



# TEST REPORT

No. I20N00956-RLAN

for

**IDEMIA Identity and Security France**

**ID Screen**

**Model Name: MPH-MB003A/MPH-MB003B**

with

**Hardware Version: V01 (M16N)/ V01 (M16I)/**

**V01 (M32N)/ V01 (M32I)**

**Software Version: V01**

**FCC ID: ZBW-MPHMB003**

**Issued Date: 2020-07-02**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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## 1. Summary of Test Report

### 1.1. Test Items

Description	ID Screen
Model Name	MPH-MB003A/MPH-MB003B
Applicant's name	IDEMIA Identity and Security France
Manufacturer's Name	IDEMIA Identity and Security France

### 1.2. Test Standards

FCC Part15-2019; ANSI C63.10-2013; KDB789033-V02r01

### 1.3. Test Result

**Pass**

### 1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,  
Futian District, Shenzhen, Guangdong, P. R. China

### 1.5. Project data

Testing Start Date:	2020-05-07
Testing End Date:	2020-07-02

### 1.6. Signature

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**Lin Zechuang**  
**(Prepared this test report)**

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**Tang Weisheng**  
**(Reviewed this test report)**

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**Zhang Bojun**  
**(Approved this test report)**



## **2. Client Information**

### **2.1. Applicant Information**

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### **2.2. Manufacturer Information**

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Contact Person Christophe SUEUR  
E-Mail christophe.sueur@idemia.com  
Telephone: +33130201434  
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### 3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

#### 3.1. About EUT

Description	ID Screen
Model Name	MPH-MB003A/MPH-MB003B
Brand Name	IDEMIA
RLAN Frequency Range	ISM Bands: 5150MHz~5250MHz; 5250MHz~5350MHz; 5470MHz~5725MHz; 5725MHz~5850MHz
RLAN Protocol	IEEE 802.11a,802.11n-HT20/40,802.11ac-VHT20/40/80
Type of modulation	OFDM
Antenna Type	Integrated
Antenna Gain	5150MHz~5350MHz: 1.79dBi 5470MHz~5725MHz: 2.85dBi 5725MHz~5850MHz: 2.52dBi
Power Supply	3.85V DC by Battery
FCC ID	ZBW-MPHMB003
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

#### 3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
UT07aa	354520110003828	V01 (M16N)	V01	2020-04-21
UT01aa	354520110005740	V01 (M16N)	V01	2020-04-16

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

#### 3.3. Internal Identification of AE

AE ID*	Description	AE ID*
AE1	Battery	/
AE2	Charger	Aa01a,Aa02a
AE3	Data Cable	Ca01a,Ca02a Cb01a,Cb02a

##### AE1

Model	MPH-MB003A(178177093)
Manufacturer	Zhongshan Tianmao Battery Co., Ltd.
Capacity	5000mAh19.25Wh
Nominal Voltage	3.85V

##### AE2

Model	S008ACM0500200
Manufacturer	Ten Pao Electronics (Huizhou) Co., Ltd.



AE3

Model	JWUB1454-M01
Manufacturer	HUIZHOU JUWEI 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 ID Screen with integrated antenna and battery.

It consists of normal options: Lithium Battery, Charger and USB Cable.

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

Samples undergoing test were selected by the client.



## **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.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part15	FCC CFR 47,Part 15,Subpart C FCC CFR 47,Part 15,Subpart E	2019
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB789033	GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E	V02r01

## 5. Test Results

### 5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

### 5.2. Test Results

No.	Test cases	Sub-clause of Part15E	Verdict
0	Maximum Output Power	15.407(a)	<b>P</b>
1	Power Spectral Density	15.407(a)	<b>P</b>
2	Occupied 26dB Bandwidth	15.407(a)	<b>/</b>
3	Occupied 6dB Bandwidth	15.407(e)	<b>P</b>
4	99% Occupied Bandwidth	15.407	<b>/</b>
5	Band edge compliance	15.407	<b>P</b>
6	Radiated Spurious Emissions	15.407	<b>P</b>
7	AC Power line Conducted	15.207	<b>P</b>
8	Transmit Power Control	15.407	<b>NA</b>

See **ANNEX A** for details.

Note: According to the definition of the application description, the device will automatically discontinue transmission in case of either absence of information to transmit or operational failure.

### 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/matrix manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2



## 6. Test Equipments Utilized

### Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2021-01-15	1 year
2	Power Sensor	U2021XA	MY55430013	Agilent	2021-01-15	1 year
3	Test Receiver	ESCI	100701	Rohde & Schwarz	2020-08-10	1 year
4	LISN	ENV216	102067	Rohde & Schwarz	2020-07-17	1 year

### Radiated test system

NO.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Loop Antenna	HLA6120	35779	TESEQ	2022-04-25	3 years
2	BiLog Antenna	3142E	00224831	ETS-Lindgren	2021-05-17	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2022-04-02	3 years
4	Test Receiver	ESR7	101676	Rohde & Schwarz	2020-11-27	1 year
5	Spectrum Analyser	FSV40	101192	Rohde & Schwarz	2021-01-14	1 year
6	Chamber	FACT3-2.0	1285	ETS-Lindgren	2021-07-19	2 years
7	Antenna	QSH-SL-18-26-S-20	17013	Q-par	2023-01-06	3 years
8	Antenna	QSH-SL-18-40-K-SG	15979	Q-par	2023-01-06	3 years

### Test software

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	10.01.00
3	EMC32	Rohde & Schwarz	10.01.00

EUT is Qualcomm engineering software provided by the customer to control the transmitting signal.

### Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

## 7. Laboratory Environment

### Semi-anechoic chambe

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz

### Shielded room

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-1000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω

### Fully-anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

## 8. Measurement Uncertainty

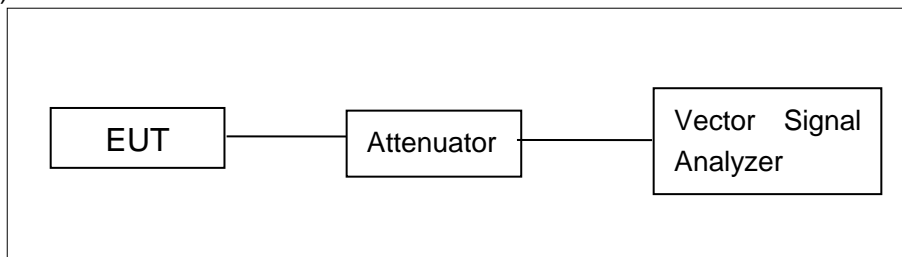
Test Name	Uncertainty ( $k=2$ )	
1. RF Output Power - Conducted	1.32dB	
2. Power Spectral Density - Conducted	2.32dB	
3. Occupied channel bandwidth - Conducted	$\pm 66\text{Hz}$	
4. Transmitter Spurious Emission - Conducted	$30\text{MHz} \leq f \leq 1\text{GHz}$	1.41dB
	$1\text{GHz} \leq f \leq 7\text{GHz}$	1.92dB
	$7\text{GHz} \leq f \leq 13\text{GHz}$	2.31dB
	$13\text{GHz} \leq f \leq 26\text{GHz}$	2.61dB
5. Transmitter Spurious Emission - Radiated	$9\text{kHz} \leq f \leq 30\text{MHz}$	1.70dB
	$30\text{MHz} \leq f \leq 1\text{GHz}$	4.90dB
	$1\text{GHz} \leq f \leq 18\text{GHz}$	4.60dB
	$18\text{GHz} \leq f \leq 40\text{GHz}$	4.10dB
6. AC Power line Conducted Emission	$150\text{kHz} \leq f \leq 30\text{MHz}$	3.00dB

## **ANNEX A: Detailed Test Results**

### **A.1. Measurement Method**

#### **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.

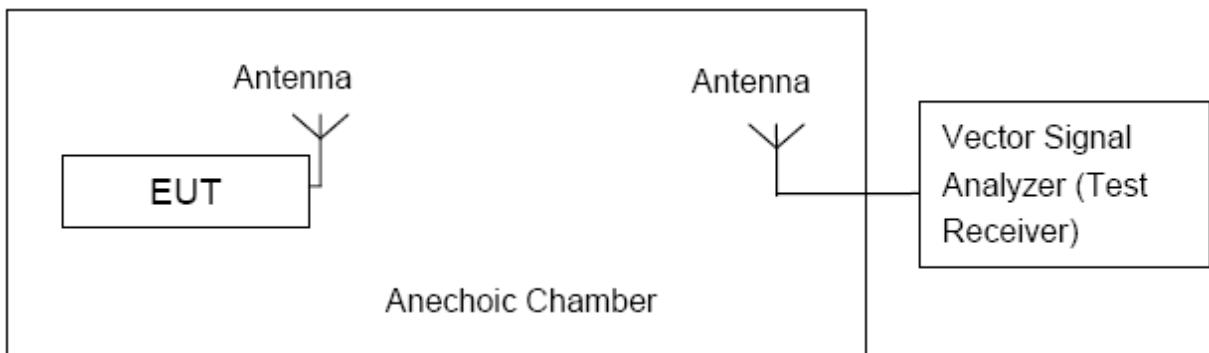


#### **Radiated Emission Measurements**

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

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

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



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	24
	5250MHz~5350MHz	24 or 11+10logB
	5470MHz~5725MHz	24 or 11+10logB
	5725MHz~5850MHz	30

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

### Measurement of method :See ANSI C63.10-2013-Clause 12.3.3.2

Method PM-G is a measurement using a gated RF average power meter.

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Because the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

### Measurement Results:

U-NII Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Conclusion
5.2GHz Band (UNII-1)	802.11a	CH 36	5180	12.67	P
		CH 40	5200	12.64	P
		CH 48	5240	12.58	P
	802.11n-HT20	CH 36	5180	12.43	P
		CH 40	5200	12.60	P
		CH 48	5240	12.27	P
	802.11n-HT40	CH 38	5190	12.44	P
		CH 46	5230	12.39	P
	802.11ac-VHT20	CH 36	5180	12.63	P
		CH 40	5200	12.51	P
		CH 48	5240	12.50	P
	802.11ac-VHT40	CH 38	5190	12.51	P
		CH 46	5230	12.33	P
	802.11ac-VHT80	CH 42	5210	11.90	P

U-NII Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Conclusion
5.3GHz Band (UNII-2A)	802.11a	CH 52	5260	12.46	P
		CH 56	5280	12.46	P
		CH 64	5320	12.42	P
	802.11n-HT20	CH 52	5260	12.31	P
		CH 56	5280	12.27	P
		CH 64	5320	12.26	P
	802.11n-HT40	CH 54	5270	12.29	P
		CH 62	5310	12.29	P
	802.11ac-VHT20	CH 52	5260	12.32	P
		CH 56	5280	12.29	P
		CH 64	5320	12.25	P
	802.11ac-VHT40	CH 54	5270	12.24	P
CH 62		5310	12.29	P	
802.11ac-VHT80	CH 58	5290	11.66	P	

U-NII Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Conclusion
5.5GHz Band (UNII-2C)	802.11a	CH 100	5500	12.29	P
		CH 120	5600	11.89	P
		CH 140	5700	11.76	P
	802.11n-HT20	CH 100	5500	12.14	P
		CH 120	5600	11.86	P
		CH 140	5700	11.38	P
	802.11n-HT40	CH 102	5510	11.67	P
		CH 118	5590	11.43	P
		CH 134	5670	11.35	P
	802.11ac-VHT20	CH 100	5500	12.13	P
		CH 120	5600	11.86	P
		CH 140	5700	11.48	P
	802.11ac-VHT40	CH 102	5510	11.57	P
		CH 118	5590	11.41	P
		CH 134	5670	11.32	P
	802.11ac-VHT80	CH 106	5530	11.92	P
CH 122		5610	11.26	P	

U-NII Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Conclusion
5.8GHz Band (UNII-3)	802.11a	CH 149	5745	11.63	P
		CH 157	5785	11.55	P
		CH 165	5825	11.48	P
	802.11n-HT20	CH 149	5745	11.58	P
		CH 157	5785	11.41	P
		CH 165	5825	11.40	P
	802.11n-HT40	CH 151	5755	11.28	P
		CH 159	5795	11.27	P
	802.11ac-VHT20	CH 149	5745	11.56	P
		CH 157	5785	11.43	P
		CH 165	5825	11.32	P
	802.11ac-VHT40	CH 151	5755	11.25	P
		CH 159	5795	11.18	P
	802.11ac-VHT80	CH 155	5775	10.90	P

**Note:**

Worst-case data rates as provided by the client were: 6Mbps (802.11a), MCS0 (802.11n), MCS0 (802.11ac). 802.11a, 802.11n-HT40 and 802.11ac-VHT80 modes are selected as the worst-case.

The following cases and test graphs are performed with this condition.

The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is not less than 98%.

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

#### Measurement Limit:

Standard	Frequency (MHz)	Limit
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11dBm/MHz(FCC)
		10dBm/MHz EIRP(IC)
	5250MHz~5350MHz	11dBm/MHz
	5470MHz~5725MHz	11dBm/MHz
	5725MHz~5850MHz	30dBm/500KHz

The PPSD measurement method SA-1 is made according to KDB 789033.

#### Measurement Results:

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180MHz(Ch36)	6.62	P
	5200MHz(Ch40)	6.84	P
	5240MHz(Ch48)	6.78	P
	5260MHz(Ch52)	6.36	P
	5280MHz(Ch56)	6.60	P
	5320MHz(Ch64)	6.26	P
	5500MHz(Ch100)	6.60	P
	5580MHz(Ch116)	6.15	P
	5700MHz(Ch140)	5.94	P

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11n-HT40	5190MHz(Ch38)	3.95	P
	5230MHz(Ch46)	3.80	P
	5270MHz(Ch54)	3.20	P
	5310MHz(Ch62)	3.28	P
	5510MHz(Ch102)	3.65	P
	5550MHz(Ch110)	2.83	P
	5670MHz(Ch134)	3.00	P

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11ac-VHT80	5210MHz(Ch42)	0.56	P
	5290MHz(Ch58)	0.13	P
	5530MHz(Ch106)	0.25	P
	5610MHz(Ch122)	-0.04	P



**5.8GHz Band (UNII-3)**

U-NII Band	Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/500kHz)	Conclusion
5.8GHz Band (UNII-3)	802.11a	CH 149	5745	2.81	<b>P</b>
		CH 157	5785	3.56	<b>P</b>
		CH 165	5825	3.43	<b>P</b>
	802.11n-HT40	CH 151	5755	-0.45	<b>P</b>
		CH 159	5795	-0.46	<b>P</b>
	802.11ac-VHT80	CH 155	5775	-1.60	<b>P</b>

**Conclusion: PASS**

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

##### Measurement Limit:

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

The measurement is made according to KDB 789033

##### Measurement Result:

Mode	Channel	Occupied 26dB Bandwidth( MHz)		Conclusion
		Fig.	Value	
802.11a	5180MHz(Ch36)	Fig.1	20.50	/
	5200MHz(Ch40)	Fig.2	20.50	/
	5240MHz(Ch48)	Fig.3	20.60	/
	5260MHz(Ch52)	Fig.4	20.55	/
	5280MHz(Ch56)	Fig.5	20.50	/
	5320MHz(Ch64)	Fig.6	20.65	/
	5500MHz(Ch100)	Fig.7	20.55	/
	5580MHz(Ch116)	Fig.8	20.40	/
	5700MHz(Ch140)	Fig.9	20.65	/
802.11n-HT40	5190MHz(Ch38)	Fig.10	40.96	/
	5230MHz(Ch46)	Fig.11	40.72	/
	5270MHz(Ch54)	Fig.12	40.96	/
	5310MHz(Ch62)	Fig.13	40.80	/
	5510MHz(Ch102)	Fig.14	40.72	/
	5550MHz(Ch110)	Fig.15	40.88	/
	5670MHz(Ch134)	Fig.16	40.80	/
802.11 ac-VHT80	5210MHz(Ch42)	Fig.17	81.12	/
	5290MHz(Ch58)	Fig.18	81.12	/
	5530MHz(Ch106)	Fig.19	81.44	/
	5610MHz(Ch122)	Fig.20	81.44	/

**Conclusion: PASS**

**Test graphs as below:**

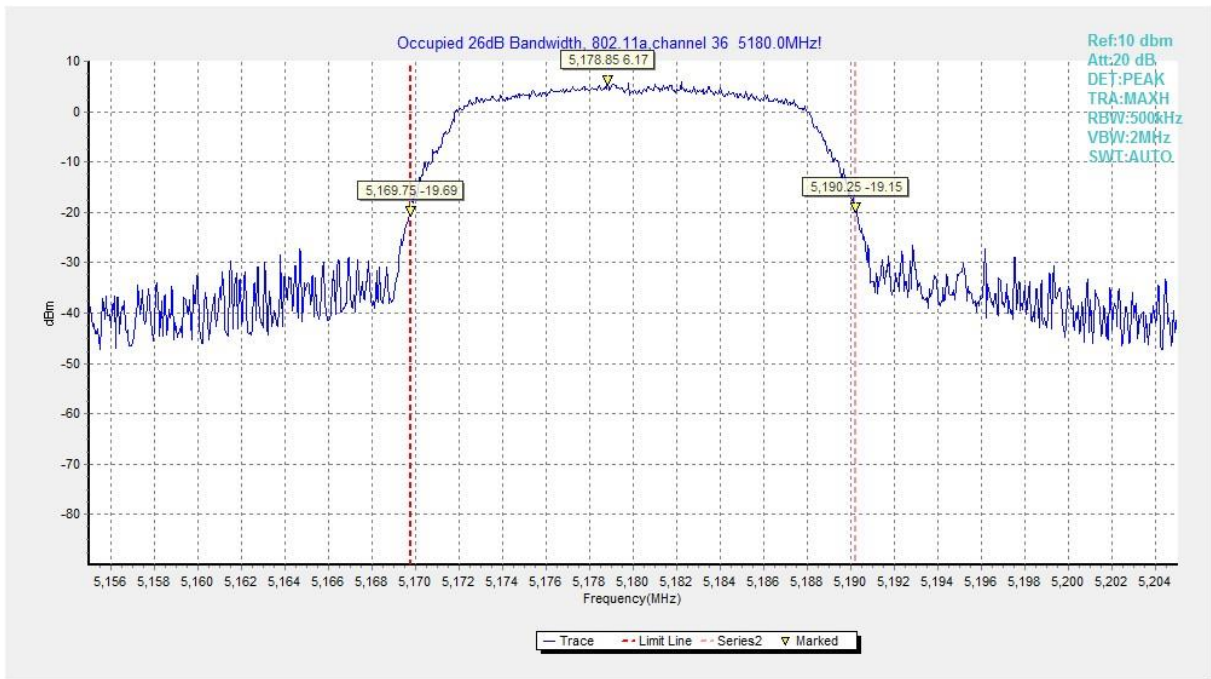


Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

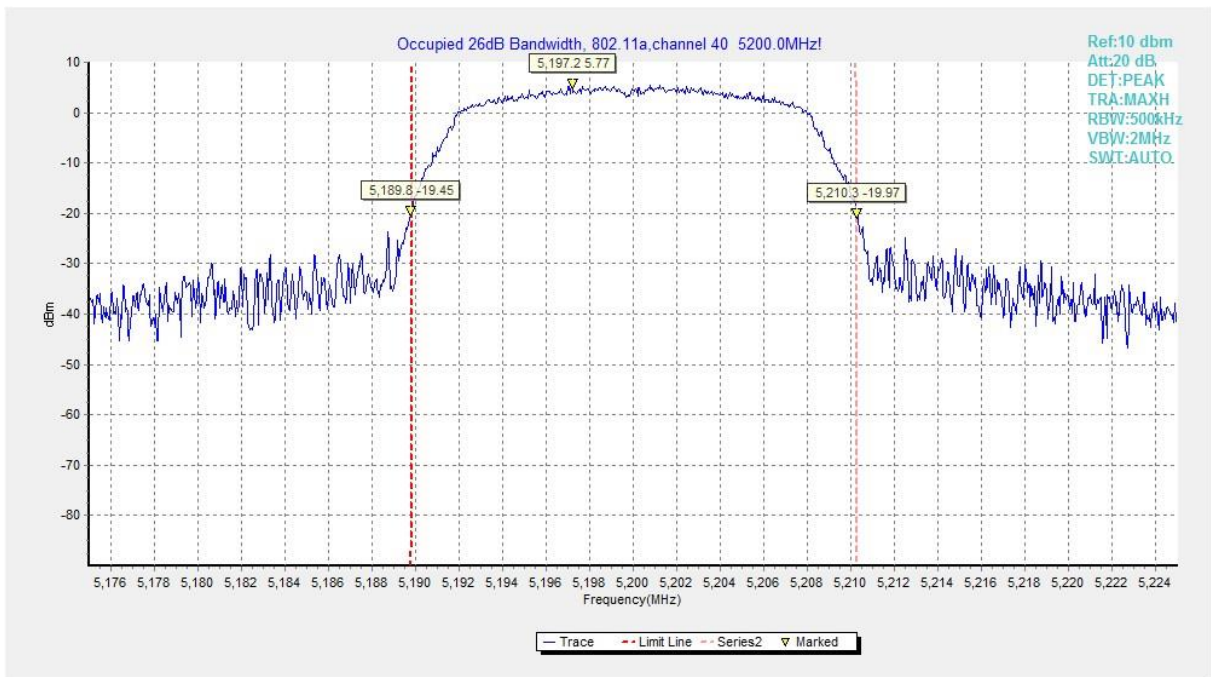
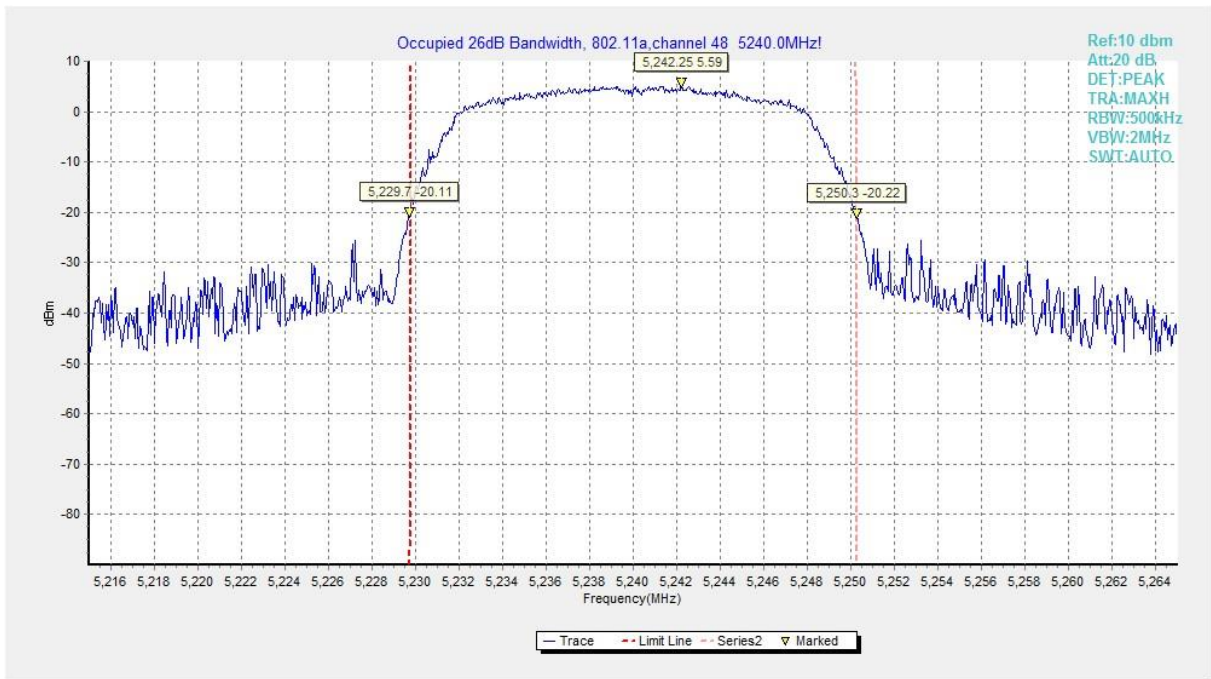
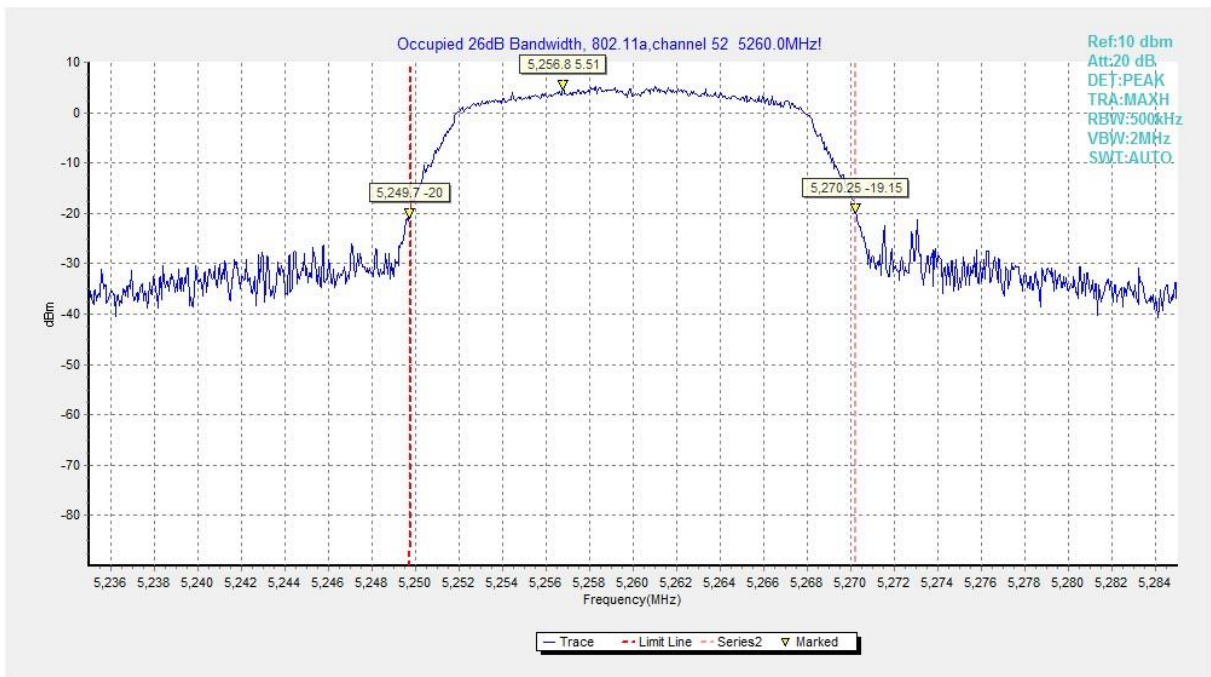


Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)



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



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

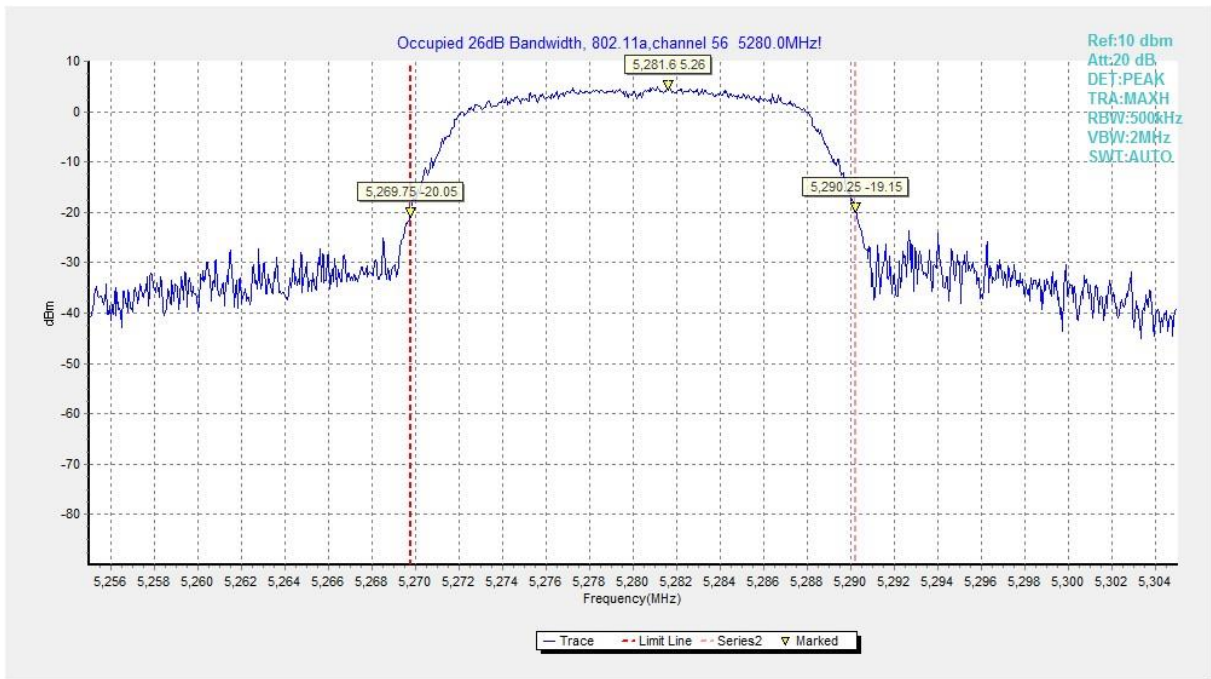


Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz)

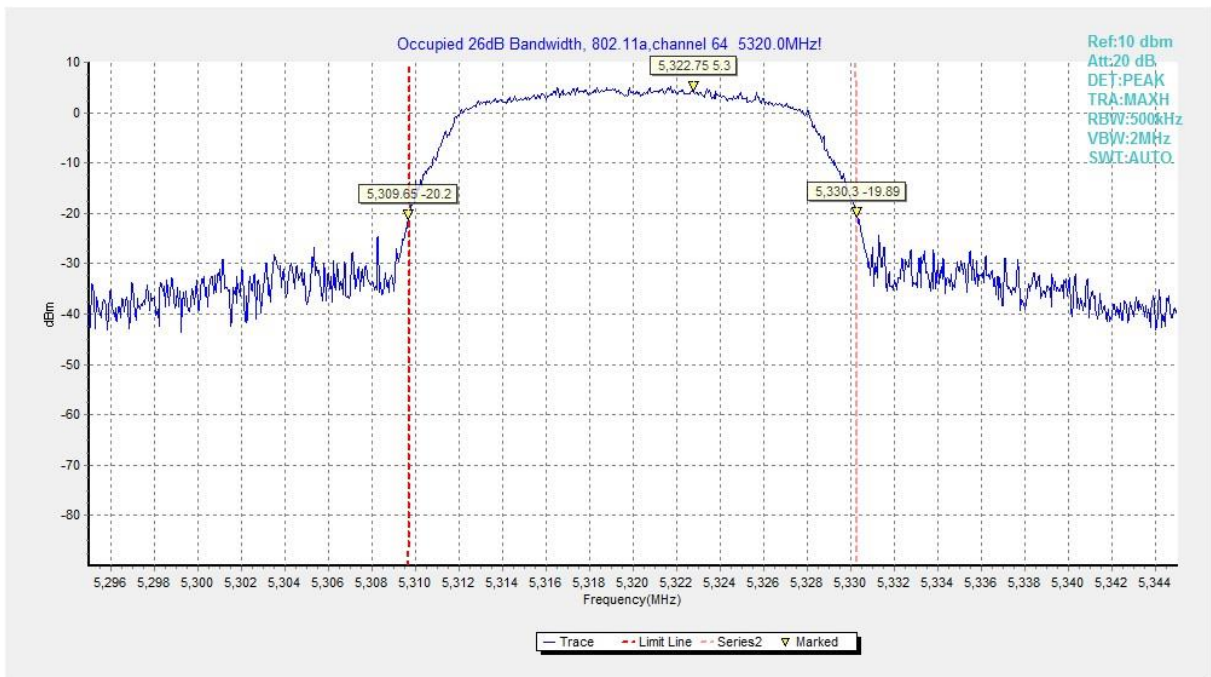
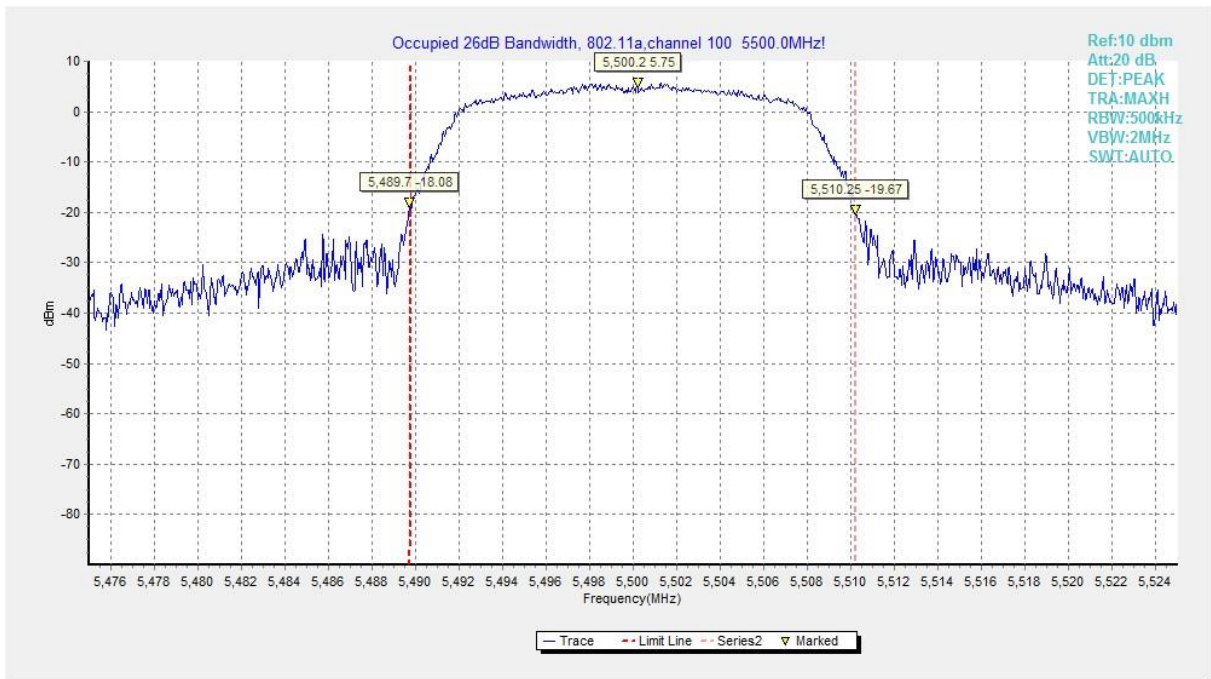
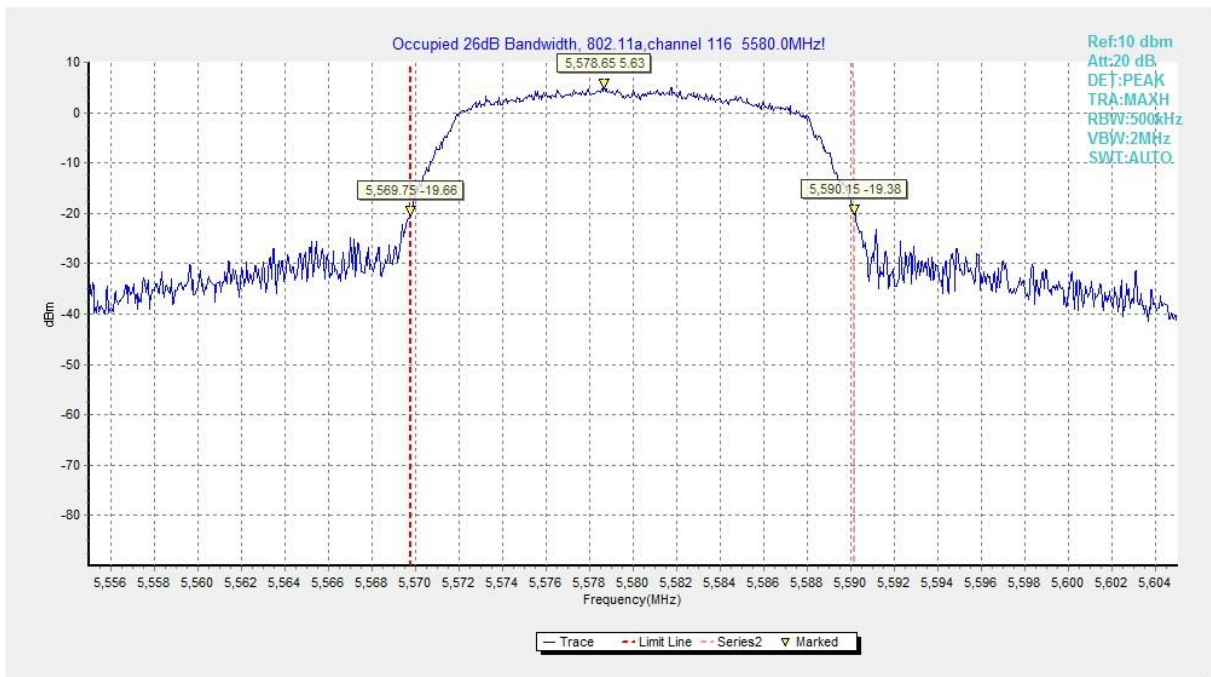


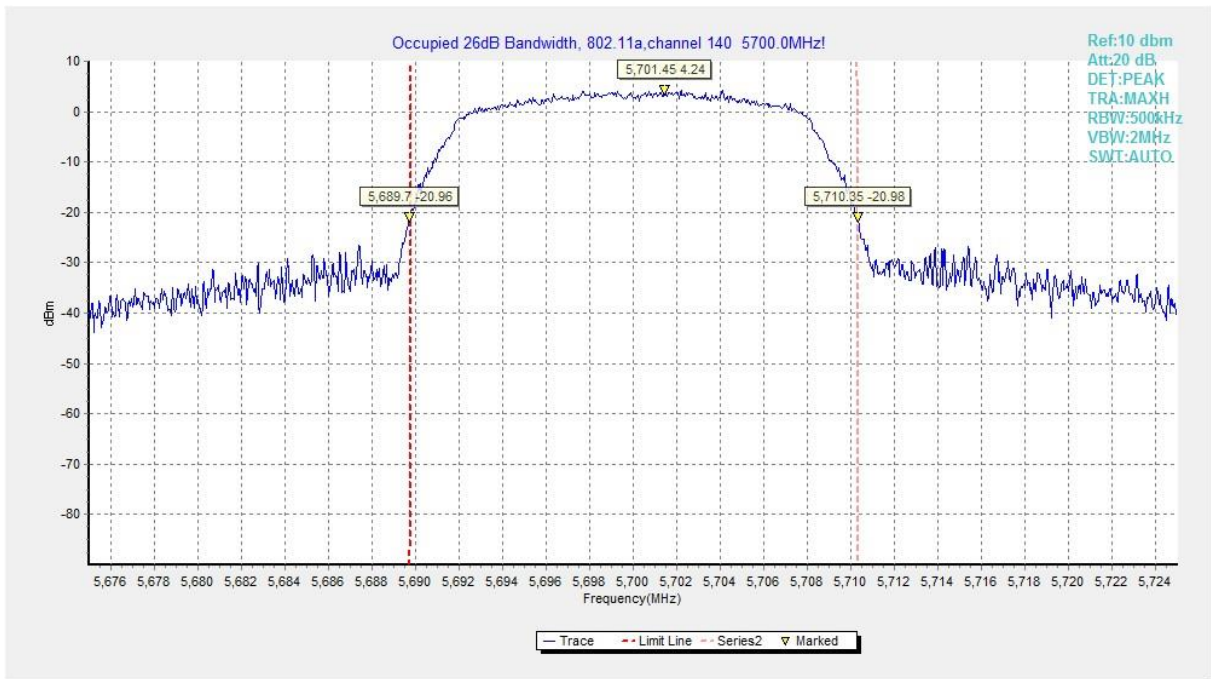
Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz)



