# FCC RADIO TEST REPORT
# FCC ID: LNQSBWD60A

**Product：** ScreenBeam Mini2 Wireless Display Receiver

**Trade Name：** Actiontec

**Model Name：** SBWD60A

**Serial Model：** N/A

**Report No.：** NTEK-2014NT07091105F1

## Prepared for

Actiontec Electronics, Inc.

760 North Mary Ave., Sunnyvale, California 94085 United States

## Prepared by

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# TEST RESULT CERTIFICATION

**Applicant's name** ..... Actiontec Electronics, Inc.

Address ..... 760 North Mary Ave., Sunnyvale, California 94085 United States

**Manufacture's Name**... Actiontec Electronics, Inc.

Address ..... 760 North Mary Ave., Sunnyvale, California 94085 United States

**Product description**

Product name ..... ScreenBeam Mini2 Wireless Display Receiver

Model and/or type reference ..... SBWD60A

Serial Model ..... N/A

**Standards** ..... FCC Part15.407 01 Oct. 2013

Test procedure ..... ANSI C63.4-2003 and KDB 789033 D01 v01r04

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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**Date of Test** .....

Date (s) of performance of tests ..... 09 Jul. 2014 ~26 Jul. 2014

Date of Issue..... 26 Jul. 2014

Test Result..... **Pass**

Testing Engineer : Kyle Xu

(Kyle Xu)

Technical Manager : Brown Lu

(Brown Lu)

Authorized Signatory : Bill

(Bill Yao)

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## 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.407) , Subpart E | | | |
|---|---|---|---|
| Standard Section | Test Item | Judgment | Remark |
| FCC §15.207<br>IC RSS-Gen §7.2.4 | AC Power Line Conducted Emissions | PASS | |
| FCC §15.209(a), 15.407(b)<br>IC RSS-210 §A9.2 | Spurious Radiated Emissions | PASS | |
| FCC §15.407(a)<br>IC RSS-210 §A9.2 | 26 dB and 99% Emission Bandwidth | PASS | |
| FCC §407(a)(1)<br>IC RSS-210 §A9.2 | Peak Output Power Measurement | PASS | |
| FCC §2.1051, §15.407(b)<br>IC RSS-210 §A9.2 | Band Edges | PASS | |
| FCC §15.407(a)(1)<br>IC RSS-210 §A9.2 | Power Spectral Density | PASS | |
| FCC §15.407(a)(6) | Peak Excursion Ratio | PASS | |
| IC RSS-210 §2.3<br>IC RSS-Gen §6.1 | Receiver Spurious Radiated Emissions | PASS | |
| FCC §2.1051, §15.407(b)<br>IC RSS-210 §A9.2 | Spurious Emissions at Antenna Terminals | PASS | |
| FCC §15.203<br>IC RSS-Gen §7.1.2 | Antenna Requirement | PASS | |

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

## 1.1 TEST FACILITY

NTEK Testing Technology Co., Ltd
Add.:1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen P.R. China.
FCC Registration No.:238937; IC Registration No.:9270A-1
CNAS Registration No.:L5516

## 1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y ± U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95** %。

| No. | Item | Uncertainty |
|---|---|---|
| 1 | Conducted Emission Test | ±1.38dB |
| 2 | RF power,conducted | ±0.16dB |
| 3 | Spurious emissions,conducted | ±0.21dB |
| 4 | All emissions,radiated(<1G) | ±4.68dB |
| 5 | All emissions,radiated(>1G) | ±4.89dB |
| 6 | Temperature | ±0.5°C |
| 7 | Humidity | ±2% |

# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>Equipment</td><td>ScreenBeam Mini2 Wireless Display Receiver</td></tr>
<tr><td>Trade Name</td><td>Actiontec</td></tr>
<tr><td>Model Name</td><td>SBWD60A</td></tr>
<tr><td>Product Description</td><td>The EUT is a ScreenBeam Mini2 Wireless Display Receiver
<table>
<tr><td>Operation Frequency:</td><td>802.11a/n(20):5180 MHz ~ 5240 MHz<br>802.11n(40): 5190 MHz ~ 5230 MHz</td></tr>
<tr><td>Modulation Type:</td><td>OFDM (BPSK / QPSK / 16QAM / 64QAM)</td></tr>
<tr><td>Bit Rate of Transmitter</td><td>802.11a:54/48/36/24/18/12/9/6Mbps<br>802.11n(20MHz):150/144.44/130/117/115.56/104/86.67/78/52/6.5Mbps<br>802.11n(40MHz):300/270/240/180/150/120/108/90/54 Mbps</td></tr>
<tr><td>Number Of Channel</td><td>802.11a/n20MHz:7CH<br>802.11n40MHz:5CH</td></tr>
<tr><td>Max.Output Power(Conducted):</td><td>12.31 dBm</td></tr>
<tr><td>Antenna Designation:</td><td>Please see Note 3.</td></tr>
<tr><td>Antenna Gain (dBi)</td><td>Please see Note 3.</td></tr>
</table>
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.</td></tr>
<tr><td>Channel List</td><td>Please refer to the Note 2.</td></tr>
<tr><td>Ratings</td><td>Adapter 1：DC 5V,1.0A<br>Adapter 2：DC 5V,1000mA</td></tr>
<tr><td>Adapter</td><td>Adapter 1：<br>Mode: MU05B2050100-A1<br>Input: 100-240V~, 50/60Hz, 0.3A<br>Output: 5V⎓, 1.0A<br>Adapter 2：<br>Mode: SC050100-US<br>Input: 100-240V~, 50/60Hz, 0.4A<br>Output: 5V⎓, 1000mA</td></tr>
<tr><td>Battery</td><td>N/A</td></tr>
</table>

Note:

1. For a more detailed features description, please refer to the manufacturer’s specifications or the User's Manual.

2.

5GHz

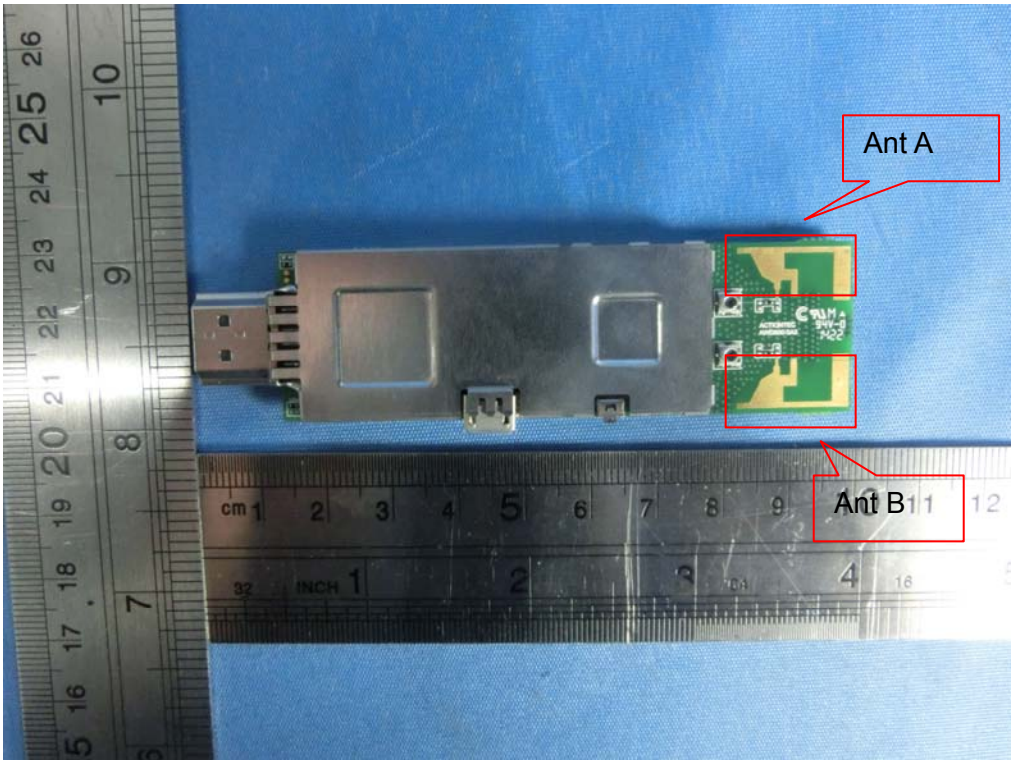
| 802.11a/n(20)Carrier Frequency Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 36 | 5180 | 38 | 5190 | 40 | 5200 | 42 | 5210 |
| 44 | 5220 | 46 | 5230 | 48 | 5240 | - | - |

| 802.11n (BW40MHz) Carrier Frequency Channel | | | | | | | |
|---|---|---|---|---|---|---|---|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 38 | 5190 | 40 | 5200 | 42 | 5210 | 44 | 5220 |
| 46 | 5230 | - | - | - | - | - | - |

3.

Table for Filed Antenna

| Ant. | Brand | Model Name | Antenna Type | Gain (dBi) | NOTE |
|---|---|---|---|---|---|
| A | N/A | N/A | PCB antenna | 2.4G/5G:6.05 | Wifi Antenna |
| B | N/A | N/A | PCB antenna | 2.4G/5G:6.05 | Wifi Antenna |




The Control software(tool_WIFI.exe) can control antenna A B ,

For 2.4GHz mode, antenna A B are transmitting,two antennas simultaneously transmit.

And the data is recorded for radiated emission and band edge.

For 5GHz mode,antenna A B are transmitting Two antennas simultaneously transmit.

And the data is recorded for radiated emission, and band edge.

For MIMO mode , Directional gain=GANT +10log(N)dbi =9.06dbi in 2.4GHz

Directional gain=GANT +10log(N)dbi =9.06dbi in 5GHz

802.11a/b/g/n 2.4GHz & 5GHz has MIMO mode.

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|---|---|
| Mode 1 | 802.11a /n CH36/ CH40/ CH 48 |
| Mode 2 | 802.11n38/ CH 46 |
| Mode 3 | Link Mode |

| **For Conducted Emission** | |
|---|---|
| Final Test Mode | Description |
| Mode 3 | Link Mode |

| **For Radiated Emission** | |
|---|---|
| Final Test Mode | Description |
| Mode 1 | 802.11a /n CH36/ CH40/ CH 48 |
| Mode 2 | 802.11n38/ CH 46 |
| Mode 3 | Link Mode |

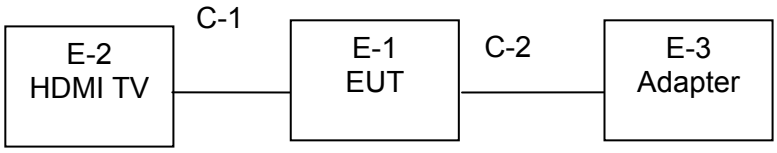
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

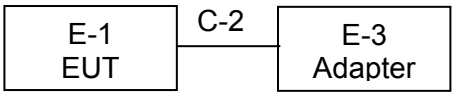
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

## 2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test




Radiated Emission Test



## 2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Brand | Model/Type No. | Series No. | Note |
|---|---|---|---|---|---|
| E-1 | ScreenBeam Mini2 Wireless Display Receiver | Actiontec | SBWD60A | N/A | EUT |
| E-2 | TV | SONY | KDL-24EX520 | N/A | |
| E-3 | Adapter 1 | Actiontec | MU05B2050100-A1 | N/A | |
| E-3 | Adapter 2 | Actiontec | SC050100-US | N/A | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|---|---|---|---|---|
| C-1 | NO | NO | 100cm | |
| C-2 | NO | NO | 80cm | |
| | | | | |
| | | | | |

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

## 2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
|---|---|---|---|---|---|---|---|
| 1 | Spectrum Analyzer | Agilent | E4407B | MY45108040 | 2014.07.06 | 2015.07.05 | 1 year |
| 2 | Test Receiver | R&S | ESPI | 101318 | 2014.06.07 | 2015.06.06 | 1 year |
| 3 | Bilog Antenna | TESEQ | CBL6111D | 31216 | 2014.07.06 | 2015.07.05 | 1 year |
| 4 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200264416 | 2014.06.07 | 2015.06.06 | 1 year |
| 5 | Spectrum Analyzer | ADVANTEST | R3132 | 150900201 | 2014.06.07 | 2015.06.06 | 1 year |
| 6 | Horn Antenna | EM | EM-AH-10180 | 2011071402 | 2014.07.06 | 2015.07.05 | 1 year |
| 7 | Horn Ant | Schwarzbeck | BBHA 9170 | 9170-181 | 2014.07.06 | 2015.07.05 | 1 year |
| 8 | Amplifier | EM | EM-30180 | 060538 | 2013.12.22 | 2014.12.21 | 1 year |
| 9 | Loop Antenna | ARA | PLA-1030/B | 1029 | 2014.06.07 | 2015.06.06 | 1 year |
| 10 | Power Meter | R&S | NRVS | 100696 | 2014.07.06 | 2015.07.05 | 1 year |
| 11 | Power Sensor | R&S | URV5-Z4 | 0395.1619.05 | 2014.07.06 | 2015.07.05 | 1 year |

Conduction Test equipment

| Item | Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until | Calibration period |
|---|---|---|---|---|---|---|---|
| 1 | Test Receiver | R&S | ESCI | 101160 | 2014.06.07 | 2015.06.06 | 1 year |
| 2 | LISN | R&S | ENV216 | 101313 | 2013.08.24 | 2014.08.23 | 1 year |
| 3 | LISN | EMCO | 3816/2 | 00042990 | 2013.08.24 | 2014.08.23 | 1 year |
| 4 | 50Ω Coaxial Switch | Anritsu | MP59B | 6200264417 | 2014.06.07 | 2015.06.06 | 1 year |
| 5 | Passive Voltage Probe | R&S | ESH2-Z3 | 100196 | 2014.06.07 | 2015.06.06 | 1 year |
| 6 | Absorbing clamp | R&S | MOS-21 | 100423 | 2014.06.07 | 2015.06.06 | 1 year |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | Attenuation | MCE | 24-10-34 | BN9258 | 2014.06.07 | 2015.06.06 | 1 year |

# 3. EMC EMISSION TEST

## 3.1 CONDUCTED EMISSION MEASUREMENT

### 3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | Class A (dBuV) | | Class B (dBuV) | | Standard |
|---|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average | |
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * | CISPR |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 | CISPR |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 | CISPR |

| | | | | | |
|---|---|---|---|---|---|
| 0.15 -0.5 | 79.00 | 66.00 | 66 - 56 * | 56 - 46 * | FCC |
| 0.50 -5.0 | 73.00 | 60.00 | 56.00 | 46.00 | FCC |
| 5.0 -30.0 | 73.00 | 60.00 | 60.00 | 50.00 | FCC |

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

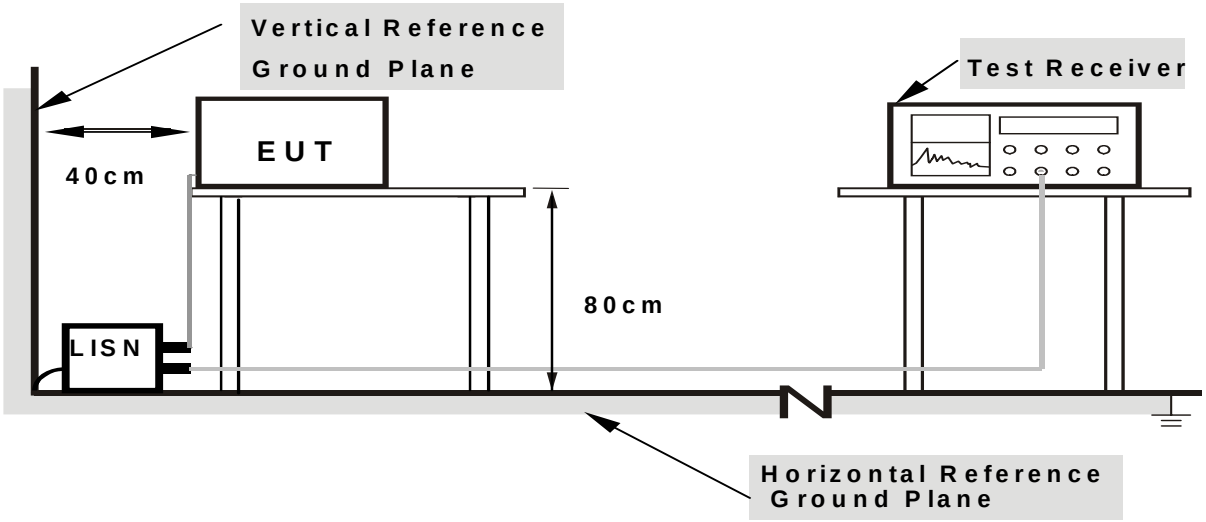
### 3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 3.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 3.1.4 TEST SETUP




Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

### 3.1.5 EUT OPERATING CONDITIONS

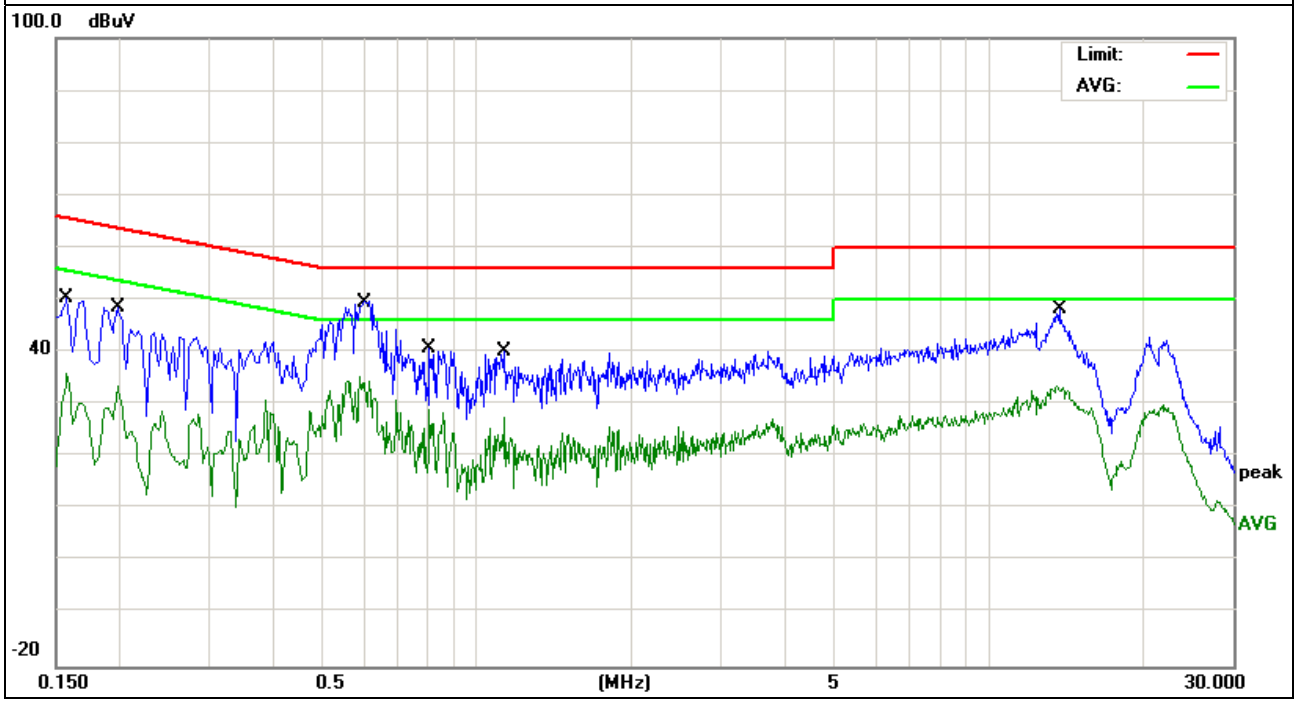
The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

### 3.1.6 TEST RESULTS

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name. ： | SBWD60A |
| Temperature： | 26 ℃ | Relative Humidity： | 56% |
| Pressure： | 1010hPa | Phase： | L |
| Test Voltage ： | DC 5V From adapter AC120V/60Hz- Adapter 1 | Test Mode： | Mode 3 |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV) | Limits (dBμV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 0.1580 | 40.62 | 9.63 | 50.25 | 65.56 | -15.31 | QP |
| 0.1580 | 26.21 | 9.63 | 35.84 | 55.56 | -19.72 | AVG |
| 0.1980 | 39.07 | 9.51 | 48.58 | 63.69 | -15.11 | QP |
| 0.1980 | 24.02 | 9.51 | 33.53 | 53.69 | -20.16 | AVG |
| 0.5899 | 39.03 | 9.53 | 48.56 | 56.00 | -7.44 | QP |
| 0.5899 | 25.81 | 9.53 | 35.34 | 46.00 | -10.66 | AVG |
| 0.8059 | 31.30 | 9.54 | 40.84 | 56.00 | -15.16 | QP |
| 0.8059 | 19.50 | 9.54 | 29.04 | 46.00 | -16.96 | AVG |
| 1.1300 | 30.64 | 9.55 | 40.19 | 56.00 | -15.81 | QP |
| 1.1300 | 17.99 | 9.55 | 27.54 | 46.00 | -18.46 | AVG |
| 13.6019 | 37.66 | 9.81 | 47.47 | 60.00 | -12.53 | QP |
| 13.6019 | 23.79 | 9.81 | 33.60 | 50.00 | -16.40 | AVG |

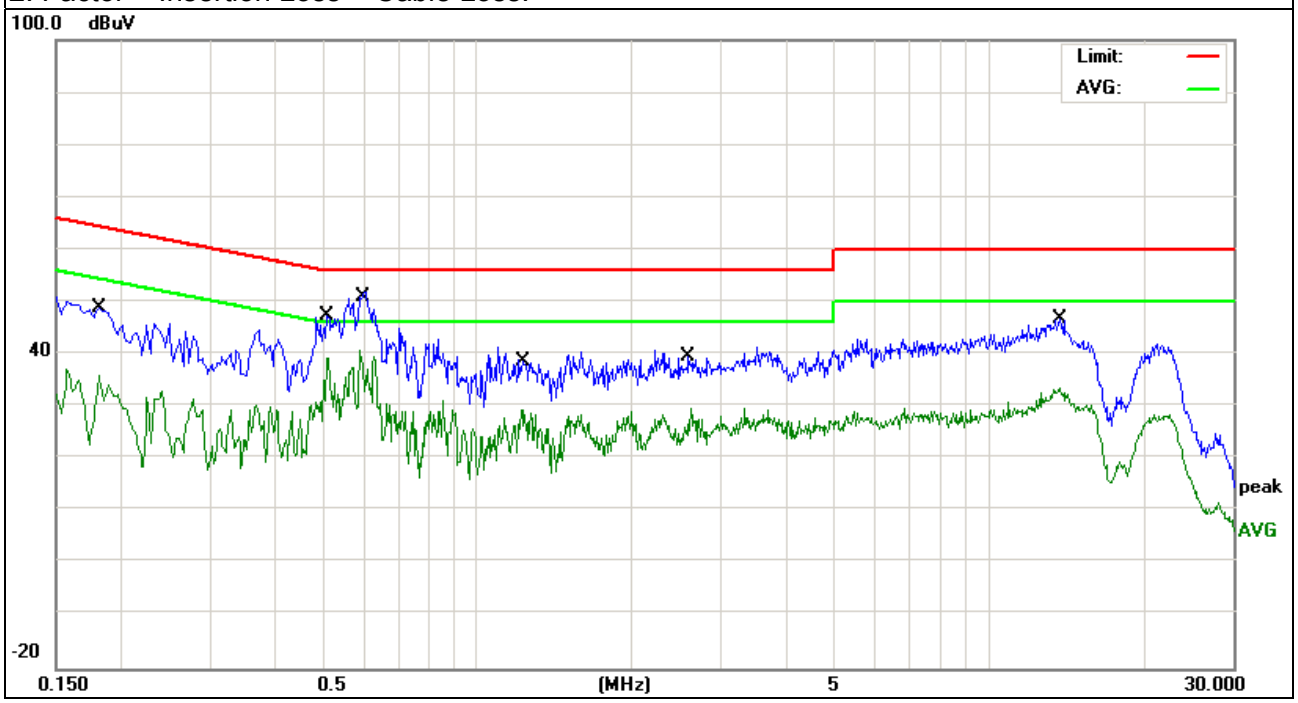
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name. ： | SBWD60A |
| Temperature： | 26 ℃ | Relative Humidity： | 56% |
| Pressure： | 1010hPa | Phase： | N |
| Test Voltage ： | DC 5V From adapter AC120V/60Hz- Adapter 1 | Test Mode： | Mode 3 |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV) | Limits (dBμV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 0.1819 | 39.32 | 9.56 | 48.88 | 64.39 | -15.51 | QP |
| 0.1819 | 26.40 | 9.56 | 35.96 | 54.39 | -18.43 | AVG |
| 0.5100 | 37.75 | 9.53 | 47.28 | 56.00 | -8.72 | QP |
| 0.5100 | 29.83 | 9.53 | 39.36 | 46.00 | -6.64 | AVG |
| 0.5898 | 41.42 | 9.53 | 50.95 | 56.00 | -5.05 | QP |
| 0.5898 | 31.34 | 9.53 | 40.87 | 46.00 | -5.13 | AVG |
| 1.2257 | 29.04 | 9.55 | 38.59 | 56.00 | -17.41 | QP |
| 1.2257 | 19.86 | 9.55 | 29.41 | 46.00 | -16.59 | AVG |
| 2.6218 | 28.27 | 9.57 | 37.84 | 56.00 | -18.16 | QP |
| 2.6218 | 19.95 | 9.57 | 29.52 | 46.00 | -16.48 | AVG |
| 13.7659 | 36.73 | 9.82 | 46.55 | 60.00 | -13.45 | QP |
| 13.7659 | 23.77 | 9.82 | 33.59 | 50.00 | -16.41 | AVG |

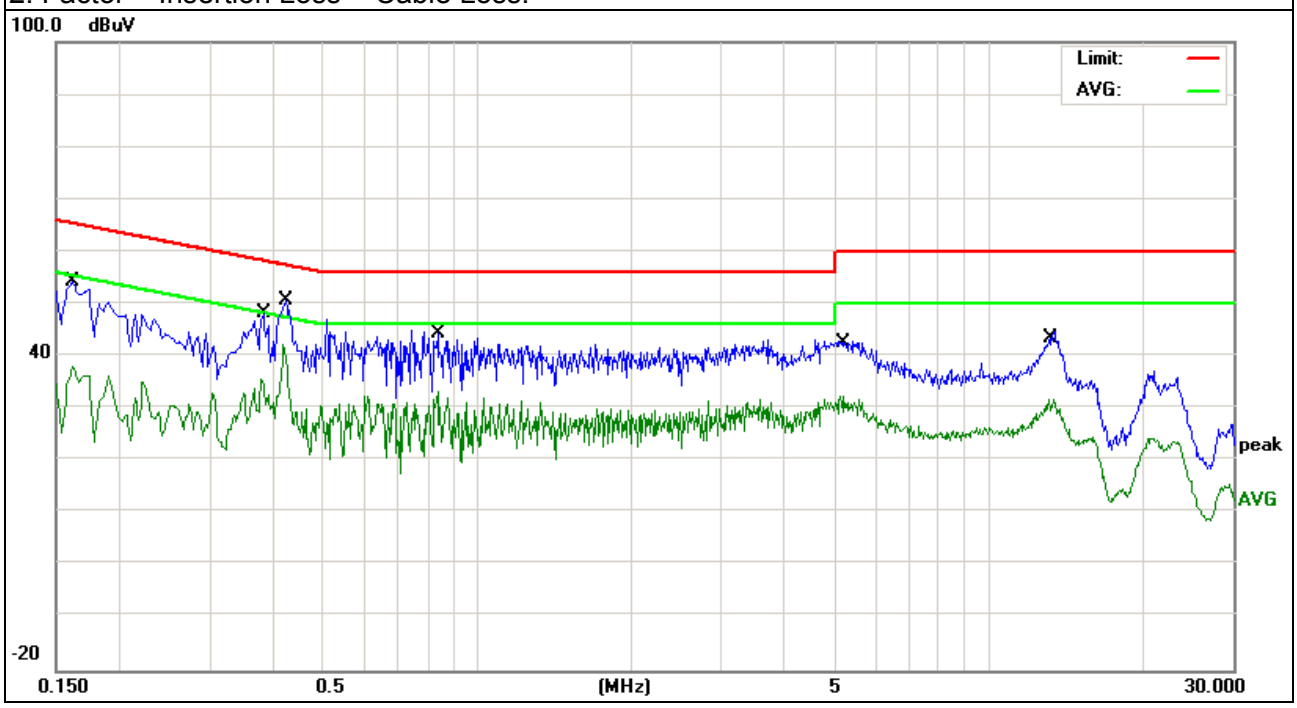
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name. ： | SBWD60A |
| Temperature： | 26 ℃ | Relative Humidity： | 56% |
| Pressure： | 1010hPa | Phase： | L |
| Test Voltage ： | DC 5V From adapter AC120V/60Hz- Adapter 2 | Test Mode： | Mode 3 |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV) | Limits (dBμV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 0.1620 | 44.56 | 9.62 | 54.18 | 65.36 | -11.18 | QP |
| 0.1620 | 28.53 | 9.62 | 38.15 | 55.36 | -17.21 | AVG |
| 0.3780 | 37.08 | 9.52 | 46.60 | 58.32 | -11.72 | QP |
| 0.3780 | 26.06 | 9.52 | 35.58 | 48.32 | -12.74 | AVG |
| 0.4180 | 39.57 | 9.52 | 49.09 | 57.49 | -8.40 | QP |
| 0.4180 | 32.70 | 9.52 | 42.22 | 47.49 | -5.27 | AVG |
| 0.8380 | 34.66 | 9.54 | 44.20 | 56.00 | -11.80 | QP |
| 0.8380 | 23.59 | 9.54 | 33.13 | 46.00 | -12.87 | AVG |
| 5.1979 | 33.02 | 9.60 | 42.62 | 60.00 | -17.38 | QP |
| 5.1979 | 22.74 | 9.60 | 32.34 | 50.00 | -17.66 | AVG |
| 13.1139 | 33.06 | 9.81 | 42.87 | 60.00 | -17.13 | QP |
| 13.1139 | 22.03 | 9.81 | 31.84 | 50.00 | -18.16 | AVG |

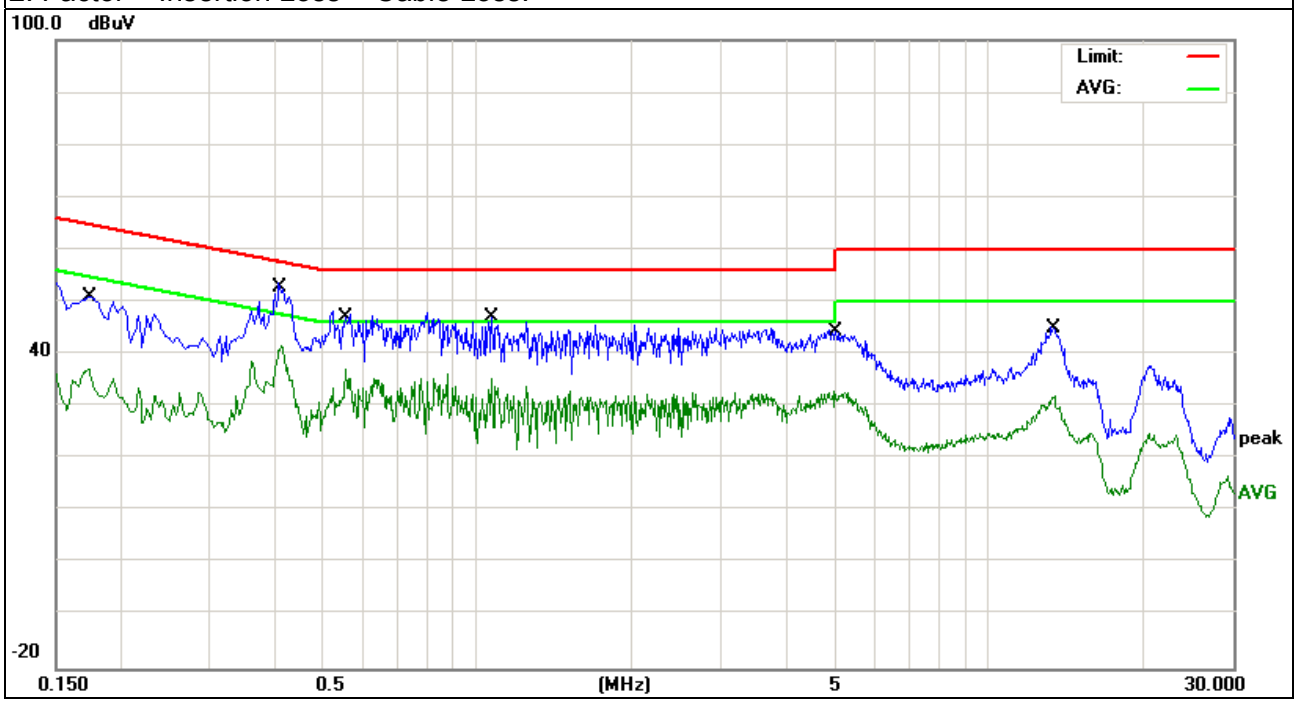
Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name. ： | SBWD60A |
| Temperature： | 26 ℃ | Relative Humidity： | 56% |
| Pressure： | 1010hPa | Phase： | N |
| Test Voltage ： | DC 5V From adapter AC120V/60Hz- Adapter 2 | Test Mode： | Mode 3 |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV) | Limits (dBμV) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|
| 0.1739 | 41.38 | 9.58 | 50.96 | 64.77 | -13.81 | QP |
| 0.1739 | 27.64 | 9.58 | 37.22 | 54.77 | -17.55 | AVG |
| 0.4139 | 42.45 | 9.52 | 51.97 | 57.57 | -5.60 | QP |
| 0.4139 | 32.16 | 9.52 | 41.68 | 47.57 | -5.89 | AVG |
| 0.5540 | 37.52 | 9.53 | 47.05 | 56.00 | -8.95 | QP |
| 0.5540 | 27.59 | 9.53 | 37.12 | 46.00 | -8.88 | AVG |
| 1.0660 | 37.53 | 9.55 | 47.08 | 56.00 | -8.92 | QP |
| 1.0660 | 25.67 | 9.55 | 35.22 | 46.00 | -10.78 | AVG |
| 4.9739 | 34.30 | 9.60 | 43.90 | 56.00 | -12.10 | QP |
| 4.9739 | 23.47 | 9.60 | 33.07 | 46.00 | -12.93 | AVG |
| 13.4338 | 34.78 | 9.81 | 44.59 | 60.00 | -15.41 | QP |
| 13.4338 | 22.25 | 9.81 | 32.06 | 50.00 | -17.94 | AVG |

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



## 3.2 RADIATED EMISSION MEASUREMENT

### 3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | Class A (dBuV/m) (at 3M) | | Class B (dBuV/m) (at 3M) | |
|---|---|---|---|---|
| | PEAK | AVERAGE | PEAK | AVERAGE |
| Above 1000 | 80 | 60 | 74 | 54 |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.
(2) The tighter limit applies at the band edges.
(3) Emission level (dBuV/m)=20log Emission level (uV/m).

