



MEASUREMENT REPORT

FCC Part 15.407 UNII 802.11a/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:

6/8/2015 - 6/29/2015

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Test Report Serial No.:

0Y1506081071.A3L-R1

FCC ID:

A3LSMN920V

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model(s):

SM-N920V

EUT Type:

Portable Handset

FCC Classification:

Unlicensed National Information Infrastructure (UNII)

FCC Rule Part(s):

Part 15.407

Test Procedure(s):

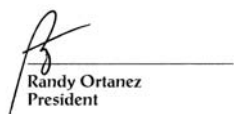
KDB 789033 D02 v01, KDB 644545 v01r02, KDB 648474 D03 v01r02,
KDB 662911 D01 v02r01

Mode	UNII Band	Channel Bandwidth (MHz)	Tx Frequency (MHz)	Conducted Power		ANT2		MIMO	
				Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)
802.11a	1	20	5180 - 5240	33.037	15.19	33.729	15.28	N/A	
	2A	20	5260 - 5320	31.915	15.04	34.119	15.33		
	2C	20	5500 - 5720	34.435	15.37	32.734	15.15		
	3	20	5745 - 5825	35.318	15.48	30.409	14.83		
802.11n	1	20	5180 - 5240	20.989	13.22	22.284	13.48	43.081	16.34
	2A	20	5260 - 5320	20.606	13.14	19.231	12.84	39.309	15.94
	2C	20	5500 - 5720	21.777	13.38	21.928	13.41	43.056	16.34
	3	20	5745 - 5825	22.080	13.44	20.606	13.14	42.686	16.30
802.11ac	1	20	5180 - 5240	20.749	13.17	21.827	13.39	42.526	16.29
	2A	20	5260 - 5320	20.606	13.14	22.284	13.48	42.788	16.31
	2C	20	5500 - 5720	22.284	13.48	21.777	13.38	42.614	16.30
	3	20	5745 - 5825	22.029	13.43	20.091	13.03	42.120	16.24
802.11n	1	40	5190 - 5230	15.922	12.02	16.866	12.27	32.605	15.13
	2A	40	5270 - 5310	16.032	12.05	15.996	12.04	32.028	15.06
	2C	40	5510 - 5710	17.701	12.48	16.634	12.21	33.297	15.22
	3	40	5755 - 5795	17.458	12.42	15.453	11.89	32.911	15.17
802.11ac	1	40	5190 - 5230	15.885	12.01	17.539	12.44	33.424	15.24
	2A	40	5270 - 5310	15.885	12.01	17.061	12.32	32.946	15.18
	2C	40	5510 - 5710	17.660	12.47	15.922	12.02	33.256	15.22
	3	40	5755 - 5795	16.181	12.09	15.922	12.02	32.066	15.06
802.11ac	1	80	5210	13.152	11.19	14.028	11.47	27.180	14.34
	2A	80	5290	13.062	11.16	13.213	11.21	26.275	14.20
	2C	80	5530 - 5690	13.932	11.44	13.305	11.24	26.874	14.29
	3	80	5775	13.213	11.21	12.218	10.87	25.431	14.05

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 789033 D02 v01 and KDB 644545 v01r02. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 0Y1506081071.A3L-R1) supersedes and replaces the previously issued test report (S/N: 0Y1506081071.A3L) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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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MEASUREMENT REPORT

FCC Part 15.407



§ 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 15.407

BASE MODEL: SM-N920V

FCC ID: A3LSMN920V

FCC CLASSIFICATION: Unlicensed National Information Infrastructure (UNII)

Test Device Serial No.: AB63F, 7CE9B, ☐ Production ☒ Pre-Production ☐ Engineering
7CF95

DATE(S) OF TEST: 6/8/2015 - 6/29/2015

TEST REPORT S/N: 0Y1506081071.A3L-R1

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'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.

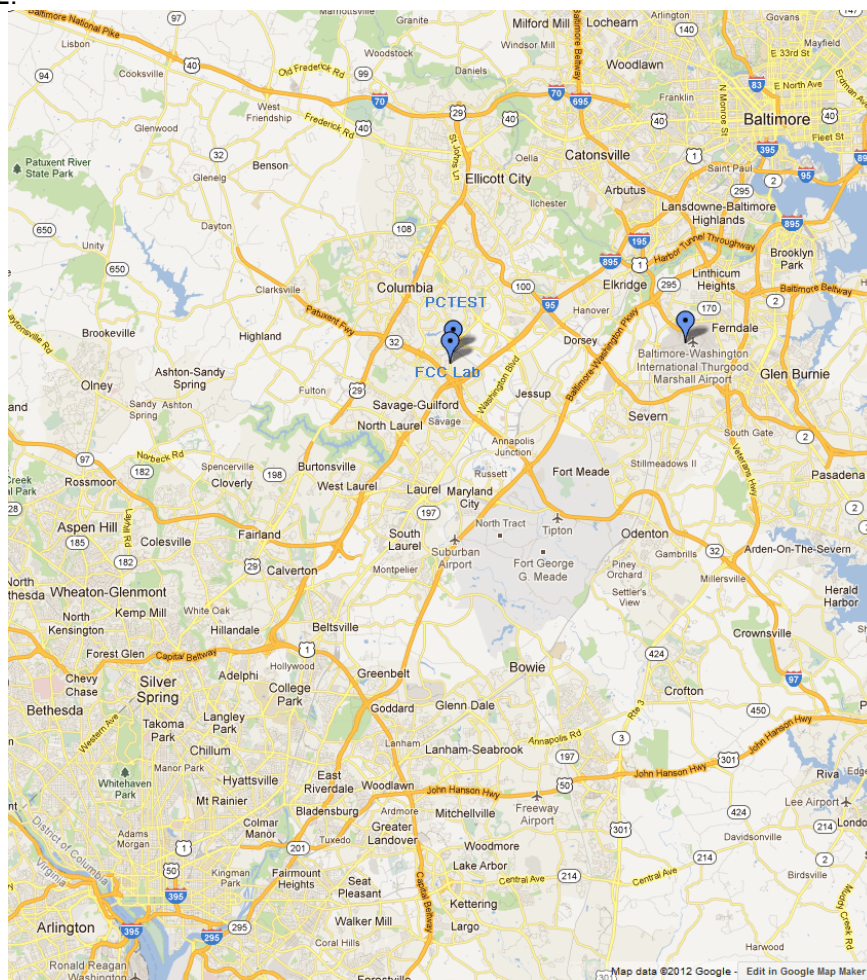


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMN920V**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), NFC, ANT+

Note: 5GHz NII operation is possible in 20MHz, and 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 B)2)b) of KDB 789033. 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:

Maximum Achievable Duty Cycles				
802.11 Mode/Band		Duty Cycle [%]		
		ANT1	ANT2	MIMO
5GHz	a	98.5	99.8	N/A
	n (HT20)	98.4	99.2	98.9
	ac (HT20)	98.3	98.8	99.3
	n (HT40)	98.1	98.1	98.8
	ac (HT40)	99.5	99.4	98.8
	ac (HT80)	98.1	99.4	96.3

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

WiFi Configurations		SISO		SDM	
		ANT1	ANT2	ANT1	ANT2
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

Data Rate(s) Tested: 6, 9, 12, 18, 24, 36, 48, 54Mbps (802.11a)
6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2 (n – 20MHz)
13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150 (n – 40MHz BW)
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 (ac – 80MHz BW)

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This device supports simultaneous transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz and 5GHz bands simultaneously on each antenna. The following tables show the worst case configurations determined during testing. The data for these configurations is contained in this test report.

Scenario A – Config-1: ANT1 transmitting in 2.4GHz mode and ANT2 in 5GHz mode

Description	2.4 GHz Tx	5 GHz Tx
Antenna	1	2
Channel	11	100
Operating Frequency(MHz)	2462	5500
Data Rate	1 Mbps	6 Mbps
Mode	802.11b	802.11a

Table 2-2. Config-1 (ANT1 2.4GHz & ANT2 5GHz)

Scenario B – Config-2: ANT1 transmitting in 5GHz mode and ANT2 in 2.4GHz mode

Description	5 GHz Tx	2.4 GHz Tx
Antenna	1	2
Channel	100	11
Operating Frequency(MHz)	5500	2462
Data Rate	6 Mbps	1 Mbps
Mode	802.11a	802.11b

Table 2-3. Config-2 (ANT1 5GHz & ANT2 2.4GHz)

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSMN920V was tested per the guidance of KDB 789033 D02 v01. 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 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 6.2, 6.3, 6.4, and 6.5 for antenna port conducted emissions test setups.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r02. Additional radiated spurious emission measurements were performed with the EUT lying flat on a certified wireless charging pad (WCP) while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

2.4 EMI Suppression Device(s)/Modifications

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

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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 789033 D02 v01 were used in the measurement of **Samsung Portable Handset FCC ID: A3LSMN920V**.

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 6.9. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

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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. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Clause 5, Figure 5.7 of ANSI C63.4-2009. 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.

3.4 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

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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 Handset are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The **Samsung Portable Handset FCC ID: A3LSMN920V** unit complies with the requirement of §15.203.

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5180	52	5260	100	5500	149	5745
:	:	:	:	:	:	:	:
42	5210	56	5280	116	5580	157	5785
:	:	:	:	:	:	:	:
48	5240	64	5320	144	5720	165	5825

Table 4-1. 802.11a / 802.11n / 802.11ac (20MHz) Frequency / Channel Operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5190	54	5270	102	5510	151	5755
:	:	:	:	:	:	:	:
46	5230	62	5310	110	5550	159	5795
				:	:		
				142	5710		

Table 4-2. 802.11n / 802.11ac (40MHz BW) Frequency / Channel Operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775
				:	:		
				138	5690		

Table 4-3. 802.11ac (80MHz BW) 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)	10/24/2014	Annual	10/24/2015	N/A
-	WL40-1	Conducted Cable Set (40GHz)	10/14/2014	Annual	10/14/2015	N/A
Agilent	8447D	Broadband Amplifier	6/12/2015	Annual	6/12/2016	2443A01900
Agilent	N9020A	MXA Signal Analyzer	10/27/2014	Annual	10/27/2015	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	3/24/2015	Annual	3/24/2016	MY52350166
Agilent	N9038A	MXE EMI Receiver	3/24/2015	Annual	3/24/2016	MY51210133
Anritsu	MA2411B	Pulse Sensor	4/8/2014	Biennial	4/8/2016	846215
Anritsu	ML2495A	Power Meter	10/31/2013	Biennial	10/31/2015	941001
Emco	6502	Active Loop Antenna (10k - 30 MHz)	6/24/2014	Biennial	6/24/2016	267
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
ETS Lindgren	3160-10	26.5-40 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	130993
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	11/11/2014	Biennial	11/11/2016	114451
Huber+Suhner	Sucoflex 102A	40GHz Radiated Cable	10/15/2014	Annual	10/15/2015	251425001
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	2
K & L	11SH10-6000/T18000	High Pass Filter	12/1/2014	Annual	12/1/2015	1
Pasternack	NMLC-1	Line Conducted Emissions Cable (NM)	10/17/2014	Annual	10/17/2015	N/A
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	3/12/2015	Annual	3/12/2016	100342
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100040
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	3/3/2015	Annual	3/3/2016	100037
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107

Table 5-1. Annual Test Equipment Calibration Schedule

Note:

For equipment listed above that has a calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

FCC ID: A3LSMN920V		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMN920V
 Method/System: Unlicensed National Information Infrastructure (UNII)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
N/A	26dB Bandwidth	N/A	CONDUCTED	PASS	Section 6.2
15.407(e)	6dB Bandwidth	>500kHz(5725-5850MHz)		PASS	Section 6.3
15.407 (a.1)	Maximum Conducted Output Power	< 250mW (23.98dBm) (5150-5250MHz) < 250mW (23.98dBm) (5250-5350MHz) < 250mW (23.98dBm) (5470-5725MHz) < 1W (30dBm) (5725-5850MHz)		PASS	Section 6.4
15.407 (a.1), (5)	Maximum Power Spectral Density	< 11 dBm/MHz (5150-5250MHz, 5250-5350MHz, 5470-5725MHz) < 30 dBm/500kHz (5725-5850MHz)		PASS	Section 6.5
15.407(g)	Frequency Stability	N/A		PASS	Section 6.6
15.407(h)	Dynamic Frequency Selection	See DFS Test Report		PASS	See DFS Test Report
15.407(b.1), (2),(3)	Undesirable Emissions	< -27 dBm/MHz EIRP (outside 5150-5350MHz, 5470-5725MHz, 5715-5860MHz) < -17 dBm/MHz EIRP (within 5715-5725MHz and 5850-5860MHz)	RADIATED	PASS	Section 6.7
15.205, 15.407(b.1), (5), (6)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS	Section 6.7, 6.8
15.407	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits	LINE CONDUCTED	PASS	Section 6.9

Table 6-1. Summary of Test Results

Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. 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 "UNII Automation," Version 3.5.

