# FCC 47 CFR PART 15 SUBPART E 15.407

## TEST REPORT

## FOR

TREKSTOR PRIMETAB T13B

Model : DFALPWW01464, DFALKWW01464

Issued to
TREKSTOR GmbH
Berliner Ring 7, 64625 Bensheim, Germany

Issued by
WH Technology Corp.

| | | |
|---|---|---|
| **EMC Test Site** | **Xizhi Office and Lab** | **Datong Rd. Xizhi Dist. New Taipei City Taiwan** |
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# Contents

**APPENDIX 1 PHOTOS OF TEST CONFIGURATION**
**PHOTOS OF EUT**

# 1. General Information

| | | |
|---|---|---|
| **Applicant** | : | **TREKSTOR GmbH** |
| **Address** | : | **Berliner Ring 7, 64625 Bensheim, Germany** |
| **Manufacturer** | : | **Heyuan Vastking Electronic Co.,Ltd** |
| **Address** | : | **No.13, Hepu Avenue, Yuancheng District, Heyuan City, Guangdong Province, China.** |
| **EUT** | : | **TREKSTOR PRIMETAB T13B** |
| **Model Name** | : | **DFALPWW01464, DFALKWW01464** |
| **Model Differences** | : | **Only model name different, others are all the same.** |

Is here with confirmed to comply with the requirements set out in the FCC Rules and Regulations Part 15 Subpart C and the measurement procedures were according to ANSI C63.4-2014. The said equipment in the configuration described in this report shows the maximum emission levels emanating

**FCC part 15 subpart E**

Receipt Date : 07/02/2018 Final Test Date : 07/18/2018

**Tested By:** **Reviewed by:**

Jul. 23, 2018 Jul. 23, 2018

**Date** Bing Chang/ Engineer **Date** Bell Wei / Manager

Designation Number: TW2954

# 2. Report of Measurements and Examinations

## 2.1 List of Measurements and Examinations

| FCC Rule | Description of Test | Result |
|---|---|---|
| 15.203 | Antenna requirement | Pass |
| 15.207 | AC Power Line Conducted Emission | Pass |
| 15.407(a)(1) | Peak Transmit Power | Pass |
| 15.407(a)(1) | Power Spectral Density | Pass |
| 15.407(e) | Channel Bandwidth | Pass |
| 15.407(b)(6), 15.205/15.209 | Undesirable Emission | Pass |
| 15.205/15.209 | Radiated Emission | Pass |
| 15.205 | Band Edge | Pass |
| 15.407(f) | Frequency Stability | Pass |

# 3. Test Configuration of Equipment under Test

## 3.1 Description of the tested samples

| | | |
|---|---|---|
| EUT Name | : | TREKSTOR PRIMETAB T13B |
| Model Number | : | DFALPWW01464 |
| FCCID | : | 2ALTX-DFALPWW01464 |
| Receipt Date | : | 07/02/2018 |
| Power From | : | ☑Inside ☑Outside<br>☑Adaptor ☑Battery ☐AC Power Source<br>☐DC Power Source ☐Support Unit PC or NB |
| Adapter | : | JHD-AP024U-120200BA-A<br>INPUT: AC100-240V~ 50/60Hz 0.45A, Output: DC12V 2000mA |
| Battery | : | 7.4V |
| Operate Frequency | : | WiFi:<br>802.11a/802.11n(HT20) /ac(VHT20): 5180MHz ~ 5240MHz; |
| Modulation Technique | : | 802.11a/n/ac: OFDM, BPSK, QPSK, 16QAM, 64QAM, 256QAM |
| Number of Channels | : | Refer to the channel list as described below |
| Antenna Type | : | FPCB Antenna |
| Antenna gain | | Antenna A :2.4GWIFI 2.0dBi; 5G WIFI 1.8dBi<br>Antenna B : 2.4GWIFI 1.85dBi; 5G WIFI 1.9dBi |

## 3.2 Carrier Frequency of Channels

1. **Channel List for 802.11a/n-HT20/ac-VHT20**

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 36 | 5180 | -- | -- |
| 40 | 5200 | -- | -- |
| 44 | 5220 | -- | -- |
| 48 | 5240 | -- | -- |
| 149 | -- | | |

2. **Channel List for 802.11n-HT40/ac-VHT40**

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 38 | 5190 | -- | -- |
| 46 | 5230 | -- | -- |

3. **Channel List for 802.11ac-VHT80**

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|
| 42 | 5210 | -- | -- |

### 3.3 Test Mode and Test Software

a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
b. The complete test system included Notebook and EUT for RF test.
c. Test Software: Radio Test.exe
d. Full charge Battery was used for all testing and the worst radiated emission case from X,Y and Z axis evaluation was selected for testing.
e. Per-test antenna **A** and antenna **B**, find the worst-case is antenna **A**, and record in report.

Note:

Have verified all construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as Test Mode as below:
Transmit (802.11a)
Transmit (802.11n MCS0 20MBW)
Transmit (802.11n MCS0 40MBW)
Transmit (802.11ac MCS0 80MBW)

## 3.4 TEST Methodology & General Test Procedures

All testing as described bellowed were performed in accordance with ANSI C63.4:2014 and ANSI C63.10:2013.

**Conducted Emissions**

The EUT is placed on a wood table, which is at 0.8 m above ground plane acceding to clause 15.207 and requirements of ANSI C63.4:2014. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz are using CISPR Quasi-Peak / Average detectors.

**Radiated Emissions**

The EUT is a placed on a turn table, which is 0.8 m above ground plane. The turntable was rotated through 360 degrees to determine the position of maximum emission level. The EUT is placed at 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

1) Putting the EUT on the platform and turning on the EUT (on/off button on the bottom of the EUT).
2) Setting test channel described as “Channel setting and operating condition”, and testing channel by channel.
3) For the maximum output power measurement, we followed the method of measurement KDB 789033 D02.
4) For the spurious emission test based on ANSI(2014), at the frequency where below 1GHz used quasi-peak detector mode; where above 1GHz used the peak and average detector mode. IF the peak value may be under average limit, the average mode will not be performed.

## 3.5 Measurement Uncertainty

| Measurement Item | Uncertainty |
|---|---|
| Peak Output Power(conducted) | ±1.345dB |
| Power Spectral Density | ±1.347dB |
| Radiated emission(1G-40GHz) | ±5.00dB |
| Radiated emission(30M-1GHz) | ±3.89dB |
| Conducted emission | ±1.81dB |

## 3.6 Description of the Support Equipments

**Setup Diagram**

See test photographs attached in appendix 1 for the actual connections between EUT and support equipment.

**Support Equipment**

Peripherals Devices:

| OUTSIDE SUPPORT EQUIPMENT | | | | | | | |
|---|---|---|---|---|---|---|---|
| No. | Equipment | Model | Serial No. | FCC ID/ BSMI ID | Trade name | Data Cable | Power Cord |
| 1. | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| INSIDE SUPPORT EQUIPMENT | | | | | | | |
| No. | Equipment | Model | Serial No. | FCC ID/ BSMI ID | Trade name | Data Cable | Power Cord |
| 1. | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

**Note:** All the above equipment /cable were placed in worse case position to maximize emission signals during emission test

**Grounding:** Grounding was in accordance with the manufacturer's requirement and conditions for the intended use.

# 4. Test and measurement equipment

## 4.1 calibration

The measuring equipment utilized to perform the tests documented in the report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

## 4.2 equipment

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and. Other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective.

**TABLELIST OF TEST AND MEASUREMENT EQUIPMENT**

| Test Site | Instrument | Manufacturer | Model No. | S/N | Next Cal. Date |
|---|---|---|---|---|---|
| Conduction | Spectrum (9K--3GHz) | R&S | FSP3 | 833387/010 | 2018/09/20 |
| | EMI Receiver | R&S | ESHS10 | 830223/008 | 2019/05/22 |
| | LISN | Rolf Heine Hochfrequenztechnik | NNB-2/16z | 98062 | 2019/05/25 |
| | ISN | Schwarzbeck | 8-Wire ISN CAT5 | CAT5-8158-0094 | 2018/09/21 |
| | RF Cable | N/A | N/A | EMI-3 | 2018/10/19 |
| Radiation | Bilog antenna(30M -1G) | ETC | MCTD2786B | BLB16M04004/JB-5-004 | 2019/05/03 |
| | Double Ridged Guide Horn antenna(1G-18G) | ETC | MCTD 1209 | DRH15N02009 | 2018/11/23 |
| | Horn antenna (18G-26G) | com-power | AH-826 | 81000 | 2018/08/15 |
| | LOOP Antenna (Below 30M) | com-power | AL-130 | 17117 | 2018/10/04 |
| | Pre amplifier (30M-1G) | EMC INSTRUMENT | EMC9135 | 980334 | 2019/05/04 |
| | Microwave Preamplifier (1G-18G) | EMC INSTRUMENT | EMC051845 | 980108&AT-18001 | 2018/10/23 |
| | Pre amplifier (18G~26G) | MITEQ | JS4-18002600-30-5A | 808329 | 2018/08/10 |
| | EMI Test Receiver | R&S | ESVS30 (20M-1000MHz) | 826006/002 | 2018/11/28 |
| | RF Cable | EMCI | N male on end | 30m | 2018/10/19 |

| | | | | | |
|---|---|---|---|---|---|
| | (open site) | | of both sides (EMI4) | | |
| | RF CABLE (1~26.5G) | HARBOUT INDUSTRIES | LL142MI(4M+4M) | NA | 2019/03/08 |
| | RF CABLE (1~26.5G) | HARBOUR INDUSTRIES | LL142MI(7M) | NA | 2018/08/11 |
| | Spectrum (9K--7GHz) | R&S | FSP7 | 830180/006 | 2019/03/25 |
| | Spectrum (9K--40GHz) | AGILENT | 8564EC | 4046A0032 | 2019/03/01 |
| -- | Power Meter | R&S | NRVS | 100696 | 2018/08/10 |
| -- | Power Sensor | R&S | URV5-Z4 | 0395.1619.05 | 2018/08/10 |

***CALIBRATION INTERVAL OF INSTRUMENTS LISTED ABOVE IS ONE YEAR**

# 5. Antenna Requirements

## 5.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

## 5.2 Antenna Construction and Directional Gain

Antenna Type: FPCB Antenna
Antenna Gain: Gain:
Antenna A :2.4GWIFI 2.0dBi; 5G WIFI 1.8dBi
Antenna B : 2.4GWIFI 1.85dBi; 5G WIFI 1.9dBi

# 6. Test of Conducted Emission

## 6.1 Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 110 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2014 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

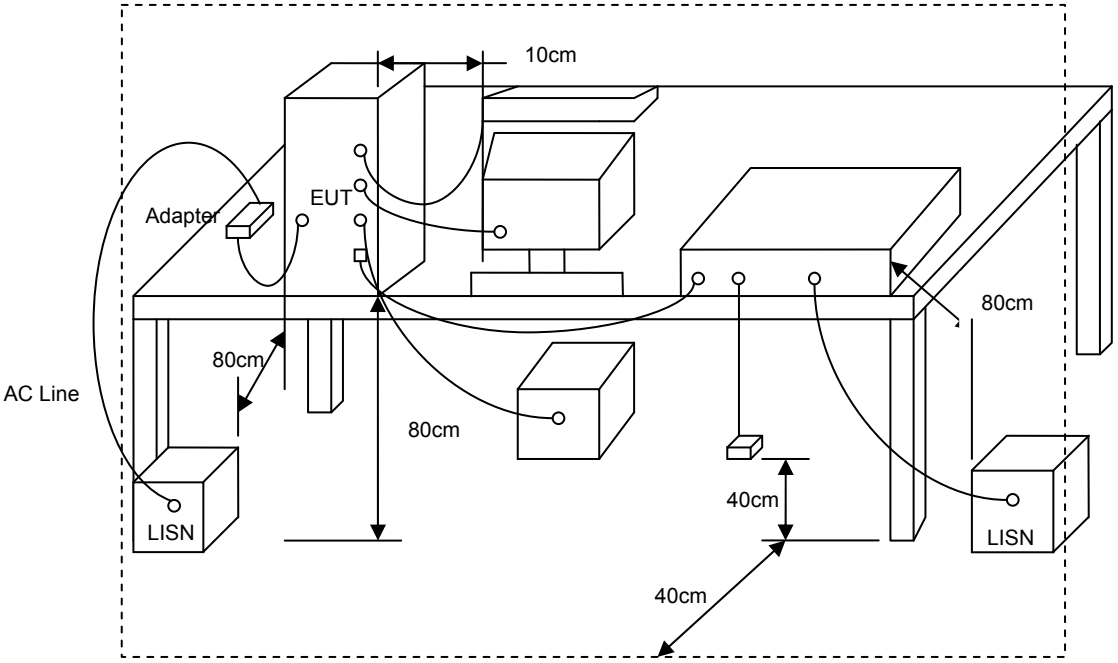
| Frequency (MHz) | Quasi Peak (dB μ V) | Average (dB μ V) |
|---|---|---|
| 0.15 – 0.5 | 66-56* | 56-46* |
| 0.5 – 5.0 | 56 | 46 |
| 5.0 – 30.0 | 60 | 50 |

*Decreases with the logarithm of the frequency.

## 6.2 Test Procedures

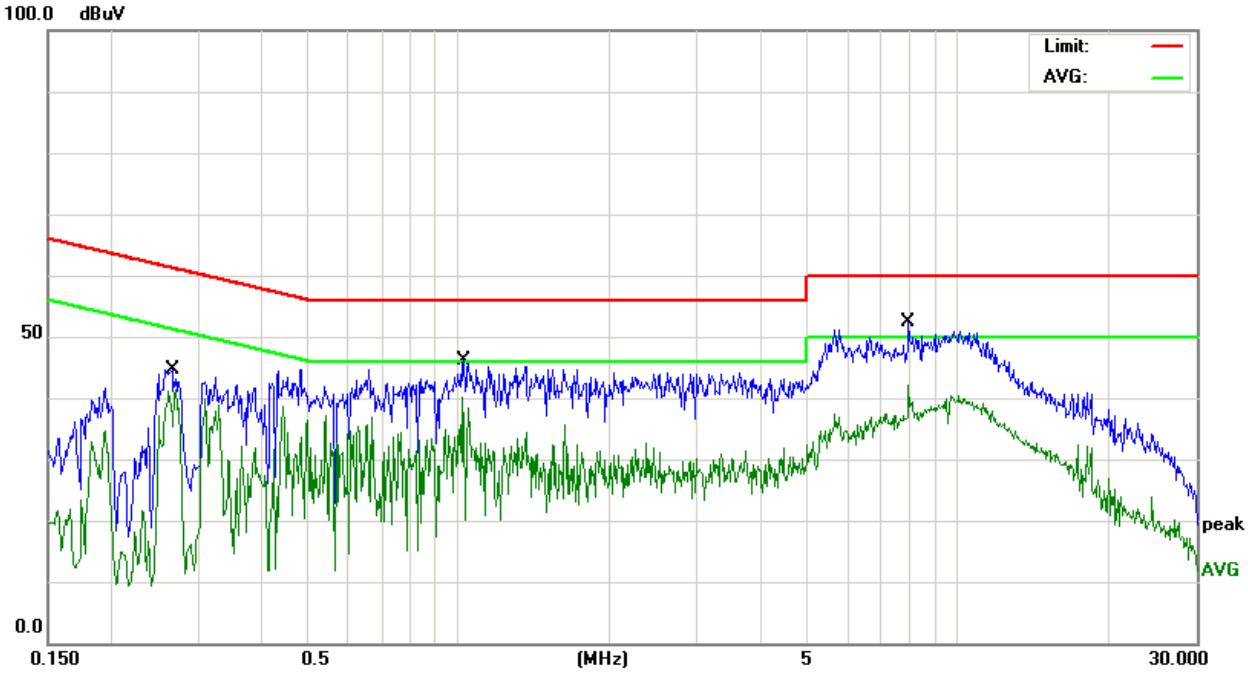
a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connecting to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

## 6.3 Typical Test Setup



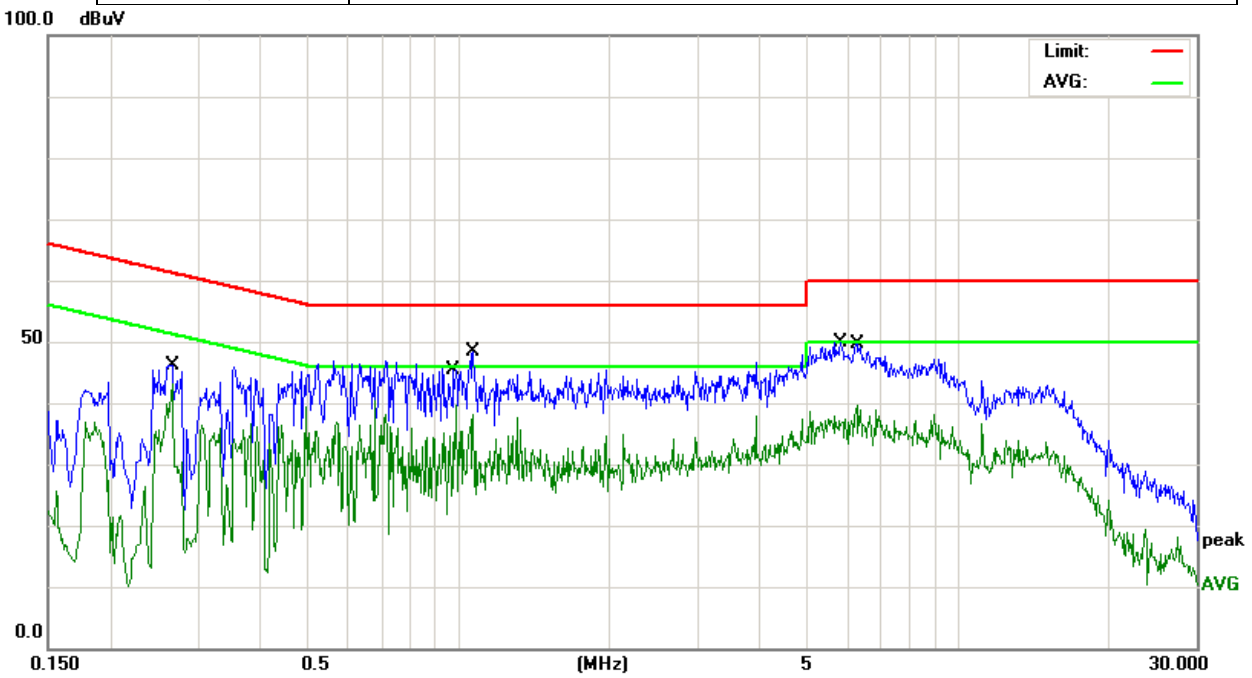
## 6.4 Test Result and Data

| | | | | | |
|---|---|---|---|---|---|
| Power | : | 120V/60Hz for adapter | Pol/Phase | : | LINE |
| Test Mode 1 | : | TX CH38 5180MHz(worst-case) | Temperatur | : | 28 °C |
| Humidity | : | 43 % | | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | | 0.2660 | 42.91 | 1.81 | 44.72 | 61.24 | -16.52 | QP |
| 2 | | 0.2700 | 39.65 | 1.80 | 41.45 | 51.12 | -9.67 | AVG |
| 3 | * | 1.0140 | 39.24 | 0.84 | 40.08 | 46.00 | -5.92 | AVG |
| 4 | | 1.0220 | 45.26 | 0.84 | 46.10 | 56.00 | -9.90 | QP |
| 5 | | 7.9698 | 42.31 | 10.19 | 52.50 | 60.00 | -7.50 | QP |
| 6 | | 7.9698 | 31.94 | 10.19 | 42.13 | 50.00 | -7.87 | AVG |

| | | | | | |
|---|---|---|---|---|---|
| Power | : | 120V/60Hz for adapter | Pol/Phase | : | NEUTRAL |
| Test Mode 1 | : | TX CH38 5180MHz(worst-case) | Temperatur | : | 28 °C |
| Humidity | : | 43 % | | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector |
| 1 | | 0.2660 | 44.27 | 1.81 | 46.08 | 61.24 | -15.16 | QP |
| 2 | | 0.2660 | 41.41 | 1.81 | 43.22 | 51.24 | -8.02 | AVG |
| 3 | * | 0.9858 | 38.78 | 0.84 | 39.62 | 46.00 | -6.38 | AVG |
| 4 | | 1.0700 | 47.51 | 0.84 | 48.35 | 56.00 | -7.65 | QP |
| 5 | | 5.8219 | 39.88 | 10.12 | 50.00 | 60.00 | -10.00 | QP |
| 6 | | 6.2618 | 29.53 | 10.13 | 39.66 | 50.00 | -10.34 | AVG |

# 7. Test of Radiated Emission

## 7.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

| Frequency (MHz) | Field Strength (microvolt/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 |

## 7.2 Test Procedures

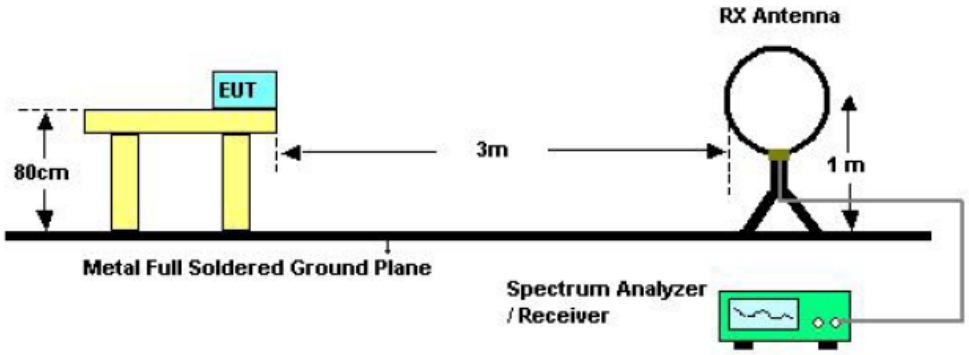
a. The EUT was placed on a rotatable table top 0.8 meter above ground.
b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
c. The table was rotated 360 degrees to determine the position of the highest radiation.
d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise,

the emissions will be measured in average mode again and reported.

