FCC PART 15
TEST REPORT
No. I20Z61660-IOT07

for

Lenovo (Shanghai) Electronics Technology Co., Ltd.

Portable Tablet Computer

Lenovo TB-J606F

FCC ID : O57TBJ606F

with

Hardware Version: Lenovo TB-J606F

Software Version: TB-J606F_RF01_200927

Issued Date: 2020-11-02

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 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.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I20Z61660-IOT07	Rev.0	1st edition	2020-11-02
I20Z61660-IOT07	Rev.1	Add Tx power Add 99% bandwidth	2020-11-10

CONTENTS

1. TEST LATORATORY

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 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 (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Conducted testing Location: CTTL(huayuan North Road)

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

Radiated testing Location: CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology Development Area, Beijing, P. R. China 100176

Radiated 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℃

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2020-09-23

Testing End Date: 2020-11-01

1.5. Signature

Xie Xiuzhen

(Prepared this test report)

Zheng Wei

(Reviewed this test report)

Hu Xiaoyu

(Approved this test report)

2. CLIENT INFORMATION

2.1. Applicant Information

Company Name:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
Address:	Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone
City:	Shanghai
Postal Code:	/
Country:	CHINA
Contact:	Spring Zhou
Telephone	+86 18116118237
E-mail:	zhoucb1@lenovo.com

2.2. Manufacturer Information

Company Name:	Lenovo PC HK Limited
Address:	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, P.R.China
City:	Hong Kong
Postal Code:	/
Country:	CHINA
Contact:	Spring Zhou
Telephone	+86 18116118237
E-mail:	zhoucb1@lenovo.com

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARYEQUIPMENT(AE)

3.1. About EUT

Description	Portable Tablet Computer
Model name	Lenovo TB-J606F
FCC ID	O57TBJ606F
WLAN Frequency Range	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5725MHz
Type of modulation	OFDM
Antenna	Integral Antenna
Voltage	3.8 V

Note: Photographs of EUT are shown in ANNEX C of this test report. Components list, please refer to documents of the manufacturer.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	HA16H66H	Lenovo TB-J606F	TB-J606F_RF01_200927
EUT2	HA16HRZ7	Lenovo TB-J606F	TB-J606F_RF01_200927

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

3.1. Internal Identification of AE used during the test

AE ID*	Description		
AE1-1	Charger	/	MC-201
AE1-2	Charger	/	MC-201
AE2-1	Charger	/	MC-202
AE2-2	Charger	/	MC-202
AE3-1	Charger	/	MC-203
AE3-2	Charger	/	MC-203
AE8	USB Cable	/	/
AE9	Battery	/	SCUD

AE1-1

Model	MC-201
Manufacturer	Acbel
Length of cable	/

AE1-2

Model	MC-201
Manufacturer	Chenyang
Length of cable	/

AE2-1

Model	MC-202
Manufacturer	Acbel
Length of cable	/

AE2-2

Model	MC-202
Manufacturer	Chenyang
Length of cable	/

AE3-1

Model	MC-203
Manufacturer	Acbel
Length of cable	/

AE3-2

Model	MC-203
Manufacturer	Chenyang
Length of cable	/

AE8

Model	/
Manufacturer	/
Length of cable	/

AE9

Model	L20D2P32
Manufacturer	SCUD
Capacitance	7500mAh
Nominal voltage	3.86V

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

3.2. General Description

The Equipment under Test (EUT) is a model of Portable Tablet Computer with Bluetooth, WLAN with integrated 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.

3.3. 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 558074 D01	Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

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	/	**P**
Peak Power Spectral Density	15.407	/	**P**
Occupied 26dB Bandwidth	15.403	/	**P**
Band edge compliance (Radiated)	15.209	/	**P**
Transmitter spurious emissions (Radiated)	15.407	/	**P**
AC Powerline Conducted Emission (150kHz- 30MHz)	15.407	/	**P**
Frequency Stability	15.407	/	**P**
99% Occupied bandwidth	/	/	**P**
Transmit Power Control	15.407	/	**NA**

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
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. Test Conditions

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℃
Voltage	3.8 V
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	2021-05-15
2	Test Receiver	ESCI	100766	Rohde & Schwarz	1 year	2021-05-06
3	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	1 year	2021-05-10
4	Shielding Room	S81	/	ETS-Lindgren	/	/
5	Attenuator	K40	/	Rosenberger	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	1 year	2018-12-30
2	BiLog Antenna	VULB9163	514	Schwarzbeck	3 years	2021-01-03
3	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	3 years	2021-05-31
4	EMI Antenna	3117	00139065	ETS-Lindgren	3 Years	20211-15
5	Spectrum Analyzer	FSV40	101047	Rohde & Schwarz	1 year	2021-07-22

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)
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

Radiated (k=2)

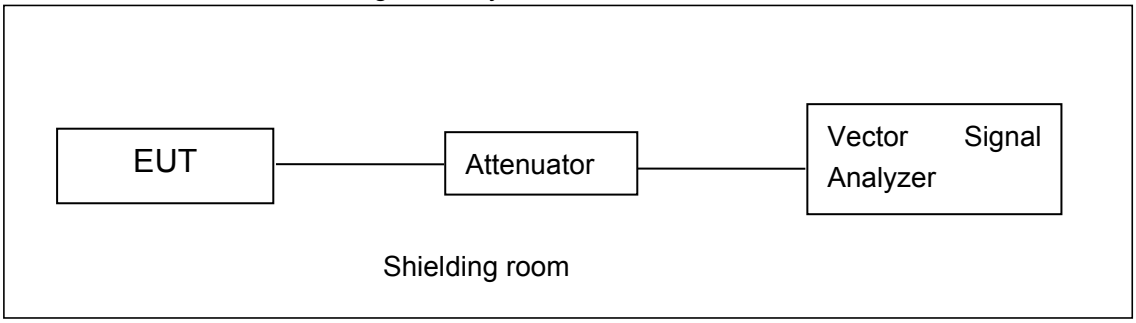
Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	5.40
1GHz ≤ f ≤18GHz	4.32
18GHz ≤ f ≤40GHz	5.26

ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

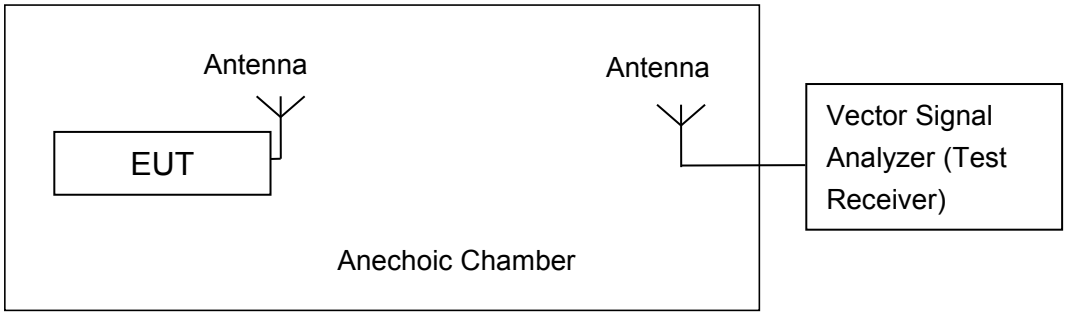
A.1.1. Conducted Measurements

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.

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 measurementmethod SA-2 is made according to KDB 789033

Measurement Results:

802.11a mode

Mode	Frequency	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz	16.64							
	5200MHz	16.67							
	5240MHz	16.41							
	5260MHz	16.42							
	5280MHz	16.21							
	5320MHz	16.28							
	5500MHz	16.48							
	5580MHz	16.22							
	5700MHz	16.06							
	5720MHz	15.91							

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

802.11n-HT20 mode

Mode	Frequency	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT20)	5180MHz	15.28							
	5200MHz	15.41							
	5240MHz	15.19							
	5260MHz	15.12							
	5280MHz	14.89							
	5320MHz	14.94							
	5500MHz	15.13							
	5580MHz	14.92							
	5700MHz	14.85							
	5720MHz	14.80							

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

this condition.

802.11ac-HT20 mode

Mode	Frequency	Test Result (dBm)								
		Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11ac (HT20)	5180MHz	16.29								
	5200MHz	16.34								
	5240MHz	16.15								
	5260MHz	16.04								
	5280MHz	15.90								
	5320MHz	16.08								
	5500MHz	16.03								
	5580MHz	15.95								
	5700MHz	15.74								
	5720MHz	15.76								

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

802.11n-HT40 mode

Mode	Frequency	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT40)	5190MHz	16.66							
	5230MHz	**16.60**							
	5270MHz	16.40							
	5310MHz	16.32							
	5510MHz	**16.44**							
	5550MHz	16.24							
	5670MHz	16.70							
	5710MHz	16.14							

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

802.11ac-HT40 mode

Mode	Frequency	Test Result (dBm)									
		Data Rate									
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac (HT40)	5190MHz	16.07									
	5230MHz	16.09									
	5270MHz	15.66									

	5310MHz	15.47									
	5510MHz	15.67									
	5550MHz	15.40									
	5670MHz	15.83									
	5710MHz	15.38									

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

802.11ac-HT80 mode

Mode	Frequency	Test Result (dBm)									
		Data Rate									
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac (HT80)	5210MHz	16.03									
	5290MHz	15.65									
	5530MHz	15.70									
	5610MHz	15.92									
	5690MHz	15.86									

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

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:

Mode	Frequency	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180 MHz	6.35	P
	5200 MHz	6.28	P
	5240 MHz	6.22	P
	5260 MHz	6.28	P
	5280 MHz	6.20	P
	5320 MHz	6.24	P
	5500 MHz	6.29	P
	5580 MHz	6.01	P
	5700 MHz	6.00	P
802.11n HT20	5180 MHz	6.00	P
	5200 MHz	5.31	P
	5240 MHz	5.37	P
	5260 MHz	5.14	P
	5280 MHz	5.15	P
	5320 MHz	5.15	P
	5500 MHz	5.11	P
	5580 MHz	5.03	P
	5700 MHz	5.01	P
802.11ac HT20	5180 MHz	5.02	P
	5200 MHz	5.03	P
	5240 MHz	5.15	P
	5260 MHz	5.16	P
	5280 MHz	5.11	P
	5320 MHz	5.10	P

	5500 MHz	5.02	P
	5580 MHz	5.02	P
	5700 MHz	5.03	P
802.11n HT40	5190 MHz	4.30	P
	5230 MHz	4.35	P
	5270 MHz	4.32	P
	5310 MHz	4.33	P
	5510 MHz	4.24	P
	5550 MHz	4.25	P
	5670 MHz	4.27	P
802.11ac HT40	5190 MHz	4.40	P
	5230 MHz	4.39	P
	5270 MHz	4.33	P
	5310 MHz	4.33	P
	5510 MHz	4.31	P
	5550 MHz	4.30	P
	5670 MHz	4.30	P
802.11ac HT80	5210MHz	4.30	P
	5290MHz	4.30	P
	5530MHz	4.09	P
	5610MHz	4.09	P

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
802.11a	5180 MHz	Fig.1	24.20	P
	5200 MHz	Fig.2	23.90	P
	5240 MHz	Fig.3	25.15	P
	5260 MHz	Fig.4	25.10	P
	5280 MHz	Fig.5	24.35	P
	5320 MHz	Fig.6	24.40	P
	5500 MHz	Fig.7	23.95	P
	5580 MHz	Fig.8	23.85	P
	5700 MHz	Fig.9	23.90	P
	5720 MHz	Fig.10	23.70	P
802.11n HT20	5180 MHz	Fig.11	25.00	P
	5200 MHz	Fig.12	25.15	P
	5240 MHz	Fig.13	25.15	P
	5260 MHz	Fig.14	25.20	P
	5280 MHz	Fig.15	25.10	P
	5320 MHz	Fig.16	24.70	P
	5500 MHz	Fig.17	25.40	P
	5580 MHz	Fig.18	24.40	P
	5700 MHz	Fig.19	24.29	P
	5720 MHz	Fig.20	25.35	P
802.11ac HT20	5180 MHz	Fig.21	25.15	P
	5200 MHz	Fig.22	24.25	P
	5240 MHz	Fig.23	25.15	P

	5260 MHz	Fig.24	24.85	P
	5280 MHz	Fig.25	24.60	P
	5320 MHz	Fig.26	25.25	P
	5500 MHz	Fig.27	25.35	P
	5580 MHz	Fig.28	24.25	P
	5700 MHz	Fig.29	25.40	P
	5720 MHz	Fig.30	24.29	P

802.11n HT40	5190 MHz	Fig.31	41.76	P
	5230 MHz	Fig.32	41.52	P
	5270 MHz	Fig.33	41.84	P
	5310 MHz	Fig.34	41.76	P
	5510 MHz	Fig.35	42.00	P
	5550 MHz	Fig.36	41.84	P
	5670 MHz	Fig.37	41.84	P
	5710 MHz	Fig.38	41.76	P
802.11ac HT40	5190 MHz	Fig.39	41.84	P
	5230 MHz	Fig.40	41.68	P
	5270 MHz	Fig.41	41.92	P
	5310 MHz	Fig.42	41.92	P
	5510 MHz	Fig.43	41.84	P
	5550 MHz	Fig.44	41.92	P
	5670 MHz	Fig.45	41.92	P
	5710 MHz	Fig.46	41.75	P
802.11ac HT80	5210MHz	Fig.47	84.00	P
	5290MHz	Fig.48	84.00	P
	5530MHz	Fig.49	84.00	P
	5610MHz	Fig.50	83.84	P
	5690MHz	Fig.51	84.00	P

Conclusion: PASS

Test graphs as below:

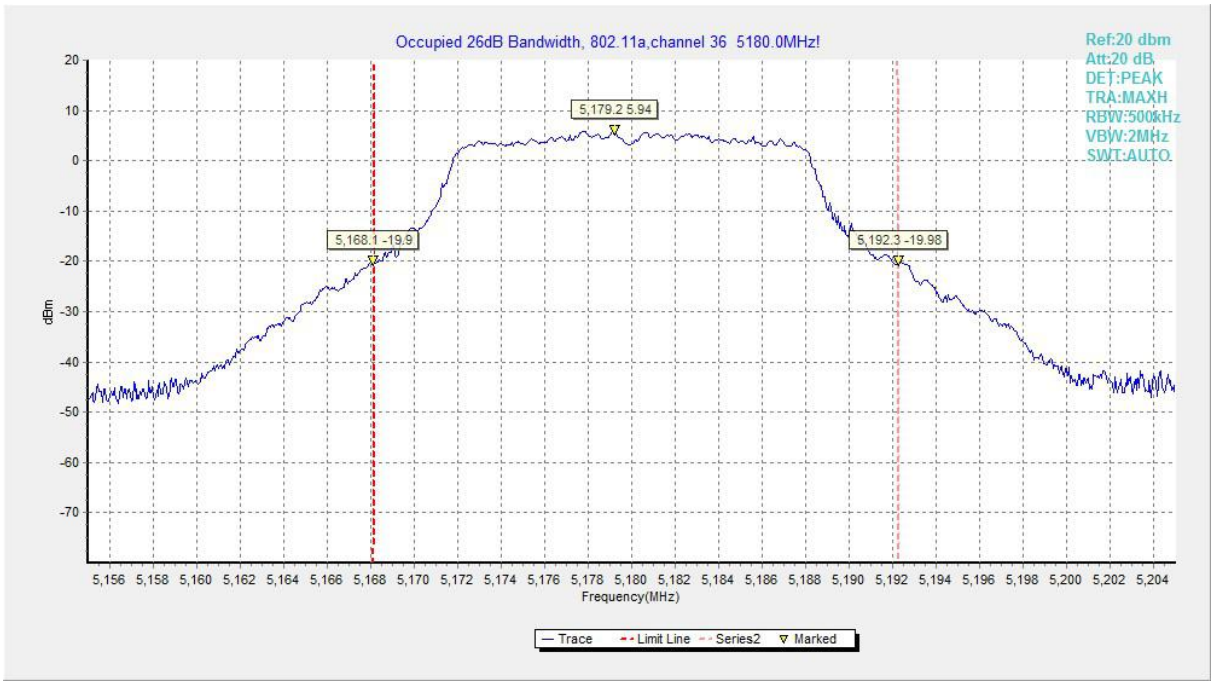


Fig.1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

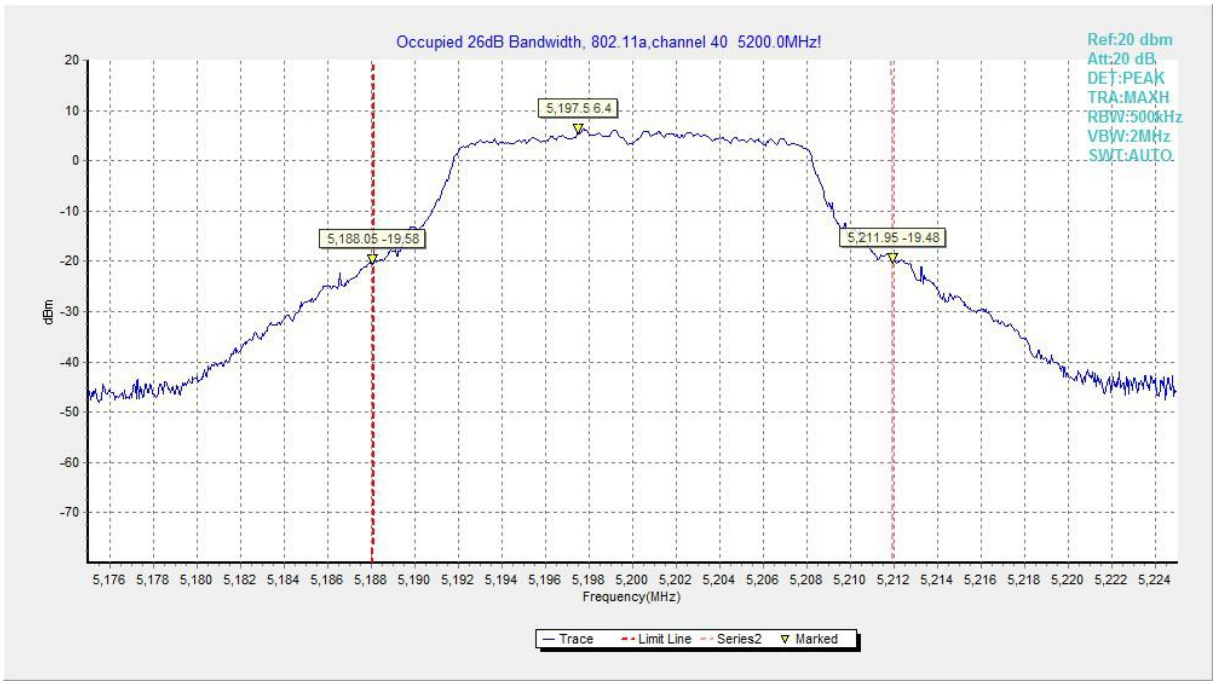


Fig.2 Occupied 26dB Bandwidth (802.11a, 5200MHz)

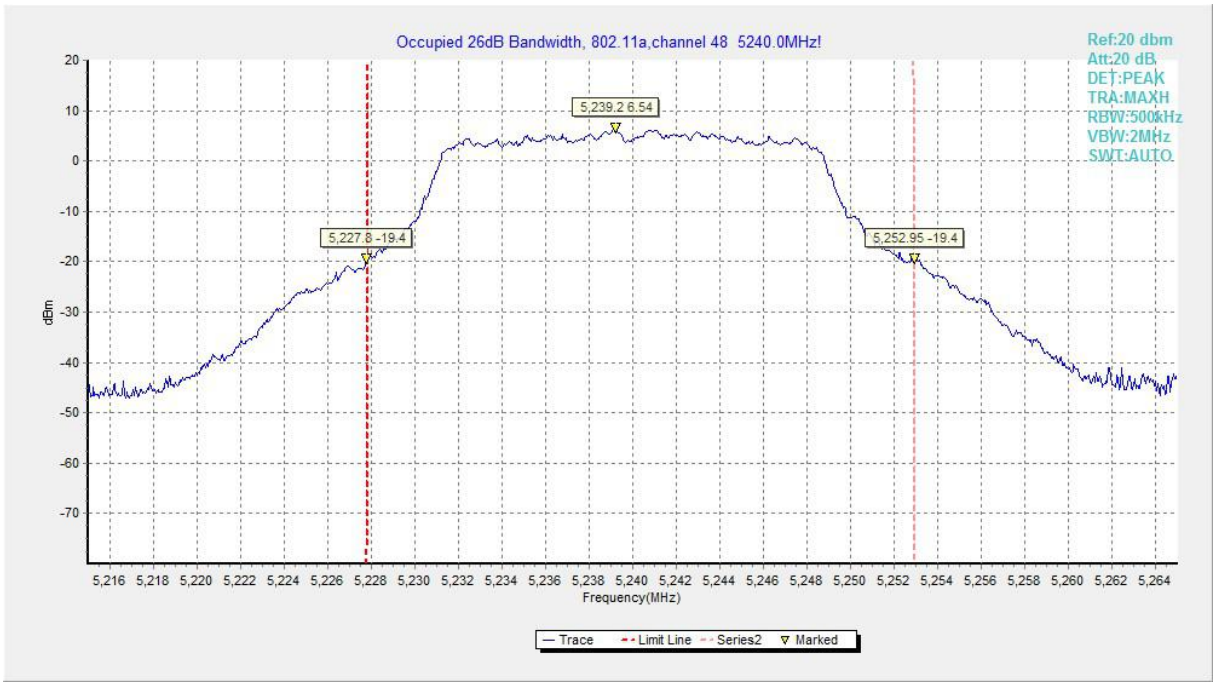


Fig.3 Occupied 26dB Bandwidth (802.11a, 5240MHz)

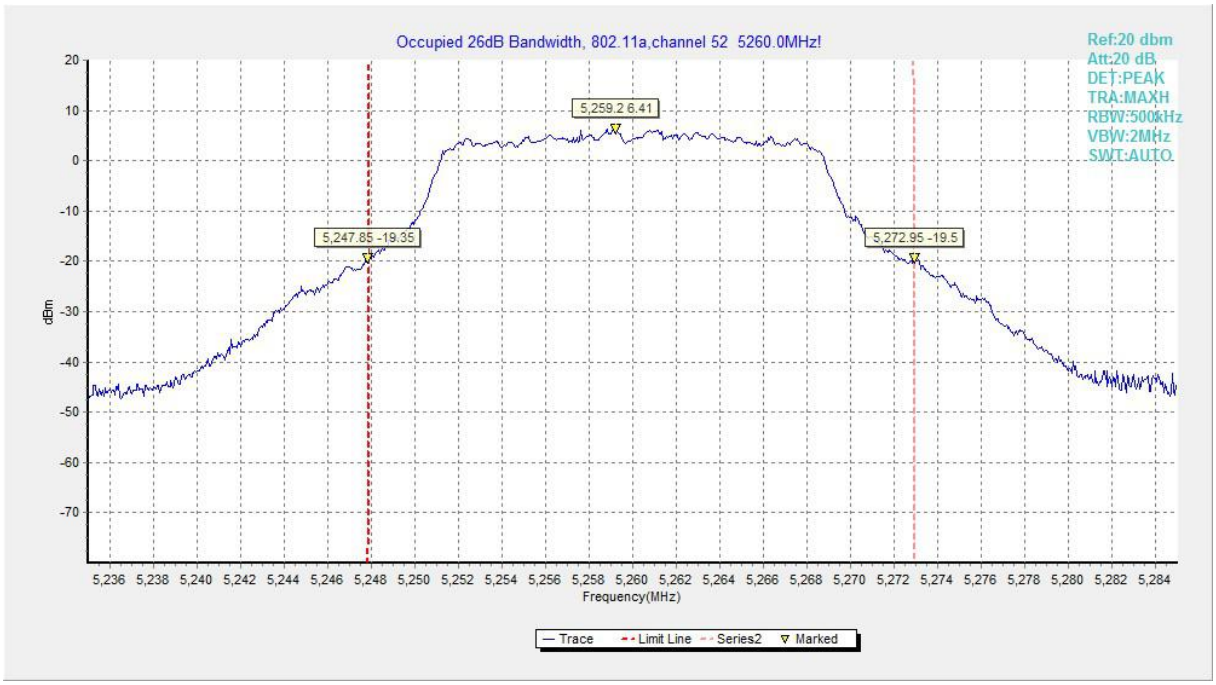


Fig.4 Occupied 26dB Bandwidth (802.11a, 5260MHz)

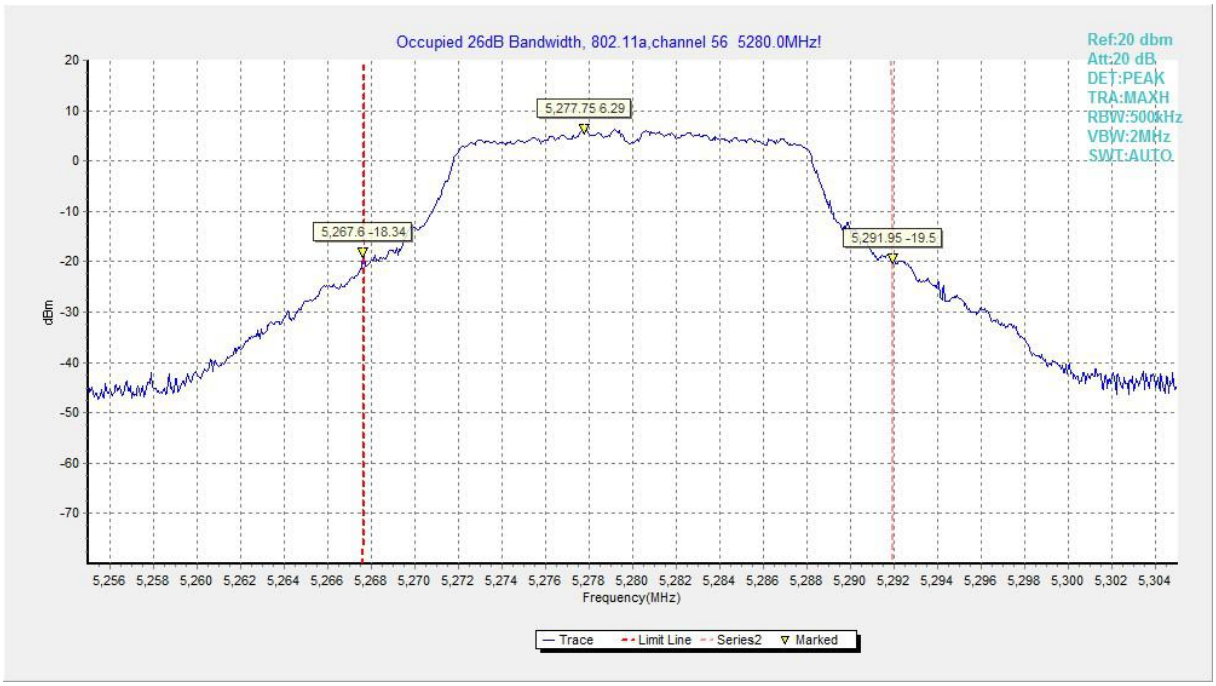


Fig.5 Occupied 26dB Bandwidth (802.11a, 5280MHz)

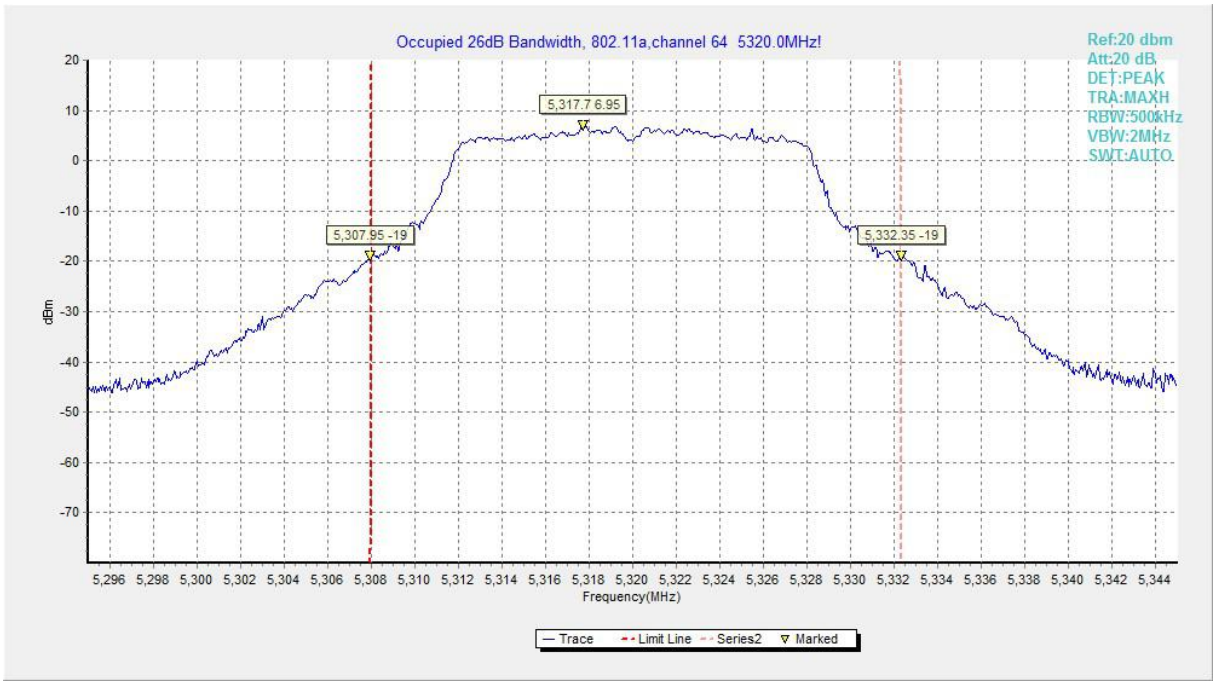


Fig.6 Occupied 26dB Bandwidth (802.11a, 5320MHz)

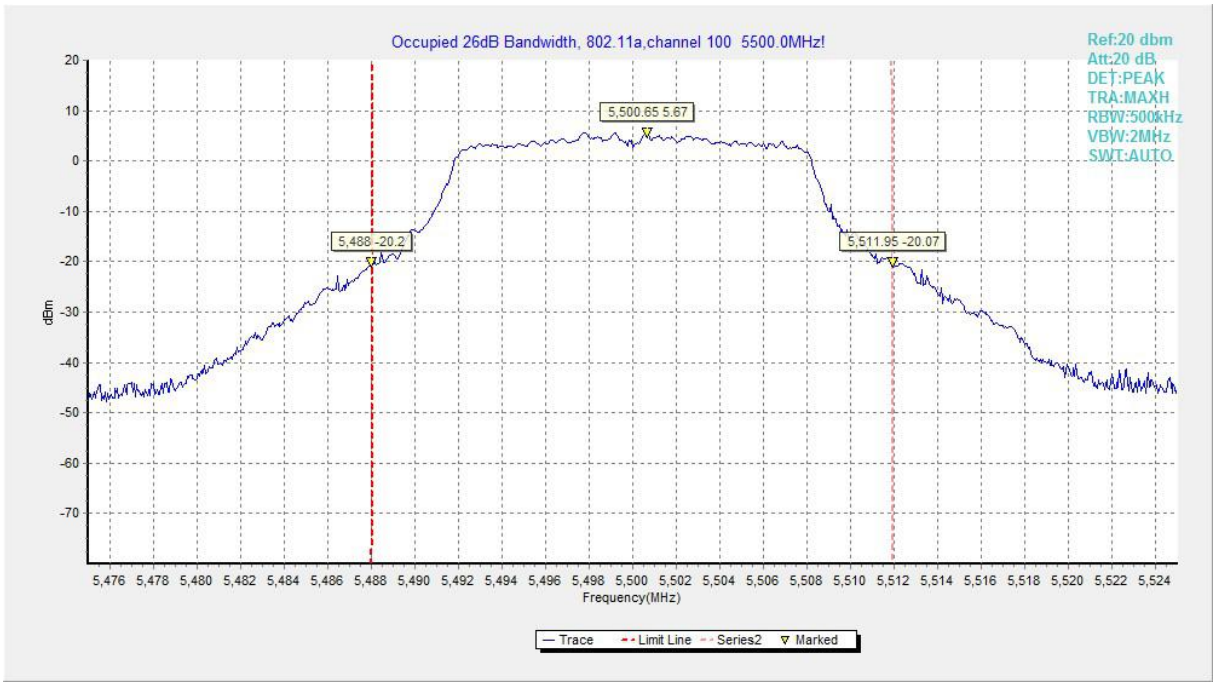


Fig.7 Occupied 26dB Bandwidth (802.11a, 5500MHz)

