



FCC PART 15 TEST REPORT No.I21Z70495-IOT04

for

Samsung Electronics Co., Ltd.

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

SM-X205

With

FCC ID: ZCASM205

Hardware Version: REV1.0

Software Version: X205.001

Issued Date: 2021-11-05

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
I21Z70495-IOT04	Rev.0	1st edition	2021-11-05

CONTENTS

CONTENTS	3
1. TEST LATORATORY.....	5
1.1. INTRODUCTION & ACCREDITATION	5
1.2. TESTING LOCATION	5
1.3. TESTING ENVIRONMENT.....	5
1.4. PROJECT DATE	5
1.5. SIGNATURE	6
2. CLIENT INFORMATION.....	7
2.1 APPLICANT INFORMATION	7
2.2 MANUFACTURER INFORMATION	7
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARYEQUIPMENT(AE)	8
3.1. ABOUT EUT	8
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	8
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	8
3.4. GENERAL DESCRIPTION.....	10
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
8.6 AC POWER-LINE CONDUCTED EMISSION	14
ANNEX A: MEASUREMENT RESULTS.....	15
A.1. MEASUREMENT METHOD	15
A.2. MAXIMUM OUTPUT POWER	16

A.3. PEAK POWER SPECTRAL DENSITY (CONDUCTED).....	20
A.4. OCCUPIED 26DB BANDWIDTH(CONDUCTED).....	21
A.5. BAND EDGES COMPLIANCE	39
A5.1 BAND EDGES - RADIATED	39
A.6. TRANSMITTER SPURIOUS EMISSION	55
A.7. AC POWERLINE CONDUCTED EMISSION (150kHz- 30MHz).....	96
A.8. 99% OCCUPIED BANDWIDTH	101
A.9. POWER CONTROL	107
ANNEX B: EUT PARAMETERS.....	107
ANNEX C: ACCREDITATION CERTIFICATE	107

1. TEST LATORATORY

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

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

1.3. Testing Environment

Normal Temperature: 15-35℃

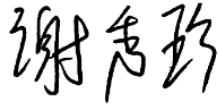
Relative Humidity: 20-75%

1.4. Project date

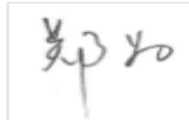
Testing Start Date: 2021-10-08

Testing End Date: 2021-11-05

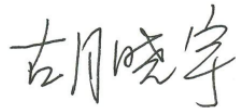
1.5. Signature



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: Samsung Electronics Co., Ltd.
Address /Post: 19 Chapin Rd., Building D Pine Brook, NJ 07058
Contact: Jenni Chun
Email: j1.chun@samsung.com
Telephone: +1-201-937-4203

2.2 Manufacturer Information

Company Name: Samsung Electronics Co., Ltd.
Address /Post: Samsung R5, Maetan dong 129, Samsung ro
Youngtong gu, Suwon city 443 742, Korea
Contact: Sunghoon Cho
Email: ggobi.cho@samsung.com
Telephone: +82-10-2722-4159

3. EQUIPMENT UNDER TEST (EUT) AND

ANCILLARY EQUIPMENT (AE)

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE Tablet with Bluetooth, WLAN
Model name	SM-X205
FCC ID	ZCASM205
WLAN Frequency Band	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -5470MHz~5725MHz
Type of modulation	OFDM
Antenna Gain	-1.37dBi
Voltage	3.85V

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
UT10a	2170495UT10a	REV1.0	X205.001
UT14a	2170495UT14a	REV1.0	X205.001

*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	Remark
AE1	Adapter1	/
AE2	Adapter2	/
AE3	Adapter3	/
AE4	Adapter4	/
AE5	Adapter5	/
AE6	Adapter6	/
AE7	Adapter7	/
AE8	Adapter8	/
AE9	Adapter9	/
AE10	Adapter10	/
AE11	Adapter11	/
AE12	USB Cable	/
AE13	Headset1	/
AE14	Headset2	/
AE15	Battery1	/
AE16	Battery2	/

AE17	Battery3	/
AE1		
Model		EP-TA50EWE
Manufacturer		HAEM Co.,Ltd
Length of cable		/
AE2		
Model		EP-TA50UWE
Manufacturer		HAEM Co.,Ltd
Length of cable		/
AE3		
Model		EP-TA50EWE
Manufacturer		RFTECH Co., Ltd.
Length of cable		/
AE4		
Model		EP-TA200EWE
Manufacturer		RFTECH Co., Ltd.
Length of cable		/
AE5		
Model		EP-TA50EWE
Manufacturer		Salcomp (Shenzhen) Co., Ltd.
Length of cable		/
AE6		
Model		EP-TA50UWE
Manufacturer		Salcomp (Shenzhen) Co., Ltd.
Length of cable		/
AE7		
Model		EP-TA50UWE
Manufacturer		DONGYANG E&P Inc.
Length of cable		/
AE8		
Model		EP-TA50BW
Manufacturer		Salcomp (Shenzhen) Co., Ltd.
Length of cable		/
AE9		
Model		EP-TA50JWE
Manufacturer		RFTech
Length of cable		/
AE10		
Model		EP-TA200JWE
Manufacturer		RFTech
Length of cable		/
AE11		
Model		EP-TA50JWE

Manufacturer	HAEM	
Length of cable	/	
AE12		
Model	EP-DR140AWE(GH39-01999A)	
Manufacturer	Samsung Electronics Co., Ltd.	
Length of cable	/	/
AE13		
Model	CH59-15054A	
Manufacturer	DONGGUAN YOUNGBO ELECTRONICS CO.,LTD	
Length of cable	/	
AE14		
Model	CH59-15054A	
Manufacturer	CRESYN HANOI Co., Ltd	
Length of cable	/	
AE15		
Type	Secondary Li-ion Battery	
SN	HQ-6300NA	
Manufacturer	Ningde Amperex Technology Limited	
AE16		
Type	Secondary Li-ion Battery	
SN	HQ-6300SD	
Manufacturer	SCUD (Fujian) Electronics CO.,LTD	
AE17		
Type	Secondary Li-ion Battery	
SN	HQ-6300SA	
Manufacturer	SCUD (Fujian) Electronics CO.,LTD	

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

3.4. General Description

The Equipment under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE Tablet 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
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/manufacture 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	3.85V
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	2022-05-24
2	LISN	ENV216	101459	R&S	1 year	2022-03-16
3	Test Receiver	ESCI	100766	R&S	1 year	2022-03-09
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	R&S	1 year	2022-09-15
2	EMI Antenna	VULB9163	9163-482	Schwarzbeck	1 year	2021-11-04
3	EMI Antenna	3117	00119024	ETS-Lindgren	1 year	2022-04-11
4	EMI Antenna	LB-180-NF	2030013000 41	A-INFO	1 year	2022-02-28
5	EMI Antenna	LB-180400 -25-C-KF	2110084000 06	A-INFO	1 year	2022-02-28
6	Analytical Spectrometer	FSV40	101047	R&S	1 year	2022-06-02
7	Analytical Spectrometer	FSV40	101525	R&S	1 year	2022-01-19

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

8.6. AC Power-line Conducted Emission

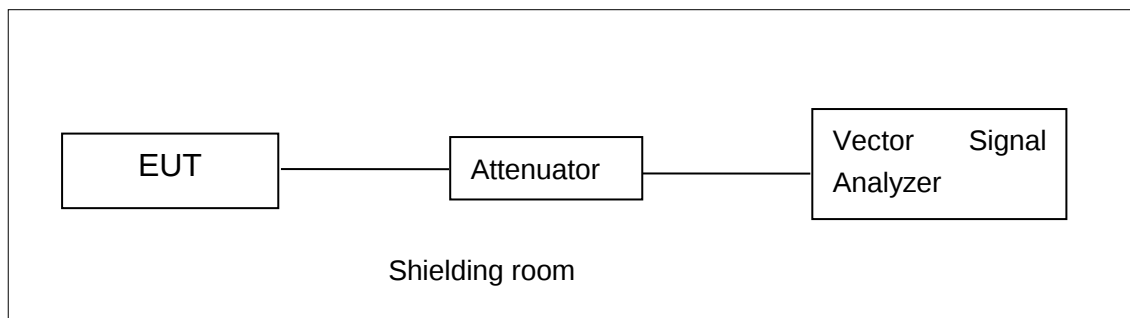
Measurement Uncertainty : 3.10,k=2

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

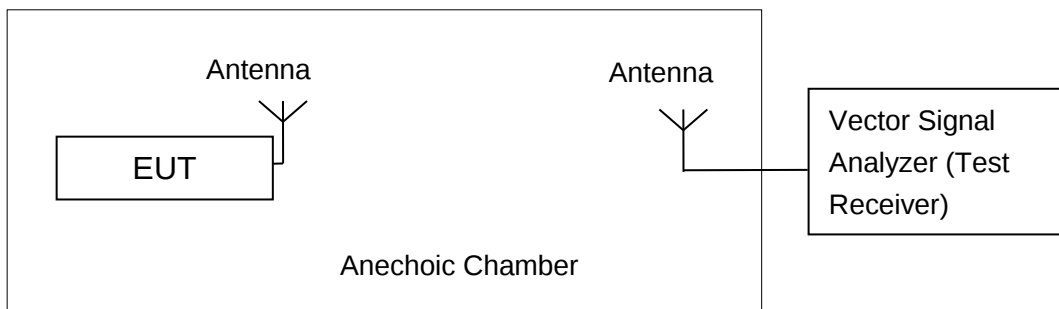


A.1.2. Radiated Emission Measurements

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.

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

Note:

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

802.11a=11+10*log(B)=24.27, B=32.55/2+5=21.275MHz,

802.11n-HT20=11+10*log(B)=24.90, B=39.10/2+5=24.55MHz,

802.11ac-VHT20=11+10*log(B)=26.22, B=56.56/2+5=33.28MHz,

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

802.11n-HT40: B=38.85/2+15=34.425MHz,

802.11ac-VHT40: B=55.52/2+15=42.76MHz,

802.11ac-VHT80: B=85.28/2+35=77.64MHz,

Duty Cycle

802.11a	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
Duty Cycle	98%	97%	96%	95%	94%	93%	91%	90%

802.11n-HT20	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle	98%	97%	96%	95%	93%	91%	89%	88%

802.11n-HT40	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle	98%	97%	96%	95%	93%	91%	90%	89%

802.11ac-HT20	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
Duty Cycle	98%	97%	96%	95%	92%	90%	89%	88%	86%

802.11ac-HT40	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
Duty Cycle	98%	98%	97%	95%	94%	93%	92%	91%	91%	90%

802.11ac-HT80	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
Duty Cycle	98%	97%	95%	94%	93%	91%	91%	90%	89%	88%

Measurement Results:

802.11a mode

Mode	Frequency	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz	15.01	14.77	14.72	13.75	13.60	13.41	12.12	12.03
	5200MHz	14.77	/	/	/	/	/	/	/
	5240MHz	14.87	/	/	/	/	/	/	/
	5260MHz	14.78	/	/	/	/	/	/	/
	5280MHz	14.71	/	/	/	/	/	/	/
	5320MHz	14.51	/	/	/	/	/	/	/
	5500MHz	14.50	/	/	/	/	/	/	/
	5580MHz	16.20	/	/	/	/	/	/	/
	5700MHz	7.66	/	/	/	/	/	/	/
	5720MHz	15.21	/	/	/	/	/	/	/

The data rate 9Mbps 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	16.15	16.11	16.11	16.14	15.55	15.66	15.67	15.71
	5200MHz	15.95	/	/	/	/	/	/	/
	5240MHz	16.26	/	/	/	/	/	/	/
	5260MHz	16.13	/	/	/	/	/	/	/
	5280MHz	16.01	/	/	/	/	/	/	/
	5320MHz	16.13	/	/	/	/	/	/	/
	5500MHz	15.81	/	/	/	/	/	/	/
	5580MHz	16.03	/	/	/	/	/	/	/
	5700MHz	15.97	/	/	/	/	/	/	/
	5720MHz	15.76	/	/	/	/	/	/	/

The data rate MCS1 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	15.54	15.49	14.46	14.47	14.24	14.37	13.82	13.79	14.11
	5200MHz	15.37	/	/	/	/	/	/	/	/
	5240MHz	15.77	/	/	/	/	/	/	/	/
	5260MHz	15.68	/	/	/	/	/	/	/	/
	5280MHz	15.44	/	/	/	/	/	/	/	/
	5320MHz	15.59	/	/	/	/	/	/	/	/
	5500MHz	15.26	/	/	/	/	/	/	/	/
	5580MHz	15.51	/	/	/	/	/	/	/	/
	5700MHz	15.43	/	/	/	/	/	/	/	/
	5720MHz	15.24	/	/	/	/	/	/	/	/

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	14.56	14.54	14.54	14.33	14.02	14.06	14.09	14.15
	5230MHz	14.77	/	/	/	/	/	/	/
	5270MHz	14.59	/	/	/	/	/	/	/
	5310MHz	14.67	/	/	/	/	/	/	/
	5510MHz	14.52	/	/	/	/	/	/	/
	5550MHz	14.16	/	/	/	/	/	/	/
	5670MHz	14.11	/	/	/	/	/	/	/
	5710MHz	14.36	/	/	/	/	/	/	/

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	14.54	14.50	13.52	13.60	13.10	13.13	12.71	12.55	13.38	13.35
	5230MHz	14.83	/	/	/	/	/	/	/	/	/
	5270MHz	14.58	/	/	/	/	/	/	/	/	/
	5310MHz	14.60	/	/	/	/	/	/	/	/	/
	5510MHz	14.48	/	/	/	/	/	/	/	/	/
	5550MHz	14.21	/	/	/	/	/	/	/	/	/
	5670MHz	14.16	/	/	/	/	/	/	/	/	/
	5710MHz	14.28	/	/	/	/	/	/	/	/	/

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	14.18	14.21	12.99	13.07	12.60	12.55	11.90	11.91	12.86	12.85
	5290MHz	/	14.14	/	/	/	/	/	/	/	/
	5530MHz	/	13.98	/	/	/	/	/	/	/	/
	5610MHz	/	13.80	/	/	/	/	/	/	/	/
	5690MHz	/	13.84	/	/	/	/	/	/	/	/

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 Section F is made according to KDB 789033

Measurement Results:

Mode	Frequency	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180 MHz	3.77	P
	5200 MHz	3.50	P
	5240 MHz	4.39	P
	5260 MHz	4.23	P
	5280 MHz	4.08	P
	5320 MHz	4.00	P
	5500 MHz	4.00	P
	5580 MHz	4.22	P
	5700 MHz	3.11	P
	5720 MHz	3.47	P
802.11n HT20	5180 MHz	3.98	P
	5200 MHz	3.84	P
	5240 MHz	4.62	P
	5260 MHz	4.54	P
	5280 MHz	4.32	P
	5320 MHz	4.35	P
	5500 MHz	4.22	P
	5580 MHz	4.47	P
	5700 MHz	3.75	P
	5720 MHz	3.79	P
802.11ac HT40	5190 MHz	-0.38	P
	5230 MHz	0.26	P
	5270 MHz	-0.32	P
	5310 MHz	-0.34	P
	5510 MHz	-0.24	P
	5550 MHz	-0.53	P
	5670 MHz	-0.75	P
	5710 MHz	-0.41	P
802.11ac	5210MHz	-3.62	P

HT80	5290MHz	-3.87	P
	5530MHz	-3.81	P
	5610MHz	-4.04	P
	5690MHz	-4.31	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	32.55	P
	5200 MHz	Fig.2	32.45	P
	5240 MHz	Fig.3	33.20	P
	5260 MHz	Fig.4	32.60	P
	5280 MHz	Fig.5	35.15	P
	5320 MHz	Fig.6	32.00	P
	5500 MHz	Fig.7	32.95	P
	5580 MHz	Fig.8	33.05	P
	5700 MHz	Fig.9	32.40	P
	5720 MHz	Fig.10	32.55	P
802.11n HT20	5180 MHz	Fig.11	39.85	P
	5200 MHz	Fig.12	39.75	P
	5240 MHz	Fig.13	39.75	P
	5260 MHz	Fig.14	39.70	P
	5280 MHz	Fig.15	39.40	P
	5320 MHz	Fig.16	39.00	P
	5500 MHz	Fig.17	39.25	P
	5580 MHz	Fig.18	39.80	P
	5700 MHz	Fig.19	40.00	P
	5720 MHz	Fig.20	39.10	P

802.11ac	5190 MHz	Fig.21	55.04	P
----------	----------	--------	-------	---

HT40	5230 MHz	Fig.22	55.36	P
	5270 MHz	Fig.23	56.16	P
	5310 MHz	Fig.24	55.92	P
	5510 MHz	Fig.25	55.76	P
	5550 MHz	Fig.26	55.52	P
	5670 MHz	Fig.27	55.68	P
	5710 MHz	Fig.28	55.52	P

802.11ac HT80	5210MHz	Fig.29	83.68	P
	5290MHz	Fig.30	85.28	P
	5530MHz	Fig.31	84.48	P
	5610MHz	Fig.32	85.76	P
	5690MHz	Fig.33	85.28	P

Conclusion: PASS

Test graphs as below:

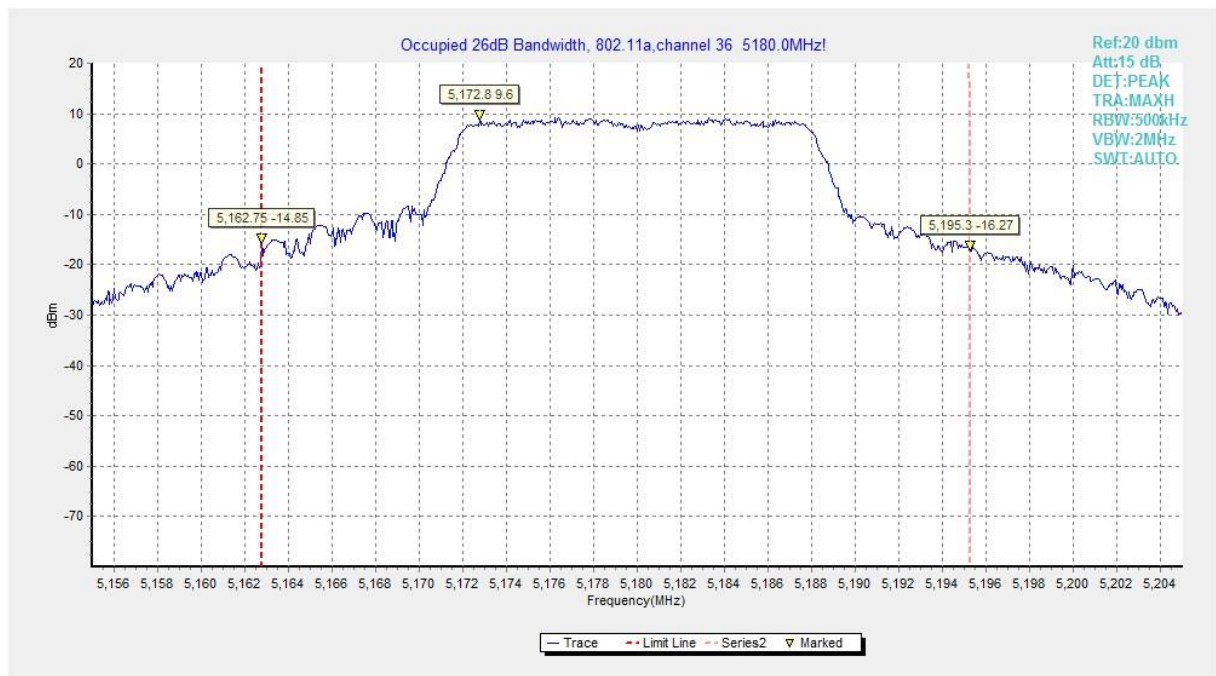


Fig.1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

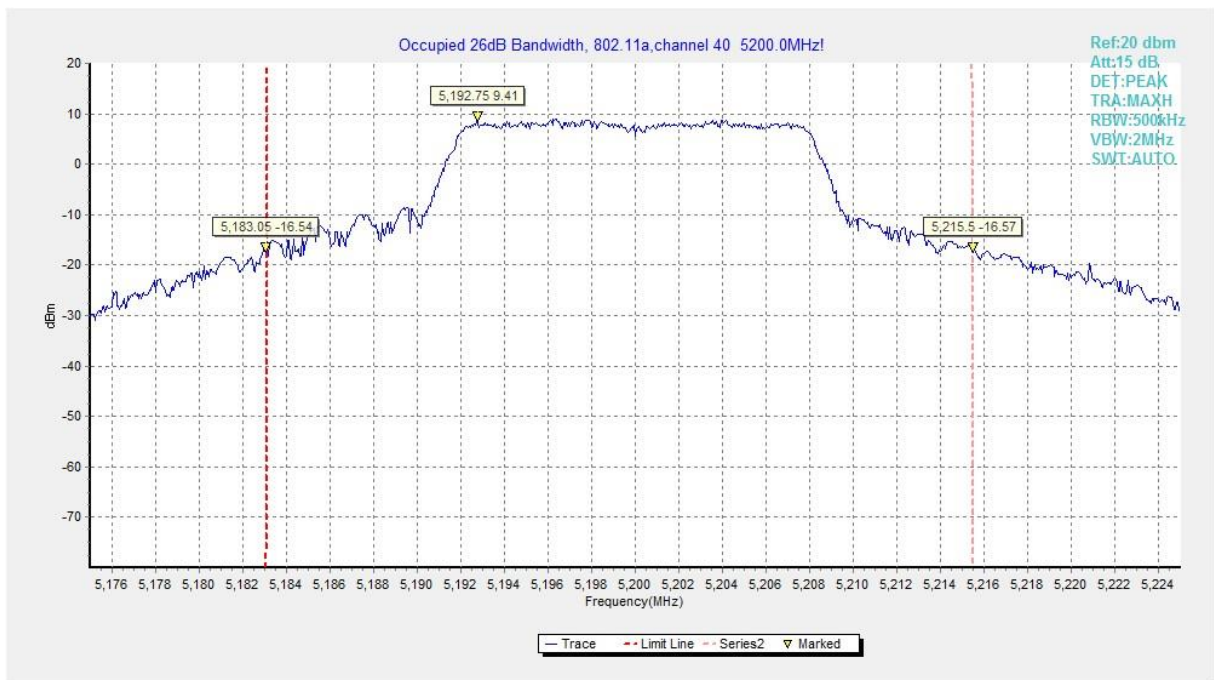


Fig.2 Occupied 26dB Bandwidth (802.11a, 5200MHz)

