

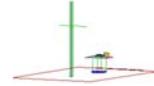


PCTEST ENGINEERING LABORATORY, INC.

7185 Oakland Mills Road, Columbia, MD 21046 USA

Tel. 410.290.6652 / Fax 410.290.6654

http://www.pctestlab.com



MEASUREMENT REPORT

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

Applicant Name:
LG Electronics MobileComm U.S.A
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:
Nov. 27 - Dec. 17, 2012
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1211261704.ZNF

FCC ID:	ZNFVS870
APPLICANT:	LG Electronics MobileComm U.S.A

Application Type: Certification
Model(s): VS-870
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 v02

Mode	Tx Frequency (MHz)	Avg Conducted		Peak Conducted	
		Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)
802.11b	2412 - 2462	42.073	16.24	75.858	18.80
802.11g	2412 - 2462	22.233	13.47	128.825	21.10
802.11n	2412 - 2462	16.827	12.26	98.855	19.95
802.11a	5745 - 5825	21.627	13.35	113.501	20.55
802.11n (20MHz)	5745 - 5825	15.453	11.89	79.068	18.98
802.11n (40MHz)	5755 - 5795	16.596	12.20	107.399	20.31

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

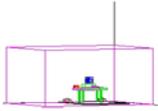


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MEASUREMENT REPORT

FCC Part 15.247

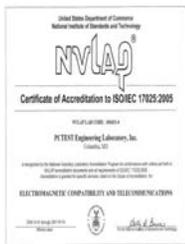


§ 2.1033 General Information

APPLICANT: LG Electronics MobileComm U.S.A
APPLICANT ADDRESS: 1000 Sylvan Avenue
 Englewood Cliffs, NJ 07632, United States
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: VS-870
FCC ID: ZNFVS870
Test Device Serial No.: WiFi#2, WiFi RSE Production Pre-Production Engineering
FCC CLASSIFICATION: Digital Transmission System (DTS)
DATE(S) OF TEST: Nov. 27 - Dec. 17, 2012
TEST REPORT S/N: 0Y1211261704.ZNF

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.

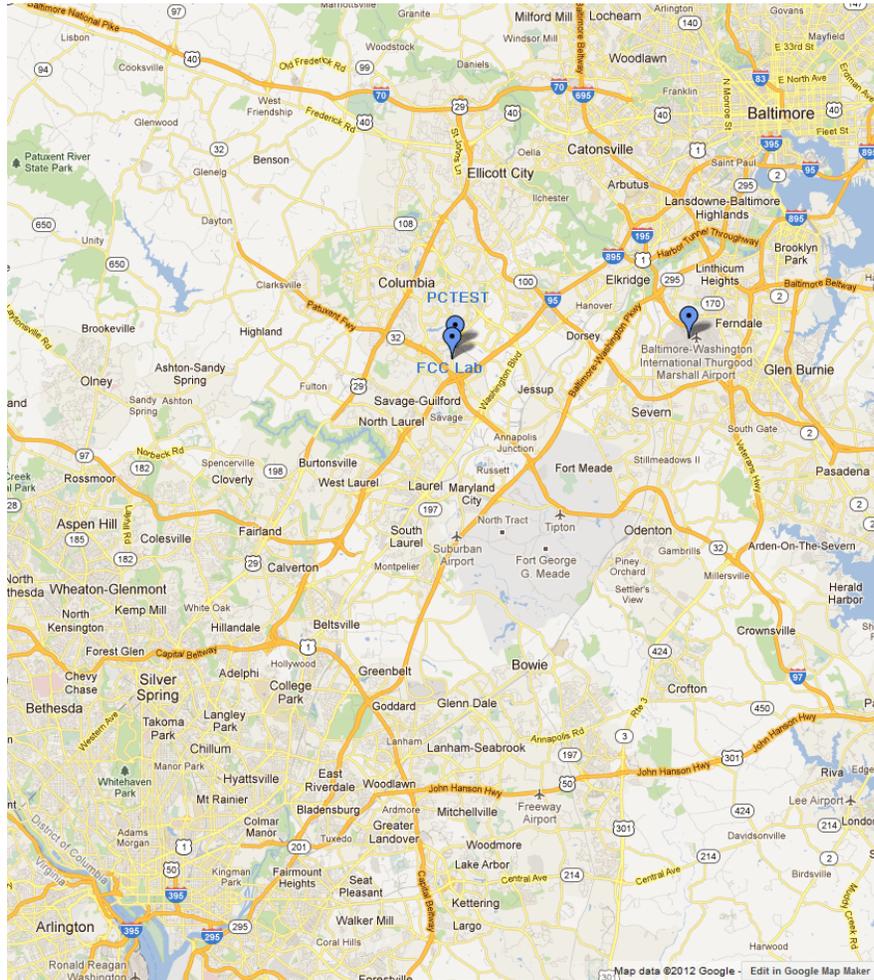


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **LG Portable Handset FCC ID: ZNFVS870**. The test data contained in this report pertains only to the emissions due to the EUT's WLAN transmitter.

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1), Band 13 LTE, 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 LG Portable Handset FCC ID: ZNFVS870 was tested per the guidance of ANSI C63.10-2009 and KDB 558074. See Sections 3.2, 3.3, and 3.4 for radiated emissions, and antenna port conducted emissions test setups, respectively.

Per KDB 648474 D03 v01r01, spurious emissions measurement data was also investigated with the wireless charging battery cover. The handset was placed on the representative charging pad under normal conditions and in a simulated call configuration. Only worst case emissions are shown in this report. Line conducted emissions testing was performed with the EUT's standard battery cover and its wireless charging battery cover. Only worst case emissions are reported. Worst case setup for radiated spurious emissions was with the standard battery cover. Worst case setup for AC line conducted emissions was with wireless charging enabled.

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 **LG Portable Handset FCC ID: ZNFVS870**.

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 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 **LG Portable Handset FCC ID: ZNFVS870** 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

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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)	7/10/2012	Annual	7/10/2013	N/A
-	WL25-1	Conducted WLAN Cable Set (25GHz)	2/13/2012	Annual	2/13/2013	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	10/9/2012	Annual	10/9/2013	US46470561
Anritsu	MA2411B	Power Sensor	3/5/2012	Annual	3/5/2013	846215
Anritsu	ML2495A	Power Meter	10/10/2012	Annual	10/10/2013	1039008
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	Annual	5/30/2013	135427
Mini-Circuits	VHF-8400+	3.4GHz - 9.9GHz High Pass Filter	2/28/2012	Annual	2/28/2013	31048
Rohde & Schwarz	RS-PR18	1-18 GHz Pre-Amplifier	6/26/2012	Annual	6/26/2013	100071
Rohde & Schwarz	RS-PR26	18-26.5 GHz Pre-Amplifier	5/30/2012	Annual	5/30/2013	100040
Rohde & Schwarz	ESU40	EMI Test Receiver	12/1/2012	Annual	12/1/2013	100342
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

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6.0 TEST RESULTS

6.1 Summary

Company Name: LG Electronics MobileComm U.S.A
 FCC ID: ZNFVS870
 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
TRANSMITTER MODE (TX)						
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 ≥ 20dBc		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
RECEIVER MODE (RX) / DIGITAL EMISSIONS						
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	9.064	0.500	Pass
2437	6	b	1	9.044	0.500	Pass
2462	11	b	1	9.039	0.500	Pass
2412	1	g	6	14.48	0.500	Pass
2437	6	g	6	15.13	0.500	Pass
2462	11	g	6	15.12	0.500	Pass
2412	1	n	6.5/7.2 (MCS0)	15.14	0.500	Pass
2437	6	n	6.5/7.2 (MCS0)	15.13	0.500	Pass
2462	11	n	6.5/7.2 (MCS0)	15.12	0.500	Pass
5745	149	a	6	15.50	0.500	Pass
5785	157	a	6	15.13	0.500	Pass
5825	165	a	6	14.22	0.500	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.07	0.500	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	13.89	0.500	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.52	0.500	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	35.08	0.500	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	35.01	0.500	Pass

Table 6-2. Conducted Bandwidth Measurements

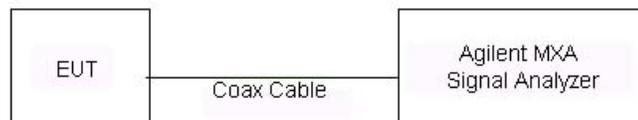
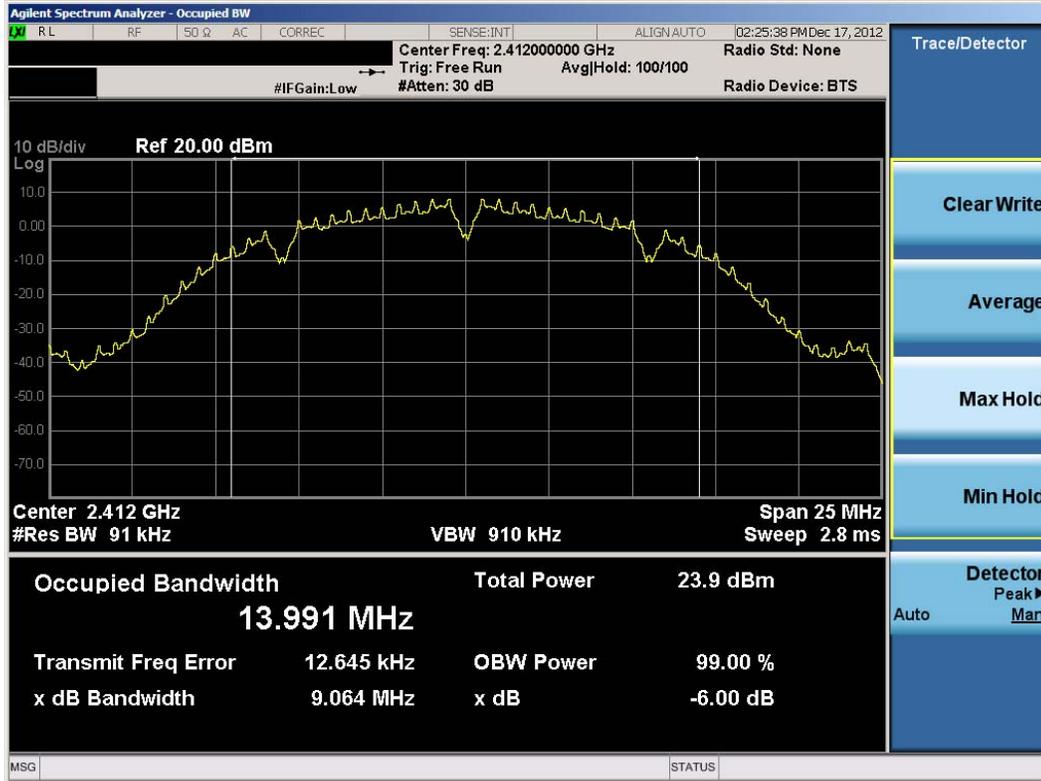
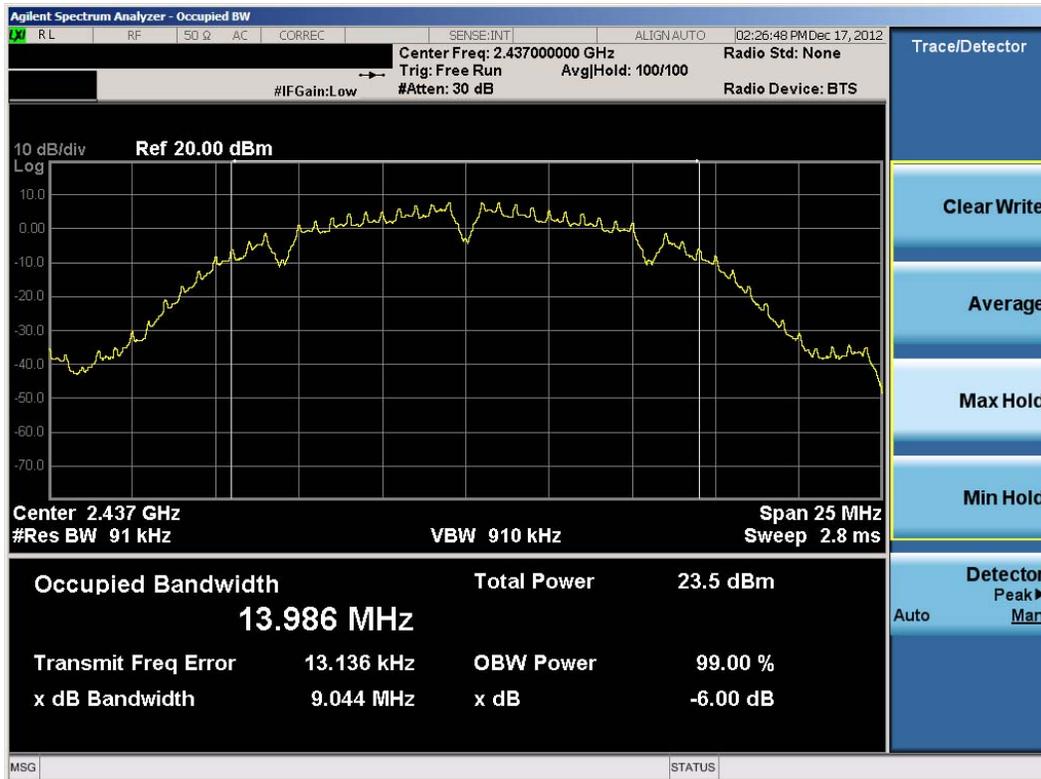


Figure 6-1. Test Instrument & Measurement Setup

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset	Page 11 of 62	

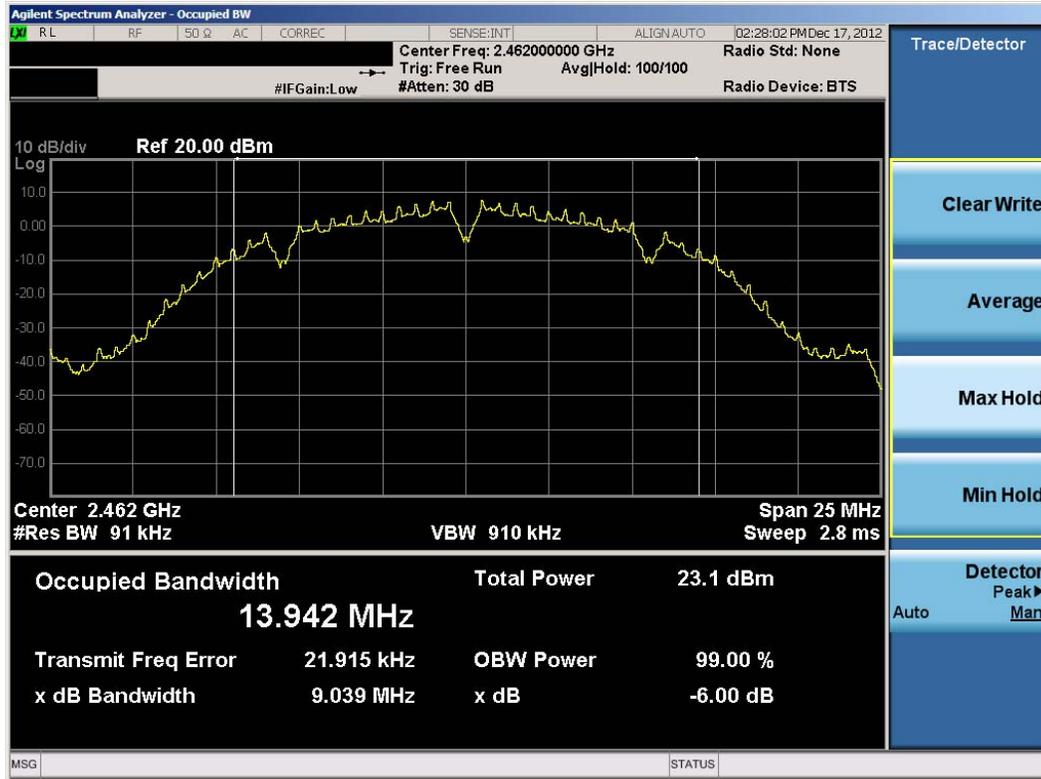


Plot 6-1. 6dB Bandwidth Plot (802.11b – Ch. 1)

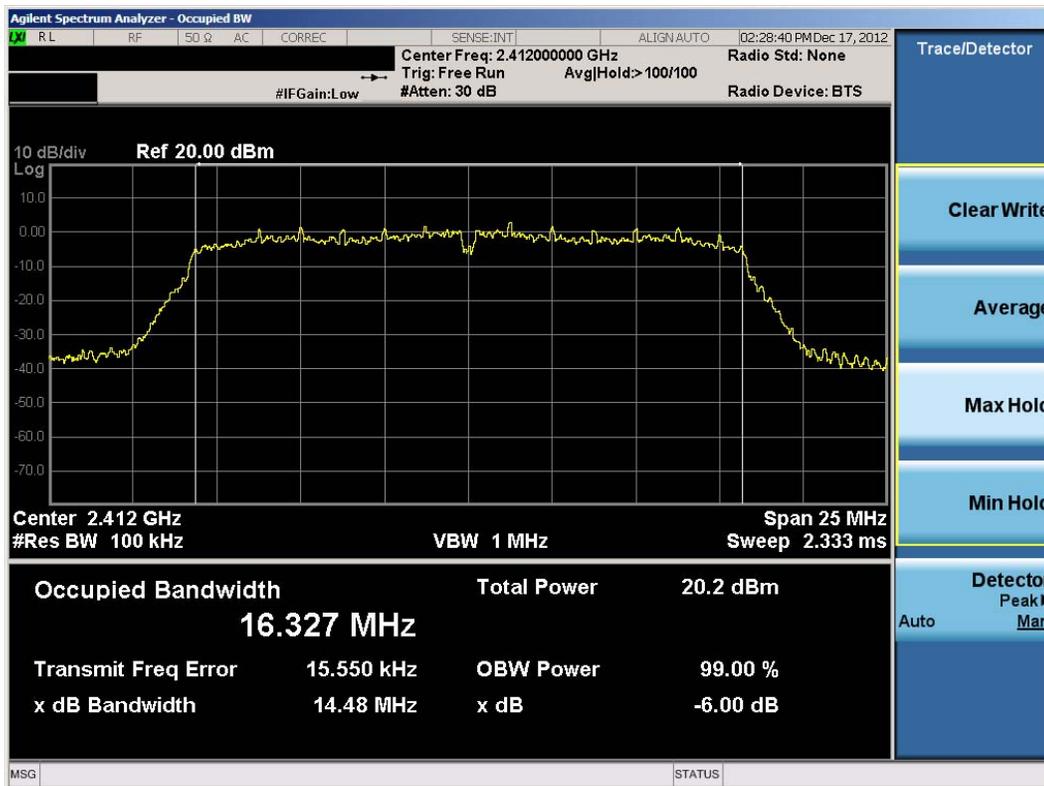


Plot 6-2. 6dB Bandwidth Plot (802.11b – Ch. 6)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 12 of 62

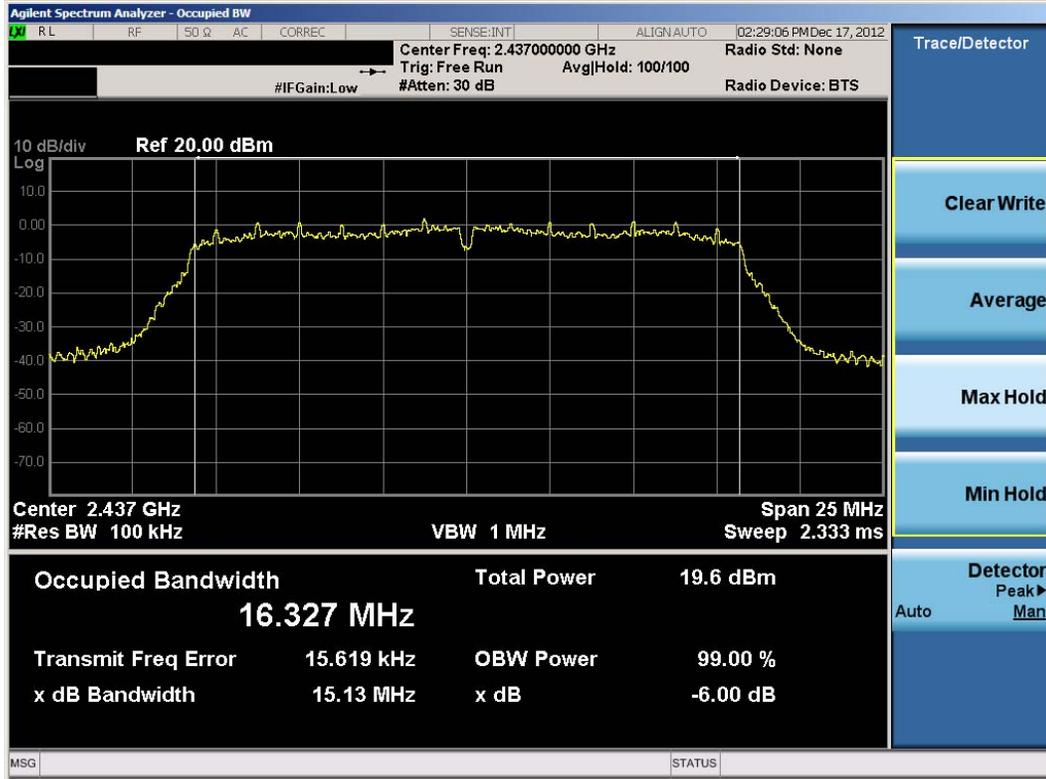


Plot 6-3. 6dB Bandwidth Plot (802.11b – Ch. 11)

