

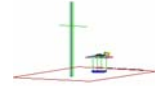


PCTEST ENGINEERING LABORATORY, INC.

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<http://www.pctestlab.com>



MEASUREMENT REPORT FCC Part 15.407 UNII 802.11a/n/ac

Applicant Name:

Panasonic Corporation of North America
Two Riverfront Plaza, 9th Floor
Newark, NJ 07102-5490
United States

Date of Testing:

12/17/2014-02/13/2015

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Test Report Serial No.:

0Y1412152290.ACJ

FCC ID:

ACJ9TGWL13A

APPLICANT:

Panasonic Corporation of North America

Application Type:

Class II Permissive Change

Model(s):

WL13A

EUT Type:

Wireless Network Adapter

FCC Classification:

Unlicensed National Information Infrastructure (UNII)

FCC Rule Part(s):

Part 15.407

Test Procedure(s):

KDB 789033 D02 v01, KDB 644545 v01r02, KDB 662911 D01 v02r01

Class II Permissive Change:

The wireless module FCC ID: ACJ9TGWL13A is integrated into the host tablet FZ-R1

Original Grant Date:

09/11/2013

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 KDB 789033 D02 v01 and KDB 644545 v01r02. Test results reported herein relate only to the item(s) tested.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.


Randy Ortanez
President



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MEASUREMENT REPORT

FCC Part 15.407



§ 2.1033 General Information

APPLICANT: Panasonic Corporation of North America

APPLICANT ADDRESS: Two Riverfront Plaza, 9th Floor
Newark, NJ 07102-5490, United States

TEST SITE: PCTEST ENGINEERING LABORATORY, INC.

TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21046 USA

FCC RULE PART(S): Part 15.407

BASE MODEL: WL13A

FCC ID: ACJ9TGWL13A

FCC CLASSIFICATION: Unlicensed National Information Infrastructure (UNII)

Test Device Serial No.: WWAN 3, WLAN 1 ☐ Production ☒ Pre-Production ☐ Engineering

DATE(S) OF TEST: 12/17/2014-02/13/2015

TEST REPORT S/N: 0Y1412152290.ACJ

Test Facility / Accreditations

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



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (2451B-1).
- PCTEST Lab is accredited to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (2451B-1) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.



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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, the Baltimore-Washington Intern'l (BWI) airport, the city of Baltimore and the Washington, DC area. (See Figure 1-1).

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.

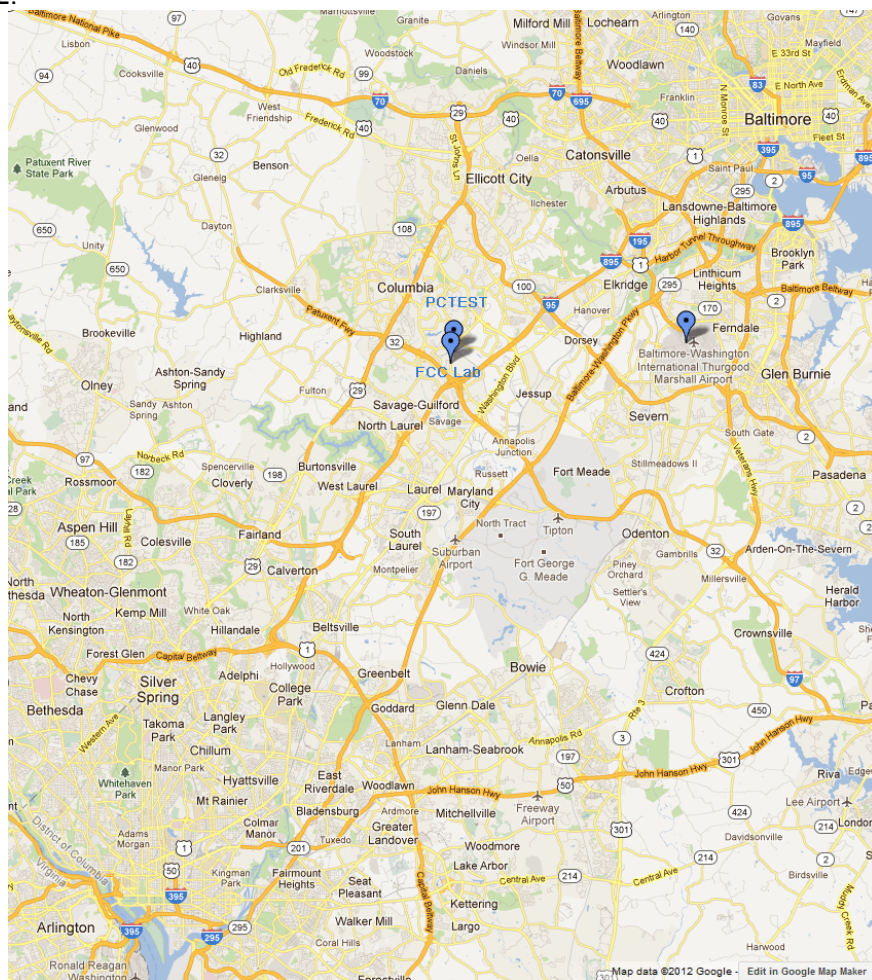


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Panasonic Wireless Network Adapter FCC ID: ACJ9TGWL13A**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

2.2 Device Capabilities

This device contains the following capabilities:

802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE)

Notes: The 5600 - 5650MHz band cannot transmit in the absence of an approved master AP and ad-hoc mode is always disabled on this band. This restriction is based on the grant condition of Intel. Please see letter from Intel in this application.

5GHz NII operation is possible in 20MHz, and 40MHz, and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of KDB 789033. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Maximum Achievable Duty Cycles				
802.11 Mode/Band		Duty Cycle [%]		
		ANT1	ANT2	MIMO
5GHz	a	99.30	99.30	N/A
	n (HT20)	99.20	99.20	99.20
	n (HT40)	98.50	98.50	98.20
	ac (HT80)	95.28	93.57	91.95

The device employs MIMO technology. Below are the possible configurations.

WiFi Configurations		SISO		SDM	
		ANT1	ANT2	ANT1	ANT2
5GHz	11a	✓	✓	✗	✗
	11n (20MHz)	✓	✓	✓	✓
	11n (40MHz)	✓	✓	✓	✓
	11ac (80MHz)	✓	✓	✓	✓

Table 2-1. Frequency / Channel Operations

✓ = Support ; ✗ = NOT Support

SISO = Single Input Single Output

SDM = Spatial Diversity Multiplexing – MIMO function

Data Rate(s) Tested: 6, 9, 12, 18, 24, 36, 48, 54Mbps (802.11a)
 6.5/7.2, 13/14.4, 19.5/21.7, 26/28.9, 39/43.3, 52/57.8, 58.5/65, 65/72.2 (n – 20MHz)
 13.5/15, 27/30, 40.5/45, 54/60, 81/90, 108/120, 121.5/135, 135/150 (n – 40MHz BW)
 29.3/32.5, 58.5/65, 87.8/97.5, 117/130, 175.5/195, 234/260, 263.3/292.5, 292.5/325, 351/390,
 390/433.3 (ac – 80MHz BW)

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2.3 Test Configuration

The Panasonic Wireless Network Adapter FCC ID: ACJ9TGWL13A was tested per the guidance of KDB 789033 D02 v01. ANSI C63.10-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing. See Section 3.2 for radiated emissions test setups.

2.4 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) and the guidance provided in KDB 789033 D02 v01 were used in the measurement of **Panasonic Wireless Network Adapter FCC ID: ACJ9TGWL13A**.

Deviation from measurement procedure.....None

3.2 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Clause 5, Figure 5.7 of ANSI C63.4-2009. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

3.3 Environmental Conditions

The temperature is controlled within range of 15°C to 35°C. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

- The antennas of the Wireless Network Adapter are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The **Panasonic Wireless Network Adapter FCC ID: ACJ9TGWL13A** unit complies with the requirement of §15.203.

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5180	52	5260	100	5500	149	5745
:	:	:	:	:	:	:	:
42	5210	56	5280	116	5580	157	5785
:	:	:	:	:	:	:	:
48	5240	64	5320	144	5720	165	5825

Table 4-1. 802.11a / 802.11n / 802.11ac (20MHz) Frequency / Channel Operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5190	54	5270	102	5510	151	5755
:	:	:	:	:	:	:	:
46	5230	62	5310	110	5550	159	5795
				:	:		
				142	5710		

Table 4-2. 802.11n / 802.11ac (40MHz BW) Frequency / Channel Operations

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775
				:	:		
				138	5690		

Table 4-3. 802.11ac (80MHz BW) Frequency / Channel Operations

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	3/25/2014	Annual	3/25/2015	N/A
-	WL40-1	Conducted Cable Set (40GHz)	10/14/2014	Annual	10/14/2015	N/A
Agilent	8447D	Broadband Amplifier	5/30/2014	Annual	5/30/2015	2443A01900
Agilent	N9020A	MXA Signal Analyzer	10/27/2014	Annual	10/27/2015	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/8/2014	Annual	5/8/2015	MY52350166
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	6/26/2013	Biennial	6/26/2015	121034
Emco	3115	Horn Antenna (1-18GHz)	1/30/2014	Biennial	1/30/2016	9704-5182
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
ETS Lindgren	3160-10	26.5-40 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	130993
Huber+Suhner	Sucoflex 102A	40GHz Radiated Cable	10/15/2014	Annual	10/15/2015	251425001
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	2
K & L	11SH10-3075/U18000	High Pass Filter	12/1/2014	Annual	12/1/2015	4
K & L	6000/T18000	High Pass Filter	12/1/2014	Annual	12/1/2015	1
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	1/27/2014	Annual	1/27/2015	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/21/2014	Annual	5/21/2015	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2014	Annual	3/5/2015	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/12/2014	Annual	3/12/2015	100040
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	5/15/2014	Annual	5/15/2015	100037
Seekonk	NC-100	Torque Wrench (8" lb)	3/18/2014	Biennial	3/18/2016	N/A
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107
VWR	62344-734	Thermometer with Clock	2/20/2014	Biennial	2/20/2016	140140336

Table 5-1. Annual Test Equipment Calibration Schedule

Note:

For equipment listed above that has a calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.

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6.0 TEST RESULTS

6.1 Summary

Company Name: Panasonic Corporation of North America
 FCC ID: ACJ9TGWL13A
 Method/System: Unlicensed National Information Infrastructure (UNII)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)					
N/A	26dB Bandwidth	N/A	CONDUCTED	PASS	Section 6.2
15.407(e)	6dB Bandwidth	>500kHz(5725-5850MHz)		PASS	Section 6.2
15.407 (a.1)	Maximum Conducted Output Power	< 250mW (23.98dBm) (5150-5250MHz) N/A (5250-5350MHz) < 250mW (23.98dBm) (5470-5725MHz) < 1W (30dBm) (5825-5850MHz)		PASS	Section 6.4
15.407 (a.1), (5)	Maximum Power Spectral Density	< 11 dBm/MHz (5150-5250MHz, 5250-5350MHz, 5470-5725MHz) < 30 dBm/500kHz (5725-5850MHz)		PASS	Section 6.5
15.407(h)	Dynamic Frequency Selection	See DFS Test Report		PASS	See DFS Test Report
15.407(b.1), (2),(3)	Undesirable Emissions	< -27 dBm/MHz EIRP (outside 5150-5350MHz, 5470-5725MHz, 5715-5860MHz) < -17 dBm/MHz EIRP (within 5715-5725MHz and 5850-5860MHz)	RADIATED	PASS	Section 6.6
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 6.6

Table 6-1. Summary of Test Results

Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "UNII Automation", Version 3.4.

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6.2 26dB Bandwidth Measurement – 802.11a/n/ac

Test Overview and Limit

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 at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

The 26dB bandwidth is used to determine the conducted power limits.

Test Procedure Used

KDB 789033 D02 v01 – Section C

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 26$. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

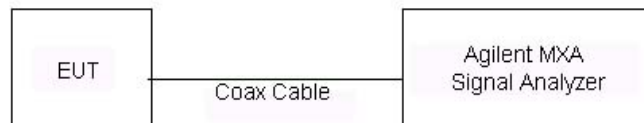


Figure 6-1. Test Instrument & Measurement Setup

Test Notes

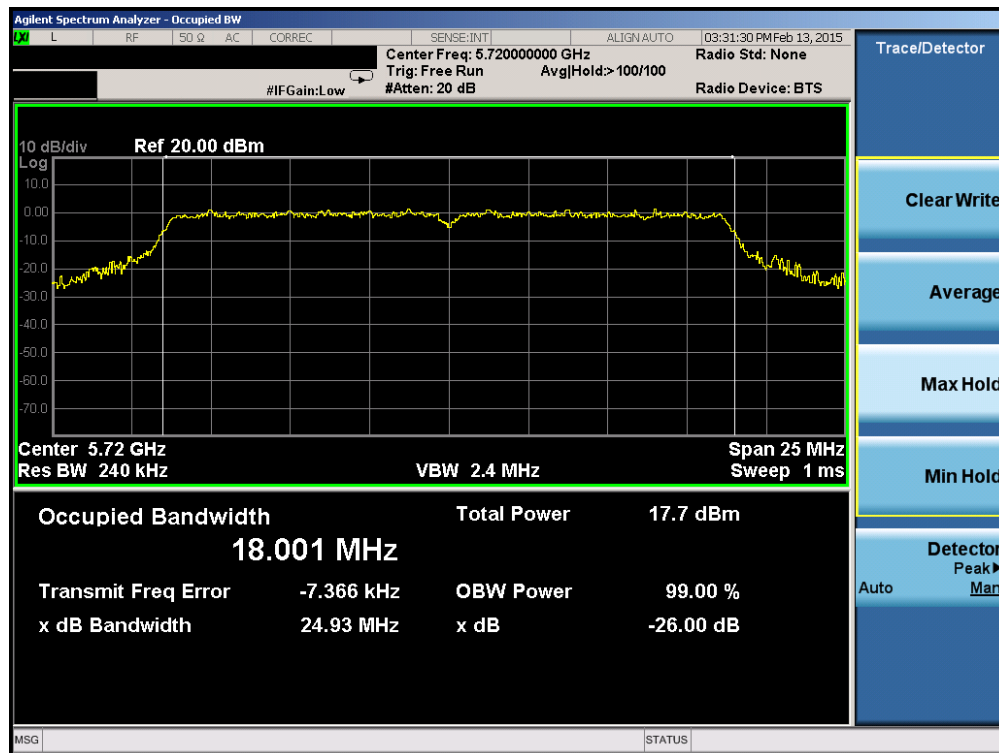
None.

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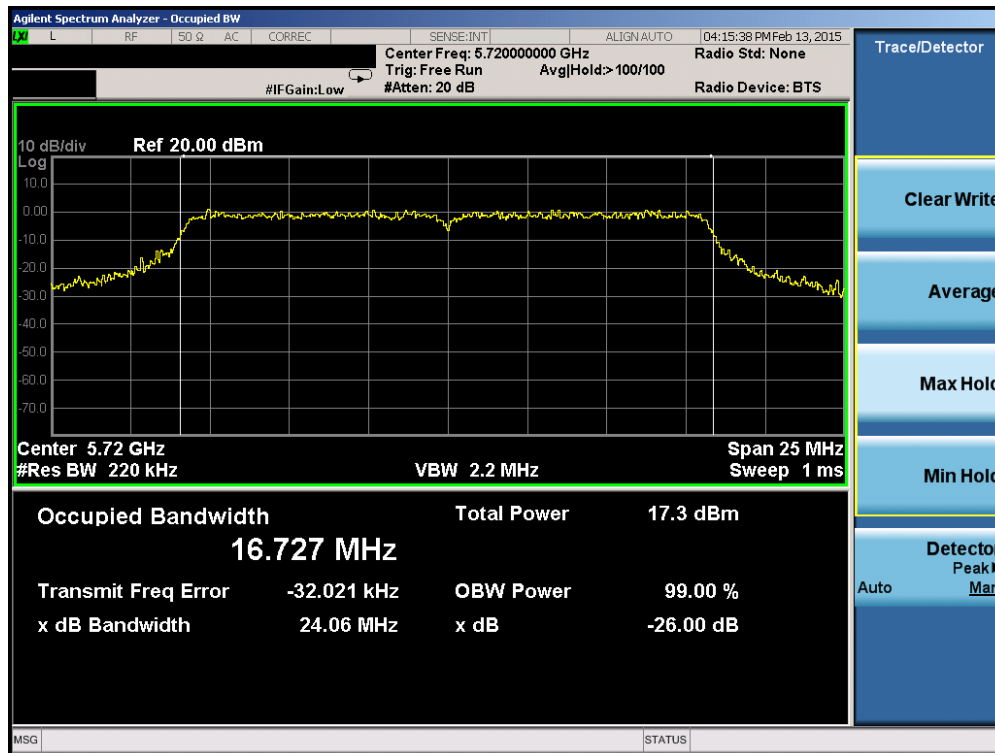
Antenna-1 26 dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
Band Gap	5720	144	a	6	24.94
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	24.06
	5710	142	n (40MHz)	13.5/15 (MCS0)	49.71
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	80.70

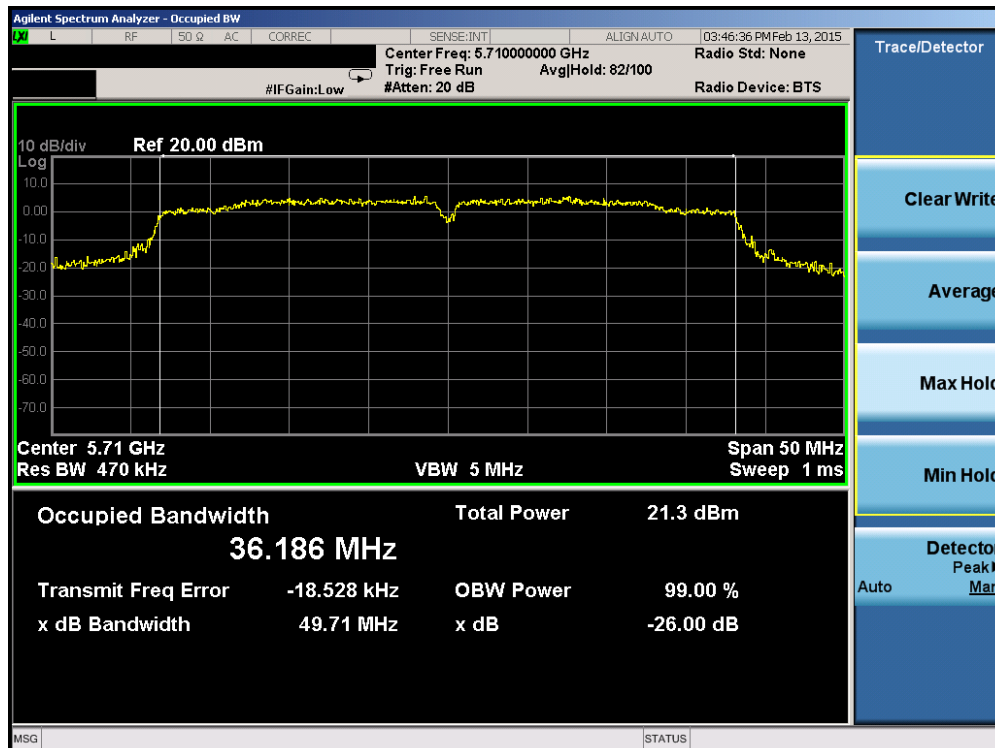
Table 6-2. Conducted Bandwidth Measurements



Plot 6-1. 26dB Bandwidth Plot (802.11a (UNII Band Gap) – Ch. 144)

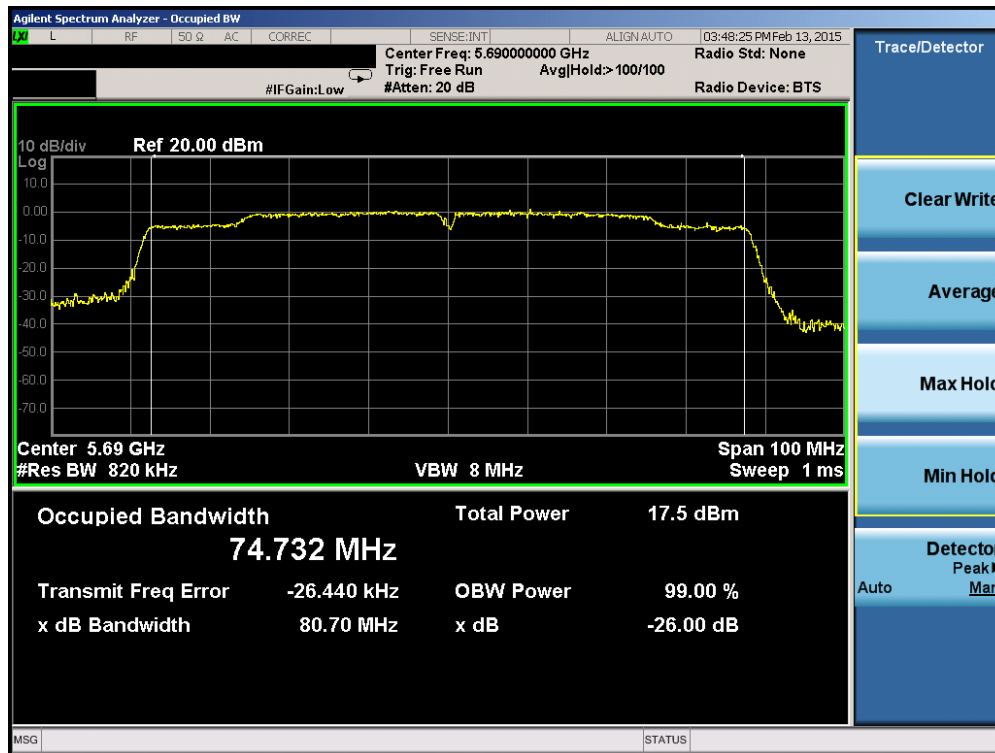


Plot 6-2. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band Gap) – Ch. 144)



Plot 6-3. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band Gap) – Ch. 142)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 13 of 103



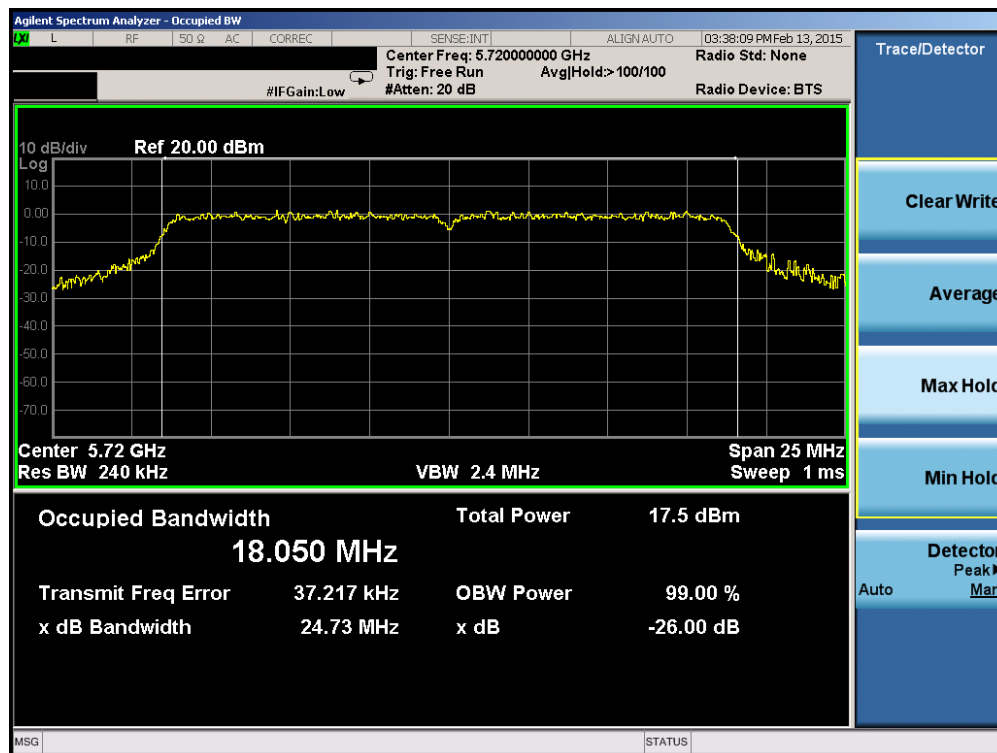
Plot 6-4. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band Gap) – Ch. 138)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 14 of 103

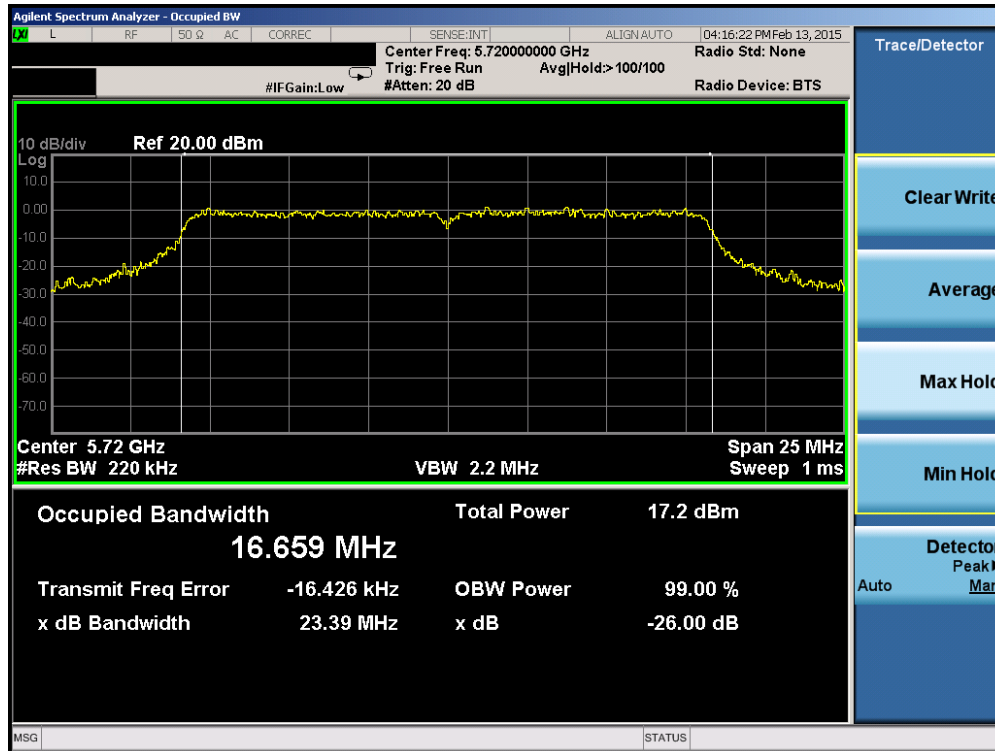
Antenna-2 26dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
Band Gap	5720	144	a	6	24.73
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	23.39
	5710	142	n (40MHz)	13.5/15 (MCS0)	47.34
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	80.32

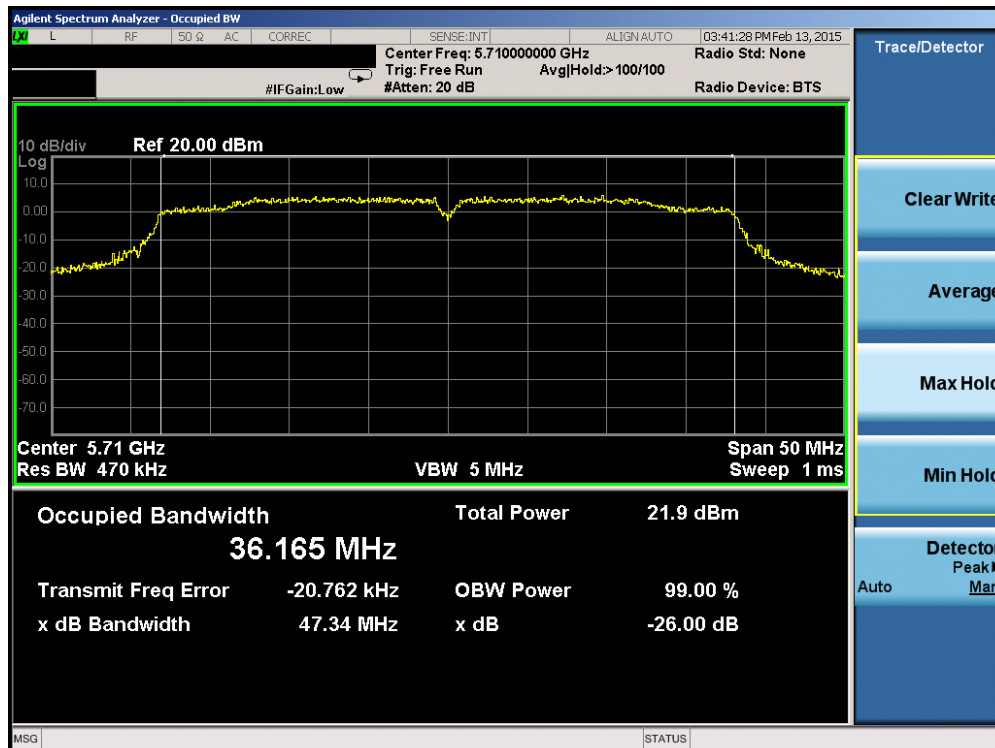
Table 6-3. Conducted Bandwidth Measurements



Plot 6-5. 26dB Bandwidth Plot (802.11a (UNII Band Gap) – Ch. 144)

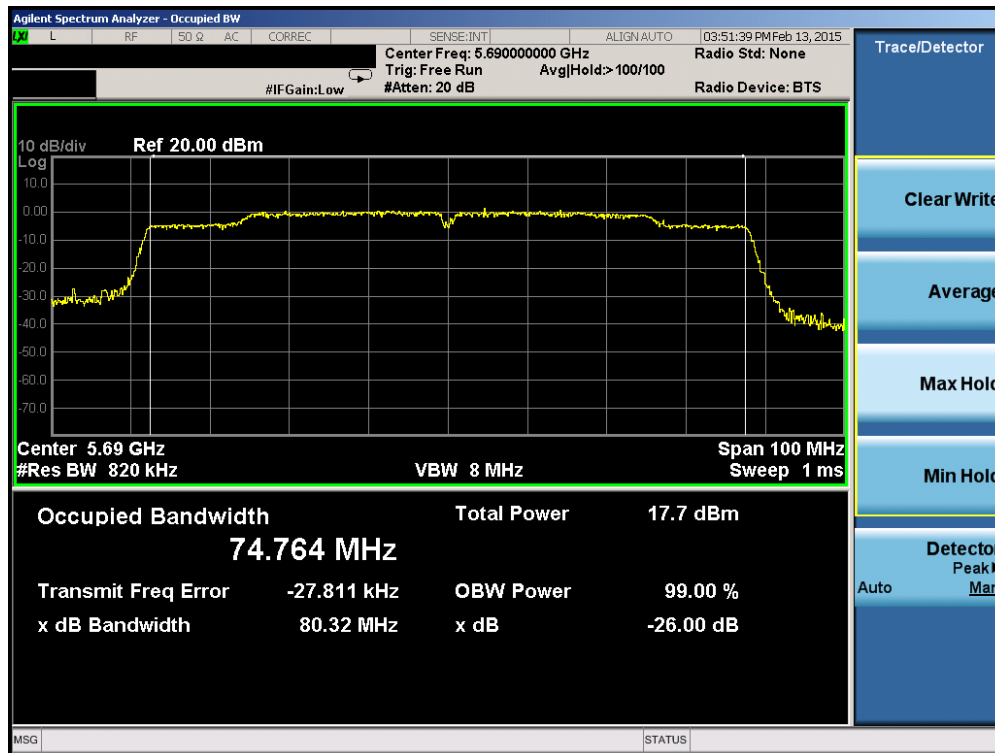


Plot 6-6. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band Gap) – Ch. 144)



Plot 6-7. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band Gap) – Ch. 142)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 16 of 103



Plot 6-8. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band Gap) – Ch. 138)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 17 of 103

6.3 6dB Bandwidth Measurement – 802.11a/n/ac

Test Overview and Limit

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 6dB bandwidth.

In the 5.725 – 5.850GHz band, the 6dB bandwidth must be ≥ 500 kHz.