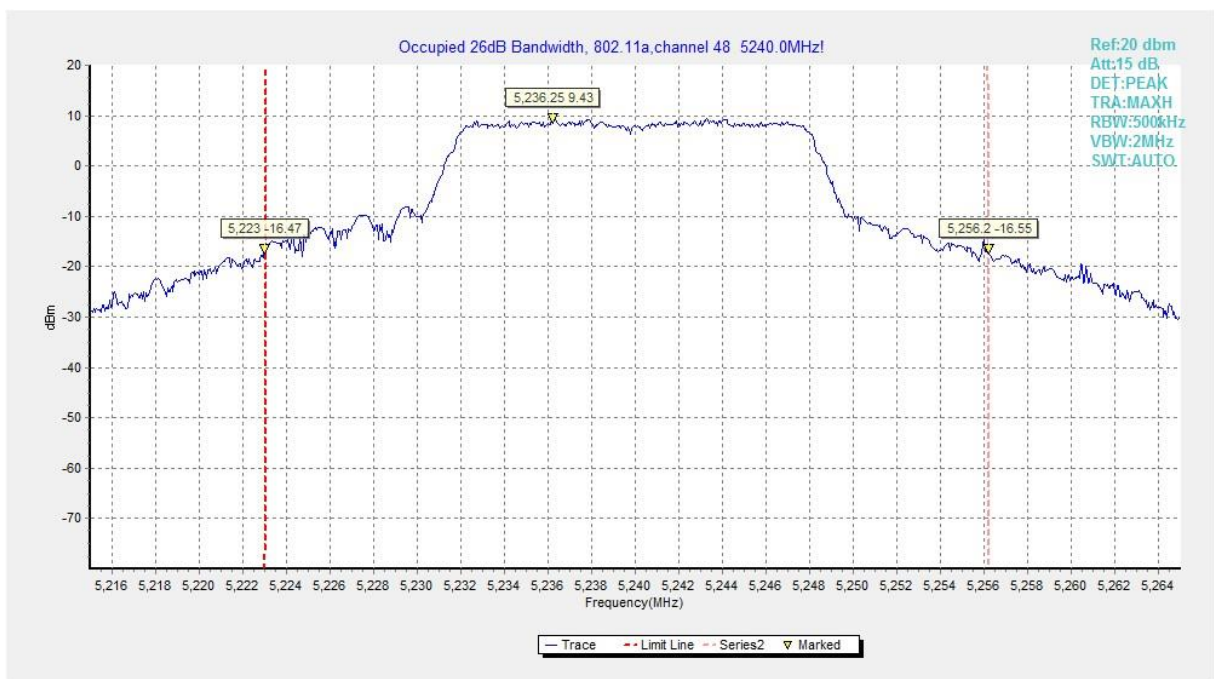


Fig.3 Occupied 26dB Bandwidth (802.11a, 5240MHz)

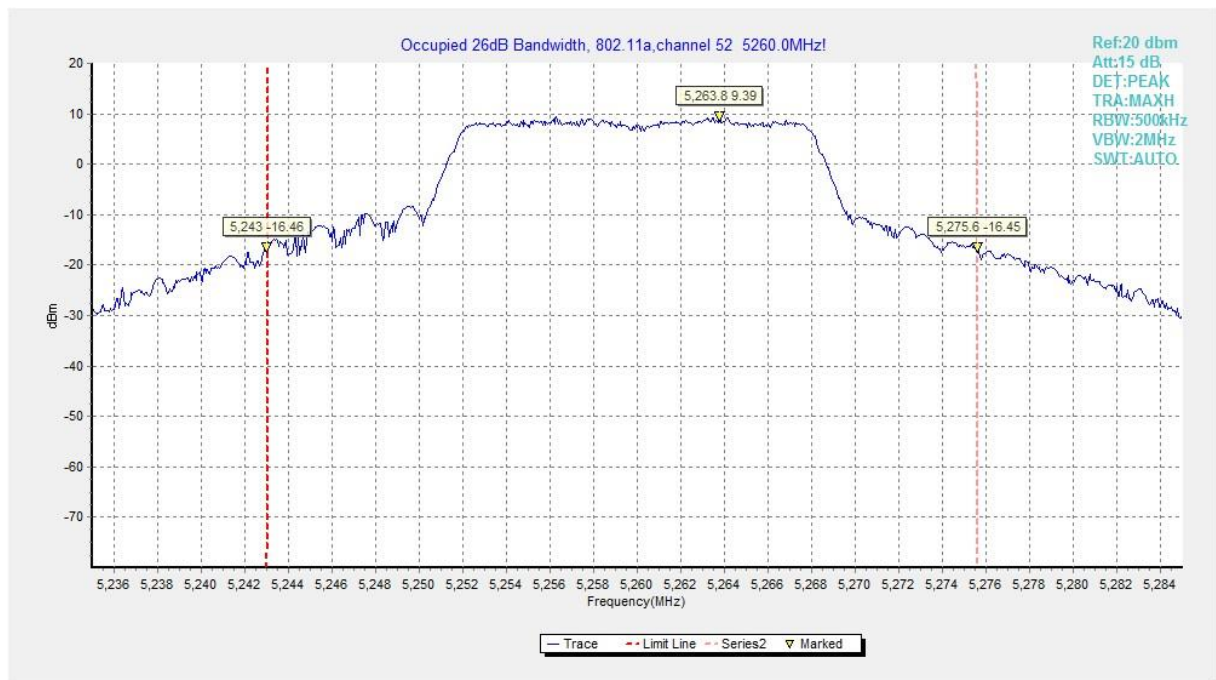


Fig.4 Occupied 26dB Bandwidth (802.11a, 5260MHz)

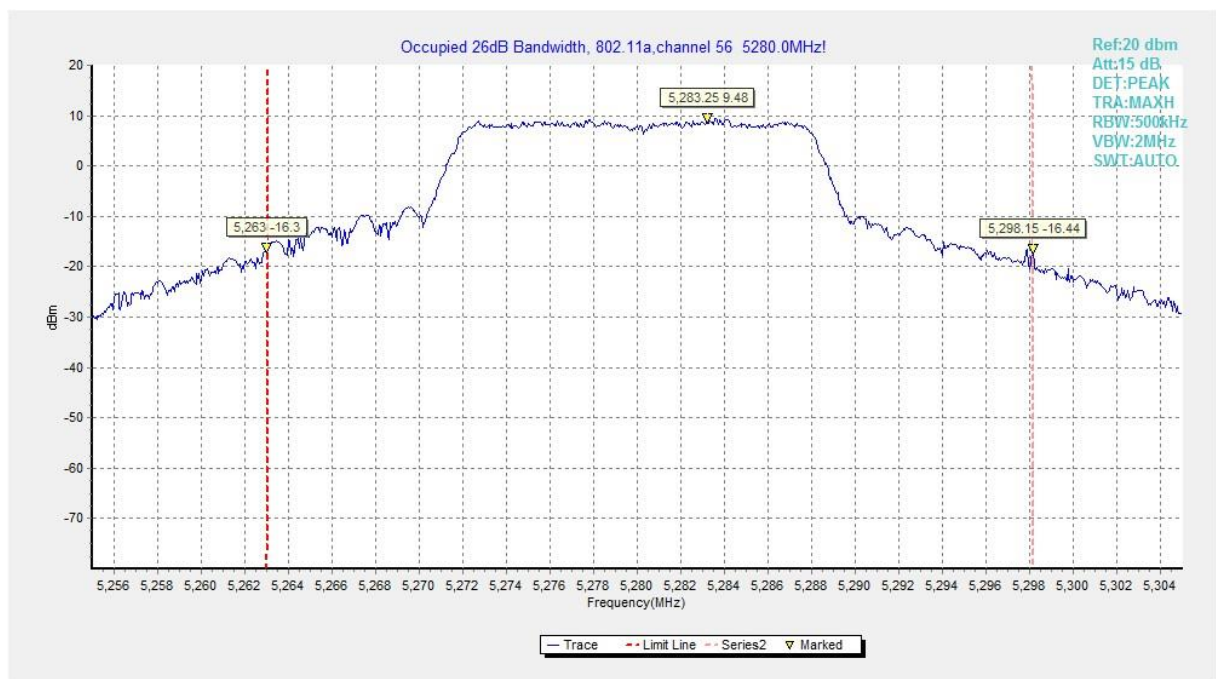


Fig.5 Occupied 26dB Bandwidth (802.11a, 5280MHz)



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

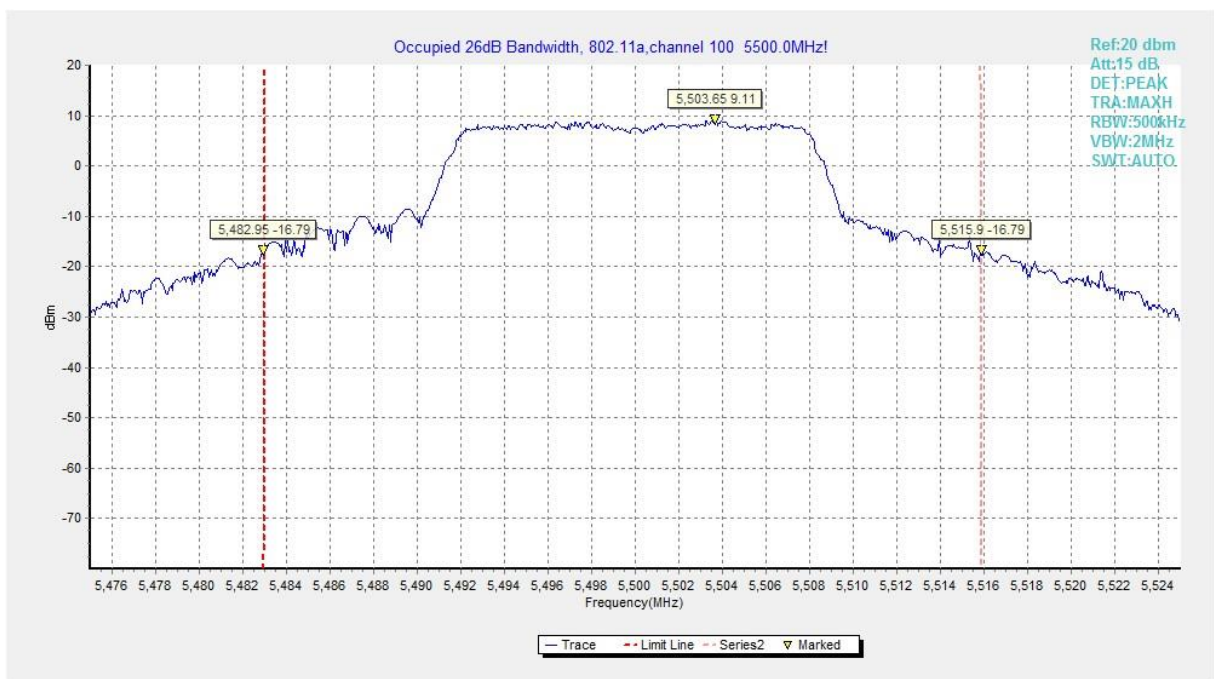


Fig.7 Occupied 26dB Bandwidth (802.11a, 5500MHz)

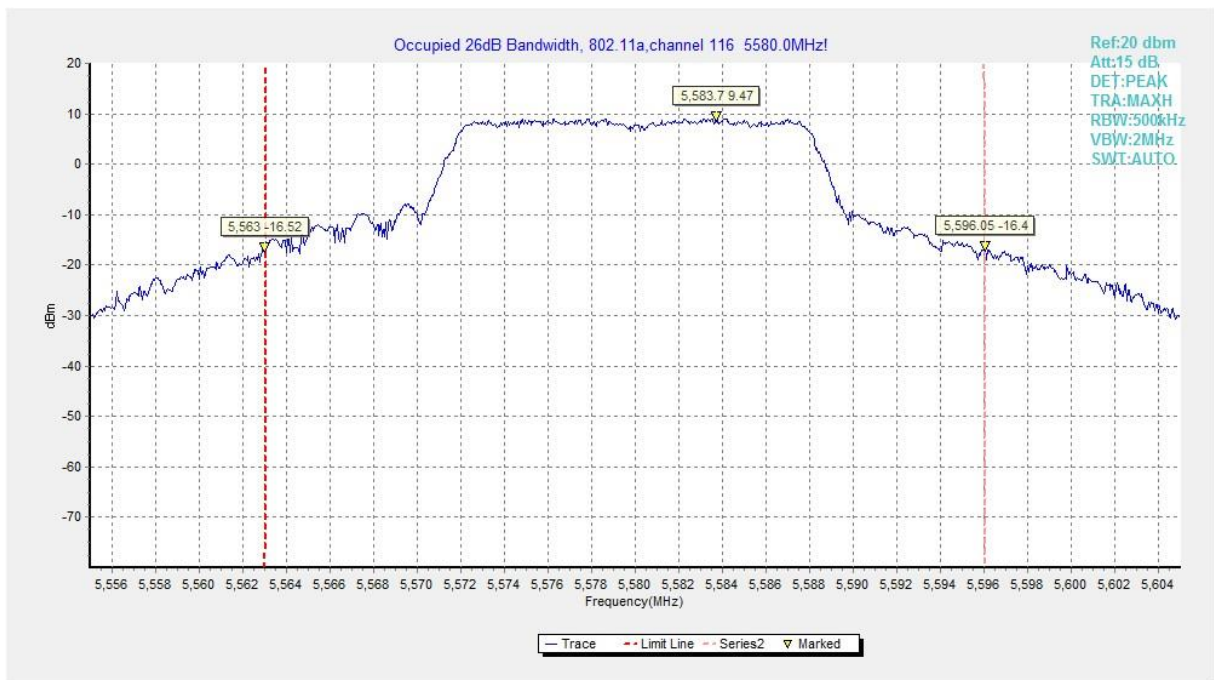


Fig.8 Occupied 26dB Bandwidth (802.11a, 5580MHz)

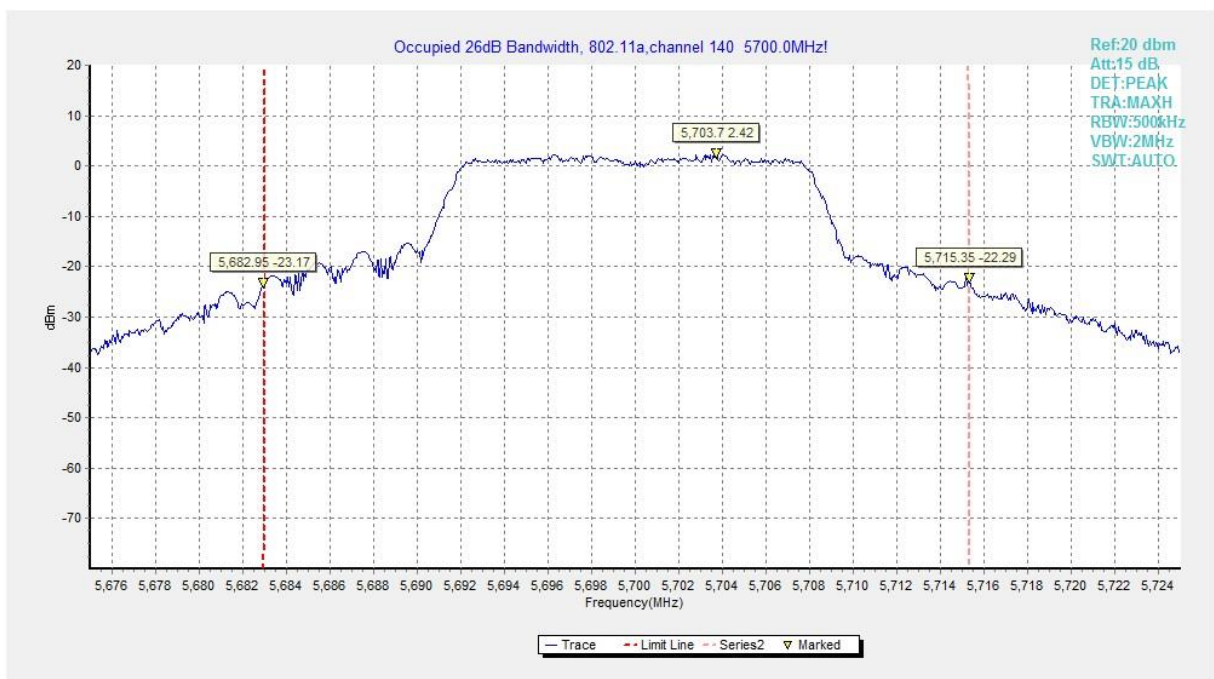


Fig.9 Occupied 26dB Bandwidth (802.11a, 5700MHz)

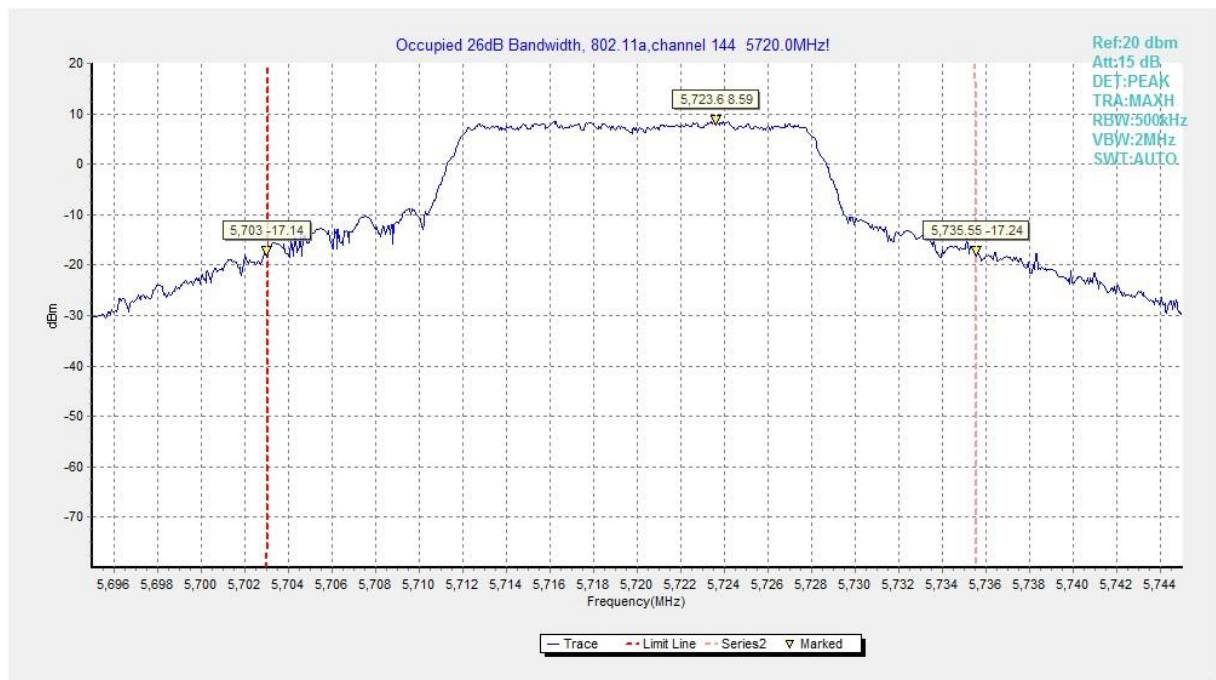


Fig.10 Occupied 26dB Bandwidth (802.11a, 5720MHz)

