



# PCTEST ENGINEERING LABORATORY, INC.

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## MEASUREMENT REPORT FCC PART 15.247 / IC RSS-210 WLAN 802.11a/b/g/n

**Applicant Name:**  
Samsung Electronics Co., Ltd.  
416 Maetan 3-Dong, Yeongtong-gu  
Suwon-si, Gyeonggi-do  
443-742, Republic of Korea

**Date of Testing:**  
09/13/12 - 09/24/12  
**Test Site/Location:**  
PCTEST Lab, Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1209111326.A3L

<b>FCC ID:</b>	<b>A3LSWDSCL21</b>
<b>APPLICANT:</b>	<b>Samsung Electronics Co., Ltd.</b>

**Application Type:** Certification  
**Model(s):** CDMA SCL21  
**EUT Type:** Portable Handset  
**FCC Classification:** Digital Transmission System (DTS)  
**FCC Rule Part(s):** Part 15.247  
**IC Specification(s):** RSS-210 Issue 8  
**Test Procedure(s):** ANSI C63.10-2009, KDB 558074

Mode	Tx Frequency (MHz)	Avg Conducted		Peak Conducted	
		Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)
802.11b	2412 - 2462	53.333	17.27	96.161	19.83
802.11g	2412 - 2462	26.424	14.22	128.529	21.09
802.11n	2412 - 2462	20.893	13.20	111.944	20.49
802.11a	5745 - 5825	26.730	14.27	127.350	21.05
802.11n (20MHz)	5745 - 5825	20.989	13.22	103.992	20.17
802.11n (40MHz)	5755 - 5795	18.408	12.65	89.536	19.52

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 ANSI C63.10-2009, and KDB 558074. 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.

PCTEST certifies that no party to this application has been subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 862.



Randy Ortanez  
President



<b>FCC ID:</b> A3LSWDSCL21		<b>FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
<b>Test Report S/N:</b> 0Y1209111326.A3L	<b>Test Dates:</b> 09/13/12 - 09/24/12	<b>EUT Type:</b> Portable Handset		Page 1 of 60

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# MEASUREMENT REPORT

## FCC Part 15.247



### § 2.1033 General Information

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

**APPLICANT ADDRESS:** 416 Maetan 3-Dong, Yeongtong-gu  
Suwon-si, Gyeonggi-do, 443-742 , Republic of 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:** CDMA SCL21

**FCC ID:** A3LSWDSCL21

**Test Device Serial No.:** FJ-234-C  Production  Pre-Production  Engineering  
FJ-234-D

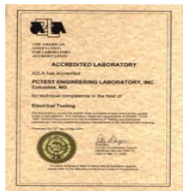
**FCC CLASSIFICATION:** Digital Transmission System (DTS)

**DATE(S) OF TEST:** 09/13/12 - 09/24/12



**TEST REPORT S/N:** 0Y1209111326.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'tl (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: A3LSWDSCL21**. 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 CDMA (BC0), 850/1900 WCDMA/HSPA, 1900 GSM/GPRS/EDGE, 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR, LE)

**Note:** 5GHz WLAN (DTS/NII) operation is possible in 20MHz and 40MHz channel bandwidths.

### 2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LSWDSCL21 was tested per the guidance of ANSI C63.10-2009 and KDB 558074. KDB 558074 was used in its entirety throughout the testing for this device. 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 2.1074 & 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(b)(2).

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 were used in the measurement of the **Samsung Portable Handset FCC ID: A3LSWDSCL21**.

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 6.10. 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 test 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 varying: the mode of operation or resolution, clock or data rate, scrolling H pattern to the EUT and/or support equipment, and changing the polarity of the receive antenna, whichever produced the worst-case emissions. To record the final measurements, the analyzer detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 120kHz for frequencies below 1GHz or 1MHz for frequencies above 1GHz. For average measurements above 1GHz, measurement procedure "RBAVG1" in Section 5.4.2.2.2.1 of KDB 558074 was used.

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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: A3LSWDSCL21** 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	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**

## 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)	7/10/2012	Annual	7/10/2013	N/A
-	WL25-1	Conducted Cable Set (25GHz)	2/13/2012	Annual	2/13/2013	N/A
-	40G-1R	40GHz Radiated Cable Set	2/23/2012	Annual	2/23/2013	N/A
-	WL40-1	Conducted Cable Set (40GHz)	2/24/2012	Annual	2/24/2013	N/A
Agilent	8447D	Broadband Amplifier	5/8/2012	Annual	5/8/2013	2443A01900
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	2/15/2012	Annual	2/15/2013	US42510244
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	5/10/2012	Annual	5/10/2013	121034
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Biennial	7/22/2013	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
Mini-Circuits	VHF-8400+	3.4GHz - 9.9GHz High Pass Filter	2/28/2012	Annual	2/28/2013	31048
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	6/26/2012	Annual	6/26/2013	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	5/30/2012	Annual	5/30/2013	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	12/15/2011	Annual	12/15/2012	100342
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	6/6/2012	Annual	6/6/2013	100037
Solar Electronics	8012-50-R-24-BNC	LISN	6/23/2011	Biennial	6/23/2013	310233
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> A3LSWDSCL21		<b>FCC Pt. 15.247 802.11a/b/g/n 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: A3LSWDSC21  
 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)  
6.5/7.2Mbps, 13/14.4Mbps, 19.5/21.7Mbps, 26/28.9Mbps, 39/43.3Mbps,  
52/57.8Mbps, 58.5/65Mbps, 65/72.2Mbps (n – 20MHz)  
13.5/15Mbps, 27/30Mbps, 40.5/45Mbps, 54/60Mbps, 81/90Mbps, 108/120Mbps,  
121.5/135Mbps, 135/150Mbps (n – 40MHz)

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	Sections 6.3, 6.4
15.247(e)	RSS-210 [A8.2]	Transmitter Power Spectral Density	< 8dBm / 3kHz Band		PASS	Section 6.5
15.247(d)	RSS-210 [A8.5]	Band Edge / Out-of-Band Emissions	Conducted ≥ 30dBc		PASS	Sections 6.6, 6.7
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 6.8, 6.9
15.207	RSS-Gen [7.2.2]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits	LINE CONDUCTED	PASS	Section 6.10
<b>RECEIVER MODE (RX) / DIGITAL EMISSIONS</b>						
15.107	RSS-Gen [7.2.2]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.107 limits	LINE CONDUCTED	PASS	Part 15B Test Report
15.109	RSS-Gen [7.2.3.2]	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.109 limits	RADIATED (30MHz-1GHz) (1-25 GHz)	PASS	Part 15B Test Report

**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.

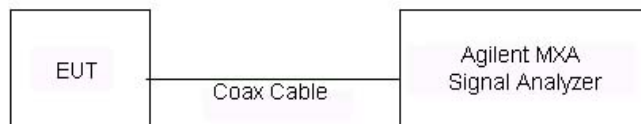
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## 6.2 6dB Bandwidth Measurement – 802.11a/b/g/n §15.247(a)(2); RSS-210 [A8.2]



The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies. **The minimum permissible 6dB bandwidth is 500 kHz.**

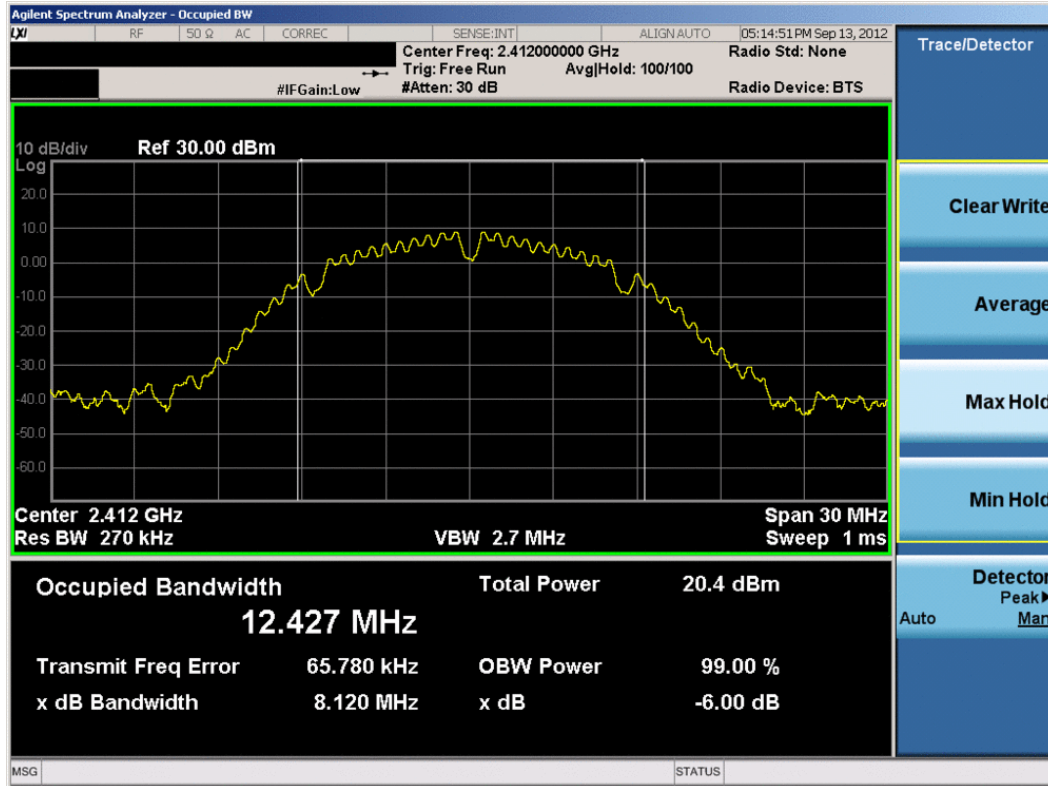
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2412	1	b	1	8.120	0.500	Pass
2437	6	b	1	8.124	0.500	Pass
2462	11	b	1	8.122	0.500	Pass
2412	1	g	6	15.97	0.500	Pass
2437	6	g	6	16.12	0.500	Pass
2462	11	g	6	15.99	0.500	Pass
2412	1	n	6.5/7.2 (MCS0)	17.51	0.500	Pass
2437	6	n	6.5/7.2 (MCS0)	17.31	0.500	Pass
2462	11	n	6.5/7.2 (MCS0)	17.42	0.500	Pass
5745	149	a	6	16.71	0.500	Pass
5785	157	a	6	16.82	0.500	Pass
5825	165	a	6	16.79	0.500	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.89	0.500	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.74	0.500	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.93	0.500	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	35.56	0.500	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	35.90	0.500	Pass

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

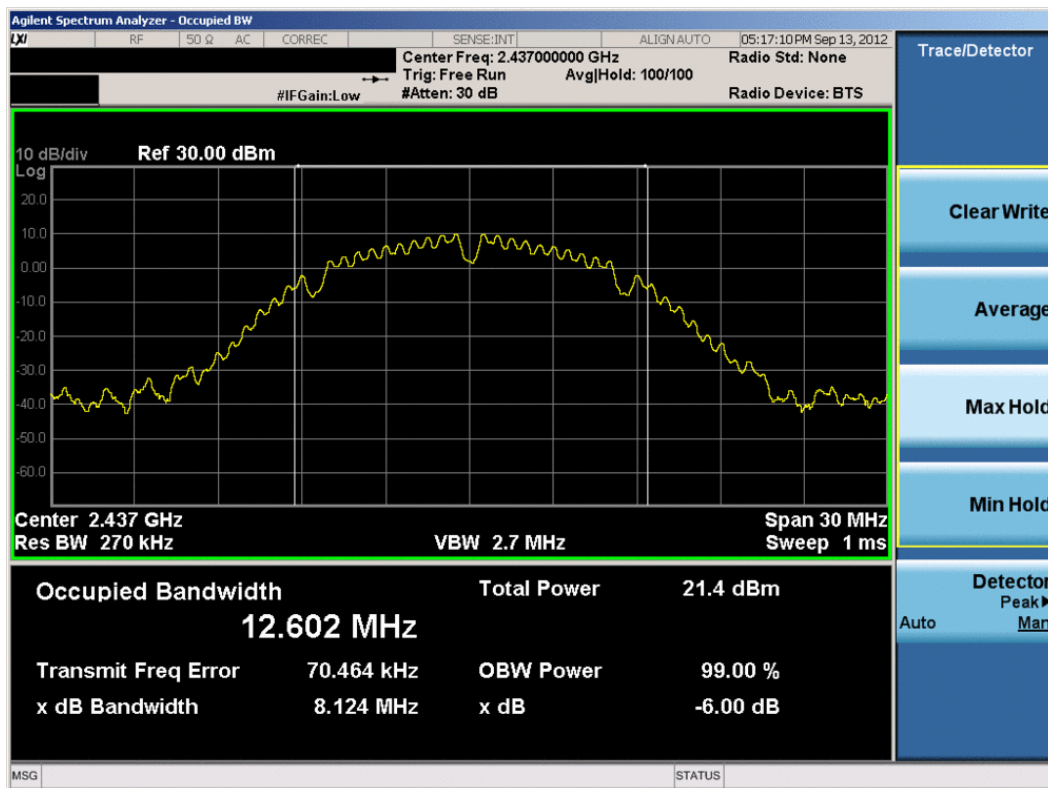


**Figure 6-1. Test Instrument & Measurement Setup**

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset	Page 11 of 60	

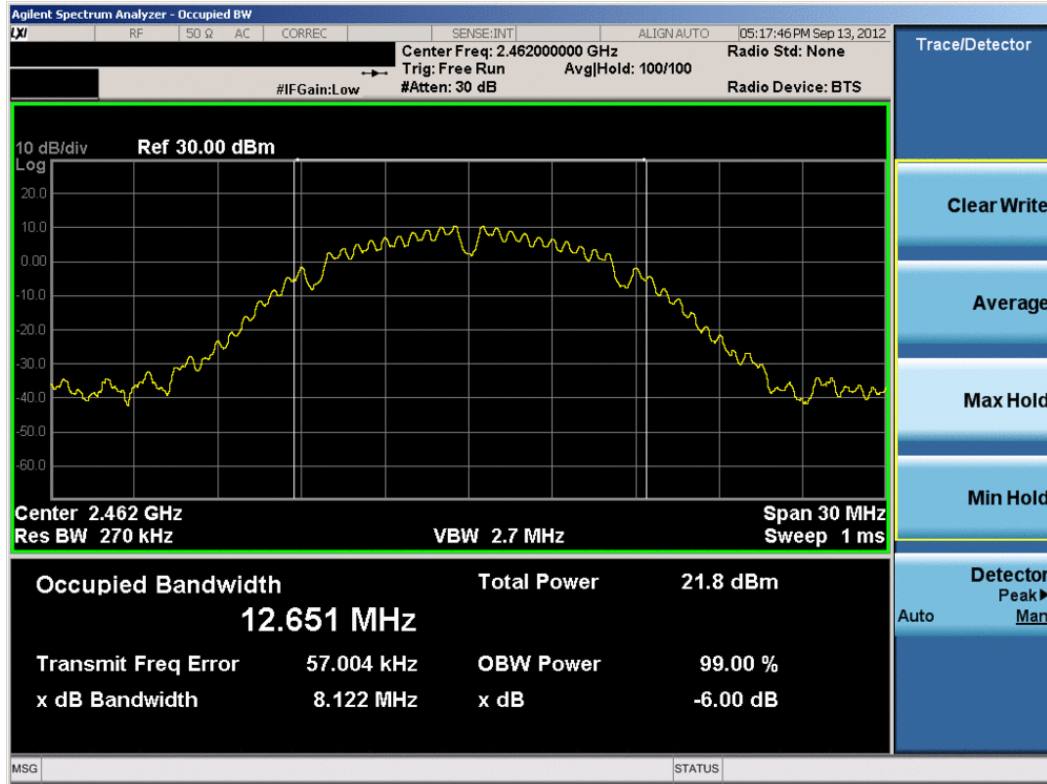


Plot 6-1. 6dB Bandwidth Plot (802.11b – Ch. 1)

