



PCTEST ENGINEERING LABORATORY, INC.

6660-B Dobbin Road, Columbia, MD 21045 USA
Tel. 410.290.6652 / Fax 410.290.6554
<http://www.pctestlab.com>



CERTIFICATE OF COMPLIANCE FCC PART 15.407 Certification

Applicant Name:
Panasonic Corporation of North America
One Panasonic Way, 4B-8
Secaucus, NJ 07094
United States

Date of Testing:
March 27, 2009
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0903050403.ACJ

FCC ID: ACJ9TGCF-524

APPLICANT: Panasonic Corporation of North America

Model(s): CF-52
EUT Type: Toughbook Model: CF-52
Max. RF Output Power: 24.89 mW (13.96 dBm) Conducted (802.11a UNII Band I)
24.38 mW (13.87 dBm) Conducted (802.11a UNII Band II)
25.41 mW (14.05 dBm) Conducted (802.11a UNII Band III)
19.68 mW (12.94 dBm) Conducted (802.11n UNII Band I)
19.72 mW (12.95 dBm) Conducted (802.11n UNII Band II)
23.23 mW (13.66 dBm) Conducted (802.11n UNII Band III)
Frequency Range: 5180MHz – 5240MHz (UNII Band I)
5260MHz – 5320MHz (UNII Band II)
5500MHz – 5700MHz (UNII Band III)
FCC Classification: Unlicensed National Information Infrastructure (UNII)
FCC Rule Part(s): Part 15.407
Test Device Serial No.: N/A

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 C-63.4-2003. Radiated data was taken with the highest gain antenna.

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.

Grant Conditions : Listed output power i s conducted.

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



Randy Ortanez
President

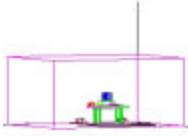


FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 1 of 69

TABLE OF CONTENTS

FCC PART 15.407 MEASUREMENT REPORT.....		3
1.0 INTRODUCTION		4
1.1 SCOPE.....		4
1.2 PCTEST TEST LOCATION		4
2.0 PRODUCT INFORMATION.....		5
2.1 EQUIPMENT DESCRIPTION		5
2.2 EMI SUPPRESSION DEVICE(S)/MODIFICATIONS		5
2.3 LABELING REQUIREMENTS.....		5
3.0 DESCRIPTION OF TEST.....		6
3.1 EVALUATION PROCEDURE.....		6
3.2 CONDUCTED EMISSIONS.....		6
3.3 RADIATED EMISSIONS		7
4.0 ANTENNA REQUIREMENTS		8
5.0 TEST EQUIPMENT CALIBRATION DATA		9
6.0 TEST RESULTS		10
6.1 SUMMARY		10
6.2 26DB BANDWIDTH MEASUREMENT.....		11
6.3 OUTPUT POWER MEASUREMENT – 802.11A (UNII BAND 1,2).....		20
6.4 OUTPUT POWER MEASUREMENT – 802.11N (UNII BAND 1,2)		21
6.5 OUTPUT POWER MEASUREMENT – 802.11A/N (UNII BAND 3).....		22
6.6 PEAK POWER SPECTRAL DENSITY.....		23
6.7 PEAK EXCURSION RATIO.....		32
6.8 FREQUENCY STABILITY.....		41
6.9 RADIATED SPURIOUS EMISSION MEASUREMENTS.....		44
6.10 RADIATED RESTRICTED BAND EDGE MEASUREMENTS		54
6.11 LINE-CONDUCTED TEST DATA.....		57
7.0 CONCLUSION		69

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 2 of 69	



MEASUREMENT REPORT

FCC Part 15.407



§ 2.1033 General Information

APPLICANT: Panasonic Corporation of North America

APPLICANT ADDRESS: One Panasonic Way, 4B-8
Secaucus, NJ 07094

TEST SITE: PCTEST ENGINEERING LABORATORY, INC.

TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA

FCC RULE PART(S): Part 15.407

MODEL NAME: CF-52

FCC ID: ACJ9TGCF-524

Test Device Serial No.: N/A Production Pre-Production Engineering

FCC CLASSIFICATION: Unlicensed National Information Infrastructure (UNII)

DATE(S) OF TEST: March 27, 2009

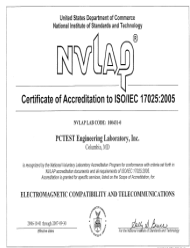
TEST REPORT S/N: 0903050403.ACJ



Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21045, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) 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 (IC-2451).
- 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 (IC-2451) 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.



FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 3 of 69	

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.

1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity area, the Baltimore-Washington Intern't'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 in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. 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 January 27, 2006 and Industry Canada.

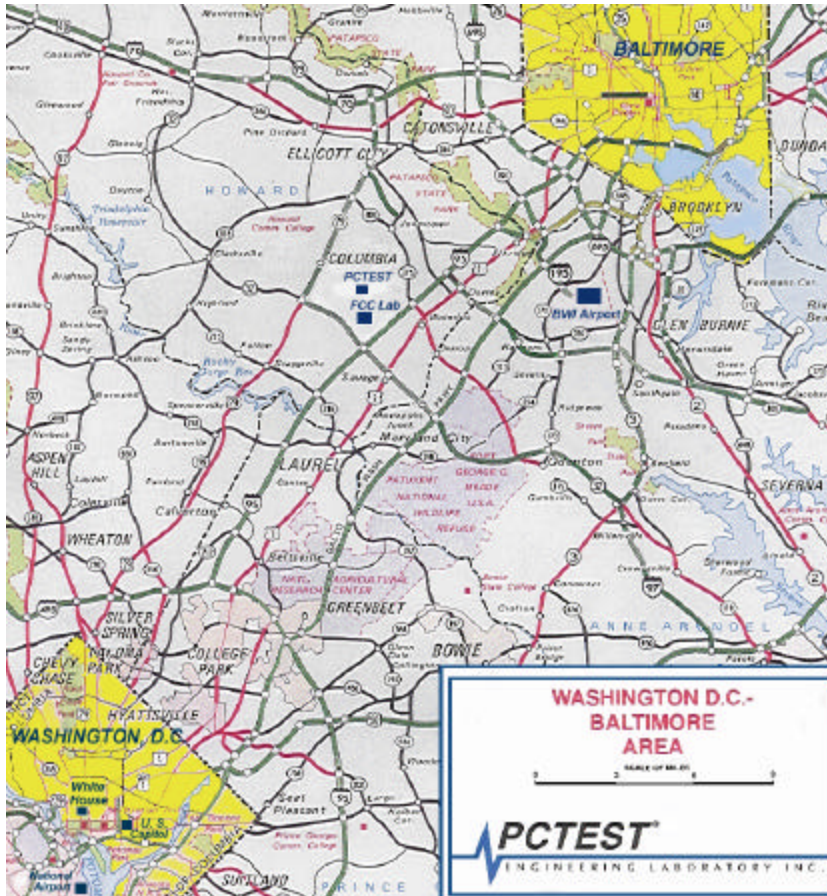


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 4 of 69

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Panasonic Toughbook Model: CF-52 FCC ID: ACJ9TGCF-524**. The EUT consisted of the following component(s):

Manufacturer / Model	FCC ID	Description
Panasonic / Model: CF-52	ACJ9TGCF-524	Toughbook Model: CF-52
Alps / Model: UGNZA	N/A	Bluetooth Module
Qualcomm / Model: UNDP-1	J9CUNDP-1	WWAN Module
Intel / Model: 512ANX MMW	PD9512ANXM	WiMAX and Wireless LAN Module

Table 2-1. EUT Equipment Description

2.2 EMI Suppression Device(s)/Modifications



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

2.3 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.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 5 of 69	

3.0 DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedure 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 FCC Public Notice DA 02-2138 dated August 30, 2002 entitled “Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands” were used in the measurement of **Panasonic Toughbook Model: CF-52 FCC ID: ACJ9TGCF-524**.

Deviation from measurement procedure.....None.

3.2 Conducted Emissions

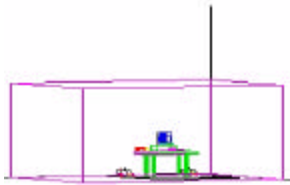


Figure 3-1. Shielded Enclosure Line-Conducted Test Facility

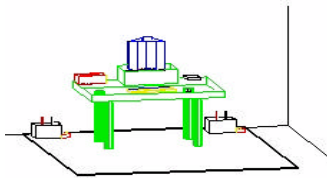


Figure 3-2. Line Conducted Emission Test Set-Up

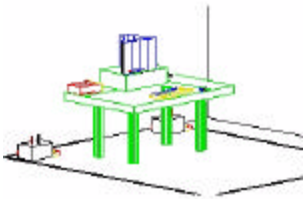


Figure 3-3. Wooden Table & Bonded LISNs

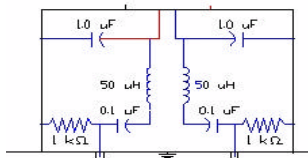


Figure 3-4. LISN Schematic Diagram

The line-conducted facility is located inside a 16’x20’x10’ shielded enclosure, manufactured by Ray Proof Series 81 (see Figure 3-1). 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 1.5m away from the sidewall of the shielded room (see Figure 3-2). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (see Figure 3-3). The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filter (100dB 14Hz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with an inner diameter of ½”. 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 Solar LISN. The LISN schematic diagram is shown (see Figure 3-4). All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion). 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 to determine the frequency producing the maximum EME from the EUT.

The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator.

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 6 of 69	

3.3 Radiated Emissions

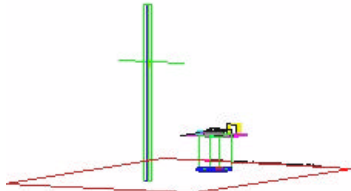


Figure 3-5. 3-Meter Test Site



Figure 3-6. Dimensions of Outdoor Test Site

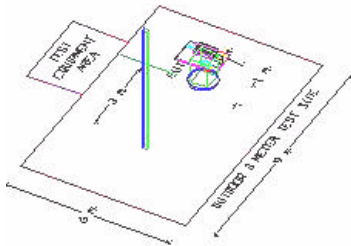


Figure 3-7. Turntable and System Setup

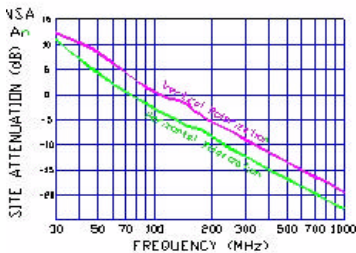


Figure 3-8. Normalized Site Attenuation Curves (H&V)

Preliminary measurements were made indoors at 1-meter using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, and turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using a bi-conical antenna and from 200 to 1000 MHz using a log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using Roberts™ Dipole antennas or horn antennas (see Figure 3-5). The test equipment was placed on a wooden and plastic bench situated on a 1.5m x 2m area adjacent to the measurement area (see Figure 3-6). 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 detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 100kHz for frequencies below 1GHz or 1MHz for frequencies above 1GHz. Above 1GHz the detector function was set to average mode (RBW = 1MHz, VBW = 10Hz).

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 3-7). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated 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 exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 3-8.

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 7 of 69

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 Toughbook Model: CF-52 are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:



The **Panasonic Toughbook Model: CF-52 FCC ID: ACJ9TGCF-524** unit complies with the requirement of §15.203.

UNII Band	Ch.	Frequency (MHz)
1	36	5180
1	40	5200
1	44	5220
1	48	5240
2	52	5260
2	56	5280
2	60	5300
2	64	5320
3	100	5500
:	:	:
3	120	5600
:	:	:
3	140	5700

Table 4-1. 802.11a Frequency / Channel Operations

UNII Band	Ch.	Frequency (MHz)
1	38	5190
1	46	5230
2	54	5270
2	62	5310
3	102	5510
:	:	:
3	118	5590
:	:	:
3	134	5670

Table 4-2. 802.11n Frequency / Channel Operations



FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 8 of 69	

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
-	No.165	(30MHz - 1000MHz) RG58 Coax Cable	N/A		N/A	N/A
-	No.166	(1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167	(100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A
Agilent	11713A	Attenuation/Switch Driver	12/4/2008	Annual	12/4/2009	3439A02645
Agilent	8447D	Broadband Amplifier	N/A		N/A	1937A03348
Agilent	8447D	Broadband Amplifier	N/A		N/A	2443A01900
Agilent	8449B	(1-26.5GHz) Pre-Amplifier	12/4/2008	Annual	12/4/2009	3008A00985
Agilent	85650A	Quasi-Peak Adapter	12/4/2008	Annual	12/4/2009	3303A01872
Agilent	85650A	Quasi-Peak Adapter	3/24/2009	Annual	3/24/2010	2043A00301
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	3/24/2009	Annual	3/24/2010	2618A02866
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	3/24/2009	Annual	3/24/2010	2542A11898
Agilent	8566B	(100Hz-22GHz) Spectrum Analyzer	12/5/2008	Annual	12/5/2009	3638A08713
Agilent	8591A	(9kHz-1.8GHz) Spectrum Analyzer	8/19/2008	Annual	8/19/2009	3144A02458
Agilent	E4407B	ESA Spectrum Analyzer	3/24/2009	Annual	3/24/2010	US39210313
Agilent	E4448A	PSA (3Hz-50GHz) Spectrum Analyzer	12/5/2008	Annual	12/5/2009	US42510244
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/8/2007	Biennial	4/8/2009	MY45470194
Emco	3115	Horn Antenna (1-18GHz)	9/24/2007	Biennial	9/24/2009	9704-5182
Emco	3115	Horn Antenna (1-18GHz)	10/4/2007	Biennial	10/4/2009	9205-3874
MiniCircuits	VHF-3100+	High Pass Filter	N/A		N/A	30721
Rohde & Schwarz	NRVD	Dual Channel Power Meter	8/20/2008	Biennial	8/20/2010	101695
Rohde & Schwarz	NRVS	Single Channel Power Meter	7/3/2007	Biennial	7/3/2009	835360/0079
Rohde & Schwarz	NRV-Z32	Peak Power Sensor (100uW-2W)	12/5/2008	Biennial	12/5/2010	100155
Rohde & Schwarz	NRV-Z33	Peak Power Sensor (1mW-20W)	12/5/2008	Biennial	12/5/2010	100004
Rohde & Schwarz	NRV-Z53	Power Sensor	7/3/2007	Biennial	7/3/2009	846076/0007
Solar Electronics	8012-50-R-24-BNC	LISN	11/8/2007	Biennial	11/8/2009	310233
Sunol	DRH-118	Horn Antenna (1 - 18GHz)	5/9/2007	Biennial	5/9/2009	A050307

Table 5-1. Annual Test Equipment Calibration Schedule

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 9 of 69	



6.0 TEST RESULTS

6.1 Summary

Company Name: Panasonic Corporation of North America
 FCC ID: ACJ9TGCF-524
 Method/System: Unlicensed National Information Infrastructure (UNII)
 Data Rate(s) Tested: 6, 9, 12, 18, 24, 36, 48, 54Mbps (802.11a)
13.5/15, 27/30, 40/45, 54/60, 81/90, 108/120, 121.5/135, 135/150Mbps (802.11n)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
N/A	26 dB Bandwidth	> 500kHz	CONDUCTED	PASS	Section 6.2
15.407 (a)(1)	Maximum Conducted Output Power	< 4 + 10log ₁₀ (BW) dBm (5150-5250) < 11 + 10log ₁₀ (B) dBm (5250-5350) < 11 + 10log ₁₀ (B) dBm (5470-5725)		PASS	Section 6.3
15.407 (a)(1), (5)	Peak Power Spectral Density	< 4 dBm/MHz (5150-5250) < 11dBm/MHz (5250-5725) < 11dBm/MHz (5470-5725)		PASS	Section 6.6
15.407(a)(6)	Peak Excursion	< 13 dB/MHz maximum difference		PASS	Section 6.7
15.407(g)	Frequency Stability	N/A		PASS	Section 6.8
15.407(b)(1), (6)	Undesirable Emissions	< -27 dBm/MHz EIRP (5150-5725)	RADIATED	PASS	Section 6.9
15.205, 15.407(b)(1), (5), (6)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-210 table 3 limits)		PASS	Section 6.10
15.207	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Section 6.11
RECEIVER MODE (Rx) / DIGITAL DEVICE					
15.107	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.107 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Part 15B Test Report
15.109	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.109 limits or < RSS-210 table 3 limits	RADIATED (30MHz-1GHz) (1-25 GHz)	PASS	Part 15B Test Report
RF EXPOSURE					
15.407(f), 2.1091/2.1093	MPE Test	1 mW/cm ² (MPE Limit) @ 20 cm	MPE	PASS	MPE Report

Table 6-1. Summary of Test Results

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 10 of 69	

6.2 26dB Bandwidth Measurement

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies. **The 26dB bandwidth is used to determine the conducted power limits.**

	Frequency [MHz]	Channel No.	802.11 Mode	Measured 26dB Bandwidth [MHz]
Band I	5180	36	a	20.00
	5200	40	a	19.97
	5240	48	a	20.00
	5190	38	n	38.99
	5230	46	n	38.54
Band II	5260	52	a	19.90
	5280	56	a	20.00
	5320	64	a	19.95
	5270	54	n	38.75
	5310	62	n	39.04
Band III	5500	100	a	20.00
	5600	120	a	19.94
	5700	140	a	20.00
	5510	102	n	39.00
	5590	118	n	38.94
	5670	134	n	38.95

Table 6-2. Conducted Bandwidth Measurements

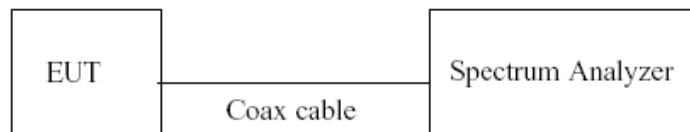


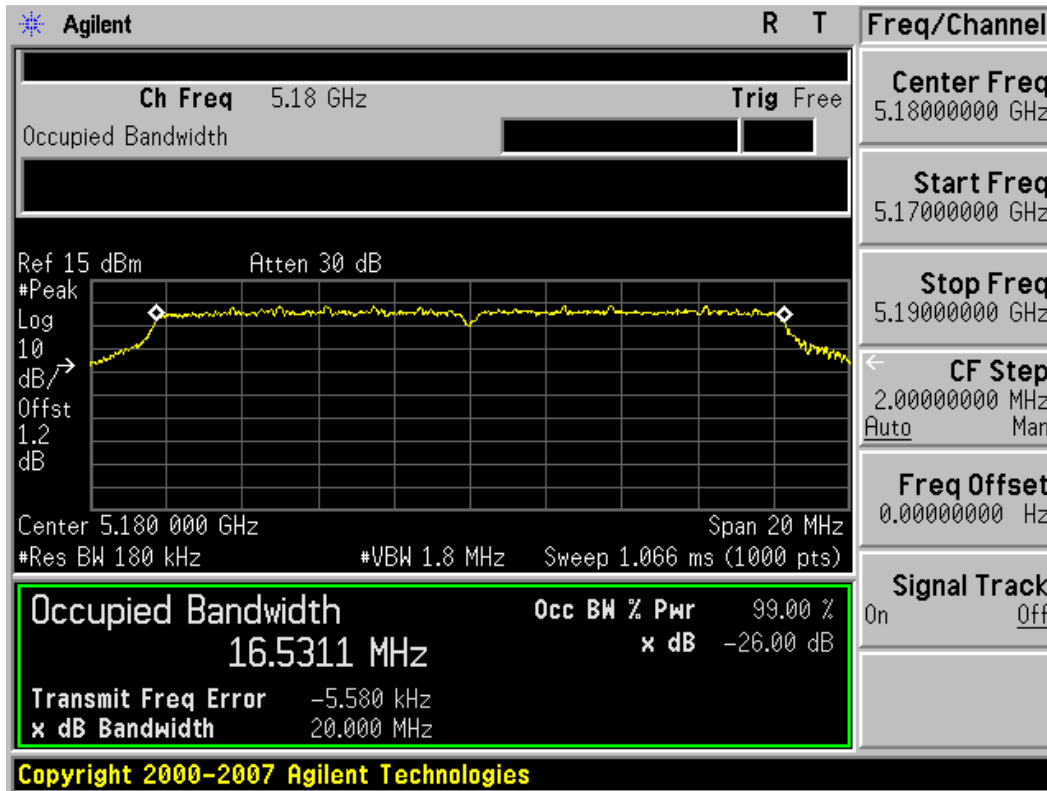
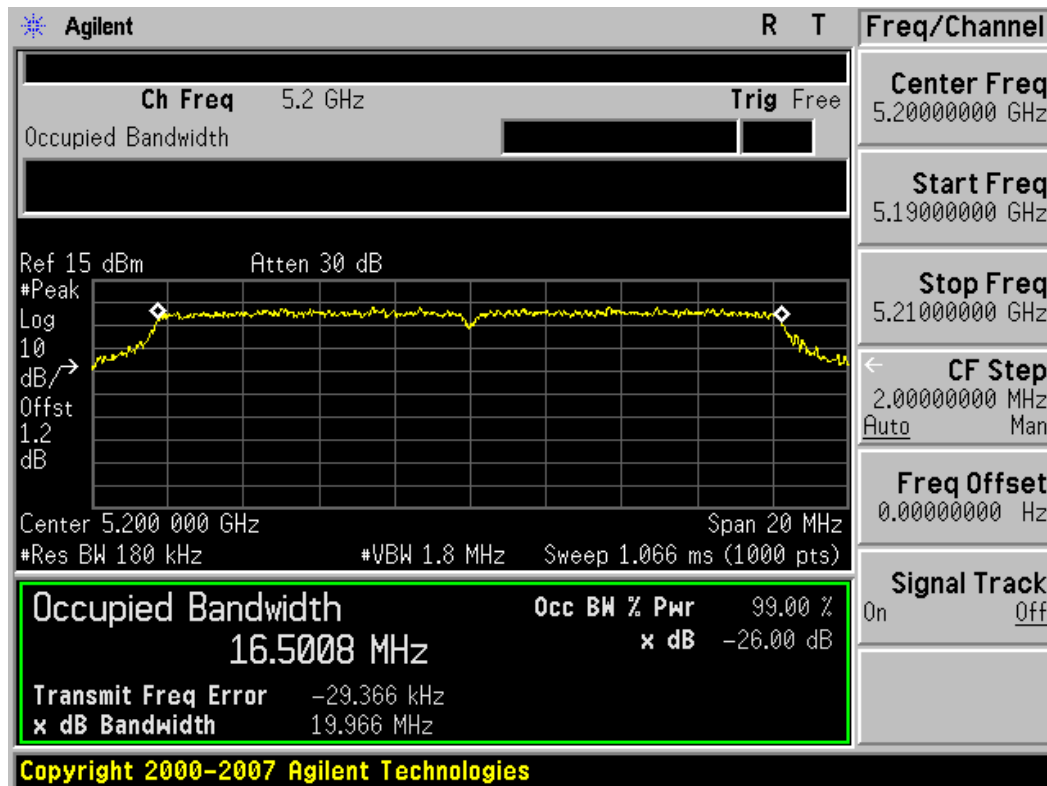


Figure 6-1. Test Instrument & Measurement Setup

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 11 of 69	

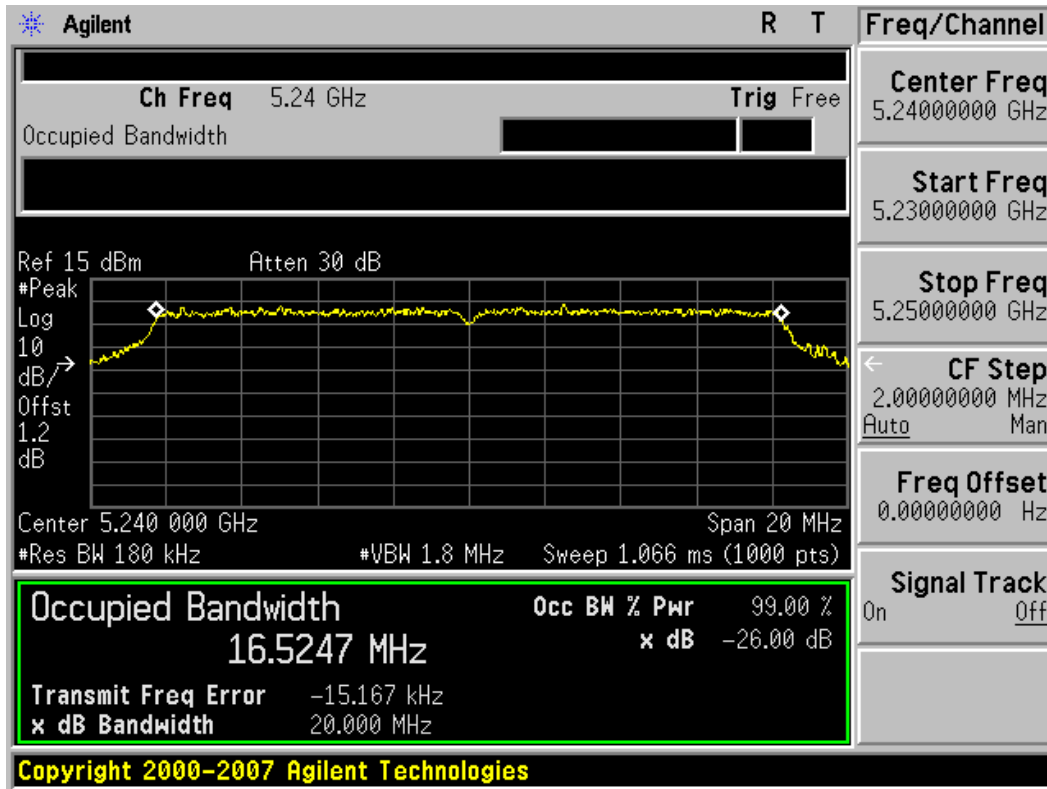


Plot 6-1. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 36)

