



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

**Date of Testing:**  
June6-July2, 2012  
**Test Site/Location:**  
PCTEST Lab, Columbia, MD, USA  
**Test Report Serial No.:**  
0Y1206040765.ZNF

<b>FCC ID:</b>	<b>ZNFLS970</b>
<b>APPLICANT:</b>	<b>LG Electronics MobileComm U.S.A</b>

**Application Type:** Certification  
**Model(s):** LG-LS970, LGLS970, LS970  
**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 C63.4-2003, 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	48.753	16.88	76.560	18.84
802.11g	2412 - 2462	19.055	12.80	83.753	19.23
802.11n	2412 - 2462	15.560	11.92	83.176	19.20
802.11a	5745 - 5825	19.724	12.95	121.339	20.84
802.11n	5745 - 5825	15.812	11.99	92.470	19.66

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 C63.4-2003. 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

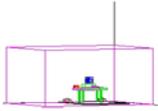


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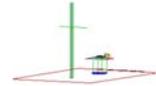
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# MEASUREMENT REPORT

## 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:** LG-LS970

**FCC ID:** ZNFLS970

**Test Device Serial No.:** #244       Production     Pre-Production     Engineering

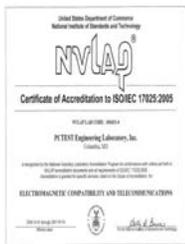
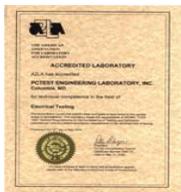
**FCC CLASSIFICATION:** Digital Transmission System (DTS)

**DATE(S) OF TEST:** June6-July2, 2012

**TEST REPORT S/N:** 0Y1206040765.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

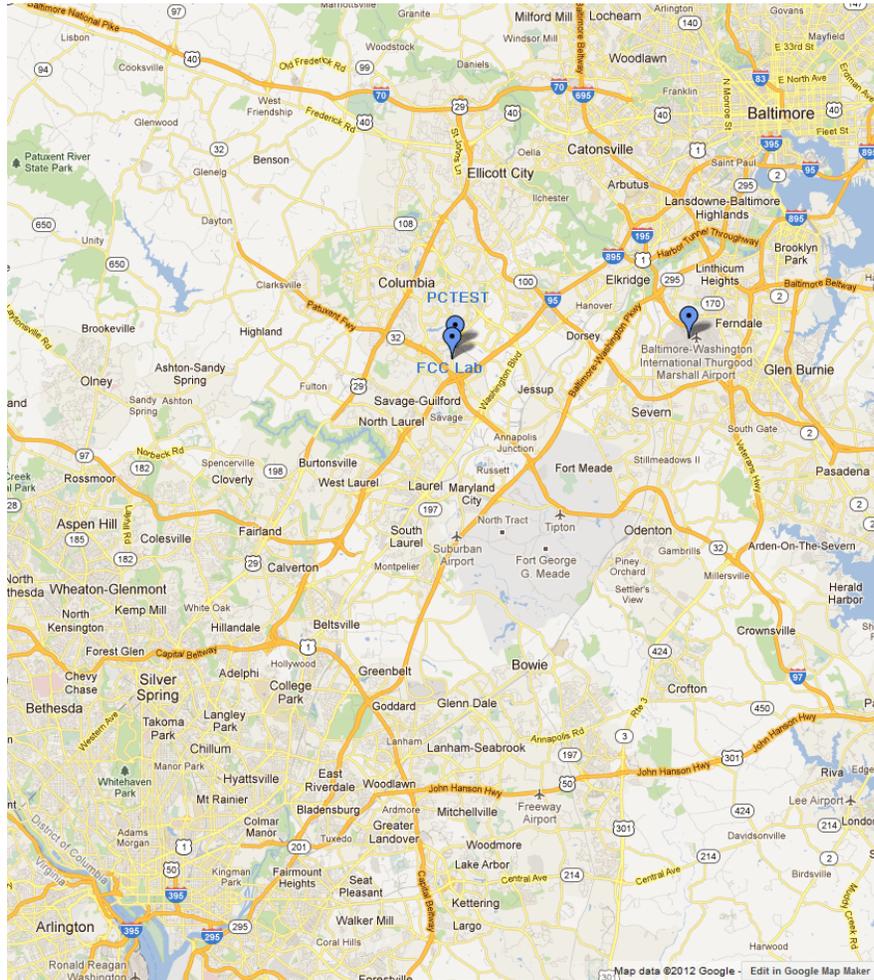
## 1.1 Scope

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 C63.4-2003 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: ZNFLS970**. The test data contained in this report pertains only to the emissions due to the EUT's DTS transmitter.

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev 0/A (BC0, BC1, BC10), Band 25 LTE with 5 and 10Mhz BW, 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC

### 2.3 Test Configuration

The LG Portable Handset FCC ID: ZNFLS970 was tested per the guidance of 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 Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) and the guidance provided in KDB 558074 were used in the measurement of the **LG Portable Handset FCC ID: ZNFLS970**.

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: ZNFLS970** 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.	Frequency (MHz)	Ch.	Frequency (MHz)
149	5745	159	5795
151	5755	161	5805
153	5765	163	5815
155	5775	165	5825
157	5785		

**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
-	WL25-1	Conducted WLAN Cable Set (25GHz)	2/13/2012	Annual	2/13/2013	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	2/13/2012	Annual	2/13/2013	N/A
-	40G-1R	40GHz Radiated Cable Set	2/23/2012	Annual	2/23/2013	N/A
-	BT2	Bluetooth Cable Set	2/17/2012	Annual	2/17/2013	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
Agilent	N9030A	PXA Signal Analyzer	2/23/2012	Annual	2/23/2013	MY49432391
Anritsu	MA2411B	Power Sensor	3/5/2012	Annual	3/5/2013	846215
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	7/22/2011	Annual	7/22/2012	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/30/2011	Annual	6/30/2012	135427
Mini-Circuits	VHF-3100+	High Pass Filter	1/15/2012	Annual	1/15/2013	30841
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	6/9/2012	Annual	6/9/2013	100071
Rohde & Schwarz	RS-PR26	18-26.5 GHz Pre-Amplifier	6/9/2012	Annual	6/9/2013	100040
Rohde & Schwarz	ESU26	EMI Test Receiver	12/15/2011	Annual	12/15/2012	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**

**Note:** Some equipment in the table above have calibration due dates that are within the test dates. Care was taken to ensure that all equipment was utilized prior to its calibration due date.

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## 6.0 TEST RESULTS

### 6.1 Summary

Company Name: LG Electronics MobileComm U.S.A  
 FCC ID: ZNFLS970  
 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)

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 < 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
<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.

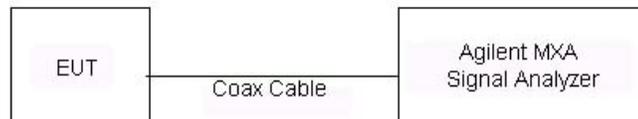
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## 6.2 6dB Bandwidth Measurement – 802.11a/b/g/n §15.247(a)(2); RSS-210 [A8.2]

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.**

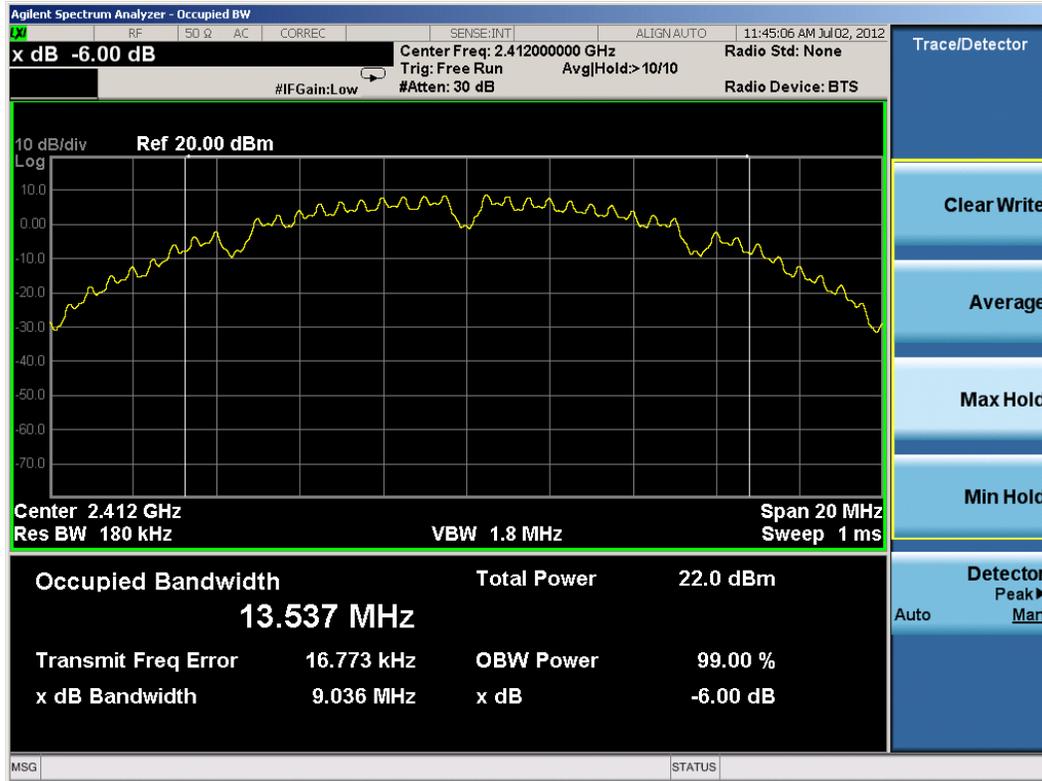
Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2412	1	b	1	9.036	0.500	Pass
2437	6	b	1	8.593	0.500	Pass
2462	11	b	1	8.630	0.500	Pass
2412	1	g	6	16.530	0.500	Pass
2437	6	g	6	16.480	0.500	Pass
2462	11	g	6	16.450	0.500	Pass
2412	1	n	6.5/7.2 (MCS0)	17.660	0.500	Pass
2437	6	n	6.5/7.2 (MCS0)	17.720	0.500	Pass
2462	11	n	6.5/7.2 (MCS0)	17.730	0.500	Pass
5745	149	a	6	16.640	0.500	Pass
5785	157	a	6	16.430	0.500	Pass
5825	165	a	6	16.520	0.500	Pass
5745	149	n	6.5/7.2 (MCS0)	17.720	0.500	Pass
5785	157	n	6.5/7.2 (MCS0)	17.760	0.500	Pass
5825	165	n	6.5/7.2 (MCS0)	17.740	0.500	Pass

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

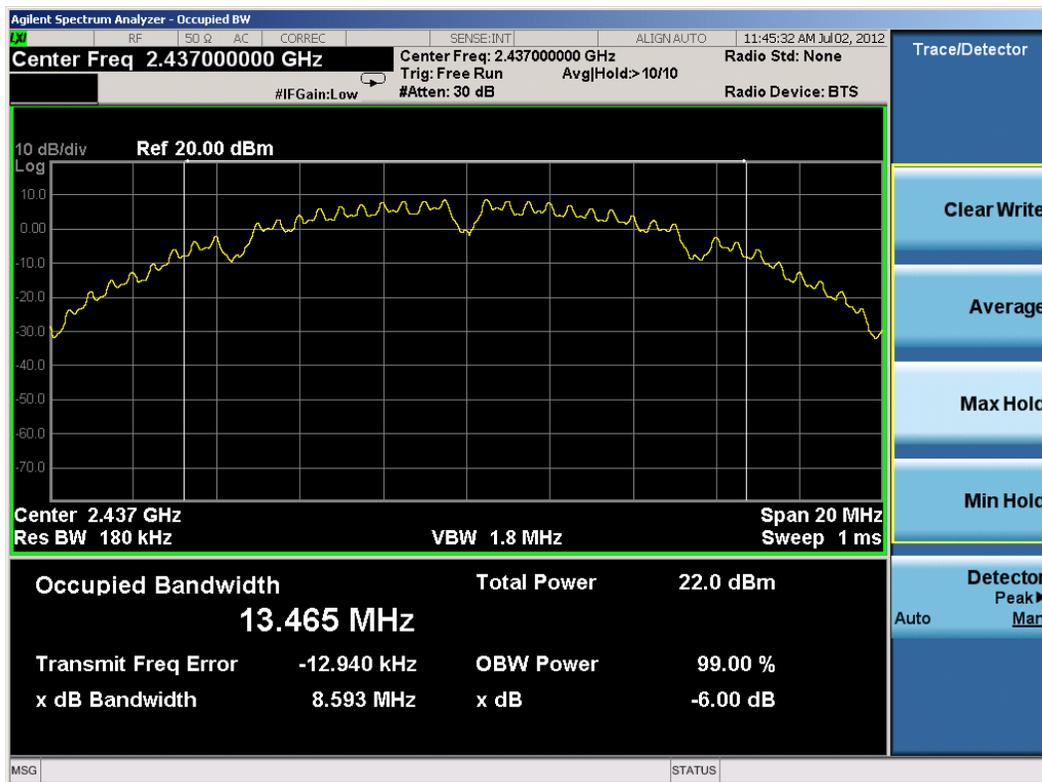


**Figure 6-1. Test Instrument & Measurement Setup**

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset	Page 11 of 57	

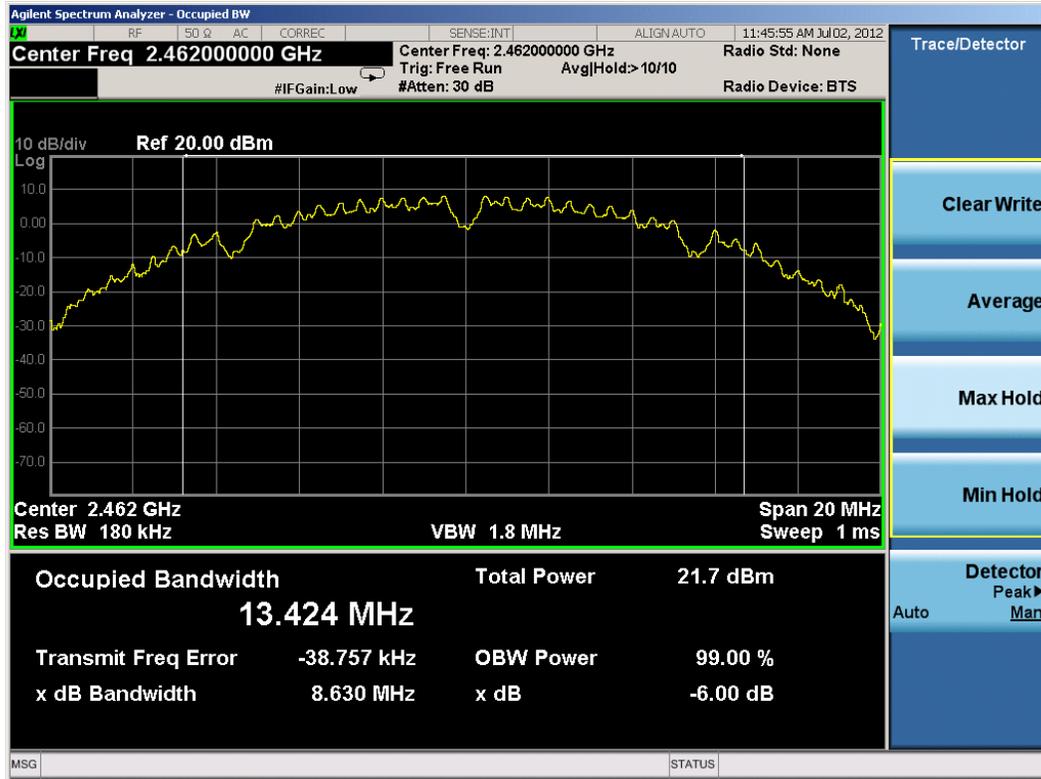


Plot 6-1. 6dB Bandwidth Plot (802.11b – Ch. 1)

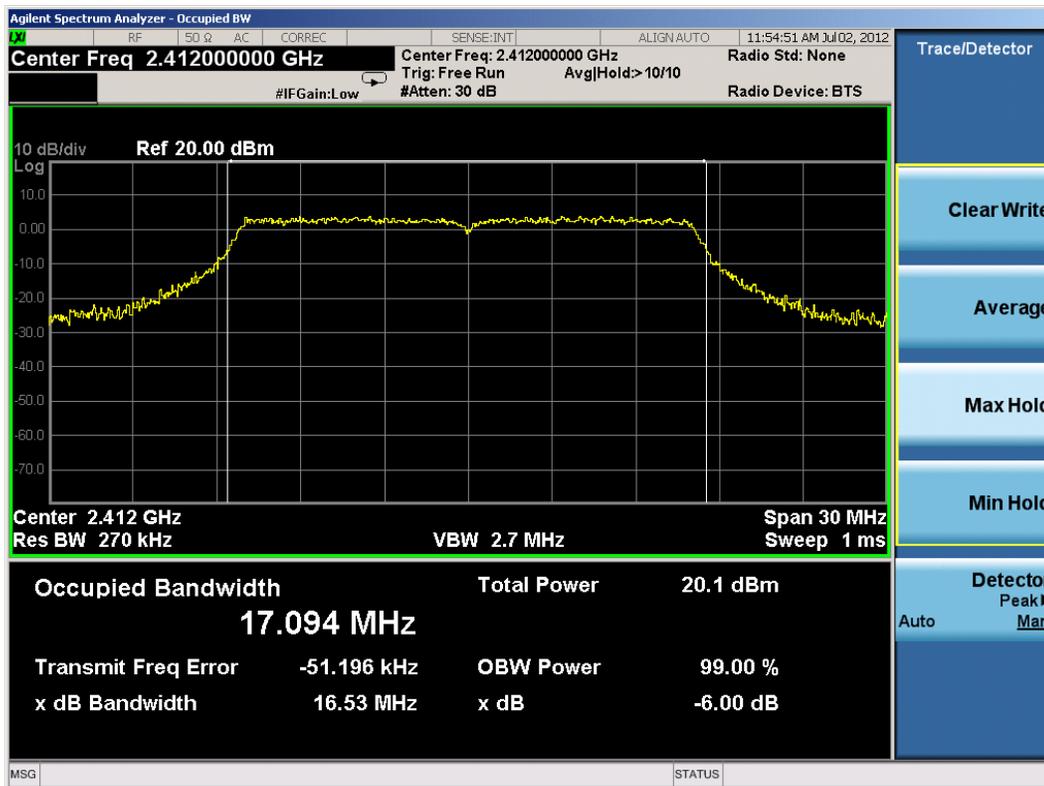


Plot 6-2. 6dB Bandwidth Plot (802.11b – Ch. 6)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 12 of 57