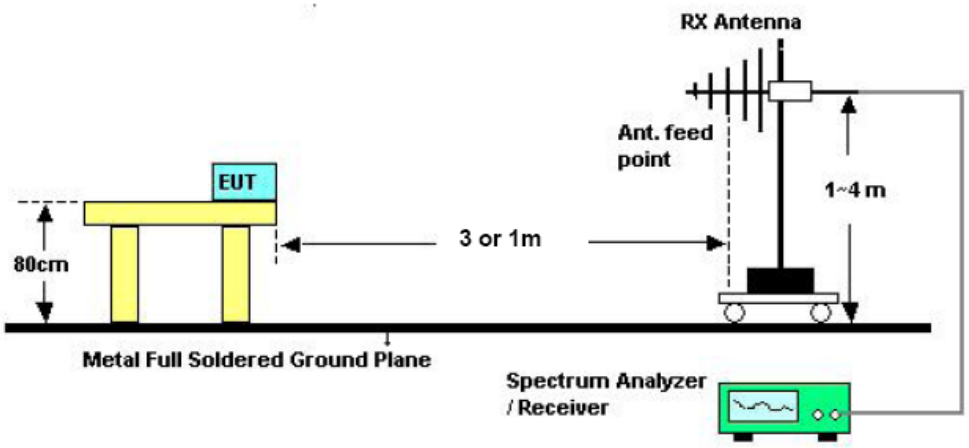
i. “Cone of radiation” has been considered to be 3dB bandwidth of the measurement antenna.

## 7.3 Typical Test Setup

**For radiated emissions below 30MHz**




**For radiated emissions above 30MHz**




Above 10 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade from 3m to 1m.
Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);
Limit line = specific limits (dBuV) + distance extrapolation factor [9.54 dB].

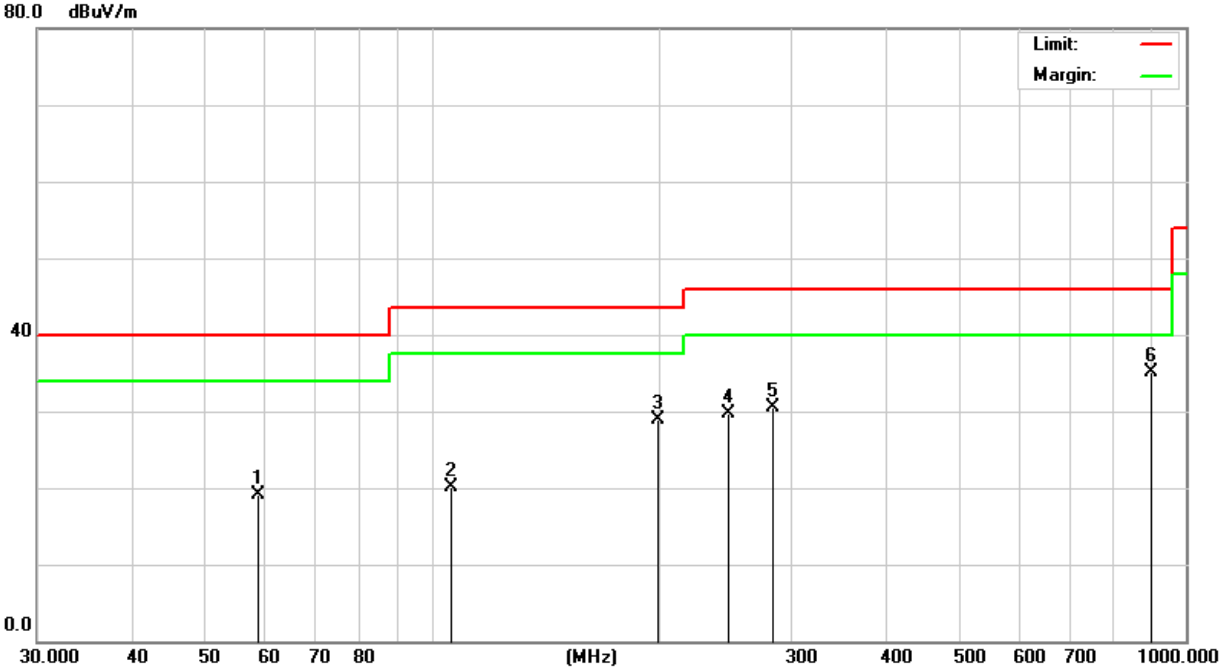
## 7.4 Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

## 7.5 Test Result and Data (30MHz ~ 1GHz, worst emissions found)

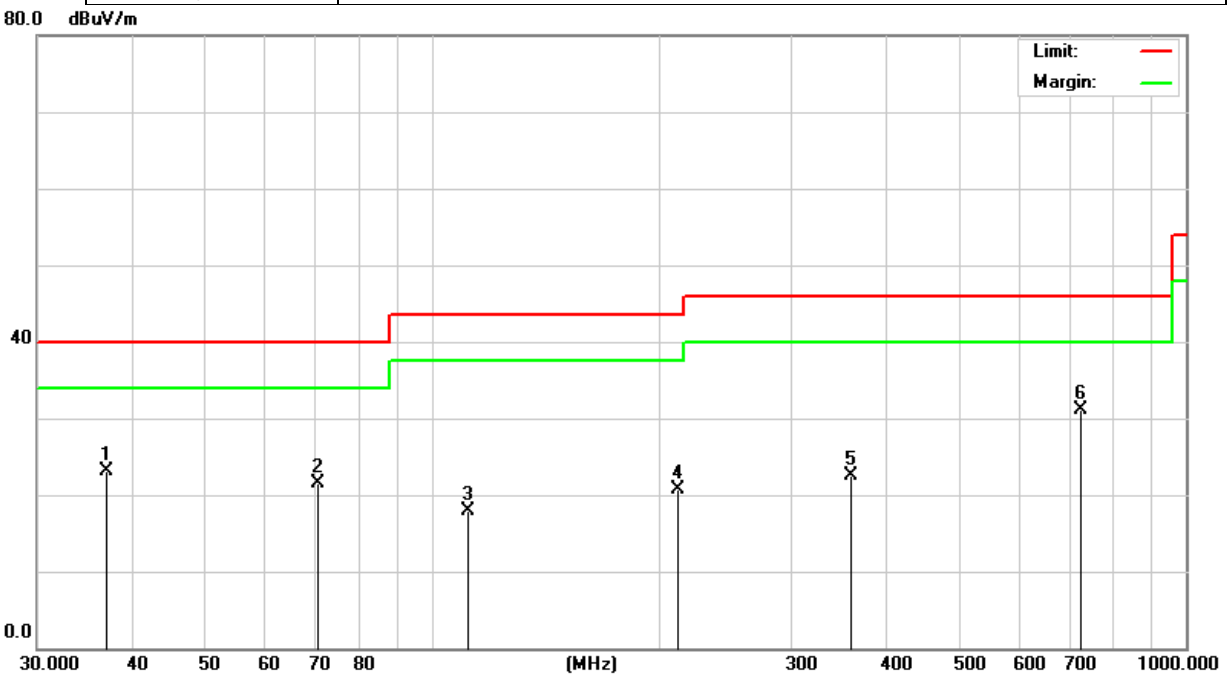
Antenna A:

| | | | | | |
|---|---|---|---|---|---|
| Power | : | DC 7.4V from battery | Pol/Phase | : | HORIZONTAL |
| Test Mode 1 | : | TX 5180MHz(worst-case) | Temperature | : | 28 °C |
| Humidity | : | 59% | | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 59.0251 | 31.98 | -12.86 | 19.12 | 40.00 | -20.88 | QP |
| 2 | | 106.3850 | 31.95 | -11.93 | 20.02 | 43.50 | -23.48 | QP |
| 3 | | 199.2855 | 45.58 | -16.76 | 28.82 | 43.50 | -14.68 | QP |
| 4 | | 247.6819 | 43.39 | -13.78 | 29.61 | 46.00 | -16.39 | QP |
| 5 | | 282.9852 | 41.54 | -11.02 | 30.52 | 46.00 | -15.48 | QP |
| 6 | * | 900.1473 | 32.30 | 2.80 | 35.10 | 46.00 | -10.90 | QP |

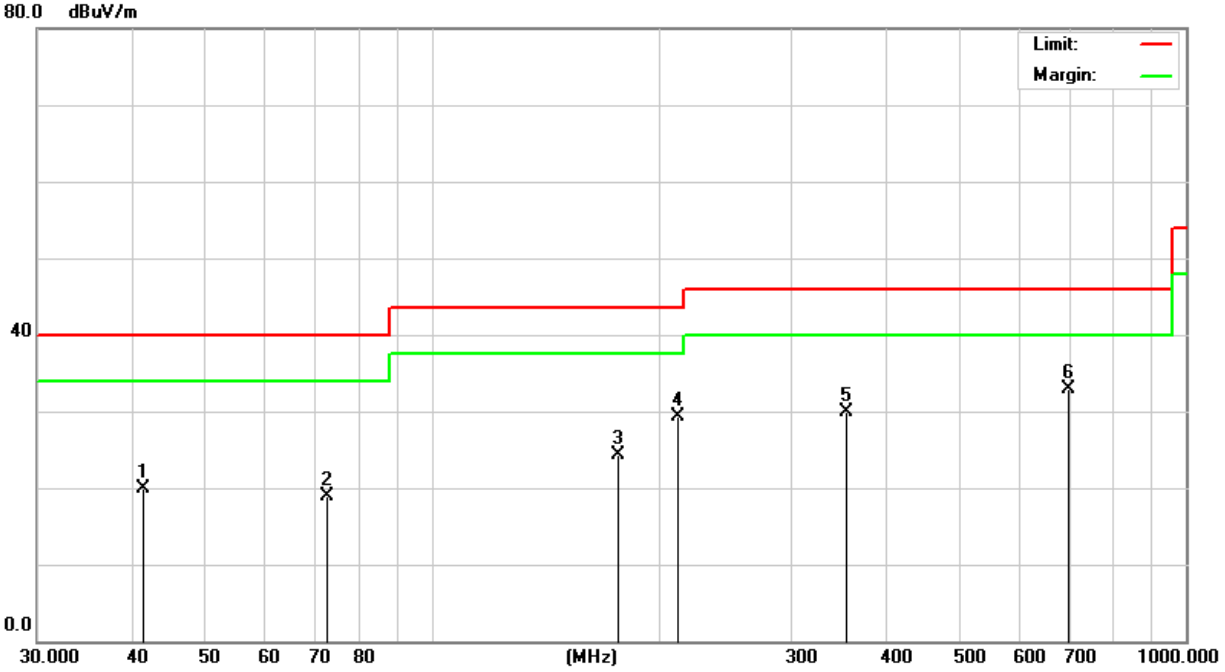
| | | | | | |
|---|---|---|---|---|---|
| Power | : | DC 7.4V from battery | Pol/Phase | : | VERTICAL |
| Test Mode 1 | : | TX 5180MHz(worst-case) | Temperature | : | 28 °C |
| Humidity | : | 59% | | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 37.0248 | 35.34 | -12.30 | 23.04 | 40.00 | -16.96 | QP |
| 2 | | 70.8315 | 36.51 | -15.00 | 21.51 | 40.00 | -18.49 | QP |
| 3 | | 111.7379 | 31.12 | -13.22 | 17.90 | 43.50 | -25.60 | QP |
| 4 | | 212.2694 | 32.93 | -12.30 | 20.63 | 43.50 | -22.87 | QP |
| 5 | | 359.1859 | 30.14 | -7.62 | 22.52 | 46.00 | -23.48 | QP |
| 6 | * | 724.2611 | 31.53 | -0.46 | 31.07 | 46.00 | -14.93 | QP |

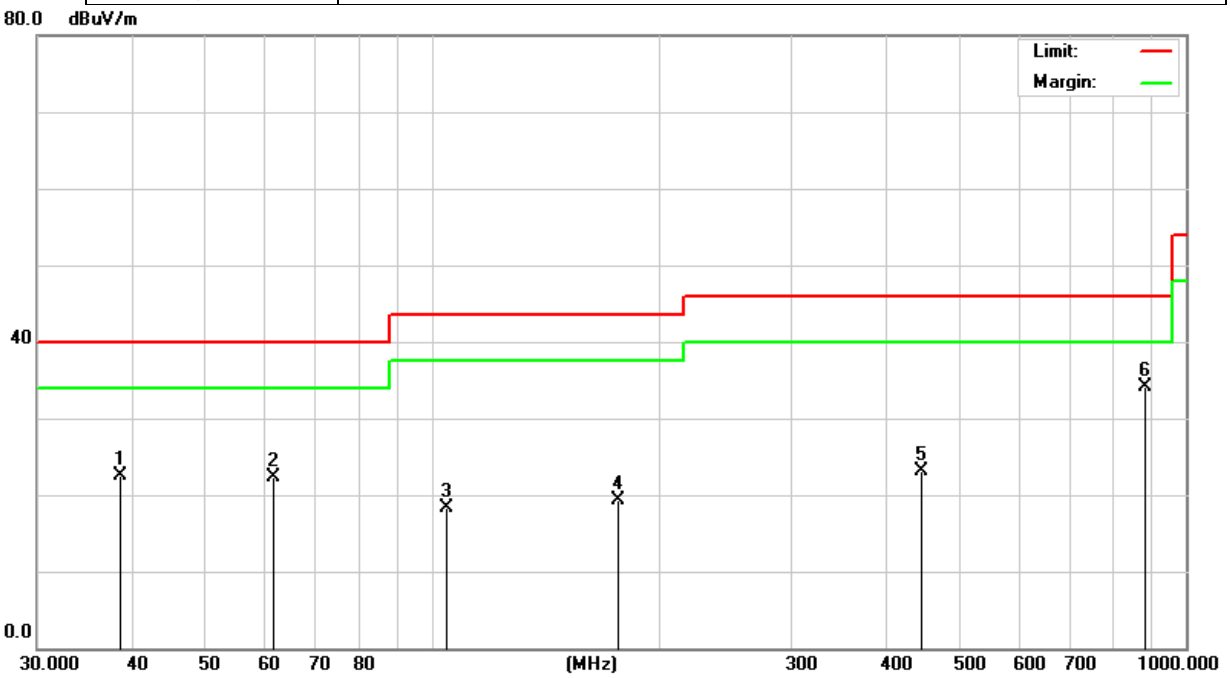
Antenna B:

| | | | | | |
|---|---|---|---|---|---|
| Power | : | DC 7.4V from battery | Pol/Phase | : | HORIZONTAL |
| Test Mode 1 | : | TX 5180MHz(worst-case) | Temperature | : | 28 °C |
| Humidity | : | 59% | | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 41.4215 | 30.39 | -10.52 | 19.87 | 40.00 | -20.13 | QP |
| 2 | | 72.8465 | 33.45 | -14.62 | 18.83 | 40.00 | -21.17 | QP |
| 3 | | 176.8876 | 37.09 | -12.85 | 24.24 | 43.50 | -19.26 | QP |
| 4 | | 212.2694 | 45.96 | -16.57 | 29.39 | 43.50 | -14.11 | QP |
| 5 | | 354.1831 | 37.81 | -7.83 | 29.98 | 46.00 | -16.02 | QP |
| 6 | * | 699.3046 | 32.54 | 0.44 | 32.98 | 46.00 | -13.02 | QP |

| | | | | | |
|---|---|---|---|---|---|
| Power | : | DC 7.4V from battery | Pol/Phase | : | VERTICAL |
| Test Mode 1 | : | TX 5180MHz(worst-case) | Temperature | : | 28 °C |
| Humidity | : | 59% | | | |




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | |
|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector |
| 1 | | 38.6160 | 34.62 | -12.14 | 22.48 | 40.00 | -17.52 | QP |
| 2 | | 61.7781 | 33.91 | -11.60 | 22.31 | 40.00 | -17.69 | QP |
| 3 | | 104.9033 | 31.60 | -13.37 | 18.23 | 43.50 | -25.27 | QP |
| 4 | | 176.8876 | 33.31 | -14.04 | 19.27 | 43.50 | -24.23 | QP |
| 5 | | 446.4141 | 29.99 | -6.82 | 23.17 | 46.00 | -22.83 | QP |
| 6 | * | 884.5028 | 31.61 | 2.57 | 34.18 | 46.00 | -11.82 | QP |

Note:

All the modulation modes were tested, the data of the worst mode are recorded in the above pages and the others modulation methods do not exceed the limits.