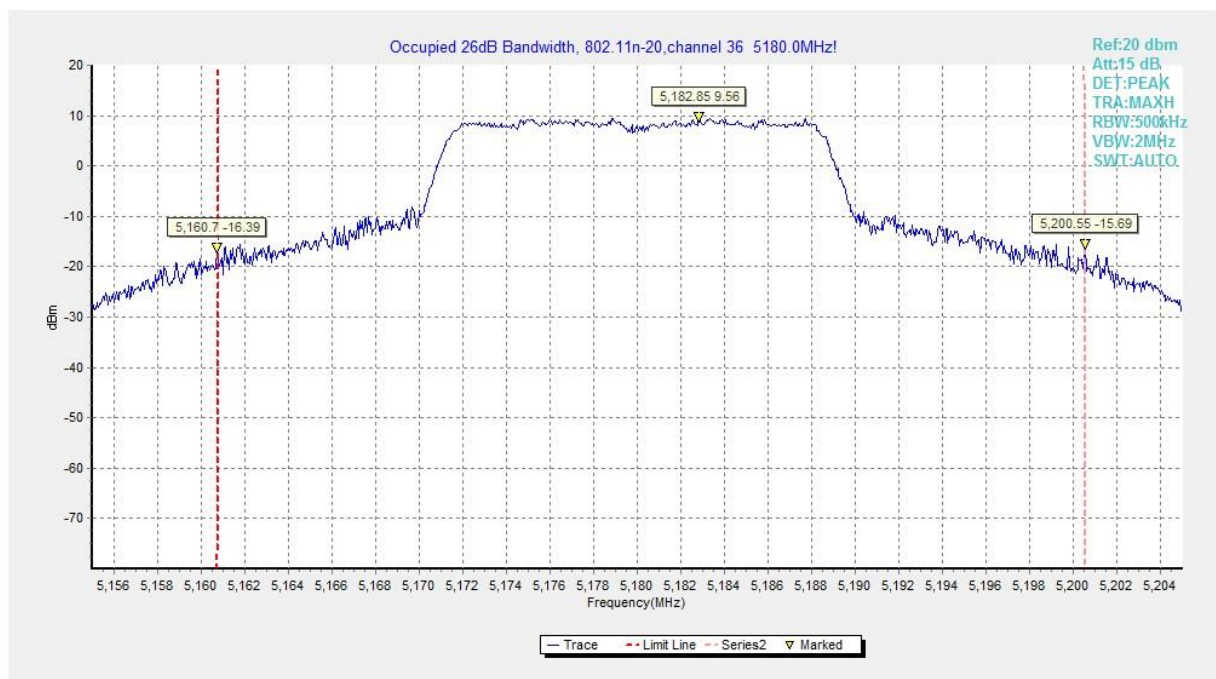


Fig.11 Occupied 26dB Bandwidth (802.11n-HT20, 5180MHz)

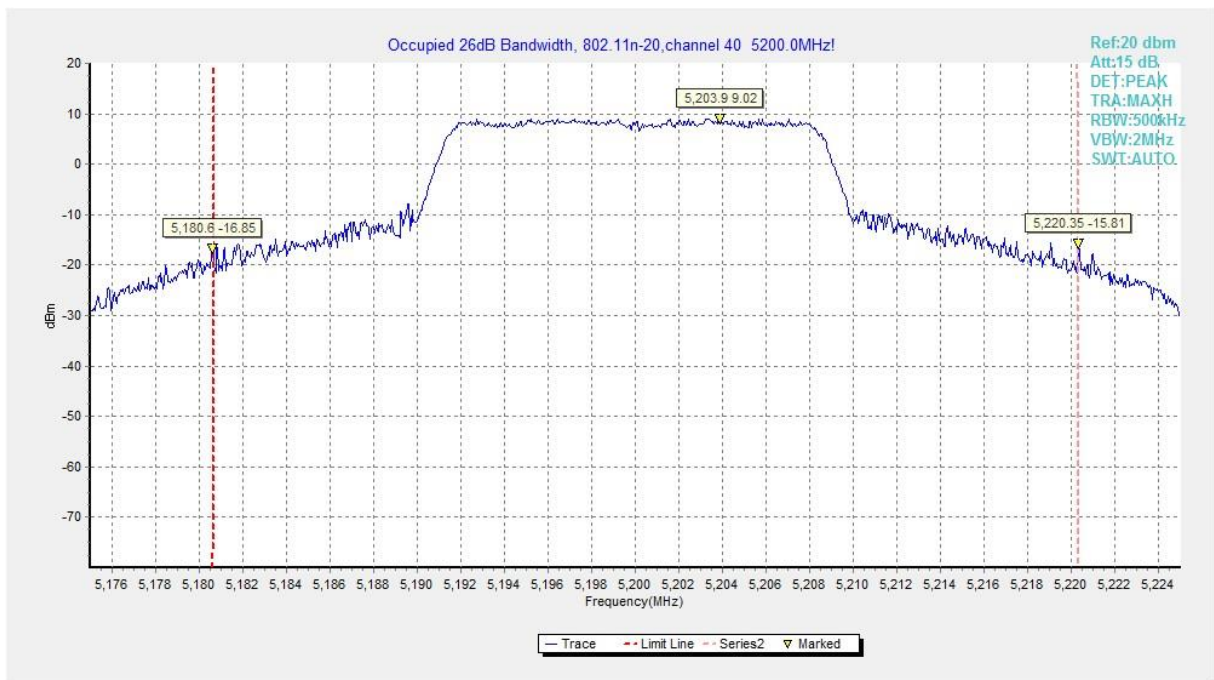


Fig.12 Occupied 26dB Bandwidth (802.11n-HT20, 5200MHz)

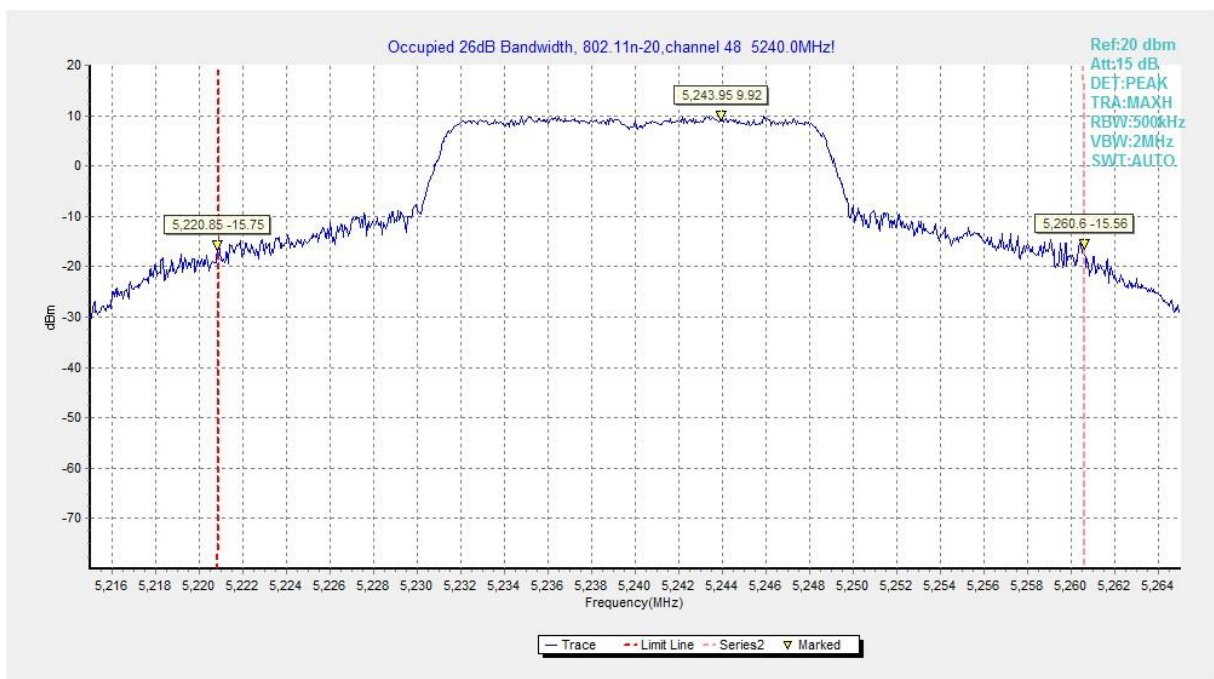


Fig.13 Occupied 26dB Bandwidth (802.11n-HT20, 5240MHz)

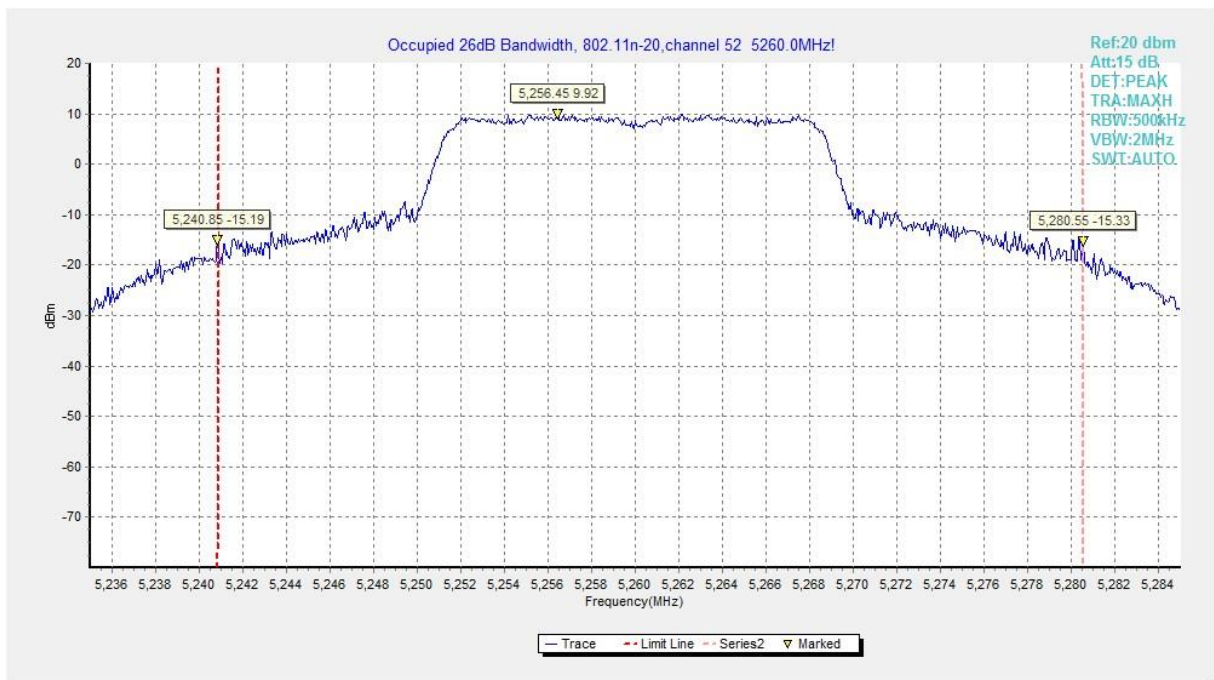


Fig.14 Occupied 26dB Bandwidth (802.11n-HT20, 5260MHz)

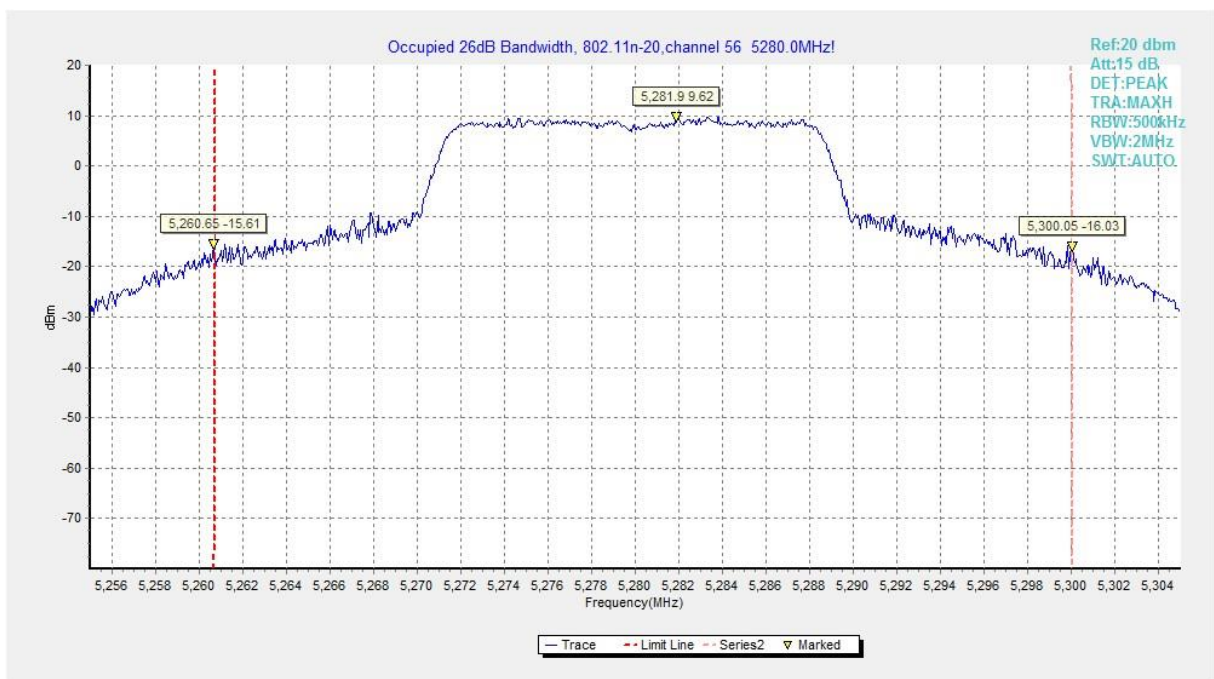


Fig.15 Occupied 26dB Bandwidth (802.11n-HT20, 5280MHz)

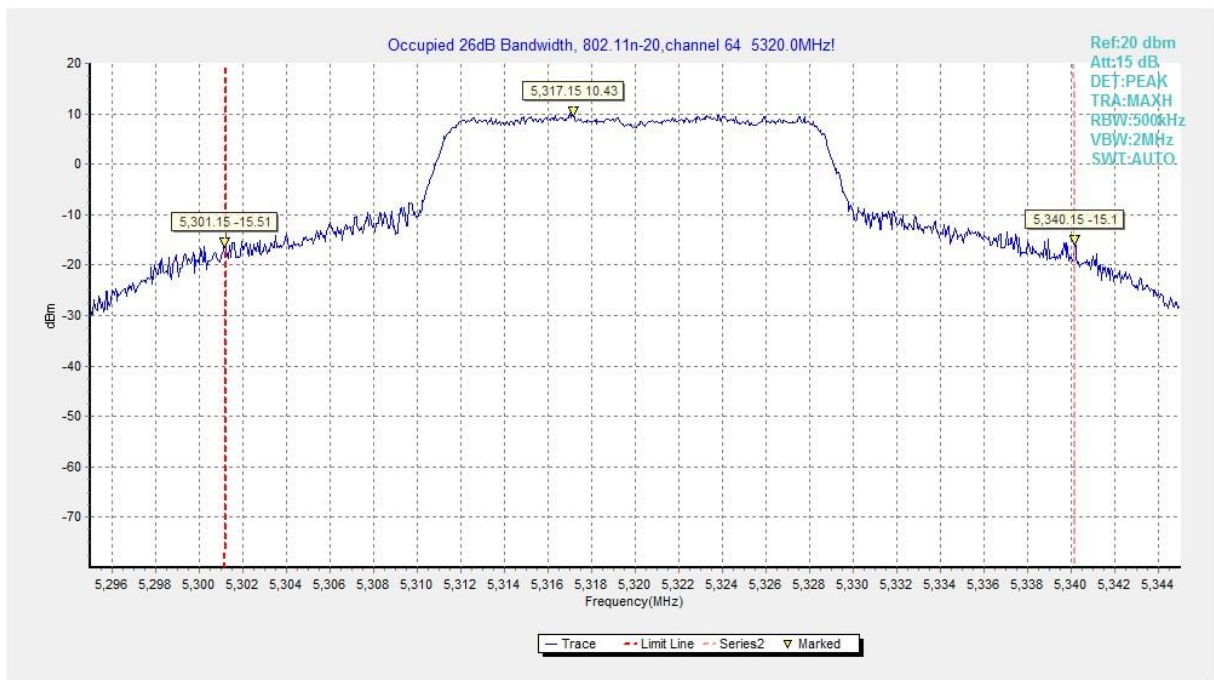


Fig.16 Occupied 26dB Bandwidth (802.11n-HT20, 5320MHz)

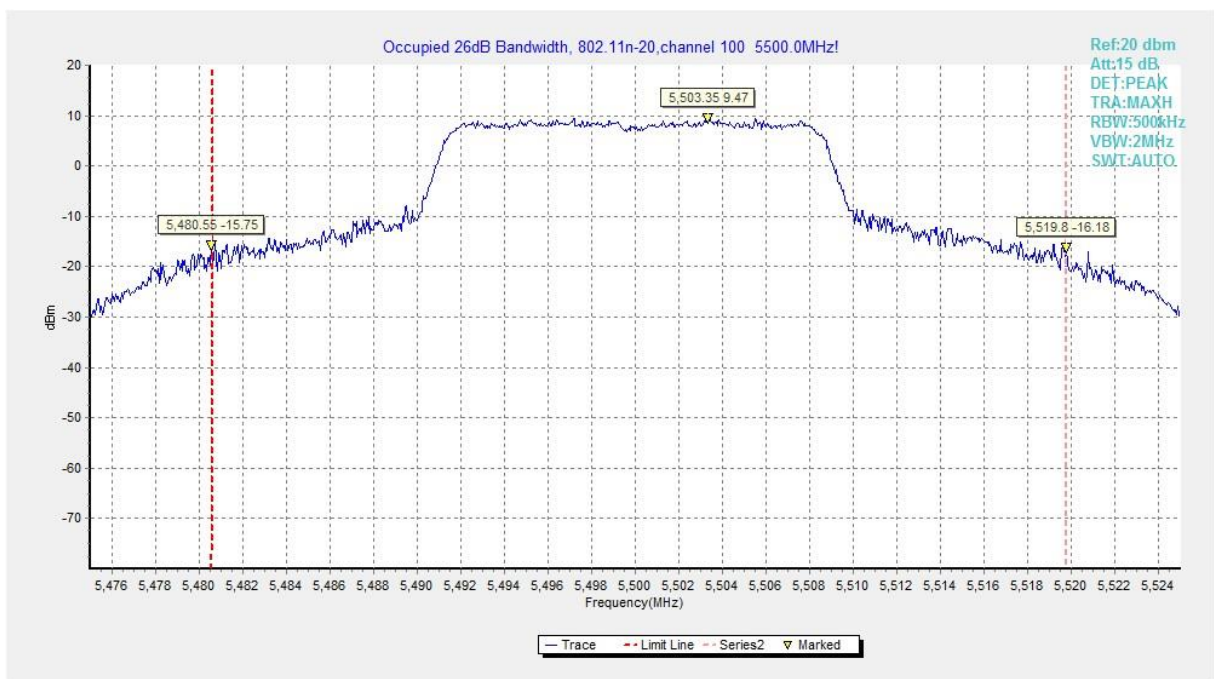


Fig.17 Occupied 26dB Bandwidth (802. 11n-HT20, 5500MHz)