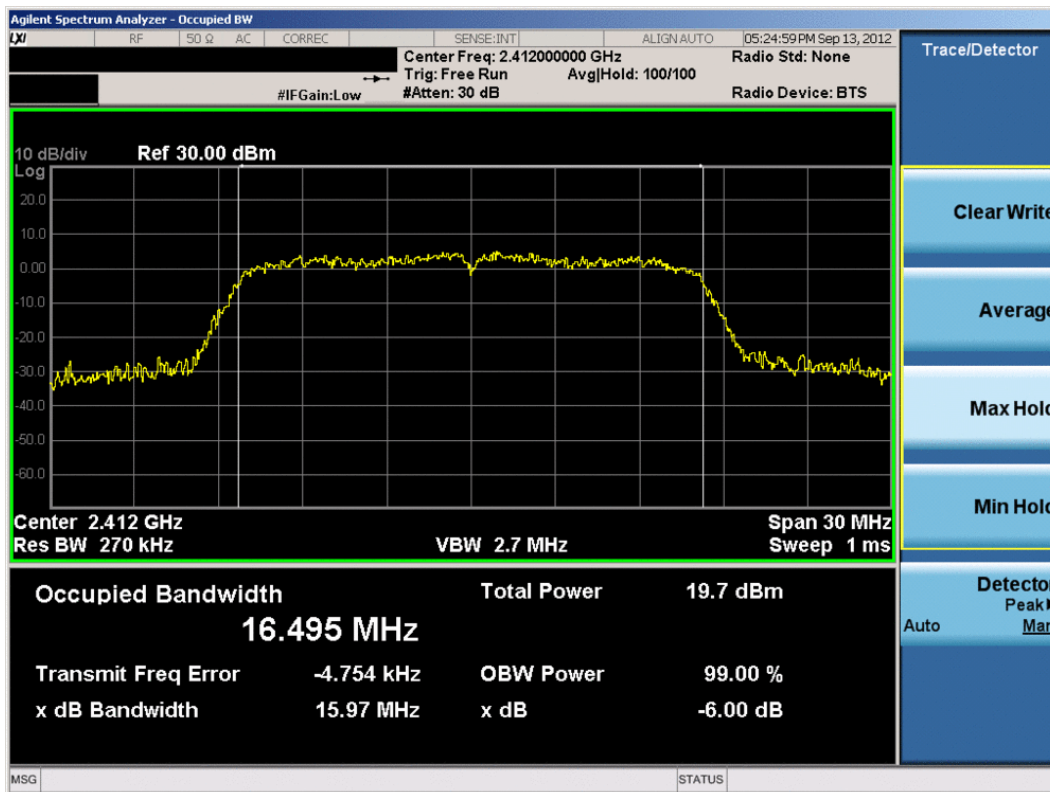


Plot 6-2. 6dB Bandwidth Plot (802.11b – Ch. 6)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 12 of 60

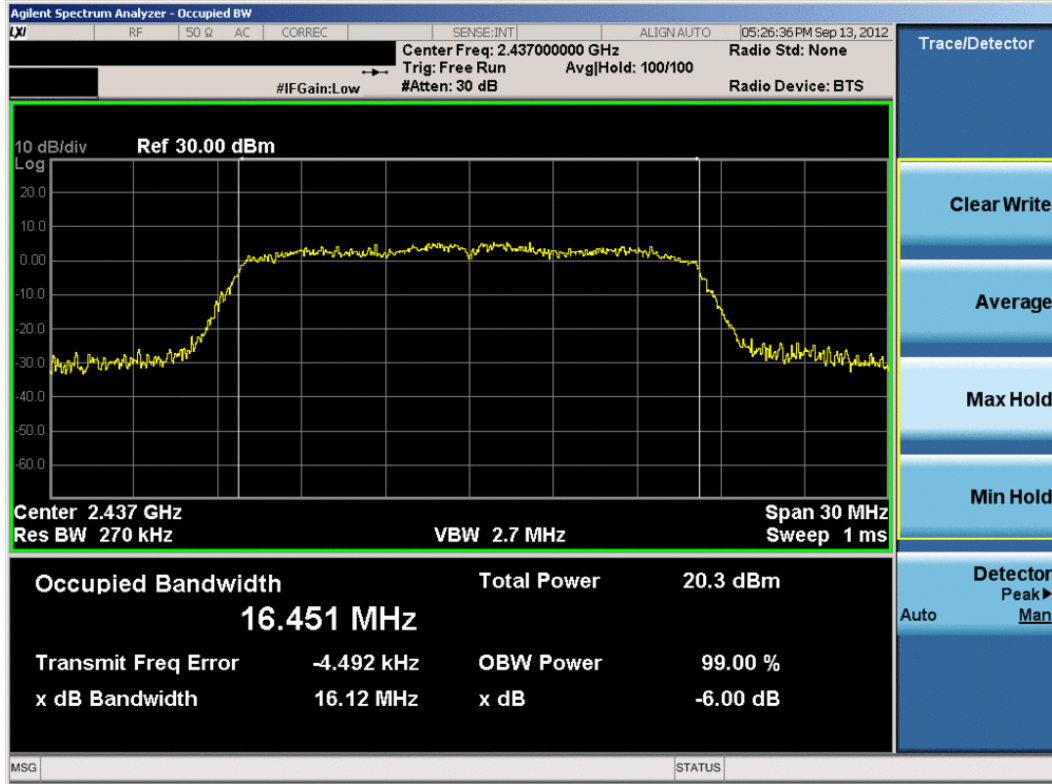


Plot 6-3. 6dB Bandwidth Plot (802.11b – Ch. 11)

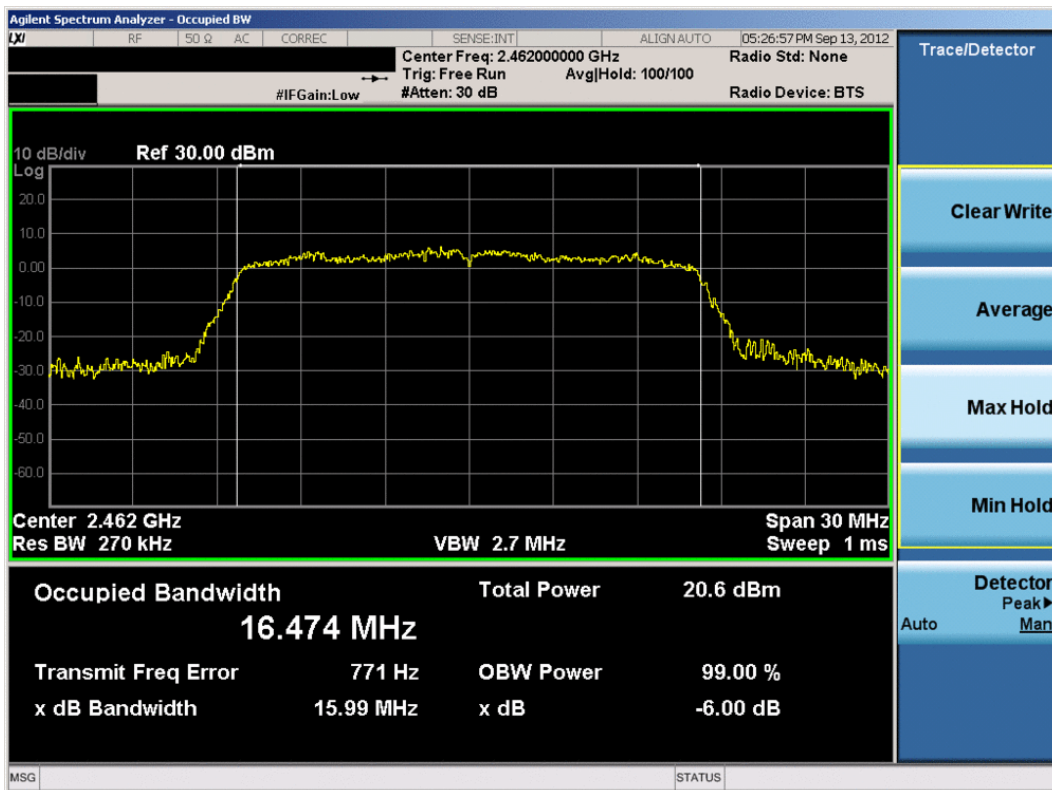


Plot 6-4. 6dB Bandwidth Plot (802.11g – Ch. 1)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 13 of 60

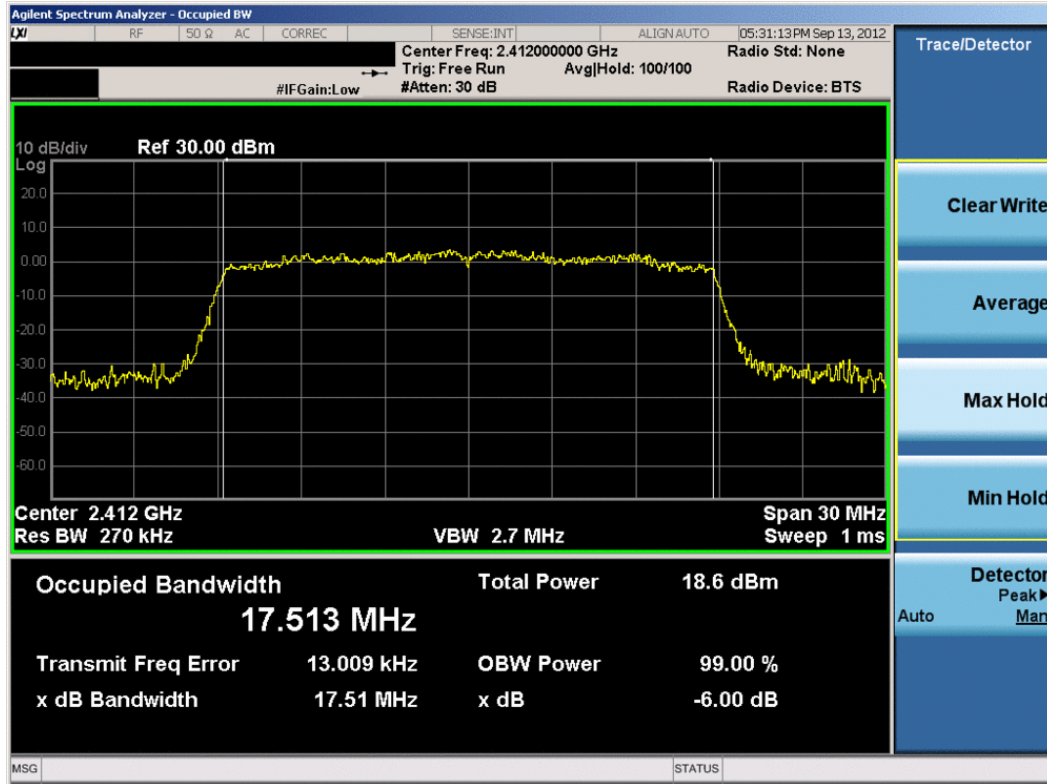


Plot 6-5. 6dB Bandwidth Plot (802.11g – Ch. 6)

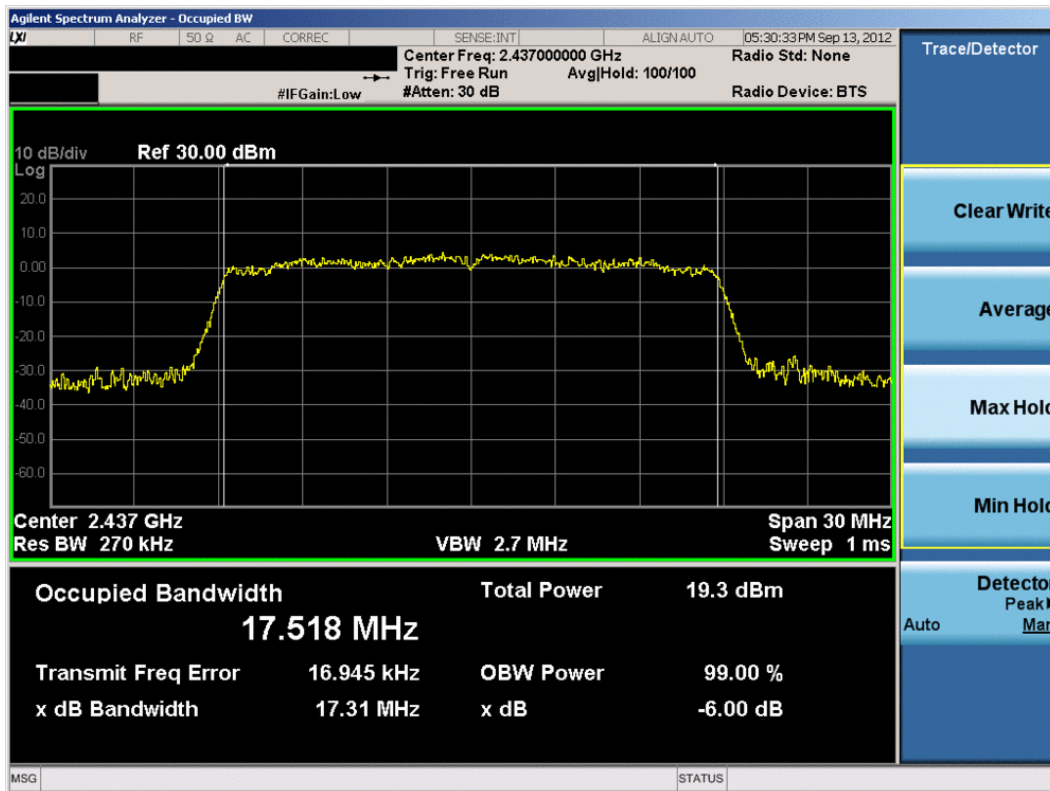


Plot 6-6. 6dB Bandwidth Plot (802.11g – Ch. 11)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 14 of 60

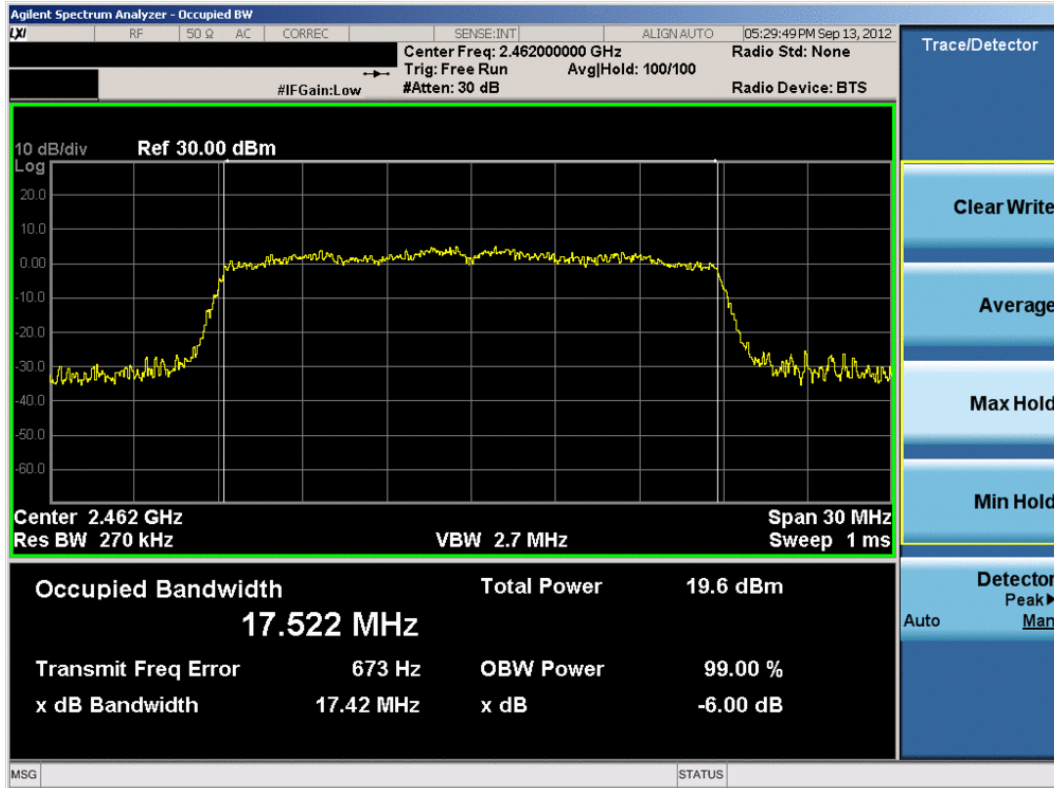


Plot 6-7. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 1)