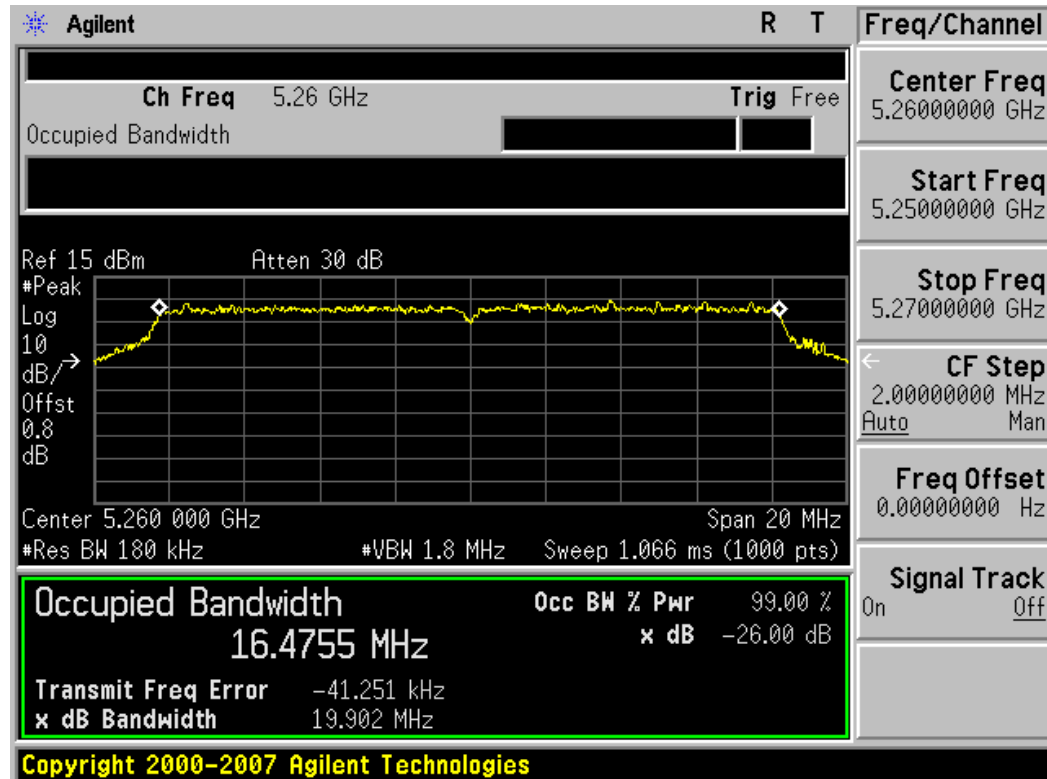


Plot 6-2. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 40)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 12 of 69

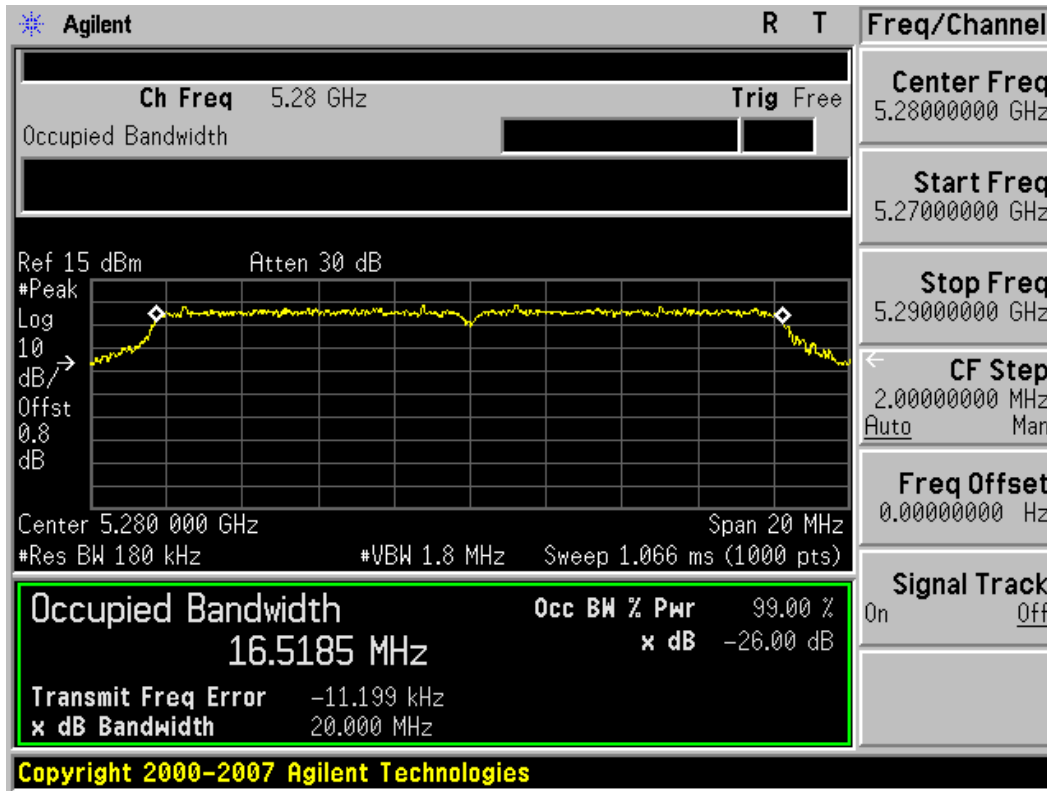


Plot 6-3. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 48)

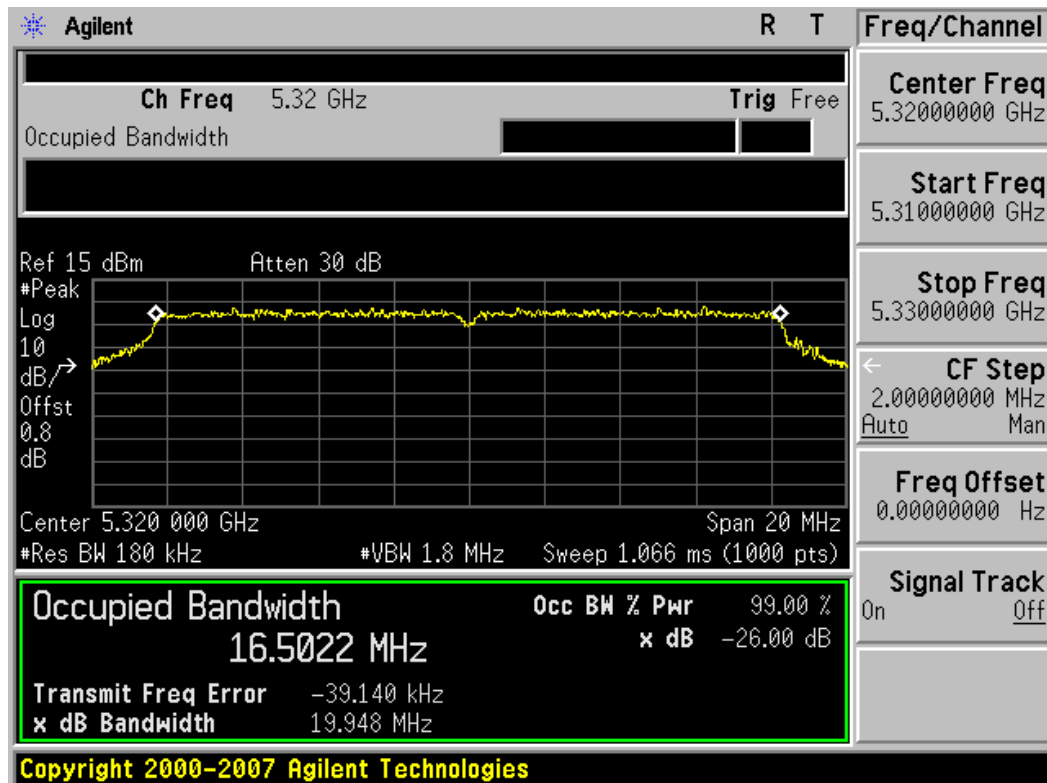


Plot 6-4. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 52)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 13 of 69

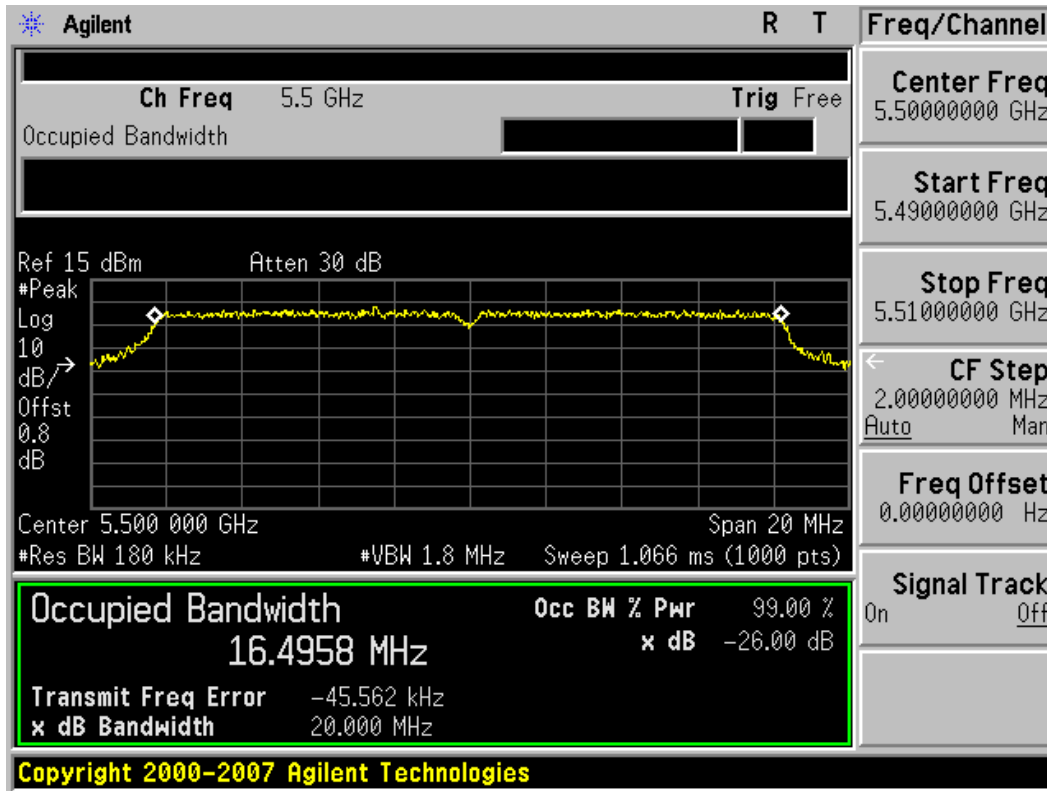


Plot 6-5. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 56)

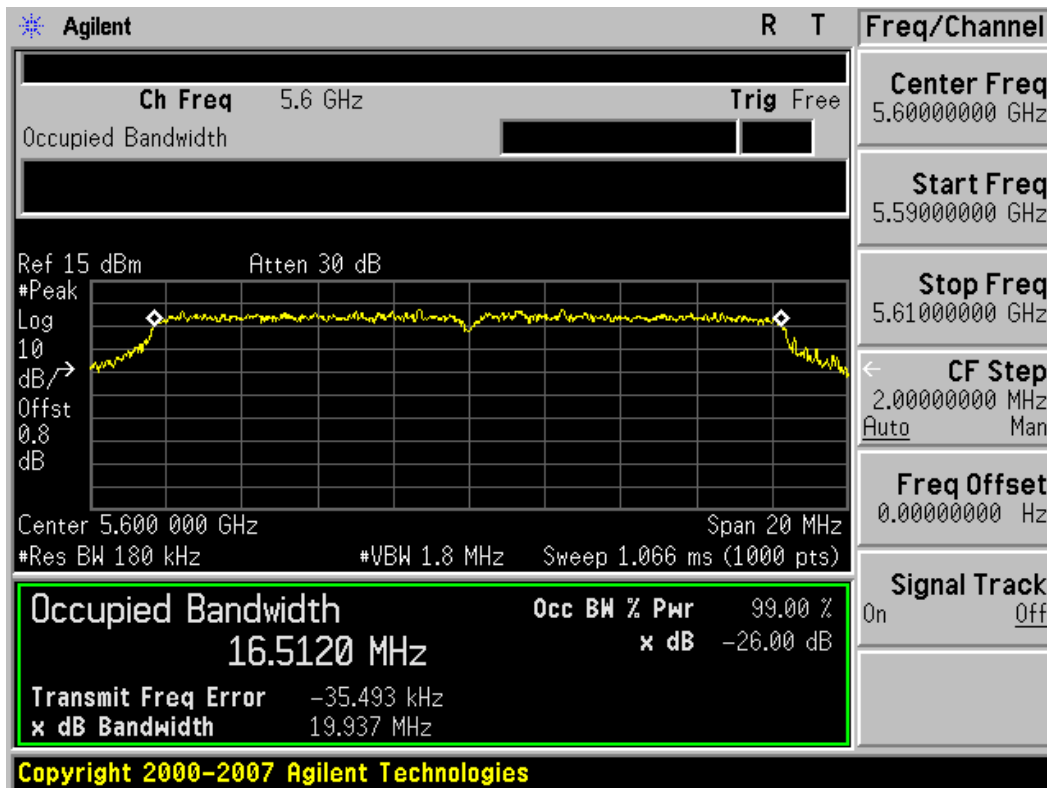


Plot 6-6. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 64)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 14 of 69	

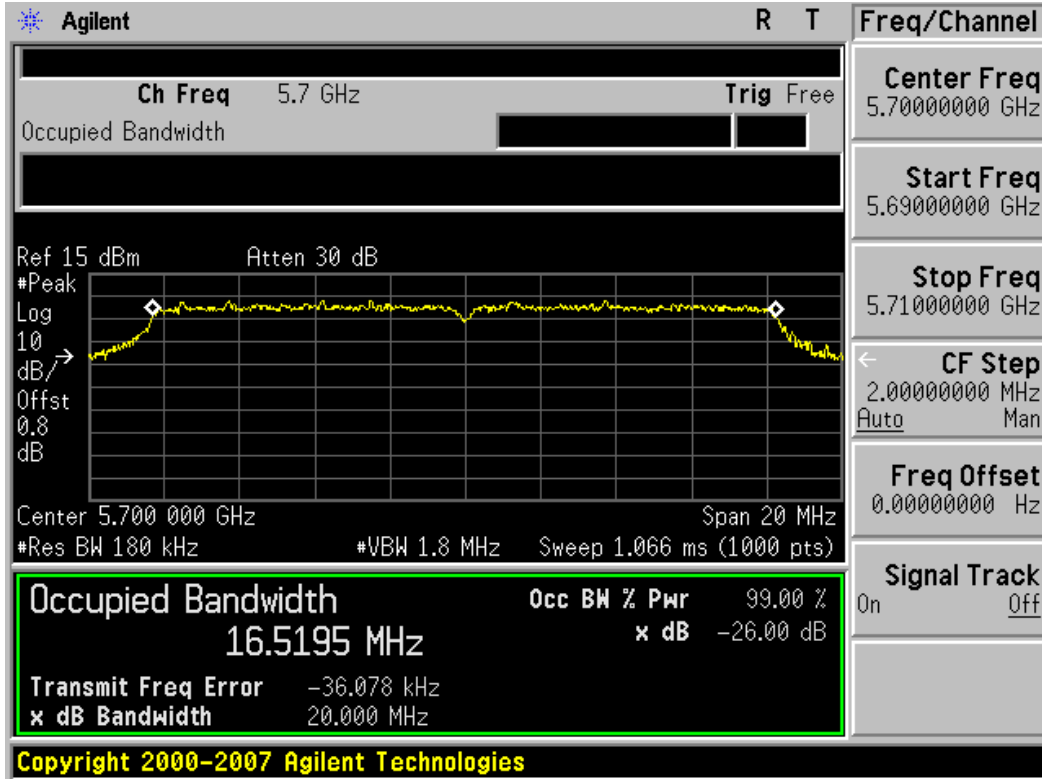


Plot 6-7. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 100)

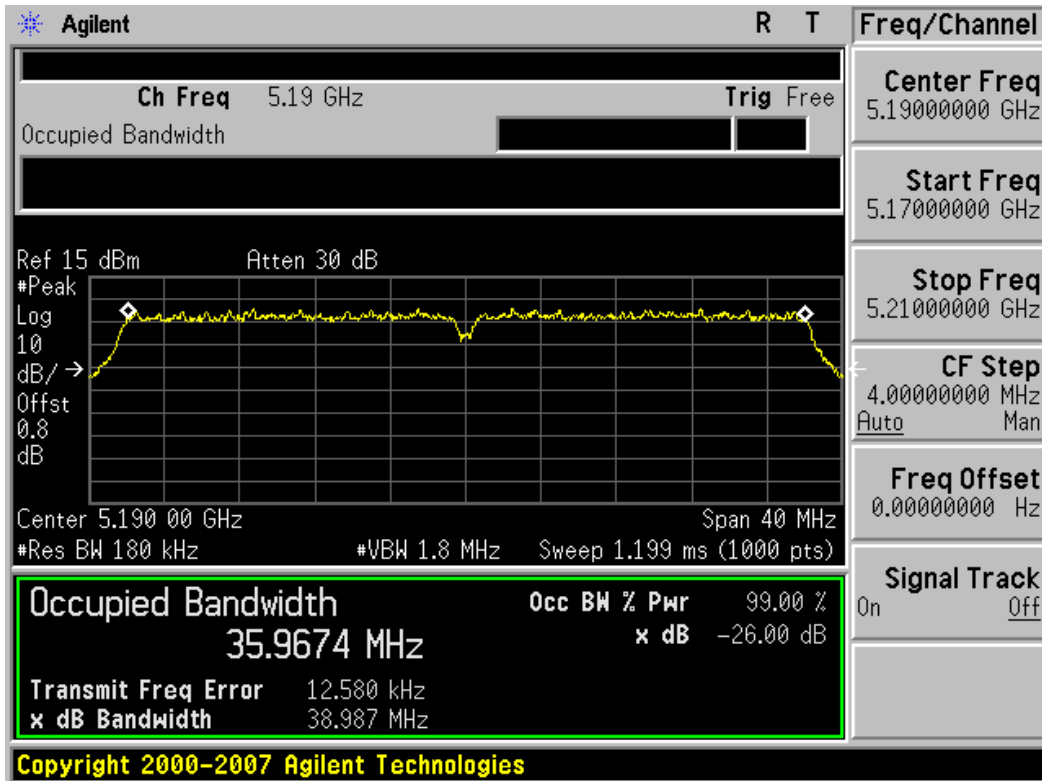


Plot 6-8. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 120)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 15 of 69

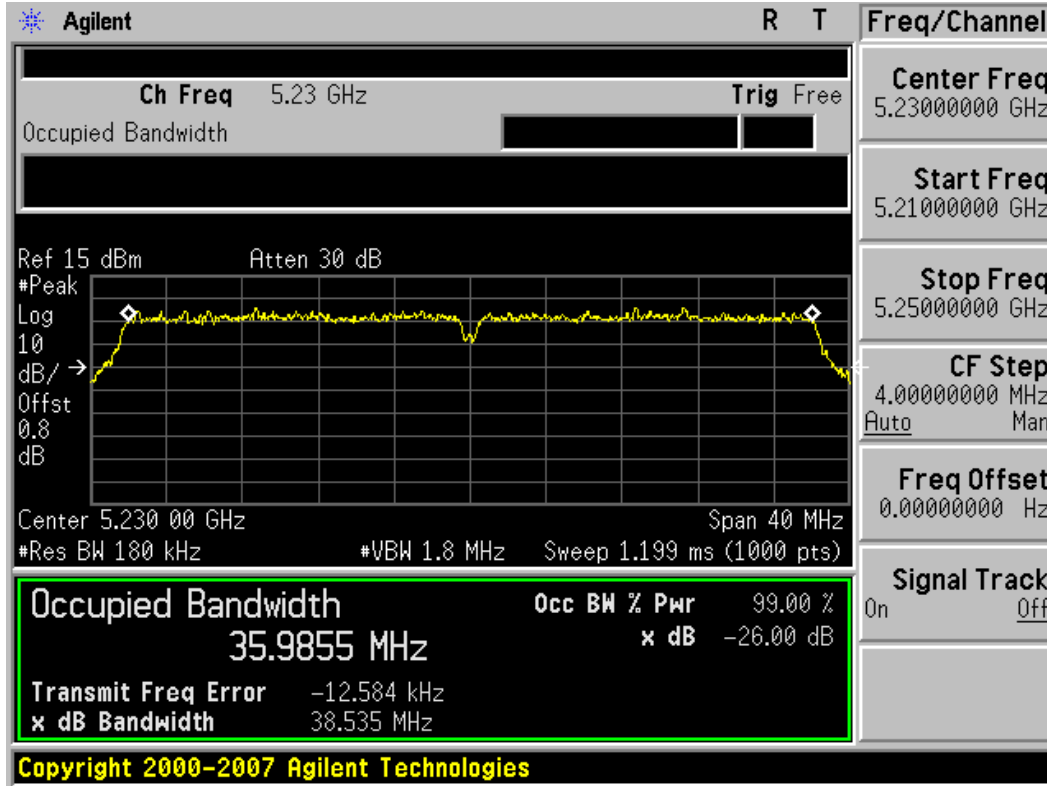


Plot 6-9. 26dB Bandwidth Plot (802.11a (UNII) – Ch. 140)

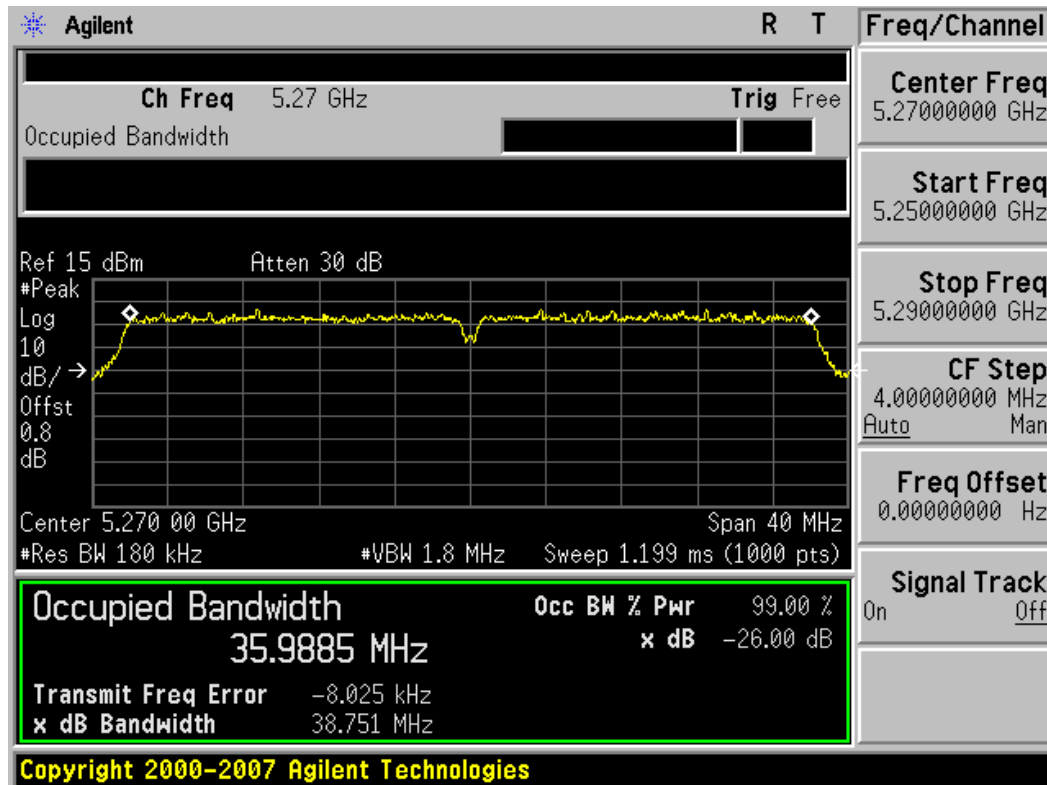


Plot 6-10. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 38)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 16 of 69

