



FCC PART 15 TEST REPORT

No. I18Z61508-IOT05

for

Samsung Electronics Co., Ltd.

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

SM-G6200

With

FCC ID: ZCASMG6200

Hardware Version: REV0.5

Software Version: OPM1.171019.026.G6200ZCU0ARJ4

Issued Date: 2018-10-30



Note:

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REPORT HISTORY

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1. TEST LATORATORY

1.1. 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

1.2. TestingEnvironment

Normal Temperature: 15-35°C

Extreme Temperature: -10/+55°C

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2018-08-20

Testing End Date: 2018-10-30



1.4. Signature

A handwritten signature in black ink, appearing to read "姜雪".

Jiang Xue
(Prepared this test report)

A handwritten signature in black ink, appearing to read "郑伟".

Zheng Wei
(Reviewed this test report)

A handwritten signature in black ink, appearing to read "高宏".

Gao Hong
(Approved this test report)



2. CLIENT INFORMATION

2.1. Applicant Information

Company Name: Samsung Electronics Co., Ltd.
(Maetan dong)129,Samsung-ro Yeongtong-gu,Suwon-si, Gyeonggi-do
Address: 16677,Korea
City: Suwon-si
Postal Code: /
Country: Korea
Telephone: /
Fax: /

2.2. Manufacturer Information

Company Name: Samsung Electronics Co., Ltd.
(Maetan dong)129,Samsung-ro Yeongtong-gu,Suwon-si, Gyeonggi-do
Address: 16677,Korea
City: Suwon-si
Postal Code: /
Country: Korea
Telephone: /
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	SM-G6200
FCC ID	ZCASMG6200
IC ID	/
WLAN Frequency Range	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5725MHz
Type of modulation	OFDM
Antenna	Integral Antenna
Voltage	3.85V DC by Battery

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
EUT5	359234090082043	REV0.5	OPM1.171019.026.G6200ZCU0ARJ4
EUT2	359234090044043	REV0.5	OPM1.171019.026.G6200ZCU0ARJ4

*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	EB-BG610ABE
	Manufacturer	Samsung SDI Co., Ltd.
	Capacitance	3300mAh
	Nominal voltage	3.85V
AE2		
	Model	HKC0115021-2D
	Manufacturer	SHENZHEN HUNTKEY ELECTRIC CO., LTD
	Length of cable	/
AE3		
	Model	711300000351

Manufacturer /
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	2016
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	2019-05-17
2	LISN	ESH3-Z5	825562/028	Rohde & Schwarz	1 year	2019-01-31
3	Test Receiver	ESCI	100766	Rohde & Schwarz	1 year	2019-04-16
4	Shielding Room	S81	/	ETS-Lindgren	/	/

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	9163-514	Schwarzbeck	3 years	2019-02-03
3	EMI Antenna	3117	00139065	ETS-Lindgren	3 years	2020-11-15
4	EMI Antenna	3116	2663	ETS-Lindgren	3 years	2020-05-31
5	Spectrum Analyzer	FSV	101047	Rohde & Schwarz	1 year	2019-07-21

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)

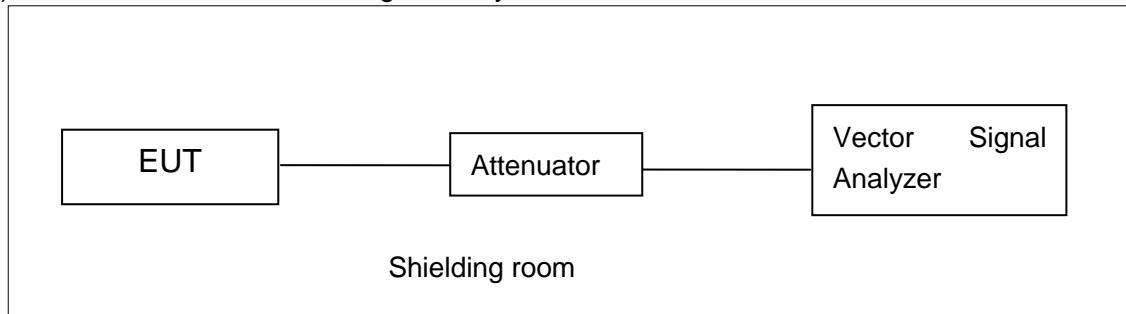
Frequency Range	Uncertainty(dB)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	5.40
1GHz ≤ f ≤ 18GHz	4.32
18GHz ≤ f ≤ 40GHz	5.26

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

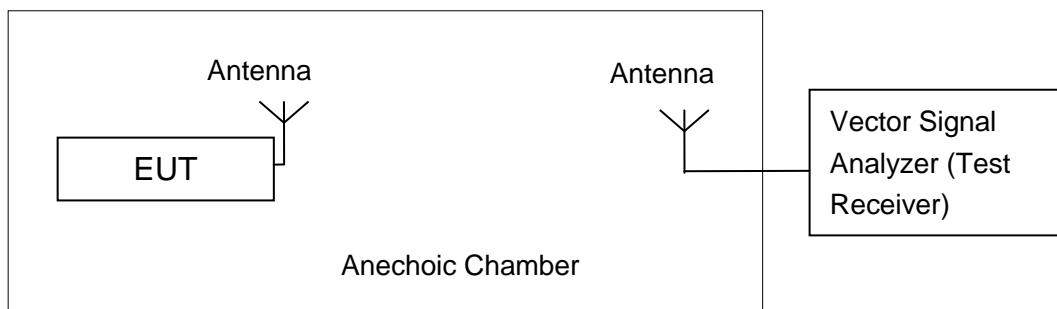


A.1.2. Radiated Emission Measurements

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-1 is made according to KDB 789033

Measurement Results:

802.11a mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz	/	/	/	15.72	/	/	/	/
	5200MHz	15.16	15.04	15.33	16.60	15.86	15.12	15.19	15.12
	5240MHz	/	/	/	15.84	/	/	/	/
	5260MHz	/	/	/	16.30	/	/	/	/
	5280MHz	/	/	/	16.47	/	/	/	/
	5320MHz	/	/	/	15.73	/	/	/	/
	5500MHz	/	/	/	13.37	/	/	/	/
	5580MHz	/	/	/	14.46	/	/	/	/
	5700MHz	/	/	/	14.34	/	/	/	/

The data rate 18Mbps 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	/	/	15.20	/	/	/	/	/
	5200MHz	14.93	14.79	16.28	15.74	15.12	15.14	15.06	15.11
	5240MHz	/	/	15.39	/	/	/	/	/
	5260MHz	/	/	16.00	/	/	/	/	/
	5280MHz	/	/	16.09	/	/	/	/	/
	5320MHz	/	/	15.53	/	/	/	/	/
	5500MHz	/	/	13.63	/	/	/	/	/
	5580MHz	/	/	14.59	/	/	/	/	/
	5700MHz	/	/	14.64	/	/	/	/	/

The data rate MCS2 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	/	/	15.22	/	/	/	/	/	/
	5200MHz	15.01	14.87	16.21	15.84	15.16	15.20	15.11	15.21	15.72
	5240MHz	/	/	15.29	/	/	/	/	/	/
	5260MHz	/	/	15.95	/	/	/	/	/	/
	5280MHz	/	/	16.03	/	/	/	/	/	/
	5320MHz	/	/	15.51	/	/	/	/	/	/
	5500MHz	/	/	14.13	/	/	/	/	/	/
	5580MHz	/	/	15.03	/	/	/	/	/	/
	5700MHz	/	/	15.19	/	/	/	/	/	/

The data rate MCS2 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	16.50	16.48	16.51	16.46	15.99	16.00	16.09	16.05	
	5230MHz	/	/	16.12	/	/	/	/	/	
	5270MHz	/	/	15.95	/	/	/	/	/	
	5310MHz	/	/	16.44	/	/	/	/	/	
	5510MHz	/	/	13.34	/	/	/	/	/	
	5550MHz	/	/	13.84	/	/	/	/	/	
	5670MHz	/	/	14.07	/	/	/	/	/	

The data rate MCS2 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	
802.11ac (HT40)	5190MHz	16.51	16.54	16.52	16.61	16.09	16.16	16.13	16.15	14.25	14.34
	5230MHz	/	/	/	15.97	/	/	/	/	/	/
	5270MHz	/	/	/	15.90	/	/	/	/	/	/
	5310MHz	/	/	/	16.49	/	/	/	/	/	/
	5510MHz	/	/	/	13.78	/	/	/	/	/	/
	5550MHz	/	/	/	14.24	/	/	/	/	/	/
	5670MHz	/	/	/	14.47	/	/	/	/	/	/

The data rate MCS3 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	16.05	16.13	16.12	16.09	15.78	15.67	15.39	15.40	13.35	13.21
	5290MHz	/	15.97	/	/	/	/	/	/	/	/
	5530MHz	/	14.28	/	/	/	/	/	/	/	/
	5610MHz	/	14.69	/	/	/	/	/	/	/	/

The data rate MCS1 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	5.30	P
	5200 MHz	5.89	P
	5240 MHz	5.22	P
	5260 MHz	5.69	P
	5280 MHz	5.46	P
	5320 MHz	5.22	P
	5500 MHz	2.61	P
	5580 MHz	2.41	P
	5700 MHz	1.78	P
802.11n HT20	5180 MHz	4.66	P
	5200 MHz	5.18	P
	5240 MHz	4.67	P
	5260 MHz	5.02	P
	5280 MHz	5.10	P
	5320 MHz	4.63	P
	5500 MHz	2.55	P
	5580 MHz	1.62	P
	5700 MHz	1.40	P
802.11ac HT20	5180 MHz	4.78	P
	5200 MHz	4.96	P
	5240 MHz	4.37	P
	5260 MHz	5.06	P
	5280 MHz	4.90	P
	5320 MHz	4.65	P
	5500 MHz	3.05	P
	5580 MHz	2.12	P
	5700 MHz	2.34	P
802.11n HT40	5190 MHz	2.35	P
	5230 MHz	2.07	P
	5270 MHz	2.46	P
	5310 MHz	2.04	P

	5510 MHz	-1.02	P
	5550 MHz	-0.37	P
	5670 MHz	-1.18	P
802.11ac HT40	5190 MHz	2.52	P
	5230 MHz	2.03	P
	5270 MHz	2.48	P
	5310 MHz	1.98	P
	5510 MHz	-0.56	P
	5550 MHz	-0.01	P
	5670 MHz	-0.15	P
802.11ac HT80	5210MHz	0.63	P
	5290MHz	0.07	P
	5530MHz	-2.21	P
	5610MHz	-2.42	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
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Measurement Result:

Mode	Channel	Occupied 26dB Bandwidth (MHz)	Conclusion
802.11a	5180 MHz	Fig.1	21.55
	5200 MHz	Fig.2	21.55
	5240 MHz	Fig.3	21.50
	5260 MHz	Fig.4	21.45
	5280 MHz	Fig.5	21.55
	5320 MHz	Fig.6	21.45
	5500 MHz	Fig.7	21.55
	5580 MHz	Fig.8	21.50
	5700 MHz	Fig.9	21.35
802.11n HT20	5180 MHz	Fig.10	22.85
	5200 MHz	Fig.11	22.50
	5240 MHz	Fig.12	23.25
	5260 MHz	Fig.13	22.90
	5280 MHz	Fig.14	22.85
	5320 MHz	Fig.15	22.85
	5500 MHz	Fig.16	22.75
	5580 MHz	Fig.17	22.95
	5700 MHz	Fig.18	22.90

802.11ac HT20	5180 MHz	Fig.19	22.90	P
	5200 MHz	Fig.20	22.55	P
	5240 MHz	Fig.21	23.05	P
	5260 MHz	Fig.22	22.70	P
	5280 MHz	Fig.23	22.70	P
	5320 MHz	Fig.24	22.85	P
	5500 MHz	Fig.25	22.80	P
	5580 MHz	Fig.26	23.00	P
	5700 MHz	Fig.27	22.95	P

