



# FCC PART 15 TEST REPORT No.I22Z60885-IOT04

for

**Razer Inc.**

**Gaming Tablet**

**RZ45-0461**

With

**FCC ID: RWO-RZ450461**

**Hardware Version: V4**

**Software Version: Razer Edge WiFi-12-user**

**Issued Date: 2022-10-28**

**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 CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I22Z60885-IOT04	Rev.0	1 <sup>st</sup> edition	2022-09-01
I22Z60885-IOT04	Rev.1	Update the resuset transmitter spurious emission(radiated).	2022-10-28

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## 1. TEST LABORATORY

### 1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

### 1.2. Testing Location

Testing Location: CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,  
P. R. China100191

### 1.3. Testing Environment

Normal Temperature: 15-35°C

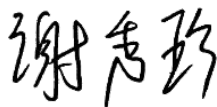
Relative Humidity: 20-75%

### 1.4. Project date

Testing Start Date: 2022-04-20

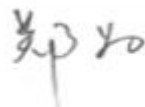
Testing End Date: 2022-09-01

### 1.5. Signature



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Xie Xiuzhen  
( Prepared this test report )



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Zheng Wei  
(Reviewed this test report)



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Pang Shuai  
(Approved this test report)



## **2. CLIENT INFORMATION**

### **2.1 Applicant Information**

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Contact: Johnsen Tia  
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### **2.2 Manufacturer Information**

Company Name: Razer Inc.  
Address /Post: 9 Pasteur, Suite 100, Irvine, CA 92618, USA.  
Contact: Johnsen Tia  
Email: Johnsen.tia@razer.com  
Telephone: +65 6571 6828

### **3. EQUIPMENT UNDER TEST (EUT) AND**

#### **ANCILLARY EQUIPMENT (AE)**

##### **3.1. About EUT**

Description	Gaming Tablet
Model name	RZ45-0461
FCC ID	RWO-RZ450461
WLAN Frequency Band	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5725MHz
Type of modulation	OFDM/OFDMA
Antenna	Embedded Antenna
Voltage	3.87V

##### **3.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>SN or IMEI</b>	<b>HW Version</b>	<b>SW Version</b>
UT65a	/	V4	Razer Edge WiFi-12-user
UT09a	/	V4	Razer Edge WiFi-12-user
UT18a	/	V4	Razer Edge WiFi-12-user

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

\*UT09a is used for Conduction test, UT65a is used for Radiation test.

##### **3.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>		
AE1	Battery	/	Inbuilt
AE2	USB Cable	/	/
AE3	Adapter	/	/
<b>AE1</b>			
Model	RC30-046001		
Manufacturer	ATL		
Capacitance	5000mAh		
Nominal voltage	3.87V		
<b>AE2</b>			
Model	LS2-A001A		
Manufacturer	/		
<b>AE3</b>			
Model	A849-200225C-US 1		
Manufacturer	/		

\*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 Gaming Tablet with embedded antenna and inbuilt battery.

It has Bluetooth (EDR)function.

It consists of normal options: travel charger, USB cable.

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

Samples undergoing test were selected by the client.

### 3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor  $k=2$ .

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

## 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.

FCC Part15	Title 47 of the Code of Federal Regulations; Chapter I Part 15 - Radio frequency devices	2018
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2013
UNII: KDB 789033 D02	General U-NII Test Procedures New Rules v02r01	2017-12
KDB 662911 D01	Emissions Testing of Transmitters with Multiple Outputs in the Same Band(e.g., MIMO, Smart Antenna, etc)	2013-10

## 5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber and performed in shielding room.



## 6. SUMMARY OF TEST RESULTS

### 6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15E	Sub-clause of IC	Verdict
Maximum Output Power	15.407	/	BR
Peak Power Spectral Density	15.407	/	BR
Occupied 26dB Bandwidth	15.403	/	BR
Band edge compliance (Radiated)	15.209	/	P
Transmitter spurious emissions (Radiated)	15.407	/	P
AC Powerline Conducted Emission (150kHz- 30MHz)	15.407	/	BR
Frequency Stability	15.407	/	BR
99% Occupied bandwidth	/	/	BR
Transmit Power Control	15.407	/	BR

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NM	Not measured, The test was not measured by CTTL
BR	Re-use test data from basic model report.
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

### 6.2. Statements

CTTL has evaluated the test cases requested by the client/manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.1.

This report only deals with the WLAN function among the features described in section 3.

### 6.3. Explanation of re-use of test data

The Equipment Under Test (EUT) model RZ45-0461 (FCC ID: RWO-RZ450461) is a variant product of RZ45-0460VWQ (FCC ID: RWO-RZ450460), according to the declaration of changes provided by the applicant and FCC KDB publication 484596 D01, spot check (power) measurements, band edge compliance (radiated) and transmitter spurious emissions (radiated) were performed on this device, other test results are derived from test report No.I22Z60808-IOT04.

For detail differences between two models please refer the Declaration of Changes document.

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.87V
Humidity	44%

## 7. TEST EQUIPMENTS UTILIZED

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2023-05-15
2	Test Receiver	ESCI 3	100344	R&S	1 year	2023-02-21
3	LISN	ENV216	101200	R&S	1 year	2022-06-29
4	Attenuator	10dB/2W	/	Rosenberger	/	/
5	Shielding Room	S81	/	ETS-Lindgren	/	/

Note:

The test dates were before the calibration due dates of equipment used (the LISN whose series number is 101200)

### Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103023	R&S	1 year	2022-10-28
2	EMI Antenna	VULB 9163	483	SCHWARZBECK	1 year	2022-08-24
3	EMI Antenna	3115	00167250	ETS-Lindgren	1 year	2022-07-01
4	Loop Antenna	HFH2-Z2	829324/007	R&S	1 year	2022-12-22

Note:

The test dates were before the calibration due dates of equipment used (the EMI Antenna which series number is 00167250, the EMI Antenna which series number is 483)

## 8. Measurement Uncertainty

### 8.1 Transmitter Output Power

Measurement Uncertainty: 0.387dB,k=1.96

### 8.2 Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

### 8.3 Occupied Channel Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

### 8.4 Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

### 8.5 Spurious Emissions

#### Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
$30\text{MHz} \leq f \leq 2\text{GHz}$	1.22
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	1.22
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.22
$8\text{GHz} \leq f \leq 12.75\text{GHz}$	1.51
$12.75\text{GHz} \leq f \leq 26\text{GHz}$	1.51
$26\text{GHz} \leq f \leq 40\text{GHz}$	1.59

#### Radiated (k=2)

Frequency Range	Uncertainty(dB)
9kHz-30MHz	4.92
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.15
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.54
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

### 8.6.AC Power-line Conducted Emission

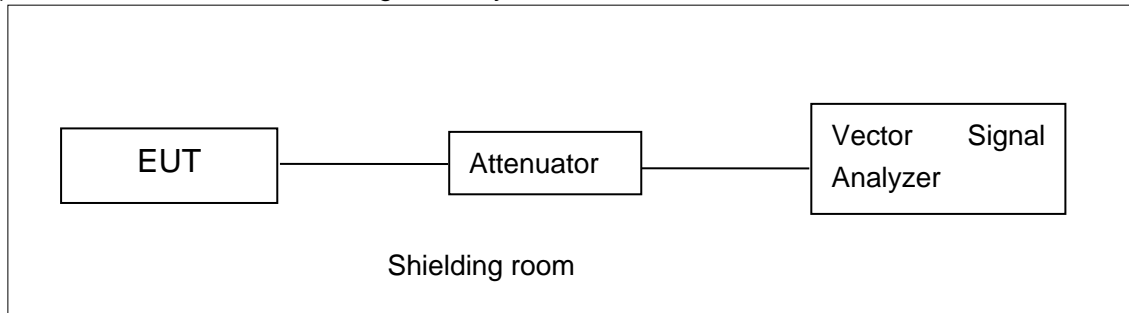
Measurement Uncertainty : 3.08,k=2

## ANNEX A: MEASUREMENT RESULTS

### A.1. Measurement Method

#### A.1.1. 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. Vector Signal Analyzer

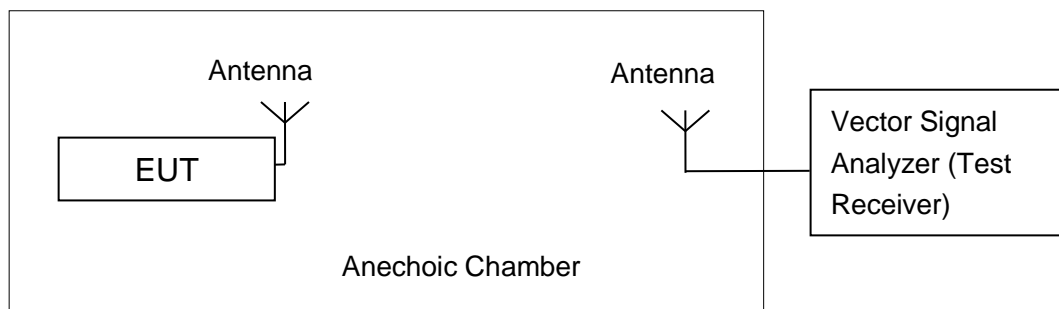


#### A.1.2. Radiated Emission Measurements

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

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

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



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. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

## A.2. Maximum output Power

### Measurement Limit and Method:

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

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

The measurement method SA-2 is made according to KDB 789033

BW	Frequency(MHz)	Ant4(dBi)	Ant5(dBi)	DG(dBi) Beamforming
20M	5180MHz	-0.4	-2.8	1.49
	5200MHz	-1.3	-2.5	1.13
	5240MHz	-2.6	-3.1	0.16
	5260MHz	-2.6	-3.1	0.16
	5280MHz	-2.1	-3.1	0.42
	5320MHz	-2.1	-3.1	0.42
	5500MHz	-1.6	-2.7	0.88
	5580MHz	-1.1	-2.2	1.38
	5700MHz	-2.6	-3.6	-0.08
	5720MHz	-2.6	-3.6	-0.08
40M	5190MHz	-1.3	-2.5	1.13
	5230MHz	-2.6	-3.1	0.16
	5270MHz	-2.6	-3.1	0.16
	5310MHz	-2.1	-3.1	0.42
	5510MHz	-1.6	-2.7	0.88
	5550MHz	-1.8	-3	0.63
	5670MHz	-1.4	-2	1.32
	5710MHz	-2.6	-3.6	-0.08
80M	5210MHz	-1.3	-2.5	1.13

	5290MHz	-2.1	-3.1	0.42
	5530MHz	-1.8	-3	0.63
	5610MHz	-1.1	-2.2	1.38
	5690MHz	-2.6	-3.6	-0.08
160M	5210MHz	-2.6	-3.1	0.16
	5290MHz	-1.8	-3	0.63

For BF transmissions, power and PSD directional gain is calculated as:

Directional gain =  $10 \log [(10G1 / 20 + 10G2 / 20 + \dots + 10Gn / 20) 2 / \text{NANT}]$  dBi, as following table for PSD. NANT = number of transmit antennas NSS = number of spatial streams. (The worst case directional gain will occur when NSS = 1)

### Measurement Results:

#### SISO

#### 802.11a mode

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5180MHz (Ch36)	16.44	17.15
5200MHz (Ch40)	16.73	17.52
5240MHz (Ch48)	16.67	17.68
5260MHz (Ch52)	16.92	17.51
5280MHz (Ch56)	16.78	17.40
5320MHz (Ch64)	16.52	17.27
5500MHz (Ch100)	17.15	16.77
5580MHz (Ch116)	17.46	17.23
5700MHz (Ch140)	17.21	17.78
5720MHz (Ch144)	16.91	17.45

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

**802.11n-HT20 mode**

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5180MHz (Ch36)	15.53	16.06
5200MHz (Ch40)	15.59	16.35
5240MHz (Ch48)	15.45	16.62
5260MHz (Ch52)	15.88	16.45
5280MHz (Ch56)	15.70	16.19
5320MHz (Ch64)	15.21	15.89
5500MHz (Ch100)	16.13	15.49
5580MHz (Ch116)	16.60	15.94
5700MHz (Ch140)	16.26	16.22
5720MHz (Ch144)	16.05	16.30

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ac-VHT20 mode**

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5180MHz (Ch36)	15.54	16.11
5200MHz (Ch40)	15.69	16.39
5240MHz (Ch48)	15.56	16.72
5260MHz (Ch52)	15.75	16.47
5280MHz (Ch56)	15.57	16.20

5320MHz (Ch64)	15.40	16.03
5500MHz (Ch100)	16.09	15.43
5580MHz (Ch116)	16.63	15.77
5700MHz (Ch140)	16.30	16.53
5720MHz (Ch144)	16.05	16.23