## 7.6 Test Result and Data (Between 1~40 GHz)

**Antenna A:**

**Above 1GHz:**

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11a-5180MHz | H | 10360 | 33.11 | 12.56 | 47.90 | 74 | -26.10 | PEAK |
| | H | 15540 | 35.07 | 16.45 | 51.99 | 74 | -22.01 | PEAK |
| | V | 10360 | 35.42 | 12.56 | 48.27 | 74 | -25.73 | PEAK |
| | V | 15540 | 35.62 | 16.45 | 53.14 | 74 | -20.86 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11a-5200 MHz | H | 10400 | 35.31 | 12.64 | 47.95 | 74 | -26.05 | PEAK |
| | H | 15600 | 34.99 | 16.53 | 51.52 | 74 | -22.48 | PEAK |
| | V | 10400 | 36.89 | 12.64 | 49.53 | 74 | -24.47 | PEAK |
| | V | 15600 | 34.85 | 16.53 | 51.38 | 74 | -22.62 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11a-5240 MHz | H | 10480 | 32.68 | 12.68 | 45.36 | 74 | -28.64 | PEAK |
| | H | 15720 | 34.86 | 16.54 | 51.40 | 74 | -22.60 | PEAK |
| | V | 10480 | 35.93 | 12.68 | 48.61 | 74 | -25.39 | PEAK |
| | V | 15720 | 34.02 | 16.54 | 50.56 | 74 | -23.44 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT20-5180MHz | H | 10360 | 33.31 | 12.56 | 45.87 | 74 | -28.13 | PEAK |
| | H | 15540 | 35.14 | 16.45 | 51.59 | 74 | -22.41 | PEAK |
| | V | 10360 | 35.41 | 12.56 | 47.97 | 74 | -26.03 | PEAK |
| | V | 15540 | 35.64 | 16.45 | 52.09 | 74 | -21.91 | PEAK |

| 802.11n HT20-5200MHz | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| | H | 10400 | 35.01 | 12.64 | 47.65 | 74 | -26.35 | PEAK |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | H | 15600 | 33.24 | 16.53 | 49.77 | 74 | -24.23 | PEAK |
| | V | 10400 | 35.84 | 12.64 | 48.48 | 74 | -25.52 | PEAK |
| | V | 15600 | 35.15 | 16.53 | 51.68 | 74 | -22.32 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT20-5240MHz | H | 10480 | 35.14 | 12.68 | 47.82 | 74 | -26.18 | PEAK |
| | H | 15720 | 29.71 | 16.54 | 46.25 | 74 | -27.75 | PEAK |
| | V | 10480 | 33.54 | 12.68 | 46.22 | 74 | -27.78 | PEAK |
| | V | 15720 | 33.42 | 16.54 | 49.96 | 74 | -24.04 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT40-5190MHz | H | 10380 | 35.54 | 12.58 | 48.12 | 74 | -25.88 | PEAK |
| | H | 15570 | 34.19 | 16.48 | 50.67 | 74 | -23.33 | PEAK |
| | V | 10380 | 37.99 | 12.58 | 50.57 | 74 | -23.43 | PEAK |
| | V | 15570 | 33.14 | 16.48 | 49.62 | 74 | -24.38 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT40-5230MHz | H | 10460 | 36.11 | 12.66 | 48.77 | 74 | -25.23 | PEAK |
| | H | 15690 | 35.62 | 16.53 | 52.15 | 74 | -21.85 | PEAK |
| | V | 10460 | 36.15 | 12.66 | 48.81 | 74 | -25.19 | PEAK |
| | V | 15690 | 32.52 | 16.53 | 49.05 | 74 | -24.95 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT20-5180MHz | H | 10360 | 35.21 | 12.56 | 47.77 | 74 | -26.23 | PEAK |
| | H | 15540 | 33.85 | 16.45 | 50.3 | 74 | -23.70 | PEAK |
| | V | 10360 | 33.87 | 12.56 | 46.43 | 74 | -27.57 | PEAK |
| | V | 15540 | 35.06 | 16.45 | 51.51 | 74 | -22.49 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT20-5200MHz | H | 10400 | 34.84 | 12.64 | 47.48 | 74 | -26.52 | PEAK |
| | H | 15600 | 32.03 | 16.53 | 48.56 | 74 | -25.44 | PEAK |
| | V | 10400 | 33.54 | 12.64 | 46.18 | 74 | -27.82 | PEAK |
| | V | 15600 | 32.13 | 16.53 | 48.66 | 74 | -25.34 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT20-5240MHz | H | 10480 | 34.51 | 12.68 | 47.19 | 74 | -26.81 | PEAK |
| | H | 15720 | 32.11 | 16.54 | 48.65 | 74 | -25.35 | PEAK |
| | V | 10480 | 33.36 | 12.68 | 46.04 | 74 | -27.96 | PEAK |
| | V | 15720 | 34.23 | 16.54 | 50.77 | 74 | -23.23 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT40-5190MHz | H | 10380 | 34.32 | 12.58 | 46.9 | 74 | -27.1 | PEAK |
| | H | 15570 | 35.03 | 16.48 | 51.51 | 74 | -22.49 | PEAK |
| | V | 10380 | 35.54 | 12.58 | 48.12 | 74 | -25.88 | PEAK |
| | V | 15570 | 32.33 | 16.48 | 48.81 | 74 | -25.19 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT40-5230MHz | H | 10460 | 35.03 | 12.66 | 47.69 | 74 | -26.31 | PEAK |
| | H | 15690 | 33.02 | 16.53 | 49.55 | 74 | -24.45 | PEAK |
| | V | 10460 | 35.35 | 12.66 | 48.01 | 74 | -25.99 | PEAK |
| | V | 15690 | 33.65 | 16.53 | 50.18 | 74 | -23.82 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT80-5210MHz | H | 10420 | 34.32 | 12.62 | 46.94 | 74 | -27.06 | PEAK |
| | H | 15630 | 33.22 | 16.52 | 49.74 | 74 | -24.26 | PEAK |
| | V | 10420 | 34.36 | 12.62 | 46.98 | 74 | -27.02 | PEAK |
| | V | 15630 | 32.51 | 16.52 | 49.03 | 74 | -24.97 | PEAK |

| |
|---|
| The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: |
| Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor. |
| Average measurement was not performed if peak level lower than average limit.<br>No any other emissions level very low which are attenuated less than 20dB below the limit.<br>According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.<br>Hence there no other emissions have been reported. |

**Antenna B:**

**Above 1GHz:**

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11a-5180MHz | H | 10360 | 34.32 | 12.56 | 46.88 | 74 | -27.12 | PEAK |
| | H | 15540 | 35.65 | 16.45 | 52.1 | 74 | -21.9 | PEAK |
| | V | 10360 | 35.18 | 12.56 | 47.74 | 74 | -26.26 | PEAK |
| | V | 15540 | 36.47 | 16.45 | 52.92 | 74 | -21.08 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11a-5200 MHz | H | 10400 | 35.85 | 12.64 | 48.49 | 74 | -25.51 | PEAK |
| | H | 15600 | 35.42 | 16.53 | 51.95 | 74 | -22.05 | PEAK |
| | V | 10400 | 37.33 | 12.64 | 49.97 | 74 | -24.03 | PEAK |
| | V | 15600 | 35.16 | 16.53 | 51.69 | 74 | -22.31 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11a-5240 MHz | H | 10480 | 33.35 | 12.68 | 46.03 | 74 | -27.97 | PEAK |
| | H | 15720 | 34.62 | 16.54 | 51.16 | 74 | -22.84 | PEAK |
| | V | 10480 | 36.03 | 12.68 | 48.71 | 74 | -25.29 | PEAK |
| | V | 15720 | 34.13 | 16.54 | 50.67 | 74 | -23.33 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT20-5180MHz | H | 10360 | 33.21 | 12.56 | 45.77 | 74 | -28.23 | PEAK |
| | H | 15540 | 35.32 | 16.45 | 51.77 | 74 | -22.23 | PEAK |
| | V | 10360 | 35.64 | 12.56 | 48.2 | 74 | -25.8 | PEAK |
| | V | 15540 | 36.03 | 16.45 | 52.48 | 74 | -21.52 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT20-5200MHz | H | 10400 | 34.58 | 12.64 | 47.22 | 74 | -26.78 | PEAK |
| | H | 15600 | 33.32 | 16.53 | 49.85 | 74 | -24.15 | PEAK |
| | V | 10400 | 36.03 | 12.64 | 48.67 | 74 | -25.33 | PEAK |
| | V | 15600 | 35.48 | 16.53 | 52.01 | 74 | -21.99 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT20-5240MHz | H | 10480 | 35.33 | 12.68 | 48.01 | 74 | -25.99 | PEAK |
| | H | 15720 | 29.41 | 16.54 | 45.95 | 74 | -28.05 | PEAK |
| | V | 10480 | 34.33 | 12.68 | 47.01 | 74 | -26.99 | PEAK |
| | V | 15720 | 32.65 | 16.54 | 49.19 | 74 | -24.81 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT40-5190MHz | H | 10380 | 36.14 | 12.58 | 48.72 | 74 | -25.28 | PEAK |
| | H | 15570 | 34.23 | 16.48 | 50.71 | 74 | -23.29 | PEAK |
| | V | 10380 | 37.03 | 12.58 | 49.61 | 74 | -24.39 | PEAK |
| | V | 15570 | 33.41 | 16.48 | 49.89 | 74 | -24.11 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11n HT40-5230MHz | H | 10460 | 37.32 | 12.66 | 49.98 | 74 | -24.02 | PEAK |
| | H | 15690 | 35.33 | 16.53 | 51.86 | 74 | -22.14 | PEAK |
| | V | 10460 | 36.12 | 12.66 | 48.78 | 74 | -25.22 | PEAK |
| | V | 15690 | 32.36 | 16.53 | 48.89 | 74 | -25.11 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT20-5180MHz | H | 10360 | 34.85 | 12.56 | 47.41 | 74 | -26.59 | PEAK |
| | H | 15540 | 34.52 | 16.45 | 50.97 | 74 | -23.03 | PEAK |
| | V | 10360 | 34.33 | 12.56 | 46.89 | 74 | -27.11 | PEAK |
| | V | 15540 | 35.64 | 16.45 | 52.09 | 74 | -21.91 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT20-5200MHz | H | 10400 | 34.28 | 12.64 | 46.92 | 74 | -27.08 | PEAK |
| | H | 15600 | 31.65 | 16.53 | 48.18 | 74 | -25.82 | PEAK |
| | V | 10400 | 33.51 | 12.64 | 46.15 | 74 | -27.85 | PEAK |
| | V | 15600 | 32.34 | 16.53 | 48.87 | 74 | -25.13 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT20-5240MHz | H | 10480 | 34.51 | 12.68 | 47.19 | 74 | -26.81 | PEAK |
| | H | 15720 | 32.75 | 16.54 | 49.29 | 74 | -24.71 | PEAK |
| | V | 10480 | 33.33 | 12.68 | 46.01 | 74 | -27.99 | PEAK |
| | V | 15720 | 34.52 | 16.54 | 51.06 | 74 | -22.94 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT40-5190MHz | H | 10380 | 34.28 | 12.58 | 46.86 | 74 | -27.14 | PEAK |
| | H | 15570 | 35.36 | 16.48 | 51.84 | 74 | -22.16 | PEAK |
| | V | 10380 | 35.74 | 12.58 | 48.32 | 74 | -25.68 | PEAK |
| | V | 15570 | 32.71 | 16.48 | 49.19 | 74 | -24.81 | PEAK |

| 802.11ac HT40-5230MHz | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| | H | 10460 | 35.21 | 12.66 | 47.87 | 74 | -26.13 | PEAK |
| | H | 15690 | 32.52 | 16.53 | 49.05 | 74 | -24.95 | PEAK |
| | V | 10460 | 32.31 | 12.66 | 44.97 | 74 | -29.03 | PEAK |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | V | 15690 | 33.43 | 16.53 | 49.96 | 74 | -24.04 | PEAK |

| | Pol. (H/V) | Frequency (MHz) | Reading (dBμV) | Factor (dB) | Emission (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|---|
| 802.11ac HT80-5210MHz | H | 10420 | 34.41 | 12.62 | 47.03 | 74 | -26.97 | PEAK |
| | H | 15630 | 33.85 | 16.52 | 50.37 | 74 | -23.63 | PEAK |
| | V | 10420 | 34.52 | 12.62 | 47.14 | 74 | -26.86 | PEAK |
| | V | 15630 | 32.56 | 16.52 | 49.08 | 74 | -24.92 | PEAK |

The field strength is calculated by adding the Antenna Factor. Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor –Preamplifier Factor.

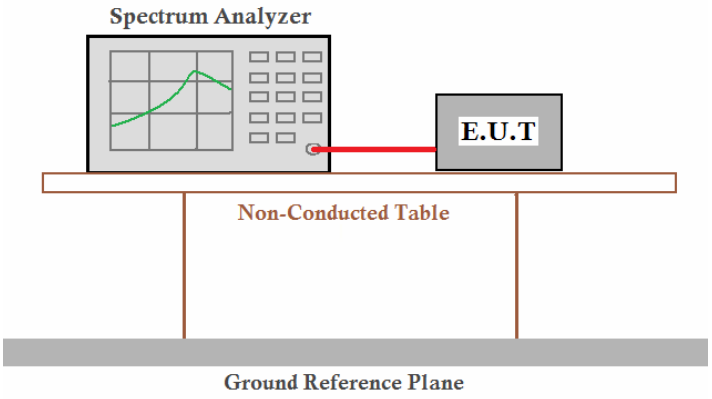
Average measurement was not performed if peak level lower than average limit.

No any other emissions level very low which are attenuated less than 20dB below the limit.

According to 15.31(o), The amplitude of spurious emissions from intentional radiators and emissions from unintentional radiators which are attenuated more than 20 dB below the permissible value need not be reported unless specifically required elsewhere in this Part.

Hence there no other emissions have been reported.

## 8. Bandwidth Measurement Data

| | |
|---|---|
| Test Requirement: | FCC Part15 E Section 15.407 |
| Test Method: | ANSI C63.10:2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01 |
| Limit: | N/A (Band I) |
| | >500KHz(Band IV) |
| Test setup: |  |
| Test procedure: | According to KDB 789033 D02 General UNII Test Procedures New Rules v01. |
| Test Instruments: | Refer to section 5.10 f & section 6.0 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

## 8.1 Test Result and Data

Antenna A:

| CH. No. | Frequency (MHz) | 26dB Occupied Bandwidth (MHz) | | | 99% Occupied Bandwidth (MHz) | | |
|---|---|---|---|---|---|---|---|
| | | 802.11a | 802.11n (HT20) | 802.11ac (VHT20) | 802.11a | 802.11n (HT20) | 802.11ac (VHT20) |
| 36 | 5180.00 | 26.58 | 24.45 | 25.32 | 16.49 | 17.75 | 17.65 |
| 40 | 5200.00 | 26.51 | 26.21 | 24.01 | 16.50 | 17.64 | 17.64 |
| 48 | 5240.00 | 23.43 | 26.63 | 24.54 | 16.50 | 17.63 | 17.65 |

| CH. No. | Frequency (MHz) | 26dB Occupied Bandwidth (MHz) | | 99% Occupied Bandwidth (MHz) | |
|---|---|---|---|---|---|
| | | 802.11n(HT40) | 802.11ac(VHT40) | 802.11n(HT40) | 802.11ac(VHT40) |
| 38 | 5190.00 | 42.89 | 44.56 | 36.07 | 36.24 |
| 46 | 5230.00 | 43.34 | 43.79 | 36.24 | 36.17 |

| CH. No. | Frequency (MHz) | 26dB Occupied Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---|---|---|---|
| | | 802.11ac(VHT80) | 802.11ac(VHT80) |
| 42 | 5210 | 80.99 | 75.44 |

Antenna B:

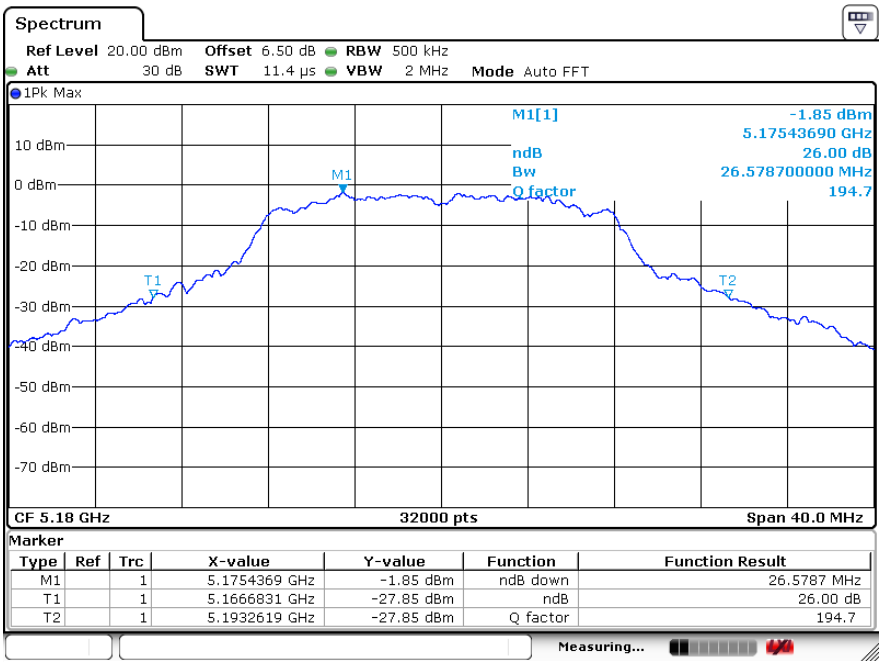
| CH. No. | Frequency (MHz) | 26dB Occupied Bandwidth (MHz) | | | 99% Occupied Bandwidth (MHz) | | |
|---|---|---|---|---|---|---|---|
| | | 802.11a | 802.11n (HT20) | 802.11ac (VHT20) | 802.11a | 802.11n (HT20) | 802.11ac (VHT20) |
| 36 | 5180.00 | 26.43 | 24.41 | 25.31 | 16.50 | 17.73 | 17.65 |
| 40 | 5200.00 | 26.30 | 26.13 | 24.00 | 16.49 | 17.62 | 17.64 |
| 48 | 5240.00 | 23.23 | 26.60 | 24.47 | 16.50 | 17.60 | 17.65 |

| CH. No. | Frequency (MHz) | 26dB Occupied Bandwidth (MHz) | | 99% Occupied Bandwidth (MHz) | |
|---|---|---|---|---|---|
| | | 802.11n(HT40) | 802.11ac(VHT40) | 802.11n(HT40) | 802.11ac(VHT40) |
| 38 | 5190.00 | 42.78 | 44.48 | 36.00 | 36.18 |
| 46 | 5230.00 | 43.26 | 43.74 | 36.13 | 36.09 |

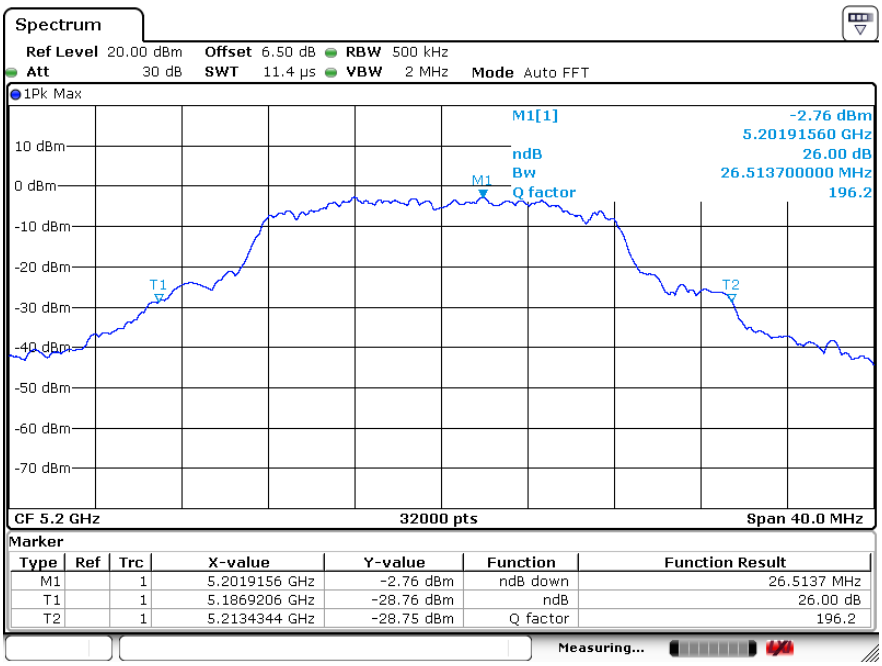
| CH. No. | Frequency (MHz) | 26dB Occupied Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---|---|---|---|
| | | 802.11ac(VHT80) | 802.11ac(VHT80) |
| 42 | 5210 | 80.96 | 75.40 |

Note: The worst data is Antenna A, only shown Antenna A Plot.