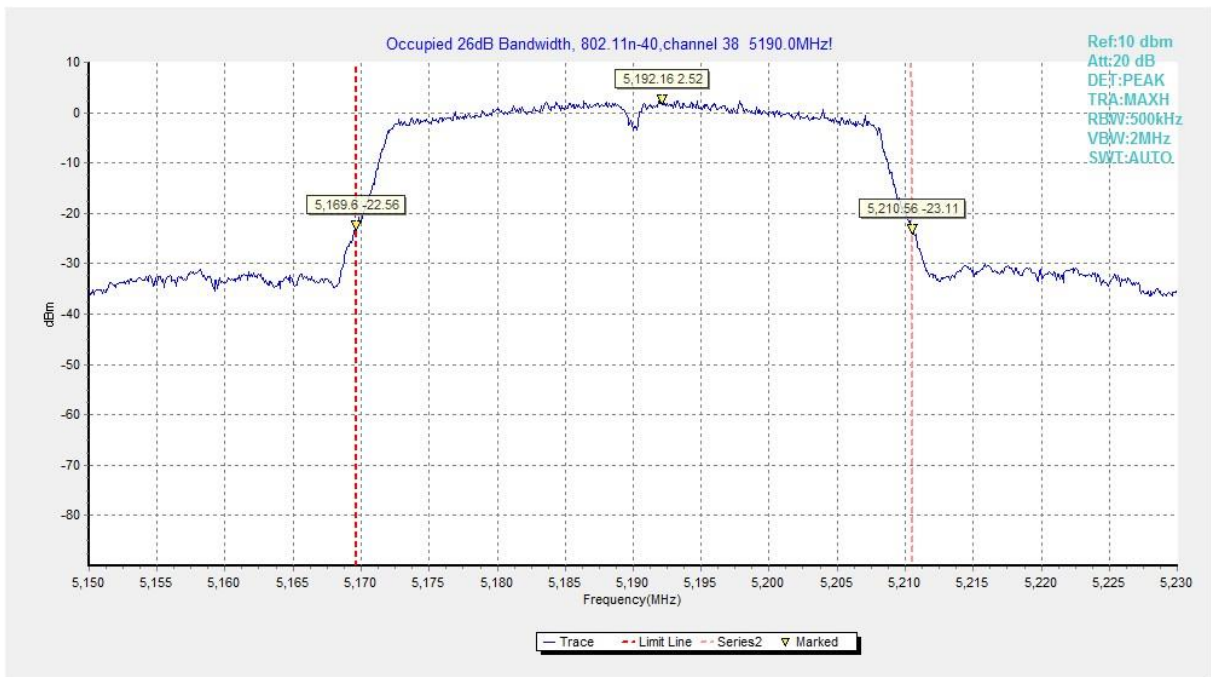
**Fig. 7 Occupied 26dB Bandwidth (802. 11a, 5500MHz)**



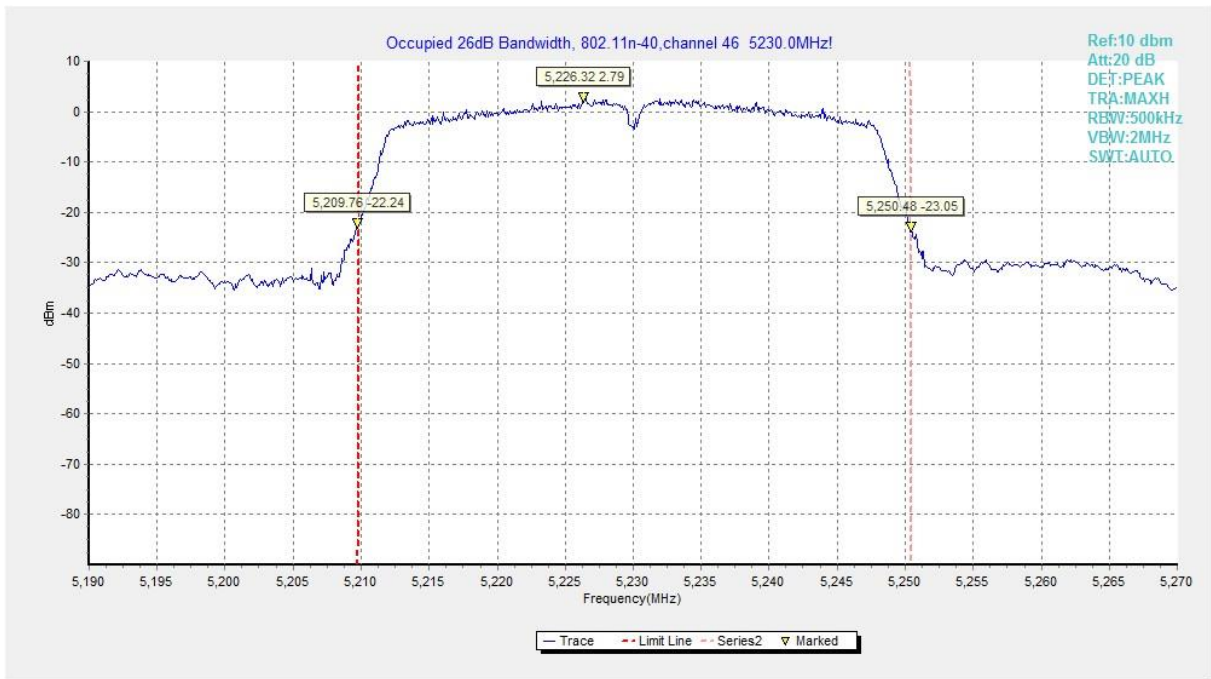
**Fig. 8 Occupied 26dB Bandwidth (802. 11a, 5600MHz)**



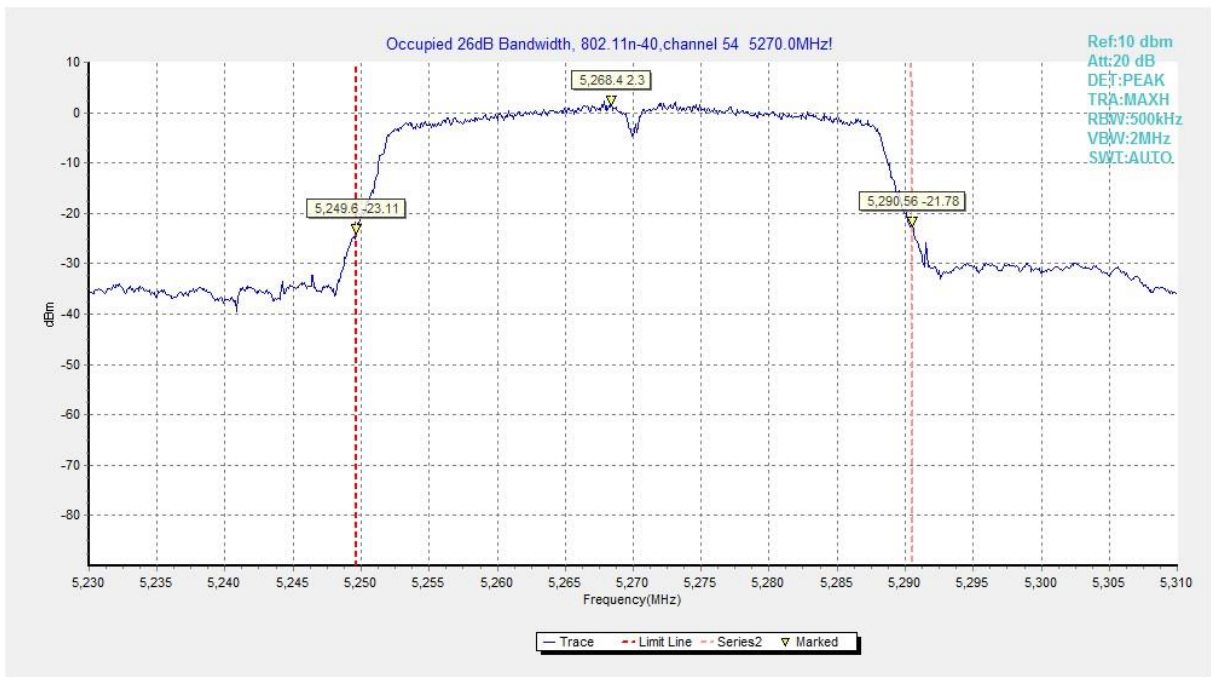
**Fig. 9 Occupied 26dB Bandwidth (802. 11a, 5700MHz)**



**Fig. 10 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)**



**Fig. 11 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)**



**Fig. 12 Occupied 26dB Bandwidth (802.11n-HT40, 5270MHz)**



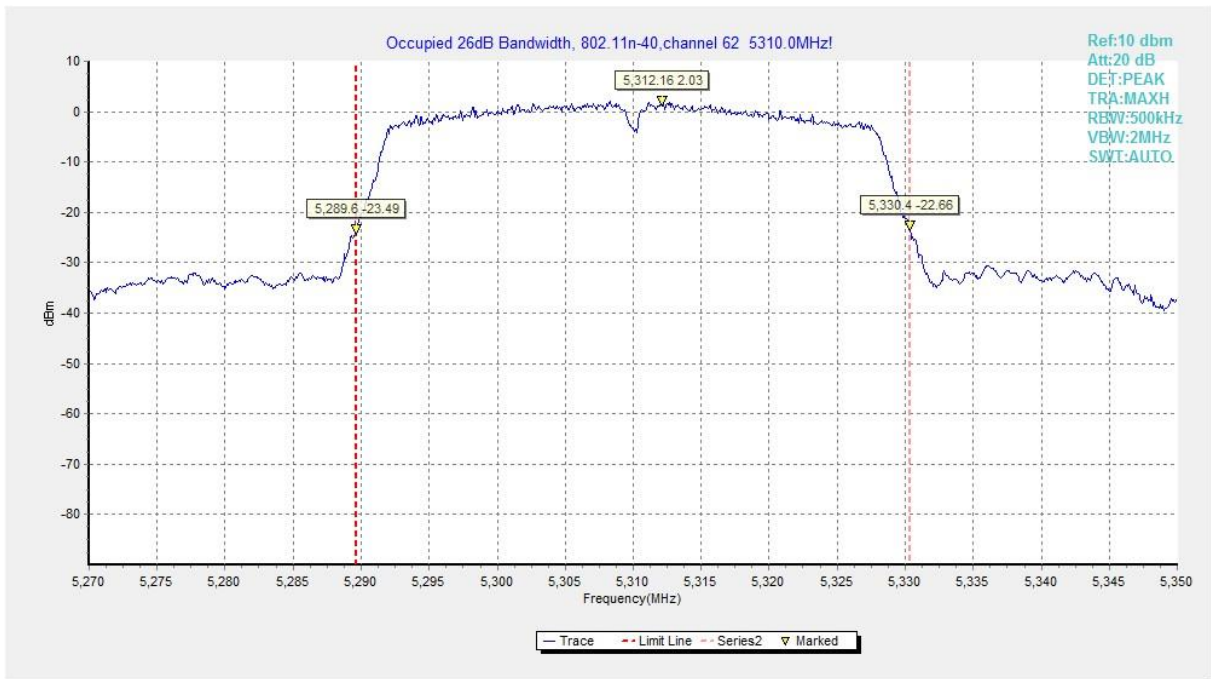


Fig. 13 Occupied 26dB Bandwidth (802.11n-HT40, 5310MHz)

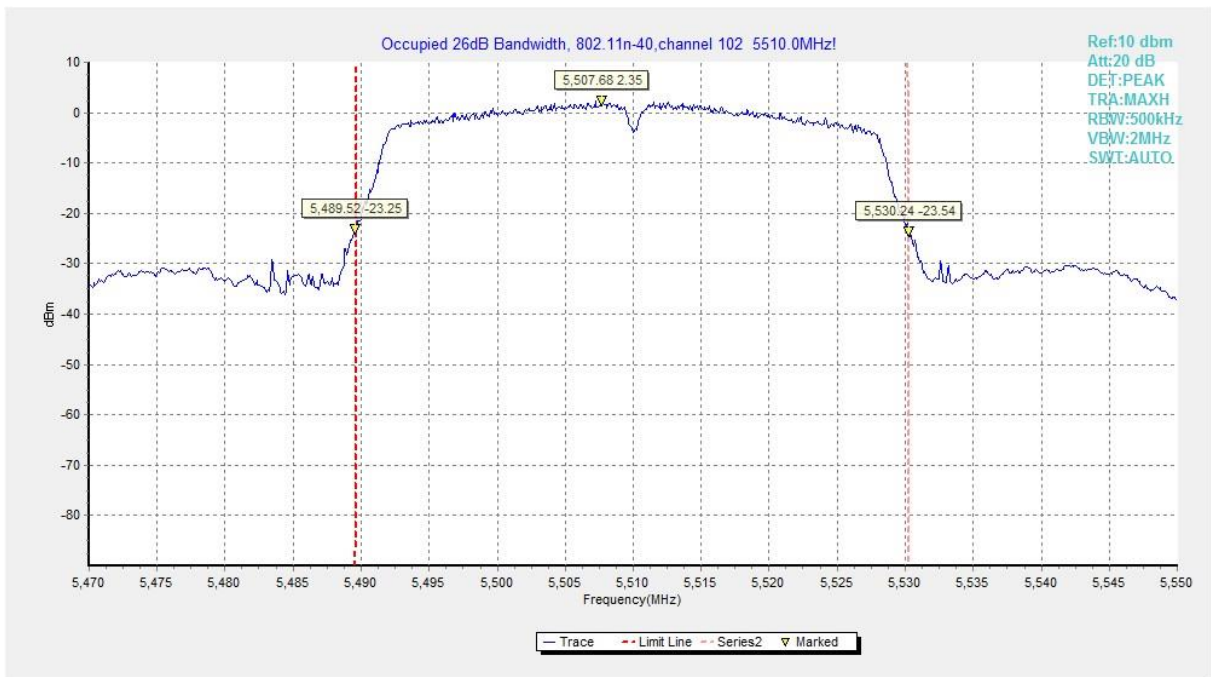


Fig. 14 Occupied 26dB Bandwidth (802.11n-HT40, 5510MHz)

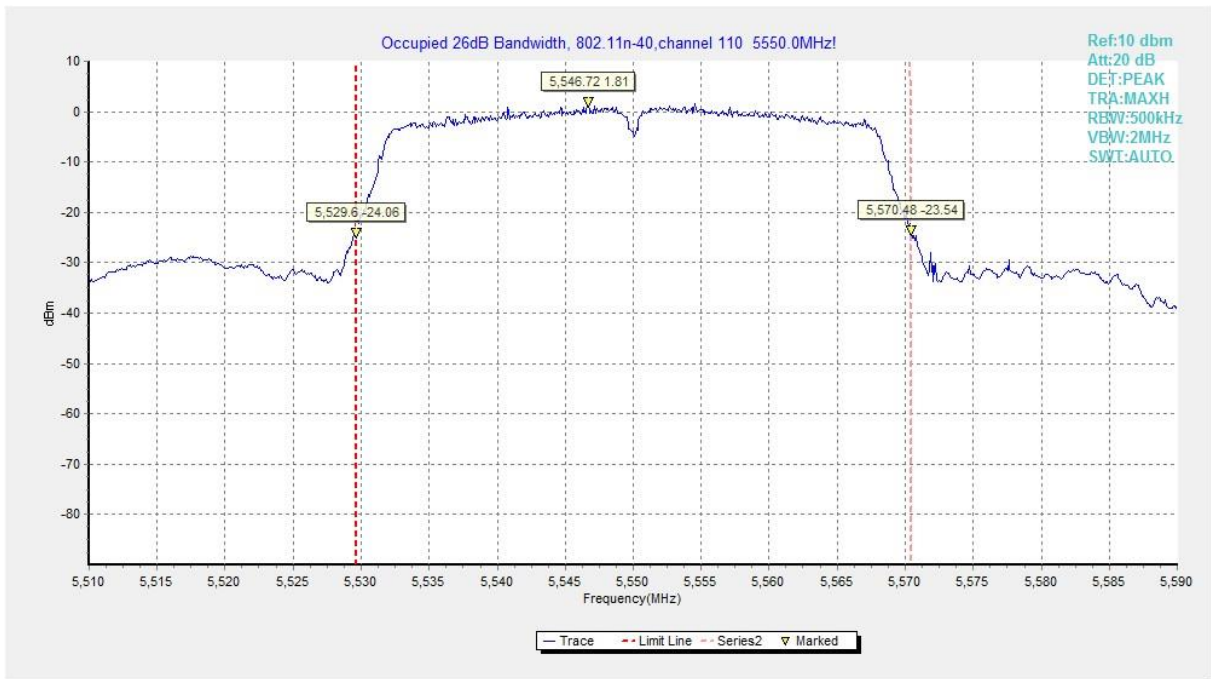


Fig. 15 Occupied 26dB Bandwidth (802. 11n-HT40, 5590MHz)



Fig. 16 Occupied 26dB Bandwidth (802. 11n-HT40, 5670MHz)

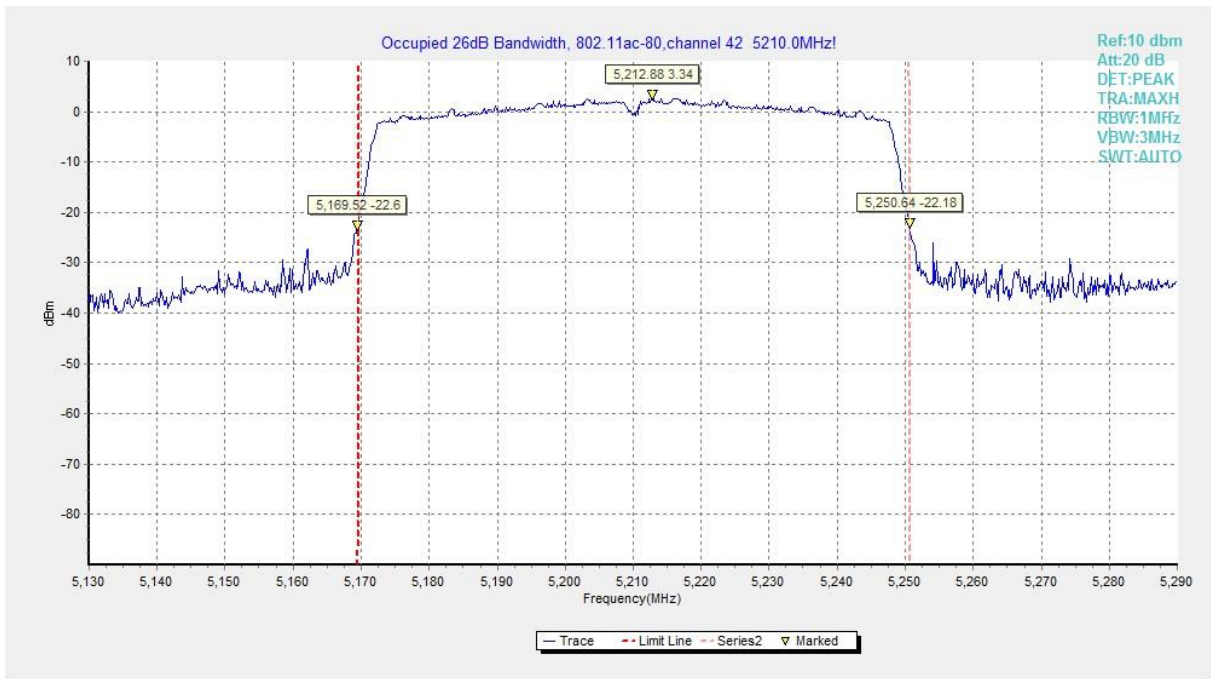


Fig. 17 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5210MHz)

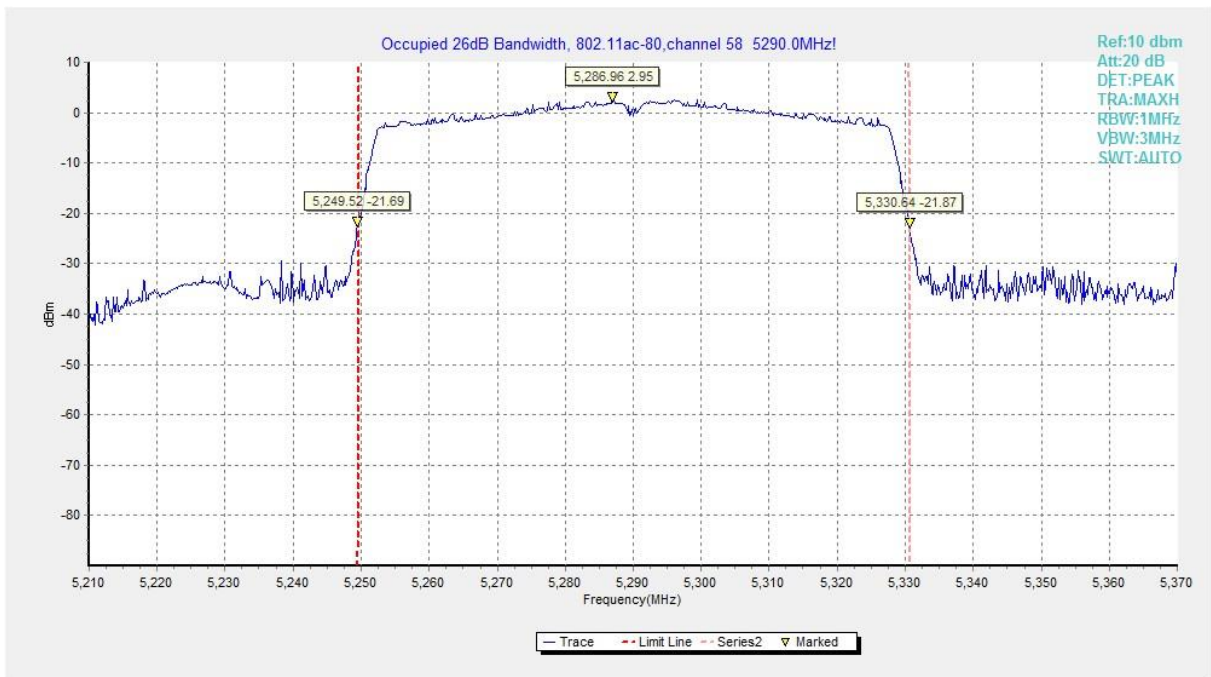


Fig. 18 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5290MHz)

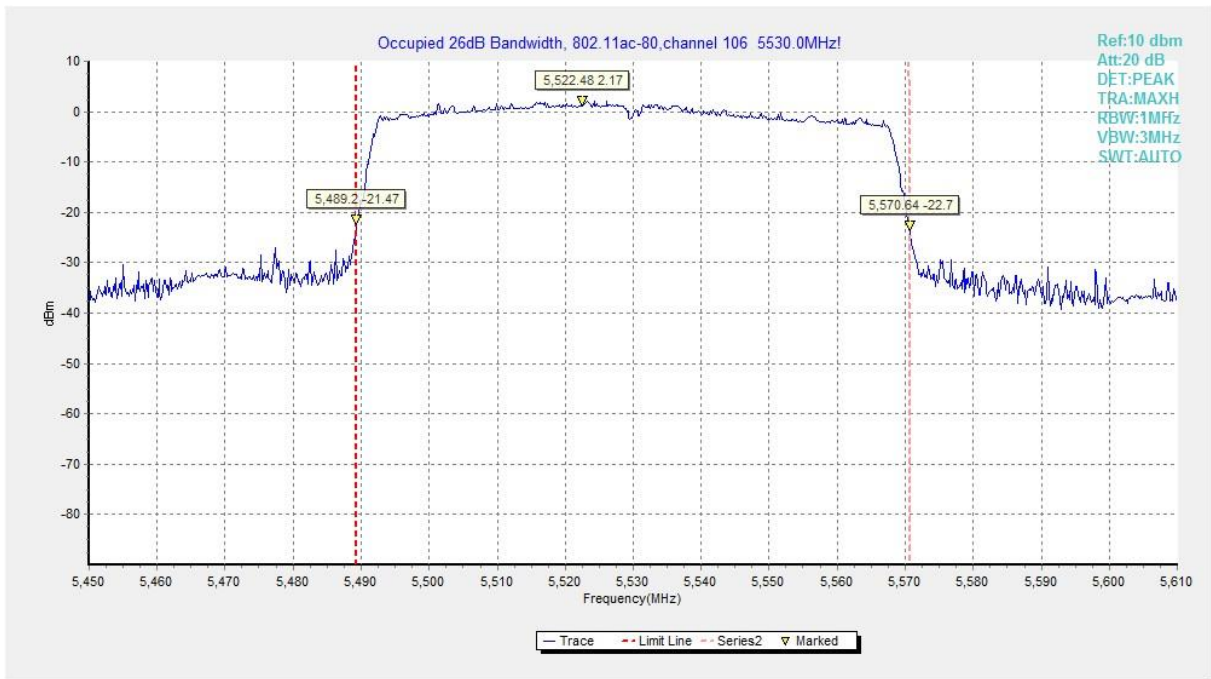


Fig. 19 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5530MHz)

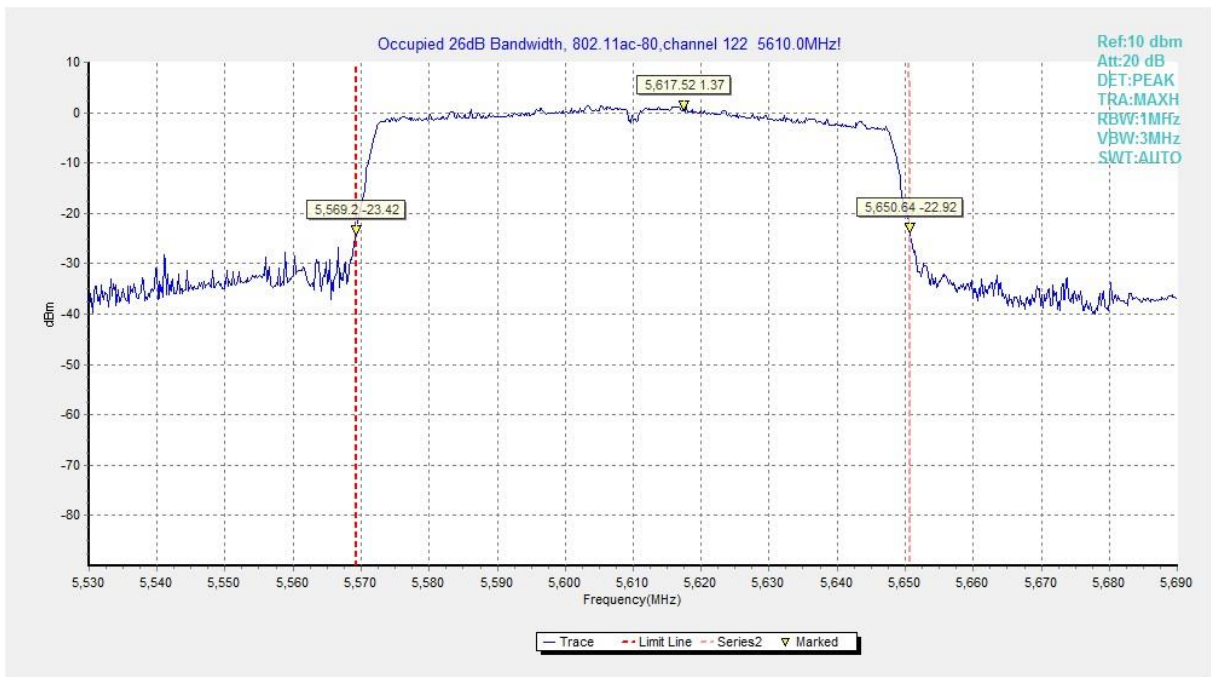


Fig. 20 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5610MHz)

### A.5. Occupied 6dB Bandwidth (conducted)

#### Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.407 (e)	≥0.5

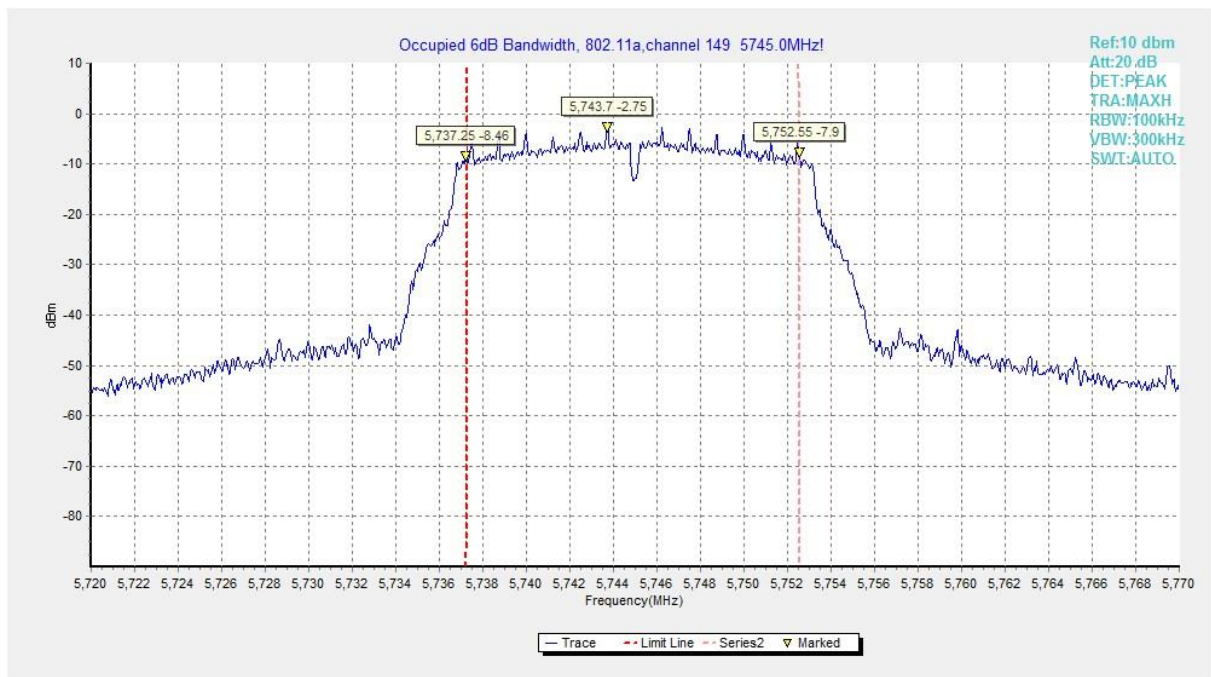
The measurement is made according to KDB 789033

#### Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth( MHz)		Conclusion
802.11a	5745MHz(Ch149)	Fig.21	15.30	P
	5785MHz(Ch157)	Fig.22	15.30	P
	5825MHz(Ch165)	Fig.23	15.10	P
802.11n-HT40	5755MHz(Ch151)	Fig.24	35.12	P
	5795MHz(Ch159)	Fig.25	35.20	P
802.11ac-VHT80	5775MHz(Ch155)	Fig.26	73.92	P

**Conclusion: PASS**

Test graphs as below:



**Fig. 21 Occupied 6dB Bandwidth (802.11a, 5745MHz)**

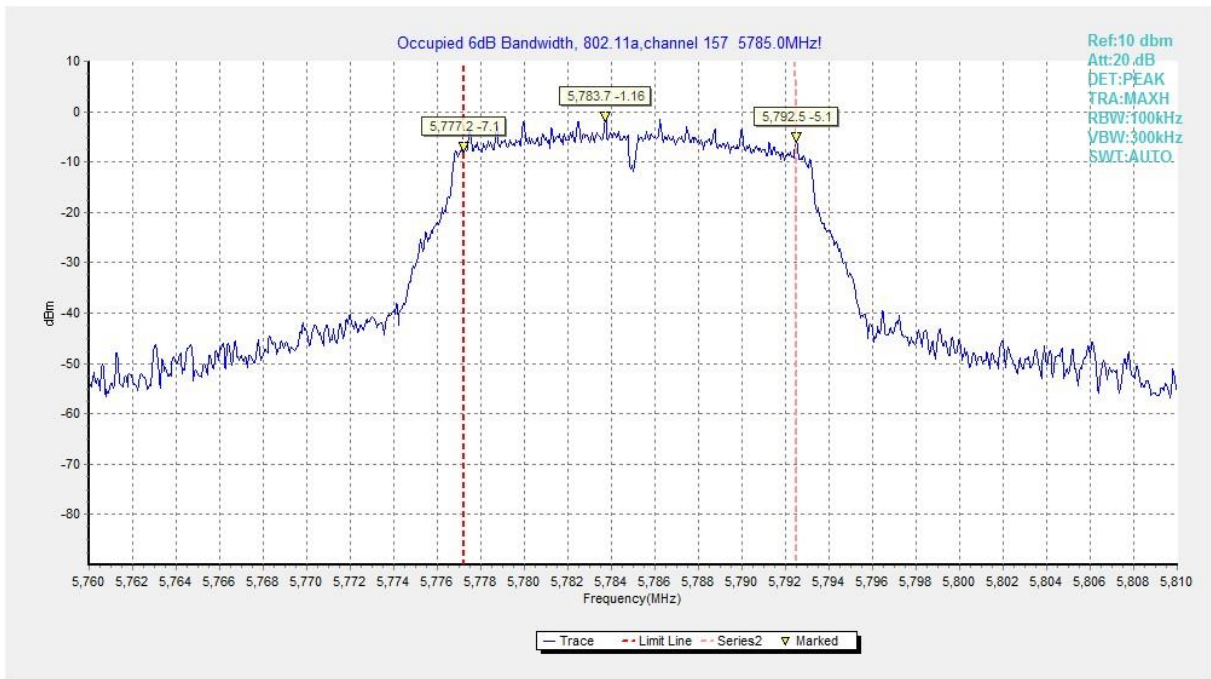


Fig. 22 Occupied 6dB Bandwidth (802.11a, 5785MHz)

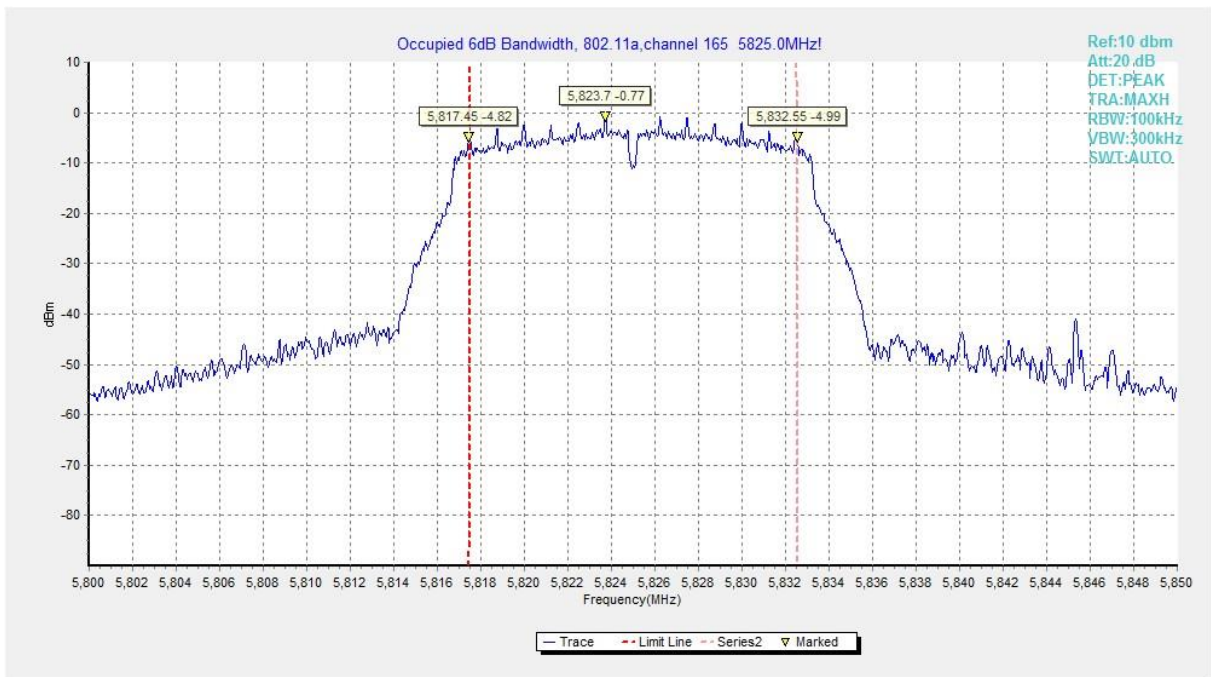


Fig. 23 Occupied 6dB Bandwidth (802.11a, 5825MHz)

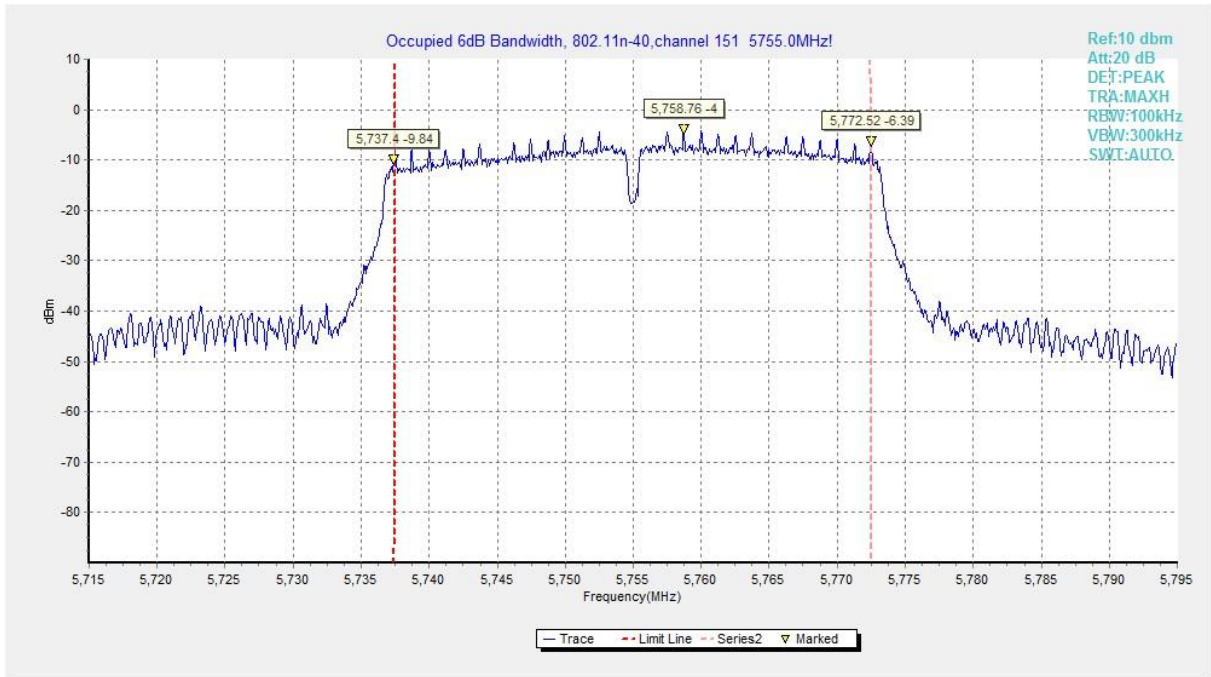


Fig. 24 Occupied 6dB Bandwidth (802.11n-HT40, 5755MHz)

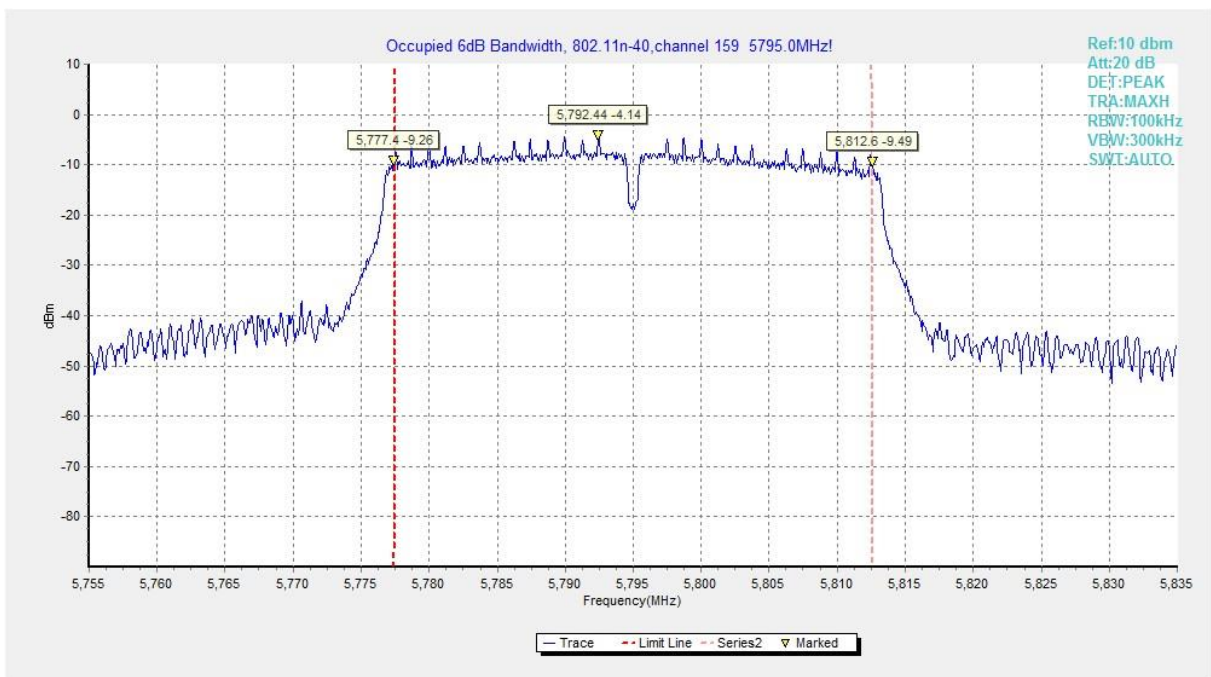


Fig. 25 Occupied 6dB Bandwidth (802.11n-HT40, 5795MHz)

