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

**Applicant Name:**
Samsung Electronics Co., Ltd.
129, Samsung-ro,
Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

**Date of Testing:**
8/9 - 9/1/2016
**Test Site/Location:**
PCTEST Lab, Columbia, MD, USA
**Test Report Serial No.:**
0Y1608101321.A3L

**FCC ID:** **A3LSMT587P**

**APPLICANT:** **Samsung Electronics Co., Ltd.**

**Application Type:** Certification
**Model(s):** SM-T587P
**EUT Type:** Portable Tablet
**FCC Classification:** Unlicensed National Information Infrastructure (UNII)
**FCC Rule Part(s):** Part 15.407
**Test Procedure(s):** KDB 789033 D02 v01r02

| UNII Band | Channel Bandwidth (MHz) | Tx Frequency (MHz) | Conducted Power | |
|---|---|---|---|---|
| | | | Max. Power (mW) | Max. Power (dBm) |
| 1 | 20 | 5180 - 5240 | 17.100 | 12.33 |
| 2A | | 5260 - 5320 | 17.338 | 12.39 |
| 2C | | 5500 - 5720 | 17.742 | 12.49 |
| 3 | | 5745 - 5825 | 17.742 | 12.49 |
| 1 | 40 | 5190 - 5230 | 17.640 | 12.47 |
| 2A | | 5270 - 5310 | 17.498 | 12.43 |
| 2C | | 5510 - 5710 | 17.579 | 12.45 |
| 3 | | 5755 - 5795 | 17.378 | 12.40 |
| 1 | 80 | 5210 | 16.444 | 12.16 |
| 2A | | 5290 | 16.558 | 12.19 |
| 2C | | 5530 - 5690 | 17.498 | 12.43 |
| 3 | | 5775 | 17.140 | 12.34 |

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 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

ACCREDITED
TESTING CERT#2041.01


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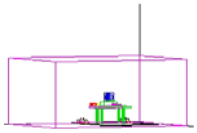
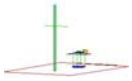


# MEASUREMENT REPORT
## FCC Part 15.407



## § 2.1033 General Information

| | |
|---|---|
| **APPLICANT:** | Samsung Electronics Co., Ltd. |
| **APPLICANT ADDRESS:** | 129, Samsung-ro, |
| | Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea |
| **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:** | SM-T587P |
| **FCC ID:** | A3LSMT587P |
| **FCC CLASSIFICATION:** | Unlicensed National Information Infrastructure (UNII) |
| **Test Device Serial No.:** | 04694, 04995, 04996 ☐ Production ☒ Pre-Production ☐ Engineering |
| **DATE(S) OF TEST:** | 8/9 - 9/1/2016 |
| **TEST REPORT S/N:** | 0Y1608101321.A3L |

## Test Facility / Accreditations

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

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

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39º 10'23" N latitude and 76º 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 C63.4-2014 on January 22, 2015.

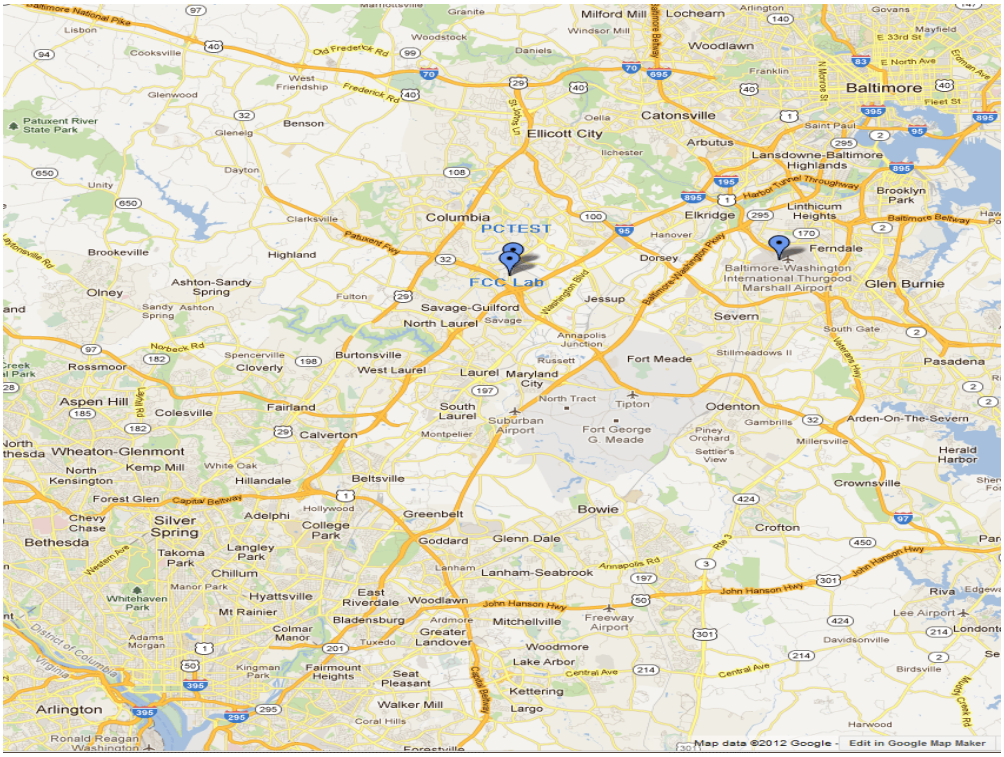


**Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area**


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# 2.0 PRODUCT INFORMATION

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet FCC ID: A3LSMT587P**. 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:

850/1900 CDMA/EvDO Rev0/A (BC0, BC1, BC10), Multi-band LTE, 802.11b/g/n WLAN, 802.11a/n/ac UNII, Bluetooth (1x, EDR, LE), ANT+

| 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 | 120 | 5600 | 157 | 5785 |
| : | : | : | : | : | : | : | : |
| 48 | 5240 | 64 | 5320 | 144 | 5720 | 165 | 5825 |

**Table 2-1. 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 2-2. 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 2-3. 802.11ac (80MHz BW) Frequency / Channel Operations**


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**Notes:**

1. 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 D02 v01r02. 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 |
| 5GHz | a | 98.8 |
| | n (HT20) | 98.7 |
| | ac (HT20) | 98.7 |
| | n (HT40) | 97.4 |
| | ac (HT40) | 97.1 |
| | ac (HT80) | 92.8 |

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)

## 2.3 Test Configuration

The Samsung Portable Tablet FCC ID: A3LSMT587P was tested per the guidance of KDB 789033 D02 v01r02. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, and 7.5 for antenna port conducted 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 TESTS

## 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v01r02 were used in the measurement of **Samsung Portable Tablet FCC ID: A3LSMT587P.**

**Deviation from measurement procedure……..…….....None**

## 3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.9.


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## 3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. A 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. 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 above 1GHz. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene 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 measurements above 1GHz, a high density expanded polystyrene block is placed on top of the test table to bring the total table height to 1.5m.

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 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, mode of operation, 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.

## 3.4 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 Portable Tablet are **permanently attached.**
- There are no provisions for connection to an external antenna.

**Conclusion:**

The **Samsung Portable Tablet FCC ID: A3LSMT587P** unit complies with the requirement of §15.203.


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# 5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the $U_{CISPR}$ measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

| Contribution | Expanded Uncertainty (±dB) |
|---|---|
| Conducted Bench Top Measurements | 1.13 |
| Line Conducted Disturbance | 3.09 |
| Radiated Disturbance (<1GHz) | 4.98 |
| Radiated Disturbance (>1GHz) | 5.07 |
| Radiated Disturbance (>18GHz) | 5.09 |


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# 6.0 TEST EQUIPMENT CALIBRATION DATA

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

| Manufacturer | Model | Description | Cal Date | Cal Interval | Cal Due | Serial Number |
|---|---|---|---|---|---|---|
| - | RE1 | Radiated Emissions Cable Set (UHF/EHF) | 7/11/2016 | Annual | 7/11/2017 | RE1 |
| - | WL25-1 | Conducted Cable Set (25GHz) | 4/11/2016 | Annual | 4/11/2017 | WL25-1 |
| Agilent | N9038A | MXE EMI Receiver | 4/21/2016 | Annual | 4/21/2017 | MY51210133 |
| Anritsu | ML2495A | Power Meter | 10/16/2015 | Biennial | 10/16/2017 | 941001 |
| Anritsu | MA2411B | Pulse Power Sensor | 10/14/2015 | Biennial | 10/14/2017 | 846215 |
| Com-Power | AL-130 | 9kHz - 30MHz Loop Antenna | 7/30/2015 | Biennial | 7/30/2017 | 121034 |
| Com-Power | PAM-103 | Pre-Amplifier (1-1000MHz) | 7/6/2016 | Annual | 7/6/2017 | 441119 |
| Com-Power | PAM-103 | Pre-Amplifier (1-1000MHz) | 2/26/2016 | Annual | 2/26/2017 | 441112 |
| Emco | 3115 | Horn Antenna (1-18GHz) | 3/10/2016 | Biennial | 3/10/2018 | 9704-5182 |
| Emco | 3116 | Horn Antenna (18 - 40GHz) | 3/27/2015 | Triennial | 3/27/2018 | 9203-2178 |
| Espec | ESX-2CA | Environmental Chamber | 3/4/2016 | Annual | 3/4/2017 | 17620 |
| ETS Lindgren | 3117 | 1-18 GHz DRG Horn (Medium) | 4/26/2016 | Biennial | 4/26/2018 | 125518 |
| ETS-Lindgren | 3816/2NM | Line Impedance Stabilization Network | 11/11/2014 | Biennial | 11/11/2016 | 114451 |
| Huber+Suhner | Sucoflex 102A | 40GHz Radiated Cable | 4/26/2016 | Annual | 4/26/2017 | 251425001 |
| Rohde & Schwarz | TS-PR40 | 26.5-40 GHz Pre-Amplifier | 3/7/2016 | Annual | 3/7/2017 | 100037 |
| K & L | 11SH10-3075/U18000 | High Pass Filter | 7/11/2016 | Annual | 7/11/2017 | 11SH10-3075/U18000-2 |
| K & L | 11SH10-3075/U18000 | High Pass Filter | 7/6/2016 | Annual | 7/6/2017 | 11SH10-3075/U18000-1 |
| K & L | 11SH10-6000/T18000 | High Pass Filter | 7/11/2016 | Annual | 7/11/2017 | 11SH10-6000/T18000-1 |
| Pasternack | NMLC-1 | Line Conducted Emissions Cable (NM) | 11/18/2015 | Annual | 11/18/2016 | NMLC-1 |
| PCTEST | - | EMC Switch System | 7/11/2016 | Annual | 7/11/2017 | NM1 |
| PCTEST | - | EMC Switch System | 7/6/2016 | Annual | 7/6/2017 | NM2 |
| Rhode & Schwarz | TS-PR18 | Pre-Amplifier | 7/6/2016 | Annual | 7/6/2017 | 101622 |
| Rohde & Schwarz | TS-PR18 | 1-18 GHz Pre-Amplifier | 7/11/2016 | Annual | 7/11/2017 | 100071 |
| Rohde & Schwarz | TS-PR26 | 18-26.5 GHz Pre-Amplifier | 3/7/2016 | Annual | 3/7/2017 | 100040 |
| Rohde & Schwarz | ESU26 | EMI Test Receiver (26.5GHz) | 5/16/2016 | Annual | 5/16/2017 | 100342 |
| Rohde & Schwarz | ESU40 | EMI Test Receiver (40GHz) | 7/15/2016 | Annual | 7/15/2017 | 100348 |
| Seekonk | NC-100 | Torque Wrench 5/16", 8" lbs | 3/2/2016 | Biennial | 3/2/2018 | N/A |
| Solar Electronics | 8012-50-R-24-BNC | Line Impedance Stabilization Network | 7/30/2015 | Biennial | 7/30/2017 | 310233 |
| Sunol | JB5 | Bi-Log Antenna (30M - 5GHz) | 3/14/2016 | Biennial | 3/14/2018 | A051107 |

**Table 6-1. Annual Test Equipment Calibration Schedule**

**Note:**

For equipment listed above that has a calibration date or 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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# 7.0 TEST RESULTS

## 7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
FCC ID: A3LSMT587P
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 7.2 |
| 15.407(e) | 6dB Bandwidth | >500kHz(5725-5850MHz) | | PASS | Section 7.3 |
| 15.407 (a.1) | Maximum Conducted Output Power | < 250mW (23.98dBm) (5150-5250MHz)<br>< 250mW (23.98dBm) (5250-5350MHz)<br>< 250mW (23.98dBm) (5470-5725MHz)<br>< 1W (30dBm) (5725-5850MHz) | | PASS | Section 7.4 |
| 15.407 (a.1), (5) | Maximum Power Spectral Density | < 11 dBm/MHz (5150-5250MHz, 5250-5350MHz, 5470-5725MHz)<br>< 30 dBm/500kHz (5725-5850MHz) | | PASS | Section 7.5 |
| 15.407(g) | Frequency Stability | N/A | | PASS | Section 7.6 |
| 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)<br>< -17 dBm/MHz EIRP (within 5715-5725MHz and 5850-5860MHz) | RADIATED | PASS | Section 7.7 |
| 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 | | PASS | Section 7.7, 7.8 |
| 15.407 | AC Conducted Emissions 150kHz – 30MHz | < FCC 15.207 limits | LINE CONDUCTED | PASS | Section 7.9 |

**Table 7-1. 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 4.2.
5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 1.1.2.


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## 7.2 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 v01r02, 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 v01r02 – 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 x 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.

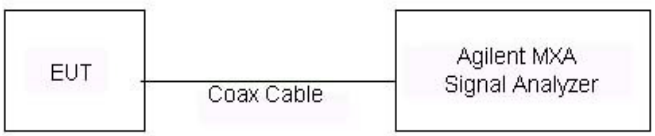


**Figure 7-1. Test Instrument & Measurement Setup**

**Test Notes**

None.


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| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured 26dB Bandwidth [MHz] |
|---|---|---|---|---|---|
| Band 1 | 5180 | 36 | a | 6 | 21.77 |
| | 5200 | 40 | a | 6 | 21.97 |
| | 5240 | 48 | a | 6 | 21.54 |
| | 5180 | 36 | n (20MHz) | 6.5/7.2 (MCS0) | 21.80 |
| | 5200 | 40 | n (20MHz) | 6.5/7.2 (MCS0) | 22.25 |
| | 5240 | 48 | n (20MHz) | 6.5/7.2 (MCS0) | 22.19 |
| | 5190 | 38 | n (40MHz) | 13.5/15 (MCS0) | 42.72 |
| | 5230 | 46 | n (40MHz) | 13.5/15 (MCS0) | 43.72 |
| | 5210 | 42 | ac (80MHz) | 29.3/32.5 (MCS0) | 82.71 |
| Band 2A | 5260 | 52 | a | 6 | 21.57 |
| | 5280 | 56 | a | 6 | 21.30 |
| | 5320 | 64 | a | 6 | 21.89 |
| | 5260 | 52 | n (20MHz) | 6.5/7.2 (MCS0) | 22.25 |
| | 5280 | 56 | n (20MHz) | 6.5/7.2 (MCS0) | 21.94 |
| | 5320 | 64 | n (20MHz) | 6.5/7.2 (MCS0) | 22.02 |
| | 5270 | 54 | n (40MHz) | 13.5/15 (MCS0) | 42.63 |
| | 5310 | 62 | n (40MHz) | 13.5/15 (MCS0) | 42.61 |
| | 5290 | 58 | ac (80MHz) | 29.3/32.5 (MCS0) | 83.41 |
| Band 2C | 5500 | 100 | a | 6 | 21.38 |
| | 5600 | 120 | a | 6 | 21.67 |
| | 5720 | 144 | a | 6 | 21.92 |
| | 5500 | 100 | n (20MHz) | 6.5/7.2 (MCS0) | 21.71 |
| | 5600 | 120 | n (20MHz) | 6.5/7.2 (MCS0) | 22.33 |
| | 5720 | 144 | n (20MHz) | 6.5/7.2 (MCS0) | 21.77 |
| | 5510 | 102 | n (40MHz) | 13.5/15 (MCS0) | 42.75 |
| | 5590 | 118 | n (40MHz) | 13.5/15 (MCS0) | 42.68 |
| | 5710 | 142 | n (40MHz) | 13.5/15 (MCS0) | 42.69 |
| | 5530 | 106 | ac (80MHz) | 29.3/32.5 (MCS0) | 82.92 |
| | 5610 | 122 | ac (80MHz) | 29.3/32.5 (MCS0) | 83.01 |
| | 5690 | 138 | ac (80MHz) | 29.3/32.5 (MCS0) | 83.37 |

**Table 7-2. Conducted Bandwidth Measurements**


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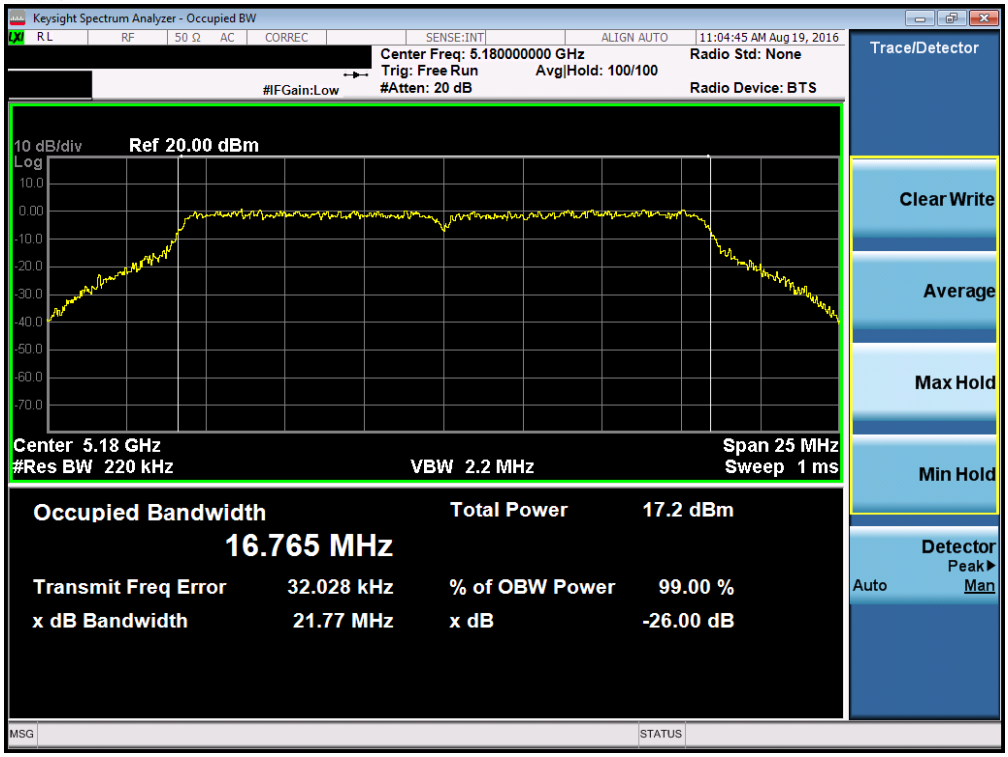
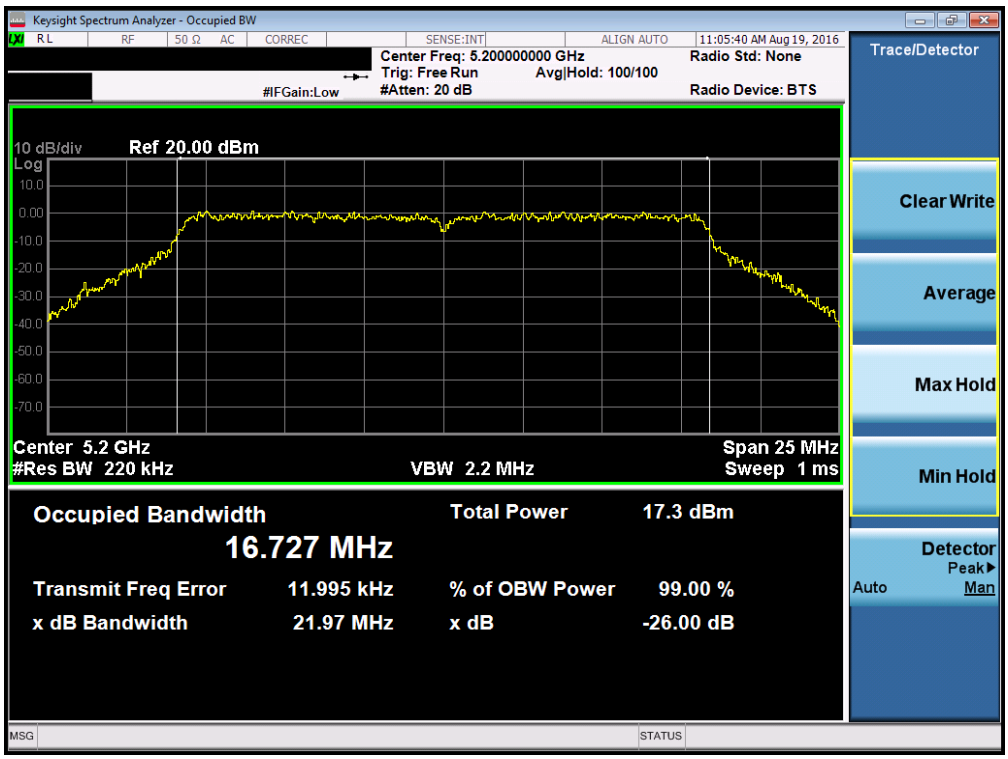



**Plot 7-1. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 36)**




**Plot 7-2. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 40)**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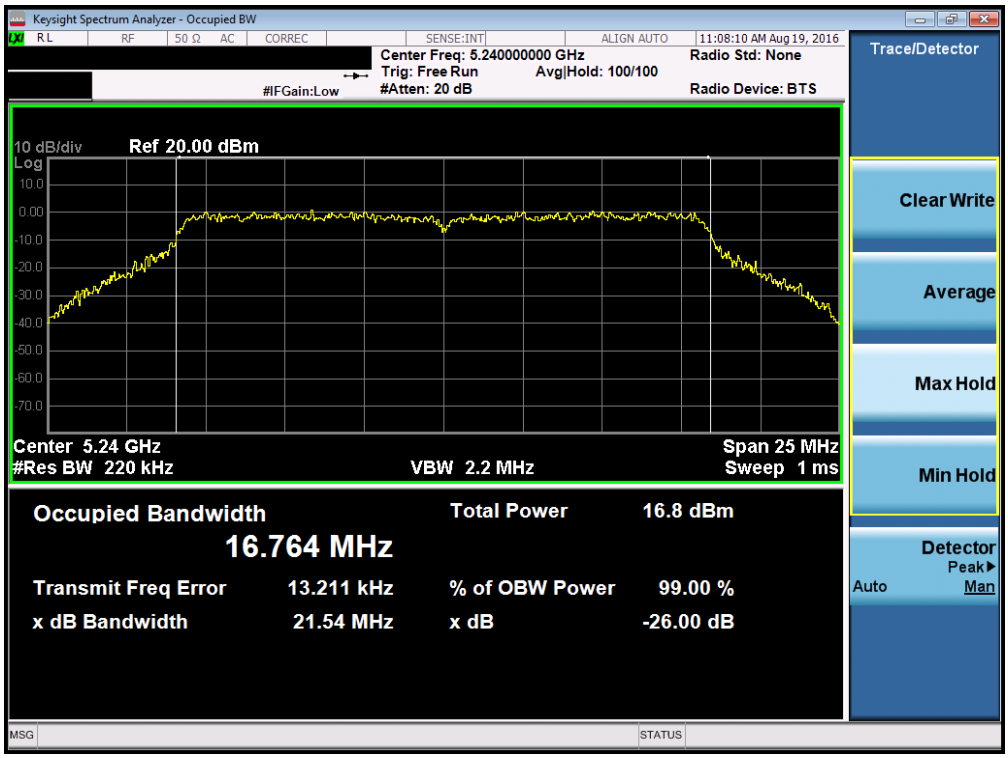


**Plot 7-3. 26dB Bandwidth Plot (802.11a (UNII Band 1) – Ch. 48)**

**Plot 7-4. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 36)**


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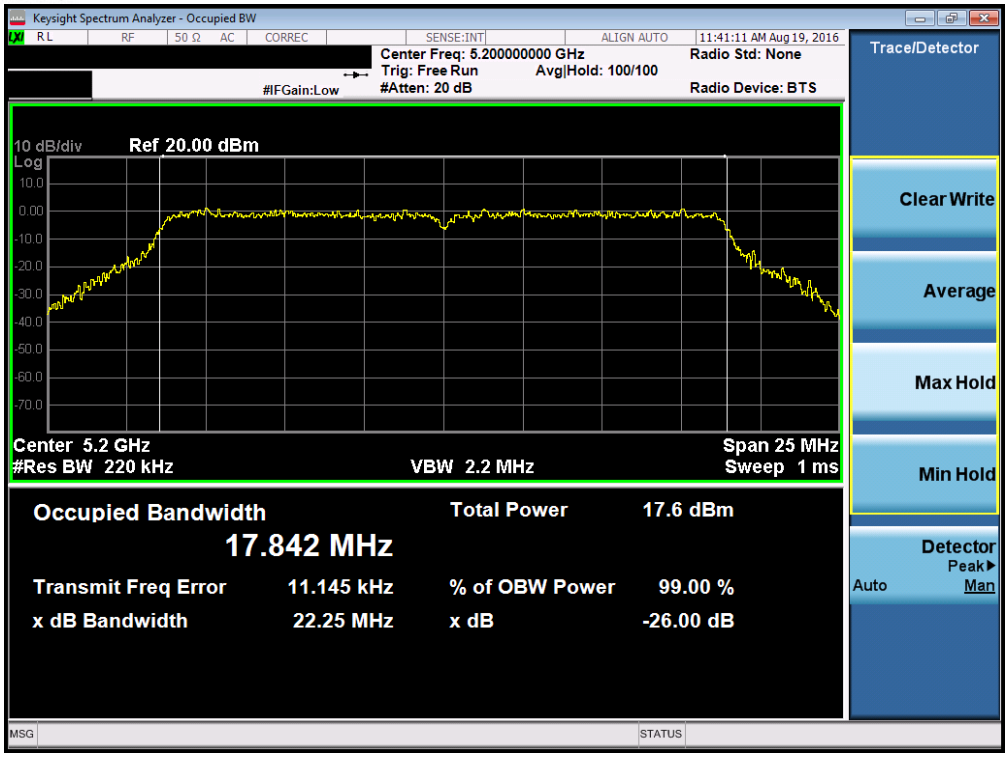
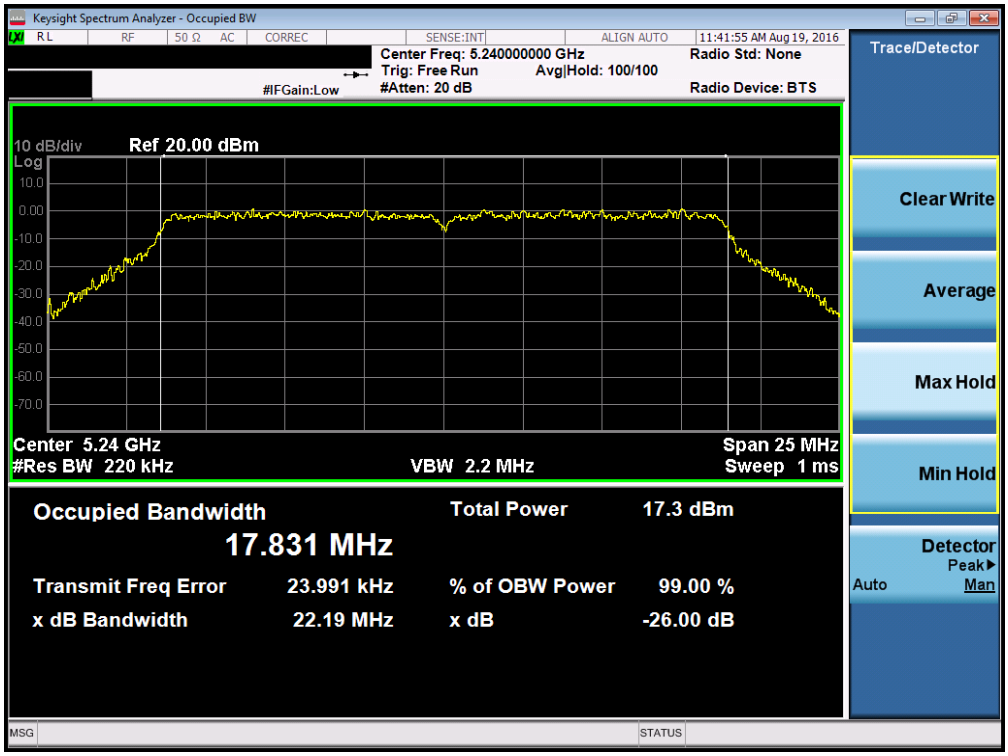
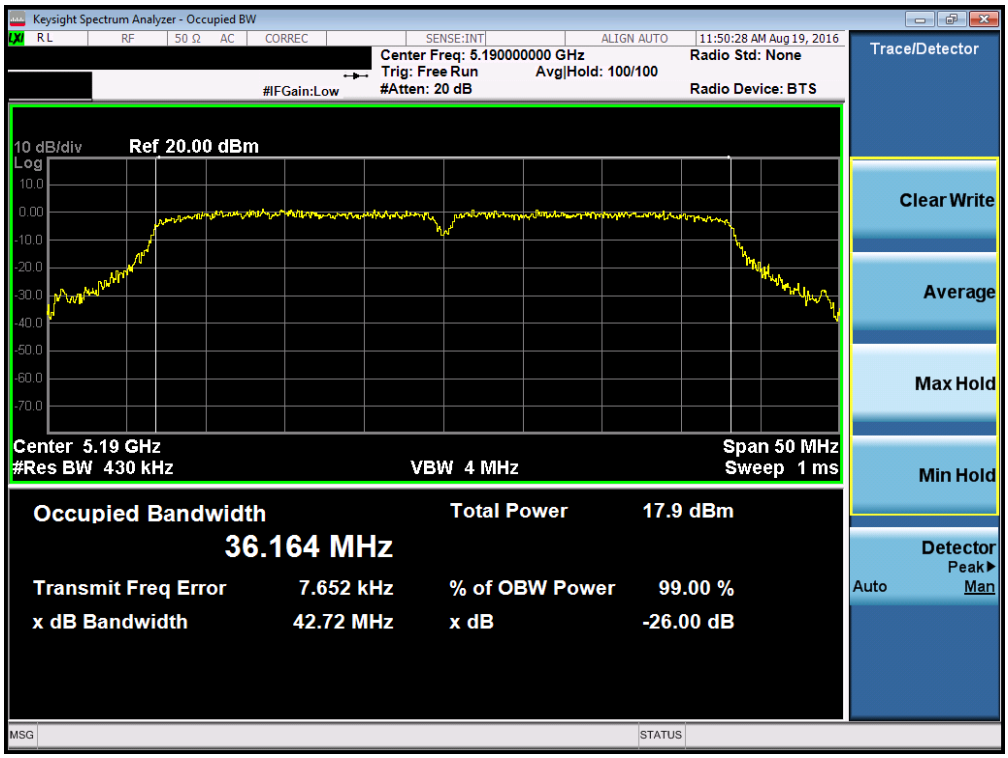



**Plot 7-5. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)**

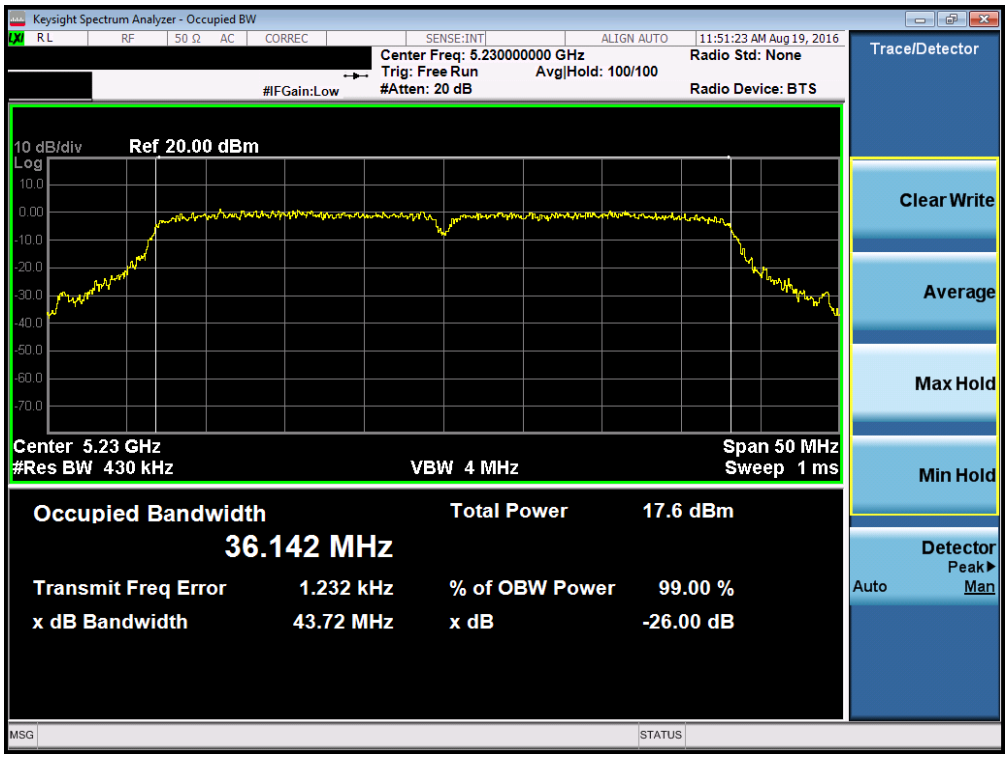



**Plot 7-6. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)**


© 2016 PCTEST Engineering Laboratory, Inc.




**Plot 7-7. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)**




**Plot 7-8. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)**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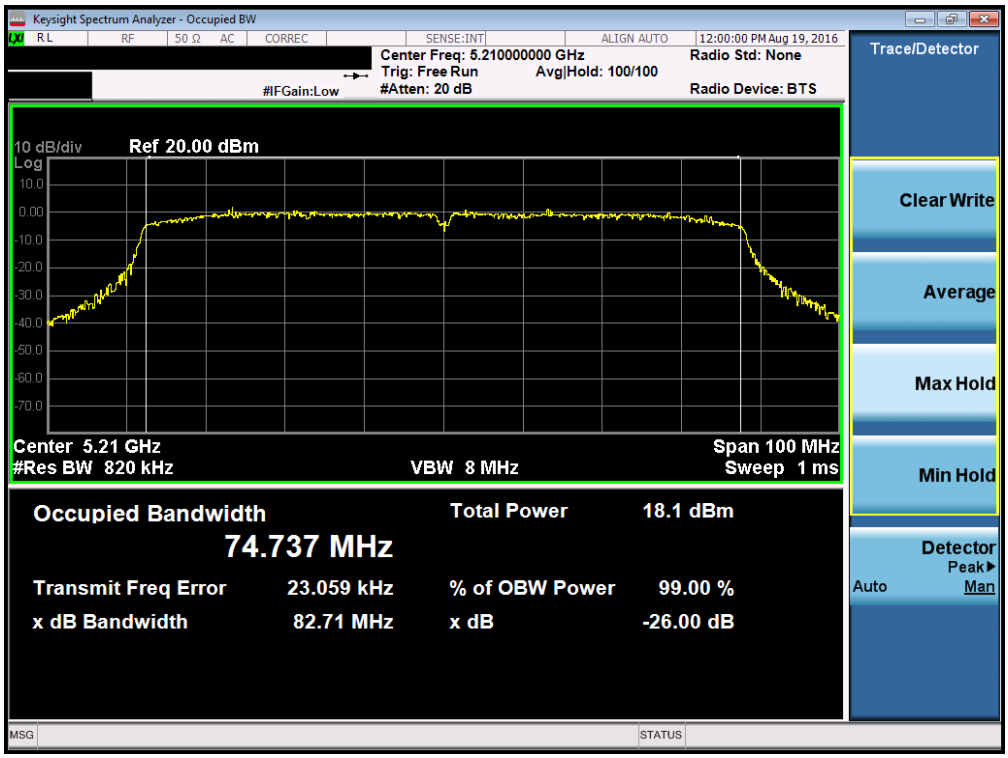
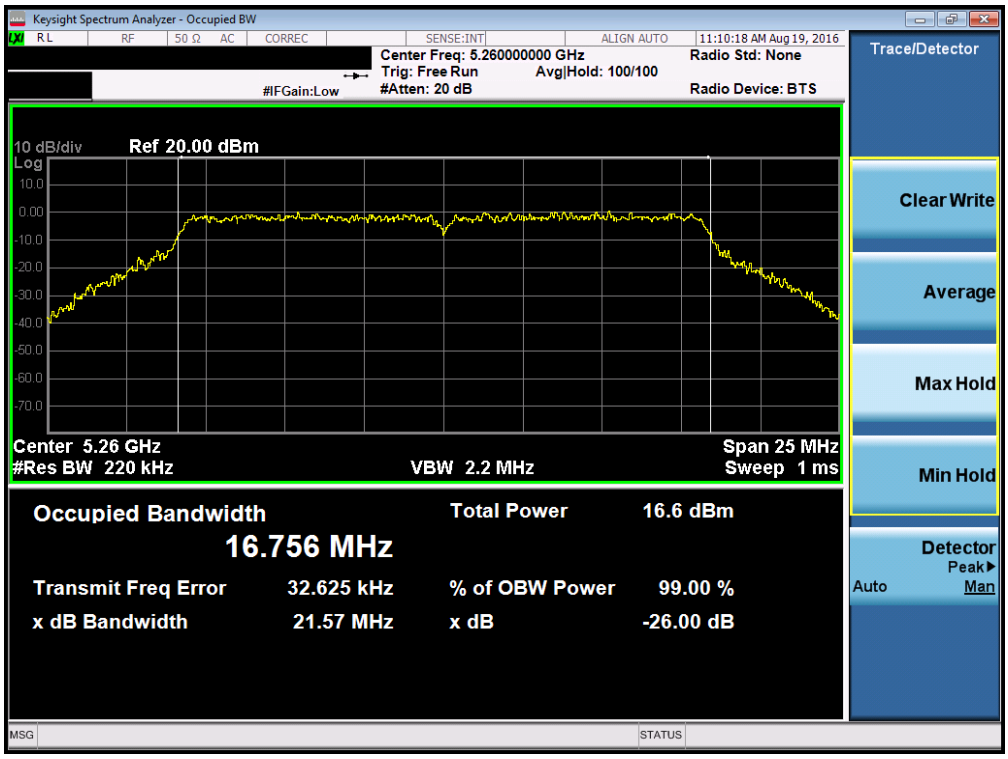



**Plot 7-9. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)**




**Plot 7-10. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 52)**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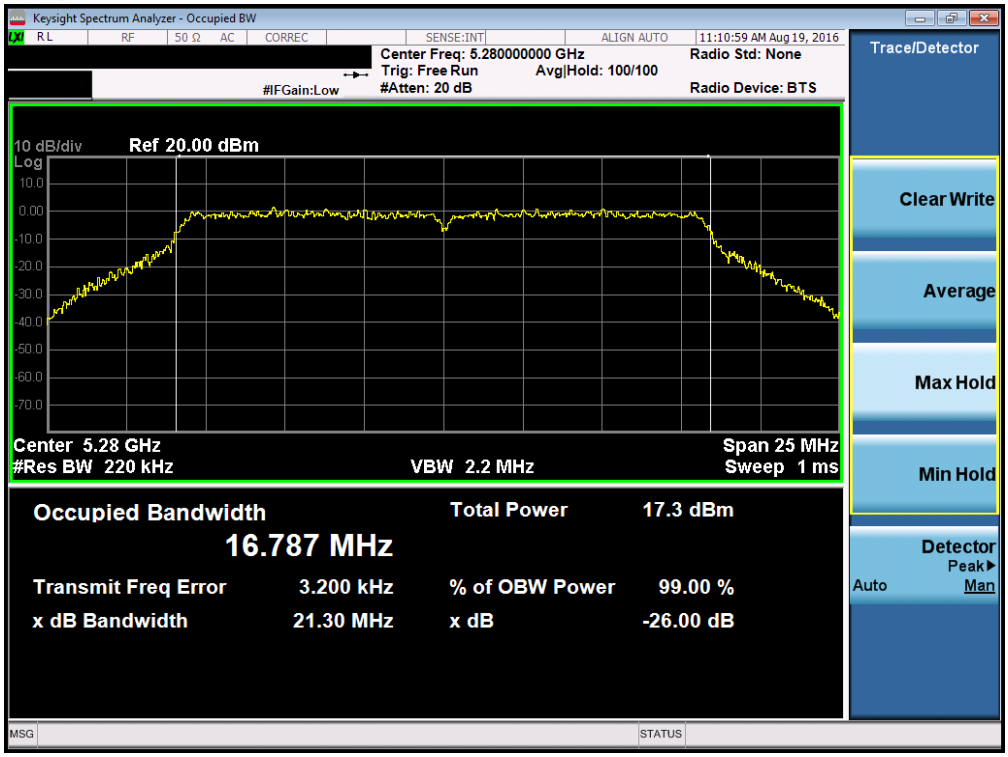
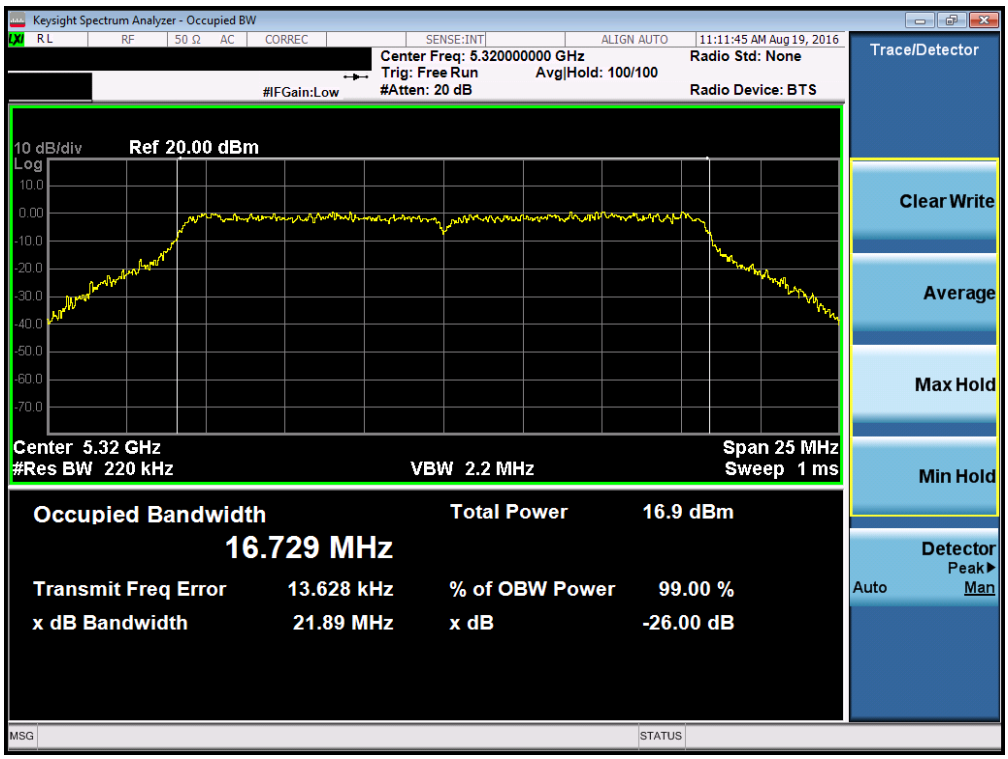