802.11n HT40	5190 MHz	Fig.28	40.24	P
	5230 MHz	Fig.29	40.80	P
	5270 MHz	Fig.30	40.40	P
	5310 MHz	Fig.31	40.40	P
	5510 MHz	Fig.32	40.56	P
	5550 MHz	Fig.33	40.48	P
	5670 MHz	Fig.34	40.72	P

802.11ac HT40	5190 MHz	Fig.35	40.48	P
	5230 MHz	Fig.36	40.56	P
	5270 MHz	Fig.37	40.48	P
	5310 MHz	Fig.38	40.64	P
	5510 MHz	Fig.39	40.56	P
	5550 MHz	Fig.40	40.32	P
	5670 MHz	Fig.41	41.04	P

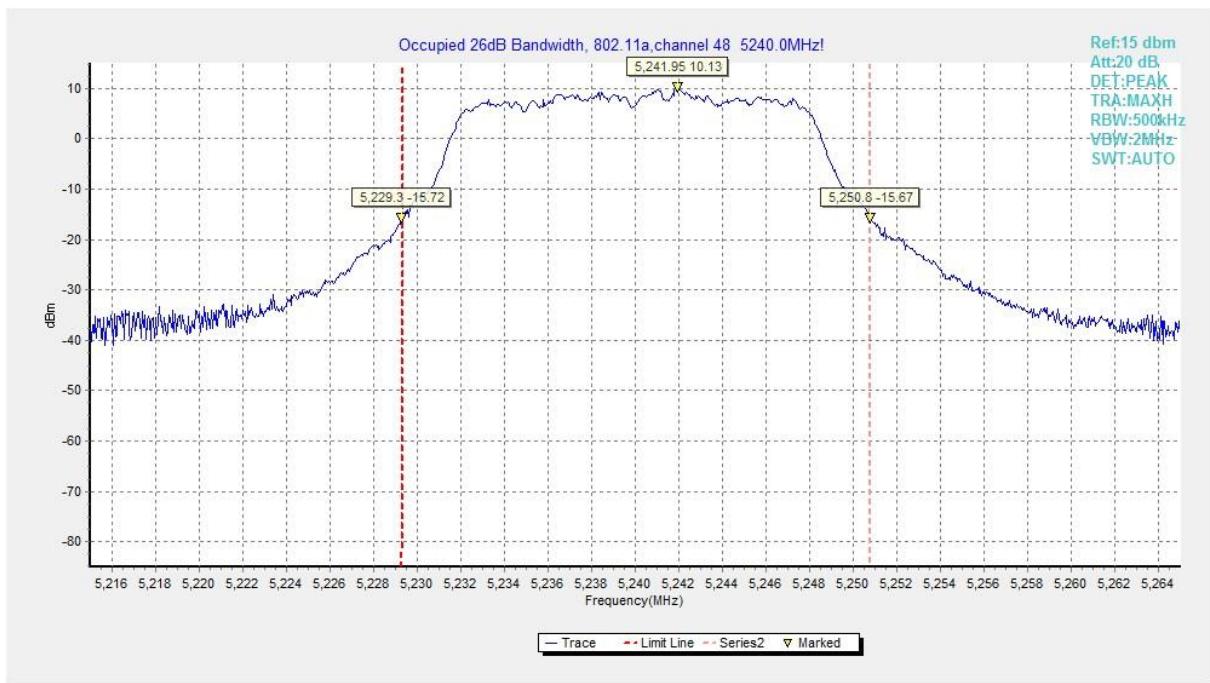
802.11ac HT80	5210MHz	Fig.42	83.52	P
	5290MHz	Fig.43	83.68	P
	5530MHz	Fig.44	83.04	P
	5610MHz	Fig.45	82.72	P

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)

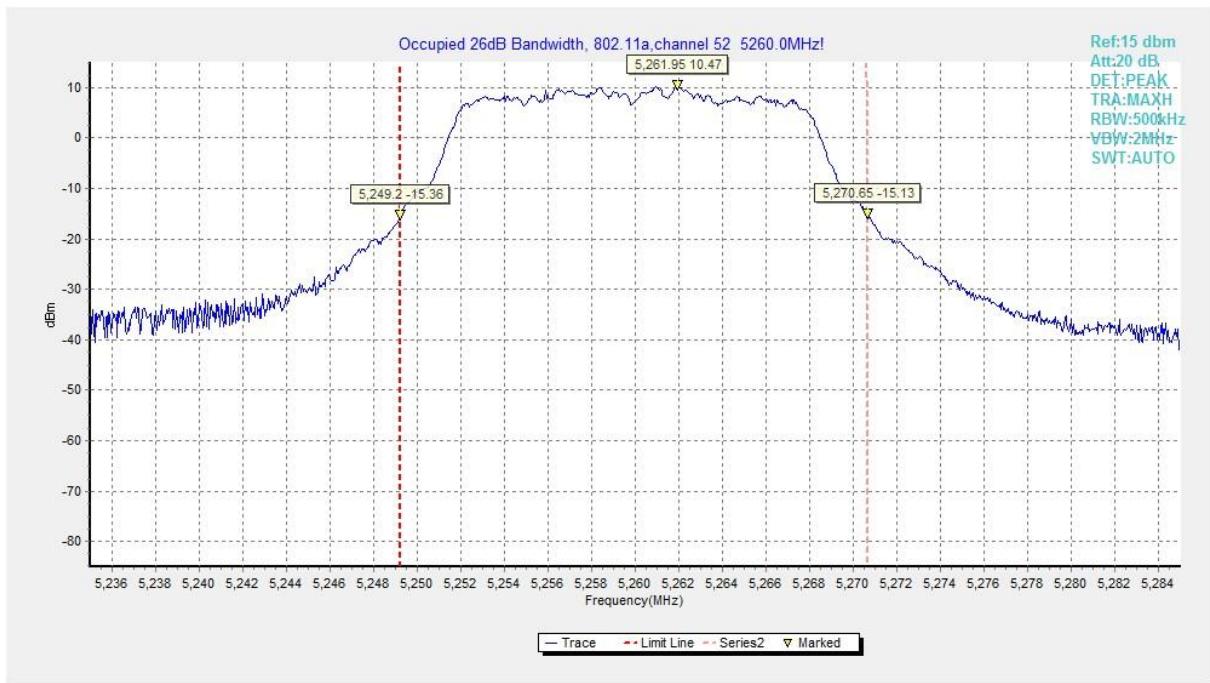

Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz)

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

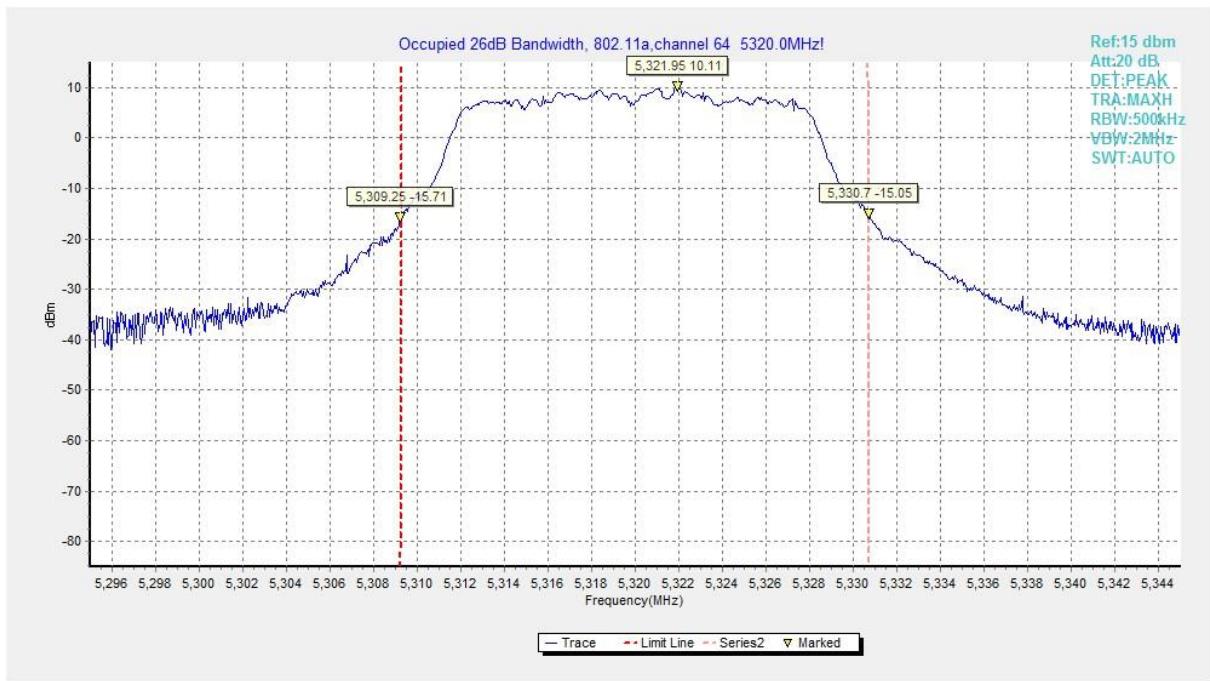
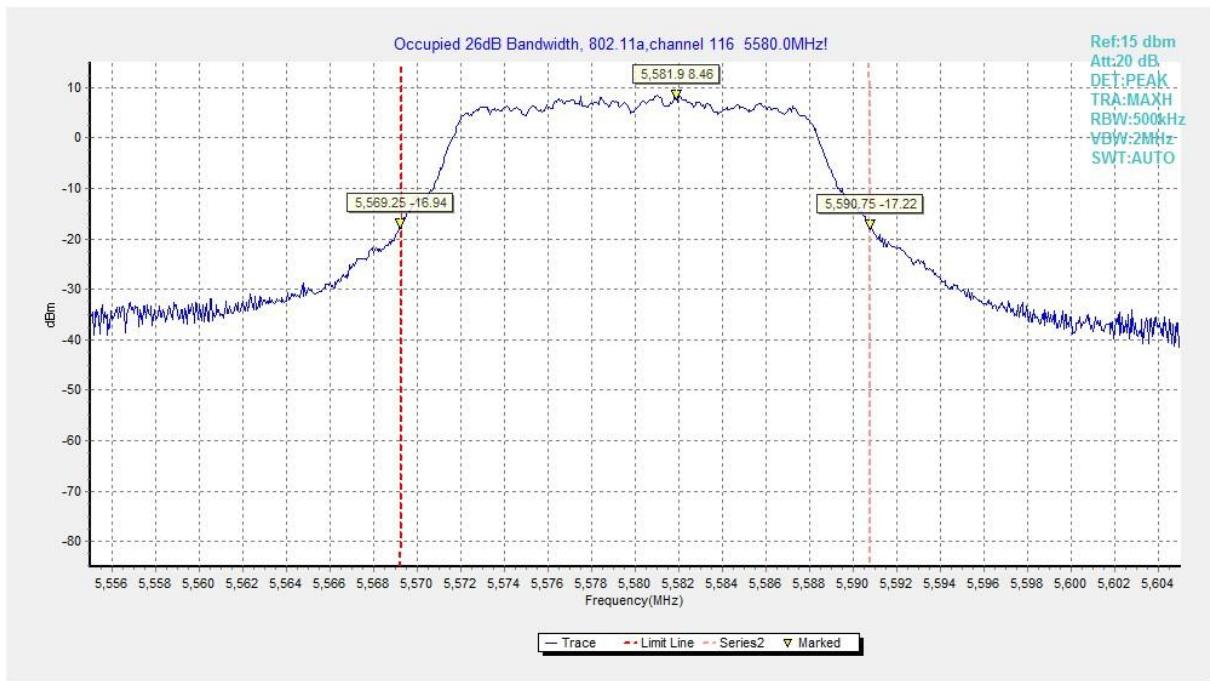
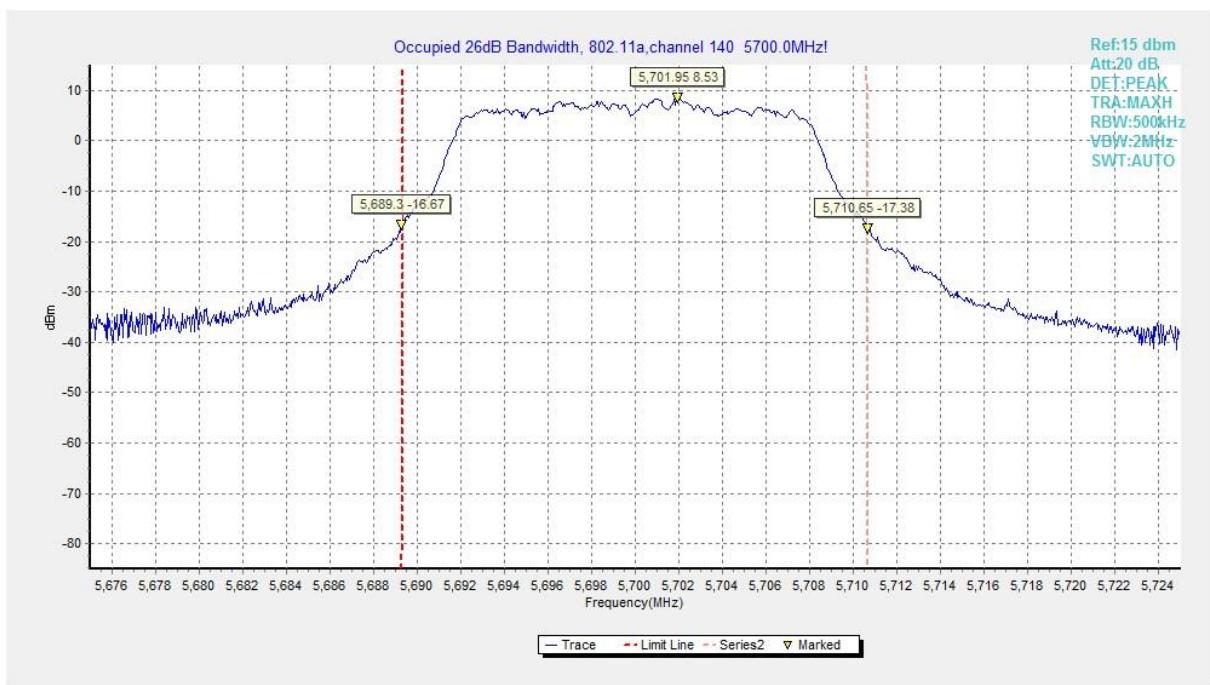

Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz)

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


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

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

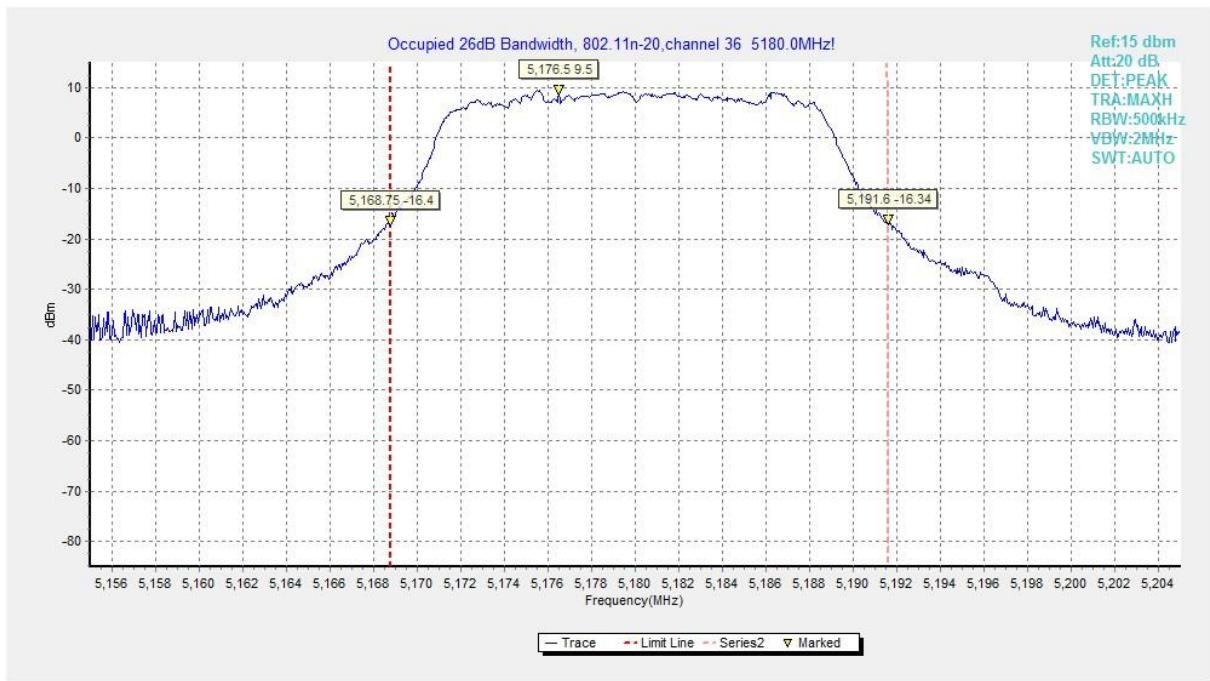


Fig. 10 Occupied 26dB Bandwidth (802.11n-HT20, 5180MHz)

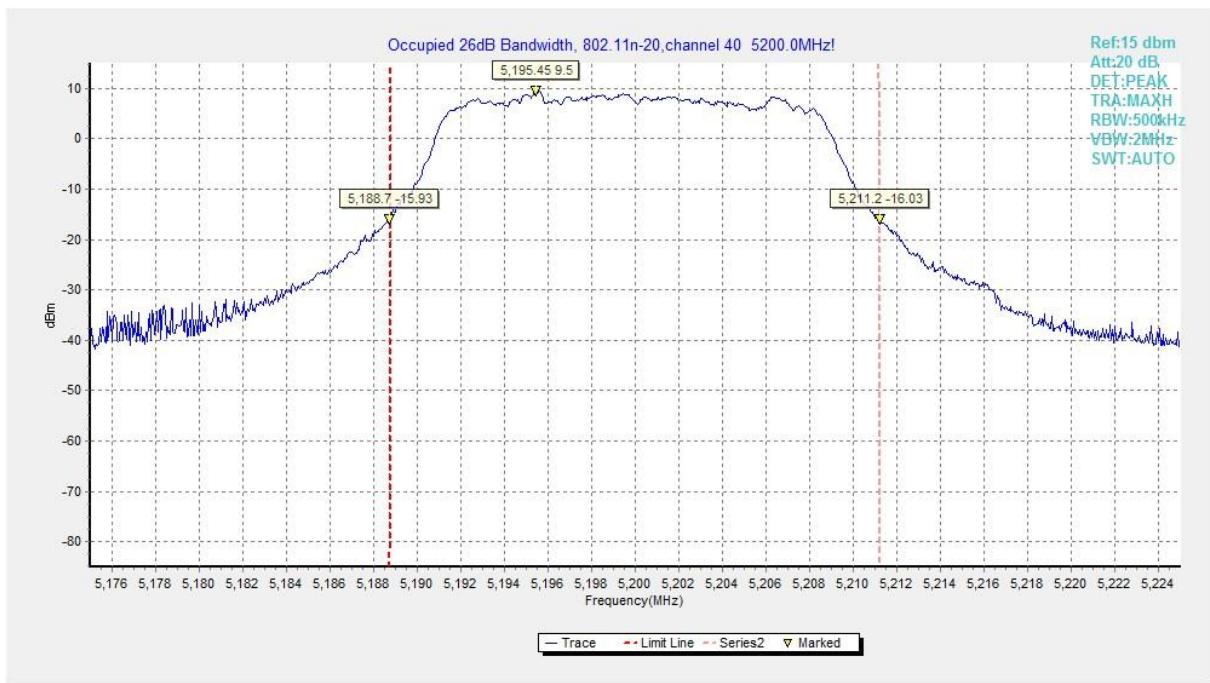


Fig. 11 Occupied 26dB Bandwidth (802.11n-HT20, 5200MHz)

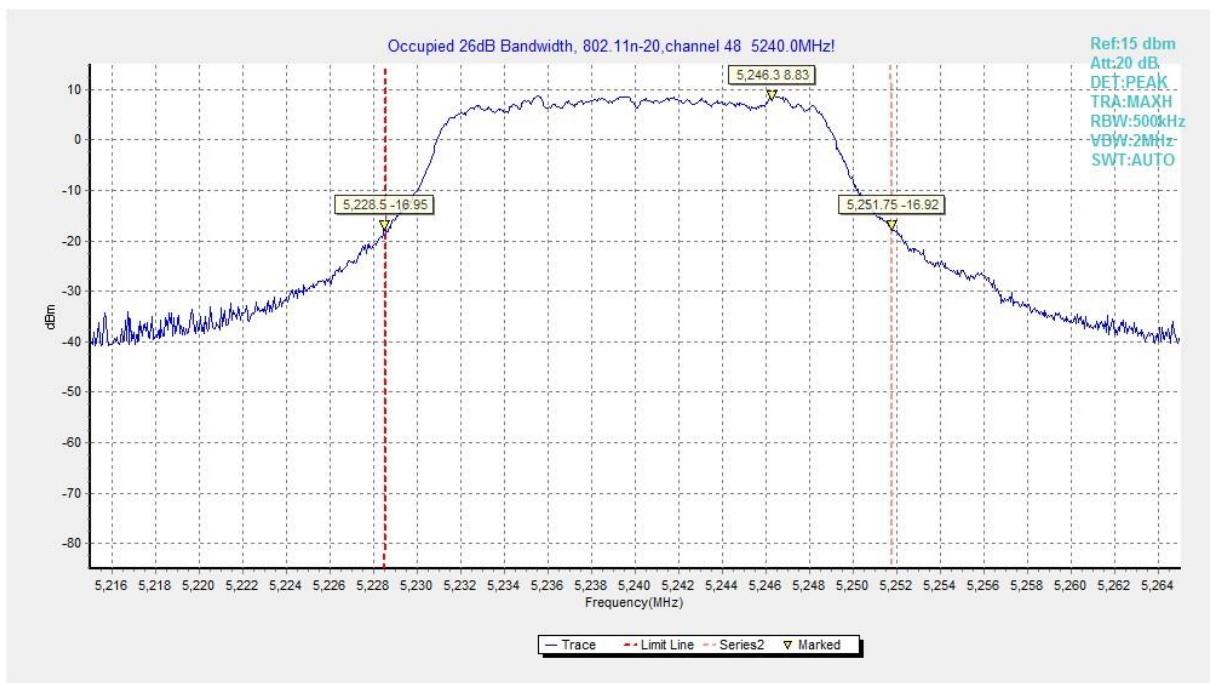


Fig. 12 Occupied 26dB Bandwidth (802.11n-HT20, 5240MHz)

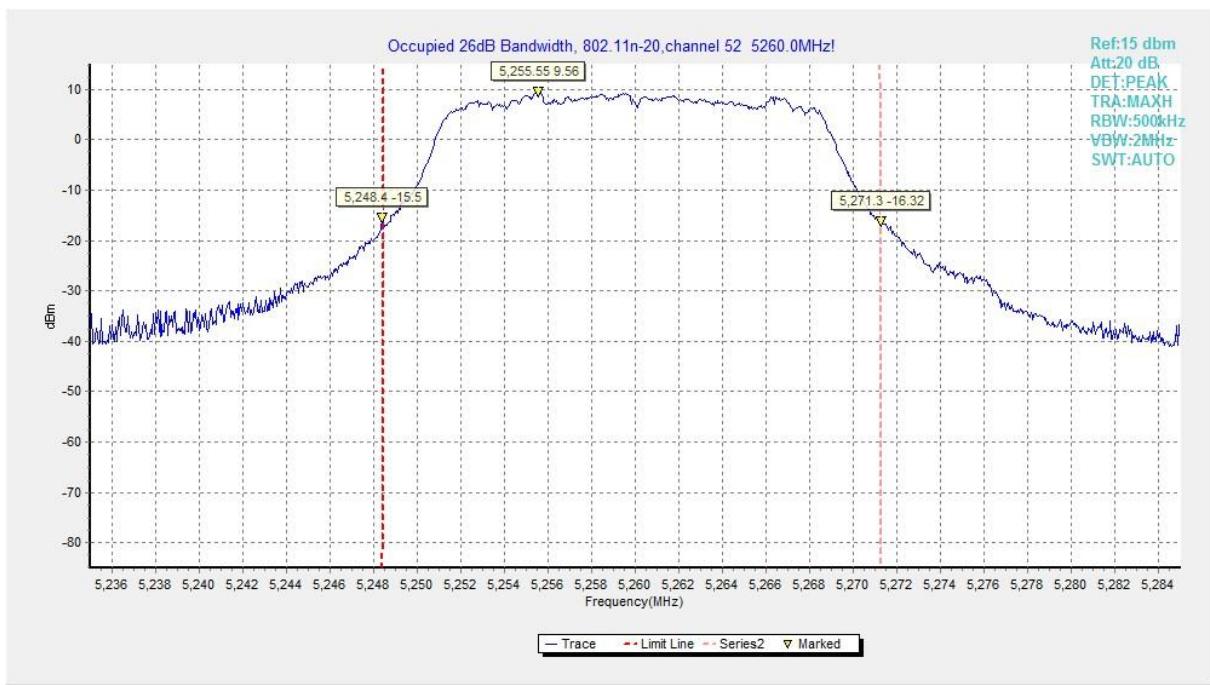


Fig. 13 Occupied 26dB Bandwidth (802.11n-HT20, 5260MHz)