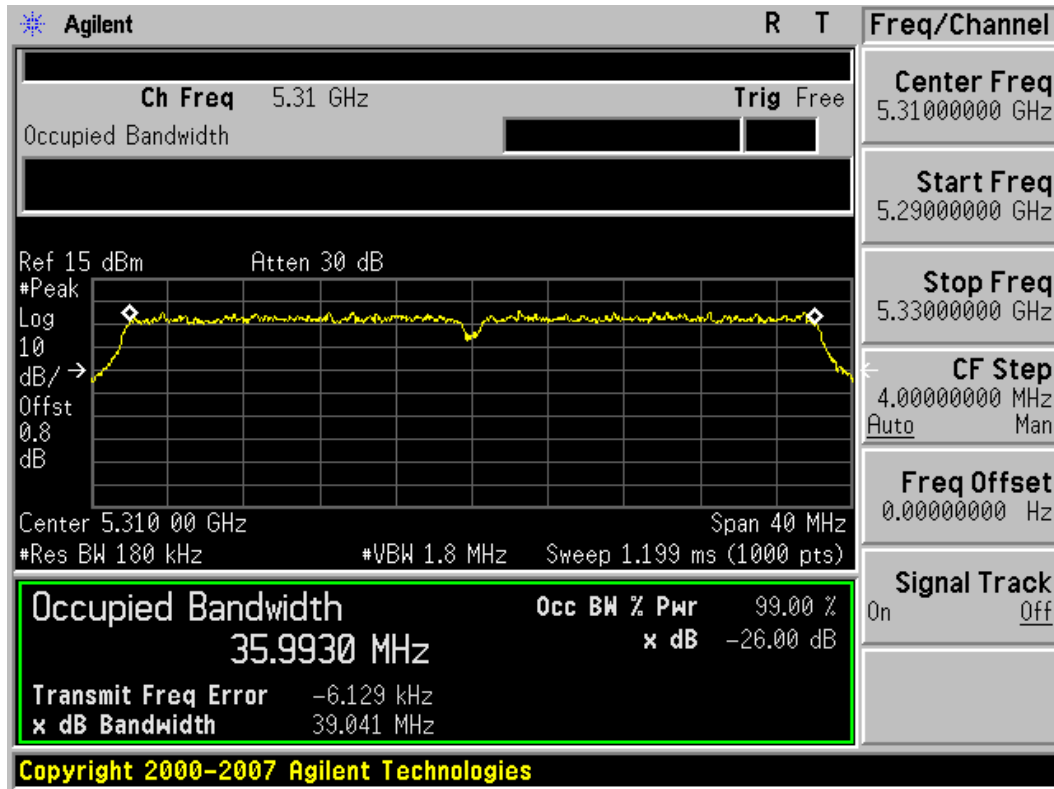


Plot 6-11. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 46)

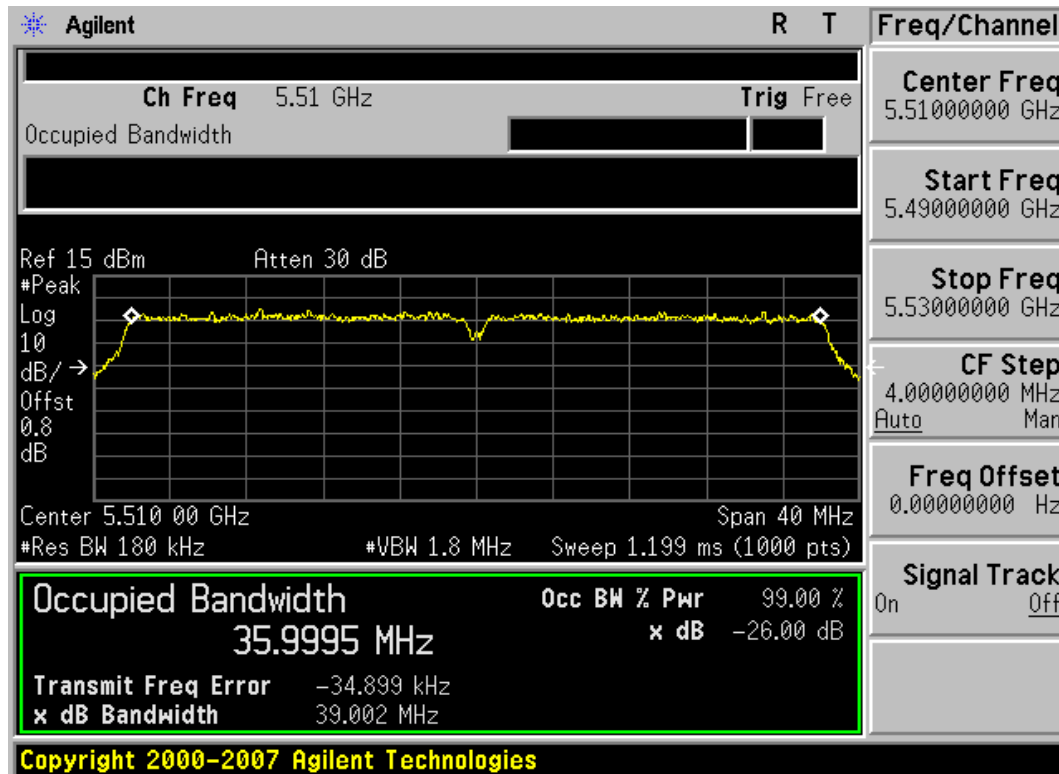


Plot 6-12. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 54)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 17 of 69

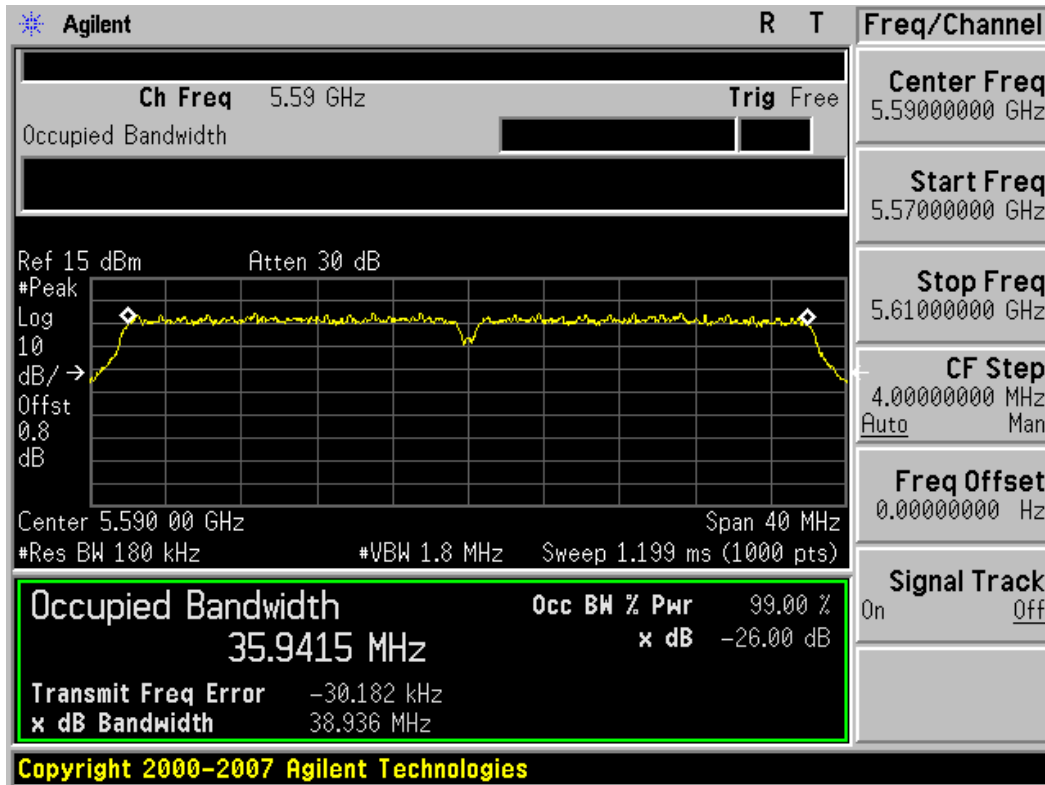


Plot 6-13. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 62)

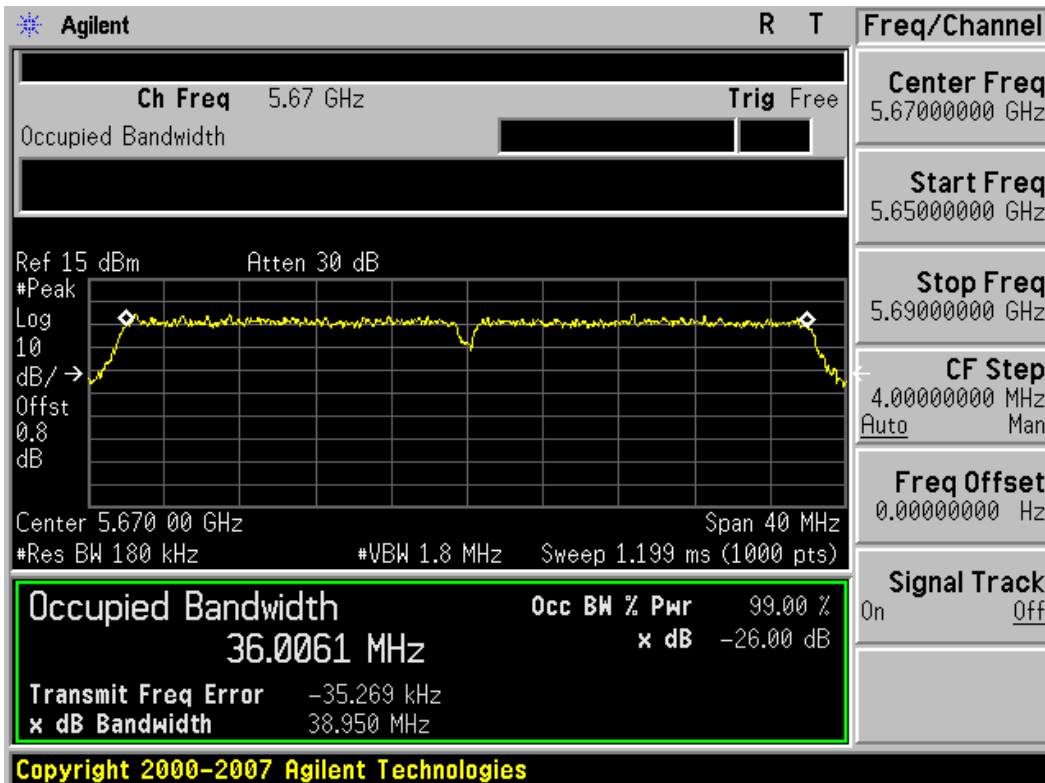


Plot 6-14. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 102)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 18 of 69



Plot 6-15. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 118)



Plot 6-16. 26dB Bandwidth Plot (802.11n (UNII) – Ch. 134)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 19 of 69

6.3 Output Power Measurement – 802.11a (UNII Band 1,2) §15.407 (a)(1)



A transmitter antenna terminal of EUT is connected to the input of a RF power sensor. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. ***In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is the lesser of 50mW (16.99dBm) and 4 dBm + 10log₁₀(26dB BW). In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log₁₀(26dB BW).***

Freq [MHz]	Channel	Data Rate [Mbps]	20MHz BW Measured Power [dBm]
5180	36	6	13.77
		9	13.22
		12	13.96
		18	13.31
		24	13.74
		36	13.00
		48	12.07
		54	10.88
5200	40	6	13.36
		9	13.35
		12	13.16
		18	13.19
		24	13.21
		36	13.14
		48	12.63
		54	10.78
5240	48	6	13.67
		9	13.37
		12	13.30
		18	13.55
		24	13.44
		36	13.40
		48	12.28
		54	10.61

Table 6-3. UNII Band I Conducted Output Power Measurements

Freq [MHz]	Channel	Data Rate [Mbps]	20MHz BW Measured Power [dBm]
5260	52	6	13.56
		9	13.30
		12	13.24
		18	13.28
		24	13.37
		36	13.04
		48	11.66
		54	10.47
5280	56	6	13.53
		9	13.12
		12	13.22
		18	13.16
		24	13.12
		36	13.05
		48	11.53
		54	10.22
5320	64	6	13.87
		9	13.45
		12	13.46
		18	13.39
		24	13.28
		36	13.23
		48	12.02
		54	10.68

Table 6-4. UNII Band II Conducted Output Power Measurements

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 20 of 69

6.4 Output Power Measurement – 802.11n (UNII Band 1,2)

§15.407 (a)(1)



A transmitter antenna terminal of EUT is connected to the input of a RF power sensor. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. ***In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is the lesser of 50mW (16.99dBm) and 4 dBm + 10log₁₀(26dB BW). In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log₁₀(26dB BW).***

Freq [MHz]	Channel	MCS Index	Data Rate [Mbps]	40MHz Measured Power [dBm]
5190	38	HT0	13.5/15	12.8
		HT1	27/30	12.47
		HT2	40/45	12.4
		HT3	54/60	12.54
		HT4	81/90	12.36
		HT5	108/120	12.21
		HT6	121.5/135	10.31
		HT7	135/150	8.55
5230	46	HT0	13.5/15	12.94
		HT1	27/30	12.75
		HT2	40/45	12.56
		HT3	54/60	12.75
		HT4	81/90	12.48
		HT5	108/120	11.6
		HT6	121.5/135	10.05
		HT7	135/150	8.74

Table 6-5. UNII Band I Conducted Output Power Measurements

Freq [MHz]	Channel	MCS Index	Data Rate [Mbps]	40MHz Measured Power [dBm]
5270	54	HT0	13.5/15	12.66
		HT1	27/30	12.45
		HT2	40/45	12.52
		HT3	54/60	12.64
		HT4	81/90	12.24
		HT5	108/120	12.03
		HT6	121.5/135	10.43
		HT7	135/150	8.75
5310	62	HT0	13.5/15	12.95
		HT1	27/30	12.80
		HT2	40/45	12.34
		HT3	54/60	12.66
		HT4	81/90	12.29
		HT5	108/120	11.85
		HT6	121.5/135	10.49
		HT7	135/150	8.56

Table 6-6. UNII Band II Conducted Output Power Measurements

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 21 of 69	

6.5 Output Power Measurement – 802.11a/n (UNII Band 3)

§15.407 (a)(1)



A transmitter antenna terminal of EUT is connected to the input of a RF power sensor. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies. ***In the 5.35 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log₁₀(26dB BW).***

Freq [MHz]	Channel	Data Rate [Mbps]	20MHz BW Measured Power [dBm]
5500	100	6	13.90
		9	14.04
		12	14.00
		18	13.92
		24	13.78
		36	13.75
		48	12.27
		54	10.41
		5600	120
9	13.92		
12	13.89		
18	13.90		
24	13.76		
36	13.67		
48	11.78		
54	10.15		
5700	140		
		9	13.95
		12	13.87
		18	13.57
		24	13.81
		36	13.72
		48	12.24
		54	10.19

Table 6-7. 802.11a UNII Band III Conducted Output Power Measurements

Freq [MHz]	Channel	MCS Index	Data Rate [Mbps]	40MHz Measured Power [dBm]
5510	102	13.5/15	HT0	13.66
		27/30	HT1	13.62
		40/45	HT2	13.55
		54/60	HT3	13.47
		81/90	HT4	13.34
		108/120	HT5	11.34
		121.5/135	HT6	9.47
5590	118	13.5/15	HT0	13.25
		27/30	HT1	13.21
		40/45	HT2	13.16
		54/60	HT3	13.01
		81/90	HT4	12.95
		108/120	HT5	11.96
		121.5/135	HT6	10.01
5670	134	13.5/15	HT0	13.21
		27/30	HT1	13.05
		40/45	HT2	12.93
		54/60	HT3	12.85
		81/90	HT4	12.74
		108/120	HT5	11.73
		121.5/135	HT6	10.14
		135/150	HT7	8.27

Table 6-8. 802.11n UNII Band III Conducted Output Power Measurements

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 22 of 69

6.6 Peak Power Spectral Density

§15.407 (a)(1),(5)

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in a continuous transmission mode at the appropriate center frequencies. **The maximum permissible peak power spectral density is 4dBm/MHz in the 5.15GHz – 5.25GHz band and 11dBm/MHz in the 5.25GHz – 5.35 GHz band.**

	Frequency [MHz]	Channel No.	802.11 Mode	Measured Power Density [dBm]	Maximum Permissible Power Density [dBm/MHz]	Margin [dB]
Band I	5180	36	a	3.71	4.0	-0.3
	5200	40	a	3.50	4.0	-0.5
	5240	48	a	3.23	4.0	-0.8
	5190	38	n	-0.02	4.0	-4.0
	5230	46	n	-0.29	4.0	-4.3
Band II	5260	52	a	3.86	11.0	-7.1
	5280	56	a	3.29	11.0	-7.7
	5320	64	a	2.94	11.0	-8.1
	5270	54	n	0.25	11.0	-10.8
	5310	62	n	-0.24	11.0	-11.2
Band III	5500	100	a	2.46	11.0	-8.5
	5600	120	a	2.53	11.0	-8.5
	5700	140	a	2.52	11.0	-8.5
	5510	102	n	-1.10	11.0	-12.1
	5590	118	n	-1.24	11.0	-12.2
	5670	134	n	-1.09	11.0	-12.1

Table 6-9. Conducted Power Spectral Density Measurements

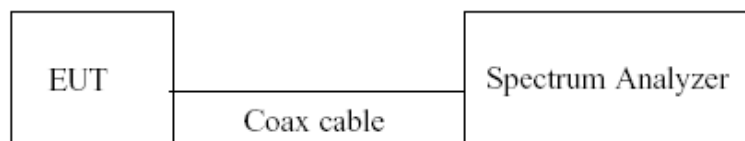


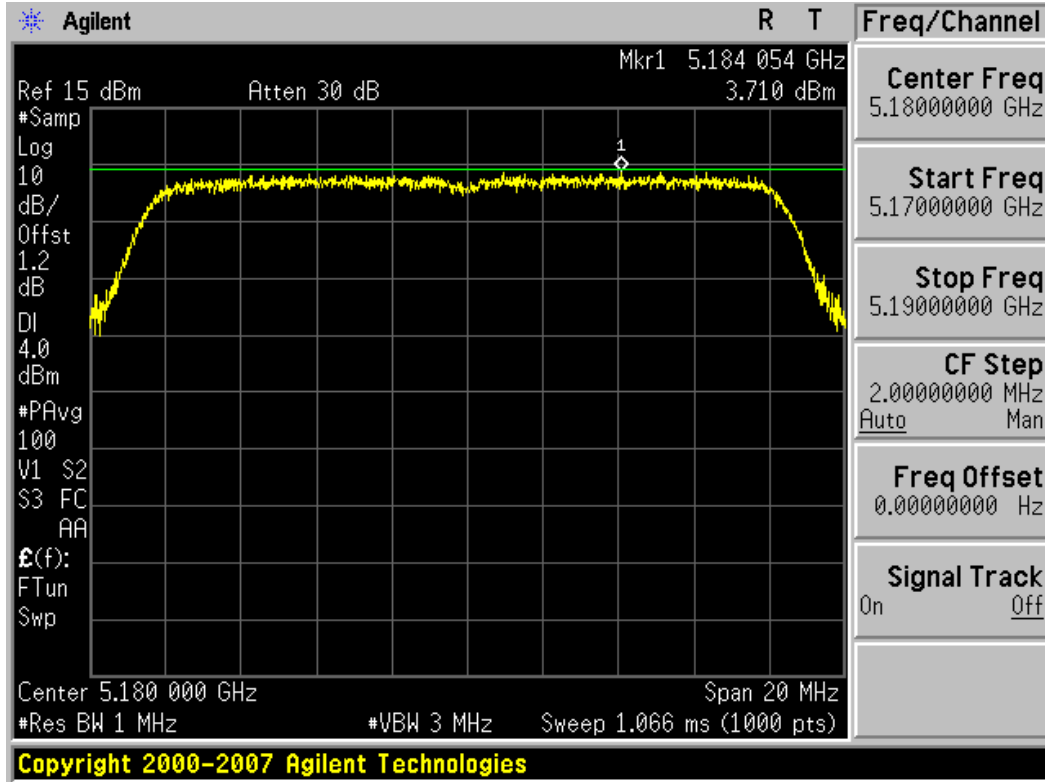
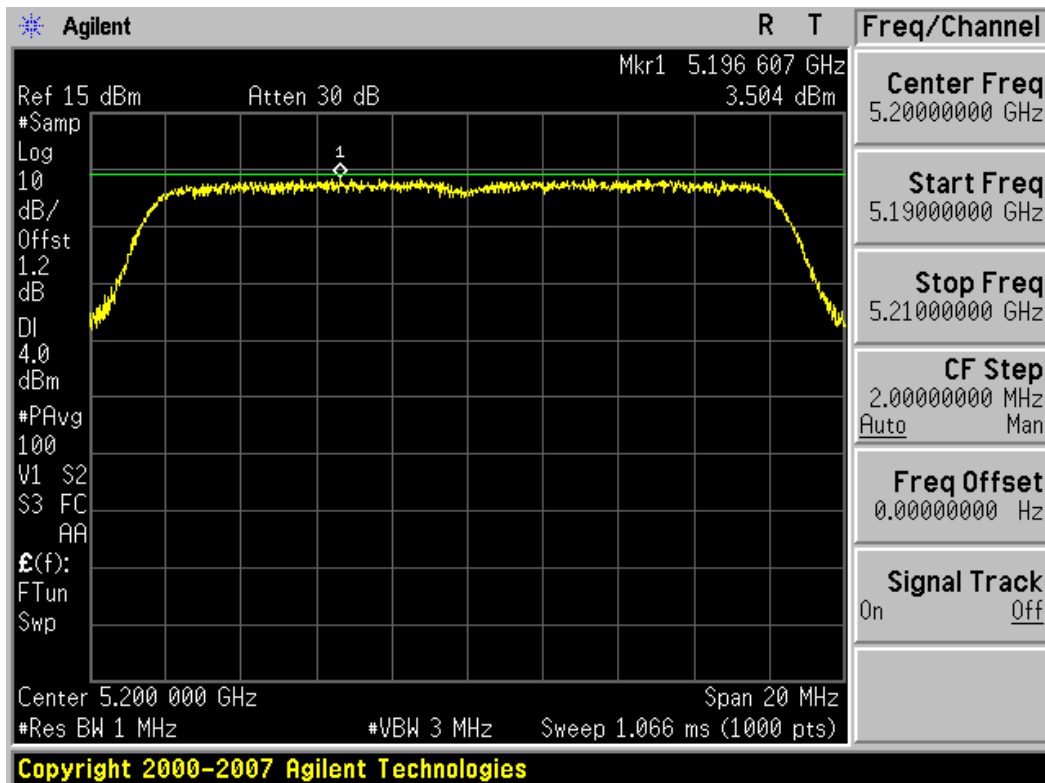


Figure 6-2. Test Instrument & Measurement Setup

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 23 of 69

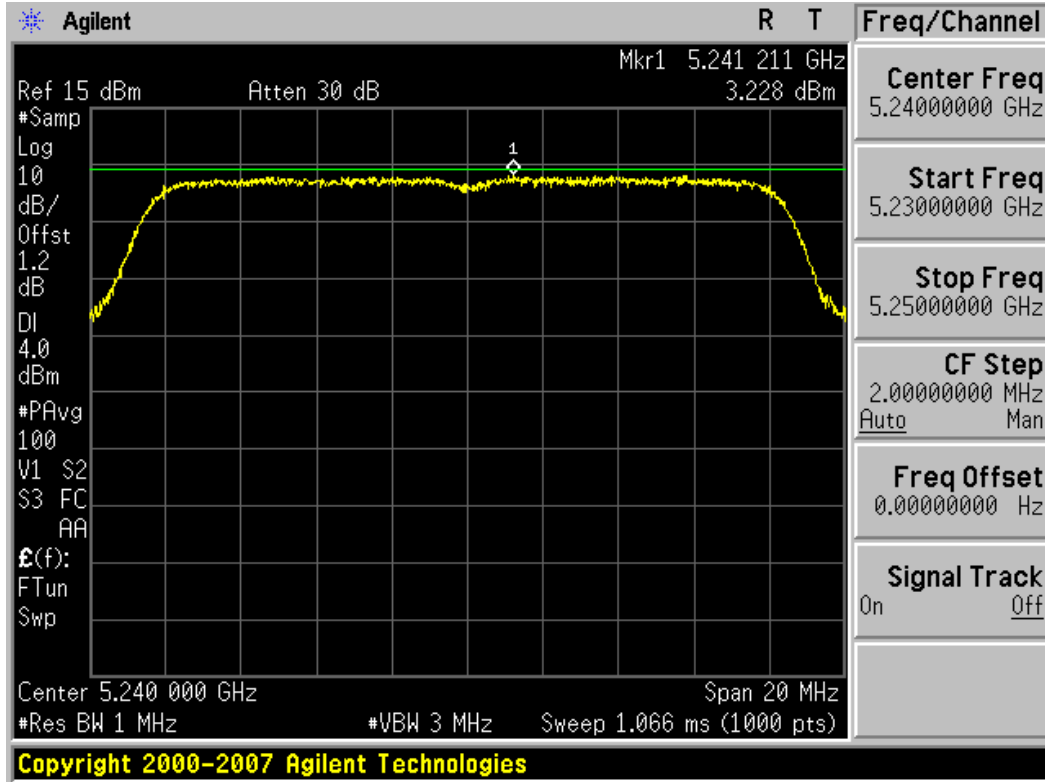


Plot 6-17. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 36)

