



TEST REPORT

No.24T04N002645-009-WLAN 5G

for

Shanghai Sunmi Technology Co.,Ltd.

Wireless data POS System

Model Name: T5F1A

with

Hardware Version: SM03_MB_V1.1

Software Version: QSC625VPBCJ10R01A03_BA01BP01GLM03V01

FCC ID: 2AH25T5F1A

Issued Date: 2025-02-17

Designation Number: CN1210

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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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04N002645-009-WLAN 5G	Rev.0	1st edition	2025-02-17

Note: the latest revision of the test report supersedes all previous versions.



CONTENTS

CONTENTS	3
1. SUMMARY OF TEST REPORT	4
1.1. TEST ITEMS	4
1.2. TEST STANDARDS	4
1.3. TEST RESULT	4
1.4. TESTING LOCATION	4
1.5. PROJECT DATA	4
1.6. SIGNATURE	4
2. CLIENT INFORMATION	5
2.1. APPLICANT INFORMATION	5
2.2. MANUFACTURER INFORMATION	5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	6
3.1. ABOUT EUT	6
3.2. INTERNAL IDENTIFICATION OF EUT	6
3.3. INTERNAL IDENTIFICATION OF AE	6
3.4. GENERAL DESCRIPTION	6
4. REFERENCE DOCUMENTS	8
4.1. DOCUMENTS SUPPLIED BY APPLICANT	8
4.2. REFERENCE DOCUMENTS FOR TESTING	8
5. TEST RESULTS	9
5.1. TESTING ENVIRONMENT	9
5.2. TEST RESULTS	9
5.3. STATEMENTS	9
6. TEST EQUIPMENTS UTILIZED	10
7. LABORATORY ENVIRONMENT	11
8. MEASUREMENT UNCERTAINTY	12
ANNEX A: DETAILED TEST RESULTS	13
A.1. MEASUREMENT METHOD	13
A.2. MAXIMUM OUTPUT POWER	16
A.3. PEAK POWER SPECTRAL DENSITY (CONDUCTED)	18
A.4. OCCUPIED 26dB BANDWIDTH (CONDUCTED)	19
A.5. OCCUPIED 6dB BANDWIDTH (CONDUCTED)	23
A.6. 99% OCCUPIED BANDWIDTH (CONDUCTED)	27
A.7. DYNAMIC FREQUENCY SELECTION	31
A.8. BAND EDGES COMPLIANCE	35
A.9. TRANSMITTER SPURIOUS EMISSION	45
A.10. RADIATED SPURIOUS EMISSIONS < 30MHZ	63
A.11. AC POWER LINE CONDUCTED EMISSION	65
A.12. POWER CONTROL	68



1. Summary of Test Report

1.1. Test Items

Description	Wireless data POS System
Model Name	T5F1A
Applicant's name	Shanghai Sunmi Technology Co.,Ltd.
Manufacturer's Name	Shanghai Sunmi Technology Co.,Ltd.

1.2. Test Standards

FCC Part15-2023; FCC 06-96-2006; ANSI C63.10-2013; KDB789033-V02r01; KDB 905462-D02.

1.3. Test Result

Pass

Please refer to "5.2. Test Results"

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,
Futian District, Shenzhen, Guangdong, P. R. China 51800

1.5. Project data

Testing Start Date:	2024-11-07
Testing End Date:	2024-12-10

1.6. Signature

Lin Zechuang
(Prepared this test report)

An Ran
(Reviewed this test report)

Zhang Bojun
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Shanghai Sunmi Technology Co.,Ltd.
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200433, China
Contact Person Emma Yang
E-Mail chan.yang@sunmi.com
Telephone: 13510126210
Fax: /

2.2. Manufacturer Information

Company Name: Shanghai Sunmi Technology Co.,Ltd.
Address: Room 505, NO.388 Song Hu Road, Yang Pu District, Shanghai
200433, China
Contact Person Emma Yang
E-Mail chan.yang@sunmi.com
Telephone: 13510126210
Fax: /



3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	Wireless data POS System
Model Name	T5F1A
RF Protocol	IEEE 802.11a/n-HT20,40/ac-VHT20,40,80
WLAN Frequency Range	ISM Bands: 5150MHz~5250MHz; 5250MHz~5350MHz; 5470MHz~5725MHz; 5725MHz~5850MHz.
Type of modulation	OFDM
Antenna Type	Integrated antenna
Antenna Gain	2.78dBi
Power Supply	7.7V DC by Battery
FCC ID	2AH25T5F1A
Device Type (DFS)	Client without radar detection(only support client mode)
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 used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
			QSC625VPBCJ10	
UT13aa	869233070014219	SM03_MB_V1.1	R01A03_BA01BP0 1GLM03V01	2024-11-06
			QSC625VPBCJ10	
UT01aa	869233070014896	SM03_MB_V1.1	R01A03_BA01BP0 1GLM03V01	2024-11-04

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

UT13aa is used for conduction test, UT01aa is used for radiation test and AC Power line Conducted Emission test.

3.3. Internal Identification of AE used during the test

AE No.	Description	AE ID*
AE1	/	/

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

3.4. General Description

The Equipment under Test (EUT) is a model of Smart Phone with integrated antenna and battery. It consists of normal options: Lithium Battery, Charger and USB Cable.



No.24T04N002645-009-WLAN 5G

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.

Reference	Title	Version
FCC Part15	FCC CFR 47,Part 15,Subpart C	2023
	FCC CFR 47,Part 15,Subpart E	
FCC 06-96	Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) devices in the 5 GHz band	2006
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013
KDB 789033	GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E	V02r01
KDB 905462	Compliance Measurement Procedures for Unlicensed-national Information Infrastructure Devices Operating in the 5250-5350 MHz and 5470-5725 MHz Bands Incorporating Dynamic Frequency Selection	D02

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)	P
1	Power Spectral Density	15.407(a)	P
2	Occupied 26dB Bandwidth	15.403(i)	/
3	Occupied 6dB Bandwidth	15.407(e)	P
4	99% Occupied Bandwidth	15.403	/
5	Dynamic Frequency Selection	15.407 (h)	P
6	Band edge compliance	15.209	P
7	Radiated Spurious Emissions	15.209	P
8	AC Power line Conducted	15.207	P
9	Transmit Power Control	15.407	NA

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/manufacture 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

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.

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	2024-12-27	1 year
2	Power Sensor	U2021XA	MY55430013	Keysight	2024-12-27	1 year
3	RF Control Unit	JS0806-2	21C8060398	Tonscend	2025-05-06	1 year
4	Vector Signal Generator	SMW200A	110889	Rohde & Schwarz	2025-03-11	1 year
5	Shielding Room	S81	CT000986-1344	ETS-Lindgren	2026-09-12	5 years
No.	Equipment	Model	FCC ID	Manufacturer	Calibration Due date	Calibration Period
6	Master AP	RT-AX86U	MSQ-RTAXI600	ASUS	/	/

Radiated test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Test Receiver	ESR7	101676	Rohde & Schwarz	2025-11-21	1 year
2	Spectrum Analyzer	FSV40	101192	Rohde & Schwarz	2025-01-12	1 year
3	Hybrid antenna	VULB 9163	330	Schwarzbeck	2027-04-21	3 years
4	Horn Antenna	3117	00066577	ETS-Lindgren	2025-04-17	3 years
5	Horn Antenna	QSH-SL-18-26-S-20	17013	Q-par	2026-02-01	3 years
6	Horn Antenna	QSH-SL-26-40-K-20	17014	Q-par	2026-01-30	3 years
7	Anechoic Chamber	FACT3-2.0	1285	ETS-Lindgren	2025-05-28	2 years
8	Loop Antenna	HLA6120	35779	TESEQ	2025-05-10	3 years
9	Test Receiver	ESCI	100702	Rohde & Schwarz	2025-01-10	1 year
10	LISN	ENV216	102067	Rohde & Schwarz	2025-10-07	1 year

Test software

No.	Equipment	Manufacturer	Version
1	JS1120-3	Tonscend	3.5
2	EMC32	Rohde & Schwarz	10.50.40

EUT is engineering software provided by the customer to control the transmitting signal.
The EUT was programmed to be in continuously transmitting mode.

7. Laboratory Environment

Shielded room

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	> 2M Ω
Ground system resistance	< 4 Ω

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	> 2M Ω
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3 m distance, from 30 to 1000 MHz
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

8. Measurement Uncertainty

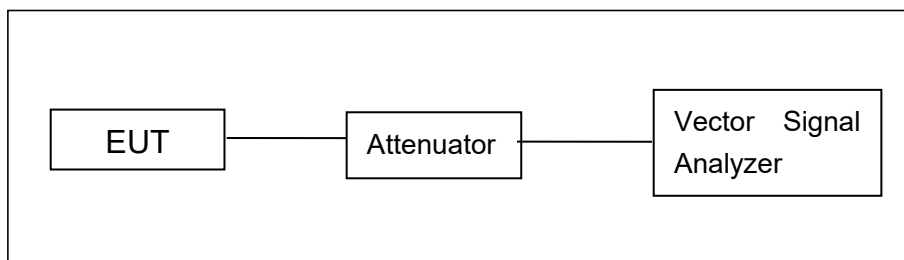
Test Name	Uncertainty ($k=2$)	
1. Maximum output Power	1.36dB	
2. Peak Power Spectral Density	1.36dB	
3. Occupied 26dB Bandwidth	4.56kHz	
4. Occupied 6dB Bandwidth	4.56kHz	
5. 99% Occupied Bandwidth	4.56kHz	
6. Band Edges Compliance	4.68dB	
7. Transmitter Spurious Emission - Radiated	$9\text{kHz} \leq f < 30\text{MHz}$	1.79dB
	$30\text{MHz} \leq f < 1\text{GHz}$	4.86dB
	$1\text{GHz} \leq f < 18\text{GHz}$	4.82dB
	$18\text{GHz} \leq f \leq 40\text{GHz}$	2.90dB
8. AC Power line Conducted Emission	$150\text{kHz} \leq f \leq 30\text{MHz}$	2.68dB

ANNEX A: Detailed Test Results

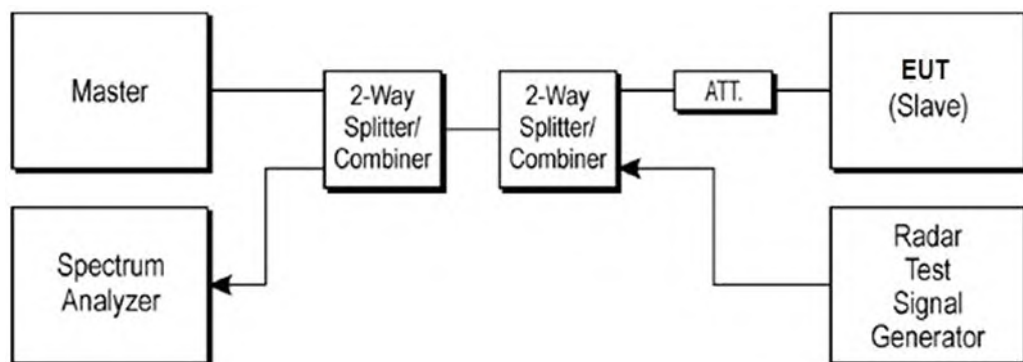
A.1. Measurement Method

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.



6). The below figure shows the DFS setup, where the EUT is a RLAN device operating in slave mode, without Radar Interference Detection function. This setup also contains a device operating in master mode. The radar test signals are injected into the master device. The EUT (slave device) is associated with the master device. WLAN traffic is generated by streaming the mpeg file from the master to the slave in full monitor video mode using the media player.

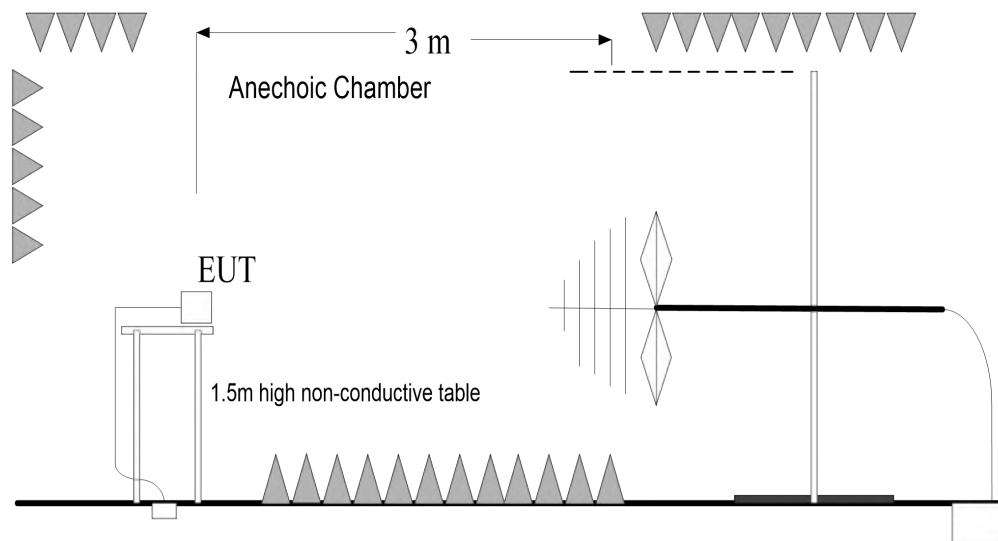


2) Radiated Emission Measurements

Test setup:

9kHz-30MHz:

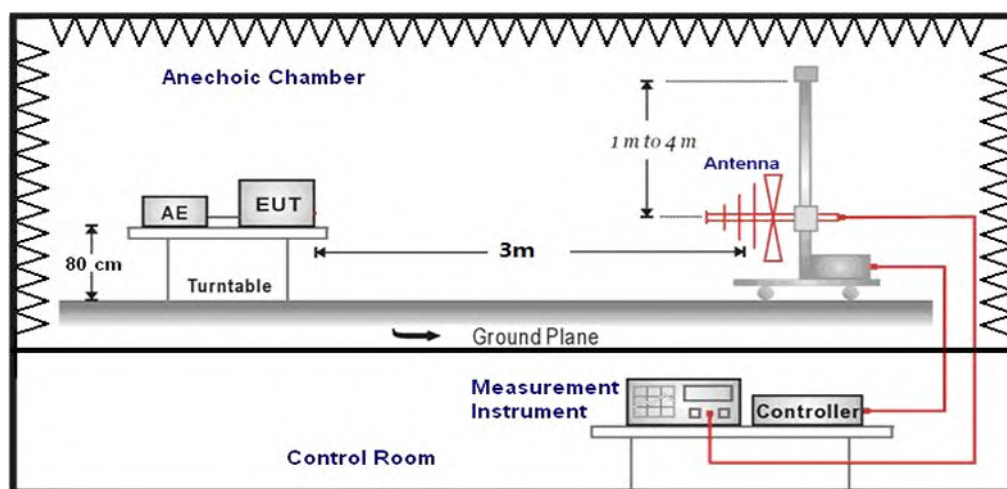
The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



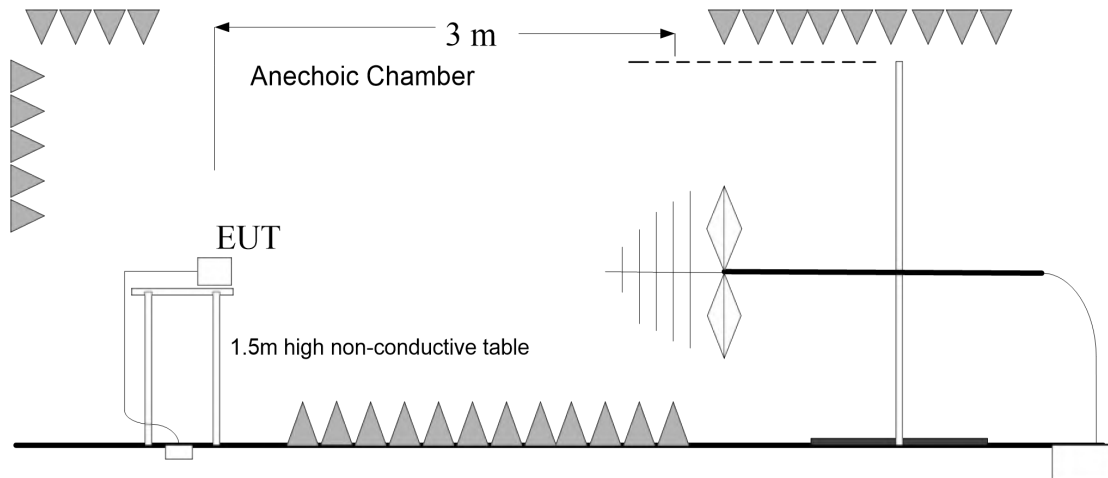
30MHz-40GHz:

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

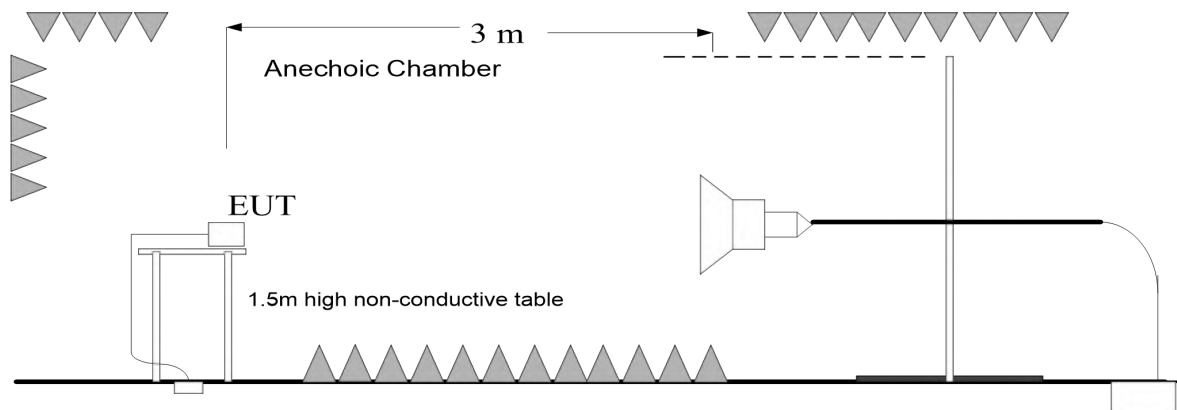
30MHz-1GHz:



1GHz-3GHz:

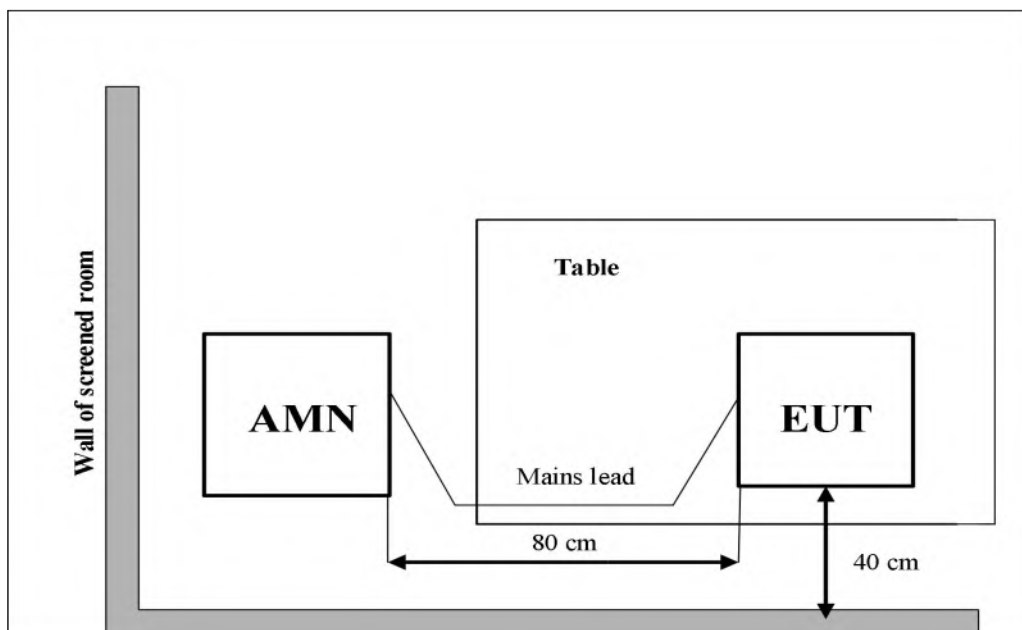


3GHz-40GHz:



3) AC Power line Conducted Emission Measurement

For WLAN, the EUT is working under test mode. The EUT is commanded to operate at maximum transmitting power.