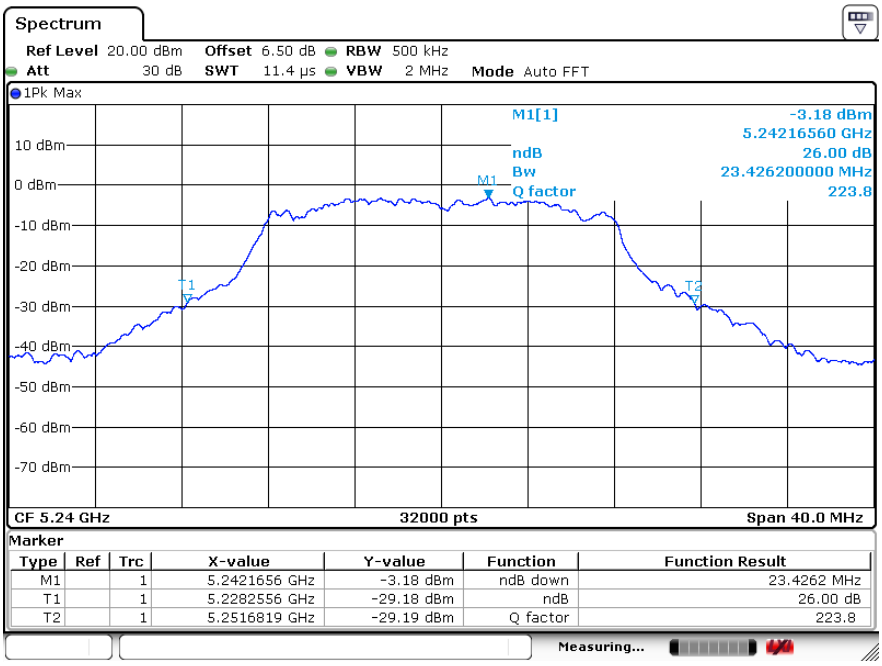
**26dB BW 802.11a**
Channel: 36



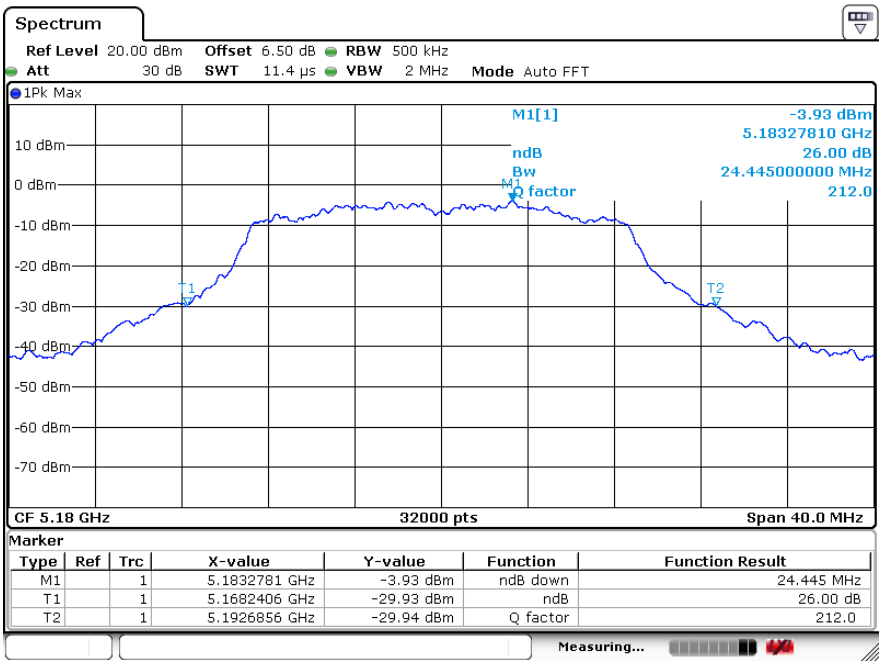

Channel: 40



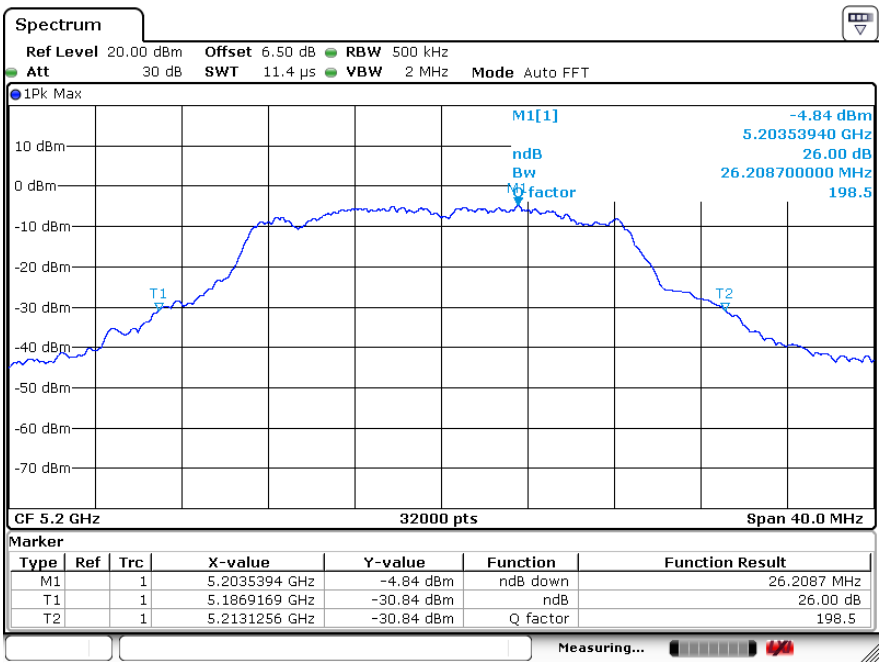
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 500 kHz
Att 30 dB SWT 11.4 µs VBW 2 MHz Mode Auto FFT
1Pk Max
M1[1]
-3.18 dBm
5.24216560 GHz
ndB 26.00 dB
Bw 23.426200000 MHz
Q factor 223.8
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2421656 GHz -3.18 dBm ndB down 23.4262 MHz
T1 1 5.2282556 GHz -29.18 dBm ndB 26.00 dB
T2 1 5.2516819 GHz -29.19 dBm Q factor 223.8
Measuring...

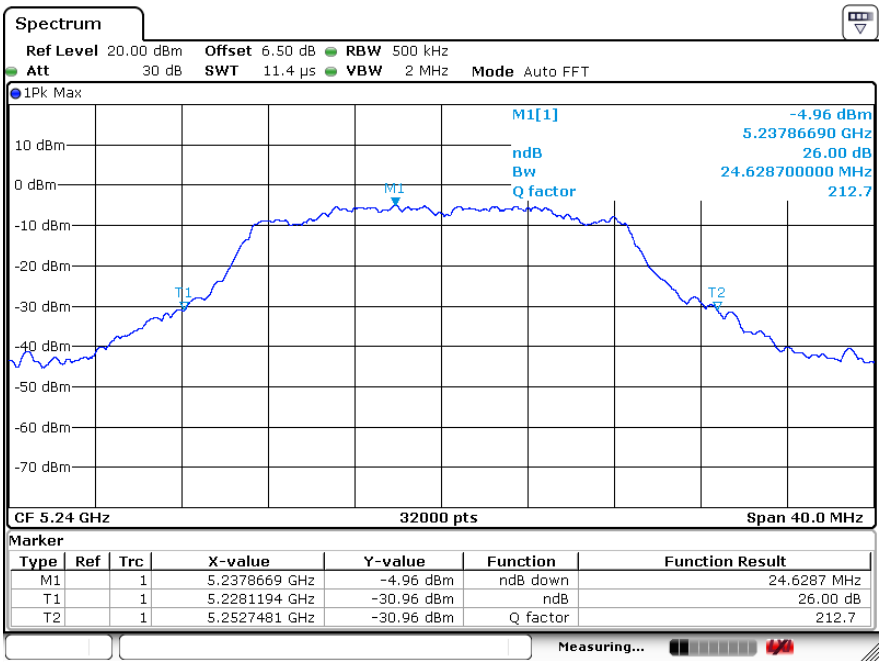
**26dB BW 802.11n20**
Channel: 36



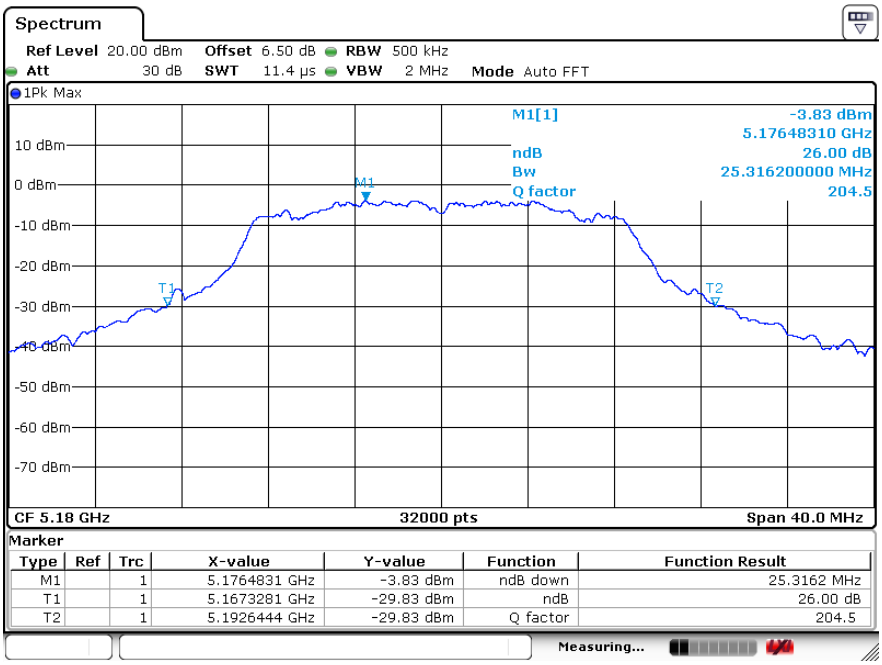

Channel: 40



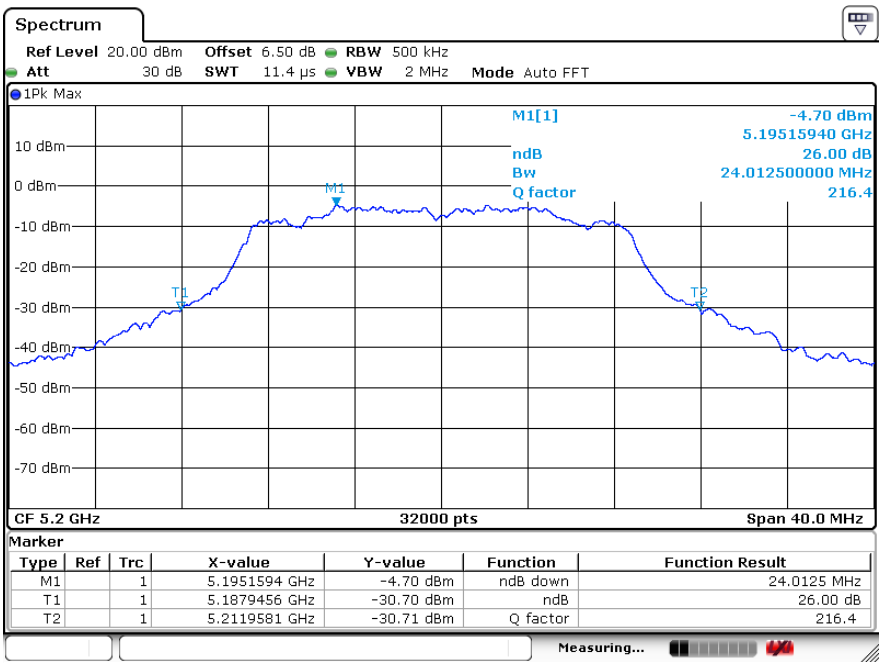
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 500 kHz
Att 30 dB SWT 11.4 µs VBW 2 MHz Mode Auto FFT
1Pk Max
M1[1]
-4.96 dBm
5.23786690 GHz
ndB 26.00 dB
Bw 24.628700000 MHz
Q factor 212.7
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
T1
T2
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2378669 GHz -4.96 dBm ndB down 24.6287 MHz
T1 1 5.2281194 GHz -30.96 dBm ndB 26.00 dB
T2 1 5.2527481 GHz -30.96 dBm Q factor 212.7
Measuring...

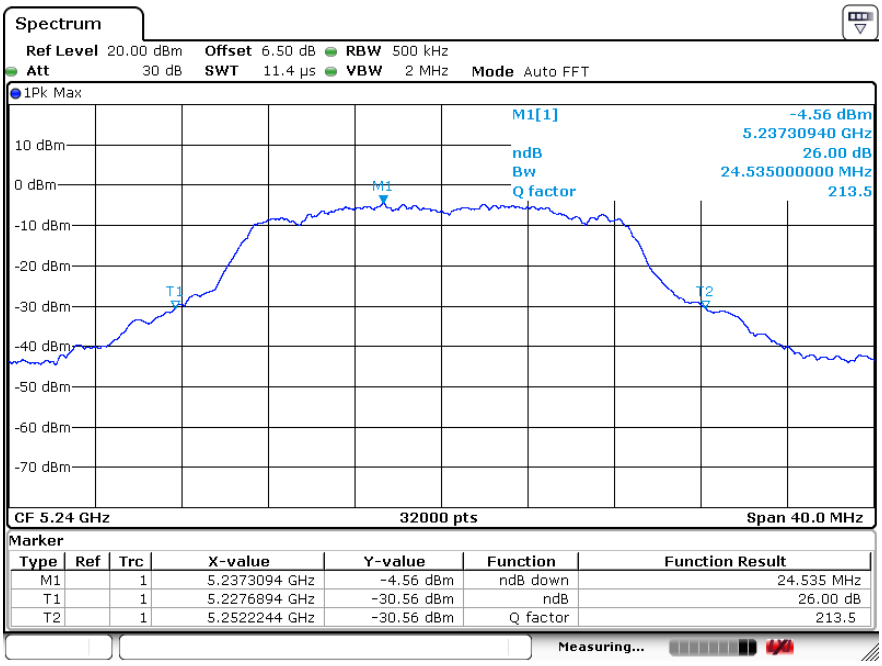
**802.11ac20**
Channel: 36



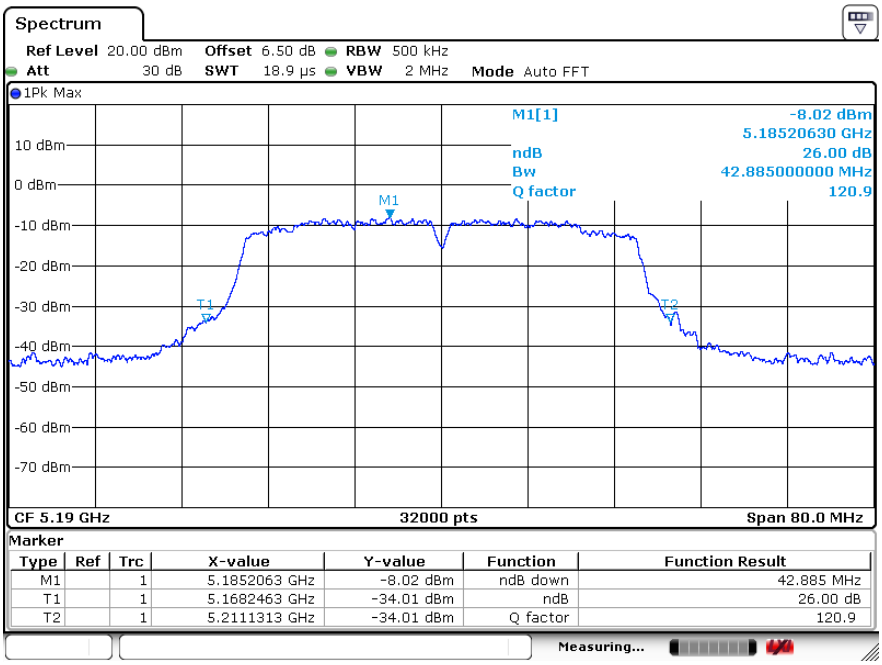

Channel: 40



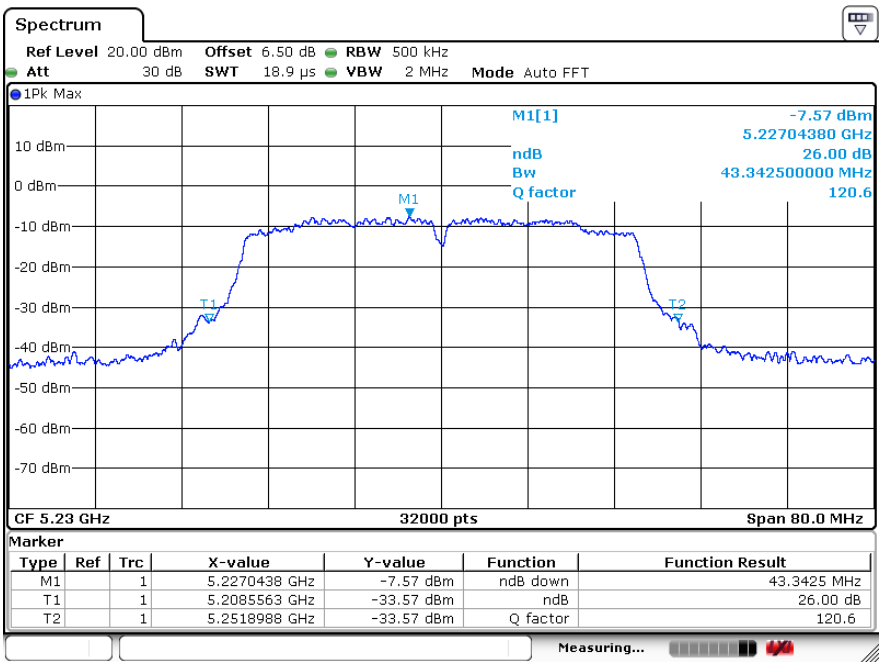
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 500 kHz
Att 30 dB SWT 11.4 µs VBW 2 MHz Mode Auto FFT
1Pk Max
M1[1]
-4.56 dBm
5.23730940 GHz
ndB 26.00 dB
Bw 24.535000000 MHz
Q factor 213.5
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
T1
T2
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2373094 GHz -4.56 dBm ndB down 24.535 MHz
T1 1 5.2276894 GHz -30.56 dBm ndB 26.00 dB
T2 1 5.2522244 GHz -30.56 dBm Q factor 213.5
Measuring...

