

# RF TEST REPORT



Report No.: FCC\_SL17072501-RUC-022A3\_W53W56

Supersede Report No.:

|                                                     |   |                                                                           |
|-----------------------------------------------------|---|---------------------------------------------------------------------------|
| Applicant                                           | : | Ruckus Wireless, Inc.                                                     |
| Product Name                                        | : | E510 Access Point                                                         |
| Model No.                                           | : | E510                                                                      |
| Test Standard                                       | : | 47 CFR 15.407                                                             |
| Test Method                                         | : | ANSI C63.4: 2014<br>789033 D02 General UNII Test Procedures New Rules v01 |
| FCC ID                                              | : | S9GE510                                                                   |
| IC ID                                               | : | 5912A-E510                                                                |
| Dates of test                                       | : | 10/24/2017-02/08/2018                                                     |
| Issue Date                                          | : | 02/09/2018                                                                |
| Test Result                                         | : | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail    |
| Equipment complied with the specification [X]       |   |                                                                           |
| Equipment did not comply with the specification [ ] |   |                                                                           |

This Test Report is Issued Under the Authority of:

|                                                                                                                                      |                   |
|--------------------------------------------------------------------------------------------------------------------------------------|-------------------|
|                                                                                                                                      |                   |
| <b>Gary Chou</b>                                                                                                                     | <b>Chen Ge</b>    |
| 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



775 Montague Expressway, Milpitas, CA 95035, USA • Phone: (+1) 408 526 1188 • Facsimile (+1) 408 526 1088

Visit us at: [www.siemic.com](http://www.siemic.com); Follow us at:



## 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**

|                                            |                                                                    |           |
|--------------------------------------------|--------------------------------------------------------------------|-----------|
| <b>1</b>                                   | <b>REPORT REVISION HISTORY.....</b>                                | <b>4</b>  |
| <b>2</b>                                   | <b>EXECUTIVE SUMMARY .....</b>                                     | <b>5</b>  |
| <b>3</b>                                   | <b>CUSTOMER INFORMATION .....</b>                                  | <b>5</b>  |
| <b>4</b>                                   | <b>TEST SITE INFORMATION.....</b>                                  | <b>5</b>  |
| <b>5</b>                                   | <b>MODIFICATION.....</b>                                           | <b>5</b>  |
| <b>6</b>                                   | <b>EUT INFORMATION.....</b>                                        | <b>6</b>  |
| 6.1                                        | EUT Description .....                                              | 6         |
| 6.2                                        | Radio Description .....                                            | 6         |
| <b>7</b>                                   | <b>SUPPORTING EQUIPMENT/SOFTWARE AND CABLING DESCRIPTION .....</b> | <b>8</b>  |
| 7.1                                        | Supporting Equipment.....                                          | 8         |
| 7.2                                        | Cabling Description.....                                           | 8         |
| 7.3                                        | Test Software Description.....                                     | 8         |
| <b>8</b>                                   | <b>TEST SUMMARY .....</b>                                          | <b>9</b>  |
| <b>9</b>                                   | <b>MEASUREMENT UNCERTAINTY .....</b>                               | <b>10</b> |
| 9.1                                        | Conducted Emissions .....                                          | 10        |
| 9.2                                        | Radiated Emissions (30MHz to 1GHz) .....                           | 10        |
| 9.3                                        | Radiated Emissions (1GHz to 40GHz).....                            | 11        |
| 9.4                                        | RF conducted measurement.....                                      | 11        |
| <b>10</b>                                  | <b>MEASUREMENTS, EXAMINATION AND DERIVED RESULTS.....</b>          | <b>12</b> |
| 10.1                                       | Output Power .....                                                 | 12        |
| 10.2                                       | Peak Power Spectral Density .....                                  | 41        |
| 10.3                                       | Radiated Spurious Emissions below 1GHz.....                        | 74        |
| 10.4                                       | Radiated Spurious Emissions above 1GHz .....                       | 76        |
| <b>ANNEX A. TEST INSTRUMENT .....</b>      |                                                                    | <b>88</b> |
| <b>ANNEX B. SIEMIC ACCREDITATION .....</b> |                                                                    | <b>89</b> |

## 1 Report Revision History

| Report No.                      | Report Version | Description | Issue Date |
|---------------------------------|----------------|-------------|------------|
| FCC_SL17072501-RUC-022A3_W53W56 | None           | Original    | 02/09/2018 |
|                                 |                |             |            |
|                                 |                |             |            |
|                                 |                |             |            |
|                                 |                |             |            |

## 2 Executive Summary

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

Company: Ruckus Wireless, Inc.  
Product: E510 Access Point  
Model: E510

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> 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              | E510 Access Point |
| Model No.                 | E510              |
| Trade Name                | Ruckus            |
| Serial No.                | 361706000066      |
| Host Model No.            | N/A               |
| Input Power               | 48VDC (PoE)       |
| Power Adapter Manu/Model  | N/A               |
| Power Adapter SN          | N/A               |
| Date of EUT received      | 10/20/2017        |
| Equipment Class/ Category | DTS, UNII         |
| Port/Connectors           | PoE, Ethernet     |

### 6.2 Radio Description

| Radio Type             | 802.11a                                       | 802.11n-20M                     | 802.11n-40M                     | 802.11ac-80M                         |
|------------------------|-----------------------------------------------|---------------------------------|---------------------------------|--------------------------------------|
| Operating Frequency    | 5260-5320MHz<br>5500-5720MHz                  | 5260-5320MHz<br>5500-5720MHz    | 5270-5310MHz<br>5510-5710MHz    | 5290MHz, 5530MHz<br>5610MHz, 5690MHz |
| Modulation             | OFDM (BPSK, QPSK, 16QAM, 64QAM)               | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM)      |
| Channel Spacing        | 20MHz                                         | 20MHz                           | 40MHz                           | 80MHz                                |
| Number of Channels     | 16                                            | 16                              | 6                               | 4                                    |
| Antenna Type           | External sector M Antenna                     |                                 |                                 |                                      |
| Antenna Gain (Peak)    | 5GHz: 5 dBi                                   |                                 |                                 |                                      |
| Antenna Connector Type | Reversed SMA                                  |                                 |                                 |                                      |
| Note                   | 2.4GHz and 5GHz Radio transmit simultaneously |                                 |                                 |                                      |

#### EUT Power level setting

| Mode         | Frequency | Power Setting |
|--------------|-----------|---------------|
| 802.11-a     | 5260      | 42            |
| 802.11-a     | 5280      | 42            |
| 802.11-a     | 5320      | 40            |
| 802.11-n-20  | 5260      | 42            |
| 802.11-n-20  | 5280      | 42            |
| 802.11-n-20  | 5320      | 40            |
| 802.11-n-40  | 5270      | 43            |
| 802.11-n-40  | 5310      | 38            |
| 802.11-ac-80 | 5290      | 38            |
|              |           |               |
| 802.11-a     | 5500      | 40            |
| 802.11-a     | 5580      | 40            |
| 802.11-a     | 5700      | 40            |
| 802.11-n-20  | 5500      | 40            |
| 802.11-n-20  | 5580      | 40            |
| 802.11-n-20  | 5700      | 40            |
| 802.11-n-40  | 5510      | 38            |
| 802.11-n-40  | 5590      | 42            |
| 802.11-n-40  | 5670      | 40            |
| 802.11-ac-80 | 5530      | 36            |
| 802.11-ac-80 | 5610      | 40            |

#### CROSS Band channels power setting

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

Note: All data rate has been verified and worst case was used for all test items.

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

| Item | Supporting Equipment Description | Model       | Serial Number | Manufacturer | Note |
|------|----------------------------------|-------------|---------------|--------------|------|
| 1    | Laptop                           | VOSTRO 1520 | 26543939185   | Dell         | -    |
|      |                                  |             |               |              |      |
|      |                                  |             |               |              |      |

### 7.2 Cabling Description

| Item | Connection Start |          | Connection Stop              |          | Length / shielding Info |           | Note |
|------|------------------|----------|------------------------------|----------|-------------------------|-----------|------|
|      | From             | I/O Port | To                           | I/O Port | Length (m)              | Shielding |      |
| 1    | EUT              | RJ45     | Power Over Ethernet Injector | RJ45     | >3m                     | N/A       | -    |
| 2    | Laptop           | RJ45     | Power Over Ethernet Injector | RJ45     | >3m                     | N/A       |      |

### 7.3 Test Software Description

| Test Item  | Software       | Description                                                |
|------------|----------------|------------------------------------------------------------|
| RF Testing | Command prompt | 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 | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A  |
| AC Conducted Emissions Voltage | FCC           | 15.207(a) | ANSI C63.4 – 2014                                                          | <input checked="" type="checkbox"/> Pass*<br><input type="checkbox"/> 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                      | <input checked="" type="checkbox"/> Pass*<br><input type="checkbox"/> N/A |
| Maximum conducted Output Power            | FCC                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.407 (a) (2)                | 789033 D02 General UNII Test Procedures New Rules v01                      | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A  |
| Power reduction (Antenna Gain > 6 dBi)    | FCC                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.407 (a) (2)                | -                                                                          | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> 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 | <input checked="" type="checkbox"/> Pass*<br><input type="checkbox"/> N/A |
| Power Spectral Density                    | FCC                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.407 (a) (2)                | 789033 D02 General UNII Test Procedures New Rules v01                      | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A  |
| Frequency Stability                       | FCC                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.407 (g)                    | -                                                                          | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> N/A  |
| Transmit Power Control (TPC)              | FCC                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.407 (h)(1)                 | -                                                                          | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> N/A  |
| User Manual                               | FCC                                                                                                                                                                                                                                                                                                                                                                                                                            | -                             | -                                                                          | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A  |
| Remark                                    | <ol style="list-style-type: none"> <li>All measurement uncertainties are not taken into consideration for all presented test result.</li> <li>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.</li> <li>Pass*: Please refer to report FCC_SL17072501-RUC-022A3_W5356.</li> </ol> |                               |                                                                            |                                                                           |

## 9 Measurement Uncertainty

### 9.1 Conducted Emissions

The test is to measure the conducted emissions to the mains port of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the LISN
- Uncertainty of cables
- Uncertainty due to the mismatches
- Etc, see the below table for details

| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading                  | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.105                |
| Filter Insertion Loss             | 0.25       | Normal                   | 2        | 1                       | 0.125                |
| LISN Insertion Loss               | 0.40       | Normal                   | 2        | 1                       | 0.20                 |
| Receiver CW accuracy              | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response          | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| PRF Response                      | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| Mismatch LISN - Receiver          | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| LISN Impedance                    | 2.5        | Triangular               | 2.449    | 1                       | 1.0208248            |
| Combined Standard Uncertainty     |            |                          |          |                         | 1.928133             |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>3.856266</b>      |

The total derived measurement uncertainty is +/- 3.86 dB.

### 9.2 Radiated Emissions (30MHz to 1GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- NSA Calibration
- Etc., details see the below table

| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading                  | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.105                |
| Filter Insertion Loss             | 0.25       | Normal                   | 2        | 1                       | 0.125                |
| Antenna Factor                    | 0.65       | Normal                   | 2        | 1                       | 0.325                |
| Receiver CW accuracy              | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response          | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| PRF Response                      | 1.5        | Rectangular              | 1.732    | 1                       | 0.86605081           |
| Mismatch Filter - Receiver        | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| NSA Calibration                   | 4.0        | U-Shape                  | 1.414    | 1                       | 2.8288543            |
| Combined Standard Uncertainty     |            |                          |          |                         | 3.0059131            |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>6.0118262</b>     |

The total derived measurement uncertainty is +/- 6.00 dB.

### 9.3 Radiated Emissions (1GHz to 40GHz)

The test is to measure the radiated emissions of the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the receiver
- Uncertainty of the antenna
- Uncertainty of cables
- Uncertainty due to the mismatches
- VSWR Calibration
- Etc., details see the below table

| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Receiver Reading                  | 0.12       | Rectangular              | 1.732    | 1                       | 0.0692840            |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.1050000            |
| Filter Insertion Loss             | 0.25       | Normal                   | 2        | 1                       | 0.1250000            |
| Antenna Factor                    | 0.65       | Normal                   | 2        | 1                       | 0.3250000            |
| Receiver CW accuracy              | 0.5        | Rectangular              | 1.732    | 1                       | 0.2886836            |
| Pulse Amplitude Response          | 1.5        | Rectangular              | 1.732    | 1                       | 0.8660508            |
| PRF Response                      | 1.5        | Rectangular              | 1.732    | 1                       | 0.8660508            |
| Mismatch Filter - Receiver        | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| VSWR Calibration                  | 2.0        | U-Shape                  | 1.414    | 1                       | 1.4144272            |
| Combined Standard Uncertainty     |            |                          |          |                         | 4.2363               |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>8.4726</b>        |

The total derived measurement uncertainty is +/- 8.47 dB.

### 9.4 RF conducted measurement

The test is to measure the RF output power from the EUT.

Some error sources that can contribute to the total uncertainty:

- Uncertainty of the Reference Level Uncertainty
- Uncertainty of variable attenuators
- Uncertainty of cables
- Uncertainty due to the mismatches

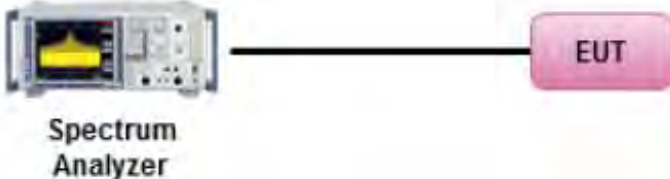
| Source of Uncertainty             | Value (dB) | Probability Distribution | Division | Sensitivity Coefficient | Expanded Uncertainty |
|-----------------------------------|------------|--------------------------|----------|-------------------------|----------------------|
| Reference Level                   | 0.12       | Rectangular              | 1.732    | 1                       | 0.069284             |
| Cable Insertion Loss              | 0.21       | Normal                   | 2        | 1                       | 0.105                |
| Attenuator                        | 0.25       | Normal                   | 2        | 1                       | 0.125                |
| Mismatch                          | 0.25       | U-Shape                  | 1.414    | 1                       | 0.1768033            |
| Combined Standard Uncertainty     |            |                          |          |                         | 0.476087             |
| <b>Expanded Uncertainty (K=2)</b> |            |                          |          |                         | <b>0.952174</b>      |

The total derived measurement uncertainty is +/- 0.95 dB.

## 10 Measurements, Examination and Derived Results

### 10.1 Output Power

#### Requirement(s):

| Spec           | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Requirement                                                                                                                                                                                                                              | Applicable                                                                 |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| § 15.407       | 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. | <input checked="" type="checkbox"/>                                        |
|                | 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.                                                                                                               | <input checked="" type="checkbox"/>                                        |
| Test Setup     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                          |                                                                            |
| Test Procedure | <p>789033 D02 General UNII Test Procedures New Rules v01r02</p> <p><u>Measurement using a Spectrum Analyzer or EMI Receiver (SA)</u></p> <p>Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep):</p> <ul style="list-style-type: none"> <li>- Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.</li> <li>- Set RBW = 1 MHz</li> <li>- Set VBW = 3 MHz</li> <li>- Number of points in sweep <math>\geq 2 \times \text{span} / \text{RBW}</math>. (This ensures that bin-to-bin spacing is <math>\leq \text{RBW}/2</math>, so that narrowband signals are not lost between frequency bins.)</li> <li>- Sweep time = auto.</li> <li>- Detector = power averaging (rms), if available. Otherwise, use sample detector mode.</li> <li>- If transmit duty cycle <math>&lt; 98\%</math>, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle <math>\geq 98\%</math>, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."</li> <li>- Trace average at least 100 traces in power averaging (rms) mode.</li> <li>- Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.</li> </ul> |                                                                                                                                                                                                                                          |                                                                            |
| Test Date      | 10/24/2017 – 02/08/2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Environmental condition                                                                                                                                                                                                                  | Temperature 23°C<br>Relative Humidity 44%<br>Atmospheric Pressure 1021mbar |
| Remark         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                          |                                                                            |
| Result         | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                          |                                                                            |

Test Data    ☒ Yes      ☐ N/A

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

Test was done by Chen Ge at RF test site.

### Output Power measurement result for 5.3GHz

| Type         | Test mode    | Freq (MHz) | CH   | Conducted Power (dBm) |        |                | Limit (dBm) | Result |
|--------------|--------------|------------|------|-----------------------|--------|----------------|-------------|--------|
|              |              |            |      | Chain0                | Chain1 | Combined Power |             |        |
| Output Power | 802.11a      | 5260       | Low  | 20.008                | 19.612 | 22.825         | 24          | Pass   |
|              | 802.11a      | 5280       | Mid  | 19.719                | 19.647 | 22.694         | 24          | Pass   |
|              | 802.11a      | 5320       | High | 18.453                | 18.417 | 21.445         | 24          | Pass   |
|              | 802.11n-20M  | 5260       | Low  | 20.155                | 20.078 | 23.127         | 24          | Pass   |
|              | 802.11n-20M  | 5280       | Mid  | 20.083                | 19.572 | 22.845         | 24          | Pass   |
|              | 802.11n-20M  | 5320       | High | 18.448                | 18.520 | 21.494         | 24          | Pass   |
|              | 802.11n-40M  | 5270       | Low  | 20.535                | 20.867 | 23.714         | 24          | Pass   |
|              | 802.11n-40M  | 5310       | Mid  | 18.277                | 18.257 | 21.277         | 24          | Pass   |
|              | 802.11ac-80M | 5290       | High | 17.593                | 17.742 | 20.678         | 24          | Pass   |

### Output Power measurement result for 5.5GHz

| Type         | Test mode    | Freq (MHz) | CH   | Conducted Power (dBm) |        |                | Limit (dBm) | Result |
|--------------|--------------|------------|------|-----------------------|--------|----------------|-------------|--------|
|              |              |            |      | Chain0                | Chain1 | Combined Power |             |        |
| Output Power | 802.11a      | 5500       | Low  | 19.357                | 19.194 | 22.286         | 24          | Pass   |
|              | 802.11a      | 5580       | Mid  | 20.043                | 19.711 | 22.890         | 24          | Pass   |
|              | 802.11a      | 5700       | High | 19.368                | 19.713 | 22.554         | 24          | Pass   |
|              | 802.11n-20M  | 5500       | Low  | 19.198                | 19.538 | 22.382         | 24          | Pass   |
|              | 802.11n-20M  | 5580       | Mid  | 20.108                | 19.708 | 22.923         | 24          | Pass   |
|              | 802.11n-20M  | 5700       | High | 19.752                | 19.831 | 22.802         | 24          | Pass   |
|              | 802.11n-40M  | 5510       | Low  | 18.079                | 18.052 | 21.076         | 24          | Pass   |
|              | 802.11n-40M  | 5550       | Mid  | 20.594                | 21.278 | 23.960         | 24          | Pass   |
|              | 802.11n-40M  | 5670       | High | 20.345                | 20.077 | 23.223         | 24          | Pass   |
|              | 802.11ac-80M | 5530       | Low  | 16.557                | 16.847 | 19.715         | 24          | Pass   |
|              | 802.11ac-80M | 5610       | High | 19.318                | 20.271 | 22.831         | 24          | Pass   |

Note: Two chains are cross-polarized, additional gain is  $10 \log_{10}(NANT)=0\text{dB}$ , max directional gain of the EUT is 5dBi. No limit adjustment is needed. All the mode transmission is MIMO.

