TEST REPORT

No. I20N00104-RLAN

for

TCL Communication Ltd.

Wifi Router

WR1O

with

Hardware Version: V2.0

Software Version: WRIO_ZZ_01.00_01

FCC ID: 2ACCJB119

Issued Date: 2020-03-22

Test Laboratory:

SAICT, Shenzhen Academy of Information and Communications Technology

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518026.

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CONTENTS

1. Summary of Test Report

1.1. Test Items

Description	Wifi Router
Model Name	WR1O
Applicant's name	TCL Communication Ltd.
Manufacturer's Name	TCL Communication Ltd.

1.2. Test Standards

FCC Part15-2018; ANSI C63.10-2013; KDB 789033-v02r01; KDB 662911-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:	2020-01-16
Testing End Date:	2020-03-20

1.6. Signature

Lin Zechuang

(Prepared this test report)

Tang Weisheng

(Reviewed this test report)

Zhang Bojun

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
E-Mail	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
E-Mail	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

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

3.1. About EUT

Description	Wifi Router
Model Name	WR1O
Brand Name	TCL
RLAN Frequency Range	ISM Bands: 5150MHz~5250MHz; 5725MHz~5850MHz
RLAN Protocol	IEEE 802.11a/n20/n40/ac20/ac40/ac80
Type of modulation	OFDM
Antenna Type	Integrated
Antenna Gain	Antenna A = 5.00 dBi. Antenna B = 5.00 dBi. MIMO = 8.00 dBi.
Power Supply	9V DC
FCC ID	2ACCJB119
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*	SN or IMEI	HW Version	SW Version	Receive Date
EUT1	191187820100040313	V2.0	WRIO_ZZ_01.00_01	2020-01-13
EUT2	191187820100040340	V2.0	WRIO_ZZ_01.00_01	2020-01-13

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	SMPS Adaptor	/
AE2	SWITHING Adaptor	/

AE1

Model	S012CDU1200100
Manufacturer	Tenpao
Length of DC line	/cm

AE2

Model	BN073-A09009U
Manufacturer	HEWEISHUN
Length of DC line	/cm

*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 Wifi Router with integrated antenna.
It consists of normal options: Charger.
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 FCC CFR 47,Part 15,Subpart E	2018
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 662911	Emissions Testing of Transmitters with Multiple Outputs in the Same Band	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
1	Maximum Output Power	15.407(a)	**P**
2	Power Spectral Density	15.407(a)	**P**
3	Occupied 26dB Bandwidth	15.407(a)	**/**
4	Occupied 6dB Bandwidth	15.407(e)	**P**
5	99% Occupied Bandwidth	15.407	**/**
6	Band edge compliance	15.407	**P**
7	Radiated Spurious Emissions	15.407	**P**
8	AC Power line Conducted	15.207	**P**
9	Frequency Stability	15.407	**P**
10	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/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	2021-01-01	1 year
2	Power Sensor	U2021XA	MY55430013	Agilent	2021-01-15	1 year
3	Test Receiver	ESCI	100702	Rohde & Schwarz	2021-01-14	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	2020-04-25	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	3 years
7	Antenna	QSH-SL-18-26-S-20	17013	Q-par	2023-01-06	3 years
8	Antenna	QSH-SL-26-40-K-20	17014	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. = 15 %, 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. = 15 %, 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 3000 MHz

8. Measurement Uncertainty

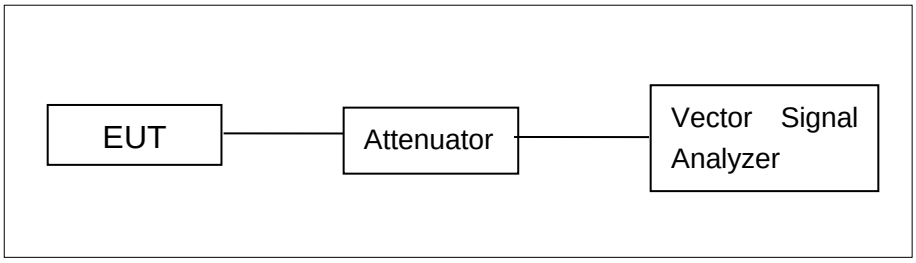
Test Name	Uncertainty(*k*=2)	
1. RF Output Power - Conducted	1.32dB	
2.Power Spectral Density - Conducted	2.32dB	
3.Occupied channel bandwidth - Conducted	66Hz	
4 Transmitter Spurious Emission - Conducted	30MHz≤f≤1GHz	1.41dB
	1GHz≤f≤7GHz	1.92dB
	7GHz≤f≤13GHz	2.31dB
	13GHz≤f≤26GHz	2.61dB
5. Transmitter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

ANNEX A: Detailed Test Results

A.1. Measurement Method

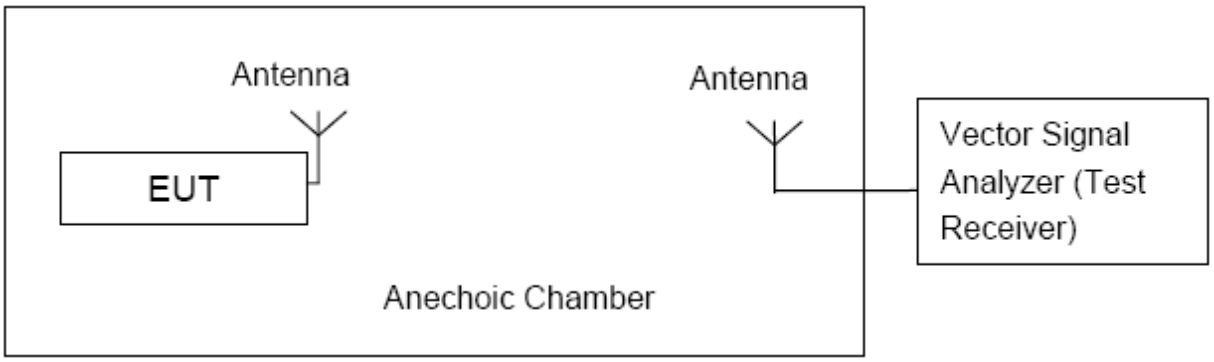
Conducted Measurements

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, KDB 662911(MIMO).
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
	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)	Output Power (dBm)	
				Ant A	Ant B
5.2GHz Band (UNII-1)	802.11a	CH 36	5180	15.39	15.29
		CH 40	5200	15.55	15.24
		CH 48	5240	15.78	15.32
	802.11n-HT20	CH 36	5180	15.13	15.47
		CH 40	5200	15.34	15.21
		CH 48	5240	15.71	15.22
	802.11n-HT40	CH 38	5190	15.06	15.28
		CH 46	5230	15.24	15.31
	802.11ac-VHT20	CH 36	5180	15.19	14.76
		CH 40	5200	15.32	14.87
		CH 48	5240	15.67	15.19
	802.11ac-VHT40	CH 38	5190	15.01	15.20
		CH 46	5230	15.19	15.29
	802.11ac-VHT80	CH 42	5210	14.89	15.39

U–NII Band	Mode	Channel	Frequency (MHz)	Output Power (dBm)	
				Ant A	Ant B
5.8GHz Band (UNII-3)	802.11a	CH 149	5745	16.07	14.35
		CH 157	5785	16.01	14.38
		CH 165	5825	15.89	14.46
	802.11n-HT20	CH 149	5745	16.02	14.29
		CH 157	5785	15.80	14.31
		CH 165	5825	15.73	14.43
	802.11n-HT40	CH 151	5755	15.61	14.01
		CH 159	5795	15.46	14.06
	802.11ac-VHT20	CH 149	5745	15.99	14.30
		CH 157	5785	15.78	14.38
		CH 165	5825	15.77	14.43
	802.11ac-VHT40	CH 151	5755	15.60	14.04
		CH 159	5795	15.57	14.11
	802.11ac-VHT80	CH 155	5775	15.41	13.87

MIMO:

U–NII Band	Mode	Channel	Frequency (MHz)	Output Power (dBm)		
				Ant A	Ant B	Sum
5.2GHz Band (UNII-1)	802.11n-HT20	CH 36	5180	14.63	14.57	17.61
		CH 40	5200	14.74	14.75	17.76
		CH 48	5240	14.85	14.71	17.79
	802.11n-HT40	CH 38	5190	14.23	14.08	17.17
		CH 46	5230	14.45	14.22	17.35
	802.11ac-VHT20	CH 36	5180	14.37	14.43	17.41
		CH 40	5200	14.66	14.57	17.63
		CH 48	5240	14.65	14.59	17.63
	802.11ac-VHT40	CH 38	5190	14.47	14.15	17.32
		CH 46	5230	14.66	14.04	17.37
	802.11ac-VHT80	CH 42	5210	14.69	14.29	17.50

U–NII Band	Mode	Channel	Frequency (MHz)	Output Power (dBm)		
				Ant A	Ant B	Sum
5.8GHz Band (UNII-3)	802.11n-HT20	CH 149	5745	15.05	13.73	17.45
		CH 157	5785	14.99	13.87	17.48
		CH 165	5825	14.77	14.01	17.42
	802.11n-HT40	CH 151	5755	14.56	13.06	16.88
		CH 159	5795	14.42	13.28	16.90
	802.11ac-VHT20	CH 149	5745	14.89	13.74	17.36
		CH 157	5785	14.64	13.89	17.29
		CH 165	5825	14.59	13.87	17.26
	802.11ac-VHT40	CH 151	5755	14.75	13.49	17.18
		CH 159	5795	14.51	13.36	16.98
	802.11ac-VHT80	CH 155	5775	14.72	13.53	17.18

Conclusion: PASS

Note:

The data rate 6Mbps (11a mode), MCS0 (11n-HT20 mode), MCS0 (11ac-HT20 mode), MCS0 (11n-HT40 mode), MCS0 (11ac-HT40 mode) and MCS0 (11ac-HT80 mode) are selected as the maximum power are got with these data rate. 802.11a, 802.11n-HT40, 802.11ac-VHT80 mode (Antenna A) is selected as the worst condition (SISO (and MIMO)).

The following cases and test graphs are mostly 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)
	5725MHz~5850MHz	30dBm/500KHz

The PPSD measurement method SA-1 is made according to KDB 789033, KDB 662911.

Measurement Results:

SISO:

U–NII Band	Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/MHz)
5.2GHz Band (UNII-1)	802.11a	CH 36	5180	8.44
		CH 40	5200	8.04
		CH 48	5240	8.32
	802.11n-HT40	CH 38	5190	5.18
		CH 46	5230	5.57
	802.11ac-VHT80	CH 42	5210	1.97

U–NII Band	Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/500kHz)
5.8GHz Band (UNII-3)	802.11a	CH 149	5745	8.15
		CH 157	5785	7.37
		CH 165	5825	7.11
	802.11n-HT40	CH 151	5755	5.31
		CH 159	5795	4.13
	802.11ac-VHT80	CH 155	5775	1.75

MIMO:

U–NII Band	Mode	Channel	Frequency (MHz)	Power Spectral Density(dBm/MHz)		
				Ant A	Ant B	Sum
5.2GHz Band (UNII-1)	802.11n-HT20	CH 36	5180	7.41	7.25	10.34
		CH 40	5200	7.68	7.00	10.36
		CH 48	5240	7.63	6.82	10.25
	802.11n-HT40	CH 38	5190	4.21	4.46	7.35
		CH 46	5230	4.88	4.30	7.61
	802.11ac-VHT80	CH 42	5210	2.43	1.85	5.16

U–NII Band	Mode	Channel	Frequency (MHz)	Power Spectral Density (dBm/500kHz)		
				Ant A	Ant B	Sum
5.8GHz Band (UNII-3)	802.11n-HT20	CH 149	5745	7.36	5.43	9.51
		CH 157	5785	6.37	5.10	8.79
		CH 165	5825	6.69	5.09	8.97
	802.11n-HT40	CH 151	5755	4.48	1.52	6.26
		CH 159	5795	3.41	2.12	5.82
	802.11ac-VHT80	CH 155	5775	1.93	0.04	4.10

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
802.11a	5180MHz(Ch36)	Fig.1	19.30	/
	5200MHz(Ch40)	Fig.2	19.35	/
	5240MHz(Ch48)	Fig.3	19.30	/
802.11n-HT40	5190MHz(Ch38)	Fig.4	41.68	/
	5230MHz(Ch46)	Fig.5	42.00	/
802.11 ac-VHT80	5210MHz(Ch42)	Fig.6	82.24	/

Conclusion: PASS

Test graphs as below:

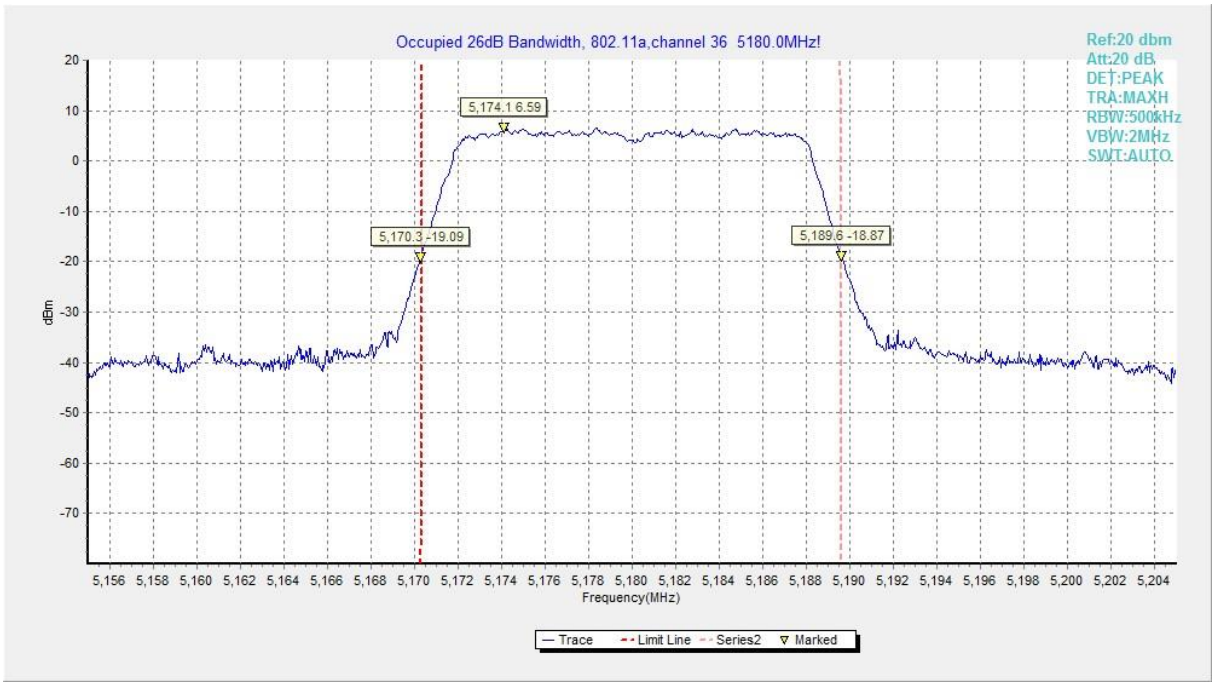


Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

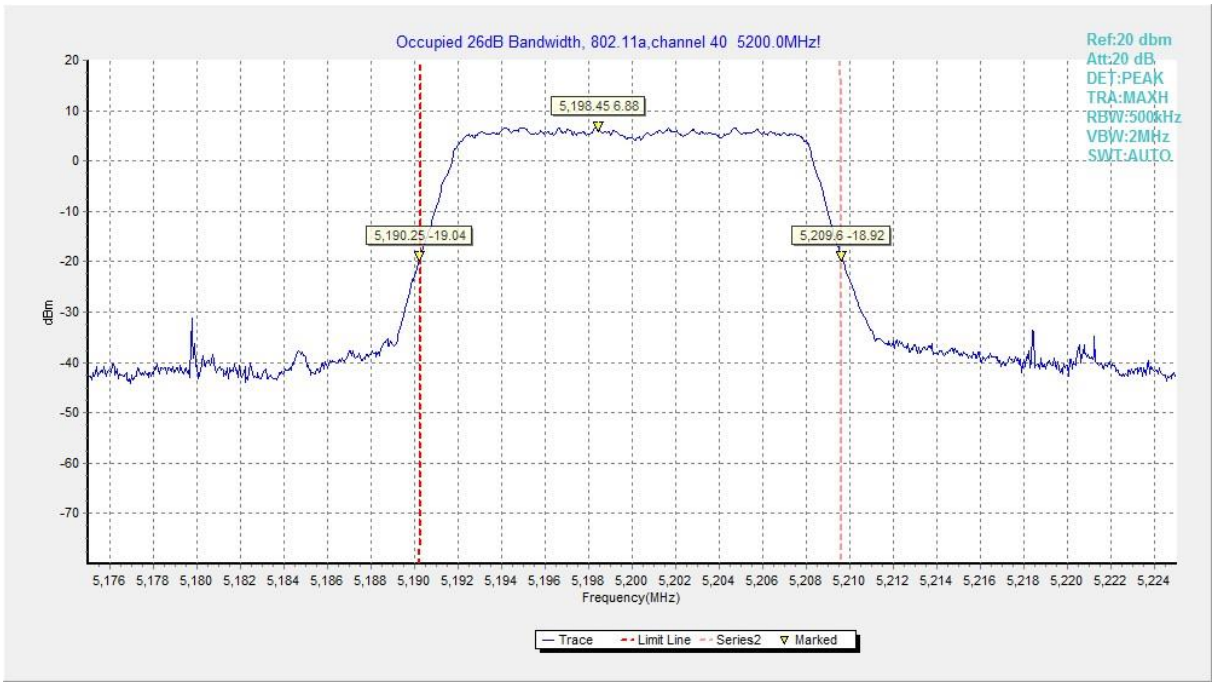


Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)