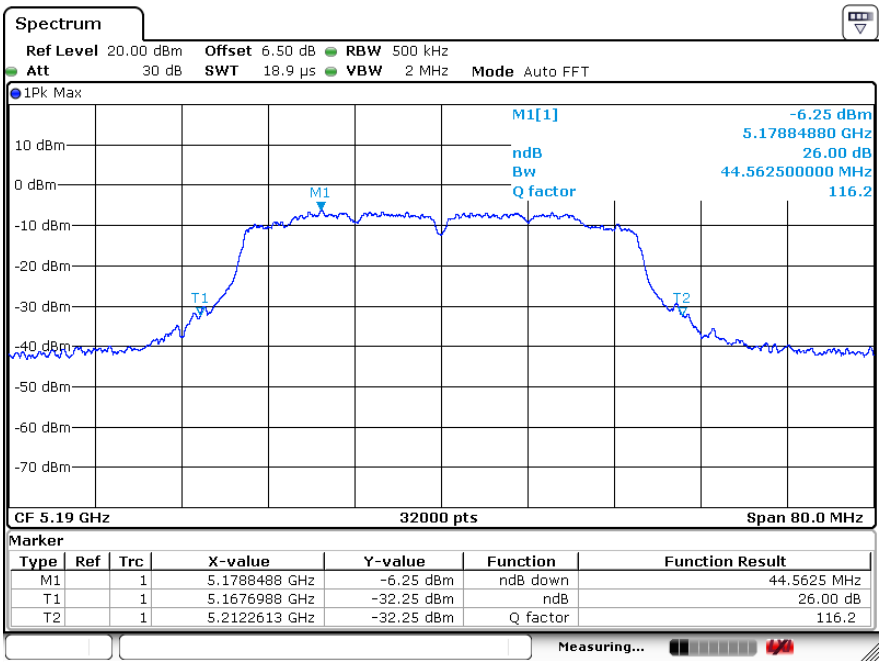
**26dB BW 802.11n40**
Channel: 38



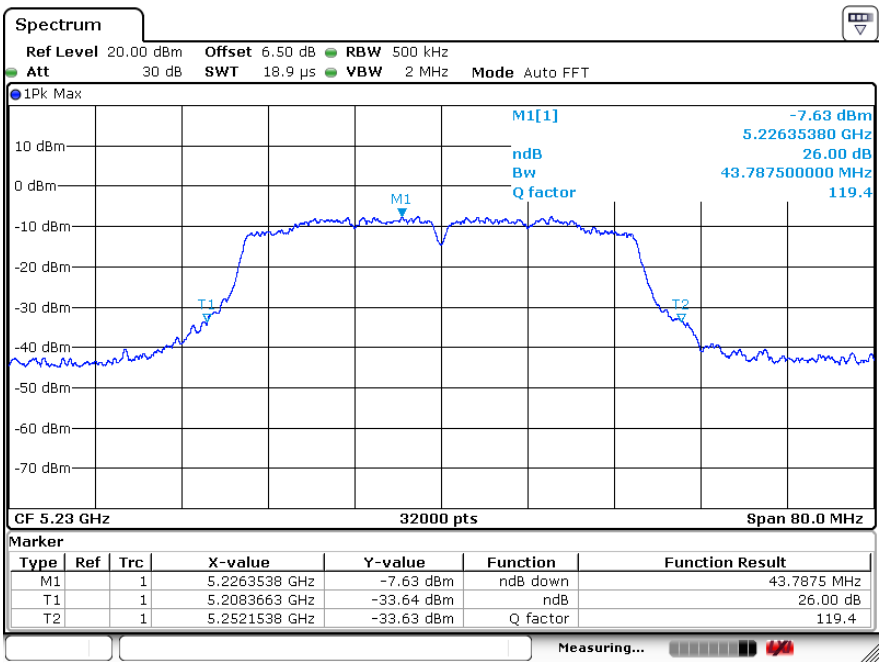

Channel: 46



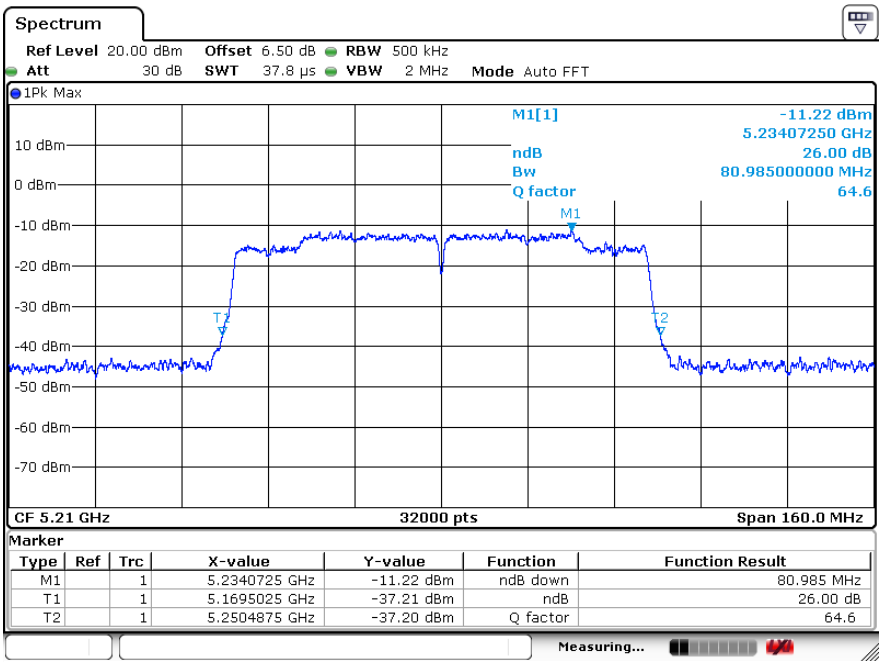
**26dB BW 802.11ac40**
Channel: 38



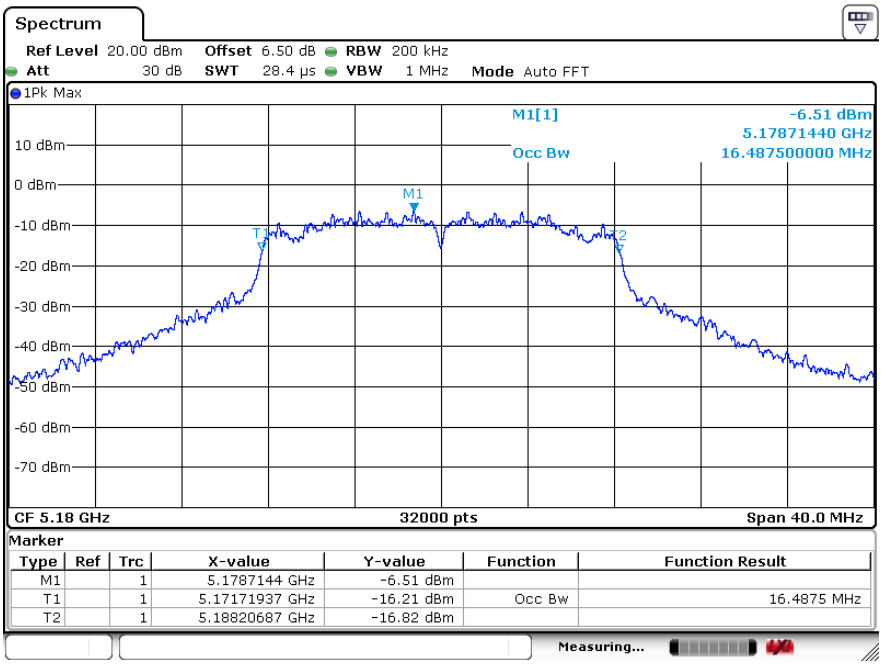

Channel: 46



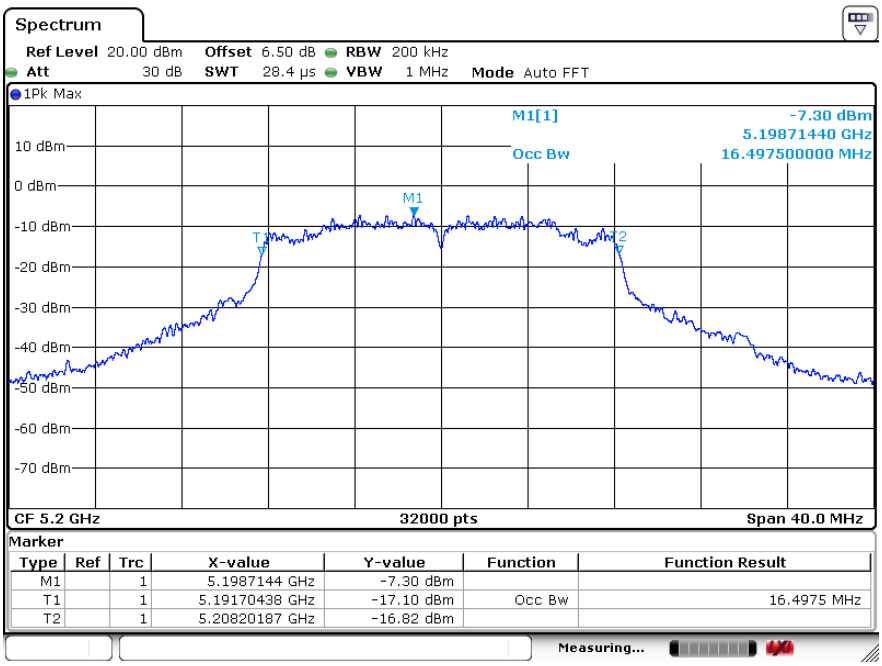
**26dB BW 802.11ac80**
Channel:42



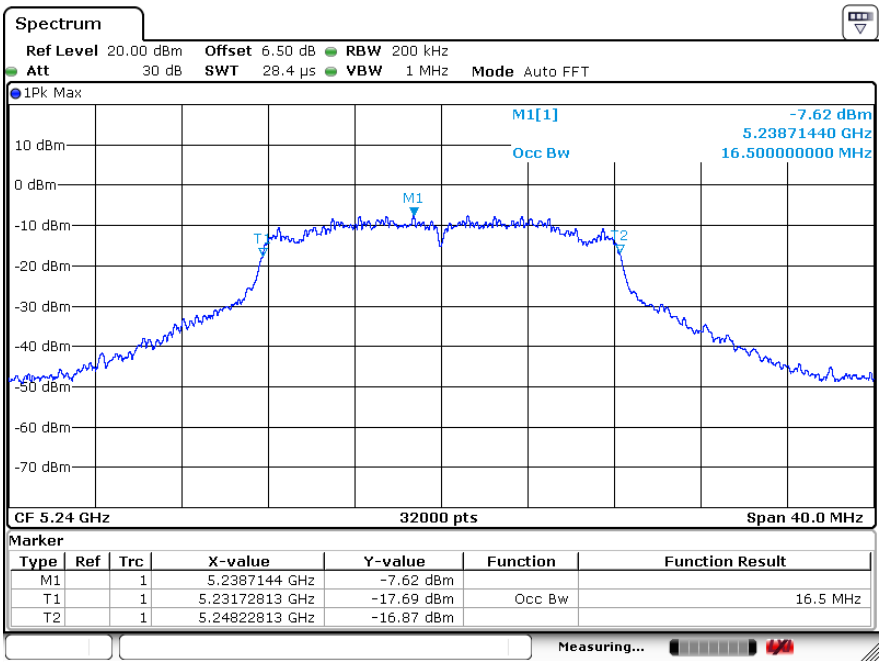
**99% OBW 802.11a**
Channel: 36



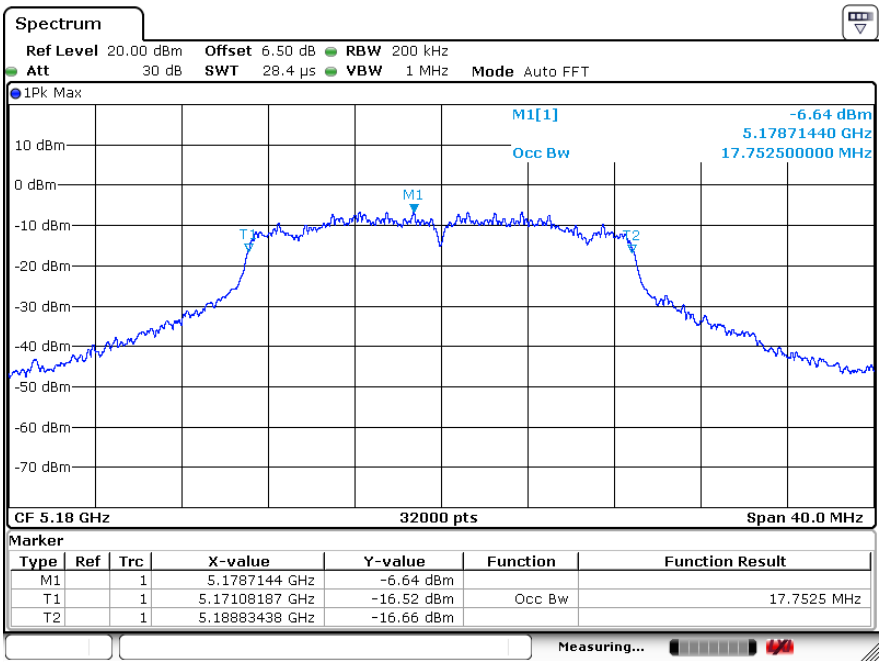

Channel: 40



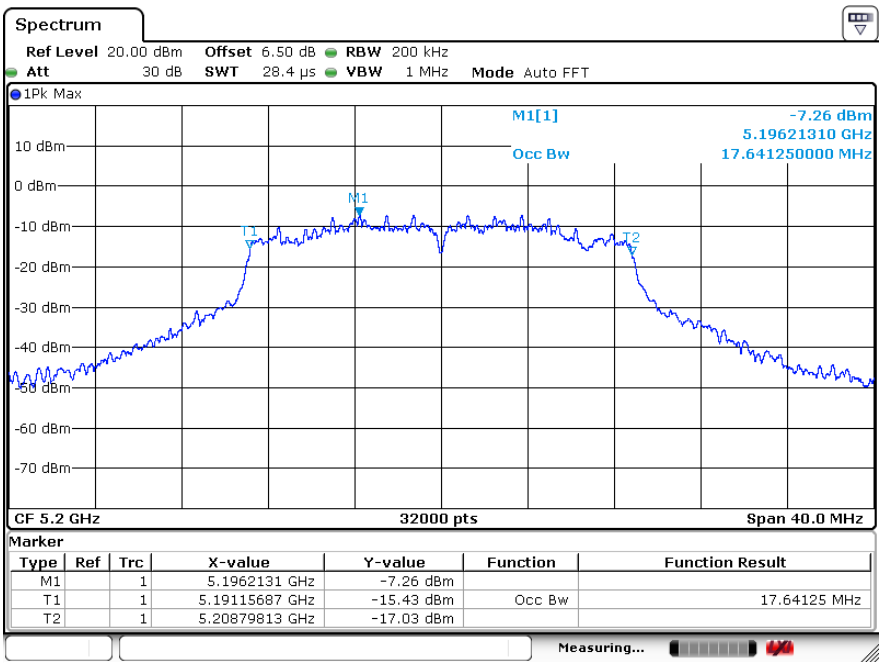
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 200 kHz
Att 30 dB SWT 28.4 µs VBW 1 MHz Mode Auto FFT
1Pk Max
M1[1]
-7.62 dBm
5.23871440 GHz
Occ Bw
16.500000000 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
T1
T2
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2387144 GHz -7.62 dBm
T1 1 5.23172813 GHz -17.69 dBm Occ Bw 16.5 MHz
T2 1 5.24822813 GHz -16.87 dBm
Measuring...

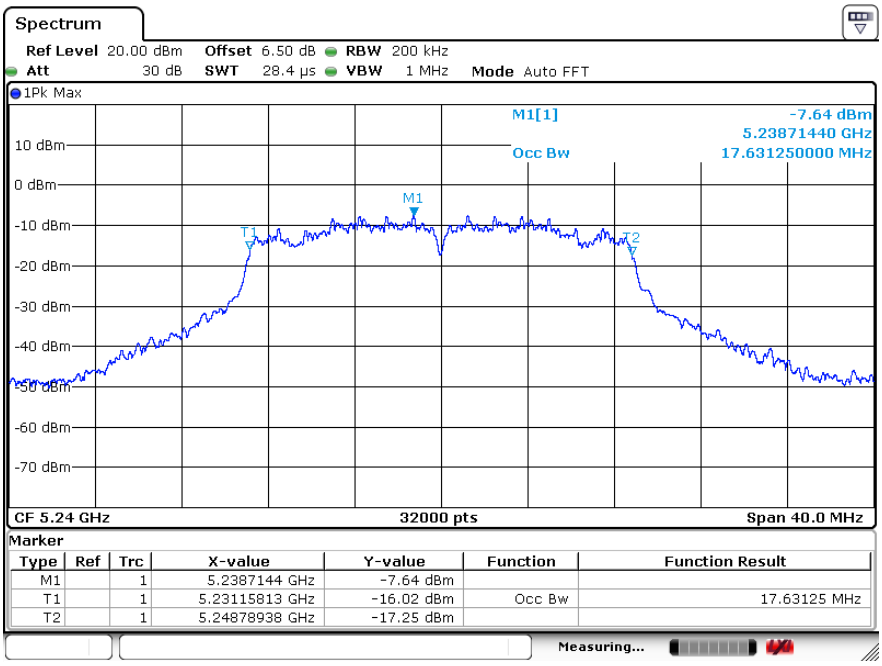
**99% OBW 802.11n20**
Channel: 36



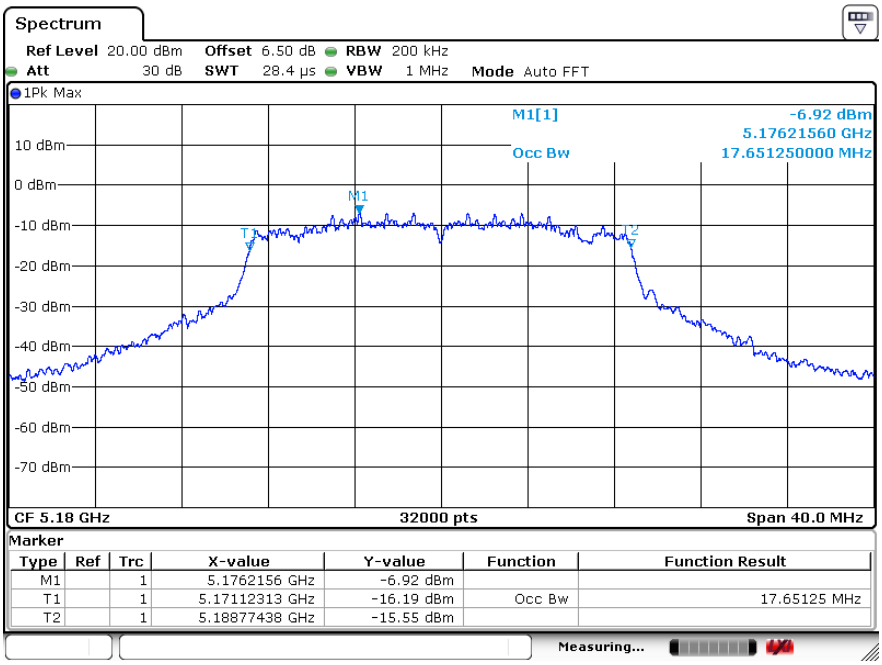

Channel: 40



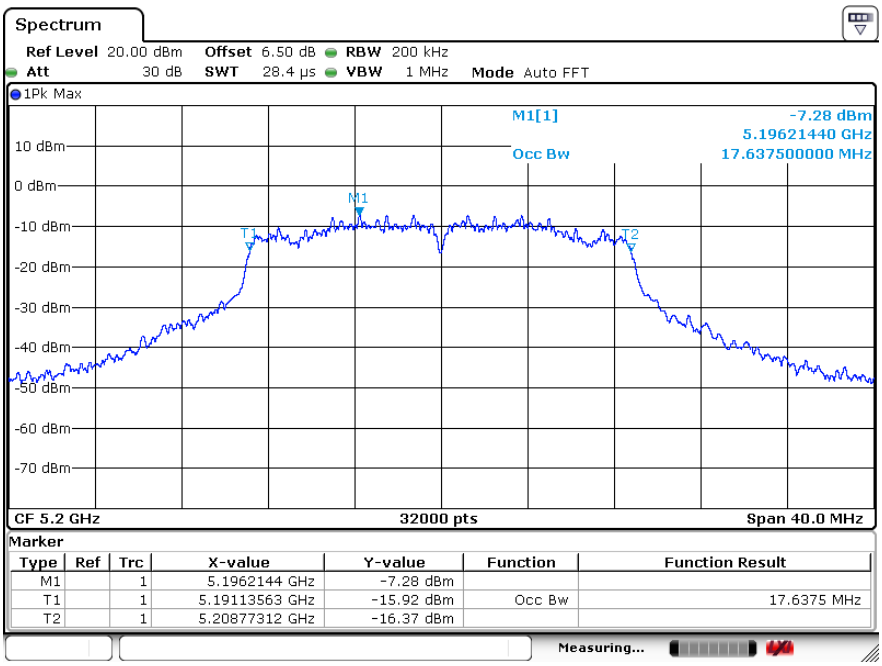
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 200 kHz
Att 30 dB SWT 28.4 µs VBW 1 MHz Mode Auto FFT
1Pk Max
M1[1]
-7.64 dBm
5.23871440 GHz
Occ Bw
17.631250000 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
T1
T2
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2387144 GHz -7.64 dBm
T1 1 5.23115813 GHz -16.02 dBm Occ Bw 17.63125 MHz
T2 1 5.24878938 GHz -17.25 dBm
Measuring...

