



TEST REPORT

No. I21N00677-RLAN

TCL Communication Ltd.

Tablet PC

Model Name: 9032

with

Hardware Version: PIO

Software Version: v1E63

FCC ID: 2ACCJB154

Issued Date: 2021-04-09

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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1. Summary of Test Report

1.1. Test Items

Description	Tablet PC
Model Name	9032
Applicant's name	TCL Communication Ltd.
Manufacturer's Name	TCL Communication Ltd.

1.2. Test Standards

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

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

1.5. Project data

Testing Start Date:	2021-03-09
Testing End Date:	2021-04-05

1.6. Signature

Lin Kanfeng
(Prepared this test report)

Tang Weisheng
(Reviewed this test report)

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(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
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Contact Person: Gong Zhizhou
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Telephone: 0086-755-36611722
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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	Tablet PC
Model Name	9032
RLAN Frequency Range	ISM Bands: -5150MHz~5250MHz -5250MHz~5350MHz -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	0.83 dBi
Power Supply	3.85V DC by Battery
FCC ID	2ACCJB154
Condition of EUT as received	No abnormality in appearance

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
UT07aa	6409ACCE7B78299	PIO	v1E63	2021-03-03
UT04aa	6409ACCE7B78288	PIO	v1E63	2021-03-02

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

*UT07aa is used for Conduction test; UT04aa is used for Radiation test and AC Power line Conducted Emission test.

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	CAC4000018C7
AE2	Charger	CBA0058AGAC7

AE1

Model	TLp040M7
Manufacturer	VEKEN
Capacity	4000mAh
Nominal Voltage	3.85v

AE2

Model	UC11US
Manufacturer	PUAN

*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 Tablet PC with integrated antenna and battery. It consists of normal options: Lithium Battery and 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	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
1	Maximum Output Power	15.407	P
2	Power Spectral Density	15.407	P
3	Occupied 26dB Bandwidth	15.403	P
4	Occupied 6dB Bandwidth	15.407	P
5	Band edge compliance	15.209	P
6	Transmitter Spurious Emissions	15.407, 15.205	P
7	AC Power line Conducted	15.107, 15.207	P
8	Frequency Stability	15.407	P
9	Transmit Power Control	15.407	NA

Please refer to **ANNEX A** for detail.

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 Date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2022-01-14	1 year
2	Power Sensor	U2021XA	MY55430013	Agilent	2022-01-14	1 year
3	Data Acquisition	U2531A	TW55443507	Agilent	/	/
4	Climate chamber	SU-242	93008165	ESPEC	2022-03-14	1 year
5	DC Power Supply	NGSM	5425	Rohde & Schwarz	2021-11-08	1 year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Date	Calibration Period
1	LISN	ESH2-Z5	100196	R&S	2022-01-01	1 year
2	Test Receiver	ESCI	100701	R&S	2021-08-05	1 year
3	Loop Antenna	HLA6120	35779	TESEQ	2022-04-25	3 year
4	BiLog Antenna	3142E	00224831	ETS-Lindgren	2021-05-17	3 year
5	Horn Antenna	3117	00066577	ETS-Lindgren	2022-04-02	3 year
6	Test Receiver	ESR7	101676	R&S	2021-11-25	1 year
7	Spectrum Analyzer	FSV40	101192	R&S	2022-01-13	1 year
8	Chamber	FACT3-2.0	1285	ETS-Lindgren	2021-07-19	3 year
9	Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2023-01-06	3 year
10	Antenna	QSH-SL-2 6-40-K-20	17014	Q-par	2023-01-06	3 year

Test software

No.	Equipment	Manufacturer	Version
1	TechMgr Software	CAICT	2.1.1
2	EMC32	Rohde & Schwarz	8.53.0
3	EMC32	Rohde & Schwarz	10.01.00

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

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

7. Laboratory Environment

Semi-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
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

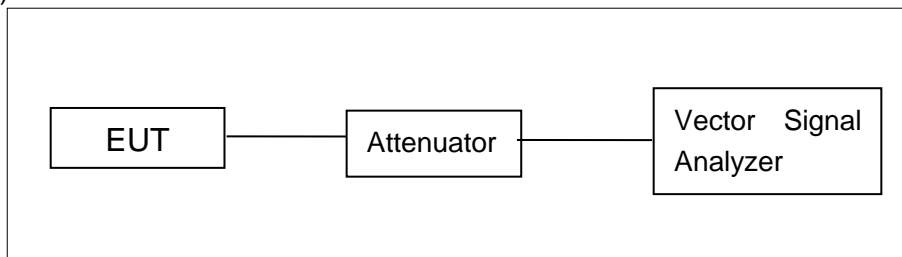
Test Name	Uncertainty ($k=2$)	
1. RF Output Power - Conducted	1.32dB	
2. Power Spectral Density - Conducted	2.32dB	
3. Occupied channel bandwidth - Conducted	66Hz	
4. Transmitter Spurious Emission - Conducted	$30\text{MHz} \leq f < 1\text{GHz}$	1.41dB
	$1\text{GHz} \leq f < 7\text{GHz}$	1.92dB
	$7\text{GHz}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

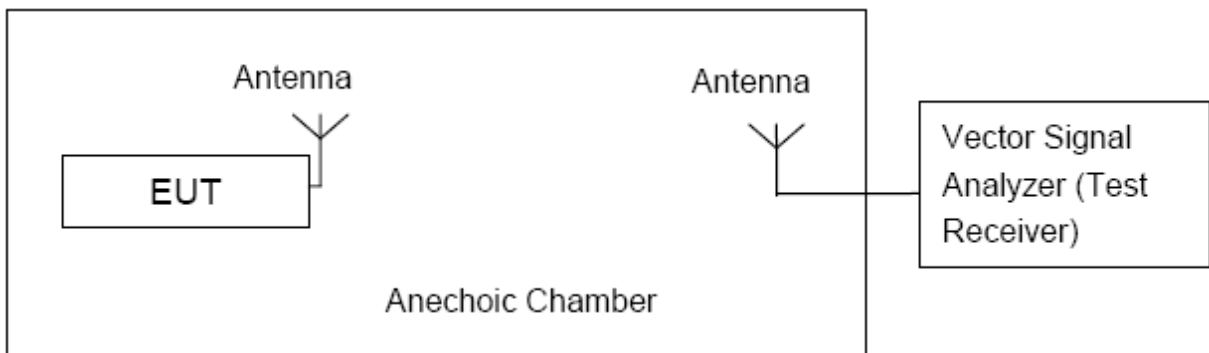


Radiated Emission Measurements

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	5150MHz~5250MHz	24
	5250MHz~5350MHz	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:

802.11a mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11a	5180MHz(Ch36)	10.94	10.88	10.86	10.85	10.93	10.89	10.85	10.92
	5200MHz(Ch40)	10.87	/	/	/	/	/	/	/
	5240MHz(Ch48)	11.08	/	/	/	/	/	/	/
	5260MHz(Ch52)	11.18	/	/	/	/	/	/	/
	5280MHz(Ch56)	11.24	/	/	/	/	/	/	/
	5320MHz(Ch64)	11.14	/	/	/	/	/	/	/
	5745MHz(Ch149)	9.16	/	/	/	/	/	/	/
	5785MHz(Ch157)	9.16	/	/	/	/	/	/	/
	5825MHz(Ch165)	9.30	/	/	/	/	/	/	/

802.11n-HT20 mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Index)							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT20)	5180MHz(Ch36)	10.82	10.75	10.81	10.80	10.76	10.75	10.73	10.80
	5200MHz(Ch40)	10.72	/	/	/	/	/	/	/
	5240MHz(Ch48)	10.88	/	/	/	/	/	/	/
	5260MHz(Ch52)	11.04	/	/	/	/	/	/	/
	5280MHz(Ch56)	11.07	/	/	/	/	/	/	/
	5320MHz(Ch64)	10.94	/	/	/	/	/	/	/
	5745MHz(Ch149)	9.02	/	/	/	/	/	/	/
	5785MHz(Ch157)	9.02	/	/	/	/	/	/	/
	5825MHz(Ch165)	9.18	/	/	/	/	/	/	/

802.11ac-VHT20 mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Index)							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac (VHT20)	5180MHz(Ch36)	10.78	10.78	10.71	10.75	10.67	10.65	10.75	10.74
	5200MHz(Ch40)	10.68	/	/	/	/	/	/	/
	5240MHz(Ch48)	10.91	/	/	/	/	/	/	/
	5260MHz(Ch52)	11.05	/	/	/	/	/	/	/
	5280MHz(Ch56)	10.87	/	/	/	/	/	/	/
	5320MHz(Ch64)	10.98	/	/	/	/	/	/	/
	5745MHz(Ch149)	9.03	/	/	/	/	/	/	/
	5785MHz(Ch157)	9.01	/	/	/	/	/	/	/
5825MHz(Ch165)	9.19	/	/	/	/	/	/	/	

802.11n-HT40 mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Index)							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11n (HT40)	5190MHz(Ch38)	10.64	10.61	10.58	10.60	10.63	10.63	10.57	10.59
	5230MHz(Ch46)	10.81	/	/	/	/	/	/	/
	5270MHz(Ch54)	10.77	/	/	/	/	/	/	/
	5310MHz(Ch62)	10.94	/	/	/	/	/	/	/
	5755MHz(Ch151)	8.95	/	/	/	/	/	/	/
	5795MHz(Ch159)	8.92	/	/	/	/	/	/	/

802.11ac-VHT40 mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Index)							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac (VHT40)	5190MHz(Ch38)	10.62	10.60	10.60	10.55	10.57	10.53	10.50	10.58
	5230MHz(Ch46)	10.80	/	/	/	/	/	/	/
	5270MHz(Ch54)	10.95	/	/	/	/	/	/	/
	5310MHz(Ch62)	10.87	/	/	/	/	/	/	/
	5755MHz(Ch151)	8.96	/	/	/	/	/	/	/
	5795MHz(Ch159)	8.95	/	/	/	/	/	/	/

802.11ac-VHT80 mode

Mode	Channel	Test Result (dBm)							
		Data Rate (Index)							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
802.11ac (VHT80)	5210MHz(Ch42)	10.90	10.90	10.88	10.87	10.85	10.86	10.82	10.87
	5290MHz(Ch58)	10.97	/	/	/	/	/	/	/
	5775MHz(Ch155)	8.56	/	/	/	/	/	/	/



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Note: The data rate 6Mbps (11a mode), MCS0 (11n mode) and MCS0 (11ac mode) are selected as the worst case. 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

Measurement Limit:

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

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

Measurement Results:

5.2GHz Band (UNII-1)

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5180MHz(Ch36)	0.40	P
	5200MHz(Ch40)	0.25	P
	5240MHz(Ch48)	0.36	P
802.11n HT40	5190MHz(Ch38)	-2.86	P
	5230MHz(Ch46)	-2.83	P
802.11ac VHT80	5210MHz(Ch42)	-6.34	P

5.3GHz Band (UNII-2A)

Mode	Channel	Power Spectral Density (dBm/MHz)	Conclusion
802.11a	5260MHz(Ch52)	0.19	P
	5280MHz(Ch56)	0.22	P
	5320MHz(Ch64)	0.22	P
802.11n HT40	5270MHz(Ch54)	-2.91	P
	5310MHz(Ch62)	-3.03	P
802.11ac VHT80	5290MHz(Ch58)	-6.72	P

5.8GHz Band (UNII-3)

Mode	Channel	Power Spectral Density (dBm/500kHz)	Conclusion
802.11a	5745MHz(CH149)	-4.11	P
	5785MHz(CH157)	-4.36	P
	5825MHz(CH165)	-4.77	P
802.11n HT40	5755MHz(CH151)	-7.60	P
	5795MHz(CH159)	-7.77	P
802.11ac VHT80	5775MHz(CH155)	-10.52	P

Conclusion: PASS



A.4. Occupied 26dB Bandwidth

Measurement Limit:

Standard	Limit (MHz)
FCC 47 CFR Part 15.403	/

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	20.64	P
	5200MHz(Ch40)	Fig.2	20.48	P
	5240MHz(Ch48)	Fig.3	20.48	P
	5260MHz(Ch52)	Fig.4	20.48	P
	5280MHz(Ch56)	Fig.5	20.64	P
	5320MHz(Ch64)	Fig.6	20.48	P
802.11n HT40	5190MHz(Ch38)	Fig.7	40.72	P
	5230MHz(Ch46)	Fig.8	40.80	P
	5270MHz(Ch54)	Fig.9	40.72	P
	5310MHz(Ch62)	Fig.10	40.80	P
802.11ac VHT80	5210MHz(Ch42)	Fig.11	81.28	P
	5290MHz(Ch58)	Fig.12	81.28	P

Conclusion: PASS

Test graphs as below:

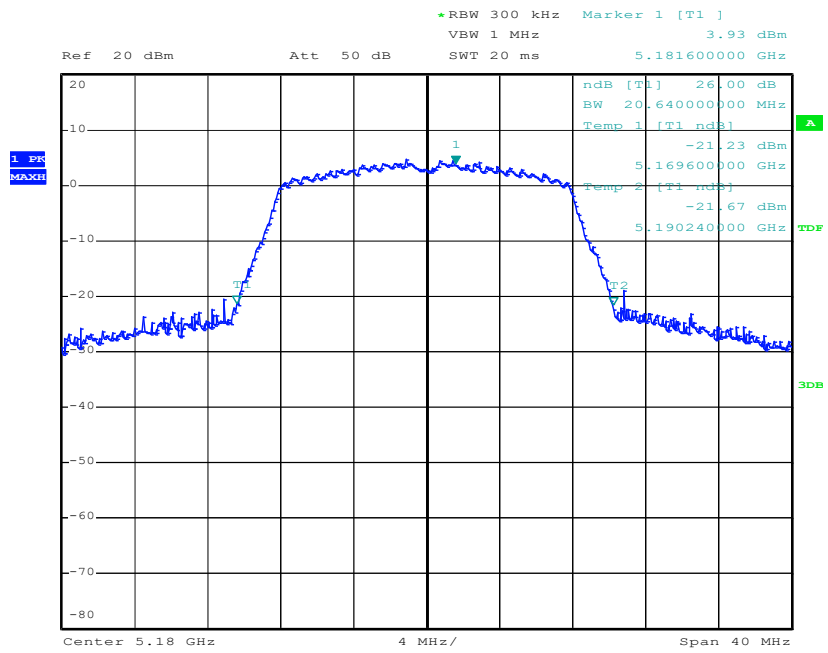


Fig. 1 Occupied 26dB Bandwidth (802.11a, 5180MHz)

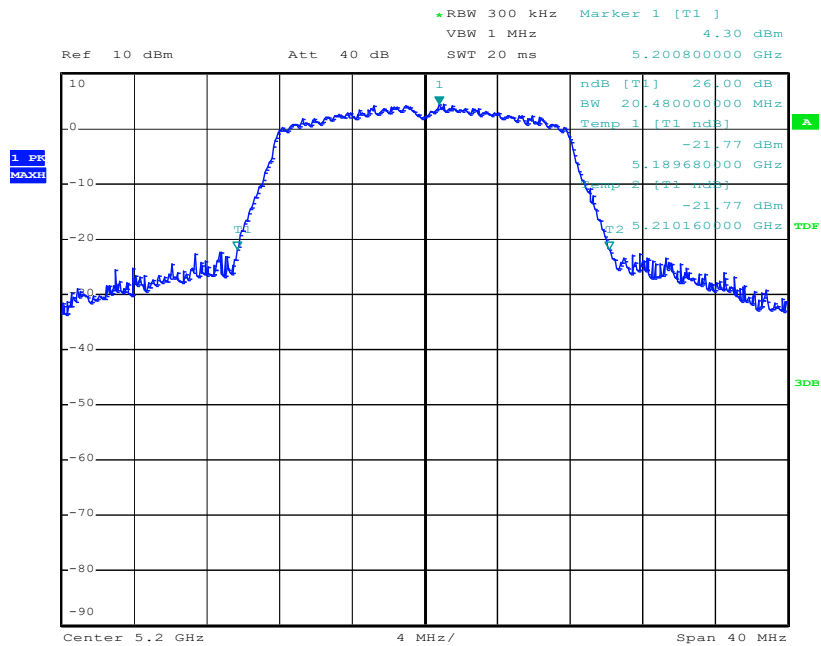


Fig. 2 Occupied 26dB Bandwidth (802.11a, 5200MHz)

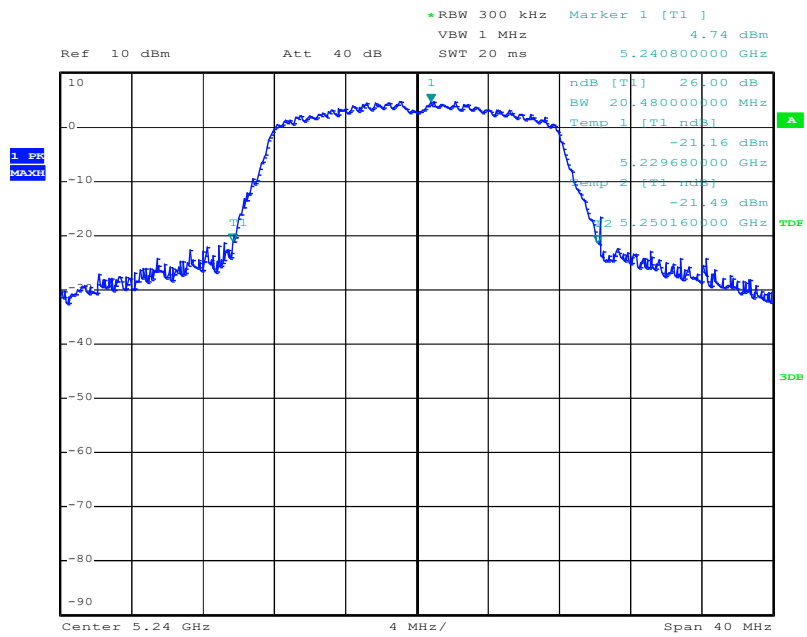


Fig. 3 Occupied 26dB Bandwidth (802.11a, 5240MHz)

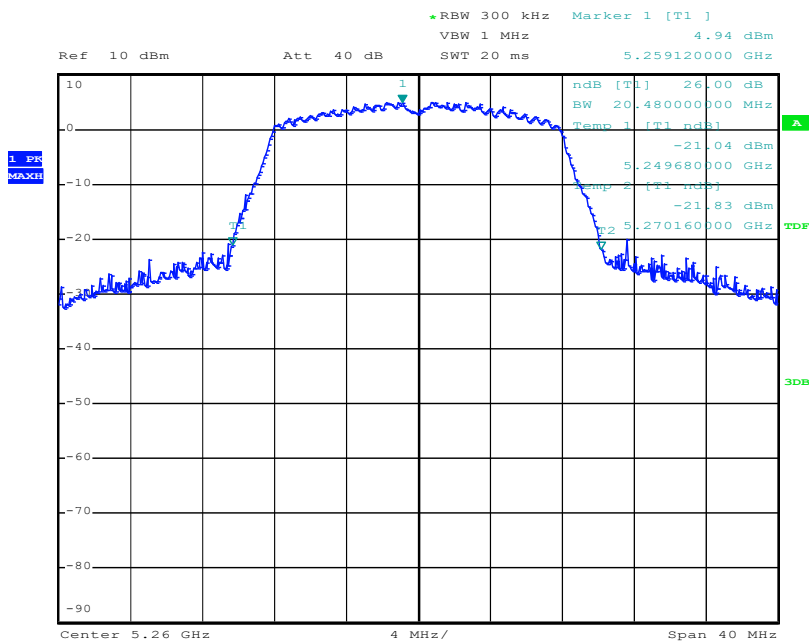


Fig. 4 Occupied 26dB Bandwidth (802.11a, 5260MHz)

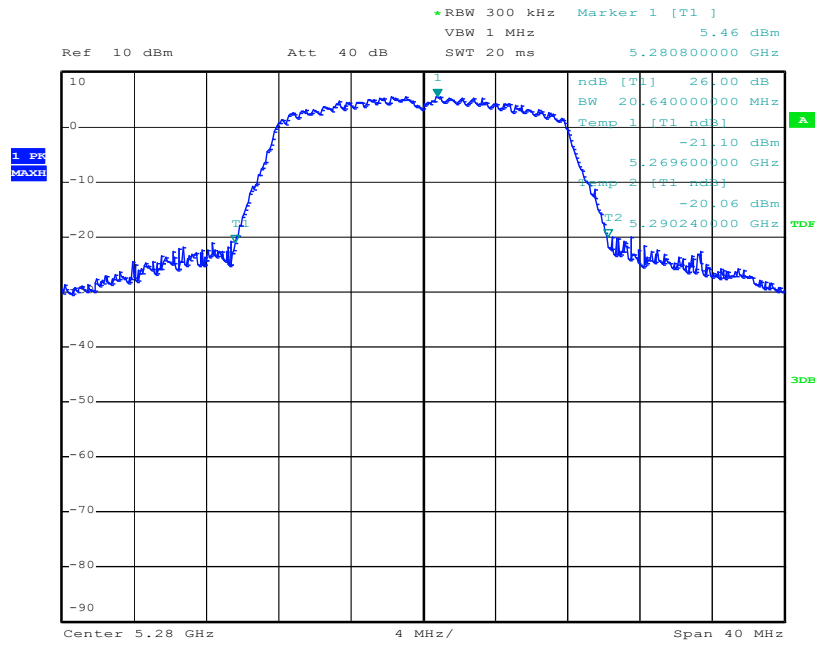


Fig. 5 Occupied 26dB Bandwidth (802.11a, 5280MHz)

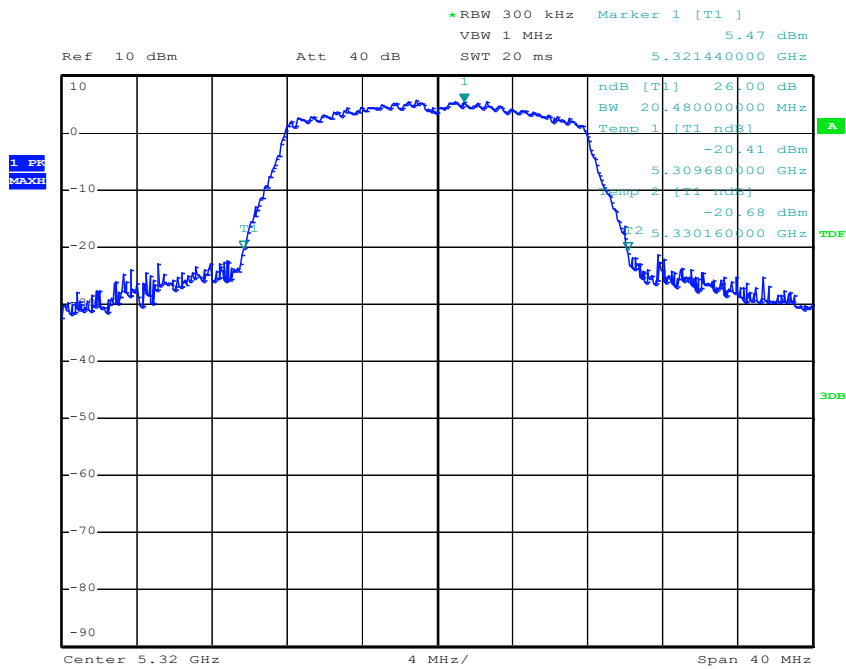


Fig. 6 Occupied 26dB Bandwidth (802.11a, 5320MHz)

