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

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

Date of Testing:
05/02 - 05/10/2012
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0Y1205100655.A3L

FCC ID:	**A3LGTI9300A**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model(s):	GT-I9300
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	24.210	13.84	45.604	16.59
802.11g	2412 - 2462	18.793	12.74	96.161	19.83
802.11n	2412 - 2462	18.323	12.63	94.406	19.75
802.11a	5745 - 5825	28.119	14.49	104.713	20.20
802.11n (20MHz)	5745 - 5825	28.184	14.50	105.439	20.23
802.11n (40MHz)	5755 - 5815	24.266	13.85	111.686	20.48

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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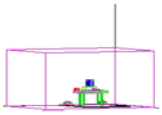

MEASUREMENT REPORT
FCC Part 15.247

§ 2.1033 General Information

APPLICANT:	Samsung Electronics Co., Ltd.
APPLICANT ADDRESS:	416 Maetan 3-Dong, Yeongtong-gu
	Suwon-si, Gyeonggi-do, 443-742 , Republic of Korea
TEST SITE:	PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS:	7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S):	Part 15.247
IC SPECIFICATION(S):	RSS-210 Issue 8
MODEL NAME:	GT-I9300
FCC ID:	A3LGTI9300A
Test Device Serial No.:	FCC_003, FCC_007 ☐ Production ☒ Pre-Production ☐ Engineering
FCC CLASSIFICATION:	Digital Transmission System (DTS)
DATE(S) OF TEST:	05/02 - 05/10/2012
TEST REPORT S/N:	0Y1205100655.A3L

Test Facility / Accreditations

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

- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- 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 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 Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (*See Figure 1-1*).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2003 on February 15, 2012.

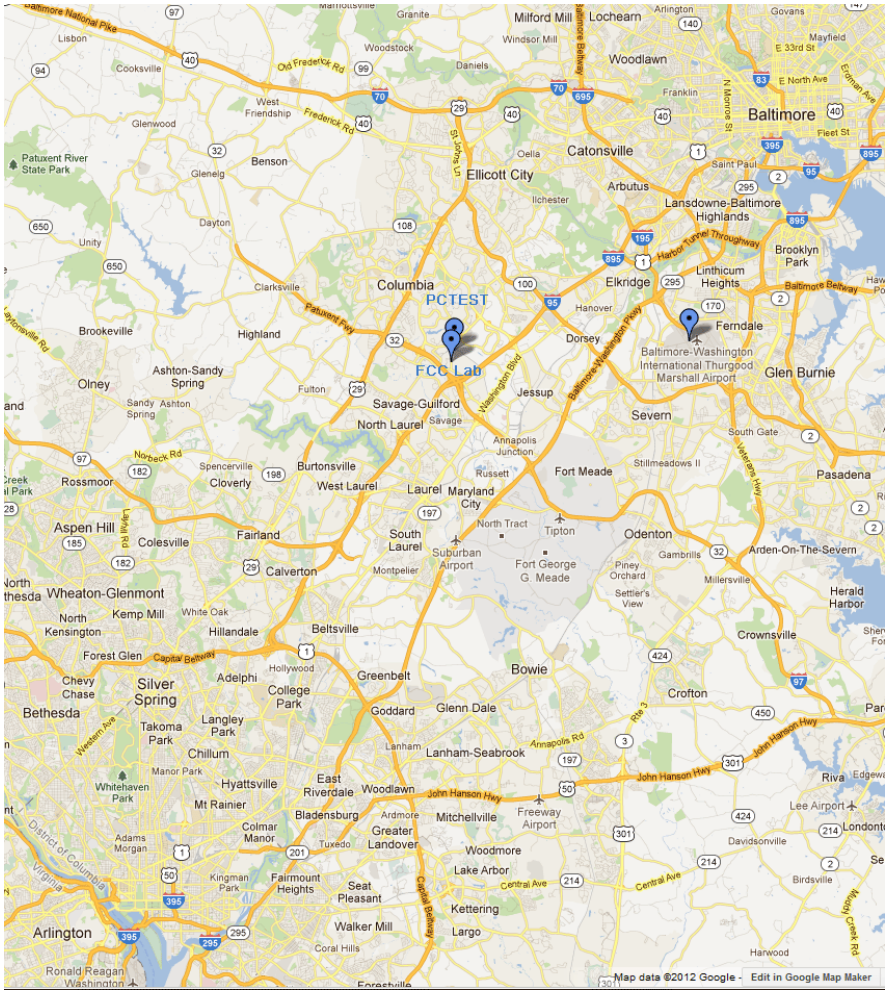

Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LGTI9300A**. 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 GSM/GPRS/EDGE, 850/1900 WCDMA/HSPA, 802.11a/b/g/n WLAN (DTS/NII), Bluetooth (1x,EDR, LE), NFC

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

2.3 Test Configuration

The Samsung Portable Handset FCC ID: A3LGTI9300A 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 **Samsung Portable Handset FCC ID: A3LGTI9300A.**

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 **Samsung Portable Handset FCC ID: A3LGTI9300A** 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)	6/7/2011	Annual	6/7/2012	N/A
-	RE2	Radiated Emissions Cable Set (VHF/UHF)	2/13/2012	Annual	2/13/2013	N/A
-	WL40-1	Conducted WLAN Cable Set (40GHz)	2/24/2012	Annual	2/24/2013	N/A
-	40G-1R	40GHz Radiated Cable Set	2/23/2012	Annual	2/23/2013	N/A
Agilent	8447D	Broadband Amplifier	5/8/2012	Annual	5/8/2013	2443A01900
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	2/15/2012	Annual	2/15/2013	US42510244
Agilent	N9020A	MXA Signal Analyzer	10/10/2011	Annual	10/10/2012	US46470561
Anritsu	MA2411B	Pulse Sensor	10/13/2011	Annual	10/13/2012	1027293
Anritsu	ML2495A	Power Meter	10/13/2011	Annual	10/13/2012	1039008
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	5/31/2011	Annual	5/31/2012	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	6/9/2011	Annual	6/9/2012	100071
Rohde & Schwarz	RS-PR26	18-26.5 GHz Pre-Amplifier	6/9/2011	Annual	6/9/2012	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:

The Agilent 8447D Broadband Amplifier was within its previous calibration period in the time during which the EUT was tested.

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6.0 TEST RESULTS

6.1 Summary

Company Name: Samsung Electronics Co., Ltd.
FCC ID: A3LGTI9300A
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	8.086	0.500	Pass
2437	6	b	1	8.089	0.500	Pass
2462	11	b	1	8.077	0.500	Pass
2412	1	g	6	15.97	0.500	Pass
2437	6	g	6	15.95	0.500	Pass
2462	11	g	6	15.95	0.500	Pass
2412	1	n	6.5/7.2 (MCS0)	17.27	0.500	Pass
2437	6	n	6.5/7.2 (MCS0)	17.23	0.500	Pass
2462	11	n	6.5/7.2 (MCS0)	17.23	0.500	Pass
5745	149	a	6	15.98	0.500	Pass
5785	157	a	6	15.95	0.500	Pass
5825	165	a	6	15.88	0.500	Pass
5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.21	0.500	Pass
5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.19	0.500	Pass
5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.12	0.500	Pass
5755	151	n (40MHz)	13.5/15 (MCS0)	35.64	0.500	Pass
5795	159	n (40MHz)	13.5/15 (MCS0)	35.42	0.500	Pass

Table 6-2. Conducted Bandwidth Measurements

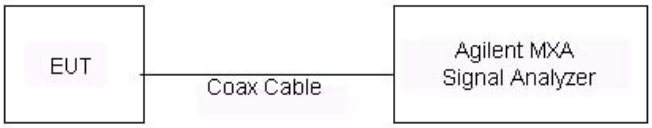

Figure 6-1. Test Instrument & Measurement Setup

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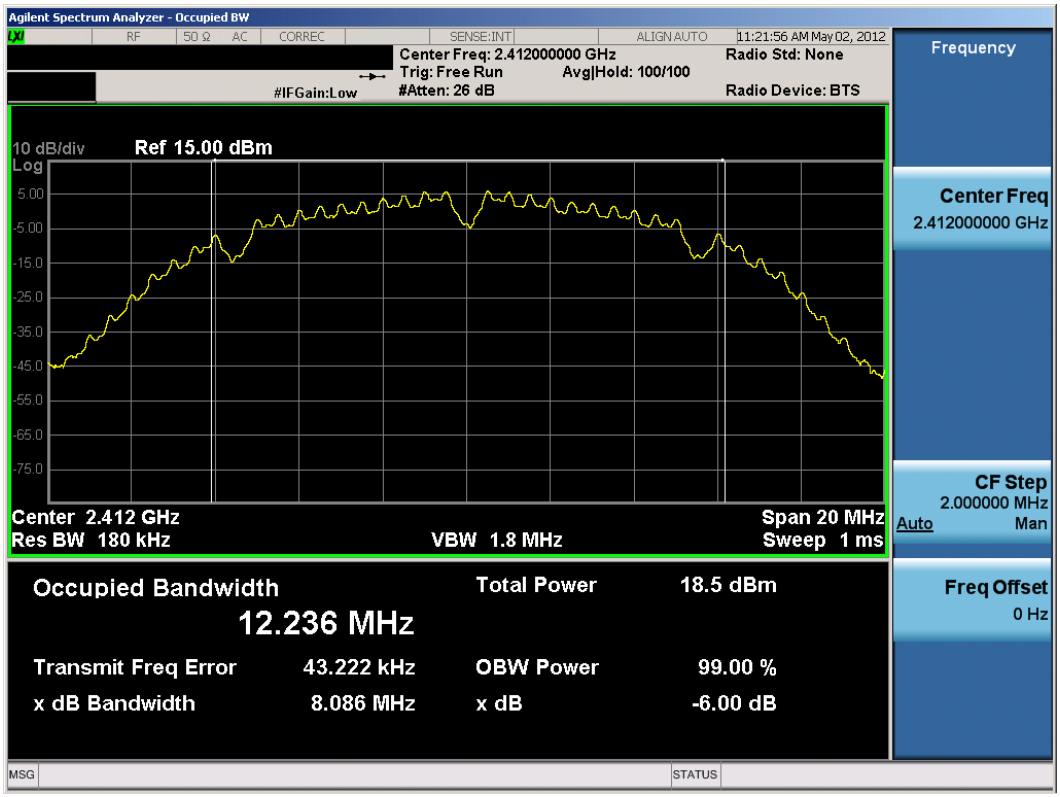

Plot 6-1. 6dB Bandwidth Plot (802.11b – Ch. 1)

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

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

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

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

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

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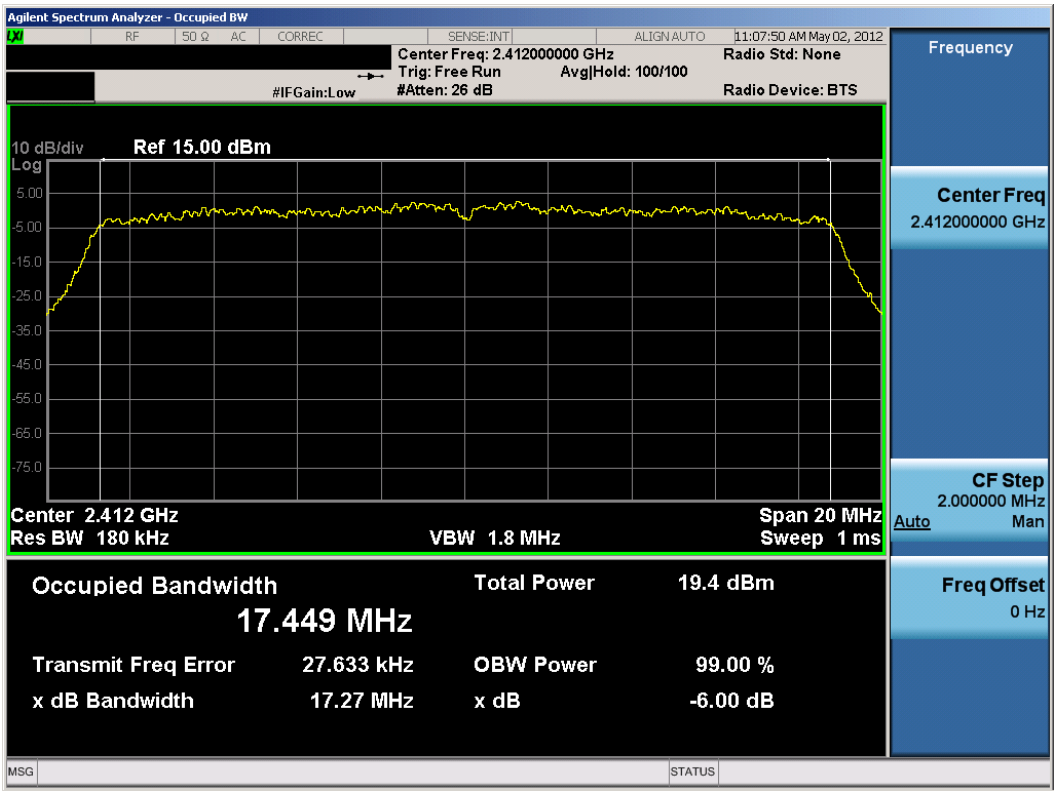

Plot 6-7. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 1)

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

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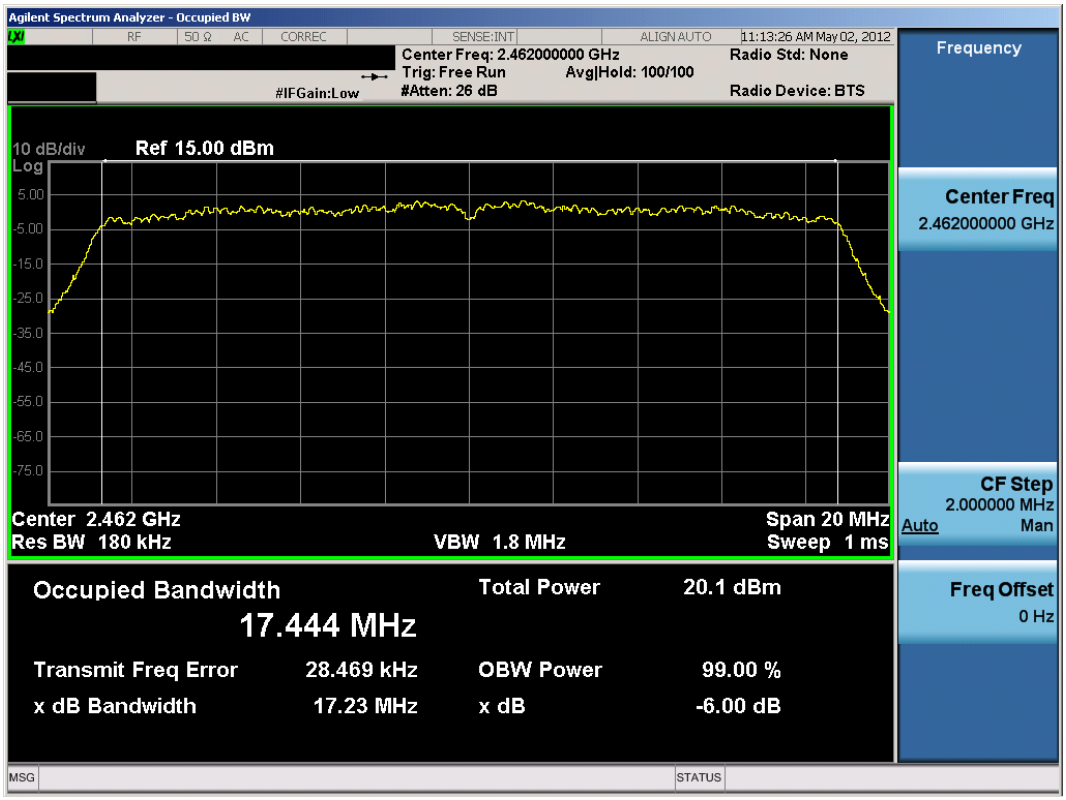
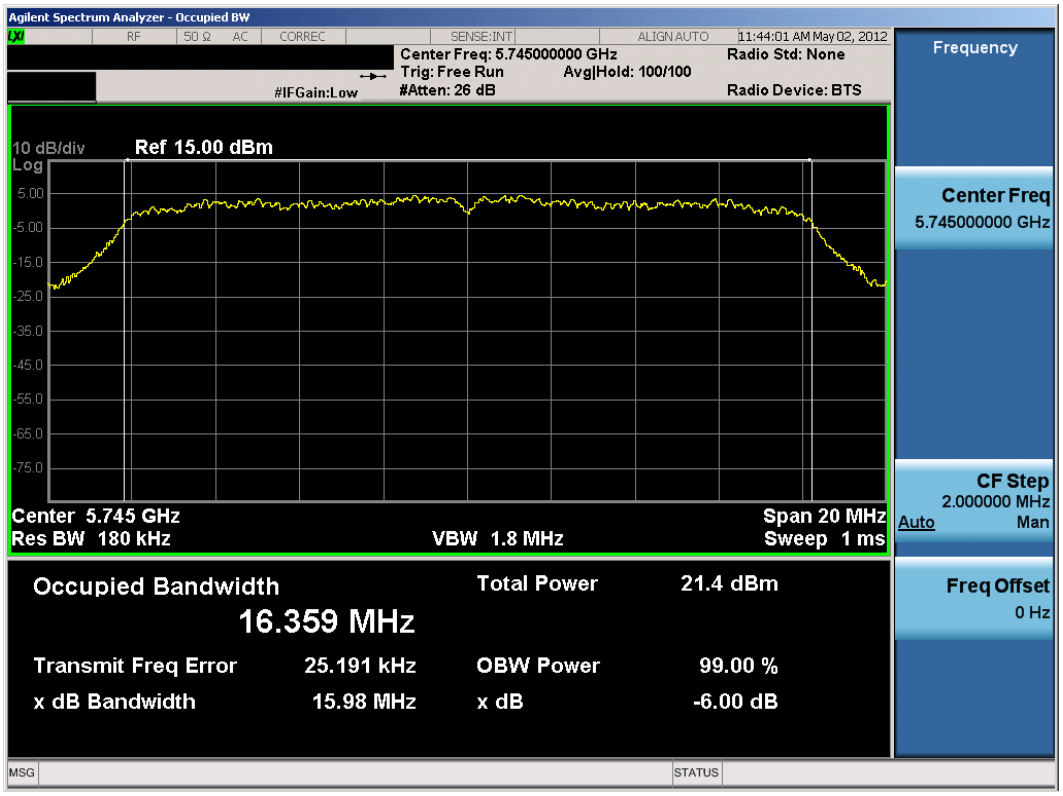


Plot 6-9. 6dB Bandwidth Plot (802.11n (2.4GHz) – Ch. 11)



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

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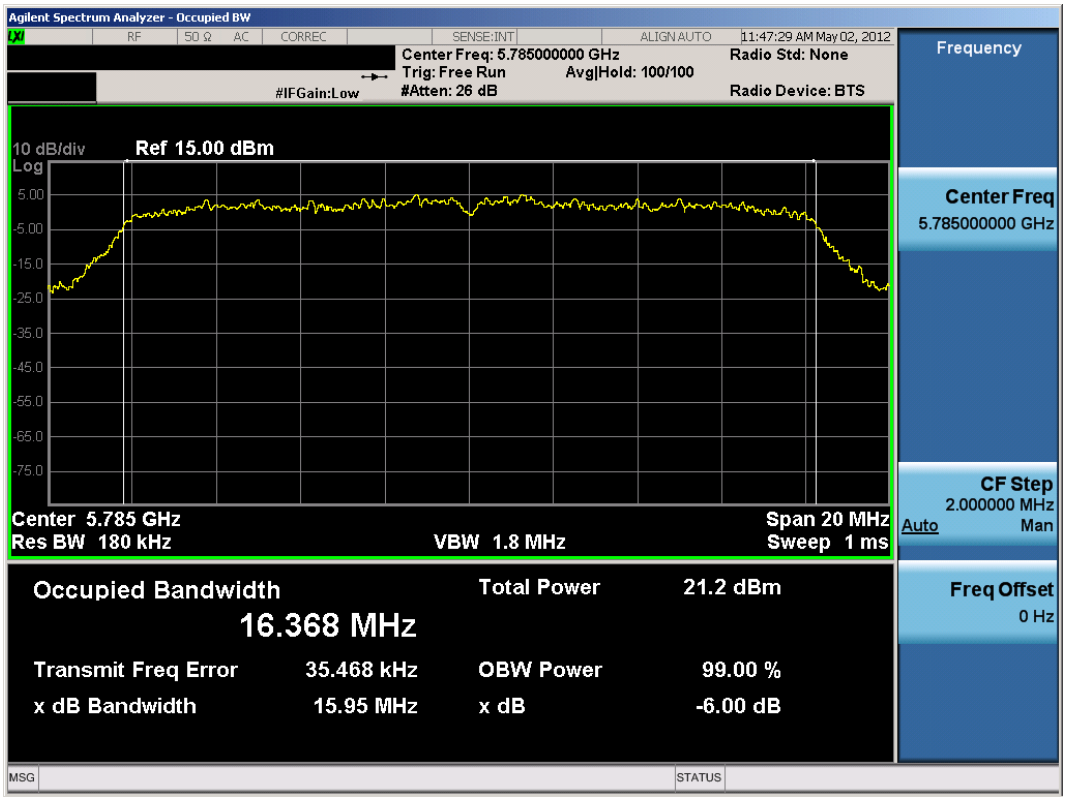
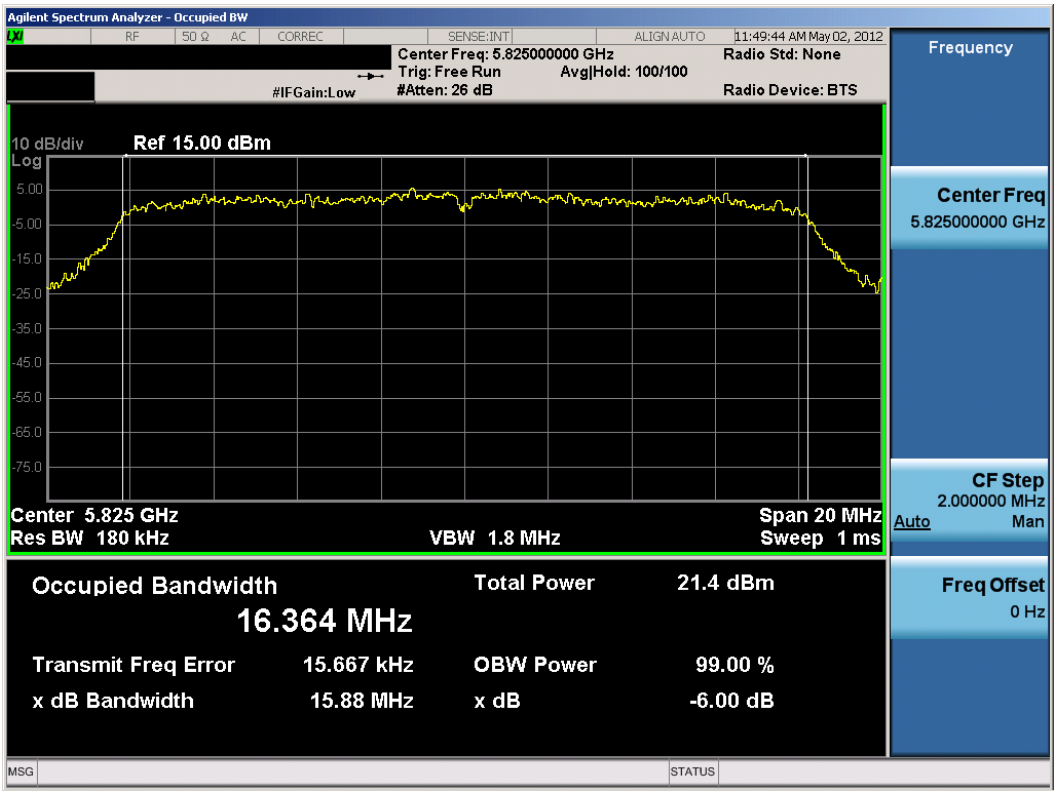