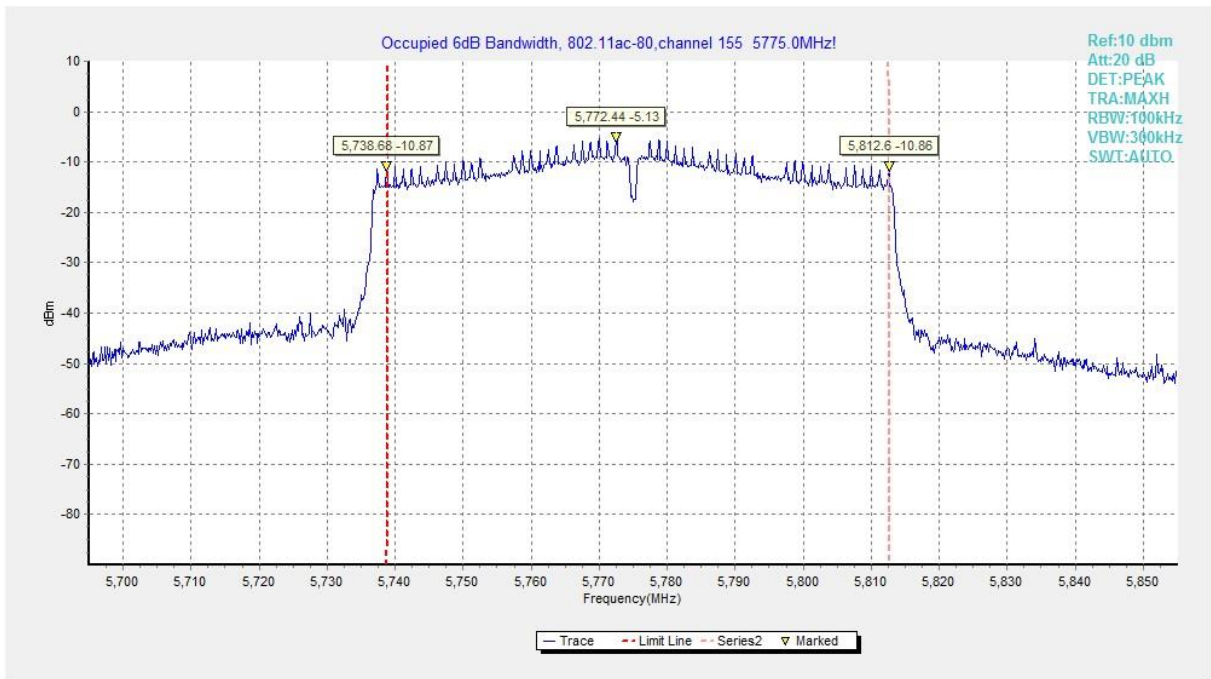


Fig. 26 Occupied 6dB Bandwidth (802.11ac-VHT80, 5775MHz)



### A.6. 99% Occupied Bandwidth(conducted)

#### Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.403	/

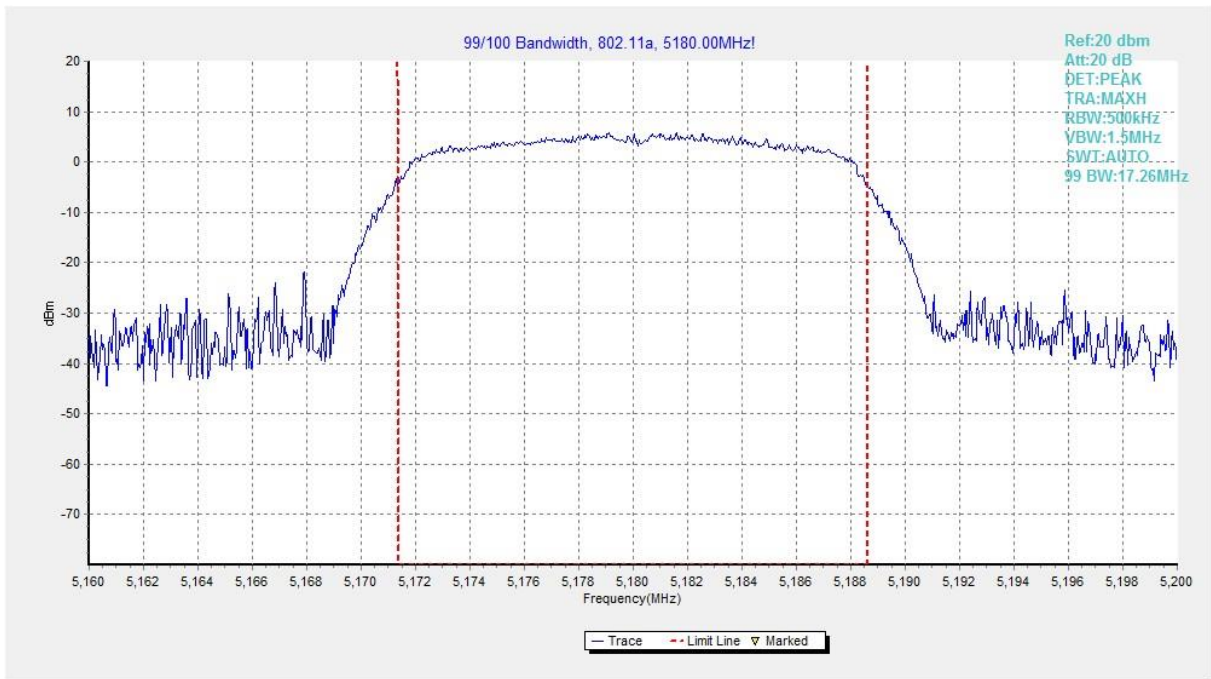
The measurement is made according to KDB 789033

#### Measurement Result:

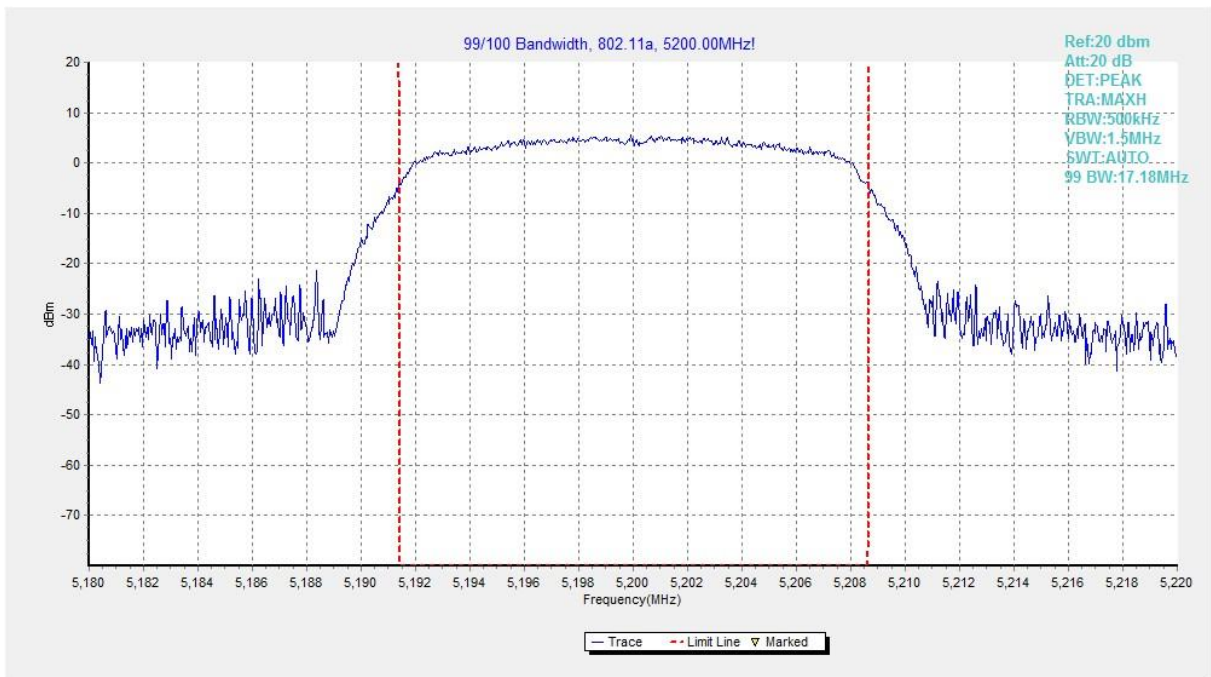
Mode	Channel	99% Occupied Bandwidth(MHz)		Conclusion
		Fig.	Value	
802.11a	5180MHz(Ch36)	Fig.27	17.26	/
	5200MHz(Ch40)	Fig.28	17.18	/
	5240MHz(Ch48)	Fig.29	17.10	/
	5260MHz(Ch52)	Fig.30	17.26	/
	5280MHz(Ch56)	Fig.31	17.26	/
	5320MHz(Ch64)	Fig.32	17.26	/
	5500MHz(Ch100)	Fig.33	17.22	/
	5580MHz(Ch116)	Fig.34	17.22	/
802.11n-HT40	5700MHz(Ch140)	Fig.35	17.26	/
	5190MHz(Ch38)	Fig.36	36.28	/
	5230MHz(Ch46)	Fig.37	36.12	/
	5270MHz(Ch54)	Fig.38	36.20	/
	5310MHz(Ch62)	Fig.39	36.20	/
	5510MHz(Ch102)	Fig.40	36.12	/
	5550MHz(Ch110)	Fig.41	36.28	/
802.11 ac-VHT80	5670MHz(Ch134)	Fig.42	36.20	/
	5210MHz(Ch42)	Fig.43	75.28	/
	5290MHz(Ch58)	Fig.44	75.28	/
	5530MHz(Ch106)	Fig.45	75.28	/
	5610MHz(Ch122)	Fig.46	75.44	/

**Conclusion: PASS**

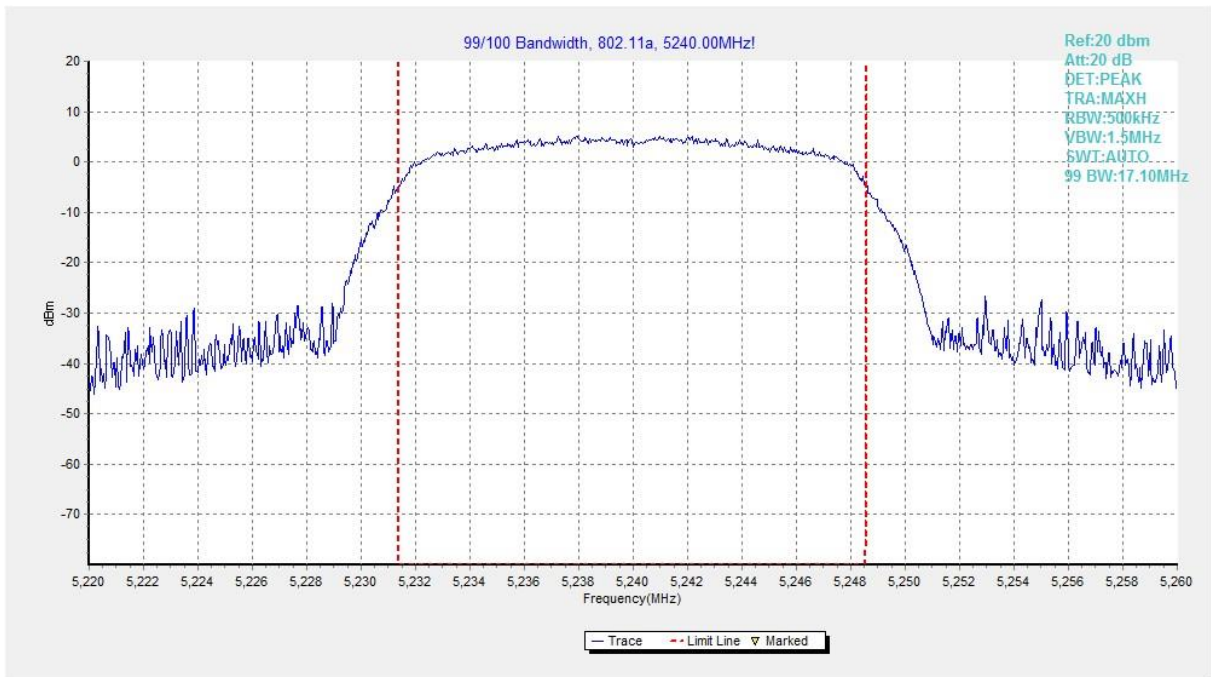
Test graphs as below:



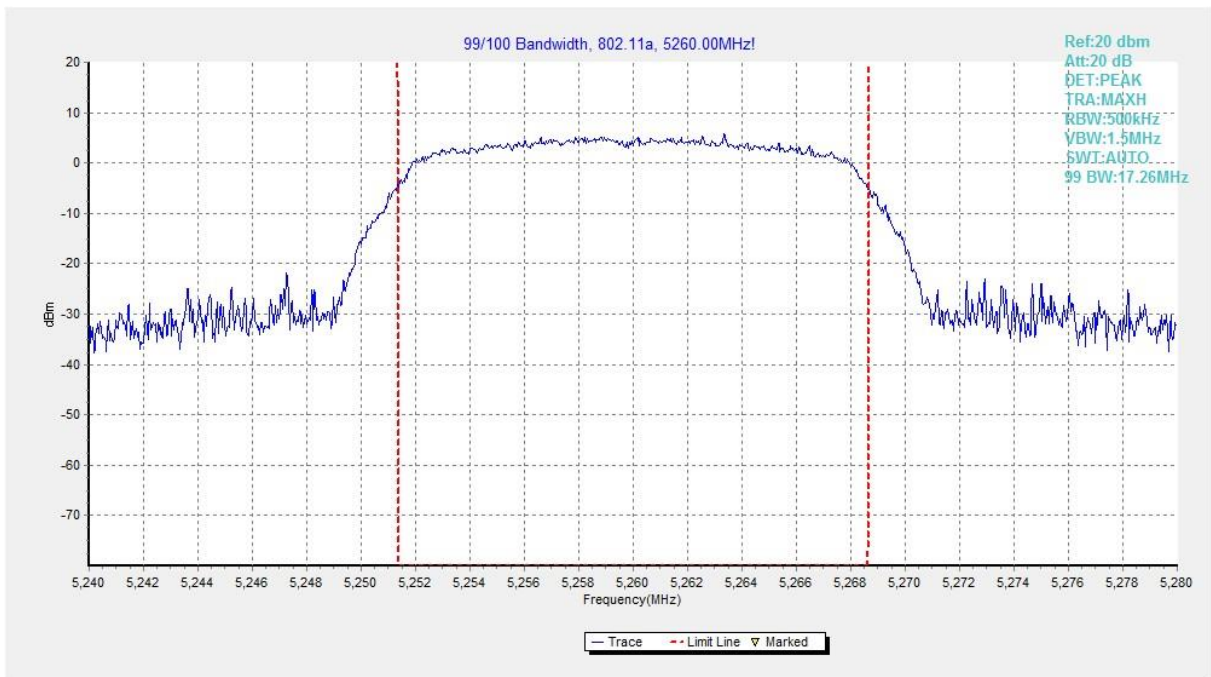
**Fig. 27 99% Occupied Bandwidth (802.11a, 5180MHz)**



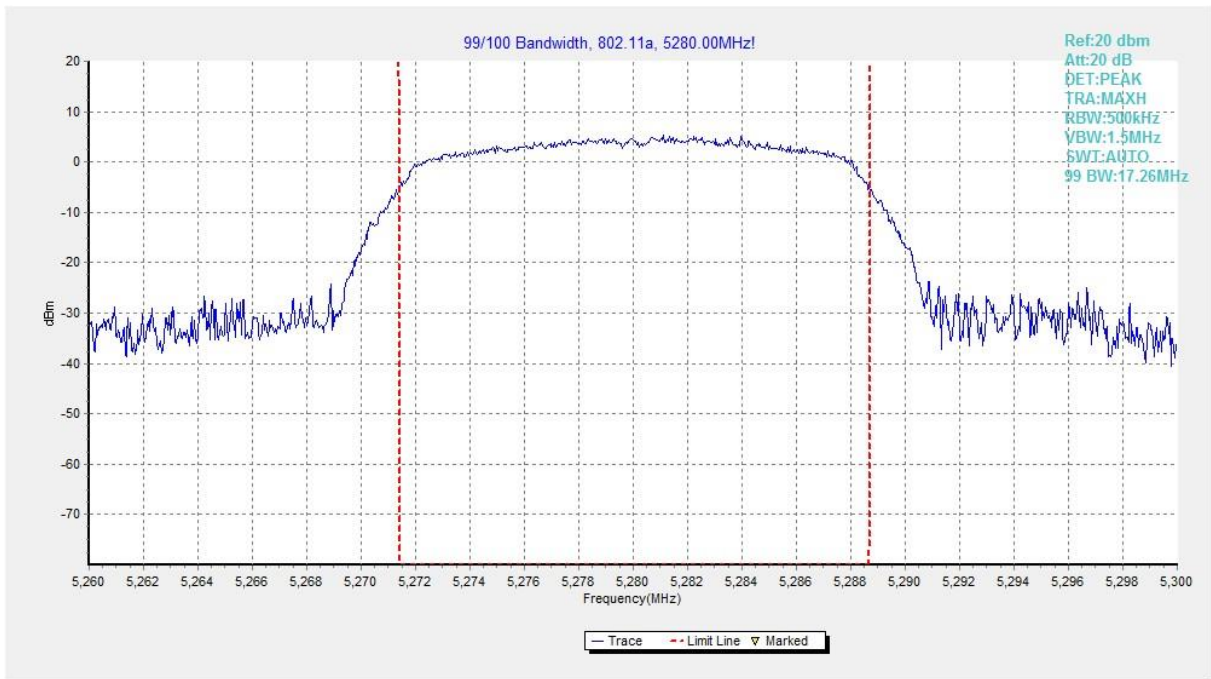
**Fig. 28 99% Occupied Bandwidth (802.11a, 5200MHz)**



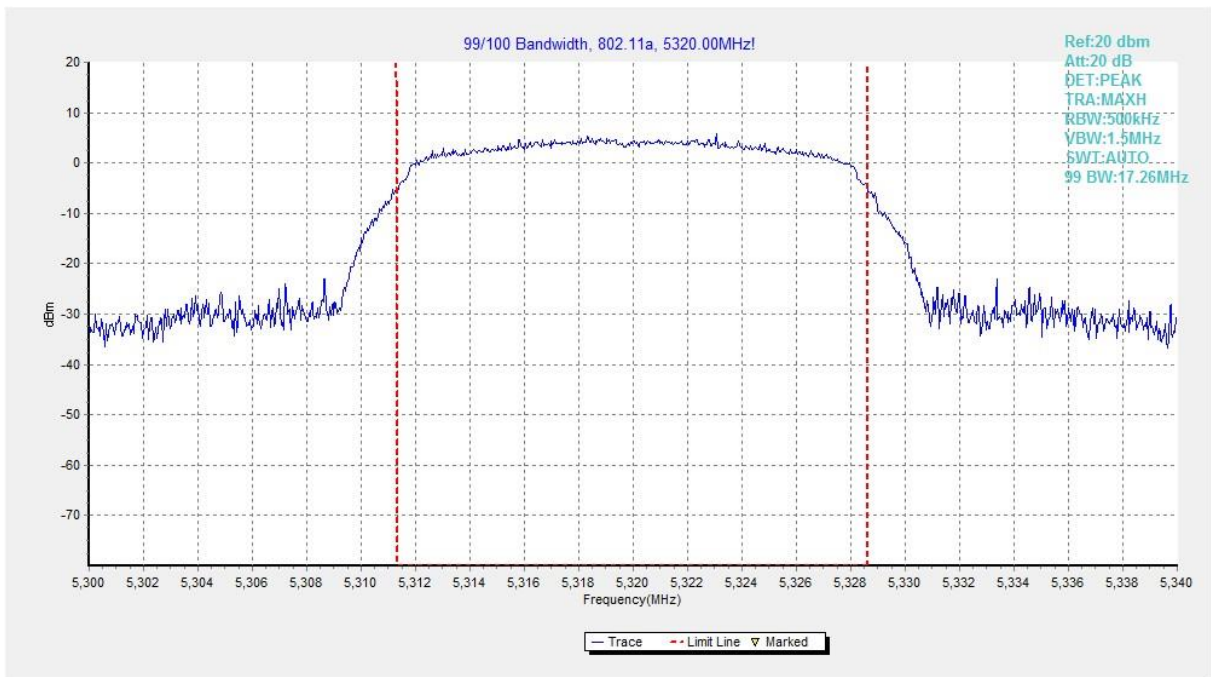
**Fig. 29 99% Occupied Bandwidth (802.11a, 5240MHz)**



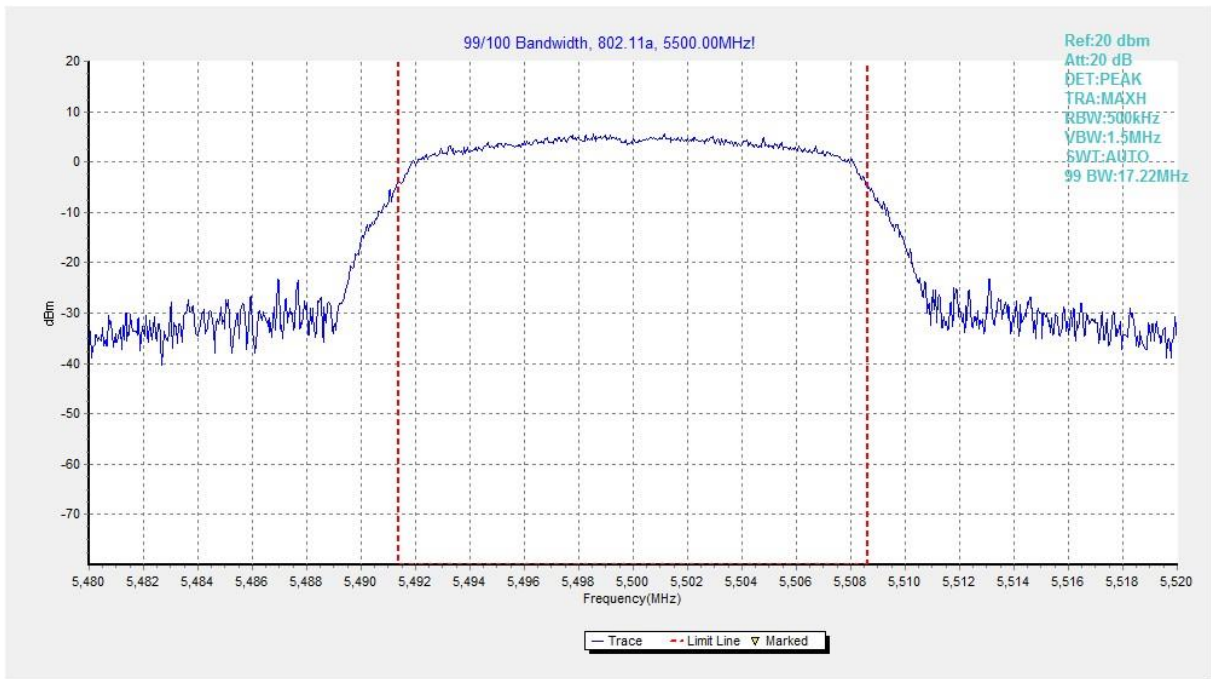
**Fig. 30 99% Occupied Bandwidth (802.11a, 5260MHz)**



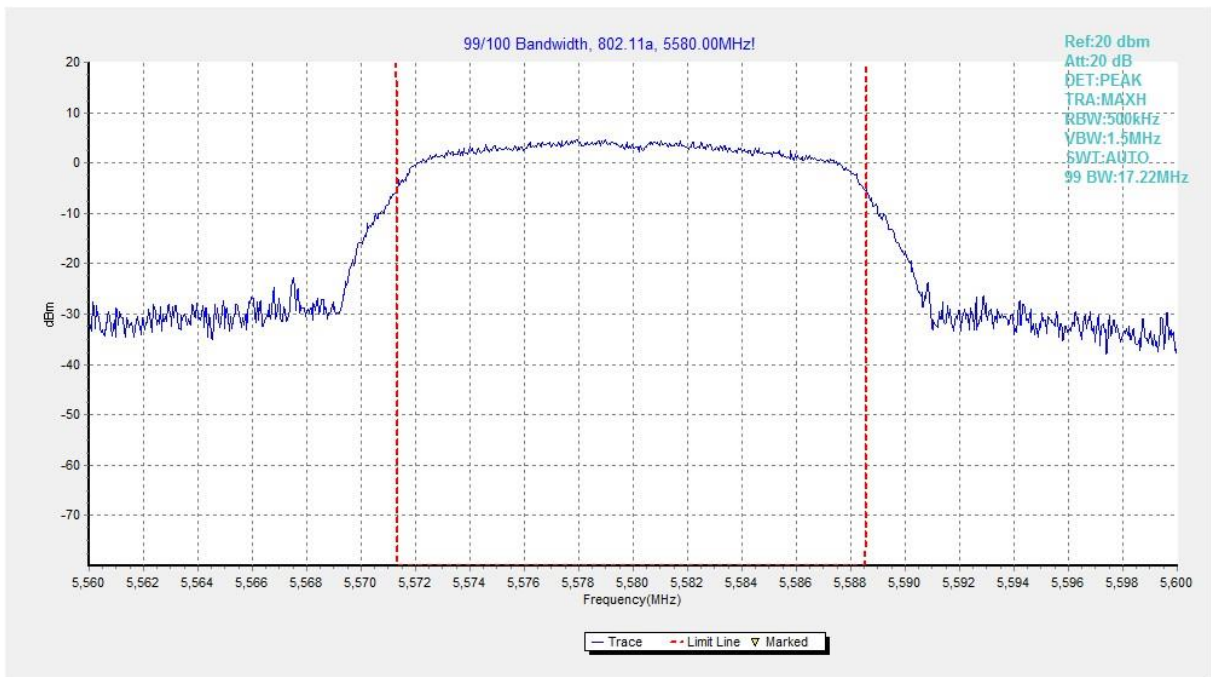
**Fig. 31 99% Occupied Bandwidth (802.11a, 5280MHz)**



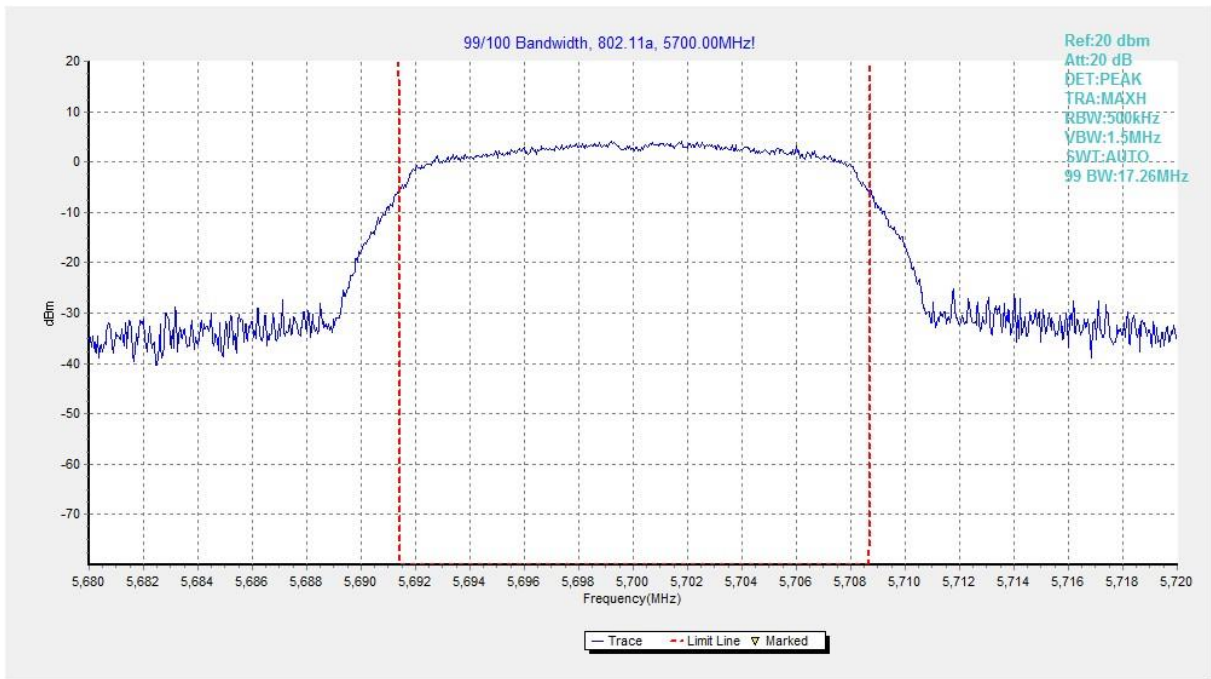
**Fig. 32 99% Occupied Bandwidth (802.11a, 5320MHz)**



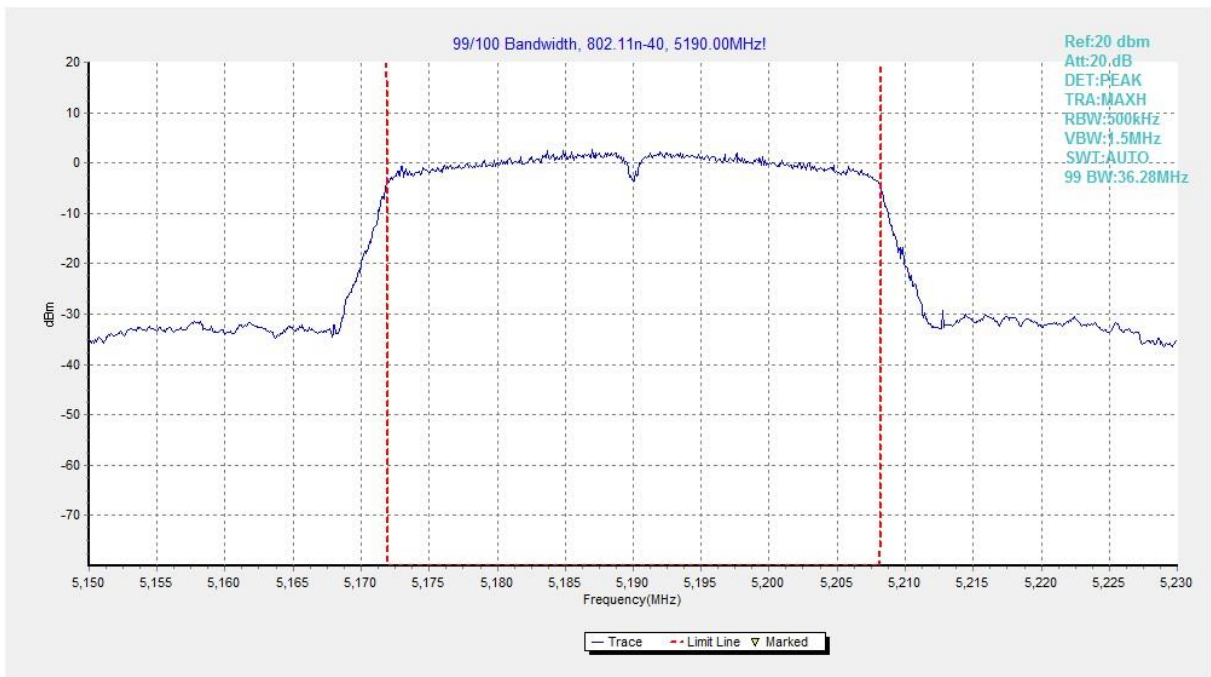
**Fig. 33 99% Occupied Bandwidth (802. 11a, 5500MHz)**



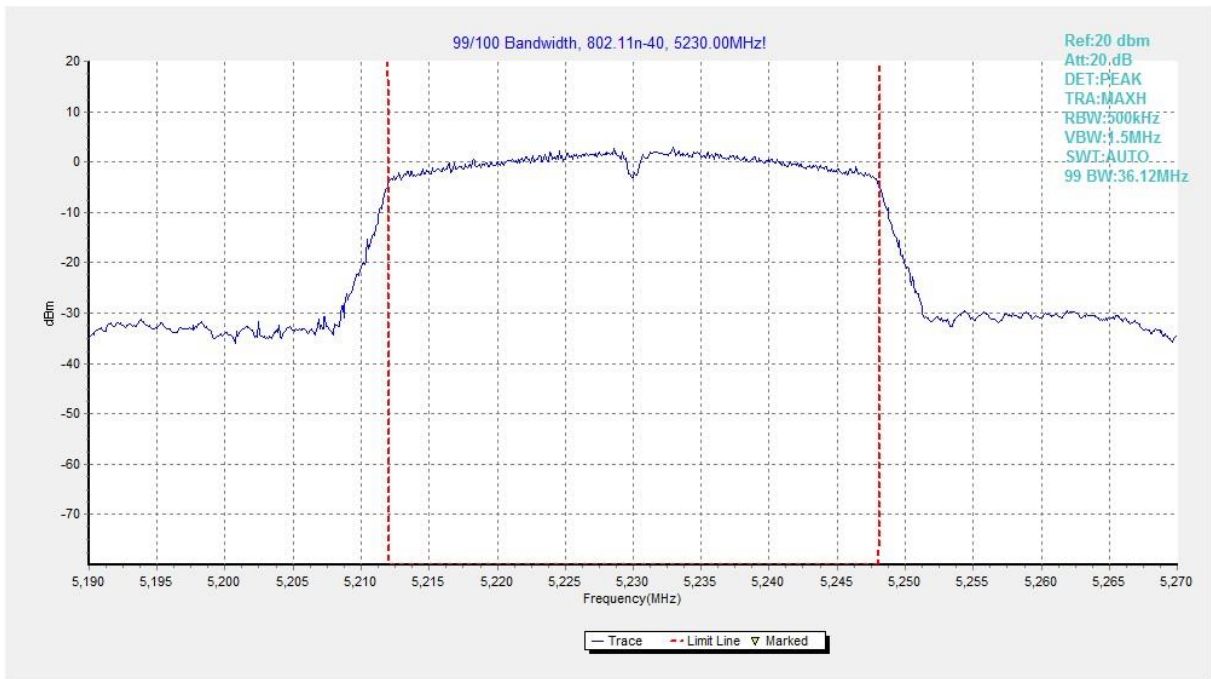
**Fig. 34 99% Occupied Bandwidth (802. 11a, 5580MHz)**



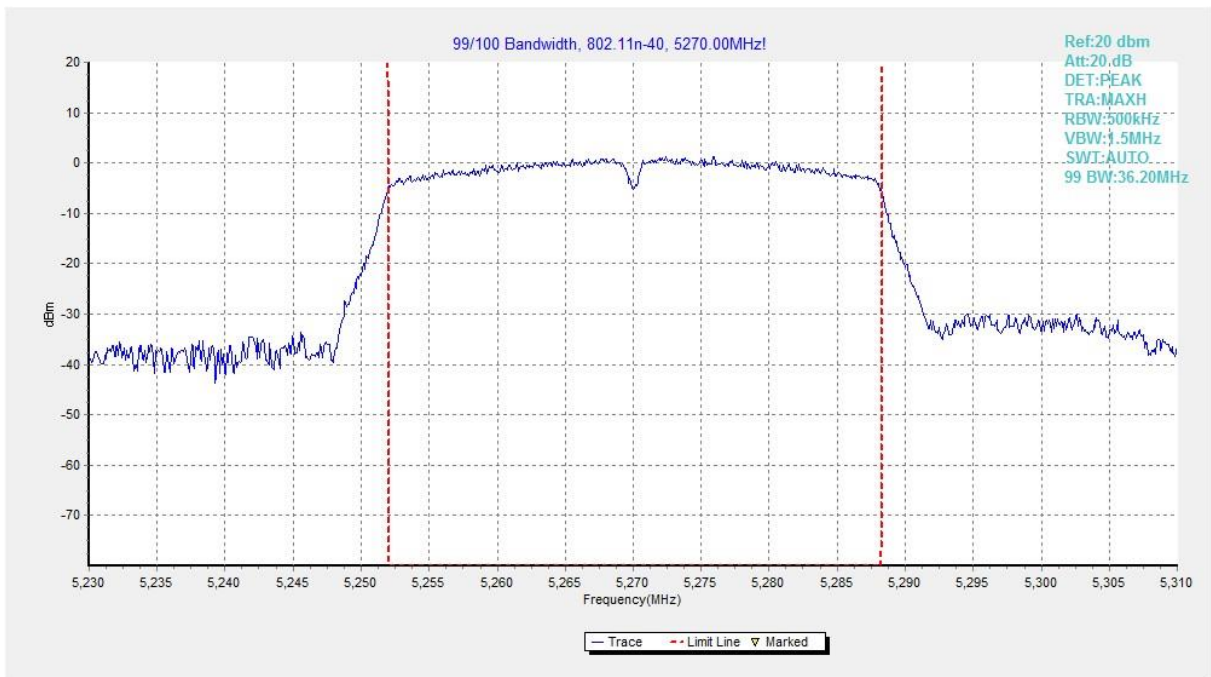
**Fig. 35 99% Occupied Bandwidth (802. 11a, 5700MHz)**



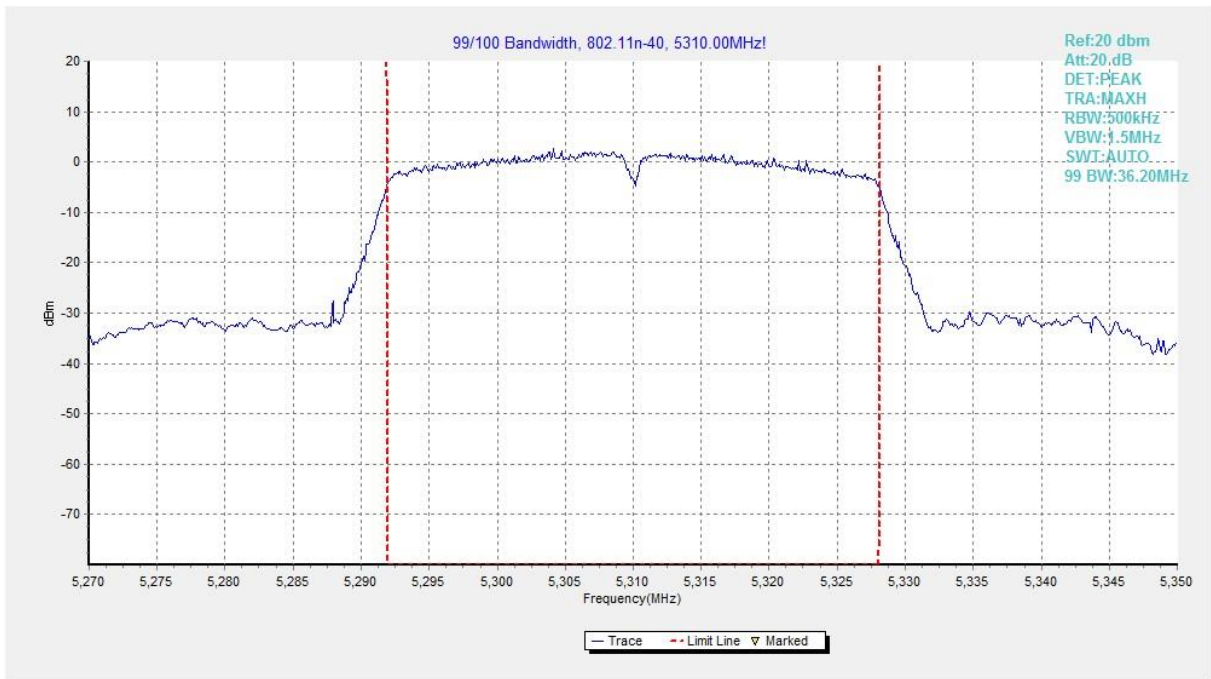
**Fig. 36 99% Occupied Bandwidth (802.11n-HT40, 5190MHz)**