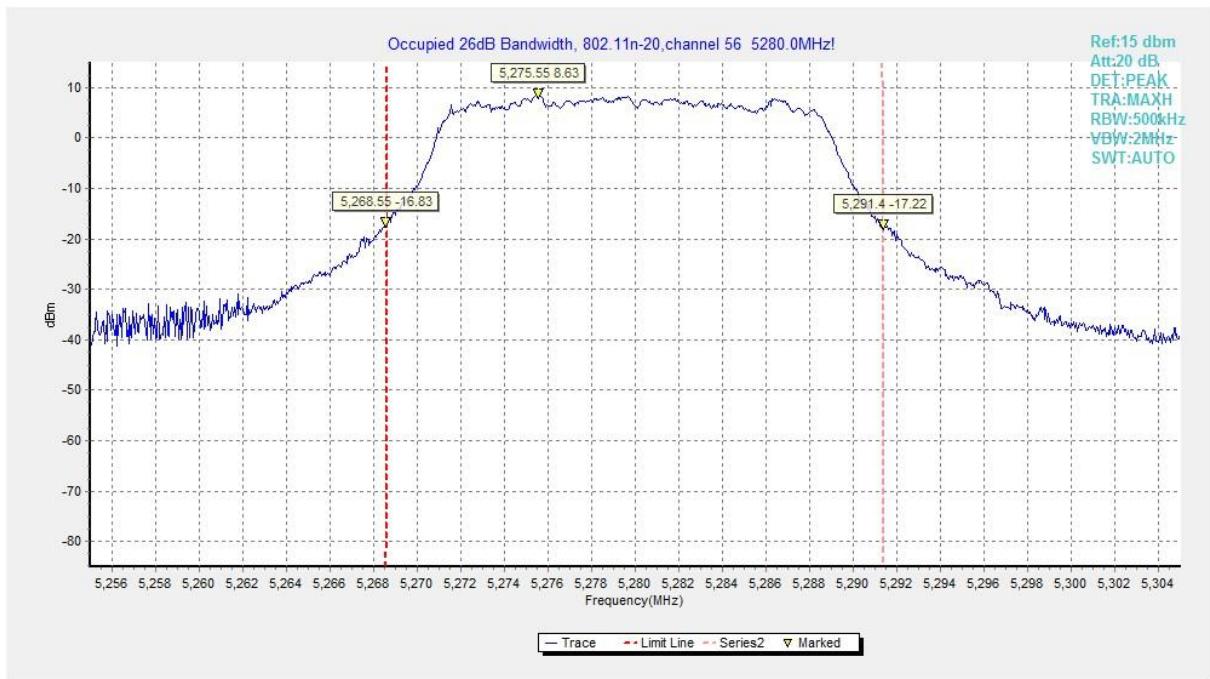


Fig. 14 Occupied 26dB Bandwidth (802.11n-HT20, 5280MHz)

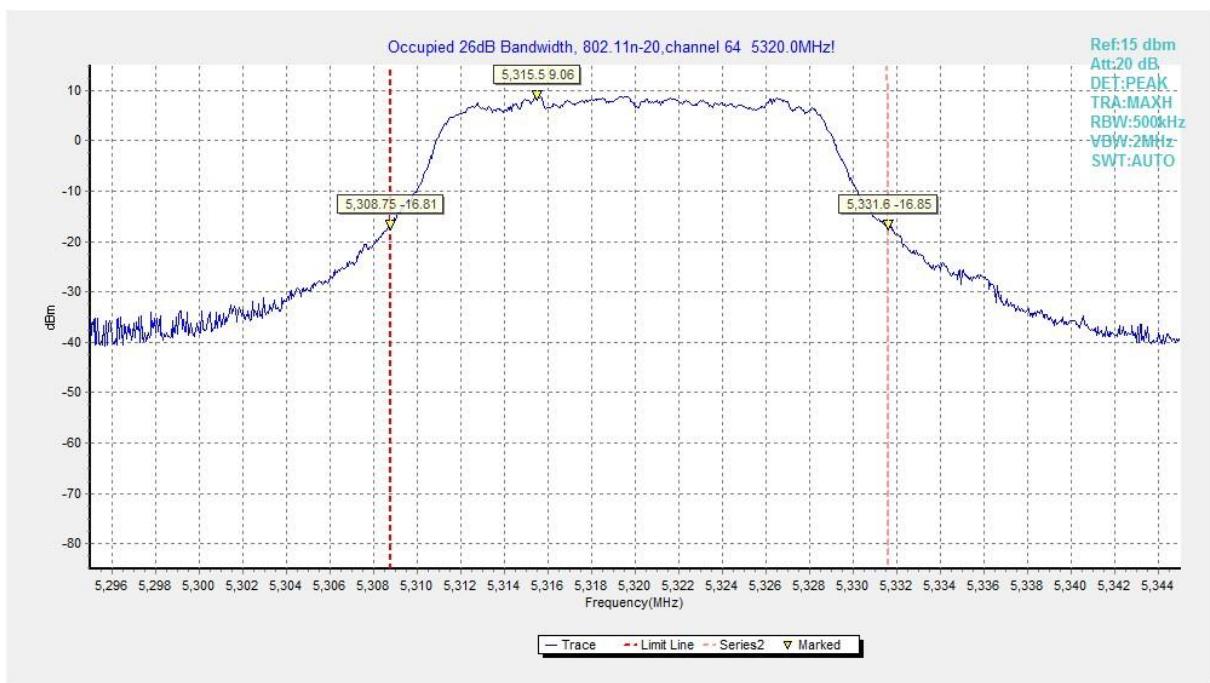


Fig. 15 Occupied 26dB Bandwidth (802.11n-HT20, 5320MHz)

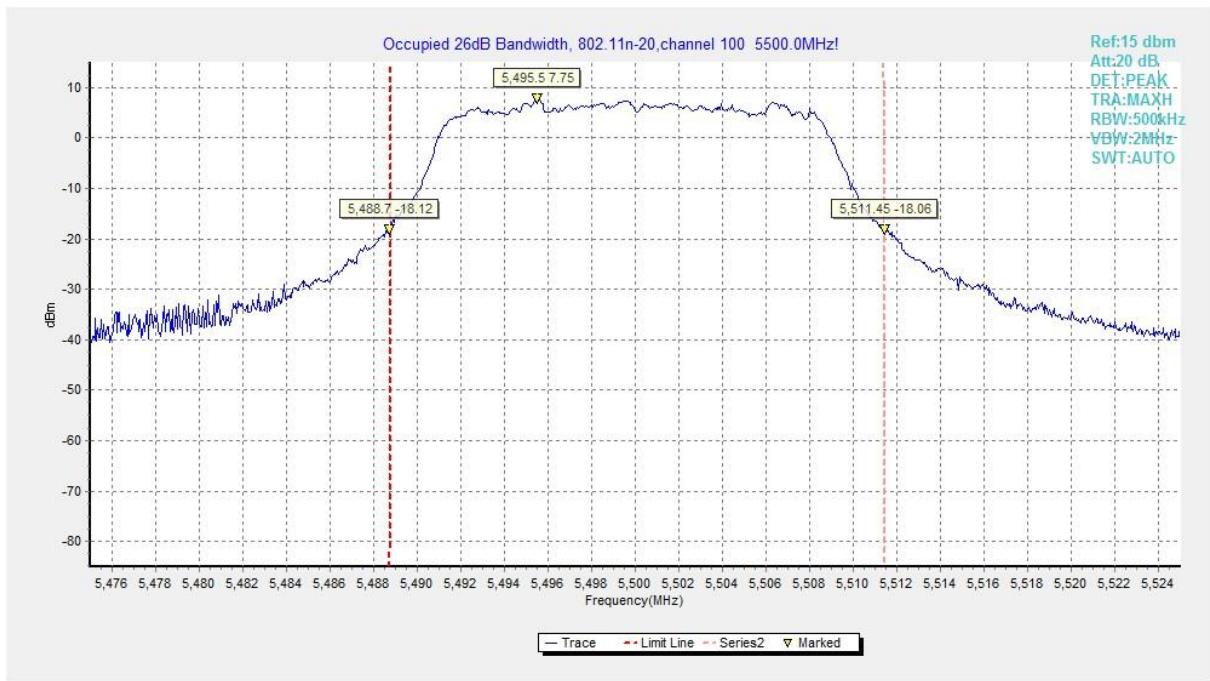


Fig. 16 Occupied 26dB Bandwidth (802. 11n-HT20, 5500MHz)

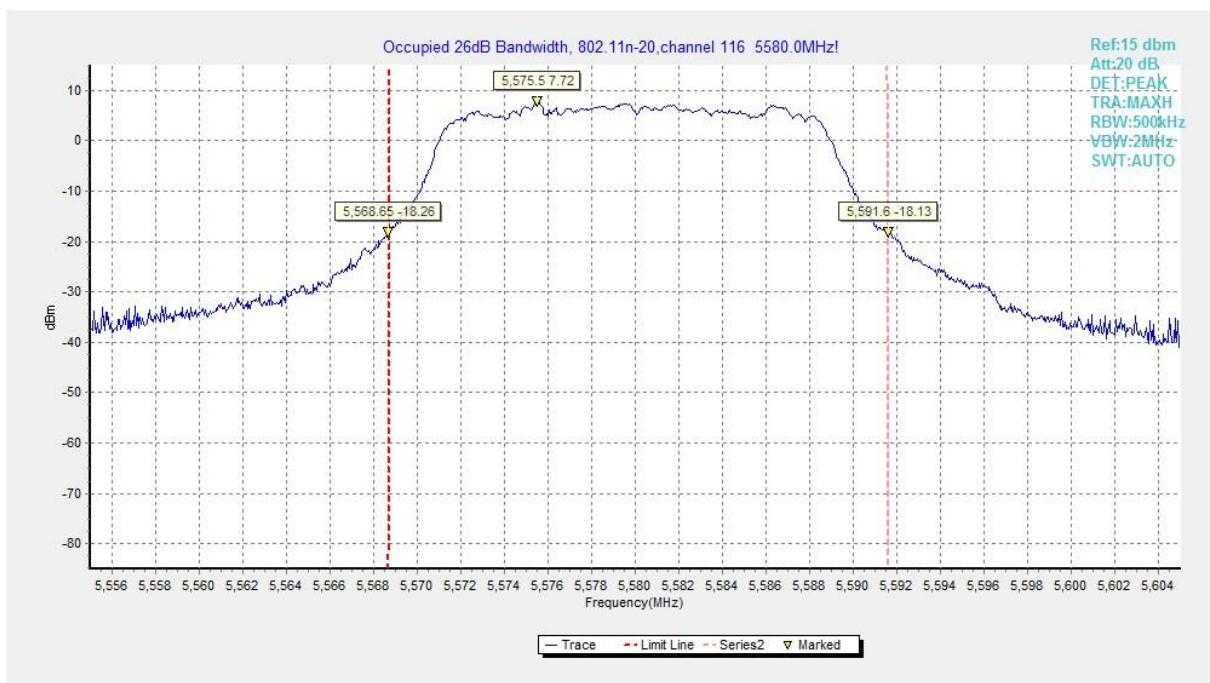


Fig. 17 Occupied 26dB Bandwidth (802. 11n-HT20, 5580MHz)