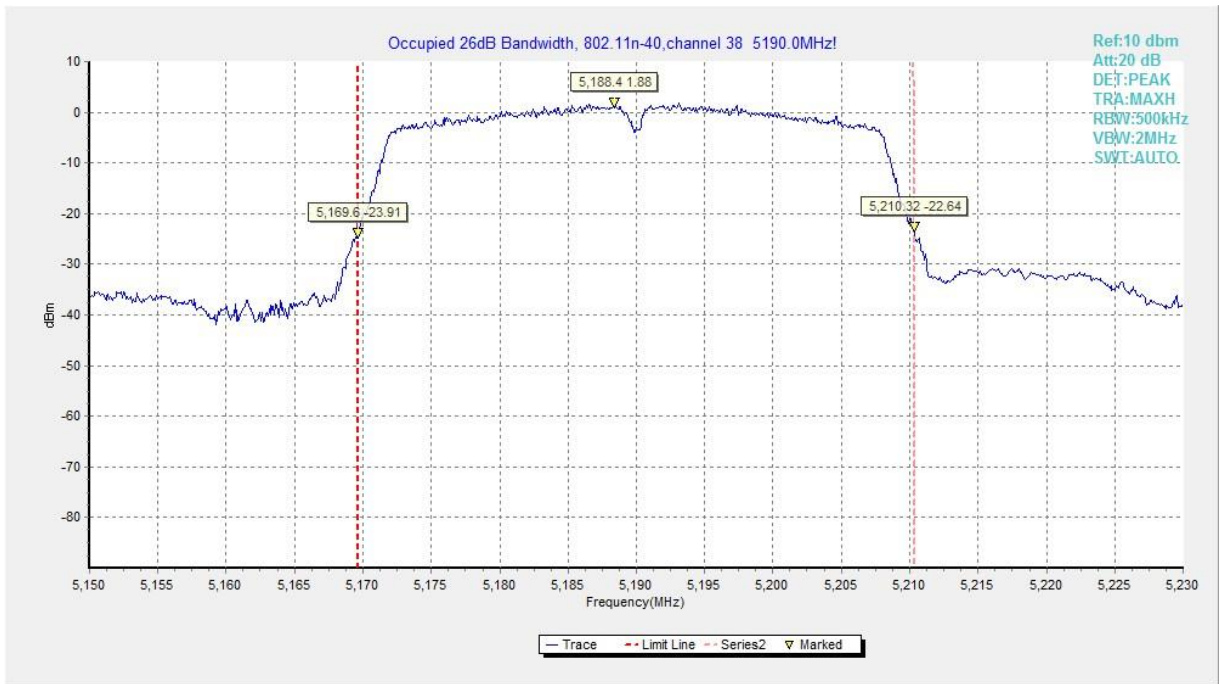


Fig. 7 Occupied 26dB Bandwidth (802.11n-HT40, 5190MHz)

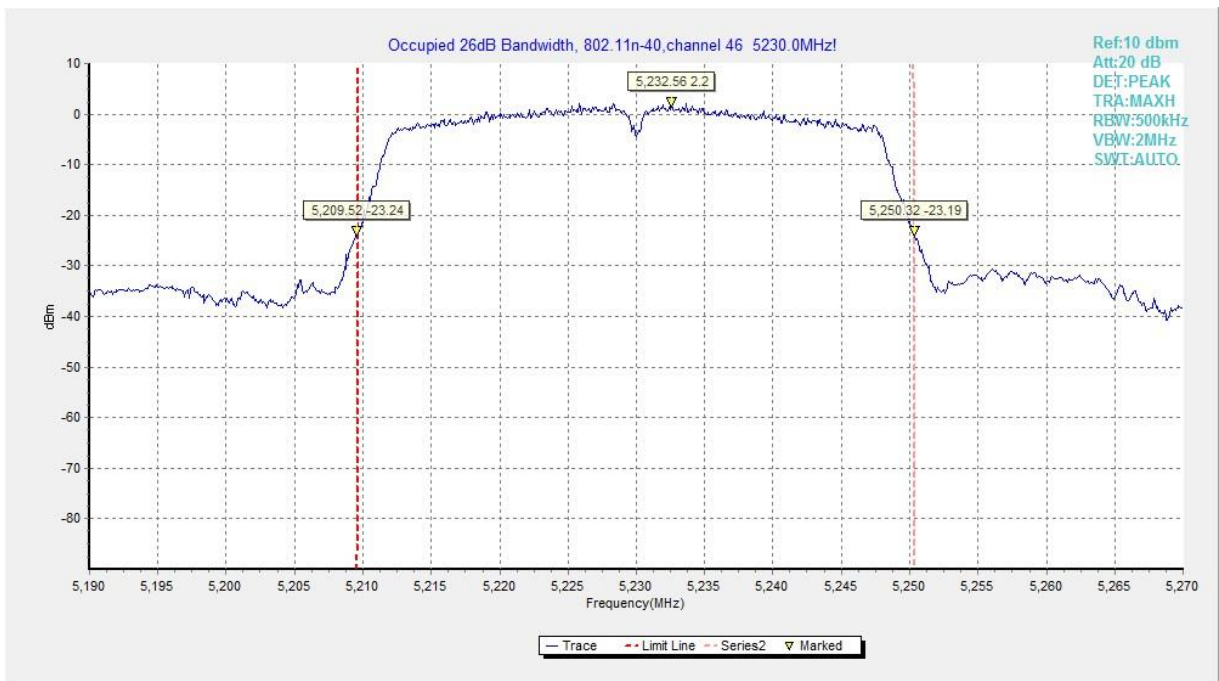


Fig. 8 Occupied 26dB Bandwidth (802.11n-HT40, 5230MHz)

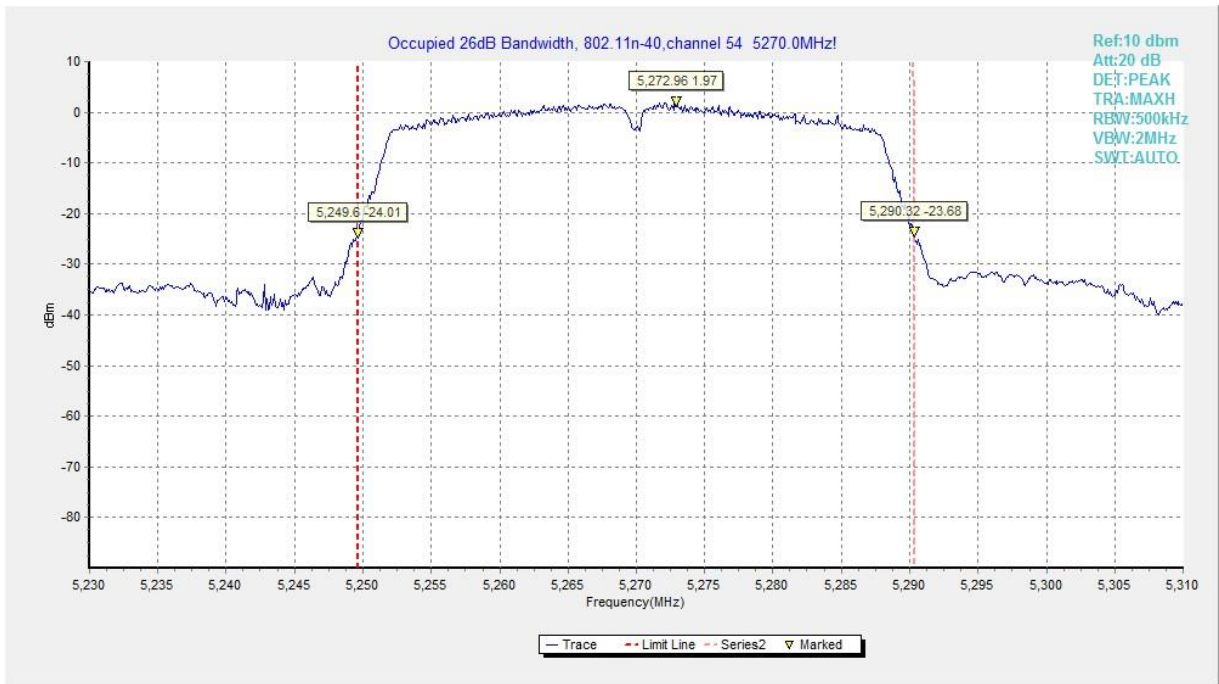


Fig. 9 Occupied 26dB Bandwidth (802.11n-HT40, 5270MHz)

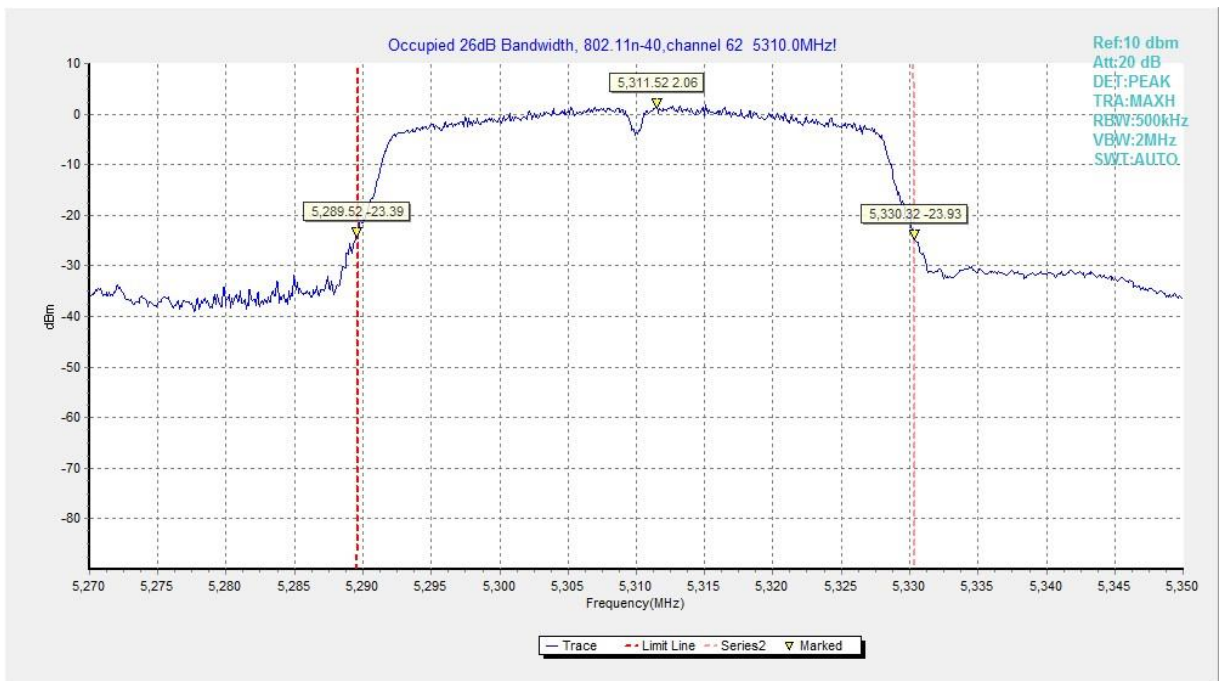


Fig. 10 Occupied 26dB Bandwidth (802.11n-HT40, 5310MHz)