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:

Mode	Frequency (MHz)	RF output power (dBm)	Conclusion
802.11a	5180MHz(CH36)	17.78	P
	5200MHz(CH40)	17.42	P
	5240MHz(CH48)	17.08	P
	5260MHz(CH52)	17.37	P
	5280MHz(CH56)	17.68	P
	5320MHz(CH64)	18.56	P
	5500MHz(CH100)	17.99	P
	5580MHz(CH116)	18.23	P
	5700MHz(CH140)	18.58	P
	5745MHz(CH149)	18.58	P
	5785MHz(CH157)	18.24	P
	5825MHz(CH165)	18.75	P
802.11n-HT20	5180MHz(CH36)	17.74	P
	5200MHz(CH40)	17.38	P
	5240MHz(CH48)	17.00	P
	5260MHz(CH52)	17.28	P
	5280MHz(CH56)	17.57	P
	5320MHz(CH64)	18.44	P
	5500MHz(CH100)	17.86	P
	5580MHz(CH116)	18.09	P
	5700MHz(CH140)	18.39	P
	5745MHz(CH149)	18.44	P
	5785MHz(CH157)	18.09	P
	5825MHz(CH165)	18.58	P

802.11ac-VHT20	5180MHz(CH36)	17.76	P
	5200MHz(CH40)	17.39	P
	5240MHz(CH48)	17.04	P
	5260MHz(CH52)	17.34	P
	5280MHz(CH56)	17.59	P
	5320MHz(CH64)	18.47	P
	5500MHz(CH100)	17.87	P
	5580MHz(CH116)	18.12	P
	5700MHz(CH140)	18.46	P
	5745MHz(CH149)	18.49	P
	5785MHz(CH157)	18.12	P
	5825MHz(CH165)	18.60	P
802.11n-HT40	5190MHz(CH38)	17.97	P
	5230MHz(CH46)	17.50	P
	5270MHz(CH54)	17.80	P
	5310MHz(CH62)	18.18	P
	5510MHz(CH102)	18.22	P
	5550MHz(CH110)	18.28	P
	5670MHz(CH134)	18.69	P
	5755MHz(CH151)	18.69	P
	5795MHz(CH159)	18.53	P
802.11ac-VHT40	5190MHz(CH38)	18.03	P
	5230MHz(CH46)	17.52	P
	5270MHz(CH54)	17.83	P
	5310MHz(CH62)	18.19	P
	5510MHz(CH102)	18.27	P
	5550MHz(CH110)	18.30	P
	5670MHz(CH134)	18.74	P
	5755MHz(CH151)	18.72	P
	5795MHz(CH159)	18.56	P
802.11ac-VHT80	5210MHz(CH42)	17.39	P
	5290MHz(CH58)	17.66	P
	5530MHz(CH106)	17.89	P
	5610MHz(CH122)	18.33	P
	5775MHz(CH155)	18.57	P

Note:

The data rate 6Mbps (11a mode), MCS0 (11n mode) and MCS0(VHT mode) are selected as the Worst-Case. **802.11a** (11ac-VHT40,80) mode is selected as the worst condition. 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%.

Conclusion: PASS

A.3. Peak Power Spectral Density (conducted)

Measurement of method: See KDB 789033 D02 v02r01, Section F.

Measurement Limit:

Standard	Frequency (MHz)	Limit
FCC CRF Part 15.407(a)	5150MHz~5250MHz	11dBm/MHz
	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	Frequency (MHz)	Power Spectral Density(dBm/MHz)	Conclusion
802.11a	5180MHz(CH36)	6.46	P
	5200MHz(CH40)	5.61	P
	5240MHz(CH48)	6.15	P
	5260MHz(CH52)	5.50	P
	5280MHz(CH56)	5.86	P
	5320MHz(CH64)	6.61	P
	5500MHz(CH100)	6.54	P
	5580MHz(CH116)	6.72	P
	5700MHz(CH140)	6.81	P
802.11ac-VHT40	5190MHz(CH38)	2.87	P
	5230MHz(CH46)	2.79	P
	5270MHz(CH54)	2.52	P
	5310MHz(CH62)	2.99	P
	5510MHz(CH102)	3.19	P
	5550MHz(CH110)	3.40	P
	5670MHz(CH134)	3.28	P
802.11ac-VHT80	5210MHz(CH42)	-1.37	P
	5290MHz(CH58)	-0.60	P
	5530MHz(CH106)	-0.07	P
	5610MHz(CH122)	-0.02	P
Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	5745MHz(CH149)	4.26	P
	5785MHz(CH157)	3.99	P
	5825MHz(CH165)	4.28	P
802.11ac-VHT40	5755MHz(CH151)	0.82	P
	5795MHz(CH159)	0.49	P
802.11ac-VHT80	5775MHz(CH155)	-2.80	P

Conclusion: PASS

A.4. Occupied 26dB Bandwidth (conducted)

Measurement of method: See KDB 789033 D02 v02r01, Section C.1.

Measurement Limit:

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

The measurement is made according to KDB 789033

Measurement Result:

Mode	Frequency (MHz)	Occupied 26dB Bandwidth (MHz)		Conclusion
802.11a	5180MHz(CH36)	Fig.1	21.60	/
	5200MHz(CH40)	Fig.2	22.20	/
	5240MHz(CH48)	/	21.56	/
	5260MHz(CH52)	/	21.52	/
	5280MHz(CH56)	/	21.36	/
	5320MHz(CH64)	/	22.20	/
	5500MHz(CH100)	/	21.72	/
	5580MHz(CH116)	/	21.52	/
	5700MHz(CH140)	/	21.68	/
	5745MHz(CH149)	/	22.76	/
	5785MHz(CH157)	/	22.00	/
	5825MHz(CH165)	/	23.48	/
802.11ac-VHT40	5190MHz(CH38)	Fig.3	42.16	/
	5230MHz(CH46)	Fig.4	41.20	/
	5270MHz(CH54)	/	41.60	/
	5310MHz(CH62)	/	42.08	/
	5510MHz(CH102)	/	42.00	/
	5550MHz(CH110)	/	41.68	/
	5670MHz(CH134)	/	42.40	/
	5755MHz(CH151)	/	49.28	/
	5795MHz(CH159)	/	49.20	/
802.11ac-VHT80	5210MHz(CH42)	Fig.5	85.92	/
	5290MHz(CH58)	Fig.6	82.88	/
	5530MHz(CH106)	/	85.76	/
	5610MHz(CH122)	/	87.84	/
	5775MHz(CH155)	/	83.20	/

See below for test graphs.

Conclusion: PASS



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



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

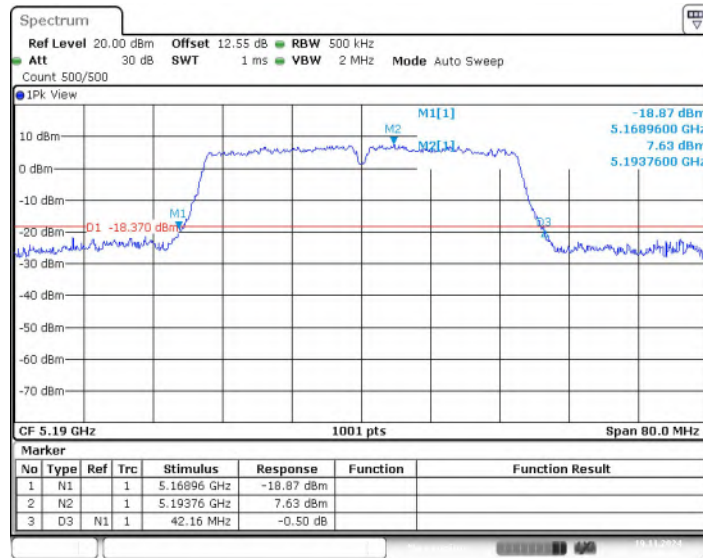


Fig. 3 Occupied 26dB Bandwidth (802.11ac-VHT40, 5190MHz)

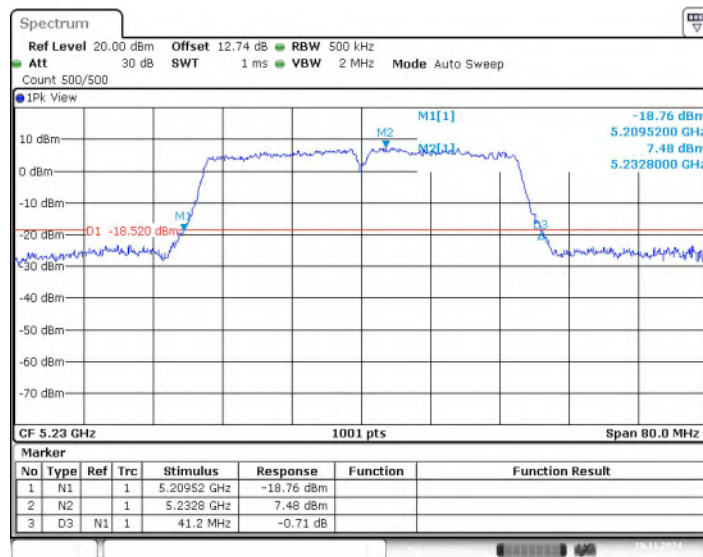


Fig. 4 Occupied 26dB Bandwidth (802.11ac-VHT40, 5230MHz)

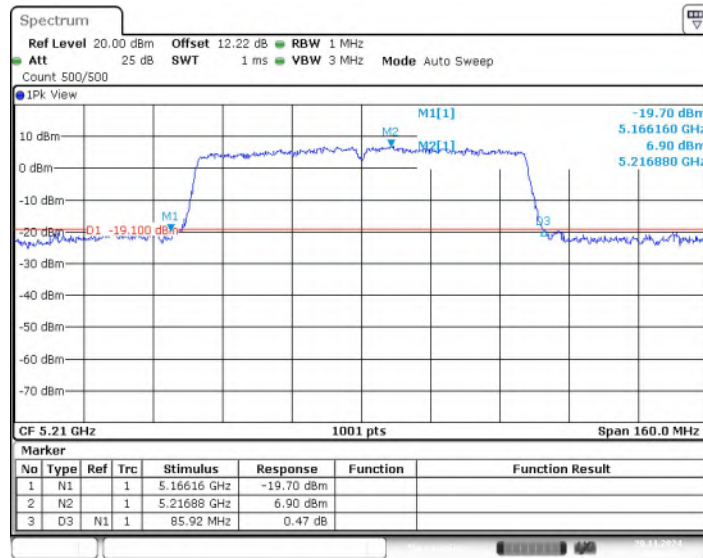


Fig. 5 Occupied 26dB Bandwidth (802.11ac-VHT80, 5210MHz)

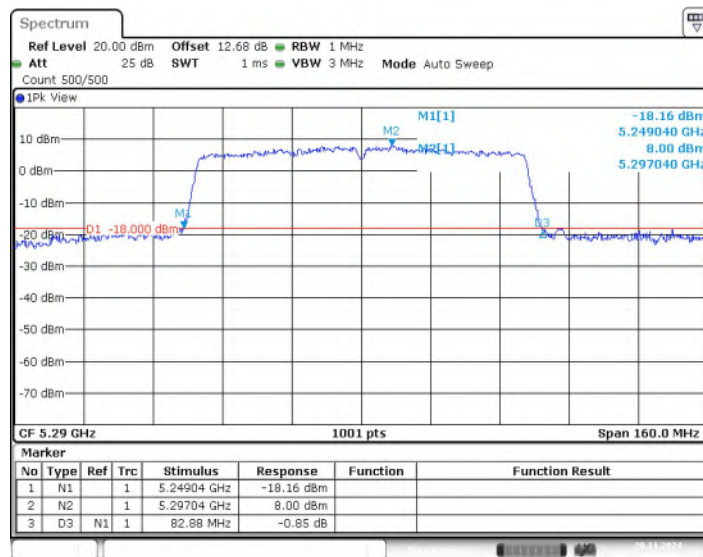


Fig. 6 Occupied 26dB Bandwidth (802.11ac-VHT80, 5290MHz)

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

Measurement of method: See KDB 789033 D02 v02r01, Section C.2.

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	Frequency (MHz)	Occupied 6dB Bandwidth (MHz)		Conclusion
802.11a	5745MHz(CH149)	Fig.7	15.40	P
	5785MHz(CH157)	Fig.8	16.04	P
	5825MHz(CH165)	Fig.9	15.32	P
802.11ac-VHT40	5755MHz(CH151)	Fig.10	35.36	P
	5795MHz(CH159)	Fig.11	35.36	P
802.11ac-VHT80	5775MHz(CH155)	Fig.12	75.20	P

See below for test graphs.

Conclusion: **PASS**

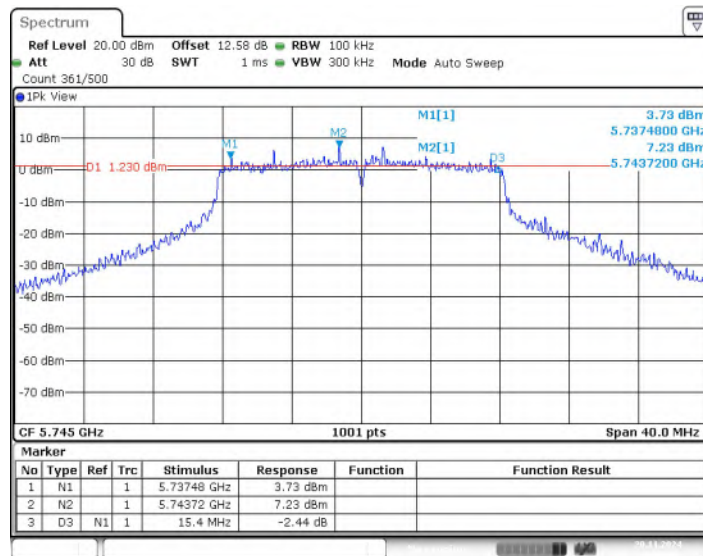


Fig. 7 Occupied 6dB Bandwidth (802.11a, 5745MHz)

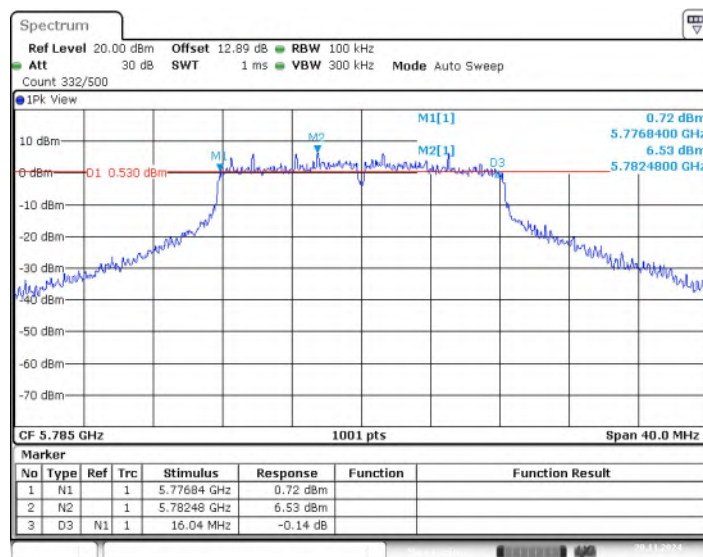


Fig. 8 Occupied 6dB Bandwidth (802.11a, 5785MHz)

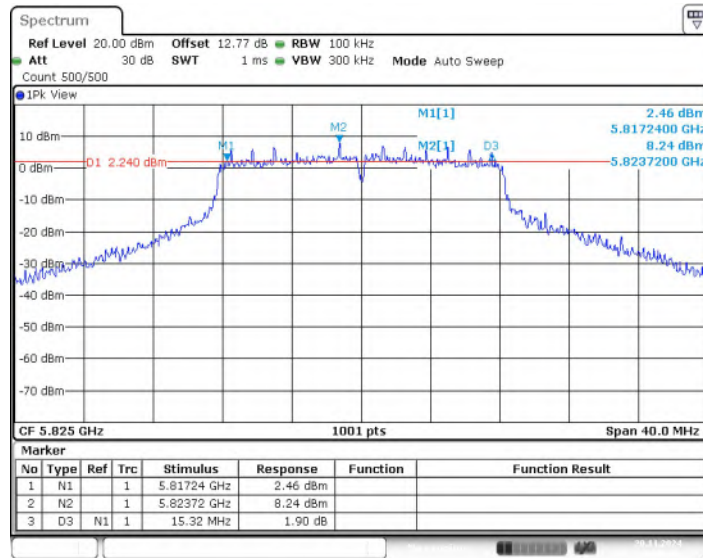


Fig. 9 Occupied 6dB Bandwidth (802.11a, 5825MHz)

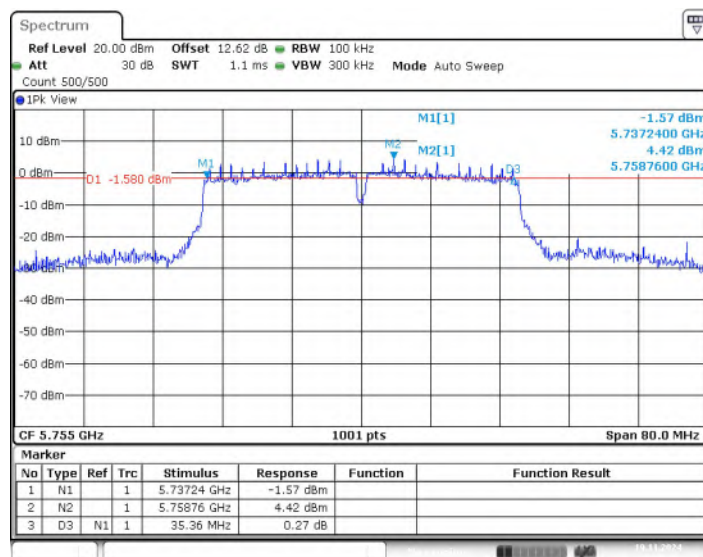


Fig. 10 Occupied 6dB Bandwidth (802.11ac-VHT40, 5755MHz)

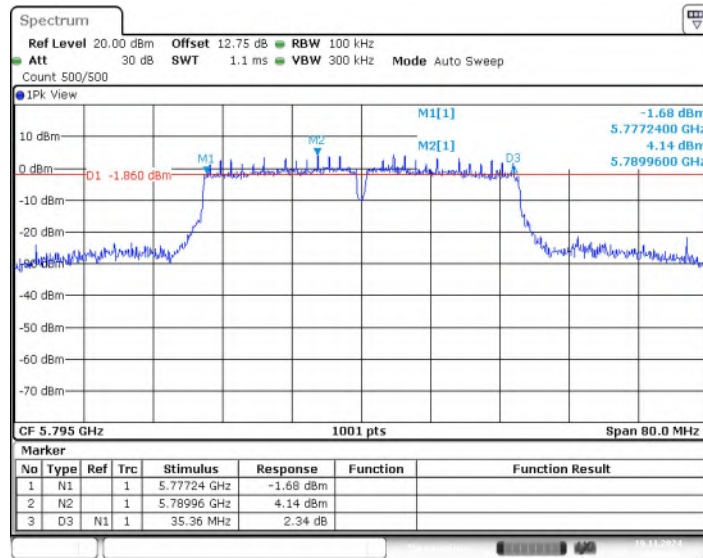


Fig. 11 Occupied 6dB Bandwidth (802.11ac-VHT40, 5795MHz)

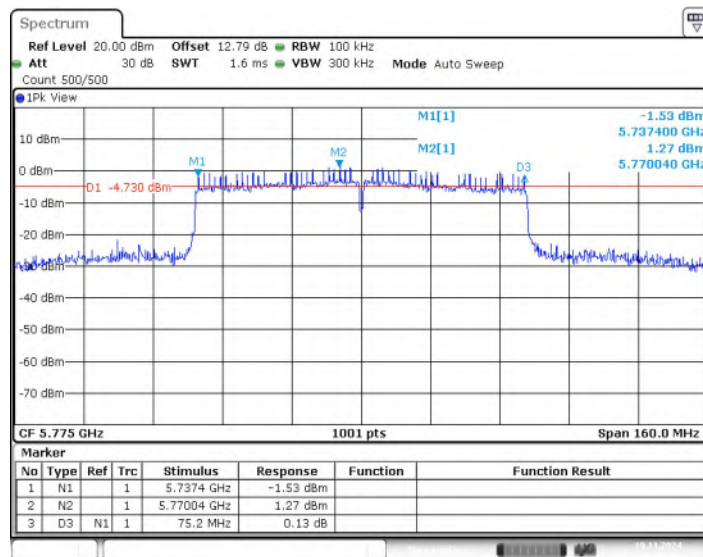


Fig. 12 Occupied 6dB Bandwidth (802.11ac-VHT80, 5775MHz)

A.6. 99% Occupied Bandwidth (conducted)

Measurement of method: See KDB 789033 D02 v02r01, Section D.

Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.403	/

The measurement is made according to KDB 789033.

Measurement Result:

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)		Conclusion
802.11a	5180MHz(CH36)	Fig.13	17.10	/
	5200MHz(CH40)	Fig.14	17.06	/
	5240MHz(CH48)	/	17.06	/
	5260MHz(CH52)	/	17.18	/
	5280MHz(CH56)	/	17.10	/
	5320MHz(CH64)	/	17.14	/
	5500MHz(CH100)	/	17.10	/
	5580MHz(CH116)	/	17.10	/
	5700MHz(CH140)	/	17.26	/
	5745MHz(CH149)	/	17.34	/
	5785MHz(CH157)	/	17.26	/
	5825MHz(CH165)	/	17.42	/
802.11ac-VHT40	5190MHz(CH38)	Fig.15	36.52	/
	5230MHz(CH46)	Fig.16	36.52	/
	5270MHz(CH54)	/	36.52	/
	5310MHz(CH62)	/	36.52	/
	5510MHz(CH102)	/	36.52	/
	5550MHz(CH110)	/	36.52	/
	5670MHz(CH134)	/	36.68	/
	5755MHz(CH151)	/	36.76	/
	5795MHz(CH159)	/	36.76	/
802.11ac-VHT80	5210MHz(CH42)	Fig.17	76.24	/
	5290MHz(CH58)	Fig.18	76.08	/
	5530MHz(CH106)	/	76.24	/
	5610MHz(CH122)	/	76.72	/
	5775MHz(CH155)	/	76.56	/

See below for test graphs.