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average |

| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

### 3.2.2 TEST PROCEDURE

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

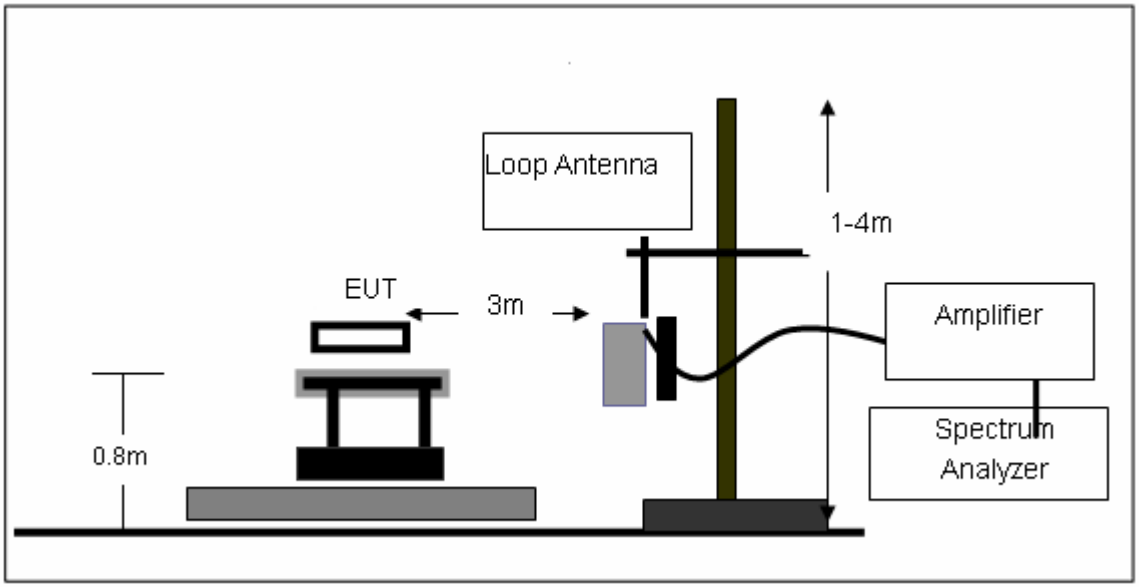
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

### 3.2.3 DEVIATION FROM TEST STANDARD

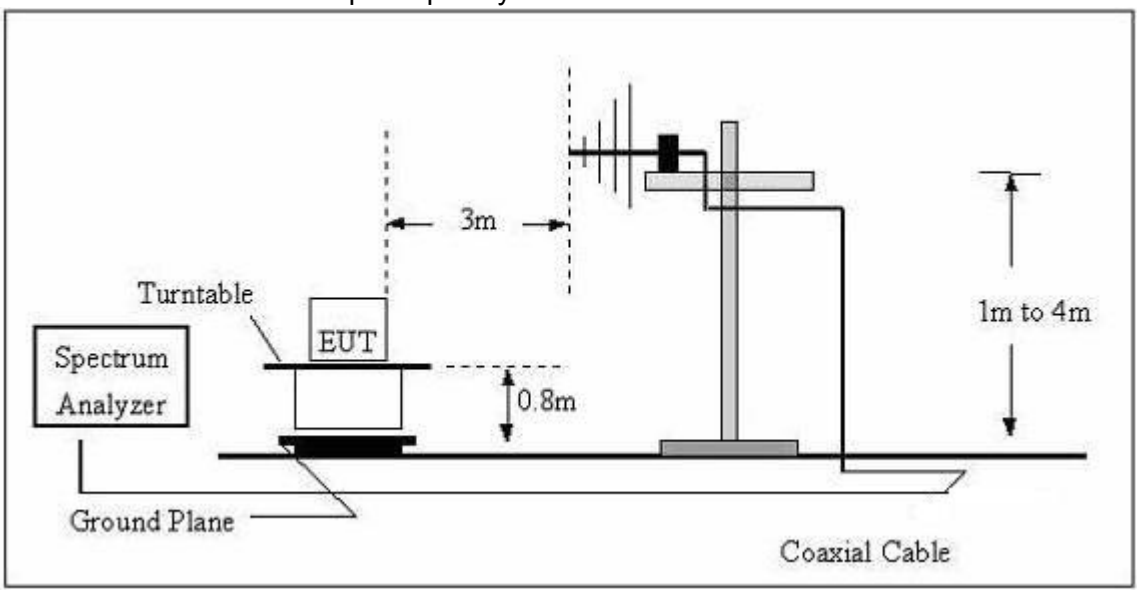
No deviation

### 3.2.4 TEST SETUP

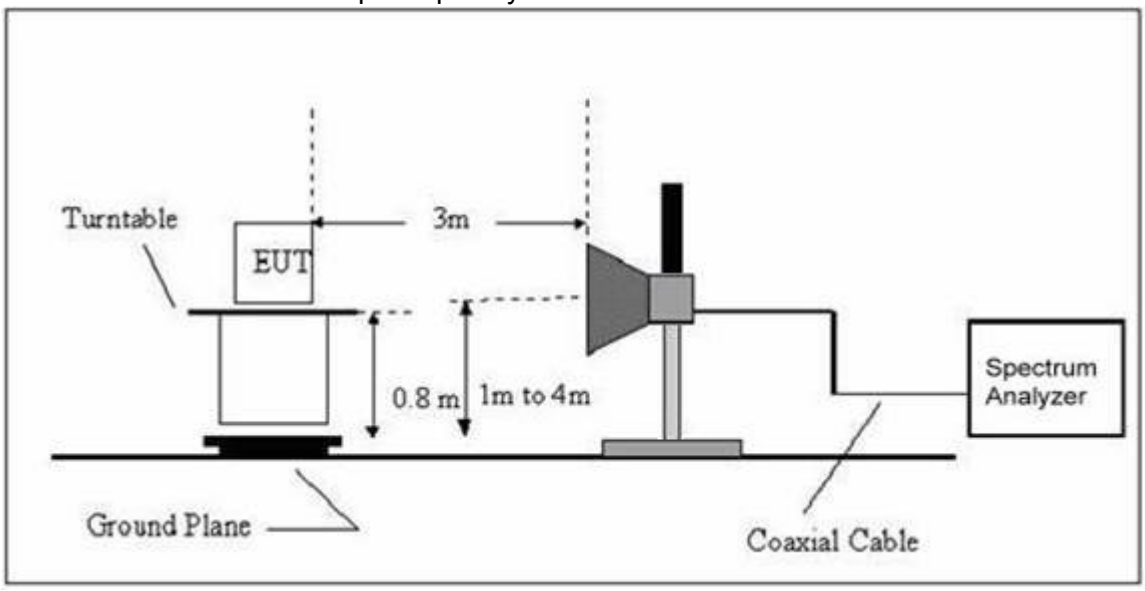
（A）Radiated Emission Test-Up Frequency Below 30MHz




（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz




### 3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 3.2.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name. ： | SBWD60A |
| Temperature： | 20 ℃ | Relative Humidtity： | 48% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX | Polarization : | -- |

| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | N/A |
| -- | -- | -- | -- | N/A |

**NOTE:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

### 3.2.7 TEST RESULTS (BETWEEN 30MHZ – 1GHZ)

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 20 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz- Adapter 1 |
| Test Mode ： | TX (5.0G) | | |

| Comment | Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| Below 1G | | | | | | | |
| Horizontal | 60.9176 | 18.37 | 7.63 | 26.00 | 40.00 | -14.00 | QP |
| Horizontal | 188.4123 | 18.31 | 10.69 | 29.00 | 43.50 | -14.50 | QP |
| Horizontal | 247.6819 | 17.23 | 13.57 | 30.80 | 46.00 | -15.20 | QP |
| Horizontal | 287.9904 | 22.28 | 14.02 | 36.30 | 46.00 | -9.70 | QP |
| Horizontal | 399.0300 | 14.53 | 18.27 | 32.80 | 46.00 | -13.20 | QP |
| Horizontal | 752.7432 | 14.13 | 26.17 | 40.30 | 46.00 | -5.70 | QP |
| Vertica | 50.0566 | 24.83 | 10.67 | 35.50 | 40.00 | -4.50 | QP |
| Vertica | 157.5586 | 20.43 | 10.47 | 30.90 | 43.50 | -12.60 | QP |
| Vertica | 369.4045 | 18.06 | 17.04 | 35.10 | 46.00 | -10.90 | QP |
| Vertica | 455.9057 | 18.68 | 19.42 | 38.10 | 46.00 | -7.90 | QP |
| Vertica | 526.3967 | 16.76 | 20.84 | 37.60 | 46.00 | -8.40 | QP |
| Vertica | 884.5027 | 15.02 | 27.08 | 42.10 | 46.00 | -3.90 | QP |

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 20 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz- Adapter 2 |
| Test Mode ： | TX (5.0G) | | |

| Comment | Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| Below 1G | | | | | | | |
| Horizontal | 146.3735 | 20.22 | 10.78 | 31.00 | 43.50 | -12.50 | QP |
| Horizontal | 194.4533 | 20.26 | 10.74 | 31.00 | 43.50 | -12.50 | QP |
| Horizontal | 290.0172 | 24.36 | 14.04 | 38.40 | 46.00 | -7.60 | QP |
| Horizontal | 392.0951 | 22.02 | 17.98 | 40.00 | 46.00 | -6.00 | QP |
| Horizontal | 441.7425 | 5.56 | 19.14 | 34.70 | 46.00 | -11.30 | QP |
| Horizontal | 804.6028 | 13.50 | 27.40 | 40.90 | 46.00 | -5.10 | QP |
| Vertica | 48.5016 | 21.74 | 11.06 | 32.80 | 40.00 | -7.20 | QP |
| Vertica | 119.0180 | 17.22 | 11.88 | 29.10 | 43.50 | -14.40 | QP |
| Vertica | 186.4405 | 17.42 | 10.68 | 28.10 | 43.50 | -15.40 | QP |
| Vertica | 313.2760 | 18.69 | 14.71 | 33.40 | 46.00 | -12.60 | QP |
| Vertica | 447.9821 | 15.74 | 19.26 | 35.00 | 46.00 | -11.00 | QP |
| Vertica | 896.9963 | 12.37 | 27.03 | 39.40 | 46.00 | -6.60 | QP |

### 3.2.8 TEST RESULTS (ABOVE 1000 MHZ)

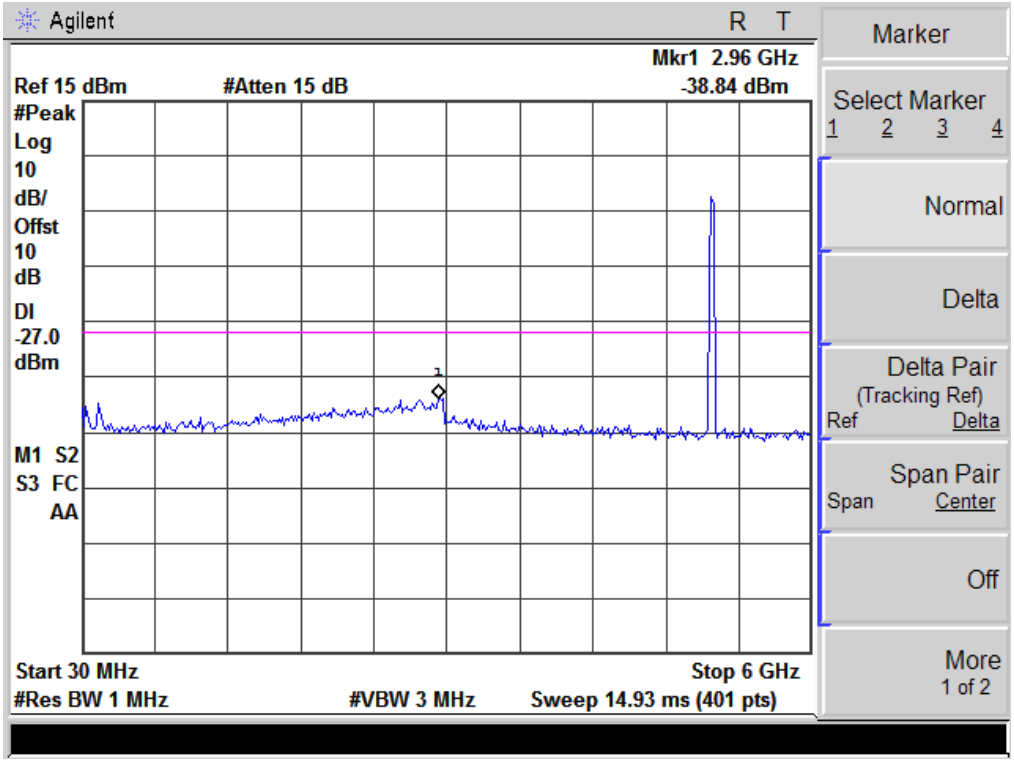
| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 20 ℃ | Relative Humidity： | 48% |
| Pressure： | 1010 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX (5.0G) | | |

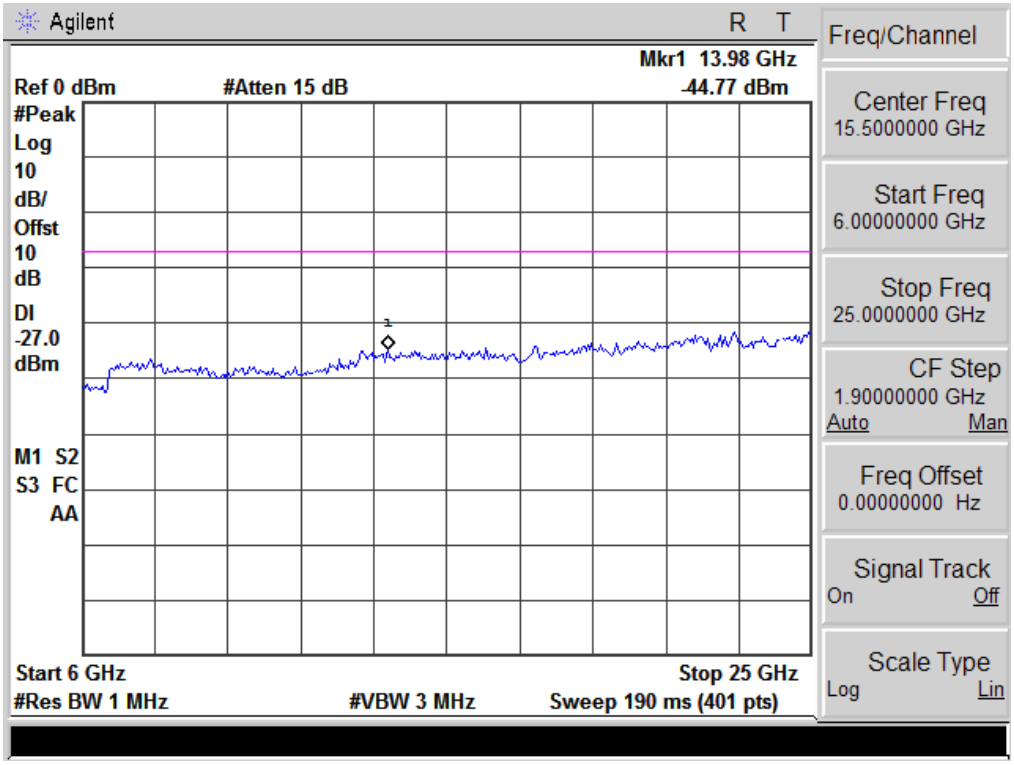
| Polar (H/V) | Frequency (MHz) | Meter Reading (dBuV) | Factor (dB) | Emission Level (dBuV/m) | Limits (dBuV/m) | Margin (dB) | Detector Type |
|---|---|---|---|---|---|---|---|
| Low Channel (5180 MHz)-Above 1G | | | | | | | |
| Vertical | 10360.000 | 38.45 | 13.09 | 51.54 | 74 | -22.46 | Pk |
| Vertical | 15540.000 | 35.31 | 15.16 | 50.47 | 74 | -23.53 | Pk |
| Horizontal | 10360.000 | 37.22 | 13.09 | 50.31 | 74 | -23.69 | Pk |
| Horizontal | 15540.000 | 33.09 | 15.16 | 48.25 | 74 | -25.75 | Pk |
| middle Channel (5200 MHz)-Above 1G | | | | | | | |
| Vertical | 10400.000 | 37.54 | 13.11 | 50.65 | 74 | -23.35 | Pk |
| Vertical | 15600.000 | 36.21 | 15.19 | 51.4 | 74 | -22.6 | Pk |
| Horizontal | 10400.000 | 31.13 | 13.11 | 44.24 | 74 | -29.76 | Pk |
| Horizontal | 15600.000 | 36.45 | 15.19 | 51.64 | 74 | -22.36 | Pk |
| High Channel (5240 MHz)-Above 1G | | | | | | | |
| Vertical | 10480.000 | 39.21 | 13.19 | 52.4 | 74 | -21.60 | Pk |
| Vertical | 15720.000 | 36.92 | 15.25 | 52.17 | 74 | -21.83 | Pk |
| Horizontal | 10480.000 | 33.22 | 13.19 | 46.41 | 74 | -27.59 | Pk |
| Horizontal | 15720.000 | 36.13 | 15.34 | 51.47 | 74 | -22.53 | Pk |

Note:"802.11a(5G)" mode is the worst mode. When PK value is lower than the Average value limit, average didn't record.

Conducted Spurious Emissions at Antenna Port:

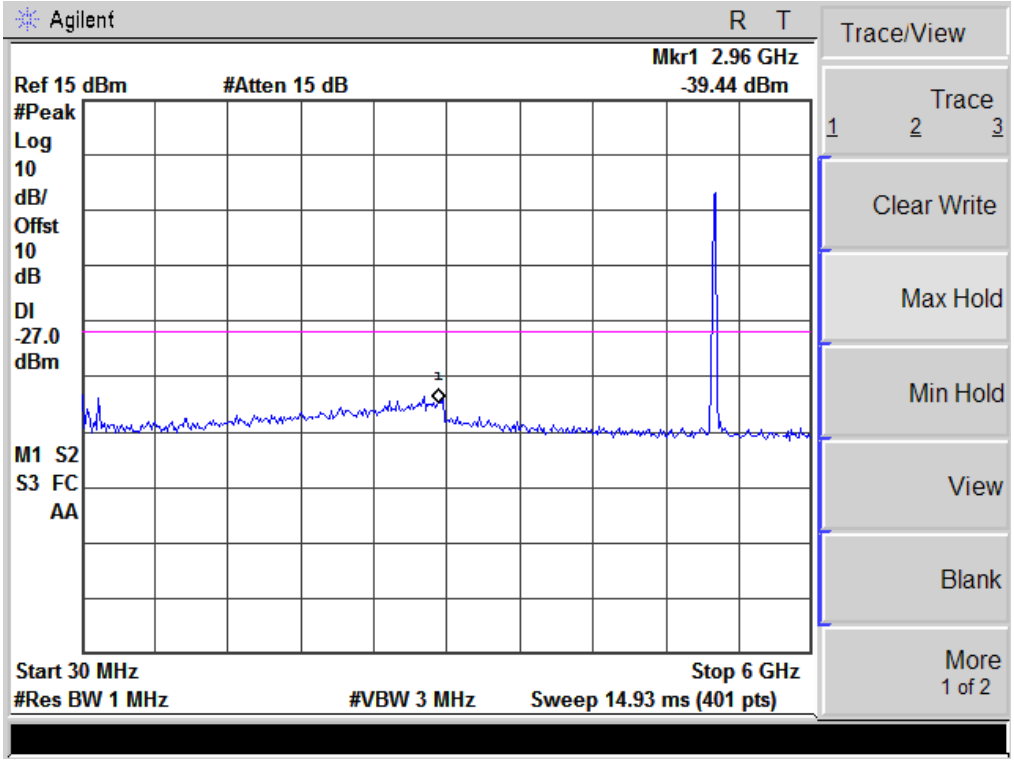
5GHz: Antenna A 802.11a Low Channel

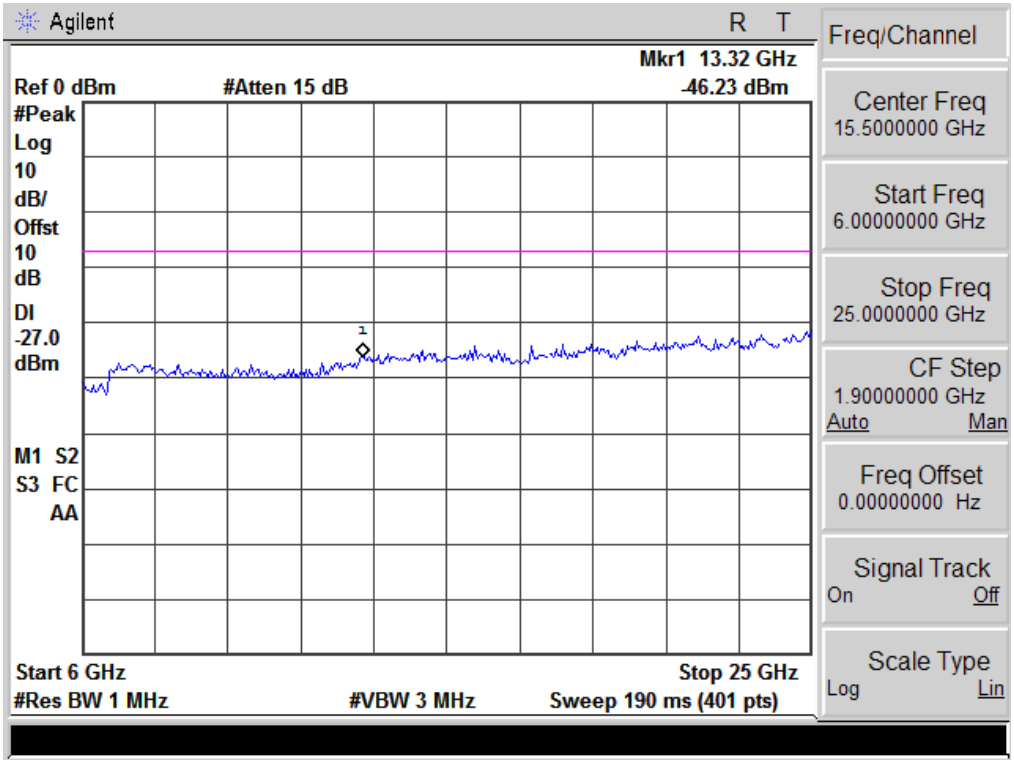



Note: No emission detected above 25GHz

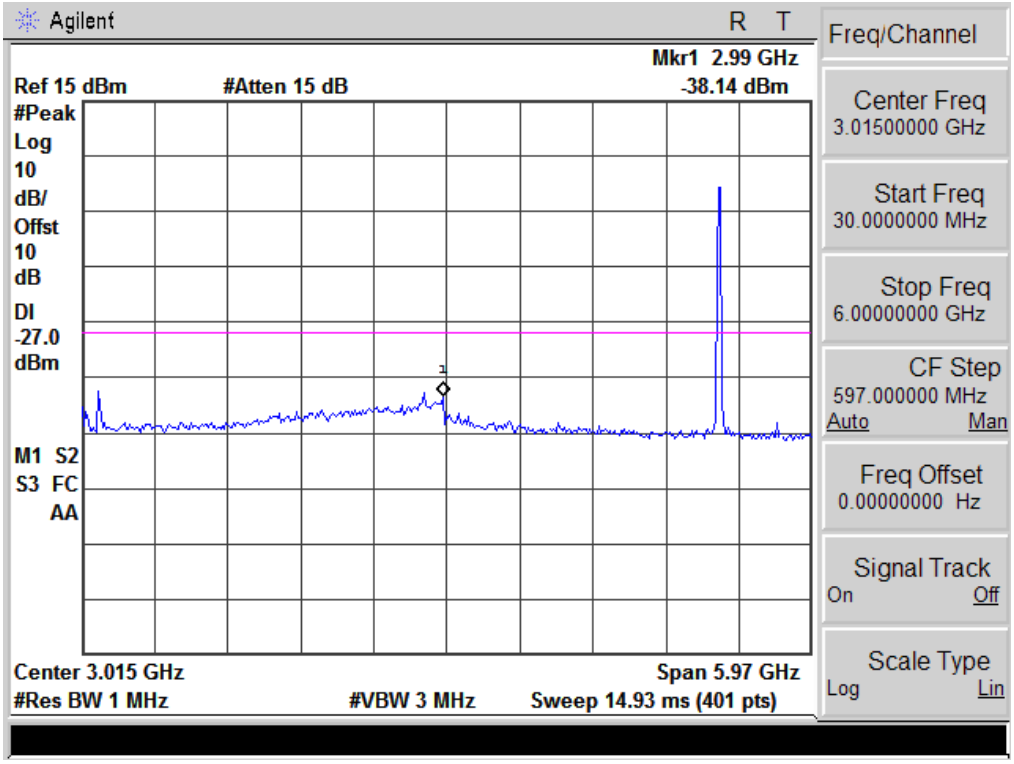
802.11a Middle Channel

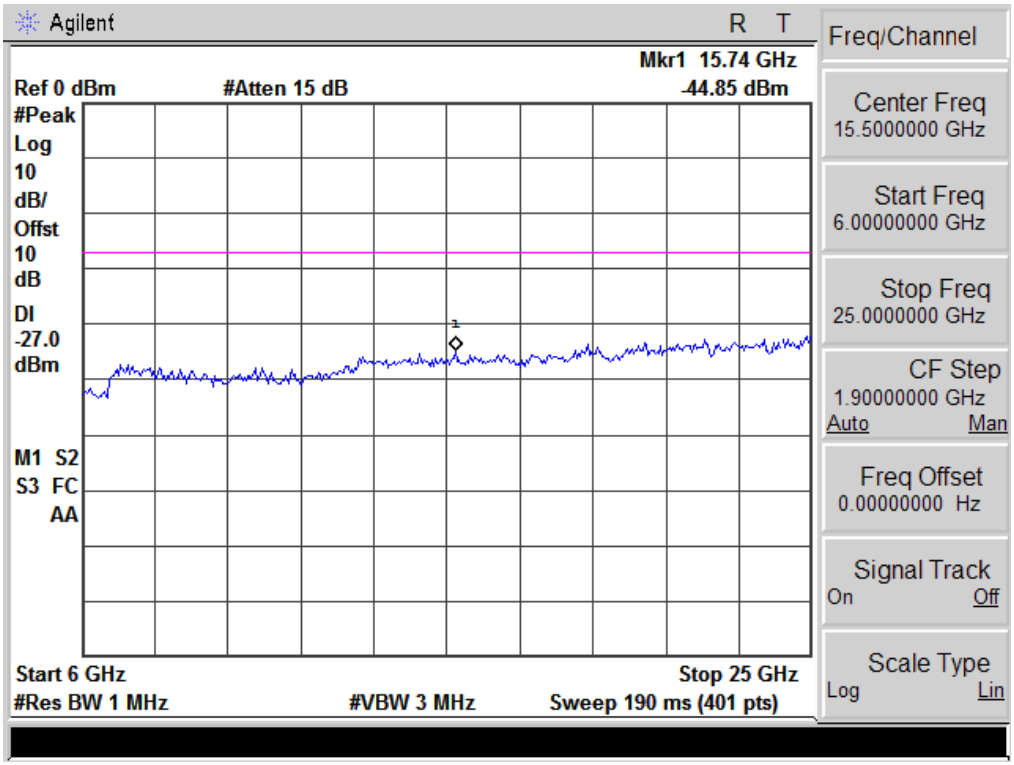



Note: No emission detected above 25GHz

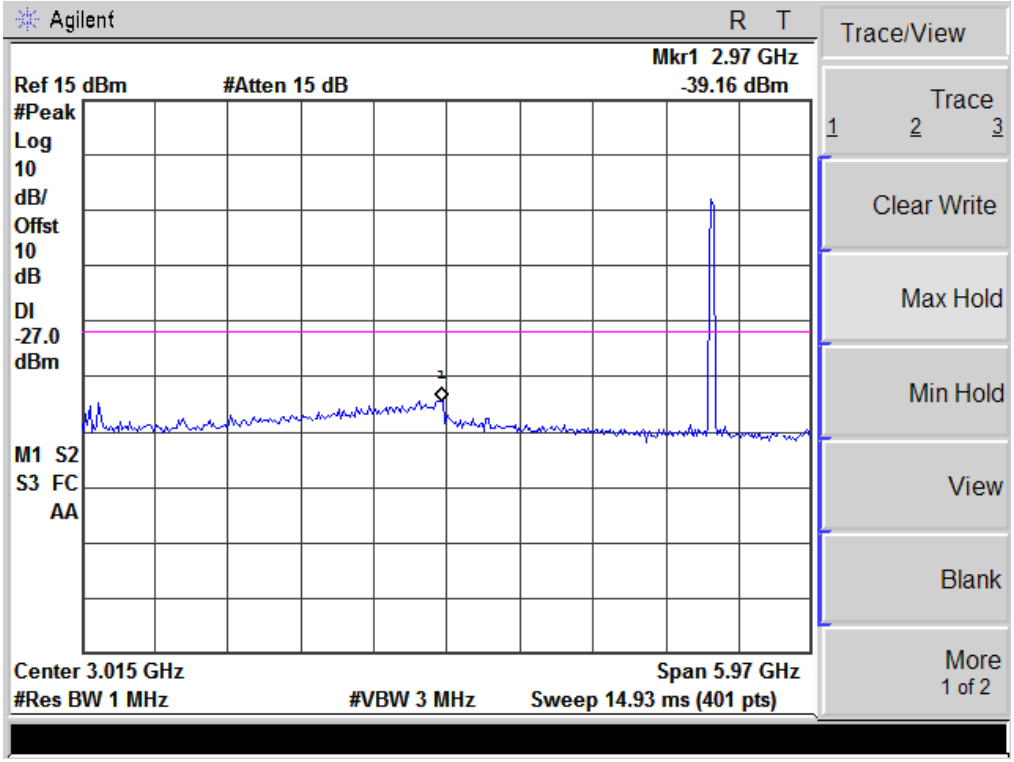
802.11a High Channel

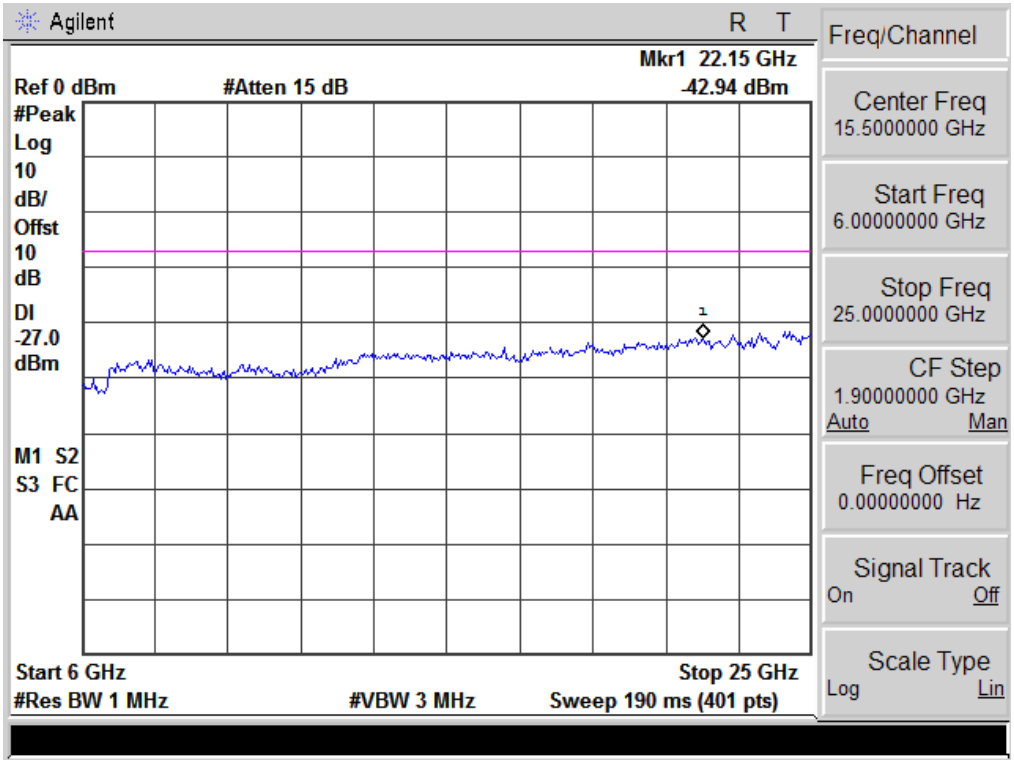



Note: No emission detected above 25GHz

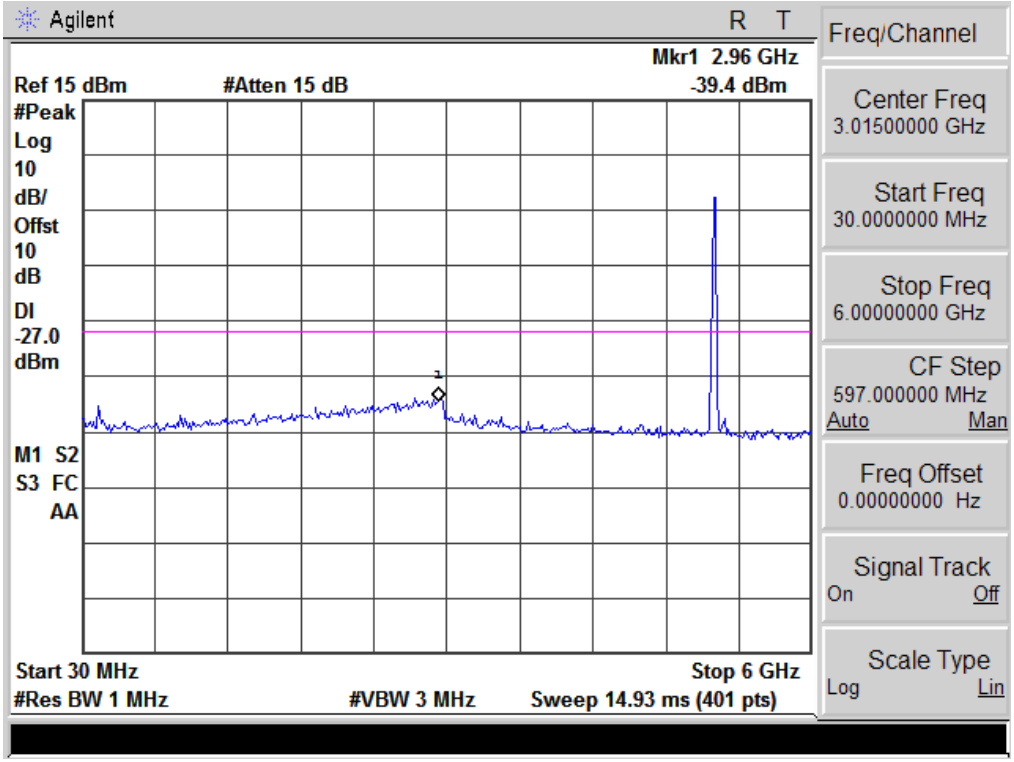
802.11n(20) Low Channel

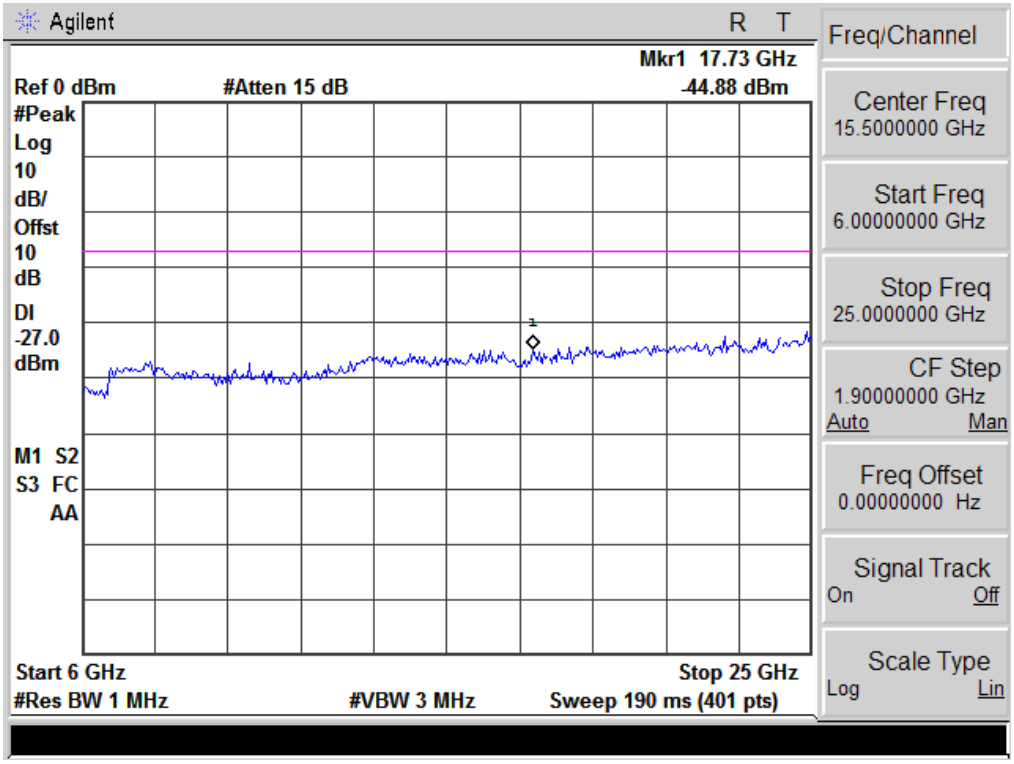



Note: No emission detected above 25GHz

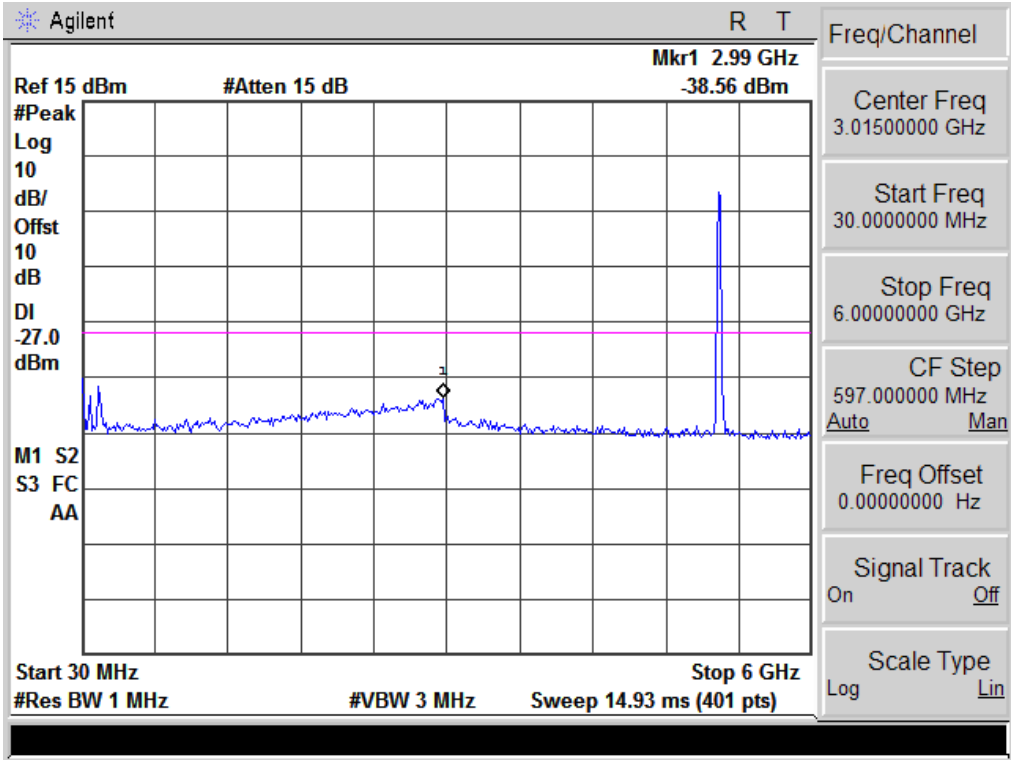
802.11n(20) Middle Channel

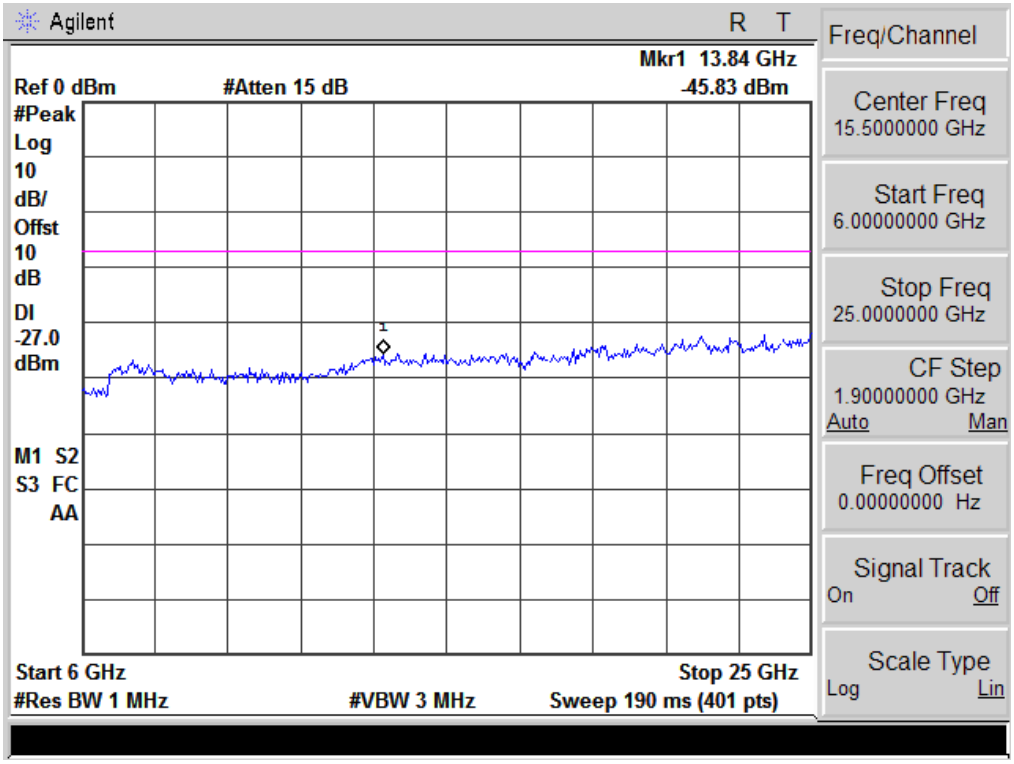



Note: No emission detected above 25GHz

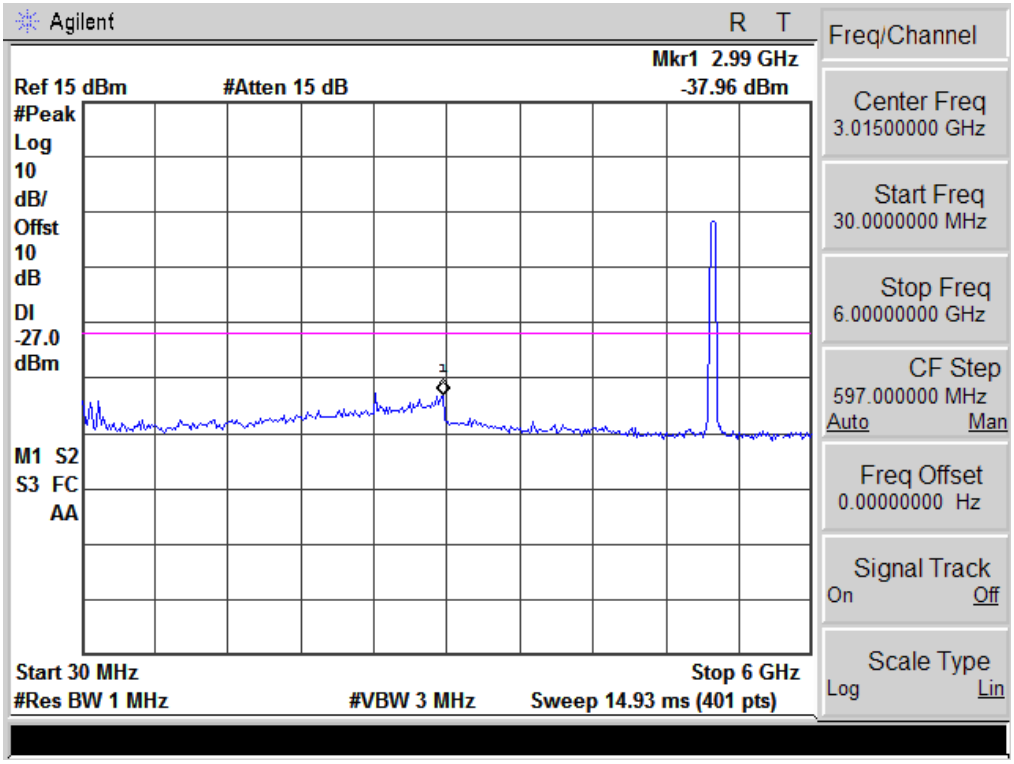
802.11n(20) High Channel

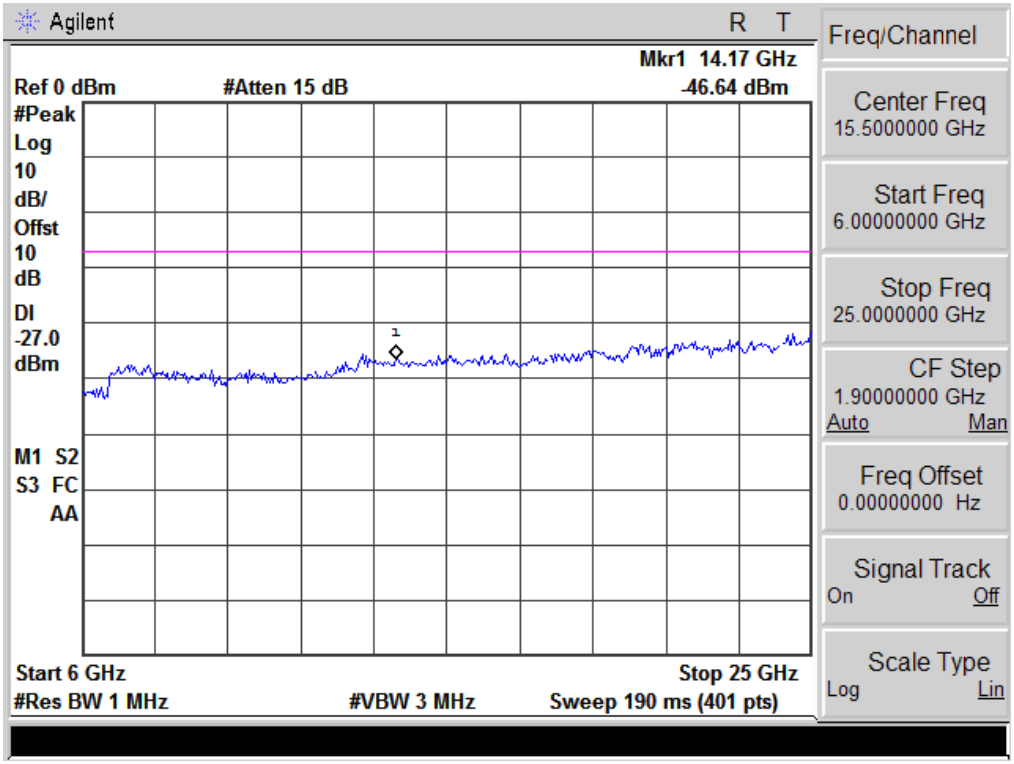



Note: No emission detected above 25GHz

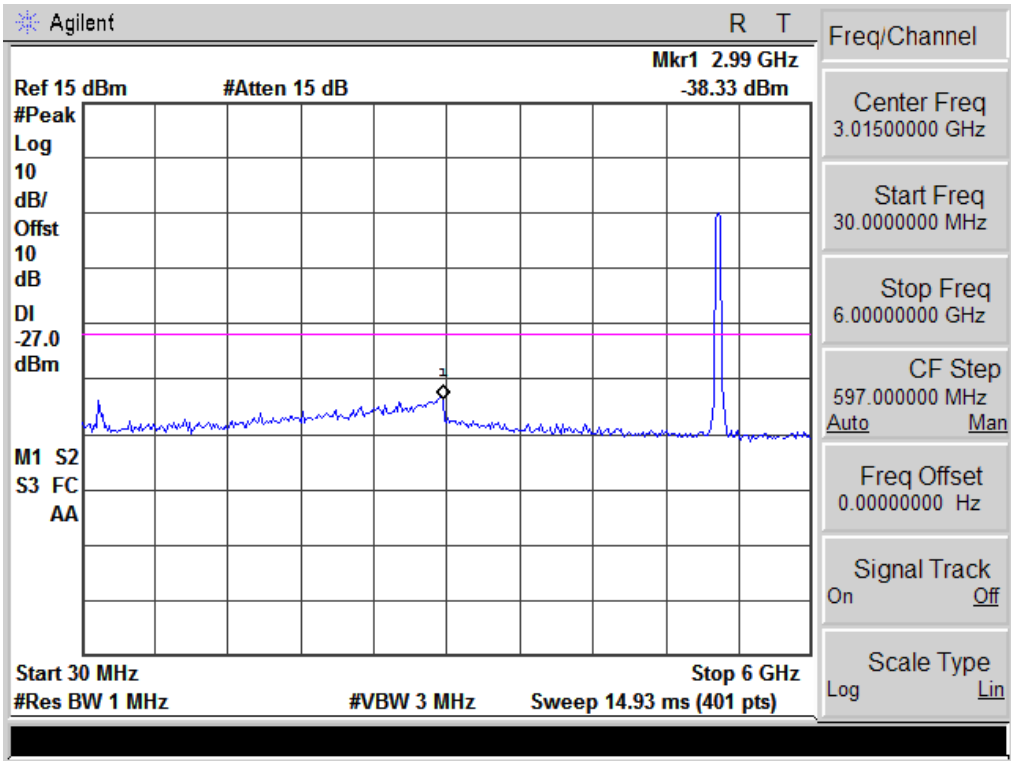
802.11n 40 Low Channel

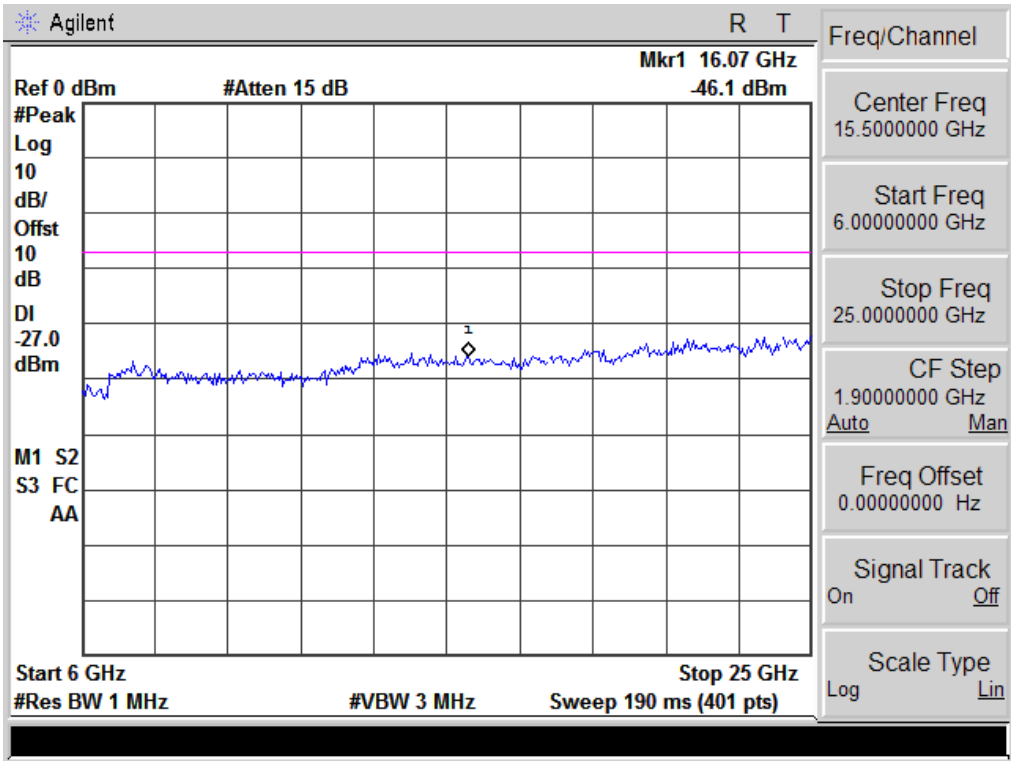



Note: No emission detected above 25GHz

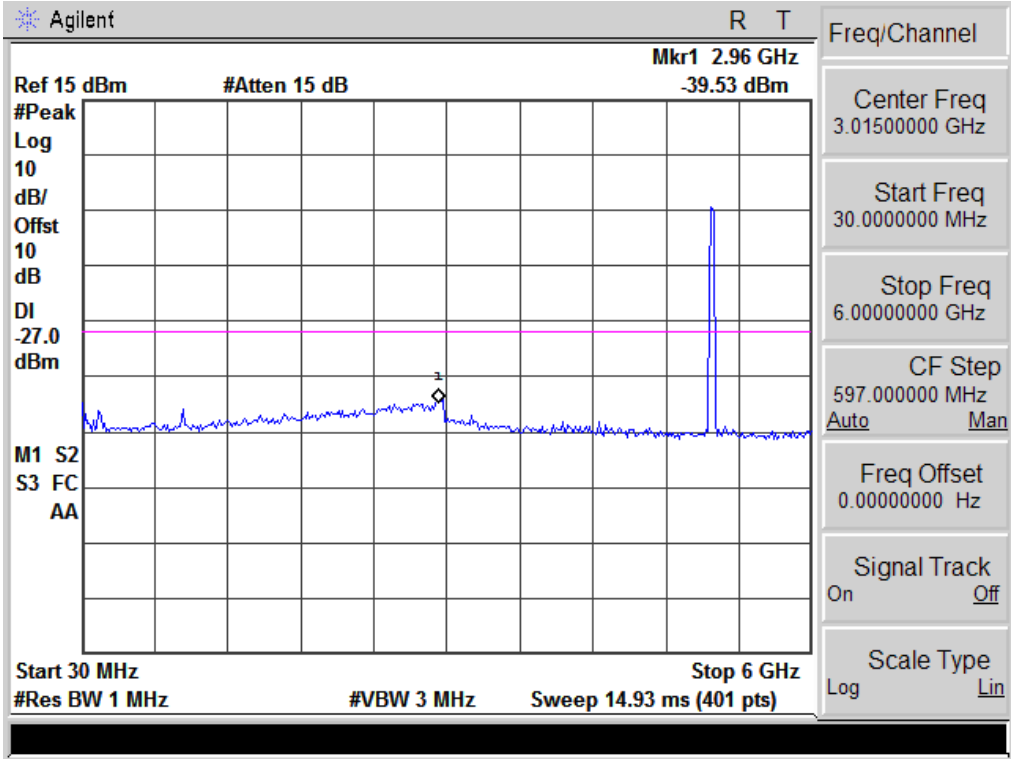
802.11n 40 High Channel

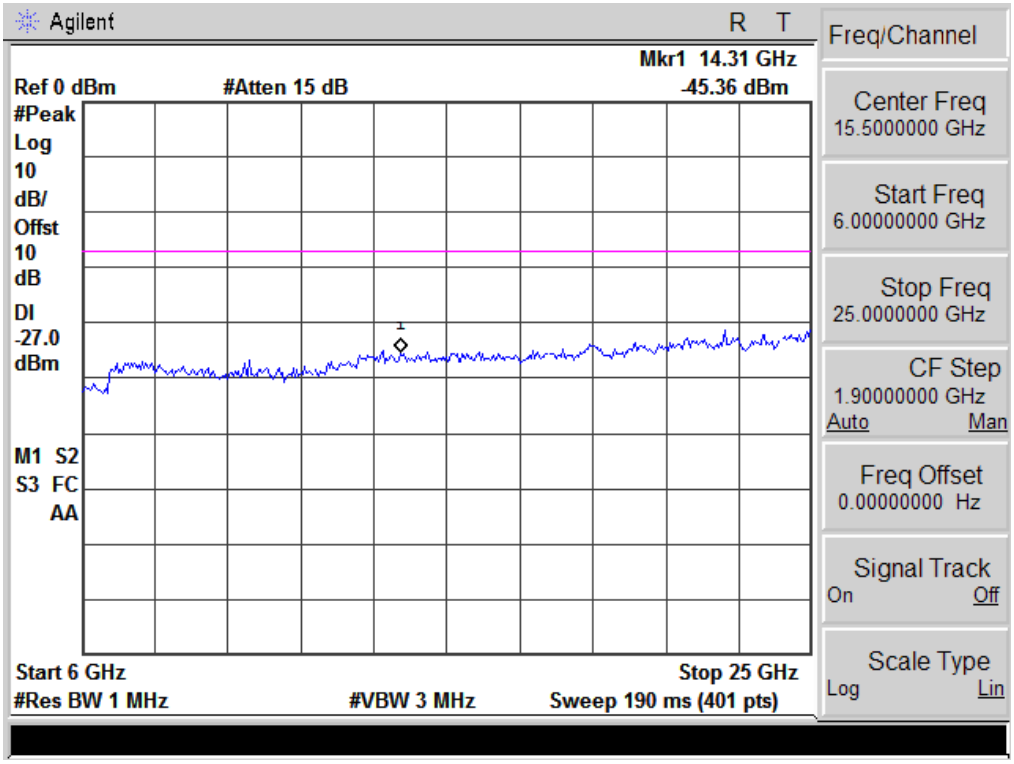



Note: No emission detected above 25GHz

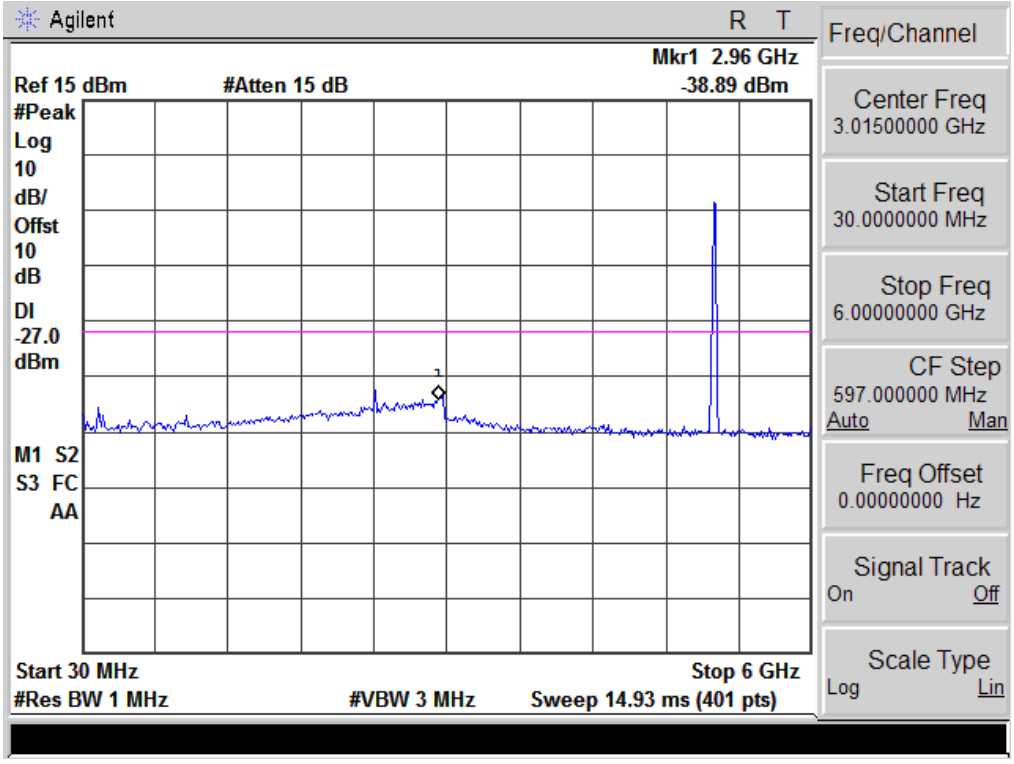
5GHz: Antenna B 802.11a Low Channel

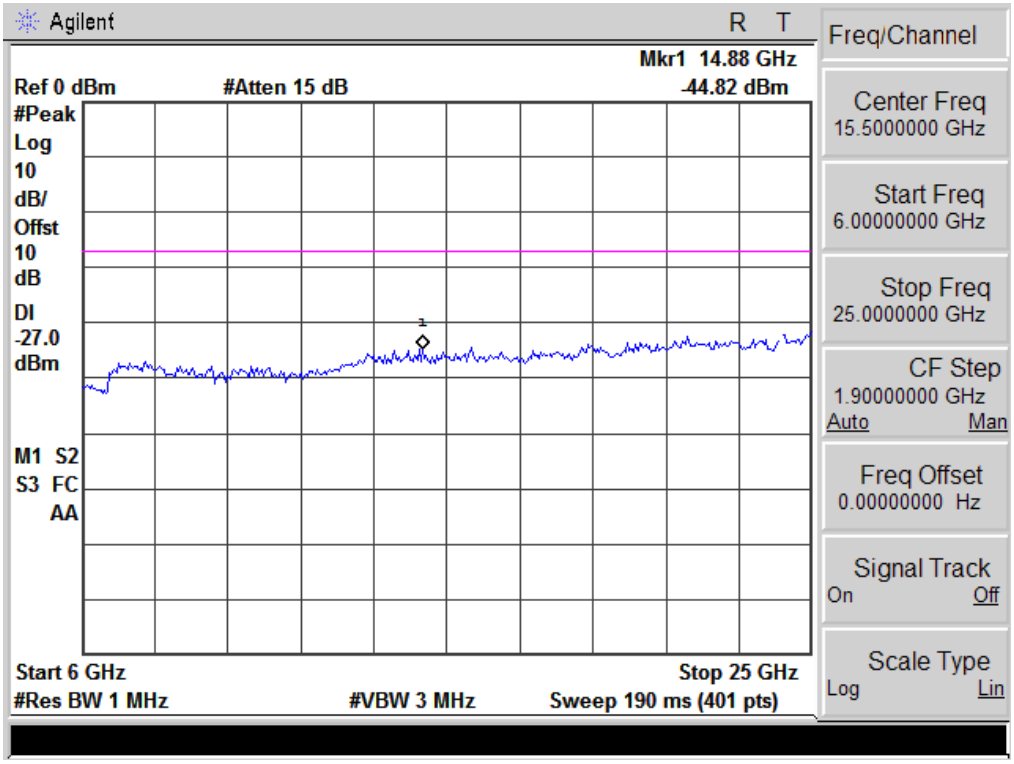



Note: No emission detected above 25GHz

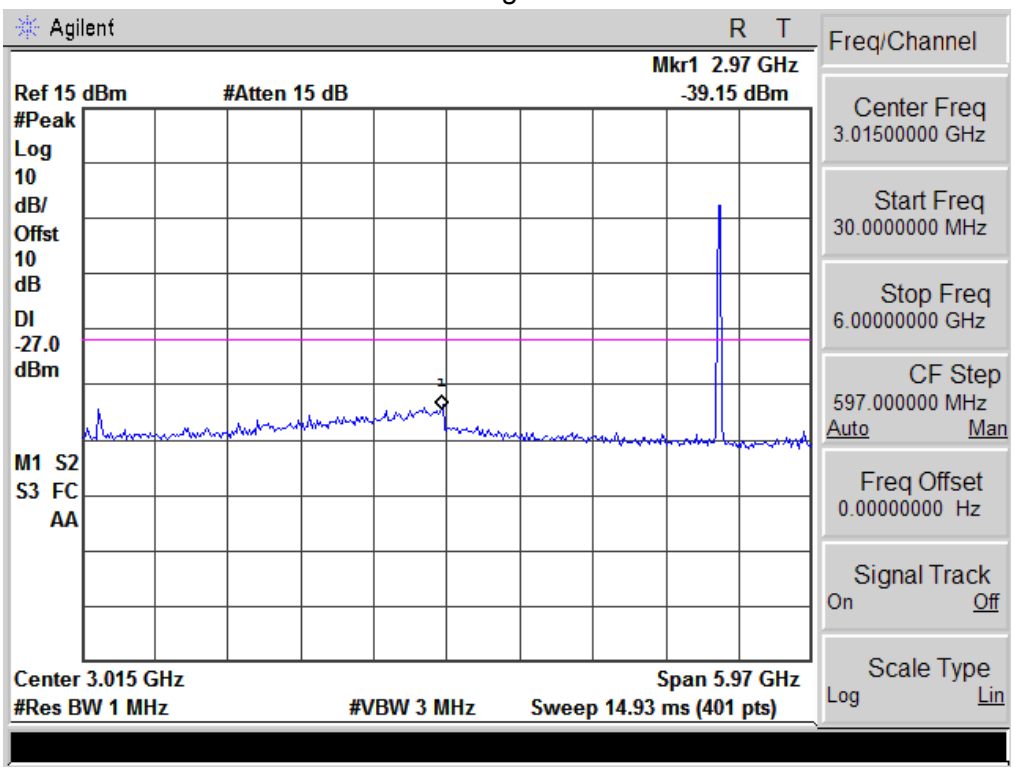
802.11a Middle Channel

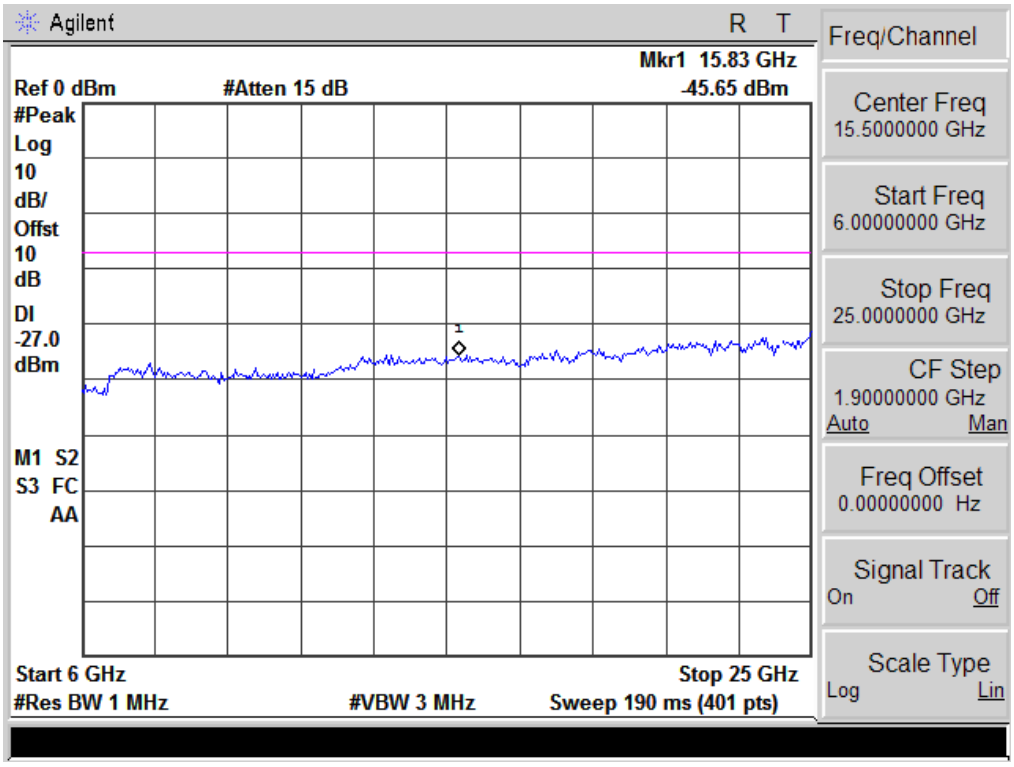



Note: No emission detected above 25GHz

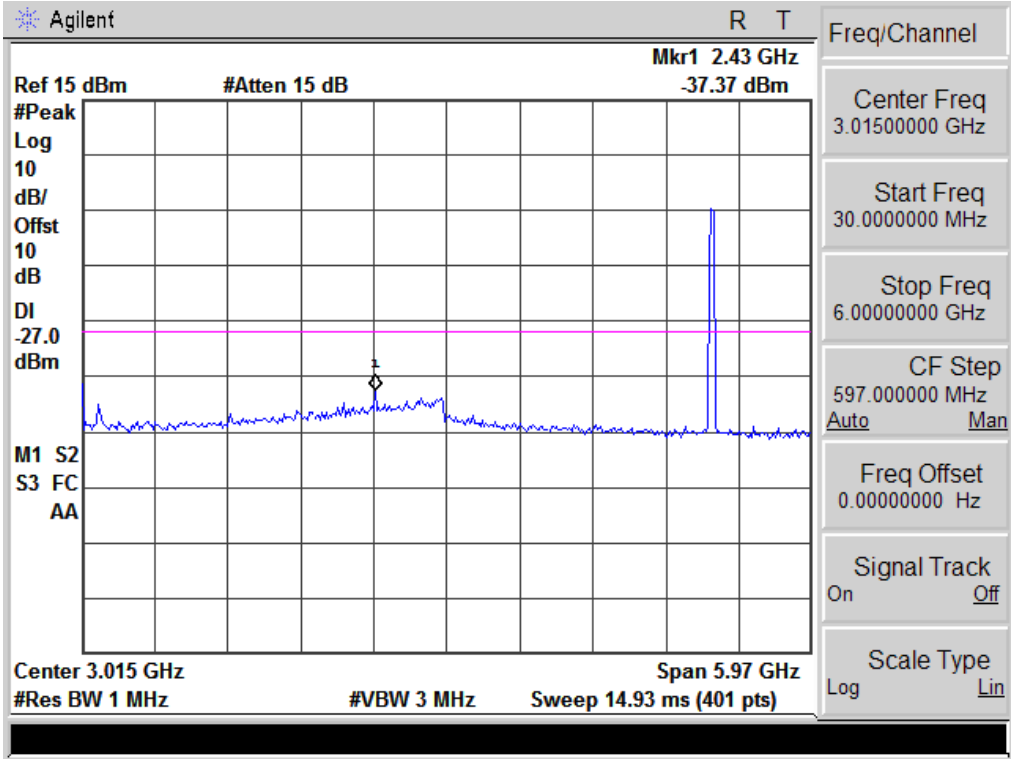
802.11a High Channel

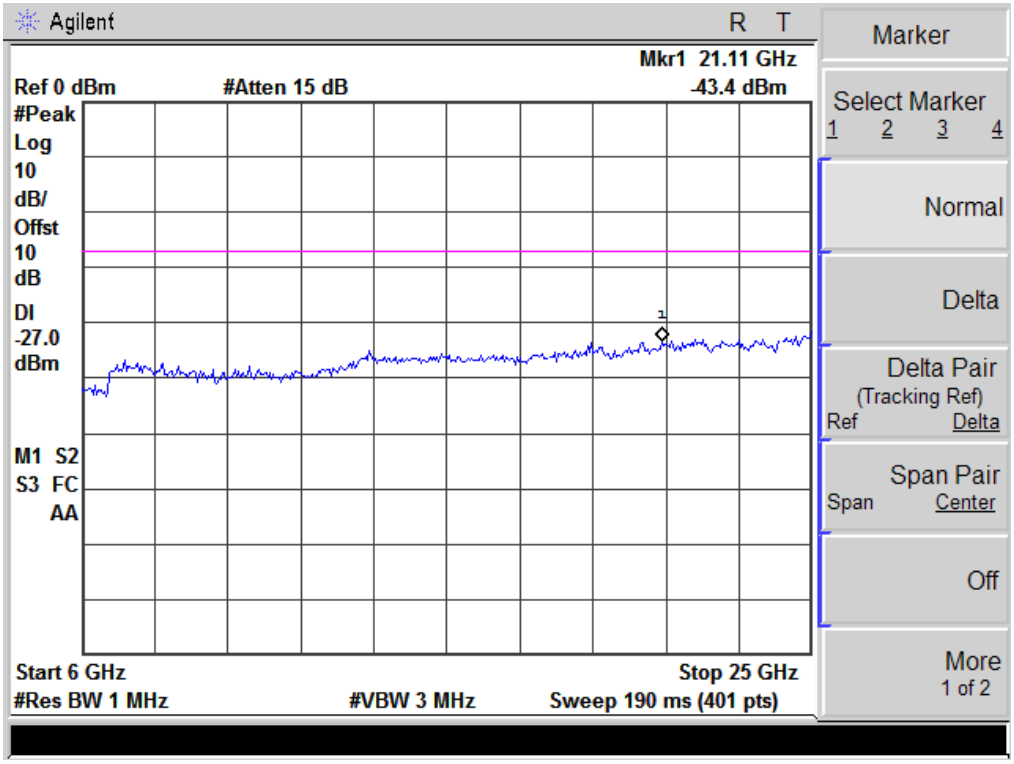



Note: No emission detected above 25GHz

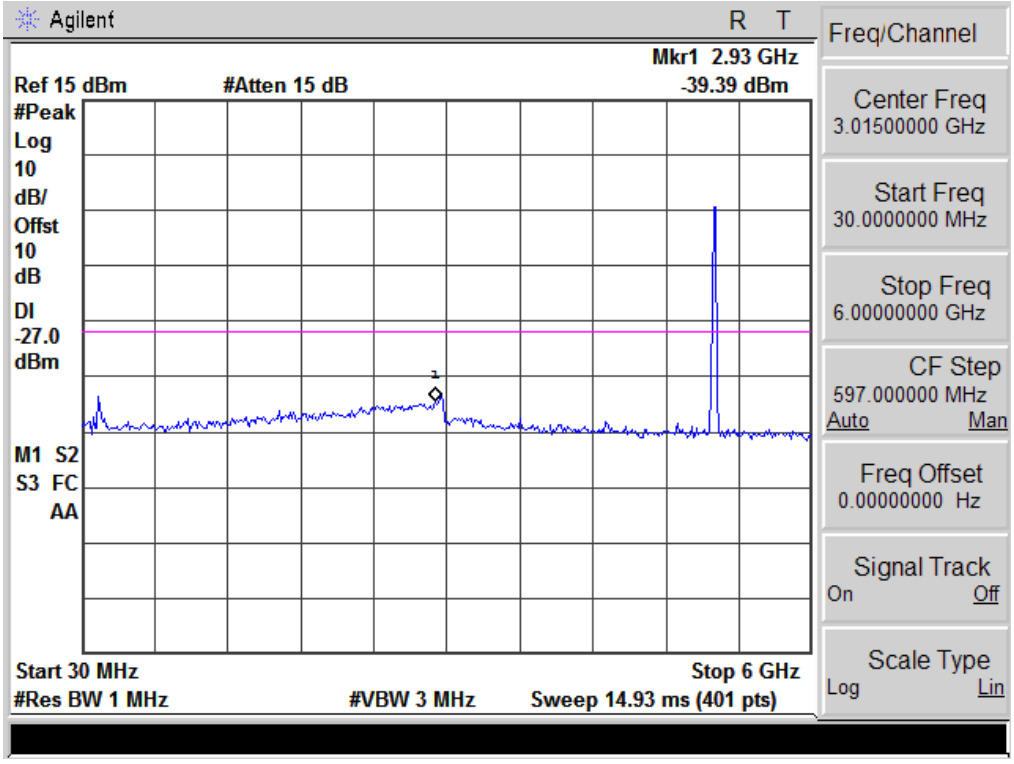
802.11n(20) Low Channel

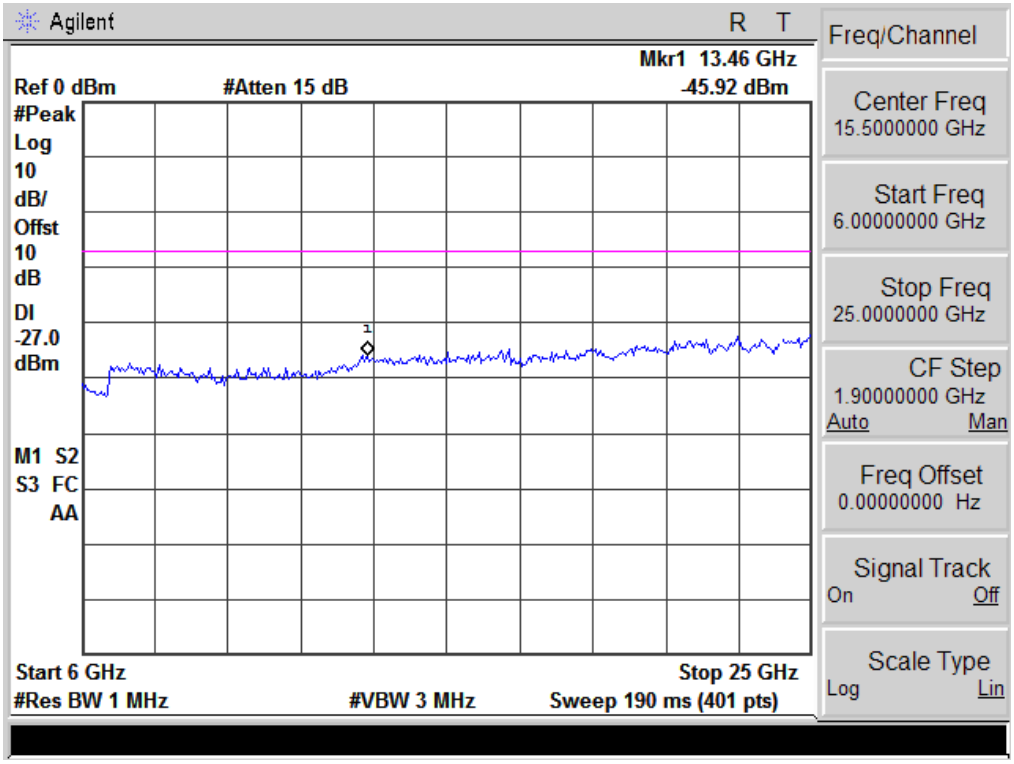



Note: No emission detected above 25GHz

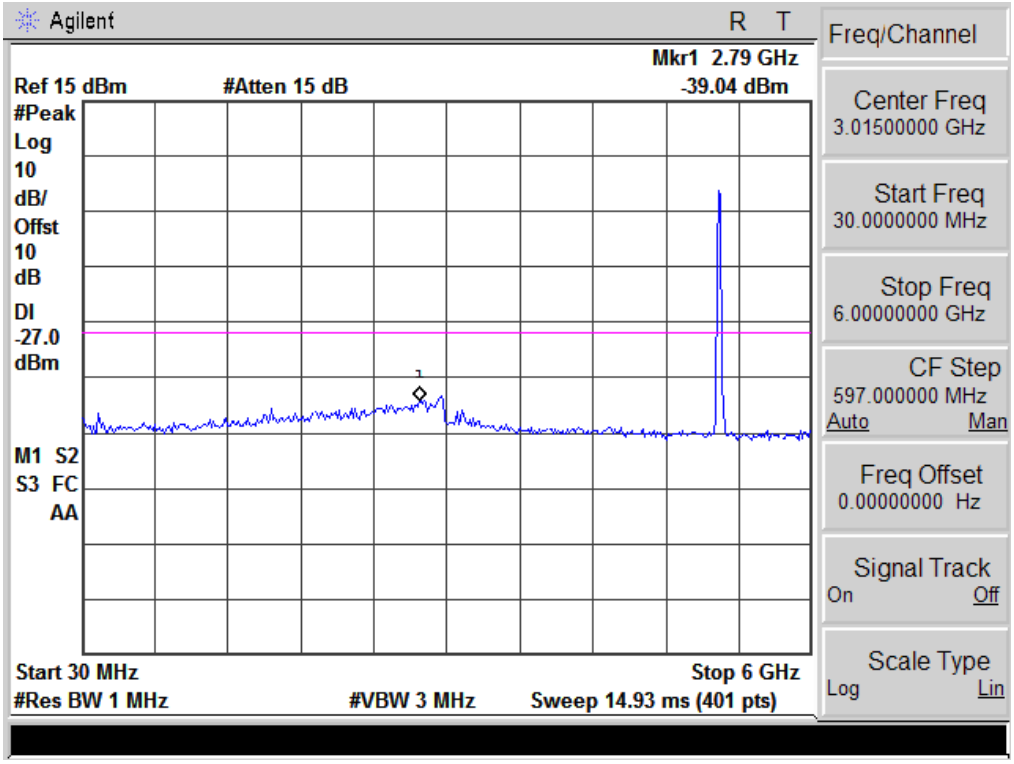
802.11n(20) Middle Channel

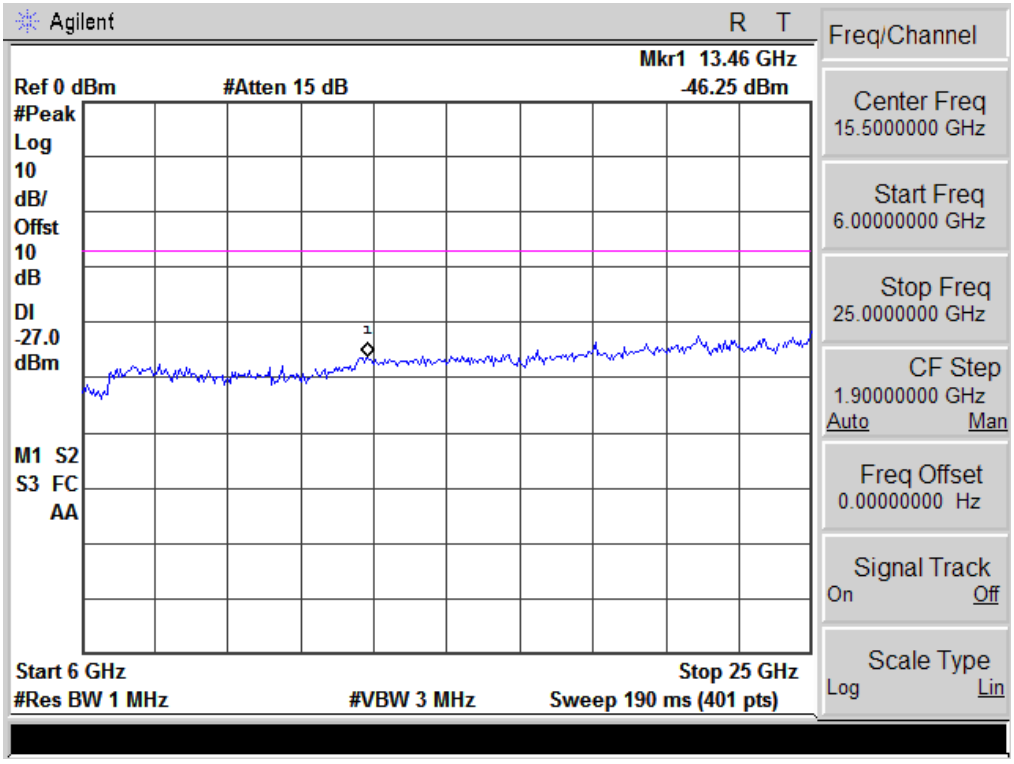



Note: No emission detected above 25GHz

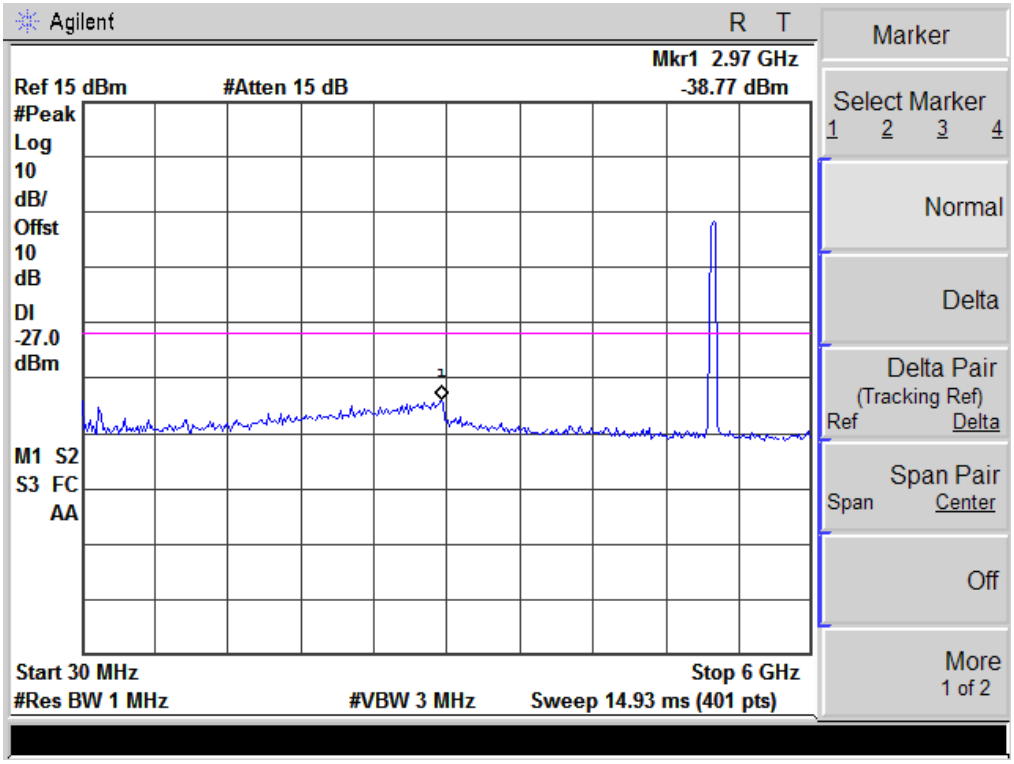
802.11n(20) High Channel

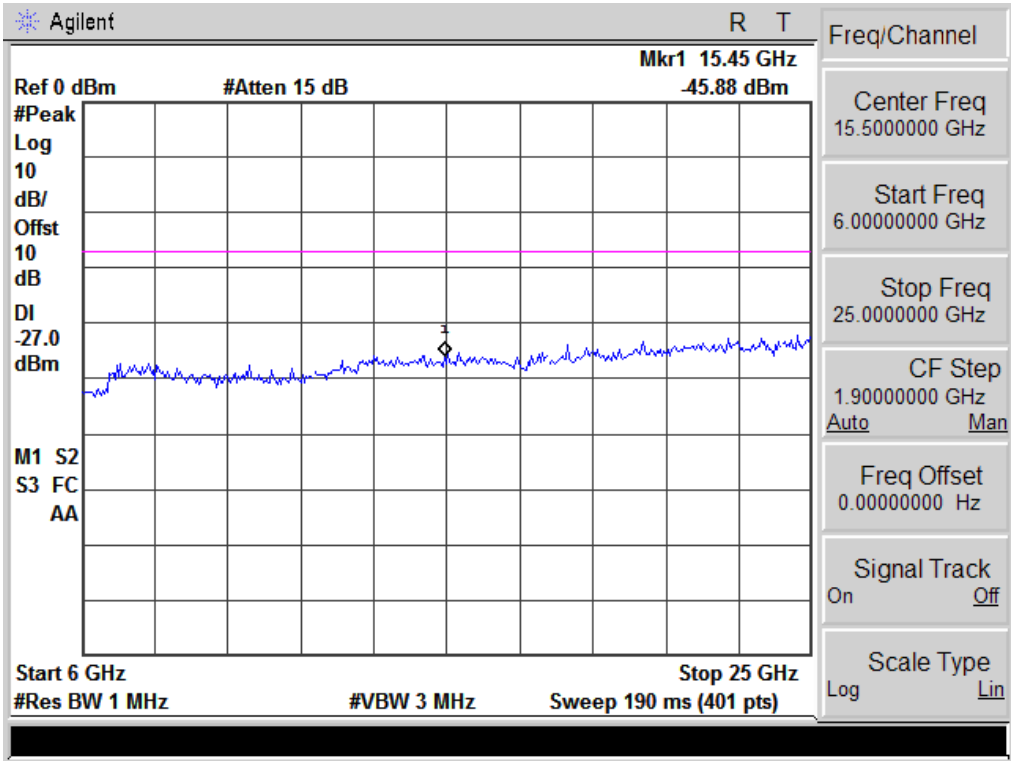



Note: No emission detected above 25GHz

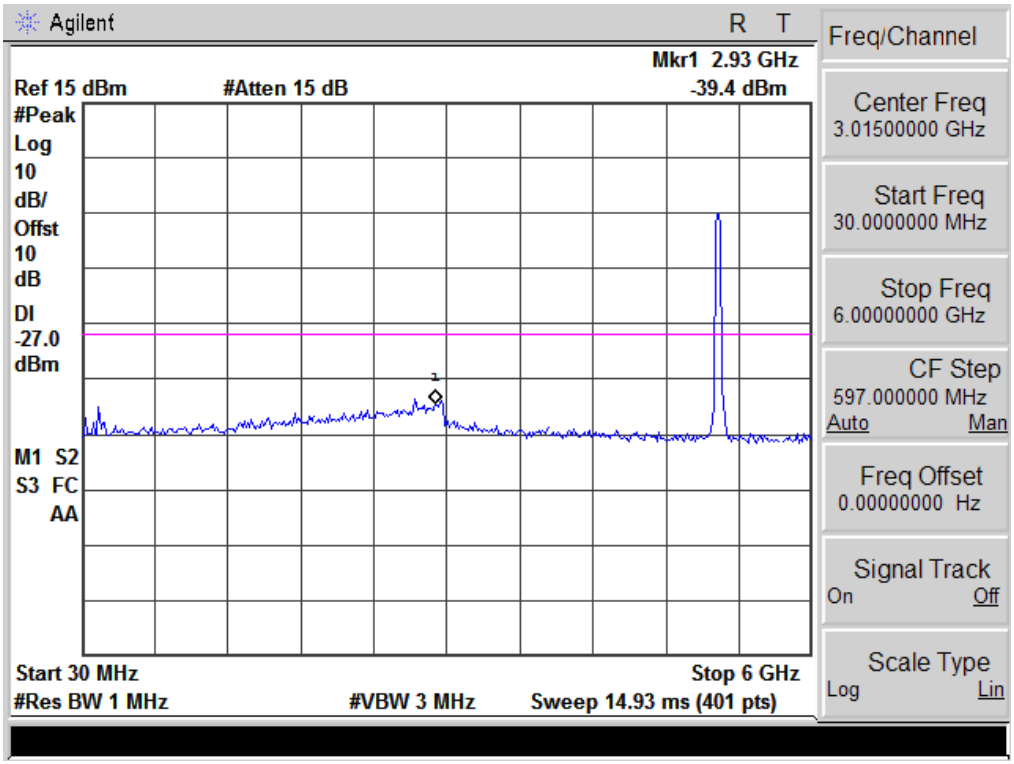
802.11n 40 Low Channel

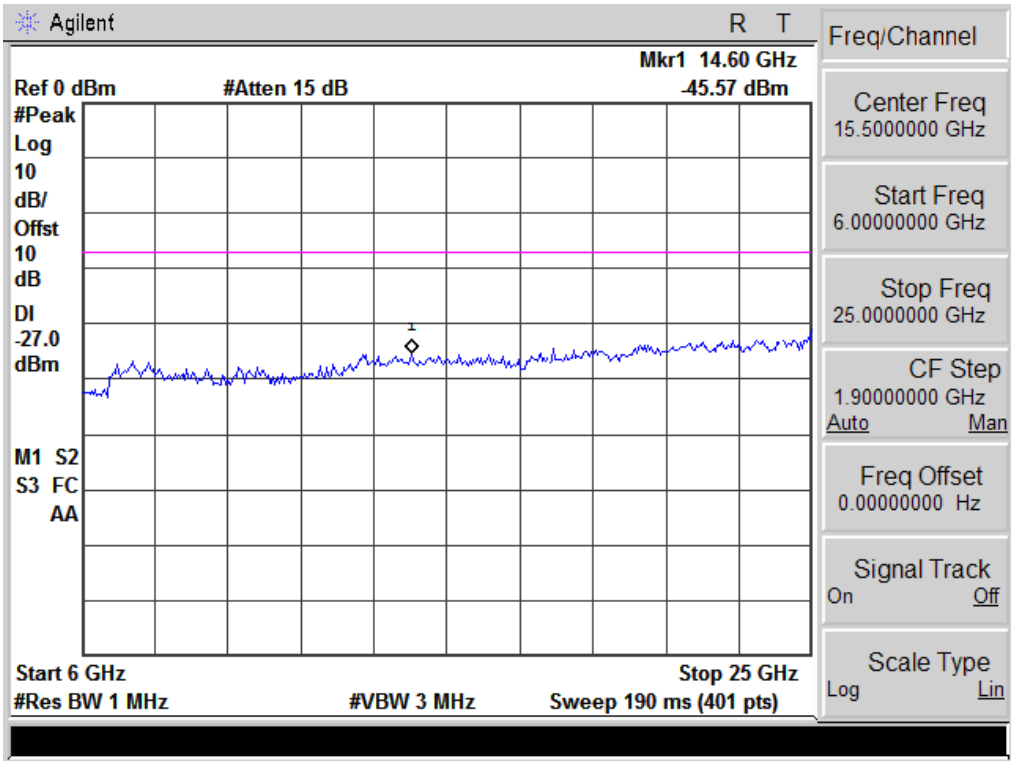



Note: No emission detected above 25GHz

802.11n 40 High Channel




Note: No emission detected above 25GHz

# 4. POWER SPECTRAL DENSITY TEST

## 4.1 APPLIED PROCEDURES / LIMIT

**According to FCC §15.407(a)(1)**

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