**Plot 7-11. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 56)**




**Plot 7-12. 26dB Bandwidth Plot (802.11a (UNII Band 2A) – Ch. 64)**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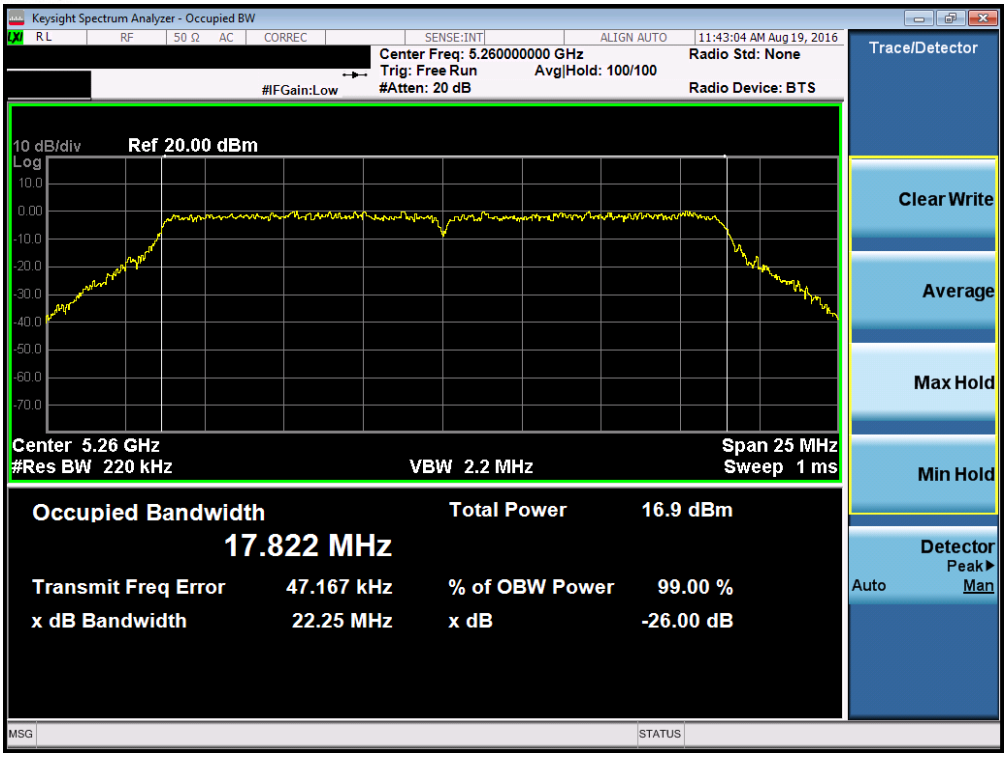
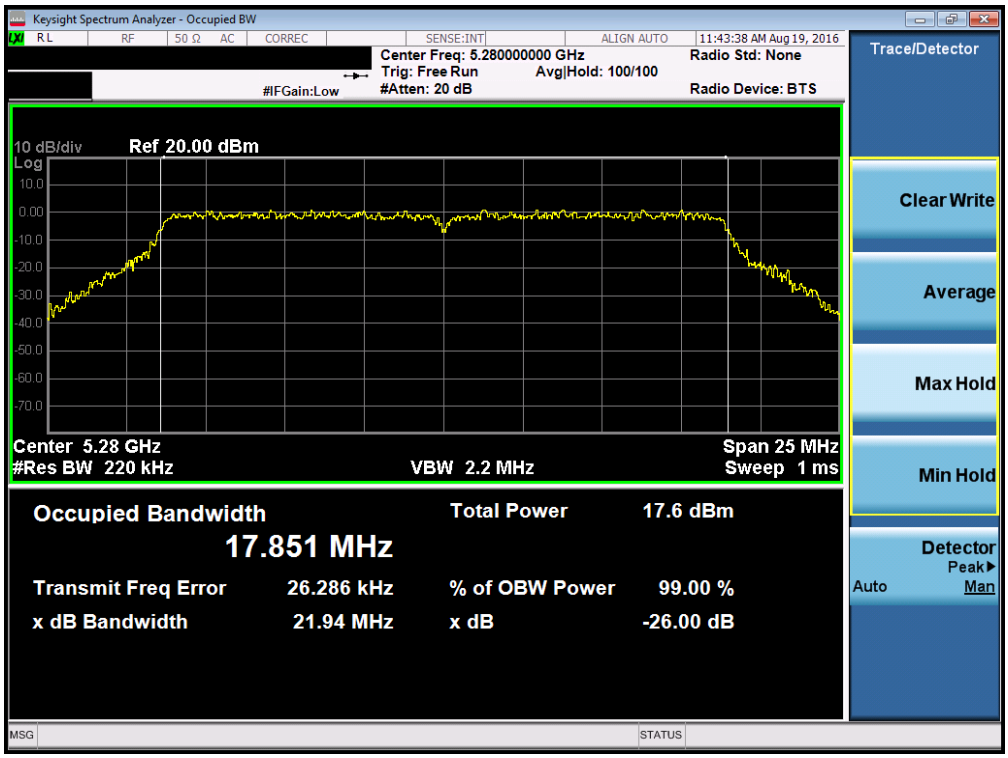



**Plot 7-13. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)**




**Plot 7-14. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)**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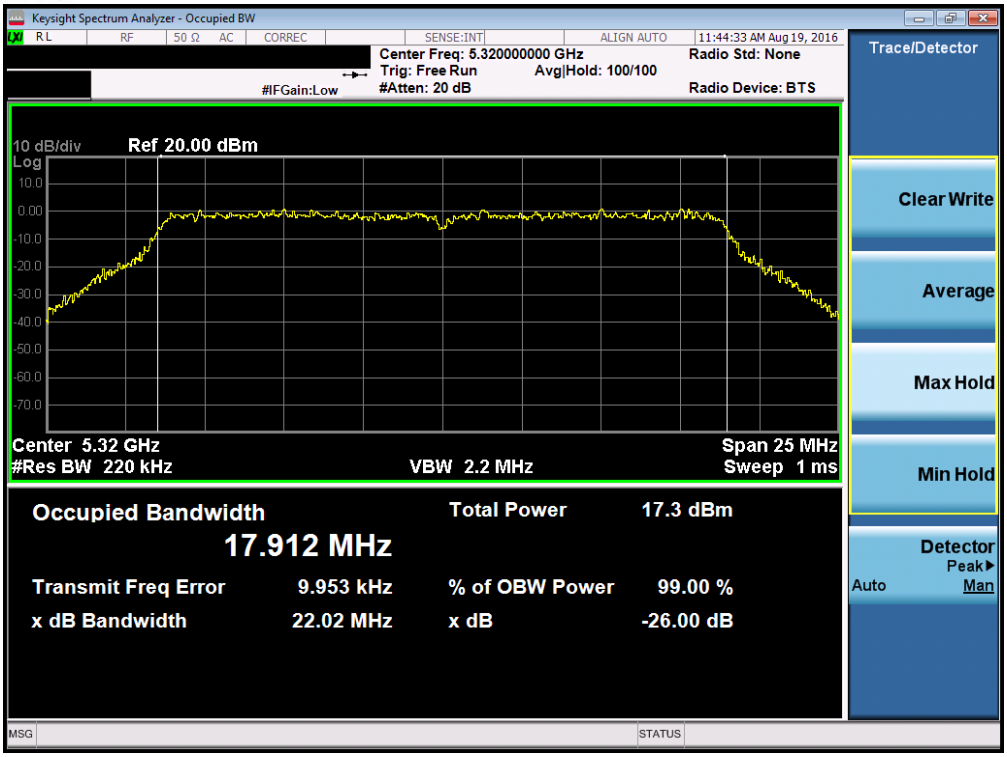
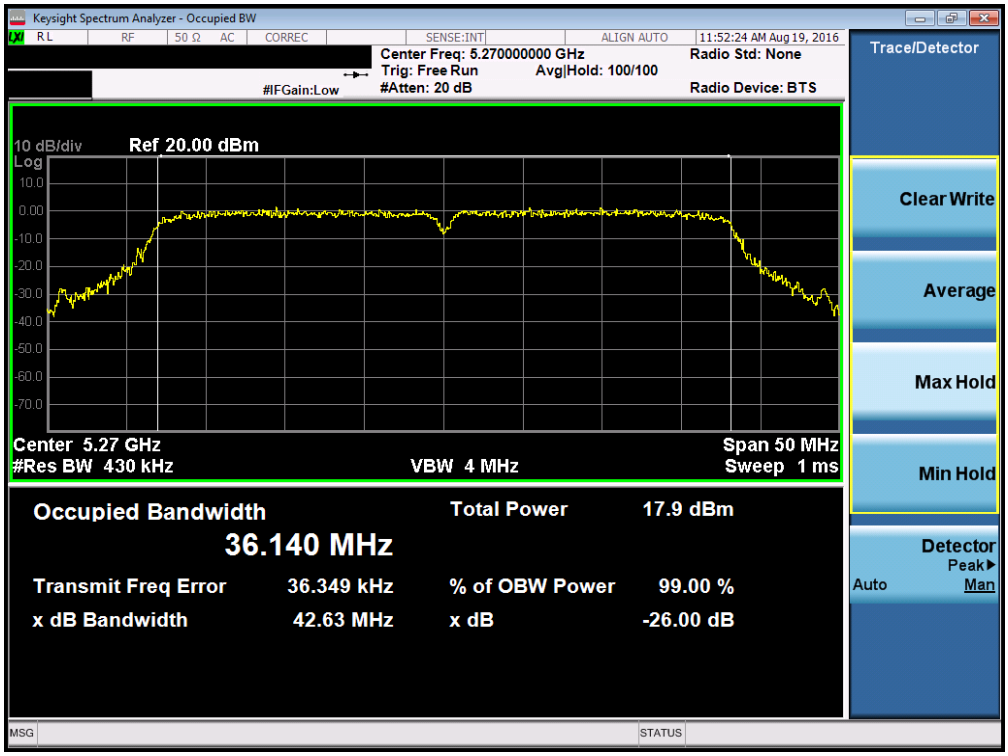



**Plot 7-15. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)**




**Plot 7-16. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)**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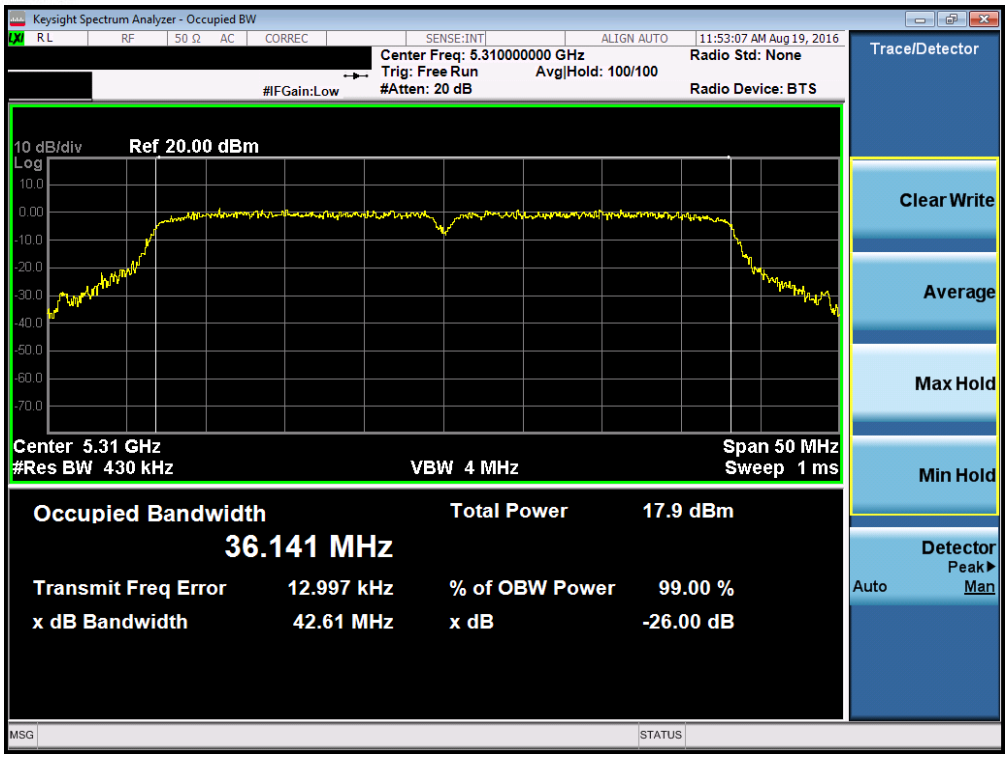
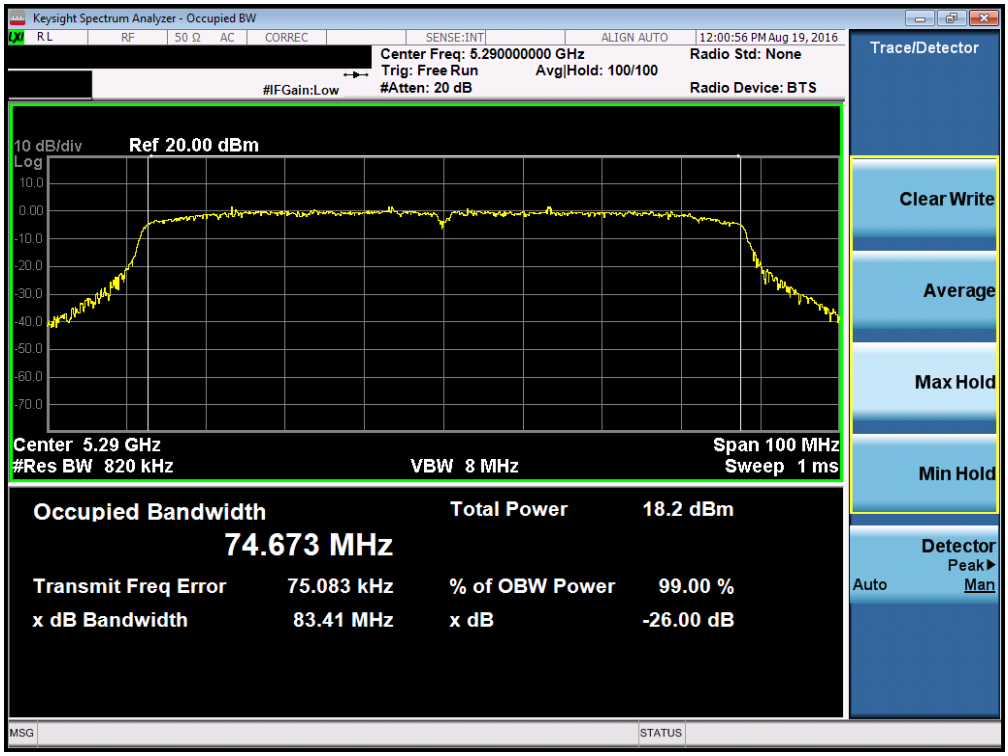



**Plot 7-17. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)**




**Plot 7-18. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)**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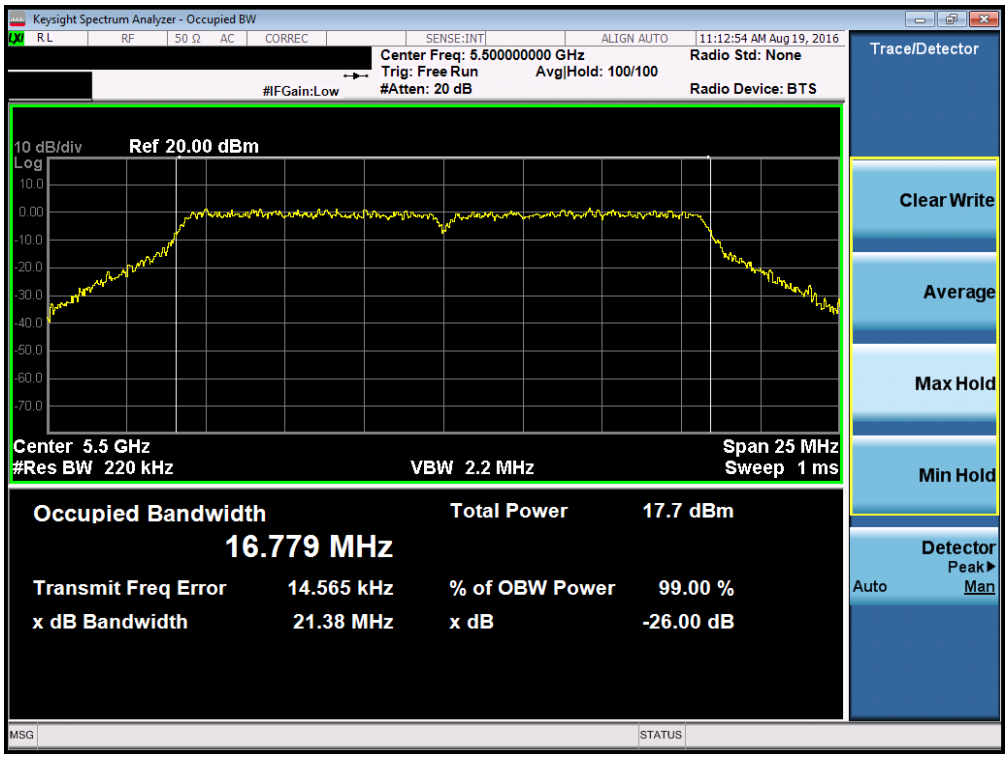
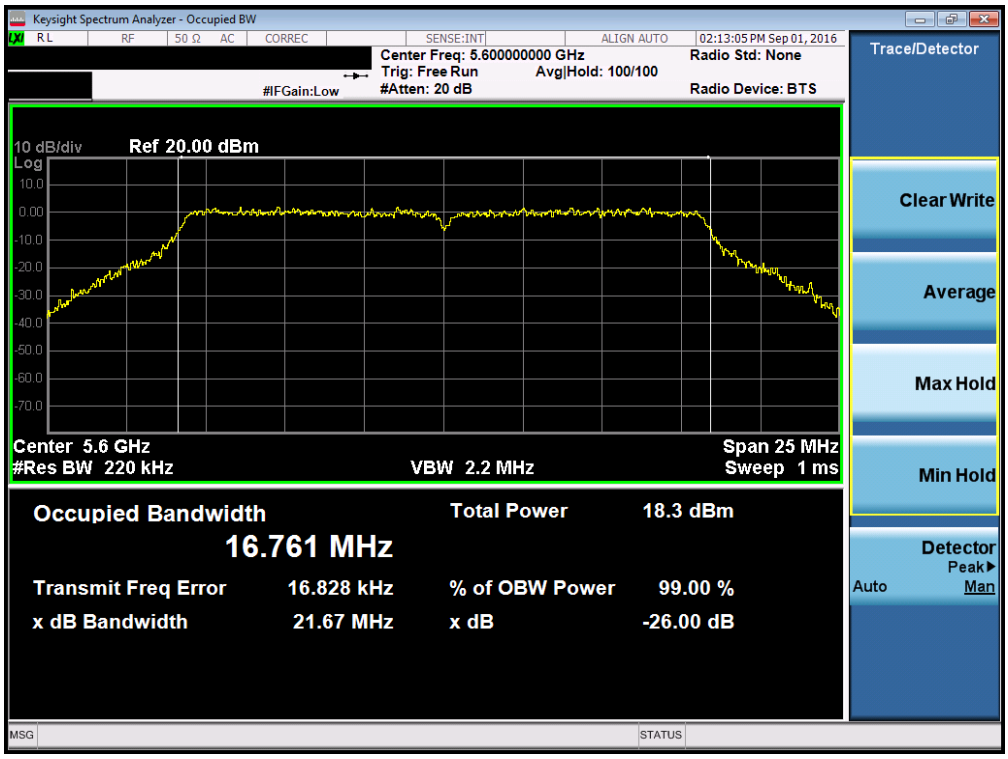



**Plot 7-19. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 100)**




**Plot 7-20. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 120)**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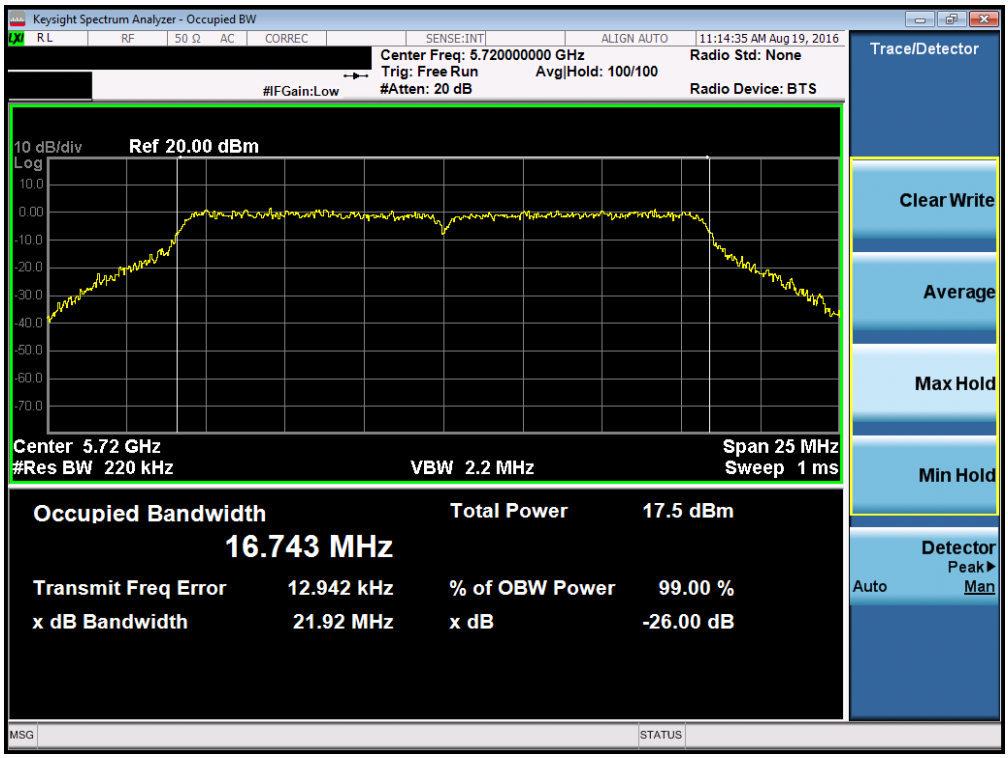
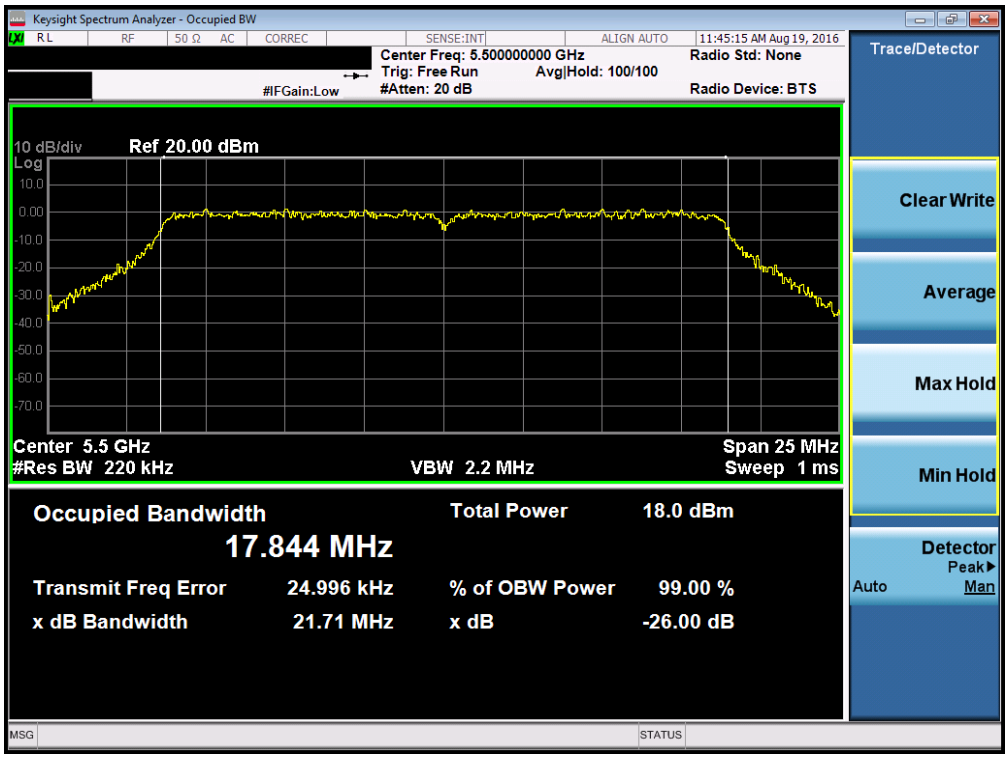



**Plot 7-21. 26dB Bandwidth Plot (802.11a (UNII Band 2C) – Ch. 144)**




**Plot 7-22. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)**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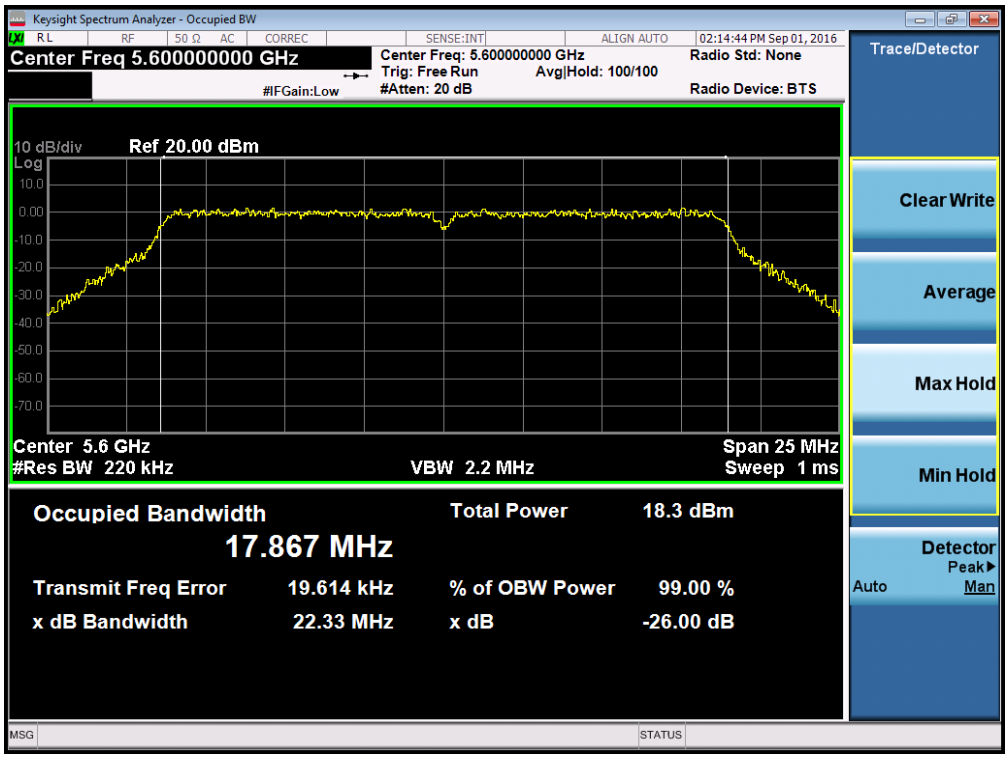


**Plot 7-23. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)**

**Plot 7-24. 26dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)**


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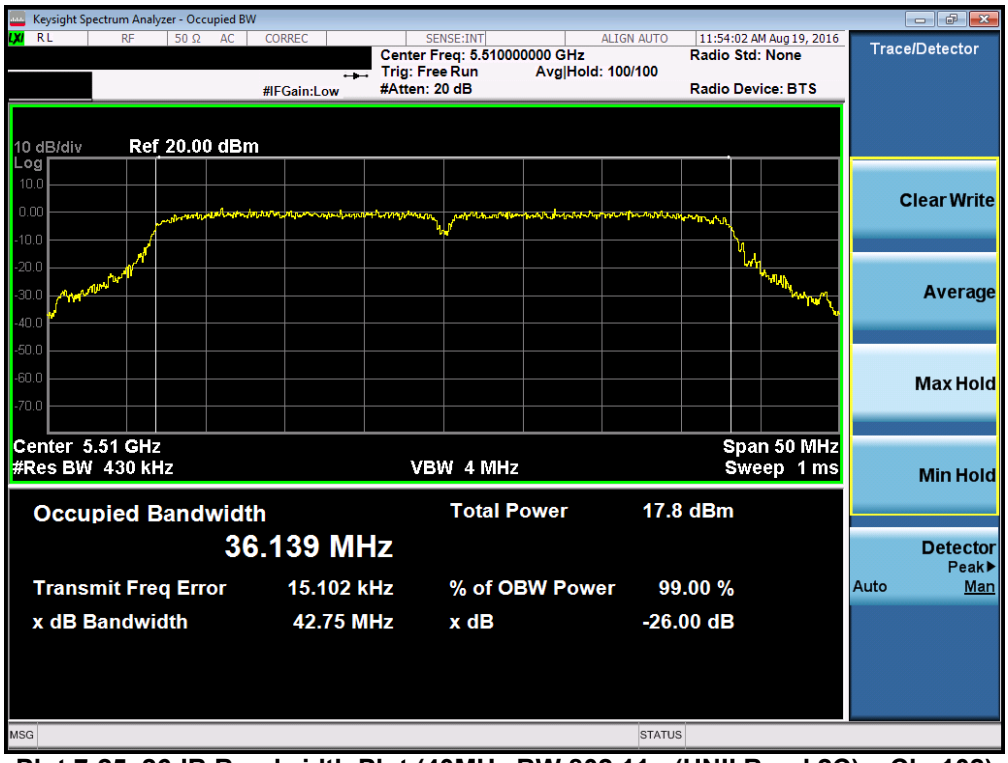
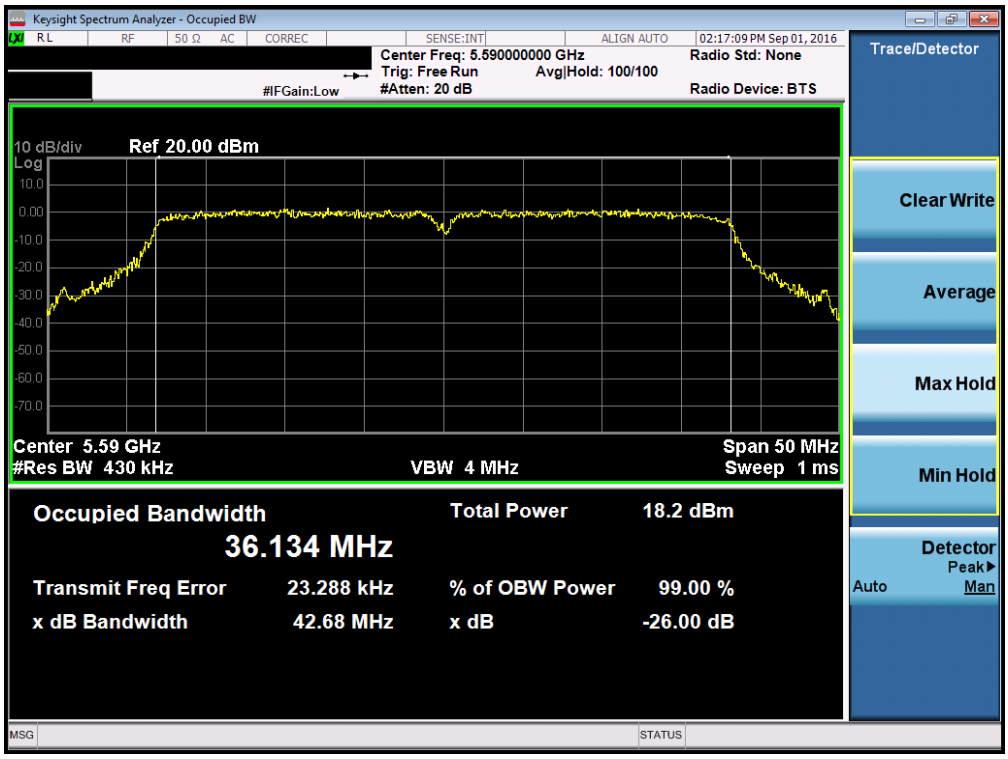



**Plot 7-25. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)**




**Plot 7-26. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)**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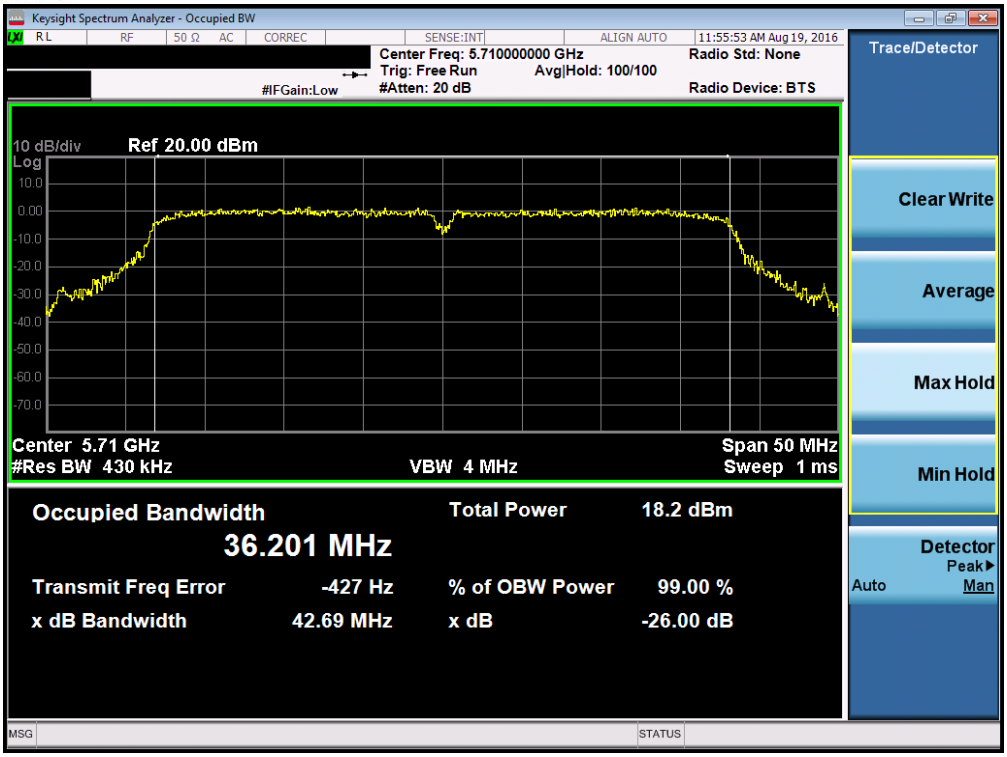
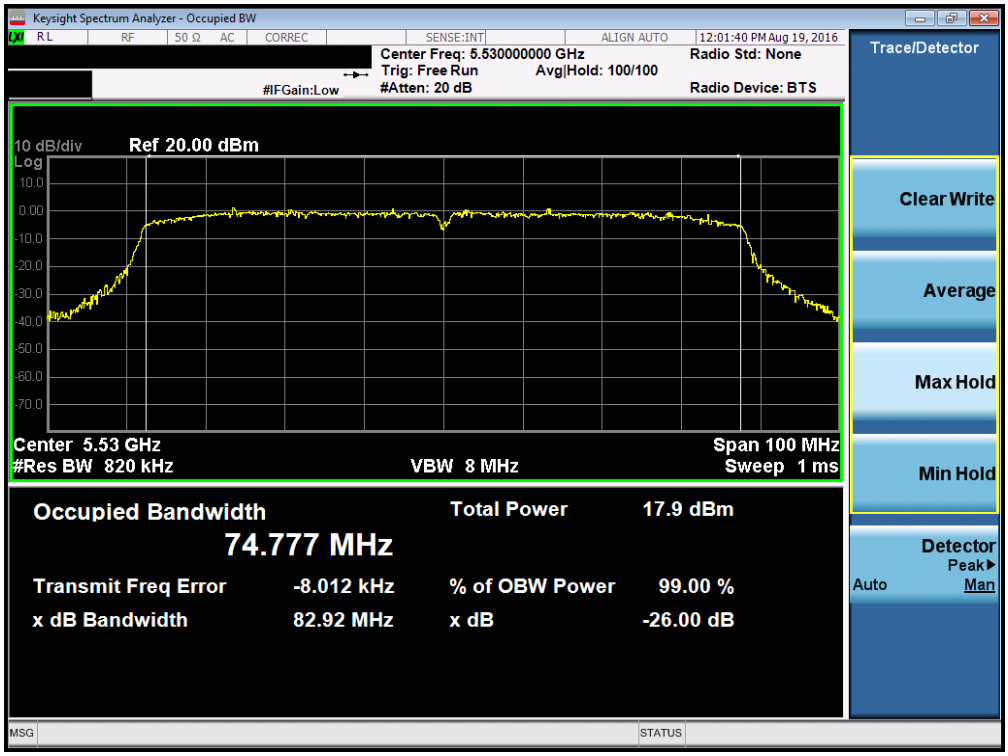



**Plot 7-27. 26dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)**




**Plot 7-28. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)**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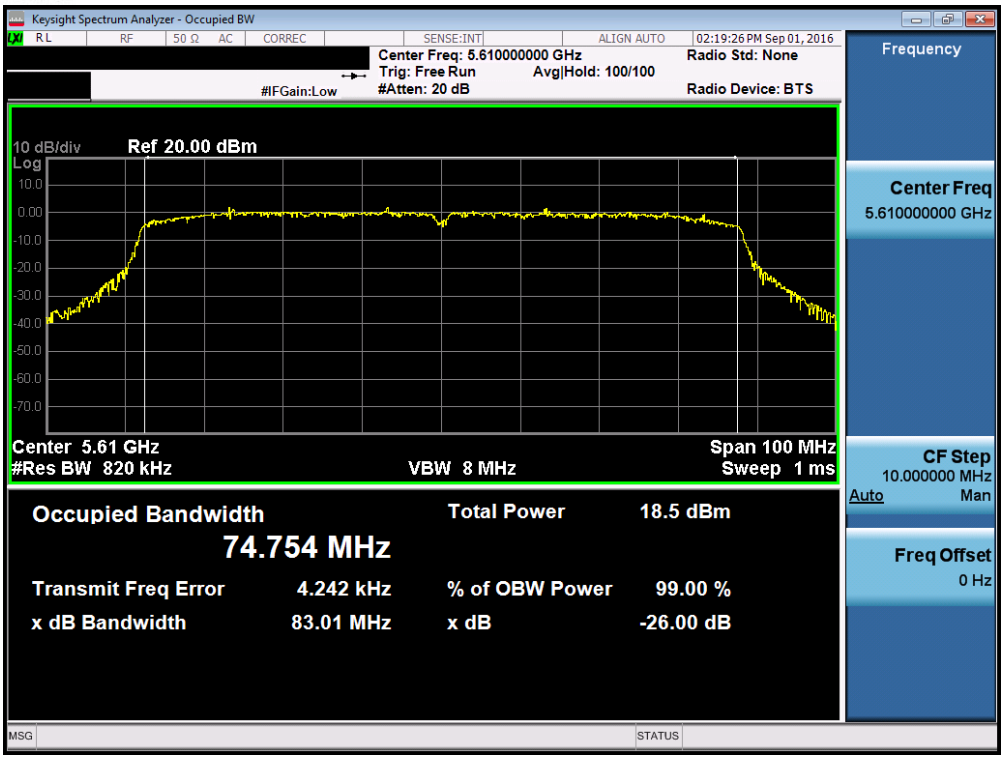
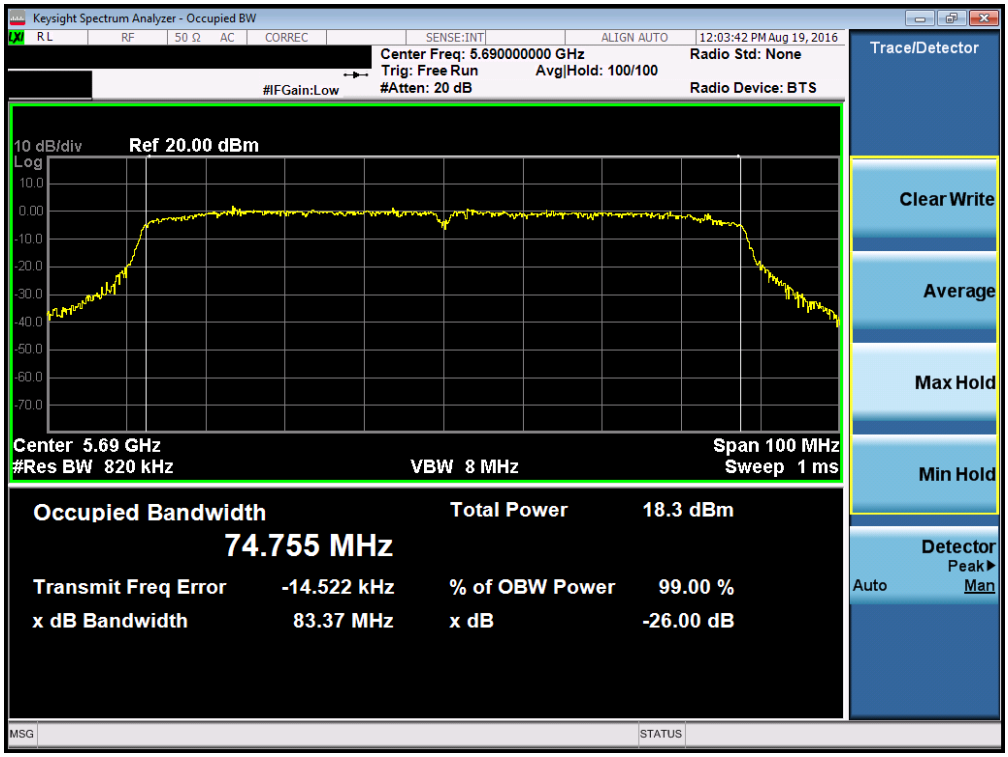



**Plot 7-29. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)**




**Plot 7-30. 26dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)**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## 7.3 6dB Bandwidth Measurement – 802.11a/n/ac

**§15.407 (e)**

**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 v01r02, 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 v01r02 – 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 ≥ 3 x 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.