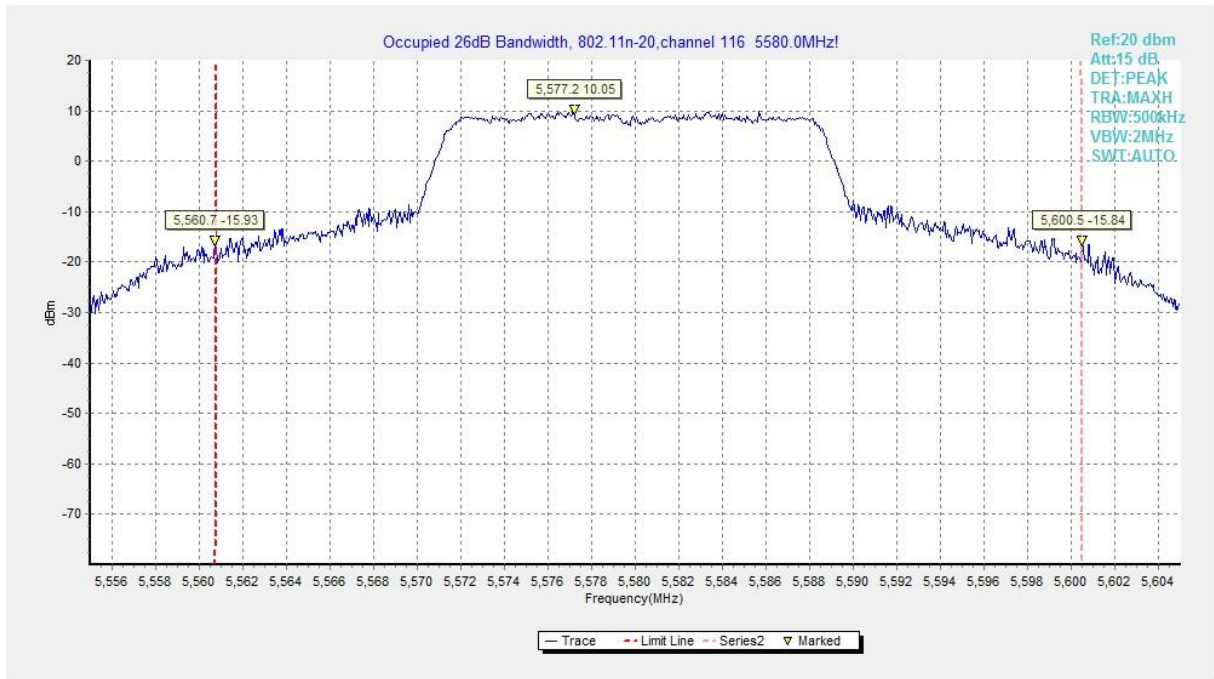


Fig.18 Occupied 26dB Bandwidth (802. 11n-HT20, 5580MHz)

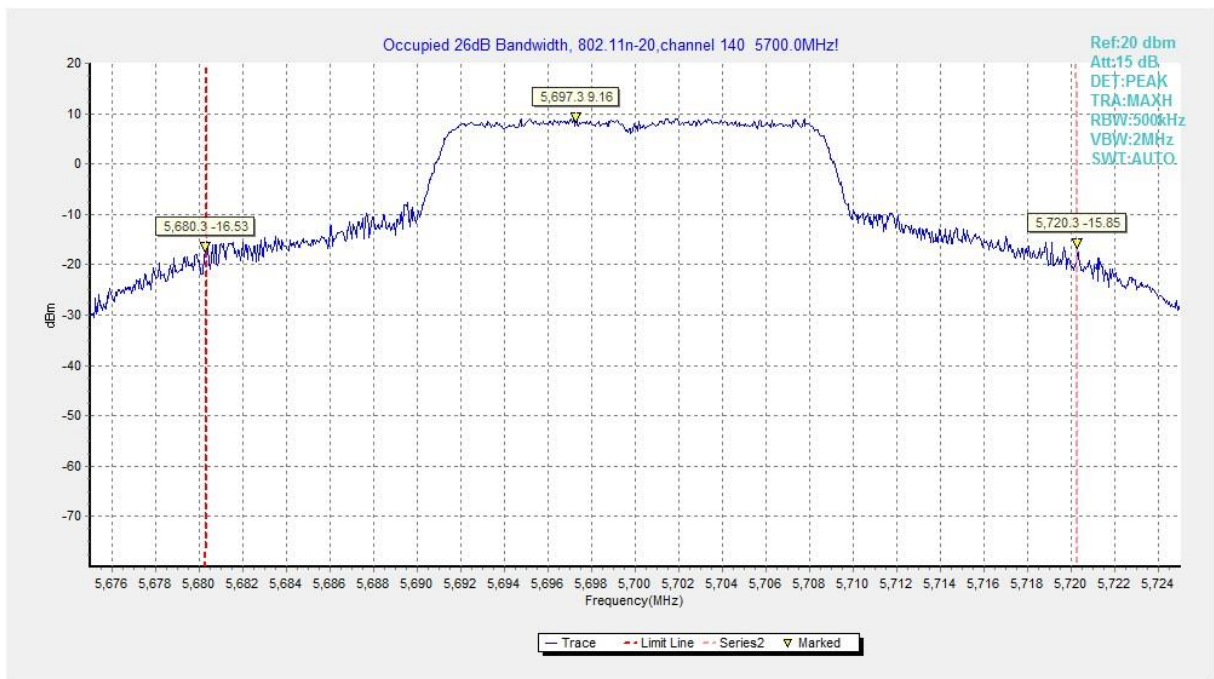


Fig.19 Occupied 26dB Bandwidth (802. 11n-HT20, 5700MHz)

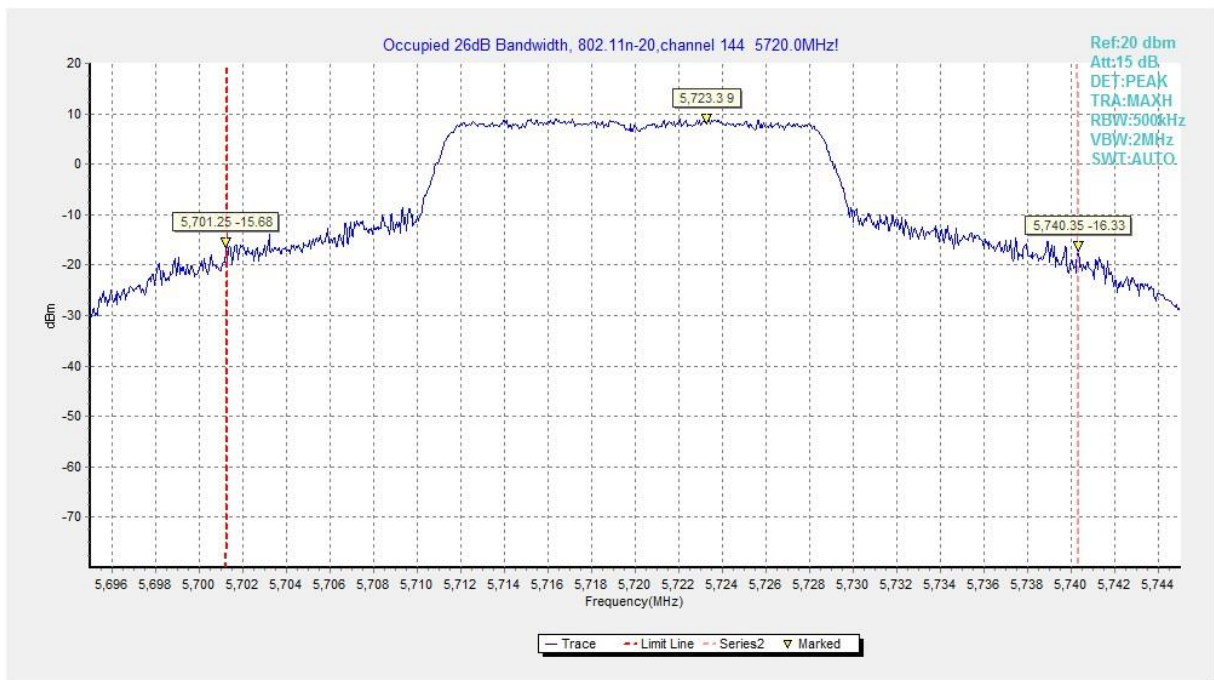


Fig.20 Occupied 26dB Bandwidth (802. 11n-HT20, 5720MHz)

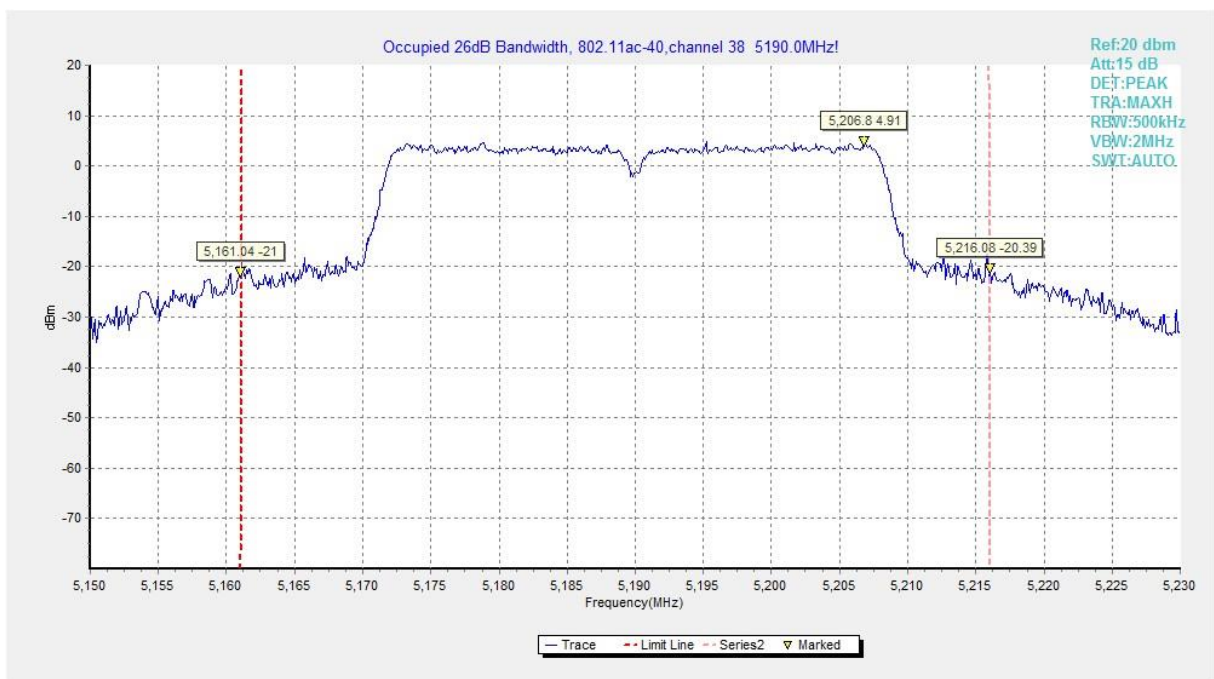


Fig.21 Occupied 26dB Bandwidth (802.11ac-HT40, 5190MHz)

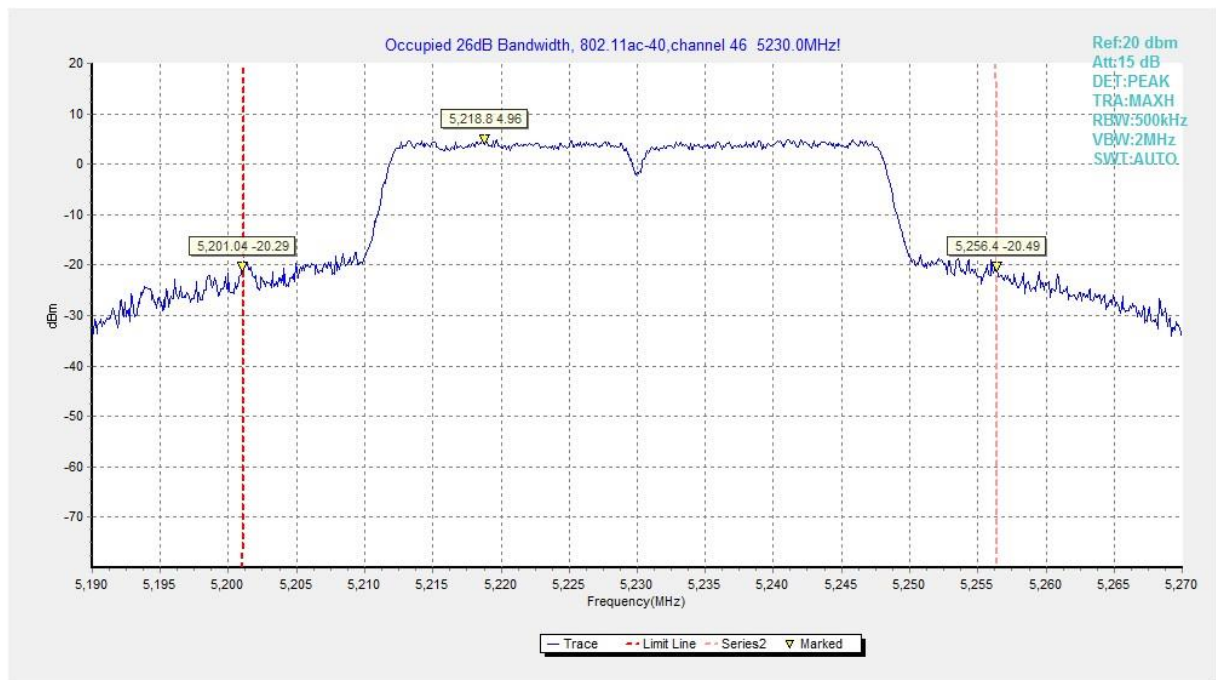


Fig.22 Occupied 26dB Bandwidth (802.11ac-HT40, 5230MHz)

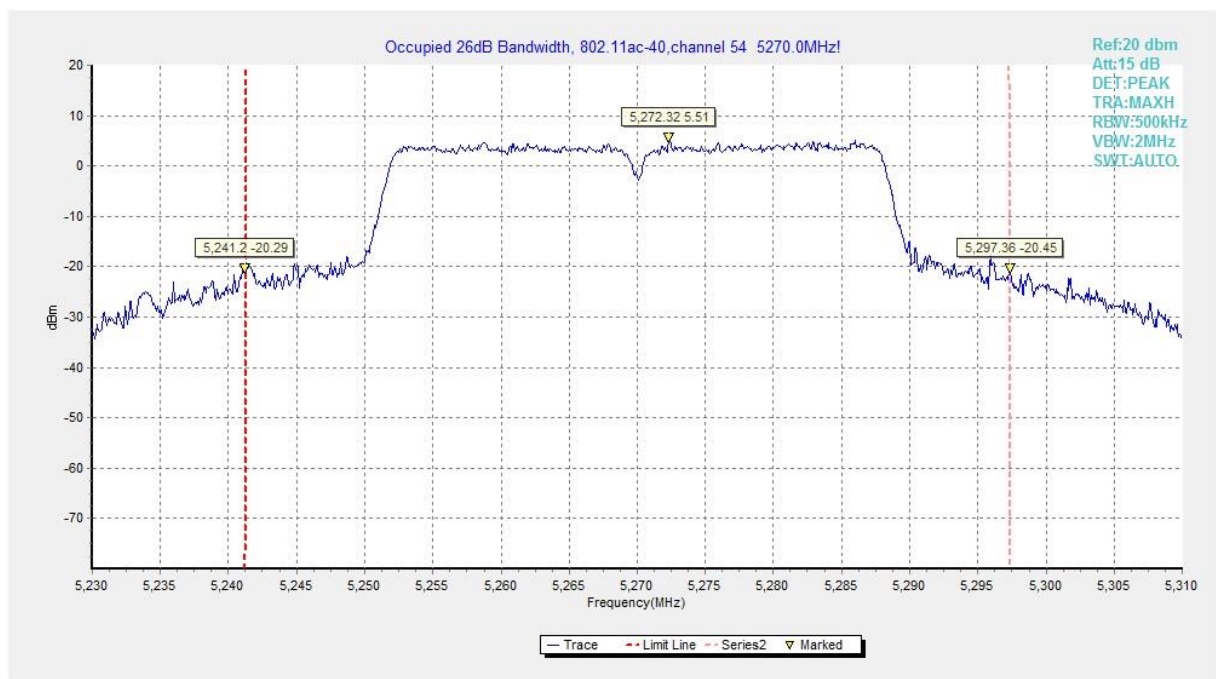


Fig.23 Occupied 26dB Bandwidth (802.11ac-HT40, 5270MHz)

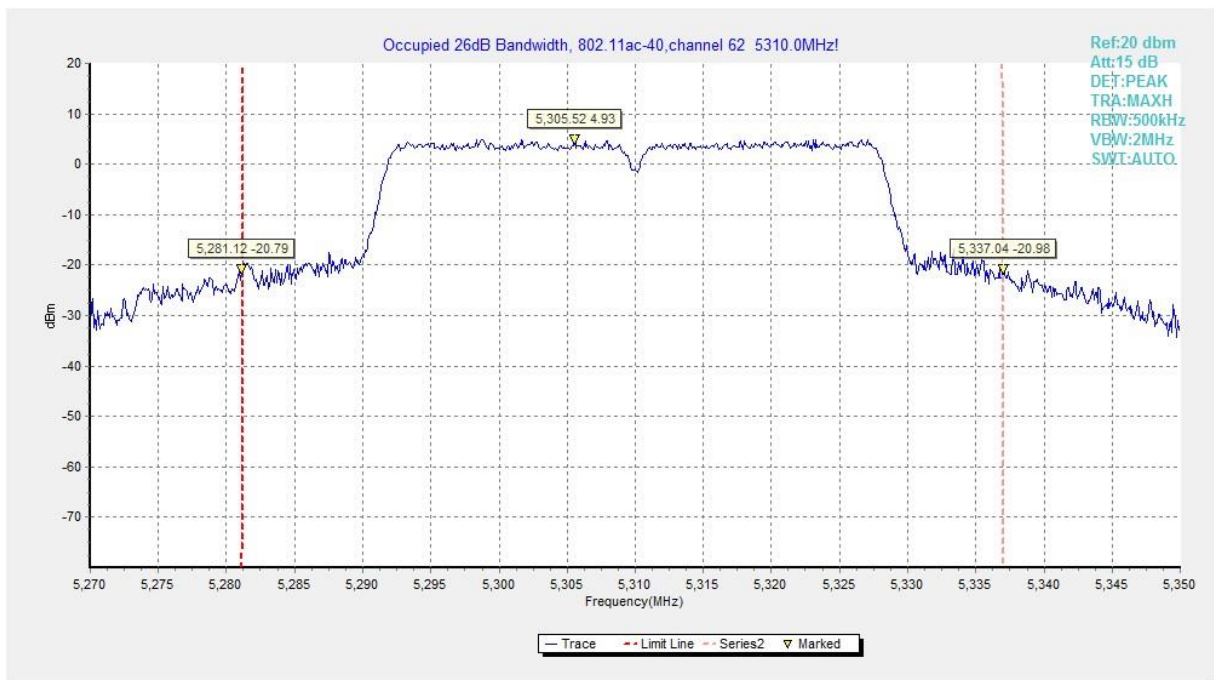


Fig.24 Occupied 26dB Bandwidth (802.11ac-HT40, 5310MHz)