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

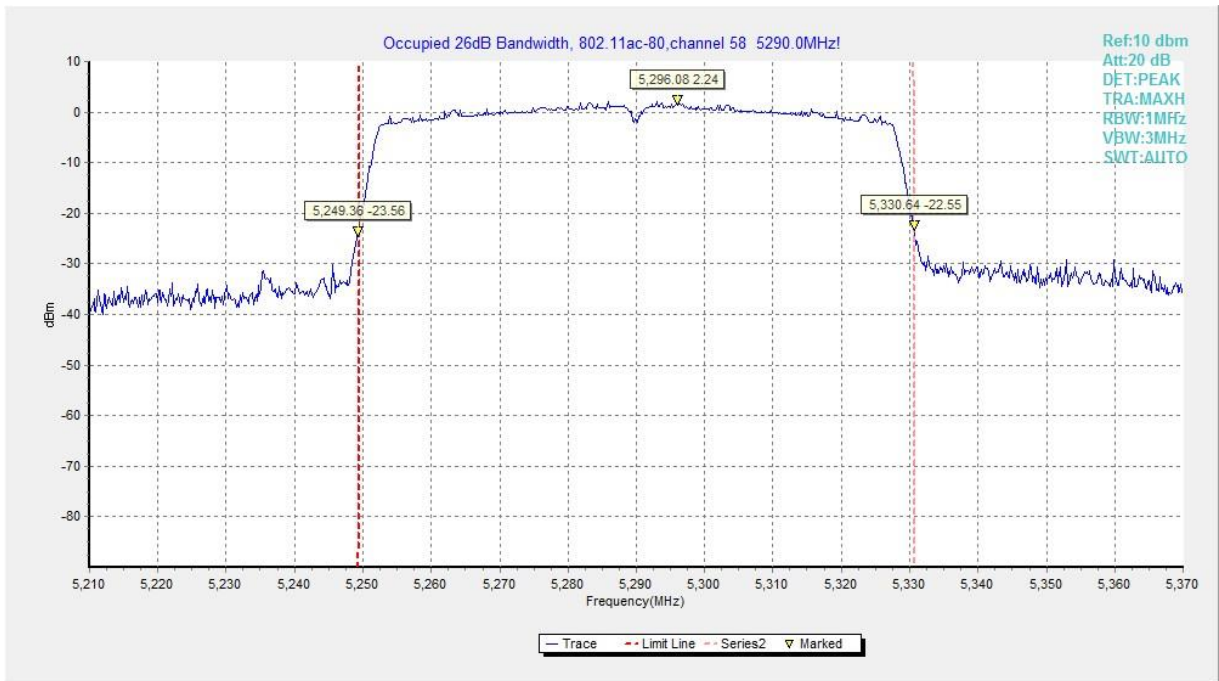


Fig. 12 Occupied 26dB Bandwidth (802. 11ac-VHT80, 5290MHz)

A.5. Occupied 6dB Bandwidth

Measurement Limit:

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

The measurement is made according to KDB 789033.

Measurement Result:

Mode	Channel	Occupied 6dB Bandwidth (MHz)		Conclusion
		Fig.	Value	
802.11a	5745MHz(Ch149)	Fig.13	15.15	P
	5785MHz(Ch157)	Fig.14	15.15	P
	5825MHz(Ch165)	Fig.15	15.10	P
802.11n HT40	5755MHz(Ch151)	Fig.16	35.04	P
	5795MHz(Ch159)	Fig.17	35.12	P
802.11ac VHT80	5775MHz(Ch155)	Fig.18	75.20	P

Conclusion: PASS

Test graphs as below:

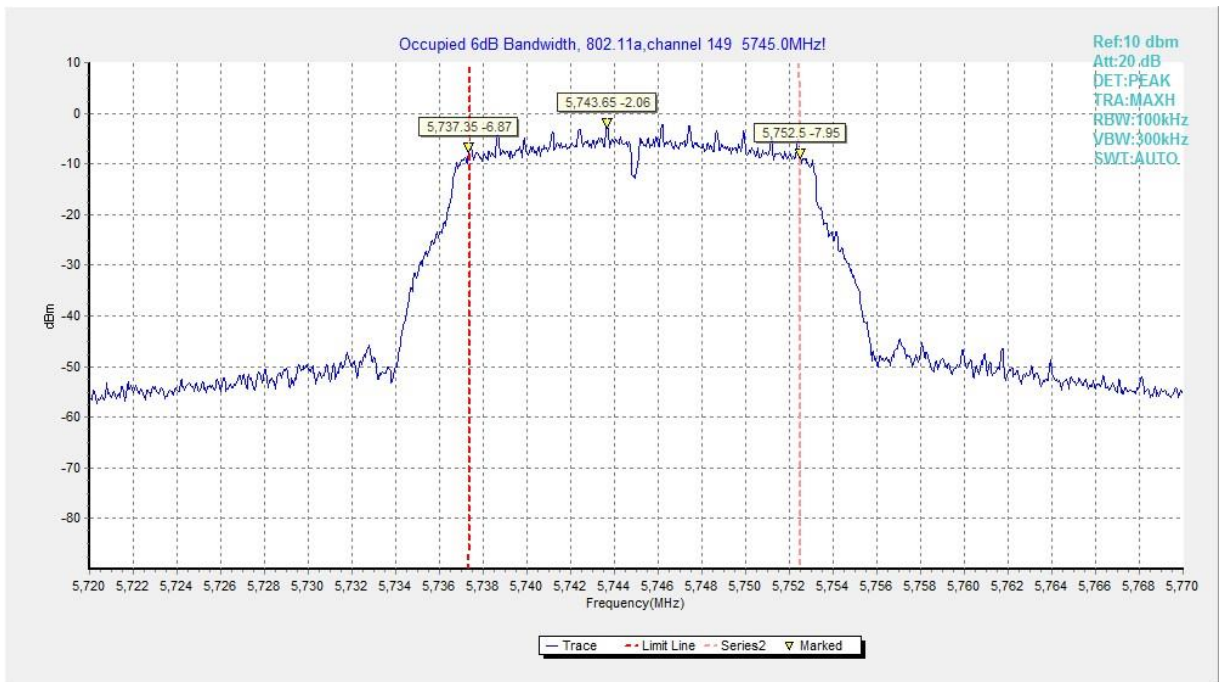


Fig. 13 Occupied 6dB Bandwidth (802.11a, 5745MHz)

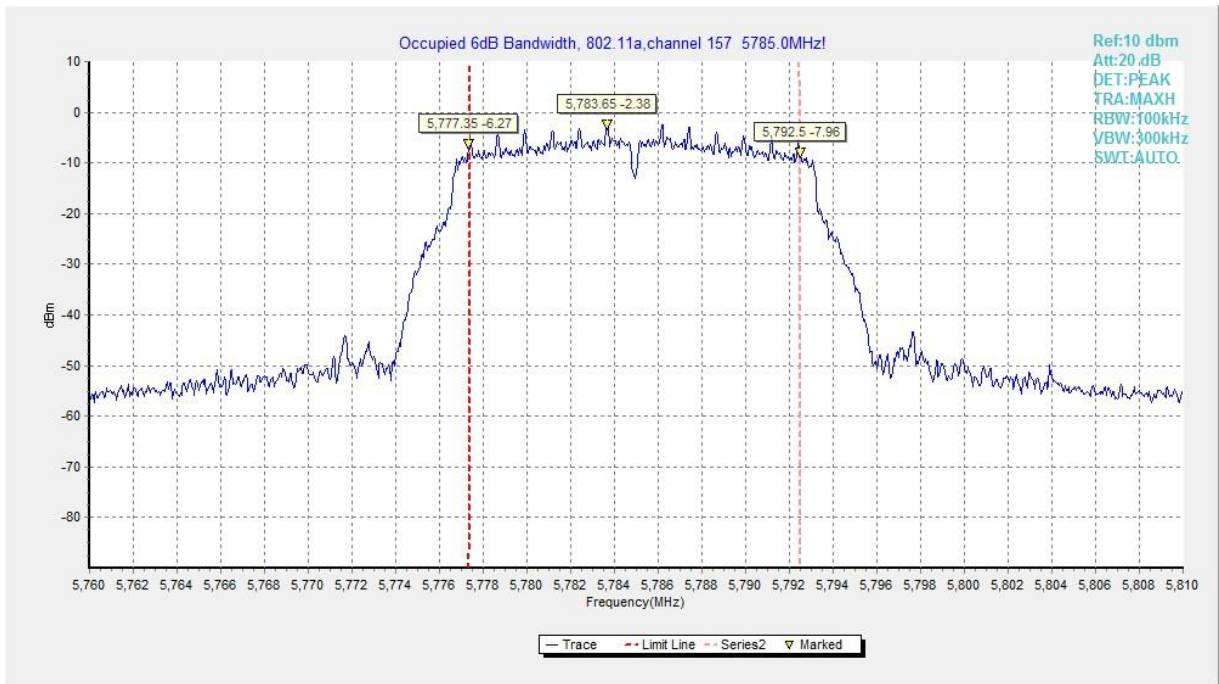


Fig. 14 Occupied 6dB Bandwidth (802.11a, 5785MHz)

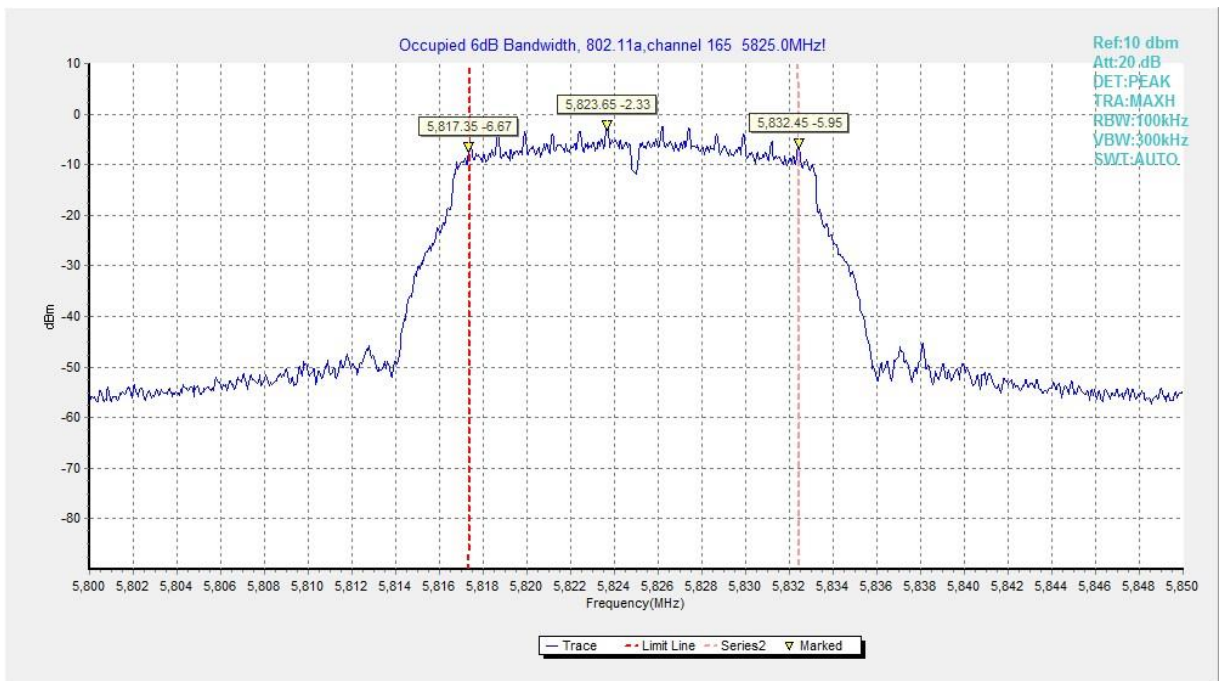


Fig. 15 Occupied 6dB Bandwidth (802.11a, 5825MHz)