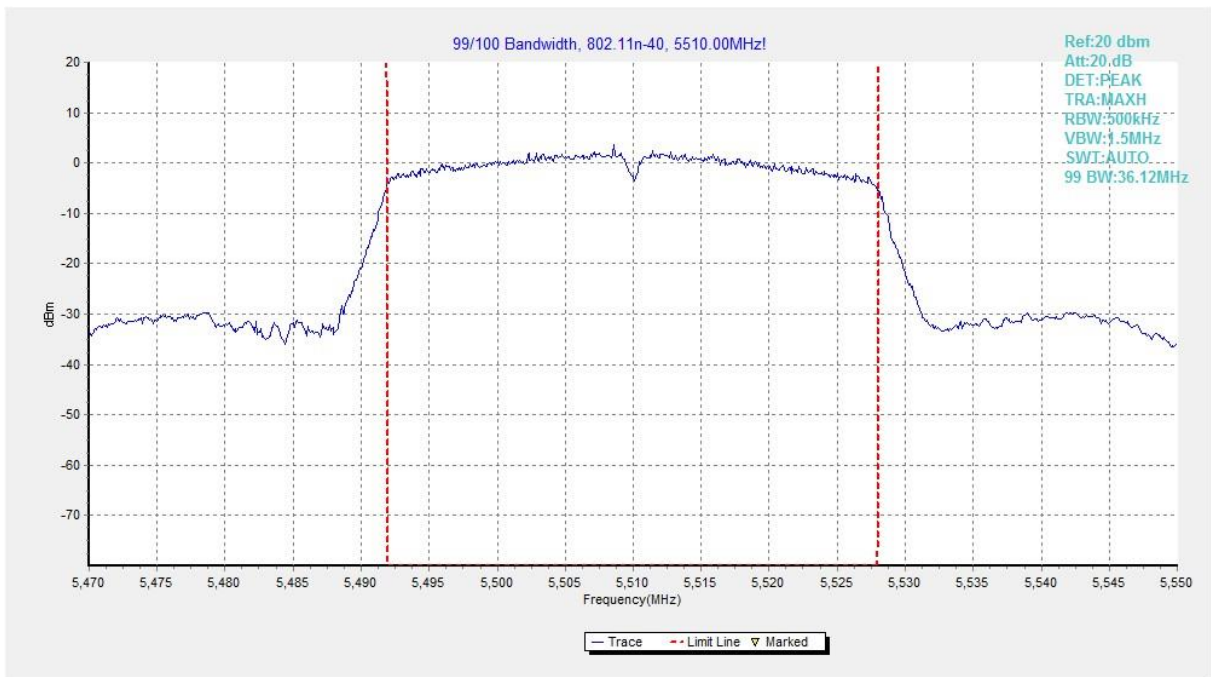
**Fig. 37 99% Occupied Bandwidth (802.11n-HT40, 5230MHz)**



**Fig. 38 99% Occupied Bandwidth (802.11n-HT40, 5270MHz)**

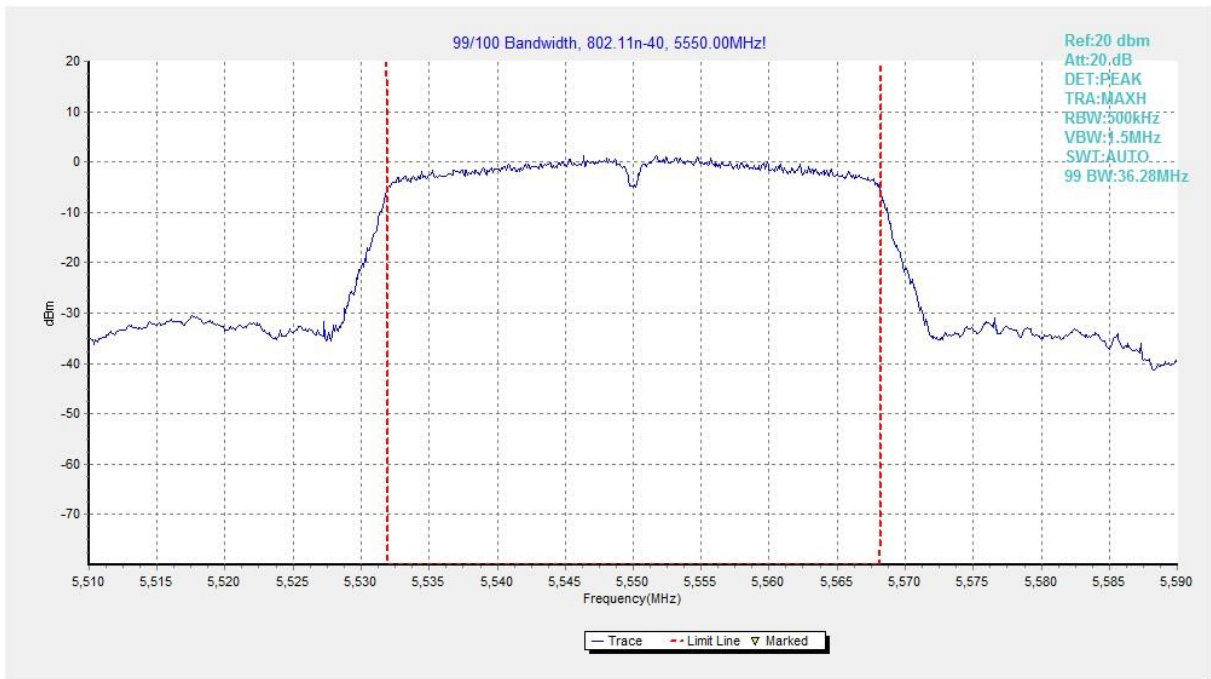


**Fig. 39 99% Occupied Bandwidth (802.11n-HT40, 5310MHz)**

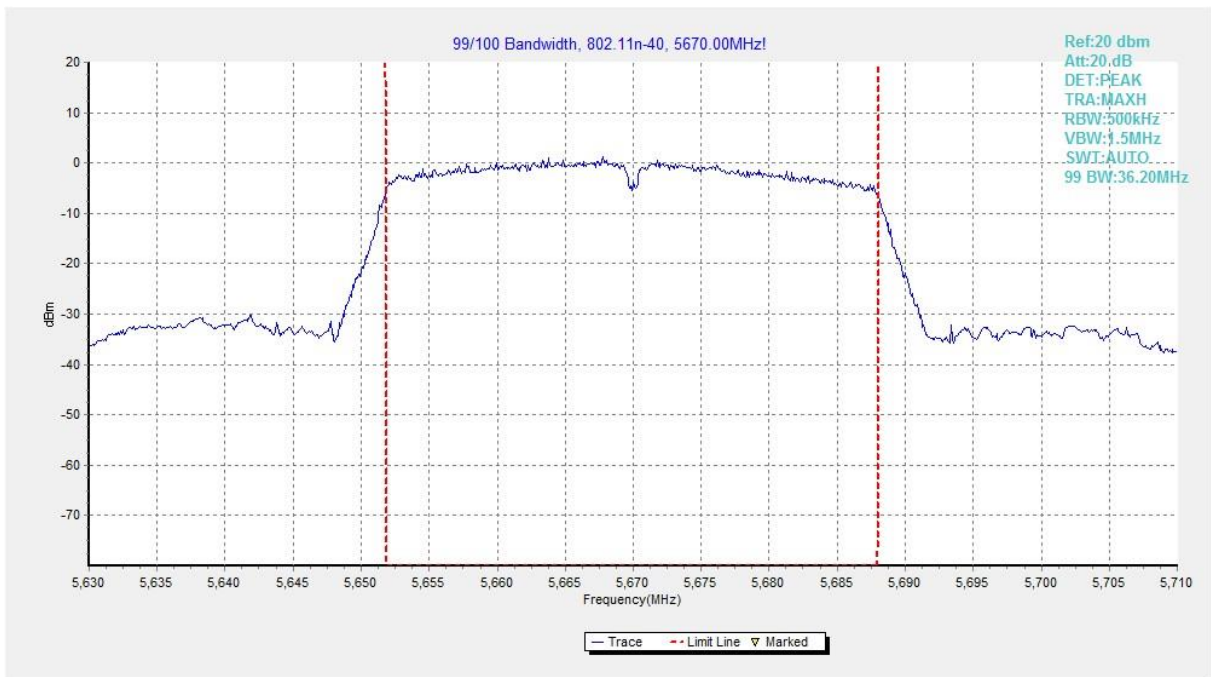


**Fig. 40 99% Occupied Bandwidth (802.11n-HT40, 5510MHz)**

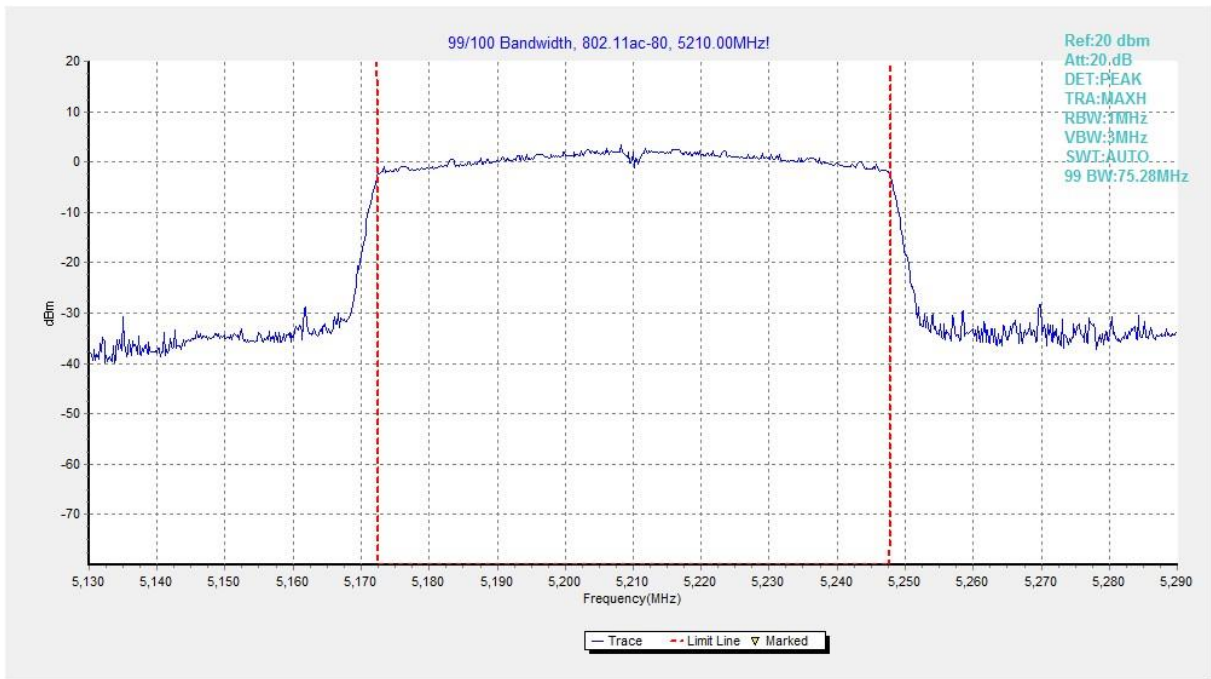




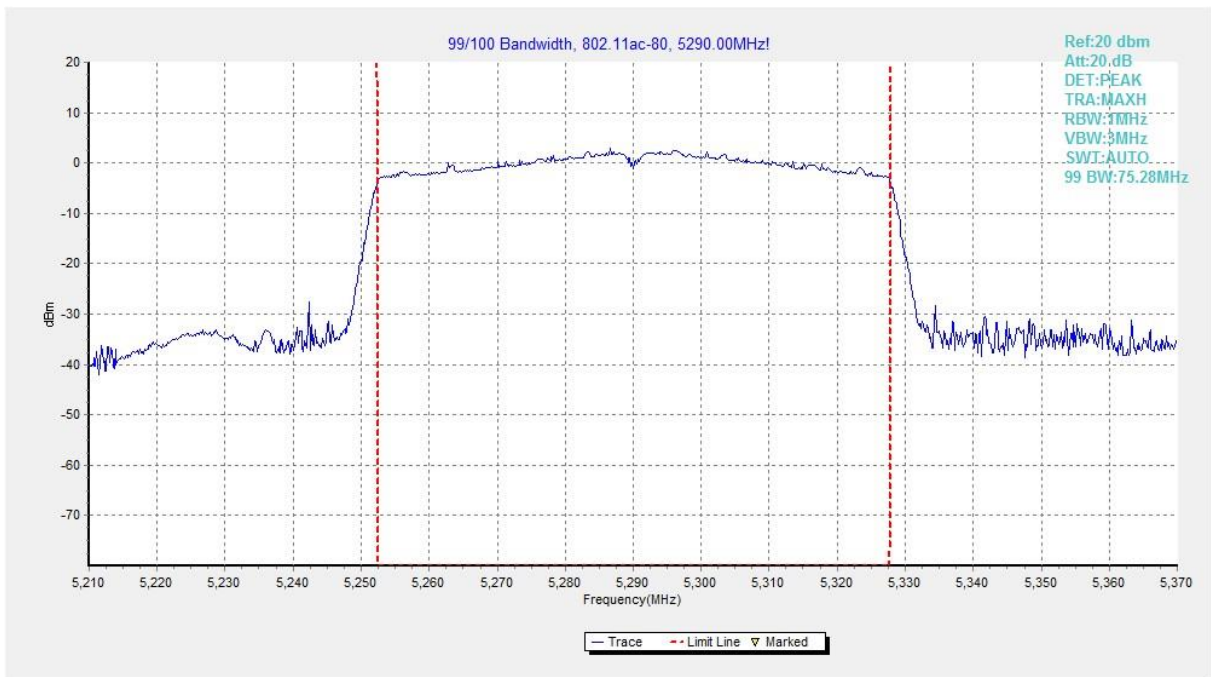
**Fig. 41 99% Occupied Bandwidth (802.11n-HT40, 5550MHz)**



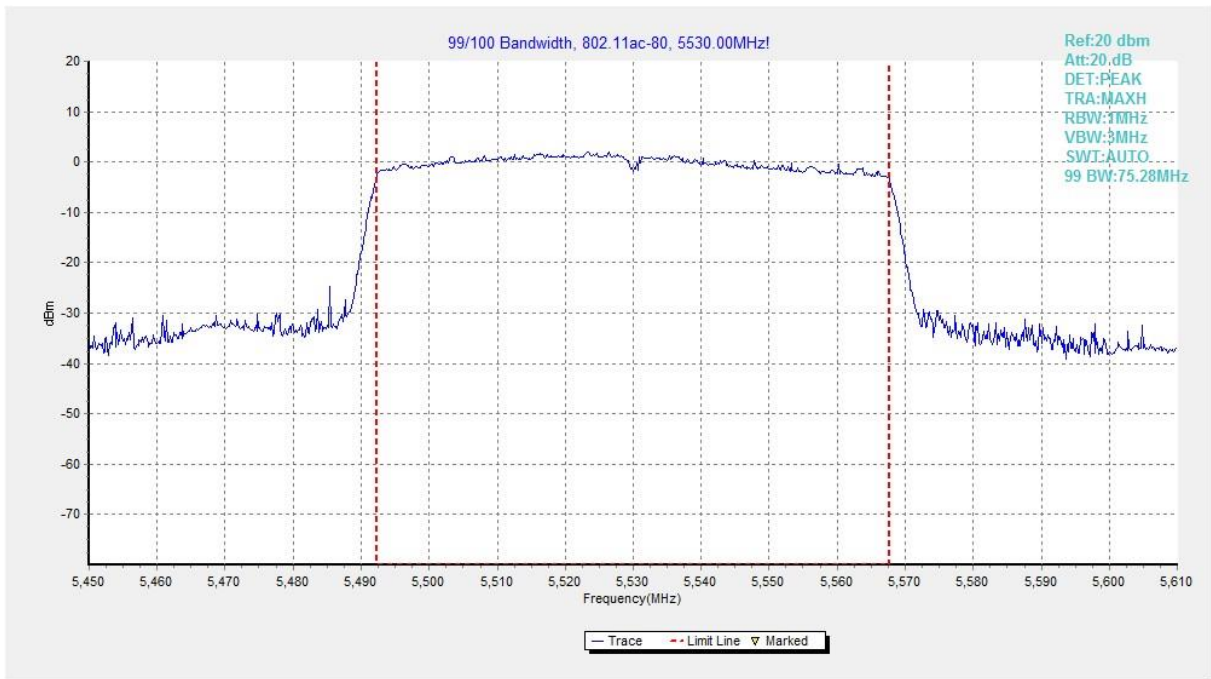
**Fig. 42 99% Occupied Bandwidth (802.11n-HT40, 5670MHz)**



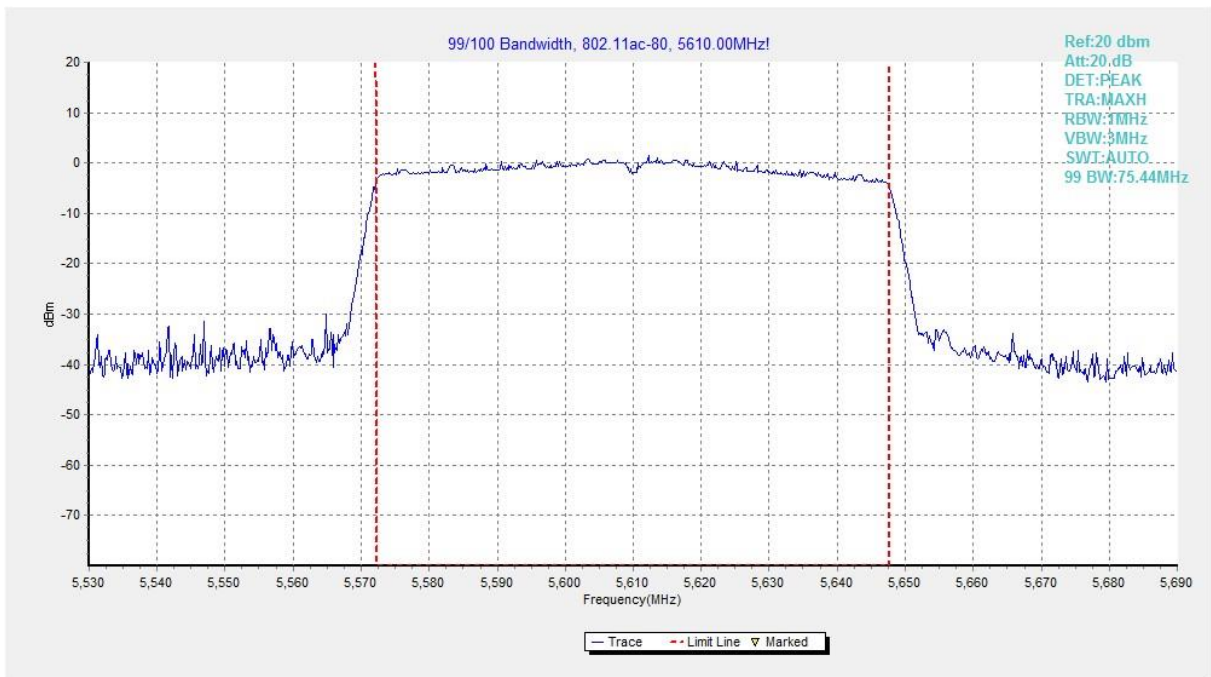
**Fig. 43 99% Occupied Bandwidth (802. 11ac-VHT80, 5210MHz)**



**Fig. 44 99% Occupied Bandwidth (802. 11ac-VHT80, 5290MHz)**



**Fig. 45 99% Occupied Bandwidth (802. 11ac-VHT80, 5530MHz)**



**Fig. 46 99% Occupied Bandwidth (802. 11ac-VHT80, 5610MHz)**

### A.7. Band Edges Compliance

#### Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5150MHz~5250MHz; 5250MHz~5350MHz; 5470MHz~5725MHz	< -27

Standard	Frequency (MHz)	Limit (dBuV/m)	
FCC 47 CFR Part 15.209	5725MHz~5850MHz	Peak	74
		Average	54

The measurement is made according to KDB 789033

#### Measurement Result:

Mode	Channel	Test Results	Conclusion
802.11a	5180 MHz(CH36)	Fig.47	P
	5320 MHz(CH64)	Fig.48	P
	5500 MHz(CH100)	Fig.49	P
	5700 MHz(CH140)	Fig.50	P
	5745 MHz(CH149)	Fig.51	P
	5825 MHz(CH165)	Fig.52	P
802.11n-HT40	5190 MHz(CH38)	Fig.53	P
	5310 MHz(CH62)	Fig.54	P
	5510 MHz(CH102)	Fig.55	P
	5670 MHz(CH134)	Fig.56	P
	5755 MHz(CH151)	Fig.57	P
	5795 MHz(CH159)	Fig.58	P
802.11ac-VHT80	5210 MHz(CH42)	Fig.59	P
	5290 MHz(CH58)	Fig.60	P
	5530 MHz(CH106)	Fig.61	P
	5775 MHz(CH155)	Fig.62	P

**Conclusion: PASS**

Test graphs as below:

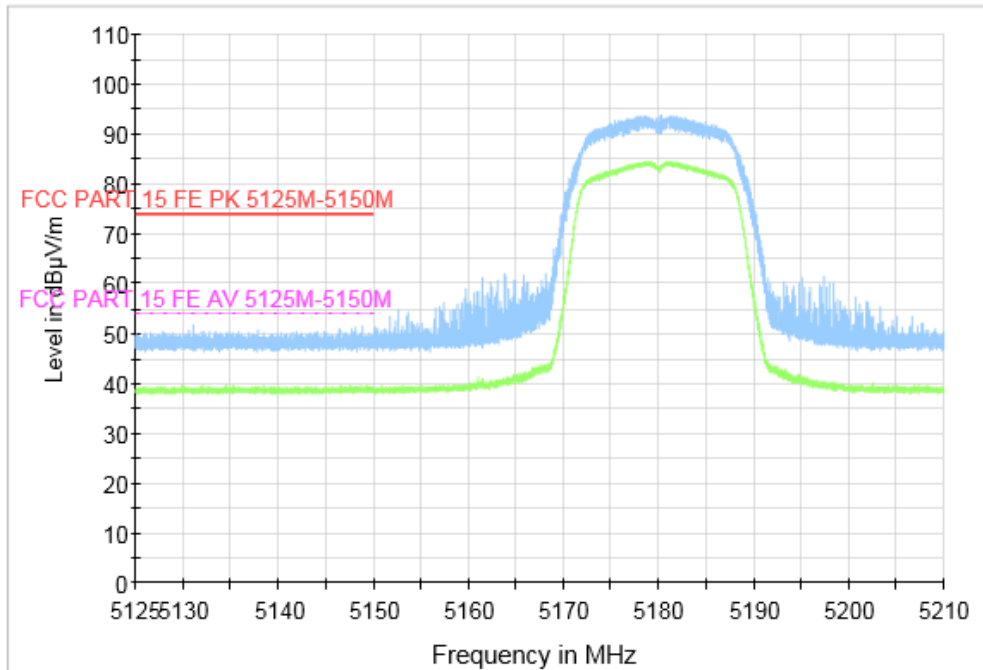


Fig. 47 Band Edges (802.11a, CH36 5180MHz)

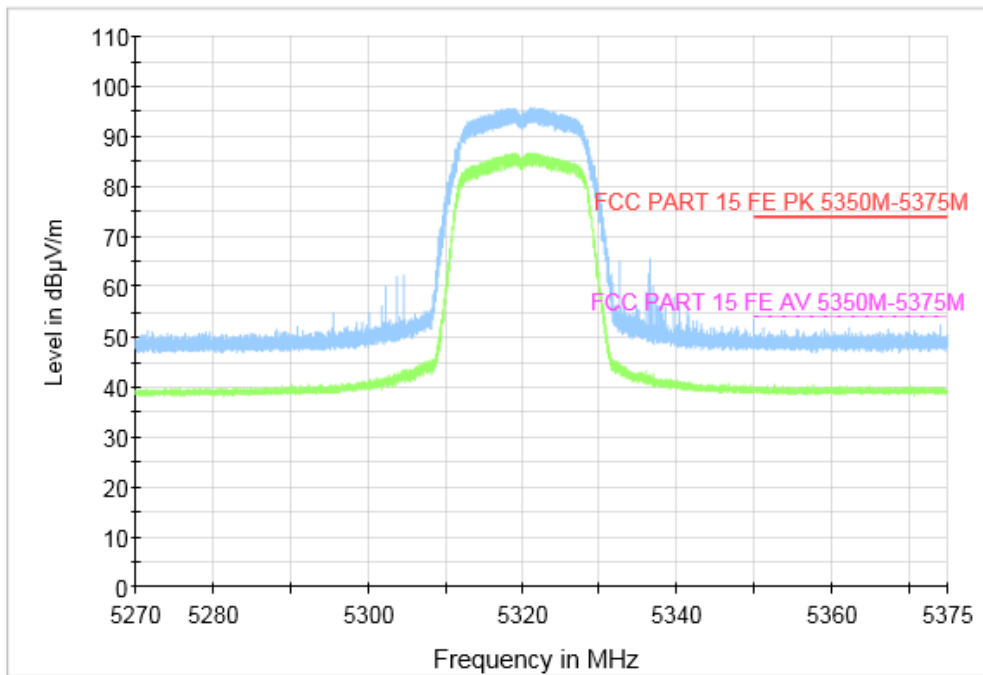
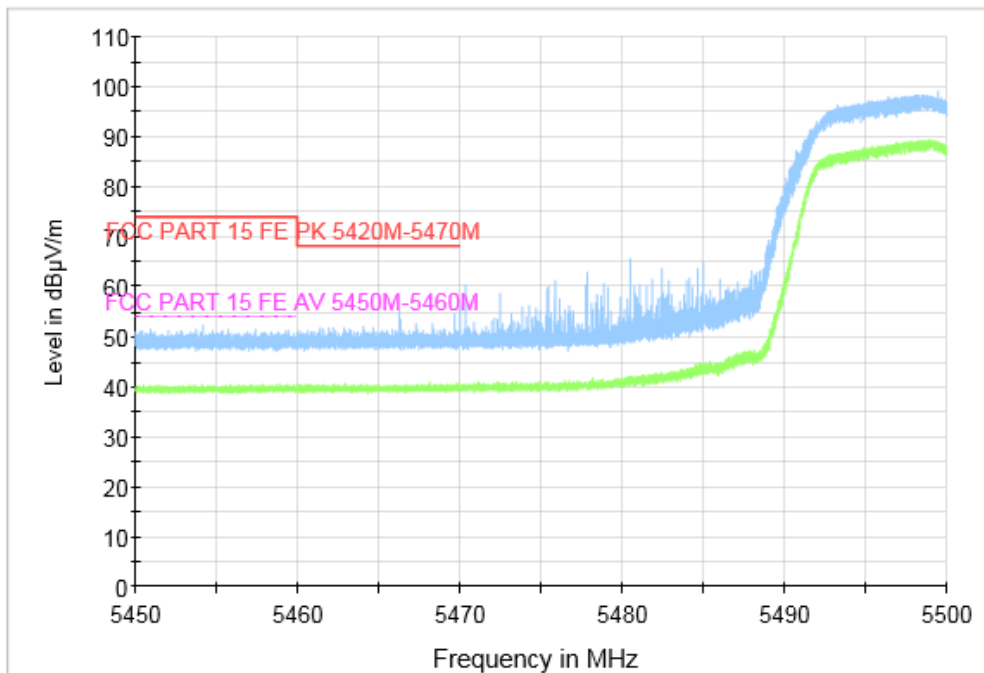
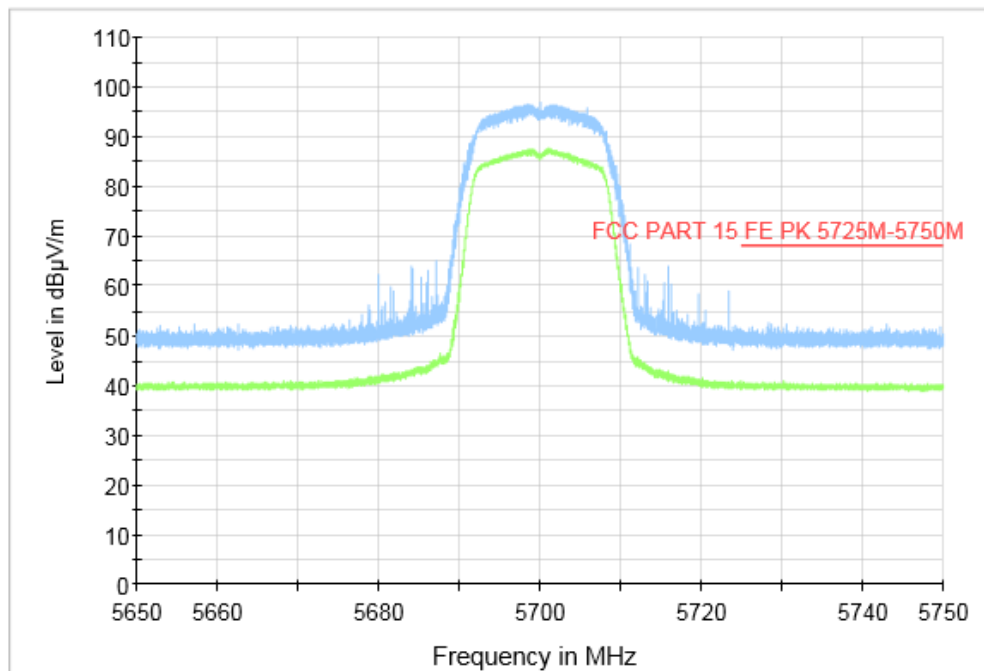


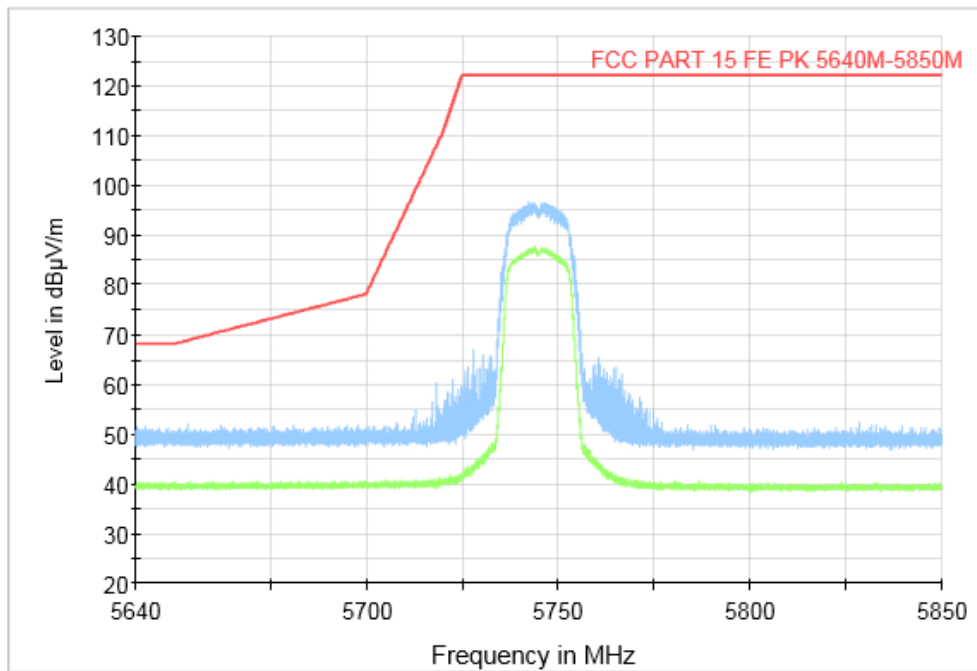
Fig. 48 Band Edges (802.11a, CH64 5320MHz)



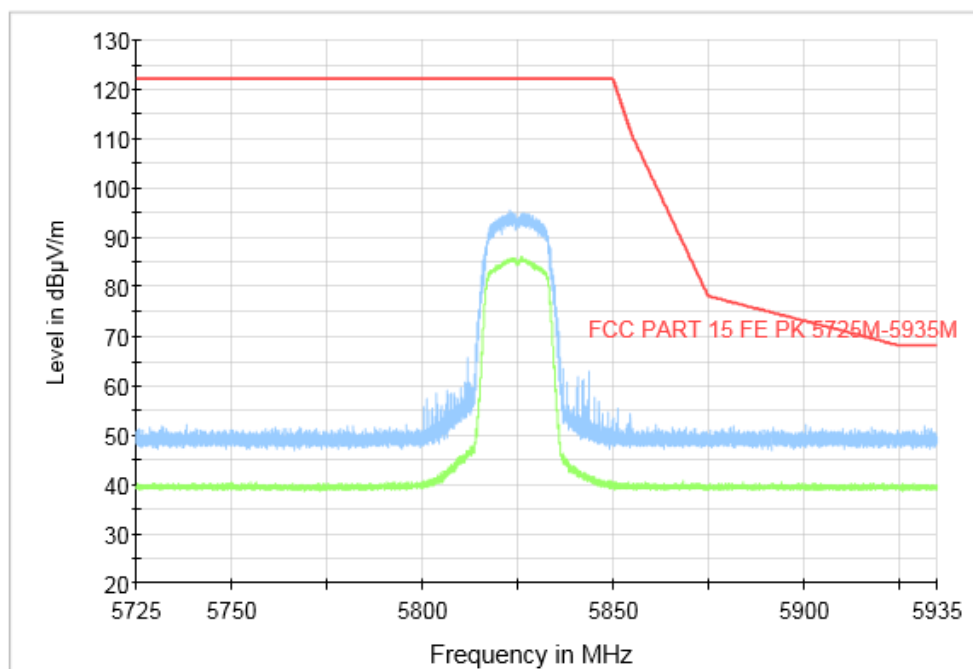
**Fig. 49 Band Edges (802.11a, CH100 5500MHz)**



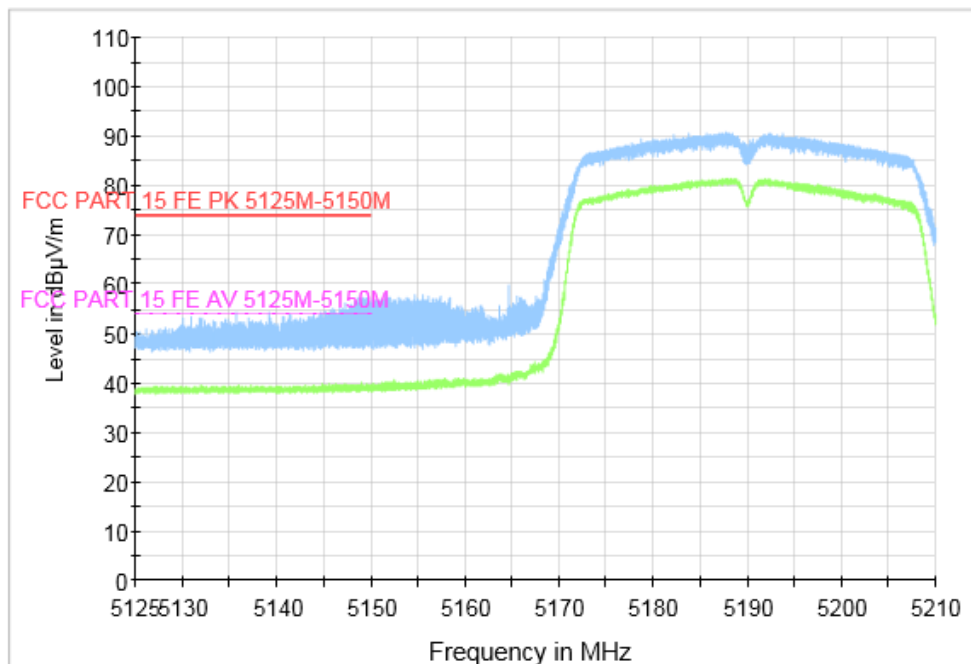
**Fig. 50 Band Edges (802.11a, CH140 5700MHz)**



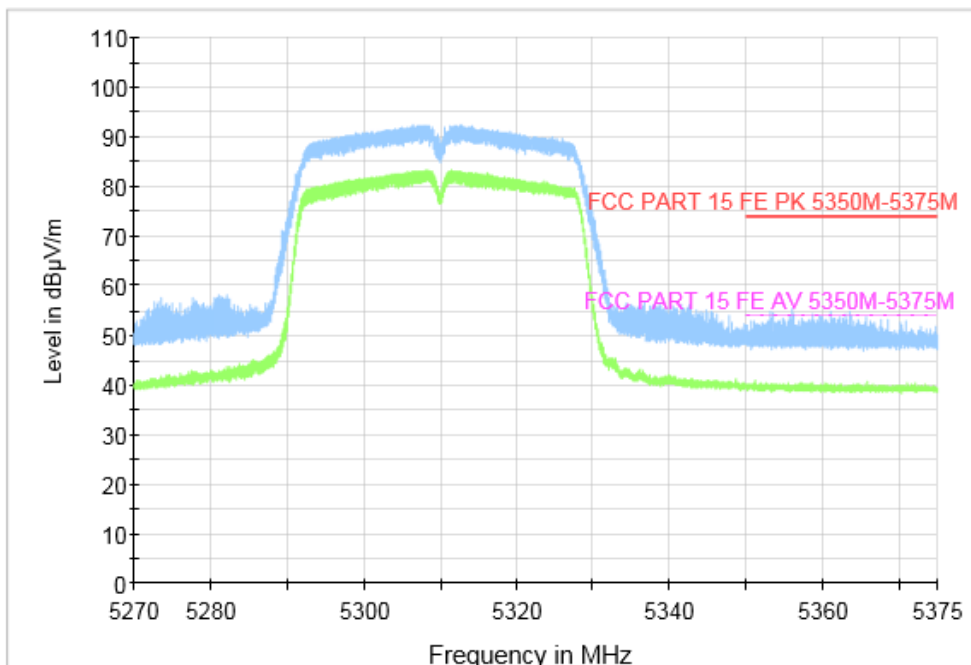
**Fig. 51 Band Edges (802.11a, CH149 5745MHz)**



