



# TEST REPORT

No. I20N00956-RLAN

for

**IDEMIA Identity and Security France**

**ID Screen**

**Model Name: MPH-MB003A/MPH-MB003B**

with

**Hardware Version: V01 (M16N)/ V01 (M16I)/**

**V01 (M32N)/ V01 (M32I)**

**Software Version: V01**

**FCC ID: ZBW-MPHMB003**

**Issued Date: 2020-07-02**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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## **1. Summary of Test Report**

### **1.1. Test Items**

|                     |                                     |
|---------------------|-------------------------------------|
| Description         | ID Screen                           |
| Model Name          | MPH-MB003A/MPH-MB003B               |
| Applicant's name    | IDEMIA Identity and Security France |
| Manufacturer's Name | IDEMIA Identity and Security France |

### **1.2. Test Standards**

FCC Part15-2019; ANSI C63.10-2013; KDB789033-V02r01

### **1.3. Test Result**

**Pass**

### **1.4. Testing Location**

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,  
Futian District, Shenzhen, Guangdong, P. R. China

### **1.5. Project data**

|                     |            |
|---------------------|------------|
| Testing Start Date: | 2020-05-07 |
| Testing End Date:   | 2020-07-02 |

### **1.6. Signature**



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**Lin Zechuang**  
**(Prepared this test report)**



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**Tang Weisheng**  
**(Reviewed this test report)**



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**Zhang Bojun**  
**(Approved this test report)**



## **2. Client Information**

### **2.1. Applicant Information**

Company Name: IDEMIA Identity and Security France  
Address: IDEMIA Identity and Security France 2 place Samuel de Champlain  
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Contact Person: Christophe SUEUR  
E-Mail: christophe.sueur@idemia.com  
Telephone: +33130201434  
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### **2.2. Manufacturer Information**

Company Name: IDEMIA Identity and Security France  
Address: IDEMIA Identity and Security France 2 place Samuel de Champlain  
92400 Courbevoie FRANCE  
Contact Person: Christophe SUEUR  
E-Mail: christophe.sueur@idemia.com  
Telephone: +33130201434  
Fax: /

### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

|                              |                                                                                        |
|------------------------------|----------------------------------------------------------------------------------------|
| Description                  | ID Screen                                                                              |
| Model Name                   | MPH-MB003A/MPH-MB003B                                                                  |
| Brand Name                   | IDEMIA                                                                                 |
| RLAN Frequency Range         | ISM Bands: 5150MHz~5250MHz;<br>5250MHz~5350MHz;<br>5470MHz~5725MHz;<br>5725MHz~5850MHz |
| RLAN Protocol                | IEEE 802.11a,802.11n-HT20/40,802.11ac-VHT20/40/80                                      |
| Type of modulation           | OFDM                                                                                   |
| Antenna Type                 | Integrated                                                                             |
| Antenna Gain                 | 5150MHz~5350MHz: 1.79dBi<br>5470MHz~5725MHz: 2.85dBi<br>5725MHz~5850MHz: 2.52dBi       |
| Power Supply                 | 3.85V DC by Battery                                                                    |
| FCC ID                       | ZBW-MPHMB003                                                                           |
| Condition of EUT as received | No abnormality in appearance                                                           |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

#### 3.2. Internal Identification of EUT

| EUT ID* | IMEI            | HW Version | SW Version | Receive Date |
|---------|-----------------|------------|------------|--------------|
| UT07aa  | 354520110003828 | V01 (M16N) | V01        | 2020-04-21   |
| UT01aa  | 354520110005740 | V01 (M16N) | V01        | 2020-04-16   |

\*EUT ID: is used to identify the test sample in the lab internally.

#### 3.3. Internal Identification of AE

| AE ID* | Description | AE ID*                  |
|--------|-------------|-------------------------|
| AE1    | Battery     | /                       |
| AE2    | Charger     | Aa01a,Aa02a             |
| AE3    | Data Cable  | Ca01a,Ca02a Cb01a,Cb02a |

##### AE1

|                 |                                     |
|-----------------|-------------------------------------|
| Model           | MPH-MB003A(178177093)               |
| Manufacturer    | Zhongshan Tianmao Battery Co., Ltd. |
| Capacity        | 5000mAh19.25Wh                      |
| Nominal Voltage | 3.85V                               |

##### AE2

|              |                                         |
|--------------|-----------------------------------------|
| Model        | S008ACM0500200                          |
| Manufacturer | Ten Pao Electronics (Huizhou) Co., Ltd. |



AE3

|              |                                   |
|--------------|-----------------------------------|
| Model        | JWUB1454-M01                      |
| Manufacturer | HUIZHOU JUWEI ELECTRONICS CO.,LTD |

\*AE ID: is used to identify the test sample in the lab internally.

### **3.4. General Description**

The Equipment under Test (EUT) is a model of ID Screen with integrated antenna and battery.

It consists of normal options: Lithium Battery, Charger and USB Cable.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.



## **4. REFERENCE DOCUMENTS**

### **4.1. Documents supplied by applicant**

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

### **4.2. Reference Documents for testing**

The following documents listed in this section are referred for testing.

| Reference   | Title                                                                                                                        | Version |
|-------------|------------------------------------------------------------------------------------------------------------------------------|---------|
| FCC Part15  | FCC CFR 47,Part 15,Subpart C<br>FCC CFR 47,Part 15,Subpart E                                                                 | 2019    |
| ANSI C63.10 | American National Standard of Procedures for Compliance<br>Testing of Unlicensed Wireless Devices                            | 2013    |
| KDB789033   | GUIDELINES FOR COMPLIANCE TESTING OF<br>UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE<br>(U-NII) DEVICES PART 15, SUBPART E | V02r01  |

## 5. Test Results

### 5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

### 5.2. Test Results

| No. | Test cases                  | Sub-clause of Part15E | Verdict   |
|-----|-----------------------------|-----------------------|-----------|
| 0   | Maximum Output Power        | 15.407(a)             | <b>P</b>  |
| 1   | Power Spectral Density      | 15.407(a)             | <b>P</b>  |
| 2   | Occupied 26dB Bandwidth     | 15.407(a)             | <b>I</b>  |
| 3   | Occupied 6dB Bandwidth      | 15.407(e)             | <b>P</b>  |
| 4   | 99% Occupied Bandwidth      | 15.407                | <b>I</b>  |
| 5   | Band edge compliance        | 15.407                | <b>P</b>  |
| 6   | Radiated Spurious Emissions | 15.407                | <b>P</b>  |
| 7   | AC Power line Conducted     | 15.207                | <b>P</b>  |
| 8   | Transmit Power Control      | 15.407                | <b>NA</b> |

See **ANNEX A** for details.

Note: According to the definition of the application description, the device will automatically discontinue transmission in case of either absence of information to transmit or operational failure.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacture as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2

## 6. Test Equipments Utilized

### Conducted test system

| No. | Equipment              | Model   | Serial Number | Manufacturer    | Calibration Due date | Calibration Period |
|-----|------------------------|---------|---------------|-----------------|----------------------|--------------------|
| 1   | Vector Signal Analyzer | FSV40   | 100903        | Rohde & Schwarz | 2021-01-15           | 1 year             |
| 2   | Power Sensor           | U2021XA | MY55430013    | Agilent         | 2021-01-15           | 1 year             |
| 3   | Test Receiver          | ESCI    | 100701        | Rohde & Schwarz | 2020-08-10           | 1 year             |
| 4   | LISN                   | ENV216  | 102067        | Rohde & Schwarz | 2020-07-17           | 1 year             |

### Radiated test system

| NO. | Equipment         | Model             | Serial Number | Manufacturer    | Calibration Due date | Calibration Period |
|-----|-------------------|-------------------|---------------|-----------------|----------------------|--------------------|
| 1   | Loop Antenna      | HLA6120           | 35779         | TESEQ           | 2022-04-25           | 3 years            |
| 2   | BiLog Antenna     | 3142E             | 00224831      | ETS-Lindgren    | 2021-05-17           | 3 years            |
| 3   | Horn Antenna      | 3117              | 00066577      | ETS-Lindgren    | 2022-04-02           | 3 years            |
| 4   | Test Receiver     | ESR7              | 101676        | Rohde & Schwarz | 2020-11-27           | 1 year             |
| 5   | Spectrum Analyser | FSV40             | 101192        | Rohde & Schwarz | 2021-01-14           | 1 year             |
| 6   | Chamber           | FACT3-2.0         | 1285          | ETS-Lindgren    | 2021-07-19           | 2 years            |
| 7   | Antenna           | QSH-SL-18-26-S-20 | 17013         | Q-par           | 2023-01-06           | 3 years            |
| 8   | Antenna           | QSH-SL-18-40-K-SG | 15979         | Q-par           | 2023-01-06           | 3 years            |

### Test software

| No. | Equipment        | Manufacturer    | Version  |
|-----|------------------|-----------------|----------|
| 1   | TechMgr Software | CAICT           | 2.1.1    |
| 2   | EMC32            | Rohde & Schwarz | 10.01.00 |
| 3   | EMC32            | Rohde & Schwarz | 10.01.00 |

EUT is Qualcomm engineering software provided by the customer to control the transmitting signal.

### Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

## 7. Laboratory Environment

### **Semi-anechoic chambe**

|                                   |                                            |
|-----------------------------------|--------------------------------------------|
| Temperature                       | Min. = 15 °C, Max. = 35 °C                 |
| Relative humidity                 | Min. = 20 %, Max. = 75 %                   |
| Shielding effectiveness           | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB  |
| Electrical insulation             | > 2MΩ                                      |
| Ground system resistance          | < 4 Ω                                      |
| Normalised site attenuation (NSA) | < ±4 dB, 3 m distance, from 30 to 1000 MHz |

### **Shielded room**

|                          |                                          |
|--------------------------|------------------------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C               |
| Relative humidity        | Min. = 20 %, Max. = 75 %                 |
| Shielding effectiveness  | 0.014MHz-1MHz> 60 dB; 1MHz-1000MHz>90 dB |
| Electrical insulation    | > 2MΩ                                    |
| Ground system resistance | < 4 Ω                                    |

### **Fully-anechoic chamber**

|                                    |                                           |
|------------------------------------|-------------------------------------------|
| Temperature                        | Min. = 15 °C, Max. = 35 °C                |
| Relative humidity                  | Min. = 20 %, Max. = 75 %                  |
| Shielding effectiveness            | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation              | > 2MΩ                                     |
| Ground system resistance           | < 4 Ω                                     |
| Voltage Standing Wave Ratio (VSWR) | ≤ 6 dB, from 1 to 18 GHz, 3 m distance    |
| Uniformity of field strength       | Between 0 and 6 dB, from 80 to 6000 MHz   |

## 8. Measurement Uncertainty

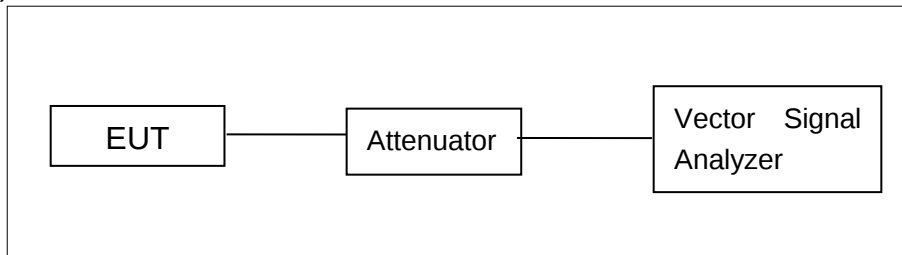
| Test Name                                   | Uncertainty ( $k=2$ )                    |        |
|---------------------------------------------|------------------------------------------|--------|
| 1. RF Output Power - Conducted              | 1.32dB                                   |        |
| 2. Power Spectral Density - Conducted       | 2.32dB                                   |        |
| 3. Occupied channel bandwidth - Conducted   | $\pm 66\text{Hz}$                        |        |
| 4 Transmitter Spurious Emission - Conducted | $30\text{MHz} \leq f \leq 1\text{GHz}$   | 1.41dB |
|                                             | $1\text{GHz} \leq f \leq 7\text{GHz}$    | 1.92dB |
|                                             | $7\text{GHz} \leq f \leq 13\text{GHz}$   | 2.31dB |
|                                             | $13\text{GHz} \leq f \leq 26\text{GHz}$  | 2.61dB |
| 5. Transmitter Spurious Emission - Radiated | $9\text{kHz} \leq f \leq 30\text{MHz}$   | 1.70dB |
|                                             | $30\text{MHz} \leq f \leq 1\text{GHz}$   | 4.90dB |
|                                             | $1\text{GHz} \leq f \leq 18\text{GHz}$   | 4.60dB |
|                                             | $18\text{GHz} \leq f \leq 40\text{GHz}$  | 4.10dB |
| 6. AC Power line Conducted Emission         | $150\text{kHz} \leq f \leq 30\text{MHz}$ | 3.00dB |

## **ANNEX A: Detailed Test Results**

### **A.1. Measurement Method**

#### **Conducted Measurements**

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode.
- 3). Set the EUT to the required channel.
- 4). Set the spectrum analyzer to start measurement.
- 5). Record the values.

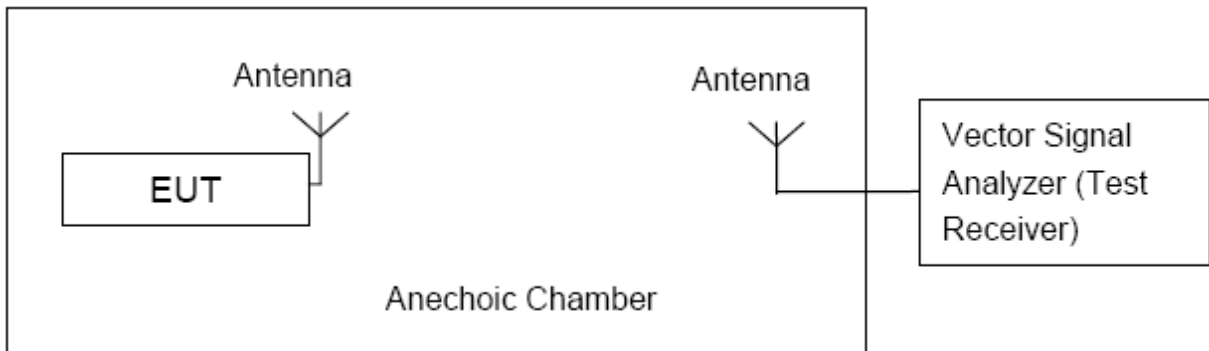


#### **Radiated Emission Measurements**

In the case of radiated emission, the used settings are as follows:

Sweep frequency from 30 MHz to 1 GHz, RBW = 100 KHz, VBW = 300 KHz;

Sweep frequency from 1 GHz to 26 GHz, RBW = 1 MHz, VBW = 10 Hz;



The measurement is made according to KDB 789033.

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

## A.2. Maximum output Power

### Measurement Limit and Method:

| Standard               | Frequency (MHz) | Limit (dBm)     |
|------------------------|-----------------|-----------------|
| FCC CRF Part 15.407(a) | 5150MHz~5250MHz | 24              |
|                        | 5250MHz~5350MHz | 24 or 11+10logB |
|                        | 5470MHz~5725MHz | 24 or 11+10logB |
|                        | 5725MHz~5850MHz | 30              |

Limit use the less value, and B is the 26dB bandwidth.

### Measurement of method :See ANSI C63.10-2013-Clause 12.3.3.2

Method PM-G is a measurement using a gated RF average power meter.