Test Procedure Used

KDB 789033 D02 v01 – Section C

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 100 kHz
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

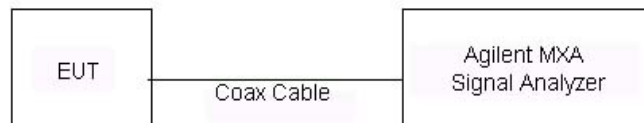


Figure 6-2. Test Instrument & Measurement Setup

Test Notes

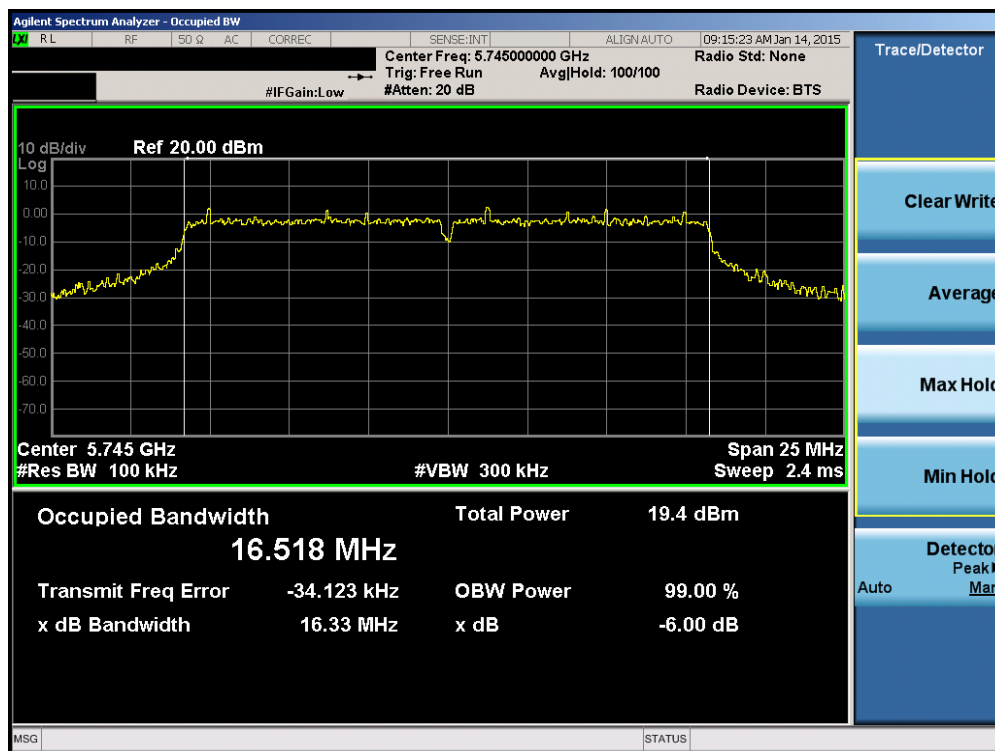
None.

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter	Page 18 of 103	

Antenna-1 6 dB Bandwidth Measurements

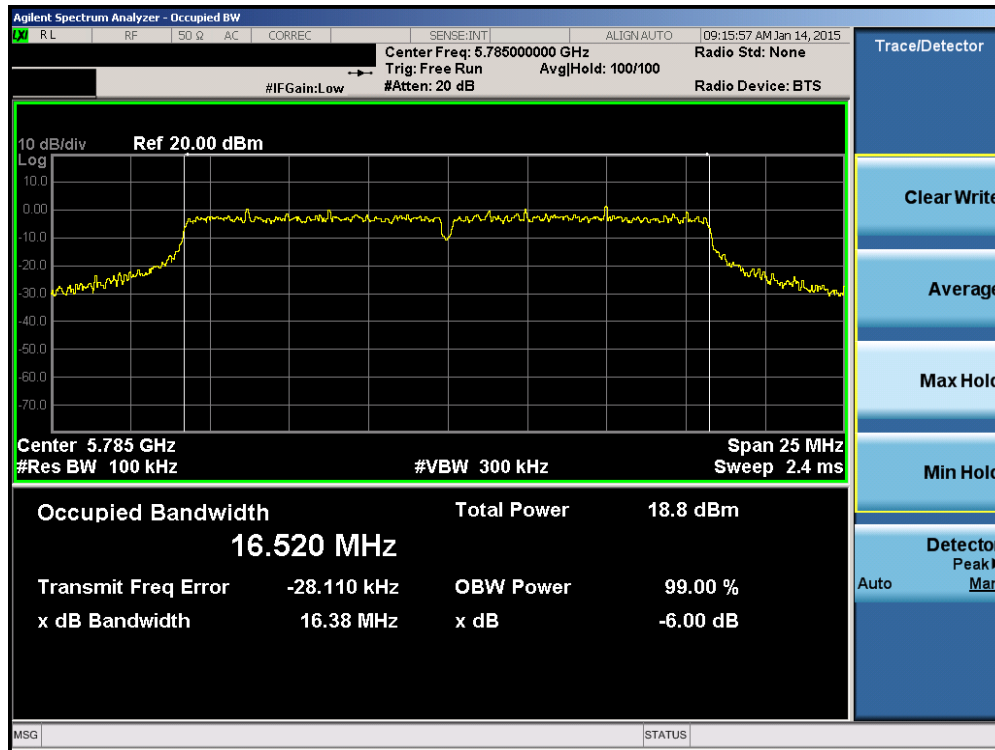
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
Band 3	5745	149	a	6	16.33
	5785	157	a	6	16.38
	5825	165	a	6	16.36
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.60
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.62
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.64
	5755	151	n (40MHz)	13.5/15 (MCS0)	35.02
	5795	159	n (40MHz)	13.5/15 (MCS0)	35.11
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.12

Table 6-4. Conducted Bandwidth Measurements

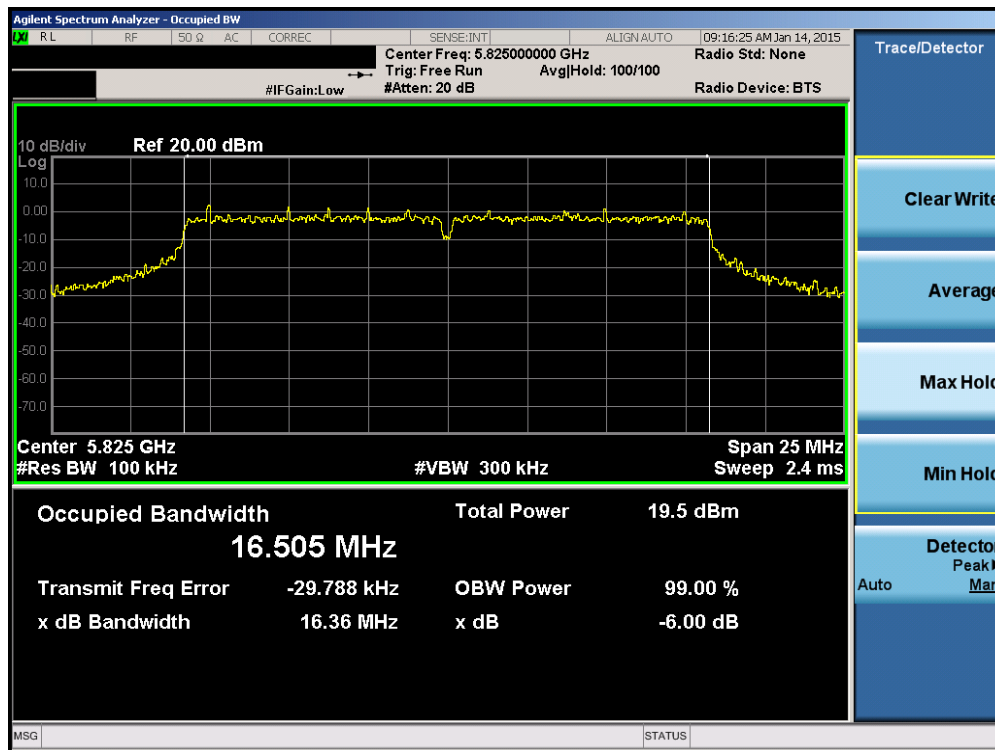


Plot 6-9. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 149)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 19 of 103

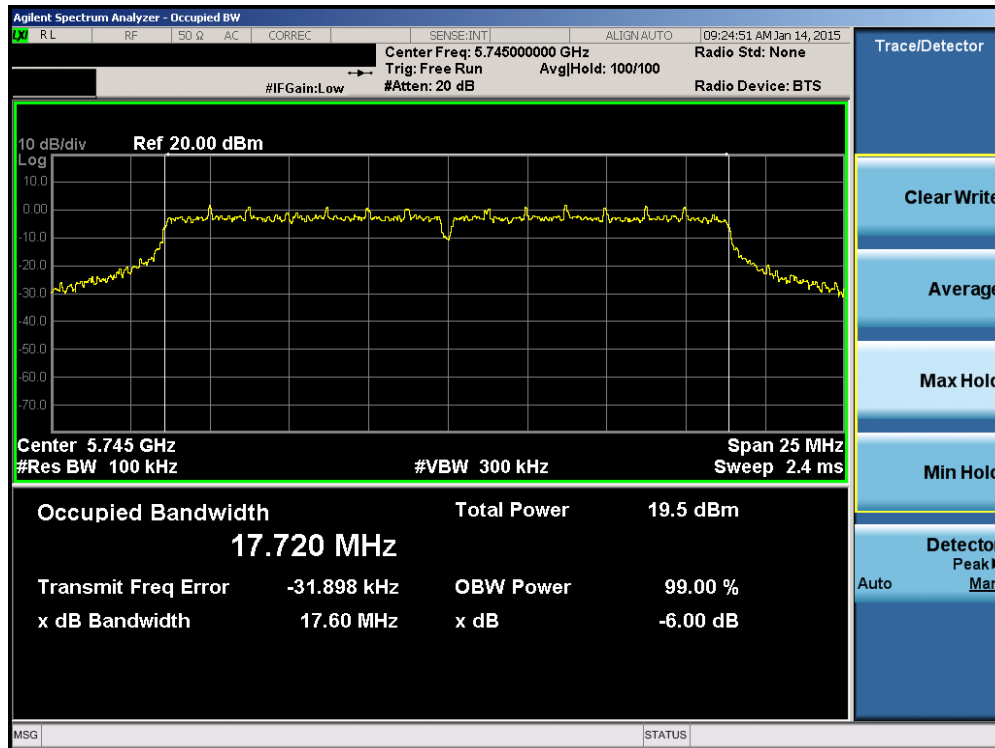


Plot 6-10. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 157)

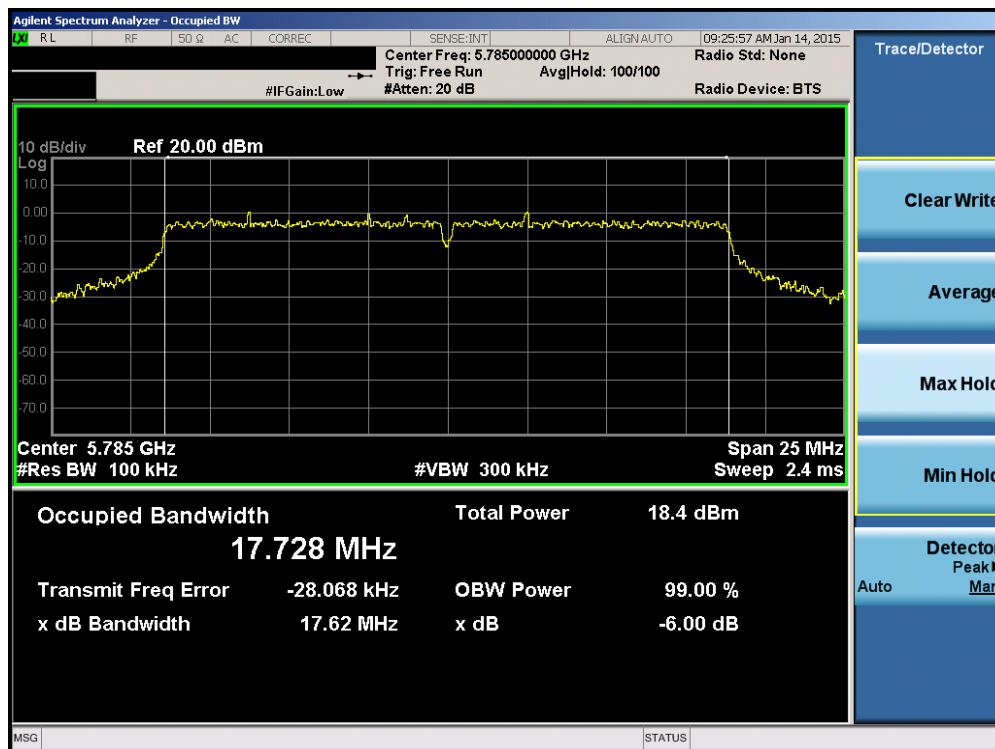


Plot 6-11. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 165)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 20 of 103

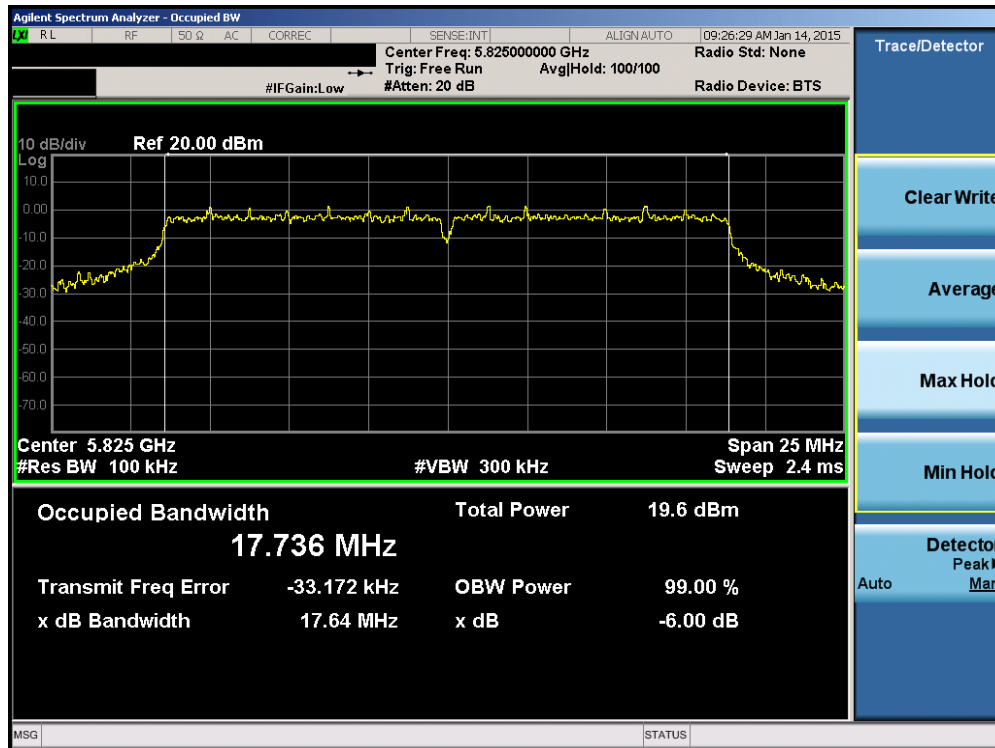


Plot 6-12. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

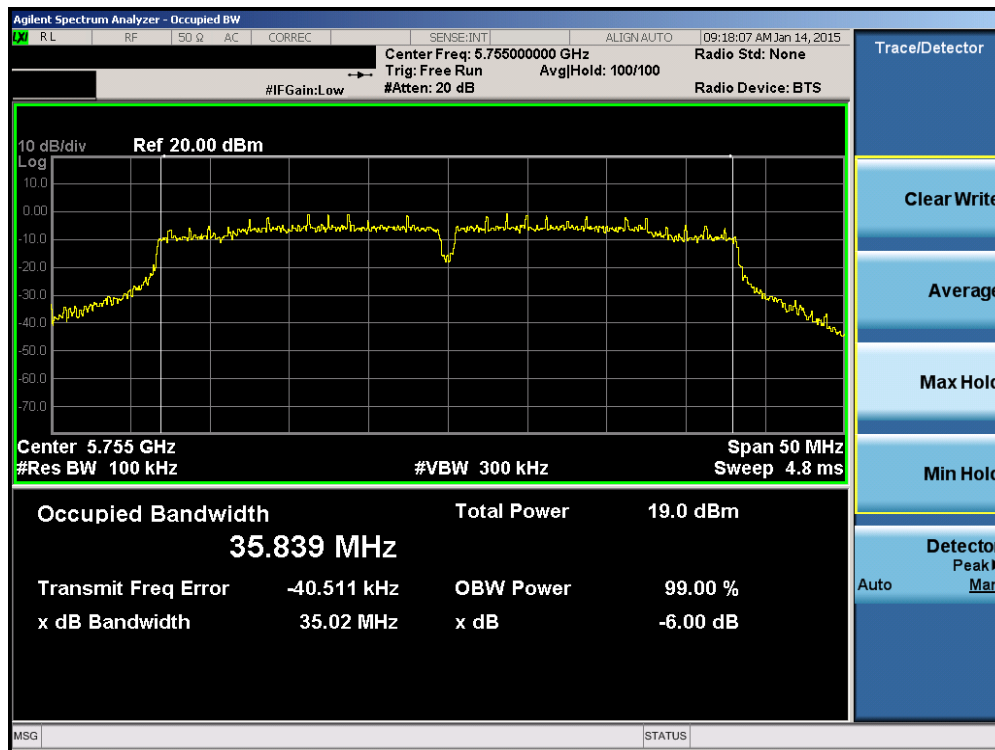


Plot 6-13. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 21 of 103

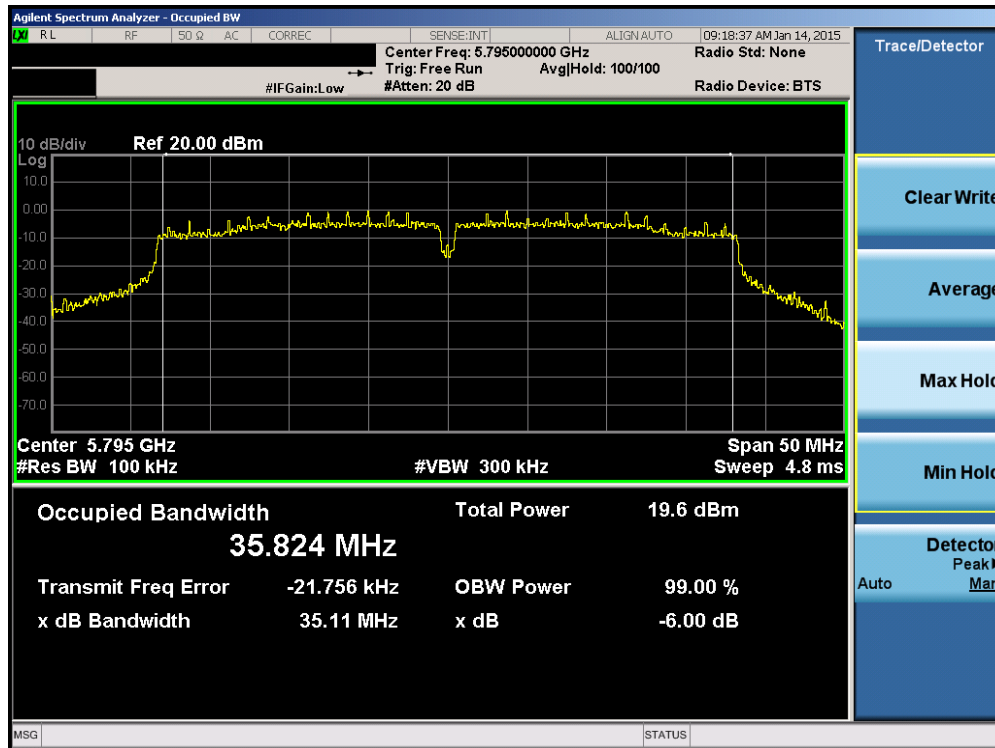


Plot 6-14. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

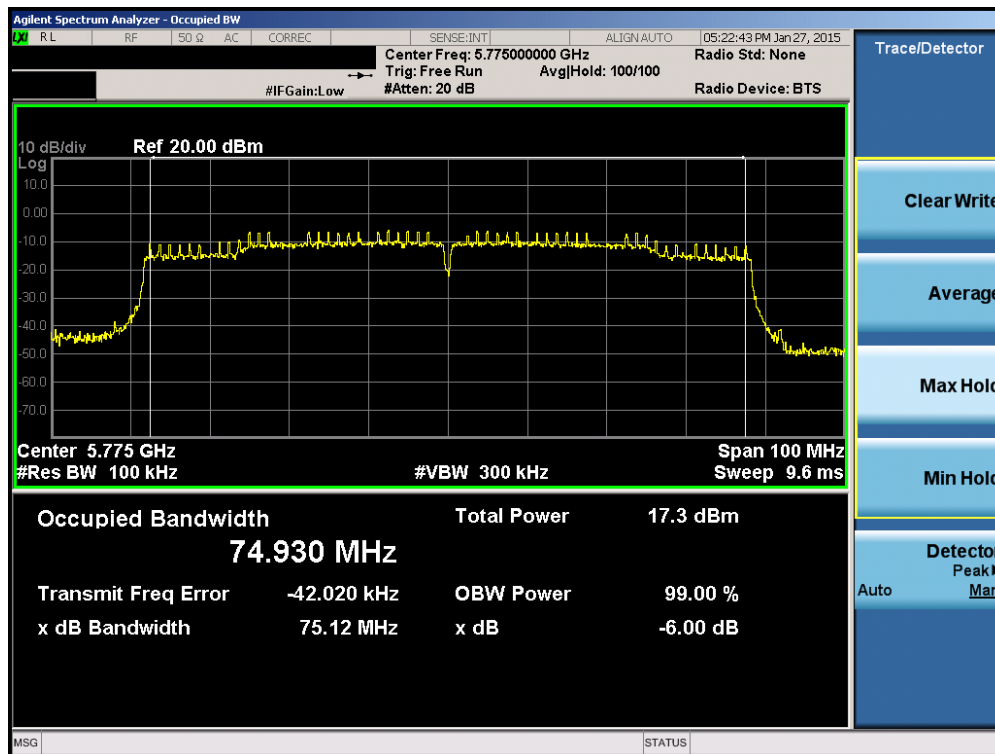


Plot 6-15. 6dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 22 of 103



Plot 6-16. 6dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



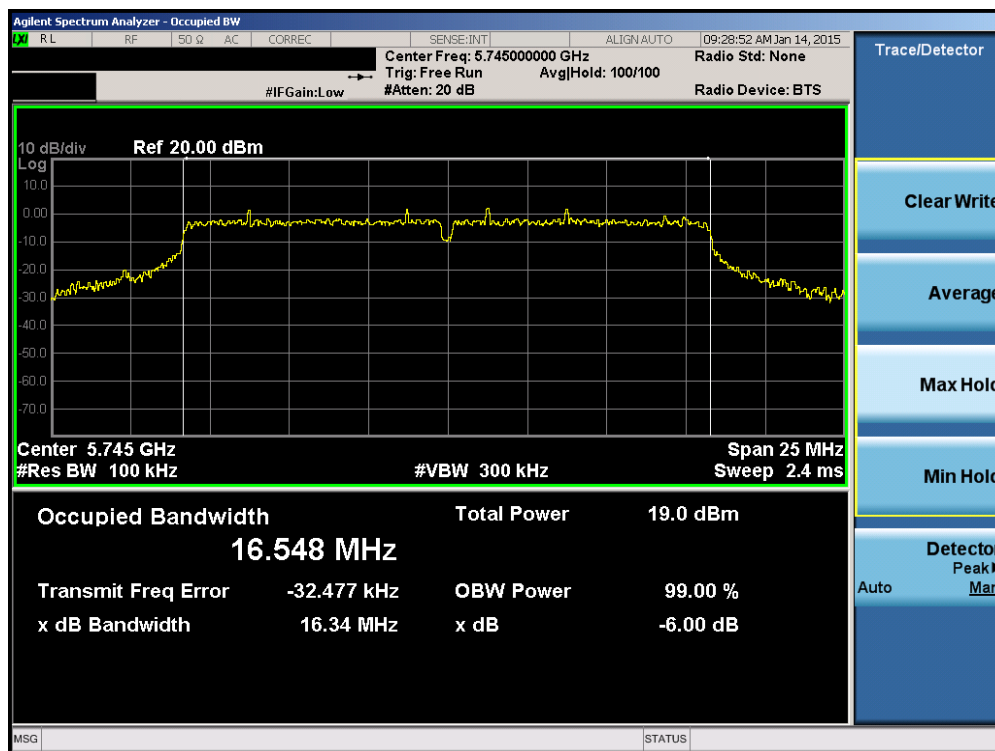
Plot 6-17. 6dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 23 of 103

Antenna-2 6dB Bandwidth Measurements

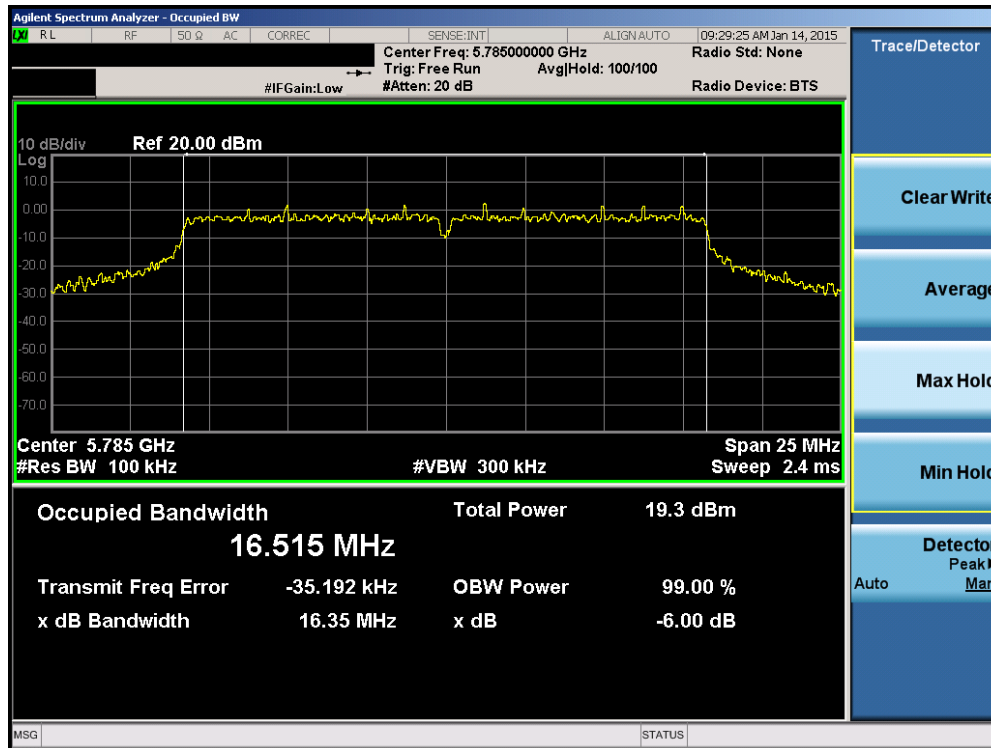
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
Band 3	5745	149	a	6	16.34
	5785	157	a	6	16.35
	5825	165	a	6	16.35
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.58
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.61
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.59
	5755	151	n (40MHz)	13.5/15 (MCS0)	33.87
	5795	159	n (40MHz)	13.5/15 (MCS0)	35.10
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.14

Table 6-5. Conducted Bandwidth Measurements

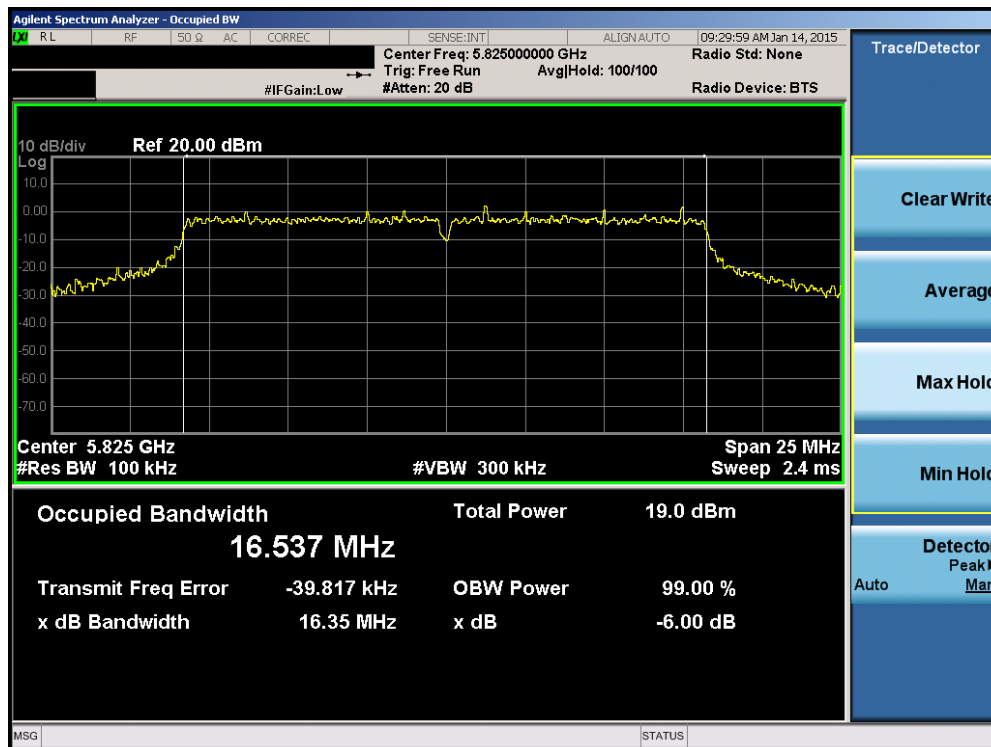


Plot 6-18. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 149)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 24 of 103

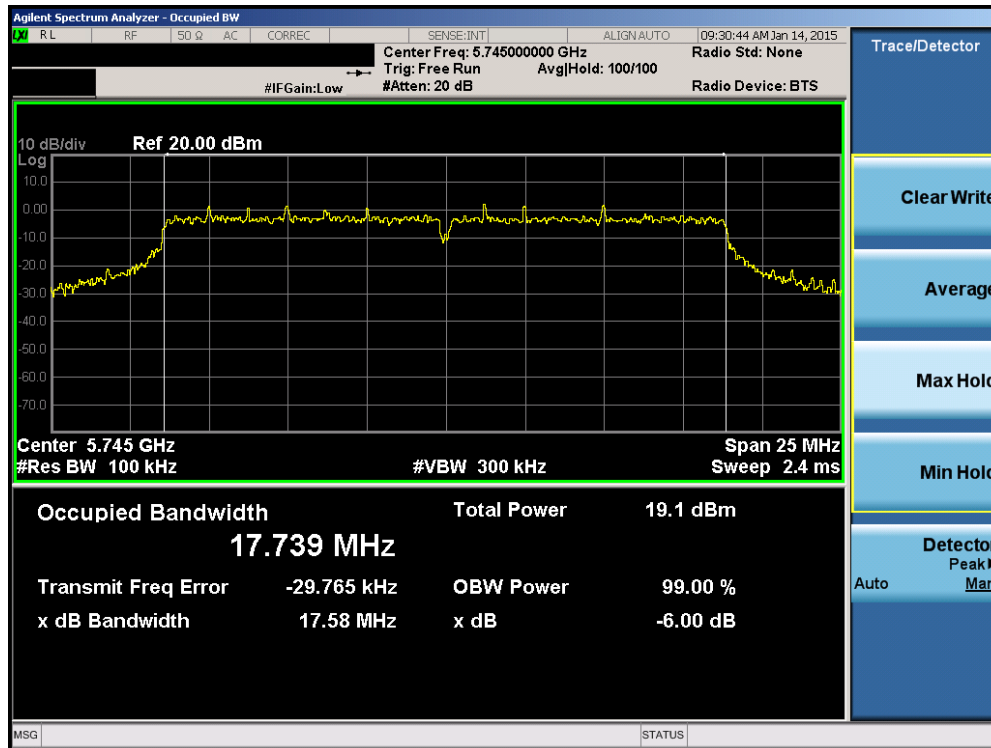


Plot 6-19. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 157)

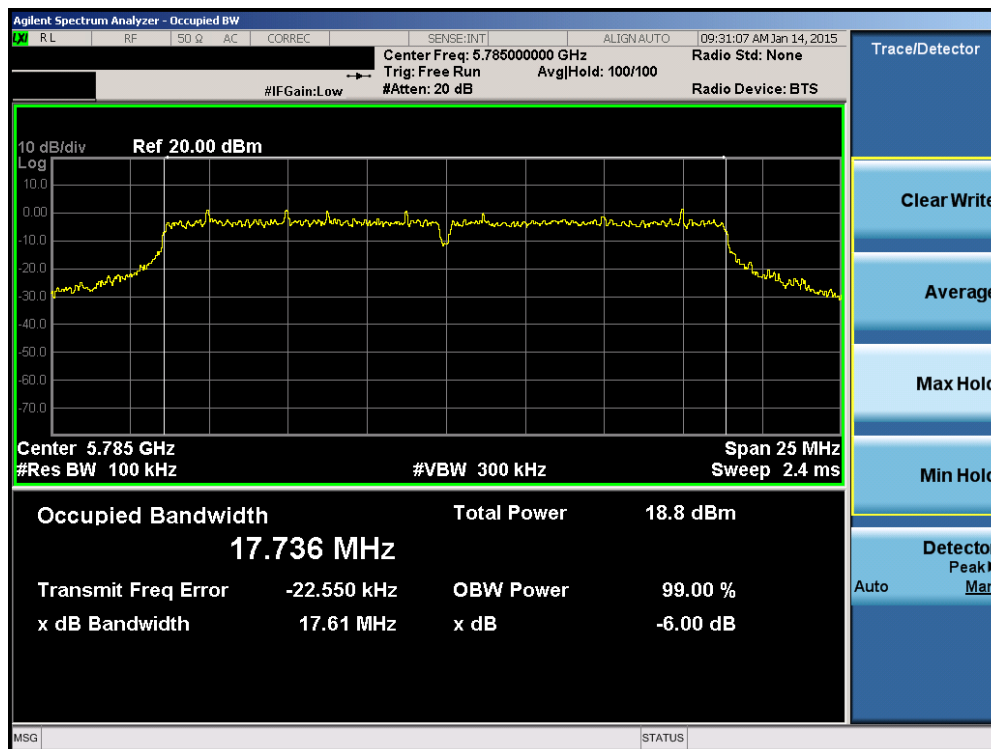


Plot 6-20. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 165)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 25 of 103

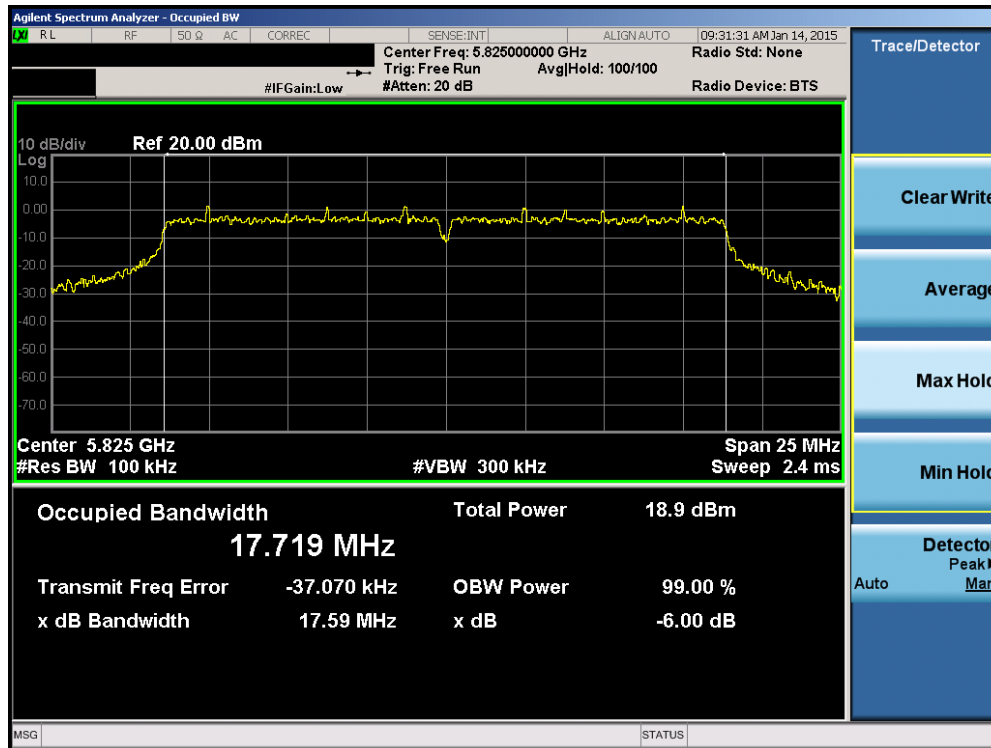


Plot 6-21. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

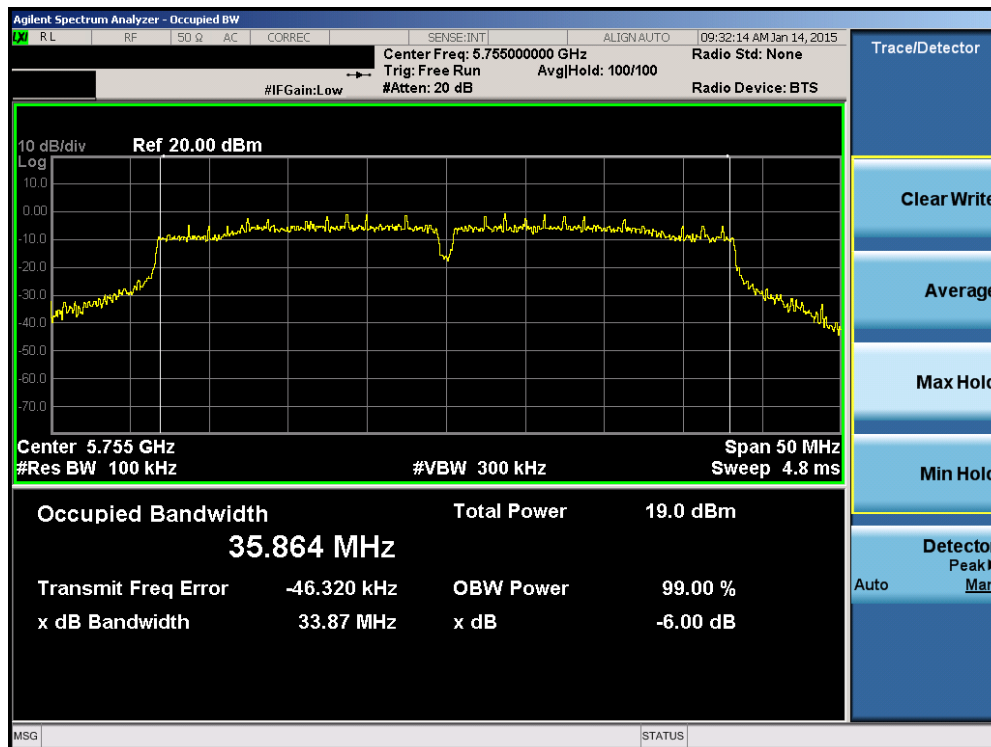


Plot 6-22. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 26 of 103

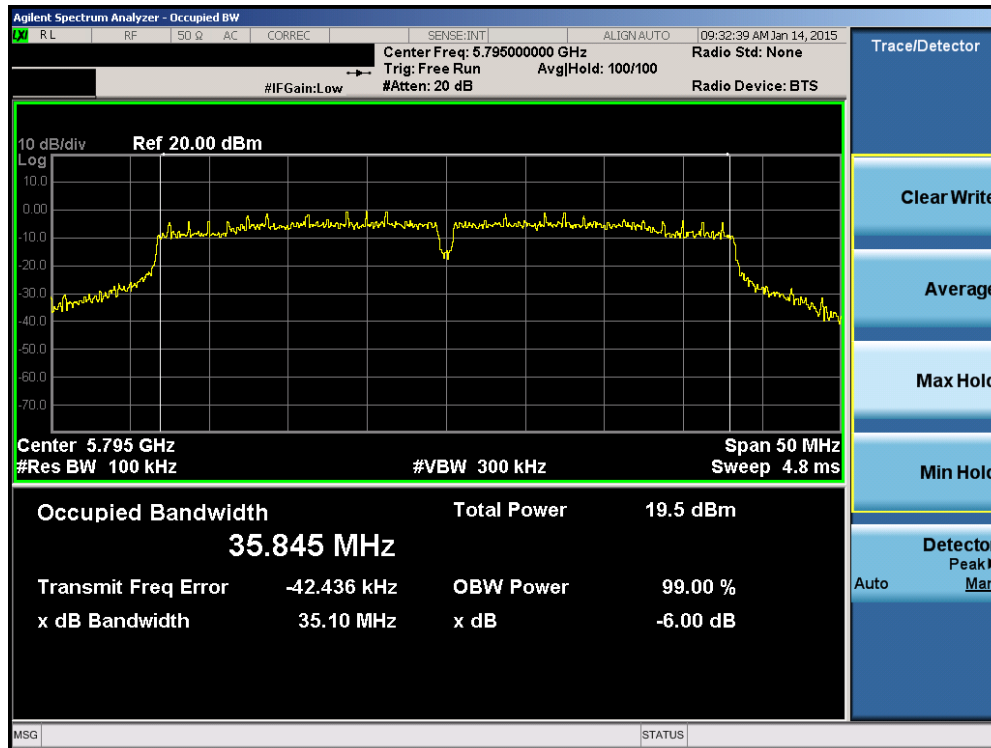


Plot 6-23. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

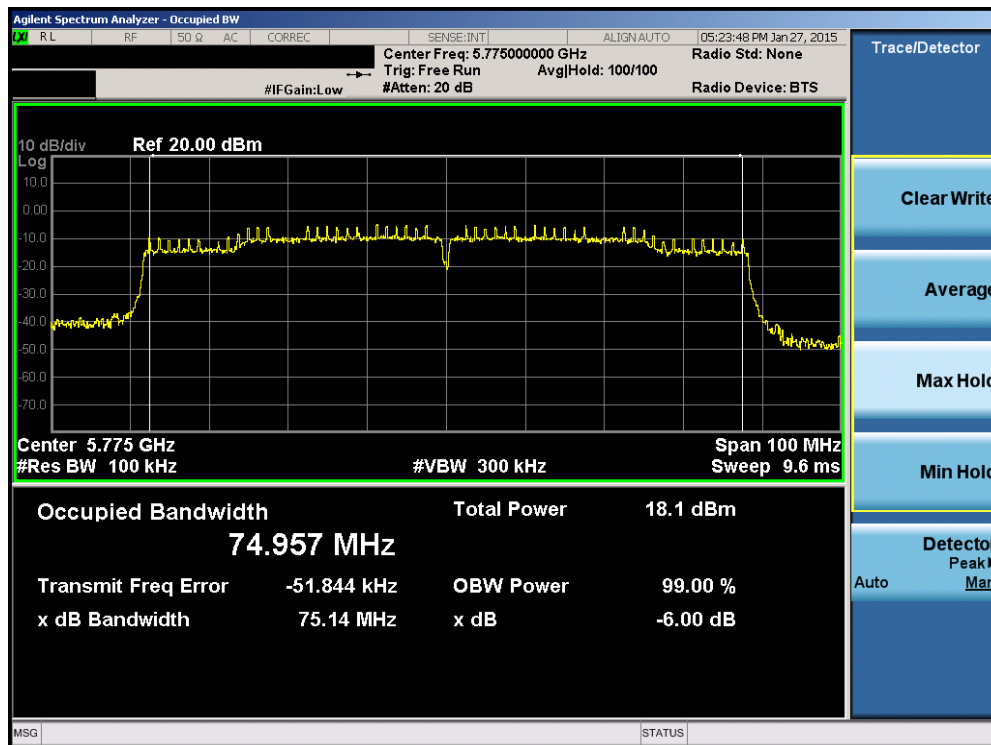


Plot 6-24. 6dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 27 of 103



Plot 6-25. 6dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 6-26. 6dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 28 of 103

6.4 UNII Output Power Measurement – 802.11a/n/ac §15.407 (a.1)

Test Overview and Limits

A transmitter antenna terminal of the EUT is connected to the input of an RF pulse power sensor. Measurement is made using a broadband average power meter while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01, and at the appropriate frequencies.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and $11 \text{ dBm} + 10\log_{10}(26\text{dB BW}) = 11 \text{ dBm} + 10\log_{10}(24.06) = 24.81\text{dBm}$.

Test Procedure Used

KDB 789033 D02 v01 – Section E)3)b) Method PM-G
KDB 662911 v02r01 – Section E)1) Measure-and-Sum Technique

Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

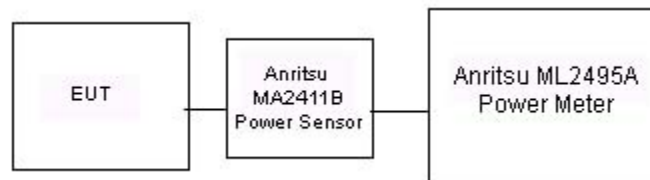


Figure 6-3. Test Instrument & Measurement Setup

Test Notes

None

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 29 of 103

Antenna-1 Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	802.11a Conducted Power [dBm]							
				Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11a	5600	120	AVG	14.78	14.74	14.98	14.98	14.99	14.98	13.03	11.28
802.11a	5620	124	AVG	14.92	14.81	14.99	14.95	14.93	14.95	13.21	11.33
802.11a	5640	128	AVG	14.81	14.82	14.95	14.92	14.87	14.80	13.15	11.38
802.11a	5720	144	AVG	10.78	10.74	10.96	10.88	10.67	10.64	10.54	9.54

Table 6-6. 802.11a (UNII) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Detector	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				6.5	13	19.5	26	39	52	58.5	65
802.11n	5600	120	AVG	14.72	14.69	14.61	14.97	14.94	13.42	11.17	9.83
802.11n	5620	124	AVG	14.59	14.71	14.67	14.86	14.90	13.32	11.20	9.79
802.11n	5640	128	AVG	14.52	14.60	14.56	14.81	14.84	13.33	11.01	9.48
802.11n	5720	144	AVG	10.71	10.66	10.95	10.84	10.79	10.45	10.70	9.45

Table 6-7. 20MHz BW 802.11n (UNII) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Detector	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				13.5	27	40.5	54	81	108	121.5	135
802.11n	5590	118	AVG	14.63	14.70	14.70	14.76	14.80	13.31	11.48	9.95
802.11n	5630	126	AVG	14.60	14.69	14.69	14.71	14.81	13.35	11.44	9.90
802.11n	5710	142	AVG	14.56	14.36	14.32	14.63	14.57	13.46	11.30	9.88

Table 6-8. 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

20MHz BW 802.11ac (5GHz) Conducted Power [dBm]				
Mode	Freq [MHz]	Channel	Detector	Data Rate
				6.5 Mbps
802.11ac	5600	120	AVG	14.71
802.11ac	5620	124	AVG	14.81
802.11ac	5640	128	AVG	14.80
802.11ac	5720	144	AVG	10.76

Table 6-9. 20MHz BW 802.11ac (UNII) Maximum Conducted Output Power

40MHz BW 802.11ac (5GHz) Conducted Power [dBm]				
Mode	Freq [MHz]	Channel	Detector	Data Rate
				13.5 Mbps
802.11ac	5590	118	AVG	14.98
802.11ac	5630	126	AVG	14.97
802.11ac	5710	142	AVG	14.53

Table 6-10. 40MHz BW 802.11ac (UNII) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Detector	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				29.3	58.5	87.8	117	175.5	234	263.3	292.5
802.11ac	5610	122	AVG	12.43	12.48	12.45	12.21	12.44	12.39	11.45	10.00
802.11ac	5690	138	AVG	12.24	12.19	12.09	12.07	12.15	12.11	11.10	9.36

Table 6-11. 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)					Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter				Page 30 of 103	

Antenna-2 Conducted Output Power Measurements

Mode	Freq [MHz]	Channel	Detector	802.11a Conducted Power [dBm]							
				Data Rate [Mbps]							
				6	9	12	18	24	36	48	54
802.11a	5600	120	AVG	14.75	14.90	14.71	14.87	14.81	14.80	13.37	11.50
802.11a	5620	124	AVG	14.70	14.82	14.76	14.85	14.78	14.71	13.35	11.34
802.11a	5640	128	AVG	14.77	14.77	14.61	14.80	14.73	14.74	13.29	11.29
802.11a	5720	144	AVG	10.89	10.72	10.85	10.41	10.22	10.53	10.65	9.26

Table 6-12. 802.11a (UNII) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Detector	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				6.5	13	19.5	26	39	52	58.5	65
802.11n	5600	120	AVG	14.92	14.60	14.66	14.79	14.82	13.17	11.42	9.92
802.11n	5620	124	AVG	14.75	14.58	14.62	14.76	14.79	13.19	11.47	9.98
802.11n	5640	128	AVG	14.77	14.52	14.60	14.73	14.74	13.26	11.45	9.96
802.11n	5720	144	AVG	10.97	10.13	9.86	10.52	10.68	10.62	9.56	8.00

Table 6-13. 20MHz BW 802.11n (UNII) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Detector	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				13.5	27	40.5	54	81	108	121.5	135
802.11n	5590	118	AVG	14.40	14.67	14.65	14.59	14.66	13.37	11.48	9.99
802.11n	5630	126	AVG	14.41	14.65	14.66	14.62	14.67	13.35	11.45	9.98
802.11n	5710	142	AVG	14.32	14.02	14.28	13.82	14.29	13.03	10.95	9.43

Table 6-14. 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

20MHz BW 802.11ac (5GHz) Conducted Power [dBm]				
Mode	Freq [MHz]	Channel	Detector	Data Rate
				6.5 Mbps
802.11ac	5600	120	AVG	14.98
802.11ac	5620	124	AVG	14.95
802.11ac	5640	128	AVG	14.91
802.11ac	5720	144	AVG	10.42

Table 6-15. 20MHz BW 802.11ac (UNII) Maximum Conducted Output Power

40MHz BW 802.11ac (5GHz) Conducted Power [dBm]				
Mode	Freq [MHz]	Channel	Detector	Data Rate
				13.5 Mbps
802.11ac	5590	118	AVG	14.99
802.11ac	5630	126	AVG	14.95
802.11ac	5710	142	AVG	14.50

Table 6-16. 40MHz BW 802.11ac (UNII) Maximum Conducted Output Power

Mode	Freq [MHz]	Channel	Detector	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]							
				Data Rate [Mbps]							
				29.3	58.5	87.8	117	175.5	234	263.3	292.5
802.11ac	5610	122	AVG	12.44	12.39	12.46	12.33	12.40	12.41	11.31	9.99
802.11ac	5690	138	AVG	12.28	12.26	11.80	12.27	12.37	12.36	11.47	9.90

Table 6-17. 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

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MIMO Maximum Conducted Output Power Measurements

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5600	120	AVG	9.02	8.91	11.98
5620	124	AVG	9.24	8.70	11.99
5640	128	AVG	8.89	8.97	11.94
5720	144	AVG	5.73	5.79	8.77

Table 6-18. MIMO 20MHz BW 802.11n (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (20MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5600	120	AVG	9.11	8.46	11.81
5620	124	AVG	9.06	8.79	11.94
5640	128	AVG	9.02	8.89	11.97
5720	144	AVG	5.08	6.37	8.78

Table 6-19. MIMO 20MHz BW 802.11ac (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (40MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5590	118	AVG	9.05	8.87	11.97
5630	126	AVG	8.83	8.78	11.82
5710	142	AVG	8.18	8.63	11.42

Table 6-20. MIMO 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

Freq [MHz]	Channel	Detector	5GHz (40MHz) Conducted Power [dBm]		
			IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5590	118	AVG	8.74	9.07	11.92
5630	126	AVG	8.91	9.01	11.97
5710	142	AVG	7.34	8.68	11.07

Table 6-21. MIMO 40MHz BW 802.11ac (UNII) Maximum Conducted Output Power

5GHz (80MHz) Conducted Power [dBm]					
Freq [MHz]	Channel	Detector	IEEE Transmission Mode		
			ANT1	ANT2	MIMO
5610	122	AVG	5.15	4.79	7.98
5690	138	AVG	5.78	5.78	8.79

Table 6-22. MIMO 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

Note:

Per KDB 662911 v02r01 Section E)1), the conducted powers at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

Sample MIMO Calculation:

At 5180MHz the average conducted output power was measured to be 9.02 dBm for Antenna-1 and 8.91 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

$$(9.02 \text{ dBm} + 8.91 \text{ dBm}) = (7.98 \text{ mW} + 7.78 \text{ mW}) = 15.76 \text{ mW} = 11.98 \text{ dBm}$$

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6.5 Maximum Power Spectral Density – 802.11a/n/ac §15.407(a.1)(2.5)

Test Overview and Limit

The spectrum analyzer was connected to the antenna terminal while the EUT was operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01, and at the appropriate frequencies. Method SA-1, as defined in KDB 789033 D02 v01, was used to measure the power spectral density.

In the 5.15 – 5.25GHz, 5.25 – 5.35GHz, 5.47 – 5.725GHz bands, the maximum permissible power spectral density is 11dBm/MHz.

In the 5.725 – 5.850GHz band, the maximum permissible power spectral density is 30dBm/500kHz.

Test Procedure Used

KDB 789033 D02 v01 – Section F
KDB 662911 v02r01 – Section E)2) Measure-and-Sum Technique

Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. RBW = 1MHz
4. VBW = 3MHz
5. Number of sweep points $\geq 2 \times (\text{span}/\text{RBW})$
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

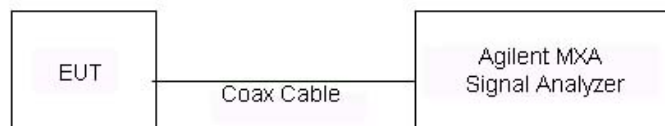


Figure 6-4. Test Instrument & Measurement Setup

Test Notes

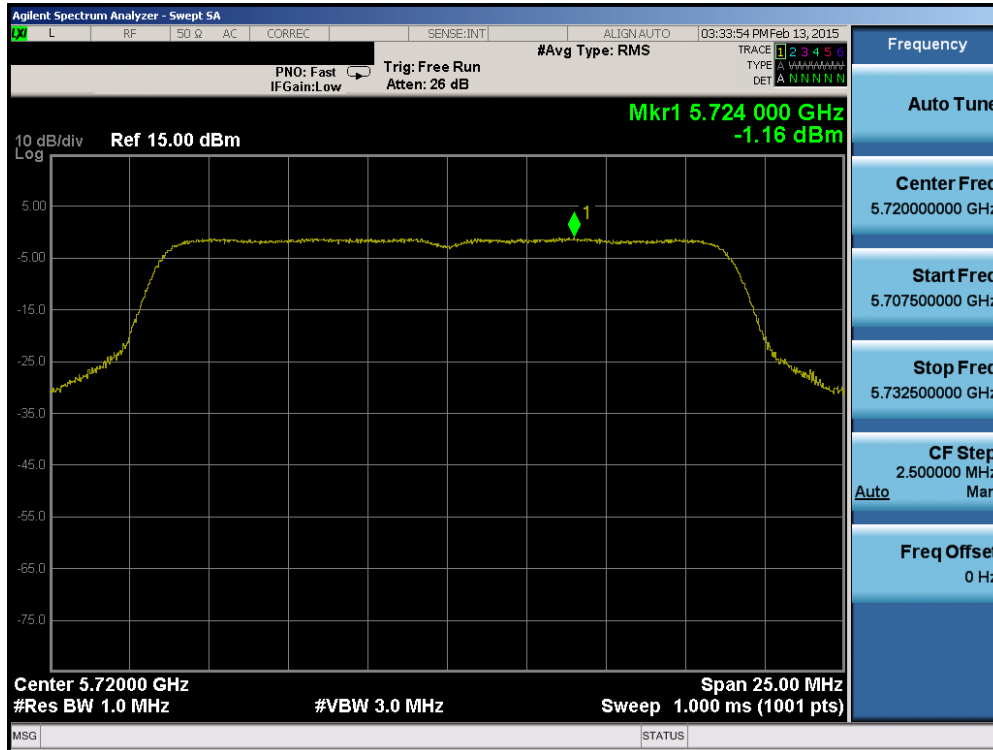
None

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Antenna-1 Power Spectral Density Measurements

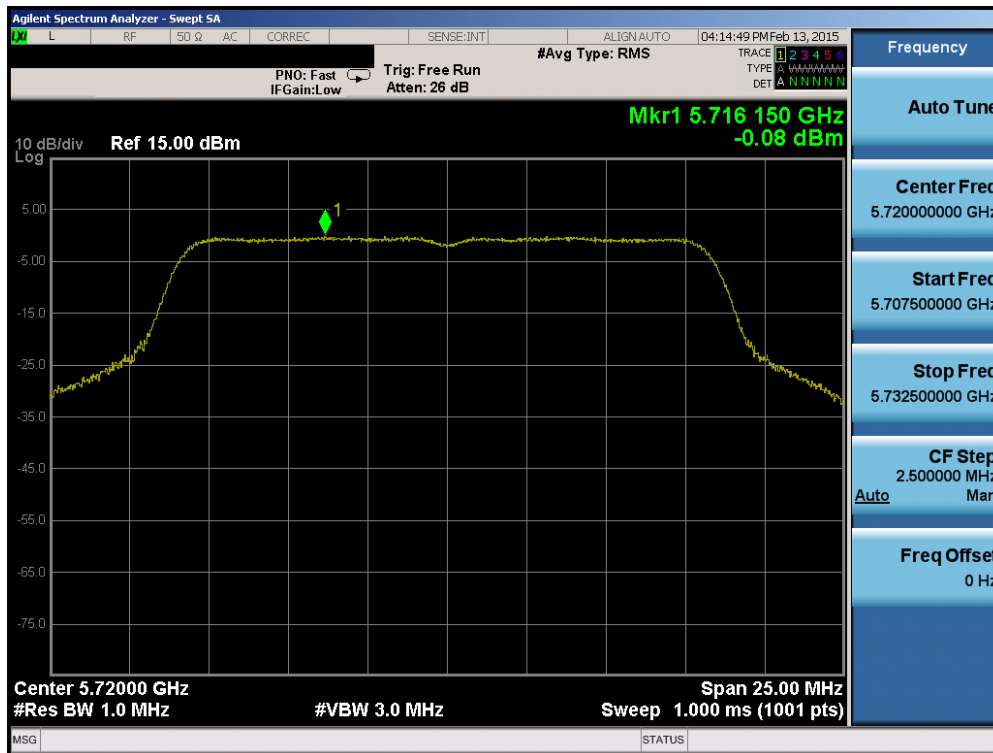
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]	Pass / Fail
Band Gap	5720	144	a	6	-1.16	11.0	-12.16	Pass
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	-0.08	11.0	-11.08	Pass
	5710	142	n (40MHz)	13.5/15 (MCS0)	1.24	11.0	-9.76	Pass
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-6.54	11.0	-17.54	Pass

Table 6-23. Band Gap Conducted Power Spectral Density Measurements

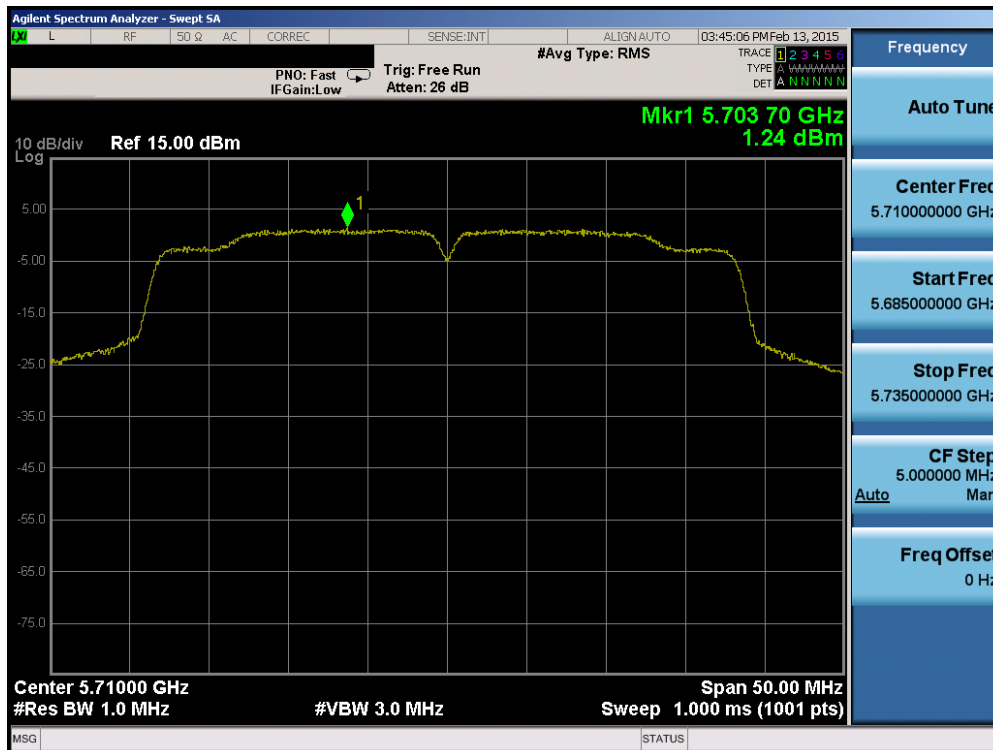


Plot 6-27. Power Spectral Density Plot (802.11a (UNII Band Gap) – Ch. 144)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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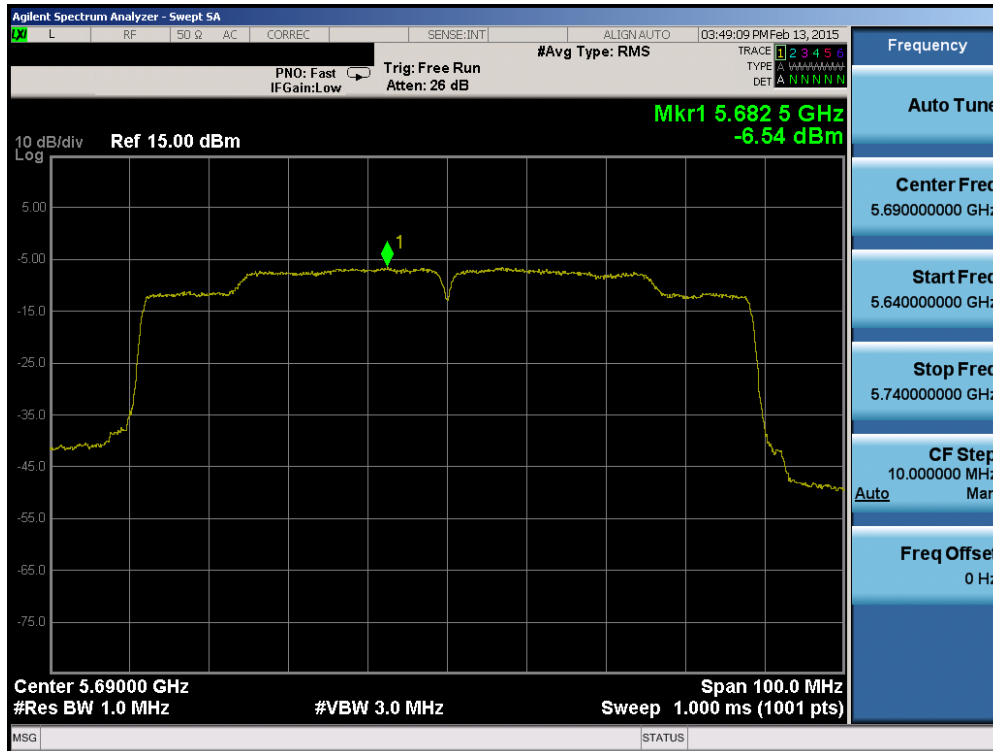


Plot 6-28. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band Gap) – Ch. 144)



Plot 6-29. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band Gap) – Ch. 142)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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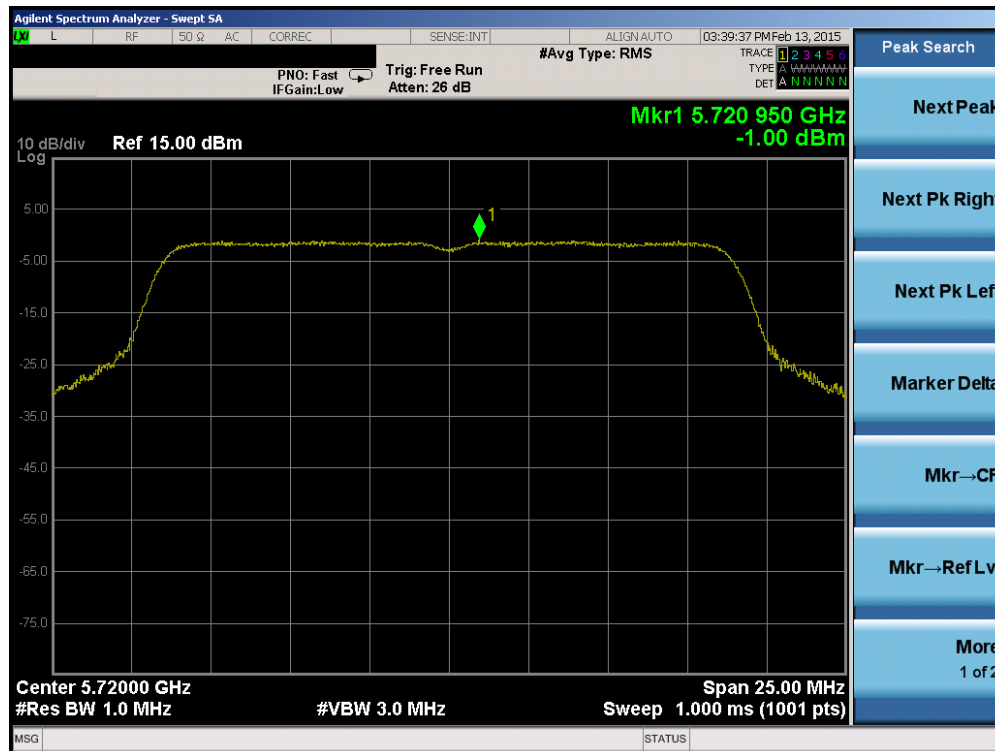
Plot 6-30. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band Gap) – Ch. 138)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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Antenna-2 Power Spectral Density Measurements