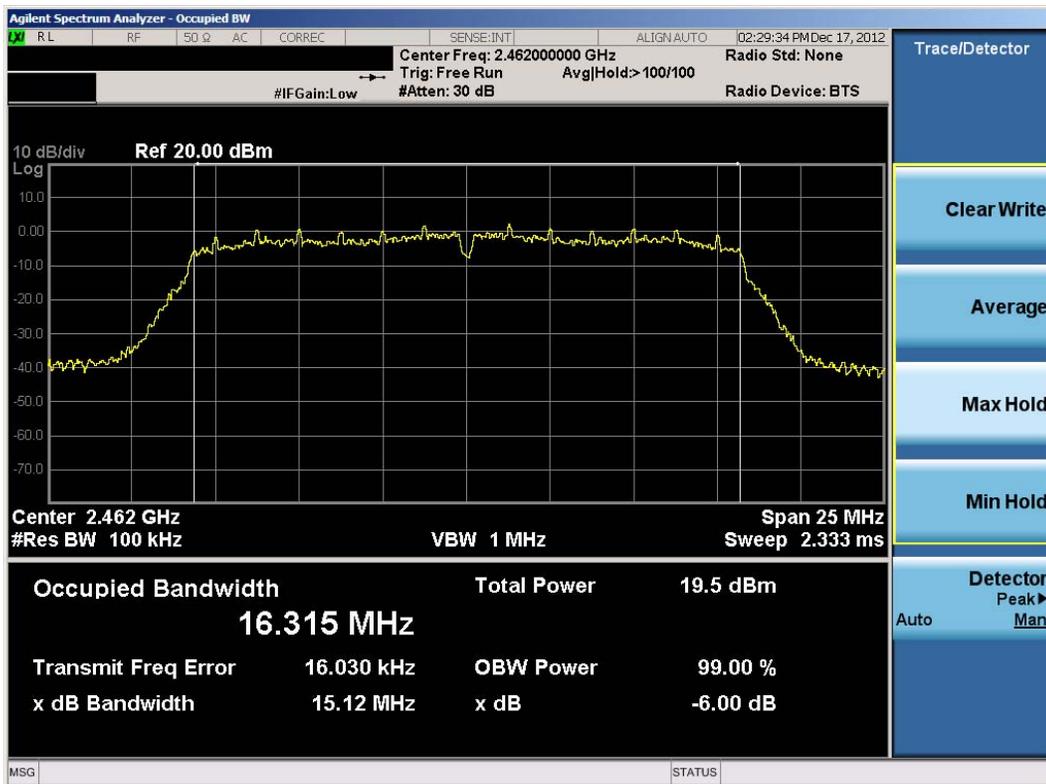


Plot 6-4. 6dB Bandwidth Plot (802.11g – Ch. 1)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 13 of 62

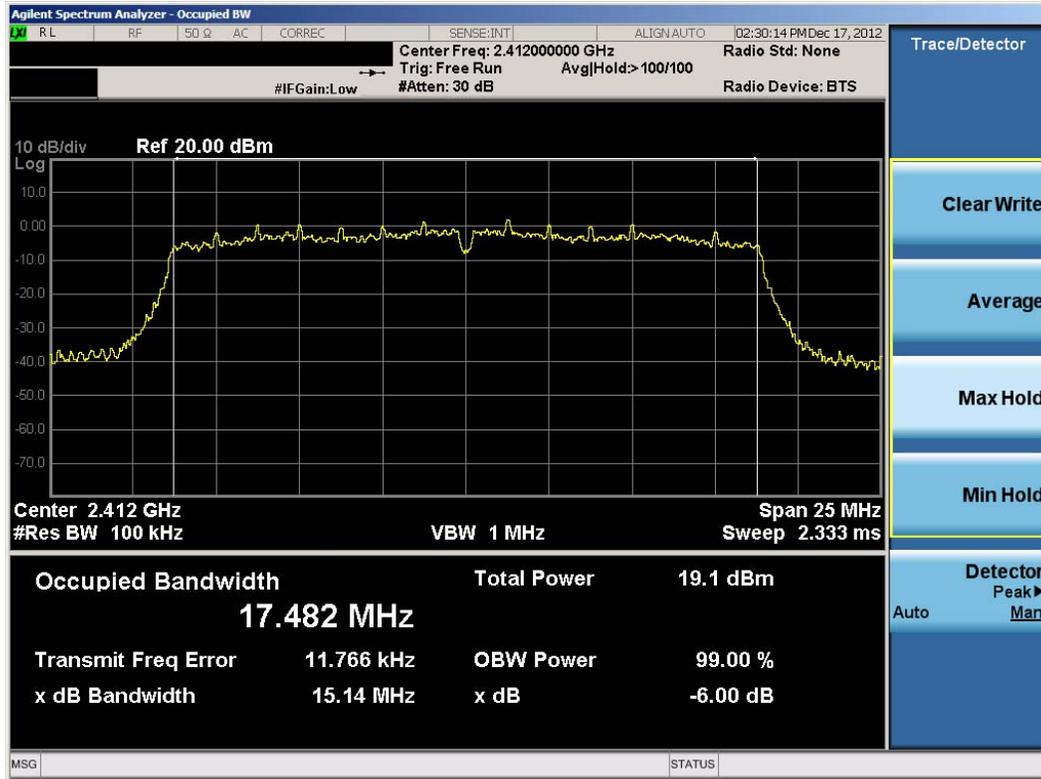


Plot 6-5. 6dB Bandwidth Plot (802.11g – Ch. 6)

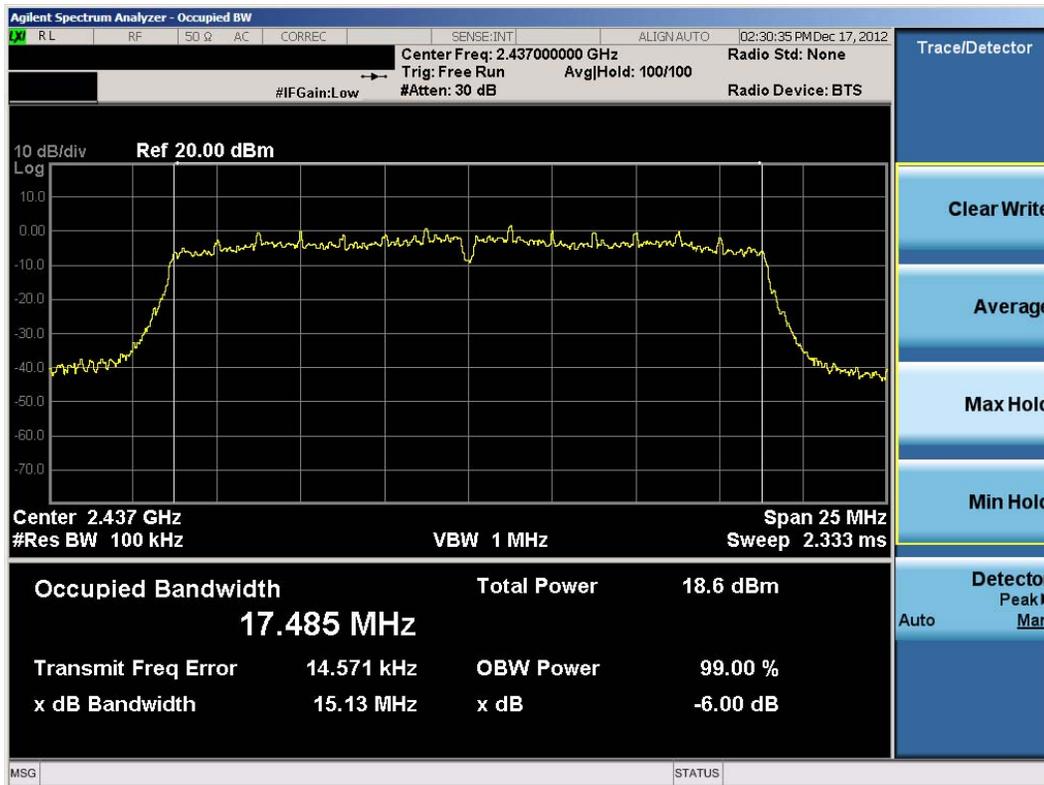


Plot 6-6. 6dB Bandwidth Plot (802.11g – Ch. 11)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 14 of 62

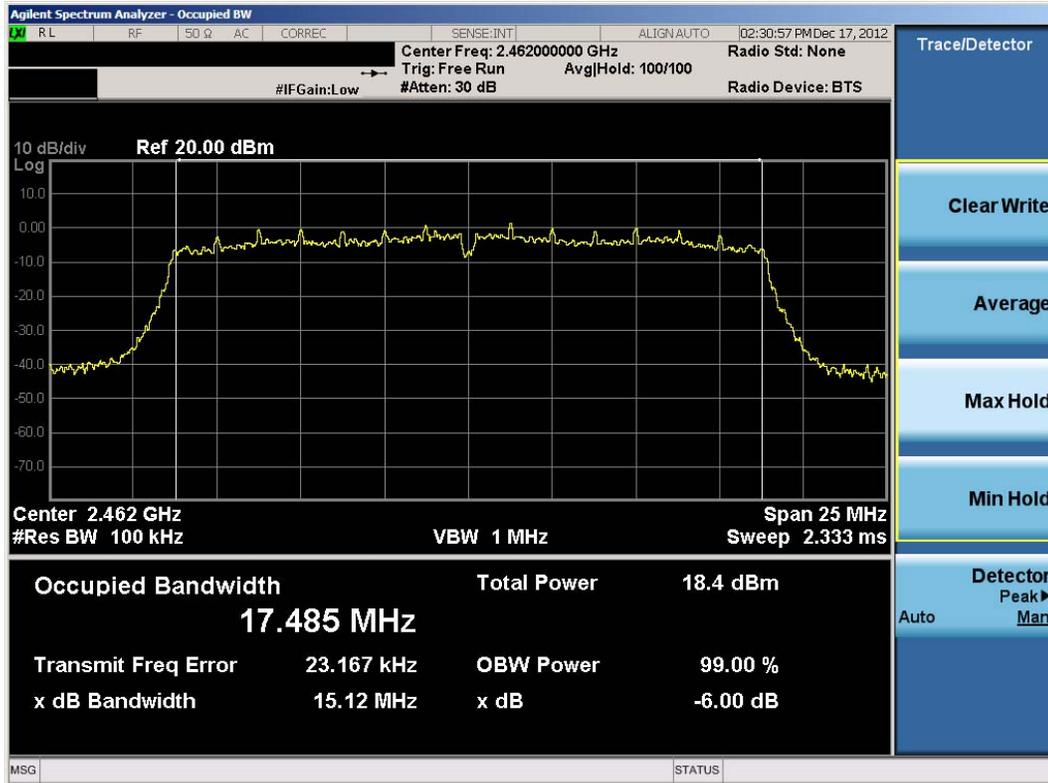


Plot 6-7. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 1)

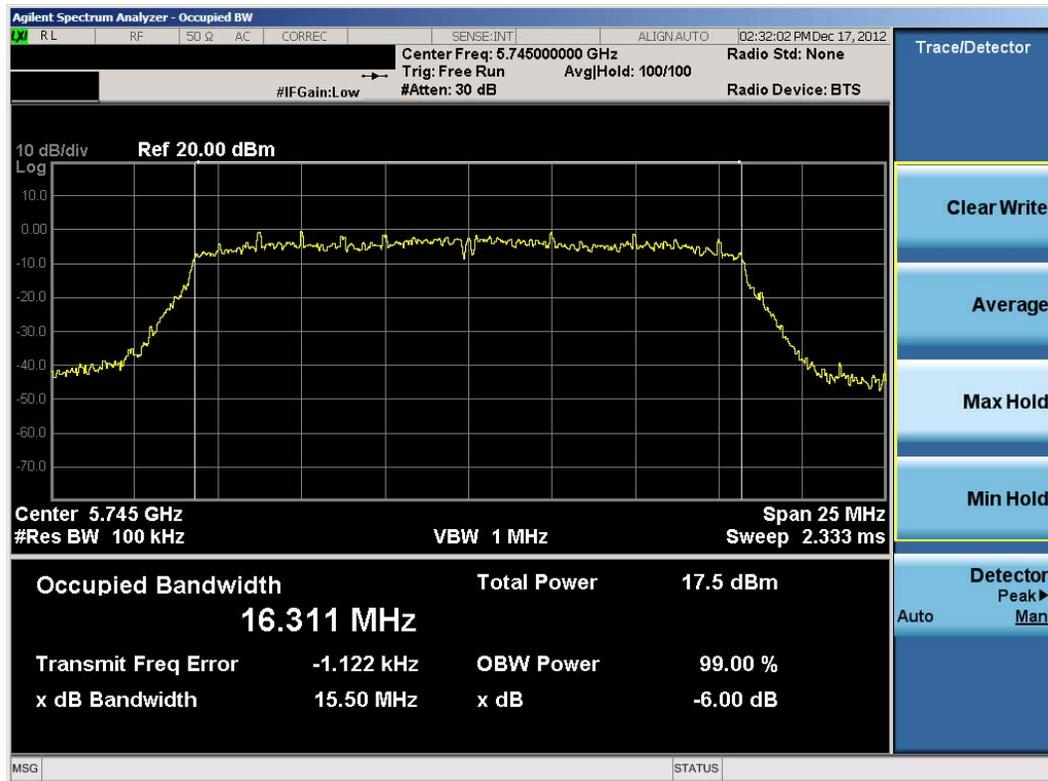


Plot 6-8. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 15 of 62

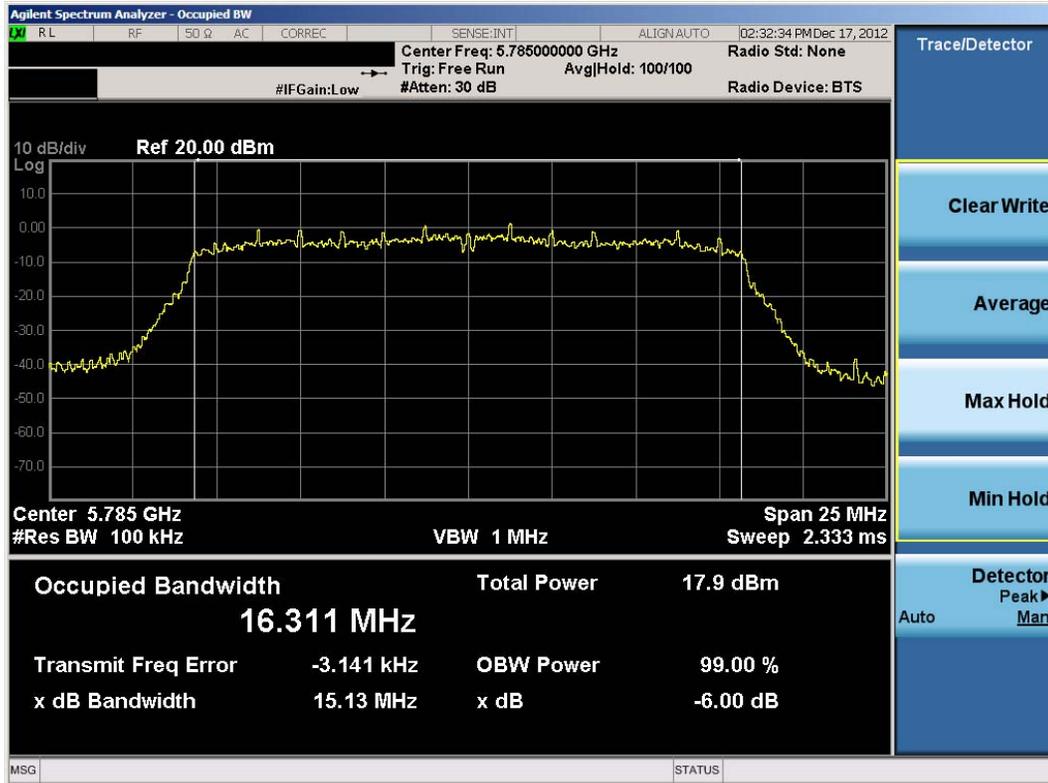


Plot 6-9. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 11)

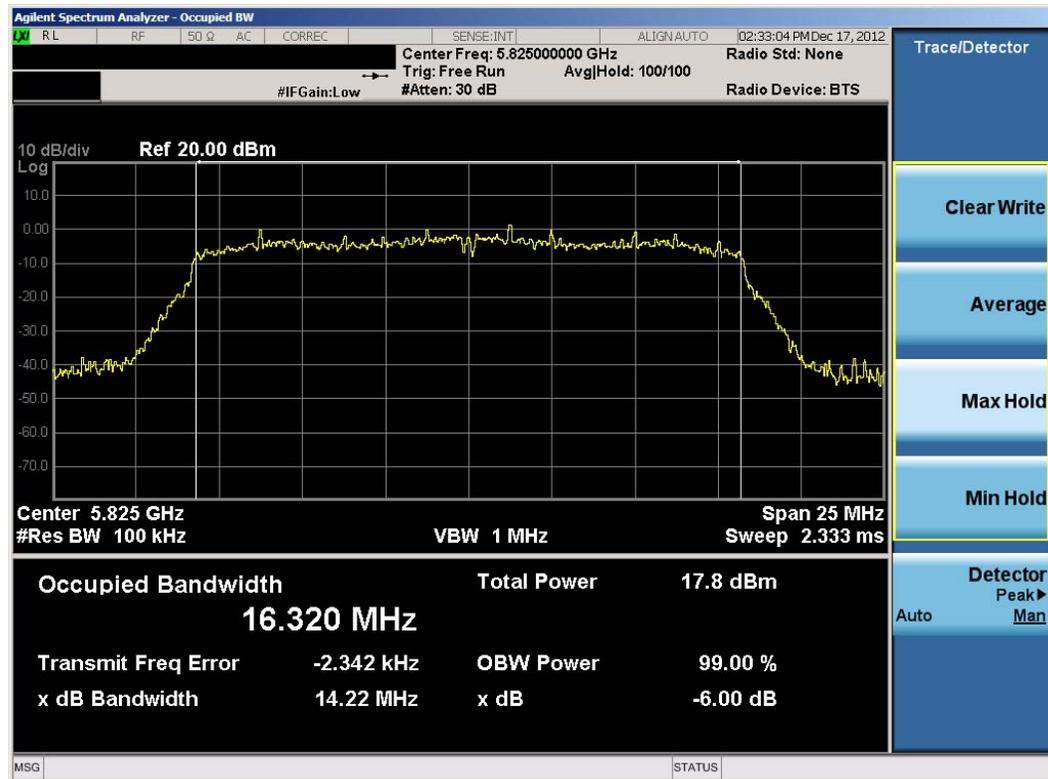


Plot 6-10. 6dB Bandwidth Plot (802.11a – Ch. 149)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 16 of 62

