# RF TEST REPORT

SIEMIC
GLOBAL TESTING & CERTIFICATIONS
*YOUR CHOICE FOR- TCB FCB CB NB CAB RCB*

**Report No.: FCC_RF_SL14121601-RUC-016A1_UNII_Rev1.0**
**Supersede Report No.: None**

| | | |
|---|---|---|
| Applicant | : | Ruckus Wireless, Inc. |
| Product Name | : | Access Point |
| Model No. | : | R710 |
| Test Standard | : | 47 CFR 15.407 |
| Test Method | : | ANSI C63.4: 2014<br>789033 D02 General UNII Test Procedures New Rules v01 |
| FCC ID | : | S9GR710 |
| IC ID | : | 5912A-R710 |
| Dates of test | : | 01/16/2015 – 02/19/2015 |
| Issue Date | : | 03/19/2015 |
| Test Result | : | ☒ Pass ☐ Fail |
| Equipment complied with the specification [X]<br>Equipment did not comply with the specification [ ] | | |

| This Test Report is Issued Under the Authority of: | |
|---|---|
| Ricky | David Zhang |
| **Ricky Wang** | **David Zhang** |
| Test Engineer | Engineer Reviewer |
| **This test report may be reproduced in full only**<br>**Test result presented in this test report is applicable to the tested sample only** | |

**Issued By:**
**SIEMIC Laboratories**
**775 Montague Expressway, Milpitas, 95035 CA**

ilac-MRA
A2LA ACCREDITED
TESTING CERT # 2742-01

# Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.


In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

## Accreditations for Conformity Assessment

| Country/Region | Accreditation Body | Scope |
|---|---|---|
| USA | FCC, A2LA | EMC, RF/Wireless, Telecom |
| Canada | IC, A2LA, NIST | EMC, RF/Wireless, Telecom |
| Taiwan | BSMI, NCC, NIST | EMC, RF, Telecom, Safety |
| Hong Kong | OFTA, NIST | RF/Wireless, Telecom |
| Australia | NATA, NIST | EMC, RF, Telecom, Safety |
| Korea | KCC/RRA, NIST | EMI, EMS, RF, Telecom, Safety |
| Japan | VCCI, JATE, TELEC, RFT | EMI, RF/Wireless, Telecom |
| Mexico | NOM, COFETEL, Caniety | Safety, EMC, RF/Wireless, Telecom |
| Europe | A2LA, NIST | EMC, RF, Telecom, Safety |
| Israel | MOC, NIST | EMC, RF, Telecom, Safety |

## Accreditations for Product Certifications

| Country | Accreditation Body | Scope |
|---|---|---|
| USA | FCC TCB, NIST | EMC, RF, Telecom |
| Canada | IC FCB, NIST | EMC, RF, Telecom |
| Singapore | iDA, NIST | EMC, RF, Telecom |
| EU | NB | EMC & R&TTE Directive |
| Japan | MIC (RCB 208) | RF, Telecom |
| Hong Kong | OFTA (US002) | RF, Telecom |

## CONTENTS

# 1 Report Revision History

| Report No. | Report Version | Description | Issue Date |
|---|---|---|---|
| FCC_RF_SL14121601-RUC-016A1_UNII | None | Original | 02/20/2015 |
| FCC_RF_SL14121601-RUC-016A1_UNII_Rev1.0 | Rev1.0 | Remove EUT photo | 03/19/2015 |
| | | | |
| | | | |
| | | | |

## 2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Ruckus Wireless, Inc.
Product: Access Point
Model: R710

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1st page.

## 3 Customer information

| | | |
|---|---|---|
| Applicant Name | : | Ruckus Wireless, Inc. |
| Applicant Address | : | 350 West Java Drive, Sunnyvale, California 94089 U.S.A |
| Manufacturer Name | : | Ruckus Wireless, Inc. |
| Manufacturer Address | : | 350 West Java Drive, Sunnyvale, California 94089 U.S.A |

## 4 Test site information

| | |
|---|---|
| Lab performing tests | SIEMIC Laboratories |
| Lab Address | 775 Montague Expressway, Milpitas, CA 95035 |
| FCC Test Site No. | 881796 |
| IC Test Site No. | 4842D-2 |
| VCCI Test Site No. | A0133 |

## 5 Modification

| Index | Item | Description | Note |
|---|---|---|---|
| - | - | - | - |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# 6 EUT Information

## 6.1 EUT Description

| | | |
|---|---|---|
| Product Name | : | Access Point |
| Model No. | : | R710 |
| Trade Name | : | Ruckus |
| Serial No. | : | 911543202059 |
| Host Model No. | : | N/A |
| Input Power | : | 48VDC (PoE) |
| Power Adapter Manu/Model | : | N/A |
| Power Adapter SN | : | N/A |
| Product Hardware version | : | 705-60398-001 |
| Product Software version | : | 812-11303-301 |
| Radio Hardware version | : | 705-60398-001 |
| Radio Software version | : | 812-11303-301 |
| Test Software version | : | 4_9_802_1_CS |
| Date of EUT received | : | 01/05/2015 |
| Equipment Class/ Category | : | DTS, UNII |
| Clock Frequencies | : | N/A |
| Port/Connectors | : | PoE, Ethernet |

## 6.2 Radio Description

| Radio Type | 802.11b | 802.11g | 802.11a | 802.11n-20M | 802.11n-40M | 802.11ac-80M |
|---|---|---|---|---|---|---|
| Operating Frequency | 2412-2462MHz | 2412-2462MHz | 5180-5320MHz<br>5500-5720MHz<br>5745-5825MHz | 2412-2462MHz<br>5180-5320MHz<br>5500-5720MHz<br>5745-5825MHz | 2422-2452MHz<br>5190-5310MHz<br>5510-5710MHz<br>5755-5795MHz | 5210MHz, 5290MHz<br>5530MHz,5690MHz,<br>5775MHz |
| Modulation | DSSS (CCK, DQPSK, DBPSK) | OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| Channel Spacing | 5MHz | 5MHz | 20MHz | 5MHz(2.4GHz), 20MHz (5GHz) | 40MHz | 80MHz |
| Number of Channels | 11 | 11 | 20 | 11(2.4GH)<br>20 (5GHz) | 9(2.4GH)<br>10(5GHz) | 5 |
| Antenna Type | Internal Patch Antenna | | | | | |
| Antenna Gain (Peak) | 2.5 dBi (2.4GHz), 3.5 dBi (5 GHz) | | | | | |
| Antenna Connector Type | U.FL | | | | | |
| Note | EUT has 4 antennas, 2 antennas are in horizontal polarity, and 2 antennas in vertical polarity. The 802.11b/g/a is in CDD mode with all 4 antenna transmit simultaneously.<br><br>Since they're in 90 deg phase shift between the horizontal and vertical antennas, for radiated limit, the result from different polarization antenna will not be combined. So only the result for 2 vertical poparity antennas and 2 horizontal poparity antennas will be combined for MIMO mode separately.For cross-polarized antenna, the total gain—including array gain—is computed separately for each of polarizations using the procedures presented in this document. The highest of the total gains shall apply. For this case, the highest of the total gain will be the directional gain of 2 antennas.<br>For conducted limit like power and psd, the result from all 4 chains will be summed.<br><br>For 802.11b/g/a mode under CDD mode, the array gain for power will be 0 and for PSD will be 10 log (Nant/Nss) dB to be calculated separately for horizontal and vertical polarity.Reference to the following KDB for clarification.<br>662911 D01 Multiple Transmitter Output v02r01<br>662911 D02 MIMO with Cross-Polarized Antennas v01 | | | | | |

**EUT Power level setting**

| Mode | Frequency | Power Setting |
|---|---|---|
| 802.11-a | 5260 | 15.5 |
| 802.11-a | 5280 | 15.5 |
| 802.11-a | 5320 | 15.5 |
| 802.11-n-20 | 5260 | 15.5 |
| 802.11-n-20 | 5280 | 15.5 |
| 802.11-n-20 | 5320 | 15.5 |
| 802.11-n-40 | 5270 | 17.5 |
| 802.11-n-40 | 5310 | 17.5 |
| 802.11-ac-80 | 5290 | 17.5 |
| | | |
| 802.11-a | 5500 | 16 |
| 802.11-a | 5580 | 16 |
| 802.11-a | 5700 | 15.5 |
| 802.11-n-20 | 5500 | 16 |
| 802.11-n-20 | 5580 | 16 |
| 802.11-n-20 | 5700 | 16 |
| 802.11-n-40 | 5510 | 17.5 |
| 802.11-n-40 | 5590 | 17.5 |
| 802.11-n-40 | 5670 | 17.5 |
| 802.11-ac-80 | 5530 | 17.5 |

**CROSSOVER channels power setting**

| Mode | Frequency | Power Setting |
|---|---|---|
| 802.11-a | 5720 | 16.5 |
| 802.11-n-20 | 5720 | 16 |
| 802.11-n-40 | 5710 | 17.5 |
| 802.11-ac-80 | 5690 | 17.5 |

# 7 Supporting Equipment/Software and cabling Description

## 7.1 Supporting Equipment

| Item | Supporting Equipment Description | Model | Serial Number | Manufacturer | Note |
|---|---|---|---|---|---|
| 1 | Laptop | PP01L Latitude C610 | CN-06P823-48643-37P-4153 | Dell | - |
| 2 | EUT power Supply | HK-AD-120A100-US | 740-64190-011 | Ruckus | - |
| | | | | | |

## 7.2 Cabling Description

| Name | Connection Start | | Connection Stop | | Length / shielding Info | | Note |
|---|---|---|---|---|---|---|---|
| | From | I/O Port | To | I/O Port | Length (m) | Shielding | |
| - | - | - | - | - | - | - | - |
| | | | | | | | |

## 7.3 Test Software Description

| Test Item | Software | Description |
|---|---|---|
| RF Testing | Command Line in windows | Set the EUT to transmit continuously in diferent test mode |
| | | |
| | | |

# 8 Test Summary

| Test Item | Test standard | | Test Method/Procedure | Pass / Fail |
|---|---|---|---|---|
| Restricted Band of Operation | FCC | 15.205 | ANSI C63.4 – 2014<br>789033 D02 General UNII Test Procedures New Rules v01 | ☒ Pass<br>☐ N/A |
| AC Conducted Emissions Voltage | FCC | 15.207(a) | ANSI C63.4 – 2014 | ☒ Pass<br>☐ N/A |

| Test Item | Test standard | | Test Method/Procedure | Pass / Fail |
|---|---|---|---|---|
| 26 & 6 dB Emission Bandwidth | FCC | 15.407 (a) (2) | 789033 D02 General UNII Test Procedures New Rules v01 | ☒ Pass<br>☐ N/A |
| Maximum conducted Output Power | FCC | 15.407 (a) (2) | 789033 D02 General UNII Test Procedures New Rules v01 | ☒ Pass<br>☐ N/A |
| Power reduction (Antenna Gain > 6 dBi) | FCC | 15.407 (a) (2) | - | ☐ Pass<br>☒ N/A |
| Band Edge and Radiated Spurious Emissions | FCC | 15.407(b)(2),<br>15.407(b)(6) | ANSI C63.4 – 2014<br>789033 D02 General UNII Test Procedures New Rules v01 | ☒ Pass<br>☐ N/A |
| Power Spectral Density | FCC | 15.407 (a) (2) | 789033 D02 General UNII Test Procedures New Rules v01 | ☒ Pass<br>☐ N/A |
| Frequency Stability | FCC | 15.407 (g) | - | ☐ Pass<br>☒ N/A |
| Transmit Power Control (TPC) | FCC | 15.407 (h)(1) | - | ☐ Pass<br>☒ N/A |
| User Manual | FCC | - | - | ☒ Pass<br>☐ N/A |
| Remark | 1. All measurement uncertainties are not taken into consideration for all presented test result.<br>2. The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual. | | | |

# 9 Measurement Uncertainty

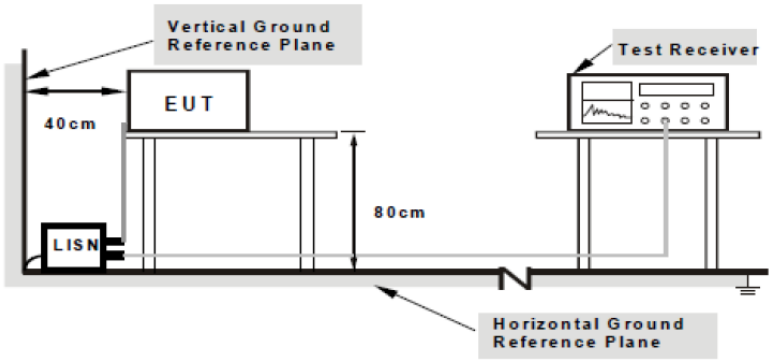
| Emissions | | | |
|---|---|---|---|
| **Test Item** | **Frequency Range** | **Description** | **Uncertainty** |
| Band Edge and Radiated Spurious Emissions | 30MHz – 1GHz | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +5.6dB/-4.5dB |
| Band Edge and Radiated Spurious Emissions | 1GHz – 40GHz | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +4.3dB/-4.1dB |

# 10 Measurements, Examination and Derived Results

## 10.1 Conducted Emissions

**Conducted Emission Limit**

| Frequency ranges (MHz) | Limit (dBuV) | |
|---|---|---|
| | QP | Average |
| 0.15 ~ 0.5 | 66 – 56 | 56 – 46 |
| 0.5 ~ 5 | 56 | 46 |
| 5 ~ 30 | 60 | 50 |

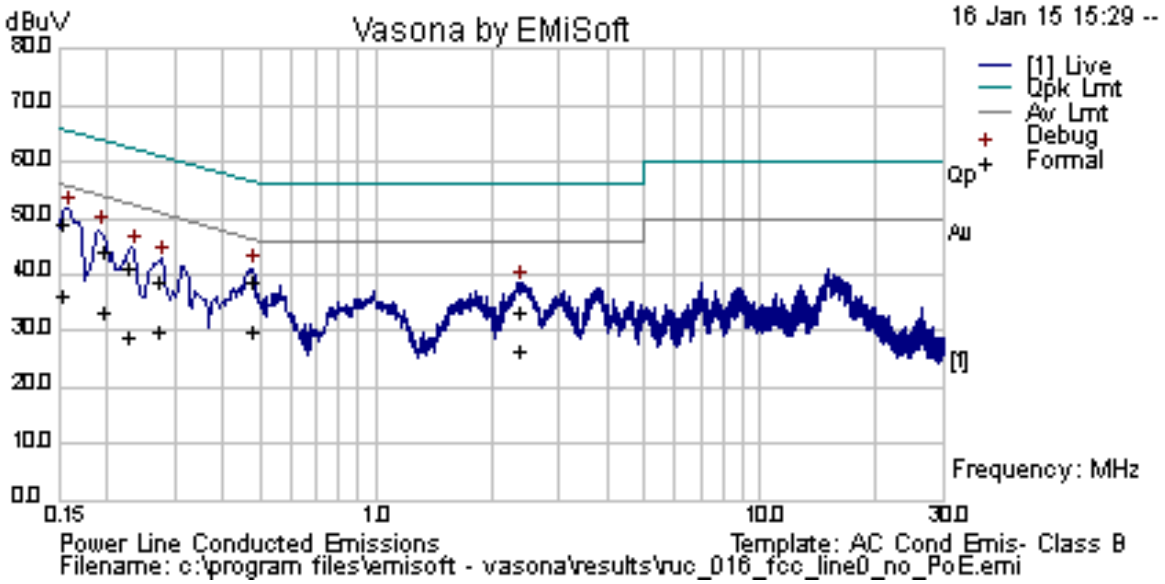
| Spec | Item | Requirement | Applicable |
|---|---|---|---|
| 47CFR§15.207 | a) | For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges. | ☒ |
| Test Setup |  Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units. | | |
| Procedure | - The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.<br>- The power supply for the EUT was fed through a 50Ω/50μH EUT LISN, connected to filtered mains.<br>- The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.<br>- All other supporting equipment was powered separately from another main supply. | | |
| Remark | EUT tested with AC 120V 60Hz | | |
| Result | ☒ Pass ☐ Fail | | |

**Test Data** ☒ Yes ☐ N/A

**Test Plot** ☒ Yes (See below) ☐ N/A

## Conducted Emission Test Results (Line)

| Test specification: | Conducted Emissions | | | |
|---|---|---|---|---|
| Environmental Conditions: | Temp(°C): | 21 | Result: | ☒ Pass ☐ Fail |
| | Humidity (%): | 42 | | |
| | Atmospheric(mbar): | 1021 | | |
| Mains Power: | 120Vac, 60Hz | | | |
| Tested by: | George Arias | | | |
| Test Date: | 01/16/2015 | | | |
| Remarks | Line | | | |

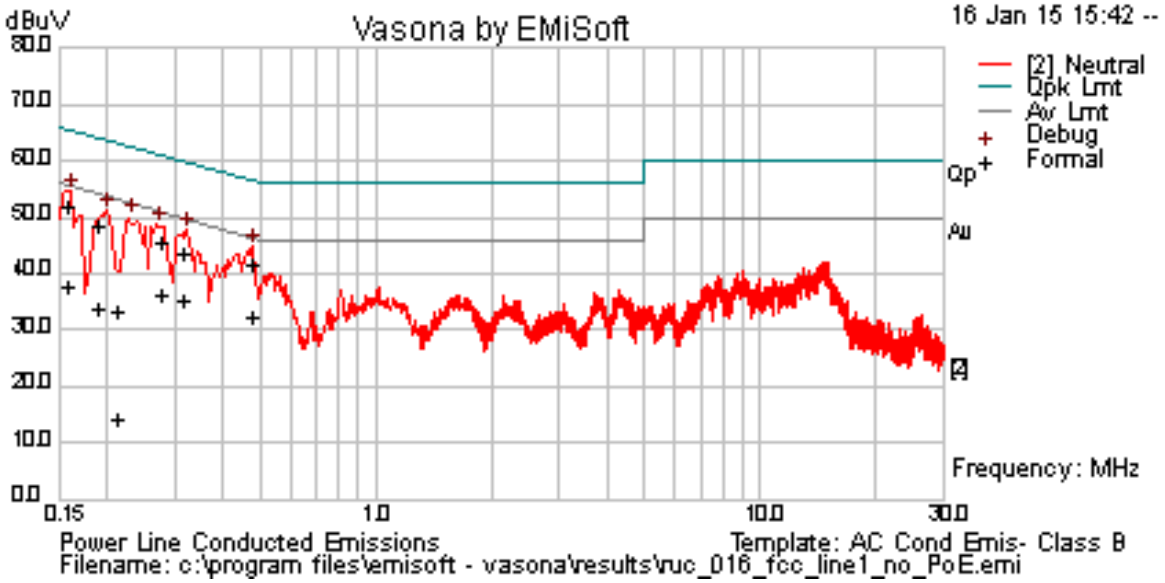



**Live Line Plot at 120Vac, 60Hz**

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line | Limit (dBuV) | Margin (dB) | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|
| 0.15 | 38.10 | 10.00 | 0.76 | 48.86 | Quasi Peak | Line | 65.86 | -17.00 | Pass |
| 0.15 | 25.70 | 10.00 | 0.76 | 36.46 | Average | Line | 55.86 | -19.40 | Pass |
| 0.19 | 33.46 | 10.00 | 0.74 | 44.20 | Quasi Peak | Line | 63.85 | -19.65 | Pass |
| 0.19 | 22.66 | 10.00 | 0.74 | 33.41 | Average | Line | 53.85 | -20.44 | Pass |
| 0.23 | 30.55 | 10.00 | 0.73 | 41.28 | Quasi Peak | Line | 62.54 | -21.25 | Pass |
| 0.23 | 18.13 | 10.00 | 0.73 | 28.87 | Average | Line | 52.54 | -23.67 | Pass |
| 0.27 | 28.02 | 10.00 | 0.72 | 38.74 | Quasi Peak | Line | 61.02 | -22.28 | Pass |
| 0.27 | 19.17 | 10.00 | 0.72 | 29.89 | Average | Line | 51.02 | -21.12 | Pass |
| 0.47 | 27.98 | 10.01 | 0.73 | 38.72 | Quasi Peak | Line | 56.44 | -17.73 | Pass |
| 0.47 | 19.09 | 10.01 | 0.73 | 29.83 | Average | Line | 46.44 | -16.61 | Pass |
| 2.36 | 22.20 | 10.02 | 0.96 | 33.19 | Quasi Peak | Line | 56.00 | -22.81 | Pass |
| 2.36 | 15.70 | 10.02 | 0.96 | 26.68 | Average | Line | 46.00 | -19.32 | Pass |

## Conducted Emission Test Results (Neutral)

| Test specification: | Conducted Emissions | | | |
|---|---|---|---|---|
| Environmental Conditions: | Temp(°C): | 21 | Result: | ☒ Pass ☐ Fail |
| | Humidity (%): | 42 | | |
| | Atmospheric(mbar): | 1021 | | |
| Mains Power: | 120Vac, 60Hz | | | |
| Tested by: | George Arias | | | |
| Test Date: | 01/16/2015 | | | |
| Remarks | Neutral | | | |




**Neutral Line@ 120Vac, 60Hz**

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line | Limit (dBuV) | Margin (dB) | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|
| 0.16 | 41.30 | 10.00 | 0.75 | 52.06 | Quasi Peak | Neutral | 65.55 | -13.49 | Pass |
| 0.16 | 27.15 | 10.00 | 0.75 | 37.91 | Average | Neutral | 55.55 | -17.64 | Pass |
| 0.19 | 37.71 | 10.00 | 0.75 | 48.46 | Quasi Peak | Neutral | 64.08 | -15.62 | Pass |
| 0.19 | 22.91 | 10.00 | 0.75 | 33.66 | Average | Neutral | 54.08 | -20.42 | Pass |
| 0.21 | 22.76 | 10.00 | 0.74 | 33.50 | Quasi Peak | Neutral | 63.10 | -29.60 | Pass |
| 0.21 | 3.72 | 10.00 | 0.74 | 14.46 | Average | Neutral | 53.10 | -38.64 | Pass |
| 0.27 | 34.83 | 10.00 | 0.72 | 45.55 | Quasi Peak | Neutral | 61.00 | -15.45 | Pass |
| 0.27 | 25.41 | 10.00 | 0.72 | 36.13 | Average | Neutral | 51.00 | -14.87 | Pass |
| 0.31 | 33.01 | 10.00 | 0.71 | 43.72 | Quasi Peak | Neutral | 59.91 | -16.19 | Pass |
| 0.31 | 24.38 | 10.00 | 0.71 | 35.09 | Average | Neutral | 49.91 | -14.81 | Pass |
| 0.47 | 30.93 | 10.01 | 0.73 | 41.68 | Quasi Peak | Neutral | 56.43 | -14.75 | Pass |
| 0.47 | 21.70 | 10.01 | 0.73 | 32.44 | Average | Neutral | 46.43 | -13.98 | Pass |

Note: The results above show only the worst case.