Conclusion: PASS

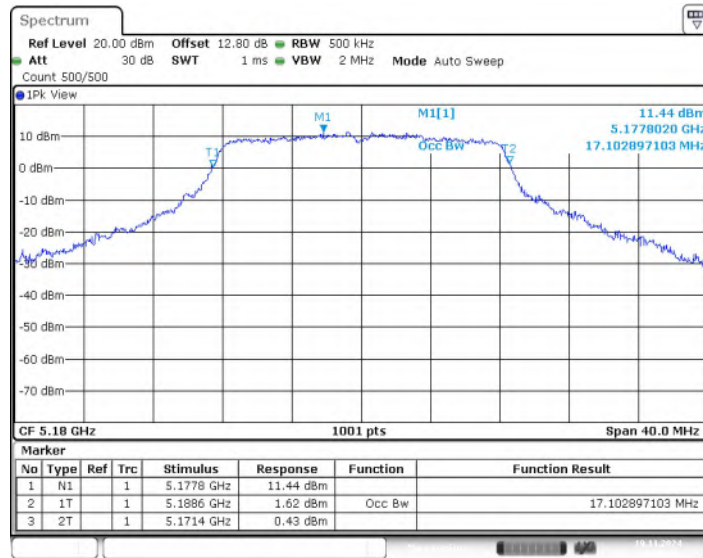


Fig. 13 99% Occupied Bandwidth (802.11a, 5180MHz)

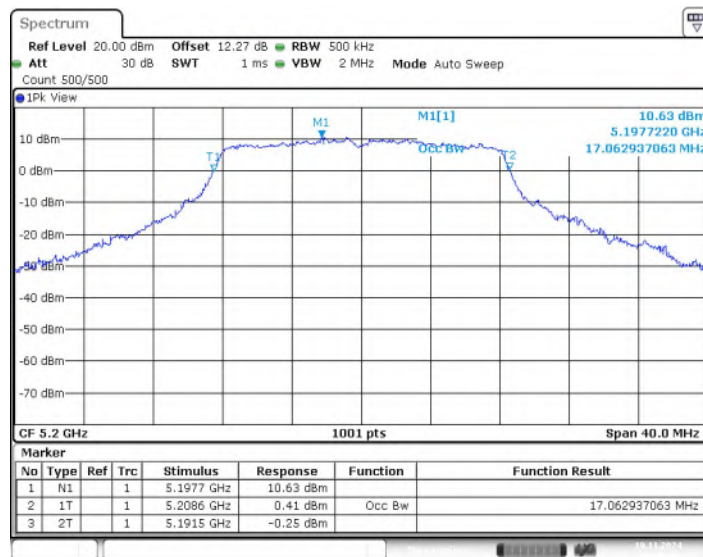


Fig. 14 99% Occupied Bandwidth (802.11a, 5200MHz)

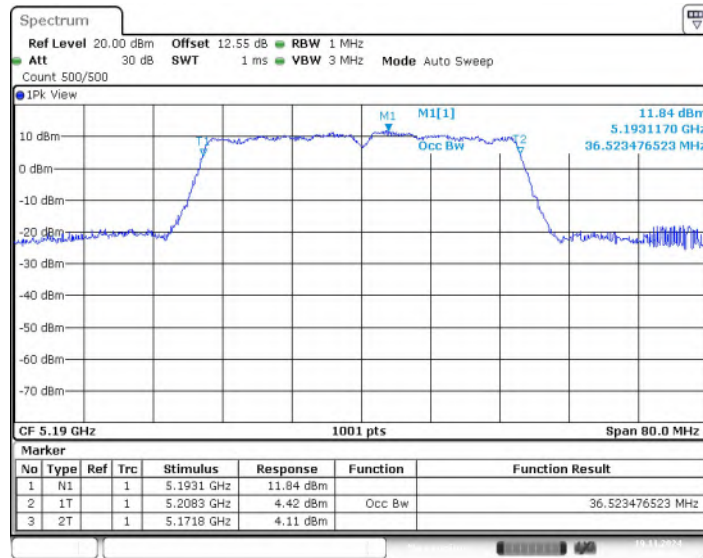


Fig. 15 99% Occupied Bandwidth (802.11ac-VHT40, 5190MHz)

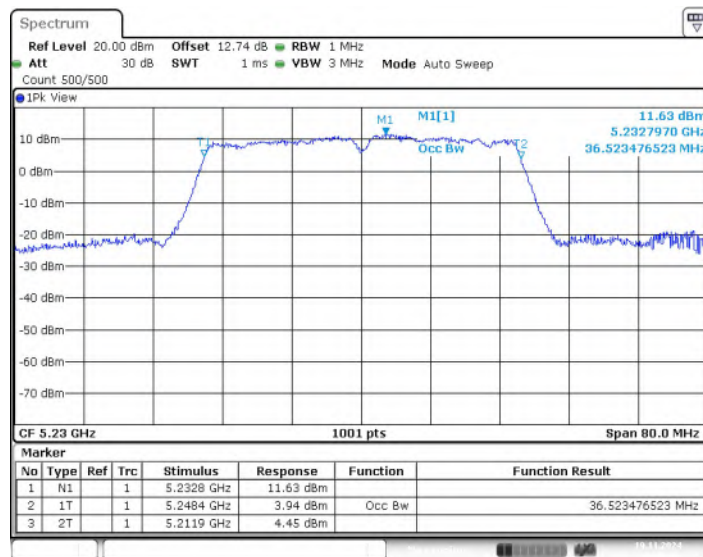


Fig. 16 99% Occupied Bandwidth (802.11ac-VHT40, 5230MHz)

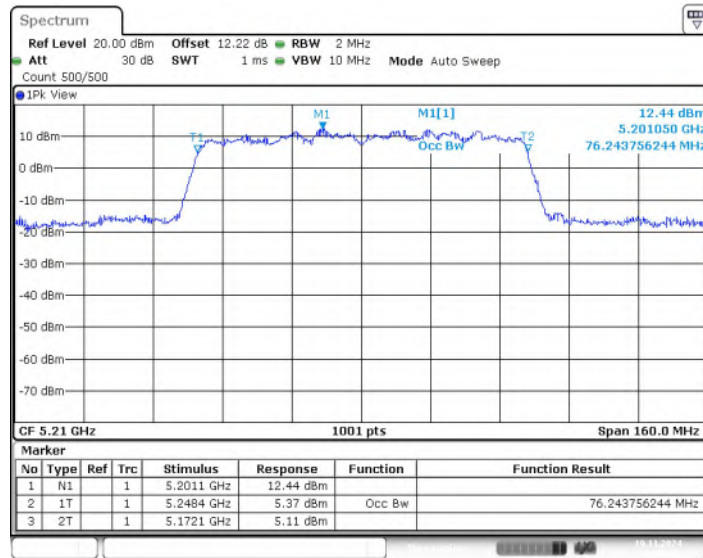


Fig. 17 99% Occupied Bandwidth (802.11ac-VHT80, 5210MHz)

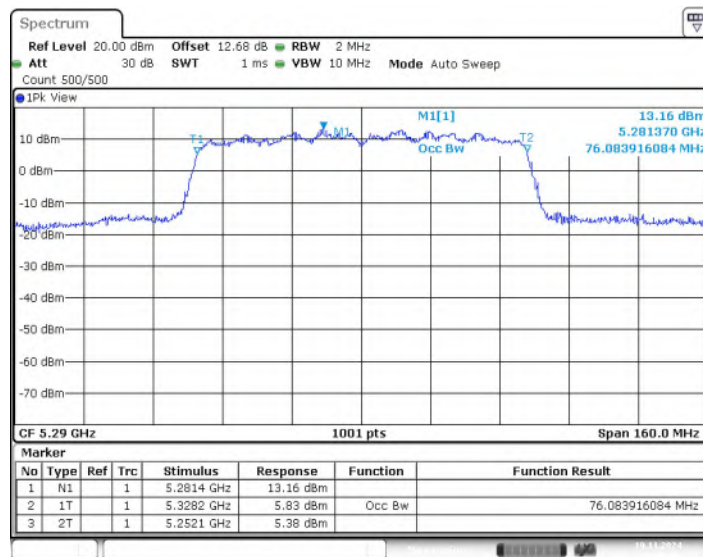


Fig. 18 99% Occupied Bandwidth (802.11ac-VHT80, 5290MHz)

A.7. Dynamic Frequency Selection

The EUT is Client without radar detection (only support client mode).

Measurement of method: See KDB 905462-D02.

Measurement Limit:

Standard	Test Items	Limit
FCC 47 CFR Part 15.407 (h)	Channel Move Time	< 10 s
	Channel Closing Transmission Time	< 200 ms + 60 ms
	Non-Occupancy Period	> 1800 s

The measurement is made according to KDB 905462.

1). Parameters of DFS test signal:

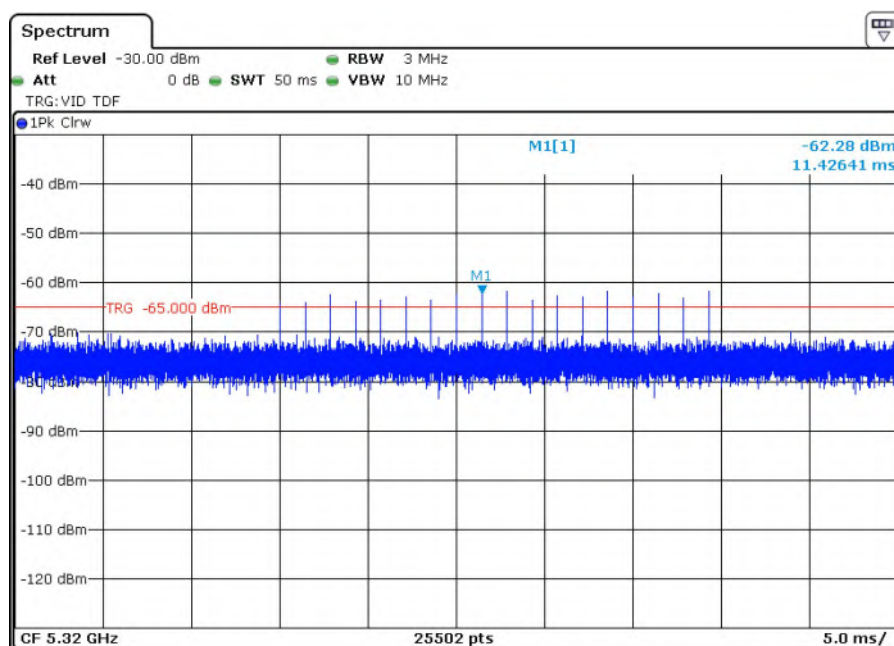
Interference threshold values, master or client incorporation in service monitoring. For device Power less than 23dBm (E.I.R.P.), the threshold level is -62 dBm at the antenna port after Correction for antenna gain and procedural adjustments.

Because of conducted measurement performed, the calibration power from radar signal generator to antenna port of DFS test equipment is -62 dBm.

Maximum Transmit Power	Value
> 200 mW	-64 dBm
< 200 mW	-62 dBm

2). Parameters of the reference DFS test signal:

Pulse width W (μs)	Pulse repetition frequency PRF (PPS)	Pulses per burst (PPB)
1	700	18



Radar Signal (Type 0)



Measurement Results:

Channel Move Time & Channel Closing Transmission Time:

Mode	Frequency (MHz)	Test Results	Conclusion
802.11a	5320MHz(Ch64)	Fig.19	P
802.11ac-VHT80	5530MHz(Ch106)	Fig.20	P

Non-Occupancy Period:

Mode	Frequency (MHz)	Test Results	Conclusion
802.11a	5320MHz(Ch64)	Fig.21	P
802.11ac-VHT80	5530MHz(Ch106)	Fig.22	P

See below for test graphs.

Conclusion: PASS

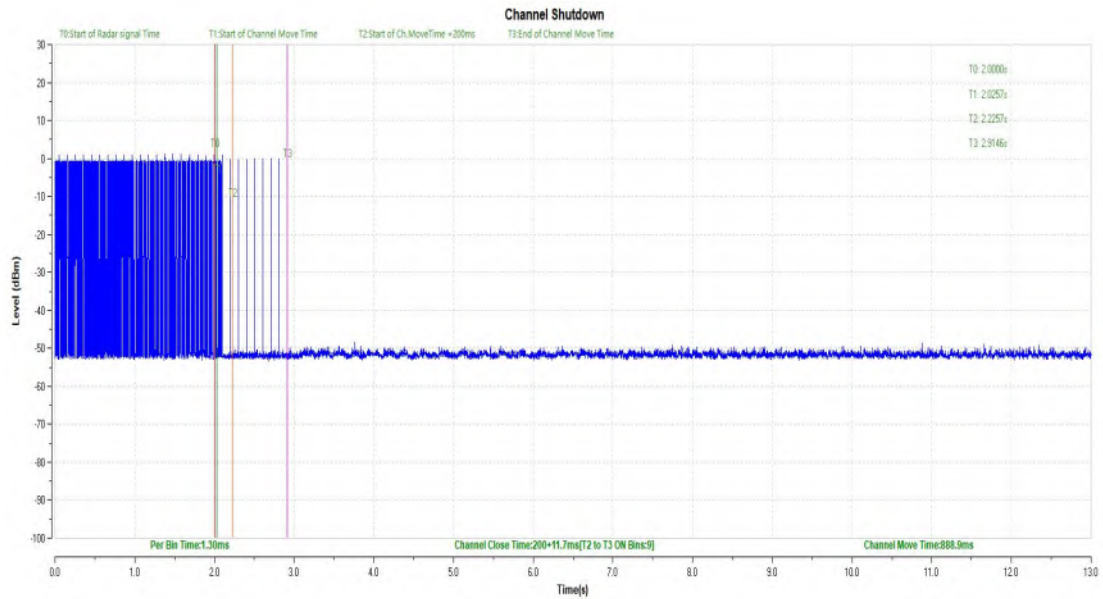


Fig. 19 Channel Move Time & Channel Closing Transmission Time (802.11a Frequency Band: 5250MHz ~ 5350MHz)

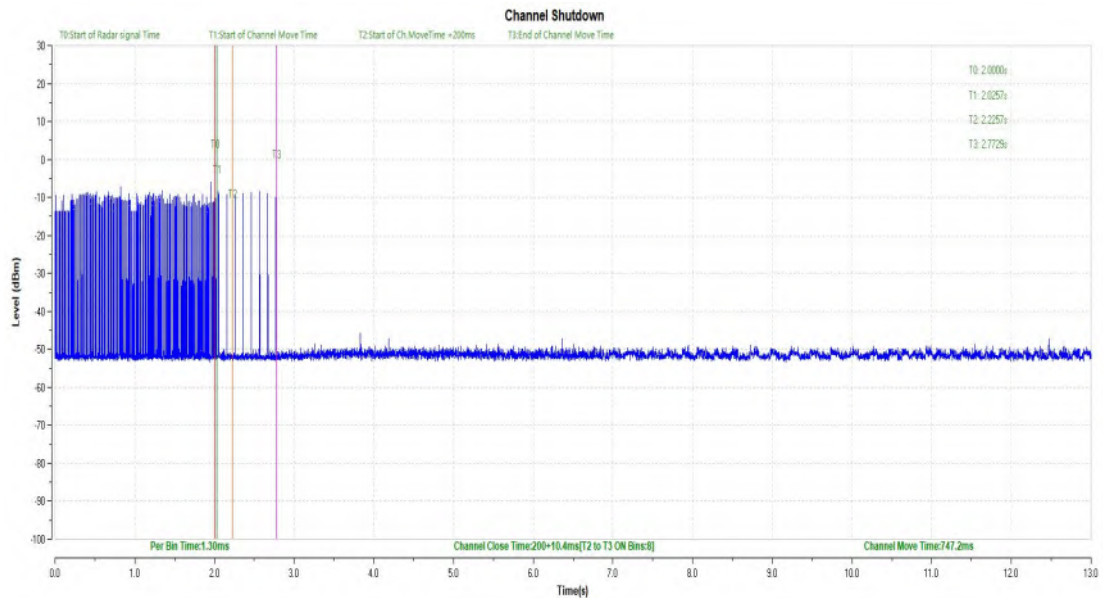


Fig. 20 Channel Move Time & Channel Closing Transmission Time (802.11ac-VHT80 Frequency Band: 5470MHz~5725MHz)

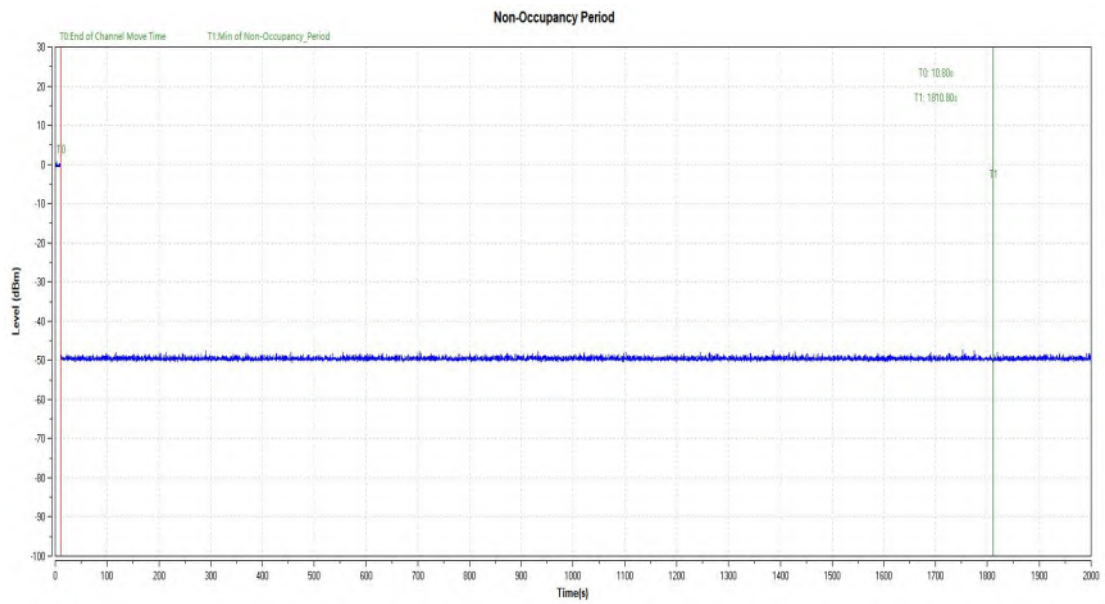


Fig. 21 Non-Occupancy Period (802.11a Frequency Band: 5250MHz ~ 5350MHz)

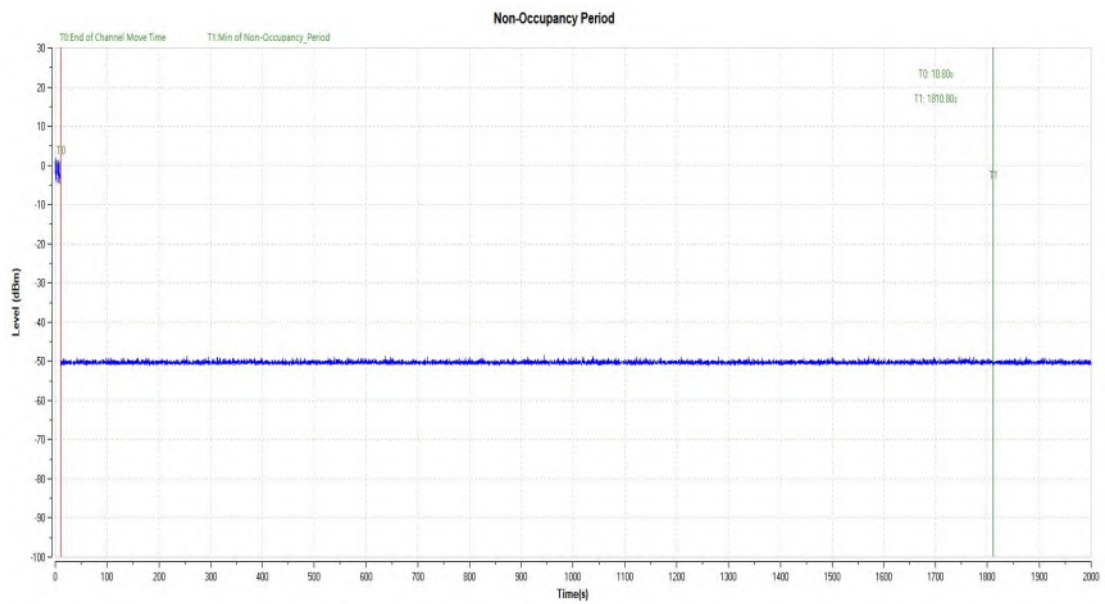


Fig. 22 Non-Occupancy Period (802.11ac-VHT80 Frequency Band: 5470MHz~5725MHz)



A.8. Band Edges Compliance

Method of Measurement: See ANSI C63.10-clause 6.10.

Measurement Limit:

Standard	Limit (dB μ V/m)	
FCC 47 CFR Part 15.209	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)).

Measurement Result:

Mode	Frequency (MHz)	Test Results	Conclusion
802.11a	5180MHz(CH36)	Fig.23	P
	5320MHz(CH64)	Fig.24	P
	5500MHz(CH100)	Fig.25	P
	5700MHz(CH140)	Fig.26	P
	5745MHz(CH149)	Fig.27	P
	5825MHz(CH165)	Fig.28	P
802.11ac-VHT40	5190MHz(CH38)	Fig.29	P
	5310MHz(CH62)	Fig.30	P
	5510MHz(CH102)	Fig.31	P
	5670MHz(CH134)	Fig.32	P
	5755MHz(CH151)	Fig.33	P
	5795MHz(CH159)	Fig.34	P
802.11ac-VHT80	5210MHz(CH42)	Fig.35	P
	5290MHz(CH58)	Fig.36	P
	5530MHz(CH106)	Fig.37	P
	5610MHz(Ch122)	Fig.38	P
	5775MHz(CH155)	Fig.39	P

See below for test graphs.