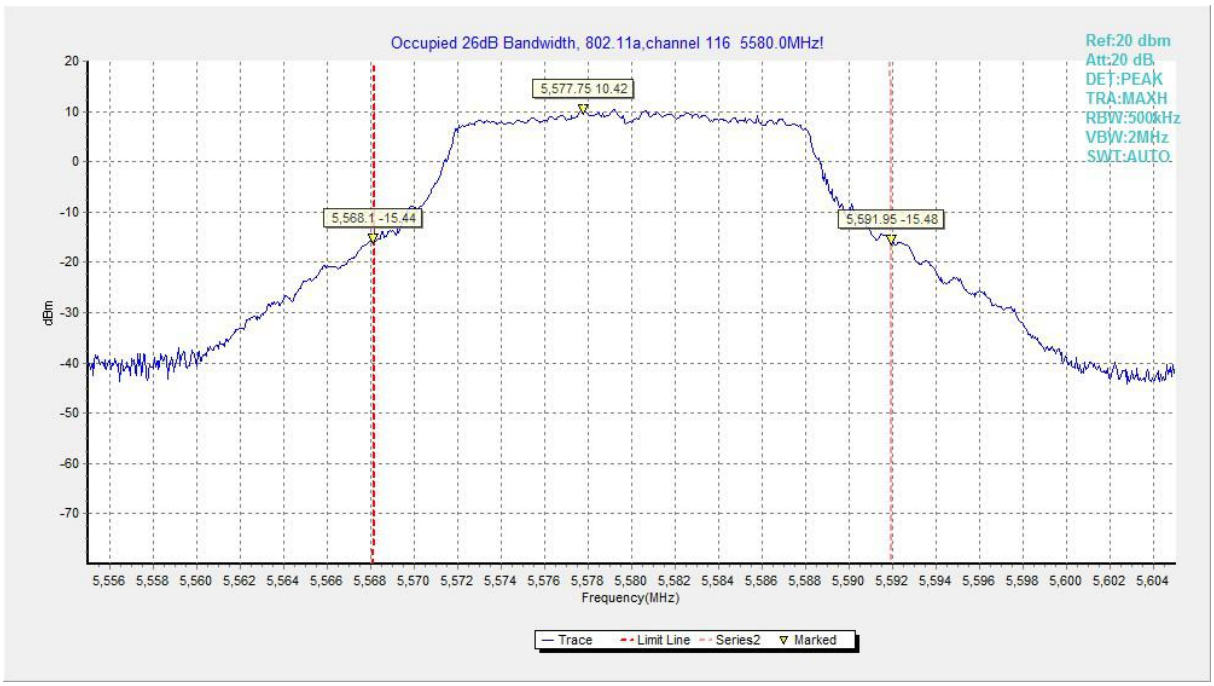


Fig.8 Occupied 26dB Bandwidth (802.11a, 5580MHz)

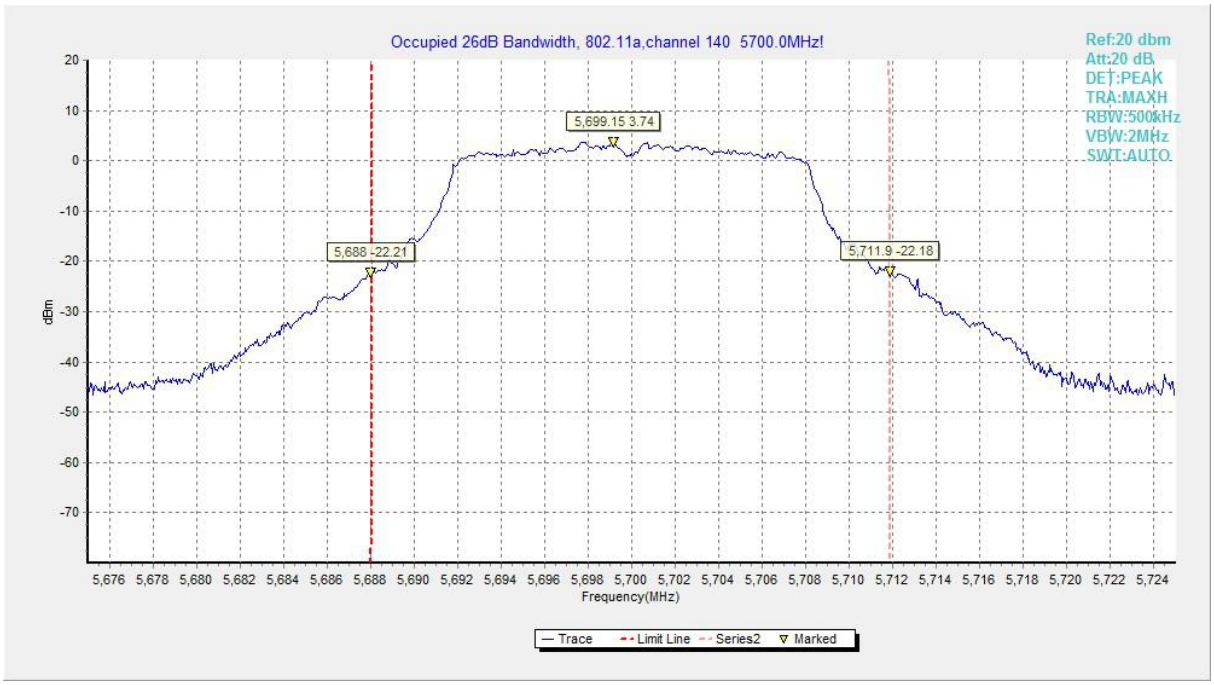


Fig.9 Occupied 26dB Bandwidth (802.11a, 5700MHz)

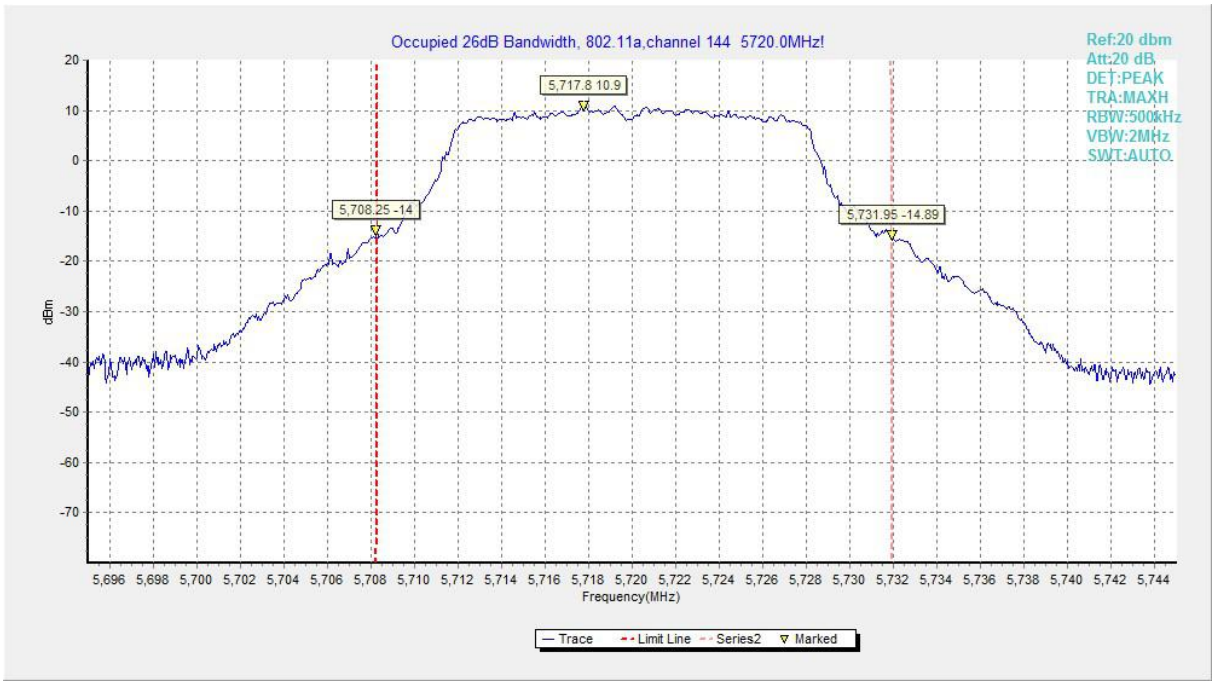


Fig.10 Occupied 26dB Bandwidth (802.11a, 5720MHz)

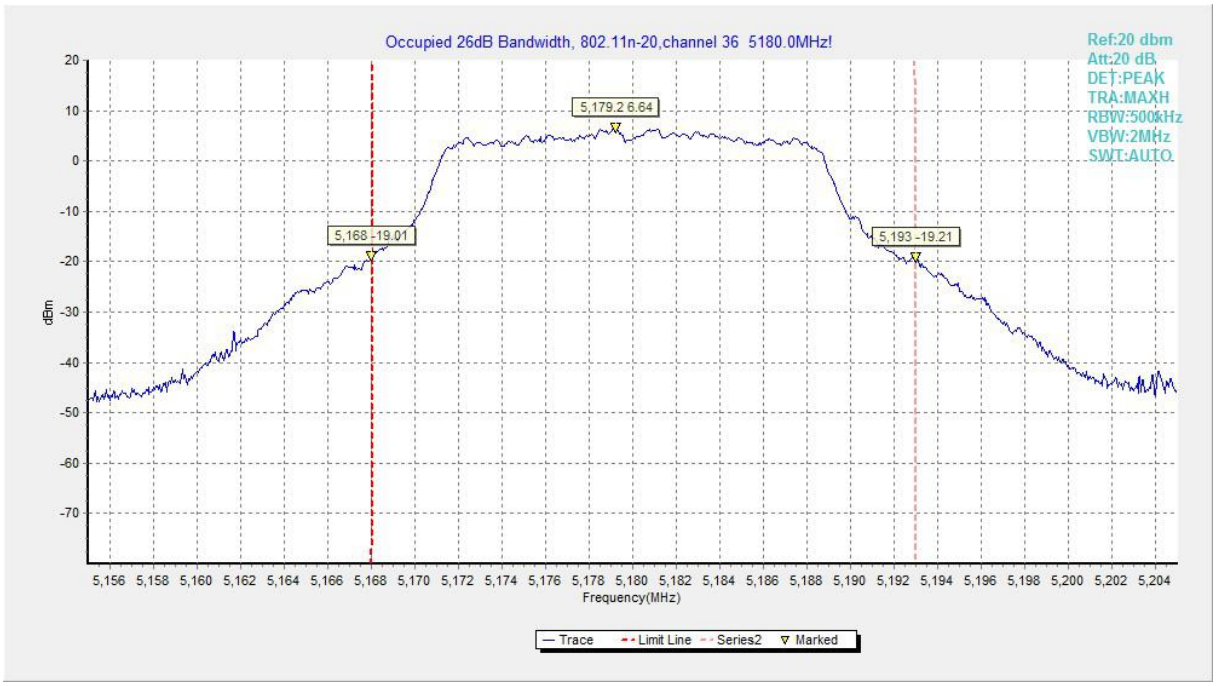


Fig.11 Occupied 26dB Bandwidth (802.11n-HT20, 5180MHz)

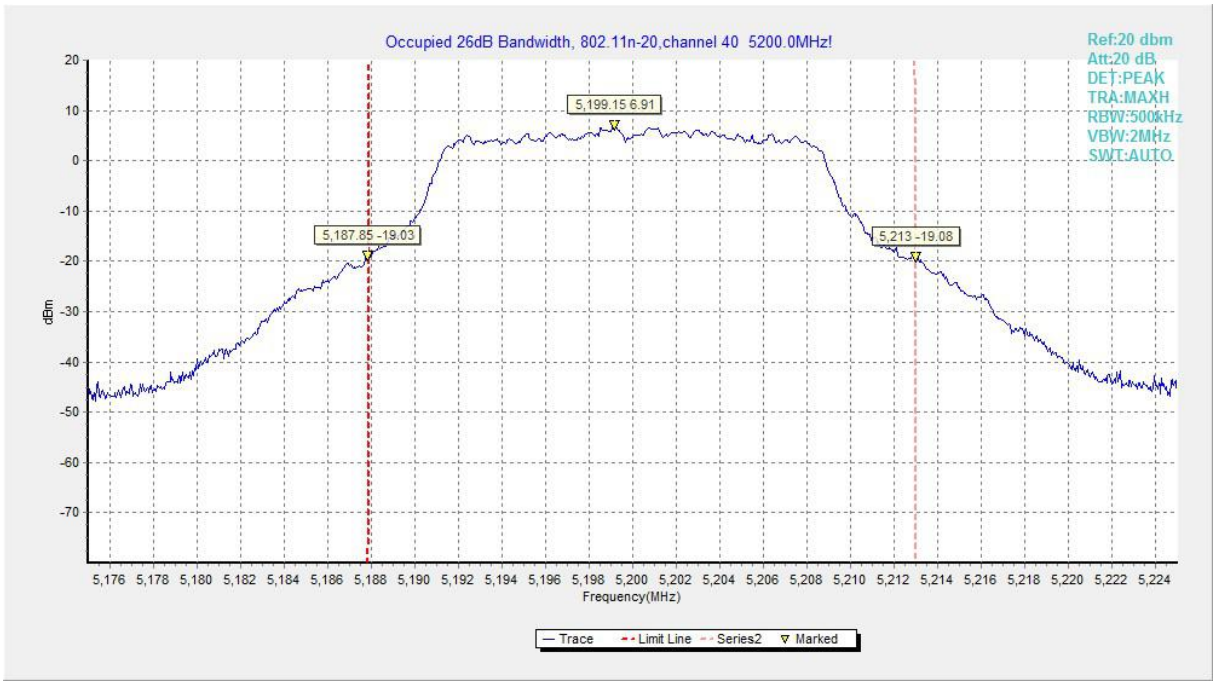


Fig.12 Occupied 26dB Bandwidth (802.11n-HT20, 5200MHz)

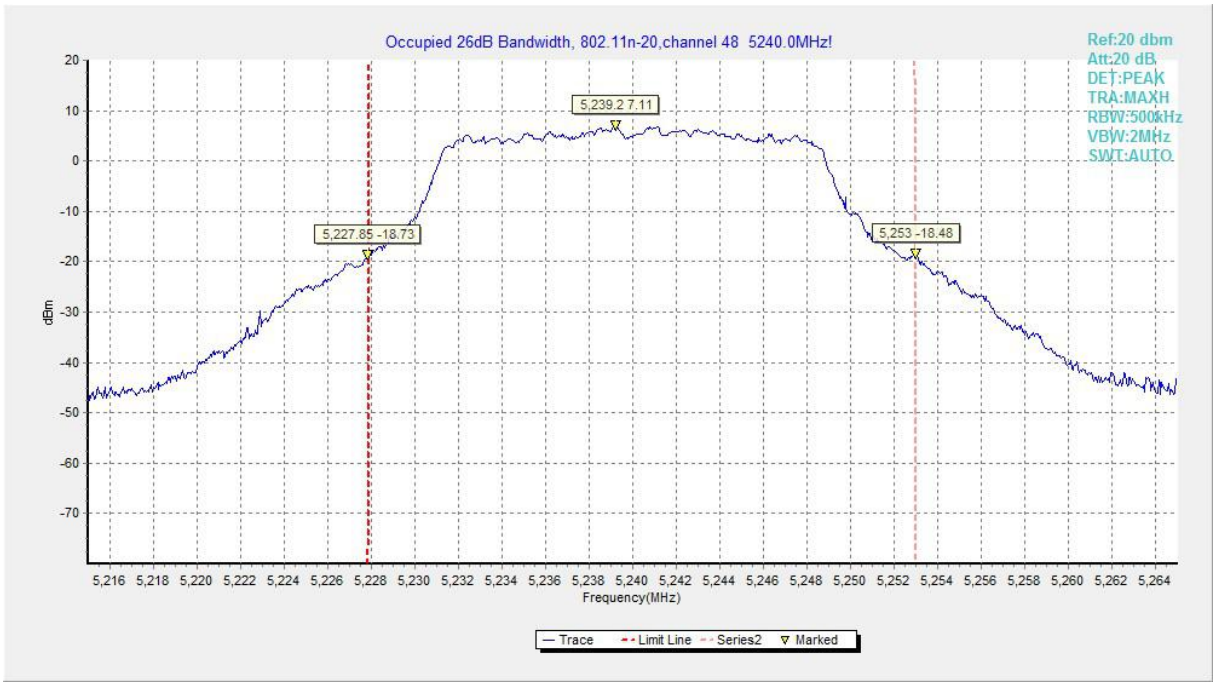


Fig.13 Occupied 26dB Bandwidth (802.11n-HT20, 5240MHz)