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### Measurement Results:

| U–NII Band           | Mode           | Channel | Frequency (MHz) | Average power (dBm) | Conclusion |
|----------------------|----------------|---------|-----------------|---------------------|------------|
| 5.2GHz Band (UNII-1) | 802.11a        | CH 36   | 5180            | 12.67               | P          |
|                      |                | CH 40   | 5200            | 12.64               | P          |
|                      |                | CH 48   | 5240            | 12.58               | P          |
|                      | 802.11n-HT20   | CH 36   | 5180            | 12.43               | P          |
|                      |                | CH 40   | 5200            | 12.60               | P          |
|                      |                | CH 48   | 5240            | 12.27               | P          |
|                      | 802.11n-HT40   | CH 38   | 5190            | 12.44               | P          |
|                      |                | CH 46   | 5230            | 12.39               | P          |
|                      | 802.11ac-VHT20 | CH 36   | 5180            | 12.63               | P          |
|                      |                | CH 40   | 5200            | 12.51               | P          |
|                      |                | CH 48   | 5240            | 12.50               | P          |
|                      | 802.11ac-VHT40 | CH 38   | 5190            | 12.51               | P          |
|                      |                | CH 46   | 5230            | 12.33               | P          |
|                      | 802.11ac-VHT80 | CH 42   | 5210            | 11.90               | P          |

| U-NII Band            | Mode           | Channel | Frequency (MHz) | Average power (dBm) | Conclusion |
|-----------------------|----------------|---------|-----------------|---------------------|------------|
| 5.3GHz Band (UNII-2A) | 802.11a        | CH 52   | 5260            | 12.46               | P          |
|                       |                | CH 56   | 5280            | 12.46               | P          |
|                       |                | CH 64   | 5320            | 12.42               | P          |
|                       | 802.11n-HT20   | CH 52   | 5260            | 12.31               | P          |
|                       |                | CH 56   | 5280            | 12.27               | P          |
|                       |                | CH 64   | 5320            | 12.26               | P          |
|                       | 802.11n-HT40   | CH 54   | 5270            | 12.29               | P          |
|                       |                | CH 62   | 5310            | 12.29               | P          |
|                       | 802.11ac-VHT20 | CH 52   | 5260            | 12.32               | P          |
|                       |                | CH 56   | 5280            | 12.29               | P          |
|                       |                | CH 64   | 5320            | 12.25               | P          |
|                       | 802.11ac-VHT40 | CH 54   | 5270            | 12.24               | P          |
|                       |                | CH 62   | 5310            | 12.29               | P          |
|                       | 802.11ac-VHT80 | CH 58   | 5290            | 11.66               | P          |

| U-NII Band            | Mode           | Channel | Frequency (MHz) | Average power (dBm) | Conclusion |
|-----------------------|----------------|---------|-----------------|---------------------|------------|
| 5.5GHz Band (UNII-2C) | 802.11a        | CH 100  | 5500            | 12.29               | P          |
|                       |                | CH 120  | 5600            | 11.89               | P          |
|                       |                | CH 140  | 5700            | 11.76               | P          |
|                       | 802.11n-HT20   | CH 100  | 5500            | 12.14               | P          |
|                       |                | CH 120  | 5600            | 11.86               | P          |
|                       |                | CH 140  | 5700            | 11.38               | P          |
|                       | 802.11n-HT40   | CH 102  | 5510            | 11.67               | P          |
|                       |                | CH 118  | 5590            | 11.43               | P          |
|                       |                | CH 134  | 5670            | 11.35               | P          |
|                       | 802.11ac-VHT20 | CH 100  | 5500            | 12.13               | P          |
|                       |                | CH 120  | 5600            | 11.86               | P          |
|                       |                | CH 140  | 5700            | 11.48               | P          |
|                       | 802.11ac-VHT40 | CH 102  | 5510            | 11.57               | P          |
|                       |                | CH 118  | 5590            | 11.41               | P          |
|                       |                | CH 134  | 5670            | 11.32               | P          |
|                       | 802.11ac-VHT80 | CH 106  | 5530            | 11.92               | P          |
|                       |                | CH 122  | 5610            | 11.26               | P          |

| U-NII Band           | Mode           | Channel | Frequency (MHz) | Average power (dBm) | Conclusion |
|----------------------|----------------|---------|-----------------|---------------------|------------|
| 5.8GHz Band (UNII-3) | 802.11a        | CH 149  | 5745            | 11.63               | P          |
|                      |                | CH 157  | 5785            | 11.55               | P          |
|                      |                | CH 165  | 5825            | 11.48               | P          |
|                      | 802.11n-HT20   | CH 149  | 5745            | 11.58               | P          |
|                      |                | CH 157  | 5785            | 11.41               | P          |
|                      |                | CH 165  | 5825            | 11.40               | P          |
|                      | 802.11n-HT40   | CH 151  | 5755            | 11.28               | P          |
|                      |                | CH 159  | 5795            | 11.27               | P          |
|                      | 802.11ac-VHT20 | CH 149  | 5745            | 11.56               | P          |
|                      |                | CH 157  | 5785            | 11.43               | P          |
|                      |                | CH 165  | 5825            | 11.32               | P          |
|                      | 802.11ac-VHT40 | CH 151  | 5755            | 11.25               | P          |
|                      |                | CH 159  | 5795            | 11.18               | P          |
|                      | 802.11ac-VHT80 | CH 155  | 5775            | 10.90               | P          |

**Note:**

Worst-case data rates as provided by the client were: 6Mbps (802.11a), MCS0 (802.11n), MCS0 (802.11ac). 802.11a, 802.11n-HT40 and 802.11ac-VHT80 modes are selected as the worst-case.

The following cases and test graphs are performed with this condition.

The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

### A.3. Peak Power Spectral Density (conducted)

#### Measurement Limit:

| Standard               | Frequency (MHz) | Limit              |
|------------------------|-----------------|--------------------|
| FCC CRF Part 15.407(a) | 5150MHz~5250MHz | 11dBm/MHz(FCC)     |
|                        |                 | 10dBm/MHz EIRP(IC) |
|                        | 5250MHz~5350MHz | 11dBm/MHz          |
|                        | 5470MHz~5725MHz | 11dBm/MHz          |
|                        | 5725MHz~5850MHz | 30dBm/500KHz       |

The PPSD measurement method SA-1 is made according to KDB 789033.

#### Measurement Results:

| Mode    | Channel        | Power Spectral Density (dBm/MHz) | Conclusion |
|---------|----------------|----------------------------------|------------|
| 802.11a | 5180MHz(Ch36)  | 6.62                             | P          |
|         | 5200MHz(Ch40)  | 6.84                             | P          |
|         | 5240MHz(Ch48)  | 6.78                             | P          |
|         | 5260MHz(Ch52)  | 6.36                             | P          |
|         | 5280MHz(Ch56)  | 6.60                             | P          |
|         | 5320MHz(Ch64)  | 6.26                             | P          |
|         | 5500MHz(Ch100) | 6.60                             | P          |
|         | 5580MHz(Ch116) | 6.15                             | P          |
|         | 5700MHz(Ch140) | 5.94                             | P          |

| Mode         | Channel        | Power Spectral Density (dBm/MHz) | Conclusion |
|--------------|----------------|----------------------------------|------------|
| 802.11n-HT40 | 5190MHz(Ch38)  | 3.95                             | P          |
|              | 5230MHz(Ch46)  | 3.80                             | P          |
|              | 5270MHz(Ch54)  | 3.20                             | P          |
|              | 5310MHz(Ch62)  | 3.28                             | P          |
|              | 5510MHz(Ch102) | 3.65                             | P          |
|              | 5550MHz(Ch110) | 2.83                             | P          |
|              | 5670MHz(Ch134) | 3.00                             | P          |

| Mode           | Channel        | Power Spectral Density (dBm/MHz) | Conclusion |
|----------------|----------------|----------------------------------|------------|
| 802.11ac-VHT80 | 5210MHz(Ch42)  | 0.56                             | P          |
|                | 5290MHz(Ch58)  | 0.13                             | P          |
|                | 5530MHz(Ch106) | 0.25                             | P          |
|                | 5610MHz(Ch122) | -0.04                            | P          |

**5.8GHz Band (UNII-3)**

| U-NII Band           | Mode           | Channel | Frequency (MHz) | Power Spectral Density (dBm/500kHz) | Conclusion |
|----------------------|----------------|---------|-----------------|-------------------------------------|------------|
| 5.8GHz Band (UNII-3) | 802.11a        | CH 149  | 5745            | 2.81                                | <b>P</b>   |
|                      |                | CH 157  | 5785            | 3.56                                | <b>P</b>   |
|                      |                | CH 165  | 5825            | 3.43                                | <b>P</b>   |
|                      | 802.11n-HT40   | CH 151  | 5755            | -0.45                               | <b>P</b>   |
|                      |                | CH 159  | 5795            | -0.46                               | <b>P</b>   |
|                      | 802.11ac-VHT80 | CH 155  | 5775            | -1.60                               | <b>P</b>   |

**Conclusion: PASS**

#### A.4. Occupied 26dB Bandwidth(conducted)

##### Measurement Limit:

| Standard                   | Limit (MHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.403 (i) | /           |

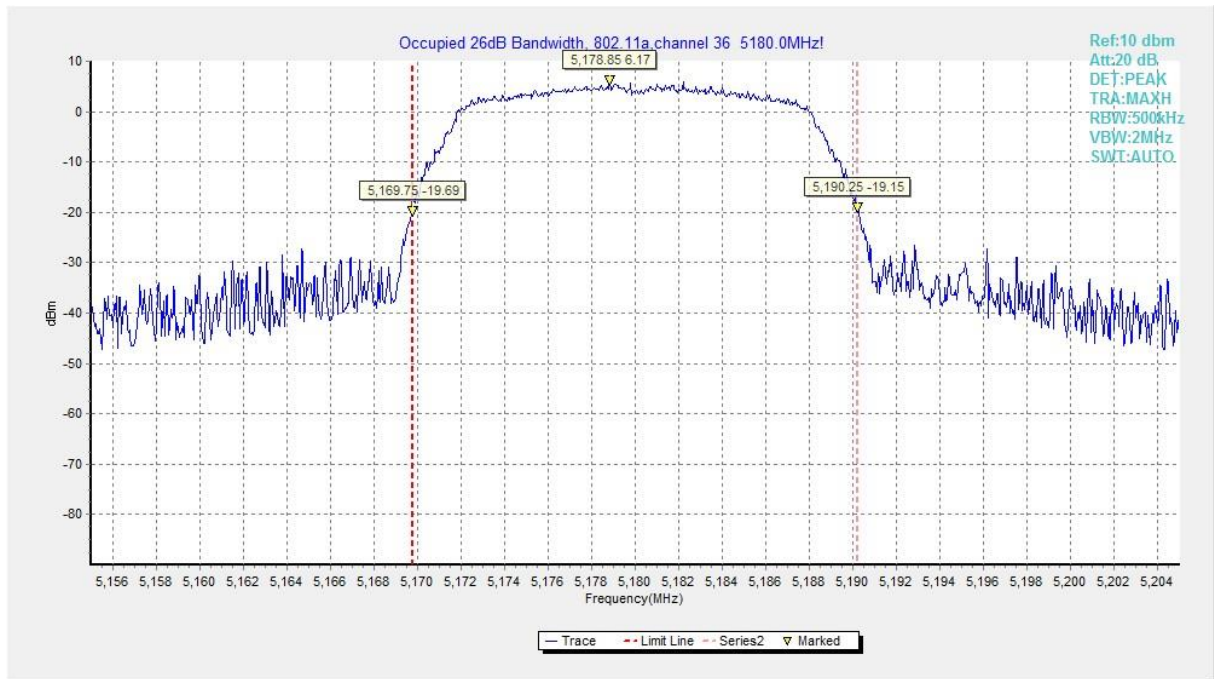
The measurement is made according to KDB 789033

##### Measurement Result:

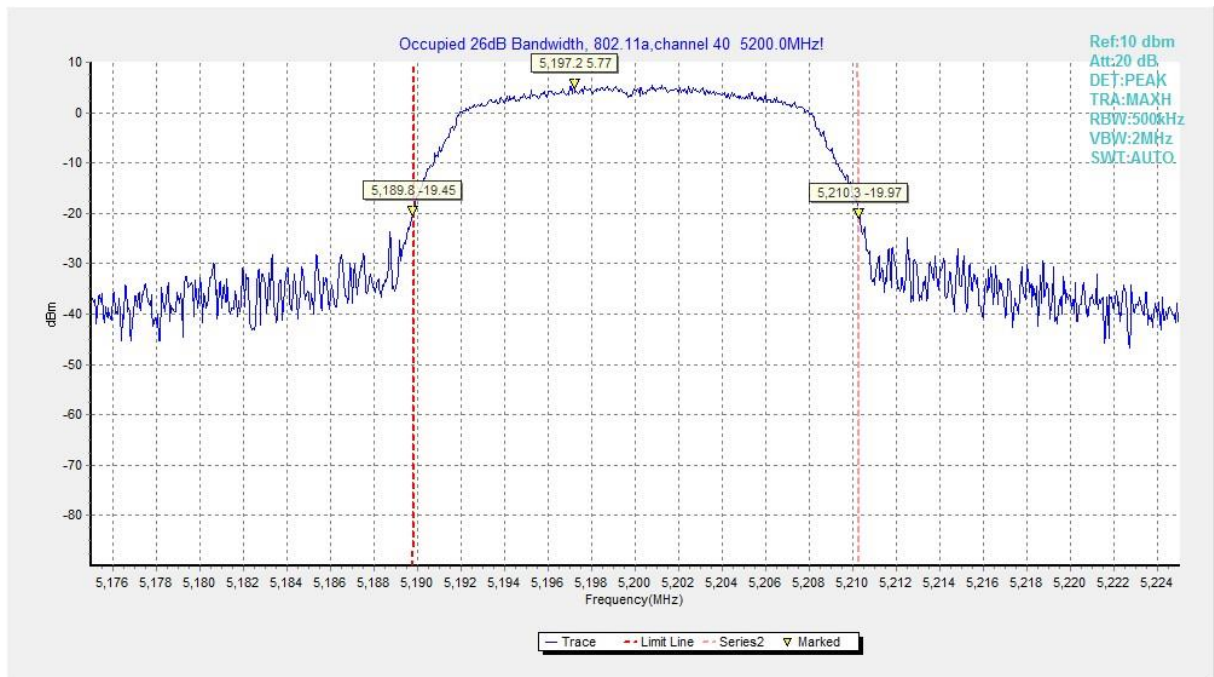
| Mode            | Channel        | Occupied 26dB Bandwidth( MHz) |       | Conclusion |
|-----------------|----------------|-------------------------------|-------|------------|
| 802.11a         | 5180MHz(Ch36)  | Fig.1                         | 20.50 | /          |
|                 | 5200MHz(Ch40)  | Fig.2                         | 20.50 | /          |
|                 | 5240MHz(Ch48)  | Fig.3                         | 20.60 | /          |
|                 | 5260MHz(Ch52)  | Fig.4                         | 20.55 | /          |
|                 | 5280MHz(Ch56)  | Fig.5                         | 20.50 | /          |
|                 | 5320MHz(Ch64)  | Fig.6                         | 20.65 | /          |
|                 | 5500MHz(Ch100) | Fig.7                         | 20.55 | /          |
|                 | 5580MHz(Ch116) | Fig.8                         | 20.40 | /          |
|                 | 5700MHz(Ch140) | Fig.9                         | 20.65 | /          |
| 802.11n-HT40    | 5190MHz(Ch38)  | Fig.10                        | 40.96 | /          |
|                 | 5230MHz(Ch46)  | Fig.11                        | 40.72 | /          |
|                 | 5270MHz(Ch54)  | Fig.12                        | 40.96 | /          |
|                 | 5310MHz(Ch62)  | Fig.13                        | 40.80 | /          |
|                 | 5510MHz(Ch102) | Fig.14                        | 40.72 | /          |
|                 | 5550MHz(Ch110) | Fig.15                        | 40.88 | /          |
|                 | 5670MHz(Ch134) | Fig.16                        | 40.80 | /          |
| 802.11 ac-VHT80 | 5210MHz(Ch42)  | Fig.17                        | 81.12 | /          |
|                 | 5290MHz(Ch58)  | Fig.18                        | 81.12 | /          |
|                 | 5530MHz(Ch106) | Fig.19                        | 81.44 | /          |
|                 | 5610MHz(Ch122) | Fig.20                        | 81.44 | /          |