FCC ID: A3LSMN920V		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.2 26dB Bandwidth Measurement – 802.11a/n/ac

Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

The 26dB bandwidth is used to determine the conducted power limits.

Test Procedure Used

KDB 789033 D02 v01 – Section C

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 26$. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth
3. $VBW \geq 3 \times RBW$
4. Detector = Peak
5. Trace mode = max hold

Test Setup

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

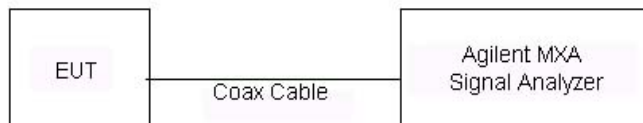


Figure 6-1. Test Instrument & Measurement Setup

Test Notes

None.

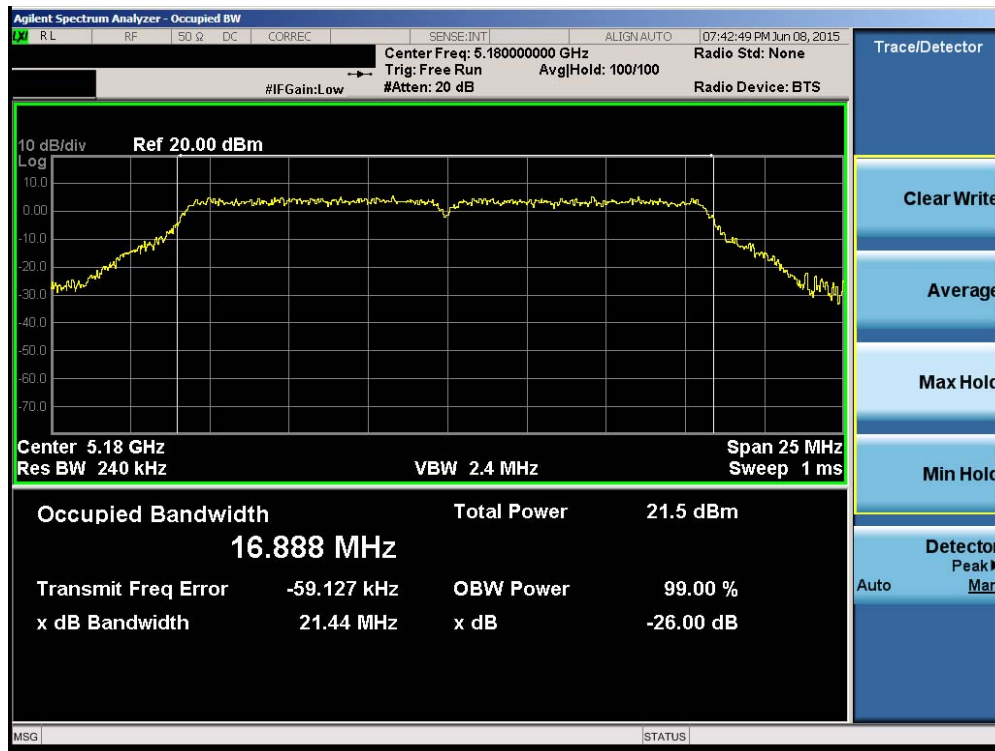
FCC ID: A3LSMN920V		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset	Page 12 of 196	

Antenna-1 26 dB Bandwidth Measurements

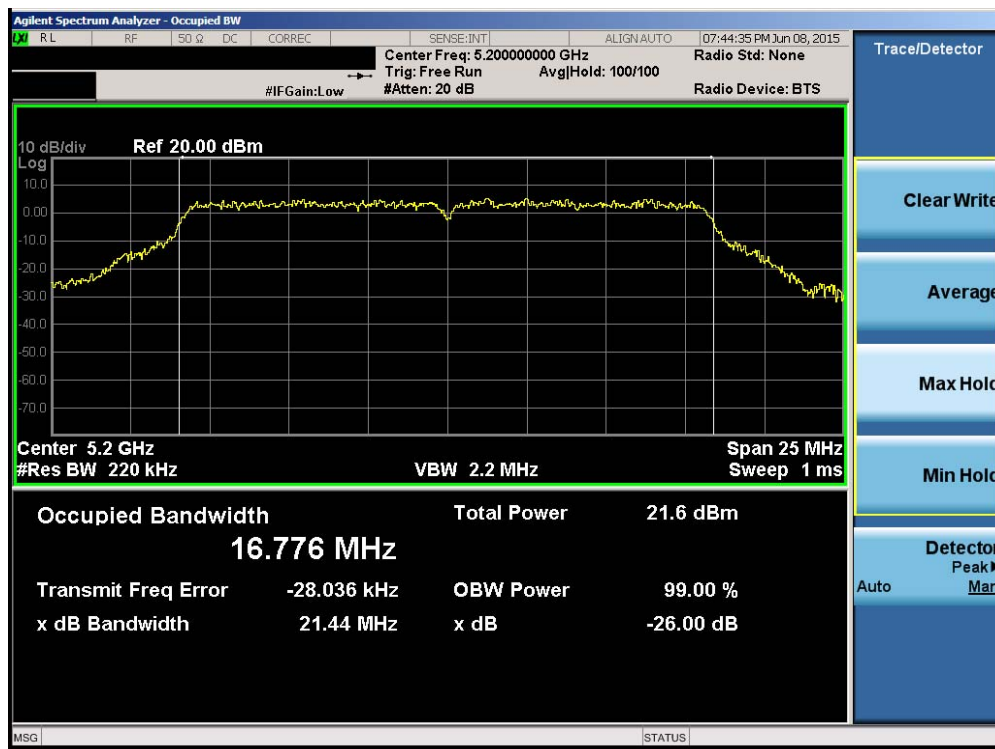
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
Band 1	5180	36	a	6	21.44
	5200	40	a	6	21.44
	5240	48	a	6	21.45
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	21.47
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	21.46
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	21.25
	5190	38	n (40MHz)	13.5/15 (MCS0)	39.72
	5230	46	n (40MHz)	13.5/15 (MCS0)	39.85
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	82.58
Band 2A	5260	52	a	6	21.54
	5280	56	a	6	21.30
	5320	64	a	6	21.38
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	21.52
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	21.42
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	21.71
	5270	54	n (40MHz)	13.5/15 (MCS0)	39.84
	5310	62	n (40MHz)	13.5/15 (MCS0)	39.89
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	81.11
Band 2C	5500	100	a	6	21.57
	5580	116	a	6	21.58
	5720	144	a	6	23.23
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	21.63
	5580	116	n (20MHz)	6.5/7.2 (MCS0)	21.65
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	21.50
	5510	102	n (40MHz)	13.5/15 (MCS0)	39.73
	5550	110	n (40MHz)	13.5/15 (MCS0)	40.15
	5710	142	n (40MHz)	13.5/15 (MCS0)	39.93
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	80.79
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	81.75

Table 6-2. Conducted Bandwidth Measurements

FCC ID: A3LSMN920V		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 6-1. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 36)

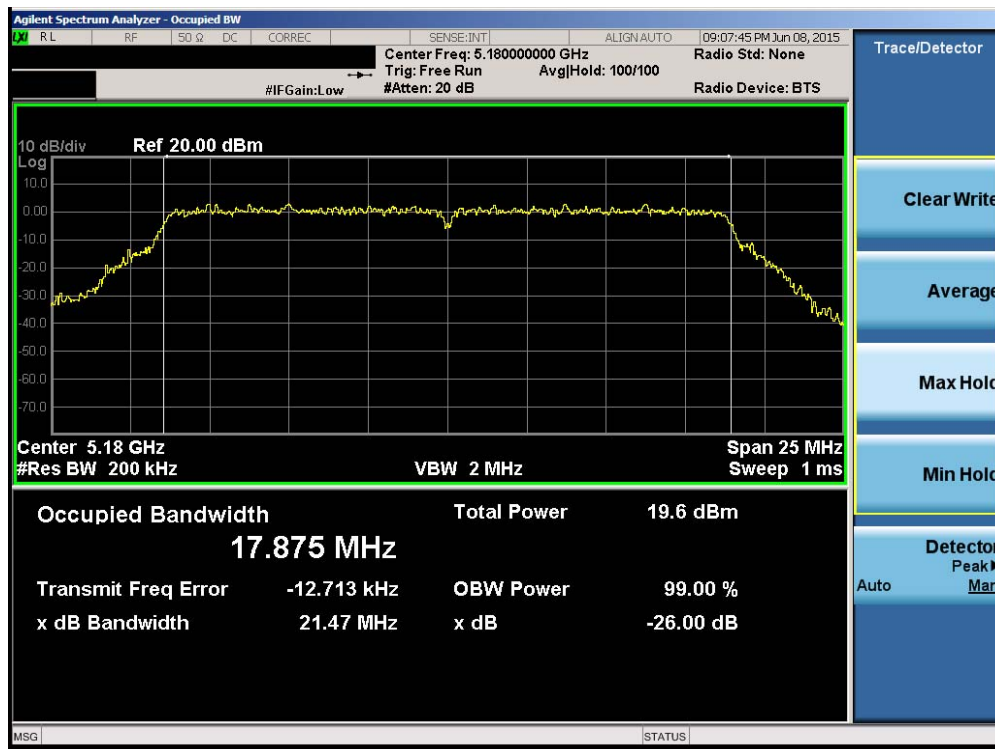


Plot 6-2. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 40)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 14 of 196

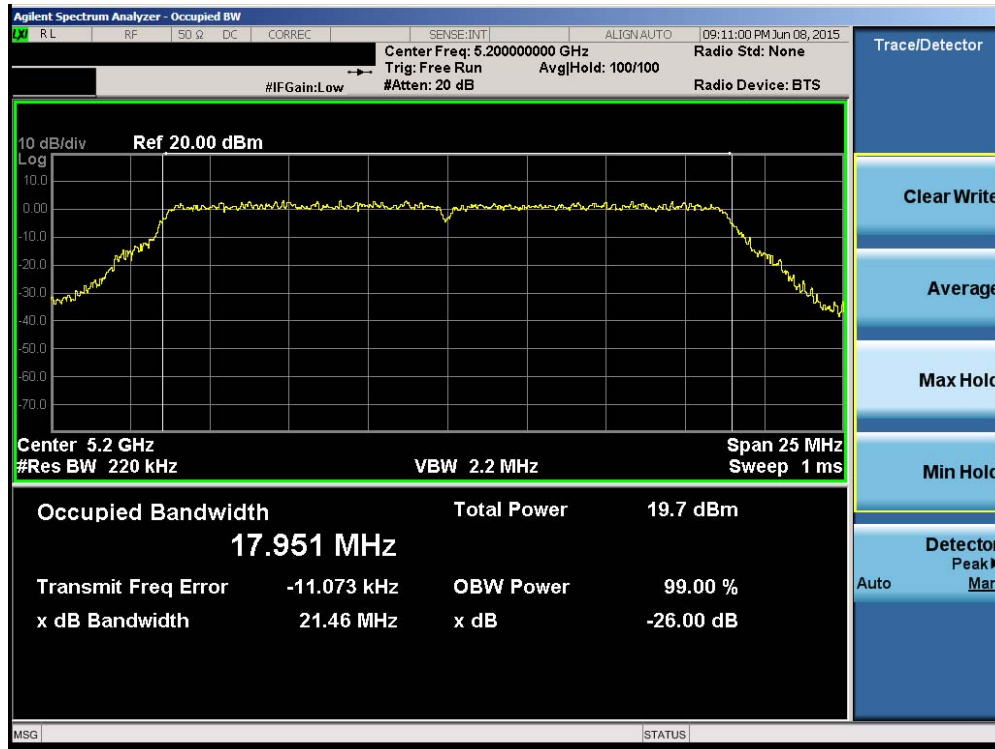


Plot 6-3. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 48)