**Fig. 52 Band Edges (802.11a, CH165 5825MHz)**

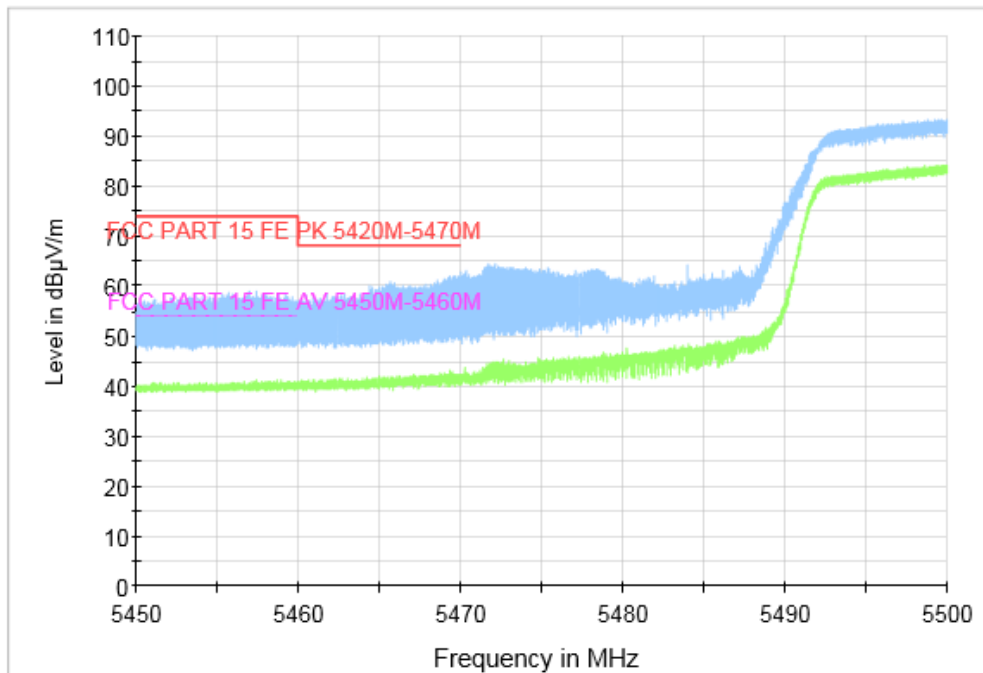


**Fig. 53 Band Edges (802.11n-HT40, CH38 5190MHz)**

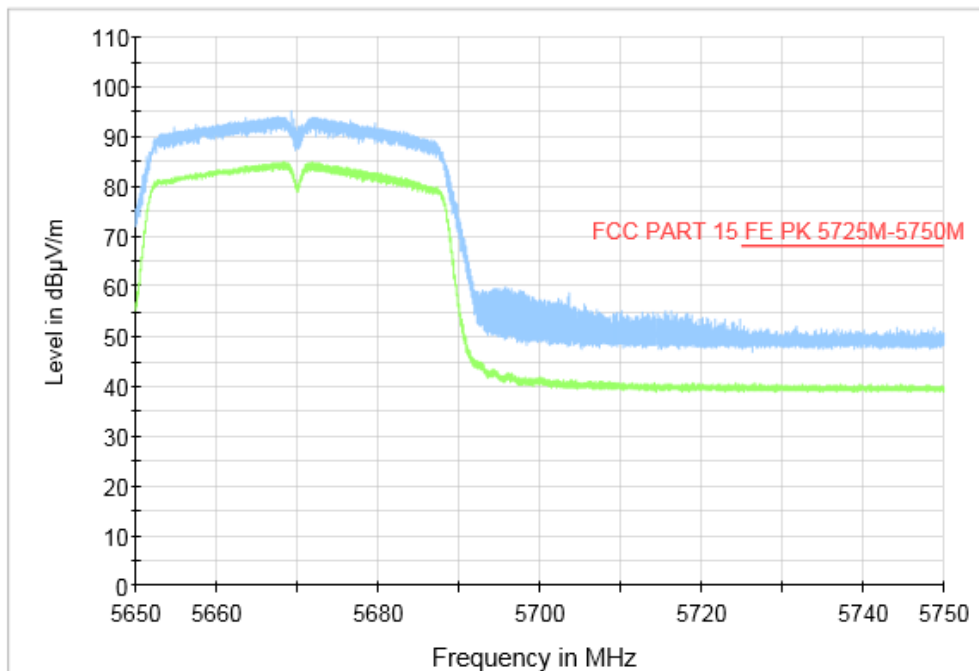


**Fig. 54 Band Edges (802.11n-HT40, CH62 5310MHz)**

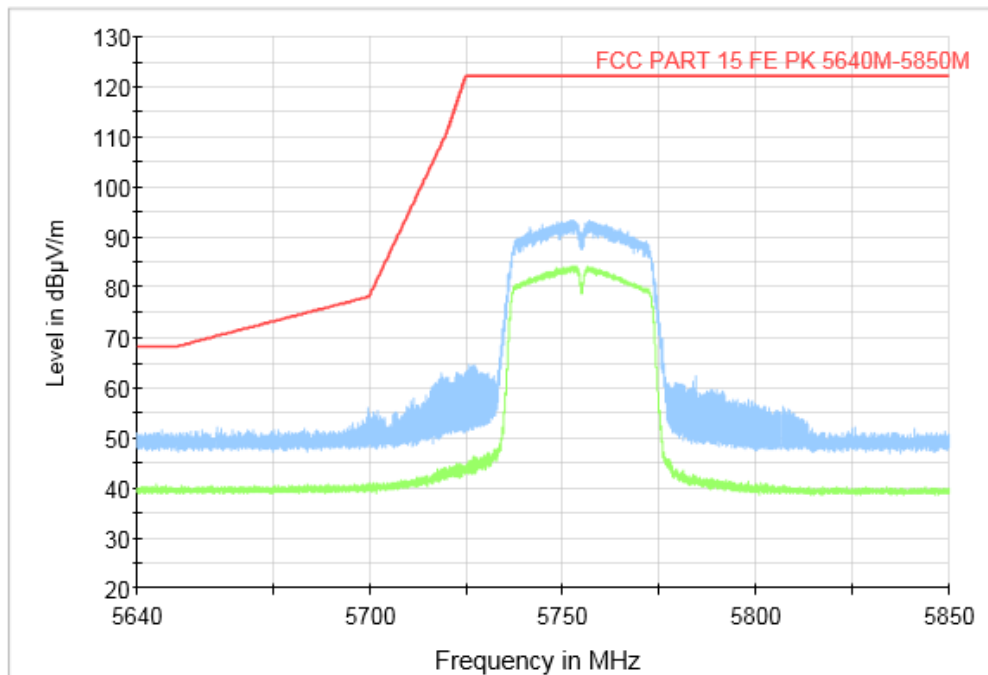




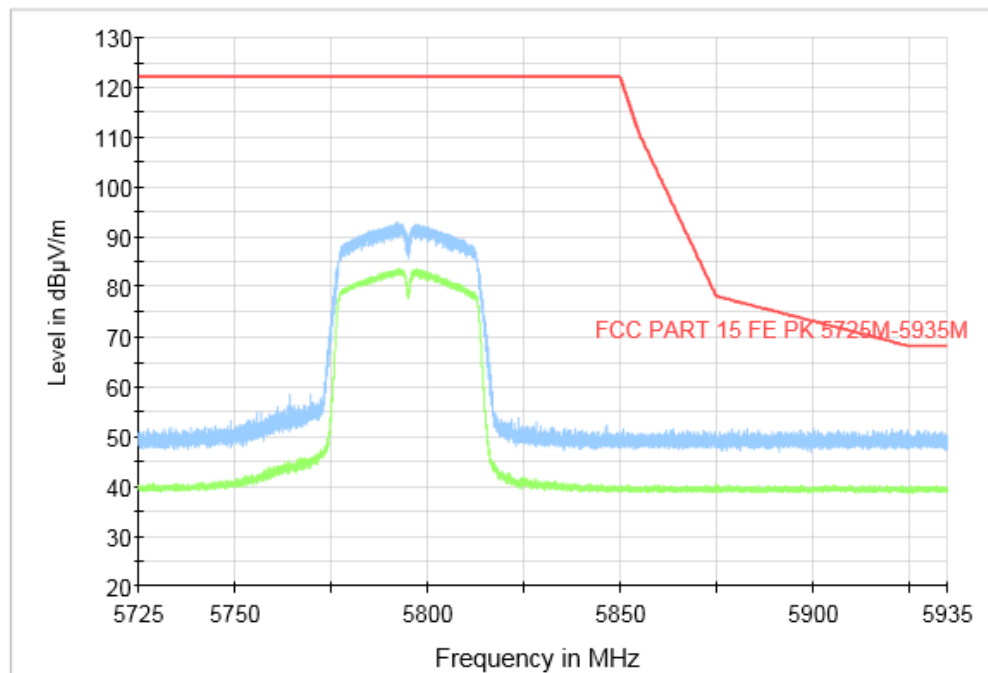
**Fig. 55 Band Edges (802.11n-HT40, CH102 5510MHz)**



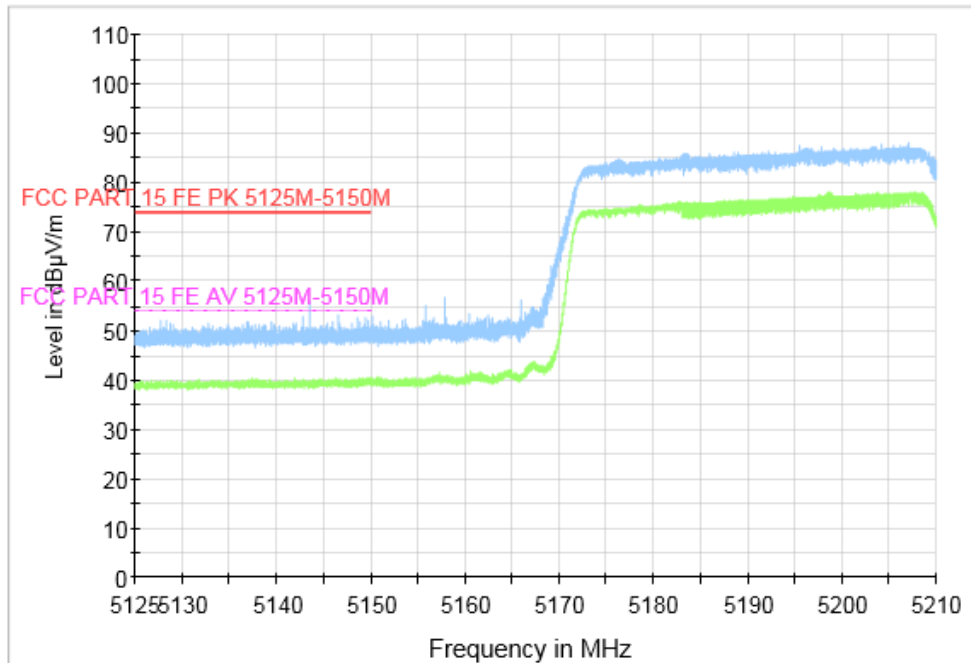
**Fig. 56 Band Edges (802.11n-HT40, CH134 5670MHz)**



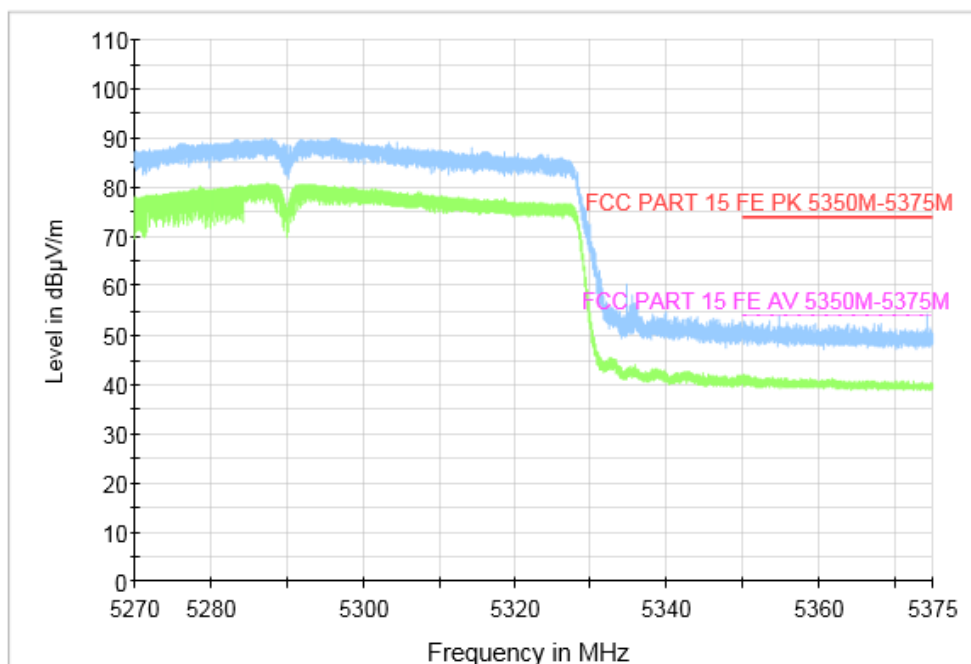
**Fig. 57 Band Edges (802.11n-HT40, CH151 5755MHz)**



**Fig. 58 Band Edges (802.11n-HT40, CH159 5795MHz)**



**Fig. 59 Band Edges (802.11ac-VHT80, CH42 5210MHz)**



**Fig. 60 Band Edges (802.11ac-VHT80, CH58 5290MHz)**

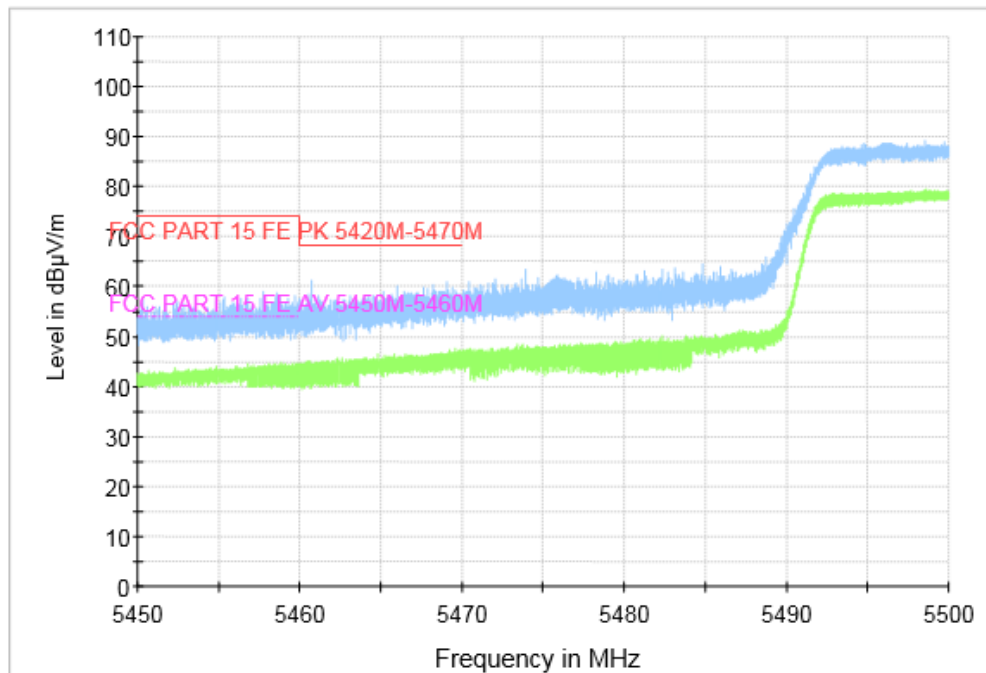


Fig. 61 Band Edges (802.11ac-VHT80, CH106 5530MHz)

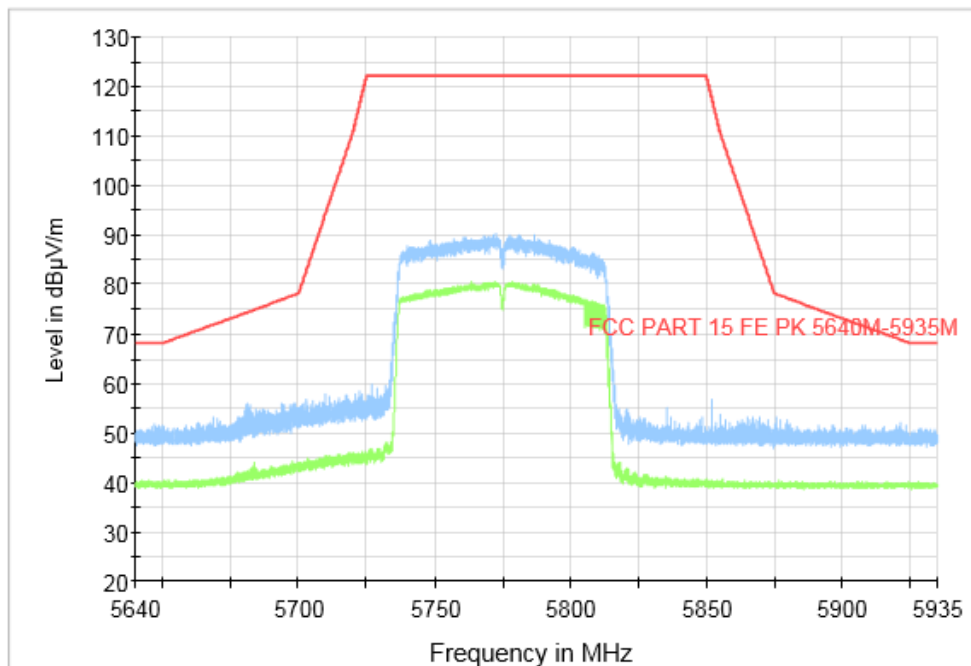


Fig. 62 Band Edges (802.11ac-VHT80, CH155 5775MHz)

## A.8. Transmitter Spurious Emission

### Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5150MHz~5250MHz; 5250MHz~5350MHz; 5470MHz~5725MHz	< -27

Standard	Frequency (MHz)	Limit (dBuV/m)	
FCC 47 CFR Part 15.209	5725MHz~5850MHz	Peak	74
		Average	54

The measurement is made according to KDB 789033.

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 (dB $\mu$ V/m)	Measurement distance (m)
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

Note: For frequency range below 960MHz, the limit in 15.209 is defined in 10m test distance. The limit used above is calculated from 10m to 3m.

### Measurement Result:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	5180MHz(Ch36)	3 GHz ~7 GHz	Fig.63	<b>P</b>
		7 GHz ~18 GHz	Fig.64	<b>P</b>
	5200MHz(Ch40)	3 GHz ~7 GHz	Fig.65	<b>P</b>
		7 GHz ~18 GHz	Fig.66	<b>P</b>
	5240MHz(Ch48)	3 GHz ~7 GHz	Fig.67	<b>P</b>
		7 GHz ~18 GHz	Fig.68	<b>P</b>
	5260MHz(Ch52)	3 GHz ~7 GHz	Fig.69	<b>P</b>
		7 GHz ~18 GHz	Fig.70	<b>P</b>
	5280MHz(Ch56)	3 GHz ~7 GHz	Fig.71	<b>P</b>
		7 GHz ~18 GHz	Fig.72	<b>P</b>
	5320MHz(Ch64)	3 GHz ~7 GHz	Fig.73	<b>P</b>
		7 GHz ~18 GHz	Fig.74	<b>P</b>
	5500MHz(Ch100)	3 GHz ~7 GHz	Fig.75	<b>P</b>
		7 GHz ~18 GHz	Fig.76	<b>P</b>
	5600MHz(Ch120)	3 GHz ~7 GHz	Fig.77	<b>P</b>

		7 GHz ~18 GHz	Fig.78	P
	5700MHz(Ch140)	3 GHz ~7 GHz	Fig.79	P
		7 GHz ~18 GHz	Fig.80	P
	5745MHz(Ch149)	3 GHz ~7 GHz	Fig.81	P
		7 GHz ~18 GHz	Fig.82	P
	5785MHz(Ch157)	3 GHz ~7 GHz	Fig.83	P
		7 GHz ~18 GHz	Fig.84	P
	5825MHz(Ch165)	3 GHz ~7 GHz	Fig.85	P
		7 GHz ~18 GHz	Fig.86	P
802.11n- HT40	5190MHz(Ch38)	3 GHz ~7 GHz	Fig.87	P
		7 GHz ~18 GHz	Fig.88	P
	5230MHz(Ch46)	3 GHz ~7 GHz	Fig.89	P
		7 GHz ~18 GHz	Fig.90	P
	5270MHz(Ch54)	3 GHz ~7 GHz	Fig.91	P
		7 GHz ~18 GHz	Fig.92	P
	5310MHz(Ch62)	3 GHz ~7 GHz	Fig.93	P
		7 GHz ~18 GHz	Fig.94	P
	5510MHz(Ch102)	3 GHz ~7 GHz	Fig.95	P
		7 GHz ~18 GHz	Fig.96	P
	5580MHz(Ch118)	3 GHz ~7 GHz	Fig.97	P
		7 GHz ~18 GHz	Fig.98	P
	5670MHz(Ch134)	3 GHz ~7 GHz	Fig.99	P
		7 GHz ~18 GHz	Fig.100	P
	5755MHz(Ch151)	3 GHz ~7 GHz	Fig.101	P
		7 GHz ~18 GHz	Fig.102	P
5795MHz(Ch159)	3 GHz ~7 GHz	Fig.103	P	
	7 GHz ~18 GHz	Fig.104	P	
802.11a- VHT80	5210MHz(Ch42)	3 GHz ~7 GHz	Fig.105	P
		7 GHz ~18 GHz	Fig.106	P
	5290MHz(Ch58)	3 GHz ~7 GHz	Fig.107	P
		7 GHz ~18 GHz	Fig.108	P
	5530MHz(Ch106)	3 GHz ~7 GHz	Fig.109	P
		7 GHz ~18 GHz	Fig.110	P
	5610MHz(Ch122)	3 GHz ~7 GHz	Fig.111	P
		7 GHz ~18 GHz	Fig.112	P
5775MHz(Ch155)	3 GHz ~7 GHz	Fig.113	P	
	7 GHz ~18 GHz	Fig.114	P	
All channels		30 MHz ~1 GHz	Fig.115	P
		1 GHz ~3 GHz	Fig.116	P
		18 GHz ~26.5 GHz	Fig.117	P
		26.5GHz~40GHz	Fig.118	P

**Worst Case Result**
**802.11a CH36**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12982.533333	47.53	68.20	20.67	H	8.3
13574.700000	47.73	68.20	20.47	H	8.6
14165.033333	48.65	68.20	19.55	V	10.7
14862.066667	48.76	68.20	19.44	H	10.9
16719.233333	52.26	68.20	15.94	V	14.9
17612.433333	51.40	68.20	16.80	H	15.6

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
10848.166667	34.14	54.00	19.86	H	5.3
11676.100000	35.09	54.00	18.91	H	7.0
12523.466667	35.76	54.00	18.24	V	8.0
15501.900000	37.10	54.00	16.90	H	11.9
15947.033333	38.07	54.00	15.93	H	13.3
17961.866667	39.77	54.00	14.23	H	16.1

**802.11a CH52**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12966.033333	46.91	68.20	21.29	H	8.5
13917.900000	48.01	68.20	20.19	H	9.4
14276.133333	48.19	68.20	20.01	H	10.9
15060.433333	48.39	68.20	19.81	H	11.1
16705.300000	51.21	68.20	16.99	H	14.9
17350.633333	50.81	68.20	17.39	V	14.7

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
10921.133333	33.75	54.00	20.25	H	5.2
11418.333333	33.74	54.00	20.26	H	5.6
11941.566667	34.97	54.00	19.03	H	7.0
12472.500000	35.00	54.00	19.00	H	7.9
15900.833333	37.84	54.00	16.16	H	13.2
17953.066667	39.50	54.00	14.50	H	16.1

**802.11a CH100**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12942.933333	47.70	68.20	20.50	H	8.6
13707.433333	45.97	68.20	22.23	H	8.6
14107.100000	47.77	68.20	20.43	H	10.3
14926.966667	47.46	68.20	20.74	H	11.2
16577.333333	50.28	68.20	17.92	V	14.8
17228.900000	50.11	68.20	18.09	H	14.8

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
10995.933333	33.07	54.00	20.93	V	5.1
11431.166667	33.08	54.00	20.92	H	5.7
11941.566667	34.42	54.00	19.58	V	7.0
12486.066667	34.57	54.00	19.43	V	8.0
15903.766667	37.13	54.00	16.87	H	13.2
17961.866667	38.57	54.00	15.43	H	16.1

**802.11a CH149**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12965.300000	46.82	68.20	21.38	V	8.5
13658.666667	46.46	68.20	21.74	V	8.5
14137.533333	48.03	68.20	20.17	V	10.5
15064.466667	47.68	68.20	20.52	V	11.1
16621.333333	49.91	68.20	18.29	H	14.9
17131.366667	50.65	68.20	17.55	V	15.0

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
11260.300000	33.24	54.00	20.76	V	5.5
11729.266667	33.91	54.00	20.09	H	6.8
12360.666667	34.26	54.00	19.74	H	7.5
15524.266667	35.67	54.00	18.33	H	12.0
15914.400000	37.23	54.00	16.77	H	13.3
17986.433333	38.40	54.00	15.60	V	15.9



**802.11n HT40 CH38**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12941.100000	47.11	68.20	21.09	V	8.6
13774.533333	45.99	68.20	22.21	V	8.6
14205.733333	47.92	68.20	20.28	V	10.9
15089.400000	48.37	68.20	19.83	V	11.2
16571.833333	50.61	68.20	17.59	H	14.8
17209.100000	50.38	68.20	17.82	V	14.8

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
11147.366667	32.86	54.00	21.14	V	5.1
11626.233333	34.18	54.00	19.82	V	6.9
12363.600000	34.37	54.00	19.63	H	7.4
15552.866667	35.74	54.00	18.26	H	11.8
16101.033333	37.79	54.00	16.21	H	14.0
17932.166667	39.06	54.00	14.94	V	16.1

**802.11n HT40 CH54**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12966.400000	46.63	68.20	21.57	H	8.5
13751.433333	45.89	68.20	22.31	V	8.7
14227.000000	47.86	68.20	20.34	H	11.0
15082.800000	48.18	68.20	20.02	V	11.2
17040.433333	50.78	68.20	17.42	V	15.0
17602.533333	51.43	68.20	16.77	H	15.5

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
11258.833333	33.50	54.00	20.50	H	5.5
11745.033333	33.93	54.00	20.07	H	6.9
12341.966667	34.39	54.00	19.61	H	7.3
15694.033333	36.13	54.00	17.87	H	12.3
16135.500000	38.02	54.00	15.98	H	14.2
17960.033333	39.00	54.00	15.00	V	16.1

**802.11n HT40 CH102**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12947.700000	46.69	68.20	21.51	V	8.6
13778.566667	46.14	68.20	22.06	H	8.7
14200.966667	47.98	68.20	20.22	V	10.9
15030.733333	47.76	68.20	20.44	H	10.9
16628.300000	50.47	68.20	17.73	H	14.9
17372.266667	50.42	68.20	17.78	H	14.6

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
10929.566667	33.05	54.00	20.95	H	5.1
11428.966667	33.53	54.00	20.47	V	5.7
12139.566667	34.83	54.00	19.17	V	7.3
15696.233333	35.99	54.00	18.01	V	12.3
15975.633333	37.46	54.00	16.54	V	13.4
17935.100000	39.04	54.00	14.96	H	16.1

**802.11n HT40 CH151**

Frequency (MHz)	Max Peak (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
12921.300000	46.66	68.20	21.54	H	8.6
13677.000000	46.23	68.20	21.97	V	8.5
14186.666667	47.89	68.20	20.31	V	10.9
15081.333333	47.46	68.20	20.74	H	11.2
16605.933333	49.88	68.20	18.32	H	14.8
17251.633333	50.34	68.20	17.86	H	14.8

Frequency (MHz)	Average (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Pol	Corr. (dB)
11211.900000	33.43	54.00	20.57	V	5.4
11687.100000	34.29	54.00	19.71	V	7.1
12278.533333	34.13	54.00	19.87	H	7.1
15552.133333	35.84	54.00	18.16	H	11.8
16106.166667	37.82	54.00	16.18	H	14.0
17954.533333	39.26	54.00	14.74	H	16.1

**802.11ac VHT80 CH42**

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12989.500000	46.93	68.20	21.27	V	8.3
13763.900000	46.71	68.20	21.49	V	8.6
14177.866667	48.91	68.20	19.29	H	10.8
14939.800000	46.97	68.20	21.23	H	11.1
16656.166667	49.98	68.20	18.22	H	14.9
17371.533333	50.25	68.20	17.95	V	14.6

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8336.133333	34.19	54.00	19.81	H	3.1
11691.133333	34.69	54.00	19.31	H	7.1
12301.266667	34.24	54.00	19.76	H	7.1
15577.433333	35.41	54.00	18.59	H	11.8
15933.833333	37.49	54.00	16.51	H	13.4
17935.100000	39.72	54.00	14.28	V	16.1

**802.11ac VHT80 CH106**

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
12968.233333	46.86	68.20	21.34	H	8.5
13653.533333	45.99	68.20	22.21	H	8.6
14058.333333	48.71	68.20	19.49	V	9.8
14819.533333	48.46	68.20	19.74	V	10.7
16508.766667	52.16	68.20	16.04	V	14.7
17370.433333	50.59	68.20	17.61	H	14.6

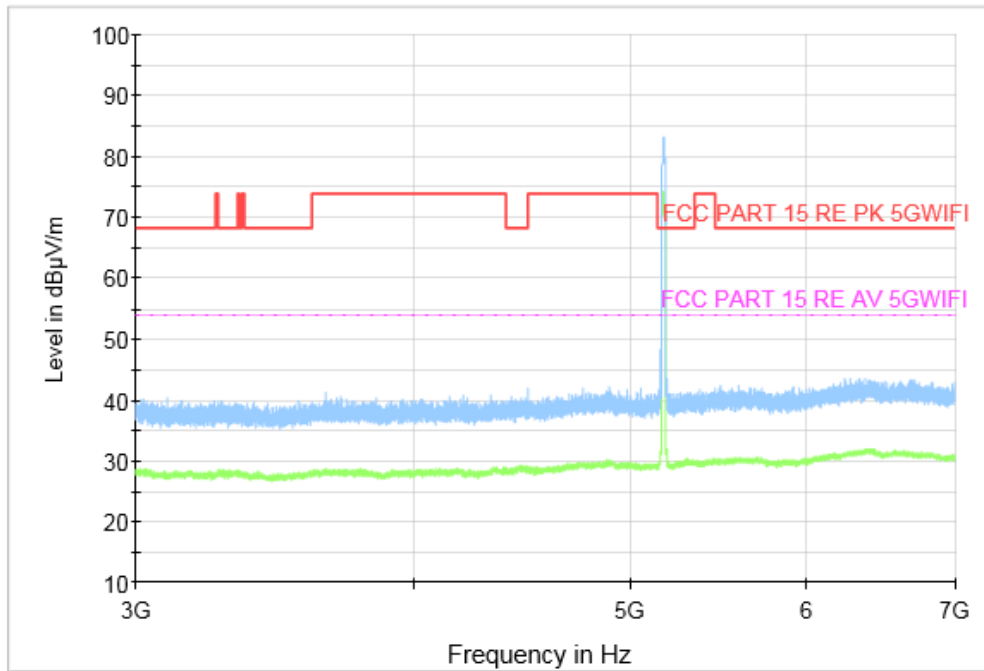
Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
10923.333333	33.43	54.00	20.57	V	5.2
11556.200000	34.43	54.00	19.57	V	6.5
12146.533333	34.96	54.00	19.04	H	7.3
15619.233333	35.71	54.00	18.29	H	11.8
16001.666667	37.36	54.00	16.64	H	13.4
17917.500000	39.27	54.00	14.73	V	16.2

**Note:**

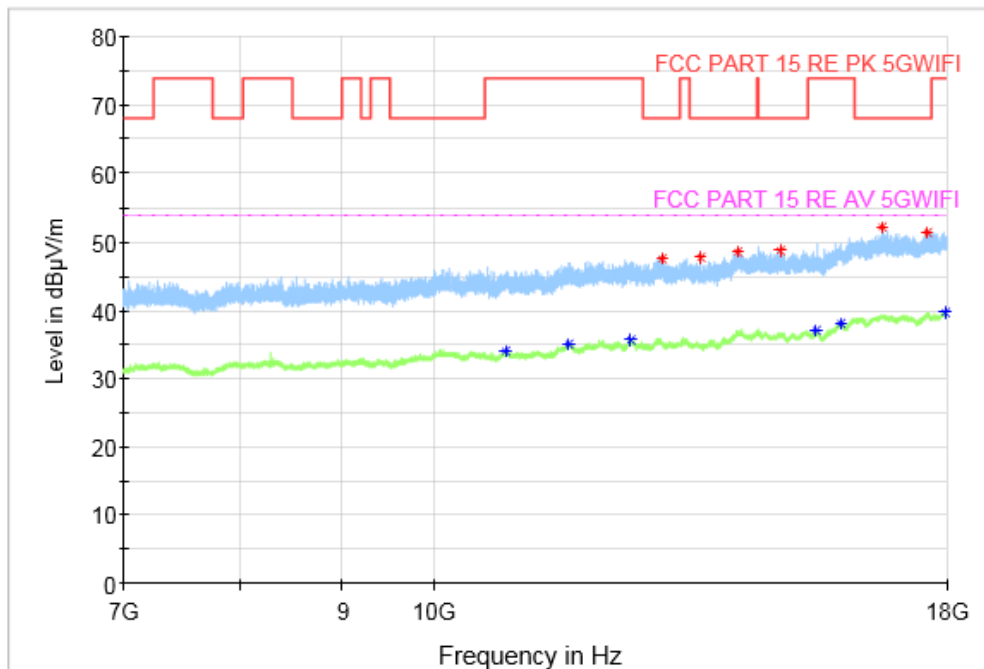
A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss", and including the gain of receive antenna, the gain of the preamplifier, the cable loss.  $P_{Mea}$  is the field strength recorded from the instrument. The measurement results are obtained as described below:

$$\text{Result} = P_{Mea} + A_{Rpl} = P_{Mea} + \text{Cable Loss} + \text{Antenna Factor}$$

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



**Fig. 63 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 3 GHz-7 GHz)**



**Fig. 64 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 7 GHz-18 GHz)**

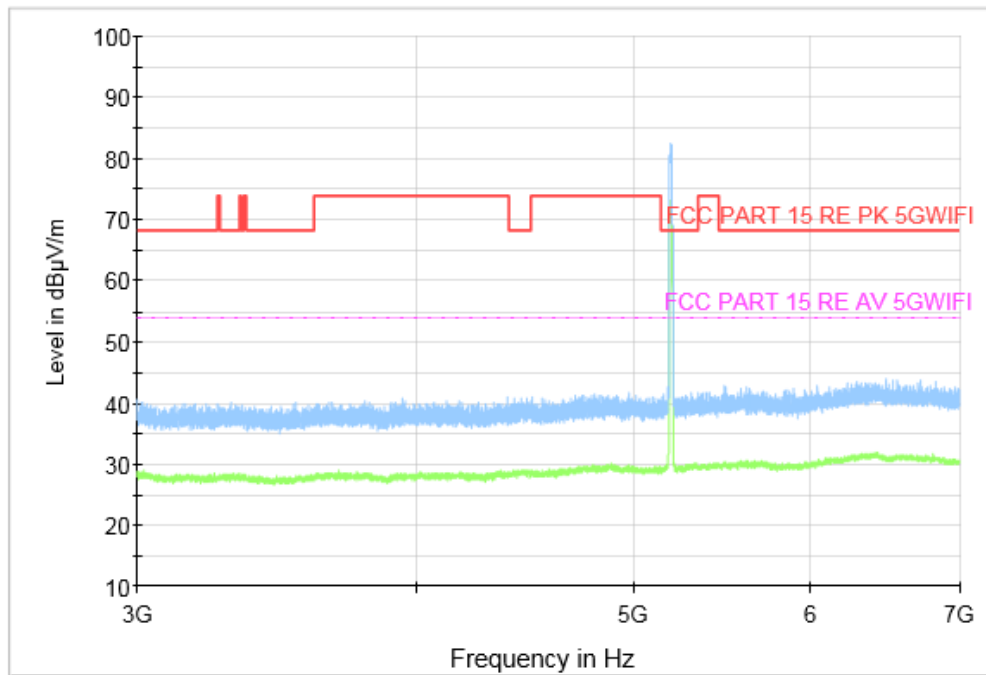


Fig. 65 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 3 GHz-7 GHz)

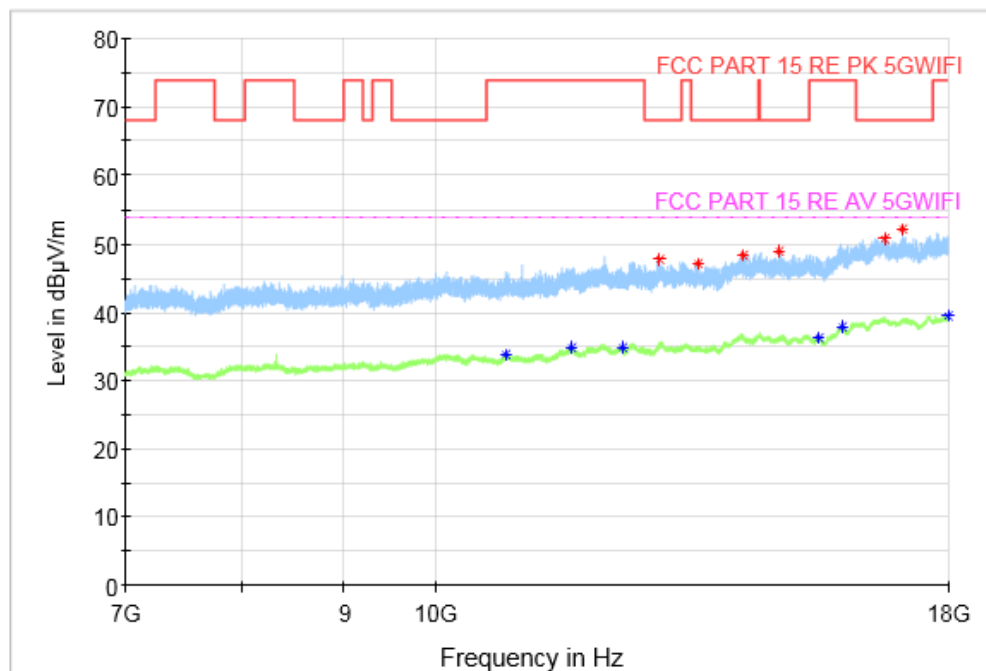


Fig. 66 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 7 GHz-18 GHz)

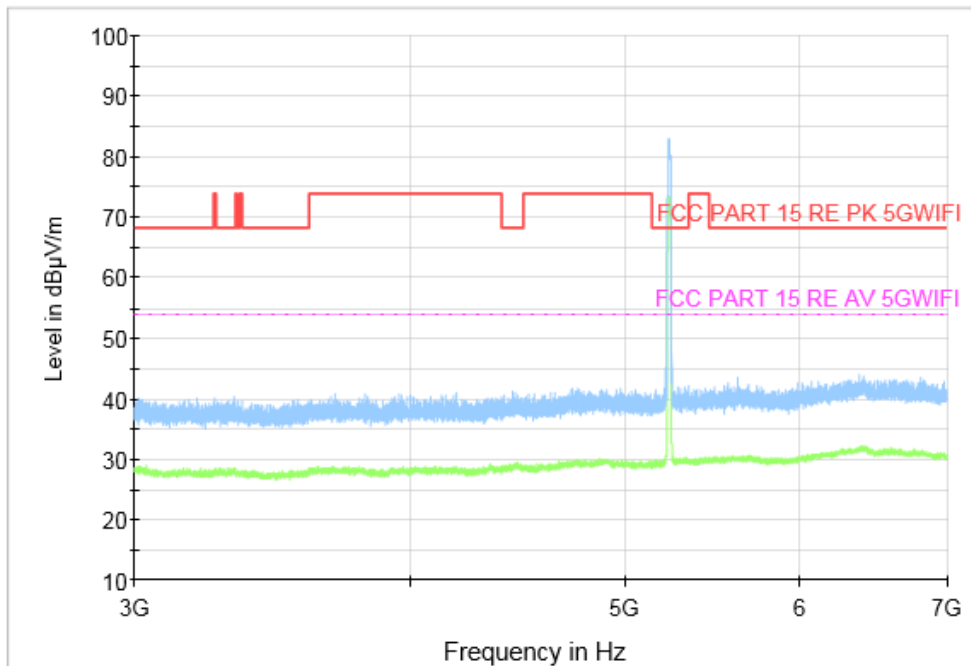


Fig. 67 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 3 GHz-7 GHz)