## 10.2 26 dB Bandwidth

**Requirement(s):**

| Spec | Item | Requirement | Applicable |
|---|---|---|---|
| § 15.407 | - | 26 dB Emission BW: Report only for reference. | ☒ |
| | a) (2) | 26 dB Emission BW: Report only for power limit calculation. | ☐ |
| Test Setup |   | | |
| Test Procedure | 789033 D02 General UNII Test Procedures New Rules v01<br><br>26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)<br>- Allow the trace to stabilize.<br>- Use the spectrum analyzer built-in measurement function to determine the 26dB BW.<br>○ Set RBW = around 1% of emission bandwidth<br>○ Set VBW > RBW<br>○ Detector = Peak<br>○ Trace mode = max hold<br>- Capture the plot.<br>- Repeat above steps for different test channel and other modulation type. | | |
| Test Date | 01/20/2015 | Environmental condition | Temperature 23ºC<br>Relative Humidity 42%<br>Atmospheric Pressure 1021mbar |
| Remark | N/A | | |
| Result | ☒ Pass ☐ Fail | | |

Equipment Setting

| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|---|---|---|---|---|---|---|---|
| 26 dB Emission Bandwidth | 1% of 26 dB EBW | >RBW | >EBW | PK | Auto | Maxhold | - |

**Test Data** ☒ Yes ☐ N/A
**Test Plot** ☒ Yes ☐ N/A

**26dB Bandwidth measurement result for 5.3GHz**

| Type | Test mode | Freq (MHz) | CH | Result (MHz) | Power calculation (dBm) 11 dBm+10 log B |
|---|---|---|---|---|---|
| 26dB BW | 802.11a | 5260 | Low | 16.68 | 23.22 |
| 26dB BW | 802.11a | 5280 | Mid | 18.91 | 23.77 |
| 26dB BW | 802.11a | 5320 | High | 18.50 | 23.67 |
| 26dB BW | 802.11n-20 | 5260 | Low | 19.70 | 23.94 |
| 26dB BW | 802.11n-20 | 5280 | Mid | 19.96 | 24.00 |
| 26dB BW | 802.11n-20 | 5320 | High | 19.58 | 23.92 |
| 26dB BW | 802.11n-40 | 5270 | Low | 39.07 | 26.92 |
| 26dB BW | 802.11n-40 | 5310 | High | 39.03 | 26.91 |
| 26dB BW | 802.11ac-80 | 5290 | Mid | 80.03 | 30.03 |

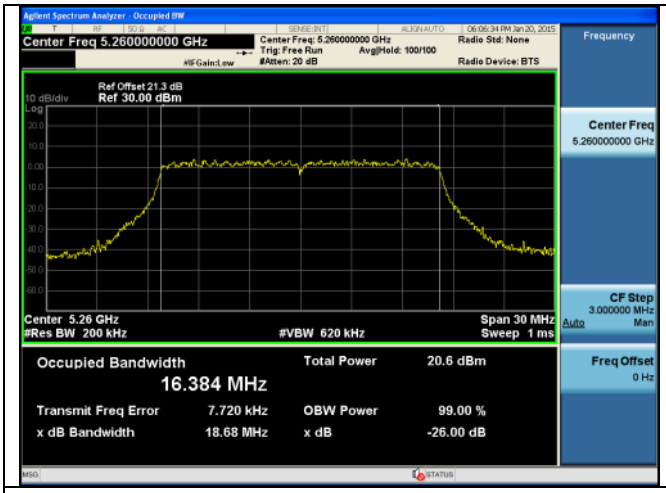
**26dB Bandwidth measurement result for 5.5GHz**

| Type | Test mode | Freq (MHz) | CH | Result (MHz) | Power calculation (dBm) 11 dBm+10 log B |
|---|---|---|---|---|---|
| 26dB BW | 802.11a | 5500 | Low | 18.51 | 23.67 |
| 26dB BW | 802.11a | 5580 | Mid | 18.69 | 23.72 |
| 26dB BW | 802.11a | 5700 | High | 18.74 | 23.73 |
| 26dB BW | 802.11n-20 | 5500 | Low | 19.66 | 23.94 |
| 26dB BW | 802.11n-20 | 5580 | Mid | 19.58 | 23.92 |
| 26dB BW | 802.11n-20 | 5700 | High | 19.79 | 23.96 |
| 26dB BW | 802.11n-40 | 5510 | Low | 38.84 | 26.89 |
| 26dB BW | 802.11n-40 | 5590 | Mid | 38.88 | 26.90 |
| 26dB BW | 802.11n-40 | 5670 | High | 38.96 | 26.91 |
| 26dB BW | 802.11ac-80 | 5530 | Low | 80.10 | 30.04 |

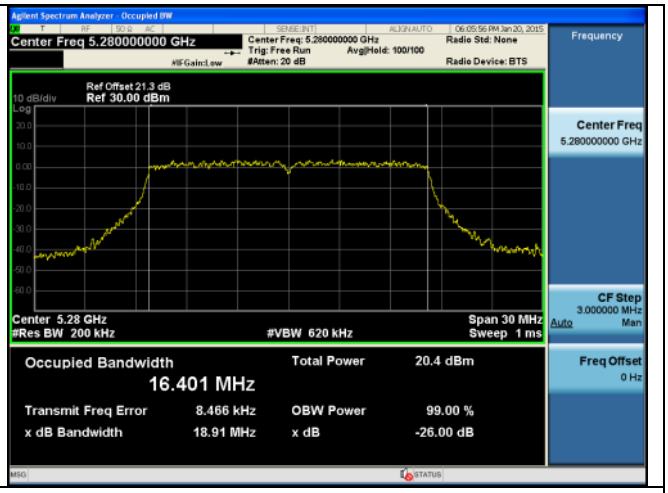
**26dB Bandwidth measurement result for CROSSOVER channels**

| Type | Test mode | Freq (MHz) | CH | Result (MHz) | Power calculation (dBm) 11 dBm+10 log B |
|---|---|---|---|---|---|
| 26dB BW | 802.11a | 5720 | CROSSOVER | 18.90 | 23.76 |
| 26dB BW | 802.11n-20 | 5720 | CROSSOVER | 19.95 | 24.00 |
| 26dB BW | 802.11n-40 | 5710 | CROSSOVER | 38.75 | 26.88 |
| 26dB BW | 802.11ac-80 | 5690 | CROSSOVER | 79.81 | 30.02 |

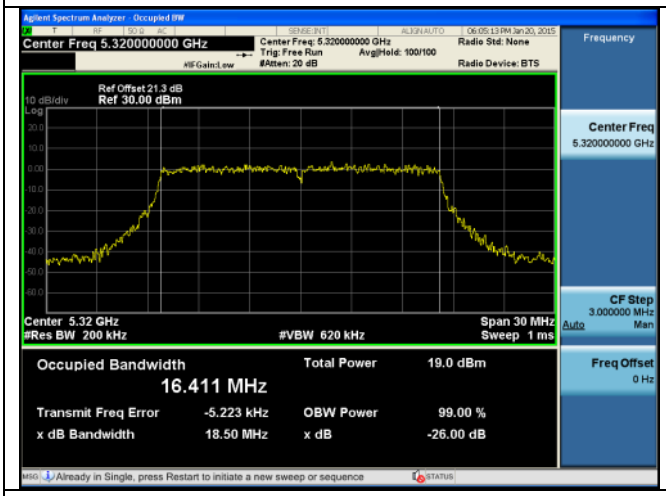
## 26dB Bandwidth Test Plots



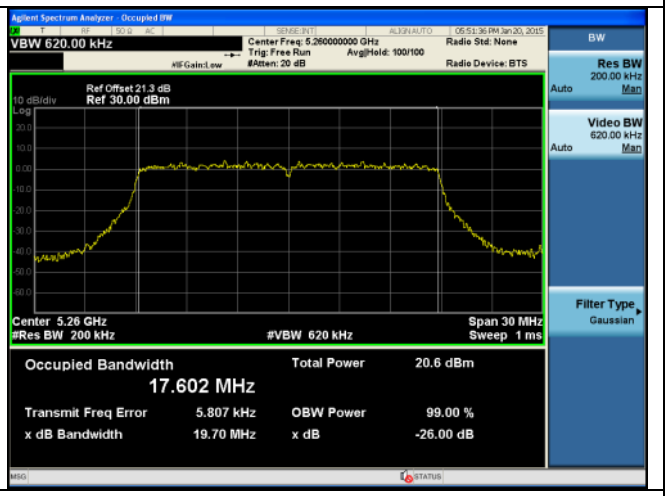

26dB BW -802.11a 5260MHz



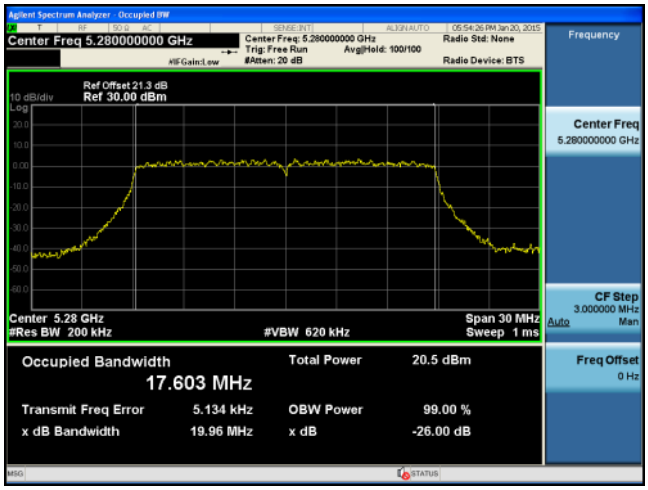

26dB BW -802.11a 5280MHz



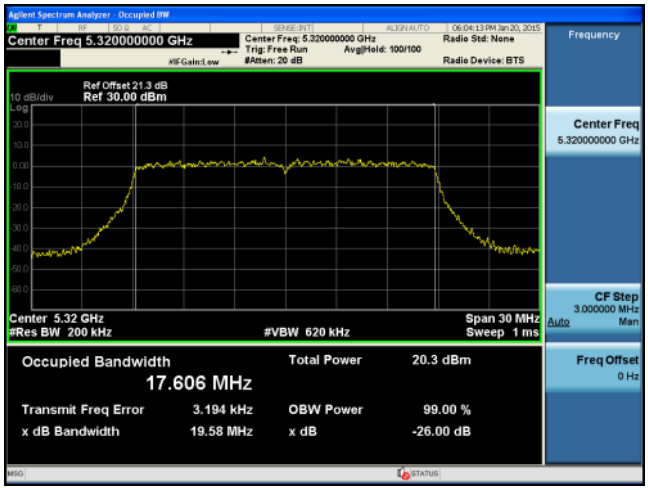

26dB BW -802.11a 5320MHz



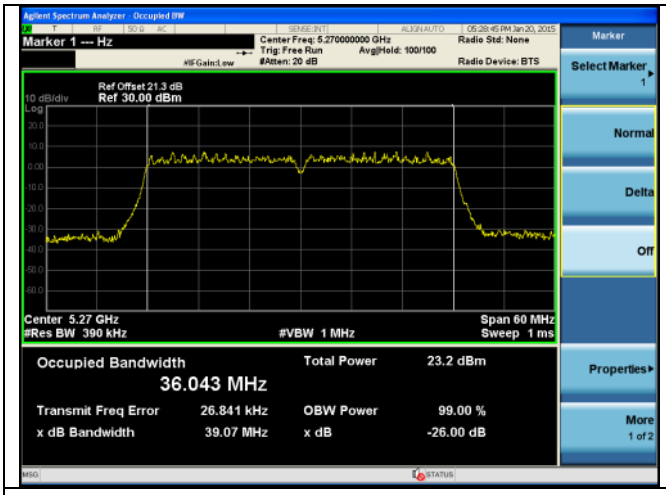

26dB BW -802.11n-20M 5260MHz



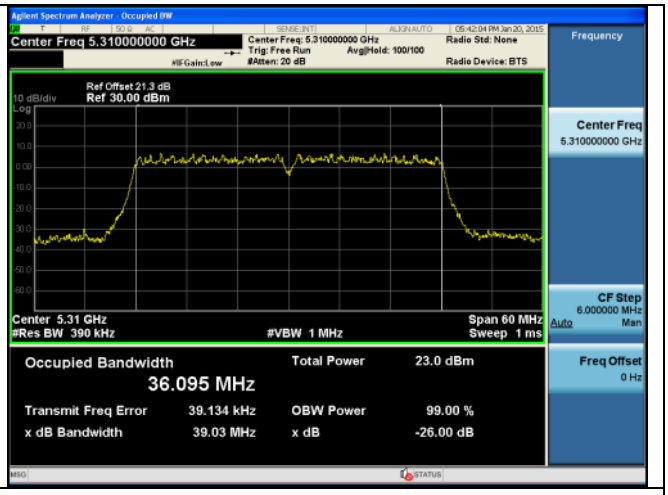

26dB BW -802.11n-20M 5280MHz



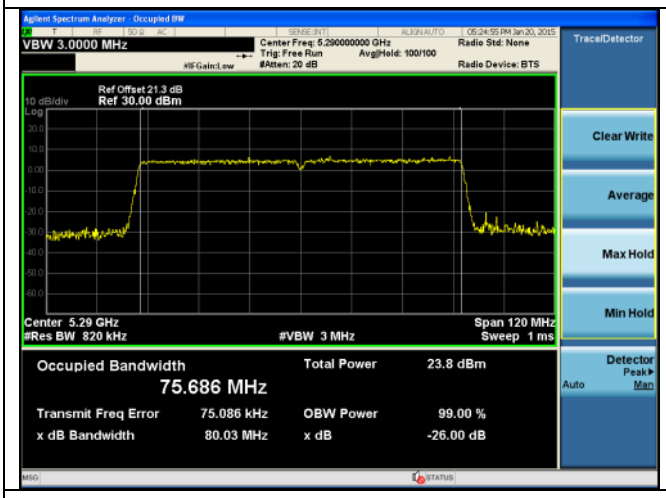

26dB BW -802.11n-20M 5320MHz




26dB BW -802.11n-40M 5270MHz

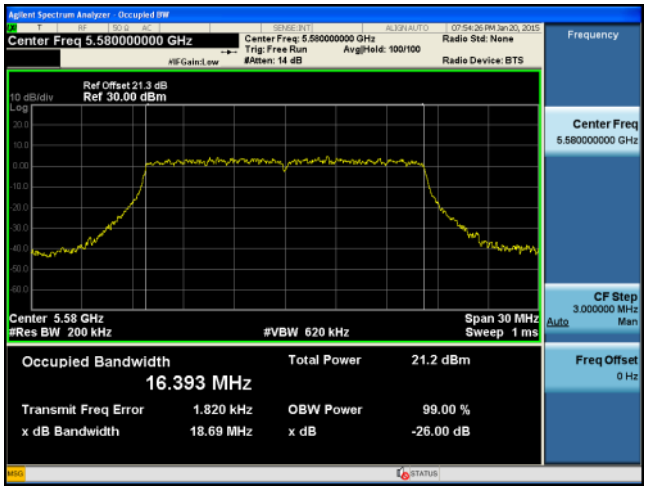



26dB BW -802.11n-40M 5310MHz

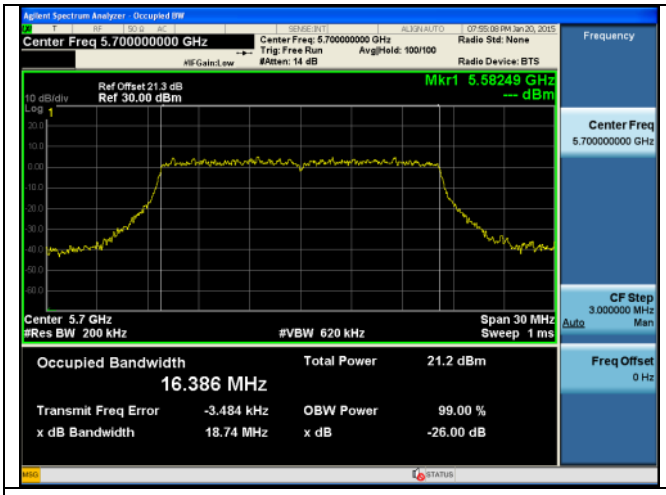



26dB BW -802.11ac-80M 5290MHz

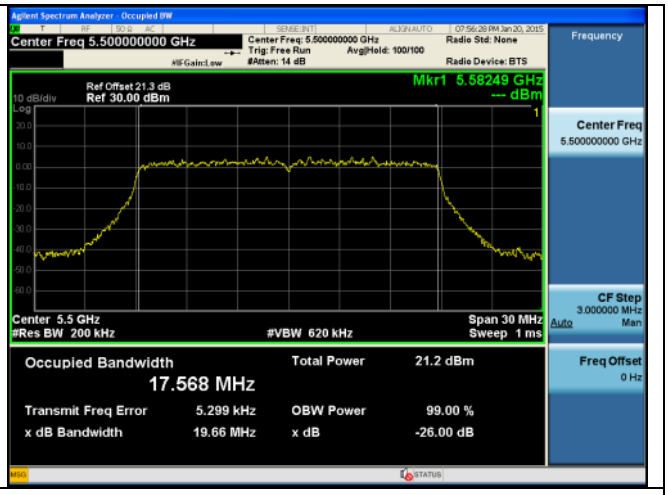

26dB BW -802.11a 5500MHz



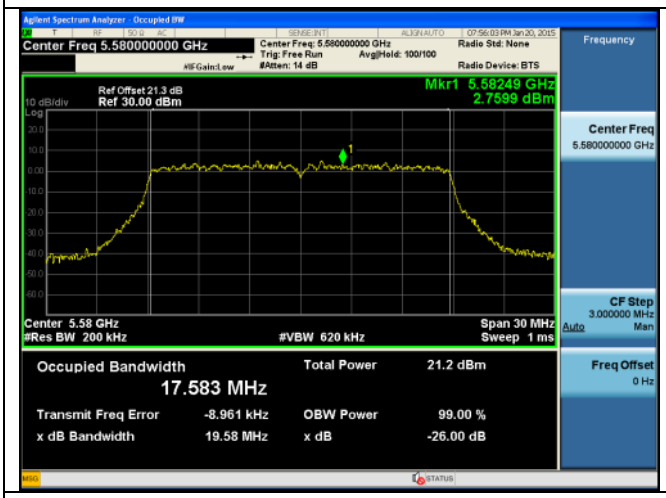

26dB BW -802.11a 5580MHz



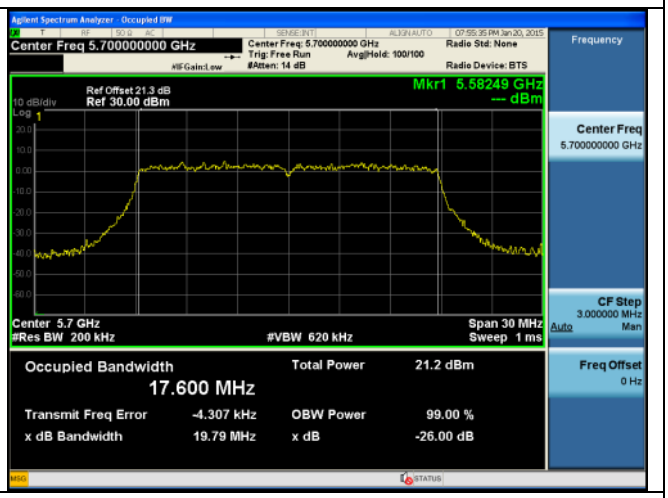

**26dB BW -802.11a 5700MHz**



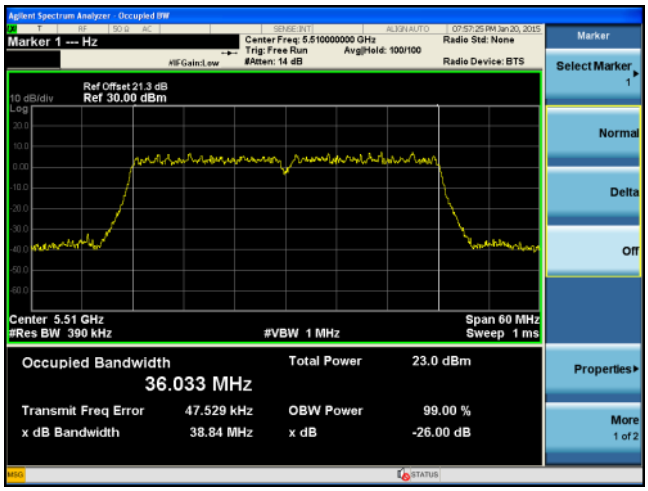

**26dB BW -802.11n-20M 5500MHz**



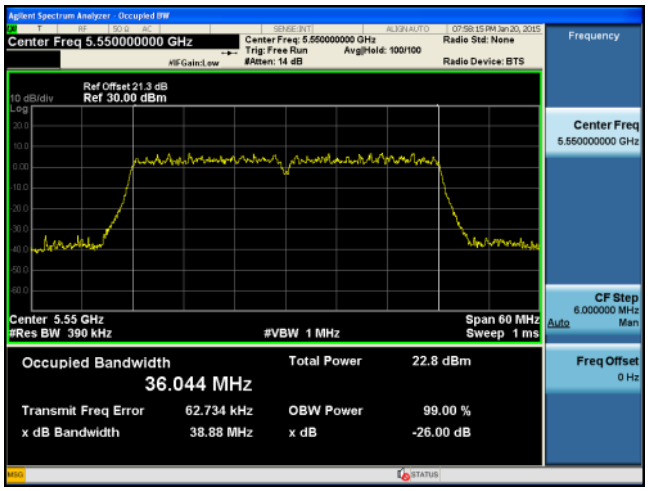

**26dB BW -802.11n-20M 5580MHz**



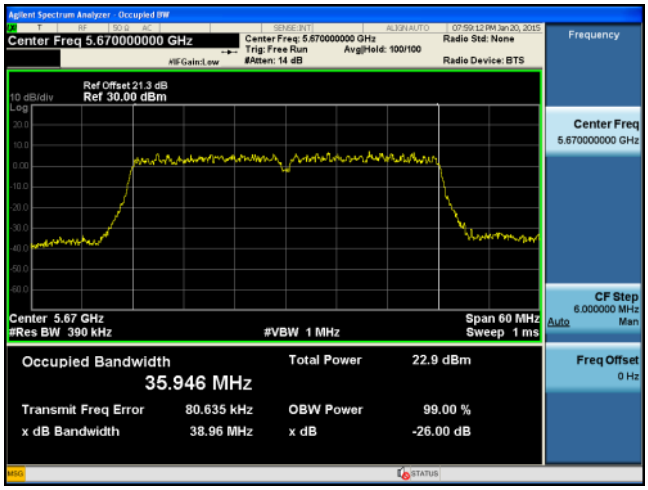

**26dB BW -802.11n-20M 5700MHz**



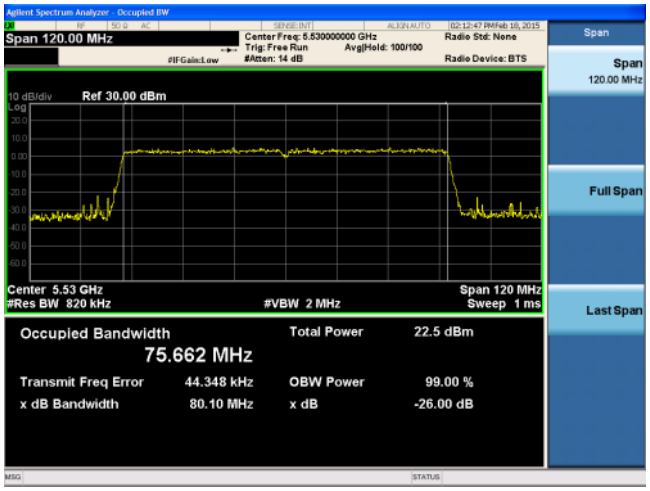

**26dB BW -802.11n-40M 5510MHz**



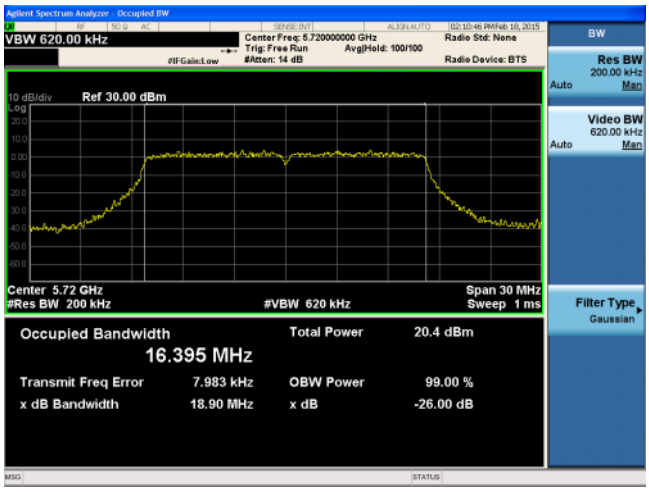

**26dB BW -802.11n-40M 5550MHz**



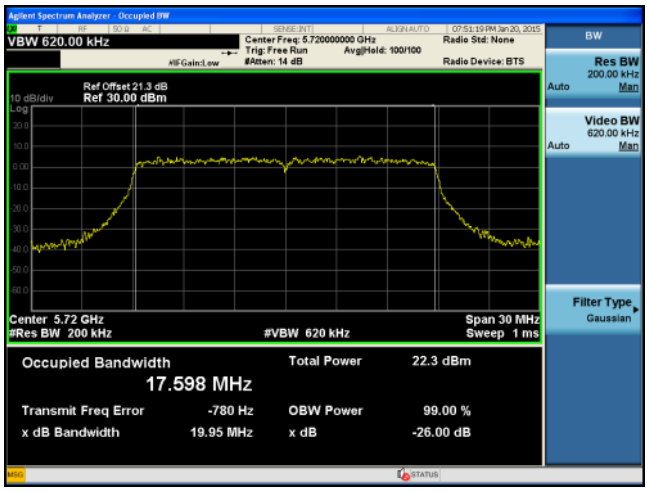

**26dB BW -802.11n-40M 5670MHz**



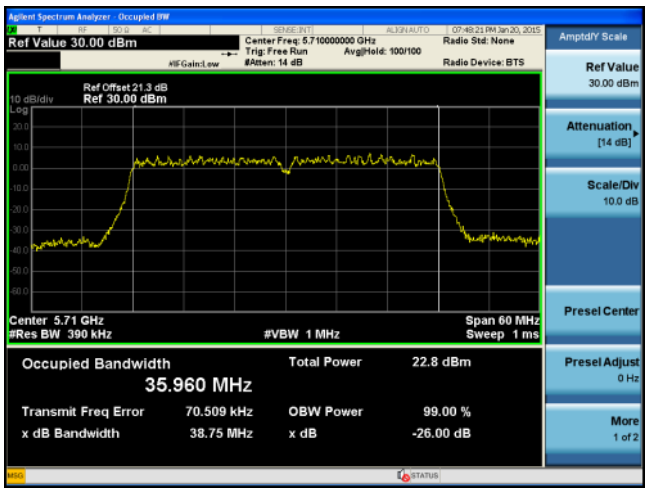

**26dB BW -802.11ac-80M 5530MHz**



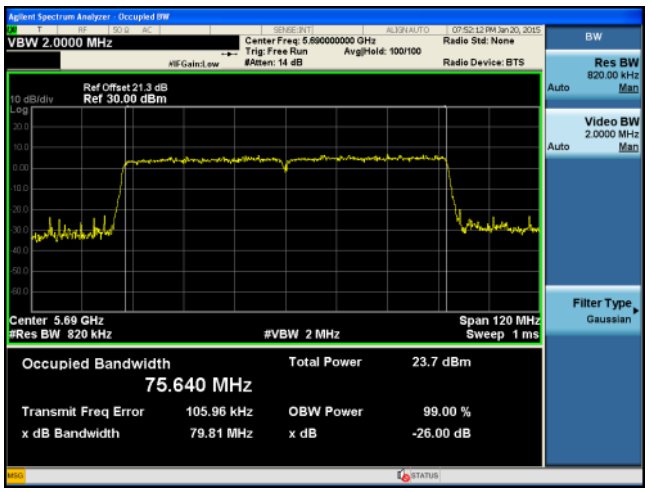

**26dB BW -802.11a CROSSOVER 5720MHz**




**26dB BW -802.11n-20M 5720MHz**




**26dB BW -802.11n-40M CROSSOVER 5710MHz**




**26dB BW -802.11ac CROSSOVER 5690MHz**

## 10.3 Peak Output Power

**Requirement(s):**

| Spec | Item | Requirement | Applicable |
|---|---|---|---|
| § 15.407 | a)(1)(i) | For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm). | ☐ |
| | a)(1)(ii) | For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. | ☐ |
| | a)(1)(iii) | For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. | ☐ |
| | a)(1)(iv) | For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. | ☐ |
| | a)(2) | For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz. | ☒ |
| | a)(3) | For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. | ☒ |

| | | | | |
|---|---|---|---|---|
| Test Setup |  | | | |
| Test Procedure | 789033 D02 General UNII Test Procedures New Rules v01<br><br>Measurement using a Power Meter (PM)<br>Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.<br>- Connect EUT's RF output power to power meter<br>- Set EUT to be continuous transmission mode<br>- Measurement the average output power using power meter and record the result<br>- Repeat above steps for different test channel and other modulation type. | | | |
| Test Date | 01/20/2015 | Environmental condition | Temperature<br>Relative Humidity<br>Atmospheric Pressure | 23°C<br>44%<br>1021mbar |
| Remark | Per KDB 662911 D01 Multiple Transmitter Output v02r01, the direction gain for horizontal polarization and vertical polarization is calculated separately. For 5Ghz band, peak antenna gain = 3.5 dBi, directional gain = 3 dB, total gain = 6.5 dBi<br>Highest of totoal gain is 6.5 dBi. The power limit and PSD limit will be reduced by amount of 0.5 dB.<br>For the cross band channels, the output power of full bandwidth is compared to the power limit in 5.5G and 5.8G as the worst case. | | | |
| Result | ☒ Pass ☐ Fail | | | |