**According to IC RSS-210 §A9.2:**

5150-5250MHz the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

### 4.1.1 TEST PROCEDURE

(i) Set span to encompass the entire emission bandwidth (EBW) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, 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 ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to “free run”.

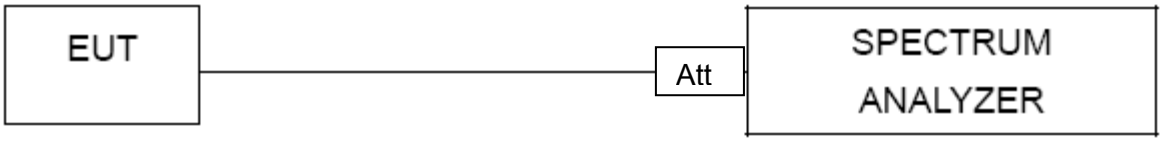
(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

(ix) Compute power by integrating the spectrum across the 26 dB EBW of the signal using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges. If the spectrum analyzer does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW of the spectrum.

### 4.1.2 DEVIATION FROM STANDARD

No deviation.

### 4.1.3 TEST SETUP




### 4.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

### 4.1.5 TEST RESULTS

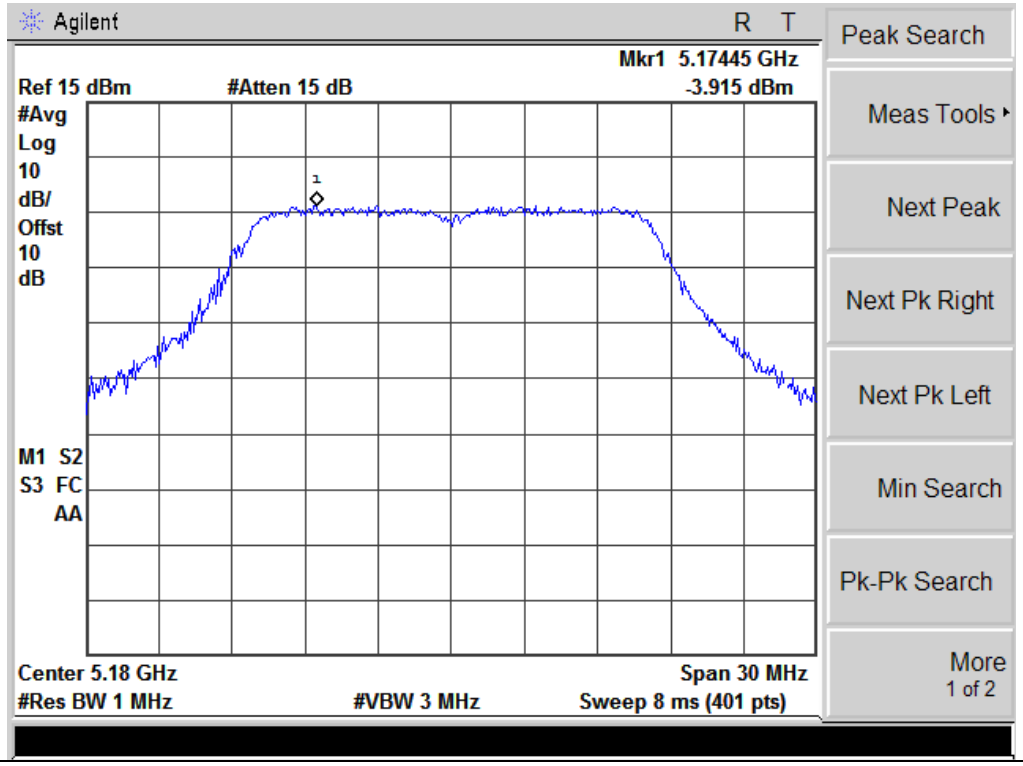
| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1015 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX a Mode /CH36, CH40, CH48 | | |

| Frequency | Power Density A (dBm) | Power Density B (dBm) | total power density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5180 MHz | -3.915 | -5.193 | -1.497 | 0.94 | PASS |
| 5200 MHz | -3.560 | -5.130 | -1.470 | 0.94 | PASS |
| 5240 MHz | -1.809 | -3.305 | 0.517 | 0.94 | PASS |

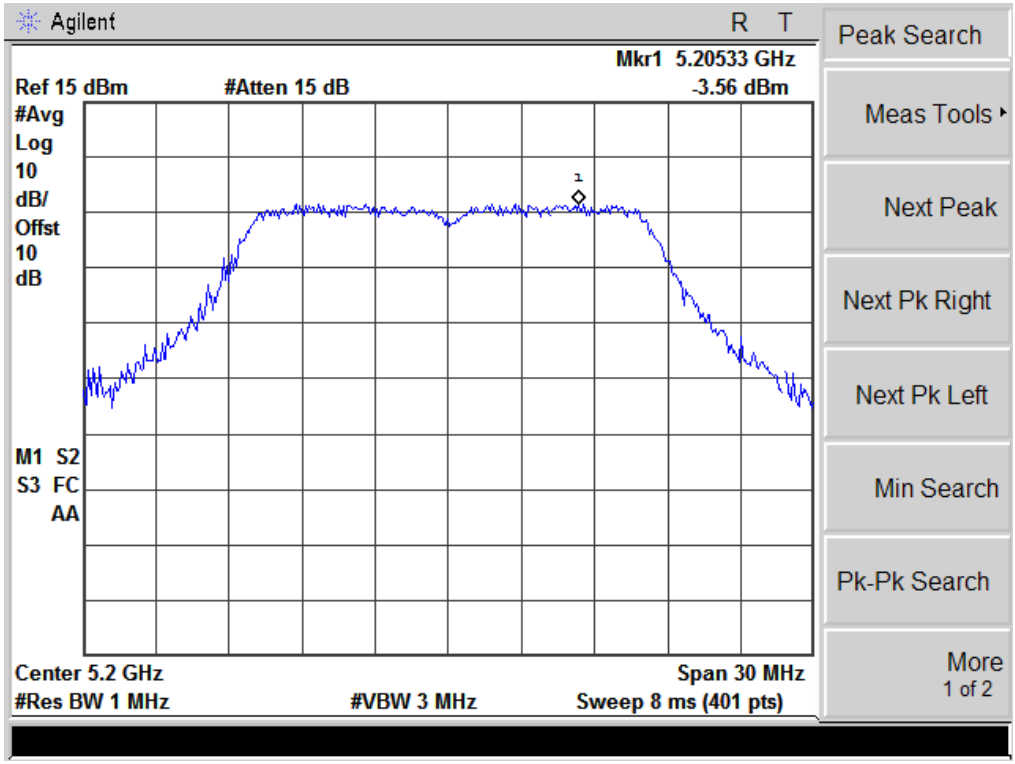
The antenna gain of 5 GHz is 9.06 dBi; therefore, the power spectral density limit is reduced by 3.06 dB.

**Antenna A**

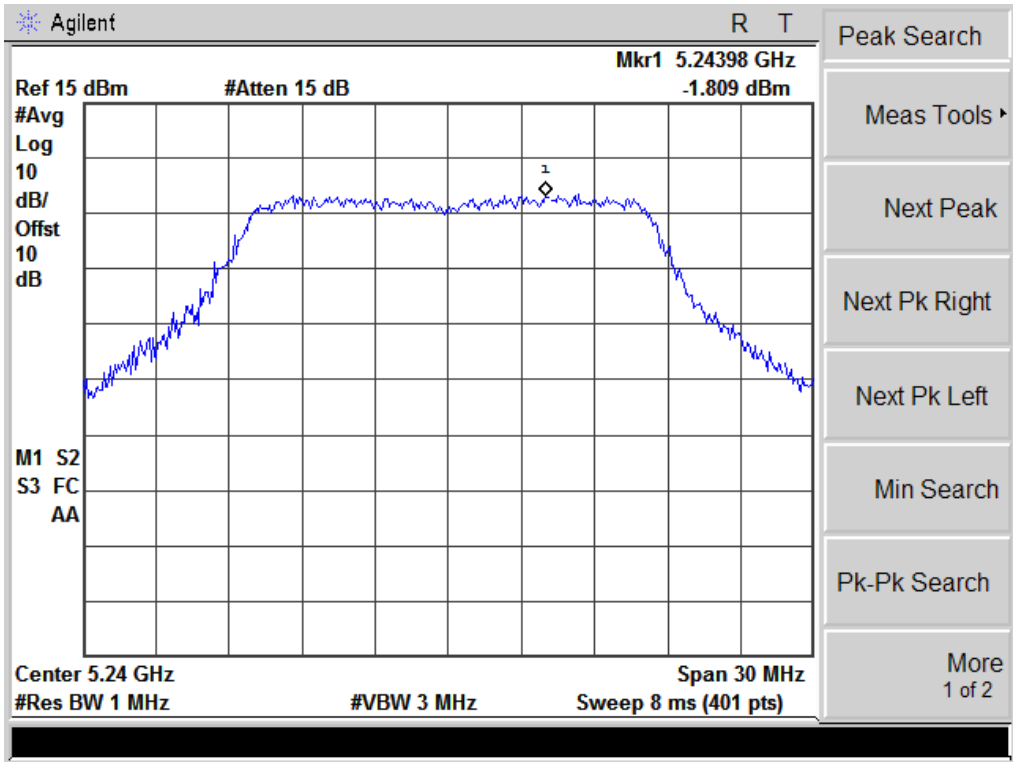
**TX CH36**



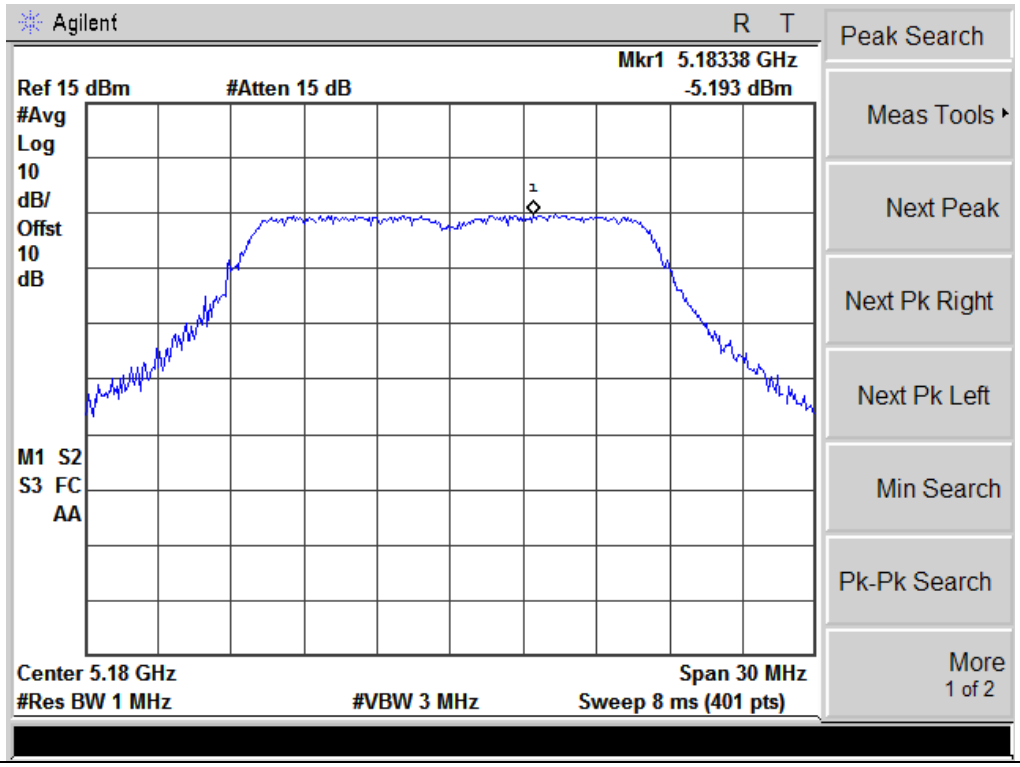
**TX CH40**



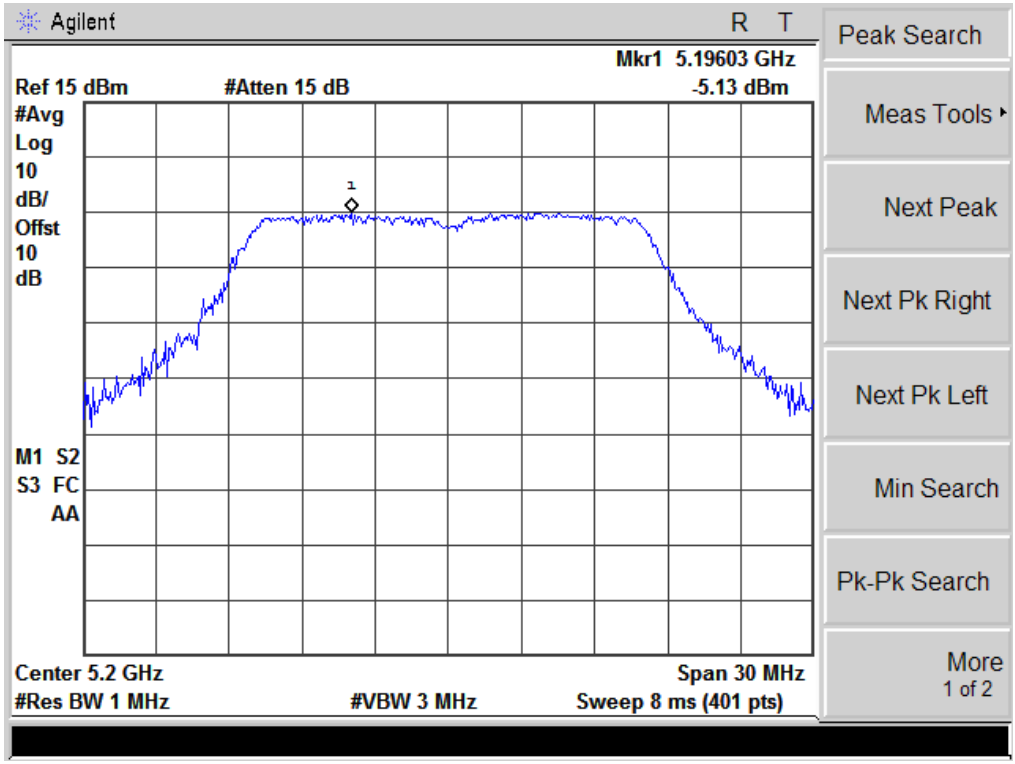

**TX CH48**



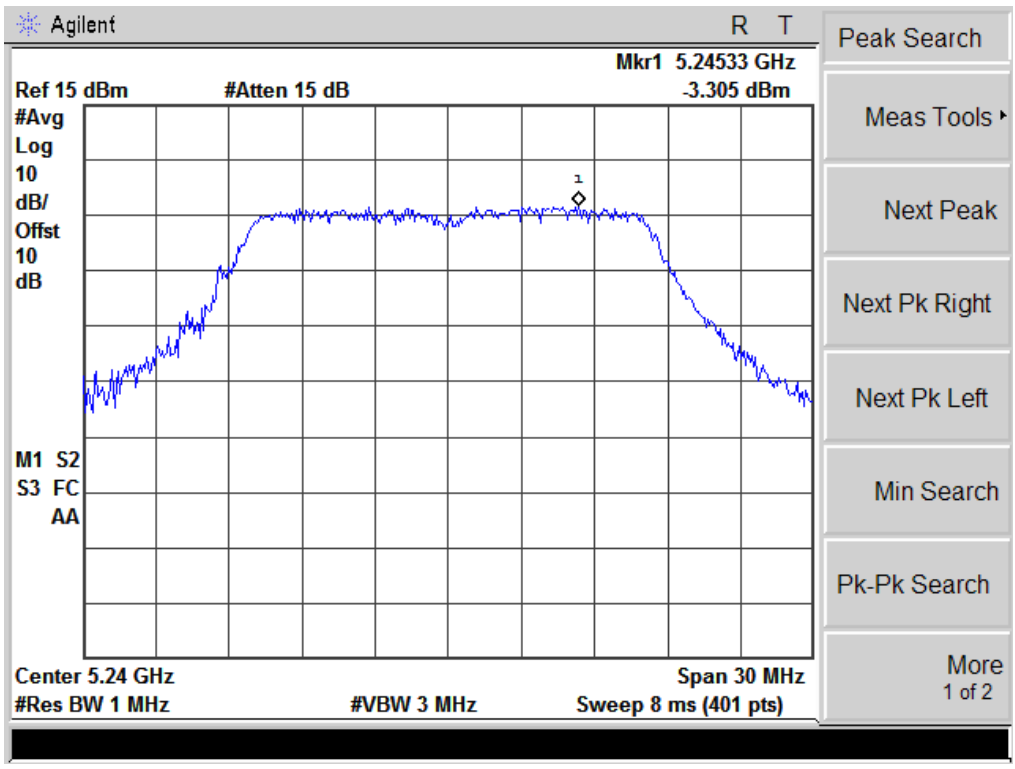
| Antenna B |
| --- |
| TX CH36 |



**TX CH40**




**TX CH48**



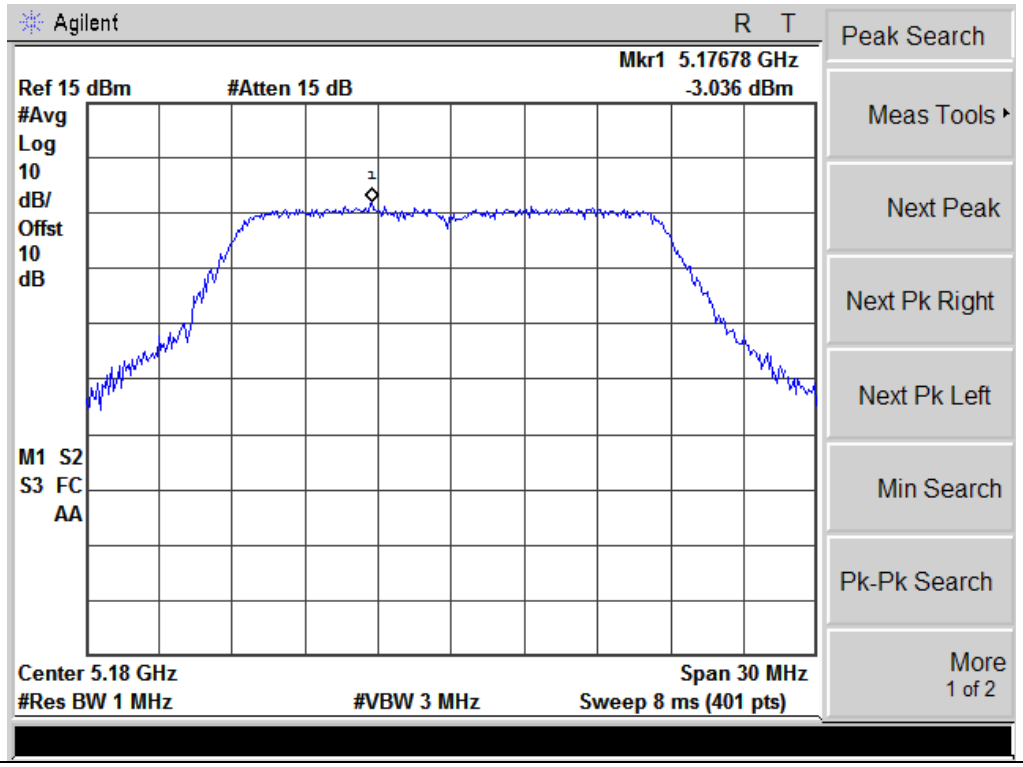
| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1015 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX n(20) Mode(5G) /CH36, CH40, CH48 | | |

| Frequency | Power Density A (dBm) | Power Density B (dBm) | total power density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5180 MHz | -3.036 | -5.433 | -1.061 | 0.94 | PASS |
| 5200 MHz | -3.600 | -4.957 | -0.881 | 0.94 | PASS |
| 5240 MHz | -1.749 | -3.214 | 0.590 | 0.94 | PASS |

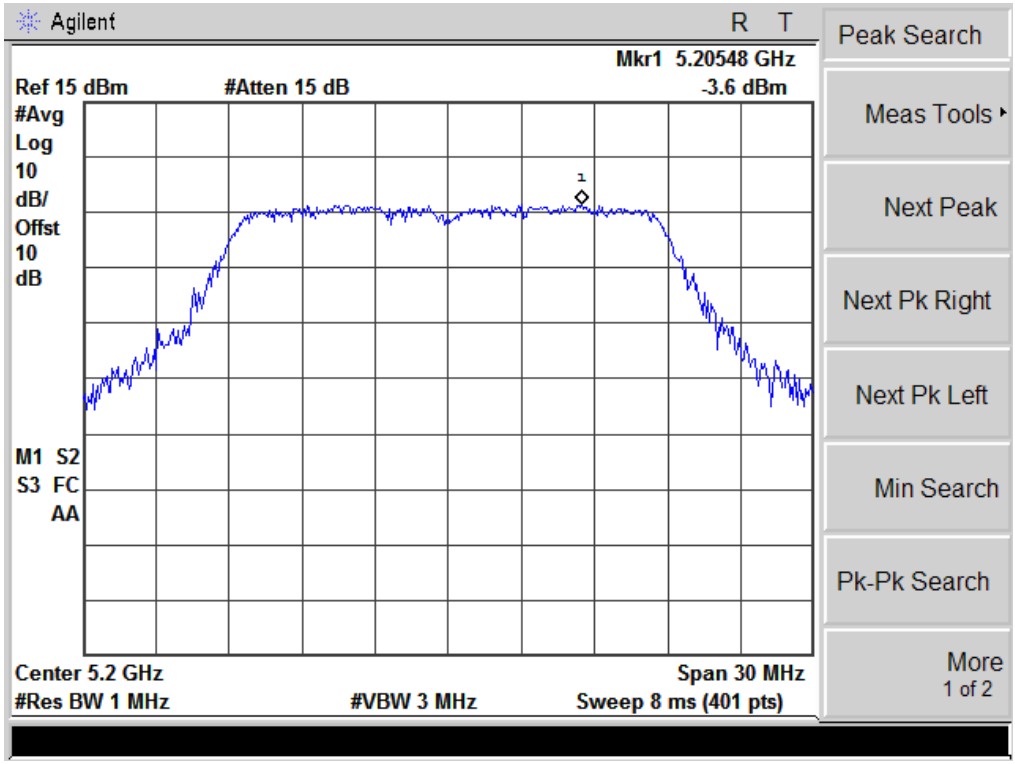
*The antenna gain of 5 GHz is 9.06 dBi; therefore, the power spectral density limit is reduced by 3.06 dB*