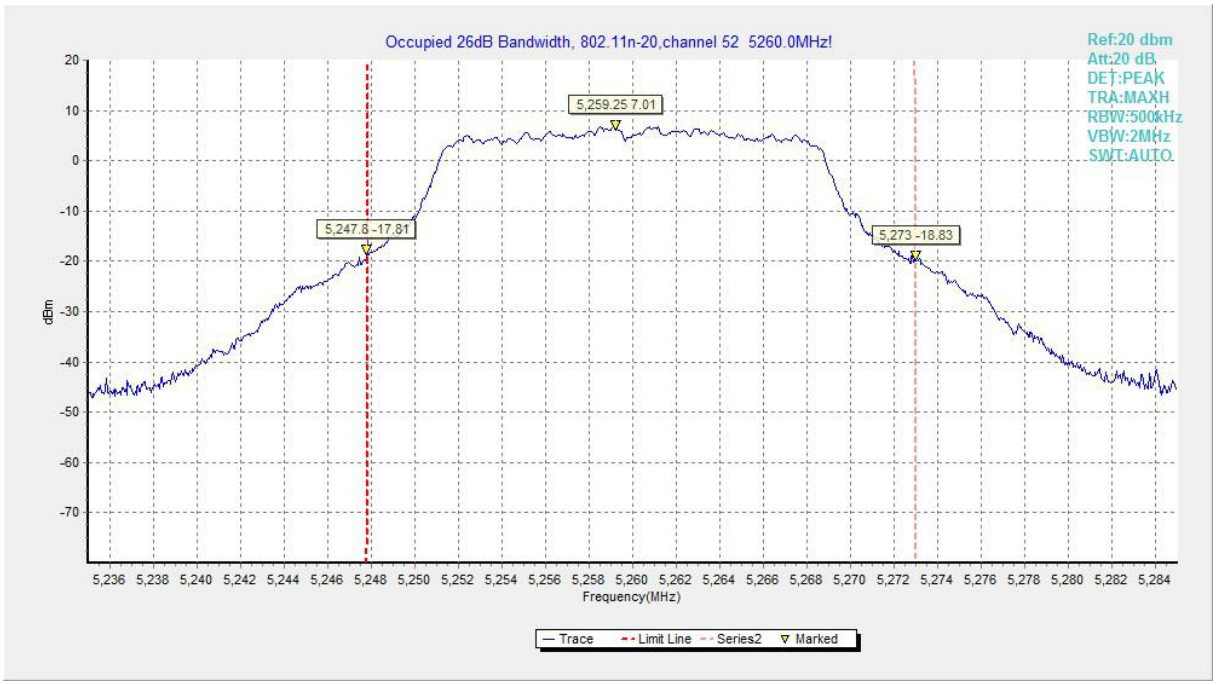


Fig.14 Occupied 26dB Bandwidth (802.11n-HT20, 5260MHz)

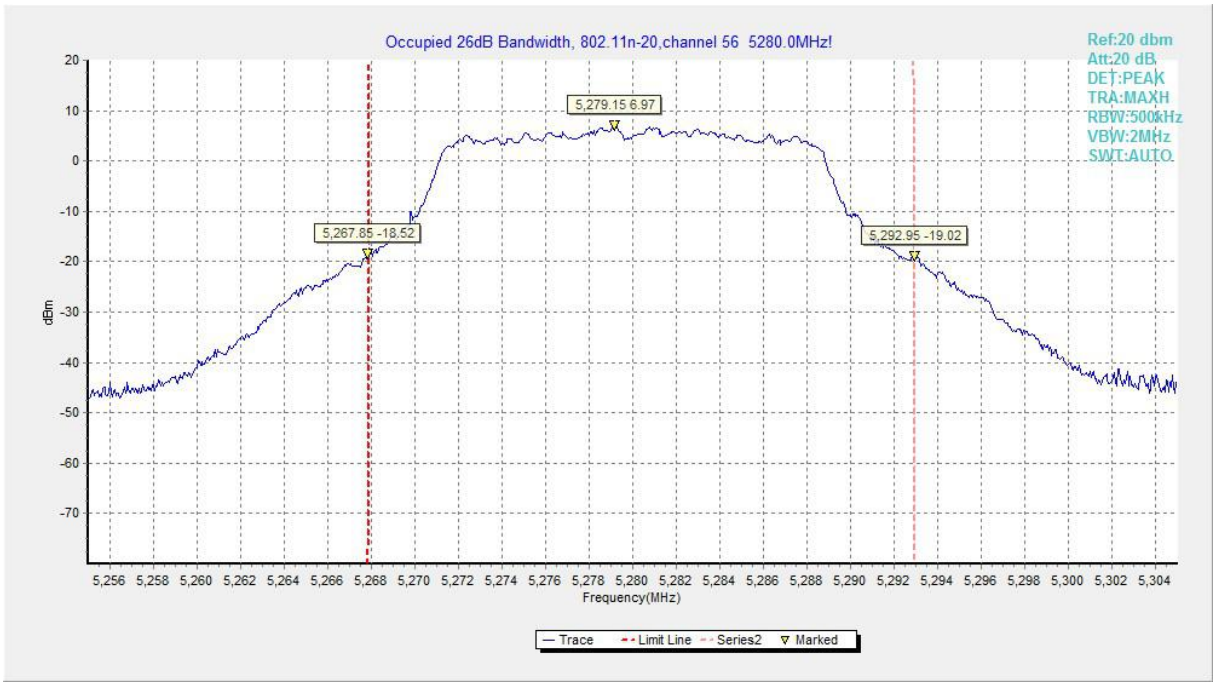


Fig.15 Occupied 26dB Bandwidth (802.11n-HT20, 5280MHz)

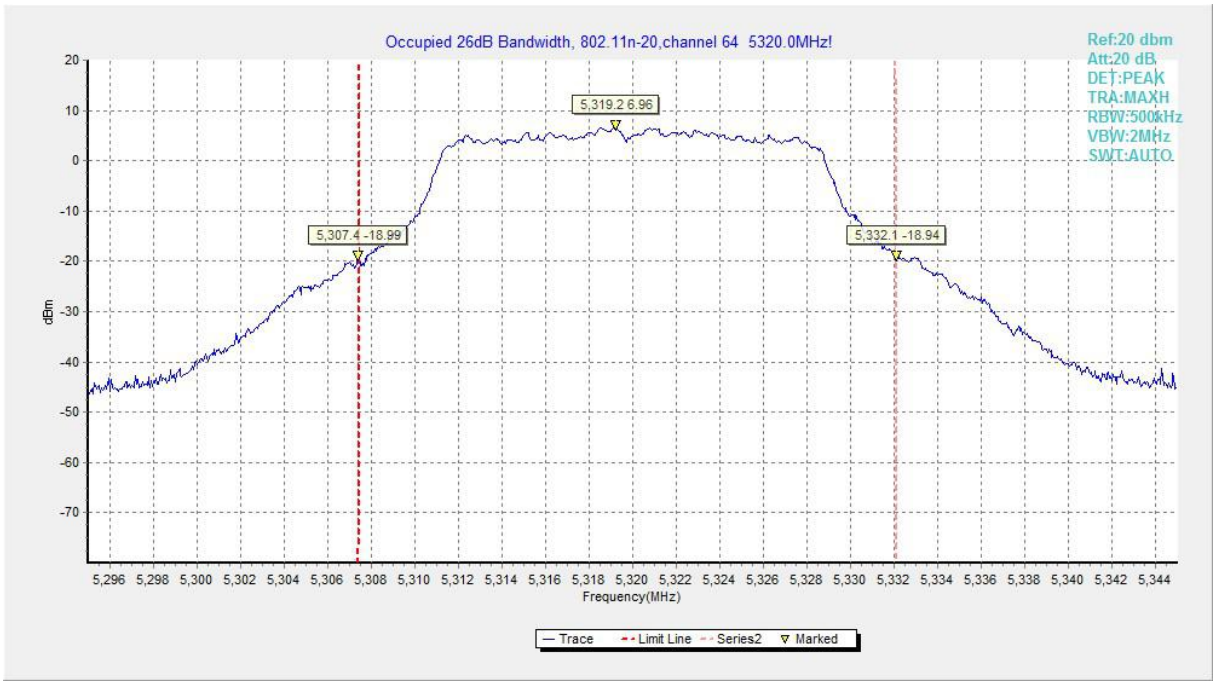


Fig.16 Occupied 26dB Bandwidth (802.11n-HT20, 5320MHz)

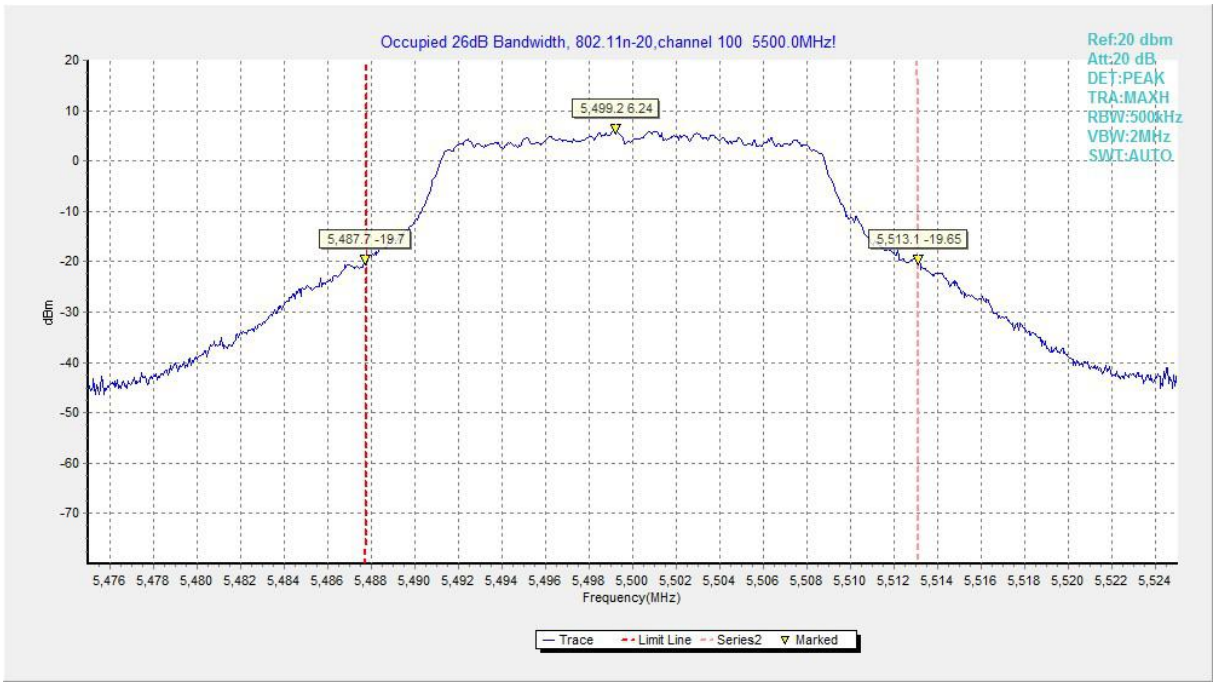


Fig.17 Occupied 26dB Bandwidth (802. 11n-HT20, 5500MHz)

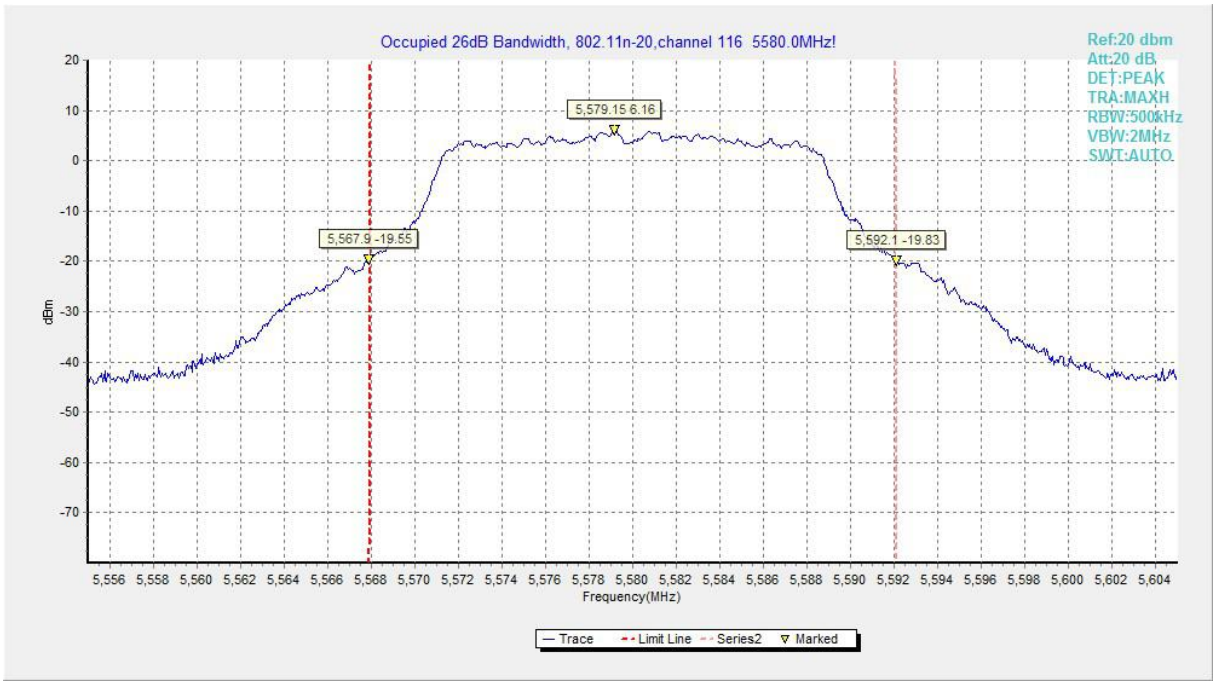


Fig.18 Occupied 26dB Bandwidth (802. 11n-HT20, 5580MHz)

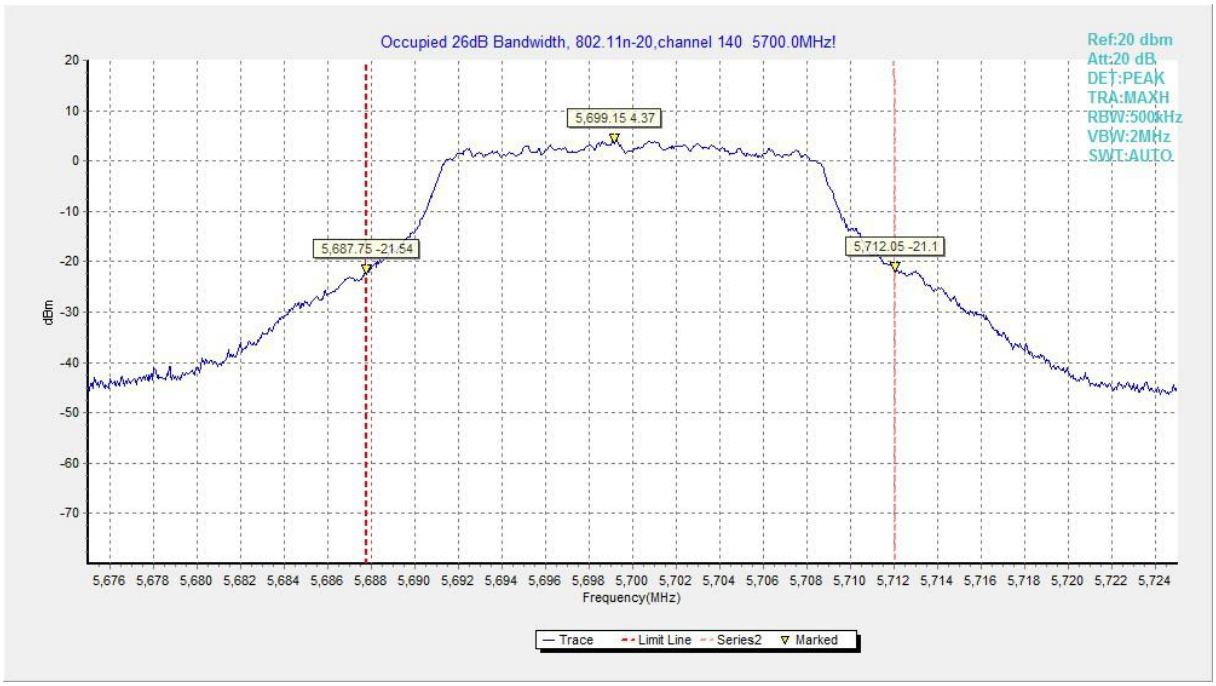


Fig.19 Occupied 26dB Bandwidth (802. 11n-HT20, 5700MHz)