Conclusion: PASS

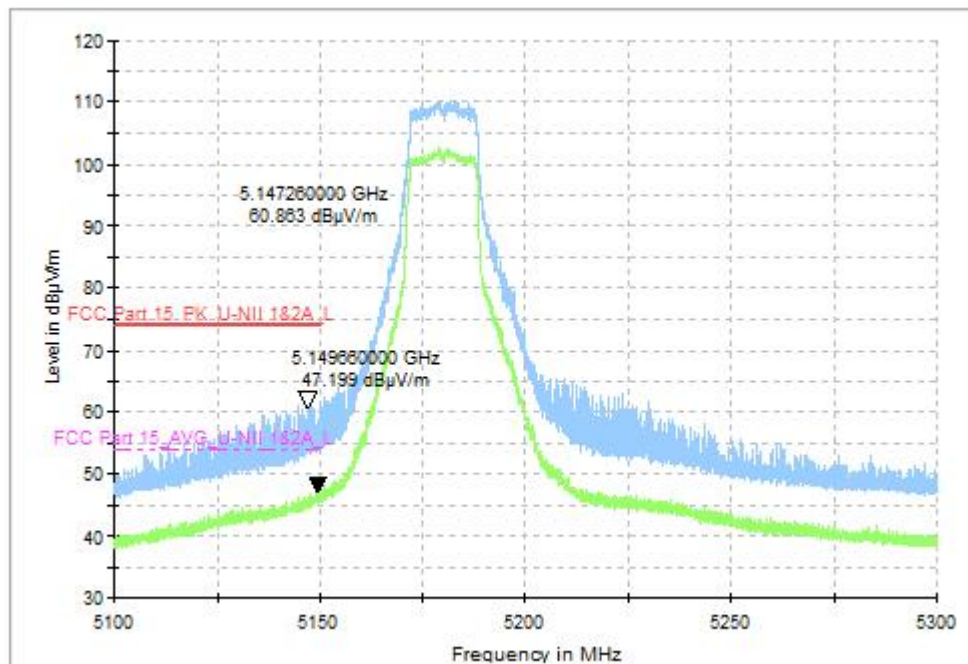


Fig. 23 Band Edges (802.11a, CH36 5180MHz)

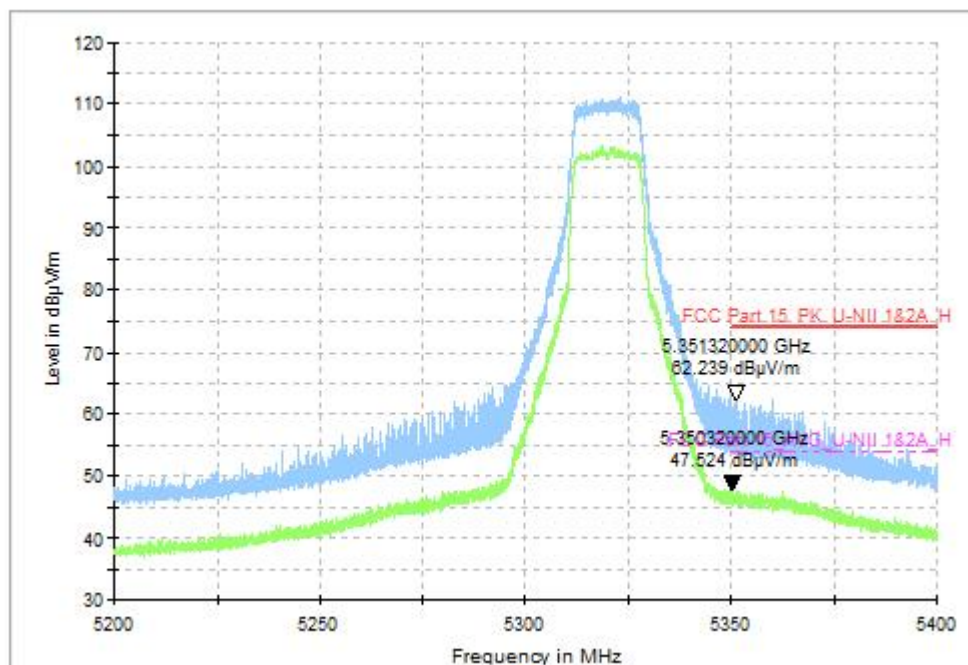


Fig. 24 Band Edges (802.11a, CH64 5320MHz)

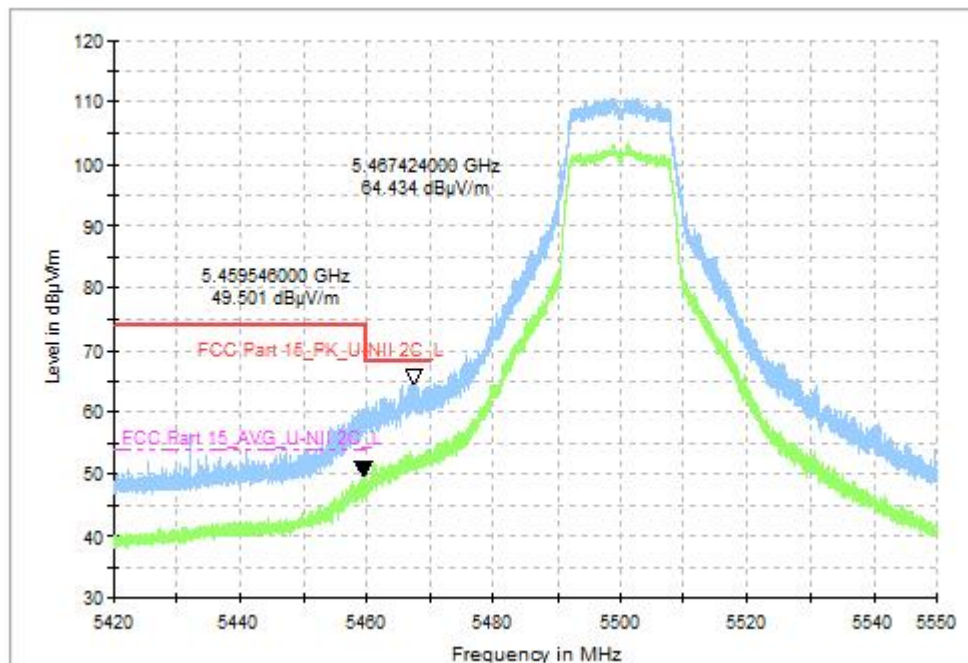


Fig. 25 Band Edges (802.11a, CH100 5500MHz)

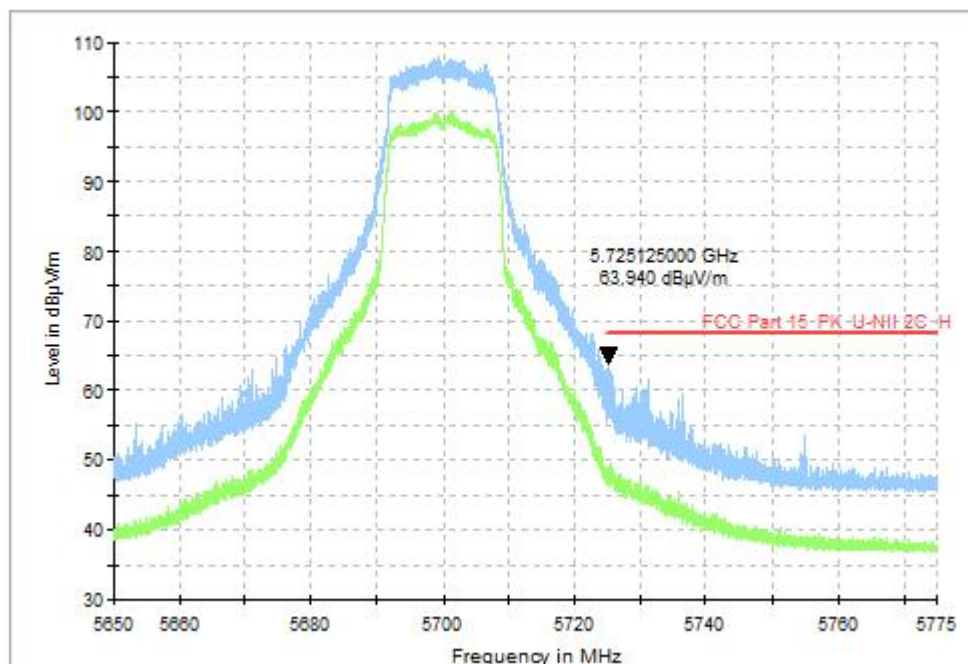


Fig. 26 Band Edges (802.11a, CH140 5700MHz)

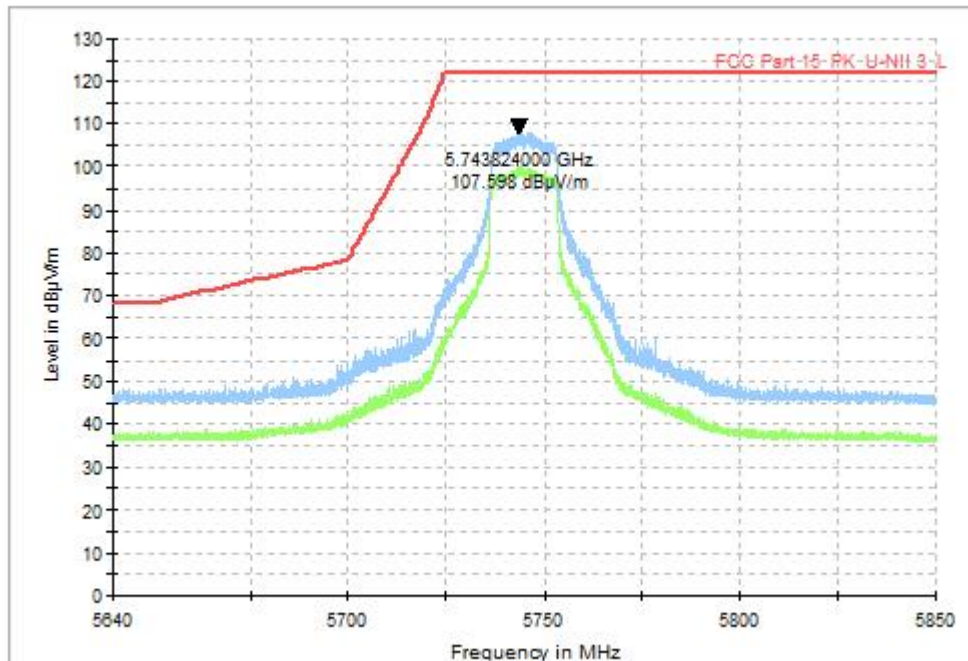


Fig. 27 Band Edges (802.11a, CH149 5745MHz)

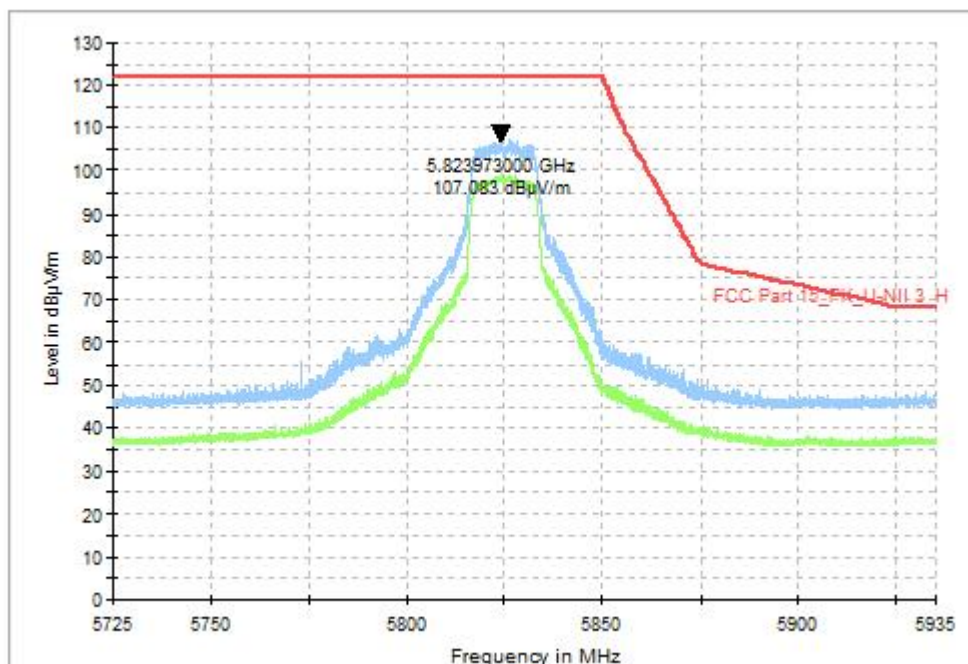


Fig. 28 Band Edges (802.11a, CH165 5825MHz)

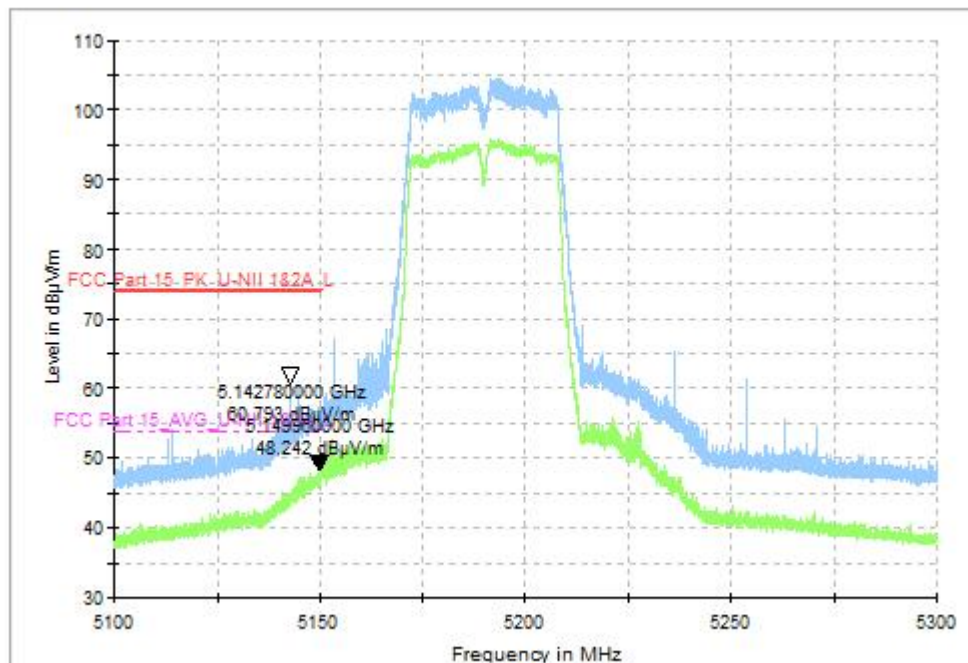


Fig. 29 Band Edges (802.11ac-VHT40, CH38 5190MHz)

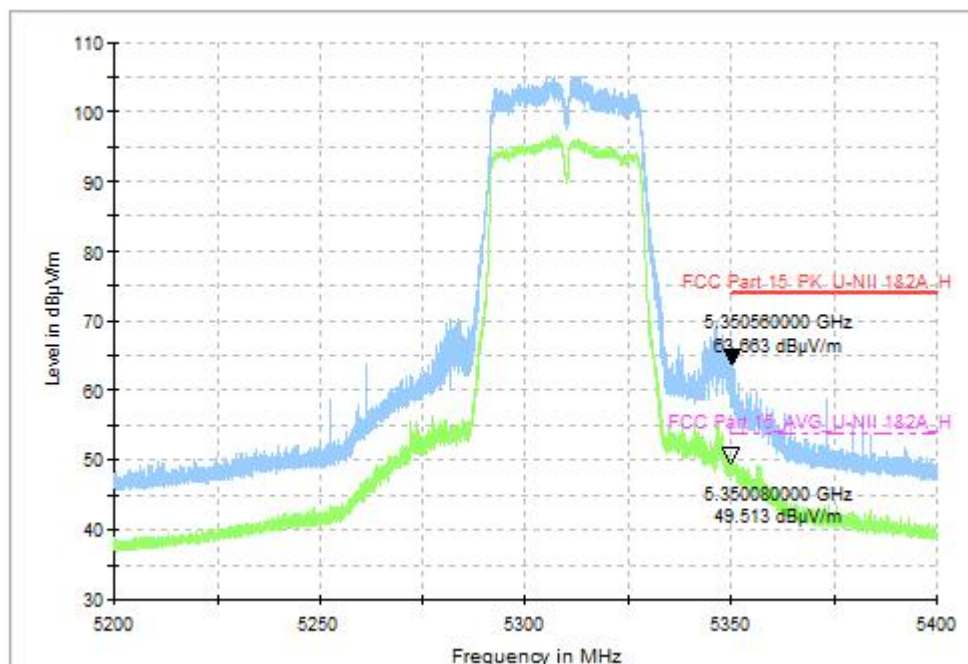


Fig. 30 Band Edges (802.11ac-VHT40, CH62 5310MHz)

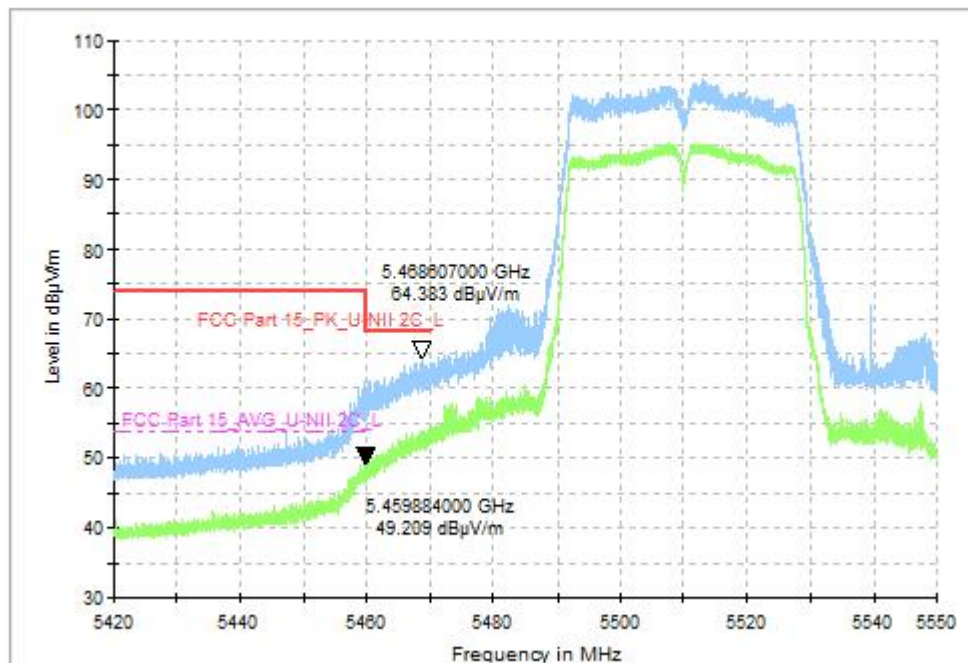


Fig. 31 Band Edges (802.11ac-VHT40, CH102 5510MHz)

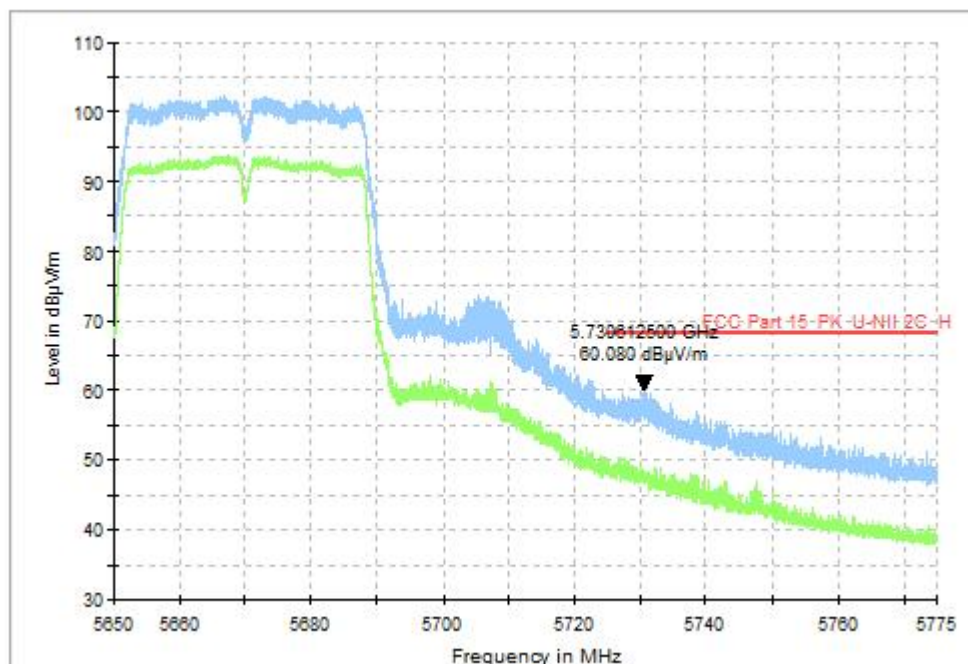


Fig. 32 Band Edges (802.11ac-VHT40, CH134 5670MHz)

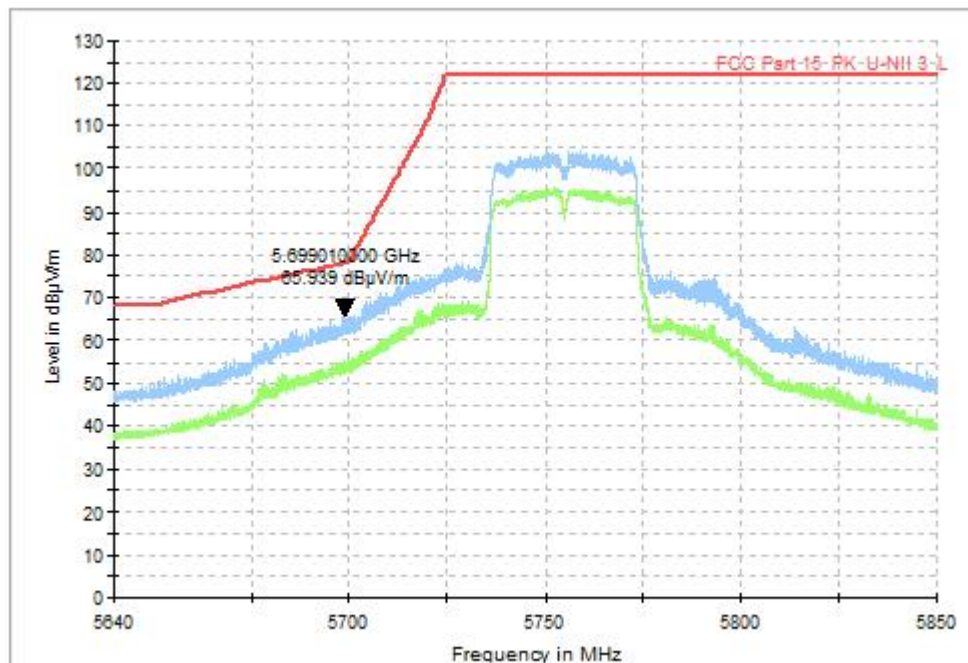


Fig. 33 Band Edges (802.11ac-VHT40, CH151 5755MHz)