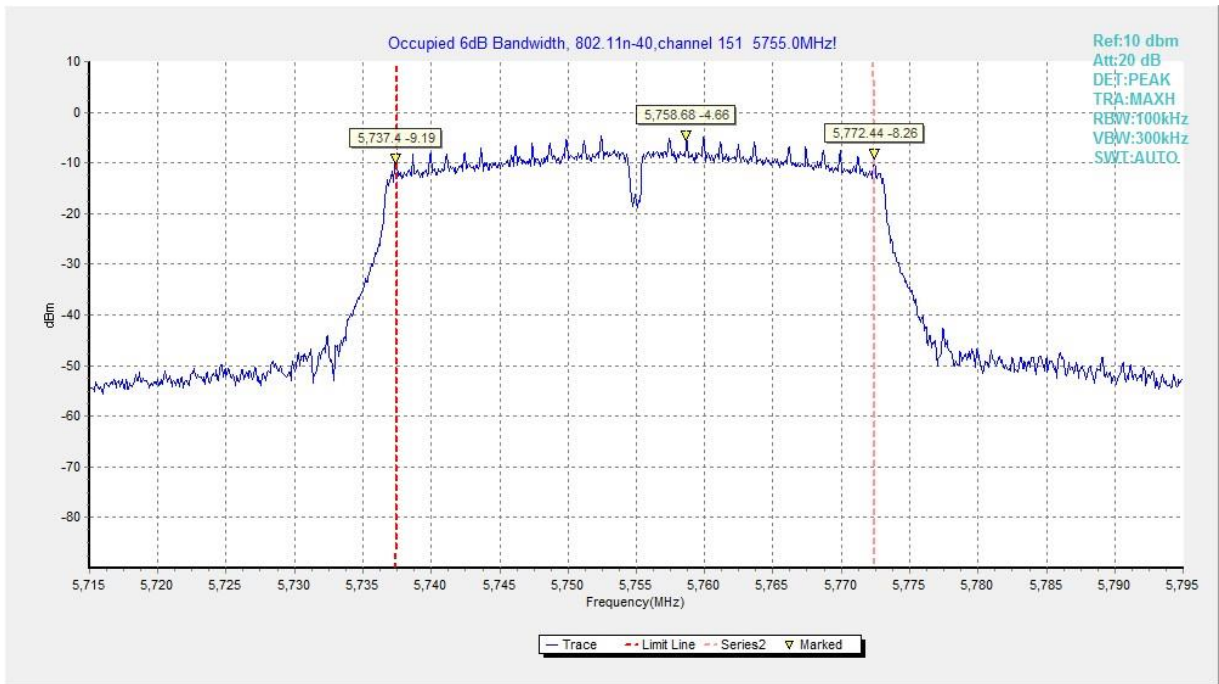


Fig. 16 Occupied 6dB Bandwidth (802.11n-HT40, 5755MHz)

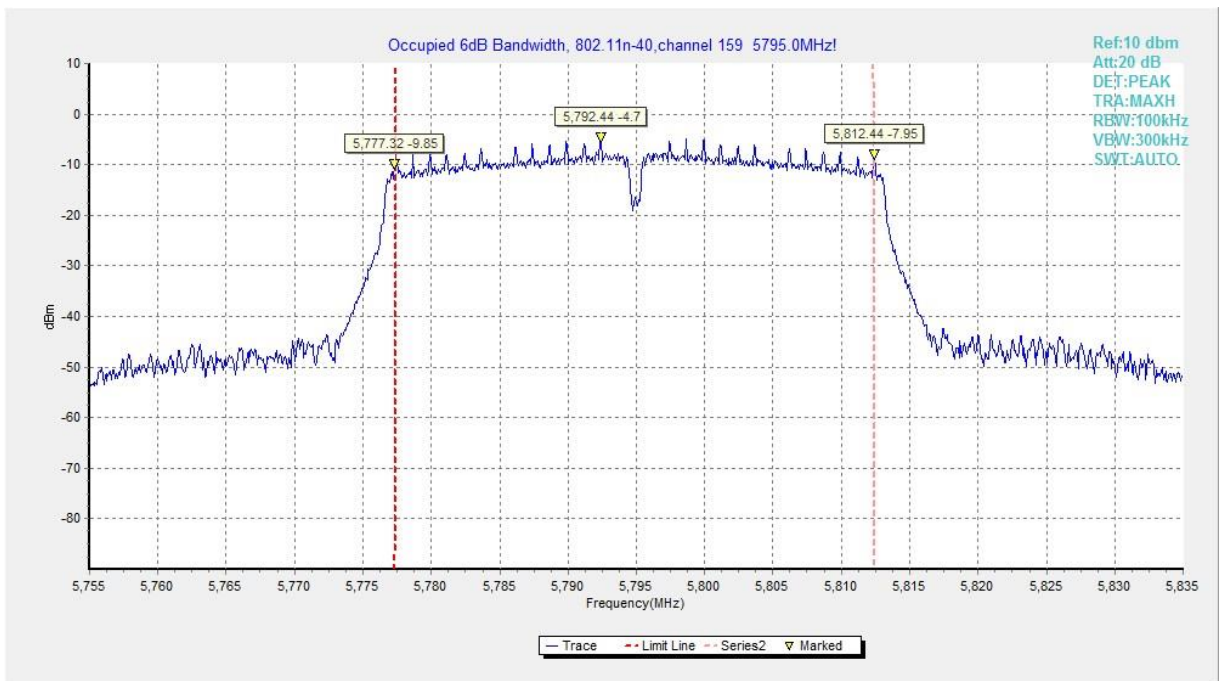


Fig. 17 Occupied 6dB Bandwidth (802.11n-HT40, 5795MHz)

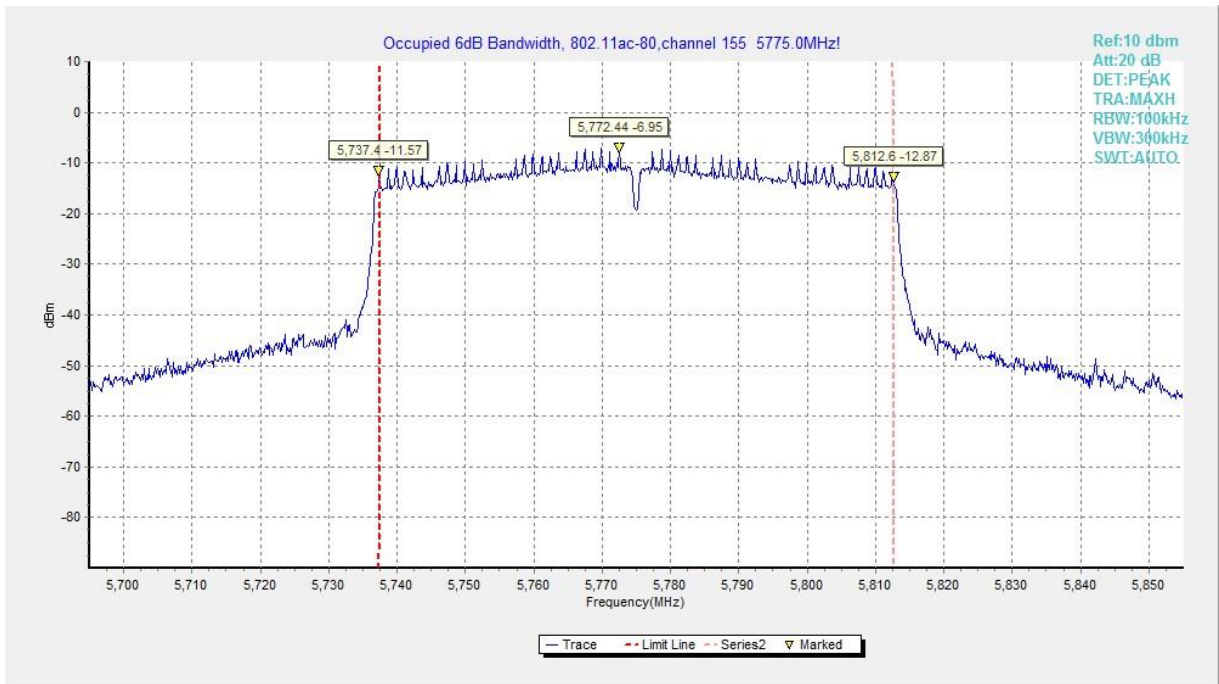


Fig. 18 Occupied 6dB Bandwidth (802.11ac-VHT80, 5775MHz)

A.6. Band Edges Compliance

Measurement Limit:

Standard	Limit (dBuV/m)	
	FCC 47 CFR Part 15.209	Peak
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
	5320 MHz (CH64)	Fig.20	P
	5745 MHz (CH149)	Fig.21	P
	5825 MHz (CH165)	Fig.22	P
802.11n HT40	5190 MHz (CH38)	Fig.23	P
	5310 MHz (CH62)	Fig.24	P
	5755 MHz (CH151)	Fig.25	P
	5795 MHz (CH159)	Fig.26	P
802.11ac VHT80	5210 MHz (CH42)	Fig.27	P
	5290 MHz (CH58)	Fig.28	P
	5775 MHz (CH155)	Fig.29	P

Conclusion: PASS

Test graphs as below:

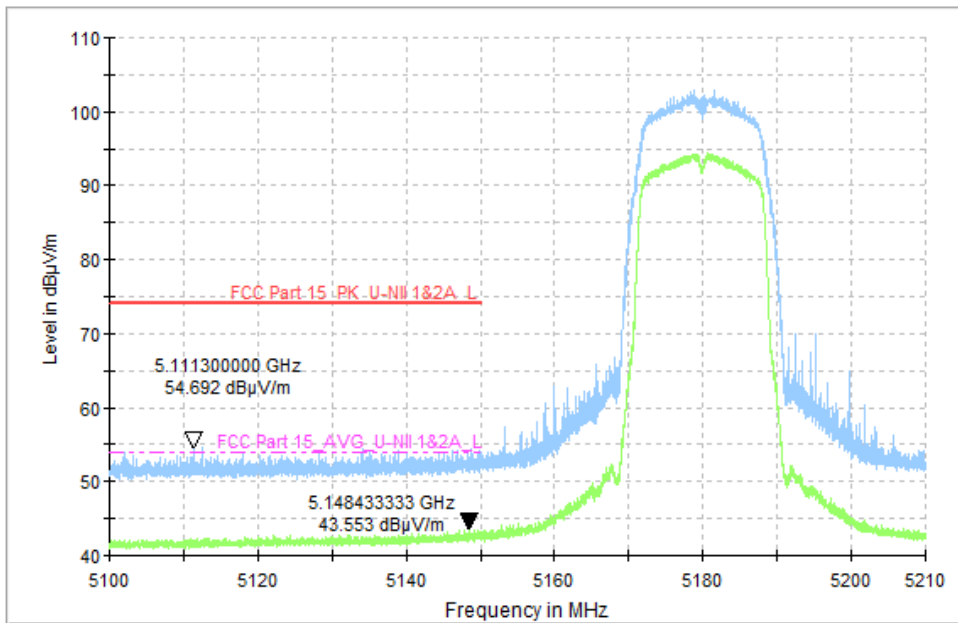


Fig. 19 Band Edges (802.11a, CH36 5180MHz)

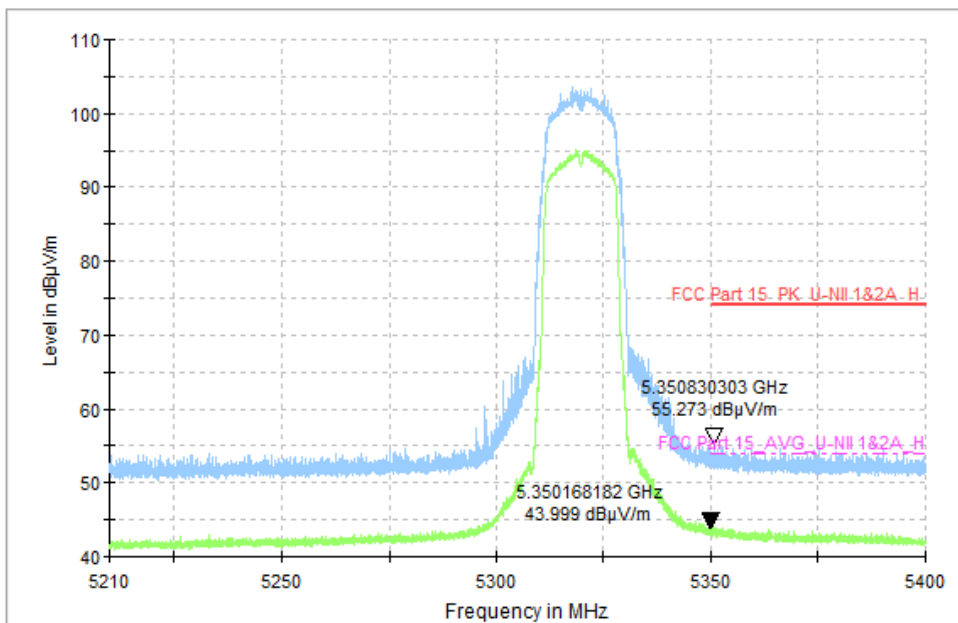


Fig. 20 Band Edges (802.11a, CH64 5320MHz)