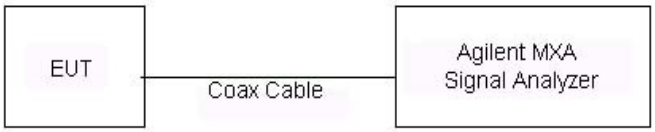


**Figure 7-2. Test Instrument & Measurement Setup**

**Test Notes**

None.


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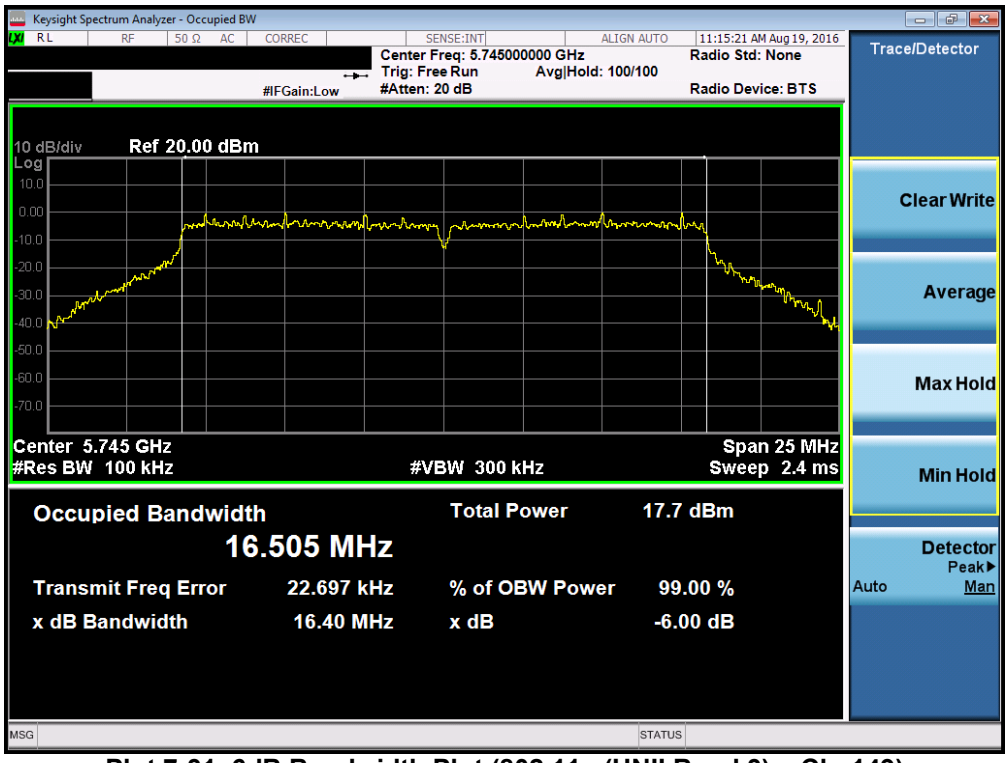
## Antenna-1 6 dB Bandwidth Measurements

| | Frequency [MHz] | Channel No. | 802.11 Mode | Data Rate [Mbps] | Measured 6dB Bandwidth [MHz] |
|---|---|---|---|---|---|
| Band 3 | 5745 | 149 | a | 6 | 16.40 |
| | 5785 | 157 | a | 6 | 16.41 |
| | 5825 | 165 | a | 6 | 16.40 |
| | 5745 | 149 | n (20MHz) | 6.5/7.2 (MCS0) | 17.62 |
| | 5785 | 157 | n (20MHz) | 6.5/7.2 (MCS0) | 17.61 |
| | 5825 | 165 | n (20MHz) | 6.5/7.2 (MCS0) | 17.61 |
| | 5755 | 151 | n (40MHz) | 13.5/15 (MCS0) | 35.22 |
| | 5795 | 159 | n (40MHz) | 13.5/15 (MCS0) | 35.38 |
| | 5775 | 155 | ac (80MHz) | 29.3/32.5 (MCS0) | 75.15 |

**Table 7-3. Conducted Bandwidth Measurements**




**Plot 7-31. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 149)**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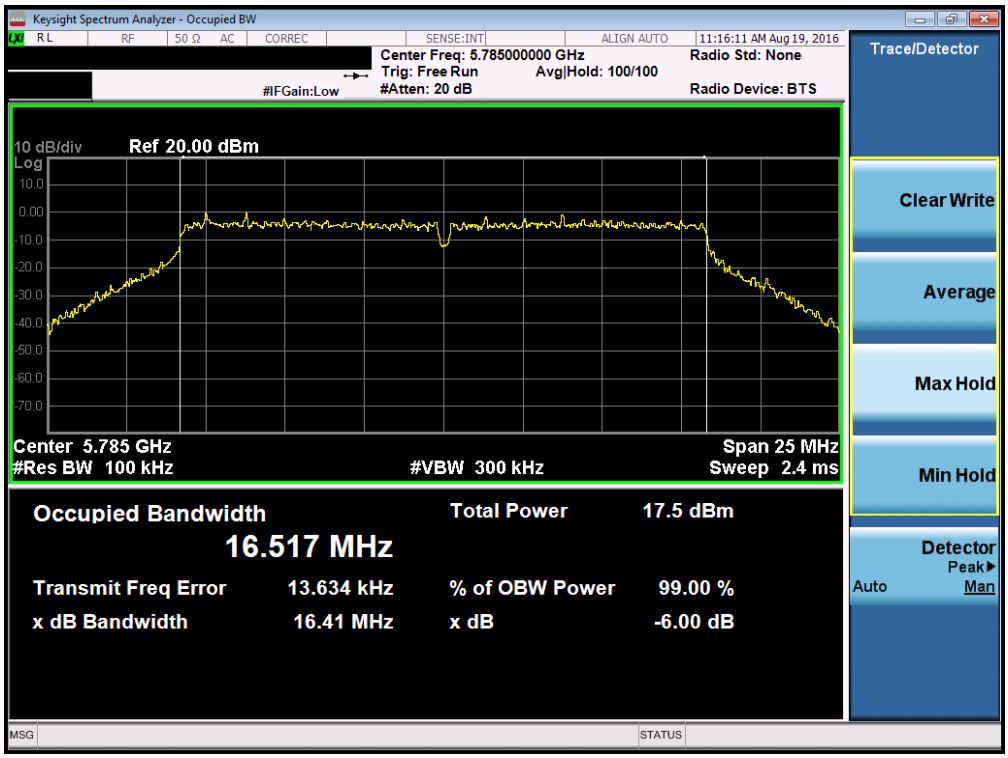
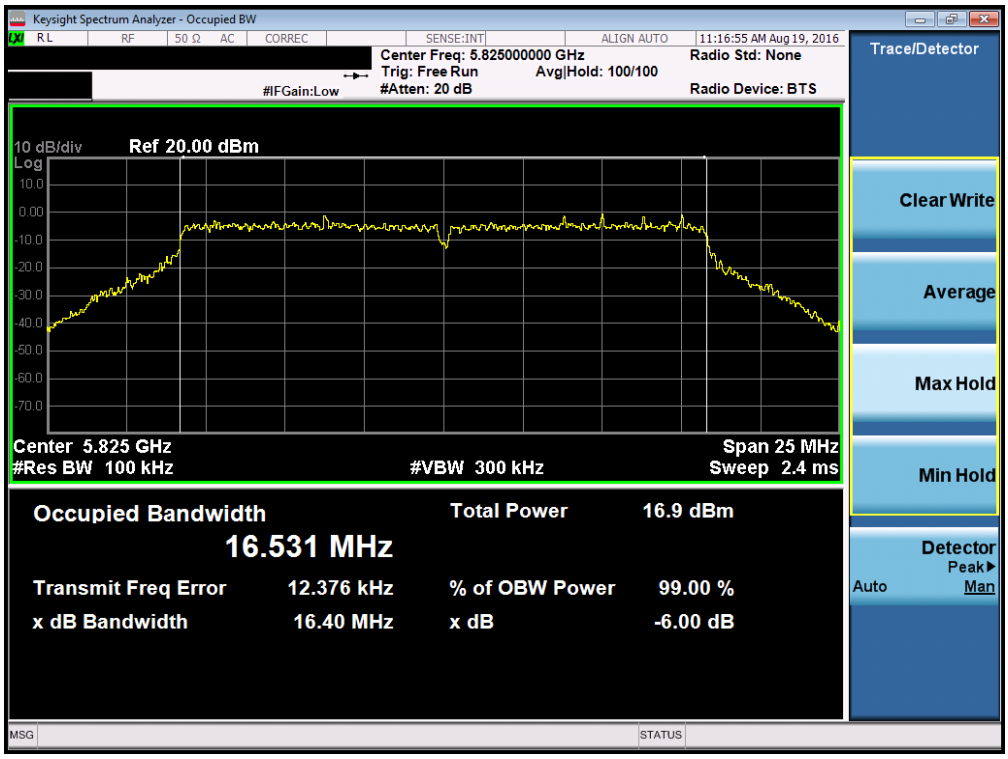



**Plot 7-32. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 157)**




**Plot 7-33. 6dB Bandwidth Plot (802.11a (UNII Band 3) – Ch. 165)**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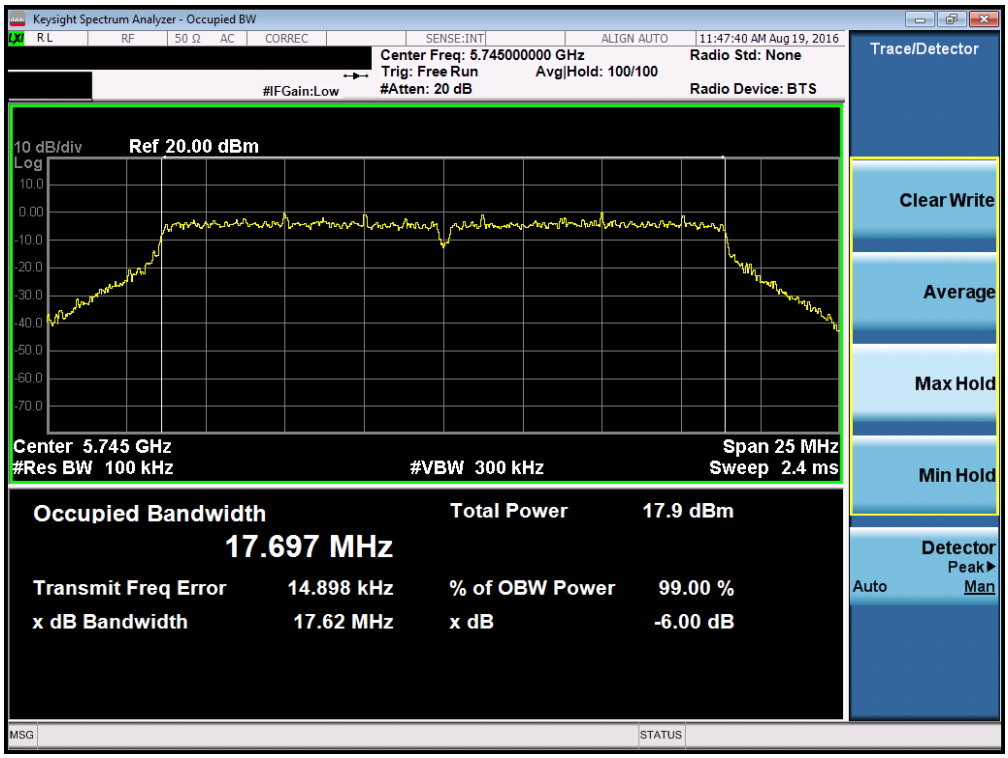
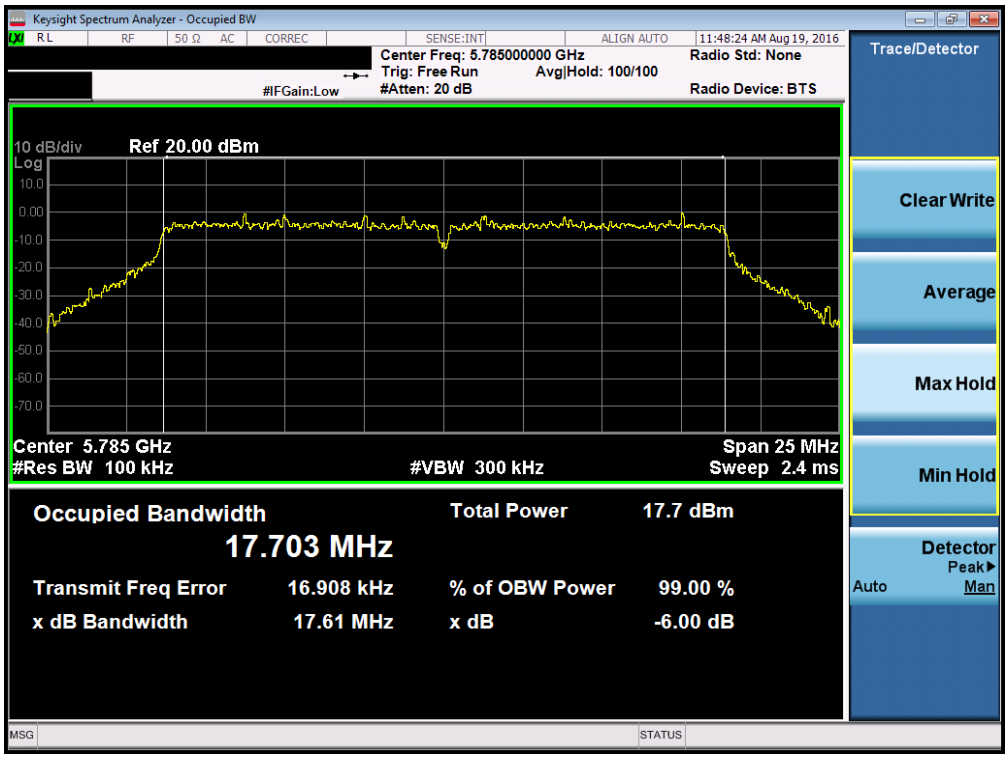



**Plot 7-34. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)**




**Plot 7-35. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)**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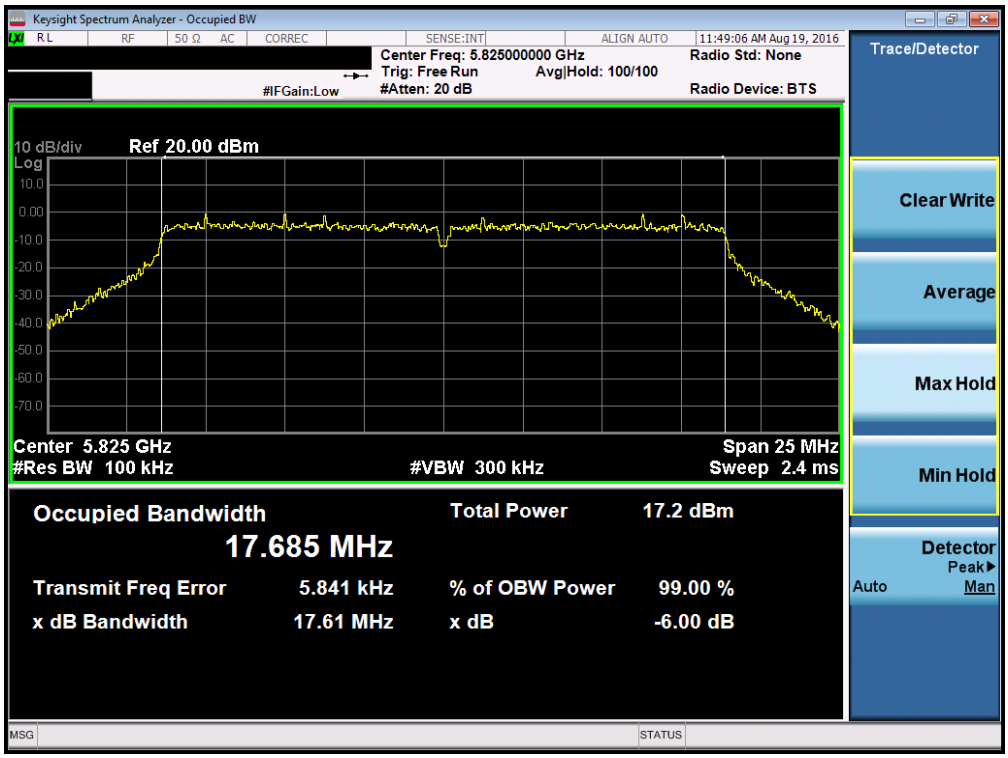
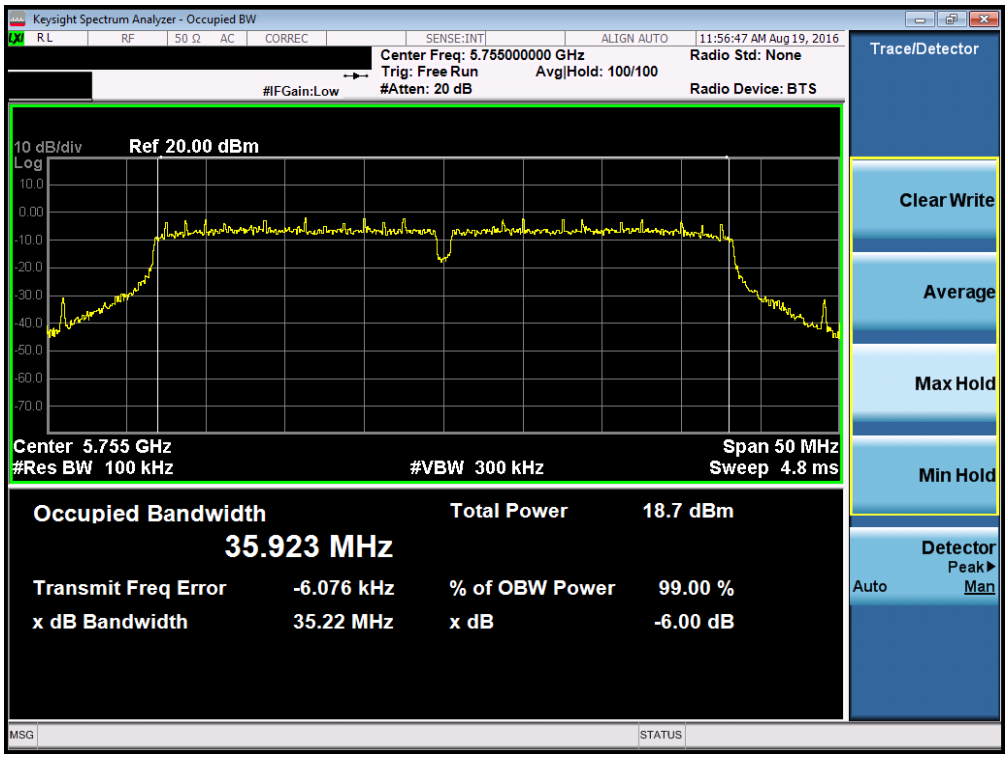



**Plot 7-36. 6dB Bandwidth Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)**




**Plot 7-37. 6dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)**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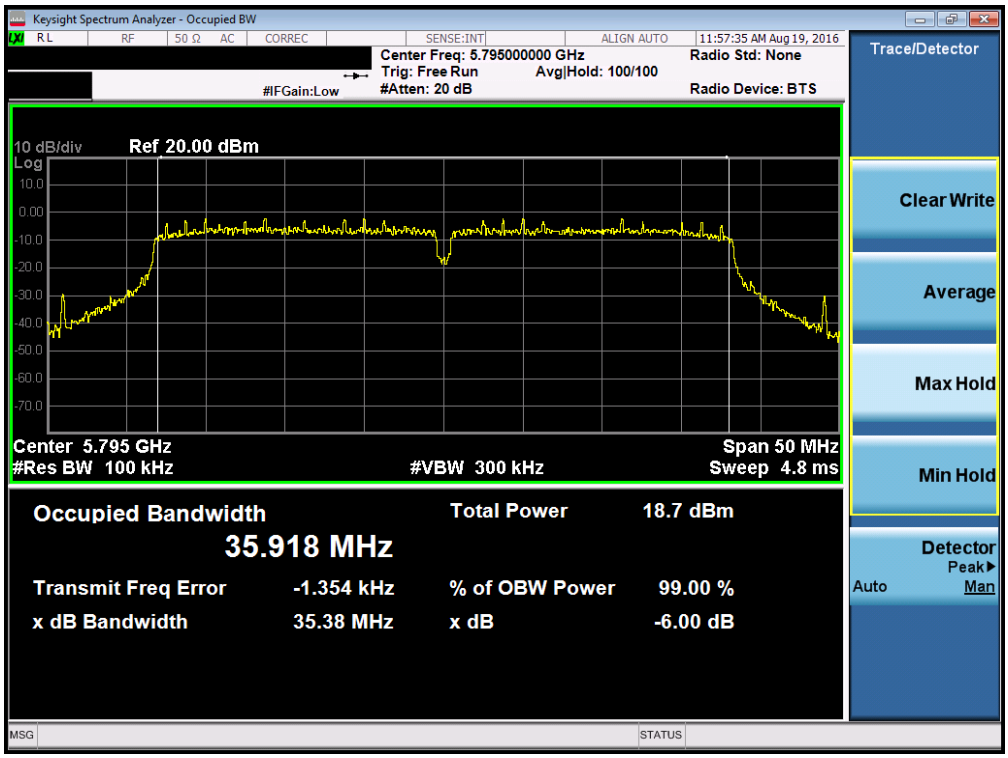
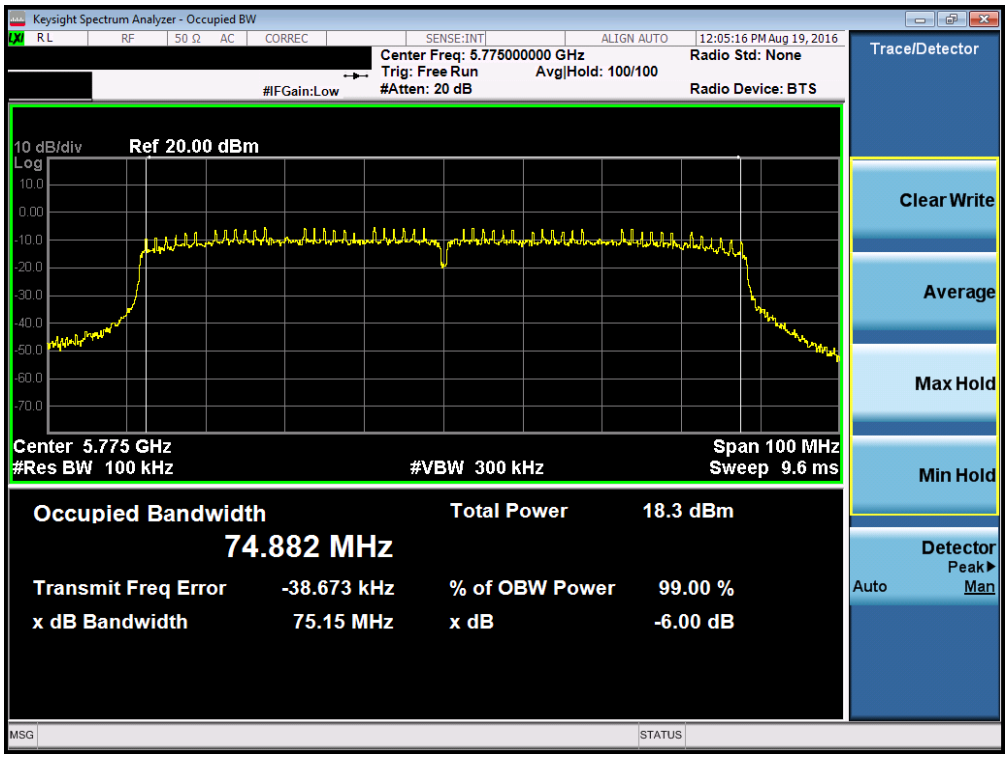



**Plot 7-38. 6dB Bandwidth Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)**




**Plot 7-39. 6dB Bandwidth Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)**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## 7.4 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 v01r02, and at the appropriate frequencies.

***In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is 250mW (23.98dBm).***

***In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log$_{10}$(26dB BW) = 11 dBm + 10log$_{10}$(21.30) = 24.28dBm.***

***In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) and 11 dBm + 10log$_{10}$(26dB BW) = 11 dBm + 10log$_{10}$(21.38) = 24.30dBm.***

***In the 5.725 – 5.850GHz band, the maximum permissible conducted output power is 1W (30dBm).***

**Test Procedure Used**

KDB 789033 D02 v01r02 – Section E)3)b) Method PM-G

**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.

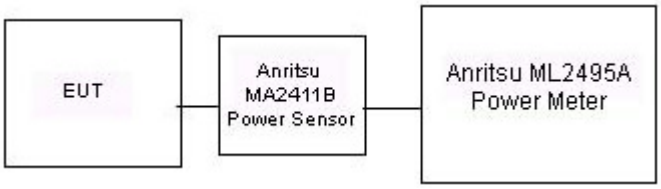


**Figure 7-3. Test Instrument & Measurement Setup**

**Test Notes**

None


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| Freq [MHz] | Channel | Detector | 5GHz (20MHz) Conducted Power [dBm] | | |
|---|---|---|---|---|---|
| | | | IEEE Transmission Mode | | |
| | | | 802.11a | 802.11n | 802.11ac |
| 5180 | 36 | AVG | 12.26 | 12.20 | 12.00 |
| 5200 | 40 | AVG | 12.24 | 12.14 | 11.95 |
| 5220 | 44 | AVG | 12.22 | 12.00 | 12.33 |
| 5240 | 48 | AVG | 12.13 | 12.01 | 12.04 |
| 5260 | 52 | AVG | 11.83 | 11.62 | 11.90 |
| 5280 | 56 | AVG | 12.39 | 12.28 | 12.02 |
| 5300 | 60 | AVG | 12.34 | 12.11 | 12.02 |
| 5320 | 64 | AVG | 12.05 | 12.01 | 12.05 |
| 5500 | 100 | AVG | 12.43 | 12.09 | 12.49 |
| 5580 | 116 | AVG | 12.49 | 12.34 | 12.49 |
| 5600 | 120 | AVG | 12.25 | 12.06 | 12.14 |
| 5620 | 124 | AVG | 12.49 | 12.37 | 12.13 |
| 5640 | 128 | AVG | 12.44 | 12.22 | 12.29 |
| 5660 | 132 | AVG | 12.01 | 12.33 | 11.92 |
| 5720 | 144 | AVG | 12.13 | 12.38 | 12.47 |
| 5745 | 149 | AVG | 12.37 | 12.31 | 12.44 |
| 5785 | 157 | AVG | 12.49 | 12.45 | 12.11 |
| 5825 | 165 | AVG | 12.28 | 12.13 | 12.28 |

**Table 7-4. 20MHz BW (UNII) Maximum Conducted Output Power**

| Freq [MHz] | Channel | Detector | 5GHz (40MHz) Conducted Power [dBm] | |
|---|---|---|---|---|
| | | | IEEE Transmission Mode | |
| | | | 802.11n | 802.11ac |
| 5190 | 38 | AVG | 12.21 | 12.45 |
| 5230 | 46 | AVG | 12.47 | 12.33 |
| 5270 | 54 | AVG | 12.43 | 12.41 |
| 5310 | 62 | AVG | 12.33 | 12.43 |
| 5510 | 102 | AVG | 12.08 | 12.32 |
| 5550 | 110 | AVG | 12.34 | 12.41 |
| 5590 | 118 | AVG | 12.36 | 12.24 |
| 5630 | 126 | AVG | 12.00 | 12.45 |
| 5670 | 134 | AVG | 12.09 | 12.40 |
| 5710 | 142 | AVG | 12.09 | 12.10 |
| 5755 | 151 | AVG | 12.33 | 12.37 |
| 5795 | 159 | AVG | 12.40 | 11.80 |

**Table 7-5. 40MHz BW (UNII) Maximum Conducted Output Power**

| 5GHz (80MHz) Conducted Power [dBm] | | | |
|---|---|---|---|
| Freq [MHz] | Channel | Detector | IEEE Transmission Mode |
| | | | 802.11ac |
| 5210 | 42 | AVG | 12.16 |
| 5290 | 58 | AVG | **12.19** |
| 5530 | 106 | AVG | **12.43** |
| 5610 | 122 | AVG | 11.84 |
| 5690 | 138 | AVG | 12.02 |
| 5775 | 155 | AVG | 12.34 |

**Table 7-6. 80MHz BW (UNII) Maximum Conducted Output Power**


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## 7.5 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 v01r02, and at the appropriate frequencies. Method SA-1, as defined in KDB 789033 D02 v01r02, 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 v01r02 – Section F

**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 x (span/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.

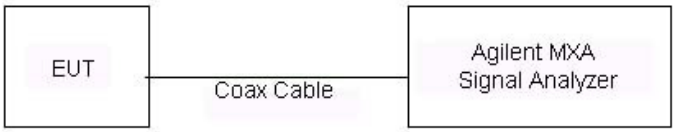


**Figure 7-4. Test Instrument & Measurement Setup**

**Test Notes**

None


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| | 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 1 | 5180 | 36 | a | 6 | 0.01 | 11.0 | -10.99 | Pass |
| | 5200 | 40 | a | 6 | -0.08 | 11.0 | -11.08 | Pass |
| | 5240 | 48 | a | 6 | -0.42 | 11.0 | -11.42 | Pass |
| | 5180 | 36 | n (20MHz) | 6.5/7.2 (MCS0) | -0.05 | 11.0 | -11.05 | Pass |
| | 5200 | 40 | n (20MHz) | 6.5/7.2 (MCS0) | 0.02 | 11.0 | -10.98 | Pass |
| | 5240 | 48 | n (20MHz) | 6.5/7.2 (MCS0) | -0.19 | 11.0 | -11.19 | Pass |
| | 5190 | 38 | n (40MHz) | 13.5/15 (MCS0) | -2.46 | 11.0 | -13.46 | Pass |
| | 5230 | 46 | n (40MHz) | 13.5/15 (MCS0) | -2.74 | 11.0 | -13.74 | Pass |
| | 5210 | 42 | ac (80MHz) | 29.3/32.5 (MCS0) | -5.96 | 11.0 | -16.96 | Pass |
| Band 2A | 5260 | 52 | a | 6 | -0.63 | 11.0 | -11.63 | Pass |
| | 5280 | 56 | a | 6 | 0.24 | 11.0 | -10.76 | Pass |
| | 5320 | 64 | a | 6 | 0.14 | 11.0 | -10.86 | Pass |
| | 5260 | 52 | n (20MHz) | 6.5/7.2 (MCS0) | -0.50 | 11.0 | -11.50 | Pass |
| | 5280 | 56 | n (20MHz) | 6.5/7.2 (MCS0) | 0.19 | 11.0 | -10.81 | Pass |
| | 5320 | 64 | n (20MHz) | 6.5/7.2 (MCS0) | 0.07 | 11.0 | -10.93 | Pass |
| | 5270 | 54 | n (40MHz) | 13.5/15 (MCS0) | -2.61 | 11.0 | -13.61 | Pass |
| | 5310 | 62 | n (40MHz) | 13.5/15 (MCS0) | -2.72 | 11.0 | -13.72 | Pass |
| | 5290 | 58 | ac (80MHz) | 29.3/32.5 (MCS0) | -5.76 | 11.0 | -16.76 | Pass |
| Band 2C | 5500 | 100 | a | 6 | 0.49 | 11.0 | -10.51 | Pass |
| | 5600 | 120 | a | 6 | 1.16 | 11.0 | -9.84 | Pass |
| | 5720 | 144 | a | 6 | 0.44 | 11.0 | -10.56 | Pass |
| | 5500 | 100 | n (20MHz) | 6.5/7.2 (MCS0) | 0.32 | 11.0 | -10.68 | Pass |
| | 5600 | 120 | n (20MHz) | 6.5/7.2 (MCS0) | 0.76 | 11.0 | -10.24 | Pass |
| | 5720 | 144 | n (20MHz) | 6.5/7.2 (MCS0) | 0.31 | 11.0 | -10.69 | Pass |
| | 5510 | 102 | n (40MHz) | 13.5/15 (MCS0) | -2.86 | 11.0 | -13.86 | Pass |
| | 5590 | 118 | n (40MHz) | 13.5/15 (MCS0) | -2.28 | 11.0 | -13.28 | Pass |
| | 5710 | 142 | n (40MHz) | 13.5/15 (MCS0) | -2.15 | 11.0 | -13.15 | Pass |
| | 5530 | 106 | ac (80MHz) | 29.3/32.5 (MCS0) | -6.10 | 11.0 | -17.10 | Pass |
| | 5610 | 122 | ac (80MHz) | 29.3/32.5 (MCS0) | -5.67 | 11.0 | -16.67 | Pass |
| | 5690 | 138 | ac (80MHz) | 29.3/32.5 (MCS0) | -5.63 | 11.0 | -16.63 | Pass |

**Table 7-7. Bands 1, 2A, 2C Conducted Power Spectral Density Measurements**


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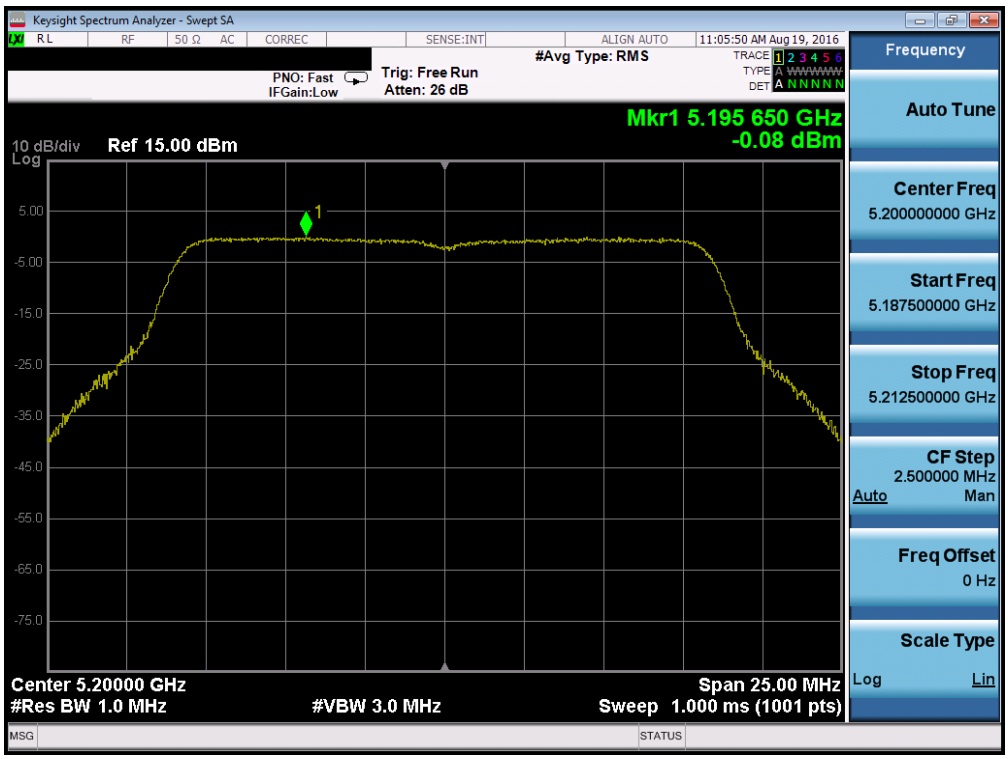
**Plot 7-40. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 36)**




**Plot 7-41. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 40)**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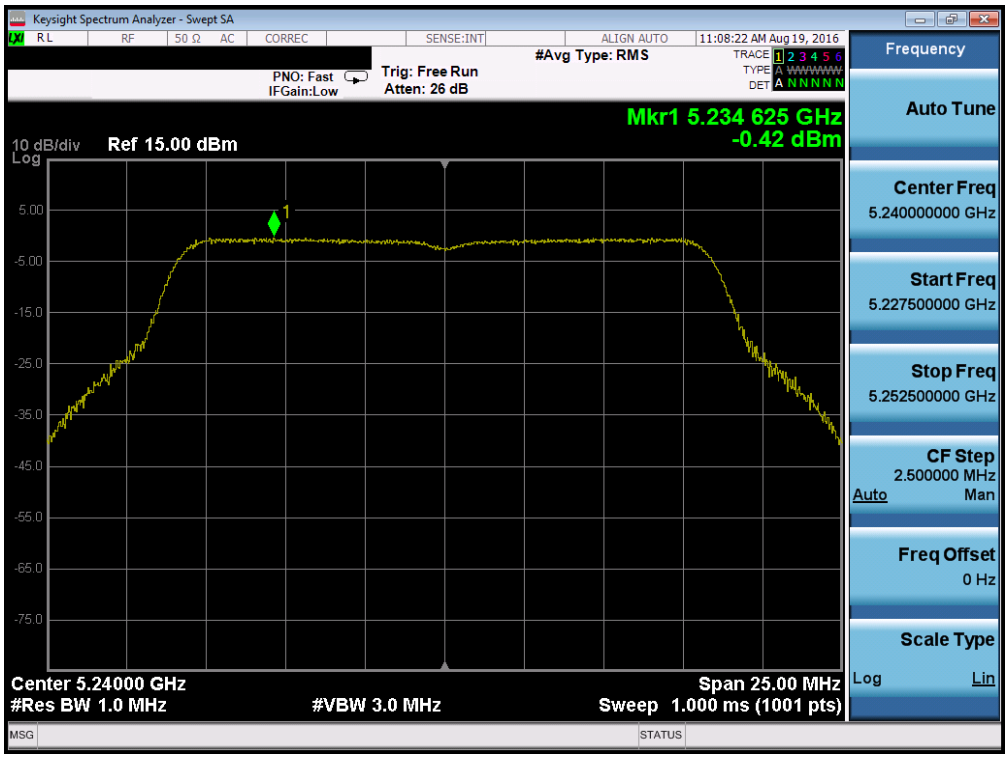


**Plot 7-42. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 48)**

**Plot 7-43. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 36)**


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**Plot 7-44. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)**