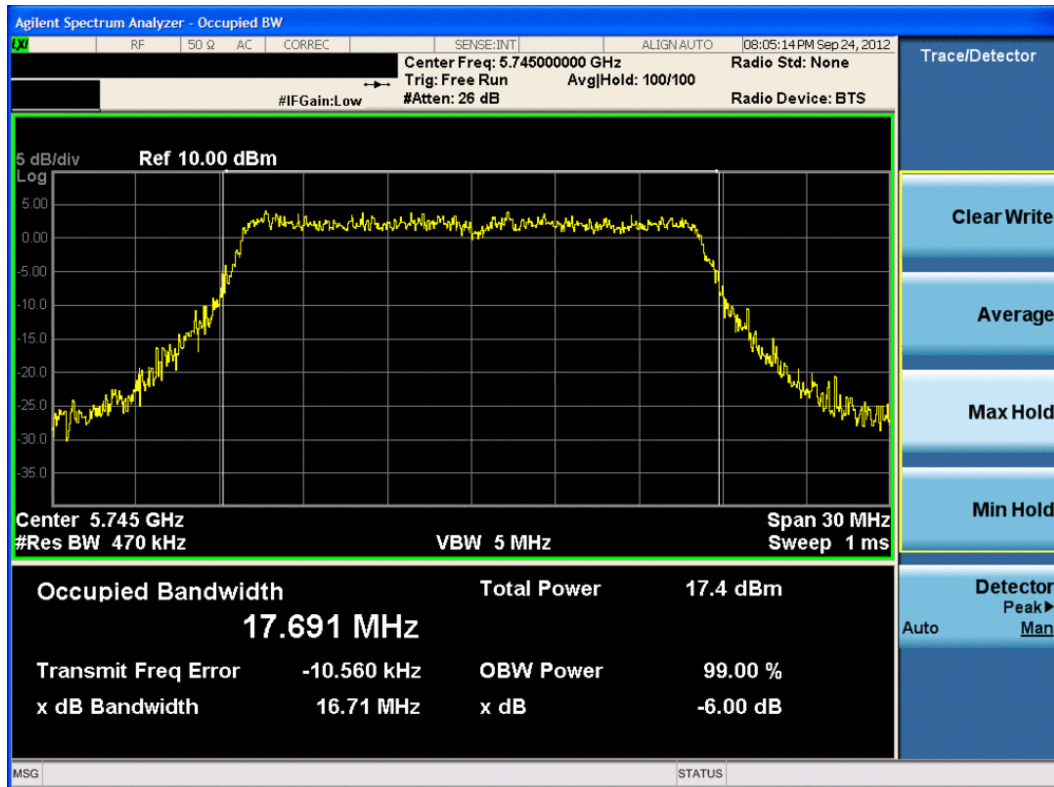


Plot 6-8. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 15 of 60

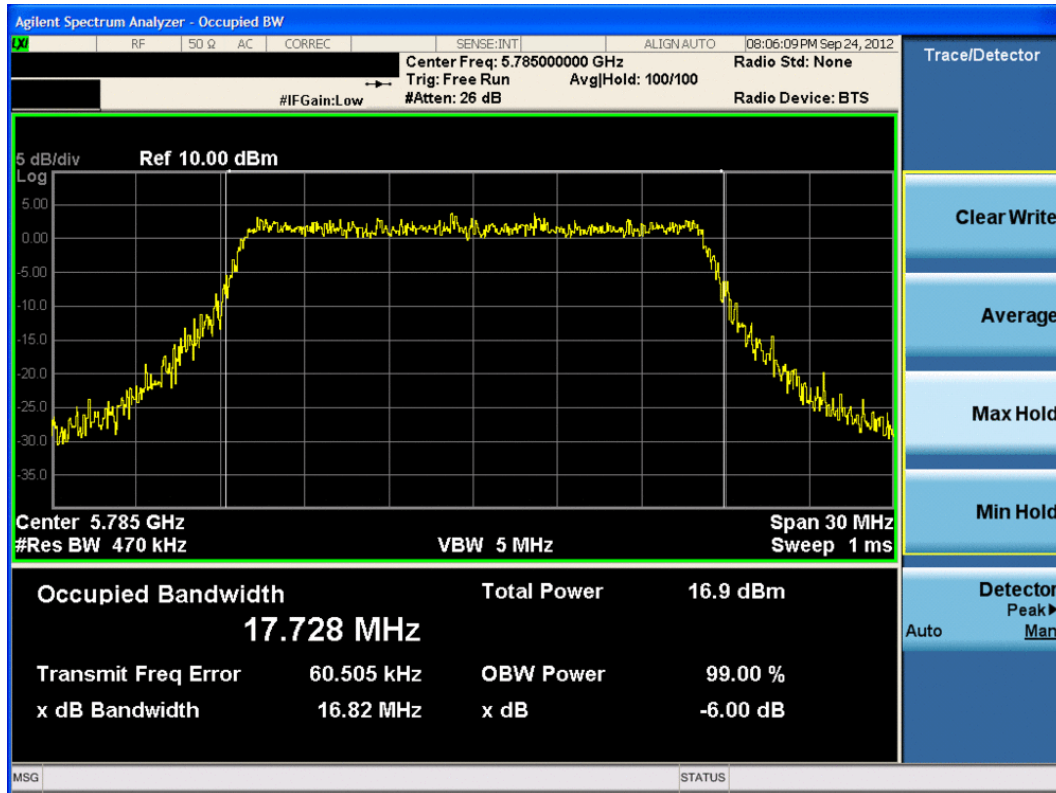


Plot 6-9. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 11)

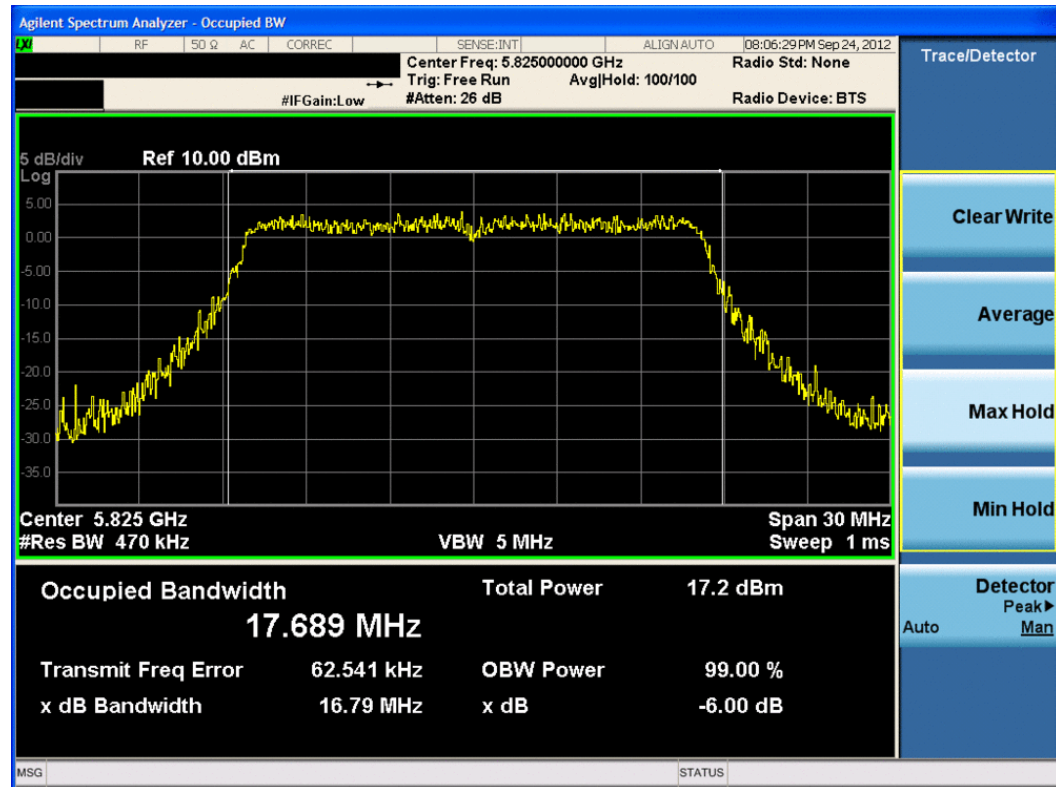


Plot 6-10. 6dB Bandwidth Plot (802.11a – Ch. 149)

FCC ID: A3LSWDSCL21	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 16 of 60

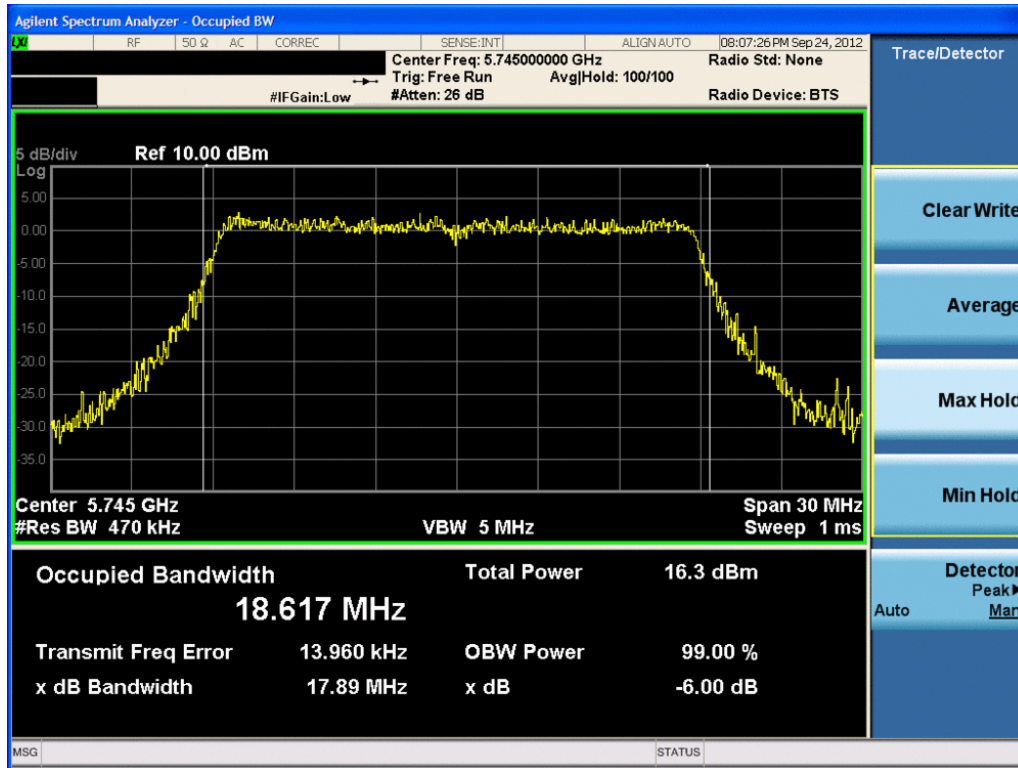


Plot 6-11. 6dB Bandwidth Plot (802.11a – Ch. 157)

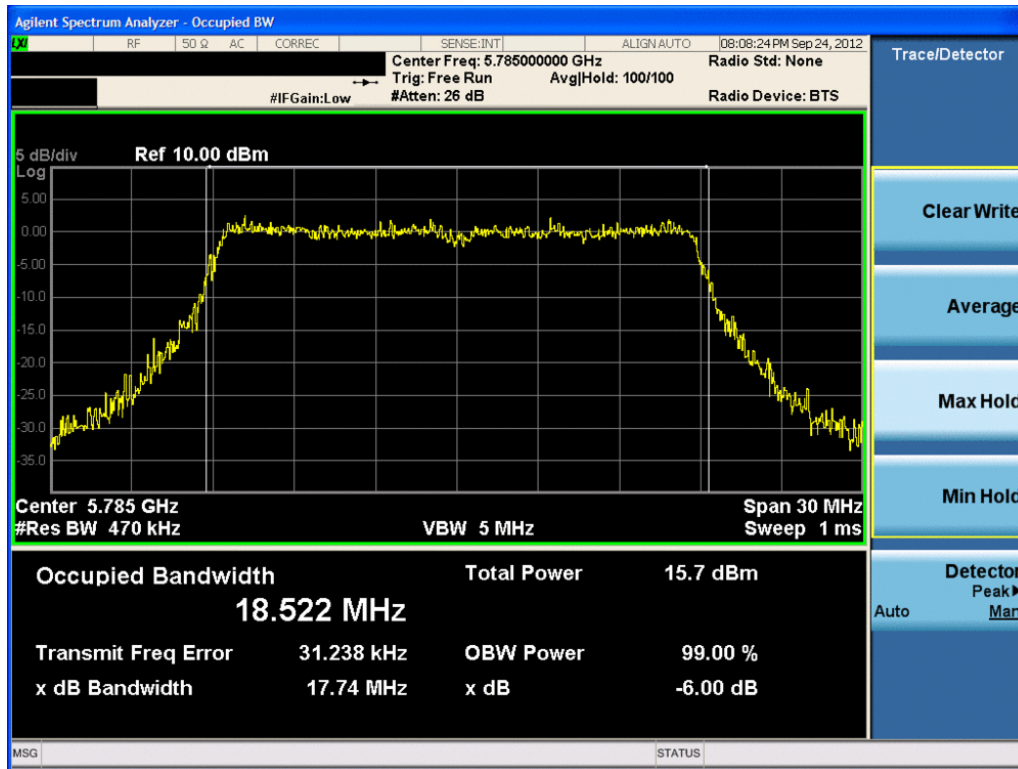


Plot 6-12. 6dB Bandwidth Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 17 of 60