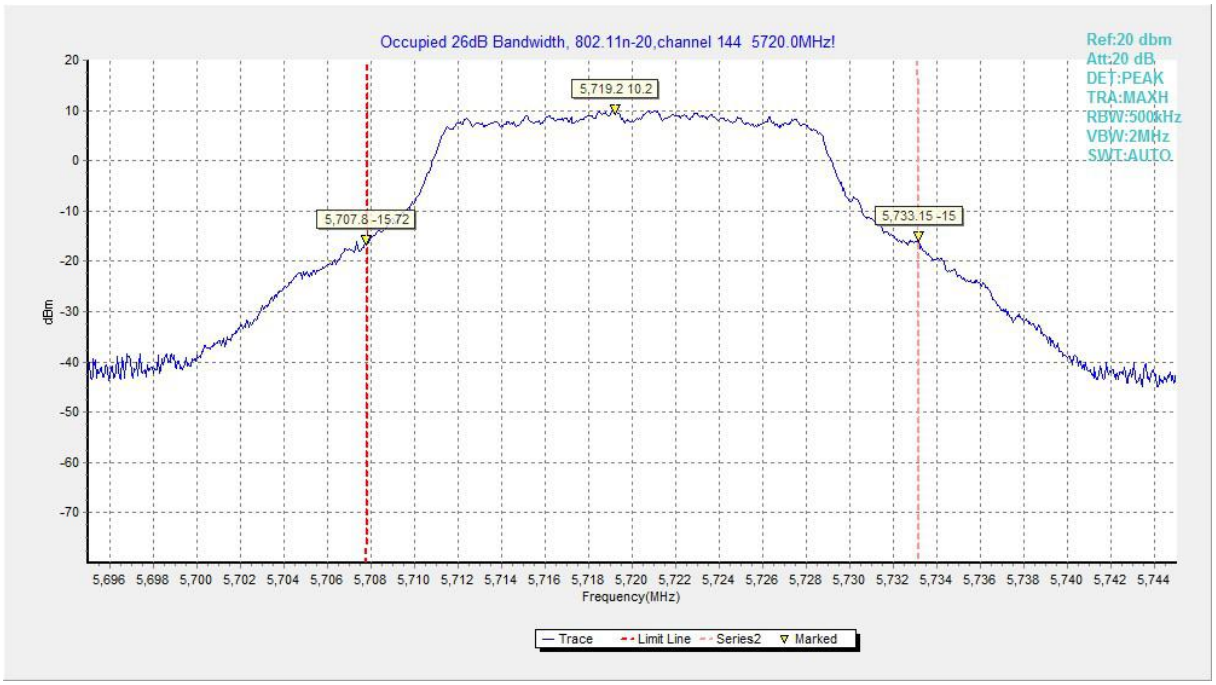


Fig.20 Occupied 26dB Bandwidth (802. 11n-HT20, 5720MHz)

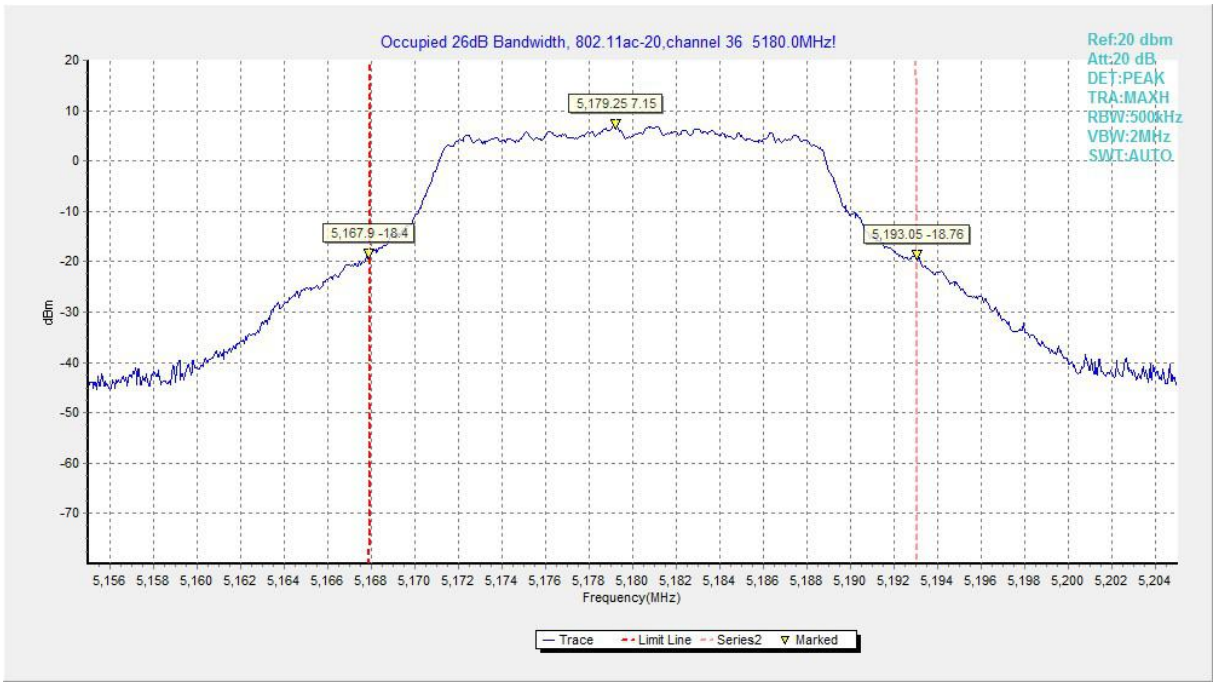


Fig.21 Occupied 26dB Bandwidth (802.11ac-HT20, 5180MHz)

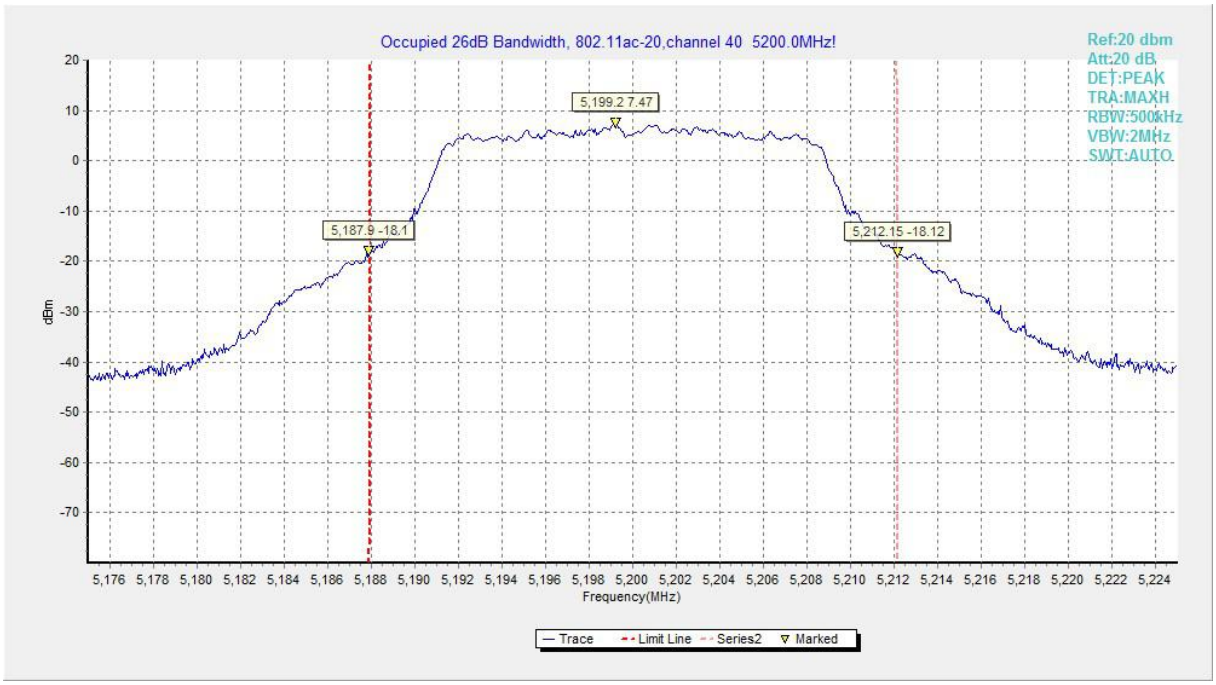


Fig.22 Occupied 26dB Bandwidth (802.11ac-HT20, 5200MHz)

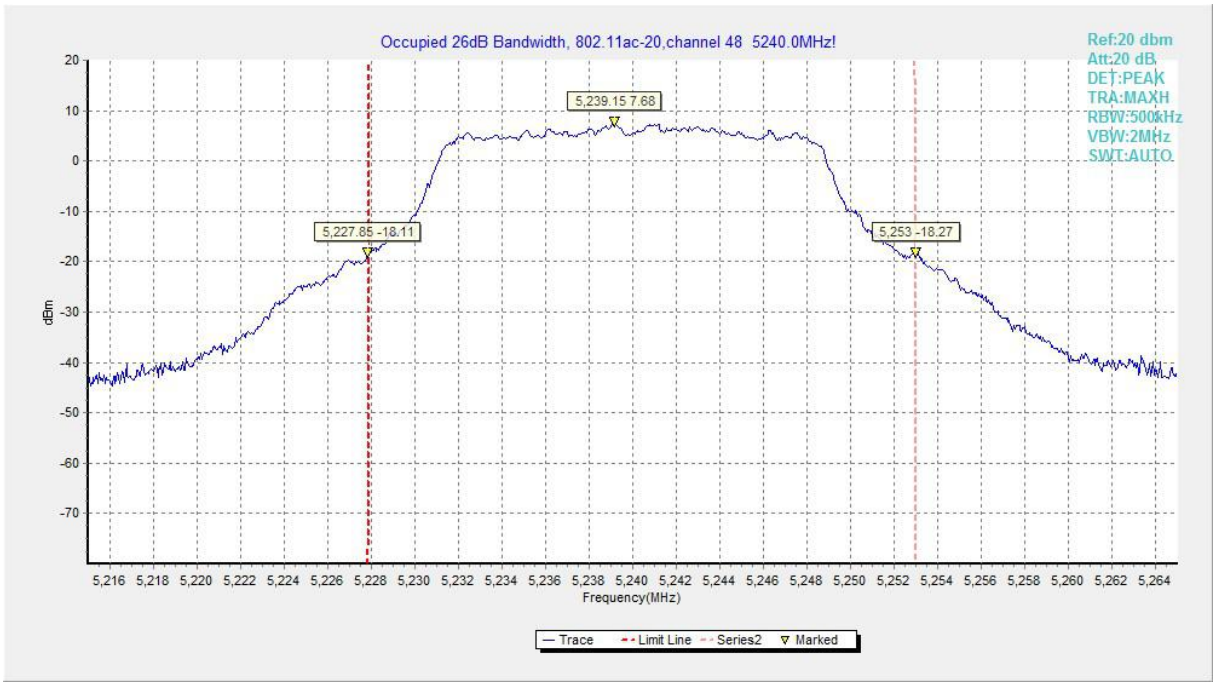


Fig.23 Occupied 26dB Bandwidth (802.11ac-HT20, 5240MHz)

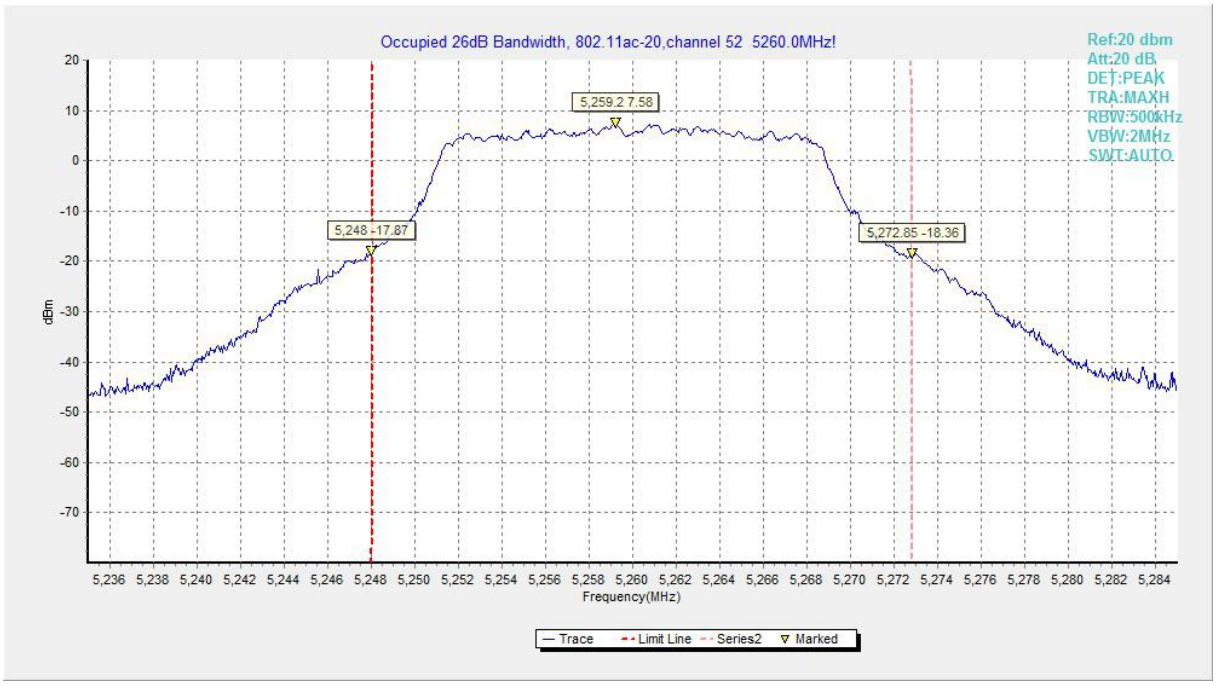


Fig.24 Occupied 26dB Bandwidth (802.11ac-HT20, 5260MHz)