**Plot 7-45. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)**


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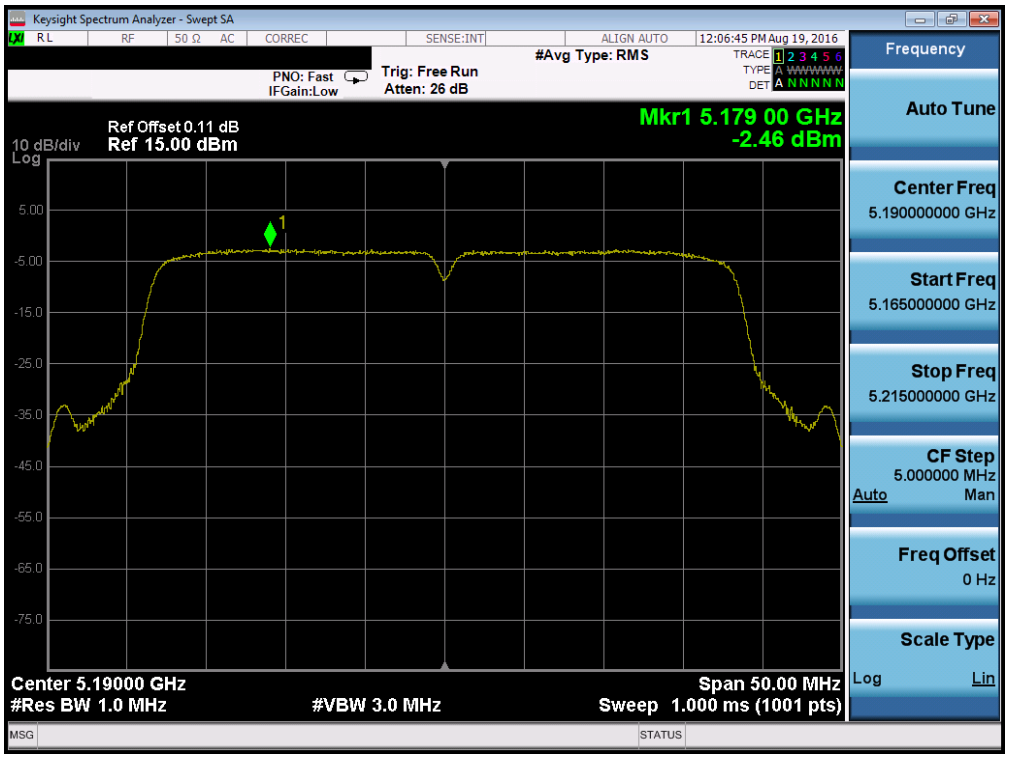
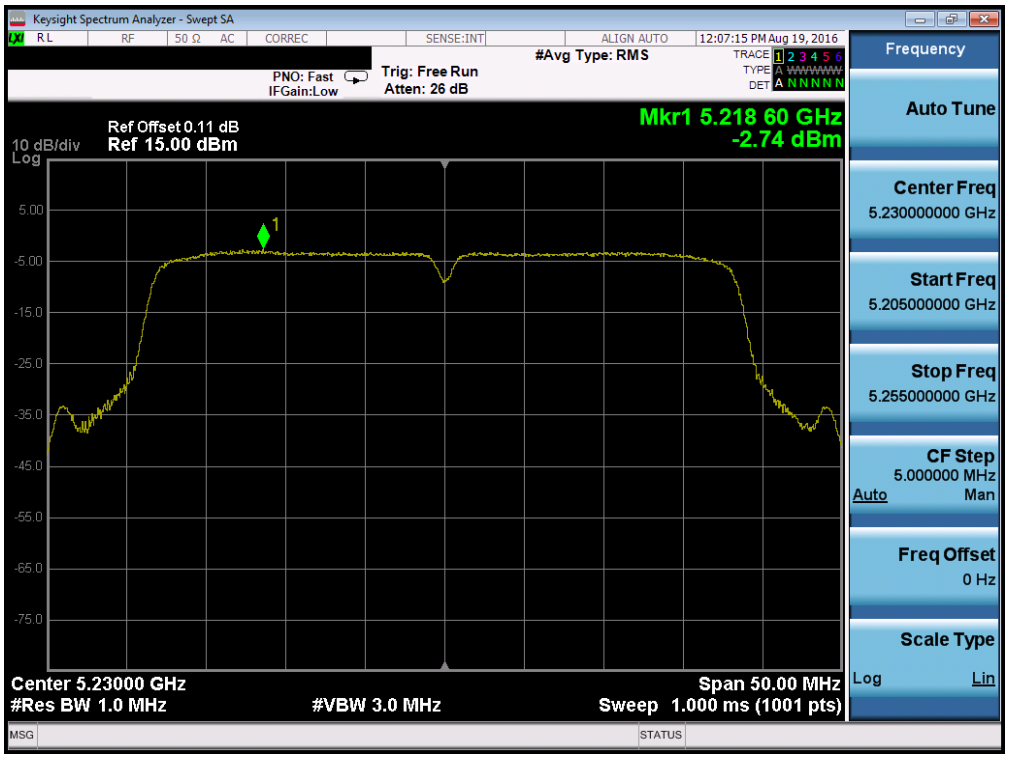



**Plot 7-46. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)**




**Plot 7-47. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)**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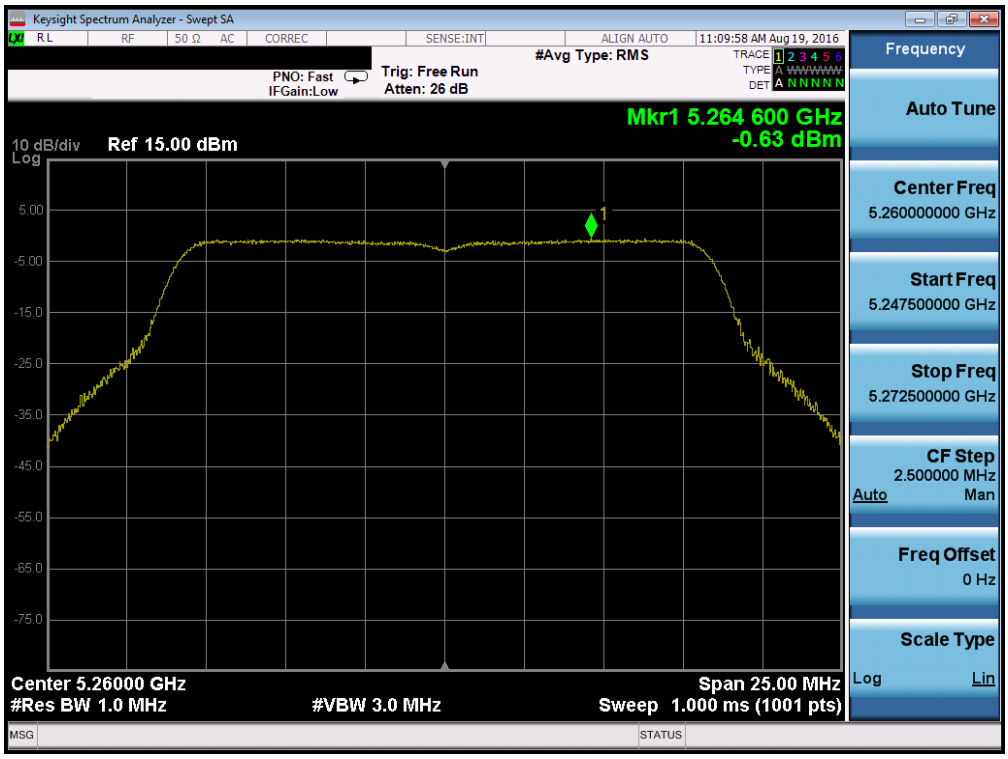
**Plot 7-48. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)**




**Plot 7-49. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 52)**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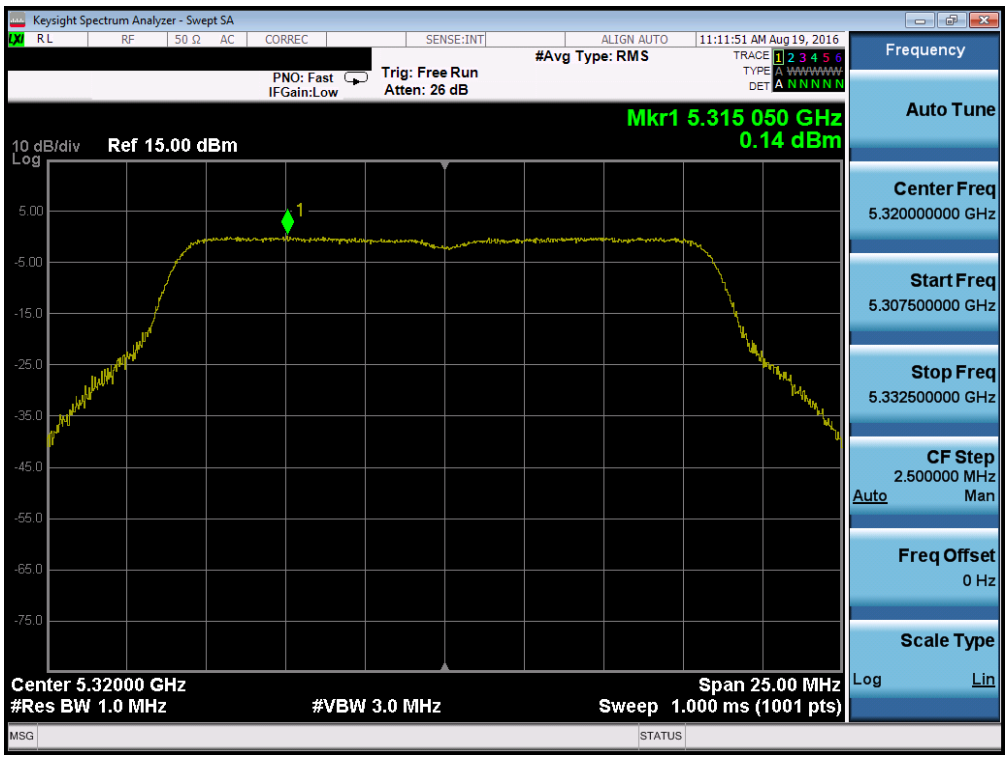
**Plot 7-50. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 56)**




**Plot 7-51. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 64)**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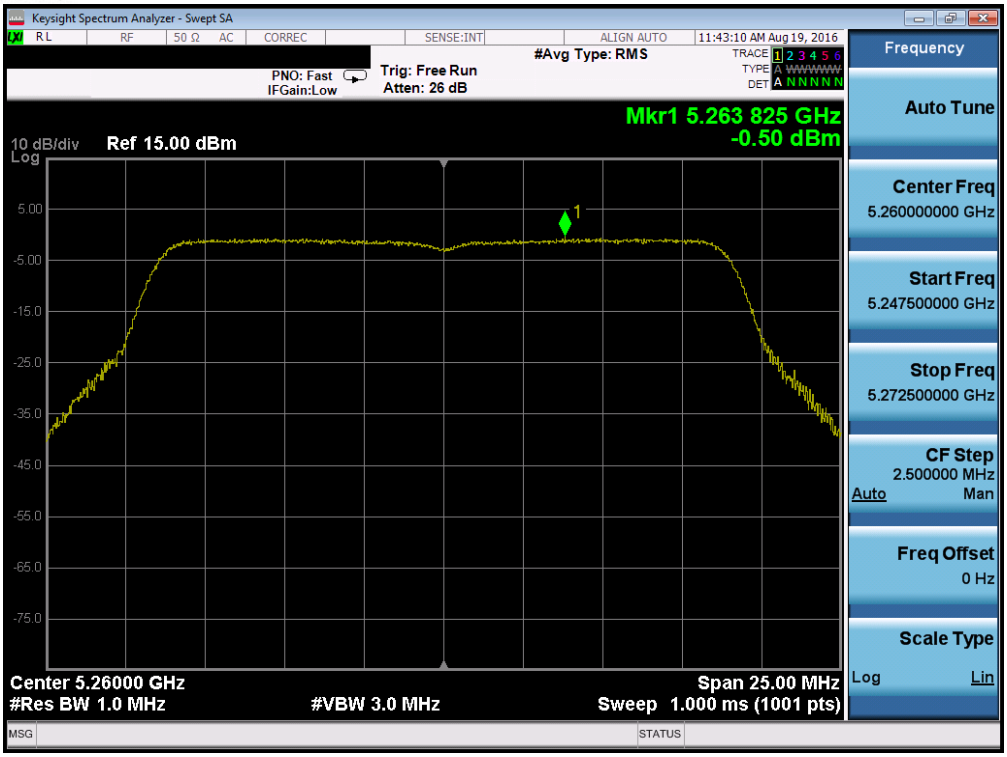
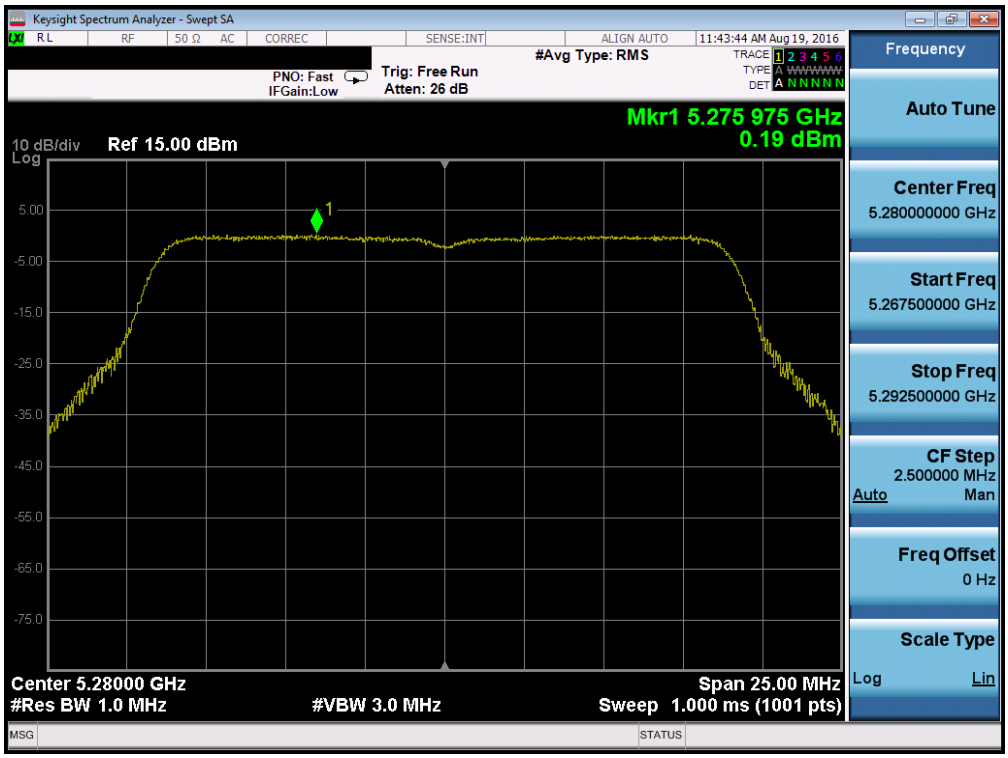



**Plot 7-52. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)**




**Plot 7-53. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)**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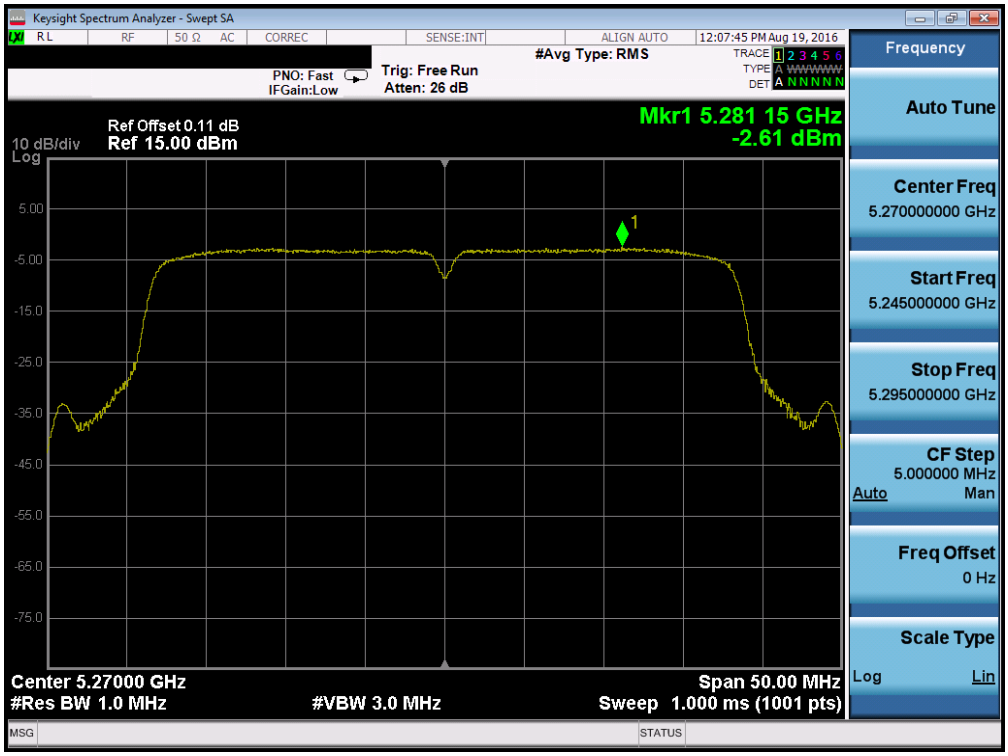
**Plot 7-54. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)**




**Plot 7-55. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)**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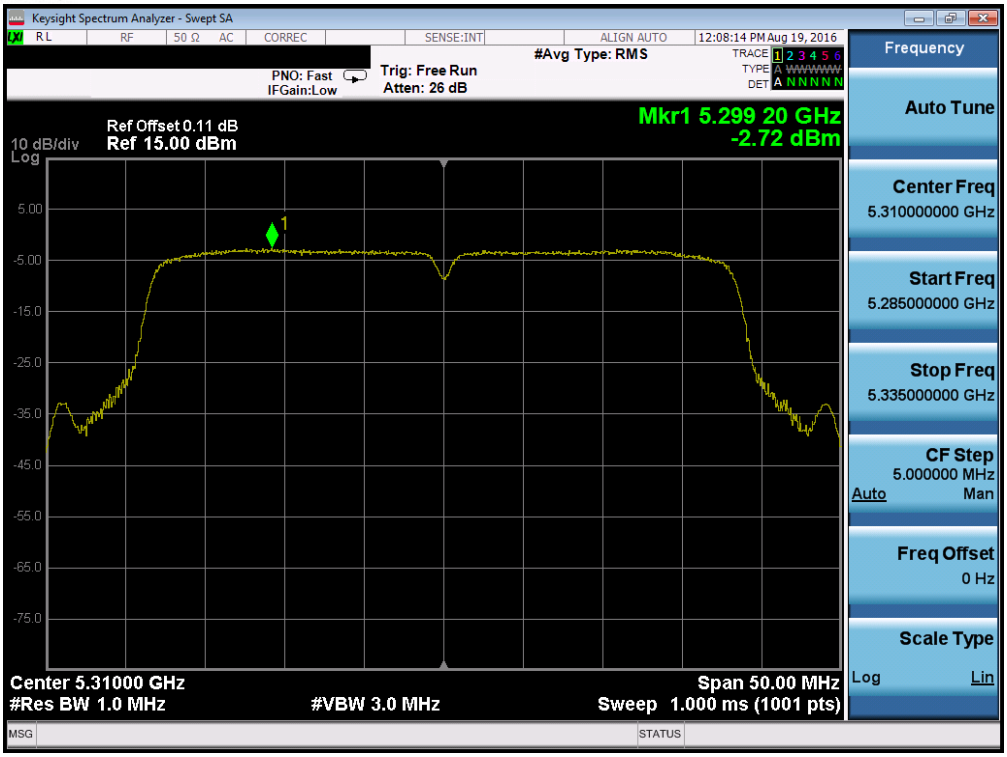
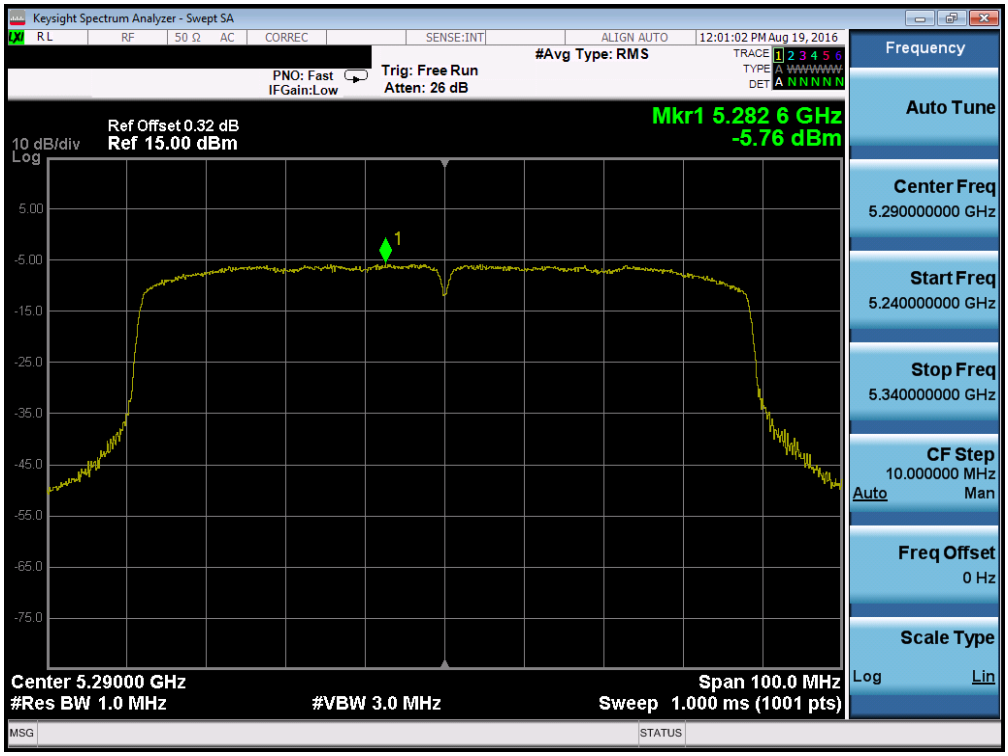



**Plot 7-56. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)**




**Plot 7-57. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)**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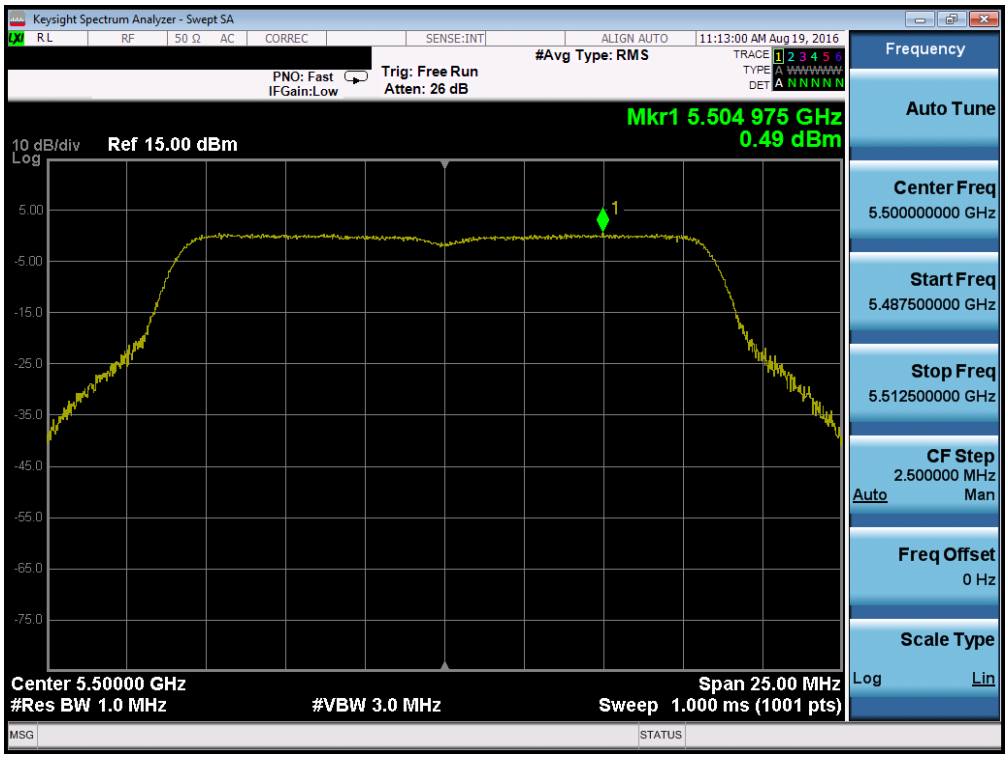
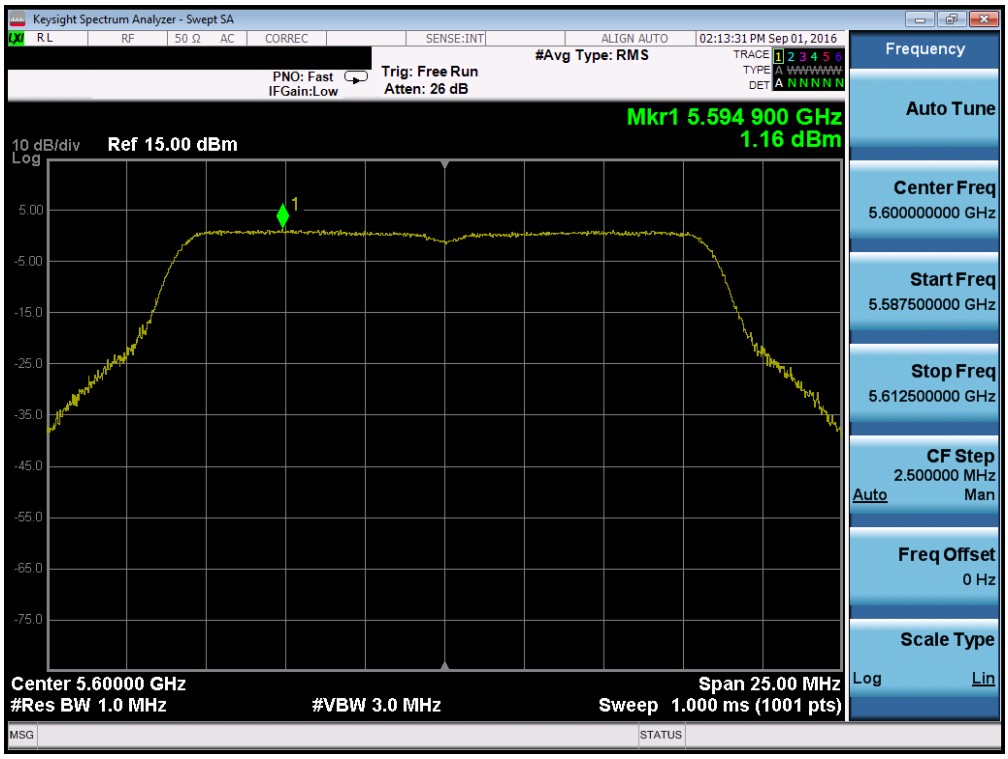



**Plot 7-58. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 100)**




**Plot 7-59. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 120)**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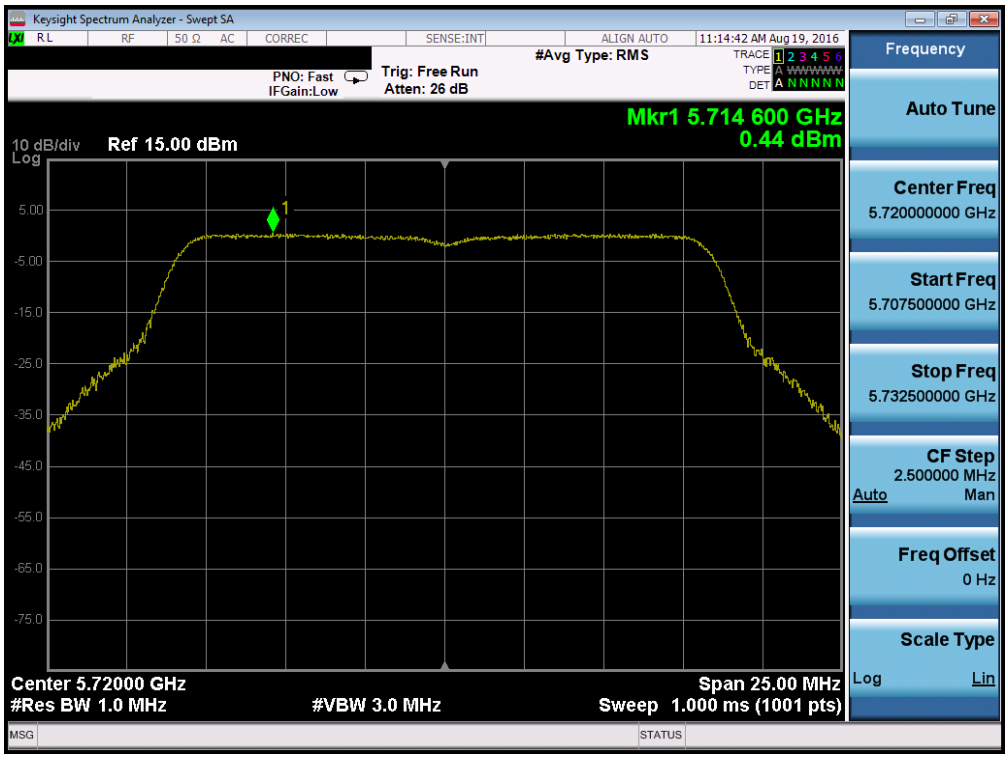


**Plot 7-60. Power Spectral Density Plot (802.11a (UNII Band 2C) – Ch. 144)**

**Plot 7-61. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)**


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**Plot 7-62. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)**

**Plot 7-63. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)**


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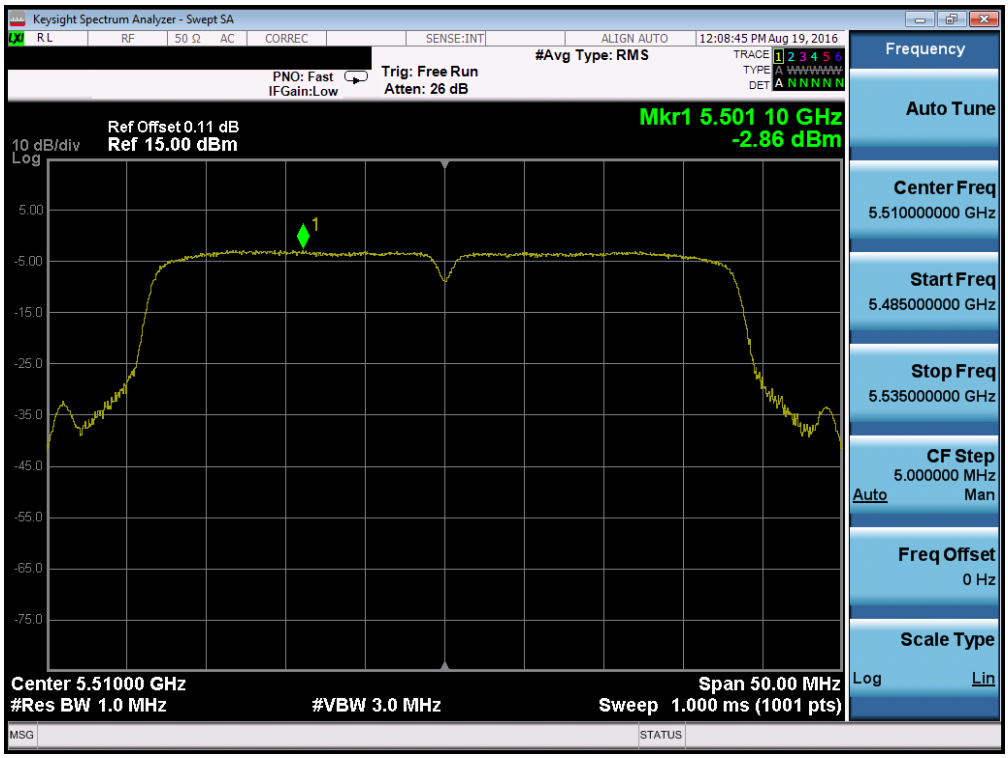
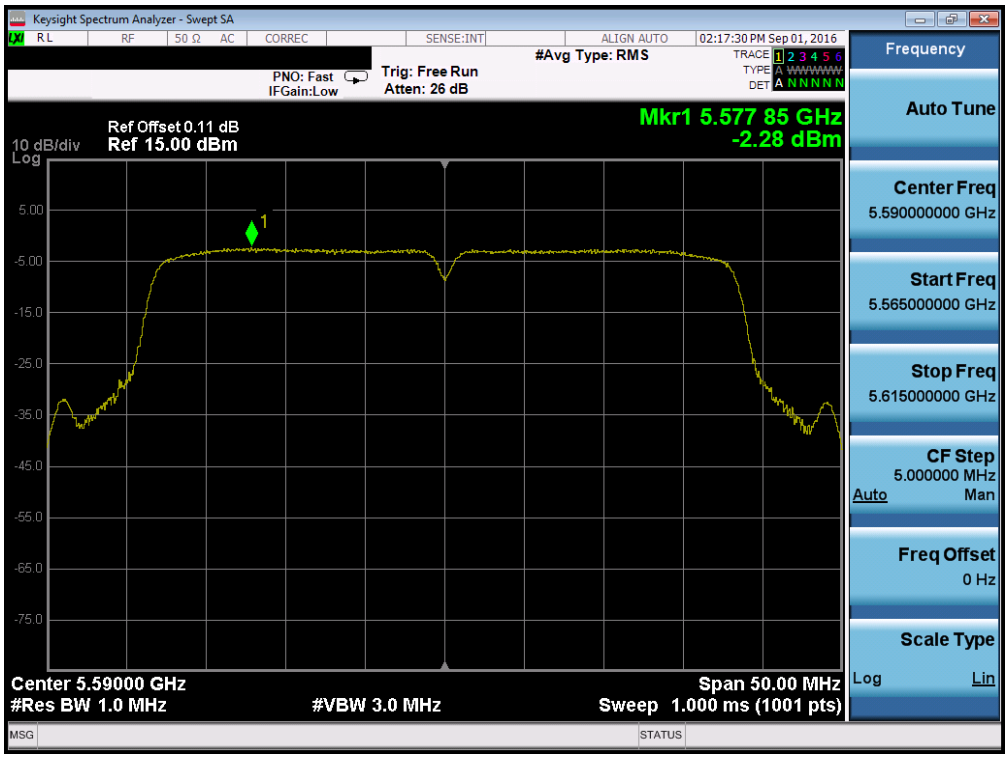



**Plot 7-64. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)**




**Plot 7-65. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)**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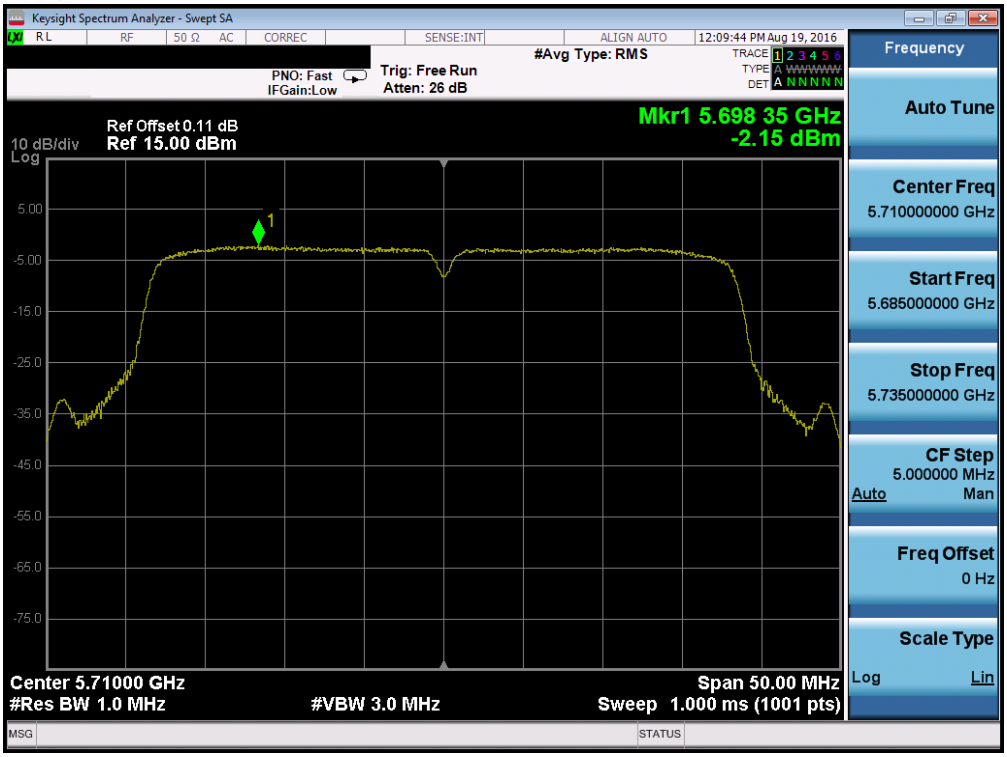
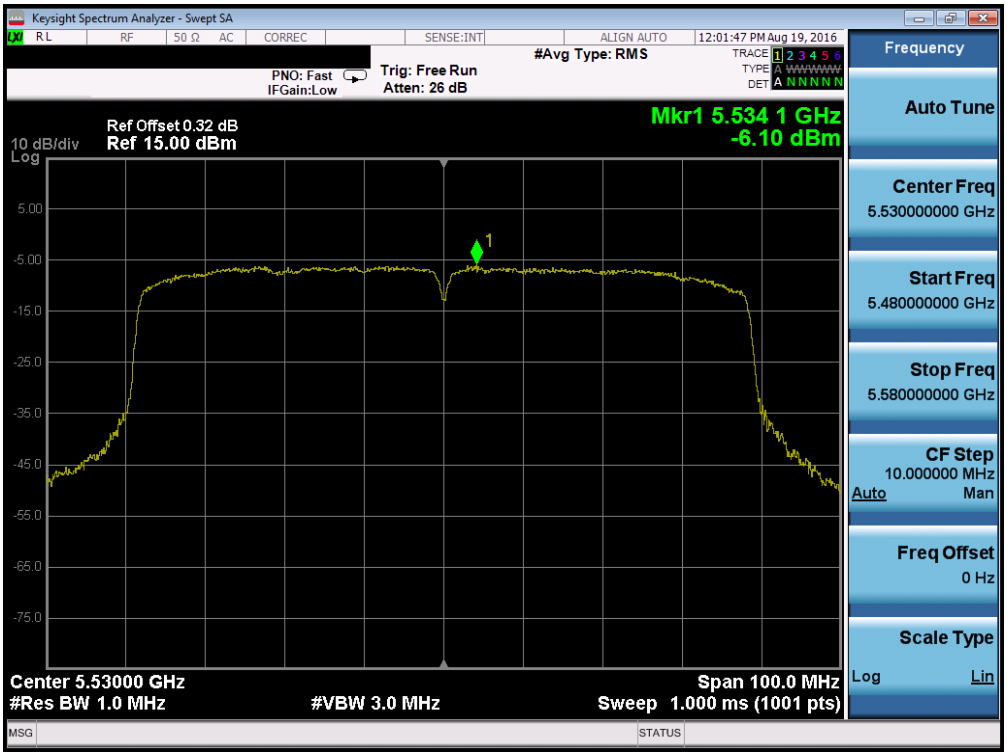



**Plot 7-66. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)**




**Plot 7-67. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)**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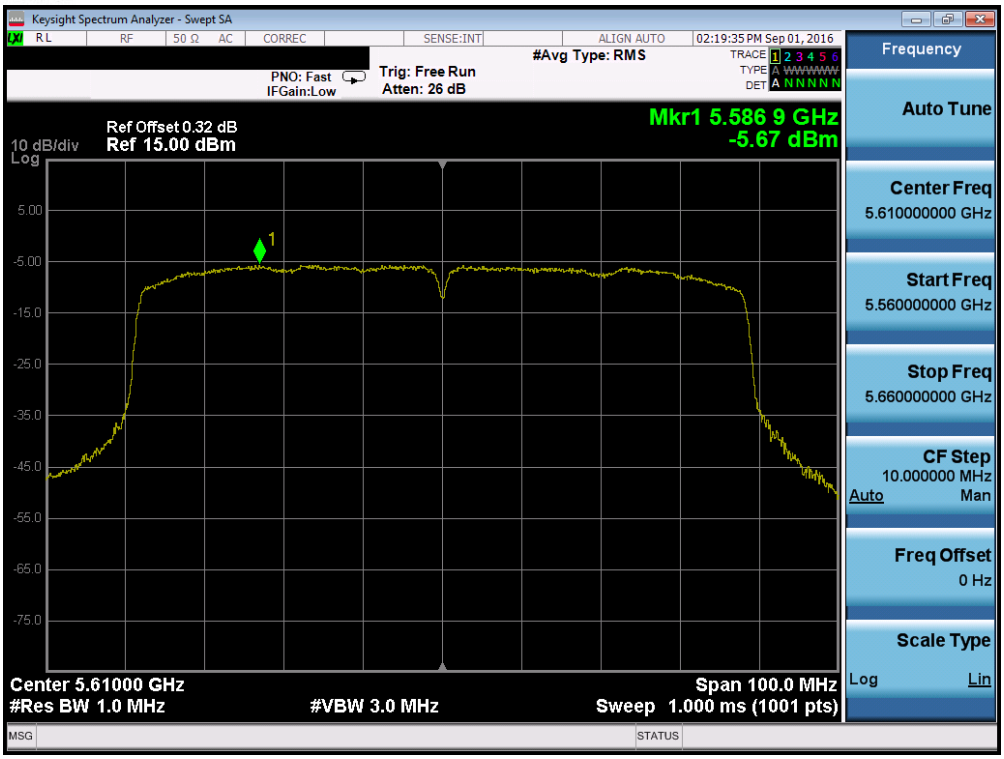


**Plot 7-68. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)**

**Plot 7-69. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)**


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| | 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 | -2.57 | 30.0 | -32.57 | Pass |
| | 5785 | 157 | a | 6 | -2.74 | 30.0 | -32.74 | Pass |
| | 5825 | 165 | a | 6 | -3.13 | 30.0 | -33.13 | Pass |
| | 5745 | 149 | n (20MHz) | 6.5/7.2 (MCS0) | -2.63 | 30.0 | -32.63 | Pass |
| | 5785 | 157 | n (20MHz) | 6.5/7.2 (MCS0) | -2.83 | 30.0 | -32.83 | Pass |
| | 5825 | 165 | n (20MHz) | 6.5/7.2 (MCS0) | -3.07 | 30.0 | -33.07 | Pass |
| | 5755 | 151 | n (40MHz) | 13.5/15 (MCS0) | -4.85 | 30.0 | -34.85 | Pass |
| | 5795 | 159 | n (40MHz) | 13.5/15 (MCS0) | -4.93 | 30.0 | -34.93 | Pass |
| | 5775 | 155 | ac (80MHz) | 29.3/32.5 (MCS0) | -8.30 | 30.0 | -38.30 | Pass |

