



**FCC PART 15
TEST REPORT
No.I19Z61530-IOT04**

For

LG Electronics Inc.

Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN

LM-X540BMW

With

FCC ID: ZNFX540HM

Hardware Version: Rev.1.0

Software Version: V09c-LAO-COM

Issued Date: 2019-09-20



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

©Copyright. All rights reserved by CTTL.

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z61530-IOT4	Rev.0	1st edition	2019-09-17
I19Z61530-IOT4	Rev.1	Add the results of CH144 CH142 and CH138	2019-09-20
I19Z61530-IOT4	Rev.2	Add the description of Interception Bandwidth	2019-09-20

CONTENTS

CONTENTS	3
1. TEST LATORATORY.....	7
1.1. INTRODUCTION & ACCREDITATION.....	7
1.2. TESTINGLOCATION	7
1.3. TESTINGENVIRONMENT	7
1.4. PROJECT DATA	8
1.5. SIGNATURE	8
2. CLIENT INFORMATION.....	9
2.1. APPLICANT INFORMATION.....	9
2.2. MANUFACTURER INFORMATION.....	9
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARYEQUIPMENT(AE)	10
3.1. ABOUT EUT	10
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	10
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	10
3.4. GENERAL DESCRIPTION.....	11
3.5. INTERPRETATION OF THE TEST ENVIRONMENT	11
4. REFERENCE DOCUMENTS	11
4.1. DOCUMENTS SUPPLIED BY APPLICANT	11
4.2. REFERENCE DOCUMENTS FOR TESTING.....	11
5. LABORATORY ENVIRONMENT.....	11
6. SUMMARY OF TEST RESULTS	12
6.1. SUMMARY OF TEST RESULTS.....	12
6.2. STATEMENTS.....	12
6.3. TEST CONDITIONS	12
7. TEST EQUIPMENTS UTILIZED	13
8. MEASUREMENT UNCERTAINTY	14
8.1. TRANSMITTER OUTPUT POWER	14
8.2. PEAK POWER SPECTRAL DENSITY.....	14
8.3. OCCUPIED CHANNEL BANDWIDTH.....	14
8.4. BAND EDGES COMPLIANCE	14
8.5. SPURIOUS EMISSIONS	14
ANNEX A: MEASUREMENT RESULTS.....	15

A.1. MEASUREMENT METHOD	15
A.2. MAXIMUM OUTPUT POWER	16
A.3. PEAK POWER SPECTRAL DENSITY (CONDUCTED).....	19
A.4. OCCUPIED 26DB BANDWIDTH(CONDUCTED).....	21
Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz).....	23
Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz).....	23
Fig. 3 Occupied 26dB Bandwidth (802.11a, 5240MHz).....	24
Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz).....	24
Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz).....	25
Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz).....	25
Fig. 7 Occupied 26dB Bandwidth (802.11a, 5500MHz).....	26
Fig. 8 Occupied 26dB Bandwidth (802.11a, 5580MHz).....	26
Fig. 9 Occupied 26dB Bandwidth (802.11a, 5700MHz).....	27
Fig. 10 Occupied 26dB Bandwidth (802.11a, 5720MHz).....	27
Fig. 11 Occupied 26dB Bandwidth (802.11n20, 5180MHz).....	28
Fig. 12 Occupied 26dB Bandwidth (802.11n20, 5200MHz).....	28
Fig. 13 Occupied 26dB Bandwidth (802.11n20, 5240MHz).....	29
Fig. 14 Occupied 26dB Bandwidth (802.11n20, 5260MHz).....	29
Fig. 15 Occupied 26dB Bandwidth (802.11n20, 5280MHz).....	30
Fig. 16 Occupied 26dB Bandwidth (802.11n20, 5320MHz).....	30
Fig. 17 Occupied 26dB Bandwidth (802.11n20, 5500MHz).....	31
Fig. 18 Occupied 26dB Bandwidth (802.11n20, 5580MHz).....	31
Fig. 19 Occupied 26dB Bandwidth (802.11n20, 5700MHz).....	32
Fig. 20 Occupied 26dB Bandwidth (802.11n20, 5720MHz).....	32
Fig. 21 Occupied 26dB Bandwidth (802.11ac20, 5180MHz).....	33
Fig. 22 Occupied 26dB Bandwidth (802.11ac20, 5200MHz).....	33
Fig. 23 Occupied 26dB Bandwidth (802.11ac20, 5240MHz).....	34
Fig. 24 Occupied 26dB Bandwidth (802.11ac20, 5260MHz).....	34
Fig. 25 Occupied 26dB Bandwidth (802.11ac20, 5280MHz).....	35
Fig. 26 Occupied 26dB Bandwidth (802.11ac20, 5320MHz).....	35
Fig. 27 Occupied 26dB Bandwidth (802.11ac20, 5500MHz).....	36
Fig. 28 Occupied 26dB Bandwidth (802.11ac20, 5580MHz).....	36
Fig. 29 Occupied 26dB Bandwidth (802.11ac20, 5700MHz).....	37
Fig. 30 Occupied 26dB Bandwidth (802.11ac20, 5720MHz).....	37
Fig. 31 Occupied 26dB Bandwidth (802.11n40, 5190MHz).....	38
Fig. 32 Occupied 26dB Bandwidth (802.11n40, 5230MHz).....	38
Fig. 33 Occupied 26dB Bandwidth (802.11n40, 5270MHz).....	39
Fig. 34 Occupied 26dB Bandwidth (802.11n40, 5310MHz).....	39
Fig. 35 Occupied 26dB Bandwidth (802.11n40, 5510MHz).....	40
Fig. 36 Occupied 26dB Bandwidth (802.11n40, 5550MHz).....	40
Fig. 37 Occupied 26dB Bandwidth (802.11n40, 5670MHz).....	41
Fig. 38 Occupied 26dB Bandwidth (802.11n40, 5710MHz).....	41
Fig. 39 Occupied 26dB Bandwidth (802.11ac40, 5190MHz).....	42
Fig. 40 Occupied 26dB Bandwidth (802.11ac40, 5230MHz).....	42

Fig. 41	Occupied 26dB Bandwidth (802.11ac40, 5270MHz)	43
Fig. 42	Occupied 26dB Bandwidth (802.11ac40, 5310MHz)	43
Fig. 43	Occupied 26dB Bandwidth (802.11ac40, 5510MHz)	44
Fig. 44	Occupied 26dB Bandwidth (802.11ac40, 5550MHz)	44
Fig. 45	Occupied 26dB Bandwidth (802.11ac40, 5670MHz)	45
Fig. 46	Occupied 26dB Bandwidth (802.11ac40, 5710MHz)	45
Fig. 47	Occupied 26dB Bandwidth (802.11ac80, 5210MHz)	46
Fig. 48	Occupied 26dB Bandwidth (802.11ac80, 5290MHz)	46
Fig. 49	Occupied 26dB Bandwidth (802.11ac80, 5530MHz)	47
Fig. 50	Occupied 26dB Bandwidth (802.11ac80, 5610MHz)	47
Fig. 51	Occupied 26dB Bandwidth (802.11ac80, 5690MHz)	48
A.5. BAND EDGES COMPLIANCE		49
A5.1 BAND EDGES - RADIATED		49
Fig. 52	Band Edges (802.11a, 5180MHz)	51
Fig. 53	Band Edges (802.11a, 5320MHz)	51
Fig. 54	Band Edges (802.11a, 5500MHz)	52
Fig. 55	Band Edges (802.11a, 5700MHz)	52
Fig. 56	Band Edges (802.11a, 5720MHz)	53
Fig. 57	Band Edges (802.11a, 5720MHz)	53
Fig. 58	Band Edges (802.11n-HT20, 5180MHz)	54
Fig. 59	Band Edges (802.11n-HT20, 5320MHz)	54
Fig. 60	Band Edges (802.11n-HT20, 5500MHz)	55
Fig. 61	Band Edges (802.11n-HT20, 5700MHz)	55
Fig. 62	Band Edges (802.11n-HT20, 5720MHz)	56
Fig. 63	Band Edges (802.11n-HT20, 5720MHz)	56
Fig. 64	Band Edges (802.11n-HT40, 5190MHz)	57
Fig. 65	Band Edges (802.11n-HT40, 5310MHz)	57
Fig. 66	Band Edges (802.11n-HT40, 5510MHz)	58
Fig. 67	Band Edges (802.11n-HT40, 5670MHz)	58
Fig. 68	Band Edges (802.11n-HT40, 5710MHz)	59
Fig. 69	Band Edges (802.11n-HT40, 5710MHz)	59
Fig. 70	Band Edges (802.11ac-HT20, 5180MHz)	60
Fig. 71	Band Edges (802.11ac-HT20, 5320MHz)	60
Fig. 72	Band Edges (802.11ac-HT20, 5500MHz)	61
Fig. 73	Band Edges (802.11ac-HT20, 5700MHz)	61
Fig. 74	Band Edges (802.11ac-HT20, 5720MHz)	62
Fig. 75	Band Edges (802.11ac-HT20, 5720MHz)	62
Fig. 76	Band Edges (802.11ac-HT40, 5190MHz)	63
Fig. 77	Band Edges (802.11ac-HT40, 5310MHz)	63
Fig. 78	Band Edges (802.11ac-HT40, 5510MHz)	64
Fig. 79	Band Edges (802.11ac-HT40, 5670MHz)	64
Fig. 80	Band Edges (802.11ac-HT40, 5710MHz)	65
Fig. 81	Band Edges (802.11ac-HT40, 5710MHz)	65
Fig. 82	Band Edges (802.11ac-HT80, 5210MHz)	66

Fig. 83	Band Edges (802.11ac-HT80, 5290MHz).....	66
Fig. 84	Band Edges (802.11ac-HT80, 5530MHz).....	67
Fig. 85	Band Edges (802.11ac-HT40, 5690MHz).....	67
Fig. 86	Band Edges (802.11ac-HT40, 5690MHz).....	68
A.6. TRANSMITTER SPURIOUS EMISSION		69
A.7. AC POWERLINE CONDUCTED EMISSION (150kHz- 30MHz).....		106
Fig. 87	Conducted Emission(802.11a, Ch40, TX)	107
Fig. 88	Conducted Emission(802.11a, IDLE)	108
A.8. 99% OCCUPIED BANDWIDTH		109
Fig. 89	99% Occupied bandwidth (802.11a, 5180MHz).....	110
Fig. 90	99% Occupied bandwidth (802.11a, 5200MHz).....	111
Fig. 91	99% Occupied bandwidth (802.11a, 5240MHz).....	111
Fig. 92	99% Occupied bandwidth (802.11n20, 5180MHz).....	112
Fig. 93	99% Occupied bandwidth (802.11n20, 5200MHz).....	112
Fig. 94	99% Occupied bandwidth (802.11n20, 5240MHz).....	113
Fig. 95	99% Occupied bandwidth (802.11ac20, 5180MHz)	113
Fig. 96	99% Occupied bandwidth (802.11ac20, 5200MHz)	114
Fig. 97	99% Occupied bandwidth (802.11ac20, 5240MHz)	114
Fig. 98	99% Occupied bandwidth (802.11n40, 5190MHz).....	115
Fig. 99	99% Occupied bandwidth (802.11n40, 5230MHz).....	115
Fig. 100	99% Occupied bandwidth (802.11ac40, 5190MHz)	116
Fig. 101	99% Occupied bandwidth (802.11ac40, 5230MHz)	116
Fig. 102	99% Occupied bandwidth (802.11ac80, 5210MHz)	117
A.9. FREQUENCY STABILITY		118
A.10. POWER CONTROL		118
ANNEX B: ACCREDITATION CERTIFICATE.....		119

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. TestingLocation

Location 1: CTTL(huayuan North Road)

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

Location 2:CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,
Haidian District, Beijing, P. R. China100191

Location 3:CTTL(Yuetan)

Address: No. 11 Yue Tan Nan Jie, Xicheng District, Beijing, P. R.
China100045

Location 4:CTTL(BDA)

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

Location 5:CTTL(South Branch)

Address: No.12, ShangSha Innovation and Technology Park,
Futian District, Shenzhen, Guangdong, P. R.
China518048

1.3. TestingEnvironment

Normal Temperature: 15-25℃
Relative Humidity: 20-75%

1.4. Project data

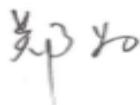
Testing Start Date: 2019-08-19
Testing End Date: 2019-09-20

1.5. Signature



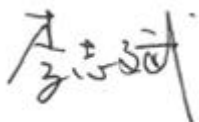
Jiang Xue

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Li Zhibin

(Approved this test report)

2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: LG Electronics Inc.
Address: LG Twin Towers,128,Yeoui-daero,Yeongdeungpo-gu
City: Seoul
Postal Code: /
Country: Korea
Telephone: +82-2-6946-1675
Fax: /

2.2. Manufacturer Information

Company Name: LG Electronics Inc.
Address: LG Twin Towers,128,Yeoui-daero,Yeongdeungpo-gu
City: Seoul
Postal Code: /
Country: Korea
Telephone: +82-2-6946-1675
Fax: /

3. EQUIPMENT UNDER TEST (EUT) AND **ANCILLARY EQUIPMENT (AE)**

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE phone with Bluetooth, WLAN
Model name	LM-X540BMW
FCC ID	ZNFX540HM
WLAN Frequency Range	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5750MHz
Type of modulation	OFDM
Antenna	Integral Antenna
Voltage	3.85V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	358619100026710/ 358619100026728	Rev.1.0	V09c-LAO-COM
EUT2	358619100027957/ 358619100027965	Rev.1.0	V09c-LAO-COM

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	Battery	/
AE2	Charger	/
AE3	USB Cable	/
AE1		
Model	BL-T45	
Manufacturer	Lishen	
Capacitance	4000mAh	
Nominal voltage	3.85V	
AE2		
Model	MCS-V01WR	
Manufacturer	Sunlin Electrocnis	
Length of cable	/	
AE3		
Model	DC15WB-G	
Manufacturer	Ningbo	

Length of cable /

*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 Multi-band GSM/WCDMA/LTE phone 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.

3.5. 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

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
Power Spectral Density	15.407	/	P
Occupied 26dB Bandwidth	15.403	/	P
Band edge compliance	15.209	/	P
Transmitter spurious emissions radiated	15.407	/	P
Spurious emissions radiated < 30 MHz	15.407	/	P
Spurious emissions conducted < 30 MHz	15.407	/	P
Frequency Stability	15.407	/	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°C
Voltage	3.85V
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	2020-05-15
2	LISN	ENV216	101459	R&S	1 year	2020-04-10
3	Test Receiver	ESCI	100766	R&S	1 year	2020-03-20
4	Shielding room	NQ(3.2*5.5*2.7)M	P1154	hankering	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	1 year	2019-11-27
2	Test Receiver	ESU26	100235	Rohde & Schwarz	1 year	2020-03-01
3	BiLog Antenna	VULB9163	9163-514	Schwarzbeck	1 year	2020-02-03
4	BiLog Antenna	VULB9163	9163-301	Schwarzbeck	1 year	2020-02-29
5	EMI Antenna	3117	00139065	ETS-Lindgren	1 year	2019-10-15
6	EMI Antenna	3115	6914	ETS-Lindgren	1 year	2019-10-15
7	EMI Antenna	3116	2663	ETS-Lindgren	1 year	2019-11-19
8	EMI Antenna	3116	2661	ETS-Lindgren	1 year	2019-10-15
9	Vector Signal Analyzer	FSV40	101047	Rohde & Schwarz	1 year	2020-05-16

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)

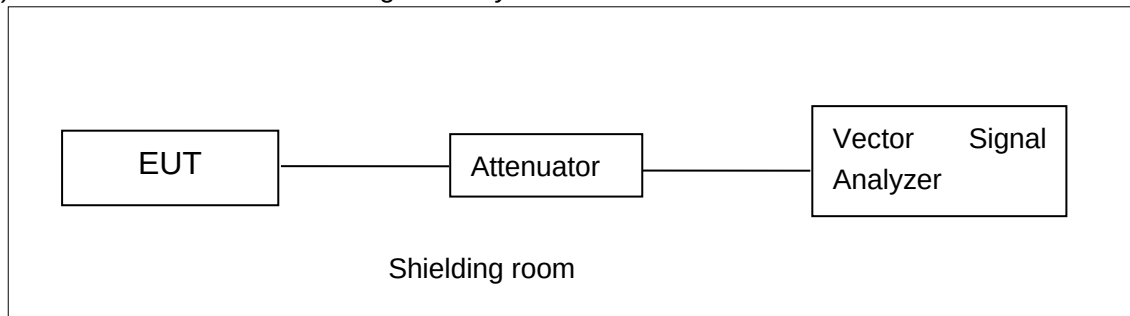
Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.40
$1\text{GHz} \leq f \leq 18\text{GHz}$	4.32
$18\text{GHz} \leq f \leq 40\text{GHz}$	5.26

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

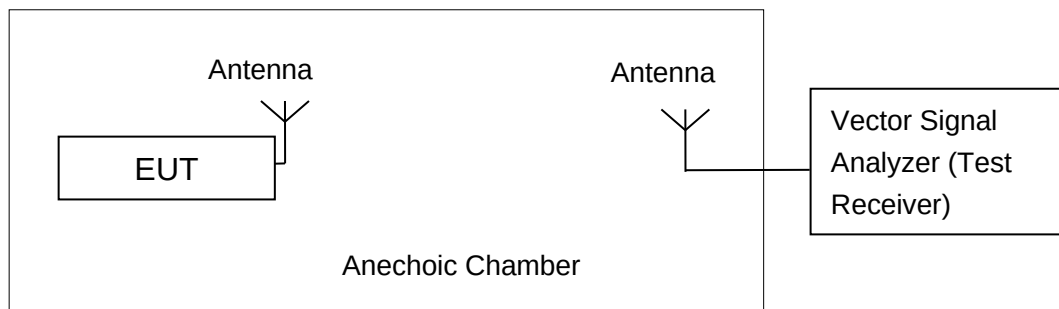


A.1.2. Radiated Emission Measurements

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 measurement method SA-1 is made according to KDB 789033

Note:

For straddle channel 20MHz Bandwidth 5720MHz, Conducted Output Power Limit:

802.11a=11+10*log(B)=22.98, B=21.55/2+5=15.78MHz,

802.11n-HT20=11+10*log(B)=23.03, B=21.90/2+5=15.78MHz,

802.11ac-VHT20=11+10*log(B)=22.86, B=20.70/2+5=15.78MHz,

For straddle channel 40/80MHz Bandwidth, conducted output power limit=24 dBm

802.11n-HT40: B=41.12/2+15=35.56MHz,

802.11ac-VHT40: B=40.80/2+15=35.40MHz,

802.11ac-VHT80: B=81.44/2+35=75.72MHz,

Measurement Results:

802.11a mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz	11.51	/	/	/	/	/	/	/
	5200MHz	11.95	/	/	/	/	/	/	/
	5240MHz	12.98	/	/	/	/	/	/	/
	5260MHz	13.06	12.97	12.86	12.82	12.69	12.16	11.16	11.10
	5280MHz	13.00	/	/	/	/	/	/	/
	5320MHz	12.57	/	/	/	/	/	/	/
	5500MHz	13.71	/	/	/	/	/	/	/
	5580MHz	14.64	/	/	/	/	/	/	/
	5700MHz	14.34	/	/	/	/	/	/	/
	5720MHz	14.26	/	/	/	/	/	/	/

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

802.11n-HT20 mode

Mode	Channel	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT20)	5180MHz	12.06	11.83	11.90	11.82	11.67	11.17	10.71	10.73
	5200MHz	12.27	/	/	/	/	/	/	/
	5240MHz	12.82	/	/	/	/	/	/	/

	5260MHz	13.10	/	/	/	/	/	/	/
	5280MHz	13.11	/	/	/	/	/	/	/
	5320MHz	13.41	/	/	/	/	/	/	/
	5500MHz	13.95	/	/	/	/	/	/	/
	5580MHz	13.71	/	/	/	/	/	/	/
	5700MHz	14.01	/	/	/	/	/	/	/
	5720MHz	13.84	/	/	/	/	/	/	/

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

802.11ac-HT20 mode

Mode	Channel	Test Result (dBm)								
		Data Rate								
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
802.11ac (HT20)	5180MHz	10.32	10.80	10.16	10.05	10.41	10.27	9.84	10.15	8.73
	5200MHz	/	11.03	/	/	/	/	/	/	/
	5240MHz	/	11.02	/	/	/	/	/	/	/
	5260MHz	/	11.20	/	/	/	/	/	/	/
	5280MHz	/	11.79	/	/	/	/	/	/	/
	5320MHz	/	11.73	/	/	/	/	/	/	/
	5500MHz	/	12.30	/	/	/	/	/	/	/
	5580MHz	/	12.61	/	/	/	/	/	/	/
	5700MHz	/	12.92	/	/	/	/	/	/	/
	5720MHz	/	12.91	/	/	/	/	/	/	/

The data rate MCS1 is selected as worse condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Channel	Test Result (dBm)							
		Data Rate							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT40)	5190MHz	12.21	11.97	11.98	11.74	11.74	11.22	10.77	10.77
	5230MHz	12.70	/	/	/	/	/	/	/
	5270MHz	12.90	/	/	/	/	/	/	/
	5310MHz	13.33	/	/	/	/	/	/	/
	5510MHz	14.01	/	/	/	/	/	/	/
	5550MHz	13.81	/	/	/	/	/	/	/
	5670MHz	13.89	/	/	/	/	/	/	/
	5710MHz	13.62	/	/	/	/	/	/	/

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

802.11ac-HT40 mode

Mode	Channel	Test Result (dBm)									
		Data Rate									
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac (HT40)	5190MHz	9.38	9.33	8.50	8.63	8.30	7.99	7.70	7.49	6.84	4.54
	5230MHz	10.23	/	/	/	/	/	/	/	/	/
	5270MHz	10.54	/	/	/	/	/	/	/	/	/
	5310MHz	10.76	/	/	/	/	/	/	/	/	/
	5510MHz	11.10	/	/	/	/	/	/	/	/	/
	5550MHz	10.85	/	/	/	/	/	/	/	/	/
	5670MHz	11.16	/	/	/	/	/	/	/	/	/
	5710MHz	10.97	/	/	/	/	/	/	/	/	/

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

802.11ac-HT80 mode

Mode	Channel	Test Result (dBm)									
		Data Rate									
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
802.11ac (HT80)	5210MHz	9.03	8.81	8.38	7.95	7.54	7.28	6.93	6.94	6.94	3.18
	5290MHz	10.21	/	/	/	/	/	/	/	/	/
	5530MHz	10.96	/	/	/	/	/	/	/	/	/
	5610MHz	11.13	/	/	/	/	/	/	/	/	/
	5690MHz	11.17	/	/	/	/	/	/	/	/	/

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 SA-1 is made according to KDB 789033

Measurement Results:

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
------	---------	----------------------------------	------------

802.11a	5180 MHz	1.58	P
	5200 MHz	1.60	P
	5240 MHz	2.16	P
	5260 MHz	2.39	P
	5280 MHz	2.25	P
	5320 MHz	2.81	P
	5500 MHz	3.86	P
	5580 MHz	3.03	P
	5700 MHz	3.40	P
	5720 MHz	4.81	P

802.11n HT20	5180 MHz	1.74	P
	5200 MHz	1.49	P
	5240 MHz	1.89	P
	5260 MHz	2.14	P
	5280 MHz	2.37	P
	5320 MHz	2.40	P
	5500 MHz	3.04	P
	5580 MHz	3.09	P
	5700 MHz	3.32	P
	5720 MHz	4.55	P

802.11ac HT20	5180 MHz	2.06	P
	5200 MHz	2.57	P
	5240 MHz	2.58	P
	5260 MHz	3.21	P
	5280 MHz	3.22	P
	5320 MHz	3.42	P
	5500 MHz	4.54	P

	5580 MHz	4.05	P
	5700 MHz	3.99	P
	5720 MHz	3.82	P

802.11n HT40	5190 MHz	-1.54	P
	5230 MHz	-1.26	P
	5270 MHz	-0.88	P
	5310 MHz	-0.27	P
	5510 MHz	0.23	P
	5550 MHz	0.08	P
	5670 MHz	0.23	P
	5710 MHz	1.56	P

802.11ac HT40	5190 MHz	-1.38	P
	5230 MHz	-1.33	P
	5270 MHz	-1.49	P
	5310 MHz	-0.91	P
	5510 MHz	0.36	P
	5550 MHz	-0.43	P
	5670 MHz	-0.08	P
	5710 MHz	-0.50	P

802.11ac HT80	5210 MHz	-4.78	P
	5290 MHz	-4.63	P
	5530 MHz	-2.69	P
	5610 MHz	-3.38	P
	5690 MHz	-2.77	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	Channel	Occupied 26dB Bandwidth (MHz)	conclusion
------	---------	--------------------------------	------------

802.11a	5180 MHz	Fig.1	20.85	P
	5200 MHz	Fig.2	20.50	P
	5240 MHz	Fig.3	20.70	P
	5260 MHz	Fig.4	20.60	P
	5280 MHz	Fig.5	20.65	P
	5320 MHz	Fig.6	21.00	P
	5500 MHz	Fig.7	21.15	P
	5580 MHz	Fig.8	20.70	P
	5700 MHz	Fig.9	20.75	P
	5720 MHz	Fig.10	21.55	P

802.11n HT20	5180 MHz	Fig.11	21.00	P
	5200 MHz	Fig.12	20.90	P
	5240 MHz	Fig.13	20.85	P
	5260 MHz	Fig.14	20.85	P
	5280 MHz	Fig.15	21.05	P
	5320 MHz	Fig.16	20.95	P
	5500 MHz	Fig.17	20.90	P
	5580 MHz	Fig.18	20.95	P
	5700 MHz	Fig.19	20.85	P
	5720 MHz	Fig.20	21.90	P

802.11ac HT20	5180 MHz	Fig.21	20.50	P
	5200 MHz	Fig.22	20.65	P
	5240 MHz	Fig.23	20.65	P
	5260 MHz	Fig.24	20.70	P
	5280 MHz	Fig.25	20.65	P
	5320 MHz	Fig.26	20.65	P
	5500 MHz	Fig.27	20.60	P
	5580 MHz	Fig.28	20.55	P

	5700 MHz	Fig.29	20.70	P
	5720 MHz	Fig.30	20.70	P

802.11n HT40	5190 MHz	Fig.31	41.20	P
	5230 MHz	Fig.32	41.04	P
	5270 MHz	Fig.33	40.88	P
	5310 MHz	Fig.34	40.96	P
	5510 MHz	Fig.35	41.04	P
	5550 MHz	Fig.36	41.12	P
	5670 MHz	Fig.37	40.88	P
	5710 MHz	Fig.38	41.12	P

802.11ac HT40	5190 MHz	Fig.39	40.88	P
	5230 MHz	Fig.40	41.20	P
	5270 MHz	Fig.41	40.96	P
	5310 MHz	Fig.42	40.96	P
	5510 MHz	Fig.43	41.04	P
	5550 MHz	Fig.44	41.12	P
	5670 MHz	Fig.45	40.80	P
	5710 MHz	Fig.46	40.80	P

802.11ac HT80	5210MHz	Fig.47	81.28	P
	5290MHz	Fig.48	81.44	P
	5530MHz	Fig.49	81.44	P
	5610MHz	Fig.50	81.28	P
	5690 MHz	Fig.51	81.44	P

Conclusion: PASS
Test graphs as below:

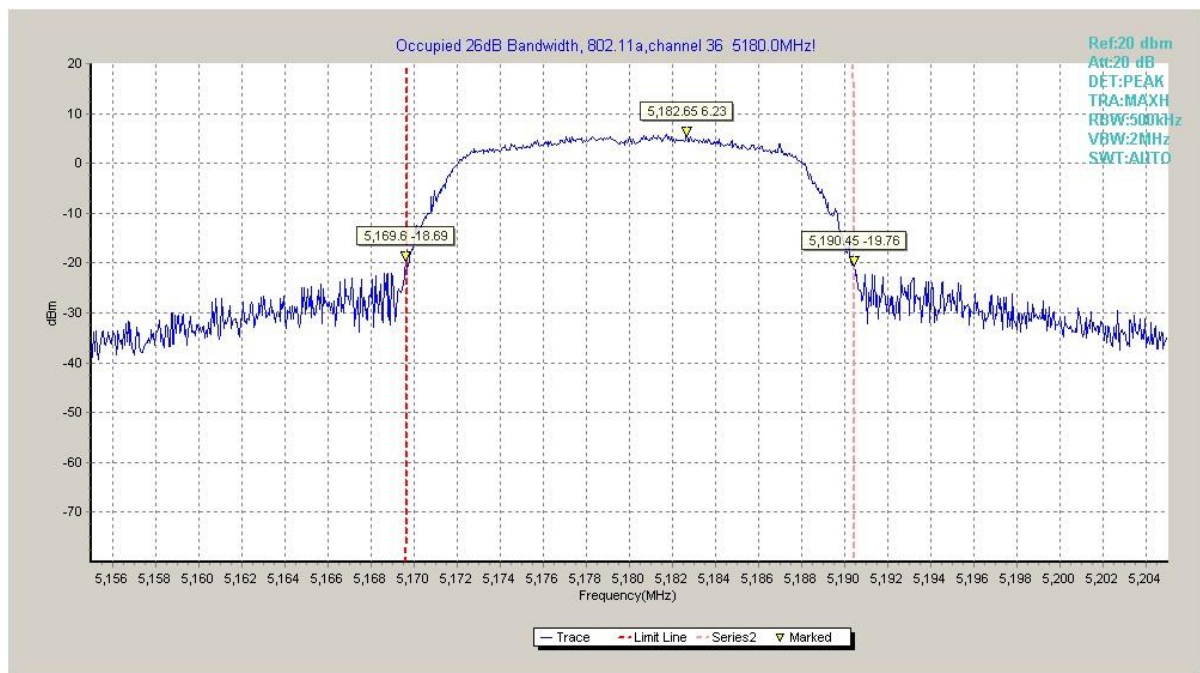


Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

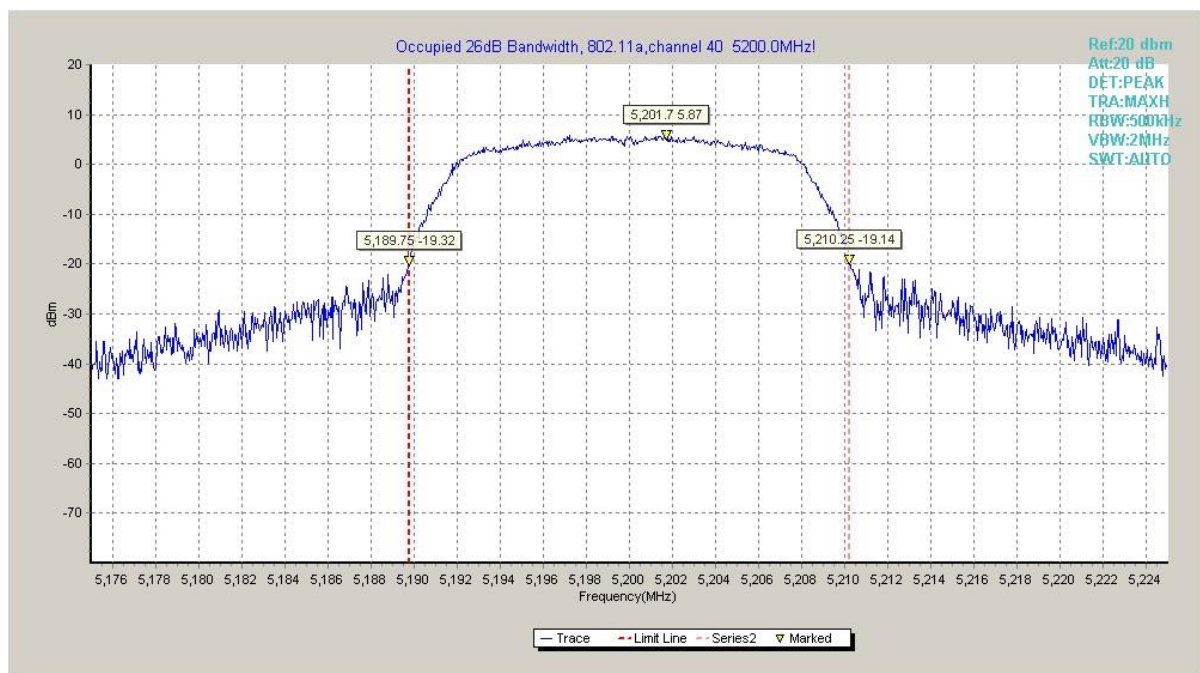


Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)

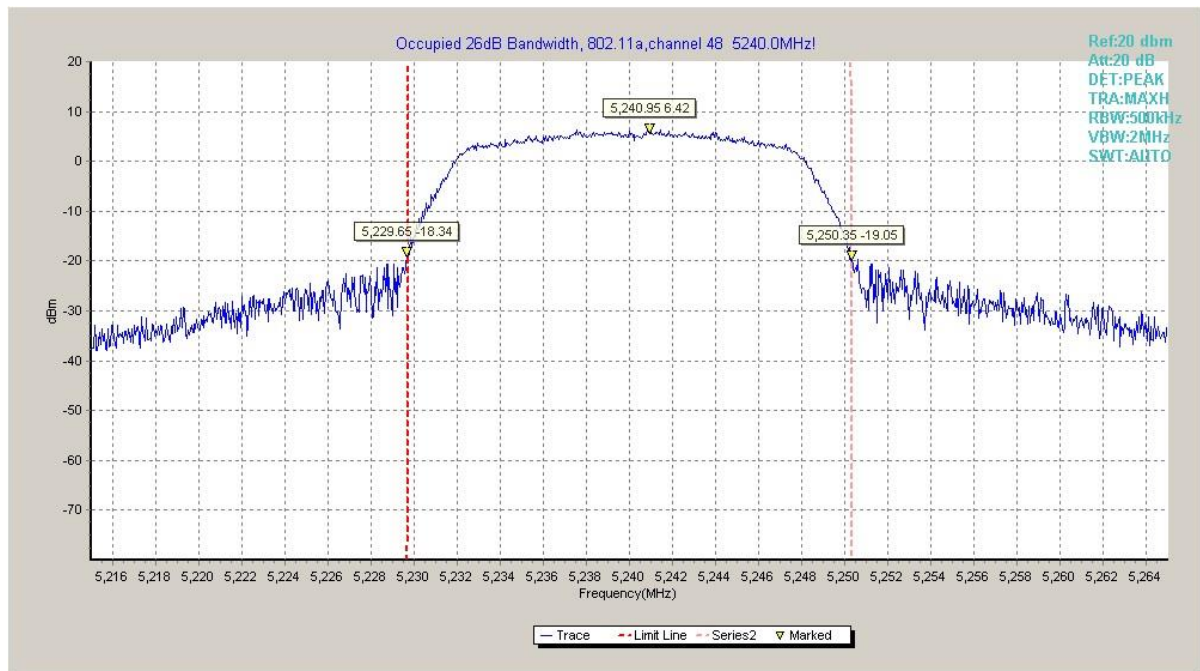


Fig. 3 Occupied 26dB Bandwidth (802.11a, 5240MHz)

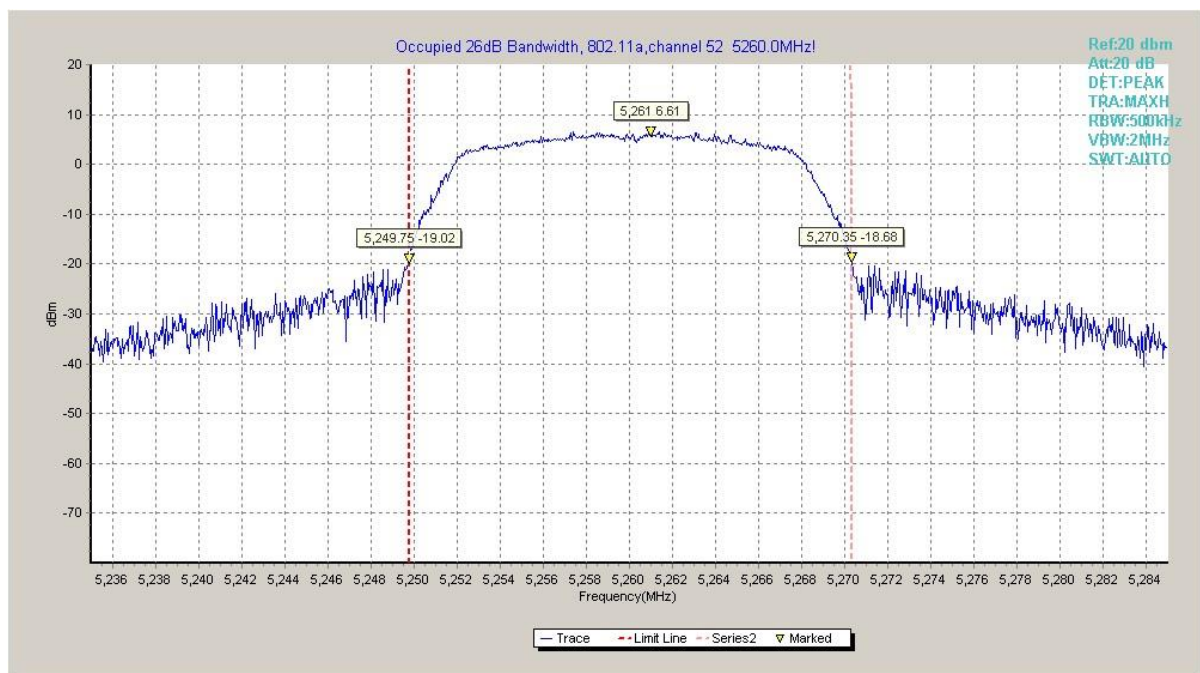


Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz)

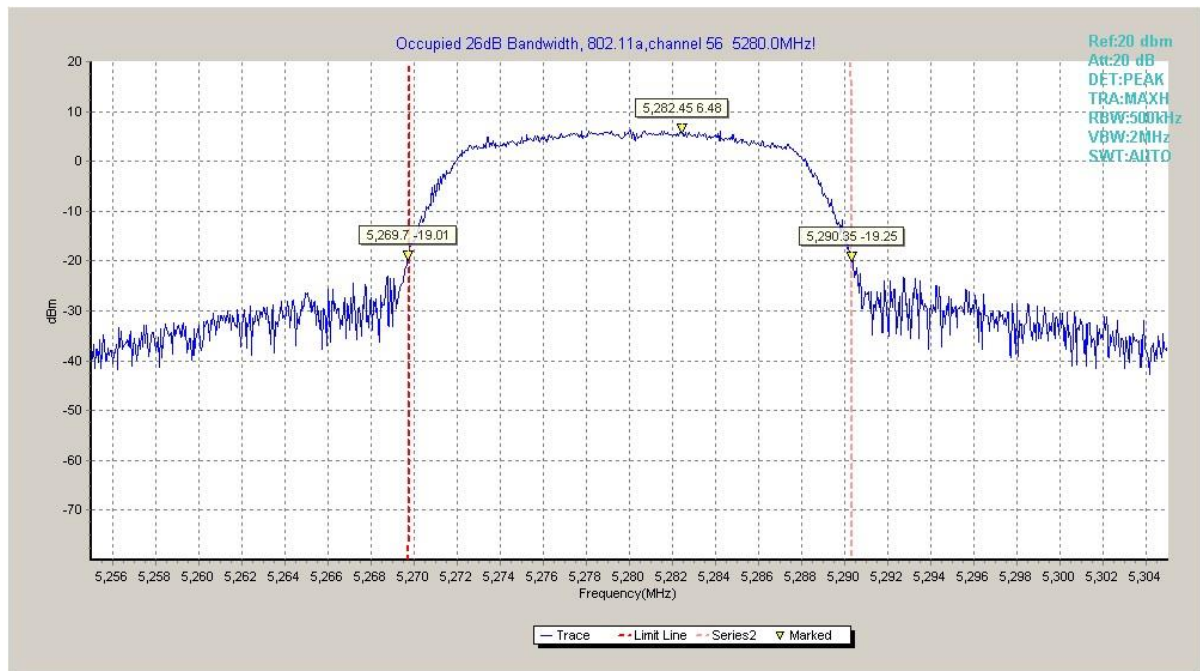


Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz)



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

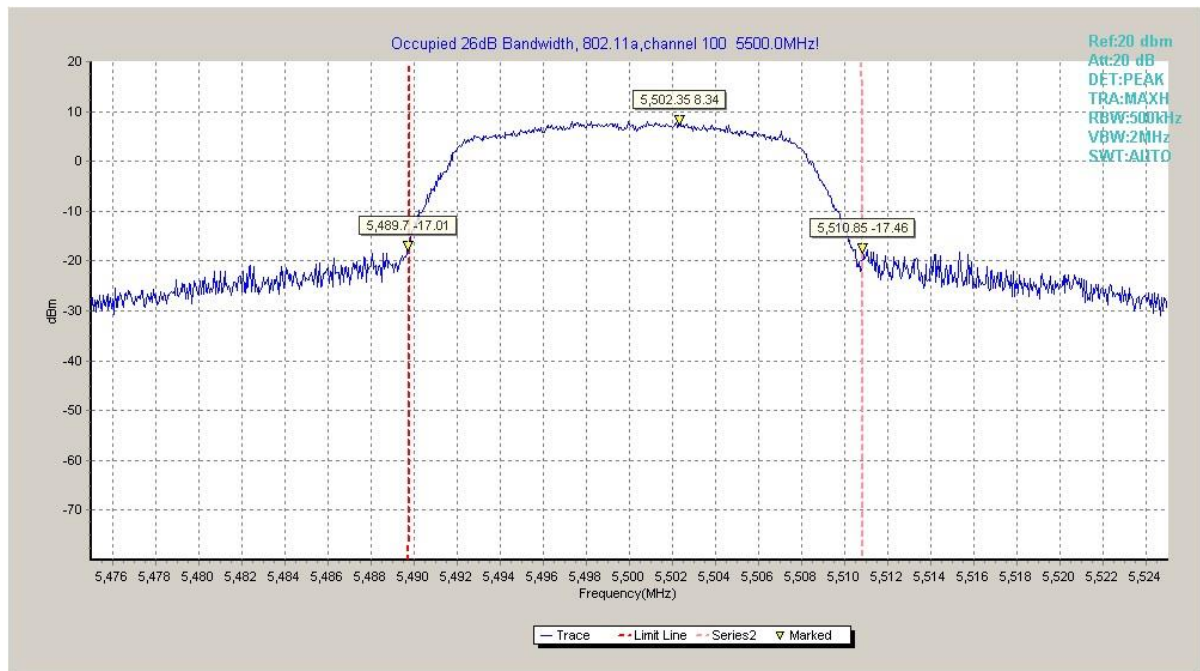


Fig. 7 Occupied 26dB Bandwidth (802.11a, 5500MHz)

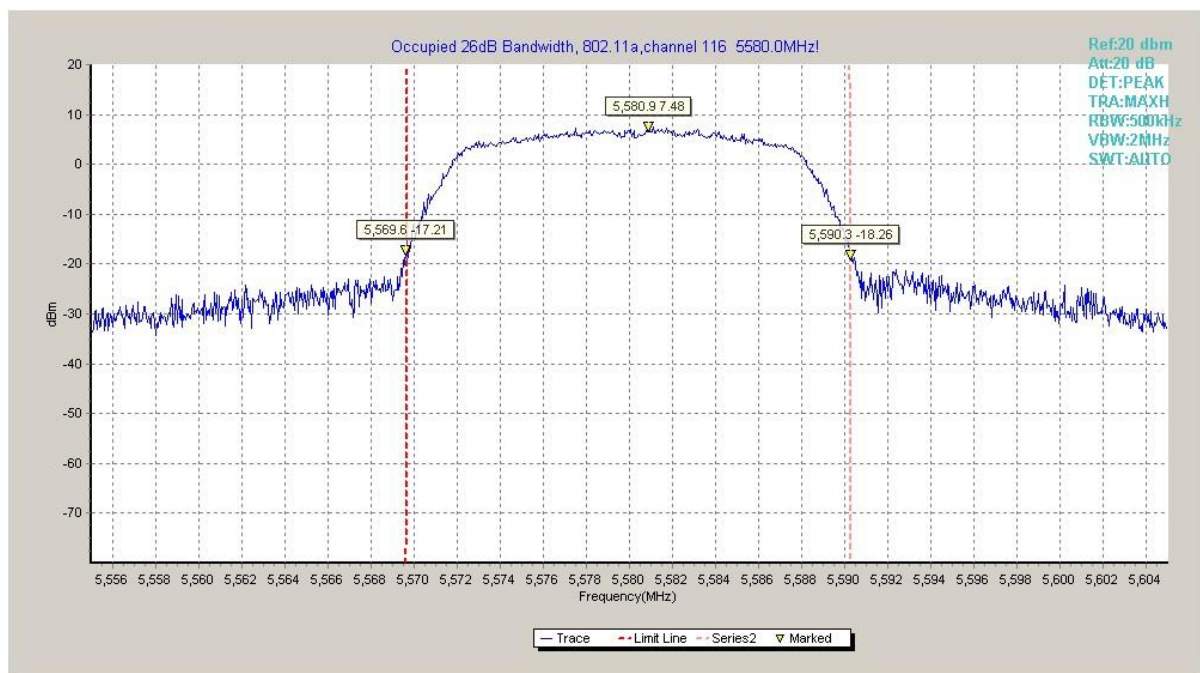


Fig. 8 Occupied 26dB Bandwidth (802.11a, 5580MHz)

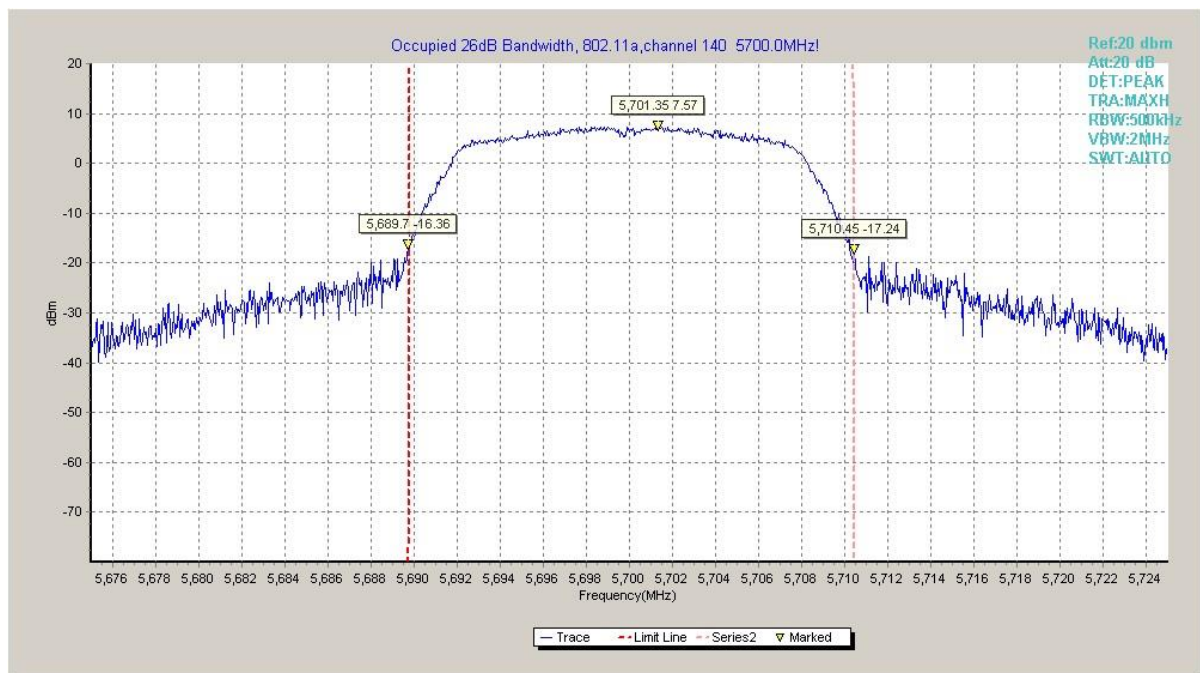


Fig. 9 Occupied 26dB Bandwidth (802.11a, 5700MHz)

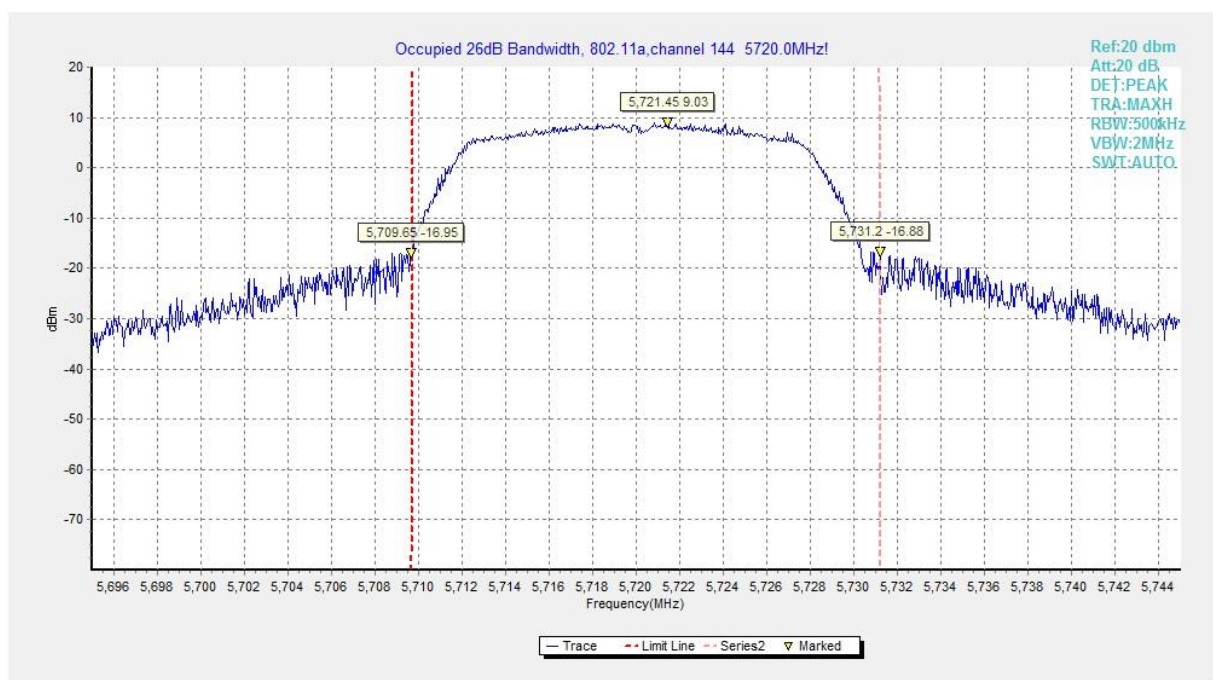


Fig. 10 Occupied 26dB Bandwidth (802.11a, 5720MHz)

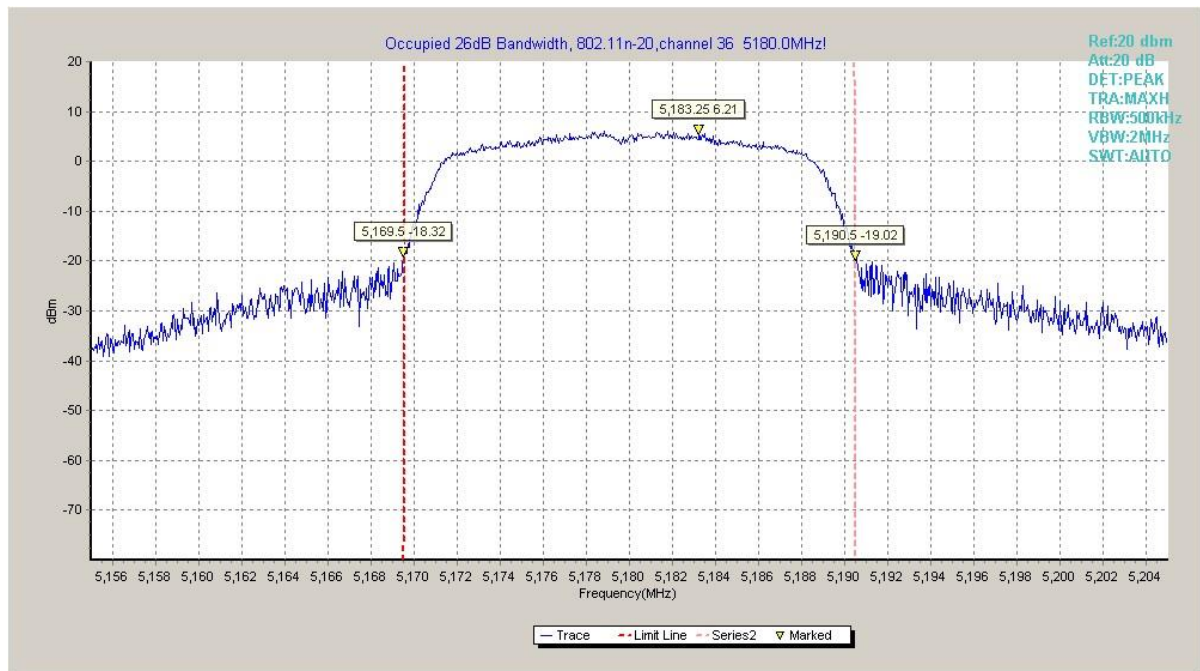


Fig. 11 Occupied 26dB Bandwidth (802.11n20, 5180MHz)

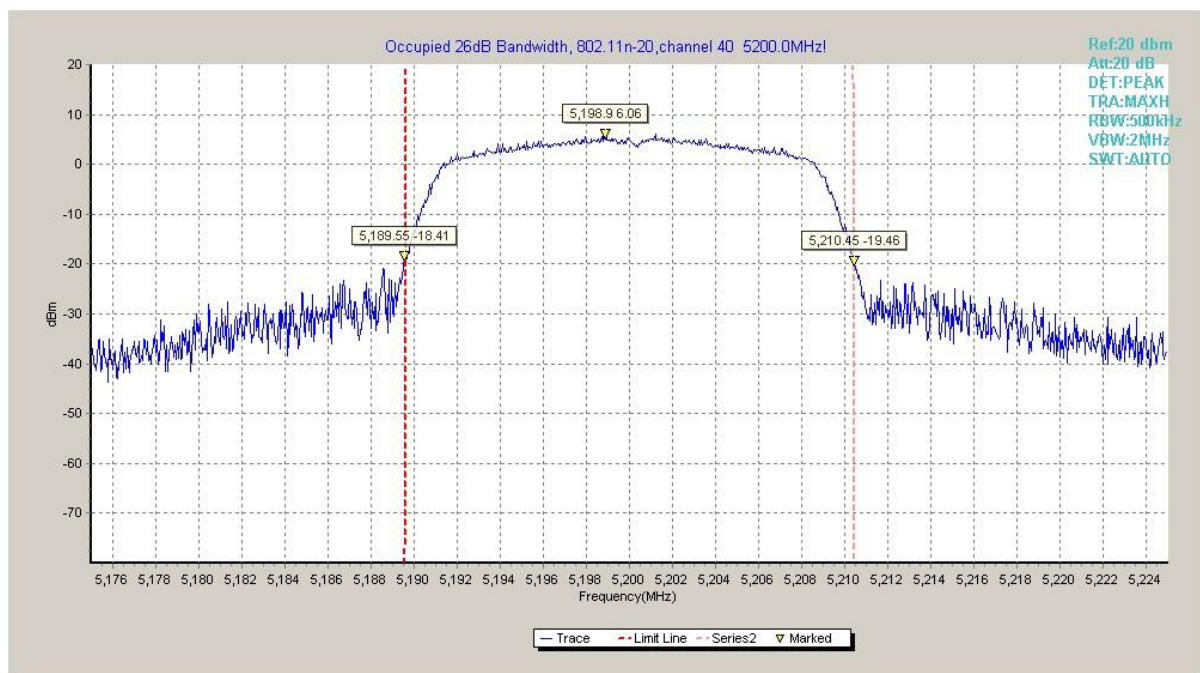


Fig. 12 Occupied 26dB Bandwidth (802.11n20, 5200MHz)

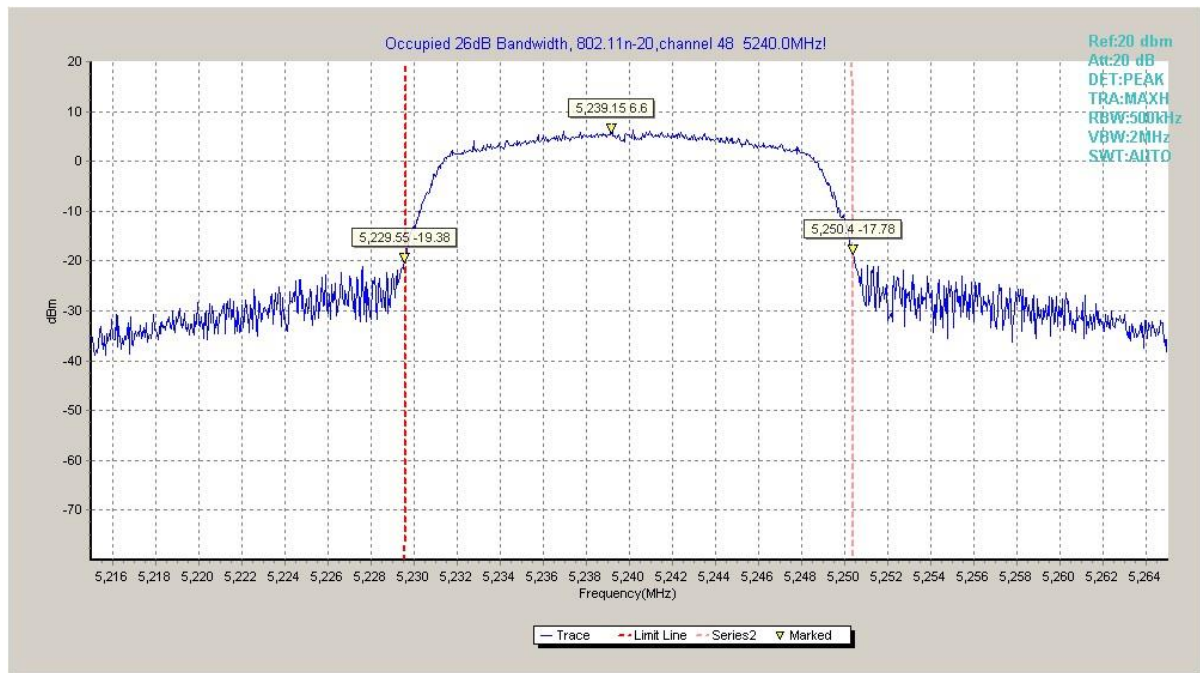


Fig. 13 Occupied 26dB Bandwidth (802.11n20, 5240MHz)

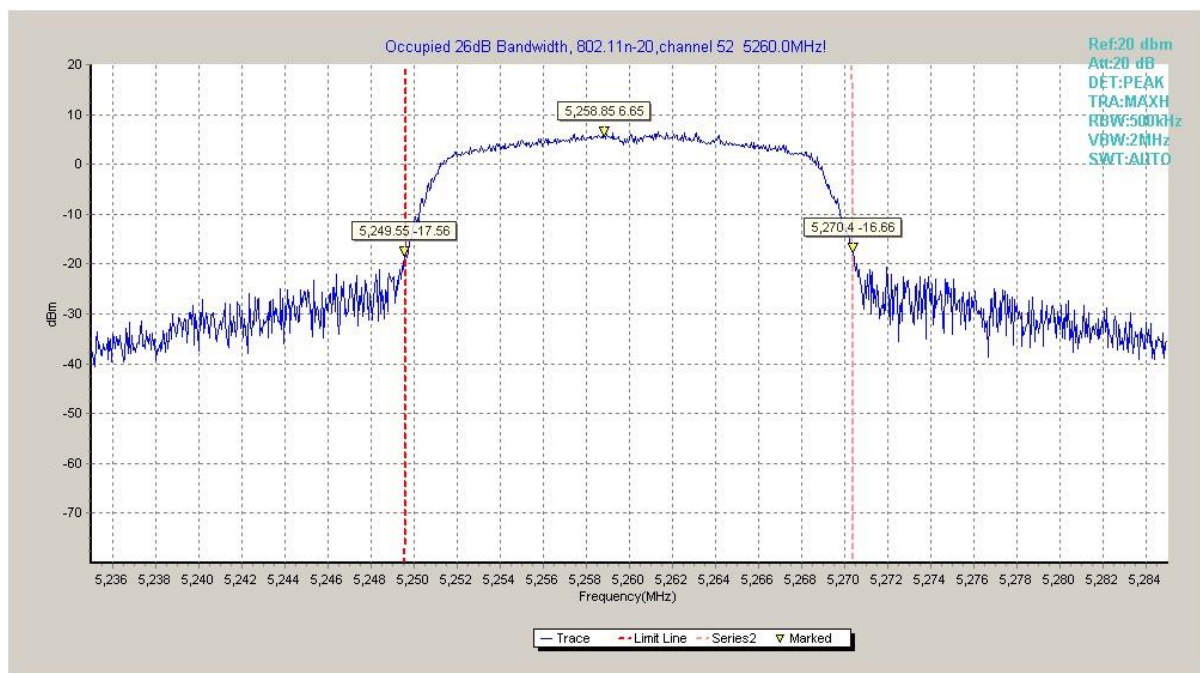


Fig. 14 Occupied 26dB Bandwidth (802.11n20, 5260MHz)

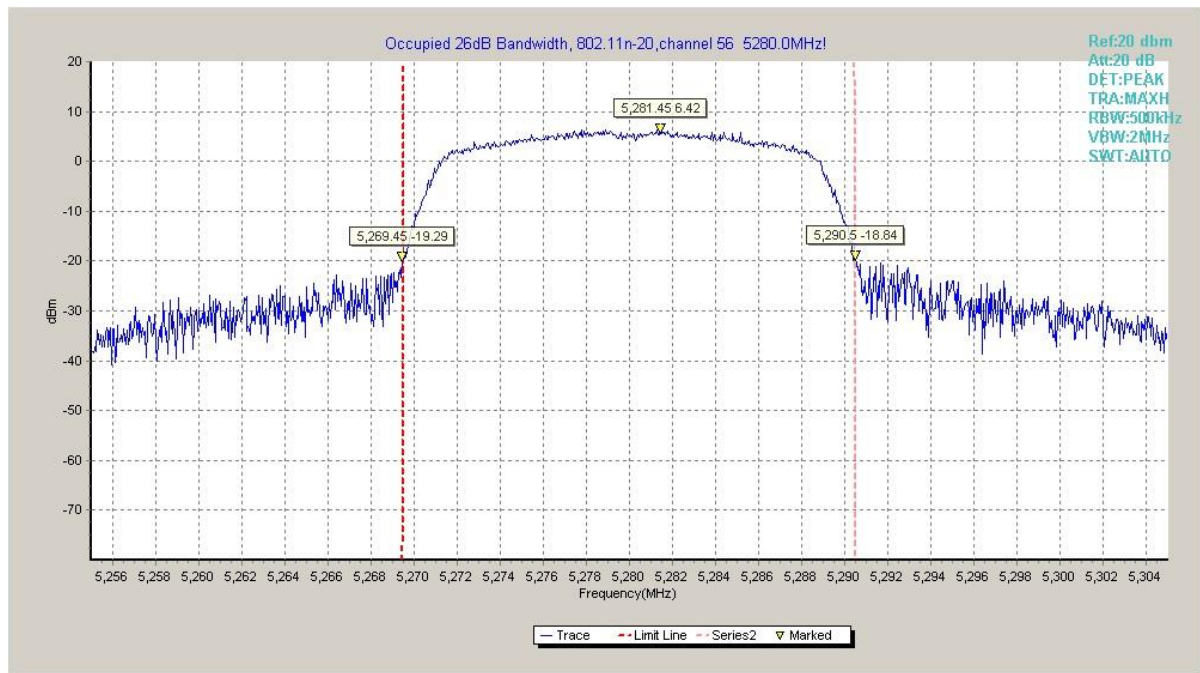


Fig. 15 Occupied 26dB Bandwidth (802.11n20, 5280MHz)

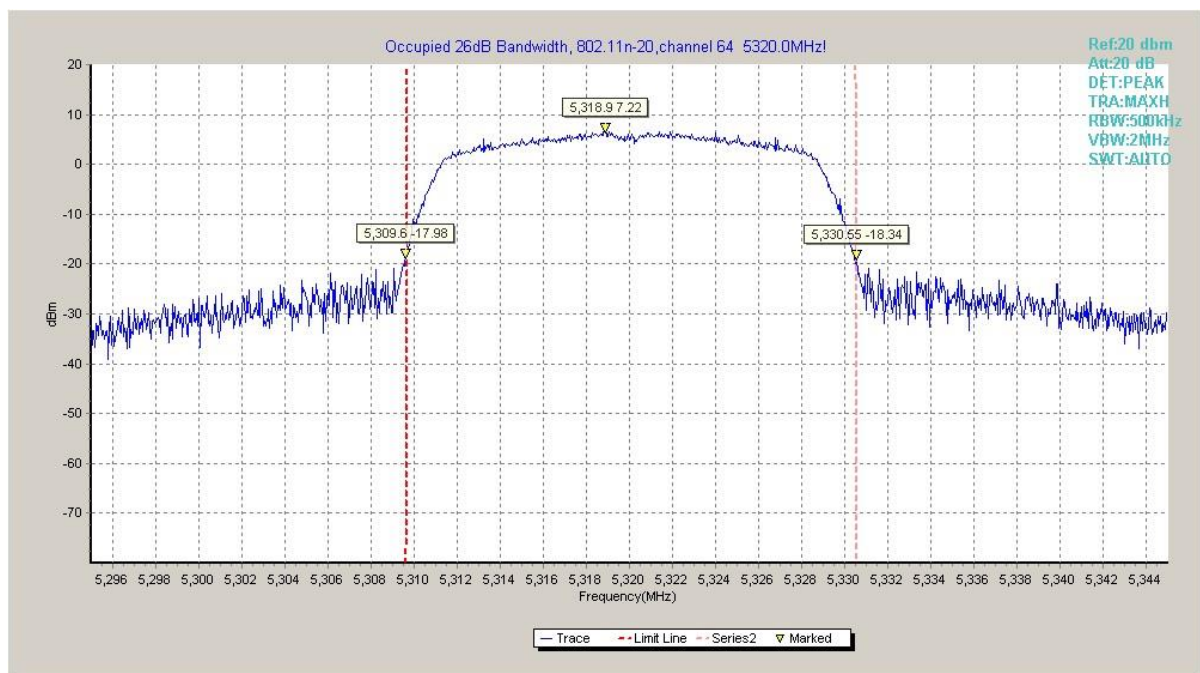


Fig. 16 Occupied 26dB Bandwidth (802.11n20, 5320MHz)

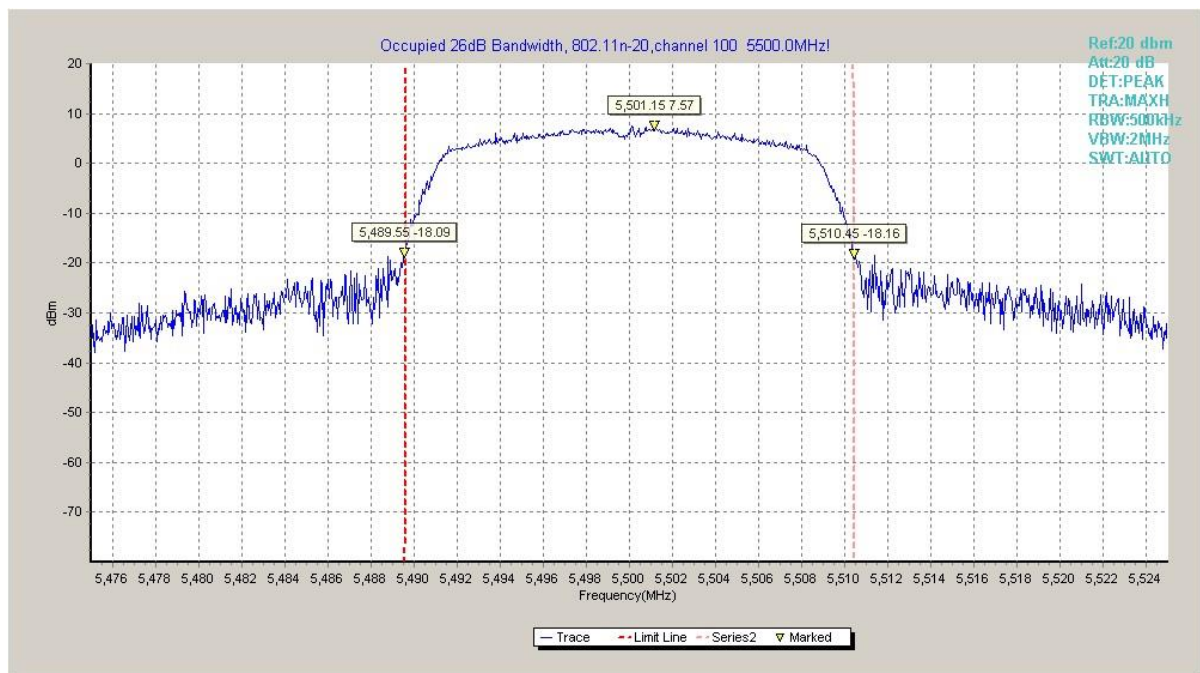


Fig. 17 Occupied 26dB Bandwidth (802.11n20, 5500MHz)

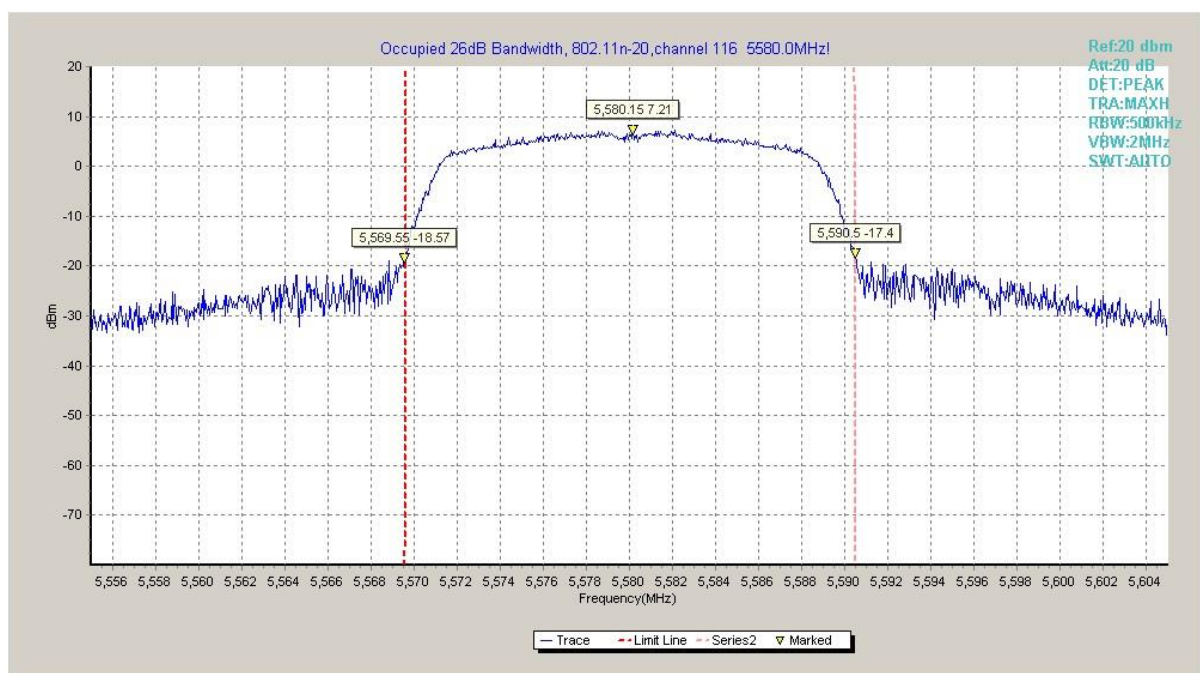


Fig. 18 Occupied 26dB Bandwidth (802.11n20, 5580MHz)

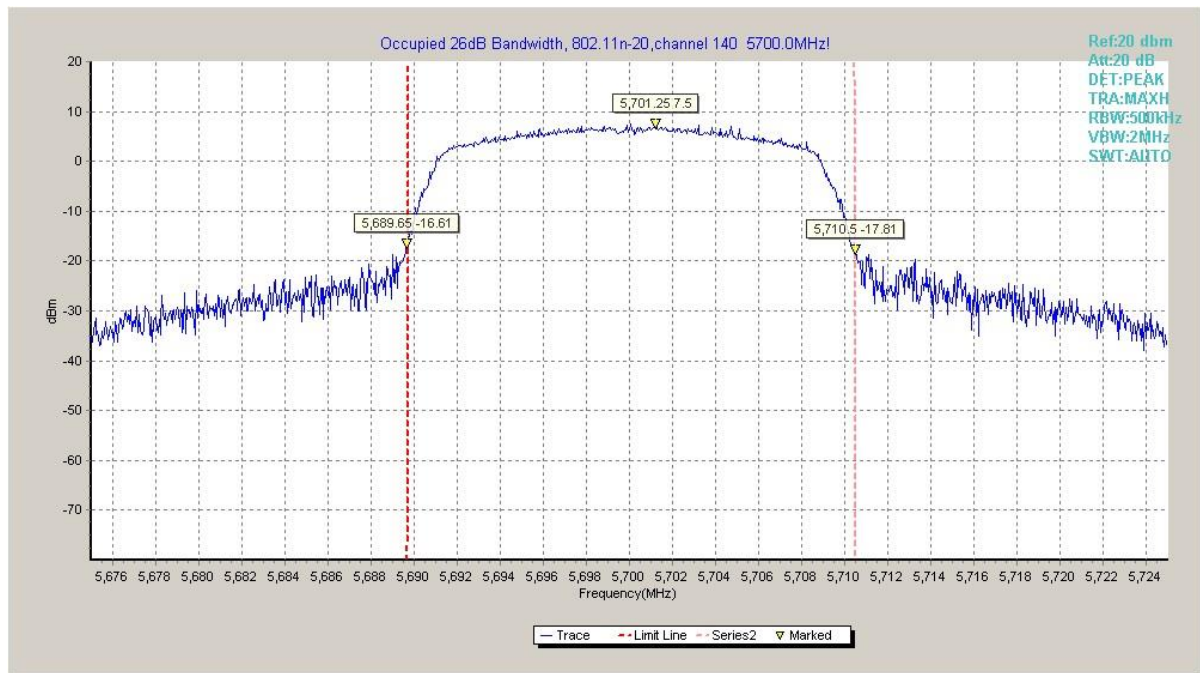


Fig. 19 Occupied 26dB Bandwidth (802.11n20, 5700MHz)

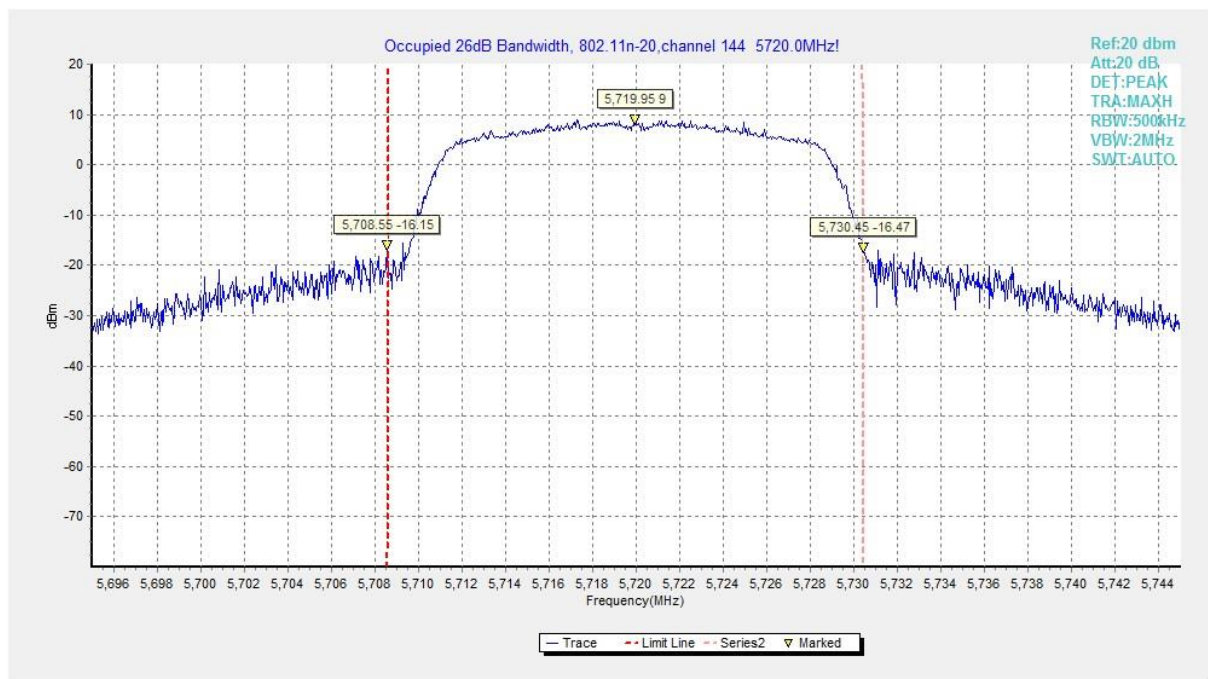


Fig. 20 Occupied 26dB Bandwidth (802.11n20, 5720MHz)

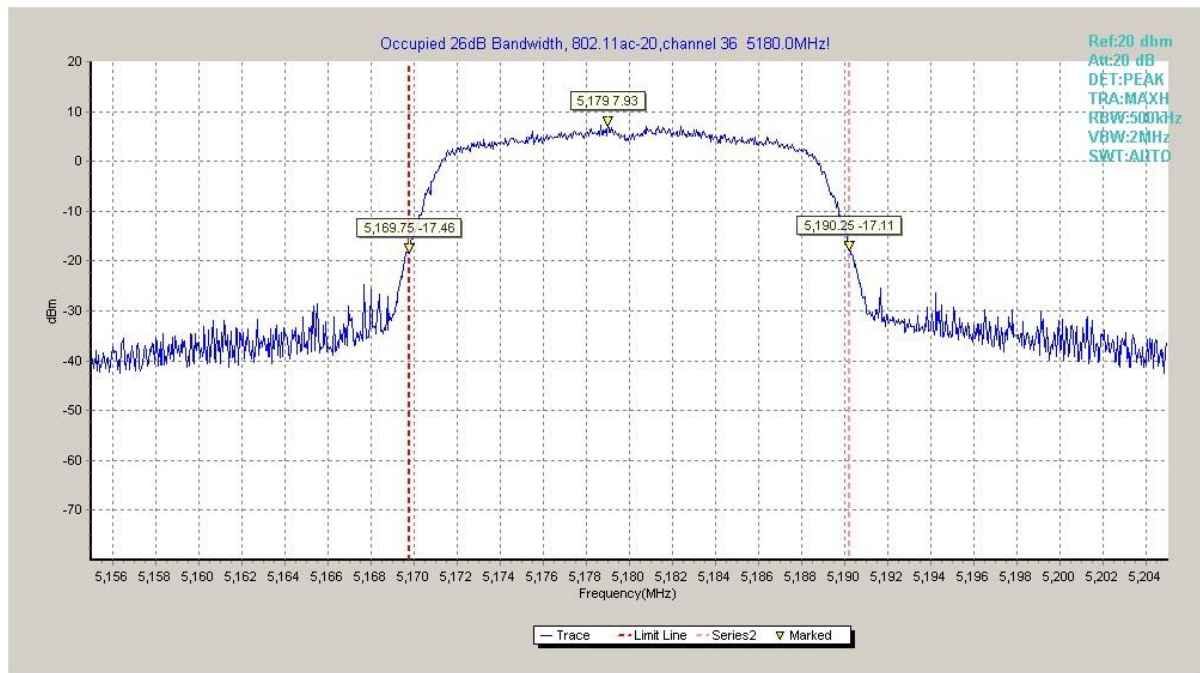


Fig. 21 Occupied 26dB Bandwidth (802.11ac20, 5180MHz)

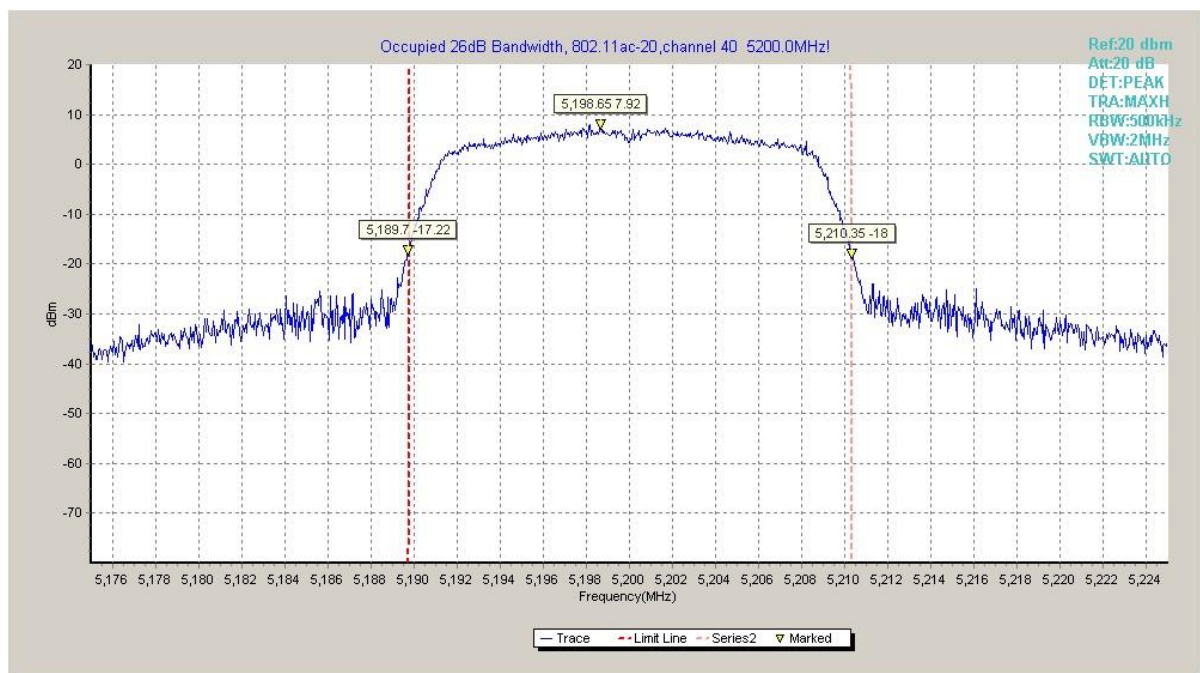


Fig. 22 Occupied 26dB Bandwidth (802.11ac20, 5200MHz)

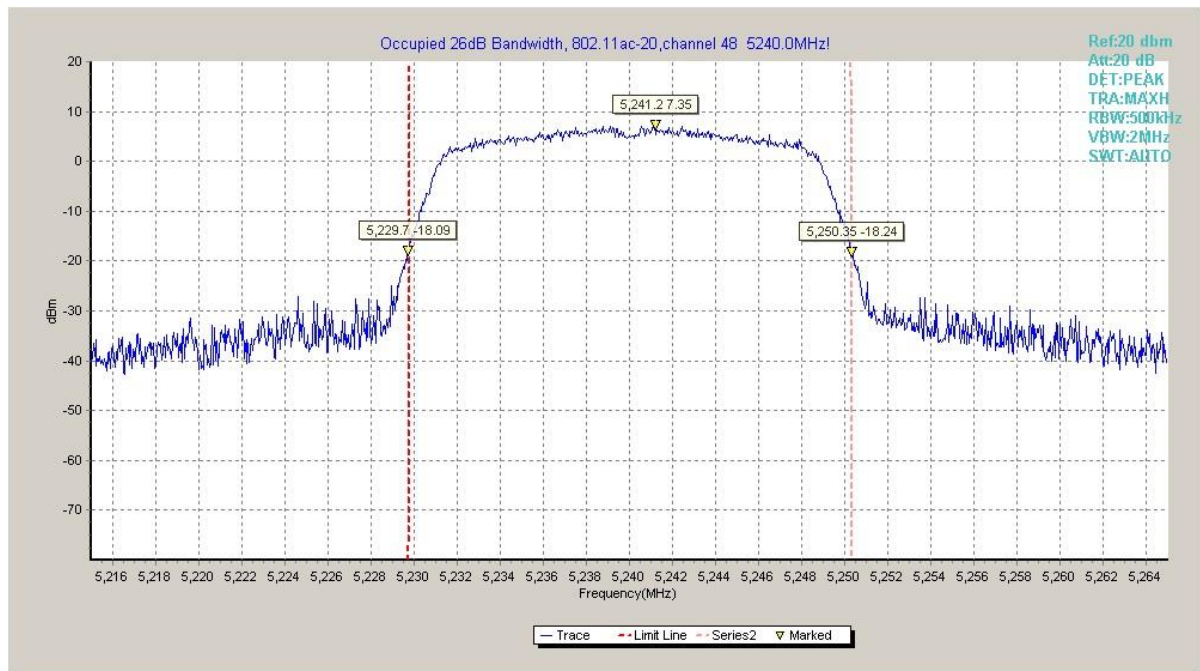


Fig. 23 Occupied 26dB Bandwidth (802.11ac20, 5240MHz)

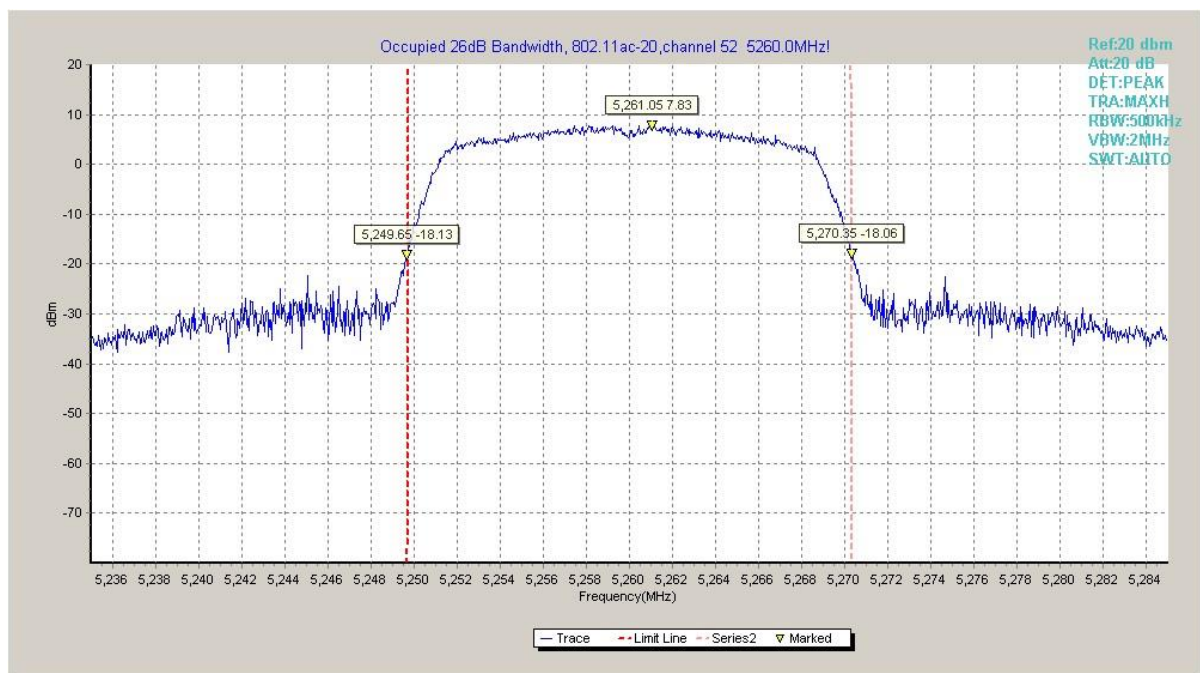


Fig. 24 Occupied 26dB Bandwidth (802.11ac20, 5260MHz)

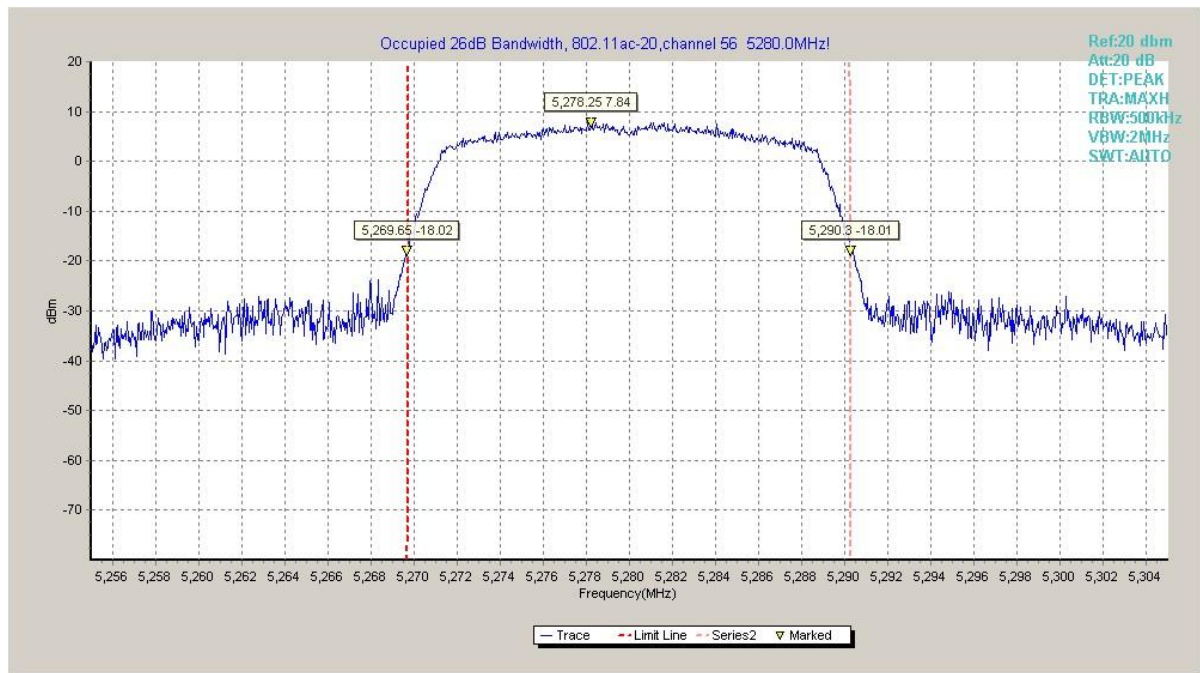


Fig. 25 Occupied 26dB Bandwidth (802.11ac20, 5280MHz)

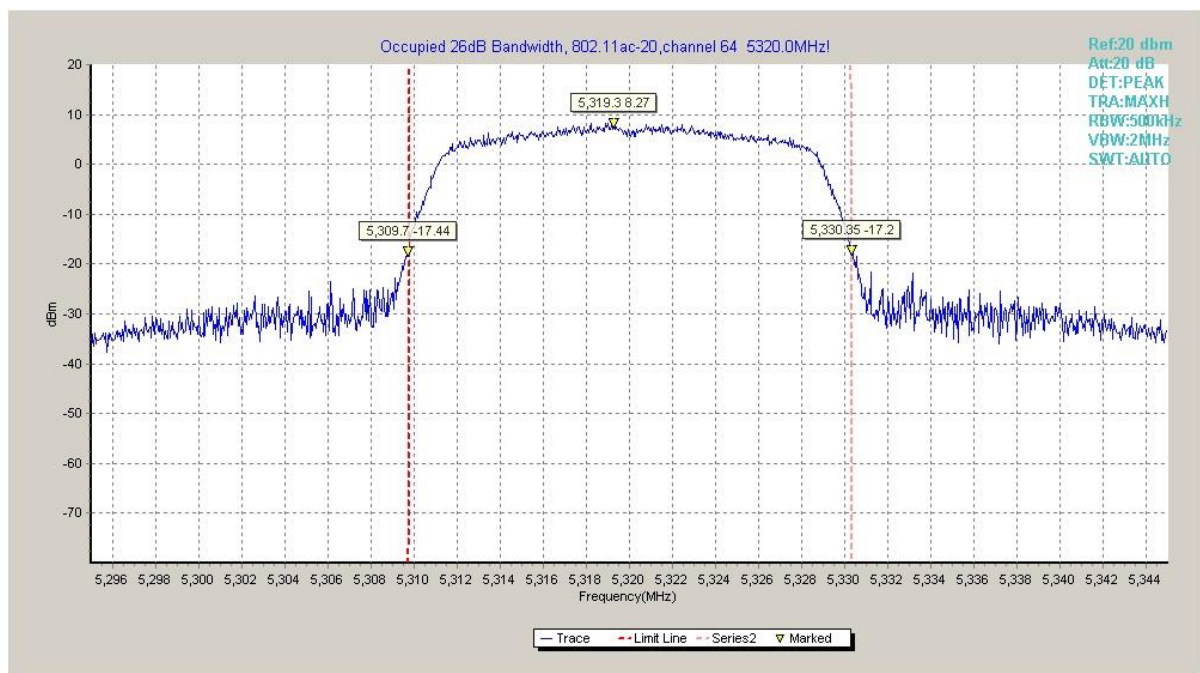


Fig. 26 Occupied 26dB Bandwidth (802.11ac20, 5320MHz)

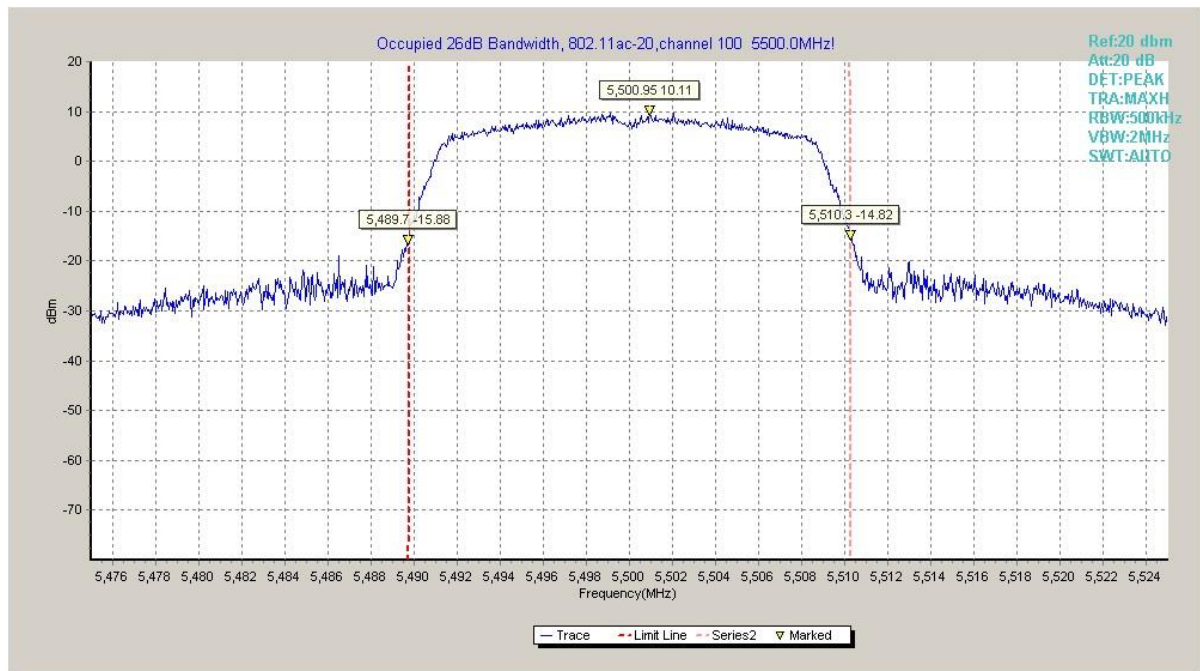


Fig. 27 Occupied 26dB Bandwidth (802.11ac20, 5500MHz)

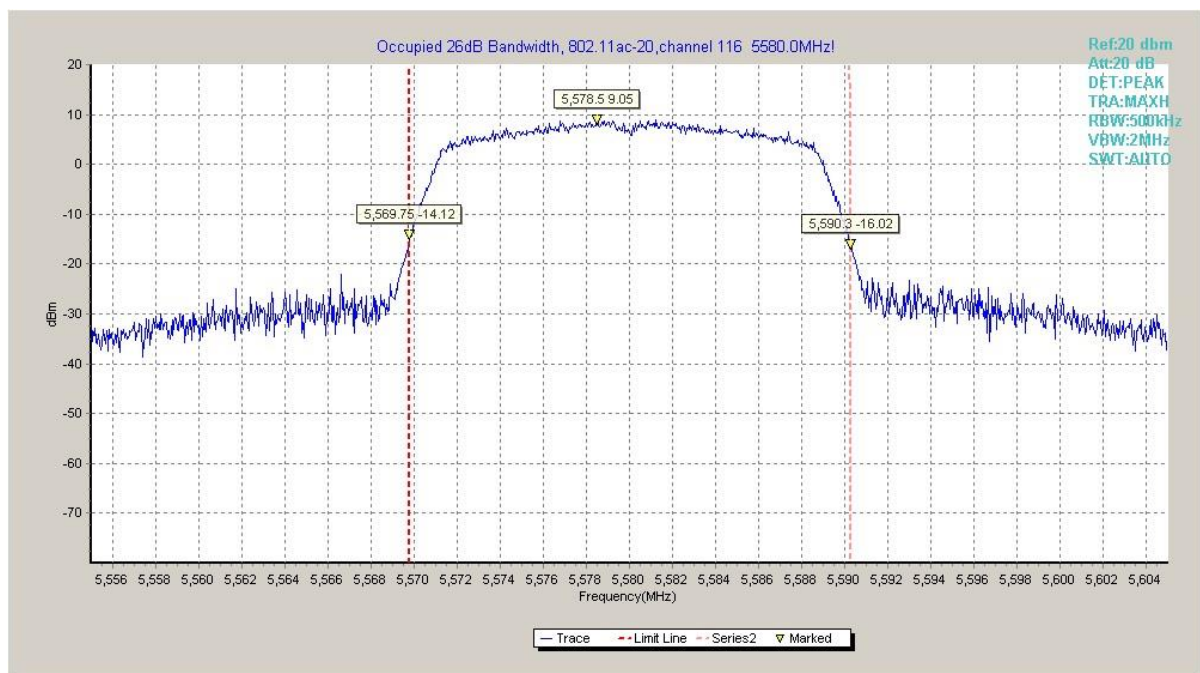


Fig. 28 Occupied 26dB Bandwidth (802.11ac20, 5580MHz)

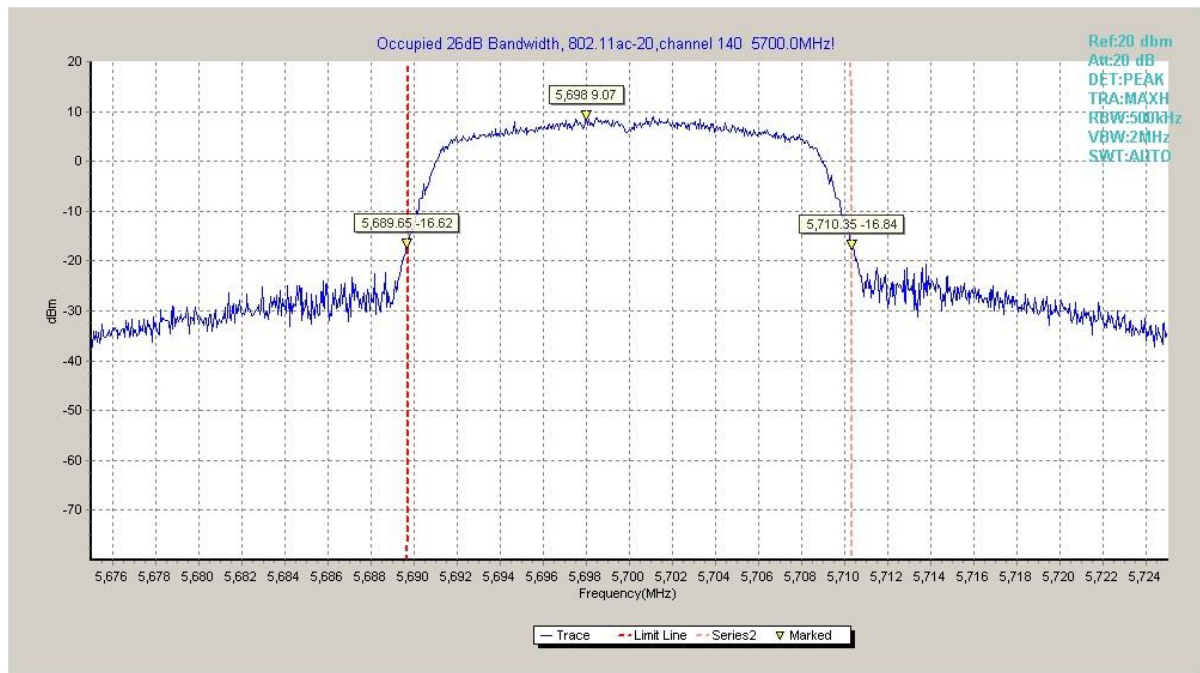


Fig. 29 Occupied 26dB Bandwidth (802.11ac20, 5700MHz)

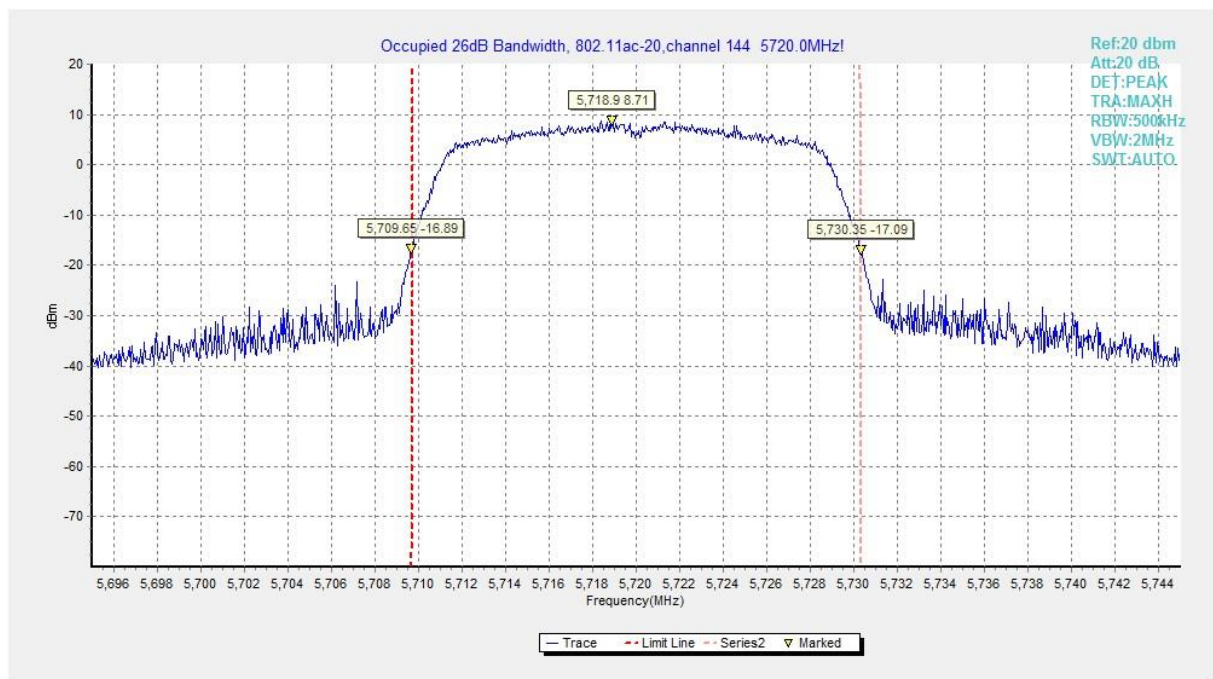


Fig. 30 Occupied 26dB Bandwidth (802.11ac20, 5720MHz)

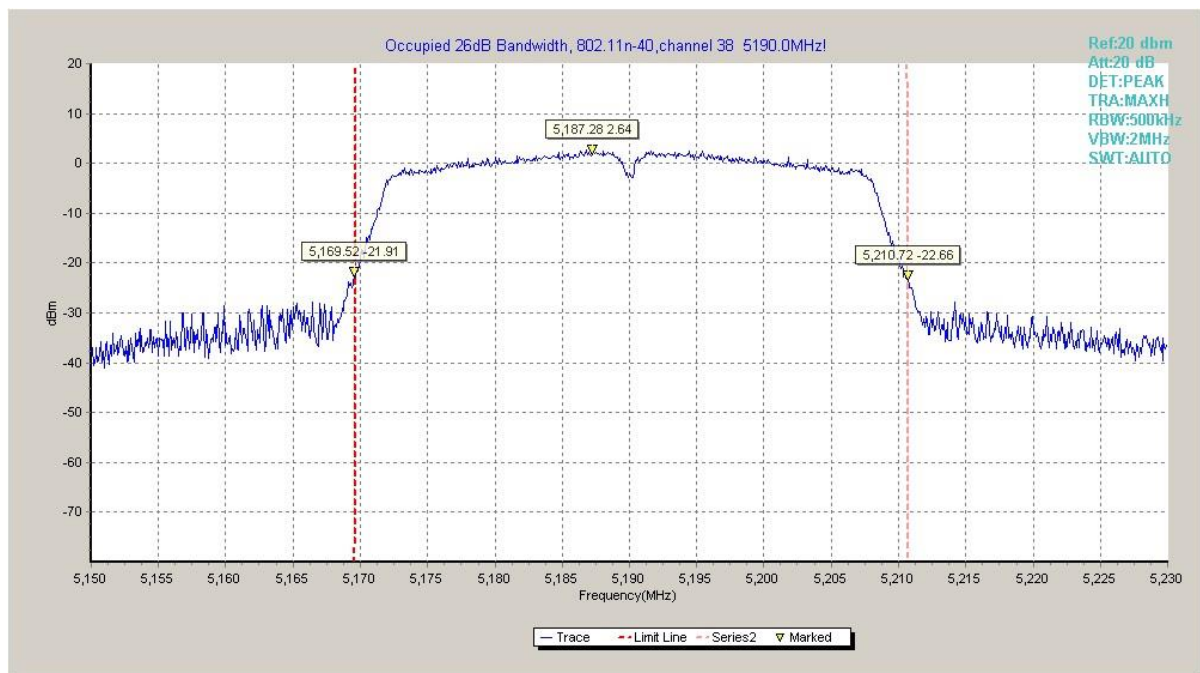


Fig. 31 Occupied 26dB Bandwidth (802.11n40, 5190MHz)

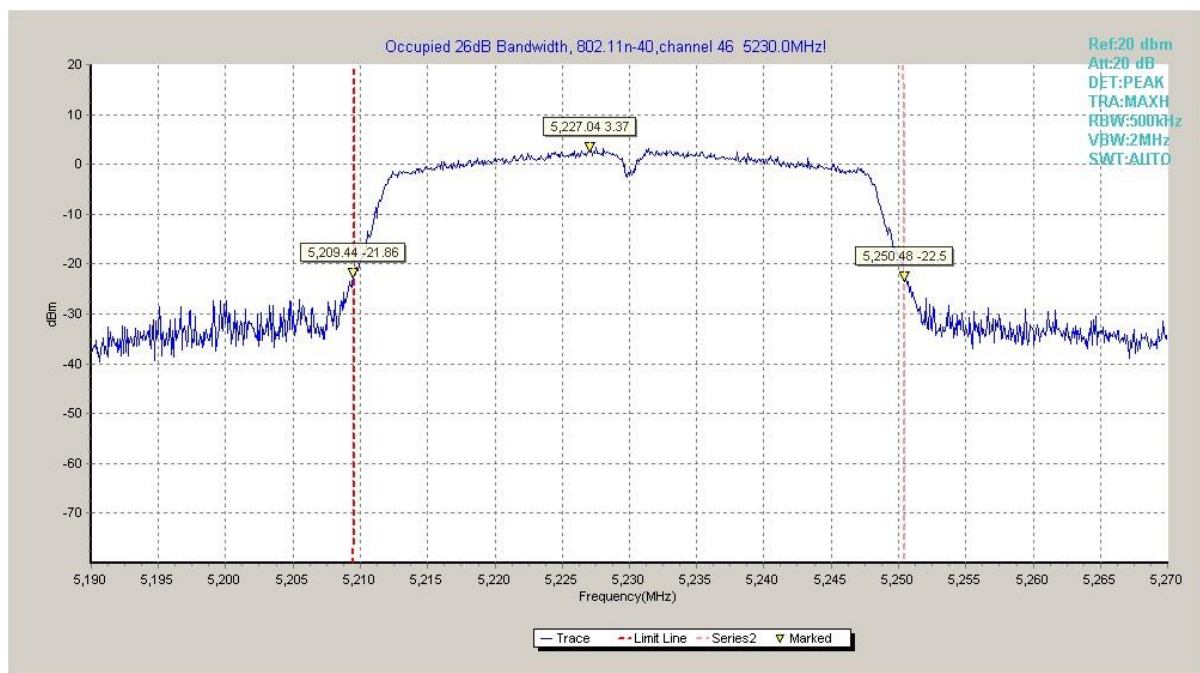


Fig. 32 Occupied 26dB Bandwidth (802.11n40, 5230MHz)

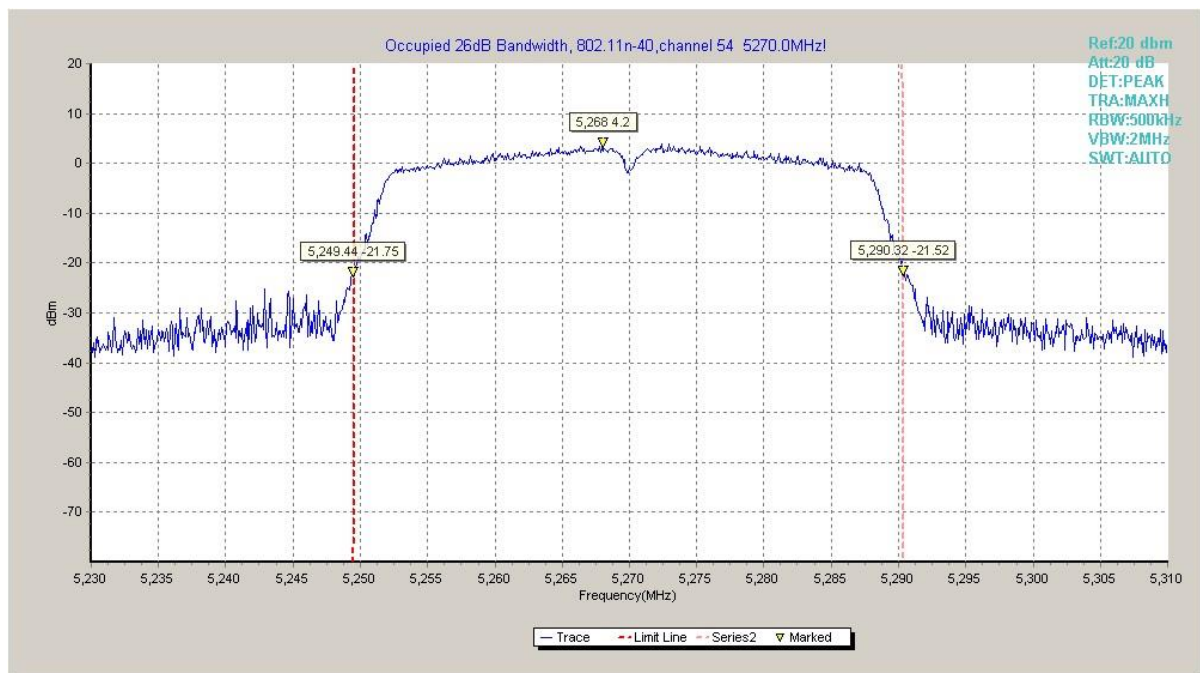


Fig. 33 Occupied 26dB Bandwidth (802.11n40, 5270MHz)

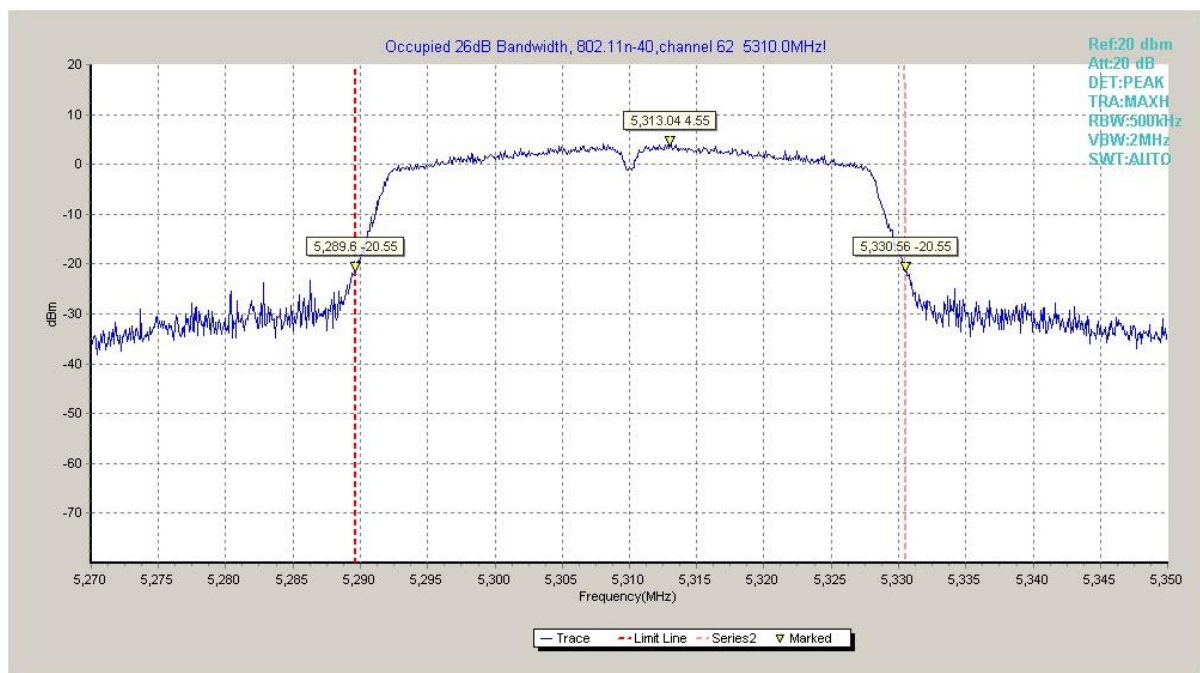


Fig. 34 Occupied 26dB Bandwidth (802.11n40, 5310MHz)

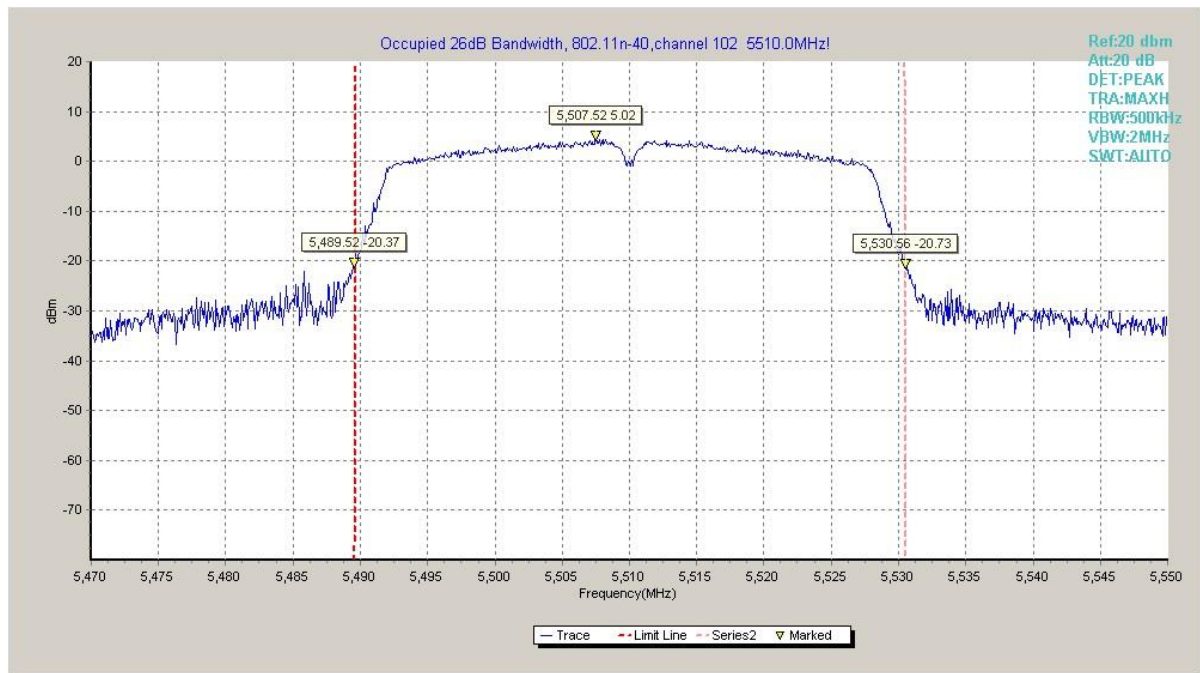


Fig. 35 Occupied 26dB Bandwidth (802.11n40, 5510MHz)

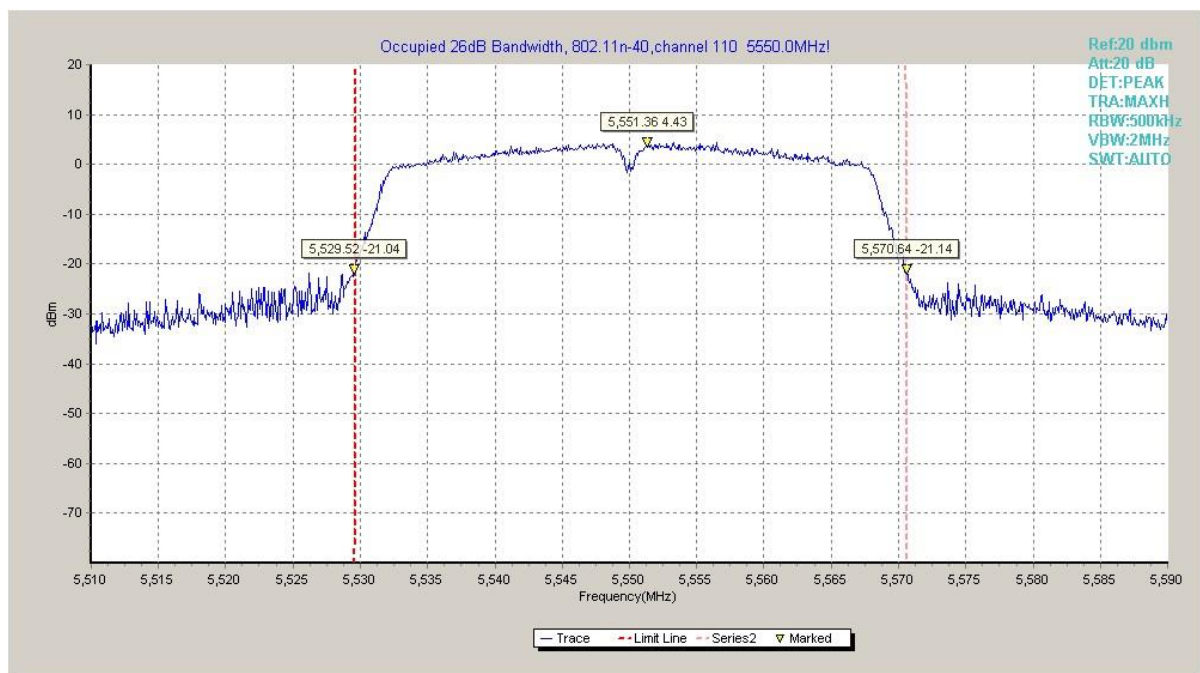


Fig. 36 Occupied 26dB Bandwidth (802.11n40, 5550MHz)

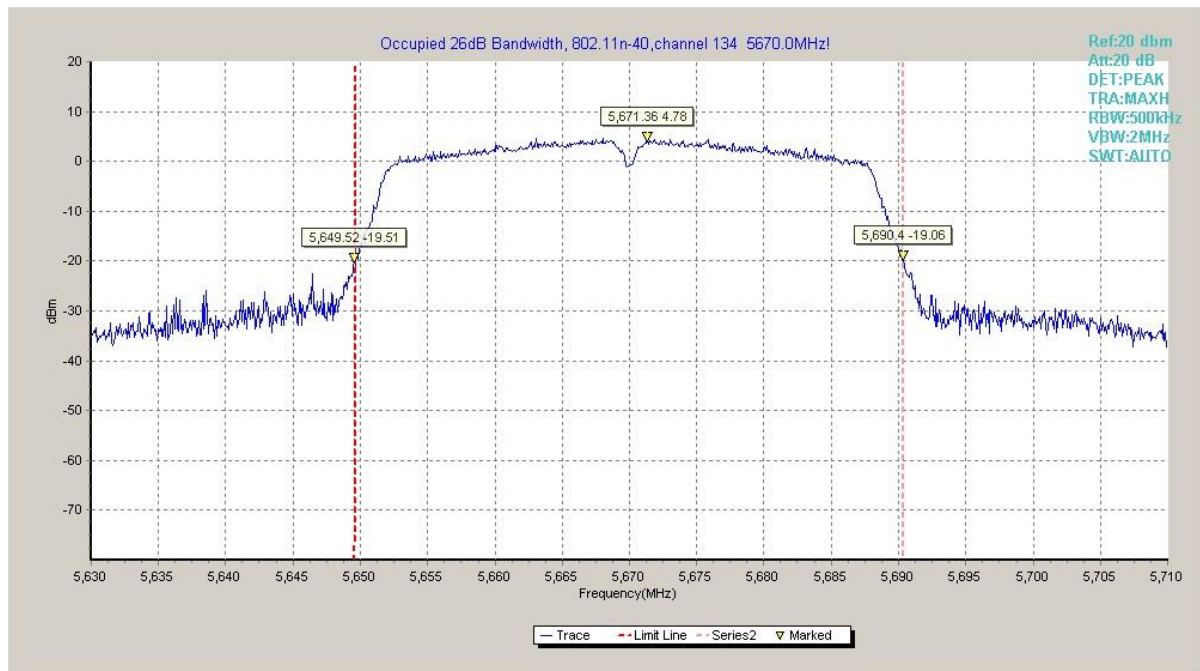


Fig. 37 Occupied 26dB Bandwidth (802.11n40, 5670MHz)

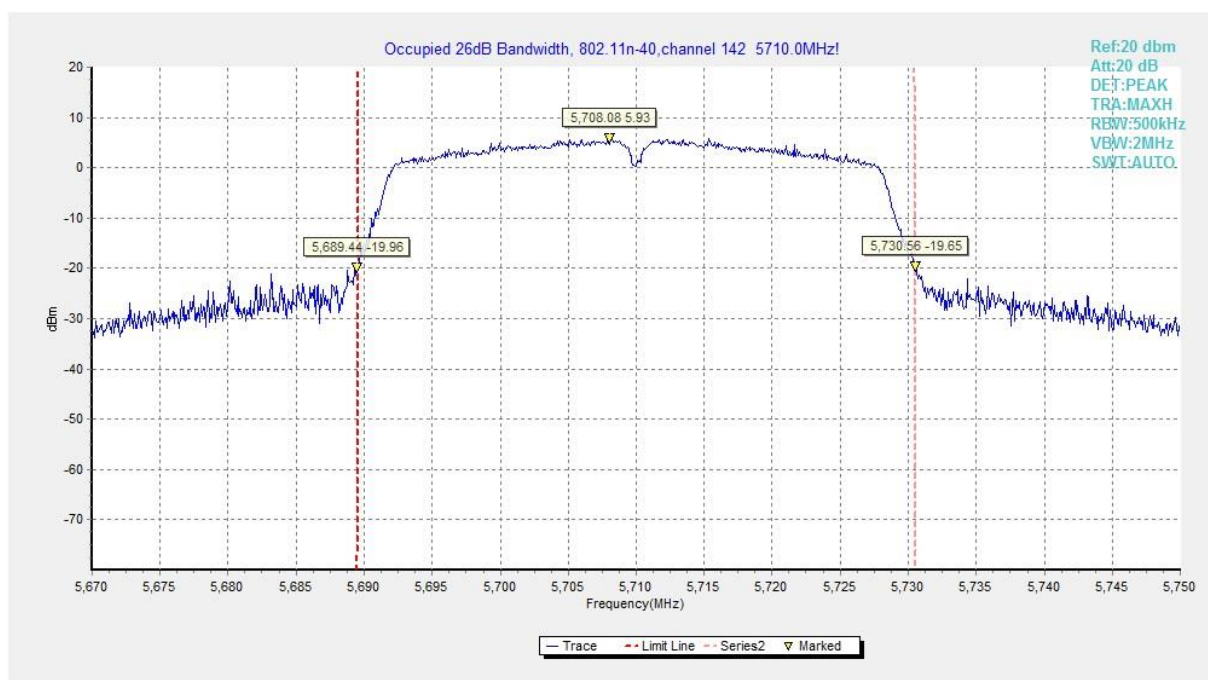


Fig. 38 Occupied 26dB Bandwidth (802.11n40, 5710MHz)

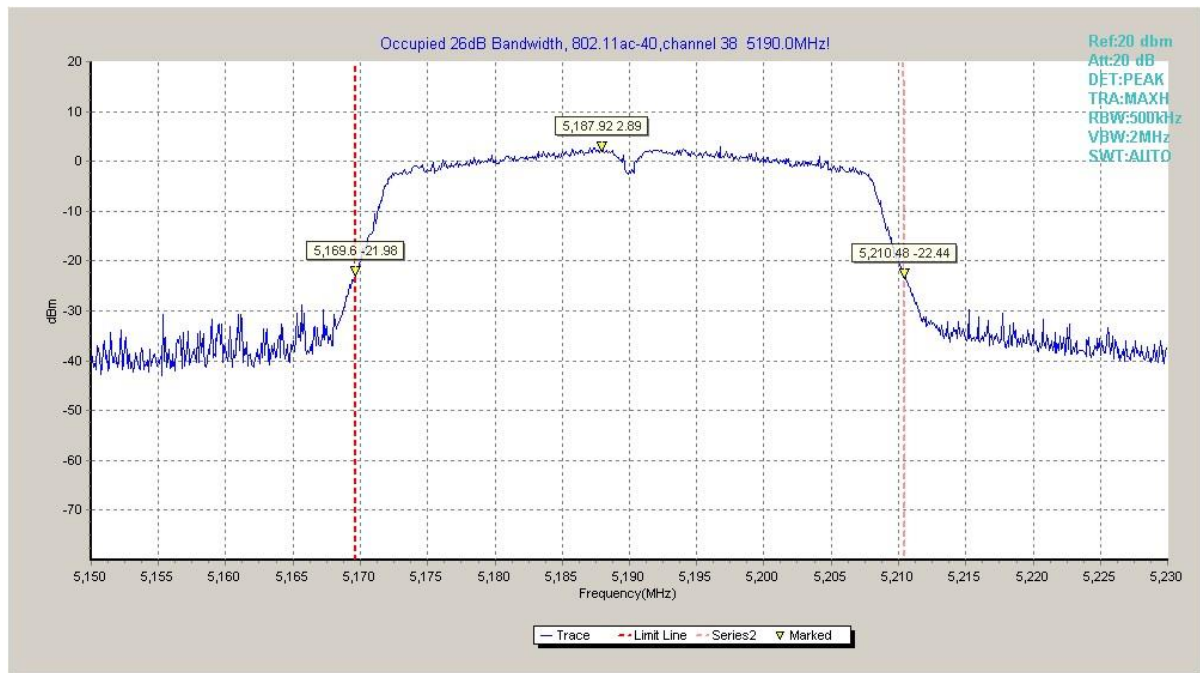


Fig. 39 Occupied 26dB Bandwidth (802.11ac40, 5190MHz)

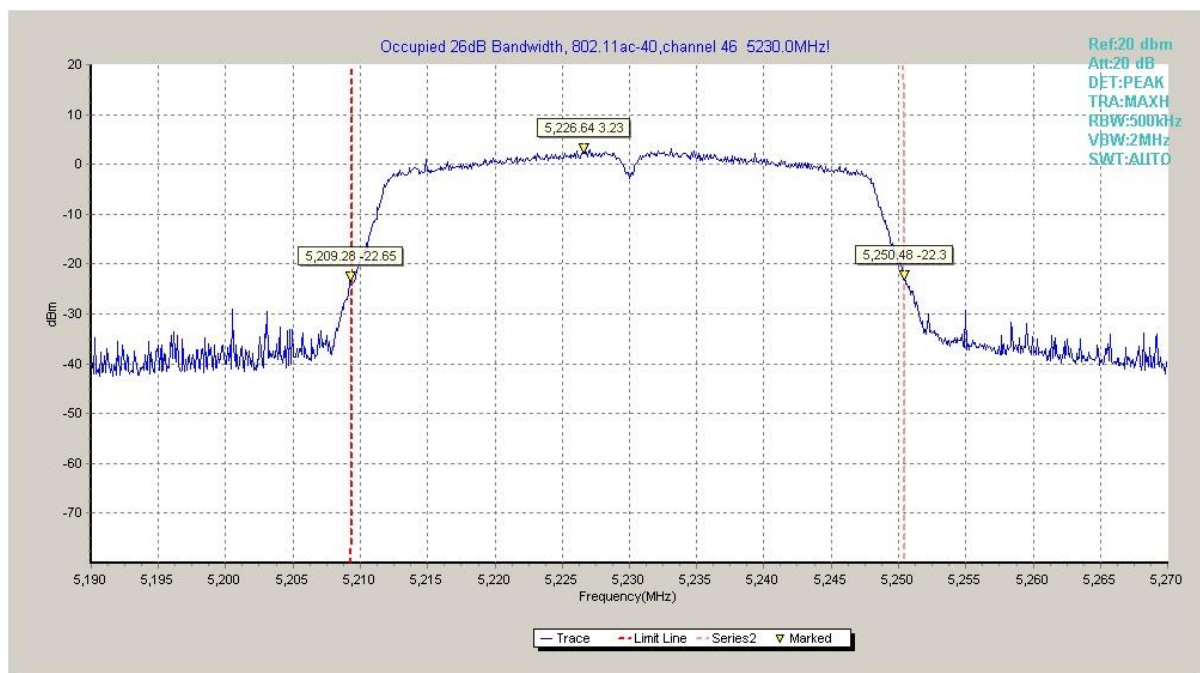


Fig. 40 Occupied 26dB Bandwidth (802.11ac40, 5230MHz)

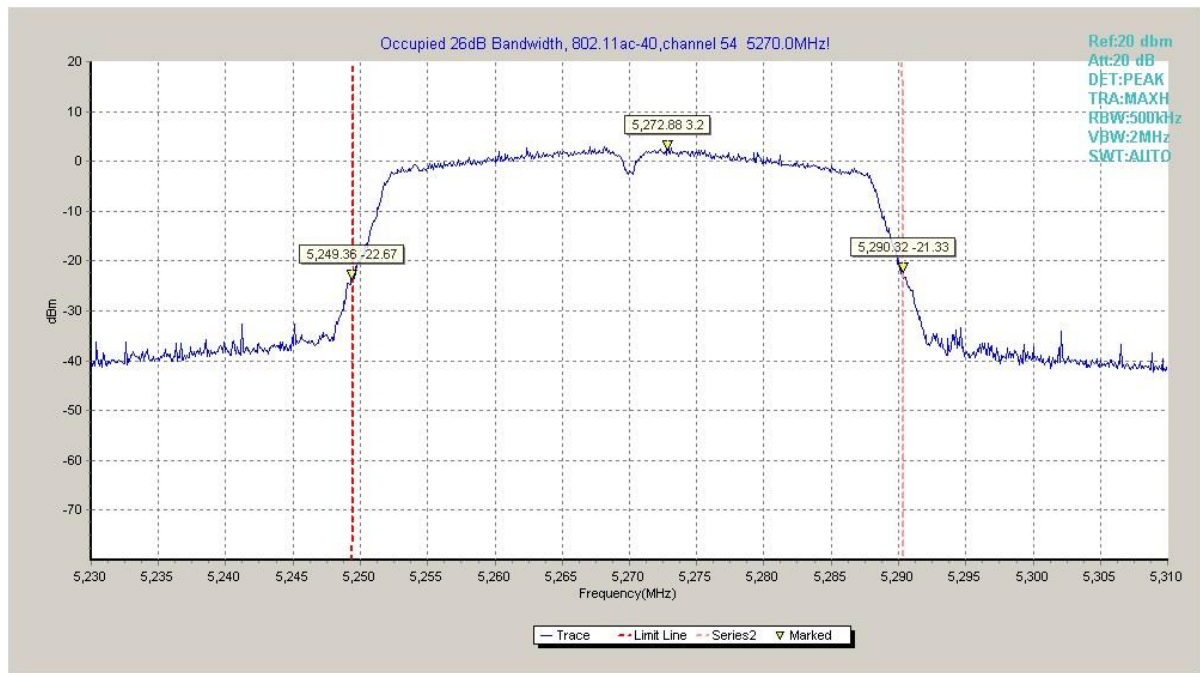


Fig. 41 Occupied 26dB Bandwidth (802.11ac40, 5270MHz)

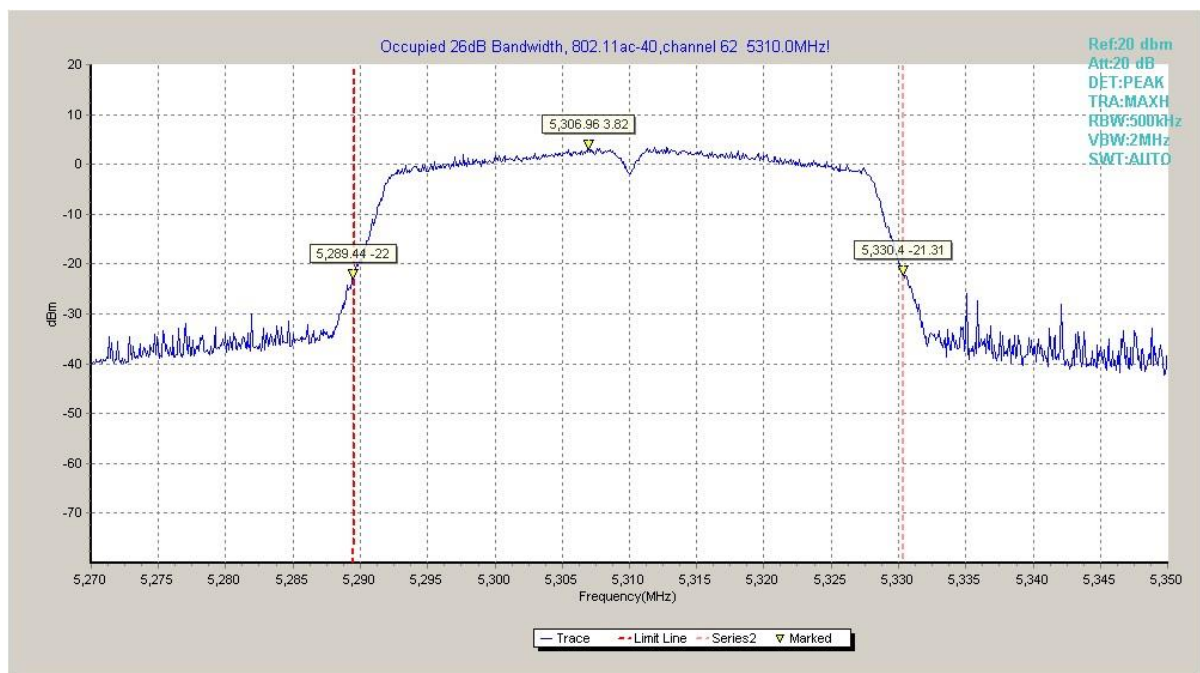


Fig. 42 Occupied 26dB Bandwidth (802.11ac40, 5310MHz)

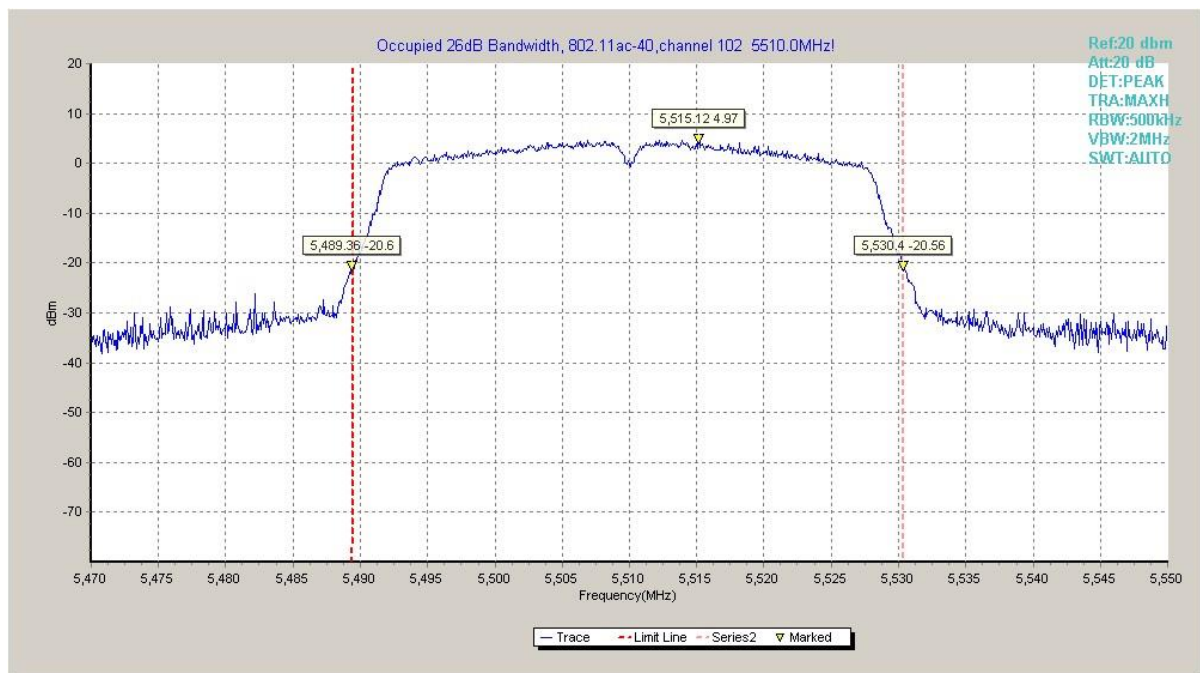


Fig. 43 Occupied 26dB Bandwidth (802.11ac40, 5510MHz)

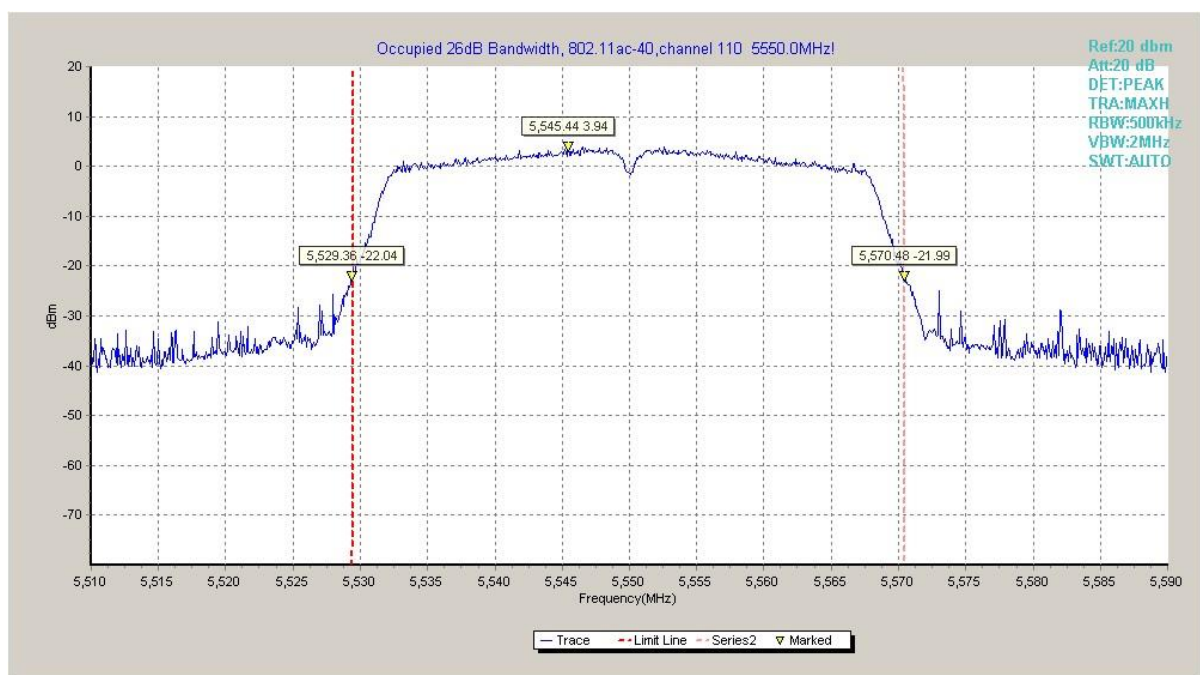


Fig. 44 Occupied 26dB Bandwidth (802.11ac40, 5550MHz)

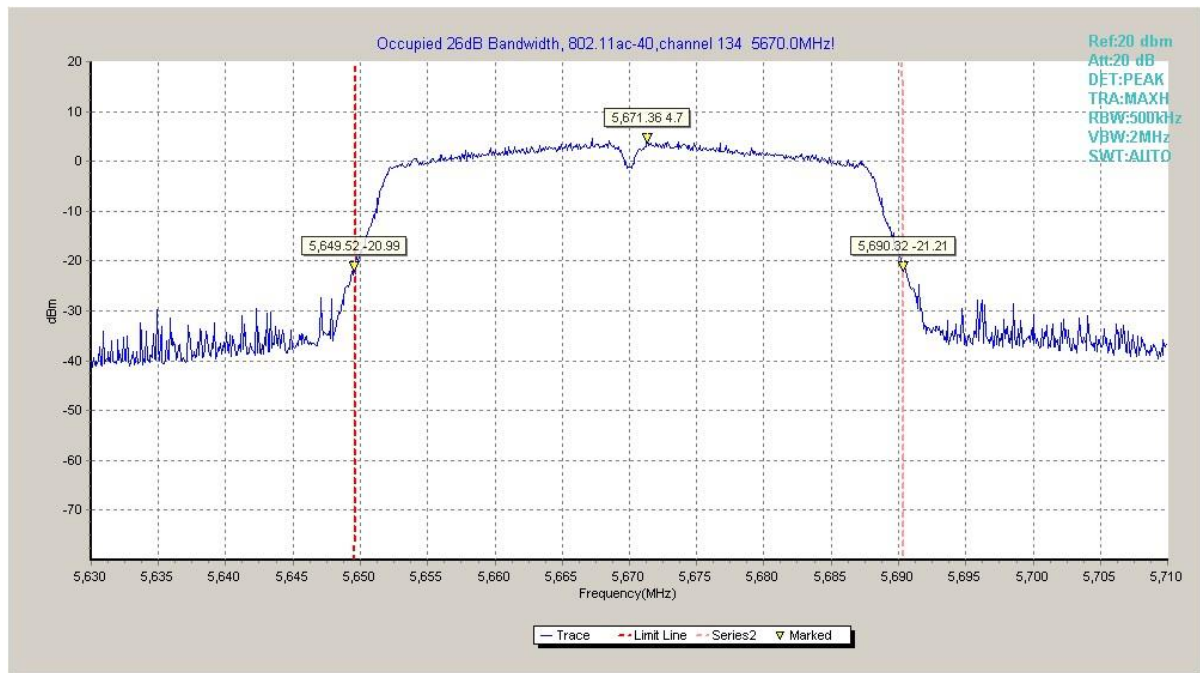


Fig. 45 Occupied 26dB Bandwidth (802.11ac40, 5670MHz)

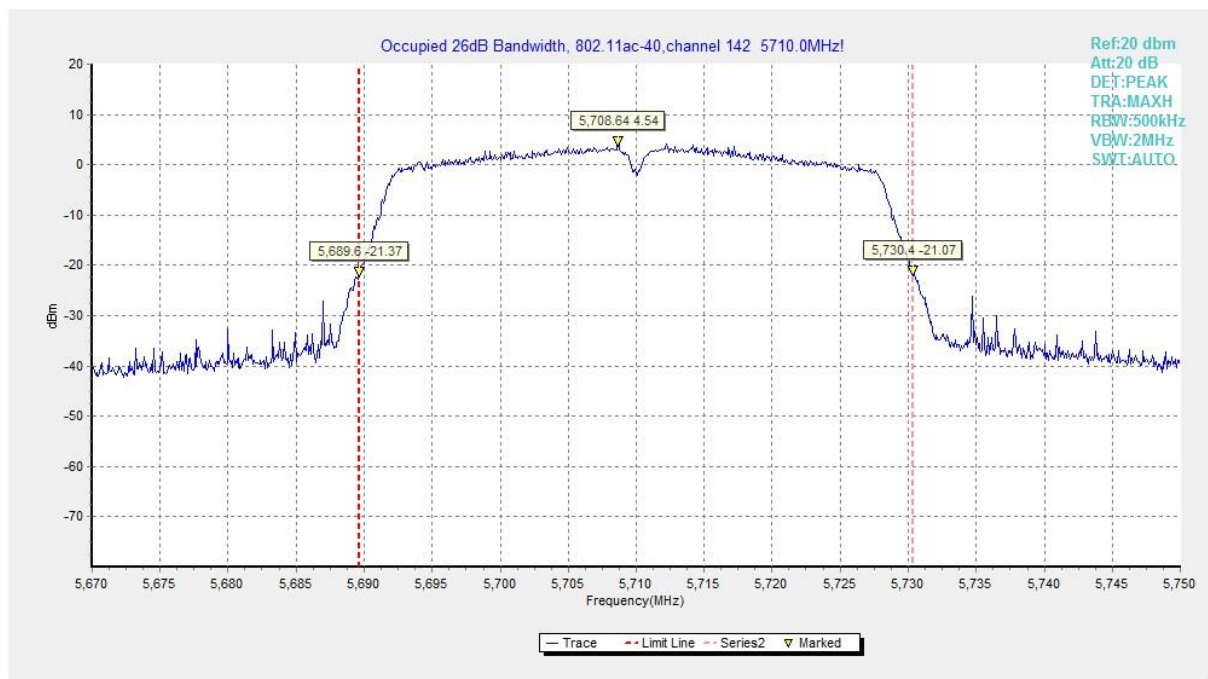


Fig. 46 Occupied 26dB Bandwidth (802.11ac40, 5710MHz)