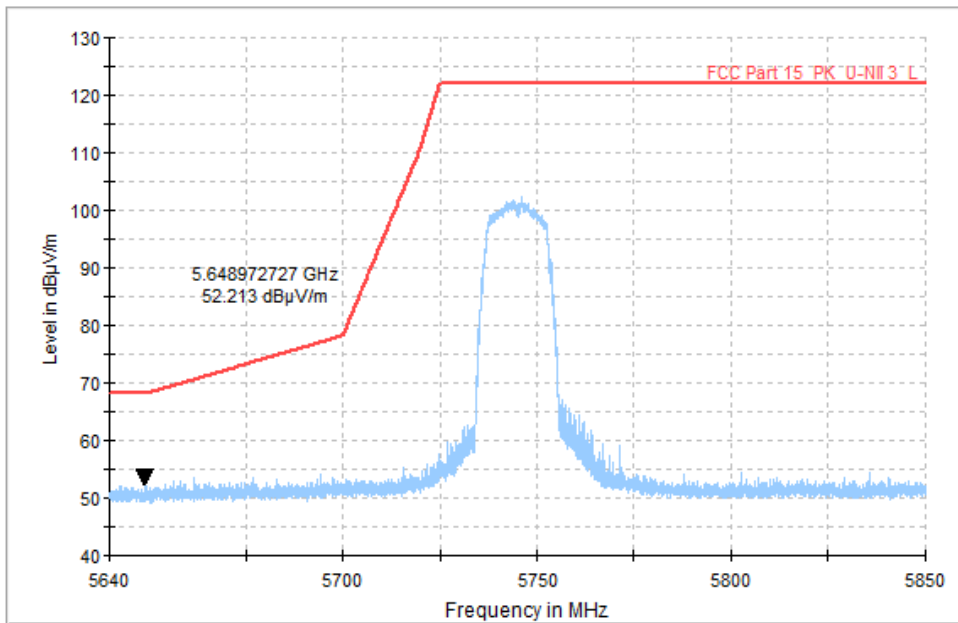


Fig. 21 Band Edges (802.11a, CH149 5745MHz)

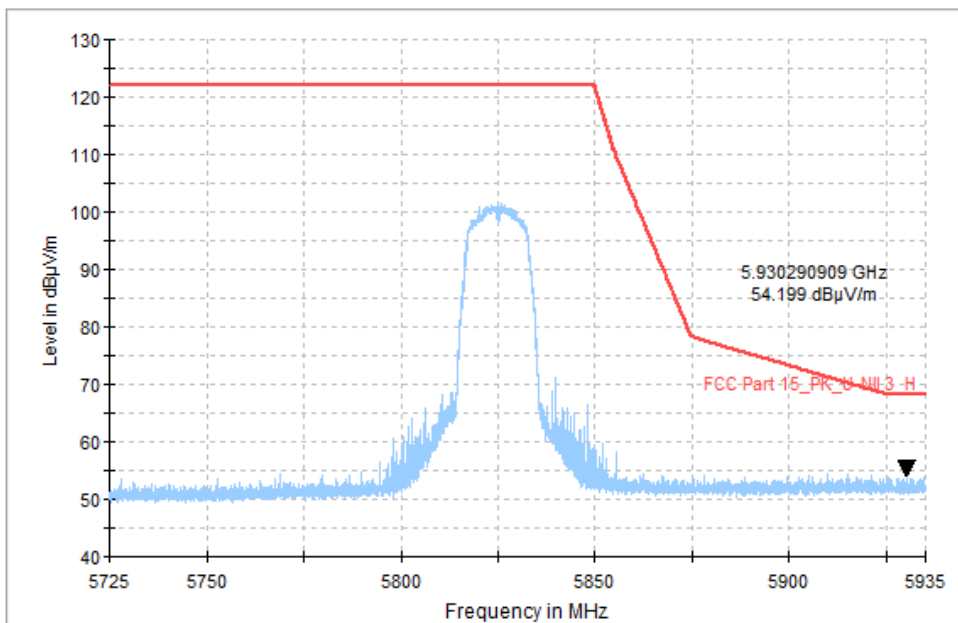


Fig. 22 Band Edges (802.11a, CH165 5825MHz)

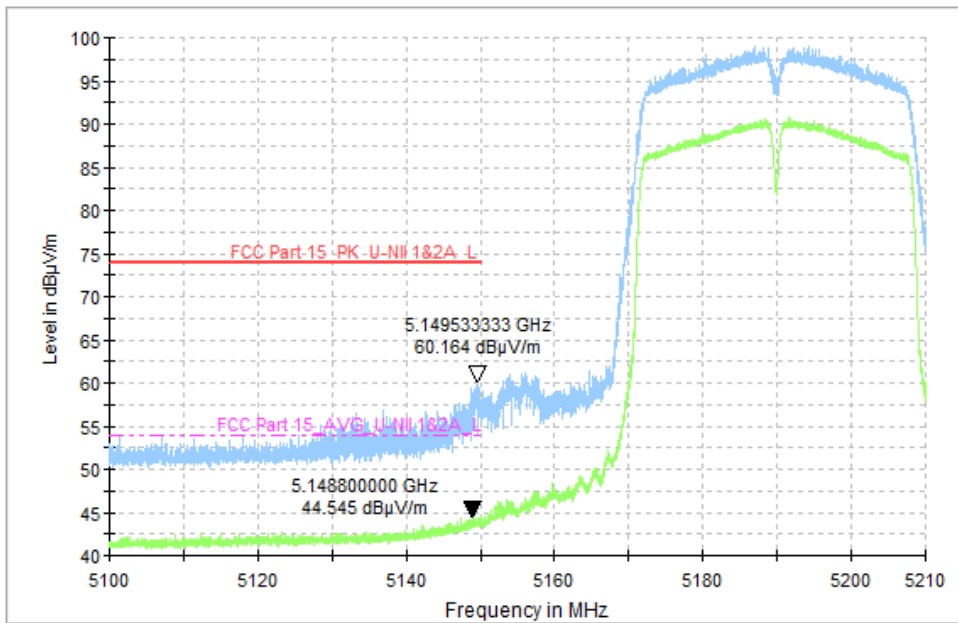


Fig. 23 Band Edges (802.11n-HT40, CH38 5190MHz)

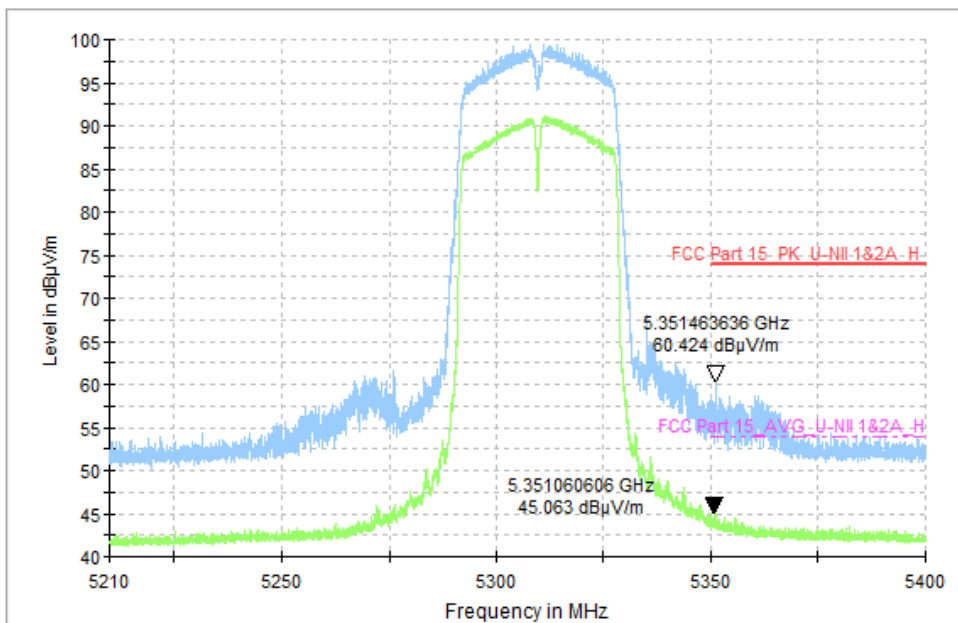


Fig. 24 Band Edges (802.11n-HT40, CH62 5310MHz)

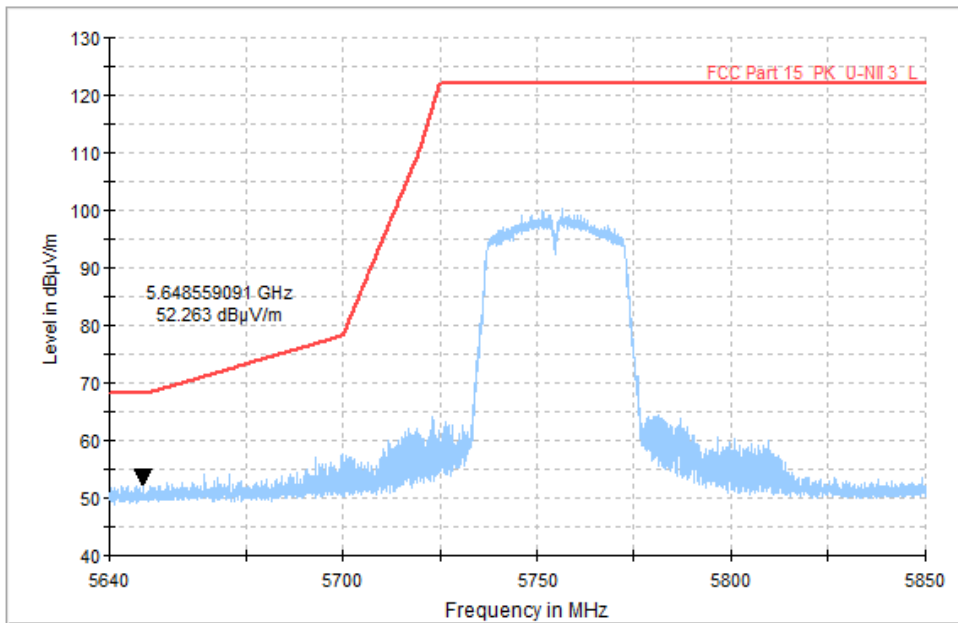


Fig. 25 Band Edges (802.11n-HT40, CH151 5755MHz)

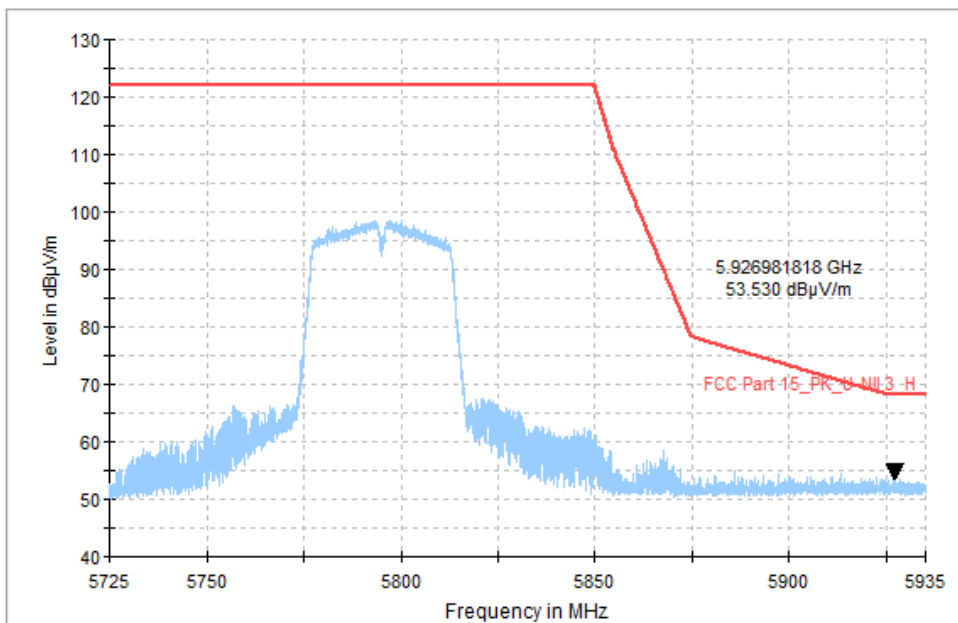


Fig. 26 Band Edges (802.11n-HT40, CH159 5795MHz)

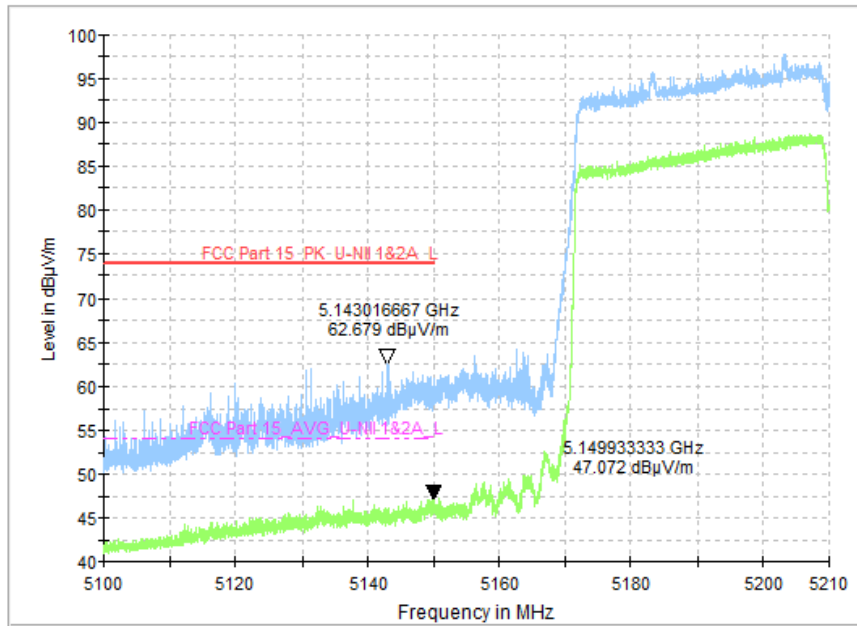


Fig. 27 Band Edges (802.11ac-VHT80, CH42 5210MHz)

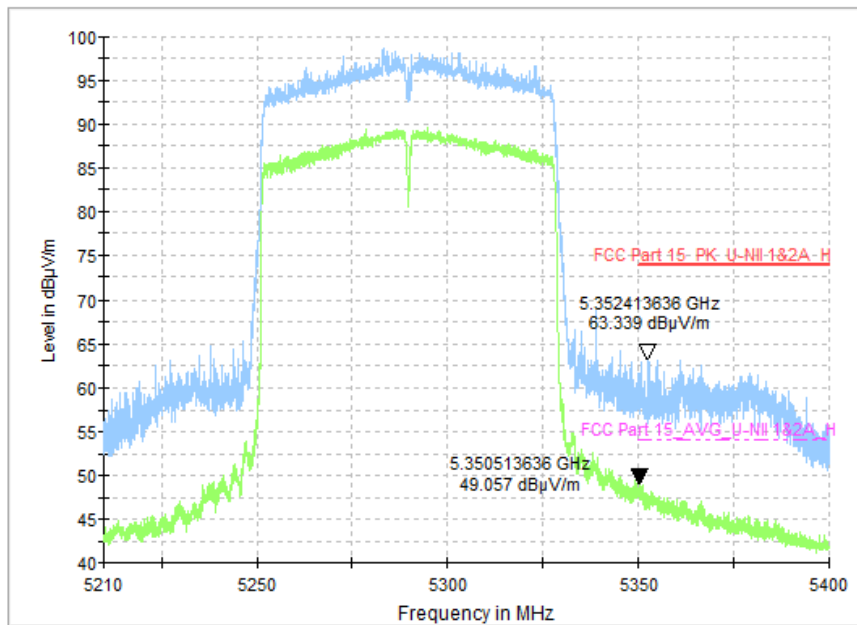


Fig. 28 Band Edges (802.11ac-VHT80, CH58 5290MHz)

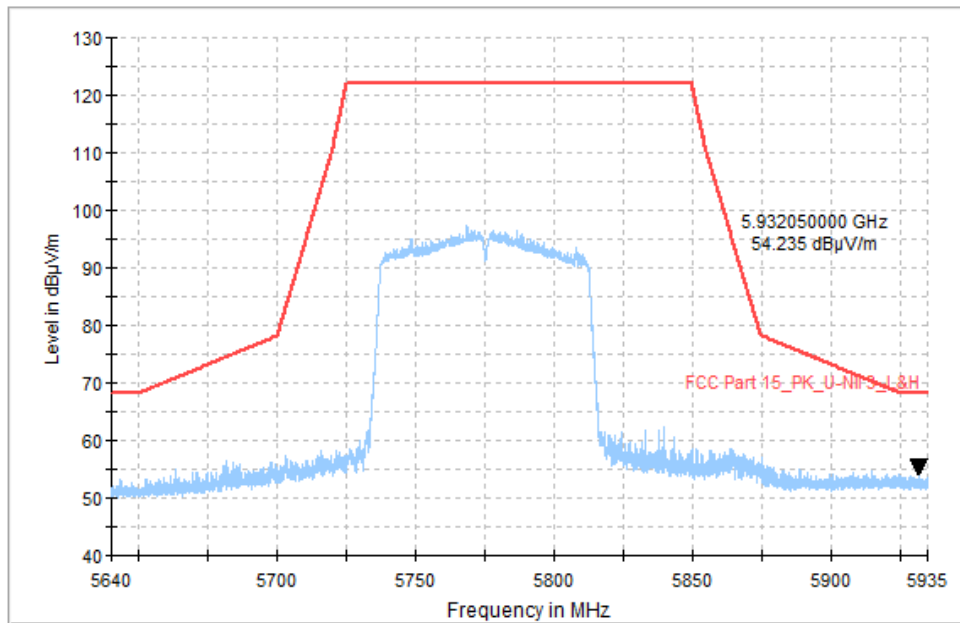


Fig. 29 Band Edges (802.11ac-VHT80, CH155 5775MHz)

A.7. Transmitter Spurious Emission

Measurement Limit:

Standard	Limit (dBm/MHz)
FCC 47 CFR Part 15.407, 15.205	< -27

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.

Measurement Result:

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11a	5180MHz (Ch36)	1 GHz ~ 18 GHz	Fig.30	P
	5200MHz (Ch40)	1 GHz ~ 18 GHz	Fig.31	P
	5240MHz (Ch48)	1 GHz ~ 18 GHz	Fig.32	P
	5260MHz (Ch52)	1 GHz ~ 18 GHz	Fig.33	P
	5280MHz (Ch56)	1 GHz ~ 18 GHz	Fig.34	P
	5320MHz (Ch64)	1 GHz ~ 18 GHz	Fig.35	P
	5745MHz (Ch149)	1 GHz ~ 18 GHz	Fig.36	P
	5785MHz (Ch157)	1 GHz ~ 18 GHz	Fig.37	P
802.11n HT40	5825MHz (Ch165)	1 GHz ~ 18 GHz	Fig.38	P
	5190MHz (Ch38)	1 GHz ~ 18 GHz	Fig.39	P
	5230MHz (Ch46)	1 GHz ~ 18 GHz	Fig.40	P
	5270MHz (Ch54)	1 GHz ~ 18 GHz	Fig.41	P
	5310MHz (Ch62)	1 GHz ~ 18 GHz	Fig.42	P
	5755MHz (Ch151)	1 GHz ~ 18 GHz	Fig.43	P
802.11ac VHT80	5795MHz (Ch159)	1 GHz ~ 18 GHz	Fig.44	P
	5210MHz (Ch42)	1 GHz ~ 18 GHz	Fig.45	P
	5290MHz (Ch58)	1 GHz ~ 18 GHz	Fig.46	P
All channels	5775MHz (Ch155)	1 GHz ~ 18 GHz	Fig.47	P
	30 MHz ~ 1 GHz	Fig.48	P	
	18 GHz ~ 26.5 GHz	Fig.49	P	
	26.5GHz ~ 40GHz	Fig.50	P	

Conclusion: PASS
Test graphs as below:

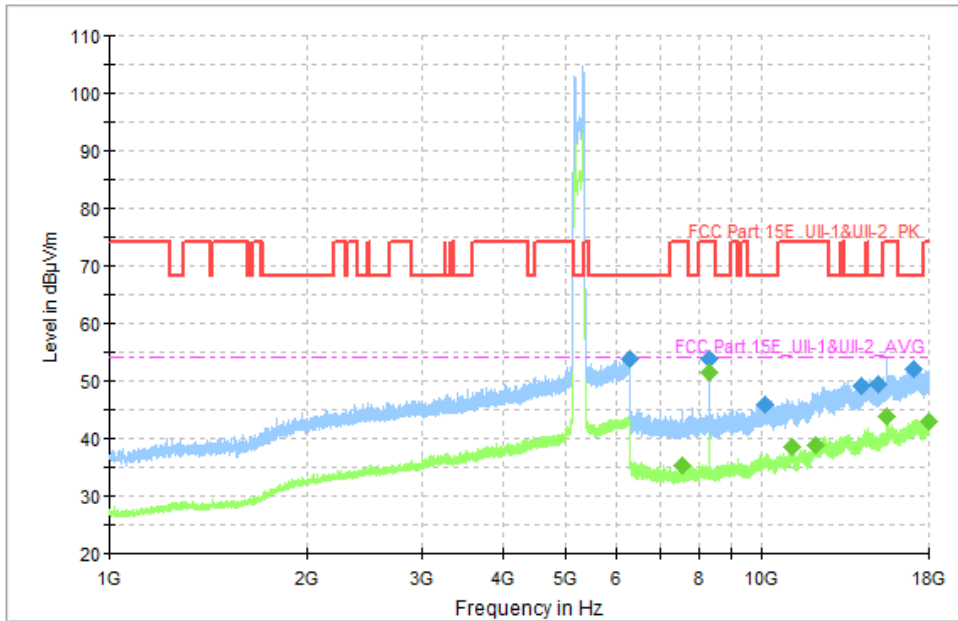


Fig. 30 Transmitter Spurious Emission (802.11a, CH36 5180MHz)