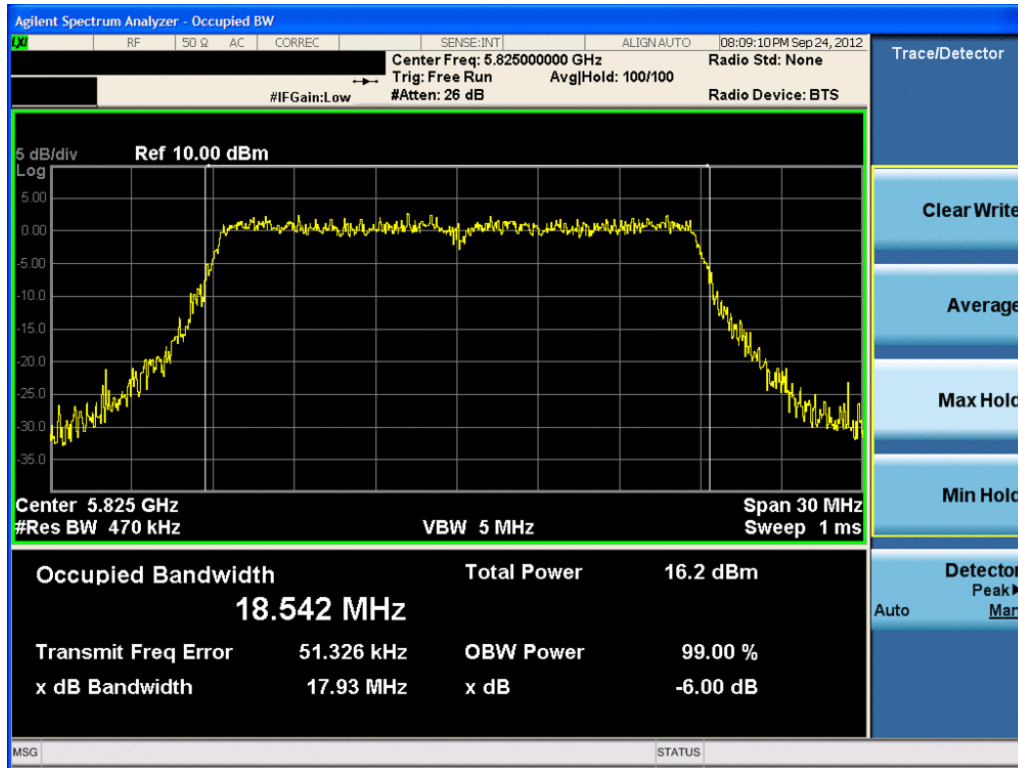


Plot 6-13. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

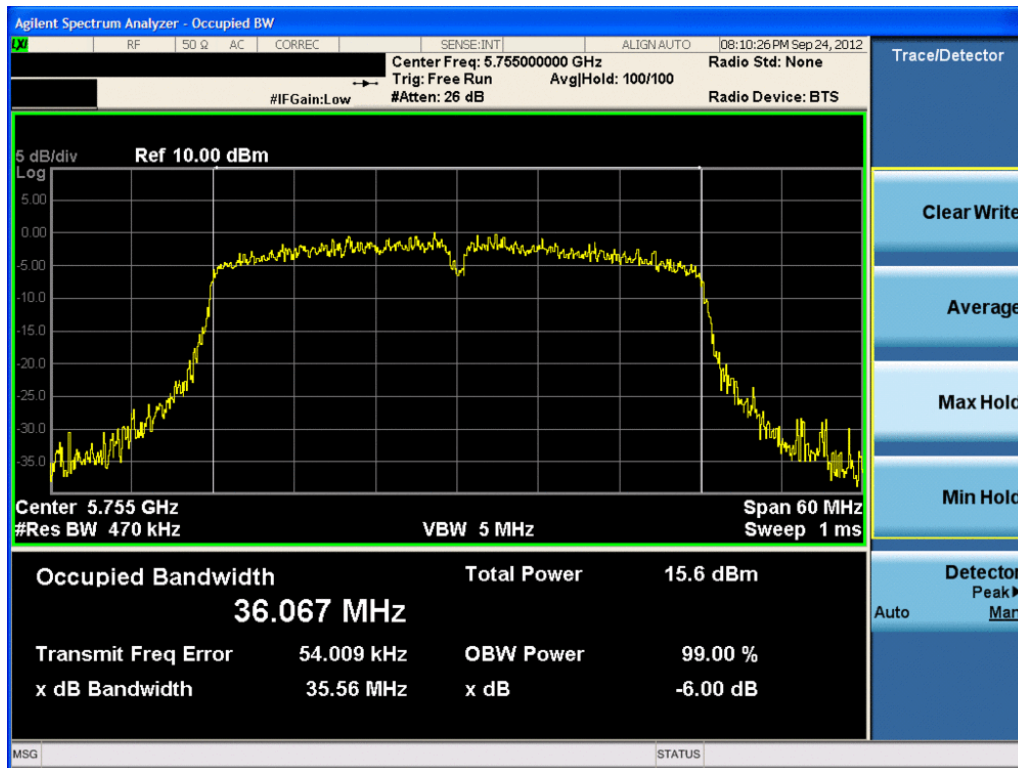


Plot 6-14. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 18 of 60

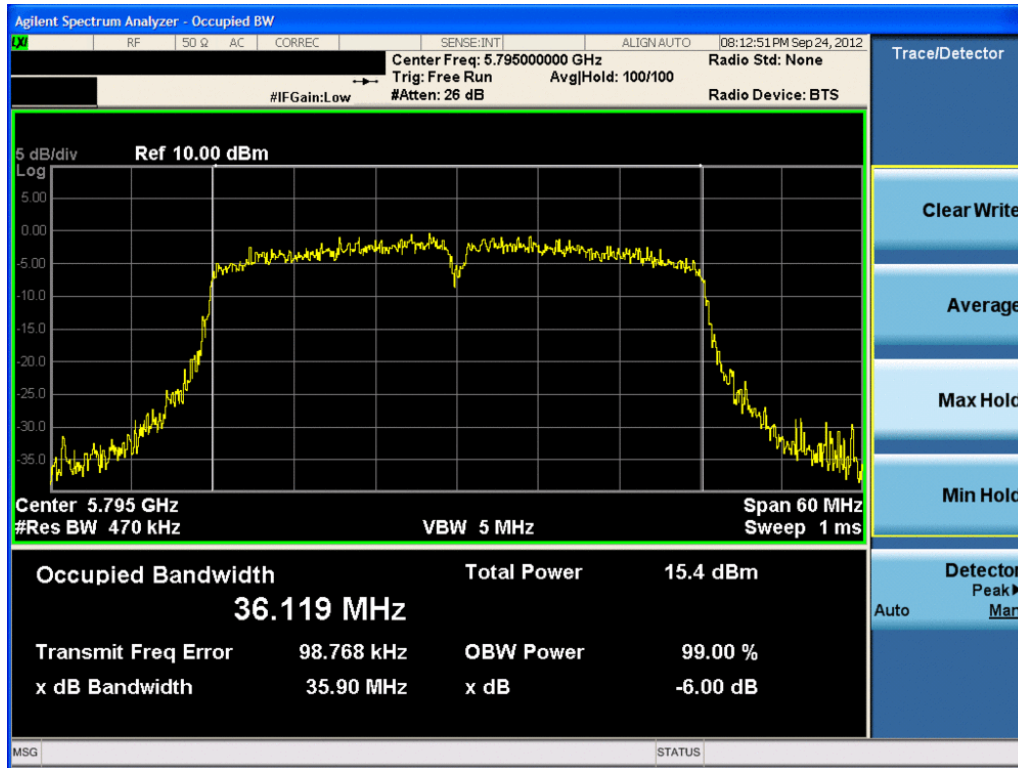


Plot 6-15. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



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

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 19 of 60



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

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 20 of 60

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

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 in transmission mode at the appropriate frequencies. **The maximum permissible conducted output power is 1 Watt.**

Mode	Freq [MHz]	Channel	Detector	802.11b Conducted Power [dBm]			
				Data Rate [Mbps]			
				1	2	5.5	11
802.11b	2412	1	AVG	15.87	15.94	16.14	16.11
			PEAK	18.64	18.70	18.68	18.72
802.11b	2437	6	AVG	16.54	16.59	16.81	16.72
			PEAK	19.28	19.27	19.26	19.30
802.11b	2462	11	AVG	17.03	17.16	17.25	17.27
			PEAK	19.74	19.78	19.74	19.83

Table 6-3. 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	12.92	12.97	13.02	13.01	13.17	13.20	13.19	13.00
			PEAK	19.94	19.99	19.93	20.07	20.16	20.26	20.19	20.16
802.11g	2437	6	AVG	13.61	13.70	13.66	13.65	13.69	13.67	13.81	13.74
			PEAK	20.54	20.58	20.52	20.70	20.56	20.61	20.77	20.62
802.11g	2462	11	AVG	14.06	14.14	14.12	14.05	14.21	14.17	14.22	14.21
			PEAK	20.87	20.89	20.99	20.81	20.98	21.06	21.09	21.03

Table 6-4. 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	11.89	12.03	12.04	11.96	12.01	11.98	12.04	12.02
			PEAK	19.31	19.39	19.32	19.27	19.39	19.54	19.41	19.40
802.11n	2437	6	AVG	12.51	12.54	12.64	12.61	12.64	12.58	12.64	12.71
			PEAK	19.86	19.82	19.96	19.91	19.95	19.87	19.93	20.11
802.11n	2462	11	AVG	13.07	13.05	13.06	13.12	13.20	13.17	13.13	13.16
			PEAK	20.18	20.31	20.25	20.31	20.49	20.36	20.40	20.43

Table 6-5. 20MHz BW 802.11n (2.4GHz) Conducted Output Power Measurements

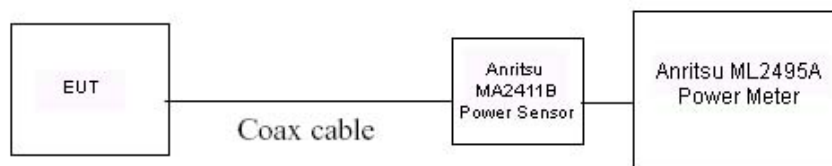



Figure 6-2. Test Instrument & Measurement Setup

FCC ID: A3LSWDSC21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset	Page 21 of 60	

## 6.4 Output Power Measurement – 802.11a/n (5GHz)

**§15.247(b)(3); RSS-210 [A8.4]**

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 power measurements while the EUT is operating in transmission mode at the appropriate frequencies. **The maximum permissible conducted output power is 1 Watt.**

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	14.15	14.21	14.19	14.25	14.19	14.27	14.22	14.16
			PEAK	20.76	20.73	20.78	20.86	20.89	21.01	20.92	20.84
802.11a	5765	153	AVG	14.11	14.16	14.07	14.12	14.15	14.12	14.24	14.19
			PEAK	20.65	20.78	20.83	20.79	20.85	20.90	20.92	20.92
802.11a	5785	157	AVG	13.98	14.08	14.06	14.11	14.12	14.09	14.12	14.14
			PEAK	20.74	20.73	20.82	20.93	20.80	20.89	20.94	20.99
802.11a	5805	161	AVG	14.02	13.98	14.02	14.11	14.01	14.09	14.12	14.08
			PEAK	20.71	20.76	20.86	20.85	20.82	21.05	20.86	20.76
802.11a	5825	165	AVG	13.95	14.03	13.96	13.96	14.07	14.04	14.09	14.02
			PEAK	20.73	20.82	20.77	20.85	20.83	20.86	20.81	20.96

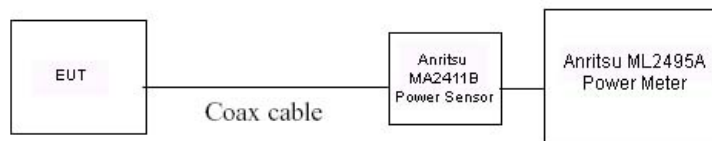
**Table 6-6. 802.11a Conducted Output Power Measurements**

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	13.08	13.08	13.11	13.07	13.14	13.22	13.11	13.14
			PEAK	19.84	19.78	19.91	19.99	19.80	20.06	19.94	19.87
802.11n	5765	153	AVG	13.01	13.00	12.98	13.05	13.09	13.10	13.13	13.13
			PEAK	19.83	19.78	19.81	19.94	20.09	20.04	19.96	20.05
802.11n	5785	157	AVG	12.92	12.99	12.97	12.97	13.04	13.03	13.06	13.04
			PEAK	19.76	19.95	19.89	19.95	20.17	19.92	19.76	20.04
802.11n	5805	161	AVG	12.92	12.87	12.93	12.91	13.01	13.02	13.00	13.02
			PEAK	19.67	19.87	19.93	19.76	19.85	19.99	20.10	20.07
802.11n	5825	165	AVG	12.80	12.96	12.89	12.93	12.90	12.95	12.98	12.95
			PEAK	19.68	19.94	20.00	19.93	19.98	19.92	19.88	20.07

**Table 6-7. 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	12.56	12.55	12.52	12.51	12.51	12.57	12.65	12.63
			PEAK	19.52	19.11	19.13	19.30	19.45	19.22	19.27	19.28
802.11n	5795	159	AVG	12.36	12.49	12.61	12.51	12.41	12.43	12.63	12.51
			PEAK	19.39	19.14	19.19	19.41	19.29	19.24	19.3	19.36

**Table 6-8. 40MHz BW 802.11n (5GHz) Conducted Output Power Measurements**



**Figure 6-3. Test Instrument & Measurement Setup**

FCC ID: A3LSWDSC21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset	Page 22 of 60	

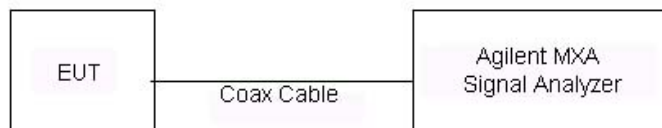
## 6.5 Power Spectral Density (802.11a/b/g/n) §15.247(e); RSS-210 [A8.2]

The peak power density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. **The maximum permissible power spectral density is 8 dBm in any 3 kHz band.**



Per the guidance on power spectral density measurements given in KDB 558074, the spectrum is measured with a 100kHz bandwidth using a peak detector. The measured spectrum is compared to the 8dBm/3kHz limit given in 15.247(e) by applying a bandwidth correction factor equal to  $10\log(3\text{kHz}/100\text{kHz}) = -15.23\text{dB}$ .

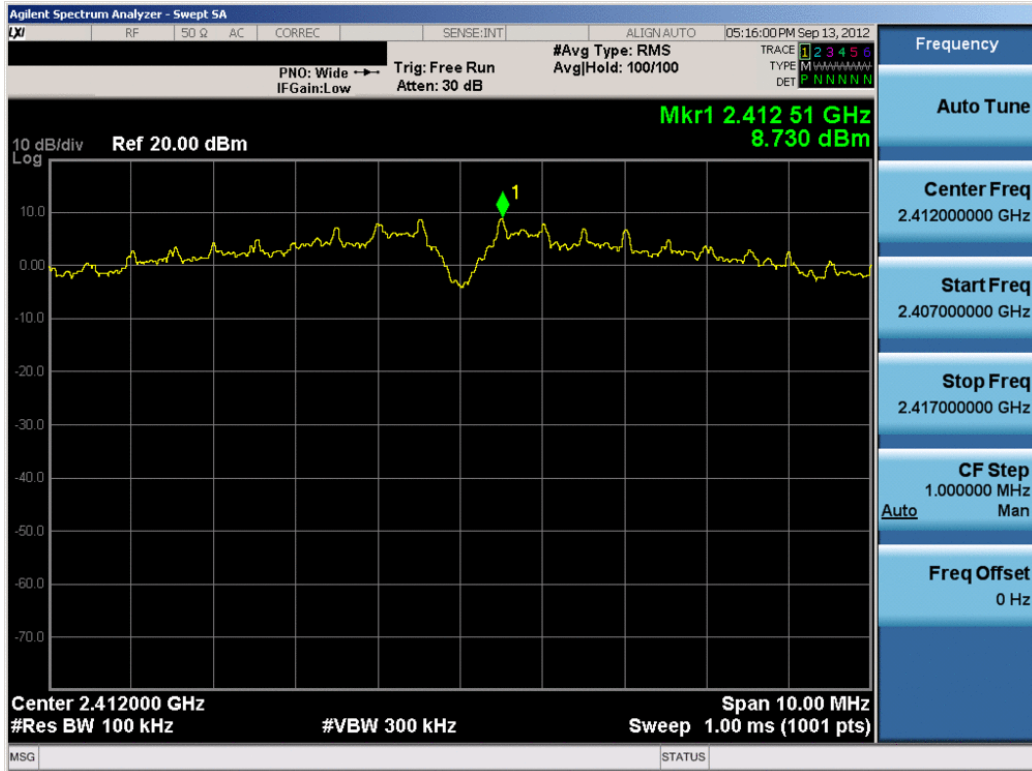
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Bandwidth Correction Factor [dB]	Corrected Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]
2412	1	b	1	8.730	-15.23	-6.499	8.0	-14.50
2437	6	b	1	9.222	-15.23	-6.007	8.0	-14.01
2462	11	b	1	9.862	-15.23	-5.367	8.0	-13.37
2412	1	g	6	3.109	-15.23	-12.120	8.0	-20.12
2437	6	g	6	4.153	-15.23	-11.076	8.0	-19.08
2462	11	g	6	2.872	-15.23	-12.357	8.0	-20.36
2412	1	n	6.5/7.2 (MCS0)	1.482	-15.23	-13.747	8.0	-21.75
2437	6	n	6.5/7.2 (MCS0)	1.955	-15.23	-13.274	8.0	-21.27
2462	11	n	6.5/7.2 (MCS0)	3.341	-15.23	-11.888	8.0	-19.89
5745	149	a	6	0.264	-15.23	-14.965	8.0	-22.96
5785	157	a	6	-0.080	-15.23	-15.309	8.0	-23.31
5825	165	a	6	0.417	-15.23	-14.812	8.0	-22.81
5745	149	n (20MHz)	6.5/7.2 (MCS0)	-1.440	-15.23	-16.669	8.0	-24.67
5785	157	n (20MHz)	6.5/7.2 (MCS0)	-1.379	-15.23	-16.608	8.0	-24.61
5825	165	n (20MHz)	6.5/7.2 (MCS0)	-0.840	-15.23	-16.069	8.0	-24.07
5755	151	n (40MHz)	13.5/15 (MCS0)	-3.538	-15.23	-18.767	8.0	-26.77
5795	159	n (40MHz)	13.5/15 (MCS0)	-3.831	-15.23	-19.060	8.0	-27.06

**Table 6-9. Conducted Power Density Measurements**

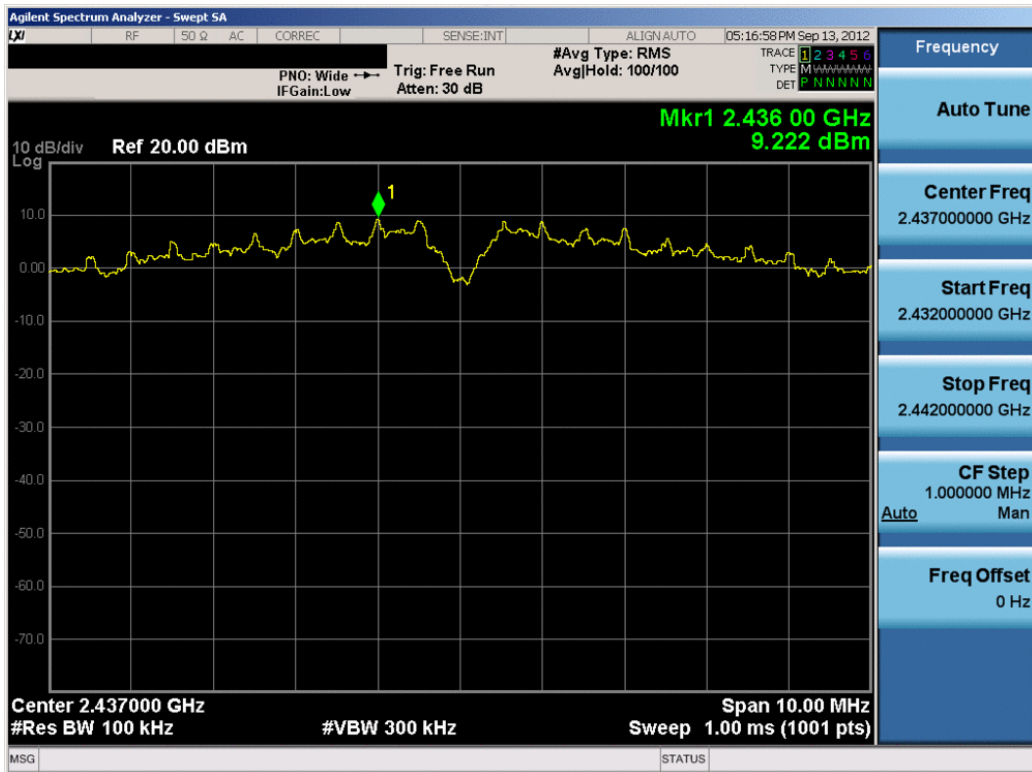


**Figure 6-4. Test Instrument & Measurement Setup**

FCC ID: A3LSWDSC21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset	Page 23 of 60	