**Conclusion: PASS**

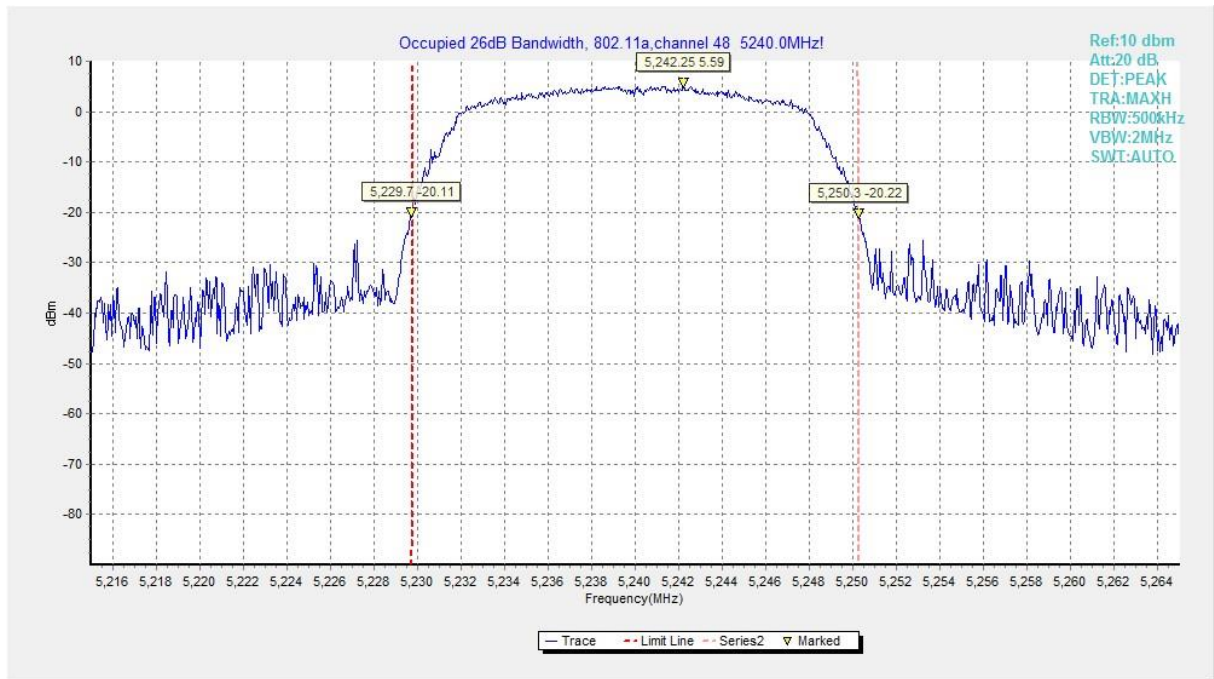
**Test graphs as below:**



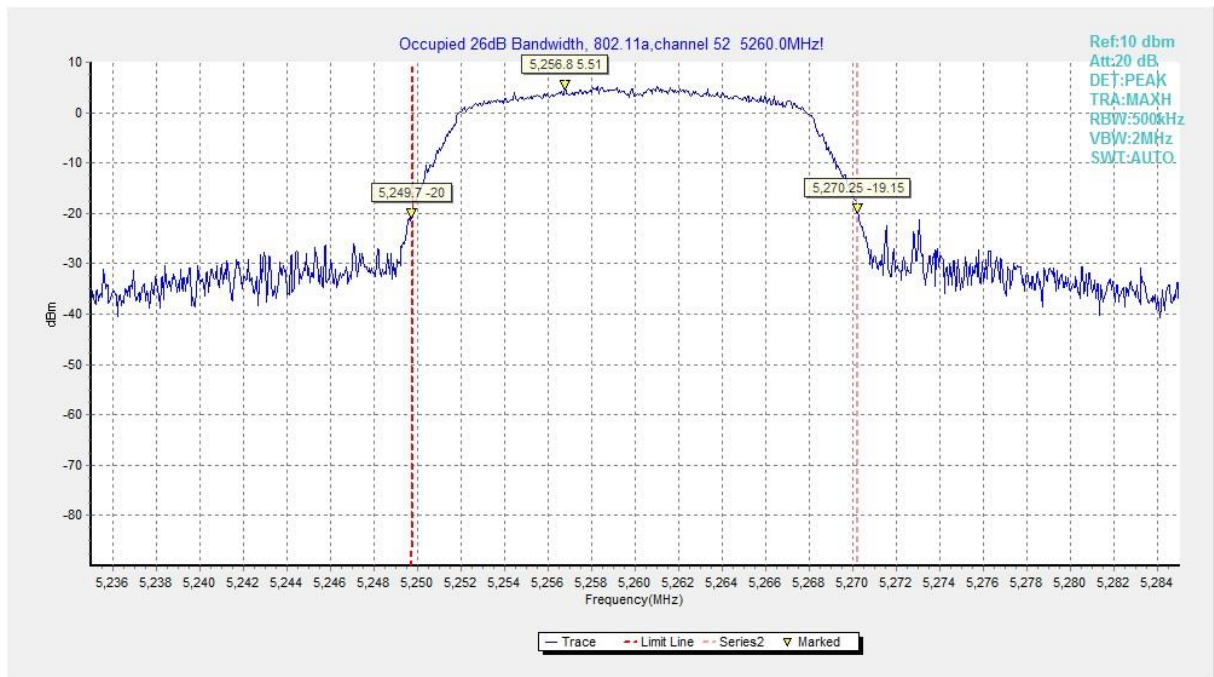
**Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz)**



**Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)**



**Fig. 3 Occupied 26dB Bandwidth (802.11a, 5240MHz)**



**Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz)**

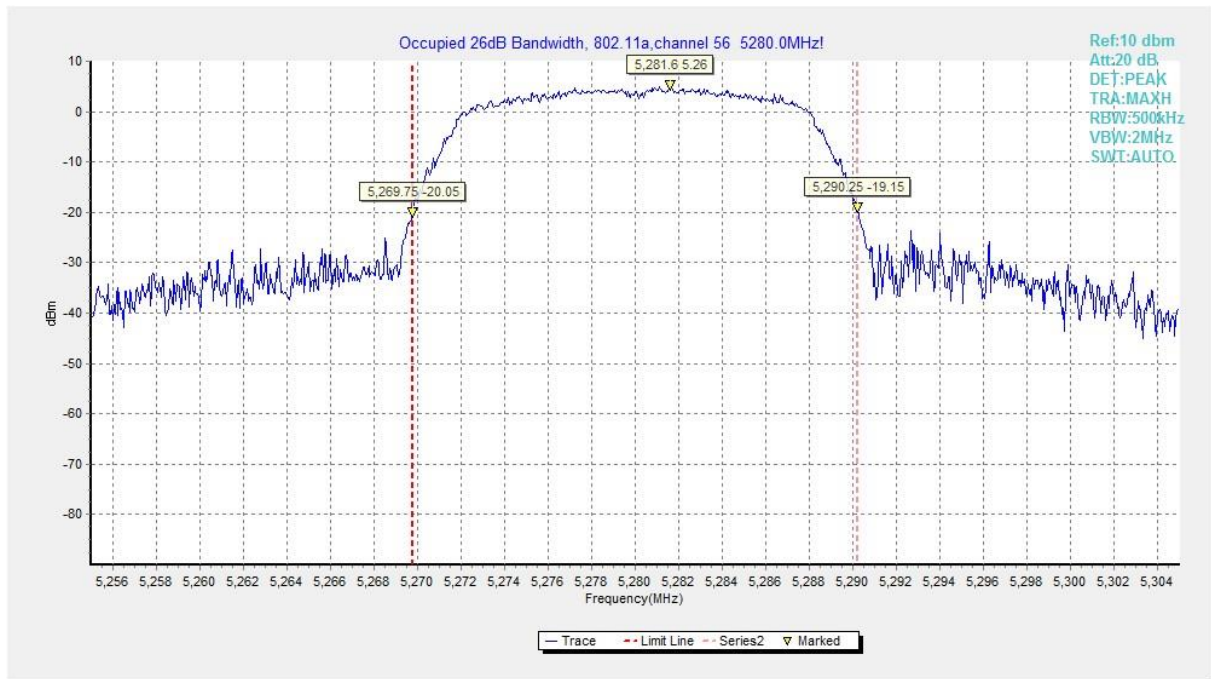


Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz)

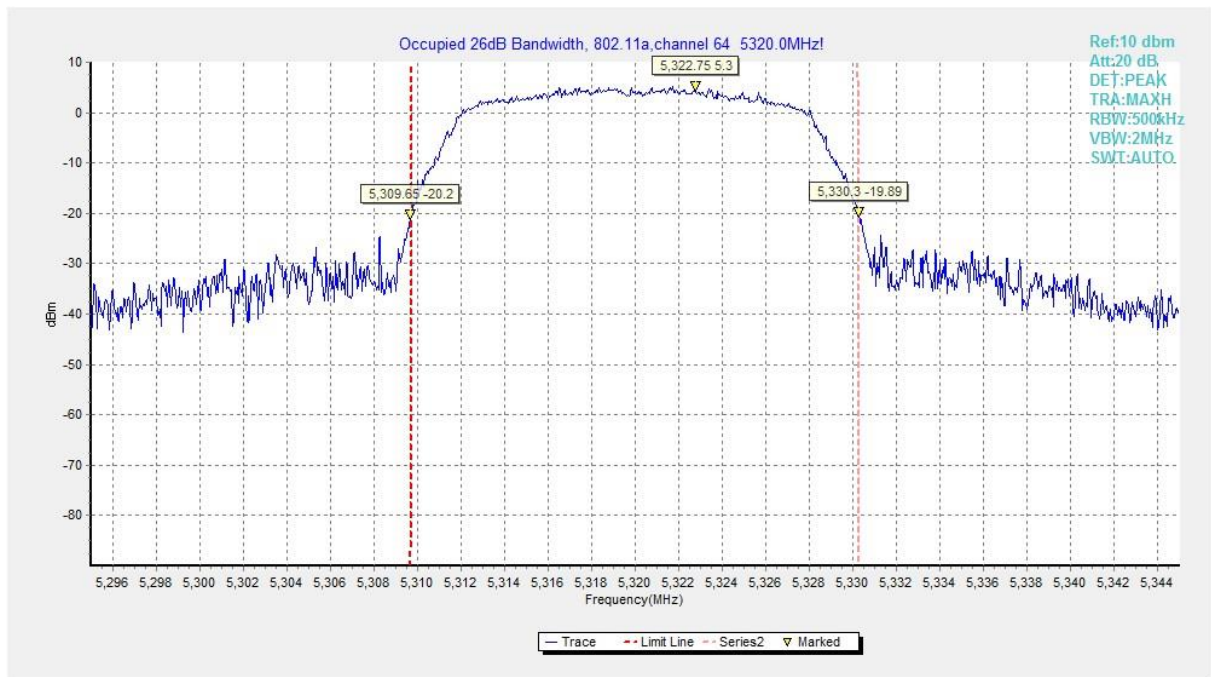


Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz)

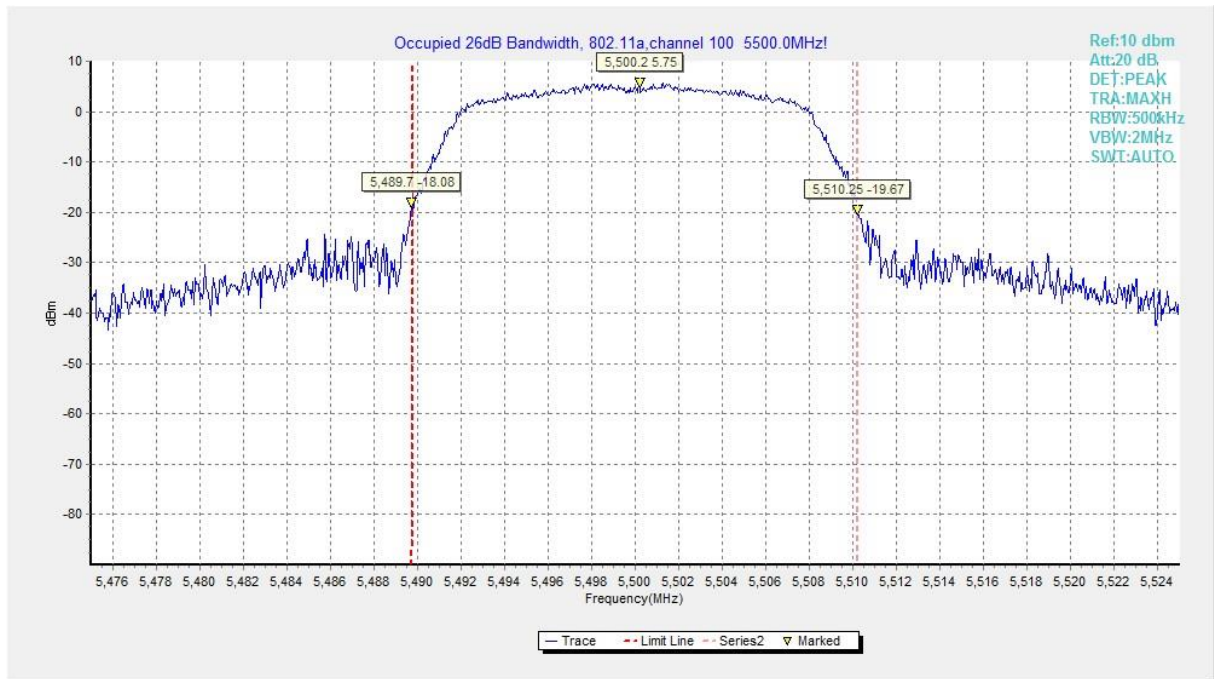


Fig. 7 Occupied 26dB Bandwidth (802. 11a, 5500MHz)

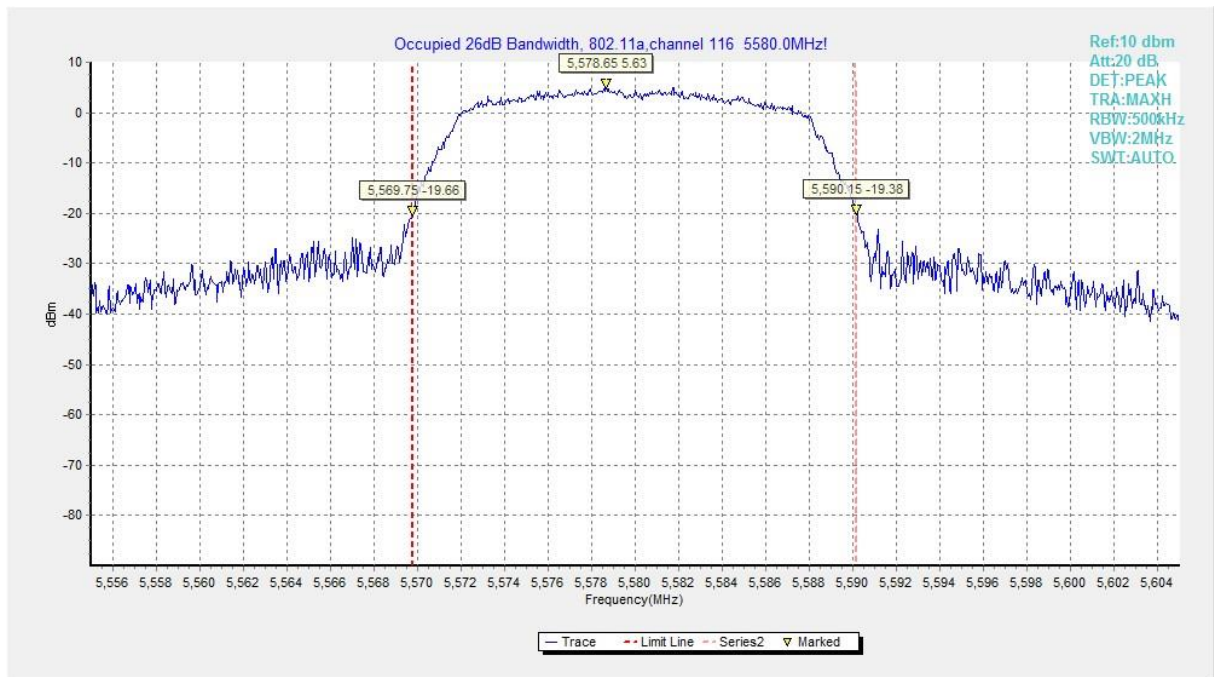


Fig. 8 Occupied 26dB Bandwidth (802. 11a, 5600MHz)

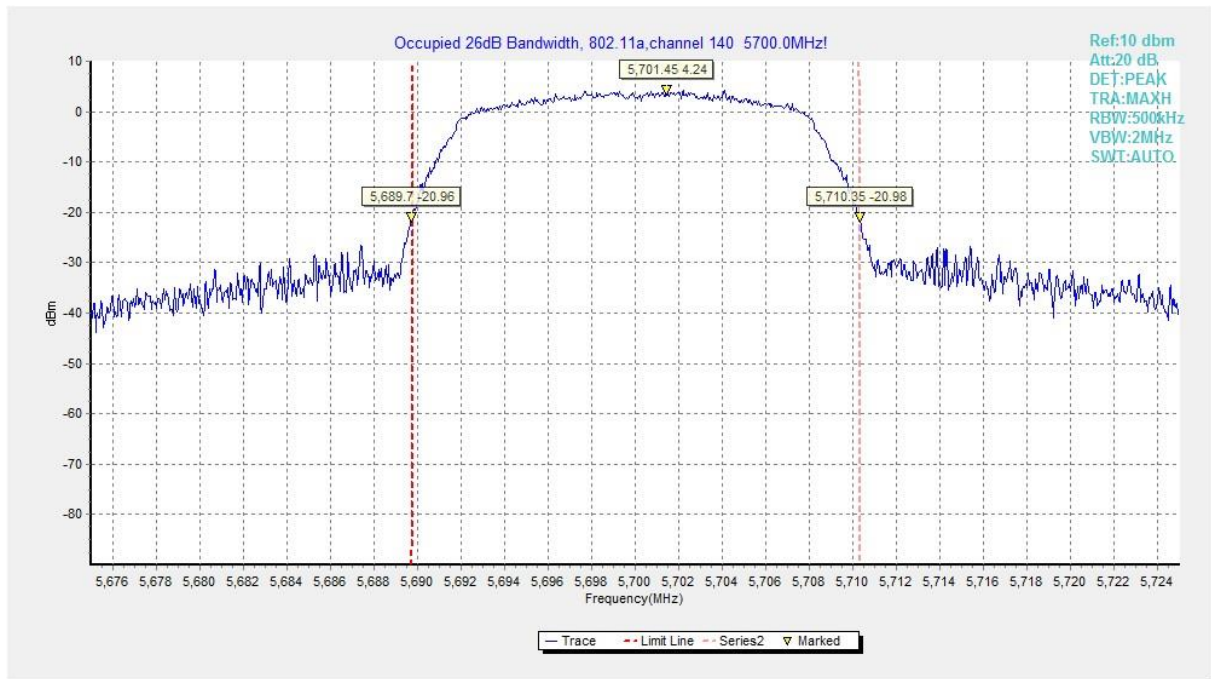


Fig. 9 Occupied 26dB Bandwidth (802. 11a, 5700MHz)