Plot 6-11. 6dB Bandwidth Plot (802.11a – Ch. 157)



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

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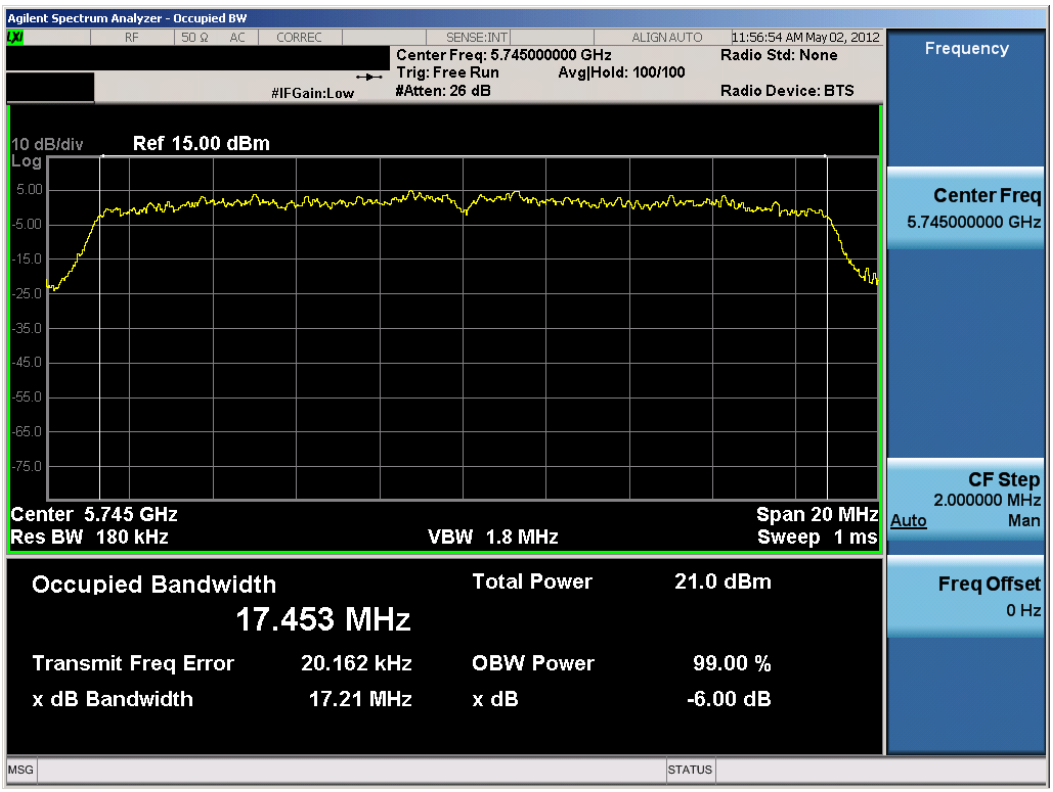
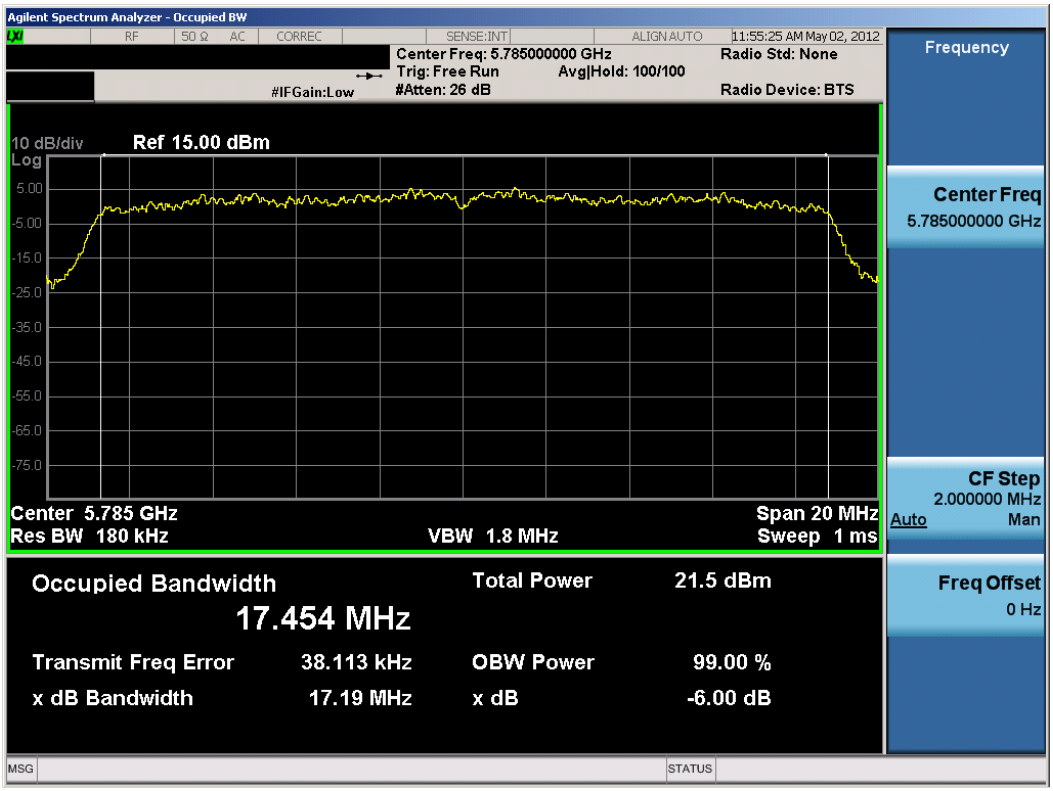


Plot 6-13. 6dB Bandwidth Plot (20Mhz BW 802.11n (5.8GHz) – Ch. 149)



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

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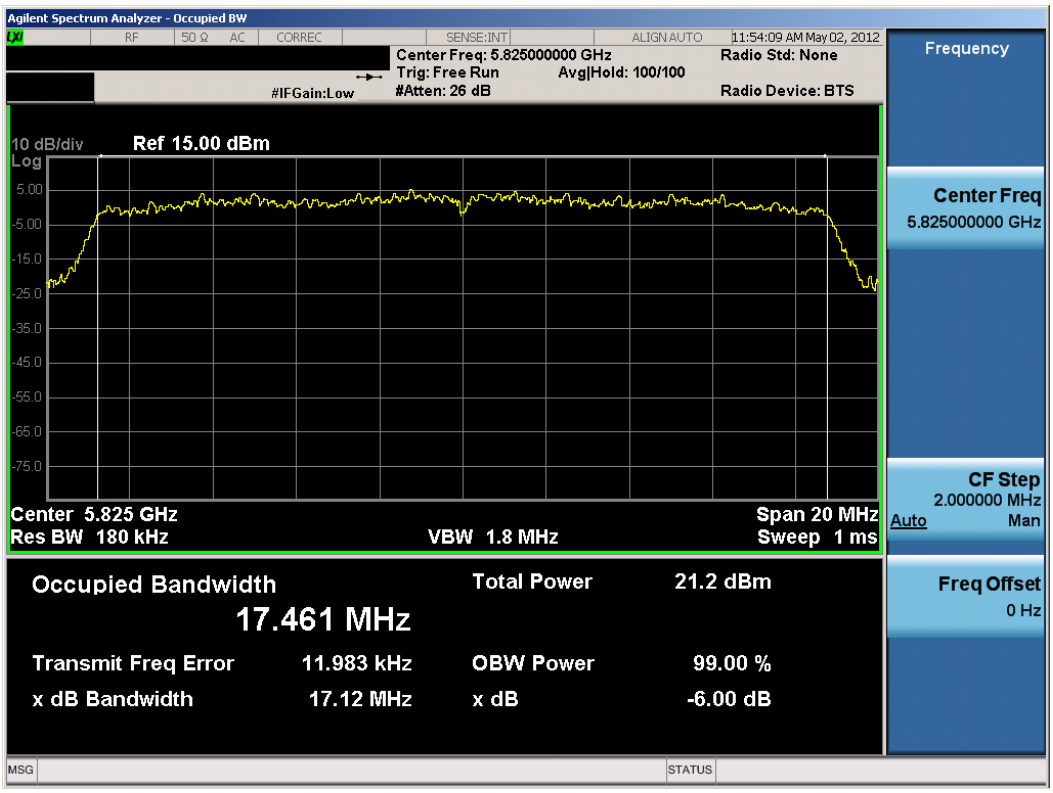
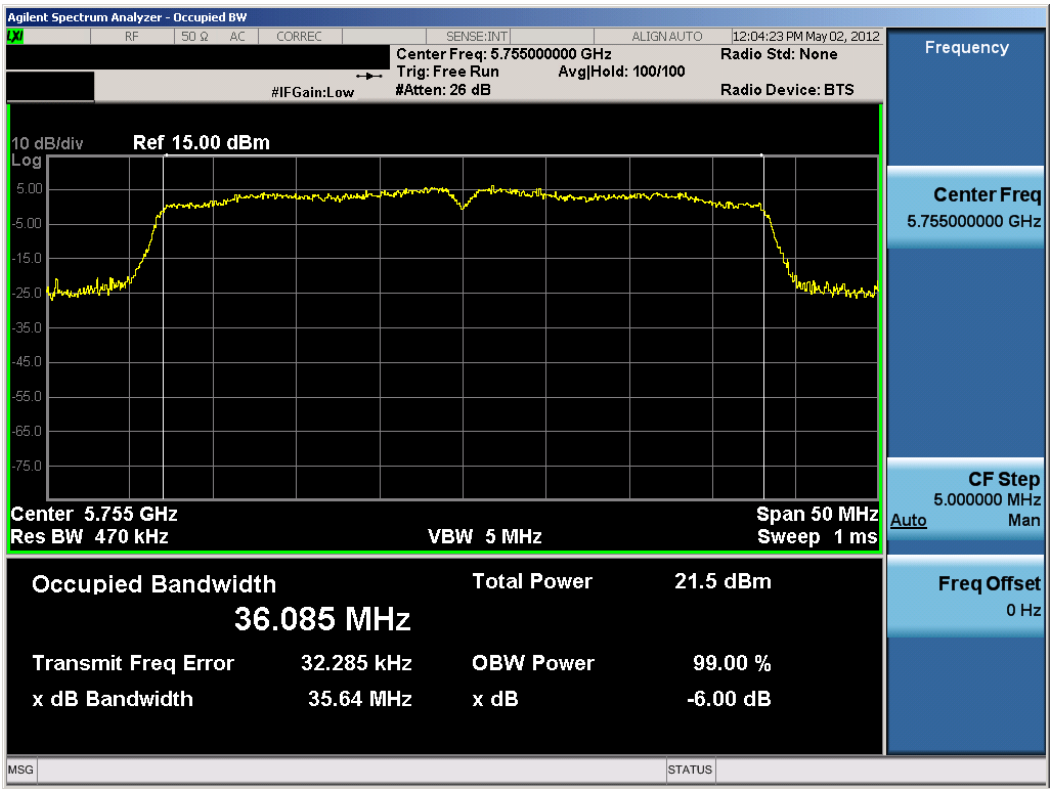


Plot 6-15. 6dB Bandwidth Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



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

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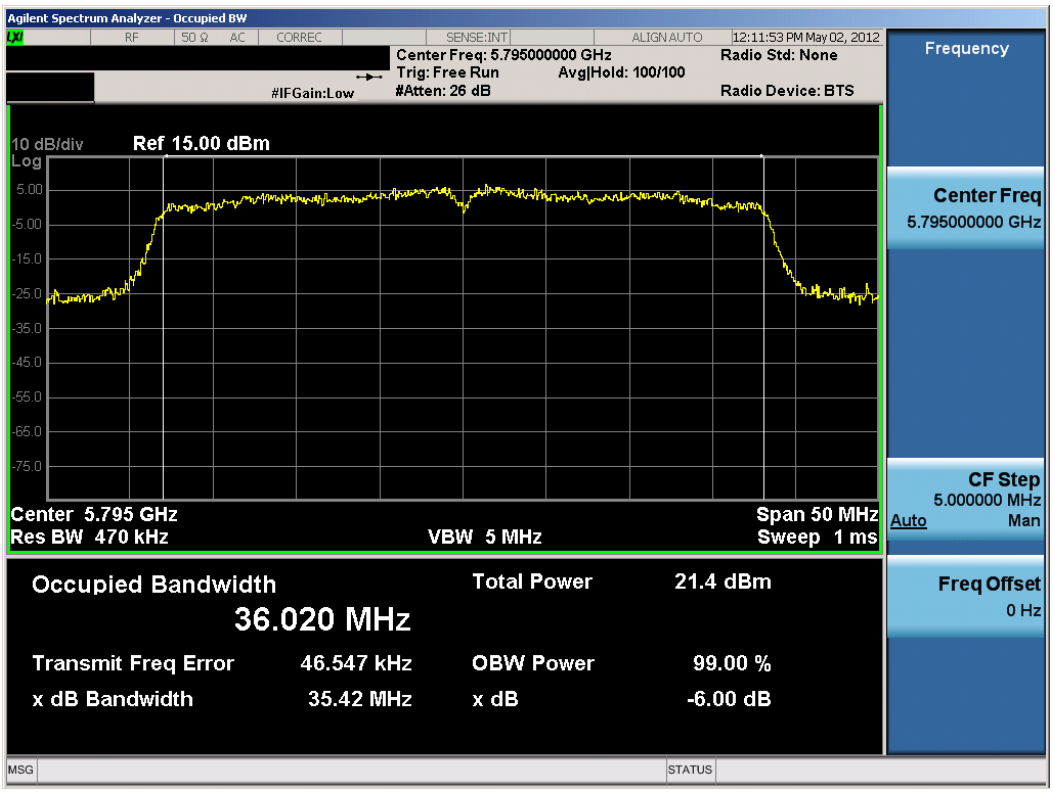

Plot 6-17. 6dB Bandwidth Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)

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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	13.22	13.32	13.34	13.33
			PEAK	16.05	16.13	16.07	16.06
802.11b	2437	6	AVG	13.52	13.63	13.59	13.52
			PEAK	16.31	16.32	16.31	16.30
802.11b	2462	11	AVG	13.79	13.84	13.76	13.73
			PEAK	16.59	16.57	16.53	16.48

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	12.29	12.31	12.26	12.28	12.21	12.23	12.28	12.28
			PEAK	19.31	19.13	19.24	19.27	19.27	19.34	19.53	19.36
802.11g	2437	6	AVG	12.54	12.53	12.54	12.54	12.43	12.52	12.45	12.49
			PEAK	19.51	19.49	19.60	19.46	19.52	19.62	19.47	19.41
802.11g	2462	11	AVG	12.71	12.73	12.74	12.66	12.70	12.65	12.67	12.68
			PEAK	19.65	19.62	19.61	19.81	19.83	19.73	19.76	19.67

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	12.23	12.15	12.12	12.24	12.09	12.15	12.22	12.24
			PEAK	19.05	19.01	19.13	19.23	19.19	19.11	19.36	19.23
802.11n	2437	6	AVG	12.43	12.40	12.45	12.39	12.38	12.40	12.41	12.46
			PEAK	19.34	19.34	19.44	19.37	19.51	19.45	19.37	19.43
802.11n	2462	11	AVG	12.57	12.58	12.59	12.55	12.59	12.53	12.63	12.61
			PEAK	19.49	19.71	19.75	19.60	19.59	19.62	19.68	19.58

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

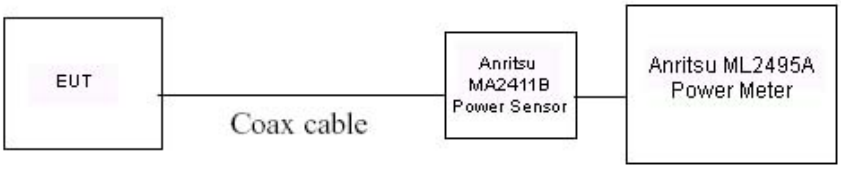

Figure 6-2. Test Instrument & Measurement Setup

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

§15.247(b)(3); RSS-210 [A8.4]

A transmitter antenna terminal of EUT is connected to the input of an RF power sensor. Measurement is made using a broadband power meter capable of making peak and average power measurements while the EUT is operating in transmission mode at the appropriate frequencies. ***The maximum permissible conducted output power is 1 Watt.***

Mode	Freq [MHz]	Channel	Detector	802.11a Conducted Power [dBm] Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11a	5745	149	AVG	14.00	13.95	14.09	14.06	14.03	14.16	14.16	14.18
			PEAK	19.49	19.50	19.76	19.70	19.85	19.75	19.85	19.86
802.11a	5765	153	AVG	14.09	14.07	14.13	14.13	14.16	14.26	14.25	14.24
			PEAK	19.69	19.71	19.71	19.72	19.77	19.87	19.97	19.90
802.11a	5785	157	AVG	14.18	14.20	14.21	14.17	14.27	14.29	14.27	14.33
			PEAK	19.82	19.87	19.90	19.81	19.92	19.96	20.04	20.09
802.11a	5805	161	AVG	14.30	14.32	14.26	14.39	14.29	14.31	14.37	14.41
			PEAK	19.93	19.90	19.94	19.94	19.98	20.01	20.11	20.19
802.11a	5825	165	AVG	14.48	14.33	14.36	14.35	14.48	14.43	14.49	14.46
			PEAK	20.11	20.03	20.03	20.08	20.12	20.11	20.17	20.20

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	14.03	13.99	14.05	14.06	14.07	14.13	14.16	14.14
			PEAK	19.62	19.61	19.68	19.68	19.81	19.84	19.75	19.86
802.11n	5765	153	AVG	14.06	14.07	14.13	14.14	14.05	14.25	14.18	14.14
			PEAK	19.69	19.62	19.80	19.87	19.74	19.92	19.97	19.93
802.11n	5785	157	AVG	14.15	14.21	14.13	14.16	14.33	14.32	14.35	14.29
			PEAK	19.77	19.84	19.81	19.88	19.88	20.03	20.01	19.99
802.11n	5805	161	AVG	14.30	14.17	14.34	14.22	14.27	14.40	14.35	14.37
			PEAK	19.94	19.79	20.10	20.05	20.11	19.99	20.07	20.20
802.11n	5825	165	AVG	14.22	14.34	14.40	14.36	14.39	14.48	14.45	14.50
			PEAK	19.88	20.01	20.10	20.04	20.17	20.14	20.23	20.21

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	13.67	13.69	13.68	13.69	13.76	13.72	13.80	13.85
			PEAK	20.27	20.02	19.95	20.34	20.31	20.30	20.24	20.18
802.11n	5795	159	AVG	13.52	13.58	13.57	13.60	13.68	13.66	13.74	13.67
			PEAK	19.89	19.81	19.73	20.24	20.33	20.37	20.38	20.48

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

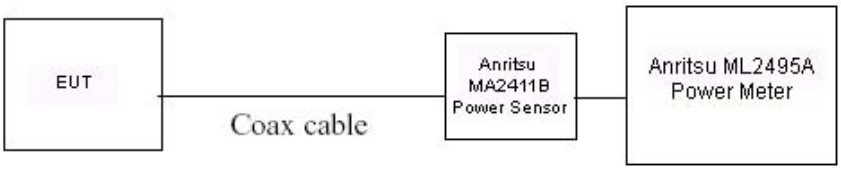

Figure 6-3. Test Instrument & Measurement Setup

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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 10log(3kHz/100kHz) = -15.23dB.