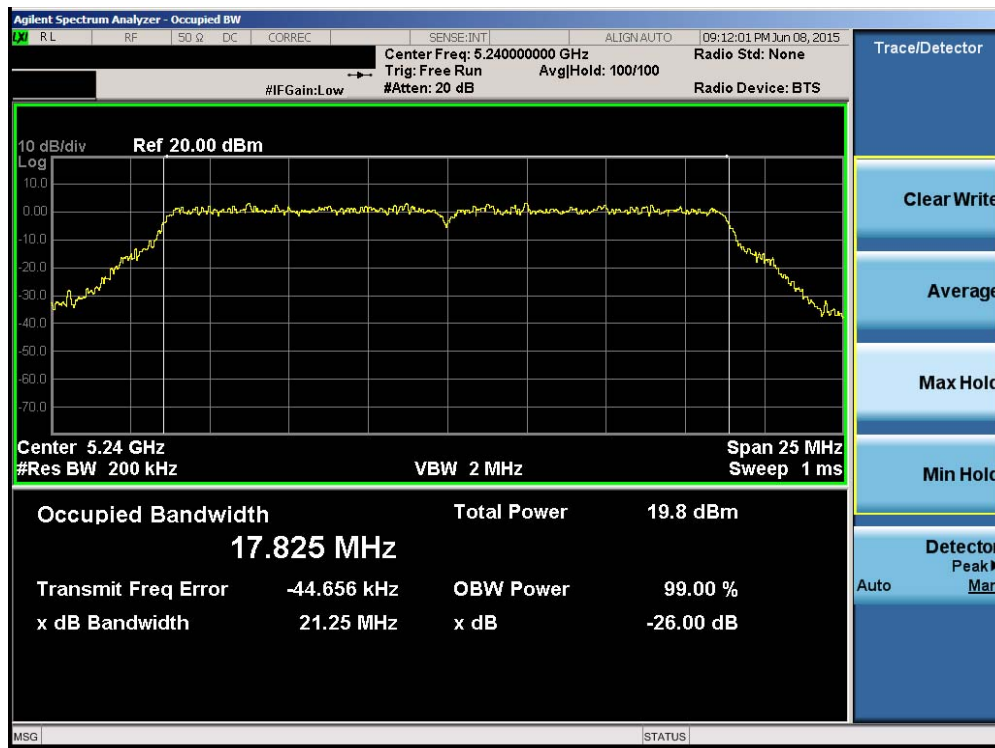


Plot 6-4. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 15 of 196

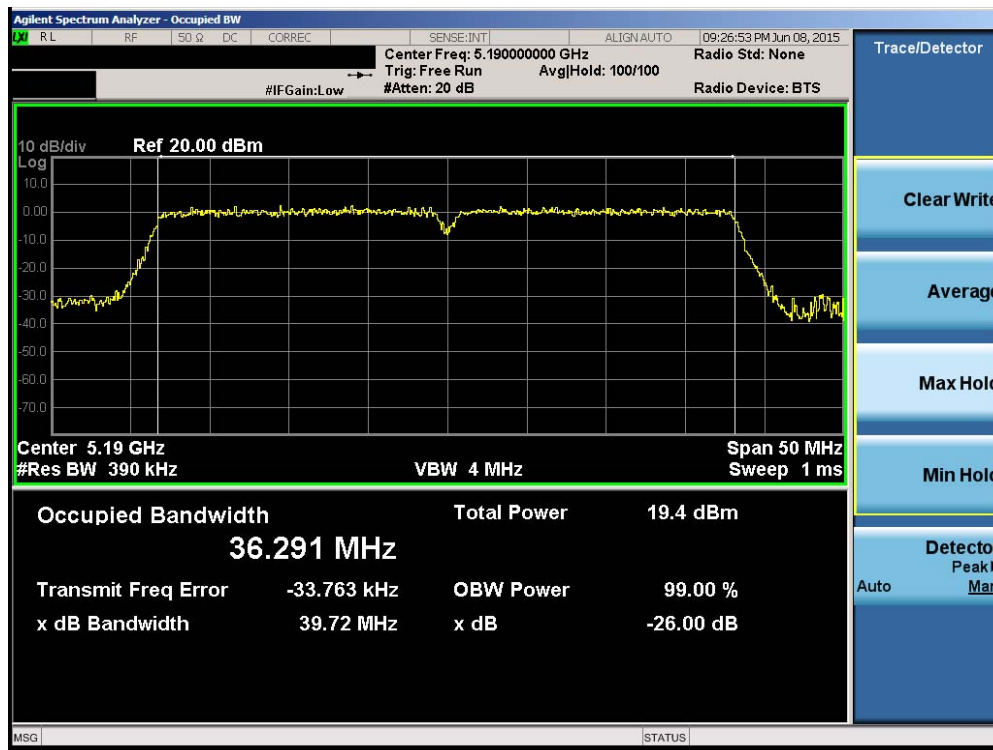


Plot 6-5. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

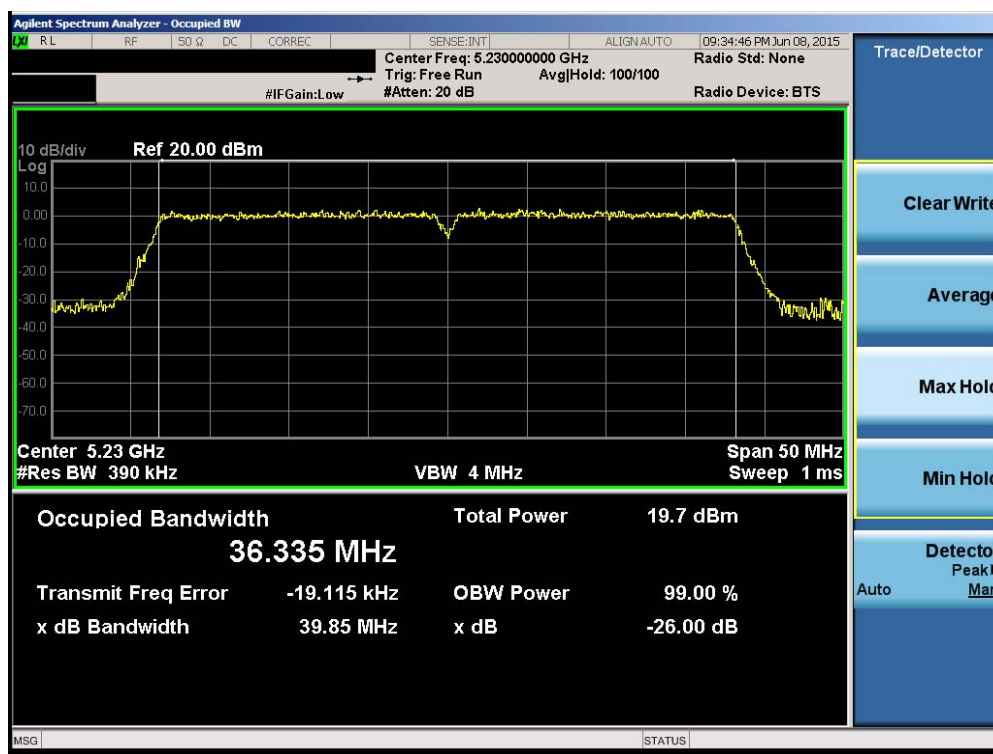


Plot 6-6. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 16 of 196

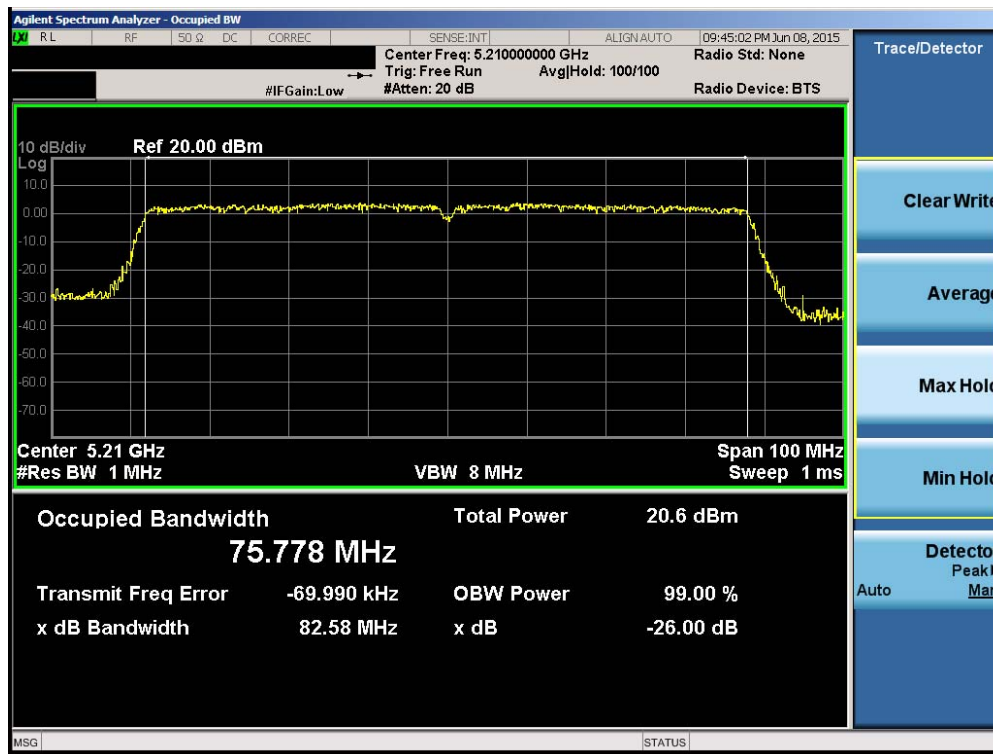


Plot 6-7. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

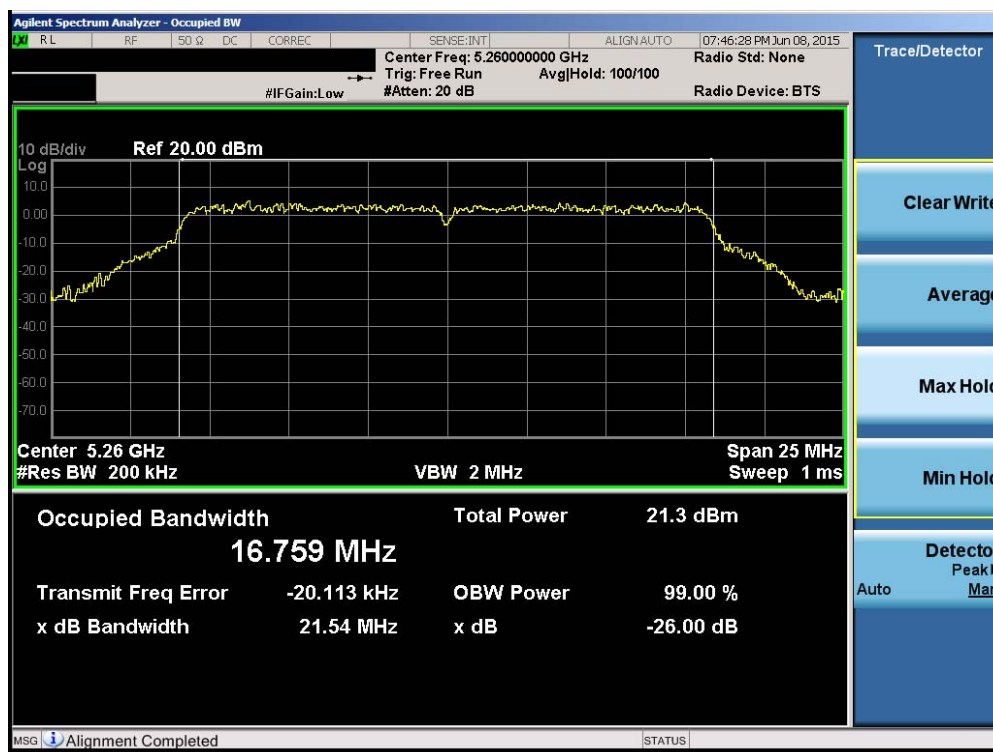


Plot 6-8. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 17 of 196

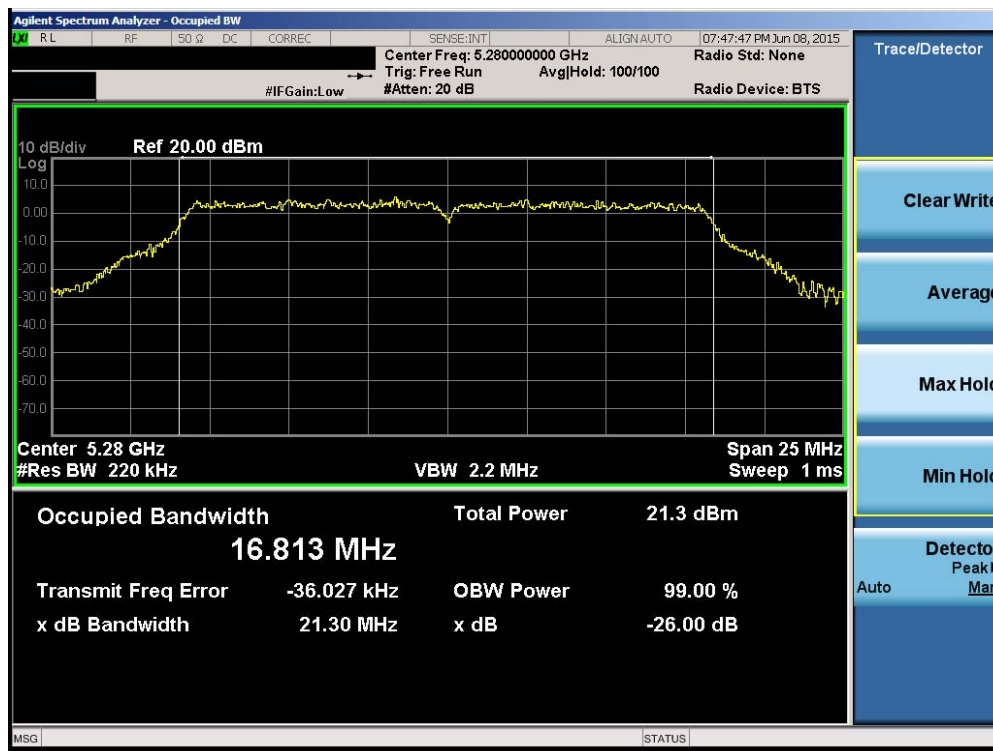


Plot 6-9. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

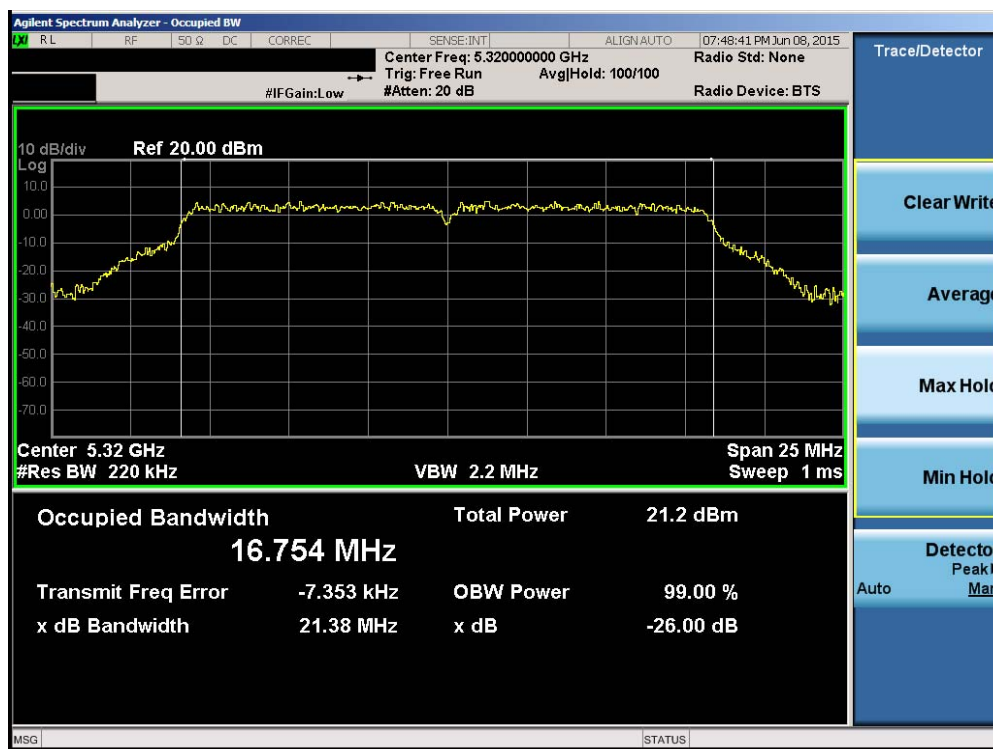