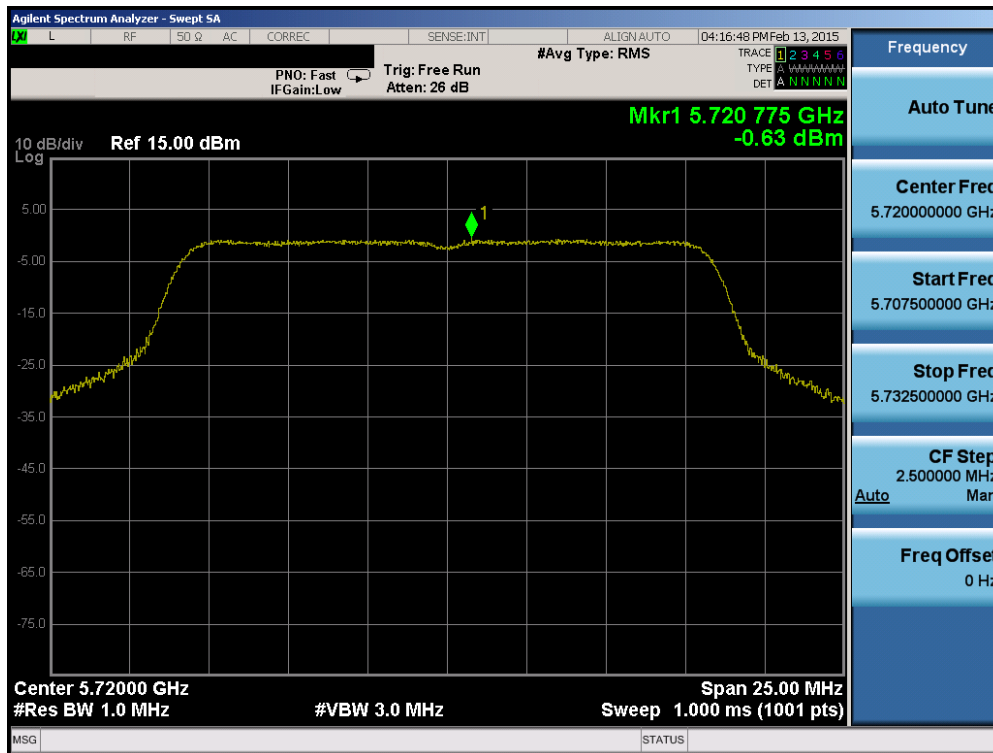
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]	Pass / Fail
Band Gap	5720	144	a	6	-1.00	11.0	-12.00	Pass
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	-0.63	11.0	-11.63	Pass
	5710	142	n (40MHz)	13.5/15 (MCS0)	1.20	11.0	-9.80	Pass
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-5.50	11.0	-16.50	Pass

Table 6-24. Band Gap Conducted Power Spectral Density Measurements

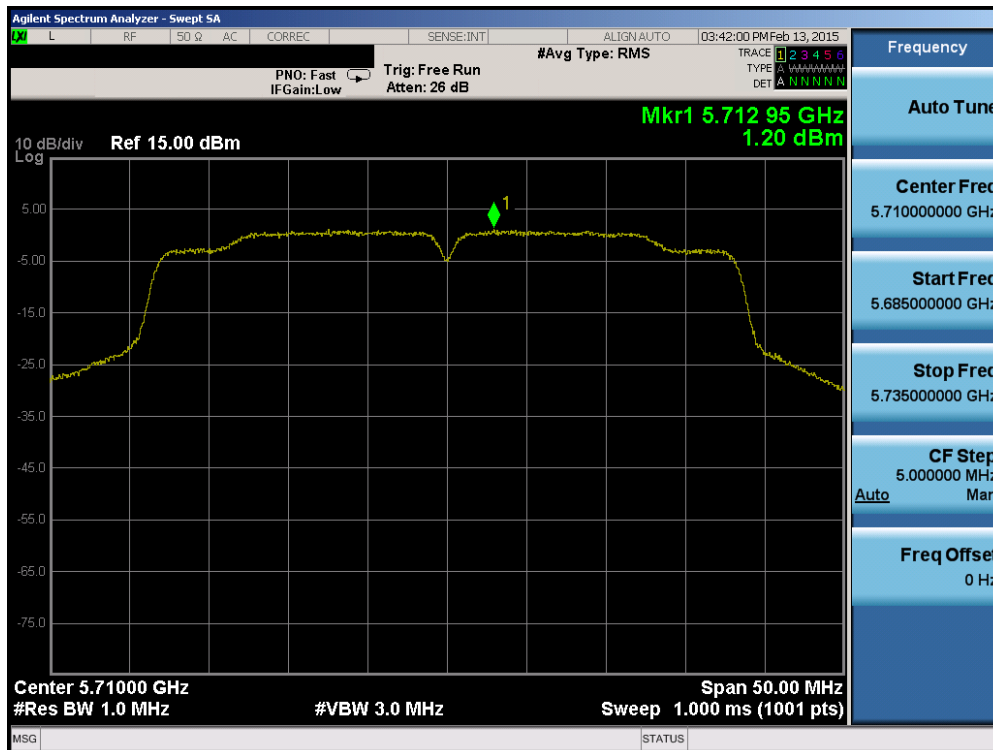


Plot 6-31. Power Spectral Density Plot (802.11a (UNII Band Gap) – Ch. 144)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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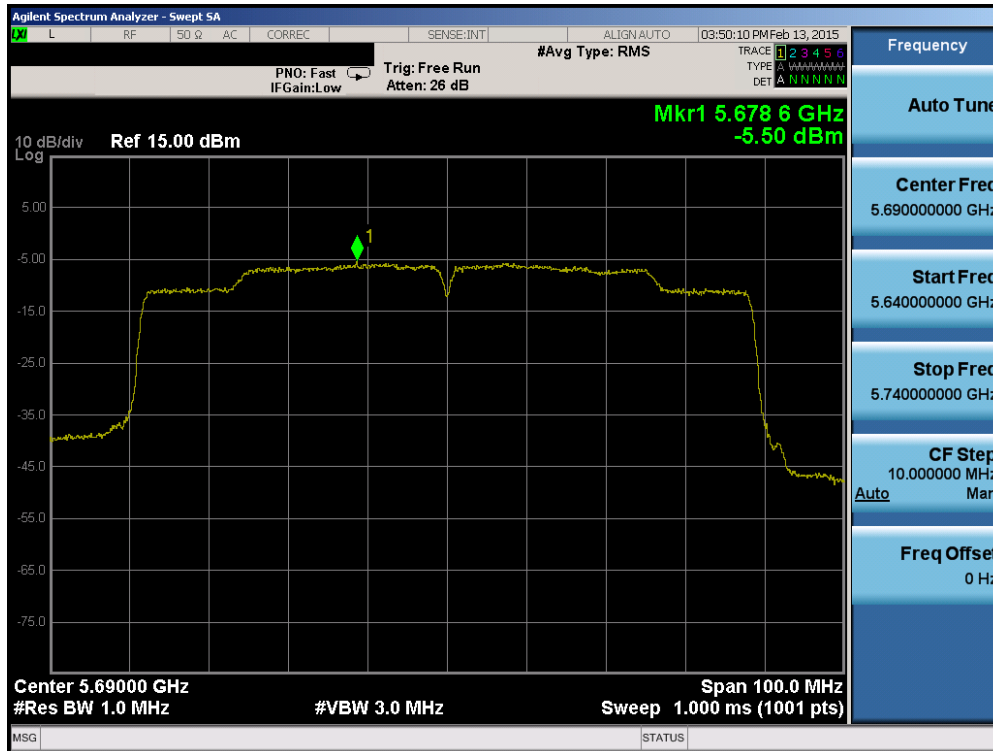


Plot 6-32. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band Gap) – Ch. 144)



Plot 6-33. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band Gap) – Ch. 142)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 39 of 103



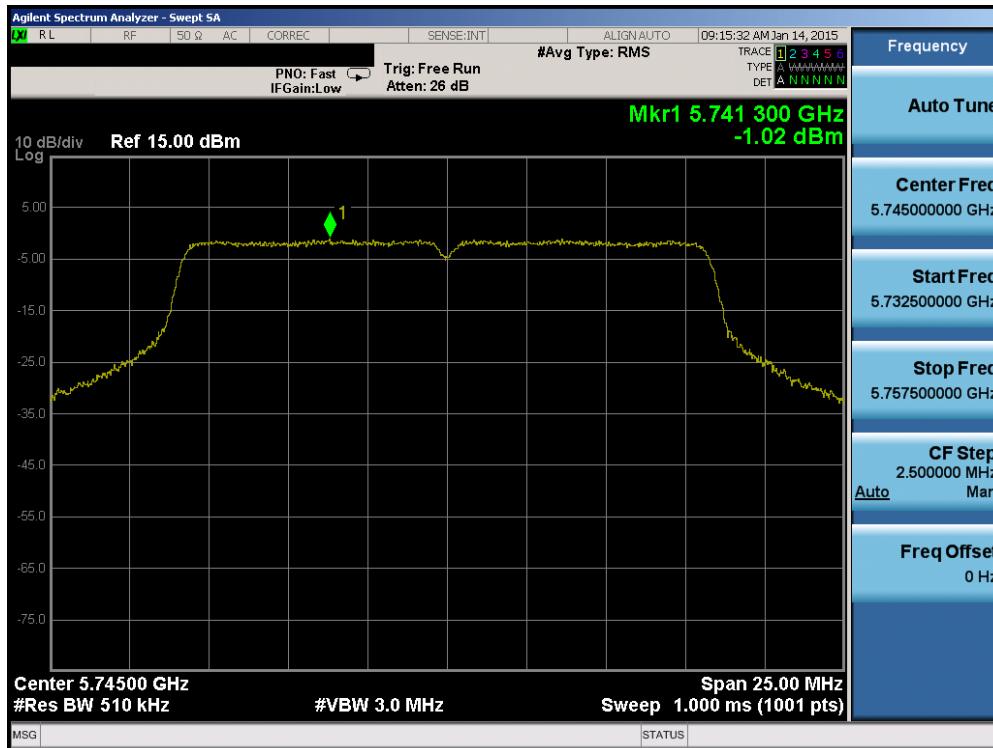
Plot 6-34. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band Gap) – Ch. 138)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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Antenna-1 Power Spectral Density Measurements

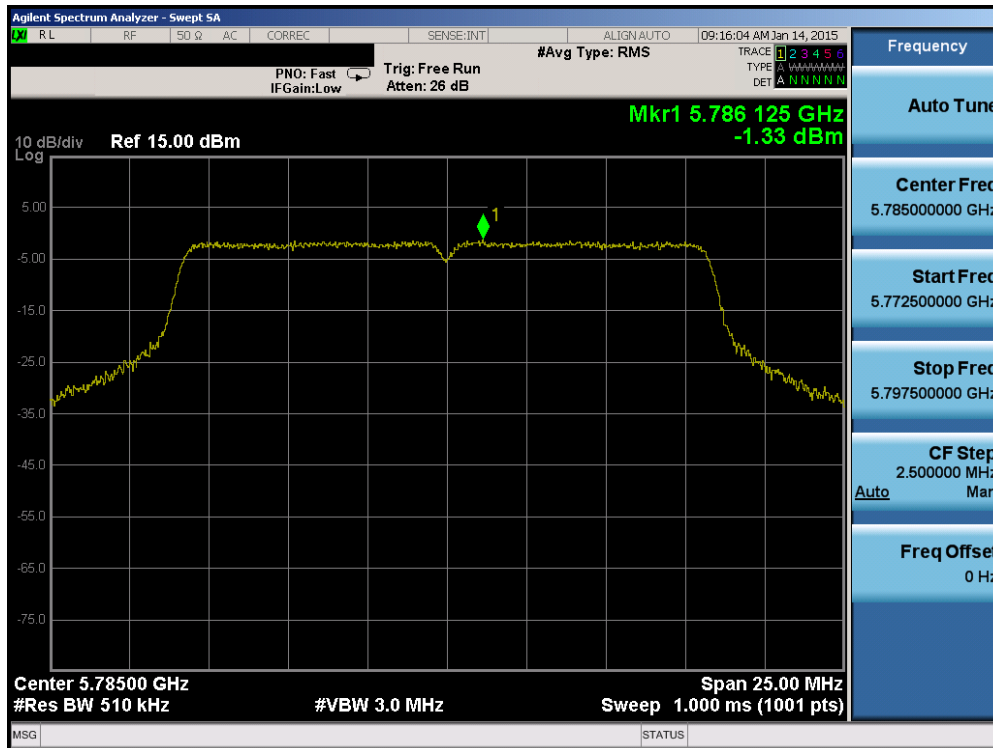
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]	Pass / Fail
Band 3	5745	149	a	6	-1.02	30.0	-31.02	Pass
	5785	157	a	6	-1.33	30.0	-31.33	Pass
	5825	165	a	6	-1.10	30.0	-31.10	Pass
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	-1.75	30.0	-31.75	Pass
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	-2.24	30.0	-32.24	Pass
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	-1.31	30.0	-31.31	Pass
	5755	151	n (40MHz)	13.5/15 (MCS0)	-4.54	30.0	-34.54	Pass
	5795	159	n (40MHz)	13.5/15 (MCS0)	-3.80	30.0	-33.80	Pass
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-9.91	30.0	-39.91	Pass

Table 6-25. Band 3 Conducted Power Spectral Density Measurements

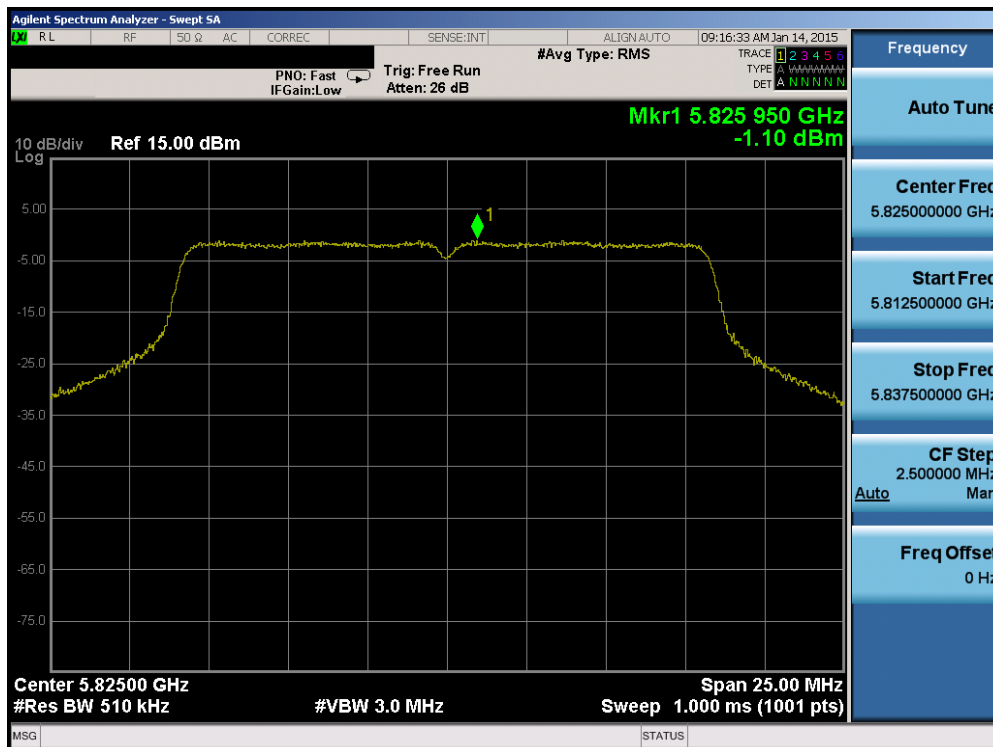


Plot 6-35. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 149)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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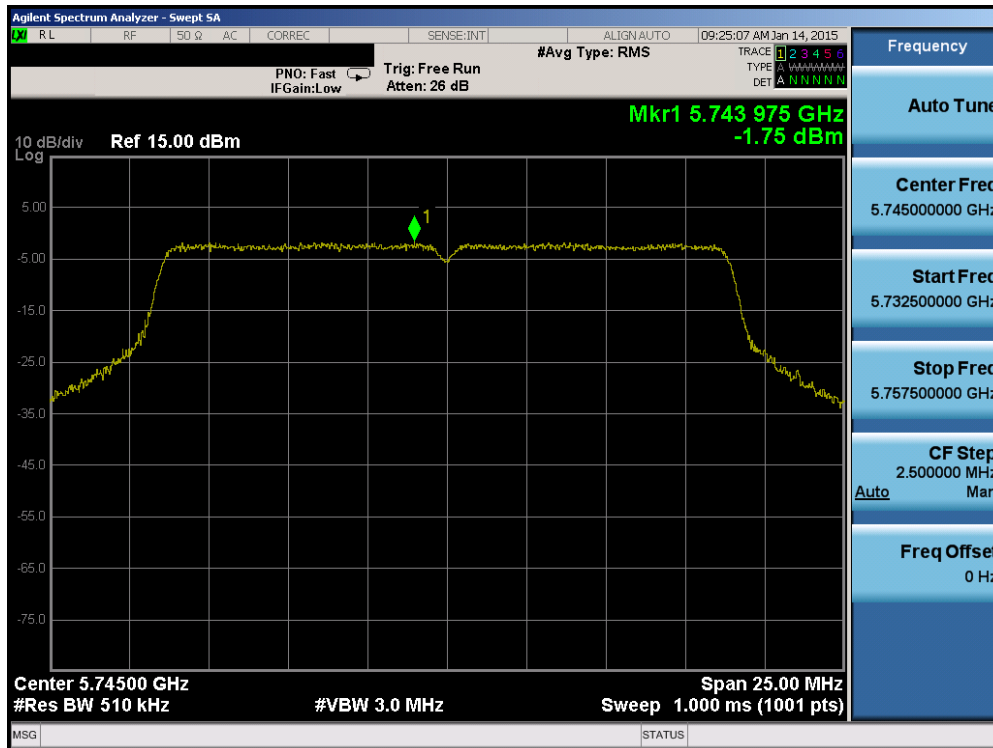


Plot 6-36. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 157)

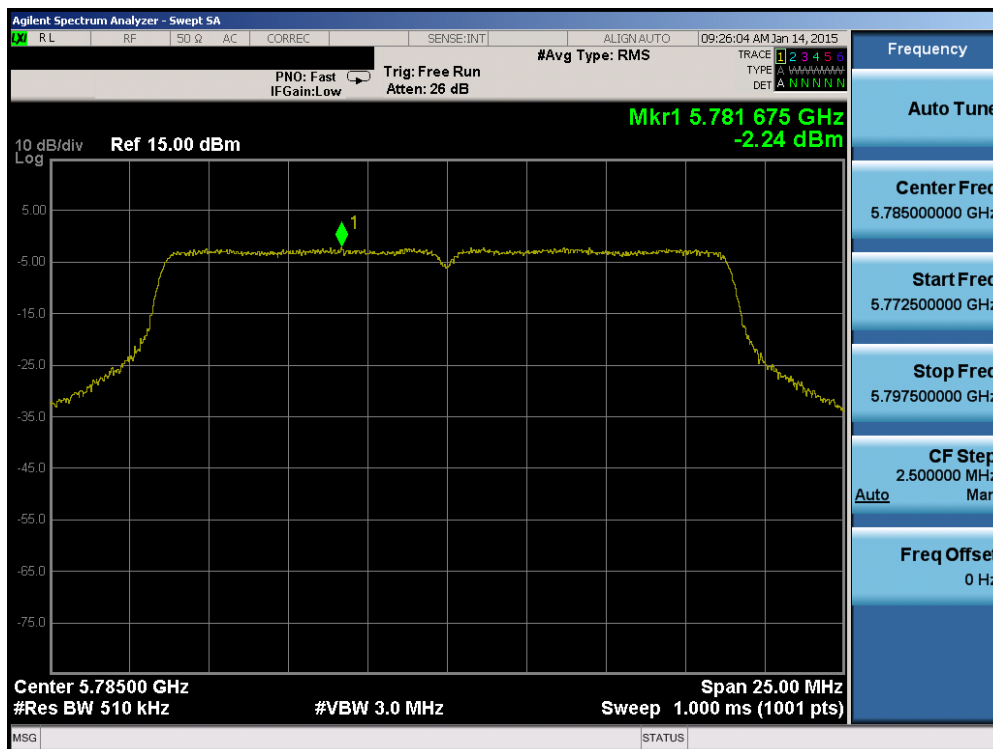


Plot 6-37. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 165)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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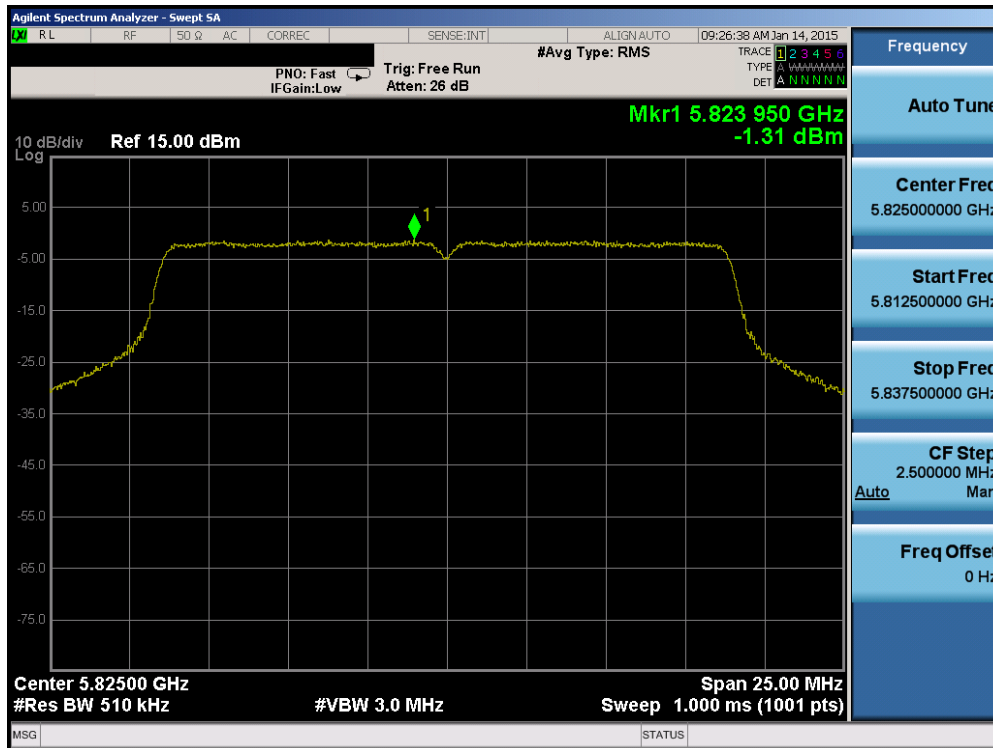


Plot 6-38. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

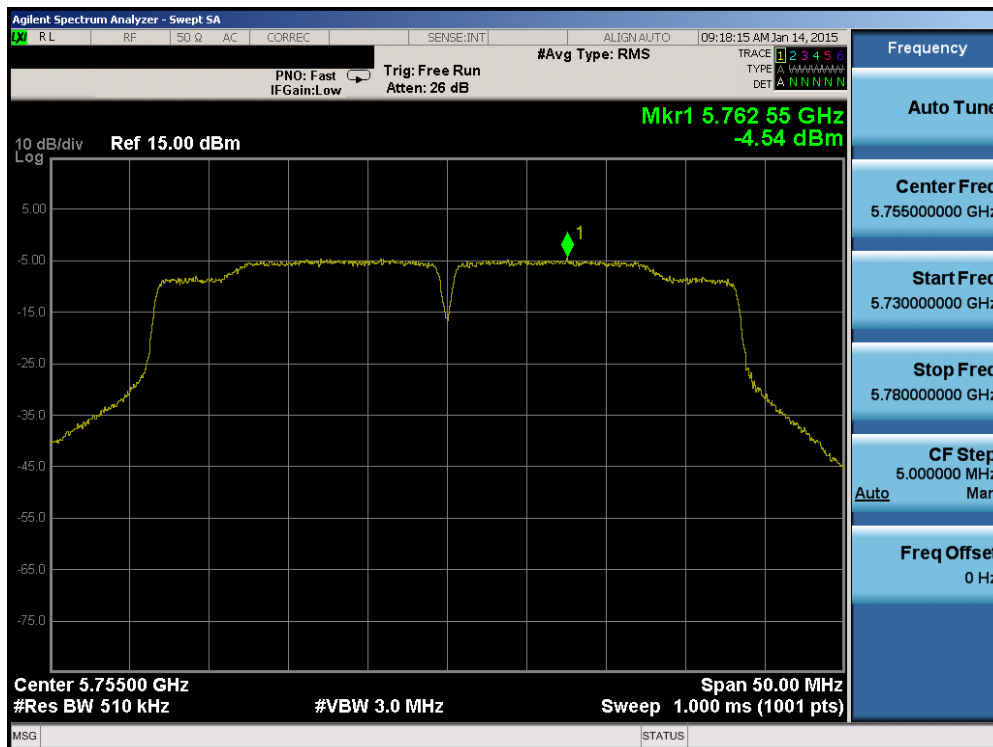


Plot 6-39. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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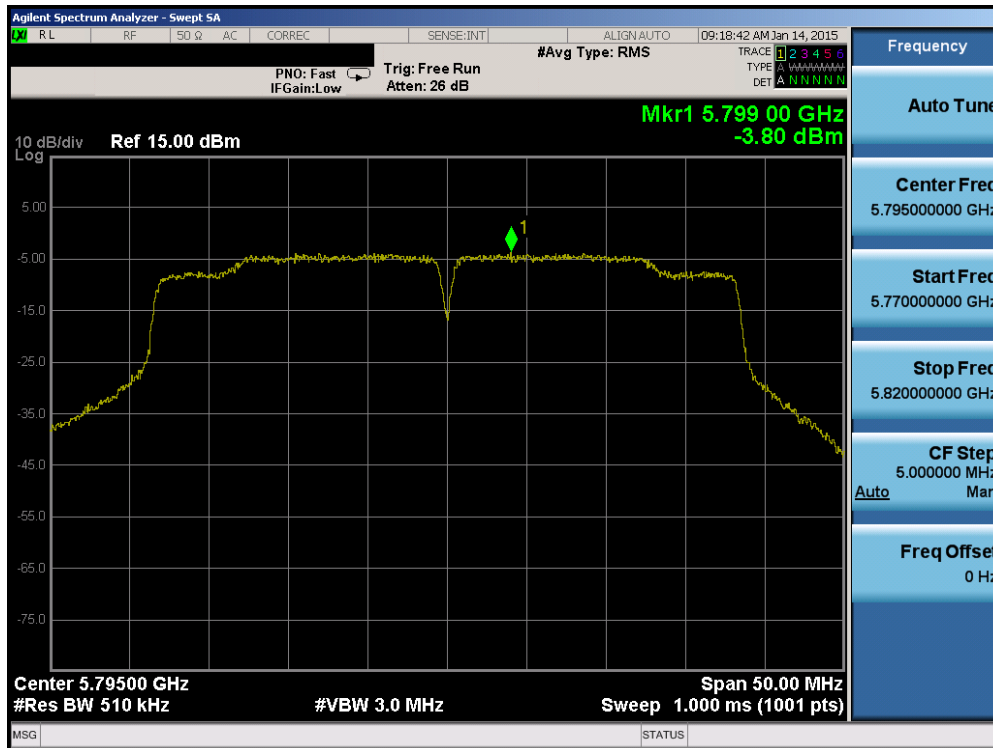


Plot 6-40. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

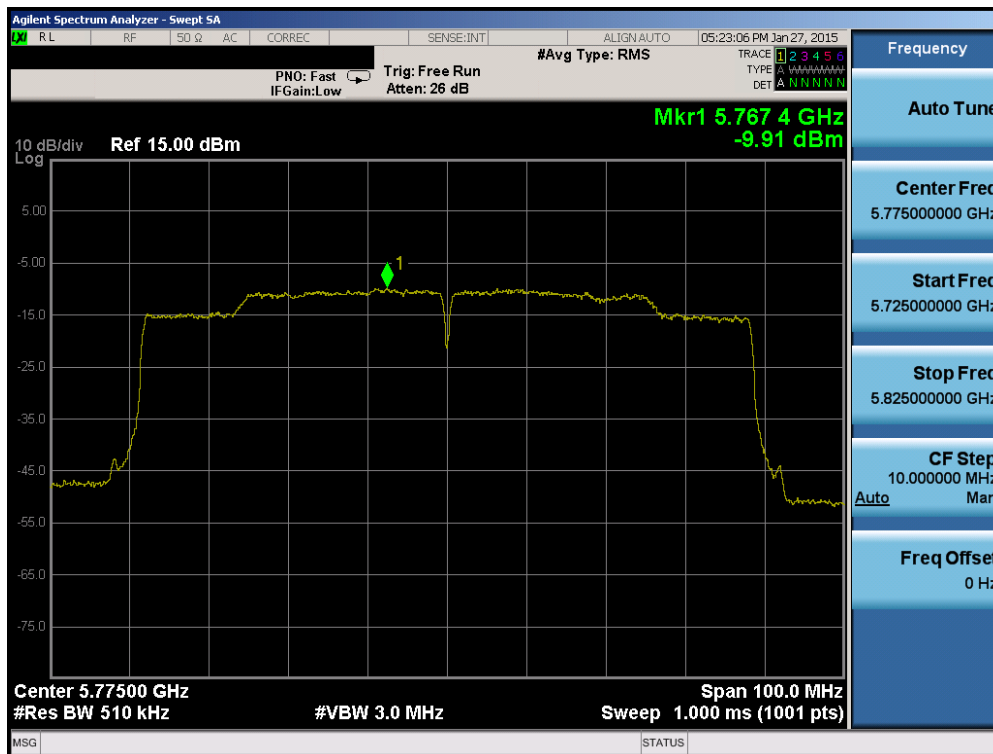


Plot 6-41. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
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Plot 6-42. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



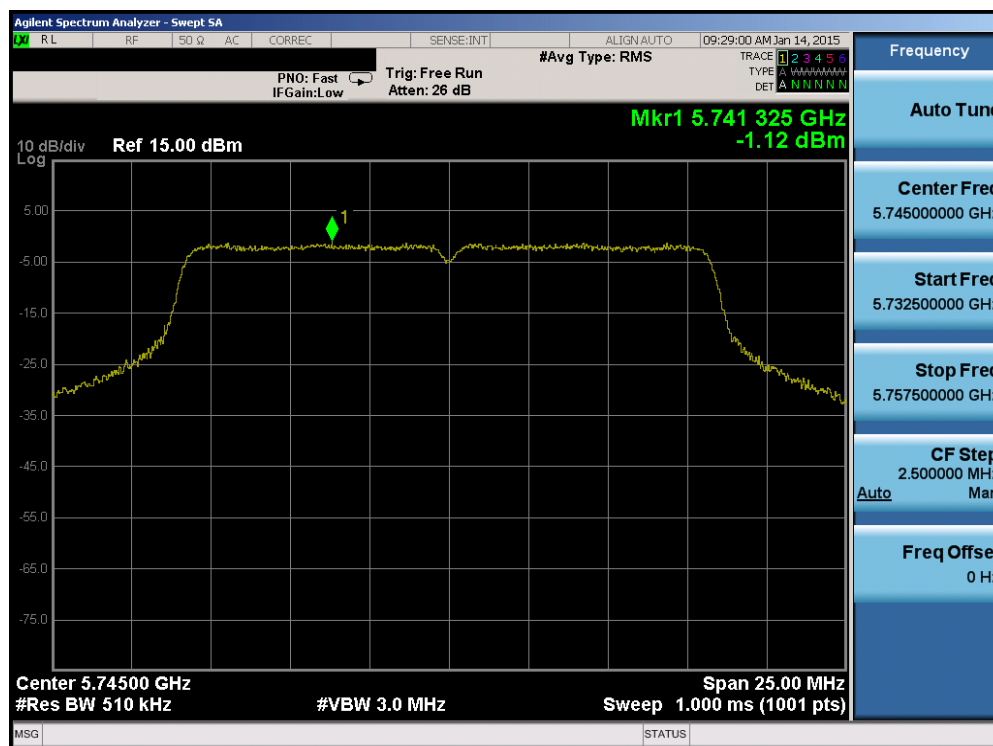
Plot 6-43. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 45 of 103

Antenna-2 Power Spectral Density Measurements

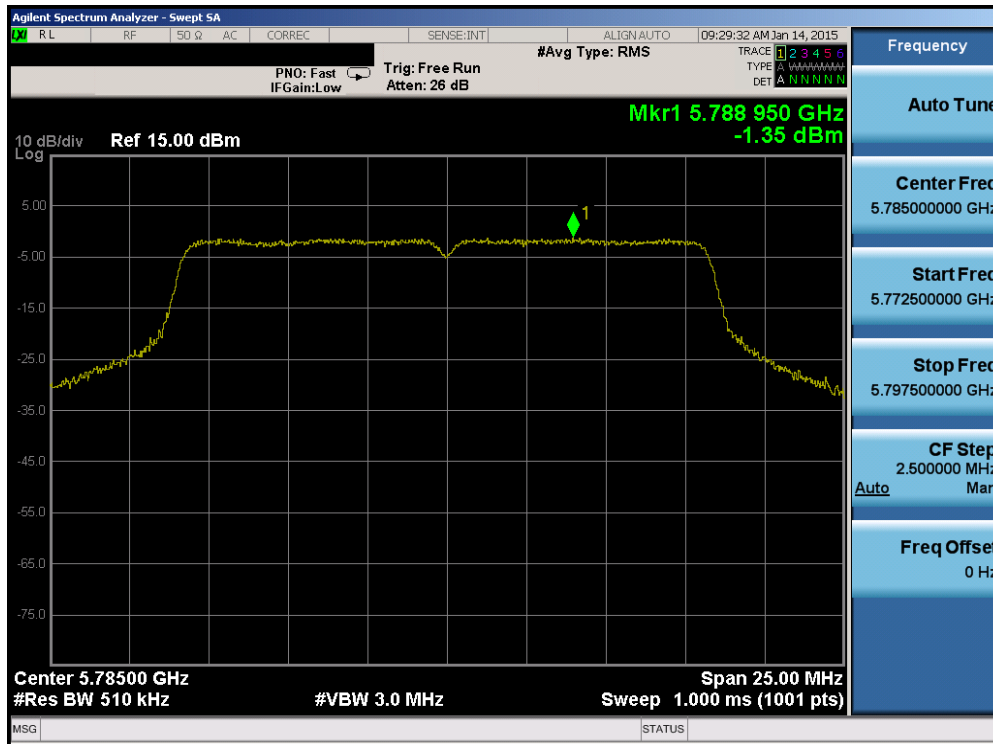
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]	Pass / Fail
Band 3	5745	149	a	6	-1.12	30.0	-31.12	Pass
	5785	157	a	6	-1.35	30.0	-31.35	Pass
	5825	165	a	6	-1.53	30.0	-31.53	Pass
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	-1.53	30.0	-31.53	Pass
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	-1.72	30.0	-31.72	Pass
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	-1.87	30.0	-31.87	Pass
	5755	151	n (40MHz)	13.5/15 (MCS0)	-4.72	30.0	-34.72	Pass
	5795	159	n (40MHz)	13.5/15 (MCS0)	-4.06	30.0	-34.06	Pass
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-8.84	30.0	-38.84	Pass