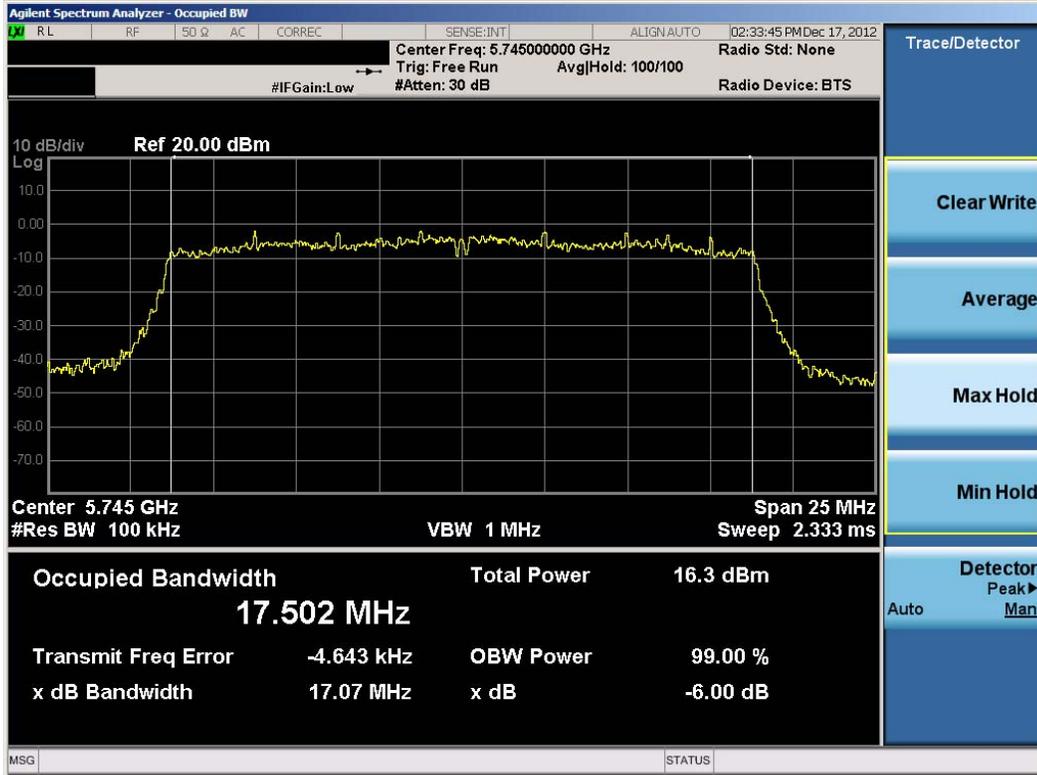


Plot 6-11. 6dB Bandwidth Plot (802.11a – Ch. 157)

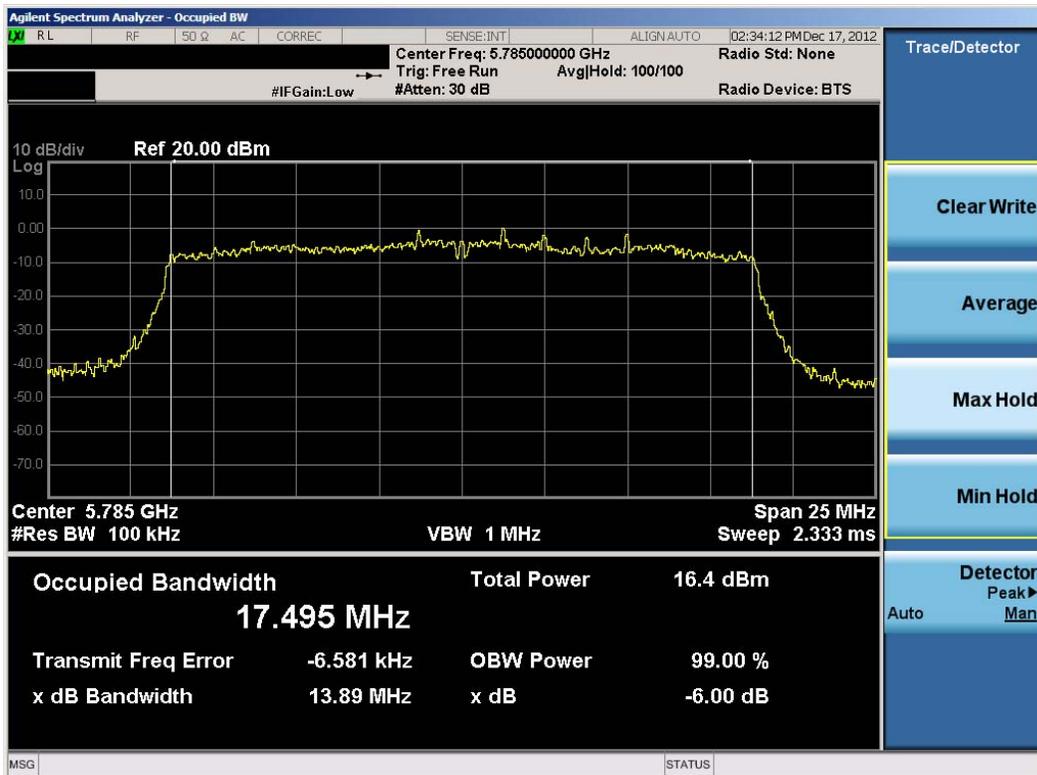


Plot 6-12. 6dB Bandwidth Plot (802.11a – Ch. 165)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 17 of 62

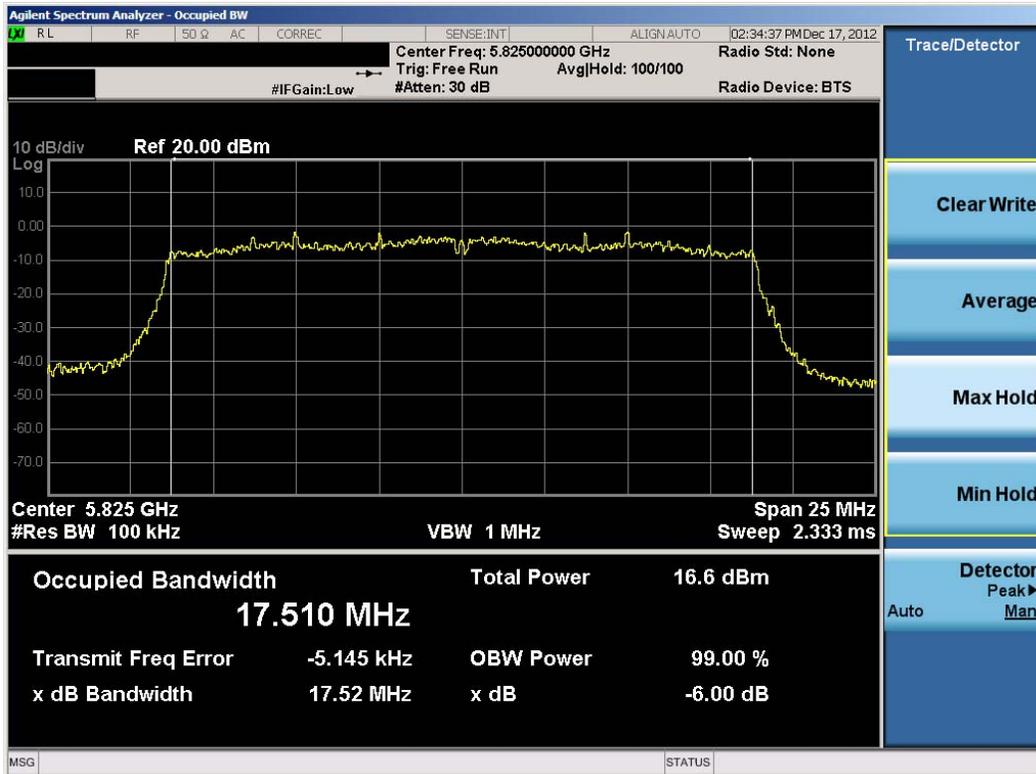


Plot 6-13. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

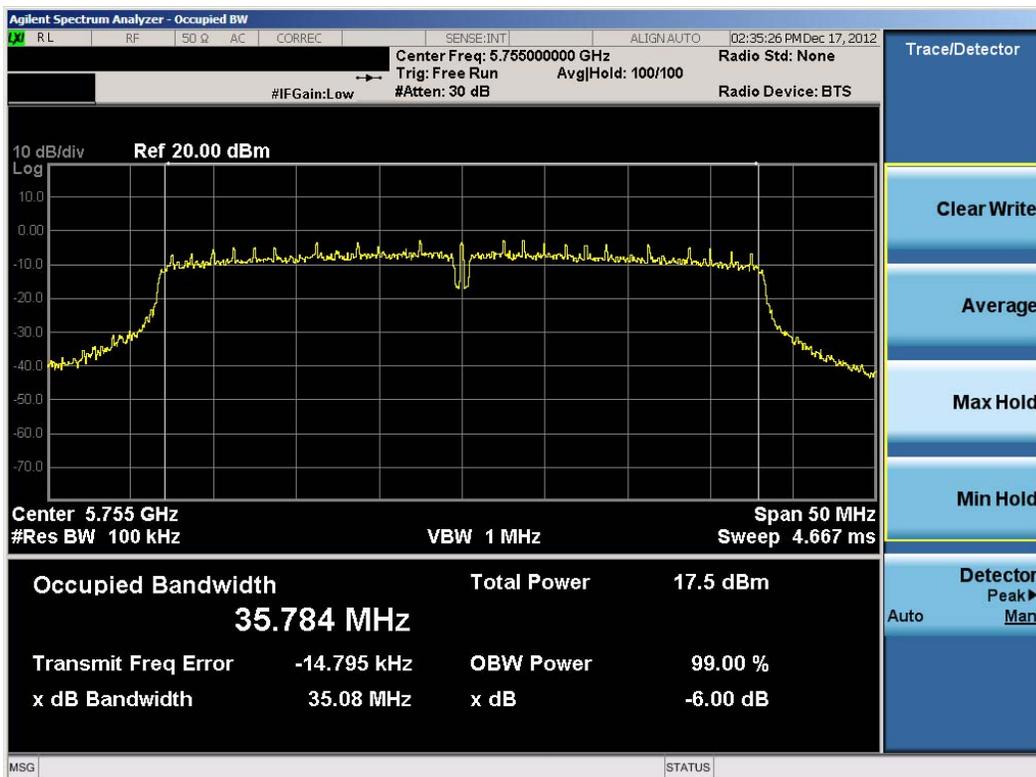


Plot 6-14. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 18 of 62

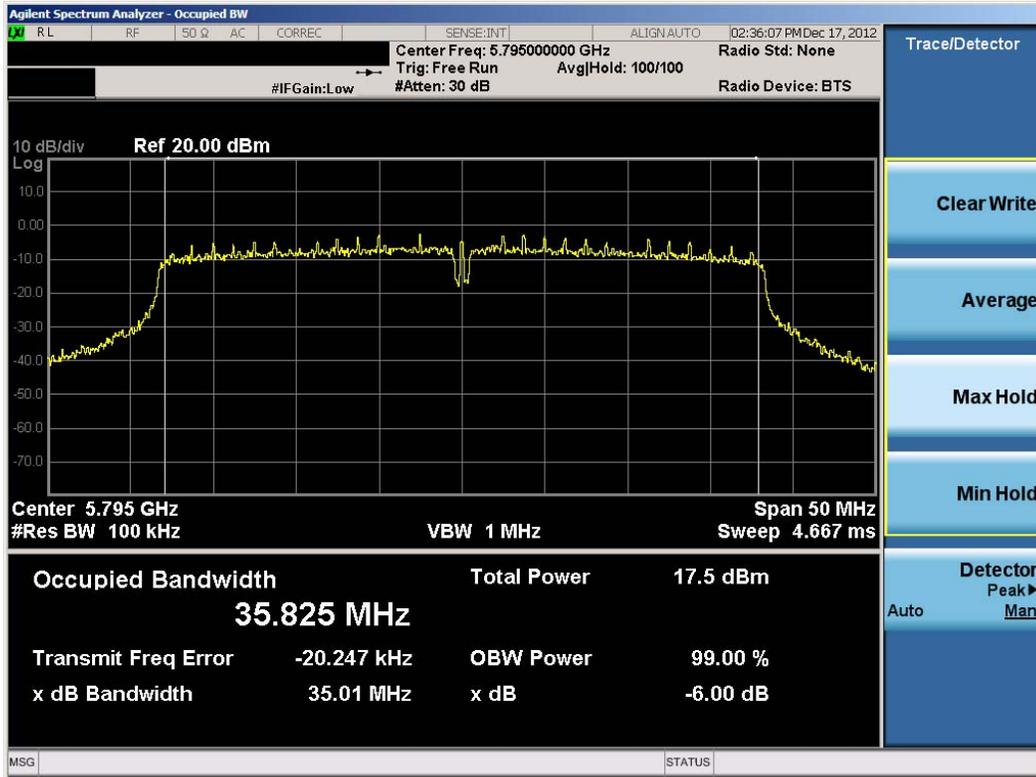


Plot 6-15. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



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

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 19 of 62



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

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 20 of 62

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	16.24	16.16	16.24	16.18
			PEAK	18.80	18.68	18.64	18.63
802.11b	2437	6	AVG	15.70	15.75	15.82	15.81
			PEAK	18.28	18.29	18.24	18.29
802.11b	2462	11	AVG	15.30	15.29	15.47	15.44
			PEAK	17.87	17.87	17.92	17.94

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	13.14	12.87	12.82	12.88	13.37	13.43	13.47	13.44
			PEAK	20.80	20.61	20.46	20.70	20.97	21.05	21.03	21.10
802.11g	2437	6	AVG	13.15	13.04	13.10	12.95	13.09	13.17	13.13	13.07
			PEAK	20.71	20.71	20.81	20.52	20.79	20.81	20.86	20.70
802.11g	2462	11	AVG	12.82	12.66	12.78	12.71	12.75	12.78	12.80	12.20
			PEAK	20.41	20.37	20.63	20.53	20.47	20.53	20.66	19.89

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	12.15	12.21	12.17	12.18	12.17	12.22	12.26	12.24
			PEAK	19.63	19.88	19.75	19.95	19.71	19.77	19.76	19.88
802.11n	2437	6	AVG	11.83	11.81	11.80	11.85	11.80	11.74	11.78	11.78
			PEAK	19.32	19.47	19.45	19.78	19.45	19.29	19.62	19.46
802.11n	2462	11	AVG	11.42	11.46	11.41	11.38	11.42	11.42	11.39	11.42
			PEAK	19.15	19.20	19.10	19.29	19.24	19.08	19.10	19.29

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

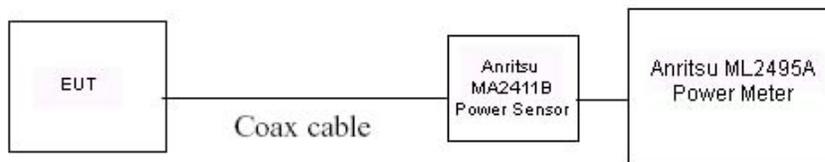


Figure 6-2. Test Instrument & Measurement Setup

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset	Page 21 of 62	

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	12.91	12.93	12.82	12.81	12.77	12.78	12.77	12.64
			PEAK	20.20	20.24	20.25	20.13	19.98	20.15	20.11	20.11
802.11a	5765	153	AVG	12.97	13.00	12.93	12.91	12.92	12.90	12.86	12.95
			PEAK	20.26	20.48	20.46	20.40	20.44	20.43	20.40	20.38
802.11a	5785	157	AVG	13.02	12.98	12.94	12.88	12.94	12.95	12.92	12.89
			PEAK	20.29	20.34	20.20	20.06	20.20	20.17	20.03	20.25
802.11a	5805	161	AVG	13.04	13.00	12.97	13.00	12.96	12.91	12.91	12.80
			PEAK	20.33	20.41	20.32	20.42	20.39	20.22	20.41	20.13
802.11a	5825	165	AVG	13.19	13.35	13.29	13.22	13.18	13.12	13.10	13.15
			PEAK	20.45	20.48	20.55	20.35	20.37	20.26	20.31	20.22

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	11.50	11.47	11.57	11.48	11.40	11.41	11.37	11.40
			PEAK	18.52	18.66	18.71	18.65	18.35	18.59	18.41	18.46
802.11n	5765	153	AVG	11.70	11.75	11.74	11.89	11.69	11.89	11.67	11.73
			PEAK	18.73	18.62	18.53	18.67	18.65	18.88	18.89	18.98
802.11n	5785	157	AVG	11.64	11.51	11.42	11.45	11.40	11.36	11.26	11.30
			PEAK	18.72	18.52	18.61	18.71	18.70	18.45	18.29	18.52
802.11n	5805	161	AVG	11.73	11.78	11.70	11.75	11.62	11.66	11.61	11.50
			PEAK	18.75	18.55	18.60	18.86	18.40	18.64	18.60	18.40
802.11n	5825	165	AVG	11.64	11.61	11.50	11.49	11.45	11.43	11.33	11.37
			PEAK	18.75	18.89	18.77	18.93	18.96	18.87	18.68	18.79

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	12.20	12.18	12.01	12.11	11.95	11.99	11.91	11.92
			PEAK	20.31	19.61	19.55	19.74	19.42	19.31	19.57	19.50
802.11n	5775	155	AVG	12.24	12.24	12.10	12.21	12.05	12.06	12.11	12.04
			PEAK	20.23	19.69	19.40	19.71	19.39	19.34	19.44	19.58

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

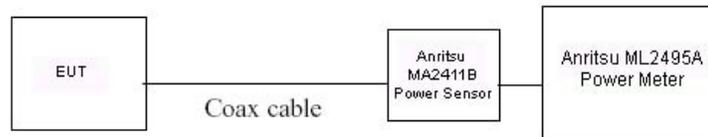


Figure 6-3. Test Instrument & Measurement Setup

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset	Page 22 of 62	

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 v02, the spectrum is measured with a resolution bandwidth of greater than or equal to 3kHz using a peak detector. The span is set to 1.5 times the DTS channel bandwidth. The measured spectrum is compared to the 8dBm/3kHz limit given in 15.247(e).

Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm / 3kHz]	Margin [dB]	Pass / Fail
2412	1	b	1	-0.098	8.0	-8.10	Pass
2437	6	b	1	-0.323	8.0	-8.32	Pass
2462	11	b	1	-0.776	8.0	-8.78	Pass
2412	1	g	6	-4.555	8.0	-12.56	Pass
2437	6	g	6	-4.698	8.0	-12.70	Pass
2462	11	g	6	-6.210	8.0	-14.21	Pass
2412	1	n	6.5/7.2 (MCS0)	-6.754	8.0	-14.75	Pass
2437	6	n	6.5/7.2 (MCS0)	-4.998	8.0	-13.00	Pass
2462	11	n	6.5/7.2 (MCS0)	-7.774	8.0	-15.77	Pass
5745	149	a	6	-3.139	8.0	-11.14	Pass
5785	157	a	6	-3.174	8.0	-11.17	Pass
5825	165	a	6	-3.610	8.0	-11.61	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	-4.458	8.0	-12.46	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	-3.392	8.0	-11.39	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	-4.318	8.0	-12.32	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	-3.228	8.0	-11.23	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	-3.426	8.0	-11.43	Pass