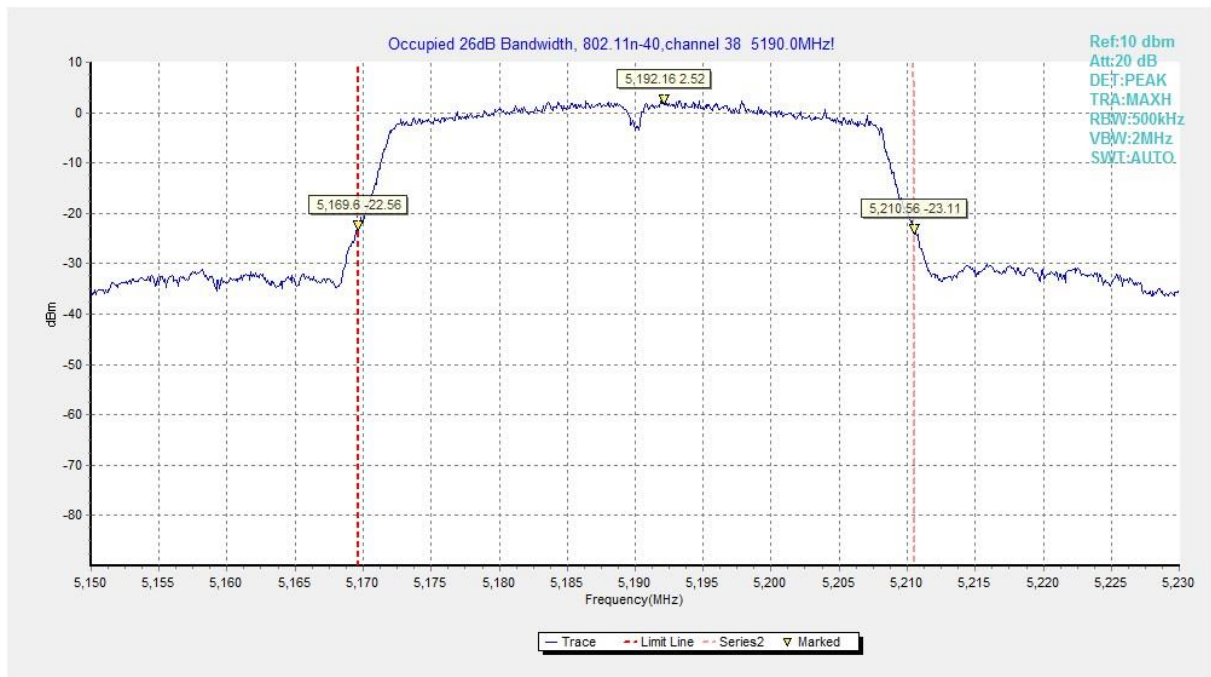


Fig. 10 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)

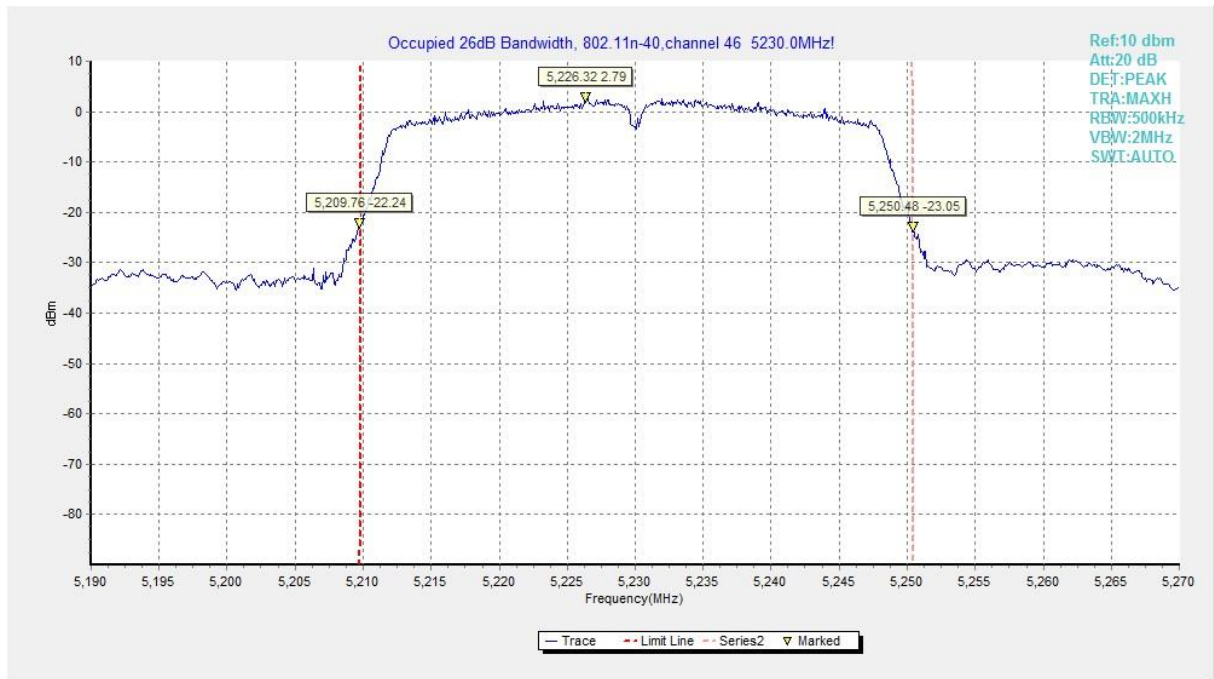


Fig. 11 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)

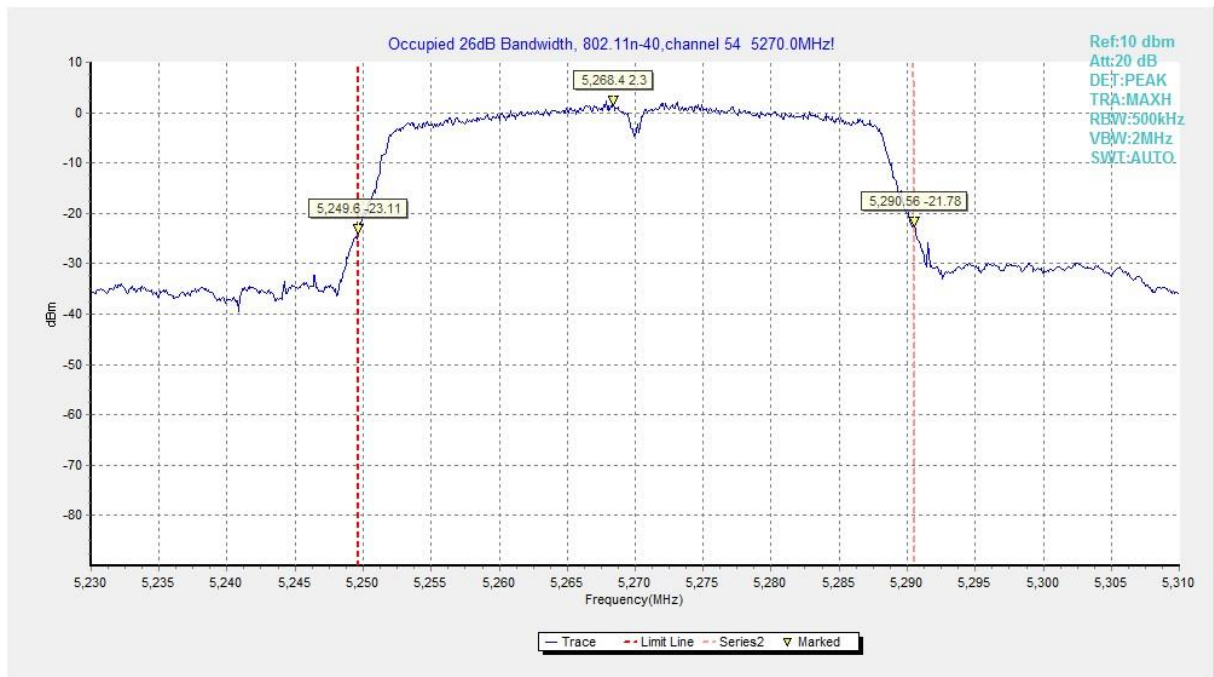


Fig. 12 Occupied 26dB Bandwidth (802.11n-HT40, 5270MHz)



Fig. 13 Occupied 26dB Bandwidth (802.11n-HT40, 5310MHz)

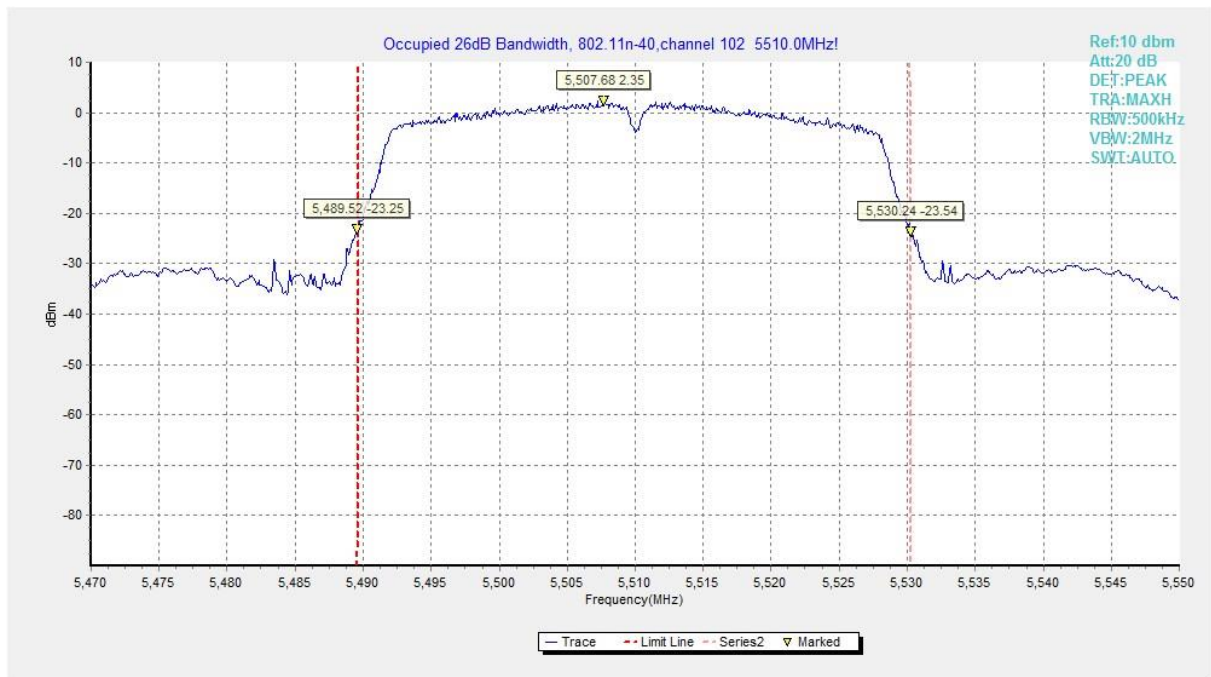


Fig. 14 Occupied 26dB Bandwidth (802. 11n-HT40, 5510MHz)



Fig. 15 Occupied 26dB Bandwidth (802. 11n-HT40, 5590MHz)

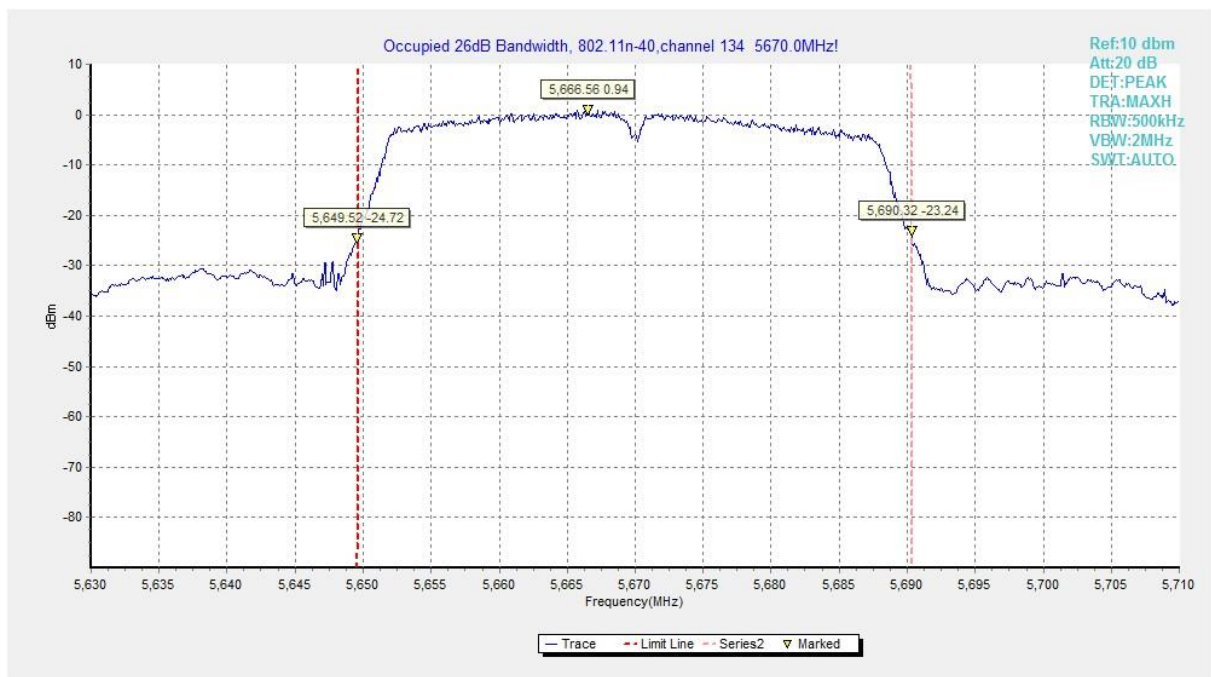


Fig. 16 Occupied 26dB Bandwidth (802. 11n-HT40, 5670MHz)

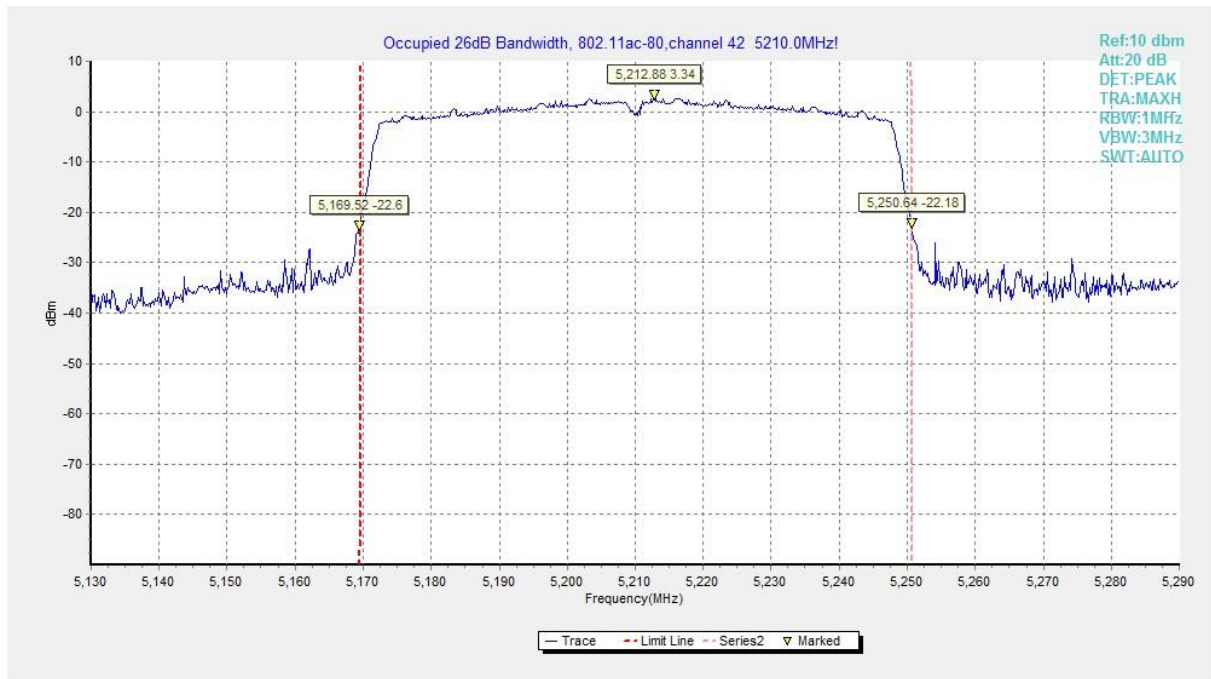


Fig. 17 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5210MHz)