Table 6-26. Band 3 Conducted Power Spectral Density Measurements

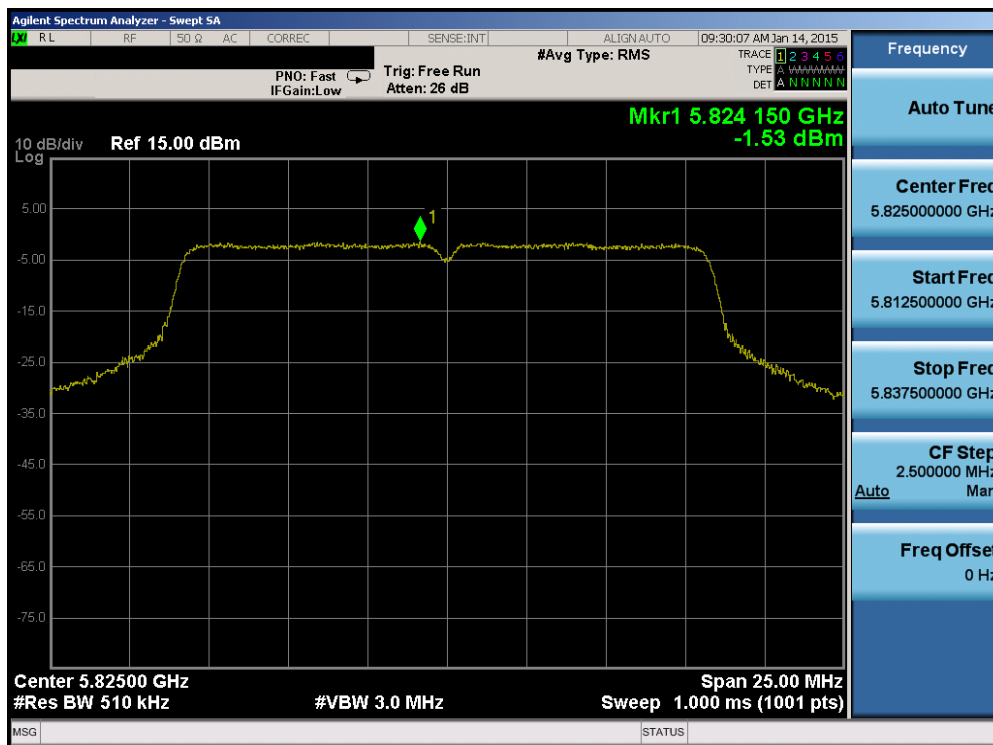


Plot 6-44. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 149)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 46 of 103

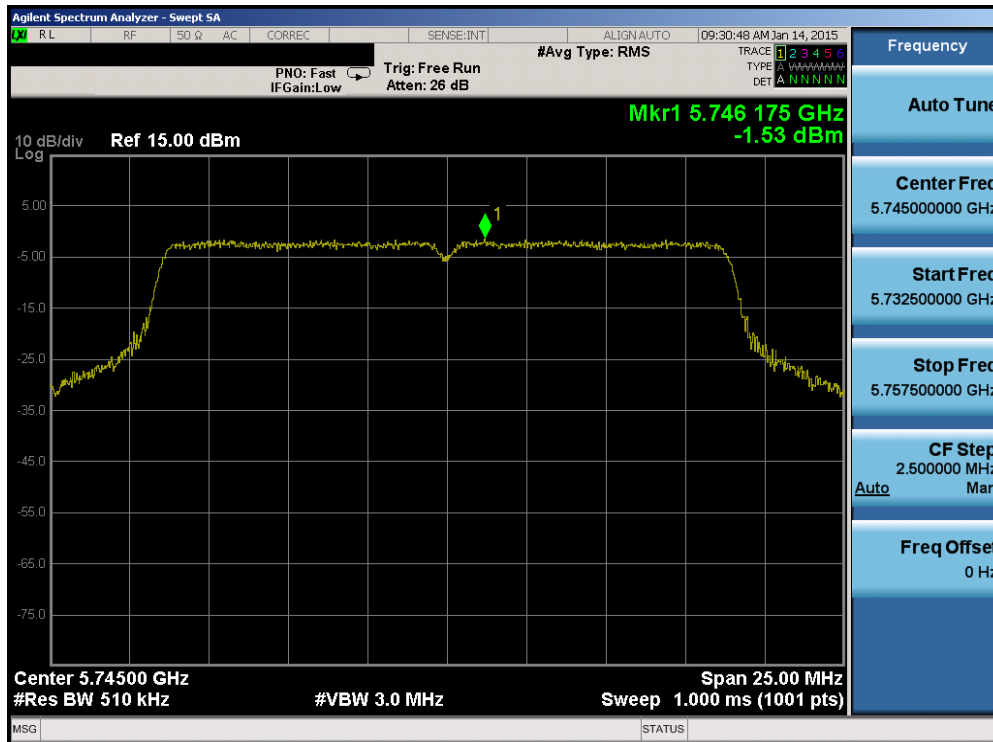


Plot 6-45. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 157)

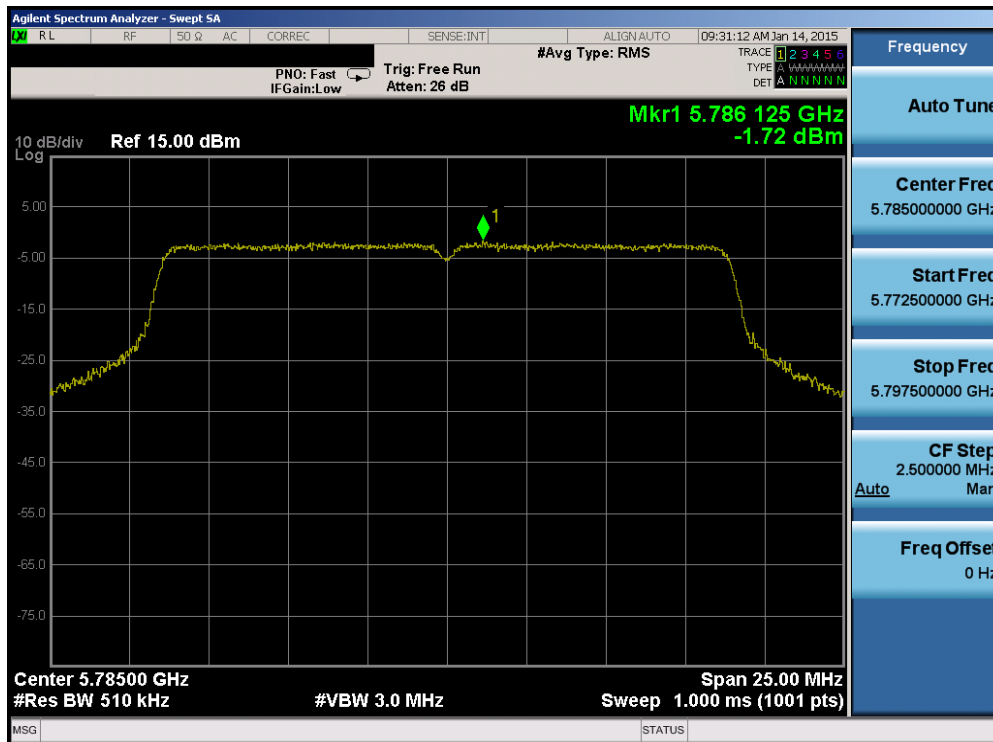


Plot 6-46. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 165)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 47 of 103

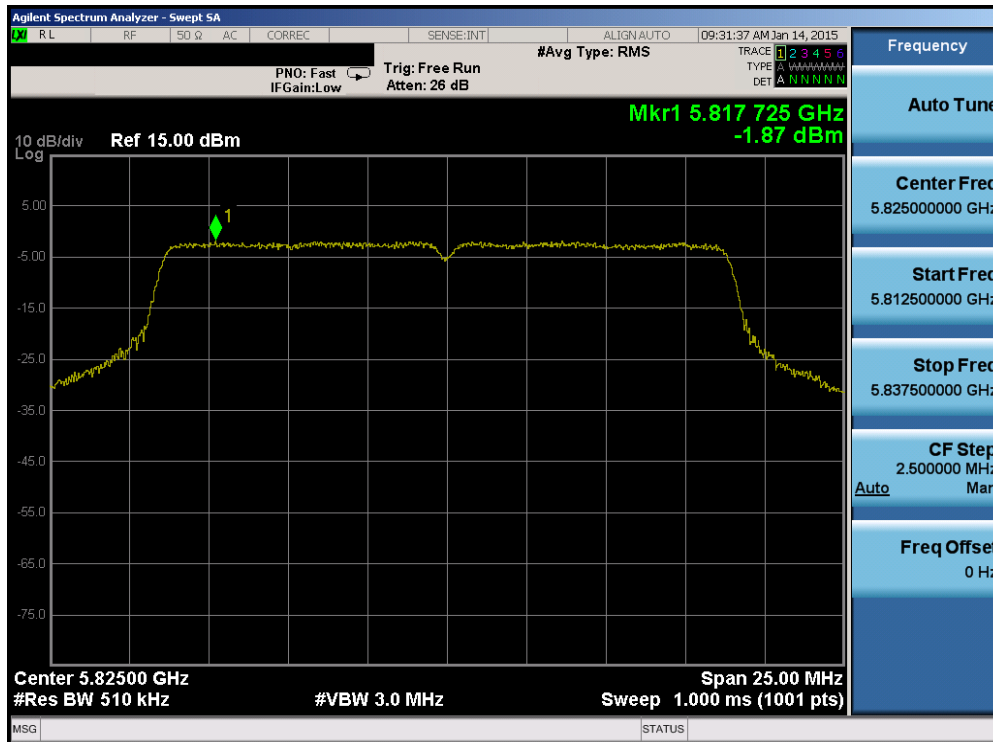


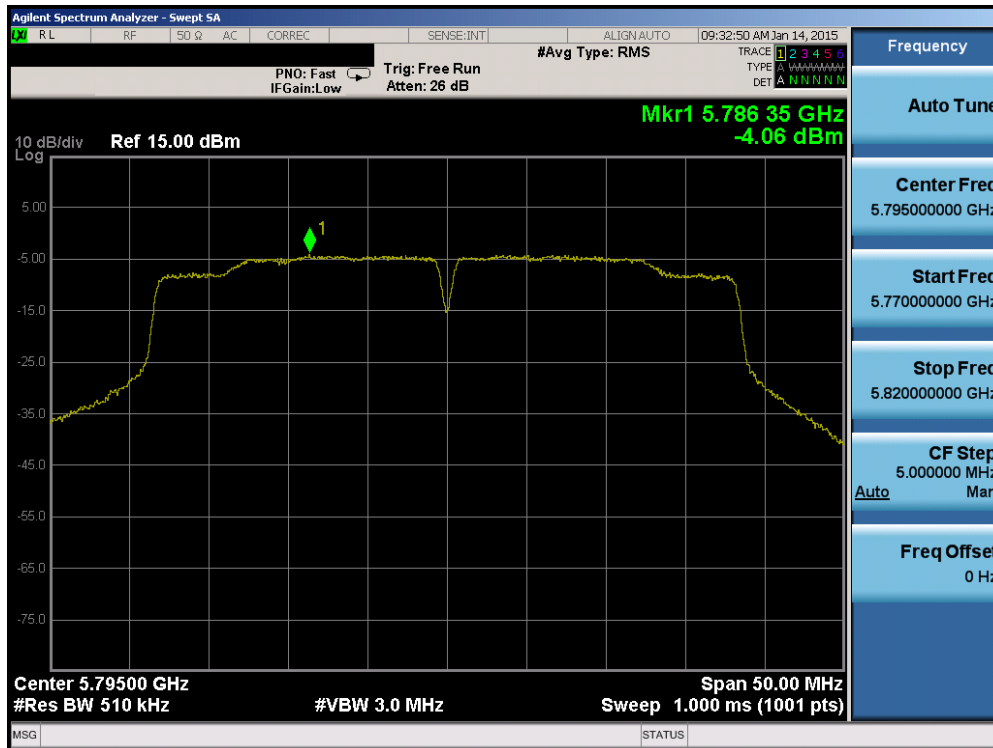
Plot 6-47. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)



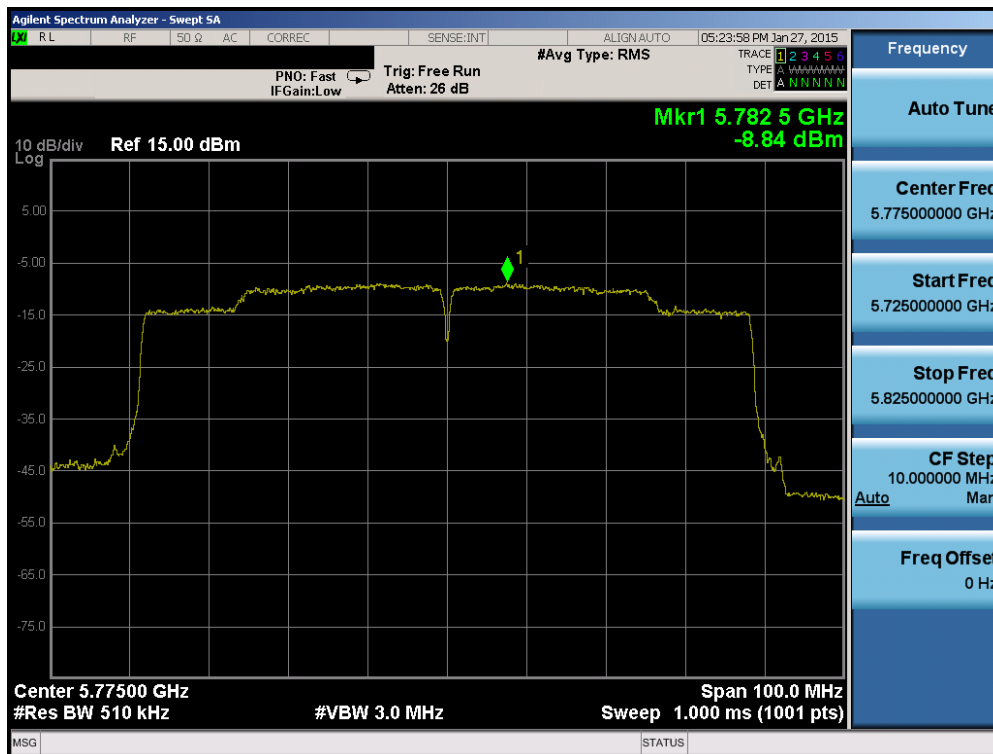
Plot 6-48. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

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Plot 6-51. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 6-52. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

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Summed MIMO Power Spectral Density Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Antenn-1 Power Density [dBm]	Antenn-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]	Pass / Fail
Band Gap	5720	144	n (20MHz)	6.5/7.2 (MCS0)	-0.08	-0.63	2.66	11.0	-8.34	Pass
	5710	142	n (40MHz)	13.5/15 (MCS0)	1.24	1.20	4.23	11.0	-6.77	Pass
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-6.54	-5.50	-2.98	11.0	-13.98	Pass

Table 6-27. Band Gap MIMO Conducted Power Spectral Density Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Antenn-1 Power Density [dBm]	Antenn-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]	Pass / Fail
Band 3	5745	149	n (20MHz)	6.5/7.2 (MCS0)	-1.75	-1.53	1.37	30.0	-28.63	Pass
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	-2.24	-1.72	1.04	30.0	-28.96	Pass
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	-1.31	-1.87	1.43	30.0	-28.57	Pass
	5755	151	n (40MHz)	13.5/15 (MCS0)	-4.54	-4.72	-1.62	30.0	-31.62	Pass
	5795	159	n (40MHz)	13.5/15 (MCS0)	-3.80	-4.06	-0.92	30.0	-30.92	Pass
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-9.91	-8.84	-6.33	30.0	-36.33	Pass

Table 6-28. Band 3 MIMO Conducted Power Spectral Density Measurements

Note:

Per KDB 662911 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

Sample MIMO Calculation:

At 5745MHz the average conducted power spectral density was measured to be -1.75 dBm for Antenna-1 and -1.53 dBm for Antenna-2.

$$\text{Antenna 1} + \text{Antenna 2} = \text{MIMO}$$

$$(-1.75 \text{ dBm} + -1.53 \text{ dBm}) = (0.67 \text{ mW} + 0.70 \text{ mW}) = 1.37 \text{ mW} = 1.37 \text{ dBm}$$

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6.6 Radiated Spurious Emission Measurements

\$15.407(b.1)(b.6) \$15.205 \$15.209

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02 v01, and at the appropriate frequencies. All channels, modes (e.g. 802.11a, 802.11n (20MHz BW), 802.11n (40MHz BW), and 802.11ac (80MHz)), and modulations/data rates were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

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 6-29 per Section 15.209.

Frequency	Field Strength [$\mu\text{V/m}$]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 6-29. Radiated Limits

Test Procedures Used

KDB 789033 D02 v01 – Section G

Test Settings

Average Measurements above 1GHz (Method AD)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be $\geq 2 \times \text{span/RBW}$)
6. Averaging type = power (RMS)
7. Sweep time = auto couple
8. Trace was averaged over 100 sweeps

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = 120kHz
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

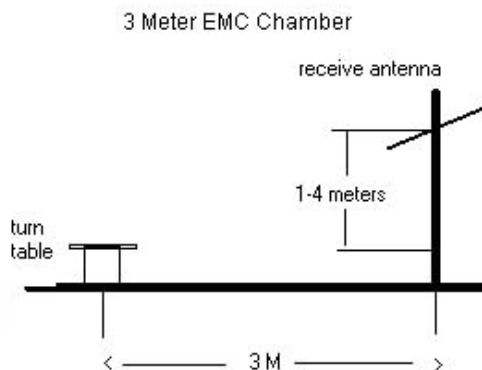


Figure 6-5. Test Instrument & Measurement Setup

Test Notes

1. All radiated spurious emissions levels were measured in a radiated test setup per the guidance of KDB 789033 D02 v01 Section H.
2. 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 6-29.
3. All spurious emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-11. All spurious emissions that do not lie in a restricted band are subject to a peak limit of -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dBμV/m.
4. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
5. This unit was tested with its standard battery.

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6. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
7. Emissions below 18GHz were measured at a 3 meter test distance while emissions above 18GHz were measured at a 1 meter test distance with the application of a distance correction factor.
8. Radiated spurious emissions were investigated while operating in MIMO mode, however, it was determined that single antenna operation produced the worst case emissions. Since the emissions produced from MIMO operation were found to be more than 20dB below the limit, the MIMO emissions are not reported.

Sample Calculations

Determining Spurious Emissions Levels

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

Radiated Band Edge Measurement Offset

- o The amplitude offset shown in the radiated restricted band edge plots in Section 6.8 was calculated using the formula:
Offset (dB) = (Antenna Factor + Cable Loss + 10 dB Attenuator) – Preamplifier Gain

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Antenna-1 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5180MHz
Channel: 36

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10360.00	-102.69	Peak	H	46.55	0.00	50.86	68.20	-17.34
* 15540.00	-117.93	Average	H	49.22	0.00	38.29	53.98	-15.69
* 15540.00	-105.61	Peak	H	49.22	0.00	50.61	73.98	-23.37
* 20720.00	-99.96	Average	H	44.20	-9.54	41.69	53.98	-12.29
* 20720.00	-97.86	Peak	H	44.20	-9.54	43.79	73.98	-30.19
25900.00	-101.47	Peak	H	45.08	-9.54	41.06	68.20	-27.14

Table 6-30. Radiated Measurements

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5200MHz
Channel: 40

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10400.00	-101.52	Peak	H	46.56	0.00	52.05	68.20	-16.15
* 15600.00	-117.99	Average	H	49.31	0.00	38.32	53.98	-15.66
* 15600.00	-105.25	Peak	H	49.31	0.00	51.06	73.98	-22.92
* 20800.00	-100.86	Average	H	44.20	-9.54	40.80	53.98	-13.18
* 20800.00	-98.01	Peak	H	44.20	-9.54	43.65	73.98	-30.33
26000.00	-102.05	Peak	H	45.11	-9.54	40.52	68.20	-27.68

Table 6-31. Radiated Measurements

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5240MHz
 Channel: 48

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10480.00	-102.15	Peak	H	46.58	0.00	51.43	68.20	-16.77
* 15720.00	-119.05	Average	H	49.58	0.00	37.53	53.98	-16.45
* 15720.00	-106.07	Peak	H	49.58	0.00	50.51	73.98	-23.47
* 20960.00	-98.82	Average	H	44.19	-9.54	42.82	53.98	-11.16
* 20960.00	-101.47	Peak	H	44.19	-9.54	40.17	73.98	-33.81
26200.00	-101.96	Peak	H	44.95	-9.54	40.45	68.20	-27.75

Table 6-32. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5260MHz
 Channel: 52

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10520.00	-101.92	Peak	H	46.59	0.00	51.67	68.20	-16.53
* 15780.00	-118.48	Average	H	49.80	0.00	38.32	53.98	-15.66
* 15780.00	-106.23	Peak	H	49.80	0.00	50.57	73.98	-23.41
* 21040.00	-102.69	Average	H	44.18	-9.54	38.94	53.98	-15.03
* 21040.00	-99.41	Peak	H	44.18	-9.54	42.22	73.98	-31.75
26300.00	-101.73	Peak	H	44.95	-9.54	40.67	68.20	-27.53

Table 6-33. Radiated Measurements

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5280MHz
 Channel: 56

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10560.00	-102.08	Peak	H	46.61	0.00	51.53	68.20	-16.67
* 15840.00	-118.83	Average	H	50.04	0.00	38.21	53.98	-15.77
* 15840.00	-106.84	Peak	H	50.04	0.00	50.20	73.98	-23.78
* 21120.00	-102.51	Average	H	44.17	-9.54	39.12	53.98	-14.86
* 21120.00	-98.97	Peak	H	44.17	-9.54	42.66	73.98	-31.32
26400.00	-100.62	Peak	H	45.01	-9.54	41.84	68.20	-26.36

Table 6-34. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5320MHz
 Channel: 64

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 10640.00	-113.98	Average	H	46.64	0.00	39.66	53.98	-14.32
* 10640.00	-103.50	Peak	H	46.64	0.00	50.14	73.98	-23.84
* 15960.00	-118.63	Average	H	50.49	0.00	38.86	53.98	-15.12
* 15960.00	-106.22	Peak	H	50.49	0.00	51.27	73.98	-22.71
* 21280.00	-104.07	Average	H	44.18	-9.54	37.56	53.98	-16.41
* 21280.00	-100.42	Peak	H	44.18	-9.54	41.21	73.98	-32.76
26600.00	-105.36	Peak	H	47.61	-9.54	39.71	68.20	-28.49

Table 6-35. Radiated Measurements

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5500MHz
 Channel: 100

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11000.00	-113.50	Average	H	46.98	0.00	40.48	53.98	-13.50
* 11000.00	-101.27	Peak	H	46.98	0.00	52.71	73.98	-21.27
16500.00	-100.15	Peak	H	52.45	0.00	59.30	68.20	-8.91
22000.00	-98.51	Peak	H	44.47	-9.54	43.42	68.20	-24.78
27500.00	-104.80	Peak	H	47.92	-9.54	40.58	68.20	-27.62

Table 6-36. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5580MHz
 Channel: 116

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11160.00	-116.62	Average	H	47.20	0.00	37.59	53.98	-16.39
* 11160.00	-103.56	Peak	H	47.20	0.00	50.65	73.98	-23.33
16740.00	-106.29	Peak	H	53.73	0.00	54.44	68.20	-13.76
* 22320.00	-102.05	Average	H	44.59	-9.54	40.00	53.98	-13.98
* 22320.00	-98.92	Peak	H	44.59	-9.54	43.13	73.98	-30.85
27900.00	-105.11	Peak	H	48.09	-9.54	40.44	68.20	-27.76

Table 6-37. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5720MHz
 Channel: 144

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11440.00	-117.81	Average	H	47.64	0.00	36.83	53.98	-17.14
* 11440.00	-105.25	Peak	H	47.64	0.00	49.39	73.98	-24.58
17160.00	-107.17	Peak	H	54.67	0.00	54.50	68.20	-13.70
* 22880.00	-103.59	Average	H	44.62	-9.54	38.49	53.98	-15.49
* 22880.00	-100.79	Peak	H	44.62	-9.54	41.29	73.98	-32.69
28600.00	-106.04	Peak	H	48.35	-9.54	39.77	68.20	-28.43

Table 6-38. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5745MHz
 Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11490.00	-116.45	Average	H	47.88	0.00	38.43	53.98	-15.55
* 11490.00	-104.59	Peak	H	47.88	0.00	50.29	73.98	-23.69
* 22980.00	-102.47	Average	H	44.64	-9.54	39.62	53.98	-14.36
* 22980.00	-99.46	Peak	H	44.64	-9.54	42.63	68.20	-25.57

Table 6-39. Radiated Measurements

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

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11570.00	-116.73	Average	H	48.15	0.00	38.42	53.98	-15.56
* 11570.00	-104.39	Peak	H	48.15	0.00	50.76	73.98	-23.22

Table 6-40. Radiated Measurements

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

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11650.00	-116.59	Average	H	48.38	0.00	38.79	53.98	-15.19
* 11650.00	-104.38	Peak	H	48.38	0.00	51.00	73.98	-22.98

Table 6-41. Radiated Measurements

Antenna-2 Radiated Spurious Emission Measurements

§15.247(d) §15.205 & §15.209

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5180MHz
Channel: 36

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10360.00	-103.23	Peak	H	46.55	0.00	50.32	68.20	-17.88
* 15540.00	-118.06	Average	H	49.22	0.00	38.16	53.98	-15.82
* 15540.00	-105.56	Peak	H	49.22	0.00	50.66	73.98	-23.32
* 20720.00	-100.17	Average	H	44.20	-9.54	41.48	53.98	-12.50
* 20720.00	-98.20	Peak	H	44.20	-9.54	43.45	73.98	-30.53
25900.00	-100.72	Peak	H	45.08	-9.54	41.81	68.20	-26.39

Table 6-42. Radiated Measurements

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5200MHz
Channel: 40

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10400.00	-100.99	Peak	H	46.56	0.00	52.58	68.20	-15.62
* 15600.00	-118.20	Average	H	49.31	0.00	38.11	53.98	-15.87
* 15600.00	-105.42	Peak	H	49.31	0.00	50.89	73.98	-23.09
* 20800.00	-101.11	Average	H	44.20	-9.54	40.55	53.98	-13.43
* 20800.00	-98.28	Peak	H	44.20	-9.54	43.38	73.98	-30.60
26000.00	-102.90	Peak	H	45.11	-9.54	39.67	68.20	-28.53

Table 6-43. Radiated Measurements

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
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Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5240MHz
 Channel: 48

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10480.00	-101.62	Peak	H	46.58	0.00	51.96	68.20	-16.24
* 15720.00	-119.02	Average	H	49.58	0.00	37.56	53.98	-16.42
* 15720.00	-106.06	Peak	H	49.58	0.00	50.52	73.98	-23.46
* 20960.00	-102.88	Average	H	44.19	-9.54	38.76	53.98	-15.22
* 20960.00	-99.53	Peak	H	44.19	-9.54	42.11	73.98	-31.87
26200.00	-101.36	Peak	H	44.95	-9.54	41.05	68.20	-27.15

Table 6-44. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5260MHz
 Channel: 52

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10520.00	-101.23	Peak	H	46.59	0.00	52.36	68.20	-15.84
* 15780.00	-118.50	Average	H	49.80	0.00	38.30	53.98	-15.68
* 15780.00	-105.88	Peak	H	49.80	0.00	50.92	73.98	-23.06
* 21040.00	-103.17	Average	H	44.18	-9.54	38.46	53.98	-15.51
* 21040.00	-99.35	Peak	H	44.18	-9.54	42.28	73.98	-31.69
26300.00	-102.02	Peak	H	44.95	-9.54	40.38	68.20	-27.82

Table 6-45. Radiated Measurements

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 62 of 103

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5280MHz
 Channel: 56

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
10560.00	-100.40	Peak	H	46.61	0.00	53.21	68.20	-14.99
* 15840.00	-119.20	Average	H	50.04	0.00	37.84	53.98	-16.14
* 15840.00	-106.23	Peak	H	50.04	0.00	50.81	73.98	-23.17
* 21120.00	-103.43	Average	H	44.17	-9.54	38.20	53.98	-15.78
* 21120.00	-100.21	Peak	H	44.17	-9.54	41.42	73.98	-32.56
26400.00	-101.18	Peak	H	45.01	-9.54	41.28	68.20	-26.92

Table 6-46. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5320MHz
 Channel: 64

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 10640.00	-112.89	Average	H	46.64	0.00	40.75	53.98	-13.23
* 10640.00	-102.09	Peak	H	46.64	0.00	51.55	73.98	-22.43
* 15960.00	-118.88	Average	H	50.49	0.00	38.61	53.98	-15.37
* 15960.00	-106.32	Peak	H	50.49	0.00	51.17	73.98	-22.81
* 21280.00	-104.82	Average	H	44.18	-9.54	36.81	53.98	-17.16
* 21280.00	-101.16	Peak	H	44.18	-9.54	40.47	73.98	-33.50
26600.00	-105.69	Peak	H	47.61	-9.54	39.38	68.20	-28.82

Table 6-47. Radiated Measurements

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter	Page 63 of 103	

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5500MHz
 Channel: 100

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11000.00	-115.45	Average	H	46.98	0.00	38.53	53.98	-15.45
* 11000.00	-103.80	Peak	H	46.98	0.00	50.18	73.98	-23.80
16500.00	-106.72	Peak	H	52.45	0.00	52.73	68.20	-15.48
22000.00	-98.68	Peak	H	44.47	-9.54	43.25	68.20	-24.95
27500.00	-104.68	Peak	H	47.92	-9.54	40.70	68.20	-27.50

Table 6-48. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5580MHz
 Channel: 116

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11160.00	-115.20	Average	H	47.20	0.00	39.01	53.98	-14.97
* 11160.00	-103.13	Peak	H	47.20	0.00	51.08	73.98	-22.90
16740.00	-106.51	Peak	H	53.73	0.00	54.22	68.20	-13.98
* 22320.00	-102.03	Average	H	44.59	-9.54	40.02	53.98	-13.96
* 22320.00	-98.87	Peak	H	44.59	-9.54	43.18	73.98	-30.80
27900.00	-105.86	Peak	H	48.09	-9.54	39.69	68.20	-28.51

Table 6-49. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5700MHz
 Channel: 140

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11400.00	-117.39	Average	H	47.64	0.00	37.25	53.98	-16.72
* 11400.00	-104.60	Peak	H	47.64	0.00	50.04	73.98	-23.93
17100.00	-106.26	Peak	H	54.67	0.00	55.41	68.20	-12.79
* 22800.00	-103.67	Average	H	44.62	-9.54	38.41	53.98	-15.57
* 22800.00	-100.46	Peak	H	44.62	-9.54	41.62	73.98	-32.36
28500.00	-106.41	Peak	H	48.35	-9.54	39.40	68.20	-28.80

Table 6-50. Radiated Measurements

Worst Case Mode: 802.11a
 Worst Case Transfer Rate: 6 Mbps
 Distance of Measurements: 1 & 3 Meters
 Operating Frequency: 5745MHz
 Channel: 149

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11490.00	-116.63	Average	H	47.88	0.00	38.25	53.98	-15.73
* 11490.00	-104.38	Peak	H	47.88	0.00	50.50	73.98	-23.48
* 22980.00	-102.52	Average	H	44.64	-9.54	39.57	53.98	-14.41
* 22980.00	-99.27	Peak	H	44.64	-9.54	42.82	68.20	-25.38

Table 6-51. Radiated Measurements

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

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11570.00	-116.28	Average	H	48.15	0.00	38.87	53.98	-15.11
* 11570.00	-104.04	Peak	H	48.15	0.00	51.11	73.98	-22.87