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11n-HT40 mode

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5190MHz (Ch38)	15.50	15.39
5230MHz (Ch46)	15.56	16.46
5270MHz (Ch54)	15.74	16.22
5310MHz (Ch62)	15.47	15.91
5510MHz (Ch102)	16.08	15.40
5550MHz (Ch110)	16.76	15.81
5670MHz (Ch134)	16.70	16.21
5710MHz (Ch142)	16.25	16.18

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT40 mode

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5190MHz (Ch38)	15.57	16.15



5230MHz (Ch46)	15.49	16.44
5270MHz (Ch54)	15.67	16.15
5310MHz (Ch62)	15.42	16.17
5510MHz (Ch102)	16.13	15.43
5550MHz (Ch110)	15.21	15.74
5670MHz (Ch134)	16.34	16.27
5710MHz (Ch142)	16.36	16.32

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT80 mode

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5210MHz (Ch42)	14.61	15.41
5290MHz (Ch58)	14.55	15.09
5530MHz (Ch106)	15.14	14.42
5610MHz (Ch122)	15.54	14.71
5690MHz (Ch138)	15.44	15.17

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT160 mode

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5250MHz (Ch50)	8.75	9.91
5570MHz (Ch114)	8.66	8.29

**802.11ax-HE20 mode(full RU)**

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5180MHz (Ch36)	16.56	17.12
5200MHz (Ch40)	16.16	17.18
5240MHz (Ch48)	16.21	17.49
5260MHz (Ch52)	16.12	16.76
5280MHz (Ch56)	16.03	16.87
5320MHz (Ch64)	15.93	16.89
5500MHz (Ch100)	16.42	16.12
5580MHz (Ch116)	16.57	16.31
5700MHz (Ch140)	16.56	17.05
5720MHz (Ch144)	16.45	16.98

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ax-HE40 mode(fill RU)**

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5190MHz (Ch38)	16.52	17.14
5230MHz (Ch46)	16.61	17.44
5270MHz (Ch54)	16.42	17.23
5310MHz (Ch62)	16.14	16.98

5510MHz (Ch102)	16.77	16.87
5550MHz (Ch110)	16.49	16.46
5670MHz (Ch134)	16.41	17.05
5710MHz (Ch142)	16.68	16.94

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE80 mode(full RU)

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5210MHz (Ch42)	15.83	16.37
5290MHz (Ch58)	15.70	16.16
5530MHz (Ch106)	15.46	15.36
5610MHz (Ch122)	15.39	15.52
5690MHz (Ch138)	15.81	15.78

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE160 mode(full RU)

Channel	Test Result (dBm)	
	MCS0	
	Ant4	Ant5
5250MHz (Ch50)	9.68	11.08
5570MHz (Ch114)	10.72	10.11

### MIMO

#### 802.11a mode

Channel	Test Result (dBm)

	<b>MCS0</b>		
	<b>Ant4</b>	<b>Ant5</b>	<b>Sum</b>
5180MHz (Ch36)	15.89	16.73	19.34
5200MHz (Ch40)	15.91	16.82	19.40
5240MHz (Ch48)	16.05	16.94	19.53
5260MHz (Ch52)	16.03	16.81	19.45
5280MHz (Ch56)	15.94	16.62	19.30
5320MHz (Ch64)	15.98	16.31	19.16
5500MHz (Ch100)	16.51	16.34	19.44
5580MHz (Ch116)	16.49	16.12	19.32
5700MHz (Ch140)	15.98	16.19	19.10
5720MHz (Ch144)	15.93	16.16	19.06

The data rate 6Mbps is selected as worst condition, and the following cases are performed with this condition.

#### 802.11n-HT20 mode

<b>Channel</b>	<b>Test Result (dBm)</b>		
	<b>MCS0</b>		
	<b>Ant4</b>	<b>Ant5</b>	<b>Sum</b>
5180MHz (Ch36)	15.06	15.54	18.32
5200MHz (Ch40)	15.03	15.43	18.24
5240MHz (Ch48)	14.74	15.81	18.32
5260MHz (Ch52)	15.10	15.41	18.27
5280MHz (Ch56)	14.78	15.16	17.98
5320MHz (Ch64)	14.81	15.21	18.02
5500MHz (Ch100)	15.63	14.75	18.22
5580MHz (Ch116)	15.64	14.50	18.12

5700MHz (Ch140)	15.03	15.19	18.12
5720MHz (Ch144)	14.95	14.72	17.85

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11ac-VHT20 mode**

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5180MHz (Ch36)	15.18	15.85	18.54
5200MHz (Ch40)	14.96	15.33	18.16
5240MHz (Ch48)	14.86	15.83	18.38
5260MHz (Ch52)	15.11	15.75	18.45
5280MHz (Ch56)	14.82	15.23	18.04
5320MHz (Ch64)	14.60	15.19	17.92
5500MHz (Ch100)	15.56	14.67	18.15
5580MHz (Ch116)	15.63	14.82	18.25
5700MHz (Ch140)	15.22	15.14	18.19
5720MHz (Ch144)	14.86	15.09	17.99

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

**802.11n-HT40 mode**

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5190MHz (Ch38)	14.95	15.95	18.49
5230MHz (Ch46)	14.79	16.02	18.46

5270MHz (Ch54)	15.42	15.66	18.55
5310MHz (Ch62)	14.81	15.37	18.11
5510MHz (Ch102)	15.71	14.79	18.28
5550MHz (Ch110)	15.83	14.83	18.37
5670MHz (Ch134)	15.18	15.07	18.14
5710MHz (Ch142)	15.17	15.42	18.31

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT40 mode

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5190MHz (Ch38)	15.29	15.95	18.64
5230MHz (Ch46)	14.86	16.14	18.56
5270MHz (Ch54)	15.23	15.86	18.57
5310MHz (Ch62)	14.82	15.23	18.04
5510MHz (Ch102)	15.46	14.81	18.16
5550MHz (Ch110)	15.82	14.72	18.32
5670MHz (Ch134)	15.17	14.96	18.08
5710MHz (Ch142)	15.08	15.28	18.19

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT80 mode

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum

5210MHz (Ch42)	14.18	14.74	17.48
5290MHz (Ch58)	13.83	14.38	17.12
5530MHz (Ch106)	14.33	13.77	17.07
5610MHz (Ch122)	14.53	13.58	17.09
5690MHz (Ch138)	14.26	13.82	17.06

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ac-VHT160 mode

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5250MHz (Ch50)	8.47	9.52	12.04
5570MHz (Ch114)	8.42	8.11	11.28

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE20 mode(full RU)

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5180MHz (Ch36)	16.25	17.11	19.71
5200MHz (Ch40)	16.17	17.15	19.70
5240MHz (Ch48)	16.18	17.41	19.85
5260MHz (Ch52)	16.18	16.77	19.50
5280MHz (Ch56)	16.09	16.83	19.49
5320MHz (Ch64)	15.88	16.95	19.46
5500MHz (Ch100)	16.41	16.07	19.25

5580MHz (Ch116)	16.48	16.28	19.39
5700MHz (Ch140)	16.86	17.14	20.01
5720MHz (Ch144)	16.54	16.91	19.74

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE40 mode(full RU)

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5190MHz (Ch38)	16.45	17.07	19.78
5230MHz (Ch46)	16.58	17.55	20.10
5270MHz (Ch54)	16.52	17.08	19.82
5310MHz (Ch62)	16.35	17.02	19.71
5510MHz (Ch102)	16.86	16.45	19.67
5550MHz (Ch110)	16.97	16.87	19.93
5670MHz (Ch134)	16.30	17.17	19.77
5710MHz (Ch142)	16.70	16.97	19.85

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

#### 802.11ax-HE80 mode(full RU)

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5210MHz (Ch42)	15.63	16.57	19.14
5290MHz (Ch58)	15.66	16.12	18.91
5530MHz (Ch106)	15.32	15.32	18.33



5610MHz (Ch122)	15.46	15.72	18.60
5690MHz (Ch138)	15.70	15.78	18.75

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

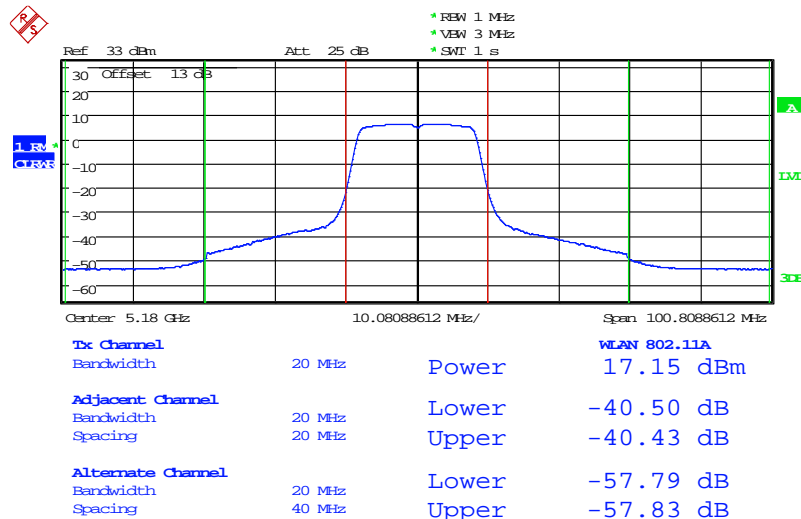
### 802.11ax-HE160 mode(full RU)

Channel	Test Result (dBm)		
	MCS0		
	Ant4	Ant5	Sum
5250MHz (Ch50)	10.11	11.15	13.67
5570MHz (Ch114)	10.69	10.19	13.46

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

The spot check result of average output power are 16.73dBm (ant5 802.11a 6Mbps ch140 prototype result: 17.78dBm) and 18.70dBm (mimo 802.11ax40 MCS0 ch46 prototype result: 20.10dBm).

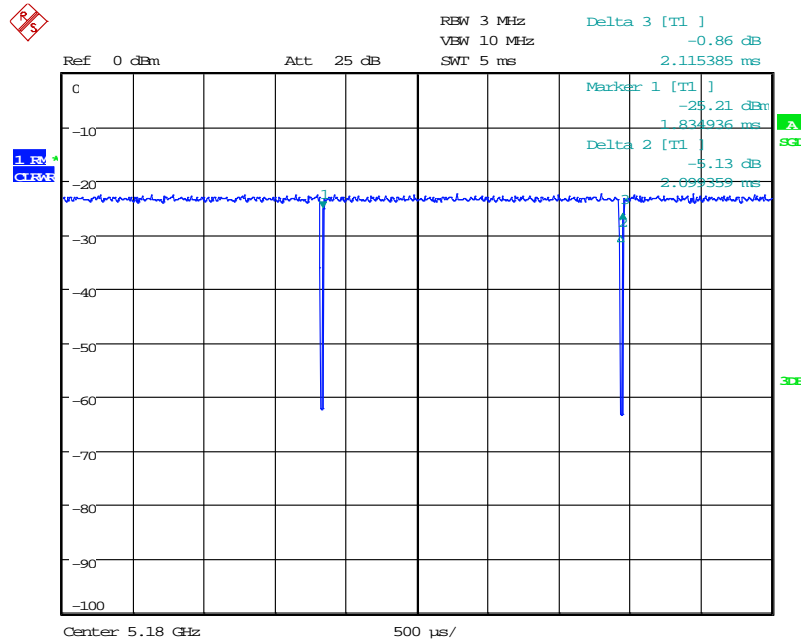
### 802.11a-5180MHz-ant5:



Date: 27.AUG.2022 04:19:15

## Duty Cycle

Mode	11a	11n20	11ac20	11ax20	11n40	11ac40	11ax40	11ac80	11ax80	11ac160	11ax160
Duty Cycle	99%	99%	99%	99%	99%	99%	99%	99%	98%	99%	98%



Date: 4.AUG.2022 16:57:01

Note: The following cases are performed with this condition:

- The maximum power of 802.11ax20/40/80/160 are got with full RU (SISO/MIMO);
- 802.11a/ac20/ac160 mode (Ant5) 802.11n40/ac80 (Ant4) are selected as the worst condition (SISO);  
802.11ax20/40/80/160 mode (Ant5) are selected as the worst condition (SISO);
- 802.11a/ac20/ac40/ac80/ac160/ax20/ax40/ax80/ax160 mode (Ant5) are selected as the worst condition (MIMO);
- The 802.11ax20 mode (compare with 802.11n20/ac20), 802.11ax40 mode (compare with 802.11n40/ac40), 802.11ax80 mode (compare with 802.11ac80), 802.11ax160 mode (compare with 802.11ac160) are selected as the worst condition (MIMO);
- The 802.11ax20 mode (compare with 802.11n20/ac20), 802.11ax40 mode (compare with 802.11n40/ac40), 802.11ax80 mode (compare with 802.11ac80), 802.11ax160 mode (compare with 802.11ac160) are selected as the worst condition (SISO Ant5).