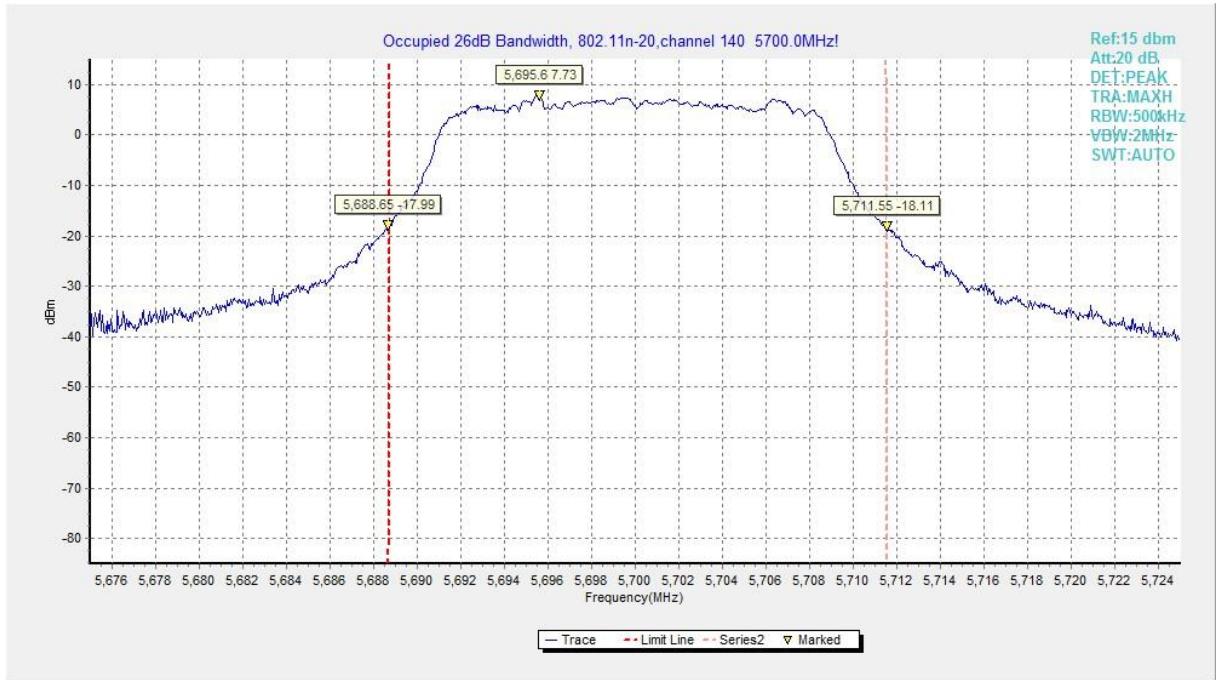

Fig. 18 Occupied 26dB Bandwidth (802.11n-HT20, 5700MHz)

Fig. 19 Occupied 26dB Bandwidth (802.11ac-HT20, 5180MHz)

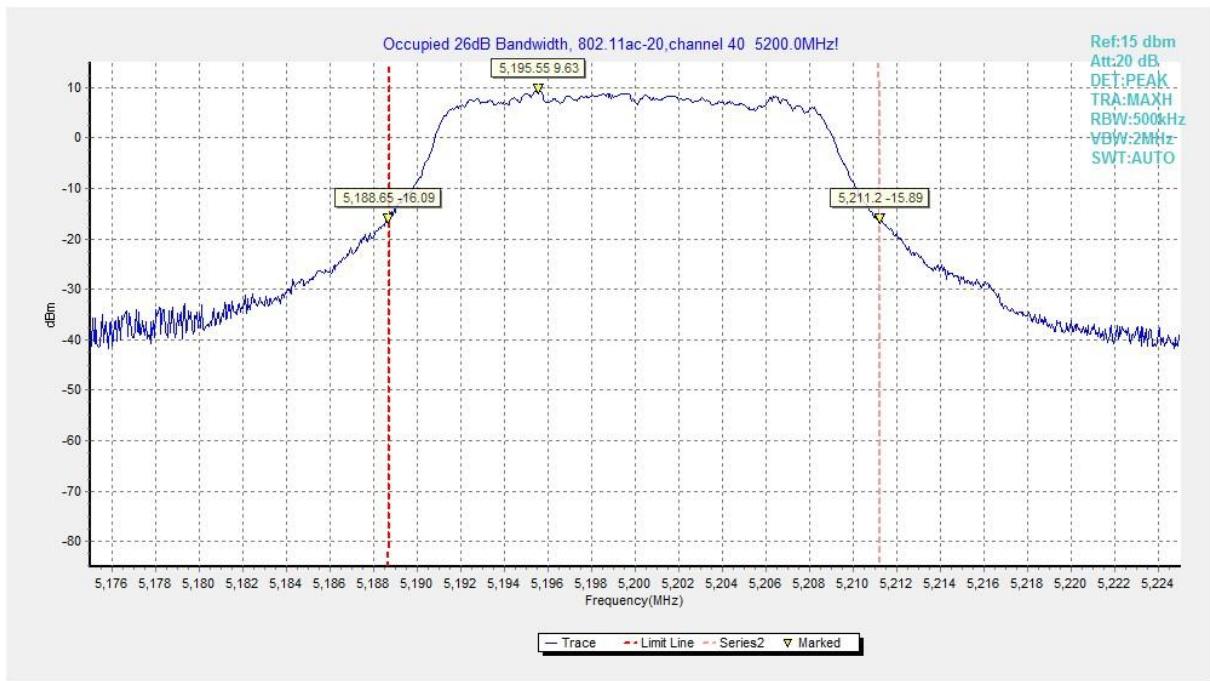


Fig. 20 Occupied 26dB Bandwidth (802.11ac-HT20, 5200MHz)



Fig. 21 Occupied 26dB Bandwidth (802.11ac-HT20, 5240MHz)



Fig. 22 Occupied 26dB Bandwidth (802.11ac-HT20, 5260MHz)

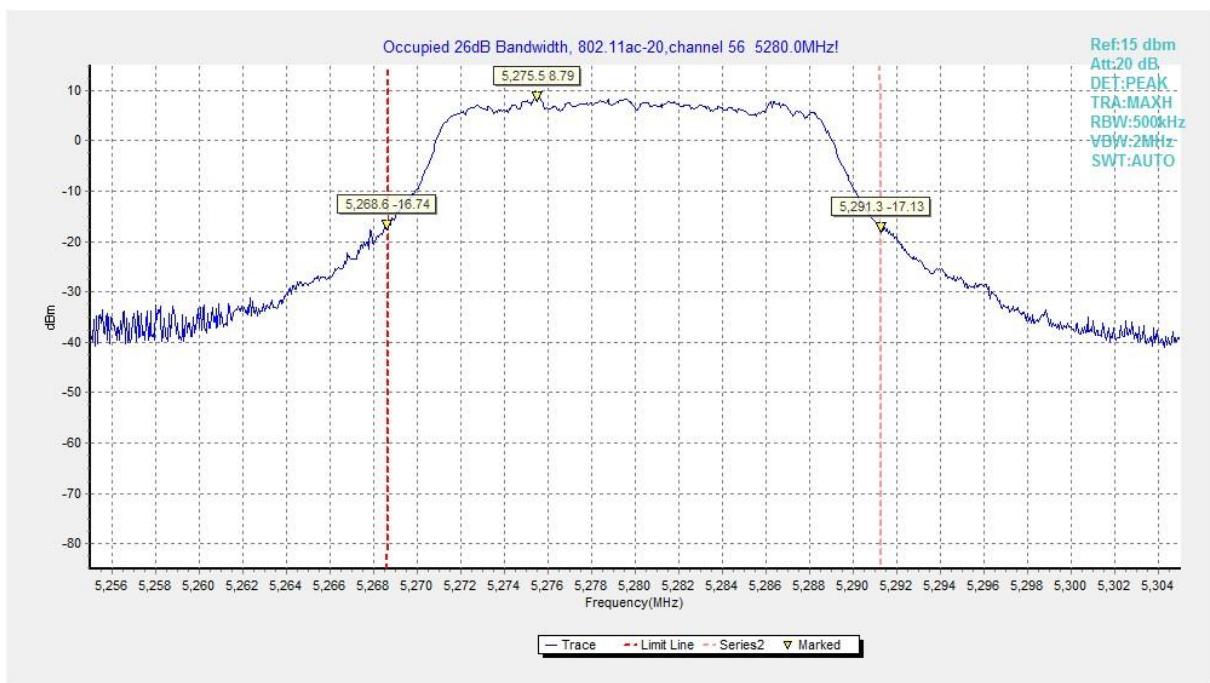


Fig. 23 Occupied 26dB Bandwidth (802.11ac-HT20, 5280MHz)

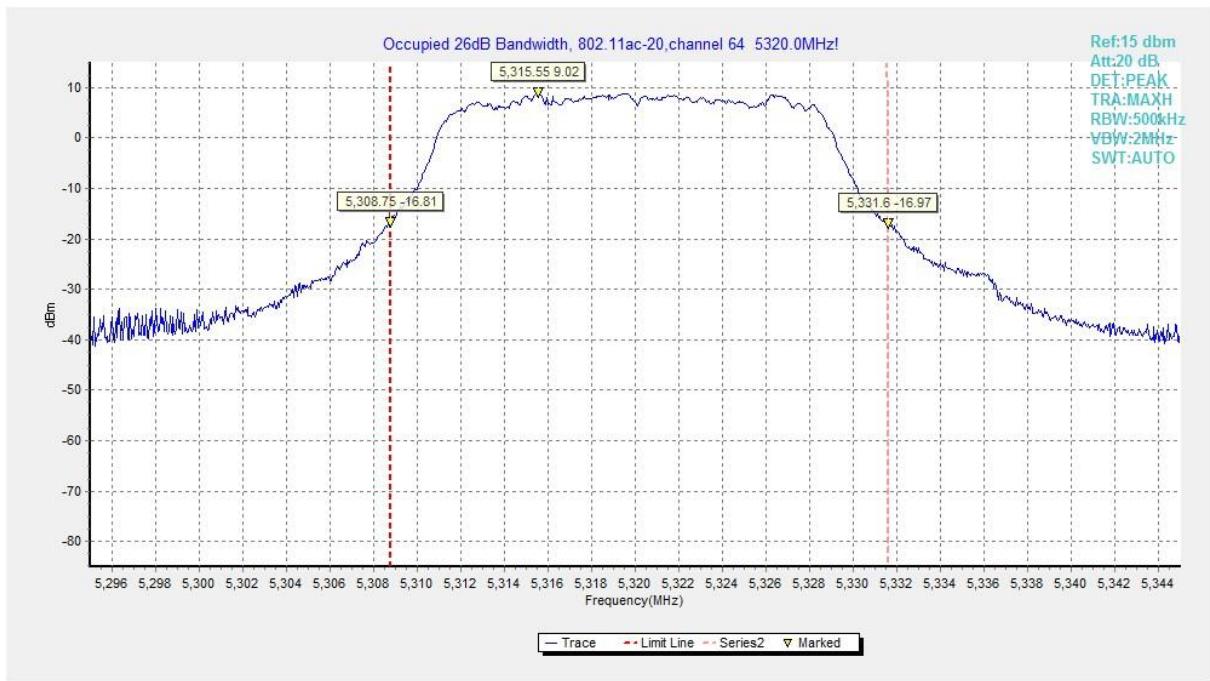


Fig. 24 Occupied 26dB Bandwidth (802.11ac-HT20, 5320MHz)