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	5.763	-15.23	-9.466	8.0	-17.47
2437	6	b	1	5.966	-15.23	-9.263	8.0	-17.26
2462	11	b	1	6.646	-15.23	-8.583	8.0	-16.58
2412	1	g	6	1.967	-15.23	-13.262	8.0	-21.26
2437	6	g	6	2.514	-15.23	-12.715	8.0	-20.71
2462	11	g	6	2.533	-15.23	-12.696	8.0	-20.70
2412	1	n	6.5/7.2 (MCS0)	2.090	-15.23	-13.139	8.0	-21.14
2437	6	n	6.5/7.2 (MCS0)	2.436	-15.23	-12.793	8.0	-20.79
2462	11	n	6.5/7.2 (MCS0)	2.736	-15.23	-12.493	8.0	-20.49
5745	149	a	6	3.942	-15.23	-11.287	8.0	-19.29
5785	157	a	6	4.424	-15.23	-10.805	8.0	-18.80
5825	165	a	6	3.994	-15.23	-11.235	8.0	-19.23
5745	149	n (20MHz)	6.5/7.2 (MCS0)	4.260	-15.23	-10.969	8.0	-18.97
5785	157	n (20MHz)	6.5/7.2 (MCS0)	4.236	-15.23	-10.993	8.0	-18.99
5825	165	n (20MHz)	6.5/7.2 (MCS0)	4.901	-15.23	-10.328	8.0	-18.33
5755	151	n (40MHz)	13.5/15 (MCS0)	0.503	-15.23	-14.726	8.0	-22.73
5795	159	n (40MHz)	13.5/15 (MCS0)	1.129	-15.23	-14.100	8.0	-22.10

Table 6-9. Conducted Power Density Measurements

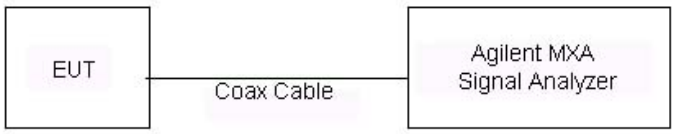

Figure 6-4. Test Instrument & Measurement Setup

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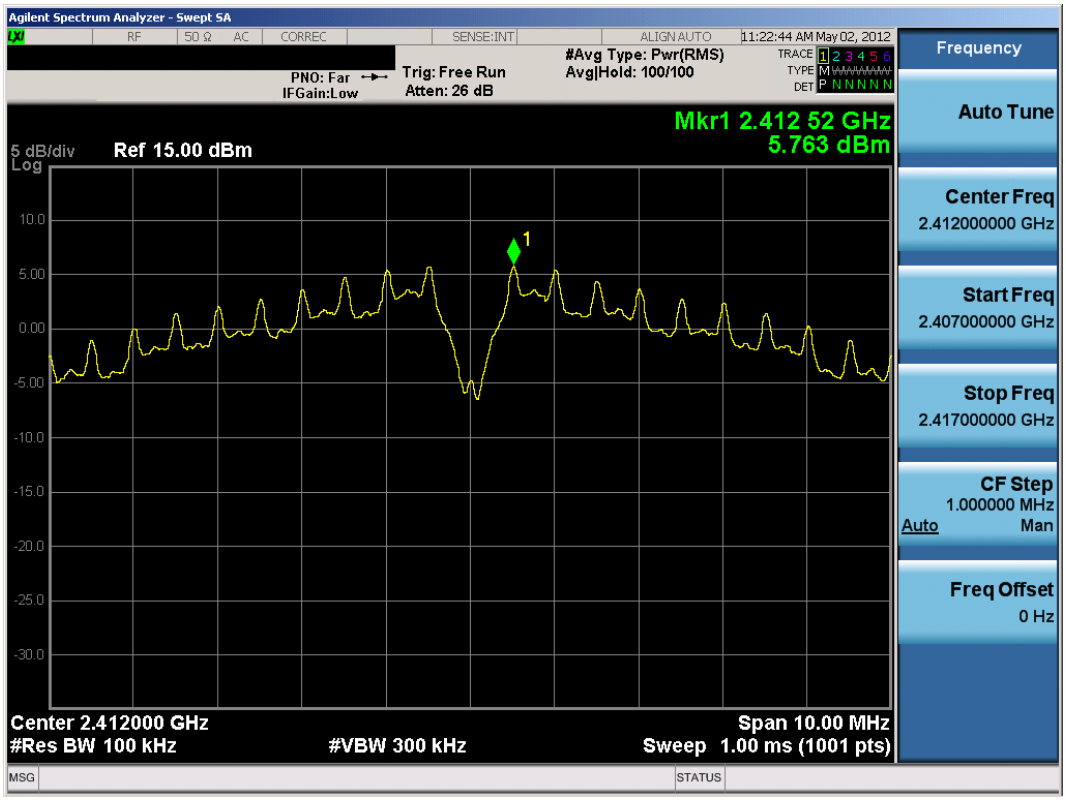
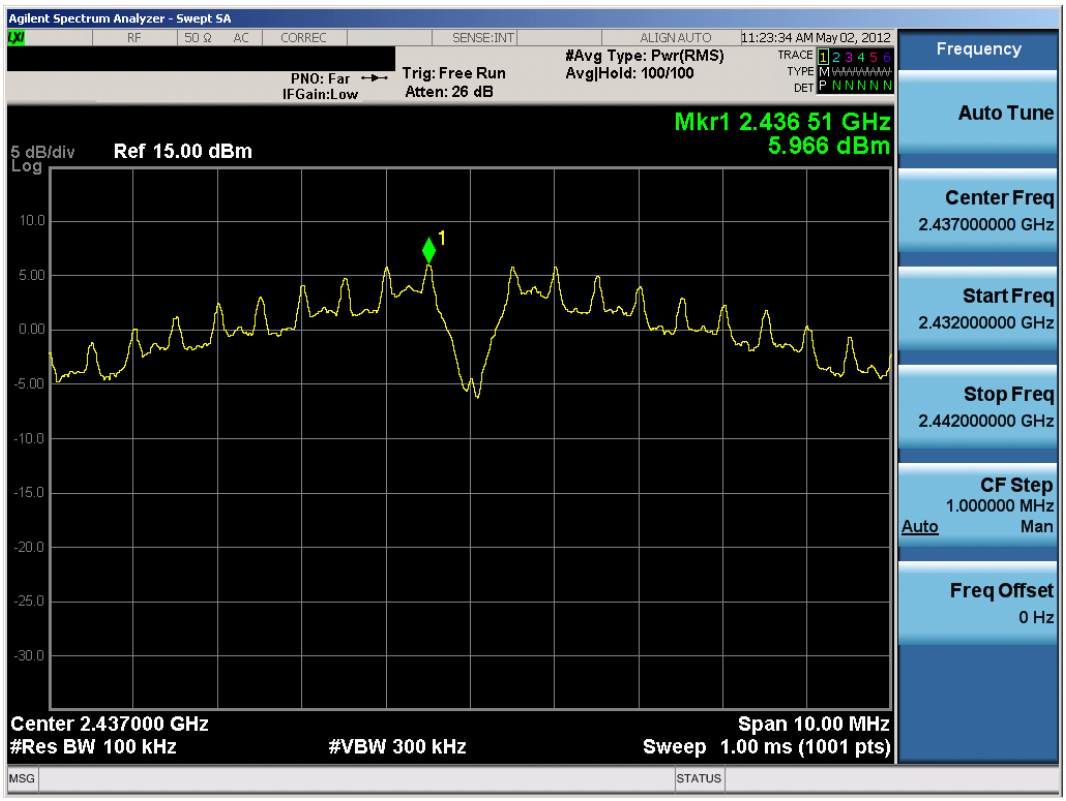


Plot 6-18. Power Spectral Density Plot (802.11b – Ch. 1)



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

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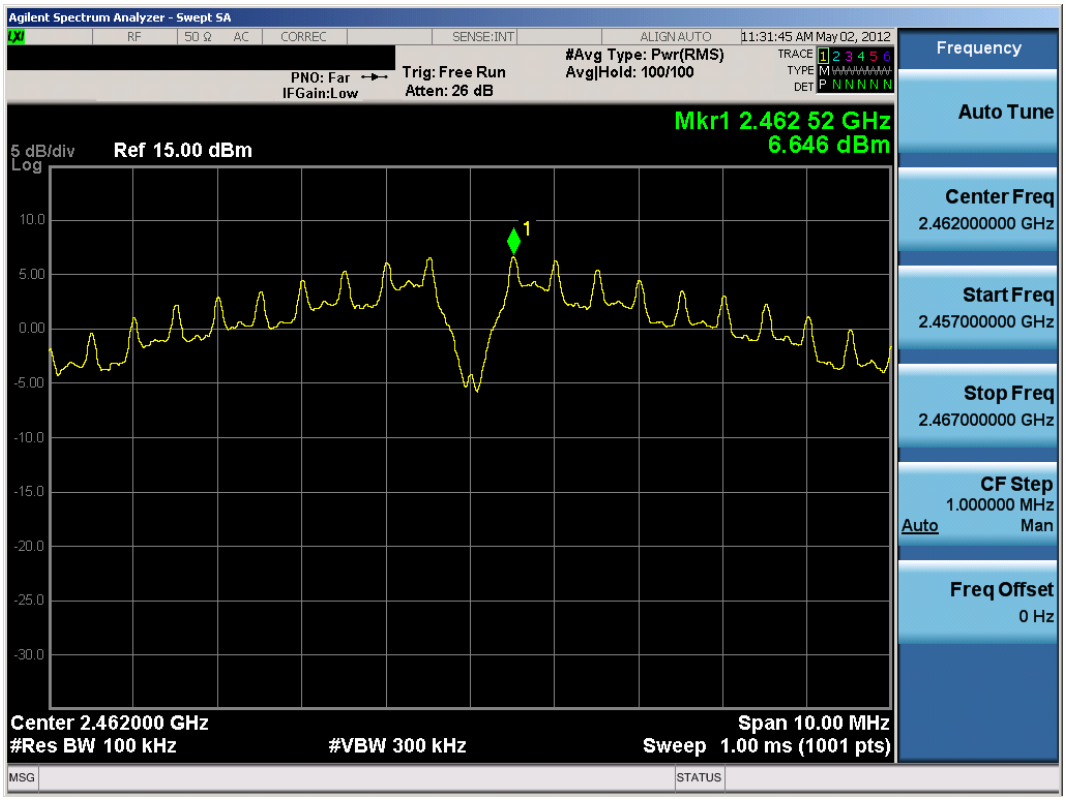
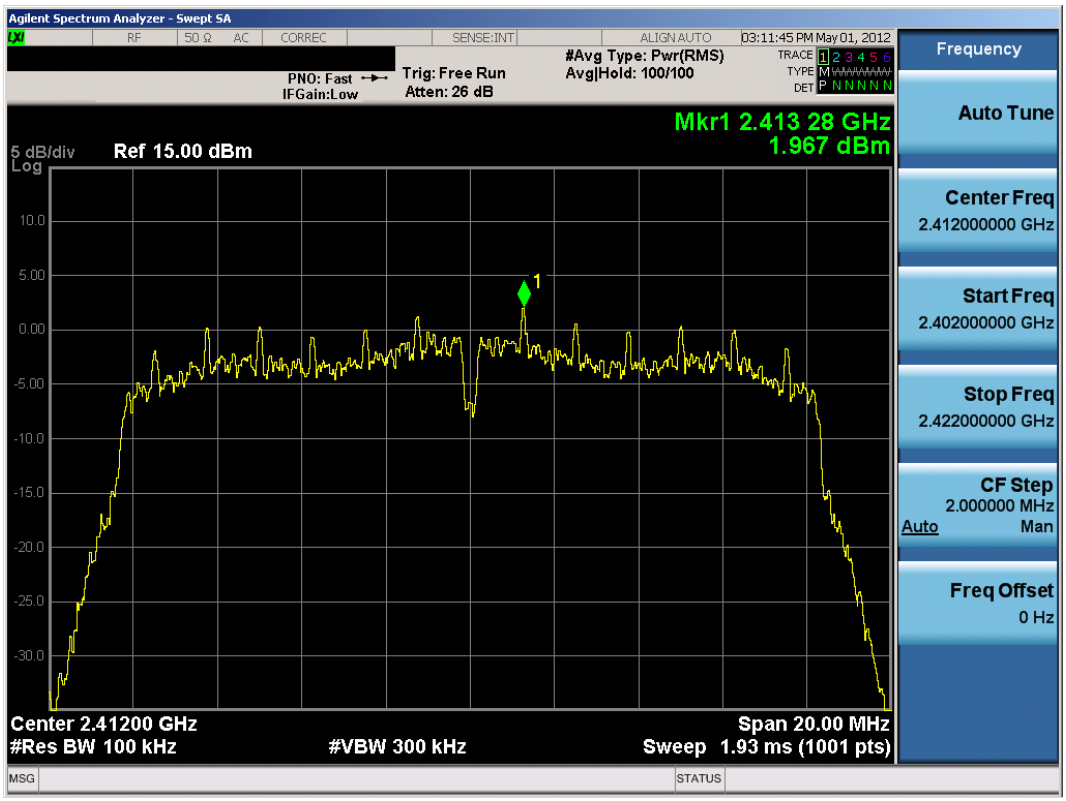


Plot 6-20. Power Spectral Density Plot (802.11b – Ch. 11)



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

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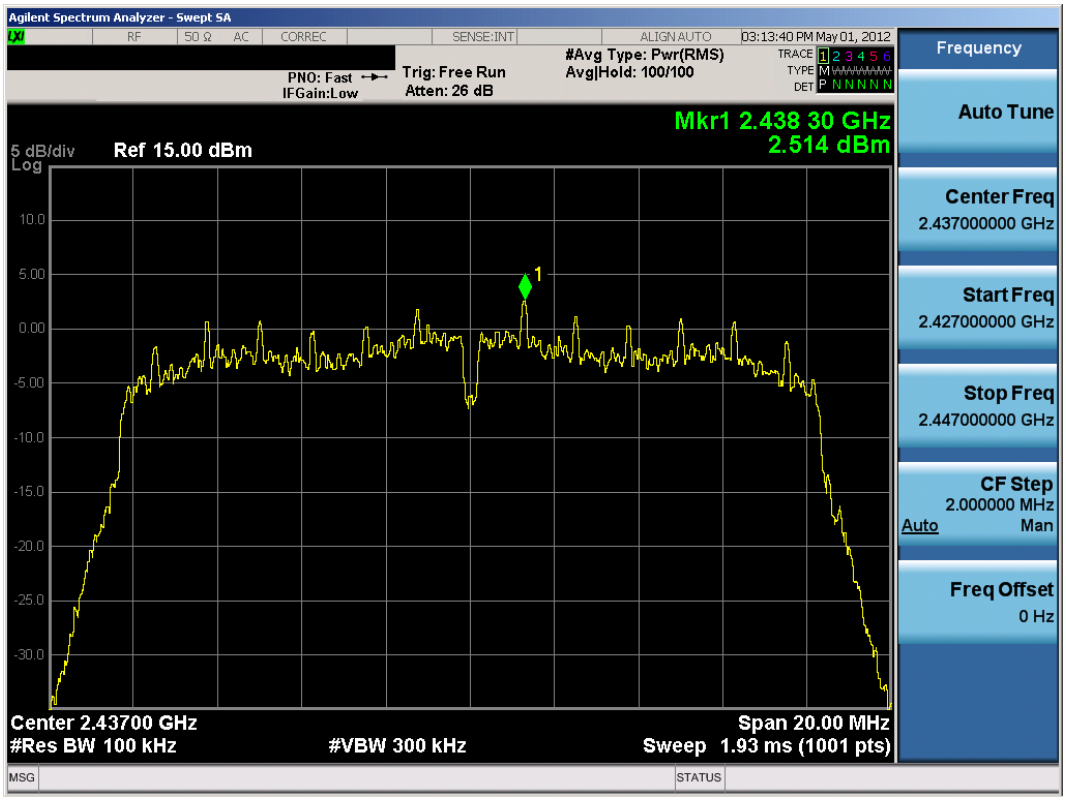
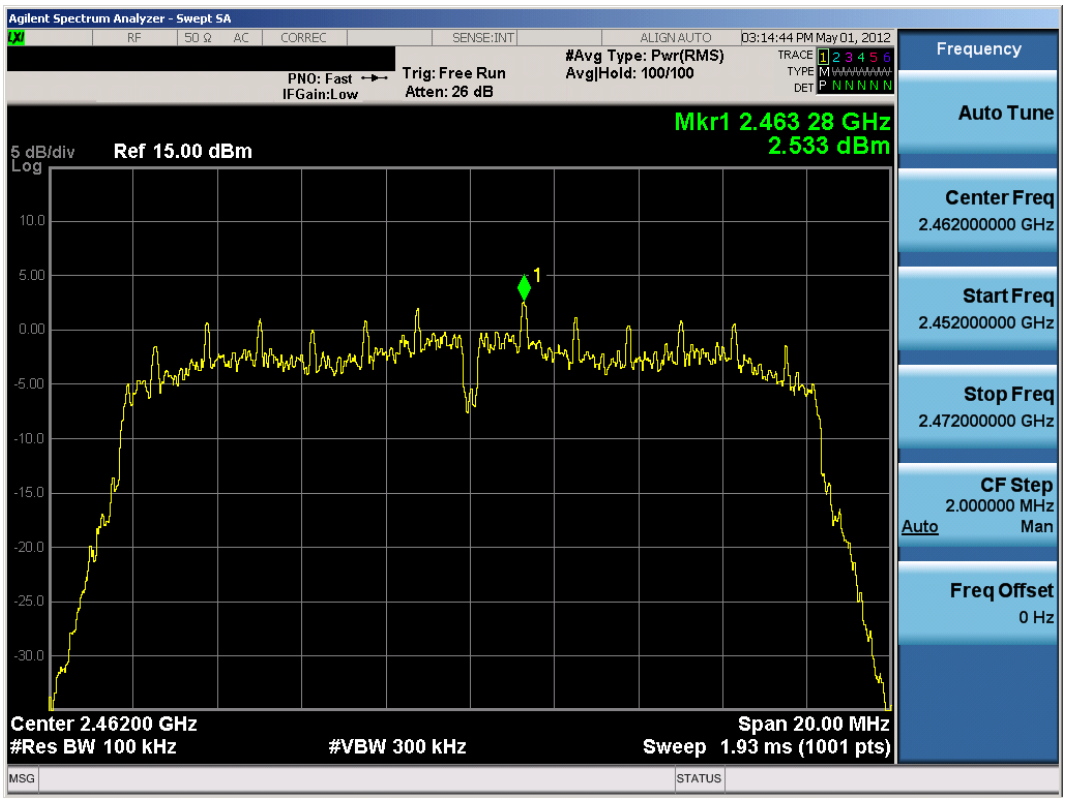


Plot 6-22. Power Spectral Density Plot (802.11g – Ch. 6)