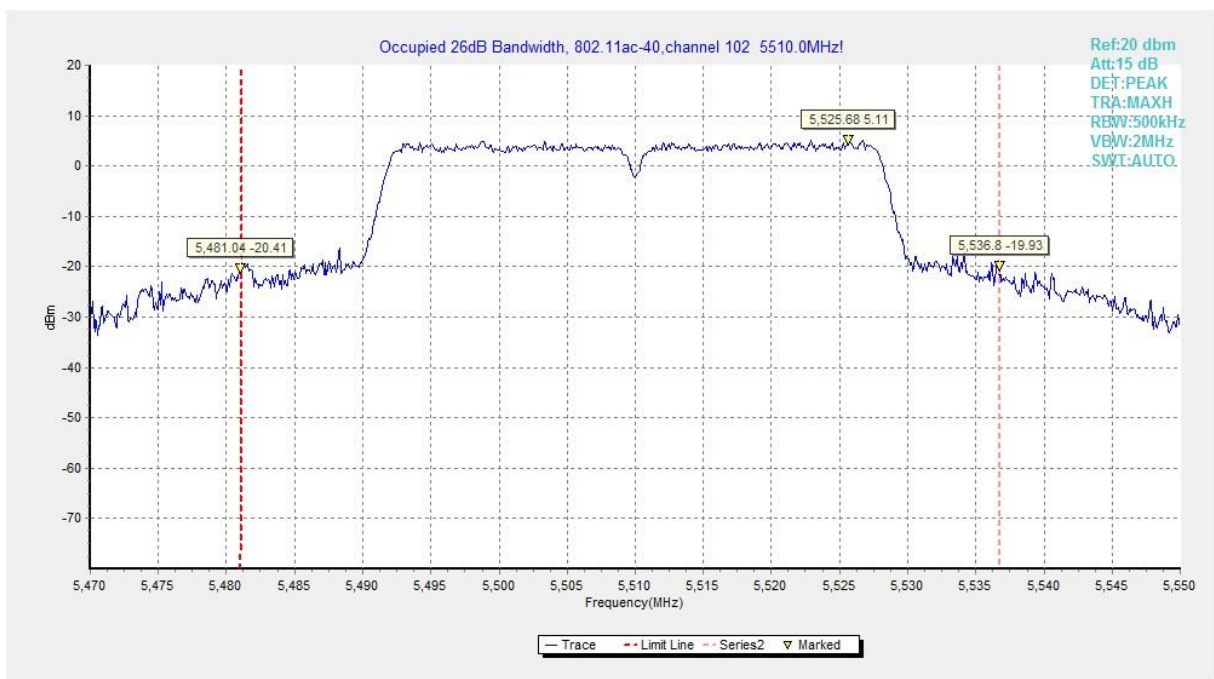


Fig.25 Occupied 26dB Bandwidth (802.11ac-HT40, 5510MHz)

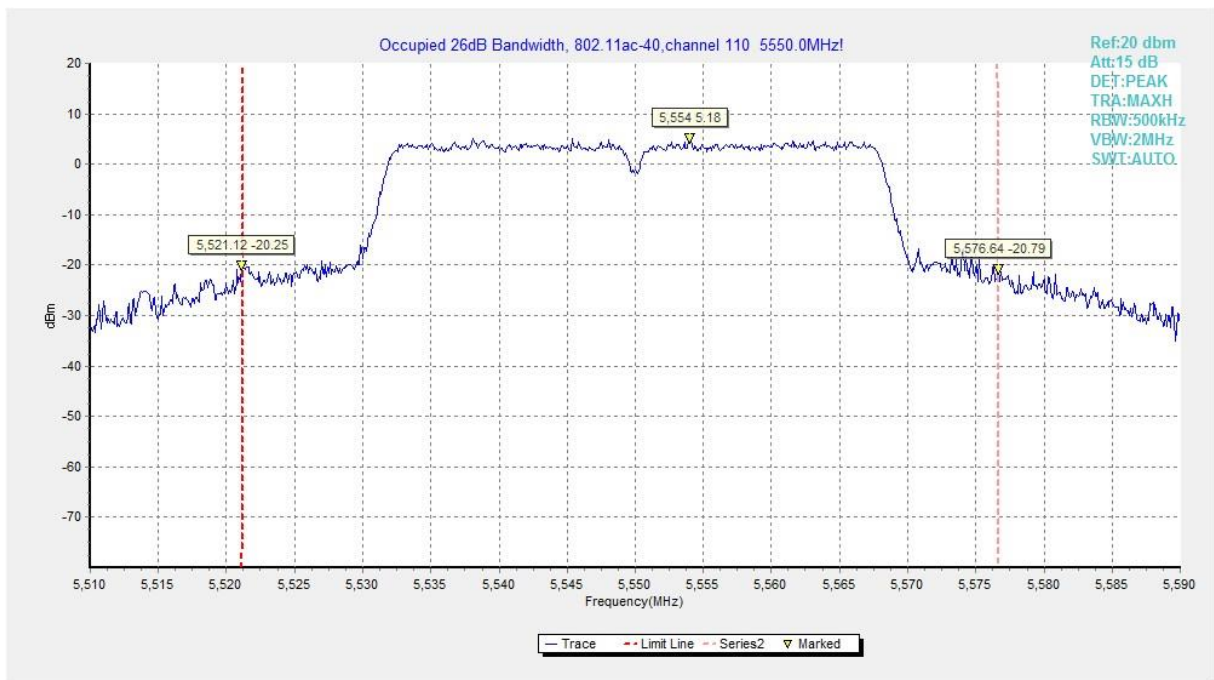


Fig.26 Occupied 26dB Bandwidth (802. 11ac-HT40, 5550MHz)

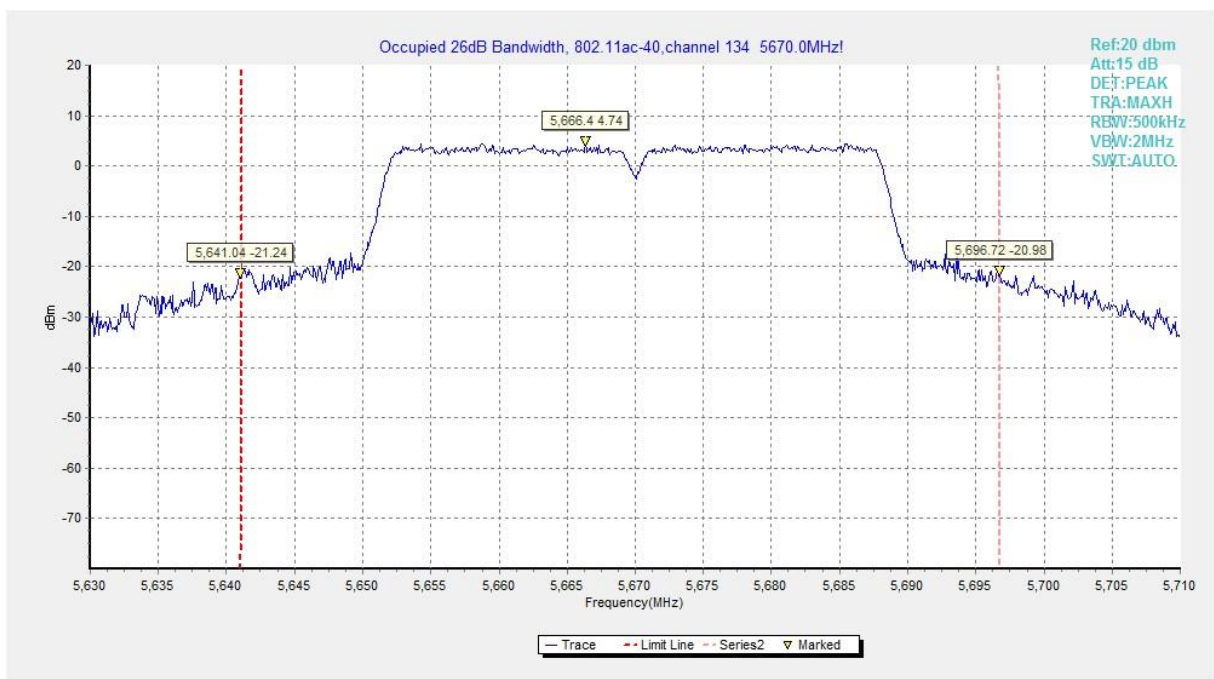


Fig.27 Occupied 26dB Bandwidth (802. 11ac-HT40, 5670MHz)

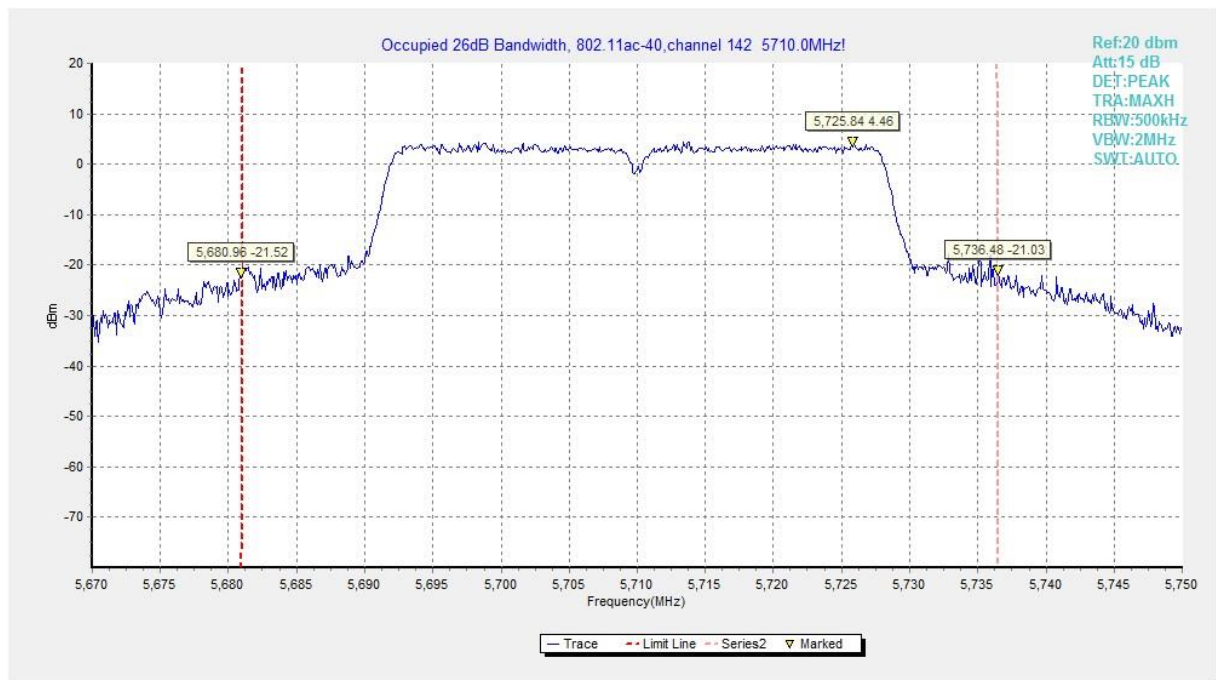


Fig.28 Occupied 26dB Bandwidth (802. 11ac-HT40, 5710MHz)

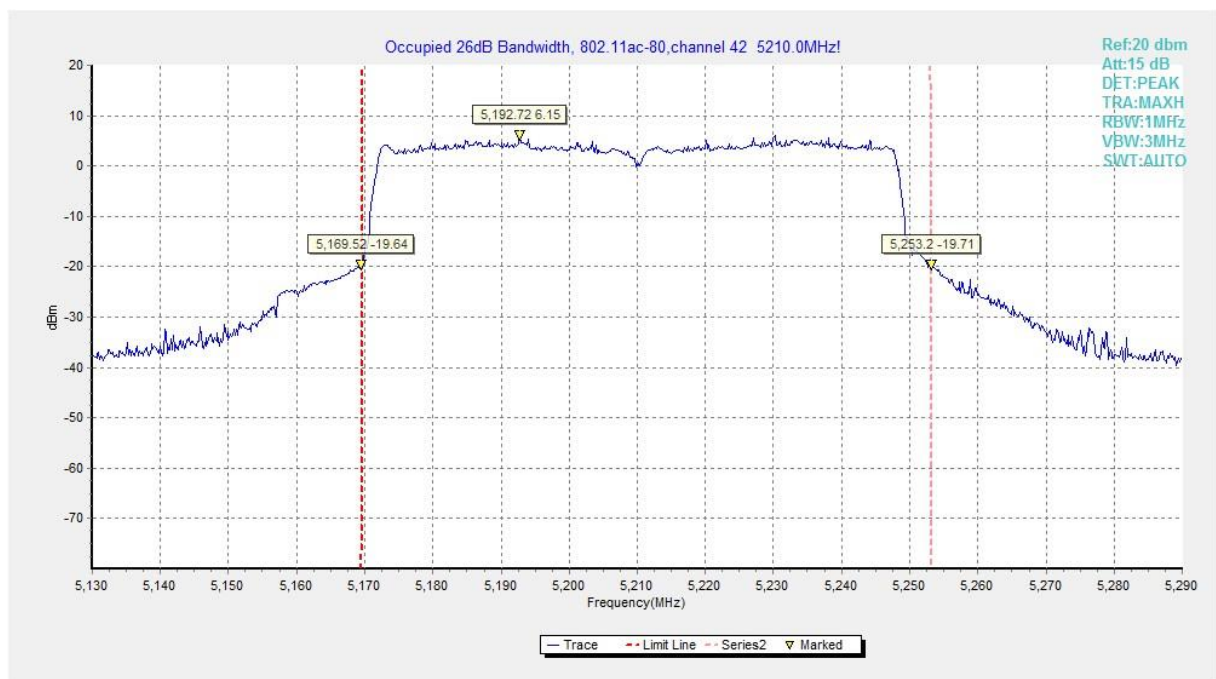


Fig.29 Occupied 26dB Bandwidth (802. 11ac-HT80, 5210MHz)

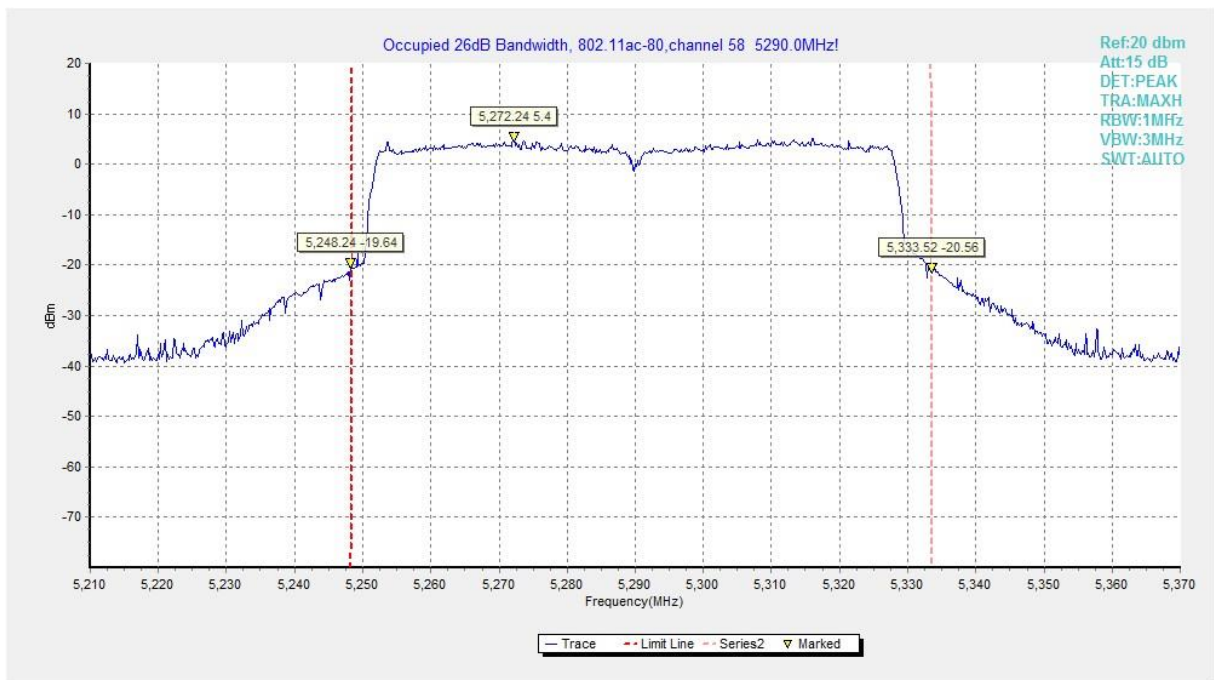


Fig.30 Occupied 26dB Bandwidth (802. 11ac-HT80, 5290MHz)

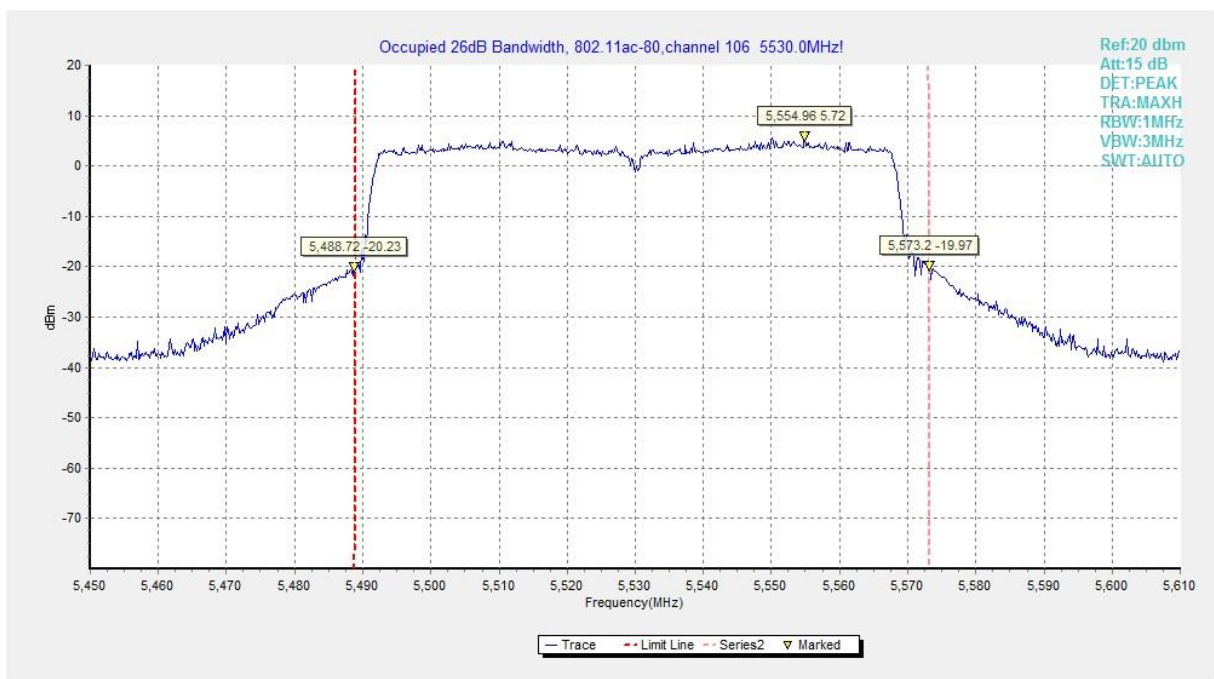


Fig.31 Occupied 26dB Bandwidth (802. 11ac-HT80, 5530MHz)

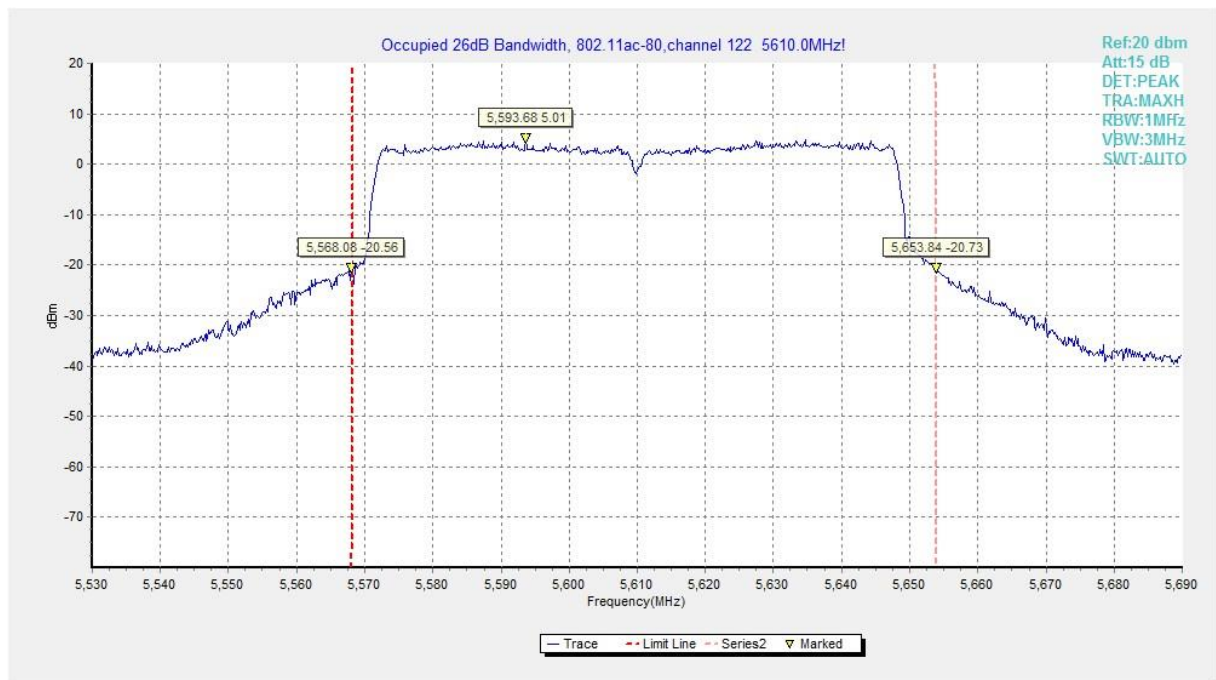


Fig.32 Occupied 26dB Bandwidth (802. 11ac-HT80, 5610MHz)