**Test Data** ☒ Yes ☐ N/A
**Test Plot** ☐ Yes (See below) ☒ N/A

**Output Power measurement result for 5.3GHz**

| Type | Test mode | Freq (MHz) | CH | Conducted Power (dBm) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| Output | 802.11a | 5260 | Low | 14.80 | 14.91 | 14.70 | 14.83 | 20.83 | 23.5 | Pass |
| Output | 802.11a | 5280 | Mid | 14.74 | 14.85 | 14.74 | 14.74 | 20.79 | 23.5 | Pass |
| Output | 802.11a | 5320 | High | 14.60 | 14.65 | 14.75 | 14.85 | 20.73 | 23.5 | Pass |
| Output | 802.11n-20M | 5260 | Low | 14.93 | 15.00 | 14.74 | 14.87 | 20.91 | 23.5 | Pass |
| Output | 802.11n-20M | 5280 | Mid | 14.85 | 14.93 | 14.77 | 14.78 | 20.85 | 23.5 | Pass |
| Output | 802.11n-20M | 5320 | High | 14.70 | 14.73 | 14.77 | 14.82 | 20.78 | 23.5 | Pass |
| Output | 802.11n-40M | 5270 | Low | 16.98 | 17.10 | 16.93 | 16.82 | 22.98 | 23.5 | Pass |
| Output | 802.11n-40M | 5310 | Mid | 16.70 | 17.12 | 16.80 | 16.61 | 22.83 | 23.5 | Pass |
| Output | 802.11ac-80M | 5290 | High | 16.70 | 17.06 | 16.93 | 16.63 | 22.85 | 23.5 | Pass |

**Output Power measurement result for 5.5GHz**

| Type | Test mode | Freq (MHz) | CH | Conducted Power (dBm) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| Output | 802.11a | 5500 | Low | 15.32 | 15.33 | 15.40 | 15.38 | 21.38 | 23.5 | Pass |
| Output | 802.11a | 5580 | Mid | 15.35 | 15.38 | 15.26 | 15.26 | 21.33 | 23.5 | Pass |
| Output | 802.11a | 5700 | High | 14.33 | 14.58 | 14.50 | 14.65 | 20.54 | 23.5 | Pass |
| Output | 802.11n-20M | 5500 | Low | 15.45 | 15.43 | 15.44 | 15.85 | 21.57 | 23.5 | Pass |
| Output | 802.11n-20M | 5580 | Mid | 15.50 | 15.47 | 15.33 | 15.79 | 21.55 | 23.5 | Pass |
| Output | 802.11n-20M | 5700 | High | 15.42 | 15.71 | 15.67 | 15.71 | 21.65 | 23.5 | Pass |
| Output | 802.11n-40M | 5510 | Low | 16.49 | 16.59 | 16.50 | 16.76 | 22.61 | 23.5 | Pass |
| Output | 802.11n-40M | 5550 | Mid | 16.45 | 16.61 | 16.41 | 16.83 | 22.60 | 23.5 | Pass |
| Output | 802.11n-40M | 5670 | High | 16.54 | 16.82 | 16.43 | 16.75 | 22.66 | 23.5 | Pass |
| Output | 802.11ac-80M | 5530 | Low | 16.55 | 16.53 | 16.31 | 16.81 | 22.57 | 23.5 | Pass |

**Output Power measurement result for CROSSOVER channels (in band 5470-5725MHz)**

| Type | Test mode | Freq (MHz) | CH | Conducted Power (dBm) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| Output | 802.11a | 5720 | CROSSOVER | 14.76 | 14.55 | 14.70 | 14.33 | 20.61 | 23.5 | Pass |
| Output | 802.11n-20M | 5720 | CROSSOVER | 15.48 | 15.63 | 15.58 | 15.82 | 21.65 | 23.5 | Pass |
| Output | 802.11n-40M | 5710 | CROSSOVER | 16.38 | 16.54 | 16.51 | 16.70 | 22.55 | 23.5 | Pass |
| Output | 802.11ac-80M | 5690 | CROSSOVER | 16.46 | 16.59 | 16.38 | 16.58 | 22.52 | 23.5 | Pass |

**Output Power measurement result for CROSSOVER channels (in band 5725-5850MHz)**

| Type | Test mode | Freq (MHz) | CH | Conducted Power (dBm) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| Output | 802.11a | 5720 | CROSSOVER | 14.76 | 14.55 | 14.70 | 14.33 | 20.61 | 29.5 | Pass |
| Output | 802.11n-20M | 5720 | CROSSOVER | 15.48 | 15.63 | 15.58 | 15.82 | 21.65 | 29.5 | Pass |
| Output | 802.11n-40M | 5710 | CROSSOVER | 16.38 | 16.54 | 16.51 | 16.70 | 22.55 | 29.5 | Pass |
| Output | 802.11ac-80M | 5690 | CROSSOVER | 16.46 | 16.59 | 16.38 | 16.58 | 22.52 | 29.5 | Pass |

## 10.4 Peak Spectral Density

**Requirement(s):**

| Spec | Item | Requirement | Applicable |
|---|---|---|---|
| § 15.407 | a)(1)(i) | For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. | ☐ |
| | a)(1)(ii) | For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. | ☐ |
| | a)(2) | For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. | ☒ |
| | a)(3) | For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. | ☒ |

| | | | | |
|---|---|---|---|---|
| Test Setup |  | | | |
| Test Procedure | 789033 D02 General UNII Test Procedures New Rules v01, II.F. Method SA-1<br><br>Maximum spectral density measurement procedure<br>- Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.<br>- Set RBW = 1 MHz<br>- Set VBW ⩾ 3 MHz<br>- Detector = RMS.<br>- Sweep time = auto couple.<br>- Trace mode = max hold.<br>- Trace average at least 100 traces in power averaging<br>- Use the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used. | | | |
| Test Date | 01/20/2015 | Environmental condition | Temperature<br>Relative Humidity<br>Atmospheric Pressure | 22ºC<br>46%<br>1020mbar |
| Remark | Per KDB 662911 D01 Multiple Transmitter Output v02r01, the direction gain for horizontal polarization and vertical polarization is calculated separately.<br>For 5Ghz band, peak antenna gain = 3.5 dBi, directional gain = 3 dB, total gain = 6.5 dBi<br>Highest of totoal gain is 6.5 dBi. The power limit and PSD limit will be reduced by amount of 0.5 dB.<br><br>For the cross band channels, the PSD of full bandwidth is compared to the PSD limit in 5.5G and 5.8G as the worst case. For 5.8GHz band, the PSD measurement on cross band channel is using 1MHz BW as the worst case. | | | |
| Result | ☒ Pass ☐ Fail | | | |

Equipment Setting

| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|---|---|---|---|---|---|---|---|
| PSD | 1MHz | ≥3MHz | >EBW | RMS | Auto | Average | - |

**Test Data** ☒ Yes ☐ N/A

**Test Plot** ☒ Yes (See below) ☐ N/A

**PSD measurement result for 5.3GHz**

| Type | Test mode | Freq (MHz) | CH | Conducted PSD (dBm/MHz) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| PSD | 802.11a | 5260 | Low | 3.98 | 3.79 | 3.88 | 3.96 | 9.92 | 10.5 | Pass |
| PSD | 802.11a | 5280 | Mid | 3.81 | 4.00 | 3.88 | 3.68 | 9.86 | 10.5 | Pass |
| PSD | 802.11a | 5320 | High | 3.54 | 3.67 | 3.71 | 3.93 | 9.74 | 10.5 | Pass |
| PSD | 802.11n-20M | 5260 | Low | 3.59 | 3.68 | 3.41 | 3.51 | 9.57 | 10.5 | Pass |
| PSD | 802.11n-20M | 5280 | Mid | 3.45 | 3.81 | 3.71 | 3.40 | 9.62 | 10.5 | Pass |
| PSD | 802.11n-20M | 5320 | High | 3.68 | 3.78 | 3.58 | 3.45 | 9.64 | 10.5 | Pass |
| PSD | 802.11n-40M | 5270 | Low | 2.69 | 2.66 | 2.64 | 2.58 | 8.66 | 10.5 | Pass |
| PSD | 802.11n-40M | 5310 | Mid | 2.63 | 2.92 | 2.49 | 2.45 | 8.65 | 10.5 | Pass |
| PSD | 802.11ac-80M | 5290 | High | -0.68 | -0.06 | -0.49 | -0.80 | 5.52 | 10.5 | Pass |

**PSD measurement result for 5.5GHz**

| Type | Test mode | Freq (MHz) | CH | Conducted PSD (dBm/MHz) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| PSD | 802.11a | 5500 | Low | 4.25 | 4.32 | 4.35 | 4.42 | 10.36 | 10.5 | Pass |
| PSD | 802.11a | 5580 | Mid | 4.45 | 4.40 | 4.42 | 4.34 | 10.42 | 10.5 | Pass |
| PSD | 802.11a | 5700 | High | 3.23 | 3.77 | 3.38 | 3.78 | 9.57 | 10.5 | Pass |
| PSD | 802.11n-20M | 5500 | Low | 4.14 | 4.12 | 4.09 | 4.47 | 10.23 | 10.5 | Pass |
| PSD | 802.11n-20M | 5580 | Mid | 4.38 | 4.20 | 4.29 | 4.45 | 10.35 | 10.5 | Pass |
| PSD | 802.11n-20M | 5700 | High | 4.44 | 4.27 | 4.29 | 4.48 | 10.39 | 10.5 | Pass |
| PSD | 802.11n-40M | 5510 | Low | 2.06 | 2.18 | 2.19 | 2.37 | 8.22 | 10.5 | Pass |
| PSD | 802.11n-40M | 5550 | Mid | 2.28 | 2.27 | 1.96 | 2.52 | 8.28 | 10.5 | Pass |
| PSD | 802.11n-40M | 5670 | High | 2.21 | 2.48 | 2.20 | 2.51 | 8.37 | 10.5 | Pass |
| PSD | 802.11ac-80M | 5530 | Low | -1.11 | -0.86 | -1.52 | -0.72 | 4.98 | 10.5 | Pass |

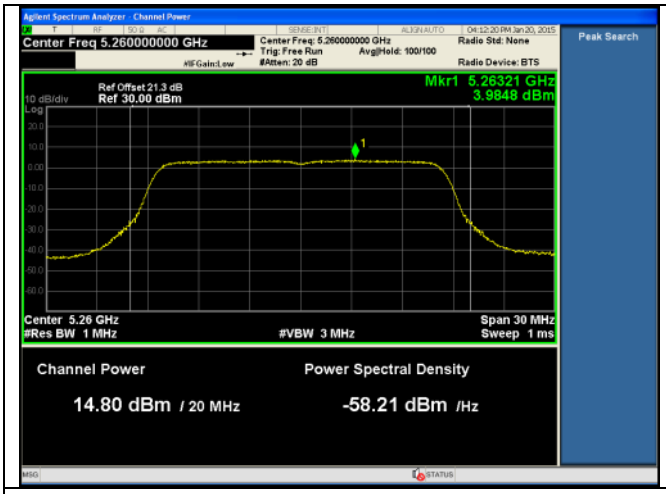
**PSD measurement result for CROSSOVER channels (in band 5470-5725MHz)**

| Type | Test mode | Freq (MHz) | CH | Conducted PSD (dBm/MHz) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| PSD | 802.11a | 5720 | CROSSOVER | 3.78 | 3.62 | 3.91 | 3.38 | 9.70 | 10.5 | Pass |
| PSD | 802.11n-20M | 5720 | CROSSOVER | 4.37 | 4.41 | 4.26 | 4.52 | 10.41 | 10.5 | Pass |
| PSD | 802.11n-40M | 5710 | CROSSOVER | 2.02 | 2.20 | 2.21 | 2.54 | 8.27 | 10.5 | Pass |
| PSD | 802.11ac-80M | 5690 | CROSSOVER | -1.01 | -1.06 | -0.87 | -0.69 | 5.12 | 10.5 | Pass |

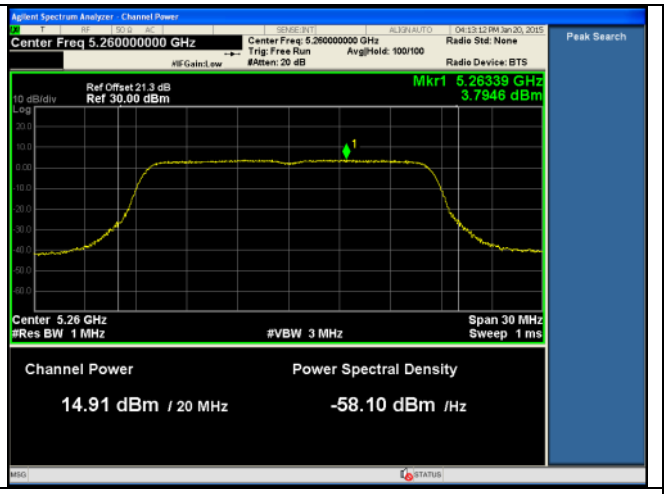
**PSD measurement result for CROSSOVER channels (in band 5725-5850MHz)**

| Type | Test mode | Freq (MHz) | CH | Conducted PSD (dBm/MHz) | | | | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Chain1 | Chain2 | Chain3 | Chain4 | Combined Power | | |
| PSD | 802.11a | 5720 | CROSSOVER | 3.78 | 3.62 | 3.91 | 3.38 | 9.70 | 29.5 | Pass |
| PSD | 802.11n-20M | 5720 | CROSSOVER | 4.37 | 4.41 | 4.26 | 4.52 | 10.41 | 29.5 | Pass |
| PSD | 802.11n-40M | 5710 | CROSSOVER | 2.02 | 2.20 | 2.21 | 2.54 | 8.27 | 29.5 | Pass |
| PSD | 802.11ac-80M | 5690 | CROSSOVER | -1.01 | -1.06 | -0.87 | -0.69 | 5.12 | 29.5 | Pass |

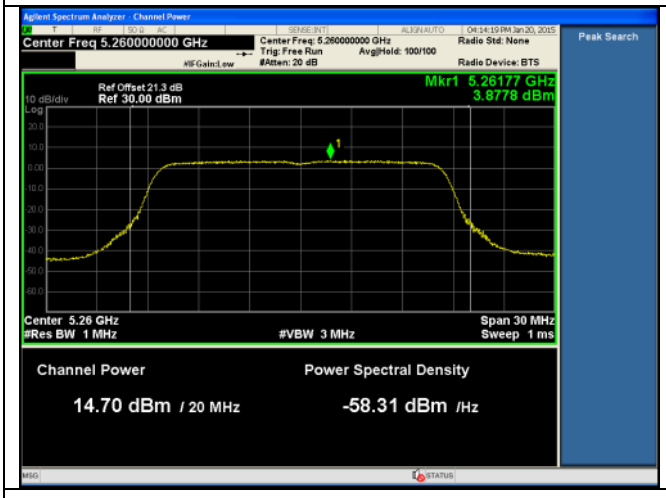
## Test Plots



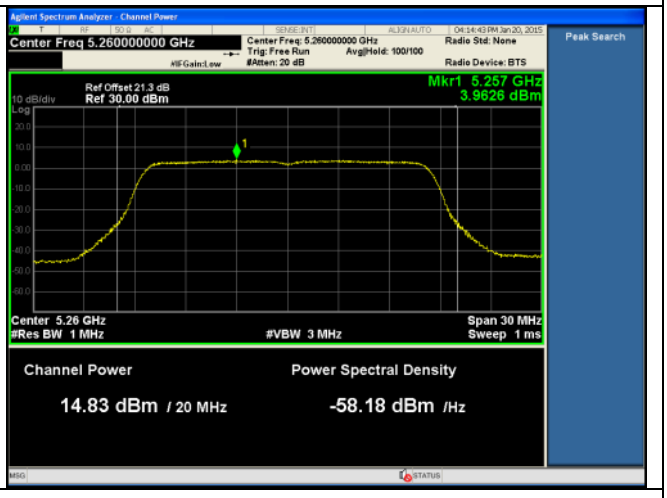

PSD-802.11a-5260M-chain1



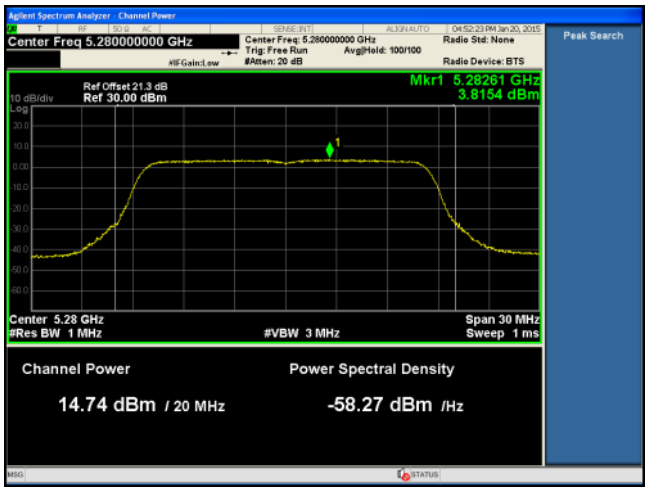

PSD-802.11a-5260M-chain2



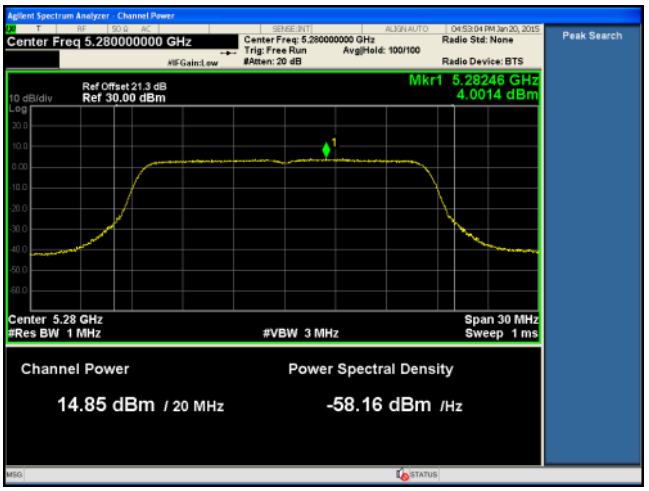

PSD-802.11a-5260M-chain3



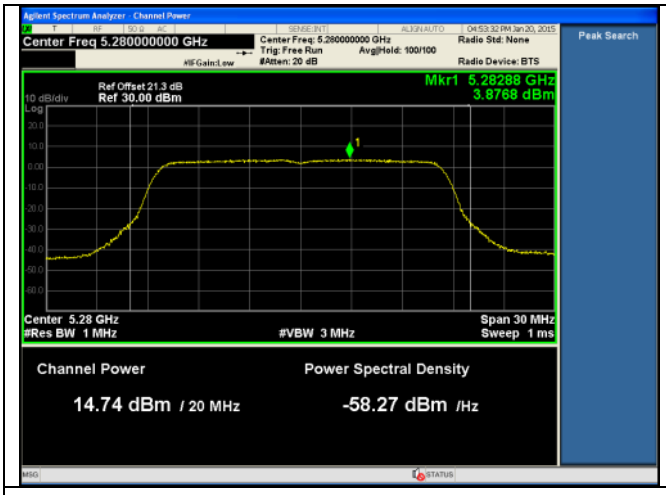

PSD-802.11a-5260M-chain4




PSD-802.11a-5280M-chain1




PSD-802.11a-5280M-chain2

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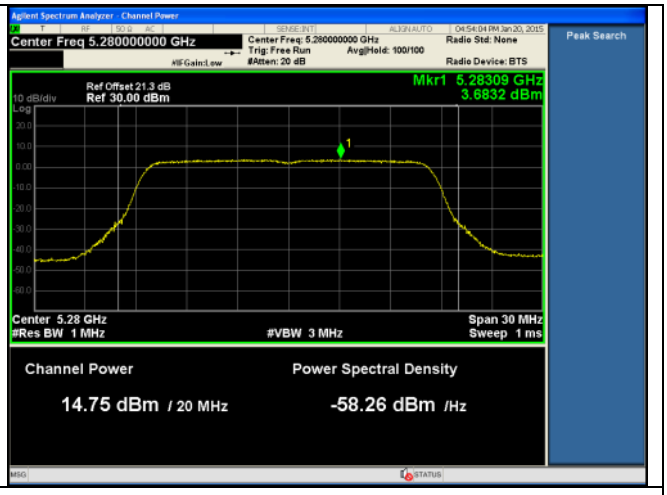
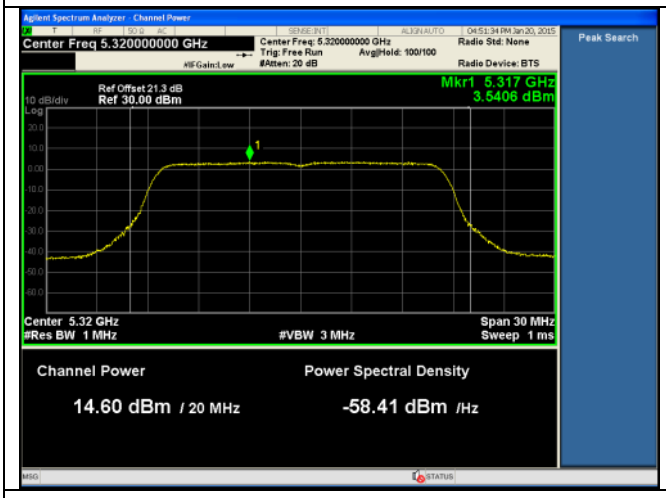
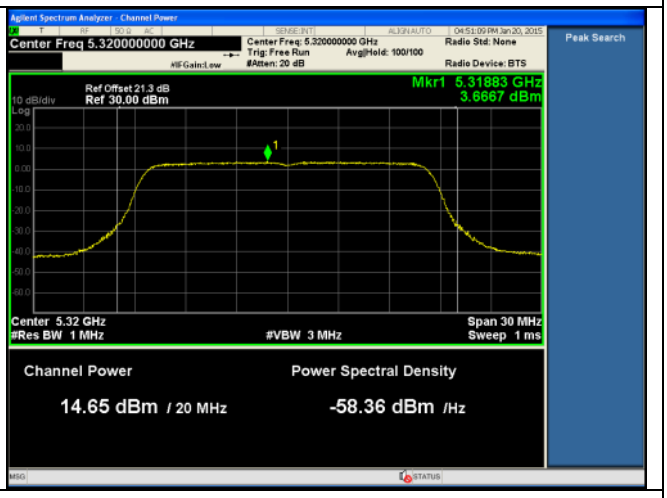