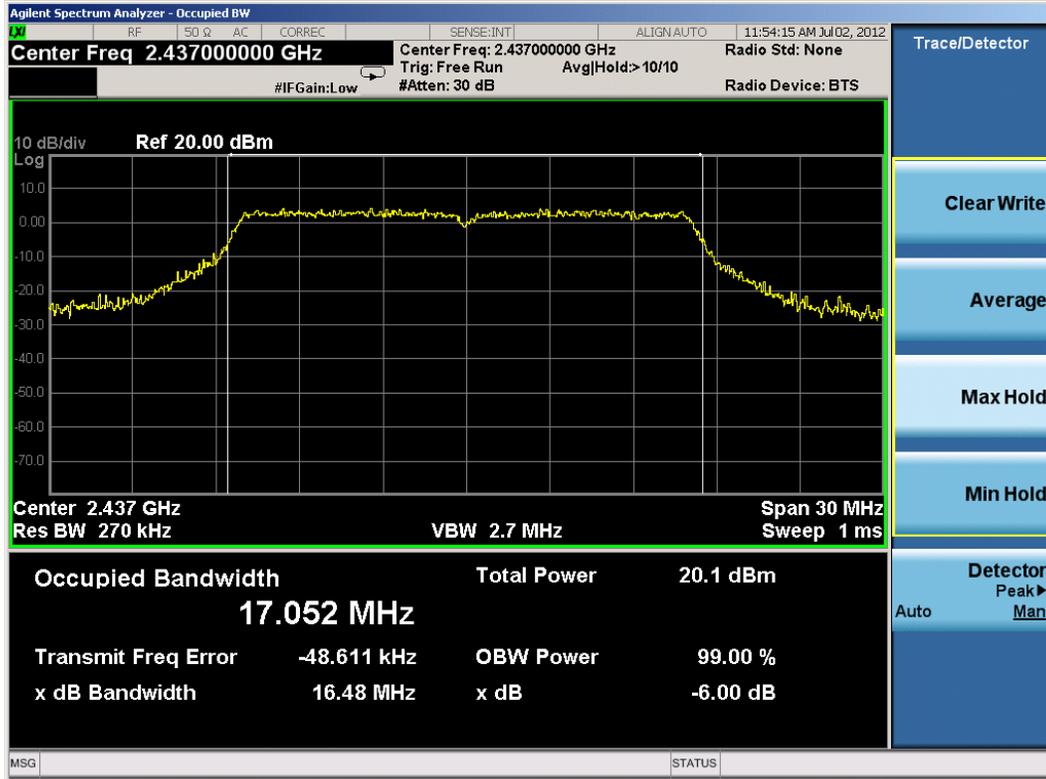


Plot 6-3. 6dB Bandwidth Plot (802.11b – Ch. 11)

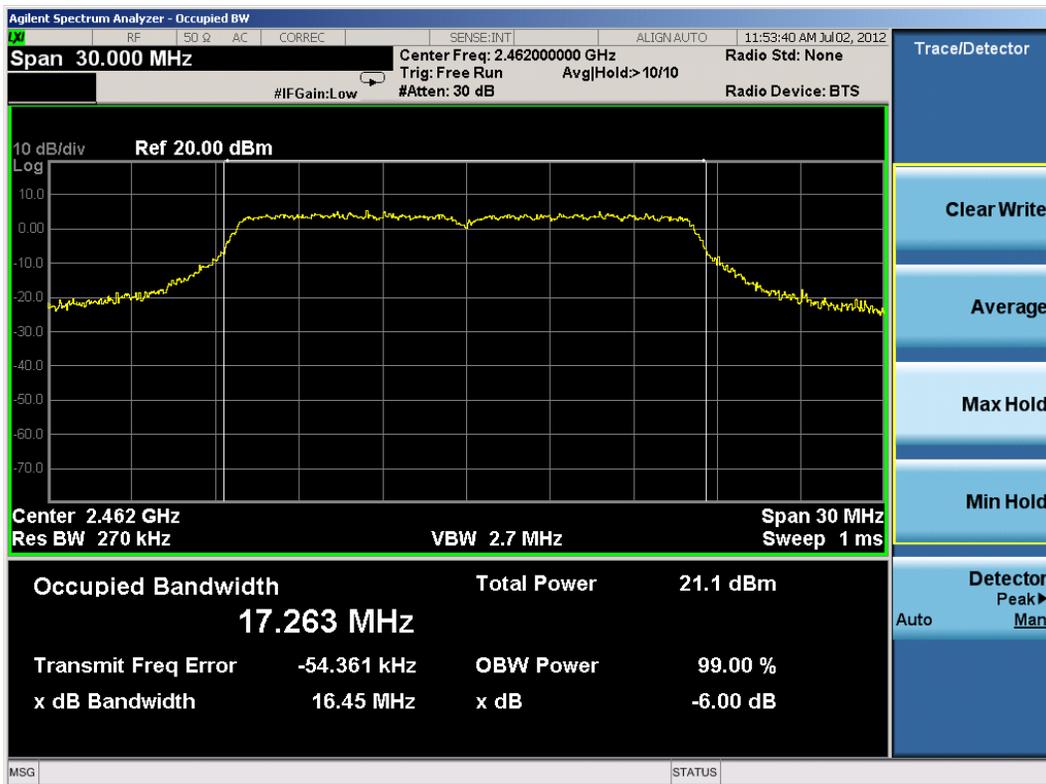


Plot 6-4. 6dB Bandwidth Plot (802.11g – Ch. 1)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 13 of 57

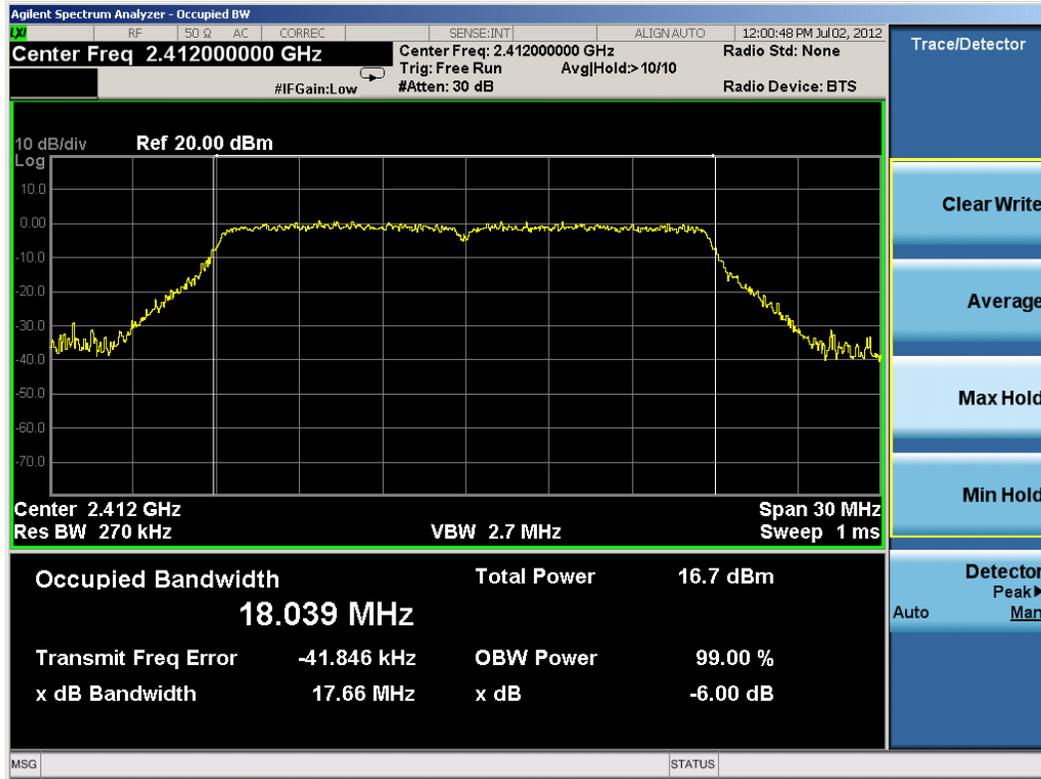


Plot 6-5. 6dB Bandwidth Plot (802.11g – Ch. 6)

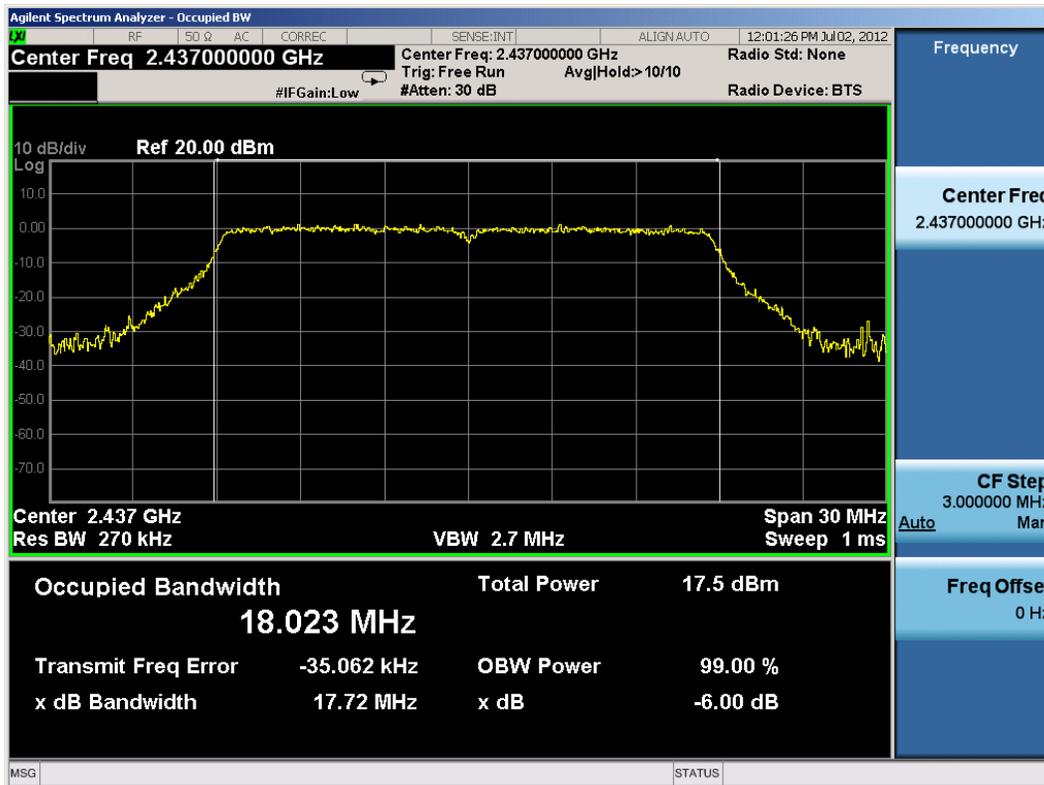


Plot 6-6. 6dB Bandwidth Plot (802.11g – Ch. 11)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 14 of 57

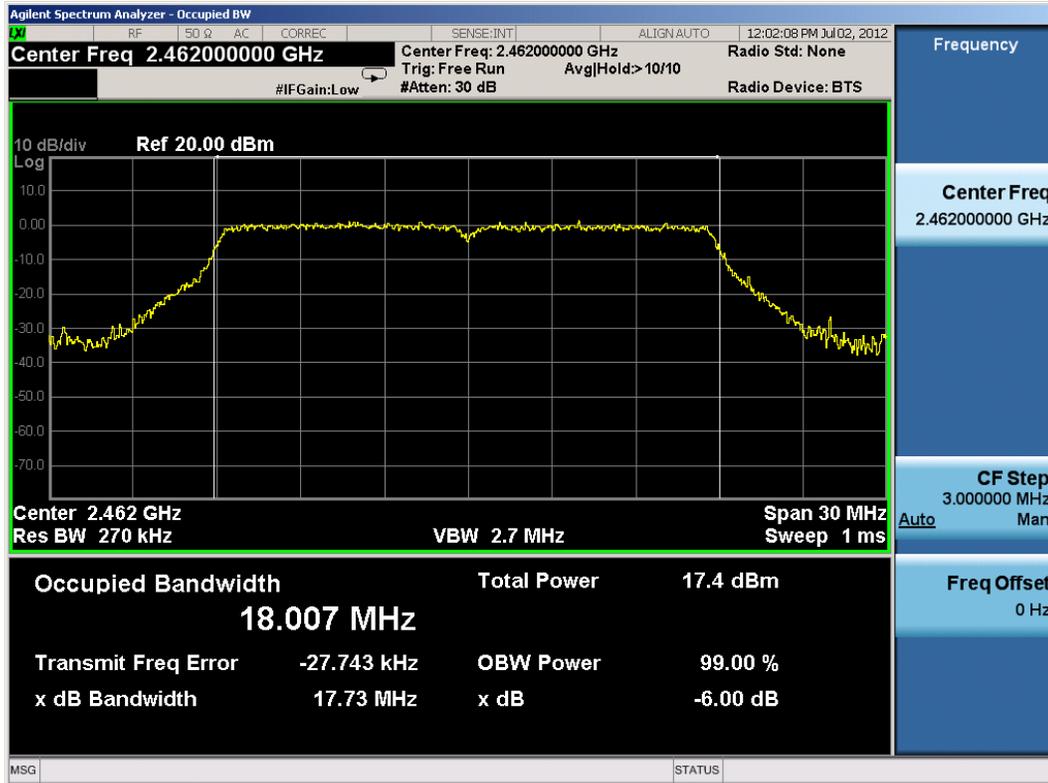


Plot 6-7. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 1)

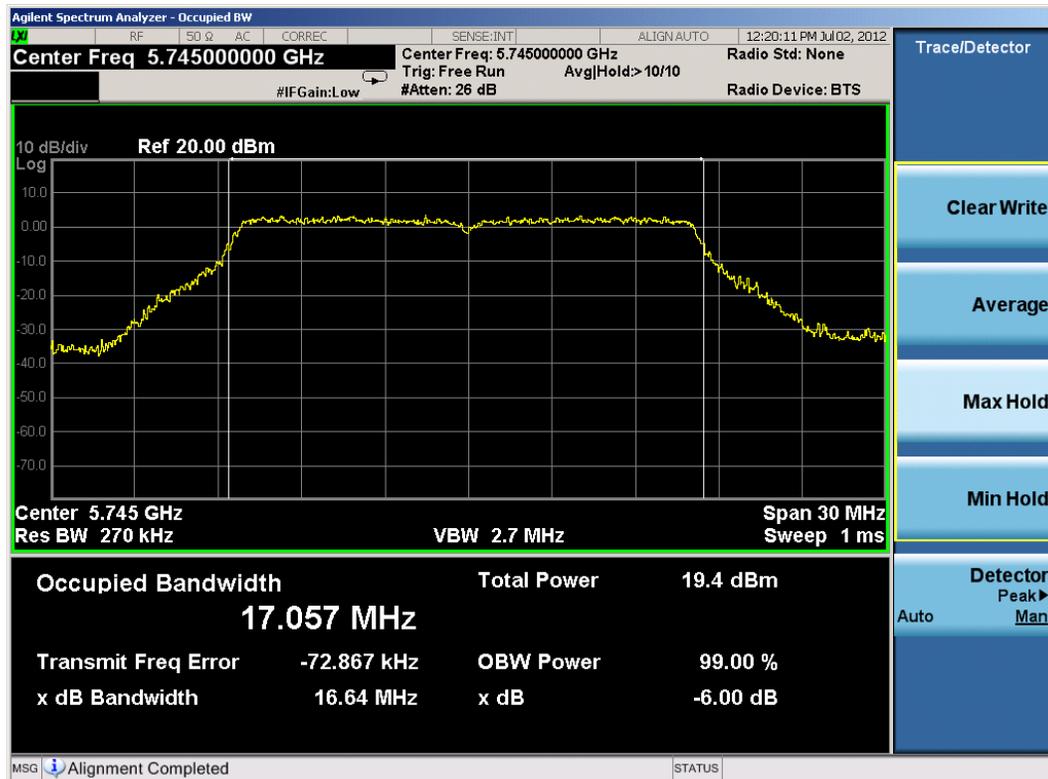


Plot 6-8. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 15 of 57

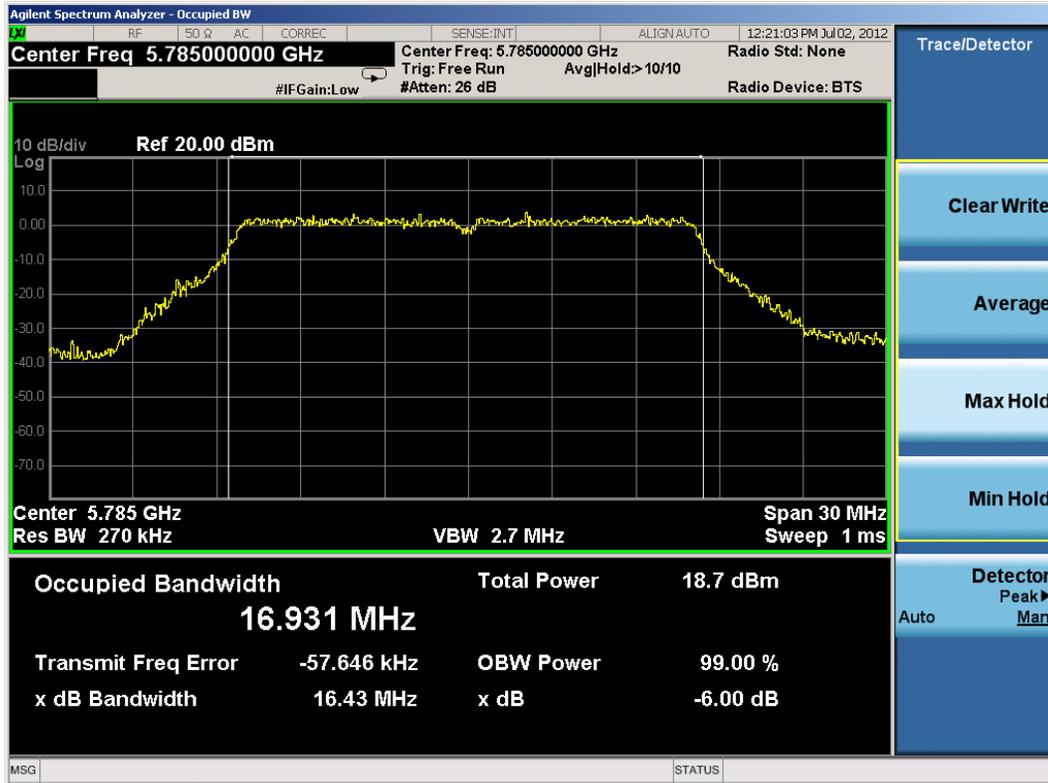


Plot 6-9. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 11)

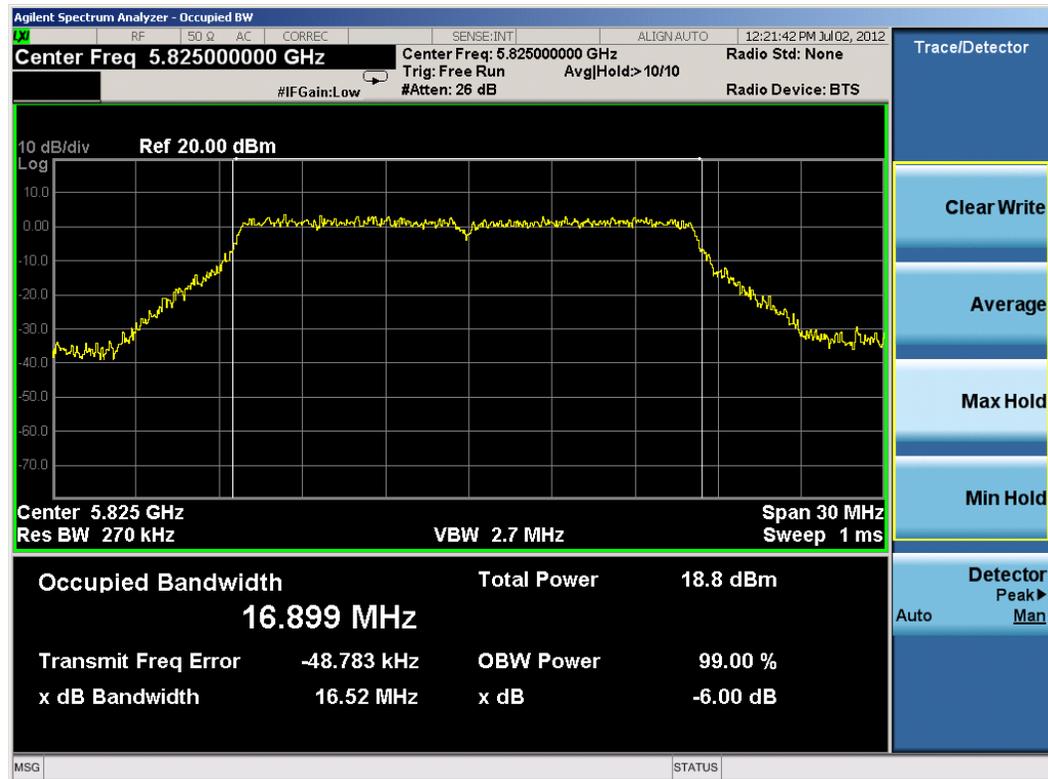


Plot 6-10. 6dB Bandwidth Plot (802.11a – Ch. 149)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 16 of 57