**Conclusion: PASS**

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

#### Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11
	5250MHz~5350MHz	11
	5470MHz~5725MHz	11

The output power measurement method Section F is made according to KDB 789033

#### Measurement Results:

##### SISO-Ant5

Mode	Frequency	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180 MHz	5.91	P
	5200 MHz	6.02	P
	5240 MHz	6.02	P
	5260 MHz	6.03	P
	5280 MHz	6.02	P
	5320 MHz	5.91	P
	5500 MHz	4.58	P
	5580 MHz	4.97	P
	5700 MHz	5.65	P
802.11ac VHT20	5180 MHz	4.64	P
	5200 MHz	4.55	P
	5240 MHz	4.82	P
	5260 MHz	4.68	P
	5280 MHz	4.62	P
	5320 MHz	4.59	P
	5500 MHz	2.90	P
	5580 MHz	3.44	P
	5700 MHz	4.38	P
	5720 MHz	4.30	P
802.11ac VHT160	5250MHz	-10.90	P
	5570MHz	-12.20	P

Mode	Frequency	Power Spectral Density (dBm/MHz)	Conclusion
802.11ax HE20(full RU)	5180 MHz	4.08	P
	5200 MHz	4.17	P
	5240 MHz	4.59	P

	5260 MHz	3.87	P
	5280 MHz	3.76	P
	5320 MHz	3.86	P
	5500 MHz	3.38	P
	5580 MHz	3.21	P
	5700 MHz	4.02	P
	5720 MHz	3.99	P
802.11ax HE40(full RU)	5190 MHz	1.13	P
	5230 MHz	1.58	P
	5270 MHz	0.90	P
	5310 MHz	0.66	P
	5510 MHz	0.43	P
	5550 MHz	0.48	P
	5670 MHz	1.07	P
802.11ax HE80(full RU)	5210MHz	-2.58	P
	5290MHz	-3.05	P
	5530MHz	-3.65	P
	5610MHz	-3.44	P
	5690MHz	-3.44	P
802.11ax HE160(full RU)	5250MHz	-10.27	P
	5570MHz	-10.73	P

**SISO-Ant4**

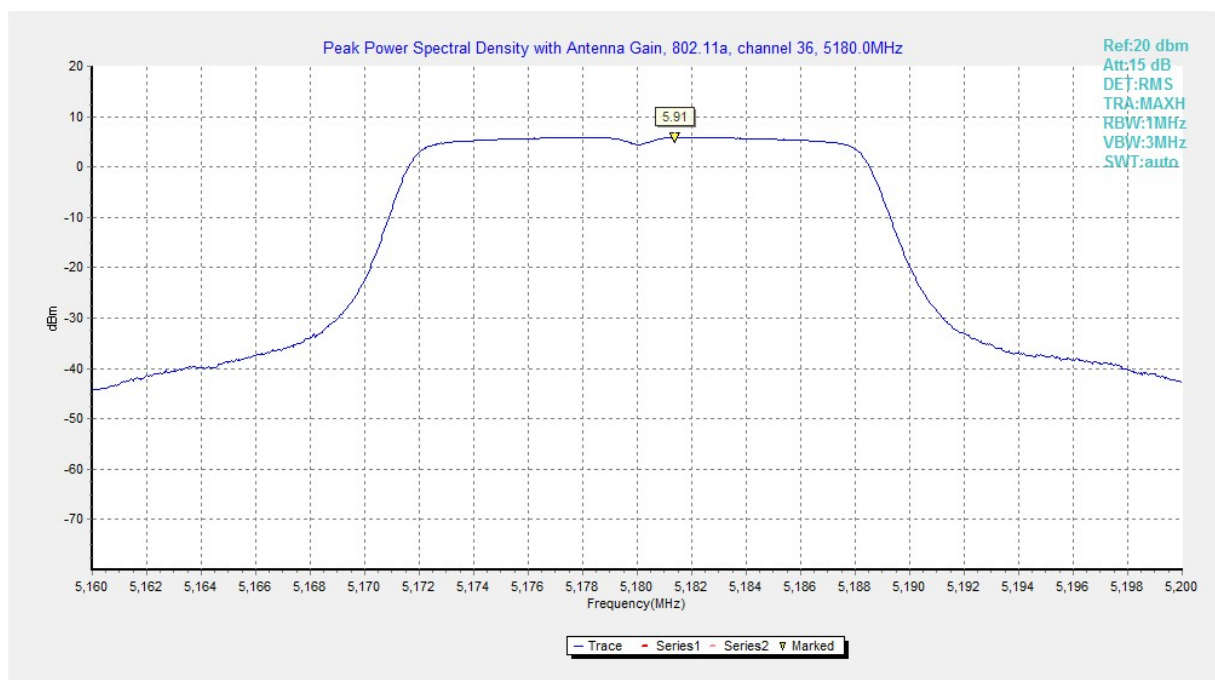
Mode	Frequency	Power Spectral Density (dBm/MHz)	Conclusion
802.11n HT40	5190 MHz	2.81	P
	5230 MHz	2.85	P
	5270 MHz	3.10	P
	5310 MHz	2.96	P
	5510 MHz	1.31	P
	5550 MHz	1.52	P
	5670 MHz	2.53	P
802.11ac VHT80	5710 MHz	2.52	P
	5210MHz	-2.14	P
	5290MHz	-2.11	P
	5530MHz	-4.24	P
	5610MHz	-3.59	P
	5690MHz	-2.84	P

**MIMO**

Mode	Frequency	Power Spectral Density (dBm/MHz)			Conclusion
		Ant4	Ant5	Sum	
802.11a	5180 MHz	5.18	6.11	8.68	P
	5200 MHz	5.12	5.79	8.48	P
	5240 MHz	5.16	6.19	8.72	P
	5260 MHz	5.43	6.03	8.75	P
	5280 MHz	5.15	5.89	8.55	P
	5320 MHz	4.92	5.61	8.29	P
	5500 MHz	5.74	5.14	8.46	P
	5580 MHz	5.40	5.15	8.29	P
	5700 MHz	5.20	5.55	8.39	P
	5720 MHz	5.88	5.82	8.86	P
802.11ac VHT20	5180 MHz	4.62	5.66	8.18	P
	5200 MHz	4.59	5.64	8.16	P
	5240 MHz	5.01	6.03	8.56	P
	5260 MHz	4.83	5.49	8.18	P
	5280 MHz	5.06	5.30	8.19	P
	5320 MHz	4.44	4.97	7.72	P
	5500 MHz	5.28	4.87	8.09	P
	5580 MHz	5.53	4.71	8.15	P
	5700 MHz	5.15	5.43	8.30	P
	5720 MHz	5.74	5.33	8.55	P
802.11ac VHT40	5190 MHz	1.45	2.01	4.75	P
	5230 MHz	1.42	2.19	4.83	P
	5270 MHz	1.72	1.76	4.75	P
	5310 MHz	1.35	1.07	4.22	P
	5510 MHz	1.93	0.78	4.40	P
	5550 MHz	2.05	0.88	4.51	P
	5670 MHz	2.10	1.11	4.64	P
	5710 MHz	1.95	0.87	4.45	P
802.11ac VHT80	5210MHz	-2.87	-2.39	0.39	P
	5290MHz	-2.80	-2.57	0.33	P
	5530MHz	-2.55	-3.75	-0.10	P
	5610MHz	-1.88	-3.41	0.43	P
	5690MHz	-2.15	-3.03	0.44	P
802.11ac VHT160	5250MHz	-12.11	-10.81	-8.40	P
	5570MHz	-11.89	-12.30	-9.08	P
802.11ax HE20(full RU)	5180 MHz	3.96	4.56	7.28	P
	5200 MHz	3.83	4.56	7.22	P
	5240 MHz	3.91	5.03	7.52	P

	5260 MHz	3.84	4.47	7.18	P
	5280 MHz	3.71	4.42	7.09	P
	5320 MHz	3.50	4.49	7.03	P
	5500 MHz	4.11	3.78	6.96	P
	5580 MHz	4.01	3.78	6.91	P
	5700 MHz	4.33	4.56	7.46	P
	5720 MHz	4.15	4.60	7.39	P
802.11ax HE40(full RU)	5190 MHz	0.84	1.58	4.24	P
	5230 MHz	0.99	2.06	4.57	P
	5270 MHz	0.81	1.47	4.16	P
	5310 MHz	0.65	1.30	4.00	P
	5510 MHz	1.07	0.75	3.92	P
	5550 MHz	1.31	0.86	4.10	P
	5670 MHz	0.83	1.57	4.23	P
802.11ax HE80(full RU)	5210MHz	-3.34	-2.48	0.12	P
	5290MHz	-3.28	-2.83	-0.04	P
	5530MHz	-3.40	-3.58	-0.48	P
	5610MHz	-3.42	-3.12	-0.26	P
	5690MHz	-2.94	-3.27	-0.09	P
802.11ax HE160 (full RU)	5250MHz	-11.00	-9.79	-7.34	P
	5570MHz	-10.18	-10.61	-7.38	P

802.11a-5180MHz-ant5:


**Conclusion: PASS**

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

##### Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.403 (i)	/

The measurement is made according to KDB 789033

##### Measurement Uncertainty:

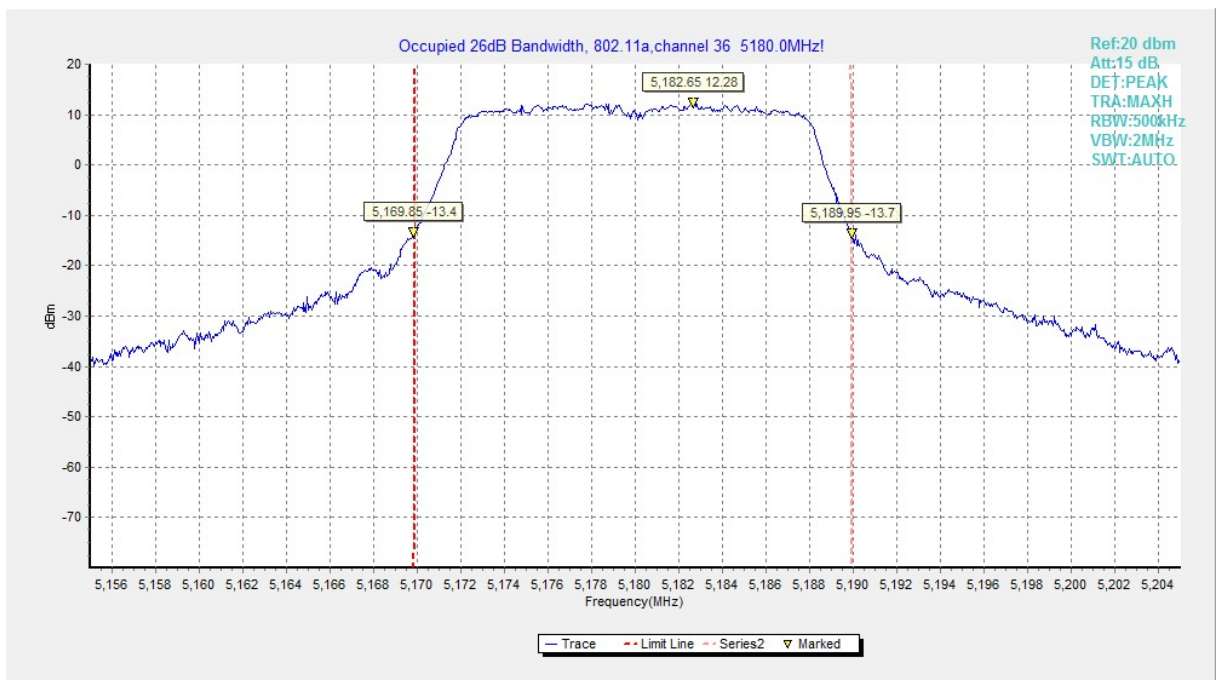
Measurement Uncertainty	60.80Hz
-------------------------	---------