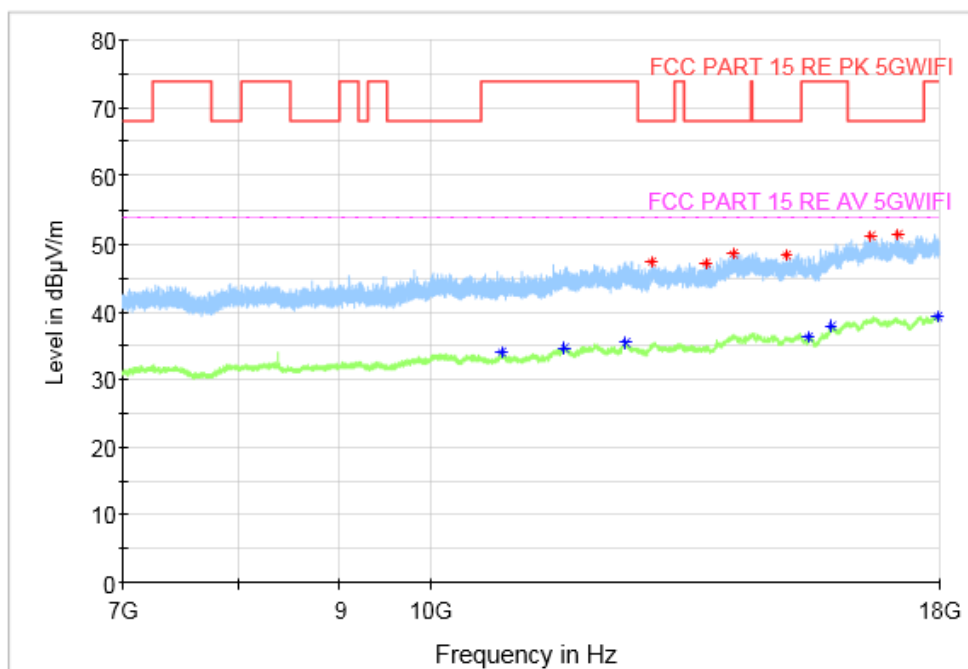
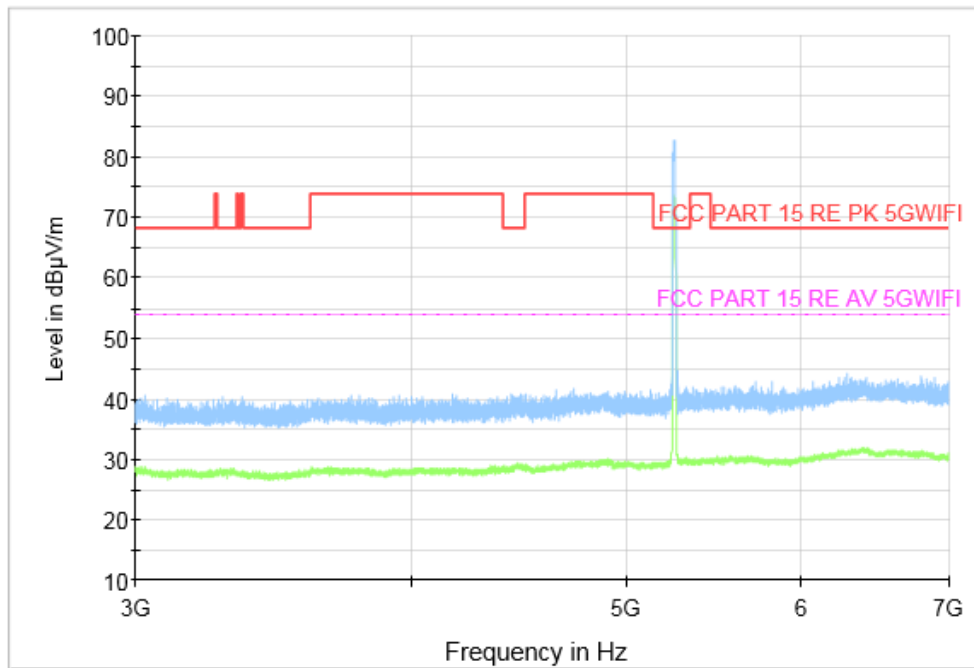
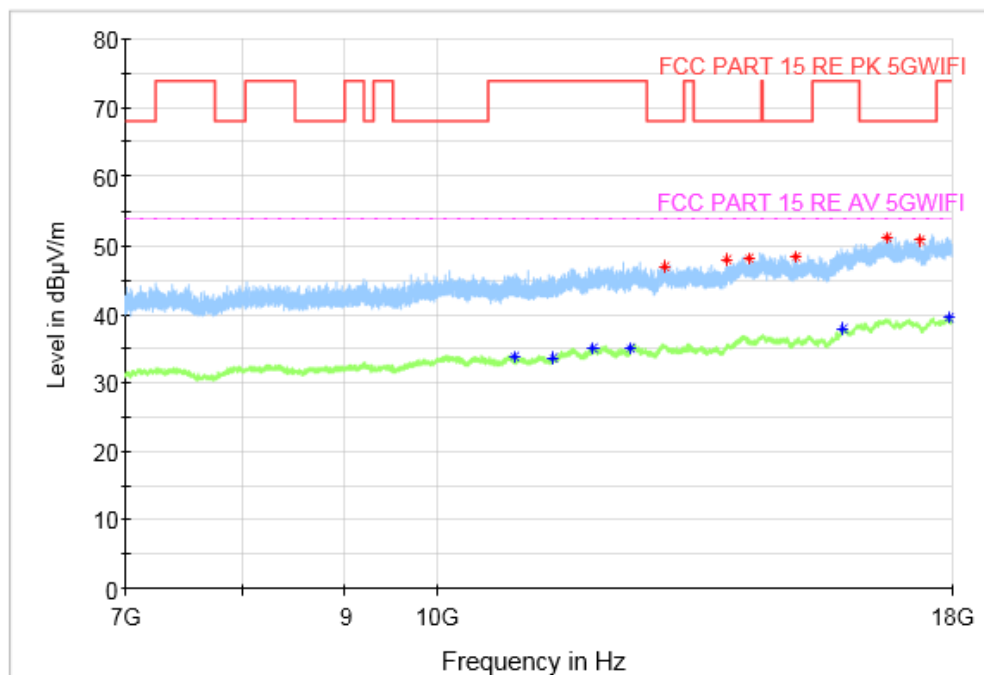


Fig. 68 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 7 GHz-18 GHz)



**Fig. 69 Transmitter Spurious Emission (802.11a, CH52 5260MHz, 3 GHz-7 GHz)**



**Fig. 70 Transmitter Spurious Emission (802.11a, CH52 5260MHz, 7 GHz-18 GHz)**

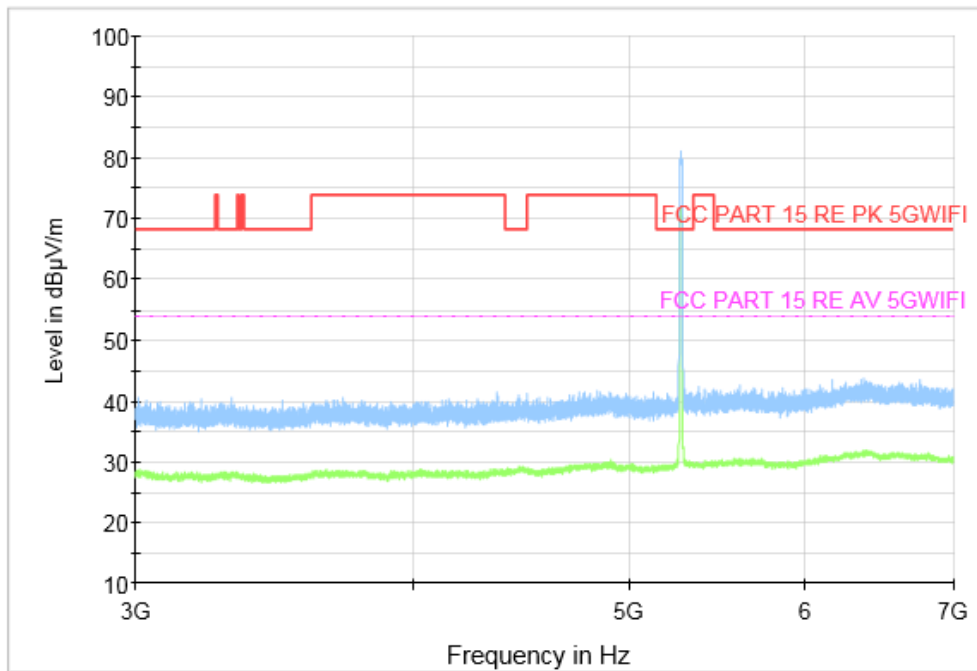


Fig. 71 Transmitter Spurious Emission (802.11a, CH56 5280MHz, 3 GHz-7 GHz)

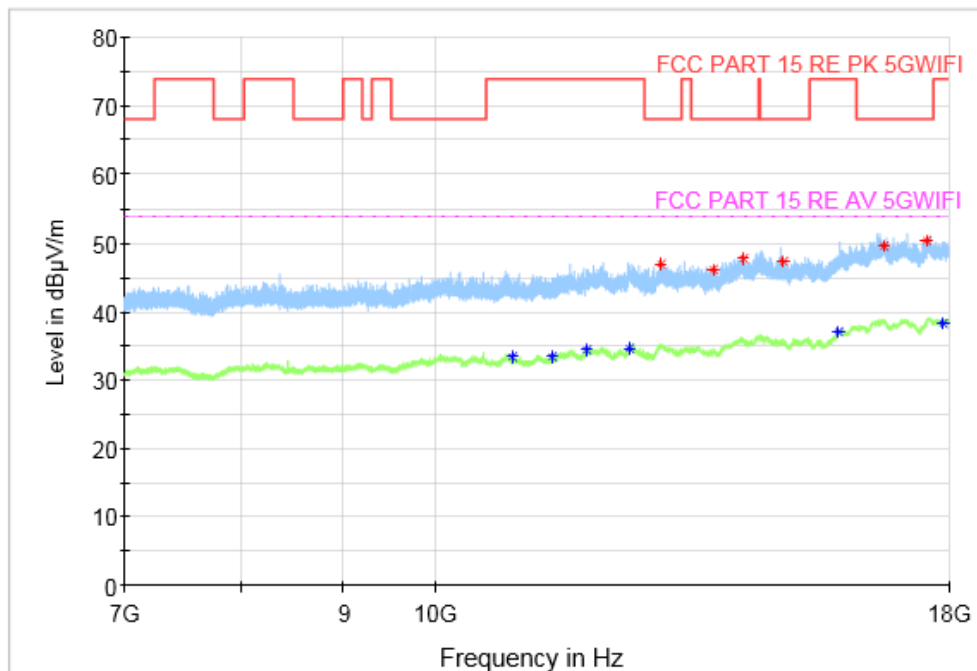


Fig. 72 Transmitter Spurious Emission (802.11a, CH56 5280MHz, 7 GHz-18 GHz)



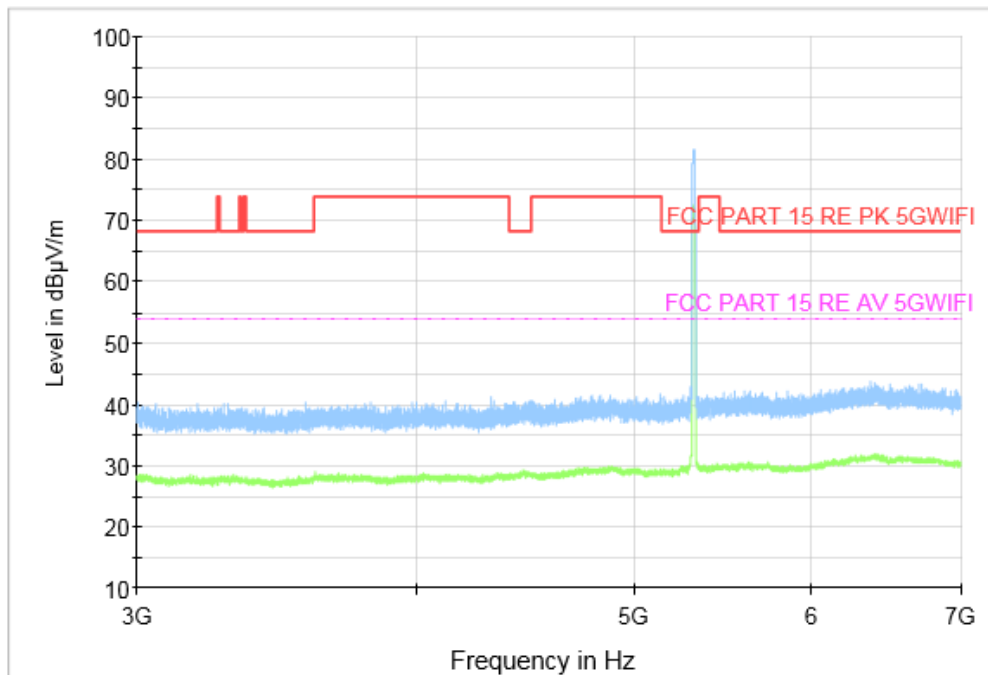


Fig. 73 Transmitter Spurious Emission (802.11a, CH64 5320MHz, 3 GHz-7 GHz)

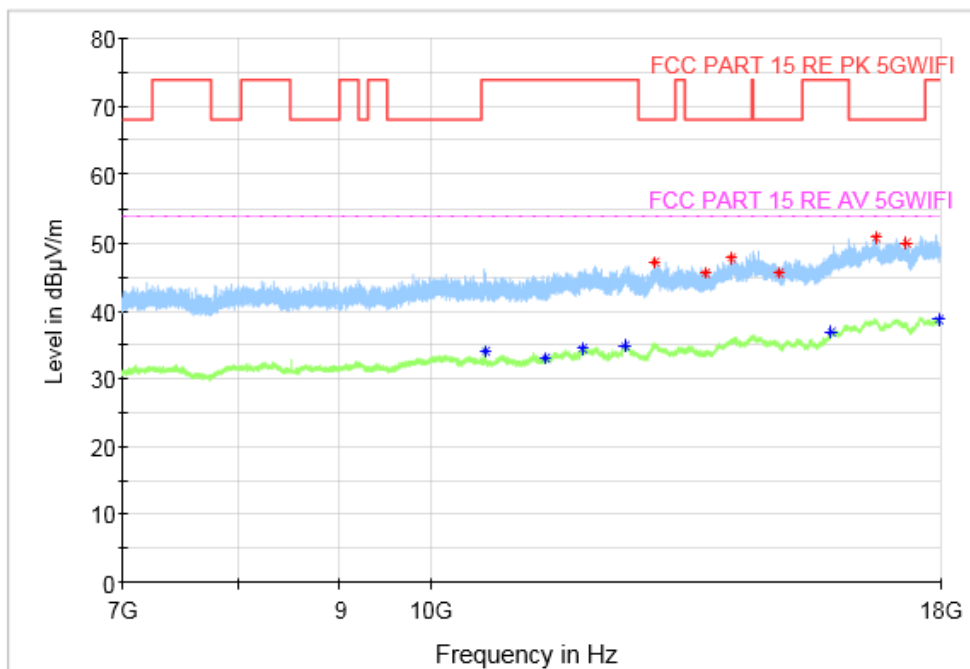


Fig. 74 Transmitter Spurious Emission (802.11a, CH64 5320MHz, 7 GHz-18 GHz)

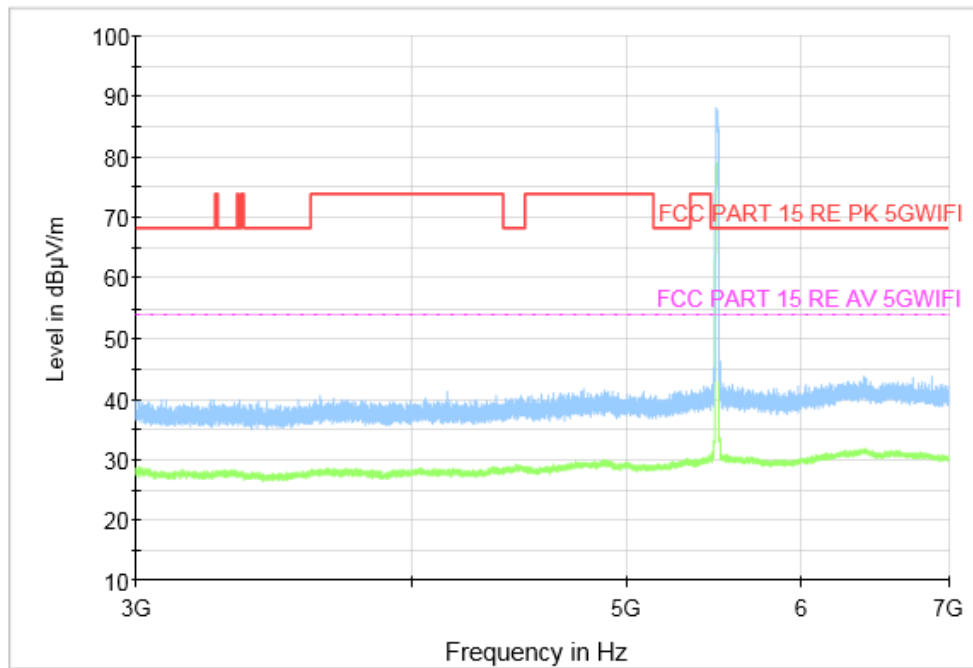


Fig. 75 Transmitter Spurious Emission (802. 11a, CH100 5500MHz, 3 GHz-7 GHz)

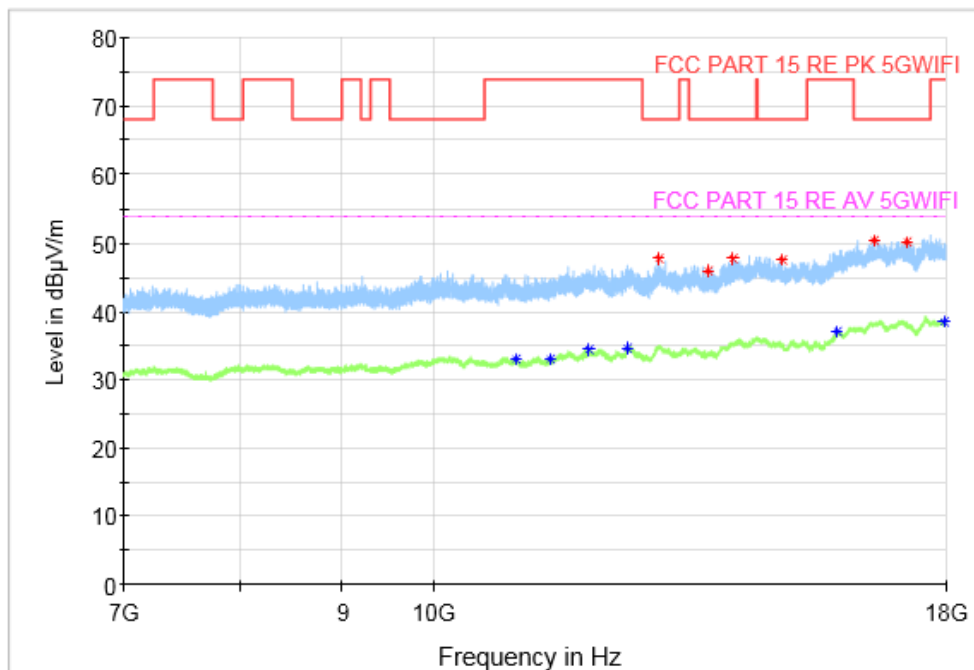


Fig. 76 Transmitter Spurious Emission (802. 11a, CH100 5500MHz, 7 GHz-18 GHz)

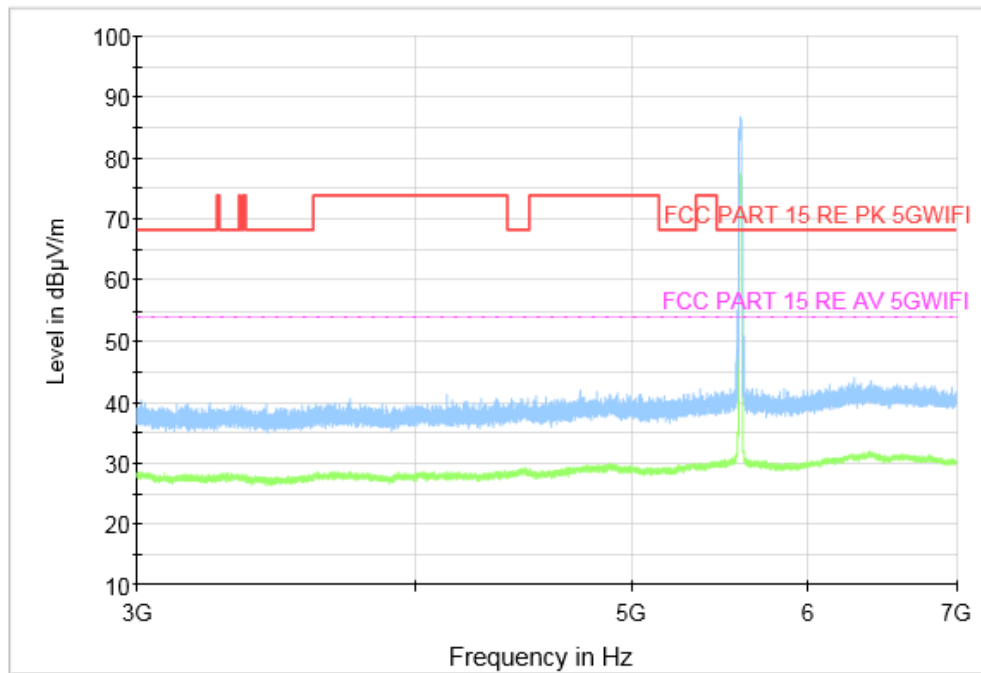


Fig. 77 Transmitter Spurious Emission (802. 11a, CH120 5600MHz, 3 GHz-7 GHz)

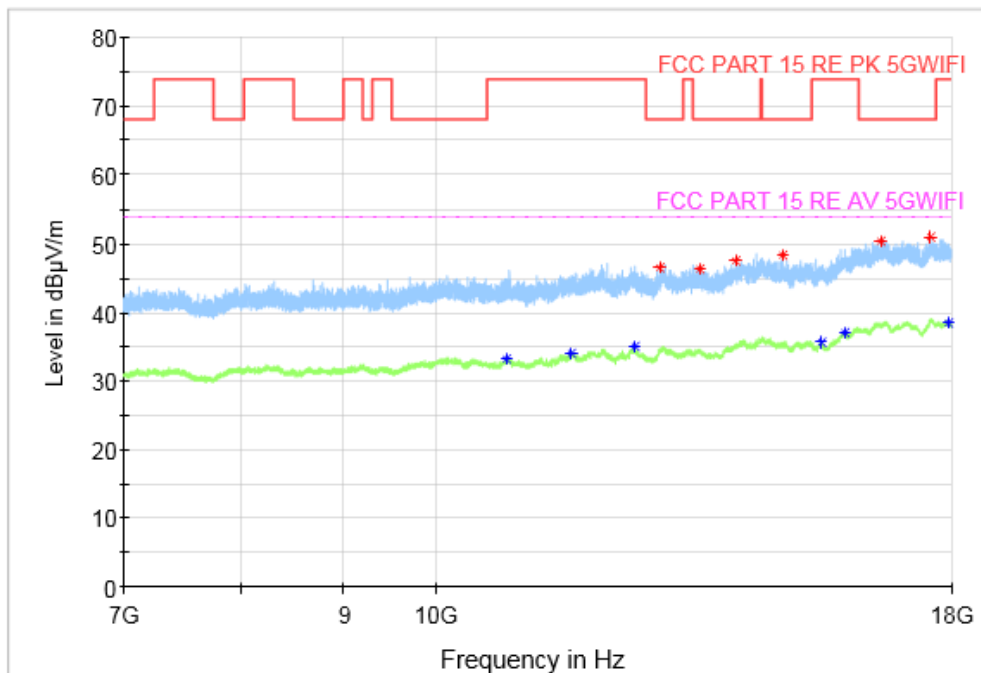


Fig. 78 Transmitter Spurious Emission (802. 11a, CH120 5600MHz, 7 GHz-18 GHz)

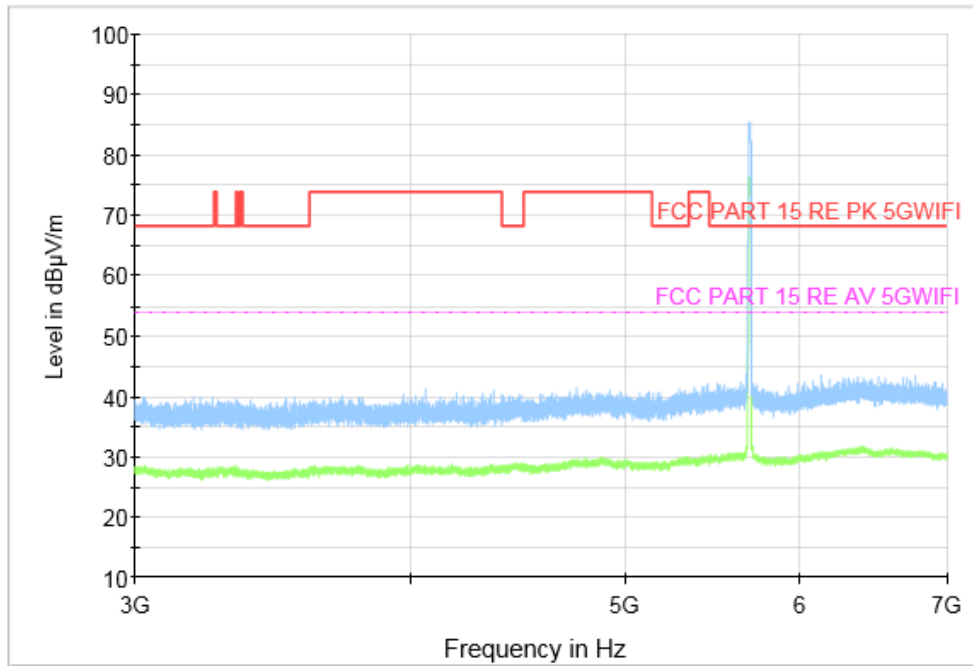


Fig. 79 Transmitter Spurious Emission (802. 11a, CH140 5700MHz, 3 GHz-7 GHz)

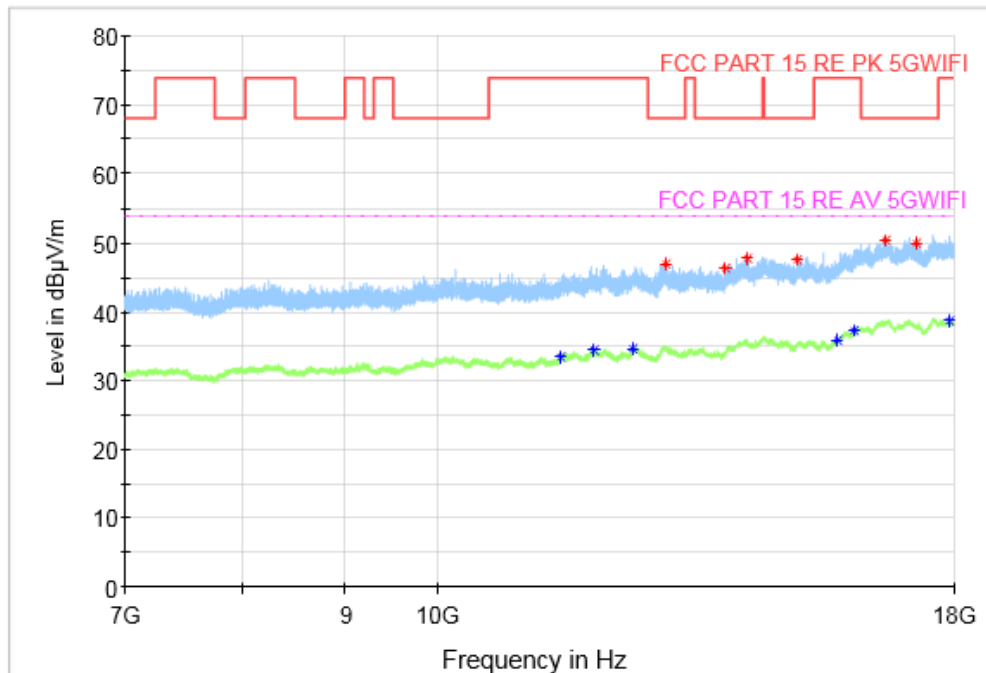


Fig. 80 Transmitter Spurious Emission (802. 11a, CH140 5700MHz, 7 GHz-18 GHz)

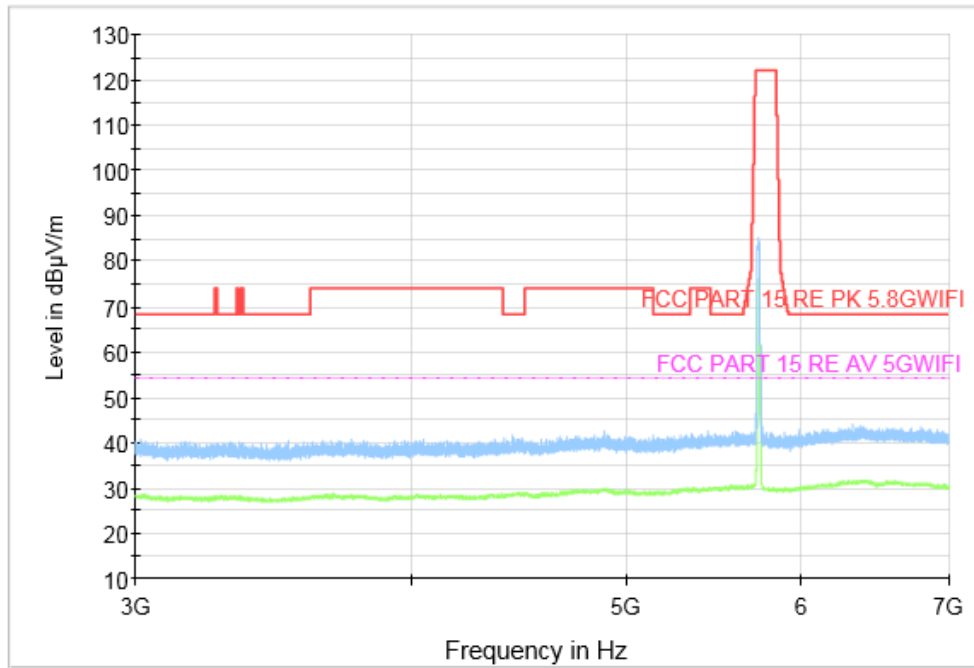


Fig. 81 Transmitter Spurious Emission (802. 11a, CH149 5745MHz, 3 GHz-7 GHz)

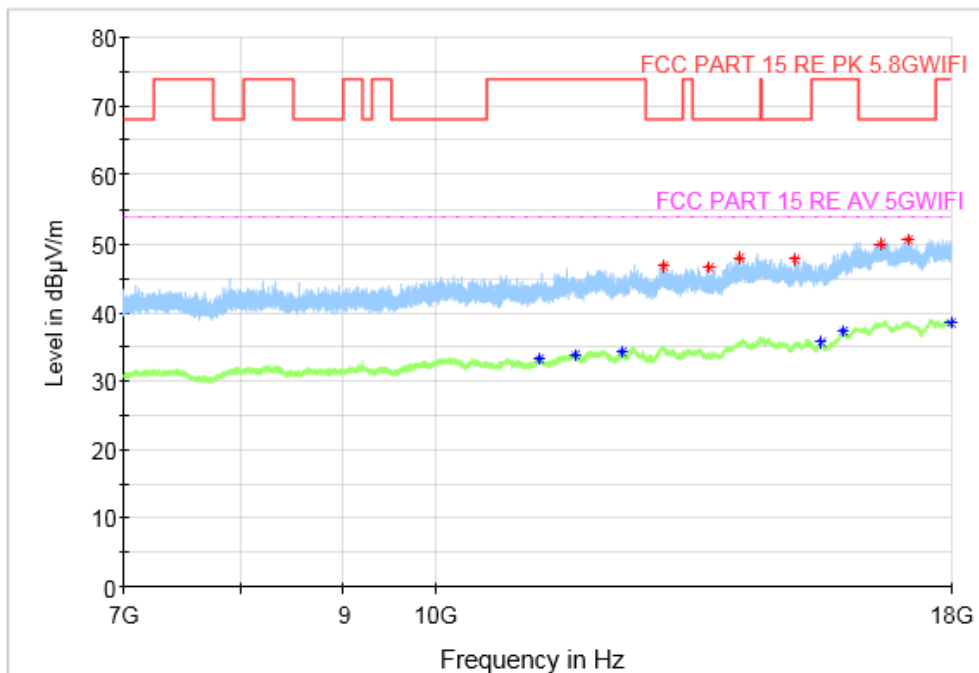
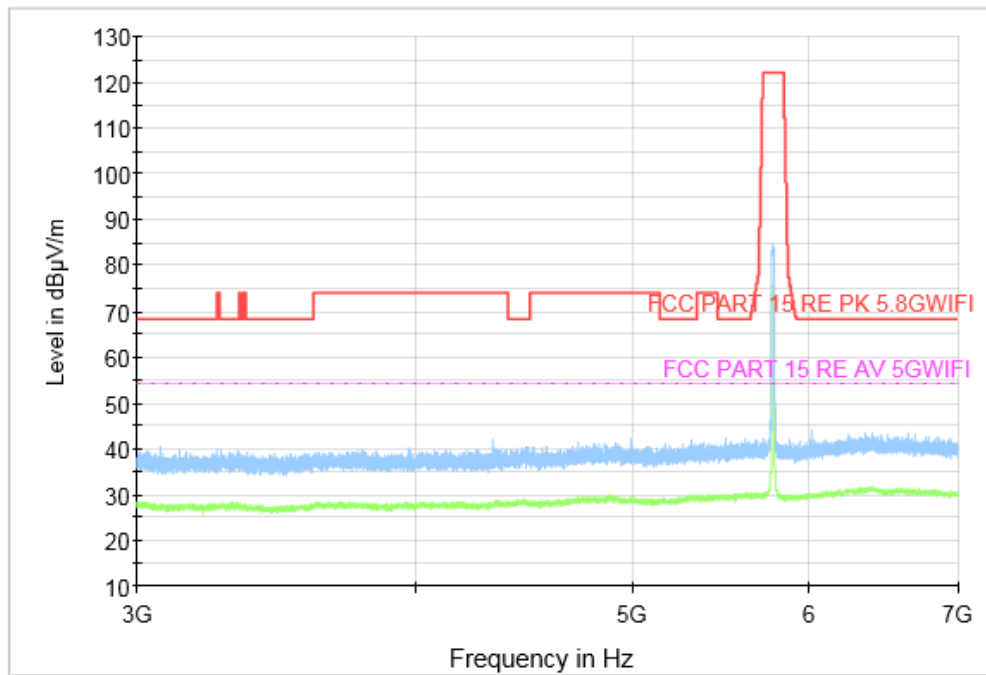
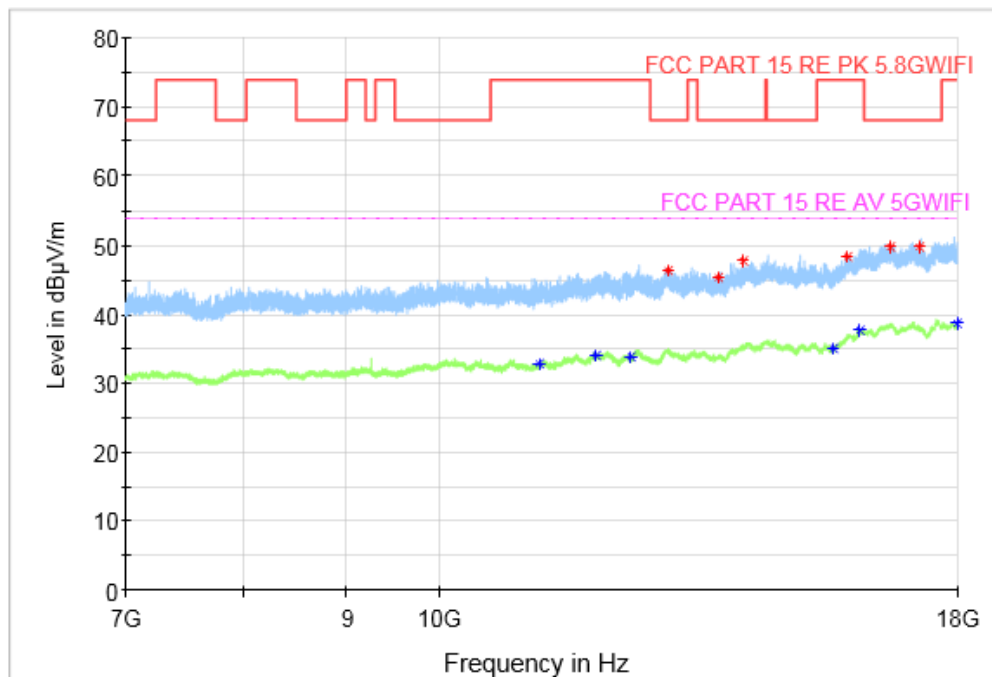


Fig. 82 Transmitter Spurious Emission (802. 11a, CH149 5745MHz, 7 GHz-18 GHz)



**Fig. 83 Transmitter Spurious Emission (802. 11a, CH157 5785MHz, 3 GHz-7 GHz)**



**Fig. 84 Transmitter Spurious Emission (802. 11a, CH157 5785MHz, 7 GHz-18 GHz)**

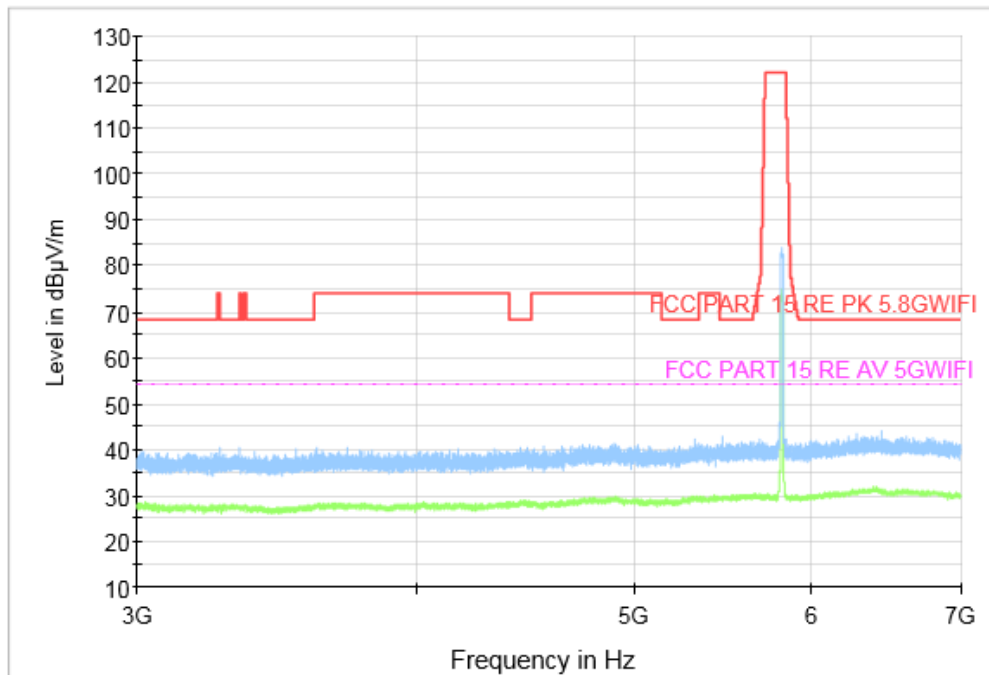


Fig. 85 Transmitter Spurious Emission (802. 11a, CH165 5825MHz, 3 GHz-7 GHz)

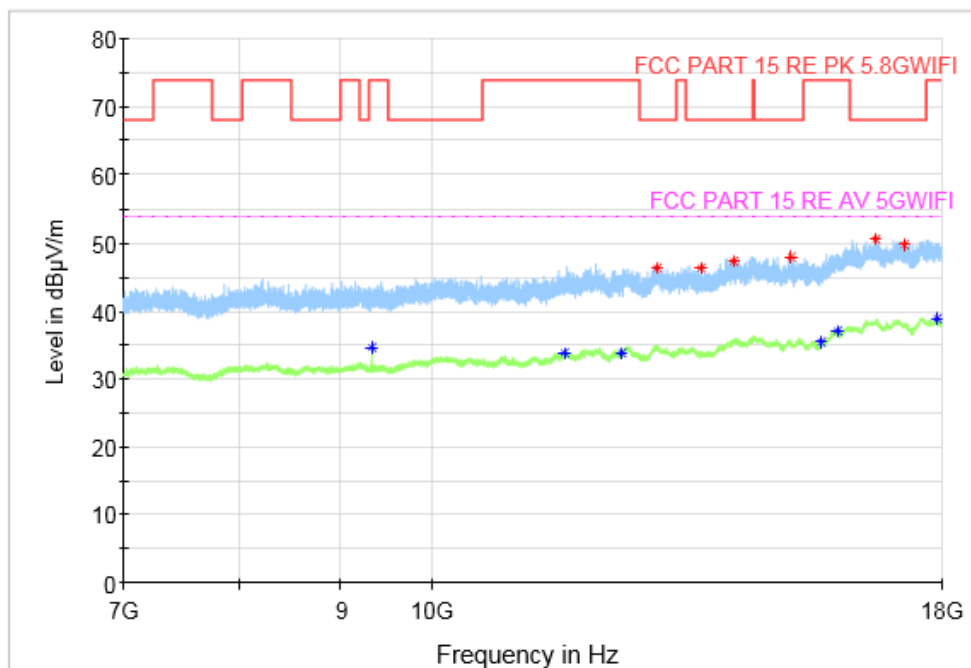


Fig. 86 Transmitter Spurious Emission (802. 11a, CH165 5825MHz, 7 GHz-18 GHz)