**Table 7-8. Band 3 Conducted Power Spectral Density Measurements**

**Plot 7-70. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 149)**


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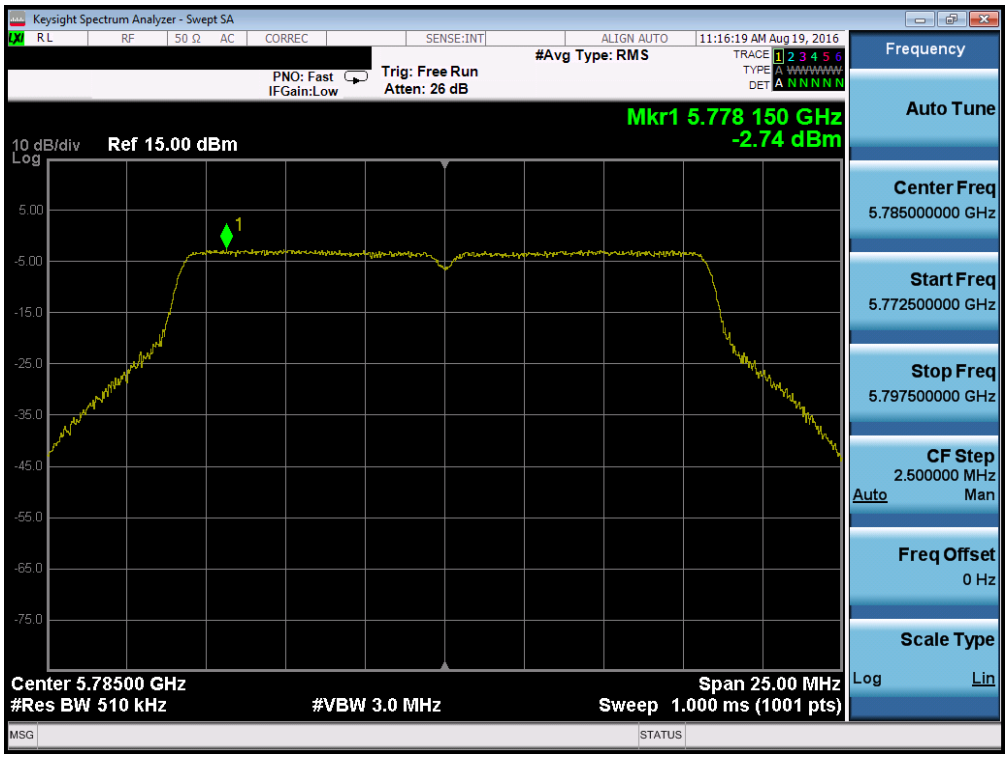
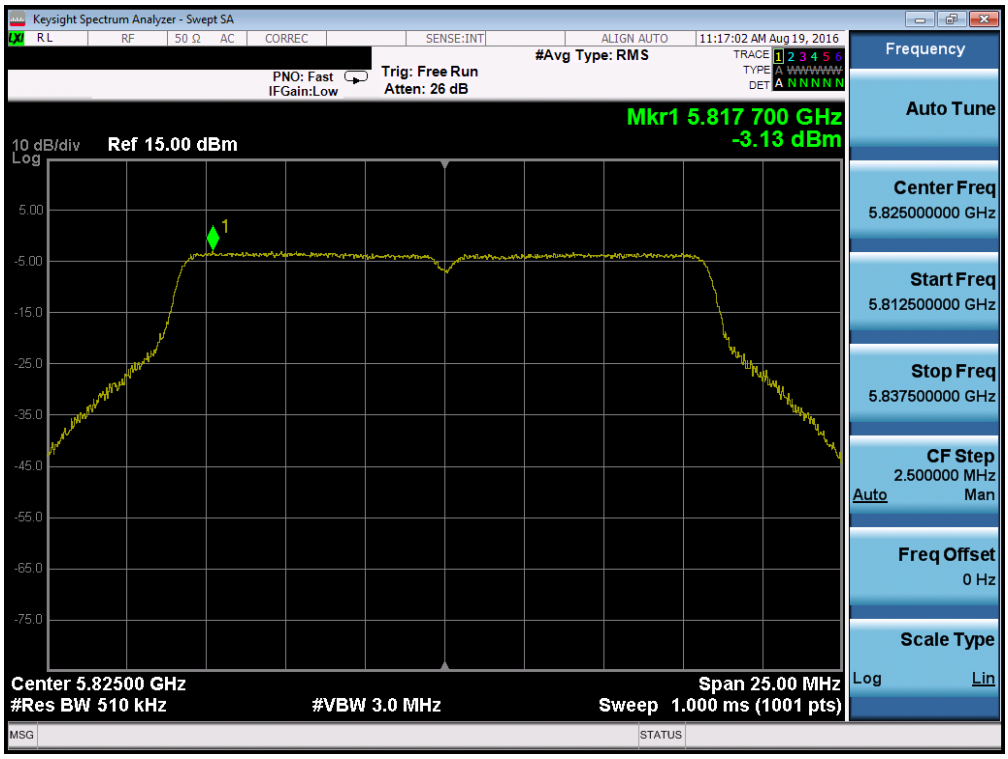



**Plot 7-71. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 157)**




**Plot 7-72. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 165)**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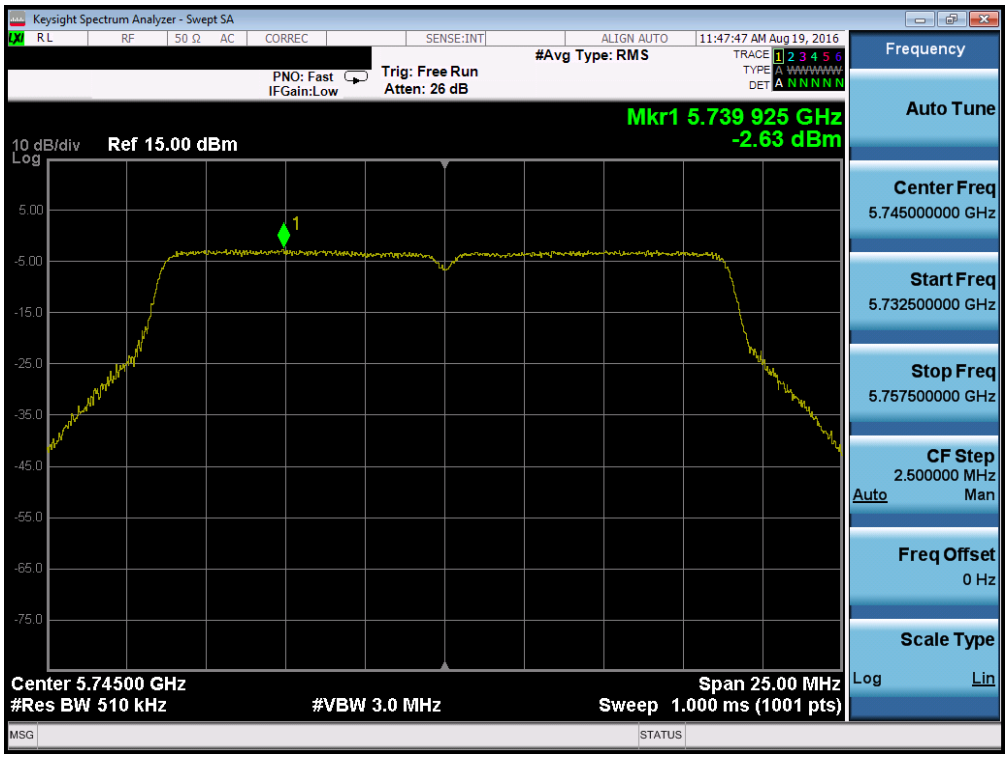
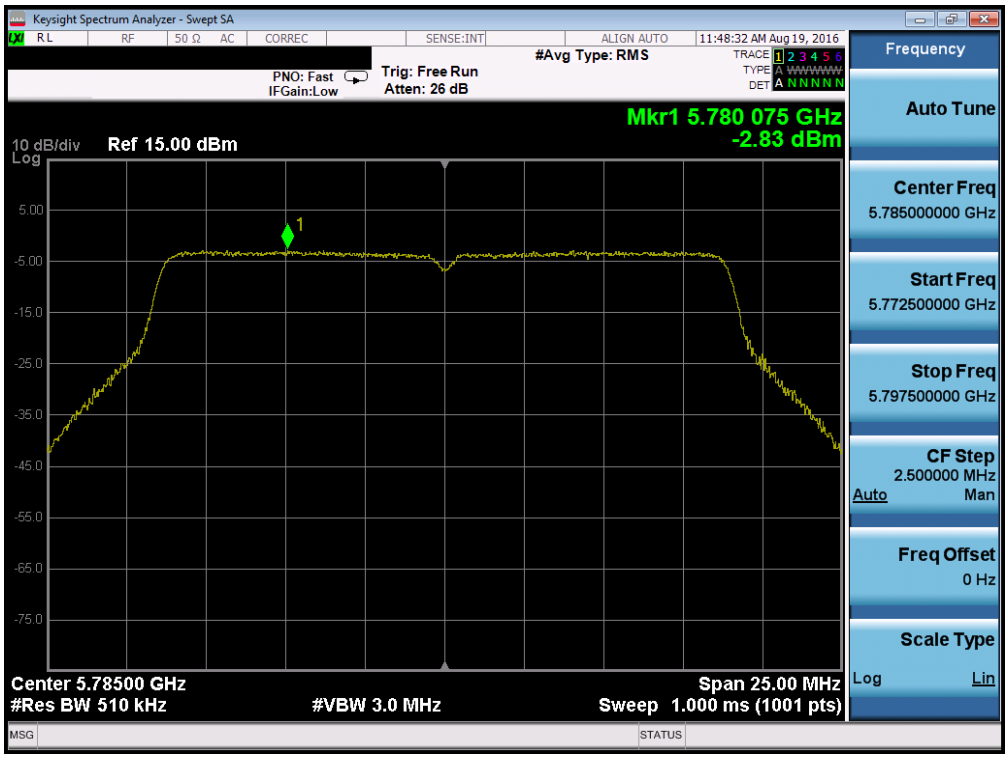



**Plot 7-73. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)**




**Plot 7-74. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)**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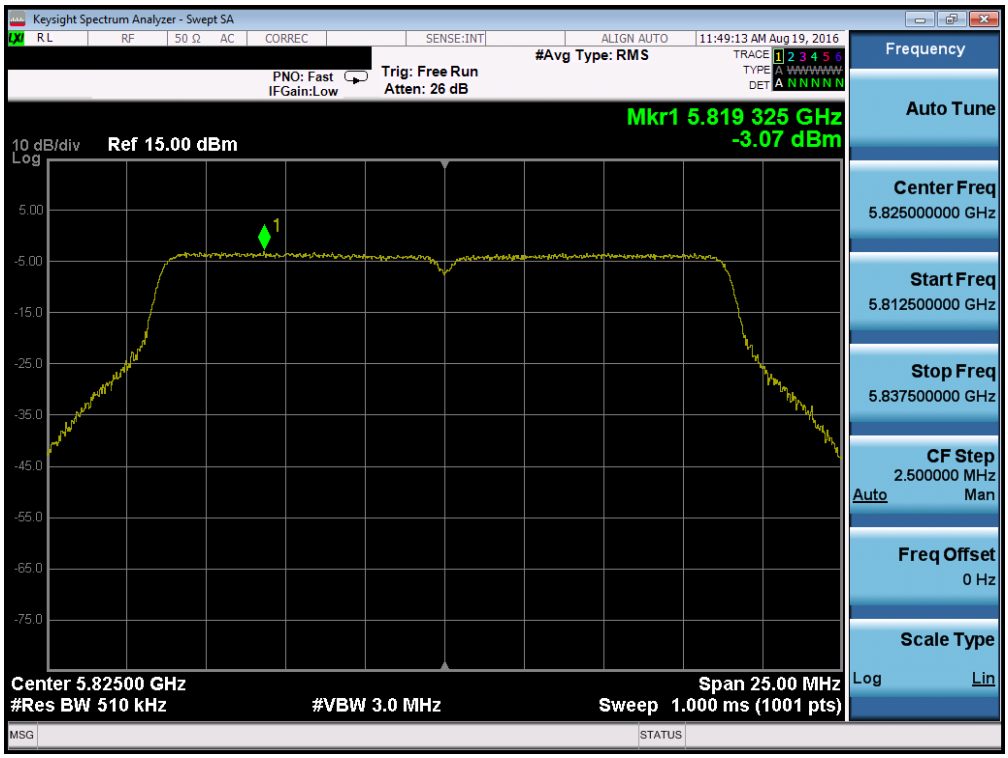
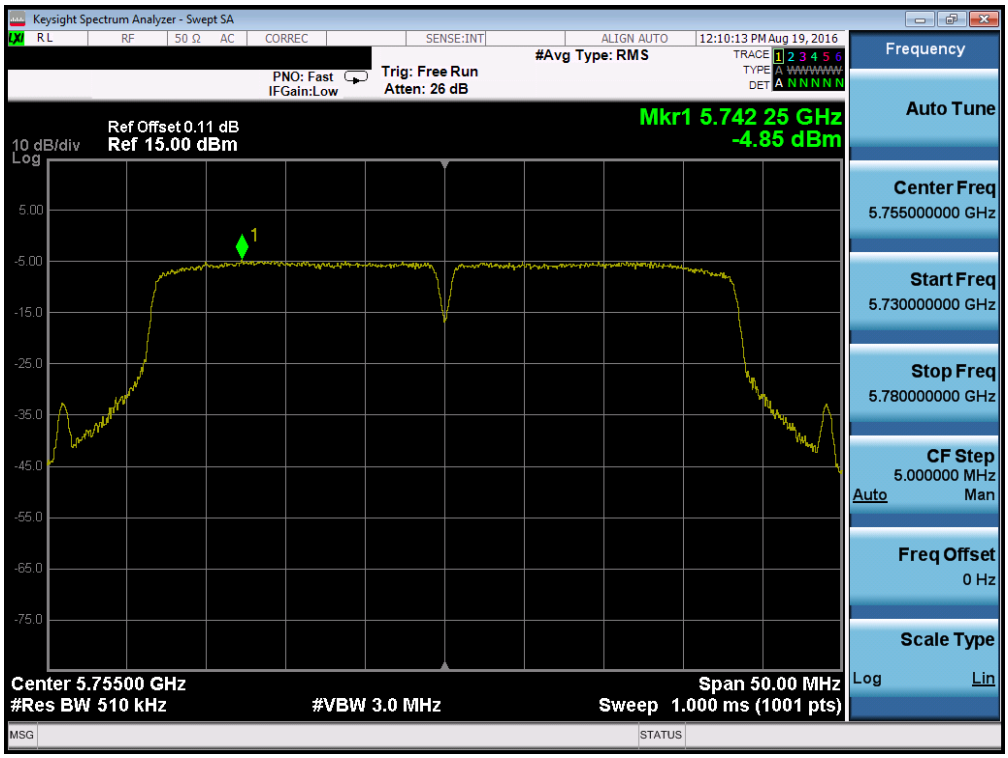



**Plot 7-75. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)**




**Plot 7-76. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)**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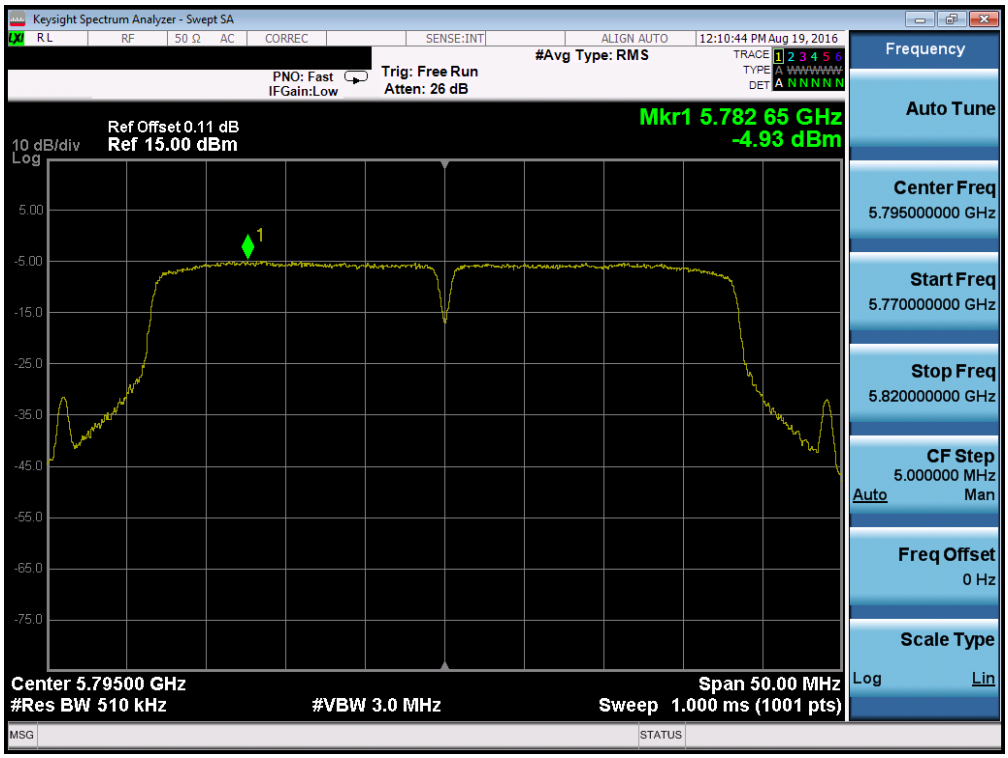


**Plot 7-77. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)**

**Plot 7-78. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)**


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## 7.6 Frequency Stability

**§15.407(g)**

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

OPERATING FREQUENCY: 5,180,000,000 Hz

CHANNEL: 36

REFERENCE VOLTAGE: 3.80 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.80 | + 20 (Ref) | 5,179,999,819 | -181 | -0.00000349 |
| 100 % | | - 30 | 5,180,000,094 | 94 | 0.00000181 |
| 100 % | | - 20 | 5,179,999,870 | -130 | -0.00000251 |
| 100 % | | - 10 | 5,180,000,136 | 136 | 0.00000263 |
| 100 % | | 0 | 5,180,000,103 | 103 | 0.00000199 |
| 100 % | | + 10 | 5,180,000,224 | 224 | 0.00000432 |
| 100 % | | + 20 | 5,180,000,300 | 300 | 0.00000579 |
| 100 % | | + 30 | 5,179,999,943 | -57 | -0.00000110 |
| 100 % | | + 40 | 5,180,000,027 | 27 | 0.00000052 |
| 100 % | | + 50 | 5,180,000,283 | 283 | 0.00000546 |
| BATT. ENDPOINT | 3.40 | + 20 | 5,180,000,148 | 148 | 0.00000286 |

**Table 7-9. Frequency Stability Measurements for UNII Band 1 (Ch. 36)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.


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## Frequency Stability
**§15.407(g)**

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

OPERATING FREQUENCY: 5,260,000,000 Hz

CHANNEL: 52

REFERENCE VOLTAGE: 3.80 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.80 | + 20 (Ref) | 5,259,999,998 | -2 | -0.00000004 |
| 100 % | | - 30 | 5,259,999,890 | -110 | -0.00000209 |
| 100 % | | - 20 | 5,260,000,056 | 56 | 0.00000106 |
| 100 % | | - 10 | 5,260,000,082 | 82 | 0.00000156 |
| 100 % | | 0 | 5,260,000,361 | 361 | 0.00000686 |
| 100 % | | + 10 | 5,259,999,762 | -238 | -0.00000452 |
| 100 % | | + 20 | 5,260,000,128 | 128 | 0.00000243 |
| 100 % | | + 30 | 5,260,000,032 | 32 | 0.00000061 |
| 100 % | | + 40 | 5,259,999,958 | -42 | -0.00000080 |
| 100 % | | + 50 | 5,259,999,703 | -297 | -0.00000565 |
| BATT. ENDPOINT | 3.40 | + 20 | 5,259,999,838 | -162 | -0.00000308 |

**Table 7-10. Frequency Stability Measurements for UNII Band 2A (Ch. 52)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.


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## Frequency Stability
**§15.407(g)**

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

OPERATING FREQUENCY: 5,500,000,000 Hz

CHANNEL: 100

REFERENCE VOLTAGE: 3.80 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.80 | + 20 (Ref) | 5,500,000,051 | 51 | 0.00000093 |
| 100 % | | - 30 | 5,500,000,126 | 126 | 0.00000229 |
| 100 % | | - 20 | 5,500,000,008 | 8 | 0.00000015 |
| 100 % | | - 10 | 5,500,000,035 | 35 | 0.00000064 |
| 100 % | | 0 | 5,499,999,987 | -13 | -0.00000024 |
| 100 % | | + 10 | 5,500,000,274 | 274 | 0.00000498 |
| 100 % | | + 20 | 5,499,999,953 | -47 | -0.00000085 |
| 100 % | | + 30 | 5,500,000,111 | 111 | 0.00000202 |
| 100 % | | + 40 | 5,500,000,023 | 23 | 0.00000042 |
| 100 % | | + 50 | 5,500,000,068 | 68 | 0.00000124 |
| BATT. ENDPOINT | 3.40 | + 20 | 5,499,999,888 | -112 | -0.00000204 |

**Table 7-11. Frequency Stability Measurements for UNII Band 2C (Ch. 100)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.


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## Frequency Stability
**§15.407(g)**

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

OPERATING FREQUENCY: 5,745,000,000 Hz

CHANNEL: 149

REFERENCE VOLTAGE: 3.80 VDC

| VOLTAGE (%) | POWER (VDC) | TEMP (°C) | FREQUENCY (Hz) | Freq. Dev. (Hz) | Deviation (%) |
|---|---|---|---|---|---|
| 100 % | 3.80 | + 20 (Ref) | 5,744,999,650 | -350 | -0.00000609 |
| 100 % | | - 30 | 5,744,999,955 | -45 | -0.00000078 |
| 100 % | | - 20 | 5,744,999,885 | -115 | -0.00000200 |
| 100 % | | - 10 | 5,745,000,176 | 176 | 0.00000306 |
| 100 % | | 0 | 5,744,999,630 | -370 | -0.00000644 |
| 100 % | | + 10 | 5,744,999,938 | -62 | -0.00000108 |
| 100 % | | + 20 | 5,745,000,108 | 108 | 0.00000188 |
| 100 % | | + 30 | 5,745,000,399 | 399 | 0.00000695 |
| 100 % | | + 40 | 5,745,000,219 | 219 | 0.00000381 |
| 100 % | | + 50 | 5,745,000,018 | 18 | 0.00000031 |
| BATT. ENDPOINT | 3.40 | + 20 | 5,745,000,367 | 367 | 0.00000639 |

**Table 7-12. Frequency Stability Measurements for UNII Band 3 (Ch. 149)**

**Note:**

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.


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## 7.7 Radiated Spurious Emission Measurements – Above 1GHz

**§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 v01r02, 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 7-13 per Section 15.209.***

| Frequency | Field Strength [μV/m] | Measured Distance [Meters] |
|---|---|---|
| Above 960.0 MHz | 500 | 3 |

**Table 7-13. Radiated Limits**

**Test Procedures Used**

KDB 789033 D02 v01r02 – 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 ≥ 2 x 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.

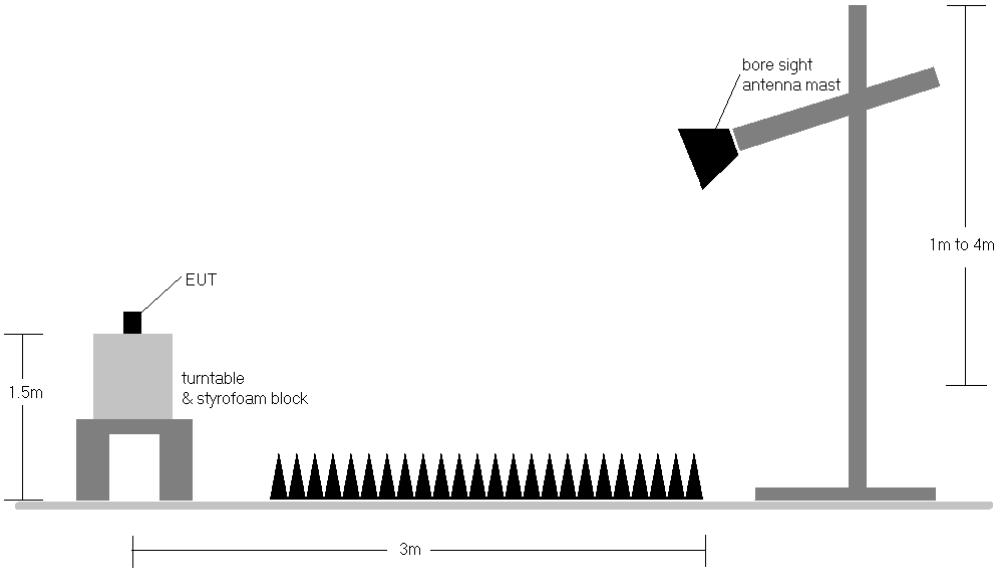


**Figure 7-5. Test Instrument & Measurement Setup**

**Test Notes**

1. All radiated spurious emissions levels were measured in a radiated test setup per the guidance of KDB 789033 D02 v01r02 Section G.
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 7-13.
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.


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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.
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. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section. Rohde & Schwarz EMC32, Version 9.15.00 automated test software was used to perform the Radiated Spurious Emissions Pre-Scan testing.
9. The "-" shown in the following RSE tables are used to denote a noise floor measurement.

## Sample Calculations

### Determining Spurious Emissions Levels

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

### Radiated Band Edge Measurement Offset

- The amplitude offset shown in the radiated restricted band edge plots in Section 7.7 was calculated using the formula:
  Offset (dB) = (Antenna Factor + Cable Loss + 10 dB Attenuator) – Preamplifier Gain


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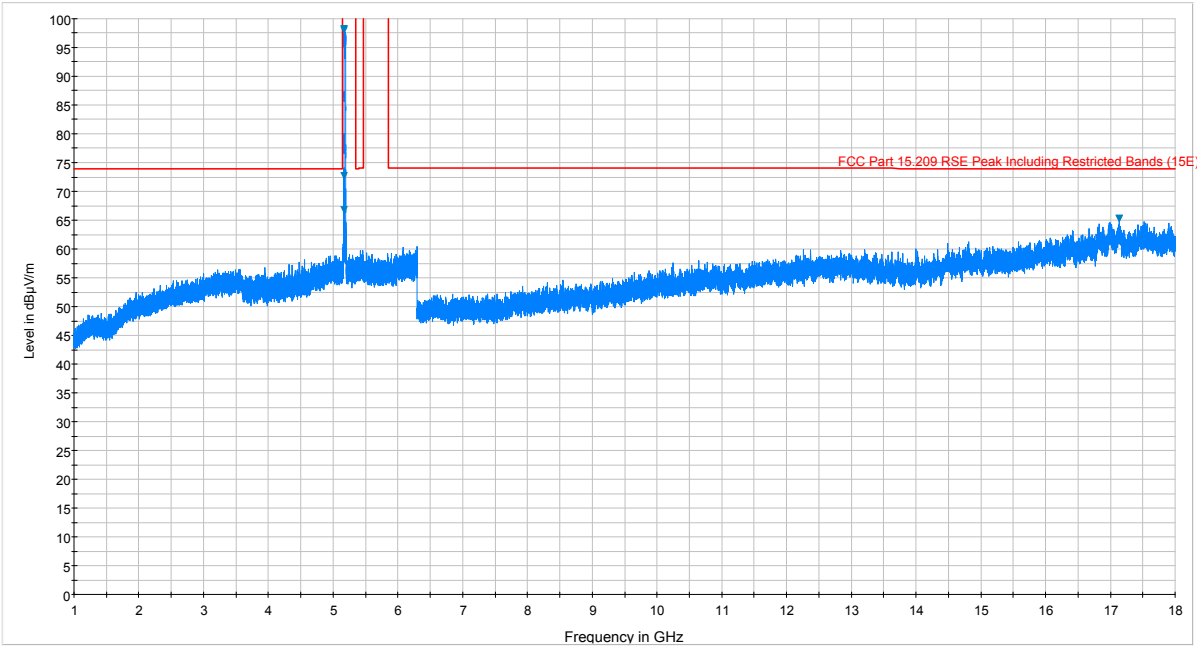
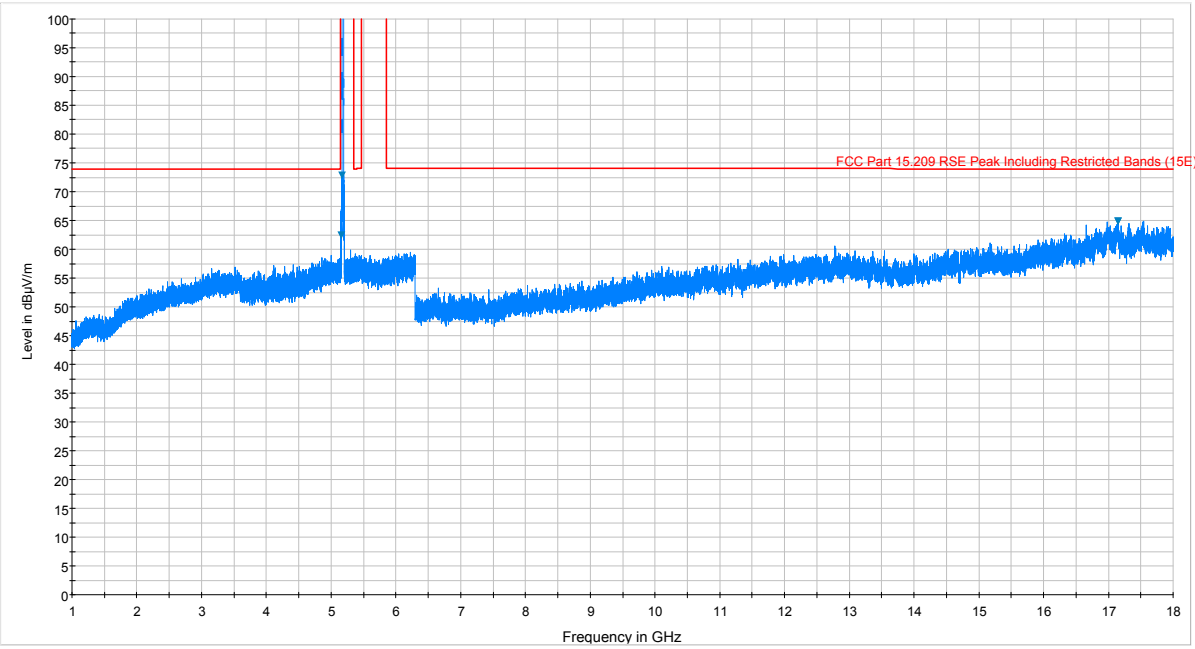
### 7.7.1 Radiated Spurious Emission Measurements




**Plot 7-79. Radiated Spurious Plot above 1GHz (802.11a – U1 Ch. 40, Ant. Pol. H)**




**Plot 7-80. Radiated Spurious Plot above 1GHz (802.11a – U1 Ch. 40, Ant. Pol. V)**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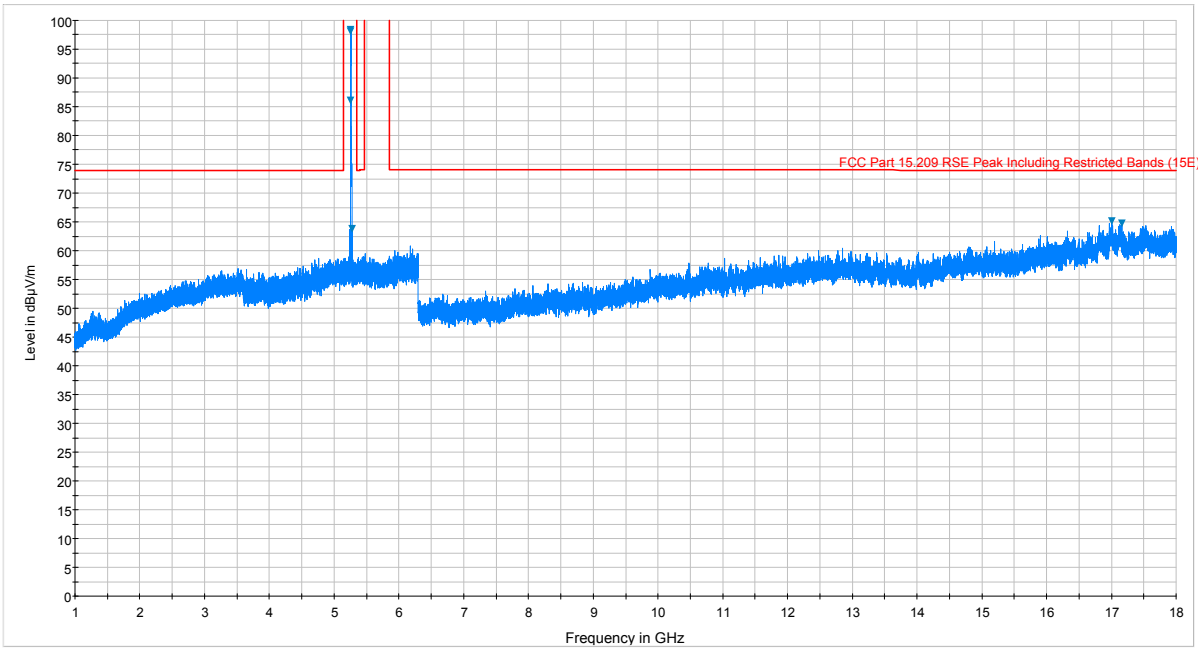
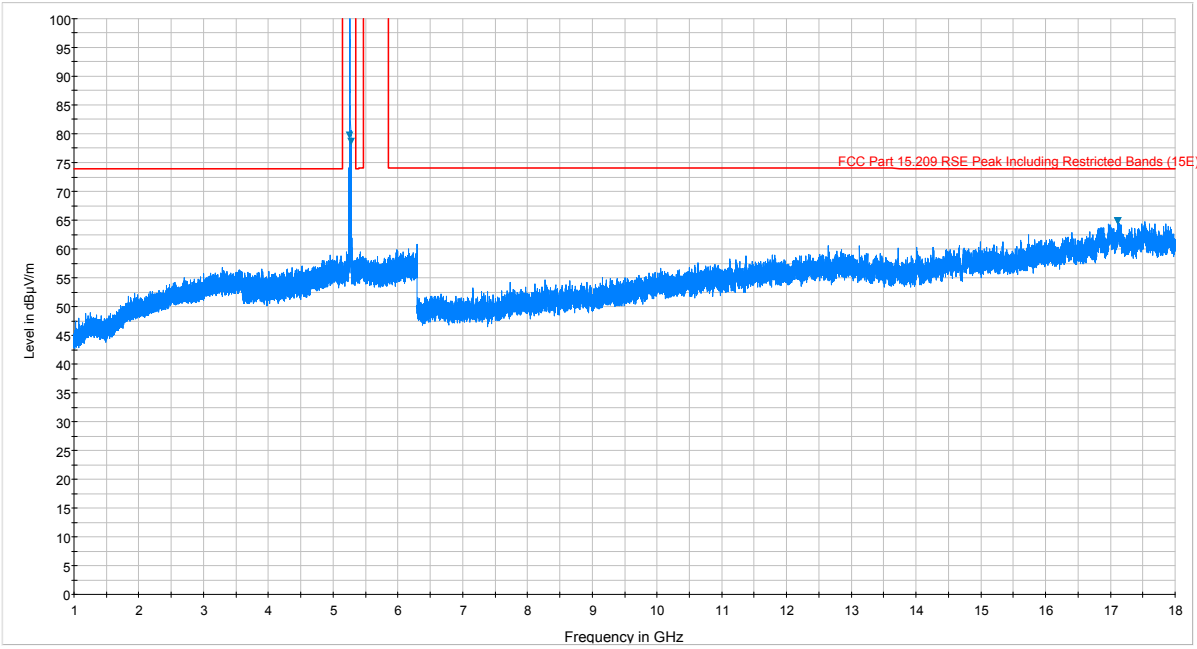



**Plot 7-81. Radiated Spurious Plot above 1GHz (802.11a – U2A Ch. 56, Ant. Pol. H)**




**Plot 7-82. Radiated Spurious Plot above 1GHz (802.11a – U2A Ch. 56, Ant. Pol. V)**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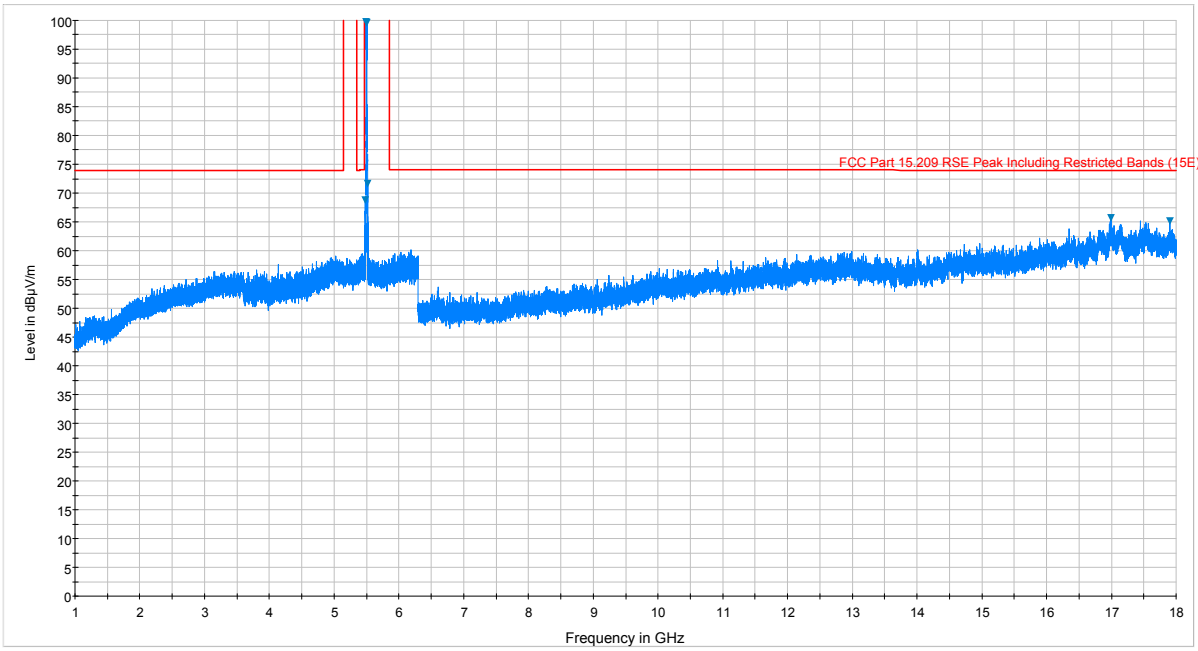
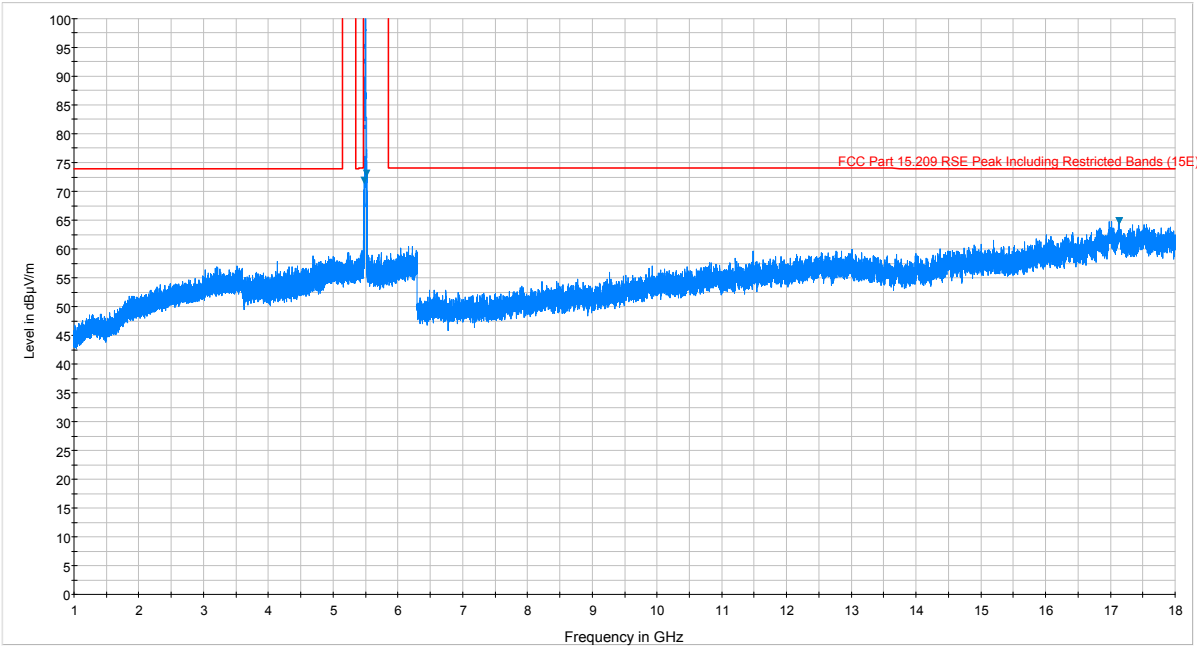