##### Measurement Result:

Mode	Frequency	Occupied 26dB Bandwidth ( MHz)		conclusion
		Fig.	Value	
802.11a	5180 MHz	Fig.1	20.10	P
	5200 MHz	Fig.2	20.05	P
	5240 MHz	Fig.3	20.20	P
	5260 MHz	Fig.4	20.05	P
	5280 MHz	Fig.5	20.05	P
	5320 MHz	Fig.6	19.00	P
	5500 MHz	Fig.7	19.85	P
	5580 MHz	Fig.8	19.90	P
	5700 MHz	Fig.9	20.05	P
	5720 MHz	Fig.10	20.00	P
802.11ax HE20	5180 MHz	Fig.11	22.65	P
	5200 MHz	Fig.12	22.65	P
	5240 MHz	Fig.13	22.80	P
	5260 MHz	Fig.14	23.25	P
	5280 MHz	Fig.15	23.20	P
	5320 MHz	Fig.16	23.15	P
	5500 MHz	Fig.17	23.10	P
	5580 MHz	Fig.18	22.85	P
	5700 MHz	Fig.19	23.25	P
	5720 MHz	Fig.20	23.65	P
802.11ax HE40	5190 MHz	Fig.21	43.04	P
	5230 MHz	Fig.22	43.12	P
	5270 MHz	Fig.23	43.20	P
	5310 MHz	Fig.24	43.04	P
	5510 MHz	Fig.25	43.04	P
	5550 MHz	Fig.26	43.28	P
	5670 MHz	Fig.27	44.24	P
	5710 MHz	Fig.28	43.84	P
802.11ax HE80	5210MHz	Fig.29	89.44	P
	5290MHz	Fig.30	88.32	P

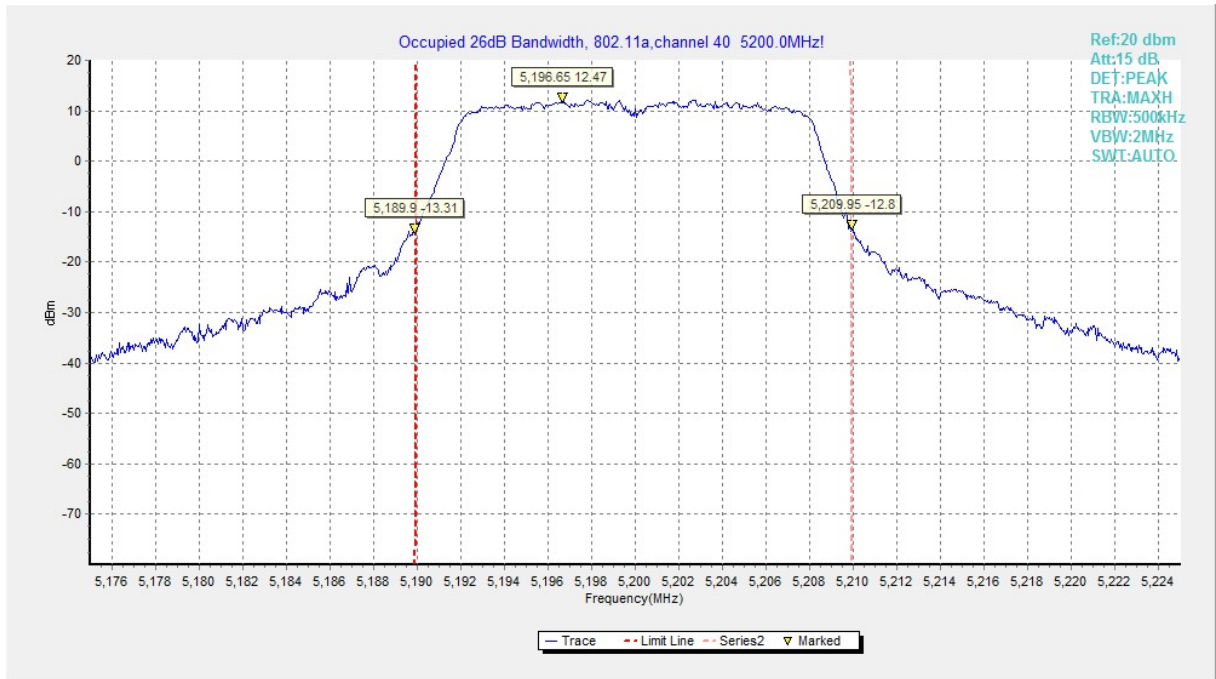
	5530MHz	Fig.31	87.84	P
	5610MHz	Fig.32	88.48	P
	5690MHz	Fig.33	89.28	P
802.11ax HE160	5250MHz	Fig.34	171.20	P
	5570MHz	Fig.35	169.60	P

**Conclusion: PASS**  
**Test graphs as below:**

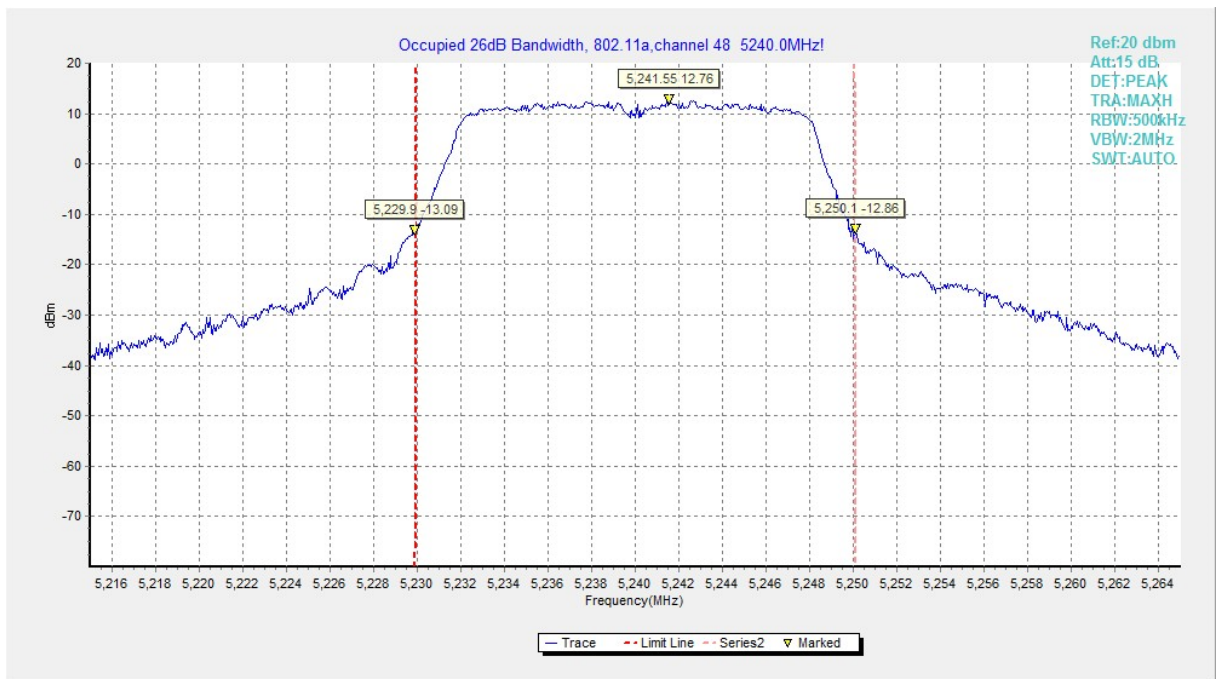


**Fig.1 Occupied 26dB Bandwidth (802.11a, 5180MHz)**

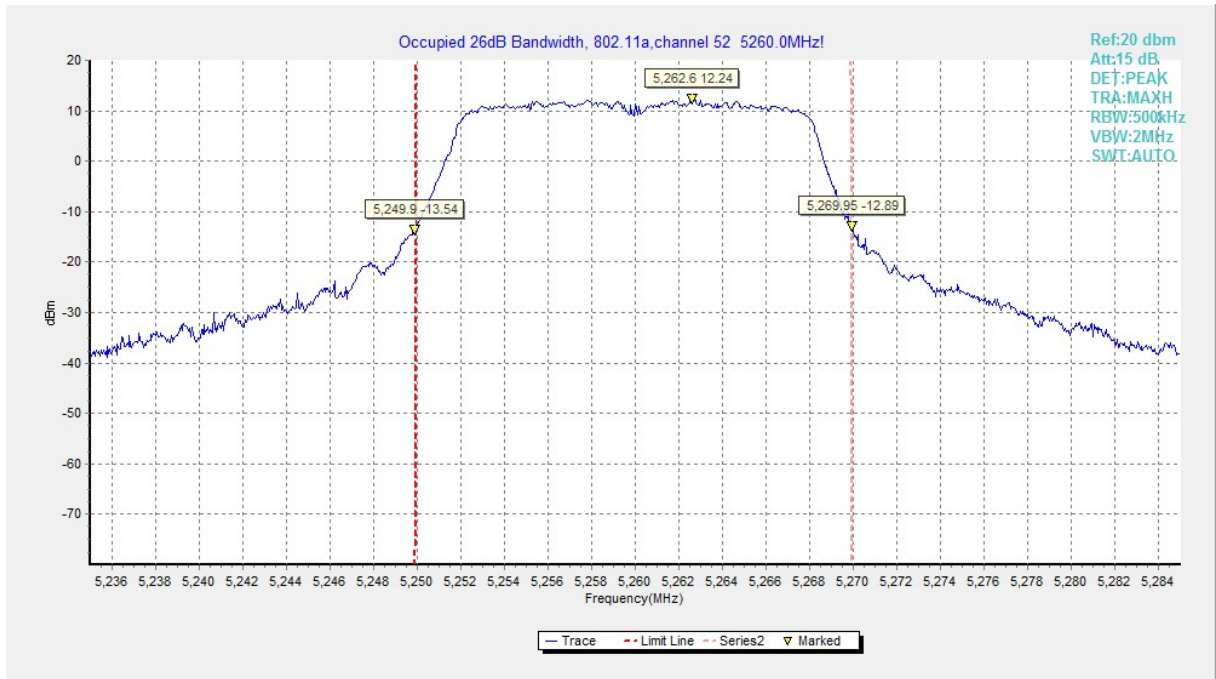




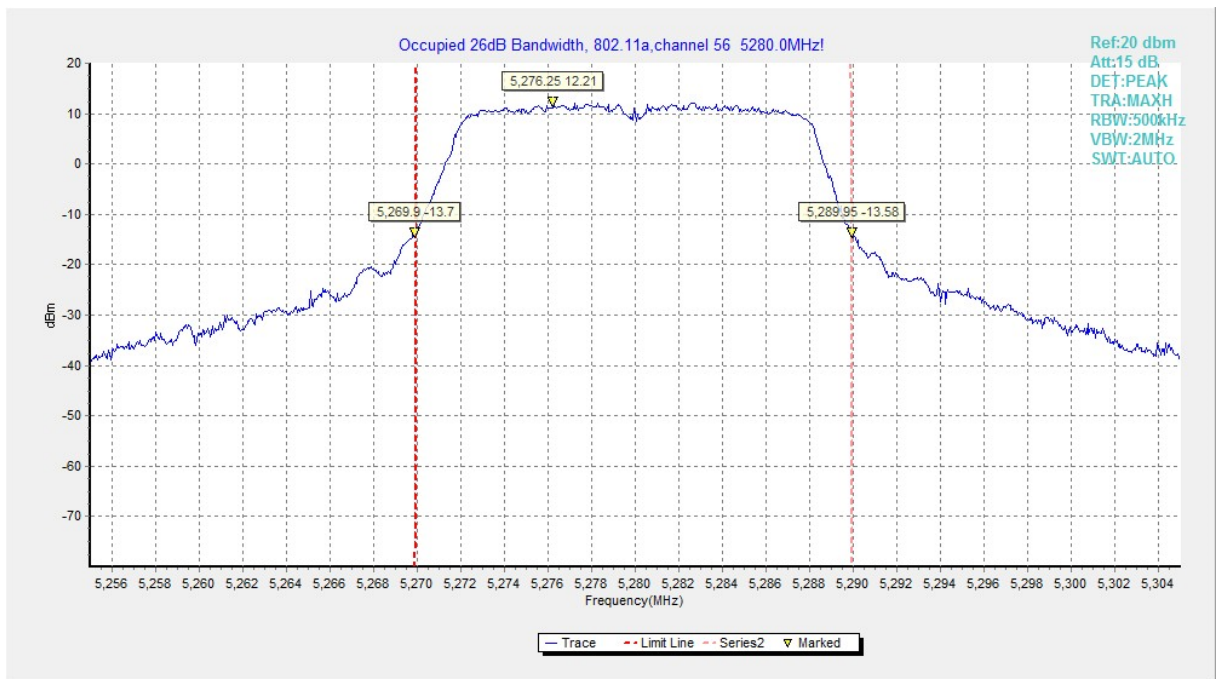
**Fig.2 Occupied 26dB Bandwidth (802.11a, 5200MHz)**