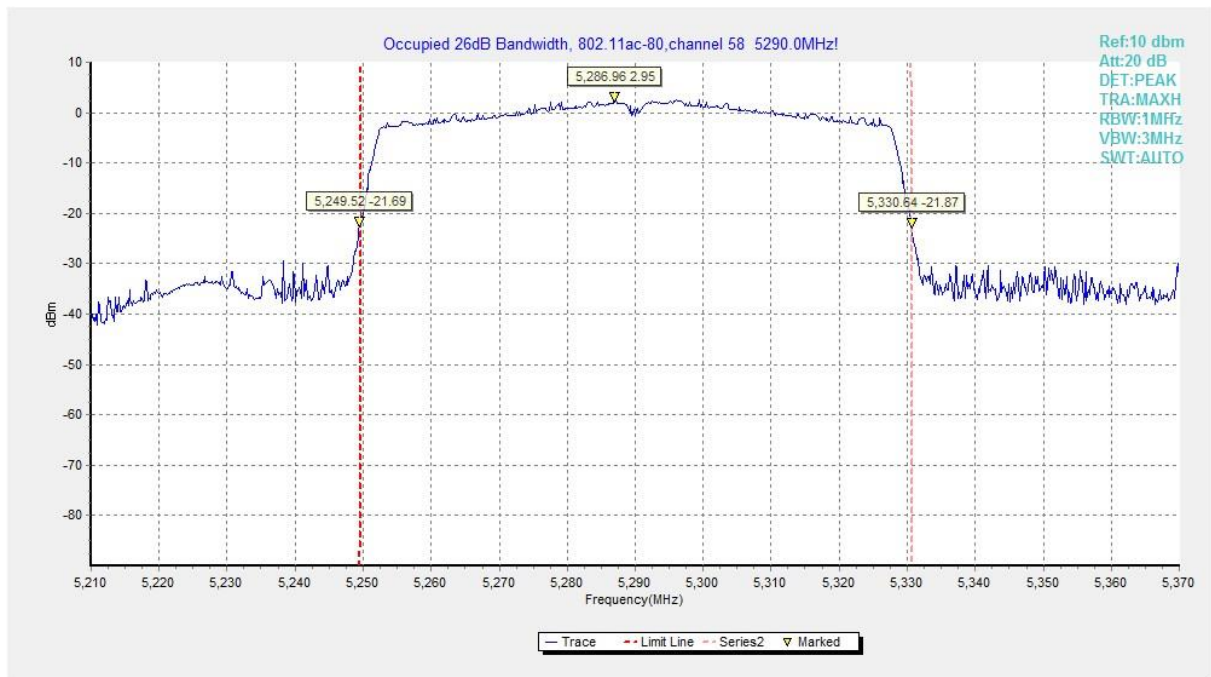


Fig. 18 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5290MHz)

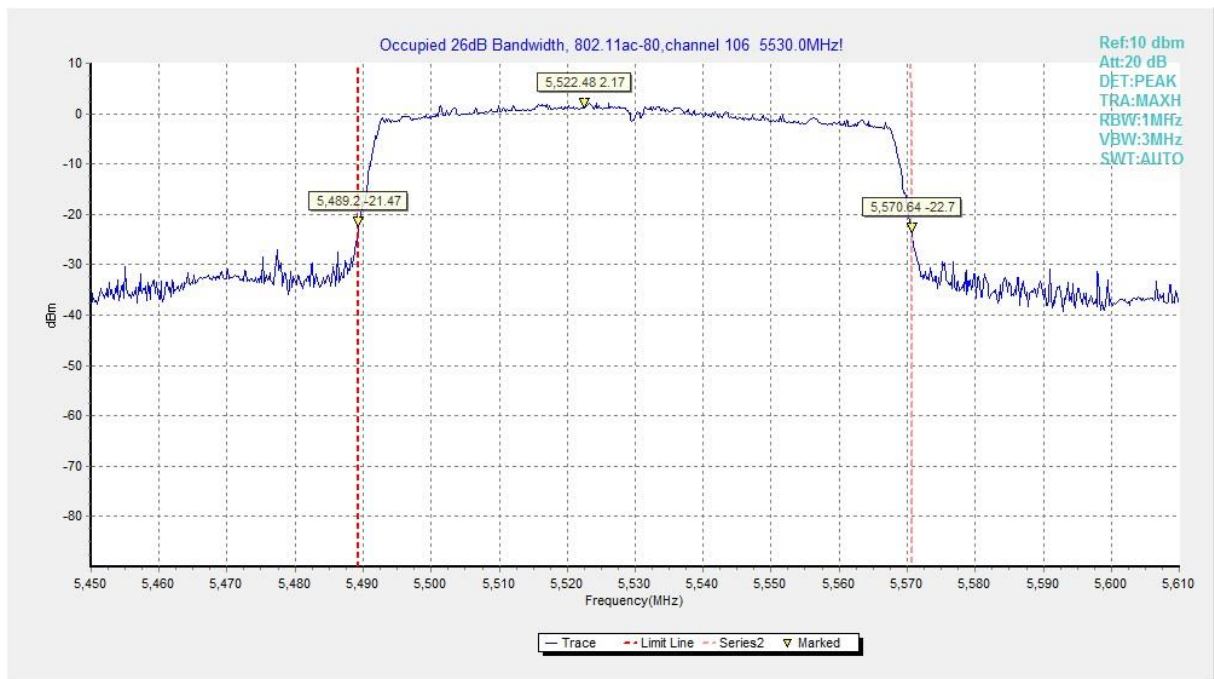


Fig. 19 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5530MHz)

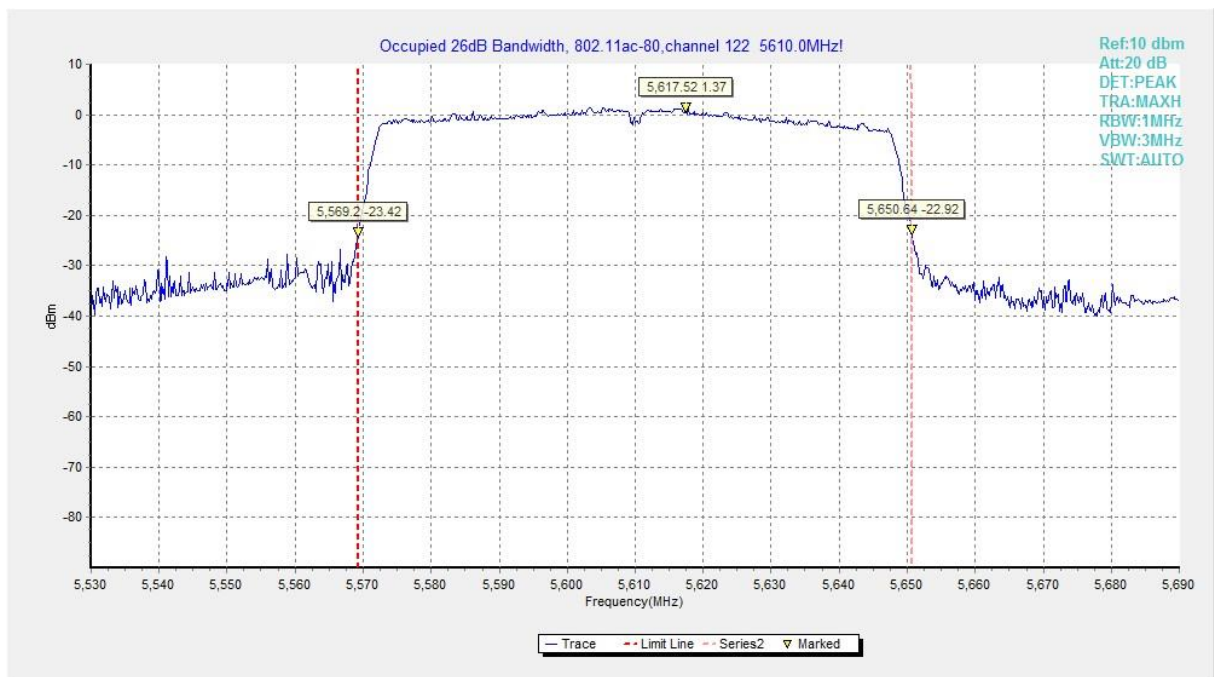


Fig. 20 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5610MHz)

### A.5. Occupied 6dB Bandwidth (conducted)

#### Measurement Limit:

| Standard                   | Limit (MHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.407 (e) | $\geq 0.5$  |

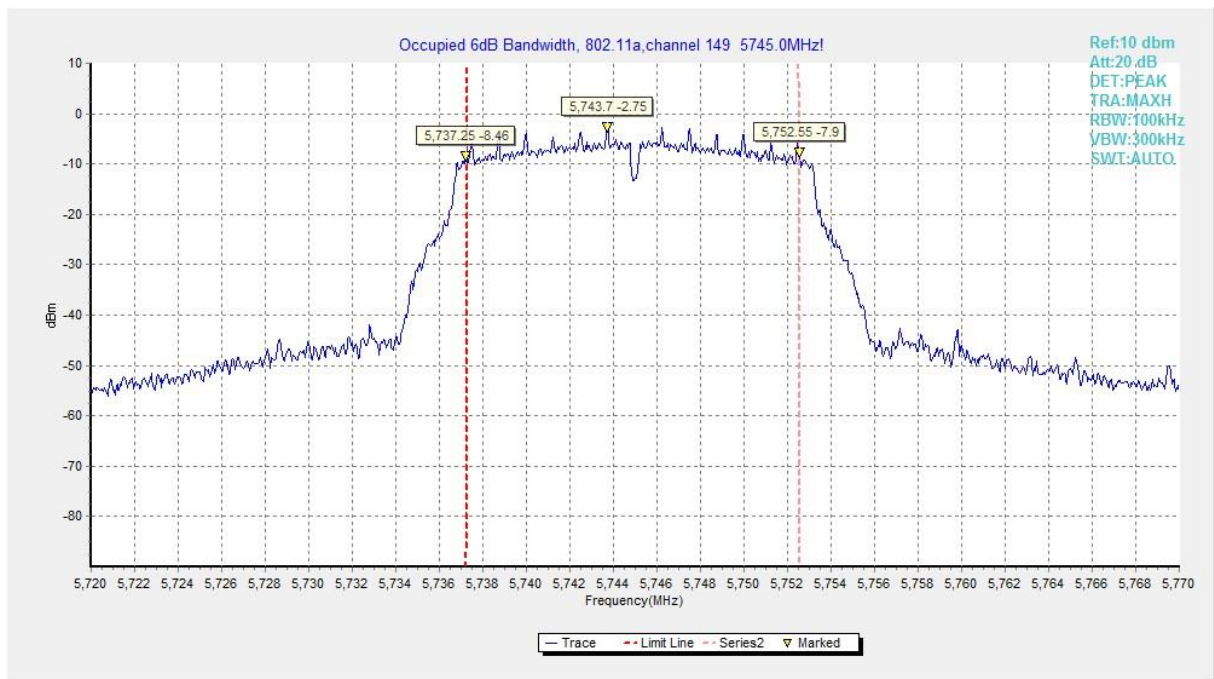
The measurement is made according to KDB 789033

#### Measurement Result:

| Mode           | Channel        | Occupied 6dB Bandwidth( MHz) |       | Conclusion |
|----------------|----------------|------------------------------|-------|------------|
| 802.11a        | 5745MHz(Ch149) | Fig.21                       | 15.30 | P          |
|                | 5785MHz(Ch157) | Fig.22                       | 15.30 | P          |
|                | 5825MHz(Ch165) | Fig.23                       | 15.10 | P          |
| 802.11n-HT40   | 5755MHz(Ch151) | Fig.24                       | 35.12 | P          |
|                | 5795MHz(Ch159) | Fig.25                       | 35.20 | P          |
| 802.11ac-VHT80 | 5775MHz(Ch155) | Fig.26                       | 73.92 | P          |

**Conclusion: PASS**

Test graphs as below:



**Fig. 21 Occupied 6dB Bandwidth (802.11a, 5745MHz)**

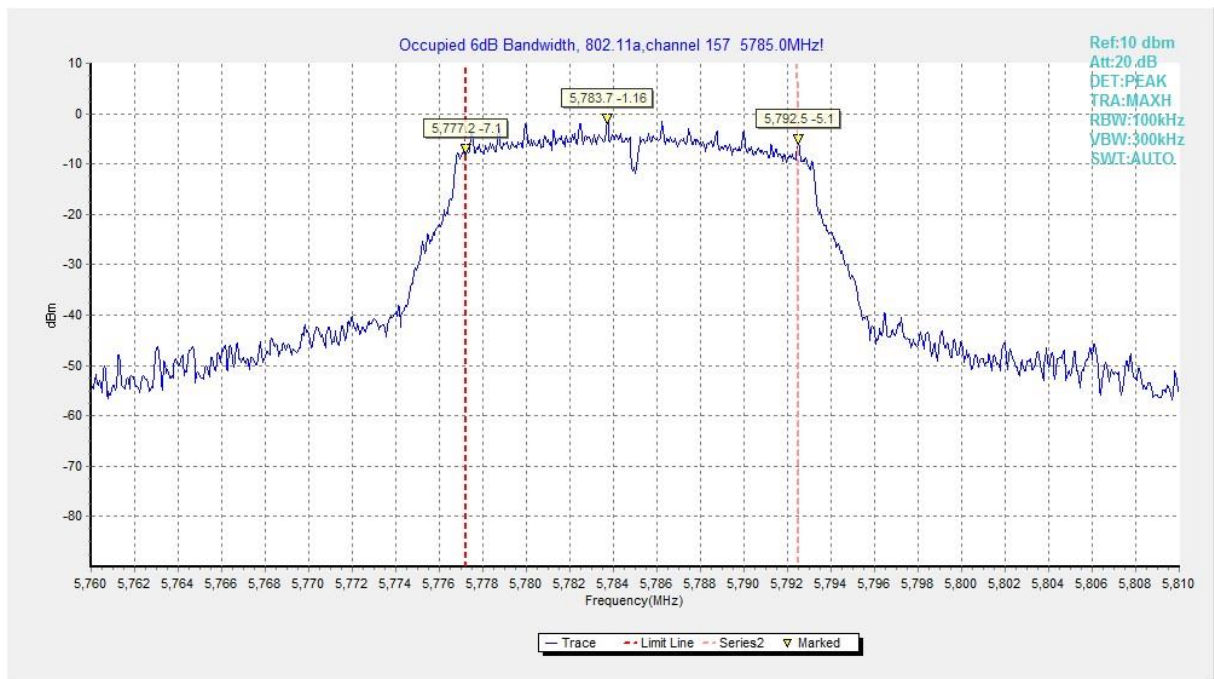


Fig. 22 Occupied 6dB Bandwidth (802.11a, 5785MHz)

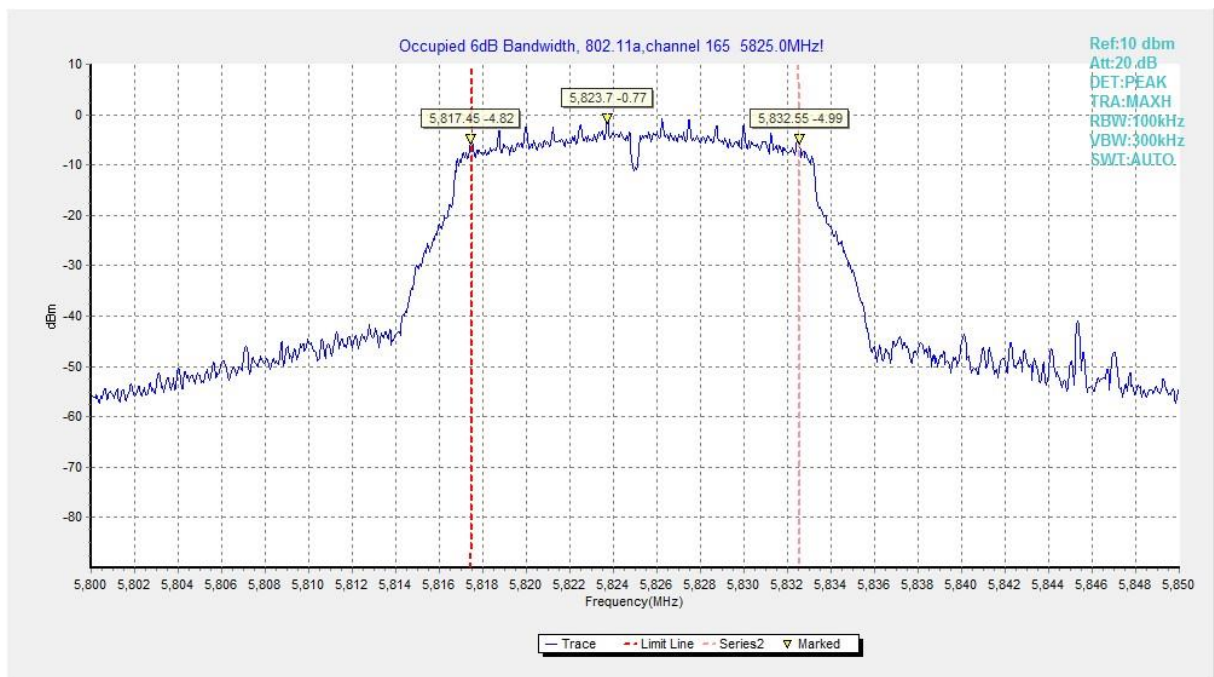


Fig. 23 Occupied 6dB Bandwidth (802.11a, 5825MHz)