**Plot 7-83. Radiated Spurious Plot above 1GHz (802.11a – U2C Ch. 120, Ant. Pol. H)**




**Plot 7-84. Radiated Spurious Plot above 1GHz (802.11a – U2C Ch. 120, Ant. Pol. V)**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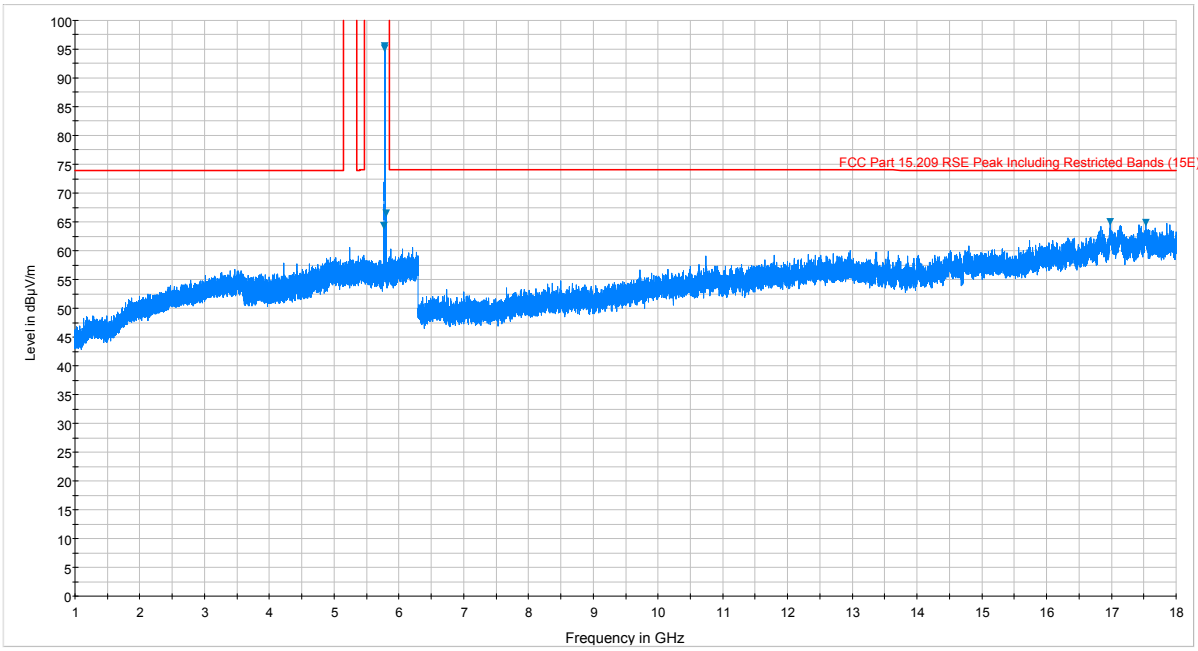
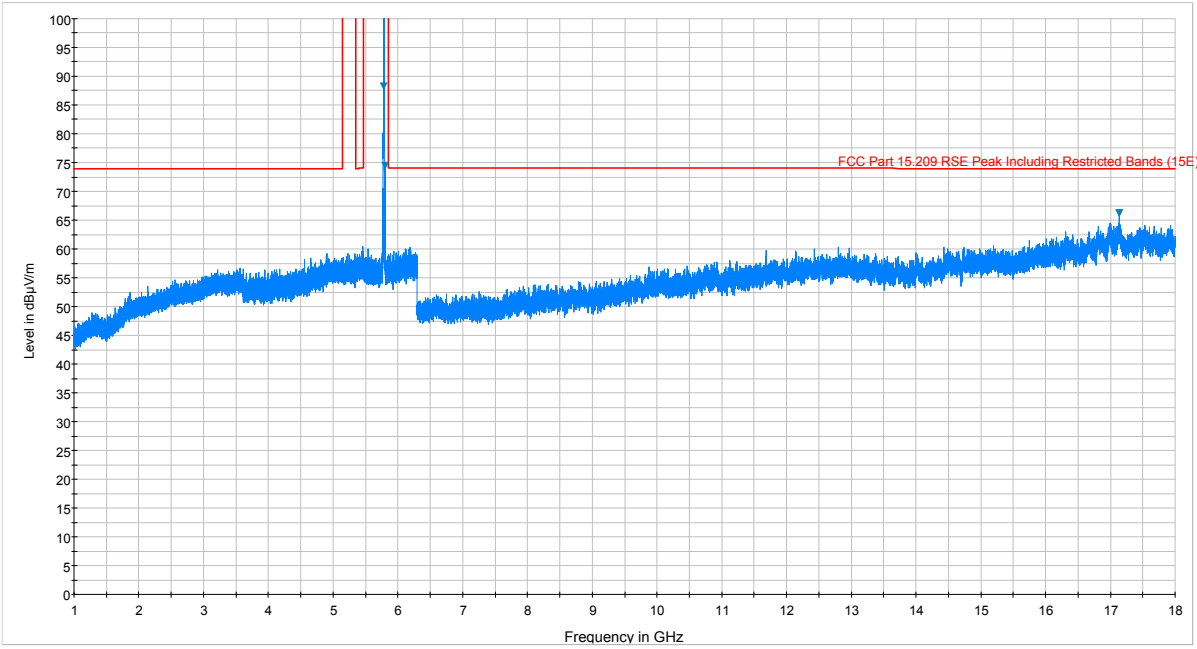



**Plot 7-85. Radiated Spurious Plot above 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-86. Radiated Spurious Plot above 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**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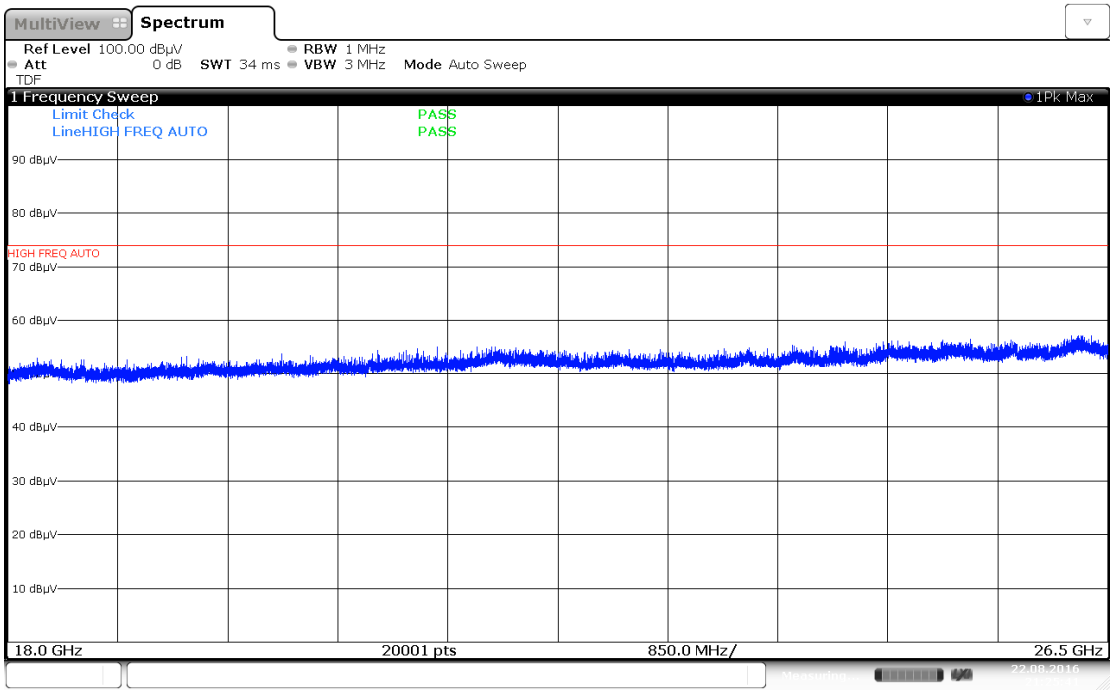
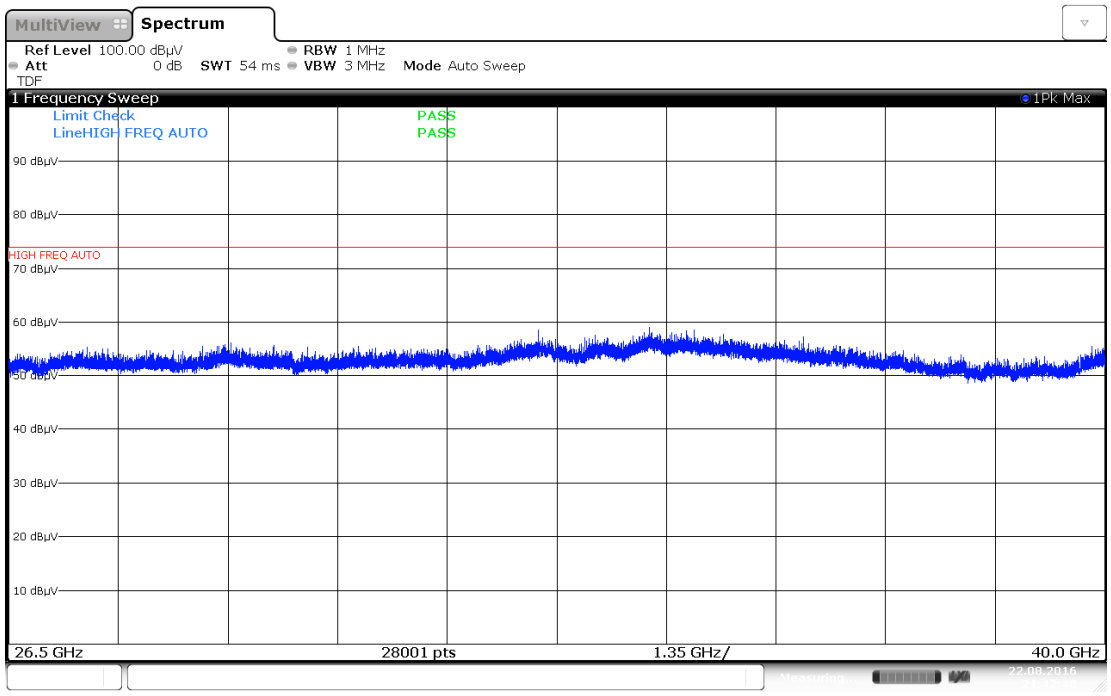
# Radiated Spurious Emissions Measurements (Above 18GHz)

**§15.209**




21:25:41 22.08.2016

**Plot 7-87. Radiated Spurious Plot above 18GHz (802.11a – Ant. Pol. H)**




21:42:49 22.08.2016

**Plot 7-88. Radiated Spurious Plot above 26GHz (802.11a – Ant. Pol. H)**



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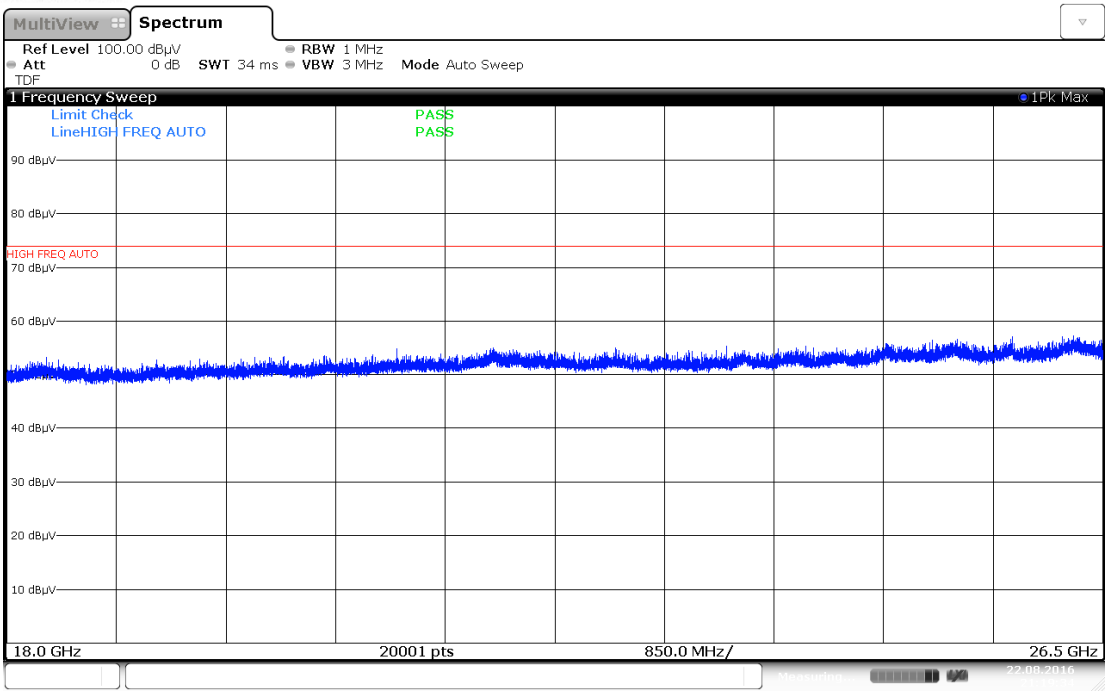
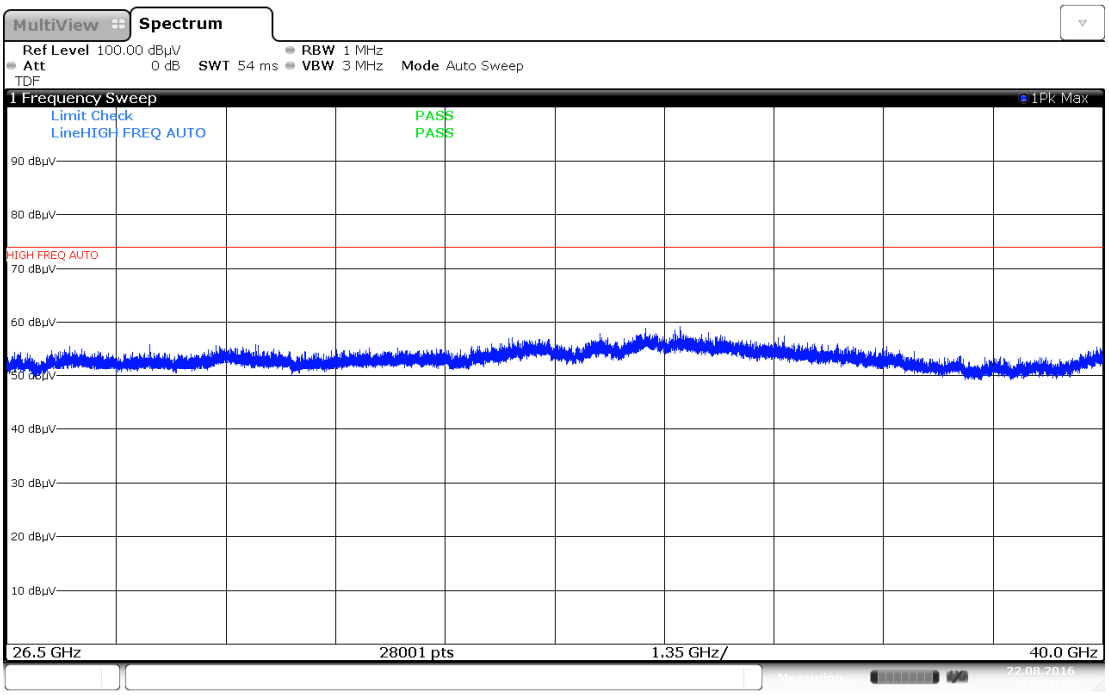



**21:19:34 22.08.2016**

**Plot 7-89. Radiated Spurious Plot above 18GHz (802.11a – Ant. Pol. V)**




**21:52:13 22.08.2016**

**Plot 7-90. Radiated Spurious Plot above 26GHz (802.11a – Ant. Pol. V)**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## 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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10360.00 | Peak | H | - | - | -63.26 | 20.04 | 0.00 | 63.78 | 68.20 | -4.42 |
| * | 15540.00 | Average | H | - | - | -81.56 | 24.53 | 0.00 | 49.97 | 53.98 | -4.01 |
| * | 15540.00 | Peak | H | - | - | -62.27 | 24.53 | 0.00 | 69.26 | 73.98 | -4.72 |
| * | 20720.00 | Average | H | - | - | -108.12 | 44.39 | -9.54 | 33.72 | 53.98 | -20.26 |
| * | 20720.00 | Peak | H | - | - | -96.67 | 44.39 | -9.54 | 45.17 | 73.98 | -28.81 |
| | 25900.00 | Peak | H | - | - | -93.89 | 45.11 | -9.54 | 48.68 | 68.20 | -19.52 |

**Table 7-14. 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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10400.00 | Peak | H | - | - | -62.74 | 19.77 | 0.00 | 64.03 | 68.20 | -4.17 |
| * | 15600.00 | Average | H | - | - | -81.54 | 23.99 | 0.00 | 49.45 | 53.98 | -4.53 |
| * | 15600.00 | Peak | H | - | - | -63.92 | 23.99 | 0.00 | 67.07 | 73.98 | -6.91 |
| * | 20800.00 | Average | H | - | - | -107.73 | 44.39 | -9.54 | 34.12 | 53.98 | -19.86 |
| * | 20800.00 | Peak | H | - | - | -96.31 | 44.39 | -9.54 | 45.54 | 73.98 | -28.44 |
| | 26000.00 | Peak | H | - | - | -94.10 | 45.12 | -9.54 | 48.47 | 68.20 | -19.73 |

**Table 7-15. Radiated Measurements**


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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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10480.00 | Peak | H | - | - | -62.85 | 21.01 | 0.00 | 65.16 | 68.20 | -3.04 |
| * | 15720.00 | Average | H | - | - | -81.76 | 24.78 | 0.00 | 50.02 | 53.98 | -3.96 |
| * | 15720.00 | Peak | H | - | - | -63.57 | 24.78 | 0.00 | 68.21 | 73.98 | -5.77 |
| * | 20960.00 | Average | H | - | - | -108.26 | 44.31 | -9.54 | 33.51 | 53.98 | -20.47 |
| * | 20960.00 | Peak | H | - | - | -95.82 | 44.31 | -9.54 | 45.95 | 73.98 | -28.03 |
| | 26200.00 | Peak | H | - | - | -94.28 | 45.01 | -9.54 | 48.19 | 68.20 | -20.01 |

**Table 7-16. 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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10520.00 | Peak | H | - | - | -62.38 | 20.31 | 0.00 | 64.93 | 68.20 | -3.27 |
| * | 15780.00 | Average | H | - | - | -81.43 | 24.83 | 0.00 | 50.40 | 53.98 | -3.58 |
| * | 15780.00 | Peak | H | - | - | -63.29 | 24.83 | 0.00 | 68.54 | 73.98 | -5.44 |
| * | 21040.00 | Average | H | - | - | -107.63 | 44.29 | -9.54 | 34.12 | 53.98 | -19.86 |
| * | 21040.00 | Peak | H | - | - | -96.61 | 44.29 | -9.54 | 45.14 | 73.98 | -28.84 |
| | 26300.00 | Peak | H | - | - | -92.24 | 45.00 | -9.54 | 50.21 | 68.20 | -17.99 |

**Table 7-17. Radiated Measurements**


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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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 10560.00 | Peak | H | - | - | -65.60 | 20.15 | 0.00 | 61.55 | 68.20 | -6.65 |
| * | 15840.00 | Average | H | - | - | -81.21 | 25.00 | 0.00 | 50.79 | 53.98 | -3.19 |
| * | 15840.00 | Peak | H | - | - | -62.86 | 25.00 | 0.00 | 69.14 | 73.98 | -4.84 |
| * | 21120.00 | Average | H | - | - | -107.18 | 44.28 | -9.54 | 34.55 | 53.98 | -19.43 |
| * | 21120.00 | Peak | H | - | - | -96.09 | 44.28 | -9.54 | 45.64 | 73.98 | -28.34 |
| | 26400.00 | Peak | H | - | - | -92.35 | 45.02 | -9.54 | 50.13 | 68.20 | -18.07 |

**Table 7-18. 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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 10640.00 | Average | H | - | - | -77.29 | 20.67 | 0.00 | 50.38 | 53.98 | -3.60 |
| * | 10640.00 | Peak | H | - | - | -65.25 | 20.67 | 0.00 | 62.42 | 73.98 | -11.56 |
| * | 15960.00 | Average | H | - | - | -80.93 | 24.80 | 0.00 | 50.87 | 53.98 | -3.11 |
| * | 15960.00 | Peak | H | - | - | -62.44 | 24.80 | 0.00 | 69.36 | 73.98 | -4.62 |
| * | 21280.00 | Average | H | - | - | -106.91 | 44.26 | -9.54 | 34.81 | 53.98 | -19.16 |
| * | 21280.00 | Peak | H | - | - | -96.59 | 44.26 | -9.54 | 45.13 | 73.98 | -28.84 |
| | 26600.00 | Peak | H | - | - | -114.25 | 47.61 | -9.54 | 30.81 | 68.20 | -37.39 |

**Table 7-19. Radiated Measurements**


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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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11000.00 | Average | H | - | - | -76.34 | 20.30 | 0.00 | 50.96 | 53.98 | -3.01 |
| * | 11000.00 | Peak | H | - | - | -63.21 | 20.30 | 0.00 | 64.09 | 73.98 | -9.88 |
| | 16500.00 | Peak | H | - | - | -72.90 | 26.48 | 0.00 | 60.58 | 68.20 | -7.62 |
| | 22000.00 | Peak | H | - | - | -93.65 | 44.50 | -9.54 | 48.31 | 68.20 | -19.89 |
| | 27500.00 | Peak | H | - | - | -103.35 | 47.97 | -9.54 | 42.08 | 68.20 | -26.12 |

**Table 7-20. Radiated Measurements**

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6 Mbps
Distance of Measurements: 1 & 3 Meters
Operating Frequency: 5600MHz
Channel: 120

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11200.00 | Average | H | - | - | -77.22 | 20.41 | 0.00 | 50.19 | 53.98 | -3.79 |
| * | 11200.00 | Peak | H | - | - | -62.74 | 20.41 | 0.00 | 64.67 | 73.98 | -9.31 |
| | 16800.00 | Peak | H | - | - | -72.14 | 26.49 | 0.00 | 61.35 | 68.20 | -6.85 |
| * | 22400.00 | Average | H | - | - | -106.63 | 44.56 | -9.54 | 35.39 | 53.98 | -18.59 |
| * | 22400.00 | Peak | H | - | - | -96.78 | 44.56 | -9.54 | 45.24 | 73.98 | -28.74 |
| | 28000.00 | Peak | H | - | - | -103.28 | 48.08 | -9.54 | 42.26 | 68.20 | -25.94 |

**Table 7-21. Radiated Measurements**


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

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11440.00 | Average | H | - | - | -78.52 | 21.62 | 0.00 | 50.10 | 53.98 | -3.88 |
| * | 11440.00 | Peak | H | - | - | -62.95 | 21.62 | 0.00 | 65.67 | 73.98 | -8.31 |
| | 17160.00 | Peak | H | - | - | -71.54 | 26.92 | 0.00 | 62.38 | 68.20 | -5.82 |
| * | 22880.00 | Average | H | - | - | -108.44 | 44.56 | -9.54 | 33.58 | 53.98 | -20.40 |
| * | 22880.00 | Peak | H | - | - | -96.92 | 44.56 | -9.54 | 45.10 | 73.98 | -28.88 |
| | 28600.00 | Peak | H | - | - | -102.74 | 48.32 | -9.54 | 43.04 | 68.20 | -25.16 |

**Table 7-22. 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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11490.00 | Average | H | - | - | -78.30 | 21.30 | 0.00 | 50.00 | 53.98 | -3.98 |
| * | 11490.00 | Peak | H | - | - | -62.29 | 21.30 | 0.00 | 66.01 | 73.98 | -7.97 |
| | 17235.00 | Peak | H | - | - | -73.34 | 26.60 | 0.00 | 60.26 | 68.20 | -7.94 |
| * | 22980.00 | Average | H | - | - | -107.80 | 44.68 | -9.54 | 34.34 | 53.98 | -19.64 |
| * | 22980.00 | Peak | H | - | - | -96.76 | 44.68 | -9.54 | 45.38 | 73.98 | -28.60 |
| | 28725.00 | Peak | H | - | - | -102.85 | 48.26 | -9.54 | 42.87 | 68.20 | -25.33 |

**Table 7-23. Radiated Measurements**


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

| | Frequency [MHz] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11570.00 | Average | H | - | - | -77.93 | 21.72 | 0.00 | 50.79 | 53.98 | -3.19 |
| * | 11570.00 | Peak | H | - | - | -62.38 | 21.72 | 0.00 | 66.34 | 73.98 | -7.64 |
| | 17355.00 | Peak | H | - | - | -72.64 | 26.68 | 0.00 | 61.04 | 68.20 | -7.16 |
| | 23140.00 | Peak | H | - | - | -95.76 | 44.75 | -9.54 | 46.45 | 68.20 | -21.75 |
| | 28925.00 | Peak | H | - | - | -102.16 | 48.29 | -9.54 | 43.59 | 68.20 | -24.61 |

**Table 7-24. 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] | Detector | Ant. Pol. [H/V] | Antenna Height [cm] | Turntable Azimuth [degree] | Analyzer Level [dBm] | AFCL [dB/m] | Distance Correction Factor [dB] | Field Strength [dBµV/m] | Limit [dBµV/m] | Margin [dB] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| * | 11650.00 | Average | H | - | - | -78.37 | 22.20 | 0.00 | 50.83 | 53.98 | -3.15 |
| * | 11650.00 | Peak | H | - | - | -62.54 | 22.20 | 0.00 | 66.66 | 73.98 | -7.32 |
| | 17475.00 | Peak | H | - | - | -72.90 | 27.55 | 0.00 | 61.65 | 68.20 | -6.55 |
| | 23300.00 | Peak | H | - | - | -96.53 | 44.75 | -9.54 | 45.68 | 68.20 | -22.52 |
| | 29125.00 | Peak | H | - | - | -102.36 | 48.28 | -9.54 | 43.38 | 68.20 | -24.82 |

**Table 7-25. Radiated Measurements**


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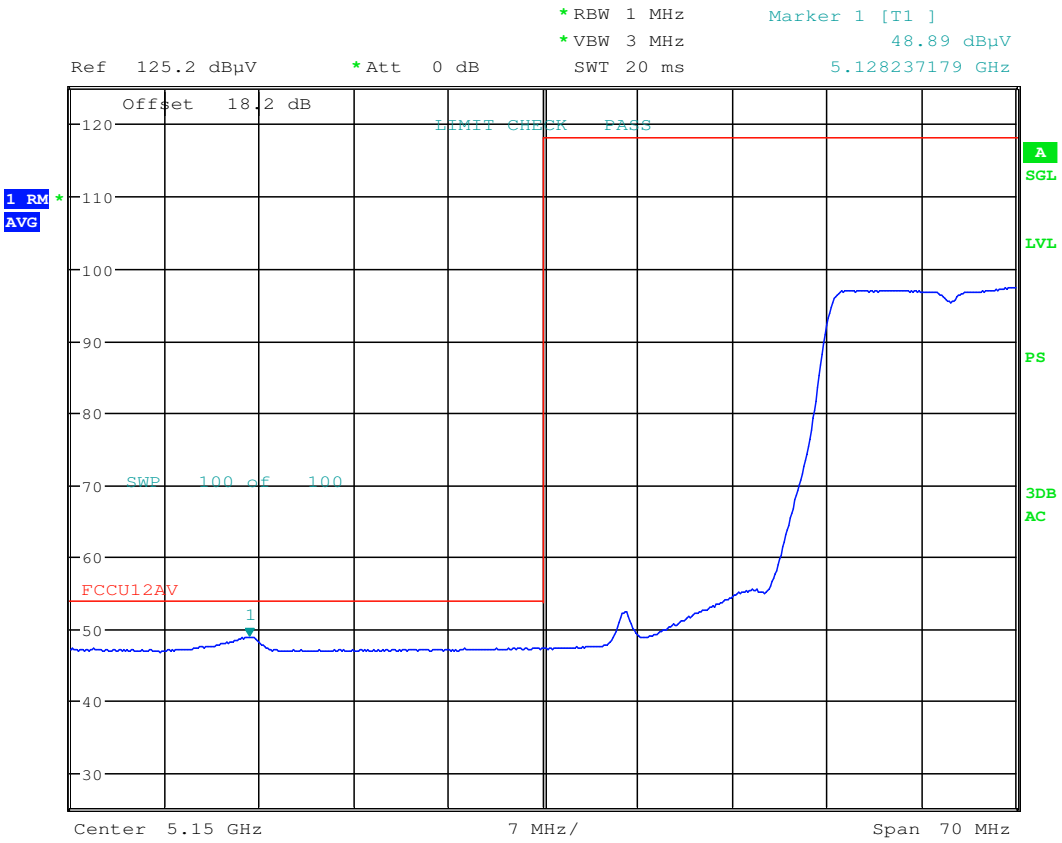
## 7.7.2 Radiated Band Edge Measurements (20MHz BW)

**§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: 12.AUG.2016 14:03:37

**Plot 7-91. Radiated Restricted Lower Band Edge Plot (Average – UNII Band 1)**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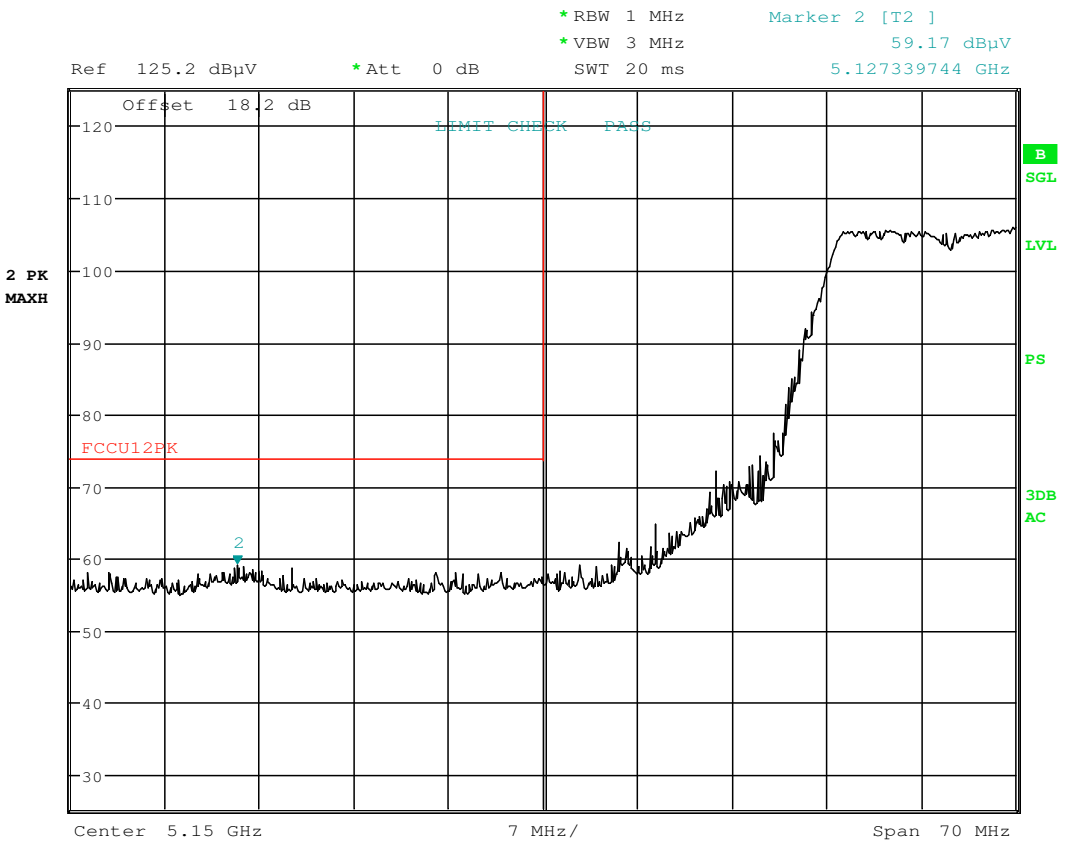
# Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 14:04:36

**Plot 7-92. Radiated Restricted Lower Band Edge Plot (Peak – UNII Band 1)**



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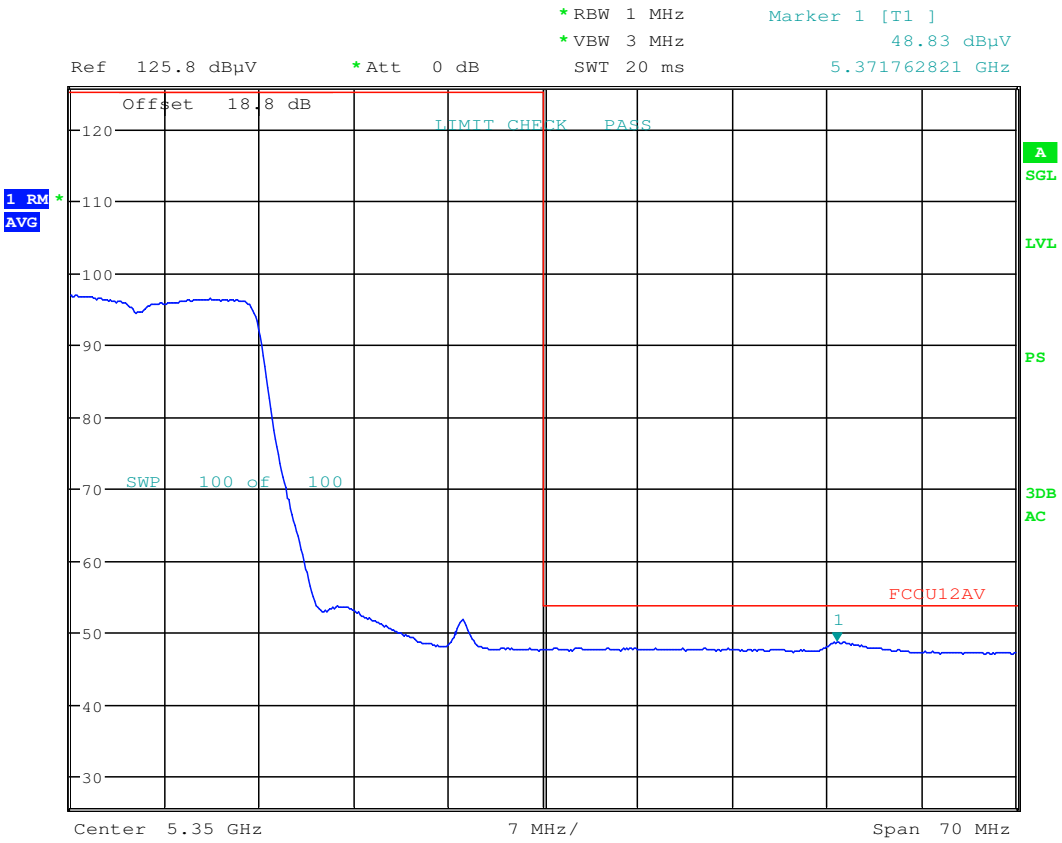
# Radiated Band Edge Measurements (20MHz BW)

**§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: 12.AUG.2016 14:12:21

**Plot 7-93. Radiated Restricted Upper Band Edge Plot (Average – UNII Band 2A)**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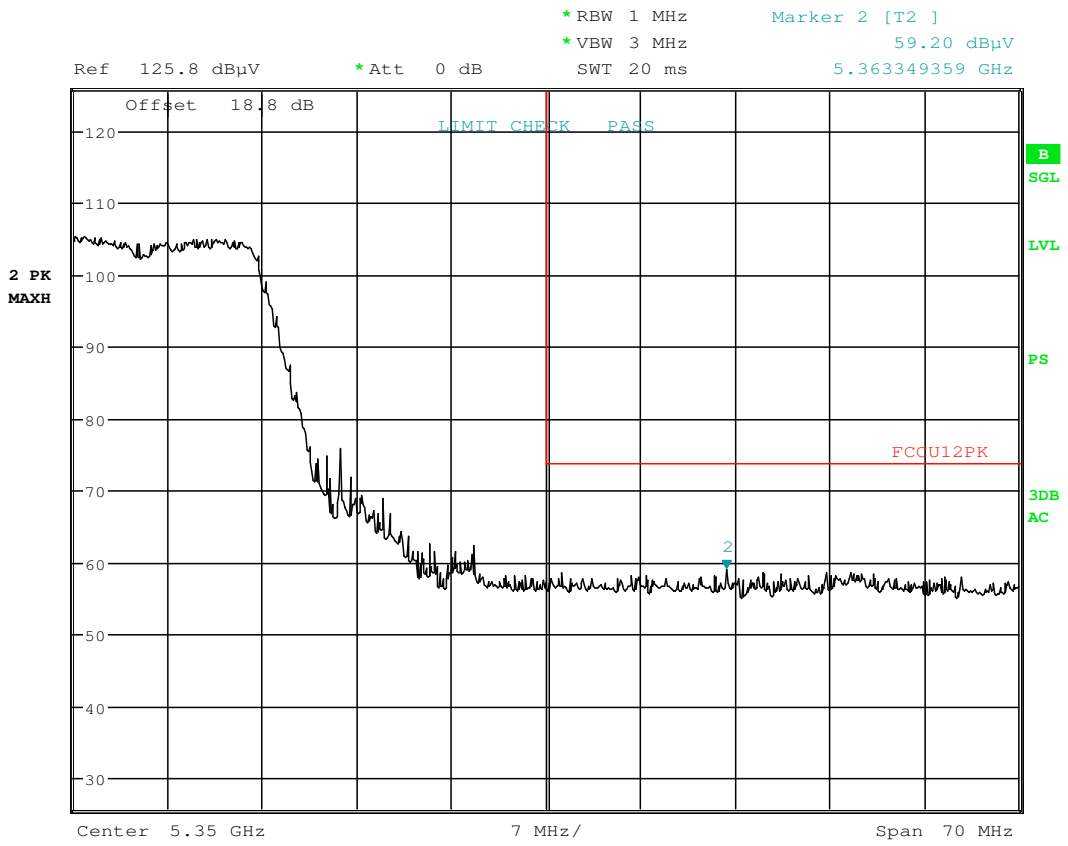
# Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 14:13:33

**Plot 7-94. Radiated Restricted Upper Band Edge Plot (Peak – UNII Band 2A)**



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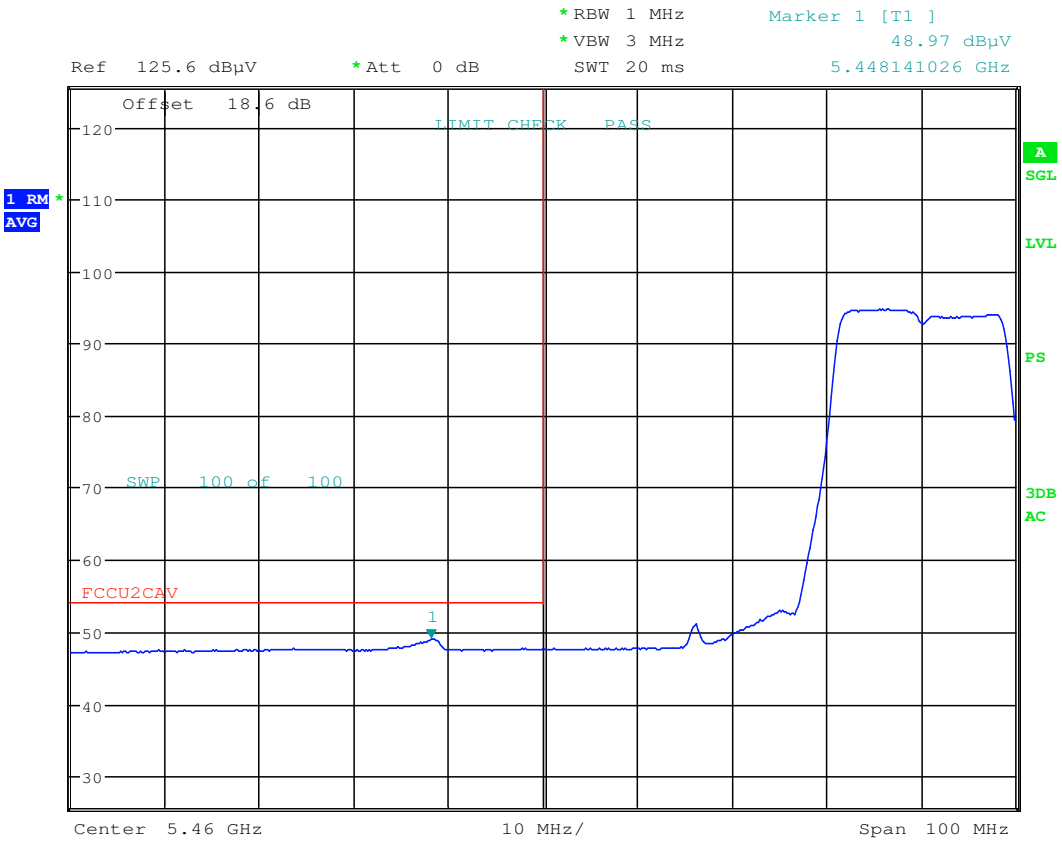
# Radiated Band Edge Measurements (20MHz BW)