**Antenna A**

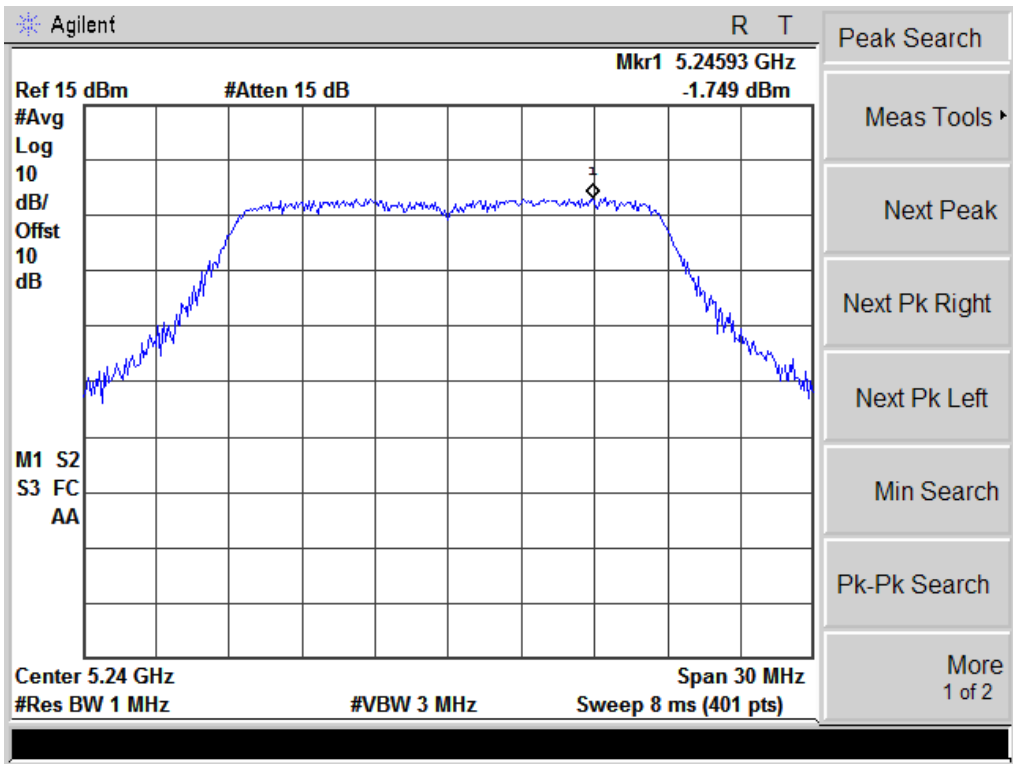
**TX CH36**



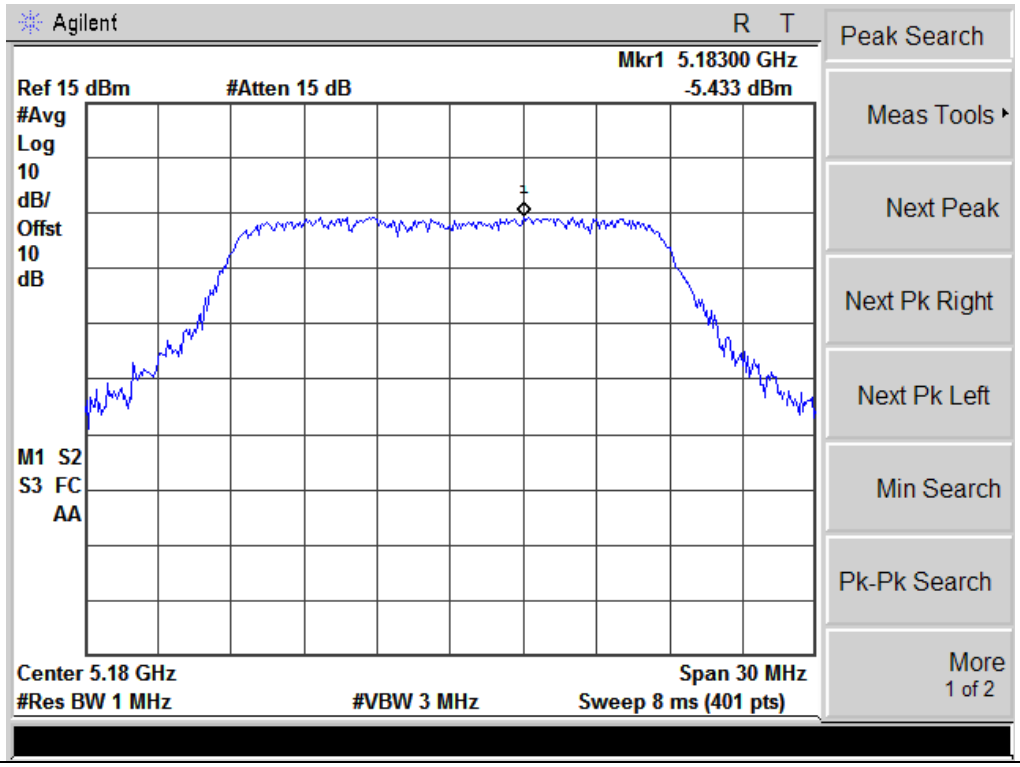
**TX CH40**



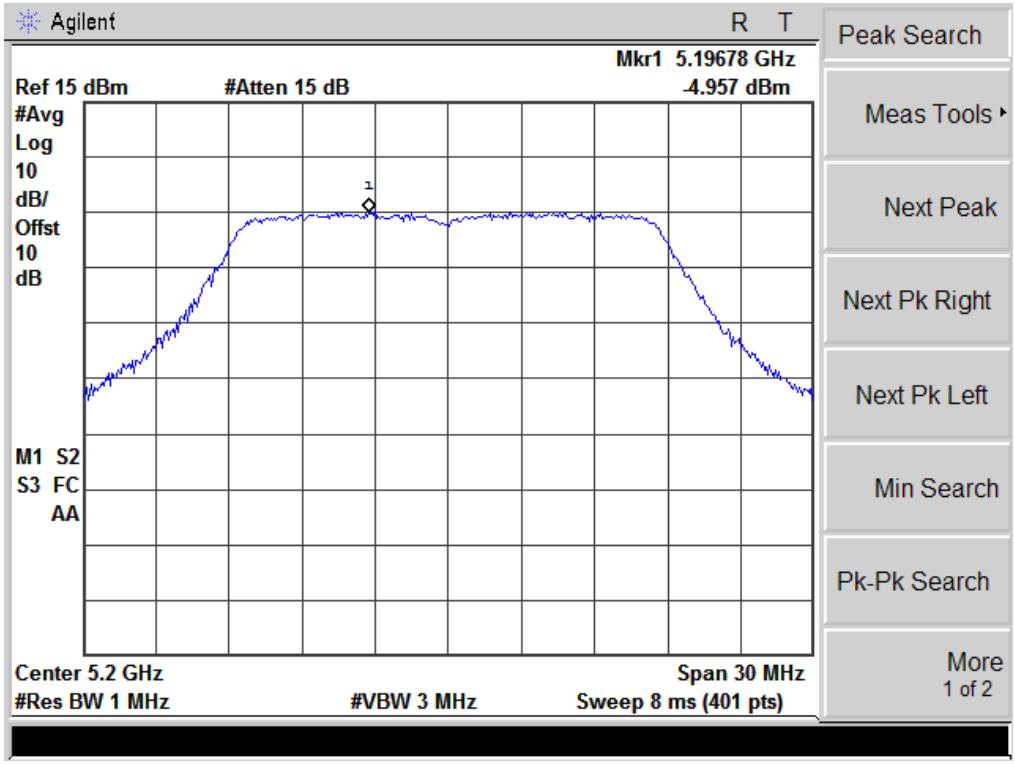

**TX CH48**



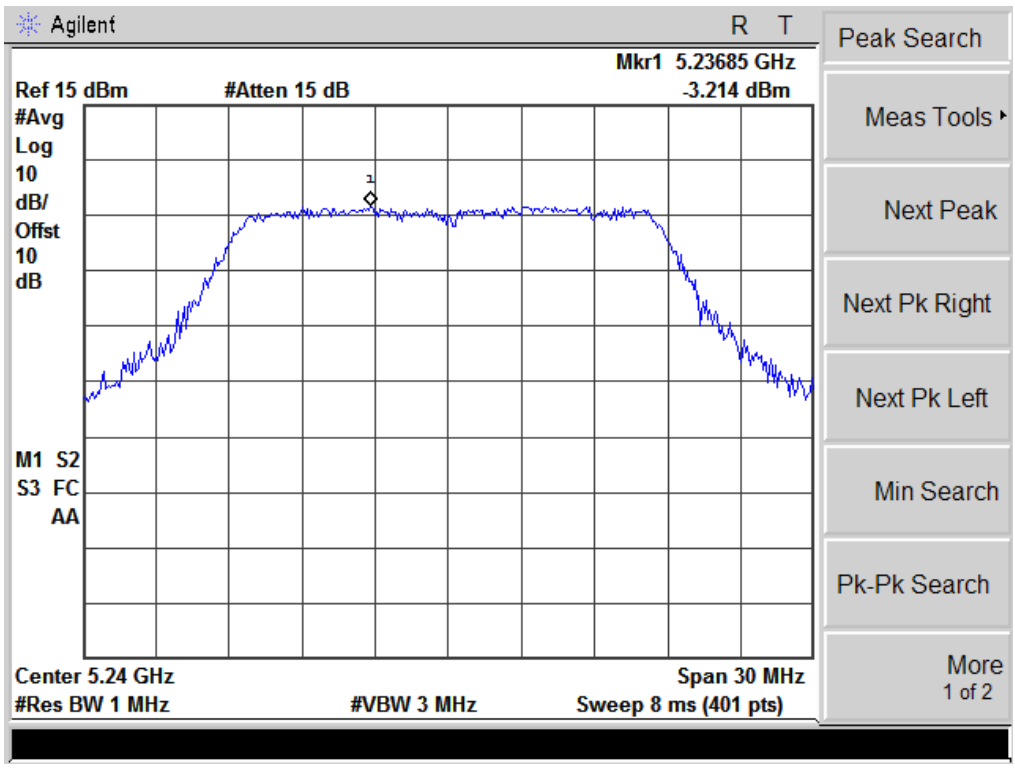
| Antenna B |
|---|
| TX CH36 |



**TX CH40**




**TX CH48**



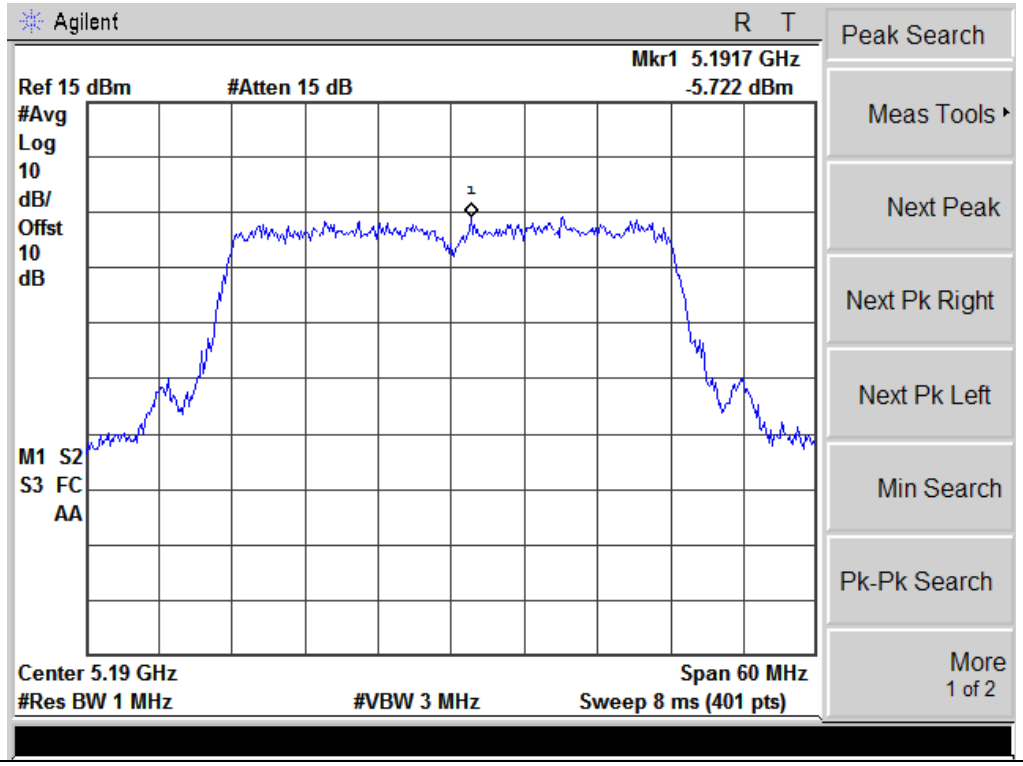
| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1015 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX n40 Mode(5G) /CH38, CH46 | | |

| Frequency | Power Density A (dBm) | Power Density B (dBm) | total power density (dBm) | Limit (dBm) | Result |
|---|---|---|---|---|---|
| 5190 MHz | -5.722 | -6.915 | -3.267 | 0.94 | PASS |
| 5230 MHz | -5.036 | -5.997 | -2.847 | 0.94 | PASS |

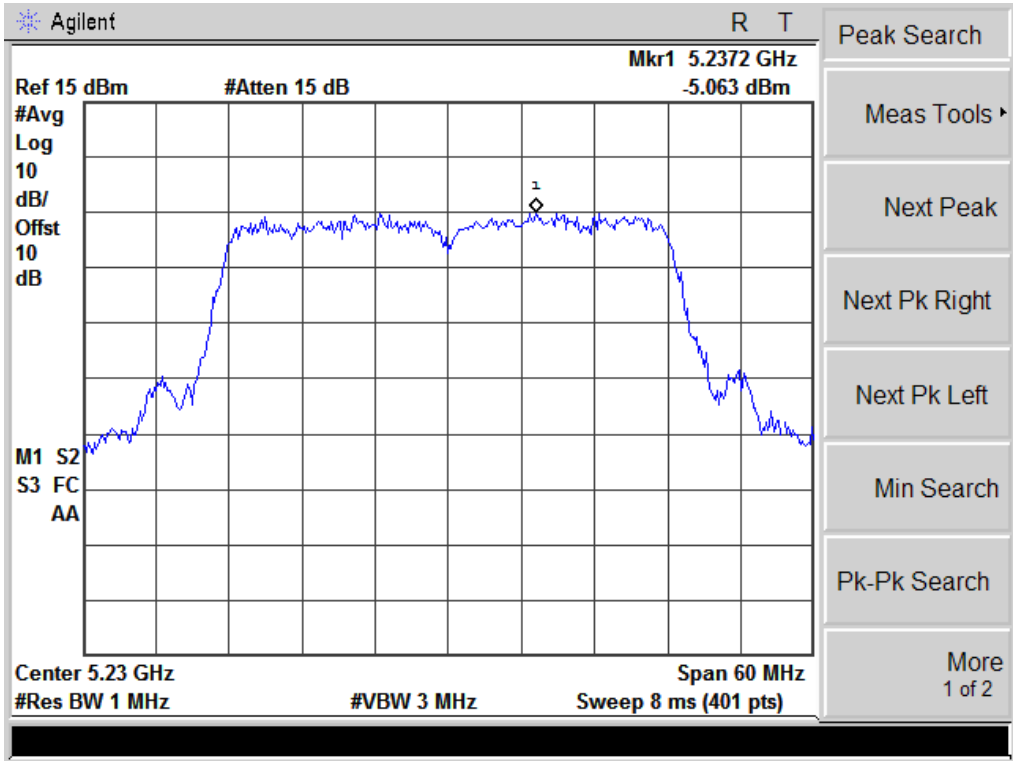
*The antenna gain of 5 GHz is 9.06 dBi; therefore, the power spectral density limit is reduced by 3.06 dB*

**Antenna A**

**TX CH38**

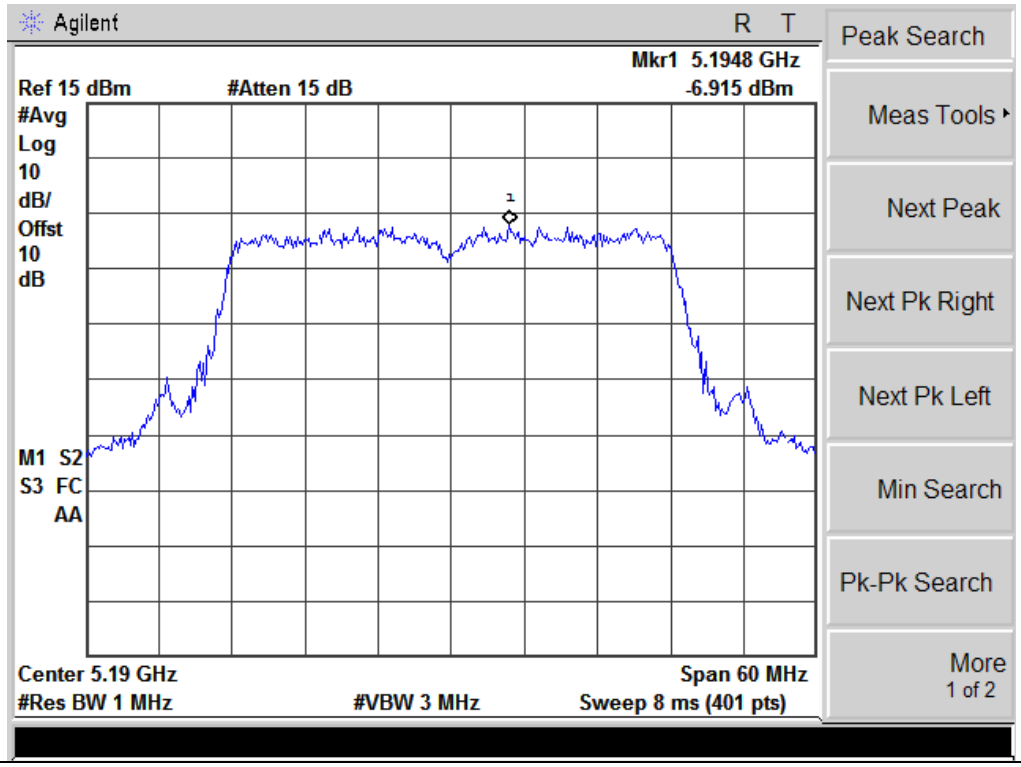


**TX CH46**

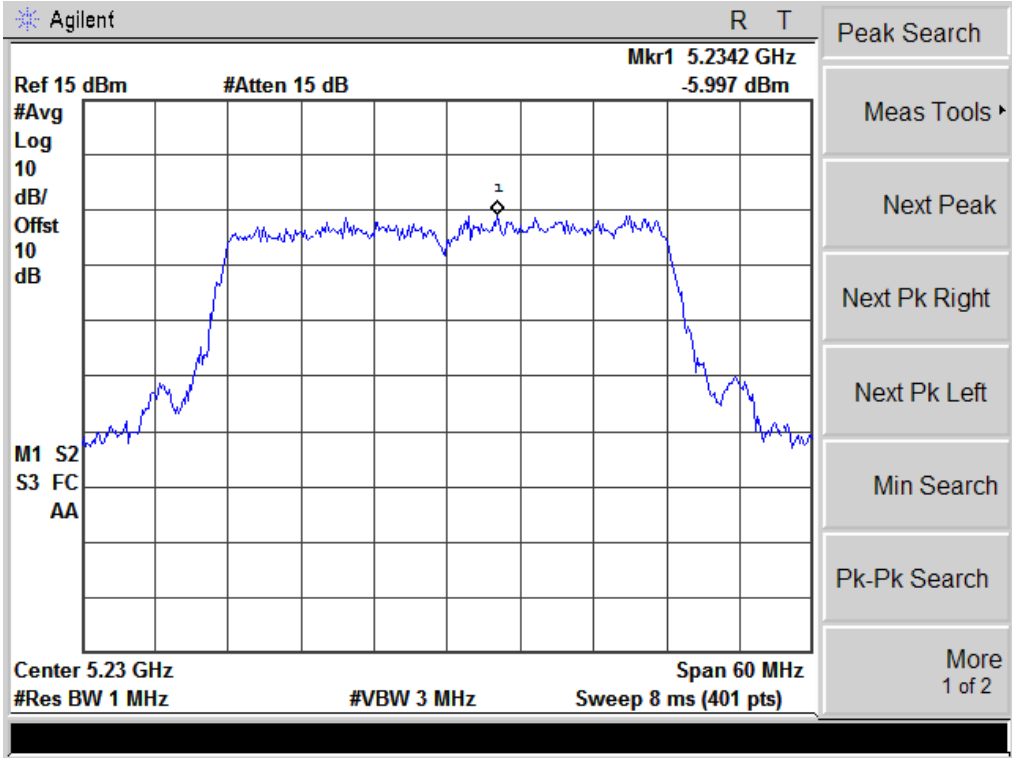



**Antenna B**

**TX CH38**



**TX CH46**


Agilent
R T
Mkr1 5.2342 GHz
Ref 15 dBm
#Atten 15 dB
-5.997 dBm
#Avg
Log
10
dB/
Offst
10
dB
M1 S2
S3 FC
AA
Center 5.23 GHz
Span 60 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 8 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

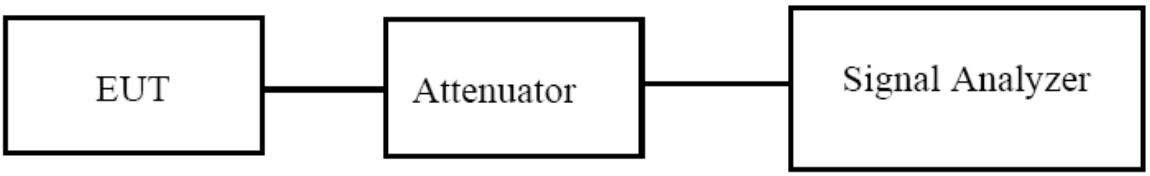
# 5. 26 DB & 99% EMISSION BANDWIDTH

## 5.1 APPLIED PROCEDURES / LIMIT

FCC §15.407(a) and IC RSS-210 §A9.2.

### 5.1.1 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 26 dB from the reference level.Record the frequency difference as the emissions bandwidth.
4. Repeat above procedures until all frequencies measured were complete.




### 5.1.2 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

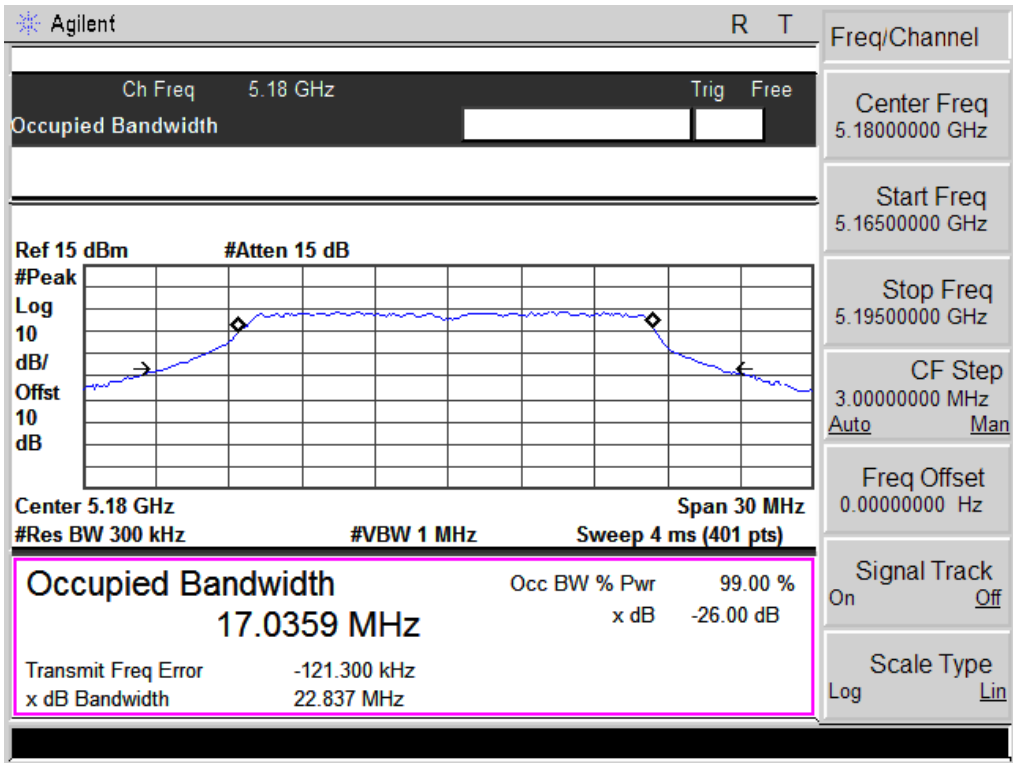
### 5.1.3 TEST RESULTS

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX a Mode /CH36, CH40, CH48 | | |

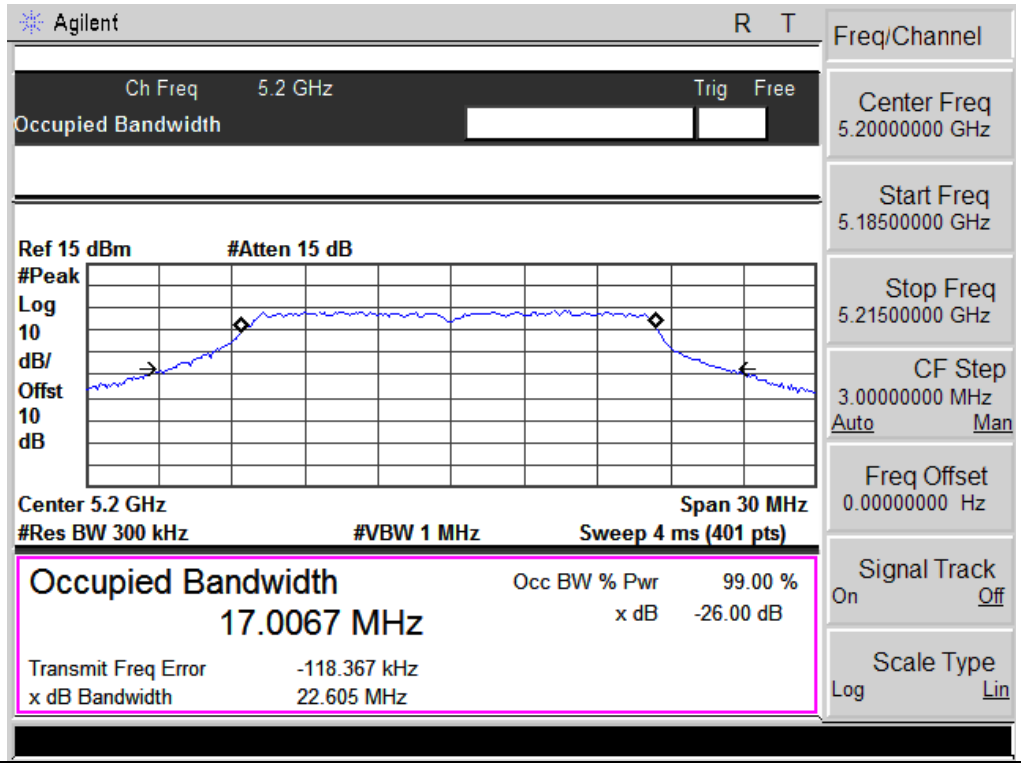
| Channel | Frequency (MHz) | 99% bandwidth (MHz)ANT A | 99% bandwidth (MHz)ANT B | 26dB bandwidth (MHz)ANT A | 26dB bandwidth (MHz)ANT B | Limit (kHz) | Result |
|---|---|---|---|---|---|---|---|
| 802.11a mode | | | | | | | |
| Low | 5180 | 17.036 | 16.987 | 22.837 | 22.714 | 500 | Pass |
| Middle | 5200 | 17.007 | 16.937 | 22.605 | 22.534 | 500 | Pass |
| High | 5240 | 17.009 | 16.970 | 22.757 | 22.463 | 500 | Pass |

**Antenna A**

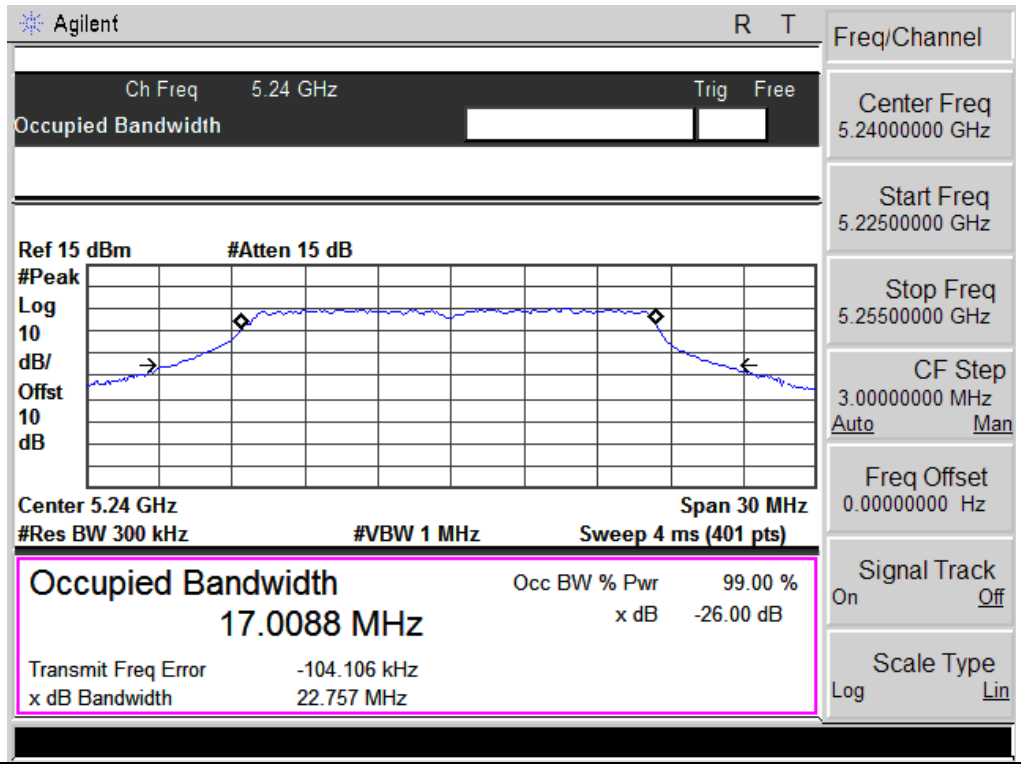
**TX CH 36**



**TX CH 40**

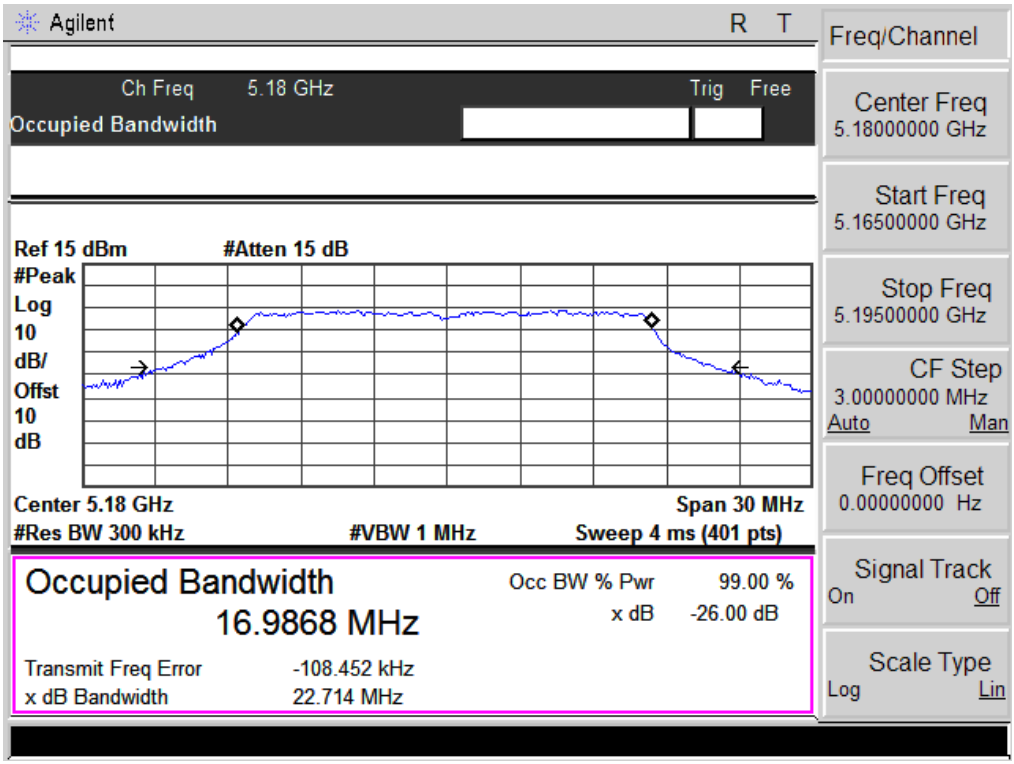



**TX CH 48**

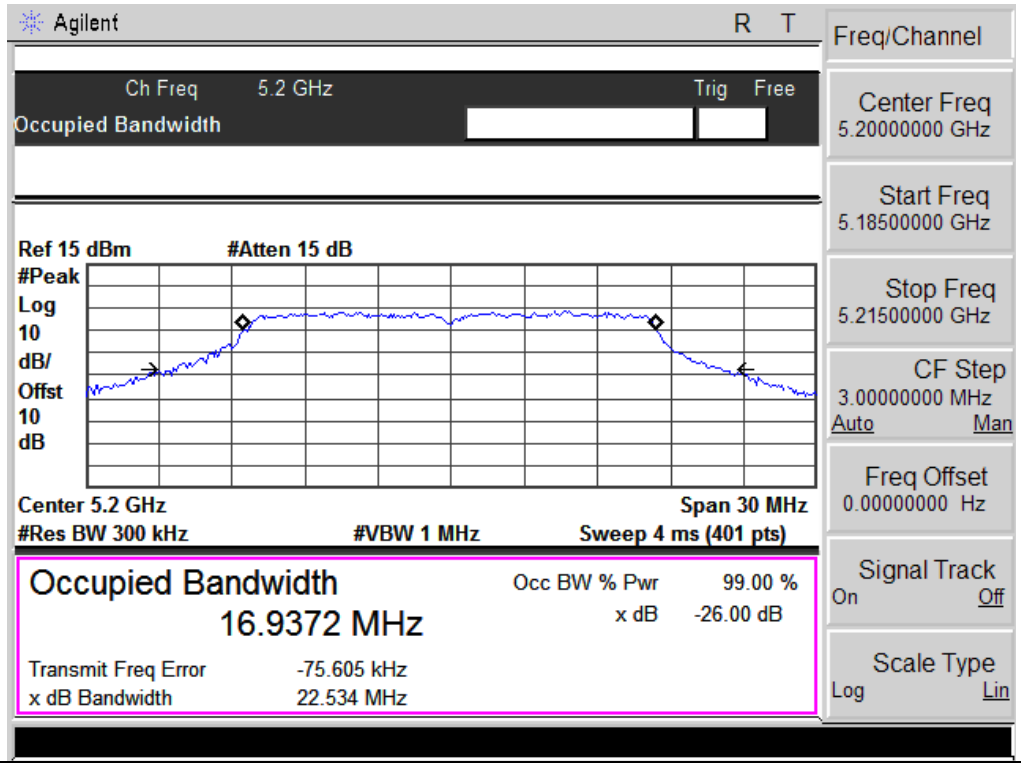


**Antenna B**

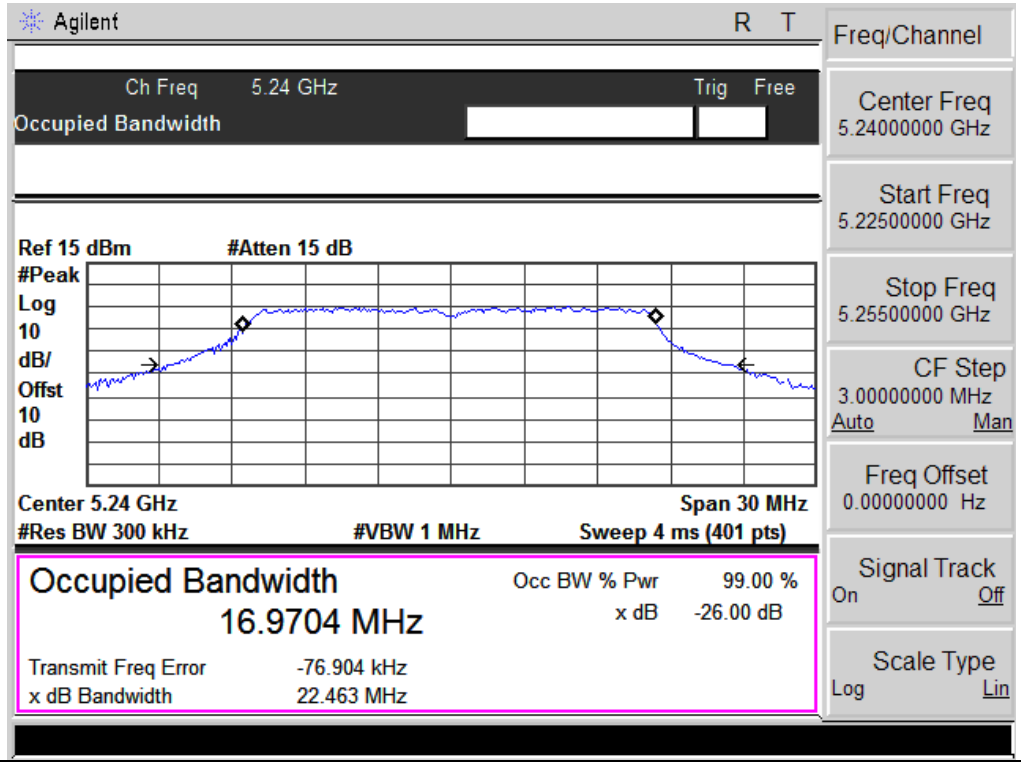
**TX CH 36**



**TX CH 40**




**TX CH 48**

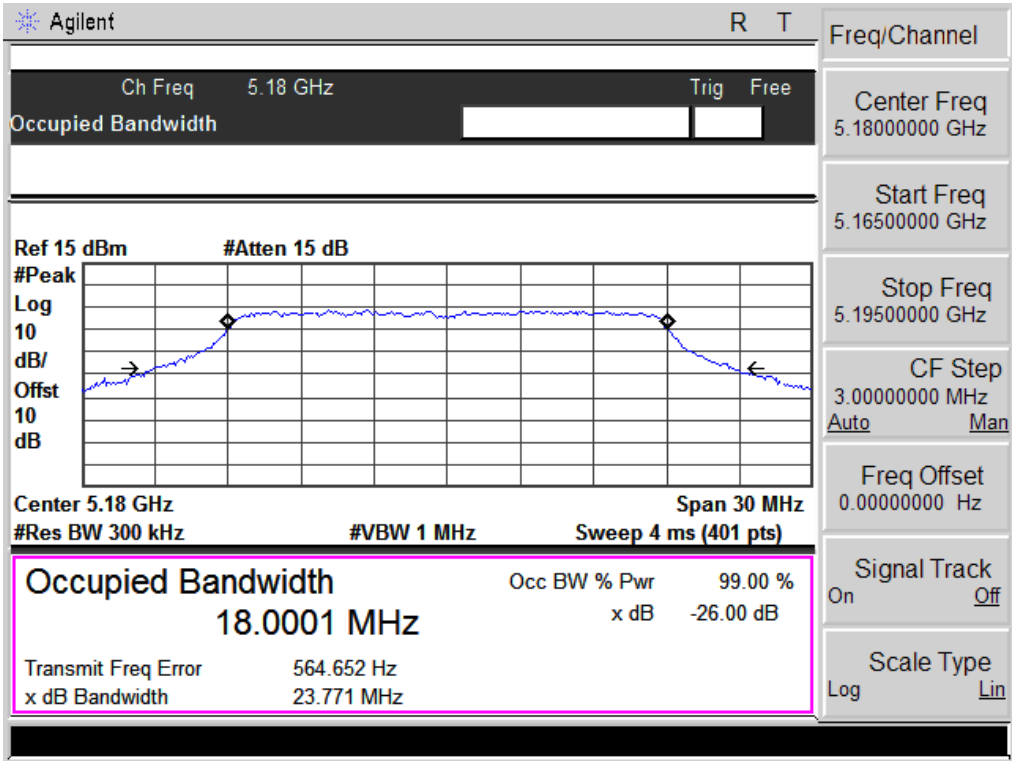


| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX n(20) Mode(5G) /CH36, CH40, CH48 | | |