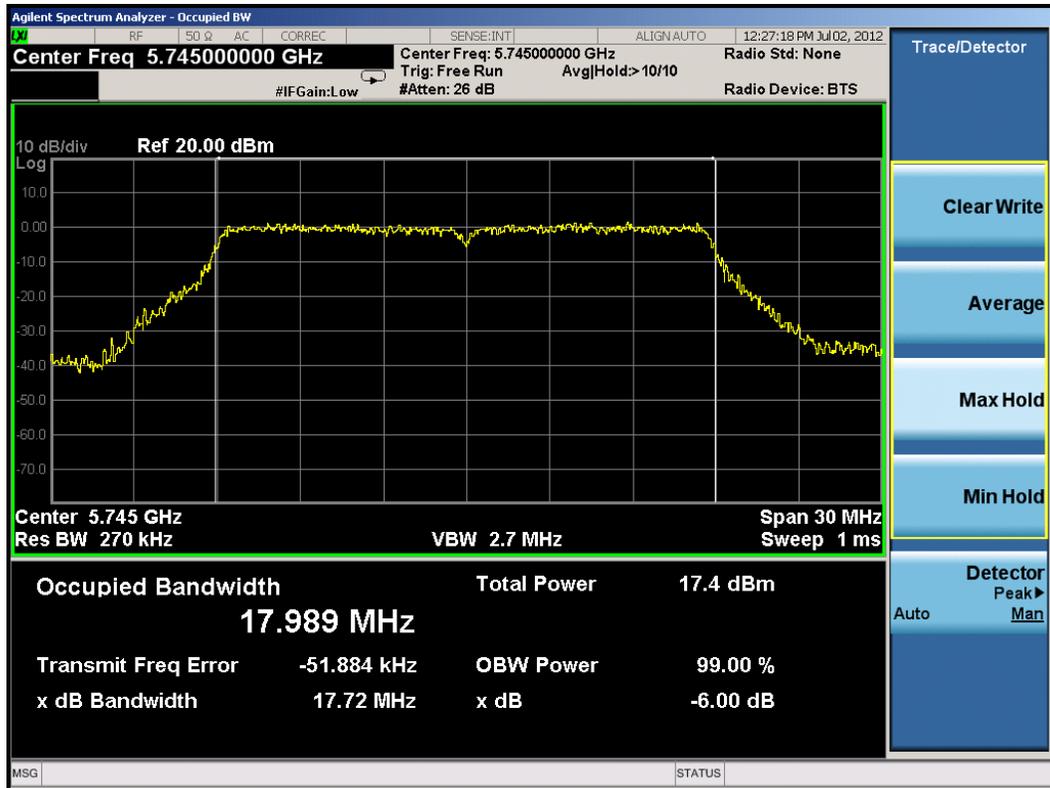


Plot 6-11. 6dB Bandwidth Plot (802.11a – Ch. 157)

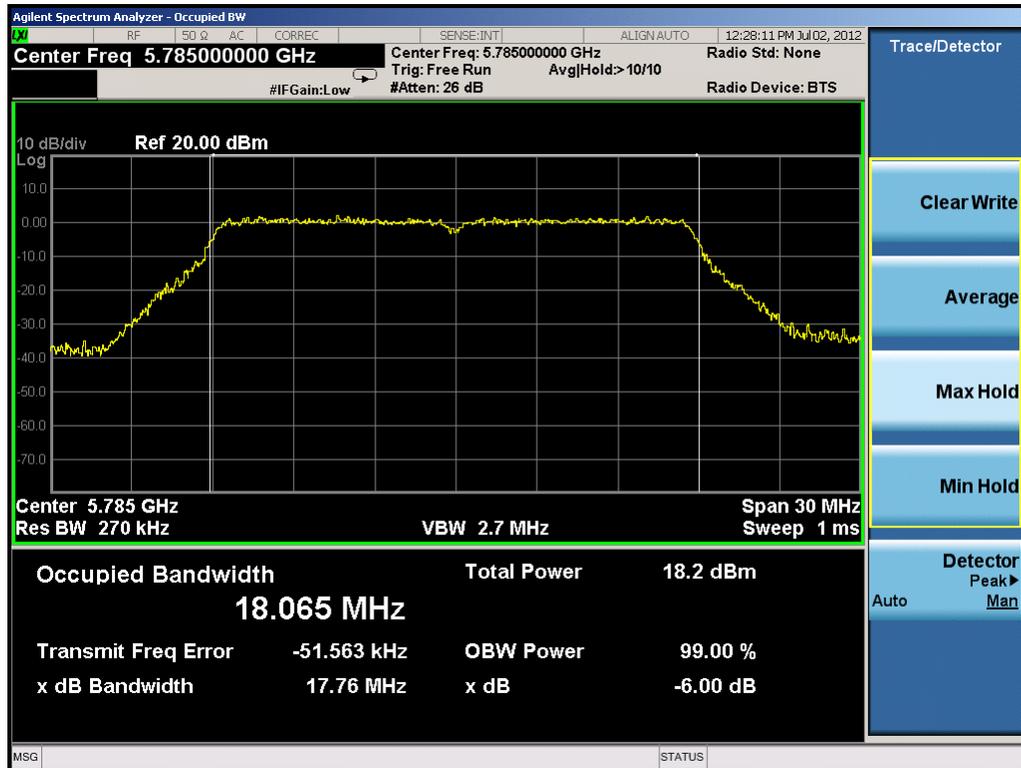


Plot 6-12. 6dB Bandwidth Plot (802.11a – Ch. 165)

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 17 of 57

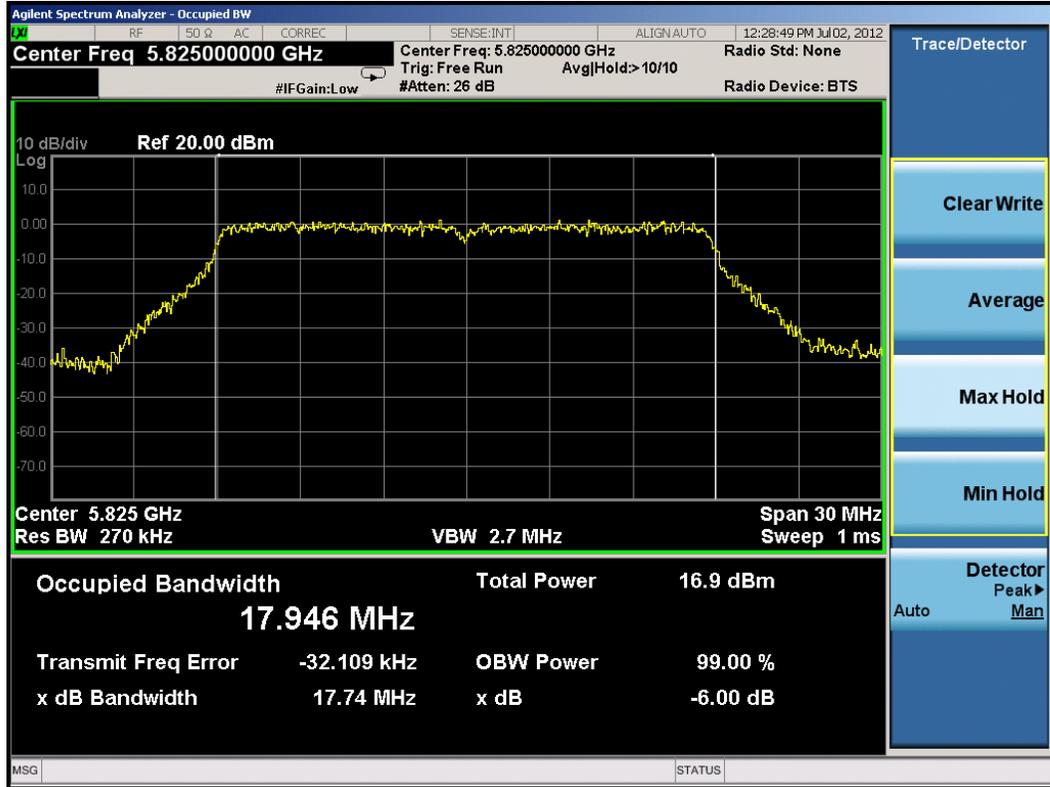


Plot 6-13. 6dB Bandwidth Plot (802.11n (5.8GHz) – Ch. 149)



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

FCC ID: ZNFLS970	<b>PCTEST</b> ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 18 of 57



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

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 19 of 57

### 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	16.58	16.80	16.81	16.88
			PEAK	17.84	17.80	18.77	17.67
802.11b	2437	6	AVG	16.64	16.21	16.66	16.49
			PEAK	17.49	18.74	18.64	18.84
802.11b	2462	11	AVG	16.20	15.96	16.06	16.07
			PEAK	17.04	18.48	18.16	18.47

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	12.80	12.13	10.84	10.54	12.45	10.55	11.12	11.75
			PEAK	16.98	18.60	17.67	17.49	18.91	17.89	18.27	18.77
802.11g	2437	6	AVG	12.75	12.29	11.30	10.50	12.69	12.65	11.44	12.00
			PEAK	16.88	19.00	18.37	17.86	19.18	19.15	18.61	18.90
802.11g	2462	11	AVG	12.73	12.47	11.53	11.24	12.71	11.62	11.68	12.13
			PEAK	16.43	19.05	18.43	18.17	19.23	18.51	18.62	18.90

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	10.83	10.70	10.00	9.95	9.82	10.33	10.86	11.92
			PEAK	16.44	18.06	17.94	17.39	17.29	17.75	18.20	16.62
802.11n	2437	6	AVG	11.05	11.22	10.19	9.85	9.82	11.08	11.79	11.76
			PEAK	18.43	18.76	18.13	17.84	17.78	18.73	19.12	19.20
802.11n	2462	11	AVG	11.11	11.33	10.24	9.47	9.36	11.01	11.58	11.61
			PEAK	18.56	18.84	18.17	17.65	17.44	18.74	19.13	19.01

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

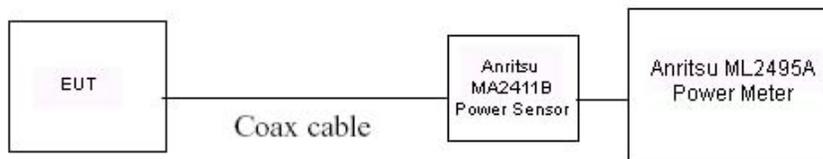


Figure 6-2. Test Instrument & Measurement Setup

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset	Page 20 of 57	

## 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	12.19	12.16	11.80	11.87	12.25	11.99	11.83	11.85
			PEAK	20.11	20.04	19.86	19.71	20.35	20.18	19.86	19.96
802.11a	5765	153	AVG	12.38	12.09	11.67	11.59	12.24	11.85	11.75	12.14
			PEAK	20.24	20.00	19.59	19.60	20.36	19.97	20.06	20.44
802.11a	5785	157	AVG	12.88	12.82	12.51	12.54	12.95	12.41	12.50	12.90
			PEAK	20.01	20.72	20.44	20.59	20.84	20.40	20.56	20.80
802.11a	5805	161	AVG	12.02	12.05	11.64	11.68	12.20	11.66	11.78	12.25
			PEAK	19.98	19.94	19.71	19.74	20.20	19.78	20.09	20.27
802.11a	5825	165	AVG	12.10	12.03	11.92	11.88	12.20	11.95	11.66	12.24
			PEAK	20.03	19.98	19.99	19.91	20.21	20.03	19.64	20.34

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	10.98	11.06	10.92	10.88	10.89	10.91	10.97	10.98
			PEAK	18.98	19.09	18.96	18.98	18.93	19.09	19.17	19.14
802.11n	5765	153	AVG	11.06	11.22	10.74	10.63	10.75	11.19	11.26	11.30
			PEAK	19.14	19.45	19.04	18.95	19.00	19.49	19.53	19.66
802.11n	5785	157	AVG	11.33	11.09	10.94	10.89	10.84	11.13	11.52	11.35
			PEAK	19.47	19.02	19.22	18.93	18.74	19.01	19.41	19.35
802.11n	5805	161	AVG	10.92	10.96	10.71	10.51	10.52	10.84	10.91	11.99
			PEAK	18.91	19.00	18.79	18.48	18.63	18.90	18.96	18.98
802.11n	5825	165	AVG	11.10	11.18	10.65	10.42	10.36	11.10	11.24	11.34
			PEAK	19.07	19.28	18.53	18.32	18.69	19.18	19.10	19.46

Table 6-7. 802.11n (5GHz) Conducted Output Power Measurements

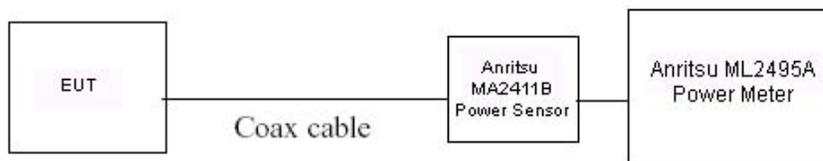


Figure 6-3. Test Instrument & Measurement Setup

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 21 of 57

## 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	8.620	-15.23	-6.609	8.0	-14.61
2437	6	b	1	7.810	-15.23	-7.419	8.0	-15.42
2462	11	b	1	8.430	-15.23	-6.799	8.0	-14.80
2412	1	g	6	2.240	-15.23	-12.989	8.0	-20.99
2437	6	g	6	2.720	-15.23	-12.509	8.0	-20.51
2462	11	g	6	2.950	-15.23	-12.279	8.0	-20.28
2412	1	n	6.5/7.2 (MCS0)	-1.080	-15.23	-16.309	8.0	-24.31
2437	6	n	6.5/7.2 (MCS0)	-0.290	-15.23	-15.519	8.0	-23.52
2462	11	n	6.5/7.2 (MCS0)	-0.366	-15.23	-15.595	8.0	-23.59
5745	149	a	6	1.170	-15.23	-14.059	8.0	-22.06
5785	157	a	6	1.220	-15.23	-14.009	8.0	-22.01
5825	165	a	6	1.440	-15.23	-13.789	8.0	-21.79
5745	149	n	6.5/7.2 (MCS0)	0.300	-15.23	-14.929	8.0	-22.93
5785	157	n	6.5/7.2 (MCS0)	0.050	-15.23	-15.179	8.0	-23.18
5825	165	n	6.5/7.2 (MCS0)	-0.800	-15.23	-16.029	8.0	-24.03

Table 6-8. Conducted Power Density Measurements

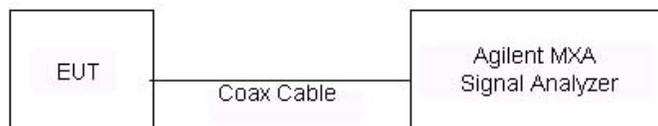
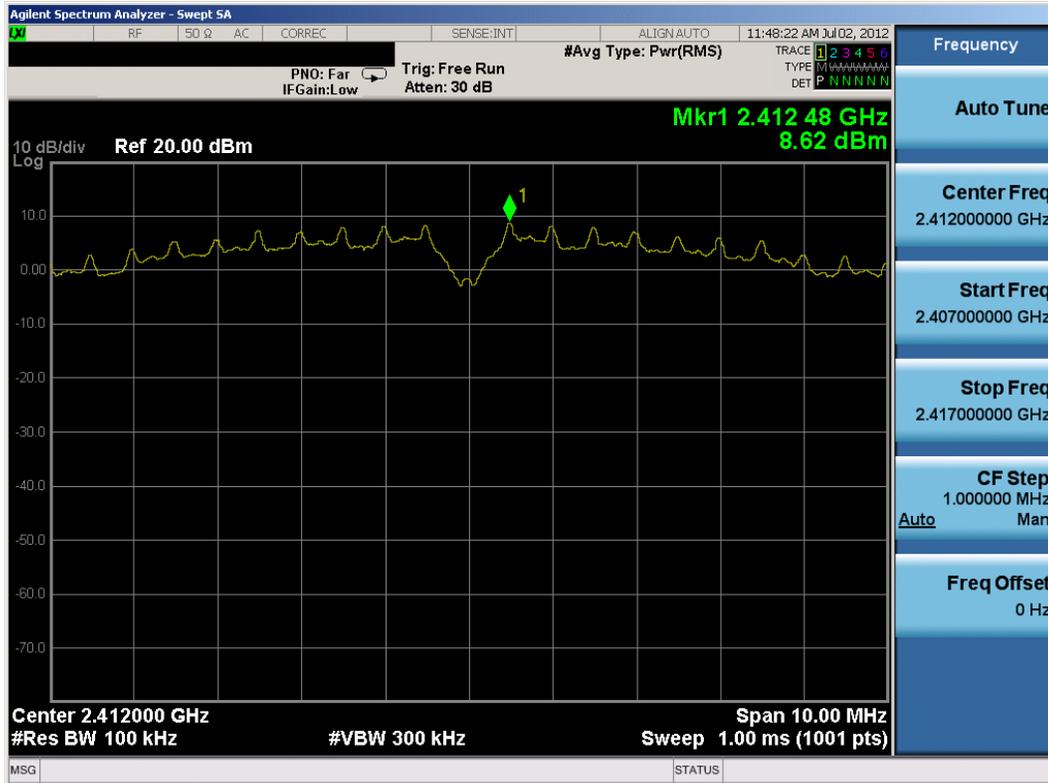
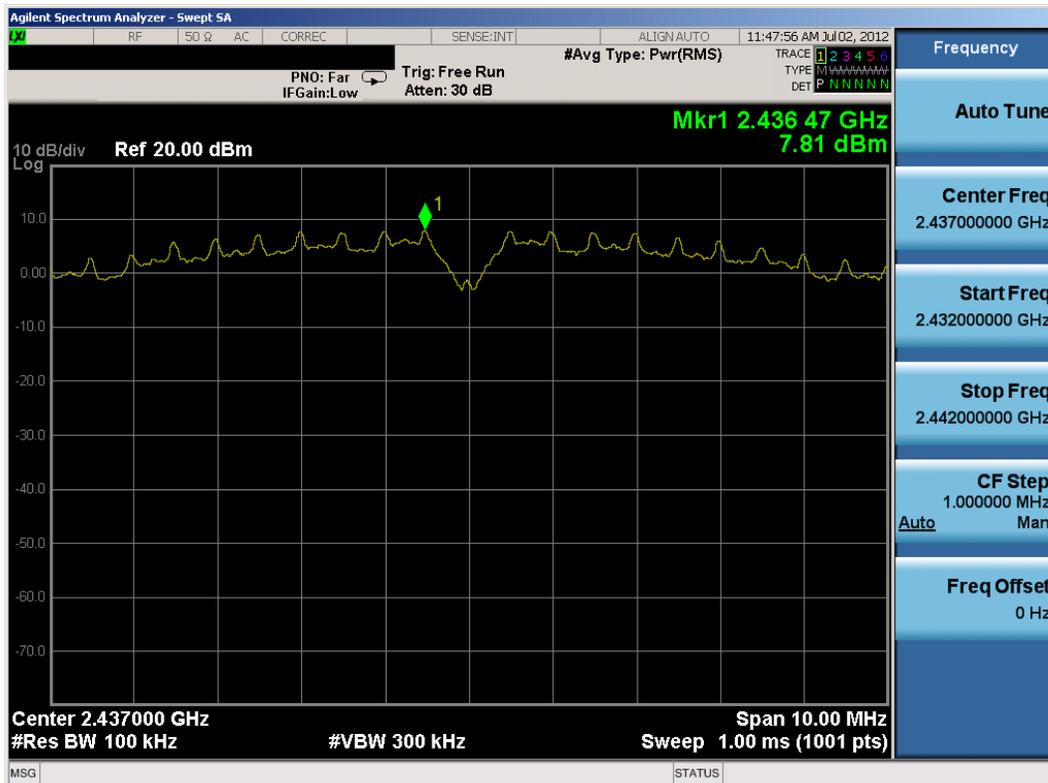