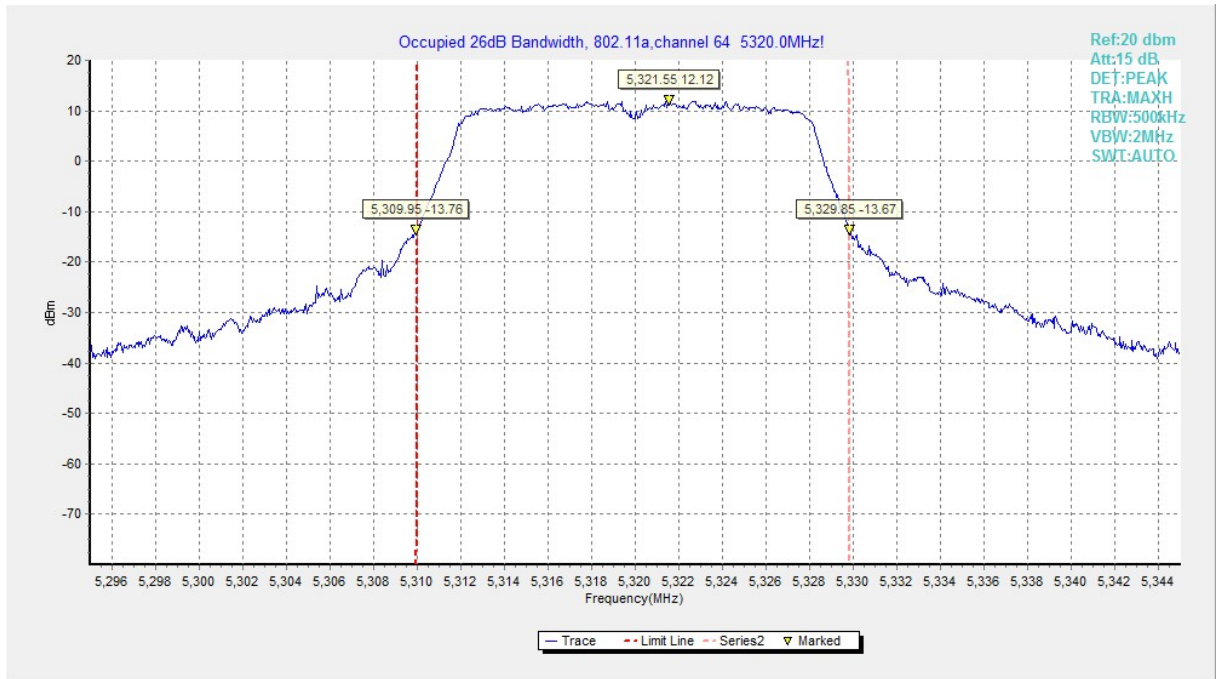
**Fig.3 Occupied 26dB Bandwidth (802.11a, 5240MHz)**



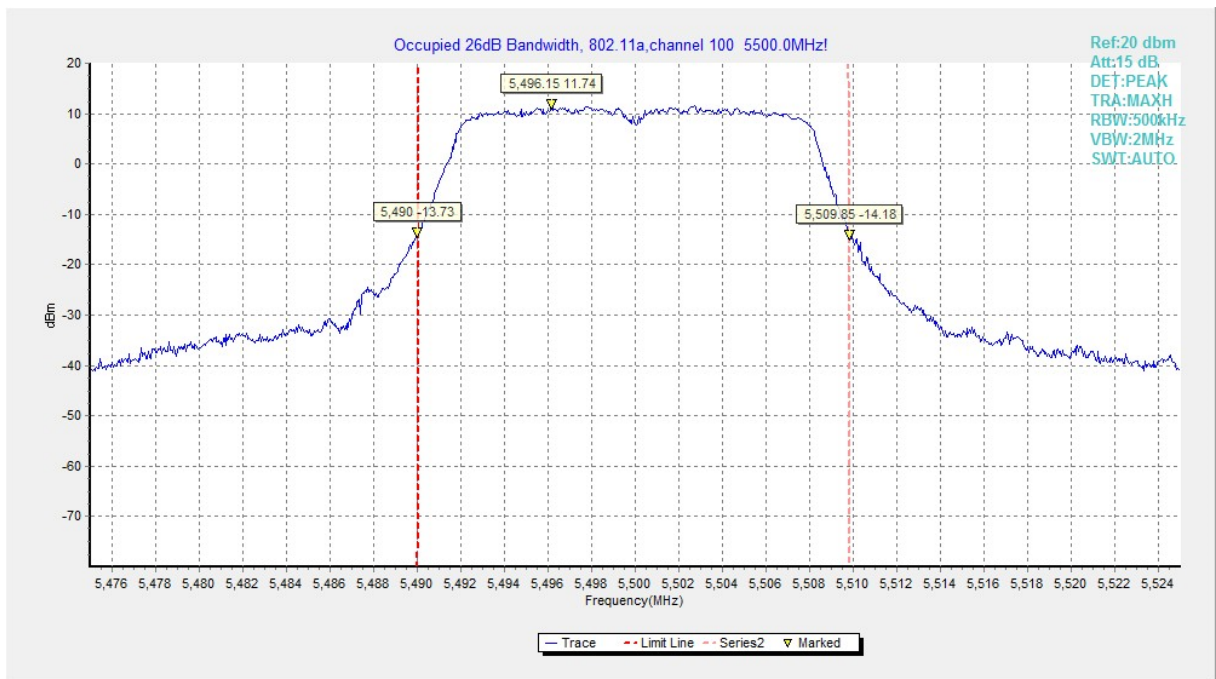
**Fig.4 Occupied 26dB Bandwidth (802.11a, 5260MHz)**



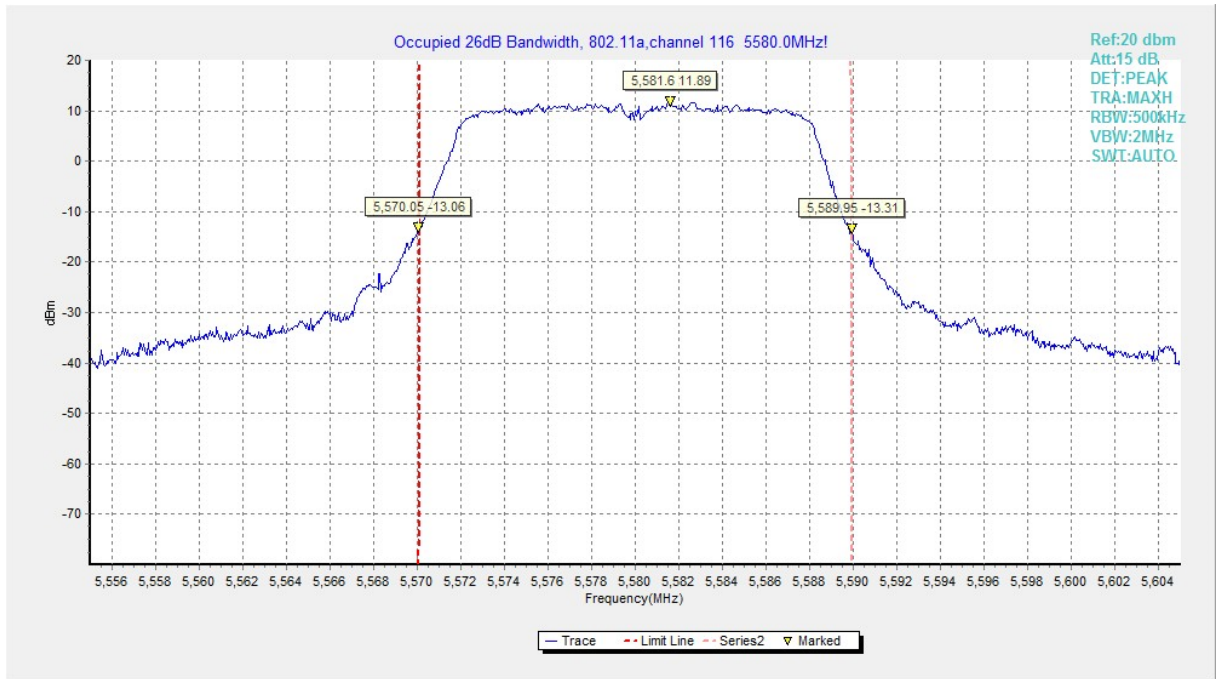
**Fig.5 Occupied 26dB Bandwidth (802.11a, 5280MHz)**



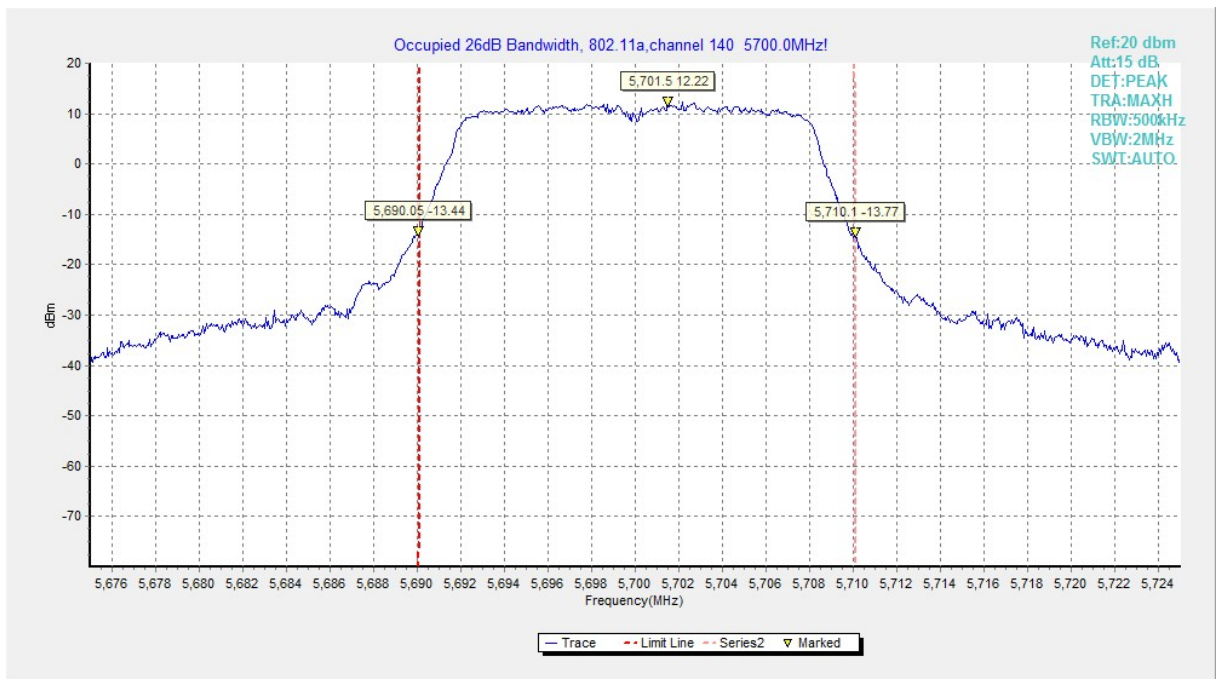
**Fig.6 Occupied 26dB Bandwidth (802.11a, 5320MHz)**