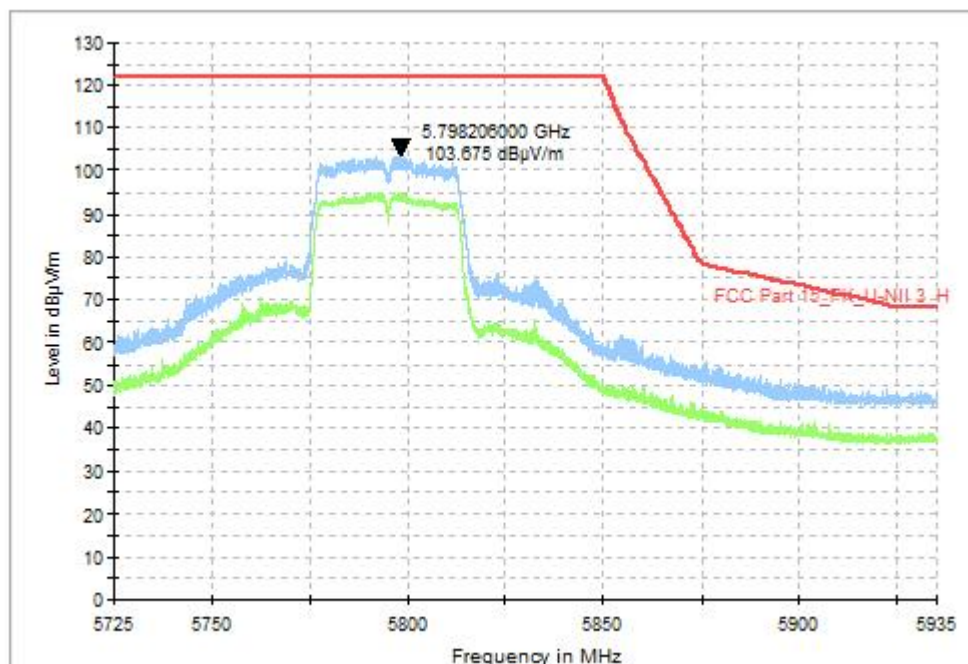


Fig. 34 Band Edges (802.11ac-VHT40, CH159 5795MHz)

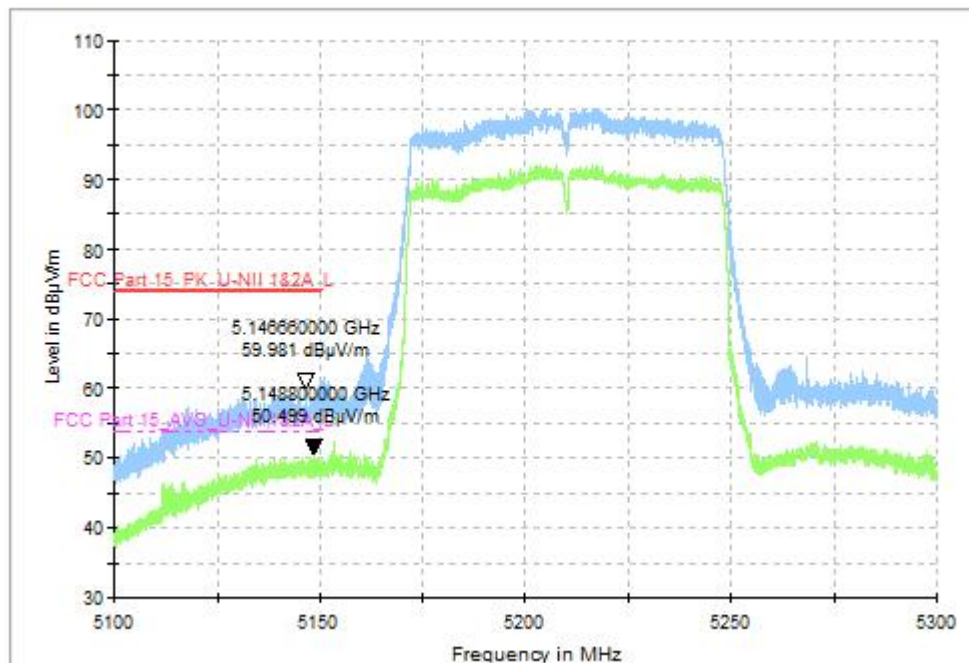


Fig. 35 Band Edges (802.11ac-VHT80, CH42 5210MHz)

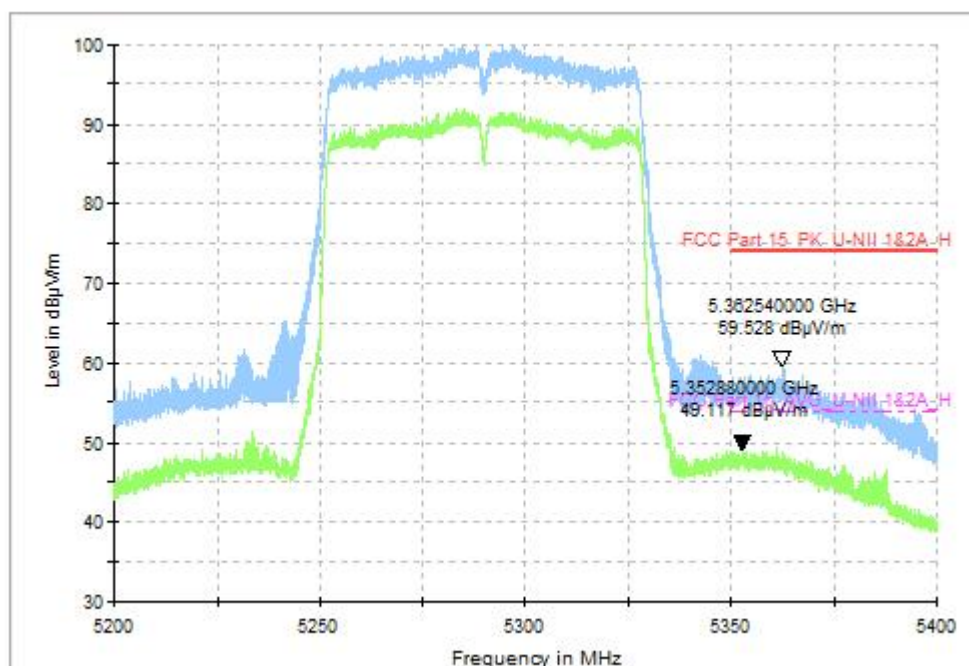


Fig. 36 Band Edges (802.11ac-VHT80, CH58 5290MHz)

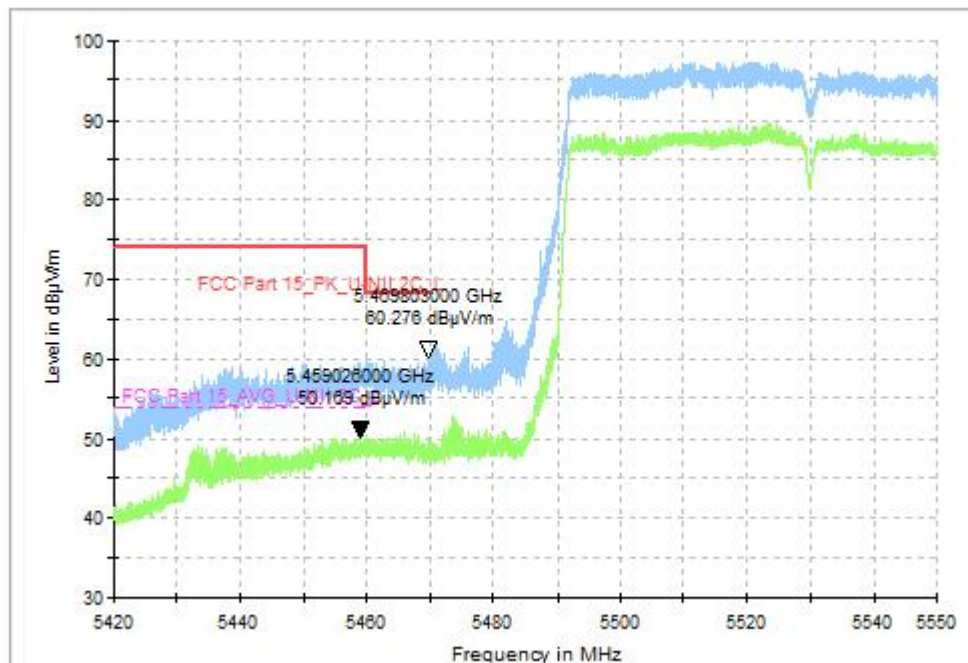


Fig. 37 Band Edges (802.11ac-VHT80, CH106 5530MHz)

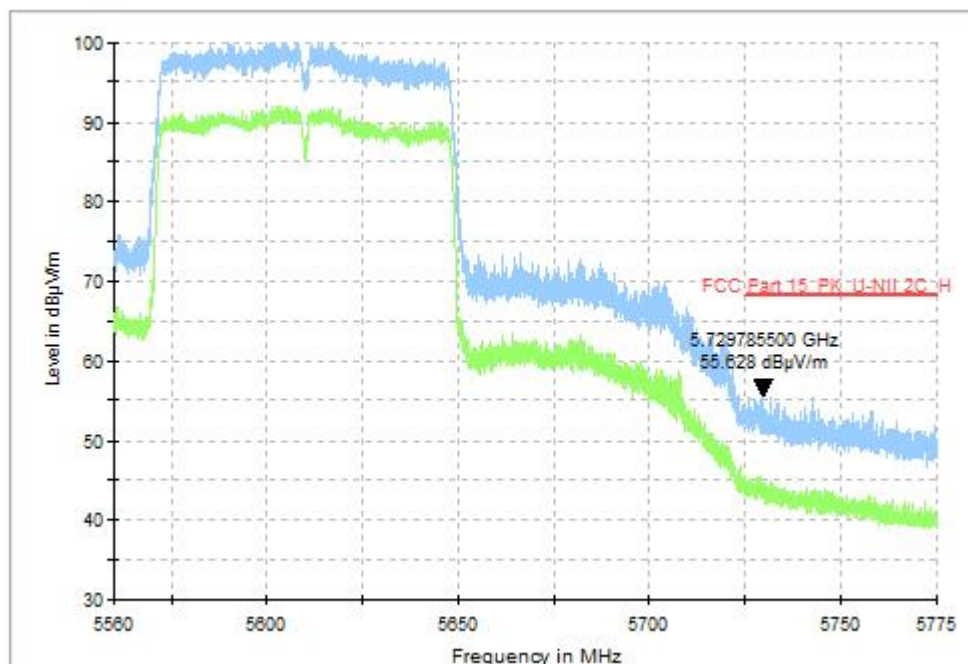


Fig. 38 Band Edges (802.11ac-VHT80, CH122 5610MHz)

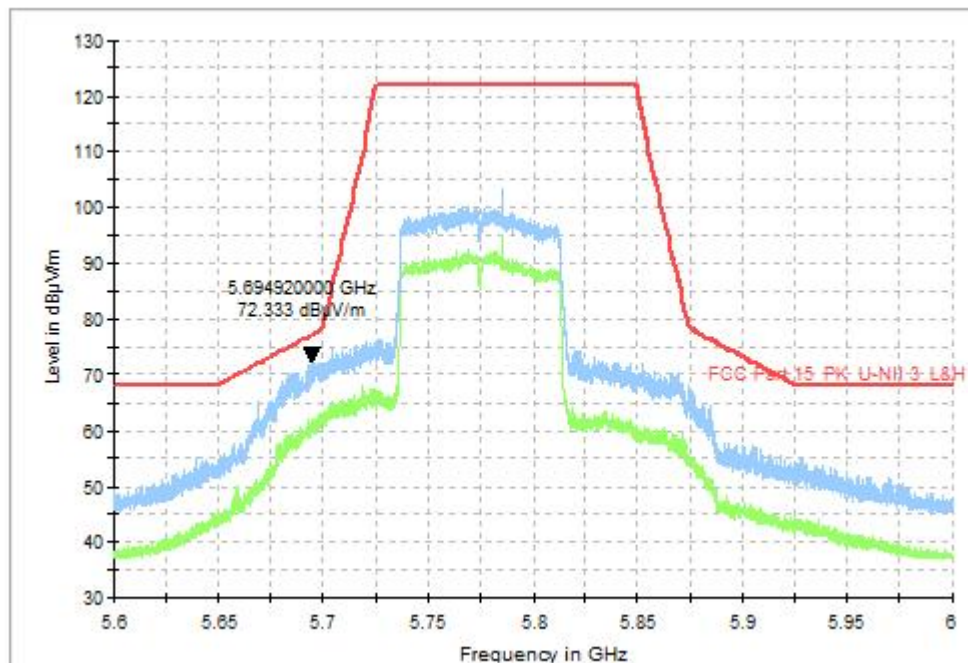


Fig. 39 Band Edges (802.11ac-VHT80, CH155 5775MHz)

A.9. Transmitter Spurious Emission

Measurement of method: See KDB 789033 D02 v02r01, Section G.3, G.4, G.5 and G.6.

Measurement Limit:

Standard	Limit (dBμV/m)	
FCC 47 CFR Part 15.209	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 (dBμV/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.

The measurement results include the horizontal polarization and vertical polarization measurements. For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.

Measurement Result:

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
802.11a	5180MHz(CH36)	1 GHz ~18 GHz	Fig.40	P
	5200MHz(CH40)	1 GHz ~18 GHz	Fig.41	P
	5240MHz(CH48)	1 GHz ~18 GHz	Fig.42	P
	5260MHz(CH52)	1 GHz ~18 GHz	Fig.43	P
	5280MHz(CH56)	1 GHz ~18 GHz	Fig.44	P
	5320MHz(CH64)	1 GHz ~18 GHz	Fig.45	P
	5500MHz(CH100)	1 GHz ~18 GHz	Fig.46	P
	5600MHz(CH120)	1 GHz ~18 GHz	Fig.47	P
	5700MHz(CH140)	1 GHz ~18 GHz	Fig.48	P
	5745MHz(CH149)	1 GHz ~18 GHz	Fig.49	P
	5785MHz(CH157)	1 GHz ~18 GHz	Fig.50	P
	5825MHz(CH165)	1 GHz ~18 GHz	Fig.51	P
802.11ac -VHT40	5190MHz(CH38)	1 GHz ~18 GHz	Fig.52	P
	5230MHz(CH46)	1 GHz ~18 GHz	Fig.53	P
	5270MHz(CH54)	1 GHz ~18 GHz	Fig.54	P
	5310MHz(CH62)	1 GHz ~18 GHz	Fig.55	P

	5510MHz(CH102)	1 GHz ~18 GHz	Fig.56	P
	5580MHz(CH118)	1 GHz ~18 GHz	Fig.57	P
	5670MHz(CH134)	1 GHz ~18 GHz	Fig.58	P
	5755MHz(CH151)	1 GHz ~18 GHz	Fig.59	P
	5795MHz(CH159)	1 GHz ~18 GHz	Fig.60	P
802.11ac -VHT80	5210MHz(CH42)	1 GHz ~18 GHz	Fig.61	P
	5290MHz(CH58)	1 GHz ~18 GHz	Fig.62	P
	5530MHz(CH106)	1 GHz ~18 GHz	Fig.63	P
	5610MHz(CH122)	1 GHz ~18 GHz	Fig.64	P
	5775MHz(CH155)	1 GHz ~18 GHz	Fig.65	P
All channels		30 MHz ~1 GHz	Fig.66	P
		18 GHz ~26.5 GHz	Fig.67	P
		26.5GHz~40GHz	Fig.68	P

Worst Case Result:

802.11a CH165

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
7426.615385	45.11	74.00	28.89	H	7.0
8400.461539	45.60	74.00	28.40	V	7.8
10632.461539	45.78	74.00	28.22	V	9.8
12295.846154	48.06	74.00	25.94	H	12.6
16132.153846	51.92	74.00	22.08	H	16.7
17711.538462	54.45	74.00	19.55	V	20.5

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
7426.615385	34.38	54.00	19.62	H	7.0
8400.461539	34.26	54.00	19.74	V	7.8
10632.461539	35.87	54.00	18.13	V	9.8
12295.846154	37.59	54.00	16.41	H	12.6
16132.153846	41.53	54.00	12.47	H	16.7
17711.538462	43.96	54.00	10.04	V	20.5

802.11ac-VHT40 CH134

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
8177.538462	44.63	74.00	29.37	H	6.0
10912.615385	46.38	74.00	27.62	V	9.4
11497.846154	47.48	74.00	26.52	H	10.1
11893.846154	46.13	74.00	27.87	H	10.2
12396.000000	47.91	74.00	26.09	H	11.3
15855.230769	51.17	74.00	22.83	V	14.0

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
8177.538462	33.55	54.00	20.45	H	6.0
10912.615385	35.90	54.00	18.10	V	9.4
11497.846154	36.66	54.00	17.34	H	10.1
11893.846154	35.53	54.00	18.47	H	10.2
12396.000000	37.37	54.00	16.63	H	11.3
15855.230769	40.72	54.00	13.28	V	14.0

802.11ac-VHT80 CH122

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
8271.692308	45.51	74.00	28.49	H	6.0
10883.076923	45.58	74.00	28.42	V	9.3
11481.230769	46.86	74.00	27.14	H	10.1
12235.384615	47.21	74.00	26.79	H	10.9
12534.923077	47.08	74.00	26.92	V	11.3
15930.000000	51.16	74.00	22.84	H	14.1

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
8271.692308	33.98	54.00	20.02	H	6.0
10883.076923	35.84	54.00	18.16	V	9.3
11481.230769	36.62	54.00	17.38	H	10.1
12235.384615	36.53	54.00	17.47	H	10.9
12534.923077	36.37	54.00	17.63	V	11.3
15930.000000	40.35	54.00	13.65	H	14.1

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:

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

See below for test graphs.

Conclusion: PASS

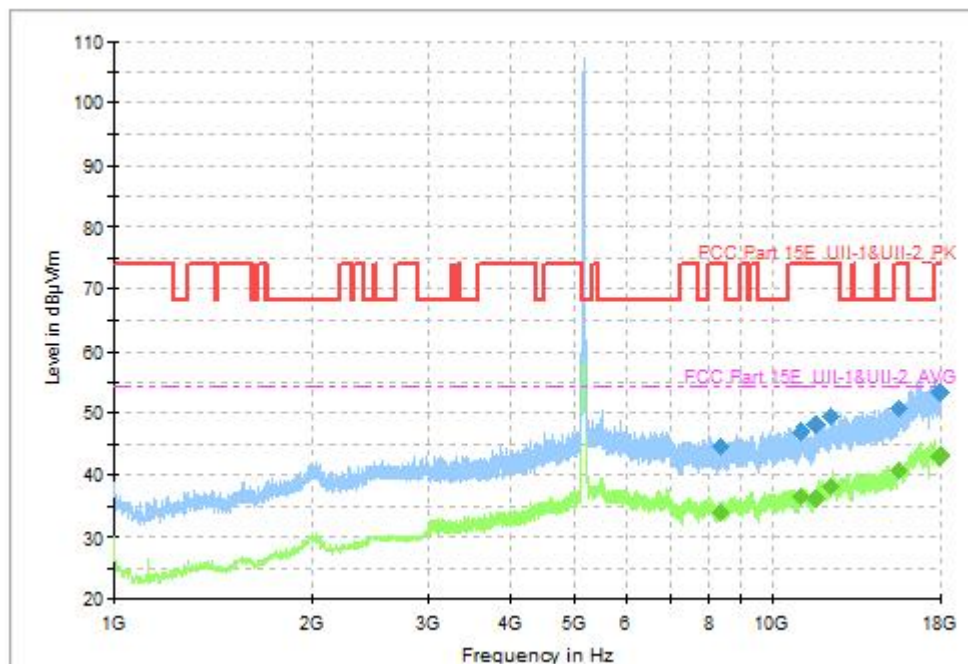


Fig. 40 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 1GHz-18GHz)

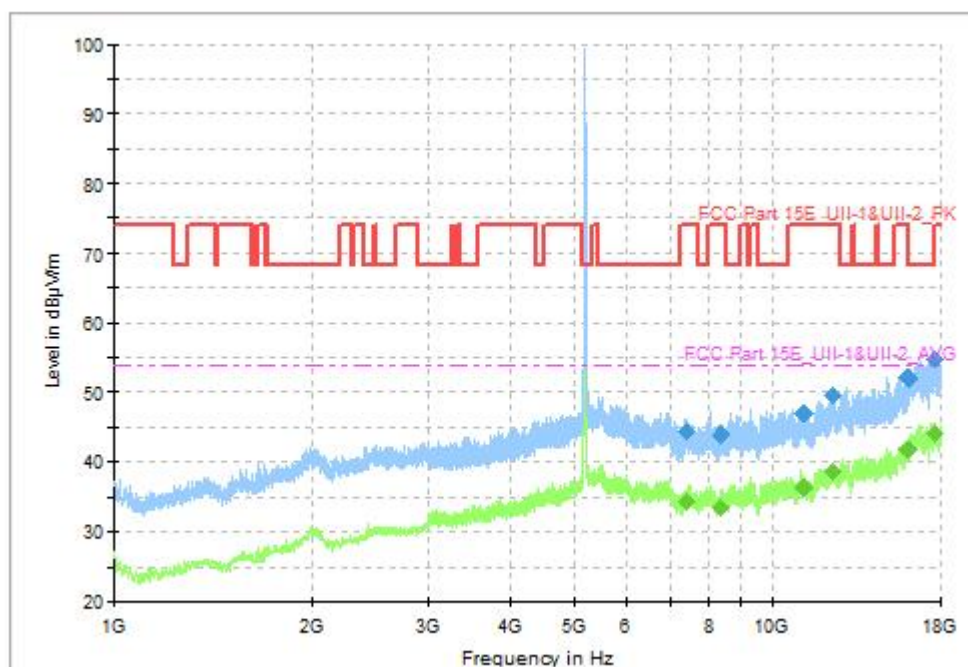


Fig. 41 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 1GHz-18GHz)