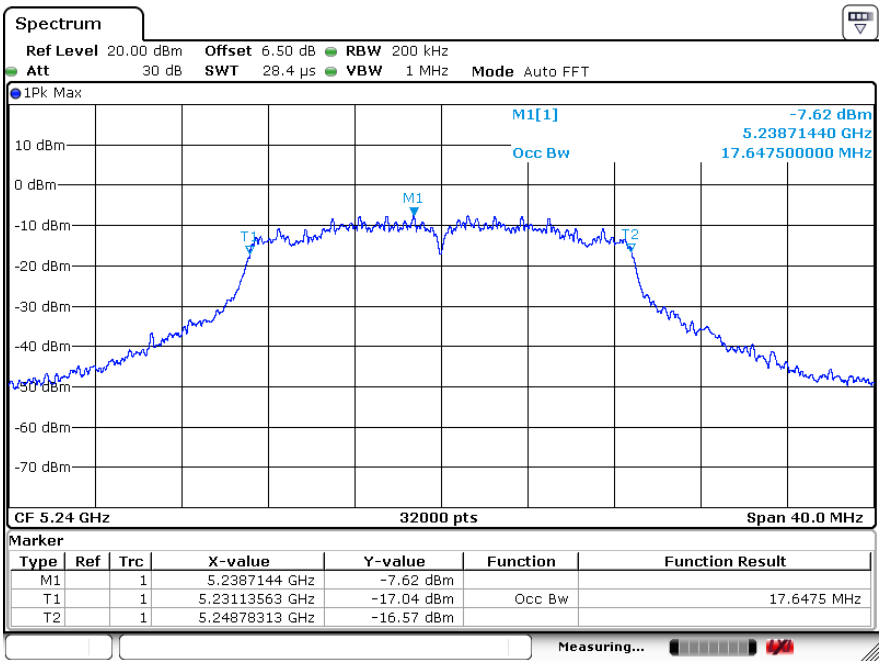
**99% OBW 802.11ac20**
Channel: 36



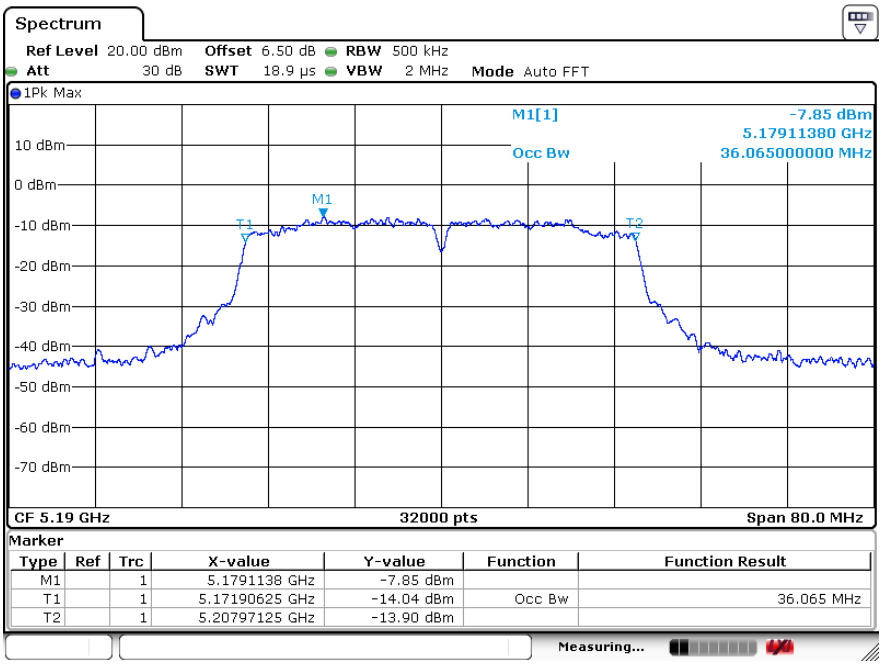

Channel: 40



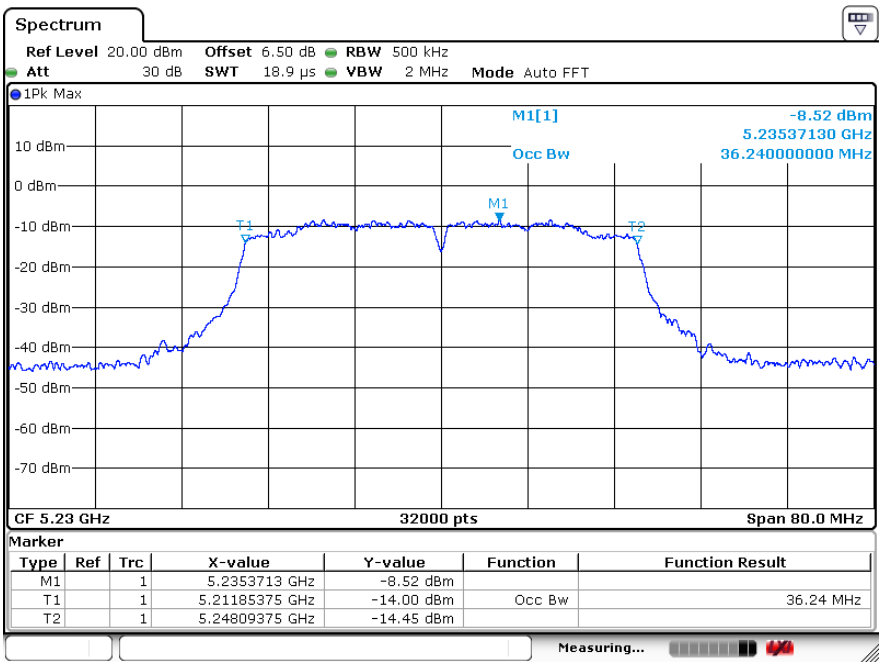
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 200 kHz
Att 30 dB SWT 28.4 µs VBW 1 MHz Mode Auto FFT
1Pk Max
M1[1]
-7.62 dBm
5.23871440 GHz
Occ Bw
17.647500000 MHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
T1
T2
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2387144 GHz -7.62 dBm
T1 1 5.23113563 GHz -17.04 dBm Occ Bw 17.6475 MHz
T2 1 5.24878313 GHz -16.57 dBm
Measuring...

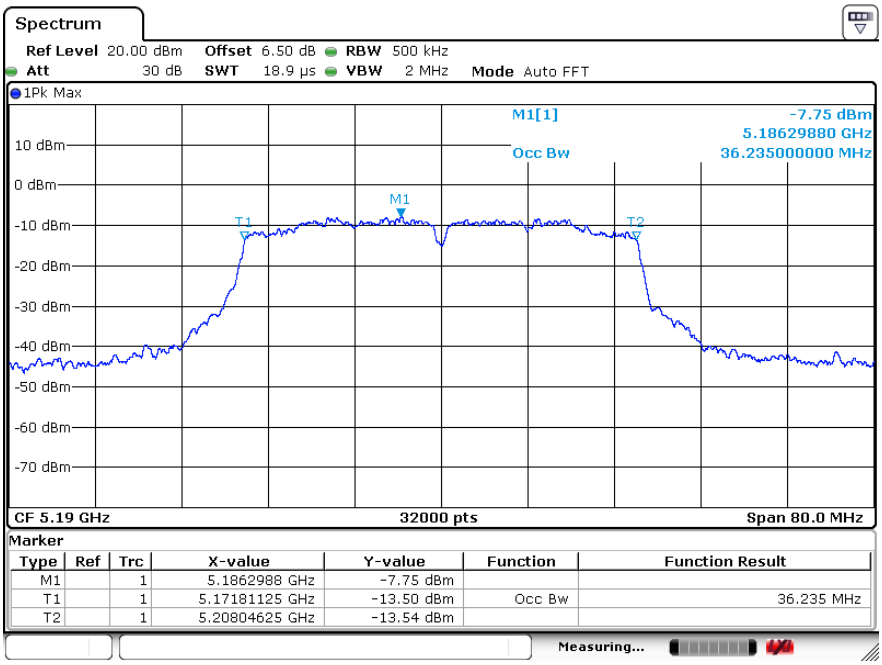
**99% OBW 802.11n40**
Channel: 38



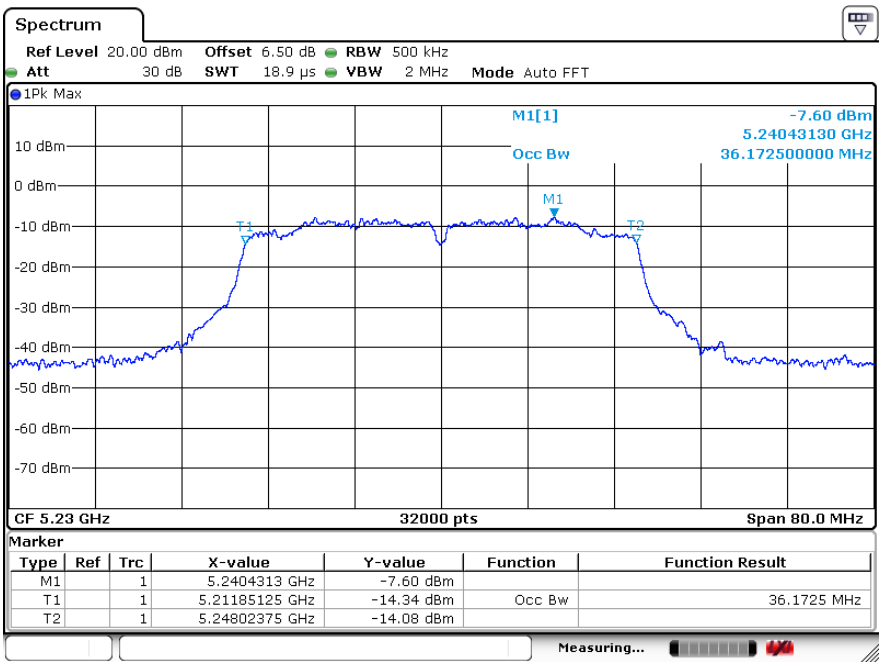

Channel: 46



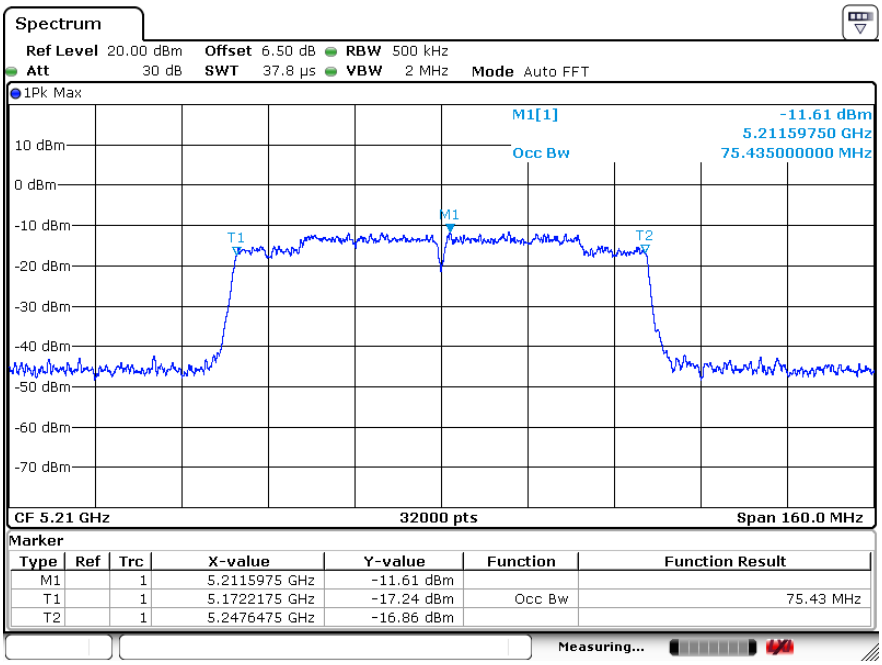
**99% OBW 802.11ac40**
Channel: 38



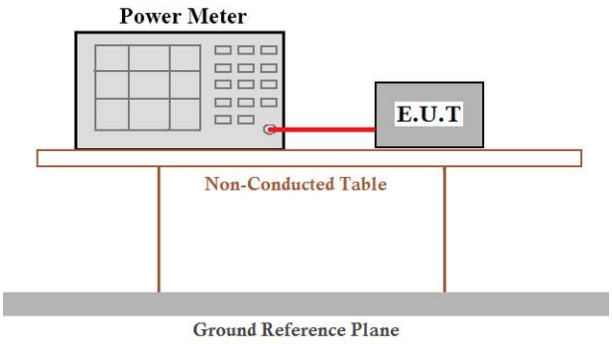

Channel: 46



**99% OBW 802.11ac80**
Channel:42



## 9. Output Power

| | |
|---|---|
| Test Requirement: | FCC Part15 E Section 15.407 |
| Test Method: | KDB 789033 D02 General UNII Test Procedures New Rules v01 |
| Limit: | For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250mW.<br>For the band 5.745-5.850 GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 30dBm |
| Test setup: |  |
| Test procedure: | **Measurement using an RF average power meter**<br>(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied<br>a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle.<br>b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.<br>c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.<br>(ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B).<br>(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.<br>(iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent). |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.3 for details |

## 9.1 Test Result and Data

Antenna A:

| CH. No. | Frequency (MHz) | Output Power (dBm) | | | Limit(dBm) | Result |
|---|---|---|---|---|---|---|
| | | 802.11a | 802.11n (HT20) | 802.11ac (VHT20) | | |
| 36 | 5180.00 | 5.69 | 5.37 | 5.76 | 24 | Pass |
| 40 | 5200.00 | 5.64 | 5.70 | 5.46 | 24 | Pass |
| 48 | 5240.00 | 5.67 | 5.56 | 5.51 | 24 | Pass |

| CH. No. | Frequency (MHz) | Output Power (dBm) | | Limit(dBm) | Result |
|---|---|---|---|---|---|
| | | 802.11n(HT40) | 802.11ac(VHT40) | | |
| 38 | 5190.00 | 4.22 | 4.30 | 24 | Pass |
| 46 | 5230.00 | 4.21 | 4.27 | 24 | Pass |

| CH. No. | Frequency (MHz) | Output Power (dBm) | Limit(dBm) | Result |
|---|---|---|---|---|
| | | 802.11ac(VHT80) | | |
| 42 | 5210 | 5.01 | 24 | Pass |

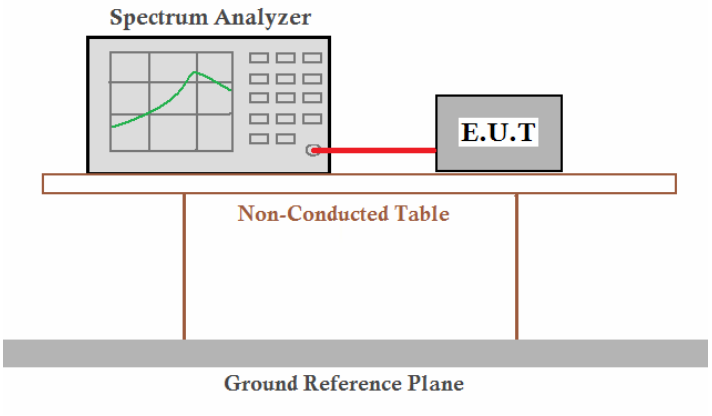
Antenna B:

| CH. No. | Frequency (MHz) | Output Power (dBm) | | | Limit(dBm) | Result |
|---|---|---|---|---|---|---|
| | | 802.11a | 802.11n (HT20) | 802.11ac (VHT20) | | |
| 36 | 5180.00 | 5.15 | 5.00 | 5.12 | 24 | Pass |
| 40 | 5200.00 | 4.95 | 5.03 | 5.11 | 24 | Pass |
| 48 | 5240.00 | 4.99 | 4.99 | 5.01 | 24 | Pass |

| CH. No. | Frequency (MHz) | Output Power (dBm) | | Limit(dBm) | Result |
|---|---|---|---|---|---|
| | | 802.11n(HT40) | 802.11ac(VHT40) | | |
| 38 | 5190.00 | 3.87 | 3.89 | 24 | Pass |
| 46 | 5230.00 | 3.98 | 4.01 | 24 | Pass |

| CH. No. | Frequency (MHz) | Output Power (dBm) | Limit(dBm) | Result |
|---|---|---|---|---|
| | | 802.11ac(VHT80) | | |
| 42 | 5210 | 4.91 | 24 | Pass |

## 10. Power Spectral Density

| | |
|---|---|
| Test Requirement: | FCC Part15 E Section 15.407 |
| Test Method: | KDB 789033 D02 General UNII Test Procedures New Rules v01 |
| Limit: | 11dBm/MHz(Band I), 30 dBm(Band IV) |
| Test setup: |  |
| Test procedure: | 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”.<br>2) Use the peak search function on the instrument to find the peak of the spectrum.<br>3) Make the following adjustments to the peak value of the spectrum, if applicable:<br>a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.<br>b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.<br>4) The result is the PPSD. |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

### 10.1 Test Result and Data

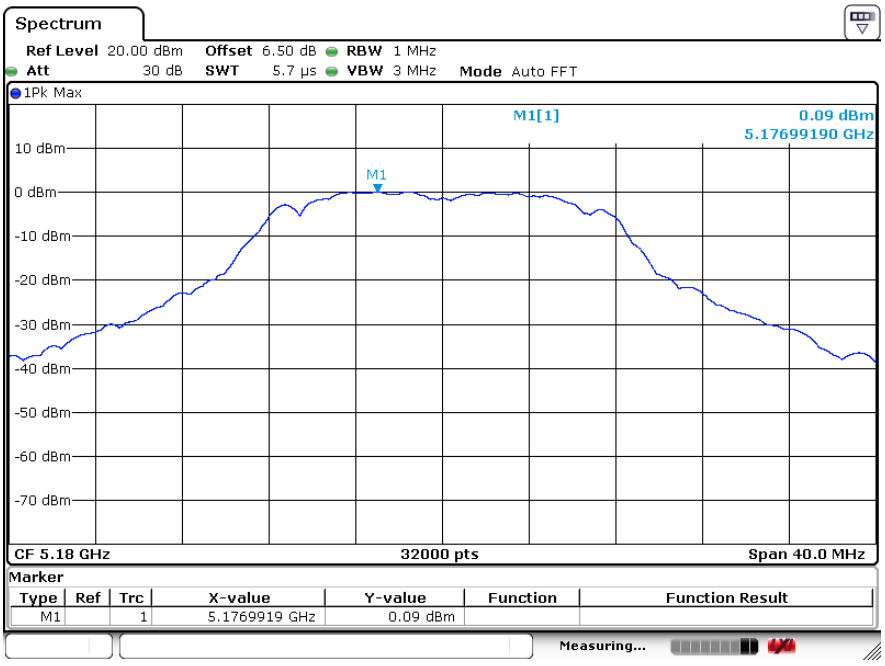
| CH. No. | Frequency | Power Density ANT A (dBm/MHz) | Power Density ANT B (dBm/MHz) | total power density (dBm/MHz) | Limit (dBm/MHz) | Result |
|---|---|---|---|---|---|---|
| **TX 802.11a Mode** | | | | | | |
| CH36 | 5180 | 0.09 | -0.13 | -- | 11 | Pass |
| CH40 | 5200 | -1.27 | -1.68 | -- | 11 | Pass |
| CH48 | 5240 | -0.73 | -1.33 | -- | 11 | Pass |
| **TX 802.11n20 Mode** | | | | | | |
| CH36 | 5180 | -0.23 | -1.01 | -- | 11 | Pass |
| CH40 | 5200 | -1.43 | -1.92 | -- | 11 | Pass |
| CH48 | 5240 | -1.08 | -1.85 | -- | 11 | Pass |
| **TX 802.11n40 Mode** | | | | | | |
| CH38 | 5190 | -4.80 | -5.31 | -- | 11 | Pass |
| CH46 | 5230 | -4.63 | -4.96 | -- | 11 | Pass |

| CH. No. | Frequency | Power Density ANT A (dBm/MHz) | Power Density ANT B (dBm/MHz) | total power density (dBm/MHz) | Limit (dBm/MHz) | Result |
|---|---|---|---|---|---|---|
| **TX 802.11 ac(VHT20) Mode** | | | | | | |
| CH36 | 5180 | -1.05 | -1.75 | -- | 11 | Pass |
| CH40 | 5200 | -0.82 | -1.65 | -- | 11 | Pass |
| CH48 | 5240 | -1.40 | -2.01 | -- | 11 | Pass |
| **TX 802.11 ac(VHT40) Mode** | | | | | | |
| CH38 | 5190 | -4.41 | -4.92 | -- | 11 | Pass |
| CH46 | 5230 | -4.24 | -4.85 | -- | 11 | Pass |
| **TX 802.11 ac(VHT80) Mode** | | | | | | |
| CH42 | 5210 | -8.28 | -8.69 | -- | 11 | Pass |

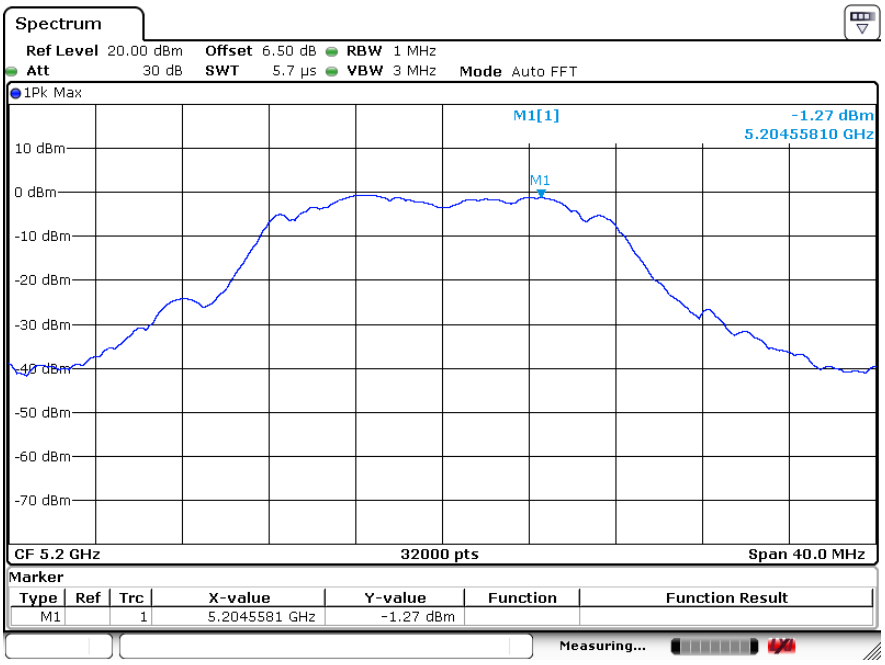
Note: The worst data is Antenna A, only shown Antenna A Plot.

**Test plots as followed:** Antenna A

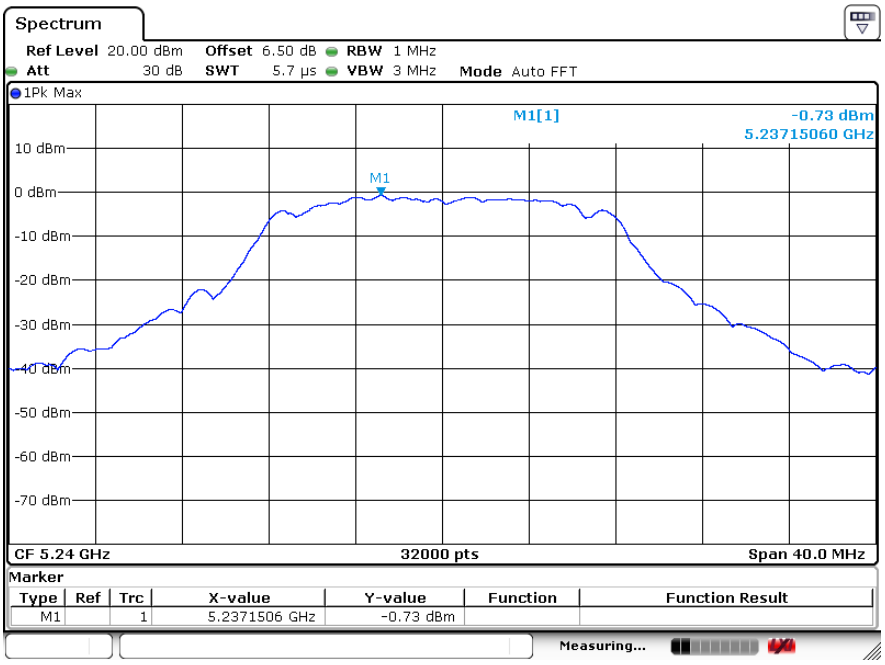
**802.11a**
Channel: 36



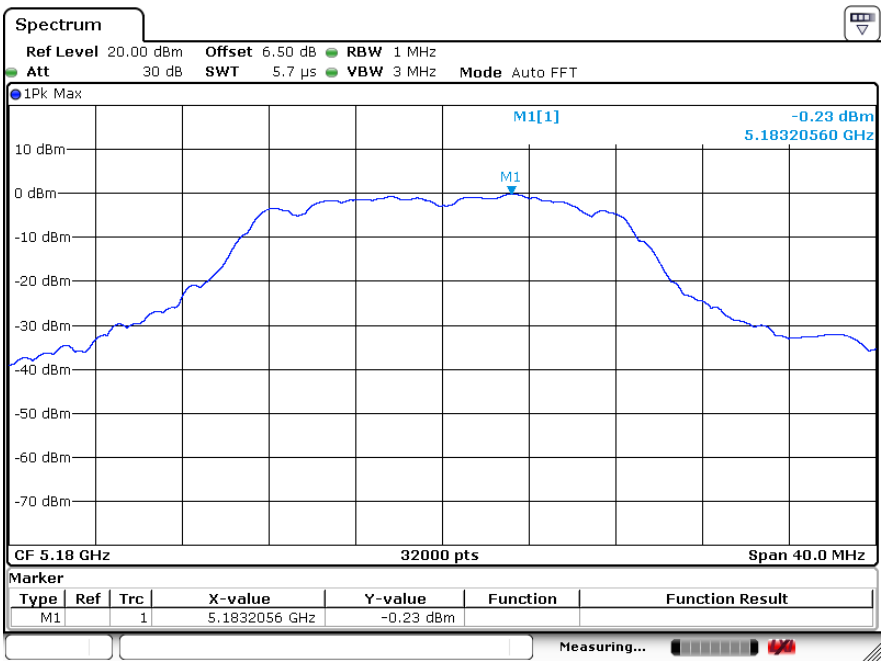

Channel: 40



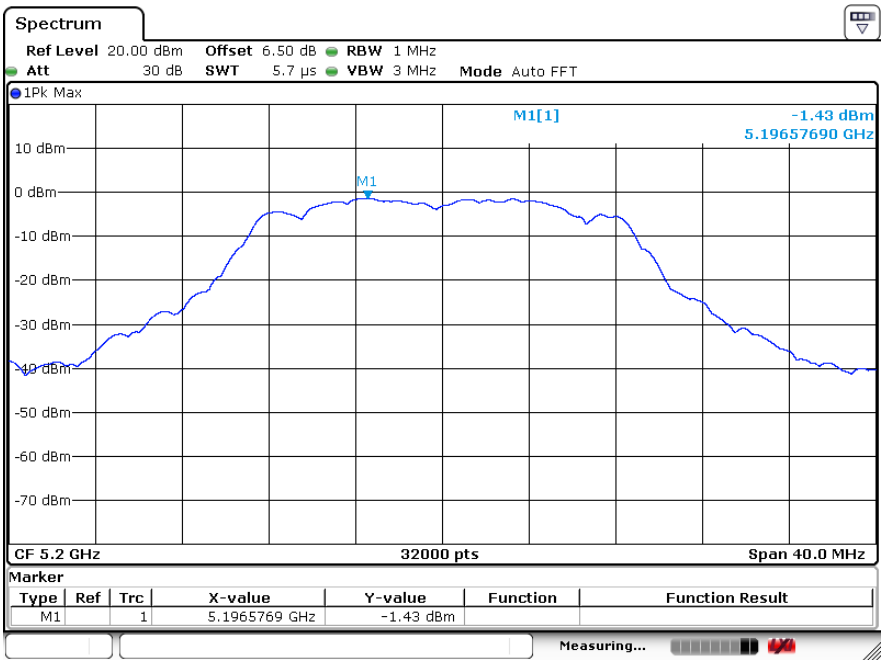
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 1 MHz
Att 30 dB SWT 5.7 µs VBW 3 MHz Mode Auto FFT
1Pk Max
M1[1]
-0.73 dBm
5.23715060 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2371506 GHz -0.73 dBm
Measuring...

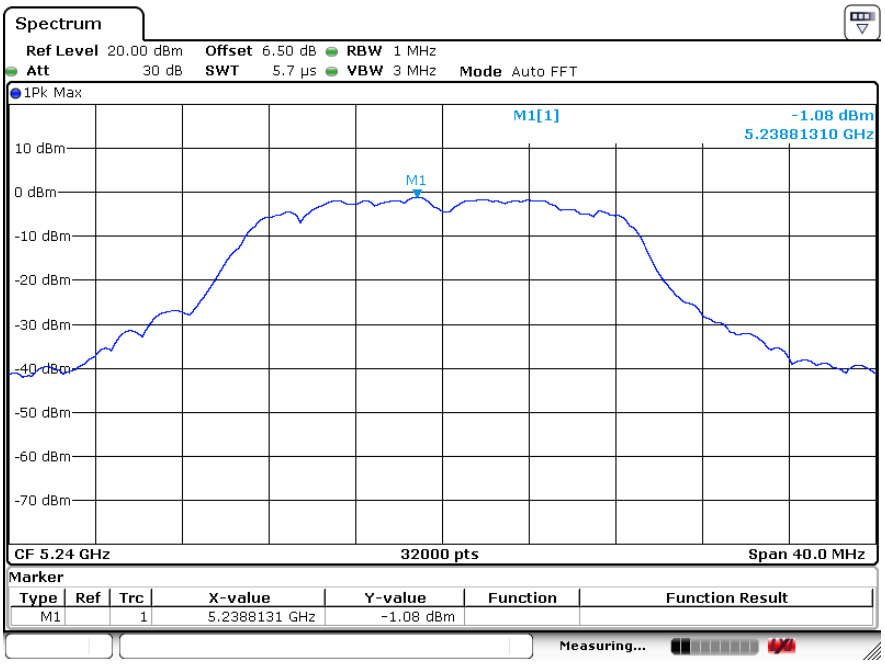
**802.11n20**
Channel: 36



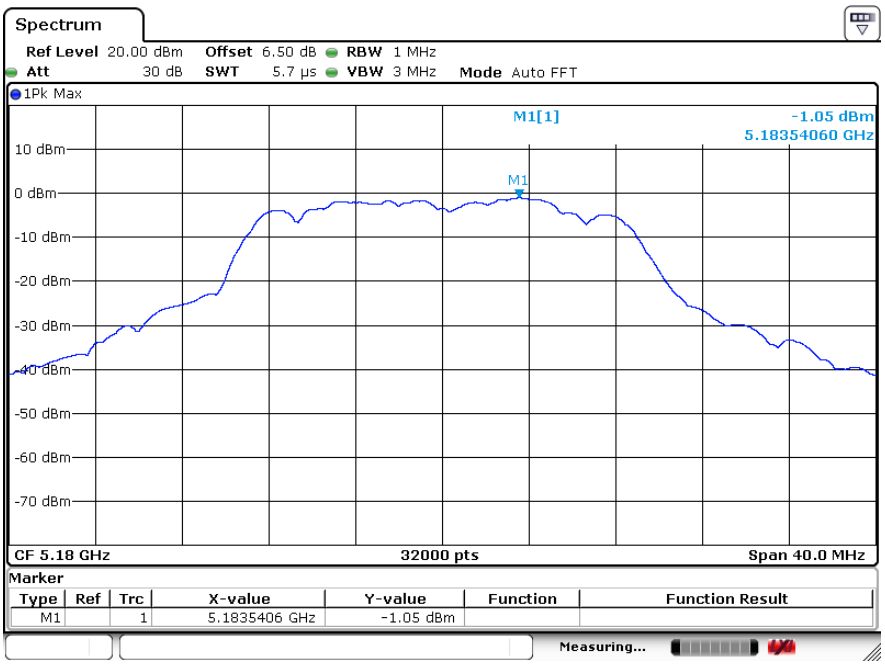

Channel: 40



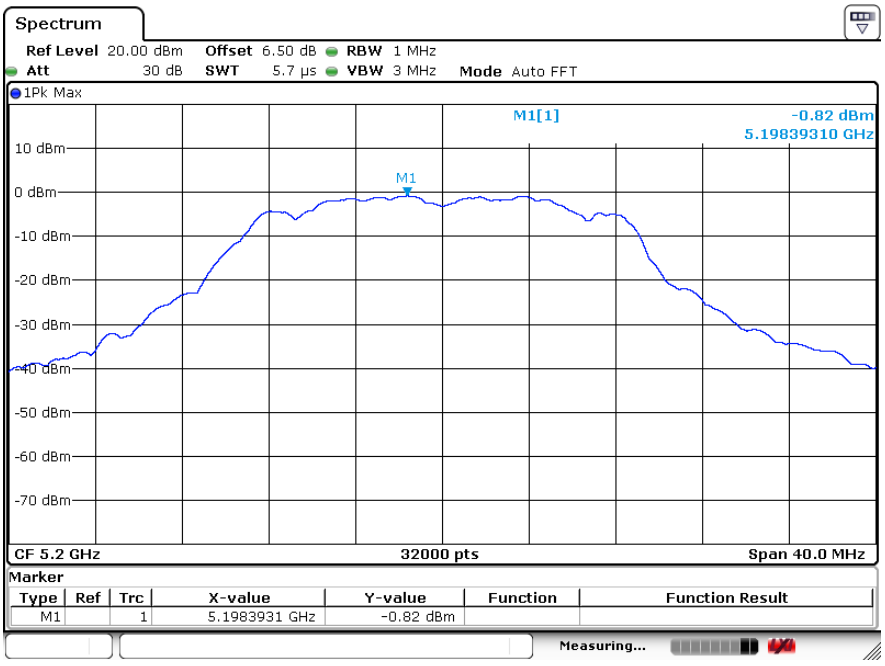
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 1 MHz
Att 30 dB SWT 5.7 µs VBW 3 MHz Mode Auto FFT
1Pk Max
M1[1]
-1.08 dBm
5.23881310 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2388131 GHz -1.08 dBm
Measuring...

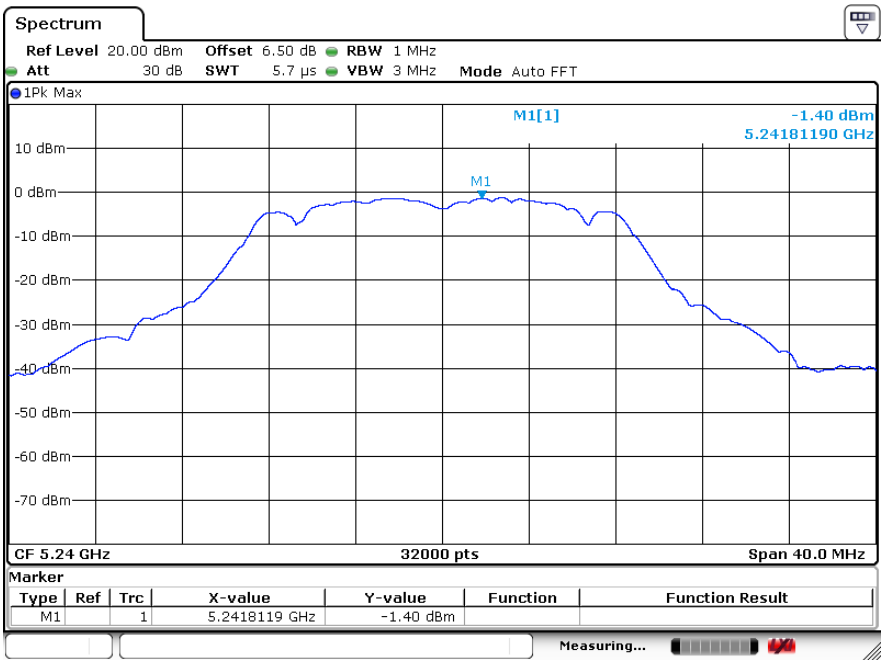
**802.11ac20**
Channel: 36



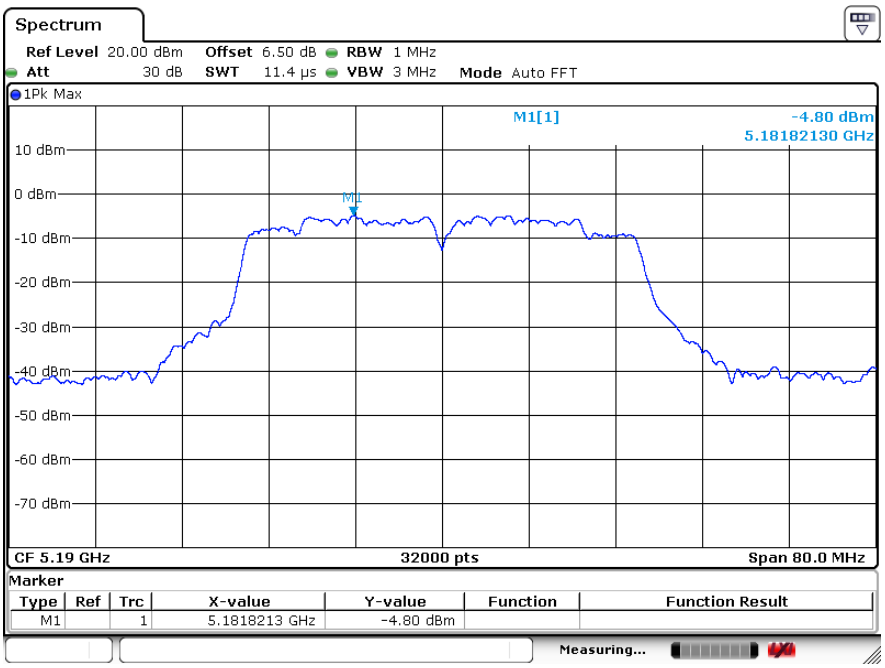

Channel: 40



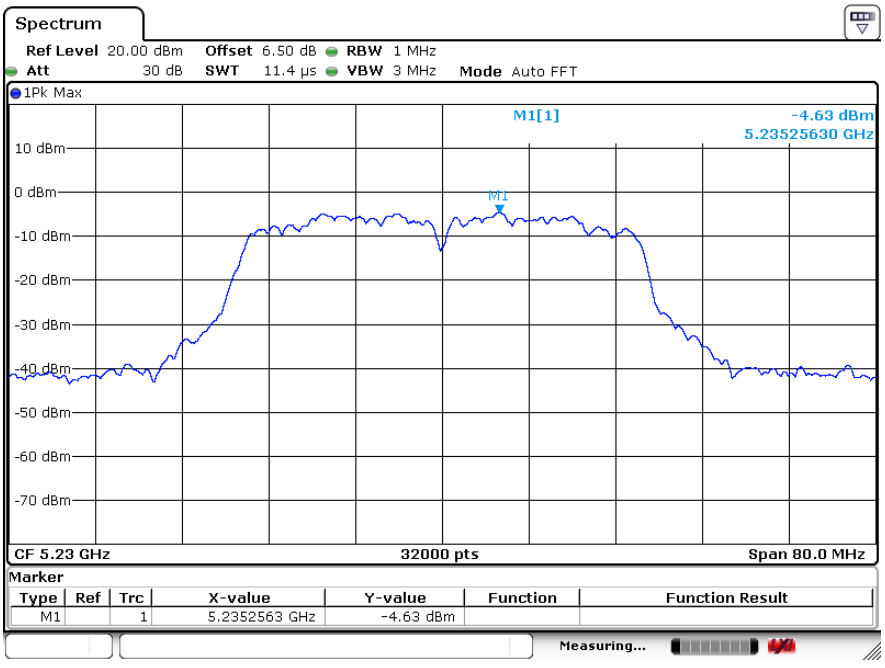
Channel: 48


Spectrum
Ref Level 20.00 dBm Offset 6.50 dB RBW 1 MHz
Att 30 dB SWT 5.7 µs VBW 3 MHz Mode Auto FFT
1Pk Max
M1[1]
-1.40 dBm
5.24181190 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 5.24 GHz
32000 pts
Span 40.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.2418119 GHz -1.40 dBm
Measuring...

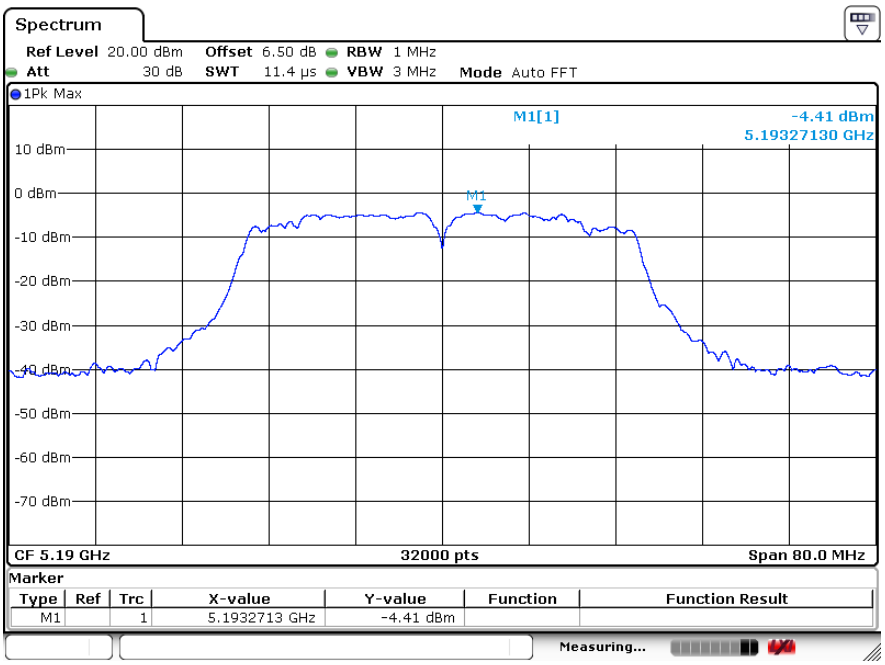
**802.11n40**
Channel: 38



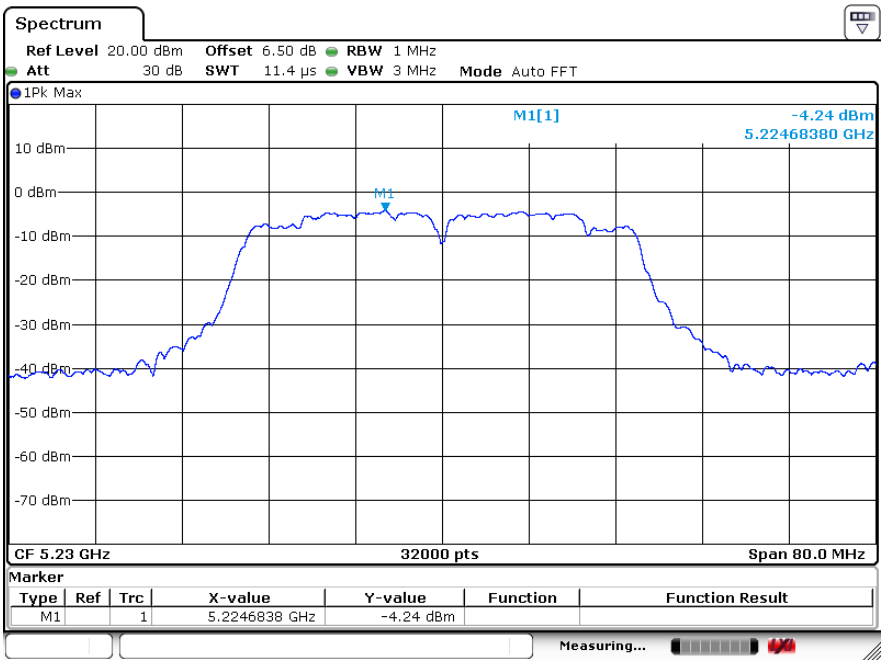

Channel: 46



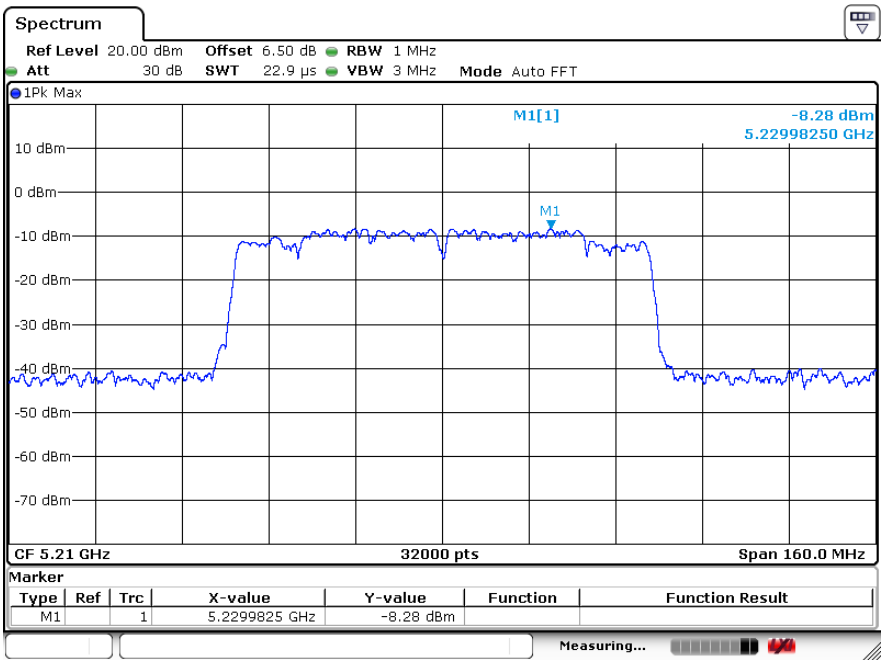
**802.11ac40**
Channel: 38




Channel: 46

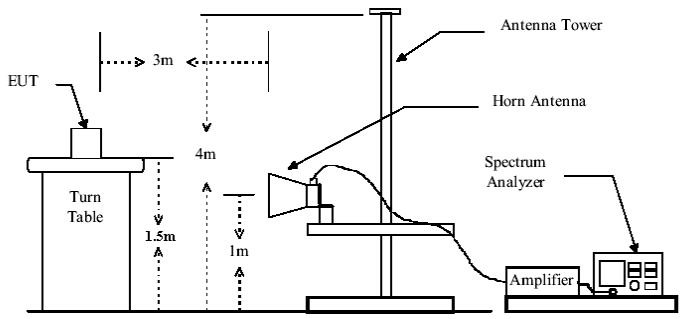


**802.11ac80**
Channel:42



## 11. Band Edges Measurement

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 5.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>74.0</td><td>Peak Value</td></tr>
</table>
Undesirable emission limits:<br>
(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.<br>
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.<br>
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
</td></tr>
<tr><td>Test Procedure:</td><td>a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to</td></tr>
</table>

| | |
|---|---|
| | determine the position of the highest radiation.<br>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test setup: | Above 1GHz<br>  <br> |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

*Remark:*

*According to KDB 789033 D02V01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:*

*E[dBuV/m] = EIRP[dBm] + 95.2;*

*For example, if EIRP = -27dBm*

*E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m*.

### 11.1 Test Result and Data

Antenna A:

**Peak value:**

| Test mode: | | 802.11a | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 44.32 | 7.18 | 51.50 | 68.2 | -16.70 | PK | H |
| 5150 | 43.41 | 7.18 | 50.59 | 68.2 | -17.61 | PK | V |
| Test mode: | | 802.11a | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 43.51 | 7.2 | 50.71 | 68.2 | -17.49 | PK | H |
| 5350 | 49.06 | 7.2 | 56.26 | 68.2 | -11.94 | PK | V |

**Average:**

| Test mode: | | 802.11a | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 31.25 | 7.18 | 38.43 | 48.2 | -9.77 | AV | H |
| 5150 | 30.16 | 7.18 | 37.34 | 48.2 | -10.86 | AV | V |
| Test mode: | | 802.11a | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 30.33 | 7.2 | 37.53 | 48.2 | -10.67 | AV | H |
| 5350 | 35.97 | 7.2 | 43.17 | 48.2 | -5.03 | AV | V |

**Peak value:**

| Test mode: | | 802.11n(HT20) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 47.51 | 7.18 | 54.69 | 68.2 | -13.51 | PK | H |
| 5150 | 54.36 | 7.18 | 61.54 | 68.2 | -6.66 | PK | V |
| Test mode: | | 802.11n(HT20) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 43.21 | 7.2 | 50.41 | 68.2 | -17.79 | PK | H |
| 5350 | 50.12 | 7.2 | 57.32 | 68.2 | -10.88 | PK | V |

**Average:**

| Test mode: | | 802.11n(HT20) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 32.96 | 7.18 | 40.14 | 48.2 | -8.06 | AV | H |
| 5150 | 38.01 | 7.18 | 45.19 | 48.2 | -3.01 | AV | V |
| Test mode: | | 802.11n(HT20) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 30.13 | 7.2 | 37.33 | 48.2 | -10.87 | AV | H |
| 5350 | 35.98 | 7.2 | 43.18 | 48.2 | -5.02 | AV | V |

**Peak value:**

| Test mode: | | 802.11n(HT40) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 43.02 | 7.18 | 50.2 | 68.2 | -18.00 | PK | H |
| 5150 | 43.26 | 7.18 | 50.44 | 68.2 | -17.76 | PK | V |
| Test mode: | | 802.11n(HT40) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 43.96 | 7.2 | 51.16 | 68.2 | -17.04 | PK | H |
| 5350 | 47.19 | 7.2 | 54.39 | 68.2 | -13.81 | PK | V |

**Average:**

| Test mode: | | 802.11n(HT40) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 30.23 | 7.18 | 37.41 | 48.2 | -10.79 | AV | H |
| 5150 | 29.16 | 7.18 | 36.34 | 48.2 | -11.86 | AV | V |
| Test mode: | | 802.11n(HT40) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 29.96 | 7.2 | 37.16 | 48.2 | -11.04 | AV | H |
| 5350 | 32.03 | 7.2 | 39.23 | 48.2 | -8.97 | AV | V |

**Peak value:**

| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 45.19 | 7.18 | 52.37 | 68.2 | -15.83 | PK | H |
| 5150 | 48.65 | 7.18 | 55.83 | 68.2 | -12.37 | PK | V |
| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 46.12 | 7.2 | 53.32 | 68.2 | -14.88 | PK | H |
| 5350 | 48.35 | 7.2 | 55.55 | 68.2 | -12.65 | PK | V |

**Average:**

| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 31.02 | 7.18 | 38.2 | 48.2 | -10 | AV | H |
| 5150 | 34.52 | 7.18 | 41.7 | 48.2 | -6.5 | AV | V |
| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 34.43 | 7.2 | 41.63 | 48.2 | -6.57 | AV | H |
| 5350 | 35.56 | 7.2 | 42.76 | 48.2 | -5.44 | AV | V |

Antenna B:

**Peak value:**

| Test mode: | | 802.11a | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 44.21 | 7.18 | 51.39 | 68.2 | -16.81 | PK | H |
| 5150 | 43.19 | 7.18 | 50.37 | 68.2 | -17.83 | PK | V |
| Test mode: | | 802.11a | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 43.31 | 7.2 | 50.51 | 68.2 | -17.69 | PK | H |
| 5350 | 48.78 | 7.2 | 55.98 | 68.2 | -12.22 | PK | V |

**Average:**

| Test mode: | | 802.11a | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 31.02 | 7.18 | 38.2 | 48.2 | -10.00 | AV | H |
| 5150 | 30.08 | 7.18 | 37.26 | 48.2 | -10.94 | AV | V |
| Test mode: | | 802.11a | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 30.25 | 7.2 | 37.45 | 48.2 | -10.75 | AV | H |
| 5350 | 35.73 | 7.2 | 42.93 | 48.2 | -5.27 | AV | V |

**Peak value:**

| Test mode: | | 802.11n(HT20) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 47.25 | 7.18 | 54.43 | 68.2 | -13.77 | PK | H |
| 5150 | 54.19 | 7.18 | 61.37 | 68.2 | -6.83 | PK | V |
| Test mode: | | 802.11n(HT20) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 43.12 | 7.2 | 50.32 | 68.2 | -17.88 | PK | H |
| 5350 | 49.97 | 7.2 | 57.17 | 68.2 | -11.03 | PK | V |

**Average:**

| Test mode: | | 802.11n(HT20) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5150 | 32.05 | 7.18 | 39.23 | 48.2 | -8.97 | AV | H |
| 5150 | 37.74 | 7.18 | 44.92 | 48.2 | -3.28 | AV | V |
| Test mode: | | 802.11n(HT20) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector | Antenna Pol. |
| 5350 | 30.03 | 7.2 | 37.23 | 48.2 | -10.97 | AV | H |
| 5350 | 35.67 | 7.2 | 42.87 | 48.2 | -5.33 | AV | V |

**Peak value:**

| Test mode: | | 802.11n(HT40) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 42.97 | 7.18 | 50.15 | 68.2 | -18.05 | PK | H |
| 5150 | 43.02 | 7.18 | 50.2 | 68.2 | -18.00 | PK | V |
| Test mode: | | 802.11n(HT40) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 43.25 | 7.2 | 50.45 | 68.2 | -17.75 | PK | H |
| 5350 | 46.41 | 7.2 | 53.61 | 68.2 | -14.59 | PK | V |

**Average:**

| Test mode: | | 802.11n(HT40) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 30.05 | 7.18 | 37.23 | 48.2 | -10.97 | AV | H |
| 5150 | 28.93 | 7.18 | 36.11 | 48.2 | -12.09 | AV | V |
| Test mode: | | 802.11n(HT40) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 29.48 | 7.2 | 36.68 | 48.2 | -11.52 | AV | H |
| 5350 | 31.97 | 7.2 | 39.17 | 48.2 | -9.03 | AV | V |

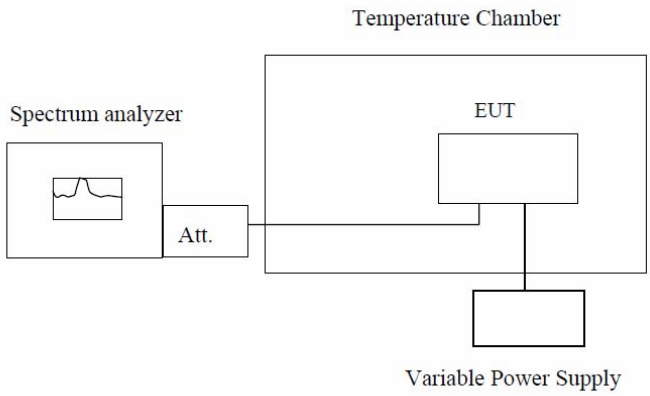
**Peak value:**

| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 45.03 | 7.18 | 52.21 | 68.2 | -15.99 | PK | H |
| 5150 | 48.25 | 7.18 | 55.43 | 68.2 | -12.77 | PK | V |
| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 45.01 | 7.2 | 52.21 | 68.2 | -15.99 | PK | H |
| 5350 | 47.93 | 7.2 | 55.13 | 68.2 | -13.07 | PK | V |

**Average:**

| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Lowest | |
|---|---|---|---|---|---|---|---|
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5150 | 30.68 | 7.18 | 37.86 | 48.2 | -10.34 | AV | H |
| 5150 | 34.22 | 7.18 | 41.4 | 48.2 | -6.80 | AV | V |
| Test mode: | | 802.11ac(VHT80) | | Test channel: | | Highest | |
| Frequency (MHz) | Reading Level | Factor | Measure Level | Limit (dBuV/m) | Margin (dB) | Detector | Antenna Pol. |
| 5350 | 34.09 | 7.2 | 41.29 | 48.2 | -6.91 | AV | H |
| 5350 | 35.14 | 7.2 | 42.34 | 48.2 | -5.86 | AV | V |

## 12. Frequency stability

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.407(g) |
| Test Method: | ANSI C63.10:2013, FCC Part 2.1055 |
| Limit: | Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified |
| Test Procedure: | The EUT was setup to ANSI C63.4, 2014; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements. |
| Test setup: |  <br>**Note :** Measurement setup for testing on Antenna connector |
| Test Instruments: | Refer to section 5.10 for details |
| Test mode: | Refer to section 5.3 for details |
| Test results: | Pass |

| Frequency stability versus Temp. | | | | | |
|---|---|---|---|---|---|
| Power Supply: DC 7.4V | | | | | |
| Temp. (°C) | Operating Frequency (MHz) | 0 minute | 2 minute | 5 minute | 10 minute |
| | | Measured Frequency (MHz) | Measured Frequency (MHz) | Measured Frequency (MHz) | Measured Frequency (MHz) |
| -30 | 5180 | 5176.1530 | 5182.9160 | 5181.2366 | 5177.7656 |
| | 5200 | 5198.4862 | 5202.7572 | 5202.1566 | 5199.3360 |
| | 5220 | 5219.8388 | 5220.2407 | 5221.2145 | 5219.7952 |
| | 5240 | 5240.0246 | 5240.6465 | 5240.1089 | 5239.5773 |
| -20 | 5180 | 5179.6240 | 5180.3928 | 5180.7688 | 5180.0094 |
| | 5200 | 5199.6009 | 5200.3051 | 5199.9405 | 5199.8086 |
| | 5220 | 5219.2612 | 5220.5552 | 5220.0365 | 5219.6675 |
| | 5240 | 5239.3614 | 5240.1103 | 5240.4602 | 5239.1825 |
| -10 | 5180 | 5178.9415 | 5180.2471 | 5180.0809 | 5179.1899 |
| | 5200 | 5199.8087 | 5200.7045 | 5200.9939 | 5199.1198 |
| | 5220 | 5219.8363 | 5220.5900 | 5220.2388 | 5219.4622 |
| | 5240 | 5239.3173 | 5240.5634 | 5240.9832 | 5239.3819 |
| 0 | 5180 | 5179.8948 | 5180.5569 | 5180.3728 | 5179.2963 |
| | 5200 | 5199.2278 | 5200.6612 | 5200.7317 | 5199.8933 |
| | 5220 | 5218.9069 | 5219.9760 | 5219.9829 | 5219.9976 |
| | 5240 | 5239.5732 | 5240.7336 | 5240.2391 | 5239.5681 |
| 10 | 5180 | 5179.2560 | 5180.0233 | 5180.8395 | 5179.3813 |
| | 5200 | 5199.2993 | 5200.1676 | 5200.5921 | 5199.7393 |
| | 5220 | 5219.0376 | 5220.3027 | 5220.0949 | 5219.9318 |
| | 5240 | 5239.0617 | 5240.5569 | 5240.6768 | 5239.5243 |
| 20 | 5180 | 5179.7525 | 5180.2415 | 5180.4188 | 5179.3355 |
| | 5200 | 5199.7051 | 5200.4881 | 5200.7624 | 5199.3744 |
| | 5220 | 5219.2651 | 5220.6157 | 5220.2781 | 5219.6687 |
| | 5240 | 5239.1152 | 5240.9421 | 5240.2786 | 5239.2804 |
| 30 | 5180 | 5179.8190 | 5180.7567 | 5180.1448 | 5179.6410 |
| | 5200 | 5199.3005 | 5200.1963 | 5200.2894 | 5199.5546 |
| | 5220 | 5219.2618 | 5220.4286 | 5220.9589 | 5219.6171 |
| | 5240 | 5239.5602 | 5240.2502 | 5240.6624 | 5239.9492 |

| | | | | | |
|---|---|---|---|---|---|
| 40 | 5180 | 5179.9014 | 5180.7265 | 5180.2244 | 5180.0123 |
| | 5200 | 5199.5642 | 5200.7204 | 5200.8330 | 5199.7874 |
| | 5220 | 5219.4641 | 5220.5004 | 5220.5917 | 5219.5885 |
| | 5240 | 5239.3020 | 5240.8121 | 5240.6858 | 5240.0723 |
| 50 | 5180 | 5179.4052 | 5180.5340 | 5180.4562 | 5179.1584 |
| | 5200 | 5199.2126 | 5200.7758 | 5200.2875 | 5199.3308 |
| | 5220 | 5219.7824 | 5220.8513 | 5220.5839 | 5219.3244 |
| | 5240 | 5239.5341 | 5240.2266 | 5240.0032 | 5239.2863 |

| Frequency stability versus Voltage | | | | | |
|---|---|---|---|---|---|
| Temperature: 25°C | | | | | |
| Power Supply (VDC) | Operating Frequency (MHz) | 0 minute Measured Frequency (MHz) | 2 minute Measured Frequency (MHz) | 5 minute Measured Frequency (MHz) | 10 minute Measured Frequency (MHz) |
| 6.9 | 5180 | 5183.9390 | 5182.0209 | 5176.2932 | 5178.4926 |
| | 5200 | 5203.8519 | 5200.2353 | 5196.7523 | 5198.0427 |
| | 5220 | 5220.8296 | 5220.2494 | 5217.3959 | 5219.8411 |
| | 5240 | 5240.7341 | 5240.7616 | 5238.4900 | 5239.2793 |
| 7.4 | 5180 | 5180.9642 | 5180.2824 | 5179.2917 | 5179.3373 |
| | 5200 | 5200.2600 | 5200.5335 | 5199.9052 | 5199.2982 |
| | 5220 | 5220.8970 | 5220.2945 | 5219.5889 | 5219.5904 |
| | 5240 | 5240.0594 | 5240.7283 | 5239.3516 | 5239.7611 |
| 8.4 | 5180 | 5180.2097 | 5180.4744 | 5179.1614 | 5179.3201 |
| | 5200 | 5200.4797 | 5200.5601 | 5199.2227 | 5199.2997 |
| | 5220 | 5219.9236 | 5220.8194 | 5219.1492 | 5219.3488 |
| | 5240 | 5240.6690 | 5240.4577 | 5239.5883 | 5239.1324 |

# 13. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.09000 – 0.11000 | 16.42000 – 16.42300 | 399.9 – 410.0 | 4.500 – 5.150 |
| 0.49500 – 0.505** | 16.69475 – 16.69525 | 608.0 – 614.0 | 5.350 – 5.460 |
| 2.17350 – 2.19050 | 16.80425 – 16.80475 | 960.0 – 1240.0 | 7.250 – 7.750 |
| 4.12500 – 4.12800 | 25.50000 – 25.67000 | 1300.0 – 1427.0 | 8.025 – 8.500 |
| 4.17725 – 4.17775 | 37.50000 – 38.25000 | 1435.0 – 1626.5 | 9.000 – 9.200 |
| 4.20725 – 4.20775 | 73.00000 – 74.60000 | 1645.5 – 1646.5 | 9.300 – 9.500 |
| 6.21500 – 6.21800 | 74.80000 – 75.20000 | 1660.0 – 1710.0 | 10.600 – 12.700 |
| 6.26775 – 6.26825 | 108.00000 – 121.94000 | 1718.8 – 1722.2 | 13.250 – 13.400 |
| 6.31175 – 6.31225 | 123.00000 – 138.00000 | 2200.0 – 2300.0 | 14.470 – 14.500 |
| 8.29100 – 8.29400 | 149.90000 – 150.05000 | 2310.0 – 2390.0 | 15.350 – 16.200 |
| 8.36200 – 8.36600 | 156.52475 – 156.52525 | 2483.5 – 2500.0 | 17.700 – 21.400 |
| 8.37625 – 8.38675 | 156.70000 – 156.90000 | 2655.0 – 2900.0 | 22.010 – 23.120 |
| 8.41425 – 8.41475 | 162.01250 – 167.17000 | 3260.0 – 3267.0 | 23.600 – 24.000 |
| 12.29000 – 12.29300 | 167.72000 – 173.20000 | 3332.0 – 3339.0 | 31.200 – 31.800 |
| 12.51975 – 12.52025 | 240.00000 – 285.00000 | 3345.8 – 3358.0 | 36.430 – 36.500 |
| 12.57675 – 12.57725 | 322.00000 – 335.40000 | 3600.0 – 4400.0 | Above 38.6 |
| 13.36000 – 13.41000 | | | |

**: Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

## 13.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:
This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.