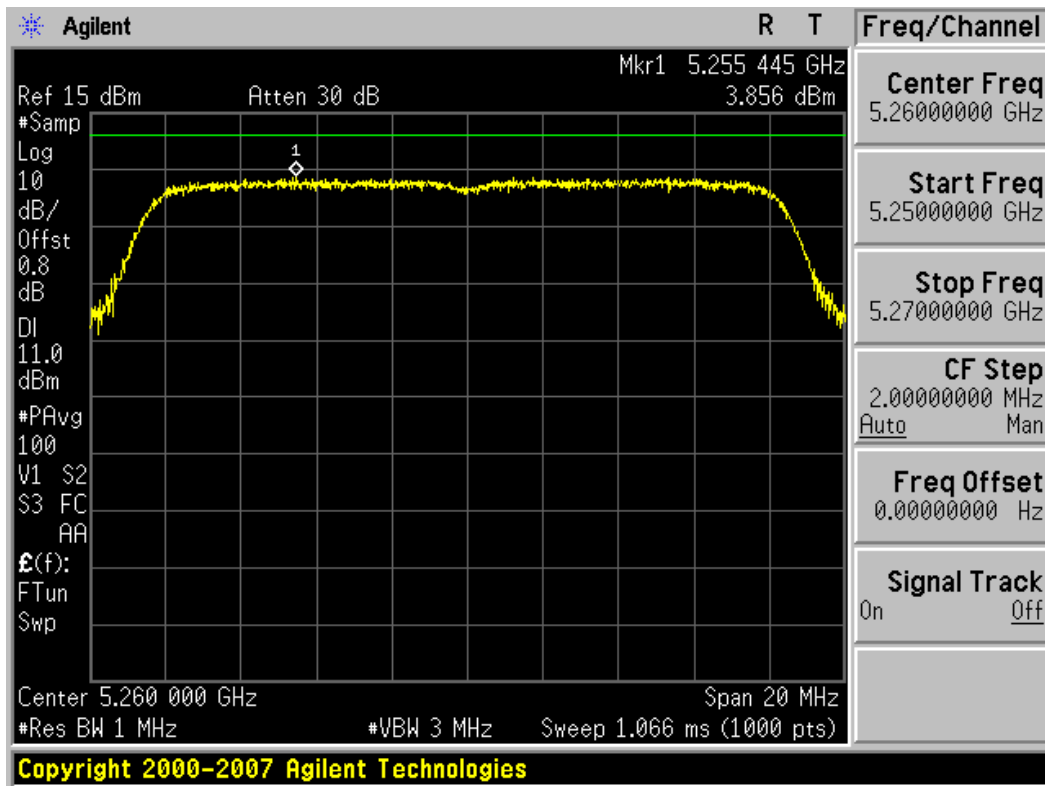


Plot 6-18. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 40)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 24 of 69

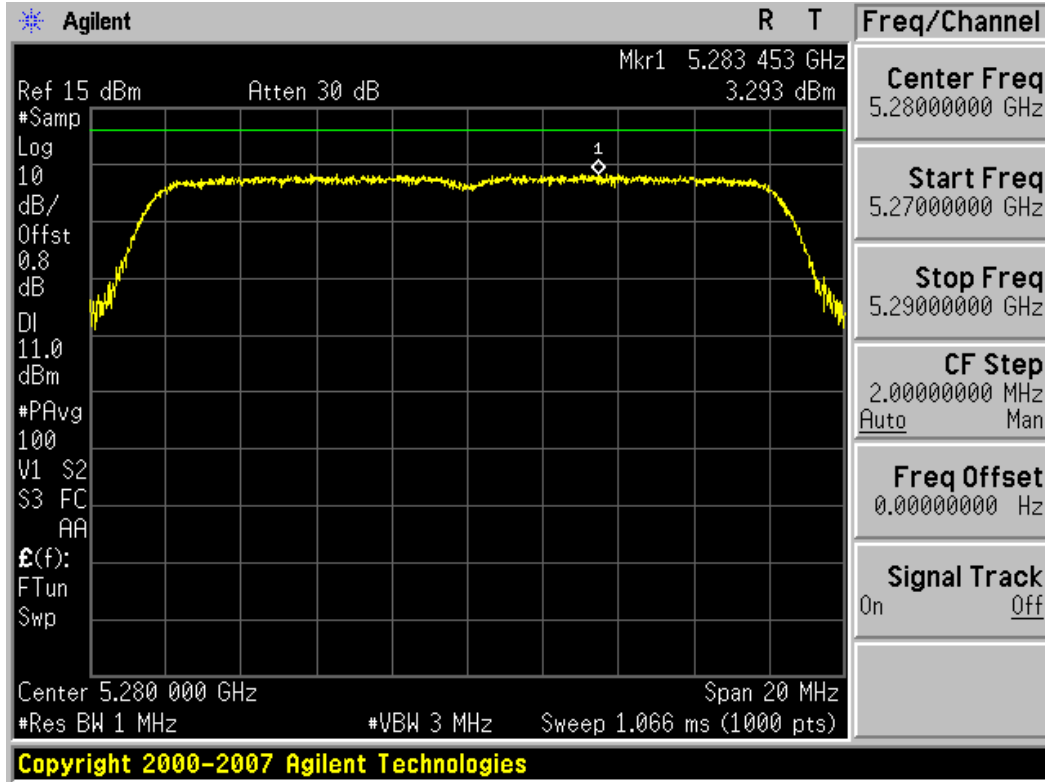


Plot 6-19. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 48)

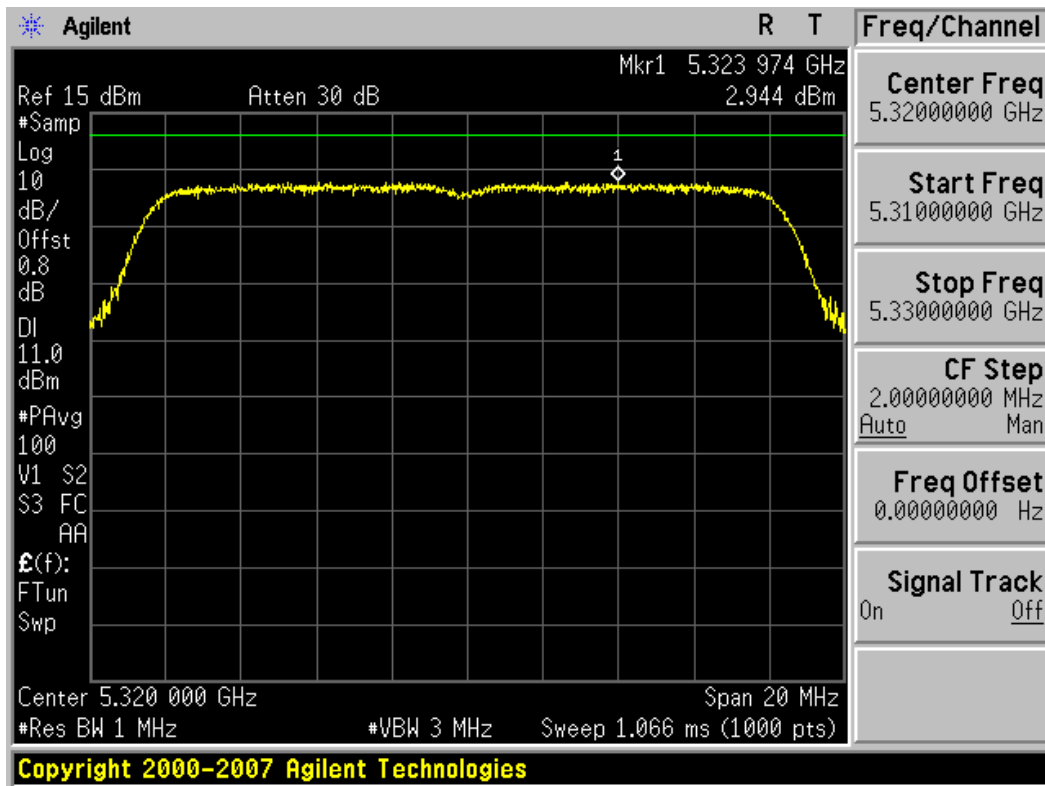


Plot 6-20. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 52)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 25 of 69

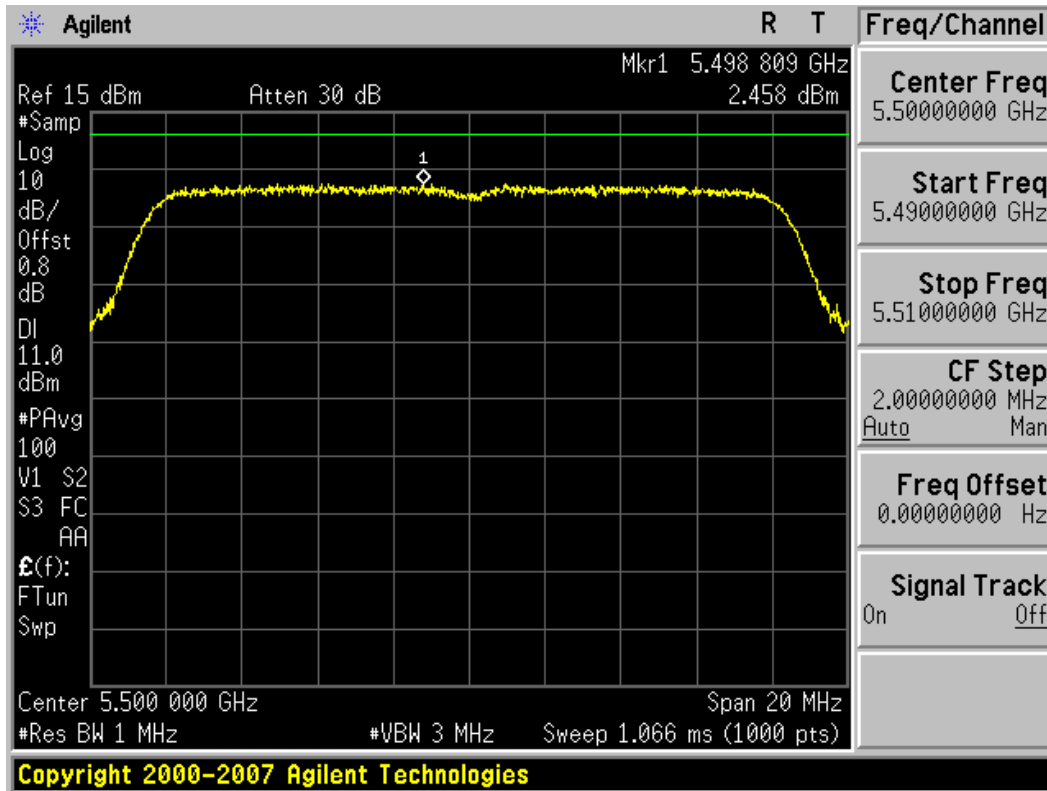


Plot 6-21. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 56)

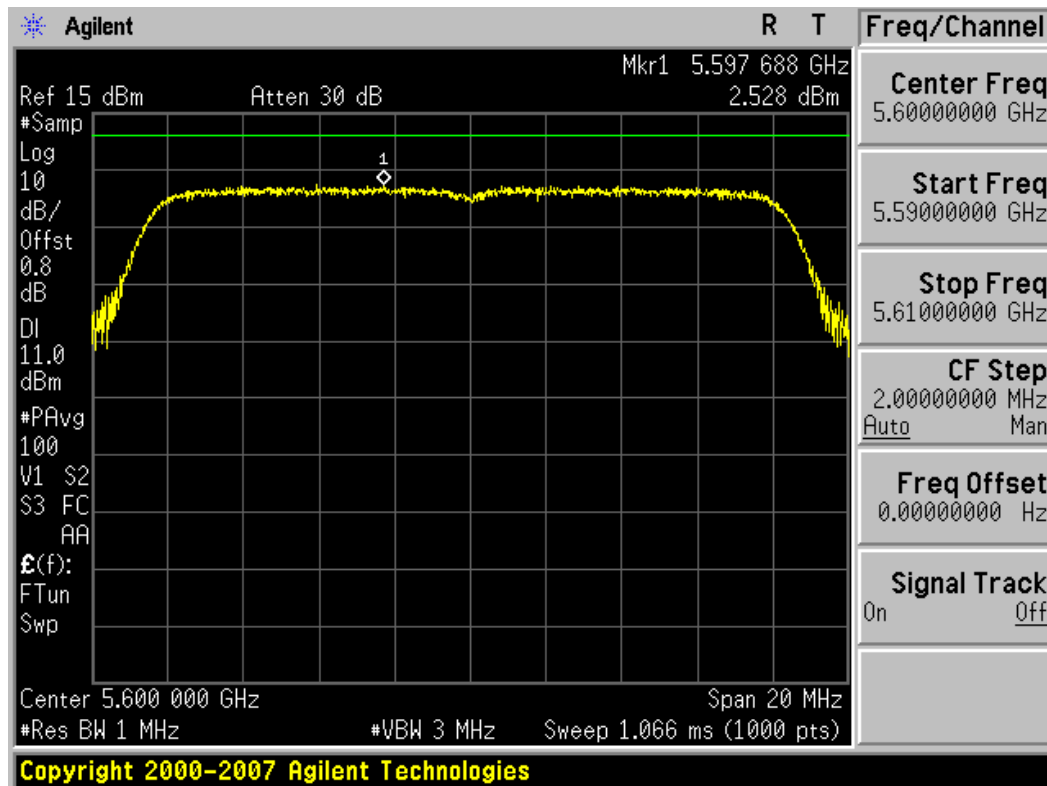


Plot 6-22. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 64)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 26 of 69

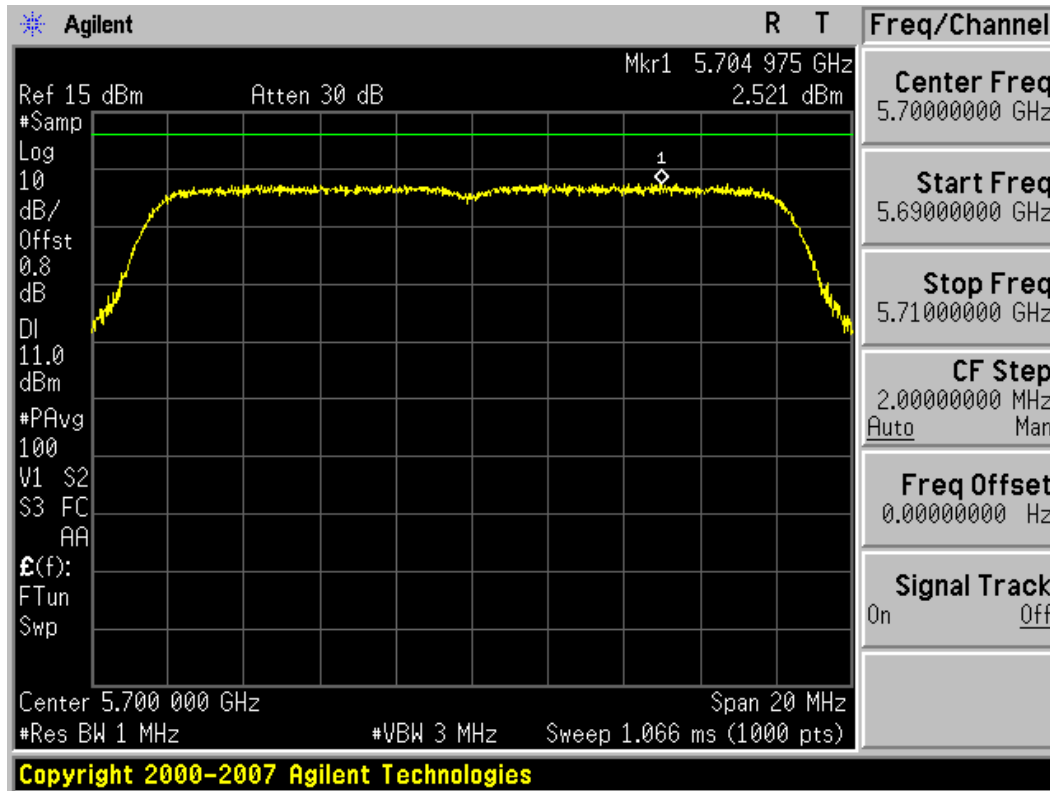


Plot 6-23. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 100)

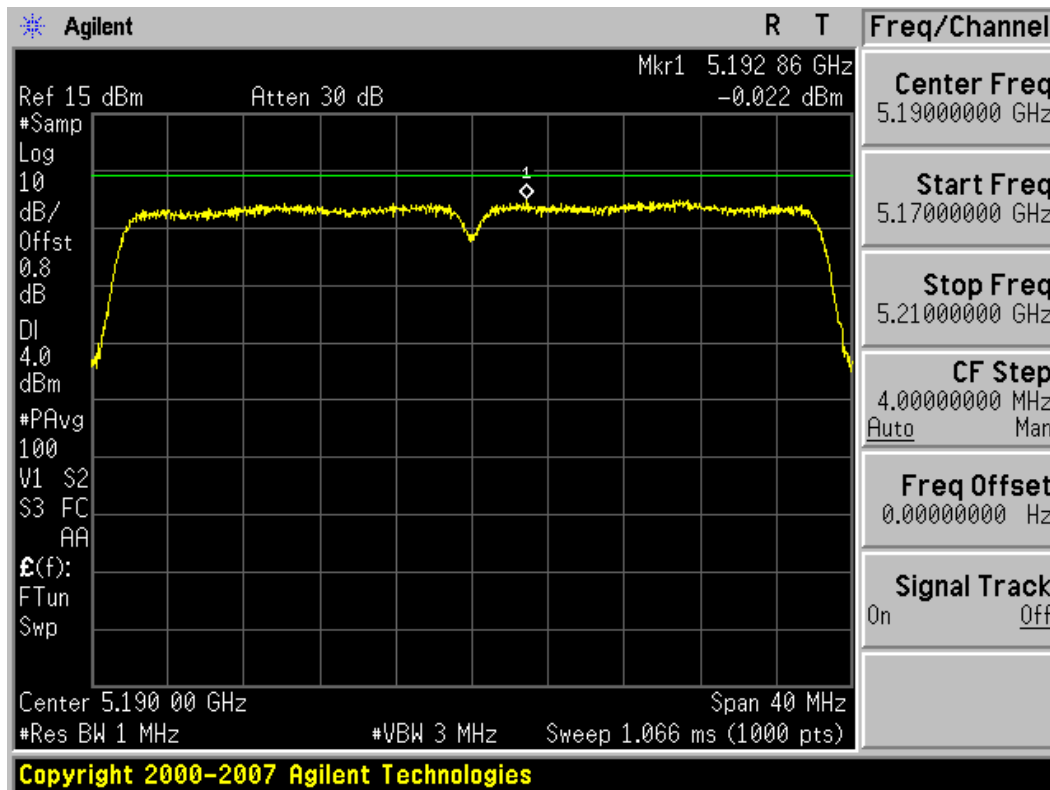


Plot 6-24. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 120)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 27 of 69

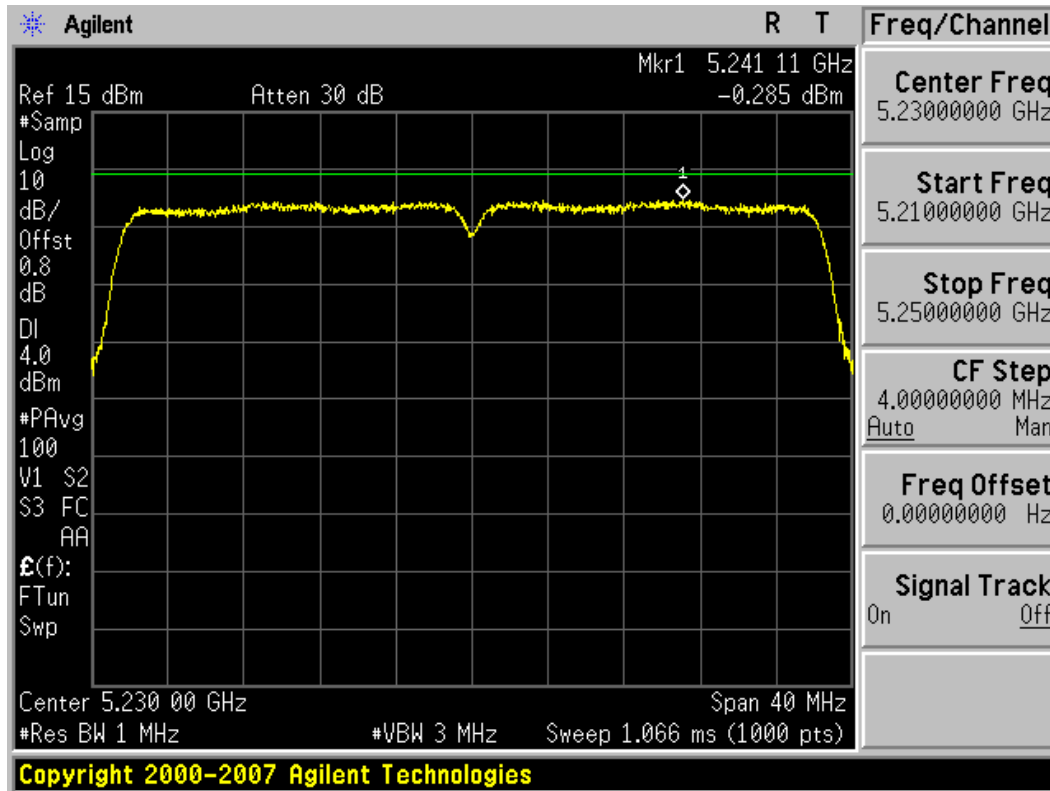


Plot 6-25. Peak Power Spectral Density Plot (802.11a (UNII) – Ch. 140)

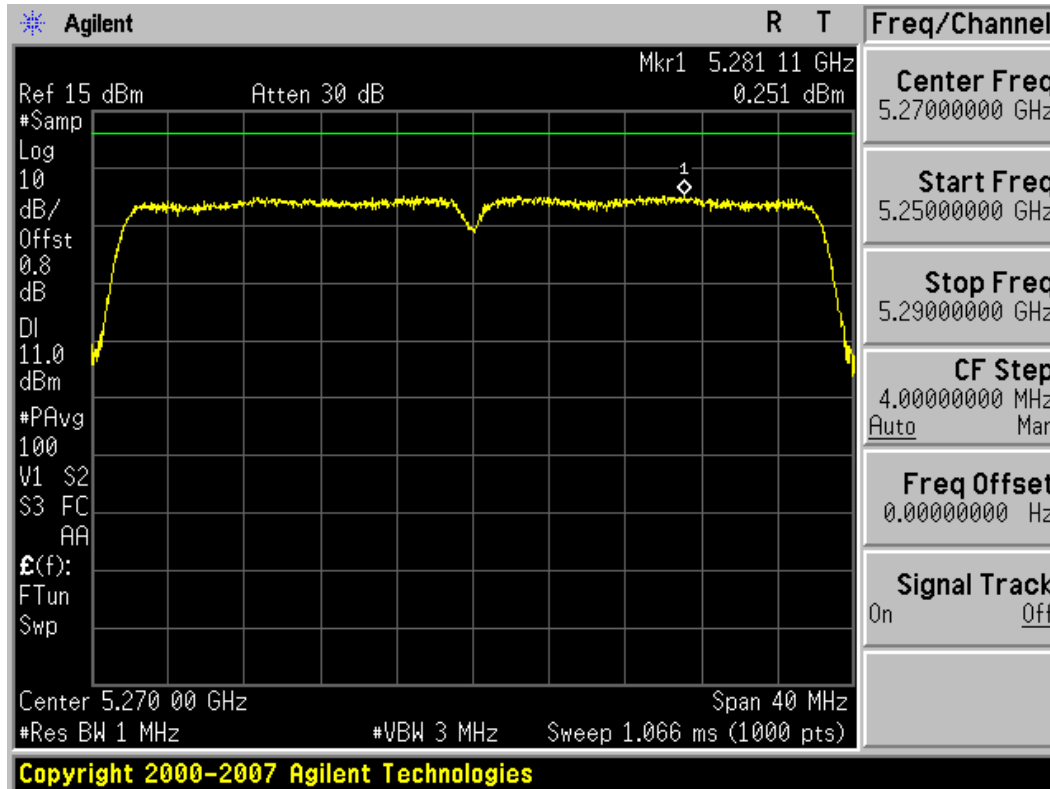


Plot 6-26. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 38)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 28 of 69

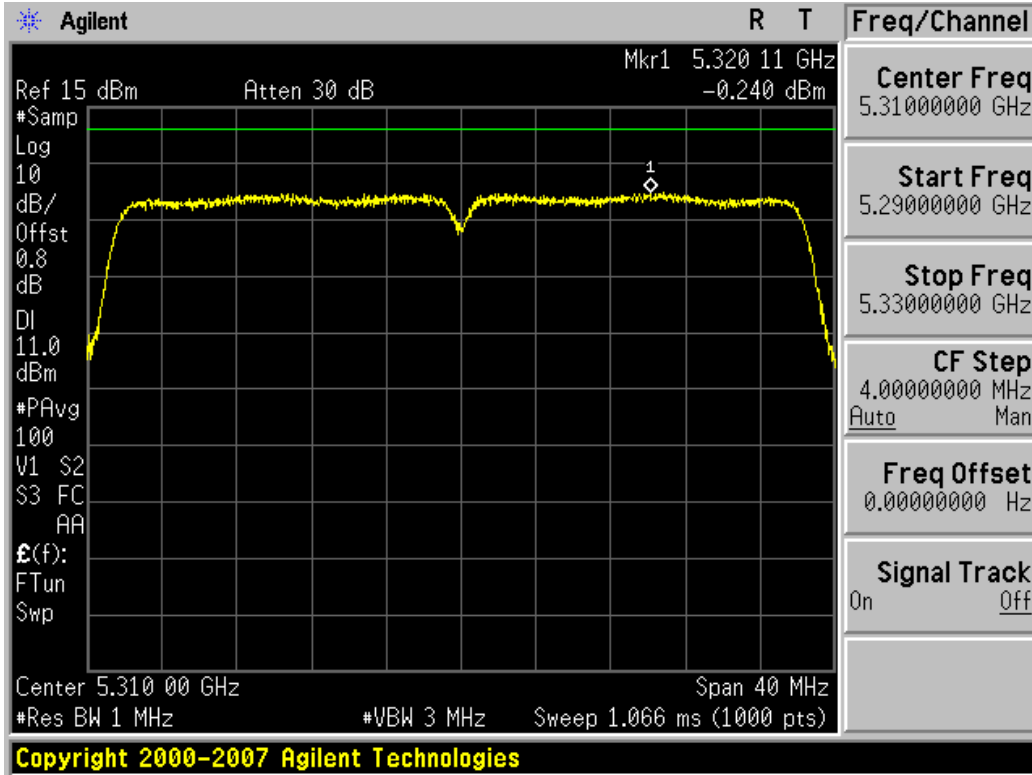


Plot 6-27. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 46)