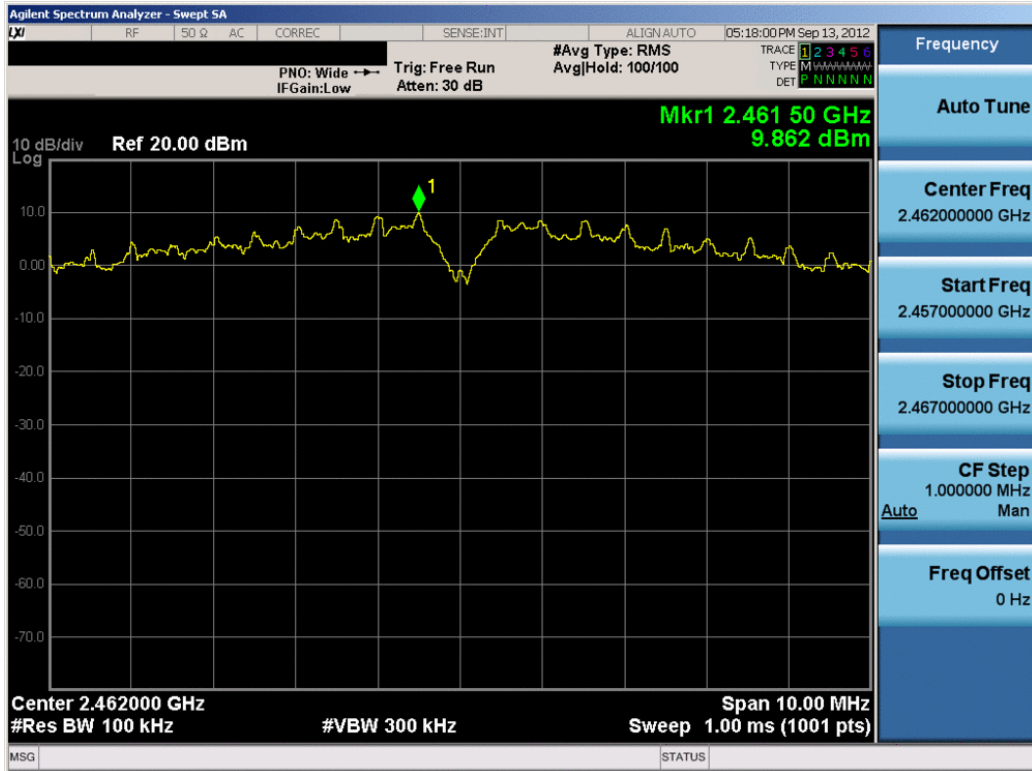


Plot 6-18. Power Spectral Density Plot (802.11b – Ch. 1)

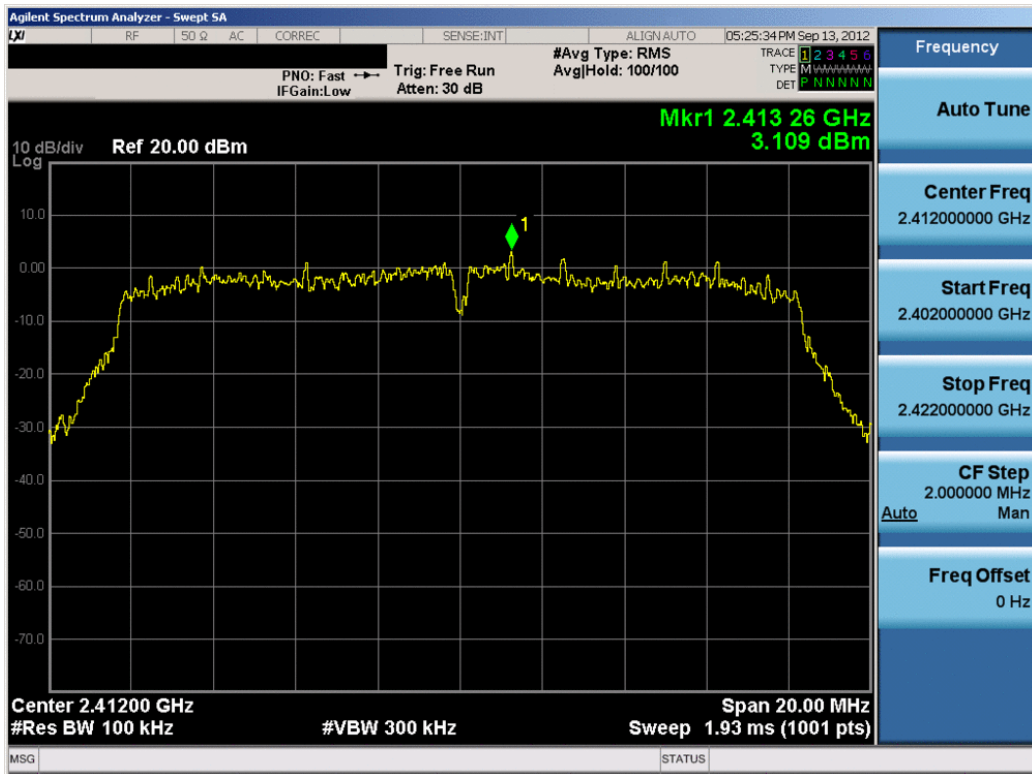


Plot 6-19. Power Spectral Density Plot (802.11b – Ch. 6)

FCC ID: A3LSWDSCL21	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 24 of 60

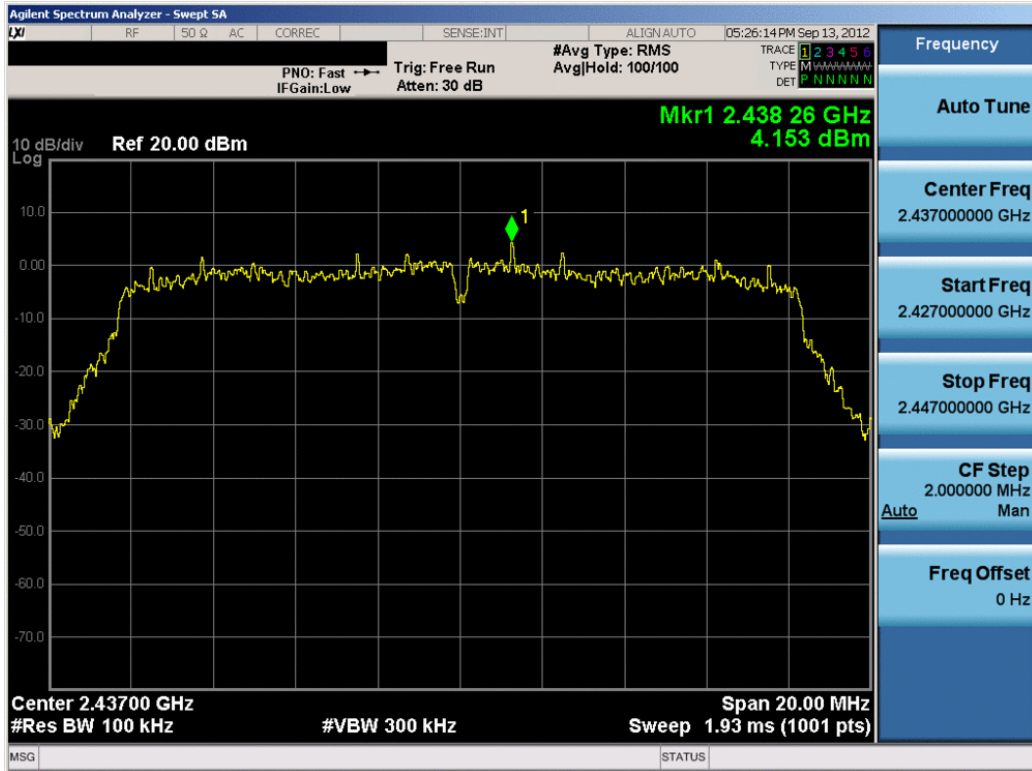


Plot 6-20. Power Spectral Density Plot (802.11b – Ch. 11)

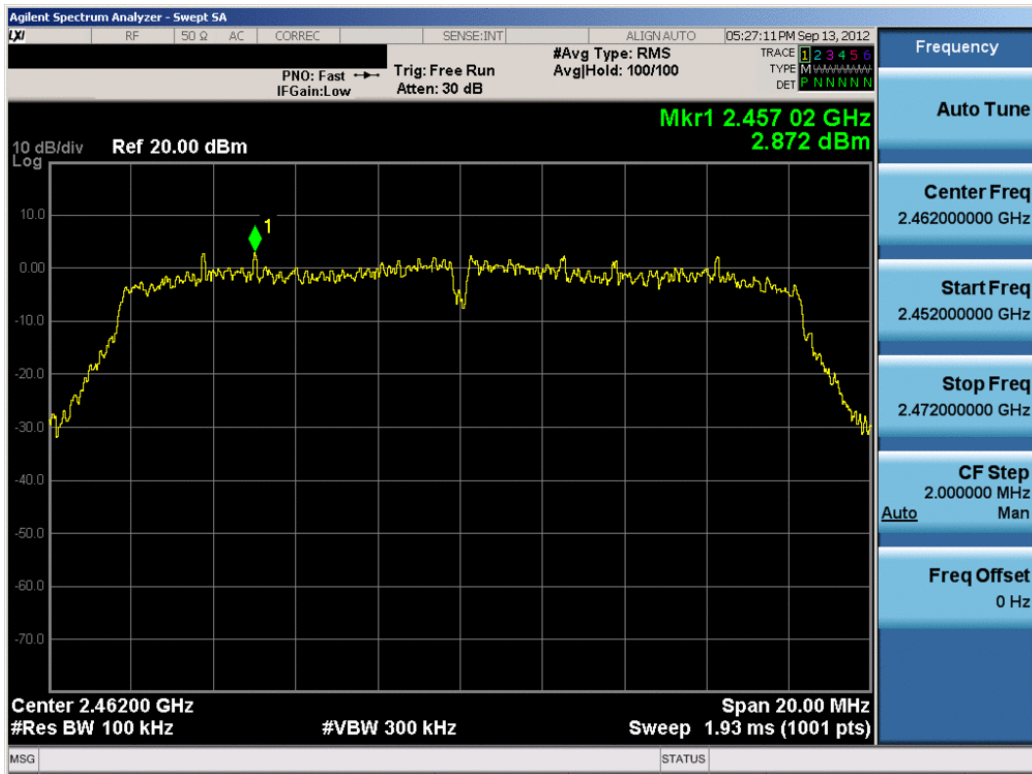


Plot 6-21. Power Spectral Density Plot (802.11g – Ch. 1)

FCC ID: A3LSWDSCL21	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset	Page 25 of 60	

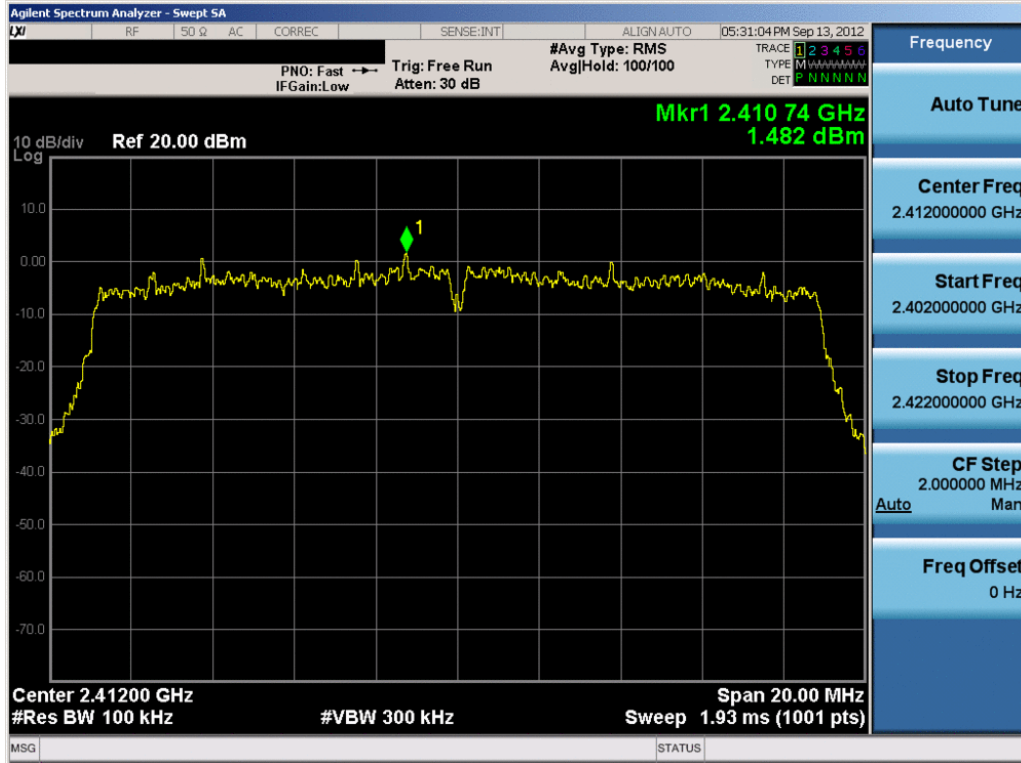


Plot 6-22. Power Spectral Density Plot (802.11g – Ch. 6)

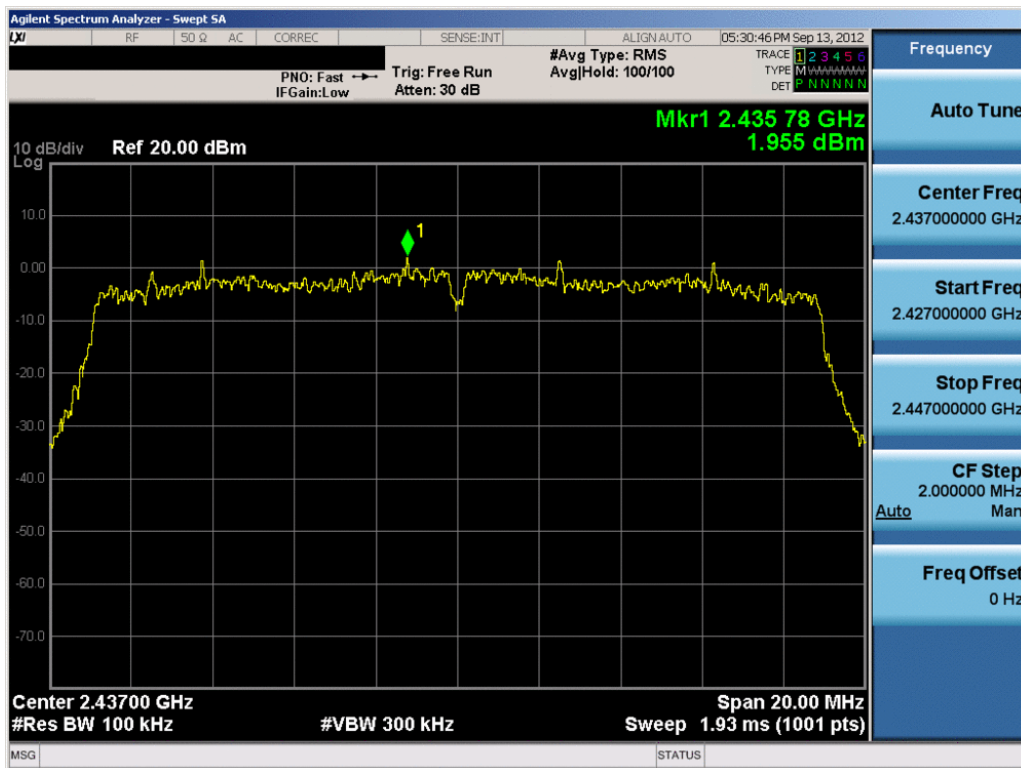


Plot 6-23. Power Spectral Density Plot (802.11g – Ch. 11)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 26 of 60