Figure 6-4. Test Instrument & Measurement Setup

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset	Page 22 of 57	

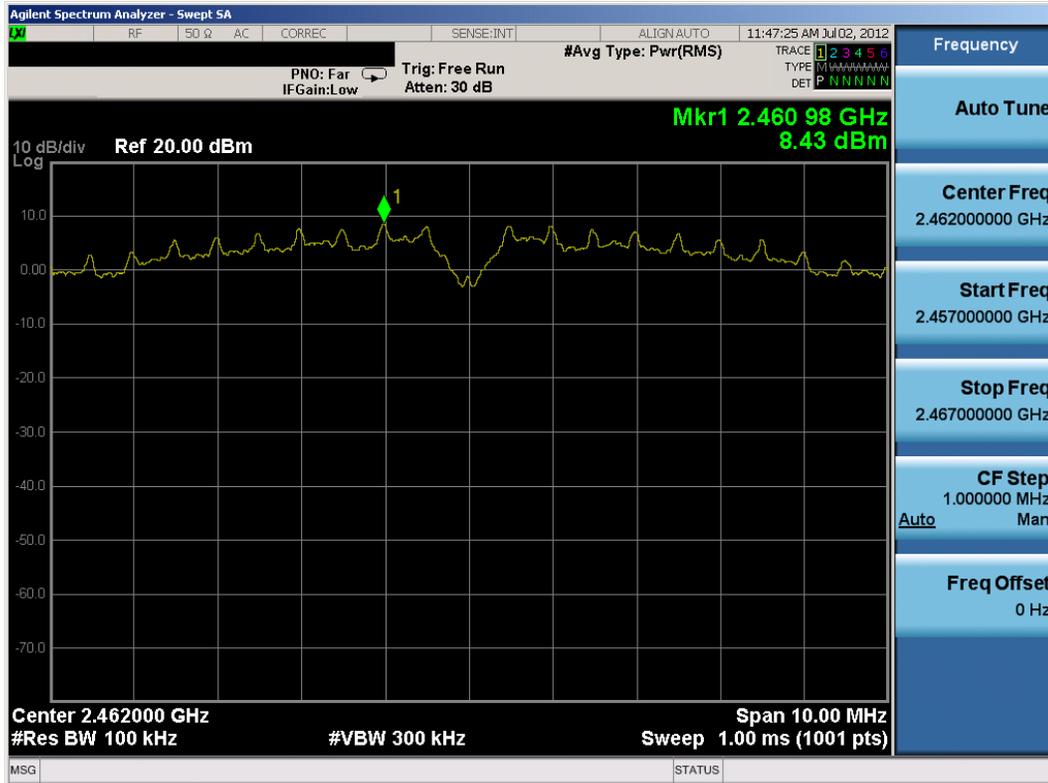


Plot 6-16. Power Spectral Density Plot (802.11b – Ch. 1)

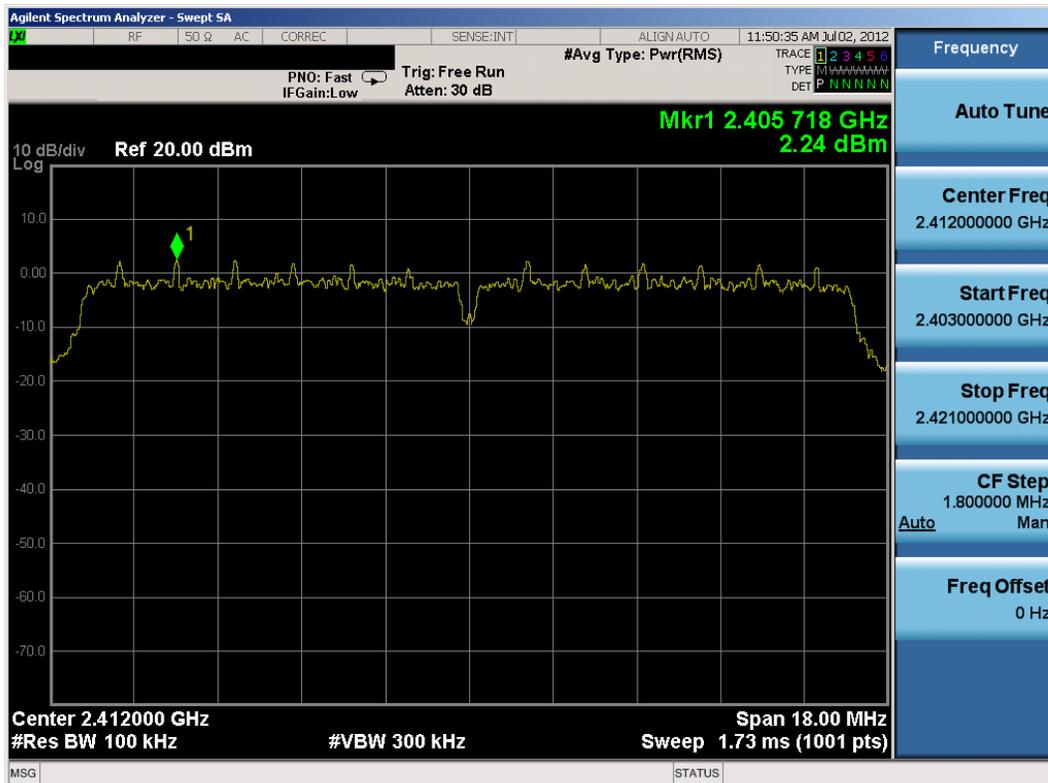


Plot 6-17. Power Spectral Density Plot (802.11b – Ch. 6)

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 23 of 57



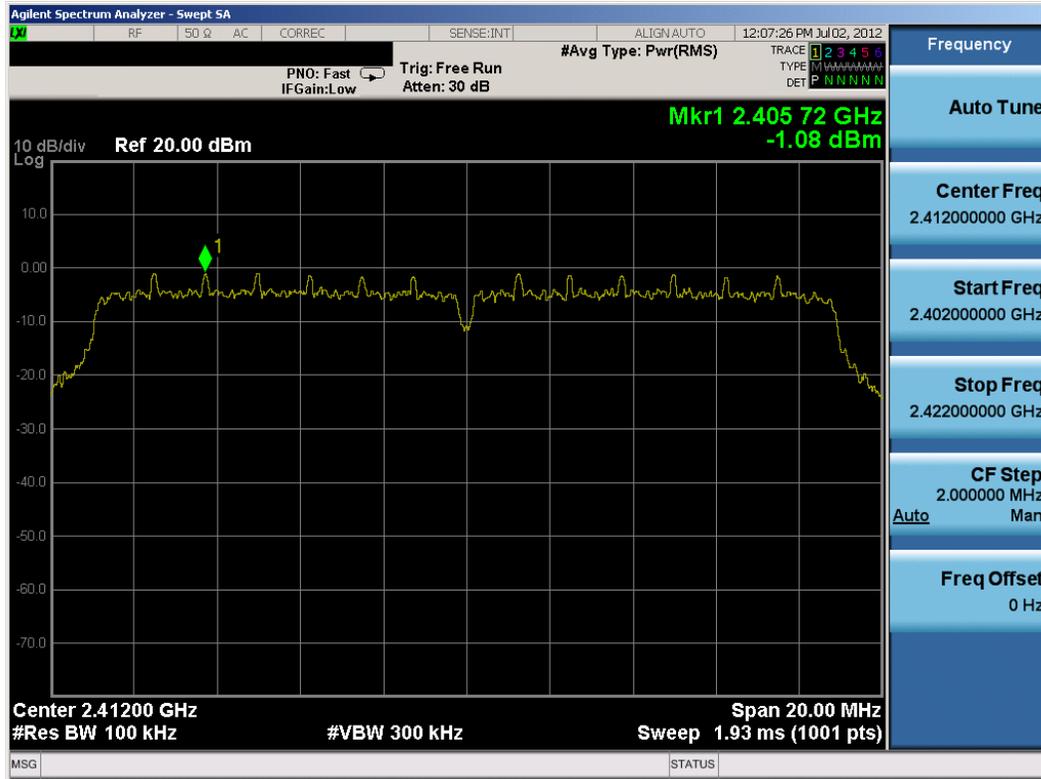
Plot 6-18. Power Spectral Density Plot (802.11b – Ch. 11)



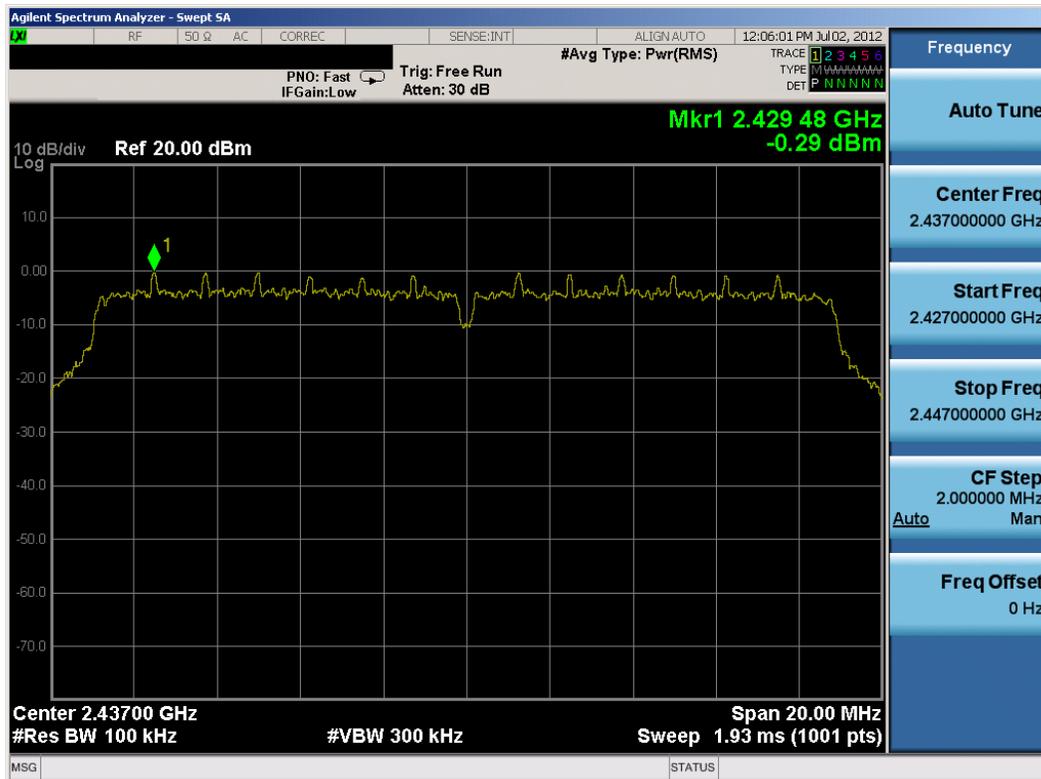
Plot 6-19. Power Spectral Density Plot (802.11g – Ch. 1)

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 24 of 57



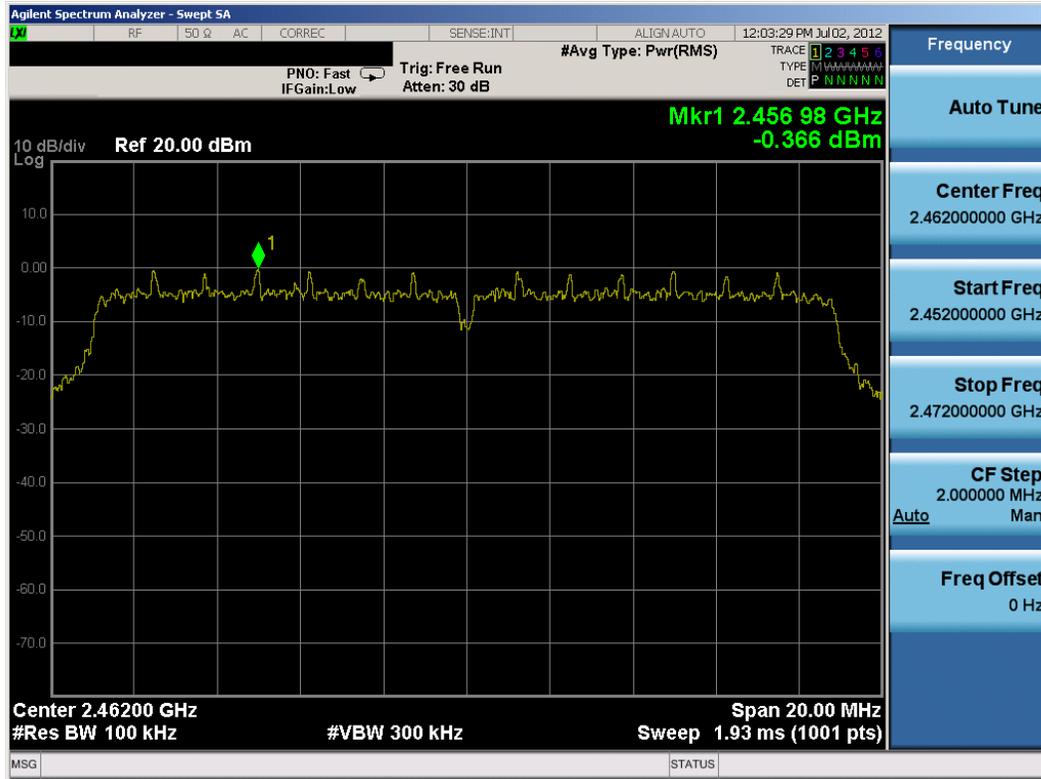


Plot 6-22. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 1)

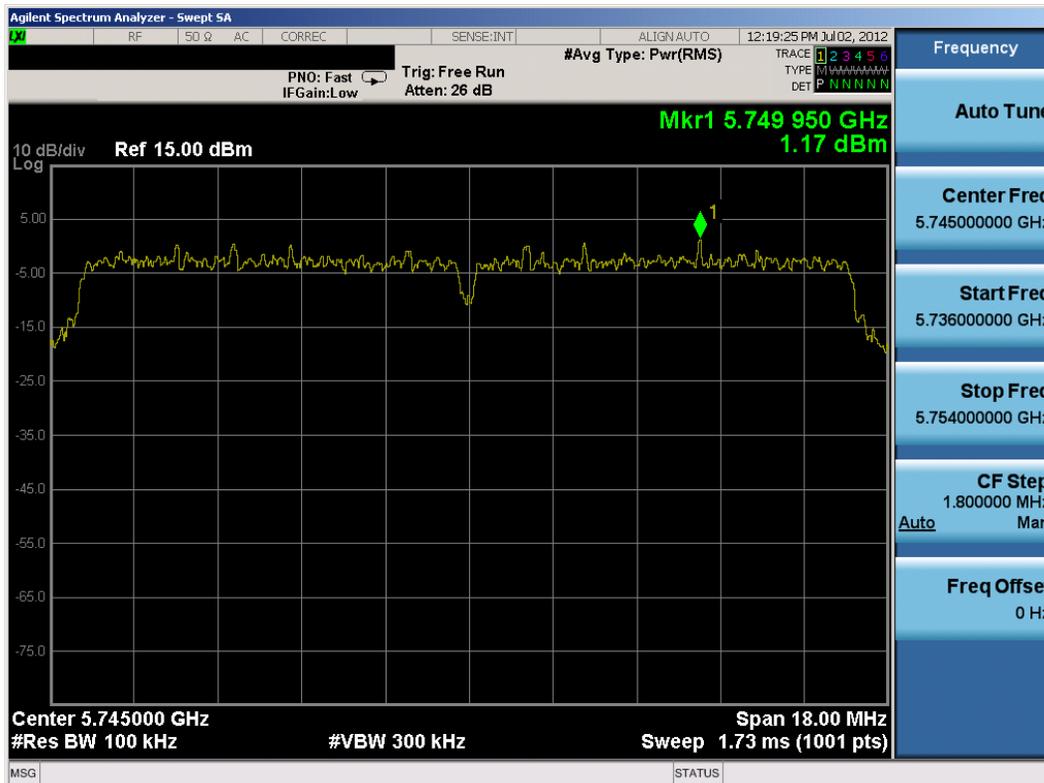


Plot 6-23. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 6)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 26 of 57

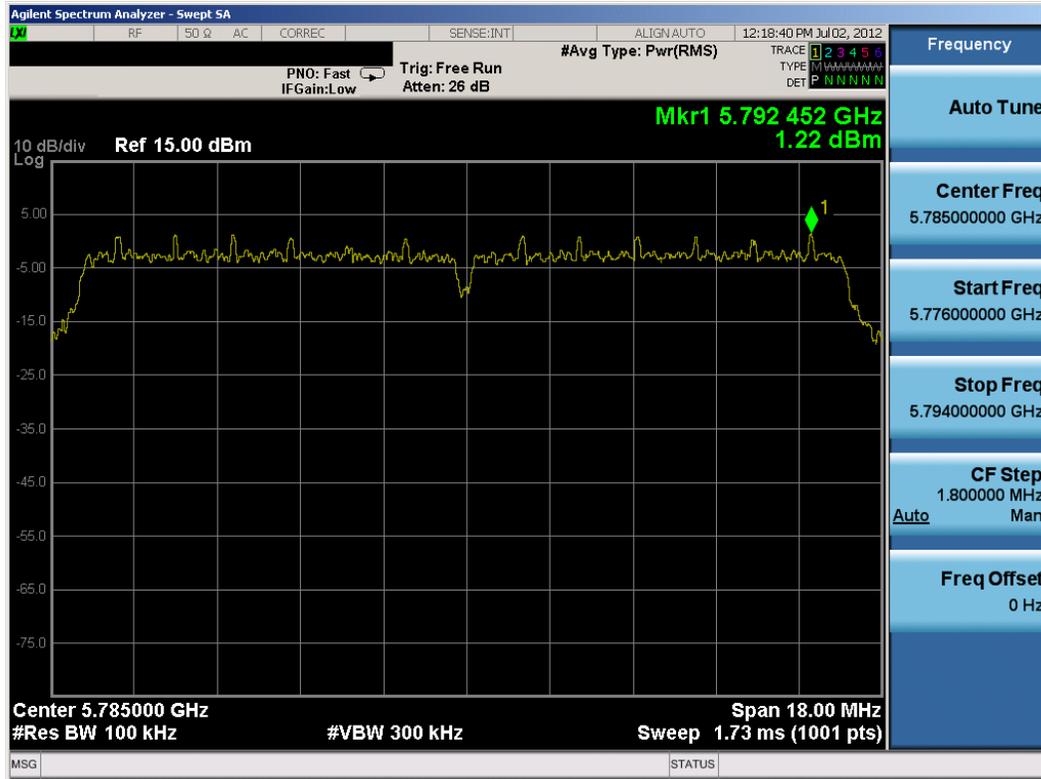


Plot 6-24. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)