Table 6-9. Conducted Power Density Measurements

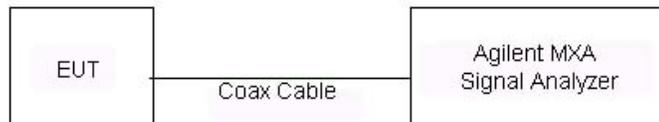
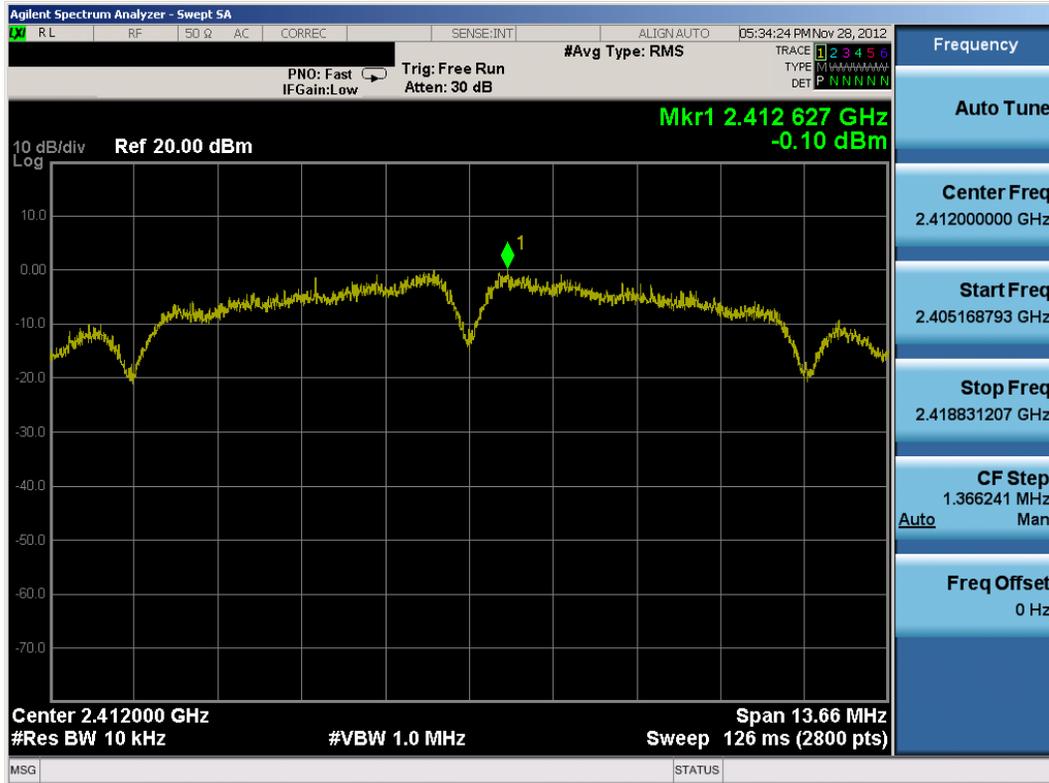
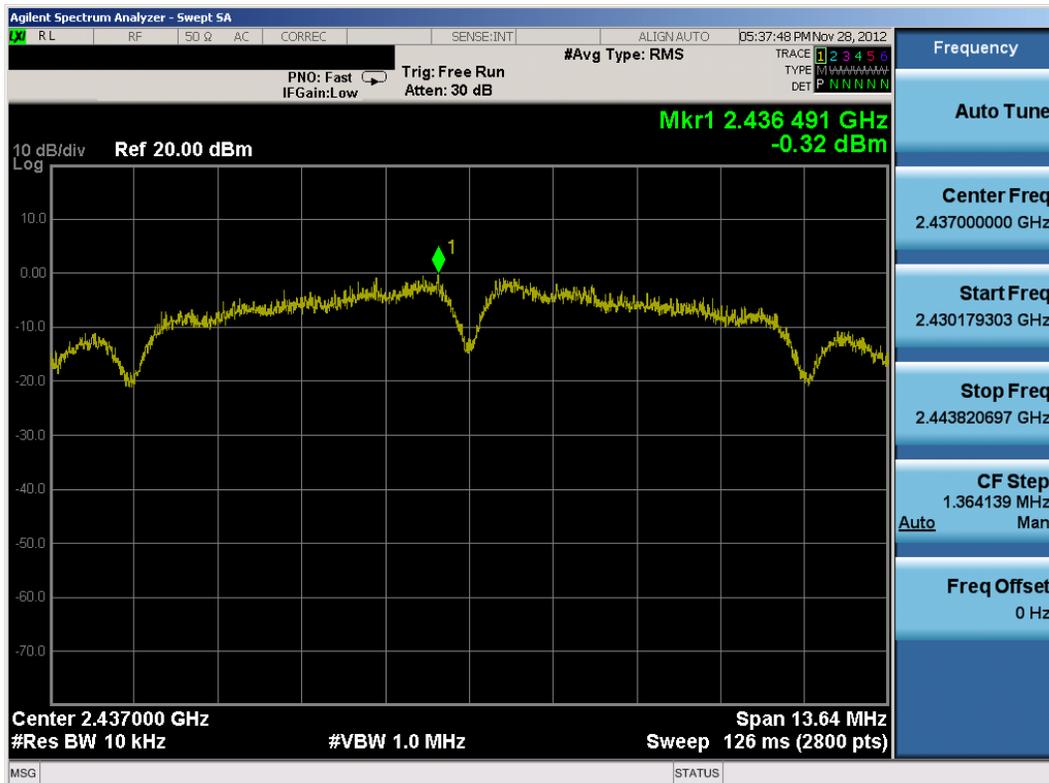


Figure 6-4. Test Instrument & Measurement Setup

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset	Page 23 of 62	



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

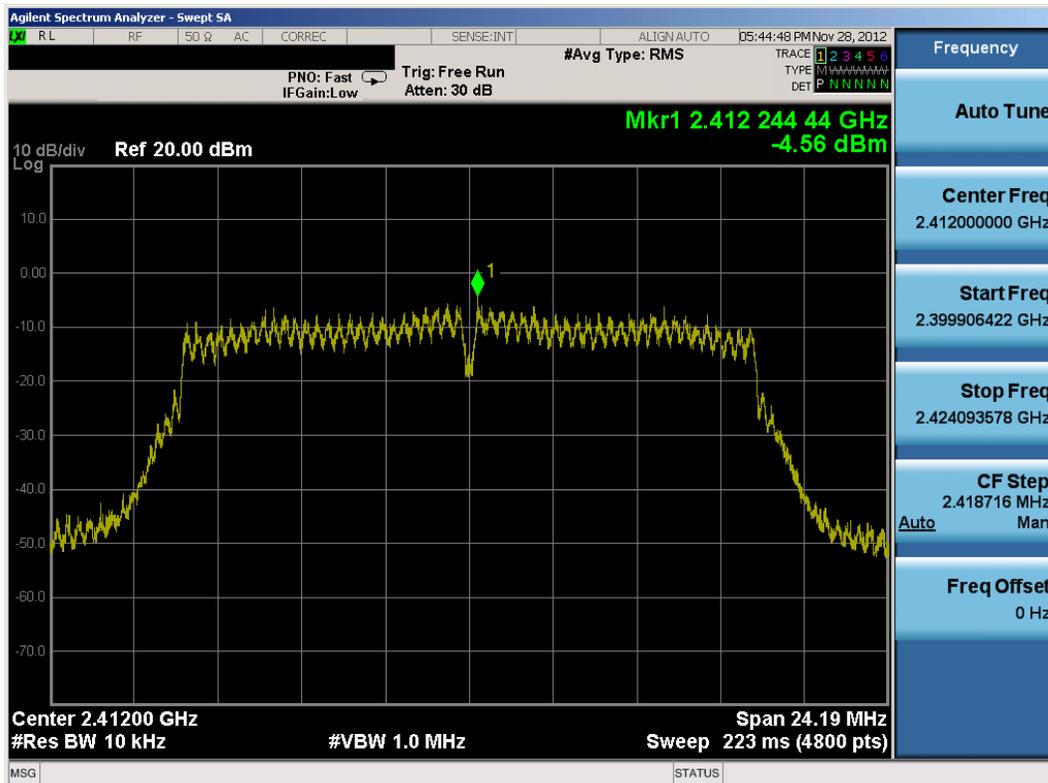


Plot 6-19. Power Spectral Density Plot (802.11b – Ch. 6)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 24 of 62

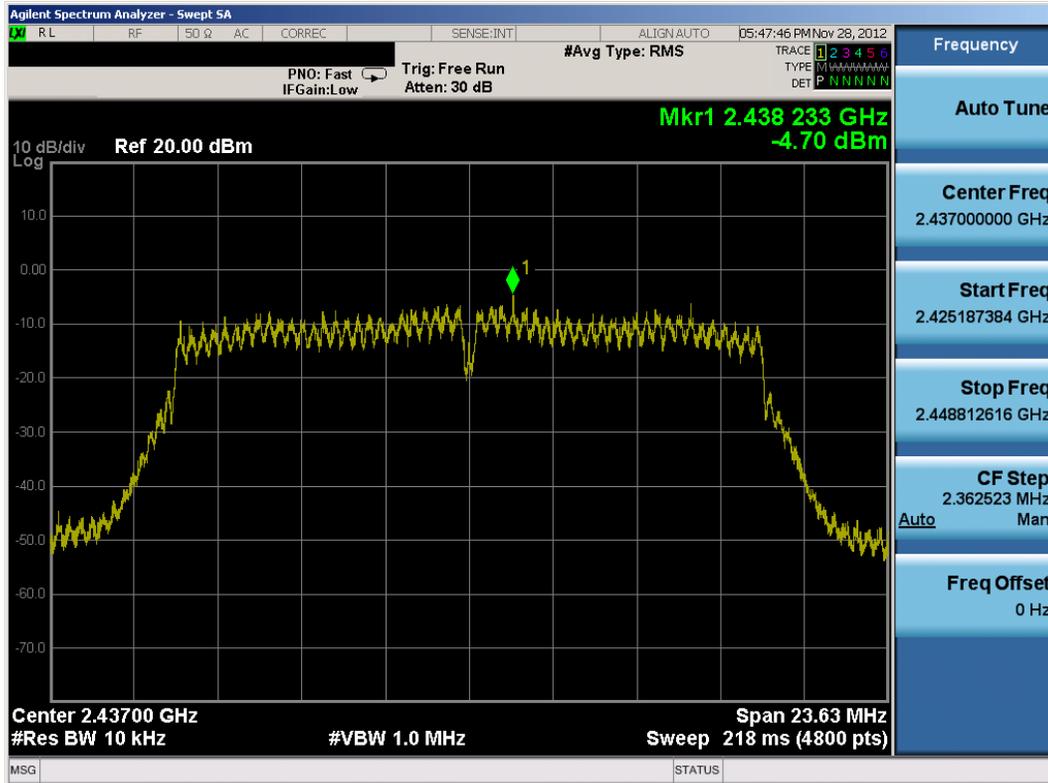


Plot 6-20. Power Spectral Density Plot (802.11b – Ch. 11)

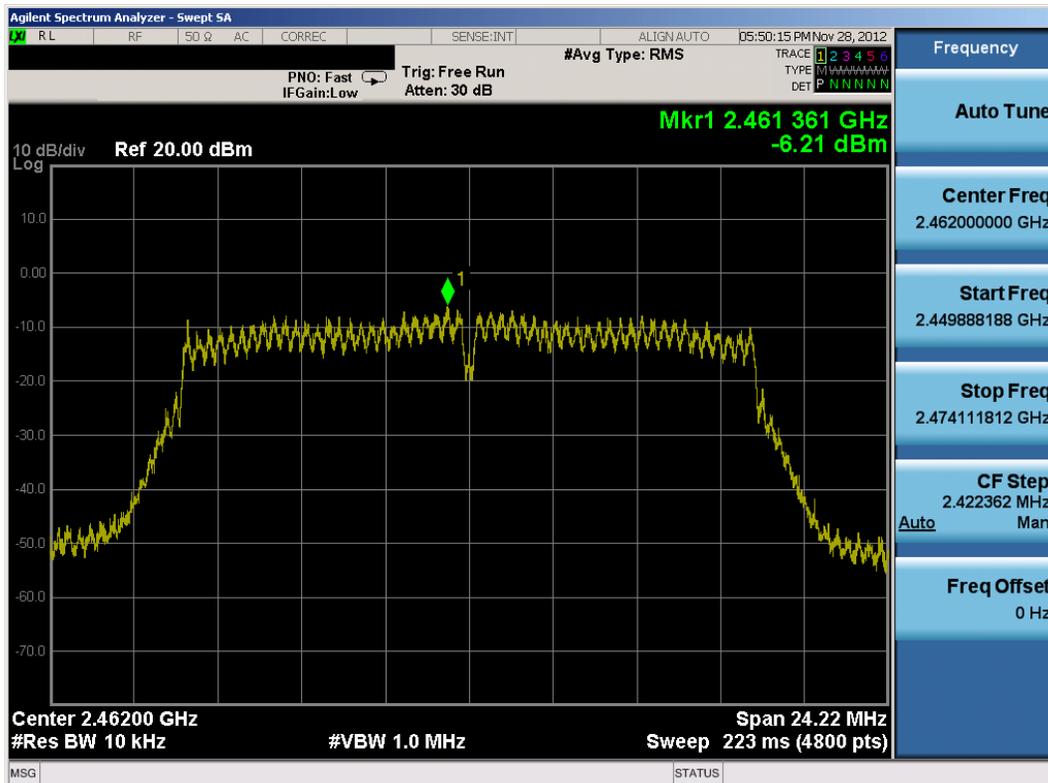


Plot 6-21. Power Spectral Density Plot (802.11g – Ch. 1)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 25 of 62

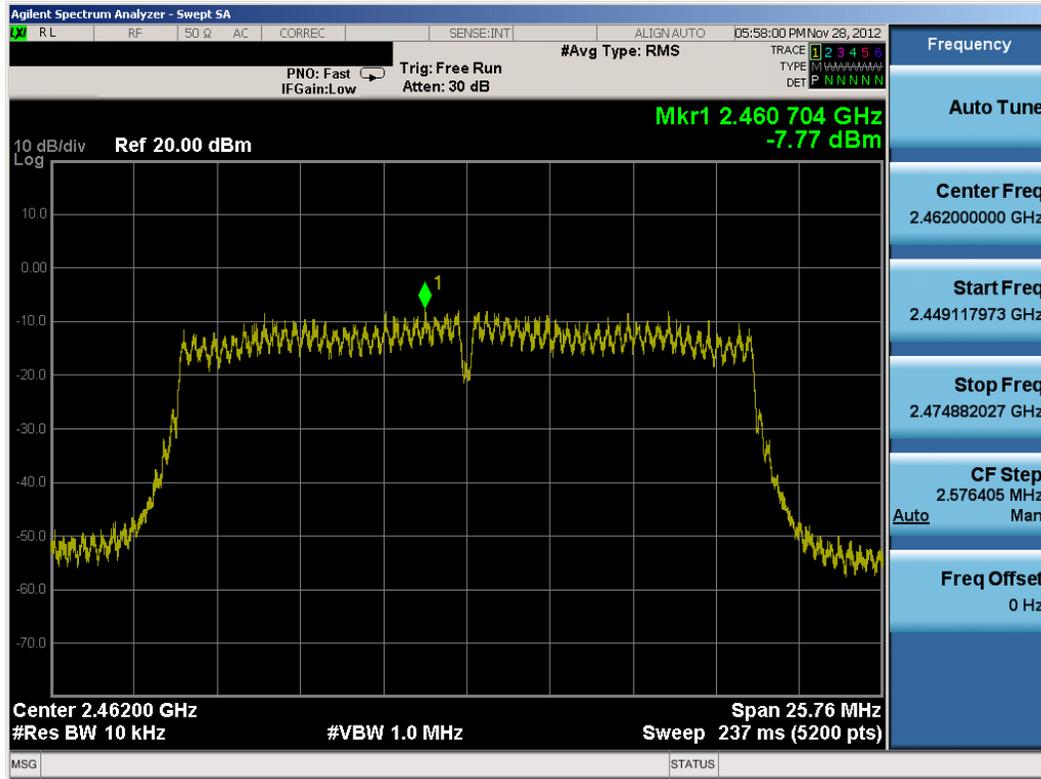


Plot 6-22. Power Spectral Density Plot (802.11g – Ch. 6)

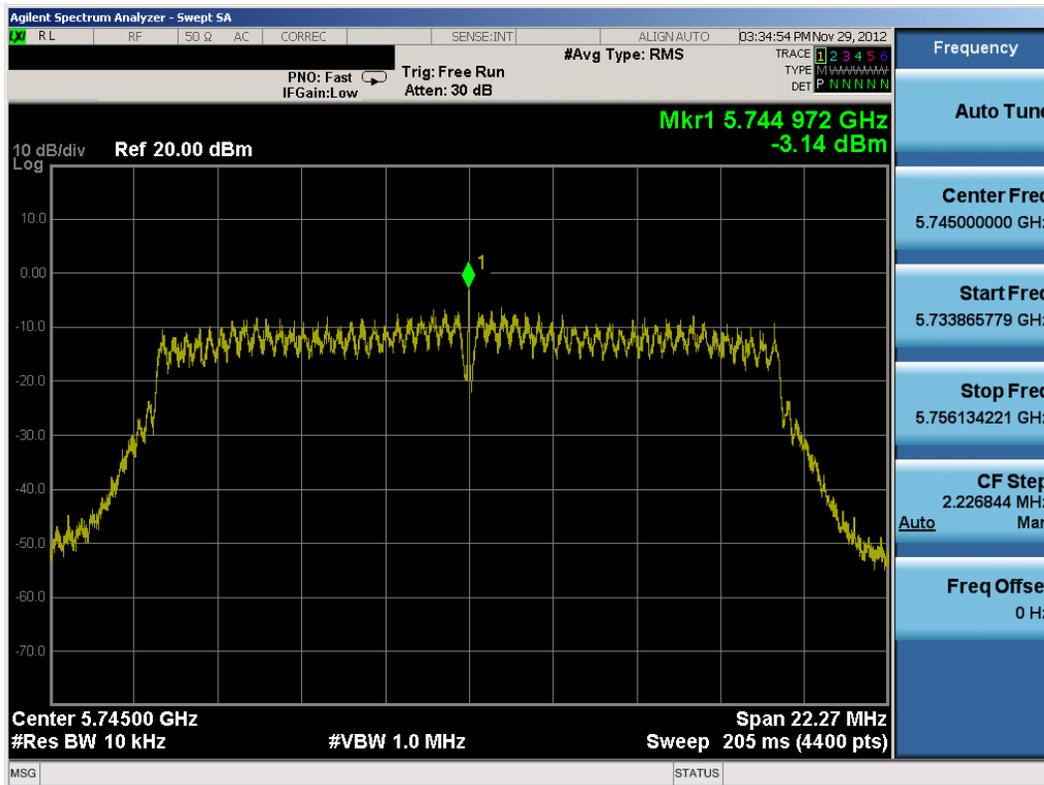


Plot 6-23. Power Spectral Density Plot (802.11g – Ch. 11)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 26 of 62

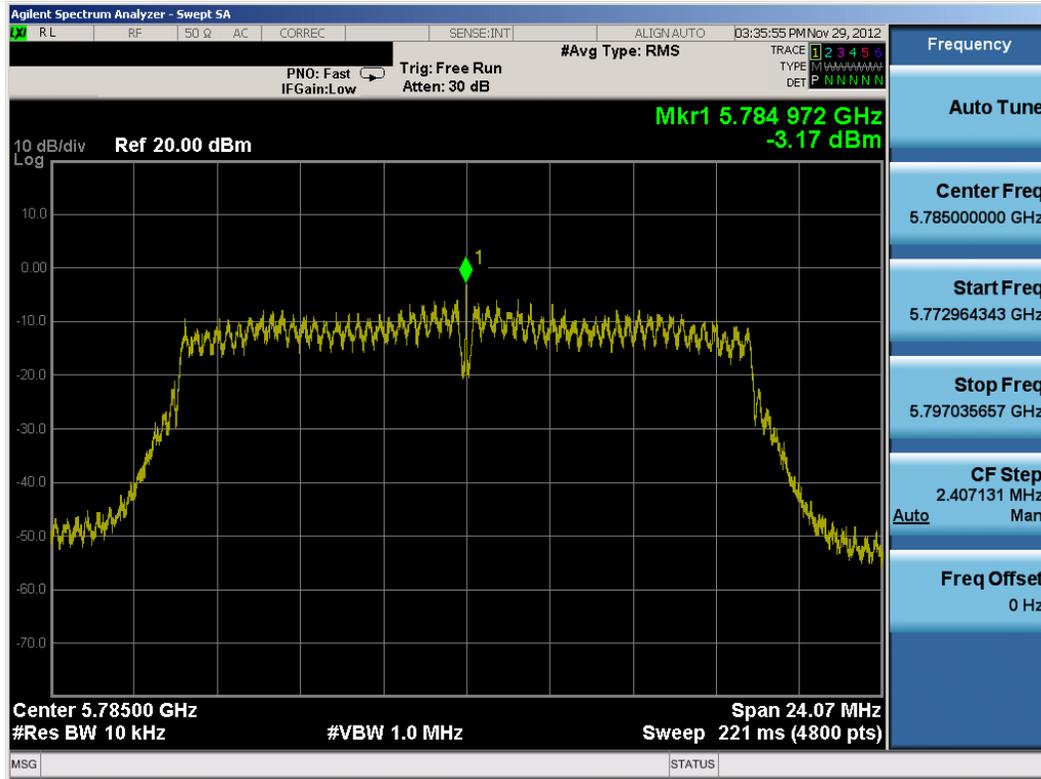


Plot 6-26. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)

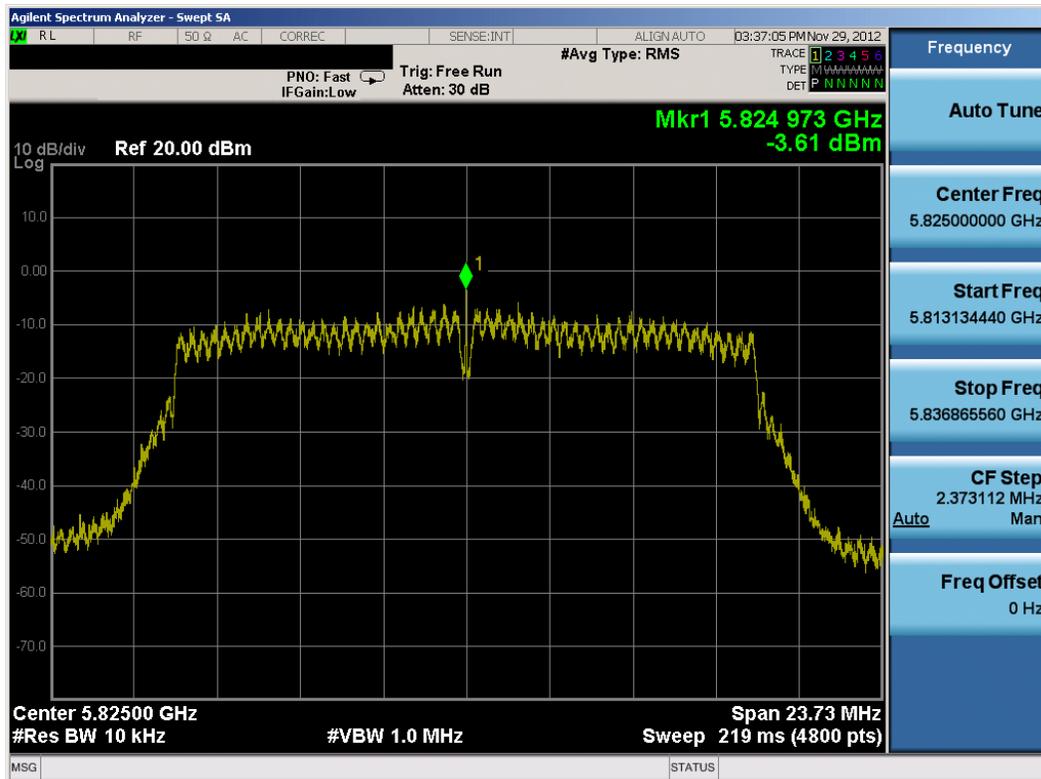


Plot 6-27. Power Spectral Density Plot (802.11a – Ch. 149)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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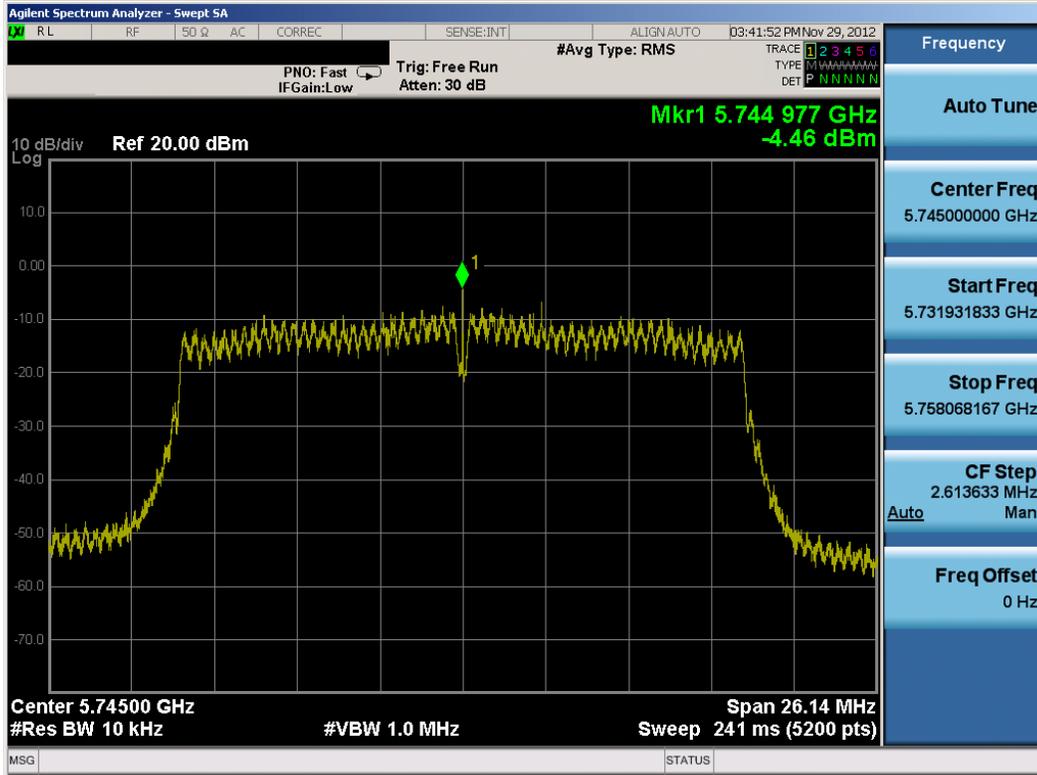


Plot 6-28. Power Spectral Density Plot (802.11a – Ch. 157)

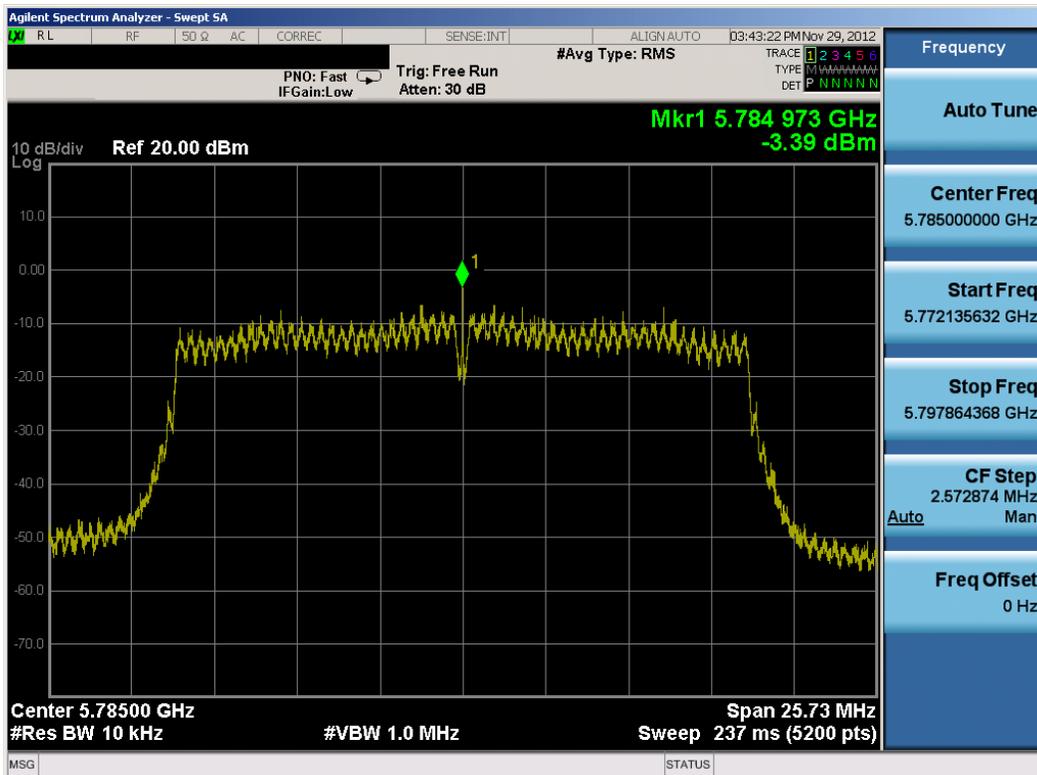


Plot 6-29. Power Spectral Density Plot (802.11a – Ch. 165)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 29 of 62

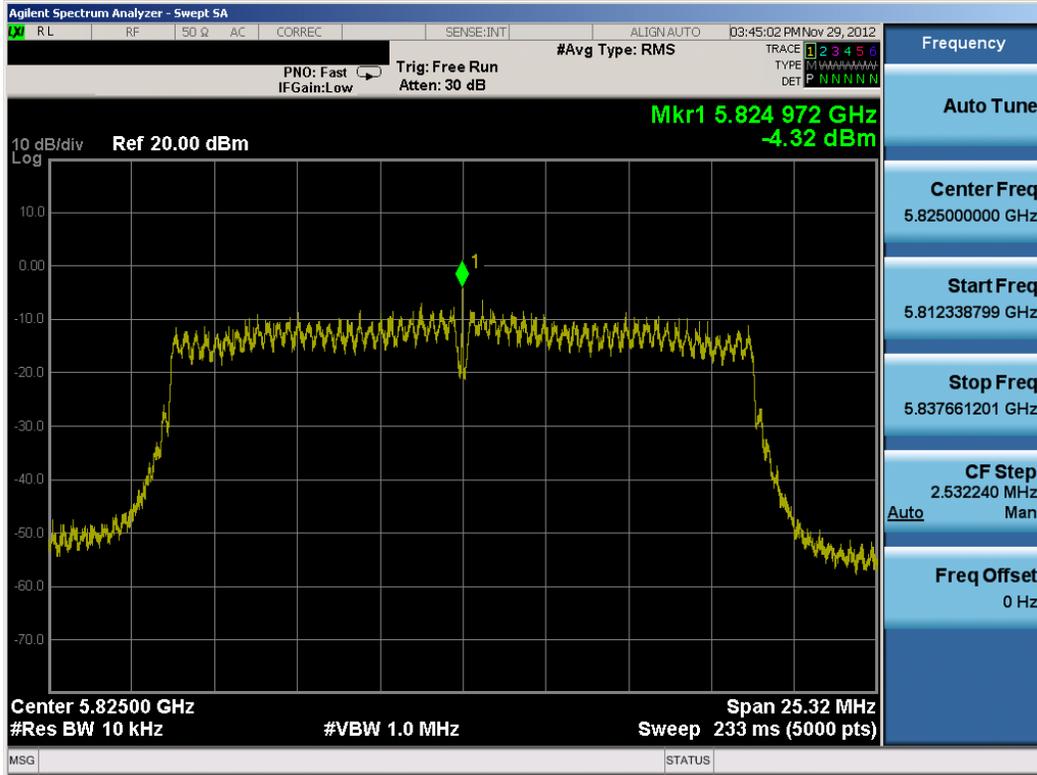


Plot 6-30. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)

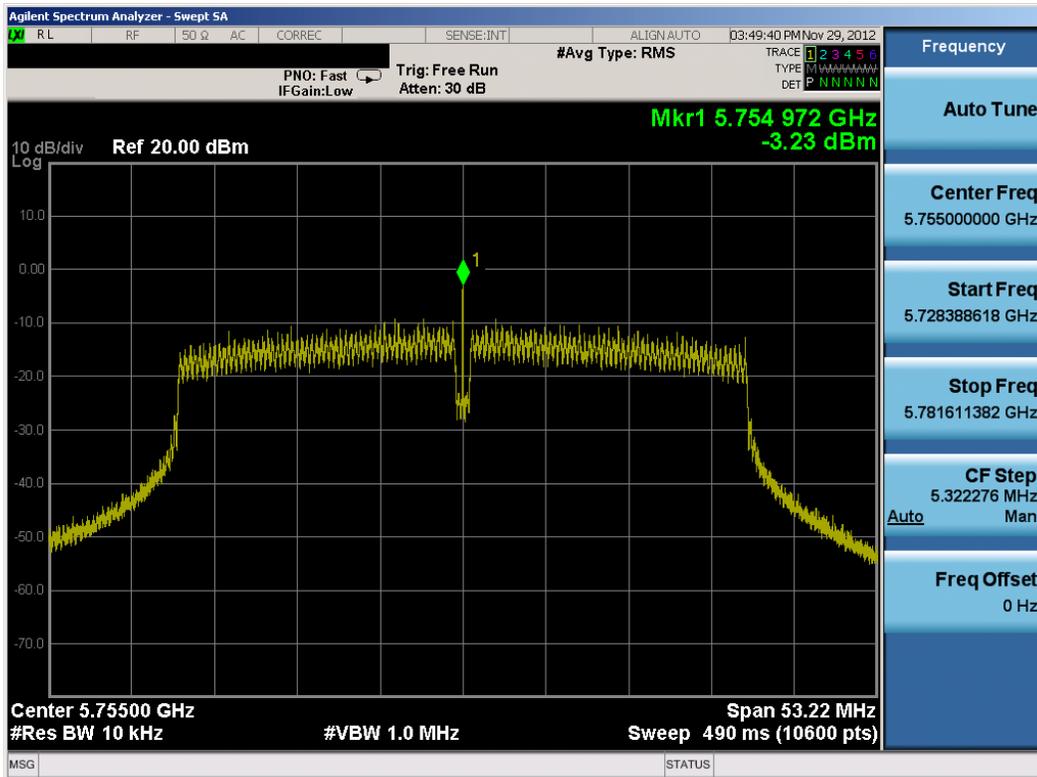


Plot 6-31. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 157)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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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)

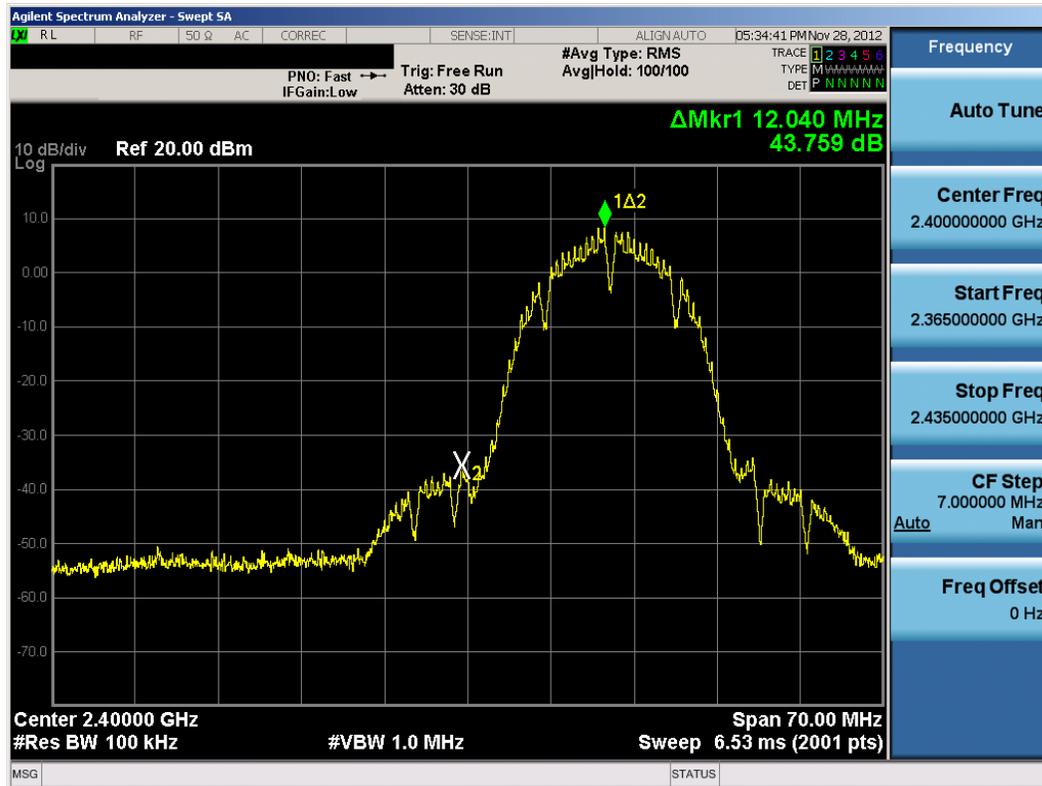
FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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6.6 Conducted Emissions at the Band Edge

§15.247(d); RSS-210 [A8.5]

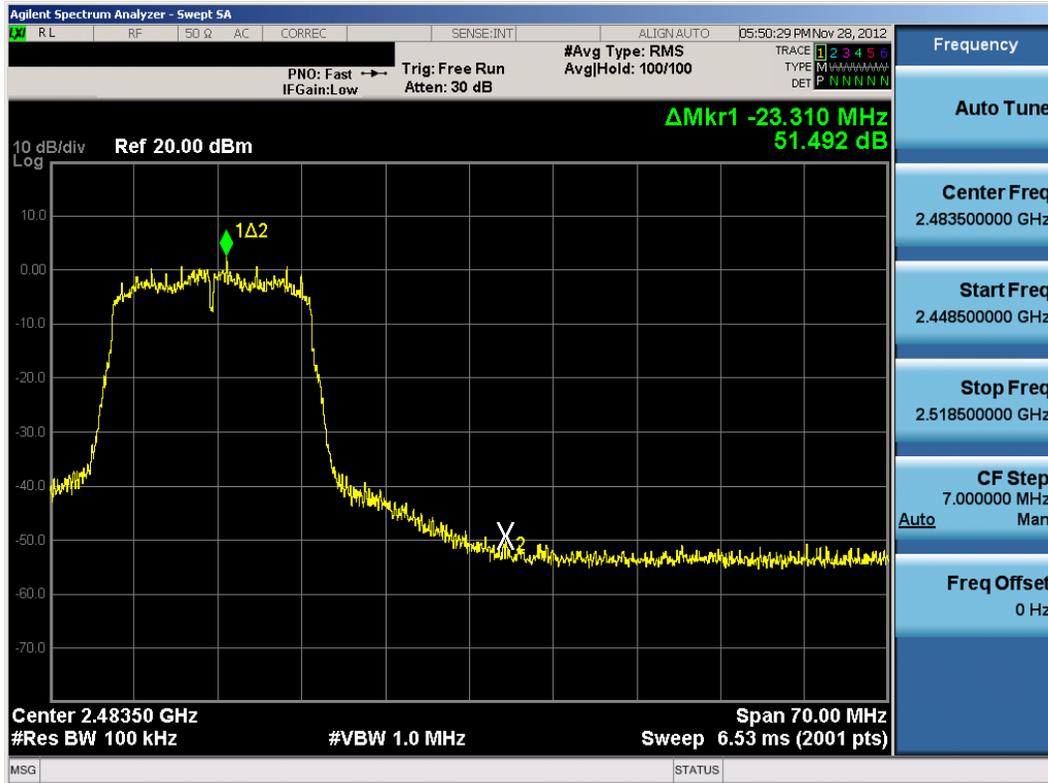
For the following out of band conducted spurious emissions plots at the band edge, the EUT was set at a data rate of 1Mbps for “b” mode, 6 Mbps for “g” mode, 6 Mbps for “a” mode, and 6.5/7.2Mbps for “n” mode. These settings produced the worst-case emissions.

The limit for out of band spurious emissions at the band edge is 30dB below the fundamental emission level measured in a 100kHz bandwidth.

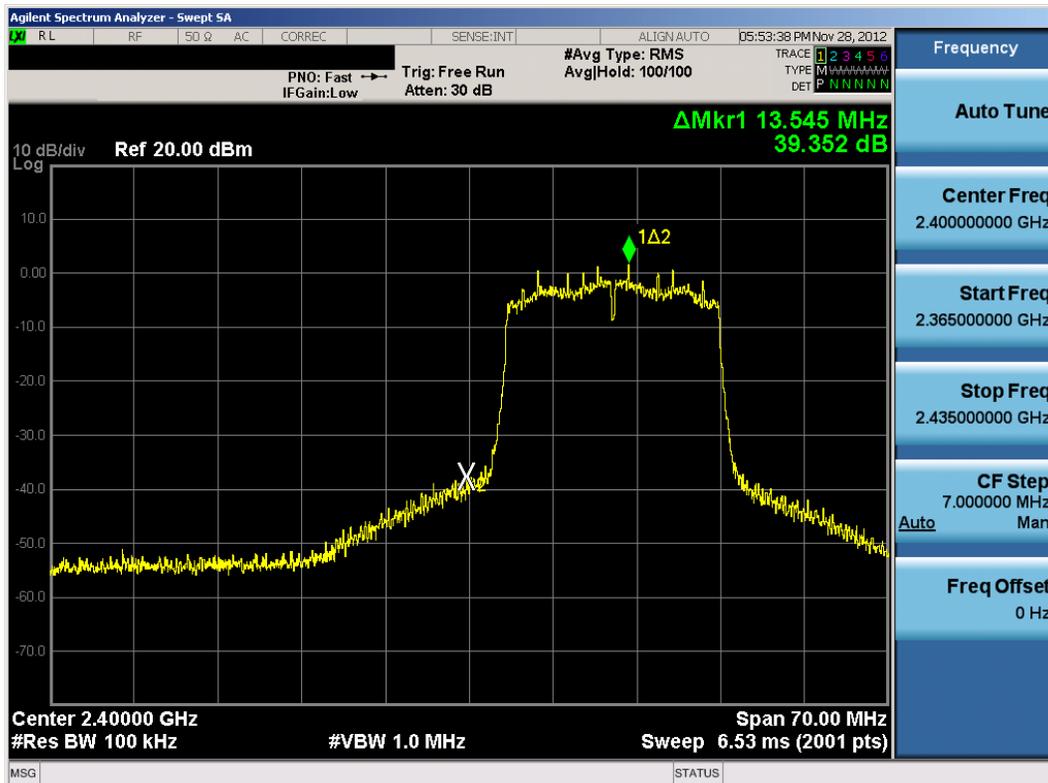


Plot 6-35. Band Edge Plot (802.11b – Ch. 1)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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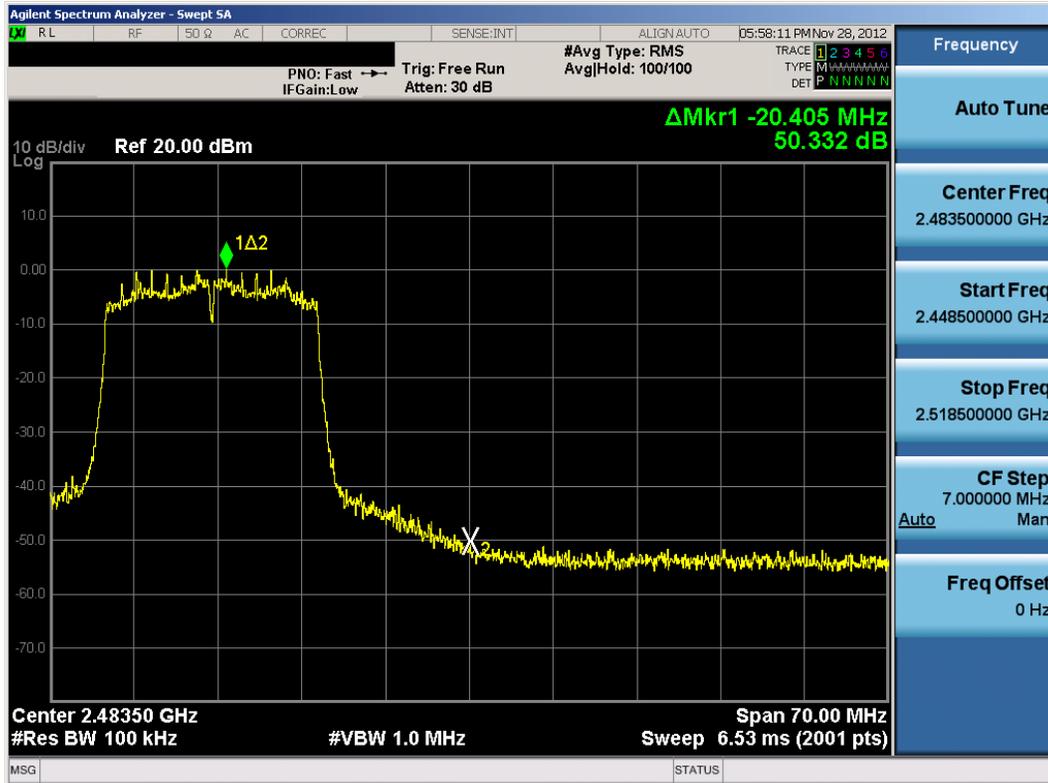


Plot 6-38. Band Edge Plot (802.11g – Ch. 11)

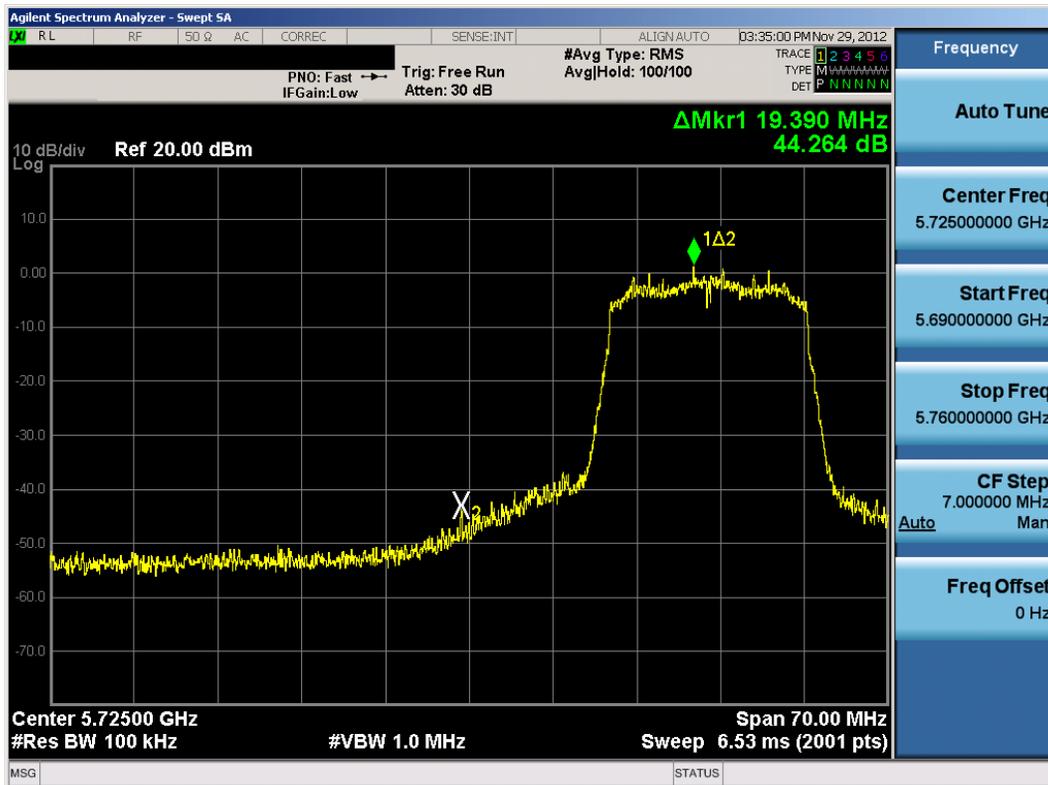


Plot 6-39. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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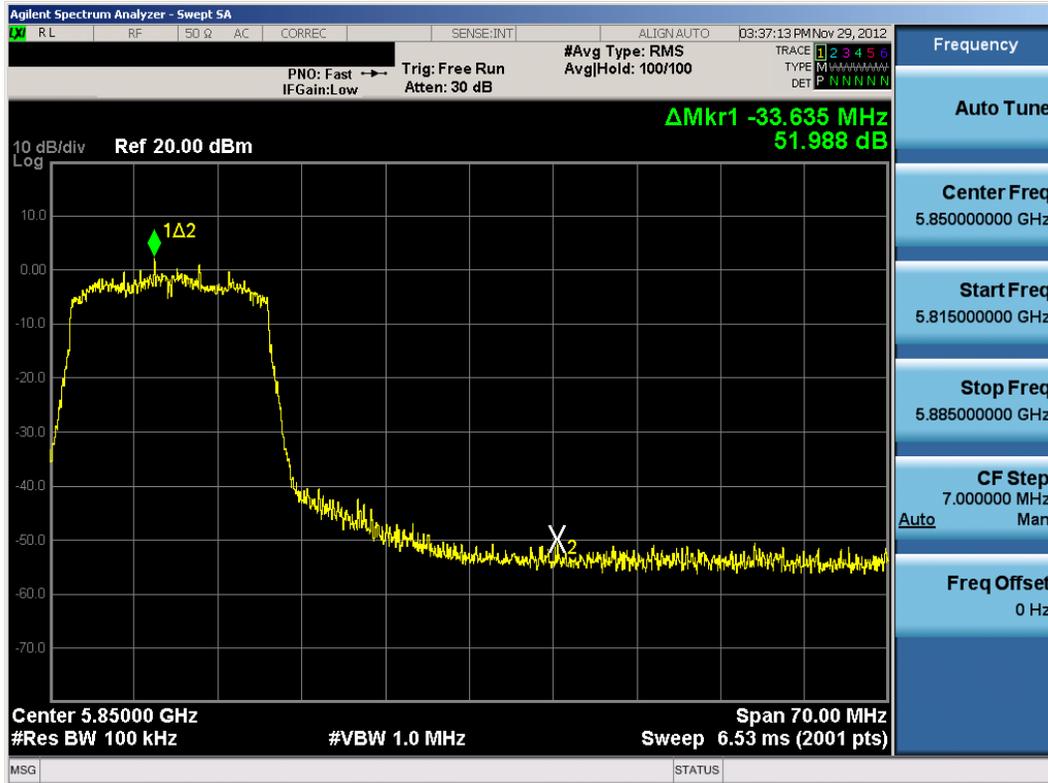


Plot 6-40. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)

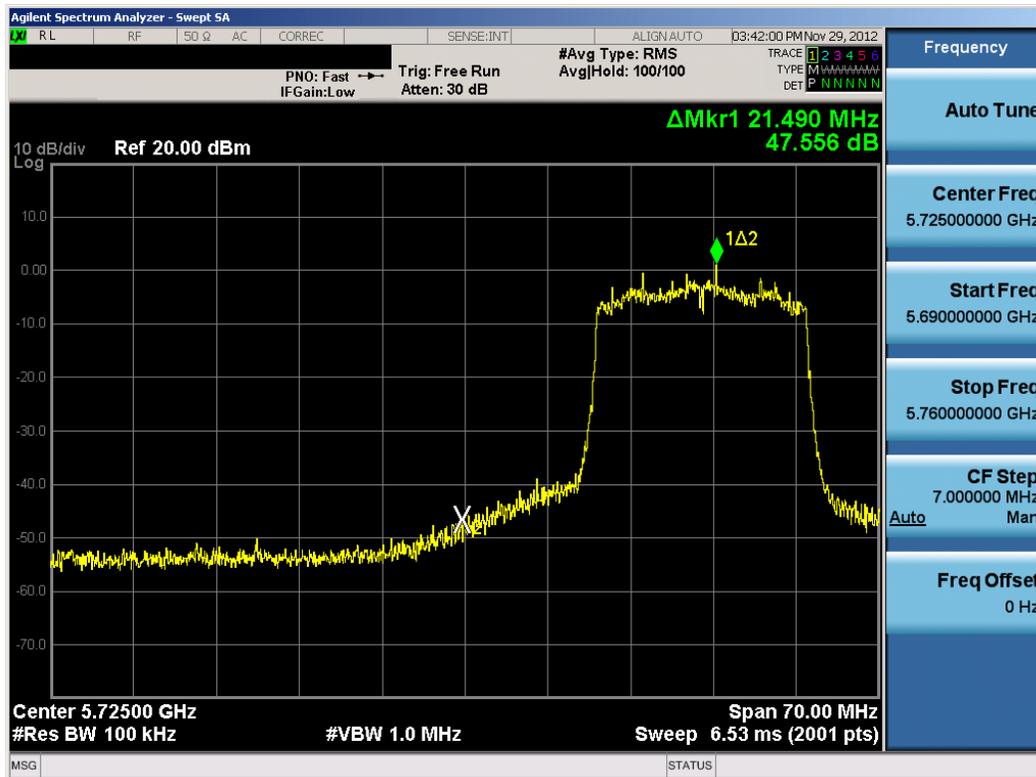


Plot 6-41. Band Edge Plot (802.11a – Ch. 149)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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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: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1211261704.ZNF	Test Dates: Nov. 27 - Dec. 17, 2012	EUT Type: Portable Handset		Page 37 of 62

6.7 Conducted Spurious Emissions

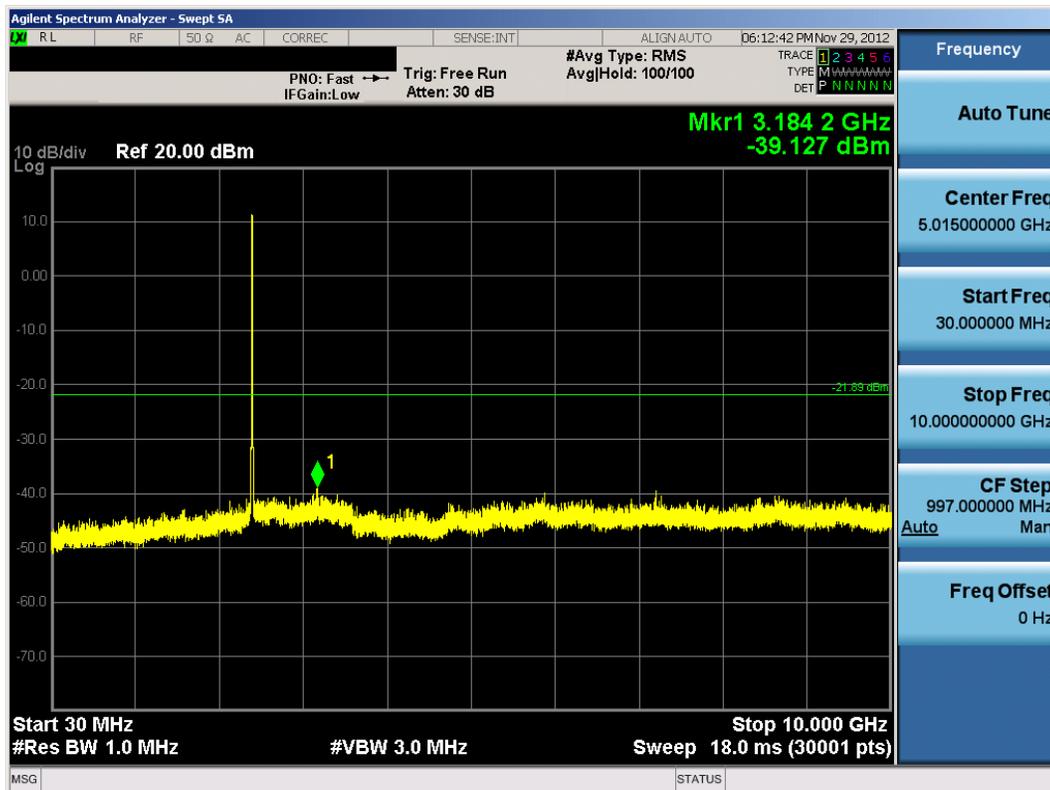
§15.247(d); RSS-210 [A8.5]

For the following out of band conducted spurious emissions plots, the EUT was investigated in all available data rates for “b”, “g”, “a”, and “n” modes. The worst case spurious emissions for the 2.4GHz band were found while transmitting in “b” mode at 1 Mbps and are shown in the plots below. The worst case spurious emissions for the 5.8GHz band were found while transmitting in “a” mode at 6 Mbps and are shown in the plots below.

The display line shown in the following plots denotes the limit at 30dB below the fundamental emission level measured in a 100kHz bandwidth, as determined in Section 6.5 of this report. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 30dB below the level of the fundamental in a 1MHz bandwidth.

For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present.

Plot 6-53 through Plot 6-58 were recorded using a PSA spectrum analyzer connected to a laptop PC via GPIB connection. Since the PSA is limited to a maximum of 8192 sweeping points, roughly about 4GHz of spectrum can be analyzed while ensuring that the bin-to-bin spacing is such that narrowband emissions are not lost (i.e. # points $\geq 2 * \text{Span}/\text{RBW}$). A program installed on the laptop (“PCTEST 40GHz CSE”, Version 1.0) sets the spectrum analyzer to gather the maximum number of spectral points from 30MHz to 40GHz in 4GHz increments and then places the data into an Excel spreadsheet from which the conducted plots are generated. The limit is 30dBc and is determined from the power spectral density plots which are measured with a 100kHz RBW. The spectrum analyzer is set as follows for each 4GHz portion of spectrum that is analyzed: RBW = 1MHz, VBW = 3MHz, sweep time = auto, detector = max peak, number of points = 8192.

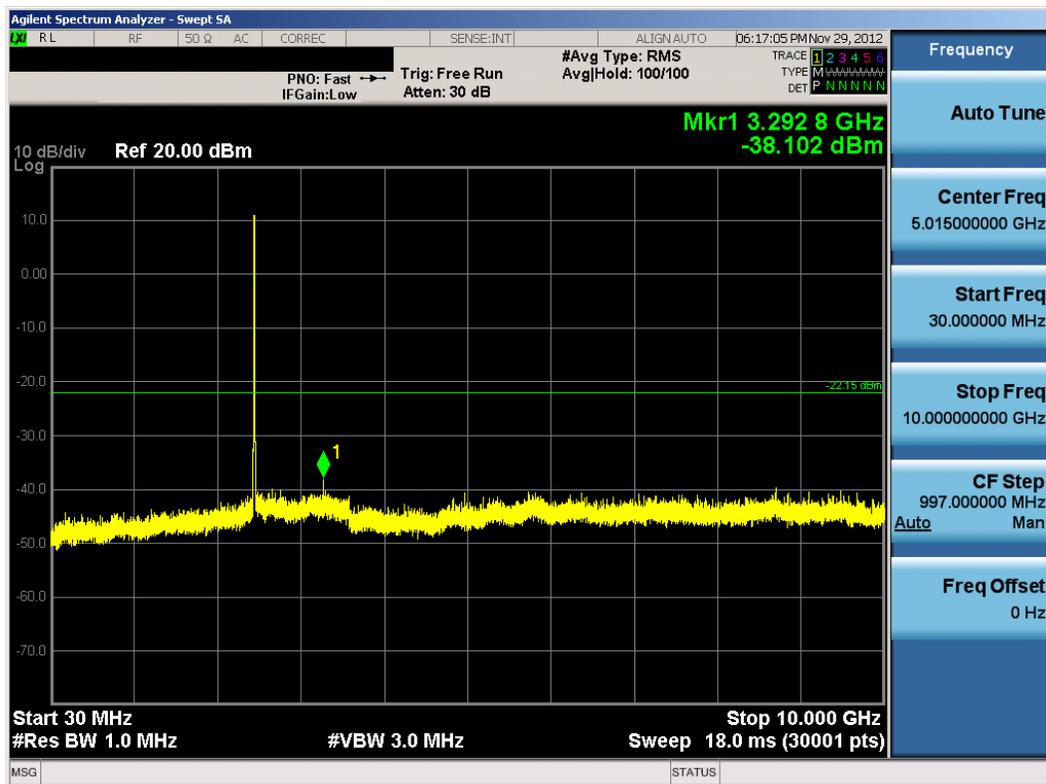


Plot 6-47. Conducted Spurious Plot (802.11b – Ch. 1)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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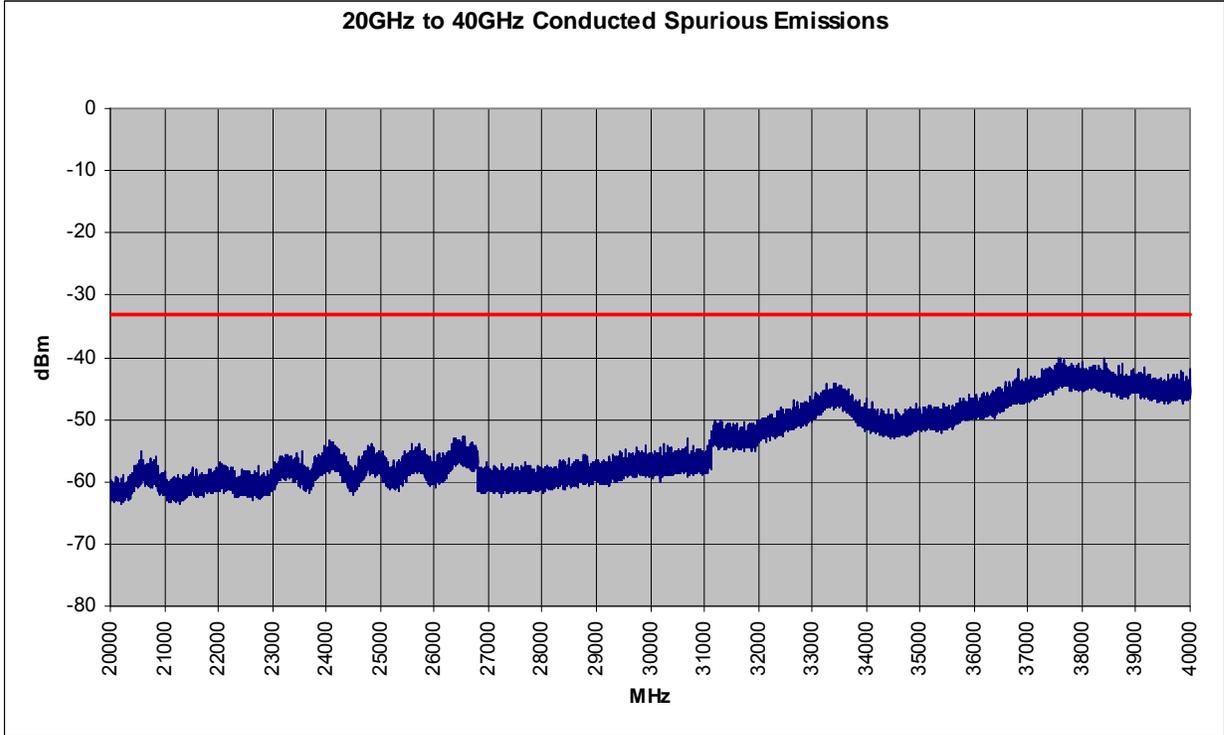


Plot 6-50. Conducted Spurious Plot (802.11b – Ch. 6)

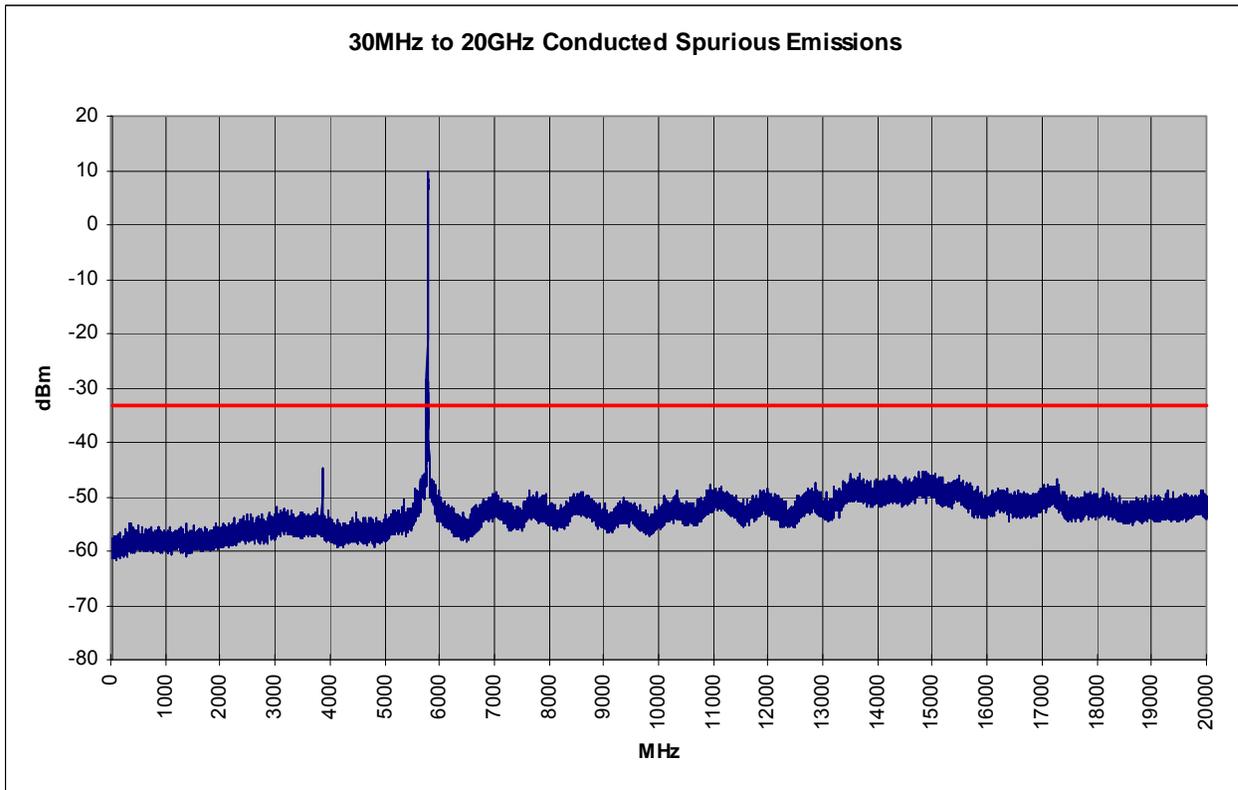


Plot 6-51. Conducted Spurious Plot (802.11b – Ch. 11)

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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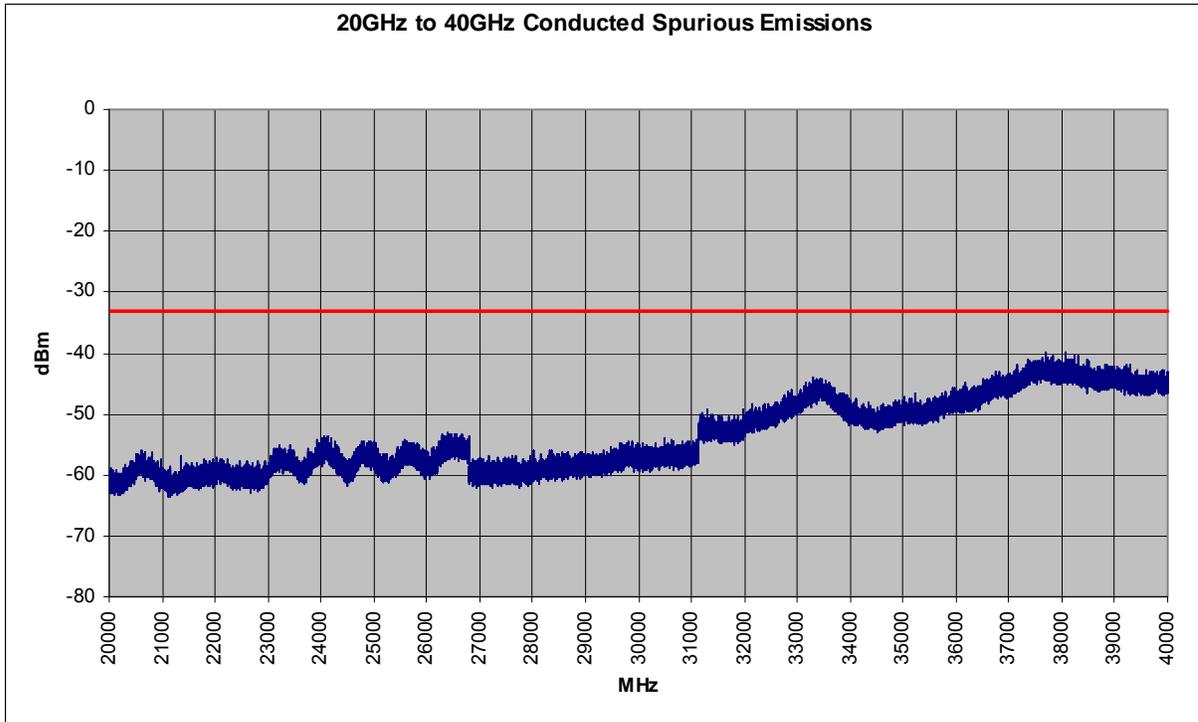


Plot 6-54. Conducted Spurious Plot (802.11a – Ch. 149)

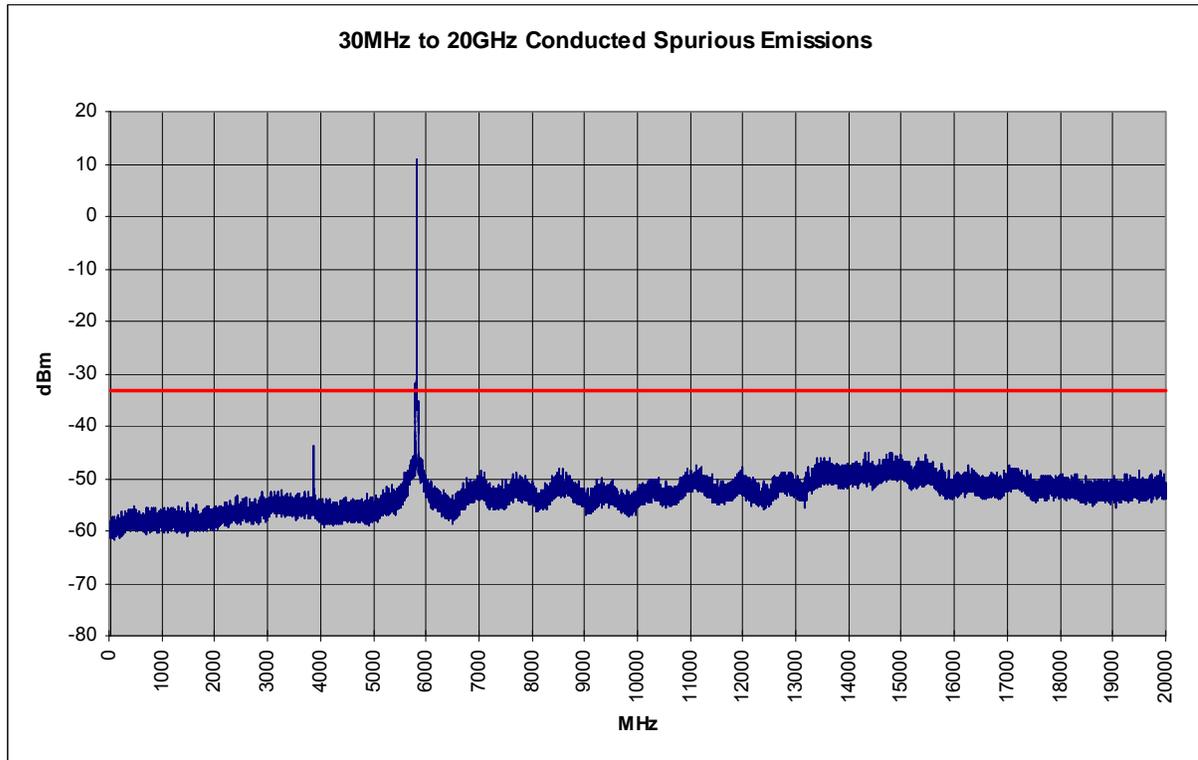


Plot 6-55. Conducted Spurious Plot (802.11a – Ch. 157)

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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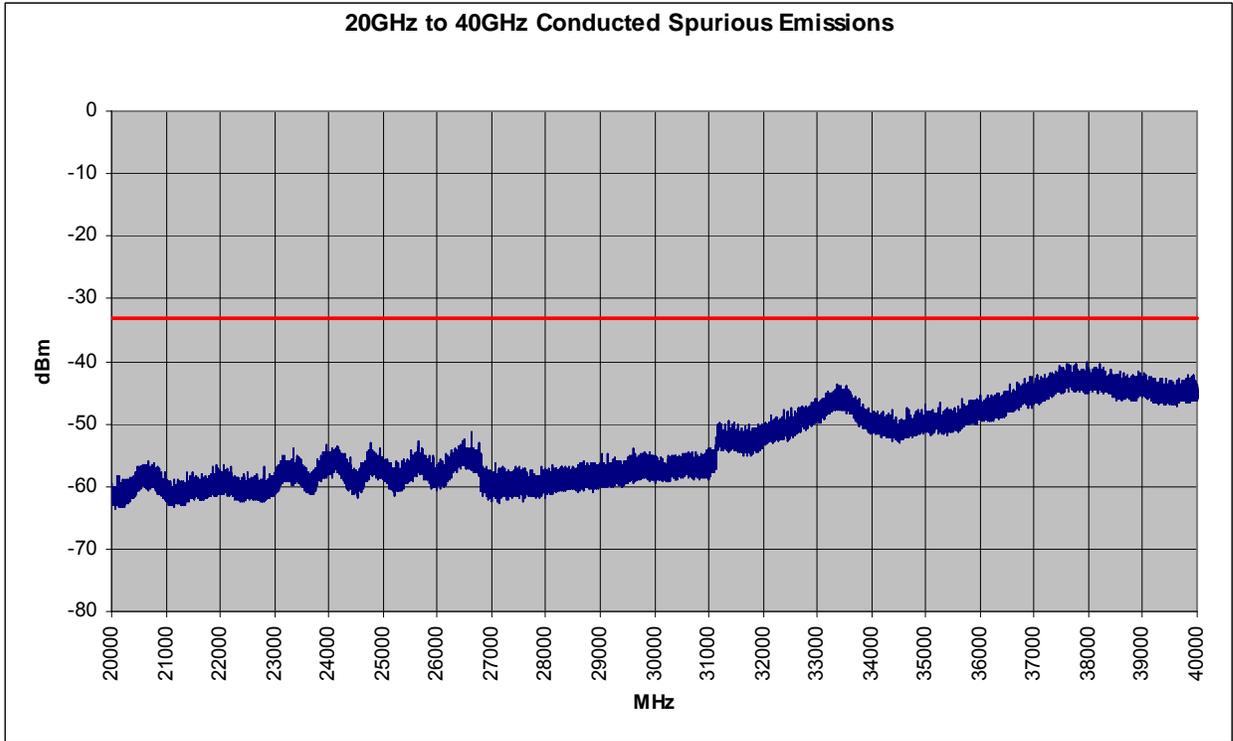


Plot 6-56. Conducted Spurious Plot (802.11a – Ch. 157)



Plot 6-57. Conducted Spurious Plot (802.11a – Ch. 165)

FCC ID: ZNFVS870		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 6-58. Conducted Spurious Plot (802.11a – Ch. 165)

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6.8 Radiated Spurious Emission Measurements

§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

The EUT was tested from 9kHz up to the tenth harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 6-10 per Section 15.209.

All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section. All measurements shown in this section were obtained using traditional radiated test methods as defined in C63.10-2009. The optional test procedures for antenna port conducted measurements of unwanted emissions per the guidance of KDB 558074 were not used to evaluate this device.

Frequency	Field Strength [$\mu\text{V/m}$]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 6-10. Radiated Limits

Sample Calculation

- Field Strength Level $_{[\text{dB}_{\mu\text{V/m}}]}$ = Analyzer Level $_{[\text{dBm}]}$ + 107 + AFCL $_{[\text{dB/m}]}$
- AFCL $_{[\text{dB/m}]}$ = Antenna Factor $_{[\text{dB/m}]}$ + Cable Loss $_{[\text{dB}]}$
- Margin $_{[\text{dB}]}$ = Field Strength Level $_{[\text{dB}_{\mu\text{V/m}}]}$ – Limit $_{[\text{dB}_{\mu\text{V/m}}]}$

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11b

Worst Case Transfer Rate: 1 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 01

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
4824.00	-110.43	Avg	H	39.46	36.03	53.98	-17.95
4824.00	-98.82	Peak	H	39.46	47.64	73.98	-26.34
12060.00	-135.00	Avg	H	49.81	21.81	53.98	-32.17
12060.00	-125.00	Peak	H	49.81	31.81	73.98	-42.17

Table 6-11. Radiated Measurements

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-10.
2. For frequencies > 1GHz, average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. Emissions whose levels were not within 20dB of the respective limits were not reported.
6. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
8. Above 960MHz the limit is 500 μ V/m (54dB μ /m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11b

Worst Case Transfer Rate: 1 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2437MHz

Channel: 06

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4874.00	-110.09	Avg	H	39.48	36.39	53.98	-17.59
4874.00	-98.52	Peak	H	39.48	47.96	73.98	-26.02
7311.00	-135.00	Avg	H	42.37	14.37	53.98	-39.61
7311.00	-125.00	Peak	H	42.37	24.37	73.98	-49.61
12185.00	-135.00	Avg	H	50.28	22.28	53.98	-31.70
12185.00	-125.00	Peak	H	50.28	32.28	73.98	-41.70

Table 6-12. Radiated Measurements

NOTES:

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-10.
- For frequencies > 1GHz, average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. Emissions whose levels were not within 20dB of the respective limits were not reported.
- Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11b

Worst Case Transfer Rate: 1 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4924.00	-110.41	Avg	H	39.50	36.09	53.98	-17.89
4924.00	-98.93	Peak	H	39.50	47.57	73.98	-26.41
7386.00	-135.00	Avg	H	42.48	14.48	53.98	-39.50
7386.00	-125.00	Peak	H	42.48	24.48	73.98	-49.50
12310.00	-135.00	Avg	H	50.74	22.74	53.98	-31.24
12310.00	-125.00	Peak	H	50.74	32.74	73.98	-41.24

Table 6-13. Radiated Measurements

NOTES:

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-10.
- For frequencies > 1GHz, average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. Emissions whose levels were not within 20dB of the respective limits were not reported.
- Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)

§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 1 & 3 Meters

Operating Frequency: 5745MHz

Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Field Strength [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]
11490.00	-109.76	Avg	H	47.34	44.58	53.98	-9.40
11490.00	-98.05	Peak	H	47.34	56.29	73.98	-17.69
22980.00	-135.00	Avg	H	38.97	10.97	53.98	-43.01
22980.00	-125.00	Peak	H	38.97	20.97	73.98	-53.01

Table 6-14. Radiated Measurements

NOTES:

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-10.
- For frequencies > 1GHz, average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. Emissions whose levels were not within 20dB of the respective limits were not reported.
- Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500 μ V/m (54dB μ /m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)
§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5785MHz
 Channel: 157

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11570.00	-110.22	Avg	H	47.40	44.18	53.98	-9.80
11570.00	-98.22	Peak	H	47.40	56.18	73.98	-17.80

Table 6-15. Radiated Measurements

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-10.
2. For frequencies > 1GHz, average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. Emissions whose levels were not within 20dB of the respective limits were not reported.
6. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
7. Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
8. Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements (Cont'd)
§15.247(d) / §15.205 & §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5825MHz
 Channel: 165

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11650.00	-110.41	Avg	H	47.50	44.09	53.98	-9.89
11650.00	-98.49	Peak	H	47.50	56.01	73.98	-17.97

Table 6-16. Radiated Measurements

NOTES:

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-10.
- For frequencies > 1GHz, average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. Emissions whose levels were not within 20dB of the respective limits were not reported.
- Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
- Average levels at -135dBm and peak levels at -125dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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6.9 Radiated Restricted Band Edge Measurements

§15.205 / §15.209; RSS-210 [A8.5]

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting.

The amplitude offset shown in the following plots was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain} = 11.9 \text{ dB}$$

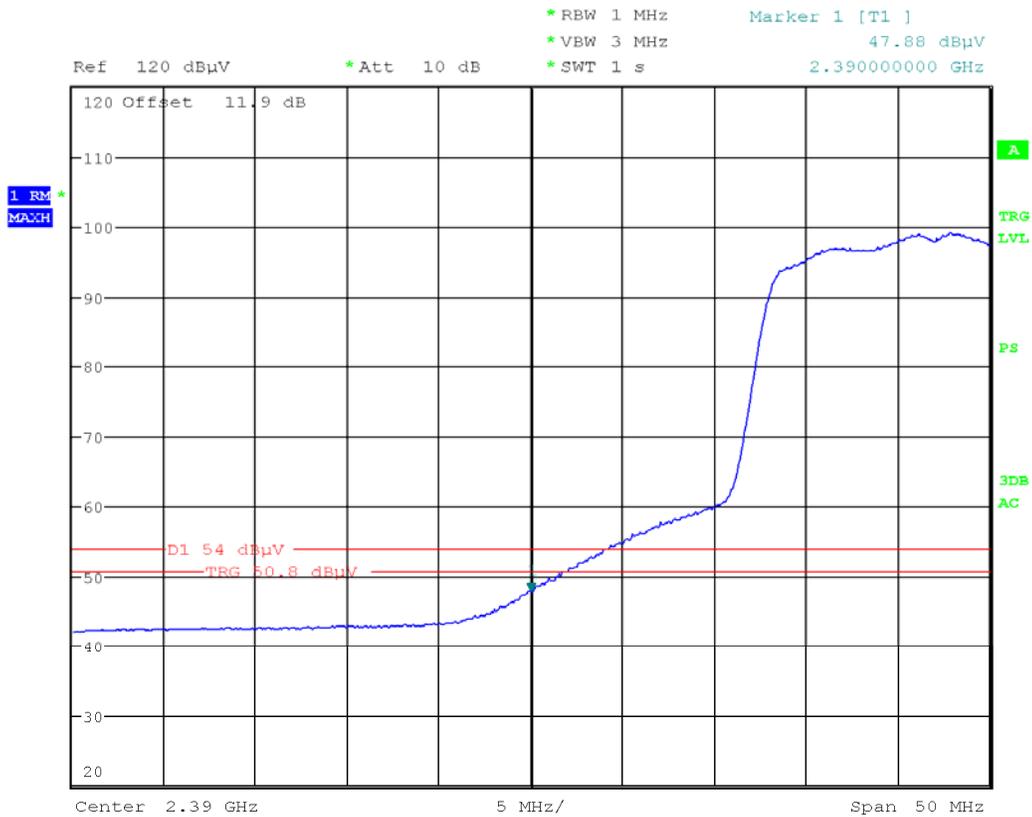
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1



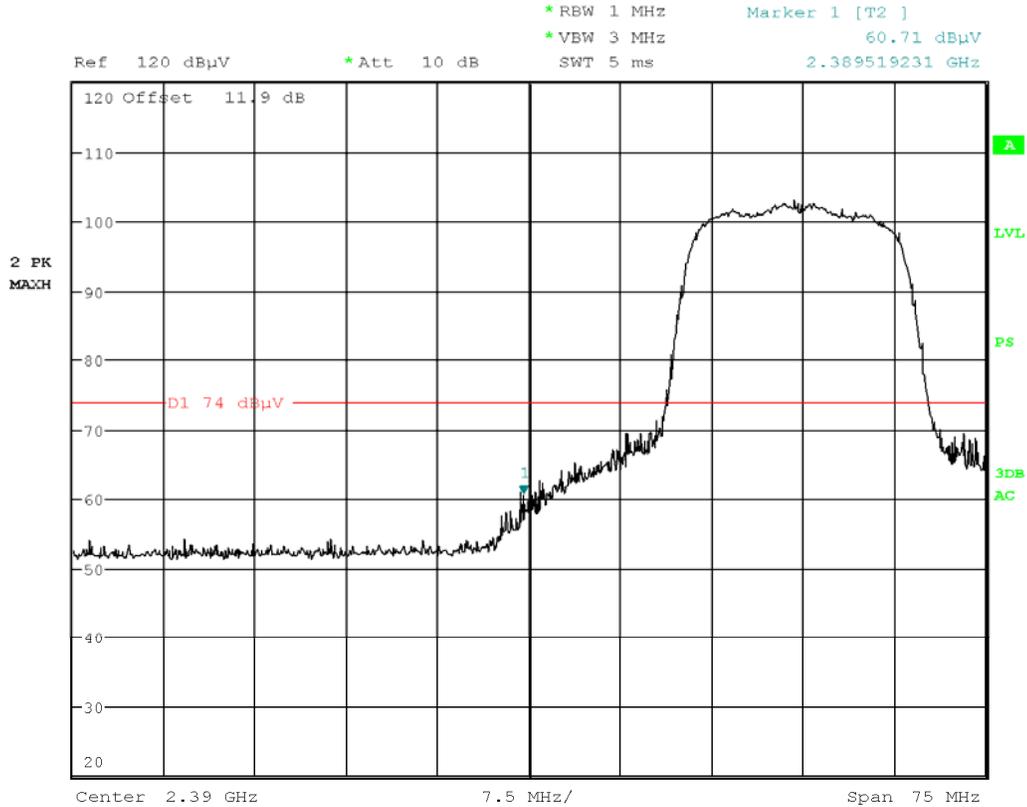
Date: 3.DEC.2012 17:09:51

Plot 6-59. Radiated Restricted Lower Band Edge Measurement (Average)

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Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 / §15.209; RSS-210 [A8.5]



Date: 28.NOV.2012 00:47:05

Plot 6-60. Radiated Restricted Lower Band Edge Measurement (Peak)

NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and are tested to the radiated emission limits specified in §15.209.
2. Average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The highest attainable duty cycle due to software restrictions was found to be 95.4%. A video trigger was implemented on average measurements to ensure that data was collected only during periods when the EUT is transmitting at its maximum power control level.