PSD-802.11a-5280M-chain4




PSD-802.11a-5320M-chain1

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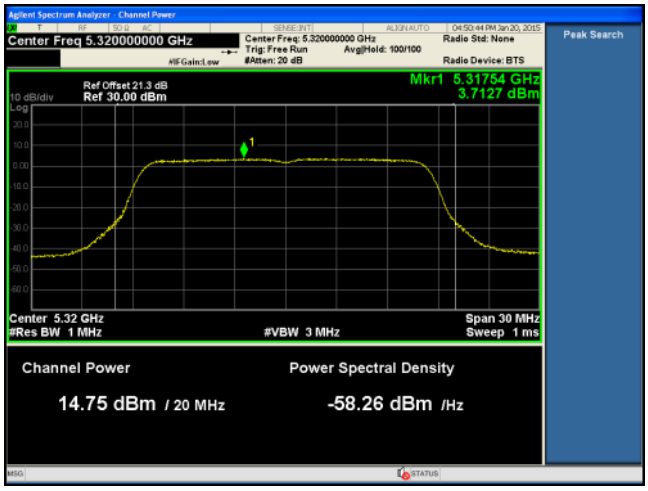


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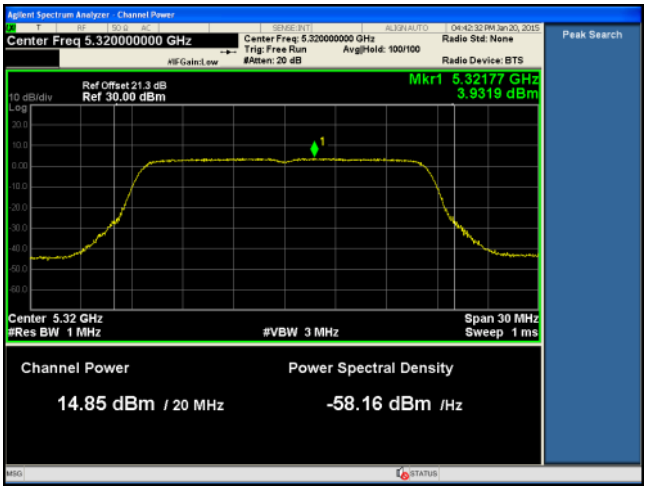


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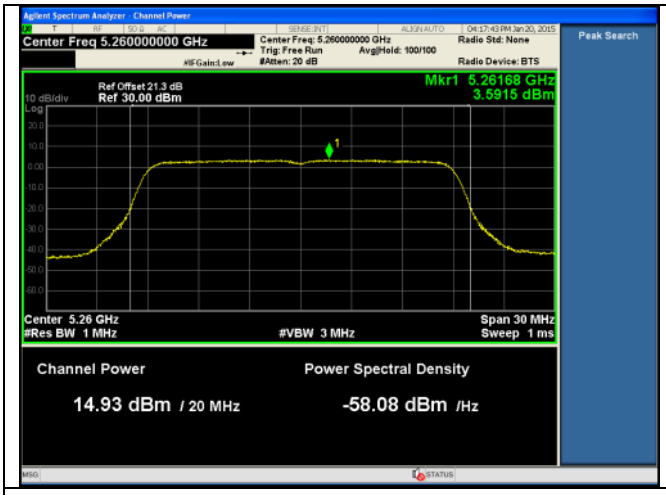
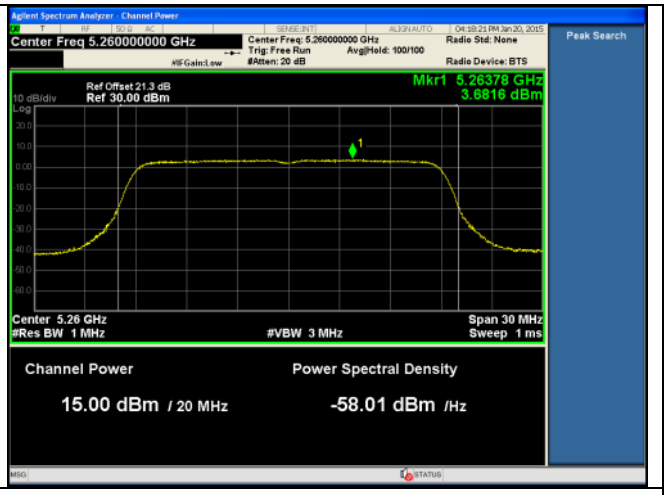



PSD-802.11n-20M-5260M-chain1

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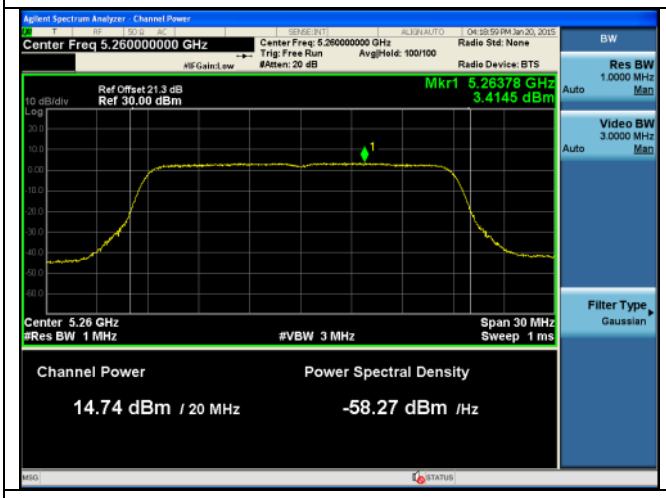
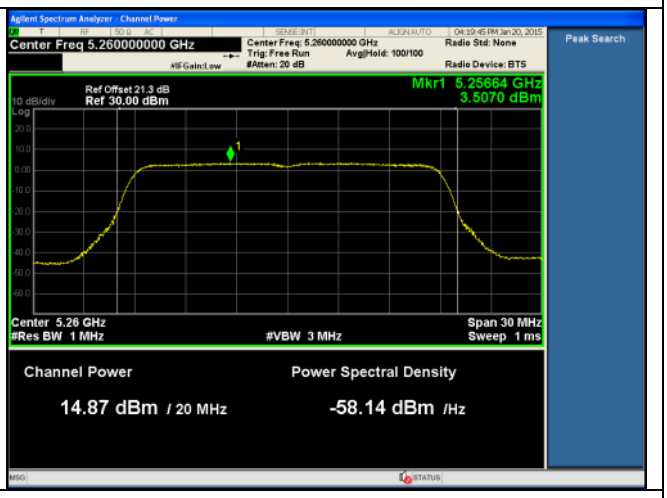



PSD-802.11n-20M-5260M-chain3

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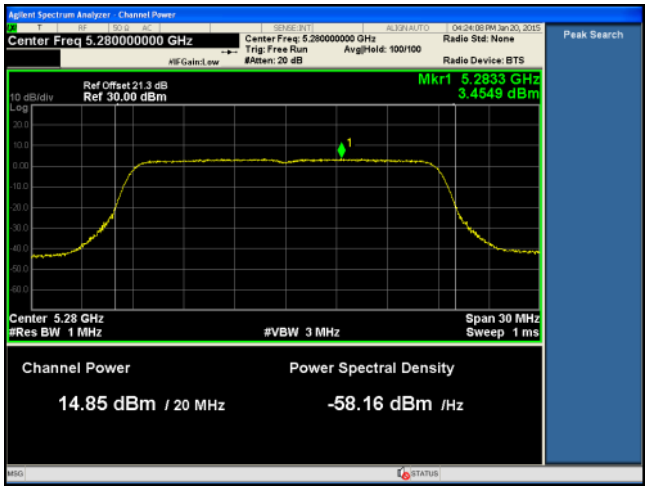
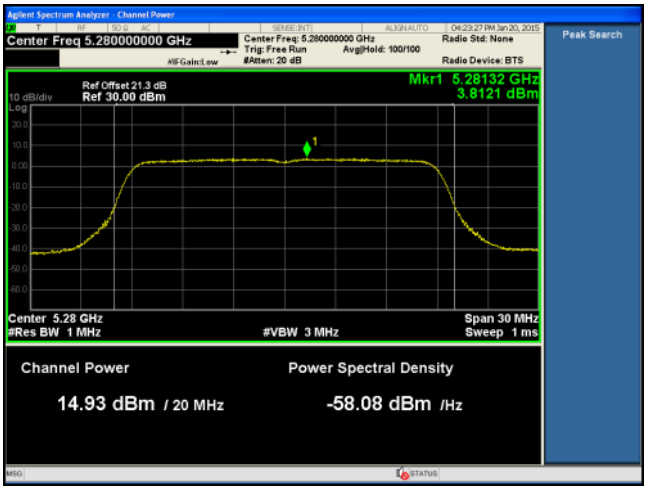



PSD-802.11n-20M-5280M-chain1

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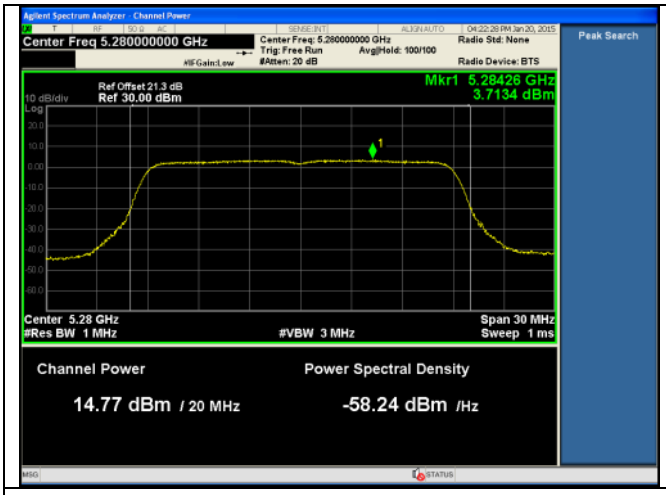


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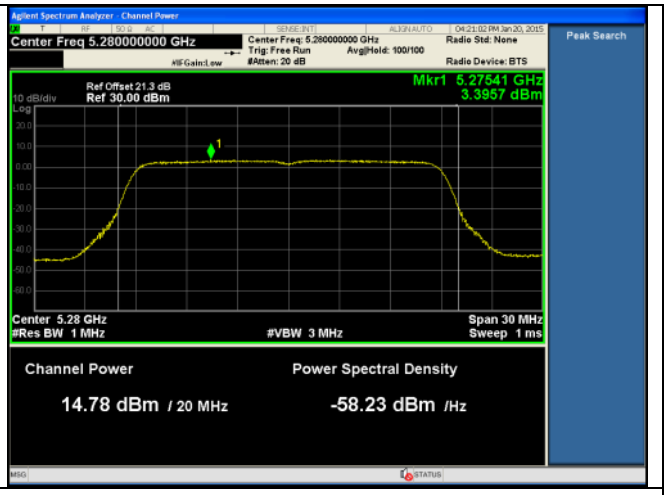


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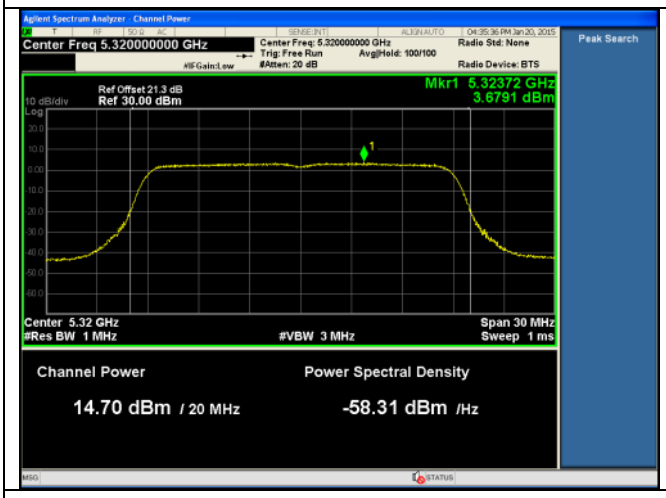
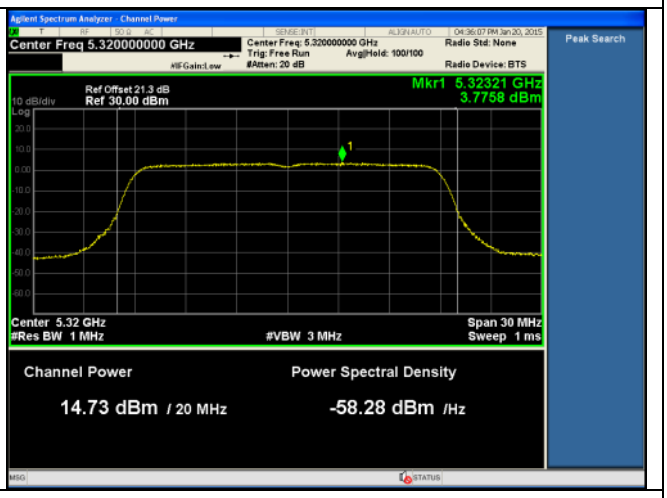



PSD-802.11n-20M-5320M-chain1

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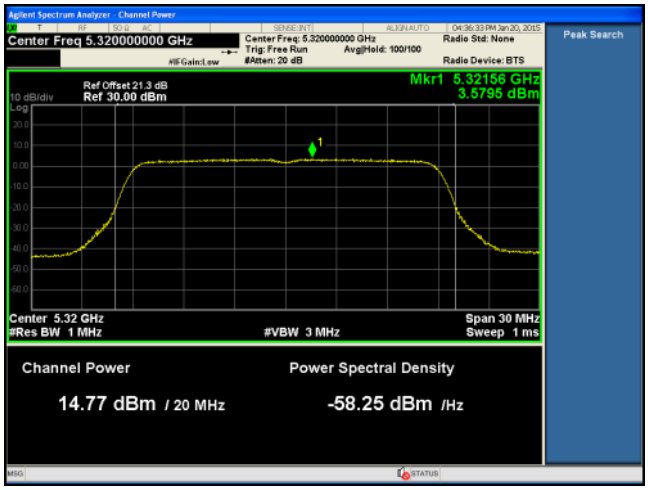


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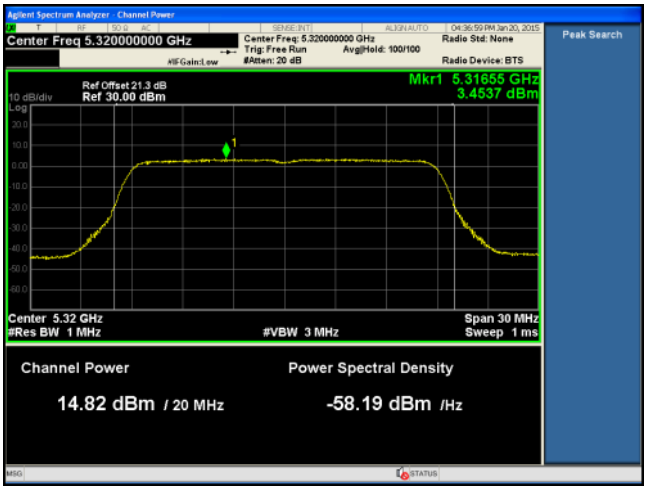


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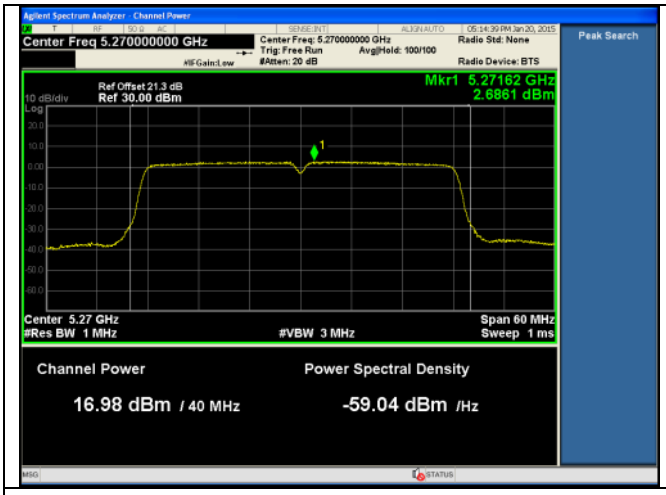
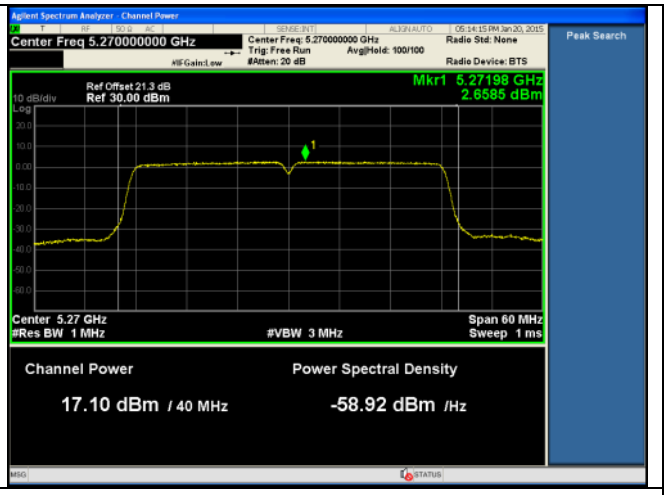



PSD-802.11n-40M-5270M-chain1

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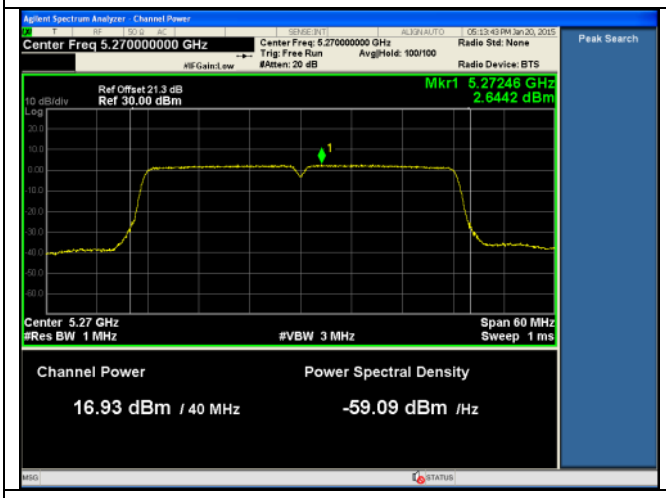


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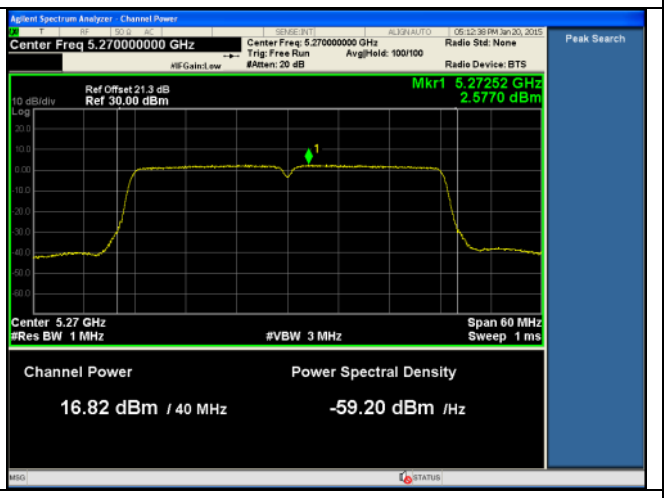


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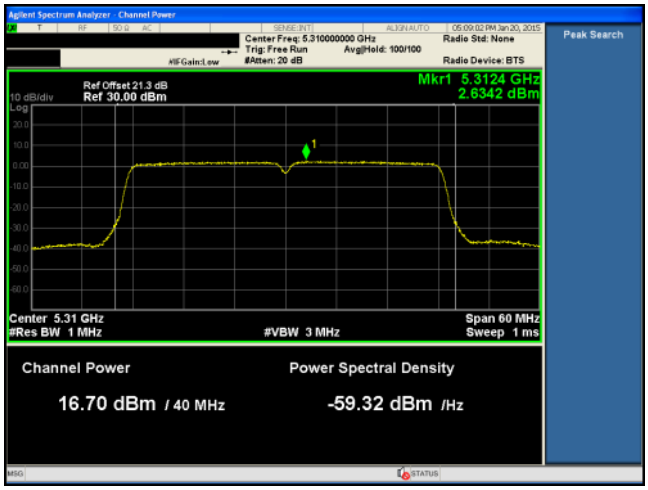
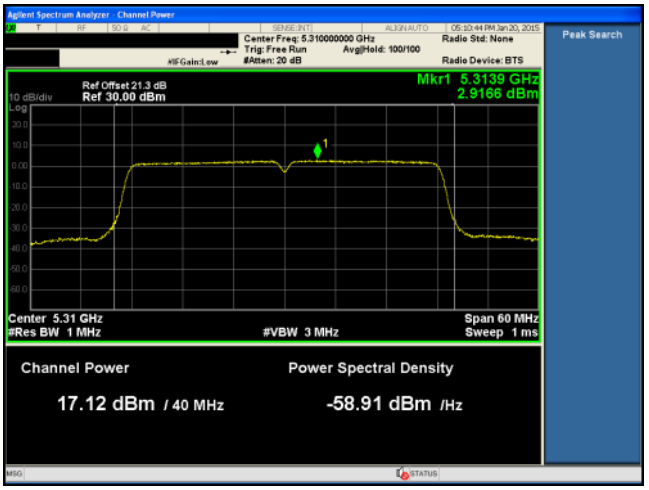



PSD-802.11n-40M-5310M-chain1

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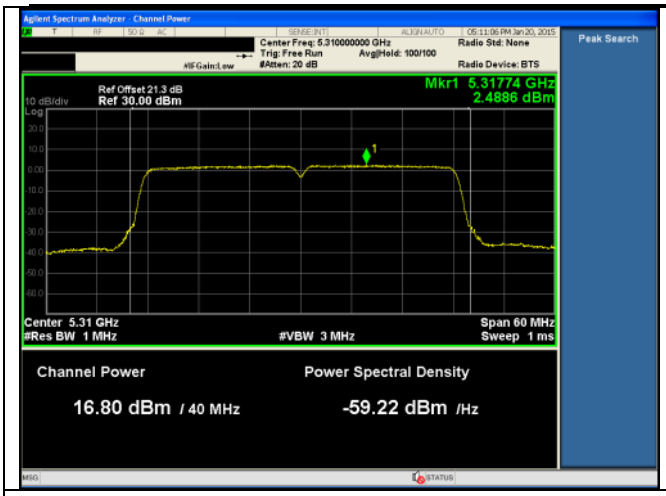


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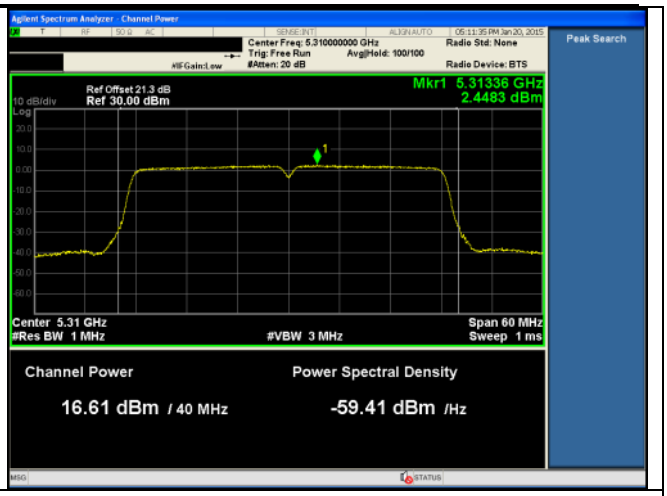


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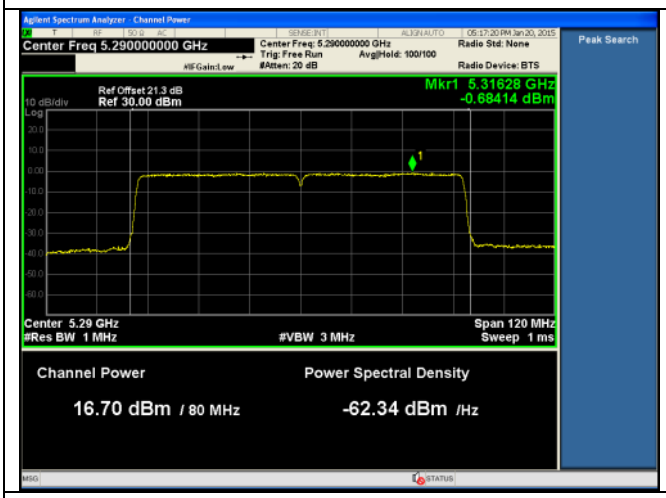
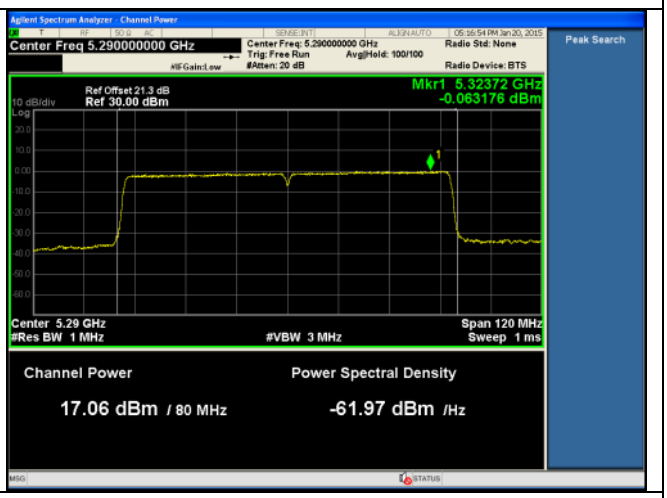



PSD-802.11ac-80M-5290M-chain1

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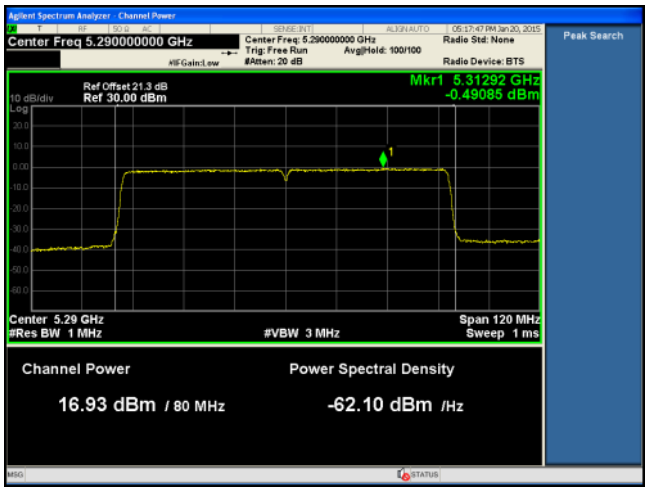


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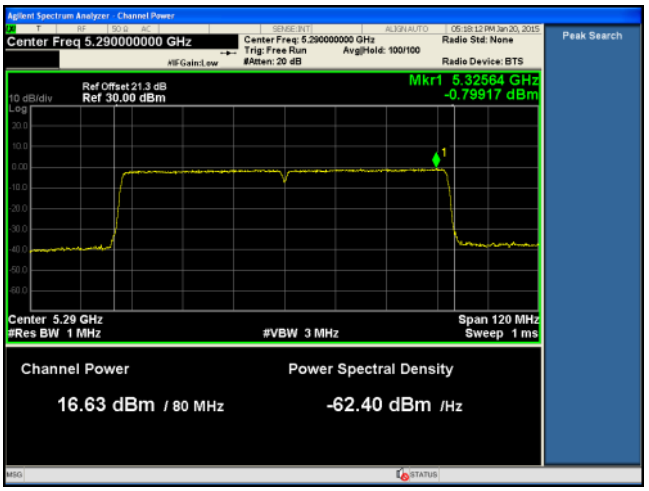


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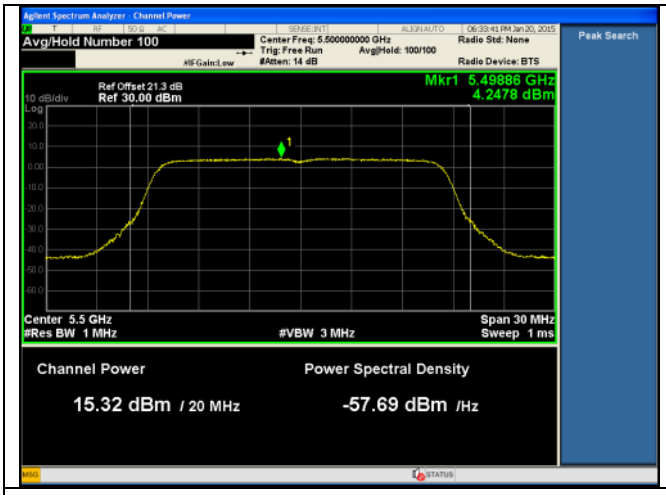
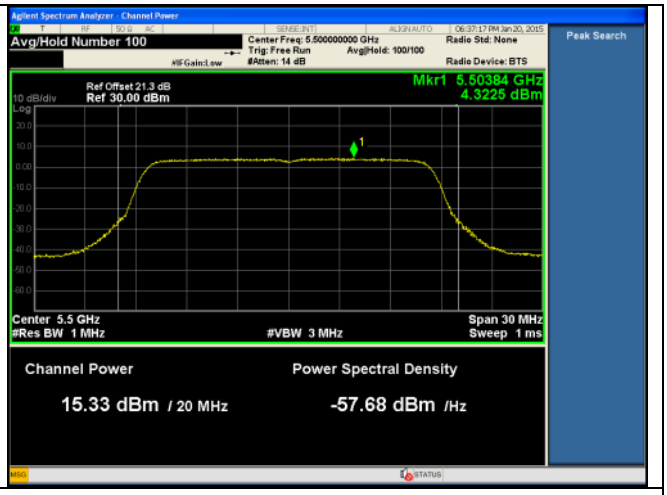
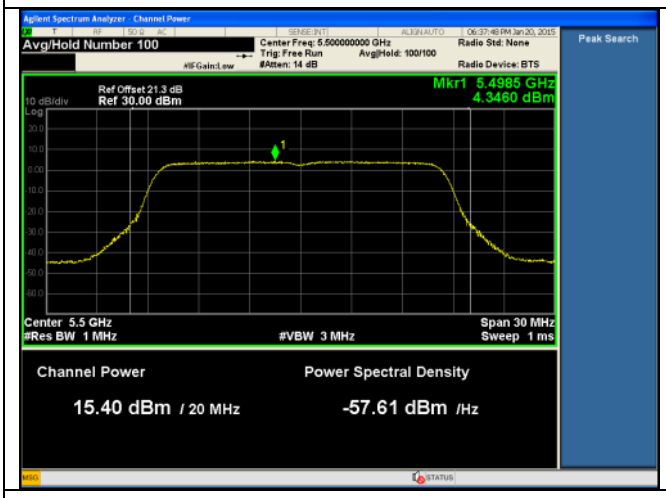


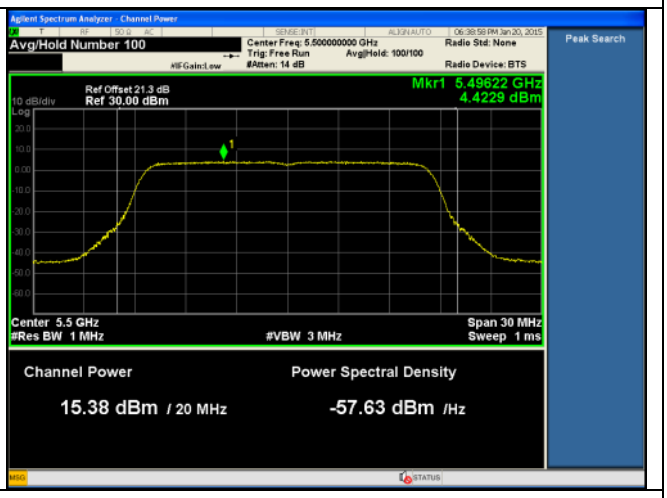

PSD-802.11a-5500M-chain1



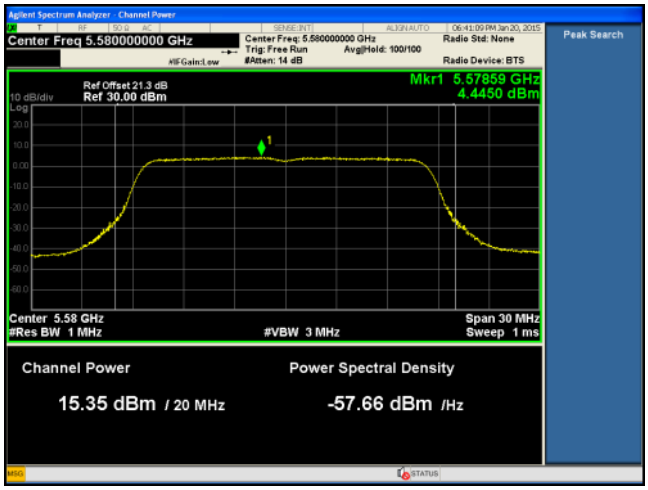

PSD-802.11a-5500M-chain2



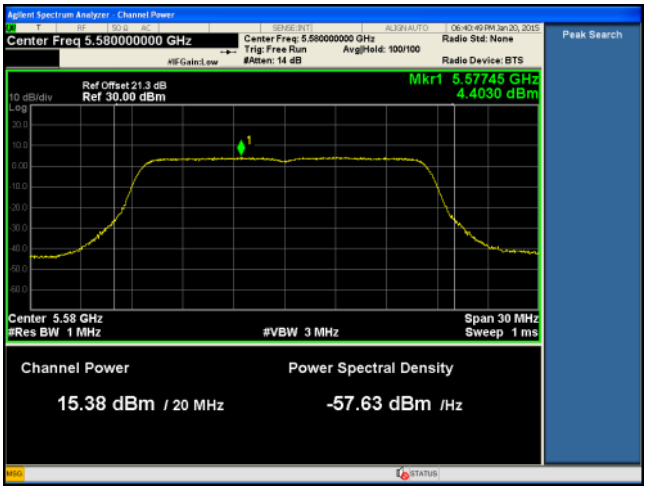

PSD-802.11a-5500M-chain3



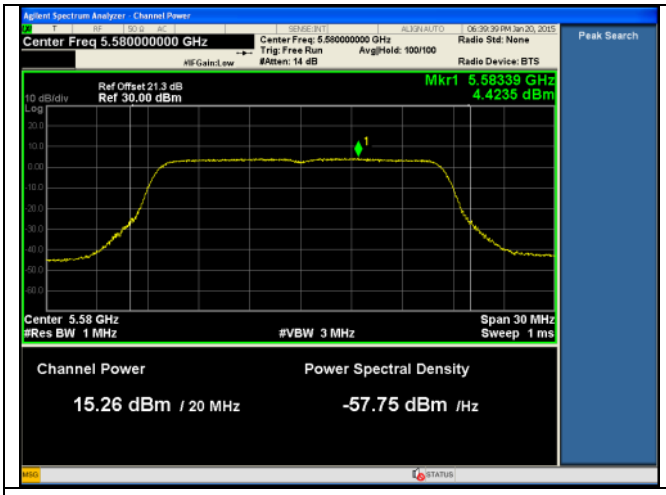

PSD-802.11a-5500M-chain4



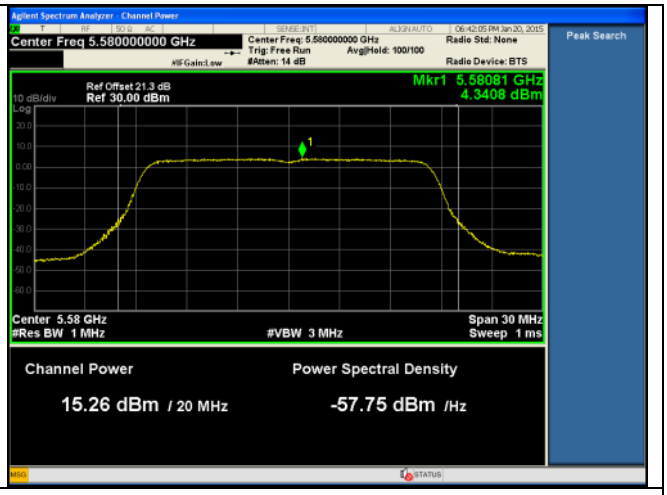

PSD-802.11a-5580M-chain1




PSD-802.11a-5580M-chain2




PSD-802.11a-5580M-chain3

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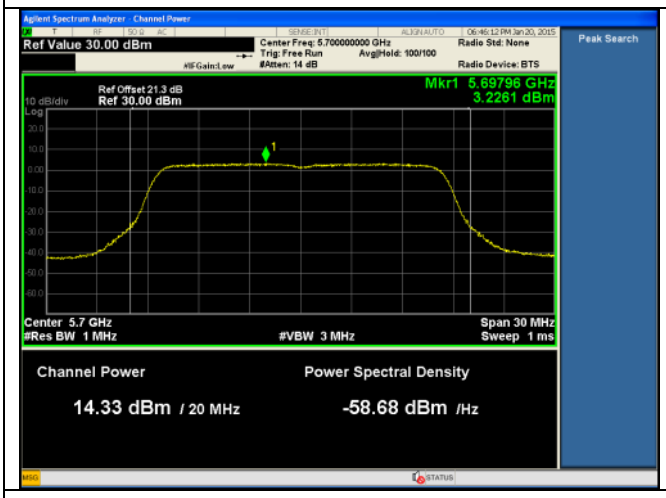
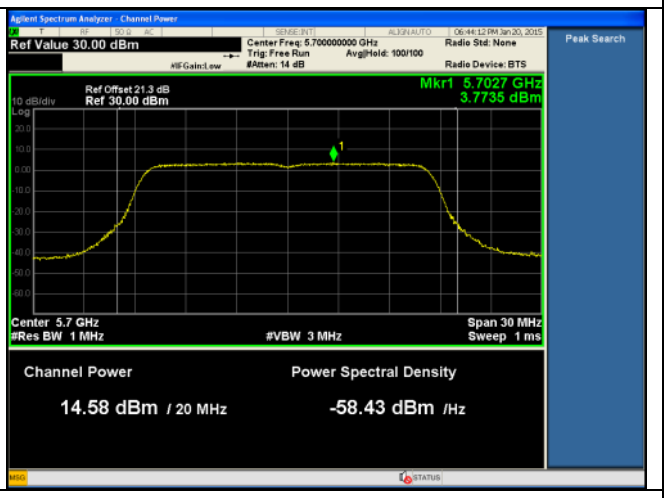
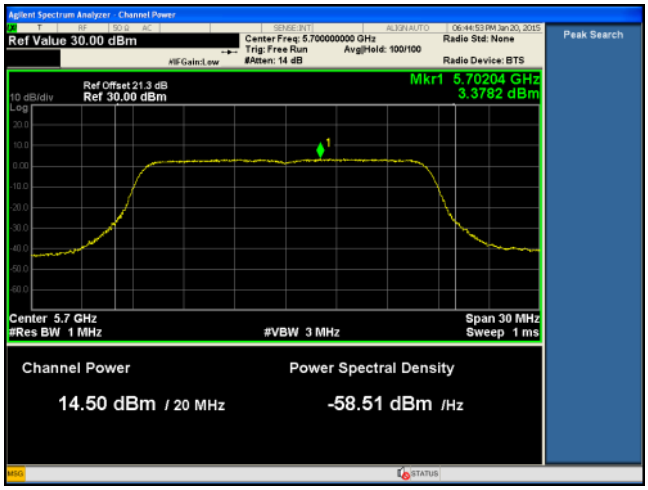



PSD-802.11a-5700M-chain1




PSD-802.11a-5700M-chain2

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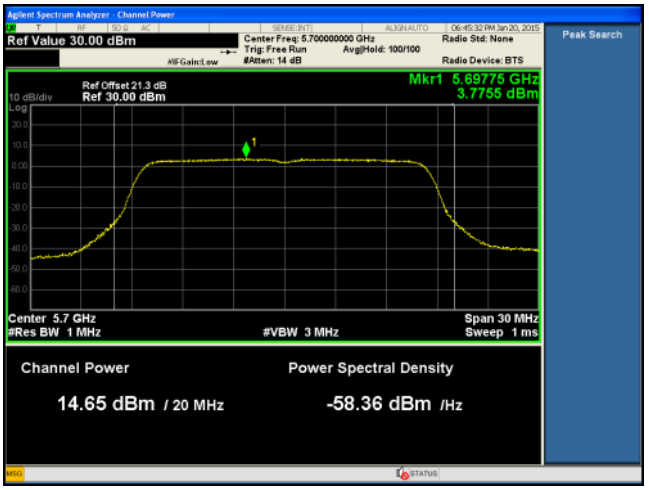
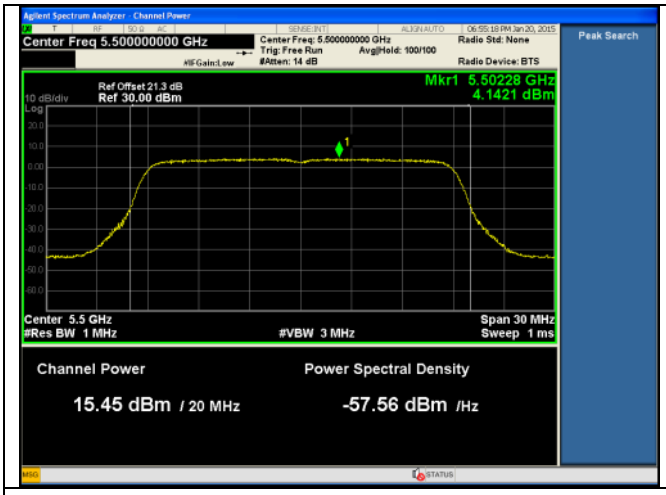
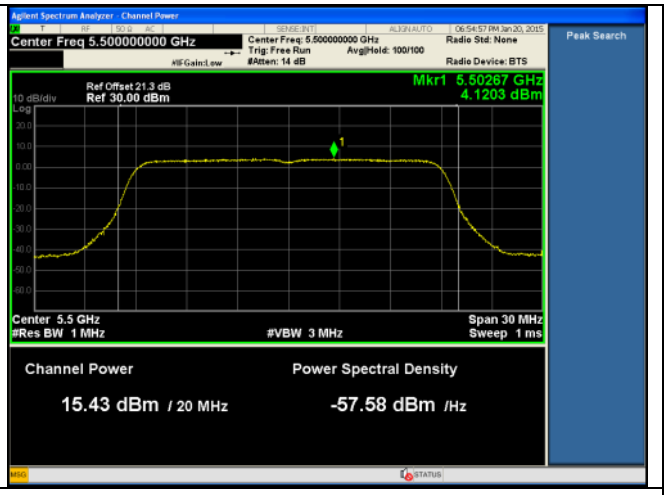


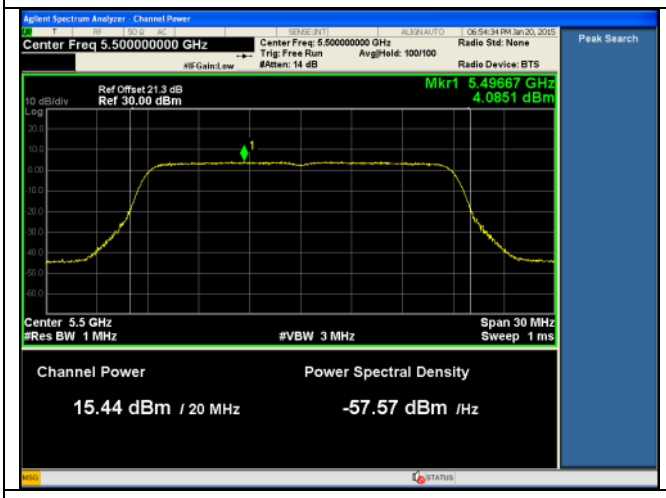

PSD-802.11a-5700M-chain4



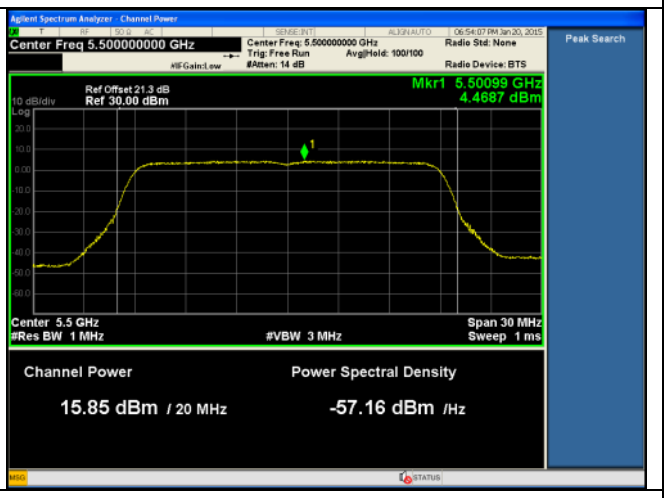

PSD-802.11n-20M-5500M-chain1



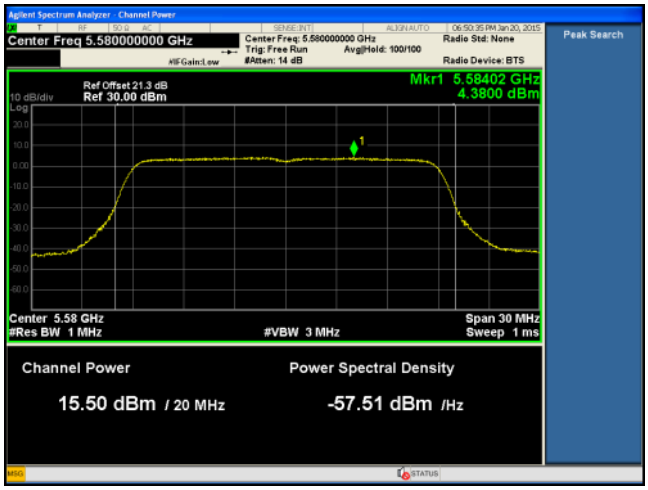

PSD-802.11n-20M-5500M-chain2



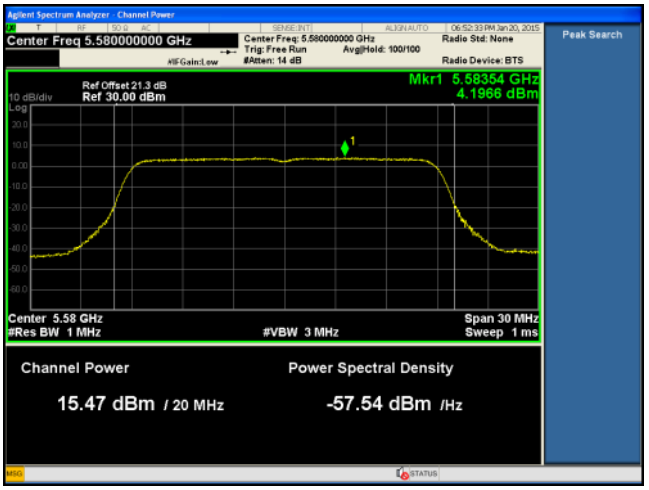

PSD-802.11n-20M-5500M-chain3



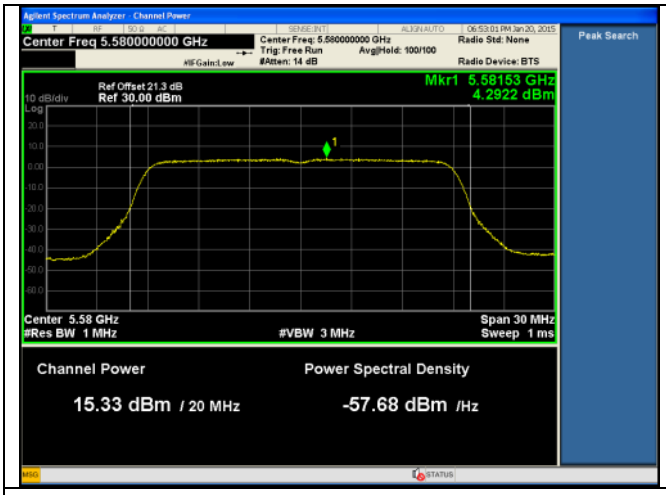

PSD-802.11n-20M-5500M-chain4



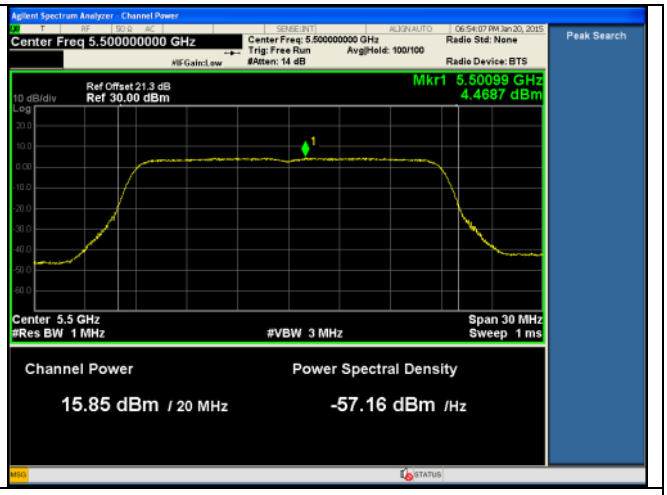

PSD-802.11n-20M-5580M-chain1



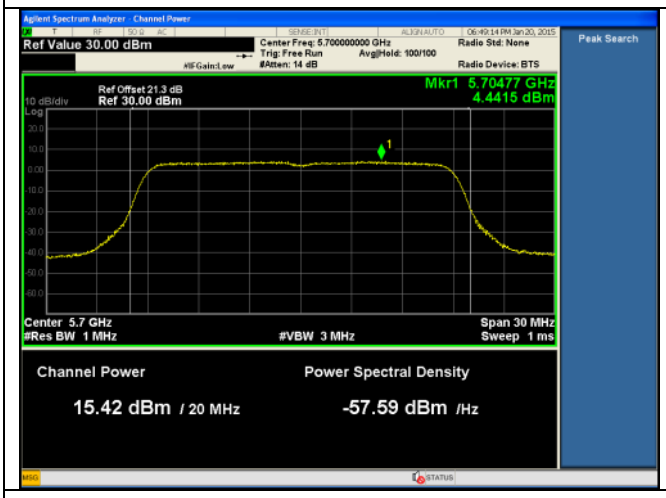

PSD-802.11n-20M-5580M-chain2



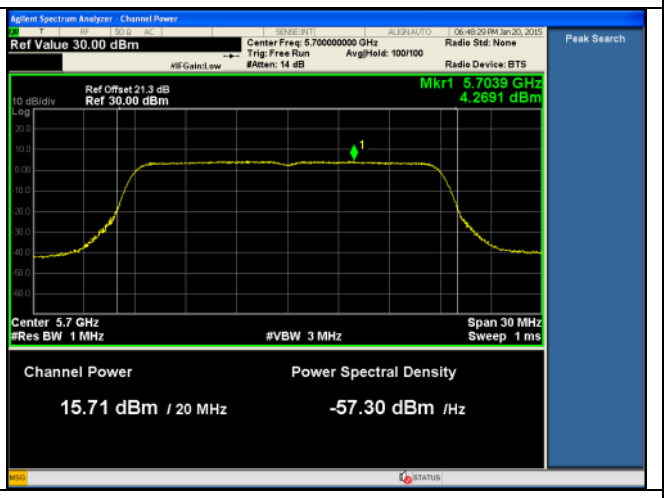

PSD-802.11n-20M-5580M-chain3



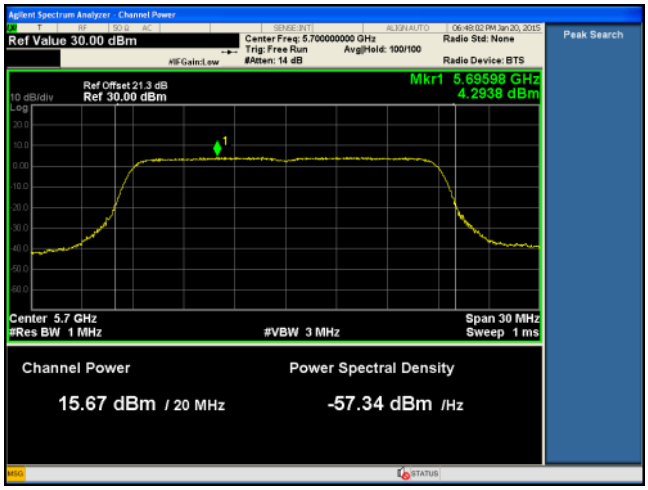

PSD-802.11n-20M-5580M-chain4




PSD-802.11n-20M-5700M-chain1




PSD-802.11n-20M-5700M-chain2

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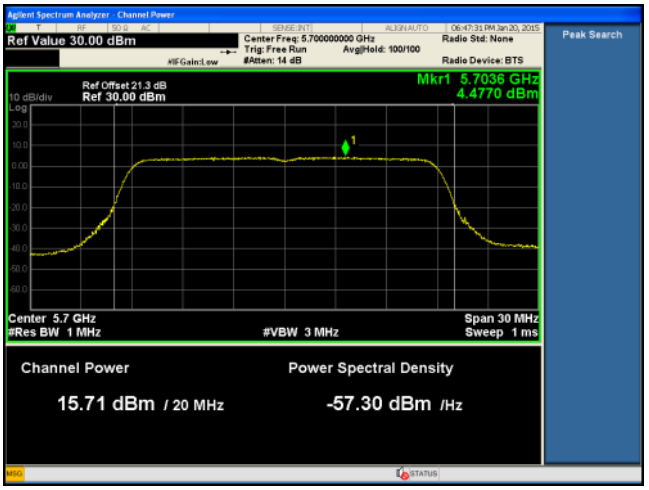
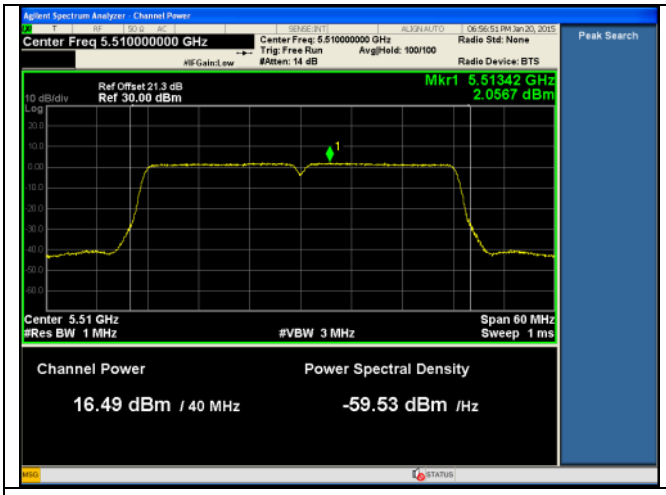
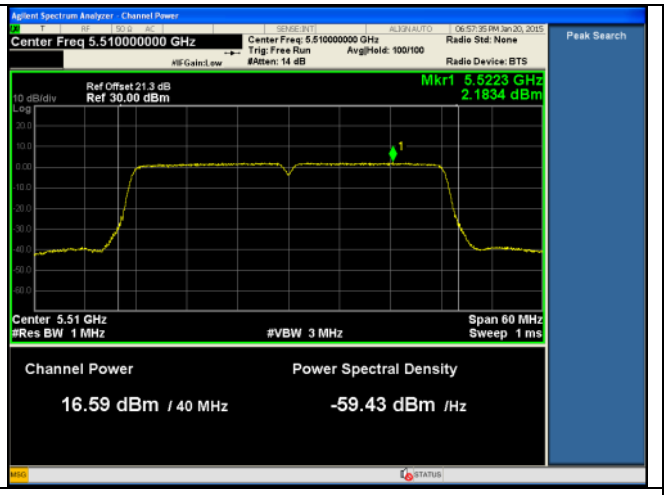


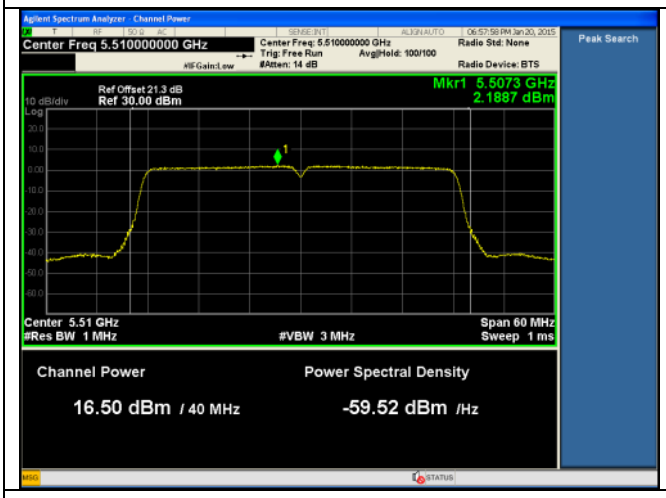

PSD-802.11n-20M-5700M-chain4




PSD-802.11n-40M-5510M-chain1




PSD-802.11n-40M-5510M-chain2

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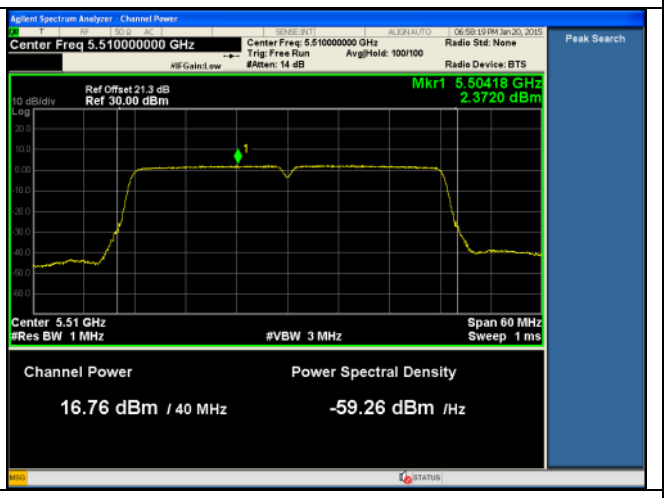


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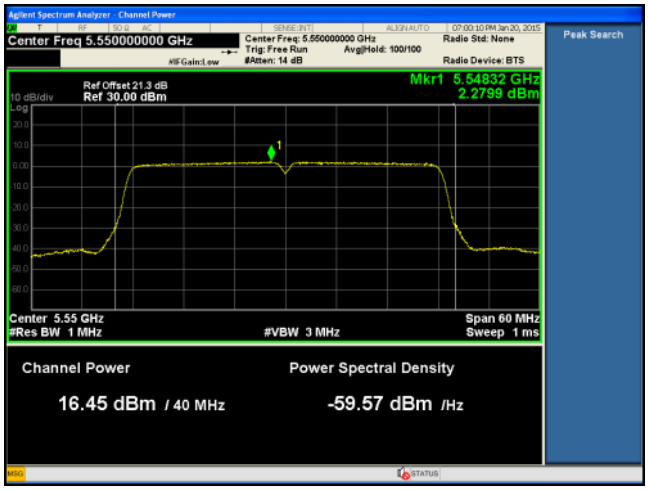
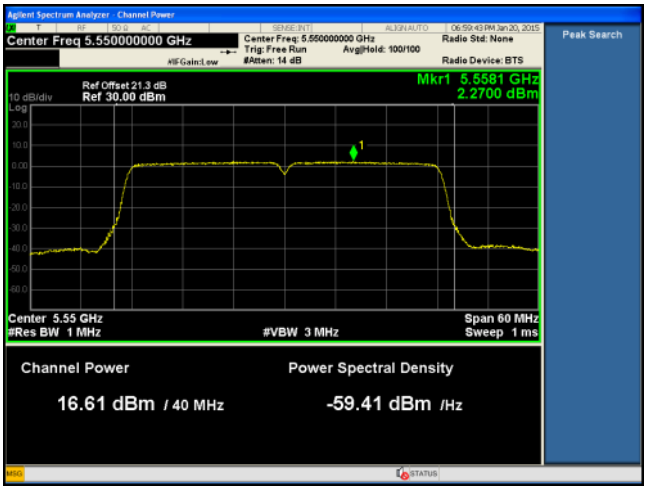



PSD-802.11n-40M-5550M-chain1

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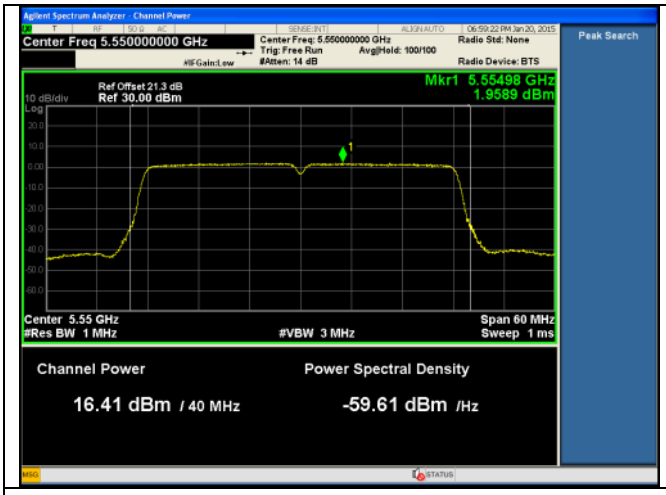


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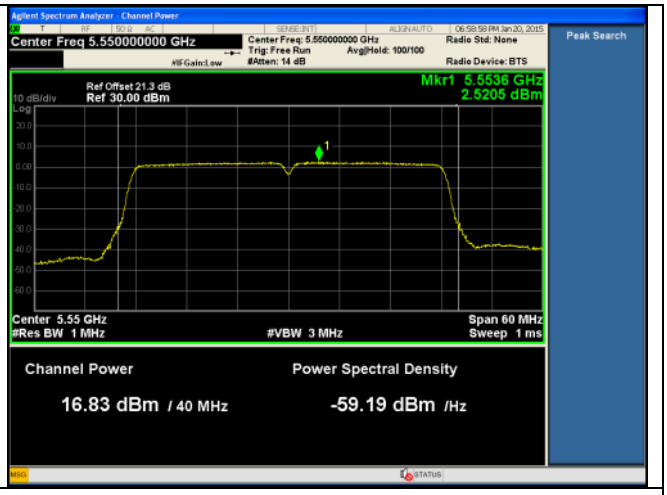


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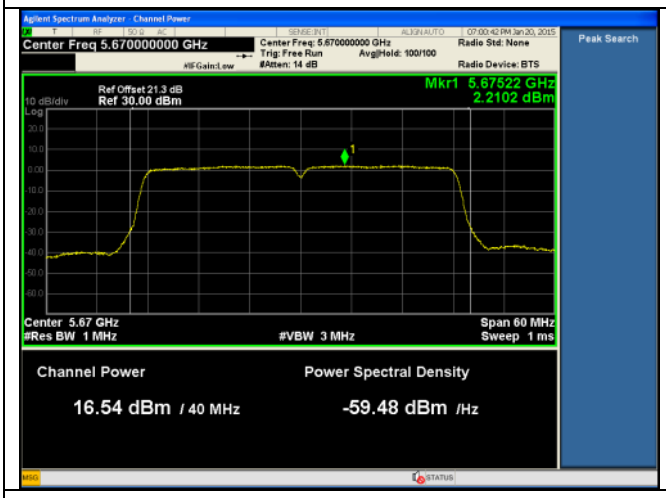
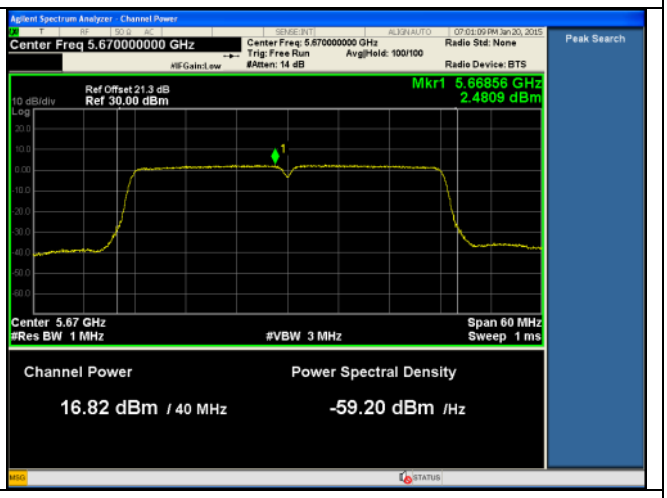
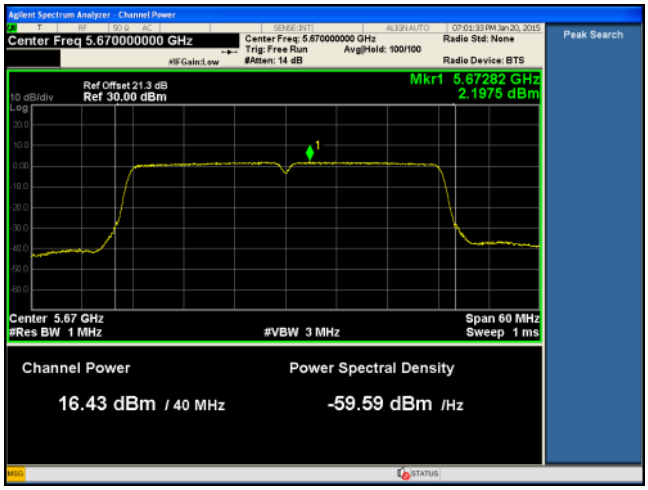


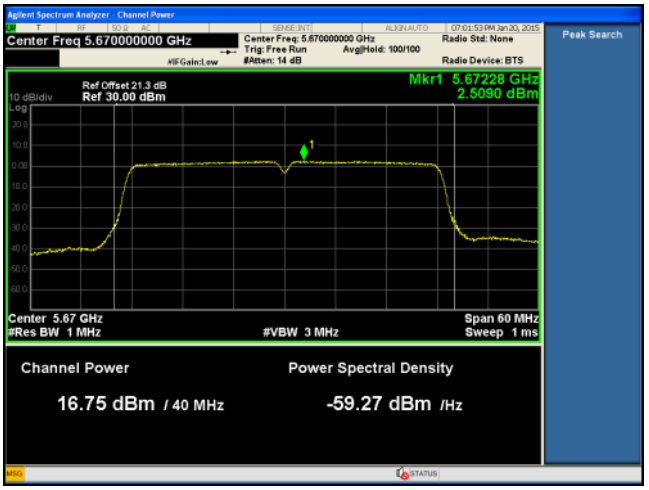

PSD-802.11n-40M-5670M-chain1



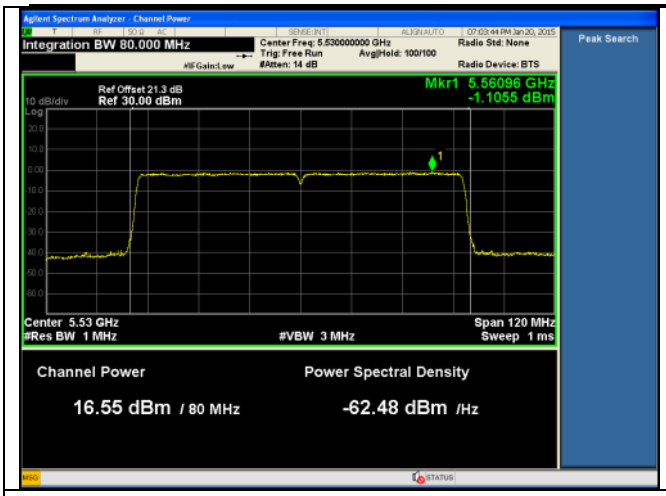

PSD-802.11n-40M-5670M-chain2



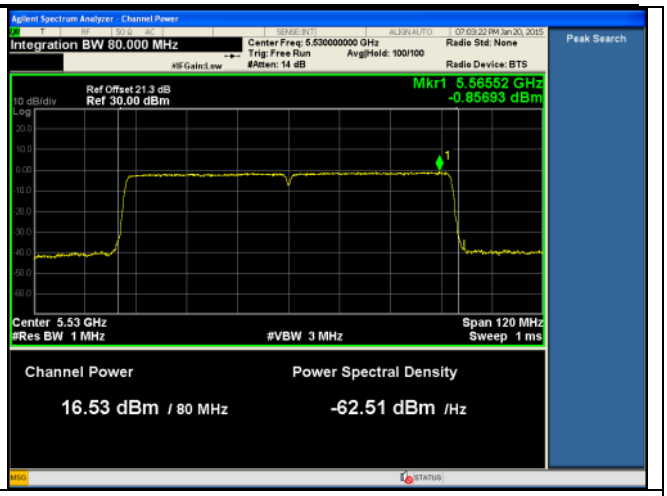

PSD-802.11n-40M-5670M-chain3



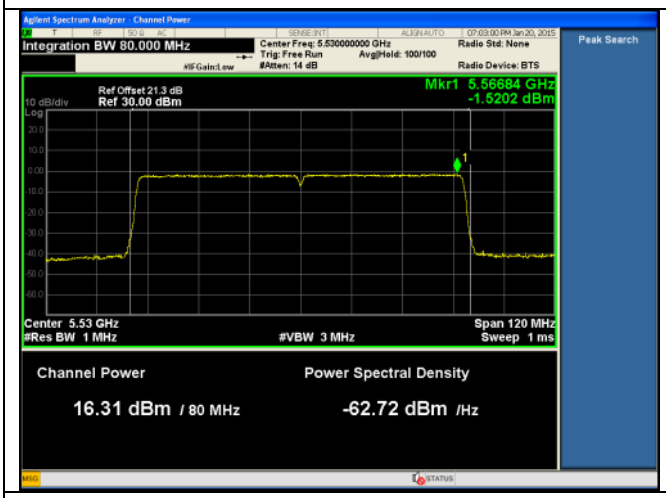

PSD-802.11n-40M-5670M-chain4



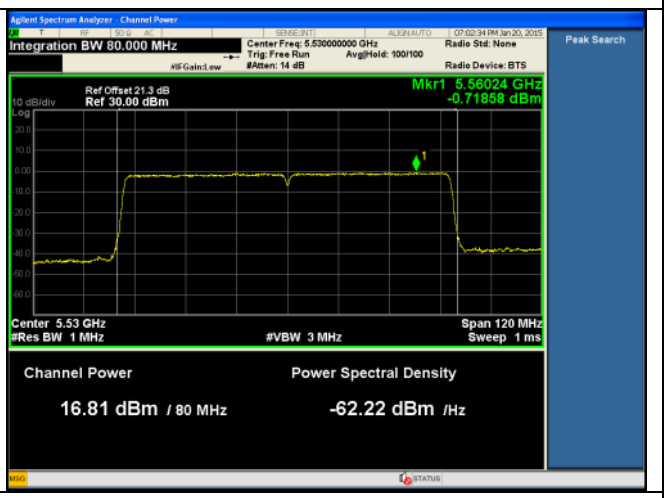

PSD-802.11ac-80M-5530M-chain1




PSD-802.11ac-80M-5530M-chain2

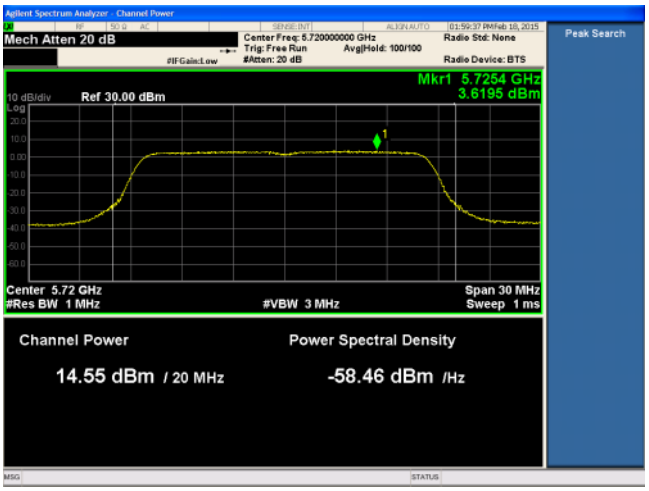



PSD-802.11ac-80M-5530M-chain3

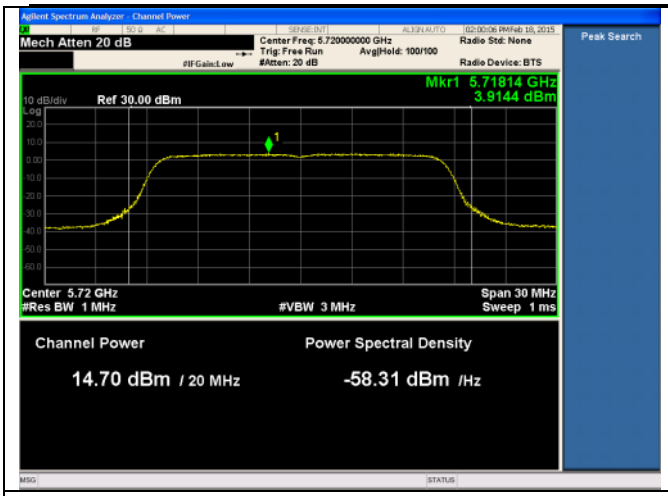



PSD-802.11ac-80M-5530M-chain4

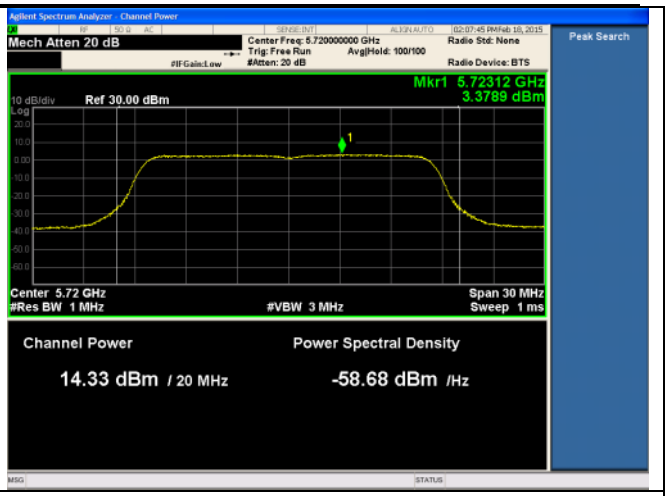

PSD-802.11a-CROSSOVER-5720M-chain1



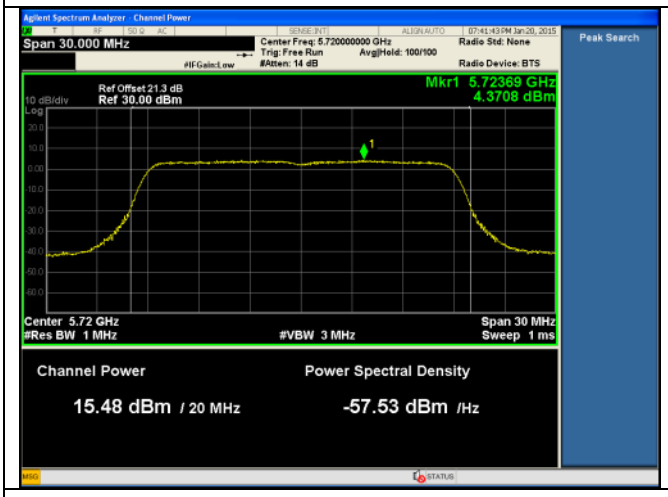

PSD-802.11a-CROSSOVER-5720M-chain2



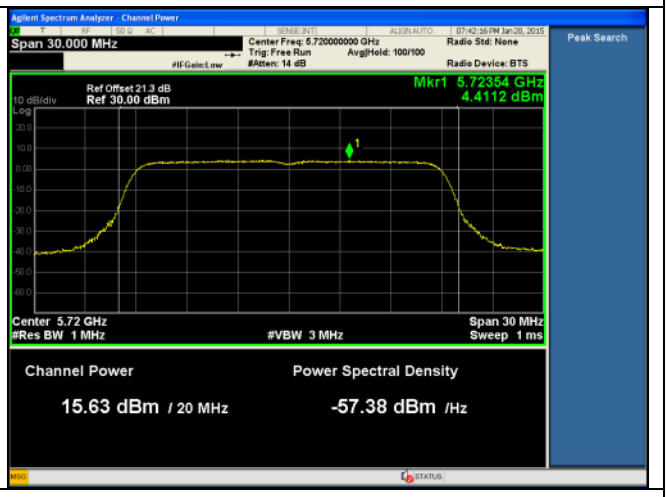

PSD-802.11a-CROSSOVER-5720M-chain3



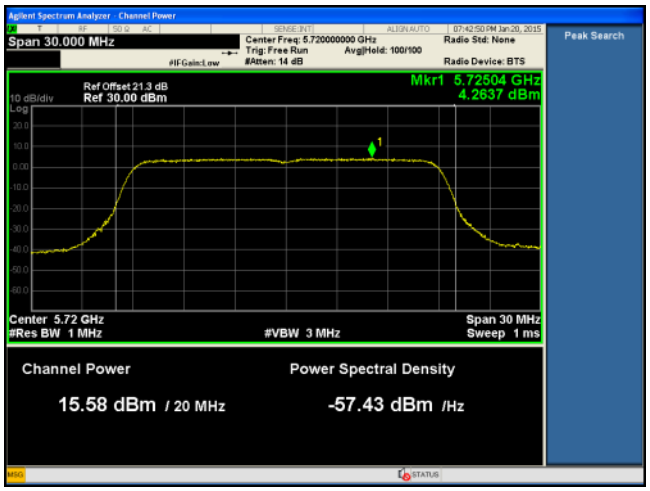

PSD-802.11a-CROSSOVER-5720M-chain4



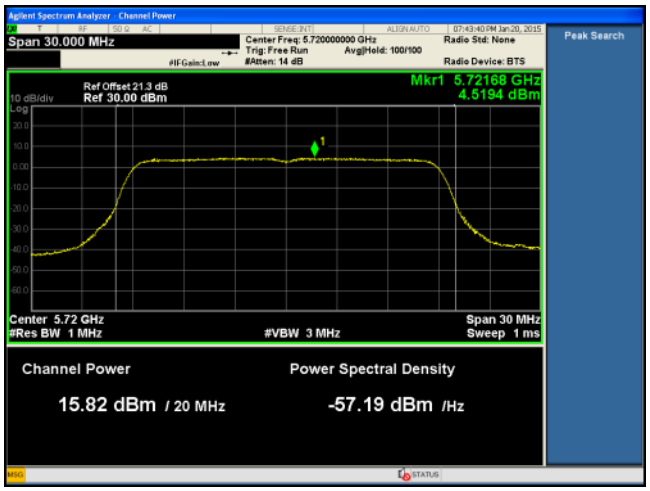

PSD-802.11n-20M-CROSSOVER-5720M-chain1



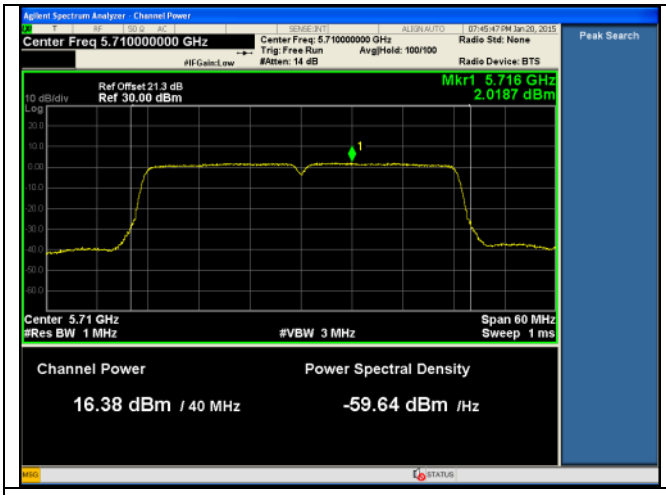

PSD-802.11n-20M-CROSSOVER-5720M-chain2



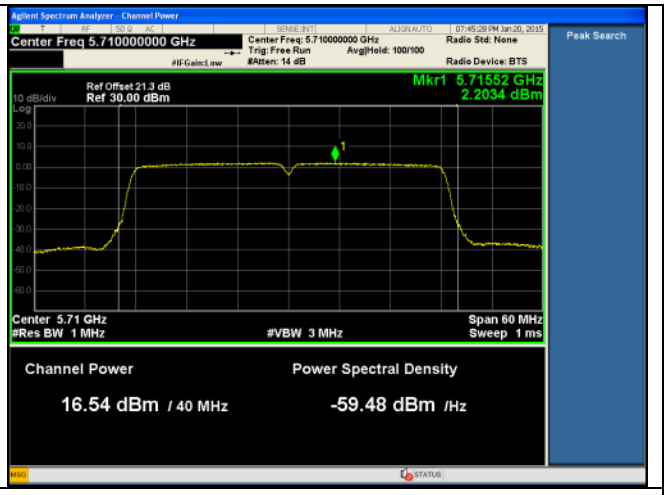

PSD-802.11n-20M-CROSSOVER-5720M-chain3



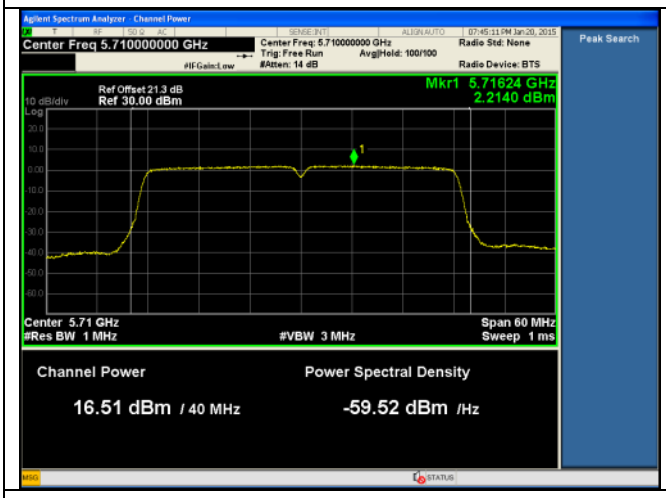

PSD-802.11n-20M-CROSSOVER-5720M-chain4



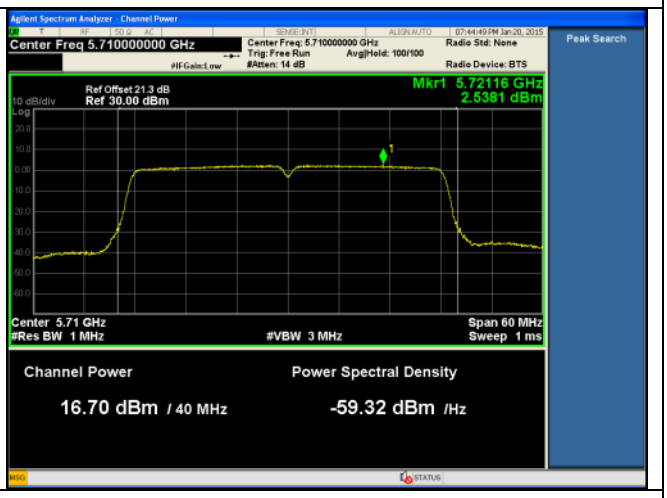

PSD-802.11n-40M-CROSSOVER-5710M-chain1



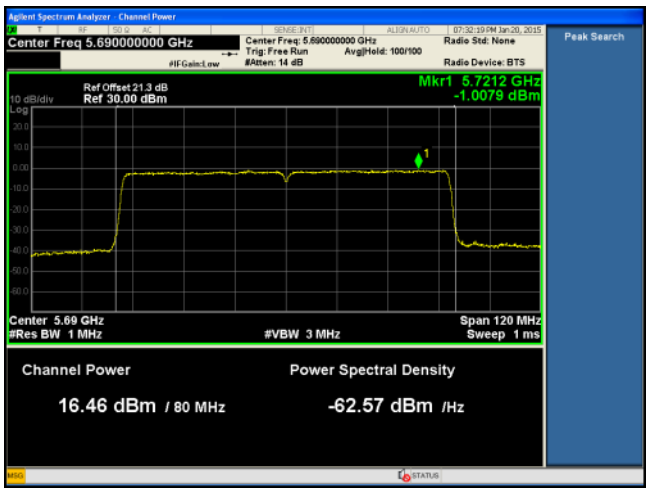

PSD-802.11n-40M-CROSSOVER-5710M-chain2



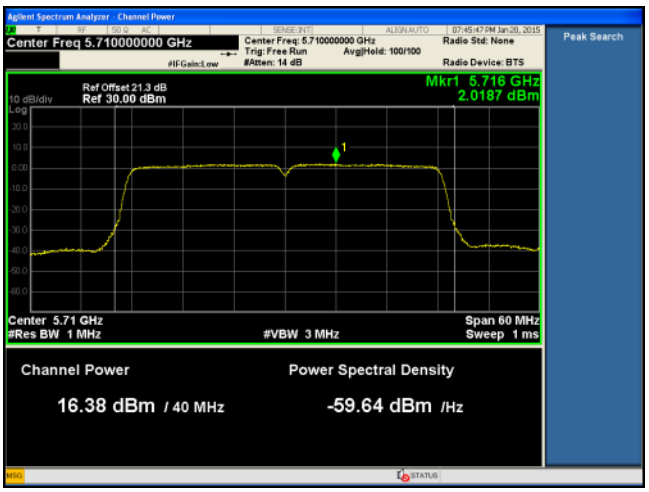

PSD-802.11n-40M-CROSSOVER-5710M-chain3



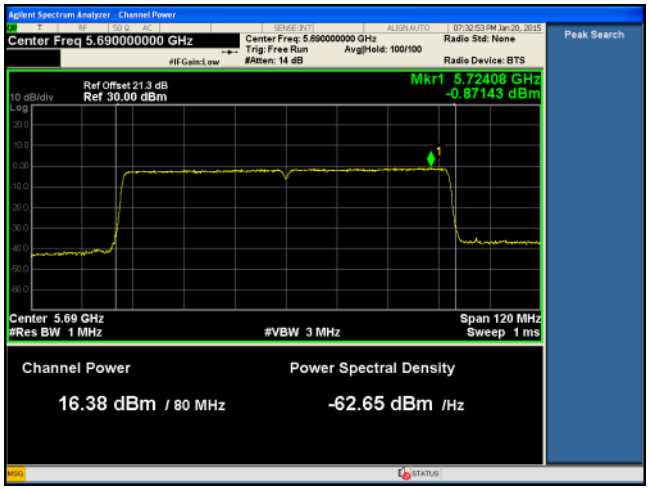

PSD-802.11n-40M-CROSSOVER-5710M-chain4



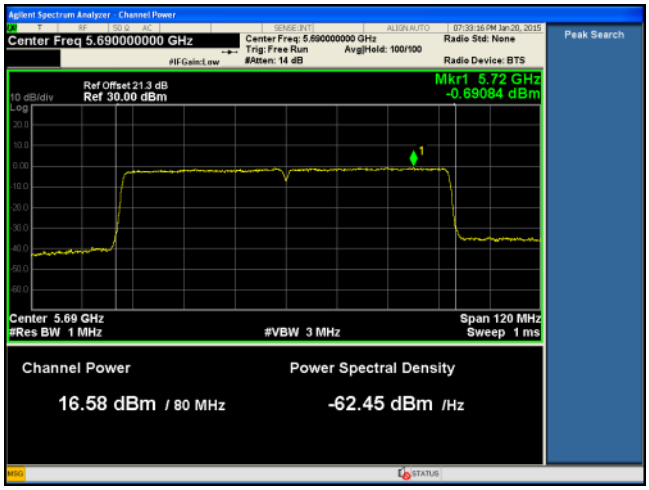

PSD-802.11ac-CROSSOVER-5690M-chain1




PSD-802.11ac-CROSSOVER-5690M-chain2



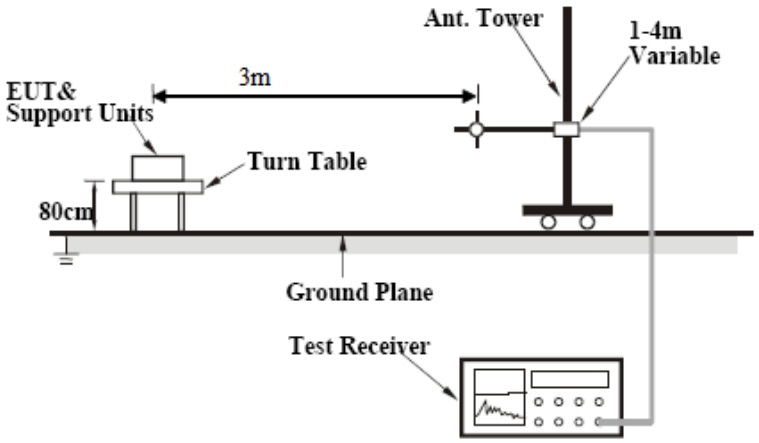

PSD-802.11ac-CROSSOVER-5690M-chain3




PSD-802.11ac-CROSSOVER-5690M-chain4

## 10.5 Radiated Spurious Emissions below 1GHz

**Requirement(s):**

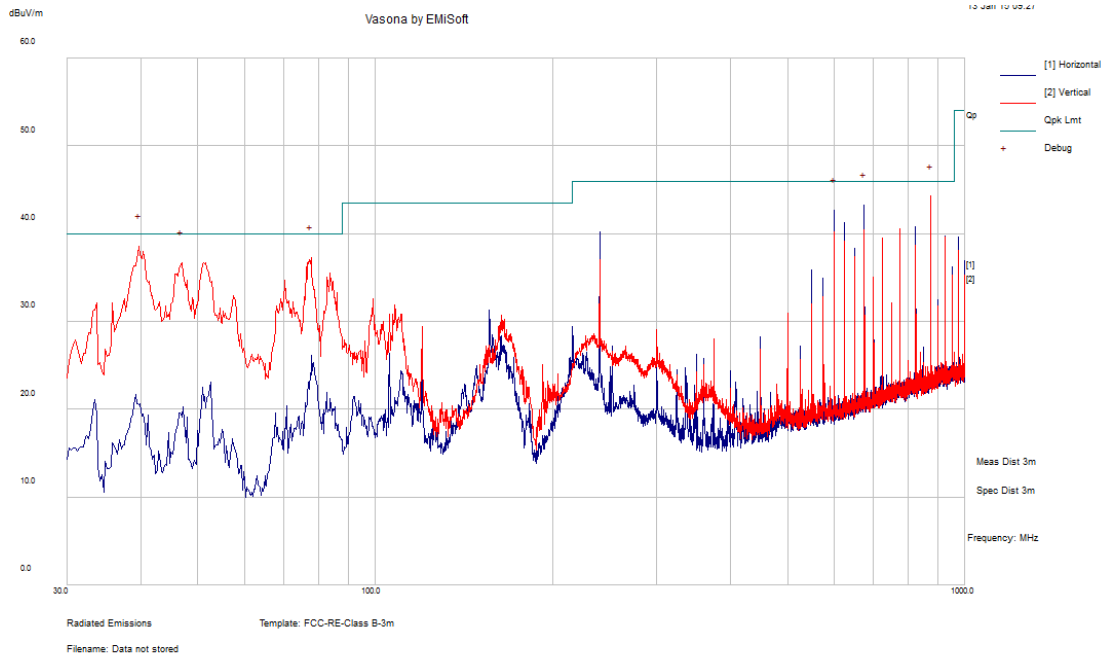
<table>
<tr><th>Spec</th><th>Requirement</th><th>Applicable</th></tr>
<tr><td>47CFR§<br>15.407(b)<br>15.209 (a)</td><td>Except higher limit as specified elsewhere in other section, the emissions from the low-power radio-frequency devices shall not exceed the field strength levels specified in the following table and the level of any unwanted emissions shall not exceed the level of the fundamental emission. The tighter limit applies at the band edges
<table>
<tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr>
<tr><td>30 – 88</td><td>100</td></tr>
<tr><td>88 – 216</td><td>150</td></tr>
<tr><td>216 960</td><td>200</td></tr>
<tr><td>Above 960</td><td>500</td></tr>
</table></td><td>☒</td></tr>
<tr><td>Test Setup</td><td> 
</td></tr>
<tr><td>Procedure</td><td>1. The EUT was switched on and allowed to warm up to its normal operating condition.<br>2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:<br>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.<br>b. The EUT was then rotated to the direction that gave the maximum emission.<br>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.<br>3. A Quasi-peak measurement was then made for that frequency point.<br>4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</td></tr>
<tr><td>Remark</td><td>The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.</td></tr>
<tr><td>Result</td><td>☒ Pass ☐ Fail</td></tr>
</table>

**Test Data** ☒ Yes (See below) ☐ N/A

**Test Plot** ☒ Yes (See below) ☐ N/A

## Radiated Emission Test Results (Below 1GHz)

| Test specification | below 1GHz | | | |
|---|---|---|---|---|
| Environmental Conditions: | Temp (°C): | 26.1 | Result | Pass |
| | Humidity (%) | 47.5 | | |
| | Atmospheric (mbar): | 1020 | | |
| Mains Power: | 120VAC, 60Hz | | | |
| Tested by: | Ricky Wang | | | |
| Test Date: | 01/29/2015 | | | |
| Remarks: | N/A | | | |

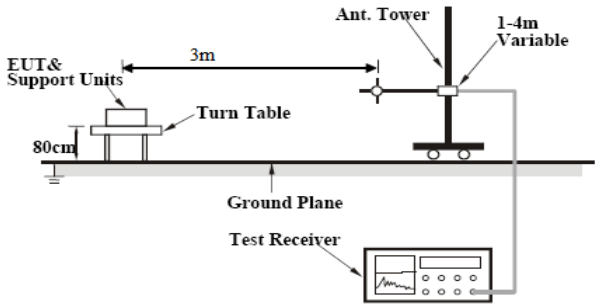



| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 39.53 | 55.71 | 1.16 | -25.82 | 31.05 | Quasi Max | V | 108.00 | 179.00 | 40.00 | -8.95 | Pass |
| 875.00 | 50.66 | 4.96 | -17.04 | 38.58 | Quasi Max | V | 100.00 | 202.00 | 46.00 | -7.42 | Pass |
| 674.99 | 57.38 | 4.42 | -19.57 | 42.23 | Quasi Max | H | 188.00 | 183.00 | 46.00 | -3.77 | Pass |
| 77.84 | 63.87 | 1.48 | -31.43 | 33.92 | Quasi Max | V | 124.00 | 277.00 | 40.00 | -6.08 | Pass |
| 46.94 | 61.10 | 1.16 | -28.76 | 33.50 | Quasi Max | V | 100.00 | 191.00 | 40.00 | -6.50 | Pass |
| 599.99 | 58.06 | 4.17 | -20.60 | 41.63 | Quasi Max | H | 100.00 | 62.00 | 46.00 | -4.37 | Pass |

Note: Both horizontal and vertical polarities were investigated. The results above show only the worst case.

## 10.6 Radiated Spurious Emissions above 1GHz

**Requirement(s):**

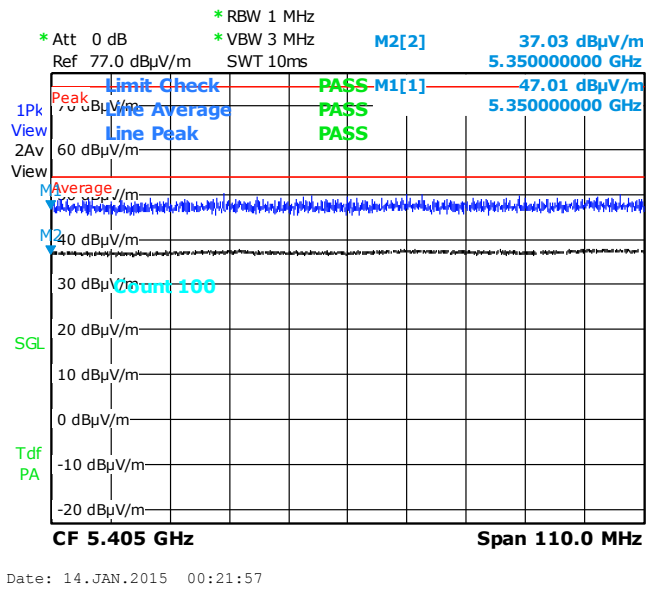
| Spec | Item | Requirement | Applicable |
|---|---|---|---|
| 47CFR§ 15.407(b)(2), 15.407(b)(6) | (1) | For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. | ☐ |
| | (2) | For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band. | ☒ |
| | (3) | For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz. | ☒ |
| | (4) | For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz. | ☐ |
| | (5) | Restricted band, emission must also comply with the radiated emission limits specified in 15.209 | ☒ |
| Test Setup |  | | |
| Procedure | 1. The EUT was switched on and allowed to warm up to its normal operating condition.<br>2. The test was carried out at the selected frequency points obtained from the EUT characterisation. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:<br>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.<br>b. The EUT was then rotated to the direction that gave the maximum emission.<br>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.<br>3. An average measurement was then made for that frequency point.<br>4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured. | | |
| Remark | The EUT was scanned up to 40GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case. | | |
| Result | ☒ Pass ☐ Fail | | |

Equipment Setting

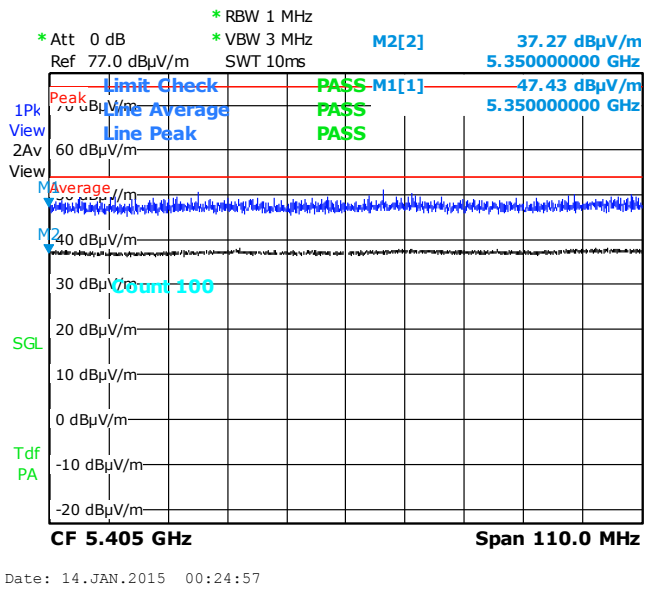
| TEST | RBW | VBW | SPAN | Detector | SWEEP | Trace | NOTES |
|---|---|---|---|---|---|---|---|
| Radiated Spurious Emission | 1MHz | 3MHz | 1GHz - 25 GHz | Peak | Auto | Max hold | PK Measurement |
| Radiated Spurious Emission | 1MHz | 10Hz | 1GHz - 25 GHz | Peak | Auto | Max hold | Ave Measurement |

**Test Data** ☒ Yes (See below) ☐ N/A
**Test Plot** ☐ Yes (See below) ☒ N/A

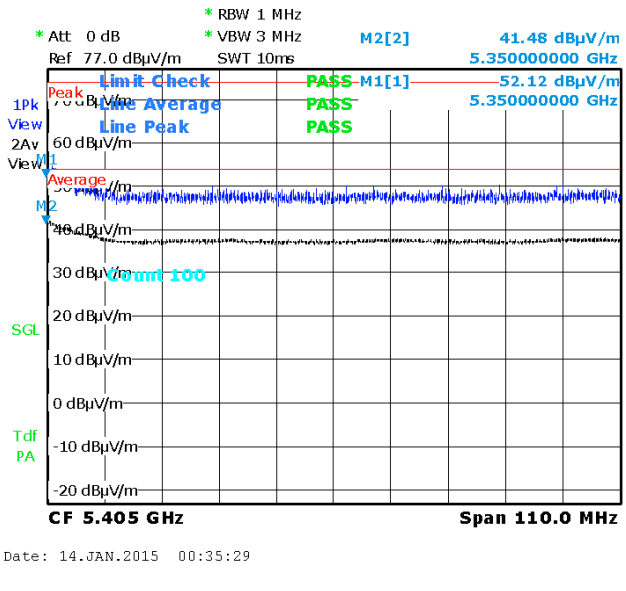
## Radiated Restricted band and Band Edge Measurement Plots:



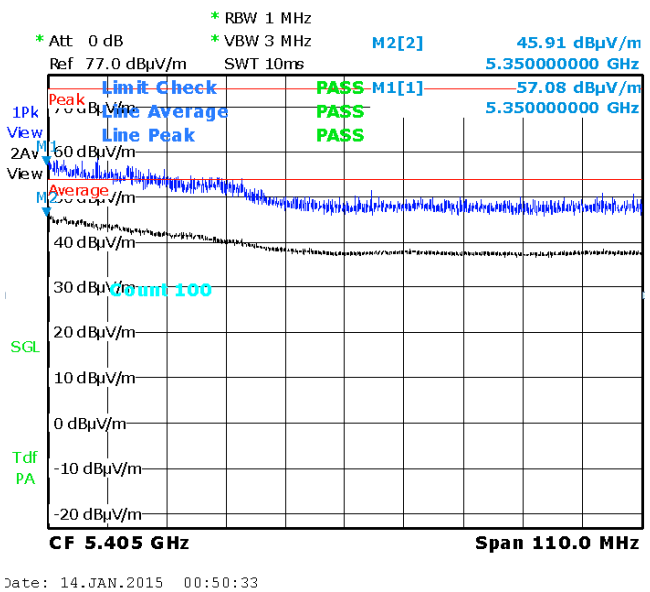

802.11a 5320M(5350-5460MHz)



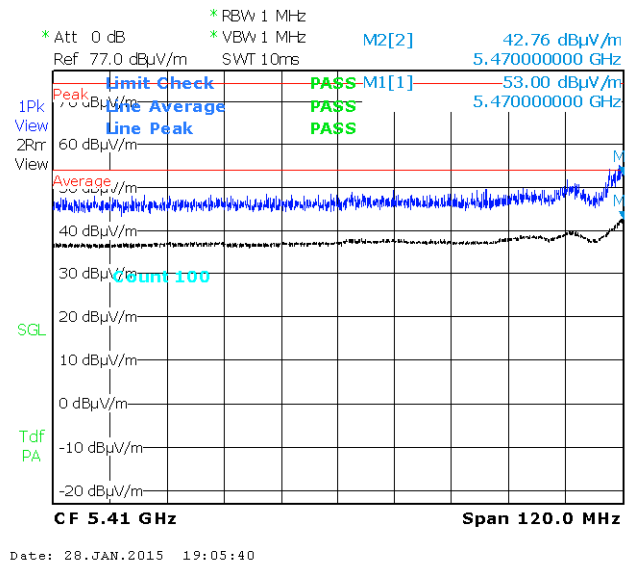

802.11n-HT20 5320M(5350-5460MHz)



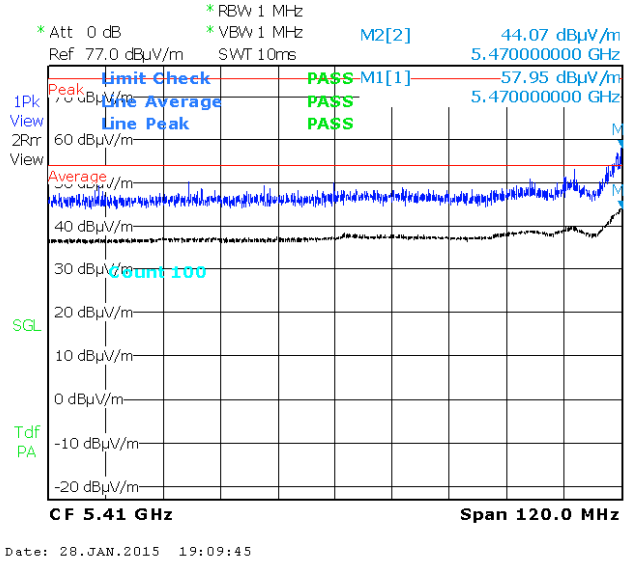

802.11n-HT40 5310M(5350-5460MHz)



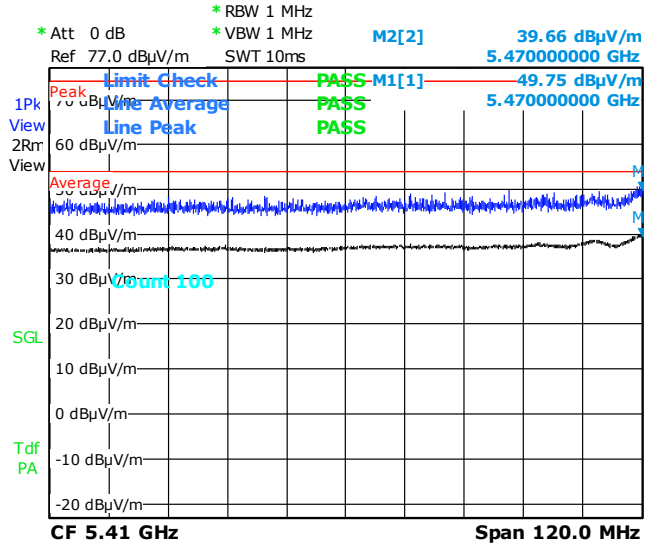

802.11ac 5290M(5350-5460MHz)



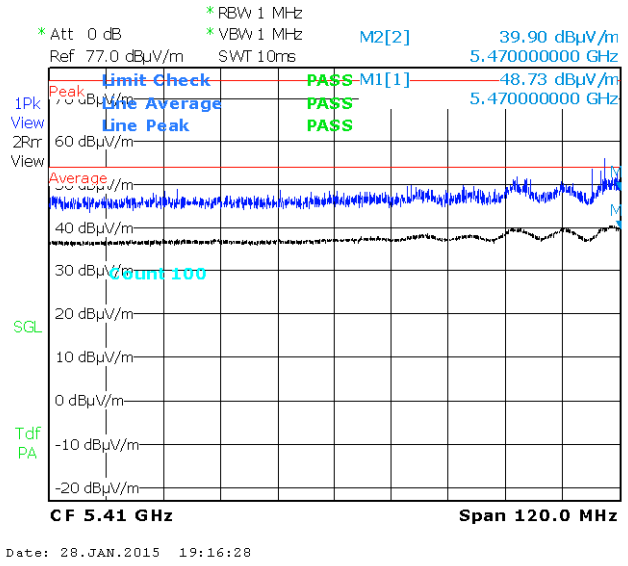

802.11a 5500M(5350-5470MHz)




802.11n-HT20 5500M(5350-5470MHz)




802.11n-HT40 5510M(5350-5470MHz)




802.11ac 5530M(5350-5470MHz)

**Band Edge measurement result for edge frequency at 5725MHz – operating at 11a-5700MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5725.00 | 56.47 | 3.51 | 1.04 | 61.02 | Peak Max | V | 199.00 | 30.00 | 74.00 | -12.98 | Pass |
| 5725.00 | 48.26 | 3.51 | 1.04 | 52.81 | Average Max | V | 199.00 | 30.00 | 54.00 | -1.19 | Pass |

(Note: Both horizontal and vertical poliarization have been verified, only the worst case data is presented here)

**Band Edge measurement result for edge frequency at 5725MHz – operating at 11n-5700MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5725.00 | 58.73 | 3.51 | 1.04 | 63.28 | Peak Max | V | 193.00 | 49.00 | 74.00 | -10.72 | Pass |
| 5725.00 | 48.99 | 3.51 | 1.04 | 53.54 | Average Max | V | 193.00 | 49.00 | 54.00 | -0.46 | Pass |

(Note: Both horizontal and vertical poliarization have been verified, only the worst case data is presented here)

**Band Edge measurement result for edge frequency at 5725MHz – operating at 11n40-5670MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5725.00 | 54.67 | 3.51 | 1.04 | 59.22 | Peak Max | V | 192.00 | 48.00 | 74.00 | -14.78 | Pass |
| 5725.00 | 44.38 | 3.51 | 1.04 | 48.93 | Average Max | V | 192.00 | 48.00 | 54.00 | -5.07 | Pass |

(Note: Both horizontal and vertical poliarization have been verified, only the worst case data is presented here)

**Band Edge measurement result for edge frequency at 5725MHz – operating at 11ac80-5530MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 5725.00 | 47.63 | 3.51 | 1.04 | 47.63 | Peak Max | H | 208.00 | 104.00 | 74.00 | -21.82 | Pass |
| 5725.00 | 39.33 | 3.51 | 1.04 | 39.33 | Average Max | H | 208.00 | 104.00 | 54.00 | -10.12 | Pass |

(Note: Both horizontal and vertical poliarization have been verified, only the worst case data is presented here)

## Radiated Emission Test Results (Above 1GHz)

**Above 1GHz-40GHz – 802.11a – 5260MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 17779.14 | 40.63 | 13.00 | 10.68 | 64.31 | Peak Max | H | 123.00 | 257.00 | 74.00 | -9.69 | Pass |
| 17779.14 | 27.14 | 13.00 | 10.68 | 50.83 | Average Max | H | 123.00 | 257.00 | 54.00 | -3.17 | Pass |
| 2190.85 | 43.48 | 4.05 | 10.88 | 58.42 | Peak Max | V | 154.00 | 161.00 | 74.00 | -15.58 | Pass |
| 2190.85 | 29.89 | 4.05 | 10.88 | 44.82 | Average Max | V | 154.00 | 161.00 | 54.00 | -9.18 | Pass |

**Above 1GHz-40GHz – 802.11a – 5280MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1001.08 | 45.50 | 2.44 | 9.68 | 57.62 | Peak Max | H | 253.00 | 123.00 | 74.00 | -16.38 | Pass |
| 1987.10 | 44.05 | 3.32 | 11.38 | 58.74 | Peak Max | V | 186.00 | 18.00 | 74.00 | -15.26 | Pass |
| 1001.08 | 32.36 | 2.44 | 9.68 | 44.48 | Average Max | H | 253.00 | 123.00 | 54.00 | -9.52 | Pass |
| 1987.10 | 29.64 | 3.32 | 11.38 | 44.33 | Average Max | V | 186.00 | 18.00 | 54.00 | -9.67 | Pass |

**Above 1GHz-40GHz – 802.11a – 5320MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1028.97 | 45.76 | 2.46 | 9.63 | 57.85 | Peak Max | V | 140.00 | 180.00 | 74.00 | -16.15 | Pass |
| 17717.18 | 40.50 | 13.00 | 10.62 | 64.12 | Peak Max | H | 280.00 | 165.00 | 74.00 | -9.88 | Pass |
| 1028.97 | 32.13 | 2.46 | 9.63 | 44.22 | Average Max | V | 140.00 | 180.00 | 54.00 | -9.78 | Pass |
| 17717.18 | 27.39 | 13.00 | 10.62 | 51.02 | Average Max | H | 280.00 | 165.00 | 54.00 | -2.98 | Pass |

**Above 1GHz-40GHz – 802.11n-20M – 5260MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1033.56 | 45.37 | 2.46 | 9.62 | 57.45 | Peak Max | H | 301.00 | 186.00 | 74.00 | -16.55 | Pass |
| 1033.56 | 31.92 | 2.46 | 9.62 | 44.00 | Average Max | H | 301.00 | 186.00 | 54.00 | -10.00 | Pass |

**Above 1GHz-40GHz – 802.11n-20M – 5280MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1020.12 | 45.50 | 2.44 | 9.68 | 57.62 | Peak Max | V | 137.00 | 271.00 | 74.00 | -16.38 | Pass |
| 1020.12 | 32.43 | 2.44 | 9.68 | 44.55 | Average Max | V | 137.00 | 271.00 | 54.00 | -9.45 | Pass |

**Above 1GHz-40GHz – 802.11n-20M – 5320MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1066.18 | 45.10 | 2.48 | 9.57 | 57.16 | Peak Max | V | 196.00 | 137.00 | 74.00 | -16.84 | Pass |
| 1066.18 | 31.57 | 2.48 | 9.57 | 43.63 | Average Max | V | 196.00 | 137.00 | 54.00 | -10.37 | Pass |

**Above 1GHz-40GHz – 802.11n-40M – 5270MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1021.86 | 45.50 | 2.44 | 9.68 | 57.62 | Peak Max | H | 171.00 | 348.00 | 74.00 | -16.38 | Pass |
| 1021.86 | 32.30 | 2.44 | 9.68 | 44.42 | Average Max | H | 171.00 | 348.00 | 54.00 | -9.58 | Pass |

**Above 1GHz-40GHz – 802.11n-40M – 5310MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1020.85 | 45.76 | 2.44 | 9.68 | 57.88 | Peak Max | V | 285.00 | 176.00 | 74.00 | -16.12 | Pass |
| 1020.85 | 32.44 | 2.44 | 9.68 | 44.55 | Average Max | V | 285.00 | 176.00 | 54.00 | -9.45 | Pass |

**Above 1GHz-40GHz – 802.11ac-80M – 5290MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4600.26 | 36.60 | 3.11 | -0.16 | 39.55 | Peak Max | H | 212.00 | 331.00 | 74.00 | -34.45 | Pass |
| 4600.26 | 23.39 | 3.11 | -0.16 | 26.34 | Average Max | H | 212.00 | 331.00 | 54.00 | -27.66 | Pass |

**Above 1GHz-40GHz – 802.11a – 5500MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1004.93 | 46.02 | 2.44 | 9.67 | 58.14 | Peak Max | V | 207.00 | 275.00 | 74.00 | -15.86 | Pass |
| 2231.84 | 43.60 | 4.20 | 10.76 | 58.57 | Peak Max | V | 101.00 | 66.00 | 74.00 | -15.43 | Pass |
| 1004.93 | 32.50 | 2.44 | 9.67 | 44.61 | Average Max | V | 207.00 | 275.00 | 54.00 | -9.39 | Pass |
| 2231.84 | 29.40 | 4.20 | 10.76 | 44.37 | Average Max | V | 101.00 | 66.00 | 54.00 | -9.63 | Pass |

**Above 1GHz-40GHz – 802.11a – 5580MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1022.22 | 45.24 | 2.45 | 9.64 | 57.33 | Peak Max | V | 179.00 | 277.00 | 74.00 | -16.67 | Pass |
| 2094.54 | 43.25 | 3.70 | 11.18 | 58.12 | Peak Max | H | 111.00 | 3.00 | 74.00 | -15.88 | Pass |
| 1022.22 | 32.16 | 2.45 | 9.64 | 44.25 | Average Max | V | 179.00 | 277.00 | 54.00 | -9.75 | Pass |
| 2094.54 | 30.17 | 3.70 | 11.18 | 45.05 | Average Max | H | 111.00 | 3.00 | 54.00 | -8.95 | Pass |

**Above 1GHz-40GHz – 802.11a – 5700MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1001.45 | 44.70 | 2.44 | 9.68 | 56.81 | Peak Max | V | 142.00 | 239.00 | 74.00 | -17.19 | Pass |
| 2159.80 | 42.96 | 3.94 | 10.98 | 57.87 | Peak Max | H | 175.00 | 31.00 | 74.00 | -16.13 | Pass |
| 1001.45 | 31.53 | 2.44 | 9.68 | 43.64 | Average Max | V | 142.00 | 239.00 | 54.00 | -10.36 | Pass |
| 2159.80 | 29.59 | 3.94 | 10.98 | 44.51 | Average Max | H | 175.00 | 31.00 | 54.00 | -9.49 | Pass |

**Above 1GHz-40GHz – 802.11n-20M – 5500MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2057.86 | 43.79 | 3.56 | 11.29 | 58.64 | Peak Max | V | 275.00 | 203.00 | 74.00 | -15.36 | Pass |
| 2057.86 | 30.14 | 3.56 | 11.29 | 44.99 | Average Max | V | 275.00 | 203.00 | 54.00 | -9.01 | Pass |

**Above 1GHz-40GHz – 802.11n-20M – 5580MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1989.25 | 43.10 | 3.32 | 11.39 | 57.82 | Peak Max | V | 239.00 | 139.00 | 74.00 | -16.18 | Pass |
| 1989.25 | 29.68 | 3.32 | 11.39 | 44.39 | Average Max | V | 239.00 | 139.00 | 54.00 | -9.61 | Pass |

**Above 1GHz-40GHz – 802.11n-20M – 5700MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1952.52 | 42.64 | 3.28 | 11.10 | 57.03 | Peak Max | V | 193.00 | 277.00 | 74.00 | -16.97 | Pass |
| 1952.52 | 29.62 | 3.28 | 11.10 | 44.00 | Average Max | V | 193.00 | 277.00 | 54.00 | -10.00 | Pass |

**Above 1GHz-40GHz – 802.11n-40M – 5510MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11588.04 | 41.79 | 5.19 | 5.95 | 52.94 | Peak Max | H | 118.00 | 58.00 | 74.00 | -21.06 | Pass |
| 11588.04 | 28.19 | 5.19 | 5.95 | 39.34 | Average Max | H | 118.00 | 58.00 | 54.00 | -14.66 | Pass |

**Above 1GHz-40GHz – 802.11n-40M – 5590MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12061.25 | 40.92 | 5.36 | 6.51 | 52.79 | Peak Max | V | 99.00 | 204.00 | 74.00 | -21.21 | Pass |
| 12061.25 | 28.16 | 5.36 | 6.51 | 40.02 | Average Max | V | 99.00 | 204.00 | 54.00 | -13.98 | Pass |

**Above 1GHz-40GHz – 802.11n-40M – 5670MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12063.34 | 40.92 | 5.36 | 6.50 | 52.79 | Peak Max | V | 130.00 | 94.00 | 74.00 | -21.21 | Pass |
| 12063.34 | 28.19 | 5.36 | 6.50 | 40.05 | Average Max | V | 130.00 | 94.00 | 54.00 | -13.95 | Pass |

**Above 1GHz-40GHz – 802.11ac-80M – 5530MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12265.26 | 40.62 | 5.43 | 6.38 | 52.43 | Peak Max | V | 239.00 | 270.00 | 74.00 | -21.57 | Pass |
| 12265.26 | 27.84 | 5.43 | 6.38 | 39.65 | Average Max | V | 239.00 | 270.00 | 54.00 | -14.35 | Pass |

**Above 1GHz-40GHz – 802.11ac-80M – 5610MHz**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12111.27 | 40.66 | 5.38 | 6.47 | 52.52 | Peak Max | V | 203.00 | 50.00 | 74.00 | -21.48 | Pass |
| 12111.27 | 27.84 | 5.38 | 6.47 | 39.69 | Average Max | V | 203.00 | 50.00 | 54.00 | -14.31 | Pass |

**Above 1GHz-25GHz- Collocation testing (2.4GHz WLAN & 5GHz WLAN on the main-board transmitting simultaneously)**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10629.33 | 36.41 | 5.05 | 5.98 | 47.43 | Peak Max | V | 148.00 | 4.00 | 74.00 | -26.57 | Pass |
| 10629.33 | 23.74 | 5.05 | 5.98 | 34.77 | Average Max | V | 148.00 | 4.00 | 54.00 | -19.23 | Pass |

# Annex A. TEST INSTRUMENT

| Instrument | Model | Serial # | Cal Date | Cal Cycle | Cal Due | In use |
|---|---|---|---|---|---|---|
| **Conducted Emissions** | | | | | | |
| R & S Receiver | ESHS10 | 830223/0009 | 04/08/2014 | 1 Year | 04/08/2015 | ☑ |
| Spectrum Analyzer | FSIQ7 | 825555/013 | 05/31/2014 | 1 Year | 04/08/2015 | ☑ |
| Schwarzbeck LISN | NNLK 8129 | 8129-190 | 08/11/2014 | 1 Year | 08/11/2015 | ☑ |
| CHASE LISN | MN2050B | 1018 | 07/31/2014 | 1 Year | 07/31/2015 | ☑ |
| Sekonic Hygro Hermograph | ST-50 | HE01-000092 | 05/25/2014 | 1 Year | 05/25/2015 | ☑ |
| **Radiated Emissions** | | | | | | |
| R & S Receiver | ESL6 | 100178 | 03/01/2014 | 1 Year | 03/04/2015 | ☑ |
| R & S Receiver | ESIB 40 | 100179 | 05/24/2014 | 1 Year | 05/24/2015 | ☑ |
| Bi-Log antenna (30MHz~2GHz) | JB1 | A030702 | 08/12/2014 | 1 Year | 08/12/2015 | ☑ |
| Horn Antenna (1-26.5GHz) | 3115 | 10SL0059 | 08/11/2014 | 1 Year | 08/11/2015 | ☑ |
| Horn Antenna (18-40 GHz) | AH-840 | 101013 | 08/11/2014 | 1 Year | 08/11/2015 | ☑ |
| Pre-Amplifier (100KHz-7GHz) | LPA-6-30 | 11140711 | 02/18/2014 | 1 Year | 02/18/2015 | ☑ |
| Microwave Preamplifier (18-40 GHz) | PA-840 | 181251 | 02/12/2014 | 1 Year | 02/12/2015 | ☑ |
| 3 Meters SAC | 3M | N/A | 03/04/2014 | 1 Year | 03/04/2015 | ☑ |
| 10 Meters SAC | 10M | N/A | 09/05/2014 | 1 Year | 09/05/2015 | ☑ |
| Sekonic Hygro Hermograph | ST-50 | HE01-000092 | 05/25/2014 | 1 Year | 05/25/2015 | ☑ |
| **RF Conducted Measurement** | | | | | | |
| Spectrum Analyzer | N9010A | MY50210206 | 05/30/2014 | 1 Year | 05/30/2015 | ☑ |
| Spectrum Analyzer | E4407B | US88441016 | 05/31/2014 | 1 Year | 05/31/2015 | ☐ |
| R & S Receiver | ESIB 40 | 100179 | 04/20/2014 | 1 Year | 04/20/2015 | ☑ |

# Annex B. SIEMIC Accreditation

| Accreditations | Document | Scope / Remark |
|---|---|---|
| ISO 17025 (A2LA) | | Please see the documents for the detailed scope |
| ISO Guide 65 (A2LA) | | Please see the documents for the detailed scope |
| TCB Designation | | A1, A2, A3, A4, B1, B2, B3, B4, C |
| FCC DoC Accreditation | | FCC Declaration of Conformity Accreditation |
| FCC Site Registration | | 3 meter site |
| FCC Site Registration | | 10 meter site |
| IC Site Registration | | 3 meter site |
| IC Site Registration | | 10 meter site |
| EU NB | | **Radio & Telecommunications Terminal Equipment:** EN45001 – EN ISO/IEC 17025 |
| | | **Electromagnetic Compatibility:** EN45001 – EN ISO/IEC 17025 |
| Singapore iDA CB(Certification Body) | | Phase I, Phase II |
| Vietnam MIC CAB Accreditation | | Please see the document for the detailed scope |
| Hong Kong OFCA | | **(Phase II)** OFCA Foreign Certification Body for Radio and Telecom |
| | | **(Phase I)** Conformity Assessment Body for Radio and Telecom |
| Industry Canada CAB | | **Radio:** Scope A – All Radio Standard Specification in Category I |
| | | **Telecom:** CS-03 Part I, II, V, VI, VII, VIII |

| | | |
|---|---|---|
| Japan Recognized Certification Body Designation |  | **Radio**: A1. Terminal equipment for purpose of calling<br>**Telecom**: B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law |
| Korea CAB Accreditation |  | **EMI:** KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI<br>KN22: Test Method for EMI<br>**EMS:** KCC Notice 2008-38, RRL Notice 2008-4: CA Procedures for EMS<br>KN24, KN61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-8, -4-11: Test Method for EMS |
| | | **Radio:** RRL Notice 2008-26, RRL Notice 2008-2, RRL Notice 2008-10, RRL Notice 2007-49, RRL Notice 2007-20, RRL Notice 2007-21, RRL Notice 2007-80, RRL Notice 2004-68 |
| | | **Telecom:** President Notice 20664, RRL Notice 2007-30, RRL Notice 2008-7 with attachments 1, 3, 5, 6; President Notice 20664, RRL Notice 2008-7 with attachment 4 |
| Taiwan NCC CAB Recognition |  | LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08 |
| Taiwan BSMI CAB Recognition |  | CNS 13438 |
| Japan VCCI |  | R-3083: Radiation 3 meter site<br>C-3421: Main Ports Conducted Interference Measurement<br>T-1597: Telecommunication Ports Conducted Interference Measurement |
| Australia CAB Recognition |  | **EMC:** AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4 |
| | | **Radio communications:** AS/NZS 4281, AS/NZS 4268, AS/NZS 4280.1, AS/NZS 4280.2, AS/NZS 4295, AS/NZS 4582, AS/NZS 4583, AS/NZS 4769.1, AS/NZS 4769.2, AS/NZS 4770, AS/NZS 4771 |
| | | **Telecommunications:** AS/ACIF S002:05, AS/ACIF S003:06, AS/ACIF S004:06 AS/ACIF S006:01, AS/ACIF S016:01, AS/ACIF S031:01, AS/ACIF S038:01, AS/ACIF S040:01, AS/ACIF S041:05, AS/ACIF S043.2:06, AS/ACIF S60950.1 |
| Australia NATA Recognition |  | AS/ACIF S002, AS/ACIF S003, AS/ACIF S004, AS/ACIF S006, AS/ACIF S016,AS/ACIF S031, AS/ACIF S038, AS/ACIF S040, AS/ACIF S041, AS/ACIF S043.2 |