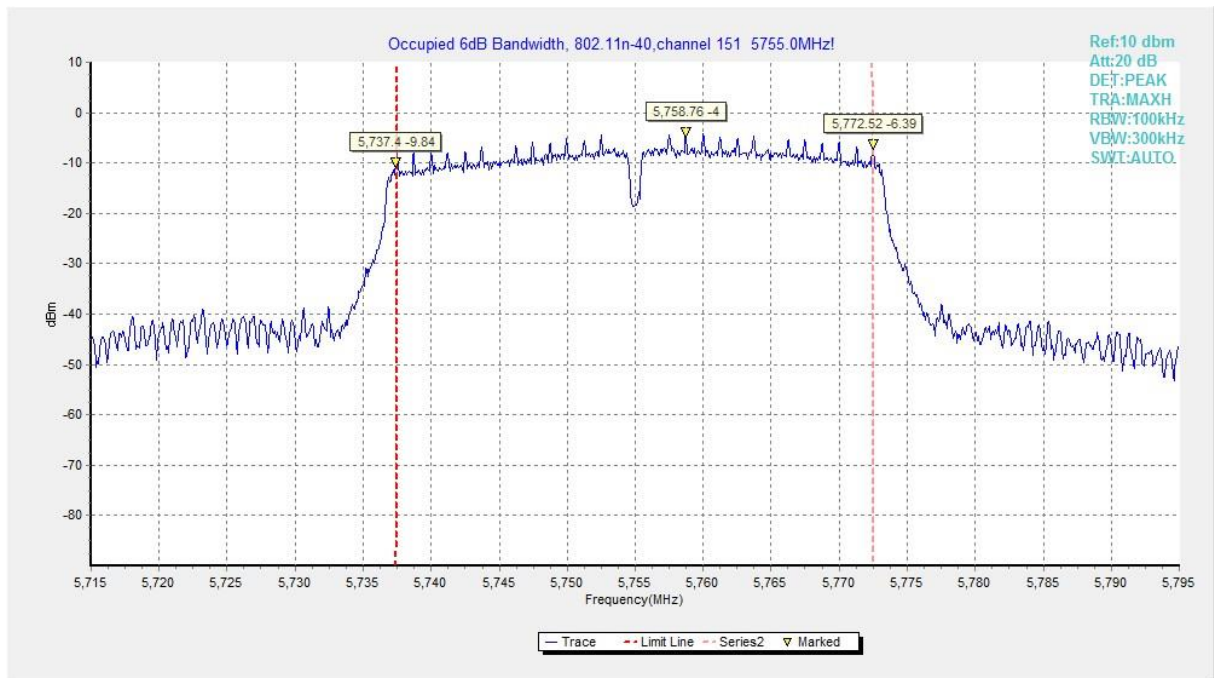


Fig. 24 Occupied 6dB Bandwidth (802.11n-HT40, 5755MHz)

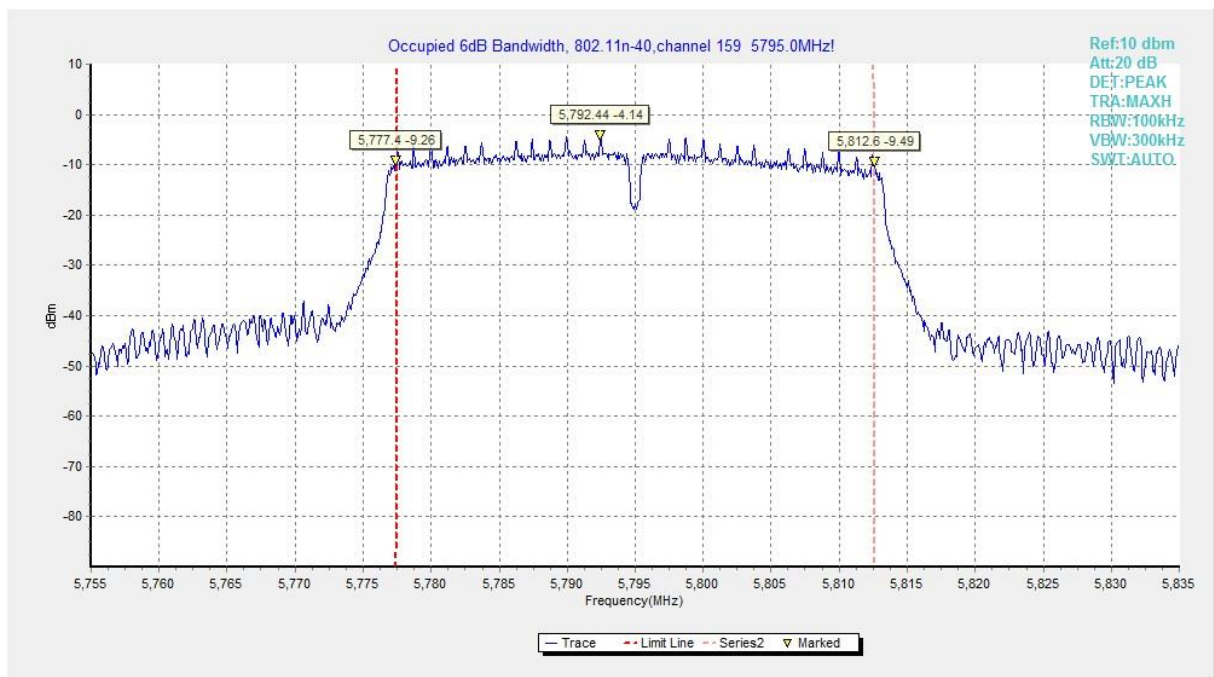


Fig. 25 Occupied 6dB Bandwidth (802.11n-HT40, 5795MHz)

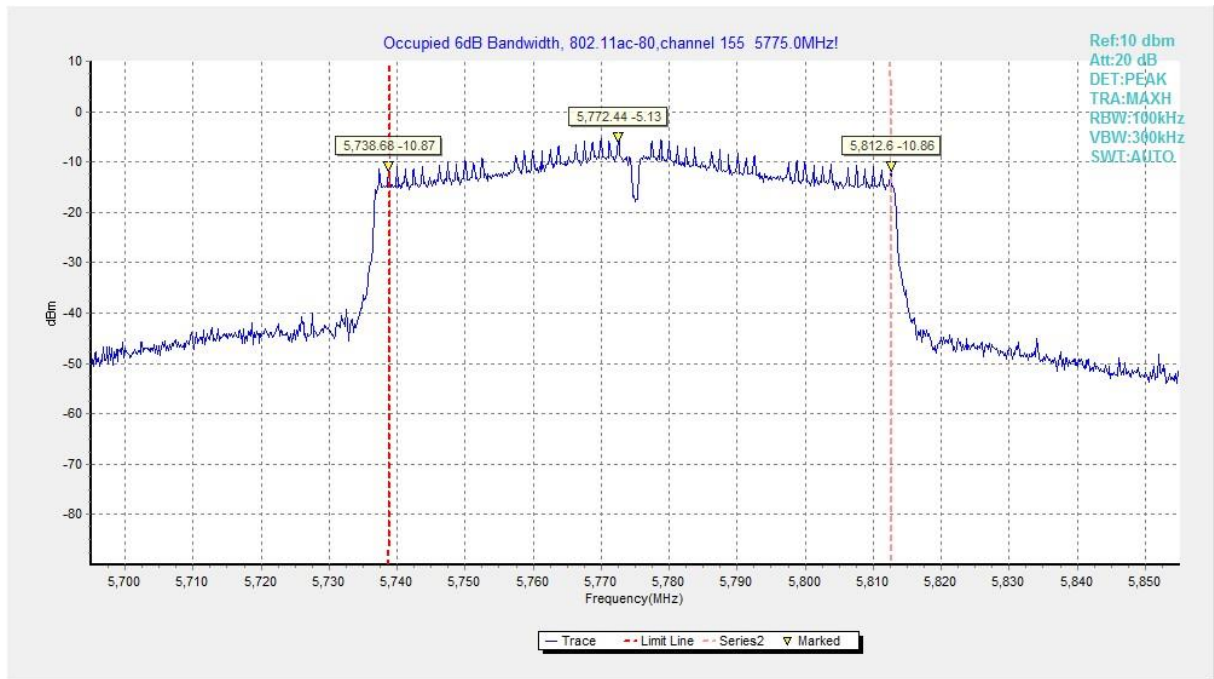


Fig. 26 Occupied 6dB Bandwidth (802.11ac-VHT80, 5775MHz)

### A.6. 99% Occupied Bandwidth(conducted)

#### Measurement Limit:

| Standard               | Limit (MHz) |
|------------------------|-------------|
| FCC 47 CFR Part 15.403 | /           |

The measurement is made according to KDB 789033

#### Measurement Result:

| Mode            | Channel        | 99% Occupied Bandwidth(MHz) |       | Conclusion |
|-----------------|----------------|-----------------------------|-------|------------|
| 802.11a         | 5180MHz(Ch36)  | Fig.27                      | 17.26 | /          |
|                 | 5200MHz(Ch40)  | Fig.28                      | 17.18 | /          |
|                 | 5240MHz(Ch48)  | Fig.29                      | 17.10 | /          |
|                 | 5260MHz(Ch52)  | Fig.30                      | 17.26 | /          |
|                 | 5280MHz(Ch56)  | Fig.31                      | 17.26 | /          |
|                 | 5320MHz(Ch64)  | Fig.32                      | 17.26 | /          |
|                 | 5500MHz(Ch100) | Fig.33                      | 17.22 | /          |
|                 | 5580MHz(Ch116) | Fig.34                      | 17.22 | /          |
|                 | 5700MHz(Ch140) | Fig.35                      | 17.26 | /          |
| 802.11n-HT40    | 5190MHz(Ch38)  | Fig.36                      | 36.28 | /          |
|                 | 5230MHz(Ch46)  | Fig.37                      | 36.12 | /          |
|                 | 5270MHz(Ch54)  | Fig.38                      | 36.20 | /          |
|                 | 5310MHz(Ch62)  | Fig.39                      | 36.20 | /          |
|                 | 5510MHz(Ch102) | Fig.40                      | 36.12 | /          |
|                 | 5550MHz(Ch110) | Fig.41                      | 36.28 | /          |
|                 | 5670MHz(Ch134) | Fig.42                      | 36.20 | /          |
| 802.11 ac-VHT80 | 5210MHz(Ch42)  | Fig.43                      | 75.28 | /          |
|                 | 5290MHz(Ch58)  | Fig.44                      | 75.28 | /          |
|                 | 5530MHz(Ch106) | Fig.45                      | 75.28 | /          |
|                 | 5610MHz(Ch122) | Fig.46                      | 75.44 | /          |

**Conclusion: PASS**

Test graphs as below:

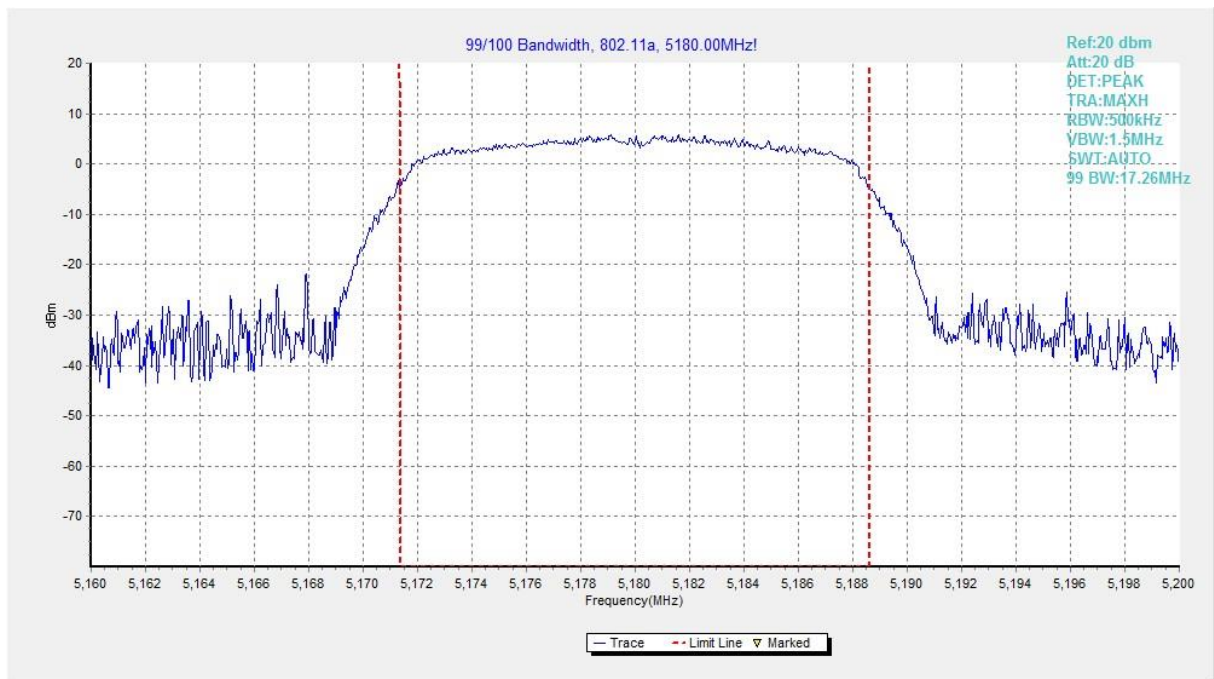


Fig. 27 99% Occupied Bandwidth (802.11a, 5180MHz)

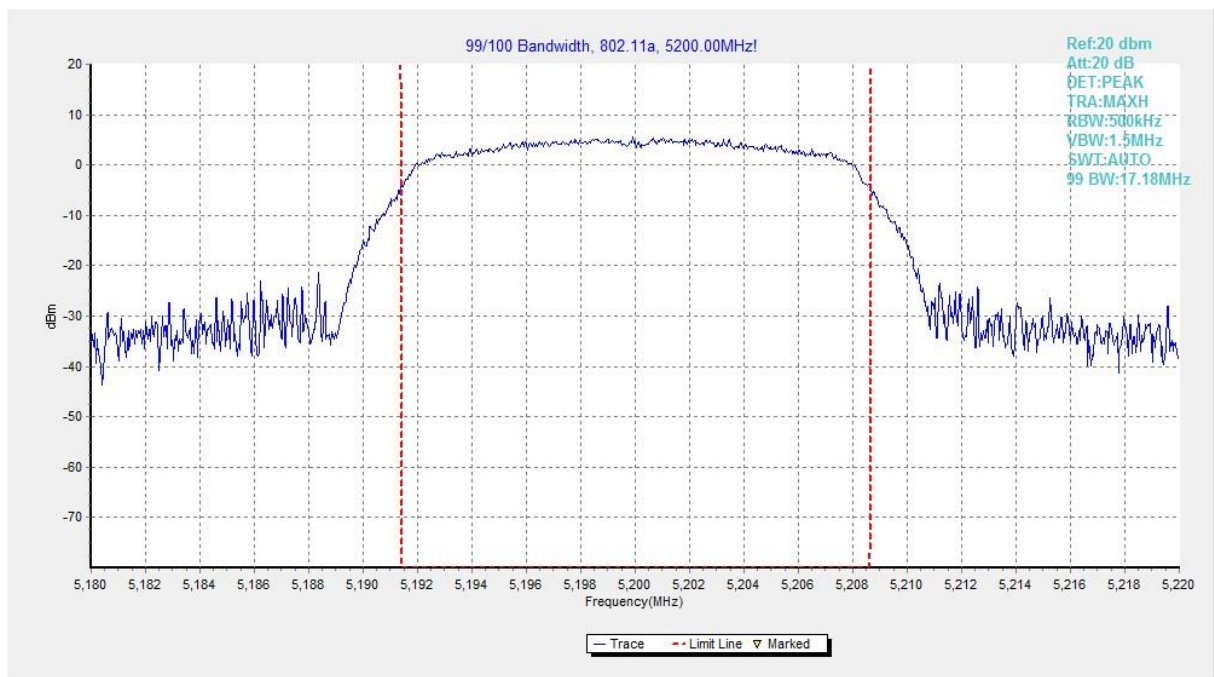


Fig. 28 99% Occupied Bandwidth (802.11a, 5200MHz)



Fig. 29 99% Occupied Bandwidth (802.11a, 5240MHz)

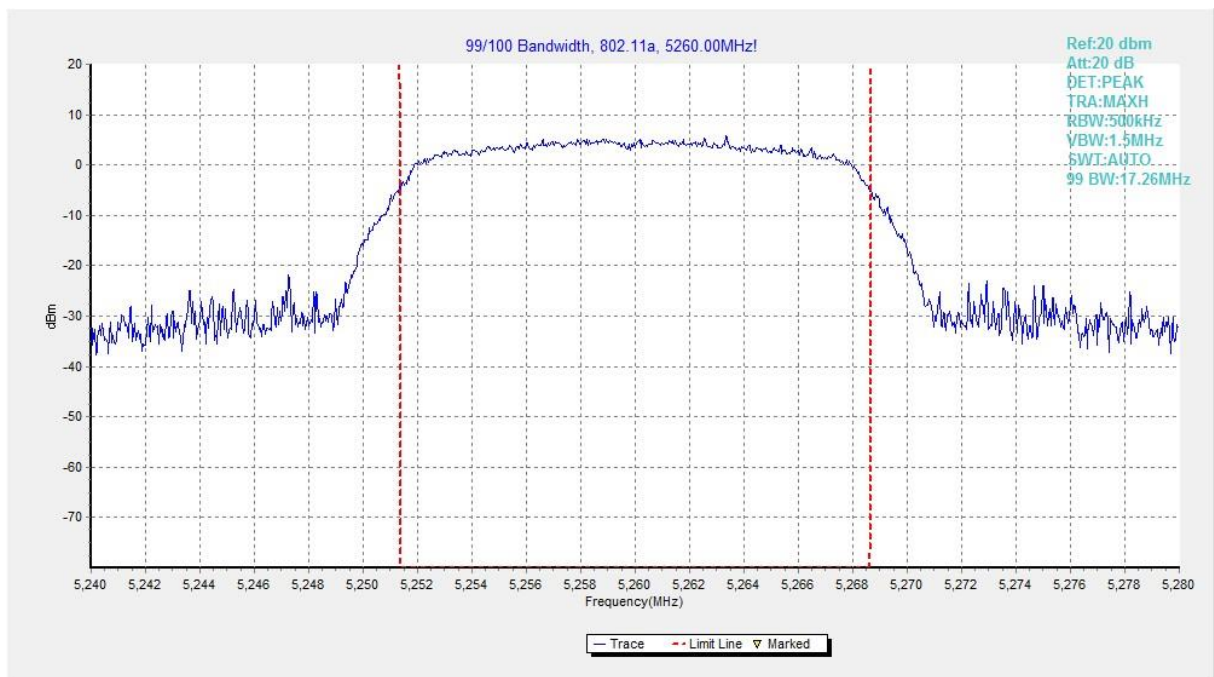


Fig. 30 99% Occupied Bandwidth (802.11a, 5260MHz)