**§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: 12.AUG.2016 14:40:50

**Plot 7-95. Radiated Restricted Lower Band Edge Plot (Average – UNII Band 2C)**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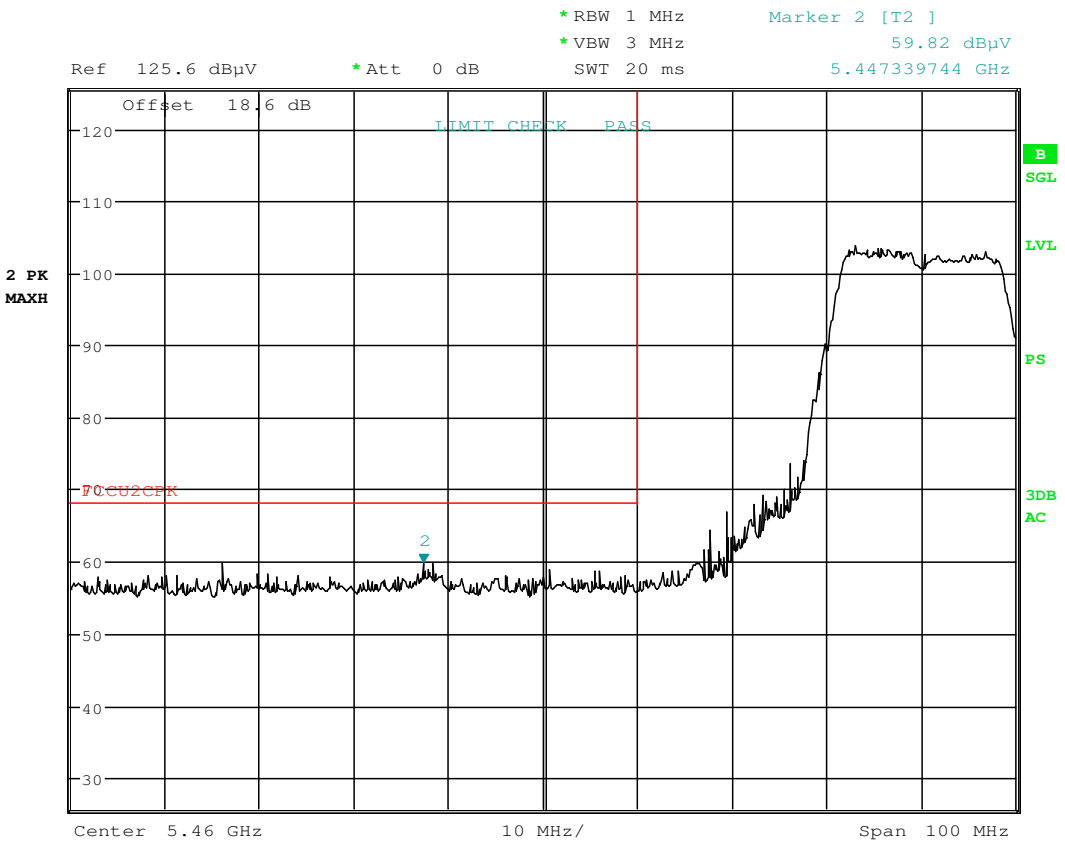
# Radiated Band Edge Measurements (20MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 14:41:46

**Plot 7-96. Radiated Restricted Lower Band Edge Plot (Peak – UNII Band 2C)**



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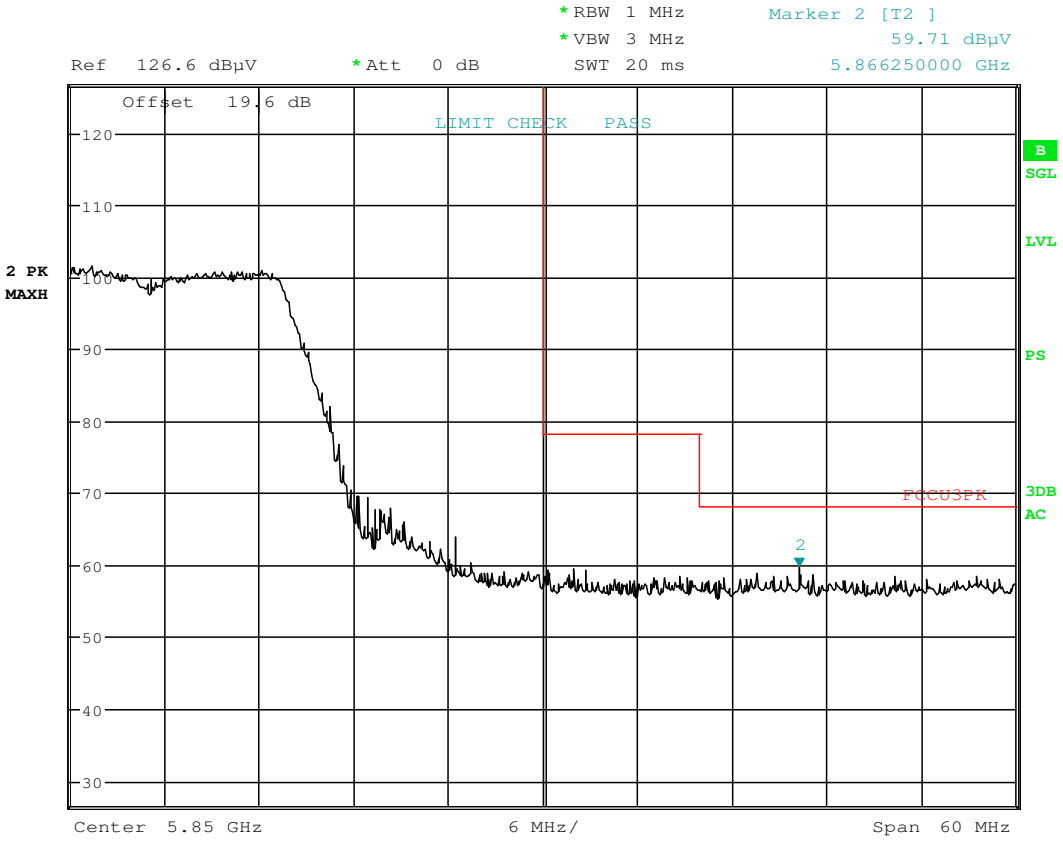
# Radiated Band Edge Measurements (20MHz BW)

**§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: 12.AUG.2016 14:50:43

**Plot 7-97. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**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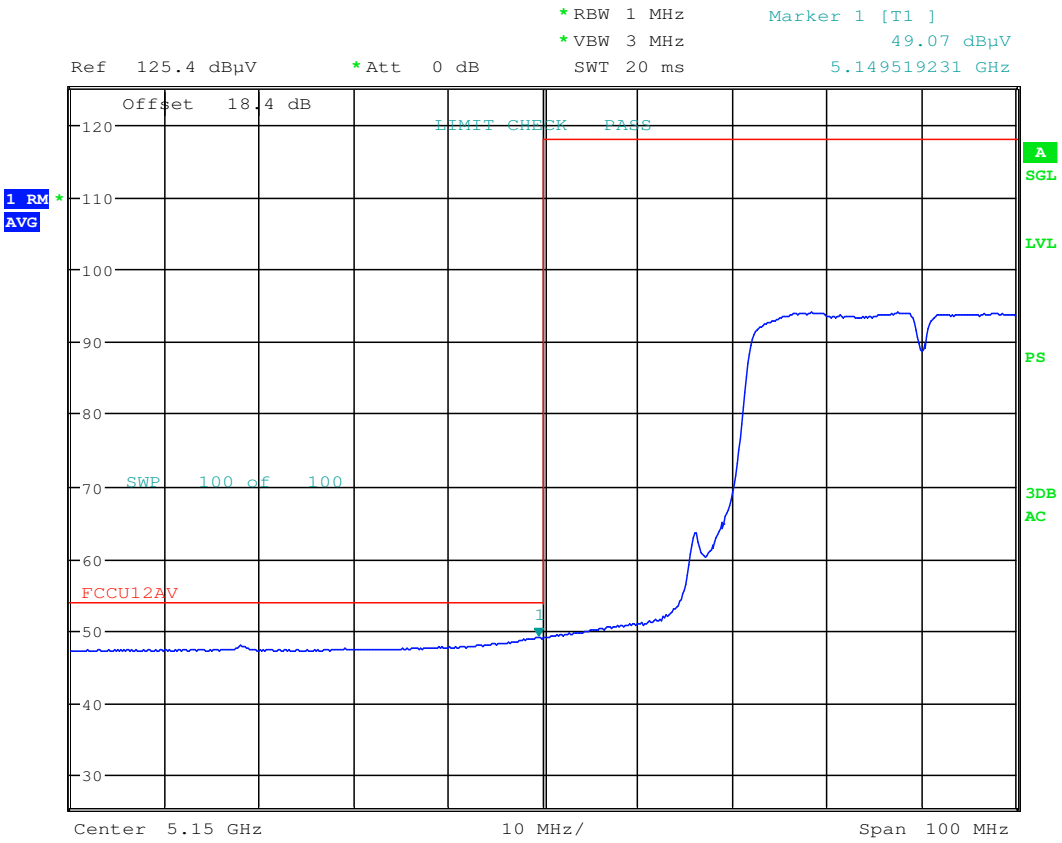
## 7.7.3 Radiated Band Edge Measurements (40MHz BW)

**§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: 12.AUG.2016 15:00:22

**Plot 7-98. Radiated Restricted Lower Band Edge Plot (Average – UNII Band 1)**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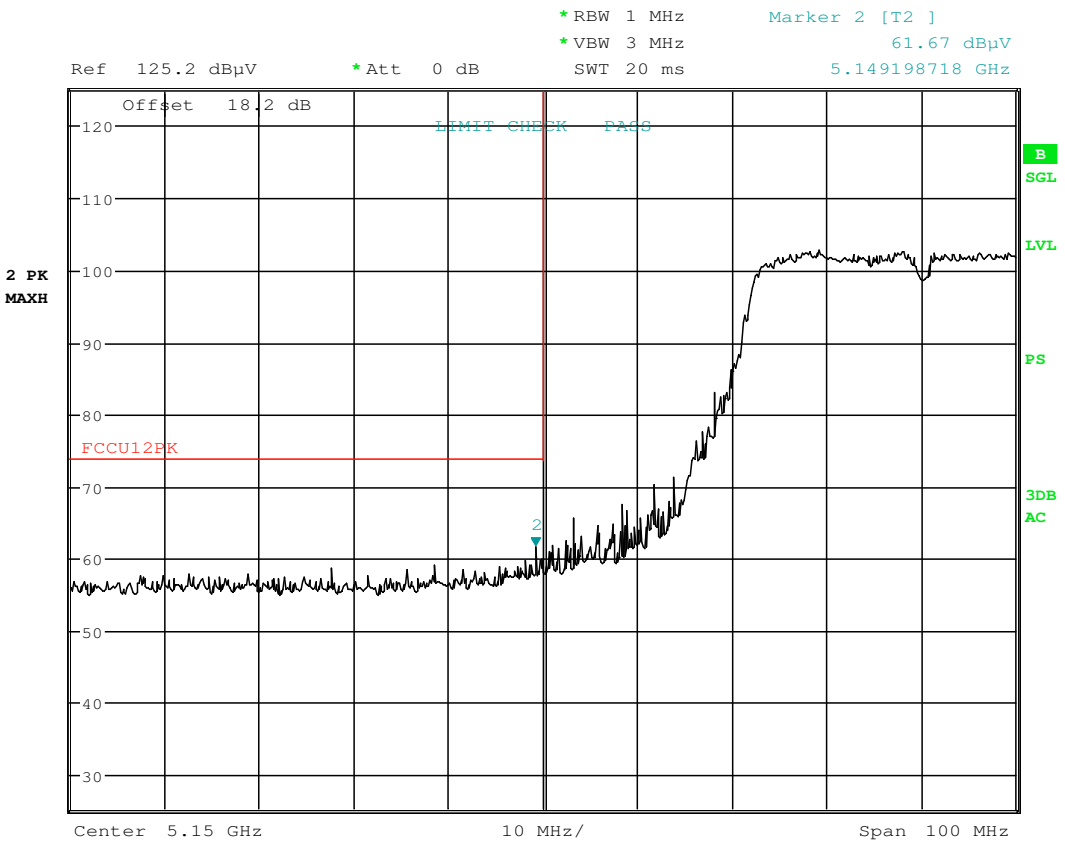
# Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 15:01:14

**Plot 7-99. Radiated Restricted Lower Band Edge Plot (Peak – UNII Band 1)**



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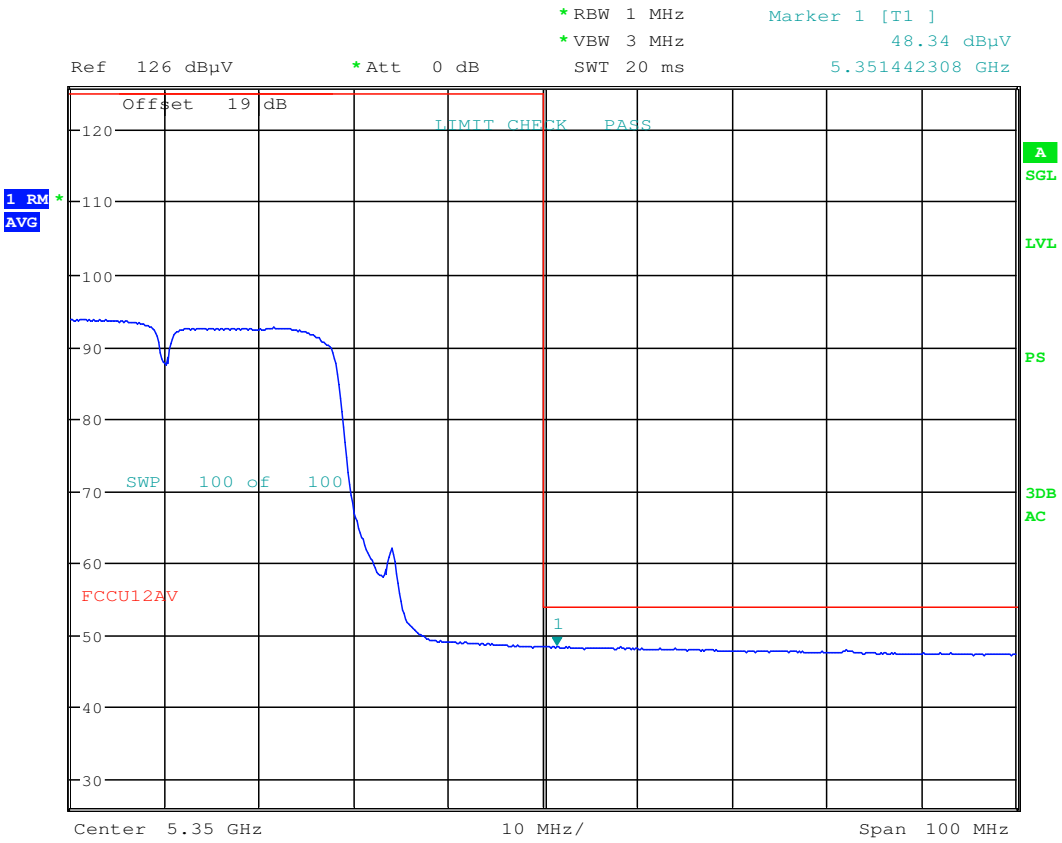
## Radiated Band Edge Measurements (40MHz BW)

**§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: 12.AUG.2016 15:22:54

**Plot 7-100. Radiated Restricted Upper Band Edge Plot (Average – UNII Band 2A)**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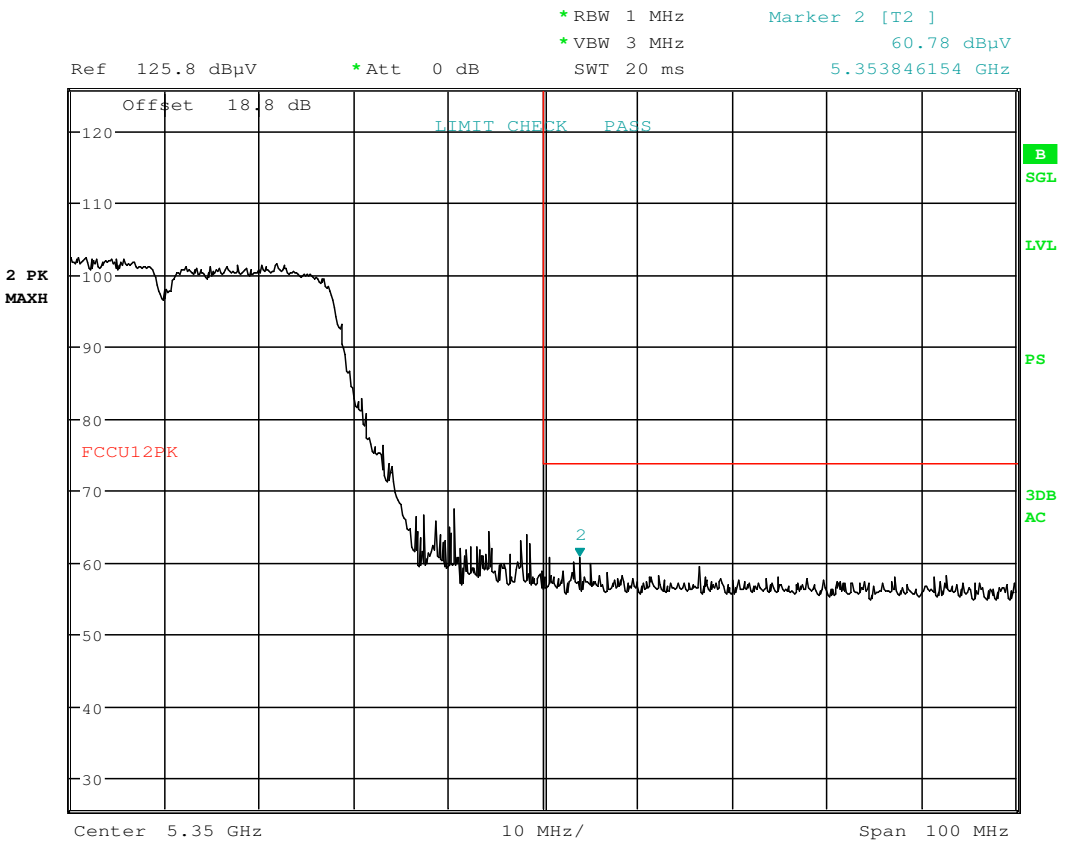
# Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 15:23:48

**Plot 7-101. Radiated Restricted Upper Band Edge Plot (Peak – UNII Band 2A)**



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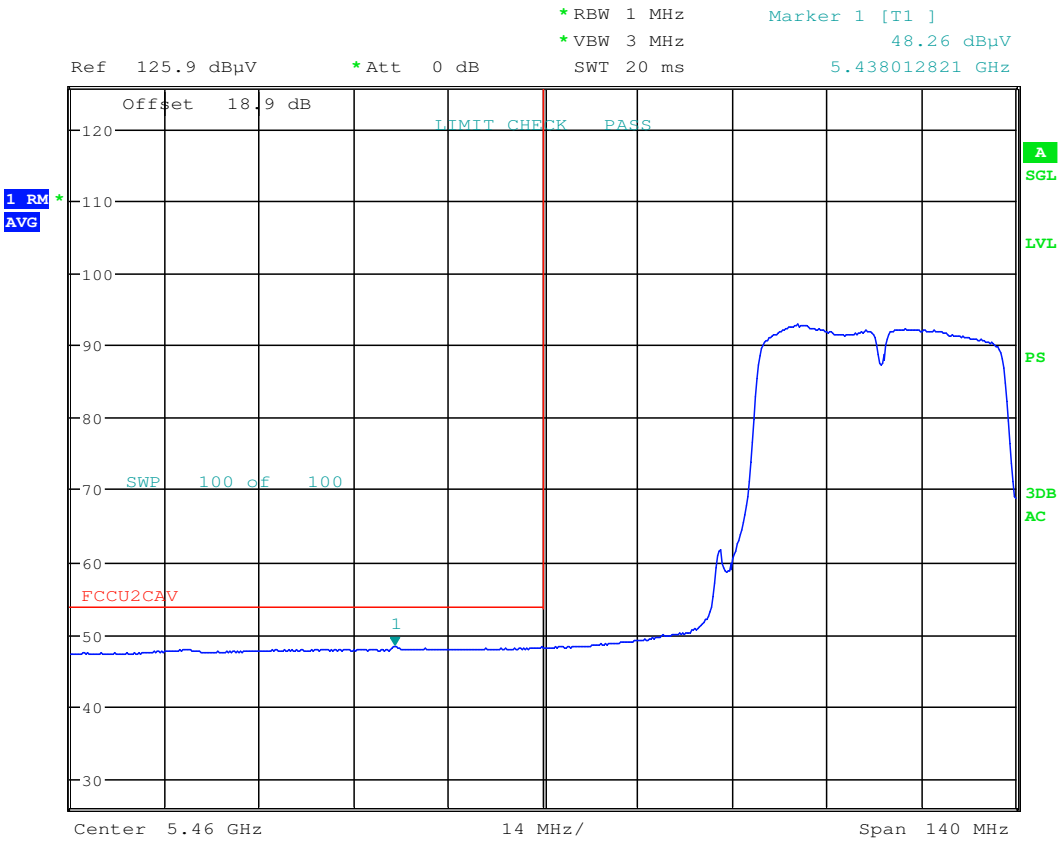
## Radiated Band Edge Measurements (40MHz BW)

**§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: 12.AUG.2016 15:29:30

**Plot 7-102. Radiated Restricted Lower Band Edge Plot (Average – UNII Band 2C)**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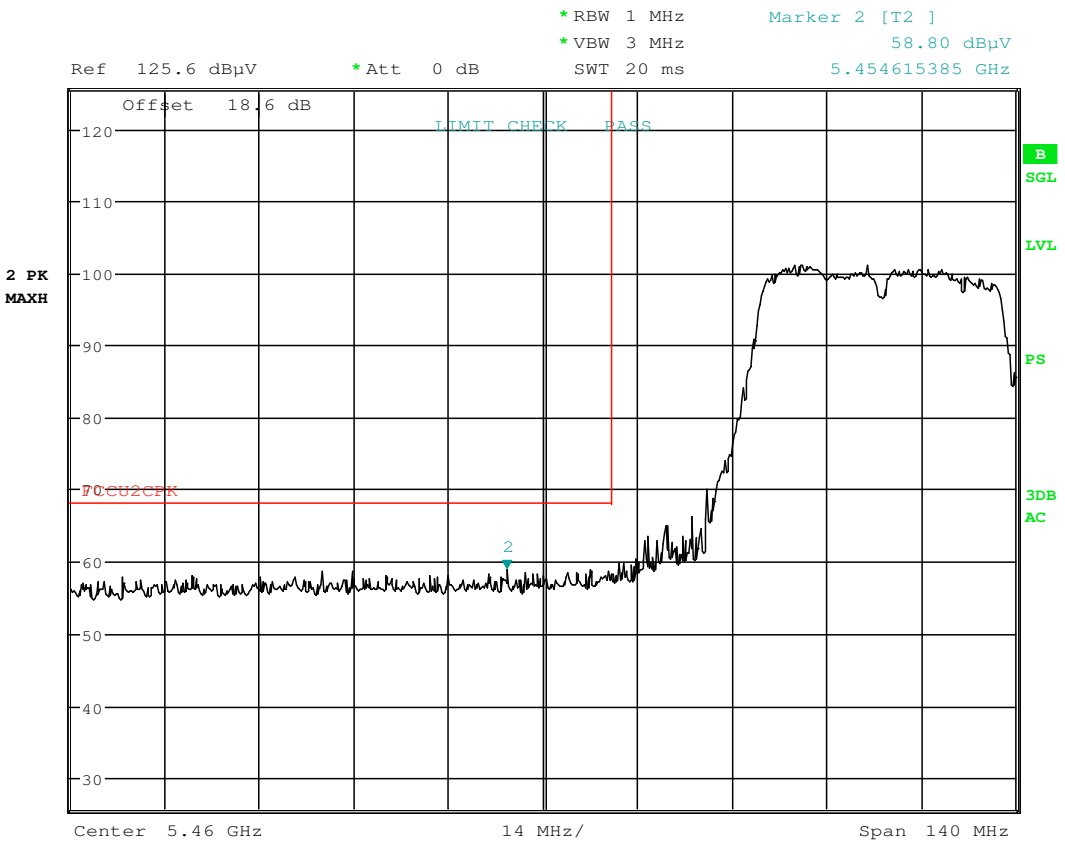
# Radiated Band Edge Measurements (40MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 15:29:59

**Plot 7-103. Radiated Restricted Lower Band Edge Plot (Peak – UNII Band 2C)**



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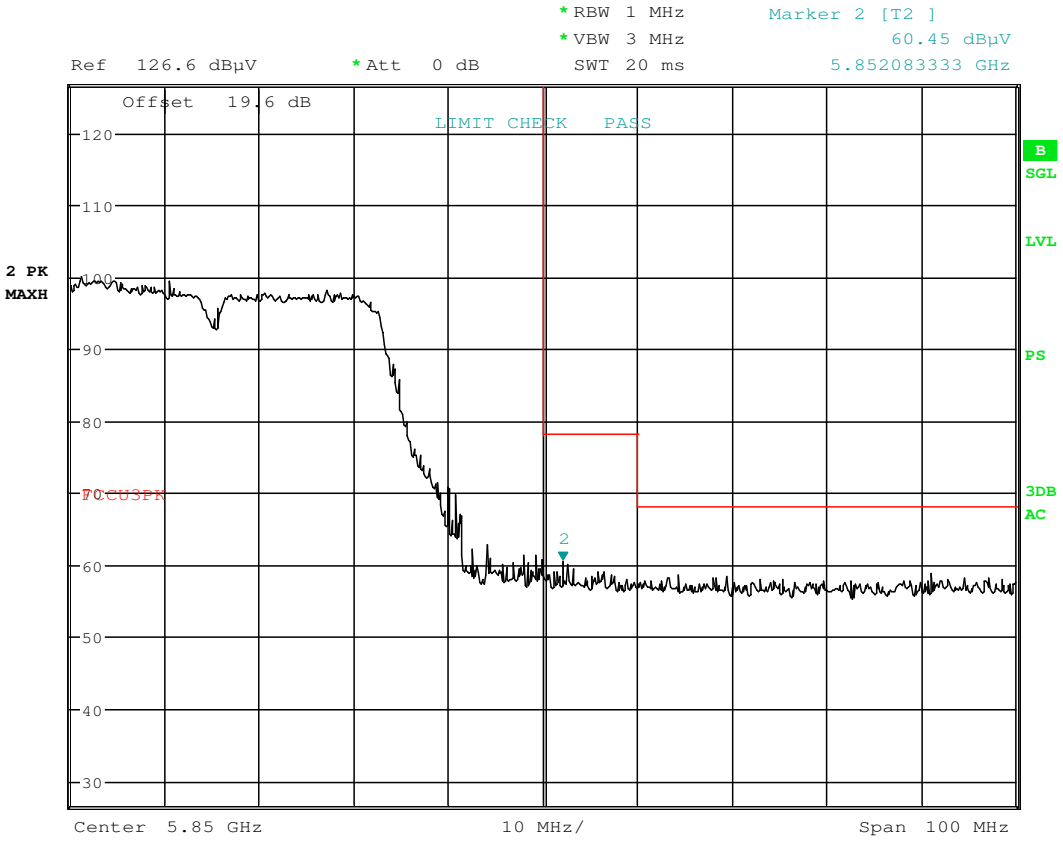
# Radiated Band Edge Measurements (40MHz BW)

**§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: 12.AUG.2016 15:38:16

**Plot 7-104. Radiated Upper Band Edge Plot (Peak – UNII Band 3)**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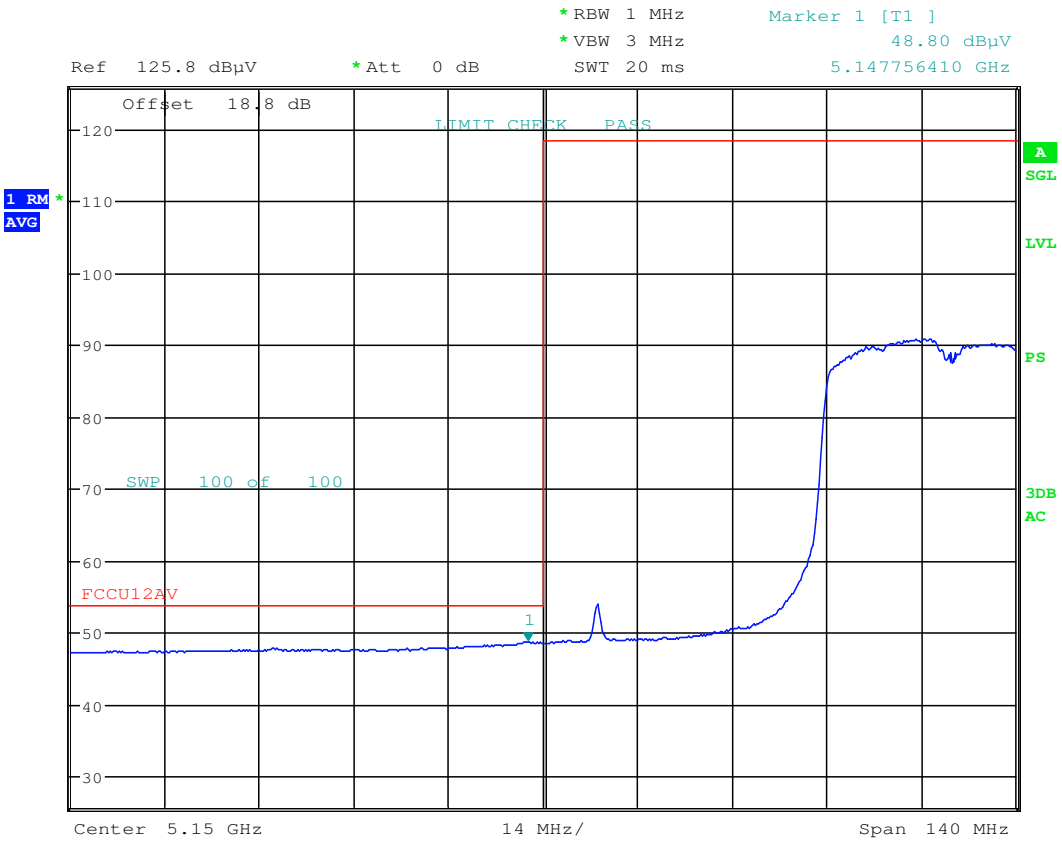
## 7.7.4 Radiated Band Edge Measurements (80MHz BW)

**§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: 12.AUG.2016 15:47:12

**Plot 7-105. Radiated Restricted Lower Band Edge Plot (Average – UNII Band 1)**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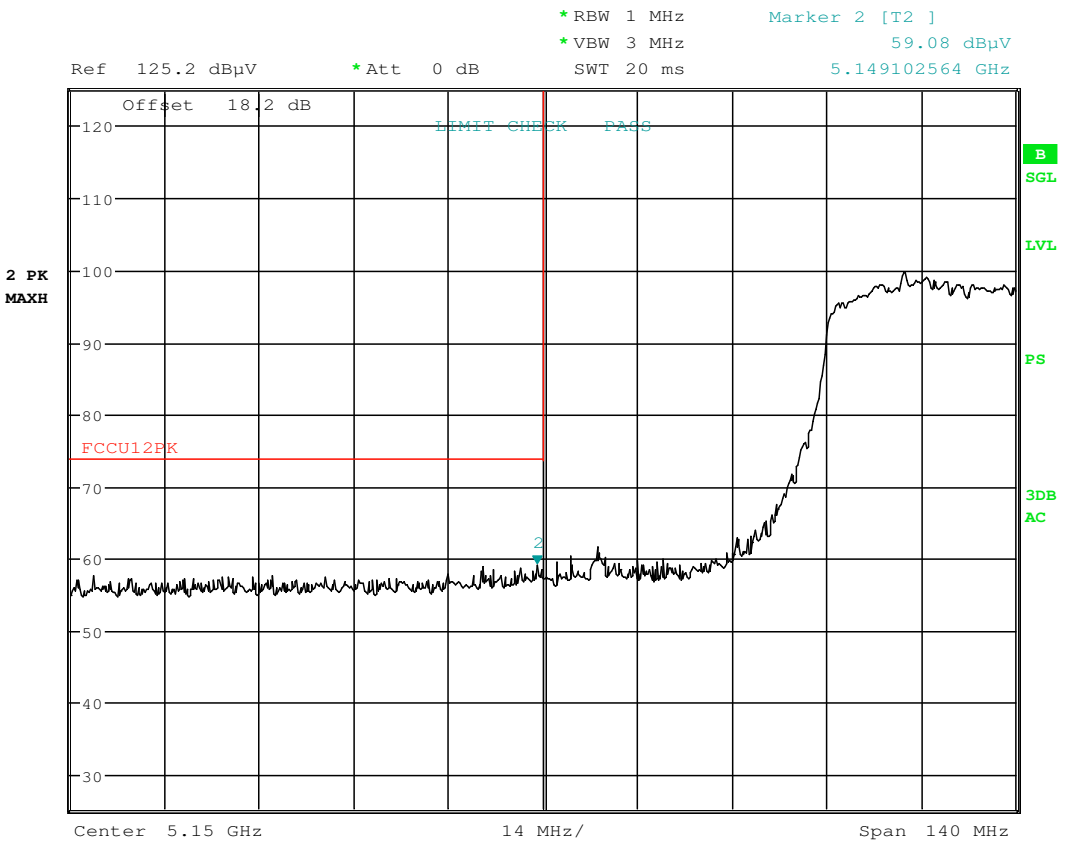
# Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 15:47:46

**Plot 7-106. Radiated Restricted Lower Band Edge Plot (Peak – UNII Band 1)**



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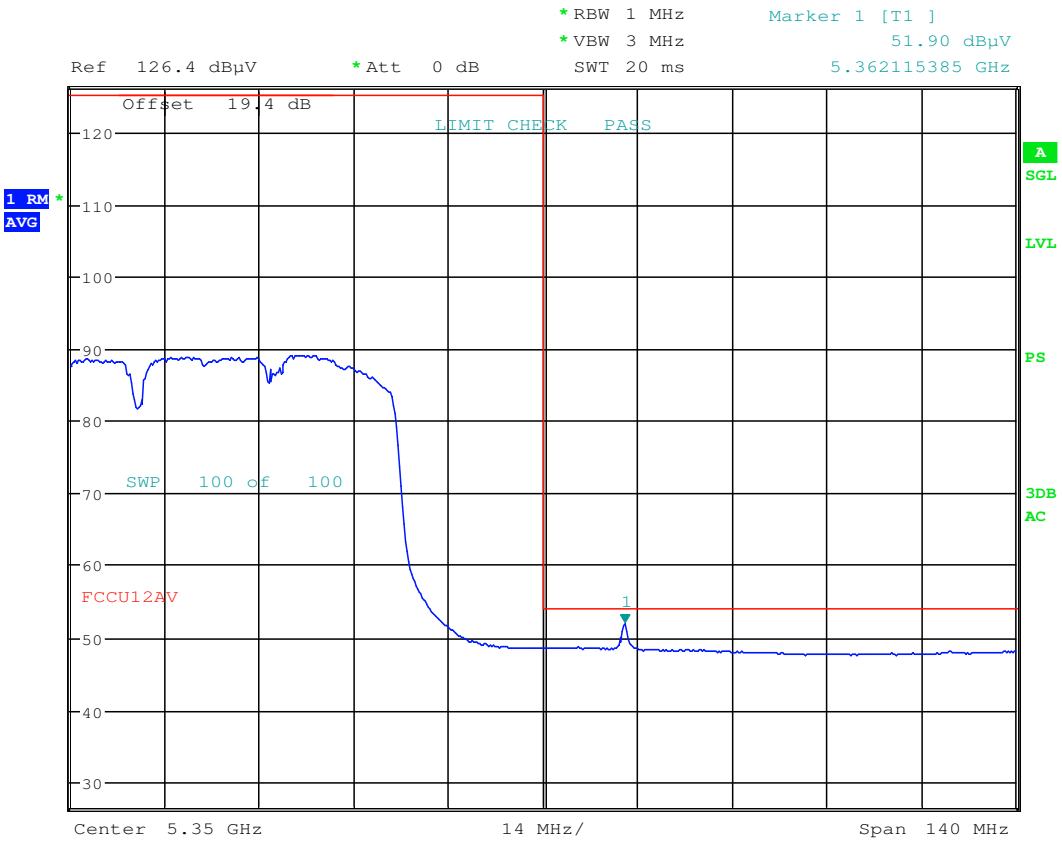
# Radiated Band Edge Measurements (80MHz BW)

**§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: 12.AUG.2016 15:56:59

**Plot 7-107. Radiated Restricted Upper Band Edge Plot (Average – UNII Band 2A)**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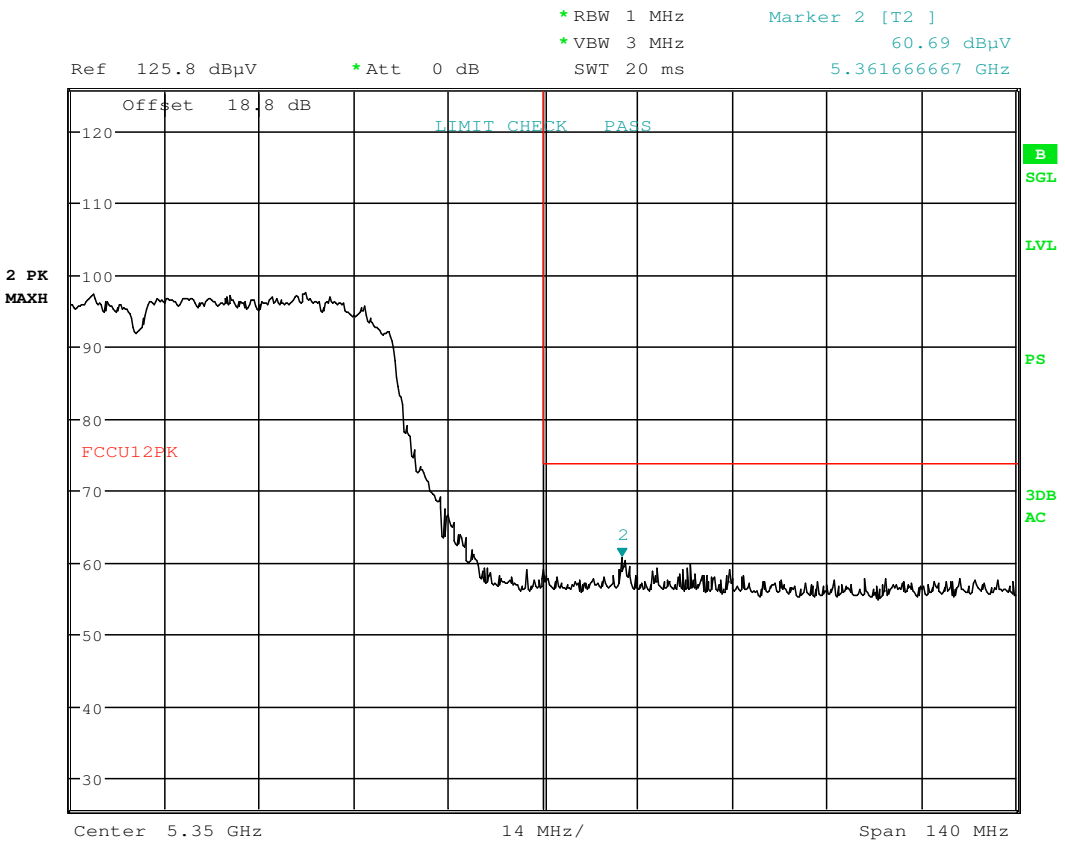
# Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 15:57:38

**Plot 7-108. Radiated Restricted Upper Band Edge Plot (Peak – UNII Band 2A)**



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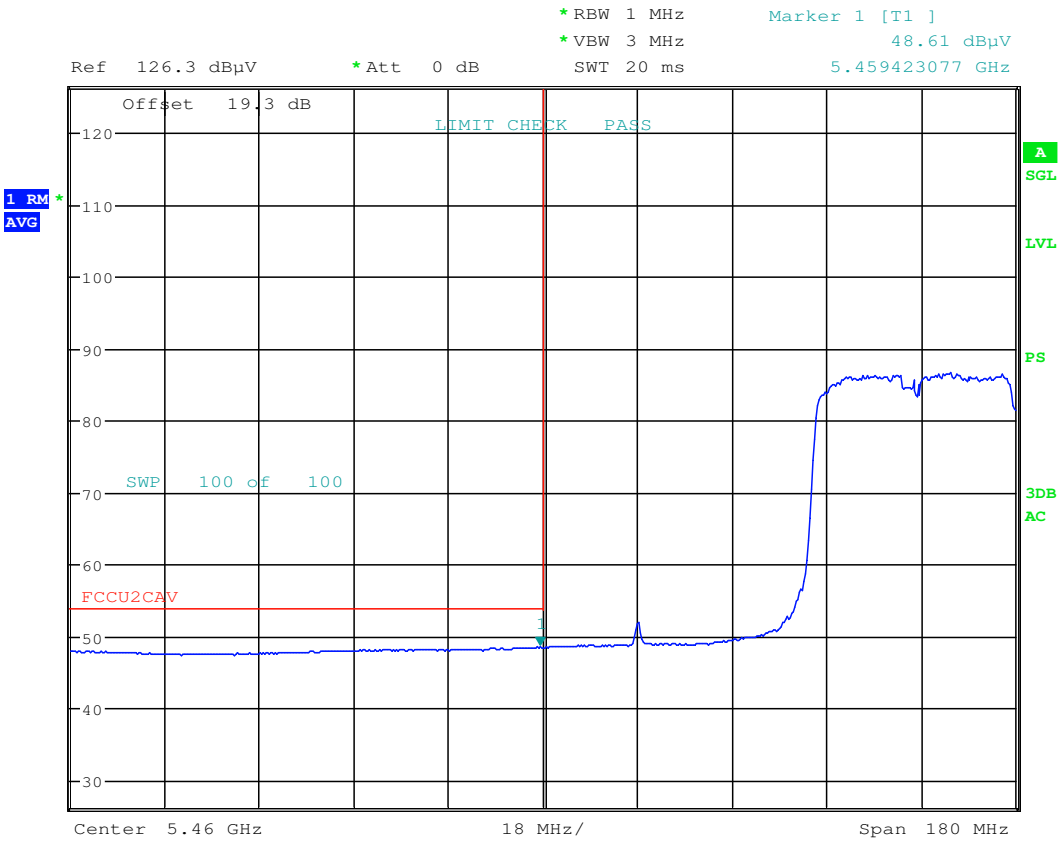
# Radiated Band Edge Measurements (80MHz BW)