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

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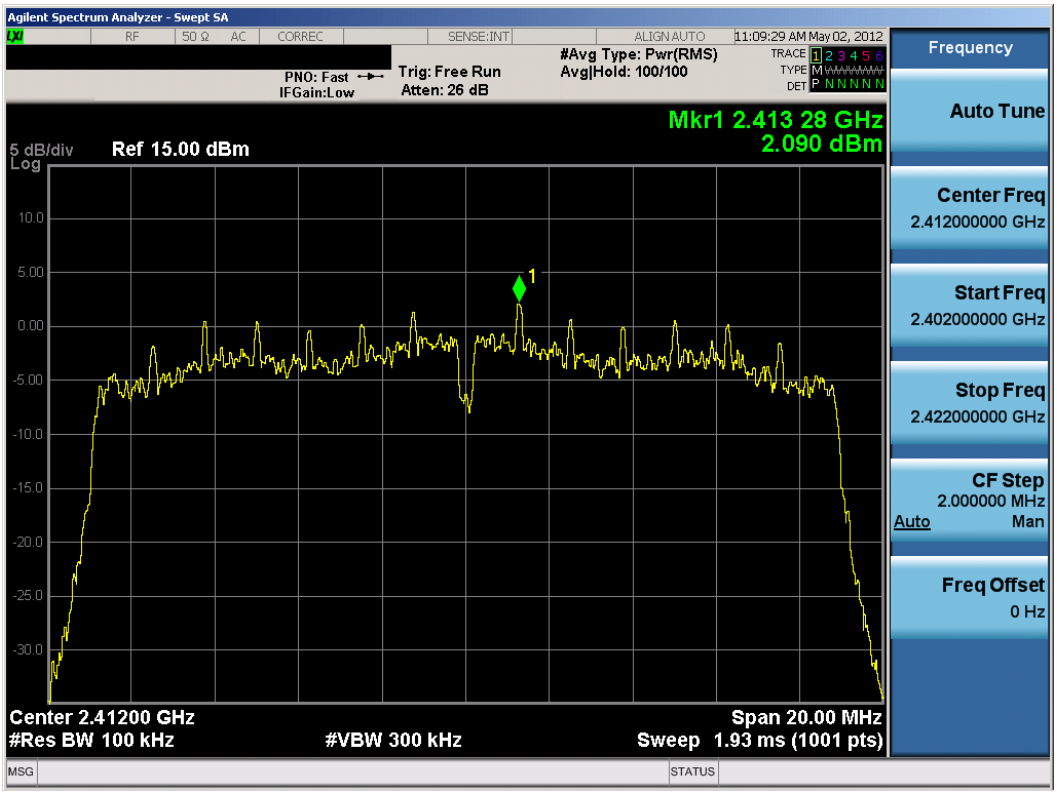
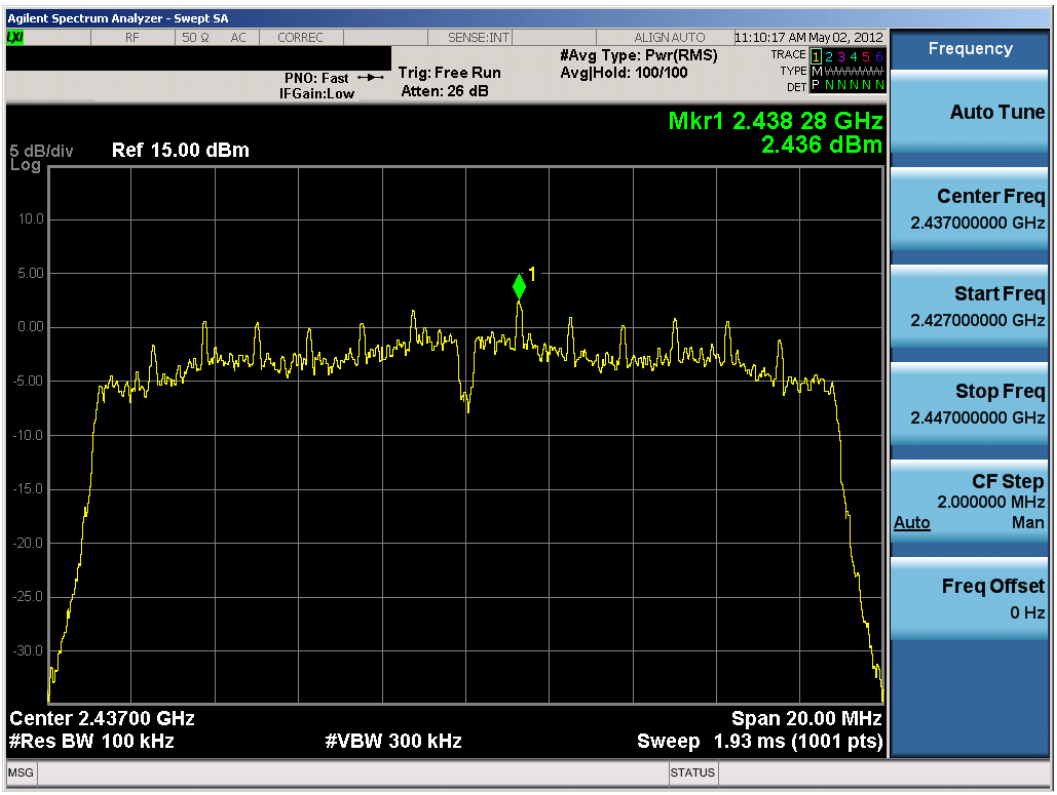


Plot 6-24. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 1)



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

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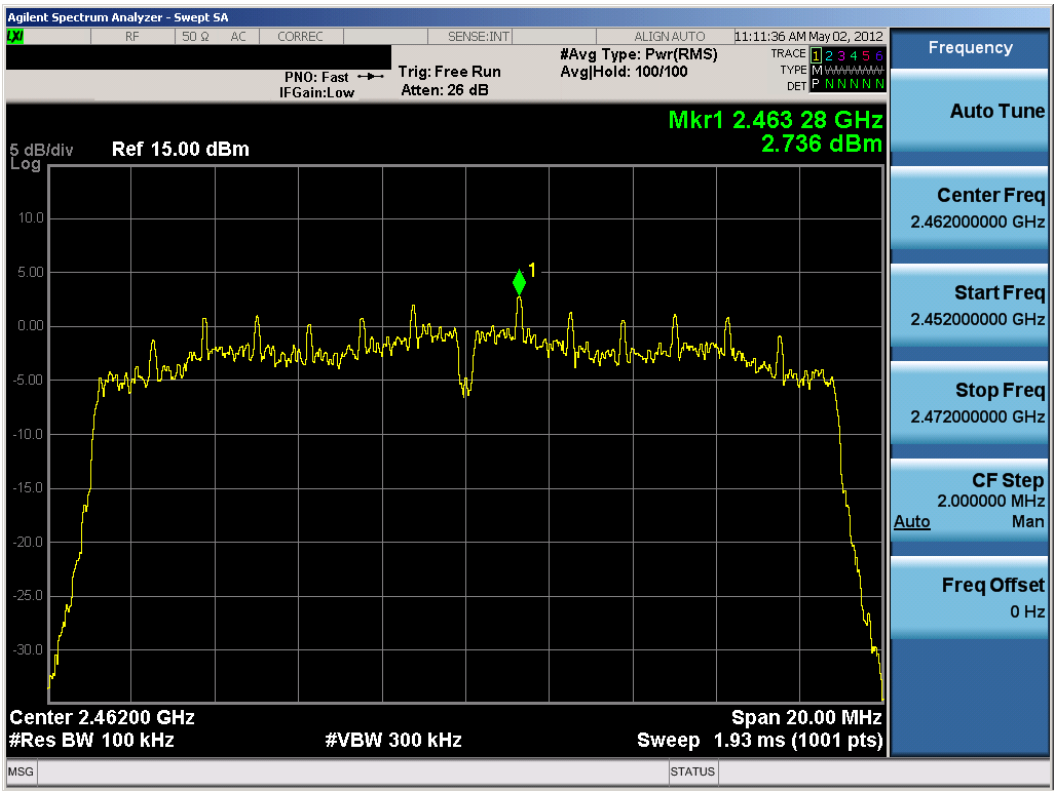
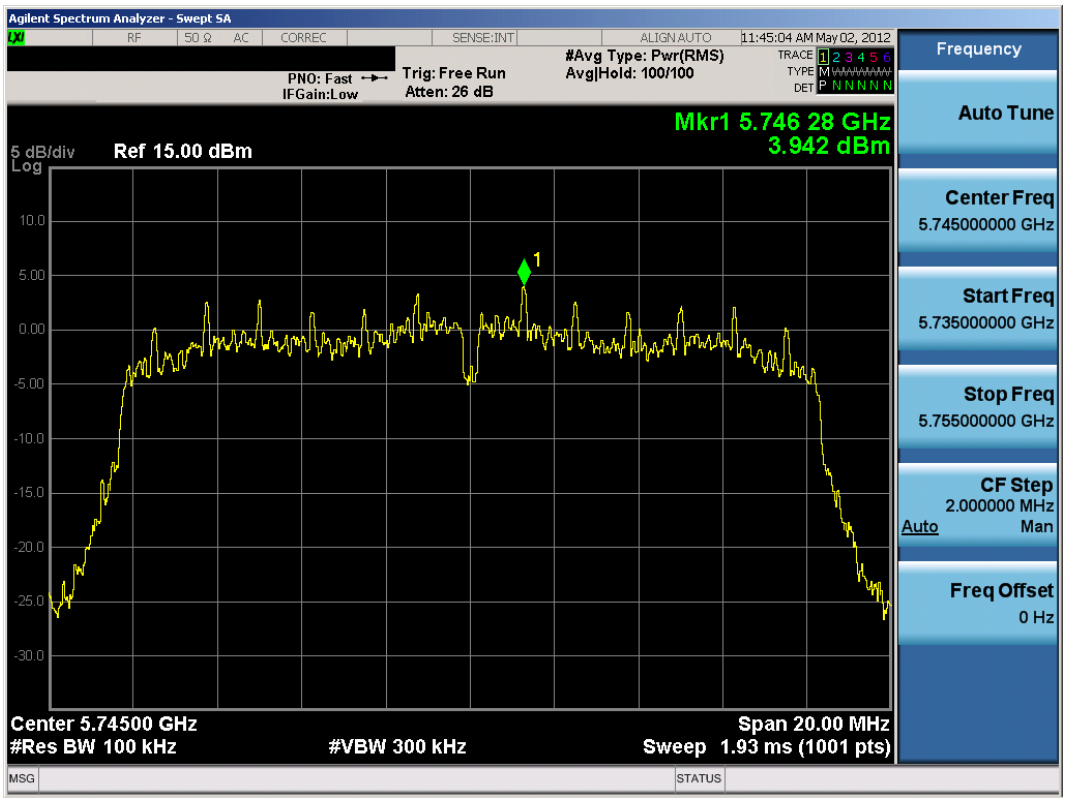


Plot 6-26. Power Spectral Density Plot (802.11n (2.4GHz) – Ch. 11)



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

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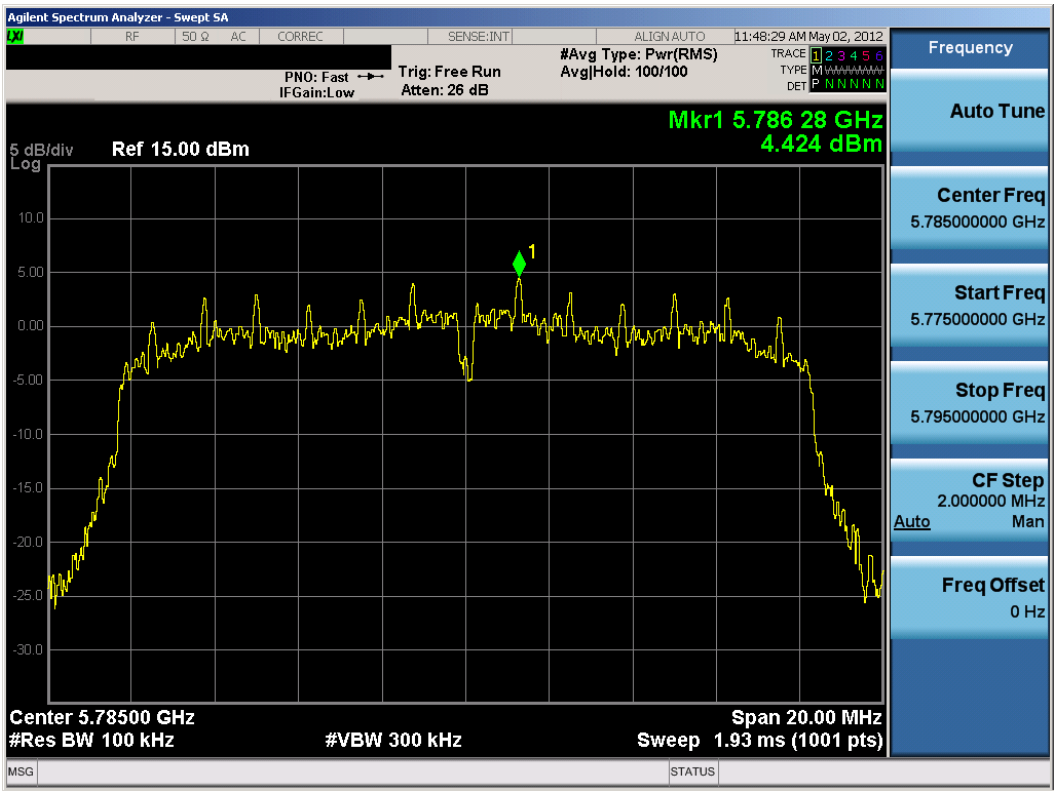
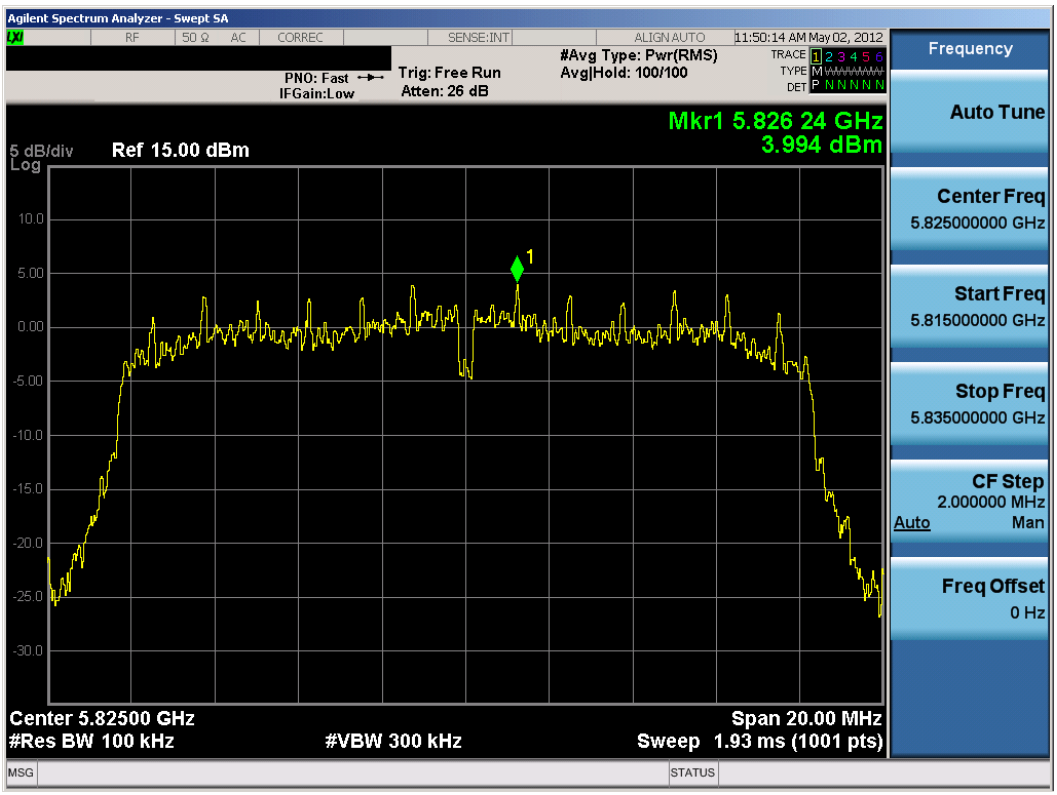


Plot 6-28. Power Spectral Density Plot (802.11a – Ch. 157)



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

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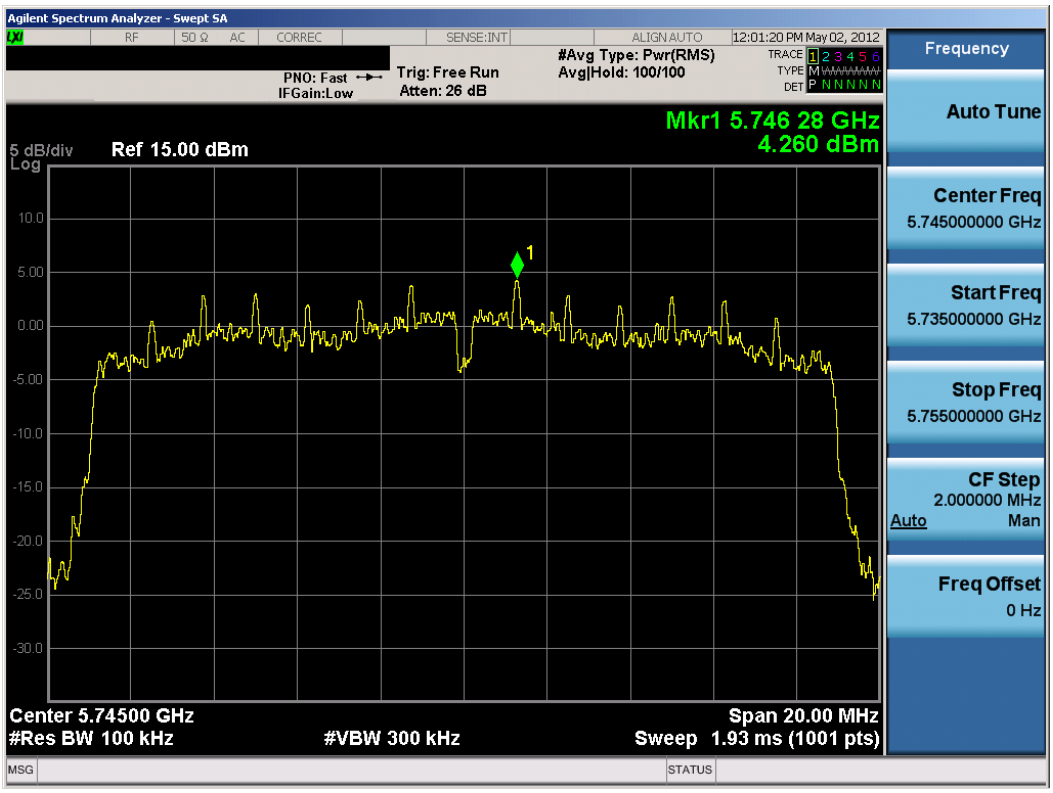
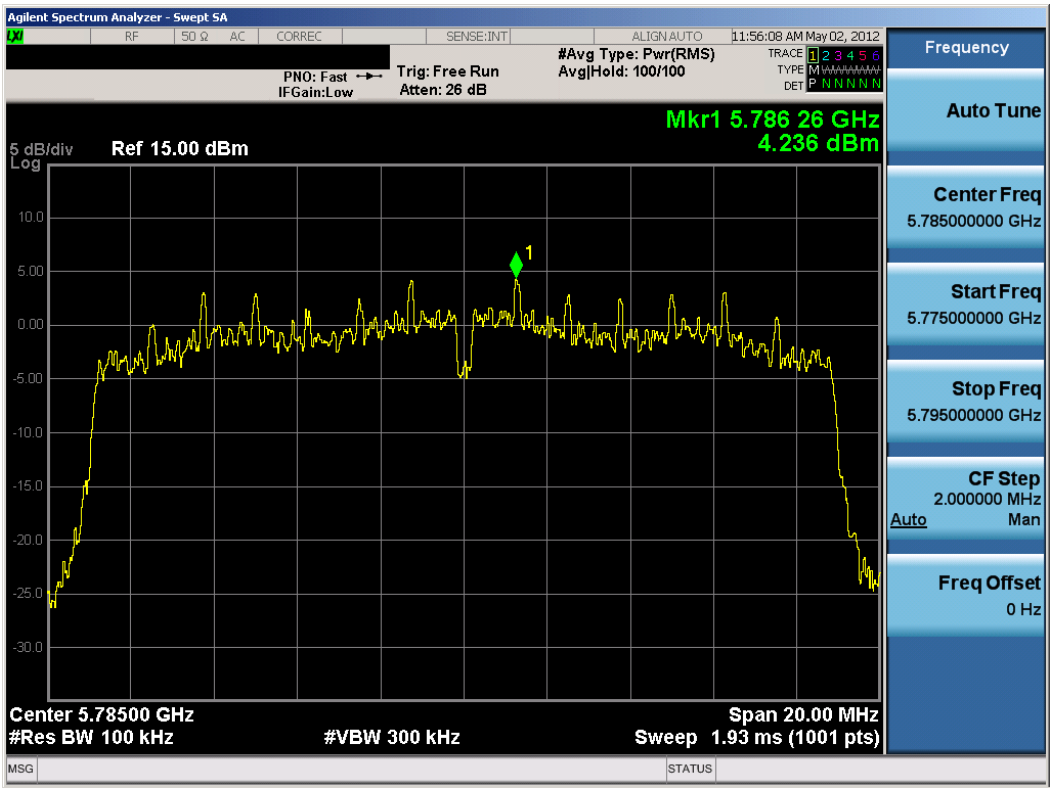


Plot 6-30. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 149)