Table 6-52. Radiated Measurements

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

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
* 11650.00	-116.82	Average	H	48.38	0.00	38.56	53.98	-15.42
* 11650.00	-104.12	Peak	H	48.38	0.00	51.26	73.98	-22.72

Table 6-53. Radiated Measurements

6.7.1 Antenna-1 Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

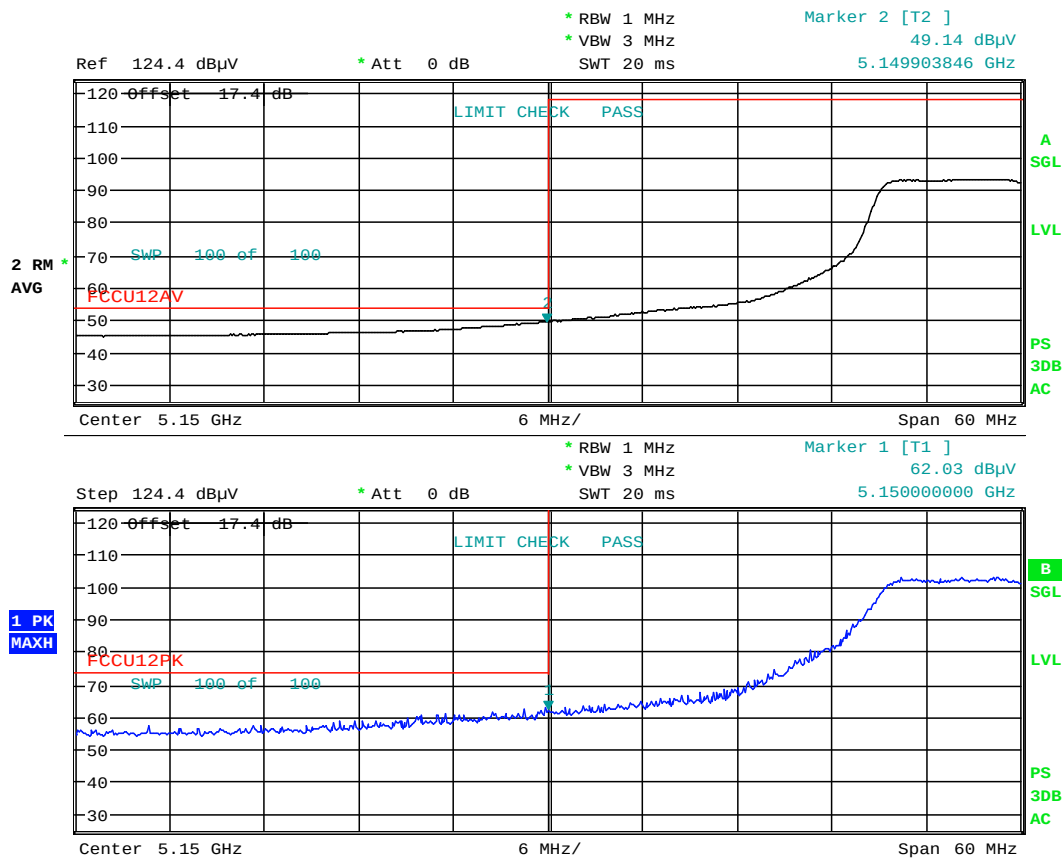
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5180MHz

Channel: 36



Date: 19.DEC.2014 13:23:32

Plot 6-53. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 67 of 103

Antenna-1 Radiated Band Edge Measurements (20MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

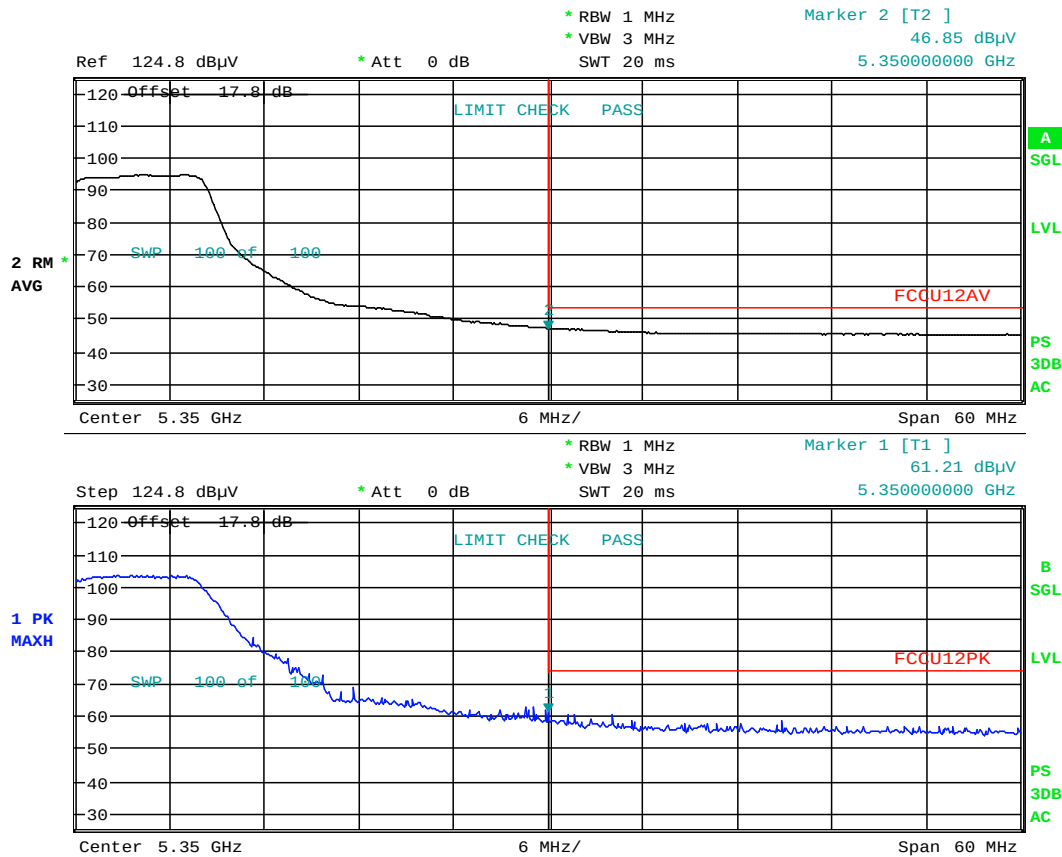
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5320MHz

Channel: 64



Date: 19.DEC.2014 15:40:48

Plot 6-54. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 68 of 103

Antenna-1 Radiated Band Edge Measurements (20MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

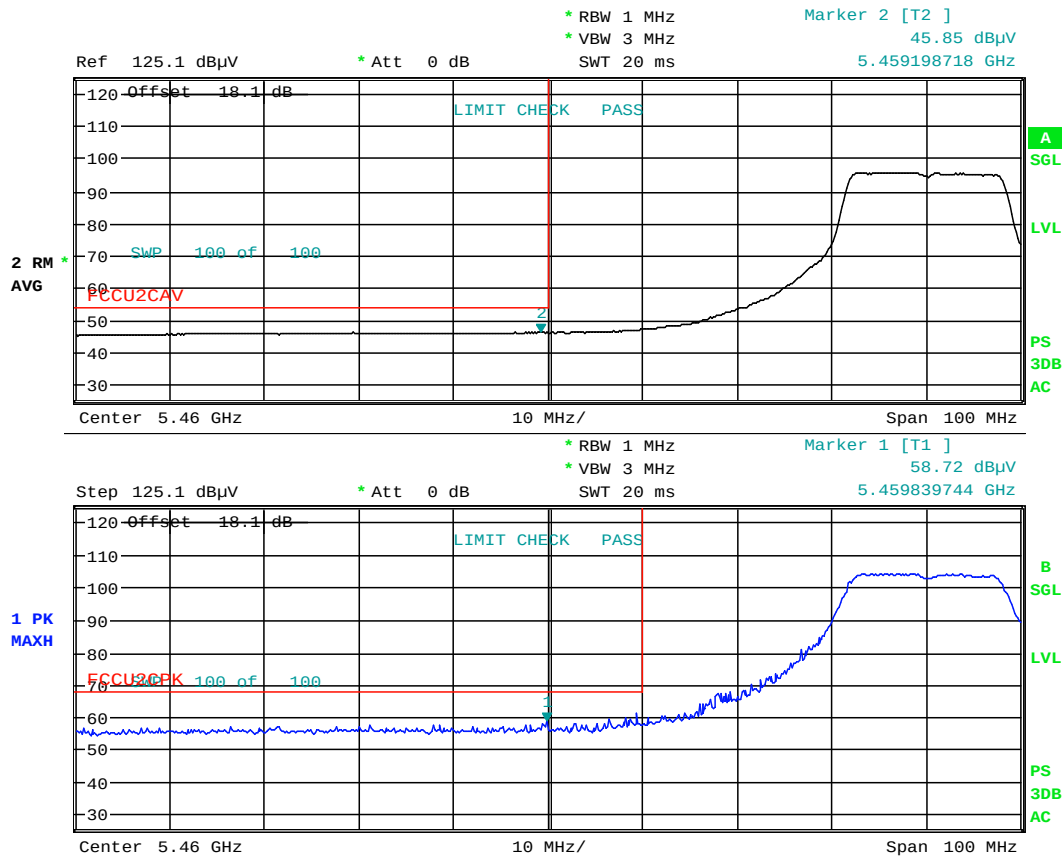
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5500MHz

Channel: 100



Date: 19.DEC.2014 15:53:47

Plot 6-55. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 69 of 103

Antenna-1 Radiated Band Edge Measurements (20MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

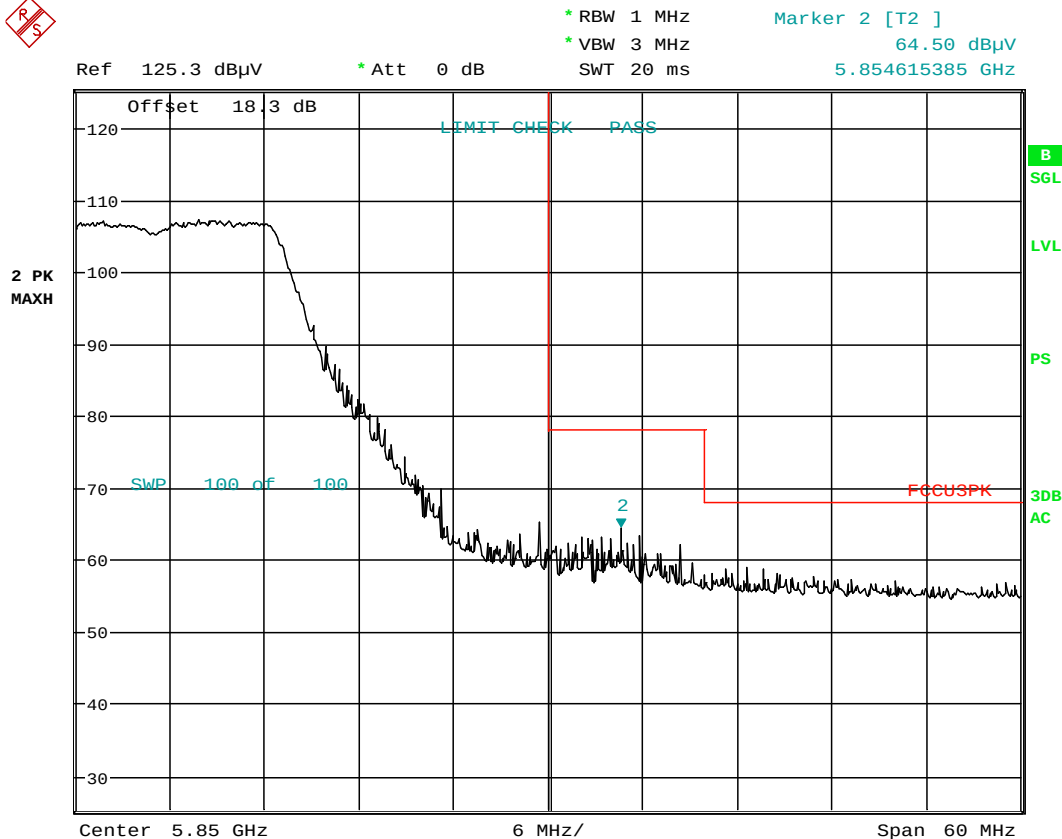
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5825MHz

Channel: 165



Date: 13.JAN.2015 20:01:52

Plot 6-56. Radiated Upper Band Edge Plot (Peak – UNII Band 3)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 70 of 103

6.7.2 Antenna-1 Radiated Band Edge Measurements (40MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

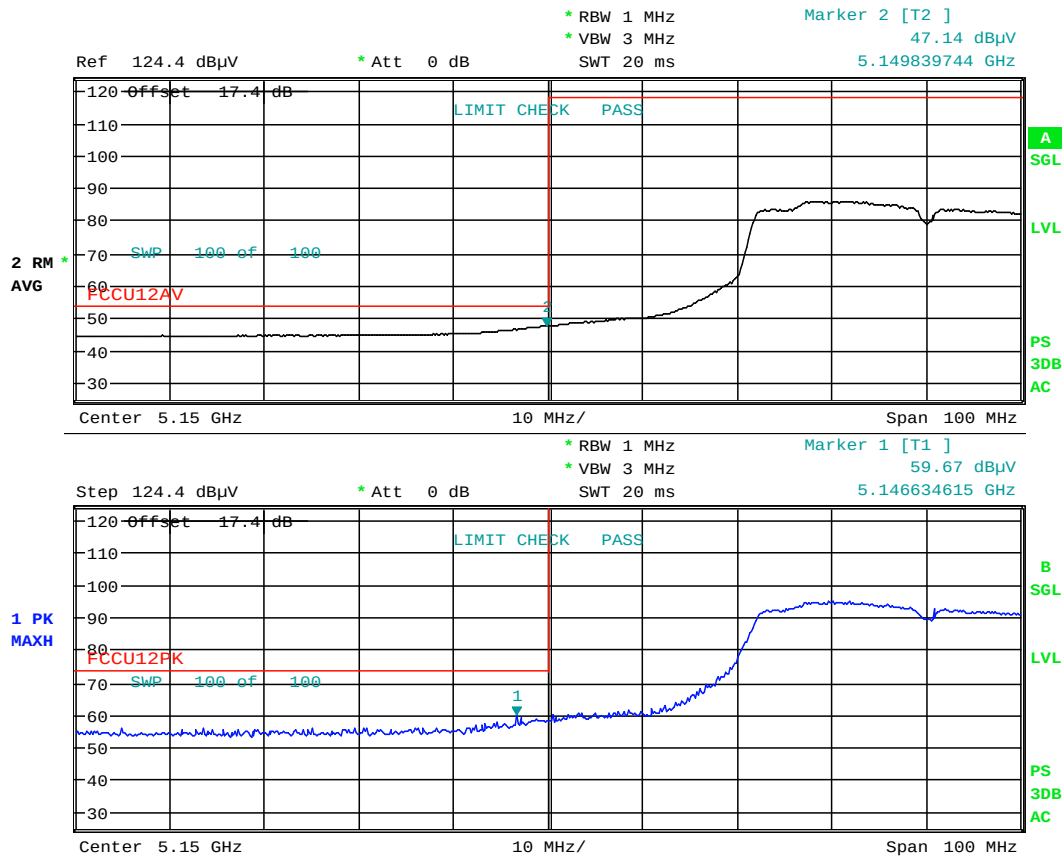
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5190MHz

Channel: 38



Date: 19.DEC.2014 15:07:29

Plot 6-57. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 71 of 103

Antenna-1 Radiated Band Edge Measurements (40MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

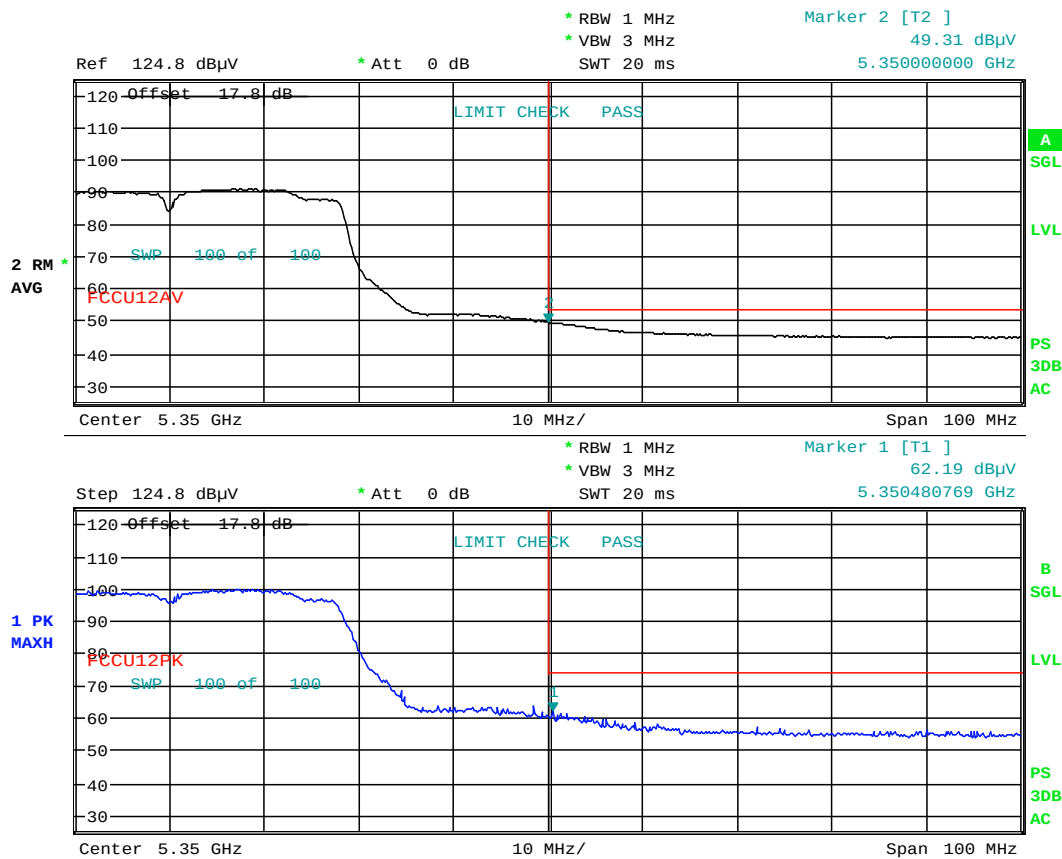
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5310MHz

Channel: 62



Date: 19.DEC.2014 15:43:17

Plot 6-58. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 72 of 103

Antenna-1 Radiated Band Edge Measurements (40MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

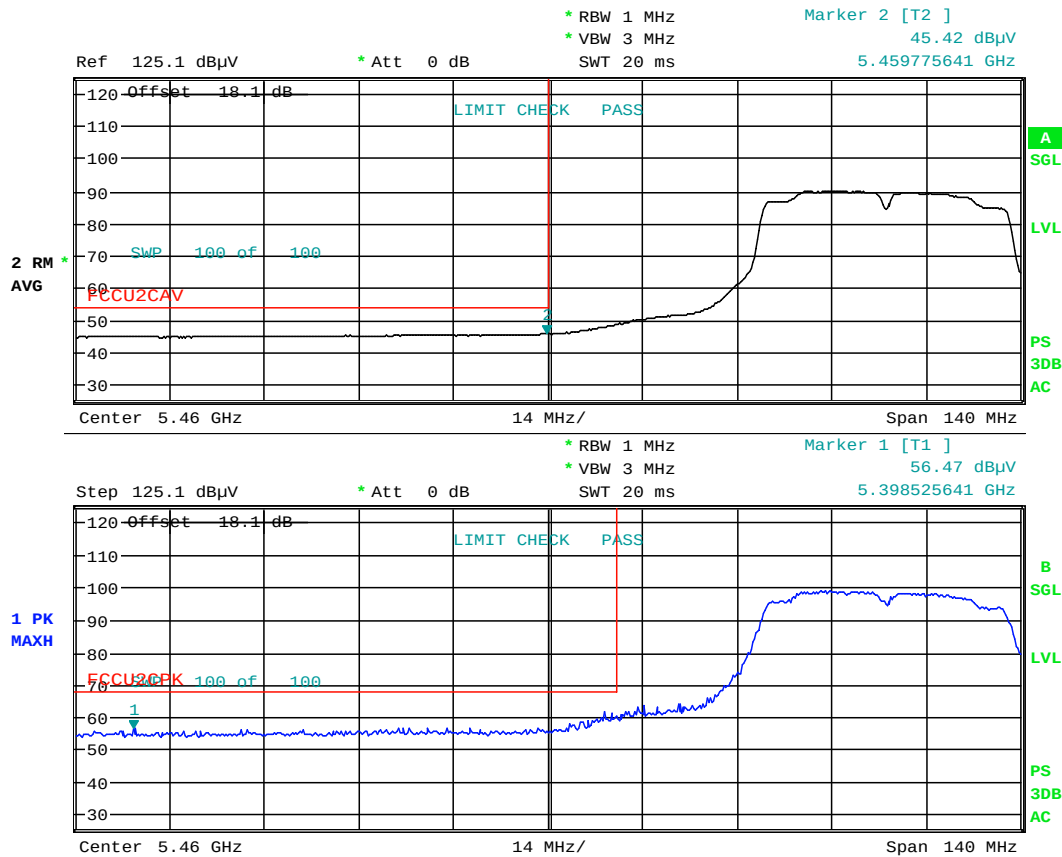
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5510MHz

Channel: 102



Date: 19.DEC.2014 15:55:32

Plot 6-59. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 73 of 103

Antenna-1 Radiated Band Edge Measurements (40MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5795MHz

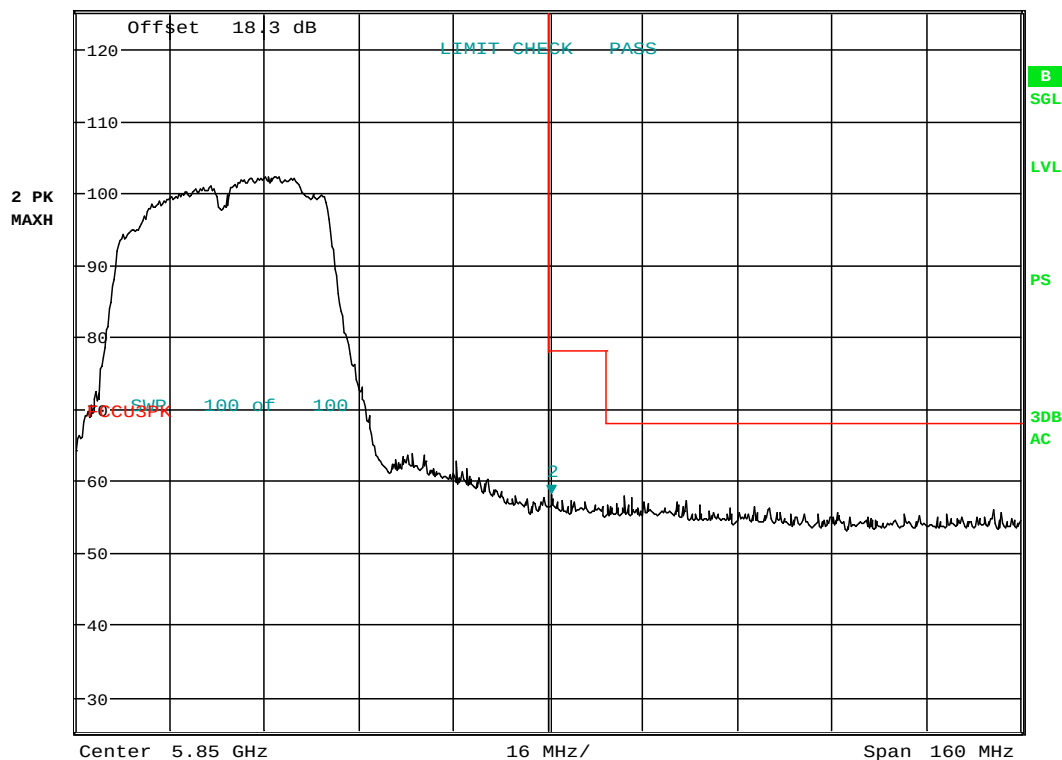
Channel: 159



MARKER 2
 5.850512821 GHz
 Ref 125.3 dBμV * Att 0 dB

* RBW 1 MHz
 * VBW 3 MHz
 SWT 20 ms

Marker 2 [T2]
 58.23 dBμV
 5.850512821 GHz



Date: 13.JAN.2015 20:05:05

Plot 6-60. Radiated Upper Band Edge Plot (Peak – UNII Band 3)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 74 of 103

6.7.3 Antenna-1 Radiated Band Edge Measurements (80MHz BW) §15.407(b.1)(b.2) §15.205 §15.209

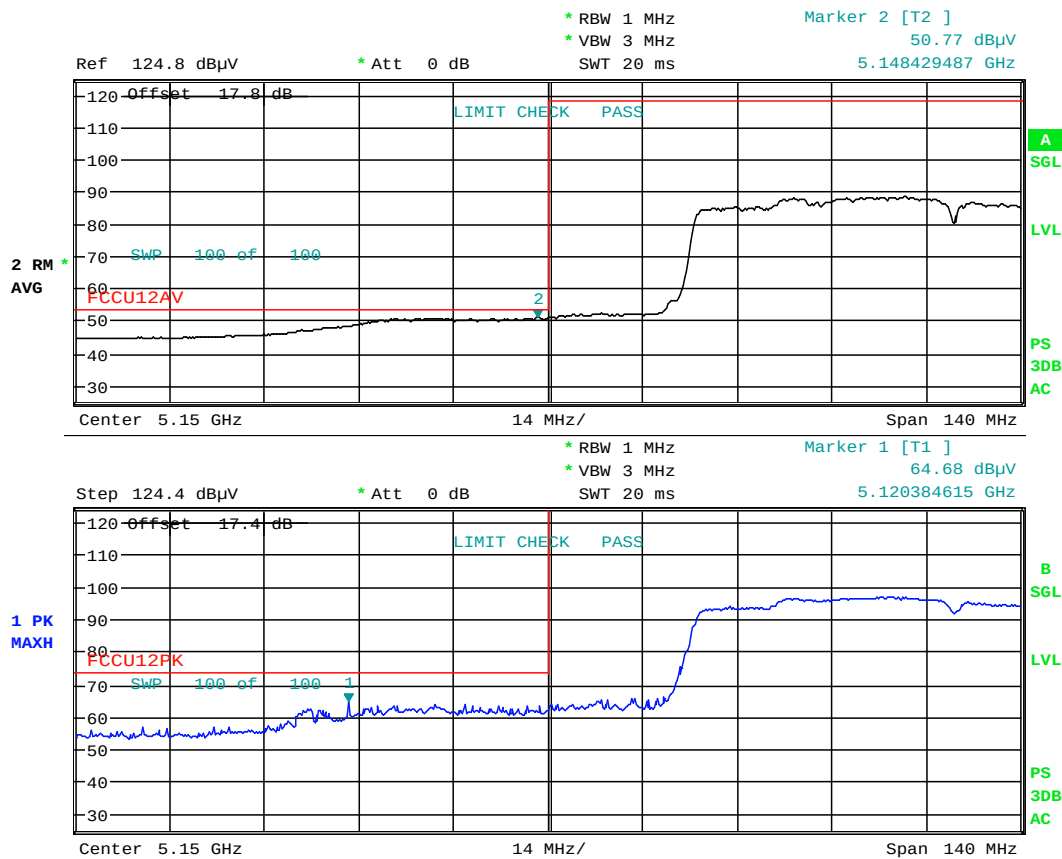
Worst Case Mode: 802.11n (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5210MHz

Channel: 42



Date: 19.DEC.2014 16:06:58

Plot 6-61. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 75 of 103

Antenna-1 Radiated Band Edge Measurements (80MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

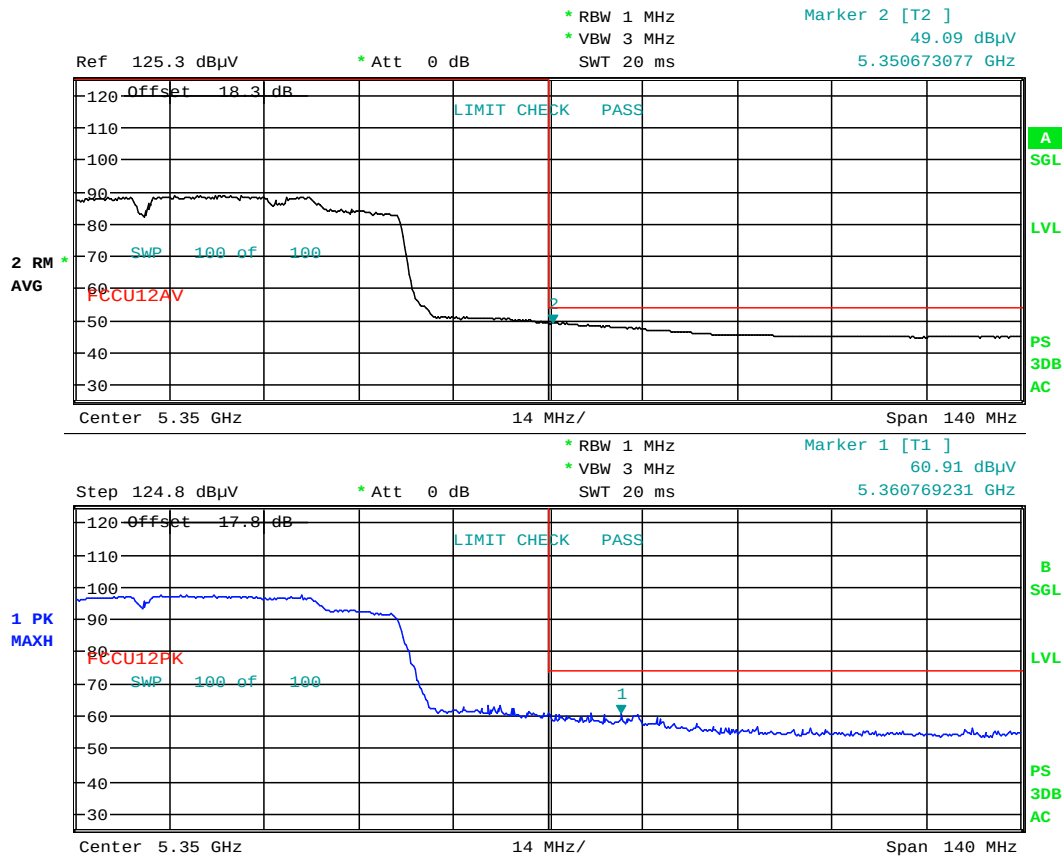
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5290MHz

Channel: 58



Date: 19.DEC.2014 16:03:16

Plot 6-62. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 76 of 103

Antenna-1 Radiated Band Edge Measurements (80MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

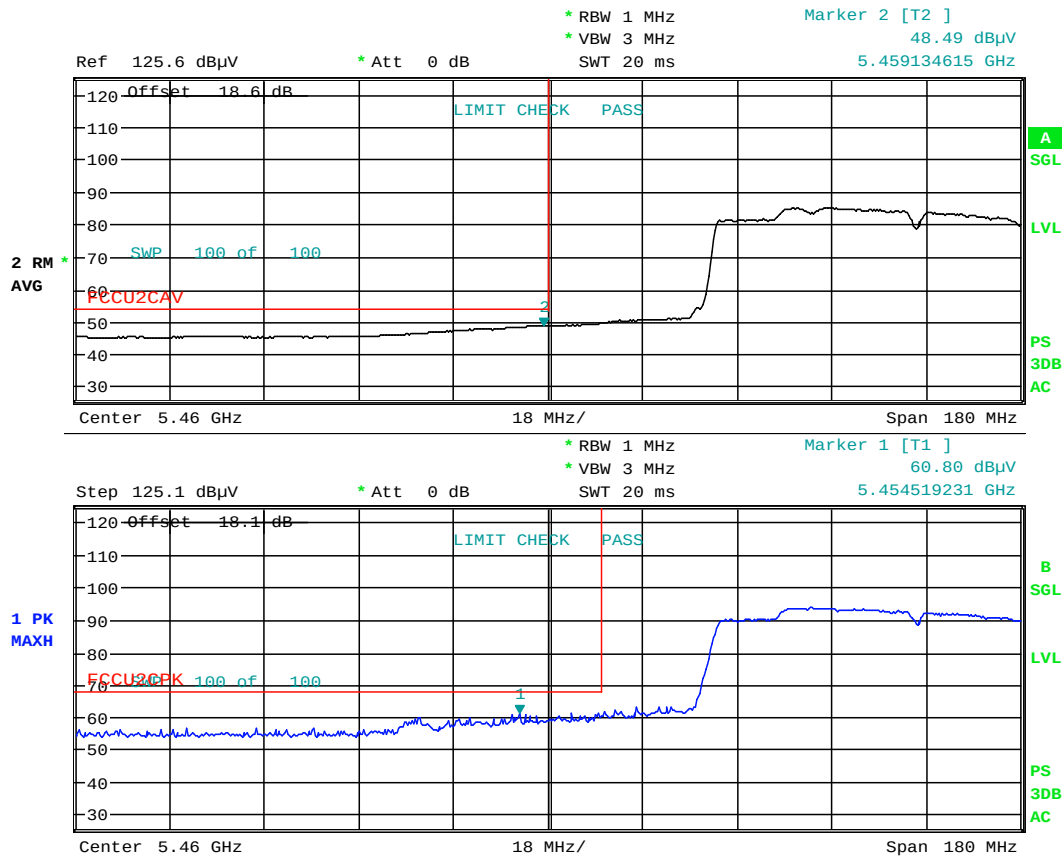
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5530MHz

Channel: 106



Date: 19.DEC.2014 15:59:13

Plot 6-63. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 77 of 103

6.7.4 Antenna-2 Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

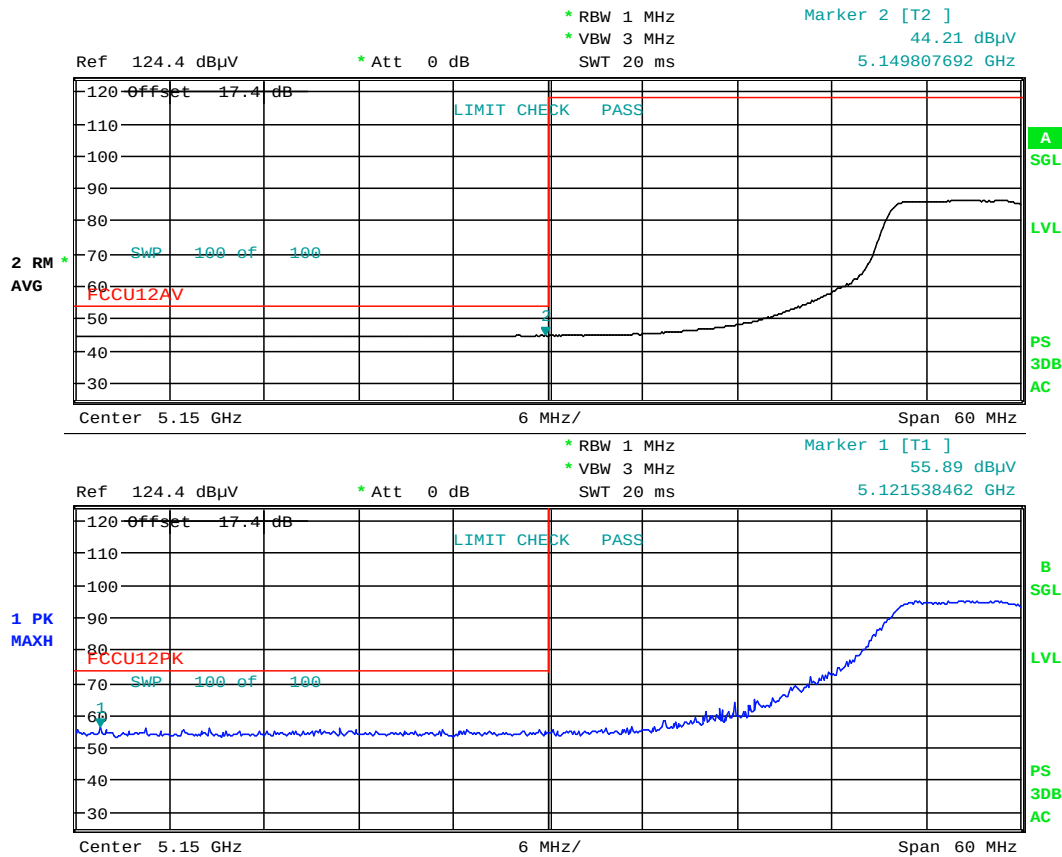
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5180MHz

Channel: 36



Date: 19.DEC.2014 17:27:56

Plot 6-65. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 79 of 103

Antenna-2 Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

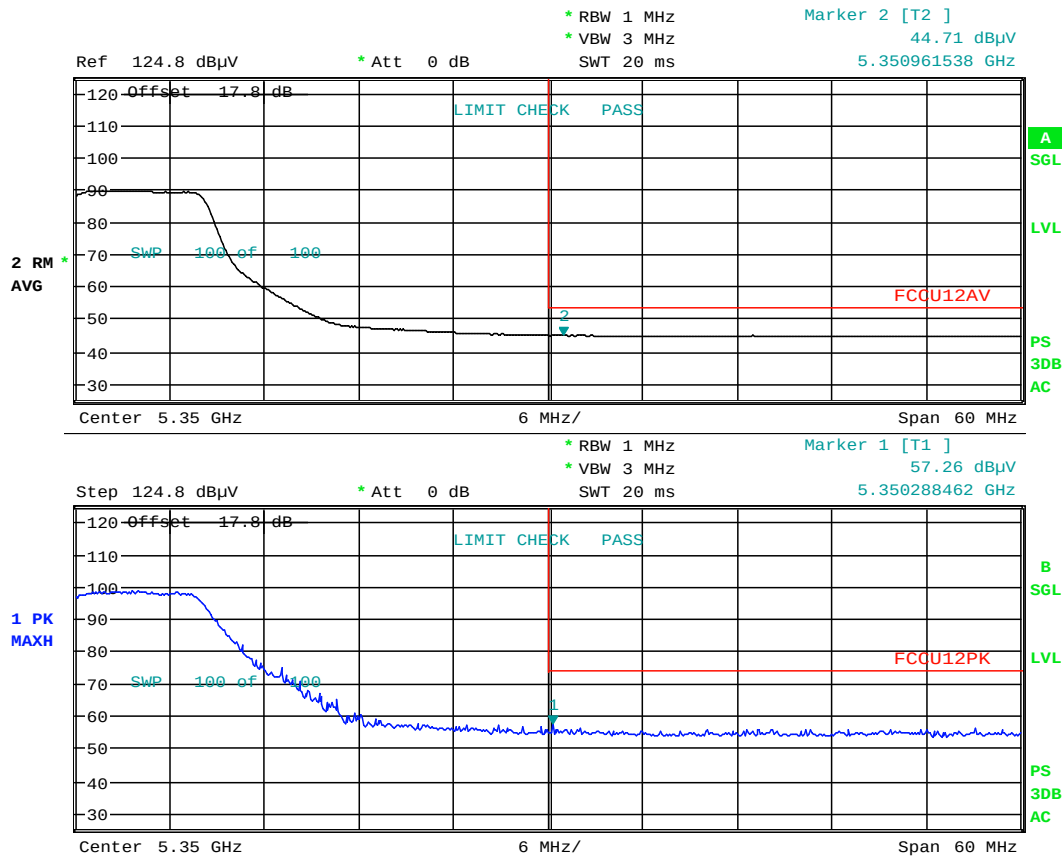
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5320MHz

Channel: 64



Date: 19.DEC.2014 16:54:06

Plot 6-66. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 80 of 103

Antenna-2 Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

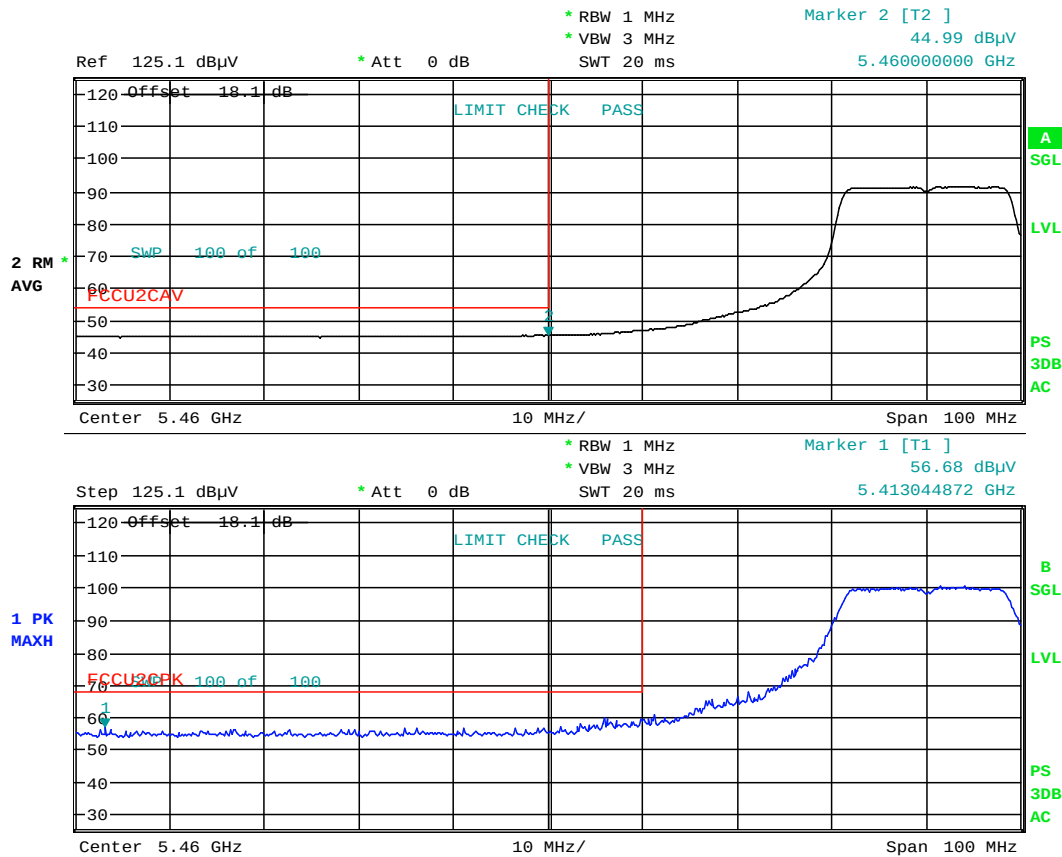
Worst Case Mode: 802.11a

Worst Case Transfer Rate: 6 Mbps

Distance of Measurements: 3 Meters

Operating Frequency: 5500MHz

Channel: 100



Date: 19.DEC.2014 17:09:41

Plot 6-67. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 81 of 103

6.7.5 Antenna-2 Radiated Band Edge Measurements (40MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

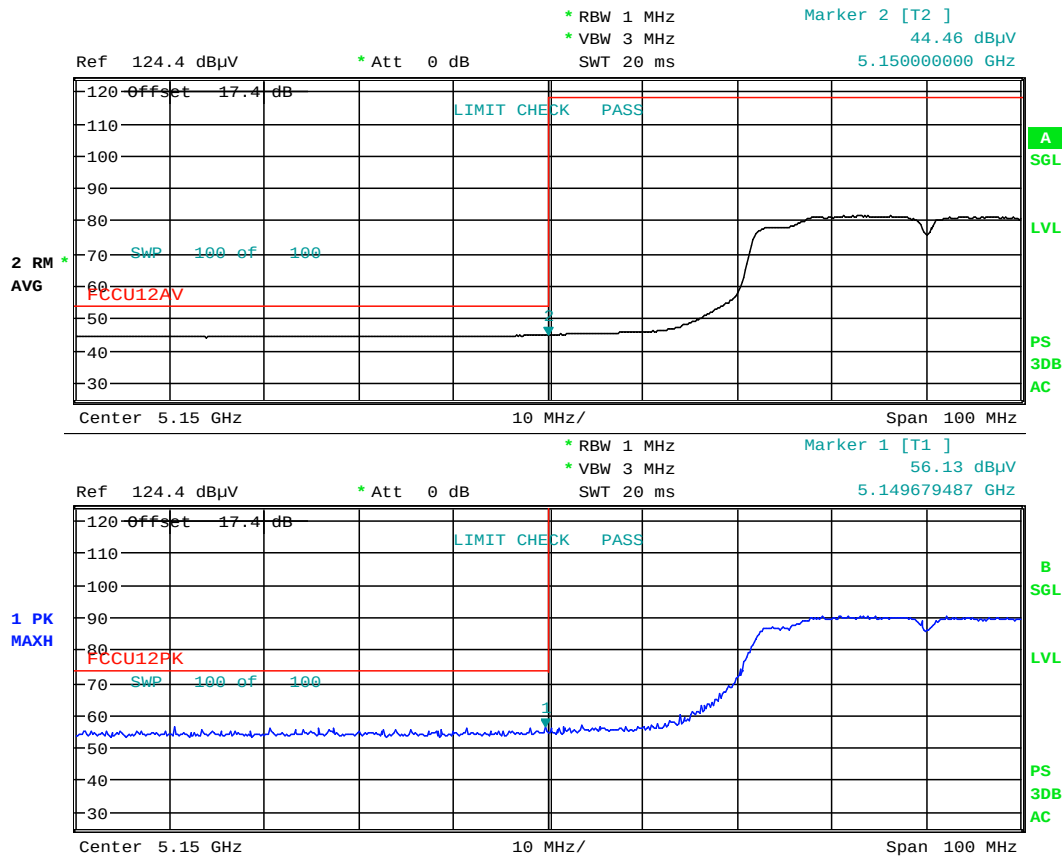
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5190MHz

Channel: 38



Date: 19.DEC.2014 17:29:21

Plot 6-69. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 83 of 103

Antenna-2 Radiated Band Edge Measurements (40MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

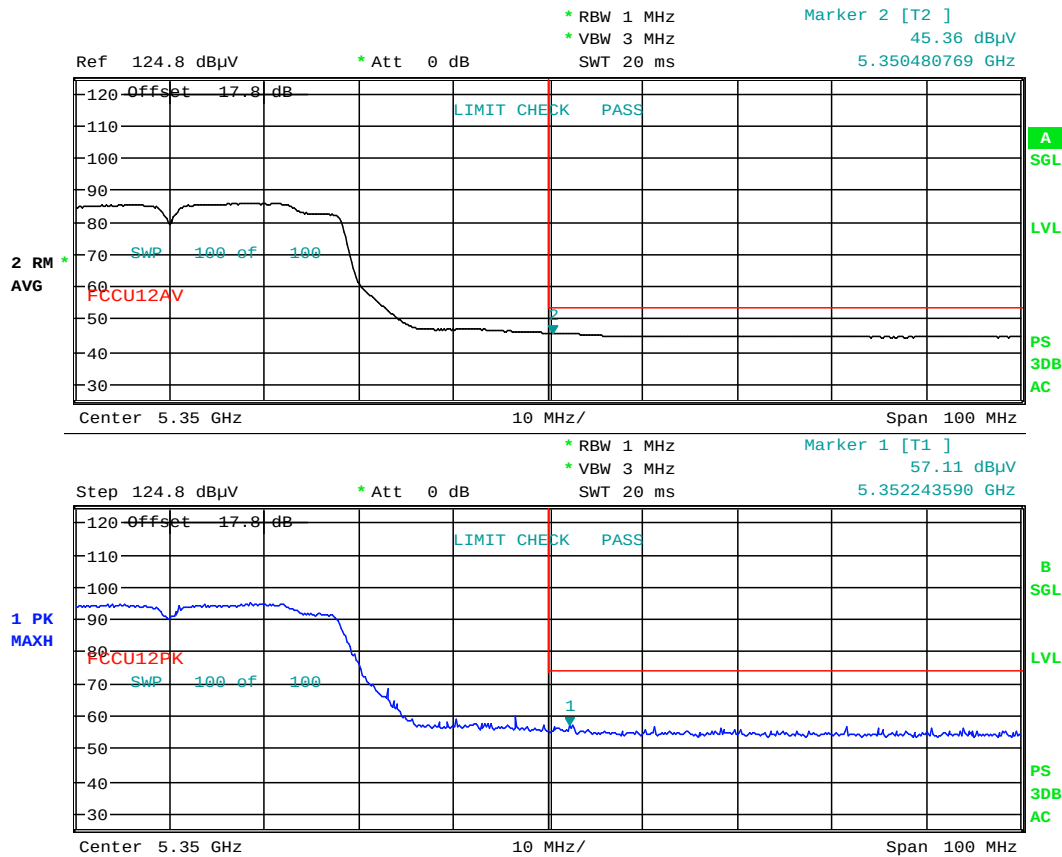
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5310MHz

Channel: 62



Date: 19.DEC.2014 16:56:01

Plot 6-70. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 84 of 103

Antenna-2 Radiated Band Edge Measurements (40MHz BW)

§15.407(b.1)(b.2) §15.205 §15.209

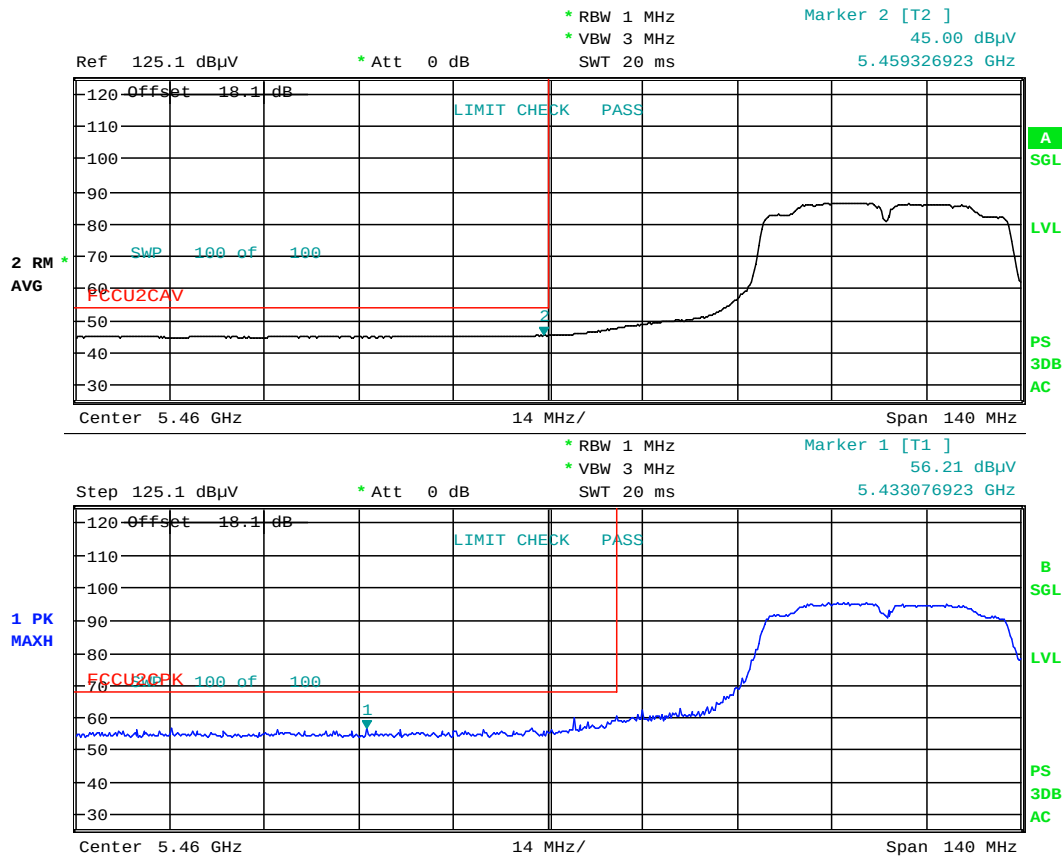
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5510MHz

Channel: 102



Date: 19.DEC.2014 17:16:50

Plot 6-71. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 85 of 103

Antenna-2 Radiated Band Edge Measurements (40MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

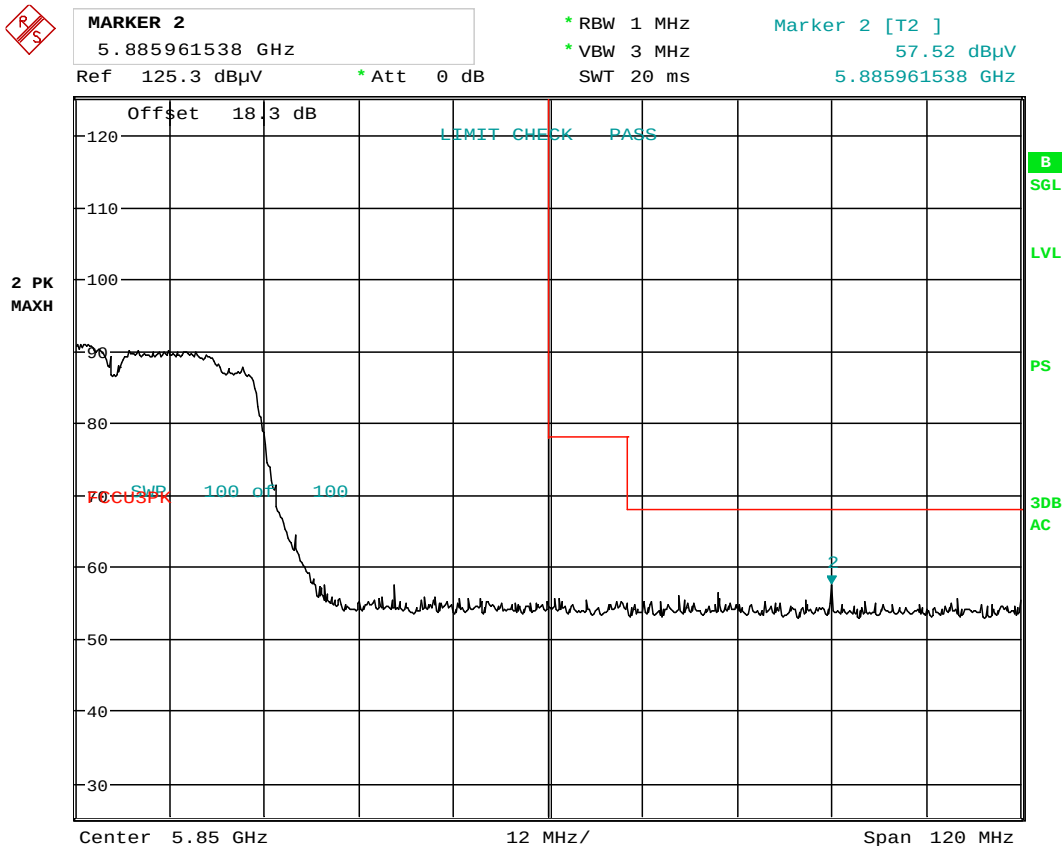
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5795MHz

Channel: 159



Date: 13.JAN.2015 20:30:17

Plot 6-72. Radiated Upper Band Edge Plot (Peak – UNII Band 3)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter	Page 86 of 103	

6.7.6 Antenna-2 Radiated Band Edge Measurements (80MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

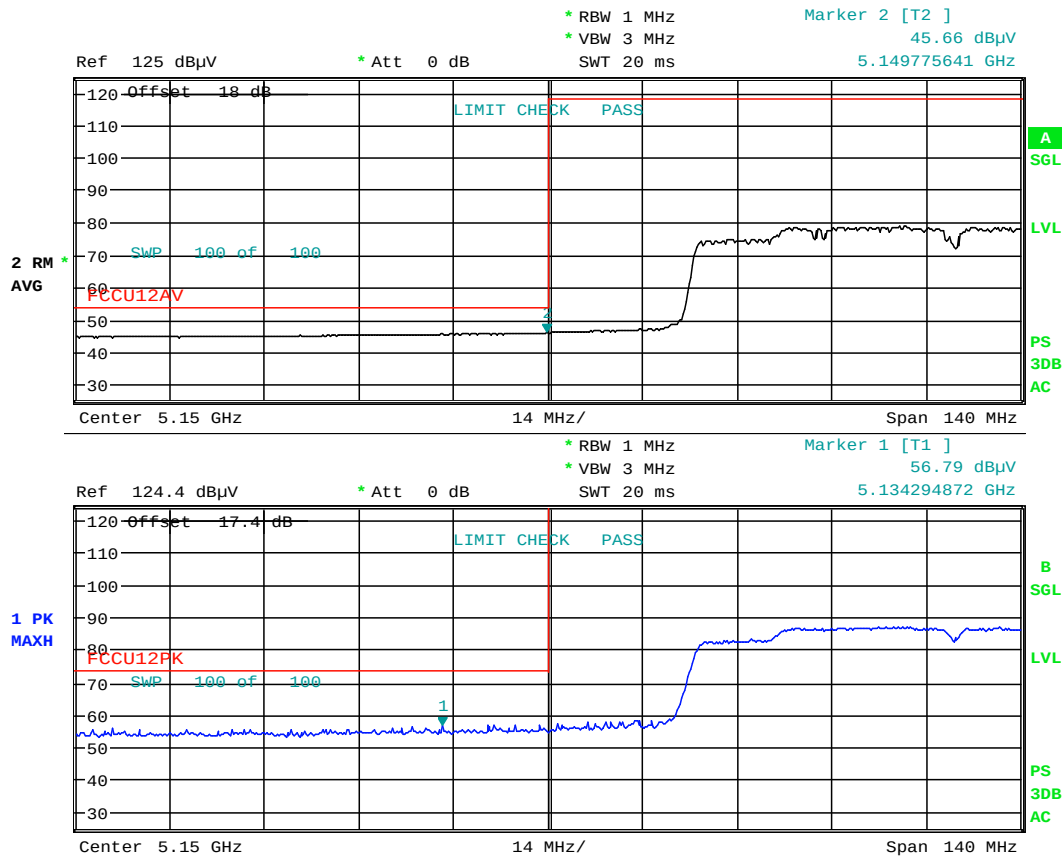
Worst Case Mode: 802.11n (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5210MHz

Channel: 42



Date: 19.DEC.2014 17:30:30

Plot 6-73. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 87 of 103

Antenna-2 Radiated Band Edge Measurements (80MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

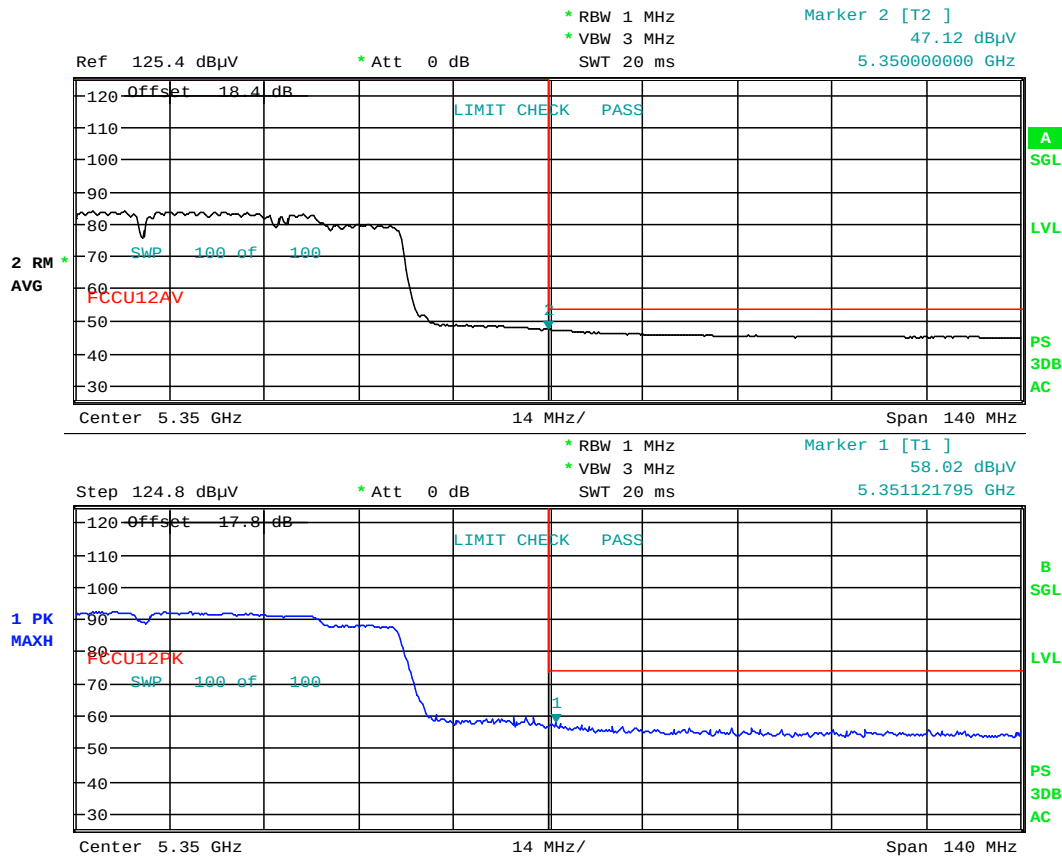
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5290MHz

Channel: 58



Date: 19.DEC.2014 16:57:53

Plot 6-74. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 88 of 103

Antenna-2 Radiated Band Edge Measurements (80MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

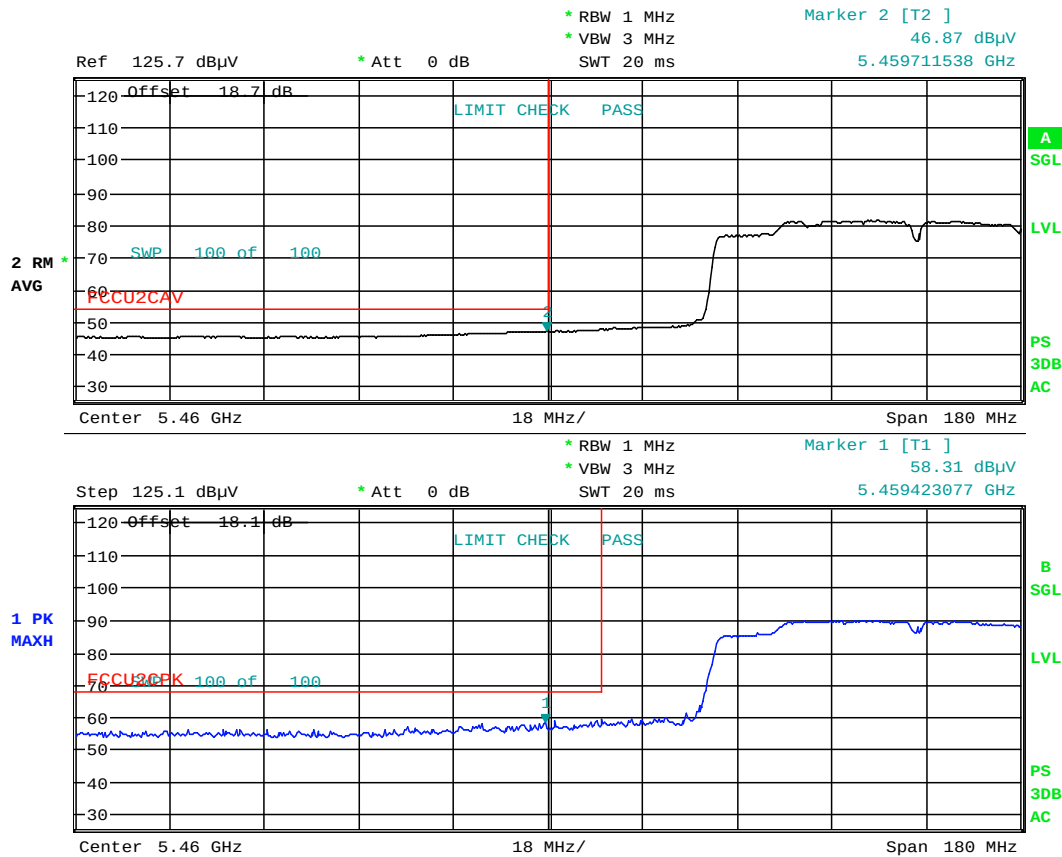
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5530MHz

Channel: 106



Date: 19.DEC.2014 17:18:42

Plot 6-75. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 89 of 103

Antenna-2 Radiated Band Edge Measurements (80MHz BW) **\$15.407(b.1)(b.2) \$15.205 \$15.209**

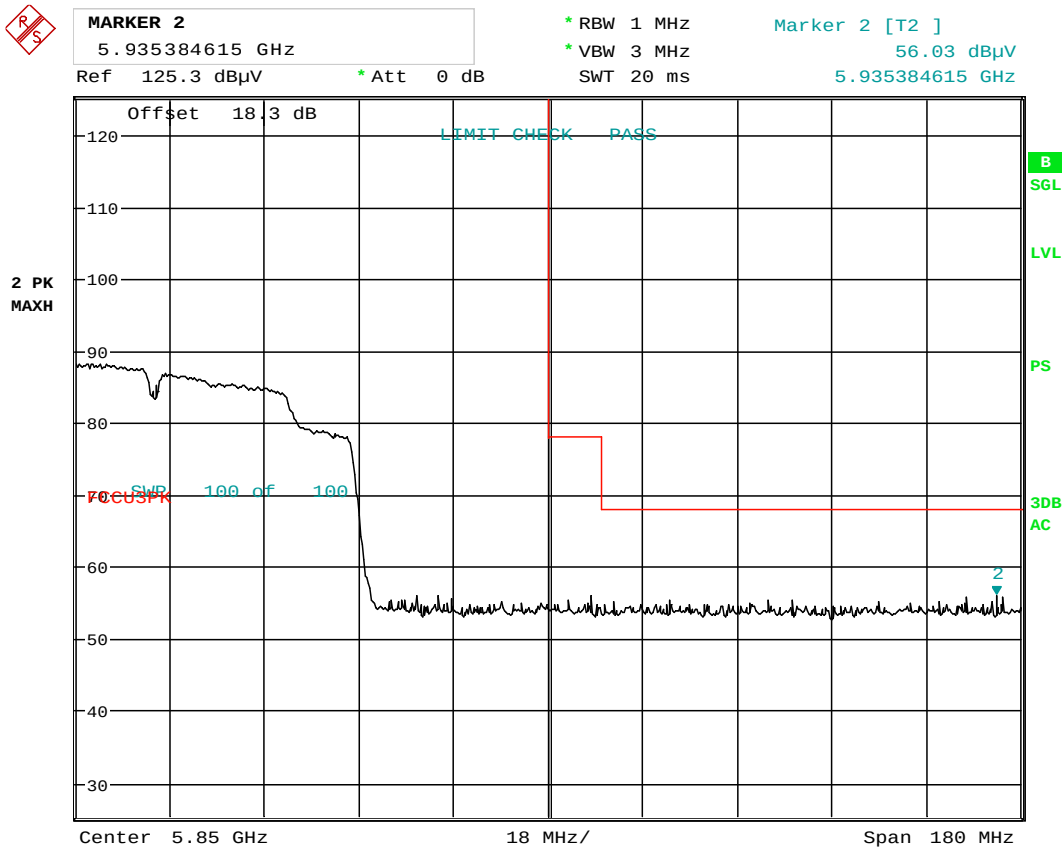
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5775MHz