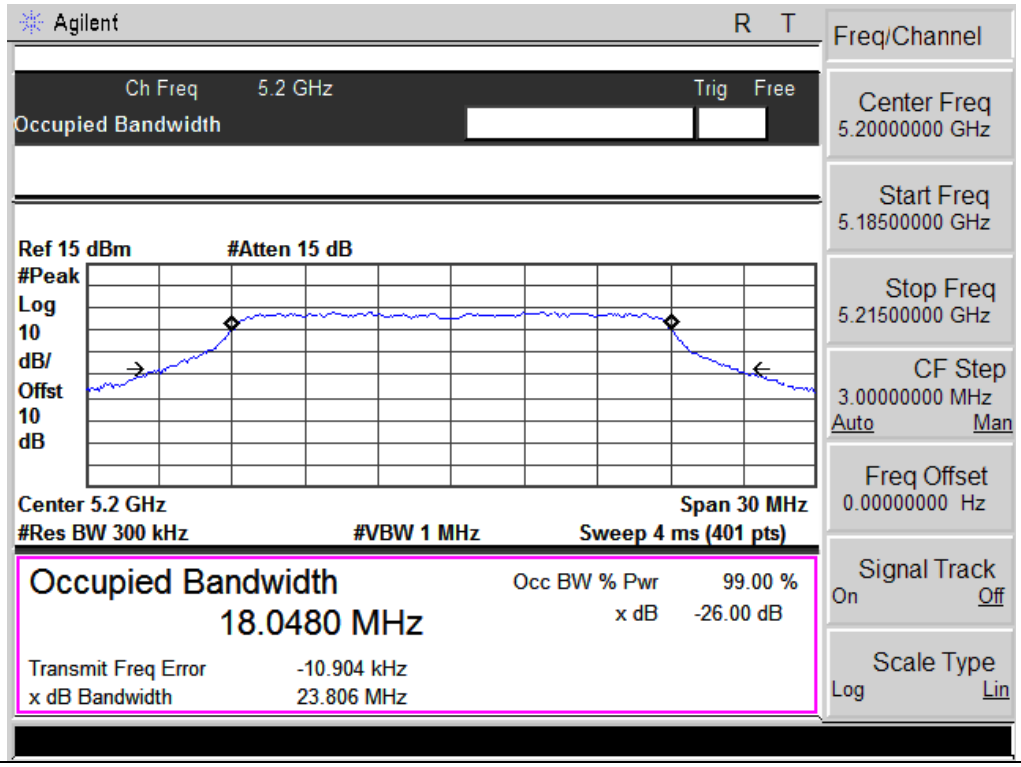
| Channel | Frequency (MHz) | 99% bandwidth (MHz)ANT A | 99% bandwidth (MHz)ANT B | 26dB bandwidth (MHz)ANT A | 26dB bandwidth (MHz) ANT B | Limit (kHz) | Result |
|---|---|---|---|---|---|---|---|
| 802.11N20 mode | | | | | | | |
| Low | 5180 | 18.000 | 17.979 | 23.771 | 23.638 | 500 | Pass |
| Middle | 5200 | 18.048 | 18.024 | 23.806 | 23.752 | 500 | Pass |
| High | 5240 | 18.027 | 17.979 | 23.894 | 23.811 | 500 | Pass |

**Antenna A**

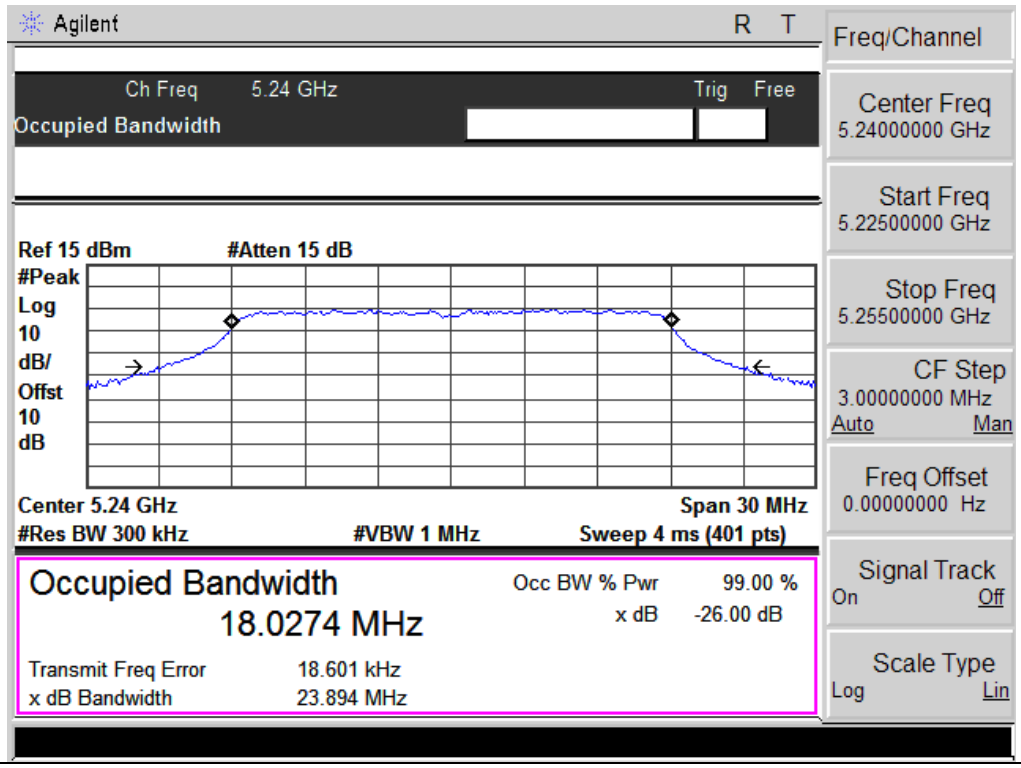
**TX CH 36**



**TX CH 40**

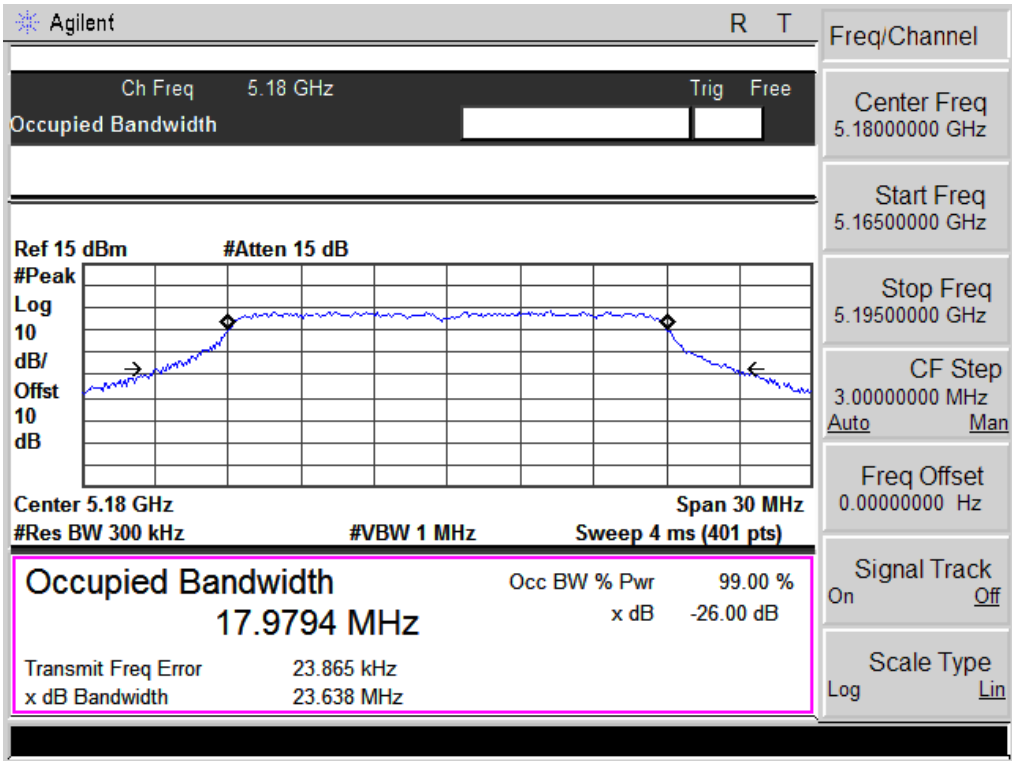



**TX CH 48**

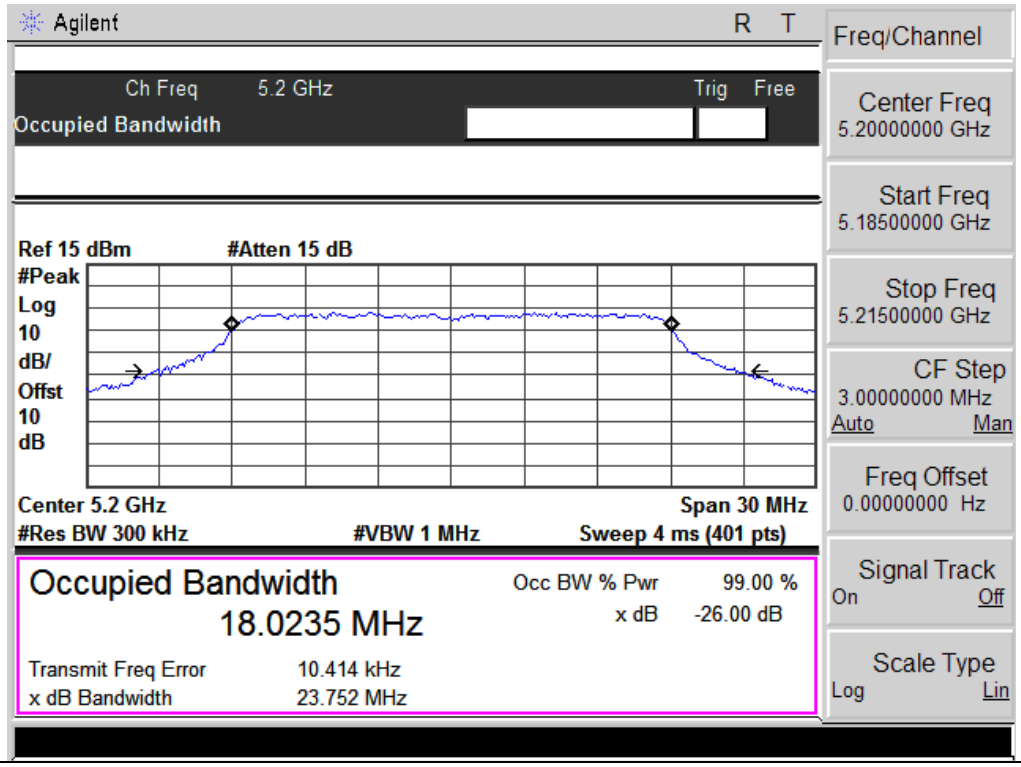


**Antenna B**

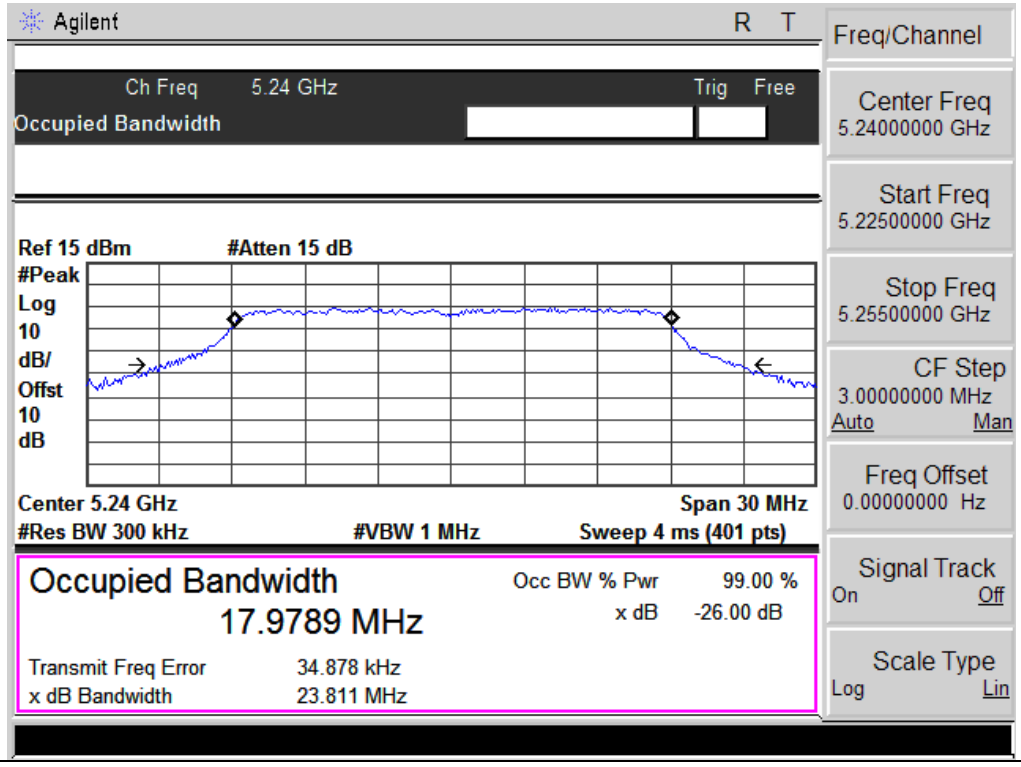
**TX CH 36**



**TX CH 40**




**TX CH 48**

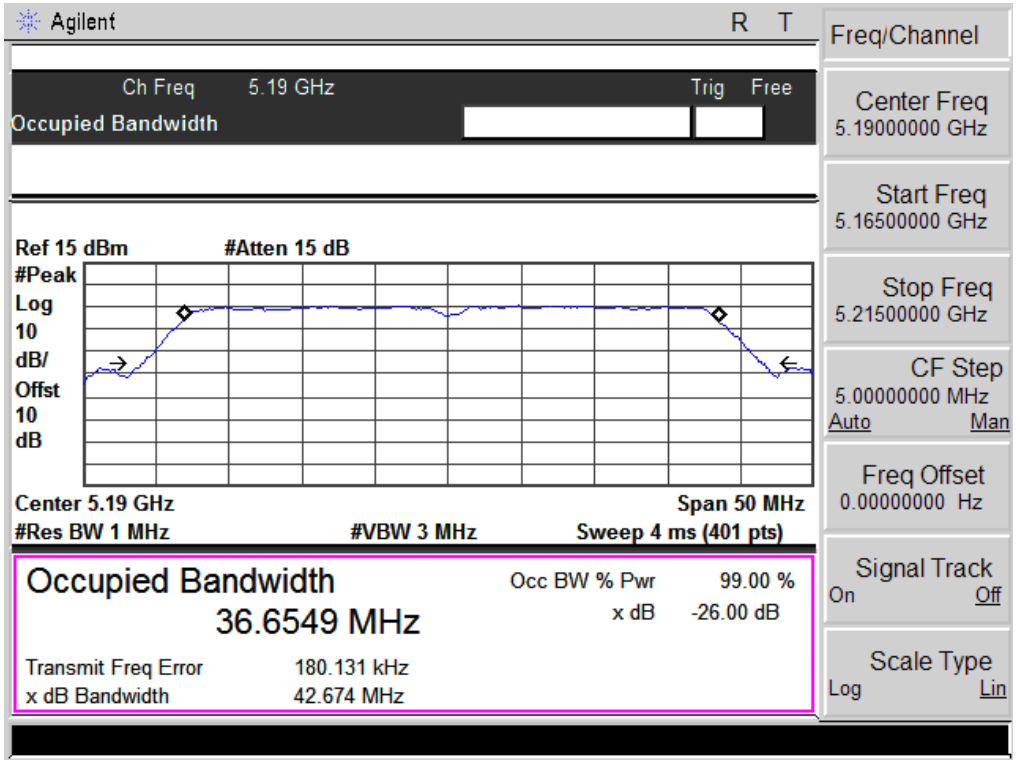


| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX n40 Mode(5G) /CH38, CH46 | | |

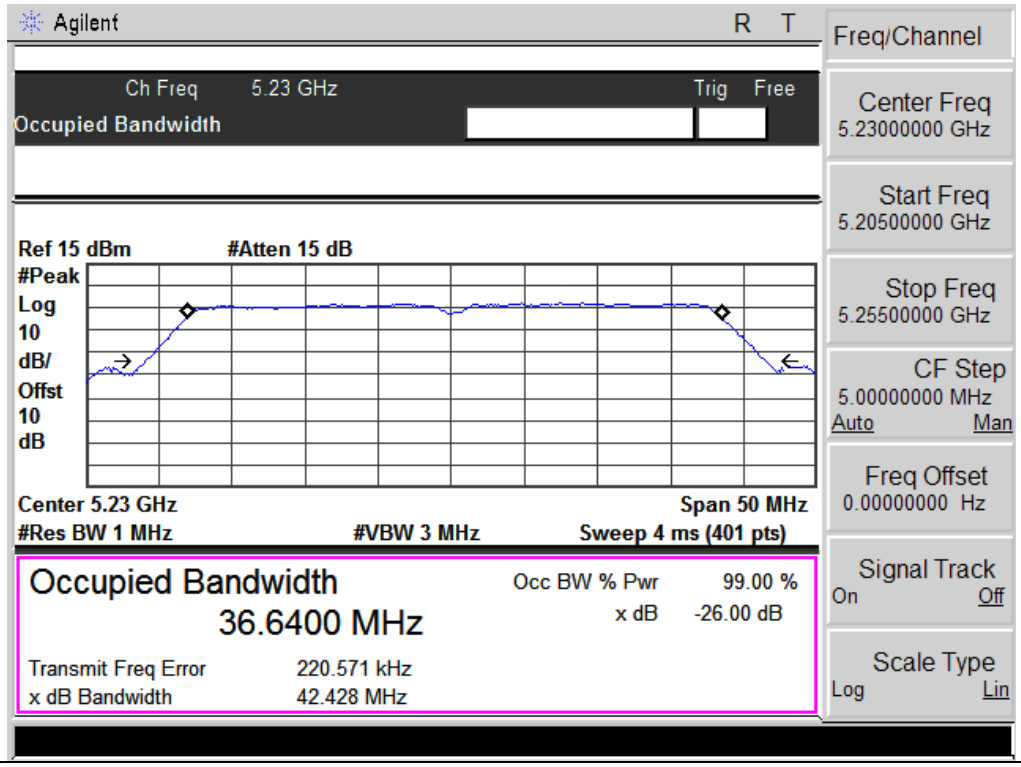
| Channel | Frequency (MHz) | 99% bandwidth (MHz)ANT A | 99% bandwidth (MHz)ANT B | 26dB bandwidth (MHz)ANT A | 26dB bandwidth (MHz) ANT B | Limit (kHz) | Result |
|---|---|---|---|---|---|---|---|
| 802.11N40 mode | | | | | | | |
| Low | 5190 | 36.655 | 36.619 | 42.674 | 42.396 | 500 | Pass |
| High | 5230 | 36.640 | 36.377 | 42.428 | 41.627 | 500 | Pass |

**Antenna A**

**TX CH 38**

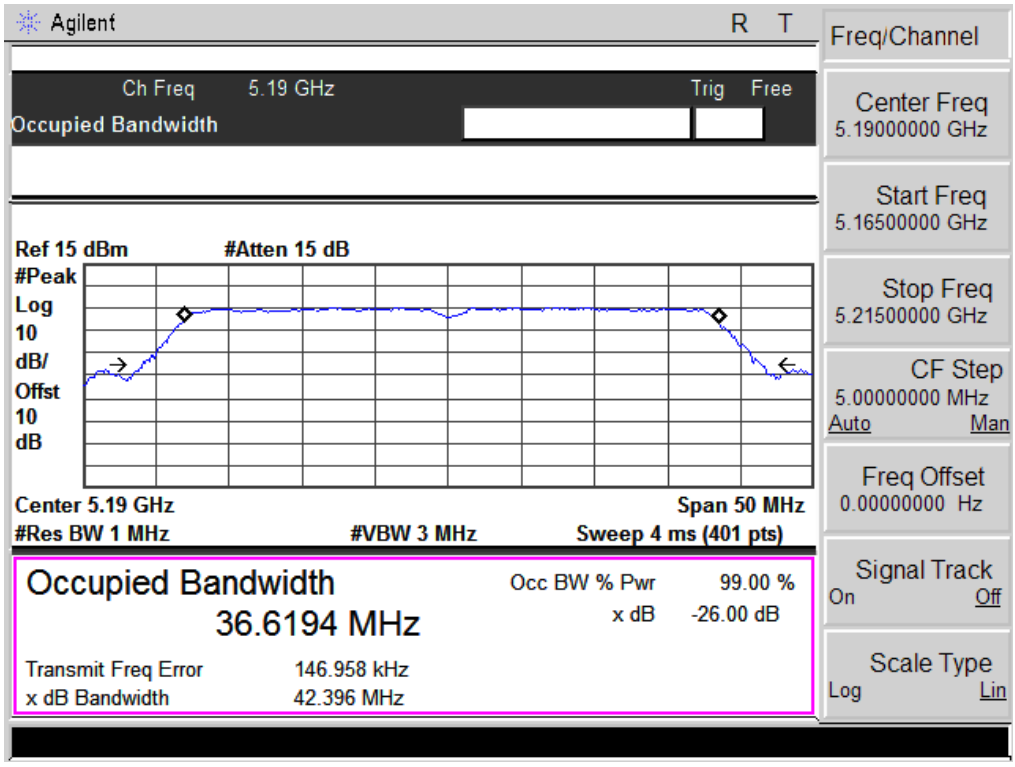


**TX CH 46**

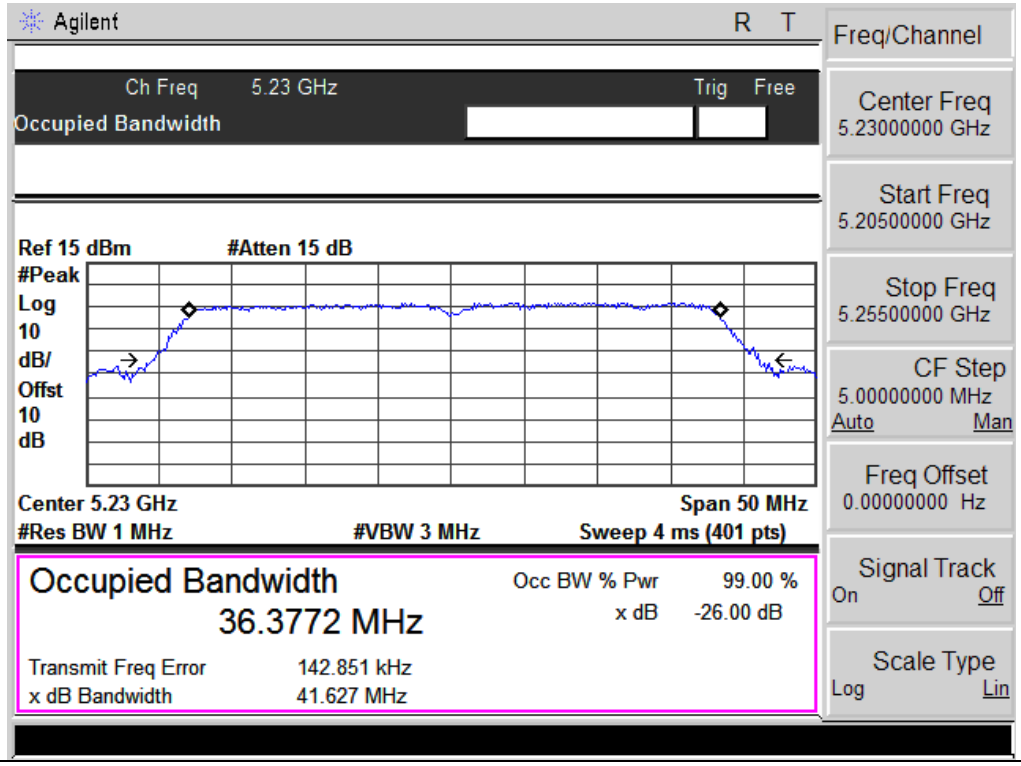



**Antenna B**

**TX CH 38**



**TX CH 46**


Agilent
R T
Freq/Channel
Ch Freq 5.23 GHz
Trig Free
Occupied Bandwidth
Center Freq
5.23000000 GHz
Start Freq
5.20500000 GHz
Ref 15 dBm
#Atten 15 dB
#Peak
Log
10
dB/
Offst
10
dB
Stop Freq
5.25500000 GHz
CF Step
5.00000000 MHz
Auto Man
Center 5.23 GHz
Span 50 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 4 ms (401 pts)
Freq Offset
0.00000000 Hz
Occupied Bandwidth
36.3772 MHz
Occ BW % Pwr 99.00 %
x dB -26.00 dB
Signal Track
On Off
Transmit Freq Error 142.851 kHz
x dB Bandwidth 41.627 MHz
Scale Type
Log Lin

# 6. PEAK OUTPUT POWER TEST

## 6.1 APPLIED PROCEDURES / LIMIT

**According to FCC §15.407(a)(1)**
For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
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. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
**According to IC RSS-210 §A9.2:**
For the 5.15–5.250 GHz bands, the maximum e.i.r.p shall not exceed 200 mW or 10 + 10 log B, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p spectral density shall not exceed 10 dBm in any 1.0 MHz band.

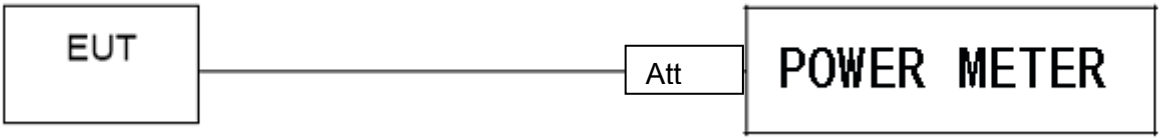
### 6.1.1 TEST PROCEDURE

a. The EUT was directly connected to the Power meter

### 6.1.2 DEVIATION FROM STANDARD

No deviation.

### 6.1.3 TEST SETUP




### 6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

### 6.1.5 TEST RESULTS

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 60% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |
| Test Mode ： | TX a/n(5G) Mode | | |

| Test Channe | Frequency | Maximum output power. Antenna port | | | | Total Power | | LIMIT |
|---|---|---|---|---|---|---|---|---|
| | | (PK) (dBm) | | (AV) (dBm) | | (PK) | (AV) | |
| | (MHz) | ANT A | ANT B | ANT A | ANT B | dBm | dBm | dBm |
| **TX 802.11a Mode** | | | | | | | | |
| CH36 | 5180 | 9.69 | 8.87 | 6.38 | 5.63 | 12.31 | 9.03 | 13.94 |
| CH40 | 5200 | 9.53 | 8.75 | 6.26 | 5.77 | 12.26 | 9.10 | 13.94 |
| CH48 | 5240 | 9.72 | 8.71 | 6.11 | 5.56 | 12.25 | 8.85 | 13.94 |
| **TX 802.11 n20M Mode** | | | | | | | | |
| CH36 | 5180 | 8.52 | 7.86 | 5.54 | 4.35 | 11.21 | 8.00 | 13.94 |
| CH40 | 5200 | 8.48 | 7.82 | 5.83 | 4.27 | 11.19 | 7.96 | 13.94 |
| CH48 | 5240 | 8.61 | 7.79 | 5.35 | 4.39 | 11.23 | 7.91 | 13.94 |
| **TX 802.11 n40M Mode** | | | | | | | | |
| CH38 | 5190 | 7.52 | 6.88 | 4.11 | 3.72 | 10.22 | 6.93 | 13.94 |
| CH46 | 5230 | 7.63 | 6.93 | 4.17 | 3.81 | 10.25 | 6.97 | 13.94 |

*The antenna gain of 5 GHz is 9.06 dBi; therefore, the power spectral density limit is reduced by 3.06 dB*

# 7. OUT OF BAND EMISSIONS

## APPLICABLE STANDARD

**According to FCC §15.407(b)**

For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of −27 dBm/MHz

**According to RSS-210 §A8.5**,

in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

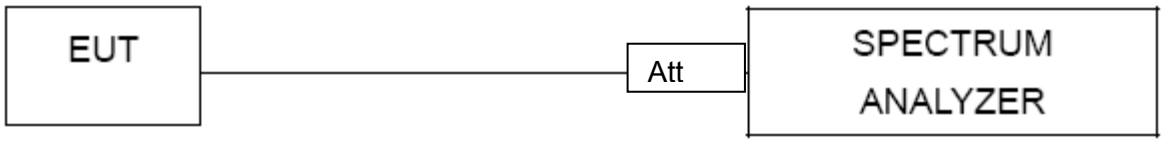
## TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

## 7.1 DEVIATION FROM STANDARD

No deviation.

## 7.2 TEST SETUP




## 7.3 EUT OPERATION CONDITIONS

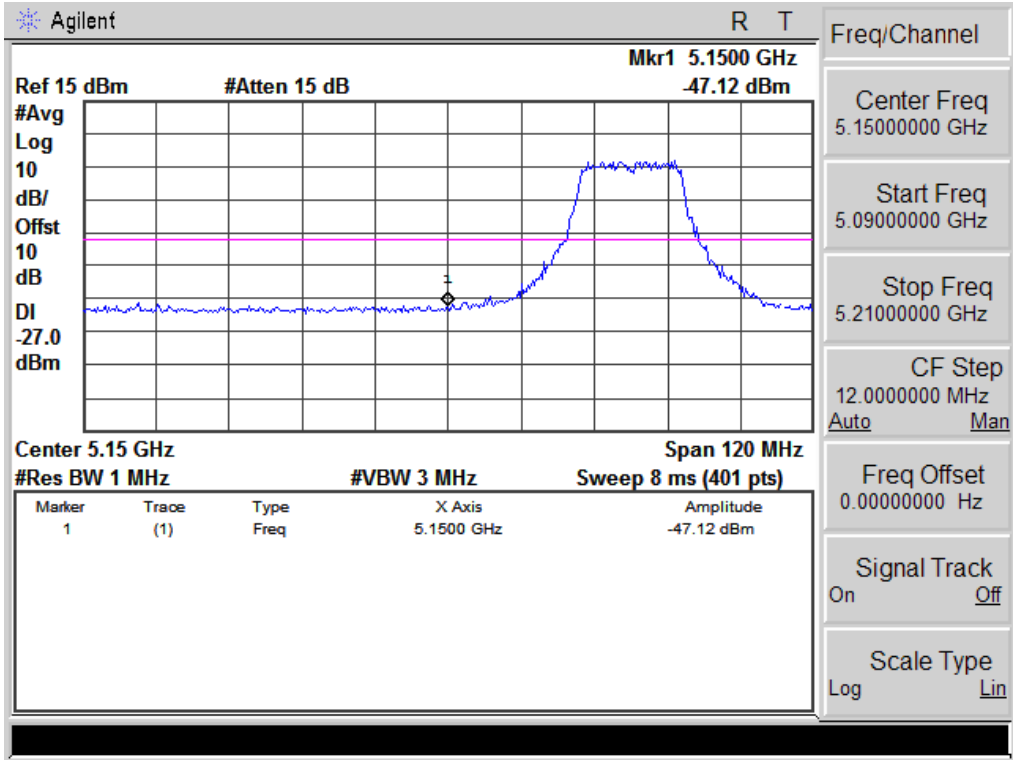
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

## 7.4 TEST RESULTS

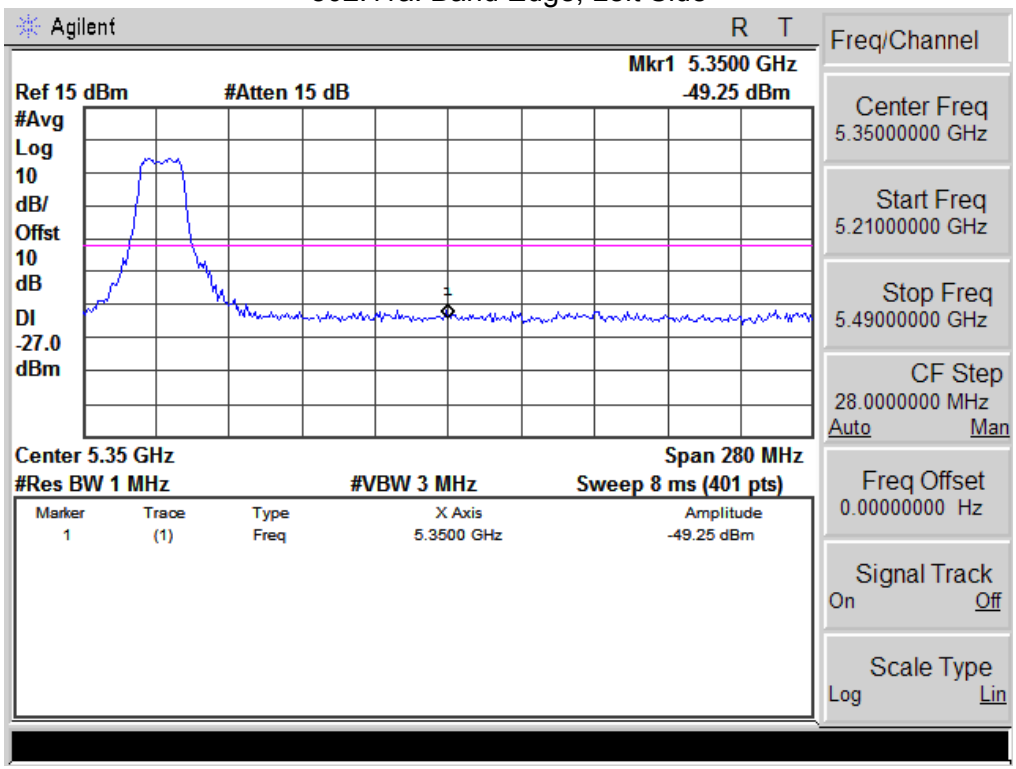
| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |

**Antenna A**

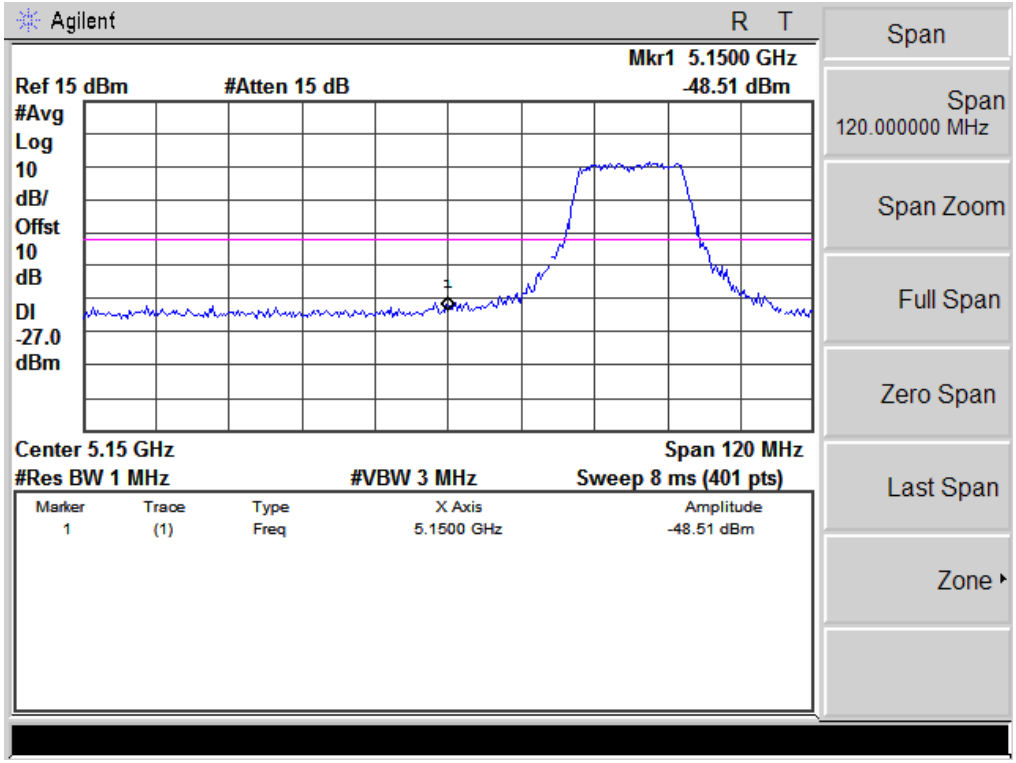
802.11a: Band Edge, Right Side



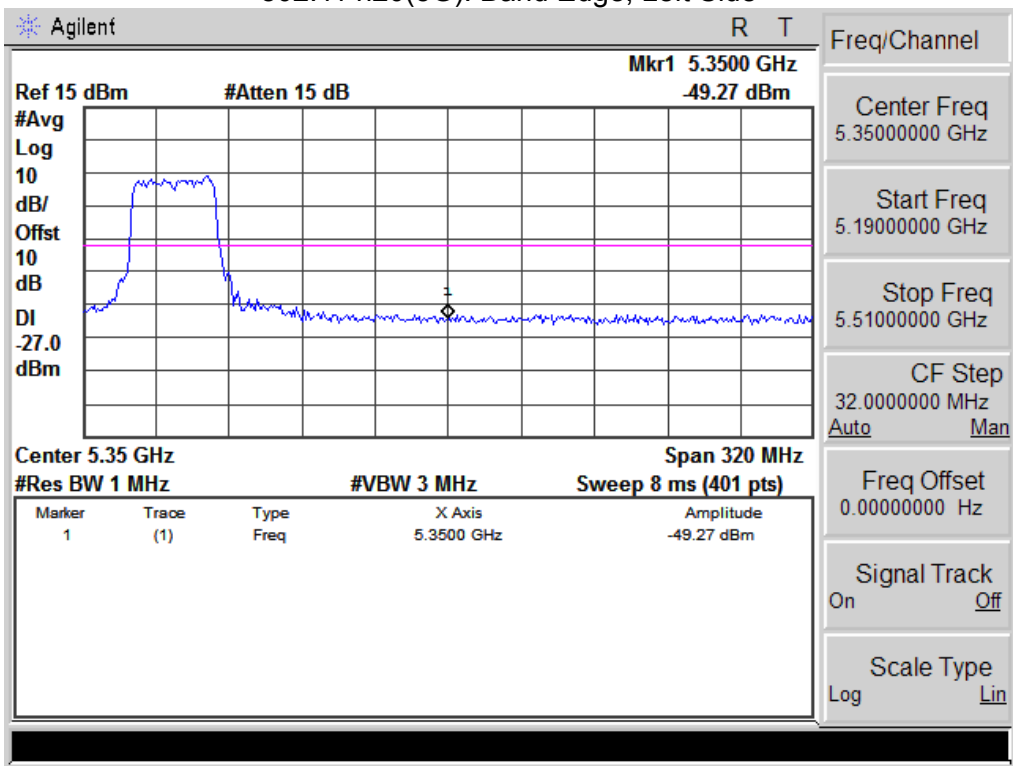

802.11a: Band Edge, Left Side



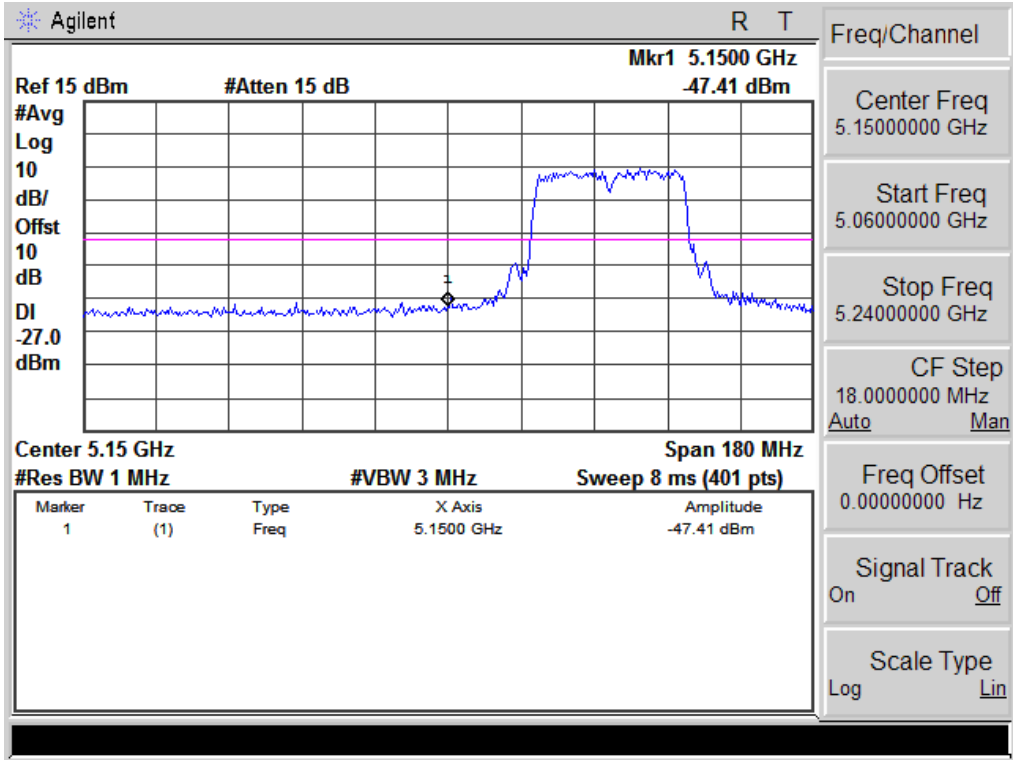
802.11 n20(5G): Band Edge, Right Side



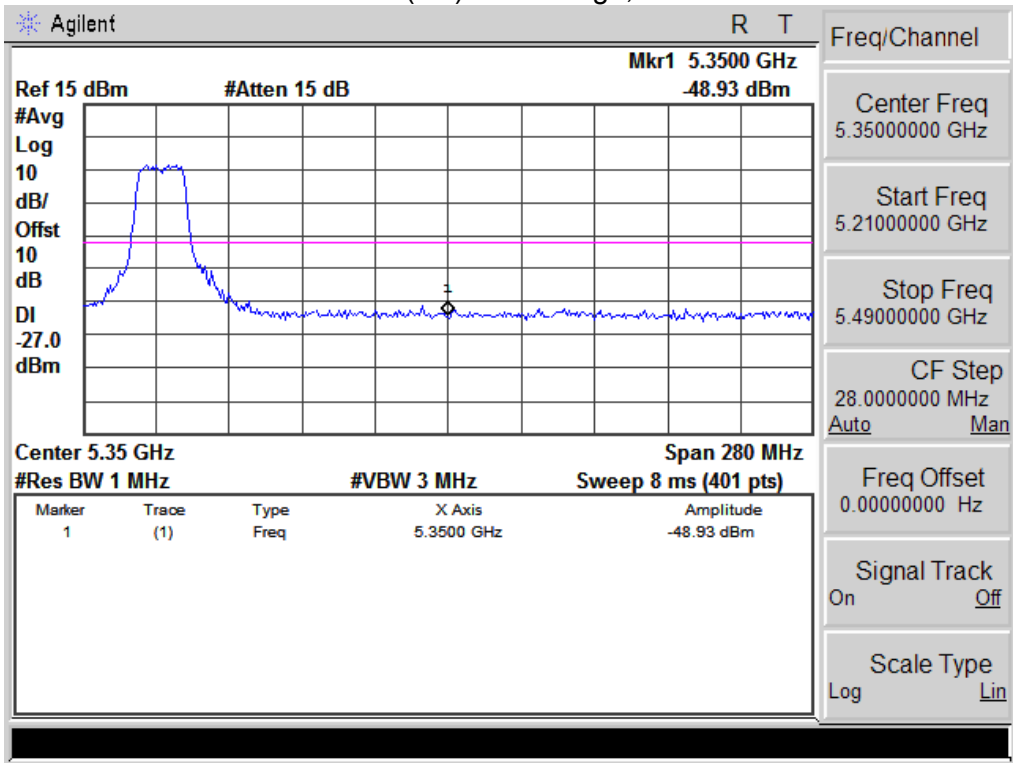

802.11 n20(5G): Band Edge, Left Side



802.11 n40(5G): Band Edge, Right Side

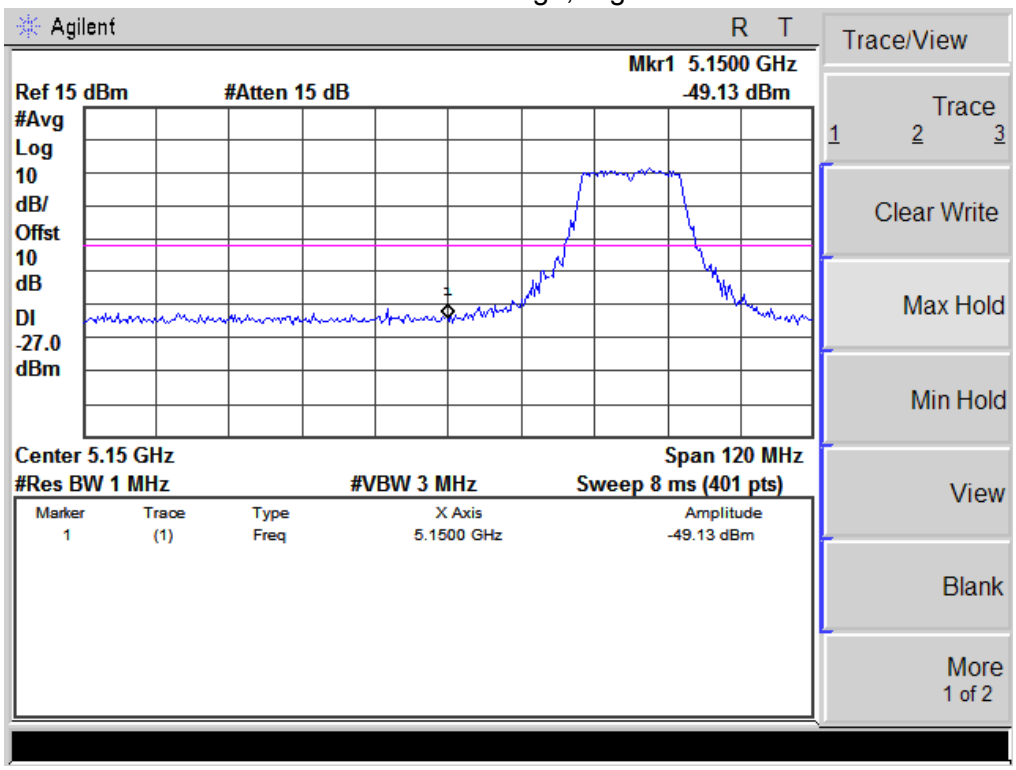



802.11 n40(5G): Band Edge, Left Side

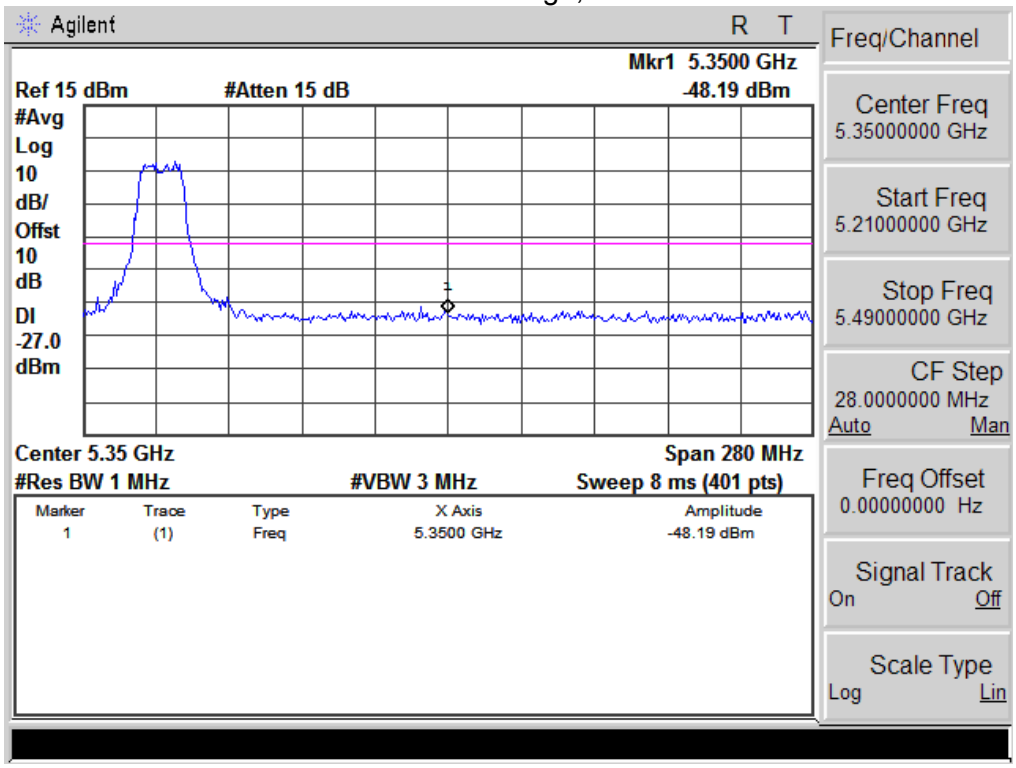


**Antenna B**

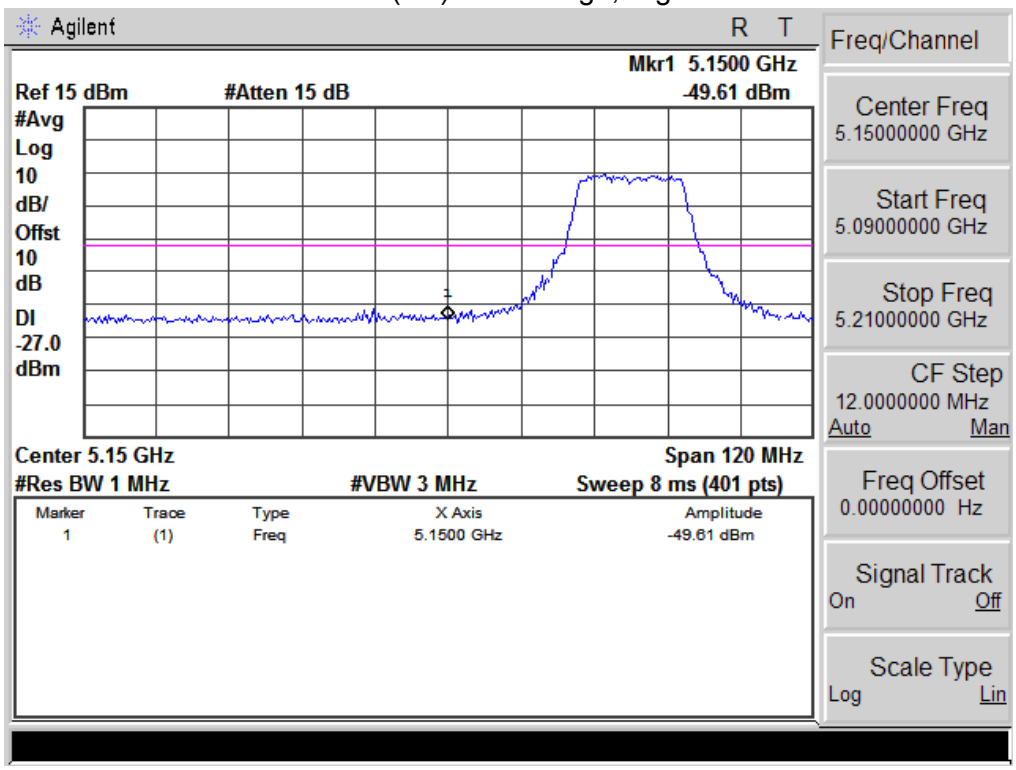
802.11a: Band Edge, Right Side



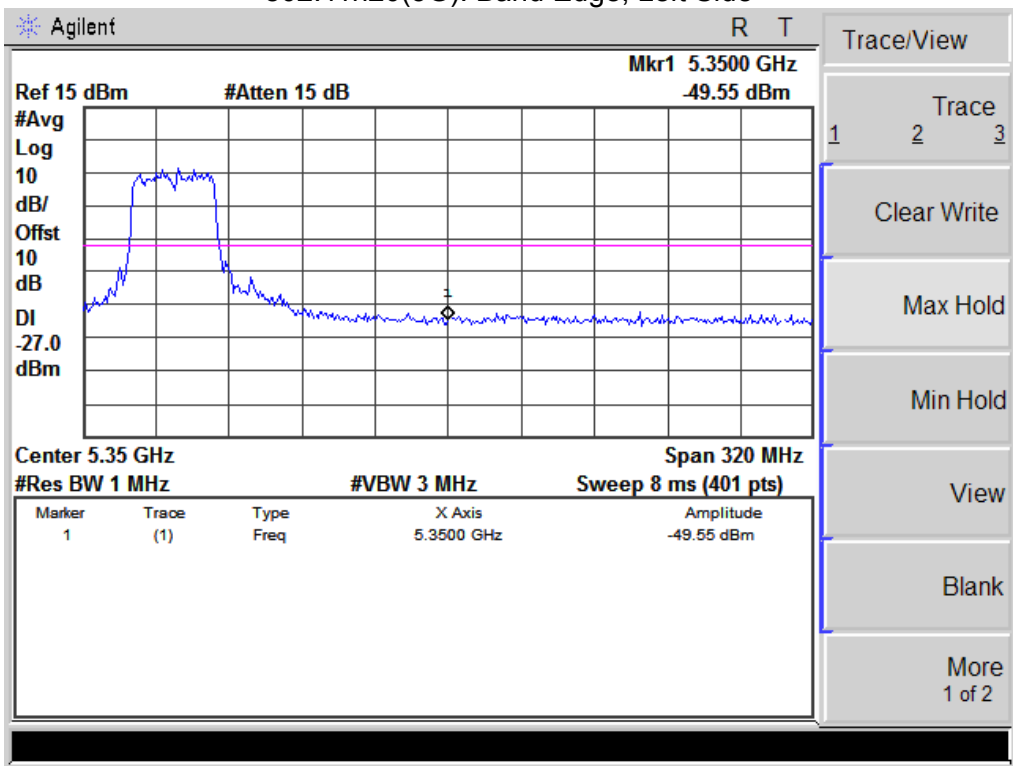

802.11a: Band Edge, Left Side



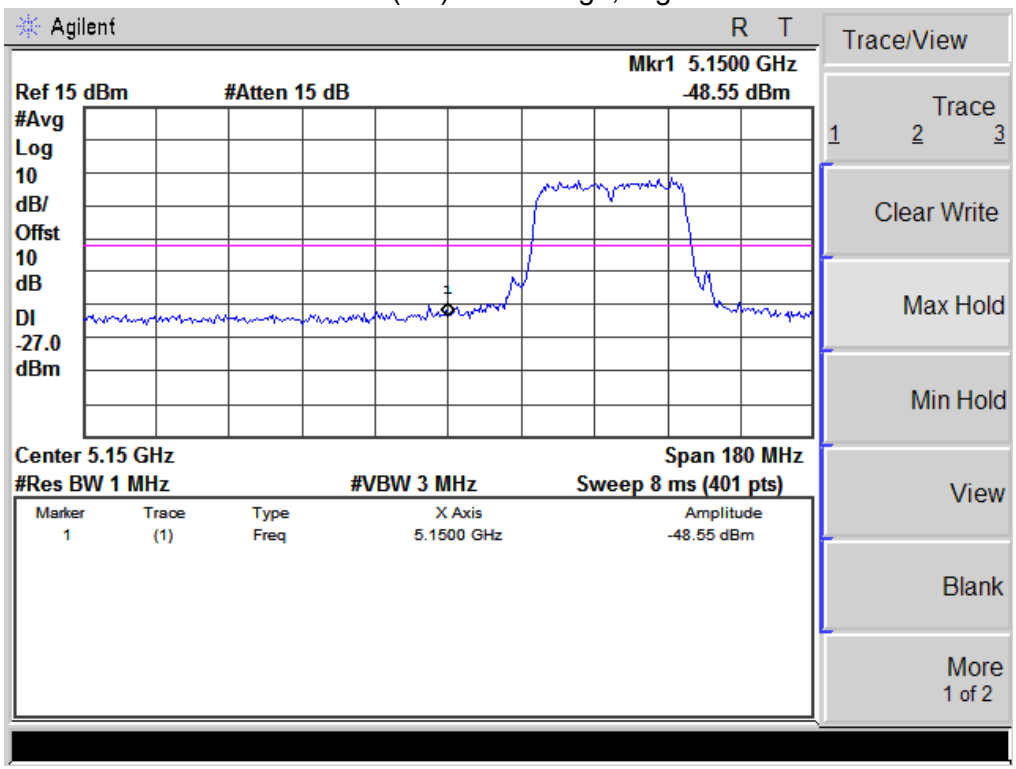
802.11n20(5G): Band Edge, Right Side



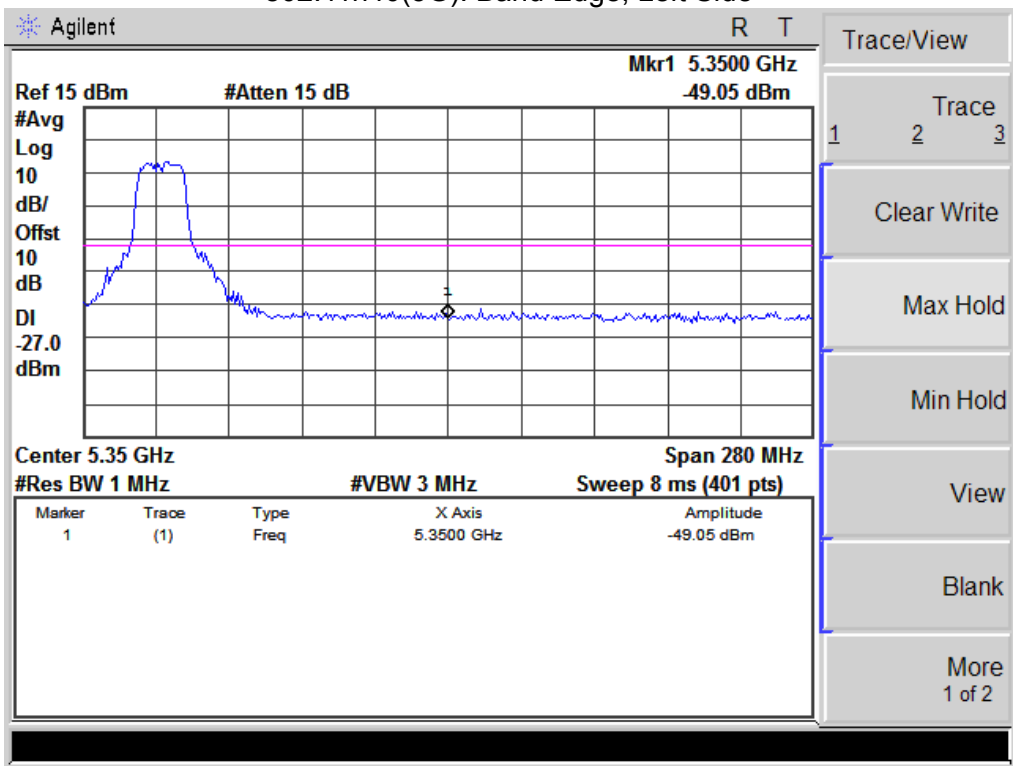

802.11n20(5G): Band Edge, Left Side



802.11n40(5G): Band Edge, Right Side




802.11n40(5G): Band Edge, Left Side



# 8. PEAK EXCURSION RATIO

## 8.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a) (6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### 8.1.1 TEST PROCEDURE

The largest difference between the following two traces must be ≤ 13 dB for all frequencies across the emission

bandwidth. Submit a plot.

1st Trace:

• Set RBW = 1 MHz, VBW ≥ 3 MHz with peak detector and maxhold settings.

2nd Trace:

• create the 2nd trace using the settings described in the setion “FCC §15.407(a)(1)(2) – CONDUCTED
TRANSMITTER OUTPUT POWER”.

### 8.1.2 DEVIATION FROM STANDARD

No deviation.

### 8.1.3 TEST SETUP

### 8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

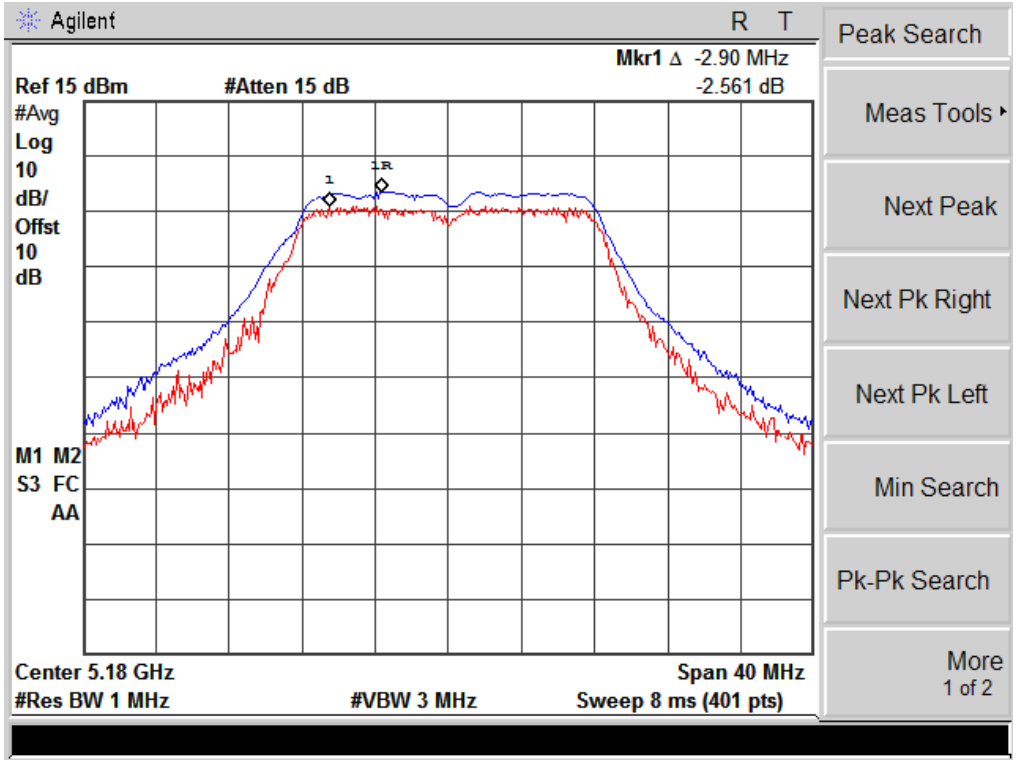
### 8.1.5 TEST RESULTS

| | | | |
|---|---|---|---|
| EUT： | ScreenBeam Mini2 Wireless Display Receiver | Model Name ： | SBWD60A |
| Temperature： | 25 ℃ | Relative Humidity： | 56% |
| Pressure： | 1012 hPa | Test Voltage ： | DC 5V From adapter AC120V/60Hz |

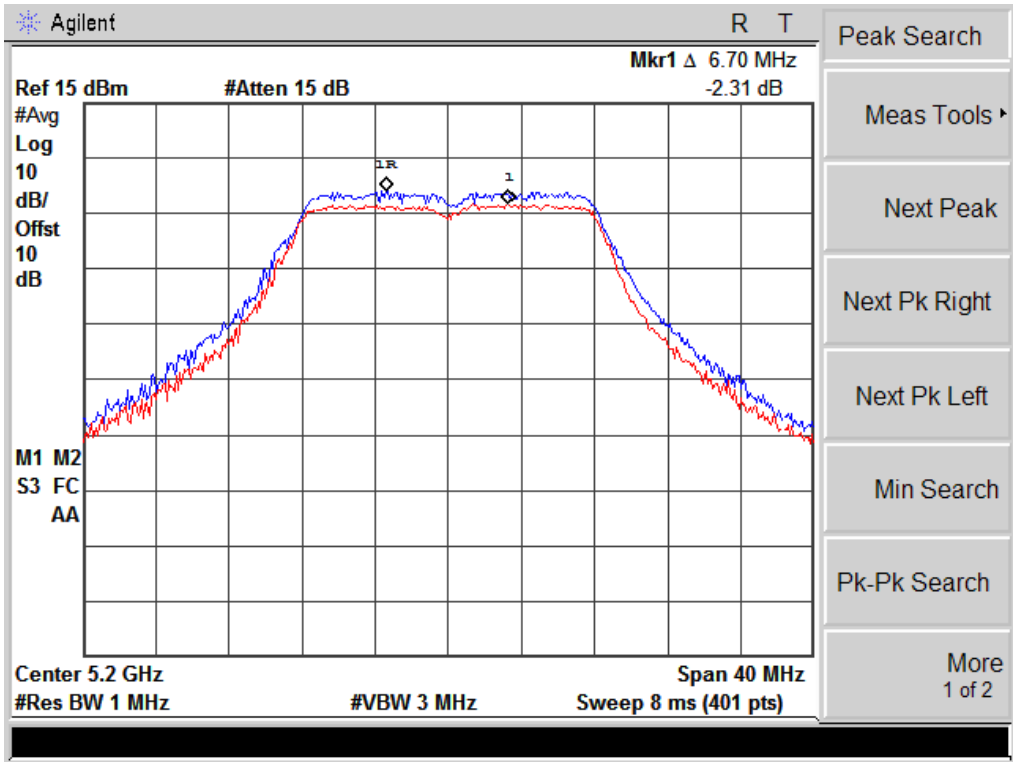
| Channel | Frequency (MHz) | TX ANT A PER(dB) | TX ANT B PER(dB) | Limit (dB) |
|---|---|---|---|---|
| **802.11a mode** | | | | |
| Low | 5180 | -2.561 | -2.457 | 13 |
| Middle | 5200 | -2.310 | -2.608 | |
| High | 5240 | -2.336 | -2.361 | |
| **802.11n HT20 mode** | | | | |
| Low | 5180 | -2.618 | -2.633 | 13 |
| Middle | 5200 | -2.629 | -2.918 | |
| High | 5240 | -2.622 | -2.898 | |
| **802.11n HT40 mode** | | | | |
| Low | 5190 | -1.160 | -1.024 | 13 |
| High | 5230 | -1.743 | -1.085 | |