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

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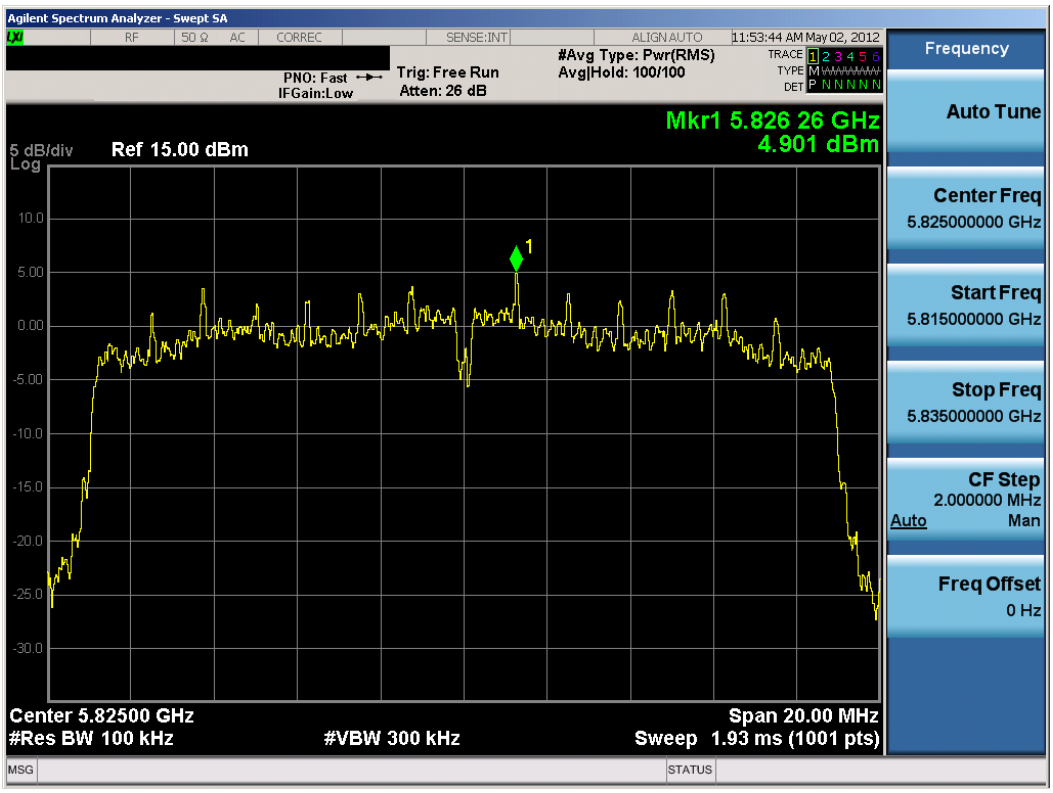
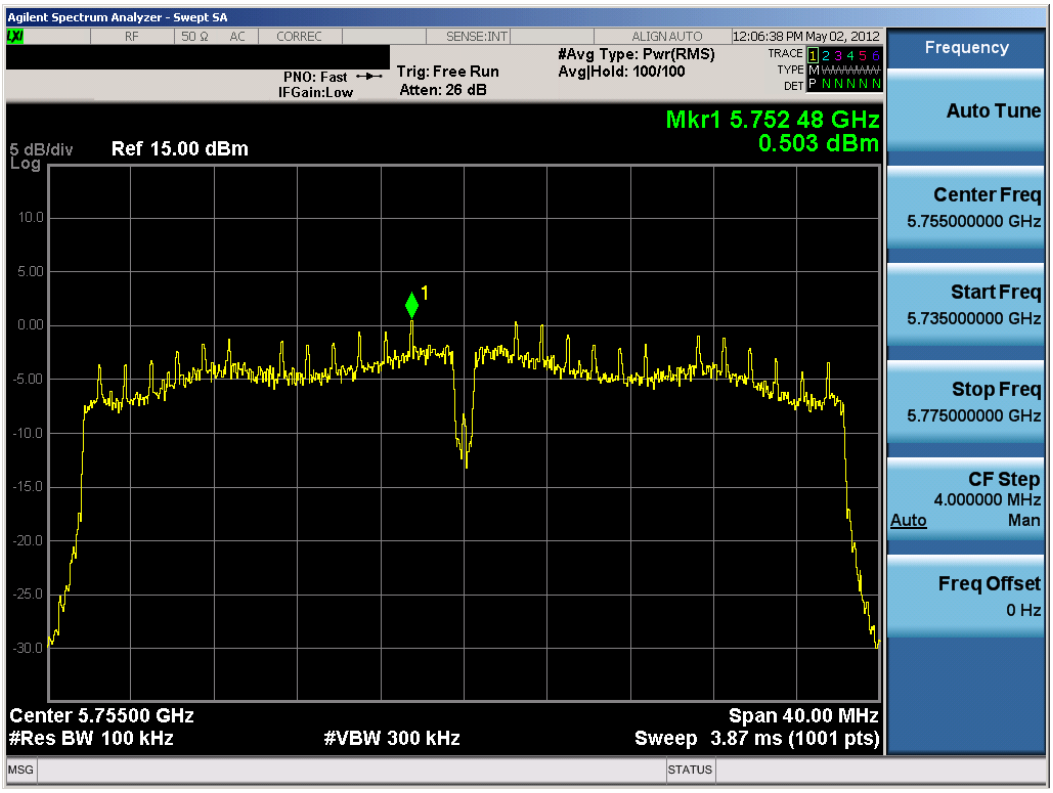


Plot 6-32. Power Spectral Density Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



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

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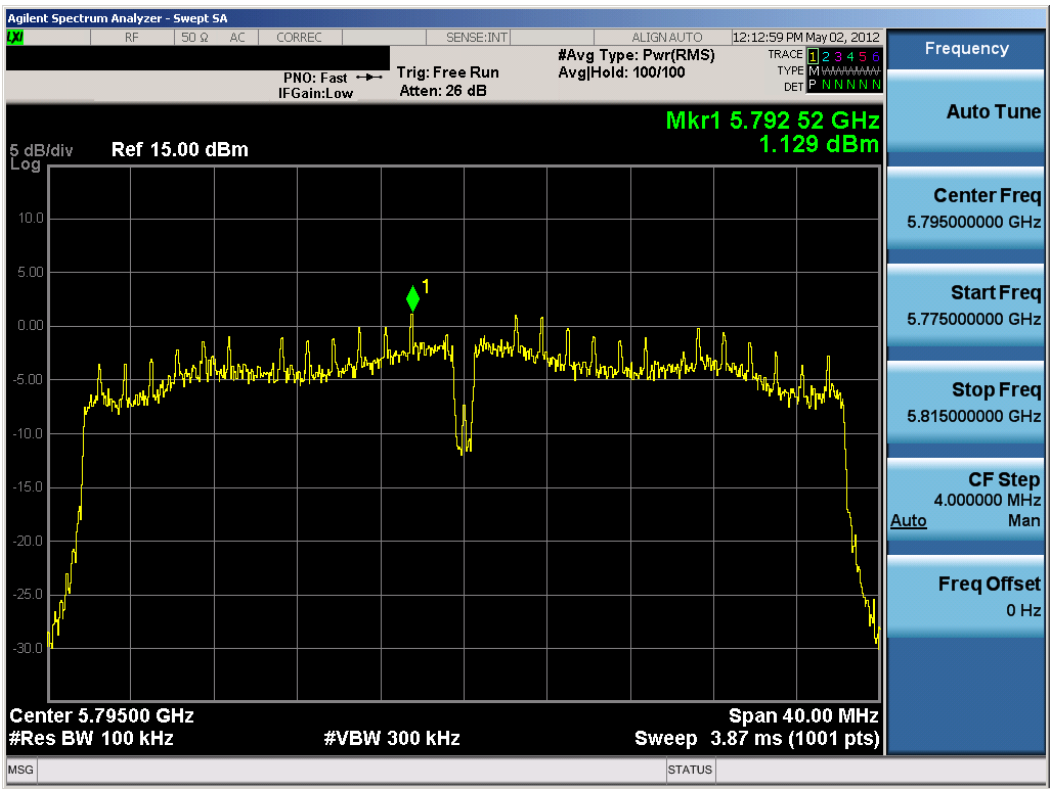

Plot 6-34. Power Spectral Density Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)

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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.

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

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

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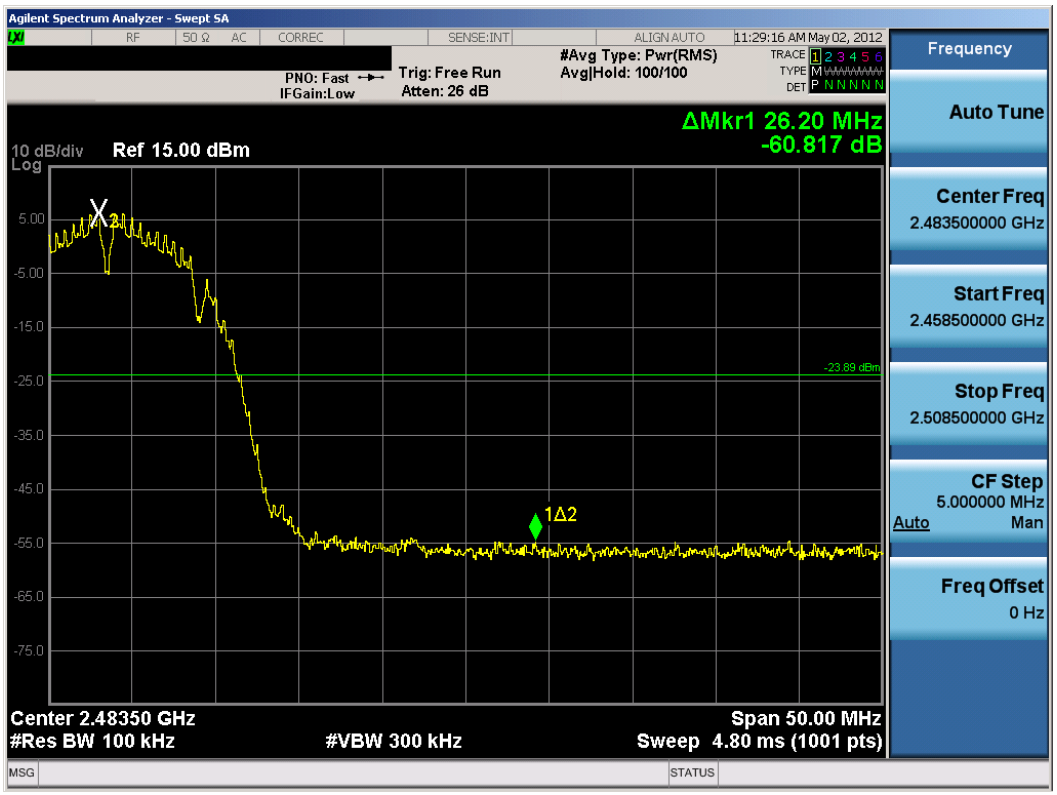
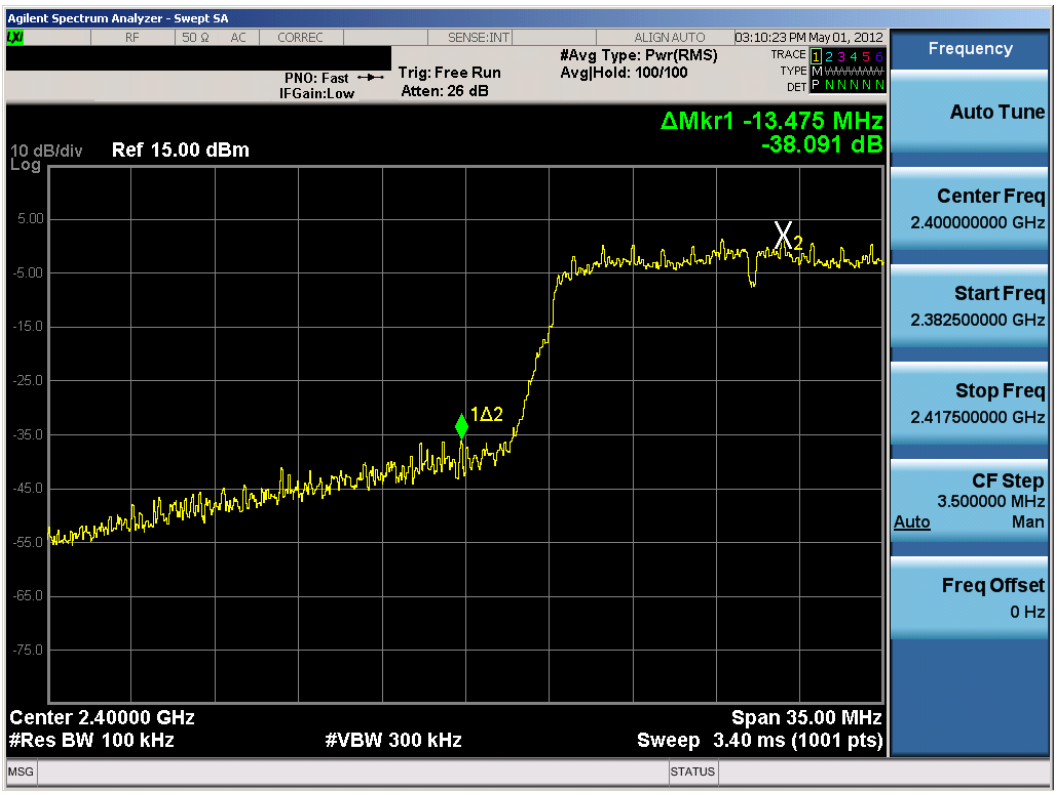


Plot 6-36. Band Edge Plot (802.11b – Ch. 11)



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

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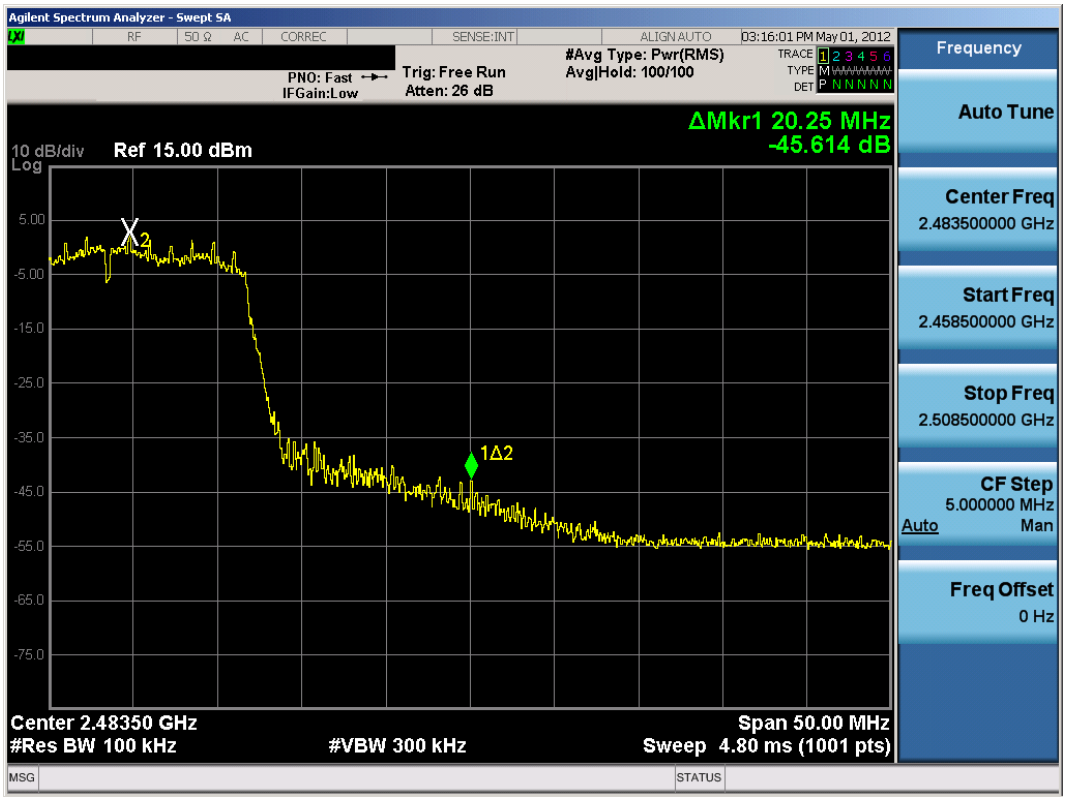
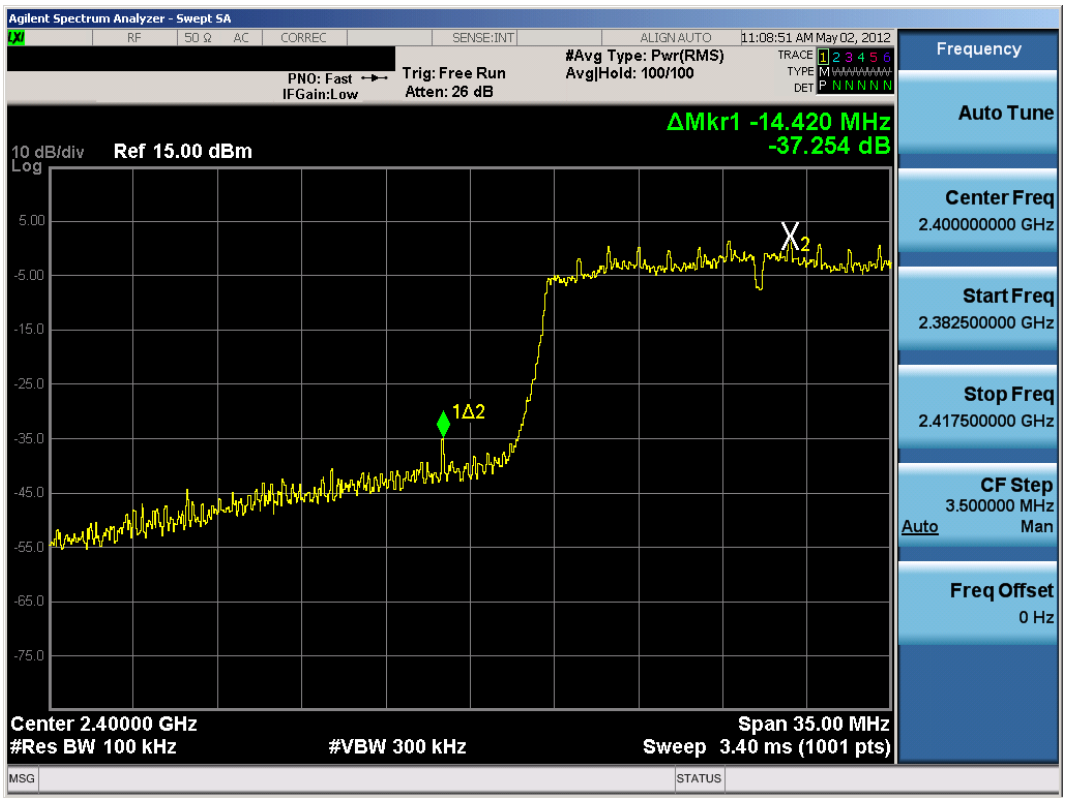


Plot 6-38. Band Edge Plot (802.11g – Ch. 11)



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

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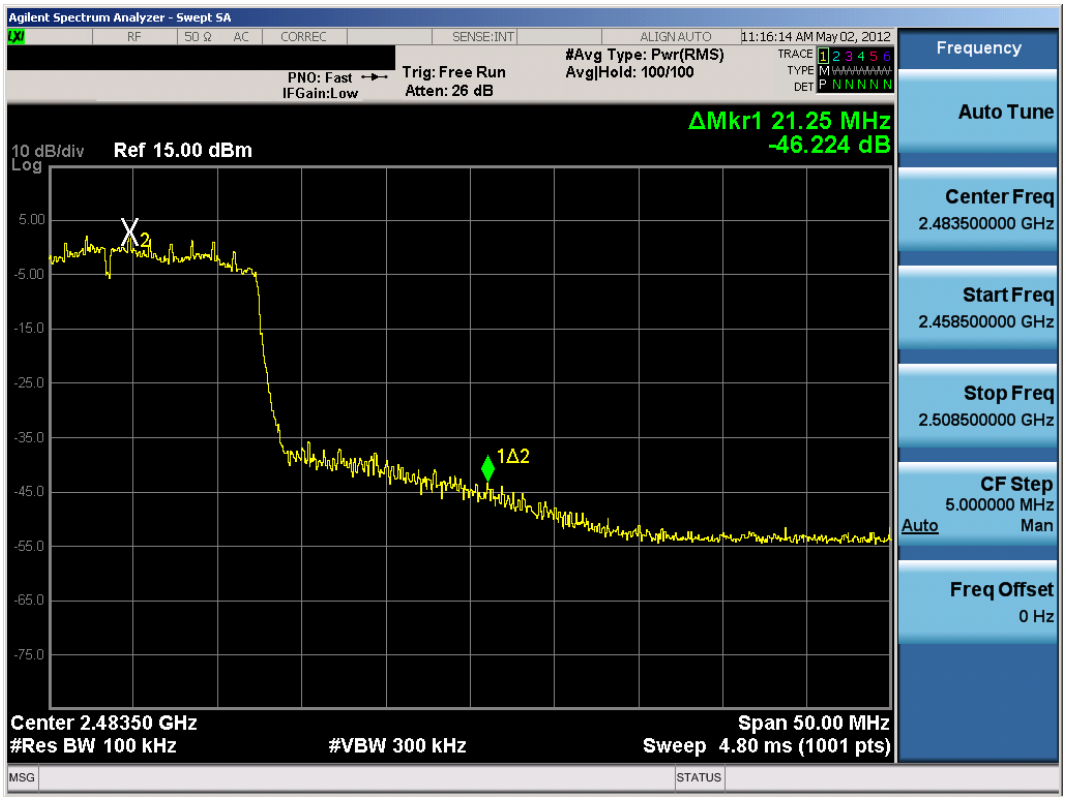
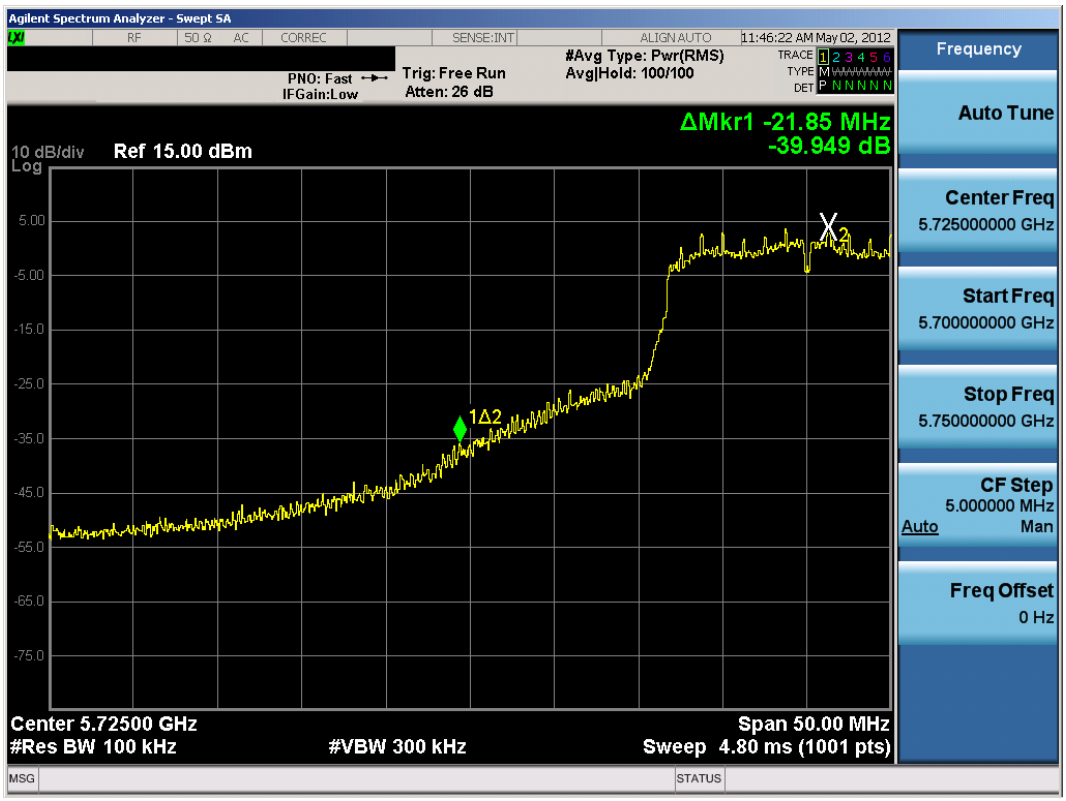