Plot 6-10. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 52)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 18 of 196

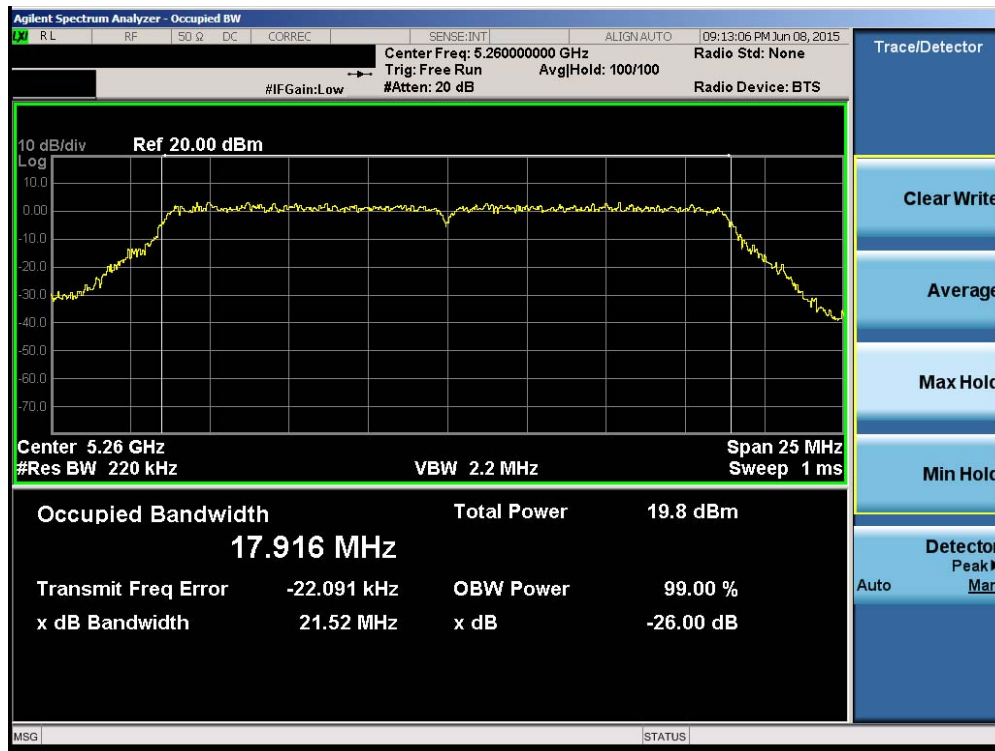


Plot 6-11. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 56)

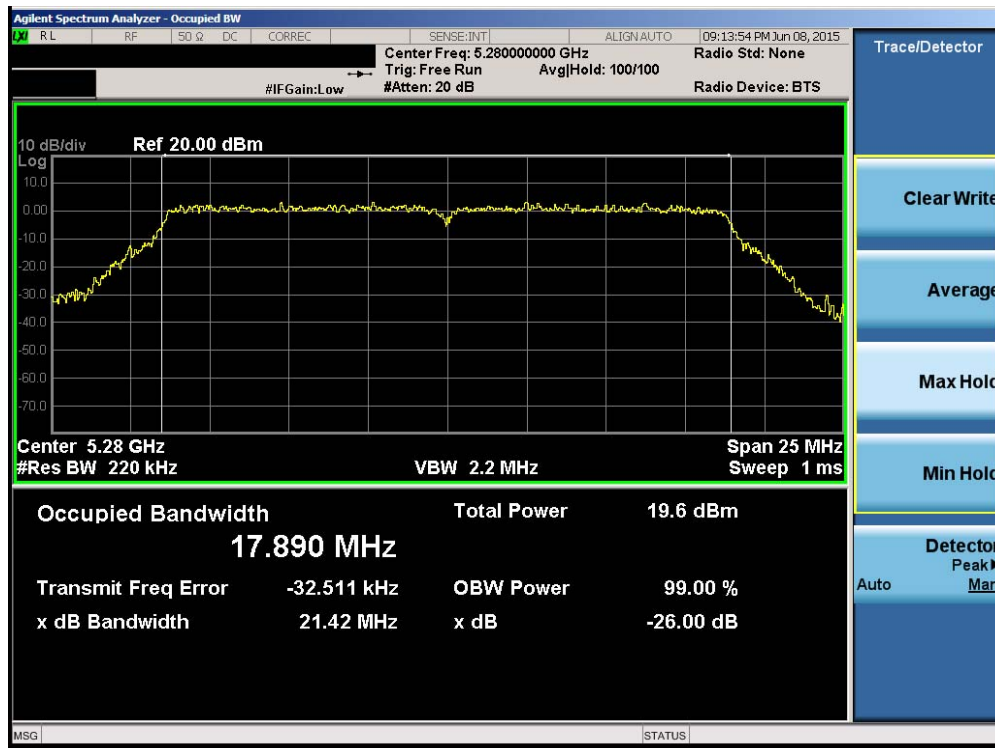


Plot 6-12. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 19 of 196

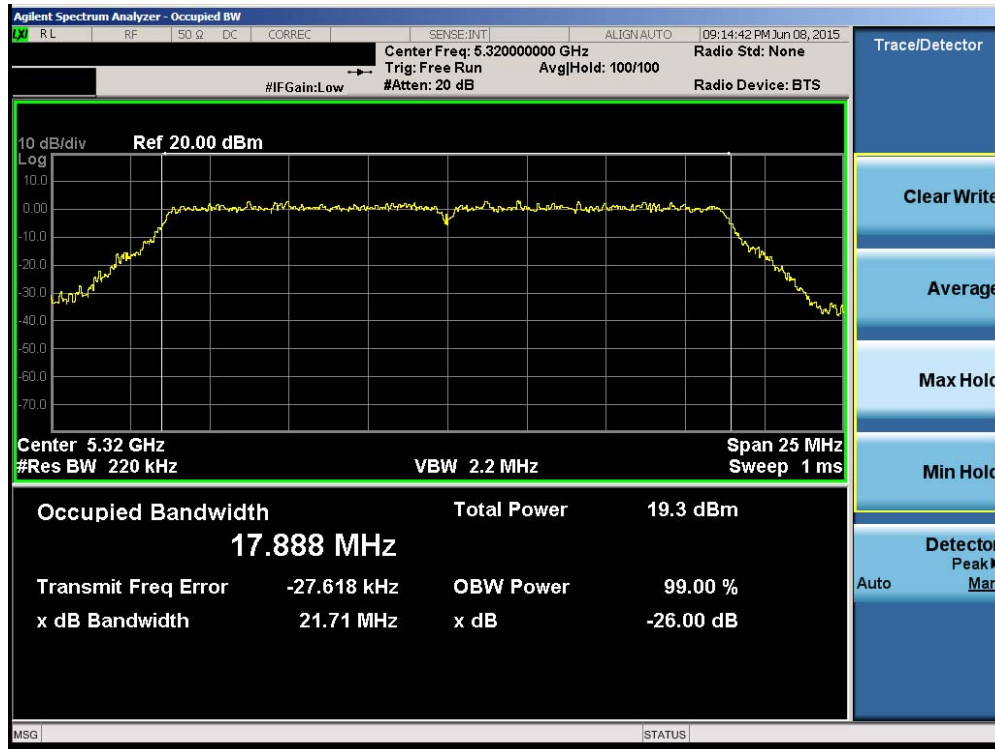


Plot 6-13. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

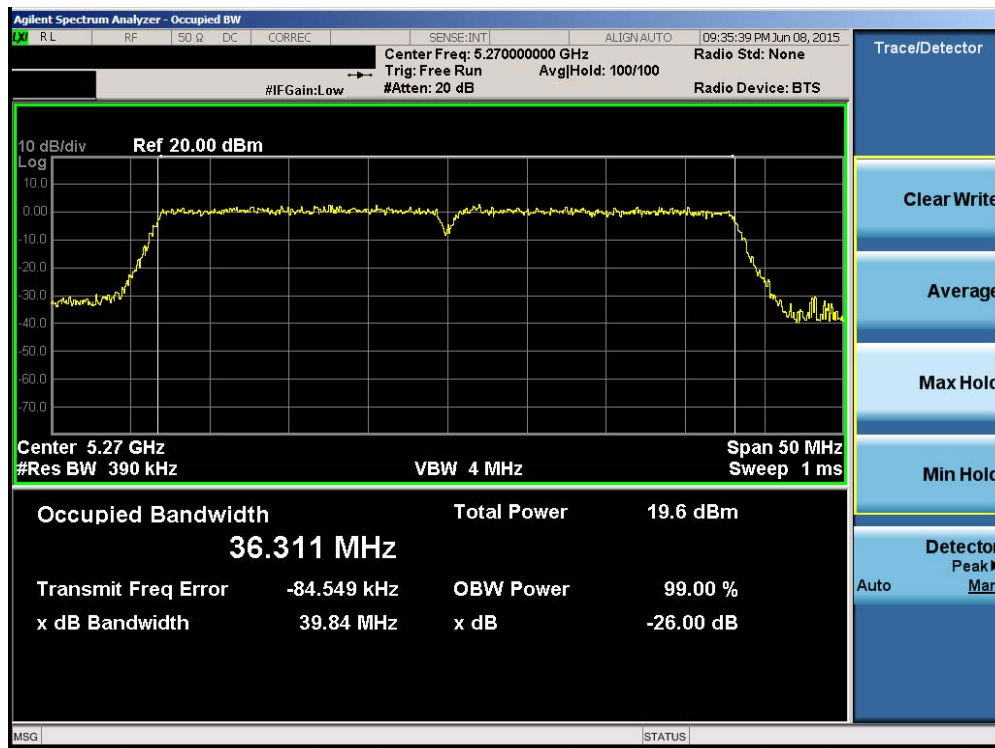


Plot 6-14. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 20 of 196

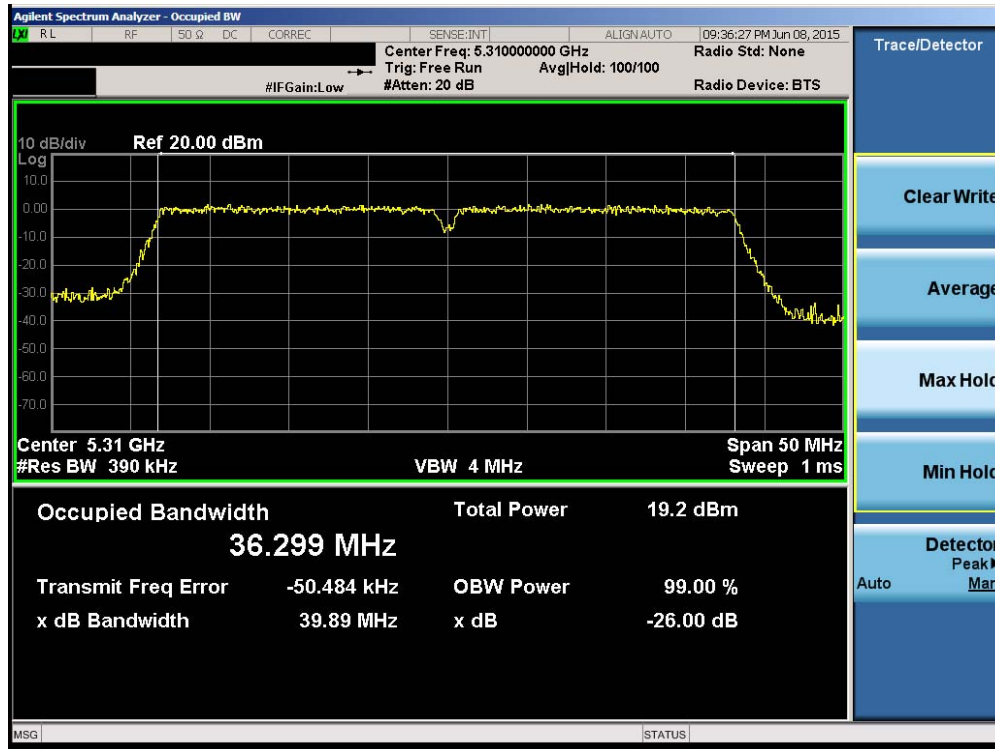


Plot 6-15. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)