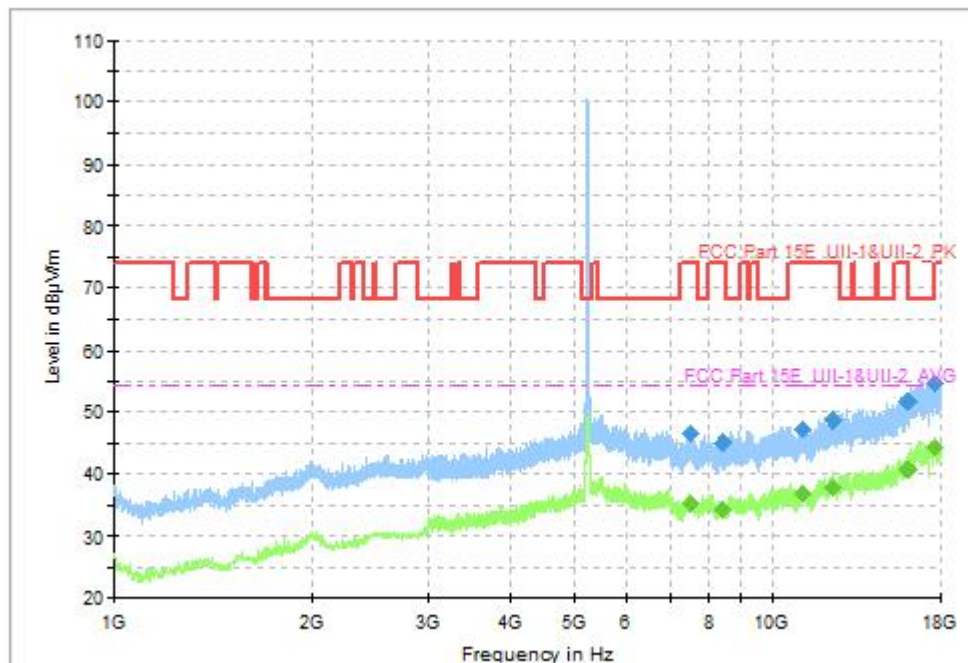


Fig. 42 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 1GHz-18GHz)

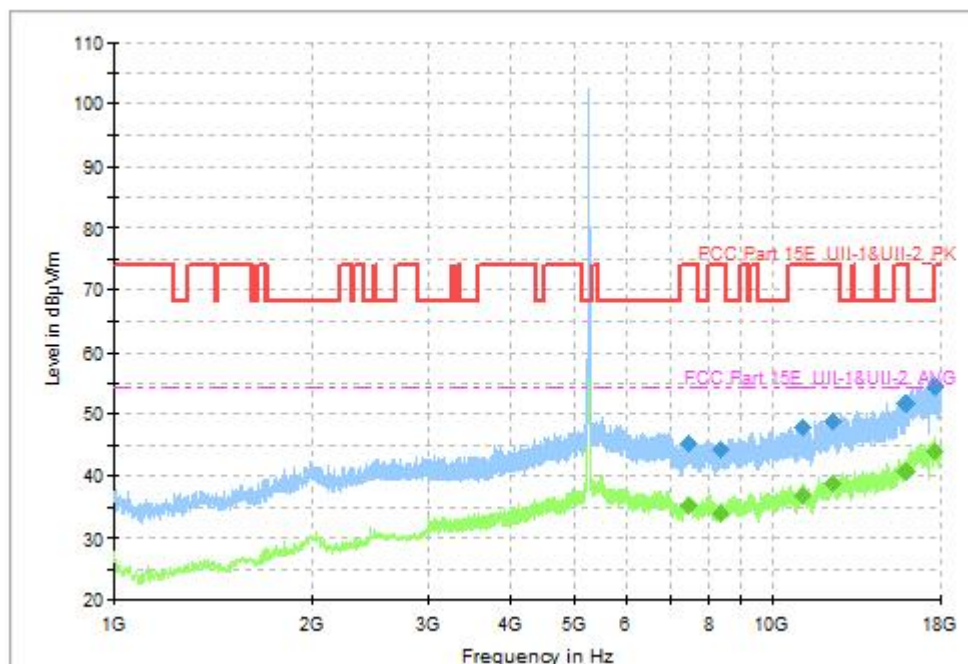


Fig. 43 Transmitter Spurious Emission (802.11a, CH52 5260MHz, 1GHz-18GHz)

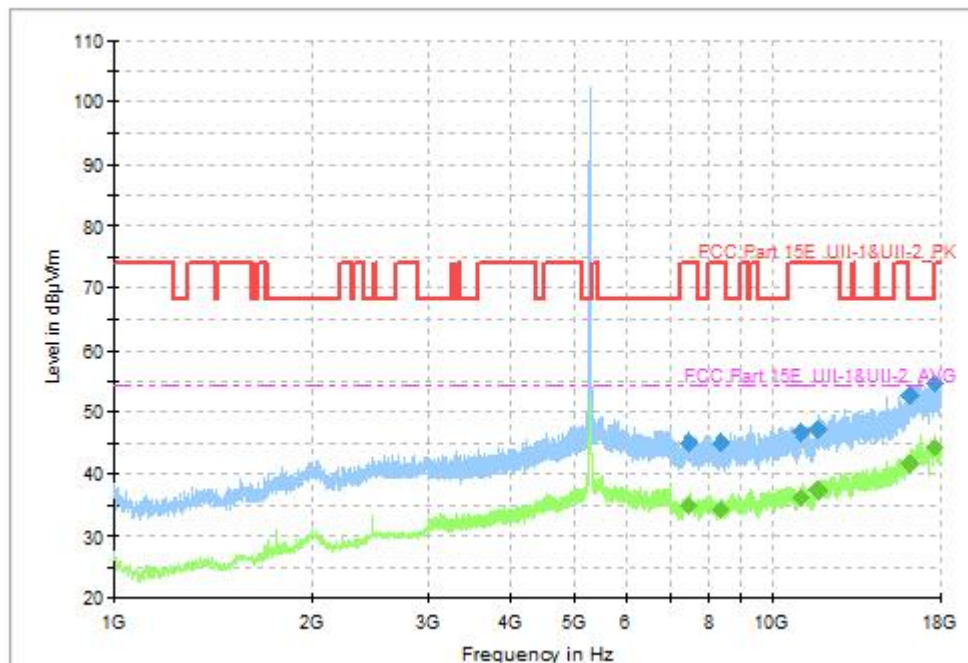


Fig. 44 Transmitter Spurious Emission (802.11a, CH56 5280MHz, 1GHz-18GHz)

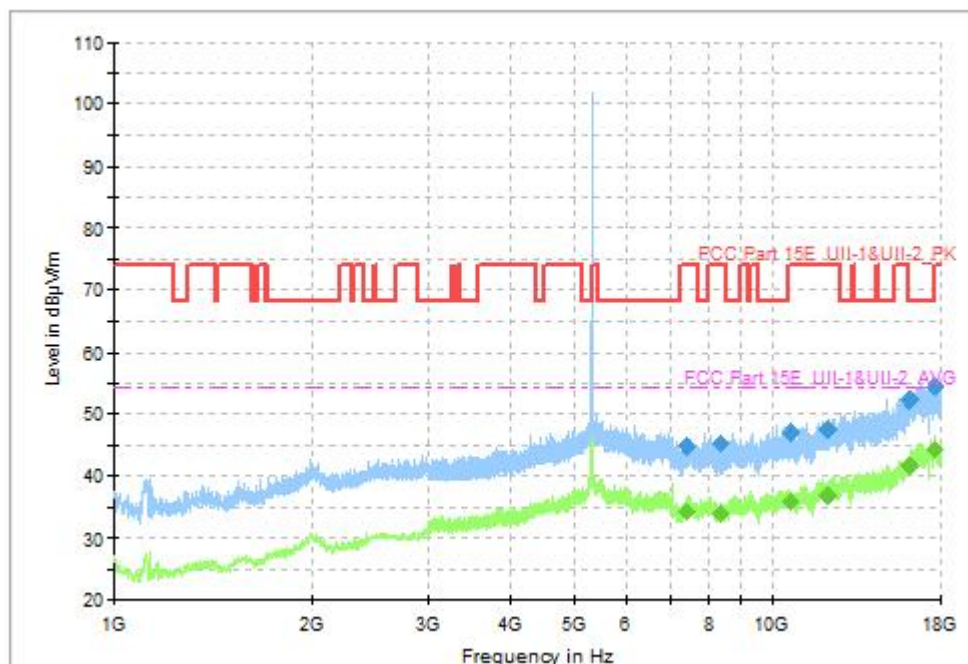


Fig. 45 Transmitter Spurious Emission (802.11a, CH64 5320MHz, 1GHz-18GHz)

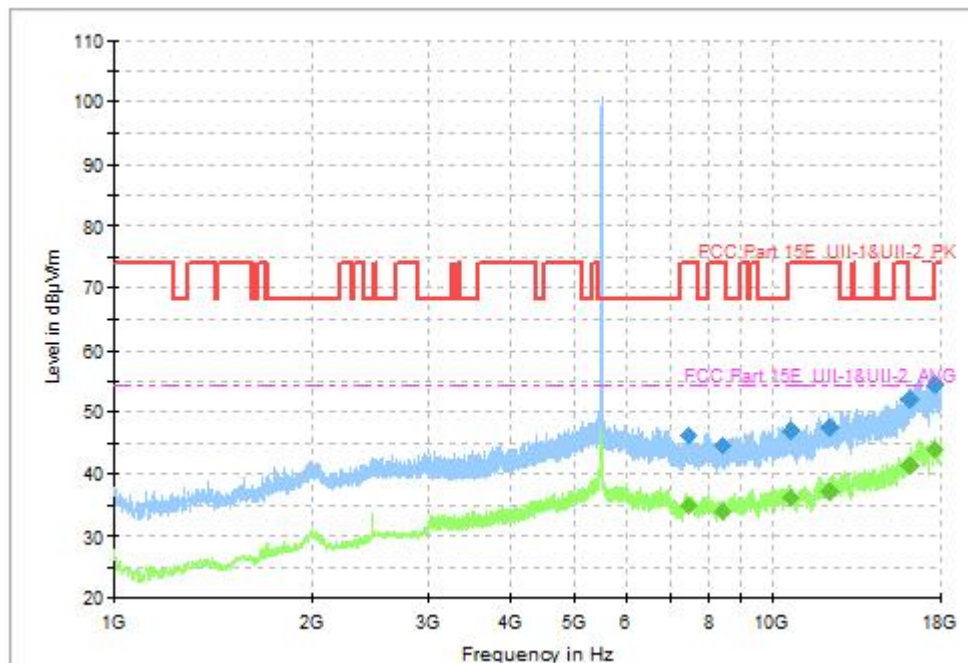


Fig. 46 Transmitter Spurious Emission (802.11a, CH100 5500MHz, 1GHz-18GHz)

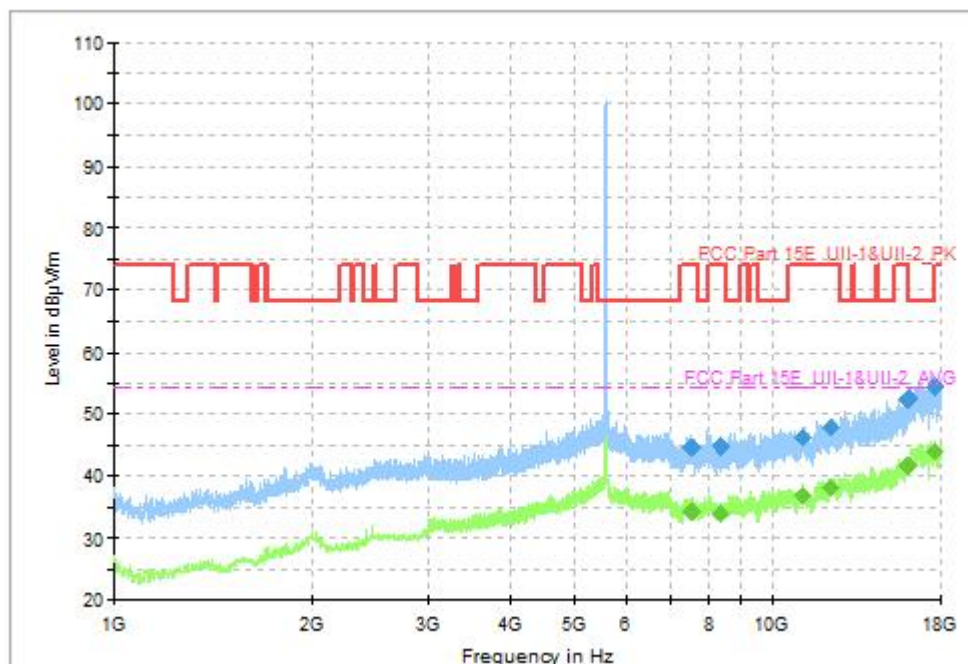


Fig. 47 Transmitter Spurious Emission (802.11a, CH120 5600MHz, 1GHz-18GHz)

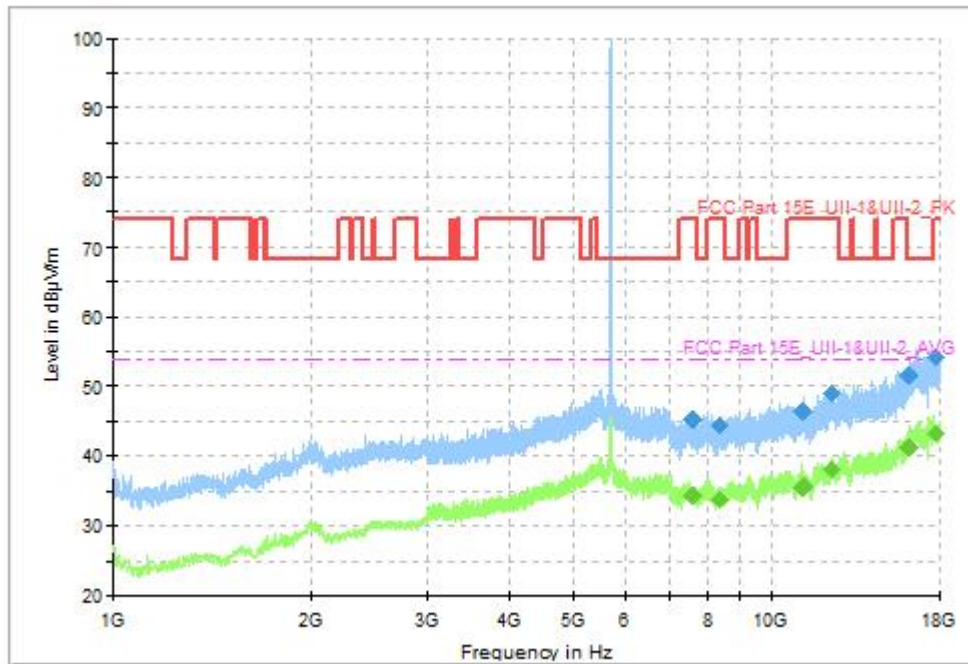


Fig. 48 Transmitter Spurious Emission (802.11a, CH140 5700MHz, 1GHz-18GHz)

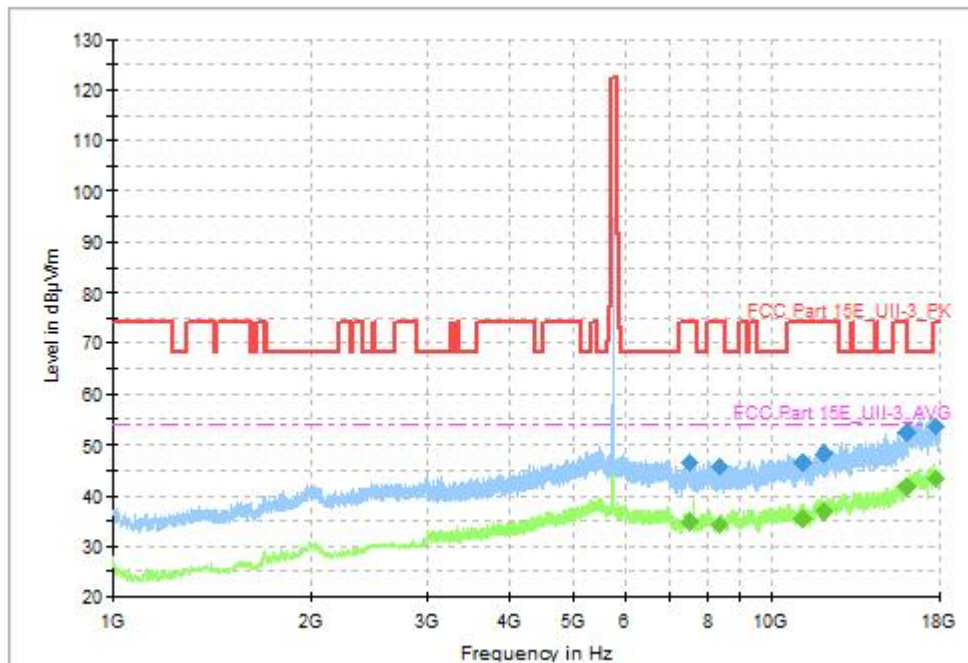


Fig. 49 Transmitter Spurious Emission (802.11a, CH149 5745MHz, 1GHz-18GHz)

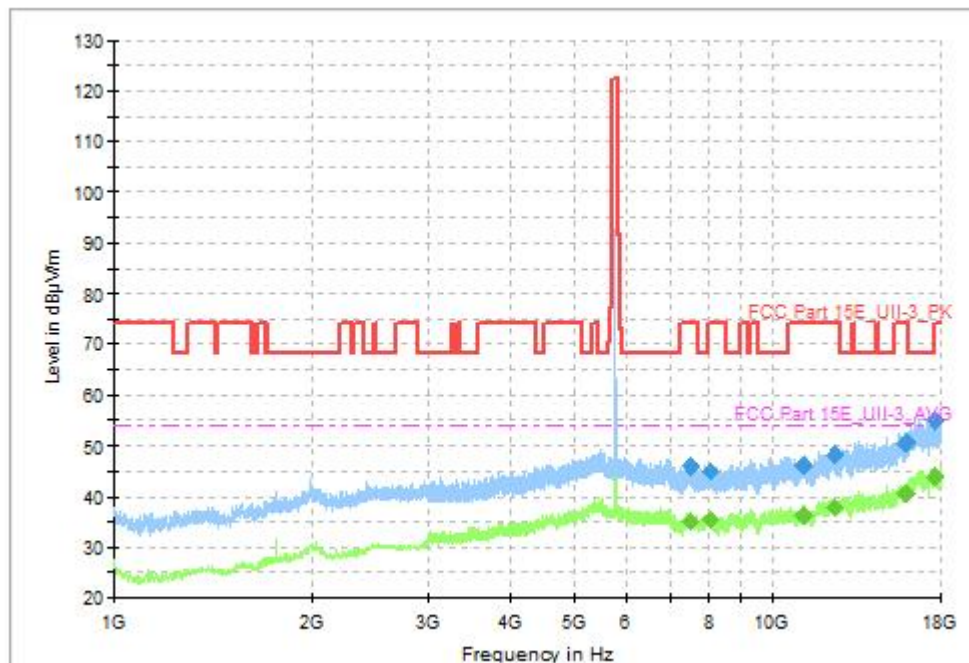


Fig. 50 Transmitter Spurious Emission (802.11a, CH157 5785MHz, 1GHz-18GHz)

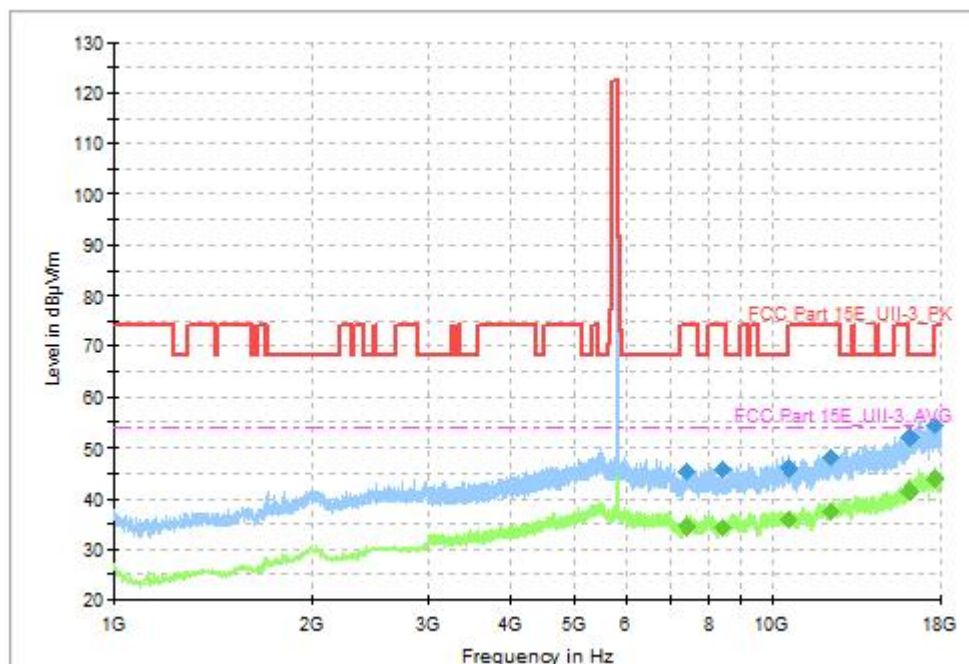


Fig. 51 Transmitter Spurious Emission (802.11a, CH165 5825MHz, 1GHz-18GHz)