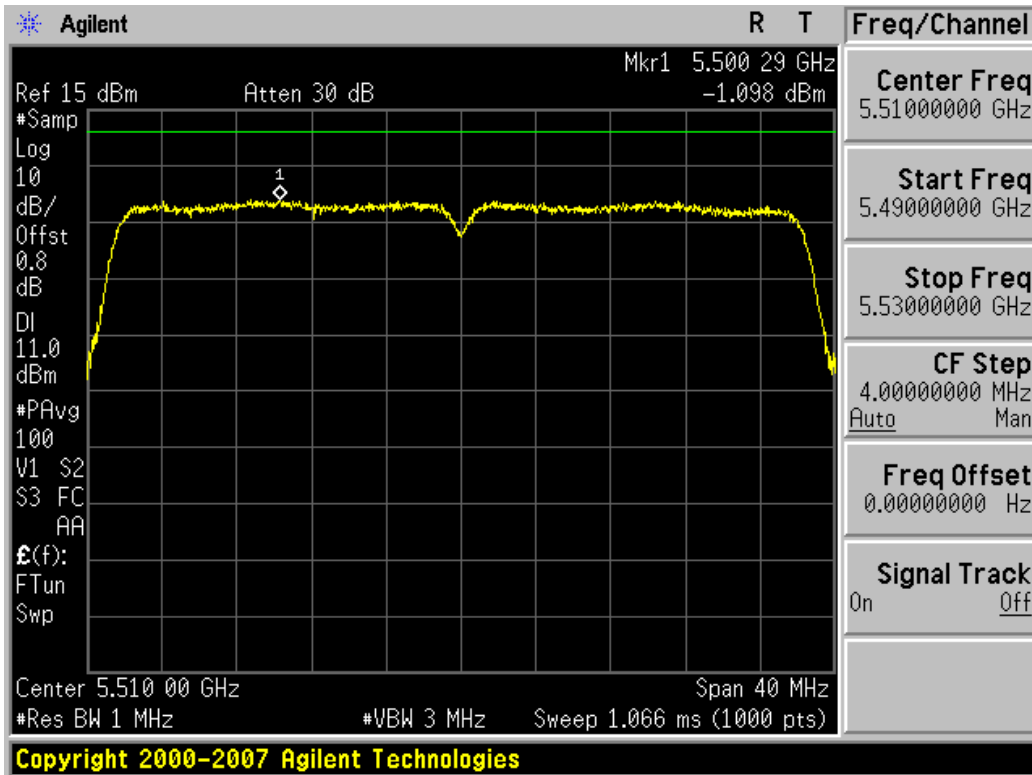


Plot 6-28. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 54)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 29 of 69

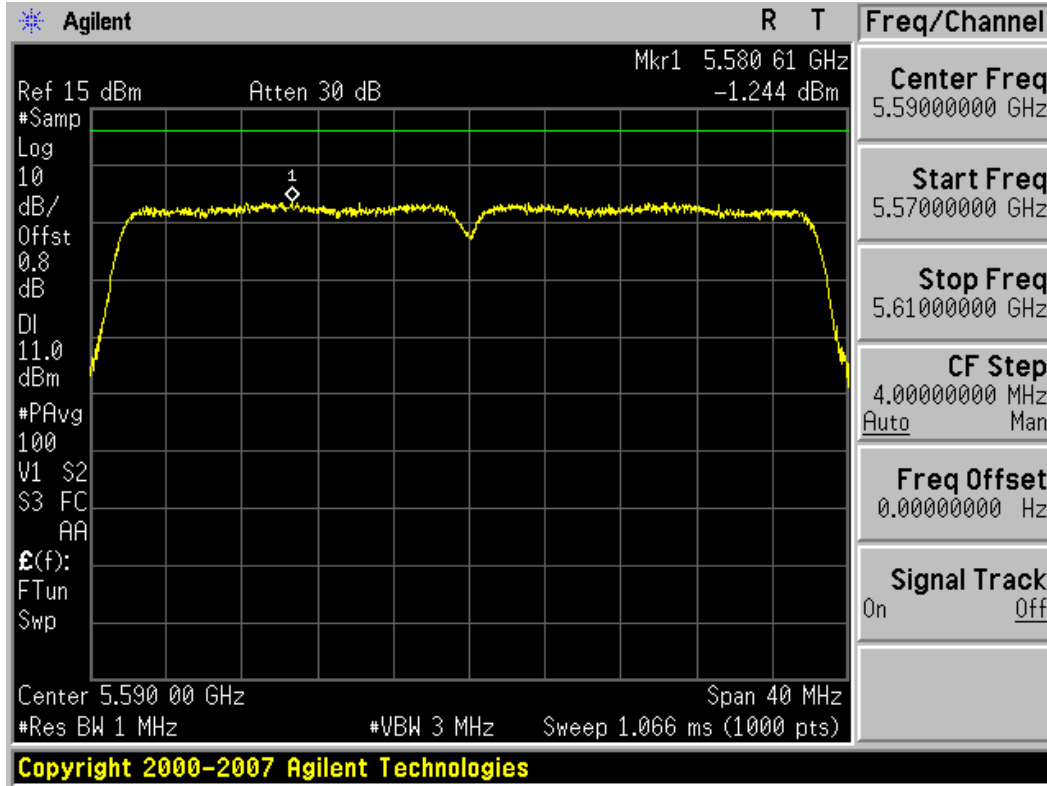


Plot 6-29. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 62)

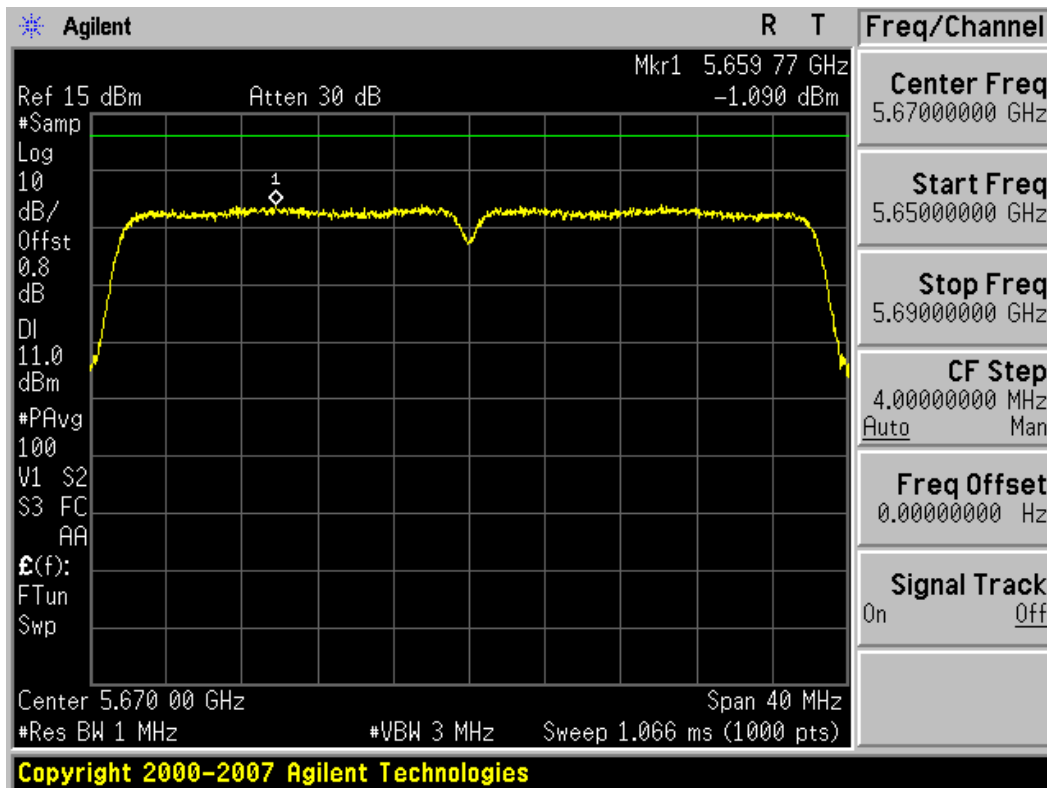


Plot 6-30. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 102)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 30 of 69



Plot 6-31. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 118)



Plot 6-32. Peak Power Spectral Density Plot (802.11n (UNII) – Ch. 134)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 31 of 69

6.7 Peak Excursion Ratio

§15.407(a)(6)

The spectrum analyzer was connected to the antenna terminal while the EUT was operating in the continuous transmission mode at the appropriate center frequencies. **The largest permissible difference between the modulation envelope (measured using a peak hold function) and the maximum conducted output power is 13 dBm/MHz.**

	Frequency [MHz]	Channel No.	802.11 Mode	Measured Peak Excursion Ratio [dBm]	Maximum Permissible Peak Excursion Ratio [dBm/MHz]	Margin [dB]
Band I	5180	36	a	9.88	13.0	-3.12
	5200	40	a	9.42	13.0	-3.58
	5240	48	a	10.08	13.0	-2.92
	5190	38	n	8.17	13.0	-4.83
	5230	46	n	8.06	13.0	-4.94
Band II	5260	52	a	9.32	13.0	-3.68
	5280	56	a	9.82	13.0	-3.18
	5320	64	a	9.99	13.0	-3.01
	5270	54	n	8.70	13.0	-4.30
	5310	62	n	8.30	13.0	-4.70
Band III	5500	100	a	9.72	13.0	-3.28
	5600	120	a	9.70	13.0	-3.30
	5700	140	a	9.50	13.0	-3.50
	5510	102	n	7.37	13.0	-5.63
	5590	118	n	7.95	13.0	-5.05
	5670	134	n	7.37	13.0	-5.63

Table 6-10. Conducted Peak Excursion Ratio Measurements

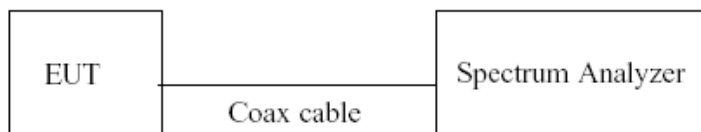


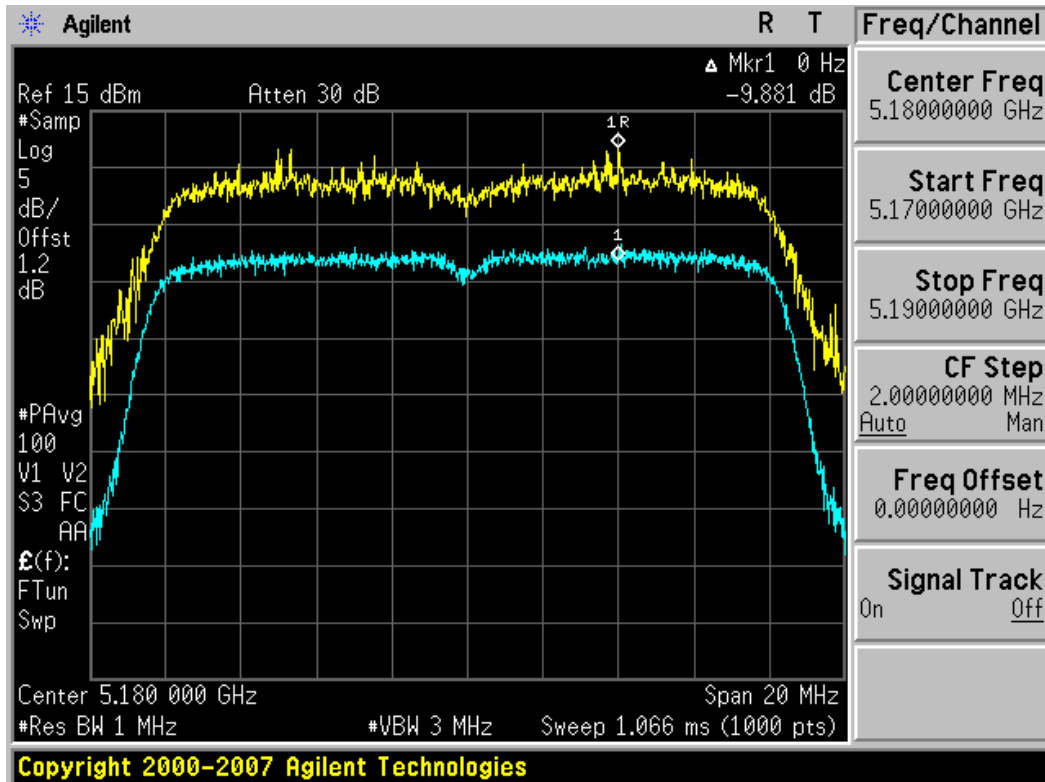
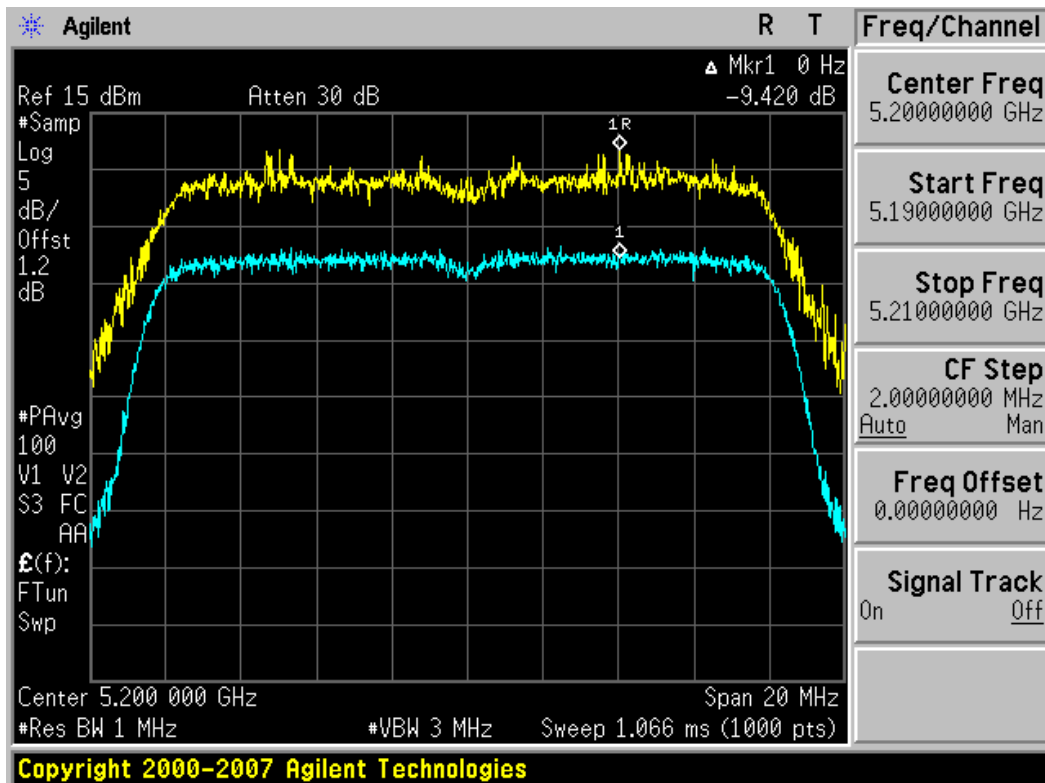


Figure 6-3. Test Instrument & Measurement Setup

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 32 of 69

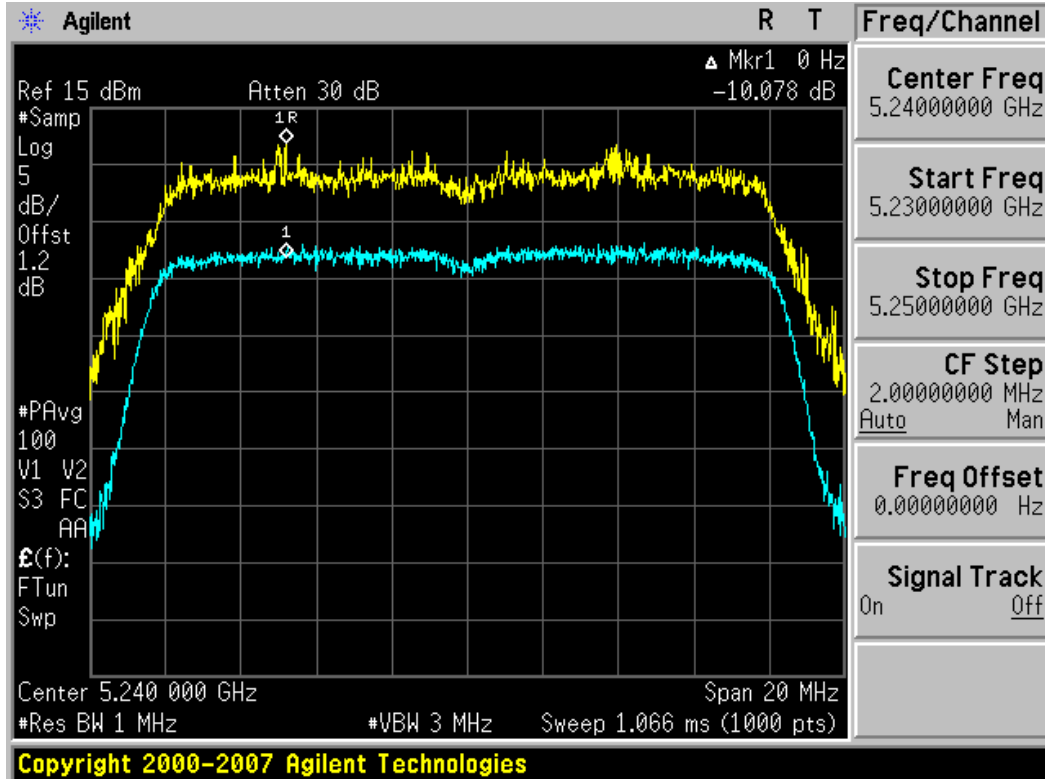


Plot 6-33. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 36)

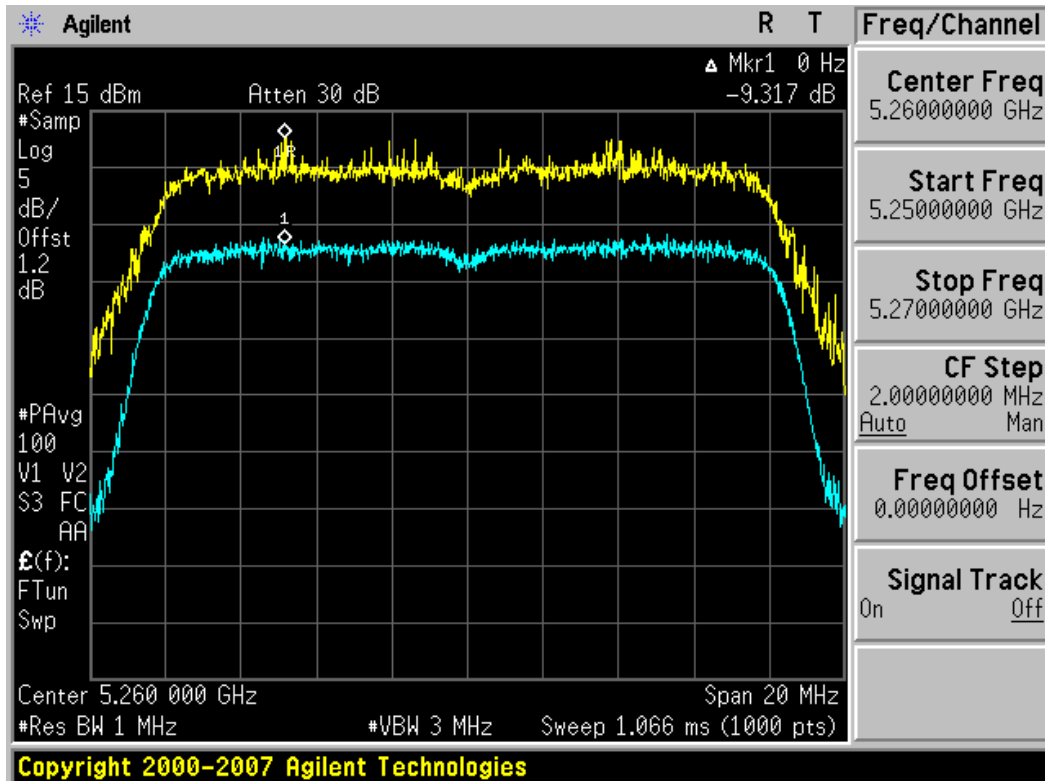


Plot 6-34. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 40)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 33 of 69

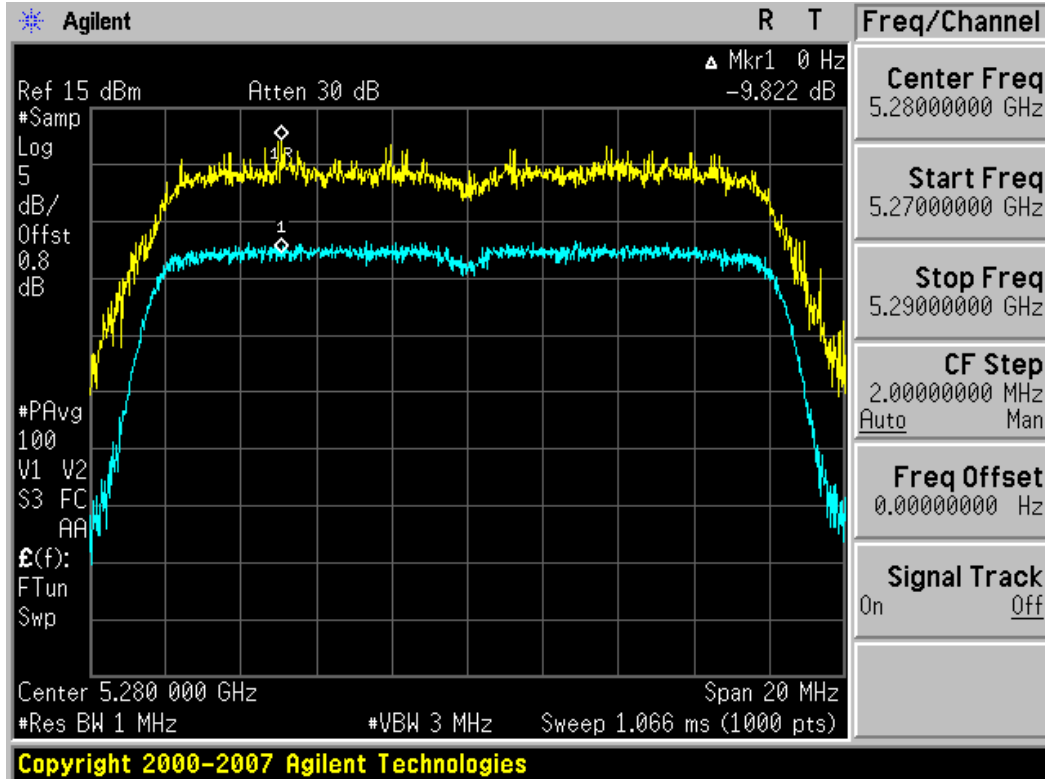


Plot 6-35. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 48)

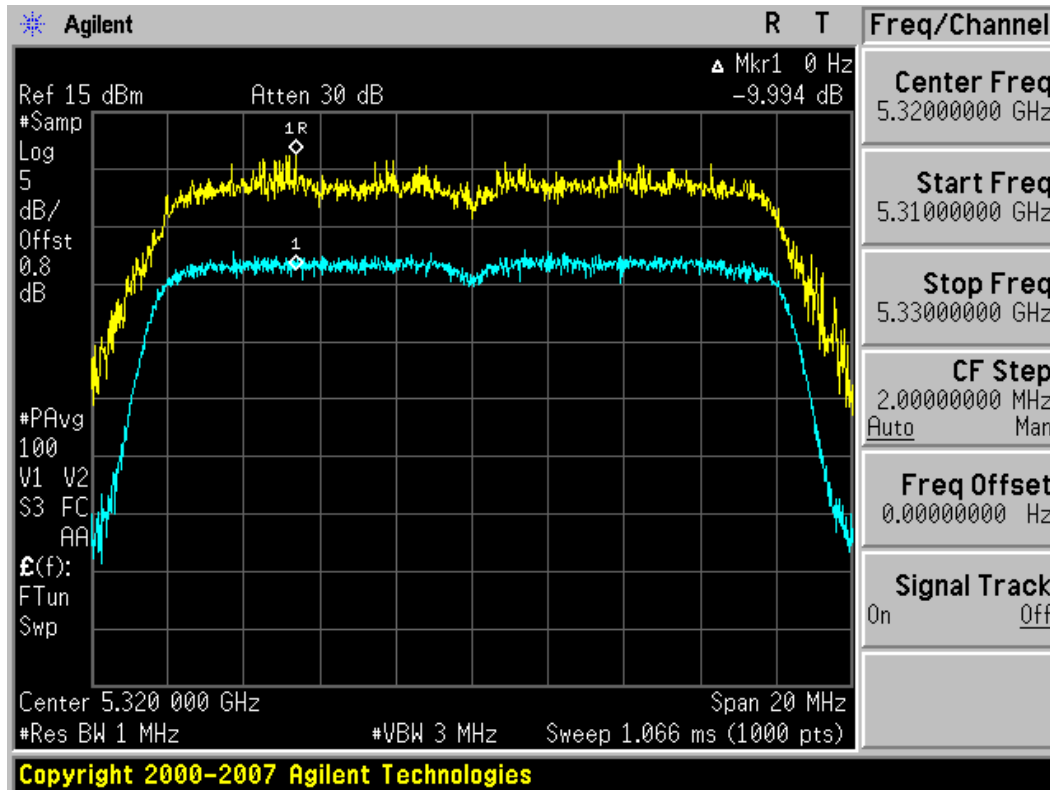


Plot 6-36. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 52)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 34 of 69