**Fig.7 Occupied 26dB Bandwidth (802.11a, 5500MHz)**



**Fig.8 Occupied 26dB Bandwidth (802.11a, 5580MHz)**



**Fig.9 Occupied 26dB Bandwidth (802.11a, 5700MHz)**

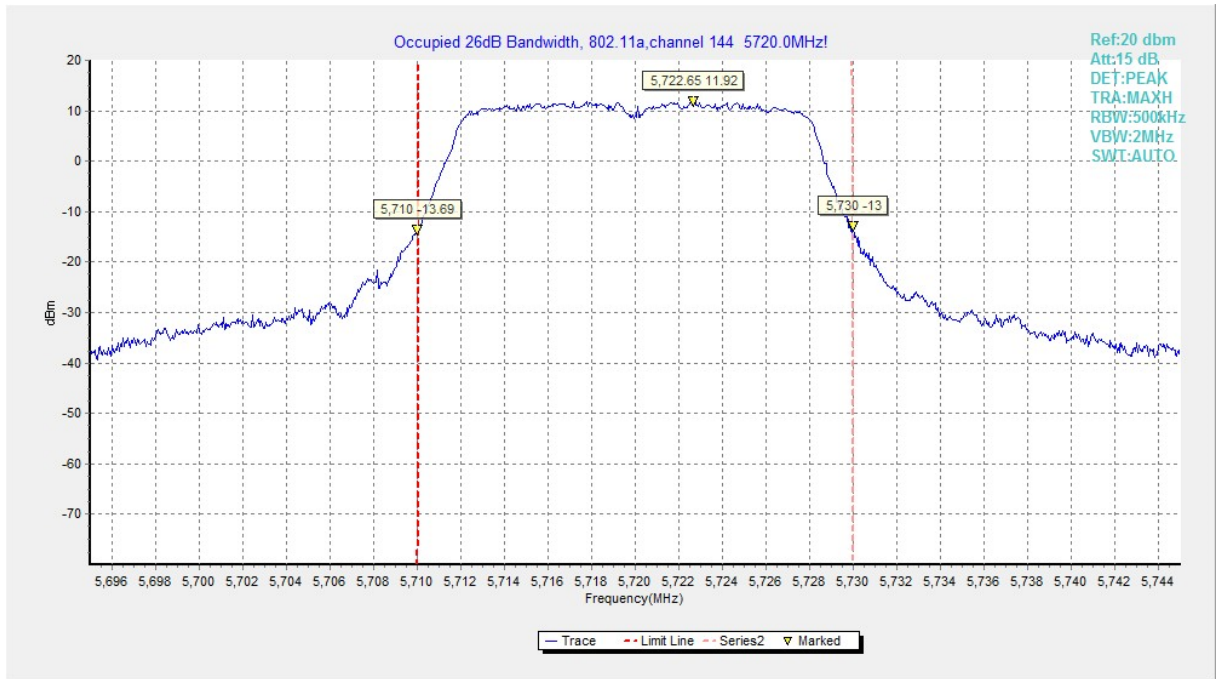


Fig.10 Occupied 26dB Bandwidth (802.11a, 5720MHz)

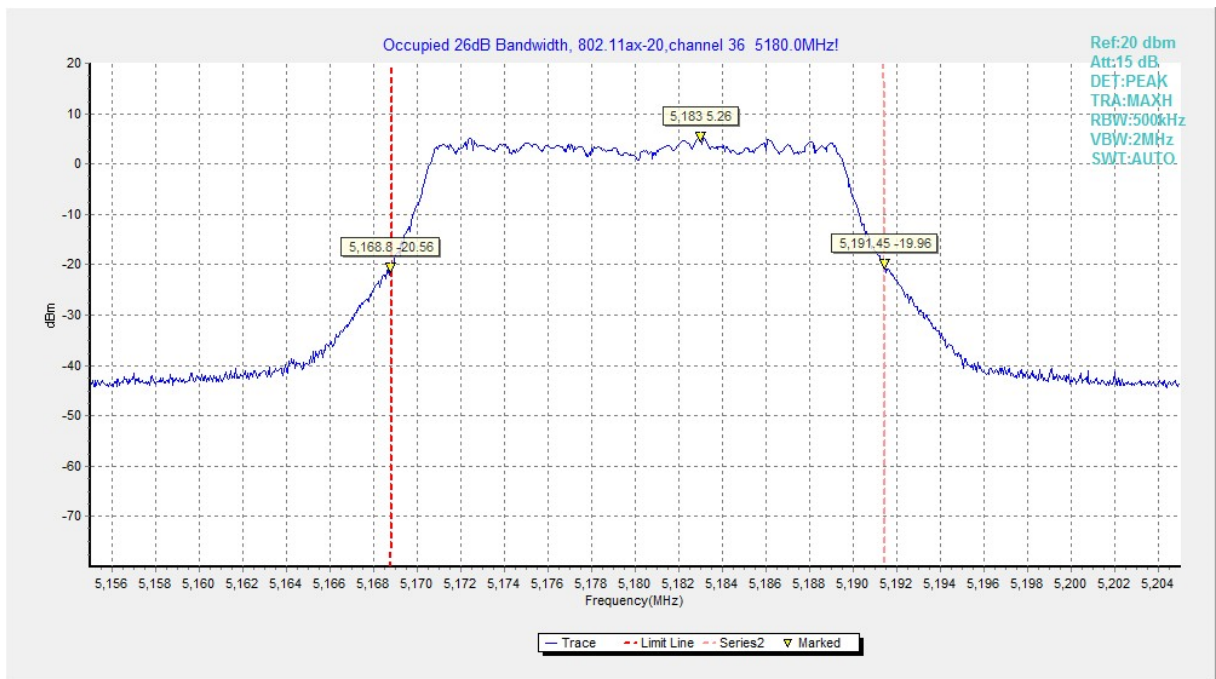


Fig.11 Occupied 26dB Bandwidth (802.11ax-HE20, 5180MHz)

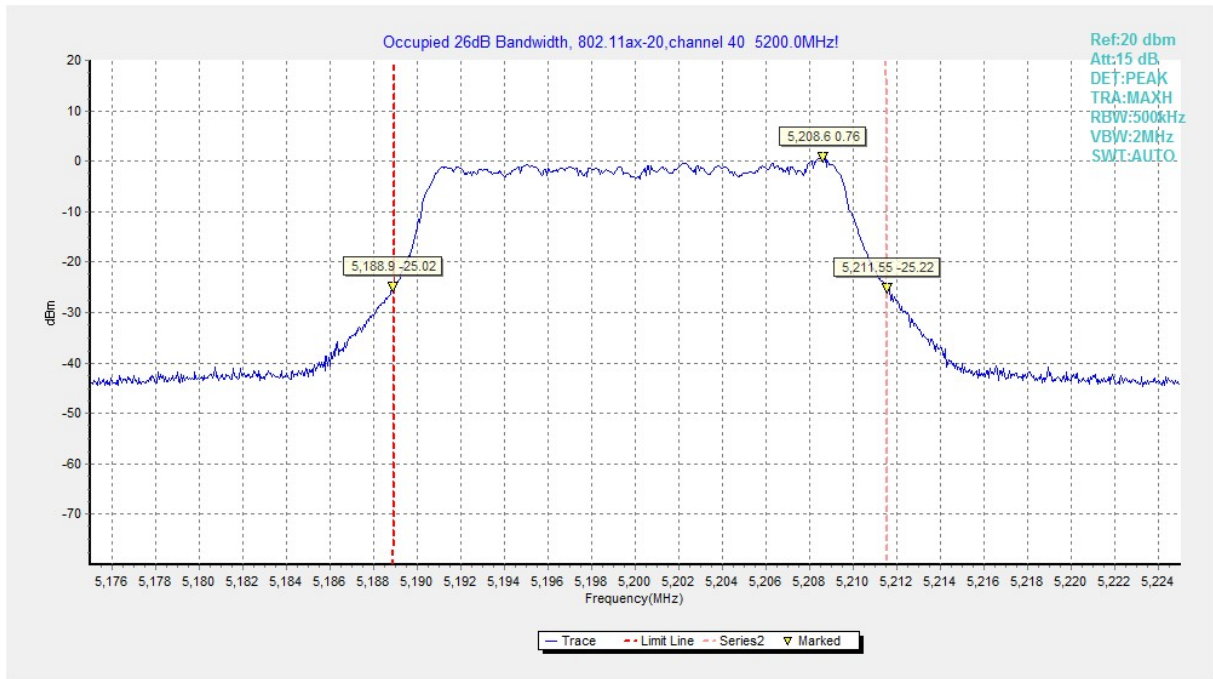


Fig.12 Occupied 26dB Bandwidth (802.11ax-HE20, 5200MHz)

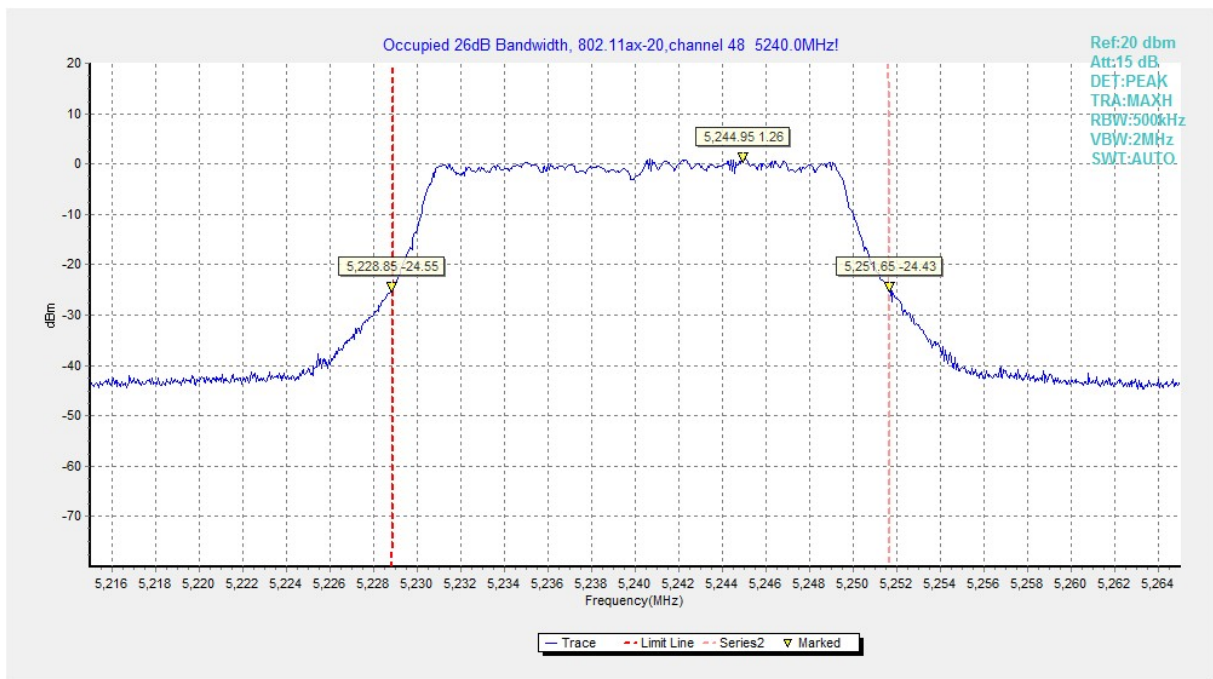


Fig.13 Occupied 26dB Bandwidth (802.11ax-HE20, 5240MHz)

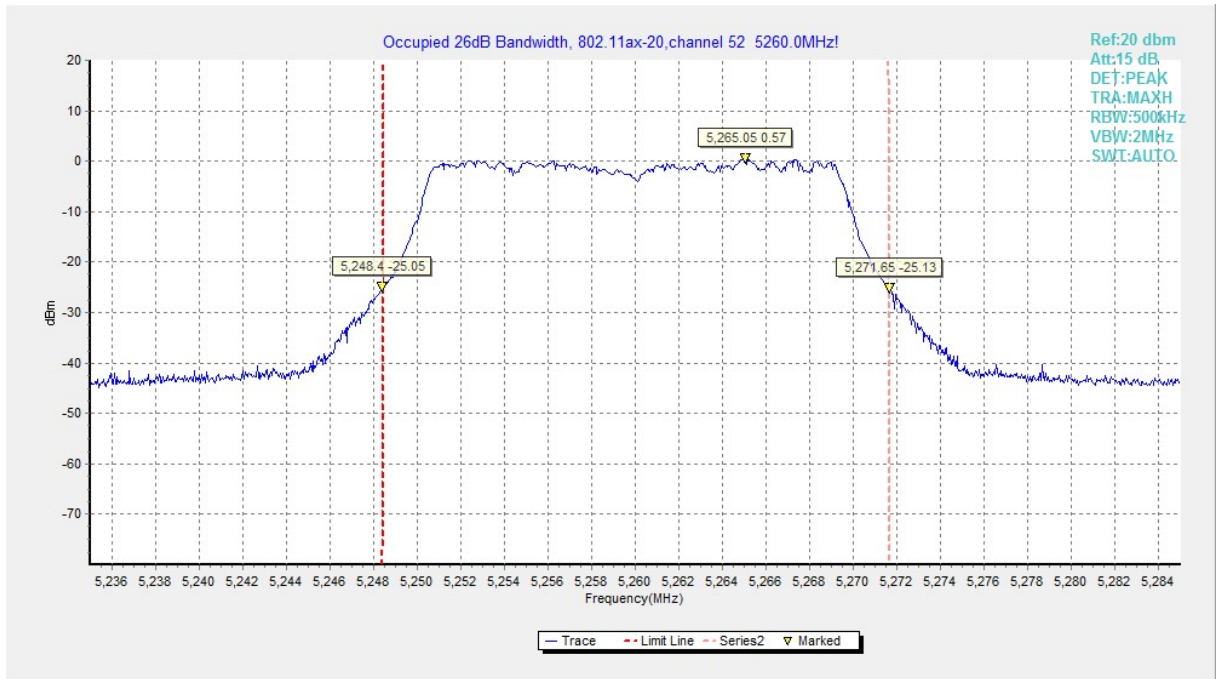


Fig.14 Occupied 26dB Bandwidth (802.11ax-HE20, 5260MHz)