**§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: 12.AUG.2016 16:01:52

**Plot 7-109. Radiated Restricted Lower Band Edge Plot (Average – UNII Band 2C)**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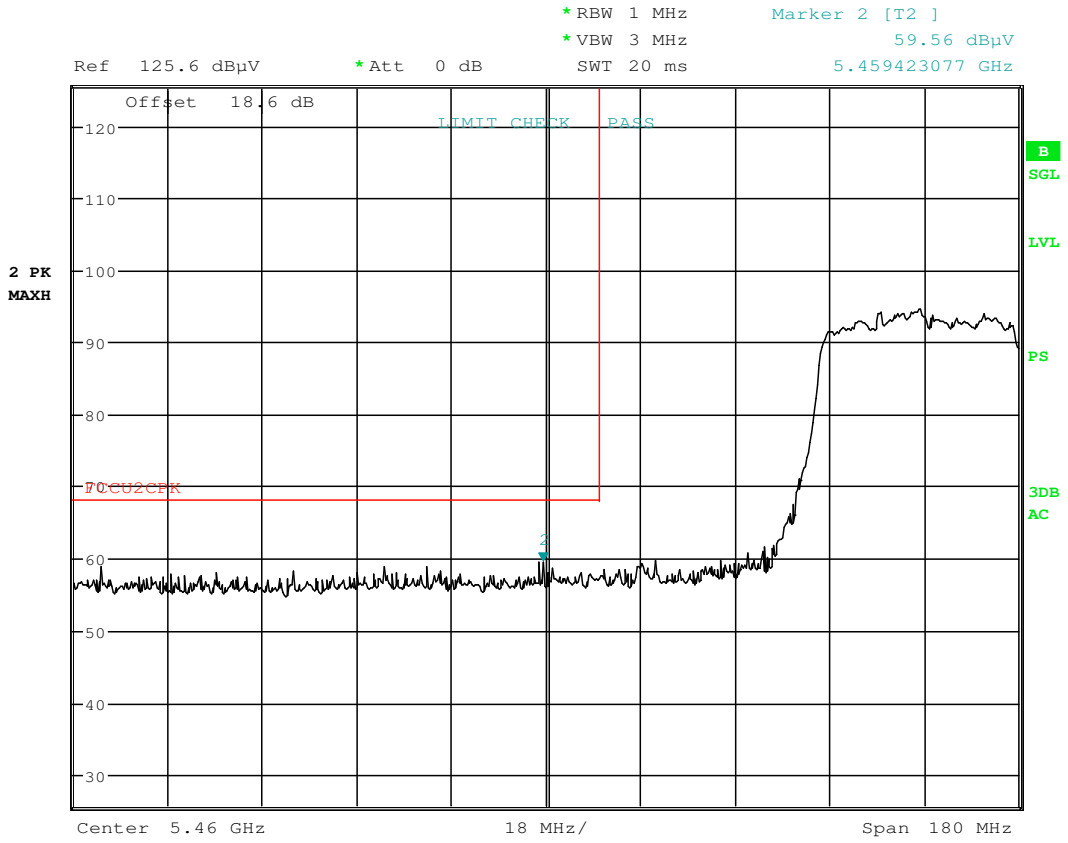
# Radiated Band Edge Measurements (80MHz BW)

**§15.407(b.1)(b.2) §15.205 §15.209**




Date: 12.AUG.2016 16:00:11

**Plot 7-110. Radiated Restricted Lower Band Edge Plot (Peak – UNII Band 2C)**



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## 7.8 Radiated Spurious Emissions Measurements – Below 1GHz

**§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 maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

***All 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 7-26 per Section 15.209.***

| Frequency | Field Strength [µV/m] | Measured Distance [Meters] |
|---|---|---|
| 0.009 – 0.490 MHz | 2400/F (kHz) | 300 |
| 0.490 – 1.705 MHz | 24000/F (kHz) | 30 |
| 1.705 – 30.00 MHz | 30 | 30 |
| 30.00 – 88.00 MHz | 100 | 3 |
| 88.00 – 216.0 MHz | 150 | 3 |
| 216.0 – 960.0 MHz | 200 | 3 |
| Above 960.0 MHz | 500 | 3 |

**Table 7-26. Radiated Limits**

**Test Procedures Used**

ANSI C63.4-2014

**Test Settings**

**Quasi-Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize


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## Test Setup

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

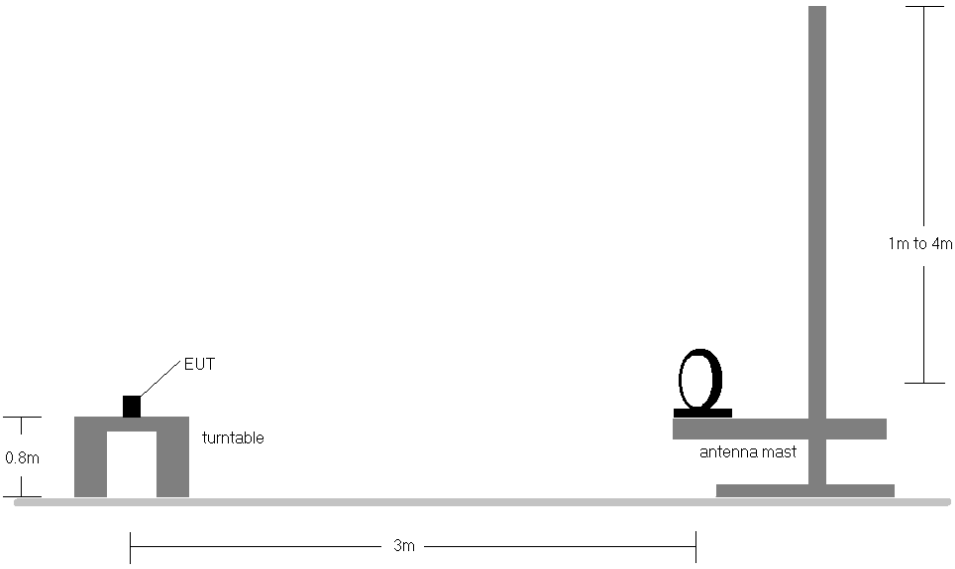


**Figure 7-6. Radiated Test Setup < 30MHz**

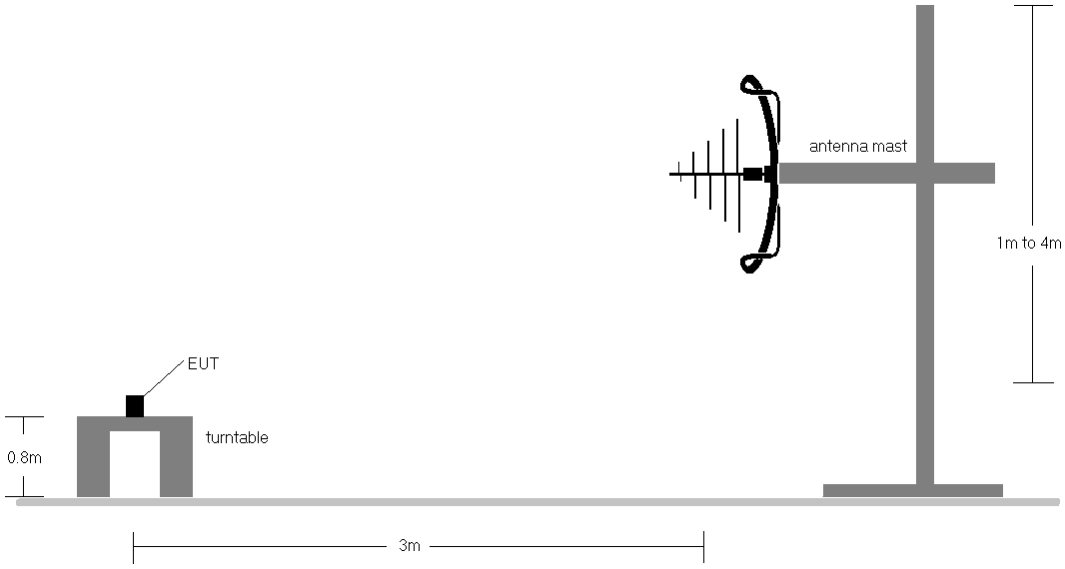


**Figure 7-7. Radiated Test Setup < 1GHz**


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## Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-26.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested with its standard battery.
4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.


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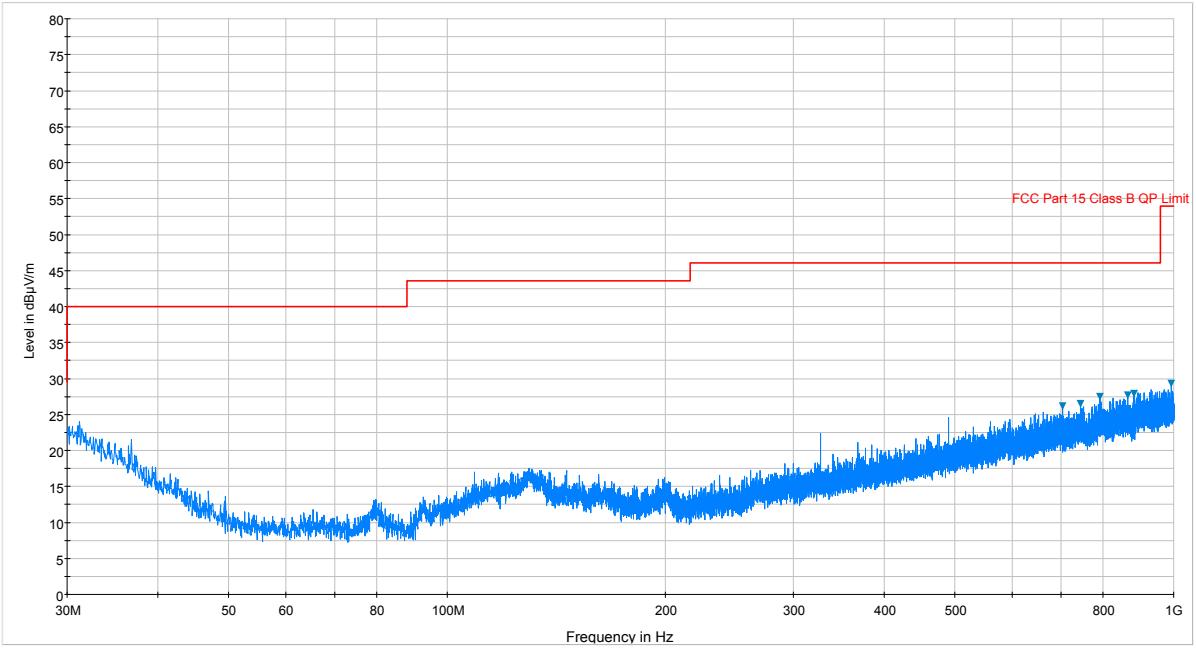
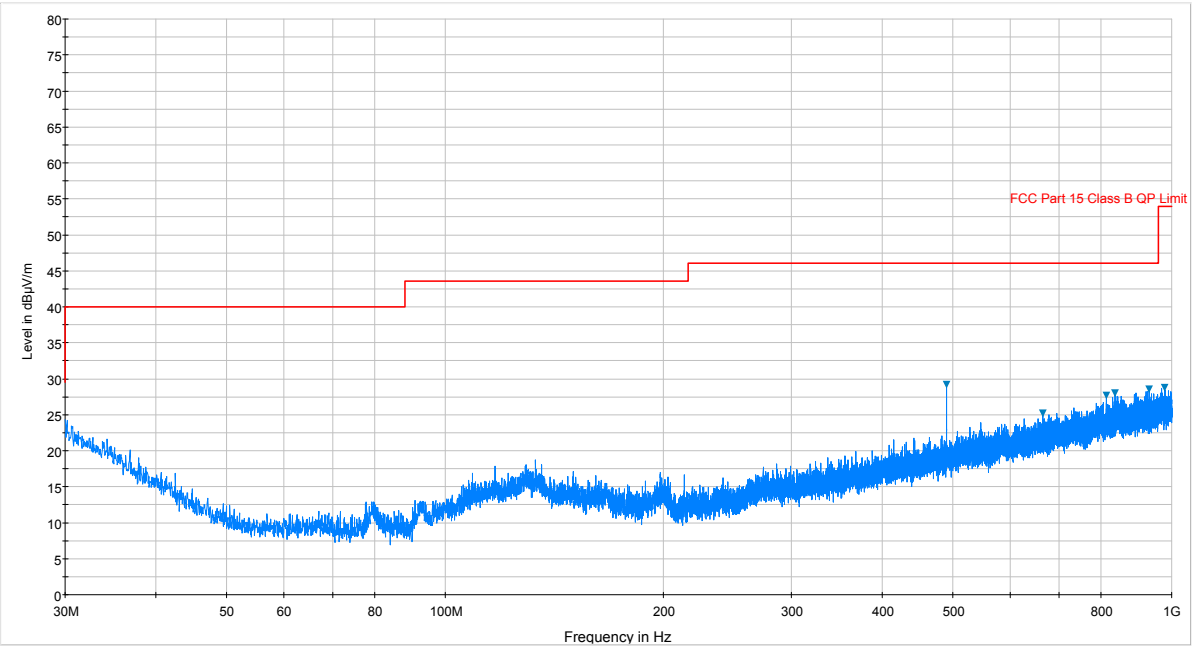
# Radiated Spurious Emissions Measurements (Below 1GHz)

**§15.209**




**Plot 7-111. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. H)**




**Plot 7-112. Radiated Spurious Plot below 1GHz (802.11a – U3 Ch. 157, Ant. Pol. V)**



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## 7.9 Line-Conducted Test Data

**§15.407**

**Test Overview and Limit**

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section.

***All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.***

| Frequency of emission (MHz) | Conducted Limit (dBμV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 – 0.5 | 66 to 56* | 56 to 46* |
| 0.5 – 5 | 56 | 46 |
| 5 – 30 | 60 | 50 |

**Table 7-27. Conducted Limits**

*Decreases with the logarithm of the frequency.

**Test Procedures Used**

ANSI C63.10-2013, Section 6.2

**Test Settings**

**Quasi-Peak Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

**Average Field Strength Measurements**

1. Analyzer center frequency was set to the frequency of the spurious emission of interest
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize


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## Test Setup

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

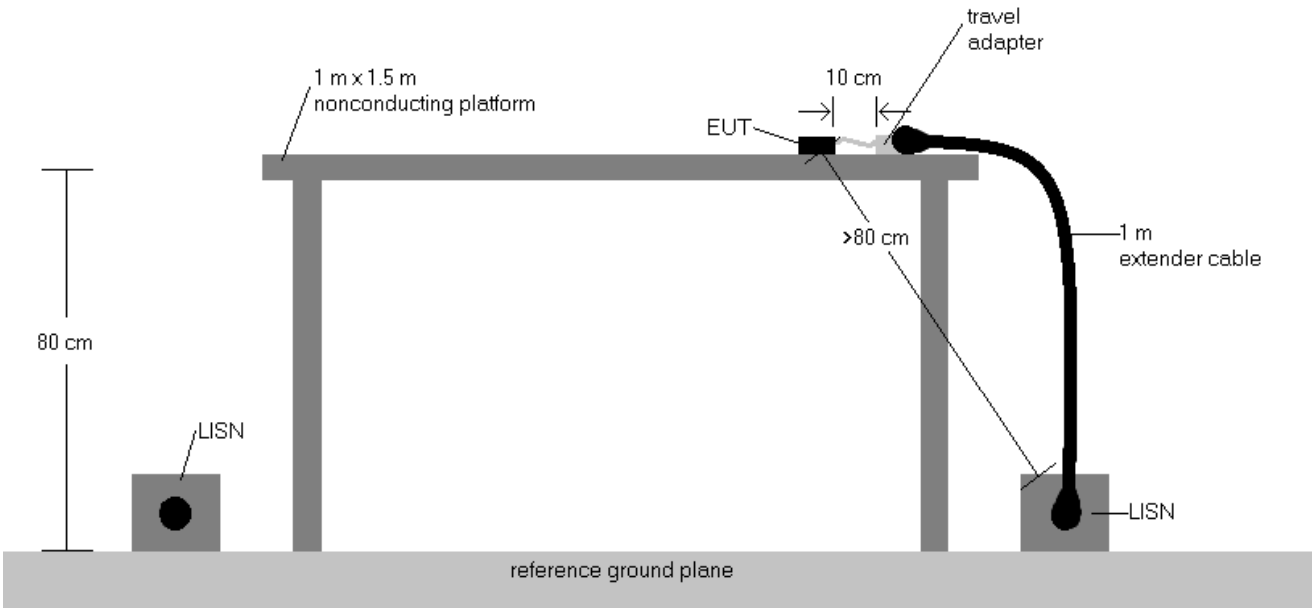


**Figure 7-8. Test Instrument & Measurement Setup**

## Test Notes

1. All modes of operation were investigated and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz are specified in 15.207.
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Corr. (dB)
5. Margin (dB) = QP/AV Limit (dBμV) - QP/AV Level (dBμV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.


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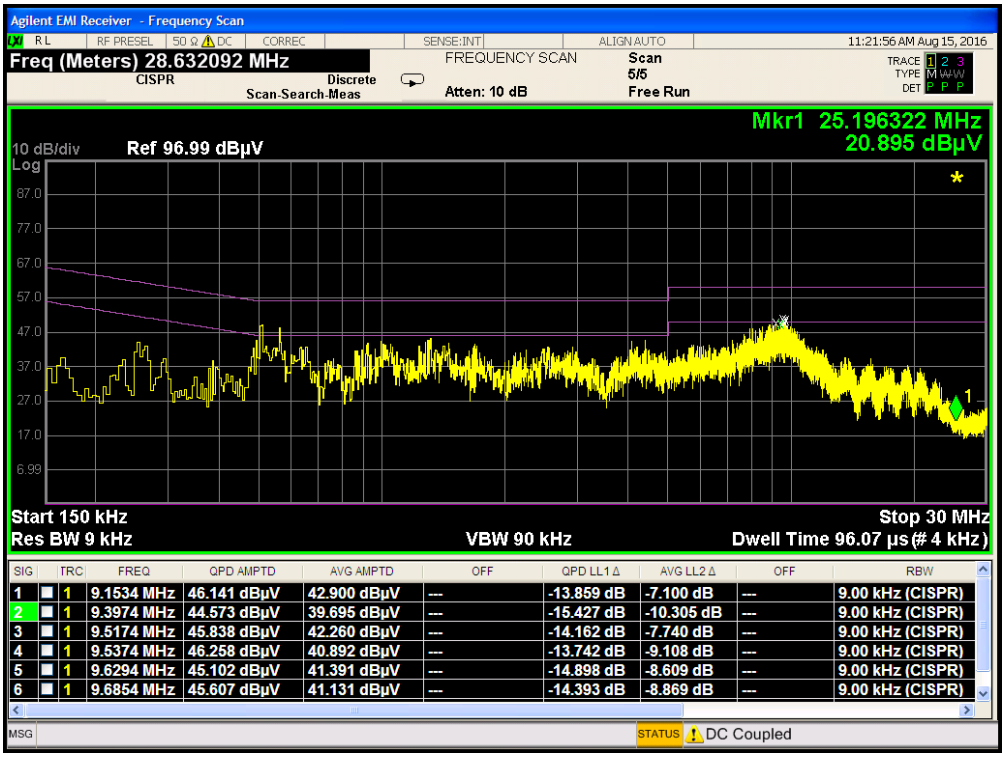
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.1534 MHz | 46.141 dBµV | 42.900 dBµV | --- | -13.859 dB | -7.100 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.3974 MHz | 44.573 dBµV | 39.695 dBµV | --- | -15.427 dB | -10.305 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.5174 MHz | 45.838 dBµV | 42.260 dBµV | --- | -14.162 dB | -7.740 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.5374 MHz | 46.258 dBµV | 40.892 dBµV | --- | -13.742 dB | -9.108 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.6294 MHz | 45.102 dBµV | 41.391 dBµV | --- | -14.898 dB | -8.609 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 9.6854 MHz | 45.607 dBµV | 41.131 dBµV | --- | -14.393 dB | -8.869 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-113. Line Conducted Plot with 802.11a UNII Band 1 (L1)**



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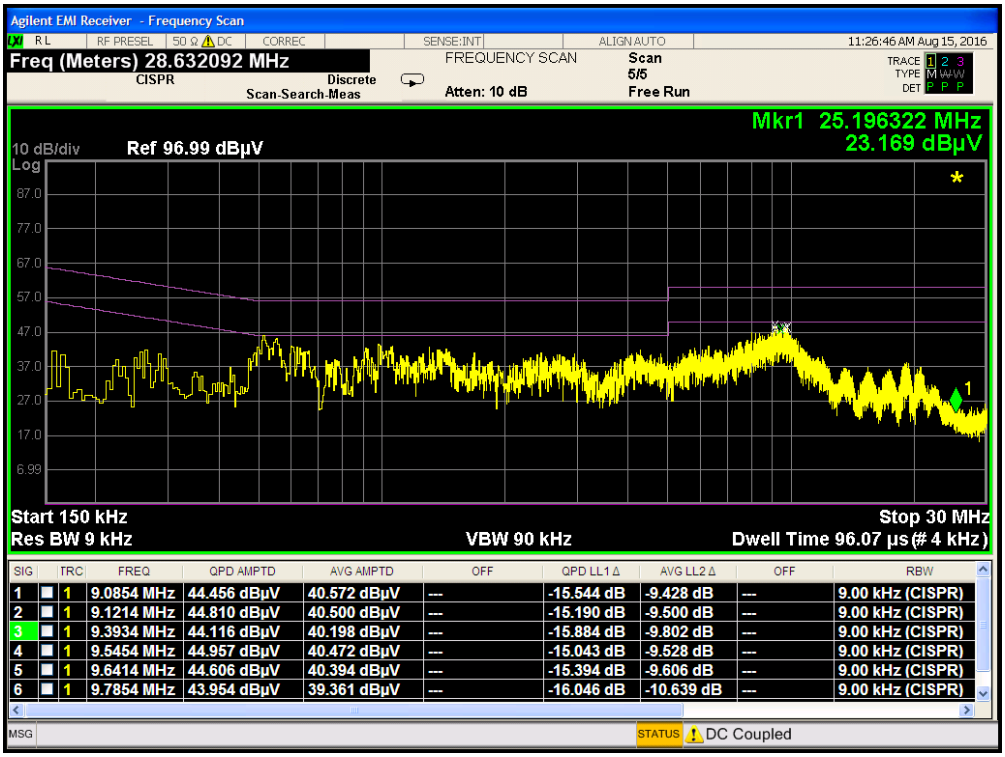
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.0854 MHz | 44.456 dBµV | 40.572 dBµV | --- | -15.544 dB | -9.428 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.1214 MHz | 44.810 dBµV | 40.500 dBµV | --- | -15.190 dB | -9.500 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.3934 MHz | 44.116 dBµV | 40.198 dBµV | --- | -15.884 dB | -9.802 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.5454 MHz | 44.957 dBµV | 40.472 dBµV | --- | -15.043 dB | -9.528 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.6414 MHz | 44.606 dBµV | 40.394 dBµV | --- | -15.394 dB | -9.606 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 9.7854 MHz | 43.954 dBµV | 39.361 dBµV | --- | -16.046 dB | -10.639 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-114. Line Conducted Plot with 802.11a UNII Band 1 (N)**



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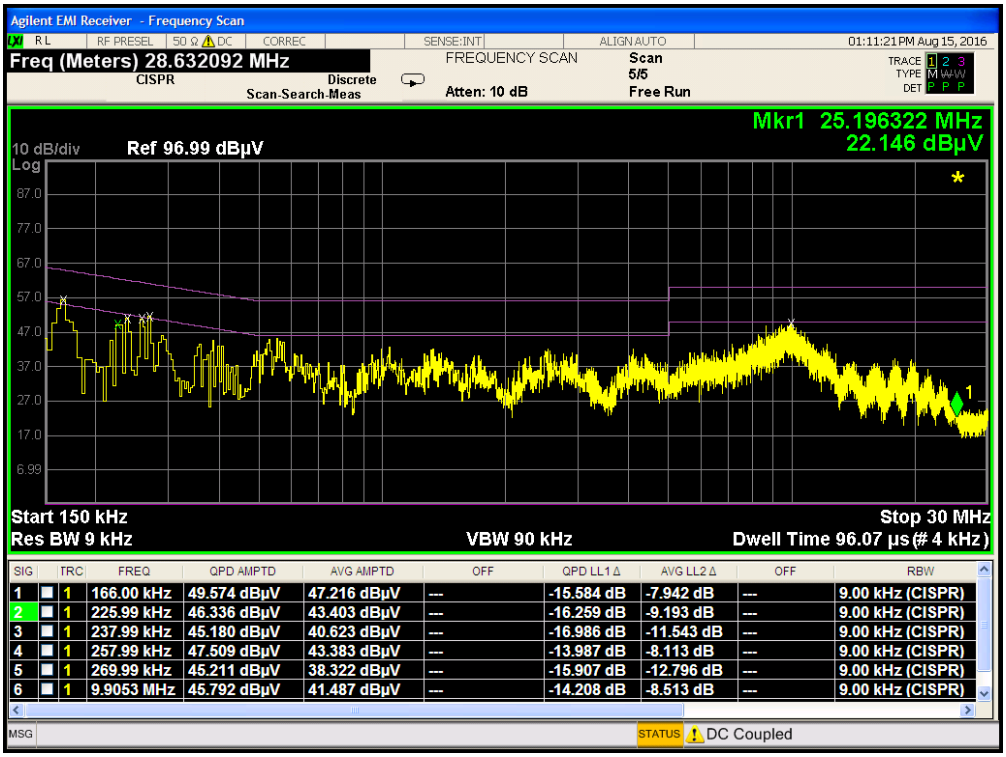
# Line-Conducted Test Data

**§15.407**




**Plot 7-115. Line Conducted Plot with 802.11a UNII Band 2A (L1)**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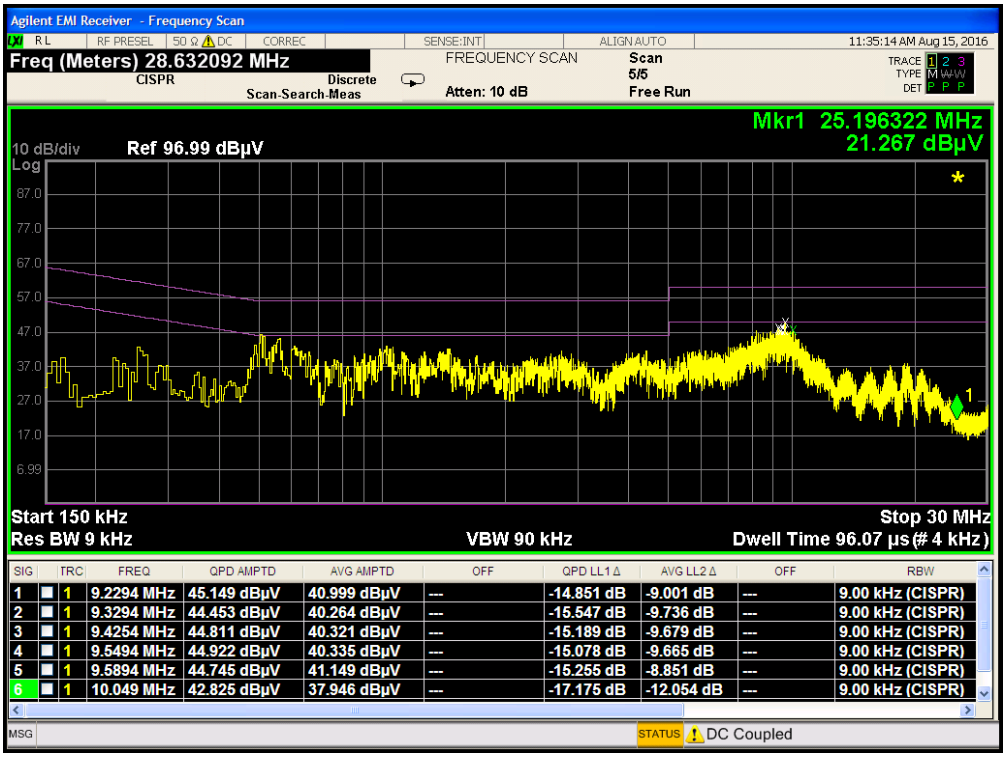
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.2294 MHz | 45.149 dBµV | 40.999 dBµV | --- | -14.851 dB | -9.001 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.3294 MHz | 44.453 dBµV | 40.264 dBµV | --- | -15.547 dB | -9.736 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.4254 MHz | 44.811 dBµV | 40.321 dBµV | --- | -15.189 dB | -9.679 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.5494 MHz | 44.922 dBµV | 40.335 dBµV | --- | -15.078 dB | -9.665 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.5894 MHz | 44.745 dBµV | 41.149 dBµV | --- | -15.255 dB | -8.851 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 10.049 MHz | 42.825 dBµV | 37.946 dBµV | --- | -17.175 dB | -12.054 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-116. Line Conducted Plot with 802.11a UNII Band 2A (N)**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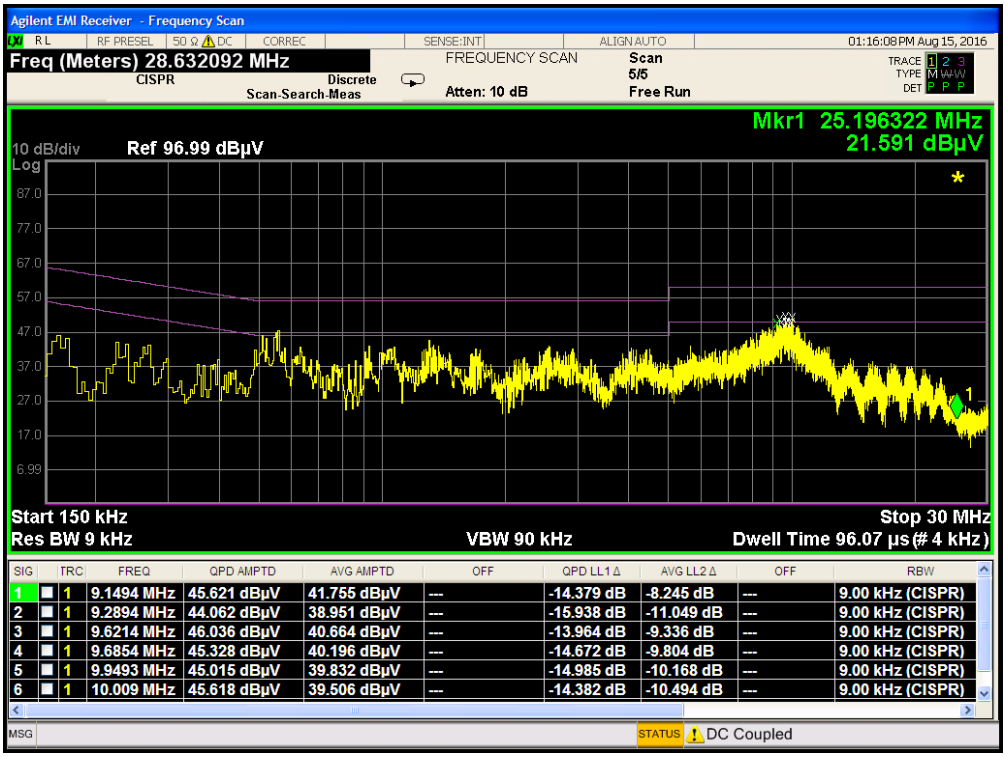
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.1494 MHz | 45.621 dBµV | 41.755 dBµV | --- | -14.379 dB | -8.245 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.2894 MHz | 44.062 dBµV | 38.951 dBµV | --- | -15.938 dB | -11.049 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.6214 MHz | 46.036 dBµV | 40.664 dBµV | --- | -13.964 dB | -9.336 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.6854 MHz | 45.328 dBµV | 40.196 dBµV | --- | -14.672 dB | -9.804 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.9493 MHz | 45.015 dBµV | 39.832 dBµV | --- | -14.985 dB | -10.168 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 10.009 MHz | 45.618 dBµV | 39.506 dBµV | --- | -14.382 dB | -10.494 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-117. Line Conducted Plot with 802.11a UNII Band 2C (L1)**



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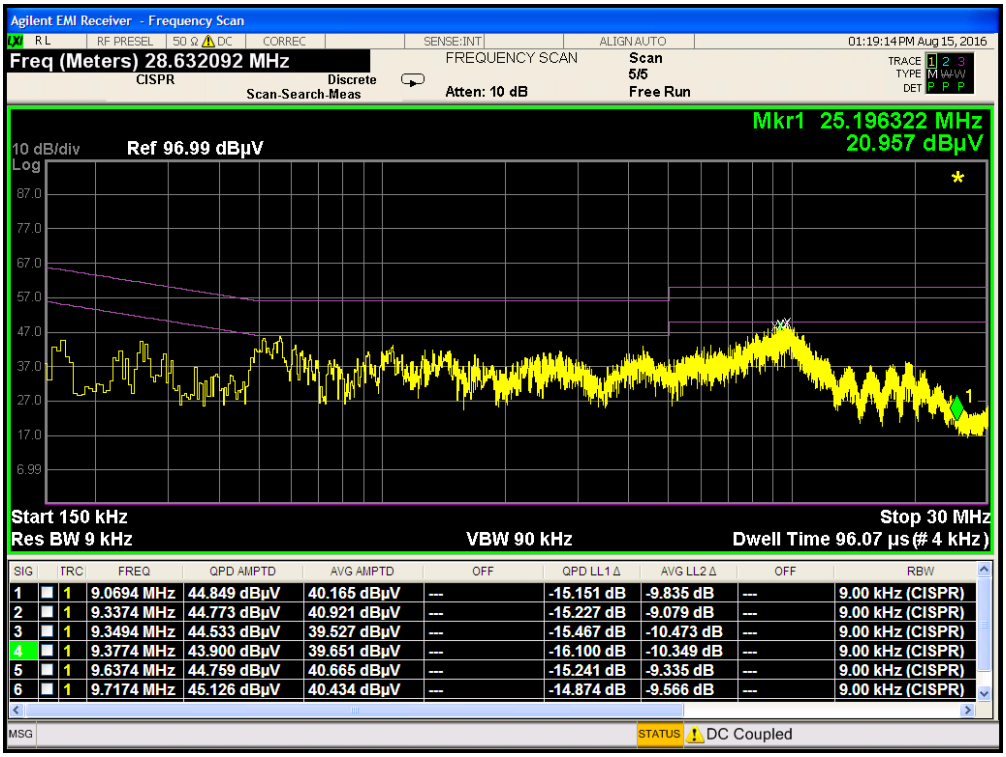
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.0694 MHz | 44.849 dBµV | 40.165 dBµV | --- | -15.151 dB | -9.835 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.3374 MHz | 44.773 dBµV | 40.921 dBµV | --- | -15.227 dB | -9.079 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.3494 MHz | 44.533 dBµV | 39.527 dBµV | --- | -15.467 dB | -10.473 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.3774 MHz | 43.900 dBµV | 39.651 dBµV | --- | -16.100 dB | -10.349 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.6374 MHz | 44.759 dBµV | 40.665 dBµV | --- | -15.241 dB | -9.335 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 9.7174 MHz | 45.126 dBµV | 40.434 dBµV | --- | -14.874 dB | -9.566 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-118. Line Conducted Plot with 802.11a UNII Band 2C (N)**



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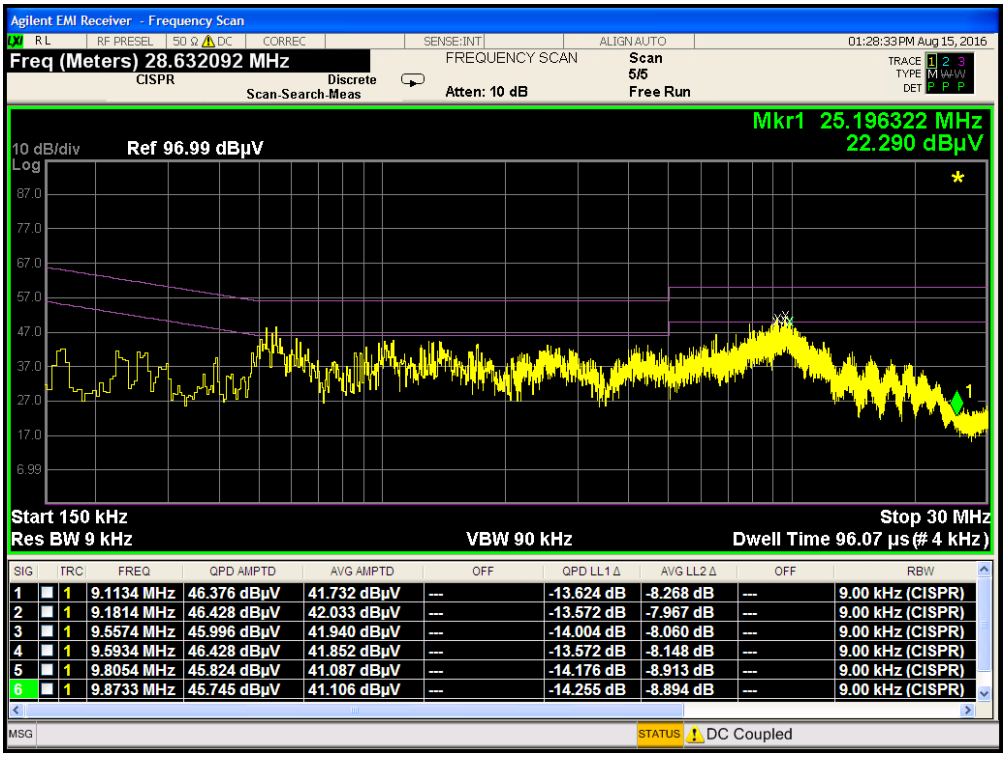
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.1134 MHz | 46.376 dBµV | 41.732 dBµV | --- | -13.624 dB | -8.268 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.1814 MHz | 46.428 dBµV | 42.033 dBµV | --- | -13.572 dB | -7.967 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.5574 MHz | 45.996 dBµV | 41.940 dBµV | --- | -14.004 dB | -8.060 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.5934 MHz | 46.428 dBµV | 41.852 dBµV | --- | -13.572 dB | -8.148 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.8054 MHz | 45.824 dBµV | 41.087 dBµV | --- | -14.176 dB | -8.913 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 9.8733 MHz | 45.745 dBµV | 41.106 dBµV | --- | -14.255 dB | -8.894 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-119. Line Conducted Plot with 802.11a UNII Band 3 (L1)**



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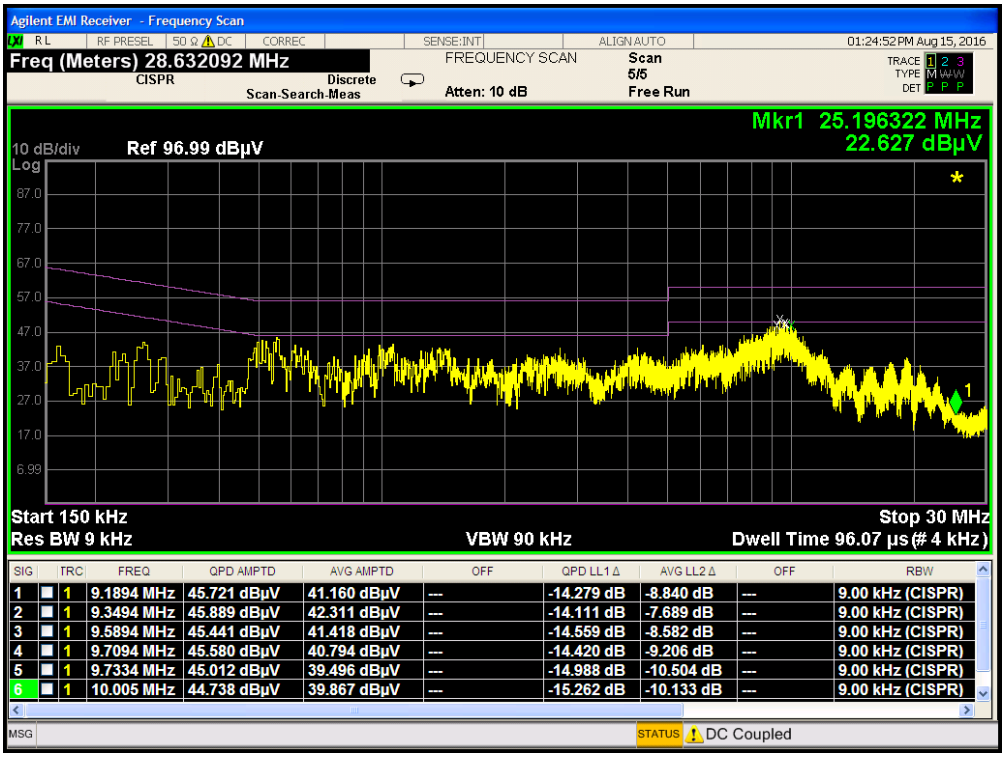
# Line-Conducted Test Data

**§15.407**




| SIG | TRC | FREQ | QPD AMPTD | AVG AMPTD | OFF | QPD LL1 Δ | AVG LL2 Δ | OFF | RBW |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 9.1894 MHz | 45.721 dBµV | 41.160 dBµV | --- | -14.279 dB | -8.840 dB | --- | 9.00 kHz (CISPR) |
| 2 | 1 | 9.3494 MHz | 45.889 dBµV | 42.311 dBµV | --- | -14.111 dB | -7.689 dB | --- | 9.00 kHz (CISPR) |
| 3 | 1 | 9.5894 MHz | 45.441 dBµV | 41.418 dBµV | --- | -14.559 dB | -8.582 dB | --- | 9.00 kHz (CISPR) |
| 4 | 1 | 9.7094 MHz | 45.580 dBµV | 40.794 dBµV | --- | -14.420 dB | -9.206 dB | --- | 9.00 kHz (CISPR) |
| 5 | 1 | 9.7334 MHz | 45.012 dBµV | 39.496 dBµV | --- | -14.988 dB | -10.504 dB | --- | 9.00 kHz (CISPR) |
| 6 | 1 | 10.005 MHz | 44.738 dBµV | 39.867 dBµV | --- | -15.262 dB | -10.133 dB | --- | 9.00 kHz (CISPR) |

**Plot 7-120. Line Conducted Plot with 802.11a UNII Band 3 (N)**



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# 8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Tablet FCC ID: A3LSMT587P** is in compliance with Part 15E of the FCC Rules.


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