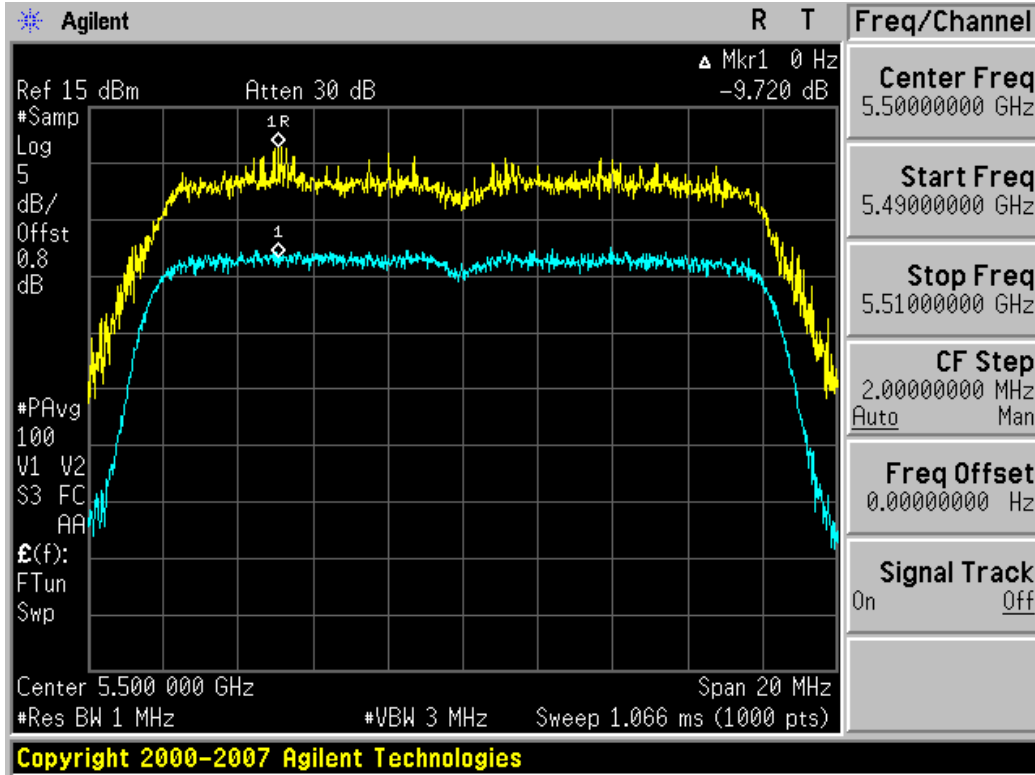


Plot 6-37. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 56)

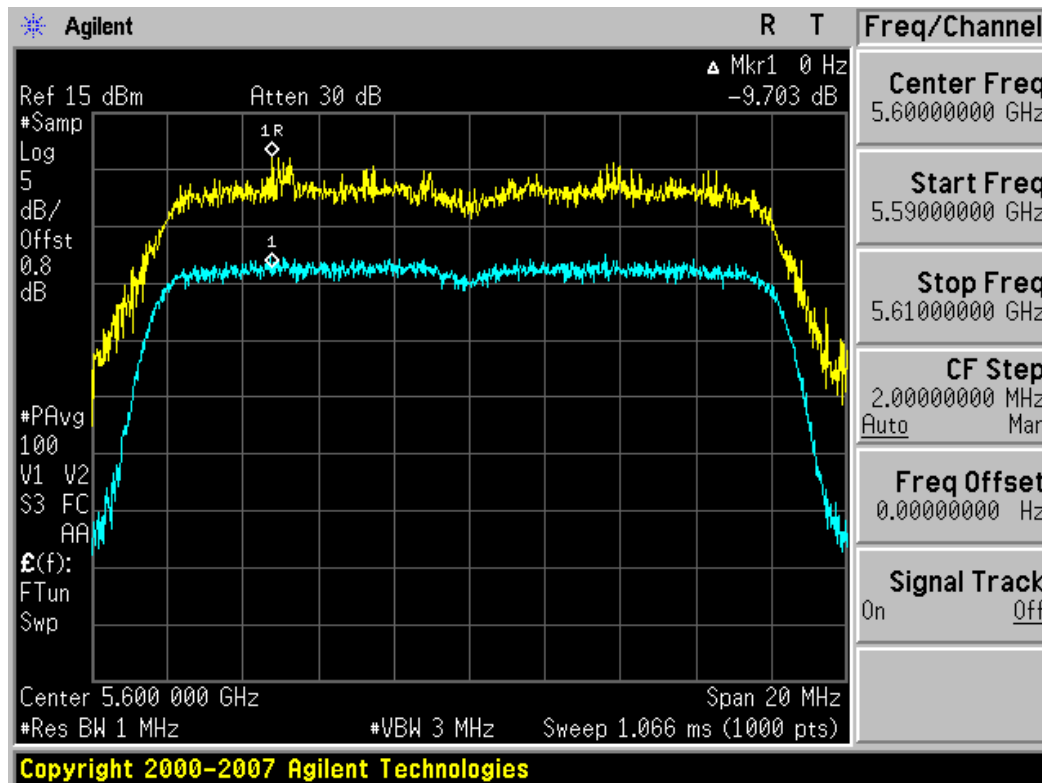


Plot 6-38. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 64)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 35 of 69

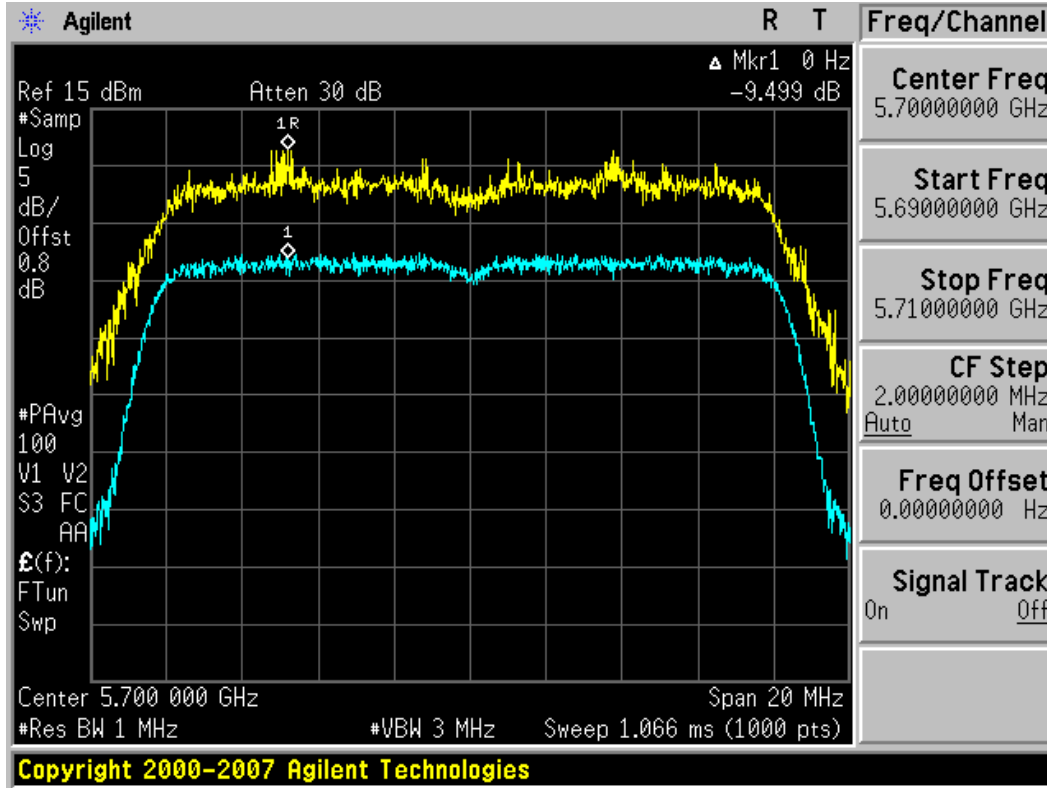


Plot 6-39. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 100)

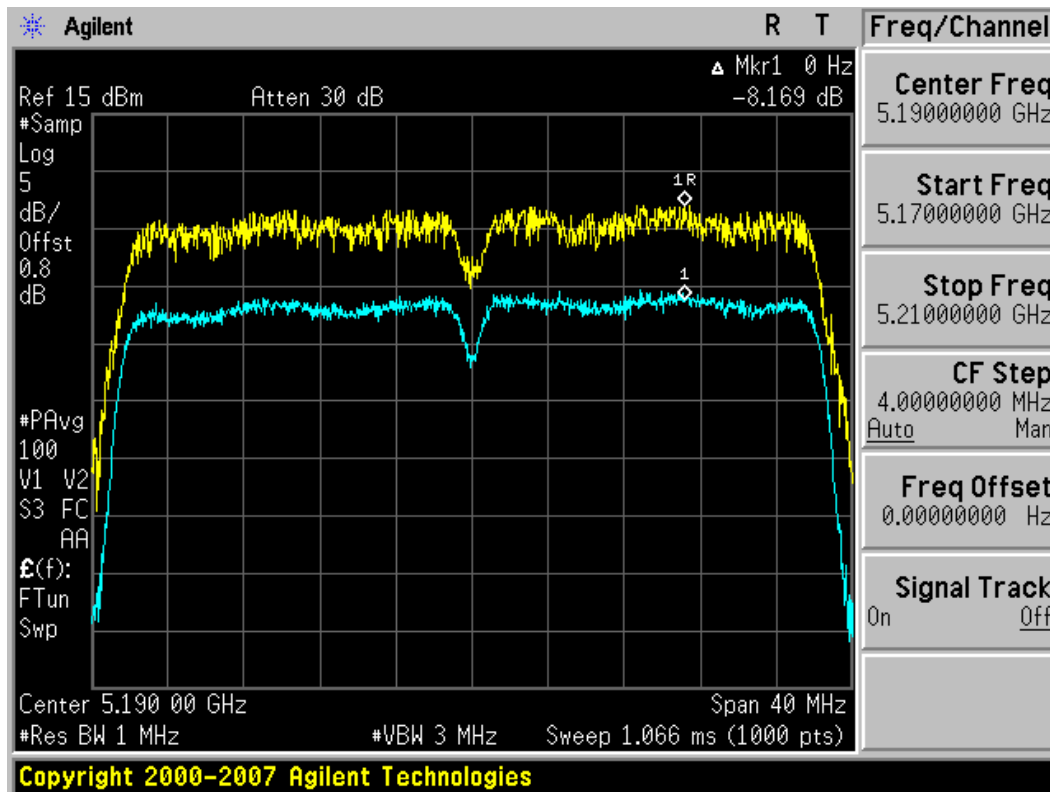


Plot 6-40. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 120)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 36 of 69

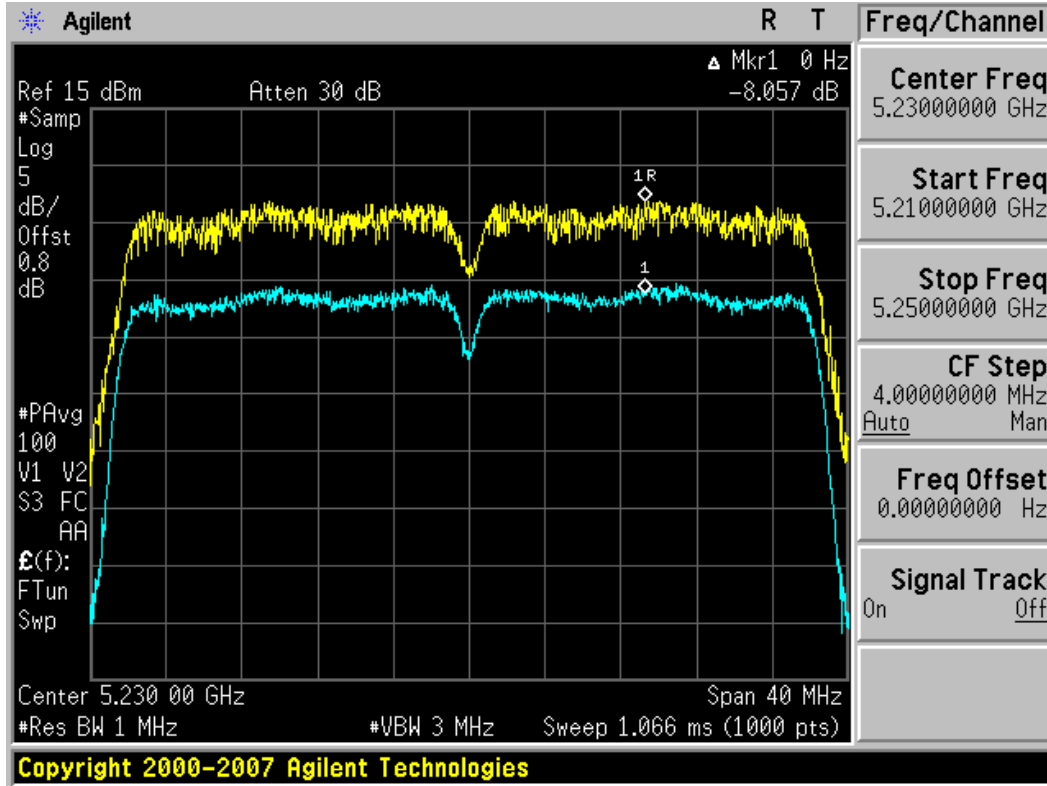


Plot 6-41. Peak Excursion Ratio Plot (802.11a (UNII) – Ch. 140)

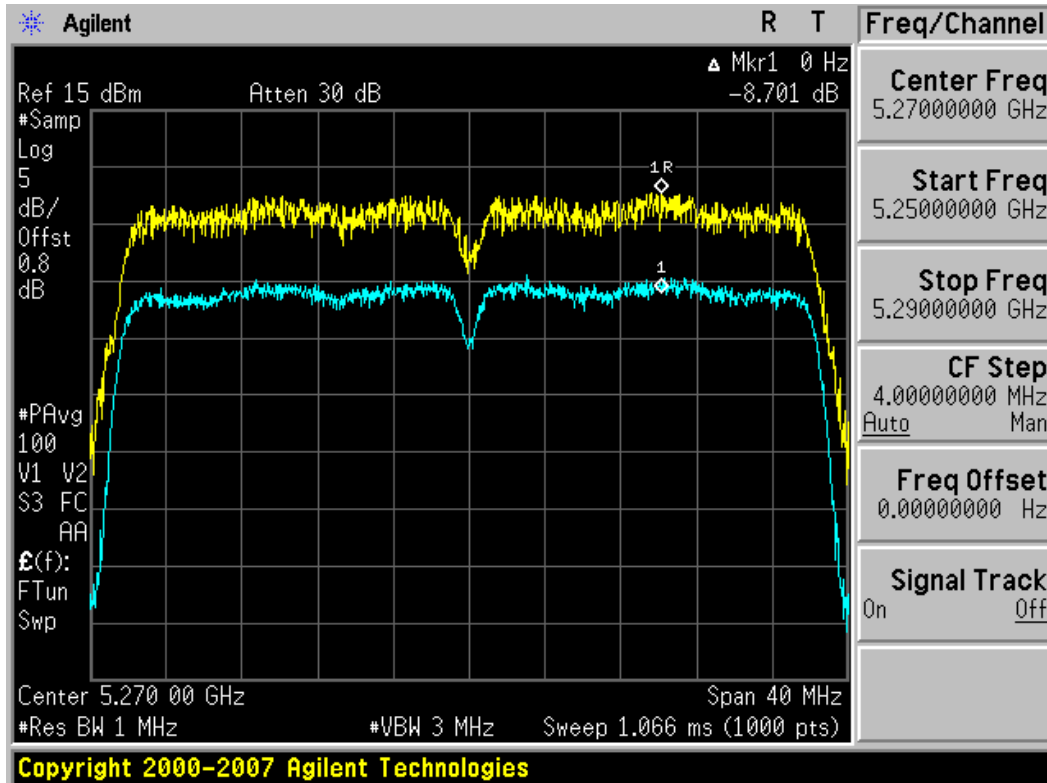


Plot 6-42. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 38)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 37 of 69

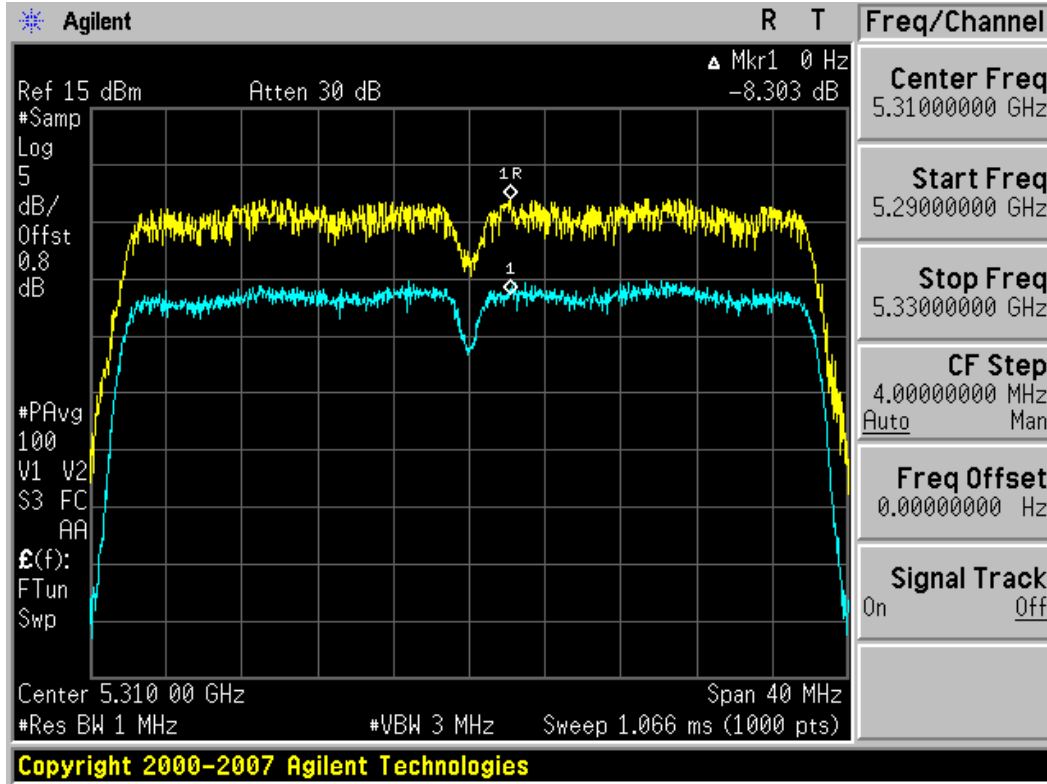


Plot 6-43. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 46)

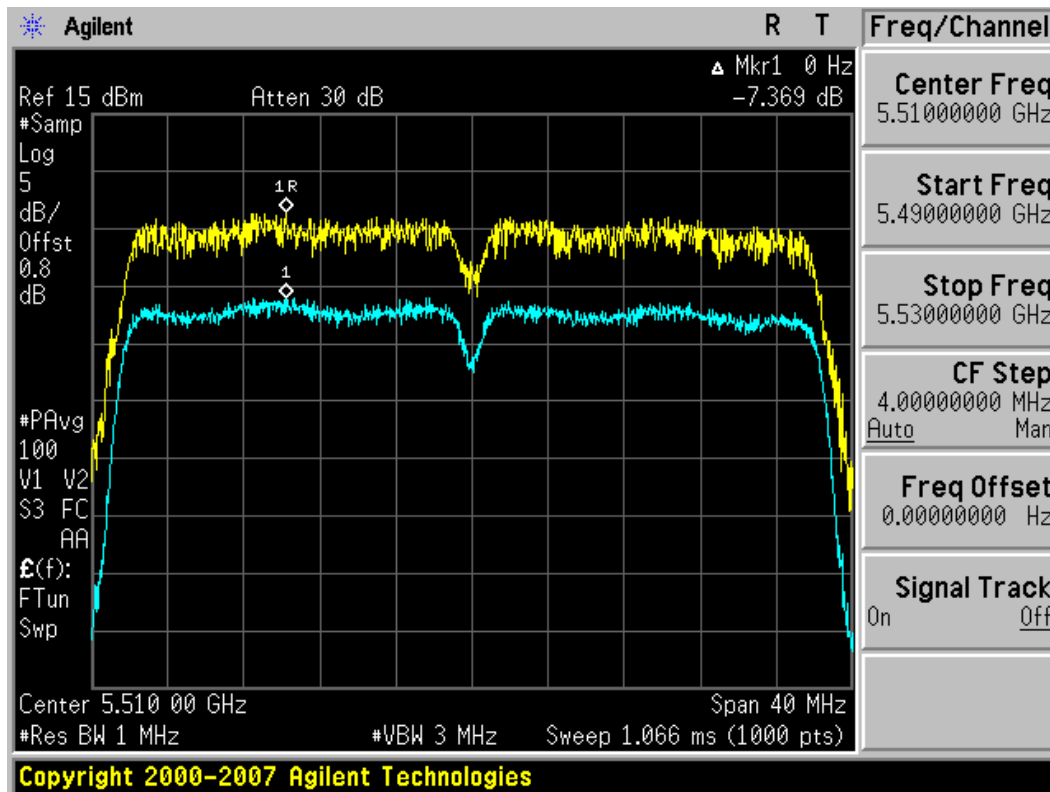


Plot 6-44. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 54)

FCC ID: ACJ9TGCF-524	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 38 of 69

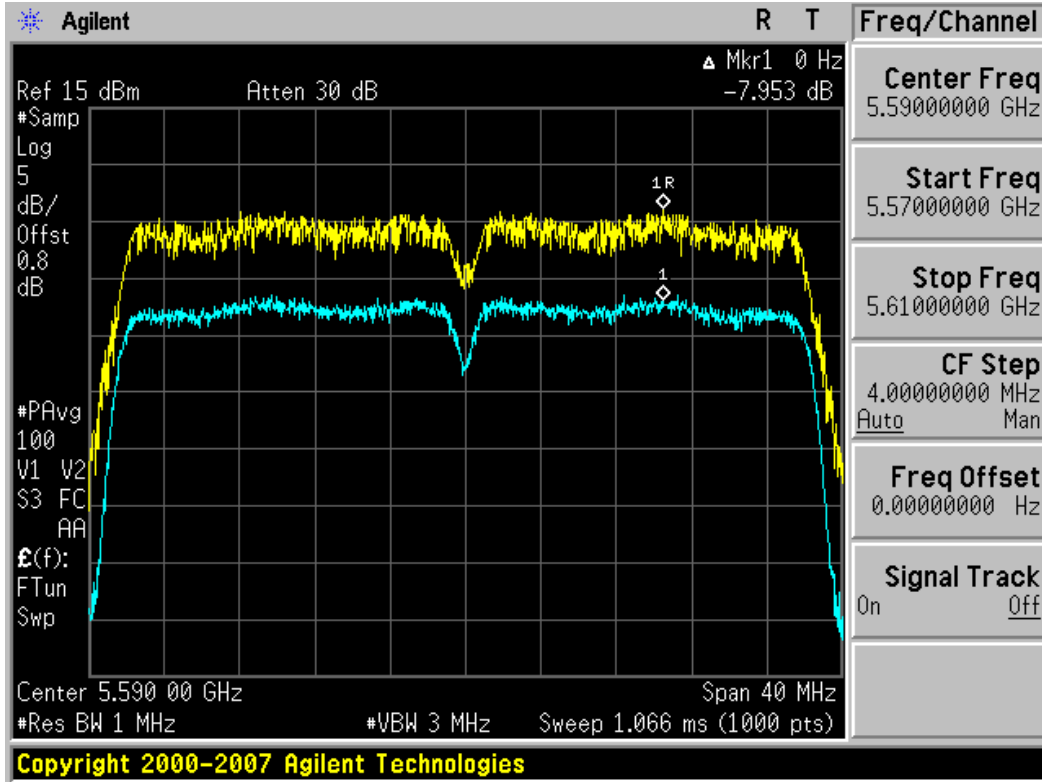


Plot 6-45. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 62)

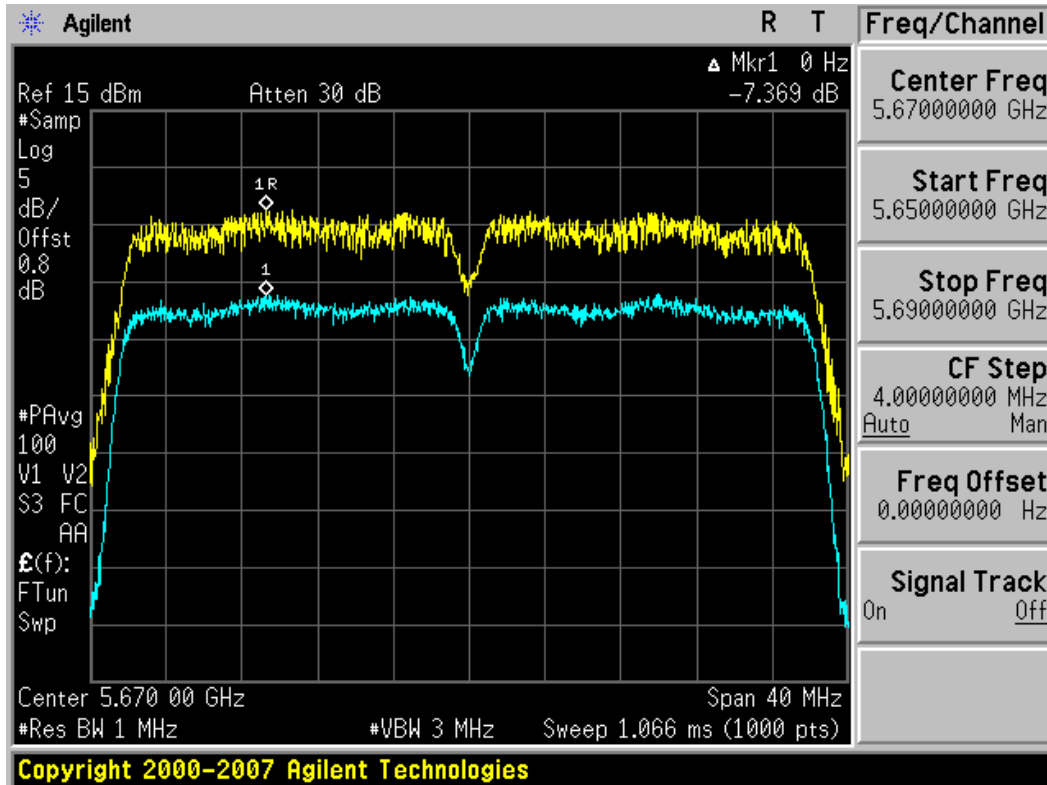


Plot 6-46. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 102)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)	Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 39 of 69



Plot 6-47. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 118)



Plot 6-48. Peak Excursion Ratio Plot (802.11n (UNII) – Ch. 134)

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 40 of 69

6.8 Frequency Stability

§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.