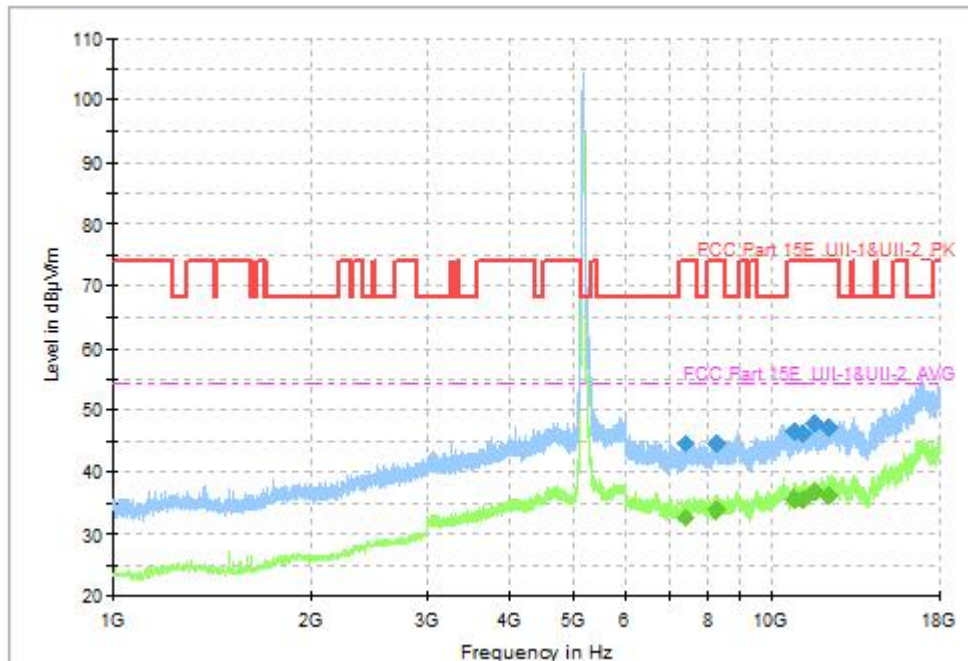


Fig. 52 Transmitter Spurious Emission (802.11ac-VHT40, CH38 5190MHz, 1GHz-18GHz)

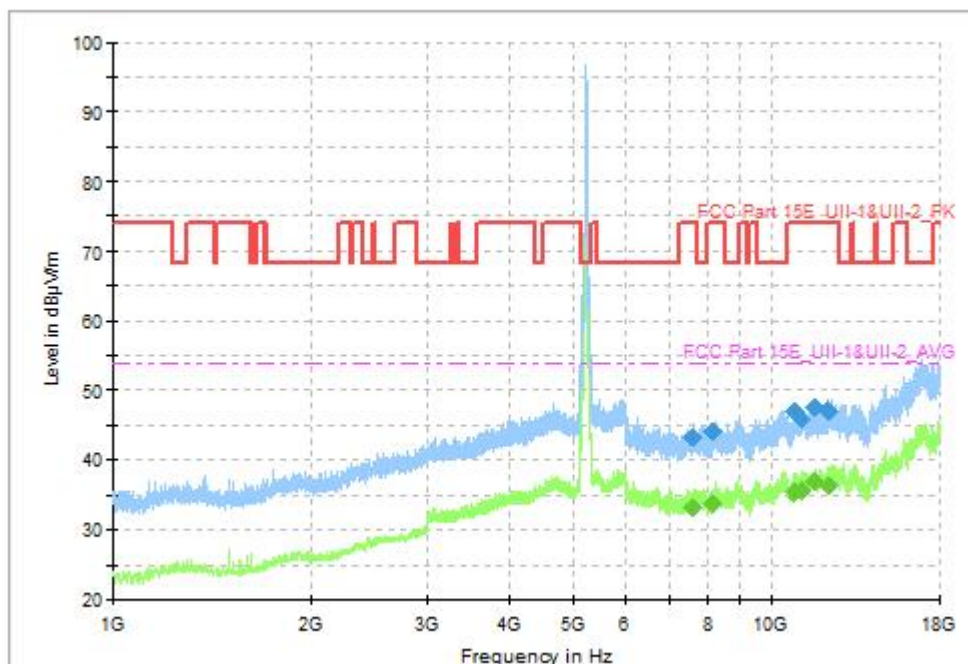


Fig. 53 Transmitter Spurious Emission (802.11ac-VHT40, CH46 5230MHz, 1GHz-18GHz)

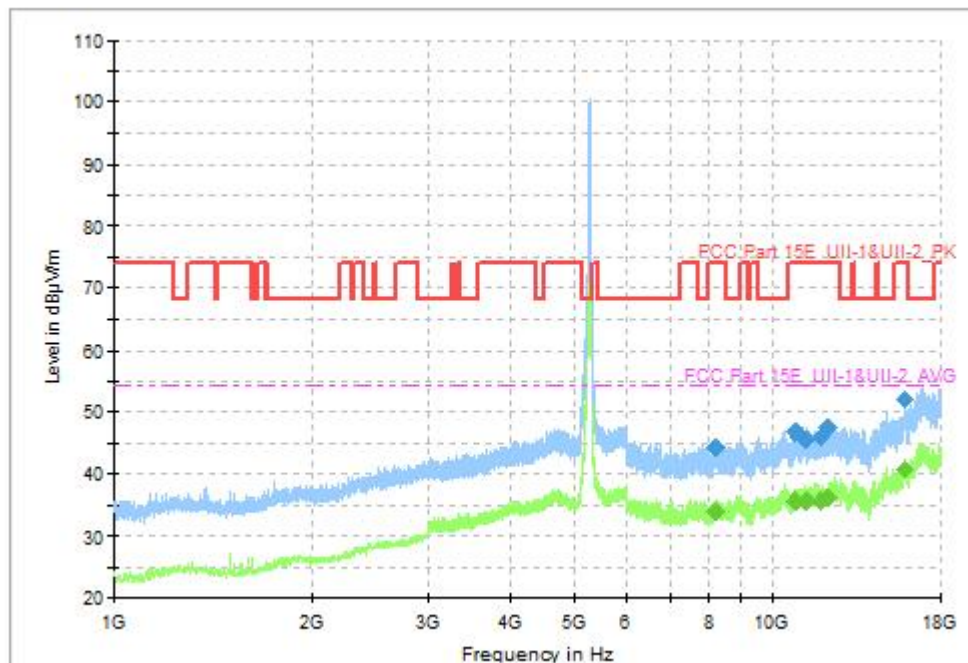


Fig. 54 Transmitter Spurious Emission (802.11ac-VHT40, CH54 5270MHz, 1GHz-18GHz)

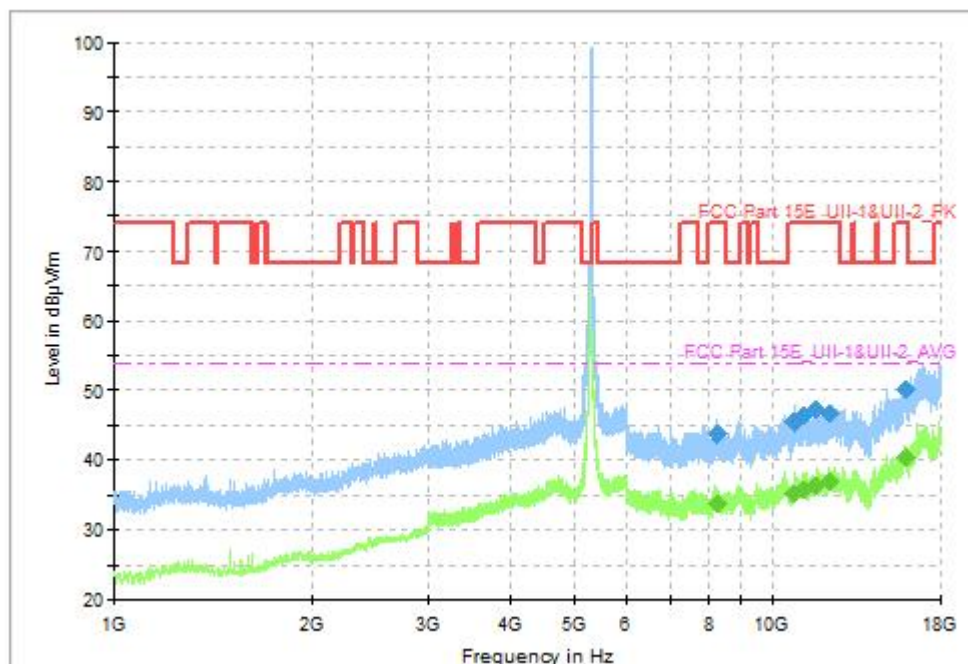


Fig. 55 Transmitter Spurious Emission (802.11ac-VHT40, CH62 5310MHz, 1GHz-18GHz)

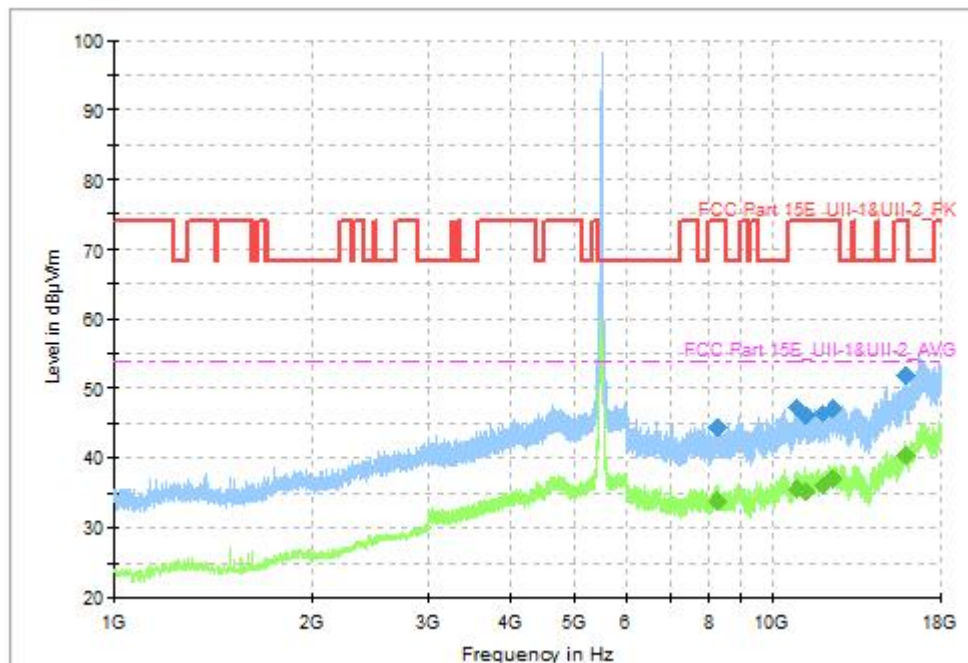


Fig. 56 Transmitter Spurious Emission (802.11ac-VHT40, CH102 5510MHz, 1GHz-18GHz)

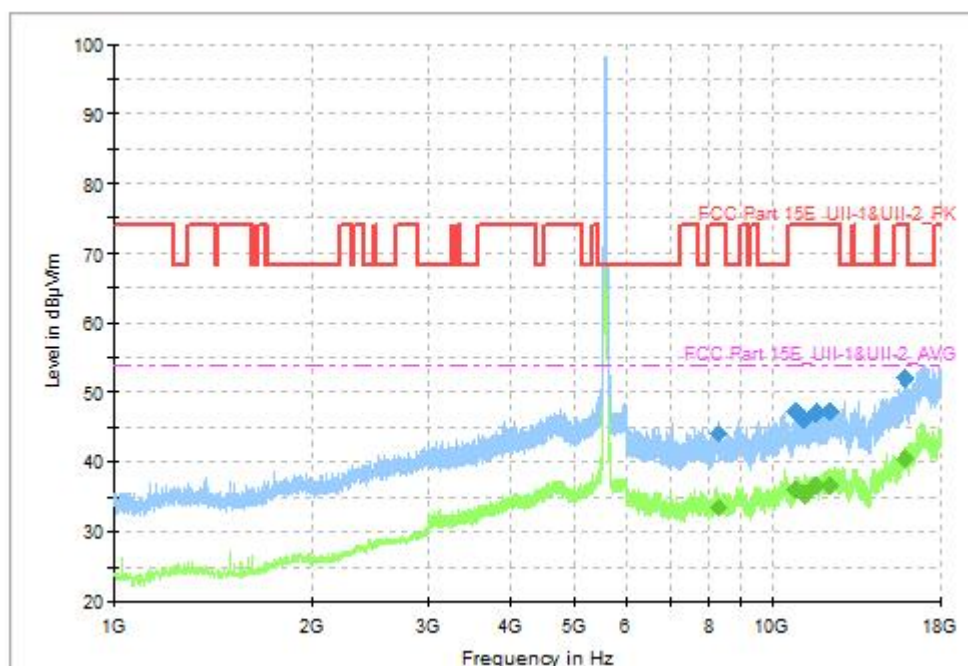


Fig. 57 Transmitter Spurious Emission (802.11ac-VHT40, CH118 5580MHz, 1GHz-18GHz)

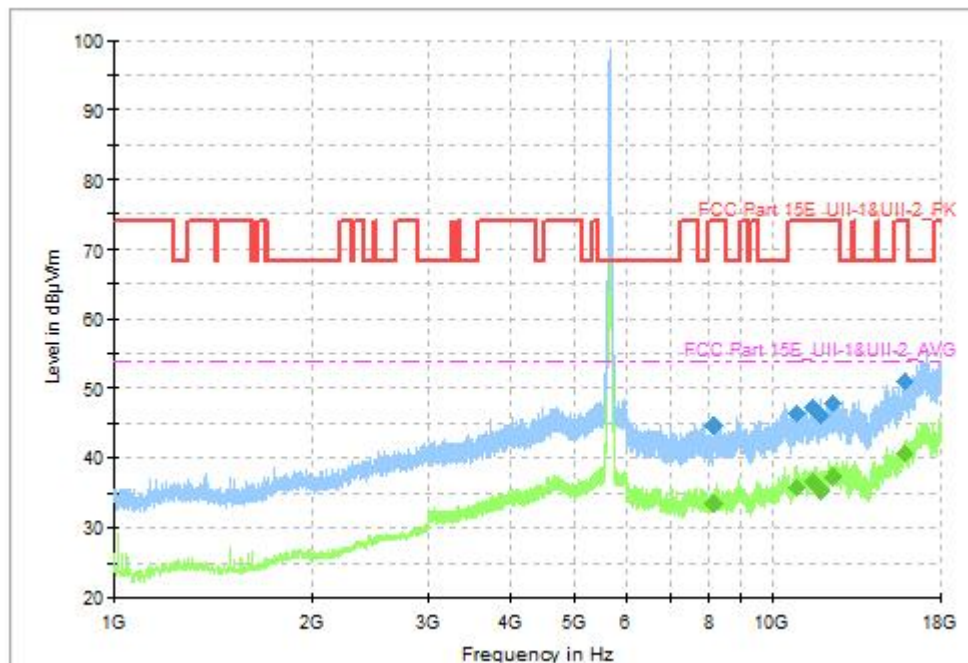


Fig. 58 Transmitter Spurious Emission (802.11ac-VHT40, CH134 5670MHz, 1GHz-18GHz)

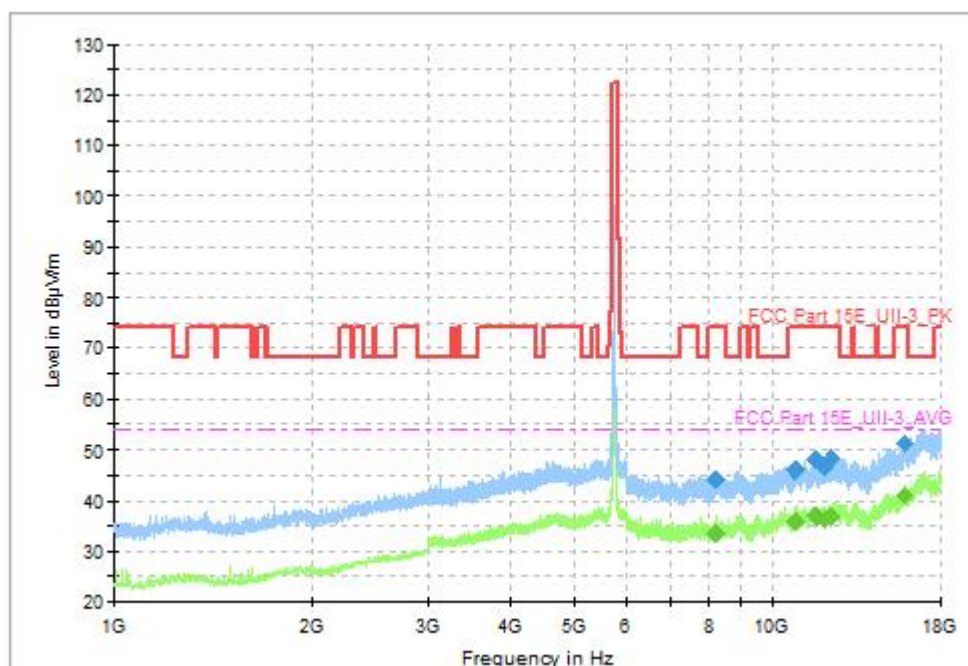


Fig. 59 Transmitter Spurious Emission (802.11ac-VHT40, CH151 5755MHz, 1GHz-18GHz)

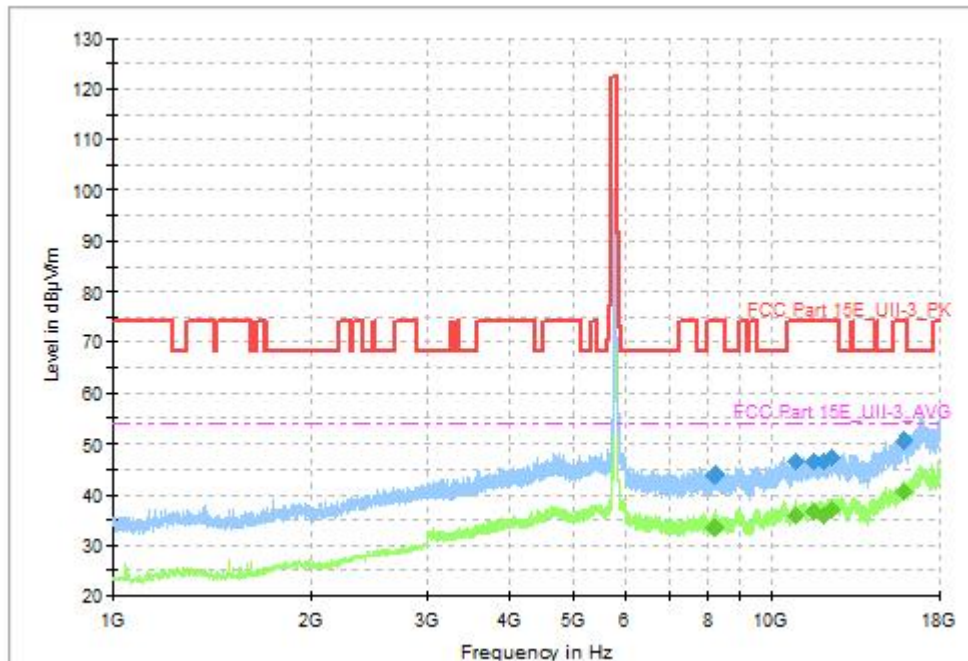


Fig. 60 Transmitter Spurious Emission (802.11ac-VHT40, CH159 5795MHz, 1GHz-18GHz)

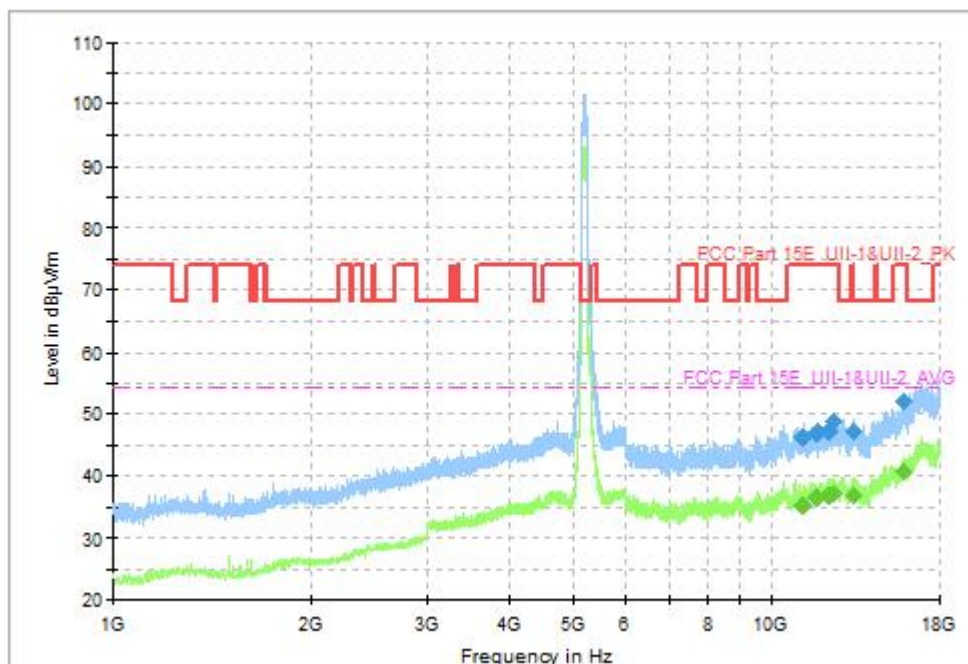


Fig. 61 Transmitter Spurious Emission (802.11ac-VHT80, CH42 5210MHz, 1GHz-18GHz)