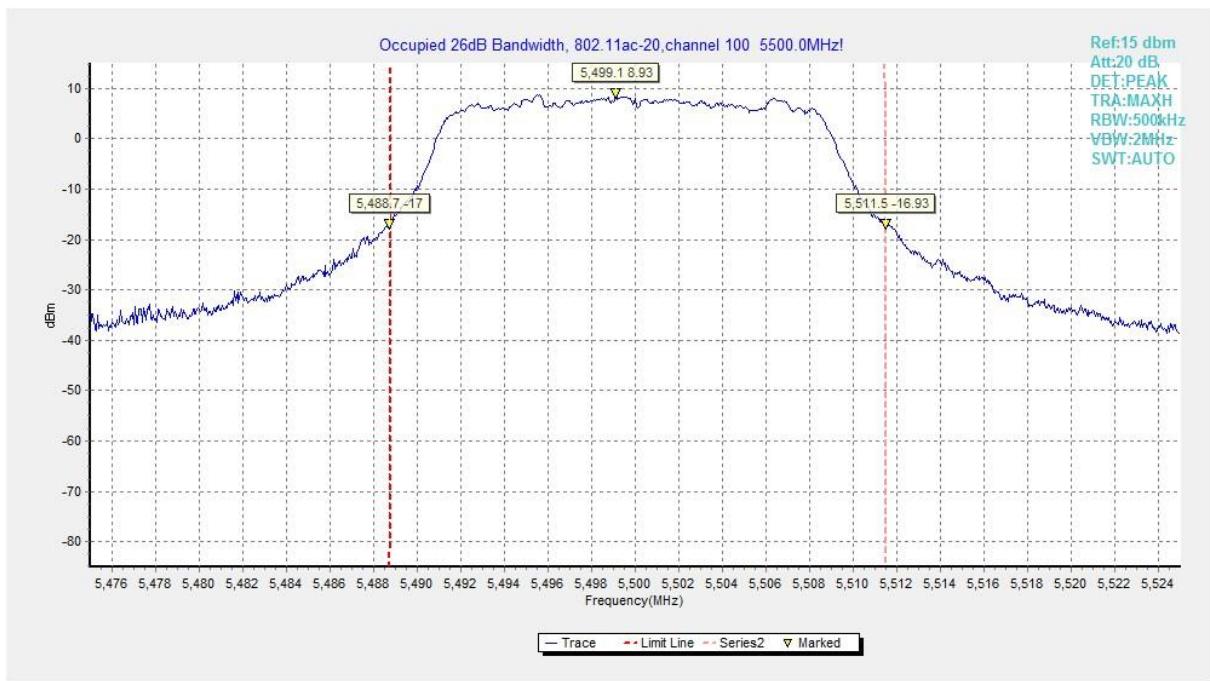


Fig. 25 Occupied 26dB Bandwidth (802.11ac-HT20, 5500MHz)

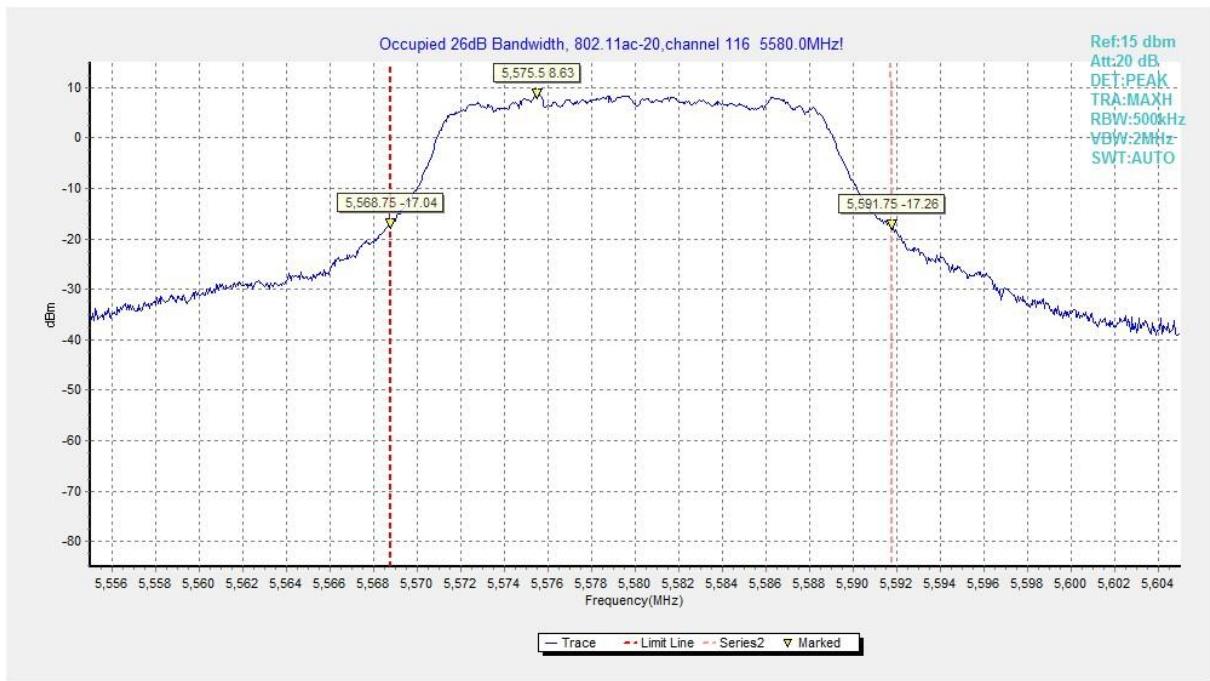


Fig. 26 Occupied 26dB Bandwidth (802. 11ac-HT20, 5580MHz)