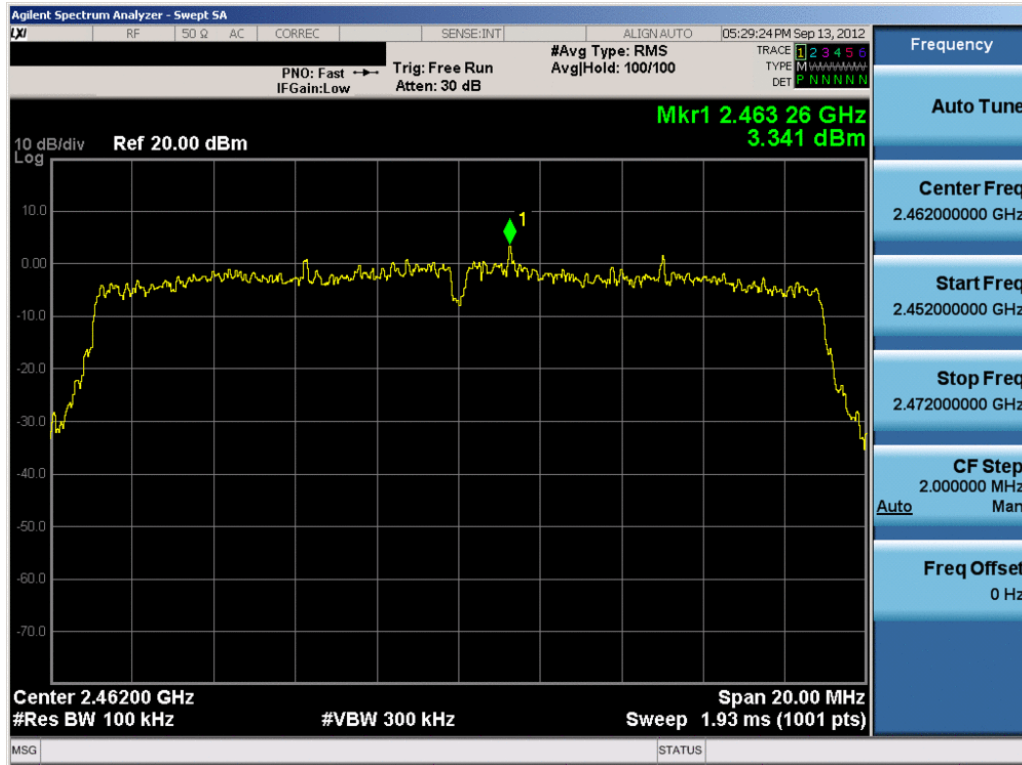


Plot 6-24. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 1)

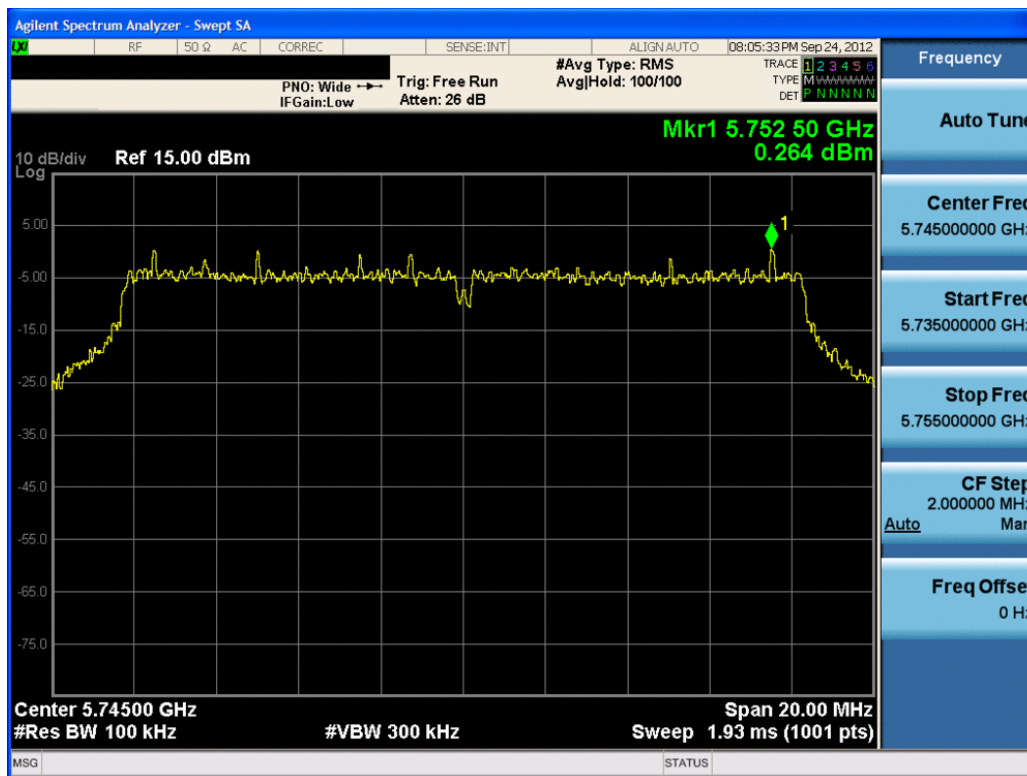


Plot 6-25. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: A3LSWDSCL21	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 27 of 60

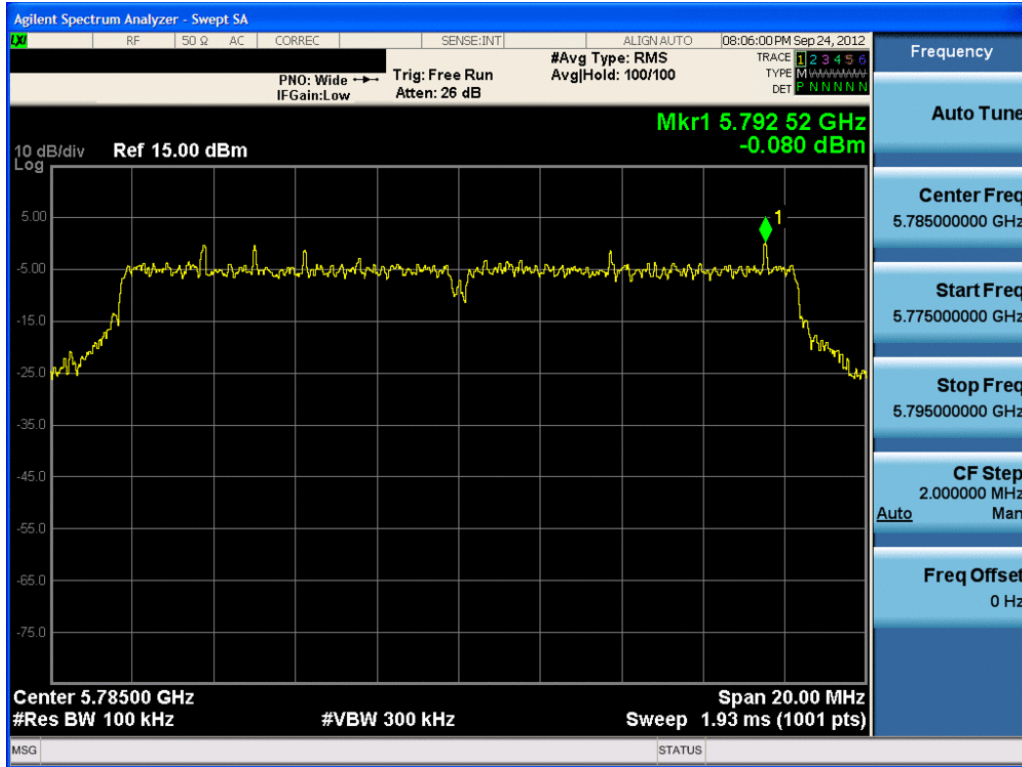


Plot 6-26. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)

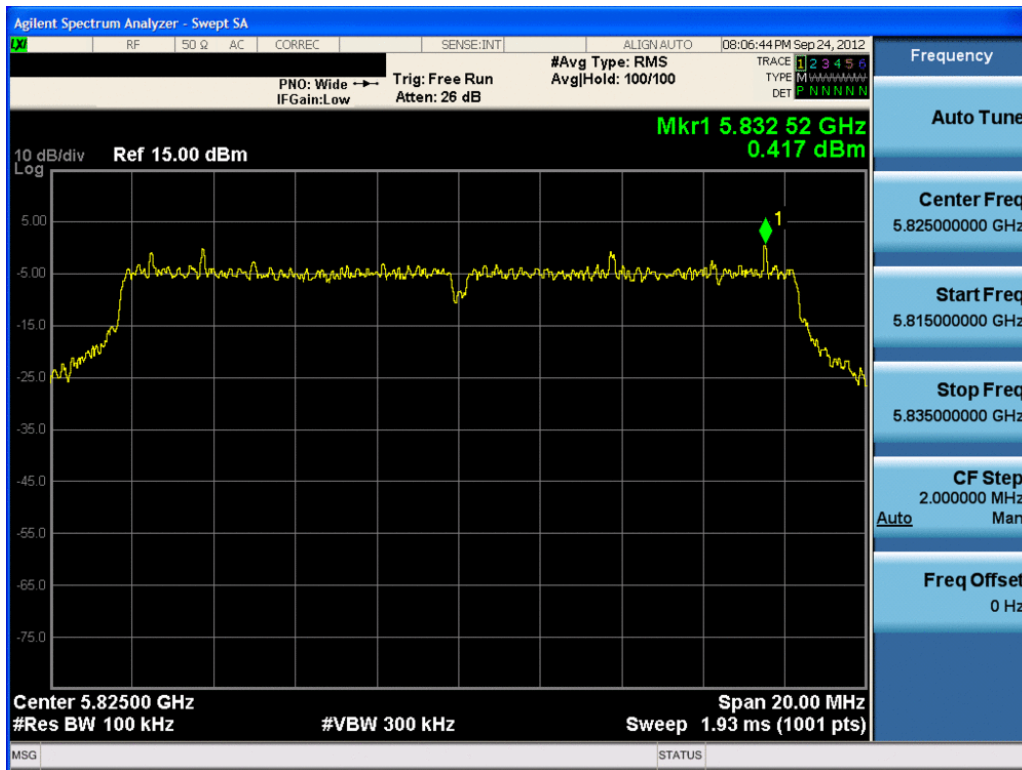


Plot 6-27. Power Spectral Density Plot (802.11a – Ch. 149)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 28 of 60



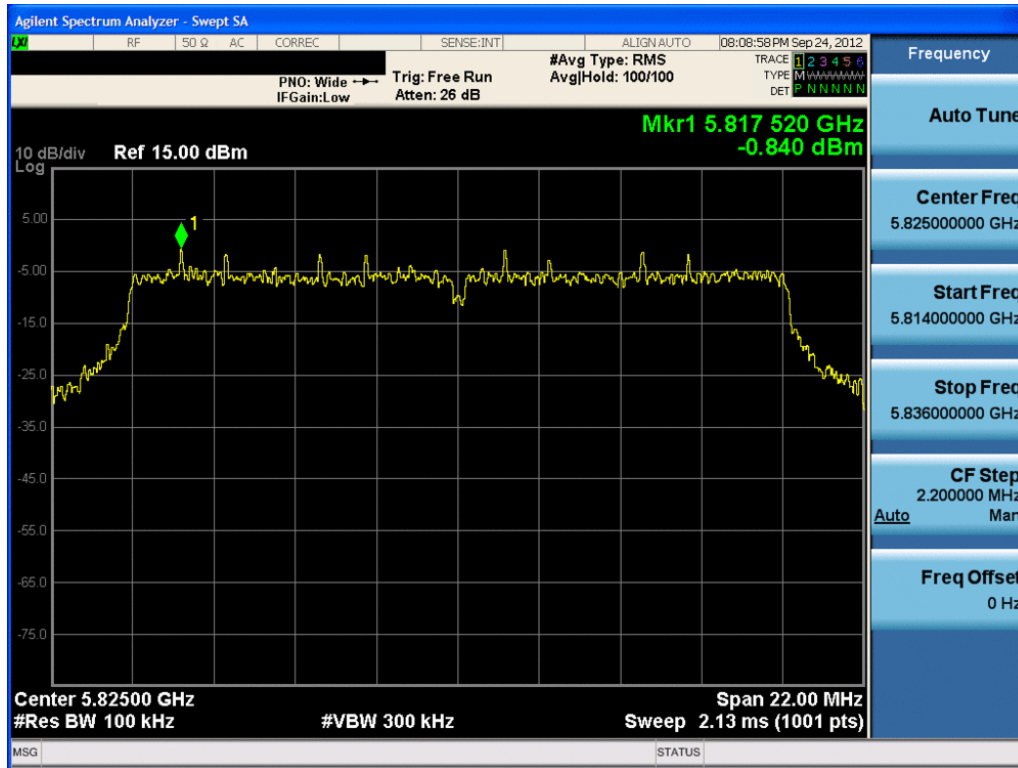
Plot 6-28. Power Spectral Density Plot (802.11a – Ch. 157)



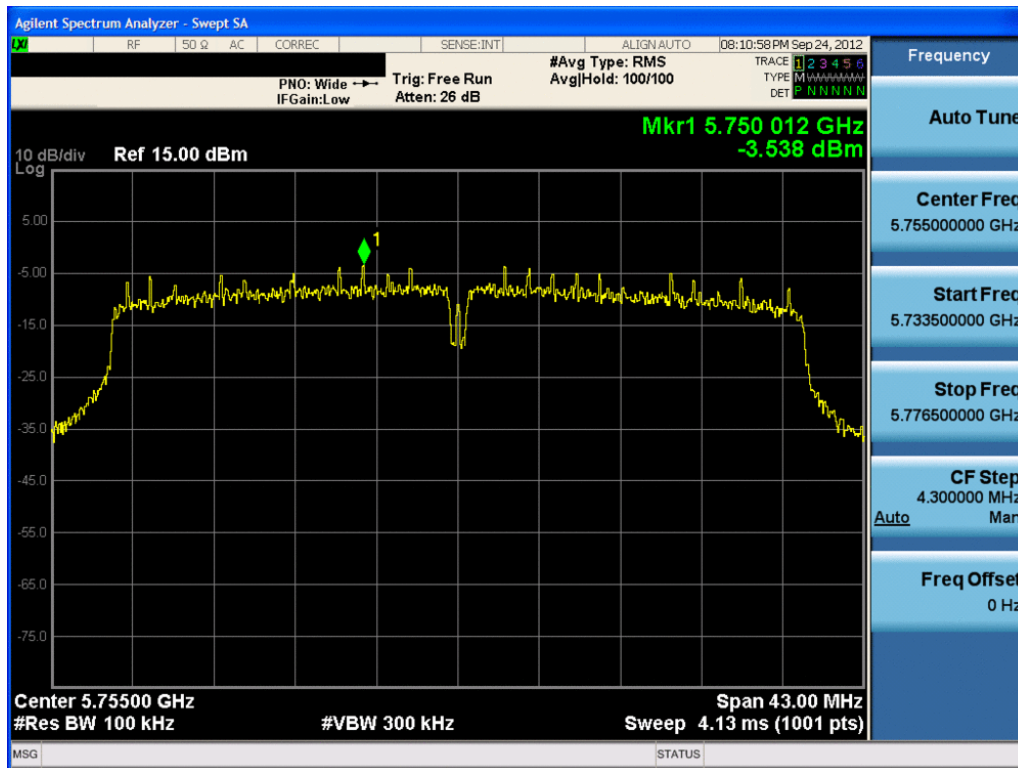
Plot 6-29. Power Spectral Density Plot (802.11a – Ch. 165)

FCC ID: A3LSWDSCL21	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 29 of 60



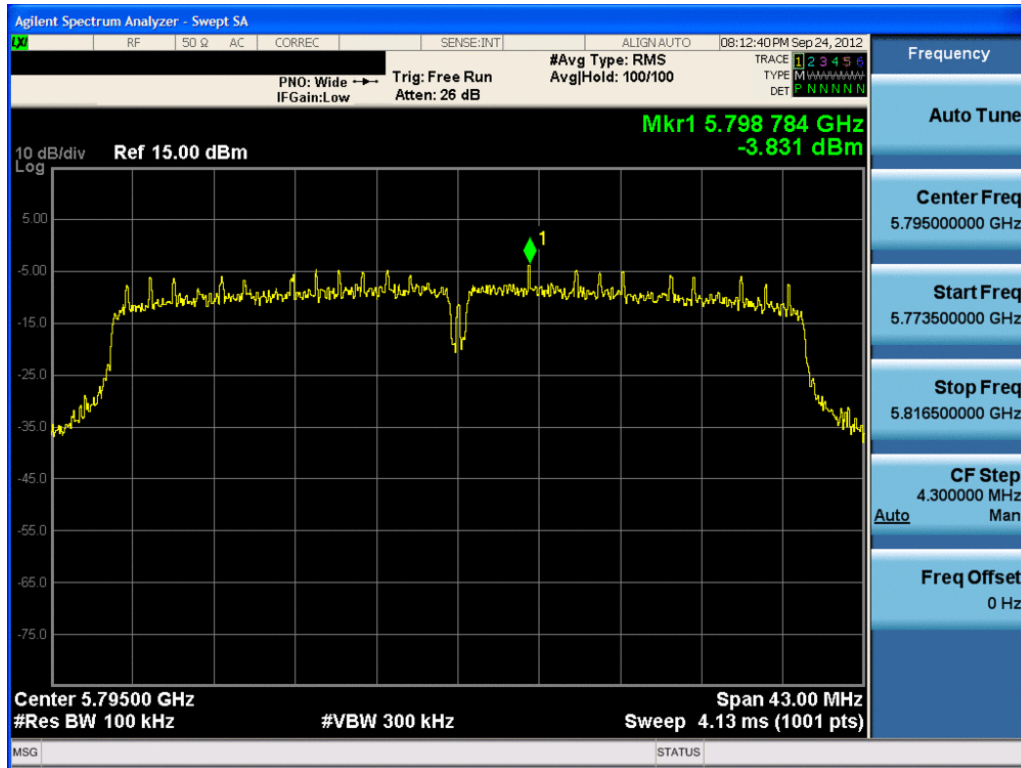


Plot 6-32. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



Plot 6-33. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

FCC ID: A3LSWDSCL21	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 31 of 60



Plot 6-34. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)

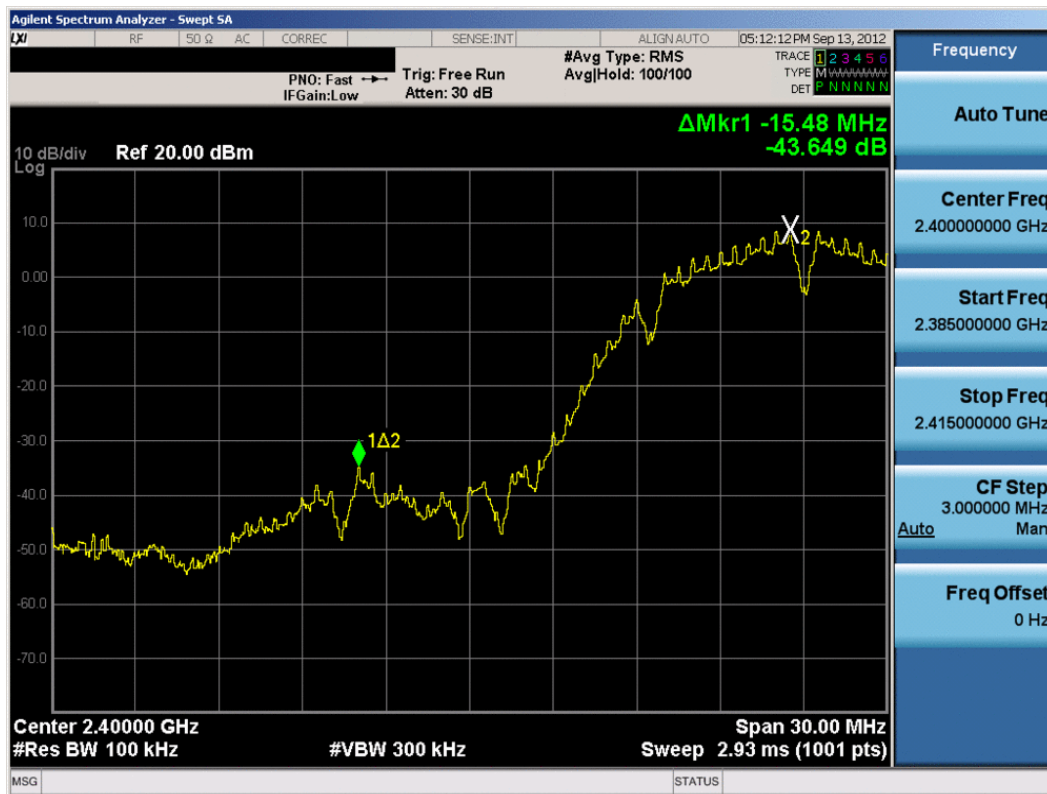
FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset	Page 32 of 60	

## 6.6 Conducted Emissions at the Band Edge

### §15.247(d); RSS-210 [A8.5]

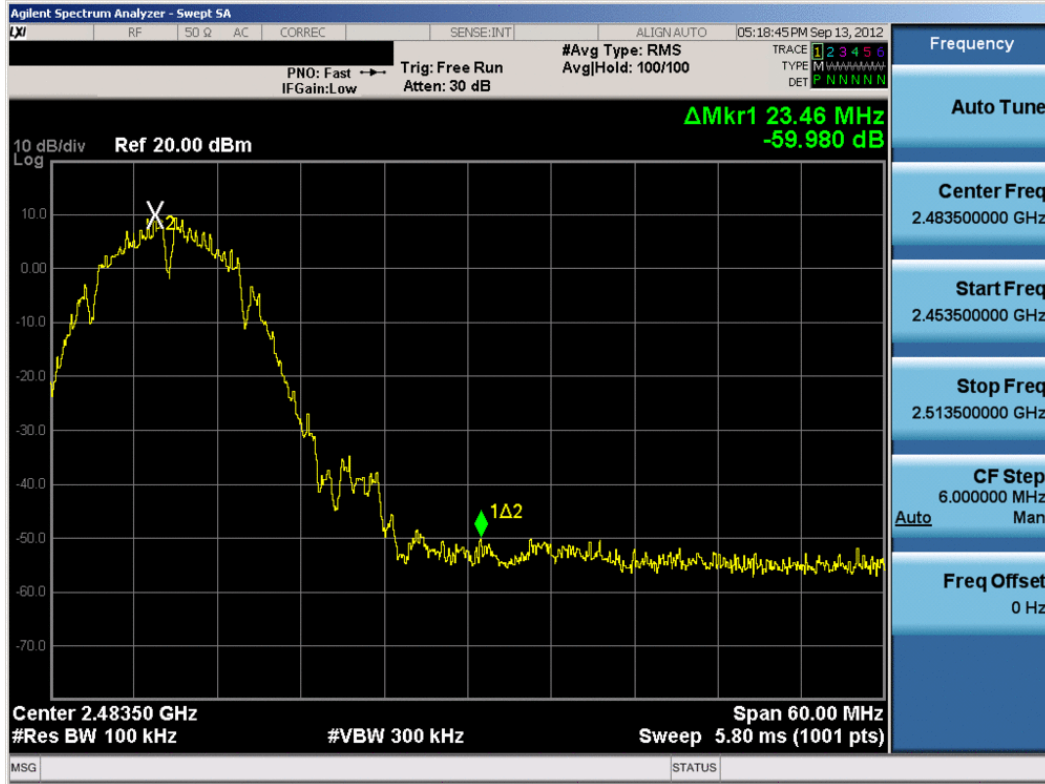
For the following out of band conducted spurious emissions plots at the band edge, the EUT was set at a data rate of 1Mbps for “b” mode, 6 Mbps for “g” mode, 6 Mbps for “a” mode, and 6.5/7.2Mbps for “n” mode. These settings produced the worst-case emissions.

Per the guidance of KDB 558074, section 5.4.1.1, the reference level for out of band emissions is established from the plots of this section since the band edge emissions are measured with a RBW of 100kHz. This reference level is then used as the limit in subsequent plots for out of band spurious emissions shown in Section 6.7. The limit for out of band spurious emissions at the band edge is 30dB below the fundamental emission level measured in a 100kHz bandwidth.

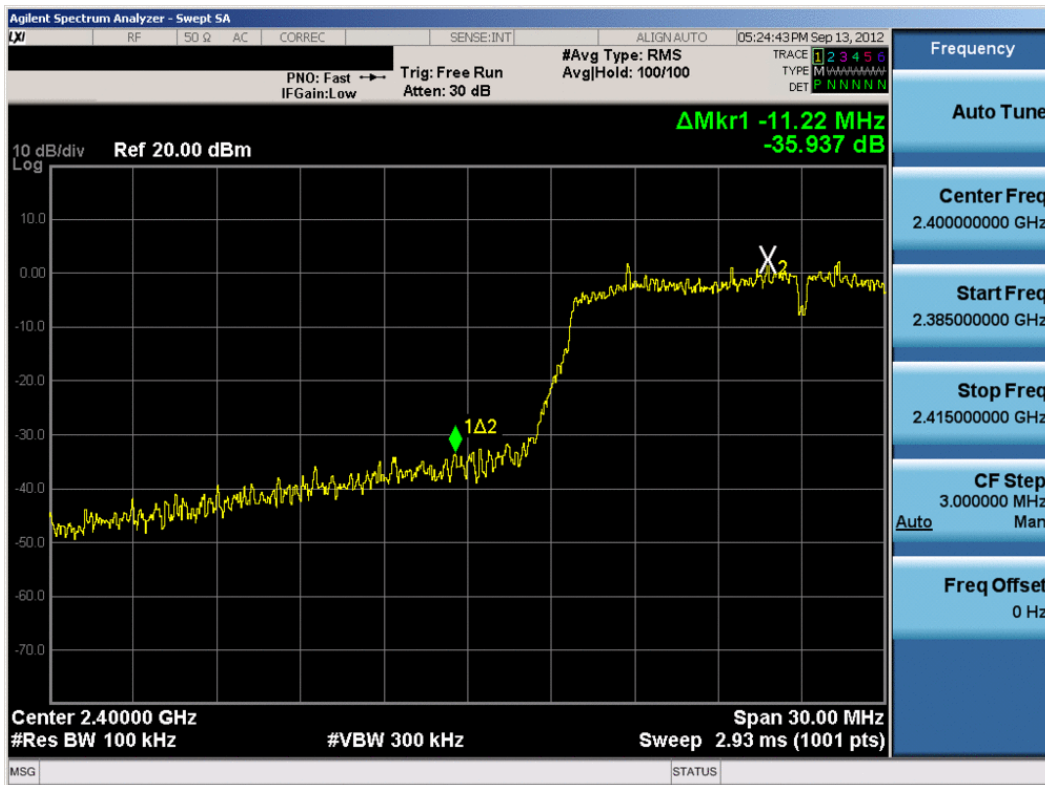


Plot 6-35. Band Edge Plot (802.11b – Ch. 1)



FCC ID: A3LSWDSC21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 33 of 60

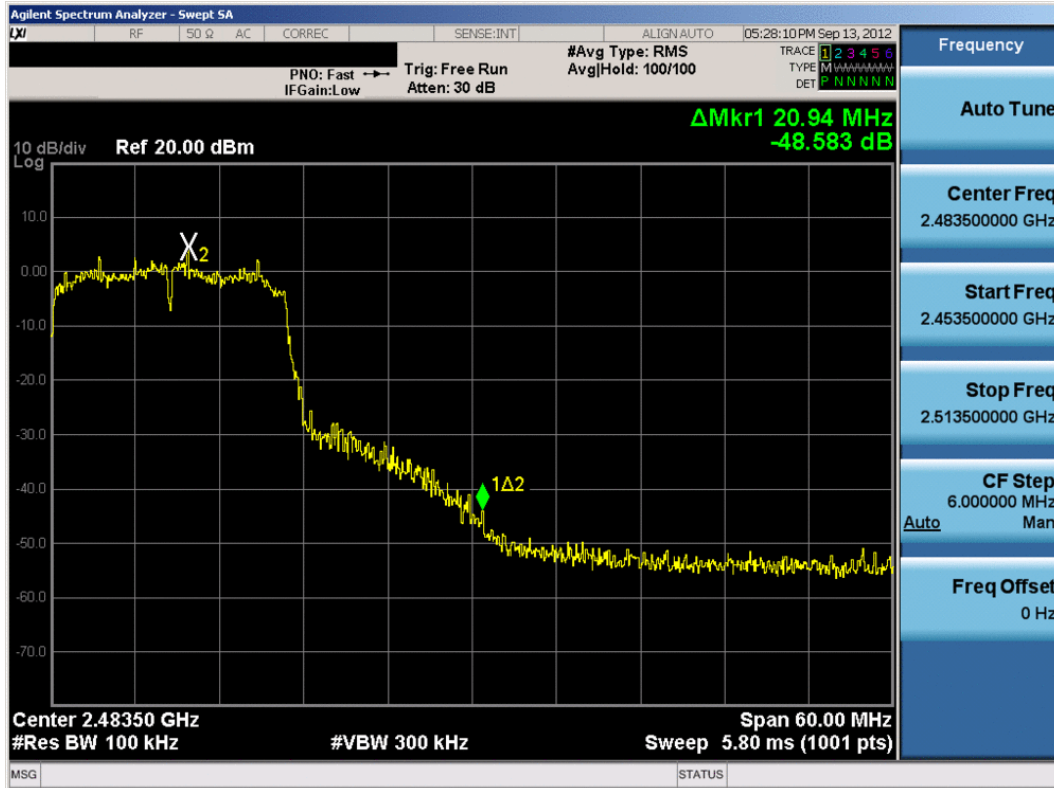


Plot 6-36. Band Edge Plot (802.11b – Ch. 11)

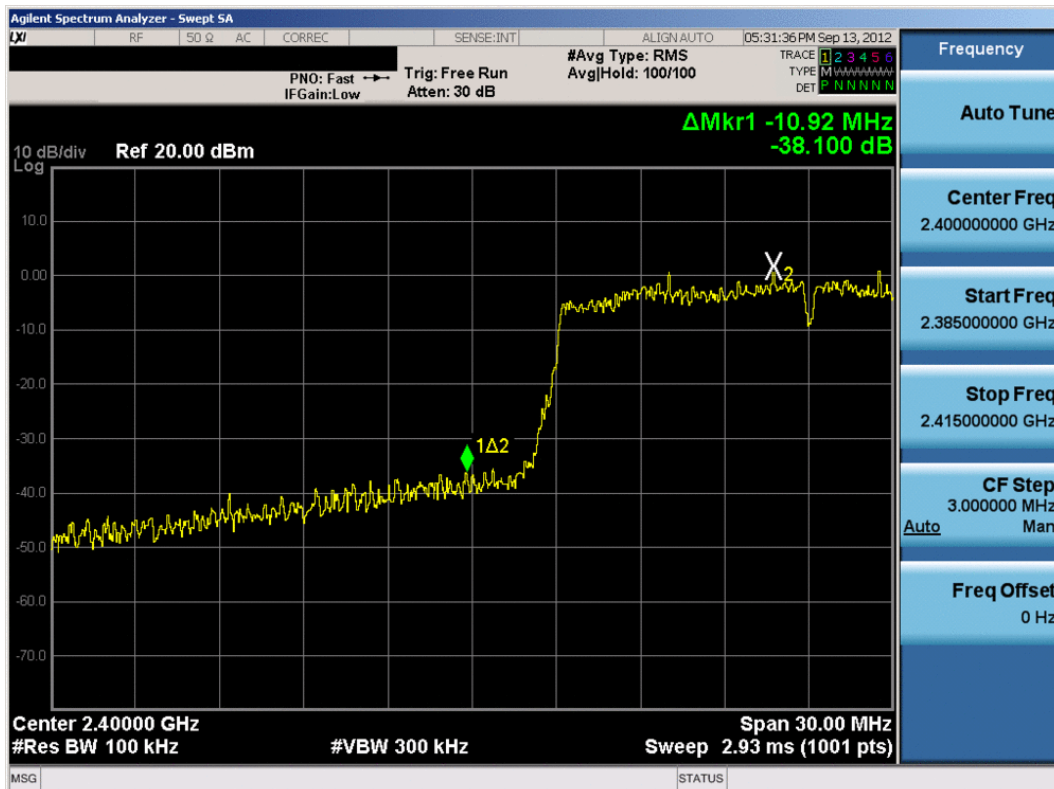


Plot 6-37. Band Edge Plot (802.11g– Ch. 1)



FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 34 of 60

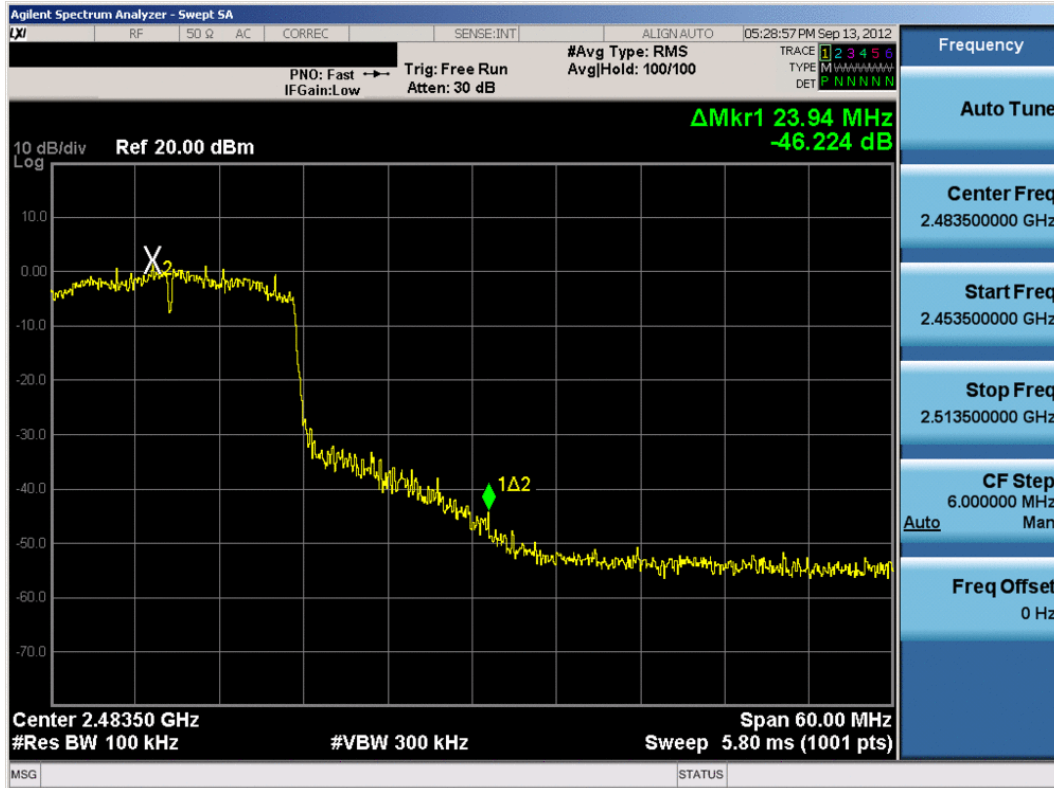


Plot 6-38. Band Edge Plot (802.11g – Ch. 11)

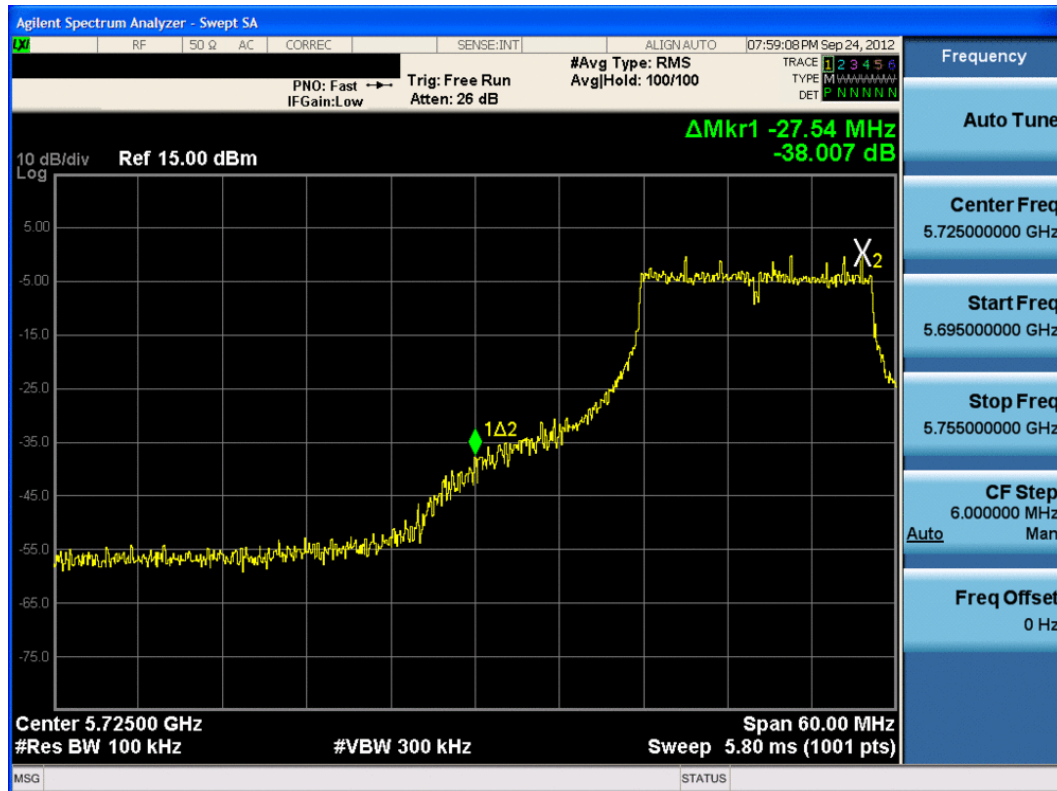


Plot 6-39. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 35 of 60

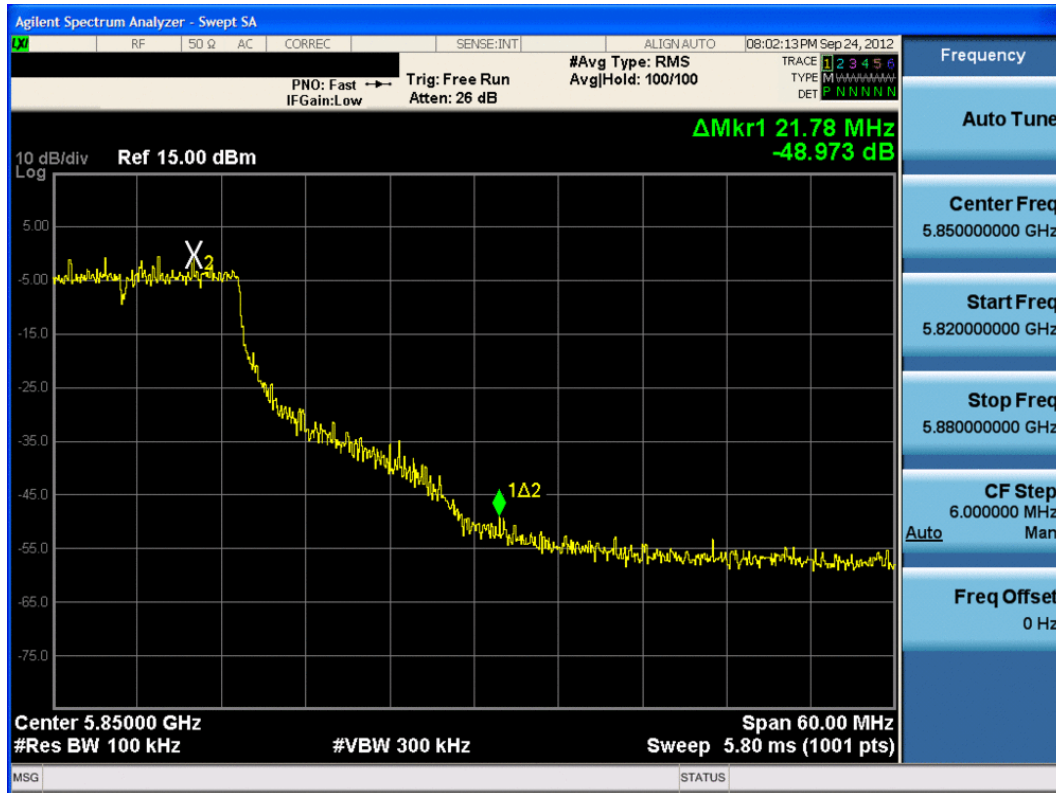


Plot 6-40. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)

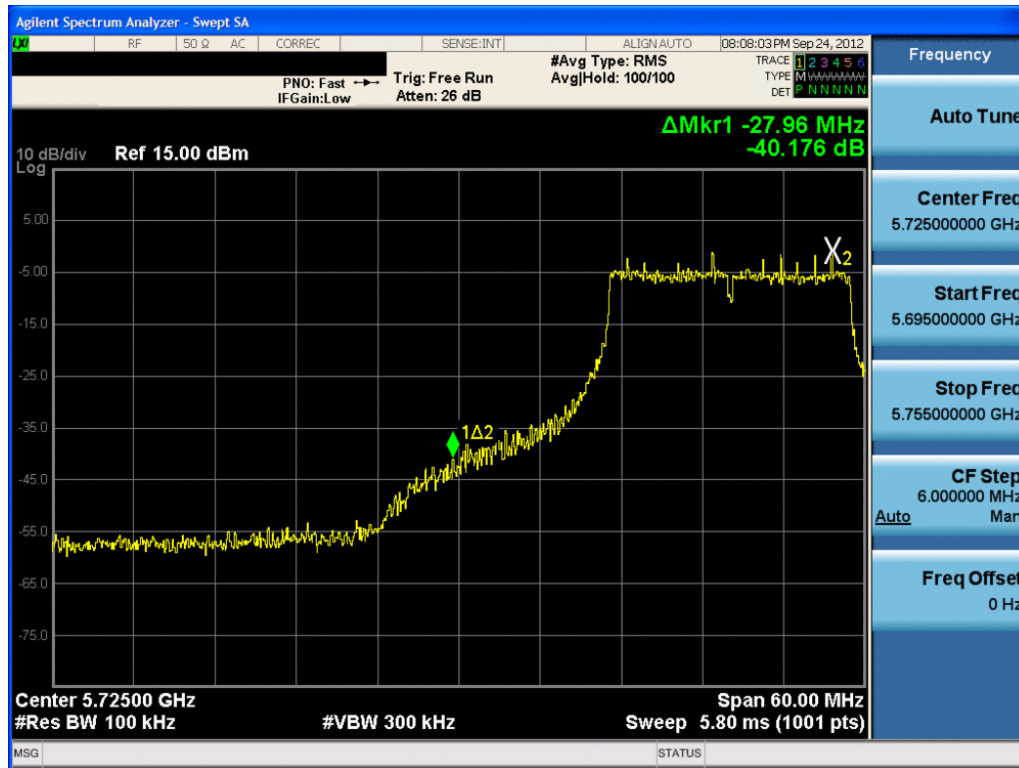


Plot 6-41. Band Edge Plot (802.11a – Ch. 149)

FCC ID: A3LSWDSCL21	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 36 of 60

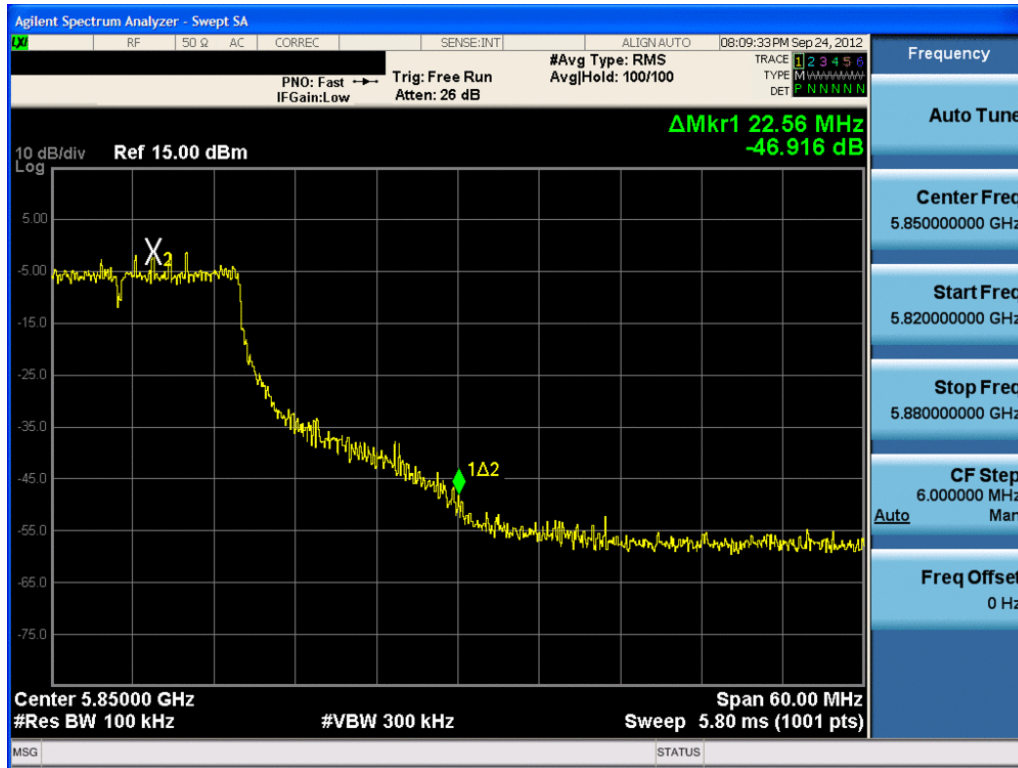


Plot 6-42. Band Edge Plot (802.11a – Ch. 165)

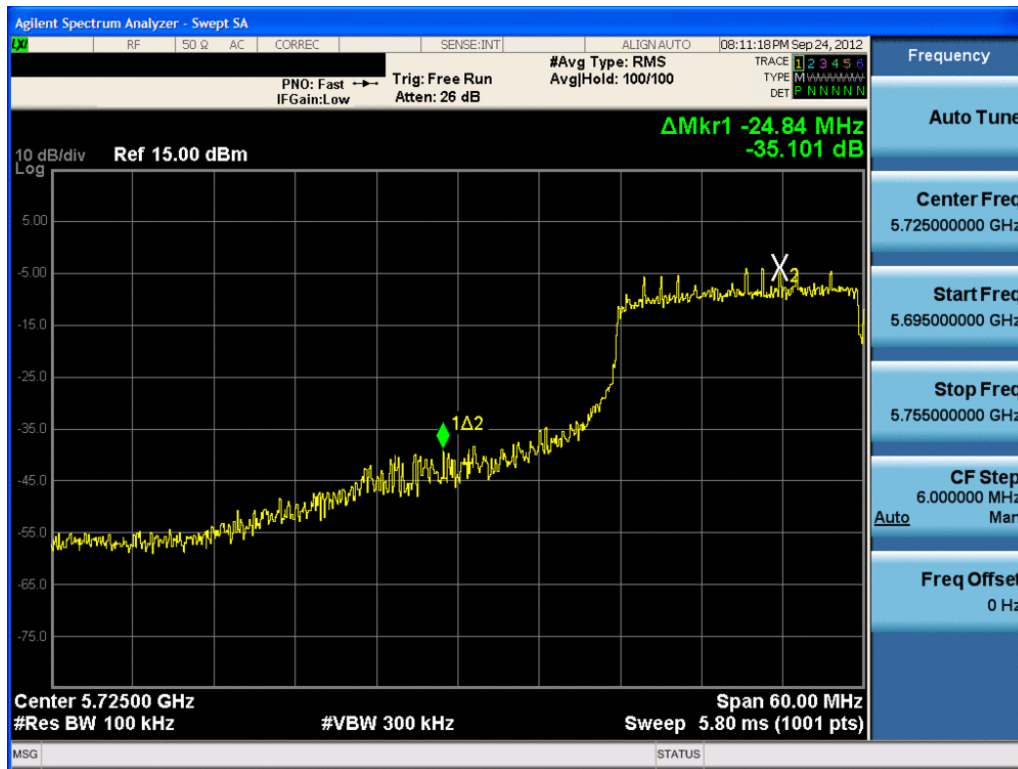


Plot 6-43. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

FCC ID: A3LSWDSCL21	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	<b>SAMSUNG</b>	Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 37 of 60



Plot 6-44. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



Plot 6-45. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 151)

FCC ID: A3LSWDSCL21		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1209111326.A3L	Test Dates: 09/13/12 - 09/24/12	EUT Type: Portable Handset		Page 38 of 60