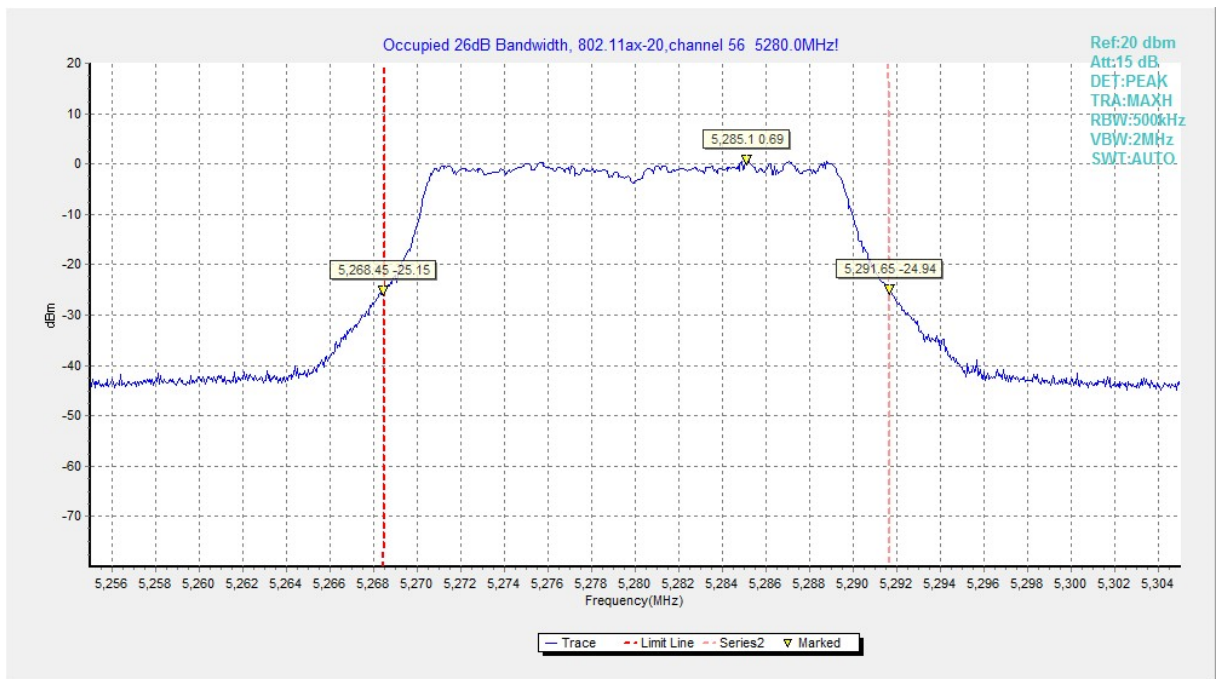


Fig.15 Occupied 26dB Bandwidth (802.11ax-HE20, 5280MHz)

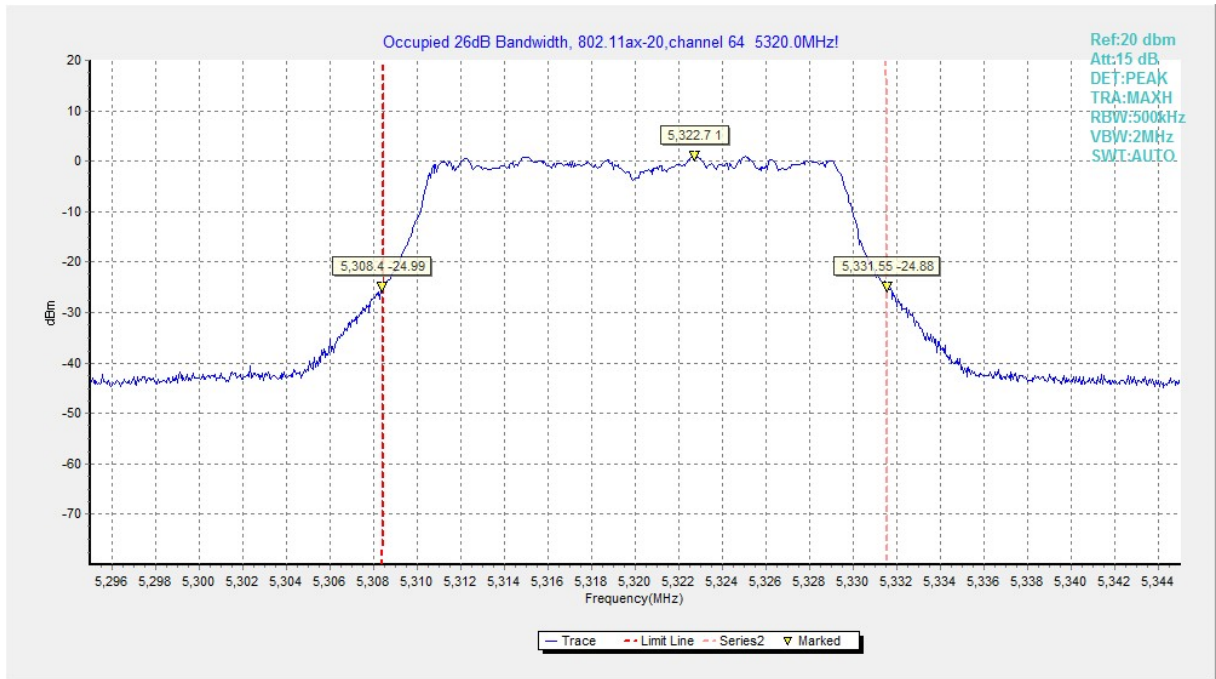


Fig.16 Occupied 26dB Bandwidth (802.11n-HT20, 5320MHz)

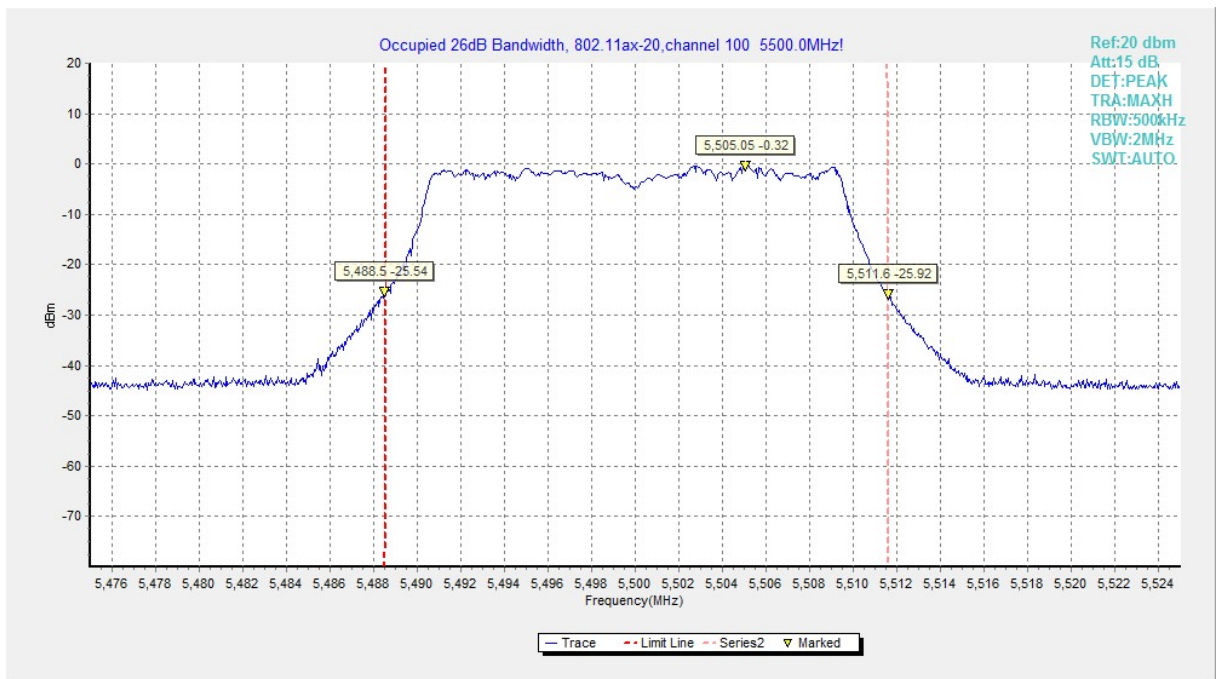
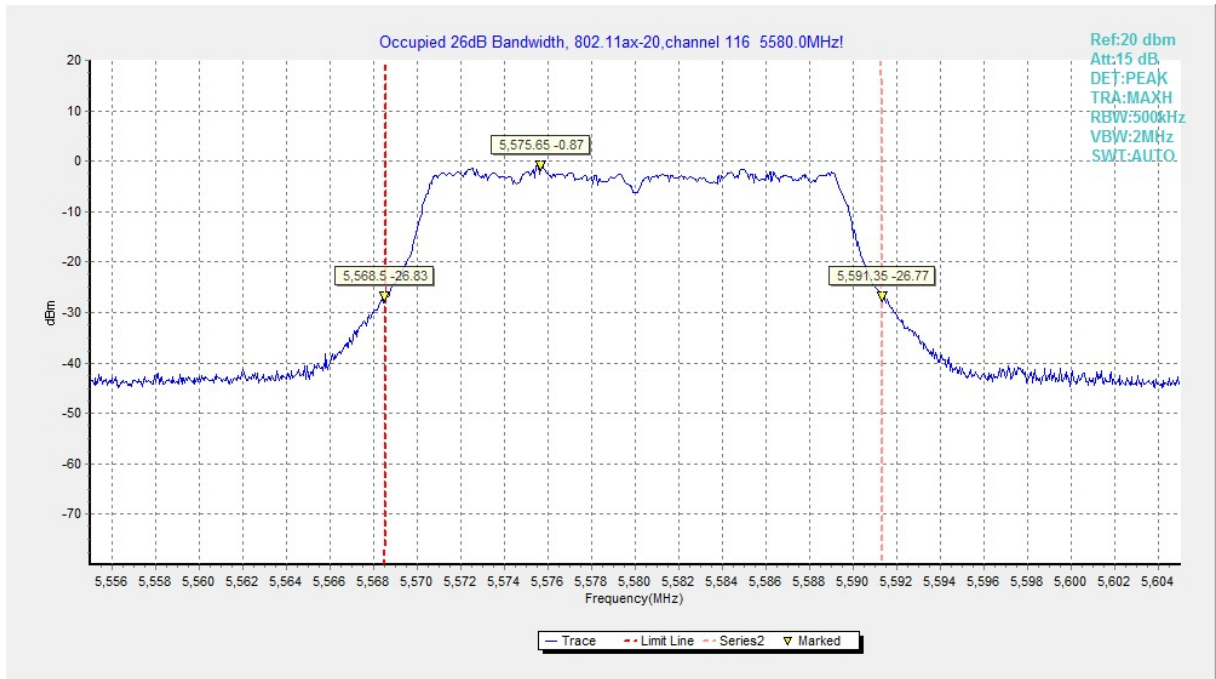
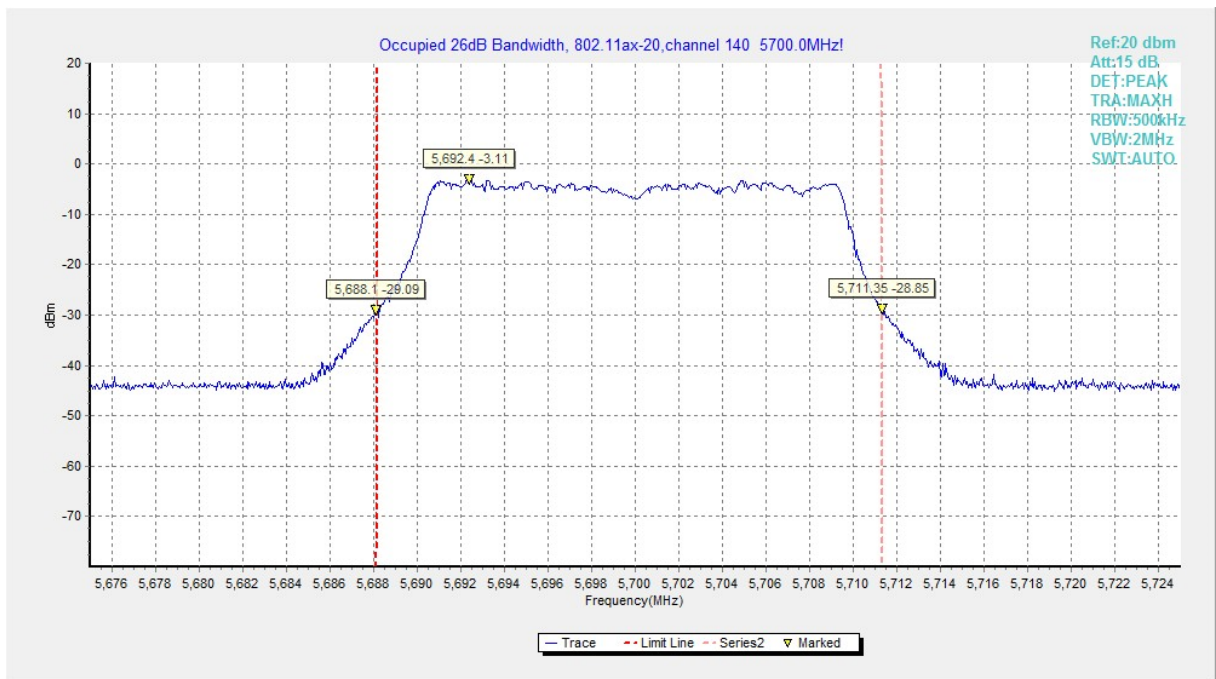