Plot 6-40. Band Edge Plot (802.11n (2.4GHz) – Ch. 11)



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

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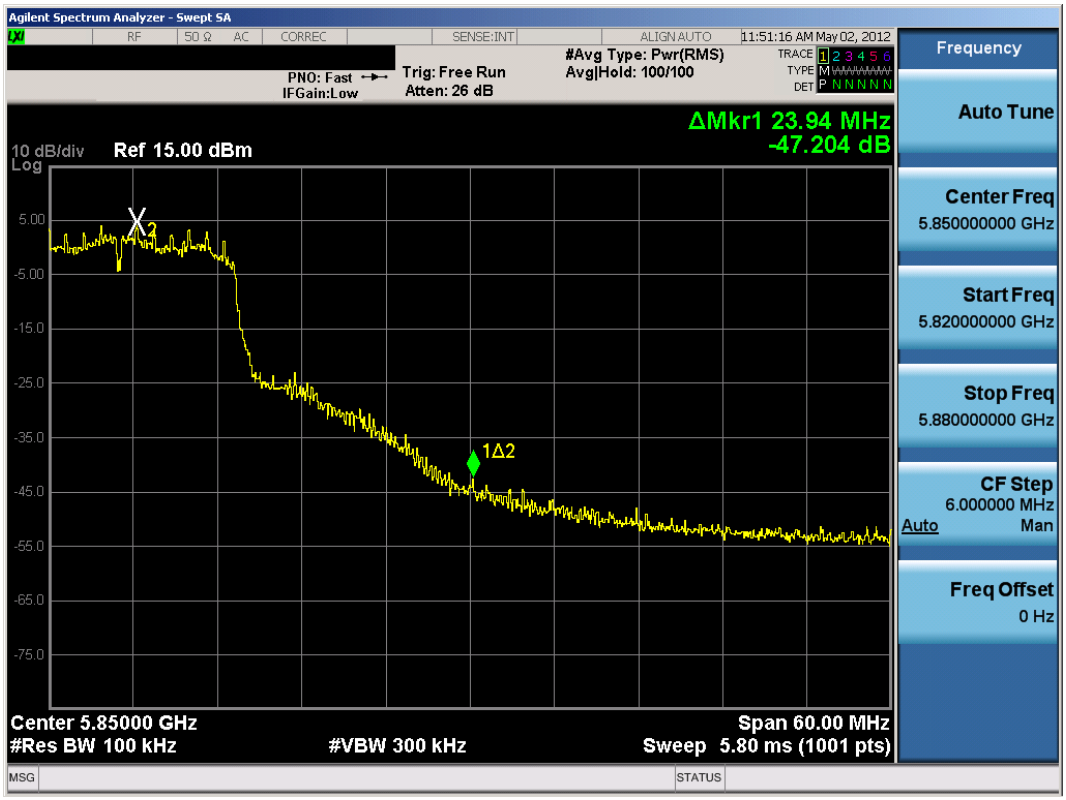
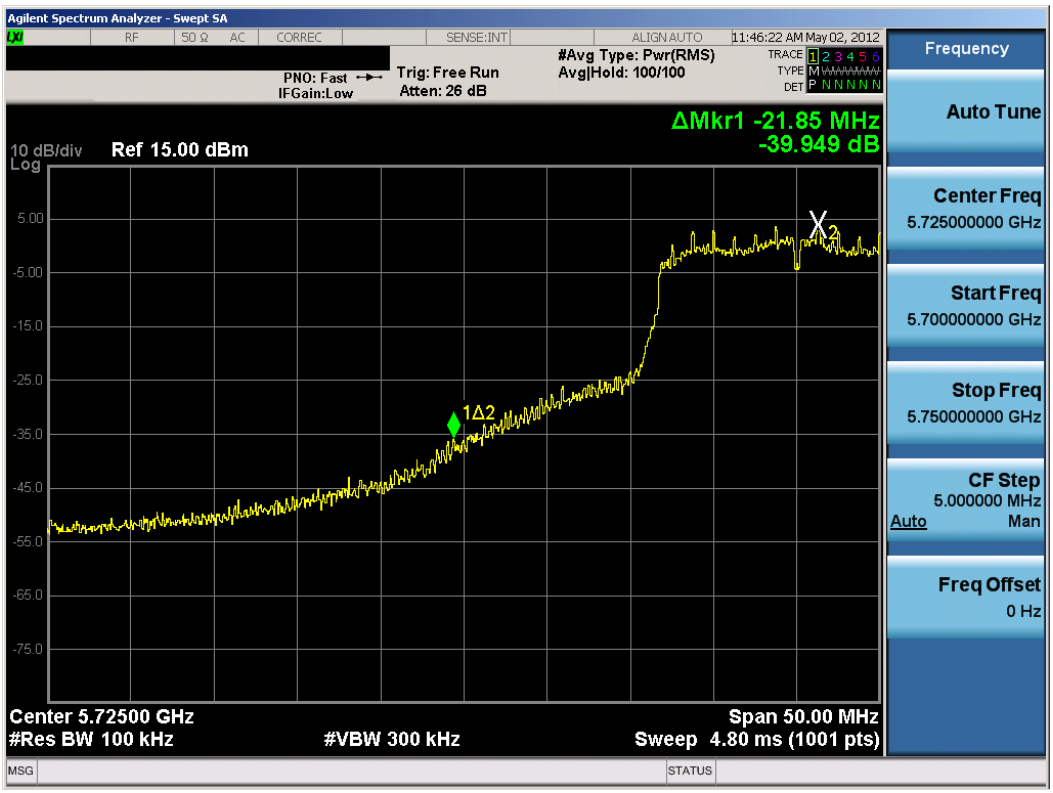


Plot 6-42. Band Edge Plot (802.11a – Ch. 165)



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

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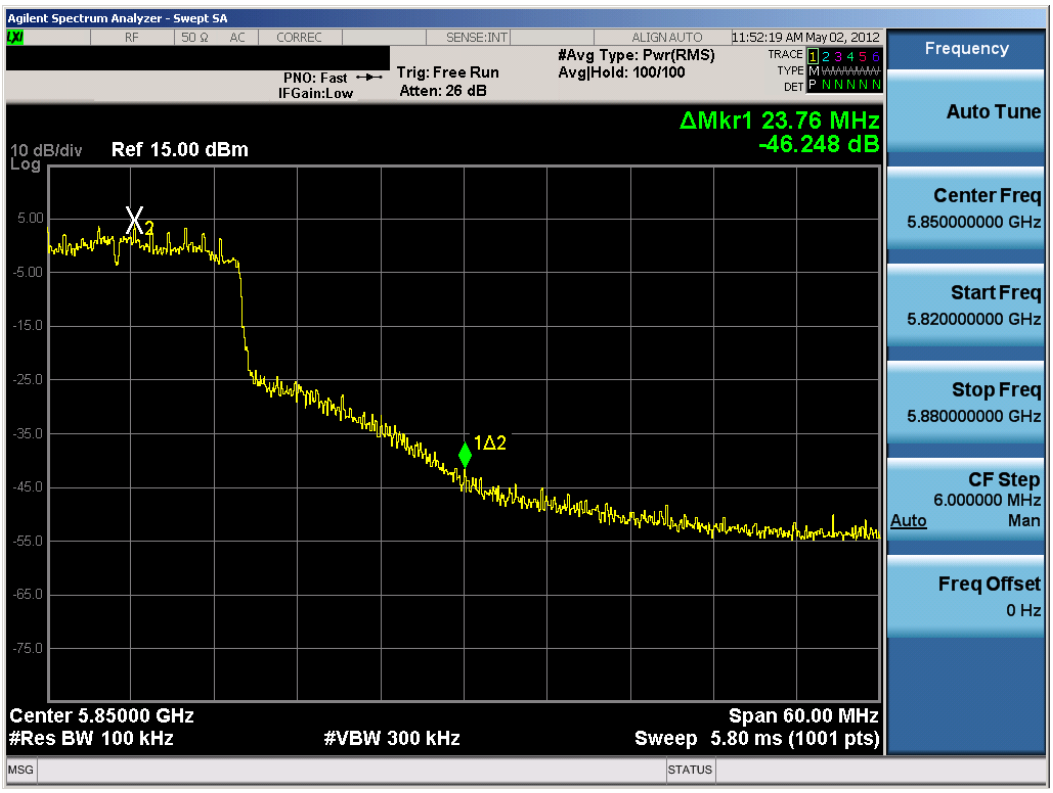
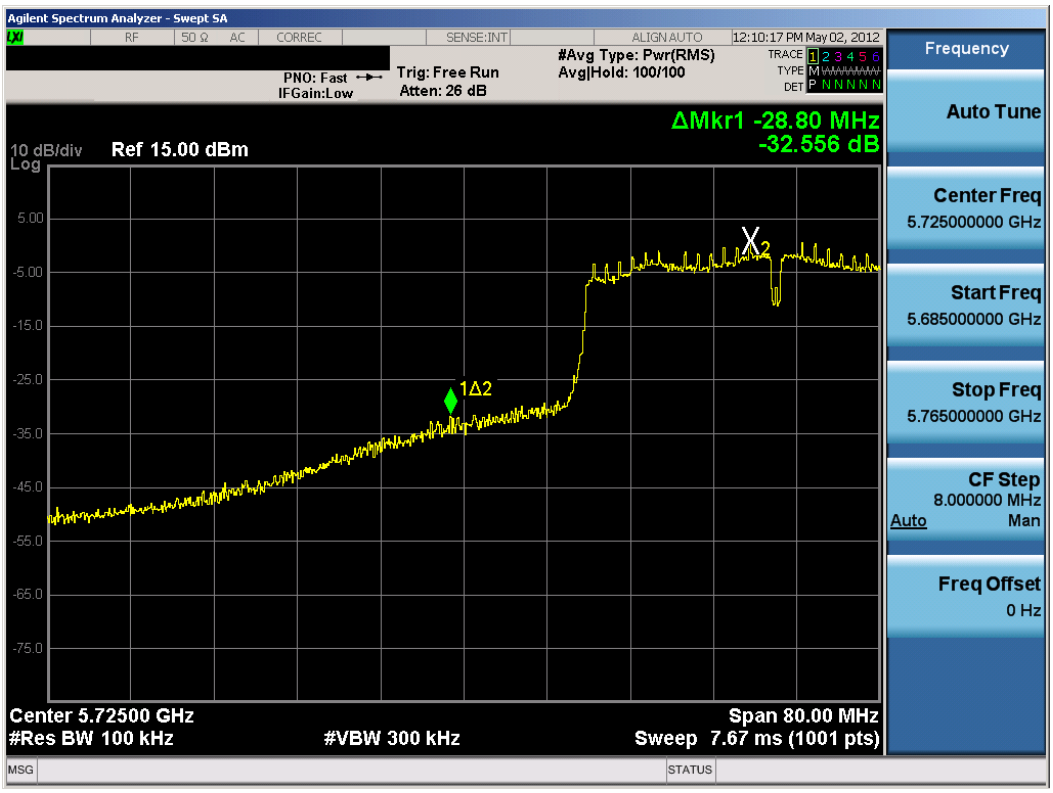


Plot 6-44. Band Edge Plot (20MHz BW 802.11n (5.8GHz) – Ch. 165)



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

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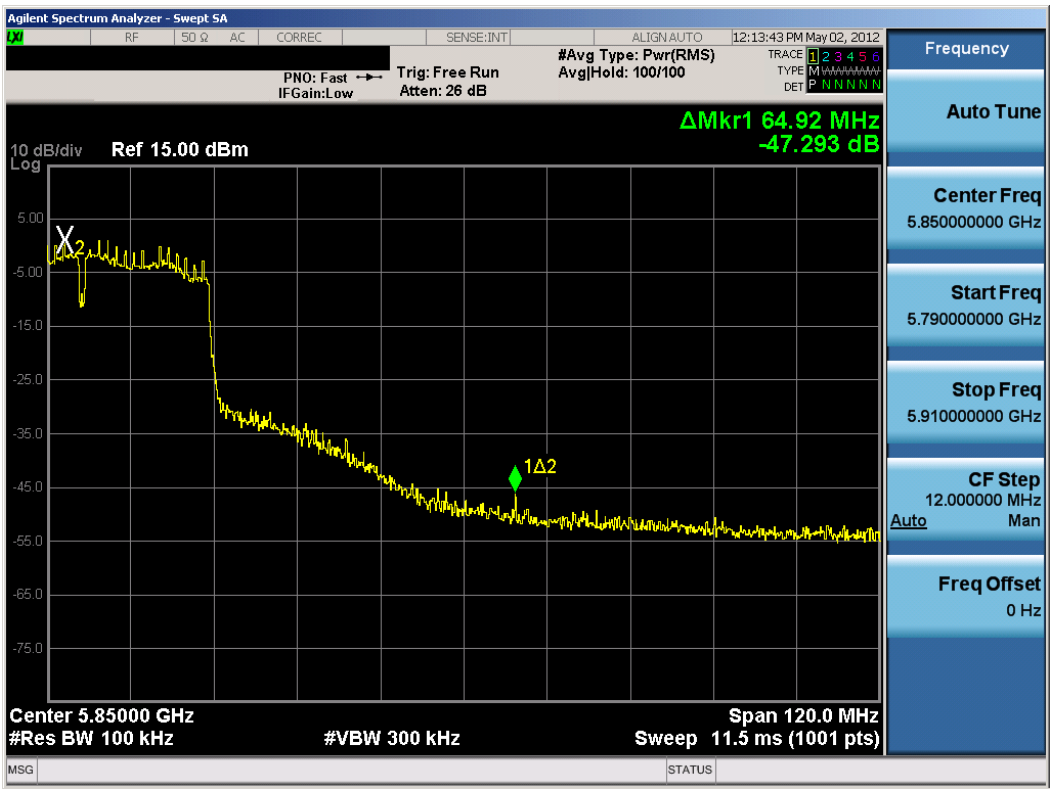

Plot 6-46. Band Edge Plot (40MHz BW 802.11n (5.8GHz) – Ch. 159)

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6.7 Conducted Spurious Emissions

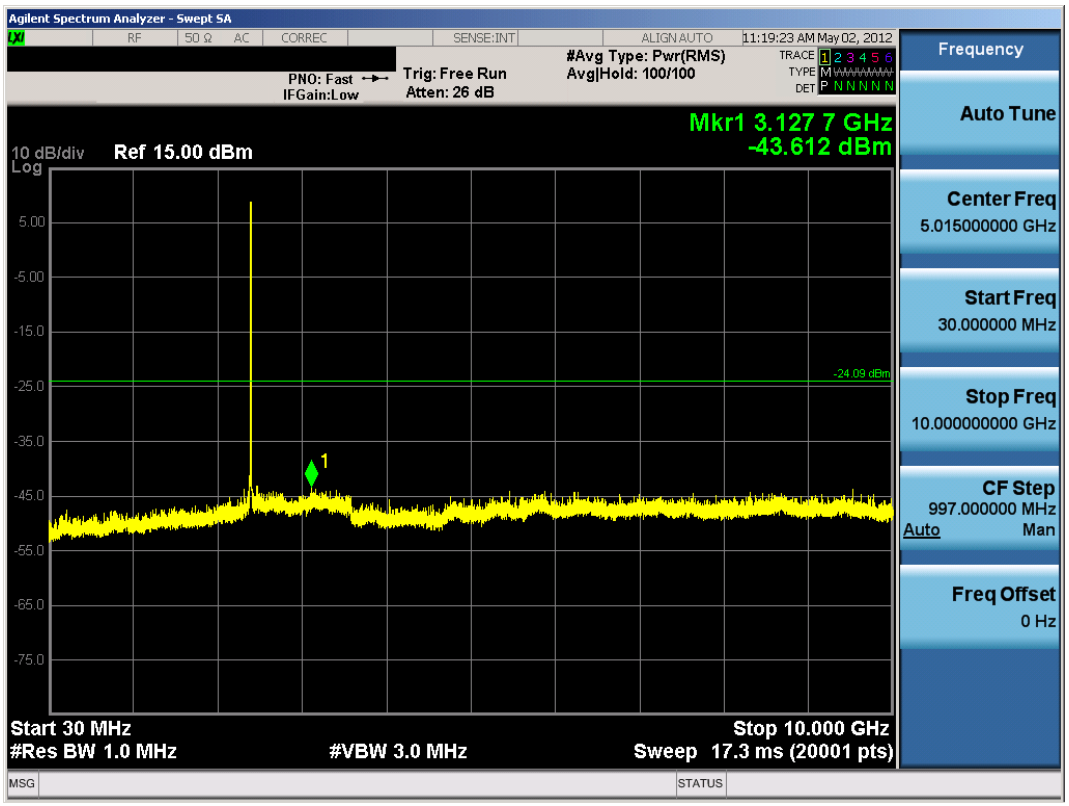
§15.247(d); RSS-210 [A8.5]

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 30dB 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 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 * Span/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)

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Plot 6-48. Conducted Spurious Plot (802.11b – Ch. 1)

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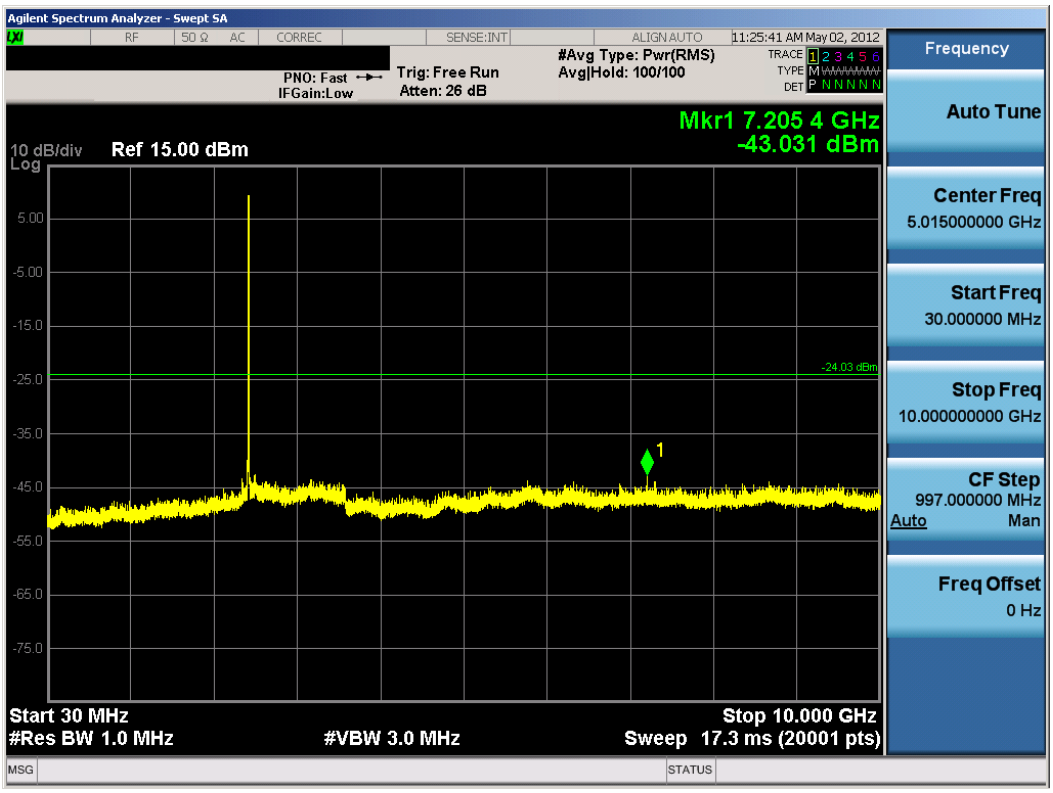
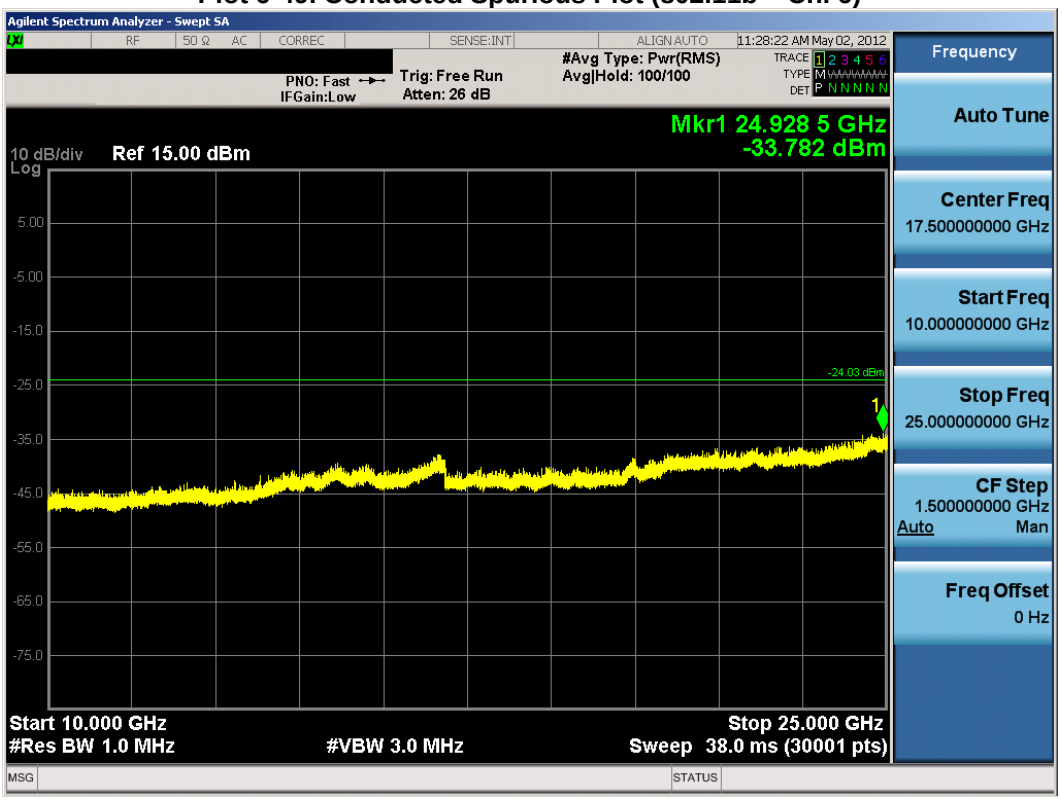