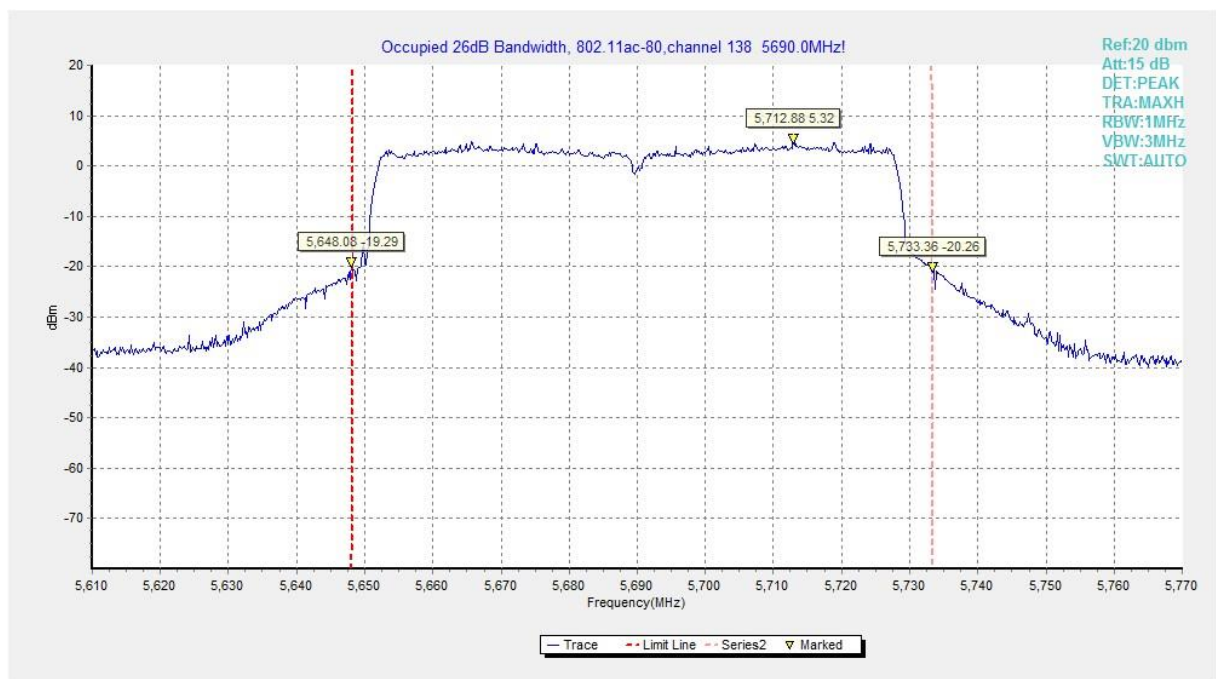


Fig.33 Occupied 26dB Bandwidth (802. 11ac-HT80, 5690MHz)

A.5. Band Edges Compliance

A5.1 Band Edges - Radiated

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407	-27 dBm/MHz

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)	Measurement distance(m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The measurement is made according to ANSI C63.10-2013 and KDB 789033

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m and the table height shall be 1.5 m.

The EUT and transmitting antenna shall be centered on the turntable.

Test Procedure

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. 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.

The receiver references:

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz	Fig.34	P
	5320 MHz	Fig.35	P
	5500 MHz	Fig.36	P
	5700 MHz	Fig.37	P
	5680 MHz	Fig.38	P
802.11n HT20	5180 MHz	Fig.39	P
	5320 MHz	Fig.40	P
	5500 MHz	Fig.41	P
	5700 MHz	Fig.42	P
	5680 MHz	Fig.43	P
802.11n HT40	5190 MHz	Fig.44	P
	5310 MHz	Fig.45	P
	5510 MHz	Fig.46	P
	5670 MHz	Fig.47	P
802.11ac HT20	5180 MHz	Fig.48	P
	5320 MHz	Fig.49	P
	5500 MHz	Fig.50	P
	5700 MHz	Fig.51	P
	5680 MHz	Fig.52	P
802.11ac HT40	5190 MHz	Fig.53	P
	5310 MHz	Fig.54	P
	5510 MHz	Fig.55	P
	5670 MHz	Fig.56	P
802.11ac HT80	5210MHz	Fig.57	P
	5290MHz	Fig.58	P
	5530MHz	Fig.59	P
	5610MHz	Fig.60	P

Conclusion: PASS
Test graphs as below:

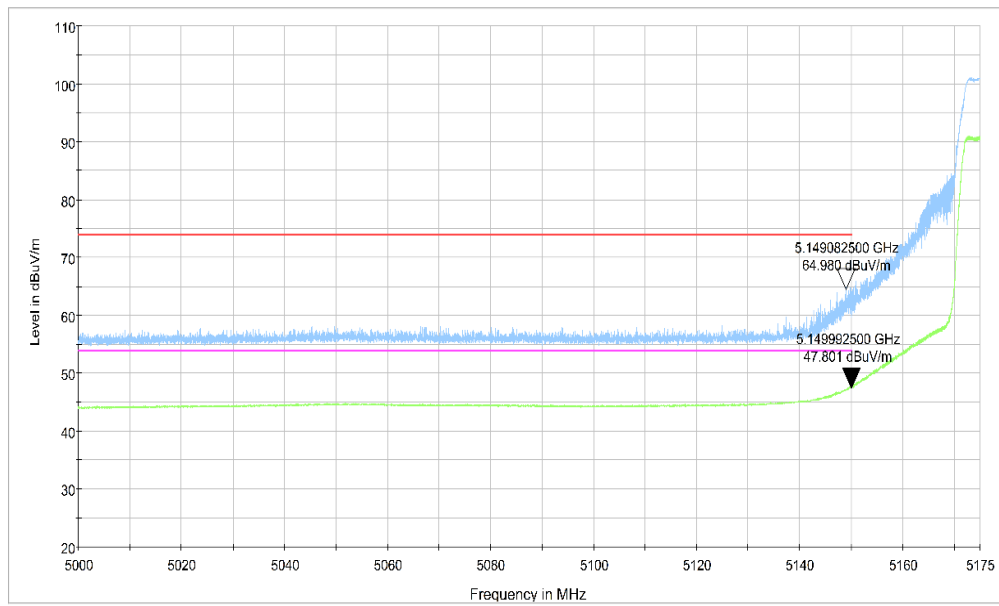


Fig.34 Band Edges (802.11a Ch36, 5180MHz)

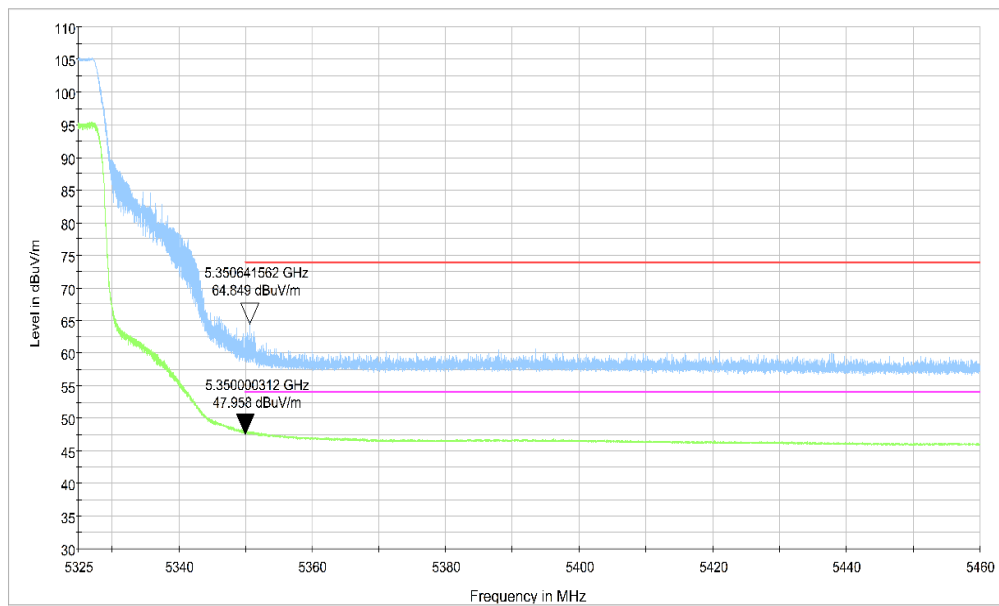


Fig.35 Band Edges (802.11a Ch64, 5320MHz)

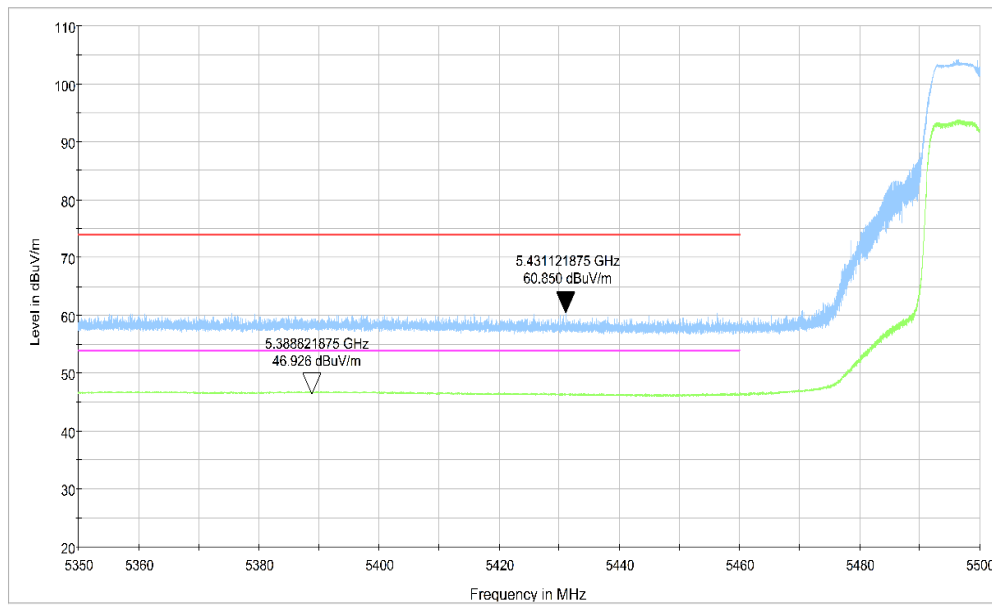


Fig.36 Band Edges (802.11a Ch100, 5500MHz)

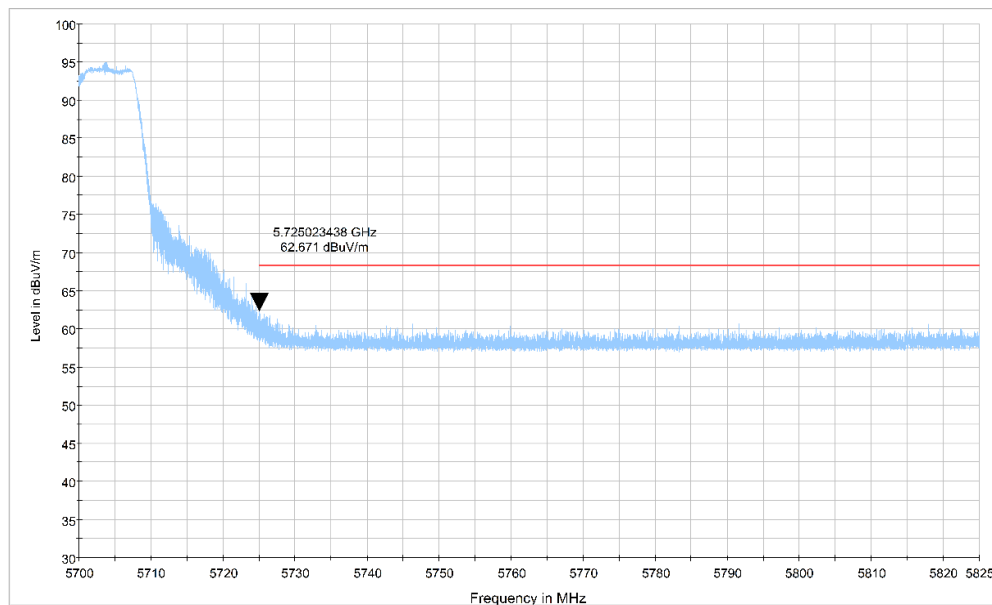


Fig.37 Band Edges (802.11a Ch140, 5700MHz)

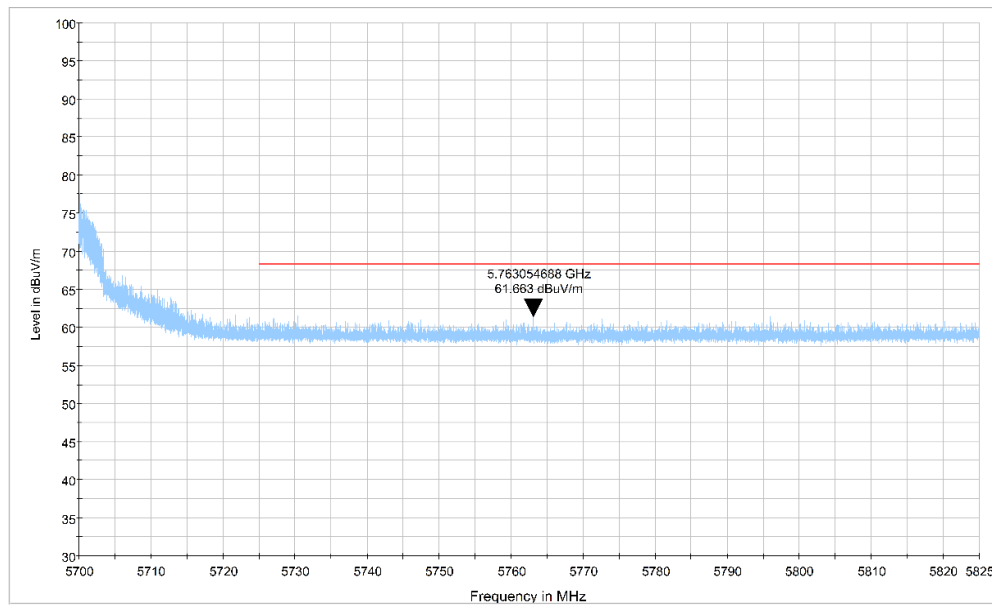


Fig.38 Band Edges (802.11a Ch136, 5680MHz)

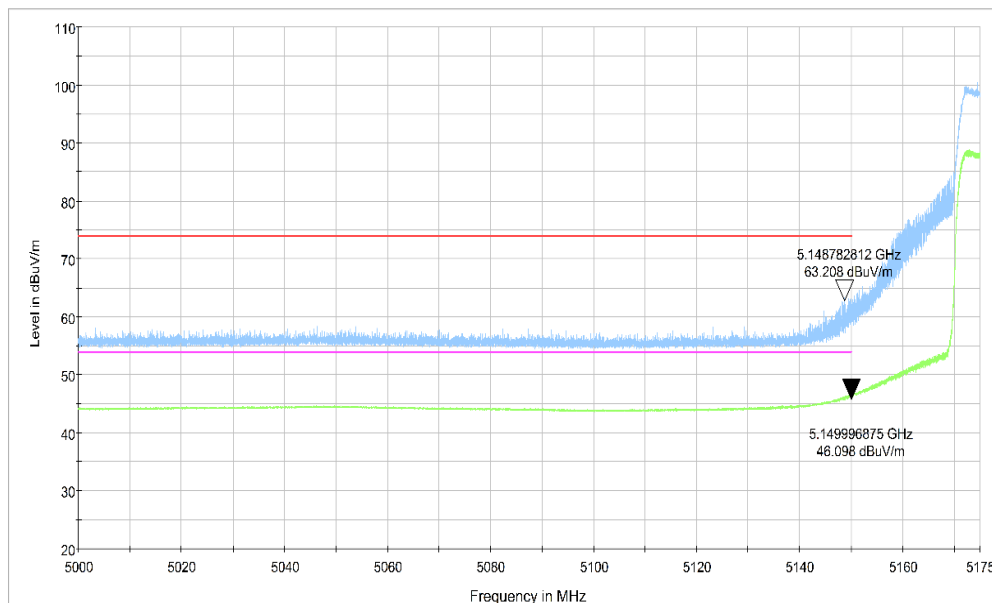


Fig.39 Band Edges (802.11n-HT20 Ch36, 5180MHz)

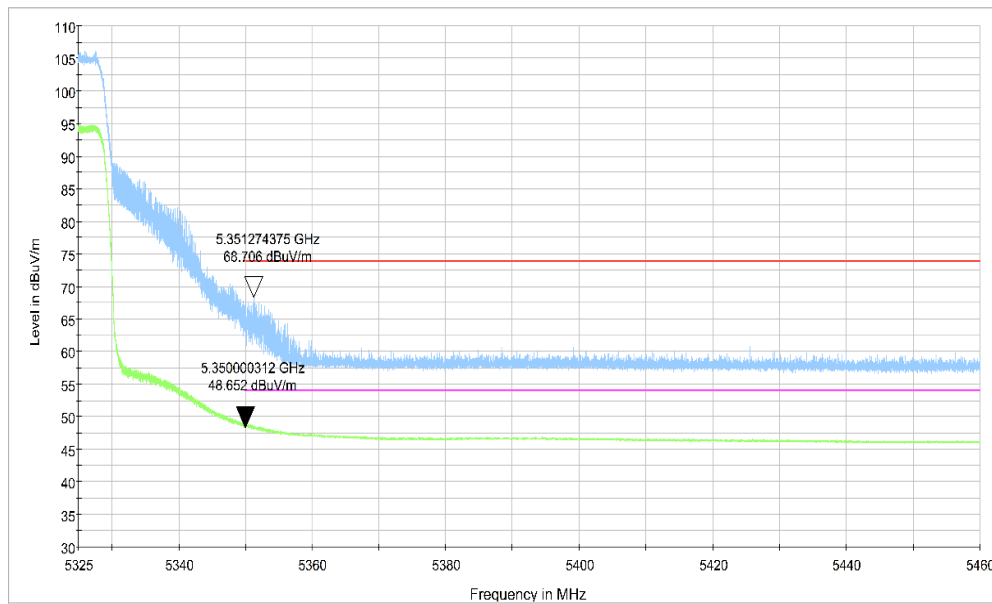


Fig.40 Band Edges (802.11n-HT20 Ch64, 5320MHz)