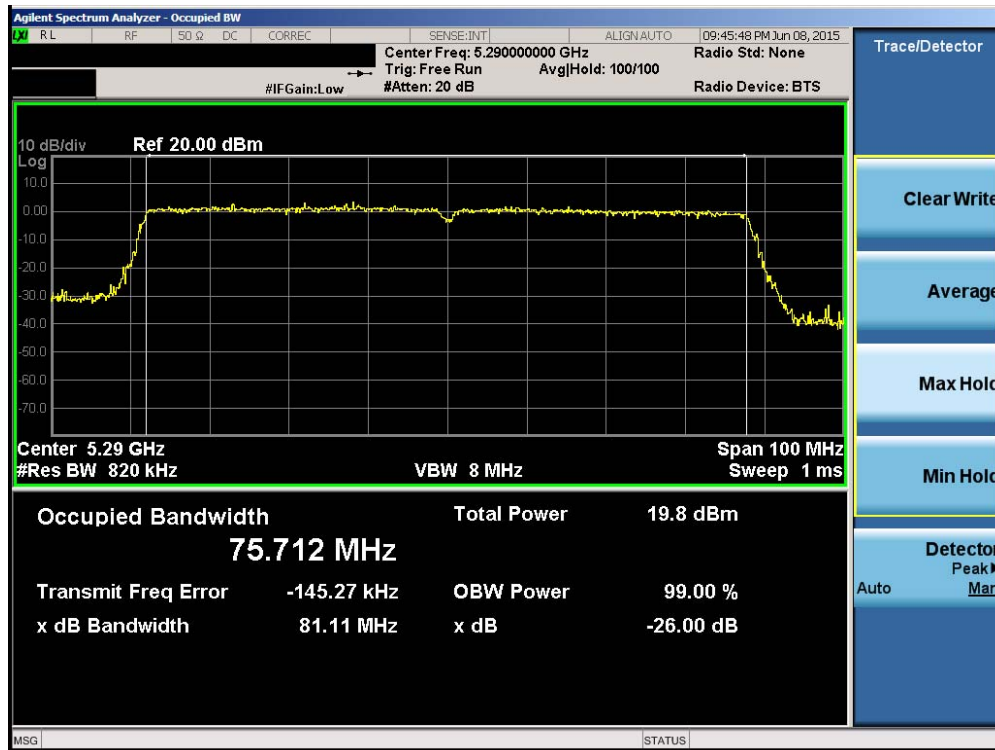


Plot 6-16. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 6-17. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

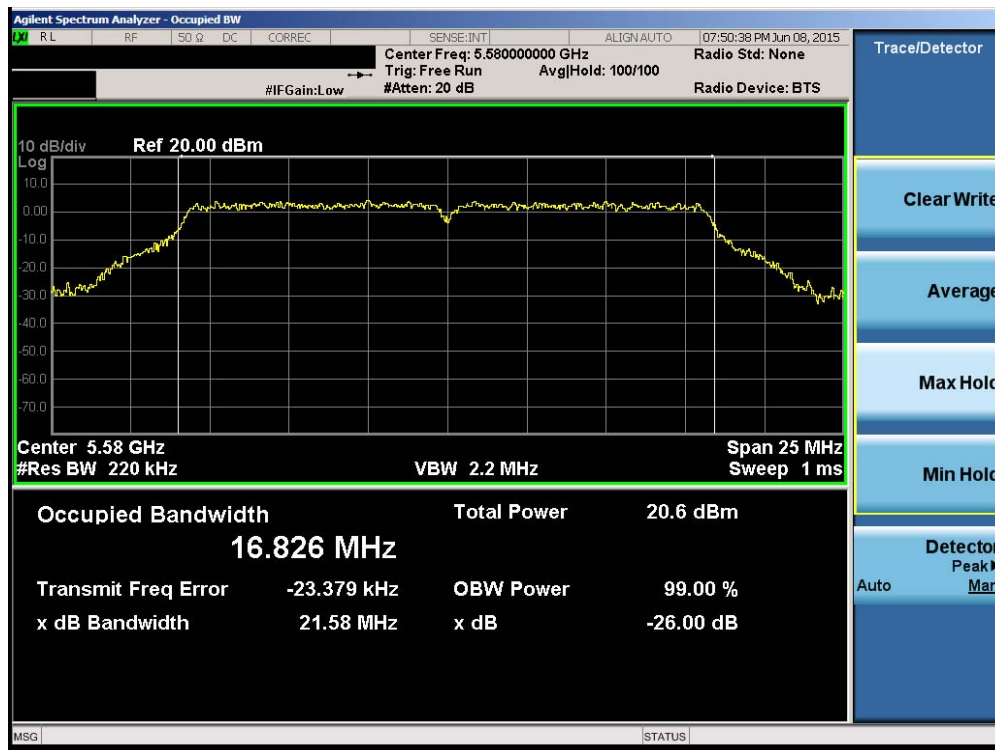


Plot 6-18. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 22 of 196



Plot 6-19. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 100)

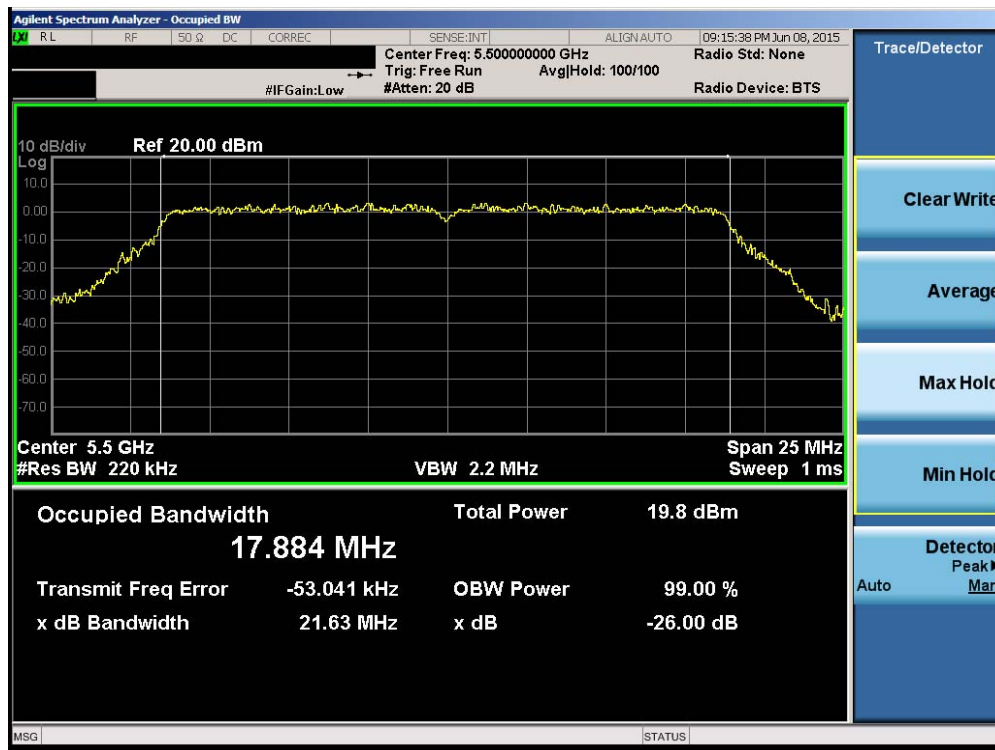


Plot 6-20. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 116)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 23 of 196



Plot 6-21. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 144)

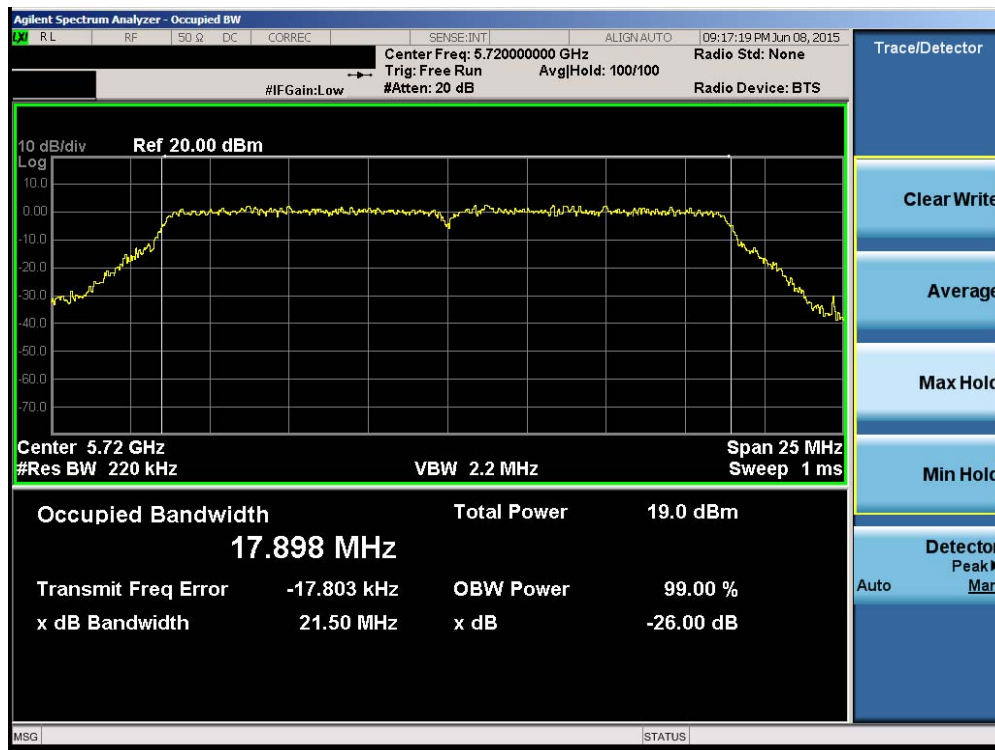


Plot 6-22. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 24 of 196

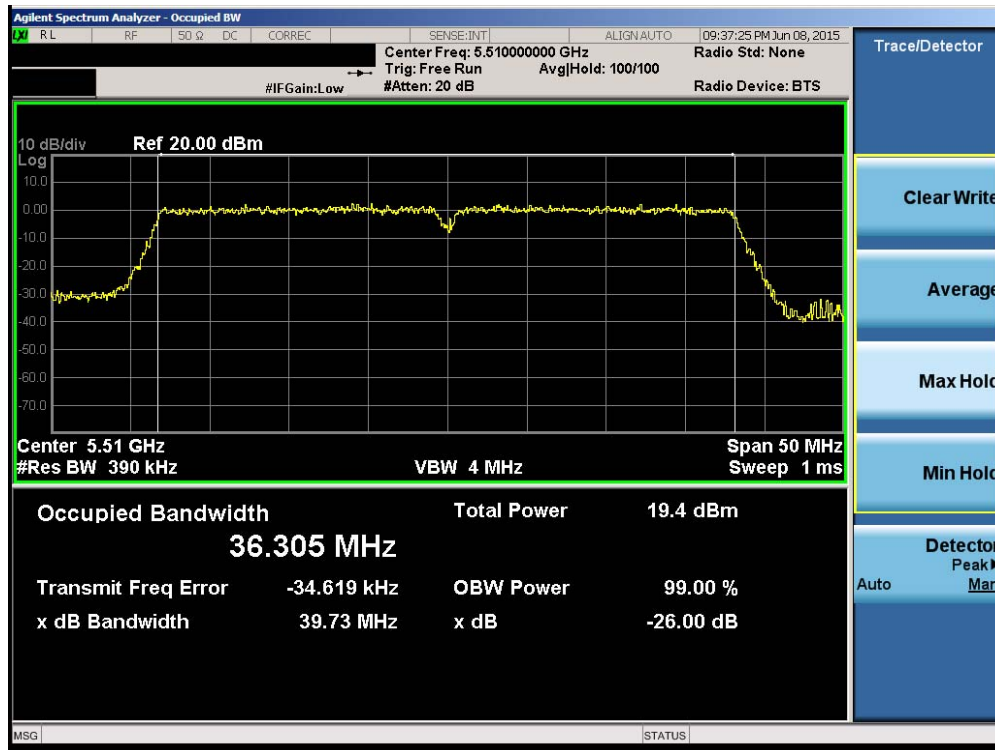


Plot 6-23. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 116)