OPERATING FREQUENCY: 5,200,000,000 Hz

CHANNEL: 40

REFERENCE VOLTAGE: 11.1 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	5,199,996,958	-3,042	-0.000059
100 %		- 30	5,199,988,203	-11,797	-0.000227
100 %		- 20	5,200,006,744	6,744	0.000130
100 %		- 10	5,199,993,632	-6,368	-0.000122
100 %		0	5,199,995,575	-4,425	-0.000085
100 %		+ 10	5,200,002,766	2,766	0.000053
100 %		+ 20	5,200,002,549	2,549	0.000049
100 %		+ 30	5,199,991,967	-8,033	-0.000154
100 %		+ 40	5,199,990,295	-9,705	-0.000187
100 %		+ 50	5,199,986,862	-13,138	-0.000253
115 %		12.77	+ 20	5,199,989,654	-10,346
BATT. ENDPOINT	9.81	+ 20	5,200,000,984	984	0.000019

Table 6-11. Frequency Stability Measurements for UNII Band Ch. 40

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 41 of 69	

Frequency Stability (Cont'd)

§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.



OPERATING FREQUENCY: 5,280,000,000 Hz

CHANNEL: 56

REFERENCE VOLTAGE: 11.1 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	5,279,996,357	-3,643	-0.000069
100 %		- 30	5,279,995,053	-4,947	-0.000094
100 %		- 20	5,280,010,857	10,857	0.000206
100 %		- 10	5,279,994,864	-5,136	-0.000097
100 %		0	5,279,992,585	-7,415	-0.000140
100 %		+ 10	5,279,997,984	-2,016	-0.000038
100 %		+ 20	5,279,995,977	-4,023	-0.000076
100 %		+ 30	5,279,997,356	-2,644	-0.000050
100 %		+ 40	5,279,987,577	-12,423	-0.000235
100 %		+ 50	5,279,986,756	-13,244	-0.000251
115 %	12.77	+ 20	5,279,996,534	-3,466	-0.000066
BATT. ENDPOINT	9.81	+ 20	5,279,997,268	-2,732	-0.000052

Table 6-12. Frequency Stability Measurements for UNII Band Ch. 56

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 42 of 69	

Frequency Stability (Cont'd)

§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded.



OPERATING FREQUENCY: 5,600,000,000 Hz

CHANNEL: 120

REFERENCE VOLTAGE: 11.1 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	11.10	+ 20 (Ref)	5,600,007,349	7,349	0.000131
100 %		- 30	5,600,000,857	857	0.000015
100 %		- 20	5,599,990,267	-9,733	-0.000174
100 %		- 10	5,600,001,846	1,846	0.000033
100 %		0	5,599,992,539	-7,461	-0.000133
100 %		+ 10	5,599,990,778	-9,222	-0.000165
100 %		+ 20	5,599,991,998	-8,002	-0.000143
100 %		+ 30	5,599,988,533	-11,467	-0.000205
100 %		+ 40	5,599,988,015	-11,985	-0.000214
100 %		+ 50	5,600,008,645	8,645	0.000154
115 %	12.77	+ 20	5,599,992,170	-7,830	-0.000140
BATT. ENDPOINT	9.81	+ 20	5,600,012,594	12,594	0.000225

Table 6-13. Frequency Stability Measurements for UNII Band Ch. 120

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 43 of 69	

6.9 Radiated Spurious Emission Measurements

§15.407(b)(1), (6), §15.205, §15.209

The EUT was tested from 9kHz and up to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHZ. Above 1 GHz, peak measurements were taken using RBW = VBW = 1MHz and 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 6-14 per Section 15.209.

Frequency	Field Strength [mV/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 6-14. Radiated Limits

Sample Calculation

- Field Strength Level [dB μ V/m] = Analyzer Level [dBm] + 107 + AFCL [dB]

Notes:

- AFCL = Antenna Factor [dB] + Cable Loss [dB]

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 44 of 69	

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5180MHz



Channel: 36

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
10360.00	-88.36	Peak	V	48.83	-9.54	57.93	68.20	-10.27
* 15540.00	-135.00	Average	V	51.58	0.00	23.58	53.98	-30.40
* 15540.00	-125.00	Peak	V	51.58	0.00	33.58	73.98	-40.40
* 20720.00	-135.00	Average	V	57.04	0.00	29.04	53.98	-24.94
* 20720.00	-125.00	Peak	V	57.04	0.00	39.04	73.98	-34.94
25900.00	-125.00	Peak	V	56.66	0.00	38.66	68.20	-29.54

Table 6-15. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 45 of 69	

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5200MHz



Channel: 40

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
10400.00	-87.98	Peak	V	48.97	-9.54	58.45	68.20	-9.75
* 15600.00	-135.00	Average	V	51.91	0.00	23.91	53.98	-30.07
* 15600.00	-125.00	Peak	V	51.91	0.00	33.91	73.98	-40.07
* 20800.00	-135.00	Average	V	56.98	0.00	28.98	53.98	-24.99
* 20800.00	-125.00	Peak	V	56.98	0.00	38.98	73.98	-34.99
26000.00	-125.00	Peak	V	56.81	0.00	38.81	68.20	-29.39

Table 6-16. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 46 of 69	

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5240MHz



Channel: 48

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
10480.00	-88.71	Peak	V	48.95	-9.54	57.70	68.20	-10.50
* 15720.00	-135.00	Average	V	51.83	0.00	23.83	53.98	-30.15
* 15720.00	-125.00	Peak	V	51.83	0.00	33.83	73.98	-40.15
* 20960.00	-135.00	Average	V	57.00	0.00	29.00	53.98	-24.98
* 20960.00	-125.00	Peak	V	57.00	0.00	39.00	73.98	-34.98
26200.00	-125.00	Peak	V	56.77	0.00	38.77	68.20	-29.43

Table 6-17. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 47 of 69	

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5260MHz



Channel: 52

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
10520.00	-88.86	Peak	V	48.83	-9.54	57.43	68.20	-10.77
* 15780.00	-135.00	Average	V	51.58	0.00	23.58	53.98	-30.40
* 15780.00	-125.00	Peak	V	51.58	0.00	33.58	73.98	-40.40
* 21040.00	-135.00	Average	V	57.04	0.00	29.04	53.98	-24.94
* 21040.00	-125.00	Peak	V	57.04	0.00	39.04	73.98	-34.94
26300.00	-125.00	Peak	V	56.66	0.00	38.66	68.20	-29.54

Table 6-18. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 48 of 69

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5280MHz



Channel: 56

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
10560.00	-88.68	Peak	V	48.97	-9.54	57.75	68.20	-10.45
* 15840.00	-135.00	Average	V	51.91	0.00	23.91	53.98	-30.07
* 15840.00	-125.00	Peak	V	51.91	0.00	33.91	73.98	-40.07
* 21120.00	-135.00	Average	V	56.98	0.00	28.98	53.98	-24.99
* 21120.00	-125.00	Peak	V	56.98	0.00	38.98	73.98	-34.99
26400.00	-125.00	Peak	V	56.81	0.00	38.81	68.20	-29.39

Table 6-19. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 49 of 69

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5320MHz



Channel: 64

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
* 10640.00	-102.87	Average	V	49.02	-9.54	43.60	53.98	-10.38
* 10640.00	-88.47	Peak	V	49.02	-9.54	58.00	73.98	-15.98
* 15960.00	-135.00	Average	V	52.16	0.00	24.16	53.98	-29.82
* 15960.00	-125.00	Peak	V	52.16	0.00	34.16	73.98	-39.82
* 21280.00	-135.00	Average	V	56.96	0.00	28.96	53.98	-25.02
* 21280.00	-125.00	Peak	V	56.96	0.00	38.96	73.98	-35.02
26600.00	-125.00	Peak	V	56.78	0.00	38.78	68.20	-29.42

Table 6-20. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 50 of 69

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5500MHz



Channel: 100

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
* 11000.00	-102.56	Average	V	49.16	-9.54	44.06	53.98	-9.92
* 11000.00	-88.86	Peak	V	49.16	-9.54	57.76	73.98	-16.22
16500.00	-125.00	Peak	V	52.09	0.00	34.09	68.20	-34.11
22000.00	-125.00	Peak	V	56.81	0.00	38.81	68.20	-29.39
27500.00	-125.00	Peak	V	56.44	0.00	38.44	68.20	-29.76

Table 6-21. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 51 of 69

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5600MHz



Channel: 120

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
* 11200.00	-102.38	Average	V	49.47	-9.54	44.55	53.98	-9.43
* 11200.00	-88.48	Peak	V	49.47	-9.54	58.45	73.98	-15.53
16800.00	-125.00	Peak	V	53.69	0.00	35.69	68.20	-32.51
* 22400.00	-135.00	Average	V	56.92	0.00	28.92	53.98	-25.06
* 22400.00	-125.00	Peak	V	56.92	0.00	38.92	73.98	-35.06
28000.00	-125.00	Peak	V	56.20	0.00	38.20	68.20	-30.00

Table 6-22. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 52 of 69	

Radiated Spurious Emission Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11a

Transfer Rate: 6 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5700MHz



Channel: 140

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
* 11400.00	-102.50	Average	V	49.78	-9.54	44.74	53.98	-9.24
* 11400.00	-88.00	Peak	V	49.78	-9.54	59.24	73.98	-14.74
17100.00	-125.00	Peak	V	55.56	0.00	37.56	68.20	-30.64
* 22800.00	-135.00	Average	V	56.74	0.00	28.74	53.98	-25.24
* 22800.00	-125.00	Peak	V	56.74	0.00	38.74	73.98	-35.24
28500.00	-125.00	Peak	V	55.61	0.00	37.61	68.20	-30.59

Table 6-23. Radiated Measurements @ 1 meter

NOTES:

- All harmonics that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz.
- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Peak Measurements > 1GHz using RBW = VBW = 1MHz.
- 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 10th 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.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 53 of 69	

6.10 Radiated Restricted Band Edge Measurements

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11n

Transfer Rate: 13.5/15 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5190MHz



Channel: 38

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
5104.50	-102.16	Average	V	41.33	-9.54	36.63	53.98	-17.35
5104.50	-91.96	Peak	V	41.33	-9.54	46.83	73.98	-27.15
5131.80	-98.44	Average	V	41.34	-9.54	40.35	53.98	-13.63
5131.80	-82.74	Peak	V	41.34	-9.54	56.05	73.98	-17.93
5148.70	-93.74	Average	V	41.34	-9.54	45.05	53.98	-8.93
5148.70	-76.54	Peak	V	41.34	-9.54	62.25	73.98	-11.73

Table 6-24. Radiated Restricted Band Measurements at 1-meter

NOTES:

- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 54 of 69

Radiated Restricted Band Edge Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11n

Transfer Rate: 13.5/15 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5310MHz



Channel: 62

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
5352.20	-99.43	Average	V	41.97	-9.54	40.00	53.98	-13.98
5352.20	-79.73	Peak	V	41.97	-9.54	59.70	73.98	-14.28
5357.90	-100.73	Average	V	41.98	-9.54	38.71	53.98	-15.27
5357.90	-82.63	Peak	V	41.98	-9.54	56.81	73.98	-17.17
5365.10	-102.73	Average	V	41.98	-9.54	36.71	53.98	-17.27
5365.10	-83.03	Peak	V	41.98	-9.54	56.41	73.98	-17.57

Table 6-25. Radiated Restricted Band Measurements at 1-meter

NOTES:

- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 55 of 69

Radiated Restricted Band Edge Measurements (Cont'd)

§15.407(b)(1) and (2), §15.205 & §15.209

Mode: 802.11n

Transfer Rate: 13.5/15 Mbps

Distance of Measurements: 1 Meter

Operating Frequency: 5510MHz



Channel: 102

Frequency [MHz]	Analyzer Level [dBm]	Detector	Pol. [H/V]	AFCL [dB]	Distance Correction Factor [dB]	Field Strength [dBmV/m]	Limit [dBmV/m]	Margin [dB]
5459.80	-99.47	Average	H	42.93	-9.54	40.91	53.98	-13.07
5459.80	-81.47	Peak	H	42.93	-9.54	58.91	73.98	-15.07
5455.30	-101.37	Average	H	43.03	-9.54	39.11	53.98	-14.87
5455.30	-81.77	Peak	H	43.03	-9.54	58.71	73.98	-15.27
5445.80	-103.38	Average	H	43.10	-9.54	37.18	53.98	-16.80
5445.80	-86.58	Peak	H	43.10	-9.54	53.98	73.98	-20.00

Table 6-26. Radiated Restricted Band Measurements at 1-meter

NOTES:

- All emissions that lie in the restricted bands (denoted by a * next to the frequency) specified in §15.205 are below the limit shown in Table 6-14.
- Average Measurements > 1GHz using RBW = 1MHz VBW = 10Hz.
- 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 10th 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 μ V/m (54dB μ /m) at 3 meters radiated.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 56 of 69	

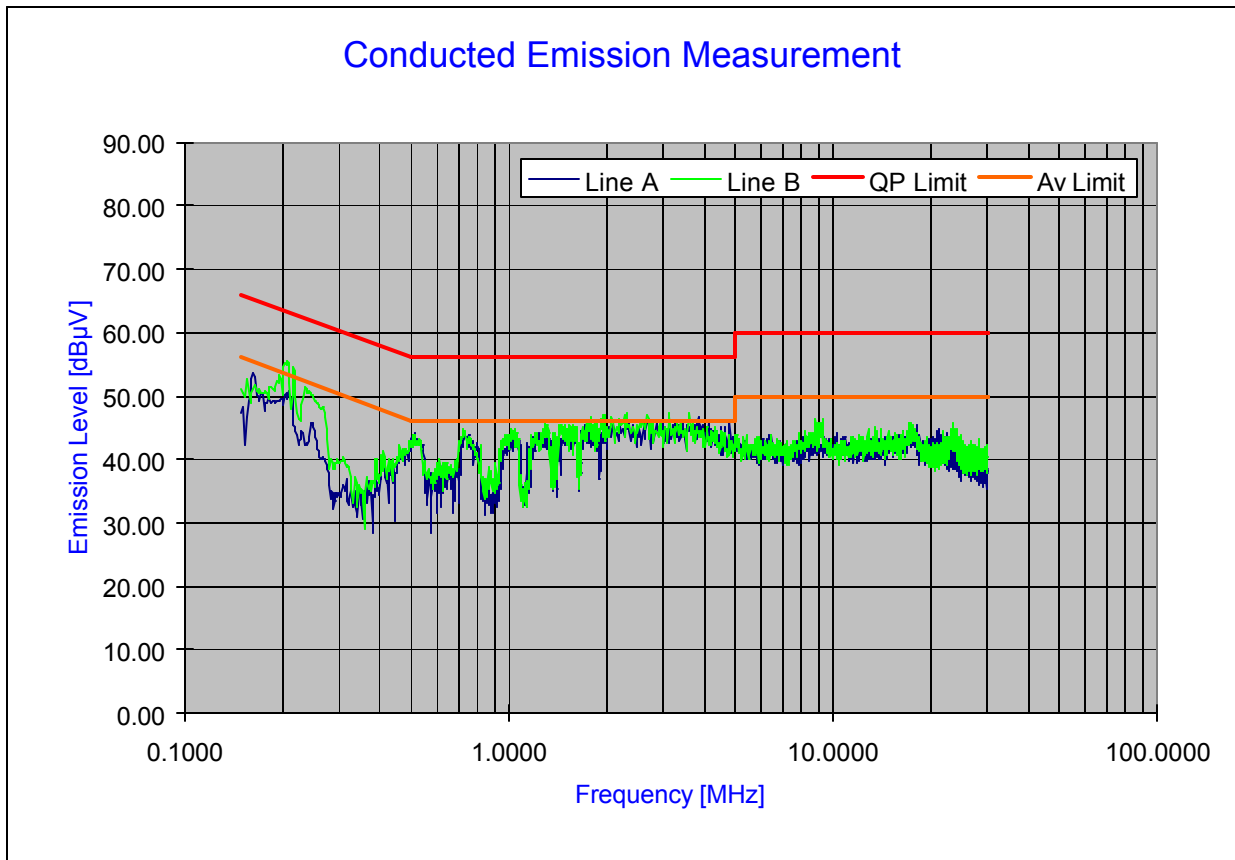
6.11 Line-Conducted Test Data

§15.207

PCTEST Engineering Laboratory Inc.

Company : Panasonic Corporation
 Model Number : CF-52
 FCC ID Code : ACJ9TGCF-524
 Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
 Tested Date : 03/27/2009
 Note : Tested with 802.11a
 UNII Band 1 ON





Ver.1.1 ©PCTEST 2006.08

Plot 6-49. Line Conducted Plot with 802.11a (UNII Band I)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 57 of 69	

Line-Conducted Test Data (Cont'd)



§15.207

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBμV]	Limit [dBμV]	Margin [dB]	Average [dBμV]	Limit [dBμV]	Margin [dB]
1	A	1.533	7.36	39.63	56.00	-16.37	26.81	46.00	-19.19
2	A	1.707	7.37	40.05	56.00	-15.95	27.24	46.00	-18.76
3	A	1.787	7.38	39.51	56.00	-16.49	26.75	46.00	-19.25
4	A	1.811	7.38	40.36	56.00	-15.64	27.29	46.00	-18.71
5	A	1.853	7.38	39.90	56.00	-16.10	24.51	46.00	-21.49
6	A	1.976	7.39	39.17	56.00	-16.83	26.39	46.00	-19.61
7	A	3.336	7.46	39.54	56.00	-16.46	29.23	46.00	-16.77
8	A	3.891	7.48	39.96	56.00	-16.04	30.00	46.00	-16.00
9	A	4.567	7.50	39.50	56.00	-16.50	31.00	46.00	-15.00
10	A	4.842	7.51	38.41	56.00	-17.59	30.79	46.00	-15.21
11	B	0.204	7.91	48.67	63.45	-14.78	44.82	53.45	-8.63
12	B	0.210	7.91	48.64	63.43	-14.79	43.77	53.43	-9.66
13	B	1.781	7.38	40.73	56.00	-15.27	26.17	46.00	-19.83
14	B	1.835	7.38	37.91	56.00	-18.09	24.27	46.00	-21.73
15	B	1.918	7.38	40.26	56.00	-15.74	27.15	46.00	-18.85
16	B	1.971	7.39	39.15	56.00	-16.85	26.66	46.00	-19.34
17	B	2.082	7.40	41.54	56.00	-14.46	27.74	46.00	-18.26
18	B	2.300	7.41	40.57	56.00	-15.43	27.60	46.00	-18.40
19	B	3.085	7.45	42.00	56.00	-14.00	31.35	46.00	-14.65
20	B	3.564	7.47	41.09	56.00	-14.91	30.70	46.00	-15.30

Table 6-27. Line Conducted Data with 802.11a (UNII Band I)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

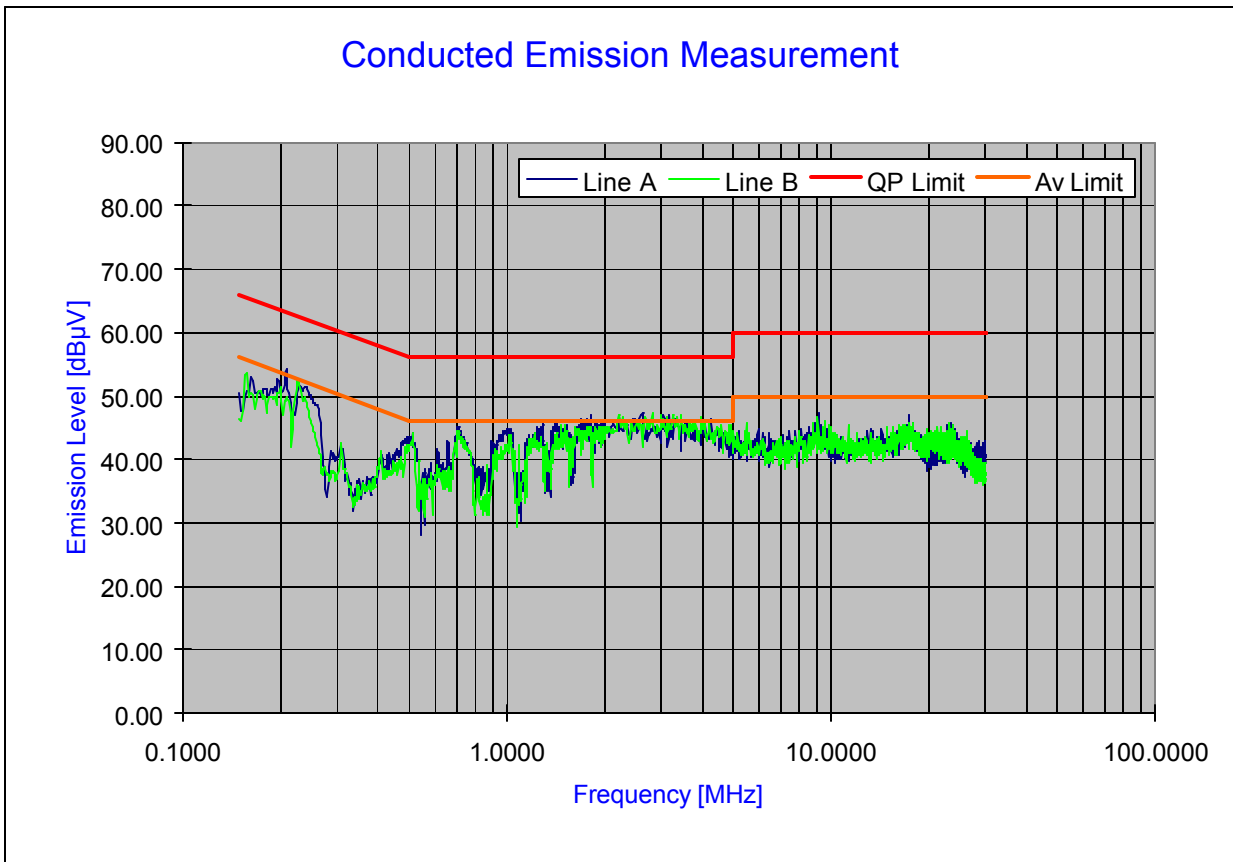
FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 58 of 69	

Line-Conducted Test Data (Cont'd)
§15.207

PCTEST Engineering Laboratory Inc.