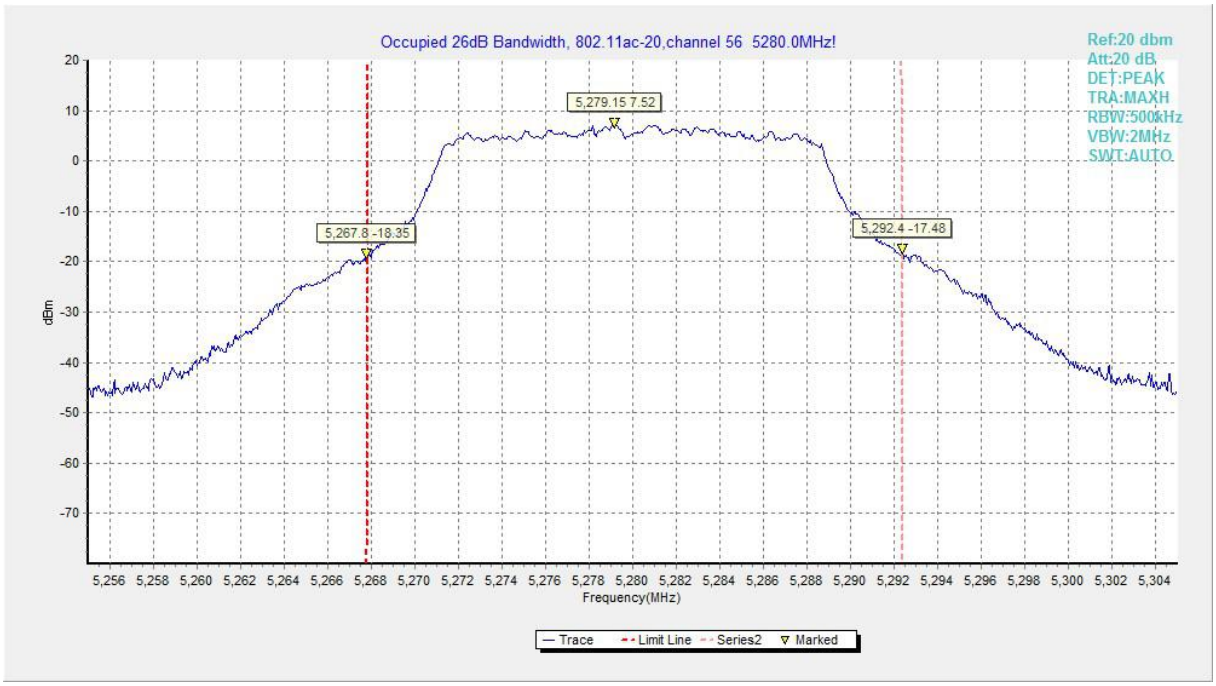


Fig.25 Occupied 26dB Bandwidth (802.11ac-HT20, 5280MHz)

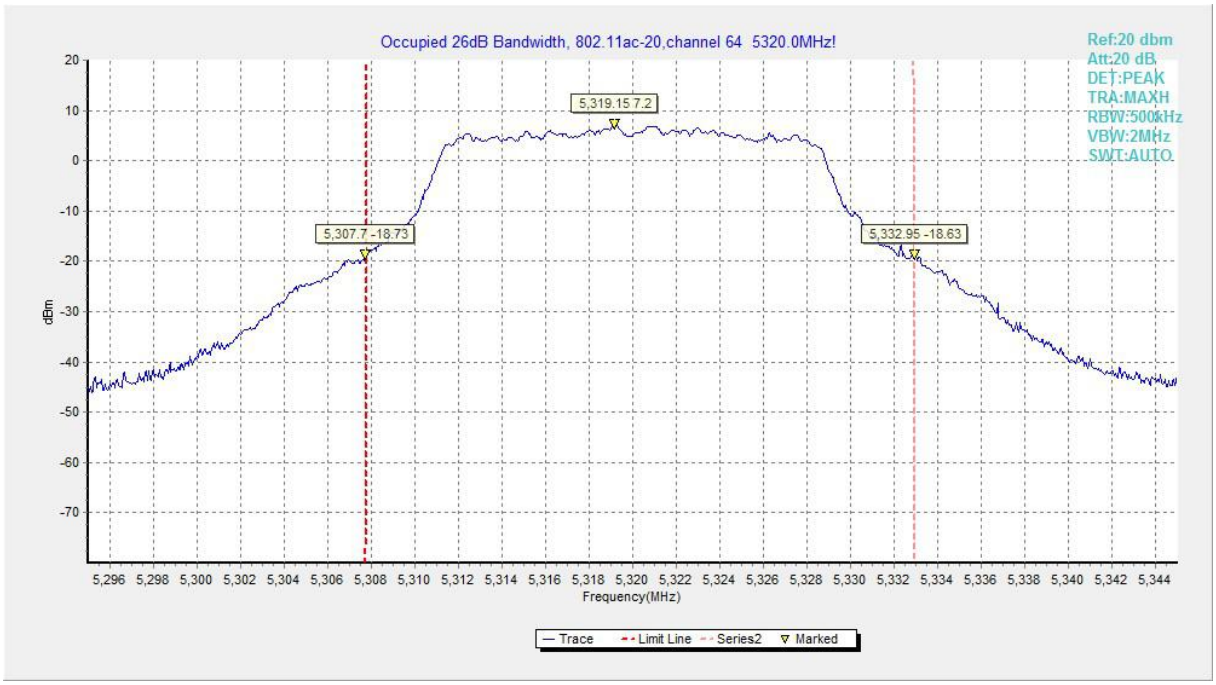


Fig.26 Occupied 26dB Bandwidth (802.11ac-HT20, 5320MHz)

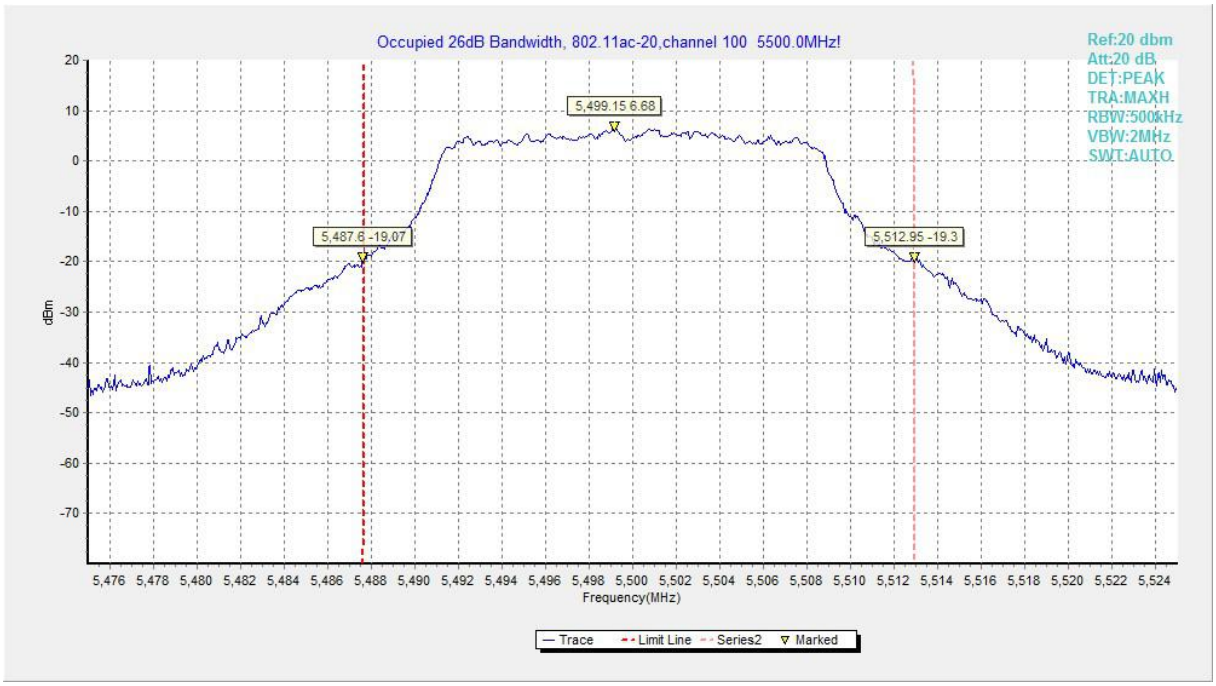


Fig.27 Occupied 26dB Bandwidth (802. 11ac-HT20, 5500MHz)

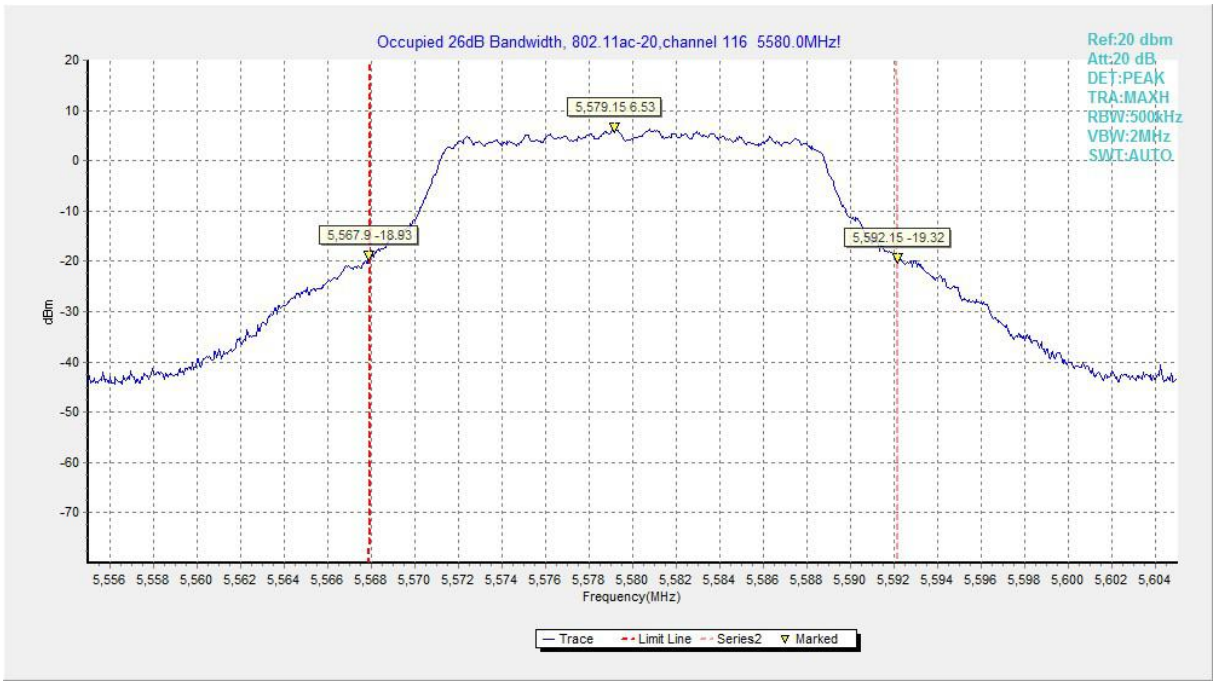


Fig.28 Occupied 26dB Bandwidth (802. 11ac-HT20, 5580MHz)

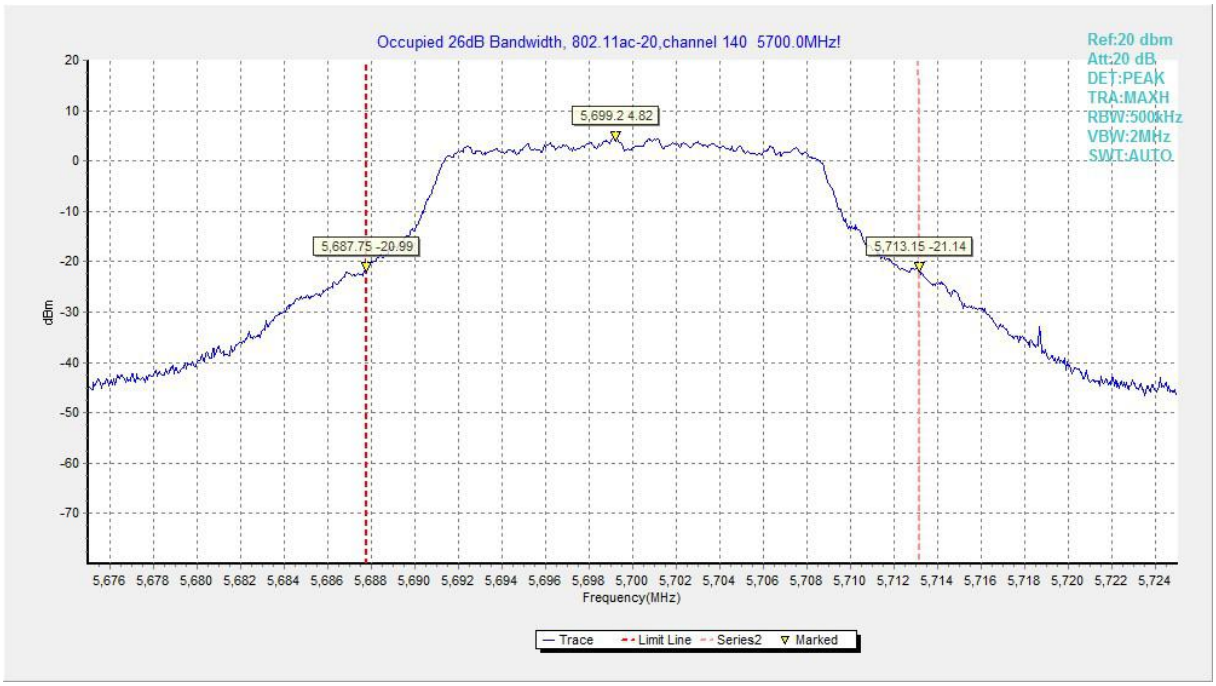


Fig.29 Occupied 26dB Bandwidth (802. 11ac-HT20, 5700MHz)

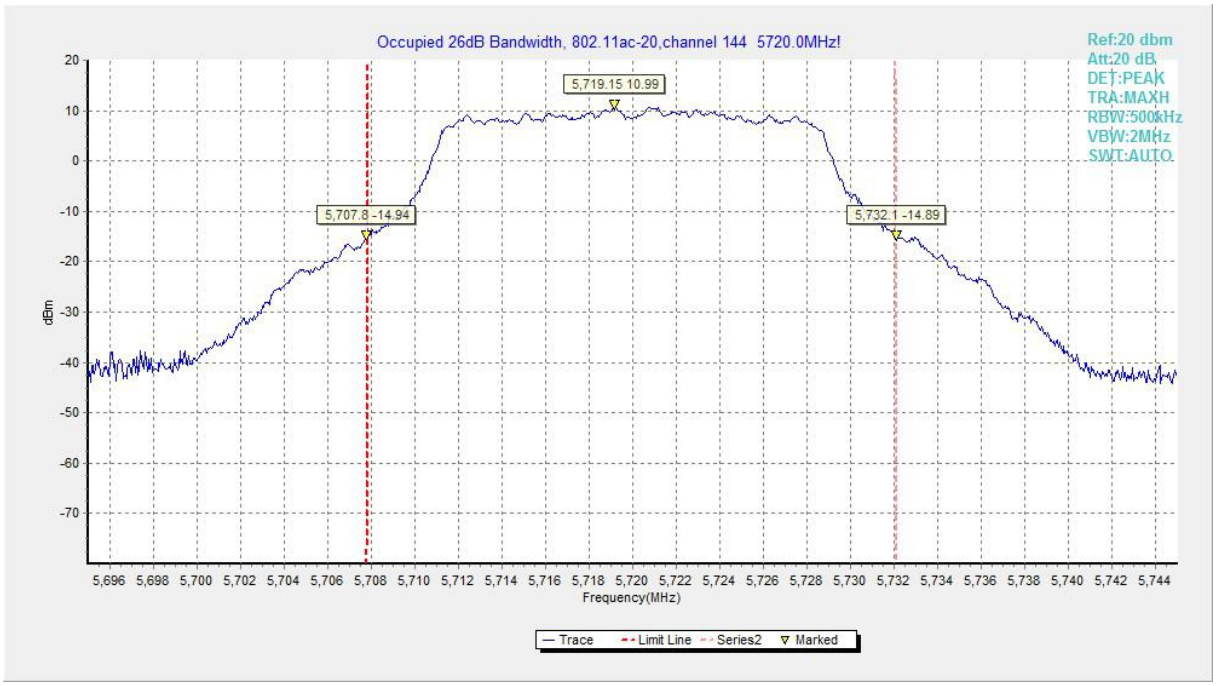


Fig.30 Occupied 26dB Bandwidth (802. 11ac-HT20, 5720MHz)

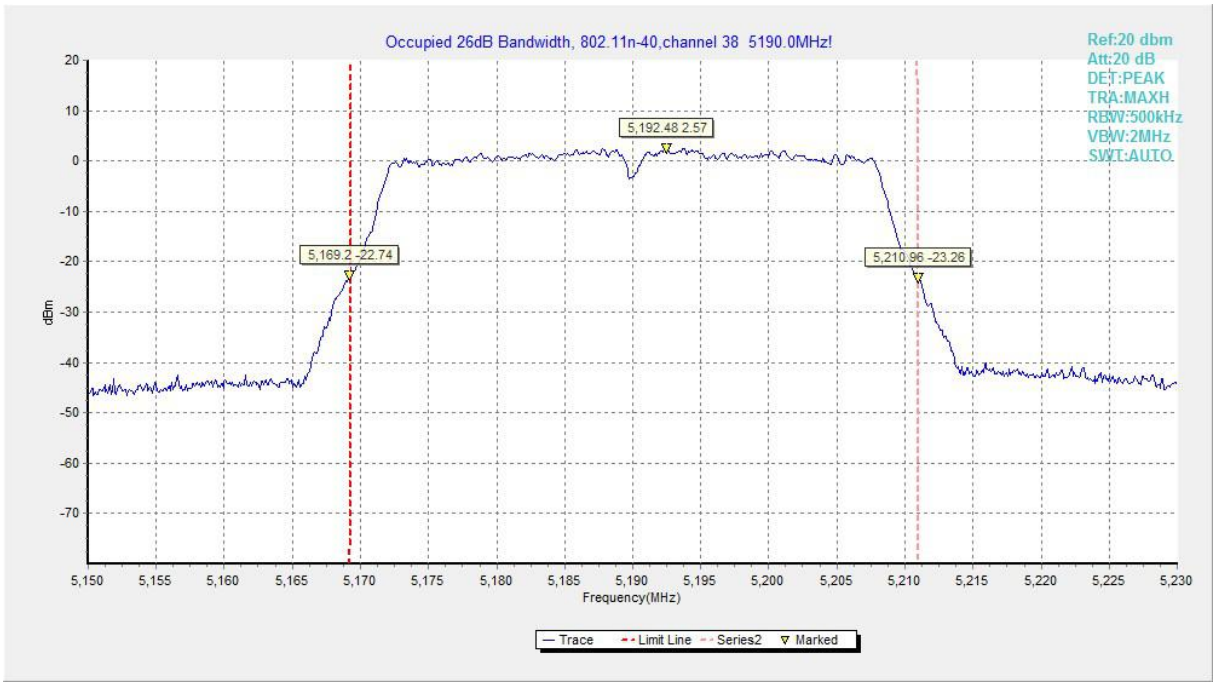


Fig.31 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)

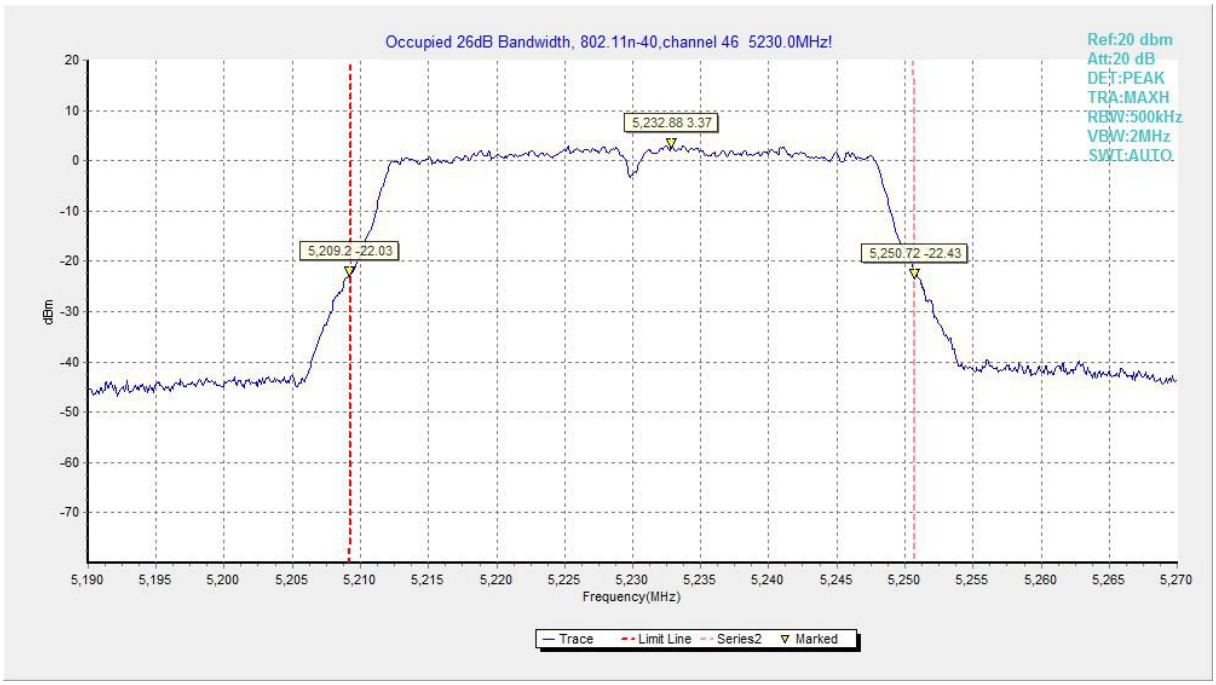


Fig.32 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)

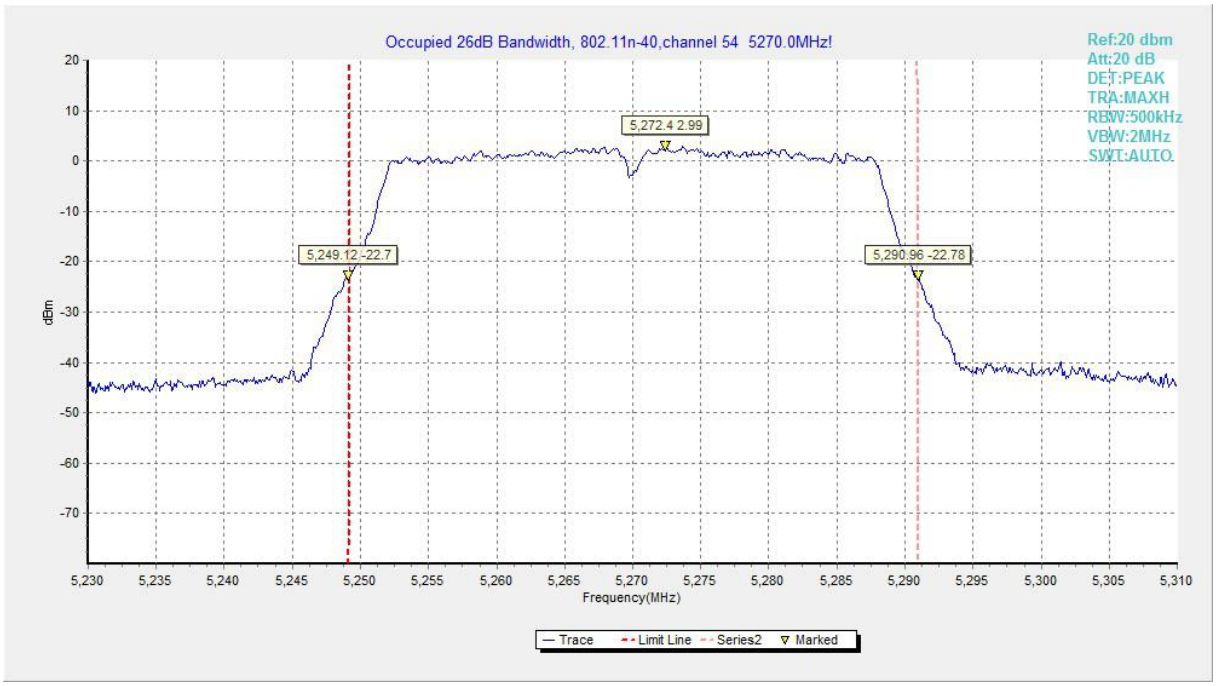


Fig.33 Occupied 26dB Bandwidth (802.11n-HT40, 5270MHz)

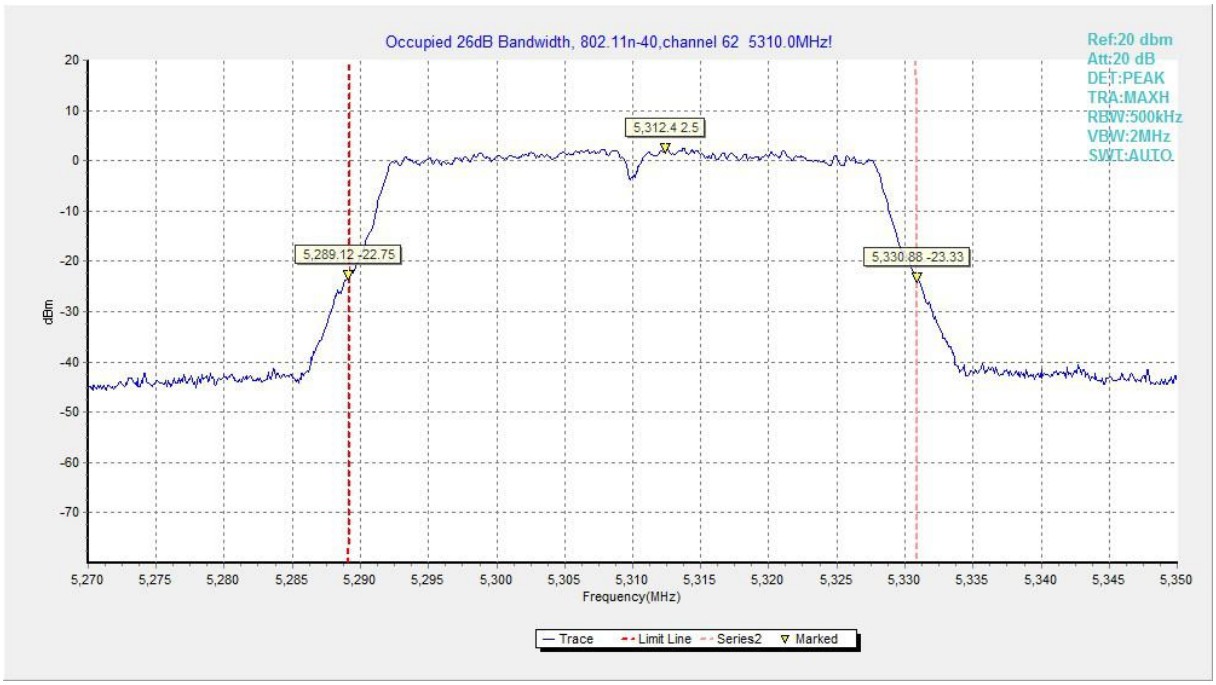


Fig.34 Occupied 26dB Bandwidth (802.11n-HT40, 5310MHz)

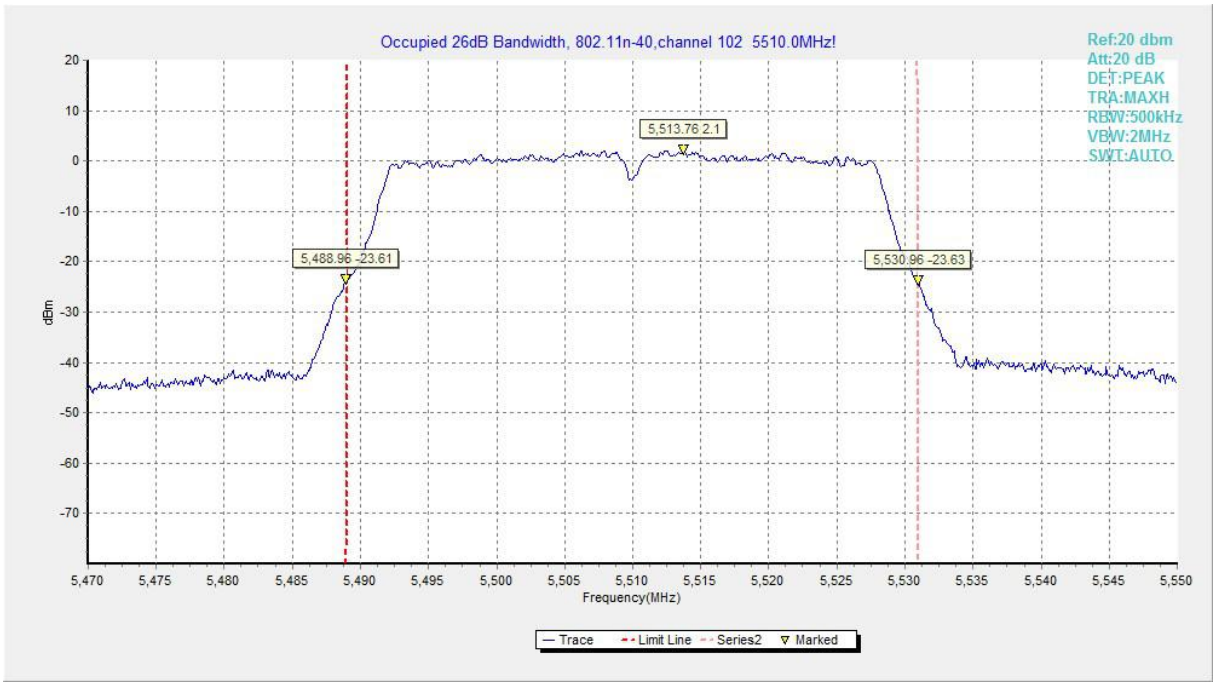


Fig.35 Occupied 26dB Bandwidth (802. 11n-HT40, 5510MHz)

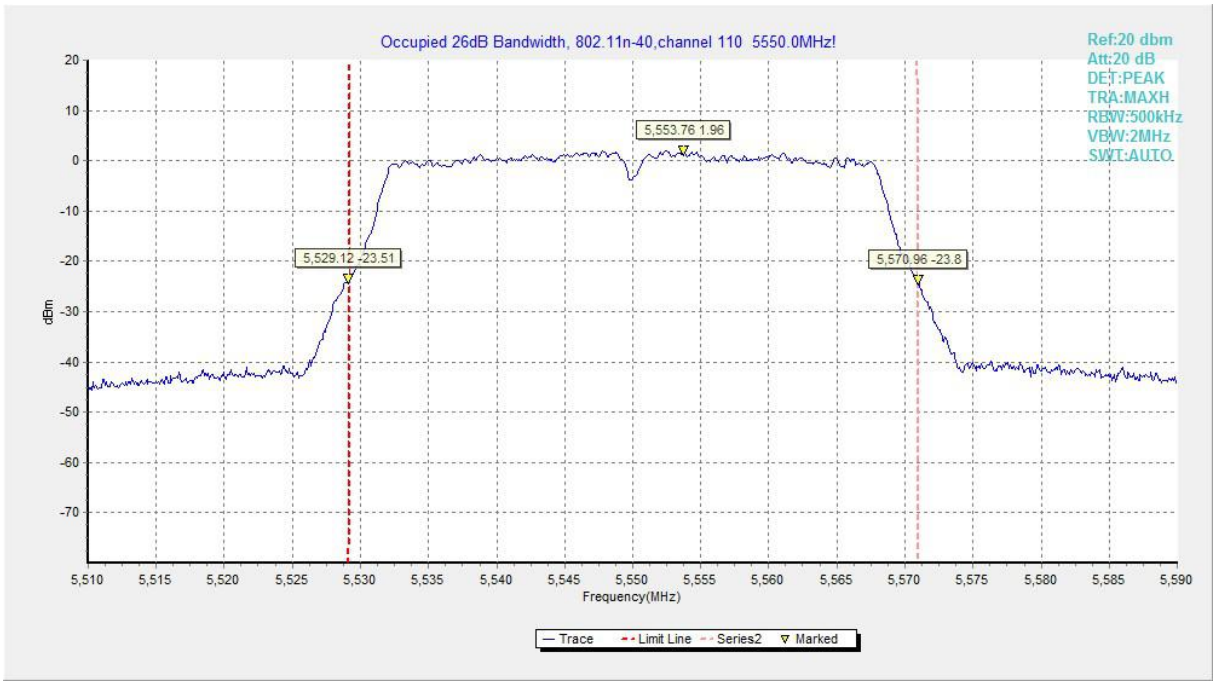


Fig.36 Occupied 26dB Bandwidth (802. 11n-HT40, 5550MHz)