Channel: 155



Date: 13.JAN.2015 20:24:19

Plot 6-76. Radiated Upper Band Edge Plot (Peak – UNII Band 3)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 90 of 103

6.7.7 MIMO Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

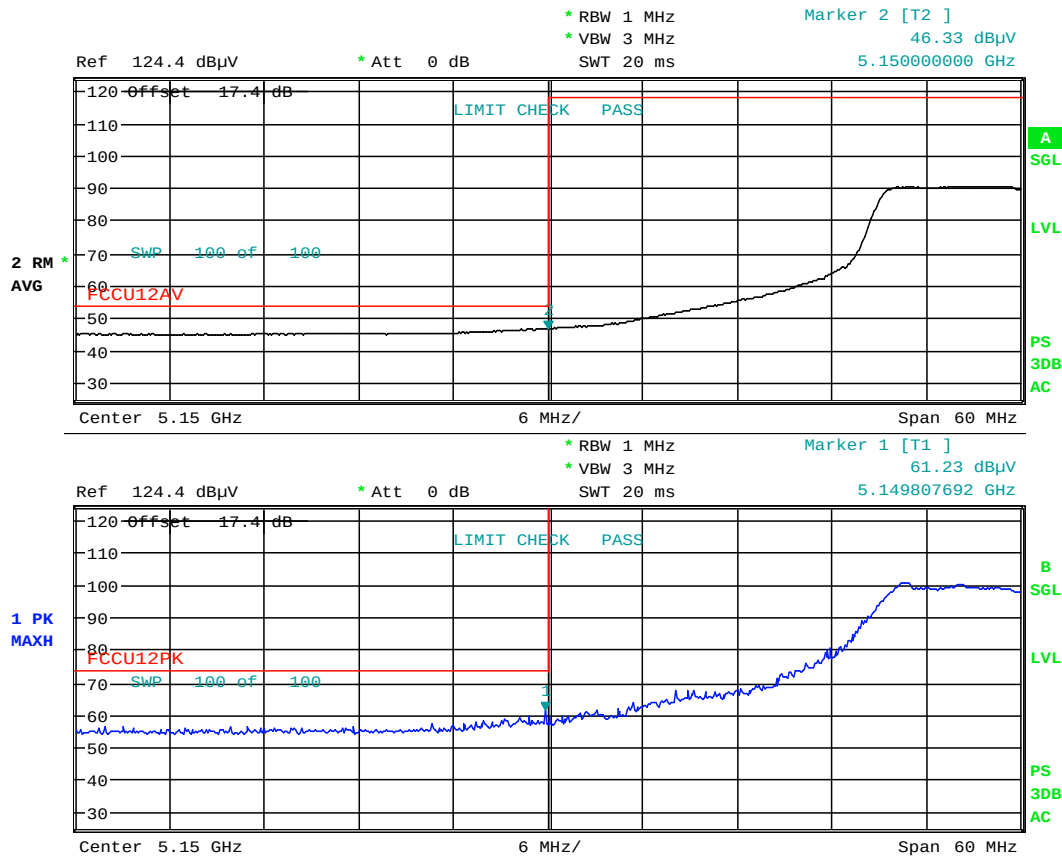
Worst Case Mode: 802.11n (20MHz)

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 5180MHz

Channel: 36



Date: 19.DEC.2014 17:37:14

Plot 6-77. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 91 of 103

MIMO Radiated Band Edge Measurements (20MHz BW) \$15.407(b.1)(b.2) \$15.205 \$15.209

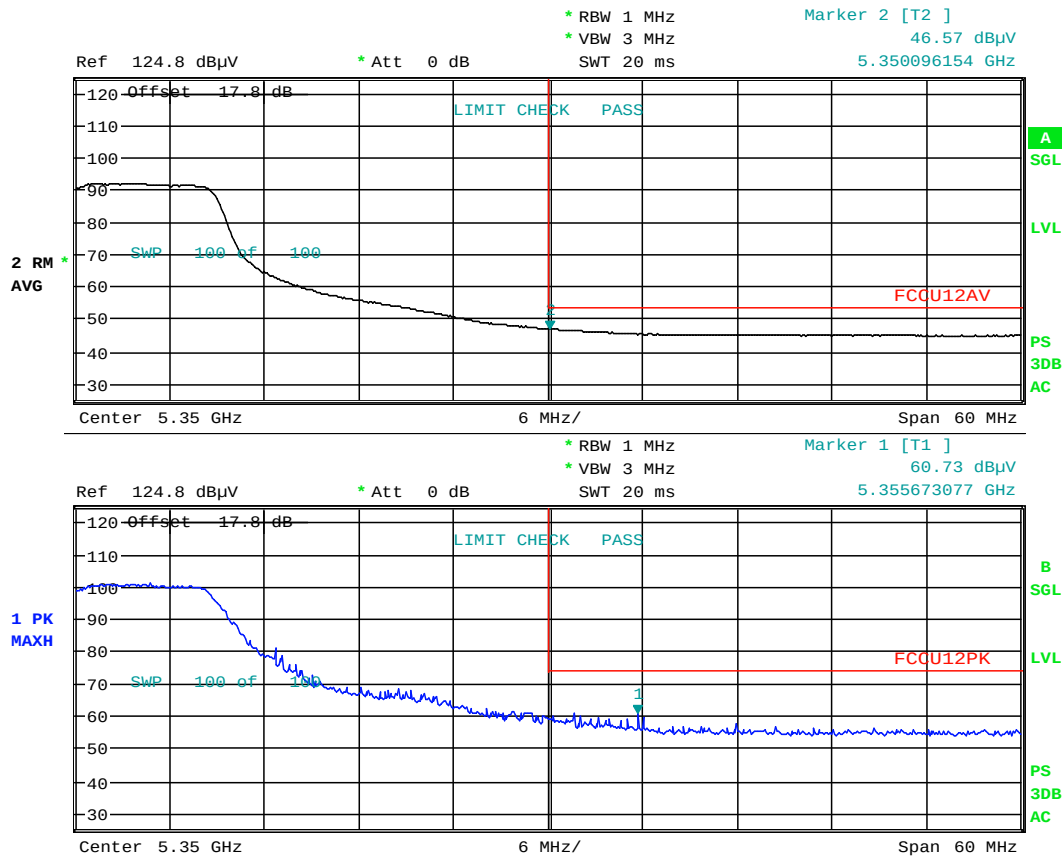
Worst Case Mode: 802.11n (20MHz)

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 5320MHz

Channel: 64



Date: 19.DEC.2014 17:47:06

Plot 6-78. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 92 of 103

MIMO Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

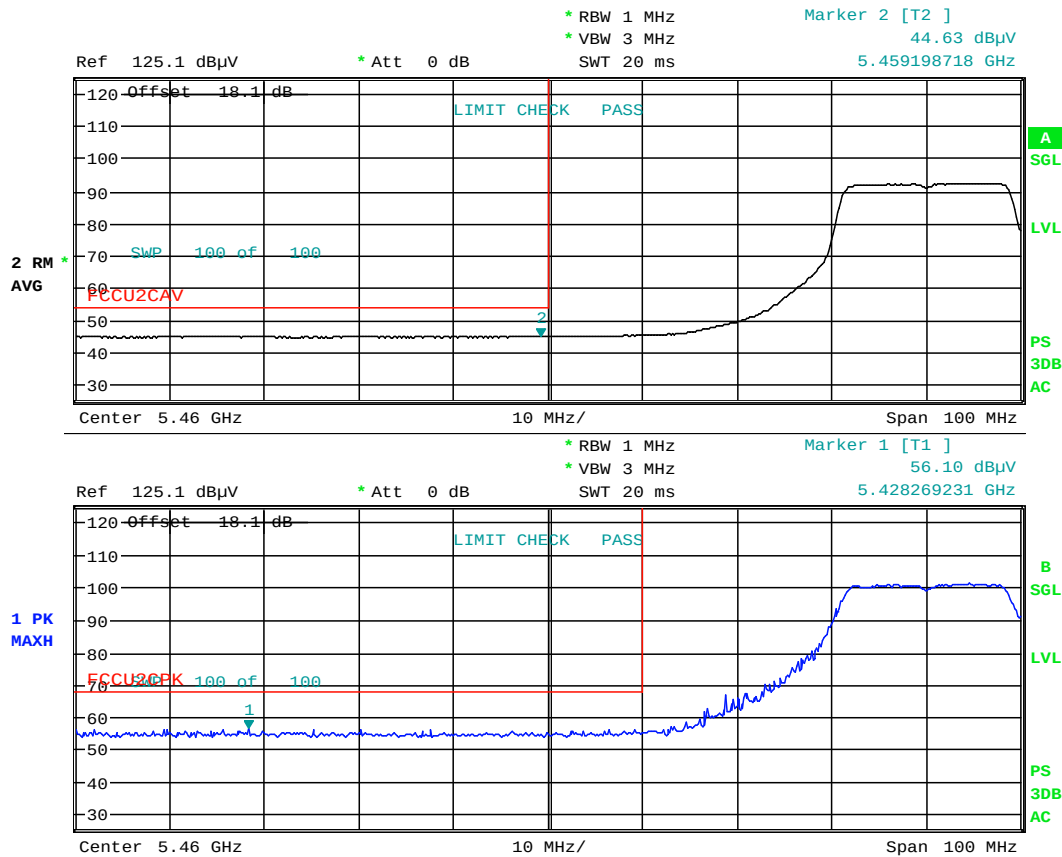
Worst Case Mode: 802.11n (20MHz)

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 5500MHz

Channel: 100



Date: 19.DEC.2014 17:55:59

Plot 6-79. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 93 of 103

MIMO Radiated Band Edge Measurements (20MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

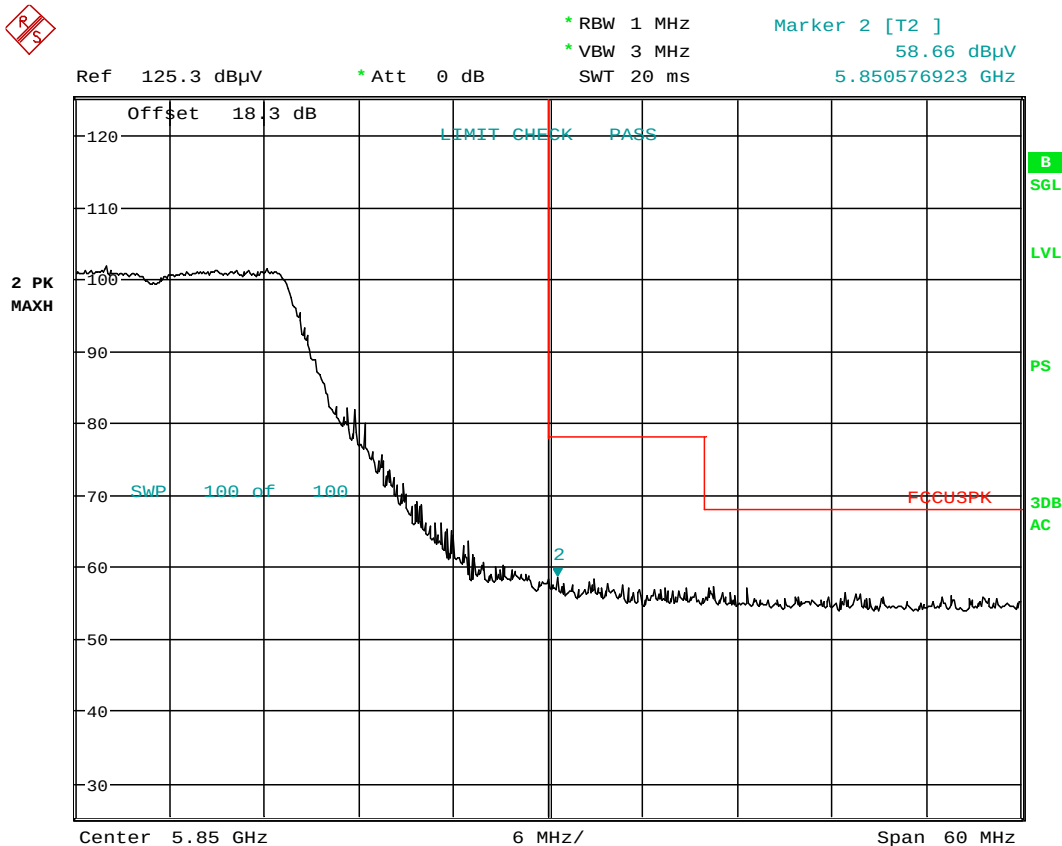
Worst Case Mode: 802.11n (20MHz)

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 5825MHz

Channel: 165



Date: 13.JAN.2015 20:44:42

Plot 6-80. Radiated Upper Band Edge Plot (Peak – UNII Band 3)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 94 of 103

6.7.8 MIMO Radiated Band Edge Measurements (40MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

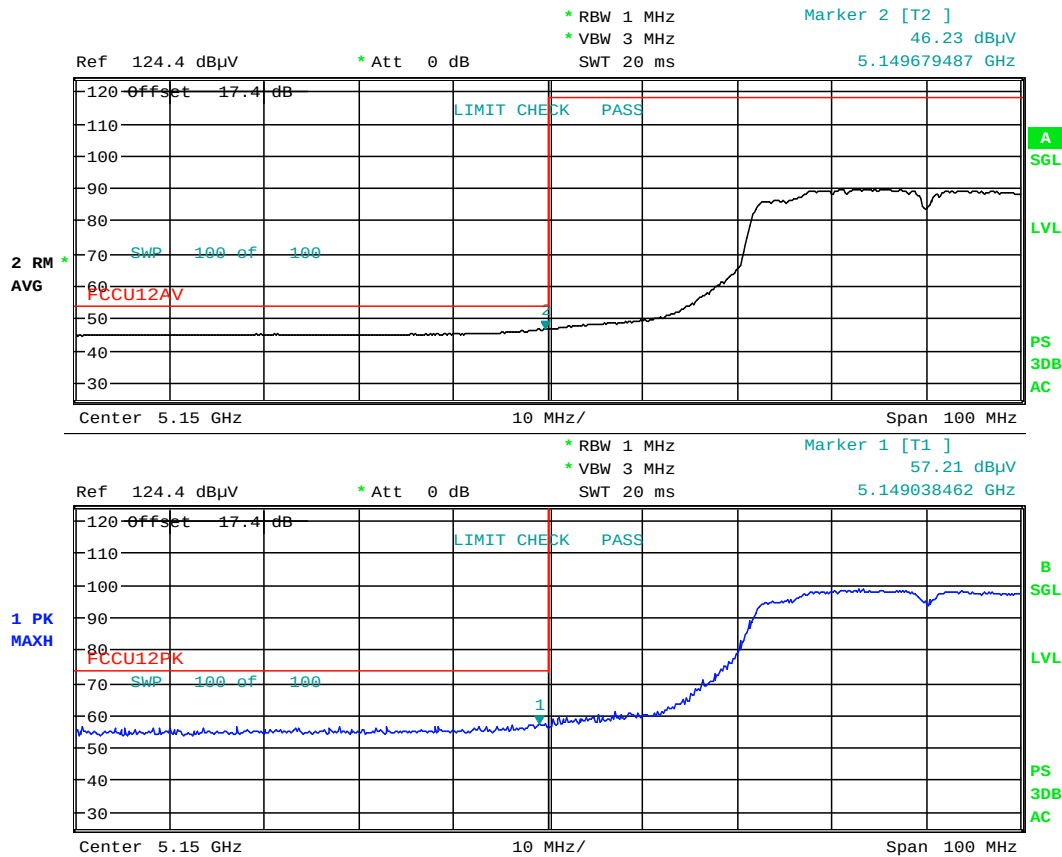
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 5190MHz

Channel: 38



Date: 19.DEC.2014 17:39:09

Plot 6-81. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 95 of 103

MIMO Radiated Band Edge Measurements (40MHz BW) \$15.407(b.1)(b.2) \$15.205 \$15.209

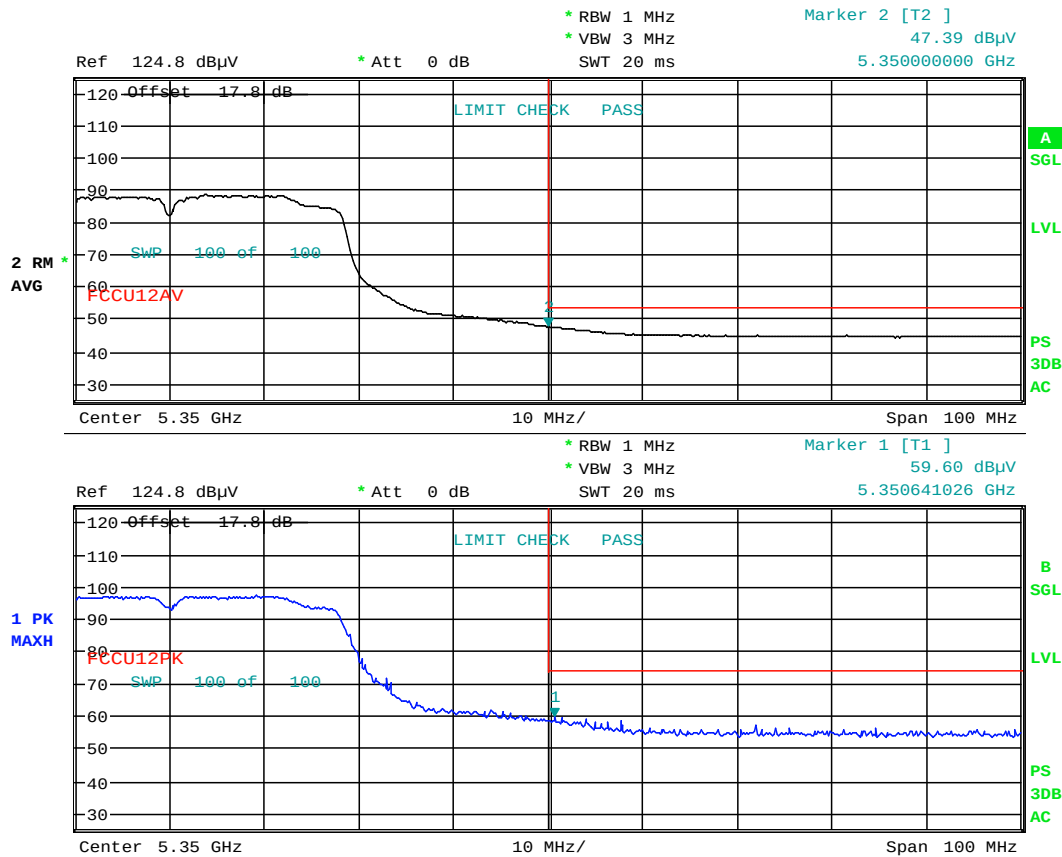
Worst Case Mode: 802.11n (40MHz)

Worst Case Transfer Rate: MCS8

Distance of Measurements: 3 Meters

Operating Frequency: 5310MHz

Channel: 62



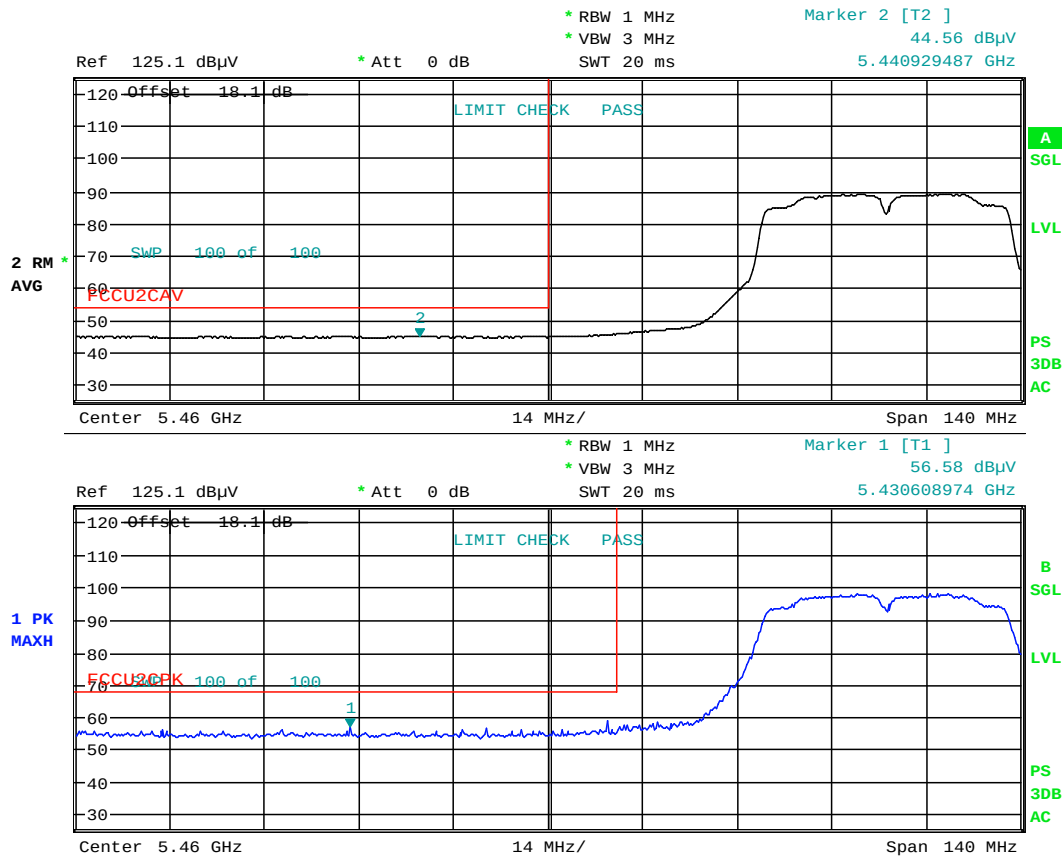
Date: 19.DEC.2014 17:49:01

Plot 6-82. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 96 of 103

MIMO Radiated Band Edge Measurements (40MHz BW) \$15.407(b.1)(b.2) \$15.205 \$15.209

Worst Case Mode: 802.11n (40MHz)
Worst Case Transfer Rate: MCS8
Distance of Measurements: 3 Meters
Operating Frequency: 5510MHz
Channel: 102



Date: 19.DEC.2014 17:57:23

Plot 6-83. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 97 of 103

6.7.9 MIMO Radiated Band Edge Measurements (80MHz BW)

\$15.407(b.1)(b.2) \$15.205 \$15.209

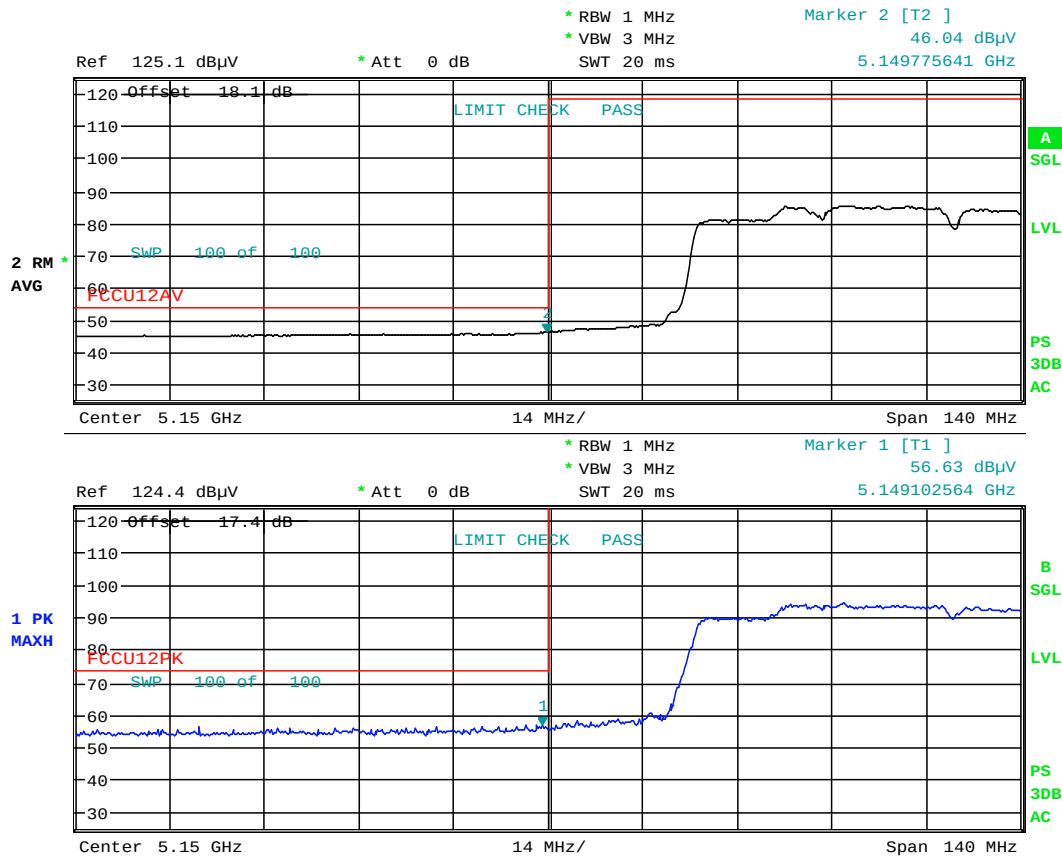
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5210MHz

Channel: 42



Date: 19.DEC.2014 17:41:37

Plot 6-85. Radiated Restricted Lower Band Edge Plot (UNII Band 1)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 99 of 103

MIMO Radiated Band Edge Measurements (80MHz BW) \$15.407(b.1)(b.2) \$15.205 \$15.209

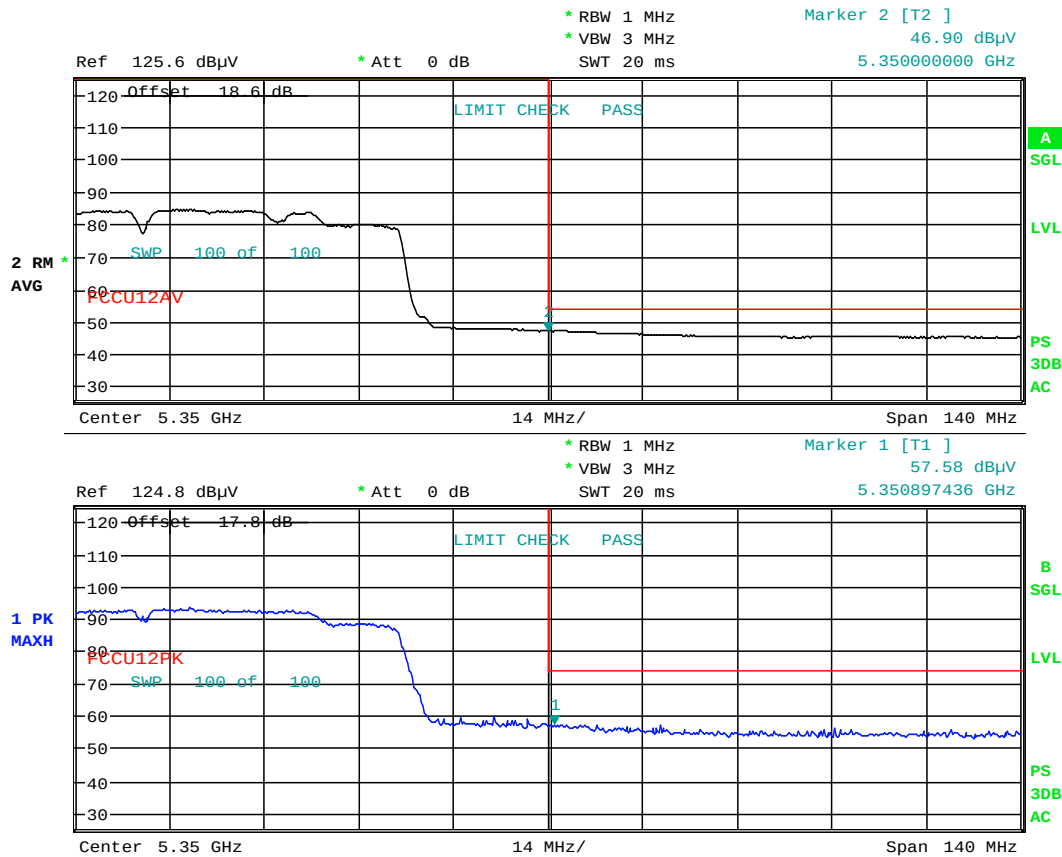
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5290MHz

Channel: 58



Date: 19.DEC.2014 17:51:09

Plot 6-86. Radiated Restricted Upper Band Edge Plot (UNII Band 2A)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 100 of 103

MIMO Radiated Band Edge Measurements (80MHz BW) \$15.407(b.1)(b.2) \$15.205 \$15.209

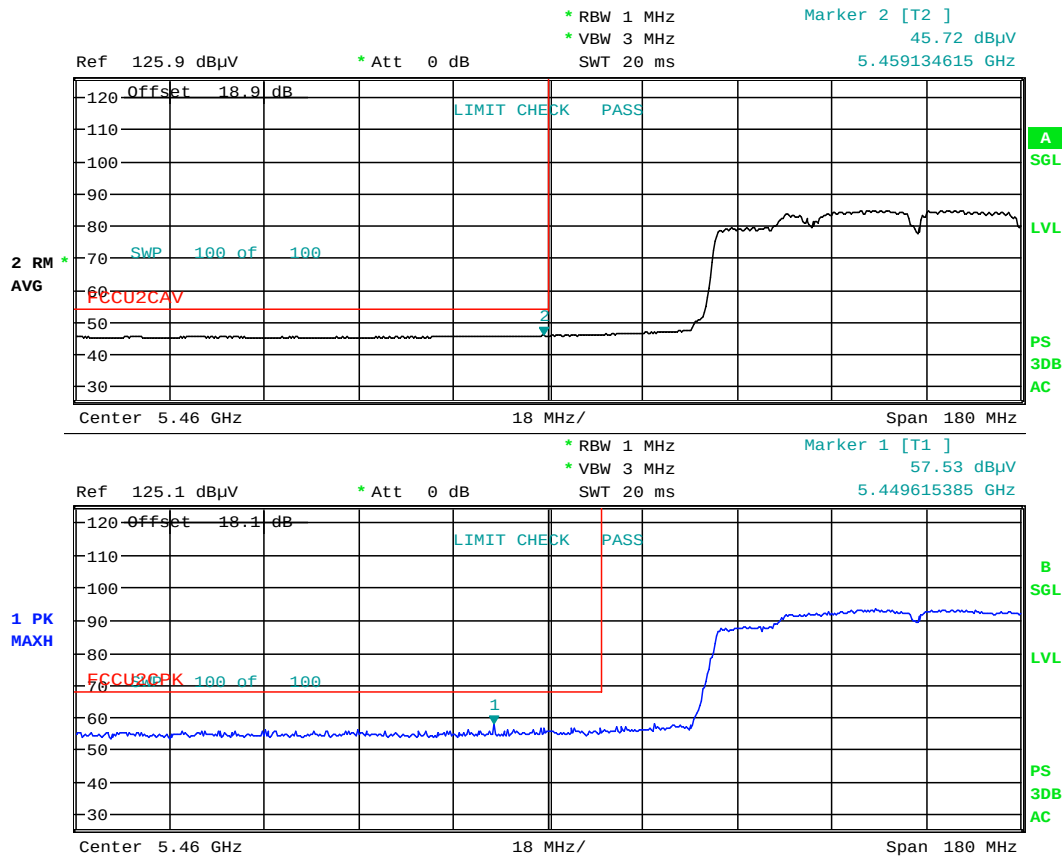
Worst Case Mode: 802.11ac (80MHz)

Worst Case Transfer Rate: MCS0

Distance of Measurements: 3 Meters

Operating Frequency: 5530MHz

Channel: 106



Date: 19.DEC.2014 17:59:01

Plot 6-87. Radiated Restricted Lower Band Edge Plot (UNII Band 2C)

FCC ID: ACJ9TGWL13A	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)	Panasonic	Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter		Page 101 of 103

7.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Panasonic Wireless Network Adapter FCC ID: ACJ9TGWL13A** is in compliance with Part 15E of the FCC Rules.

FCC ID: ACJ9TGWL13A		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CLASS II PERMISSIVE CHANGE)		Reviewed by: Quality Manager
Test Report S/N: 0Y1412152290.ACJ	Test Dates: 12/17/2014-02/13/2015	EUT Type: Wireless Network Adapter	Page 103 of 103	