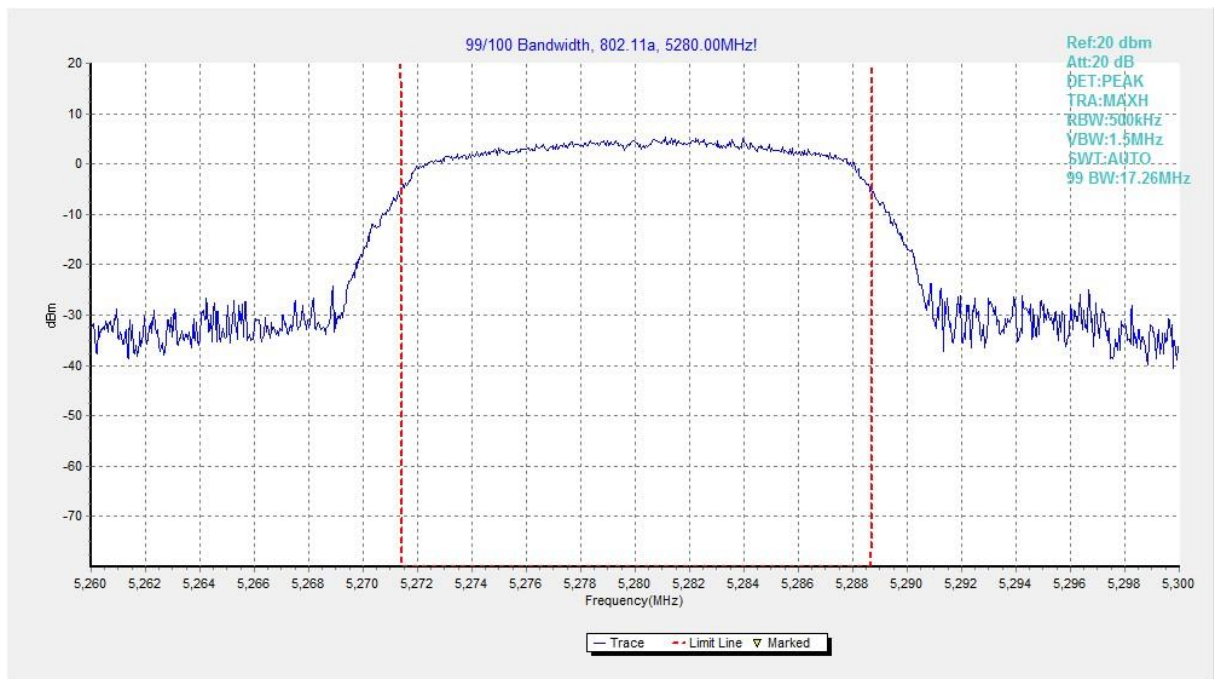


Fig. 31 99% Occupied Bandwidth (802.11a, 5280MHz)

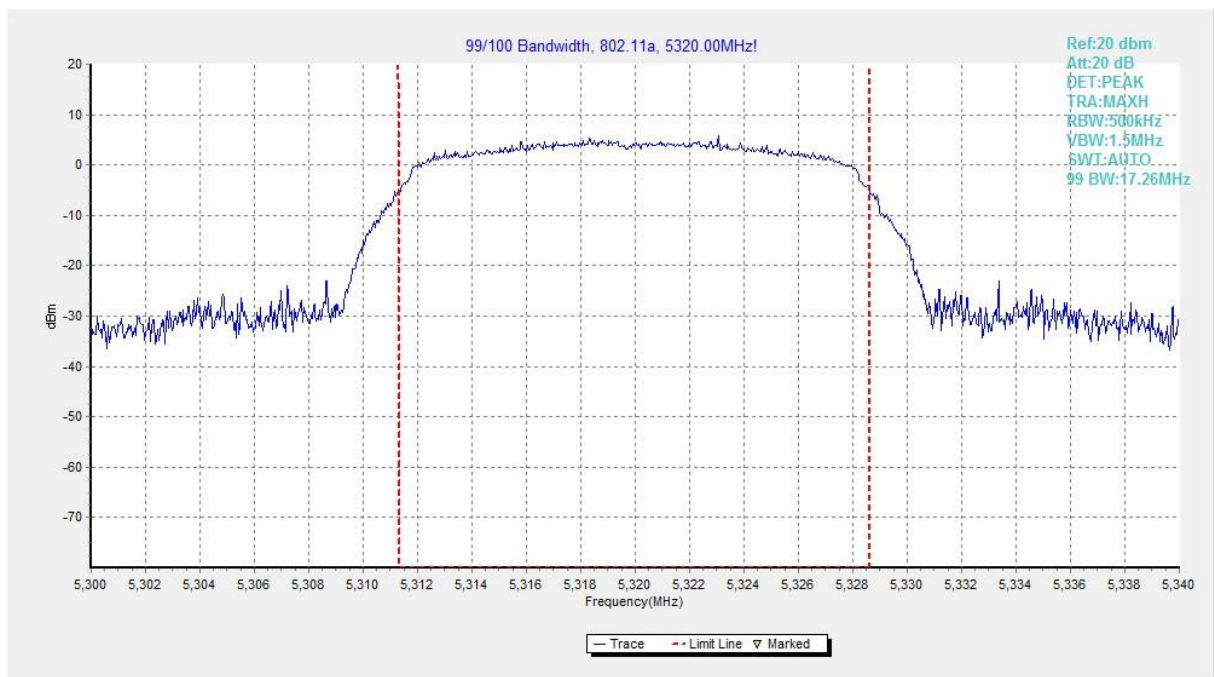


Fig. 32 99% Occupied Bandwidth (802.11a, 5320MHz)

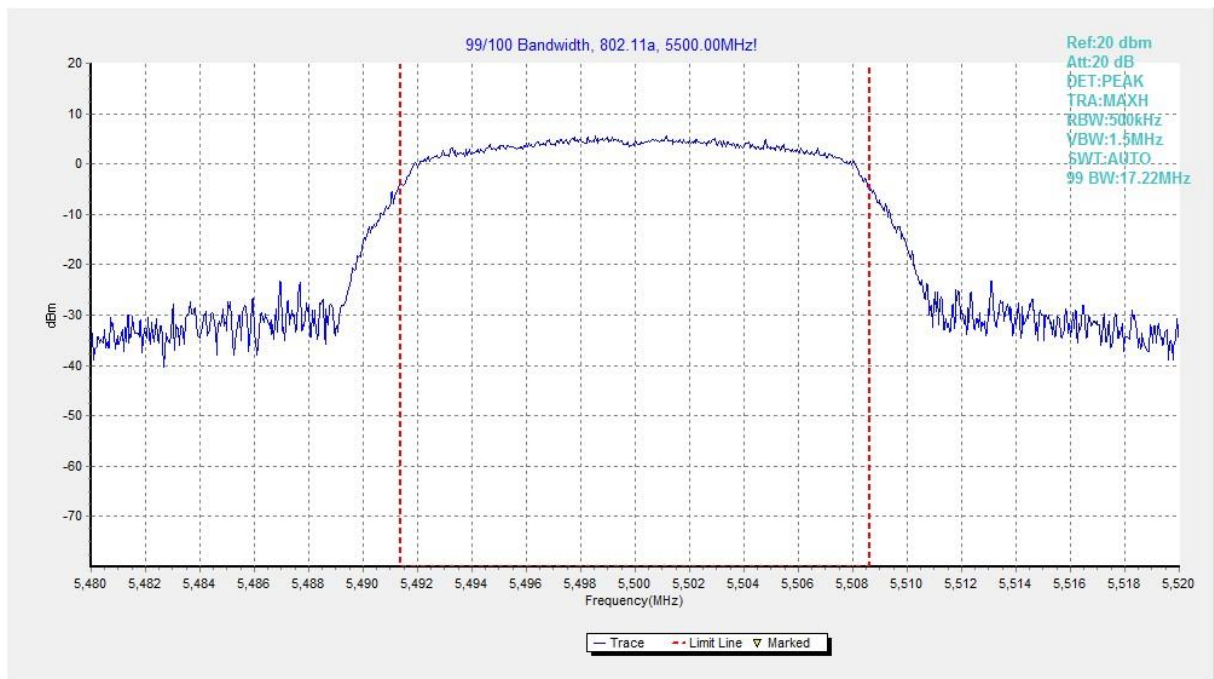


Fig. 33 99% Occupied Bandwidth (802. 11a, 5500MHz)

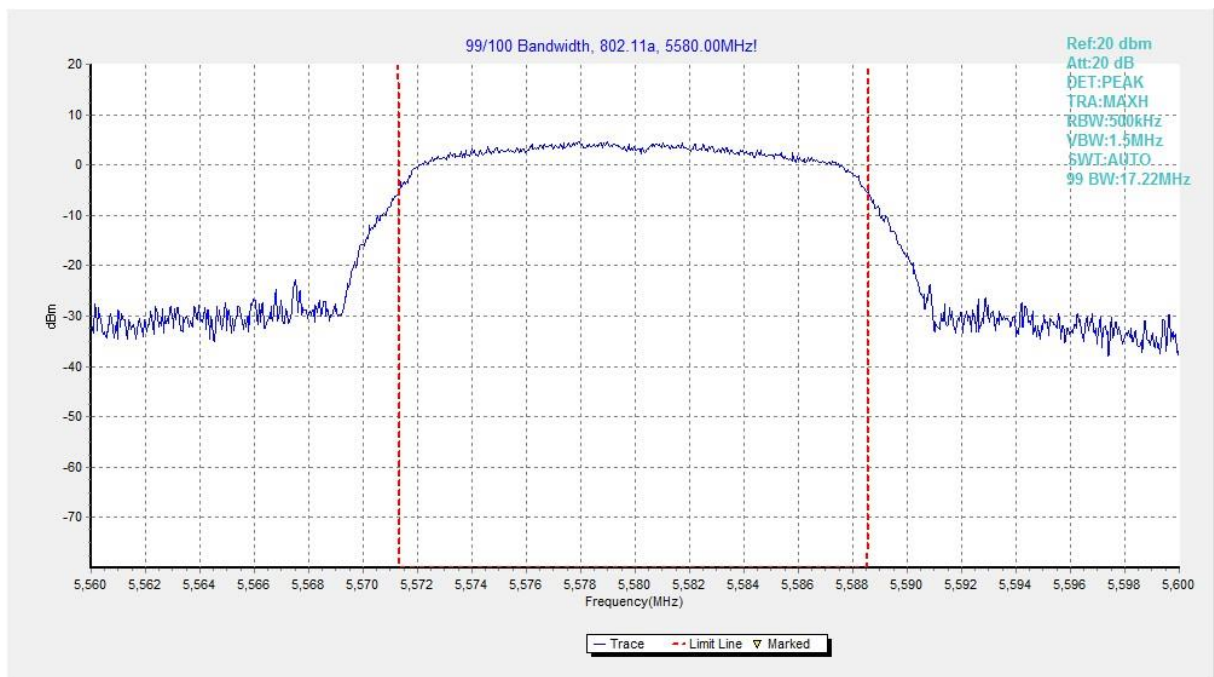


Fig. 34 99% Occupied Bandwidth (802. 11a, 5580MHz)

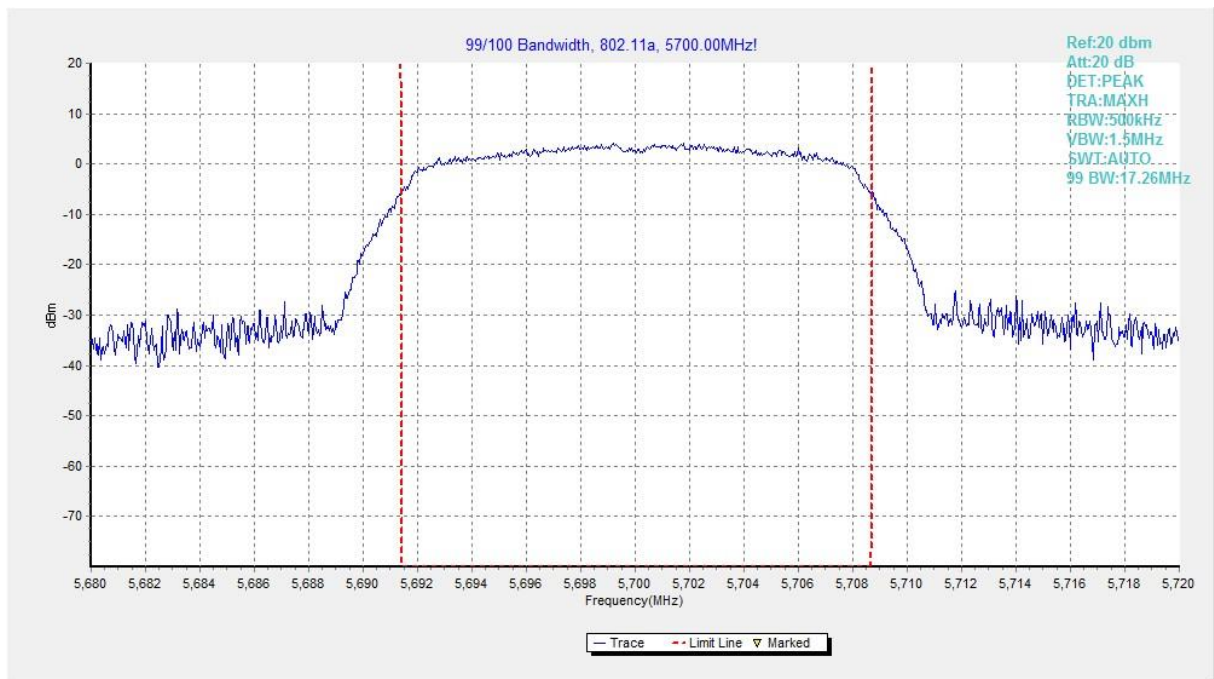


Fig. 35 99% Occupied Bandwidth (802. 11a, 5700MHz)

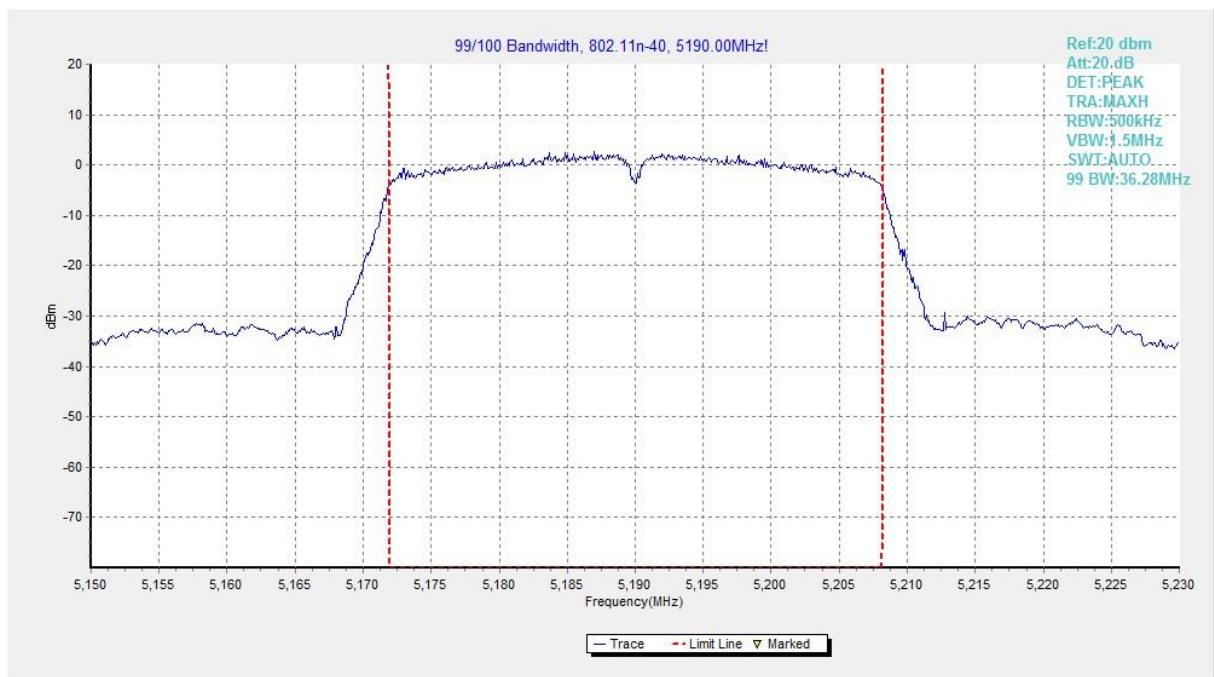


Fig. 36 99% Occupied Bandwidth (802.11n-HT40, 5190MHz)