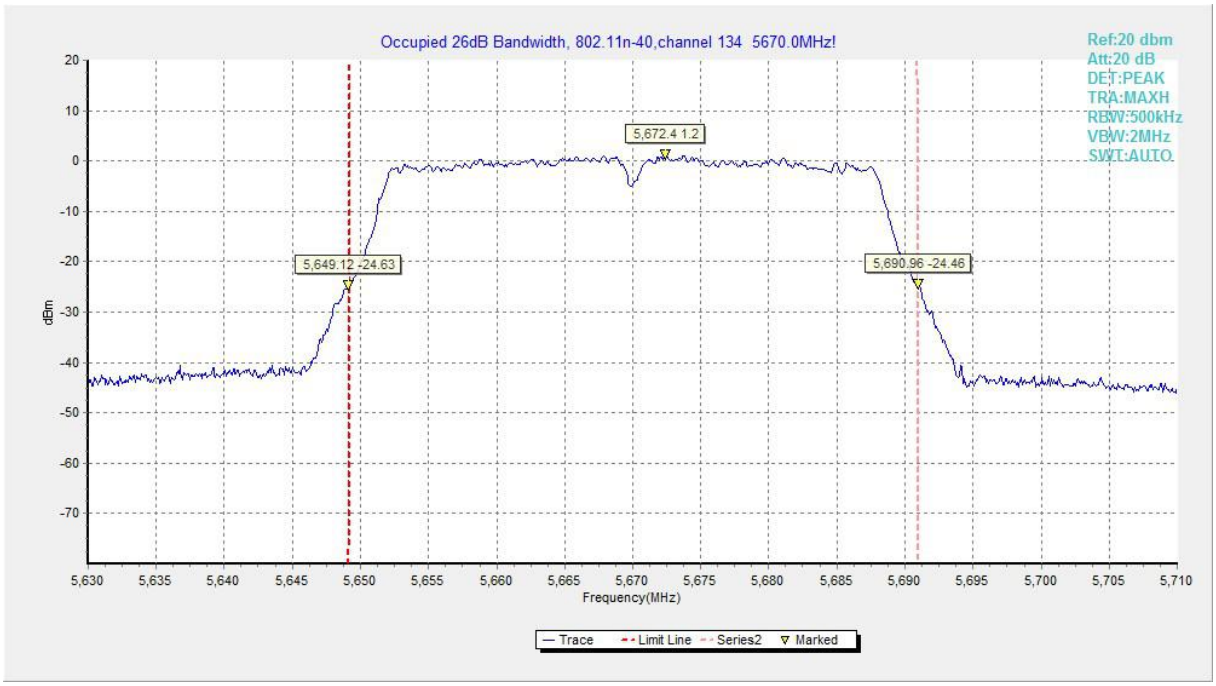


Fig.37 Occupied 26dB Bandwidth (802. 11n-HT40, 5670MHz)

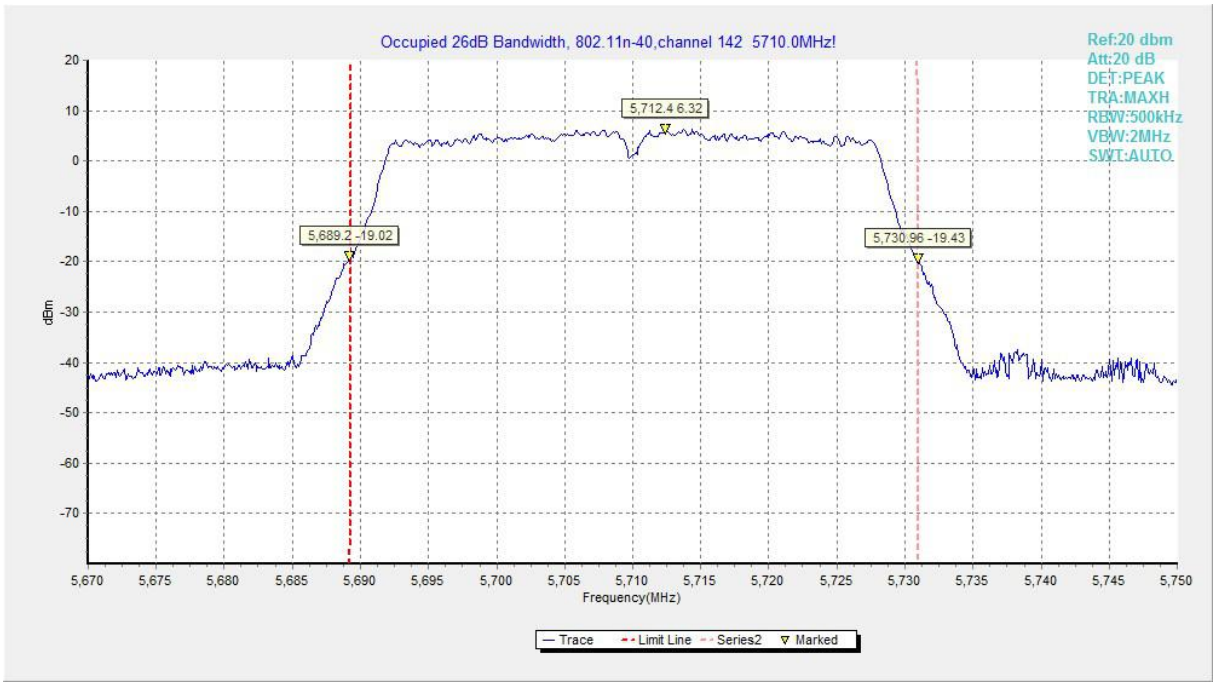


Fig.38 Occupied 26dB Bandwidth (802. 11n-HT40, 5710MHz)

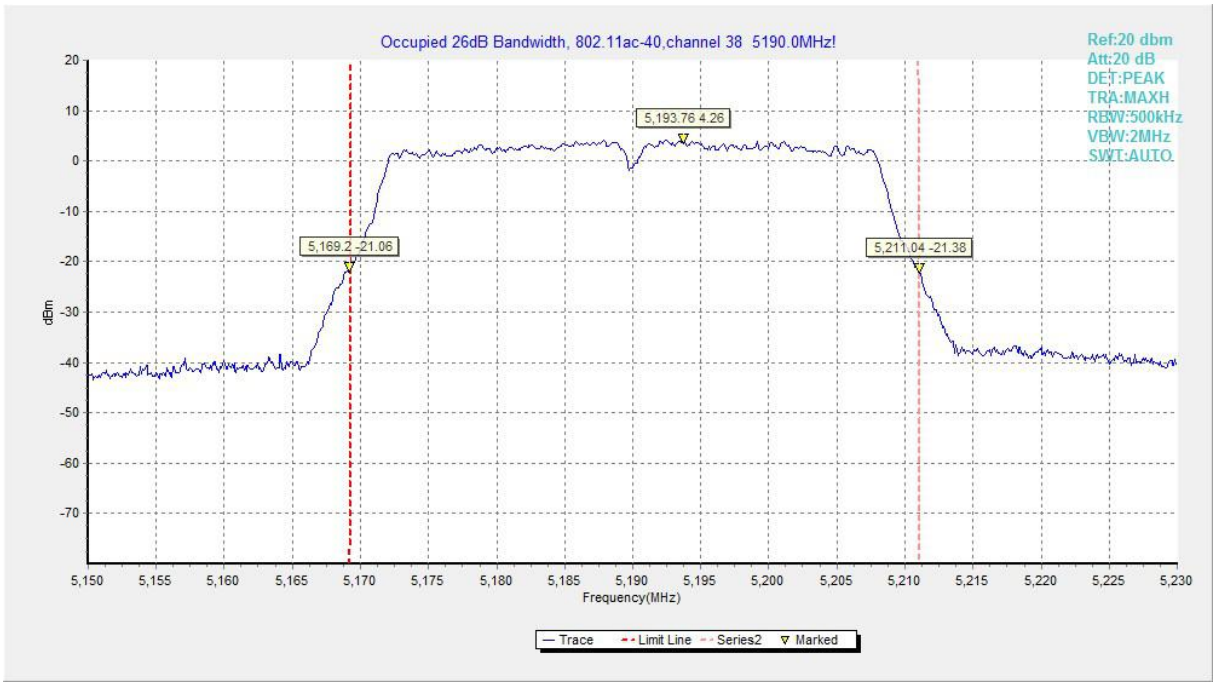


Fig.39 Occupied 26dB Bandwidth (802.11ac-HT40, 5190MHz)

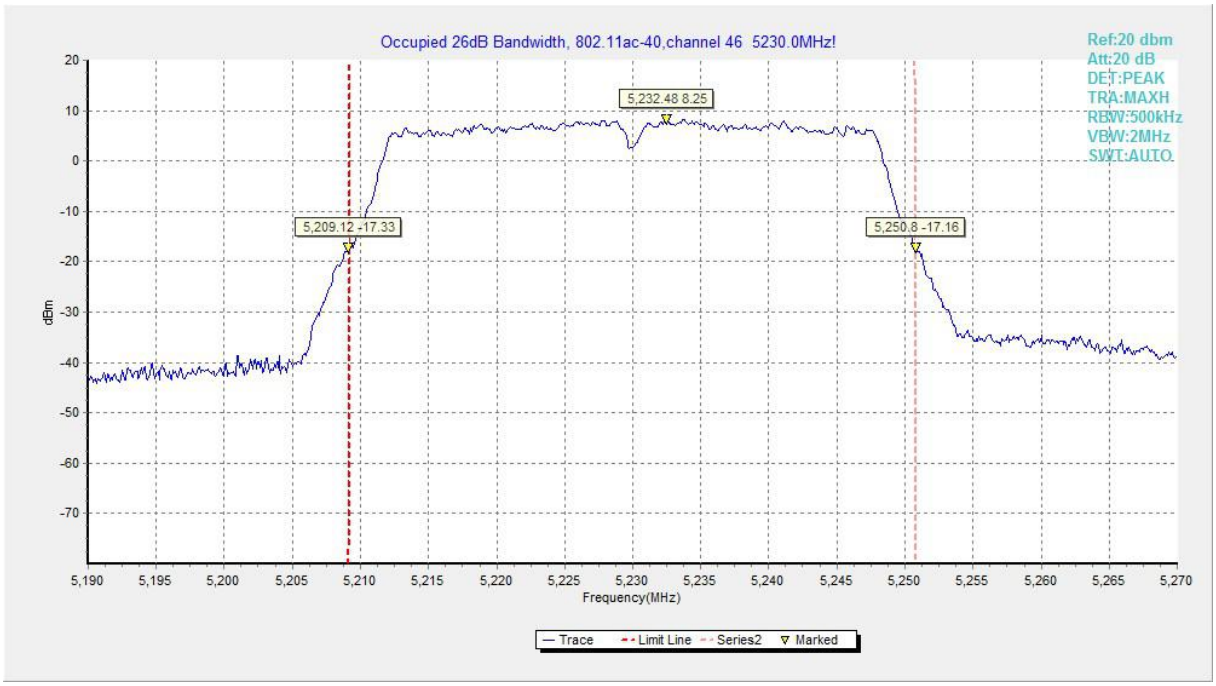


Fig.40 Occupied 26dB Bandwidth (802.11ac-HT40, 5230MHz)

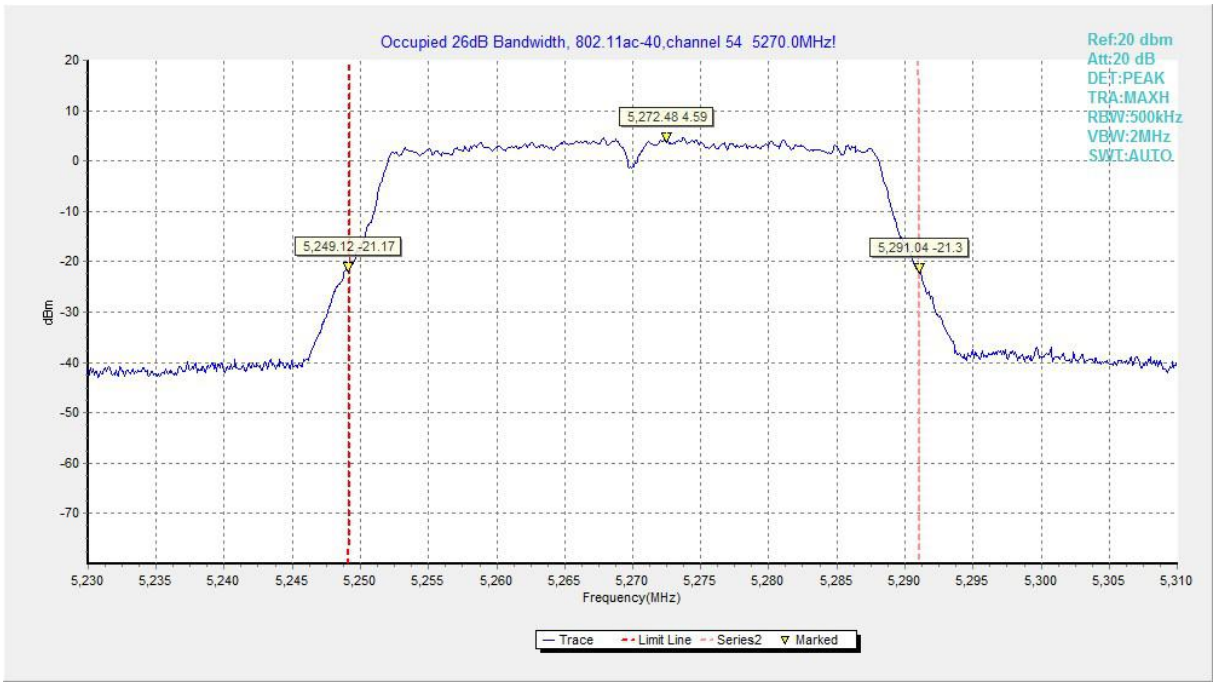


Fig.41 Occupied 26dB Bandwidth (802.11ac-HT40, 5270MHz)

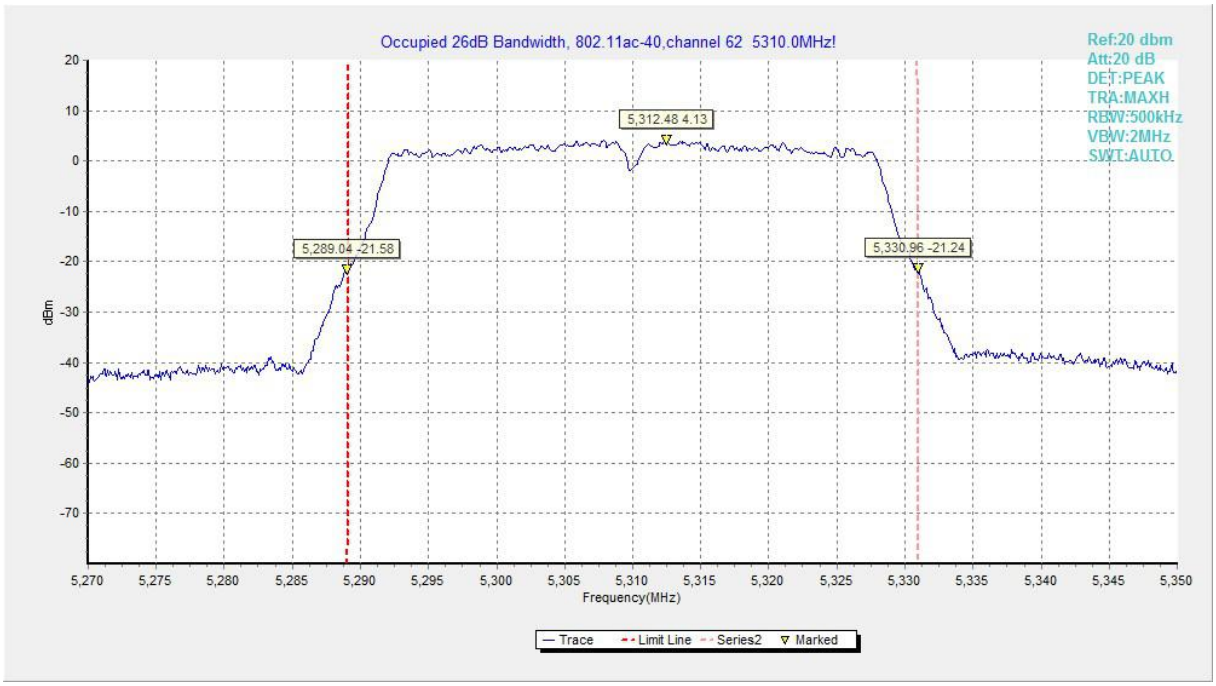


Fig.42 Occupied 26dB Bandwidth (802.11ac-HT40, 5310MHz)