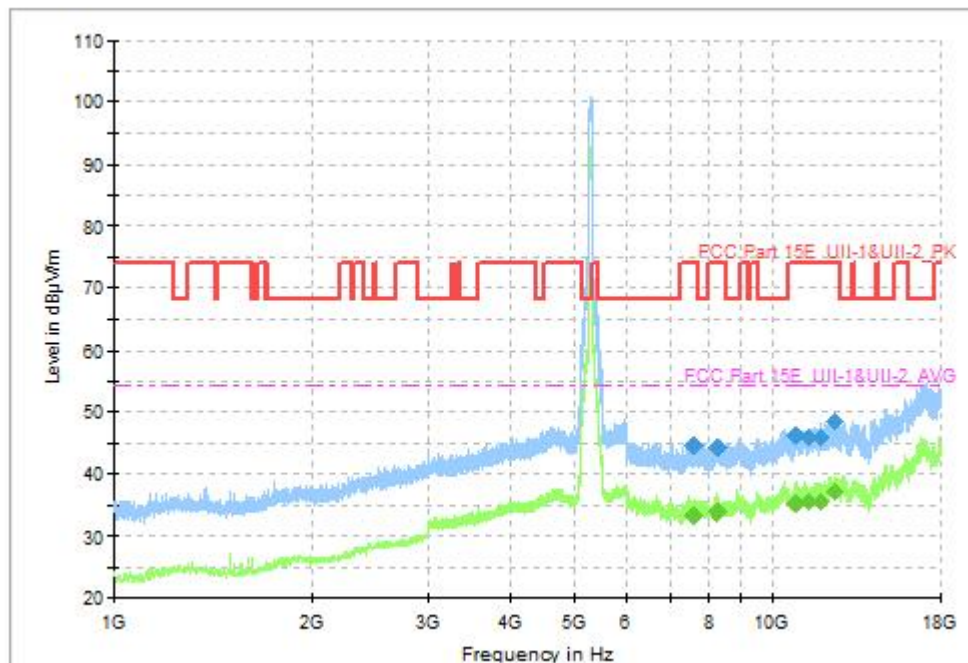


Fig. 62 Transmitter Spurious Emission (802.11ac-VHT80, CH58 5290MHz, 1GHz-18GHz)

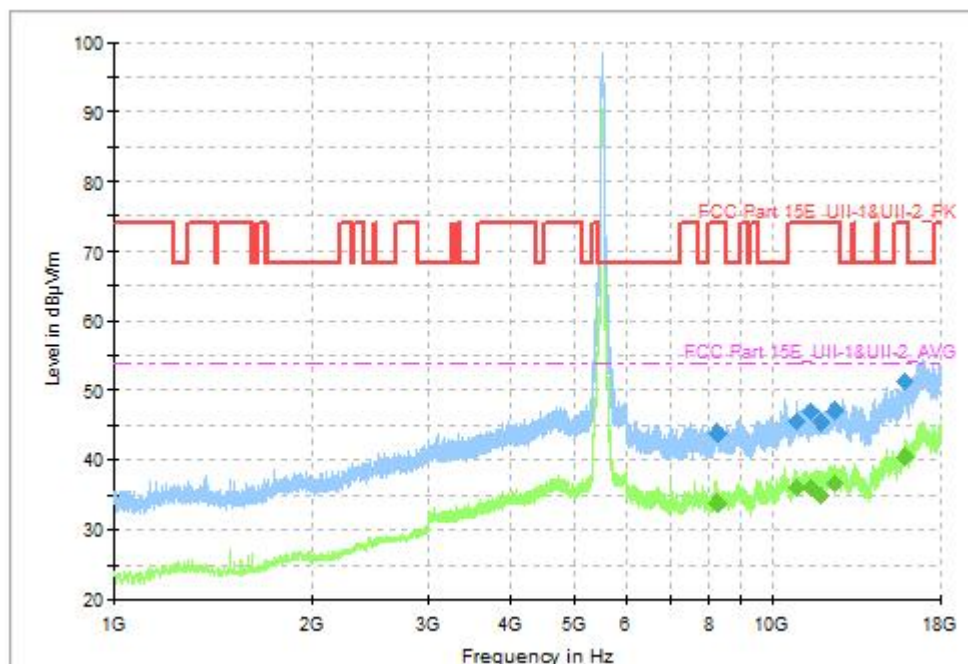


Fig. 63 Transmitter Spurious Emission (802.11ac-VHT80, CH106 5530MHz, 1GHz-18GHz)

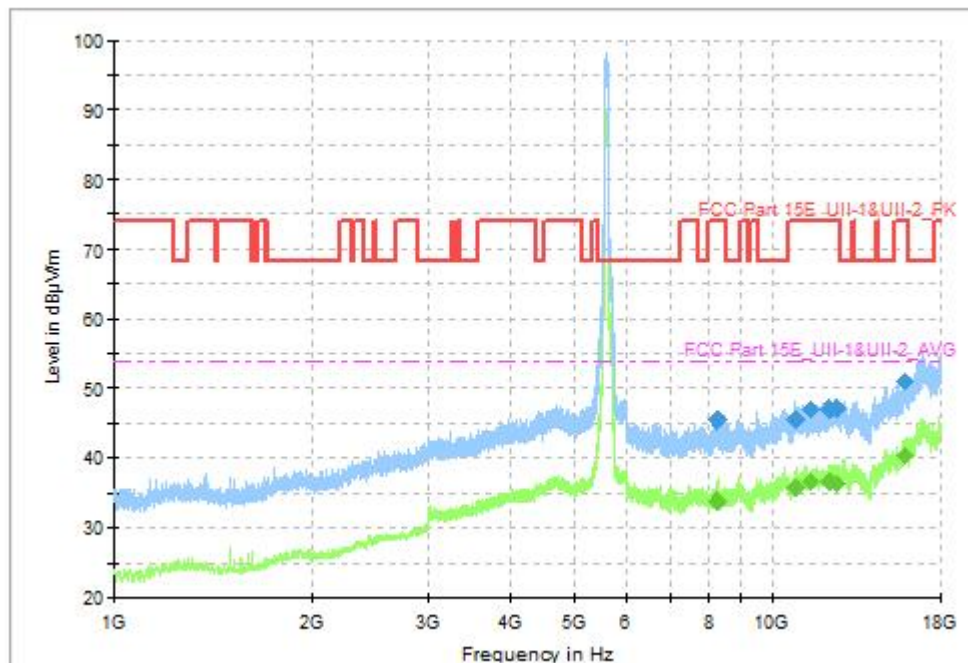


Fig. 64 Transmitter Spurious Emission (802.11ac-VHT80, CH122 5610MHz, 1GHz-18GHz)

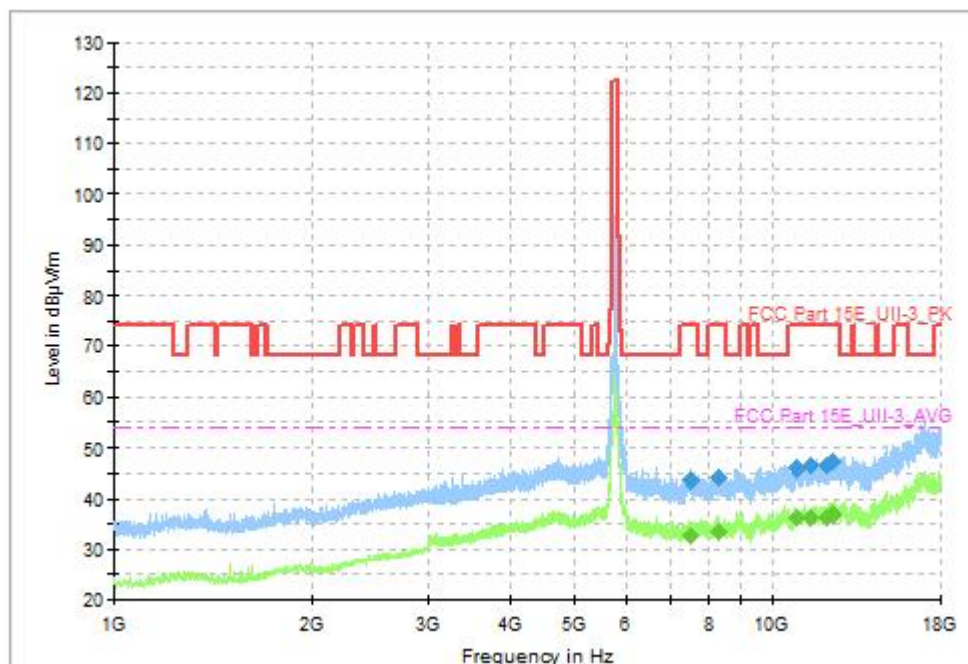


Fig. 65 Transmitter Spurious Emission (802.11ac-VHT80, CH155 5775MHz, 1GHz-18GHz)

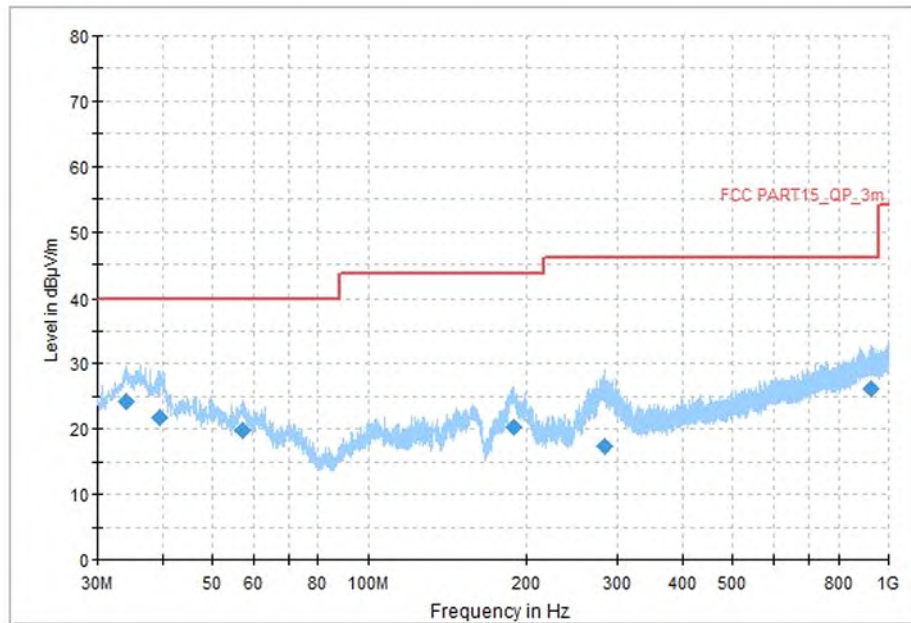


Fig. 66 Transmitter Spurious Emission (All channel, 30MHz~1GHz)

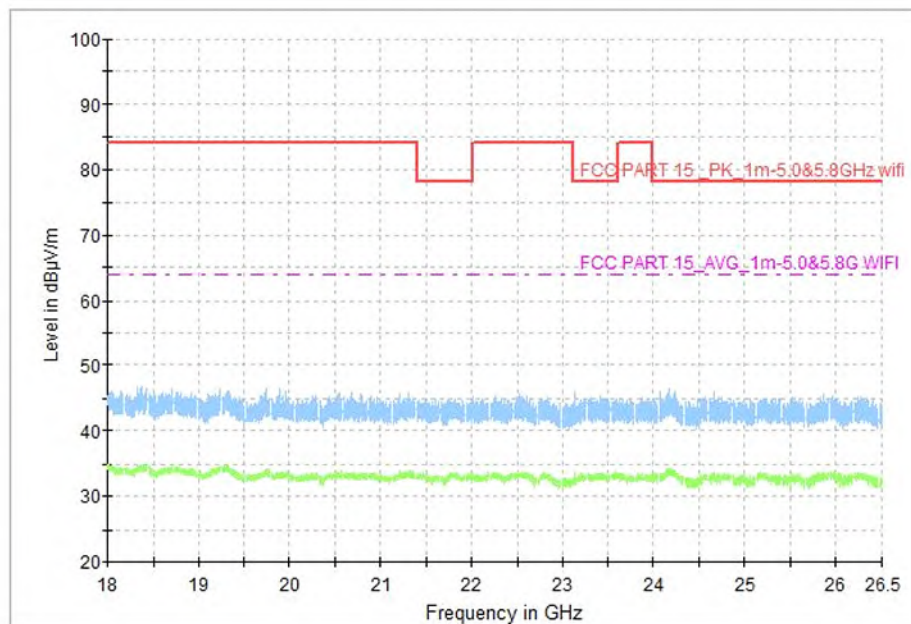


Fig. 67 Transmitter Spurious Emission (All channel, 18GHz~26.5GHz)

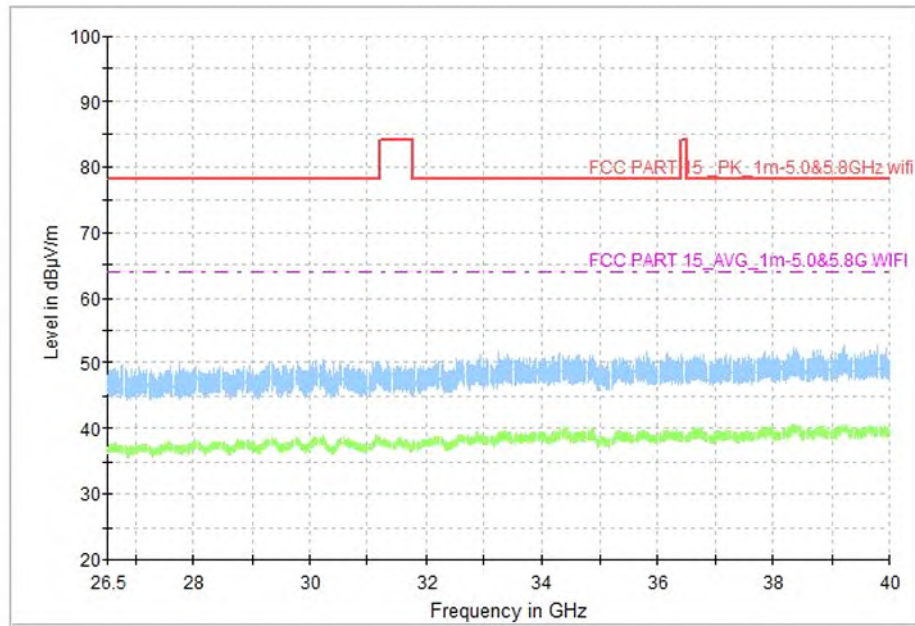


Fig. 68 Transmitter Spurious Emission (All channel, 26.5GHz~40GHz)

A.10. Radiated Spurious Emissions < 30MHz

Method of Measurement: See ANSI C63.10-clause 6.4.

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.69	P

See below for test graphs.

Conclusion: PASS

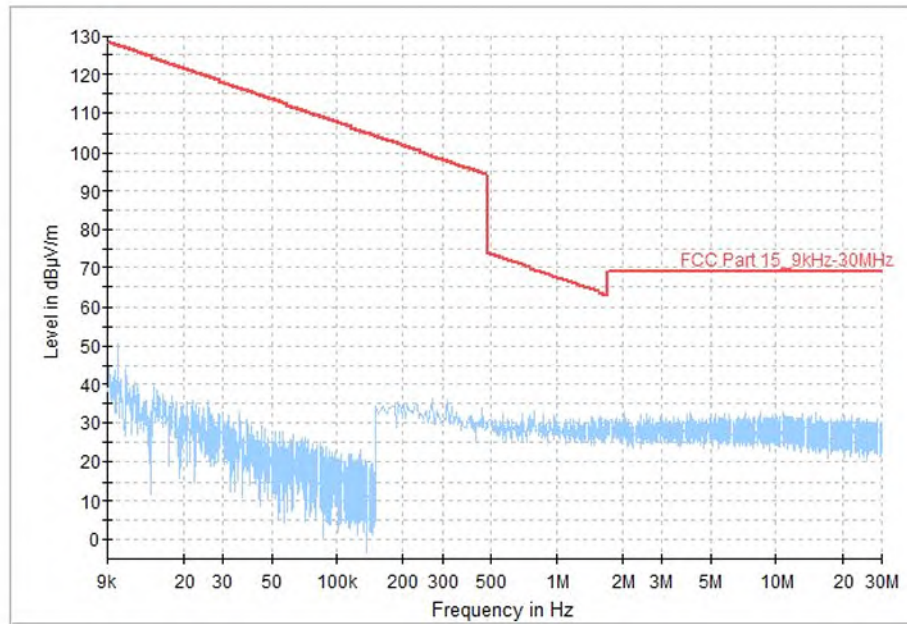


Fig. 69 Radiated Spurious Emission (All Channel, 9 kHz ~30 MHz)

**A.11. AC Power Line Conducted Emission**

Method of Measurement: See ANSI C63.10-clause 6.2.

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
			Traffic	Idle	
0.15 to 0.5	66 to 56	56 to 46	Fig.70	Fig.71	P
0.5 to 5	56	46			
5 to 30	60	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.

See below for test graphs.

Conclusion: PASS

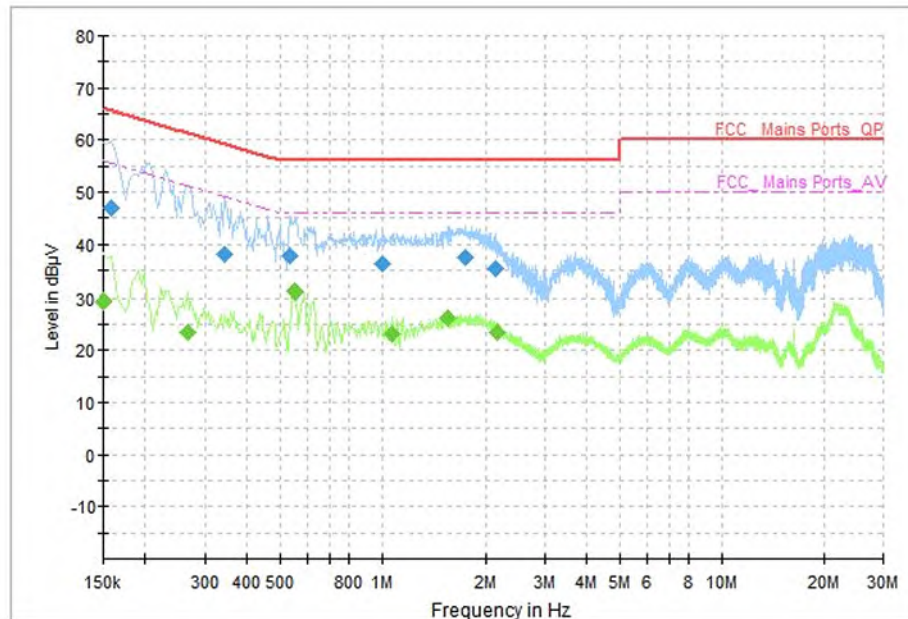


Fig. 70 AC Power line Conducted Emission (Traffic)

Measurement Result: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	46.95	65.57	18.61	N	ON	7
0.342000	38.25	59.16	20.90	N	ON	10
0.534000	37.86	56.00	18.14	N	ON	10
1.002000	36.18	56.00	19.82	N	ON	10
1.742000	37.54	56.00	18.46	N	ON	10
2.138000	35.31	56.00	20.69	N	ON	10

Measurement Result: Average

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.150000	29.12	56.00	26.88	N	ON	7
0.266000	23.47	51.24	27.77	N	ON	10
0.550000	31.18	46.00	14.82	N	ON	10
1.074000	23.01	46.00	22.99	N	ON	10
1.546000	26.11	46.00	19.89	L1	ON	10
2.166000	23.37	46.00	22.63	N	ON	10

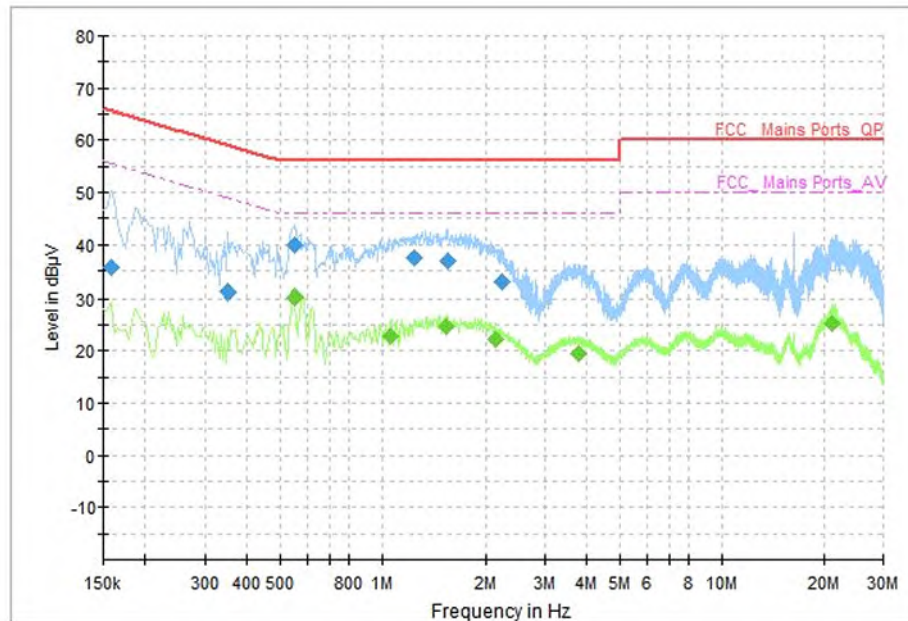


Fig. 71 AC Power line Conducted Emission (Idle)

Measurement Result: Quasi Peak

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.158000	35.63	65.57	29.94	L1	ON	10
0.350000	31.21	58.96	27.75	L1	ON	10
0.554000	40.08	56.00	15.92	N	ON	10
1.246000	37.36	56.00	18.64	N	ON	10
1.542000	36.87	56.00	19.13	N	ON	10
2.230000	33.04	56.00	22.96	L1	ON	10

Measurement Result: Average

Frequency (MHz)	Quasi Peak (dBμV)	Limit (dBμV)	Margin (dB)	Line	Filter	Corr. (dB)
0.550000	30.23	46.00	15.77	L1	ON	10
1.062000	22.88	46.00	23.12	L1	ON	10
1.538000	24.58	46.00	21.42	L1	ON	10
2.134000	22.27	46.00	23.73	L1	ON	10
3.786000	19.49	46.00	26.51	N	ON	10
21.274000	25.12	50.00	24.88	N	ON	10



A.12. 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*****