Company : Panasonic Corporation
 Model Number : CF-52
 FCC ID Code : ACJ9TGCF-524
 Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
 Tested Date : 03/27/2009
 Note : Tested with 802.11a
 UNII Band 2 ON





Ver.1.1 ©PCTEST 2006.08

Plot 6-50. Line Conducted Plot with 802.11a (UNII Band II)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 59 of 69



Line-Conducted Test Data (Cont'd)
§15.207

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBµV]	Limit [dBµV]	Margin [dB]	Average [dBµV]	Limit [dBµV]	Margin [dB]
1	A	0.205	7.91	47.99	63.40	-15.41	40.29	53.40	-13.11
2	A	1.675	7.37	40.04	56.00	-15.96	25.88	46.00	-20.12
3	A	1.730	7.37	41.11	56.00	-14.89	26.51	46.00	-19.49
4	A	1.745	7.37	41.32	56.00	-14.68	26.26	46.00	-19.74
5	A	1.808	7.38	40.35	56.00	-15.65	25.18	46.00	-20.82
6	A	2.271	7.41	41.17	56.00	-14.83	26.76	46.00	-19.24
7	A	2.586	7.42	42.75	56.00	-13.25	29.56	46.00	-16.44
8	A	3.300	7.46	41.45	56.00	-14.55	31.27	46.00	-14.73
9	A	3.544	7.46	41.77	56.00	-14.23	29.42	46.00	-16.58
10	A	4.245	7.49	39.90	56.00	-16.10	30.49	46.00	-15.51
11	B	0.235	7.80	48.10	62.26	-14.16	29.43	52.26	-22.83
12	B	2.133	7.40	40.83	56.00	-15.17	29.18	46.00	-16.82
13	B	2.336	7.41	42.21	56.00	-13.79	26.62	46.00	-19.38
14	B	2.760	7.43	41.33	56.00	-14.67	27.50	46.00	-18.50
15	B	2.797	7.43	42.31	56.00	-13.69	30.62	46.00	-15.38
16	B	3.261	7.45	42.62	56.00	-13.38	31.70	46.00	-14.30
17	B	3.290	7.46	41.21	56.00	-14.79	30.30	46.00	-15.70
18	B	3.502	7.46	42.33	56.00	-13.67	31.77	46.00	-14.23
19	B	3.738	7.47	42.22	56.00	-13.78	28.97	46.00	-17.03
20	B	3.981	7.48	41.68	56.00	-14.32	31.52	46.00	-14.48

Table 6-28. Line Conducted Data with 802.11a (UNII Band II)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

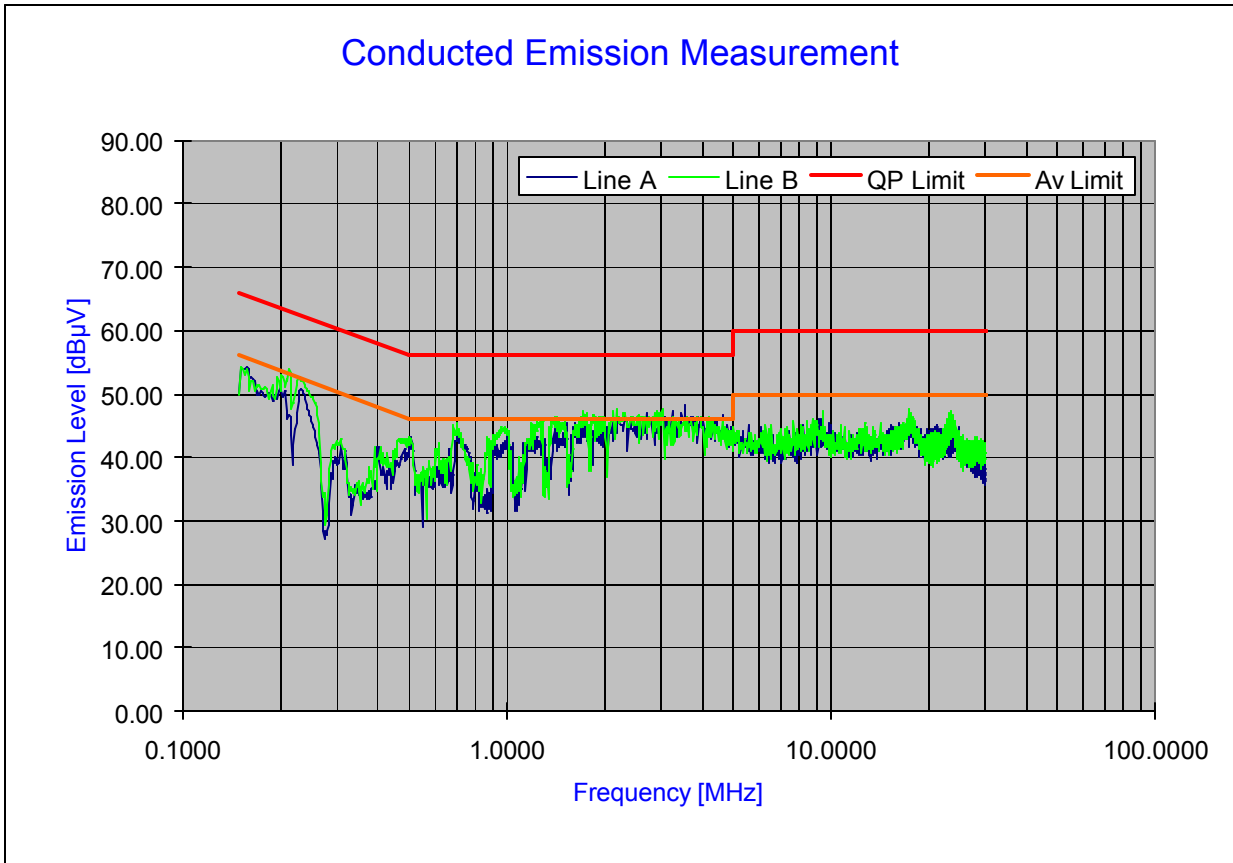
FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 60 of 69	

Line-Conducted Test Data (Cont'd)
§15.207

PCTEST Engineering Laboratory Inc.

Company : Panasonic Corporation
 Model Number : CF-52
 FCC ID Code : ACJ9TGCF-524
 Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
 Tested Date : 03/27/2009
 Note : Tested with 802.11a
 UNII Band 3 ON





Ver.1.1 ©PCTEST 2006.08

Plot 6-51. Line Conducted Plot with 802.11a (UNII Band III)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 61 of 69	

Line-Conducted Test Data (Cont'd)



§15.207

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBμV]	Limit [dBμV]	Margin [dB]	Average [dBμV]	Limit [dBμV]	Margin [dB]
1	A	1.519	7.35	40.86	56.00	-15.14	29.32	46.00	-16.68
2	A	1.624	7.36	42.62	56.00	-13.38	30.96	46.00	-15.04
3	A	1.721	7.37	40.47	56.00	-15.53	26.80	46.00	-19.20
4	A	2.668	7.43	40.41	56.00	-15.59	29.03	46.00	-16.97
5	A	3.480	7.46	42.58	56.00	-13.42	30.88	46.00	-15.12
6	A	3.699	7.47	42.64	56.00	-13.36	30.88	46.00	-15.12
7	A	3.850	7.48	41.15	56.00	-14.85	31.30	46.00	-14.70
8	A	4.164	7.49	41.97	56.00	-14.03	31.47	46.00	-14.53
9	A	4.406	7.49	41.12	56.00	-14.88	30.48	46.00	-15.52
10	A	4.629	7.50	40.71	56.00	-15.29	30.39	46.00	-15.61
11	B	0.204	7.92	48.28	63.47	-15.19	46.09	53.47	-7.38
12	B	1.723	7.37	41.93	56.00	-14.07	26.00	46.00	-20.00
13	B	1.758	7.37	41.37	56.00	-14.63	25.10	46.00	-20.90
14	B	1.841	7.38	44.13	56.00	-11.87	28.29	46.00	-17.71
15	B	1.919	7.38	39.99	56.00	-16.01	26.26	46.00	-19.74
16	B	1.966	7.39	40.72	56.00	-15.28	26.03	46.00	-19.97
17	B	1.988	7.39	42.92	56.00	-13.08	26.07	46.00	-19.93
18	B	2.074	7.40	42.99	56.00	-13.01	26.86	46.00	-19.14
19	B	2.297	7.41	43.23	56.00	-12.77	26.75	46.00	-19.25
20	B	2.989	7.44	43.40	56.00	-12.60	30.23	46.00	-15.77

Table 6-29. Line Conducted Data with 802.11a (UNII Band III)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

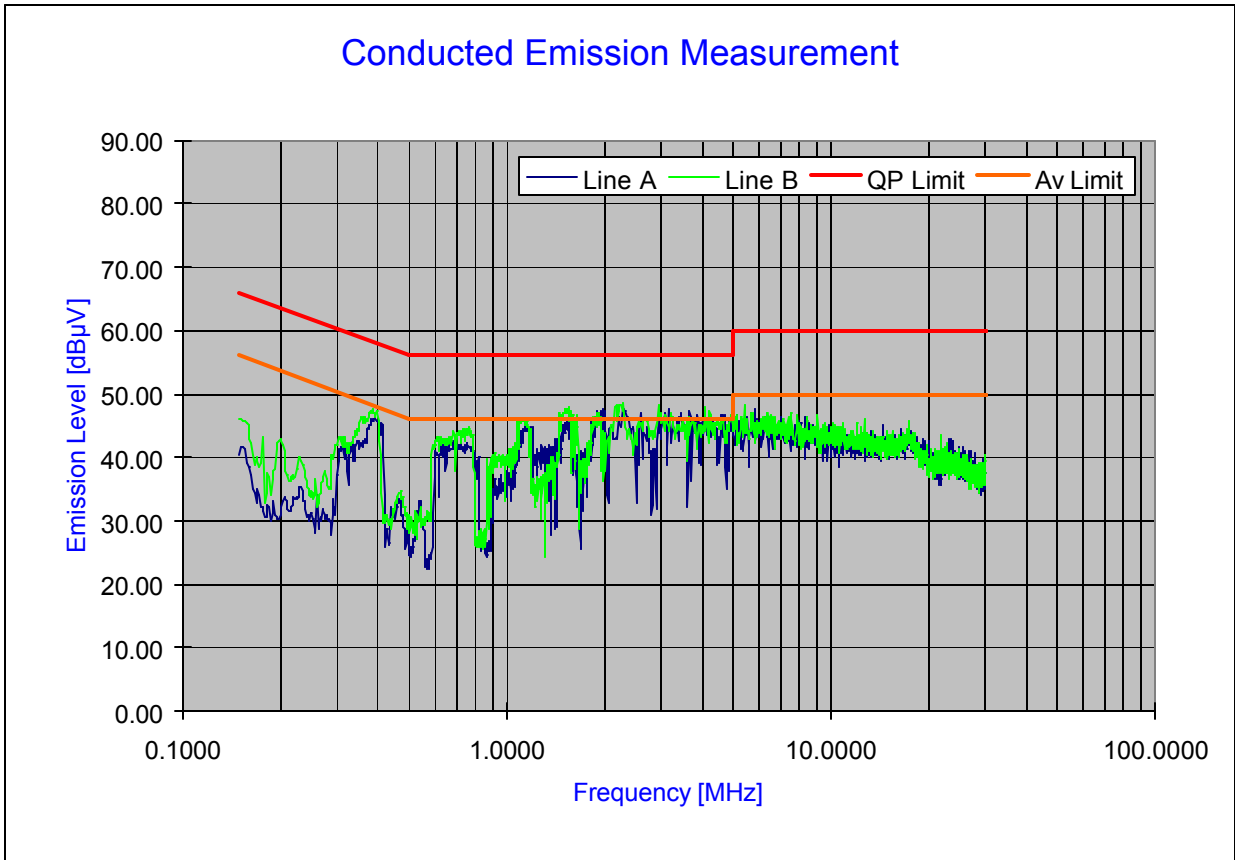
FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 62 of 69	

Line-Conducted Test Data (Cont'd)
§15.207

PCTEST Engineering Laboratory Inc.

Company : Panasonic Corporation
 Model Number : CF-52
 FCC ID Code : ACJ9TGCF-524
 Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
 Tested Date : 03/27/2009
 Note : Tested with 802.11n
 UNII Band 1 ON





Ver.1.1 ©PCTEST 2006.08

Plot 6-52. Line Conducted Plot with 802.11n (UNII Band I)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 63 of 69	



Line-Conducted Test Data (Cont'd)
§15.207

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBμV]	Limit [dBμV]	Margin [dB]	Average [dBμV]	Limit [dBμV]	Margin [dB]
1	A	1.956	7.39	43.37	56.00	-12.63	23.38	46.00	-22.62
2	A	2.004	7.39	35.59	56.00	-20.41	22.78	46.00	-23.22
3	A	2.277	7.41	44.72	56.00	-11.28	28.99	46.00	-17.01
4	A	2.638	7.43	44.14	56.00	-11.86	30.15	46.00	-15.85
5	A	2.996	7.44	44.47	56.00	-11.53	30.95	46.00	-15.05
6	A	3.097	7.45	42.98	56.00	-13.02	27.53	46.00	-18.47
7	A	3.389	7.46	43.40	56.00	-12.60	29.32	46.00	-16.68
8	A	3.748	7.47	41.62	56.00	-14.38	26.72	46.00	-19.28
9	A	3.785	7.47	42.59	56.00	-13.41	29.24	46.00	-16.76
10	A	4.605	7.50	40.80	56.00	-15.20	29.79	46.00	-16.21
11	B	1.452	7.35	38.12	56.00	-17.88	21.94	46.00	-24.06
12	B	1.550	7.36	44.57	56.00	-11.43	25.40	46.00	-20.60
13	B	1.575	7.36	41.66	56.00	-14.34	21.72	46.00	-24.28
14	B	1.601	7.36	36.27	56.00	-19.73	21.17	46.00	-24.83
15	B	1.905	7.38	43.21	56.00	-12.79	28.58	46.00	-17.42
16	B	2.258	7.41	45.45	56.00	-10.55	30.53	46.00	-15.47
17	B	3.007	7.44	44.03	56.00	-11.97	31.02	46.00	-14.98
18	B	4.136	7.48	40.07	56.00	-15.93	29.26	46.00	-16.74
19	B	4.222	7.49	41.74	56.00	-14.26	29.69	46.00	-16.31
20	B	4.956	7.51	41.11	56.00	-14.89	30.56	46.00	-15.44

Table 6-30. Line Conducted Data with 802.11n (UNII Band I)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

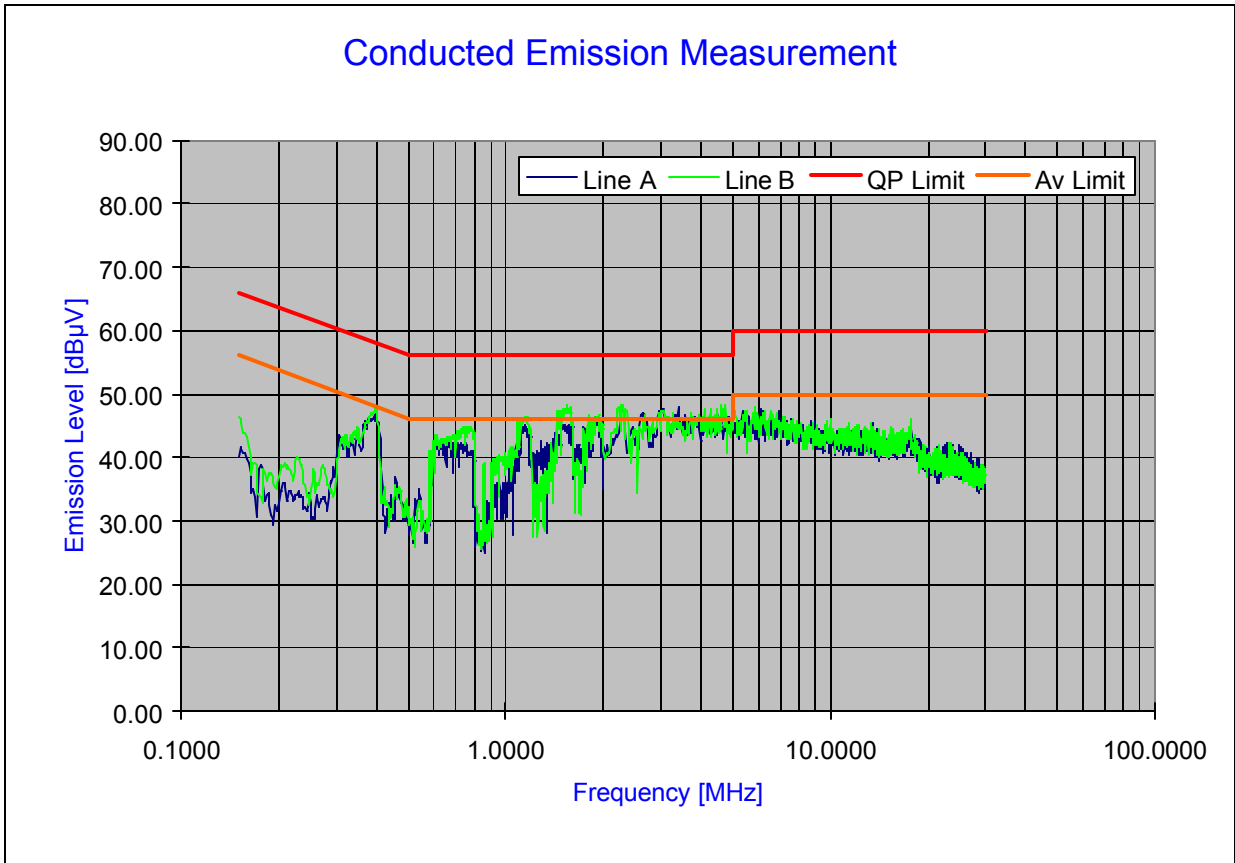
FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 64 of 69	

Line-Conducted Test Data (Cont'd)
§15.207

PCTEST Engineering Laboratory Inc.

Company : Panasonic Corporation
 Model Number : CF-52
 FCC ID Code : ACJ9TGCF-524
 Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
 Tested Date : 03/27/2009
 Note : Tested with 802.11n
 UNII Band 2 ON





Ver.1.1 ©PCTEST 2006.08

Plot 6-53. Line Conducted Plot with 802.11n (UNII Band II)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 65 of 69	



Line-Conducted Test Data (Cont'd)
§15.207

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBµV]	Limit [dBµV]	Margin [dB]	Average [dBµV]	Limit [dBµV]	Margin [dB]
1	A	1.889	7.38	43.23	56.00	-12.77	28.60	46.00	-17.40
2	A	1.932	7.39	43.09	56.00	-12.91	26.08	46.00	-19.92
3	A	1.975	7.39	36.51	56.00	-19.49	22.91	46.00	-23.09
4	A	2.268	7.41	44.71	56.00	-11.29	30.36	46.00	-15.64
5	A	2.636	7.43	44.42	56.00	-11.58	29.81	46.00	-16.19
6	A	3.381	7.46	43.85	56.00	-12.15	29.58	46.00	-16.42
7	A	3.749	7.47	42.78	56.00	-13.22	30.20	46.00	-15.80
8	A	3.897	7.48	41.74	56.00	-14.26	27.20	46.00	-18.80
9	A	4.606	7.50	40.90	56.00	-15.10	27.67	46.00	-18.33
10	A	4.874	7.51	41.36	56.00	-14.64	26.94	46.00	-19.06
11	B	1.422	7.35	36.92	56.00	-19.08	21.08	46.00	-24.92
12	B	1.468	7.35	44.69	56.00	-11.31	24.82	46.00	-21.18
13	B	1.547	7.36	45.54	56.00	-10.46	28.41	46.00	-17.59
14	B	1.924	7.39	43.62	56.00	-12.38	25.34	46.00	-20.66
15	B	2.286	7.41	45.93	56.00	-10.07	29.34	46.00	-16.66
16	B	3.007	7.44	44.39	56.00	-11.61	30.53	46.00	-15.47
17	B	3.768	7.47	41.18	56.00	-14.82	28.73	46.00	-17.27
18	B	4.171	7.49	41.47	56.00	-14.53	28.80	46.00	-17.20
19	B	4.208	7.49	41.29	56.00	-14.71	27.35	46.00	-18.65
20	B	4.726	7.50	42.27	56.00	-13.73	27.89	46.00	-18.11

Table 6-31. Line Conducted Data with 802.11a (UNII Band II)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

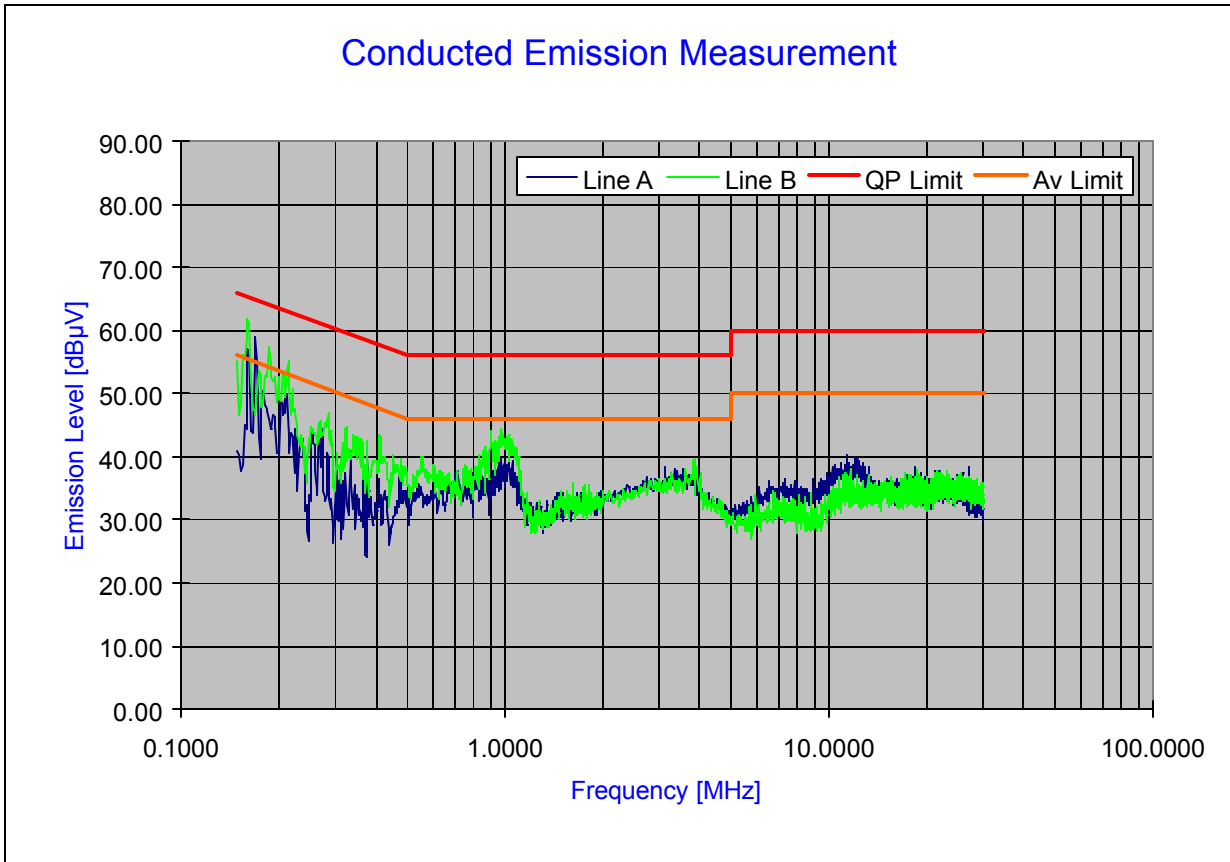
FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 66 of 69	

Line-Conducted Test Data (Cont'd)
§15.207

PCTEST Engineering Laboratory Inc.

Company : Panasonic Corporation
 Model Number : CF-19
 FCC ID Code : ACJ9TGCF-19C
 Standard : FCC Part 15C, 15.207

Power Source : AC120V/60Hz
 Tested Date : 01/23/2009
 Note : Tested with 802.11n
 UNII Band 3 ON





Ver.1.1 ©PCTEST 2006.08

Plot 6-54. Line Conducted Plot with 802.11n (UNII Band III)

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 67 of 69



Line-Conducted Test Data (Cont'd)
§15.207

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBμV]	Limit [dBμV]	Margin [dB]	Average [dBμV]	Limit [dBμV]	Margin [dB]
1	A	1.828	7.38	40.54	56.00	-15.46	25.12	46.00	-20.88
2	A	1.888	7.38	43.21	56.00	-12.79	30.35	46.00	-15.65
3	A	1.928	7.39	41.89	56.00	-14.11	27.87	46.00	-18.13
4	A	2.229	7.40	42.15	56.00	-13.85	23.54	46.00	-22.46
5	A	2.241	7.41	44.88	56.00	-11.12	29.99	46.00	-16.01
6	A	2.612	7.43	44.81	56.00	-11.19	29.93	46.00	-16.07
7	A	3.032	7.44	43.93	56.00	-12.07	27.28	46.00	-18.72
8	A	4.107	7.48	43.16	56.00	-12.84	29.84	46.00	-16.16
9	A	4.856	7.51	40.93	56.00	-15.07	26.78	46.00	-19.22
10	A	4.996	7.51	41.01	56.00	-14.99	29.74	46.00	-16.26
11	B	1.471	7.35	38.06	56.00	-17.94	21.32	46.00	-24.68
12	B	1.572	7.36	45.19	56.00	-10.81	25.85	46.00	-20.15
13	B	1.578	7.36	41.27	56.00	-14.73	24.29	46.00	-21.71
14	B	2.272	7.41	45.74	56.00	-10.26	30.17	46.00	-15.83
15	B	3.144	7.45	40.28	56.00	-15.72	26.22	46.00	-19.78
16	B	3.775	7.47	41.51	56.00	-14.49	28.34	46.00	-17.66
17	B	4.039	7.48	40.51	56.00	-15.49	26.84	46.00	-19.16
18	B	4.228	7.49	41.64	56.00	-14.36	26.77	46.00	-19.23
19	B	4.653	7.50	42.50	56.00	-13.50	30.02	46.00	-15.98
20	B	4.979	7.51	42.18	56.00	-13.82	30.02	46.00	-15.98

Table 6-32. Line Conducted Data with 802.11n (UNII Band III)



Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot made using a peak detector.
5. Deviations to the Specifications: None.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52	Page 68 of 69	

7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Panasonic Toughbook Model: CF-52** **FCC ID: ACJ9TGCF-524** is in compliance with Part 15E of the FCC Rules.

FCC ID: ACJ9TGCF-524		FCC Pt. 15.407 802.11a/n UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0903050403.ACJ	Test Dates: March 27, 2009	EUT Type: Toughbook Model: CF-52		Page 69 of 69