### Output Power measurement result for CROSS channels (in band 5470-5725MHz)

| Type | Test mode    | Freq (MHz) | CH    | Conducted Power (dBm) |        |                | Limit (dBm) | Result |
|------|--------------|------------|-------|-----------------------|--------|----------------|-------------|--------|
|      |              |            |       | Chain0                | Chain1 | Combined Power |             |        |
|      | 802.11a      | 5720       | CROSS | 19.58                 | 19.47  | 22.54          | 24          | Pass   |
|      | 802.11n-20M  | 5720       | CROSS | 19.34                 | 19.29  | 22.33          | 24          | Pass   |
|      | 802.11n-40M  | 5710       | CROSS | 19.74                 | 19.76  | 22.76          | 24          | Pass   |
|      | 802.11ac-80M | 5690       | CROSS | 20.14                 | 20.42  | 23.29          | 24          | Pass   |

### Output Power measurement result for CROSS channels (in band 5725-5850MHz)

| Type         | Test mode    | Freq (MHz) | CH    | Conducted Power (dBm) |        |                | Limit (dBm) | Result |
|--------------|--------------|------------|-------|-----------------------|--------|----------------|-------------|--------|
|              |              |            |       | Chain0                | Chain1 | Combined Power |             |        |
| Output Power | 802.11a      | 5720       | CROSS | 19.58                 | 19.47  | 22.54          | 30          | Pass   |
|              | 802.11n-20M  | 5720       | CROSS | 19.34                 | 19.29  | 22.33          | 30          | Pass   |
|              | 802.11n-40M  | 5710       | CROSS | 19.74                 | 19.76  | 22.76          | 30          | Pass   |
|              | 802.11ac-80M | 5690       | CROSS | 20.14                 | 20.42  | 23.29          | 30          | Pass   |

Note: Two chains are cross-polarized, additional gain is  $10 \log_{10}(NANT)=0\text{dB}$ , max directional gain of the EUT is 5dBi. No limit adjustment is needed. All the mode transmission is MIMO

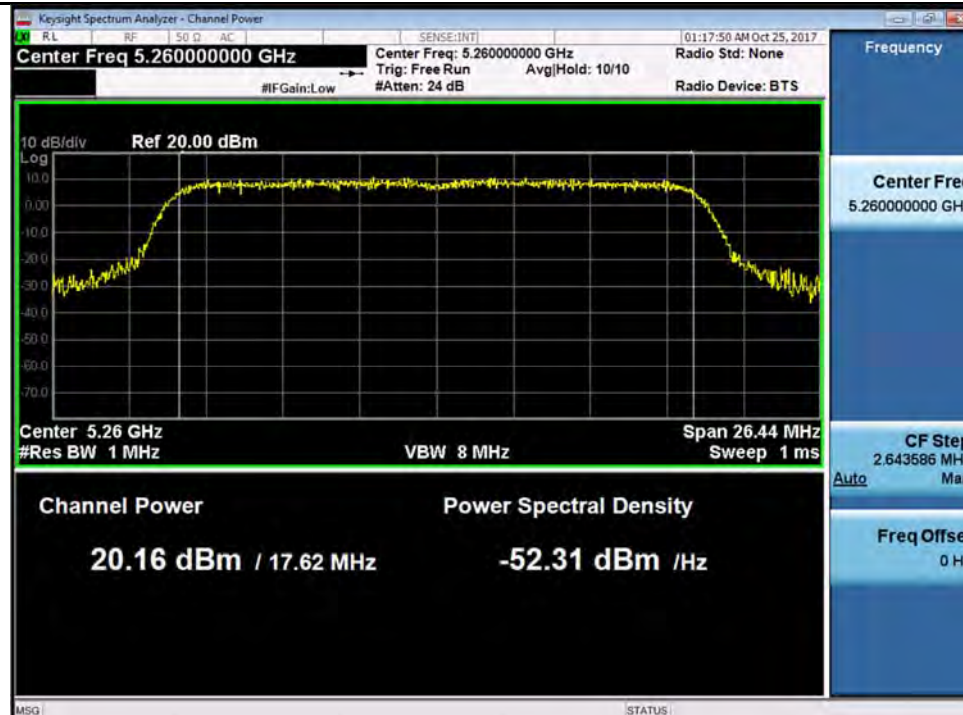
# Test Plot for W53:

Chain 0:

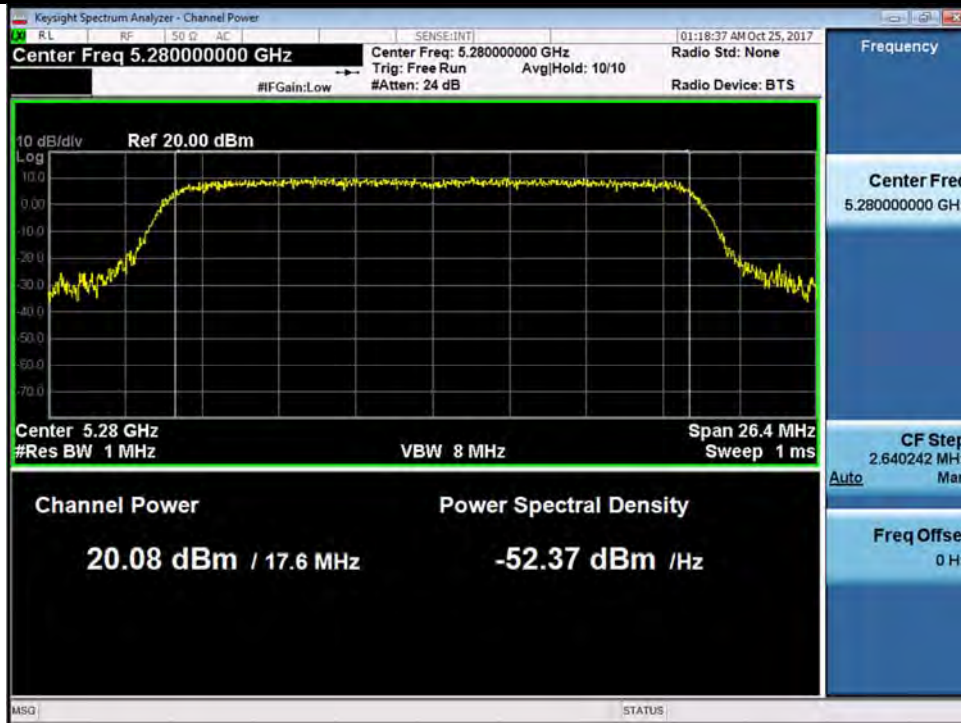




802.11a-5320M



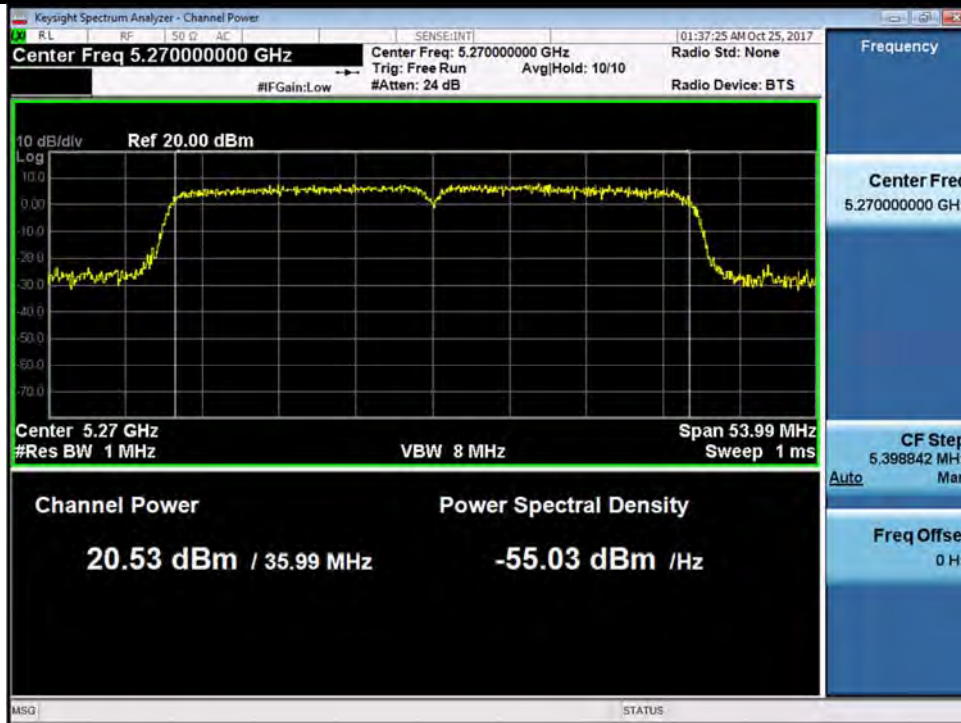
802.11n-HT20 5260M



802.11n-HT20 5280M



802.11n-HT20 5320M



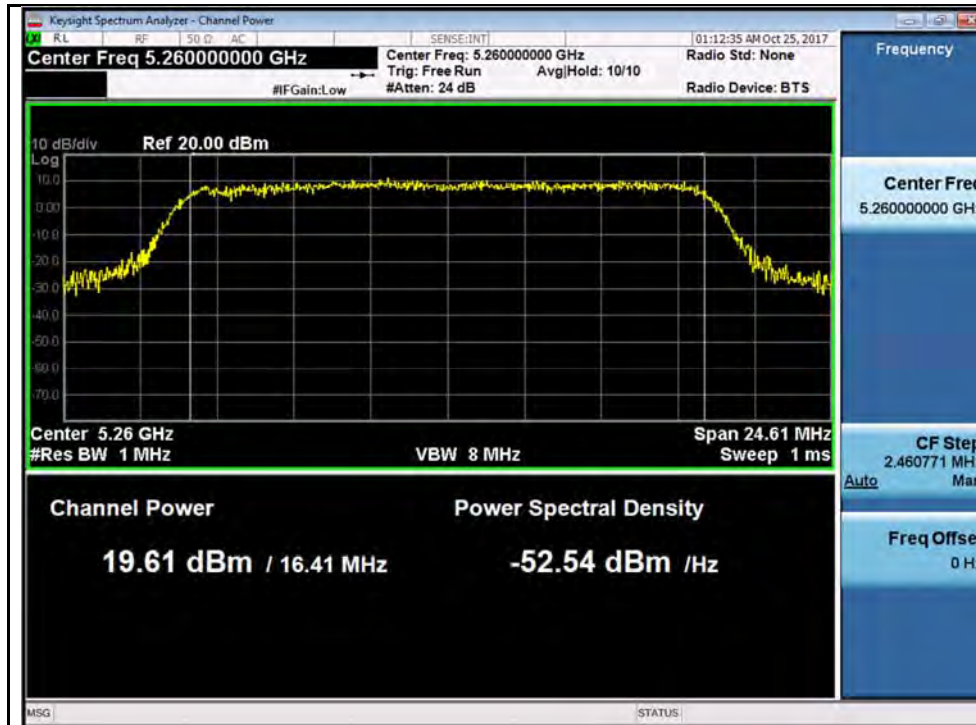
802.11n-HT40 5270M



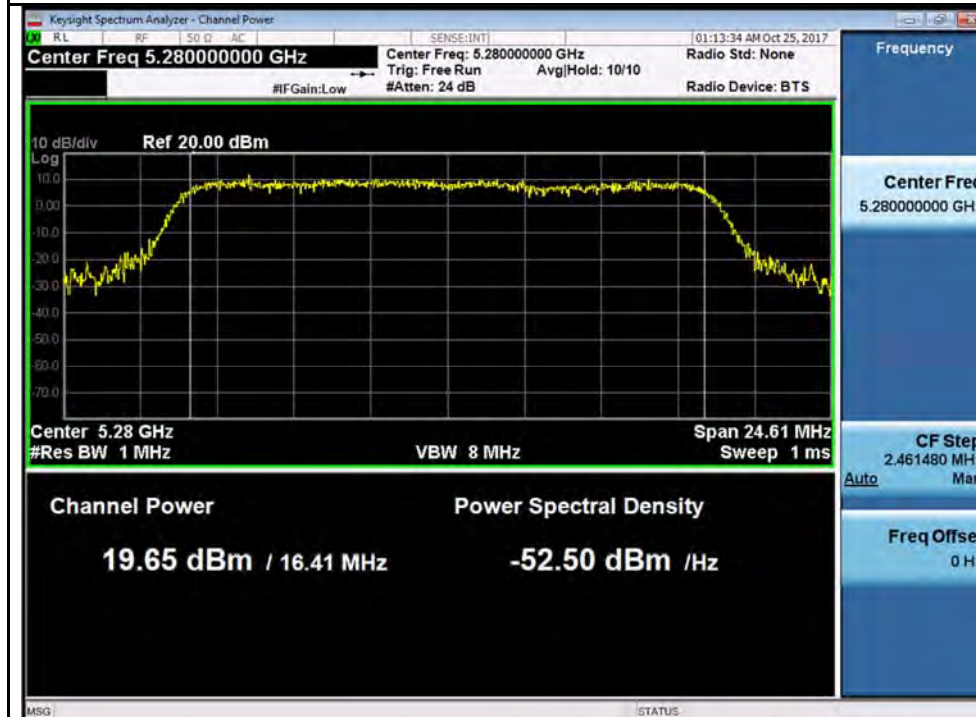
802.11n-HT40 5310M



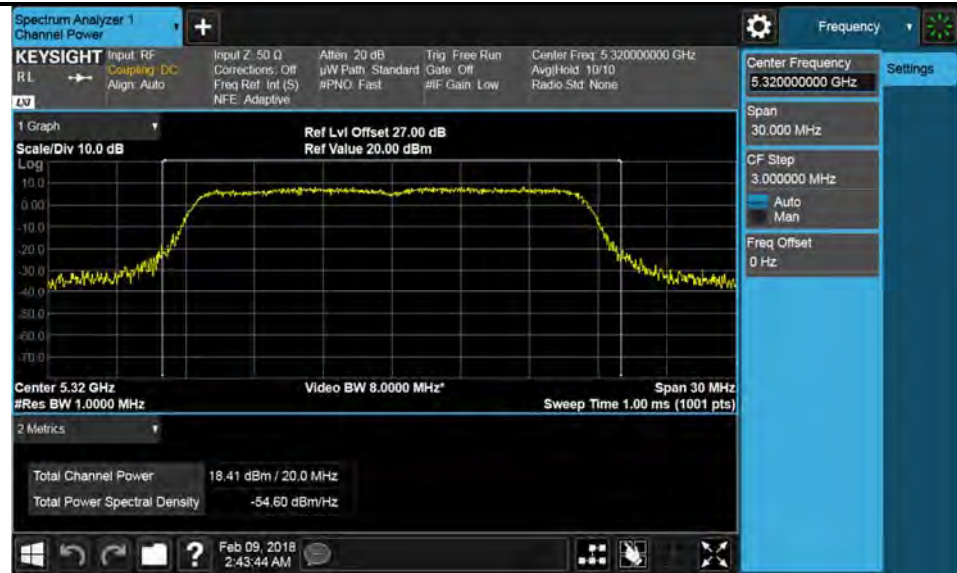
Chain 1:



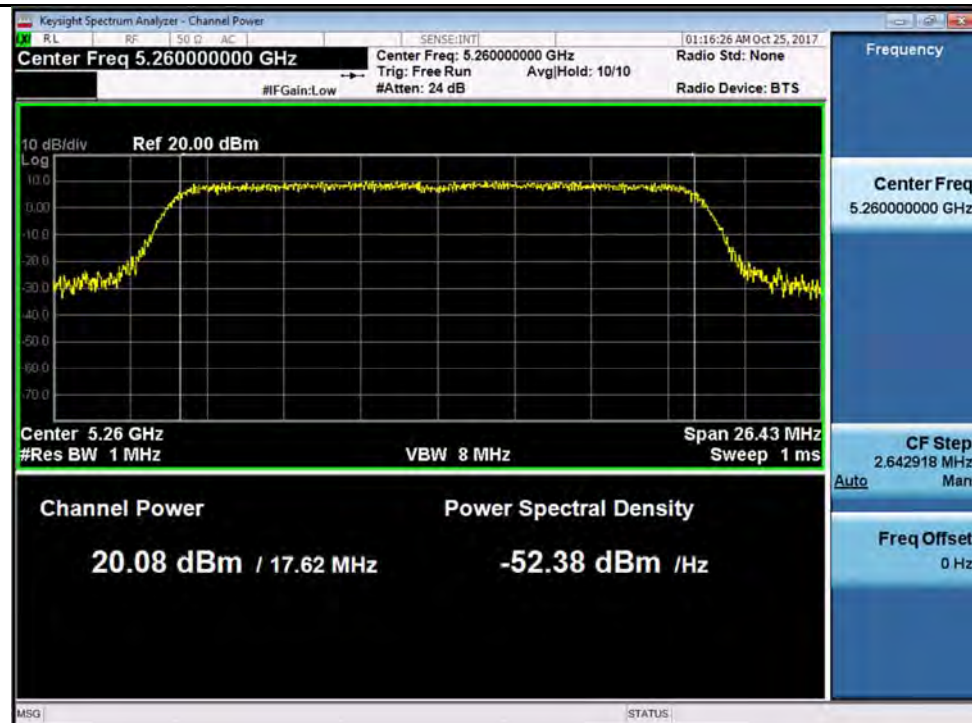
802.11a-5260M



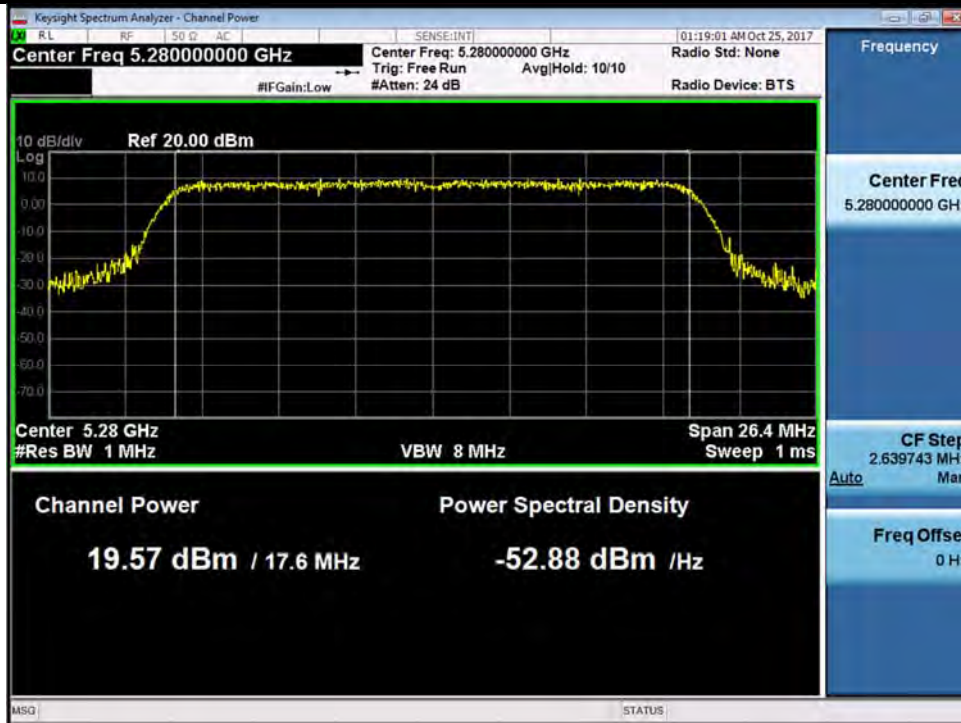
802.11a-5280M



802.11a-5320M



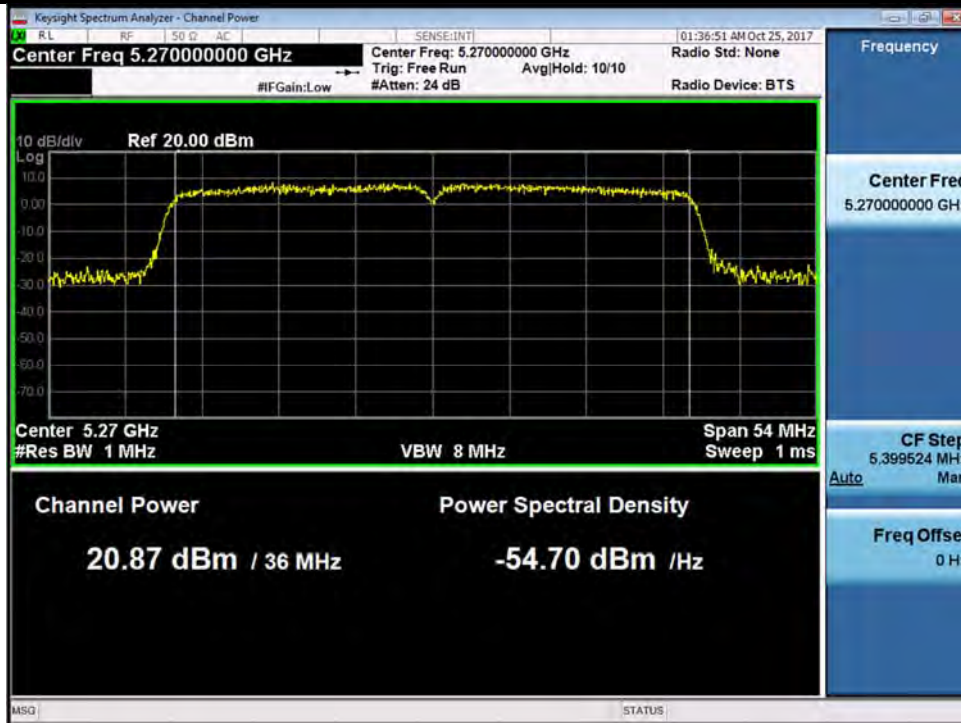
802.11n-HT20 5260M



802.11n-HT20 5280M



802.11n-HT20 5320M



802.11n-HT40 5270M

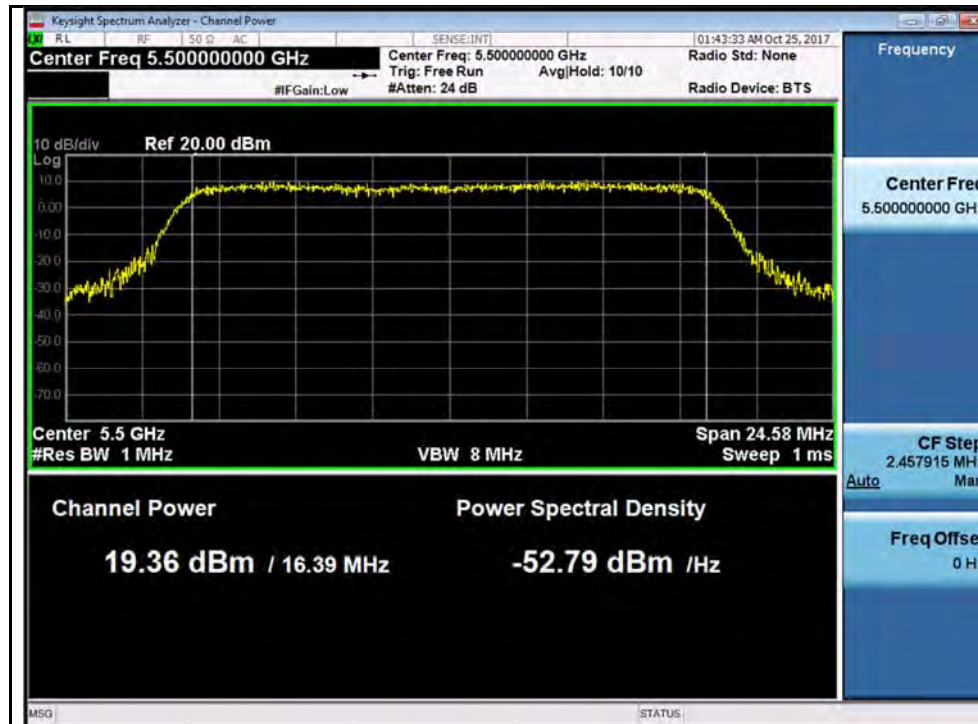


802.11n-HT40 5310M

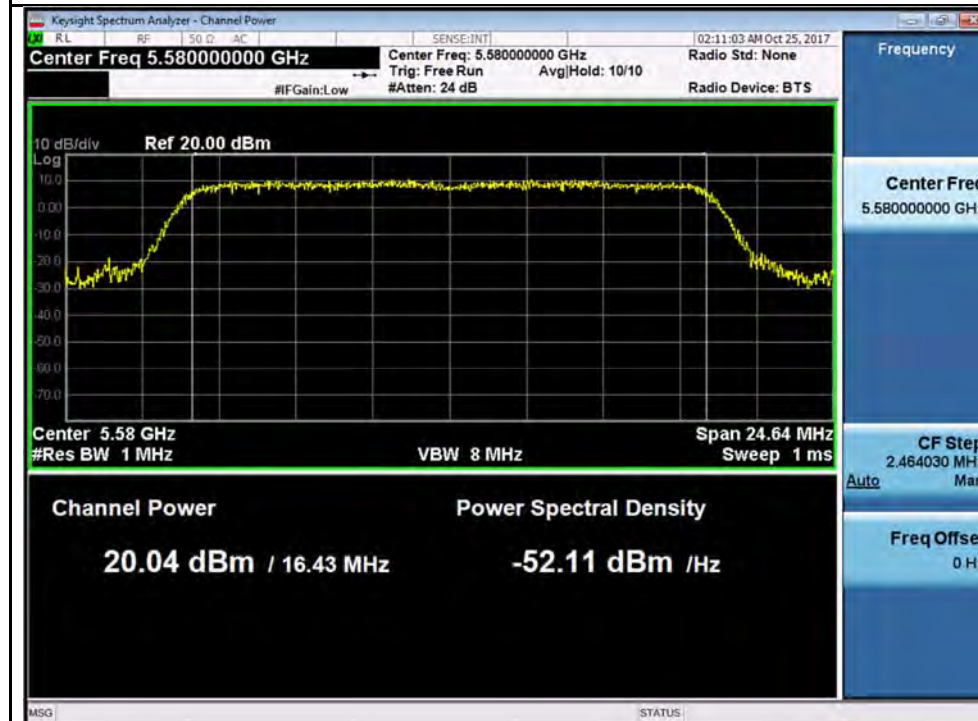


**Test Plot for W56:**

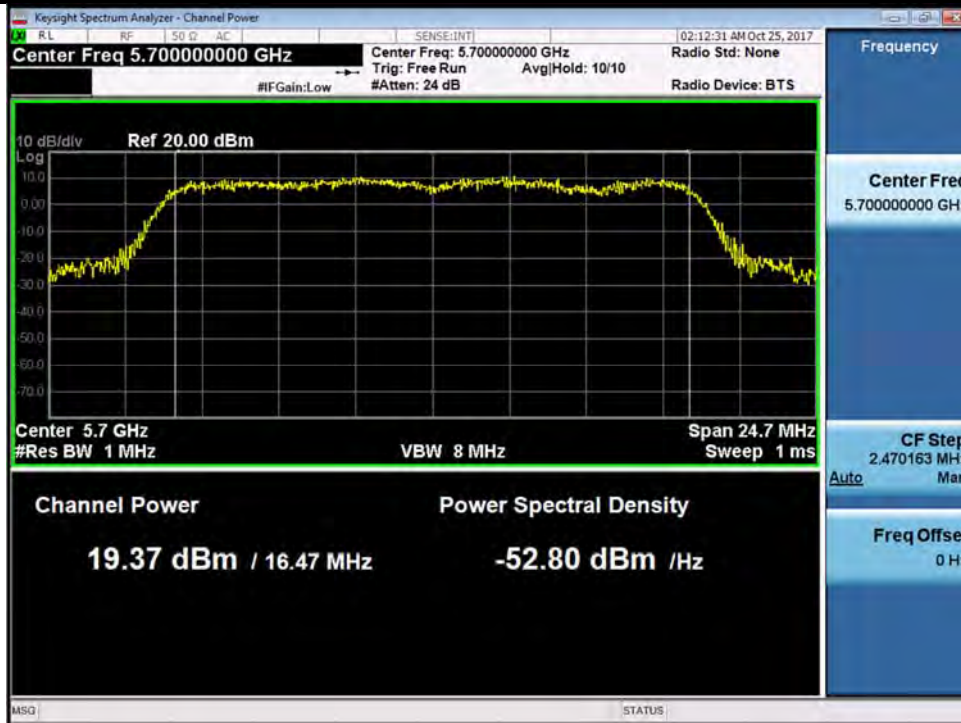
Chain 0:



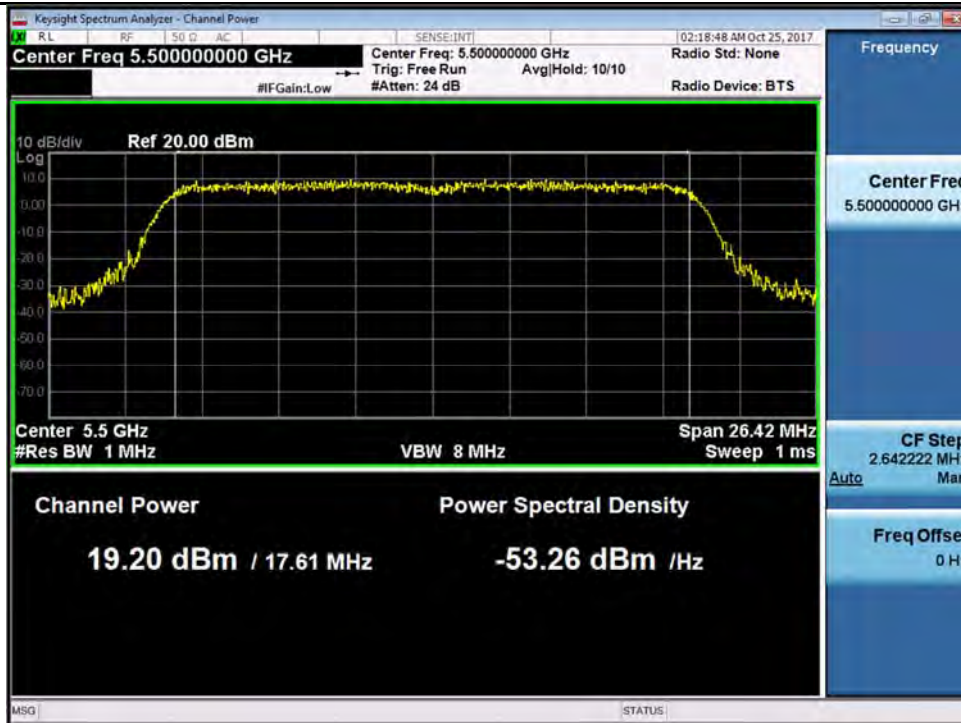
802.11a-5500M



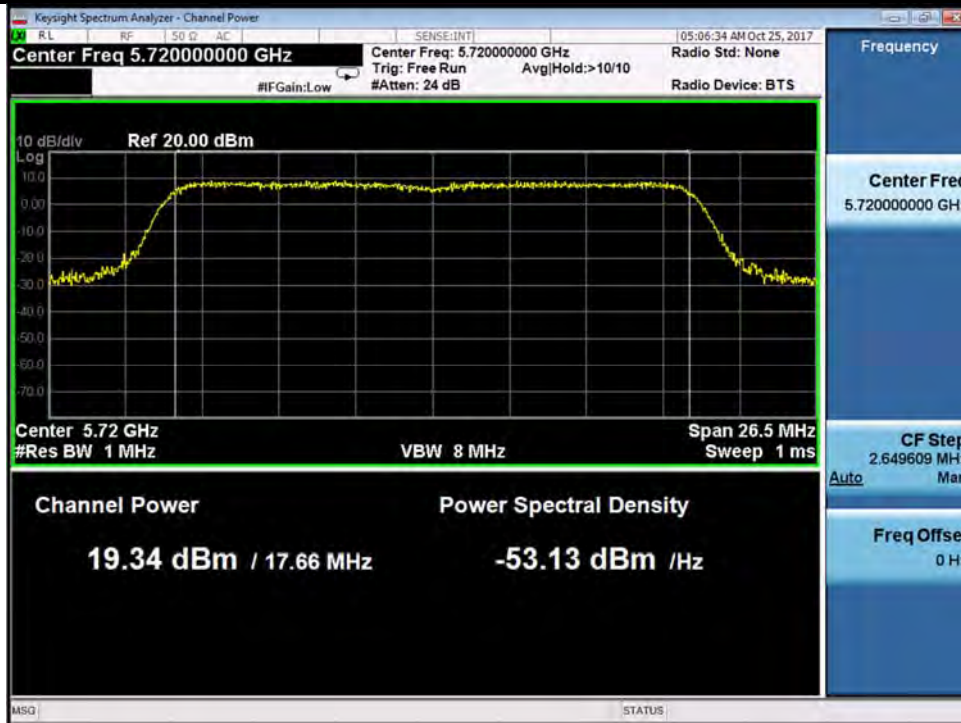
802.11a-5580M



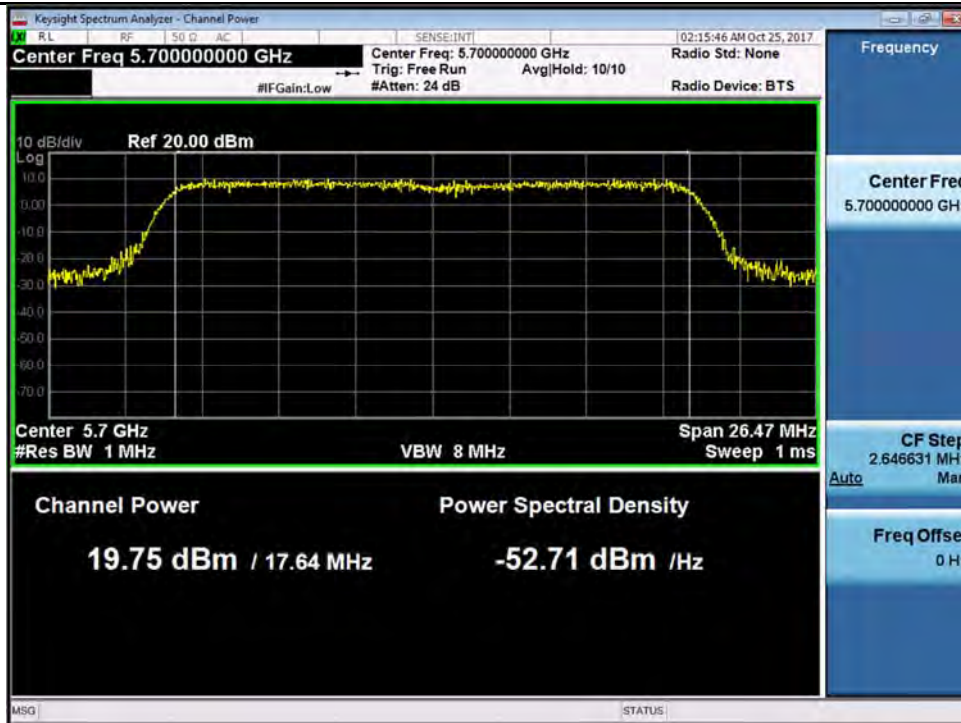
802.11a-5700M



802.11n-HT20 5500M



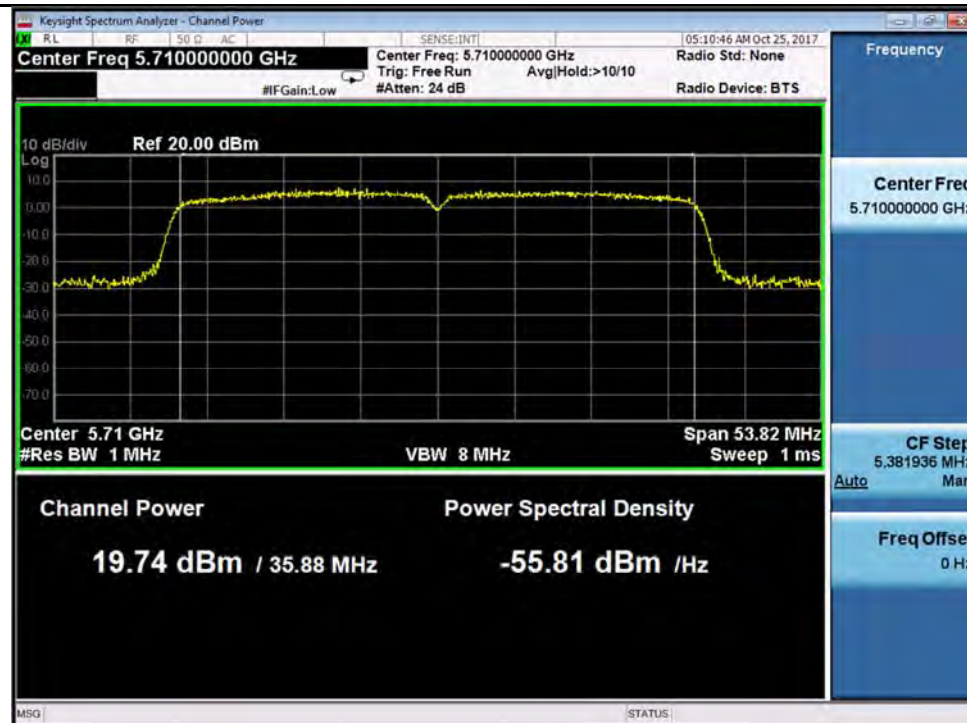
802.11n-HT20 5580M



802.11n-HT20 5700M



802.11n-HT40 5510M

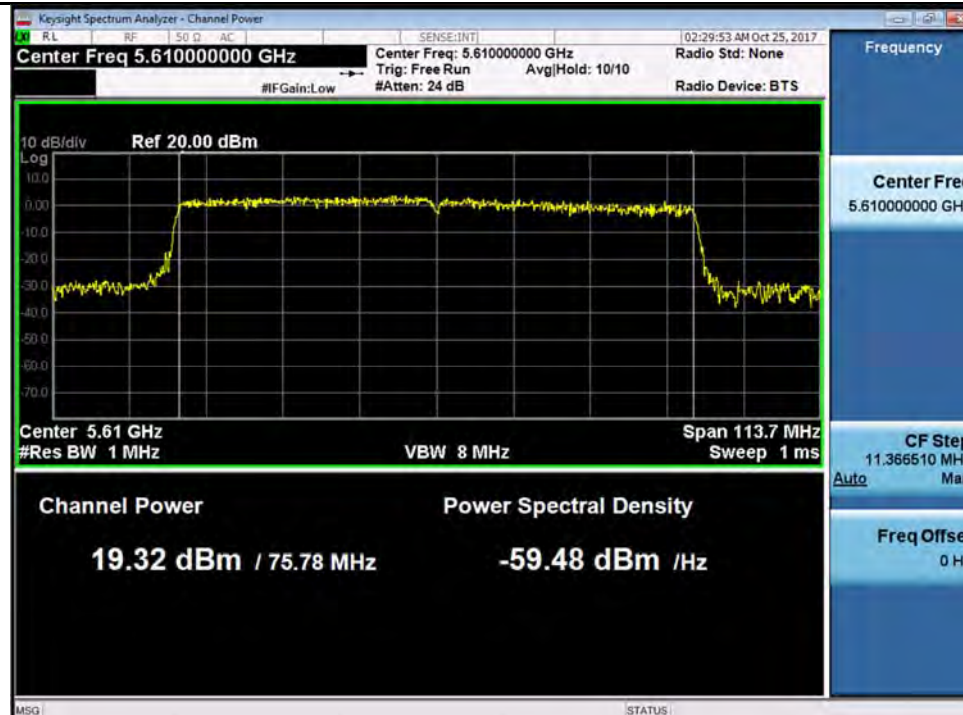


802.11n-HT40 5550M



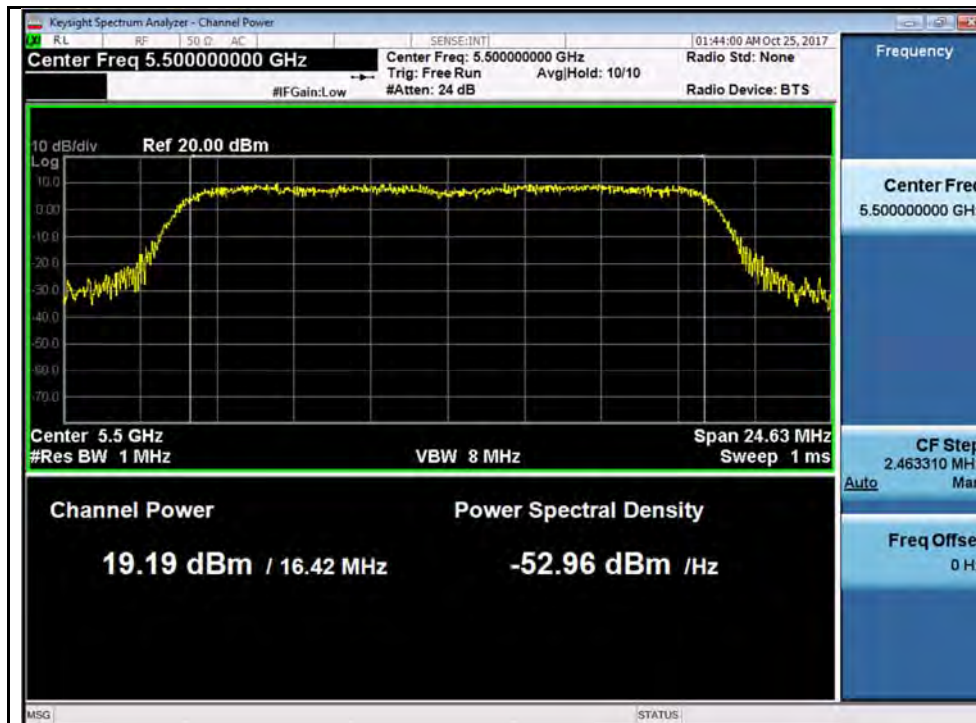


802.11ac-VHT80 5530M



802.11ac-VHT80 5610M

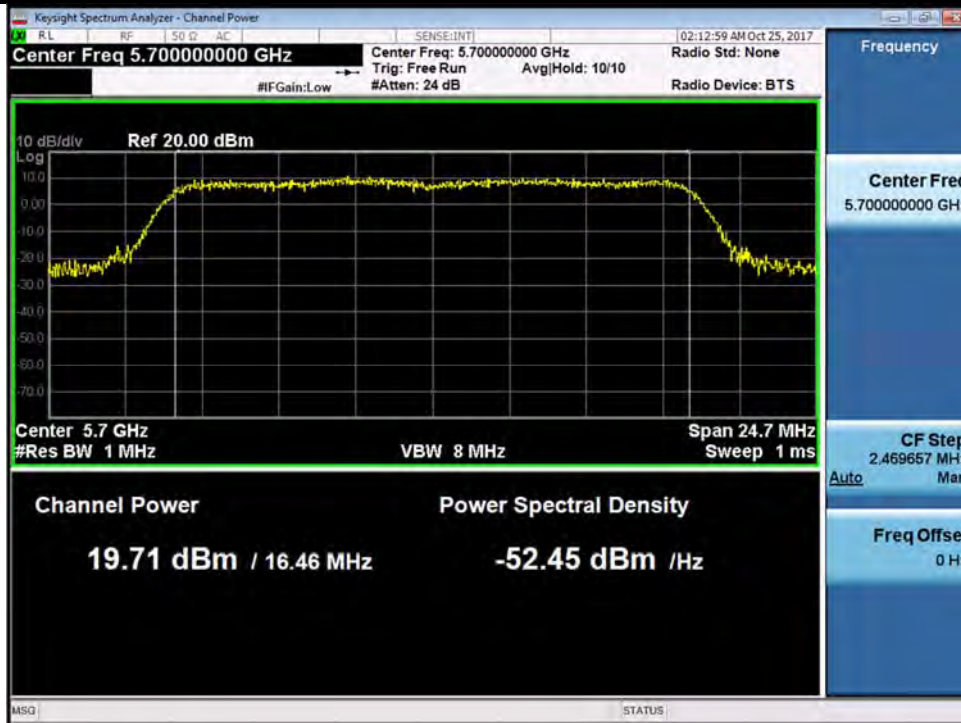
Chain 1:



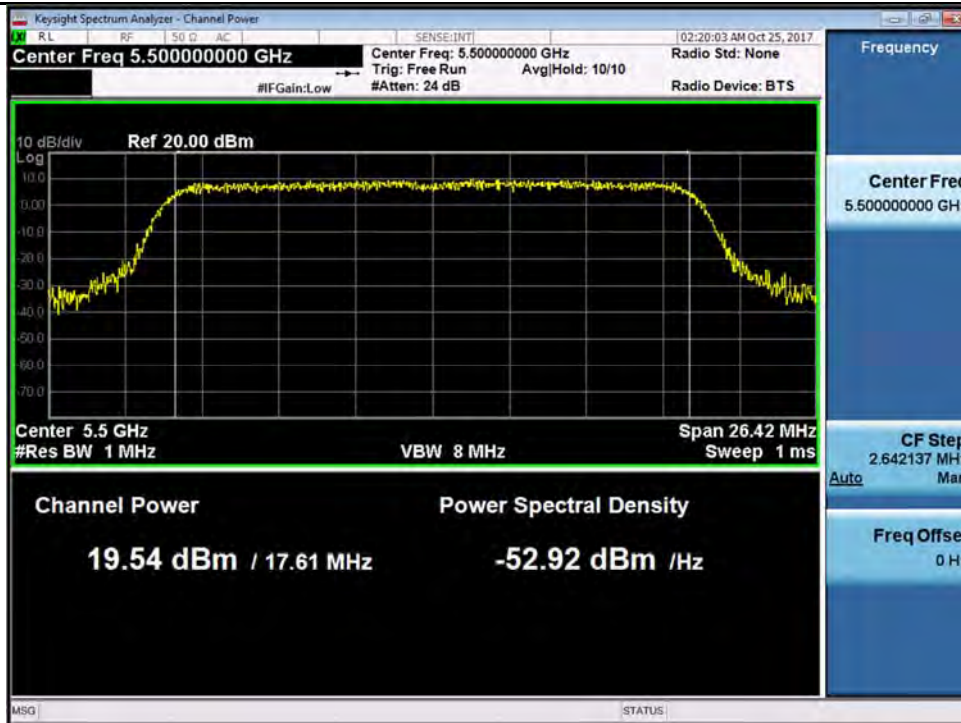
802.11a-5500M



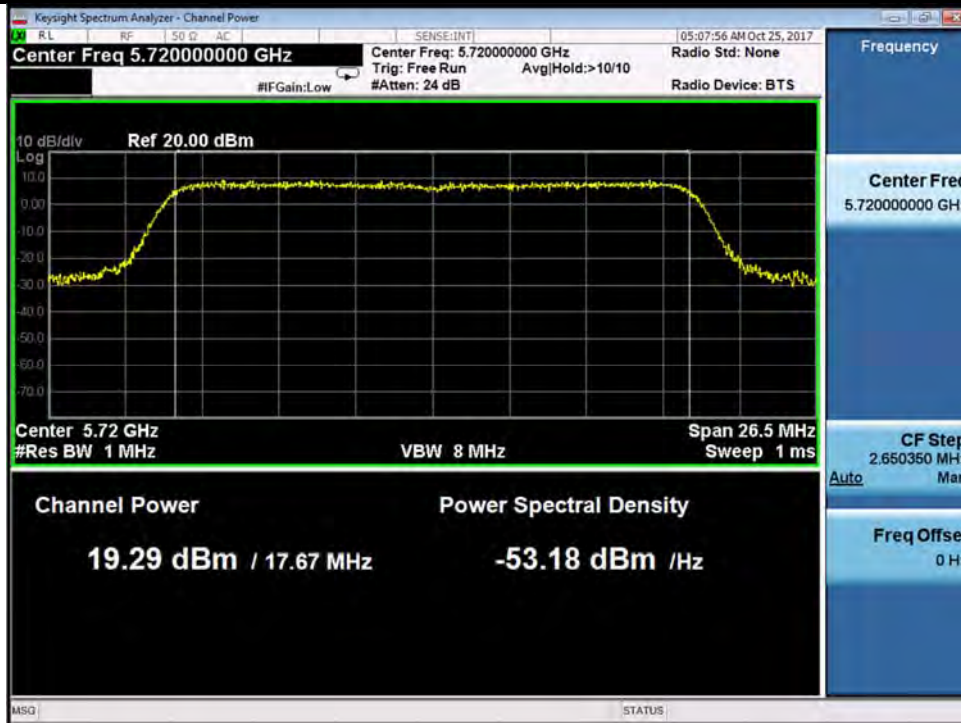
802.11a-5580M



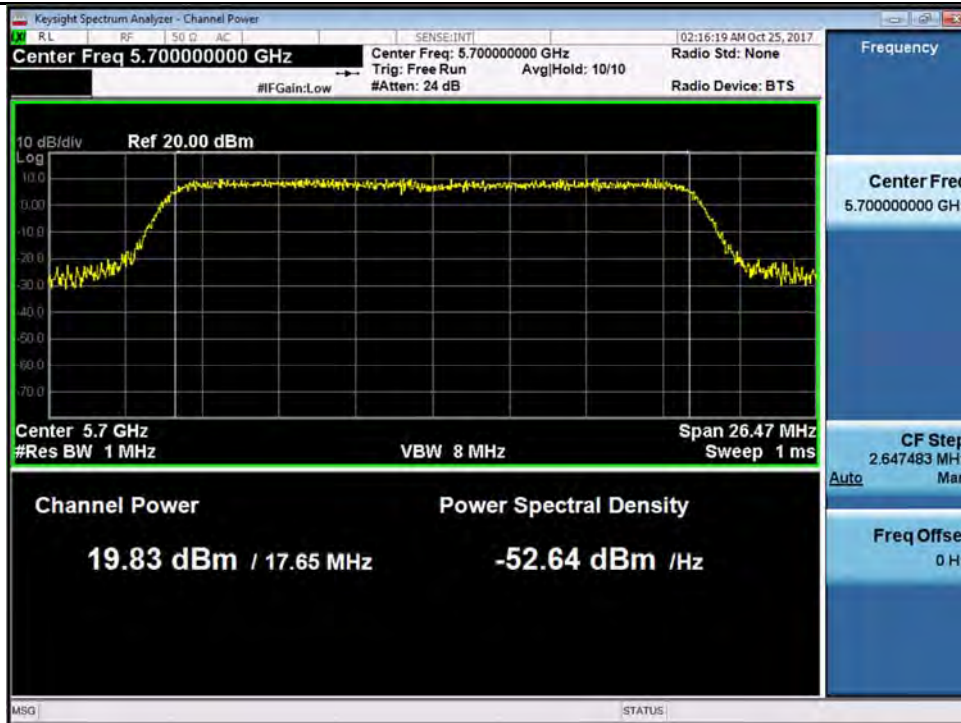
802.11a-5700M



802.11n-HT20 5500M



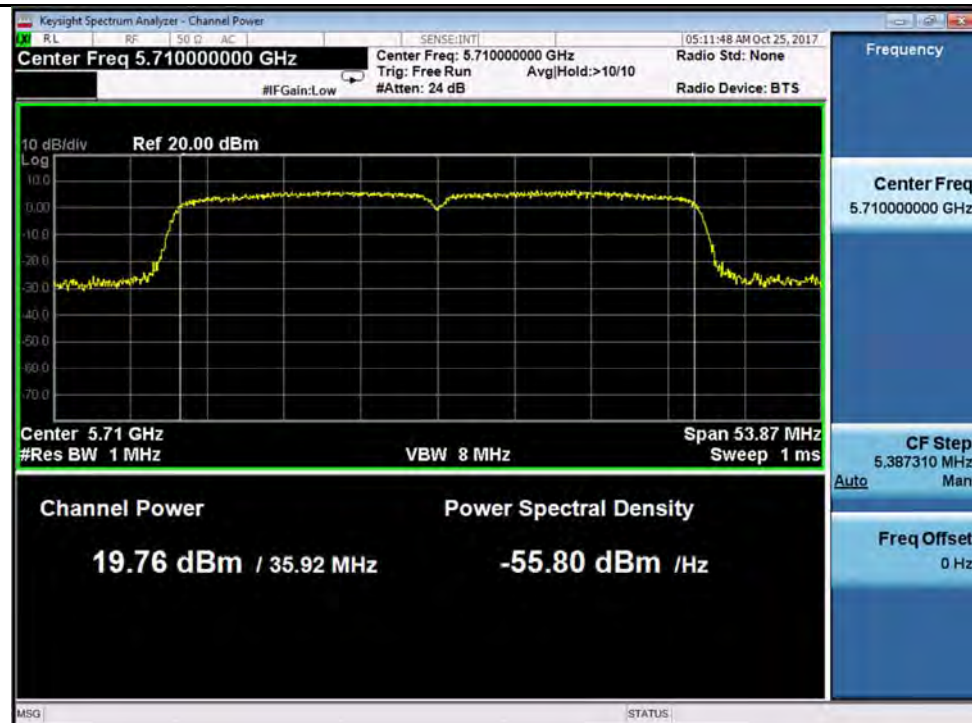
802.11n-HT20 5580M



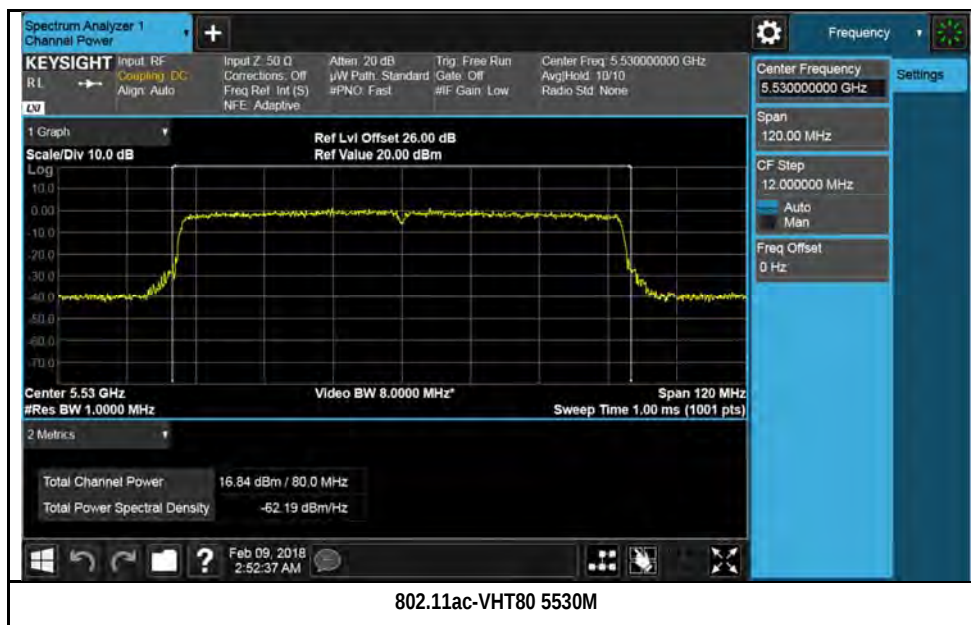
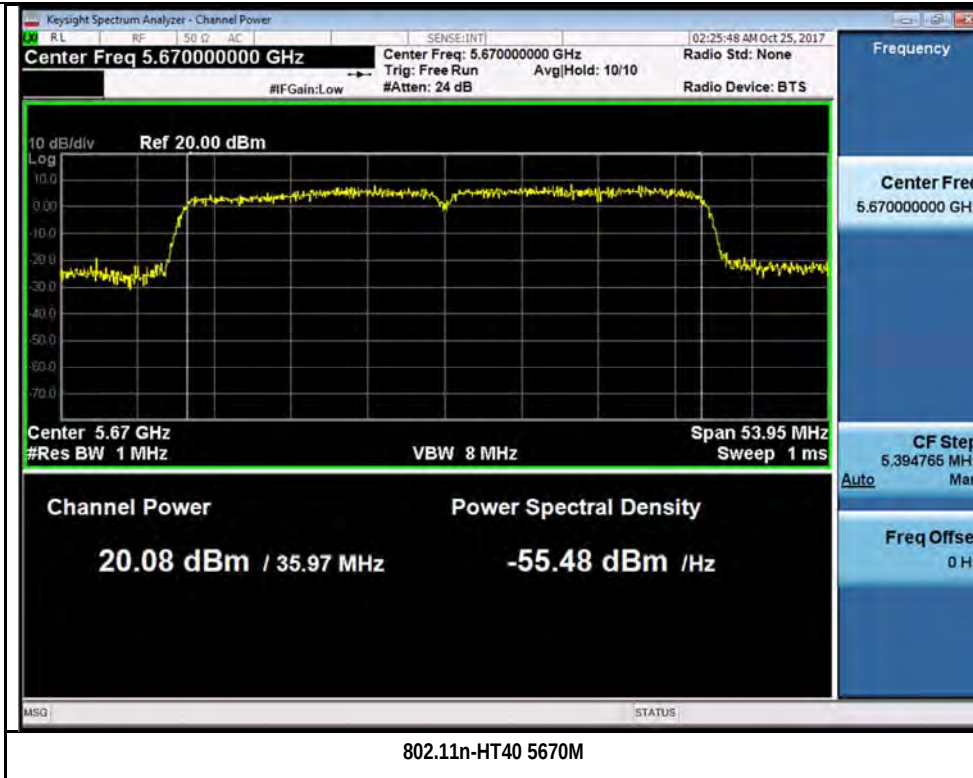
802.11n-HT20 5700M

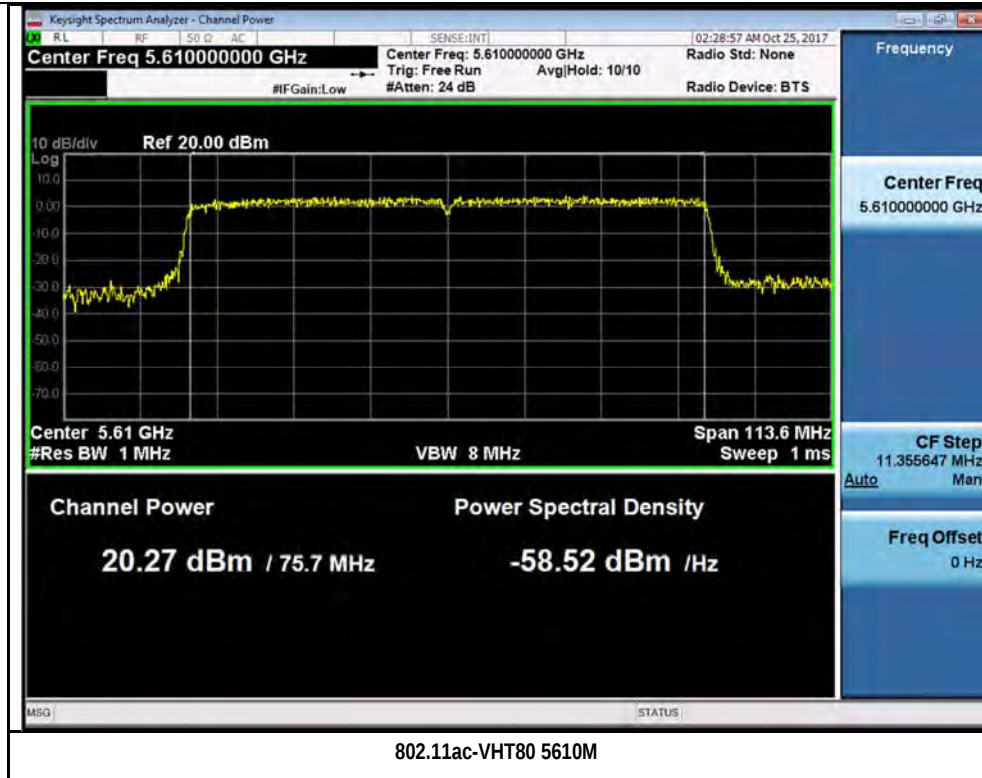


802.11n-HT40 5510M



802.11n-HT40 5550M



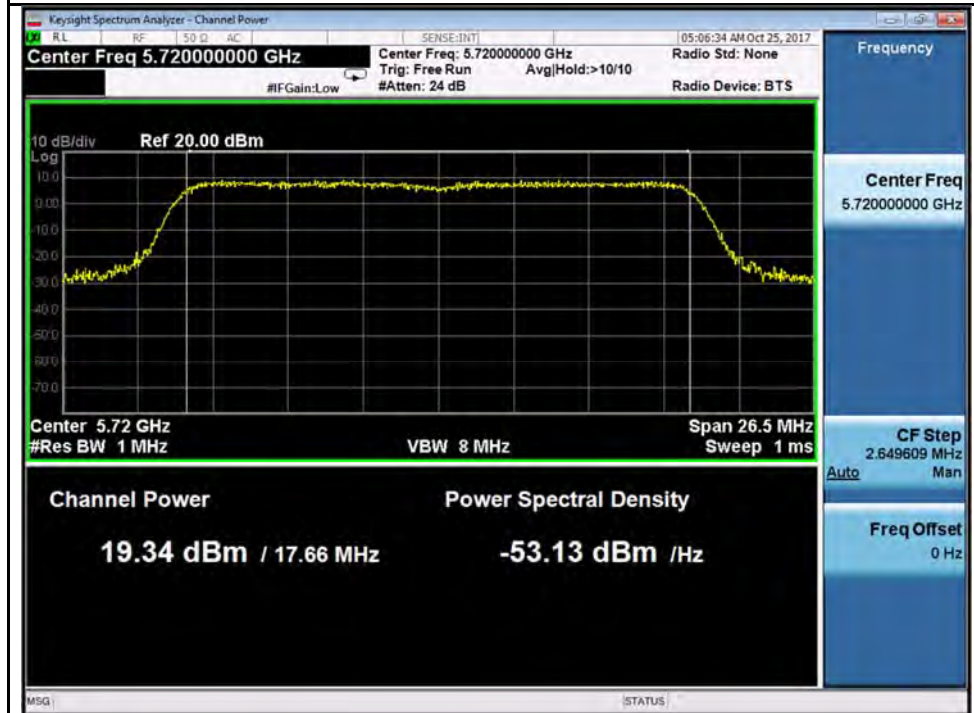


## Test Plot for Crossband:

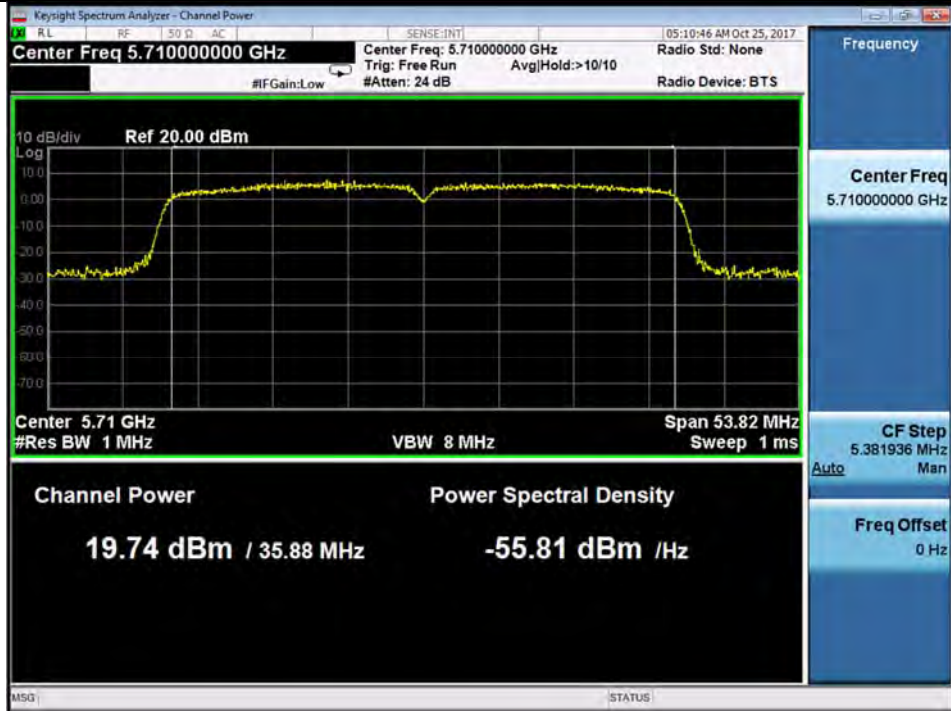
Chain 0:



802.11a-5720M



802.11n-HT20 5720M

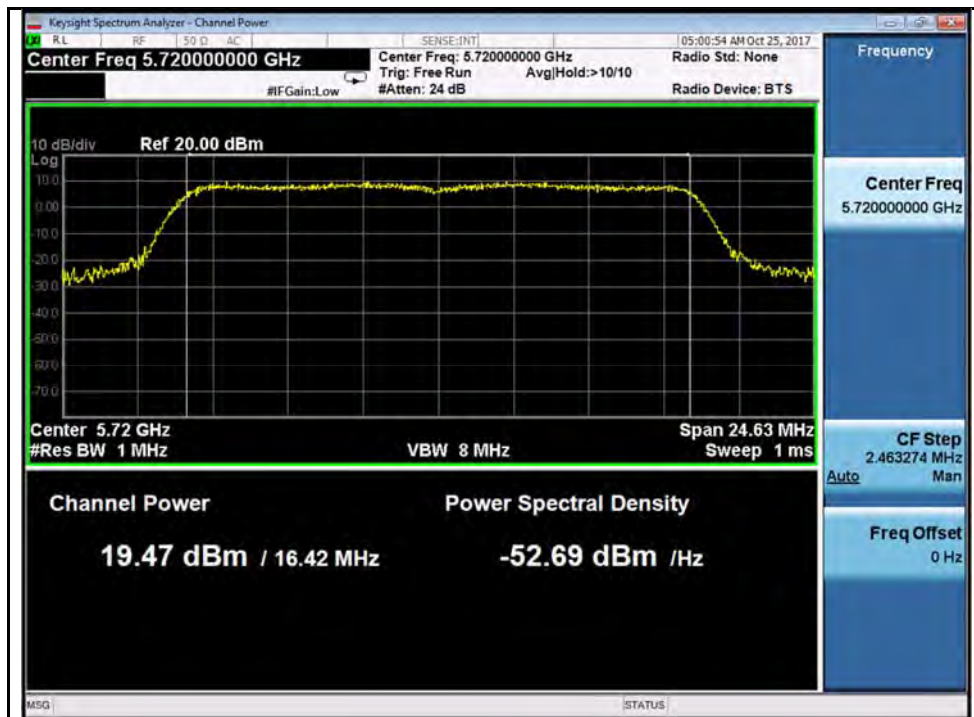


802.11n-HT40 5710M

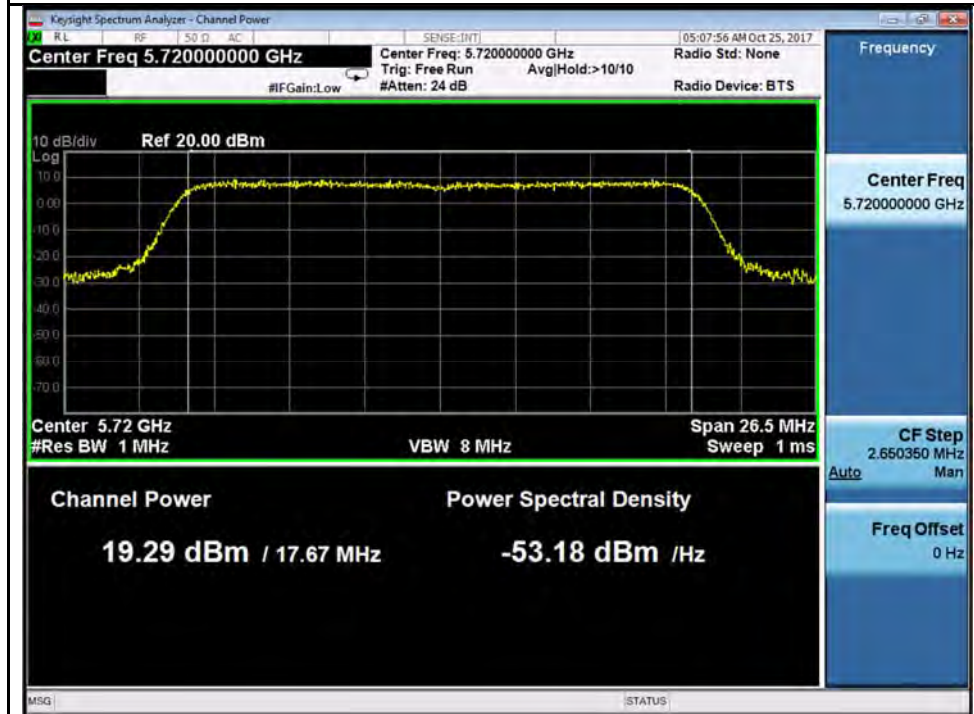


802.11ac-VHT80 5690M

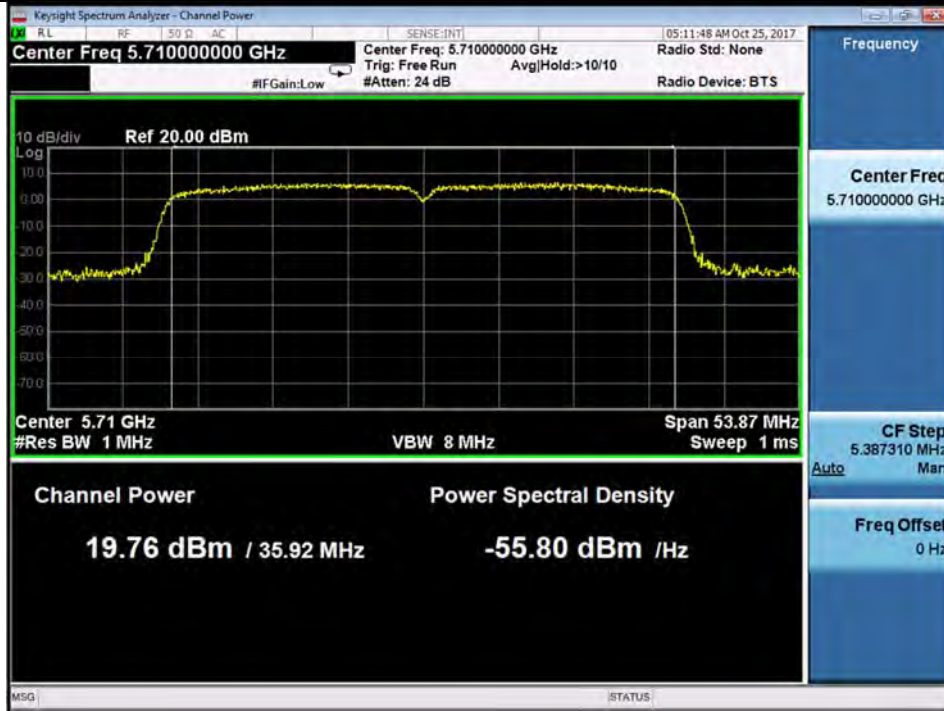
Chain 1:



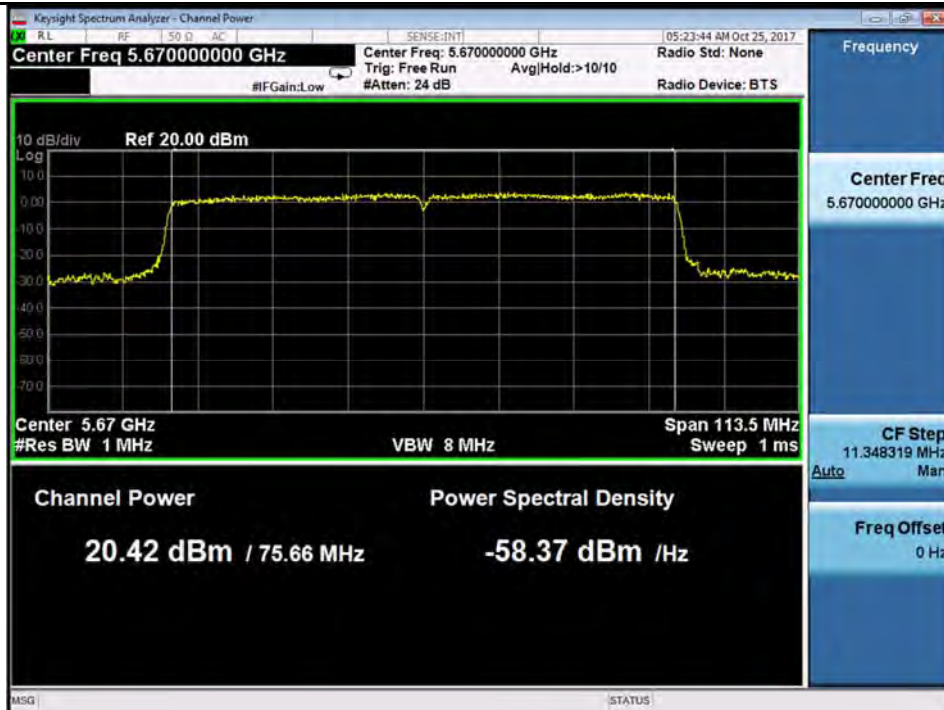
802.11a-5720M



802.11n-HT20 5720M



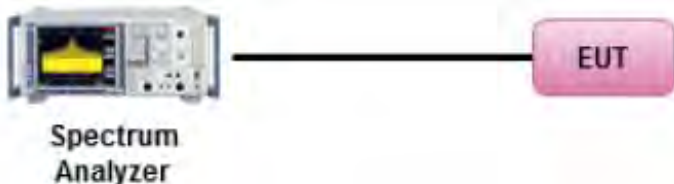
802.11n-HT40 5710M



802.11ac-VHT80 5690M

## 10.2 Peak Power 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. | <input type="checkbox"/>                                                   |
|                | 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.  | <input type="checkbox"/>                                                   |
|                | 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.                  | <input checked="" type="checkbox"/>                                        |
|                | 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.                                         | <input checked="" type="checkbox"/>                                        |
| Test Setup     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                      |                                                                            |
| Test Procedure | <p>789033 D02 General UNII Test Procedures New Rules v01, II.F. Method SA-1</p> <p><u>Maximum spectral density measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.</li> <li>- Set RBW = 1 MHz</li> <li>- Set VBW <math>\geq</math> 3 MHz</li> <li>- Detector = RMS.</li> <li>- Sweep time = auto couple.</li> <li>- Trace mode = max hold.</li> <li>- Trace average at least 100 traces in power averaging</li> <li>- Use the peak marker function to determine the maximum amplitude level within the RBW.</li> </ul> <p>Apply correction to the result if different RBW is used.</p> |                                                                                                                                                      |                                                                            |
| Test Date      | 10/24/2017                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Environmental condition                                                                                                                              | Temperature 22°C<br>Relative Humidity 46%<br>Atmospheric Pressure 1020mbar |
| Remark         | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                      |                                                                            |
| Result         | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                      |                                                                            |

Test Data    ☒ Yes                      ☐ N/A

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

Test was done by Chen Ge at RF test site.

### PSD measurement result for 5.3GHz

| Type | Test mode    | Freq (MHz) | CH   | Conducted PSD (dBm/MHz) |        |                | Limit (dBm) | Result |
|------|--------------|------------|------|-------------------------|--------|----------------|-------------|--------|
|      |              |            |      | Chain0                  | Chain1 | Combined Power |             |        |
| PSD  | 802.11a      | 5260       | Low  | 7.613                   | 7.541  | 10.587         | 11          | Pass   |
|      | 802.11a      | 5280       | Mid  | 7.960                   | 7.850  | 10.916         | 11          | Pass   |
|      | 802.11a      | 5320       | High | 6.489                   | 6.273  | 9.393          | 11          | Pass   |
|      | 802.11n-20M  | 5260       | Low  | 7.668                   | 7.678  | 10.683         | 11          | Pass   |
|      | 802.11n-20M  | 5280       | Mid  | 7.596                   | 7.675  | 10.646         | 11          | Pass   |
|      | 802.11n-20M  | 5320       | High | 6.354                   | 6.299  | 9.337          | 11          | Pass   |
|      | 802.11n-40M  | 5270       | Low  | 5.408                   | 5.384  | 8.406          | 11          | Pass   |
|      | 802.11n-40M  | 5310       | Mid  | 3.342                   | 3.165  | 6.265          | 11          | Pass   |
|      | 802.11ac-80M | 5290       | High | -0.815                  | -0.724 | 2.241          | 11          | Pass   |

### PSD measurement result for 5.5GHz

| Type | Test mode    | Freq (MHz) | CH   | Conducted PSD (dBm/MHz) |        |                | Limit (dBm) | Result |
|------|--------------|------------|------|-------------------------|--------|----------------|-------------|--------|
|      |              |            |      | Chain0                  | Chain1 | Combined Power |             |        |
| PSD  | 802.11a      | 5500       | Low  | 7.340                   | 7.307  | 10.334         | 11          | Pass   |
|      | 802.11a      | 5580       | Mid  | 7.784                   | 7.837  | 10.821         | 11          | Pass   |
|      | 802.11a      | 5700       | High | 7.944                   | 7.914  | 10.939         | 11          | Pass   |
|      | 802.11n-20M  | 5500       | Low  | 7.236                   | 7.229  | 10.243         | 11          | Pass   |
|      | 802.11n-20M  | 5580       | Mid  | 7.598                   | 7.648  | 10.633         | 11          | Pass   |
|      | 802.11n-20M  | 5700       | High | 7.313                   | 7.423  | 10.379         | 11          | Pass   |
|      | 802.11n-40M  | 5510       | Low  | 3.077                   | 3.339  | 6.220          | 11          | Pass   |
|      | 802.11n-40M  | 5550       | Mid  | 5.856                   | 5.665  | 8.772          | 11          | Pass   |
|      | 802.11n-40M  | 5670       | High | 5.565                   | 5.189  | 8.391          | 11          | Pass   |
|      | 802.11ac-80M | 5530       | Low  | -1.949                  | -1.776 | 1.149          | 11          | Pass   |
|      | 802.11ac-80M | 5610       | High | 0.855                   | 1.123  | 4.001          | 11          | Pass   |

Note: Two chains are cross-polarized, additional gain is  $10 \log_{10}(NANT)=0\text{dB}$ , max directional gain of the EUT is 5dBi. No limit adjustment is needed. All the mode transmission is MIMO.

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

| Type | Test mode    | Freq (MHz) | CH    | Conducted PSD (dBm/MHz) |        |                | Limit (dBm) | Result |
|------|--------------|------------|-------|-------------------------|--------|----------------|-------------|--------|
|      |              |            |       | Chain0                  | Chain1 | Combined Power |             |        |
| PSD  | 802.11a      | 5720       | CROSS | 7.76                    | 7.47   | 10.63          | 11          | Pass   |
|      | 802.11n-20M  | 5720       | CROSS | 6.59                    | 6.62   | 9.62           | 11          | Pass   |
|      | 802.11n-40M  | 5710       | CROSS | 4.80                    | 4.64   | 7.73           | 11          | Pass   |
|      | 802.11ac-80M | 5690       | CROSS | 1.64                    | 1.65   | 4.66           | 11          | Pass   |

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

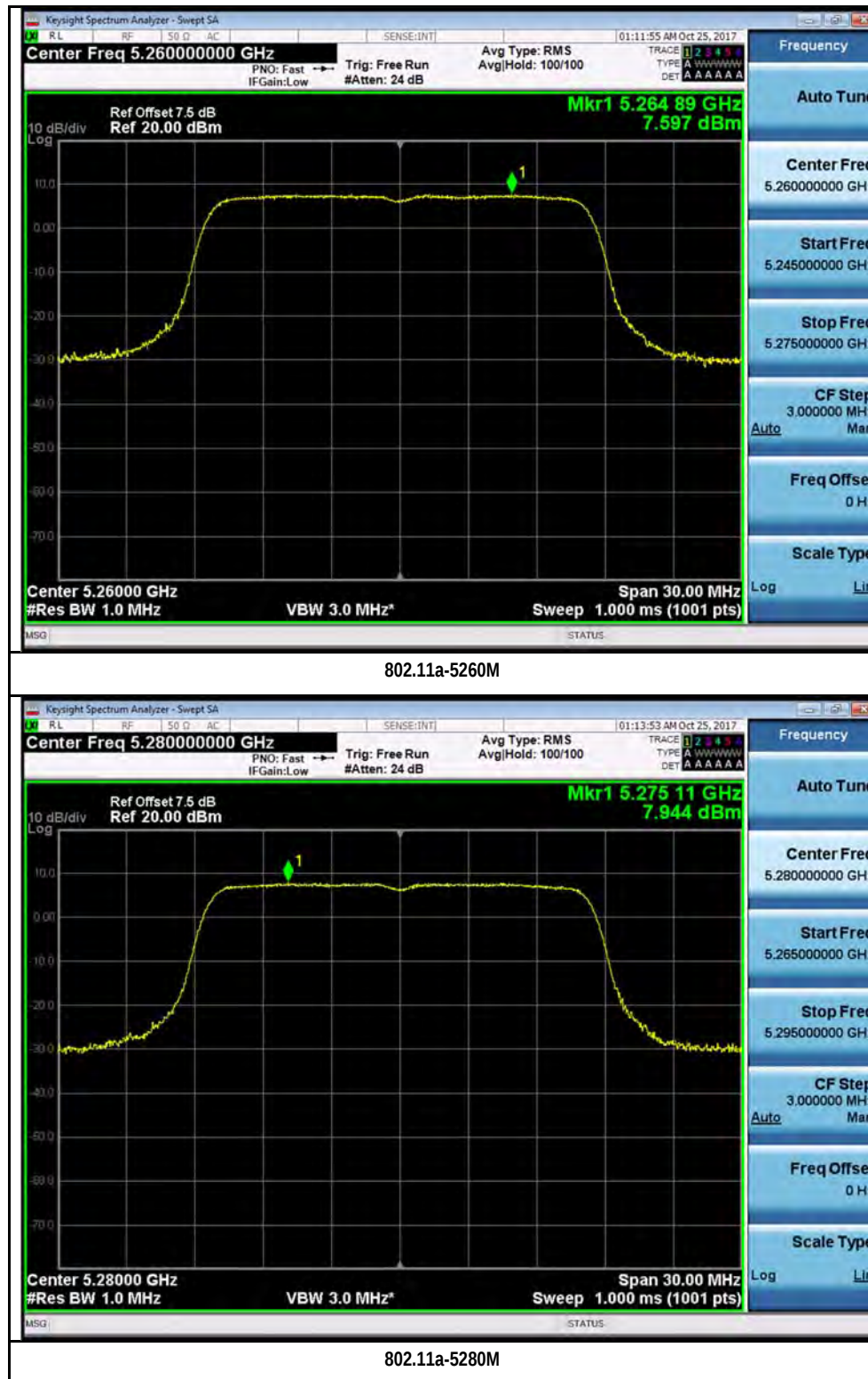
| Test mode    | Freq (MHz) | CH    | Conducted PSD (dBm/MHz) |        |              | Corrected Level (dBm/500kHz) | Limit (dBm/500kHz) | Result |
|--------------|------------|-------|-------------------------|--------|--------------|------------------------------|--------------------|--------|
|              |            |       | Chain0                  | Chain1 | Combined PSD |                              |                    |        |
| 802.11a      | 5720       | CROSS | -0.36                   | -0.67  | 2.50         | 9.49                         | 30                 | Pass   |
| 802.11n-20M  | 5720       | CROSS | -0.41                   | -0.80  | 2.41         | 9.40                         | 30                 | Pass   |
| 802.11n-40M  | 5710       | CROSS | -3.25                   | -3.47  | -0.35        | 6.64                         | 30                 | Pass   |
| 802.11ac-80M | 5690       | CROSS | -6.49                   | -6.52  | -3.49        | 3.50                         | 30                 | Pass   |

**Correction factor=10\*log(500/100)=6.99**

Note: Two chains are cross-polarized, additional gain is  $10 \log_{10}(NANT)=0\text{dB}$ , max directional gain of the EUT is 5dBi. No limit adjustment is needed. All the mode transmission is MIMO.