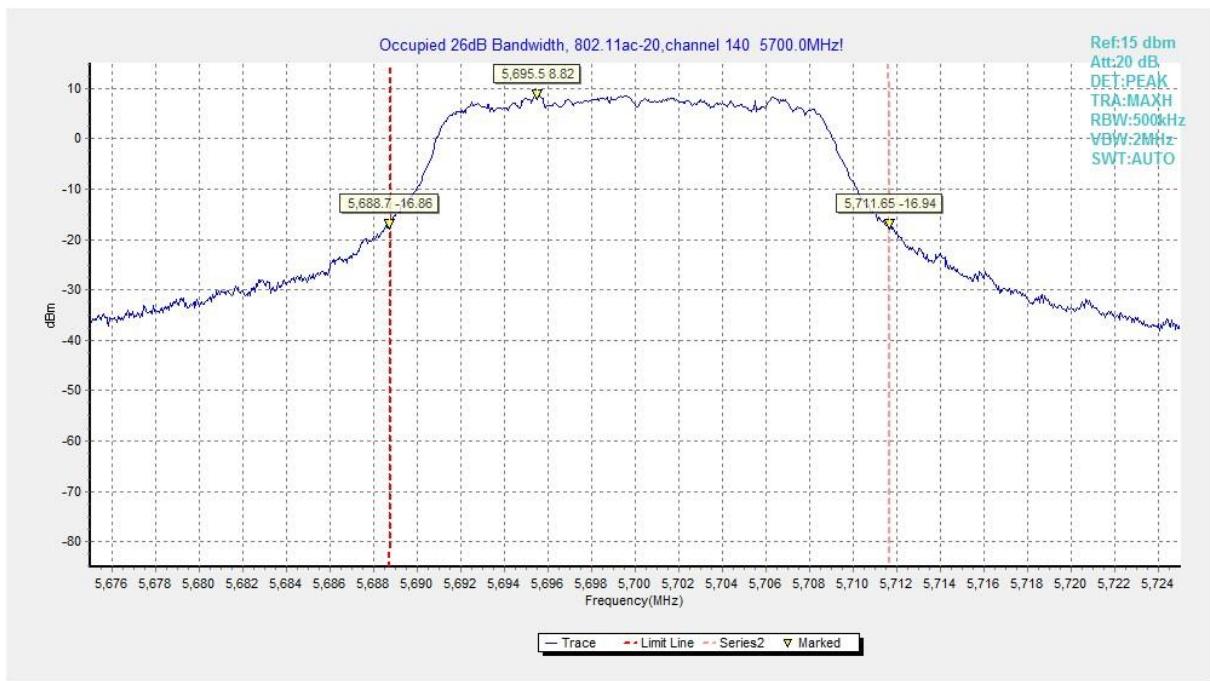
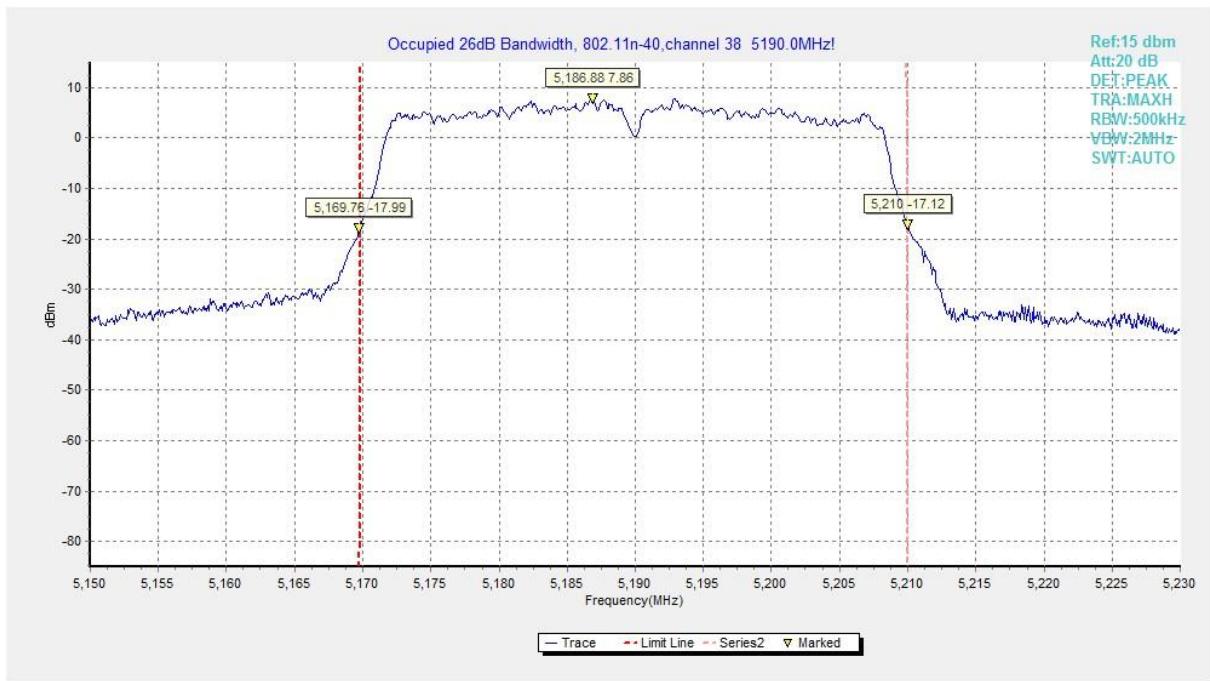
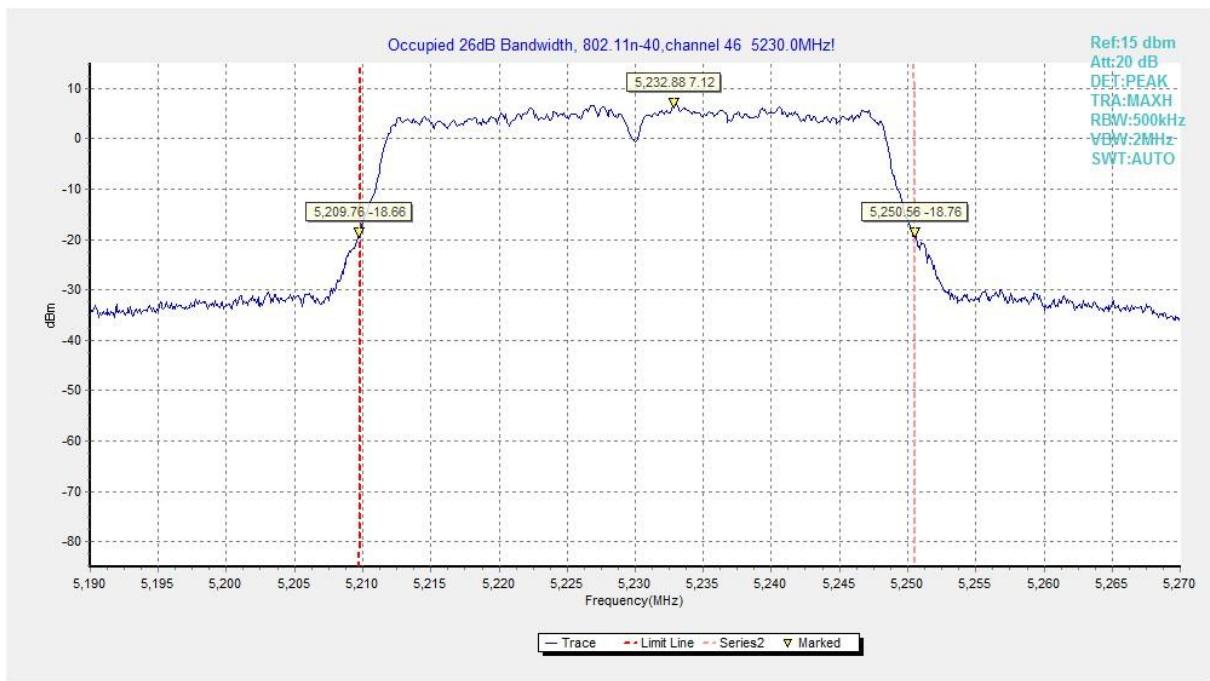
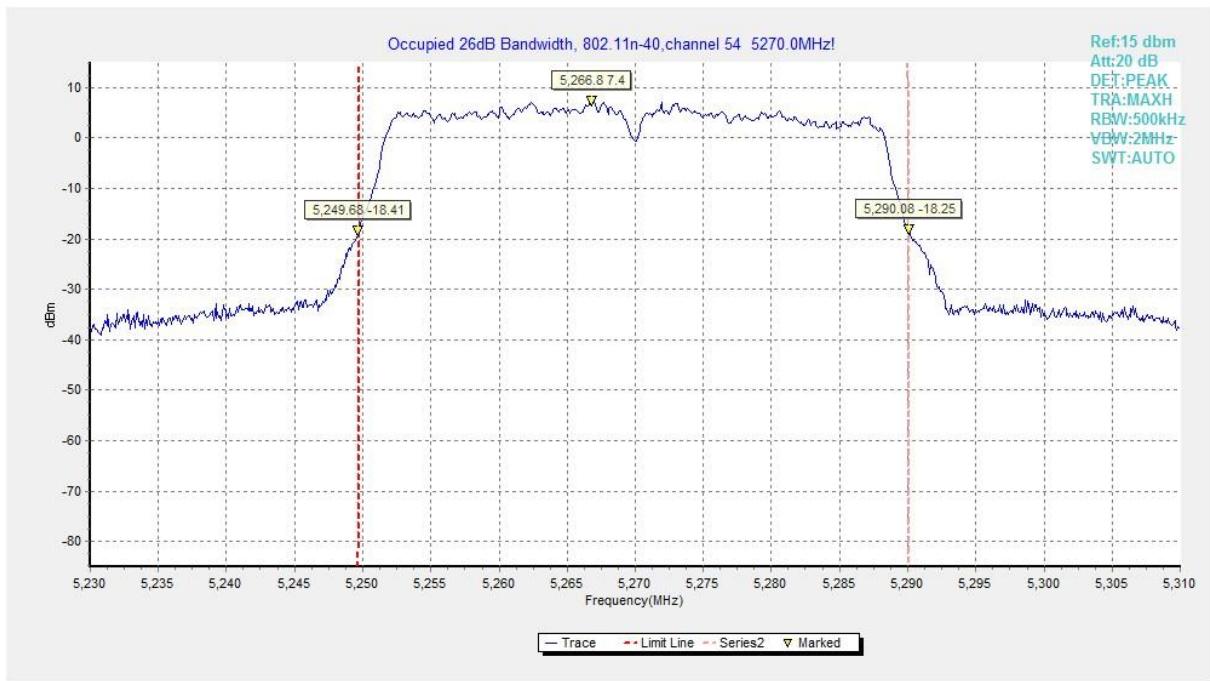
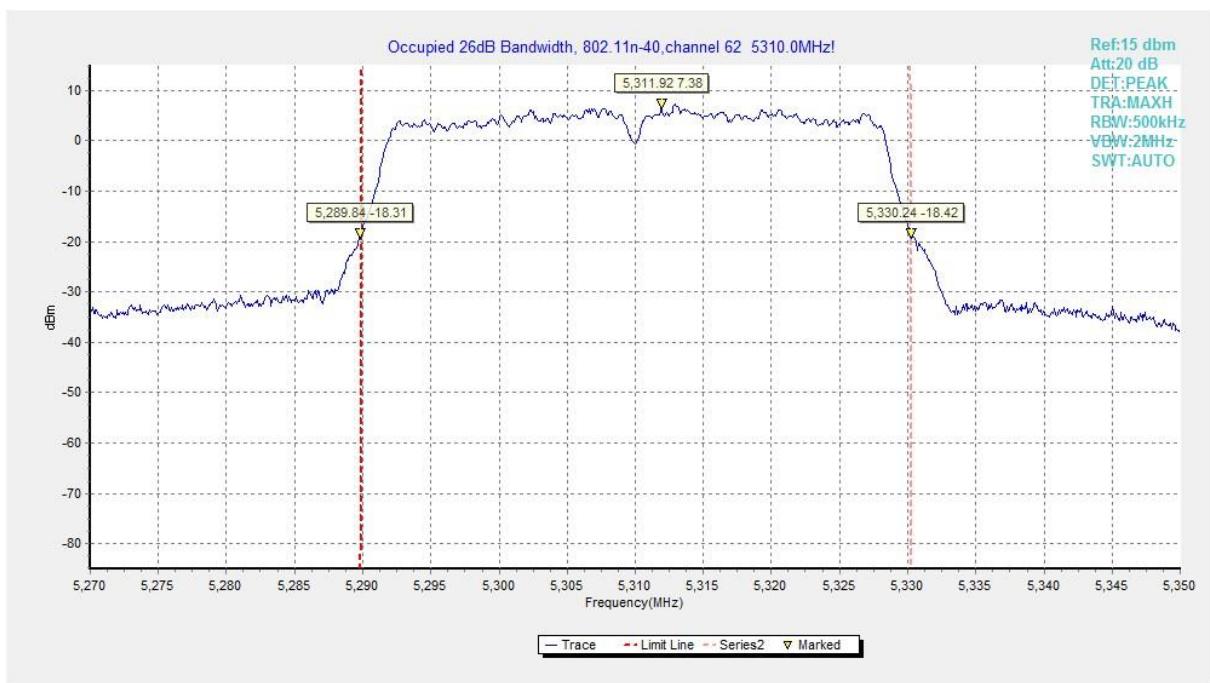


Fig. 27 Occupied 26dB Bandwidth (802. 11ac-HT20, 5700MHz)


Fig. 28 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)

Fig. 29 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)


Fig. 30 Occupied 26dB Bandwidth (802.11n-HT40, 5270MHz)

Fig. 31 Occupied 26dB Bandwidth (802.11n-HT40, 5310MHz)

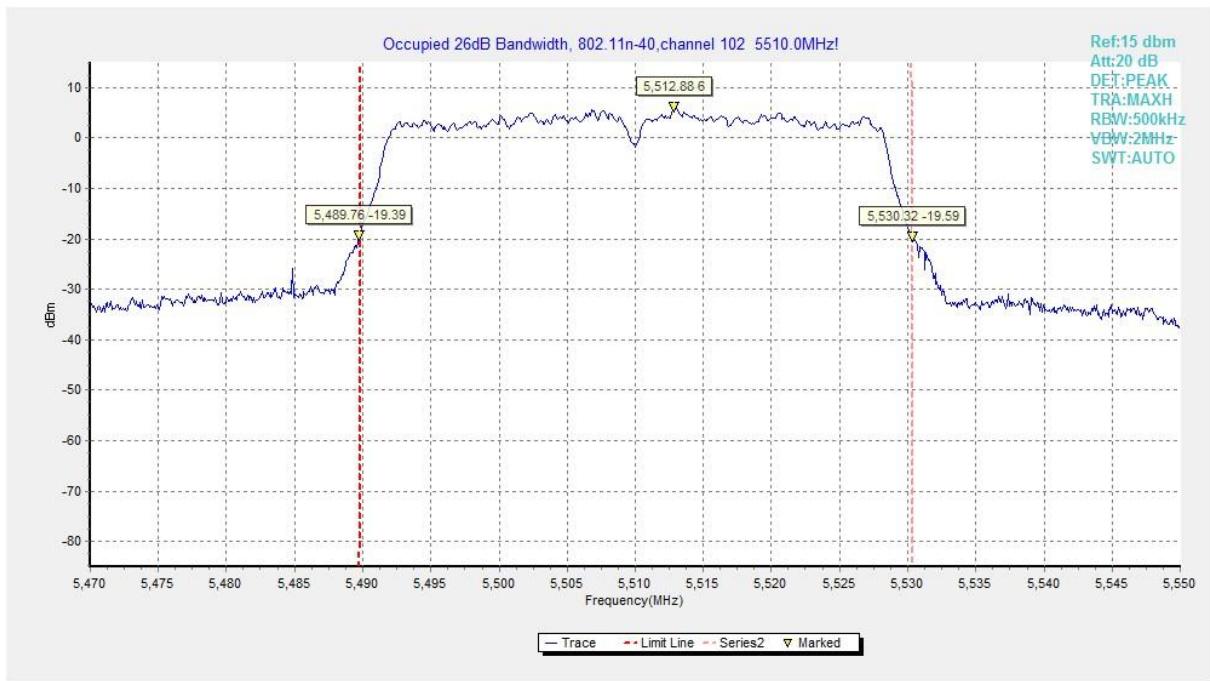


Fig. 32 Occupied 26dB Bandwidth (802. 11n-HT40, 5510MHz)

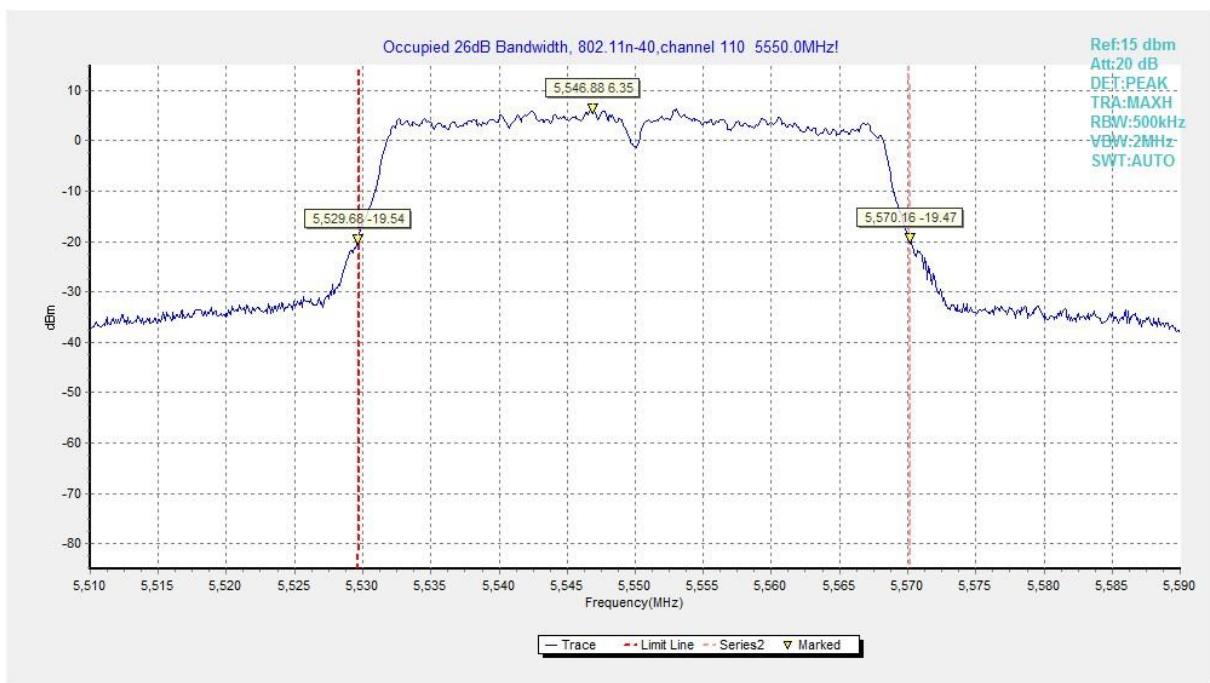


Fig. 33 Occupied 26dB Bandwidth (802. 11n-HT40, 5550MHz)