Fig.17 Occupied 26dB Bandwidth (802.11ax-HE20, 5500MHz)

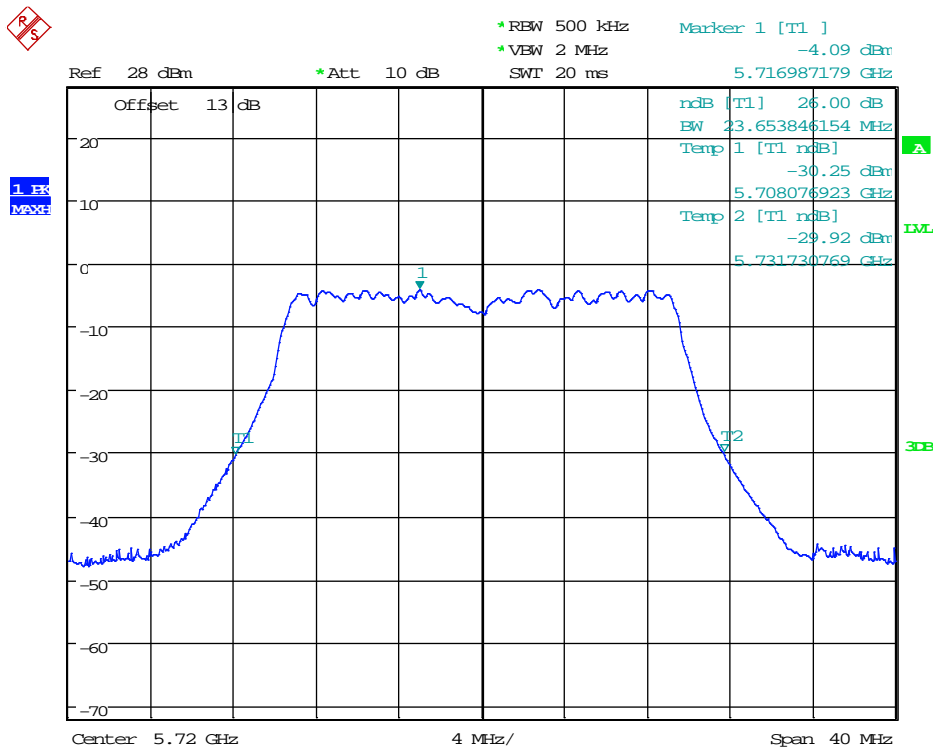




**Fig.18 Occupied 26dB Bandwidth (802.11ax-HE20, 5580MHz)**

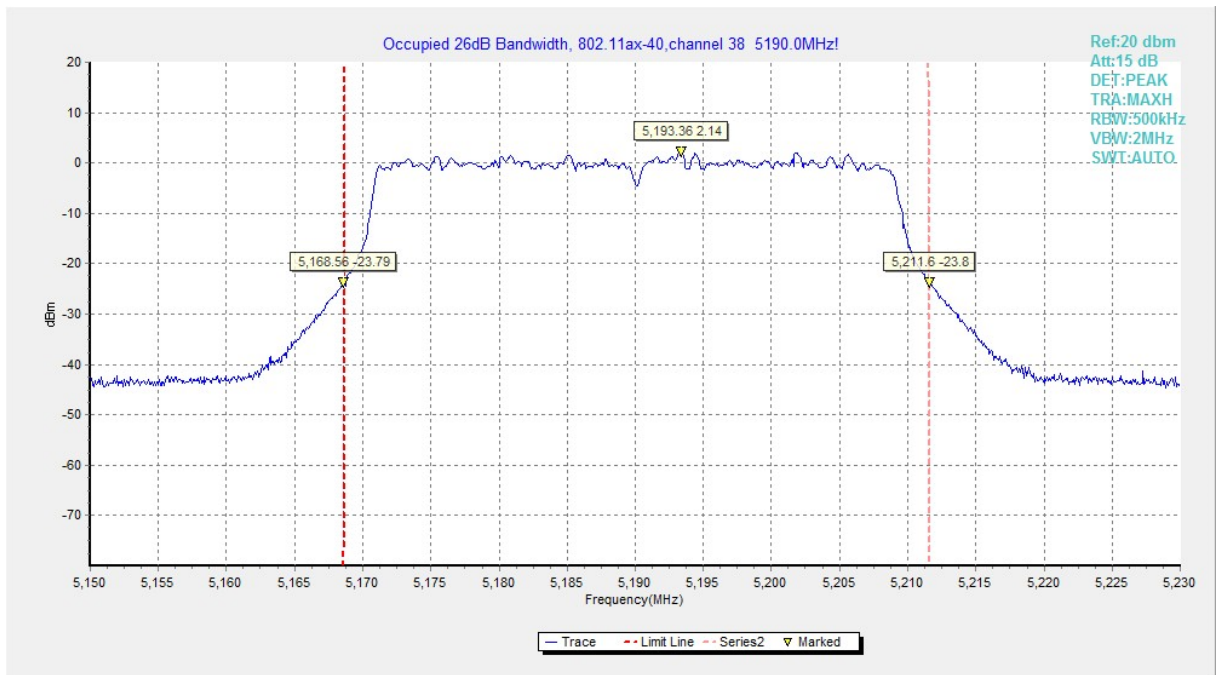


**Fig.19 Occupied 26dB Bandwidth (802.11ax-HE20, 5700MHz)**



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**Fig.20 Occupied 26dB Bandwidth (802.11ax-HE20, 5720MHz)**



**Fig.21 Occupied 26dB Bandwidth (802.11ax-HE40, 5190MHz)**

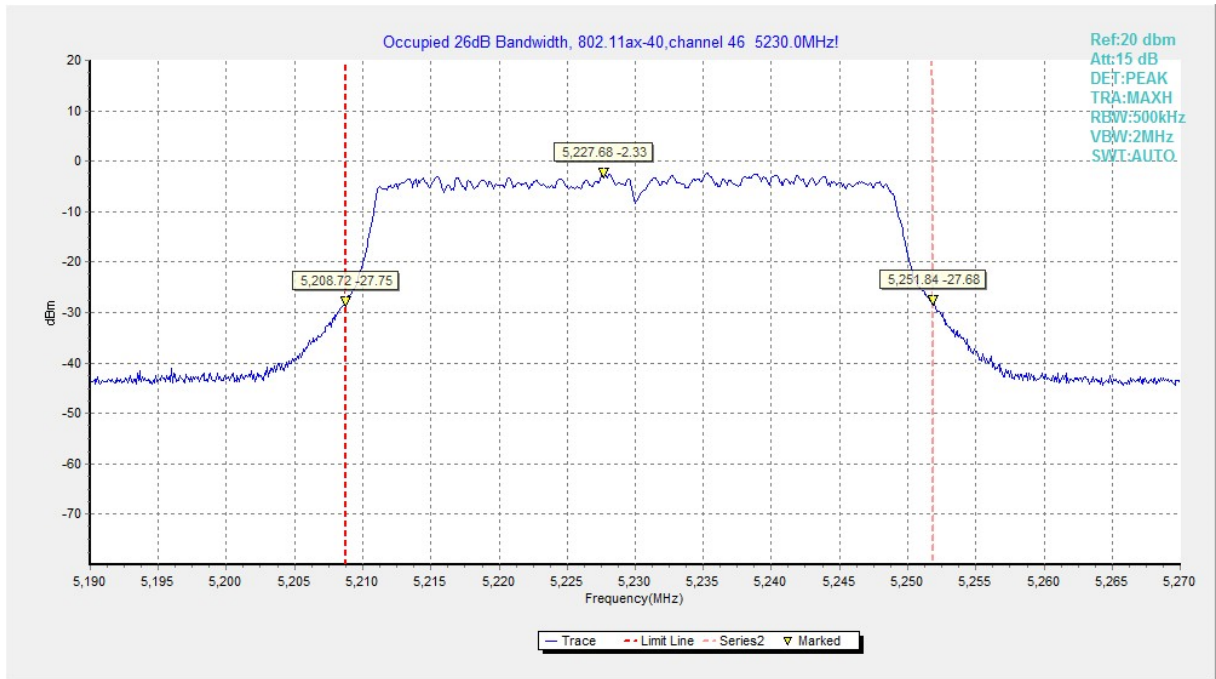


Fig.22 Occupied 26dB Bandwidth (802.11ax-HE40, 5230MHz)

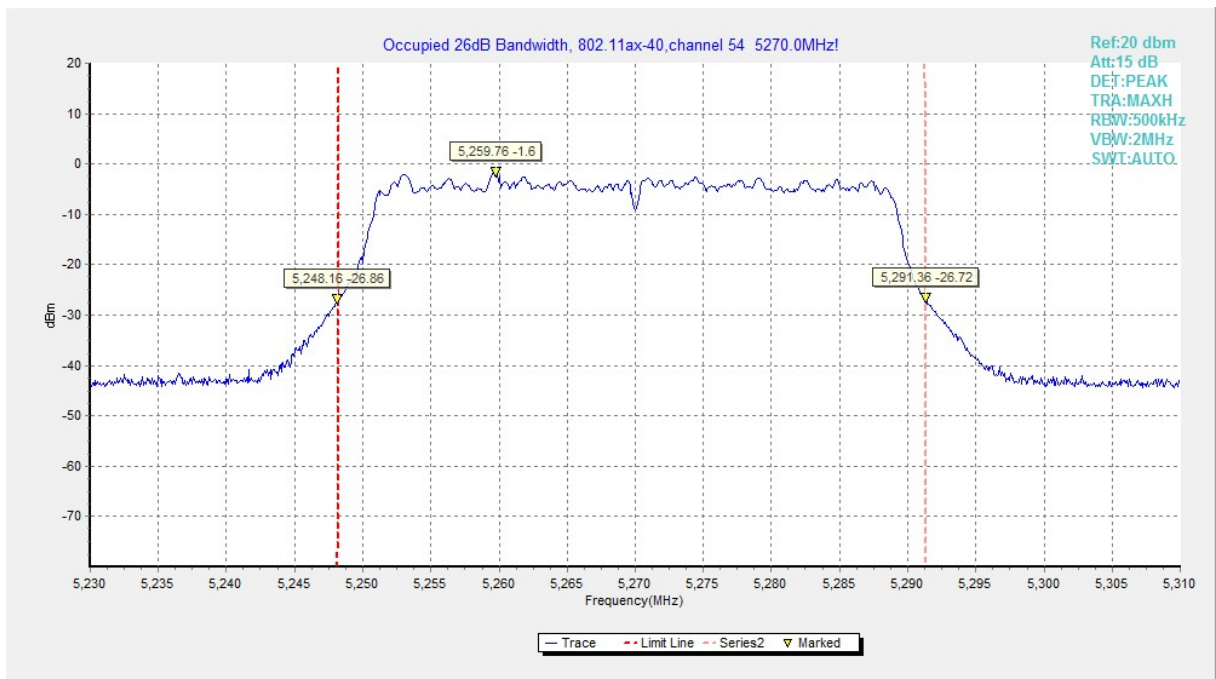


Fig.23 Occupied 26dB Bandwidth (802.11ax-HE40, 5270MHz)