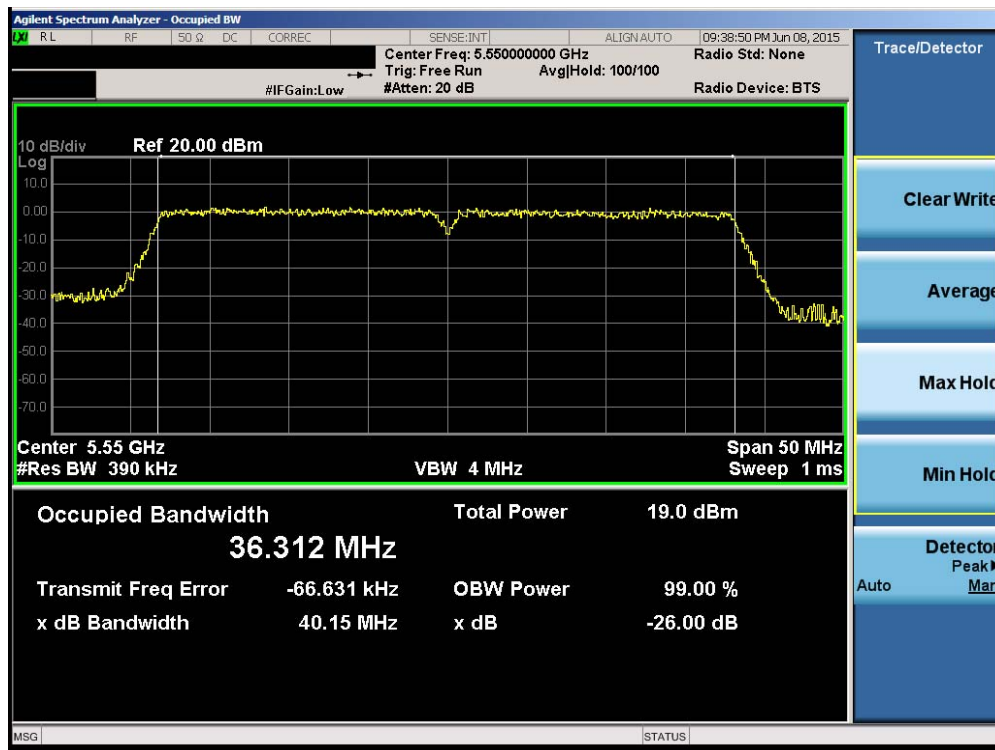


Plot 6-24. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 25 of 196

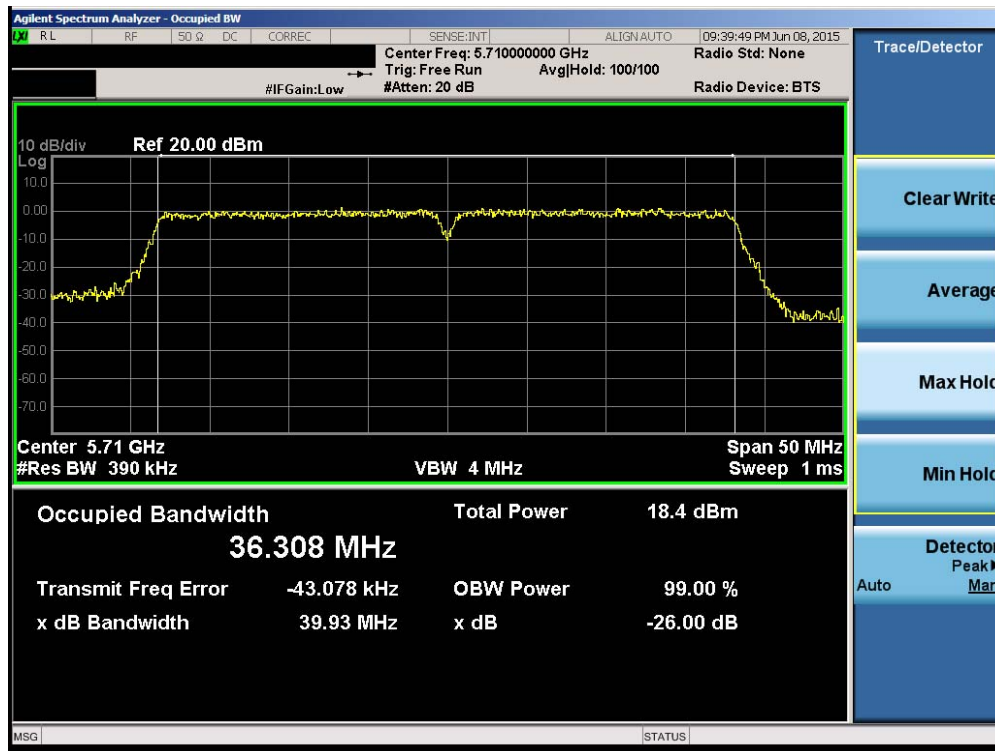


Plot 6-25. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

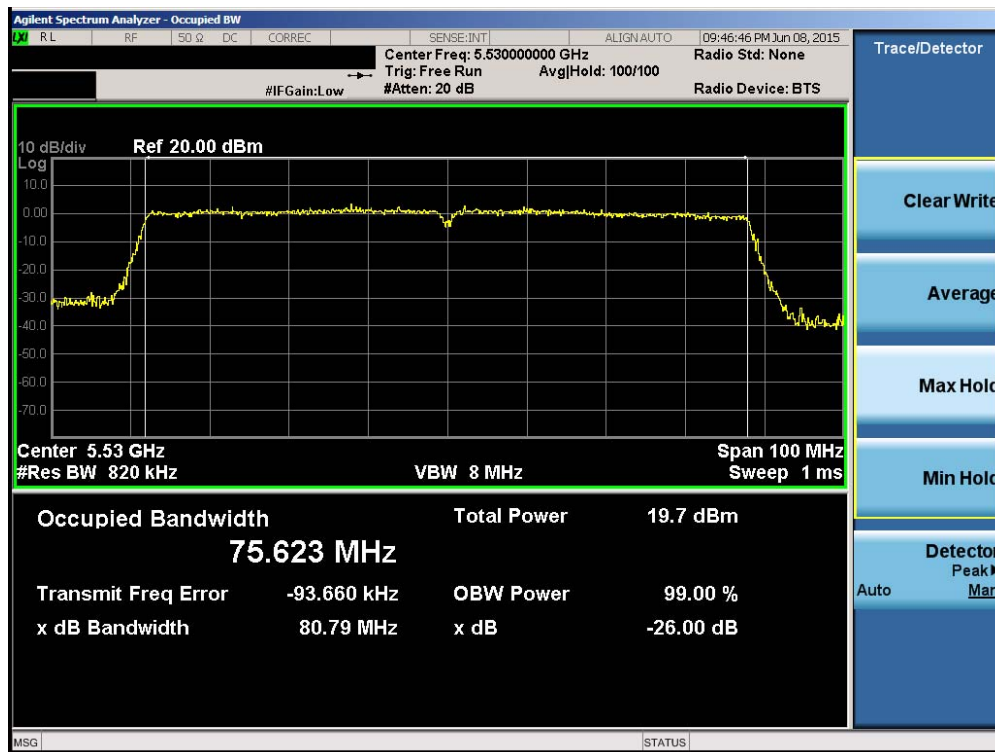


Plot 6-26. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 110)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 26 of 196

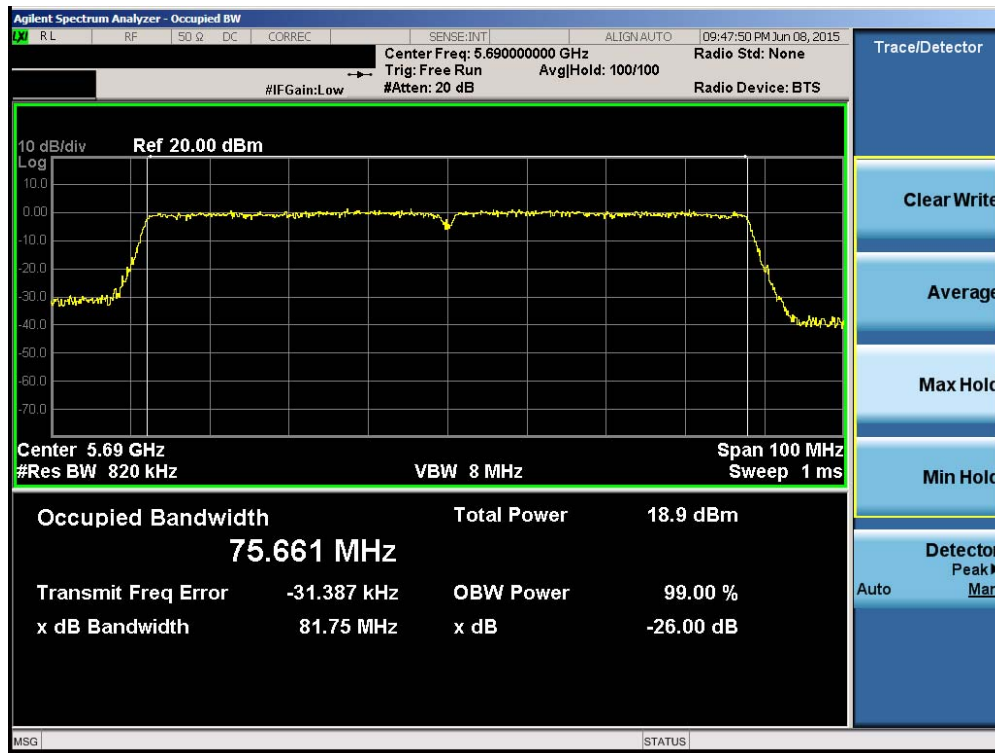


Plot 6-27. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)



Plot 6-28. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 27 of 196



Plot 6-29. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

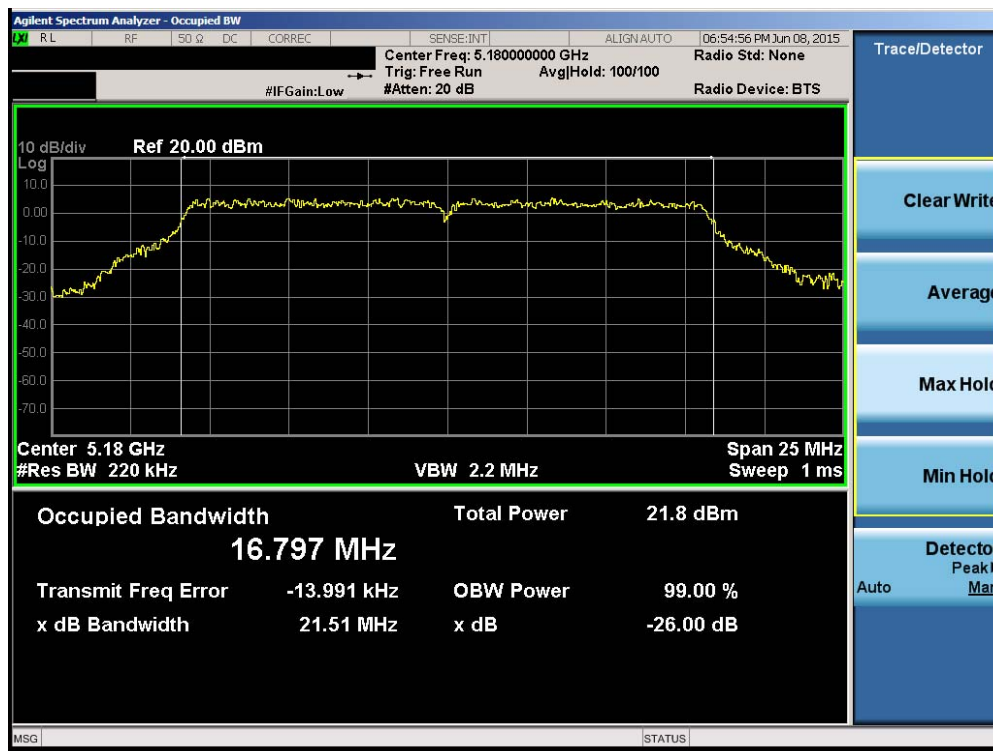
FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 28 of 196