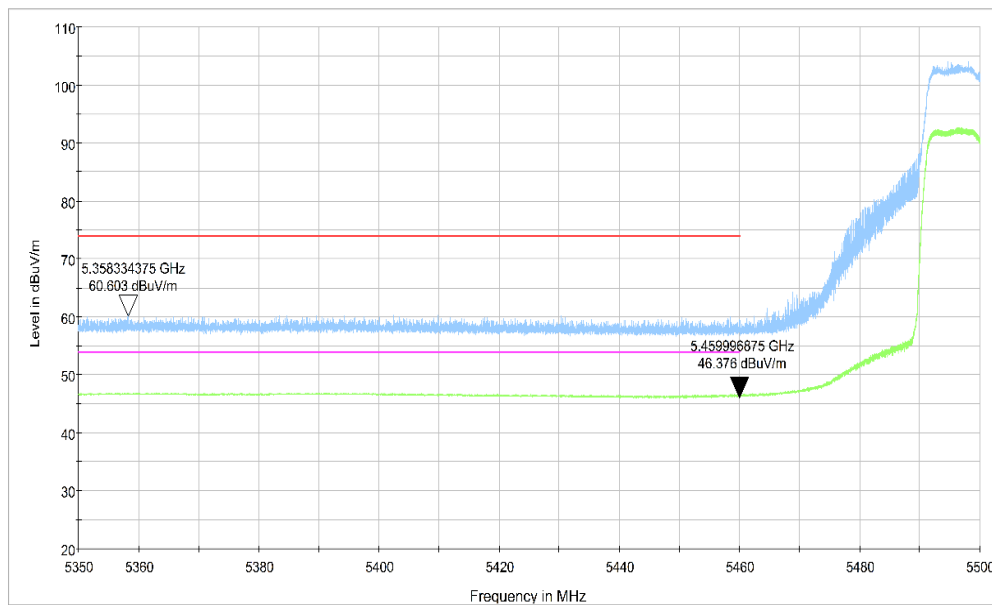


Fig.41 Band Edges (802.11n-HT20 Ch100, 5500MHz)

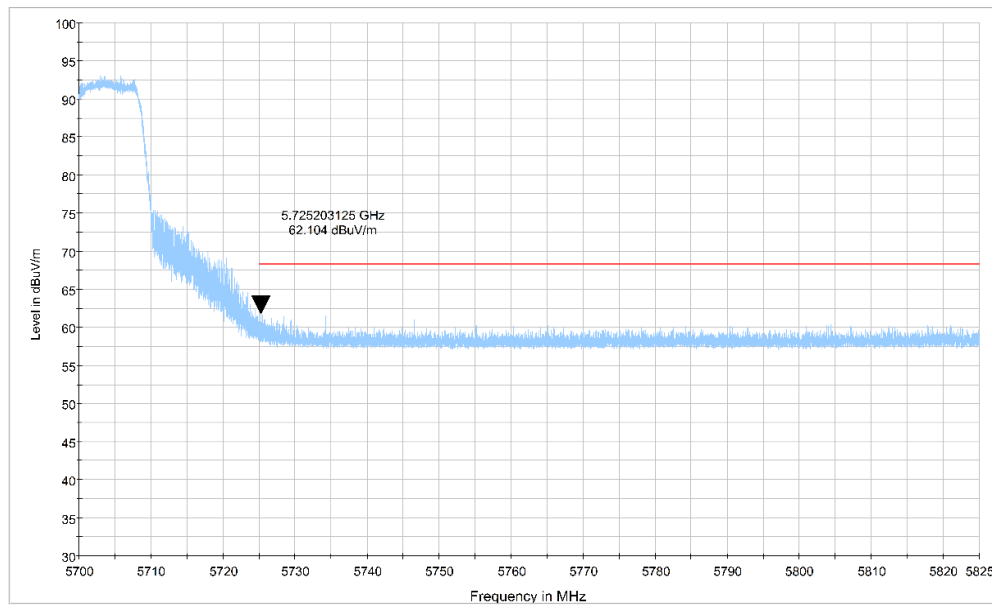


Fig.42 Band Edges (802.11n-HT20 Ch140, 5700MHz)

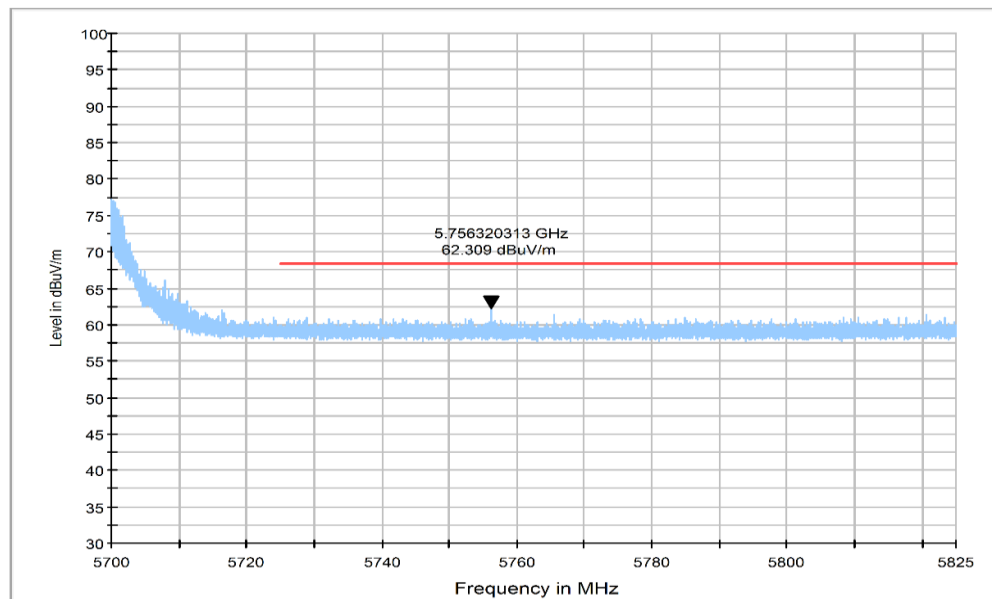


Fig.43 Band Edges (802.11n-HT20 Ch136, 5680MHz)

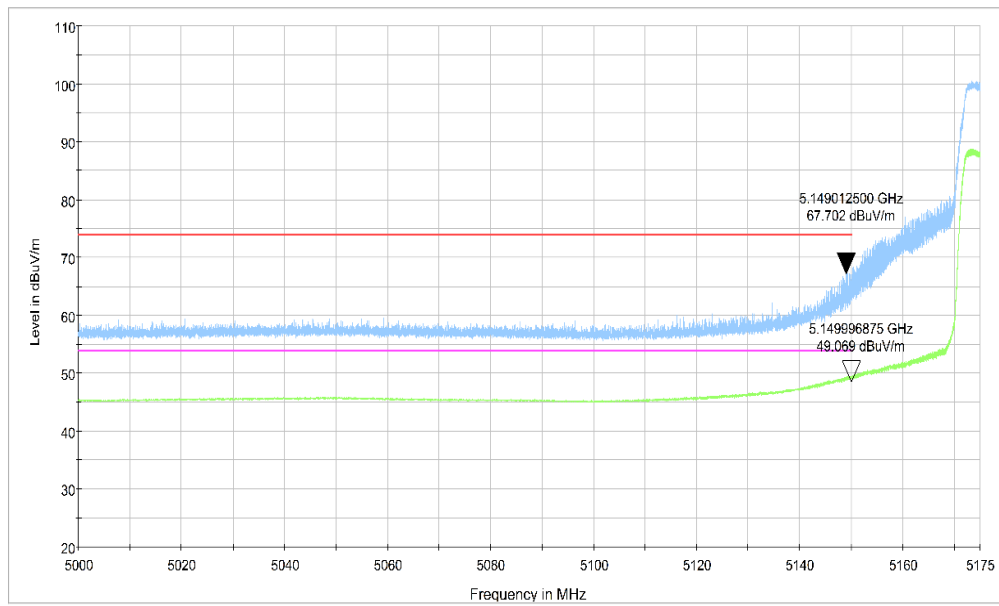


Fig.44 Band Edges (802.11n-HT40 Ch38, 5190MHz)

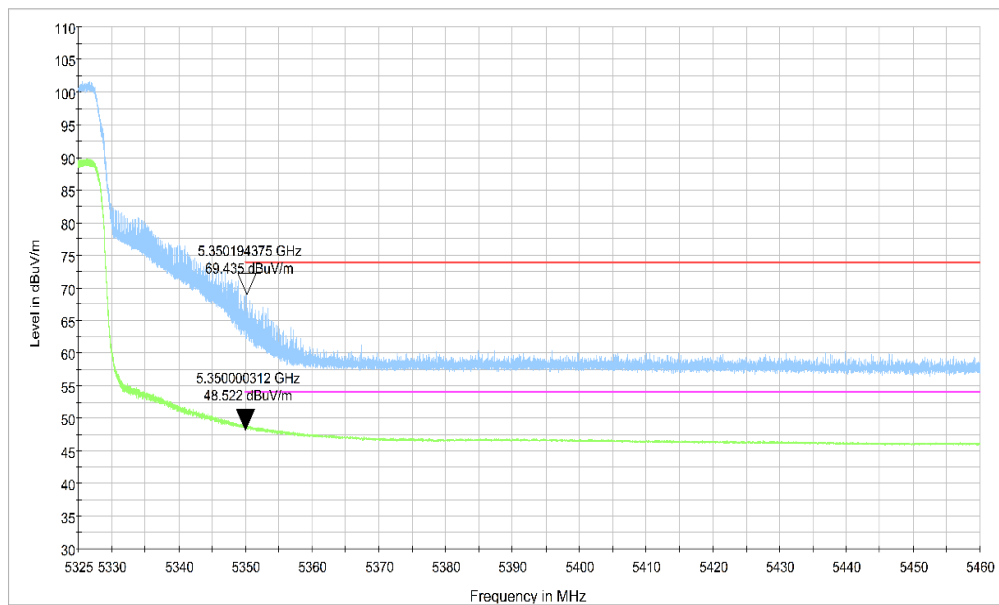


Fig.45 Band Edges (802.11n-HT40 Ch62, 5310MHz)

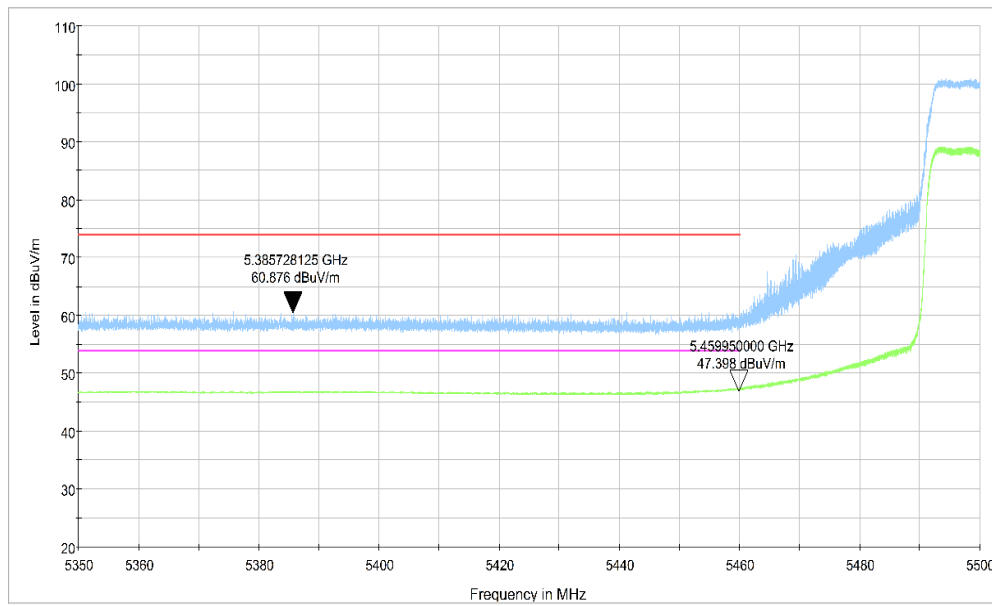


Fig.46 Band Edges (802.11n-HT40 Ch102, 5510MHz)

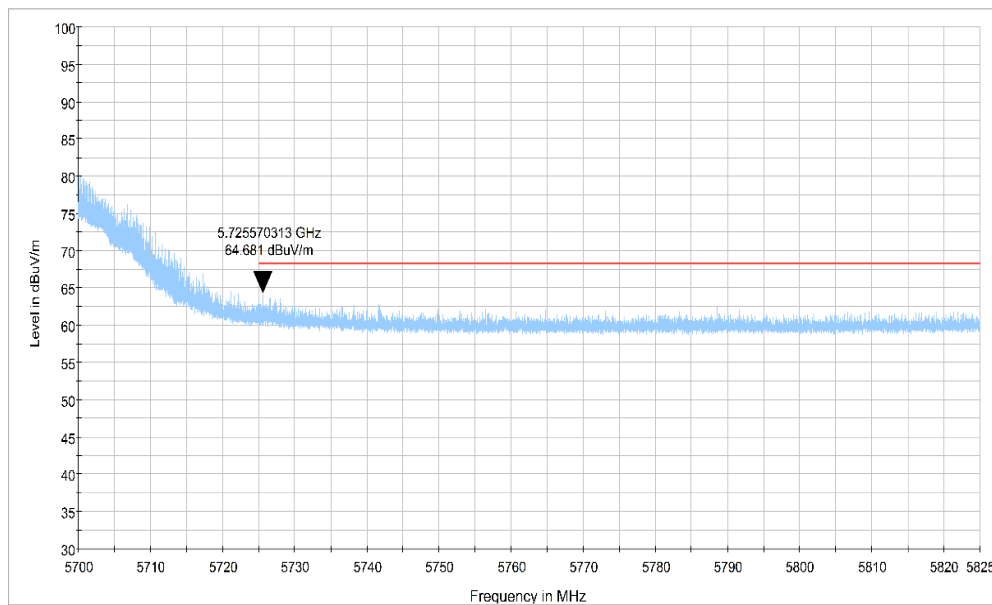


Fig.47 Band Edges (802.11n-HT40 Ch134, 5670MHz)

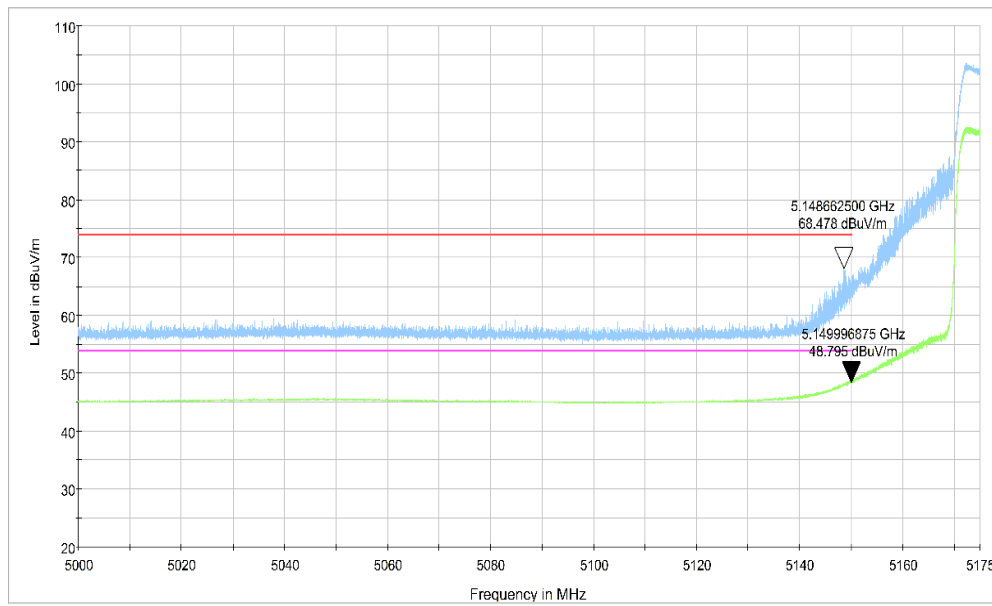


Fig.48 Band Edges (802.11ac-HT20 Ch36, 5180MHz)

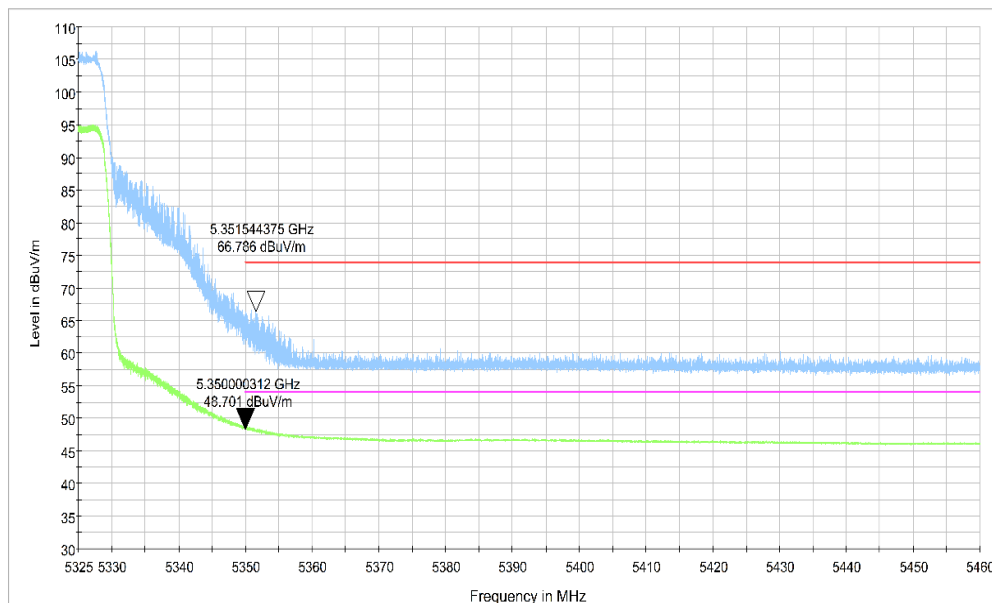


Fig.49 Band Edges (802.11ac-HT20 Ch64, 5320MHz)

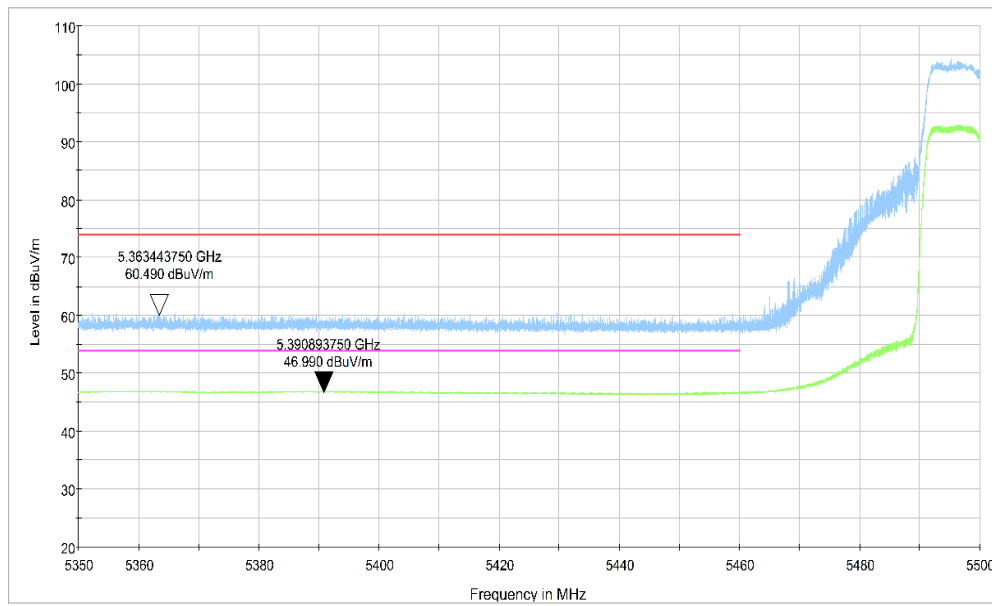


Fig.50 Band Edges (802.11ac-HT20 Ch100, 5500MHz)

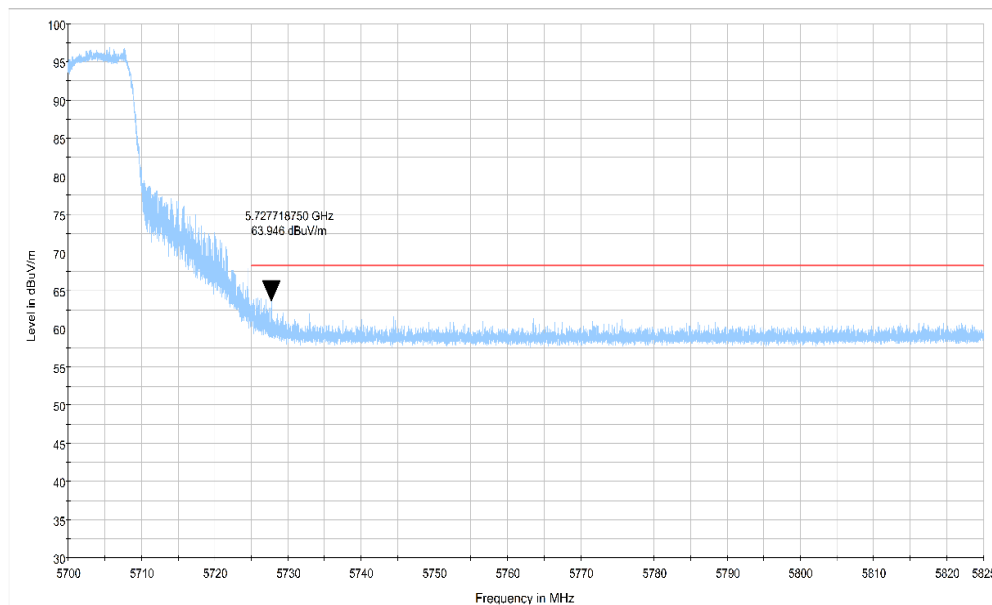


Fig.51 Band Edges (802.11ac-HT20 Ch140, 5700MHz)