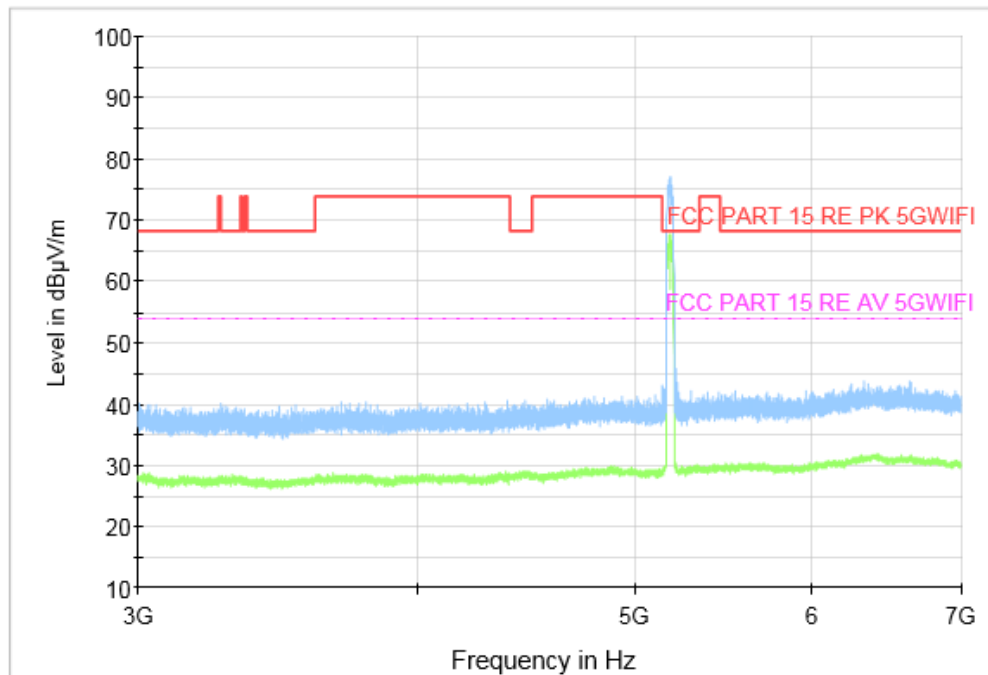


Fig. 87 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz, 3 GHz-7 GHz)

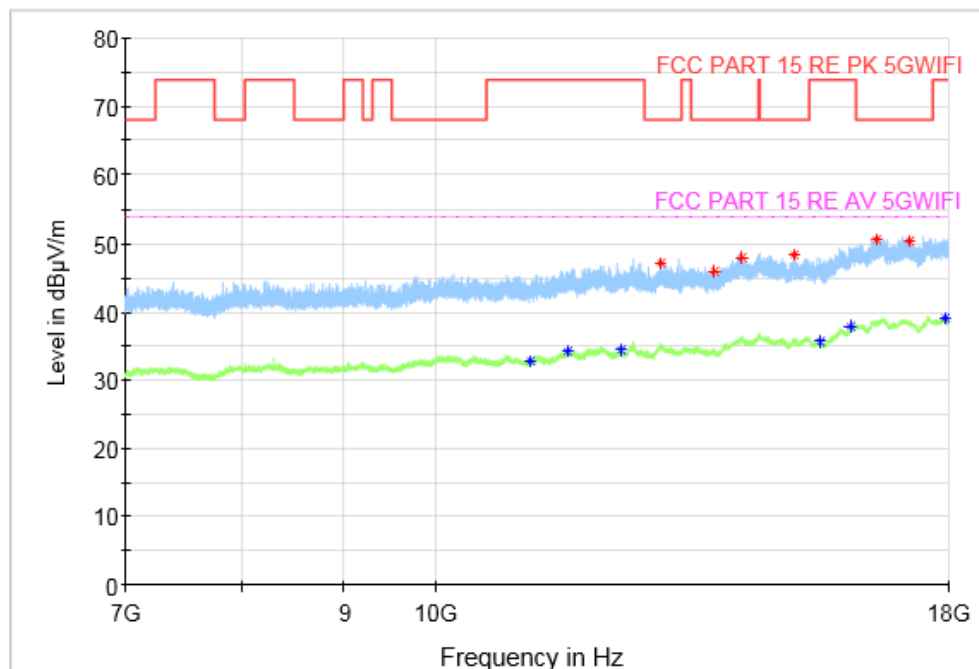


Fig. 88 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz, 7 GHz-18 GHz)



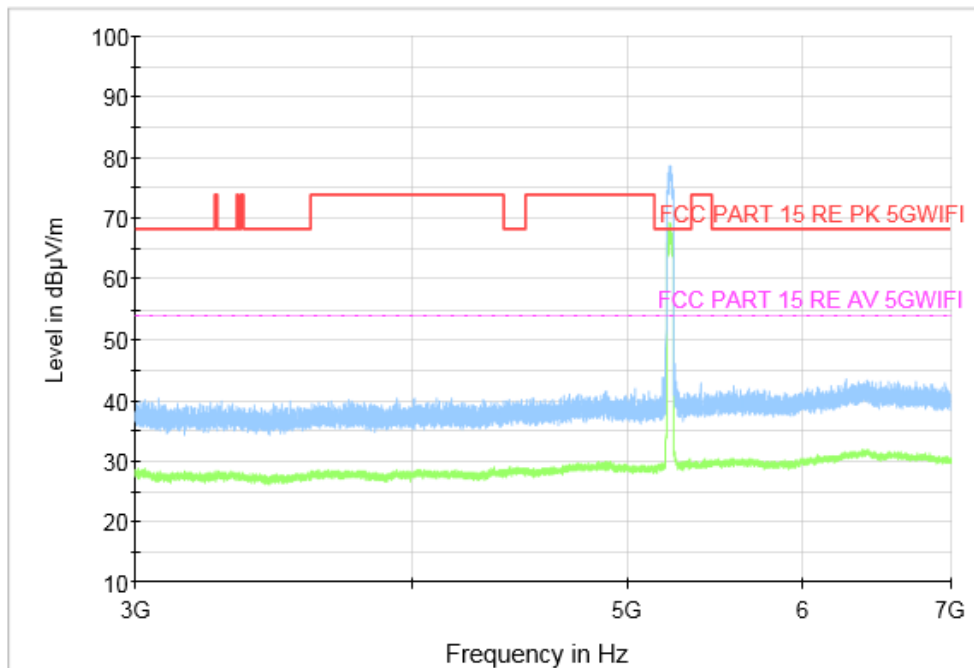


Fig. 89 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz, 3 GHz-7 GHz)

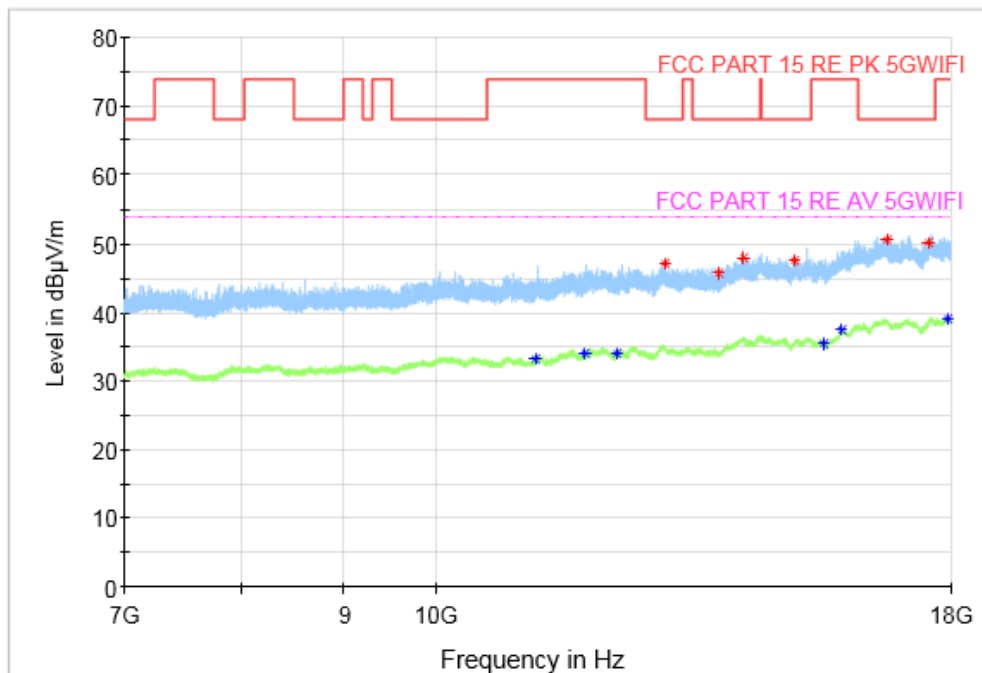
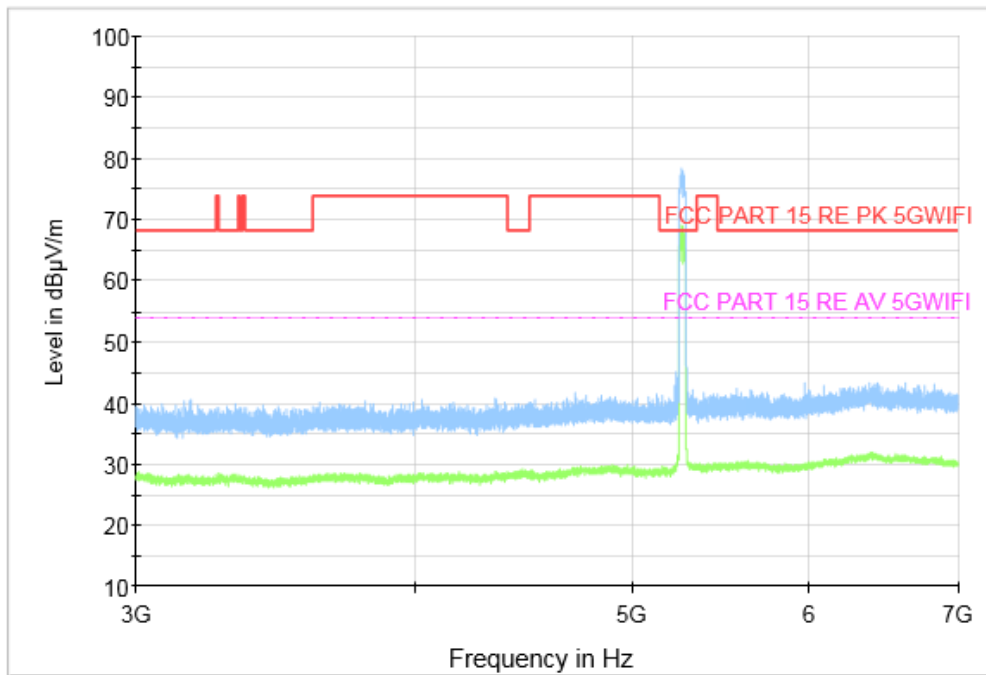
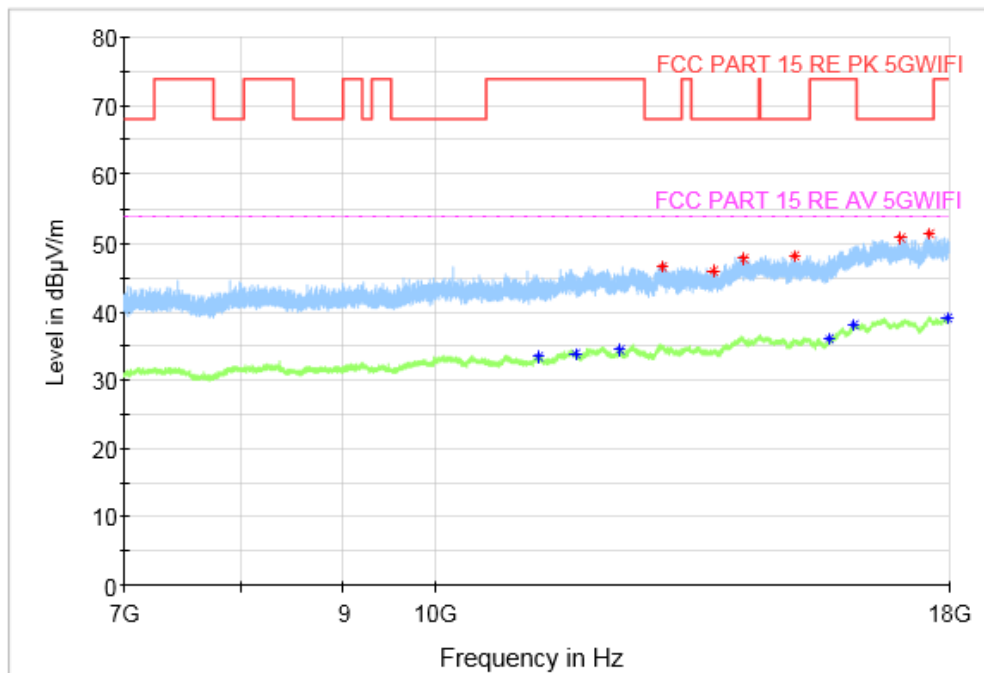


Fig. 90 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz, 7 GHz-18 GHz)



**Fig. 91 Transmitter Spurious Emission (802.11n-HT40, CH54 5270MHz, 3 GHz-7 GHz)**



**Fig. 92 Transmitter Spurious Emission (802.11n-HT40, CH54 5270MHz, 7 GHz-18 GHz)**

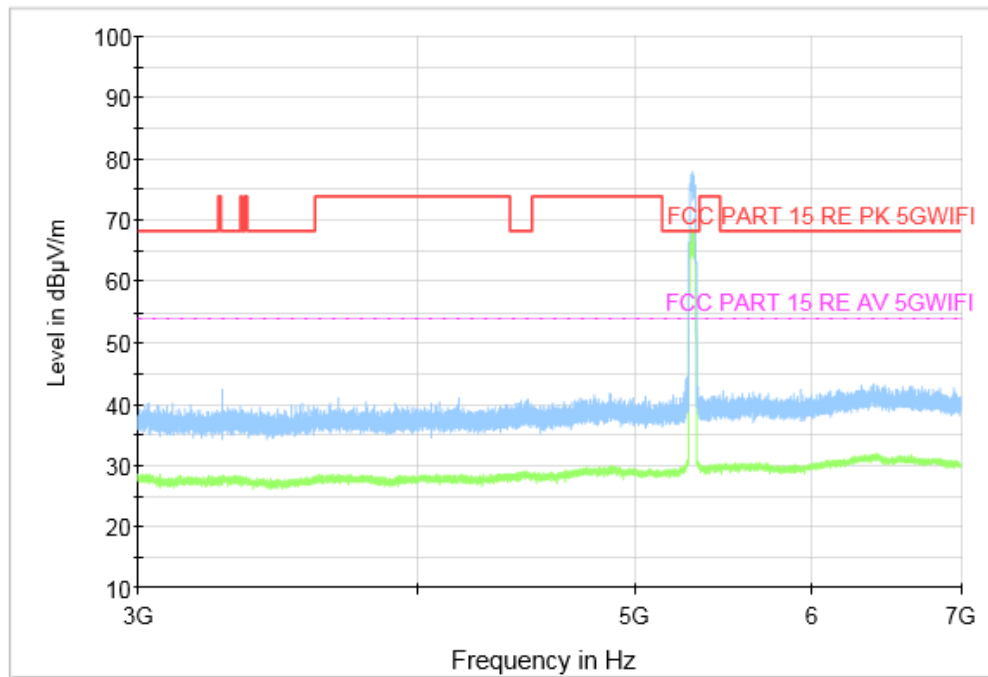


Fig. 93 Transmitter Spurious Emission (802.11n-HT40, CH62 5310MHz, 3 GHz-7 GHz)

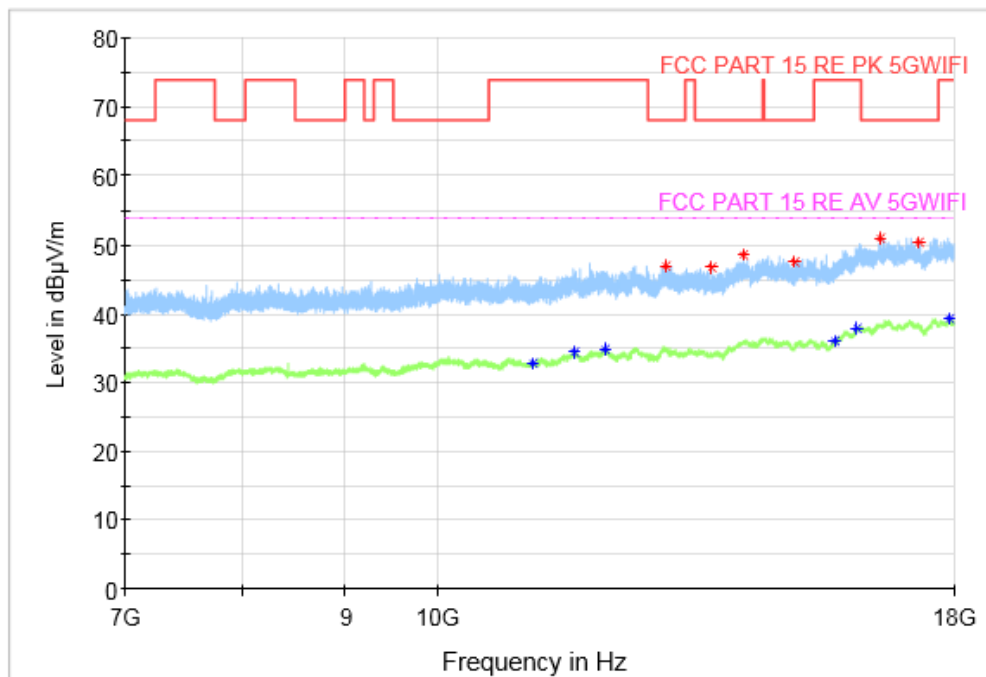


Fig. 94 Transmitter Spurious Emission (802.11n-HT40, CH62 5310MHz, 7 GHz-18 GHz)

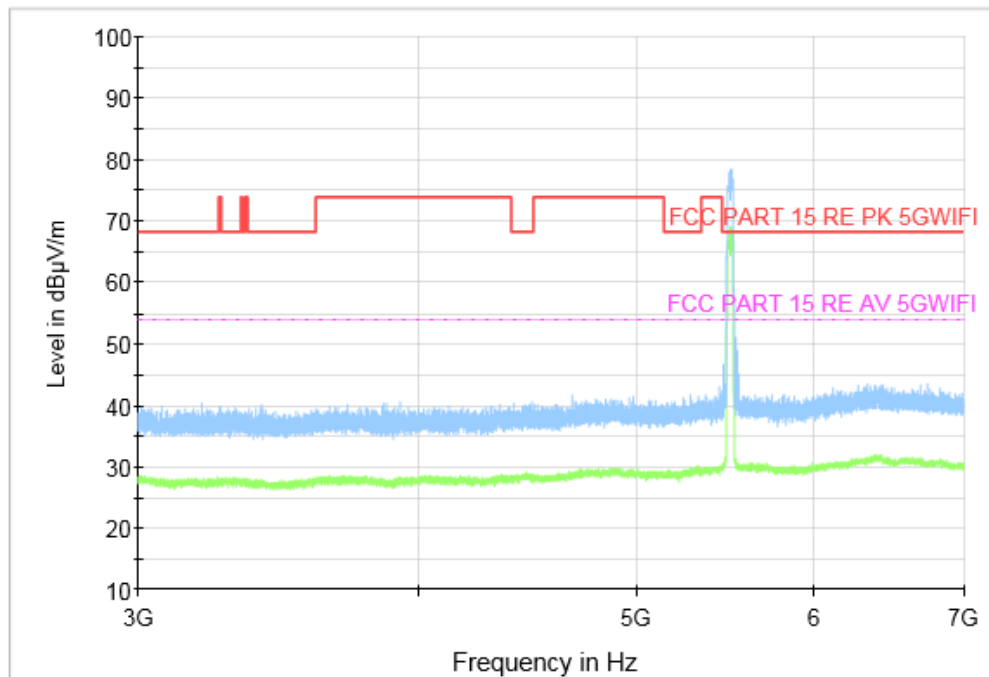


Fig. 95 Transmitter Spurious Emission (802. 11n-HT40, CH102 5510MHz, 3 GHz-7 GHz)

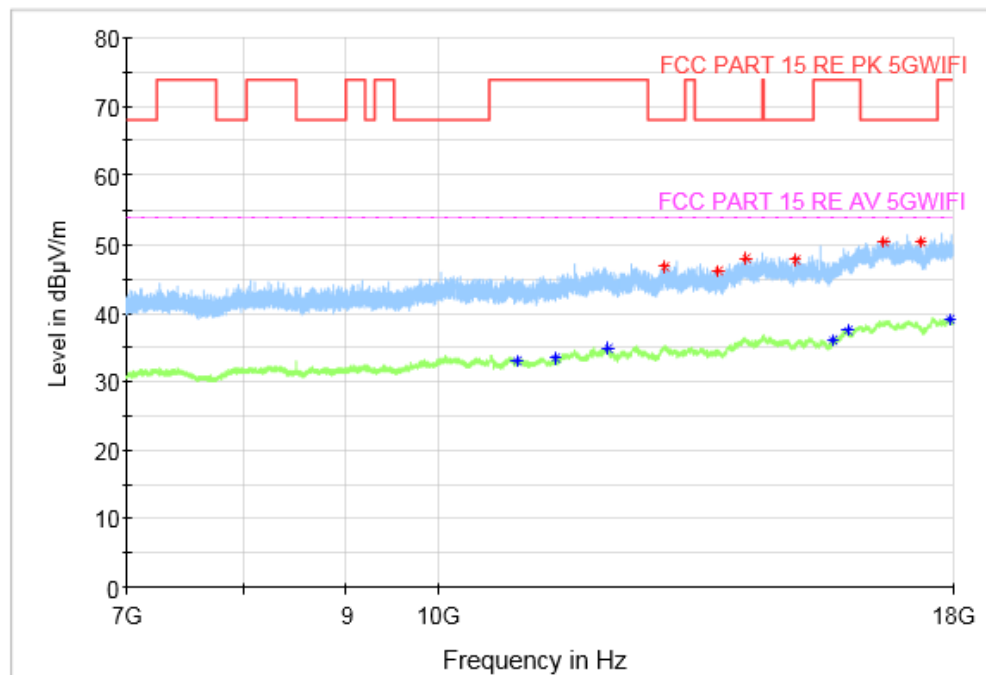


Fig. 96 Transmitter Spurious Emission (802. 11n-HT40, CH102 5510MHz, 7 GHz-18 GHz)

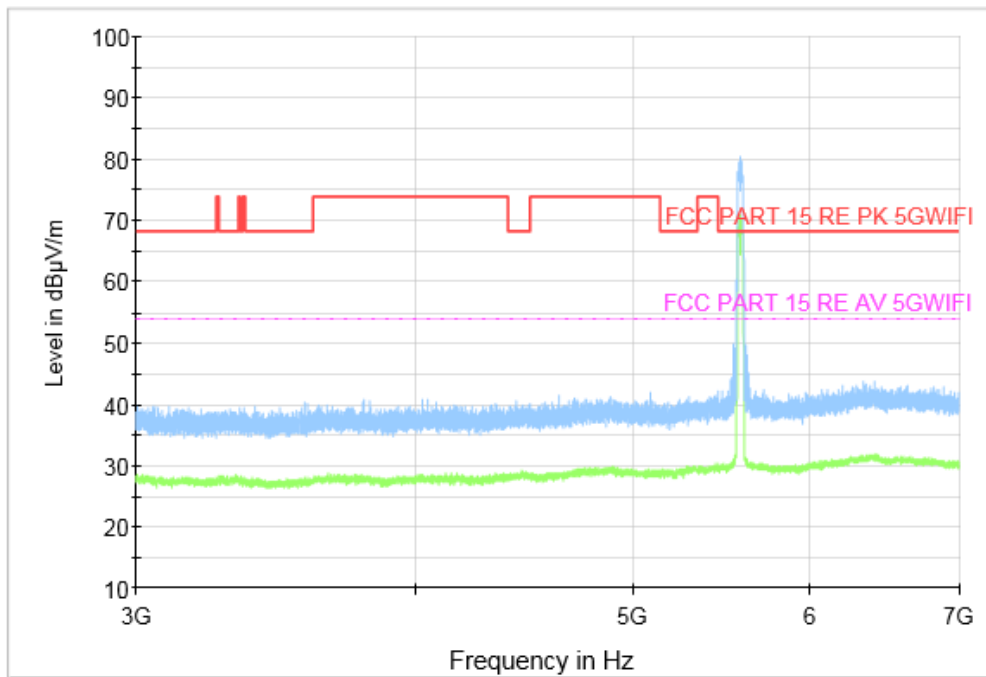


Fig. 97 Transmitter Spurious Emission (802. 11n-HT40, CH118 5580MHz, 3 GHz-7 GHz)

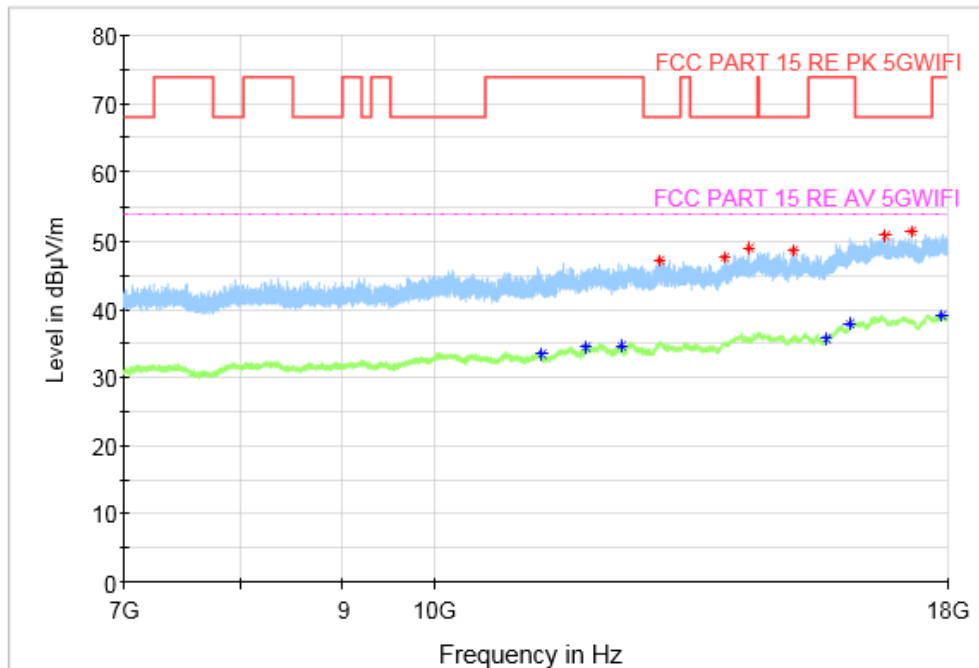


Fig. 98 Transmitter Spurious Emission (802. 11n-HT40, CH118 5580MHz, 7 GHz-18 GHz)

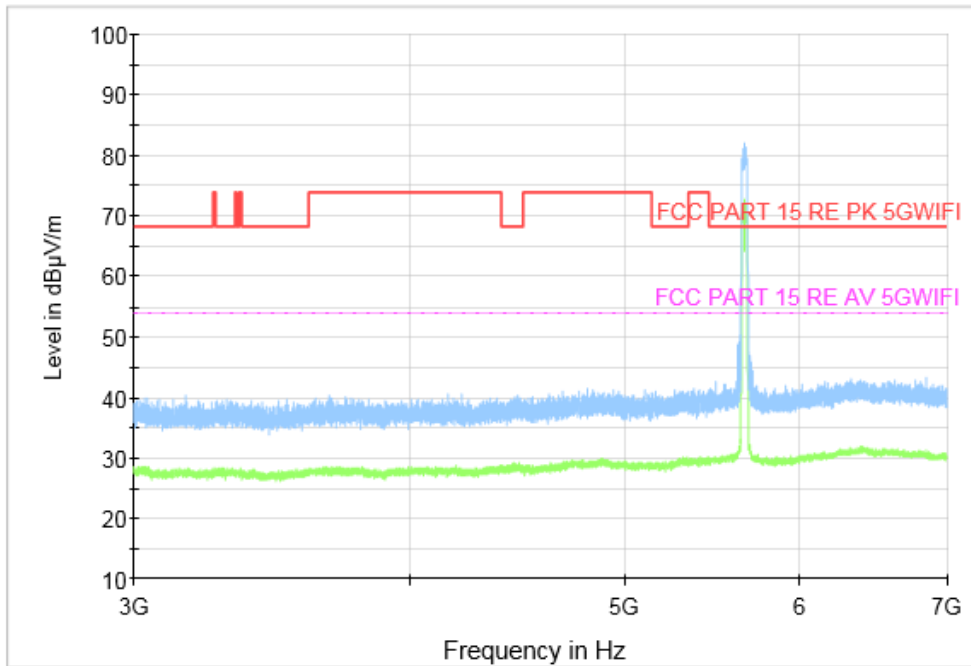


Fig. 99 Transmitter Spurious Emission (802. 11n-HT40, CH134 5670MHz, 3 GHz-7 GHz)

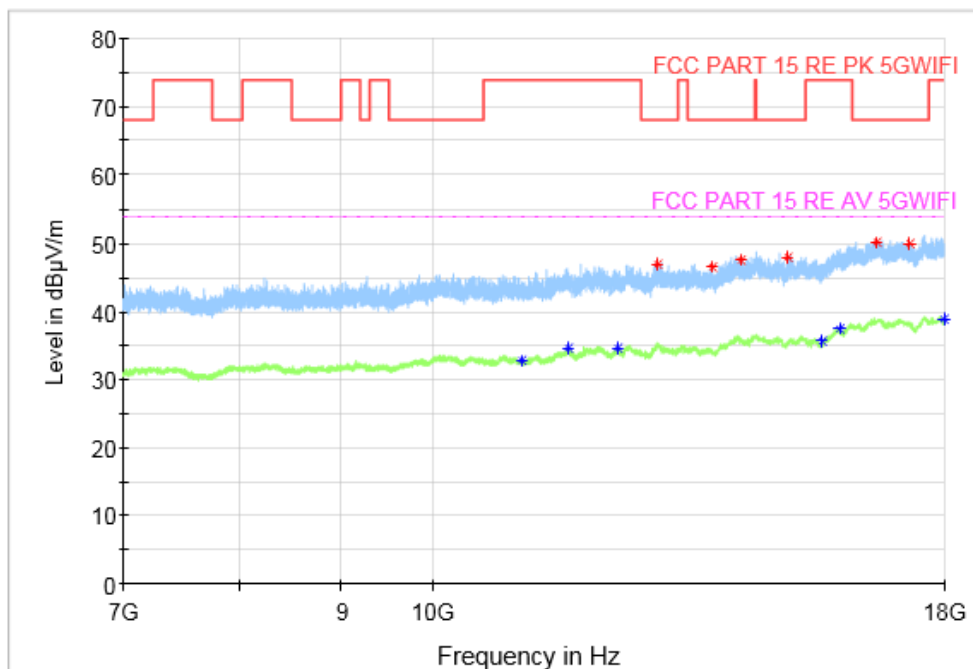


Fig. 100 Transmitter Spurious Emission (802. 11n-HT40, CH134 5670MHz, 7 GHz-18 GHz)

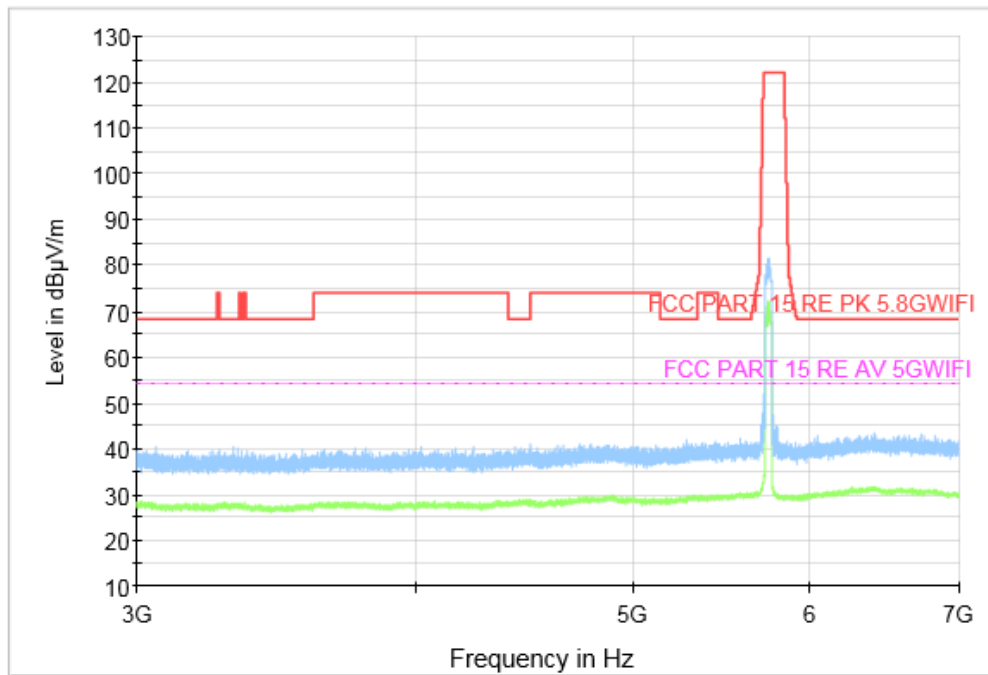


Fig. 101 Transmitter Spurious Emission (802. 11n-HT40, CH151 5755MHz, 3 GHz-7 GHz)

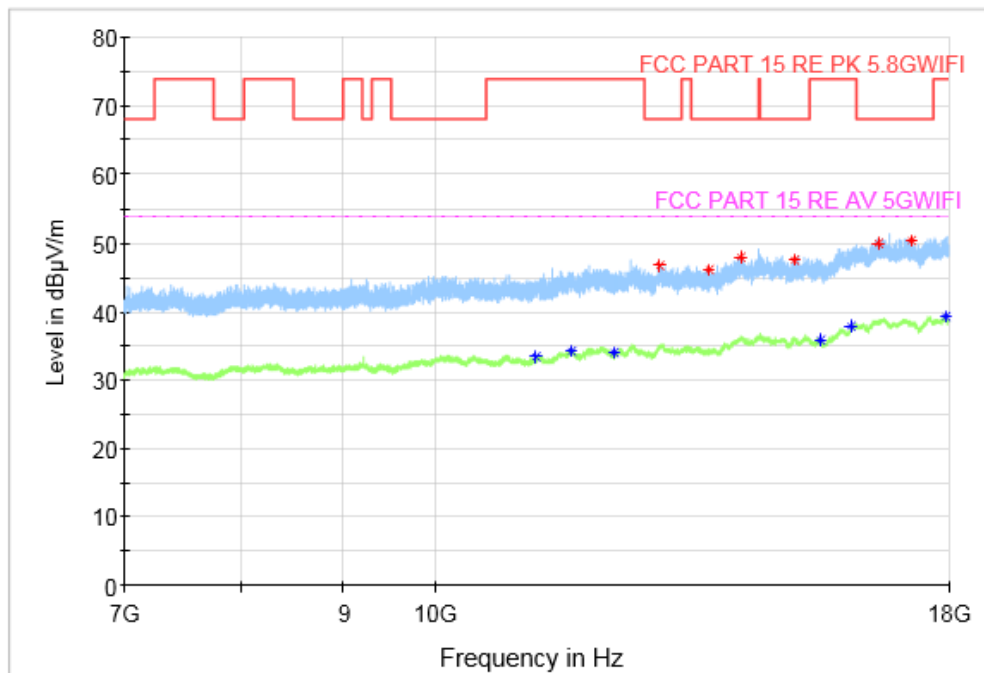


Fig. 102 Transmitter Spurious Emission (802. 11n-HT40, CH151 5755MHz, 7 GHz-18 GHz)

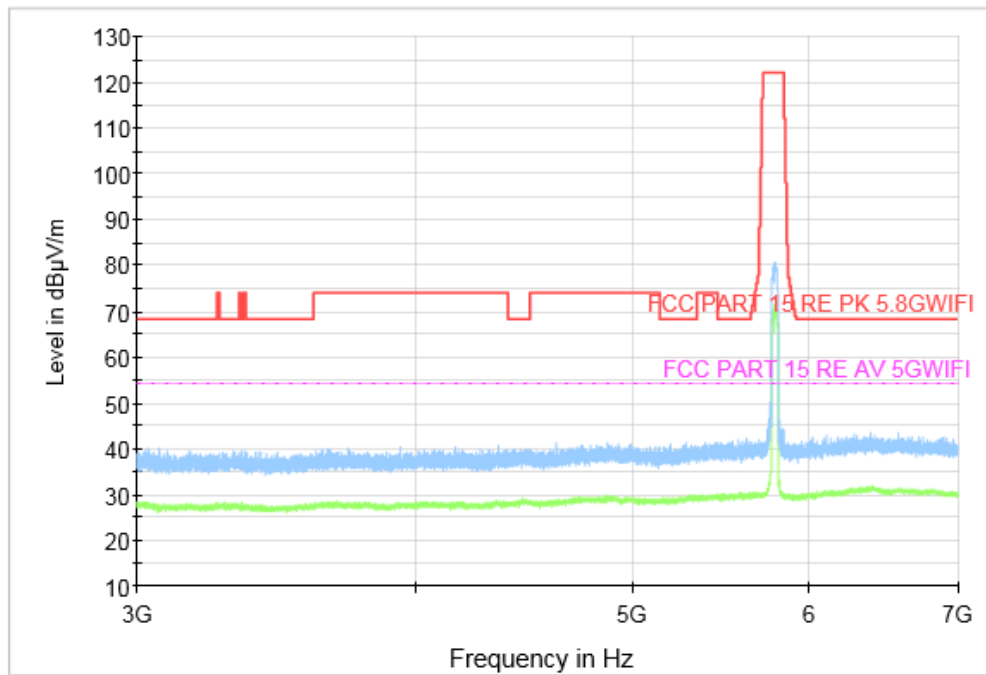


Fig. 103 Transmitter Spurious Emission (802. 11n-HT40, CH159 5795MHz, 3 GHz-7 GHz)

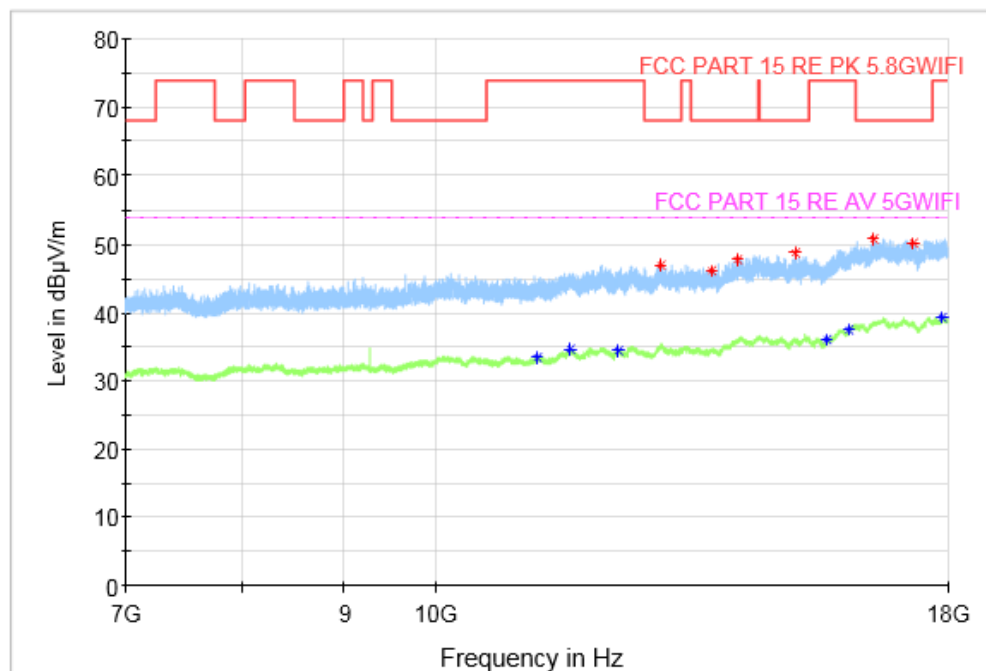


Fig. 104 Transmitter Spurious Emission (802. 11n-HT40, CH159 5795MHz, 7 GHz-18 GHz)