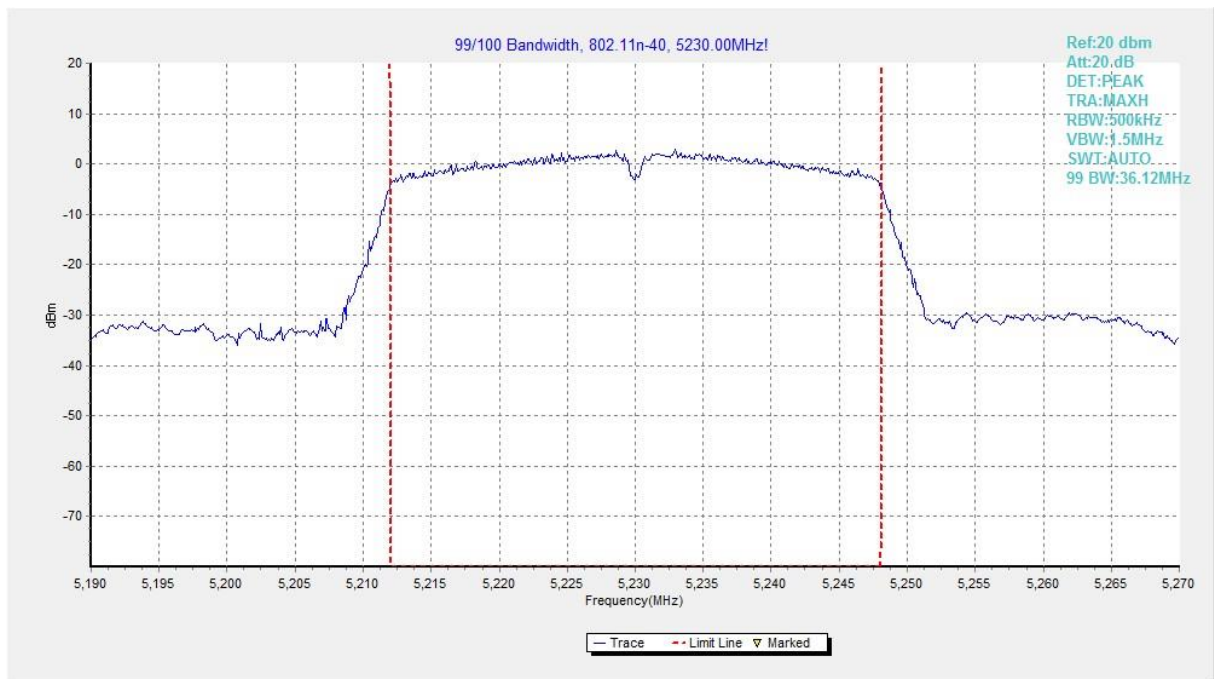


Fig. 37 99% Occupied Bandwidth (802.11n-HT40, 5230MHz)

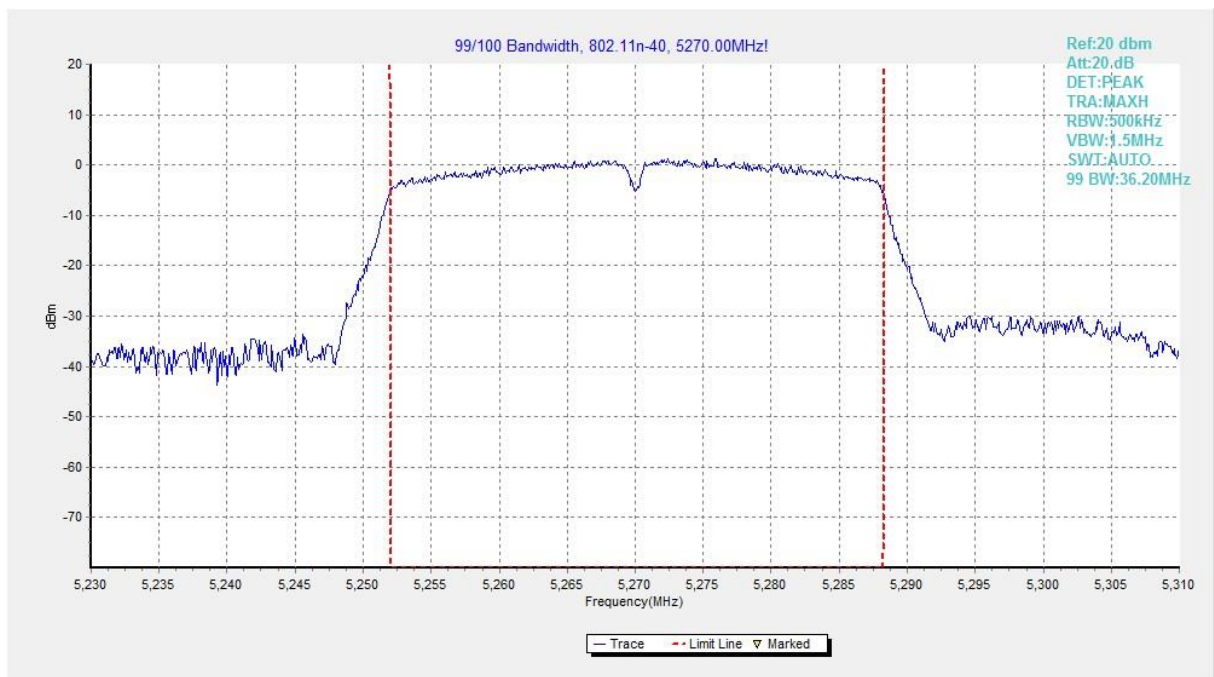
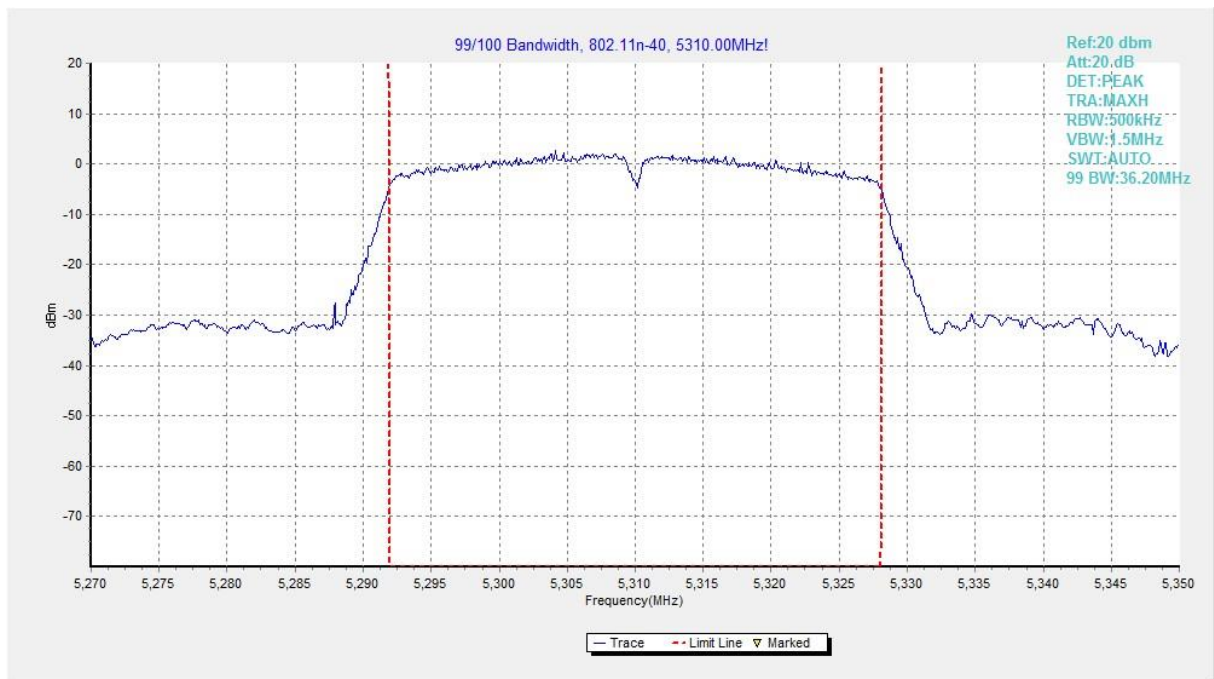
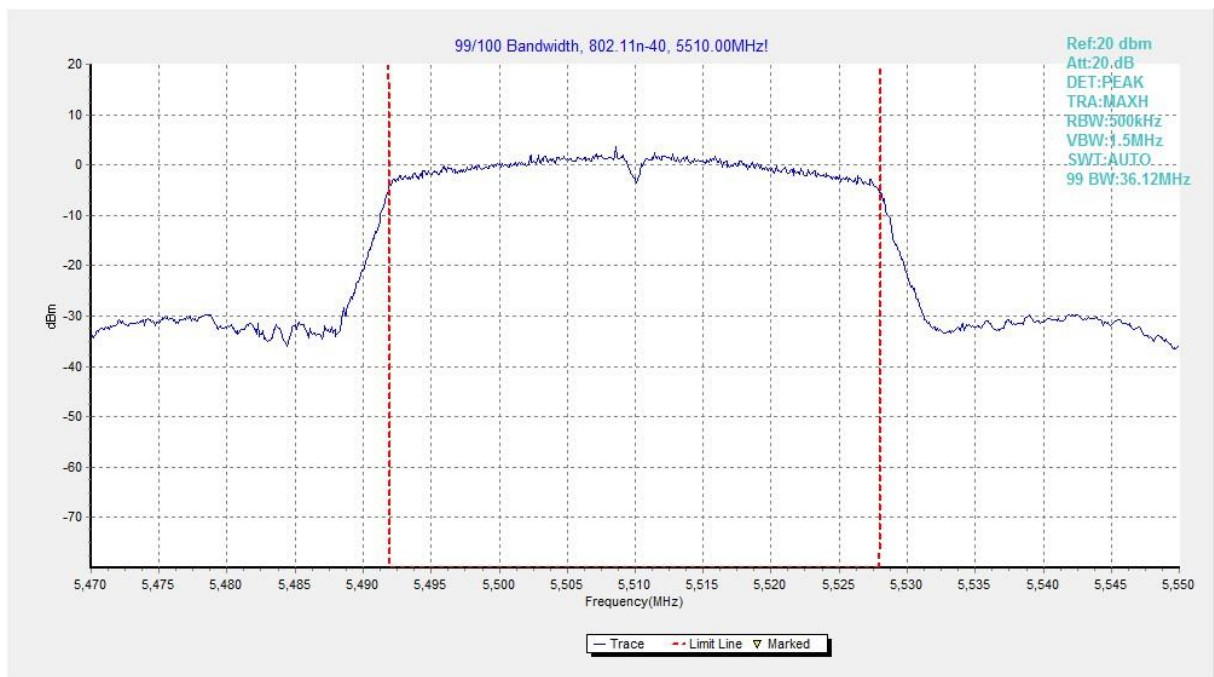


Fig. 38 99% Occupied Bandwidth (802.11n-HT40, 5270MHz)



**Fig. 39 99% Occupied Bandwidth (802.11n-HT40, 5310MHz)**



**Fig. 40 99% Occupied Bandwidth (802.11n-HT40, 5510MHz)**

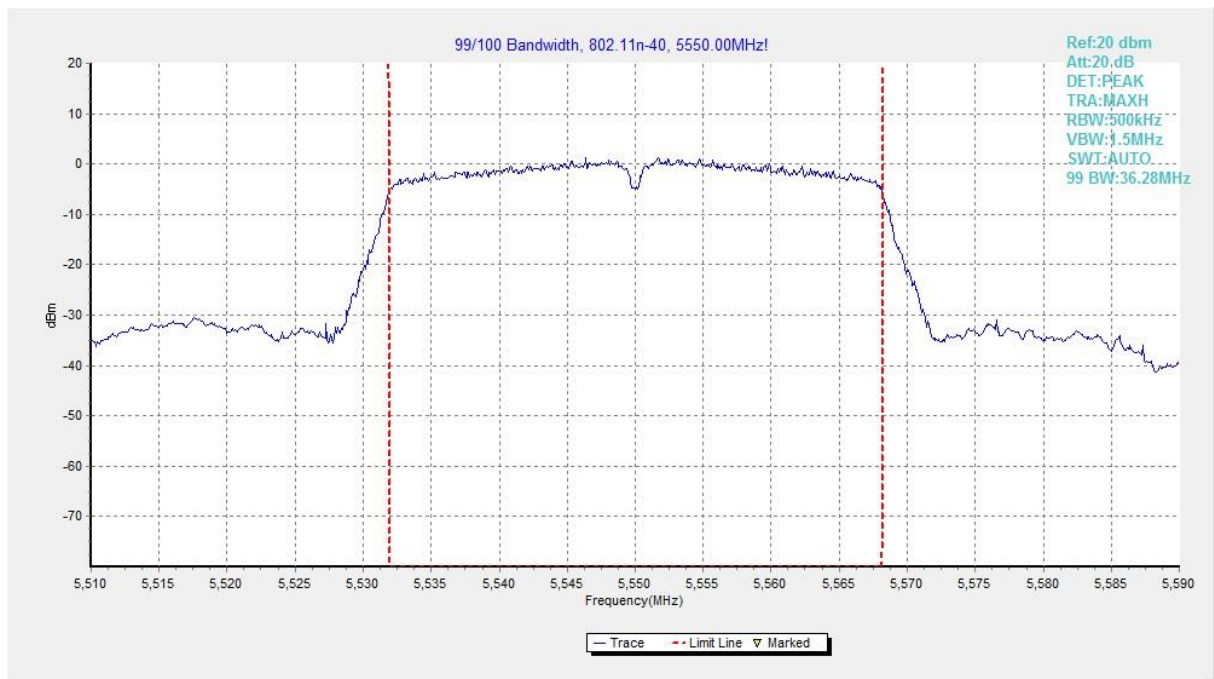


Fig. 41 99% Occupied Bandwidth (802.11n-HT40, 5550MHz)

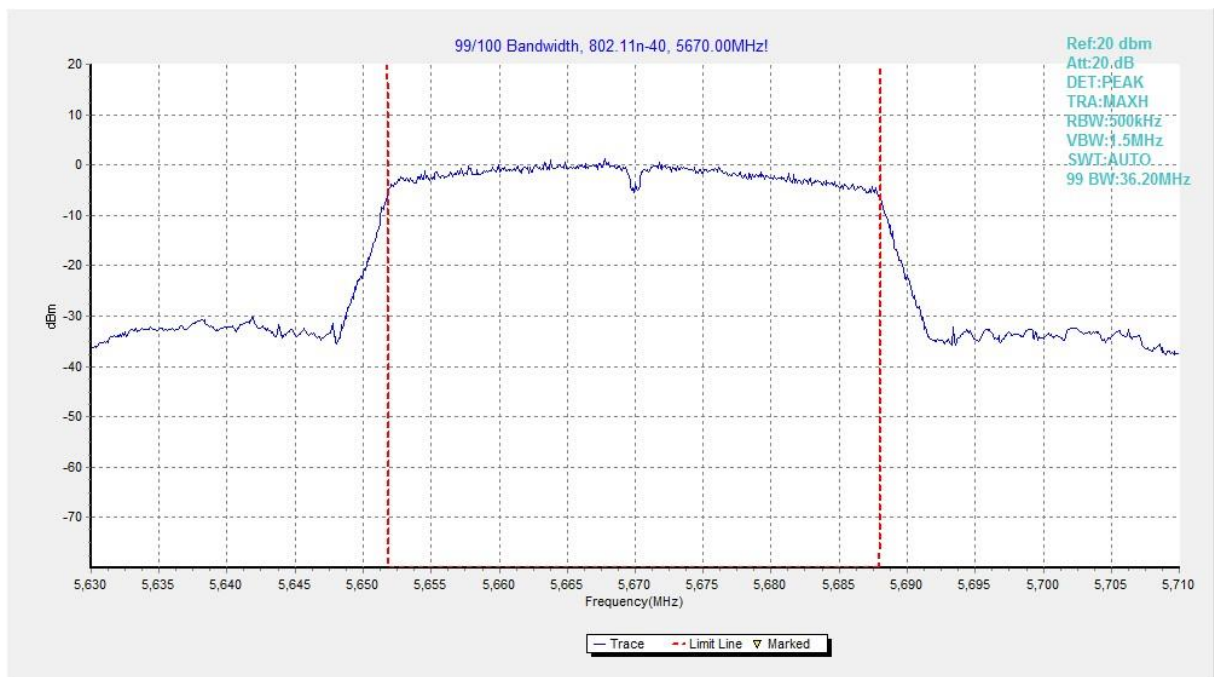


Fig. 42 99% Occupied Bandwidth (802.11n-HT40, 5670MHz)