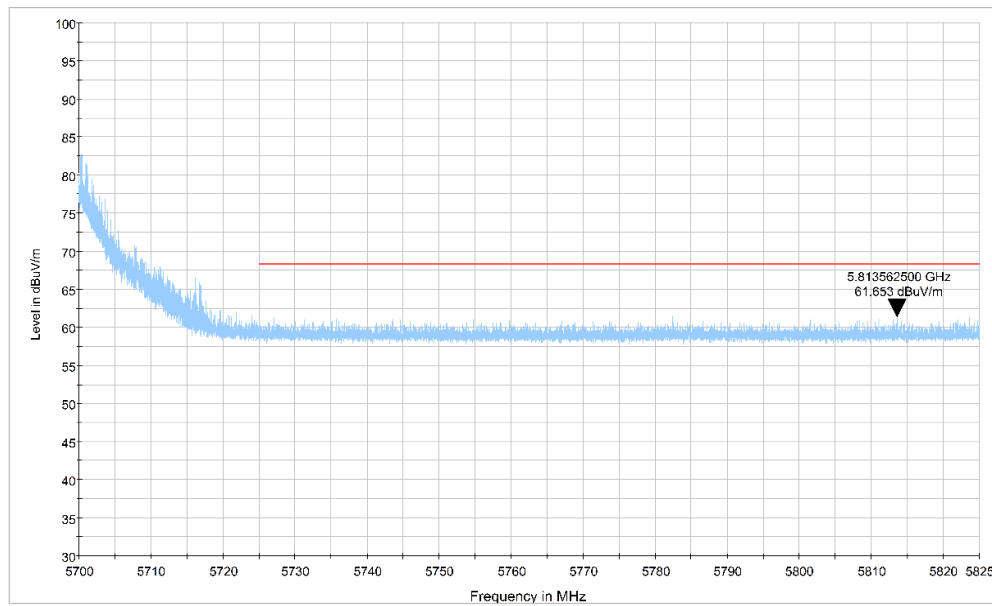


Fig.52 Band Edges (802.11ac-HT20 Ch136, 5680MHz)

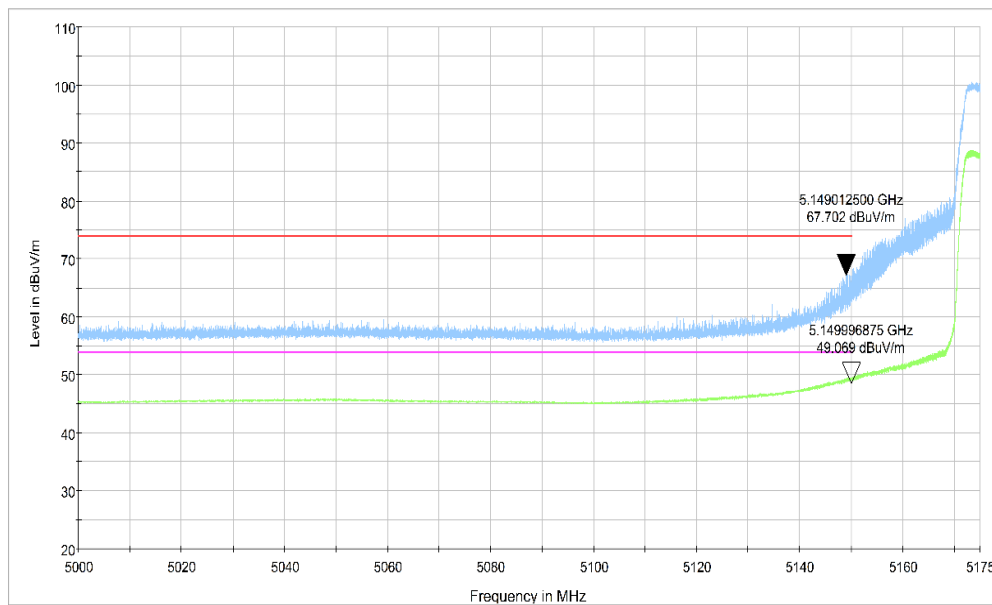


Fig.53 Band Edges (802.11ac-HT40 Ch38, 5190MHz)

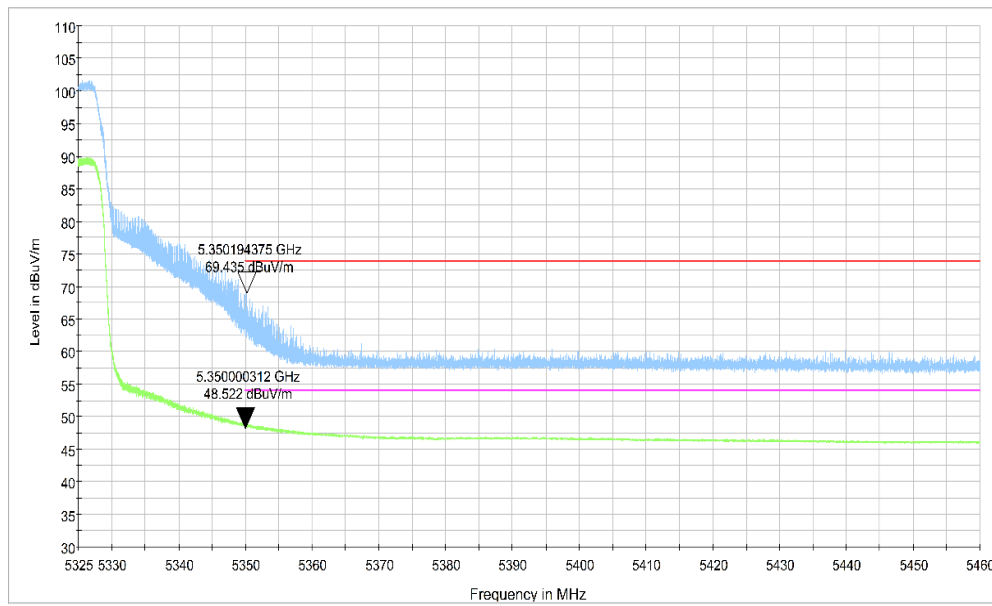


Fig.54 Band Edges (802.11ac-HT40 Ch62, 5310MHz)

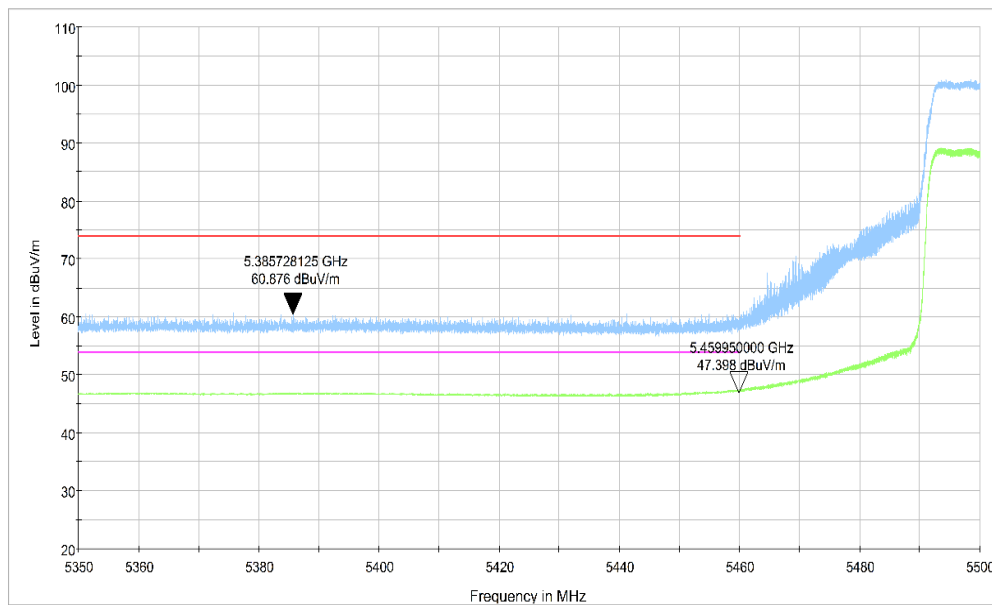


Fig.55 Band Edges (802.11ac-HT40 Ch102, 5510MHz)

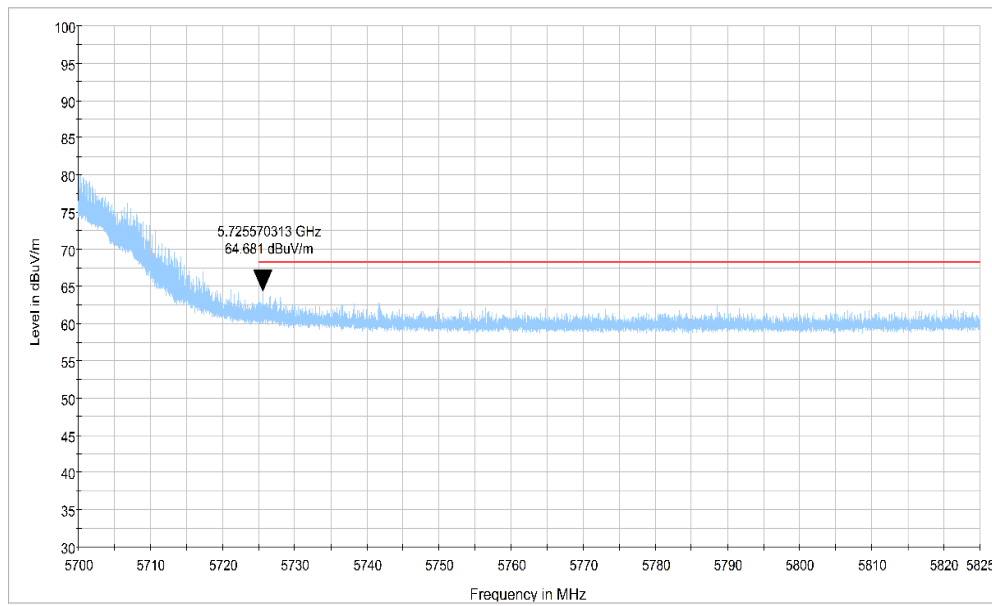


Fig.56 Band Edges (802.11ac-HT40 Ch134, 5670MHz)

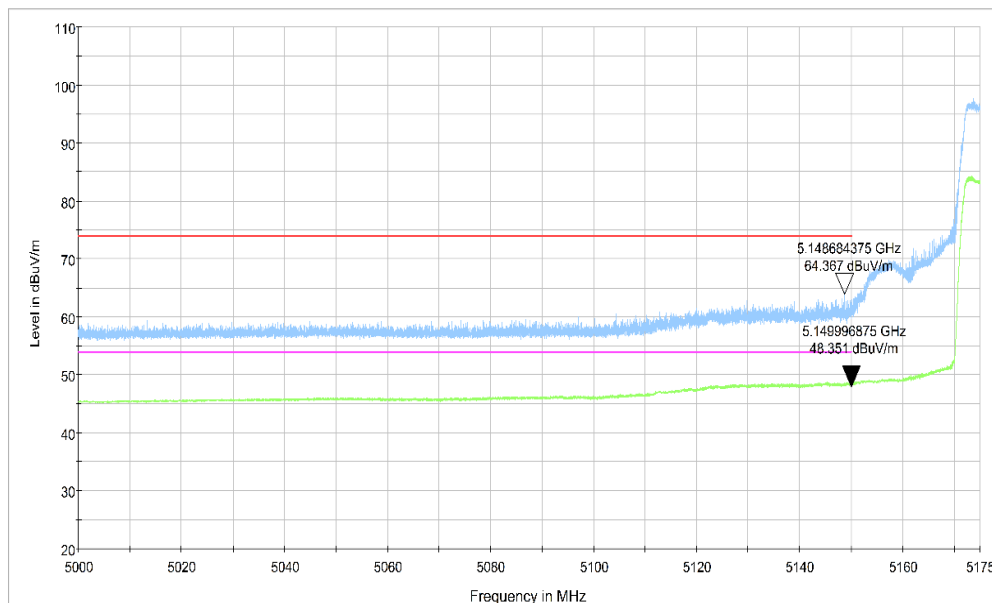


Fig.57 Band Edges (802.11ac-HT80 Ch42 , 5210MHz)

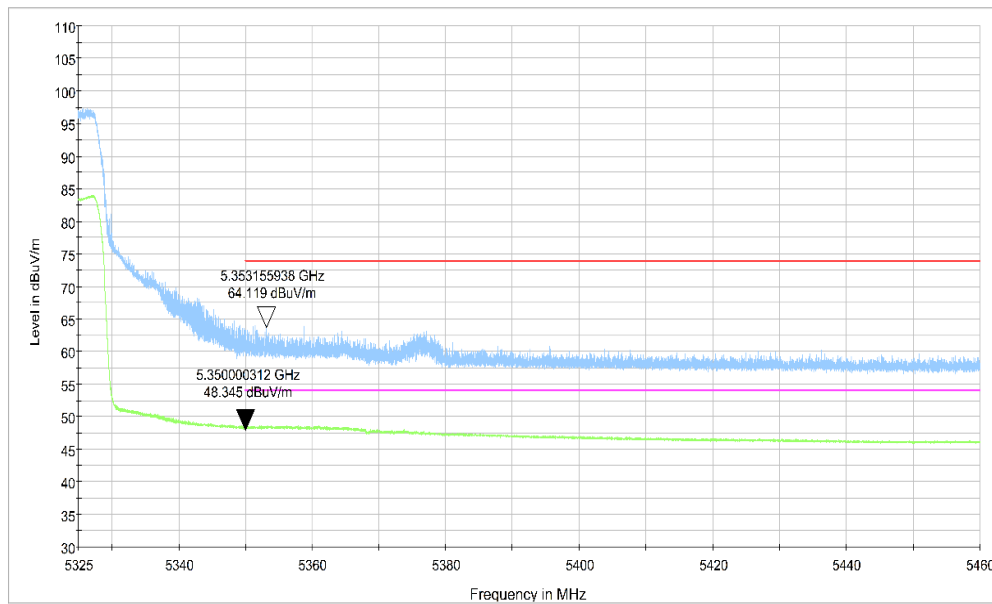


Fig.58 Band Edges (802.11ac-HT80 Ch58, 5290MHz)

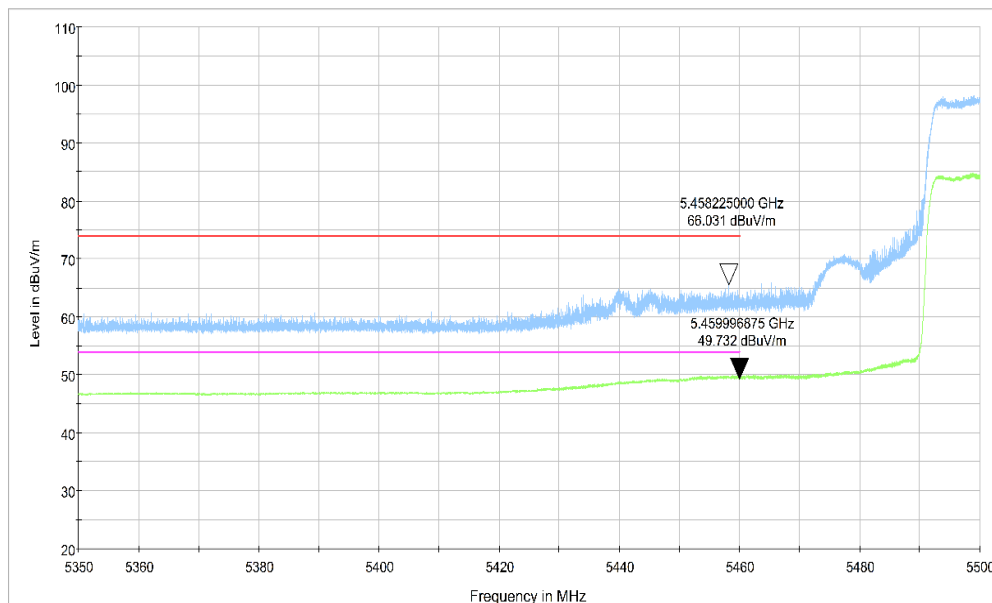


Fig.59 Band Edges (802.11ac-HT80 Ch106, 5530MHz)

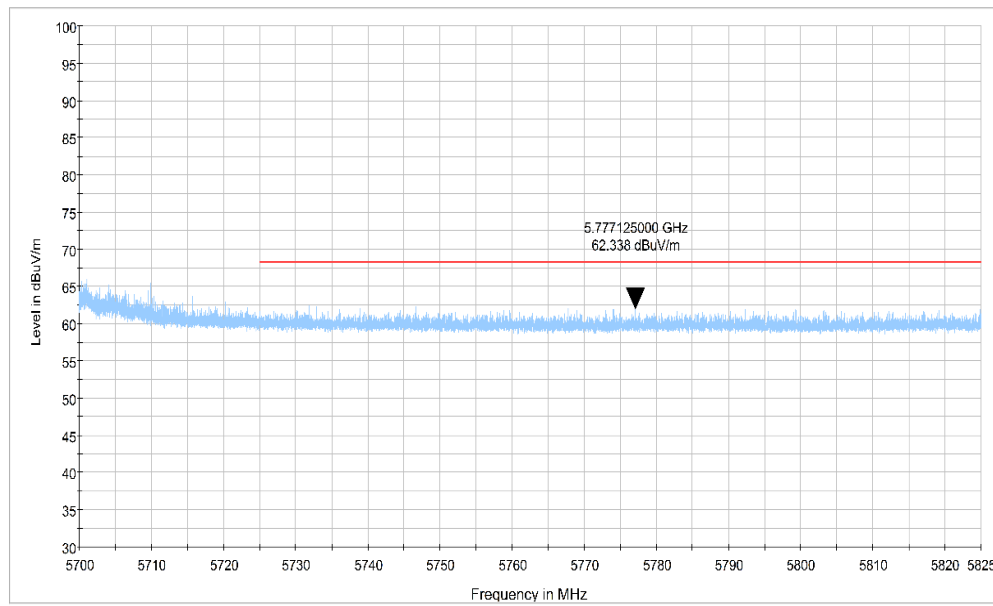


Fig.60 Band Edges (802.11ac-HT80 Ch122, 5610MHz)

A.6. Transmitter Spurious Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.407	-27 dBm/MHz

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency (MHz)	Field strength(μ V/m)	Measurement distance(m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength(μ V/m)	Field strength(dBuV/m)	Measurement distance(m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The measurement is made according to ANSI C63.10-2013 and KDB 789033

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m

The EUT and transmitting antenna shall be centered on the turntable.

Test Procedure

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. 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.

The receiver references:

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Measurement Results:

802.11a mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	36(5180MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	40(5200MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	48(5240MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	52(5260MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	56(5280MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	64(5320MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	100(5500MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	120(5600MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	140(5700MHz)	1 GHz ~ 3 GHz	---	P

		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	144(5720MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n -HT20	36(5180MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	40(5200MHz)	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	48(5240MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	52(5260MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	56(5280MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	64(5320MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	100(5500MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	120(5600MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P

	140(5700MHz)	26.5 GHz ~ 40 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	144(5720MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P

802.11n-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n HT40	38(5190MHz)	30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	46(5230MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	54(5270MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	62(5310MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	102(5510MHz)	9kHz ~30 MHz	---	P
		30 MHz ~1 GHz	---	P
		1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
		18 GHz ~ 26.5 GHz	---	P
		26.5 GHz ~ 40 GHz	---	P
	118(5590MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P
	134(5670MHz)	1 GHz ~ 3 GHz	---	P
		3 GHz ~ 7 GHz	---	P
		7 GHz ~ 18 GHz	---	P