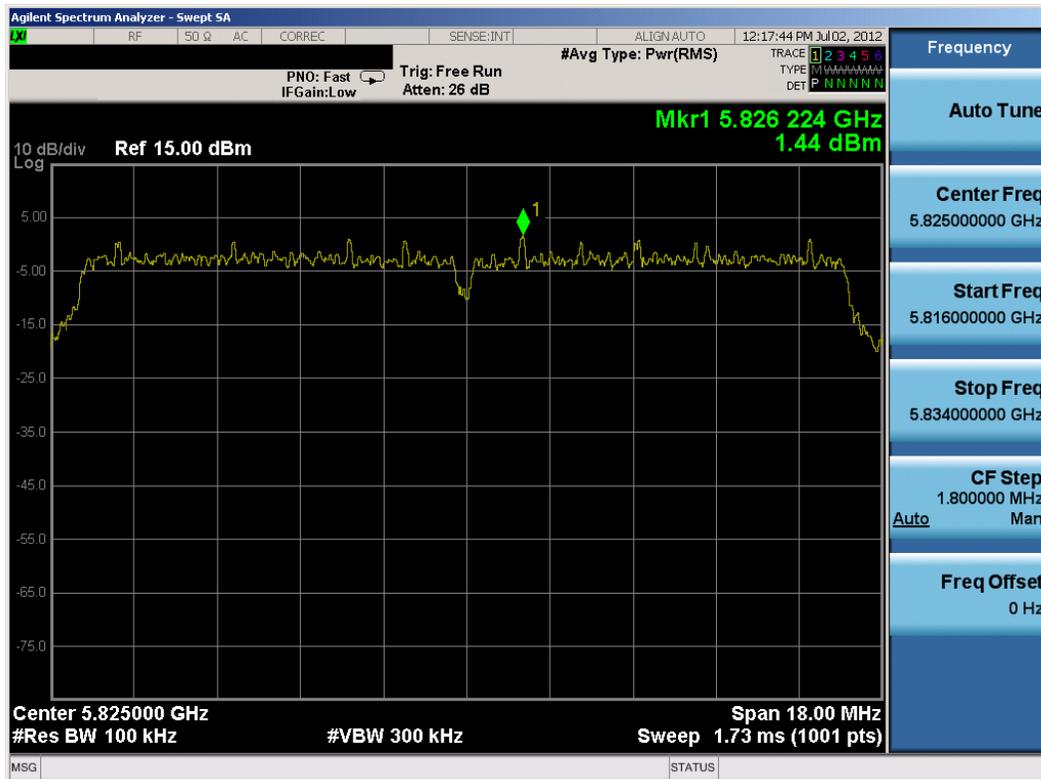


Plot 6-25. Power Spectral Density Plot (802.11a – Ch. 149)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset	Page 27 of 57	

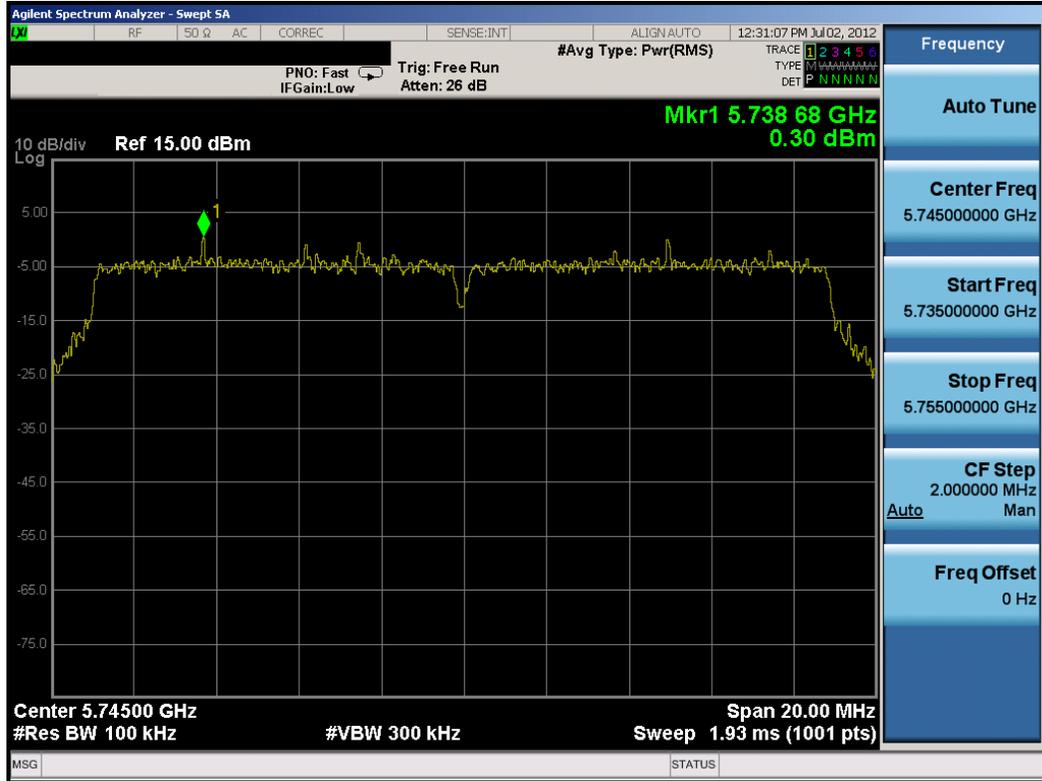


Plot 6-26. Power Spectral Density Plot (802.11a – Ch. 157)

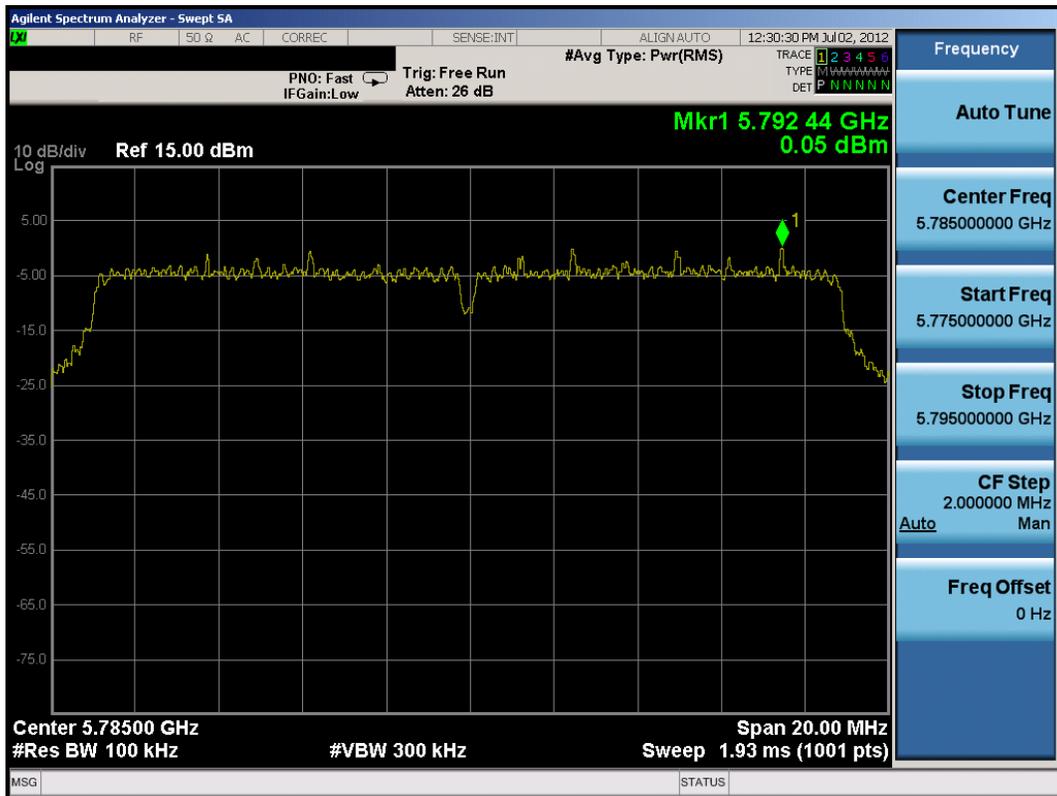


Plot 6-27. Power Spectral Density Plot (802.11a – Ch. 165)

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 6-28. Power Spectral Density Plot (802.11n (5.8GHz) – Ch. 149)



Plot 6-29. Power Spectral Density Plot (802.11n (5.8GHz) – Ch. 157)

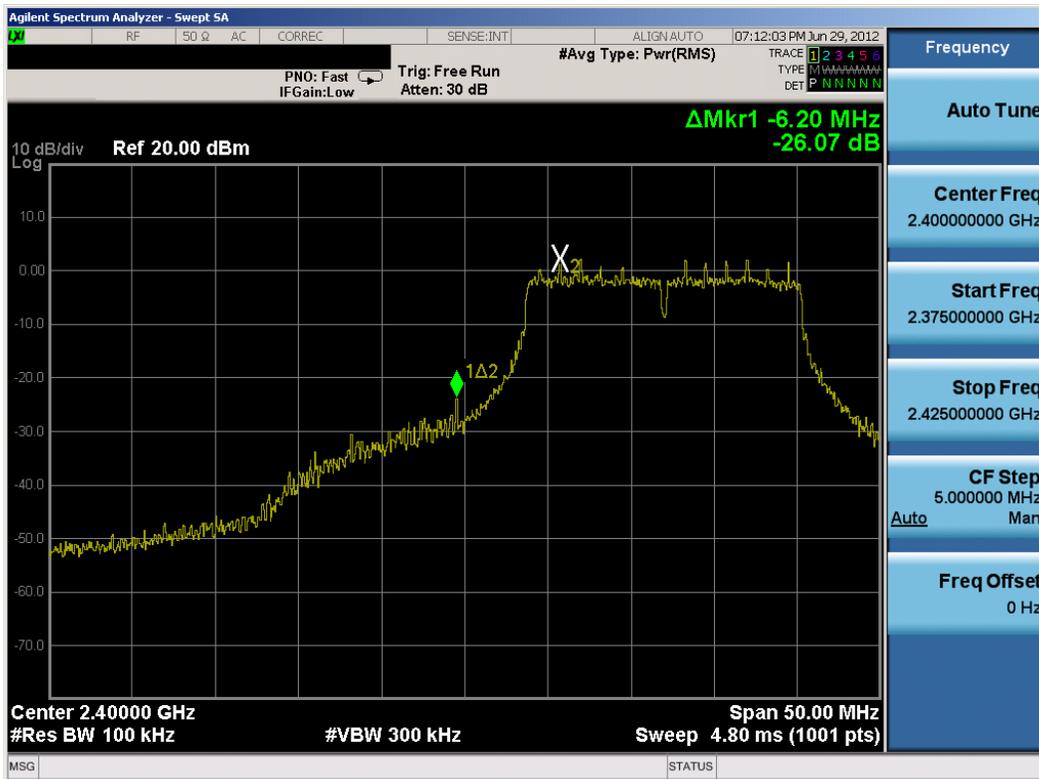
FCC ID: ZNFLS970	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)	LG	Reviewed by: Quality Manager
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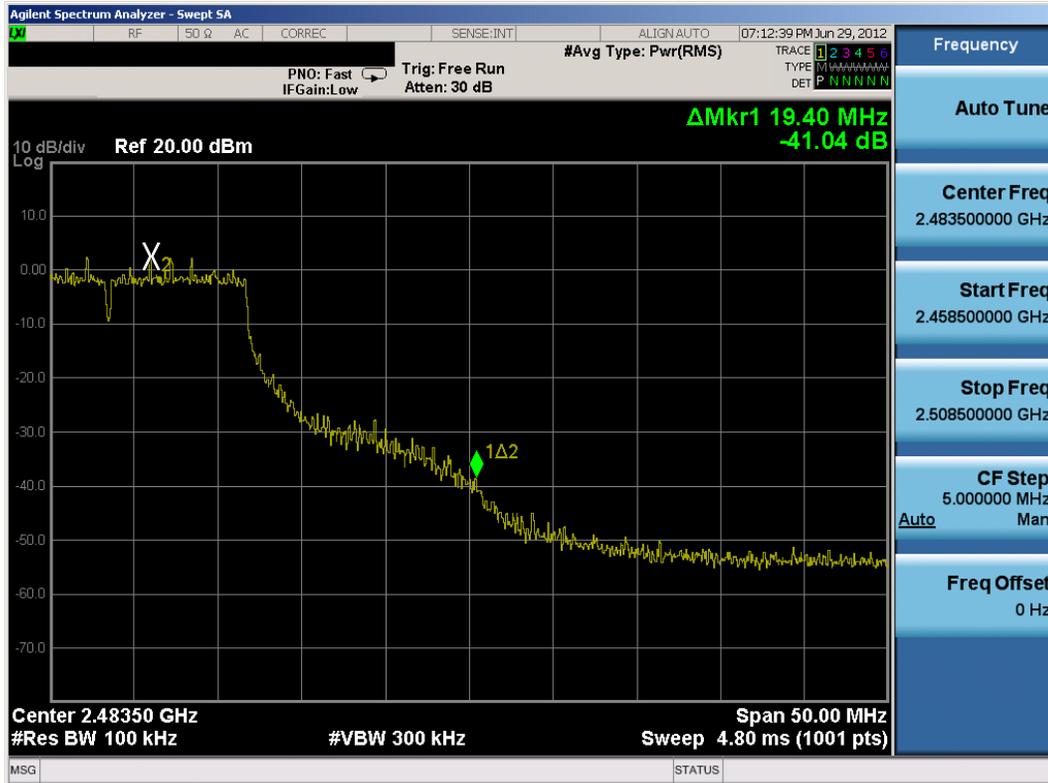


Plot 6-32. Band Edge Plot (802.11b – Ch. 11)

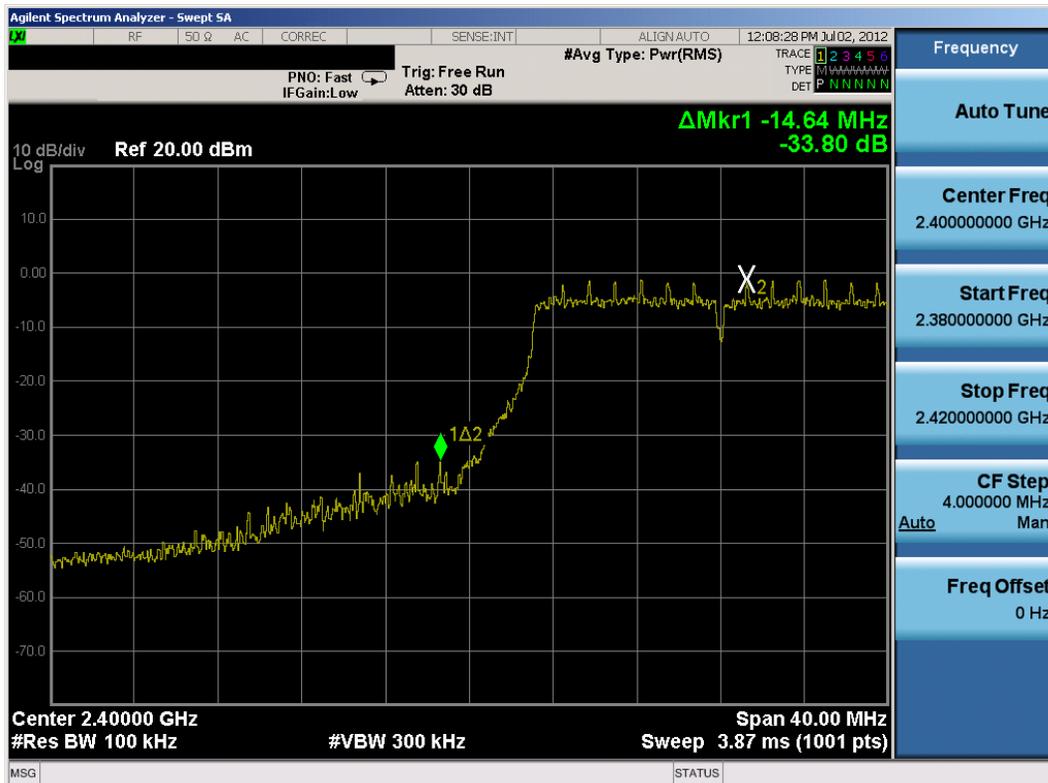


Plot 6-33. Band Edge Plot (802.11g– Ch. 1)

FCC ID: ZNFLS970		FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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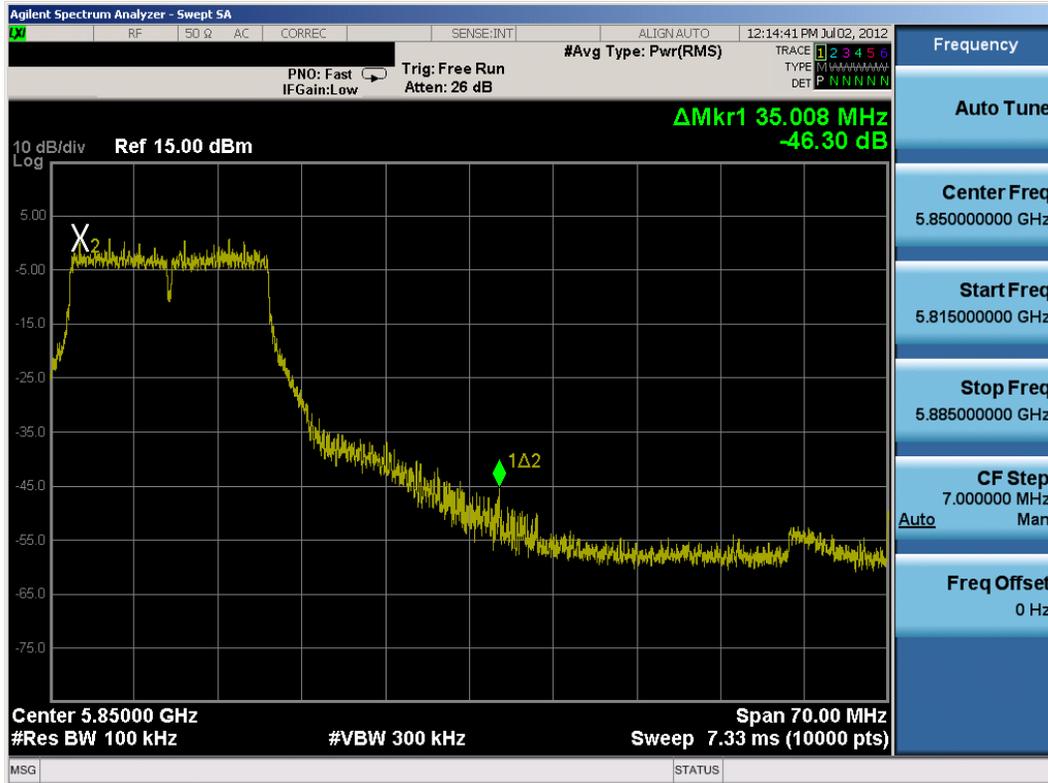
Plot 6-34. Band Edge Plot (802.11g – Ch. 11)