Antenna-2 26dB Bandwidth Measurements

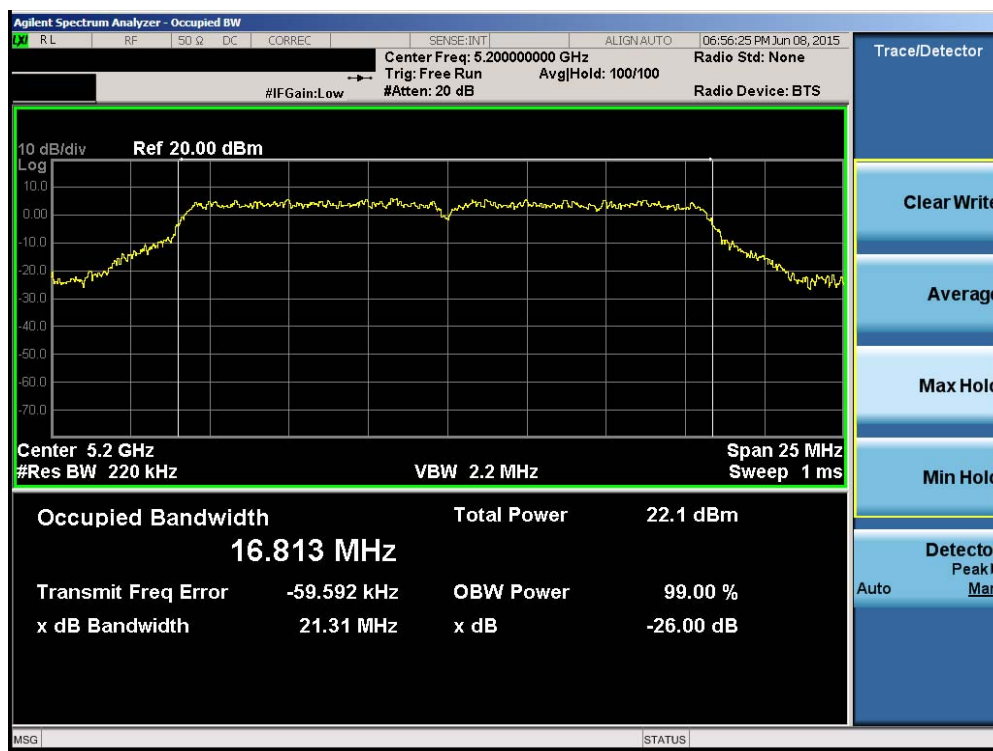
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
Band 1	5180	36	a	6	21.51
	5200	40	a	6	21.31
	5240	48	a	6	21.61
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	21.67
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	21.58
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	21.44
	5190	38	n (40MHz)	13.5/15 (MCS0)	39.96
	5230	46	n (40MHz)	13.5/15 (MCS0)	43.75
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	80.92
Band 2A	5260	52	a	6	21.45
	5280	56	a	6	21.35
	5320	64	a	6	21.54
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	21.52
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	21.63
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	21.52
	5270	54	n (40MHz)	13.5/15 (MCS0)	40.13
	5310	62	n (40MHz)	13.5/15 (MCS0)	39.90
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	81.76
Band 2C	5500	100	a	6	21.27
	5580	116	a	6	21.25
	5720	144	a	6	21.30
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	21.51
	5580	116	n (20MHz)	6.5/7.2 (MCS0)	21.63
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	21.58
	5510	102	n (40MHz)	13.5/15 (MCS0)	40.19
	5550	110	n (40MHz)	13.5/15 (MCS0)	40.08
	5710	142	n (40MHz)	13.5/15 (MCS0)	39.99
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	81.39
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	80.95

Table 6-3. Conducted Bandwidth Measurements

FCC ID: A3LSMN920V		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 29 of 196

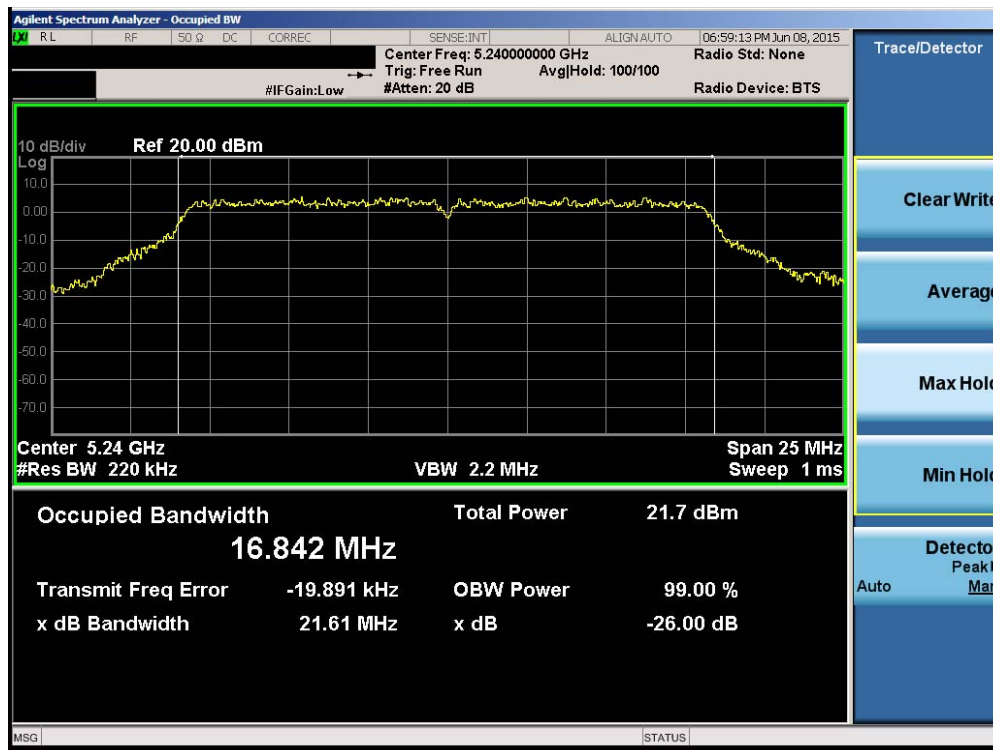


Plot 6-30. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 36)

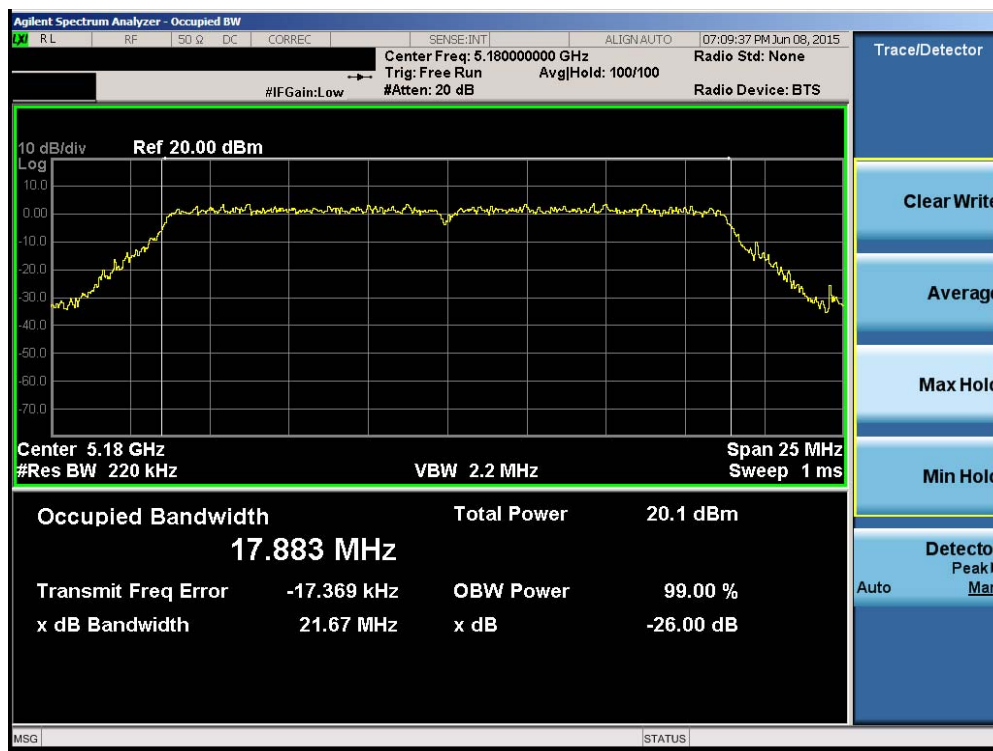


Plot 6-31. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 40)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 30 of 196

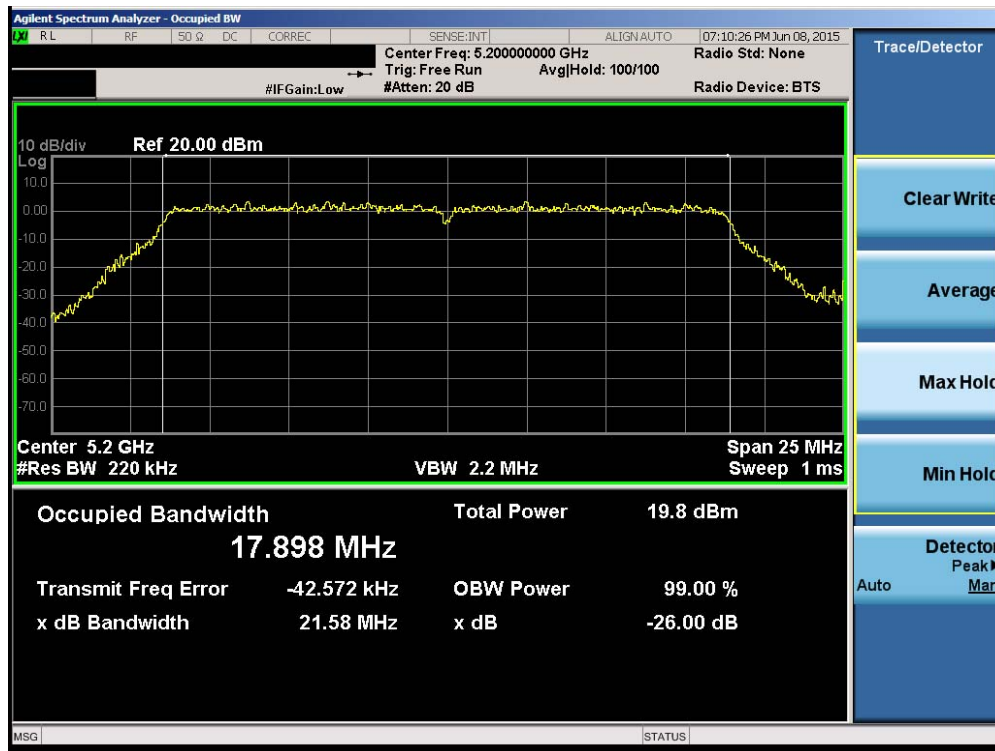


Plot 6-32. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 48)