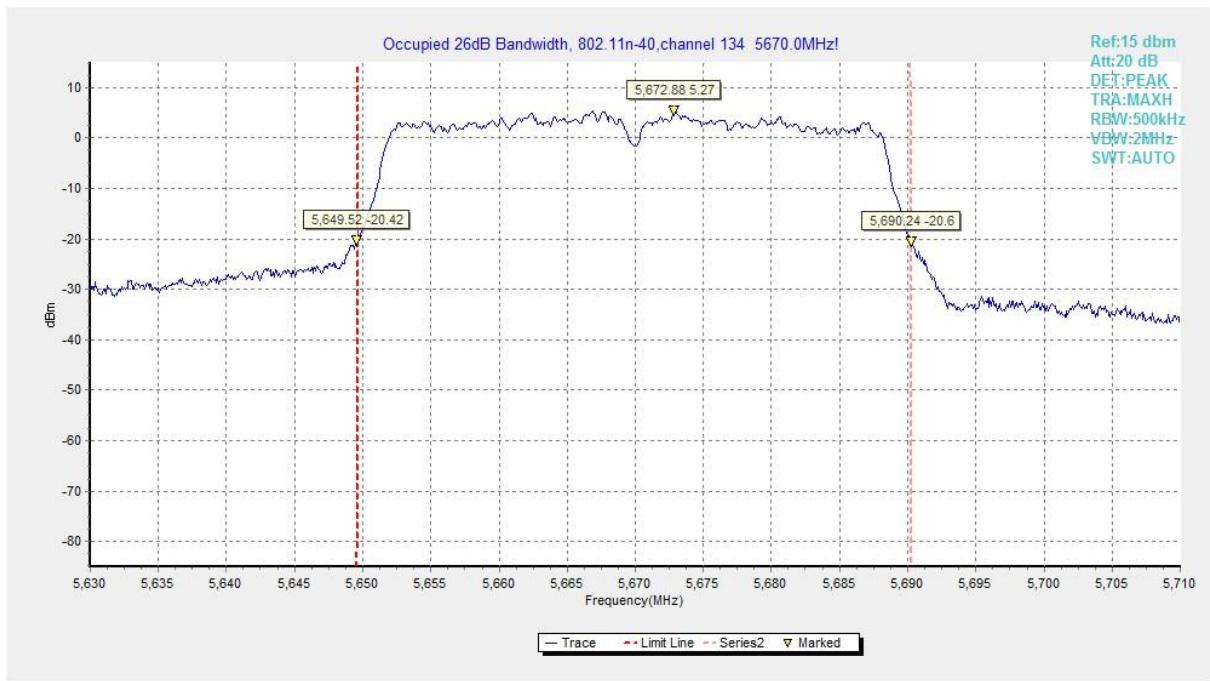


Fig. 34 Occupied 26dB Bandwidth (802.11n-HT40, 5670MHz)

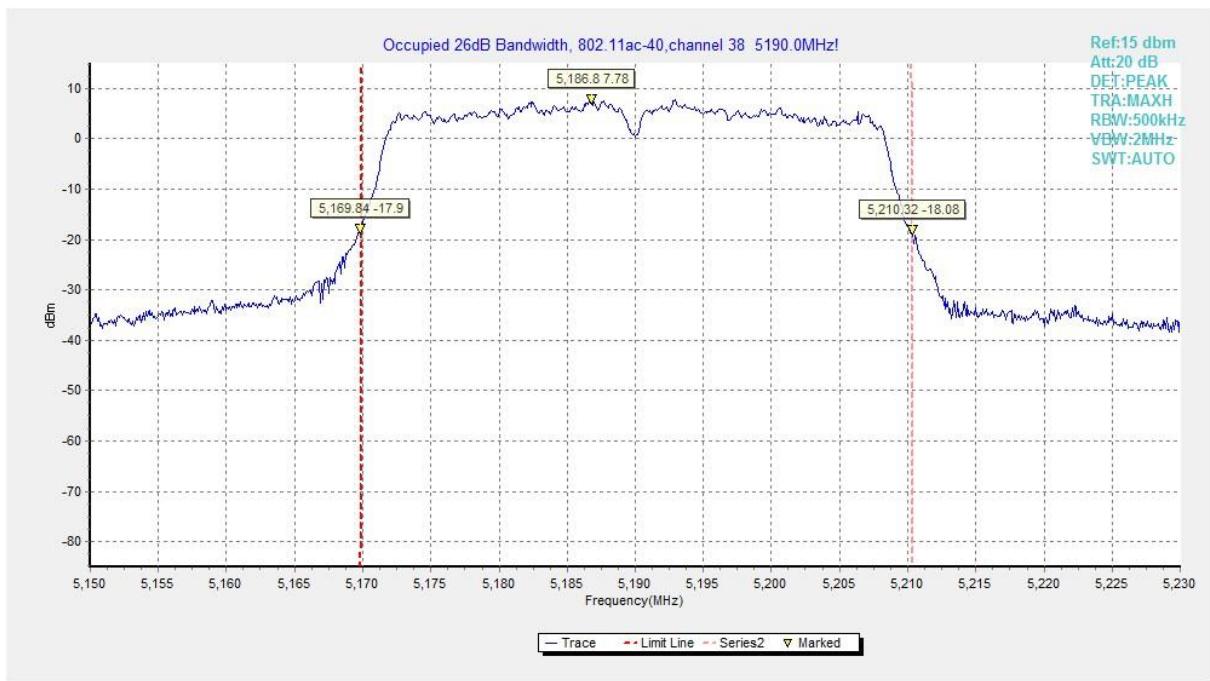


Fig. 35 Occupied 26dB Bandwidth (802.11ac-HT40, 5190MHz)

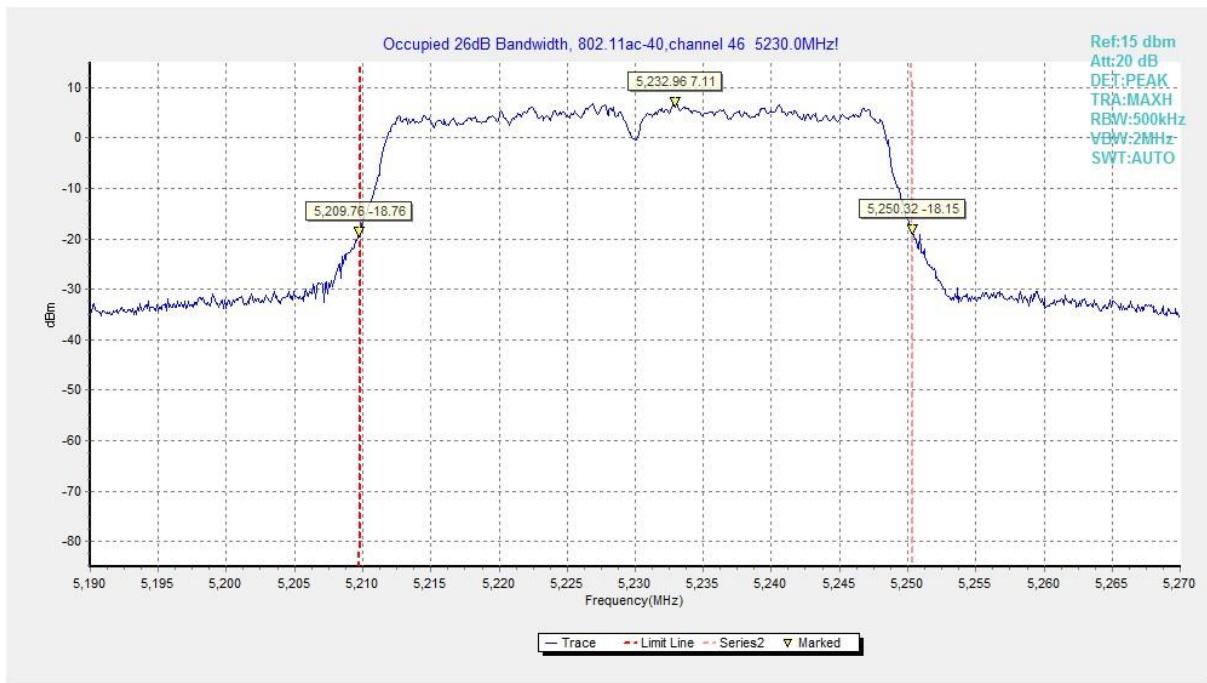


Fig. 36 Occupied 26dB Bandwidth (802.11ac-HT40, 5230MHz)

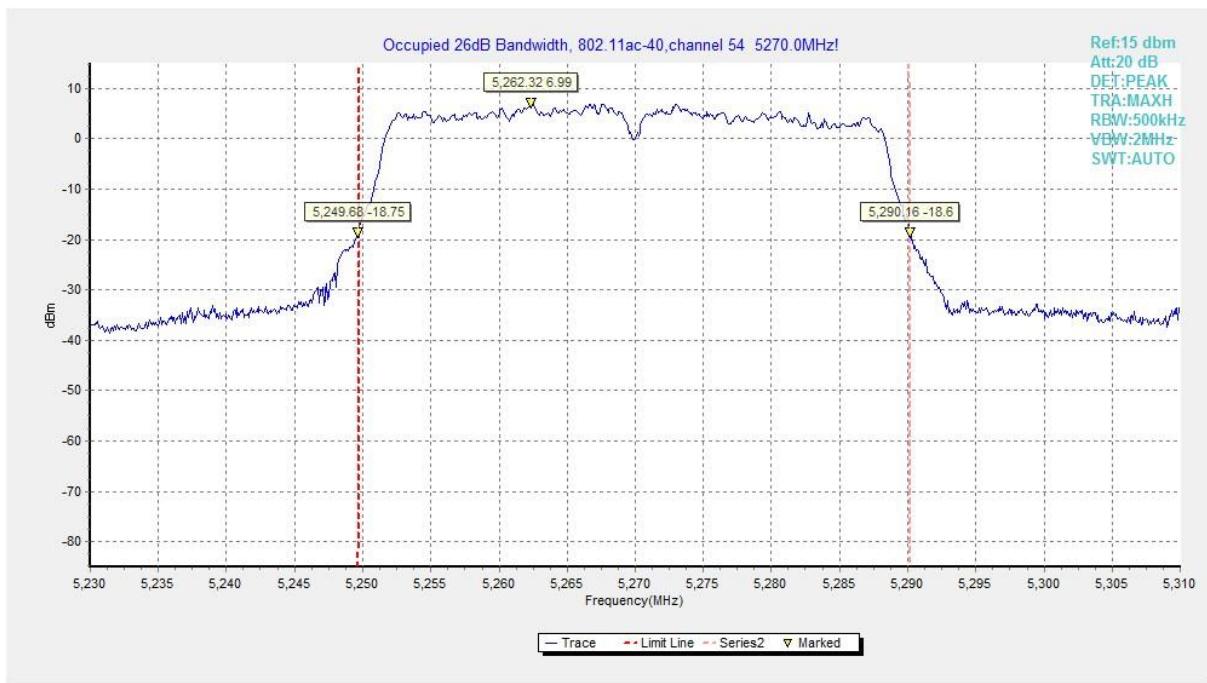


Fig. 37 Occupied 26dB Bandwidth (802.11ac-HT40, 5270MHz)