Plot 6-49. Conducted Spurious Plot (802.11b – Ch. 6)



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

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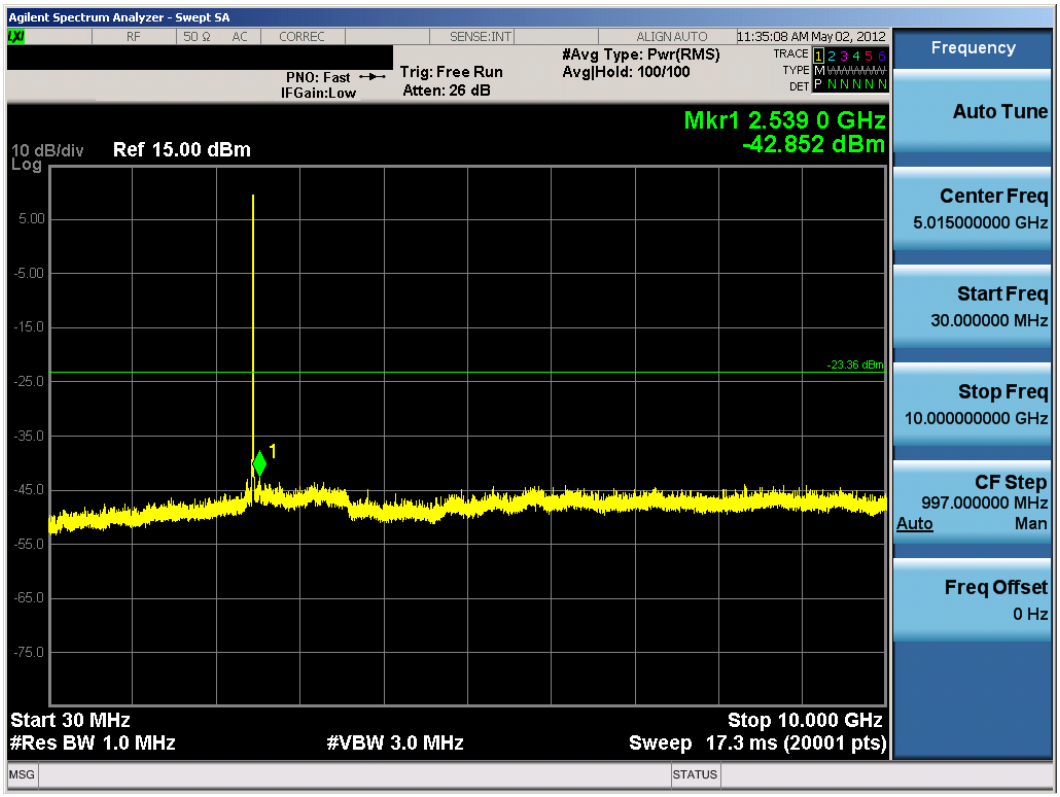
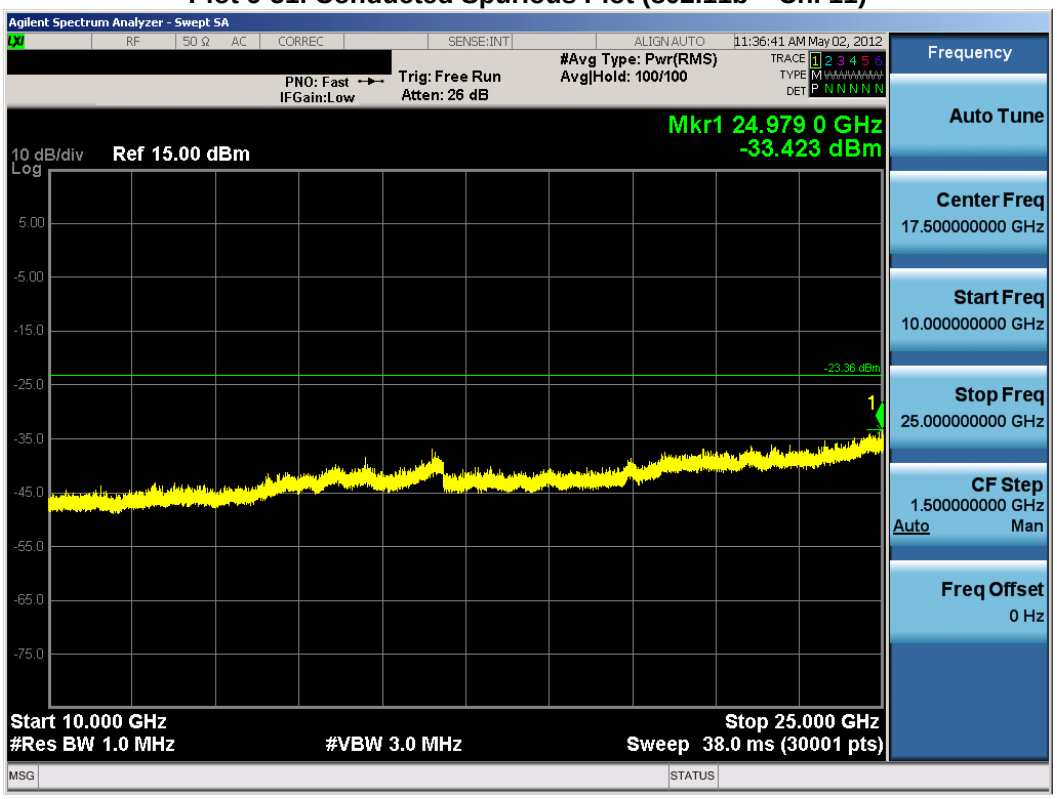


Plot 6-51. Conducted Spurious Plot (802.11b – Ch. 11)



Plot 6-52. Conducted Spurious Plot (802.11b – Ch. 11)

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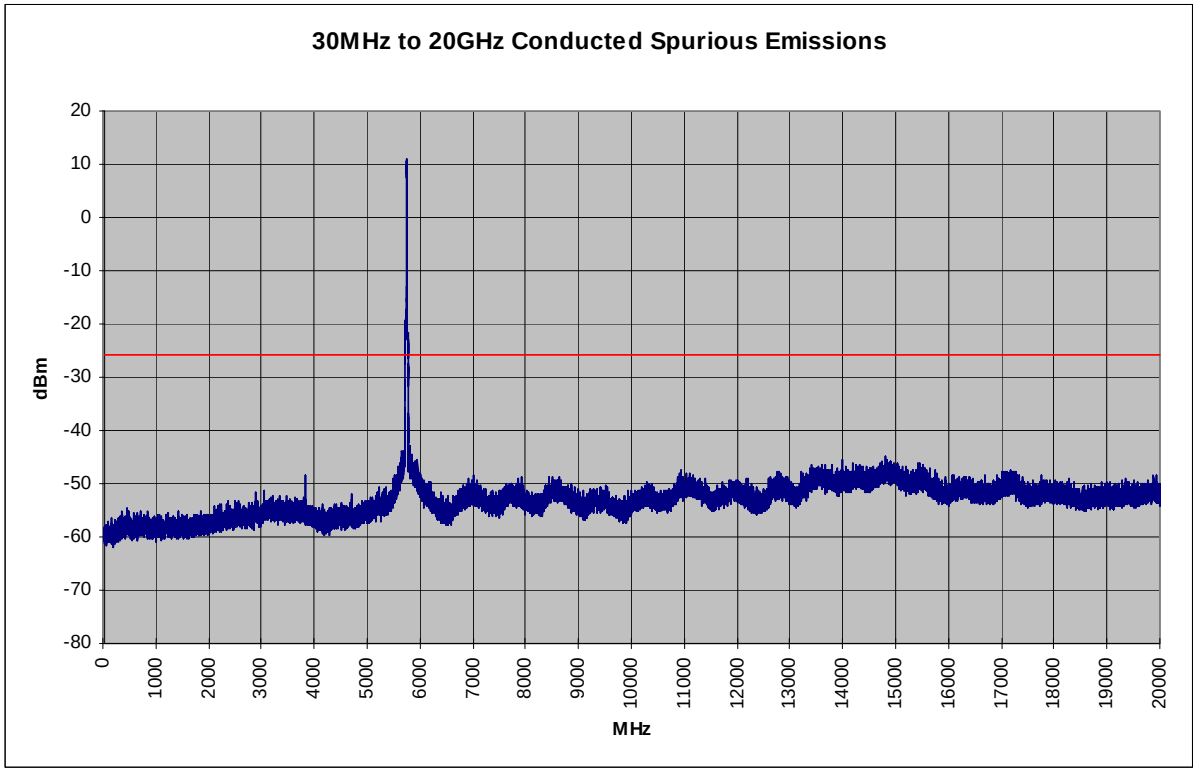
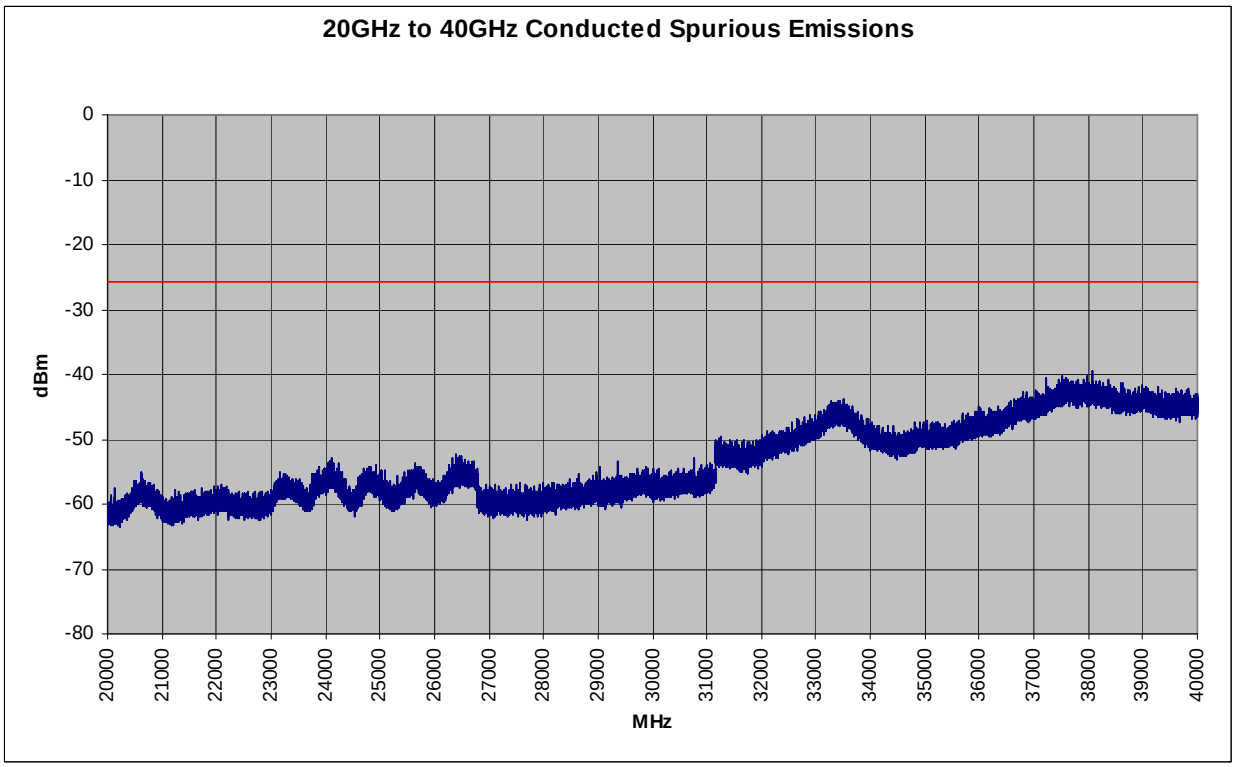


Plot 6-53. Conducted Spurious Plot (802.11a – Ch. 149)



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

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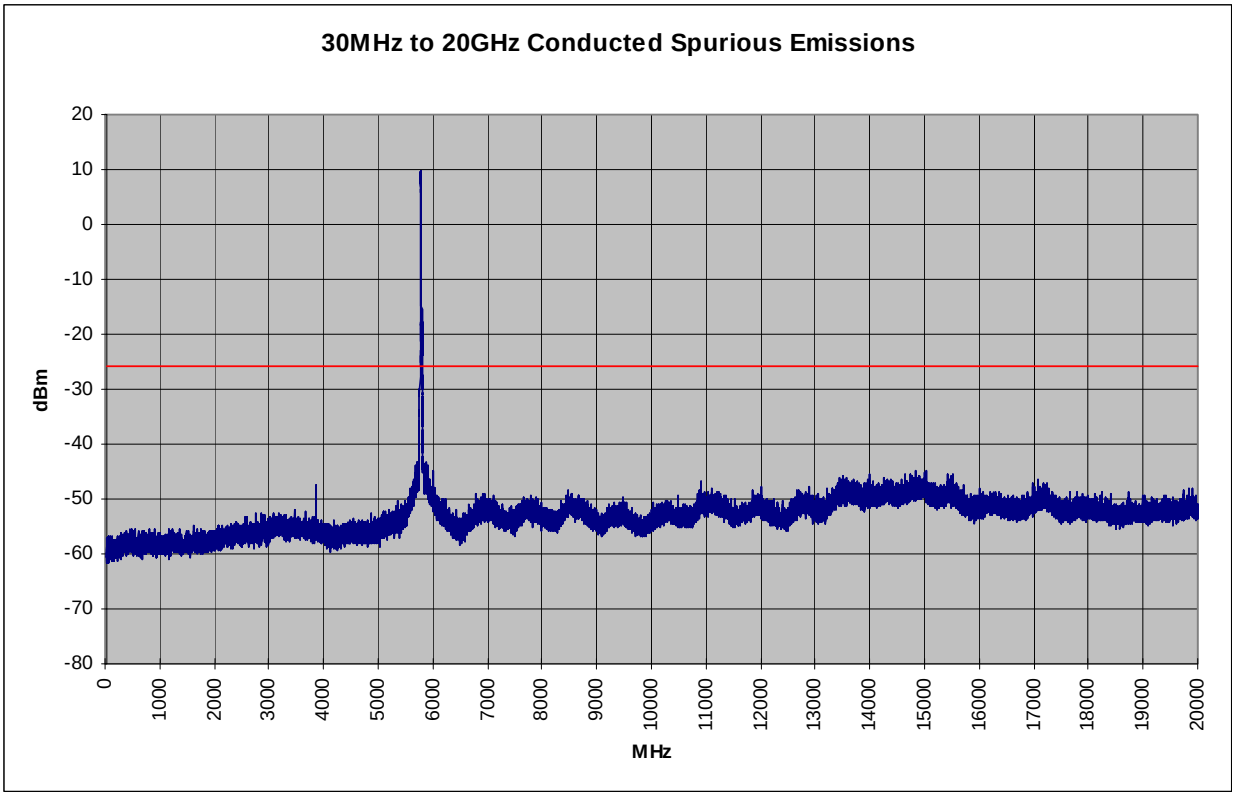
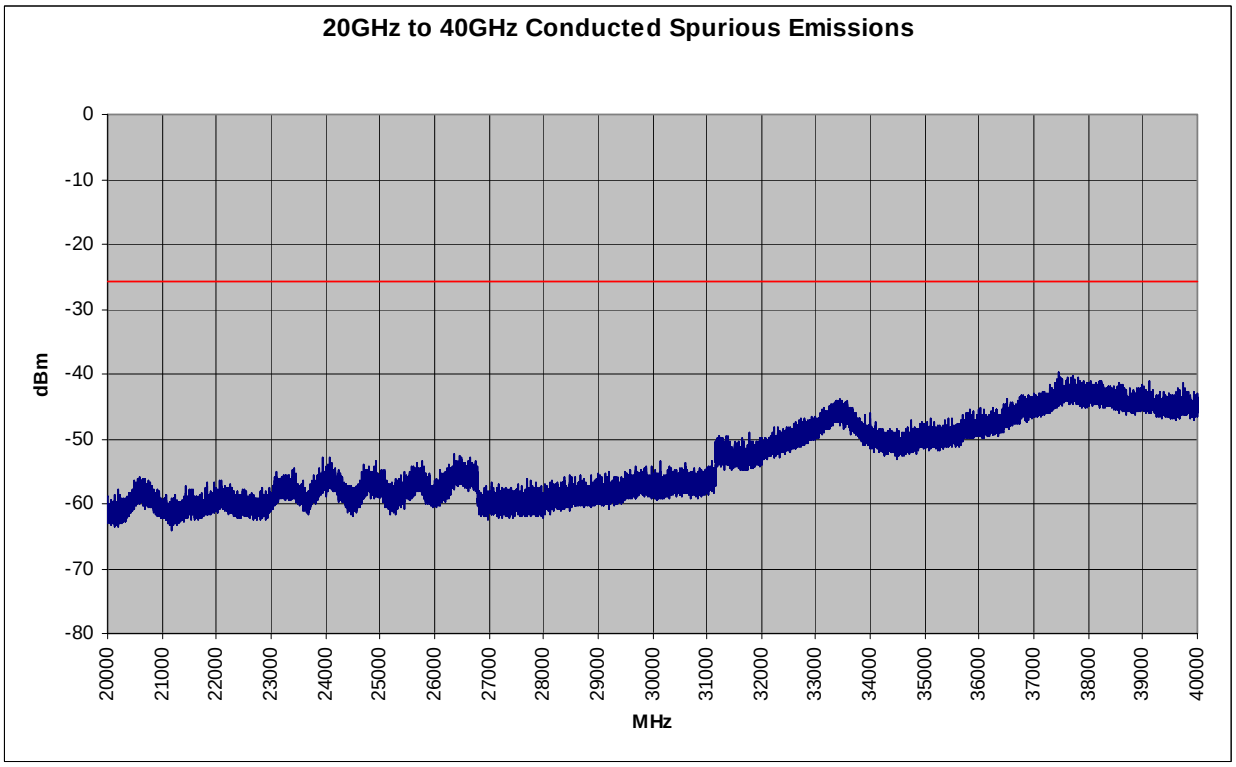


Plot 6-55. Conducted Spurious Plot (802.11a – Ch. 157)