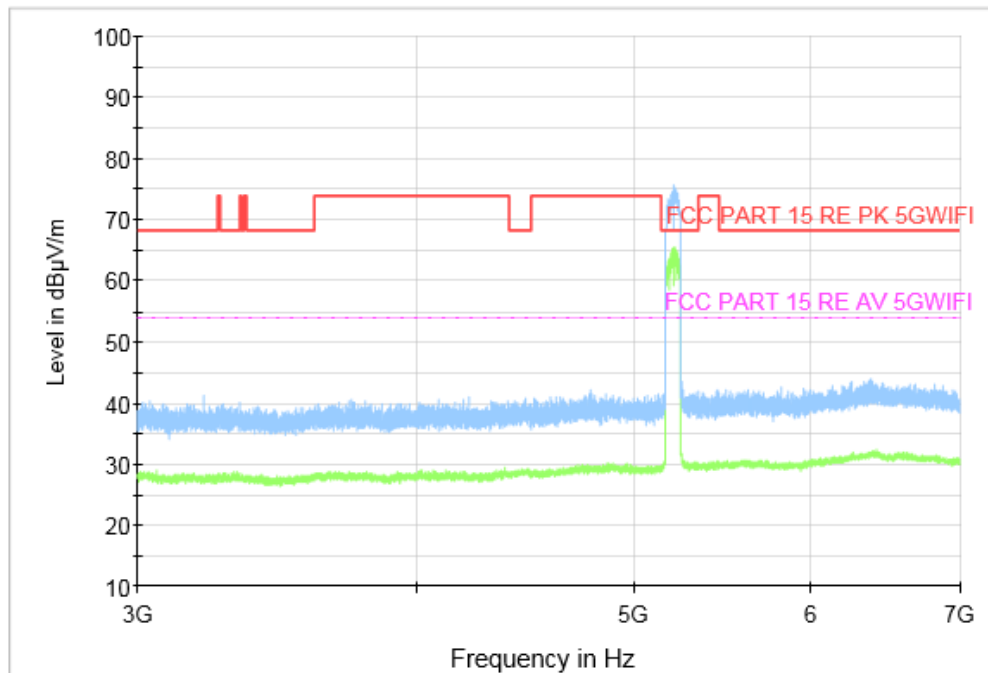


Fig. 105 Transmitter Spurious Emission (802. 11ac-VHT80, CH42 5210MHz, 3 GHz-7 GHz)

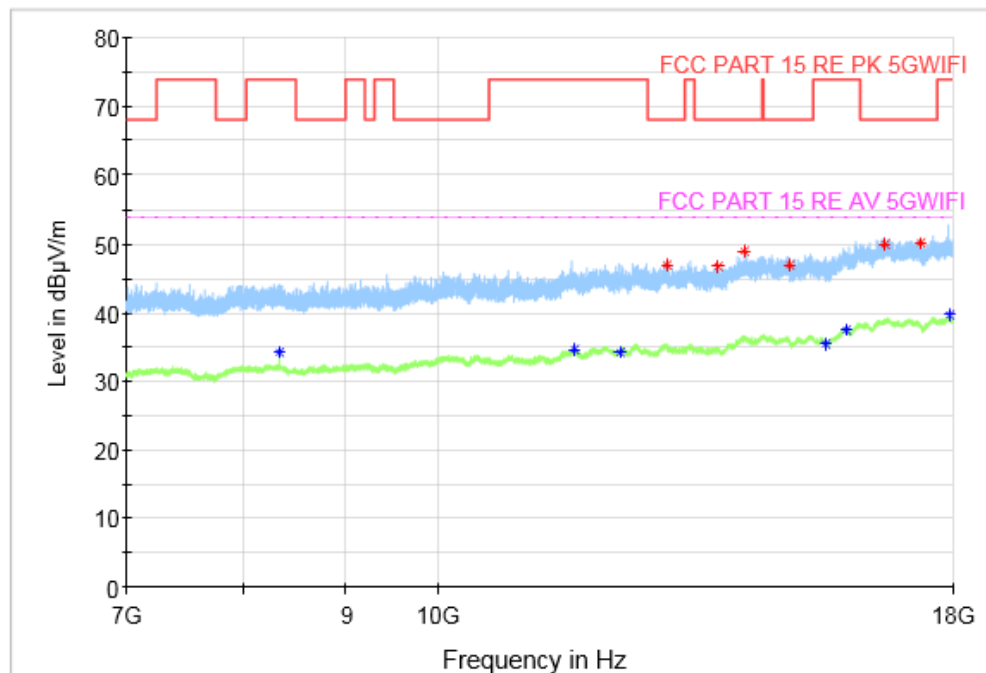


Fig. 106 Transmitter Spurious Emission (802. 11ac-VHT80, CH42 5210MHz, 7 GHz-18 GHz)

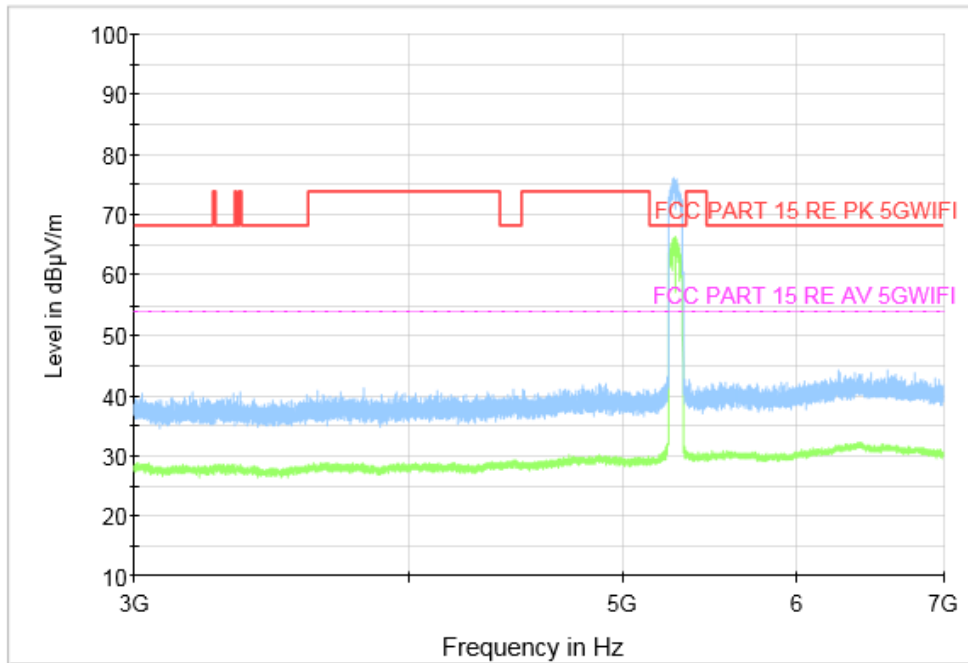


Fig. 107 Transmitter Spurious Emission (802. 11ac-VHT80, CH58 5290MHz, 3 GHz-7 GHz)

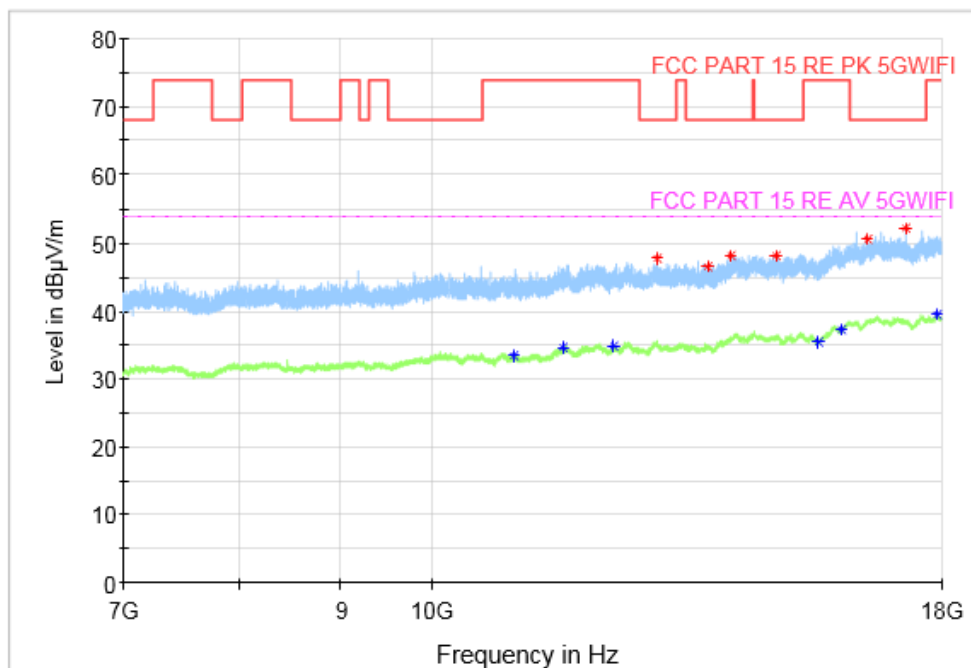
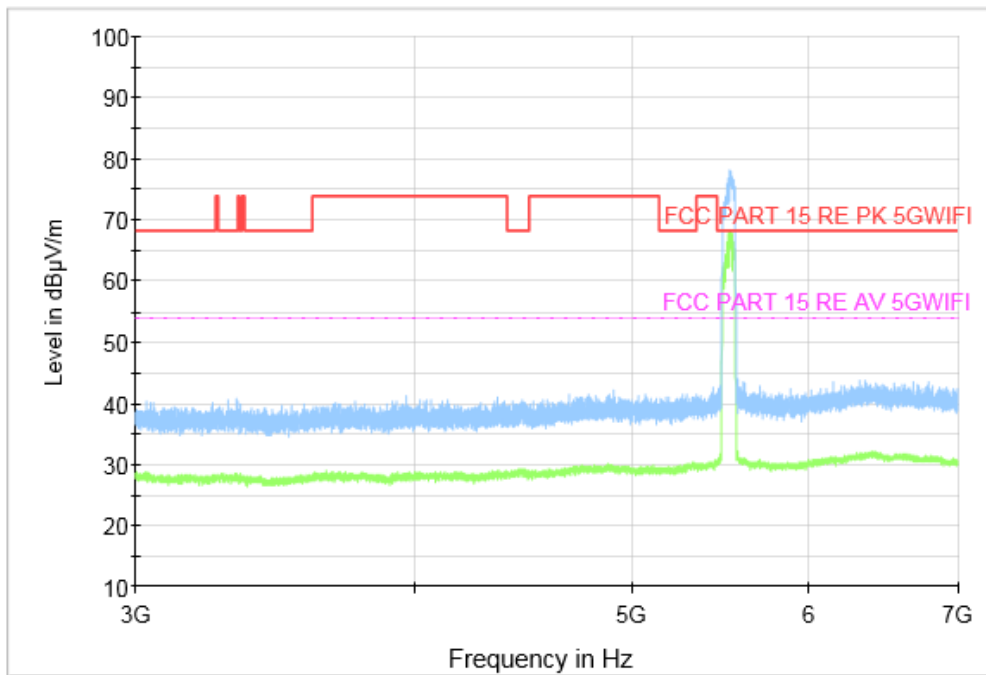
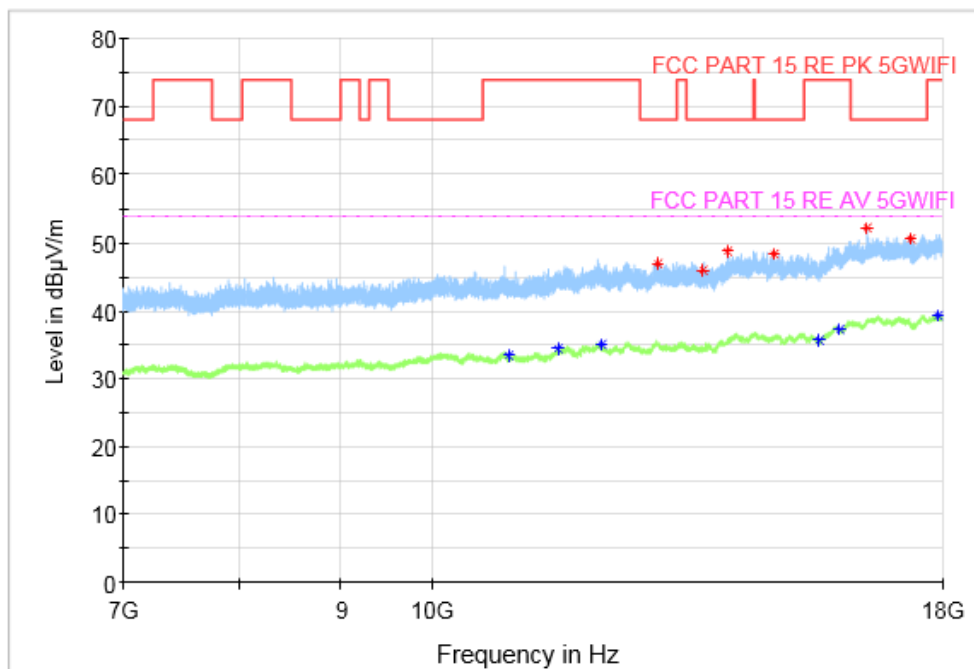


Fig. 108 Transmitter Spurious Emission (802. 11ac-VHT80, CH58 5290MHz, 7 GHz-18 GHz)



**Fig. 109 Transmitter Spurious Emission (802. 11ac-VHT80, CH106 5530MHz, 3 GHz-7 GHz)**



**Fig. 110 Transmitter Spurious Emission (802. 11ac-VHT80, CH106 5530MHz, 7 GHz-18 GHz)**

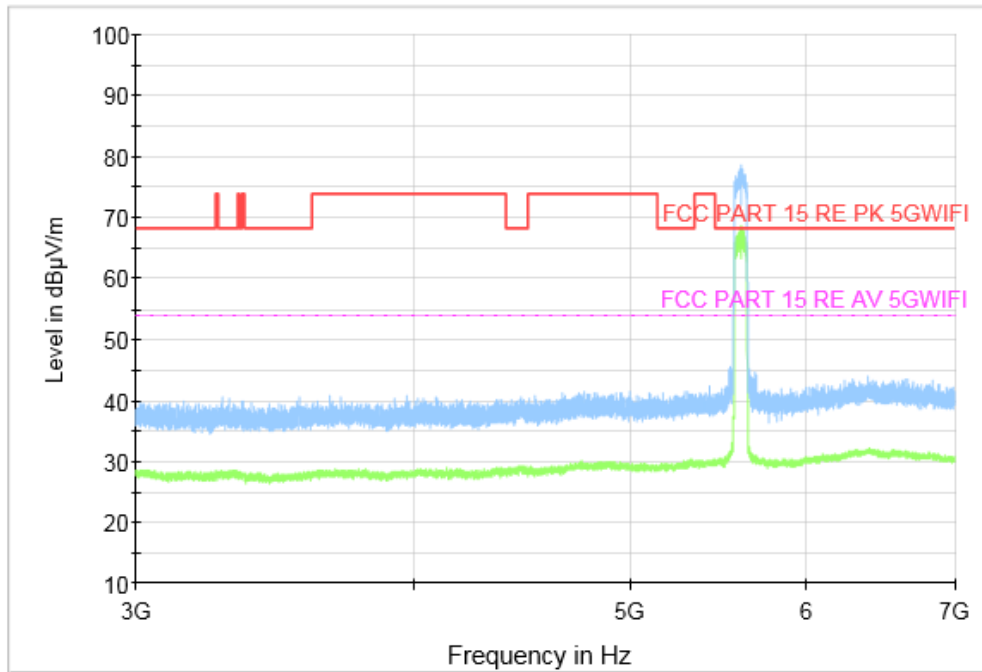


Fig. 111 Transmitter Spurious Emission (802. 11ac-VHT80, CH122 5610MHz, 3 GHz-7 GHz)

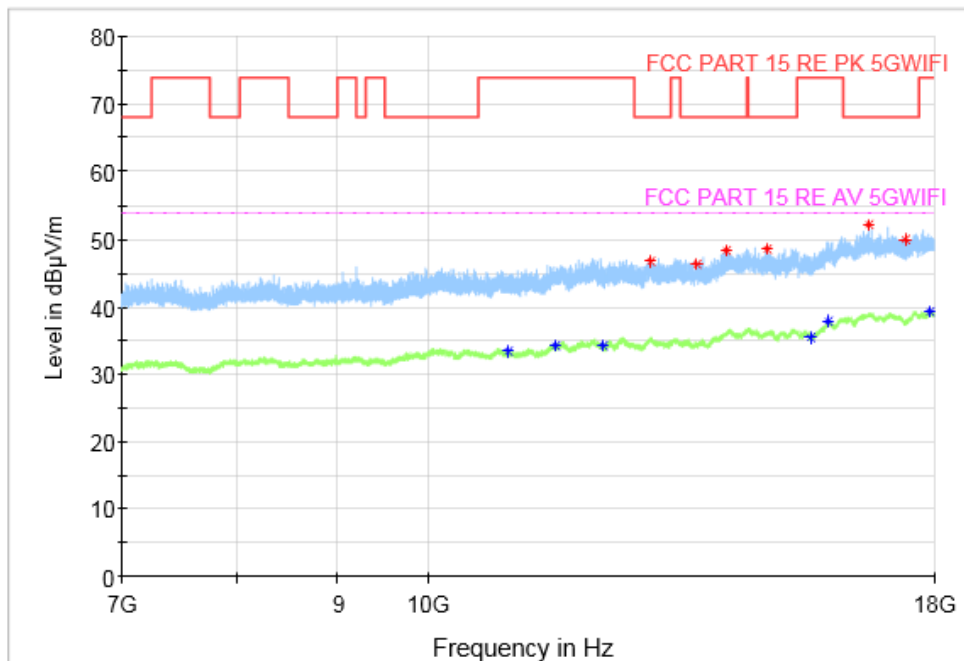


Fig. 112 Transmitter Spurious Emission (802. 11ac-VHT80, CH122 5610MHz, 7 GHz-18 GHz)

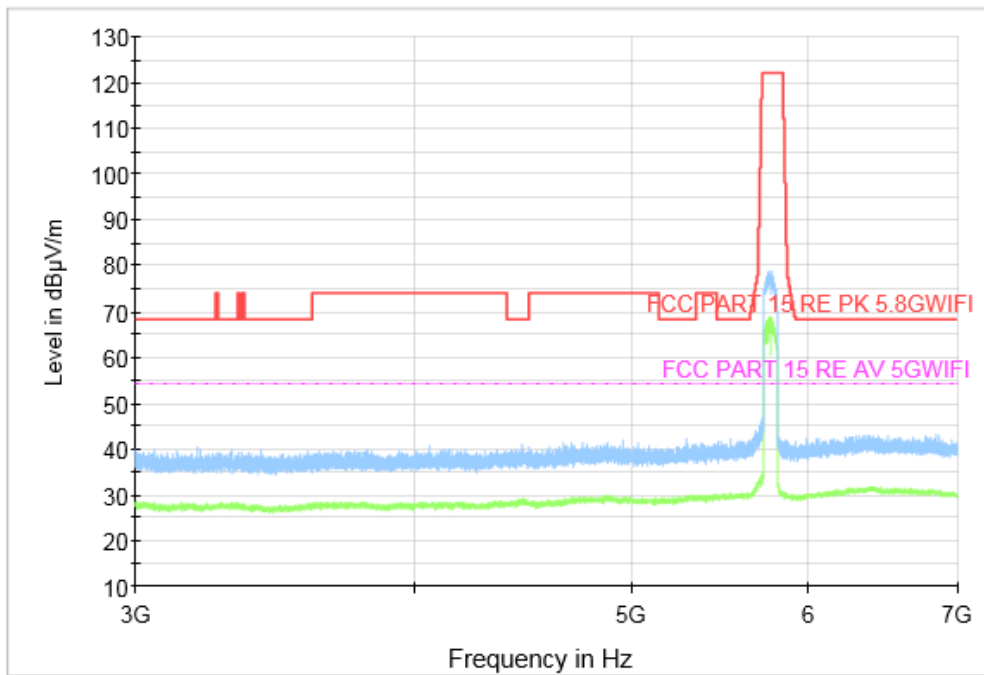


Fig. 113 Transmitter Spurious Emission (802. 11ac-VHT80, CH155 5775MHz, 3 GHz-7 GHz)

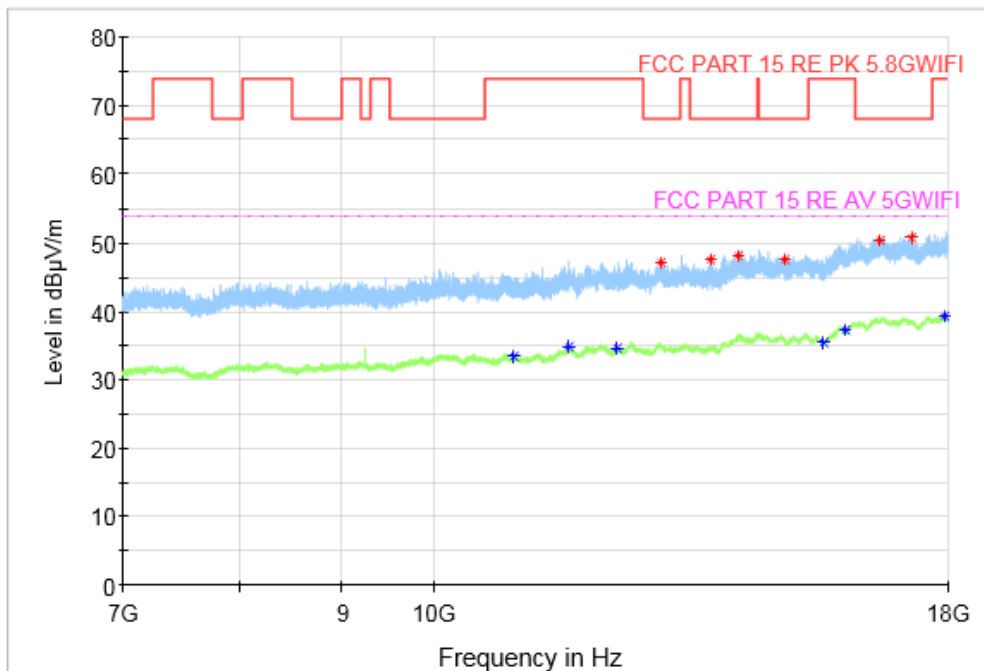
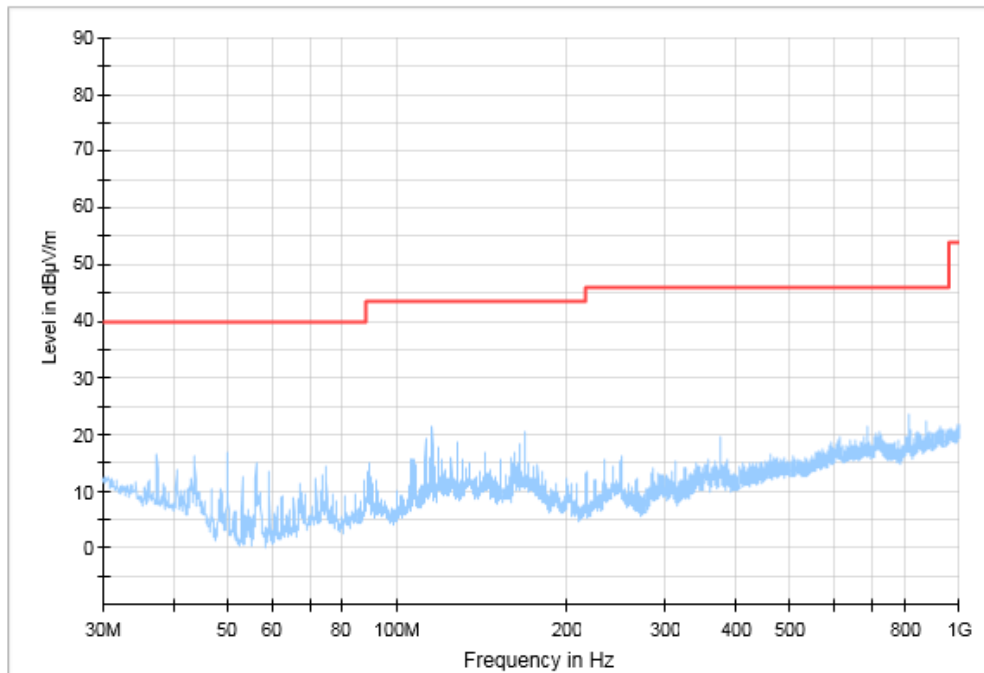
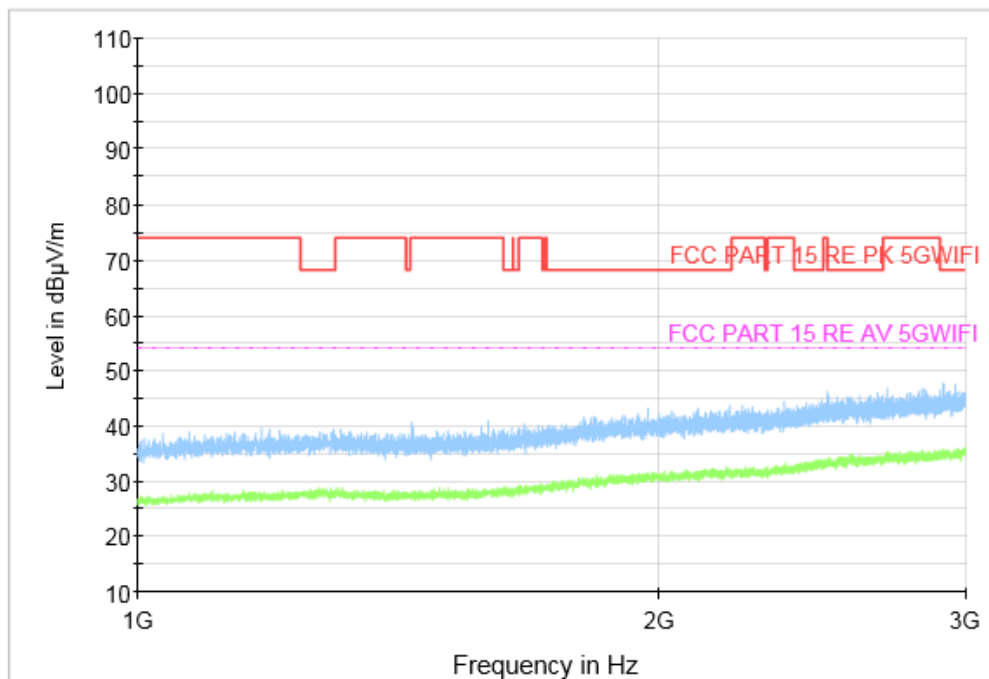


Fig. 114 Transmitter Spurious Emission (802. 11ac-VHT80, CH155 5775MHz, 7 GHz-18 GHz)



**Fig. 115 Transmitter Spurious Emission (All channel, 30MHz~1GHz)**



**Fig. 116 Transmitter Spurious Emission (All channel, 1GHz~3GHz)**

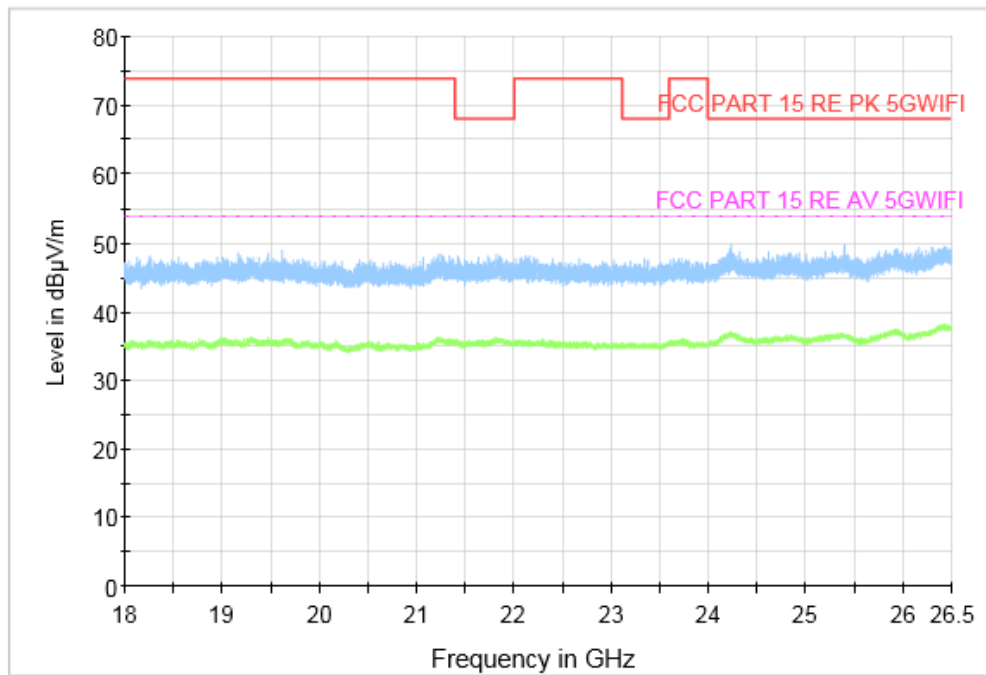


Fig. 117 Transmitter Spurious Emission (All channel, 18GHz~26.5GHz)

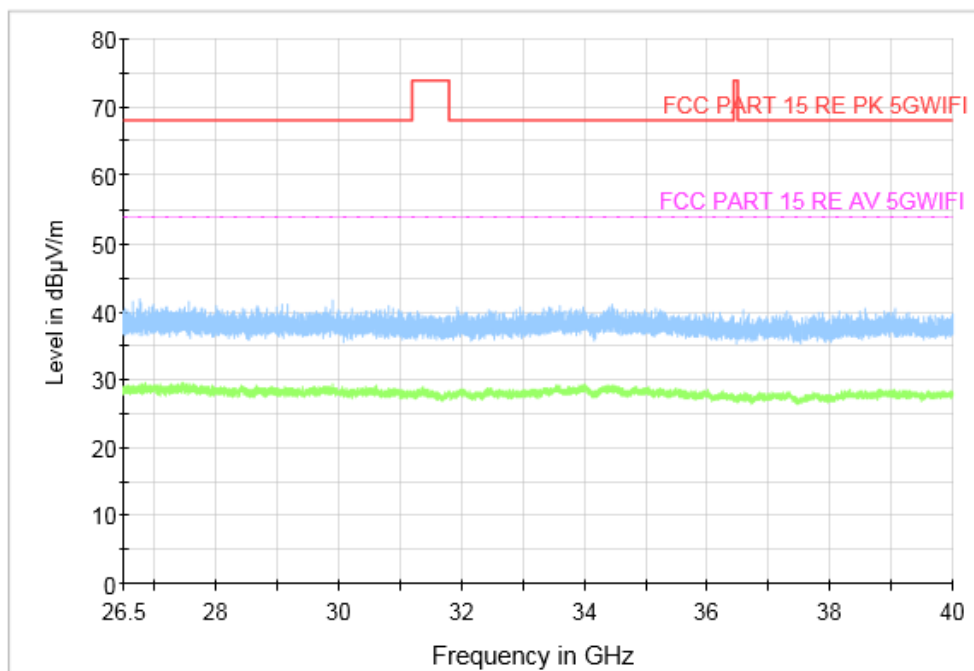


Fig. 118 Transmitter Spurious Emission (All channel, 26.5GHz~40GHz)

### A.9. Radiated Spurious Emissions < 30MHz

#### Measurement Limit (15.209, 9kHz-30MHz):

Frequency (MHz)	Field strength ( $\mu\text{V/m}$ )	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

The measurement is made according to KDB 789033.

Note: The measurement distance during the test is 3m. The limit used in plots recalculated based on the extrapolation factor of 40 dB/decade.

#### Measurement Result(Worst case):

Mode	Frequency Range	Test Results	Conclusion
All Channel	9 kHz ~30 MHz	Fig.119	P

**Conclusion: PASS**

Test graphs as below:

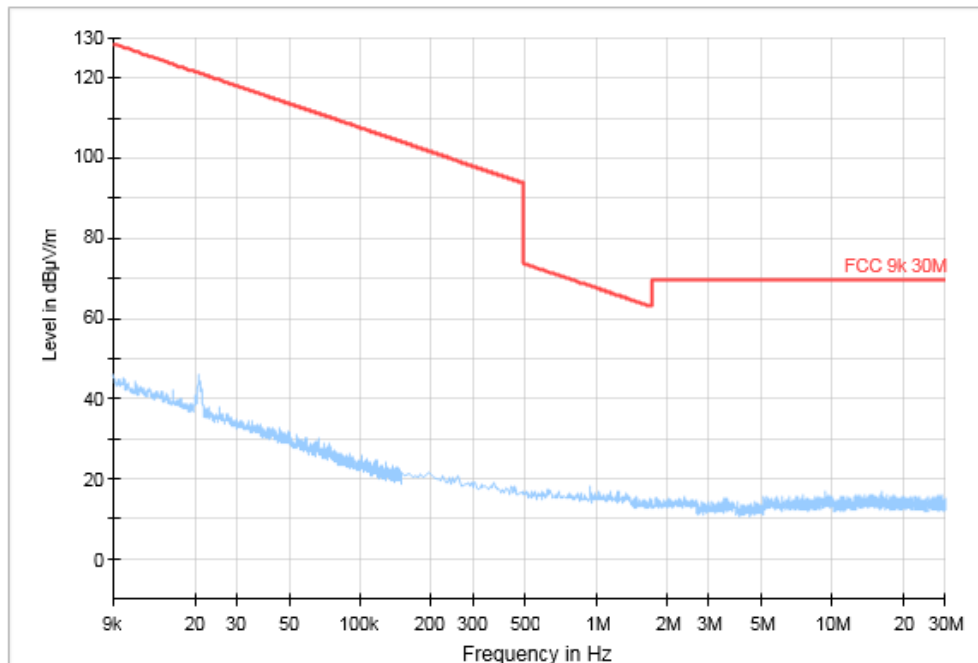


Fig. 119 Radiated Spurious Emission (All Channel, 9 kHz ~30 MHz)



### A.10. AC Power Line Conducted Emission

**Test Condition:**

Voltage (V)	Frequency (Hz)
120	60

**Measurement Result and limit:**

RLAN (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.120	Fig.121	P
0.5 to 5	56			
5 to 30	60			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

RLAN (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB $\mu$ V)	Result (dB $\mu$ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.120	Fig.121	P
0.5 to 5	46			
5 to 30	50			

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

**Note:** The measurement results include the L1 and N measurements.

**Conclusion: PASS**

**Test graphs as below:**

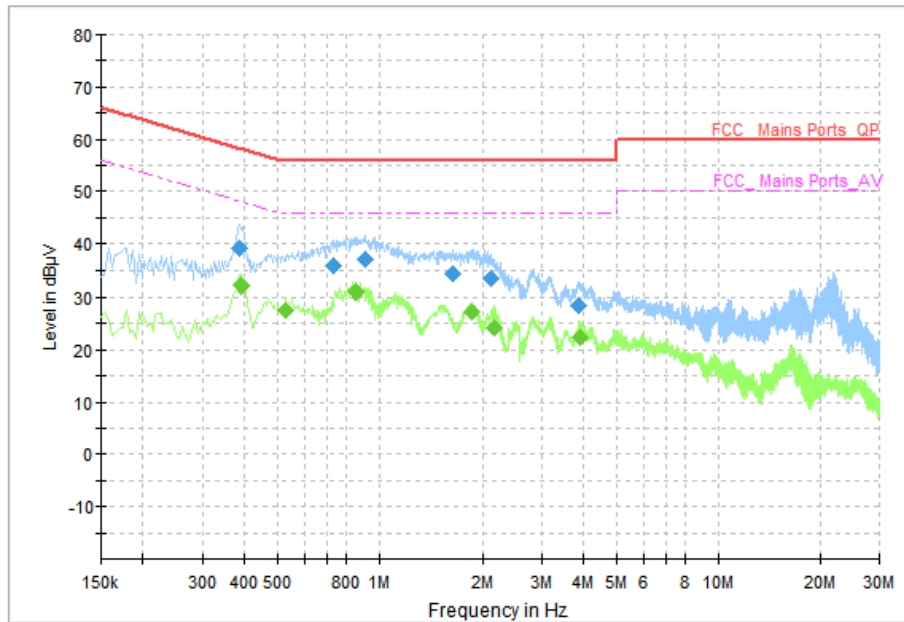


Fig. 120 AC Power line Conducted Emission (802.11n, AE1, 120V)

Measurement Result: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.386000	39.07	58.15	19.08	N	ON	9.6
0.730000	35.92	56.00	20.08	N	ON	9.7
0.906000	37.01	56.00	18.99	N	ON	9.7
1.638000	34.39	56.00	21.61	L1	ON	9.7
2.130000	33.33	56.00	22.67	L1	ON	9.7
3.874000	28.48	56.00	27.52	N	ON	9.7

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.390000	32.22	48.06	15.85	N	ON	9.6
0.530000	27.48	46.00	18.52	N	ON	9.7
0.854000	30.97	46.00	15.03	N	ON	9.7
1.862000	27.37	46.00	18.63	N	ON	9.7
2.162000	24.17	46.00	21.83	N	ON	9.7
3.886000	22.28	46.00	23.72	N	ON	9.7

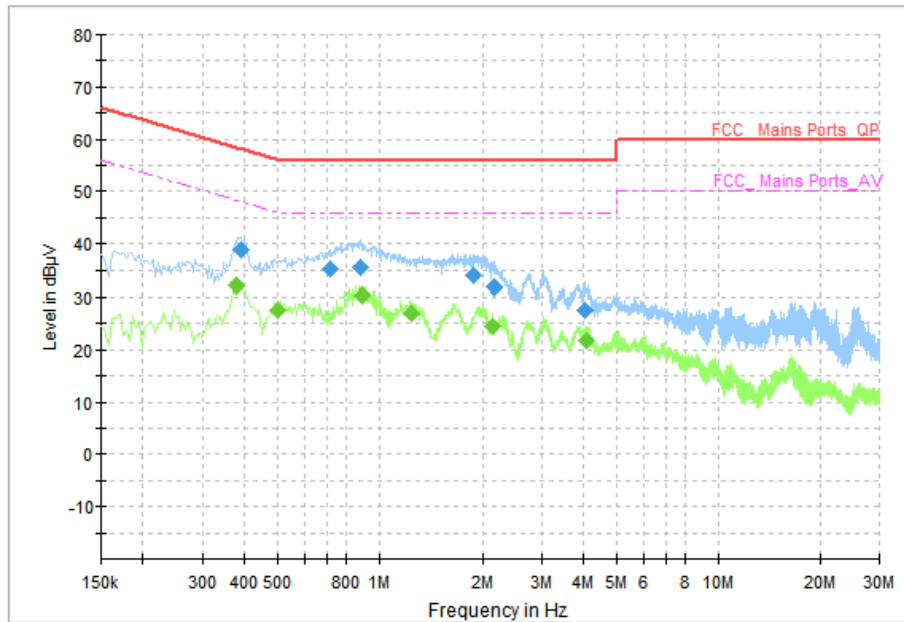


Fig. 121 AC Power line Conducted Emission (Idle, AE1, 120V)

Measurement Result: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.390000	38.81	58.06	19.26	N	ON	9.6
0.714000	35.21	56.00	20.79	N	ON	9.7
0.878000	35.59	56.00	20.41	N	ON	9.7
1.882000	34.01	56.00	21.99	L1	ON	9.7
2.170000	31.89	56.00	24.11	L1	ON	9.7
4.006000	27.43	56.00	28.57	N	ON	9.7

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.378000	32.21	48.32	16.12	N	ON	9.6
0.498000	27.43	46.03	18.61	N	ON	9.7
0.890000	30.26	46.00	15.74	N	ON	9.7
1.250000	27.09	46.00	18.91	N	ON	9.7
2.150000	24.43	46.00	21.57	N	ON	9.7
4.086000	21.66	46.00	24.34	N	ON	9.7



### **A.11. Power control**

A Transmission Power Control mechanism is not required for systems with an e.i.r.p. of less than 27dBm (500mW).

**\*\*\*END OF REPORT\*\*\***