**Antenna A**

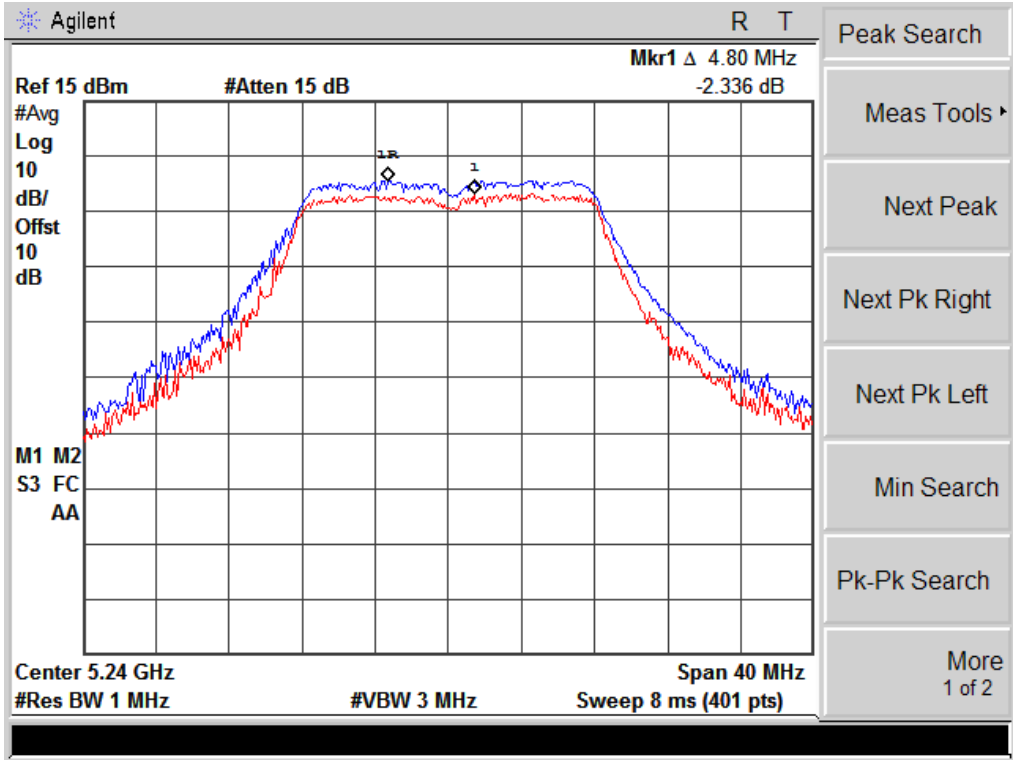
802.11a:CH 36



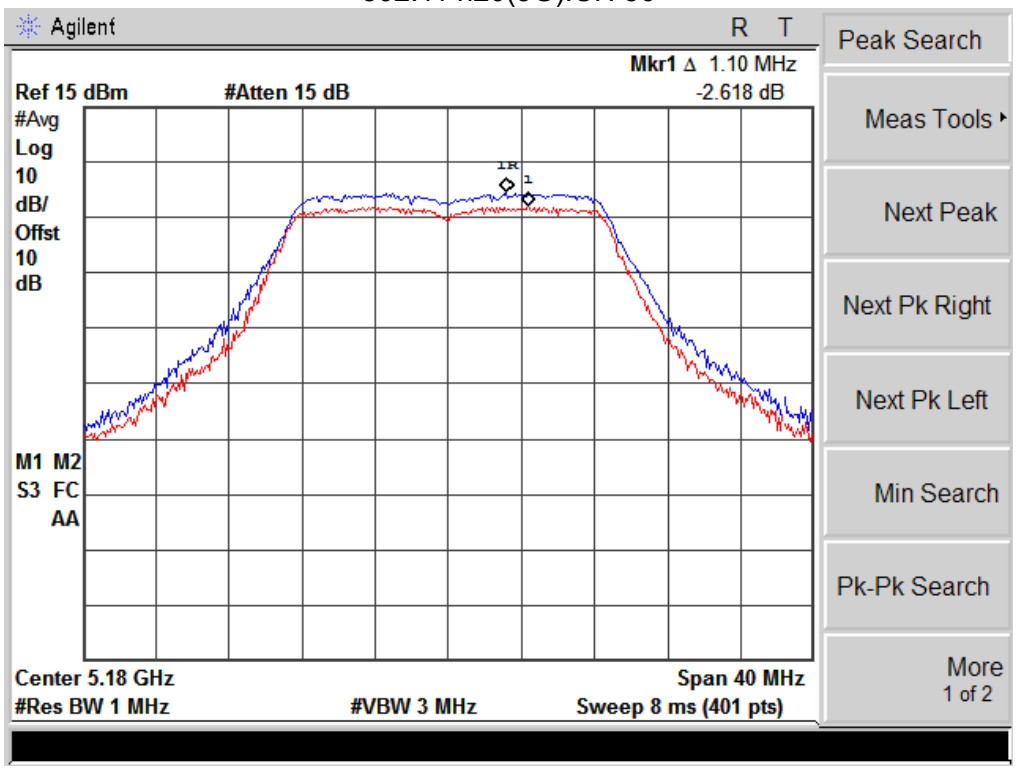

CH 40



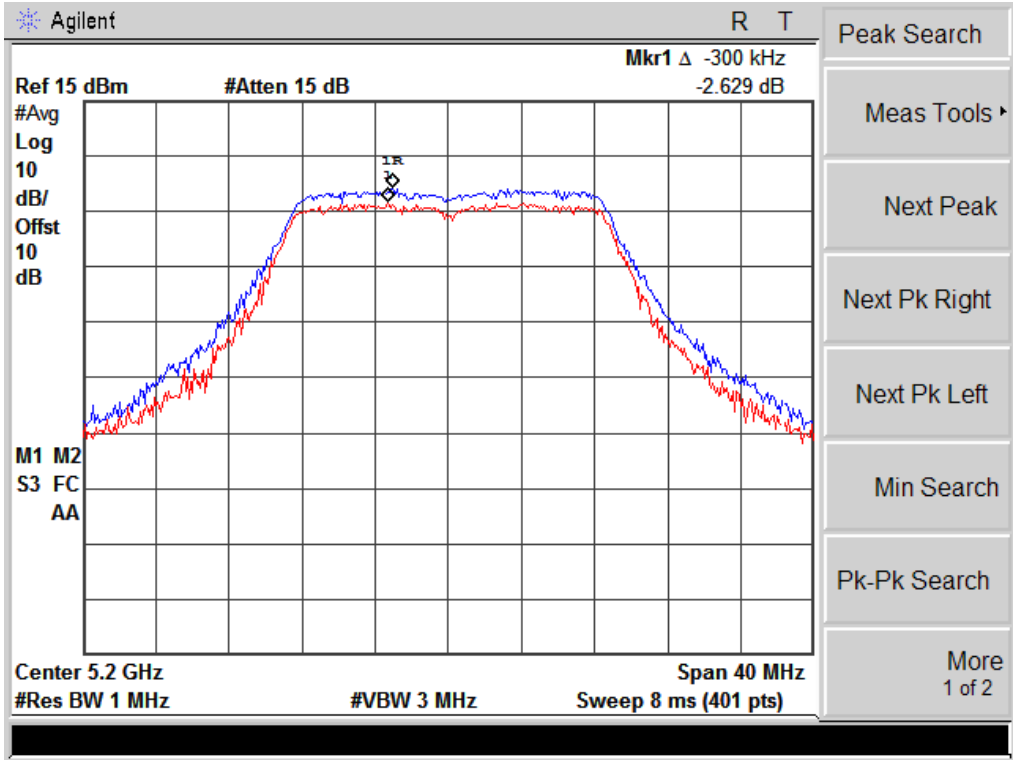
CH 48



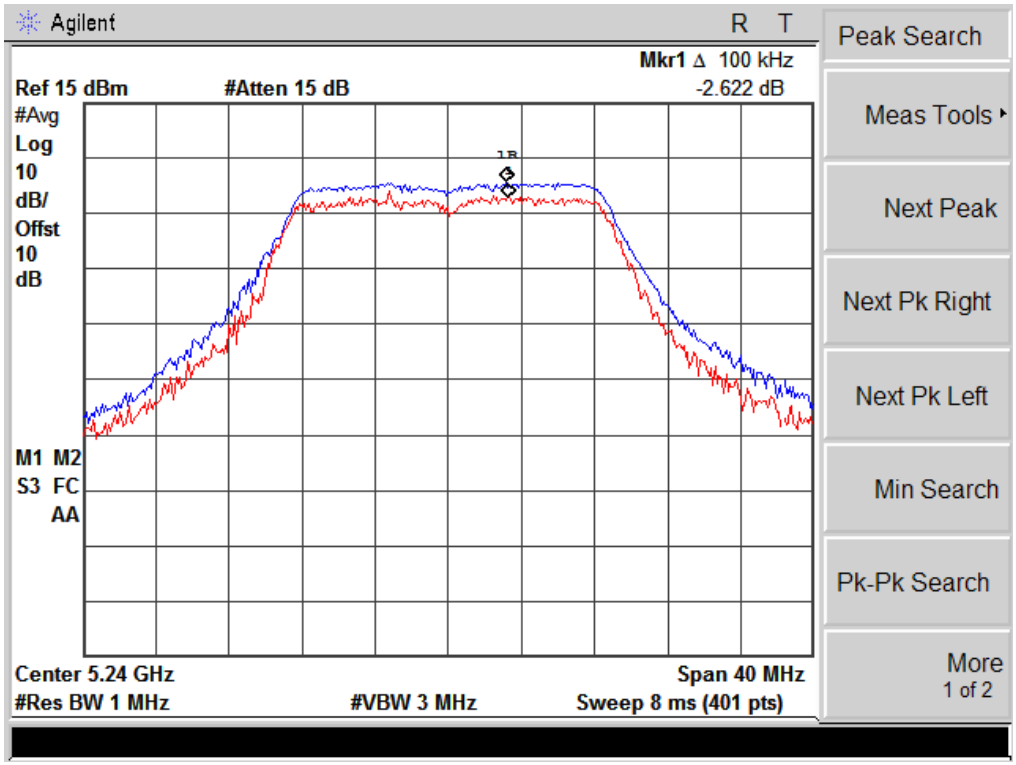

802.11 n20(5G):CH 36



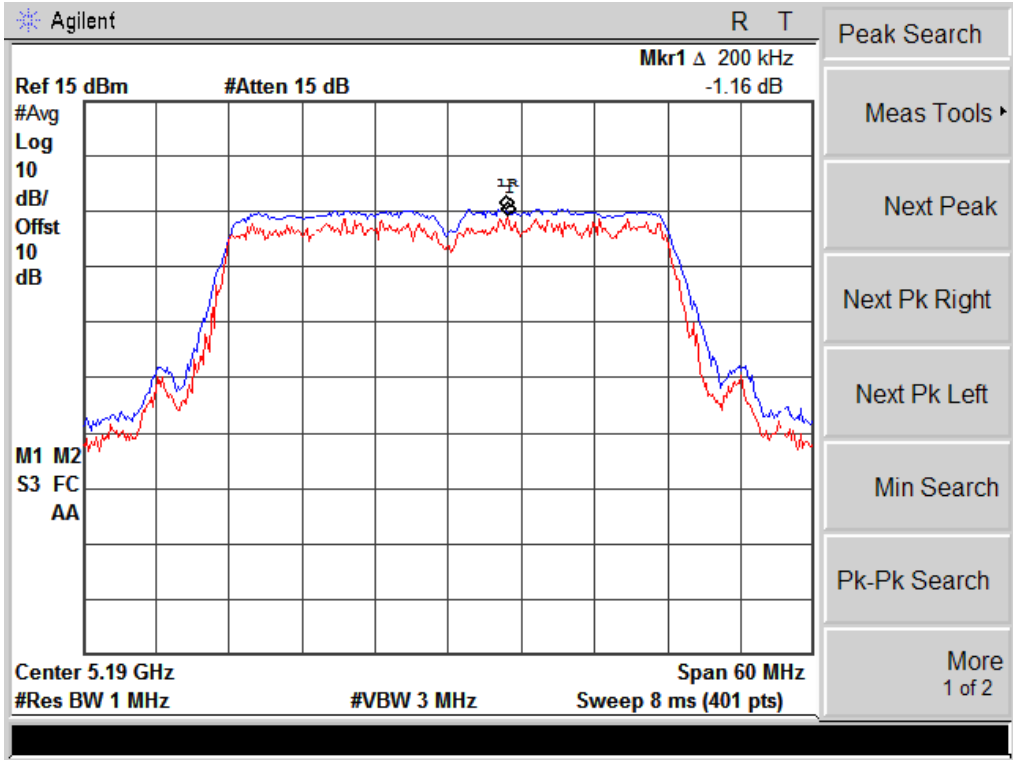
CH 40


Agilent
R T
Mkr1 Δ -300 kHz
-2.629 dB
Ref 15 dBm
#Atten 15 dB
#Avg
Log
10
dB/
Offst
10
dB
1R
M1 M2
S3 FC
AA
Center 5.2 GHz
Span 40 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 8 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

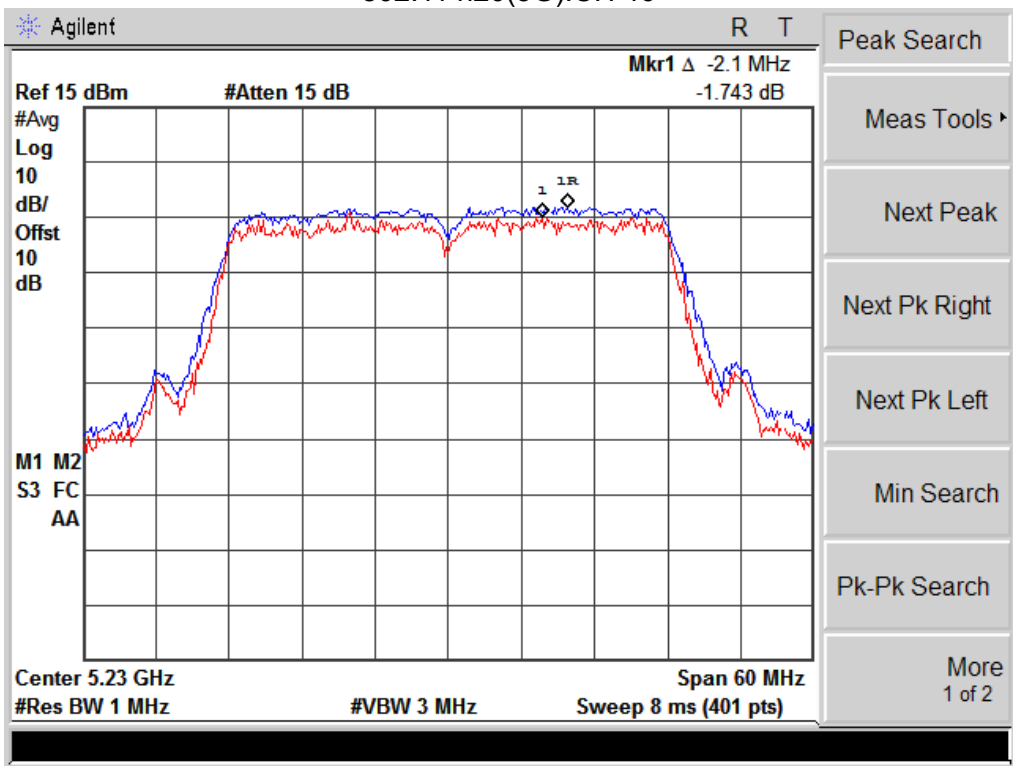
CH 48


Agilent
R T
Mkr1 Δ 100 kHz
-2.622 dB
Ref 15 dBm
#Atten 15 dB
#Avg
Log
10
dB/
Offst
10
dB
1R
M1 M2
S3 FC
AA
Center 5.24 GHz
Span 40 MHz
#Res BW 1 MHz
#VBW 3 MHz
Sweep 8 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

802.11 n40(5G):CH 38

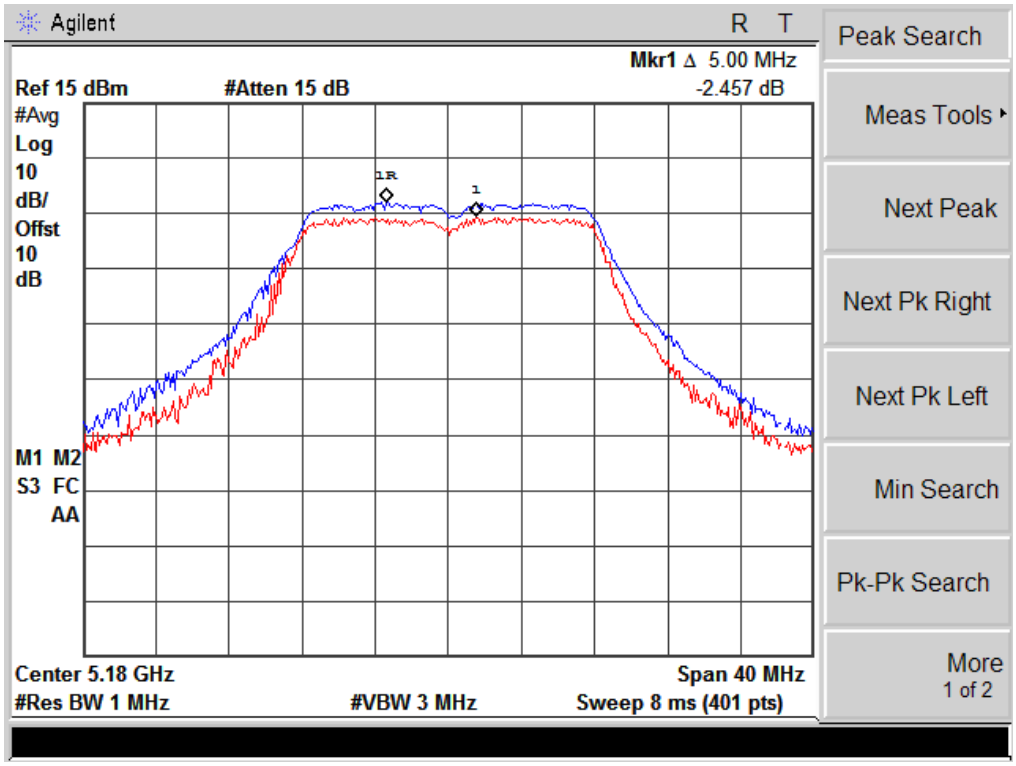



802.11 n20(5G):CH 46

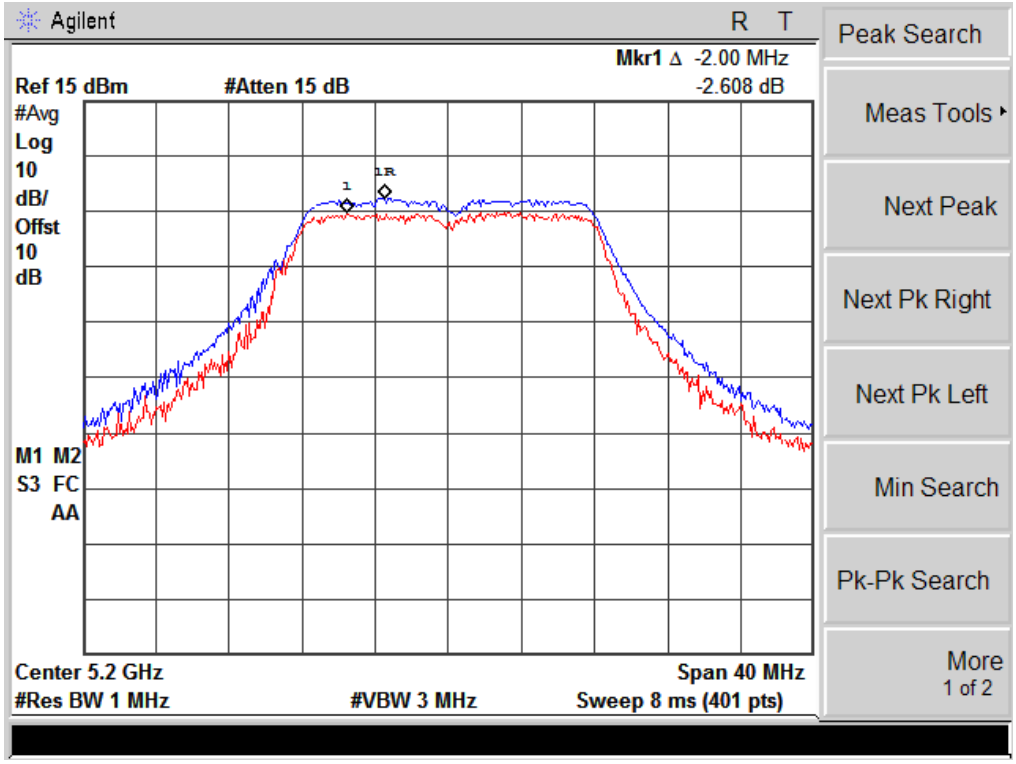


**Antenna B**

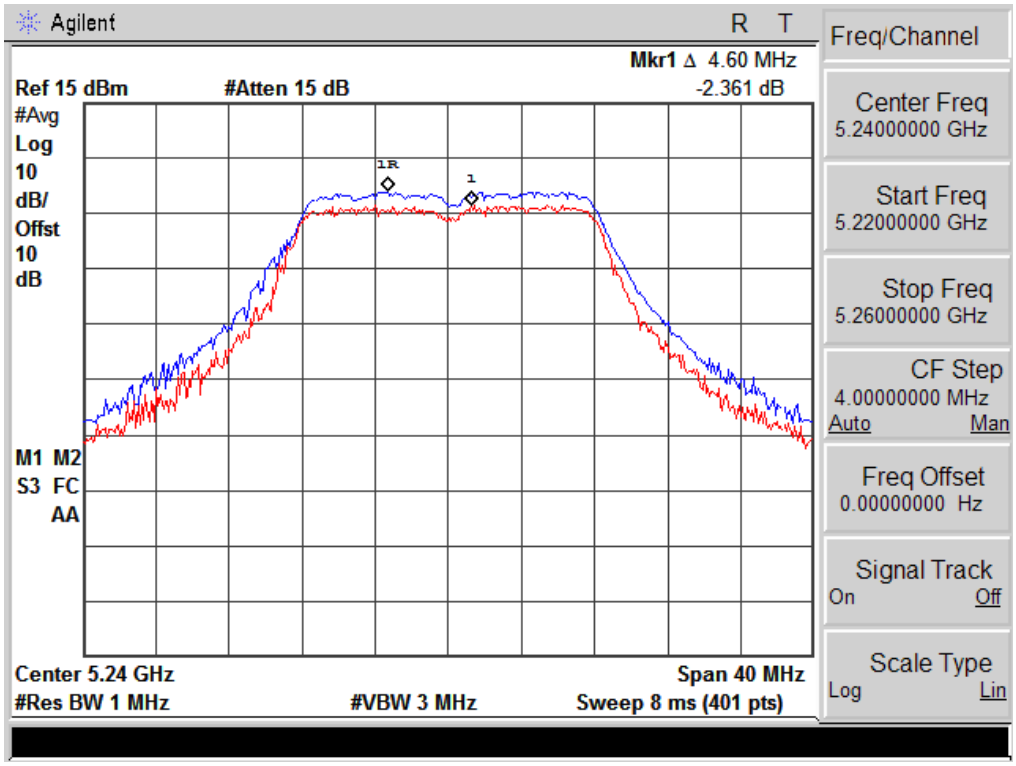
802.11a: CH 36



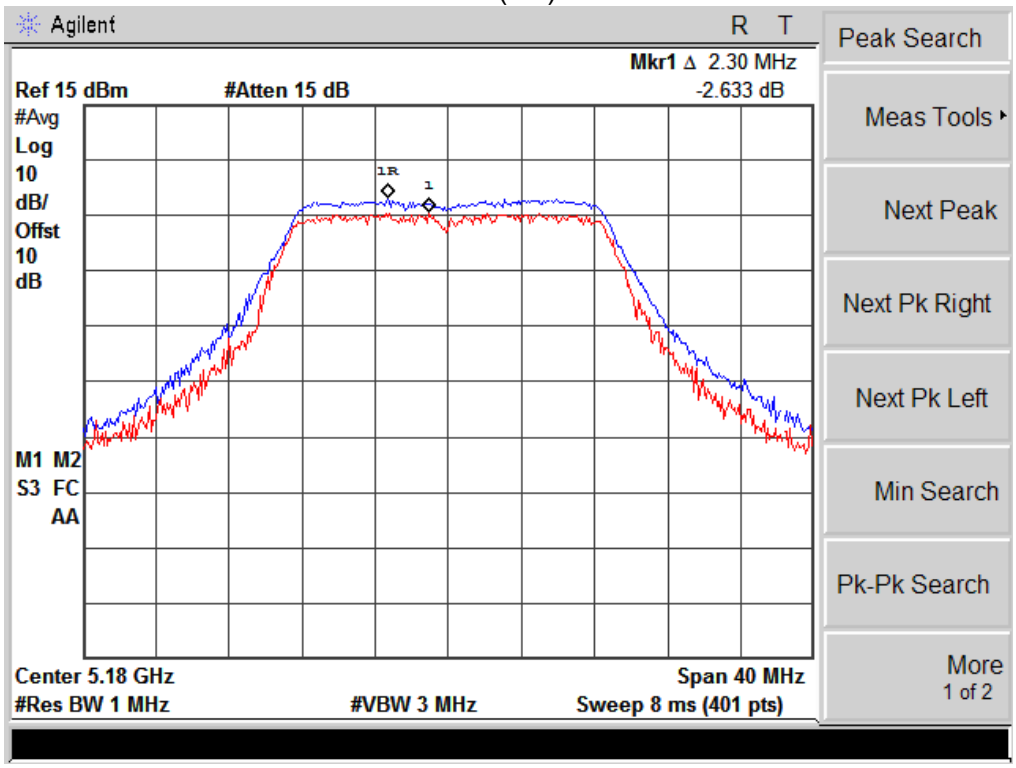

CH 40



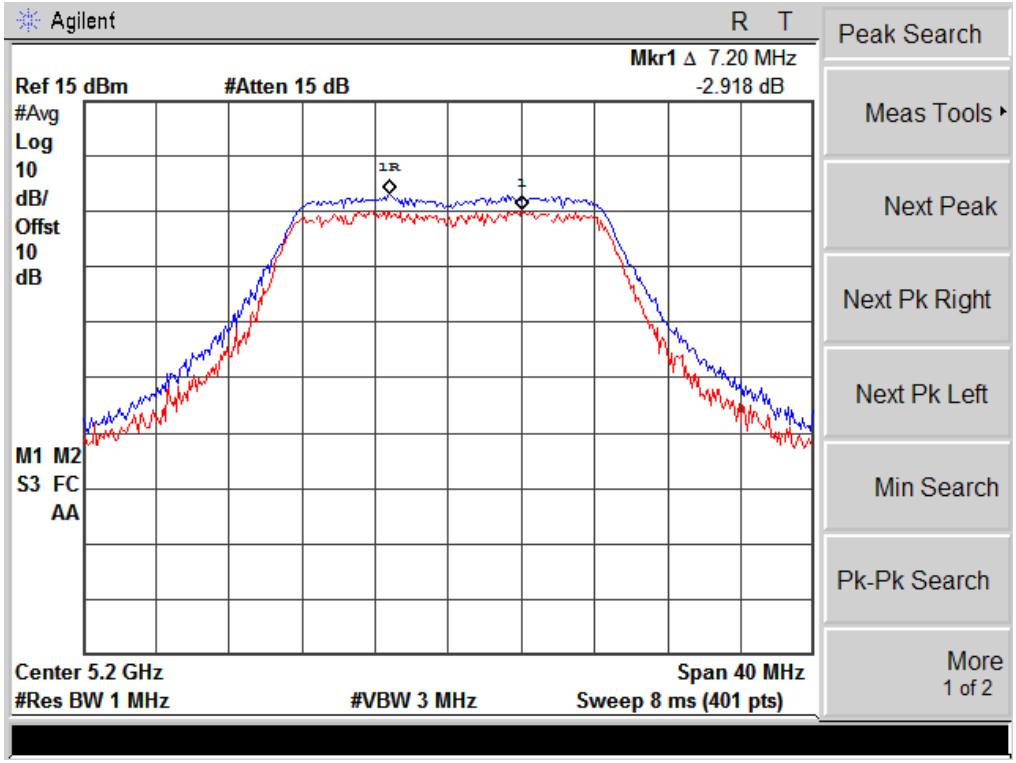
CH 48



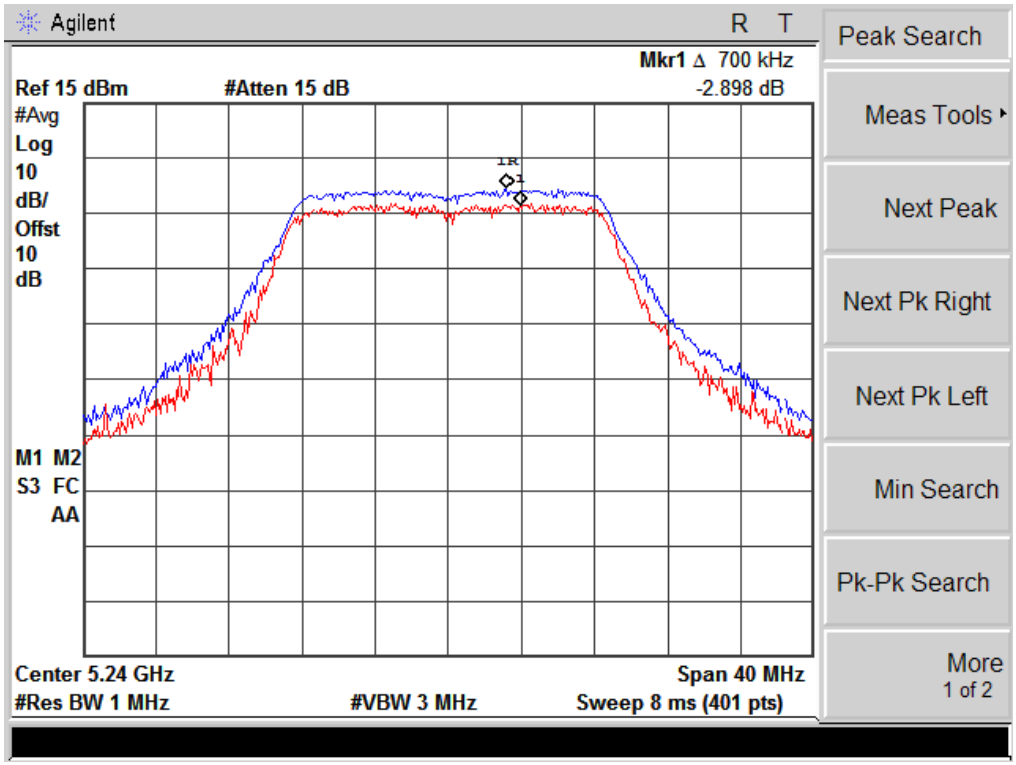

802.11n20(5G): CH 36



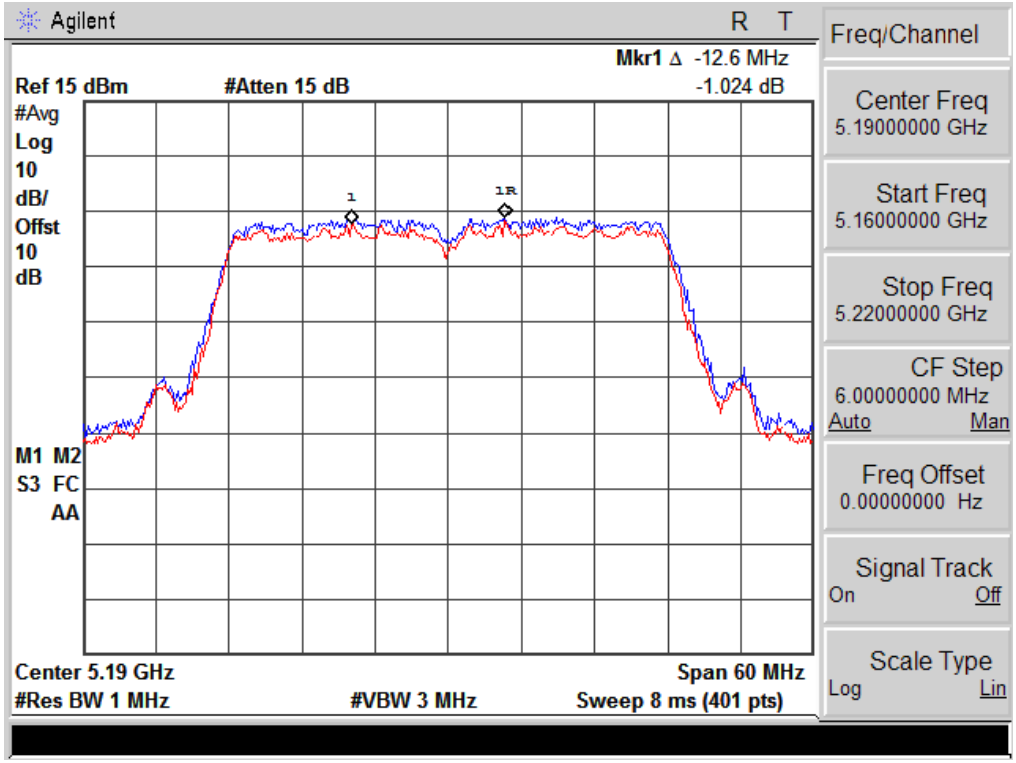
CH 40


Agilent
R T
Mkr1 Δ 7.20 MHz
-2.918 dB
Ref 15 dBm
#Atten 15 dB
#Avg
Log
10
dB/
Offst
10
dB
1R
1
M1 M2
S3 FC
AA
Center 5.2 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 40 MHz
Sweep 8 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

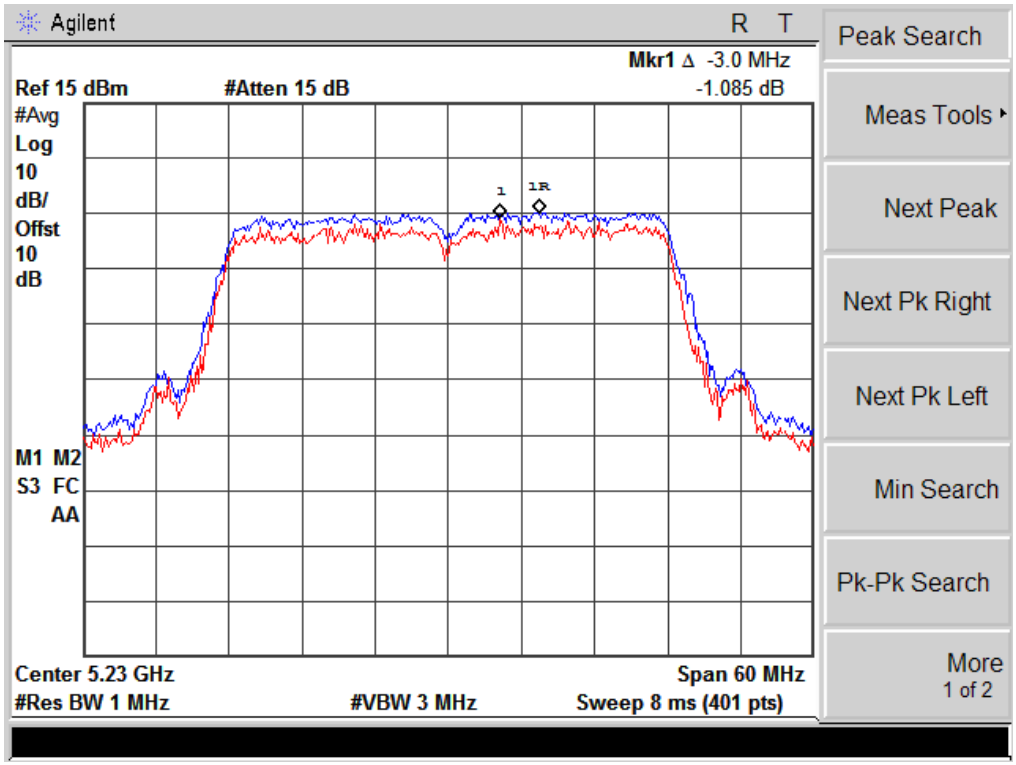
CH 48


Agilent
R T
Mkr1 Δ 700 kHz
-2.898 dB
Ref 15 dBm
#Atten 15 dB
#Avg
Log
10
dB/
Offst
10
dB
1R
1
M1 M2
S3 FC
AA
Center 5.24 GHz
#Res BW 1 MHz
#VBW 3 MHz
Span 40 MHz
Sweep 8 ms (401 pts)
Peak Search
Meas Tools
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
More
1 of 2

802.11n40(5G): CH 38




CH 46



# 9. ANTENNA REQUIREMENT

## 9.1 STANDARD REQUIREMENT

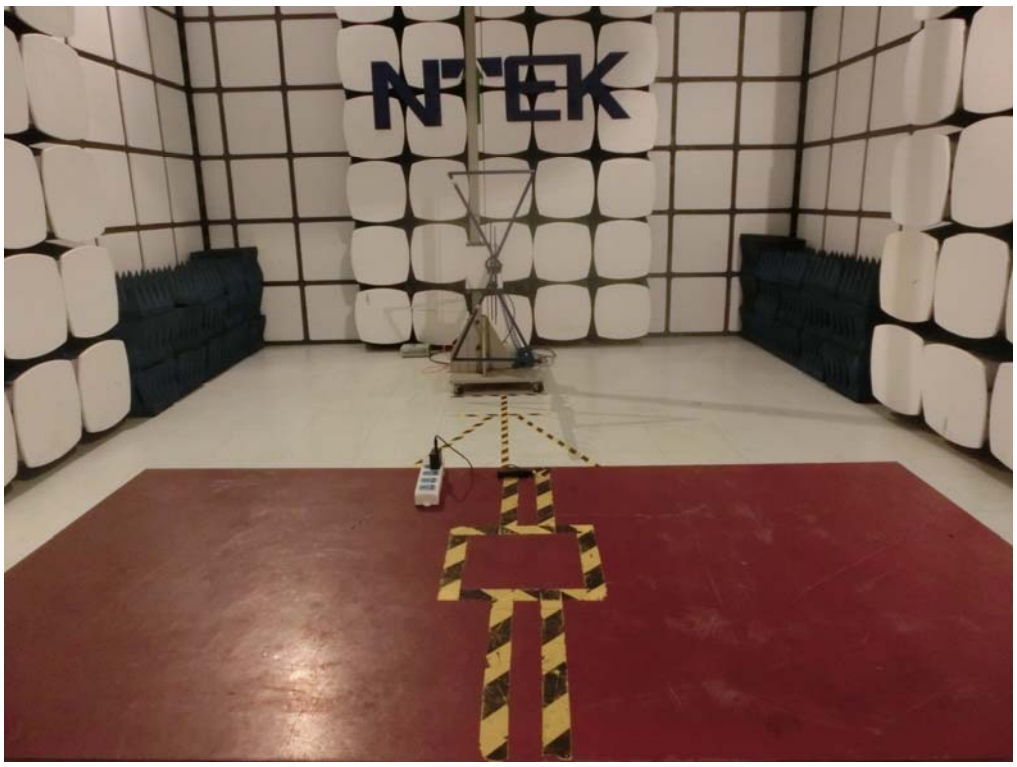
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

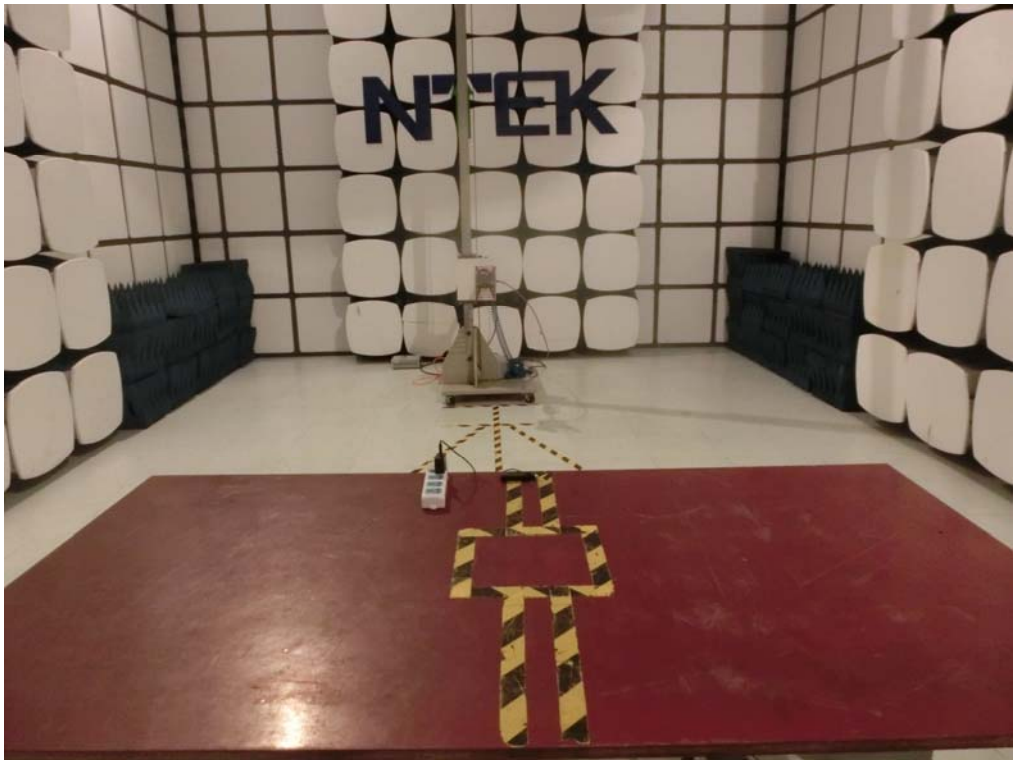
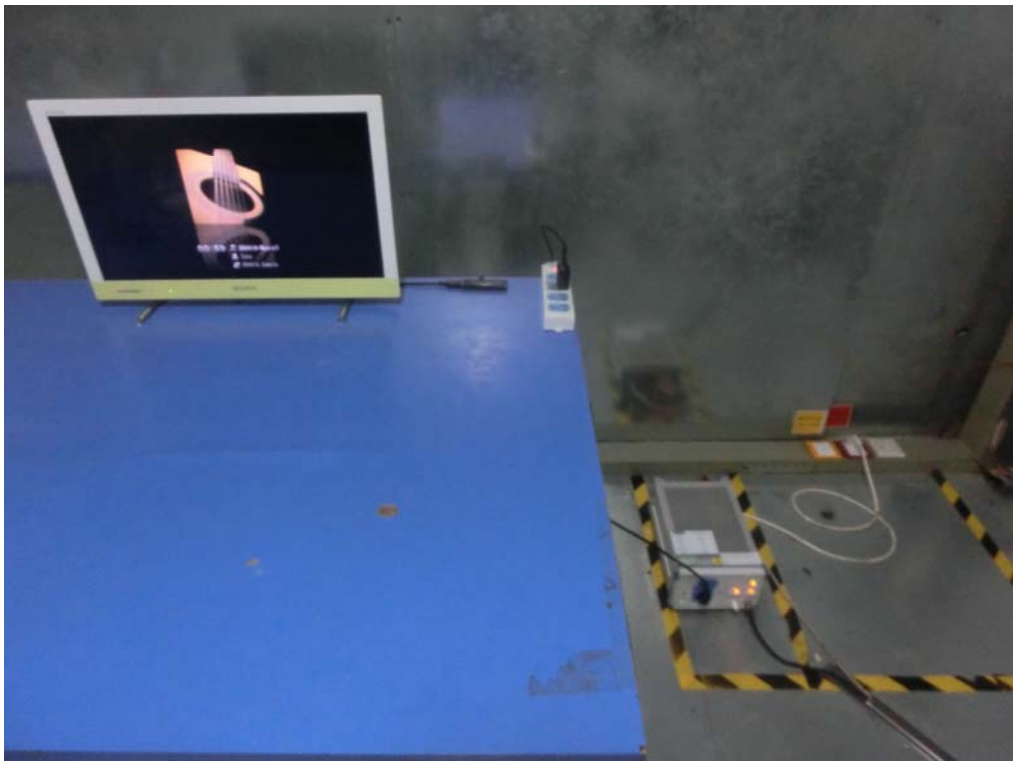
## 9.2 EUT ANTENNA

The EUT antenna is PCB antenna. It comply with the standard requirement.

## 10. EUT TEST PHOTO

**Radiated Measurement Photos**





**Conducted Measurement Photos**