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

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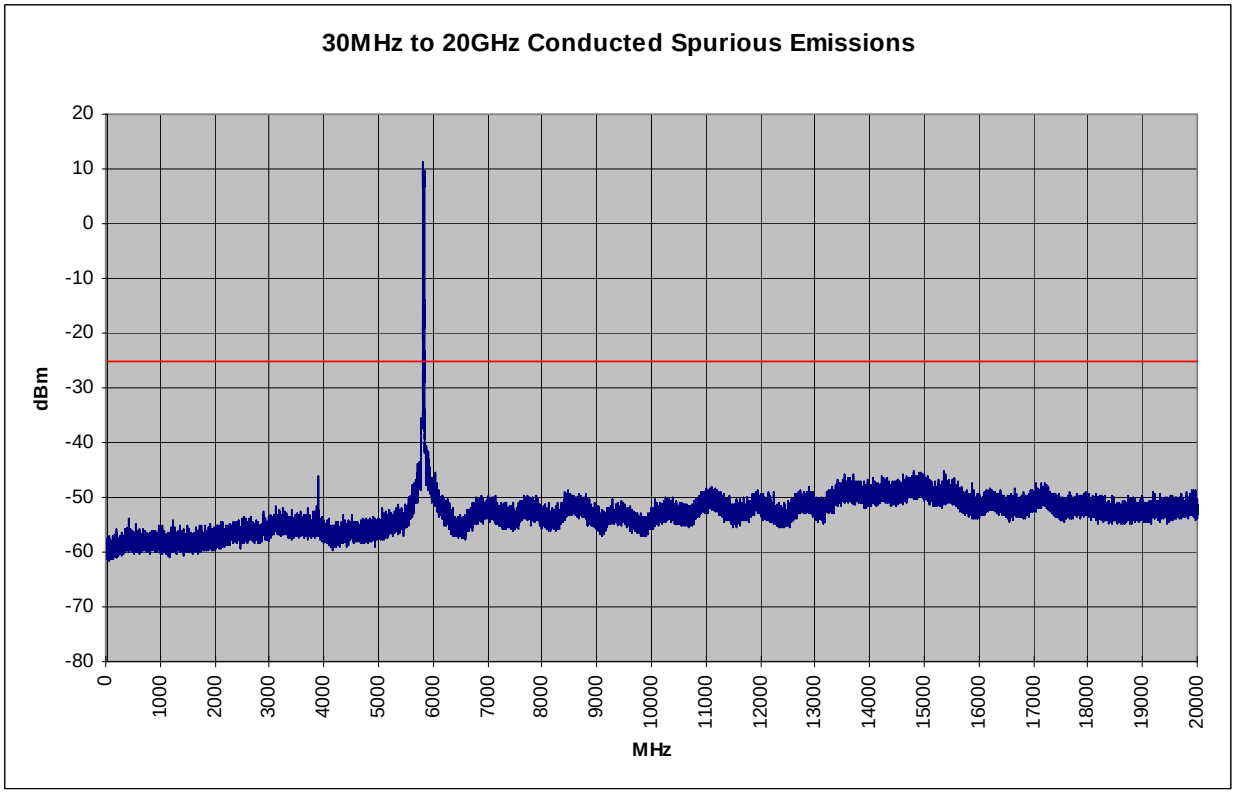
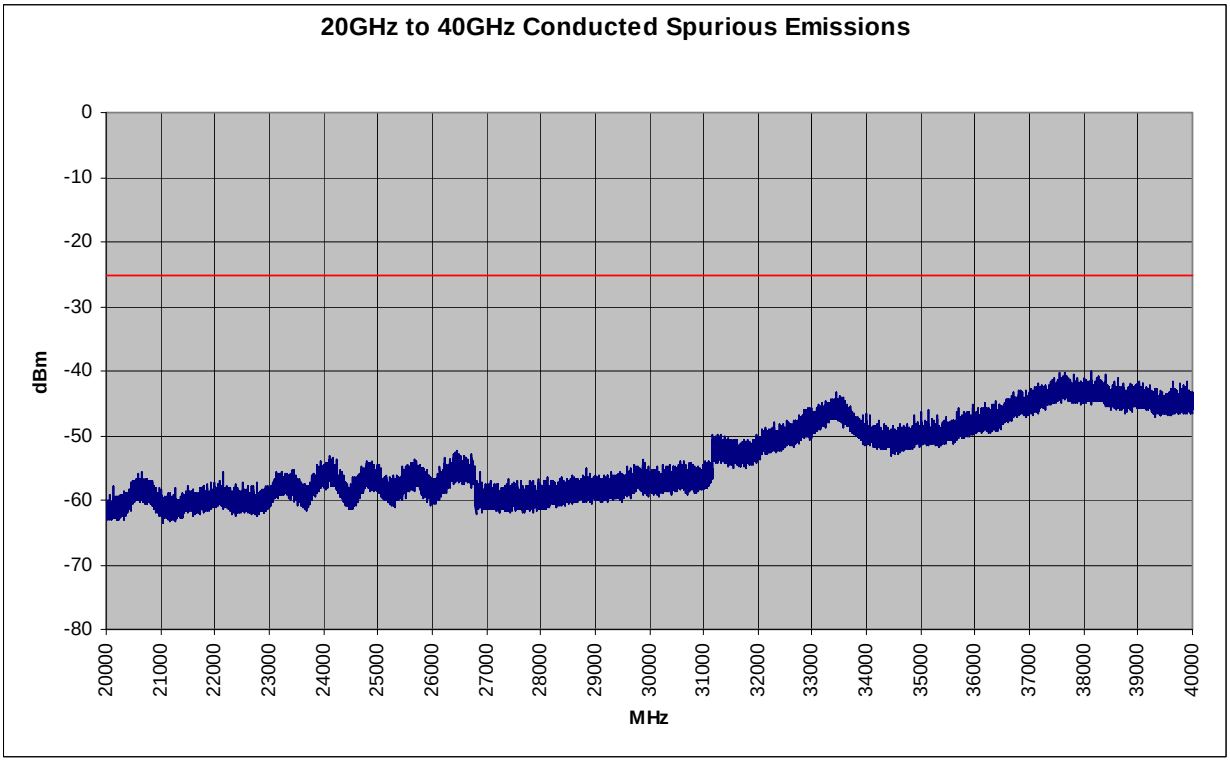


Plot 6-57. Conducted Spurious Plot (802.11a – Ch. 165)



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

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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 [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4824.00	-111.26	Avg	H	39.43	35.17	53.98	-18.81
4824.00	-101.29	Peak	H	39.43	45.14	73.98	-28.84
12060.00	-135.00	Avg	H	49.66	21.66	53.98	-32.32
12060.00	-125.00	Peak	H	49.66	31.66	73.98	-42.32

Table 6-11. Radiated Measurements @ 3 meters

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 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 10th 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 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: 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	-107.78	Avg	H	39.48	38.71	53.98	-15.27
4874.00	-99.71	Peak	H	39.48	46.78	73.98	-27.20
7311.00	-102.26	Avg	H	47.90	52.64	53.98	-1.34
7311.00	-95.92	Peak	H	47.90	58.98	73.98	-15.00
12185.00	-135.00	Avg	H	50.32	22.32	53.98	-31.66
12185.00	-125.00	Peak	H	50.32	32.32	73.98	-41.66

Table 6-12. Radiated Measurements @ 3 meters

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 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 10th 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 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	-108.05	Avg	H	39.54	38.49	53.98	-15.49
4924.00	-100.16	Peak	H	39.54	46.38	73.98	-27.60
7386.00	-103.27	Avg	H	48.89	52.62	53.98	-1.36
7386.00	-95.92	Peak	H	48.89	59.97	73.98	-14.01
12310.00	-135.00	Avg	H	50.98	22.98	53.98	-31.00
12310.00	-125.00	Peak	H	50.98	32.98	73.98	-41.00

Table 6-13. Radiated Measurements @ 3 meters

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 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 10th 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 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/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11490.00	-115.90	Avg	H	47.44	0.00	38.5	53.98	-15.44
11490.00	-102.51	Peak	H	47.44	0.00	51.9	73.98	-22.05
22980.00	-93.04	Avg	H	42.61	-9.54	47.0	53.98	-6.95
22980.00	-89.44	Peak	H	42.61	-9.54	50.6	73.98	-23.35

Table 6-14. Radiated Measurements @ 1 & 3 meters

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 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 10th 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 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: 3 Meters

Operating Frequency: 5785MHz

Channel: 157

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11570.00	-114.40	Avg	H	47.42	40.0	53.98	-13.95
11570.00	-101.62	Peak	H	47.42	52.8	73.98	-21.17

Table 6-15. Radiated Measurements @ 3 meters

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 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 10th 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 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: 3 Meters

Operating Frequency: 5825MHz

Channel: 165

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
11650.00	-116.39	Avg	H	47.47	38.1	53.98	-15.89
11650.00	-102.39	Peak	H	47.47	52.1	73.98	-21.89

Table 6-16. Radiated Measurements @ 3 meters

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 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 10th 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 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]

Worst Case Mode: 802.11n

Worst Case Transfer Rate: 6.5/7.2Mbps (MCS0)

Distance of Measurements: 3 Meters

Operating Frequency: 2412MHz

Channel: 1

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB/m]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
2383.33	-97.92	Avg	H	35.43	44.50	53.98	-9.48
2383.33	-77.37	Peak	H	35.43	65.05	73.98	-8.93
2388.08	-95.47	Avg	H	35.47	47.00	53.98	-6.98
2388.08	-75.46	Peak	H	35.47	67.01	73.98	-6.97
2390.00	-94.32	Avg	H	35.49	48.18	53.98	-5.80
2390.00	-74.50	Peak	H	35.49	68.00	73.98	-5.98

Table 6-17. 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 6-10.

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 10th 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 μV/m (54dBμ/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: 802.11n

Worst Case Transfer Rate: 6.5/7.2Mbps (MCS0)

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]
2483.50	-93.21	Avg	H	36.44	50.23	53.98	-3.75
2483.50	-73.85	Peak	H	36.44	69.59	73.98	-4.39
2484.06	-93.95	Avg	H	36.44	49.50	53.98	-4.48
2484.06	-72.65	Peak	H	36.44	70.80	73.98	-3.18
2485.43	-95.13	Avg	H	36.46	48.33	53.98	-5.65
2485.43	-72.61	Peak	H	36.46	70.85	73.98	-3.13

Table 6-18. 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 6-10.

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 10th 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 μV/m (54dBμ/m) at 3 meters radiated.

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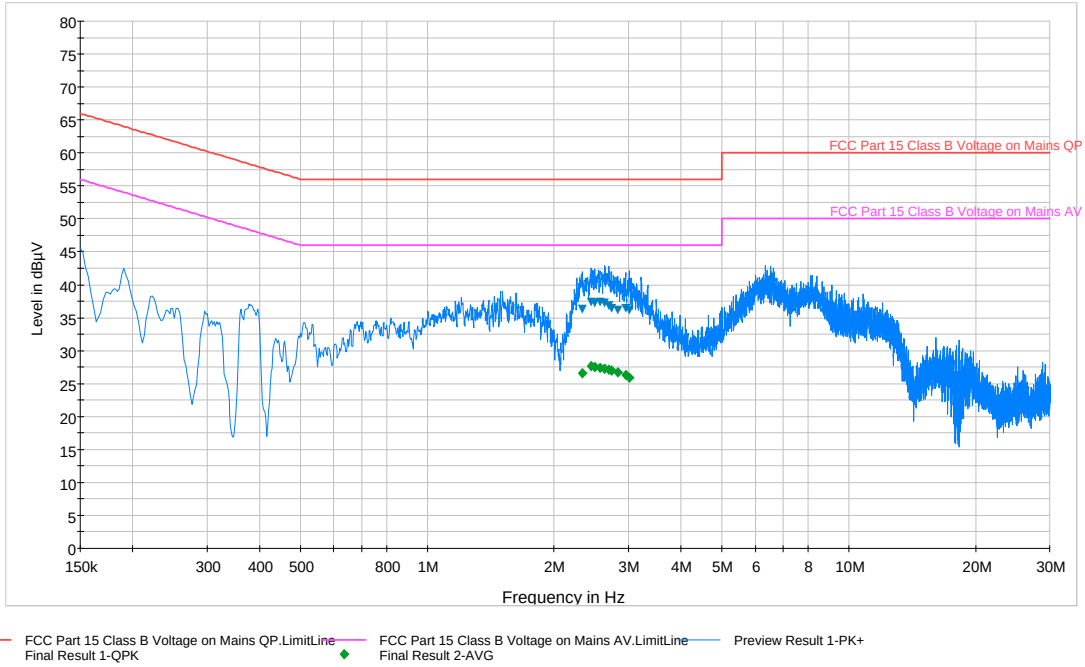
6.10 Line-Conducted Test Data

§15.207; RSS-Gen [7.2.2]



Plot 6-59. Line Conducted Plot with 802.11b (L1)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
2.334750	L1	0.2	36.3	56.0	19.7	26.5	46.0	19.5
2.445000	L1	0.2	37.3	56.0	18.7	27.7	46.0	18.3
2.494500	L1	0.2	37.2	56.0	18.8	27.5	46.0	18.5
2.564250	L1	0.2	37.4	56.0	18.6	27.3	46.0	18.7
2.638500	L1	0.2	37.2	56.0	18.8	27.3	46.0	18.7
2.699250	L1	0.2	36.9	56.0	19.1	27.1	46.0	18.9
2.737500	L1	0.2	36.5	56.0	19.5	26.9	46.0	19.1
2.825250	L1	0.2	36.2	56.0	19.8	26.7	46.0	19.3
2.955750	L1	0.2	36.5	56.0	19.5	26.3	46.0	19.7
3.018750	L1	0.2	36.2	56.0	19.8	26.0	46.0	20.0

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

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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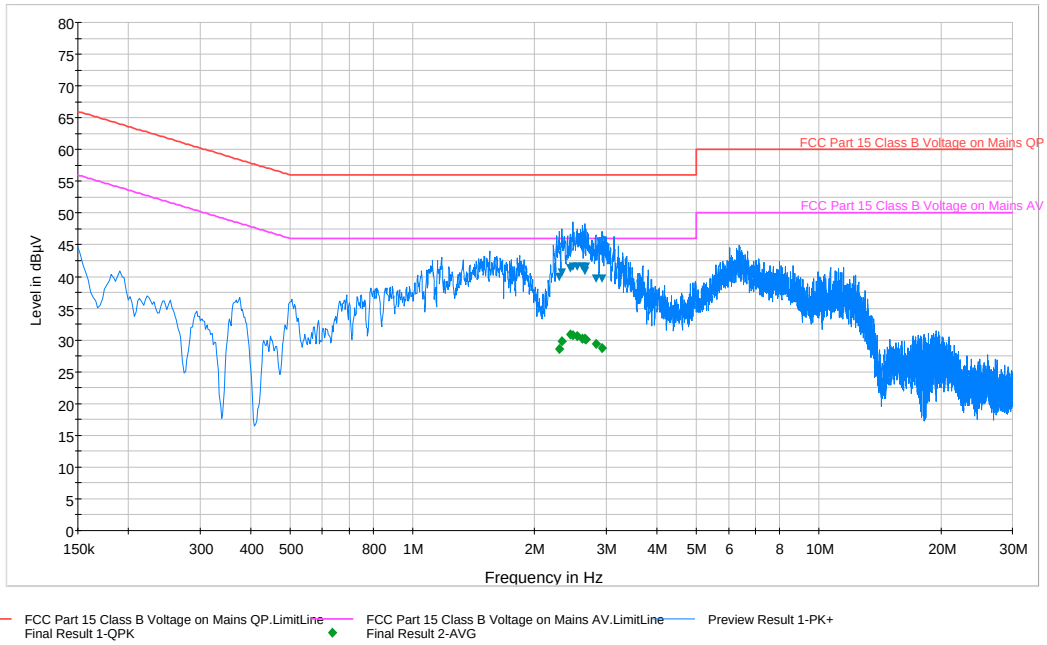
Line-Conducted Test Data (Cont'd)
§15.207; RSS-Gen [7.2.2]



Plot 6-60. Line Conducted Plot with 802.11b (N)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
2.296500	N	0.2	40.0	56.0	16.0	28.6	46.0	17.4
2.332500	N	0.2	40.7	56.0	15.3	29.8	46.0	16.2
2.442750	N	0.2	41.2	56.0	14.8	30.9	46.0	15.1
2.481000	N	0.2	41.5	56.0	14.5	30.8	46.0	15.2
2.550750	N	0.2	41.5	56.0	14.5	30.6	46.0	15.4
2.625000	N	0.2	41.6	56.0	14.4	30.2	46.0	15.8
2.658750	N	0.2	40.9	56.0	15.1	30.2	46.0	15.8
2.674500	N	0.2	41.6	56.0	14.4	30.1	46.0	15.9
2.825250	N	0.2	39.7	56.0	16.3	29.4	46.0	16.6
2.931000	N	0.2	39.6	56.0	16.4	28.7	46.0	17.3

Table 6-20. 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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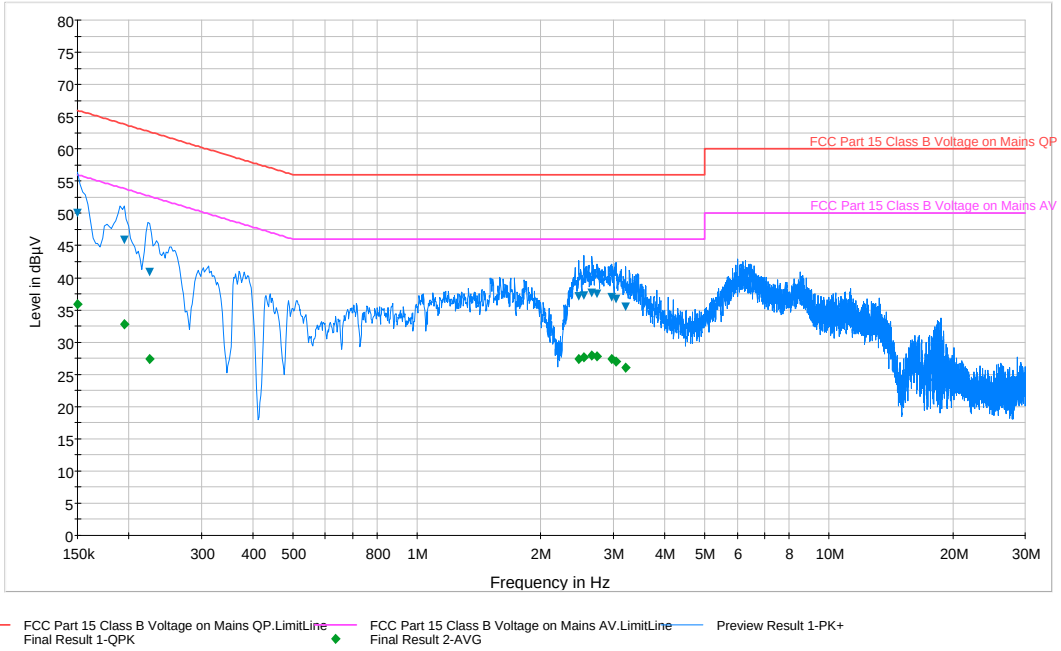
Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-61. Line Conducted Plot with 802.11a (L1)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
0.150000	L1	0.2	50.1	66.0	15.9	35.8	56.0	20.2
0.195000	L1	0.2	45.9	63.8	17.9	32.8	53.8	21.1
0.224250	L1	0.1	40.8	62.7	21.8	27.3	52.7	25.3
2.474250	L1	0.2	37.1	56.0	18.9	27.4	46.0	18.6
2.544000	L1	0.2	37.3	56.0	18.7	27.6	46.0	18.4
2.663250	L1	0.2	37.7	56.0	18.3	27.9	46.0	18.1
2.735250	L1	0.2	37.4	56.0	18.6	27.8	46.0	18.2
2.971500	L1	0.2	36.9	56.0	19.1	27.4	46.0	18.6
3.041250	L1	0.2	36.6	56.0	19.4	27.0	46.0	19.0
3.212250	L1	0.2	35.4	56.0	20.6	26.0	46.0	20.0

Table 6-21. Line Conducted Data with 802.11a (L1)

Notes:

1. 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.
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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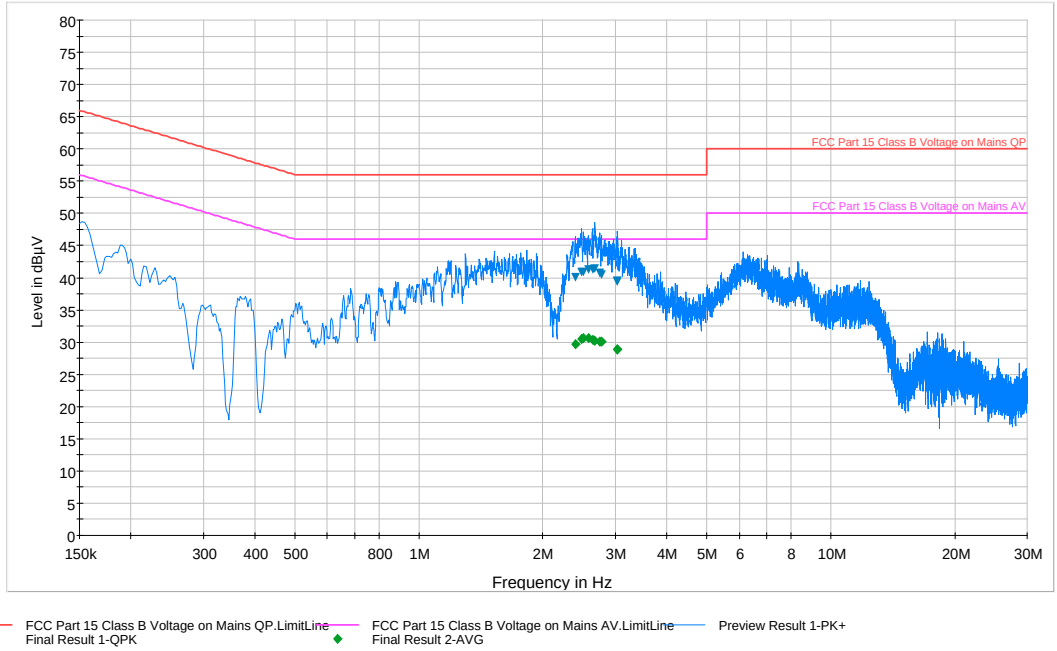
Line-Conducted Test Data (Cont'd)

§15.207; RSS-Gen [7.2.2]



Plot 6-62. Line Conducted Plot with 802.11a (N)

Frequency MHz	Line	Corr. dB	QuasiPeak dBµV	Limit dBµV	Margin dB	Average dBµV	Limit dBµV	Margin dB
2.395500	N	0.2	40.1	56.0	15.9	29.6	46.0	16.4
2.487750	N	0.2	40.9	56.0	15.1	30.5	46.0	15.5
2.505750	N	0.2	40.9	56.0	15.1	30.6	46.0	15.4
2.577750	N	0.2	41.3	56.0	14.7	30.7	46.0	15.4
2.640750	N	0.2	41.3	56.0	14.7	30.3	46.0	15.7
2.674500	N	0.2	41.4	56.0	14.6	30.2	46.0	15.8
2.746500	N	0.2	40.7	56.0	15.3	30.1	46.0	15.9
2.773500	N	0.2	40.5	56.0	15.5	30.1	46.0	15.9
3.025500	N	0.2	39.6	56.0	16.4	28.8	46.0	17.2
3.036750	N	0.2	39.5	56.0	16.5	28.8	46.0	17.2

Table 6-22. Line Conducted Data with 802.11a (N)

Notes:

1. 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.
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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7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LGTI9300A** is in compliance with Part 15C of the FCC Rules and RSS-210 of the Industry Canada Rules.

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