**Test Plot for W53:**

**Chain 0:**





802.11a-5320M



802.11n-HT20 5260M



802.11n-HT20 5280M



802.11n-HT20 5320M



802.11n-HT40 5270M



802.11n-HT40 5310M



Chain 1:



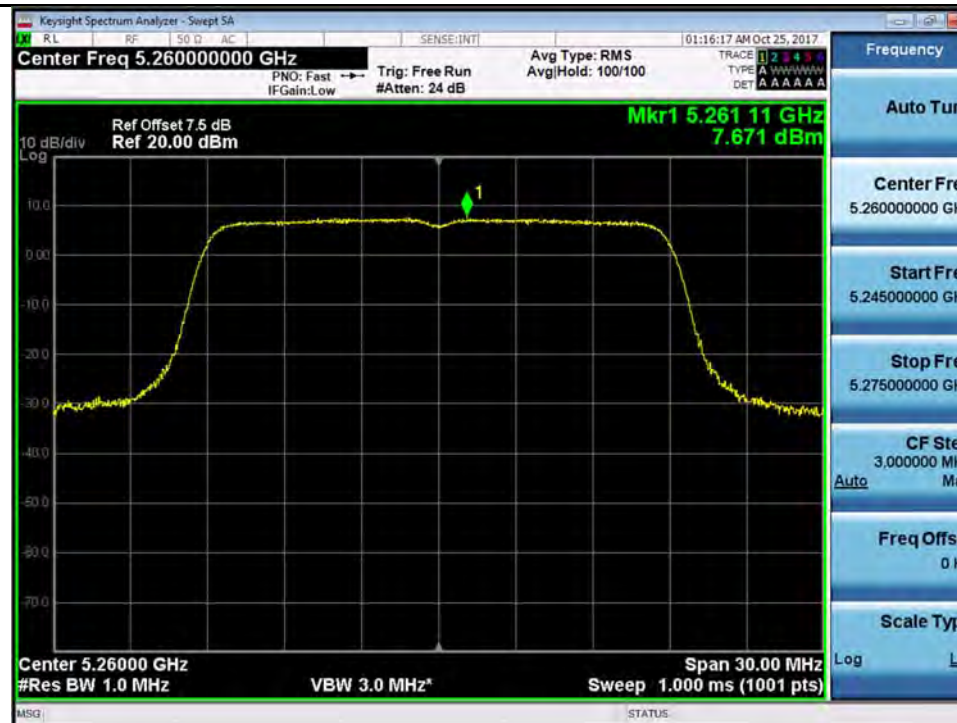
802.11a-5260M



802.11a-5280M



802.11a-5320M



802.11n-HT20 5260M



802.11n-HT20 5280M



802.11n-HT20 5320M



802.11n-HT40 5270M

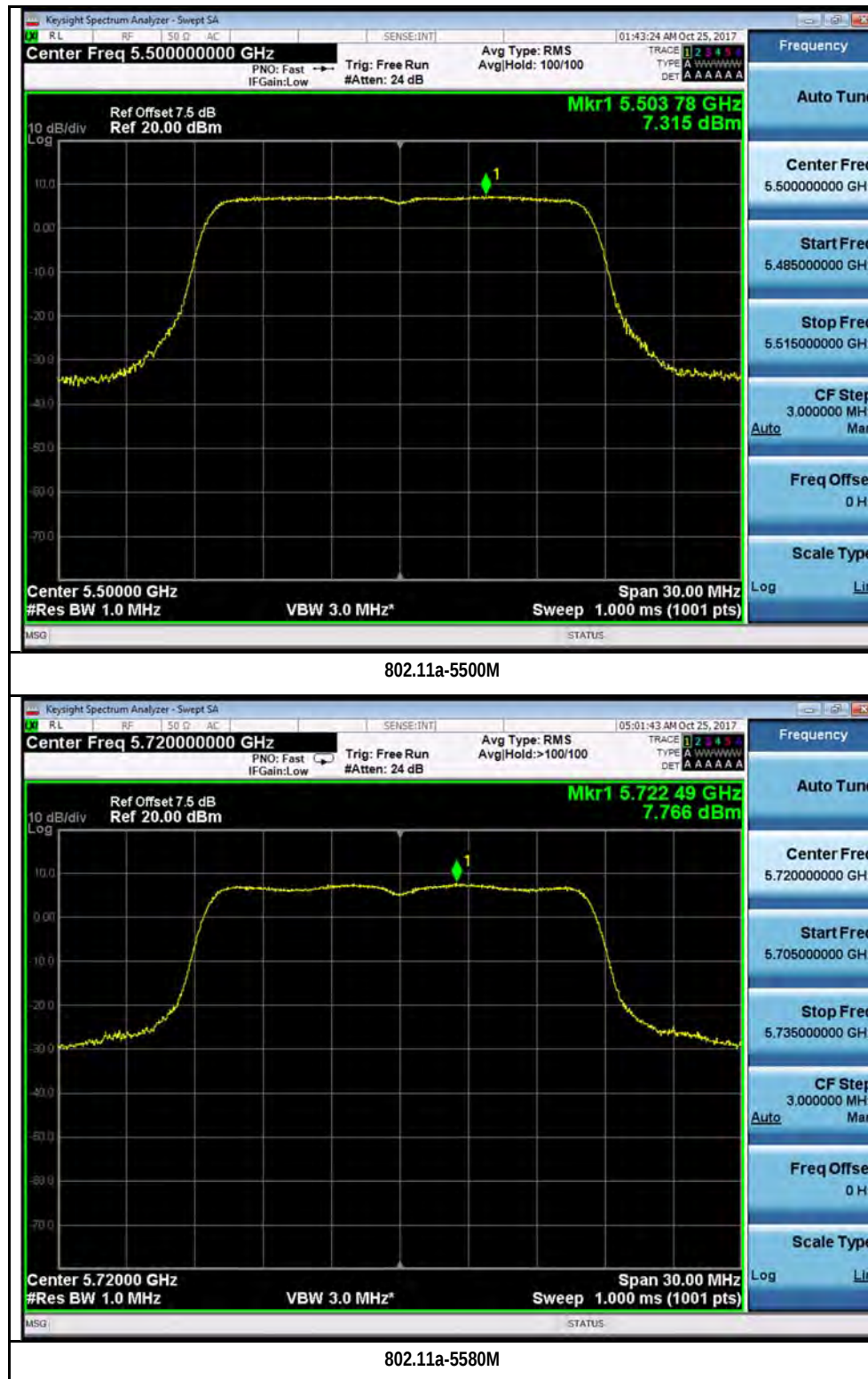


802.11n-HT40 5310M



Test Plot for W56:

Chain 0:

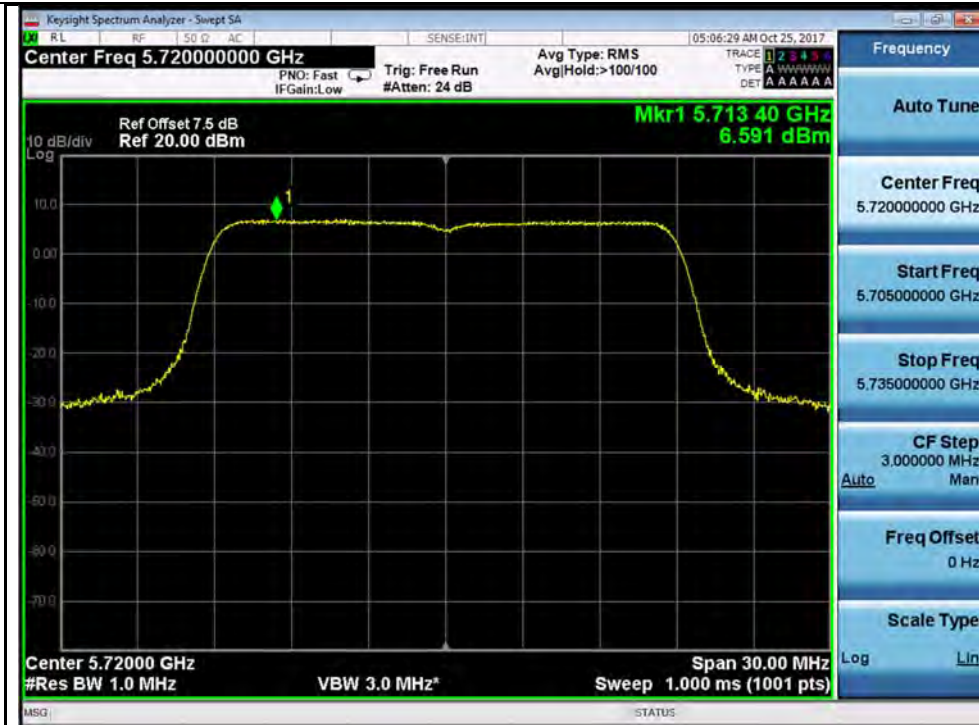




802.11a-5700M



802.11n-HT20 5500M



802.11n-HT20 5580M



802.11n-HT20 5700M



802.11n-HT40 5510M



802.11n-HT40 5550M





802.11ac-VHT80 5530M

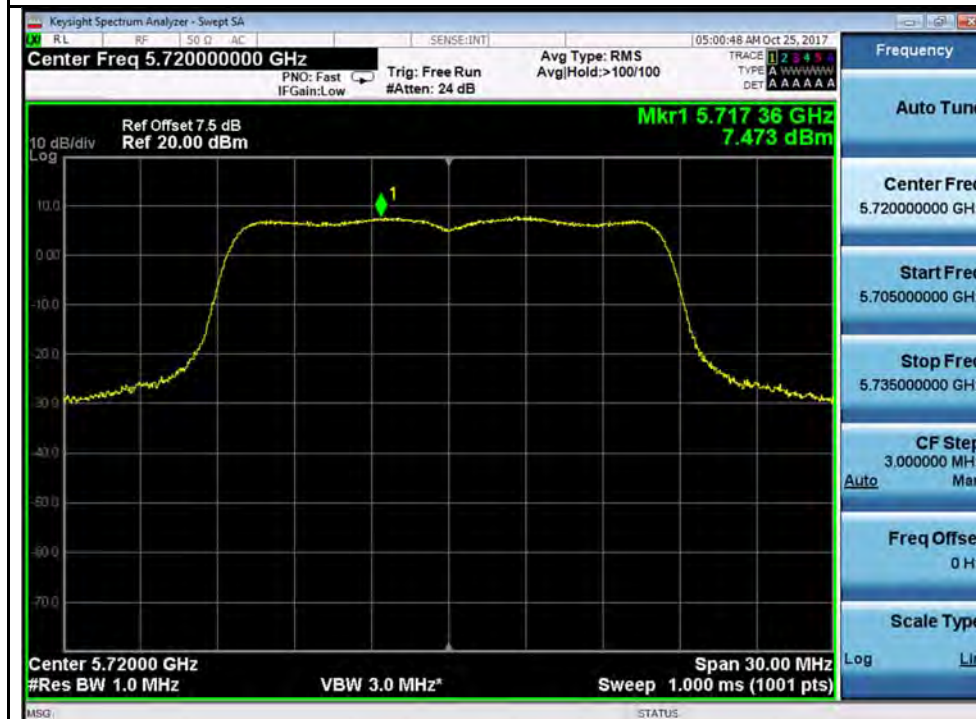


802.11ac-VHT80 5610M

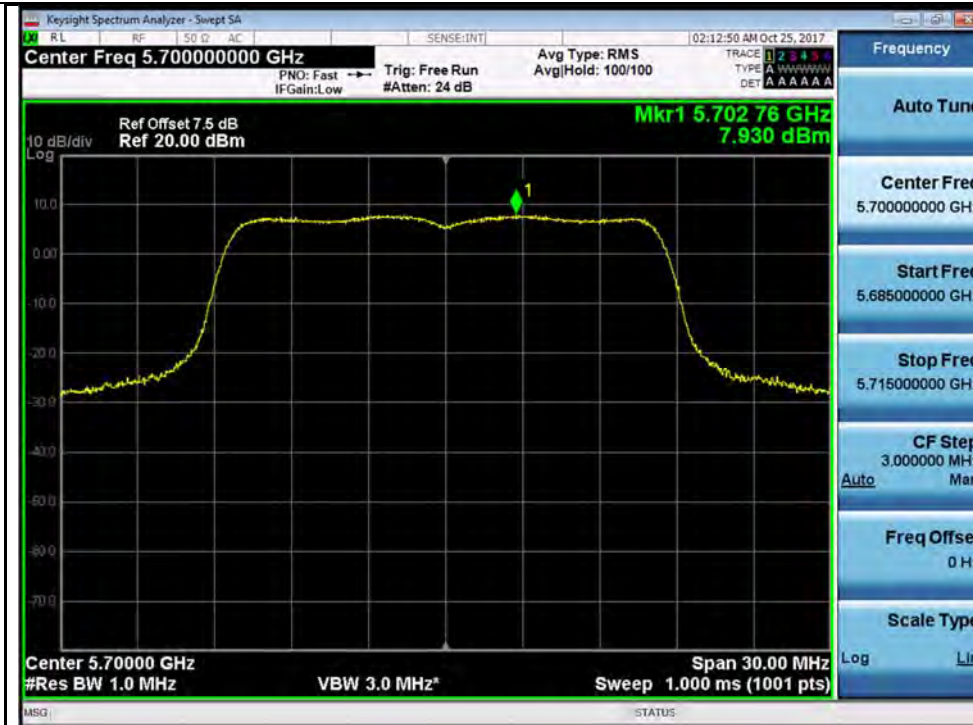
Chain 1:



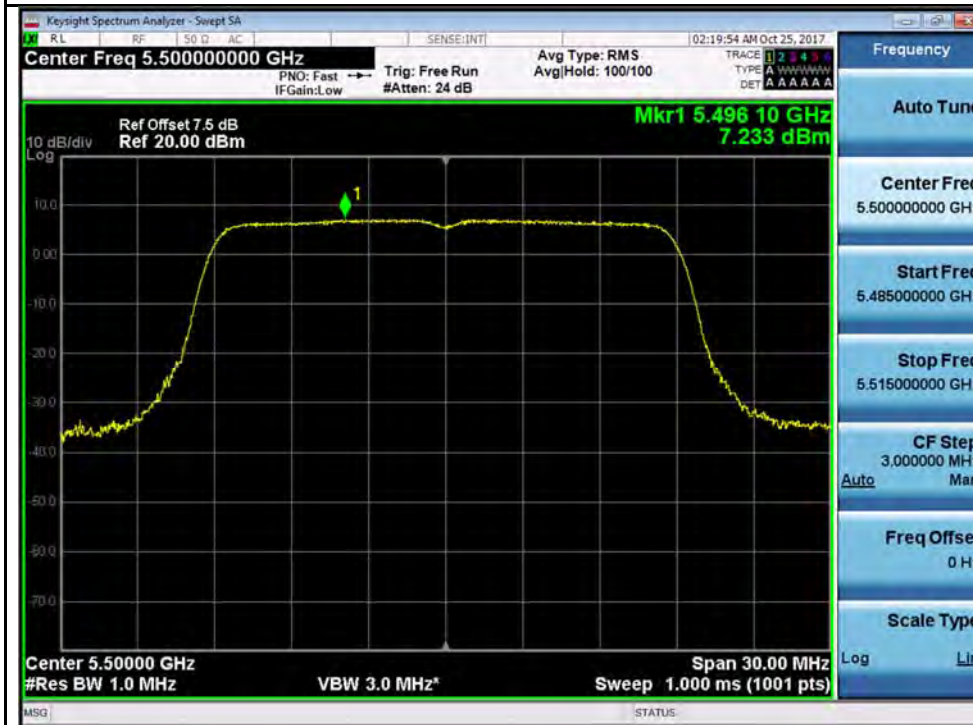
802.11a-5500M



802.11a-5580M



802.11a-5700M



802.11n-HT20 5500M



802.11n-HT20 5580M



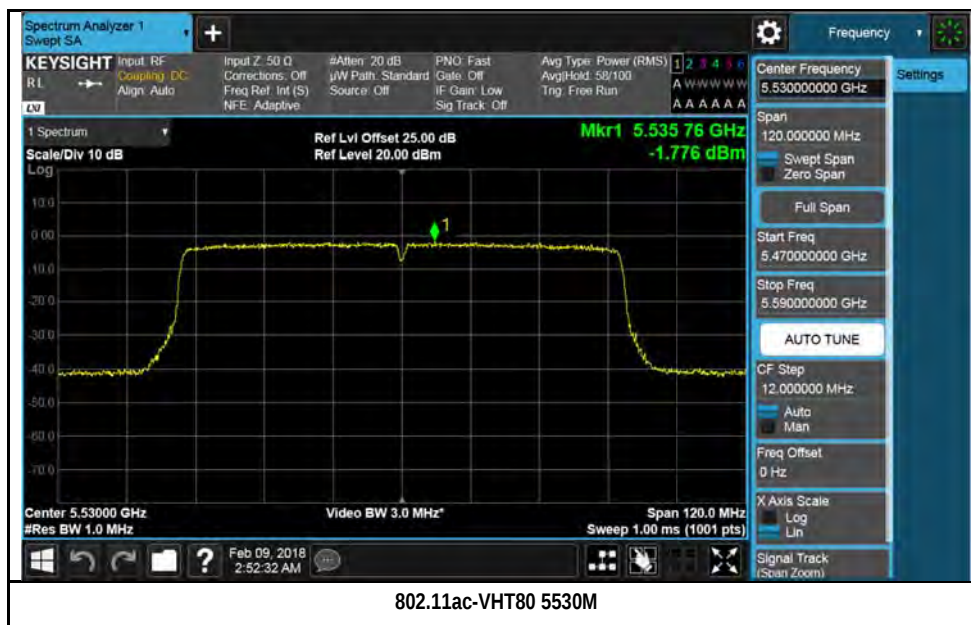
802.11n-HT20 5700M



802.11n-HT40 5510M



802.11n-HT40 5550M



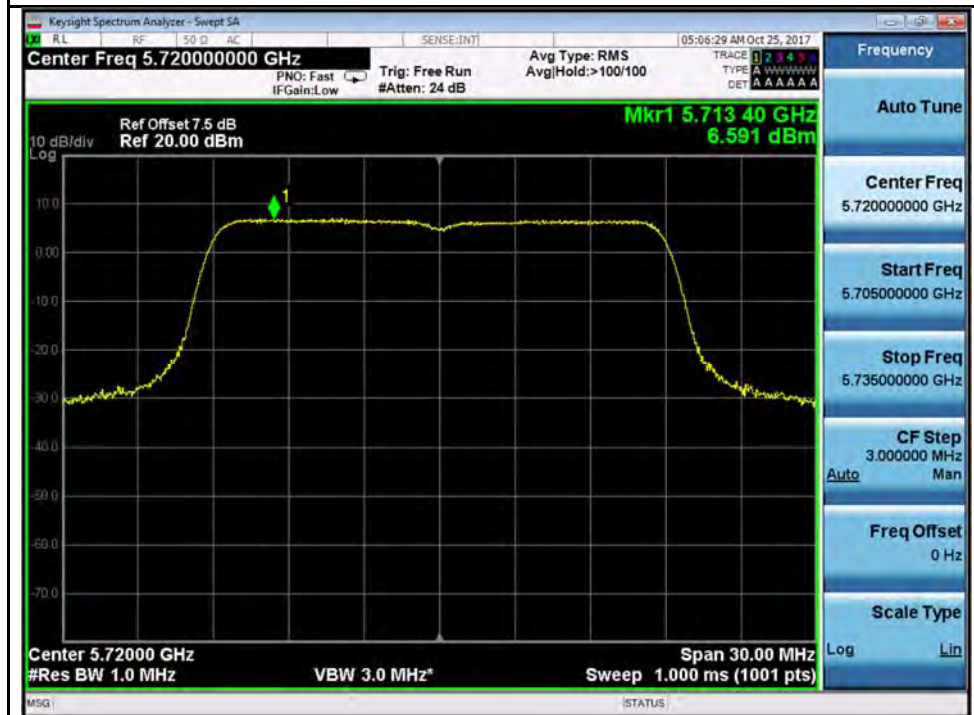


## Test Plot for Crossband (W56 procedure):

Chain 0:



802.11a-5720M



802.11n-HT20 5720M



802.11n-HT40 5710M



802.11ac-VHT80 5690M

Chain 1:



802.11a-5720M



802.11n-HT20 5720M



802.11n-HT40 5710M



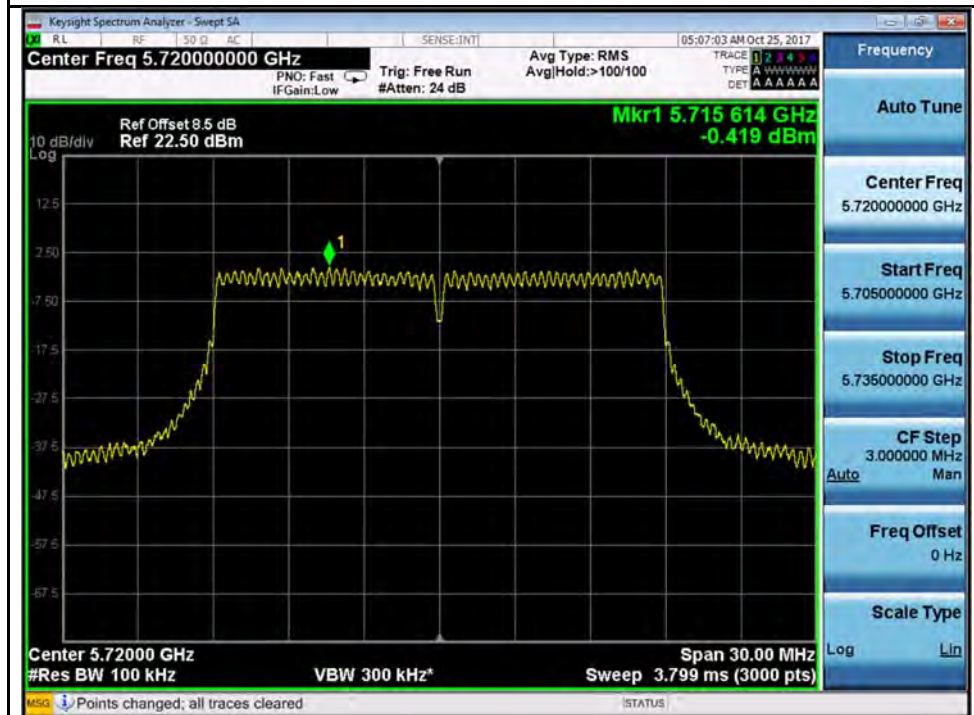
802.11ac-VHT80 5690M

## Test Plot for Crossband (W58 procedure):

Chain 0:



802.11a-5720M



802.11n-HT20 5720M

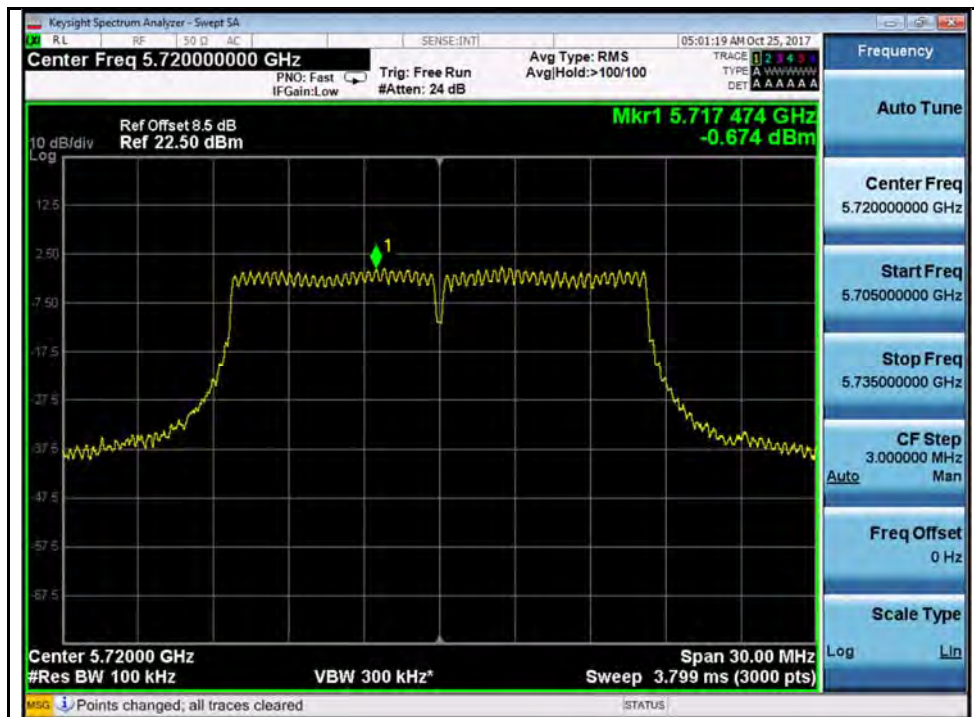


802.11n-HT40 5710M

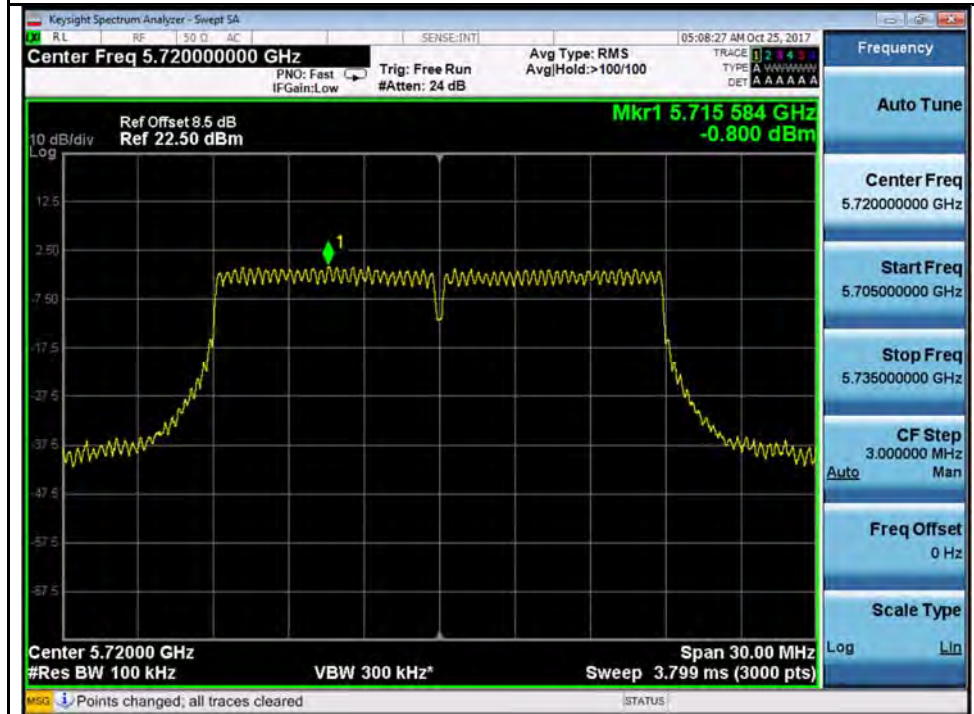


802.11ac-VHT80 5690M

Chain 1:



802.11a-5720M



802.11n-HT20 5720M



802.11n-HT40 5710M



802.11ac-VHT80 5690M

### 10.3 Radiated Spurious Emissions below 1GHz

#### Requirement(s):

| Spec                              | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Applicable            |                       |         |     |          |     |         |     |           |     |              |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|---------|-----|----------|-----|---------|-----|-----------|-----|--------------|
| 47CFR§<br>15.407(b)<br>15.209 (a) | <p>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</p> <table><thead><tr><th>Frequency range (MHz)</th><th>Field Strength (uV/m)</th></tr></thead><tbody><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></tbody></table>                                                                                                                                                                                                                                                                                                                                         | Frequency range (MHz) | Field Strength (uV/m) | 30 – 88 | 100 | 88 – 216 | 150 | 216 960 | 200 | Above 960 | 500 | <div>☒</div> |
| Frequency range (MHz)             | Field Strength (uV/m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                       |                       |         |     |          |     |         |     |           |     |              |
| 30 – 88                           | 100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                       |         |     |          |     |         |     |           |     |              |
| 88 – 216                          | 150                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                       |         |     |          |     |         |     |           |     |              |
| 216 960                           | 200                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                       |         |     |          |     |         |     |           |     |              |
| Above 960                         | 500                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                       |                       |         |     |          |     |         |     |           |     |              |
| Test Setup                        | <div><div><div><div><div>Semi Anechoic Chamber</div><div><div>Radio Absorbing Material</div><div><div>EUT</div><div>0.8m</div></div><div>3m</div><div><div>Antenna</div><div>1.4m</div></div><div>Ground Plane</div></div></div><div><div><div>Spectrum Analyzer</div></div></div></div></div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                       |                       |         |     |          |     |         |     |           |     |              |
| Procedure                         | <div><div><div><div>1. The EUT was switched on and allowed to warm up to its normal operating condition.</div><div>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:<div><div>a. Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</div><div>b. The EUT was then rotated to the direction that gave the maximum emission.</div><div>c. Finally, the antenna height was adjusted to the height that gave the maximum emission.</div></div></div><div>3. A Quasi-peak measurement was then made for that frequency point.</div><div>4. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</div></div></div></div> |                       |                       |         |     |          |     |         |     |           |     |              |
| Remark                            | The EUT was scanned up to 1GHz. Both horizontal and vertical polarities were investigated. The results show only the worst case.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                       |                       |         |     |          |     |         |     |           |     |              |
| Result                            | <div><div>☒ Pass</div><div>☐ Fail</div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                       |                       |         |     |          |     |         |     |           |     |              |

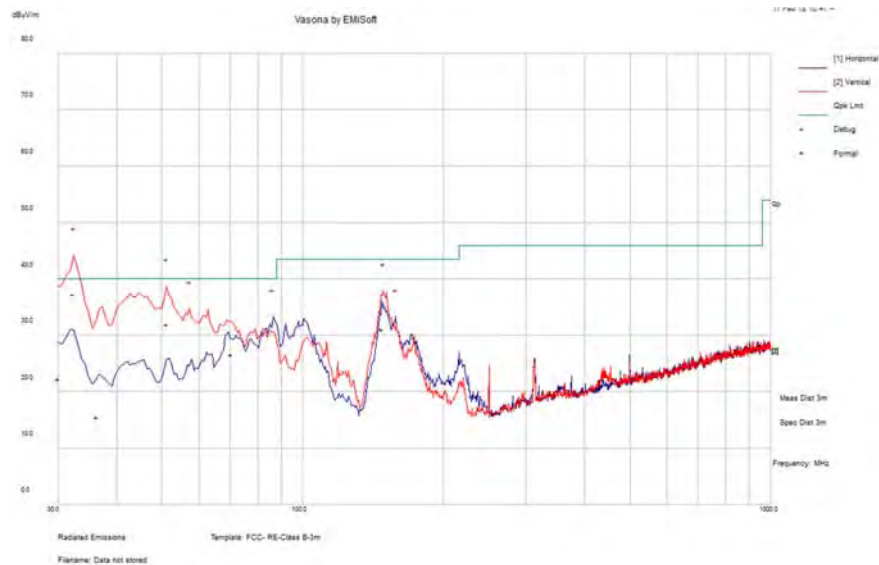
Test Data    ☒ Yes (See below)      ☐ N/A

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

Test was done by Shuo Zhang at 10m chamber.

## Radiated Emission Test Results (Below 1GHz)

|                           |                       |      |  |  |        |      |
|---------------------------|-----------------------|------|--|--|--------|------|
| Test specification        | below 1GHz            |      |  |  | Result | Pass |
| Environmental Conditions: | Temp (°C):            | 23   |  |  |        |      |
|                           | Humidity (%)          | 46   |  |  |        |      |
|                           | Atmospheric (mbar):   | 1017 |  |  |        |      |
| Mains Power:              | 120VAC, 60Hz          |      |  |  |        |      |
| Tested by:                | Gary Chou             |      |  |  |        |      |
| Test Date:                | 10/24/2017-02/08/2018 |      |  |  |        |      |
| Remarks:                  | 802.11a – 5320MHZ     |      |  |  |        |      |

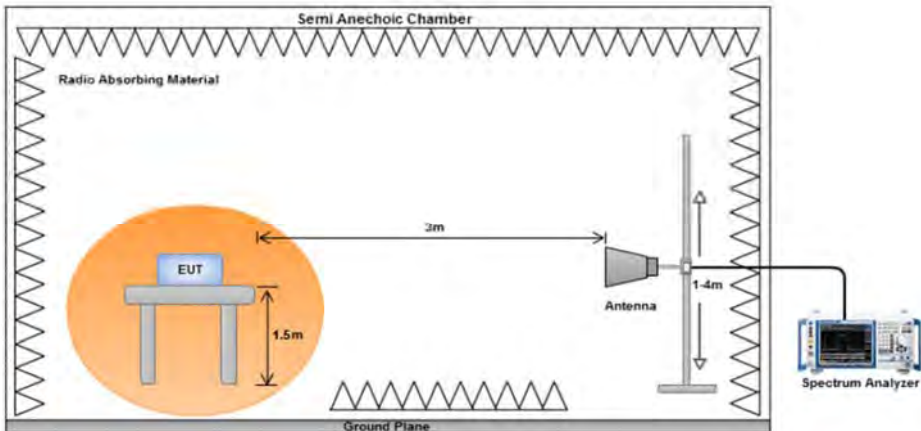


| Frequency MHz | Raw dBuV | Cable Loss | AF dB  | Level dBuV/m | Measurement Type | Po l | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail |
|---------------|----------|------------|--------|--------------|------------------|------|--------|---------|--------------|-----------|------------|
| 32.33         | 40.96    | 11.33      | -15.07 | 37.22        | Quasi Max        | V    | 108    | 17      | 40           | -2.79     | Pass       |
| 51.12         | 47.63    | 11.59      | -27.3  | 31.91        | Quasi Max        | V    | 143    | 212     | 40           | -8.09     | Pass       |
| 30.00         | 23.84    | 11.29      | -12.86 | 22.27        | Quasi Max        | H    | 340    | 303     | 40           | -17.73    | Pass       |
| 147.36        | 42.25    | 12.38      | -23.64 | 30.99        | Quasi Max        | V    | 119    | 185     | 43.5         | -12.51    | Pass       |
| 70.25         | 42.43    | 11.7       | -27.57 | 26.56        | Quasi Max        | V    | 117    | 185     | 40           | -13.44    | Pass       |
| 36.22         | 22.4     | 11.39      | -18.37 | 15.42        | Quasi Max        | H    | 259    | 280     | 40           | -24.58    | Pass       |

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

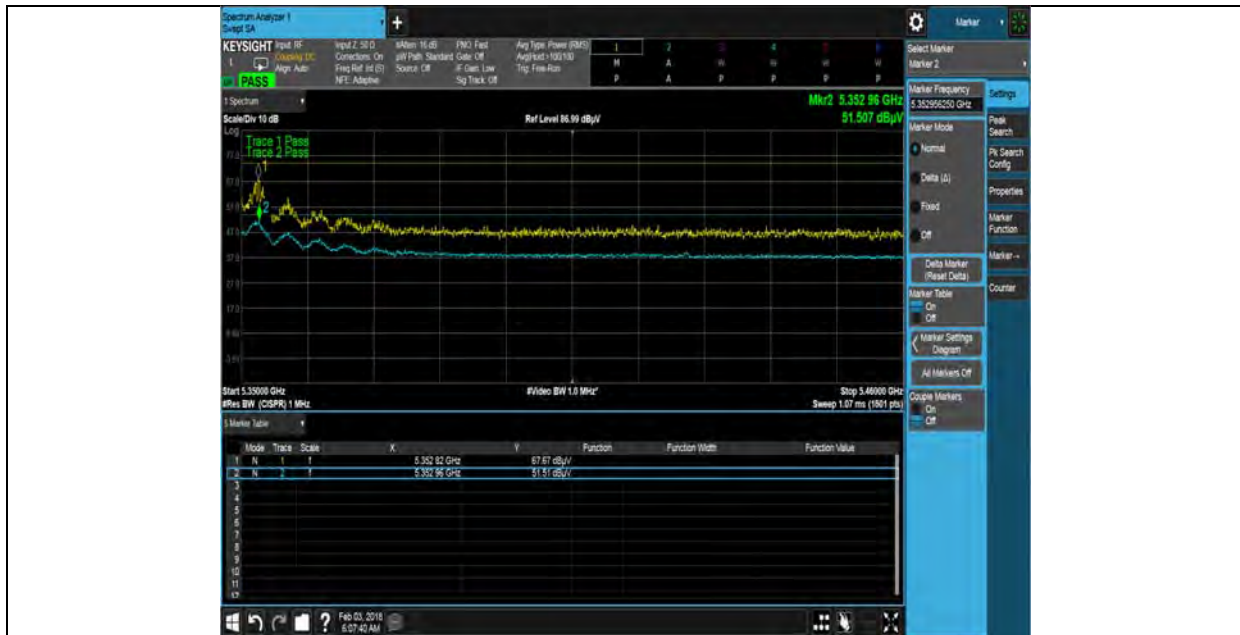
## 10.4 Radiated Spurious Emissions above 1GHz

### Requirement(s):

| Spec          | Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Requirement                                                                                      | Applicable                          |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------|
| 47CFR§ 15.209 | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Restricted band, emission must also comply with the radiated emission limits specified in 15.209 | <input checked="" type="checkbox"/> |
| Test Setup    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                  |                                     |
| Procedure     | <ol style="list-style-type: none"> <li>The EUT was switched on and allowed to warm up to its normal operating condition.</li> <li>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: <ol style="list-style-type: none"> <li>Vertical or horizontal polarisation (whichever gave the higher emission level over a full rotation of the EUT) was chosen.</li> <li>The EUT was then rotated to the direction that gave the maximum emission.</li> <li>Finally, the antenna height was adjusted to the height that gave the maximum emission.</li> </ol> </li> <li>An average measurement was then made for that frequency point.</li> <li>Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.</li> </ol> |                                                                                                  |                                     |
| Remark        | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                  |                                     |
| Result        | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                  |                                     |

**Test Data**    ☐ Yes (See below)      ☒ N/A  
**Test Plot**    ☒ Yes (See below)      ☐ N/A  
**Test was done by Chen Ge at 10m chamber.**

## Radiated Restricted band Plots:



802.11a 5320M(5350-5460MHz)



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



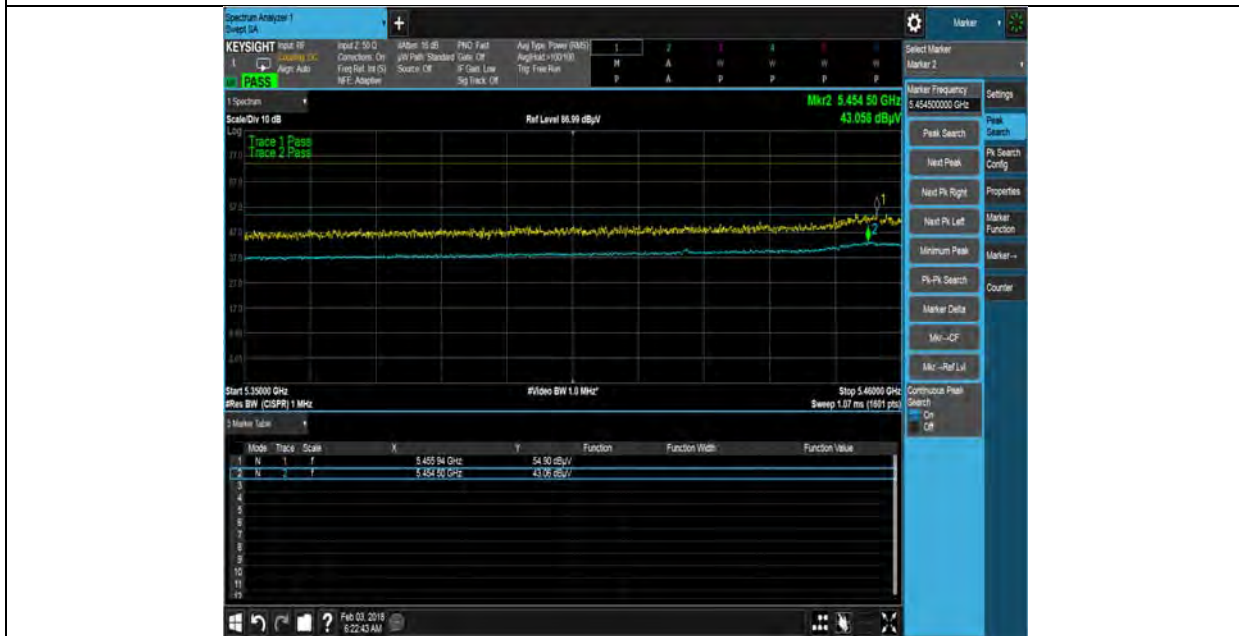
802.11n-HT40 5310M(5350-5460MHz)



802.11ac 5290M(5350-5460MHz)



802.11a 5500M(5350-5460MHz)



802.11n-HT20 5500M(5350-5460MHz)



802.11n-HT40 5510M(5350-5460MHz)



802.11ac 5530M(5350-5460MHz)

## Radiated Emission Test Results (Above 1GHz)

W53 band:

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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7905.51       | 41.05    | 5.35       | -0.33 | 46.07        | Peak Max         | H   | 266    | 300     | 74           | -27.93    | Pass       |
| 10520.91      | 44.96    | 6.09       | 1.89  | 52.94        | Peak Max         | H   | 232    | 47      | 74           | -21.06    | Pass       |
| 13721.76      | 45.84    | 7.11       | 4.58  | 57.53        | Peak Max         | V   | 169    | 160     | 74           | -16.47    | Pass       |
| 7905.51       | 23.1     | 5.35       | -0.33 | 28.12        | Average Max      | V   | 266    | 300     | 54           | -25.88    | Pass       |
| 10520.91      | 27.16    | 6.09       | 1.89  | 35.14        | Average Max      | V   | 232    | 47      | 54           | -18.86    | Pass       |
| 13721.76      | 28.43    | 7.11       | 4.58  | 40.12        | Average Max      | V   | 169    | 160     | 54           | -13.88    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7550.48       | 41.84    | 5.15       | -0.41 | 46.58        | Peak Max         | V   | 266    | 303     | 74           | -27.42    | Pass       |
| 10559.19      | 44.89    | 6.1        | 1.91  | 52.9         | Peak Max         | H   | 232    | 42      | 74           | -21.1     | Pass       |
| 13459.06      | 46.39    | 7.04       | 4.52  | 57.95        | Peak Max         | H   | 168    | 161     | 74           | -16.05    | Pass       |
| 7550.48       | 24.77    | 5.15       | -0.41 | 29.51        | Average Max      | H   | 266    | 303     | 54           | -24.49    | Pass       |
| 10559.19      | 27.14    | 6.1        | 1.91  | 35.15        | Average Max      | V   | 232    | 42      | 54           | -18.85    | Pass       |
| 13459.06      | 29.29    | 7.04       | 4.52  | 40.85        | Average Max      | H   | 168    | 161     | 54           | -13.15    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7431.77       | 41.83    | 5.14       | -0.39 | 46.58        | Peak Max         | H   | 264    | 299     | 74           | -27.42    | Pass       |
| 10640.42      | 45.22    | 6.14       | 1.92  | 53.28        | Peak Max         | V   | 230    | 49      | 74           | -20.72    | Pass       |
| 13230.1       | 46.09    | 6.99       | 4.48  | 57.56        | Peak Max         | V   | 161    | 156     | 74           | -16.44    | Pass       |
| 7431.77       | 23.87    | 5.14       | -0.39 | 28.62        | Average Max      | H   | 264    | 299     | 54           | -25.38    | Pass       |
| 10640.42      | 27.65    | 6.14       | 1.92  | 35.71        | Average Max      | H   | 230    | 49      | 54           | -18.29    | Pass       |
| 13230.1       | 28.2     | 6.99       | 4.48  | 39.67        | Average Max      | V   | 161    | 156     | 54           | -14.33    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7223.03       | 42.15    | 5.15       | -0.32 | 46.98        | Peak Max         | V   | 265    | 298     | 74           | -27.02    | Pass       |
| 10520.86      | 44.96    | 6.09       | 1.89  | 52.94        | Peak Max         | V   | 234    | 44      | 74           | -21.06    | Pass       |
| 13598.37      | 47.12    | 7.08       | 4.6   | 58.8         | Peak Max         | H   | 169    | 157     | 74           | -15.2     | Pass       |
| 7223.03       | 24.8     | 5.15       | -0.32 | 29.63        | Average Max      | H   | 265    | 298     | 54           | -24.37    | Pass       |
| 10520.86      | 27.06    | 6.09       | 1.89  | 35.04        | Average Max      | H   | 234    | 44      | 54           | -18.96    | Pass       |
| 13598.37      | 29.5     | 7.08       | 4.6   | 41.18        | Average Max      | H   | 169    | 157     | 54           | -12.82    | Pass       |
| 7223.03       | 42.15    | 5.15       | -0.32 | 46.98        | Peak Max         | V   | 265    | 298     | 74           | -27.02    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7825.581      | 41.57    | 5.28       | -0.32 | 46.53        | Peak Max         | V   | 271    | 296     | 74           | -27.47    | Pass       |
| 10559.84      | 44.88    | 6.1        | 1.91  | 52.89        | Peak Max         | V   | 225    | 44      | 74           | -21.11    | Pass       |
| 13397.52      | 46.29    | 7.03       | 4.57  | 57.89        | Peak Max         | V   | 161    | 157     | 74           | -16.11    | Pass       |
| 7825.581      | 24.22    | 5.28       | -0.32 | 29.18        | Average Max      | H   | 271    | 296     | 54           | -24.82    | Pass       |
| 10559.84      | 27.04    | 6.1        | 1.91  | 35.05        | Average Max      | H   | 225    | 44      | 54           | -18.95    | Pass       |
| 13397.52      | 28.38    | 7.03       | 4.57  | 39.98        | Average Max      | H   | 161    | 157     | 54           | -14.02    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7838.39       | 41.58    | 5.29       | -0.32 | 46.55        | Peak Max         | H   | 271    | 298     | 74           | -27.45    | Pass       |
| 10640.93      | 45.25    | 6.14       | 1.92  | 53.31        | Peak Max         | V   | 229    | 49      | 74           | -20.69    | Pass       |
| 13540.95      | 47.55    | 7.06       | 4.53  | 59.14        | Peak Max         | V   | 161    | 162     | 74           | -14.86    | Pass       |
| 7838.39       | 23.91    | 5.29       | -0.32 | 28.88        | Average Max      | H   | 271    | 298     | 54           | -25.12    | Pass       |
| 10640.93      | 27.69    | 6.14       | 1.92  | 35.75        | Average Max      | V   | 229    | 49      | 54           | -18.25    | Pass       |
| 13540.95      | 29.69    | 7.06       | 4.53  | 41.28        | Average Max      | H   | 161    | 162     | 54           | -12.72    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7580.26       | 41.22    | 5.16       | -0.41 | 45.97        | Peak Max         | H   | 266    | 303     | 74           | -28.03    | Pass       |
| 10379.43      | 43.77    | 6.01       | 1.55  | 51.33        | Peak Max         | V   | 232    | 47      | 74           | -22.67    | Pass       |
| 13223.35      | 46.55    | 6.99       | 4.47  | 58.01        | Peak Max         | H   | 170    | 156     | 74           | -15.99    | Pass       |
| 7580.26       | 23.67    | 5.16       | -0.41 | 28.42        | Average Max      | V   | 266    | 303     | 54           | -25.58    | Pass       |
| 10379.43      | 25.83    | 6.01       | 1.55  | 33.39        | Average Max      | V   | 232    | 47      | 54           | -20.61    | Pass       |
| 13223.35      | 29.01    | 6.99       | 4.47  | 40.47        | Average Max      | V   | 170    | 156     | 54           | -13.53    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7871.16       | 42.2     | 5.32       | -0.32 | 47.2         | Peak Max         | H   | 272    | 295     | 74           | -26.8     | Pass       |
| 10620.37      | 44.57    | 6.13       | 1.92  | 52.62        | Peak Max         | V   | 229    | 47      | 74           | -21.38    | Pass       |
| 13252.57      | 47.11    | 7          | 4.5   | 58.61        | Peak Max         | H   | 170    | 161     | 74           | -15.39    | Pass       |
| 7871.1        | 24.97    | 5.32       | -0.32 | 29.97        | Average Max      | H   | 272    | 295     | 54           | -24.03    | Pass       |
| 10620.37      | 26.97    | 6.13       | 1.92  | 35.02        | Average Max      | V   | 229    | 47      | 54           | -18.98    | Pass       |
| 13252.57      | 29.61    | 7          | 4.5   | 41.11        | Average Max      | V   | 170    | 161     | 54           | -12.89    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7358.84       | 41.75    | 5.15       | -0.36 | 46.54        | Peak Max         | H   | 269    | 301     | 74           | -27.46    | Pass       |
| 10579.76      | 44.31    | 6.11       | 1.92  | 52.34        | Peak Max         | H   | 228    | 41      | 74           | -21.66    | Pass       |
| 13473.34      | 45.9     | 7.04       | 4.52  | 57.46        | Peak Max         | V   | 161    | 153     | 74           | -16.54    | Pass       |
| 7358.84       | 24.34    | 5.15       | -0.36 | 29.13        | Average Max      | V   | 269    | 301     | 54           | -24.87    | Pass       |
| 10579.76      | 27.07    | 6.11       | 1.92  | 35.1         | Average Max      | V   | 228    | 41      | 54           | -18.9     | Pass       |
| 13473.34      | 28.05    | 7.04       | 4.52  | 39.61        | Average Max      | H   | 161    | 153     | 54           | -14.39    | Pass       |

**W56 band:**  
**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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7806.578      | 42.02    | 5.27       | -0.32 | 46.97        | Peak Max         | V   | 264    | 298     | 74           | -27.03    | Pass       |
| 11000.94      | 44.32    | 6.13       | 1.95  | 52.4         | Peak Max         | V   | 234    | 44      | 74           | -21.6     | Pass       |
| 13702.54      | 46.27    | 7.11       | 4.6   | 57.98        | Peak Max         | H   | 168    | 162     | 74           | -16.02    | Pass       |
| 7806.578      | 24.46    | 5.27       | -0.32 | 29.41        | Average Max      | V   | 264    | 298     | 54           | -24.59    | Pass       |
| 11000.94      | 27.15    | 6.13       | 1.95  | 35.23        | Average Max      | H   | 234    | 44      | 54           | -18.77    | Pass       |
| 13702.54      | 28.78    | 7.11       | 4.6   | 40.49        | Average Max      | V   | 168    | 162     | 54           | -13.51    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7243.89       | 40.74    | 5.16       | -0.33 | 45.57        | Peak Max         | V   | 270    | 301     | 74           | -28.43    | Pass       |
| 11159.9       | 44.84    | 6.07       | 2.14  | 53.05        | Peak Max         | V   | 231    | 41      | 74           | -20.95    | Pass       |
| 13362.87      | 46.88    | 7.02       | 4.57  | 58.47        | Peak Max         | V   | 163    | 160     | 74           | -15.53    | Pass       |
| 7243.8        | 22.8     | 5.16       | -0.33 | 27.63        | Average Max      | H   | 270    | 301     | 54           | -26.37    | Pass       |
| 11159.9       | 26.86    | 6.07       | 2.14  | 35.07        | Average Max      | H   | 231    | 41      | 54           | -18.93    | Pass       |
| 13362.87      | 28.94    | 7.02       | 4.57  | 40.53        | Average Max      | V   | 163    | 160     | 54           | -13.47    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7783.38       | 43.01    | 5.25       | -0.32 | 47.94        | Peak Max         | H   | 267    | 302     | 74           | -26.06    | Pass       |
| 11400.01      | 44.78    | 6.05       | 2.53  | 53.36        | Peak Max         | H   | 232    | 49      | 74           | -20.64    | Pass       |
| 13597.08      | 47.07    | 7.08       | 4.6   | 58.75        | Peak Max         | H   | 166    | 156     | 74           | -15.25    | Pass       |
| 7783.38       | 25.35    | 5.25       | -0.32 | 30.28        | Average Max      | H   | 267    | 302     | 54           | -23.72    | Pass       |
| 11400.01      | 26.84    | 6.05       | 2.53  | 35.42        | Average Max      | H   | 232    | 49      | 54           | -18.58    | Pass       |
| 13597.08      | 29.14    | 7.08       | 4.6   | 40.82        | Average Max      | H   | 166    | 156     | 54           | -13.18    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7726.08       | 41.36    | 5.21       | -0.32 | 46.25        | Peak Max         | H   | 273    | 296     | 74           | -27.75    | Pass       |
| 11000.95      | 44.32    | 6.13       | 1.95  | 52.4         | Peak Max         | H   | 232    | 41      | 74           | -21.6     | Pass       |
| 13546.73      | 47.73    | 7.06       | 4.54  | 59.33        | Peak Max         | H   | 167    | 162     | 74           | -14.67    | Pass       |
| 7726.0        | 23.4     | 5.21       | -0.32 | 28.29        | Average Max      | V   | 273    | 296     | 54           | -25.71    | Pass       |
| 11000.95      | 27.2     | 6.13       | 1.95  | 35.28        | Average Max      | H   | 232    | 41      | 54           | -18.72    | Pass       |
| 13546.73      | 30.71    | 7.06       | 4.54  | 42.31        | Average Max      | H   | 167    | 162     | 54           | -11.69    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7126.87       | 41.85    | 5.12       | -0.29 | 46.68        | Peak Max         | V   | 271    | 298     | 74           | -27.32    | Pass       |
| 11159.17      | 44.91    | 6.07       | 2.14  | 53.12        | Peak Max         | V   | 229    | 47      | 74           | -20.88    | Pass       |
| 13029.5       | 47.08    | 6.91       | 4.55  | 58.54        | Peak Max         | H   | 161    | 154     | 74           | -15.46    | Pass       |
| 7126.87       | 24.45    | 5.12       | -0.29 | 29.28        | Average Max      | V   | 271    | 298     | 54           | -24.72    | Pass       |
| 11159.17      | 27.47    | 6.07       | 2.14  | 35.68        | Average Max      | V   | 229    | 47      | 54           | -18.32    | Pass       |
| 13029.5       | 29.56    | 6.91       | 4.55  | 41.02        | Average Max      | H   | 161    | 154     | 54           | -12.98    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7780.65       | 42.64    | 5.25       | -0.32 | 47.57        | Peak Max         | H   | 270    | 304     | 74           | -26.43    | Pass       |
| 11400.64      | 44.75    | 6.05       | 2.53  | 53.33        | Peak Max         | H   | 229    | 45      | 74           | -20.67    | Pass       |
| 13611.36      | 46.65    | 7.08       | 4.6   | 58.33        | Peak Max         | V   | 161    | 160     | 74           | -15.67    | Pass       |
| 7780.65       | 24.86    | 5.25       | -0.32 | 29.79        | Average Max      | V   | 270    | 304     | 54           | -24.21    | Pass       |
| 11400.64      | 27.08    | 6.05       | 2.53  | 35.66        | Average Max      | H   | 229    | 45      | 54           | -18.34    | Pass       |
| 13611.36      | 29.5     | 7.08       | 4.6   | 41.18        | Average Max      | V   | 161    | 160     | 54           | -12.82    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7056.91       | 41.32    | 5.1        | -0.27 | 46.15        | Peak Max         | H   | 269    | 303     | 74           | -27.85    | Pass       |
| 11019.18      | 45.21    | 6.12       | 1.97  | 53.3         | Peak Max         | V   | 234    | 46      | 74           | -20.7     | Pass       |
| 13218.27      | 46.96    | 6.99       | 4.46  | 58.41        | Peak Max         | V   | 168    | 161     | 74           | -15.59    | Pass       |
| 7056.91       | 23.74    | 5.1        | -0.27 | 28.57        | Average Max      | V   | 269    | 303     | 54           | -25.43    | Pass       |
| 11019.18      | 27.39    | 6.12       | 1.97  | 35.48        | Average Max      | V   | 234    | 46      | 54           | -18.52    | Pass       |
| 13218.27      | 28.98    | 6.99       | 4.46  | 40.43        | Average Max      | H   | 168    | 161     | 54           | -13.57    | Pass       |

**Above 1GHz-40GHz – 802.11n-40M – 5550MHz**

| 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7672.06       | 41.85    | 5.19       | -0.32 | 46.72        | Peak Max         | V   | 267    | 302     | 74           | -27.28    | Pass       |
| 11100.09      | 44.63    | 6.09       | 2.07  | 52.79        | Peak Max         | V   | 227    | 45      | 74           | -21.21    | Pass       |
| 13102.76      | 46.14    | 6.94       | 4.43  | 57.51        | Peak Max         | V   | 163    | 162     | 74           | -16.49    | Pass       |
| 7672.06       | 24.26    | 5.19       | -0.32 | 29.13        | Average Max      | H   | 267    | 302     | 54           | -24.87    | Pass       |
| 11100.09      | 27.62    | 6.09       | 2.07  | 35.78        | Average Max      | H   | 227    | 45      | 54           | -18.22    | Pass       |
| 13102.76      | 28.86    | 6.94       | 4.43  | 40.23        | Average Max      | V   | 163    | 162     | 54           | -13.77    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7912.02       | 41.7     | 5.36       | -0.33 | 46.73        | Peak Max         | H   | 269    | 301     | 74           | -27.27    | Pass       |
| 11340.8       | 44.56    | 6.04       | 2.4   | 53           | Peak Max         | V   | 232    | 44      | 74           | -21       | Pass       |
| 13029.42      | 47.08    | 6.91       | 4.55  | 58.54        | Peak Max         | V   | 161    | 154     | 74           | -15.46    | Pass       |
| 7912.02       | 23.9     | 5.36       | -0.33 | 28.93        | Average Max      | V   | 269    | 301     | 54           | -25.07    | Pass       |
| 11340.8       | 26.74    | 6.04       | 2.4   | 35.18        | Average Max      | V   | 232    | 44      | 54           | -18.82    | Pass       |
| 13029.42      | 29.2     | 6.91       | 4.55  | 40.66        | Average Max      | H   | 161    | 154     | 54           | -13.34    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7309.94       | 41.81    | 5.15       | -0.35 | 46.61        | Peak Max         | V   | 268    | 303     | 74           | -27.39    | Pass       |
| 11059.58      | 45.34    | 6.11       | 2.02  | 53.47        | Peak Max         | V   | 230    | 42      | 74           | -20.53    | Pass       |
| 13436.22      | 47.04    | 7.04       | 4.54  | 58.62        | Peak Max         | V   | 164    | 160     | 74           | -15.38    | Pass       |
| 7309.94       | 24.21    | 5.15       | -0.35 | 29.01        | Average Max      | V   | 268    | 303     | 54           | -24.99    | Pass       |
| 11059.58      | 27.37    | 6.11       | 2.02  | 35.5         | Average Max      | V   | 230    | 42      | 54           | -18.5     | Pass       |
| 13436.22      | 29.95    | 7.04       | 4.54  | 41.53        | Average Max      | H   | 164    | 160     | 54           | -12.47    | 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 |
|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|
| 7222.39       | 42.04    | 5.15       | -0.32 | 46.87        | Peak Max         | V   | 265    | 301     | 74           | -27.13    | Pass       |
| 11219.26      | 44.96    | 6.04       | 2.21  | 53.21        | Peak Max         | V   | 231    | 50      | 74           | -20.79    | Pass       |
| 13273.26      | 45.91    | 7          | 4.52  | 57.43        | Peak Max         | V   | 169    | 157     | 74           | -16.57    | Pass       |
| 7222.39       | 24.27    | 5.15       | -0.32 | 29.1         | Average Max      | V   | 265    | 301     | 54           | -24.9     | Pass       |
| 11219.26      | 27.66    | 6.04       | 2.21  | 35.91        | Average Max      | H   | 231    | 50      | 54           | -18.09    | Pass       |
| 13273.26      | 28.75    | 7          | 4.52  | 40.27        | Average Max      | H   | 169    | 157     | 54           | -13.73    | Pass       |

## Annex A. TEST INSTRUMENT

| Instrument                         | Model    | Serial #   | Cal Date   | Cal Cycle | Cal Due    | In use                              |
|------------------------------------|----------|------------|------------|-----------|------------|-------------------------------------|
| <b>Conducted Emissions</b>         |          |            |            |           |            |                                     |
| R & S Receiver                     | ESIB 40  | 100179     | 06/08/2017 | 1 Year    | 06/08/2018 | <input checked="" type="checkbox"/> |
| CHASE LISN                         | MN2050B  | 1018       | 08/07/2017 | 1 Year    | 08/07/2018 | <input checked="" type="checkbox"/> |
| <b>Radiated Emissions</b>          |          |            |            |           |            |                                     |
| R & S Receiver                     | ESIB 40  | 1018       | 08/07/2017 | 1 Year    | 08/07/2018 | <input checked="" type="checkbox"/> |
| Bi-Log antenna (30MHz~2GHz)        | JB1      | A030702    | 08/12/2017 | 1 Year    | 08/12/2018 | <input checked="" type="checkbox"/> |
| Horn Antenna (1GHz~26GHz)          | 3115     | 100059     | 08/25/2017 | 1 Year    | 08/25/2018 | <input checked="" type="checkbox"/> |
| <b>RF Conducted Measurement</b>    |          |            |            |           |            |                                     |
| Spectrum Analyzer                  | N9010A   | 10SL0219   | 08/20/2017 | 1 Year    | 08/20/2018 | <input checked="" type="checkbox"/> |
| Spectrum Analyzer                  | N9030B   | MY57140374 | 09/06/2017 | 1 Year    | 09/06/2018 | <input checked="" type="checkbox"/> |
| R & S Receiver                     | ESIB 40  | 100179     | 06/08/2017 | 1 Year    | 06/08/2018 | <input checked="" type="checkbox"/> |
| ETS-Lingren<br>USB RF Power Sensor | 7002-006 | 10SL0190   | 09/03/2017 | 1 Year    | 09/03/2018 | <input checked="" type="checkbox"/> |

## 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                         |                                                                                     | <a href="#">A1</a> , <a href="#">A2</a> , <a href="#">A3</a> , <a href="#">A4</a> , <a href="#">B1</a> , <a href="#">B2</a> , <a href="#">B3</a> , <a href="#">B4</a> , 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                                   |    | <b>Radio &amp; Telecommunications Terminal Equipment:</b><br>EN45001 – EN ISO/IEC 17025                                                                                   |
|                                         |   | <b>Electromagnetic Compatibility:</b><br>EN45001 – EN ISO/IEC 17025                                                                                                       |
| Singapore iDA<br>CB(Certification Body) |  | <a href="#">Phase I</a> , <a href="#">Phase II</a>                                                                                                                        |
| Vietnam MIC<br>CAB Accreditation        |  | Please see the document for the detailed scope                                                                                                                            |
| Hong Kong OFCA                          |  | <b>(Phase II)</b> OFCA Foreign Certification Body for Radio and Telecom                                                                                                   |
|                                         |  | <b>(Phase I)</b> Conformity Assessment Body for Radio and Telecom                                                                                                         |
| Industry Canada CAB                     |  | <b>Radio:</b> Scope A – All Radio Standard Specification in Category I                                                                                                    |
|                                         |  | <b>Telecom:</b> CS-03 Part I, II, V, VI, VII, VIII                                                                                                                        |

|                                                 |                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Japan Recognized Certification Body Designation |    | <p><b>Radio:</b> A1. Terminal equipment for purpose of calling</p> <p><b>Telecom:</b> B1. Specified radio equipment specified in Article 38-2, Paragraph 1, Item 1 of the Radio Law</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Korea CAB Accreditation                         |    | <p><b>EMI:</b> KCC Notice 2008-39, RRL Notice 2008-3: CA Procedures for EMI<br/>KN22: Test Method for EMI</p> <p><b>EMS:</b> 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</p> <p><b>Radio:</b> 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</p> <p><b>Telecom:</b> 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</p> |
| Taiwan NCC CAB Recognition                      |    | LP0002, PSTN01, ADSL01, ID0002, IS6100, CNS14336, PLMN07, PLMN01, PLMN08                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Taiwan BSMI CAB Recognition                     |    | CNS 13438                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Japan VCCI                                      |  | <p>R-3083: Radiation 3 meter site</p> <p>C-3421: Main Ports Conducted Interference Measurement</p> <p>T-1597: Telecommunication Ports Conducted Interference Measurement</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Australia CAB Recognition                       |  | <p><b>EMC:</b> AS/NZS CISPR 11, AS/NZS CISPR 14.1, AS/NZS CISPR22, AS/NZS 61000.6.3, AS/NZS 61000.6.4</p> <p><b>Radio communications:</b> 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</p> <p><b>Telecommunications:</b> 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</p>                                                                                                             |
| 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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |