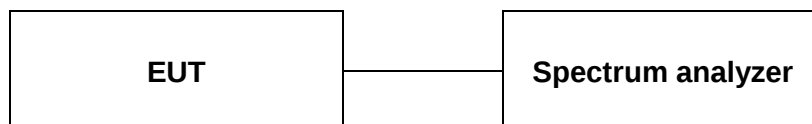


## 7. power spectral density

### 7.1. Test setup



### 7.2. Test Overview and Limit

| Frequency Band | Limit                                             |
|----------------|---------------------------------------------------|
| 5150-5250MHz   | The power spectral density less than 11dBm/1MHz   |
| 5250-5350MHz   | The power spectral density less than 11dBm/1MHz   |
| 5470-5725MHz   | The power spectral density less than 11dBm/1MHz   |
| 5725-5850MHz   | The power spectral density less than 30dBm/500kHz |

### 7.3. Test procedure (KDB 789033)

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.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...." (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:
  - 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.
  - b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
4. The result is the Maximum PSD over 1 MHz reference bandwidth.
5. For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth ( $< 1$  MHz, or  $< 500$  kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
  - a) Set  $RBW \geq 1/T$ , where  $T$  is defined in section II.B.I.a).

b) Set VBW  $\geq$  3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add  $10 \log (500 \text{ kHz/RBW})$  to the measured result, whereas RBW ( $< 500 \text{ kHz}$ ) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add  $10 \log (1\text{MHz/RBW})$  to the measured result, whereas RBW ( $< 1 \text{ MHz}$ ) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

## 7.4. Test results

Ambient temperature: 22°C

Relative humidity: 45% R.H.

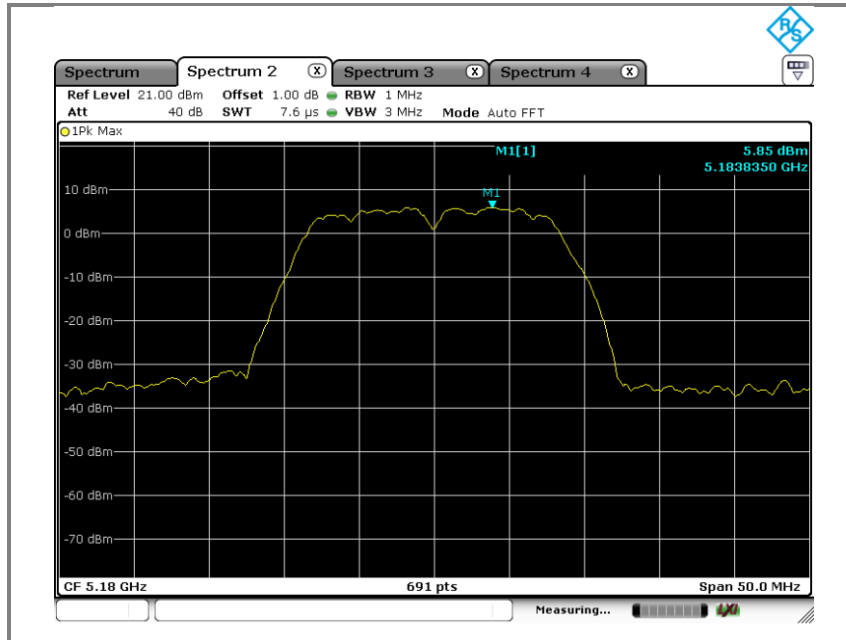
-Next Page

| Mode              | Frequency (MHz) | Power Spectral Density (dB m / 1 MHz) | Limit (dB m / 1 MHz) |
|-------------------|-----------------|---------------------------------------|----------------------|
| U-NII-1(802.11a)  | 5 180           | 5.85                                  | 11dBm                |
|                   | 5 220           | 6.07                                  |                      |
|                   | 5 240           | 5.85                                  |                      |
| U-NII-1(n_HT20)   | 5 180           | 5.15                                  |                      |
|                   | 5 220           | 5.03                                  |                      |
|                   | 5 240           | 5.82                                  |                      |
| U-NII-1(n_HT40)   | 5 190           | 0.95                                  |                      |
|                   | 5 230           | 1.38                                  |                      |
| U-NII-1(VHT80)    | 5 210           | -2.19                                 |                      |
| U-NII-2A(802.11a) | 5 180           | 6.64                                  | 11dBm                |
|                   | 5 220           | 6.01                                  |                      |
|                   | 5 240           | 7.23                                  |                      |
| U-NII-2A(n_HT20)  | 5 180           | 5.58                                  |                      |
|                   | 5 220           | 5.65                                  |                      |
|                   | 5 240           | 5.71                                  |                      |
| U-NII-2A(n_HT40)  | 5 270           | 1.60                                  |                      |
|                   | 5 310           | 2.43                                  |                      |
| U-NII-2A(VHT80)   | 5 290           | -2.73                                 |                      |
| U-NII-2C(802.11a) | 5 500           | 6.45                                  | 11dBm                |
|                   | 5 560           | 5.33                                  |                      |
|                   | 5 620           | 5.12                                  |                      |
| U-NII-2C(n_HT20)  | 5 500           | 5.54                                  |                      |
|                   | 5 560           | 5.44                                  |                      |
|                   | 5 620           | 4.90                                  |                      |
| U-NII-2C(n_HT40)  | 5 510           | 1.29                                  |                      |
|                   | 5 550           | 0.73                                  |                      |
|                   | 5 590           | 0.87                                  |                      |
| U-NII-2C(VHT80)   | 5 530           | -3.34                                 |                      |
|                   | 5 610           | -3.02                                 |                      |

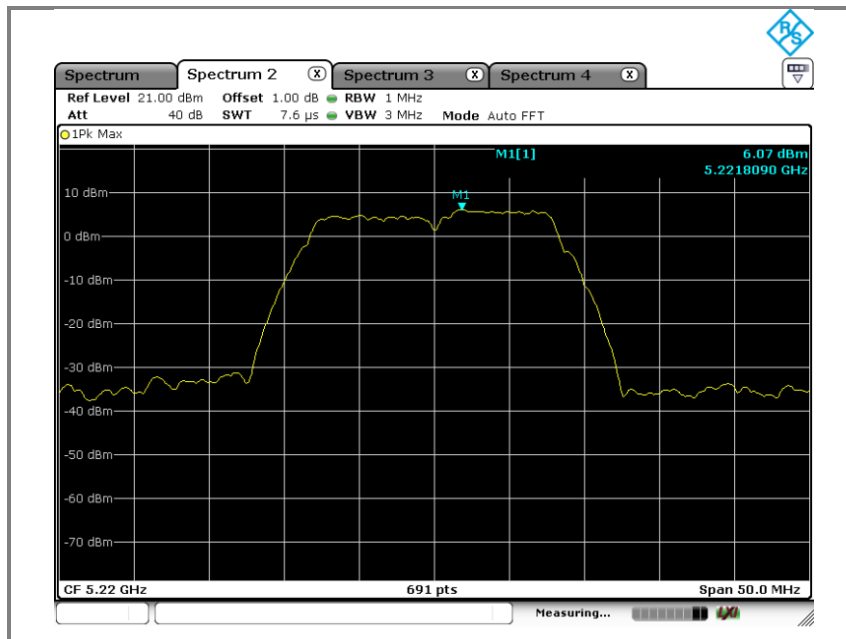
| Mode             | Frequency (MHz) | Power Spectral Density (dB m / 500kHz) | Limit (dB m / 500kHz) |
|------------------|-----------------|----------------------------------------|-----------------------|
| U-NII-3(802.11a) | 5 745           | 3.73                                   | 30                    |
|                  | 5 785           | 3.30                                   |                       |
|                  | 5 805           | 3.25                                   |                       |
| U-NII-3(n_HT20)  | 5 745           | 3.21                                   |                       |
|                  | 5 785           | 2.66                                   |                       |
|                  | 5 805           | 2.49                                   |                       |
| U-NII-3(n_HT40)  | 5 755           | -0.58                                  |                       |
|                  | 5 795           | 1.57                                   |                       |
| U-NII-3(VHT80)   | 5 775           | -4.37                                  |                       |

Operation mode: U-NII-1(802.11a)

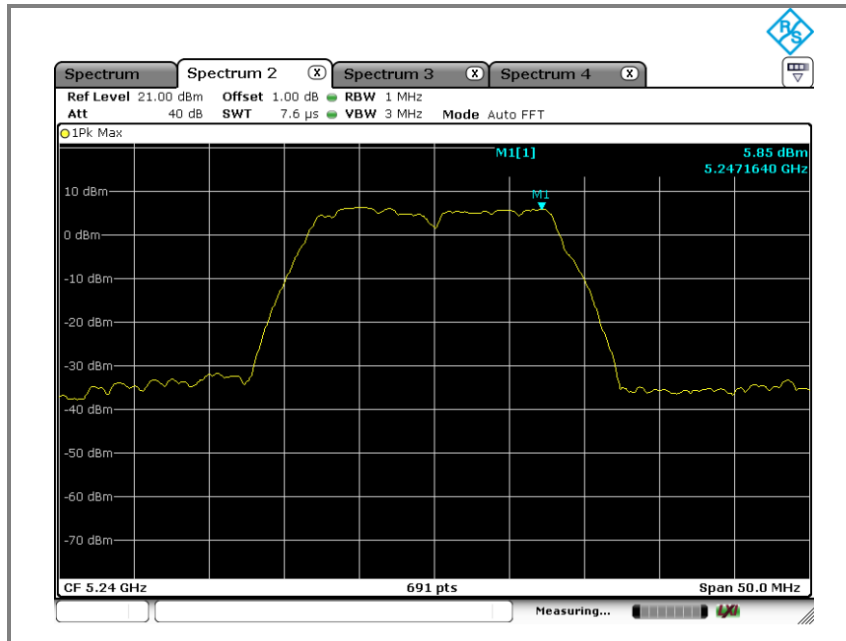
#### A. Low channel(5180 MHz)



#### B. Middle channel(5220 MHz)

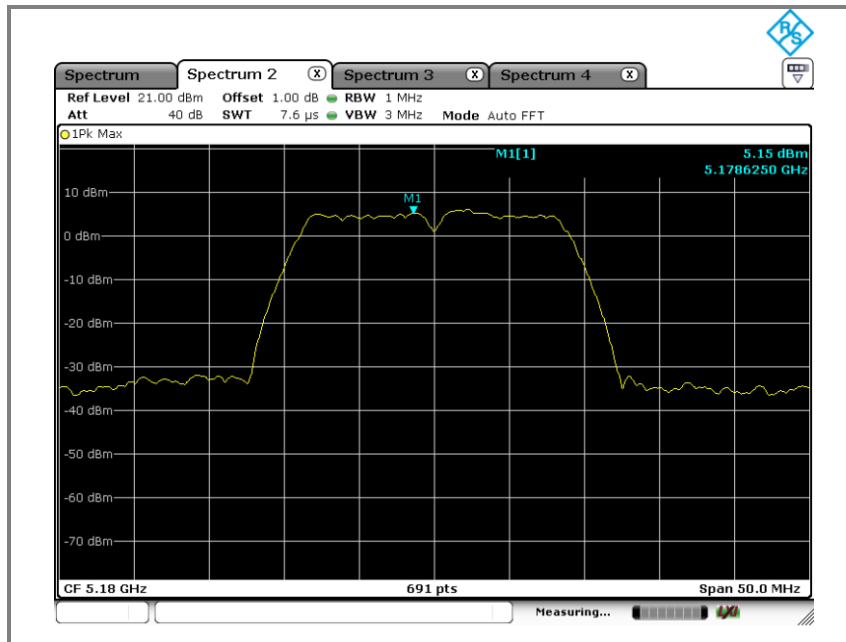


### C. High channel(5240 MHz)

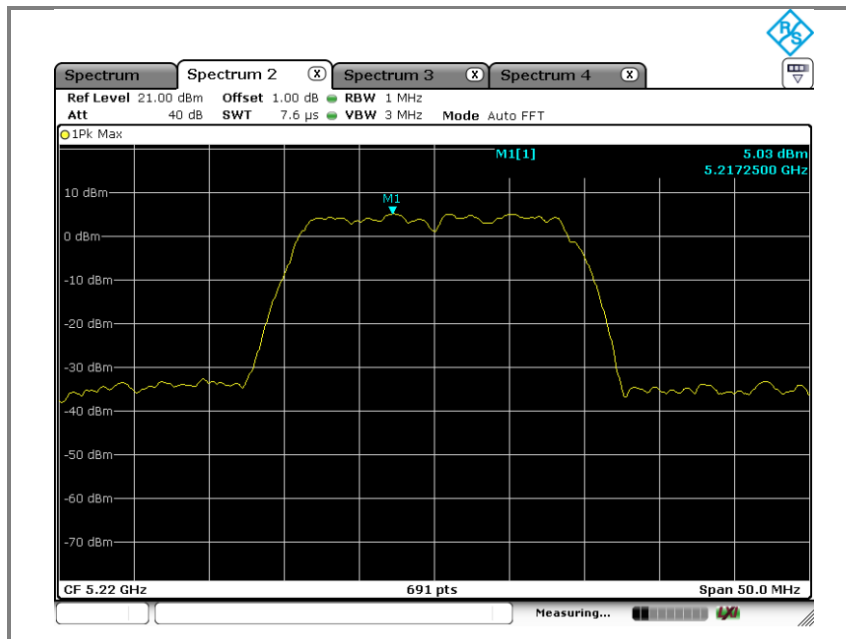


Operation mode: U-NII-1(n\_HT20)

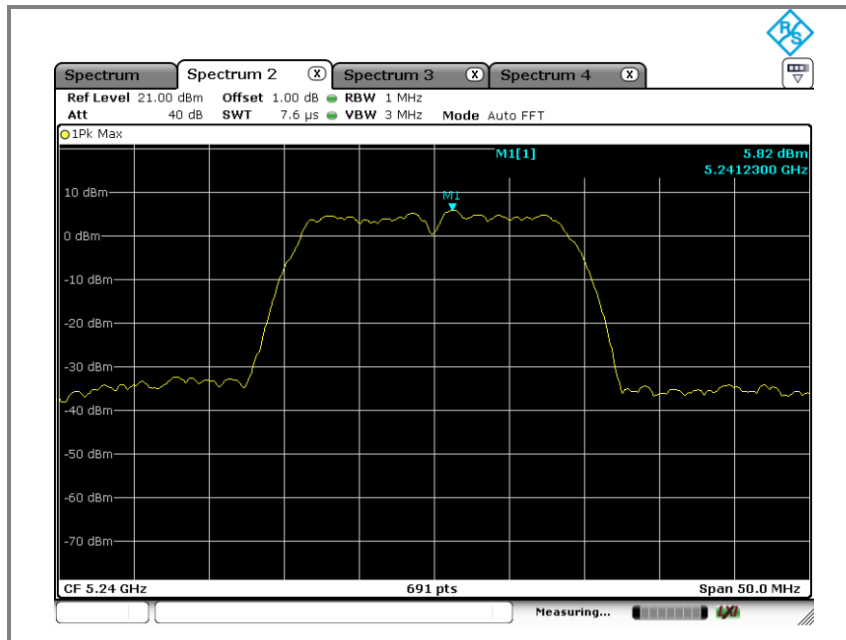
#### A. Low channel(5180 MHz)



#### B. Middle channel(5220 MHz)

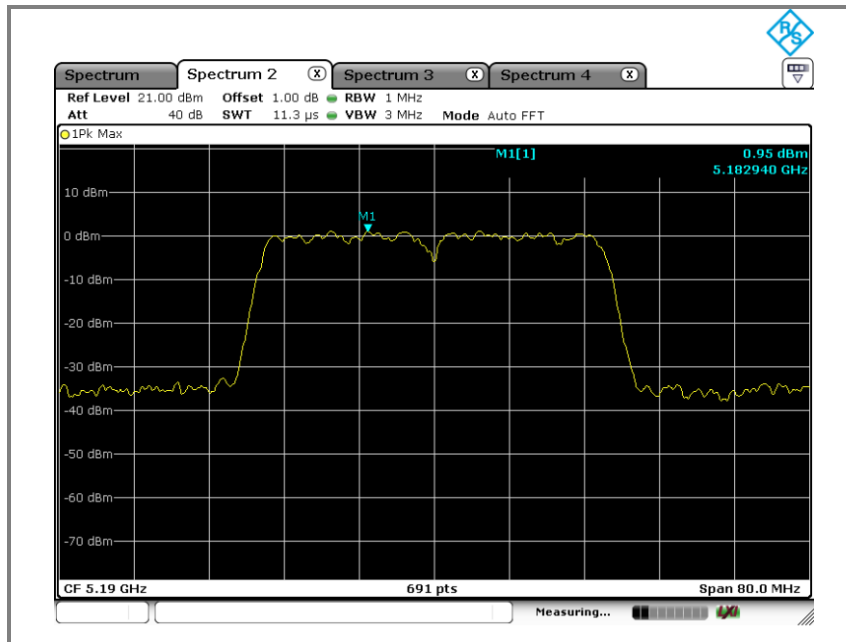


### C. High channel(5240 MHz)

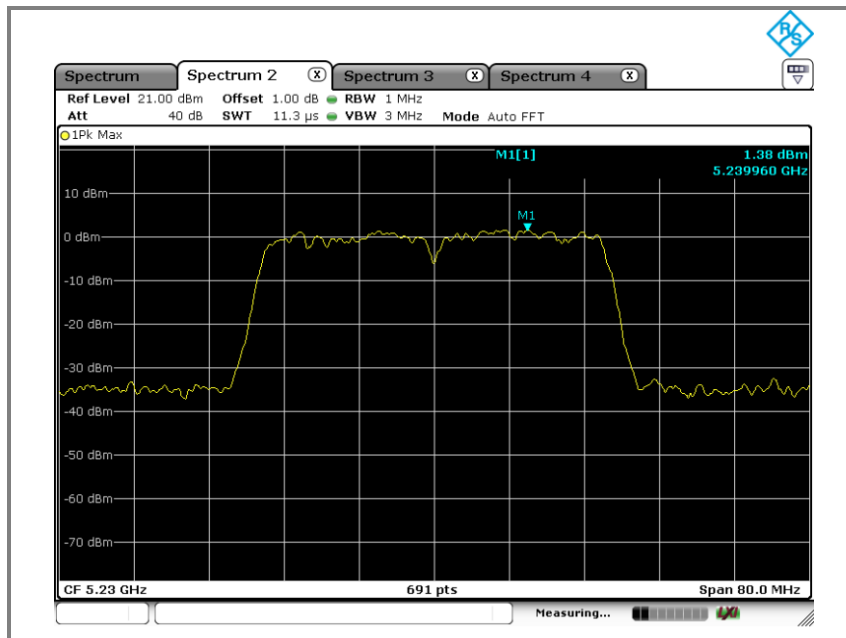


Operation mode: U-NII-1(n\_HT40)

A. Low channel(5190 MHz)

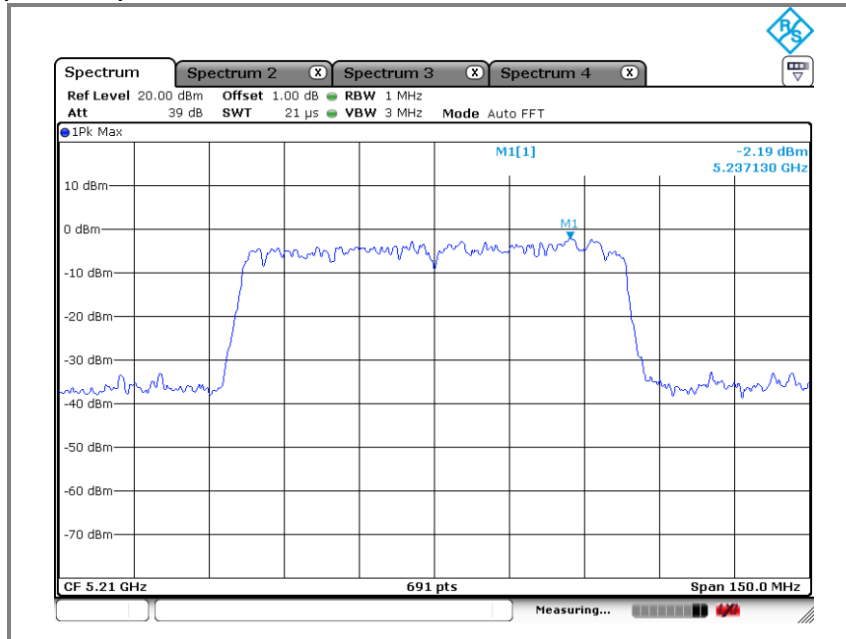


B. High channel(5230 MHz)



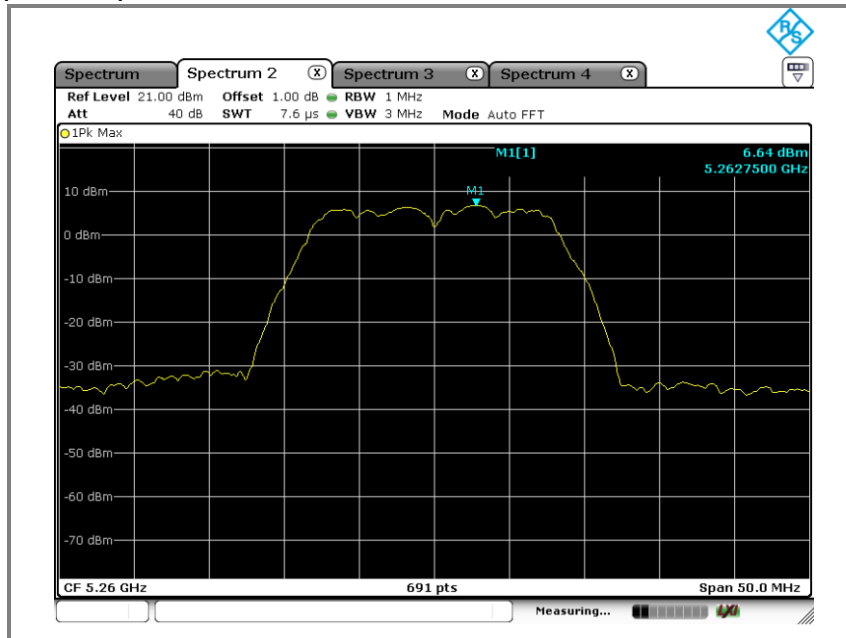
Operation mode: U-NII-1(VHT80)

A. Low channel(5210 MHz)

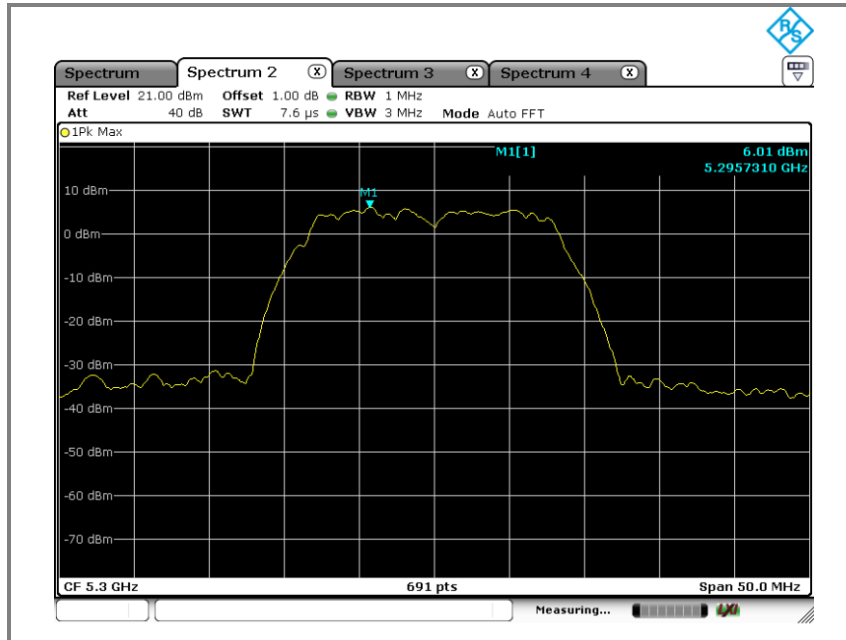


Operation mode: U-NII-2A(802.11a)

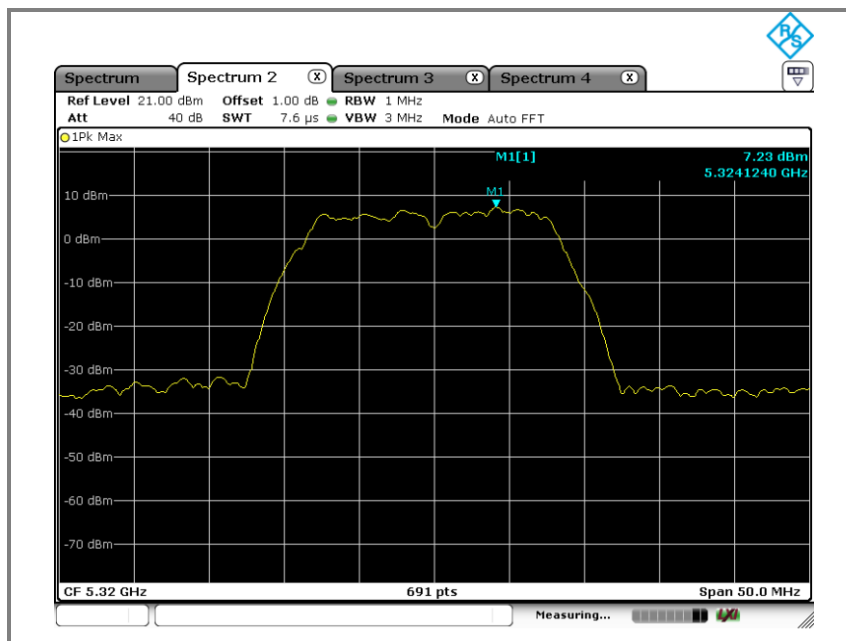
A. Low channel(5260 MHz)



## B. Middle channel(5300 MHz)

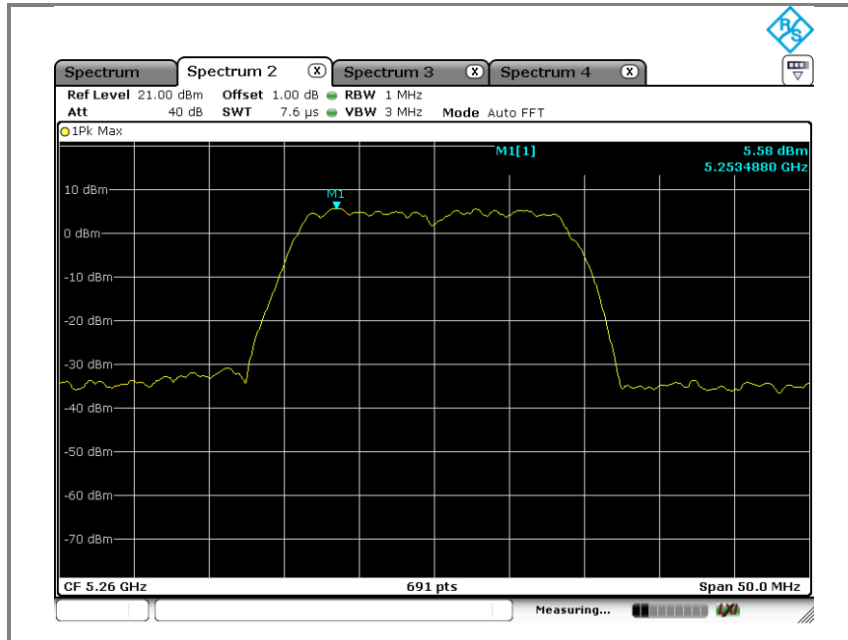


## C. High channel(5320 MHz)

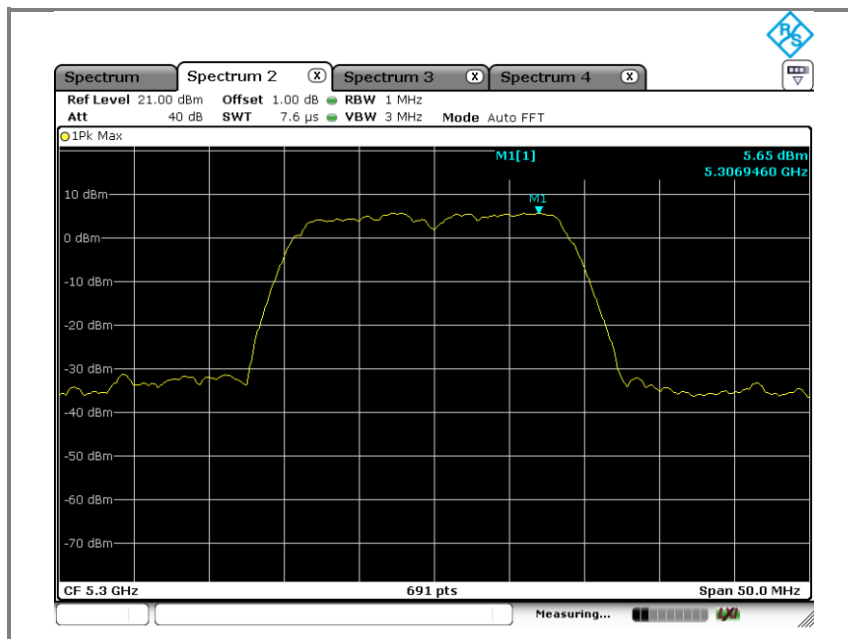


Operation mode: U-NII-2A(n\_HT20)

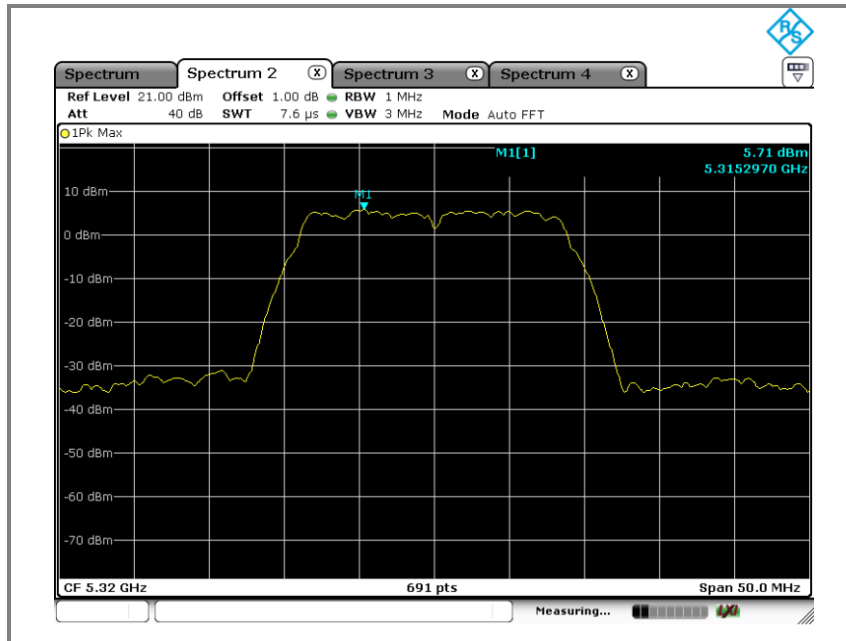
**A. Low channel(5260 MHz)**



**B. Middle channel(5300 MHz)**

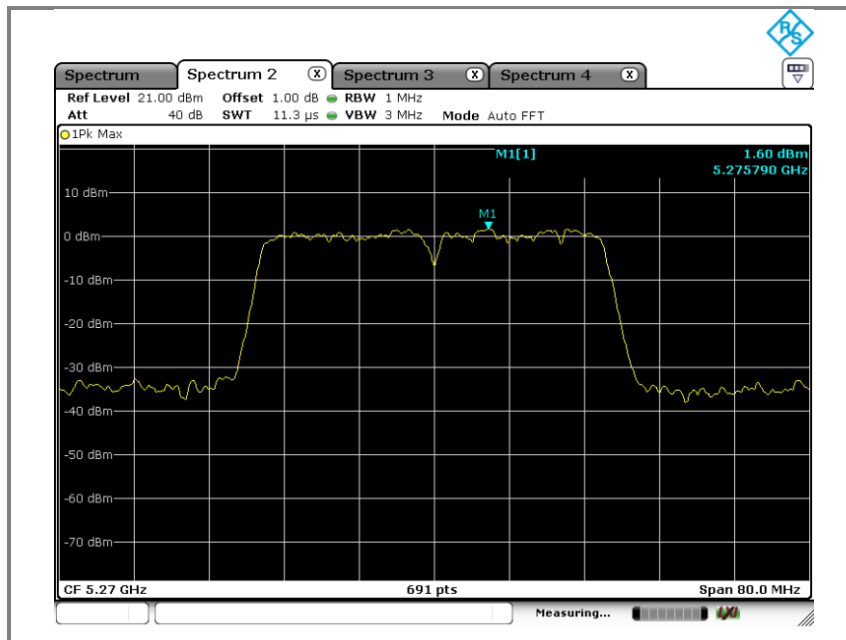


### C. High channel(5320 MHz)

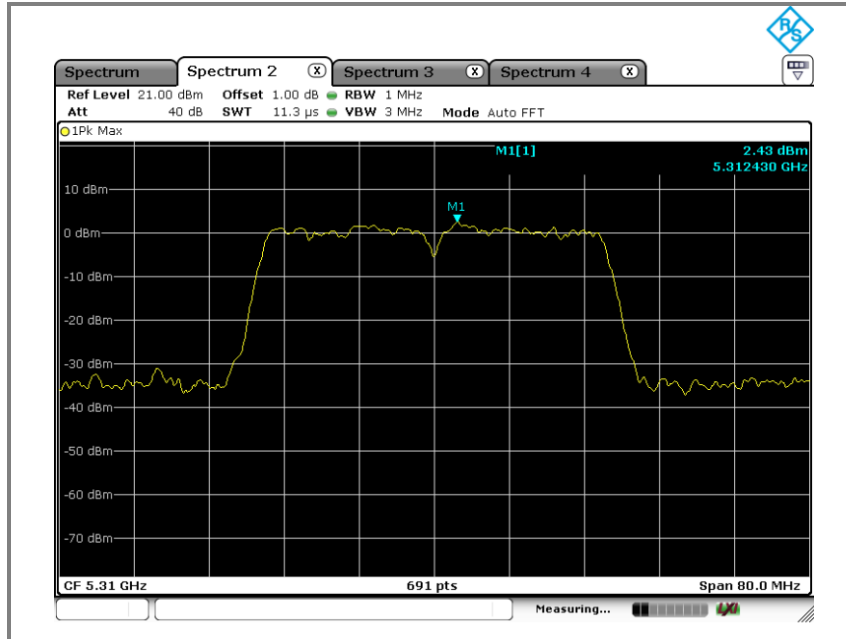


**Operation mode: U-NII-2A(n\_HT40)**

### A. Low channel(5270 MHz)

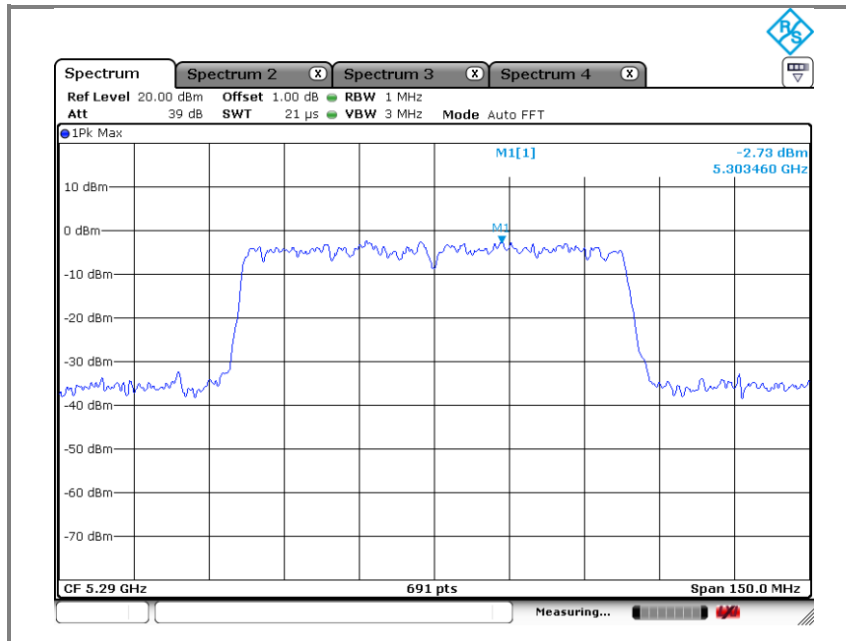


## B. High channel(5310 MHz)



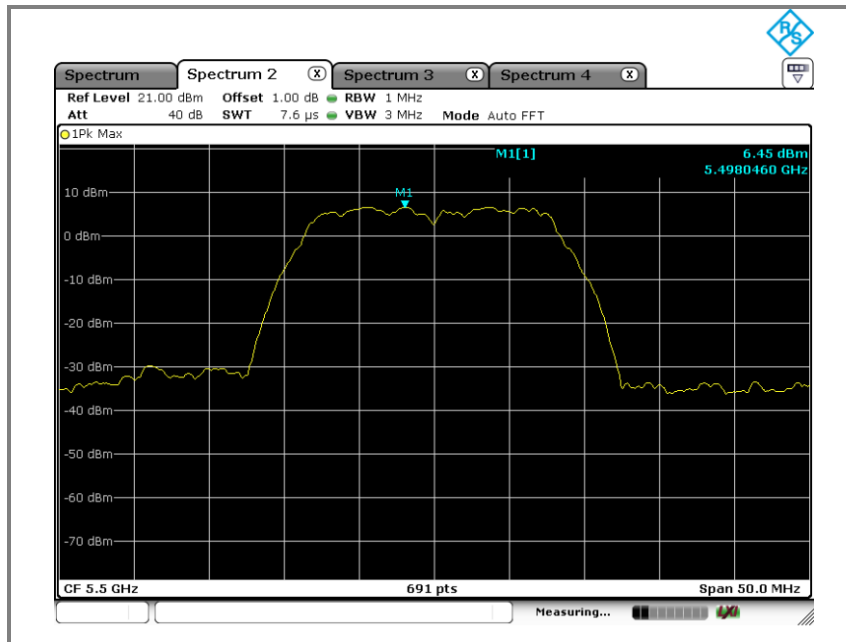
Operation mode: U-NII-2A(VHT80)

## A. Low channel(5290 MHz)

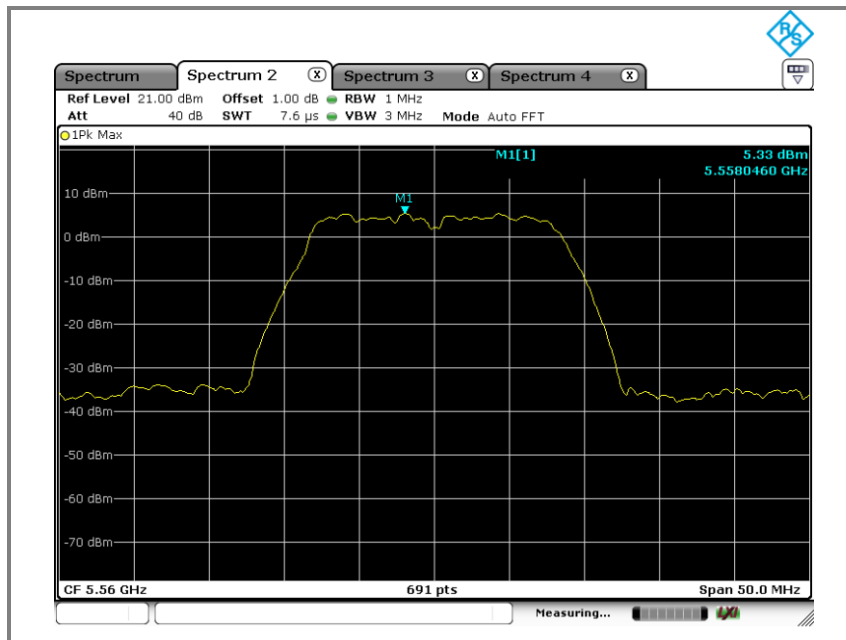


Operation mode: U-NII-2C(802.11a)

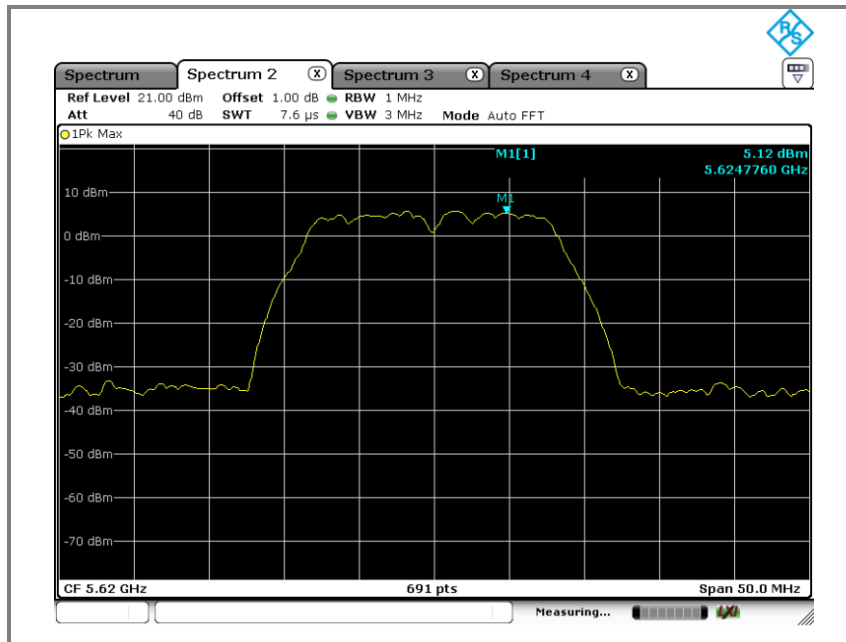
A. Low channel(5500 MHz)



B. Middle channel(5560 MHz)

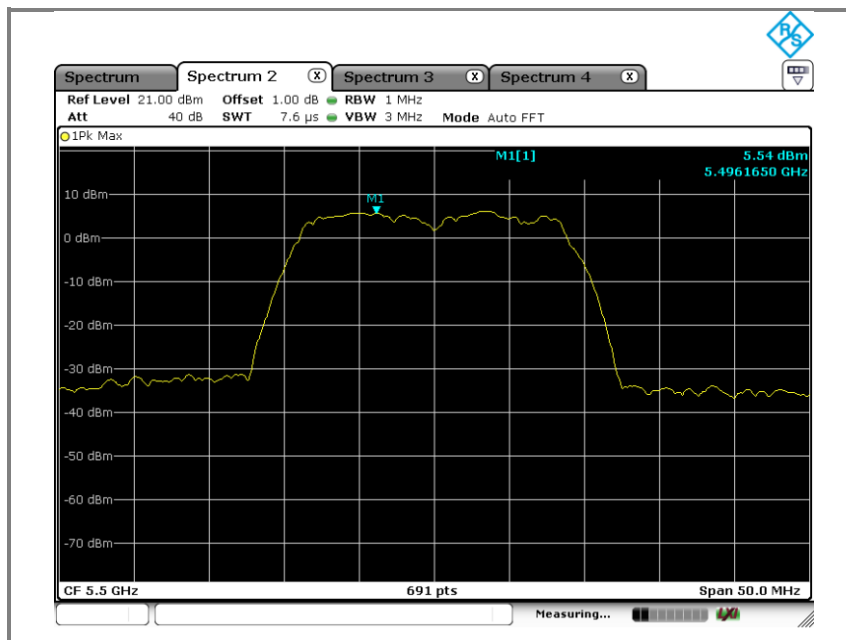


### C. High channel(5620 MHz)

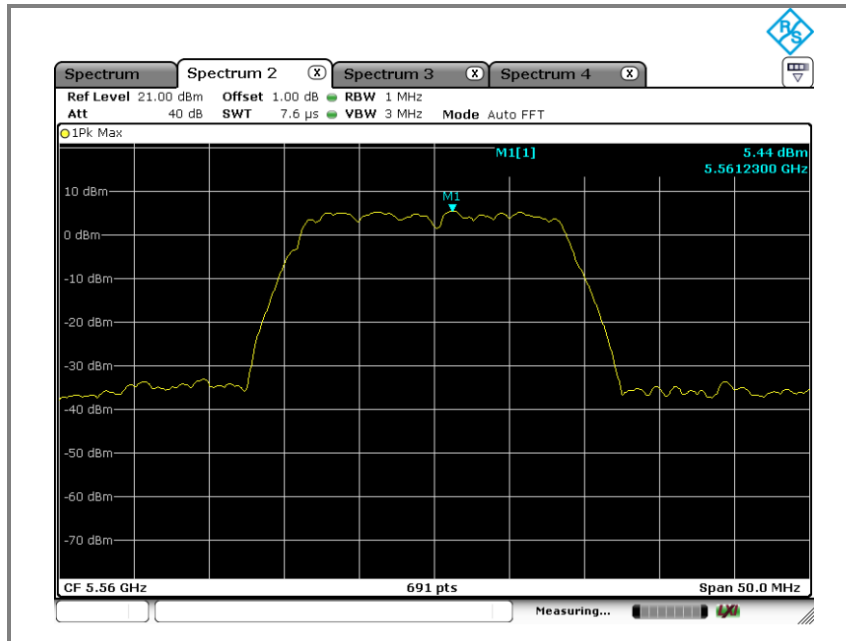


Operation mode: U-NII-2C(n\_HT20)

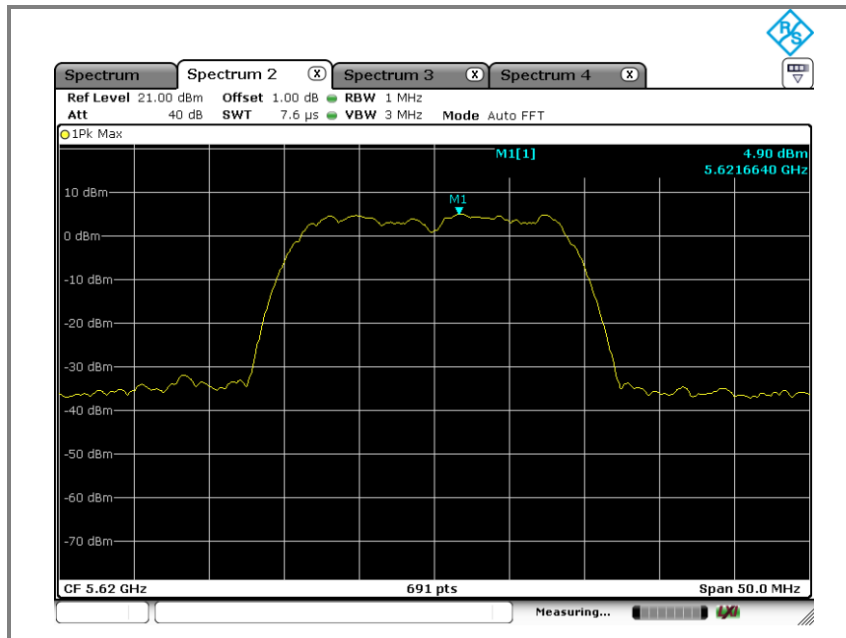
### A. Low channel(5500 MHz)



## B. Middle channel(5560 MHz)

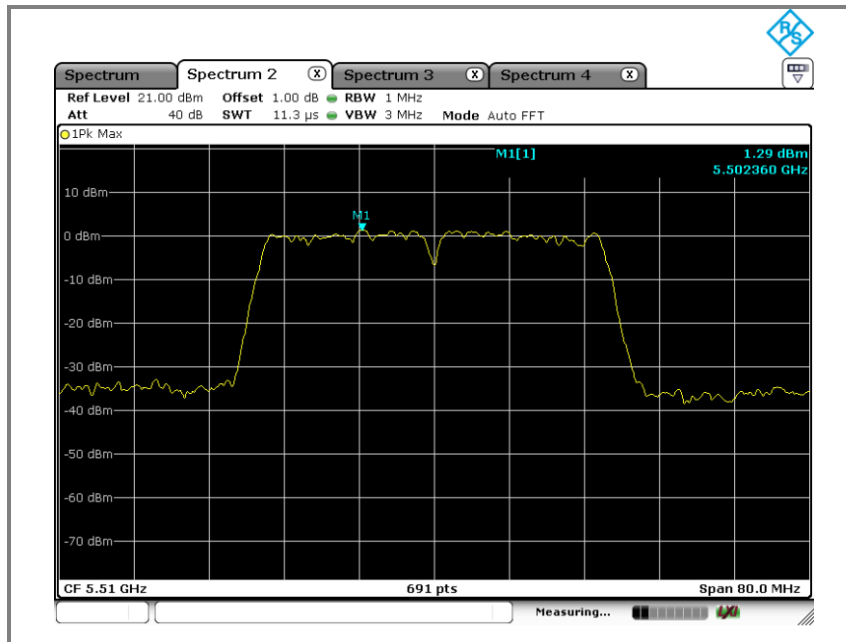


## C. High channel(5620 MHz)

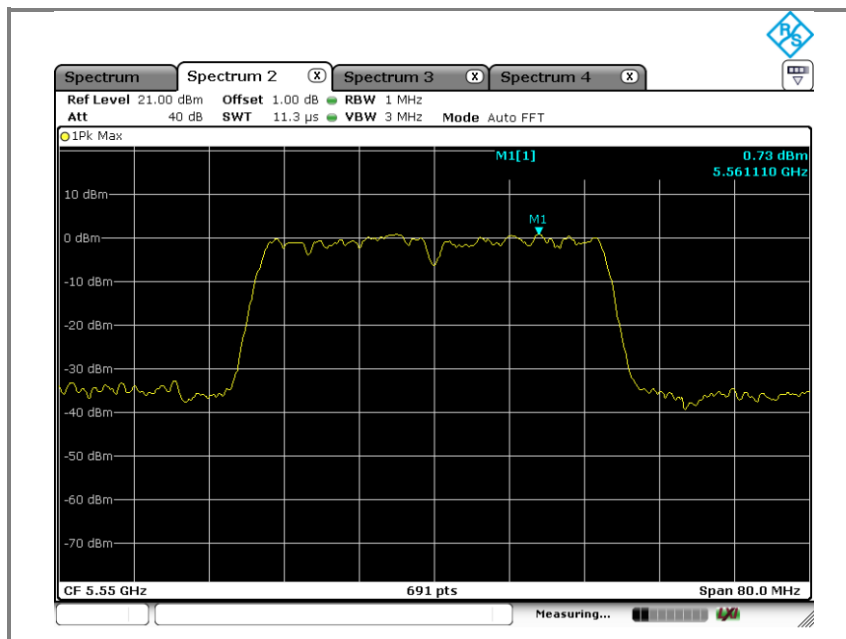


Operation mode: U-NII-2C(n\_HT40)

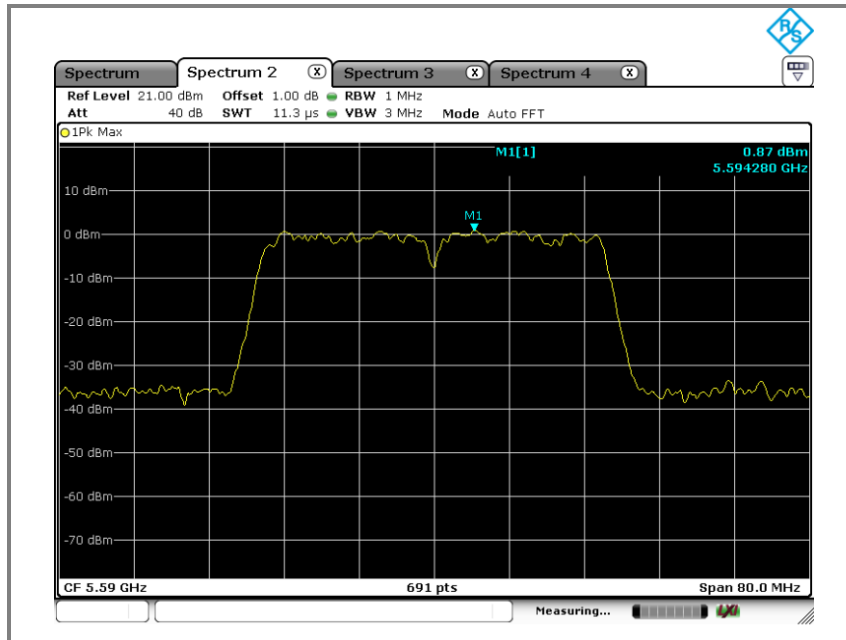
**A. Low channel(5510 MHz)**



**B. Middle channel(5550 MHz)**

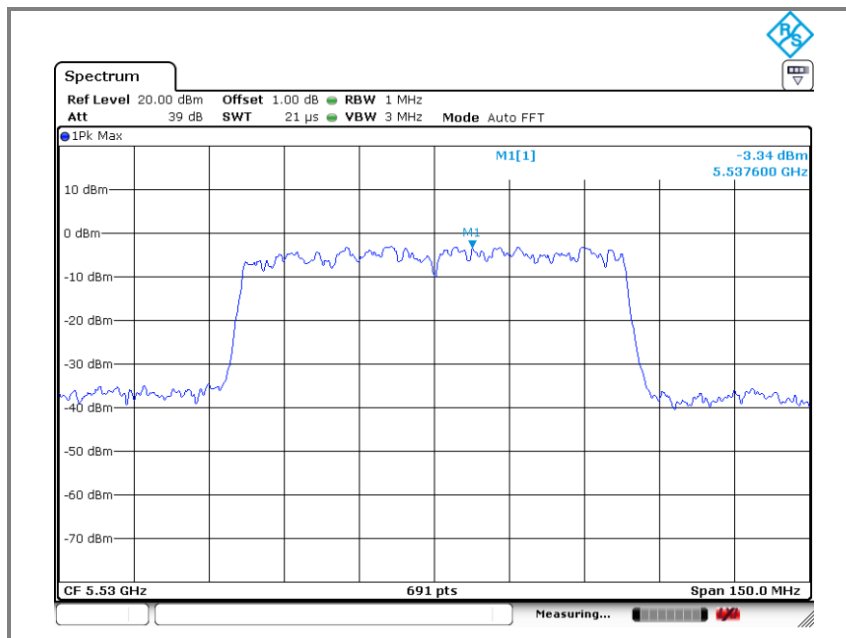


### C. High channel(5590 MHz)

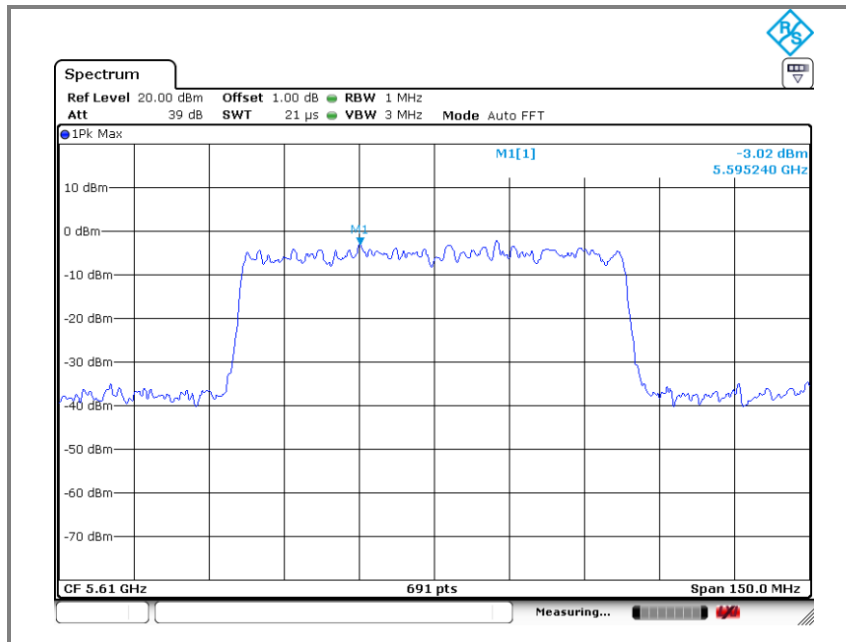


**Operation mode: U-NII-2C(VHT80)**

### A. Low channel(5530 MHz)

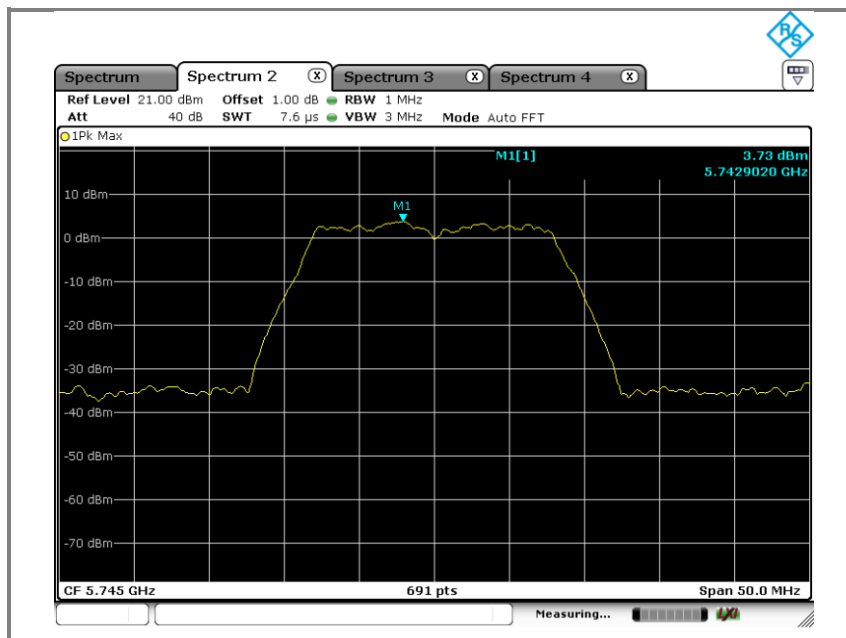


### A. High channel(5610 MHz)

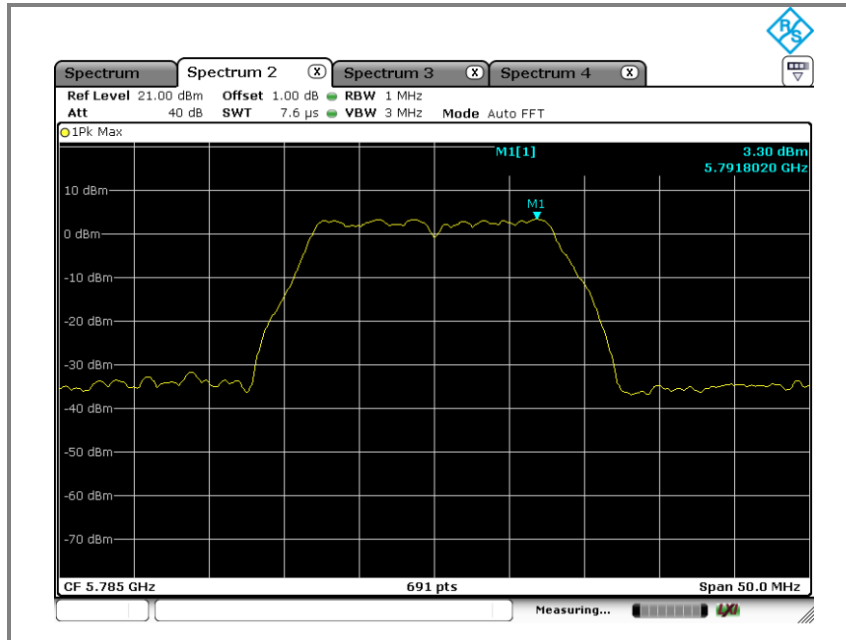


Operation mode: U-NII-3(802.11a)

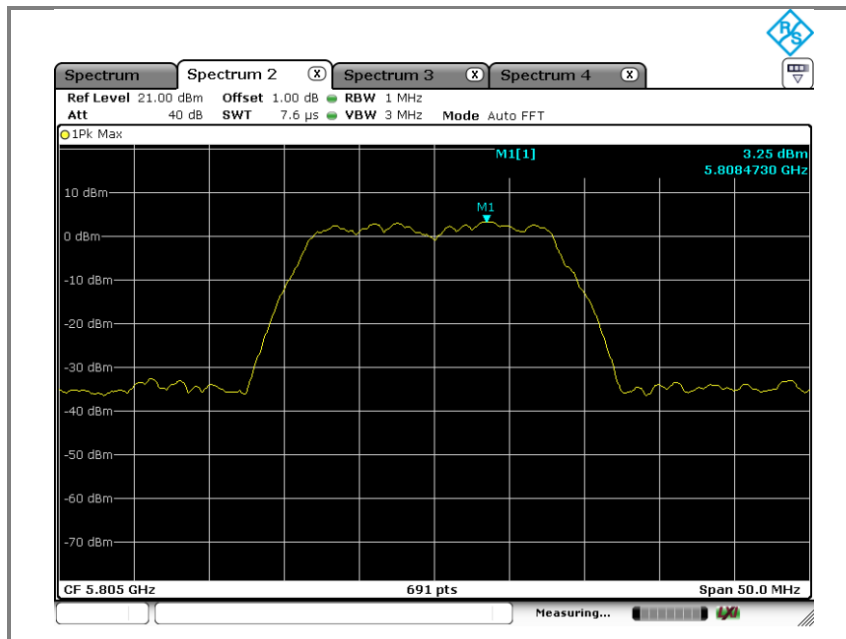
### A. Low channel(5745 MHz)



## B. Middle channel(5785 MHz)

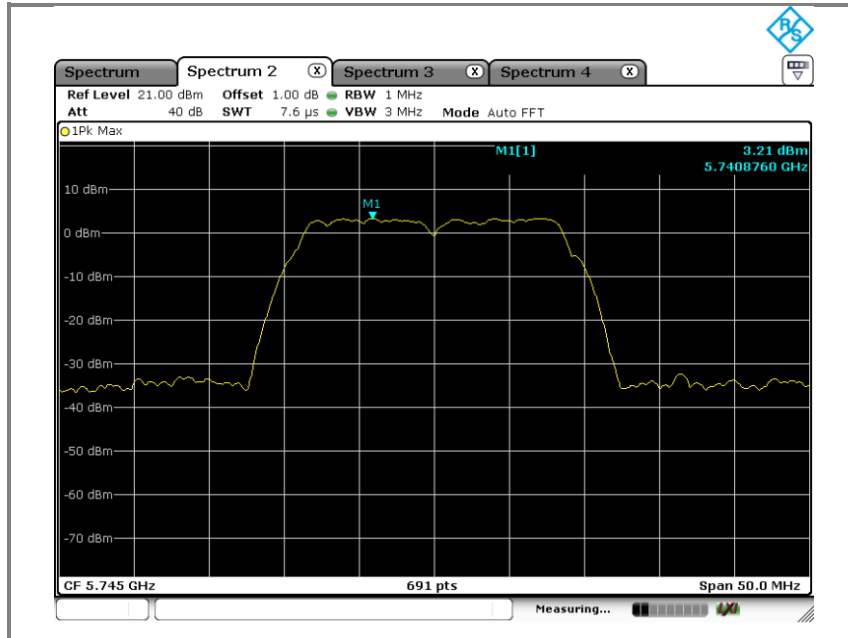


## C. High channel(5805 MHz)

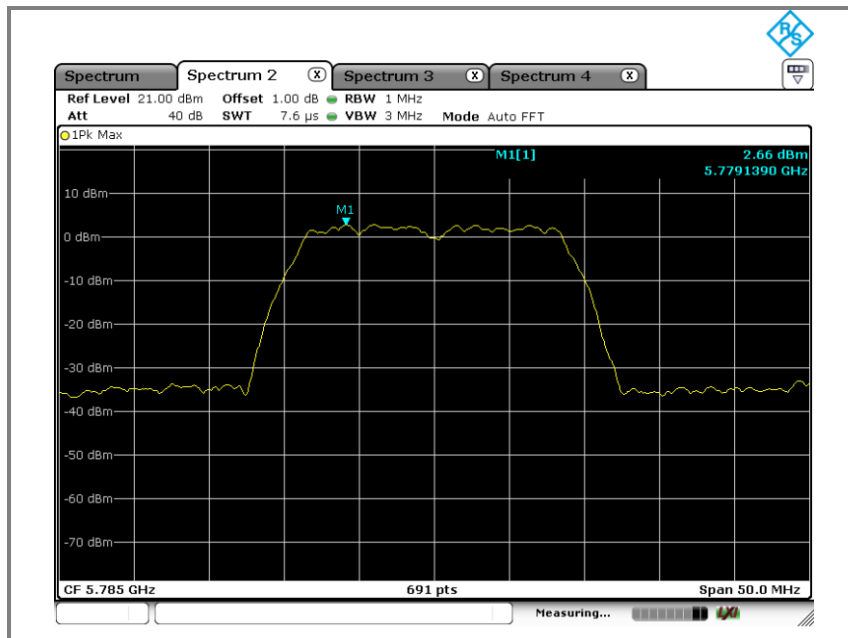


Operation mode: U-NII-3(n\_HT20)

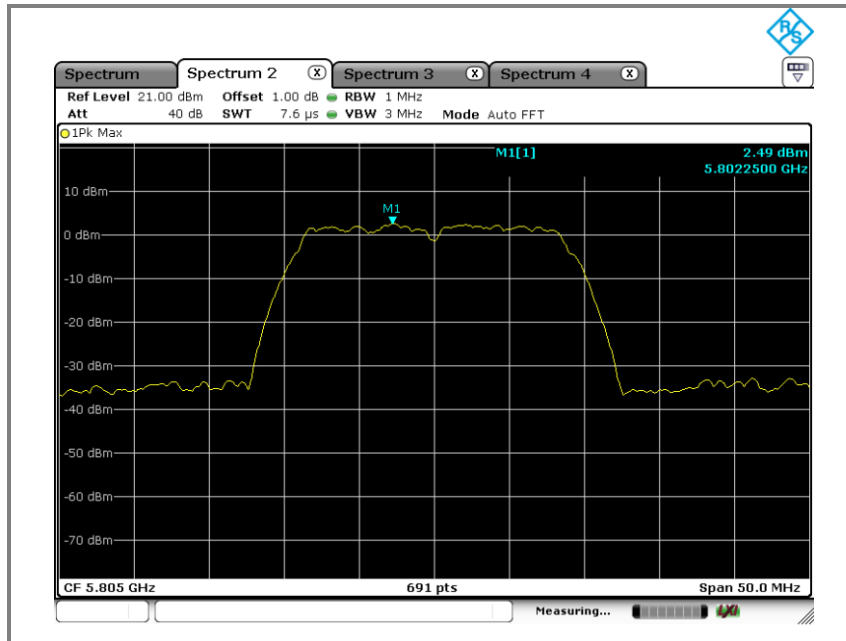
#### A. Low channel(5745 MHz)



#### B. Middle channel(5785 MHz)

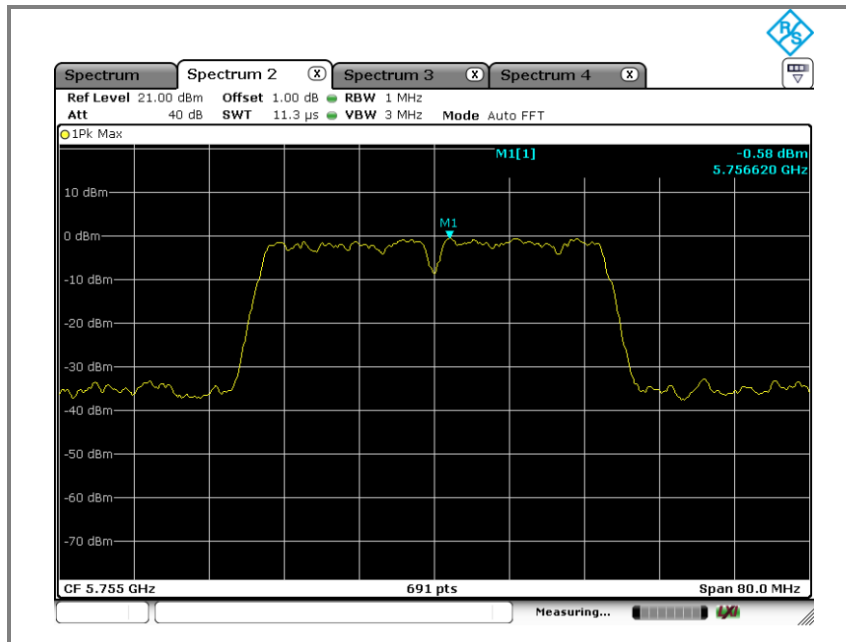


**C. High channel(5805 MHz)**

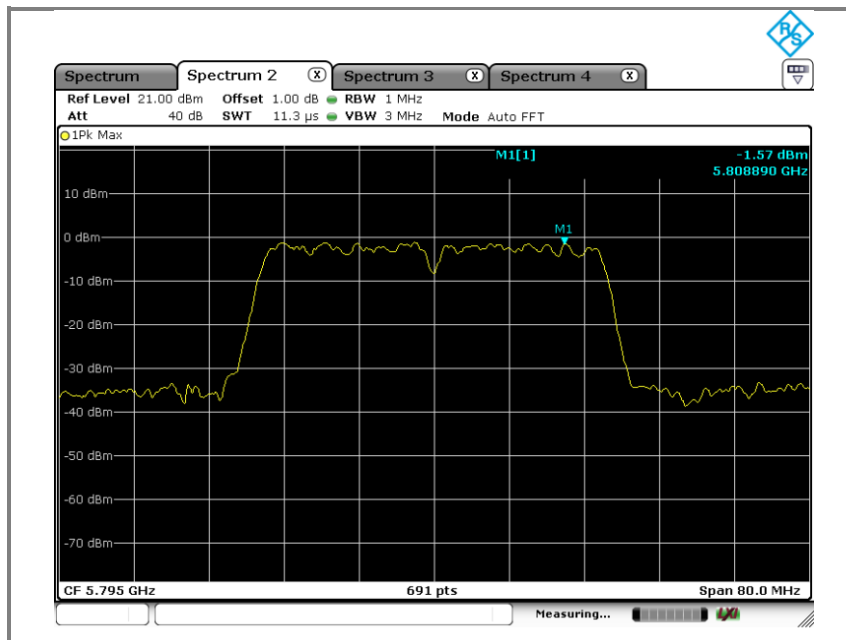


Operation mode: U-NII-3(n\_HT40)

A. Low channel(5755 MHz)

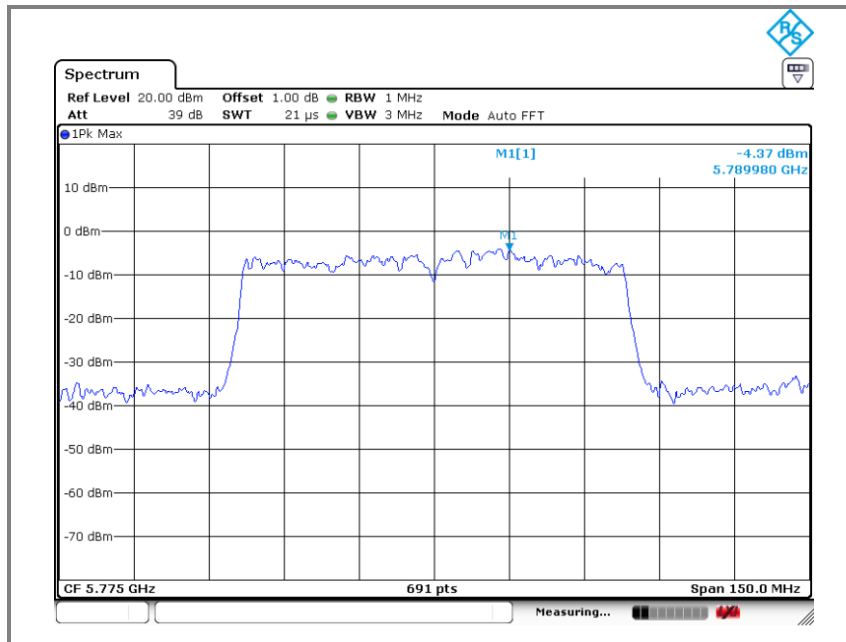


B. High channel(5795 MHz)



Operation mode: U-NII-3(VHT80)

A. Low channel(5775 MHz)



## 8. 6 dB Bandwidth

### 8.1. Test setup



### 8.2. Limit

Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### 8.3. Test procedure

#### Test procedure

KDB 789033 D02 v01r03– Section C.2, KDB 644545 D03 v01

1. Set RBW = 100 kHz
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW.
3. Detector = peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize
6. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.
7. In case of band crossing channels 138, 142 and 144, the measurement is complied with section D of KDB 644545\_D03 v01.

### 8.4. Test results

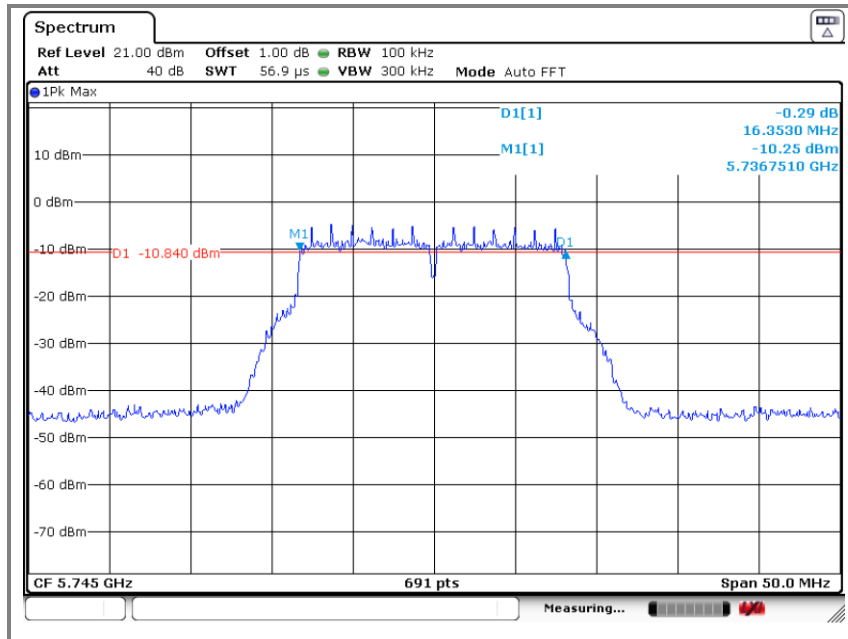
Ambient temperature: 22°C

Relative humidity: 45 % R.H.

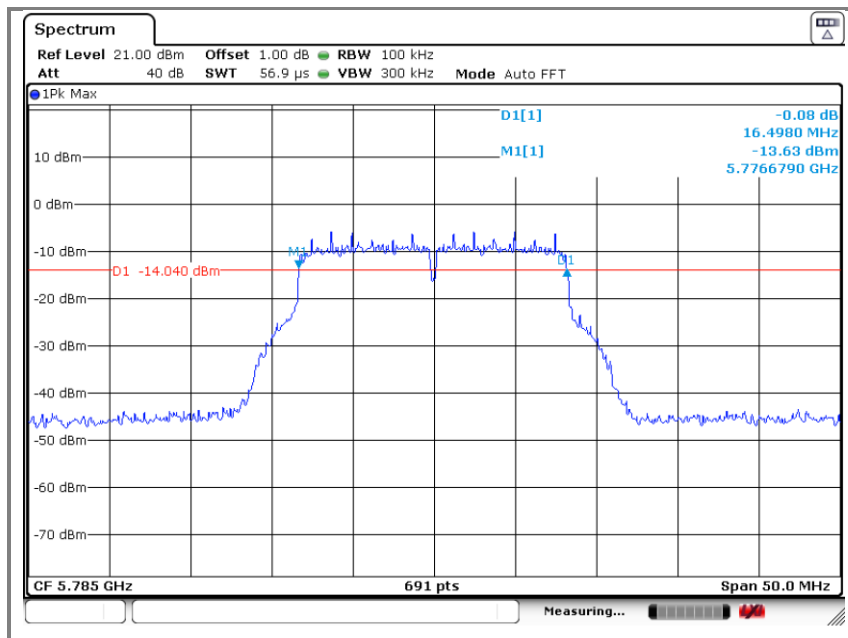
| Mode             | Frequency (MHz) | 6 dB bandwidth (MHz) |
|------------------|-----------------|----------------------|
| U-NII-3(802.11a) | 5 745           | 16.35                |
|                  | 5 785           | 16.50                |
|                  | 5 805           | 16.57                |
| U-NII-3(n_HT20)  | 5 745           | 17.73                |
|                  | 5 785           | 17.58                |
|                  | 5 805           | 17.66                |
| U-NII-3(n_HT40)  | 5 755           | 36.47                |
|                  | 5 795           | 36.47                |
| U-NII-3(VHT80)   | 5 775           | 75.98                |

Operation mode: U-NII-3(802.11a)

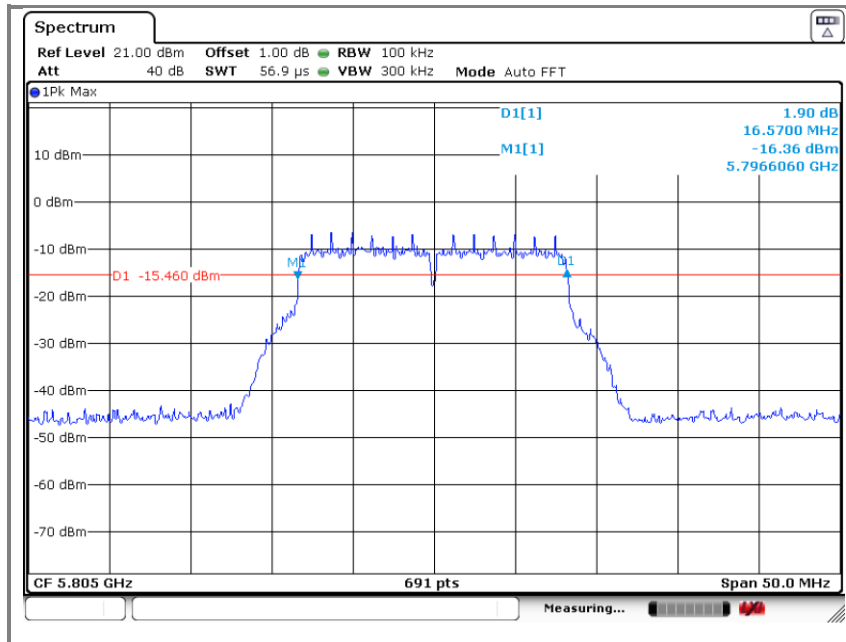
**A. Low channel(5745 MHz)**



**B. Middle channel(5785 MHz)**

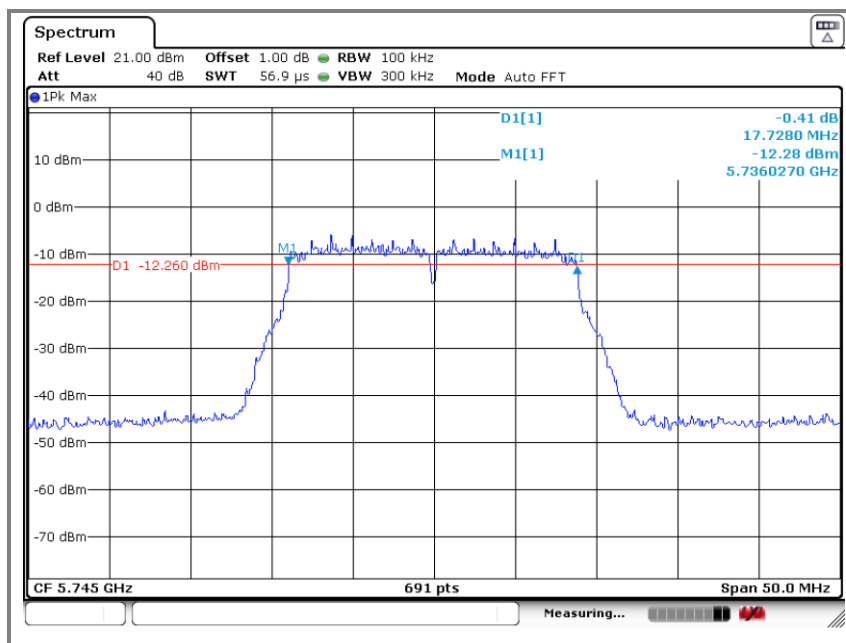


### C. High channel(5805 MHz)

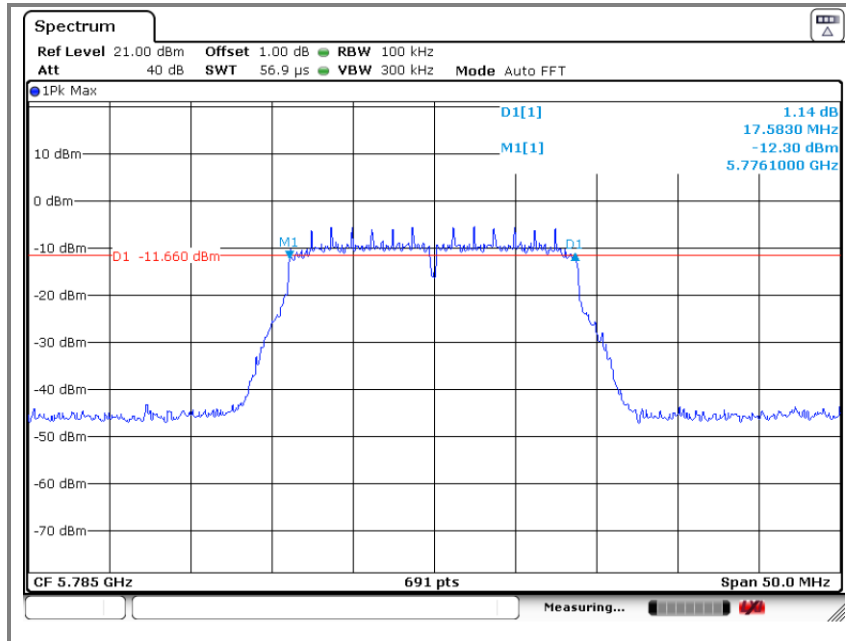


Operation mode: U-NII-3(n\_HT20)

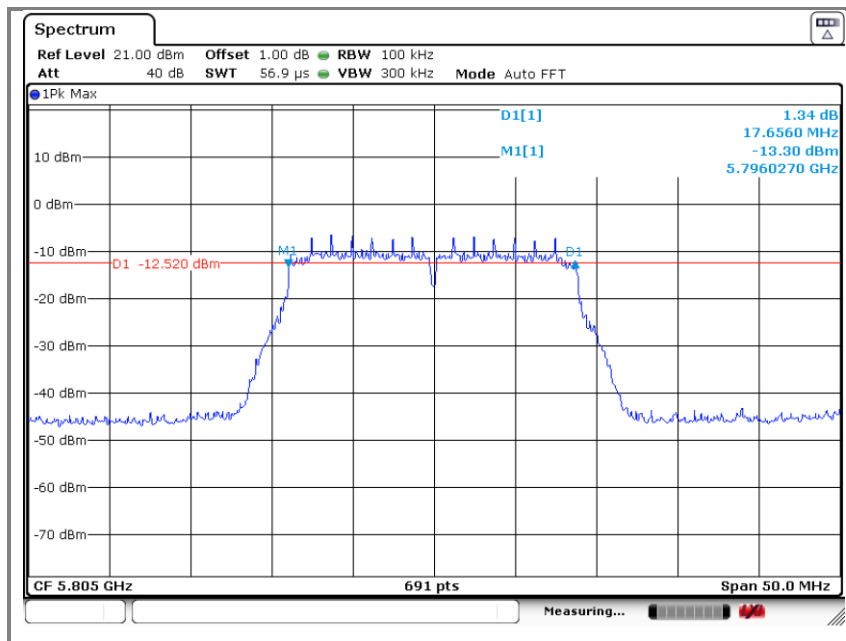
### A. Low channel(5745 MHz)



## B. Middle channel(5785 MHz)

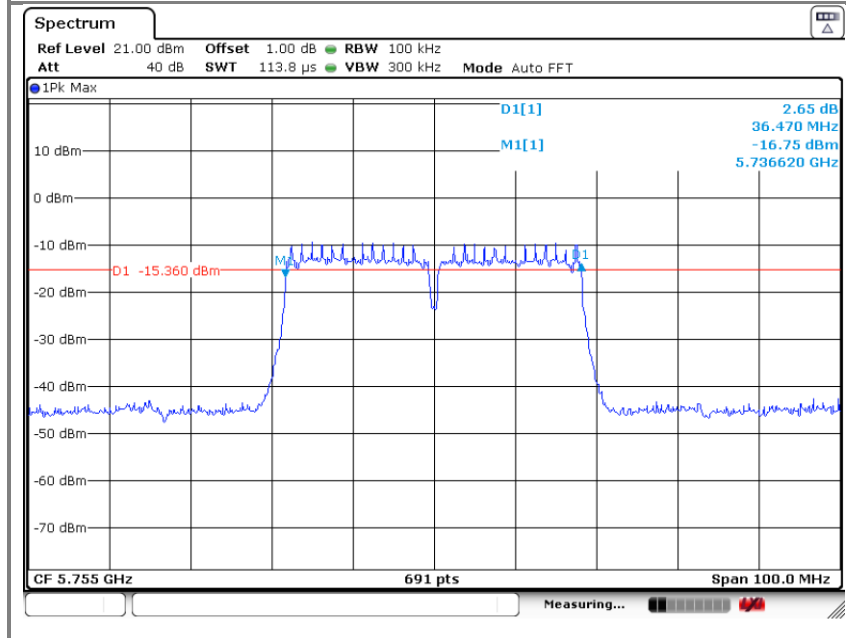


## C. High channel(5805 MHz)

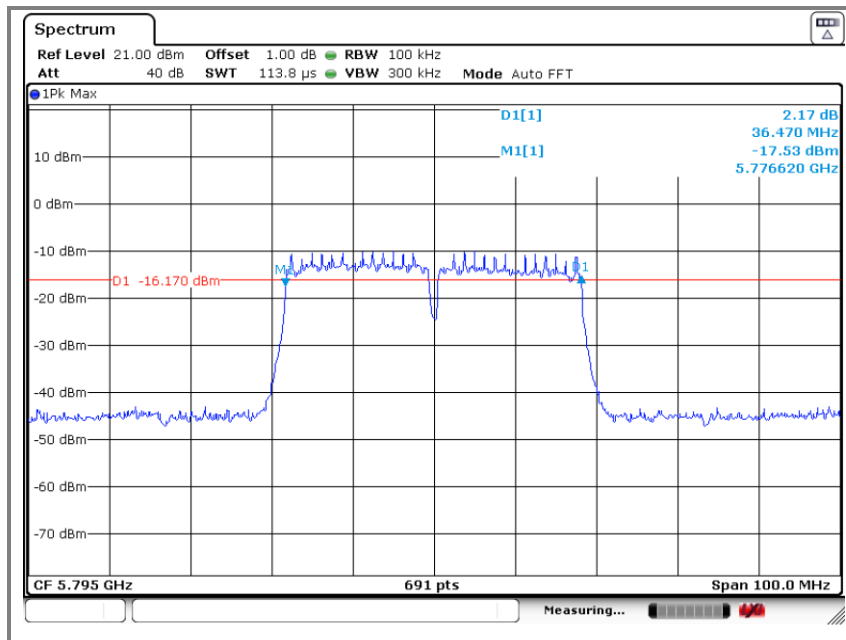


Operation mode: U-NII-3(n\_HT40)

**A. Low channel(5755 MHz)**

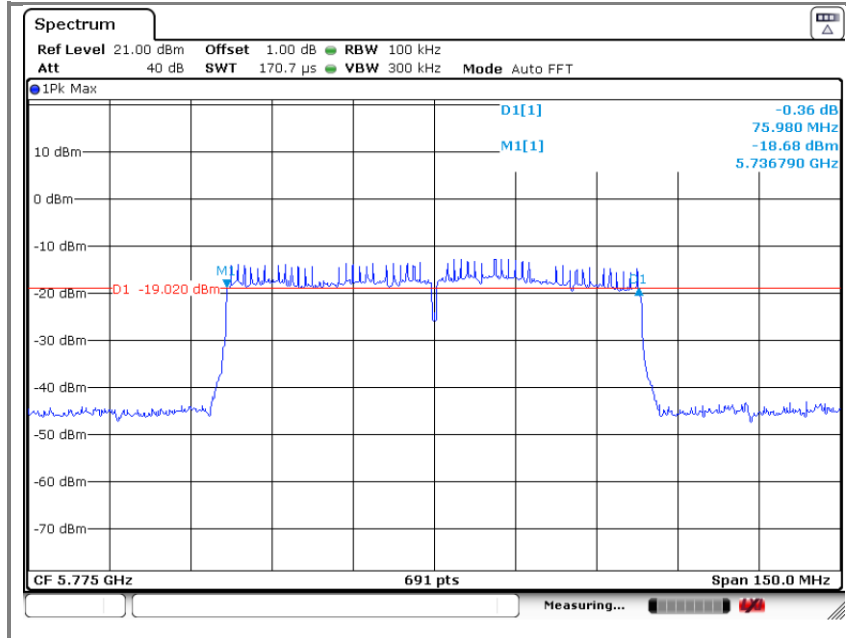


**B. High channel(5795 MHz)**



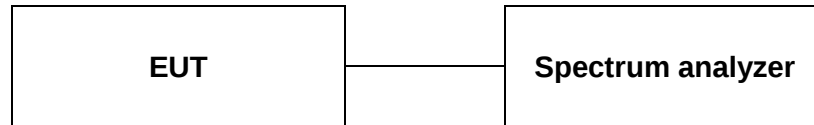
Operation mode: U-NII-3(VHT80)

A. Low channel(5775 MHz)



## 9. Frequency stability

### 9.1. Test setup



### 9.2. Limit

Not applicable

### 9.3. Test procedure

- a. The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

## 9.4. Test results

Operation mode: Normal mode

Operation Frequency :5 180 MHz (Worst case)

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz)    | Deviation (%) |
|-------------|-------------|-----------|--------------|---------------|
| 100%        | 13.5        | +20(Ref)  | 5179 986 415 | 0.000 262     |
| 100%        |             | -20       | 5179 975 479 | 0.000 473     |
| 100%        |             | -10       | 5179 993 057 | 0.000 134     |
| 100%        |             | 0         | 5179 971 473 | 0.000 551     |
| 100%        |             | +10       | 5179 987 173 | 0.000 248     |
| 100%        |             | +20       | 5179 993 528 | 0.000 125     |
| 100%        |             | +25       | 5179 981 580 | 0.000 356     |
| 100%        |             | +30       | 5179 984 428 | 0.000 301     |
| 100%        |             | +40       | 5179 998 263 | 0.000 034     |
| 100%        |             | +50       | 5179 984 175 | 0.000 306     |
| 100%        |             | +60       | 5179 974 115 | 0.000 500     |
| 85%         | 11.48       | +20       | 5179 994 283 | 0.000 110     |
| 115%        | 15.53       | +20       | 5179 988 871 | 0.000 215     |

Operation Frequency :5 260 MHz (Worst case)

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz)    | Deviation (%) |
|-------------|-------------|-----------|--------------|---------------|
| 100%        | 13.5        | +20(Ref)  | 5259 984 155 | 0.000 301     |
| 100%        |             | -20       | 5259 985 263 | 0.000 280     |
| 100%        |             | -10       | 5259 966 377 | 0.000 639     |
| 100%        |             | 0         | 5259 983 645 | 0.000 311     |
| 100%        |             | +10       | 5259 976 911 | 0.000 439     |
| 100%        |             | +20       | 5259 989 760 | 0.000 195     |
| 100%        |             | +25       | 5259 994 435 | 0.000 106     |
| 100%        |             | +30       | 5259 985 546 | 0.000 275     |
| 100%        |             | +40       | 5259 982 673 | 0.000 329     |
| 100%        |             | +50       | 5259 996 969 | 0.000 058     |
| 100%        |             | +60       | 5259 989 664 | 0.000 197     |
| 85%         | 11.48       | +20       | 5259 974 395 | 0.000 487     |
| 115%        | 15.53       | +20       | 5259 971 513 | 0.000 542     |

**Operation Frequency :5 500 MHz (Worst case)**

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz)     | Deviation (%) |
|-------------|-------------|-----------|---------------|---------------|
| 100%        | 13.5        | +20(Ref)  | 5 499 985 252 | 0.000 268     |
| 100%        |             | -20       | 5 499 986 635 | 0.000 243     |
| 100%        |             | -10       | 5 499 989 896 | 0.000 184     |
| 100%        |             | 0         | 5 499 978 558 | 0.000 390     |
| 100%        |             | +10       | 5 499 984 704 | 0.000 278     |
| 100%        |             | +20       | 5 499 982 141 | 0.000 325     |
| 100%        |             | +25       | 5 499 986 322 | 0.000 249     |
| 100%        |             | +30       | 5 499 995 993 | 0.000 073     |
| 100%        |             | +40       | 5 499 982 566 | 0.000 317     |
| 100%        |             | +50       | 5 499 983 359 | 0.000 303     |
| 100%        |             | +60       | 5 499 986 638 | 0.000 243     |
| 85%         | 11.48       | +20       | 5 499 978 464 | 0.000 392     |
| 115%        | 15.53       | +20       | 5 499 984 222 | 0.000 287     |

**Operation Frequency :5 745 MHz (Worst case)**

| VOLTAGE (%) | POWER (VDC) | TEMP (dB) | FREQ (Hz)     | Deviation (%) |
|-------------|-------------|-----------|---------------|---------------|
| 100%        | 13.5        | +20(Ref)  | 5 744 985 602 | 0.000 251     |
| 100%        |             | -20       | 5 744 963 353 | 0.000 638     |
| 100%        |             | -10       | 5 744 986 836 | 0.000 229     |
| 100%        |             | 0         | 5 744 986 569 | 0.000 234     |
| 100%        |             | +10       | 5 744 984 948 | 0.000 262     |
| 100%        |             | +20       | 5 744 970 164 | 0.000 519     |
| 100%        |             | +25       | 5 744 975 342 | 0.000 429     |
| 100%        |             | +30       | 5 744 983 625 | 0.000 285     |
| 100%        |             | +40       | 5 744 976 466 | 0.000 410     |
| 100%        |             | +50       | 5 744 989 893 | 0.000 176     |
| 100%        |             | +60       | 5 744 977 687 | 0.000 388     |
| 85%         | 11.48       | +20       | 5 744 982 747 | 0.000 300     |
| 115%        | 15.53       | +20       | 5 744 973 922 | 0.000 454     |

## 10. RF exposure evaluation

### 10.1 Environmental evaluation and exposure limit according to FCC CFR 47 part 1, 1.1307(b), 1.1310

According to §15.247(e)(i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines. According to KDB 447498 (2)(a)(i)

#### Limits for maximum permissible exposure (MPE)

| Frequency range<br>(MHz)                                | Electric field<br>strength(V/m) | Magnetic field<br>strength (A/m) | Power density<br>(mW/cm <sup>2</sup> ) | Average time |
|---------------------------------------------------------|---------------------------------|----------------------------------|----------------------------------------|--------------|
| (A) Limits for Occupational / Control exposures         |                                 |                                  |                                        |              |
| 300 – 1 500                                             | --                              | --                               | F/300                                  | 6            |
| 1 500 – 100 000                                         | --                              | --                               | 5                                      | 6            |
| (B) Limits for General Population / Uncontrol Exposures |                                 |                                  |                                        |              |
| 300 – 1 500                                             | --                              | --                               | F/1 500                                | 6            |
| <u>1 500 – 100 000</u>                                  | --                              | --                               | <u>1</u>                               | <u>30</u>    |

### 10.2. Friis transmission formula : $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

$P_d$  = Power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = Numeric gain of the antenna relative to isotropic antenna

$\pi$  = 3.1416

$R$  = distance between observation point and center of the radiator in cm

$P_d$  the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and total power input to the antenna, through the calculation, we will know the distance where the MPE limit is reached.

### 10.3. Test result of RF exposure evaluation

Test Item : RF Exposure evaluation data

Test Mode : Normal operation

#### 10.4. Output power into antenna & RF exposure evaluation distance

| Mode              | Frequency (MHz) | Output Peak power to antenna (dBm) | Antenna gain(dBi) | Antenna Gain (dBi) Numeric | Powerdensity at 20 cm (mW/cm <sup>2</sup> ) | Power density Limits (mW/cm <sup>2</sup> ) |
|-------------------|-----------------|------------------------------------|-------------------|----------------------------|---------------------------------------------|--------------------------------------------|
| U-NII-1(802.11a)  | 5 180           | 14.70                              | 3.36              | 2.17                       | 0.012 7                                     | 1                                          |
|                   | 5 220           | 14.74                              |                   |                            | 0.012 9                                     |                                            |
|                   | 5 240           | 15.03                              |                   |                            | 0.013 8                                     |                                            |
| U-NII-1(n_HT20)   | 5 180           | 14.68                              |                   |                            | 0.012 7                                     |                                            |
|                   | 5 220           | 14.66                              |                   |                            | 0.012 6                                     |                                            |
|                   | 5 240           | 14.76                              |                   |                            | 0.012 9                                     |                                            |
| U-NII-1(n_HT40)   | 5 190           | 13.41                              |                   |                            | 0.009 5                                     |                                            |
|                   | 5 230           | 13.23                              |                   |                            | 0.009 1                                     |                                            |
| U-NII-1(VHT80)    | 5 210           | 11.97                              |                   |                            | 0.006 8                                     |                                            |
| U-NII-2A(802.11a) | 5 260           | 15.36                              | 3.36              | 2.17                       | 0.014 8                                     |                                            |
|                   | 5 300           | 15.33                              |                   |                            | 0.014 7                                     |                                            |
|                   | 5 320           | 15.15                              |                   |                            | 0.014 1                                     |                                            |
| U-NII-2A(n_HT20)  | 5 260           | 15.12                              |                   |                            | 0.014 0                                     |                                            |
|                   | 5 300           | 14.95                              |                   |                            | 0.013 5                                     |                                            |
|                   | 5 320           | 15.26                              |                   |                            | 0.014 5                                     |                                            |
| U-NII-2A(n_HT40)  | 5 270           | 13.84                              |                   |                            | 0.010 5                                     |                                            |
|                   | 5 310           | 14.05                              |                   |                            | 0.011 0                                     |                                            |
| U-NII-2A(VHT80)   | 5 290           | 11.75                              |                   |                            | 0.006 5                                     |                                            |
| U-NII-2C(802.11a) | 5 500           | 15.40                              | 3.36              | 2.17                       | 0.015 0                                     |                                            |
|                   | 5 560           | 14.66                              |                   |                            | 0.012 6                                     |                                            |
|                   | 5 620           | 14.43                              |                   |                            | 0.012 0                                     |                                            |
| U-NII-2C(n_HT20)  | 5 500           | 15.19                              |                   |                            | 0.014 3                                     |                                            |
|                   | 5 560           | 14.77                              |                   |                            | 0.013 0                                     |                                            |
|                   | 5 620           | 14.43                              |                   |                            | 0.012 0                                     |                                            |
| U-NII-2C(n_HT40)  | 5 510           | 13.13                              |                   |                            | 0.008 9                                     |                                            |
|                   | 5 550           | 12.72                              |                   |                            | 0.008 1                                     |                                            |
|                   | 5 590           | 12.83                              |                   |                            | 0.008 3                                     |                                            |
| U-NII-2C(VHT80)   | 5 530           | 11.18                              |                   |                            | 0.005 7                                     |                                            |
|                   | 5 610           | 10.93                              |                   |                            | 0.0054                                      |                                            |
| U-NII-3(802.11a)  | 5 745           | 12.81                              | 3.36              | 2.17                       | 0.0082                                      |                                            |
|                   | 5 785           | 12.60                              |                   |                            | 0.0079                                      |                                            |
|                   | 5 805           | 11.95                              |                   |                            | 0.0068                                      |                                            |
| U-NII-3(n_HT20)   | 5 745           | 12.47                              |                   |                            | 0.0076                                      |                                            |
|                   | 5 785           | 12.81                              |                   |                            | 0.0082                                      |                                            |
|                   | 5 805           | 11.81                              |                   |                            | 0.0066                                      |                                            |
| U-NII-3(n_HT40)   | 5 755           | 11.15                              |                   |                            | 0.0056                                      |                                            |
|                   | 5 795           | 10.74                              |                   |                            | 0.0051                                      |                                            |
| U-NII-3(VHT40)    | 5 775           | 9.54                               |                   |                            | 0.0039                                      |                                            |

#### ※ Remark

The power density  $P_d$  (5th column) at a distance of 20 cm calculated from the friis transmission formula is far below the limit of 1 mW/cm<sup>2</sup>.

## 11. Antenna requirement

### 11.1 Standard Applicable:

According to §15.203, Antenna requirement.

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

### 11.2 Antenna Connected Construction:

The directional gains of antenna used for transmitting is below table, and the antenna connector is designed with fixed type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

|     | P/N         | Type         | Gain    |
|-----|-------------|--------------|---------|
| Ant | ODBWPTR5020 | Chip Antenna | 3.36dBi |