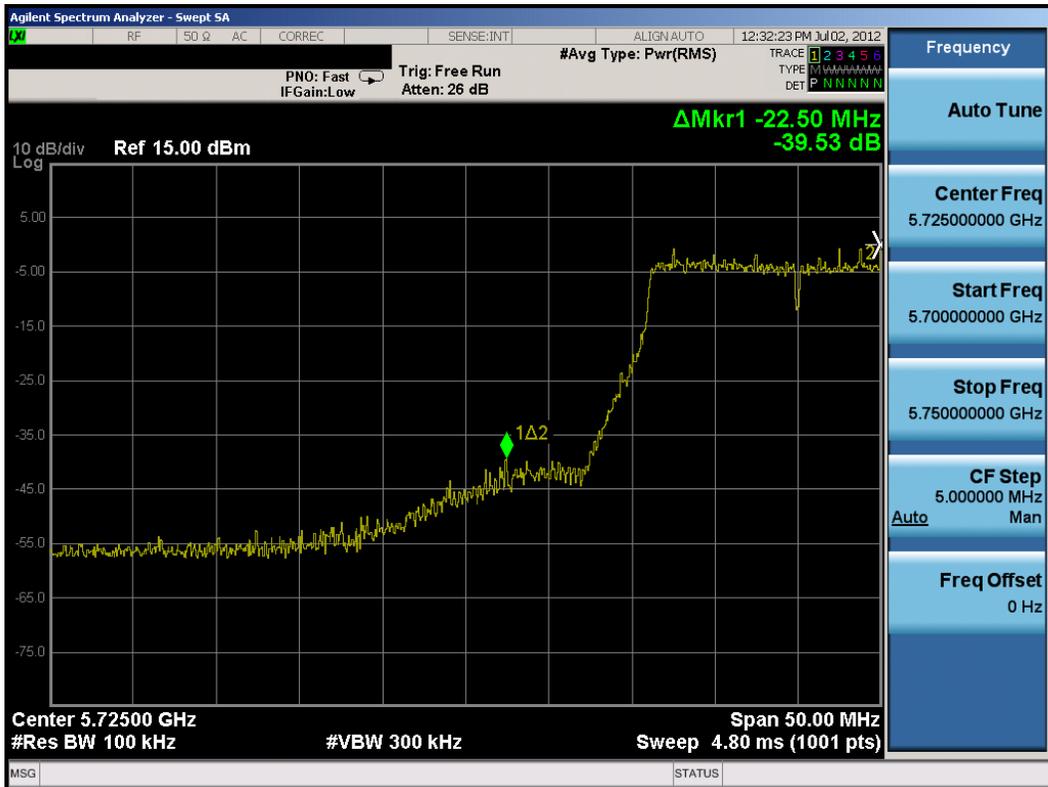
Plot 6-35. Band Edge Plot (802.11n (2.4GHz) – Ch. 1)

FCC ID: ZNFLS970	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: 0Y1206040765.ZNF	Test Dates: June6-July2, 2012	EUT Type: Portable Handset		Page 33 of 57





Plot 6-38. Band Edge Plot (802.11a – Ch. 165)



Plot 6-39. Band Edge Plot (802.11n (5.8GHz) – Ch. 149)

FCC ID: ZNFLS970	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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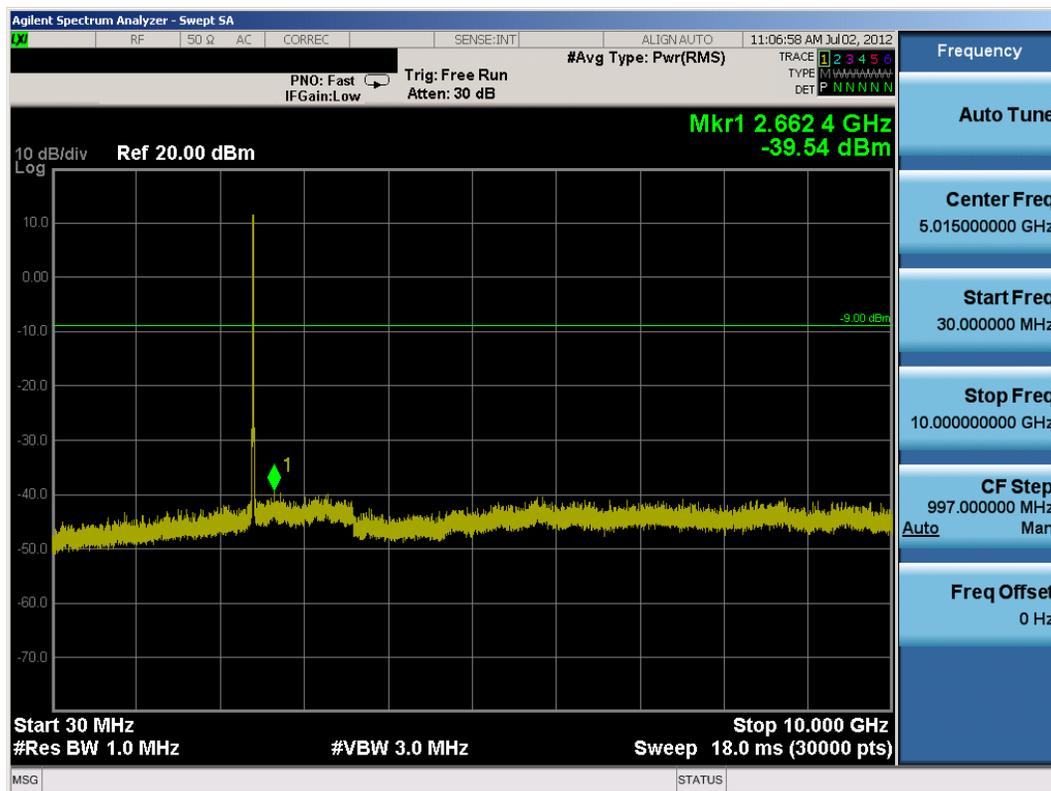
## 6.7 Conducted Spurious Emissions

### §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.

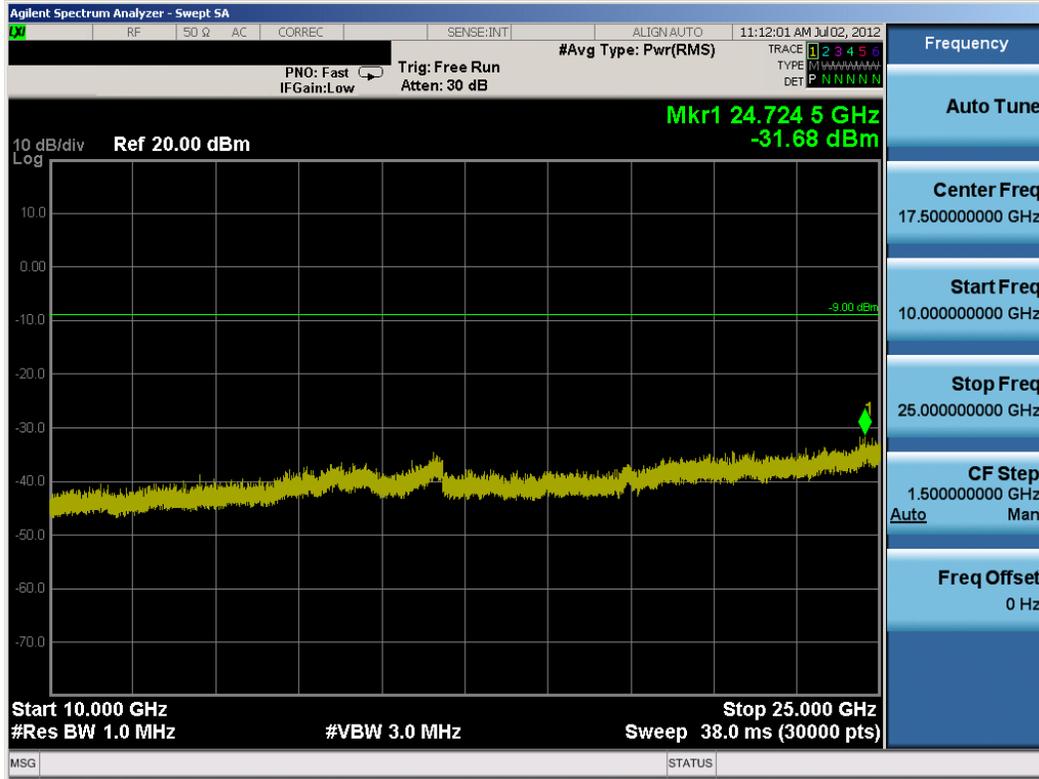
The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth, as determined in Section 6.6 of this report. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

The 802.11a conducted spurious emissions plots are generated based on trace data from the Agilent PSA Spectrum Analyzer. Measuring 4GHz at a time and utilizing 8192 sweep points (maximum number of sweep points allowed on Agilent PSA) per each 4GHz, the Agilent PSA measured conducted spurious emissions up to 40GHz. Measurement were made using peak detector, RBW = 1MHz, and VBW = 3MHz. The display line shown on the 802.11a conducted spurious emissions plots denotes the limit at 20dB below the corresponding Power Spectral Density measured in Section 6.5. Trace data was imported into Excel to produce the plots reported below using PCTEST 40GHz CSE software, Version 1.0.

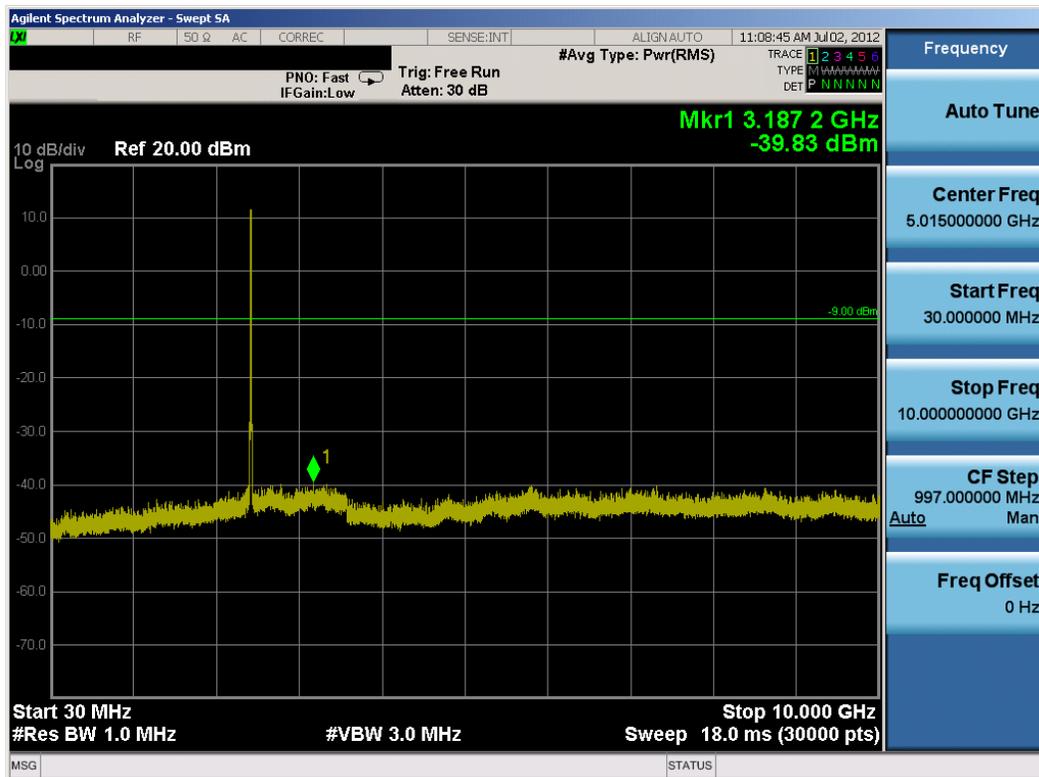


Plot 6-41. Conducted Spurious Plot (802.11b – Ch. 1)

FCC ID: ZNFLS970	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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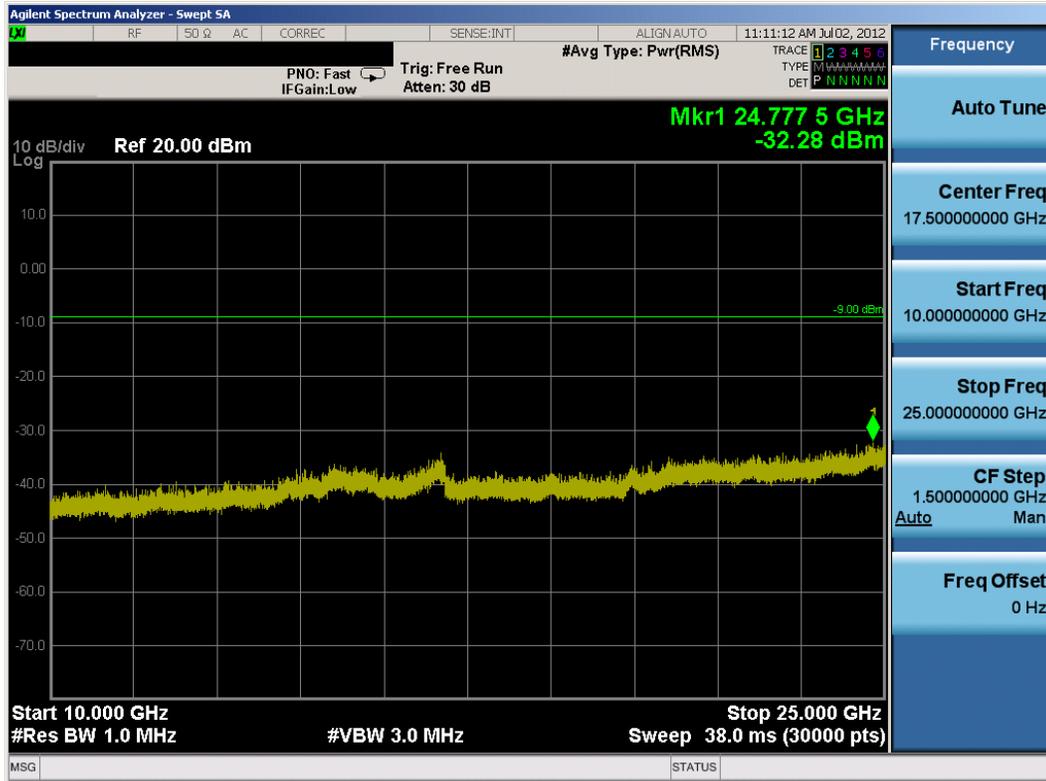


Plot 6-42. Conducted Spurious Plot (802.11b – Ch. 1)

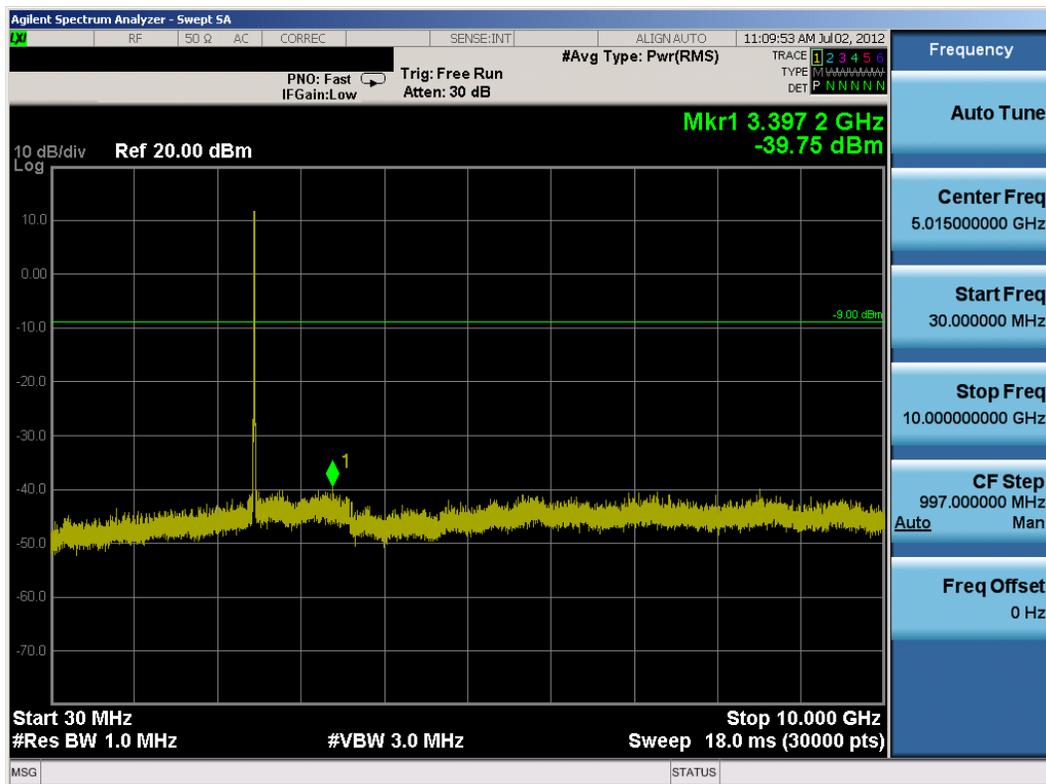


Plot 6-43. Conducted Spurious Plot (802.11b – Ch. 6)

FCC ID: ZNFLS970	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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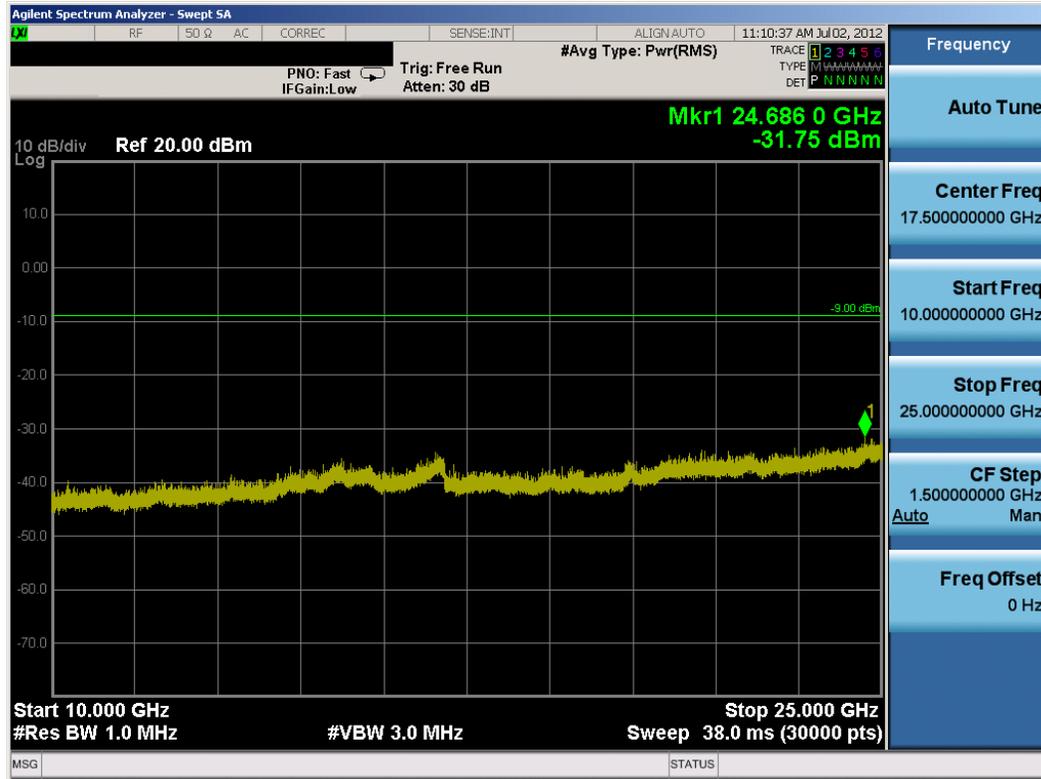


Plot 6-44. Conducted Spurious Plot (802.11b – Ch. 6)

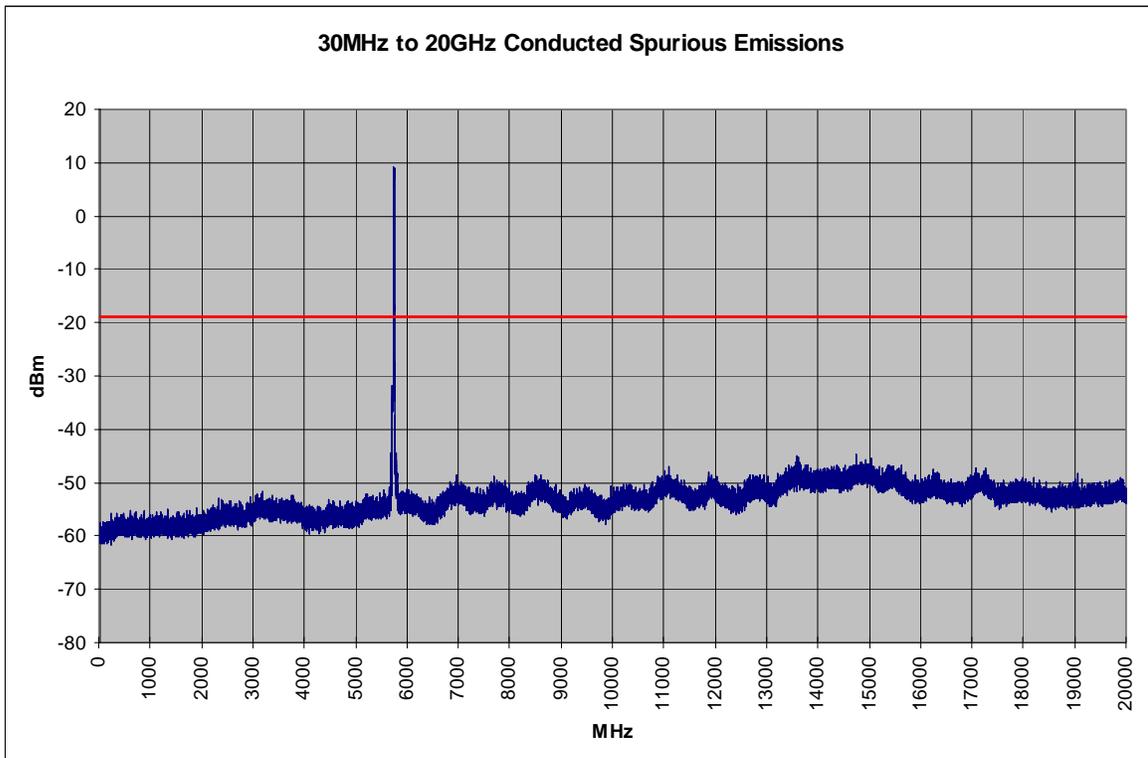


Plot 6-45. Conducted Spurious Plot (802.11b – Ch. 11)

FCC ID: ZNFLS970	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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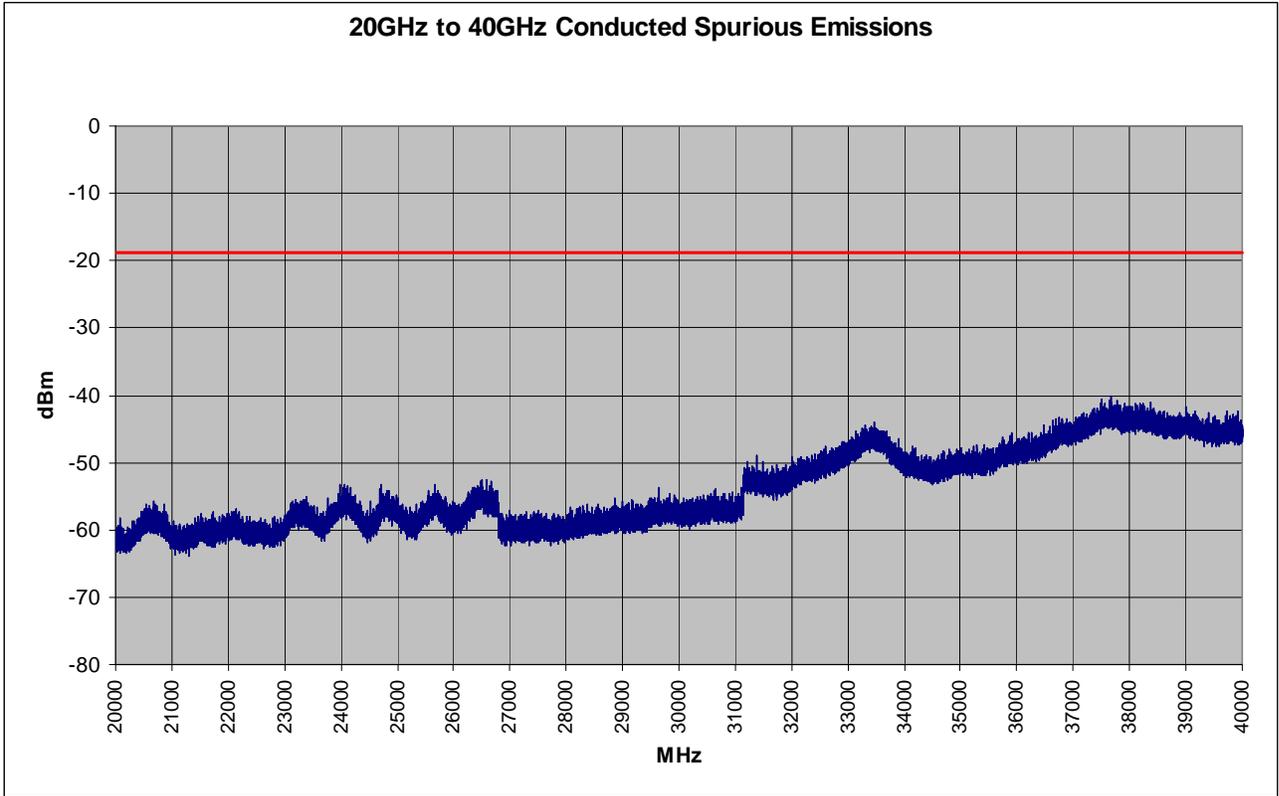


Plot 6-46. Conducted Spurious Plot (802.11b – Ch. 11)

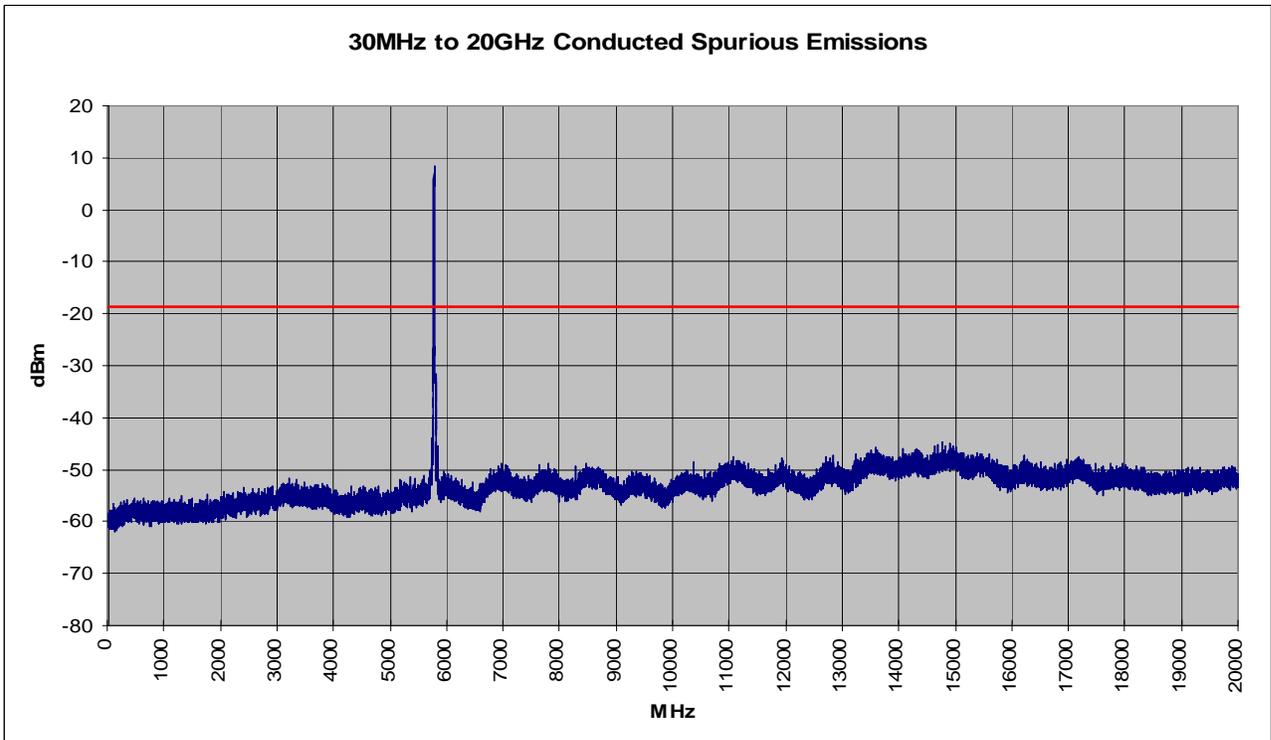


Plot 6-47. Conducted Spurious Plot (802.11a – Ch. 149)

FCC ID: ZNFLS970	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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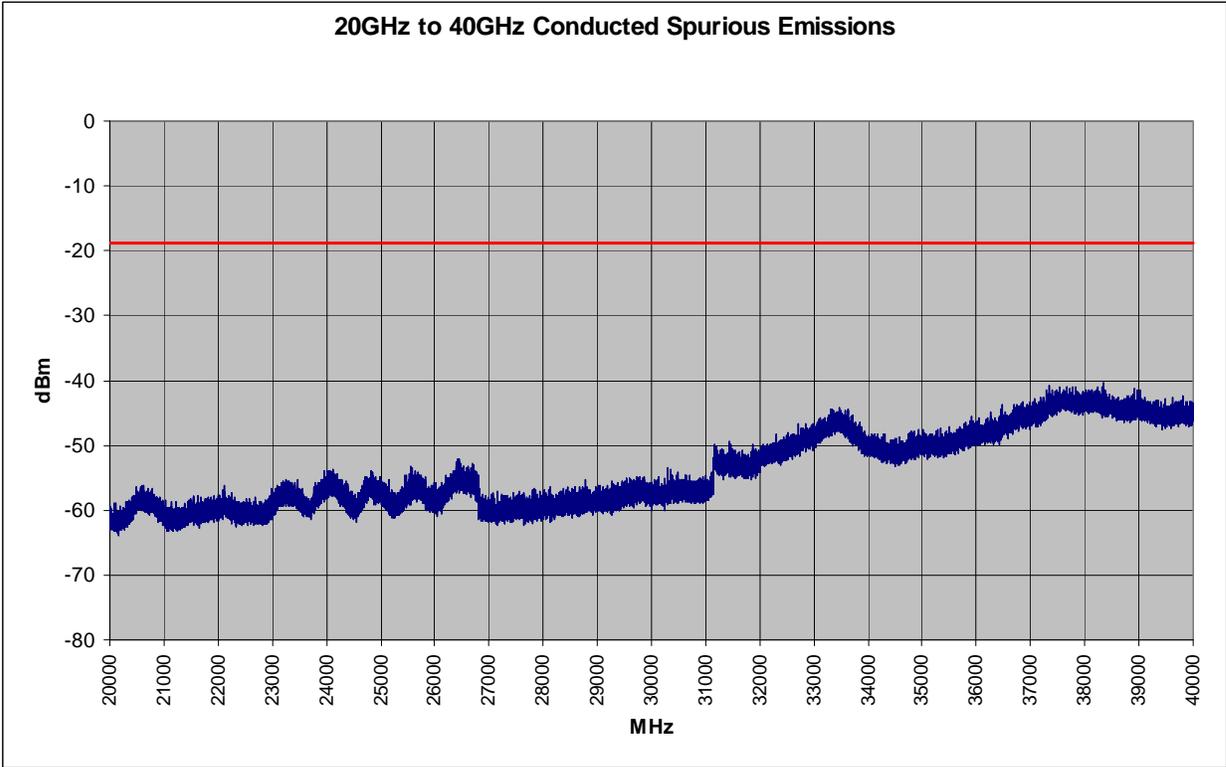


**Plot 6-48. Conducted Spurious Plot (802.11a – Ch. 149)**

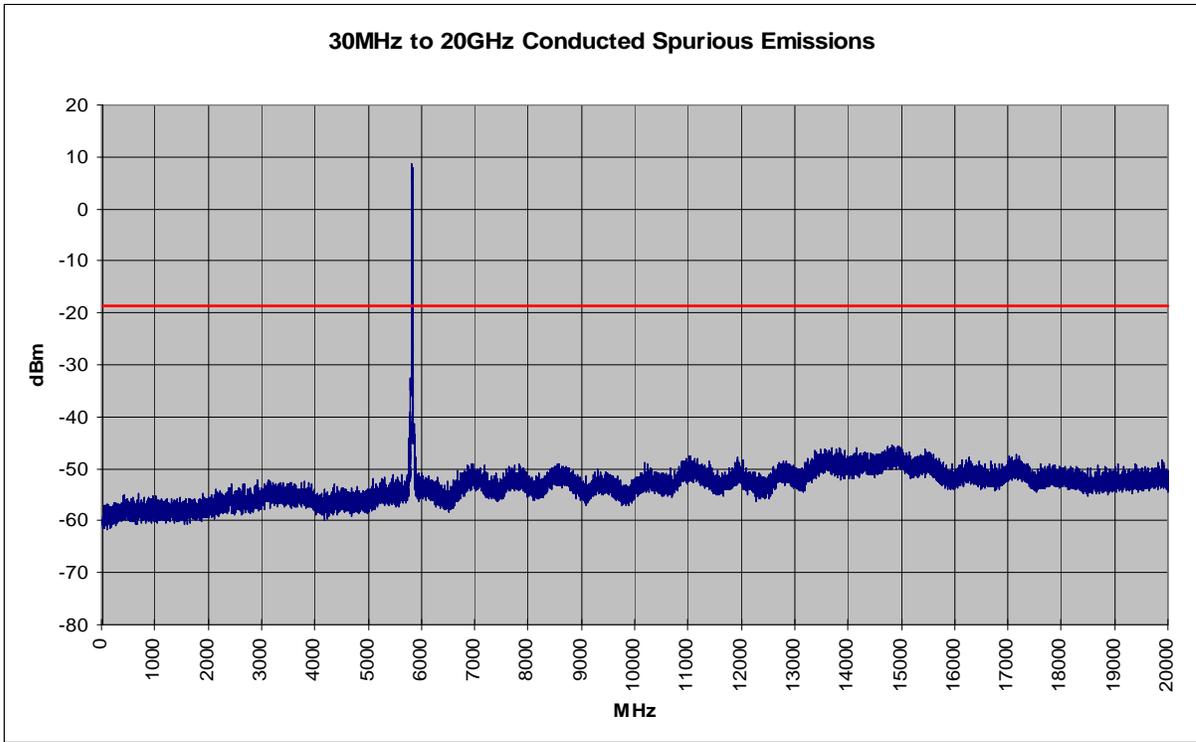


**Plot 6-49. Conducted Spurious Plot (802.11a – Ch. 157)**

<b>FCC ID:</b> ZNFLS970		<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> 0Y1206040765.ZNF	<b>Test Dates:</b> June6-July2, 2012	<b>EUT Type:</b> Portable Handset	Page 41 of 57	

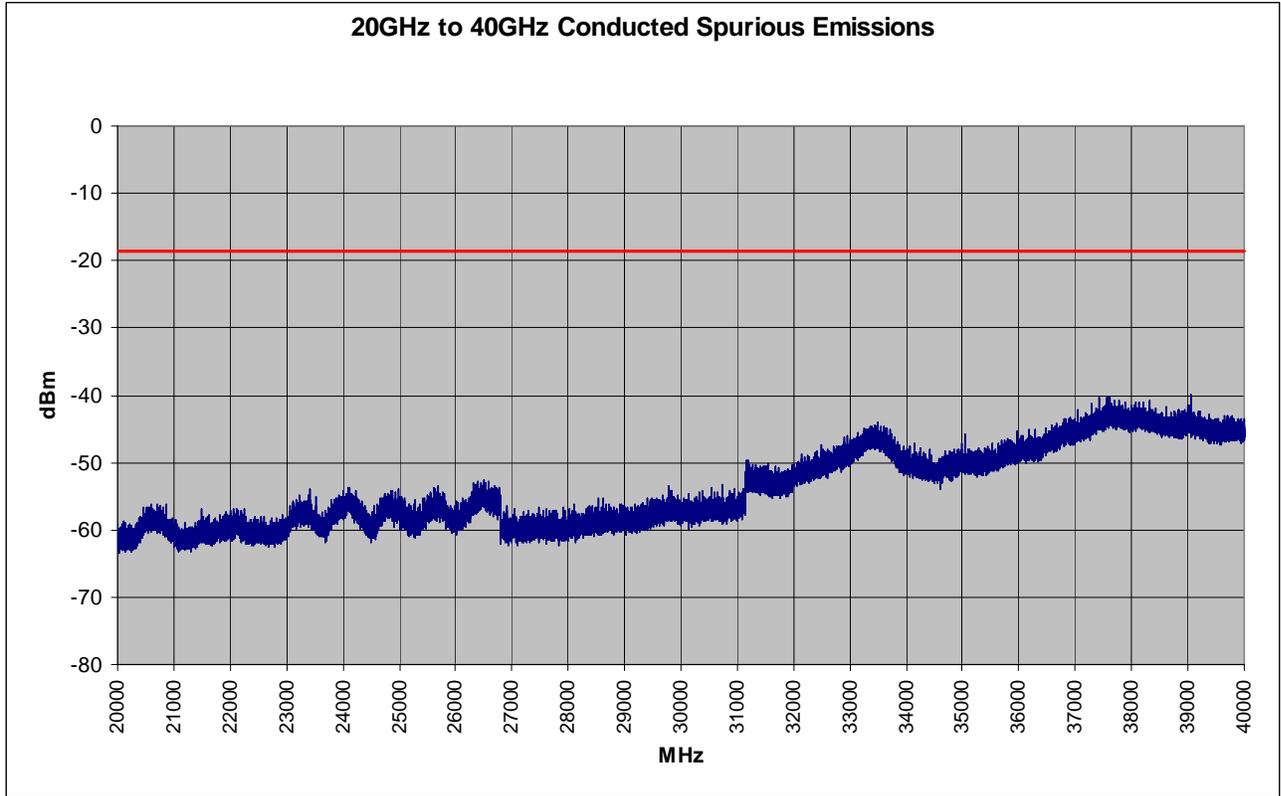


**Plot 6-50. Conducted Spurious Plot (802.11a – Ch. 157)**



**Plot 6-51. Conducted Spurious Plot (802.11a – Ch. 165)**

<b>FCC ID:</b> ZNFLS970		<b>FCC Pt. 15.247 802.11a/b/g/n MEASUREMENT REPORT (CERTIFICATION)</b>		<b>Reviewed by:</b> Quality Manager
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**Plot 6-52. Conducted Spurious Plot (802.11a – Ch. 165)**

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<b>Test Report S/N:</b> 0Y1206040765.ZNF	<b>Test Dates:</b> June6-July2, 2012	<b>EUT Type:</b> Portable Handset	Page 43 of 57	

## 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 6-9 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. 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 6-9. Radiated Limits**

### Sample Calculation

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

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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 $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
4824.00	-107.58	Avg	H	39.05	38.47	53.98	-15.51
4824.00	-100.58	Peak	H	39.05	45.47	73.98	-28.51
12060.00	-135.00	Avg	H	50.20	22.20	53.98	-31.78
12060.00	-125.00	Peak	H	50.20	32.20	73.98	-41.78

**Table 6-10. Radiated Measurements @ 3 meters**

**NOTES:**

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /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 [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
4874.00	-106.22	Avg	H	39.09	39.87	53.98	-14.11
4874.00	-99.42	Peak	H	39.09	46.67	73.98	-27.31
7311.00	-135.00	Avg	H	42.19	14.19	53.98	-39.79
7311.00	-125.00	Peak	H	42.19	24.19	73.98	-49.79
12185.00	-135.00	Avg	H	50.51	22.51	53.98	-31.47
12185.00	-125.00	Peak	H	50.51	32.51	73.98	-41.47

**Table 6-11. Radiated Measurements @ 3 meters**

### NOTES:

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /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 [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
4924.00	-109.59	Avg	H	39.08	36.49	53.98	-17.49
4924.00	-100.39	Peak	H	39.08	45.69	73.98	-28.29
7386.00	-135.00	Avg	H	42.28	14.28	53.98	-39.70
7386.00	-125.00	Peak	H	42.28	24.28	73.98	-49.70
12310.00	-135.00	Avg	H	50.76	22.76	53.98	-31.22
12310.00	-125.00	Peak	H	50.76	32.76	73.98	-41.22

**Table 6-12. Radiated Measurements @ 3 meters**

**NOTES:**

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /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 Meter

Operating Frequency: 5745MHz

Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
11490.00	-109.07	Avg	H	46.63	-9.54	35.0	53.98	-18.97
11490.00	-100.07	Peak	H	46.63	-9.54	44.0	73.98	-29.97
22980.00	-100.54	Avg	H	44.44	-9.54	41.4	53.98	-12.63
22980.00	-98.48	Peak	H	44.44	-9.54	43.4	73.98	-30.57

**Table 6-13. Radiated Measurements @ 1 meter**

**NOTES:**

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /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 Meter  
 Operating Frequency: 5785MHz  
 Channel: 157

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11570.00	-108.53	Avg	H	46.79	-9.54	35.7	53.98	-18.26
11570.00	-99.33	Peak	H	46.79	-9.54	44.9	73.98	-29.06

**Table 6-14. Radiated Measurements @ 1 meter**

**NOTES:**

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm 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 Meter  
 Operating Frequency: 5825MHz  
 Channel: 165

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
11650.00	-108.80	Avg	H	46.89	-9.54	35.6	53.98	-18.42
11650.00	-99.40	Peak	H	46.89	-9.54	45.0	73.98	-29.02

**Table 6-15. Radiated Measurements @ 1 meter**

**NOTES:**

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /m) at 3 meters radiated.

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## 6.9 Radiated Restricted Band Edge Measurements

§15.205 / §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
2383.40	-98.99	Avg	H	35.39	43.40	53.98	-10.58
2383.40	-85.39	Peak	H	35.39	57.00	73.98	-16.98
2385.50	-98.48	Avg	H	35.44	43.95	53.98	-10.03
2385.50	-80.08	Peak	H	35.44	62.35	73.98	-11.63
2390.00	-92.58	Avg	H	35.47	49.89	53.98	-4.09
2390.00	-75.98	Peak	H	35.47	66.49	73.98	-7.49

**Table 6-16. Radiated Restricted Band Measurements at 3-meters**

**NOTES:**

1. All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
2. For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
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 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
6. Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
7. Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /m) at 3 meters radiated.

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## Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 / §15.209; RSS-210 [A8.5]

Worst Case Mode: 802.11g

Worst Case Transfer Rate: 6Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 2462MHz

Channel: 11

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dB $\mu$ V/m]	Limit [dB $\mu$ V/m]	Margin [dB]
2483.50	-95.97	Avg	H	36.39	47.42	53.98	-6.56
2483.50	-78.87	Peak	H	36.39	64.52	73.98	-9.46
2483.80	-97.07	Avg	H	36.39	46.33	53.98	-7.65
2483.80	-79.47	Peak	H	36.39	63.93	73.98	-10.05
2485.00	-99.07	Avg	H	36.40	44.33	53.98	-9.65
2485.00	-86.07	Peak	H	36.40	57.33	73.98	-16.65

**Table 6-17. Radiated Restricted Band Measurements at 3-meters**

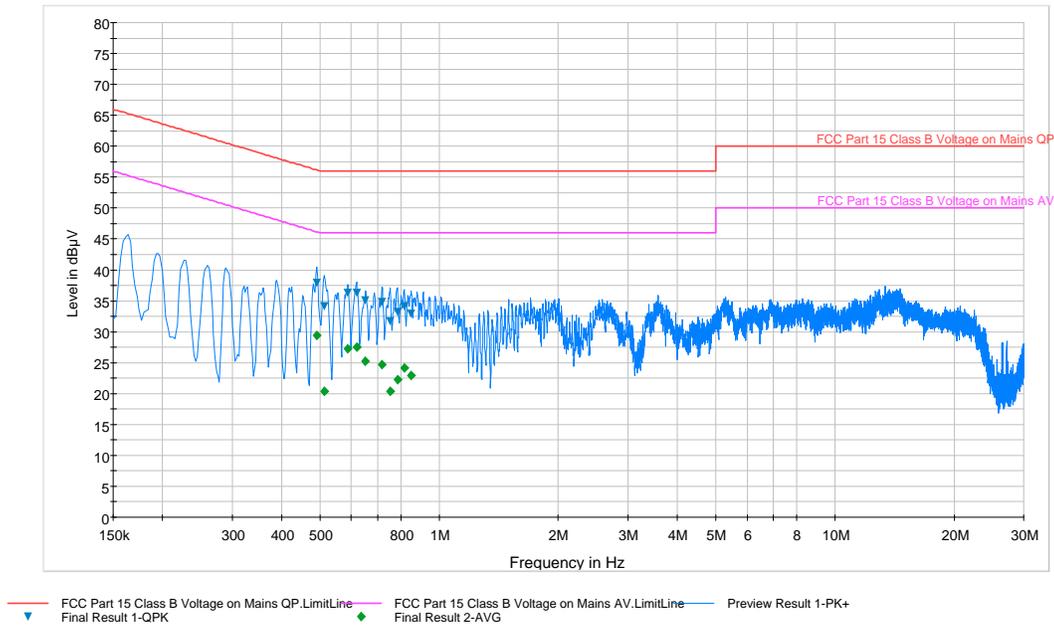
**NOTES:**

- All emissions shown lie in the restricted bands specified in §15.205 are below the limit shown in Table 6-9.
- For frequencies > 1GHz, average measurements are recorded using the RBAVG1 measurement procedure of KDB 558074. Peak measurements are recorded using RBW = 1MHz, VBW = 3MHz.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
- The spectrum is measured from 9kHz to the 10<sup>th</sup> harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
- Levels at - 135 dBm represent the analyzer noise floor and signify that no emission was detected.
- Above 960MHz the limit is 500  $\mu$ V/m (54dB $\mu$ /m) at 3 meters radiated.

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## 6.10 Line-Conducted Test Data

### §15.207; RSS-Gen [7.2.2]



**Plot 6-53. Line Conducted Plot with 802.11b (L1)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.490	L1	0.1	37.90	56.20	18.30	29.40	46.20	16.80
0.512	L1	0.1	34.10	56.00	21.90	20.40	46.00	25.60
0.587	L1	0.1	36.20	56.00	19.80	27.30	46.00	18.70
0.618	L1	0.1	36.30	56.00	19.70	27.60	46.00	18.40
0.652	L1	0.1	35.10	56.00	20.90	25.30	46.00	20.70
0.717	L1	0.1	34.90	56.00	21.10	24.70	46.00	21.30
0.753	L1	0.1	31.70	56.00	24.30	20.30	46.00	25.70
0.785	L1	0.1	33.20	56.00	22.80	22.20	46.00	23.80
0.816	L1	0.1	34.20	56.00	21.80	24.10	46.00	21.90
0.850	L1	0.1	32.90	56.00	23.10	22.90	46.00	23.10

**Table 6-18. Line Conducted Data with 802.11b (L1)**

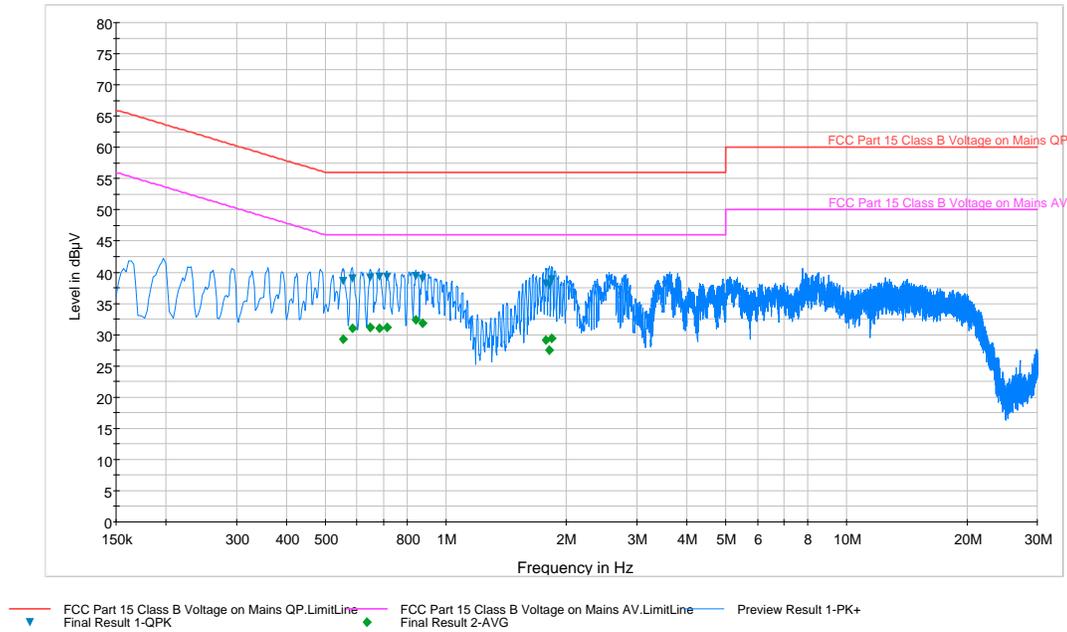
**Notes:**

- 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. 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 6-54. Line Conducted Plot with 802.11b (N)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.553	N	0.1	38.60	56.00	17.40	29.30	46.00	16.70
0.584	N	0.1	39.00	56.00	17.00	31.10	46.00	14.90
0.647	N	0.1	39.10	56.00	16.90	31.20	46.00	14.80
0.681	N	0.1	39.30	56.00	16.70	31.00	46.00	15.00
0.713	N	0.1	39.20	56.00	16.80	31.10	46.00	14.90
0.841	N	0.1	39.40	56.00	16.60	32.40	46.00	13.60
0.875	N	0.1	39.10	56.00	16.90	31.80	46.00	14.20
1.777	N	0.2	38.20	56.00	17.80	29.20	46.00	16.80
1.815	N	0.2	38.00	56.00	18.00	27.60	46.00	18.40
1.840	N	0.2	38.90	56.00	17.10	29.40	46.00	16.60

**Table 6-19. Line Conducted Data with 802.11b (N)**

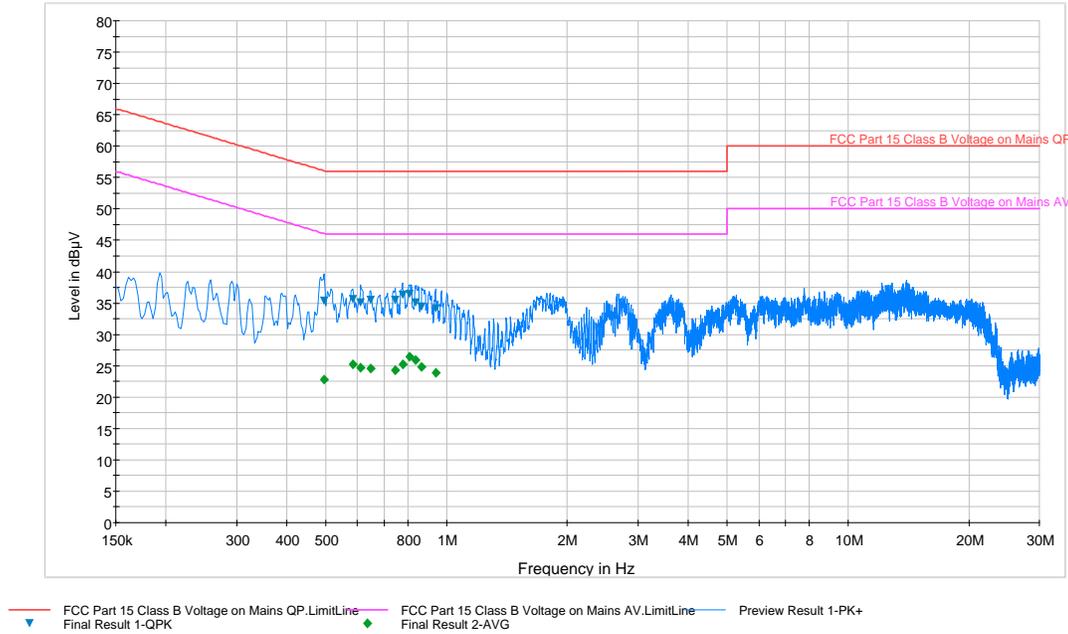
**Notes:**

1. 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. The emissions found were not affected by the choice of channel used during testing.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Factor (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBµV) = QP/AV Analyzer/Receiver Level (dBµV) + Factor (dB)
5. Margin (dB) = QP/AV Limit (dBµV) – QP/AV Level (dBµV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

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## Line-Conducted Test Data (Cont'd)

### §15.207; RSS-Gen [7.2.2]



**Plot 6-55. Line Conducted Plot with 802.11a (L1)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.497	L1	0.1	35.30	56.10	20.80	22.80	46.10	23.30
0.584	L1	0.1	35.60	56.00	20.40	25.30	46.00	20.70
0.611	L1	0.1	35.10	56.00	20.90	24.70	46.00	21.30
0.647	L1	0.1	35.50	56.00	20.50	24.50	46.00	21.50
0.746	L1	0.1	35.40	56.00	20.60	24.20	46.00	21.80
0.778	L1	0.1	36.30	56.00	19.70	25.30	46.00	20.70
0.809	L1	0.1	36.40	56.00	19.60	26.40	46.00	19.60
0.836	L1	0.1	35.10	56.00	20.90	25.90	46.00	20.10
0.868	L1	0.1	34.40	56.00	21.60	24.90	46.00	21.10
0.940	L1	0.1	34.20	56.00	21.80	23.90	46.00	22.10

**Table 6-20. Line Conducted Data with 802.11a (L1)**

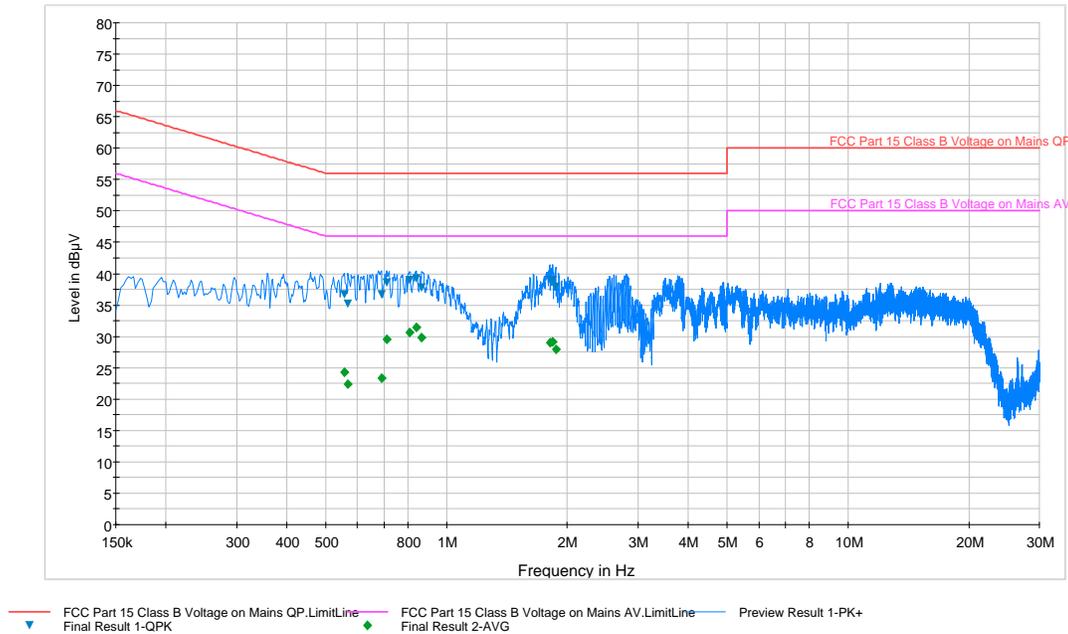
**Notes:**

- 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. 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 6-56. Line Conducted Plot with 802.11a (N)**

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.557	N	0.1	36.70	56.00	19.30	24.30	46.00	21.70
0.569	N	0.1	35.20	56.00	20.80	22.40	46.00	23.60
0.688	N	0.1	36.70	56.00	19.30	23.30	46.00	22.70
0.708	N	0.1	38.60	56.00	17.40	29.50	46.00	16.50
0.809	N	0.1	38.90	56.00	17.10	30.60	46.00	15.40
0.841	N	0.1	39.30	56.00	16.70	31.50	46.00	14.50
0.868	N	0.1	37.80	56.00	18.20	29.80	46.00	16.20
1.808	N	0.2	38.90	56.00	17.10	29.00	46.00	17.00
1.840	N	0.2	39.00	56.00	17.00	29.10	46.00	16.90
1.874	N	0.2	37.90	56.00	18.10	28.00	46.00	18.00

**Table 6-21. 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. 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: ZNFLS970** is in compliance with Part 15C of the FCC Rules and RSS-210 of the Industry Canada Rules.

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