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Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 / §15.209; RSS-210 [A8.5]

The amplitude offset shown in the following plots was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain} = 12.8 \text{ dB}$$

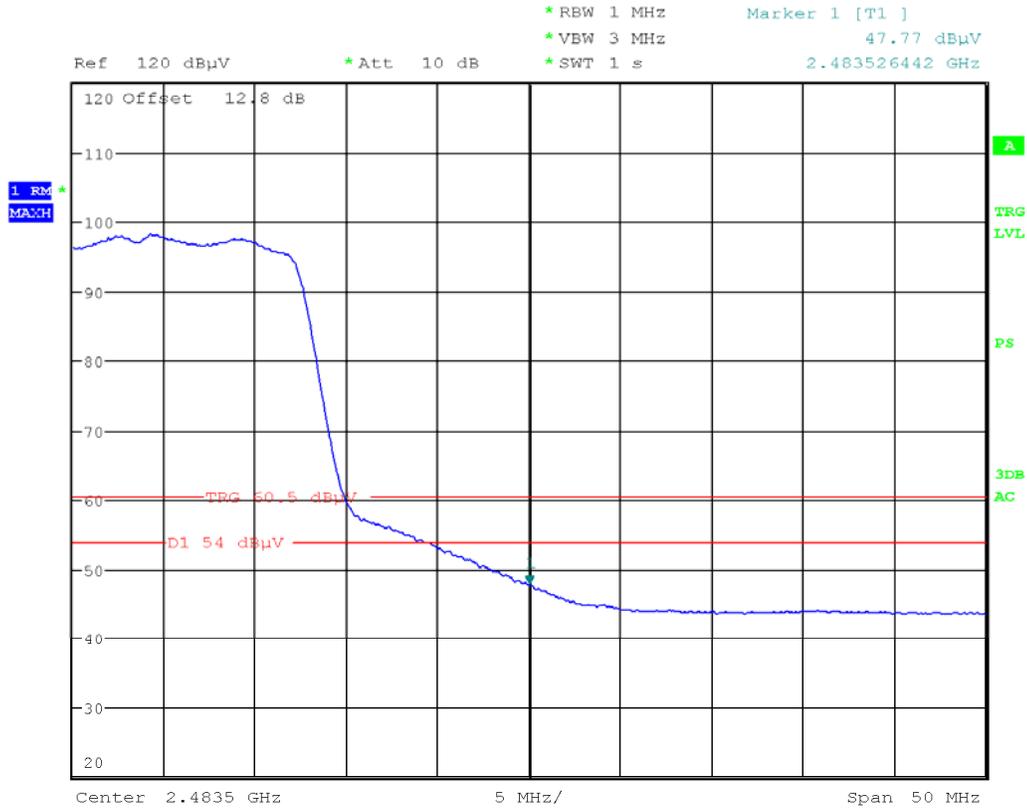
Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11



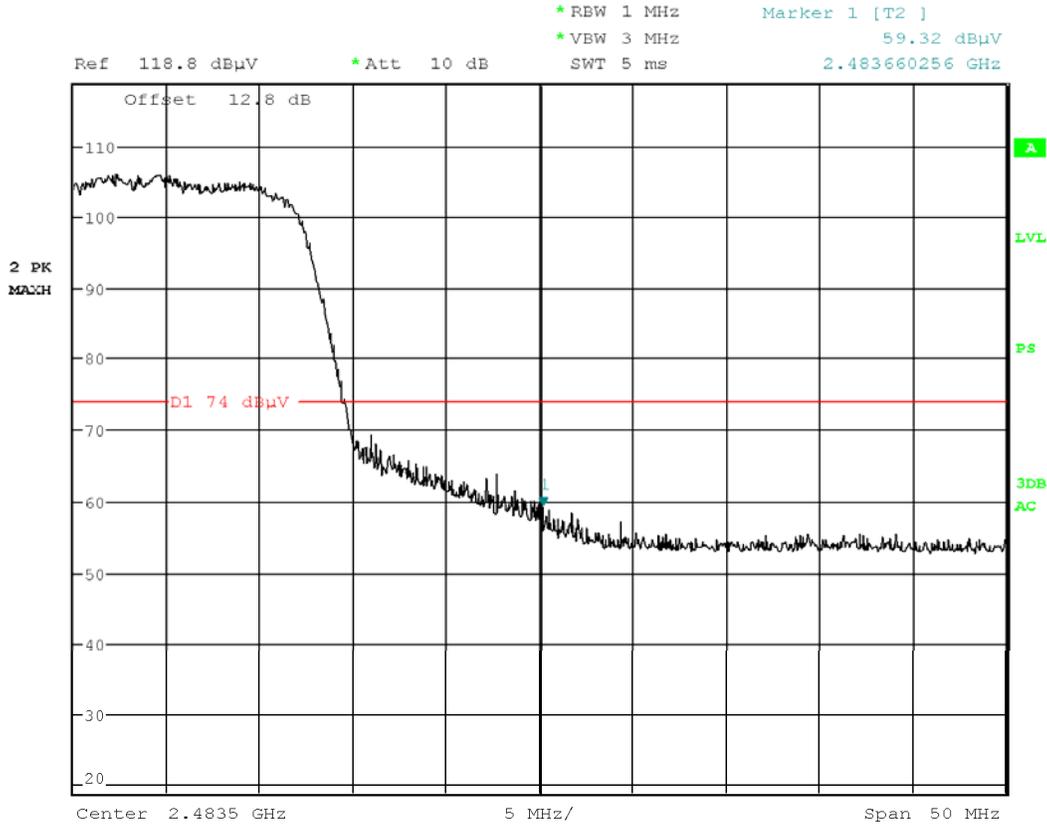
Date: 3.DEC.2012 17:06:08

Plot 6-61. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: ZNFVS870	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 / §15.209; RSS-210 [A8.5]



Date: 27.NOV.2012 23:37:19

Plot 6-62. Radiated Restricted Upper Band Edge Measurement (Peak)

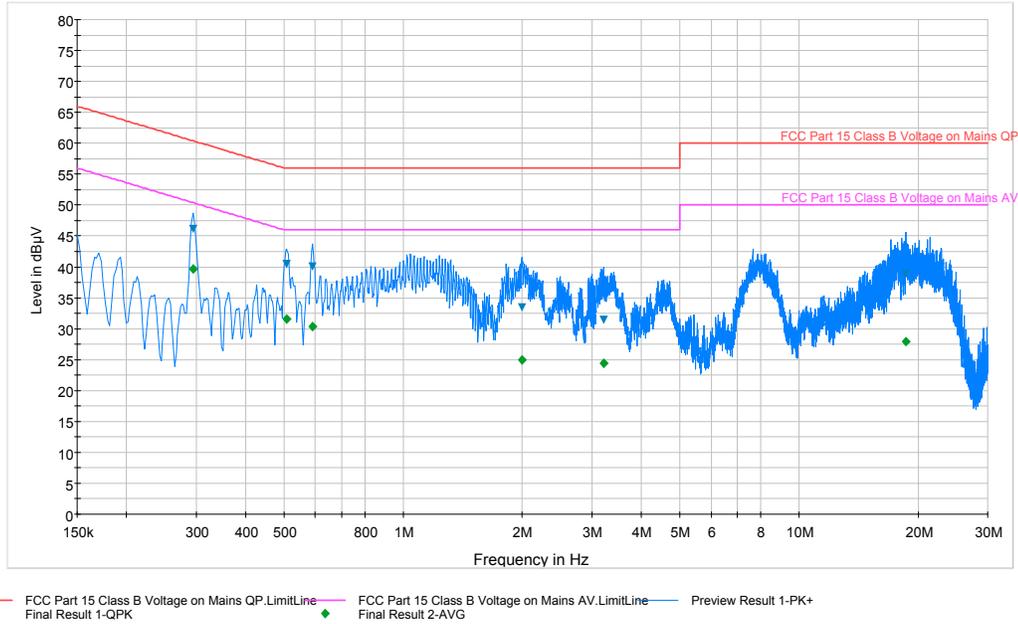
NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and are tested to the radiated emission limits specified in §15.209.
2. Average measurements are recorded using the slow sweep time procedure specified in Section 8.2.2 (Option 2) of KDB 558074 with 1001 data points. Peak measurements are performed using the procedure specified in Section 8.1.1 (Option 1) of KDB 558074 with RBW = 1MHz.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes. Worst case setup was with the standard battery cover.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The highest attainable duty cycle due to software restrictions was found to be 95.4%. A video trigger was implemented on average measurements to ensure that data was collected only during periods when the EUT is transmitting at its maximum power control level.

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6.10 Line-Conducted Test Data

§15.207; RSS-Gen [7.2.2]



Plot 6-63. Line Conducted Plot with 802.11b (L1)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.294	L1	0.1	46.10	60.40	14.30	39.60	50.40	10.80
0.508	L1	0.1	40.50	56.00	15.50	31.50	46.00	14.50
0.591	L1	0.1	40.00	56.00	16.00	30.30	46.00	15.70
1.993	L1	0.2	33.50	56.00	22.50	25.00	46.00	21.00
3.208	L1	0.2	31.40	56.00	24.60	24.40	46.00	21.60
18.652	L1	0.7	38.90	60.00	21.10	28.00	50.00	22.00

Table 6-17. Line Conducted Data with 802.11b (L1)

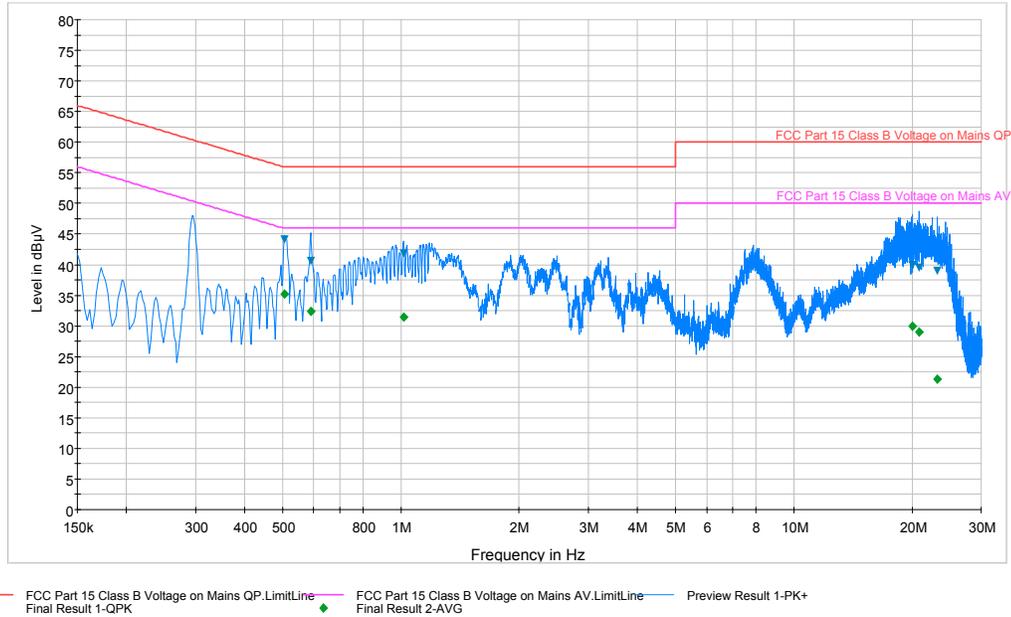
Notes:

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11b mode using 1Mbps on Channel 6 with wireless charging enabled. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

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Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-64. Line Conducted Plot with 802.11b (N)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.506	N	0.1	44.10	56.00	11.90	35.20	46.00	10.80
0.589	N	0.1	40.70	56.00	15.30	32.40	46.00	13.60
1.014	N	0.2	41.80	56.00	14.20	31.40	46.00	14.60
20.076	N	0.8	39.90	60.00	20.10	30.00	50.00	20.00
20.814	N	0.8	39.60	60.00	20.40	29.00	50.00	21.00
23.154	N	0.8	39.00	60.00	21.00	21.40	50.00	28.60

Table 6-18. Line Conducted Data with 802.11b (N)

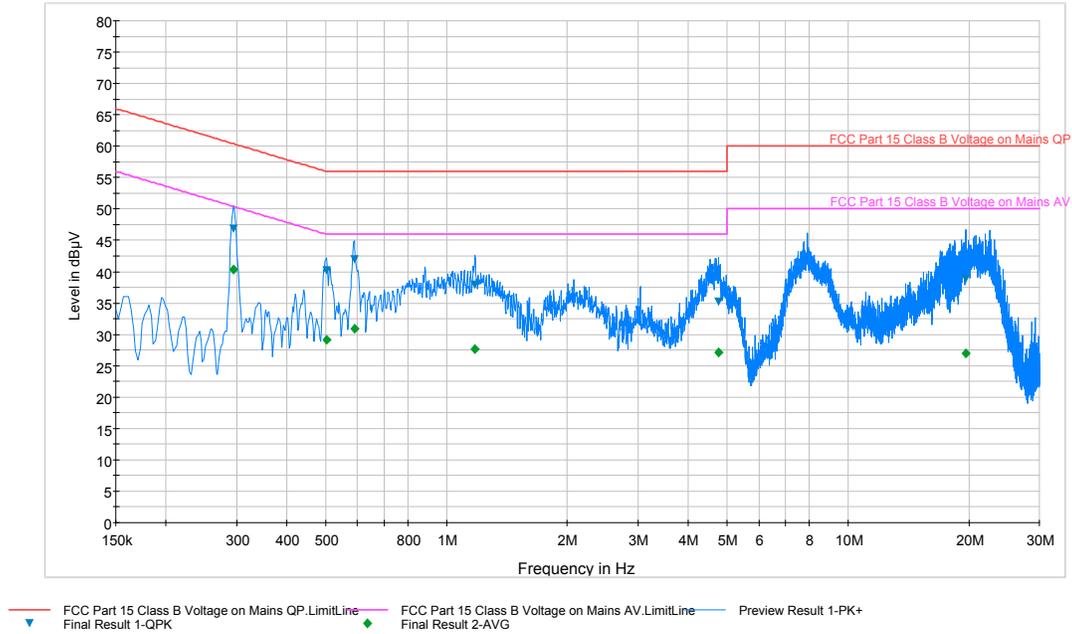
Notes:

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11b mode using 1Mbps on Channel 6 with wireless charging enabled. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

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Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-65. Line Conducted Plot with 802.11a (L1)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.294	L1	0.1	46.80	60.40	13.60	40.30	50.40	10.10
0.503	L1	0.1	40.30	56.00	15.70	29.20	46.00	16.80
0.589	L1	0.1	41.90	56.00	14.10	30.90	46.00	15.10
1.178	L1	0.2	37.90	56.00	18.10	27.60	46.00	18.40
4.760	L1	0.2	35.20	56.00	20.80	27.10	46.00	18.90
19.651	L1	0.7	38.80	60.00	21.20	27.00	50.00	23.00

Table 6-19. Line Conducted Data with 802.11a (L1)

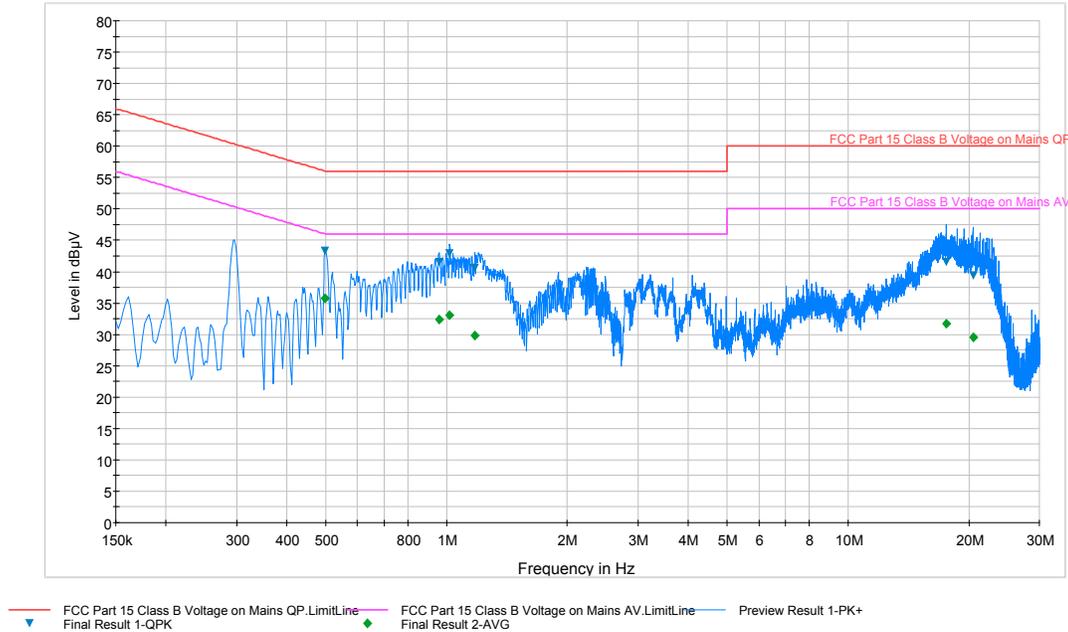
Notes:

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 157 with wireless charging enabled. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

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Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-66. Line Conducted Plot with 802.11a (N)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.499	N	0.1	43.30	56.00	12.70	35.70	46.00	10.30
0.960	N	0.1	41.60	56.00	14.40	32.40	46.00	13.60
1.019	N	0.2	42.90	56.00	13.10	33.00	46.00	13.00
1.176	N	0.2	40.60	56.00	15.40	29.90	46.00	16.10
17.565	N	0.7	41.60	60.00	18.40	31.70	50.00	18.30
20.492	N	0.8	39.40	60.00	20.60	29.60	50.00	20.40

Table 6-20. Line Conducted Data with 802.11a (N)

Notes:

- All modes of operation, data rates, and test channels were investigated and the worst-case emissions are reported in 802.11a mode using 6Mbps on Channel 157 with wireless charging enabled. The emissions found were not affected by the choice of channel used during testing.
- The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
- Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
- QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
- Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
- Traces shown in plot are made using a peak detector.
- Deviations to the Specifications: None.

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7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **LG Portable Handset FCC ID: ZNFVS870** is in compliance with Part 15C of the FCC Rules and RSS-210 of the Industry Canada Rules.

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