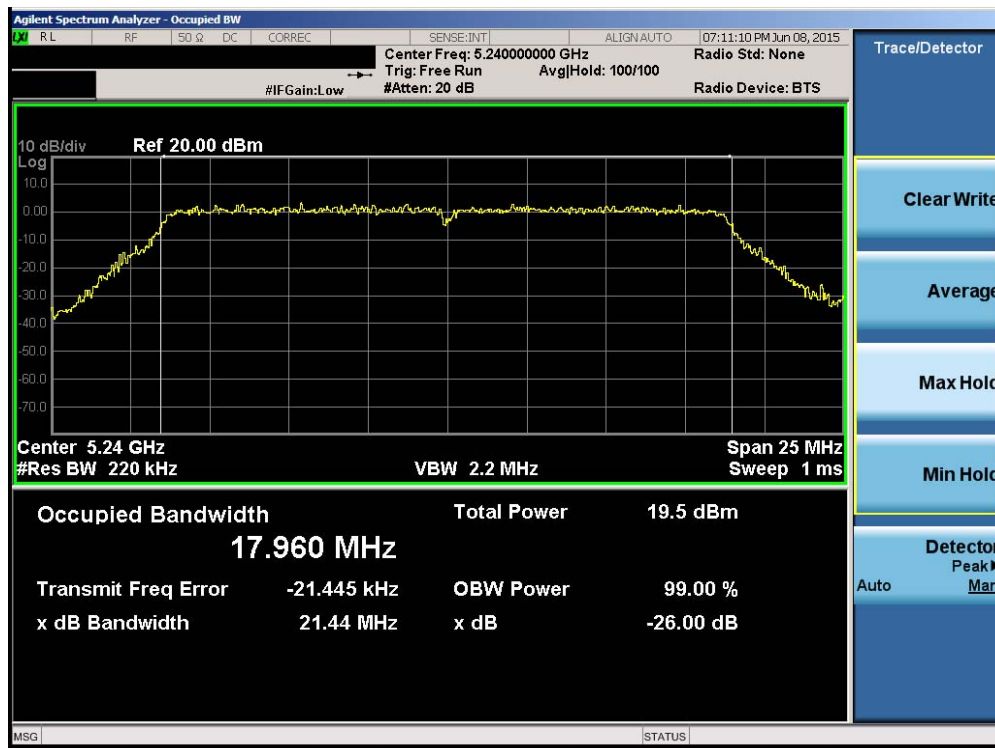


Plot 6-33. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 31 of 196

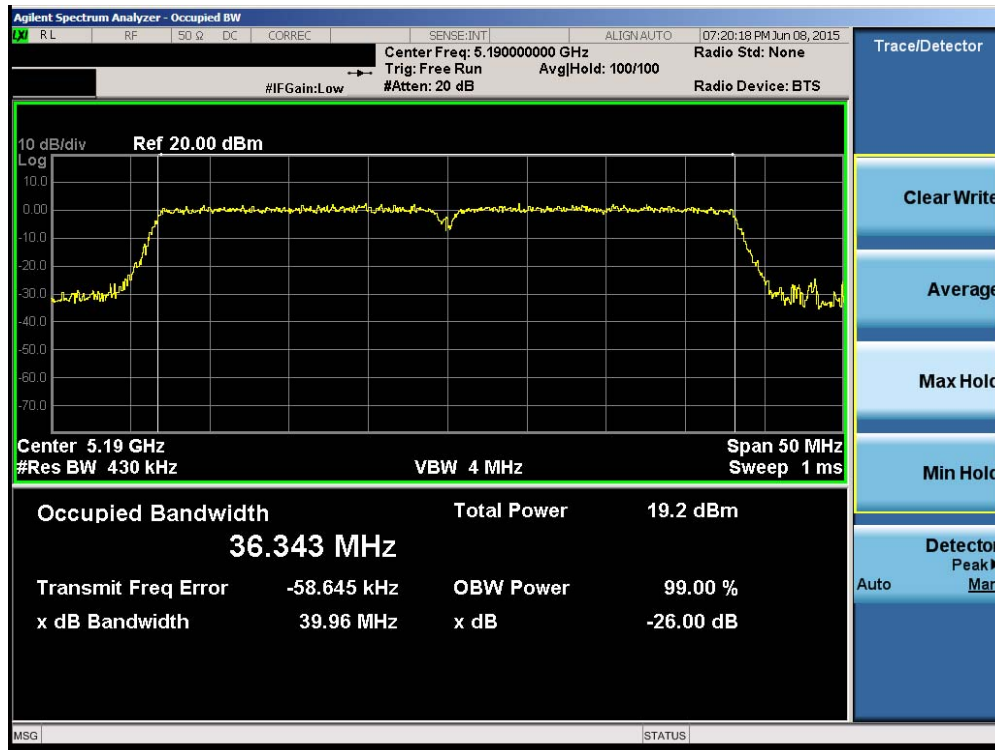


Plot 6-34. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

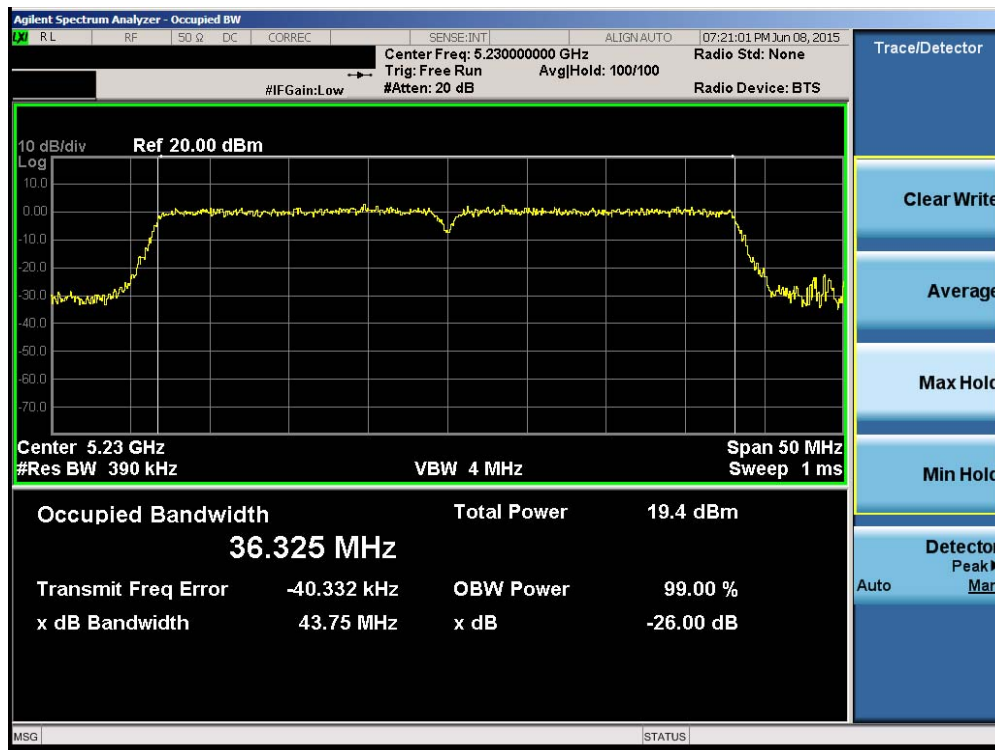


Plot 6-35. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 32 of 196

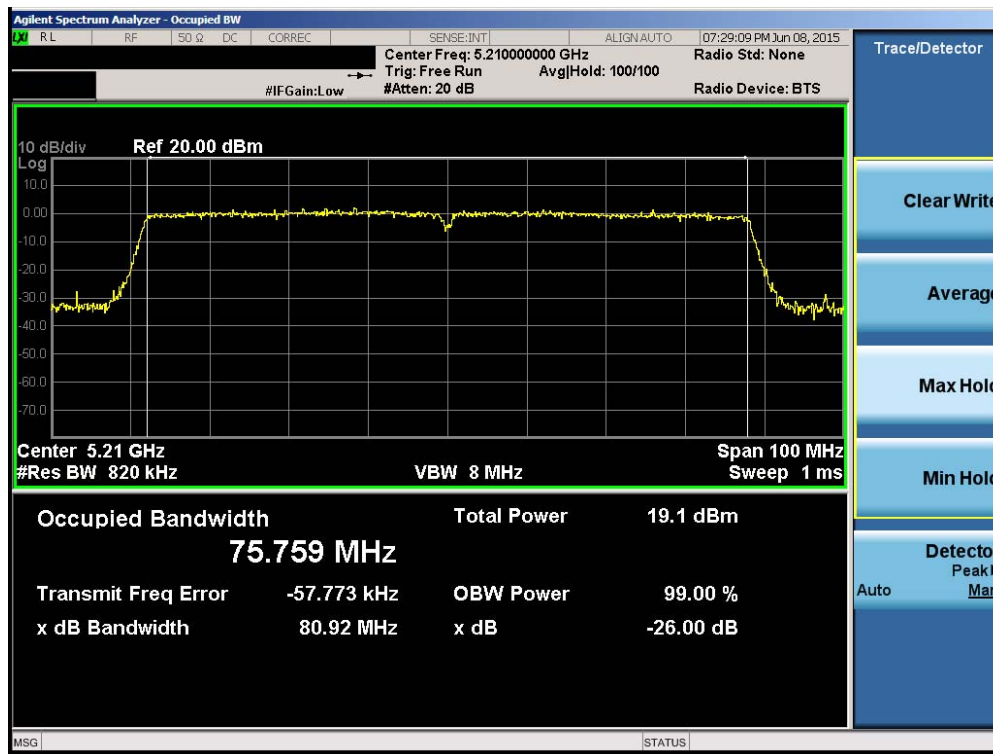


Plot 6-36. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

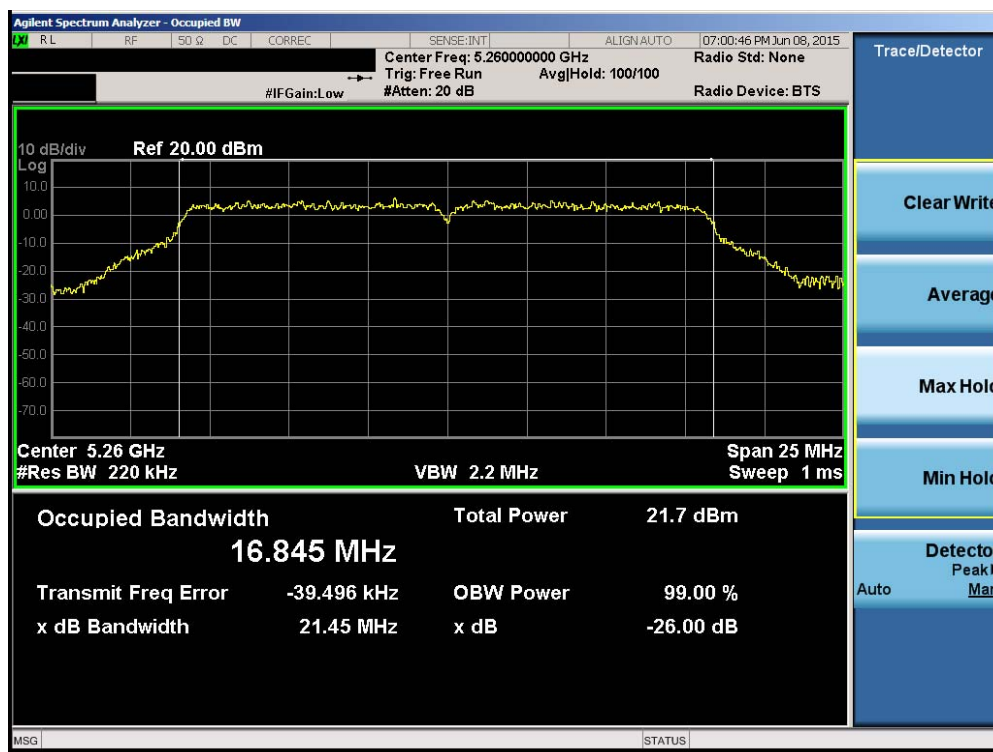


Plot 6-37. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 33 of 196



Plot 6-38. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

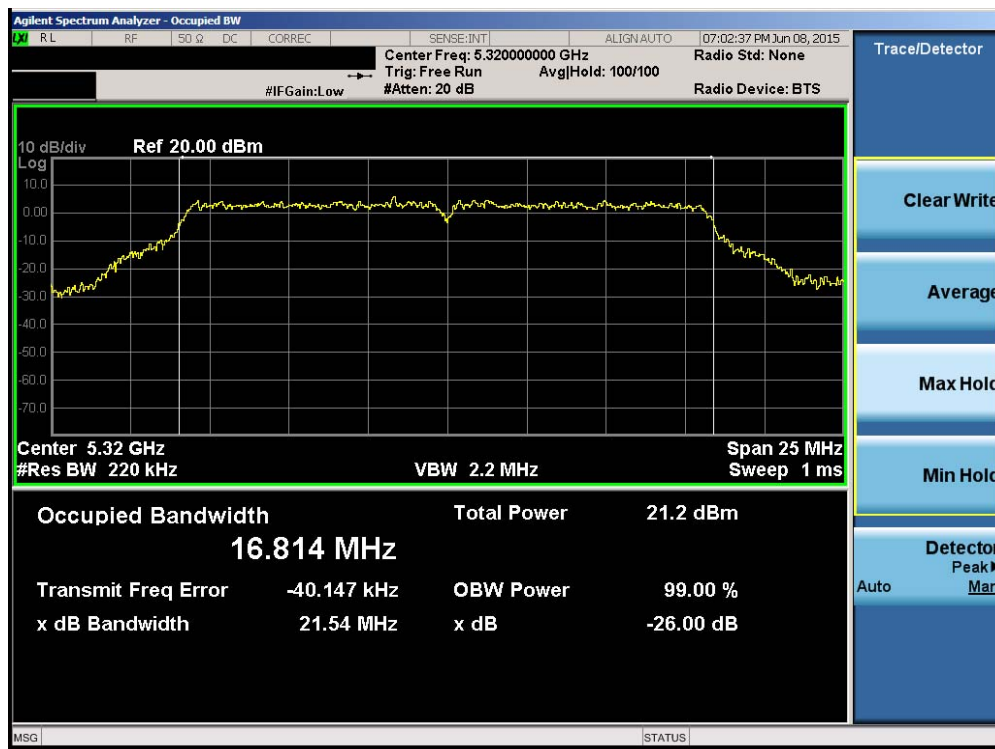


Plot 6-39. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 52)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 34 of 196



Plot 6-40. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 56)



Plot 6-41. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMN920V	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1506081071.A3L-R1	Test Dates: 6/8/2015 - 6/29/2015	EUT Type: Portable Handset		Page 35 of 196