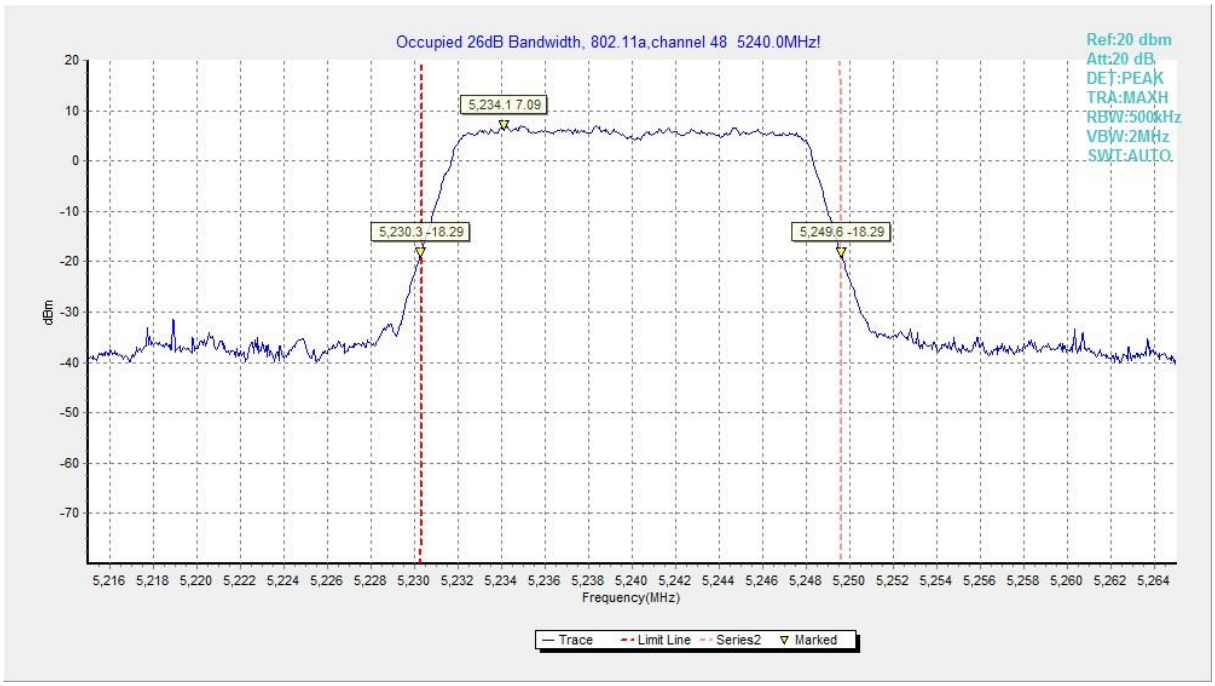


Fig. 3 Occupied 26dB Bandwidth (802.11a, 5240MHz)

Fig. 4 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)

Fig. 5 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)

Fig. 6 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5210MHz)

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.7	16.35	**P**
	5785MHz(Ch157)	Fig.8	16.35	**P**
	5825MHz(Ch165)	Fig.9	16.30	**P**
802.11n-HT40	5755MHz(Ch151)	Fig.10	35.52	**P**
	5795MHz(Ch159)	Fig.11	35.68	**P**
802.11ac-VHT80	5775MHz(Ch155)	Fig.12	75.20	**P**

Conclusion: PASS

Test graphs as below:

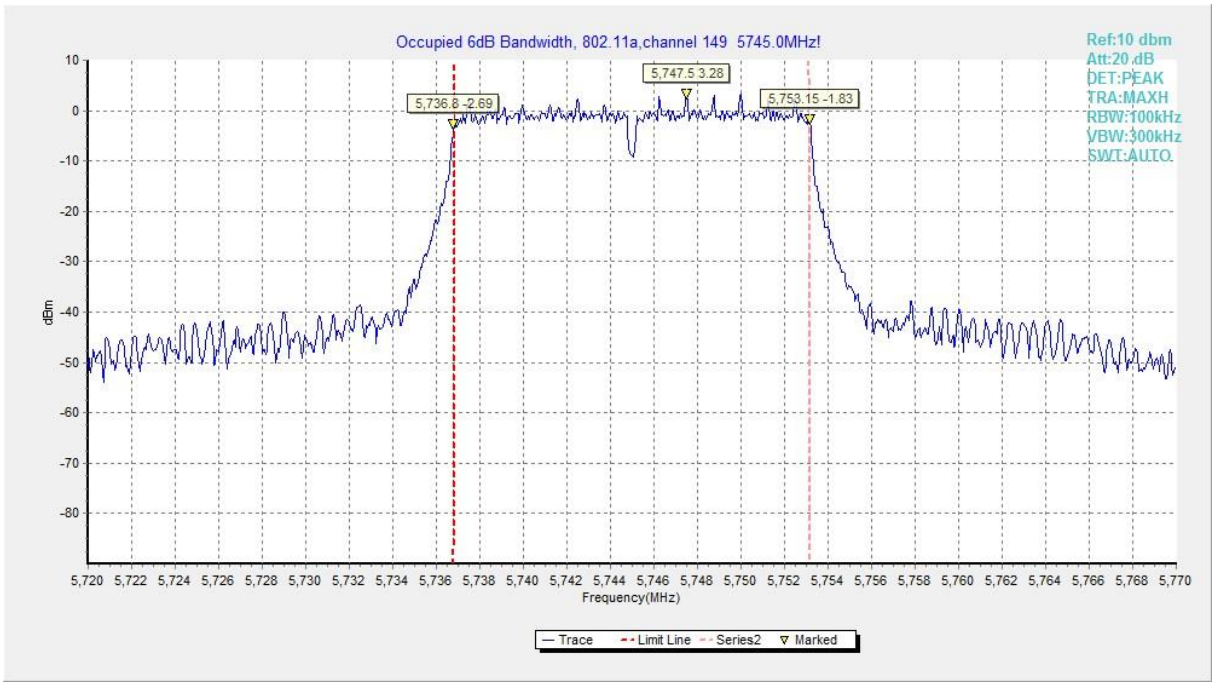


Fig. 7 Occupied 6dB Bandwidth (802.11a, 5745MHz)

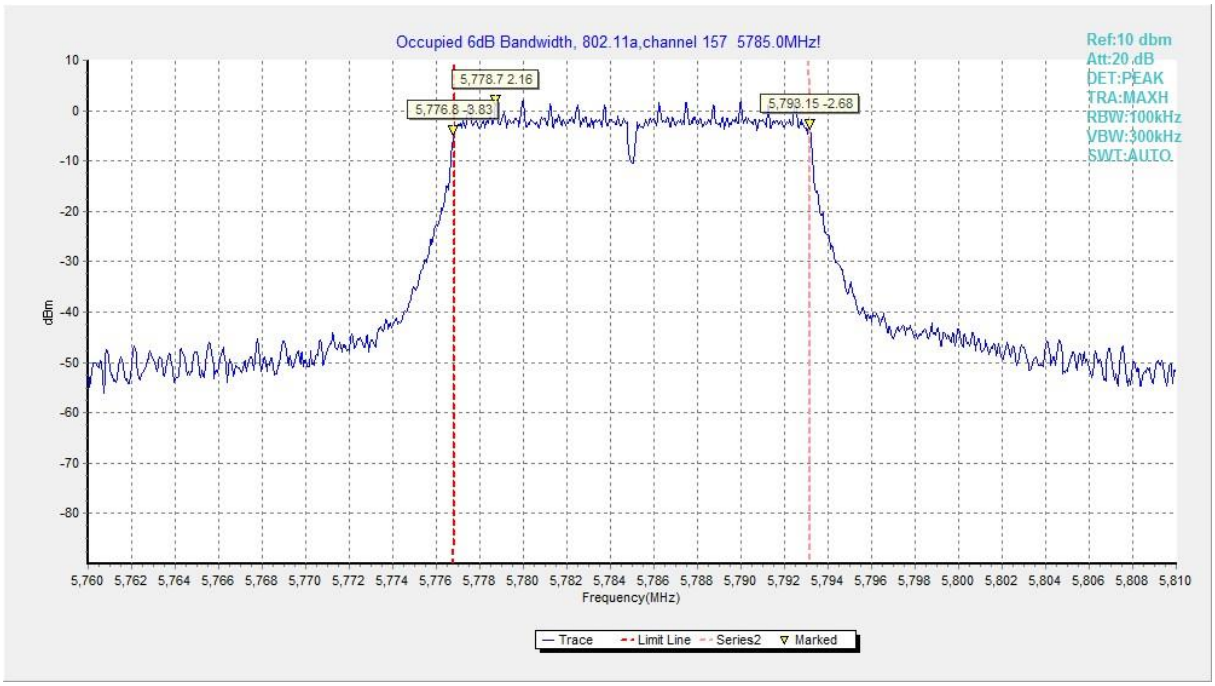


Fig. 8 Occupied 6dB Bandwidth (802.11a, 5785MHz)

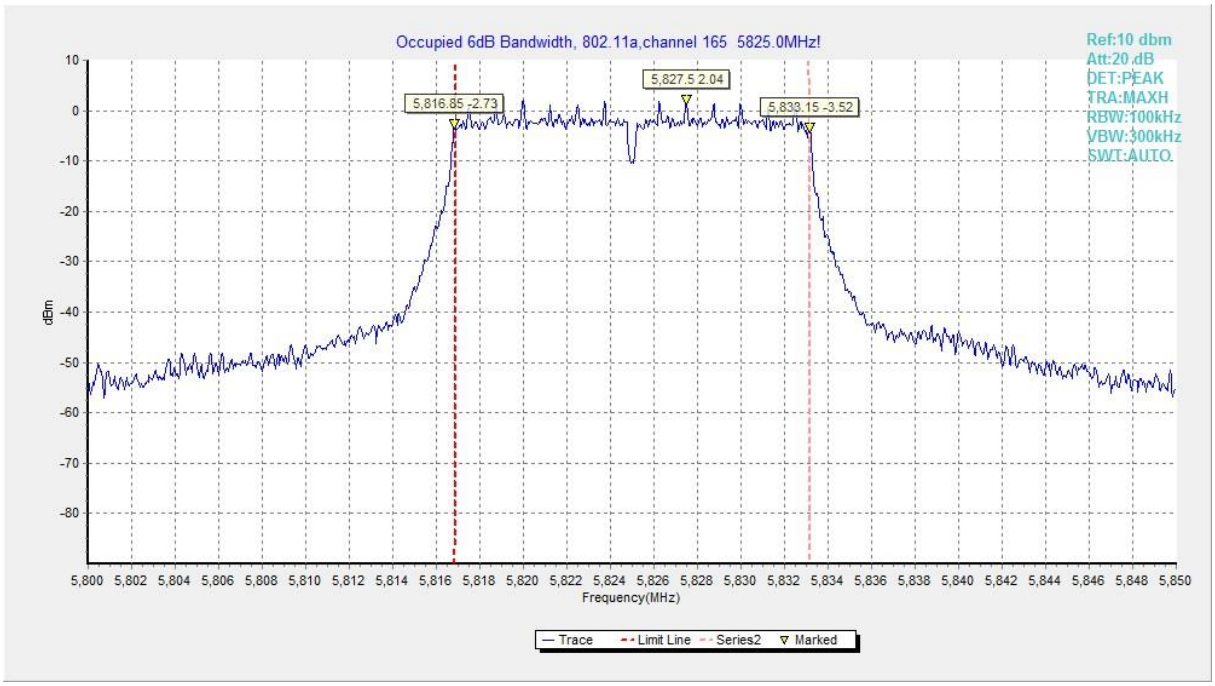


Fig. 9 Occupied 6dB Bandwidth (802.11a, 5825MHz)

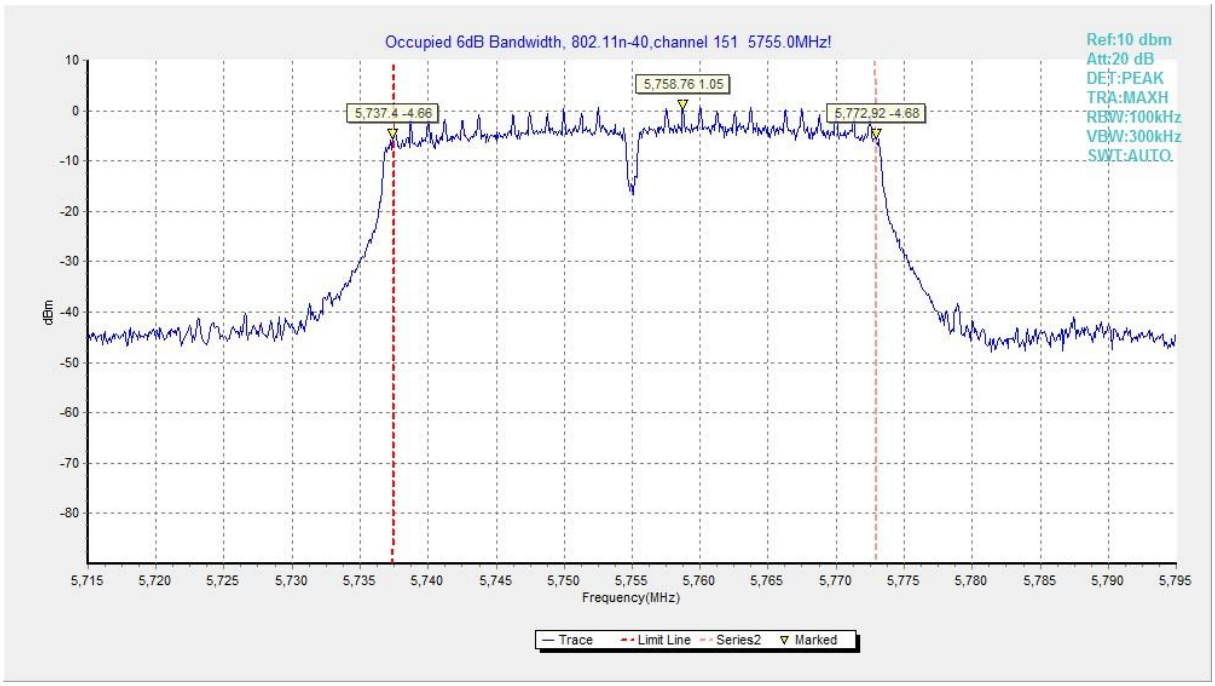


Fig. 10 Occupied 6dB Bandwidth (802.11n-HT40, 5755MHz)

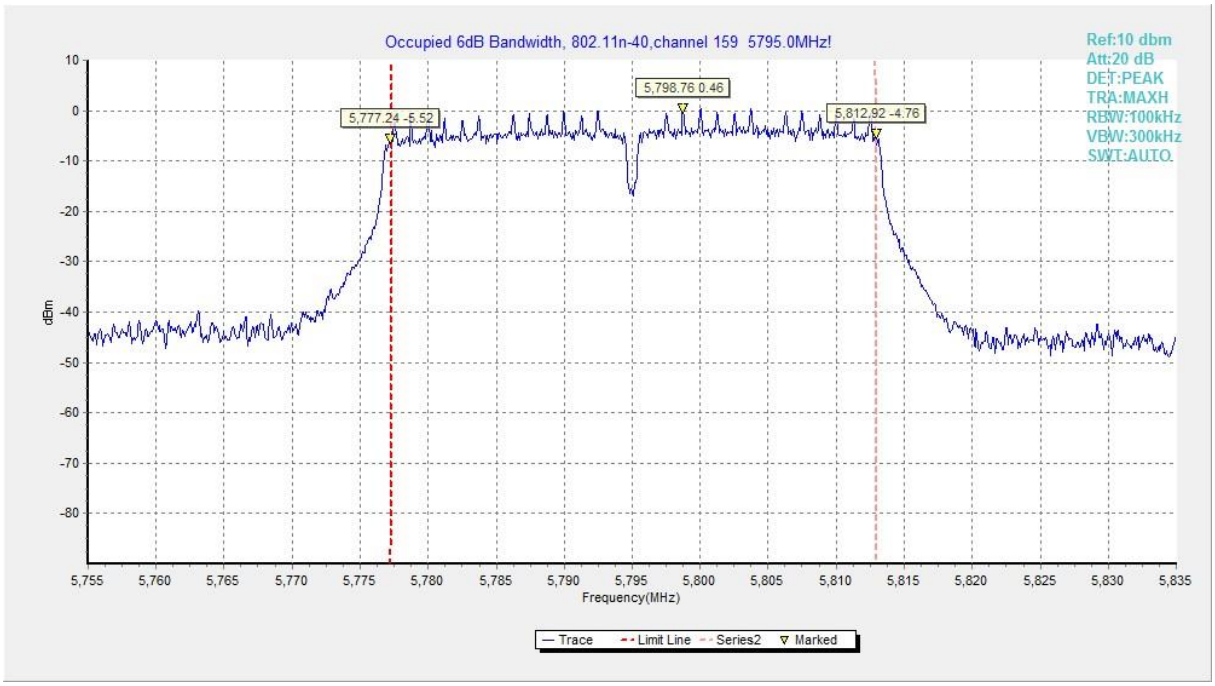


Fig. 11 Occupied 6dB Bandwidth (802.11n-HT40, 5795MHz)

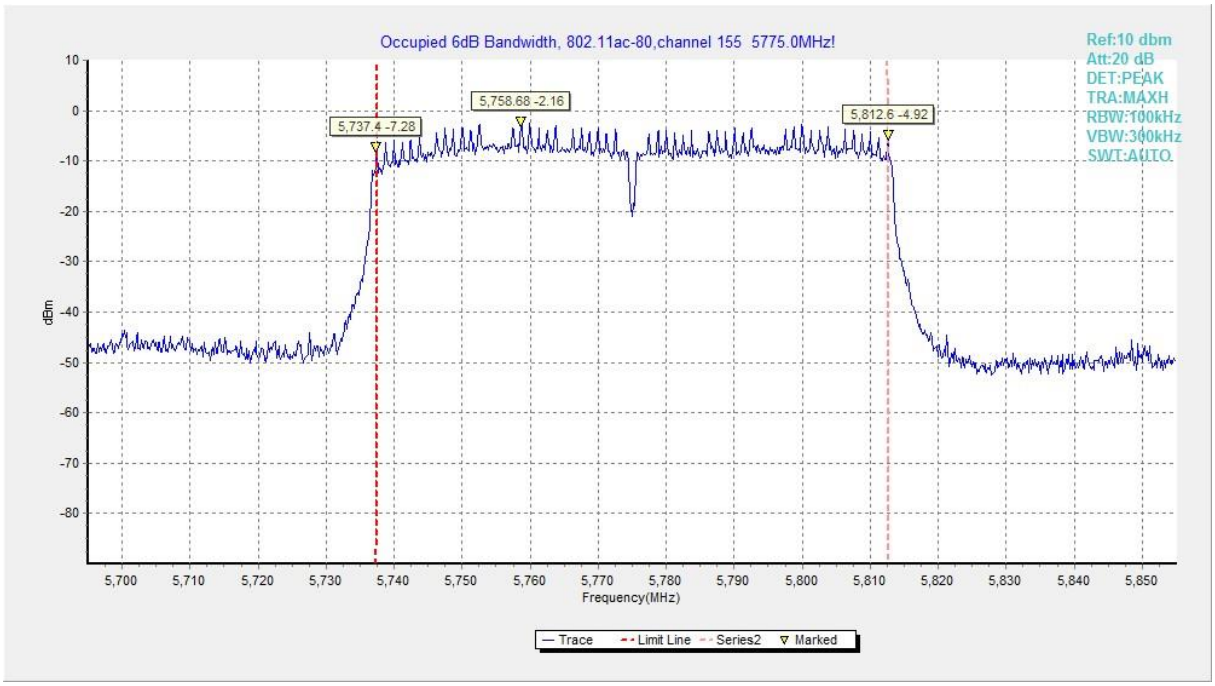


Fig. 12 Occupied 6dB Bandwidth (802.11ac-VHT80, 5775MHz)

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
802.11a	5180MHz(Ch36)	Fig.13	16.62	/
	5200MHz(Ch40)	Fig.14	16.58	/
	5240MHz(Ch48)	Fig.15	16.62	/
802.11n-HT40	5190MHz(Ch38)	Fig.16	36.36	/
	5230MHz(Ch46)	Fig.17	36.28	/
802.11 ac-VHT80	5210MHz(Ch42)	Fig.18	75.28	/

Conclusion: PASS

Test graphs as below:

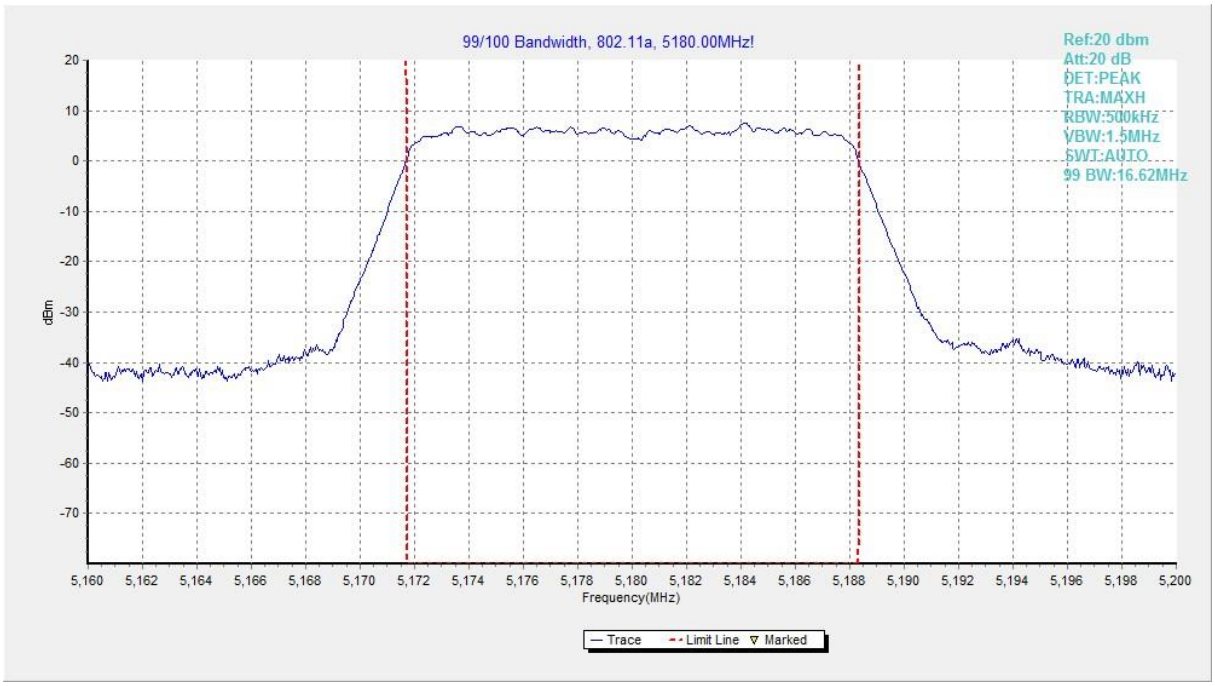


Fig. 13 99% Occupied Bandwidth (802.11a, 5180MHz)

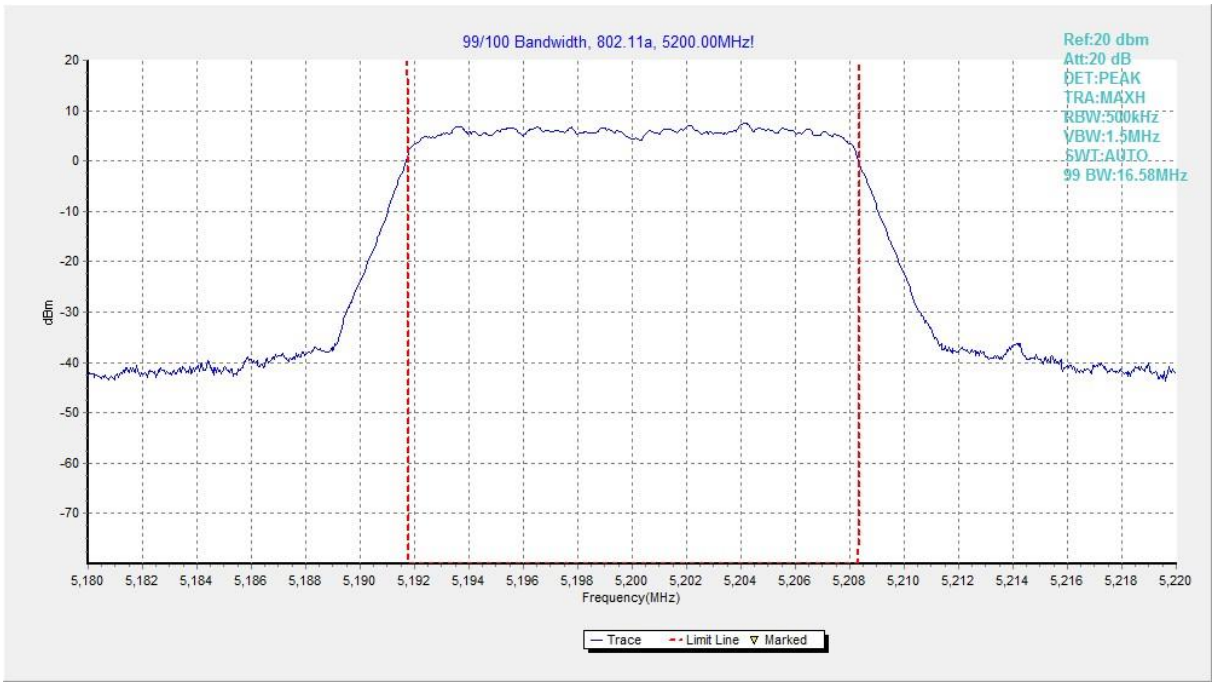


Fig. 14 99% Occupied Bandwidth (802.11a, 5200MHz)

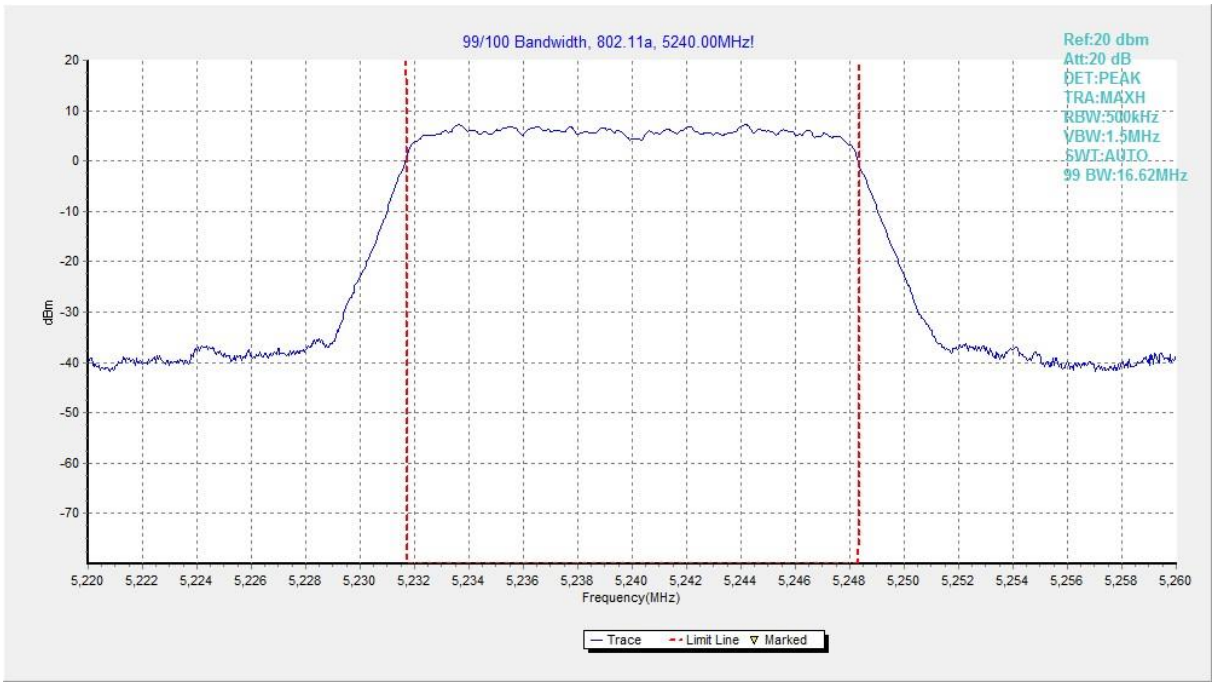


Fig. 15 99% Occupied Bandwidth (802.11a, 5240MHz)

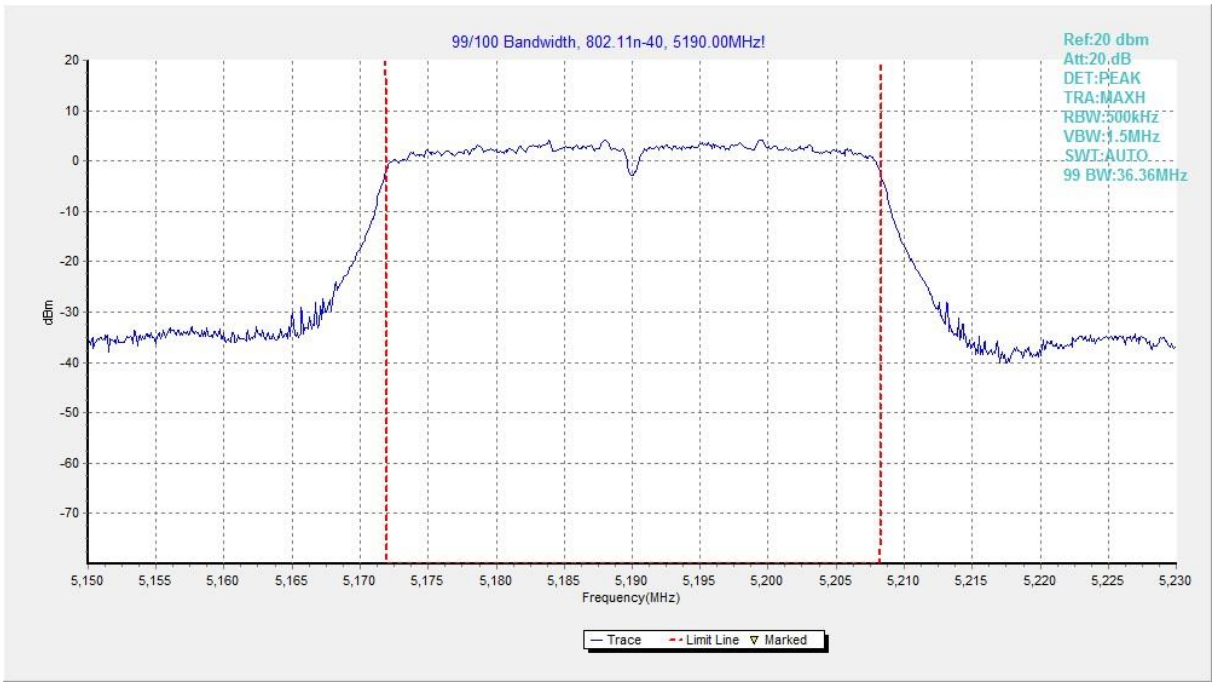


Fig. 16 99% Occupied Bandwidth (802.11n-HT40, 5190MHz)

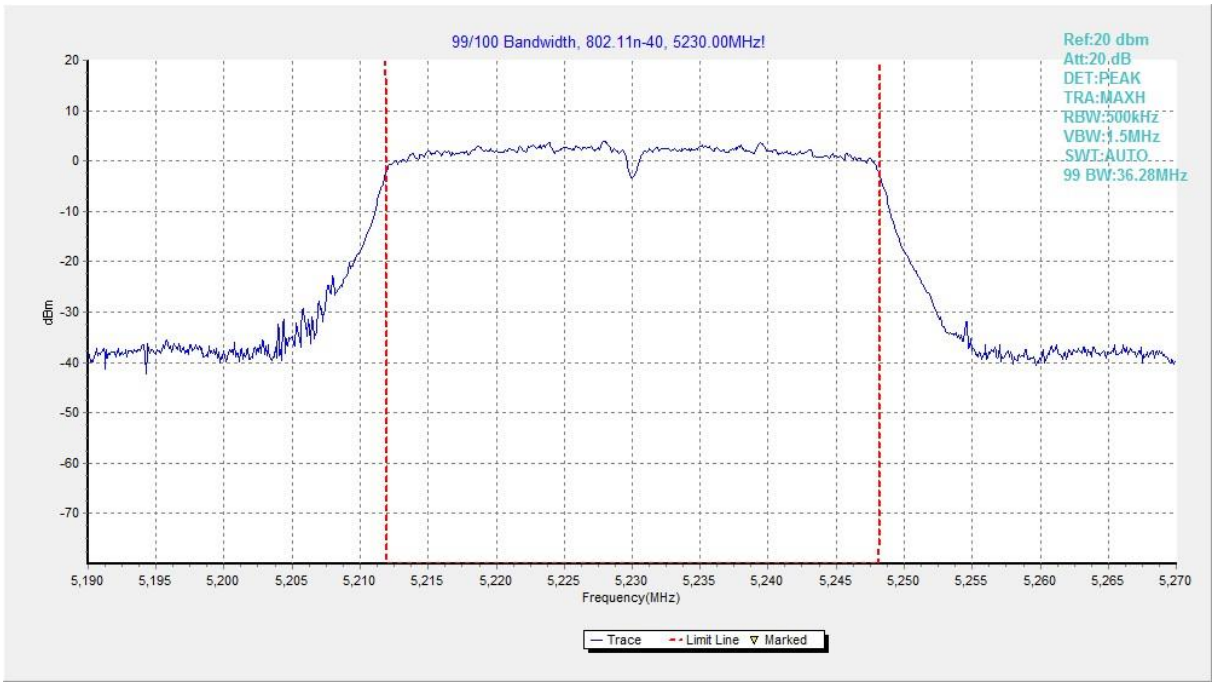


Fig. 17 99% Occupied Bandwidth (802.11n-HT40, 5230MHz)

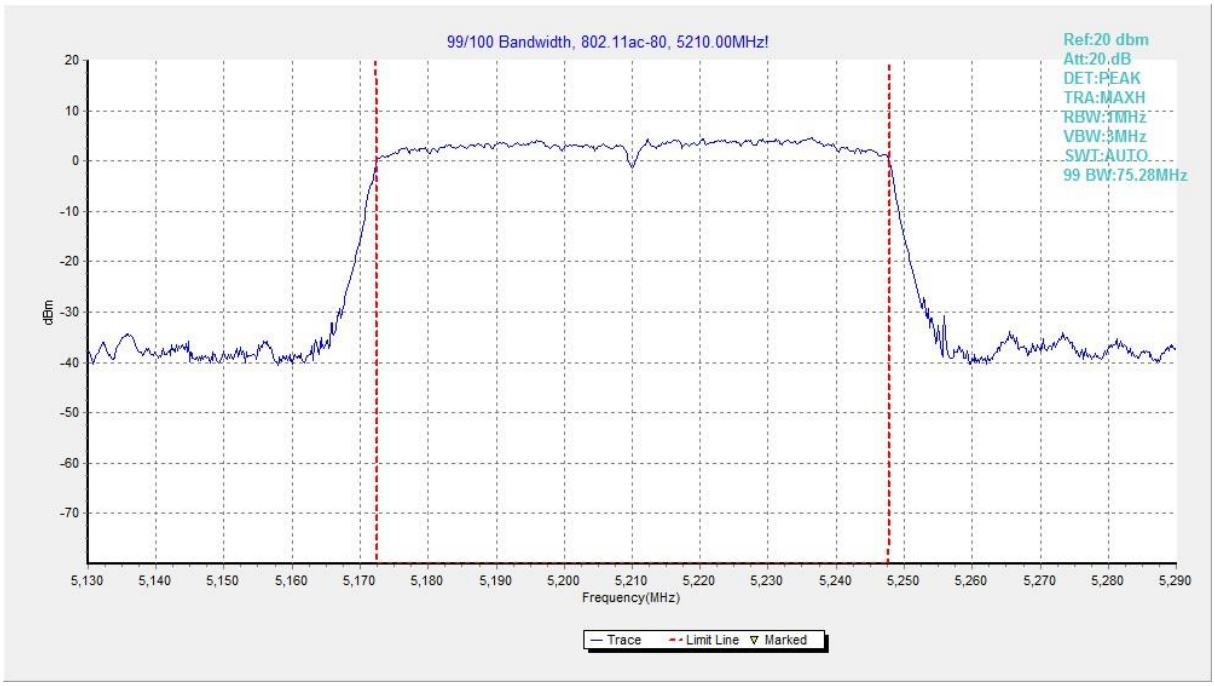


Fig. 18 99% Occupied Bandwidth (802. 11ac-VHT80, 5210MHz)

A.7. Band Edges Compliance

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5150MHz~5250MHz	< -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.19	**P**
	5745 MHz(CH149)	Fig.20	**P**
	5825 MHz(CH165)	Fig.21	**P**
802.11n-HT40	5190 MHz(CH38)	Fig.22	**P**
	5755 MHz(CH151)	Fig.23	**P**
	5795 MHz(CH159)	Fig.24	**P**
802.11ac-VHT80	5210 MHz(CH42)	Fig.25	**P**
	5775 MHz(CH155)	Fig.26	**P**

Conclusion: PASS

Test graphs as below:

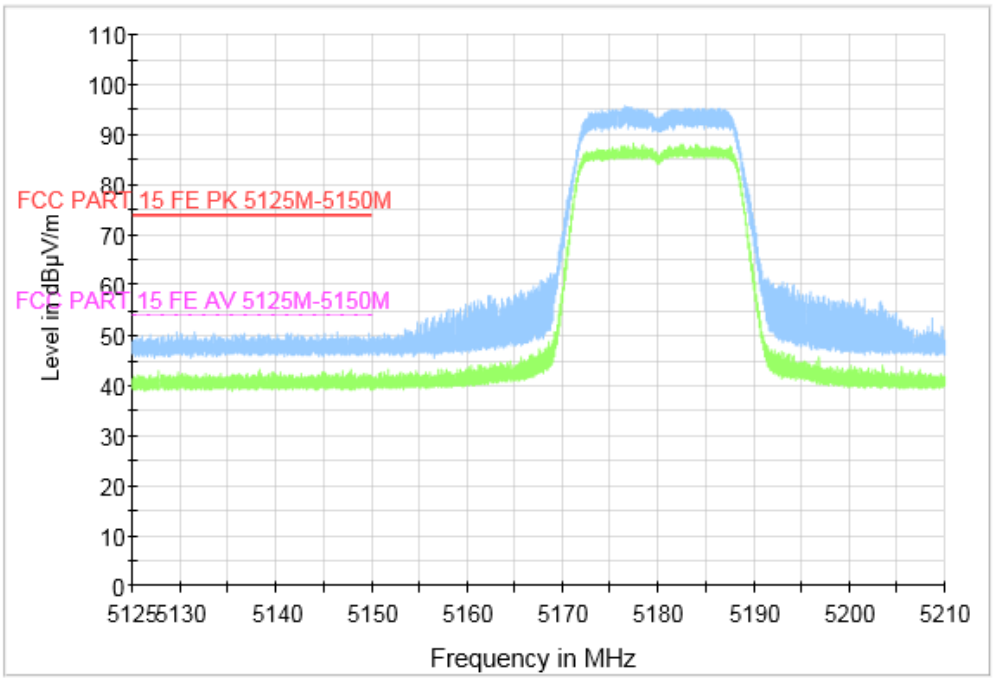


Fig. 19 Band Edges (802.11a, CH36 5180MHz)

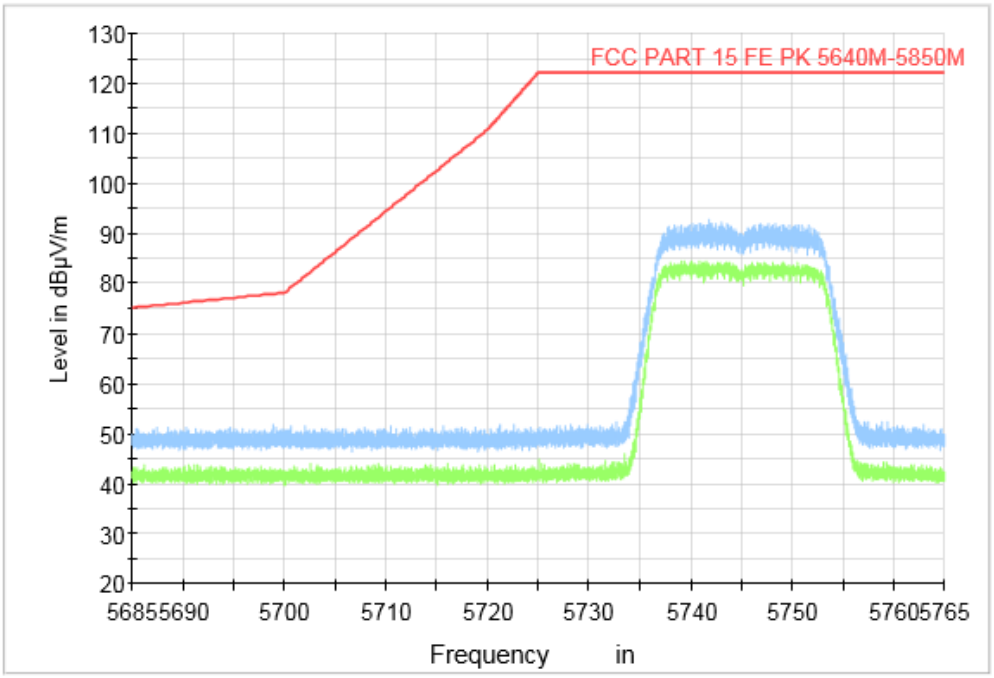


Fig. 20 Band Edges (802.11a, CH149 5745MHz)

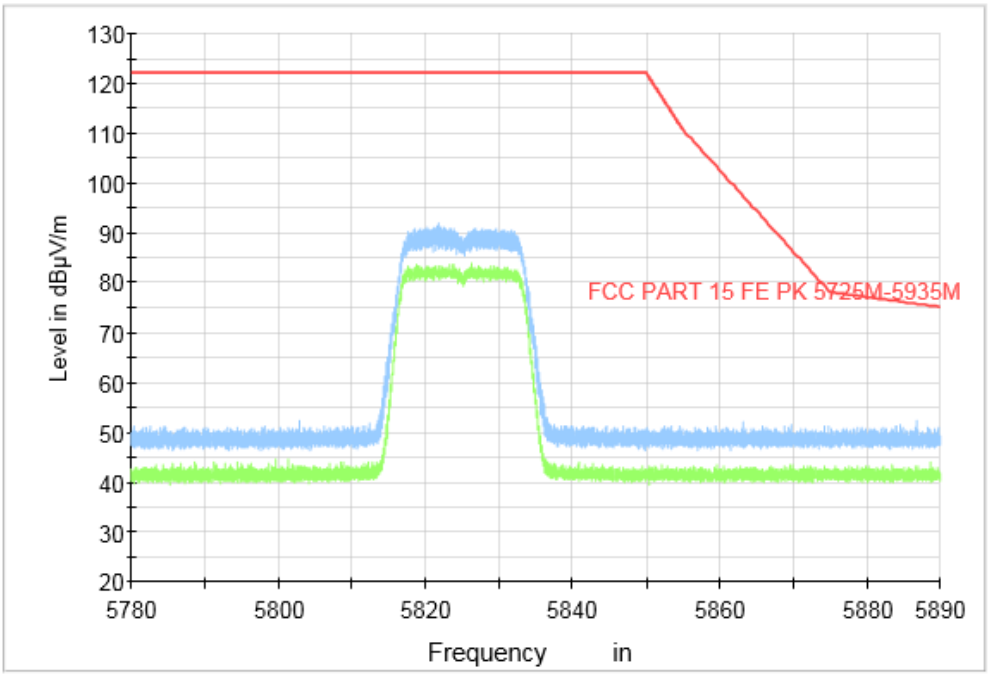


Fig. 21 Band Edges (802.11a, CH165 5825MHz)

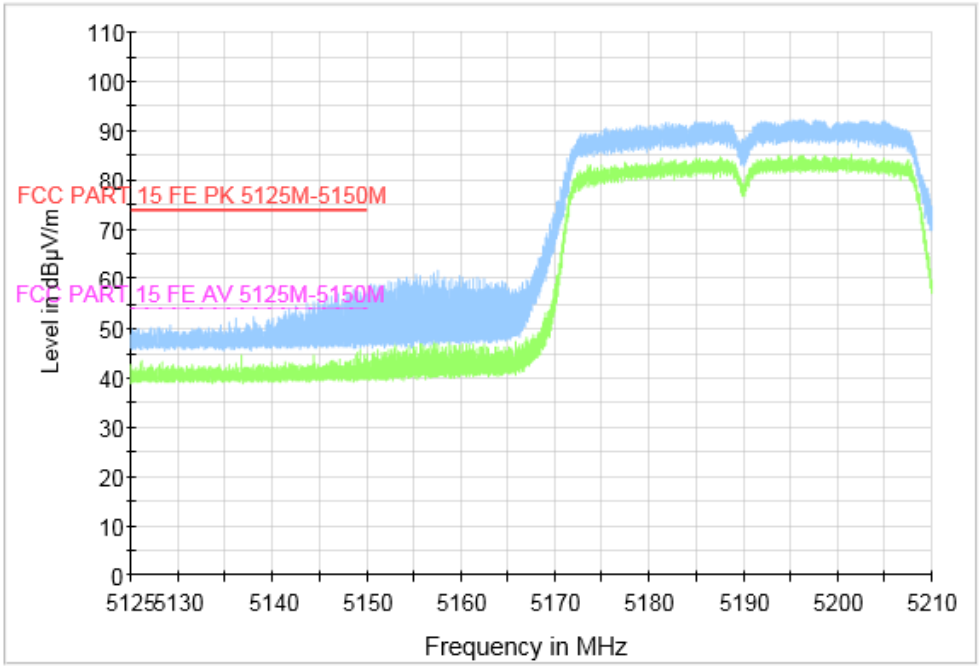


Fig. 22 Band Edges (802.11n-HT40, CH38 5190MHz)

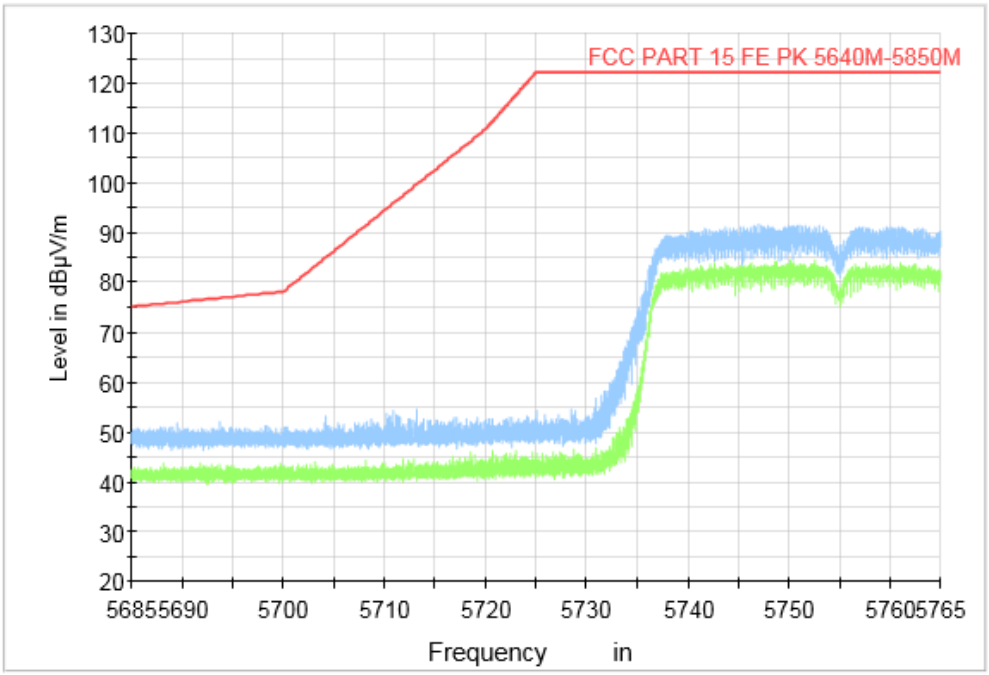


Fig. 23 Band Edges (802.11n-HT40, CH151 5755MHz)

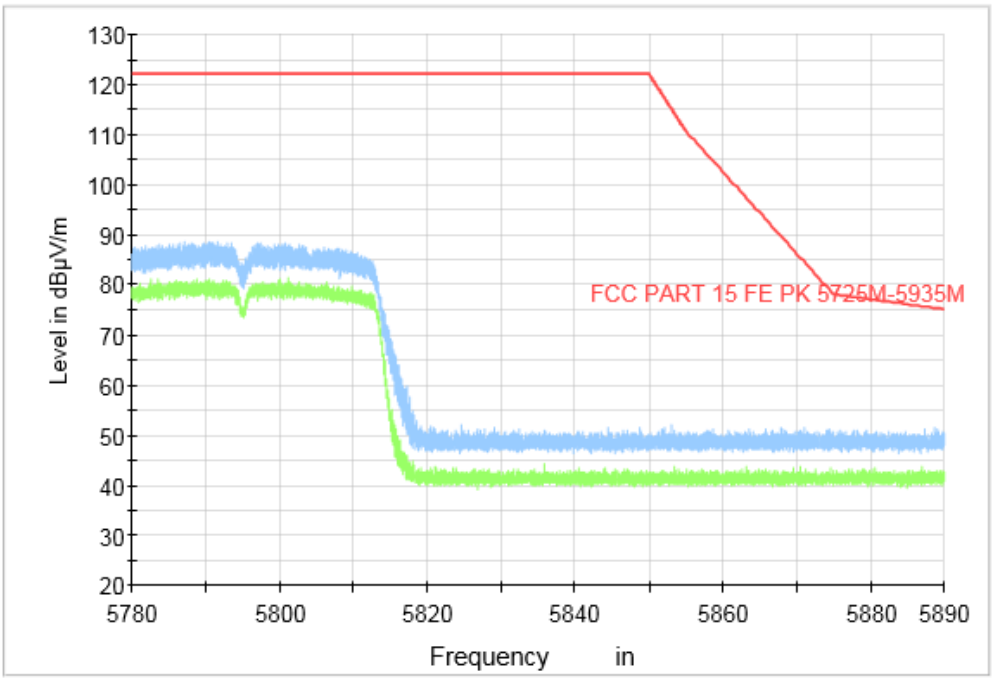


Fig. 24 Band Edges (802.11n-HT40, CH159 5795MHz)

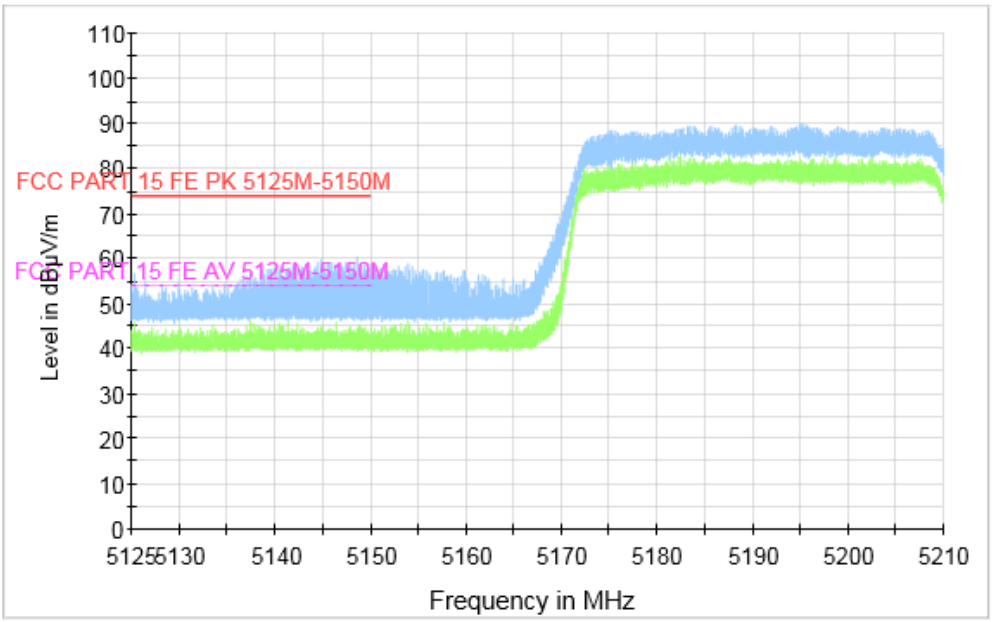


Fig. 25 Band Edges (802.11ac-VHT80, CH42 5210MHz)

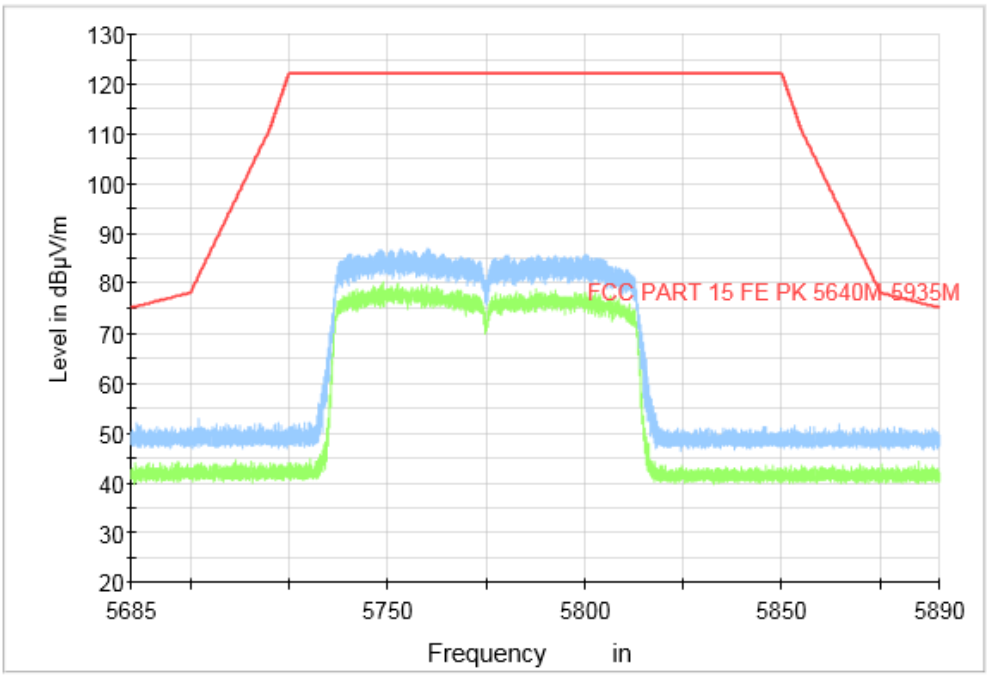


Fig. 26 Band Edges (802.11ac-VHT80, CH155 5775MHz)

A.8. Transmitter Spurious Emission

Measurement Limit:

Standard	Frequency (MHz)	Limit (dBm/MHz)
FCC 47 CFR Part 15.407	5150MHz~5250MHz	< -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, KDB 662911.
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.

Measurement Result:

SISO:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	5180MHz(Ch36)	1 GHz ~3 GHz	Fig.27	**P**
		3 GHz ~7 GHz	Fig.28	**P**
		7 GHz ~18 GHz	Fig.29	**P**
	5200MHz(Ch40)	1 GHz ~3 GHz	Fig.30	**P**
		3 GHz ~7 GHz	Fig.31	**P**
		7 GHz ~18 GHz	Fig.32	**P**
	5240MHz(Ch48)	1 GHz ~3 GHz	Fig.33	**P**
		3 GHz ~7 GHz	Fig.34	**P**
		7 GHz ~18 GHz	Fig.35	**P**
	5745MHz(Ch149)	1 GHz ~3 GHz	Fig.36	**P**
		3 GHz ~7 GHz	Fig.37	**P**
		7 GHz ~18 GHz	Fig.38	**P**
	5785MHz(Ch157)	1 GHz ~3 GHz	Fig.39	**P**
		3 GHz ~7 GHz	Fig.40	**P**
		7 GHz ~18 GHz	Fig.41	**P**

	5825MHz(Ch165)	1 GHz ~3 GHz	Fig.42	**P**
		3 GHz ~7 GHz	Fig.43	**P**
		7 GHz ~18 GHz	Fig.44	**P**
802.11n-HT40	5190MHz(Ch38)	1 GHz ~3 GHz	Fig.45	**P**
		3 GHz ~7 GHz	Fig.46	**P**
		7 GHz ~18 GHz	Fig.47	**P**
	5230MHz(Ch46)	1 GHz ~3 GHz	Fig.48	**P**
		3 GHz ~7 GHz	Fig.49	**P**
		7 GHz ~18 GHz	Fig.50	**P**
	5755MHz(Ch151)	1 GHz ~3 GHz	Fig.51	**P**
		3 GHz ~7 GHz	Fig.52	**P**
		7 GHz ~18 GHz	Fig.53	**P**
	5795MHz(Ch159)	1 GHz ~3 GHz	Fig.54	**P**
		3 GHz ~7 GHz	Fig.55	**P**
		7 GHz ~18 GHz	Fig.56	**P**
802.11a-VHT80	5210MHz(Ch42)	1 GHz ~3 GHz	Fig.57	**P**
		3 GHz ~7 GHz	Fig.58	**P**
		7 GHz ~18 GHz	Fig.59	**P**
	5775MHz(Ch155)	1 GHz ~3 GHz	Fig.60	**P**
		3 GHz ~7 GHz	Fig.61	**P**
		7 GHz ~18 GHz	Fig.62	**P**
All channels		30 MHz ~1 GHz	Fig.63	**P**
		18 GHz ~26.5 GHz	Fig.64	**P**
		26.5GHz~40GHz	Fig.65	**P**

MIMO:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11 n-HT20	5180MHz(Ch36)	1 GHz ~3 GHz	Fig.66	**P**
		3 GHz ~7 GHz	Fig.67	**P**
		7 GHz ~18 GHz	Fig.68	**P**
	5200MHz(Ch40)	1 GHz ~3 GHz	Fig.69	**P**
		3 GHz ~7 GHz	Fig.70	**P**
		7 GHz ~18 GHz	Fig.71	**P**
	5240MHz(Ch48)	1 GHz ~3 GHz	Fig.72	**P**
		3 GHz ~7 GHz	Fig.73	**P**
		7 GHz ~18 GHz	Fig.74	**P**
	5745MHz(Ch149)	1 GHz ~3 GHz	Fig.75	**P**
		3 GHz ~7 GHz	Fig.76	**P**
		7 GHz ~18 GHz	Fig.77	**P**
	5785MHz(Ch157)	1 GHz ~3 GHz	Fig.78	**P**
		3 GHz ~7 GHz	Fig.79	**P**
		7 GHz ~18 GHz	Fig.80	**P**

	5825MHz(Ch165)	1 GHz ~3 GHz	Fig.81	**P**
		3 GHz ~7 GHz	Fig.82	**P**
		7 GHz ~18 GHz	Fig.83	**P**
802.11n-HT40	5190MHz(Ch38)	1 GHz ~3 GHz	Fig.84	**P**
		3 GHz ~7 GHz	Fig.85	**P**
		7 GHz ~18 GHz	Fig.86	**P**
	5230MHz(Ch46)	1 GHz ~3 GHz	Fig.87	**P**
		3 GHz ~7 GHz	Fig.88	**P**
		7 GHz ~18 GHz	Fig.89	**P**
	5755MHz(Ch151)	1 GHz ~3 GHz	Fig.90	**P**
		3 GHz ~7 GHz	Fig.91	**P**
		7 GHz ~18 GHz	Fig.92	**P**
	5795MHz(Ch159)	1 GHz ~3 GHz	Fig.93	**P**
		3 GHz ~7 GHz	Fig.94	**P**
		7 GHz ~18 GHz	Fig.95	**P**
802.11a-VHT80	5210MHz(Ch42)	1 GHz ~3 GHz	Fig.96	**P**
		3 GHz ~7 GHz	Fig.97	**P**
		7 GHz ~18 GHz	Fig.98	**P**
	5775MHz(Ch155)	1 GHz ~3 GHz	Fig.99	**P**
		3 GHz ~7 GHz	Fig.100	**P**
		7 GHz ~18 GHz	Fig.101	**P**
All channels		30 MHz ~1 GHz	Fig.102	**P**
		18 GHz ~26.5 GHz	Fig.103	**P**
		26.5GHz~40GHz	Fig.104	**P**

Radiated Emissions for Co-located:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11 n-HT20 (2.4GHz + 5GHz)	2462MHz(Ch11) +5240MHz(Ch48)	30 MHz ~1 GHz	Fig.105	**P**
		1 GHz ~3 GHz	Fig.106	**P**
		3 GHz ~7 GHz	Fig.107	**P**
		7 GHz ~18 GHz	Fig.108	**P**
		18 GHz ~26.5 GHz	Fig.109	**P**
		26.5GHz~40GHz	Fig.110	**P**

Worst Case Result

SISO:

802.11a CH48

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
13968.87	48.00	68.20	20.20	H	9.5
10482.97	50.12	68.20	18.08	V	5.0
14904.60	48.53	68.20	19.67	H	11.1
15720.80	64.24	74.00	9.76	V	12.4
16568.90	51.05	68.20	17.15	V	14.8
17117.43	50.96	68.20	17.24	V	15.0

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
10944.60	35.93	54.00	18.07	V	5.2
11533.47	36.74	54.00	17.26	H	6.3
12303.10	36.47	54.00	17.53	V	7.1
15723.37	51.11	54.00	2.89	V	12.4
15905.23	39.94	54.00	14.06	V	13.2
17888.53	41.53	54.00	12.47	H	16.2

802.11a CH165

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7766.70	47.31	68.20	20.89	V	1.9
8693.63	43.99	68.20	24.21	H	3.0
9847.90	51.51	68.20	16.69	V	4.5
14179.33	47.87	68.20	20.33	V	10.8
16288.40	50.59	68.20	17.61	H	14.3
17481.53	57.32	68.20	10.88	V	14.8

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7451.37	34.27	54.00	19.73	H	2.1
8268.67	34.74	54.00	19.26	V	3.1
11649.70	45.07	54.00	8.93	V	6.9
12362.50	37.52	54.00	16.48	V	7.4
15945.20	39.49	54.00	14.51	H	13.3
17910.53	41.90	54.00	12.10	V	16.3

802.11n HT40 CH46

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7890.63	44.37	68.20	23.83	H	2.6
9848.27	49.87	68.20	18.33	V	4.5
10272.87	46.12	68.20	22.08	H	5.1
13910.93	47.63	68.20	20.57	H	9.4
16626.10	51.12	68.20	17.08	H	14.9
17383.63	53.69	68.20	14.51	V	14.6

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7726.37	43.84	54.00	10.16	V	1.9
10860.27	36.17	54.00	17.83	V	5.2
11589.93	42.83	54.00	11.17	V	6.6
12216.20	36.41	54.00	17.59	V	7.2
15943.73	39.78	54.00	14.22	V	13.3
17966.63	41.02	54.00	12.98	V	16.1

802.11n HT40 CH159

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7958.10	44.18	68.20	24.02	H	2.7
9847.90	51.64	68.20	16.56	V	4.5
14266.60	48.63	68.20	19.57	V	10.9
14948.23	48.03	68.20	20.17	V	11.1
16576.23	50.44	68.20	17.76	V	14.8
17373.00	52.92	68.20	15.28	V	14.6

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7726.37	44.98	54.00	9.02	V	1.9
10824.70	36.65	54.00	17.35	V	5.3
11589.93	43.85	54.00	10.15	V	6.6
12556.83	36.97	54.00	17.03	H	7.9
16137.33	41.04	54.00	12.96	H	14.2
17912.73	41.42	54.00	12.59	H	16.3

802.11ac VHT80 CH42

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8704.27	43.84	68.20	24.36	V	3.0
9847.90	50.15	68.20	18.05	V	4.5
10407.07	47.61	68.20	20.59	V	5.0
14257.07	48.40	68.20	19.80	V	10.9
15676.43	60.15	74.00	13.85	V	12.2
17081.13	51.09	68.20	17.11	V	15.0

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
10749.17	34.93	54.00	19.07	H	5.0
11675.00	36.11	54.00	17.89	V	7.0
12458.57	36.01	54.00	17.99	V	7.6
15675.33	48.35	54.00	5.65	V	12.2
16088.57	39.79	54.00	14.21	V	13.9
17961.50	41.29	54.00	12.71	H	16.1

802.11ac VHT80 CH155

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7133.47	44.61	68.20	23.59	V	1.8
9847.90	51.82	68.20	16.38	V	4.5
12967.87	46.53	68.20	21.67	H	8.5
15196.83	48.04	68.20	20.16	V	11.0
16637.83	51.79	68.20	16.41	H	14.9
17372.63	53.50	68.20	14.70	V	14.6

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7699.97	43.99	54.00	10.01	V	2.0
10903.90	36.10	54.00	17.90	V	5.2
11549.97	45.19	54.00	8.81	V	6.4
12566.00	37.12	54.00	16.88	V	7.9
15842.17	39.72	54.00	14.28	V	12.8
17925.57	41.03	54.00	12.97	H	16.1

MIMO:

802.11n-HT20 CH48

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8902.63	44.61	68.20	23.59	V	3.3
9847.90	51.73	68.20	16.47	V	4.5
10476.37	66.57	68.20	1.63	V	5.0
14857.30	48.18	68.20	20.02	H	10.8
16638.20	51.39	68.20	16.81	V	14.9
17596.30	51.12	68.20	17.08	V	15.5

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8256.20	34.72	54.00	19.28	V	3.1
10808.93	35.69	54.00	18.31	V	5.2
11687.83	37.12	54.00	16.88	V	7.1
12515.77	37.66	54.00	16.34	V	8.0
15714.57	50.20	54.00	3.80	V	12.3
17907.97	41.54	54.00	12.46	H	16.3

802.11n-HT20 CH157

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
9847.90	50.89	68.20	17.31	V	4.5
11571.97	62.88	74.00	11.12	V	6.5
14316.83	48.23	68.20	19.97	H	10.9
14844.10	48.58	68.20	19.62	H	10.8
16577.33	50.87	68.20	17.33	H	14.8
17356.50	59.39	68.20	8.81	V	14.7

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7713.17	44.28	54.00	9.72	V	1.9
10939.47	35.93	54.00	18.07	H	5.1
11570.87	51.06	54.00	2.94	H	6.5
12349.67	37.52	54.00	16.48	V	7.3
16188.30	40.86	54.00	13.14	V	14.4
17912.37	41.66	54.00	12.34	V	16.3

802.11n HT40 CH46

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8643.40	44.62	68.20	23.58	H	2.9
9848.27	51.57	68.20	16.63	V	4.5
10458.40	62.34	68.20	5.86	V	5.0
14013.97	47.27	68.20	20.93	H	9.5
16622.07	51.25	68.20	16.95	H	14.9
17250.90	50.79	68.20	17.41	V	14.8

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
8221.37	34.79	54.00	19.21	H	3.0
10835.70	36.26	54.00	17.74	V	5.3
11624.77	37.43	54.00	16.57	H	6.9
12534.10	37.50	54.00	16.50	H	8.0
15683.77	50.15	54.00	3.85	V	12.2
17921.53	41.05	54.00	12.95	H	16.2

802.11n HT40 CH159

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
9848.27	50.14	68.20	18.06	V	4.5
11581.87	59.24	74.00	14.76	H	6.6
14215.27	47.75	68.20	20.45	H	10.9
14800.83	48.82	68.20	19.38	V	10.7
16505.83	50.39	68.20	17.81	H	14.7
17387.67	56.74	68.20	11.46	V	14.6

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
7726.73	44.39	54.00	9.61	V	1.9
10891.43	35.68	54.00	18.32	H	5.2
11597.27	49.61	54.00	4.39	V	6.6
12556.83	37.74	54.00	16.26	V	7.9
15928.70	39.74	54.00	14.26	H	13.3
17934.37	41.46	54.00	12.54	H	16.1

802.11ac VHT80 CH42

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
9847.90	50.47	68.20	17.73	V	4.5
10459.50	59.02	68.20	9.18	V	5.0
14208.67	48.15	68.20	20.05	H	10.9
15015.70	48.26	68.20	19.94	H	10.9
16412.70	50.71	68.20	17.49	H	14.1
17080.40	50.80	68.20	17.40	H	15.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
8175.53	34.59	54.00	19.41	H	2.8
10837.17	36.56	54.00	17.44	V	5.3
11899.77	37.36	54.00	16.64	V	7.1
12516.13	37.38	54.00	16.62	V	8.0
15673.50	46.97	54.00	7.03	V	12.2
17942.80	41.29	54.00	12.71	V	16.0

802.11ac VHT80 CH155

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
9847.90	52.18	68.20	16.02	V	4.5
11578.93	57.26	74.00	16.74	V	6.6
14001.50	47.59	68.20	20.61	V	9.5
14929.17	48.24	68.20	19.96	H	11.2
16671.57	50.69	68.20	17.51	H	14.9
17312.50	53.45	68.20	14.75	V	14.9

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
7699.97	44.22	54.00	9.78	V	2.0
10925.53	35.76	54.00	18.24	V	5.2
11578.93	50.90	54.00	3.10	V	6.6
12337.20	37.22	54.00	16.78	V	7.3
16278.87	40.92	54.00	13.08	H	14.3
17889.27	41.23	54.00	12.77	H	16.2

Radiated Emissions for Co-located:

Frequency (MHz)	Max Peak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
9847.90	55.08	68.20	13.12	V	4.5
10482.60	59.71	68.20	8.49	V	5
14016.53	51.17	68.20	17.03	H	9.5
14907.90	51.09	68.20	17.11	V	11.1
16697.97	54.83	68.20	13.37	V	14.9
17714.73	53.54	74.00	20.46	H	15.8

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB)
11094.20	36.66	54.00	17.34	V	5
11507.43	37.63	54.00	16.37	H	6.2
12028.10	37.98	54.00	16.02	V	7.2
12537.77	38.62	54.00	15.38	H	8
15721.90	41.85	54.00	12.15	V	12.4
17928.87	42.93	54.00	11.07	H	16.1

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} + Cable Loss + Antenna Factor

Conclusion: PASS

Test graphs as below:

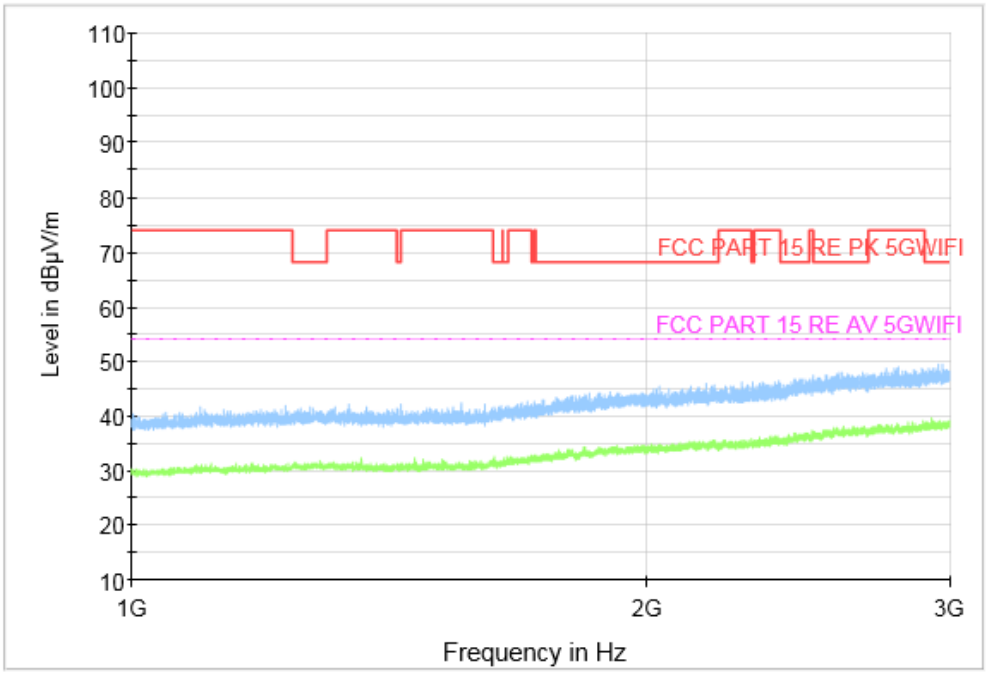


Fig. 27 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 1 GHz-3 GHz), SISO

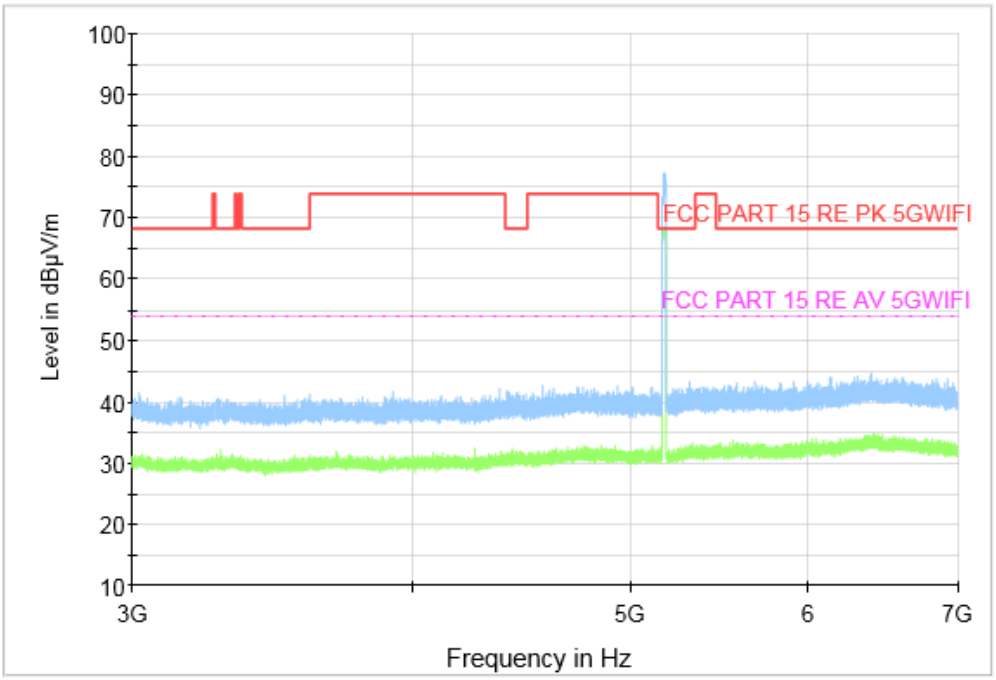


Fig. 28 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 3 GHz-7 GHz), SISO

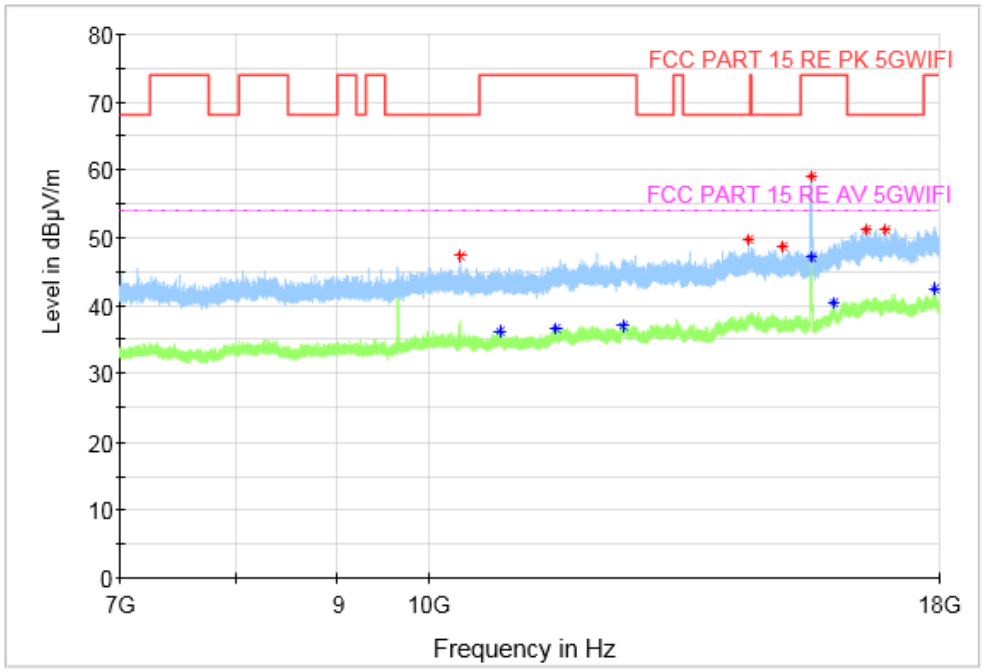


Fig. 29 Transmitter Spurious Emission (802.11a, CH36 5180MHz, 7 GHz-18 GHz), SISO

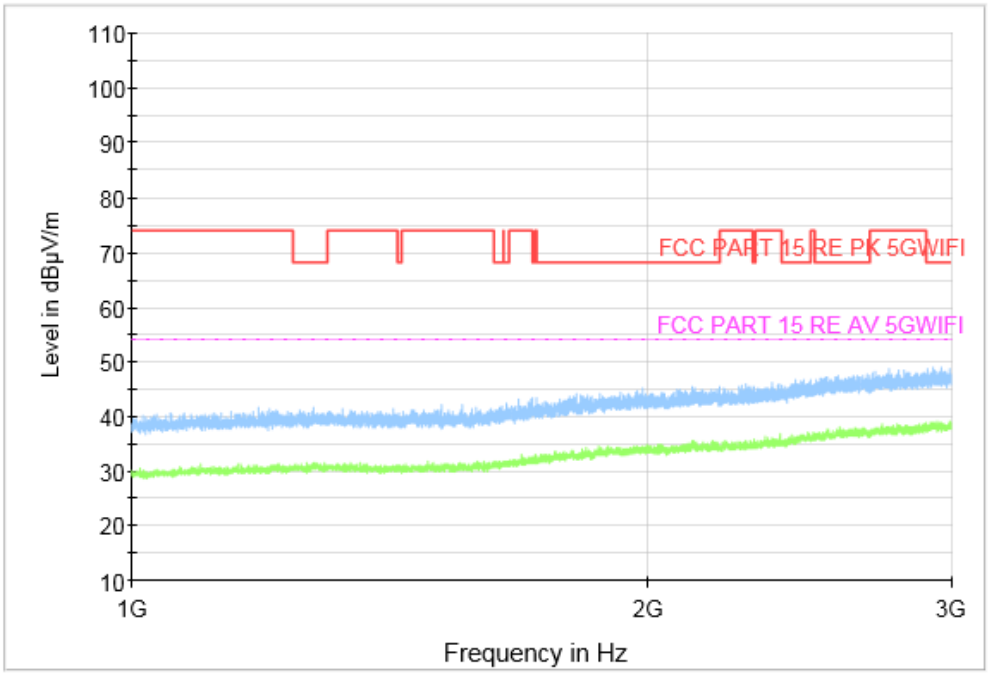


Fig. 30 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 1 GHz-3 GHz), SISO

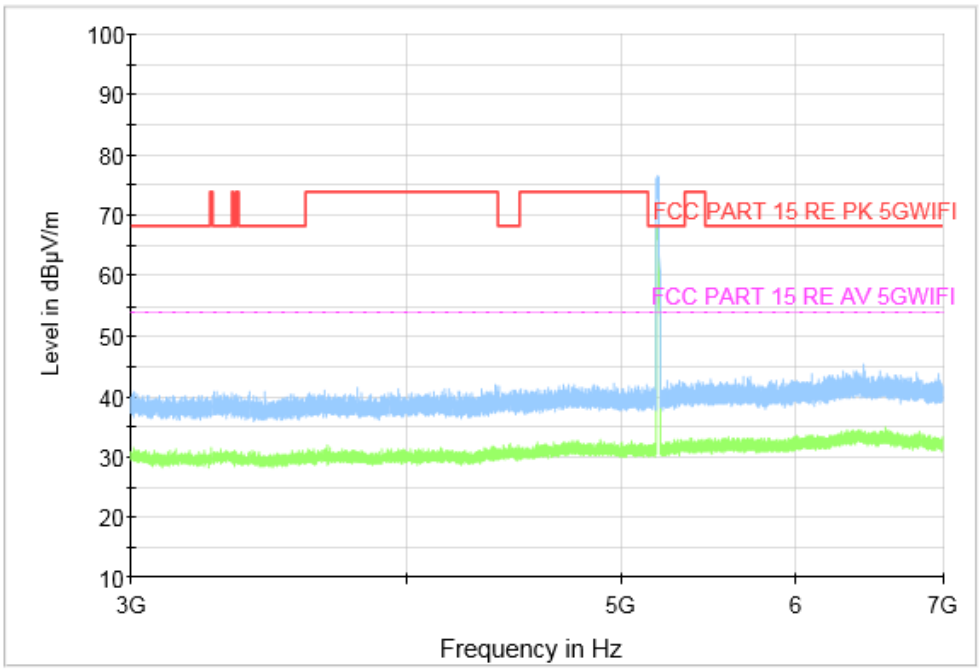


Fig. 31 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 3 GHz-7 GHz), SISO

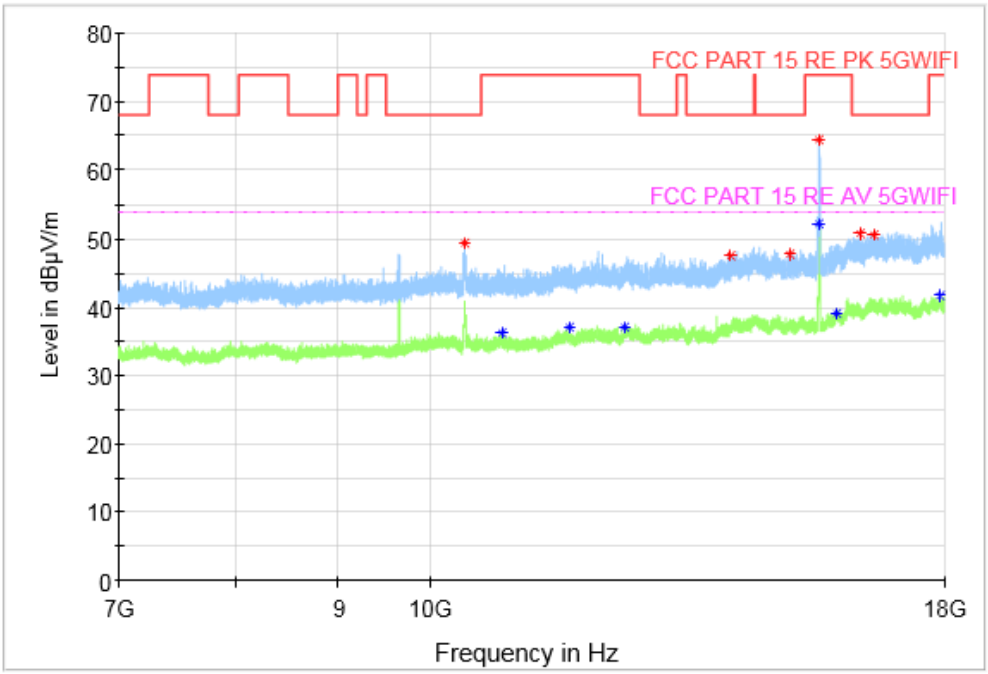


Fig. 32 Transmitter Spurious Emission (802.11a, CH40 5200MHz, 7 GHz-18 GHz), SISO

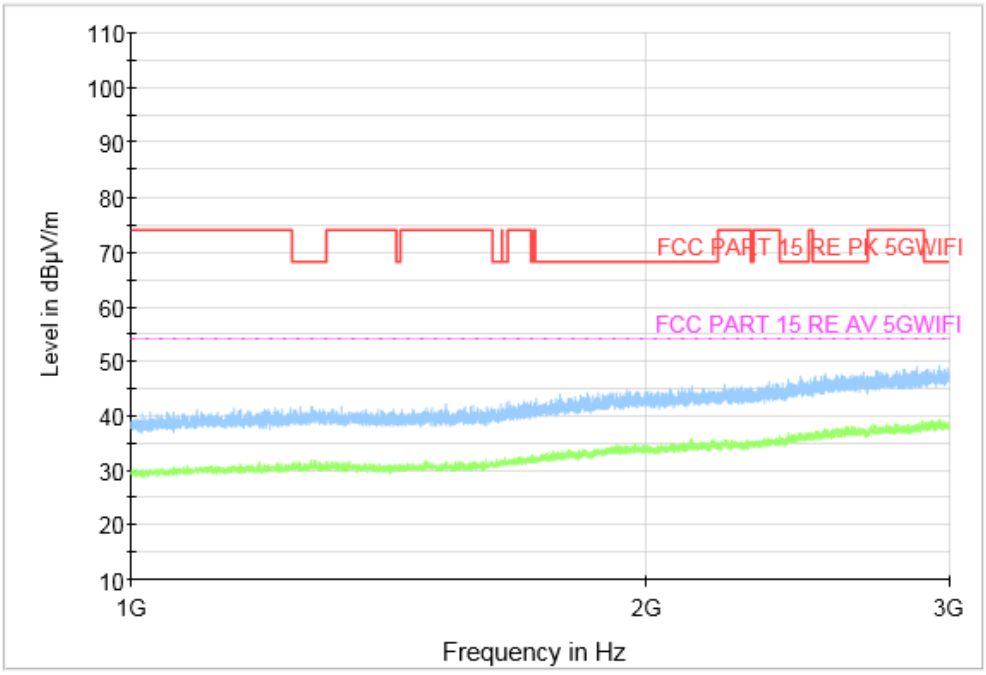


Fig. 33 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 1 GHz-3 GHz), SISO

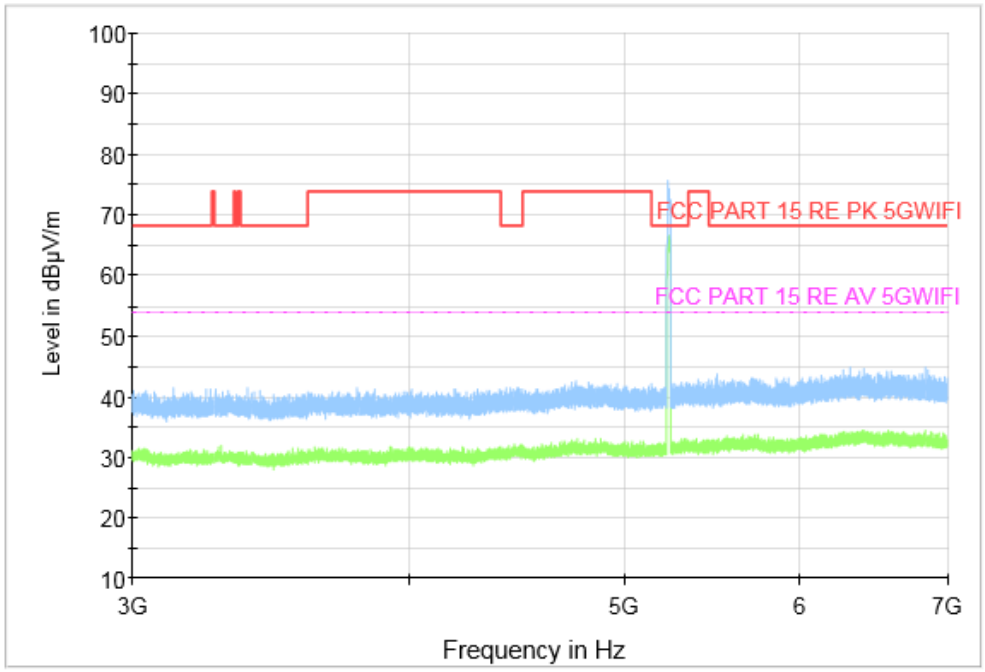


Fig. 34 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 3 GHz-7 GHz), SISO

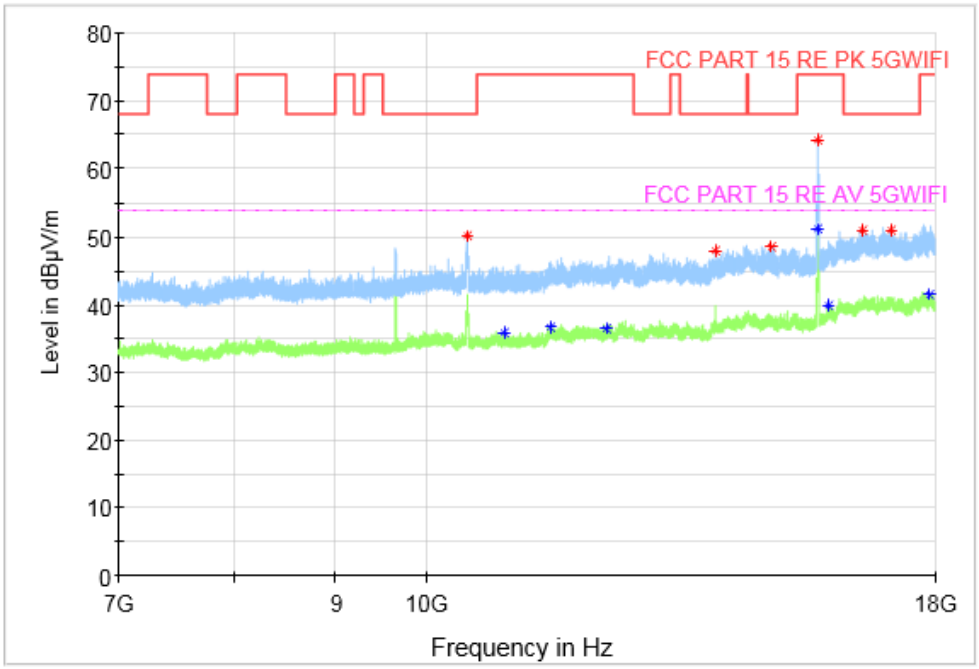


Fig. 35 Transmitter Spurious Emission (802.11a, CH48 5240MHz, 7 GHz-18 GHz), SISO

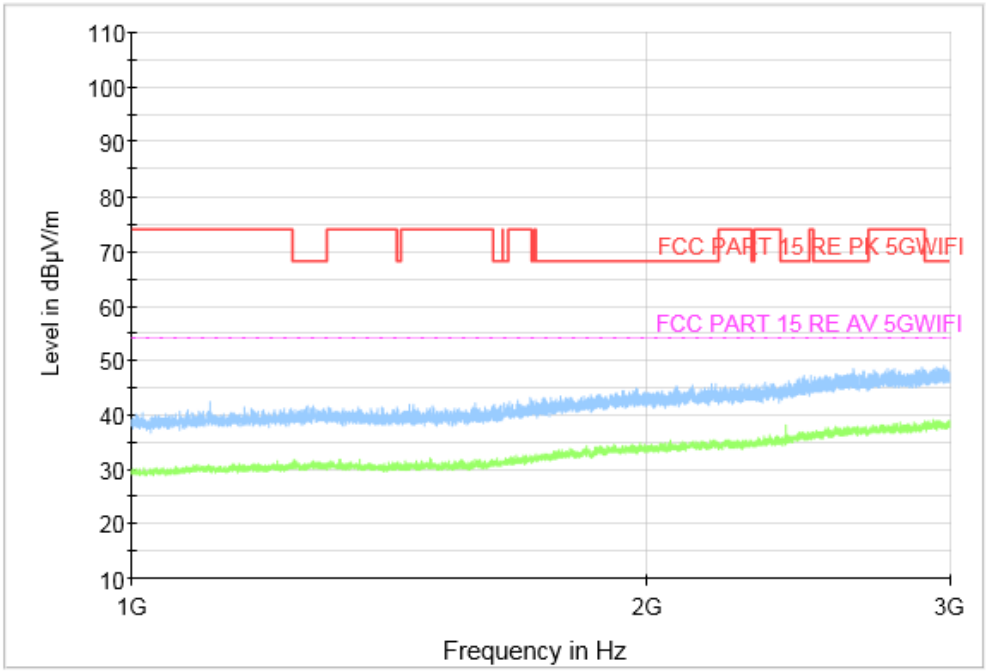


Fig. 36 Transmitter Spurious Emission (802. 11a, CH149 5745MHz, 1 GHz-3 GHz), SISO

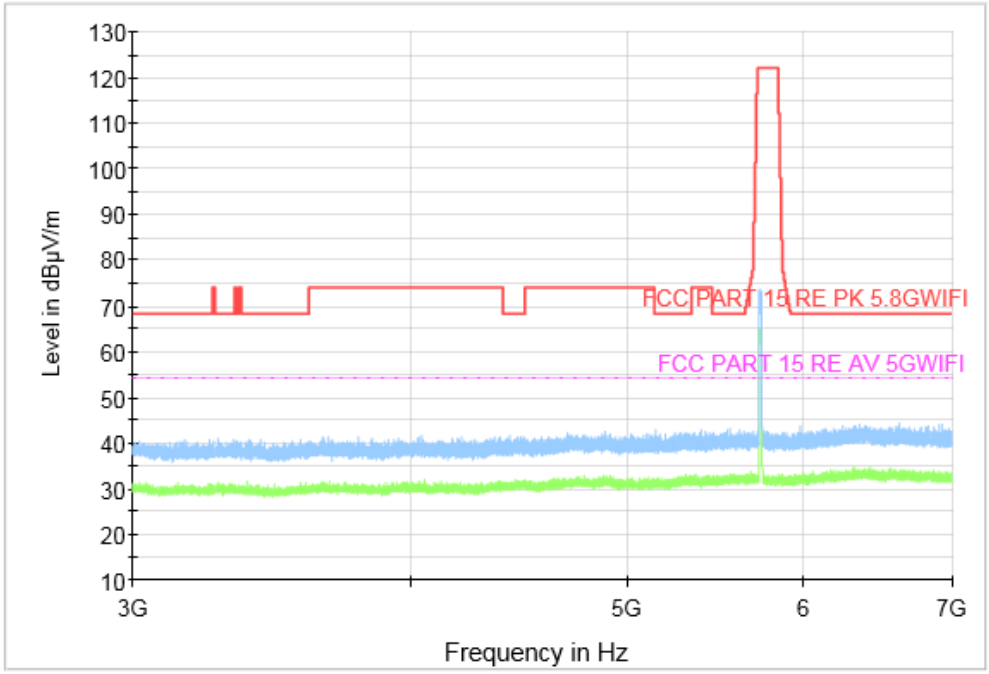


Fig. 37 Transmitter Spurious Emission (802. 11a, CH149 5745MHz, 3 GHz-7 GHz), SISO

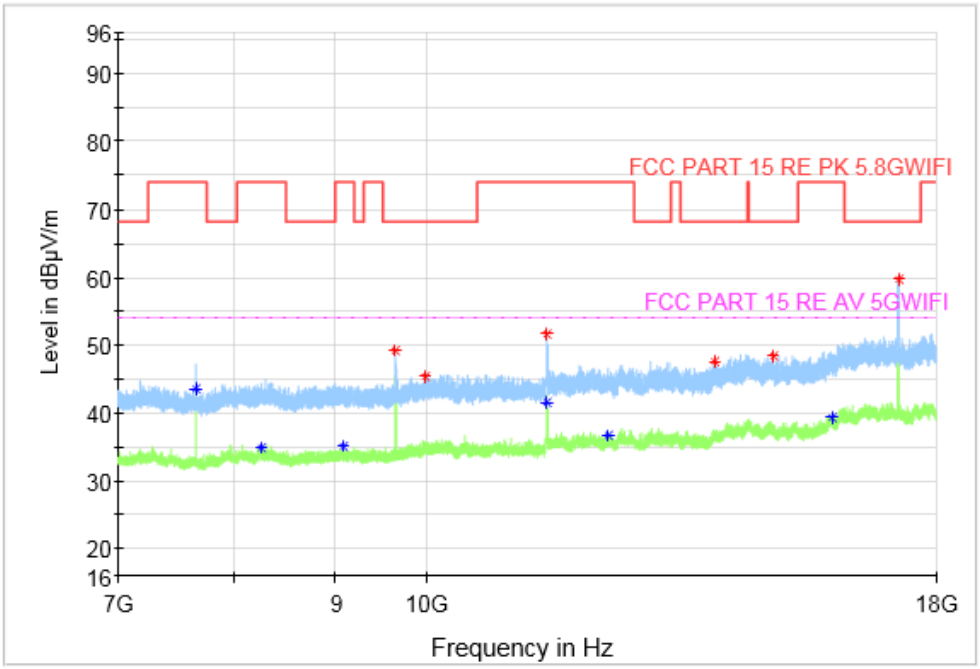


Fig. 38 Transmitter Spurious Emission (802. 11a, CH149 5745MHz, 7 GHz-18 GHz), SISO

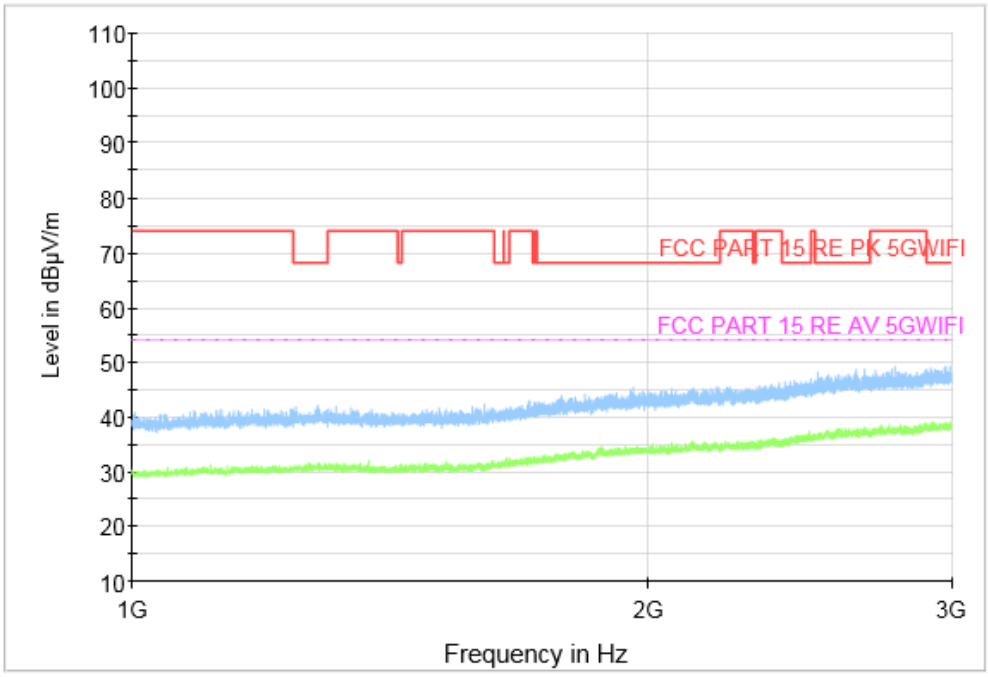


Fig. 39 Transmitter Spurious Emission (802. 11a, CH157 5785MHz, 1 GHz-3 GHz), SISO

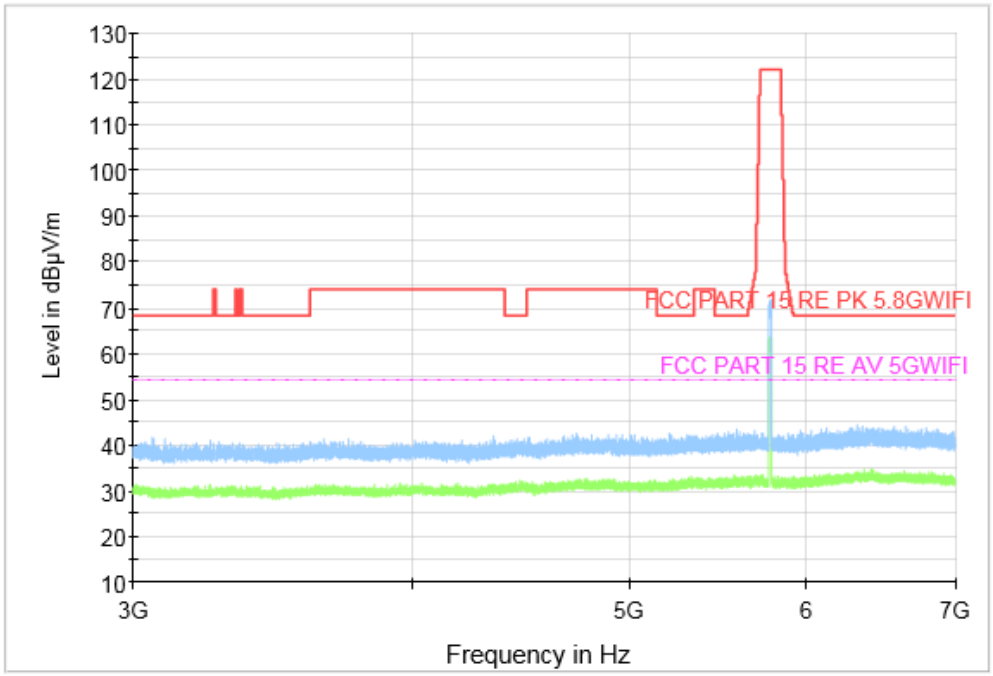


Fig. 40 Transmitter Spurious Emission (802. 11a, CH157 5785MHz, 3 GHz-7 GHz), SISO

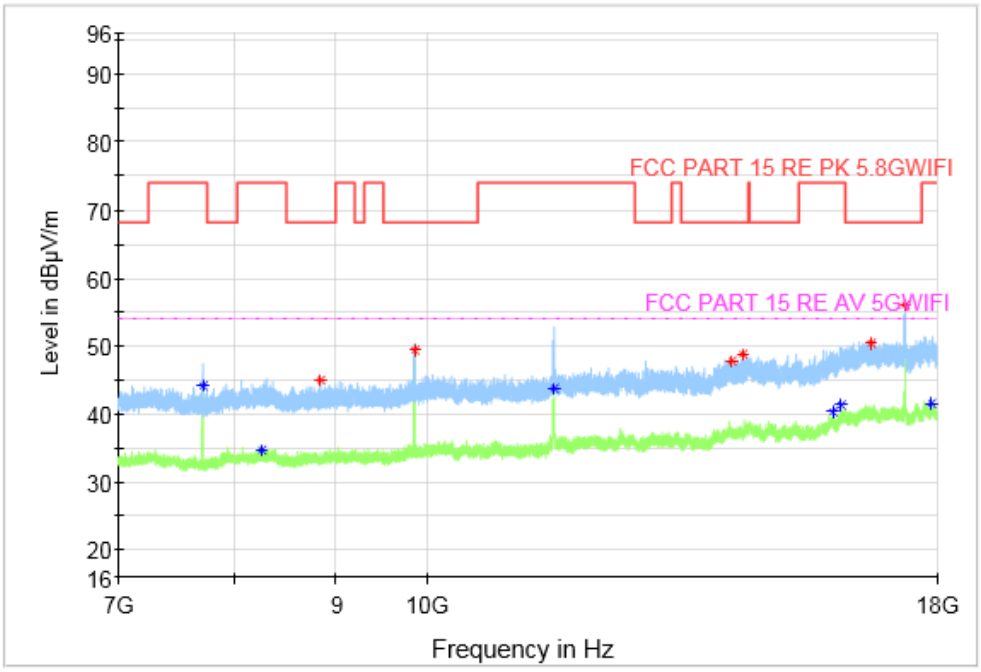


Fig. 41 Transmitter Spurious Emission (802. 11a, CH157 5785MHz, 7 GHz-18 GHz), SISO

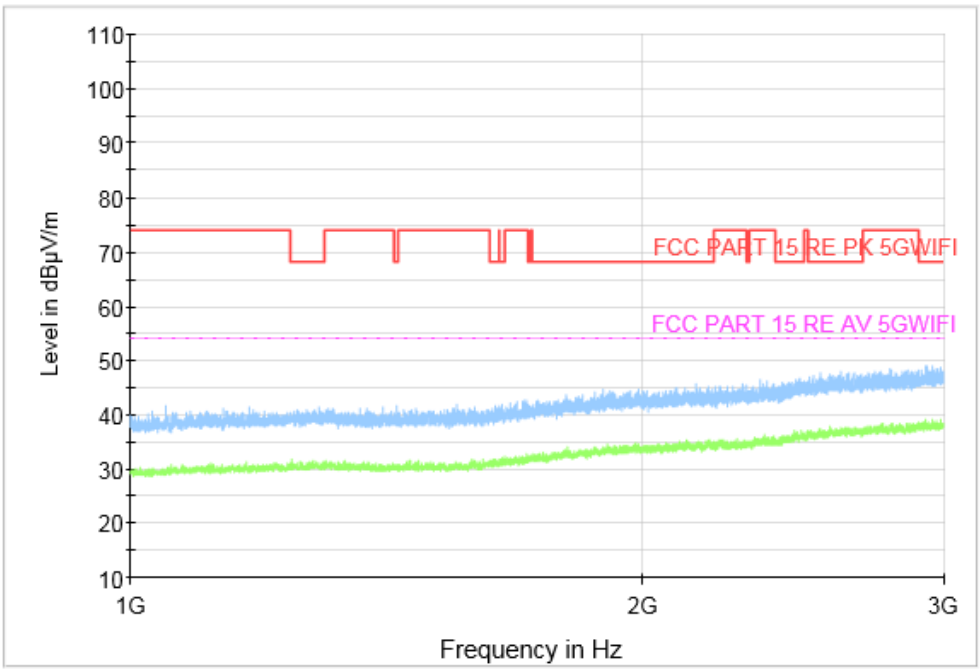


Fig. 42 Transmitter Spurious Emission (802. 11a, CH165 5825MHz, 1 GHz-3 GHz), SISO

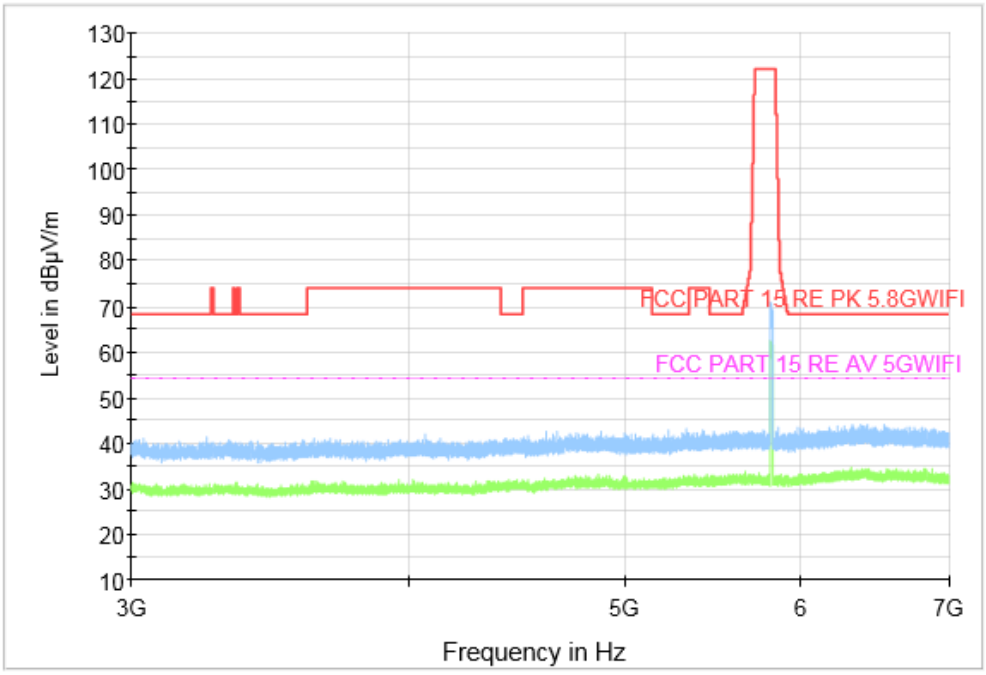


Fig. 43 Transmitter Spurious Emission (802. 11a, CH165 5825MHz, 3 GHz-7 GHz), SISO

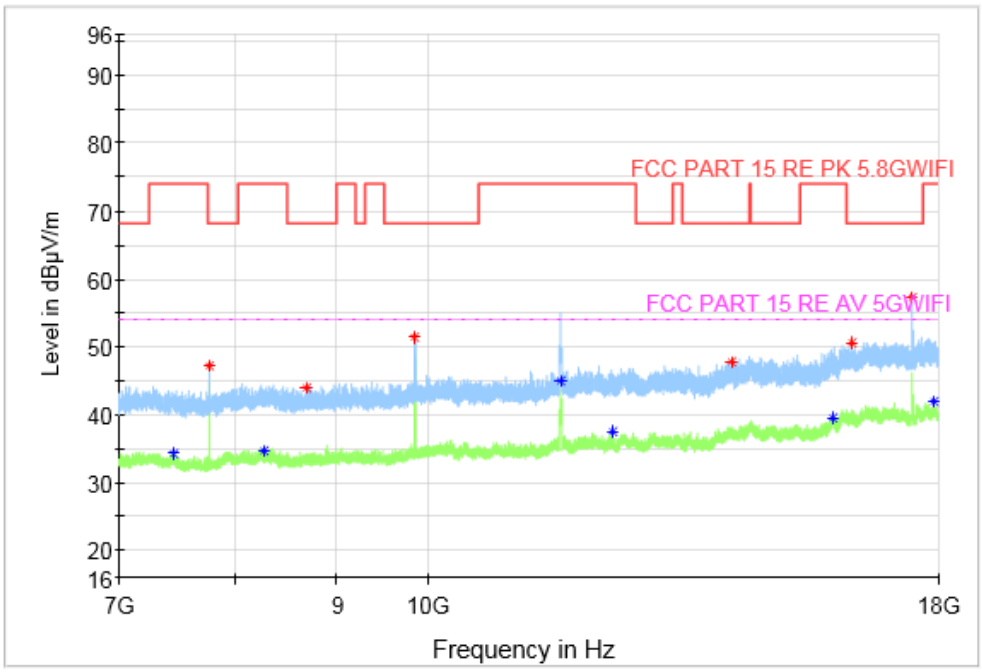


Fig. 44 Transmitter Spurious Emission (802. 11a, CH165 5825MHz, 7 GHz-18 GHz), SISO

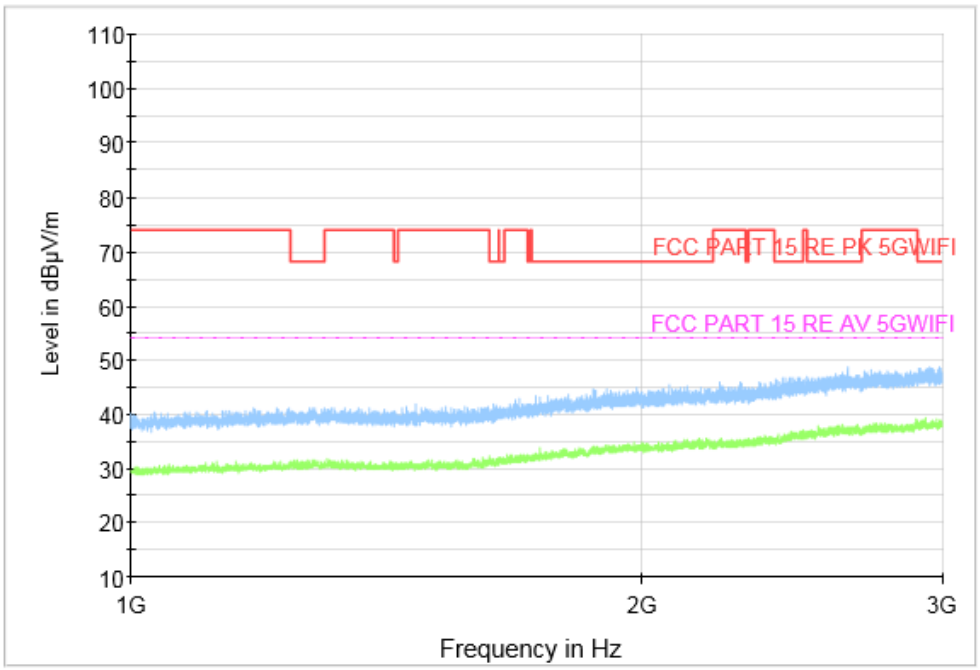


Fig. 45 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz, 1 GHz-3 GHz), SISO

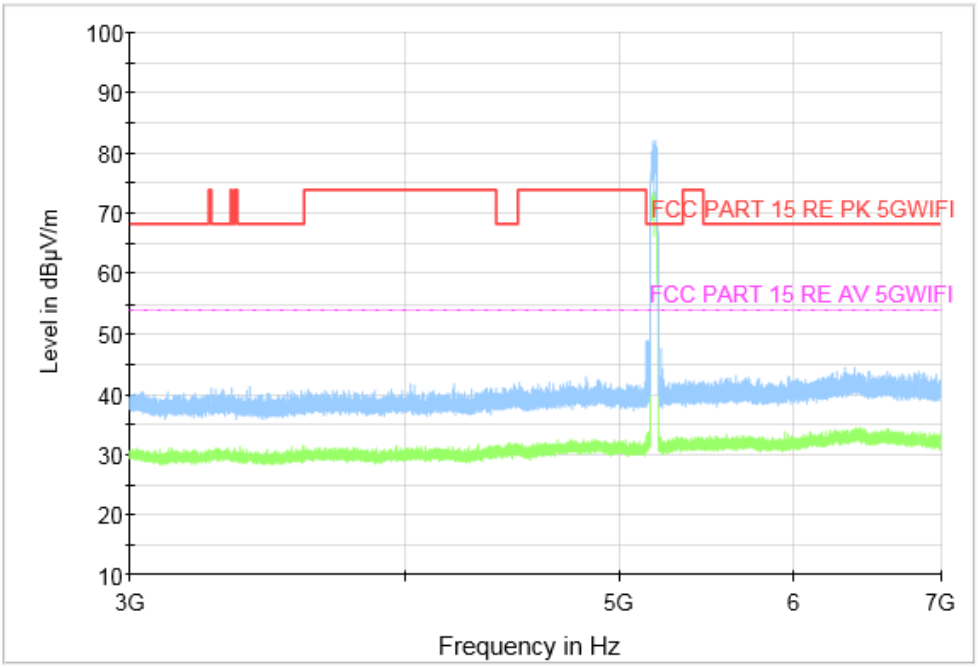


Fig. 46 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz, 3 GHz-7 GHz), SISO

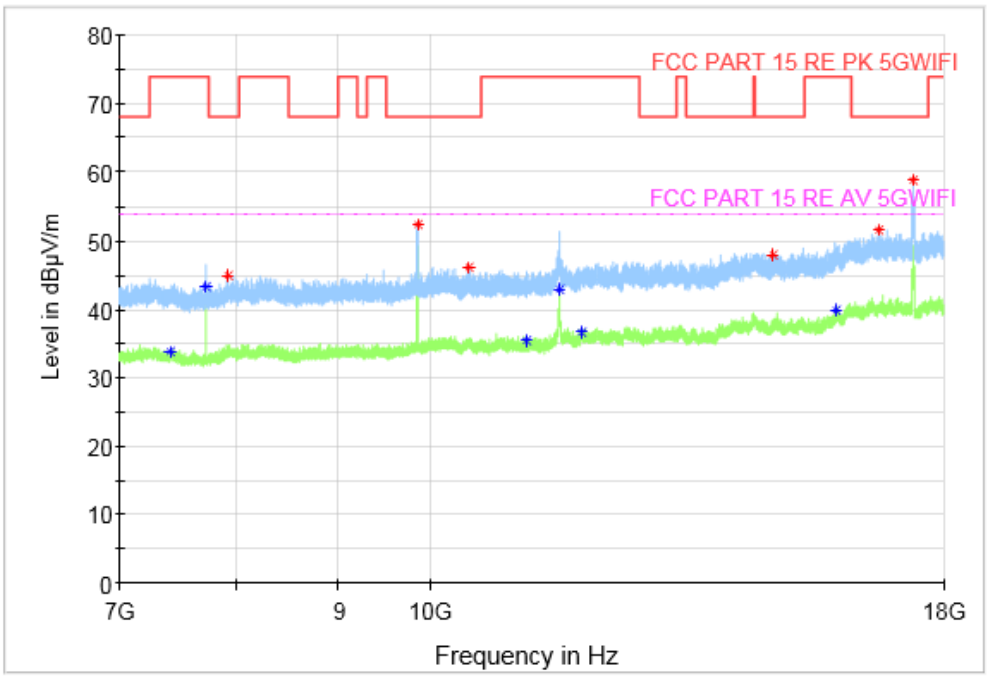


Fig. 47 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz, 7 GHz-18 GHz), SISO

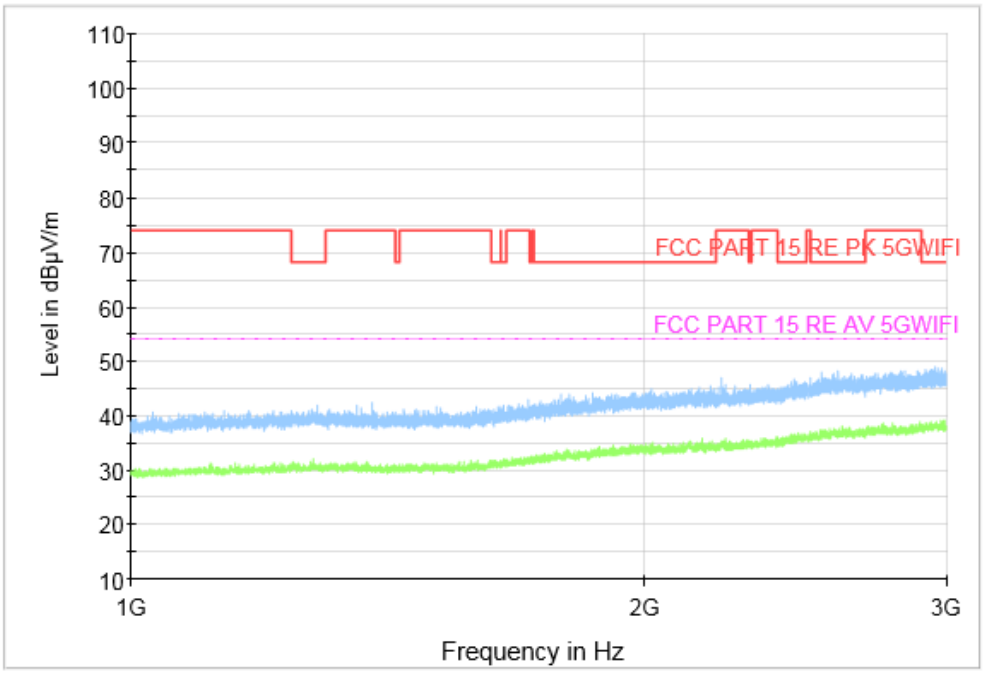


Fig. 48 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz, 1 GHz-3 GHz), SISO

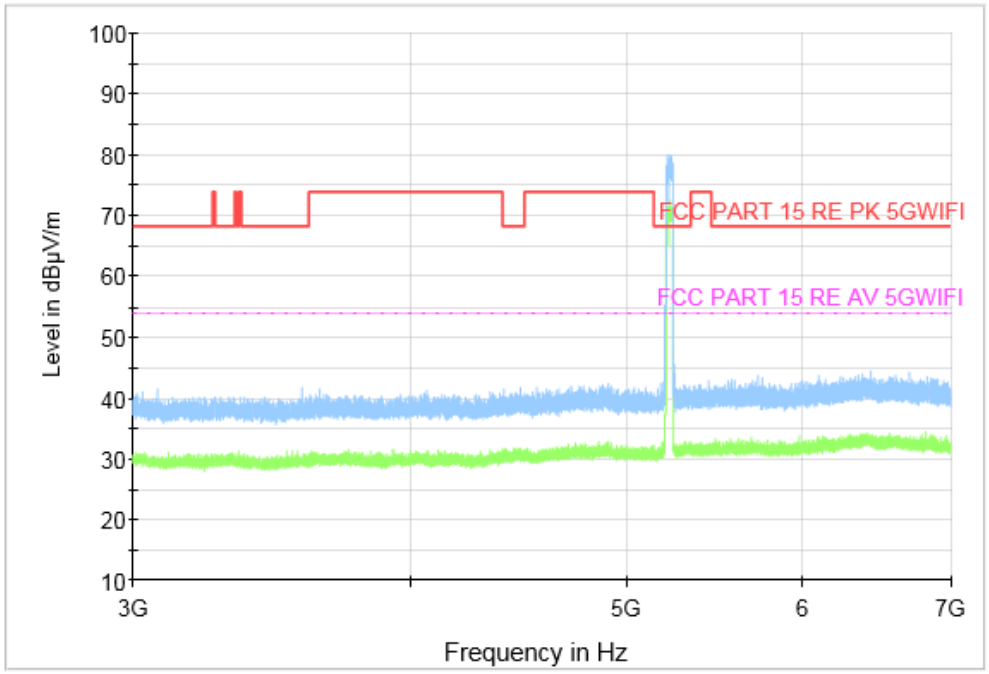


Fig. 49 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz, 3 GHz-7 GHz), SISO

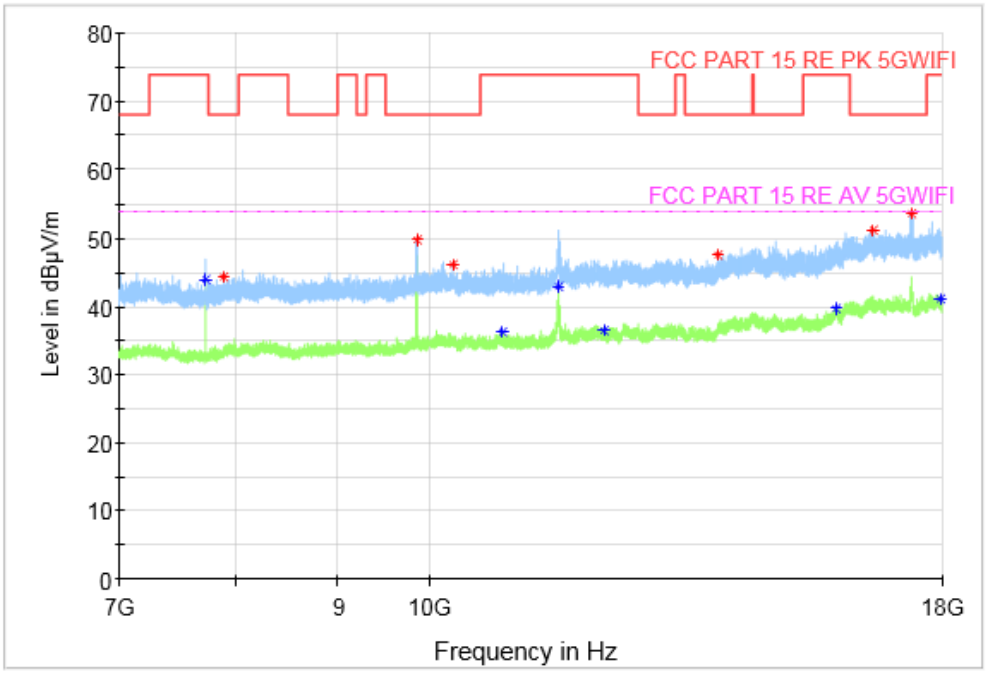


Fig. 50 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz, 7 GHz-18 GHz), SISO