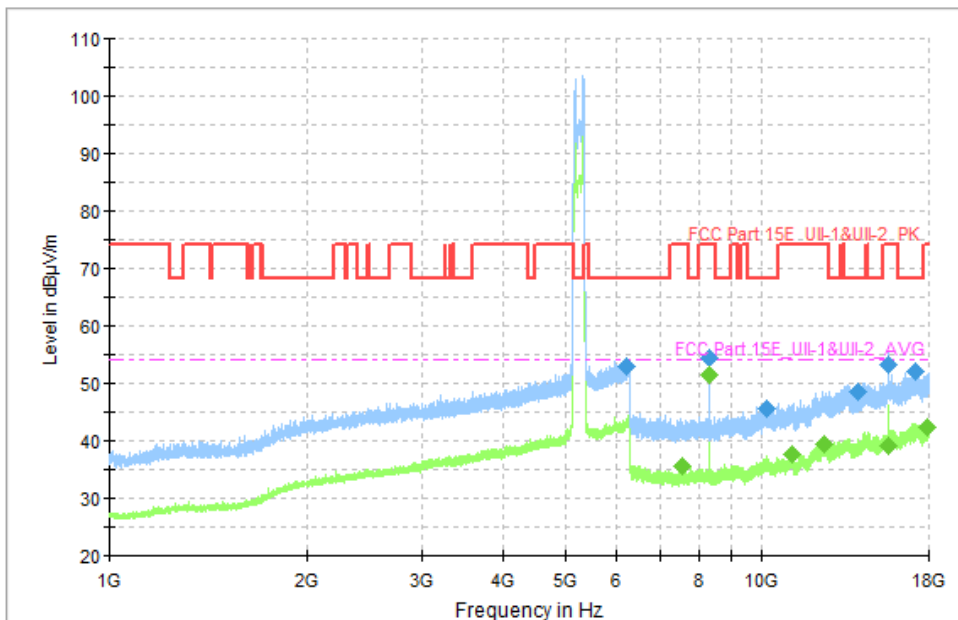


Fig. 31 Transmitter Spurious Emission (802.11a, CH40 5200MHz)

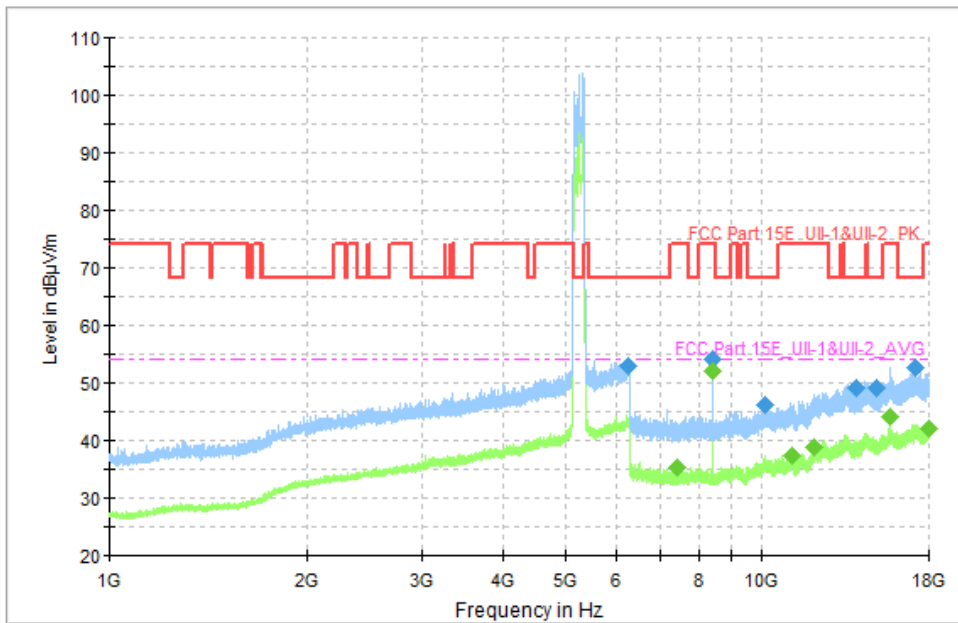


Fig. 32 Transmitter Spurious Emission (802.11a, CH48 5240MHz)

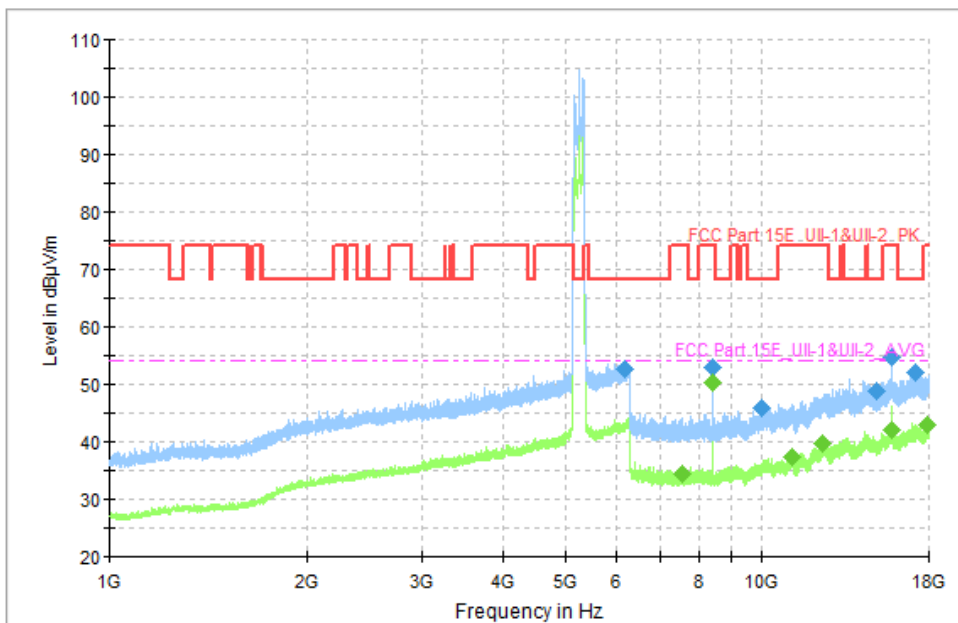


Fig. 33 Transmitter Spurious Emission (802.11a, CH52 5260MHz)

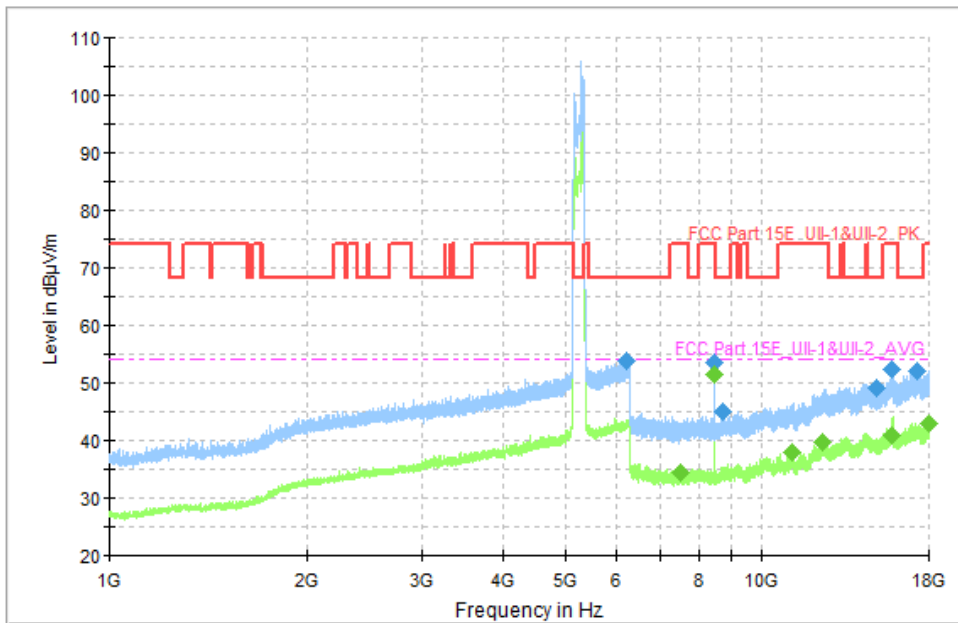


Fig. 34 Transmitter Spurious Emission (802.11a, CH56 5280MHz)

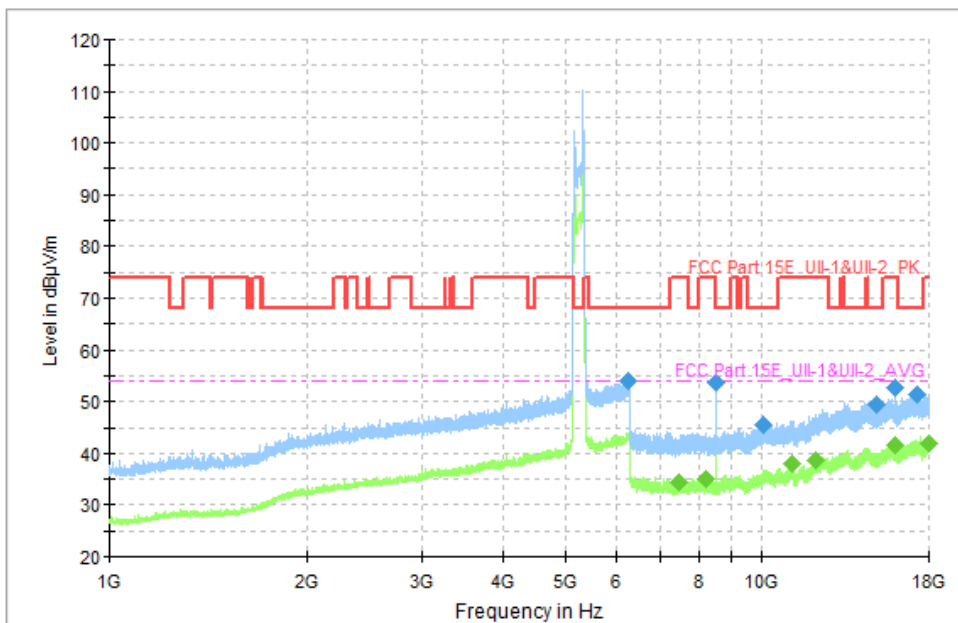


Fig. 35 Transmitter Spurious Emission (802.11a, CH64 5320MHz)

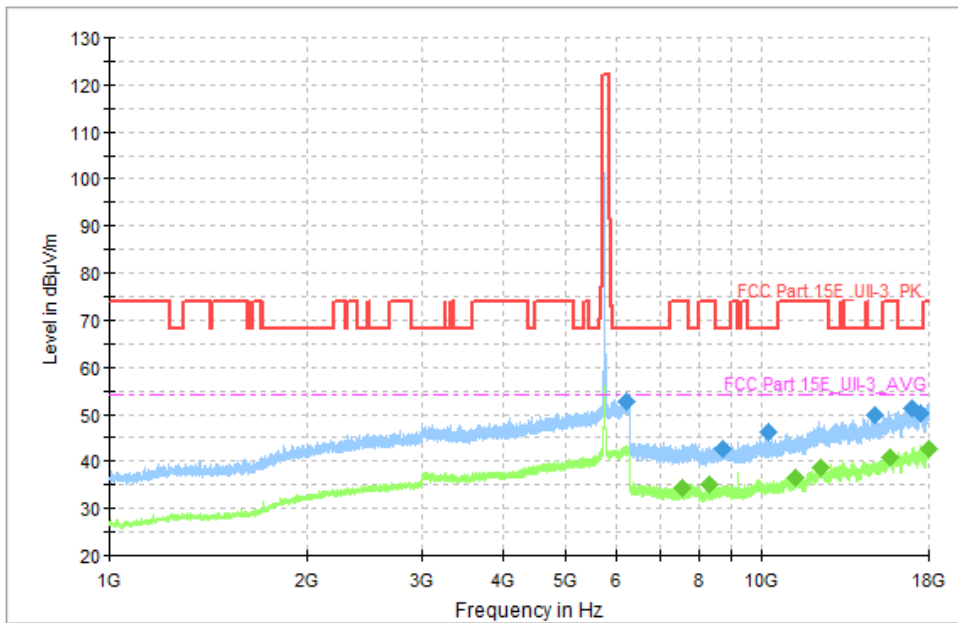


Fig. 36 Transmitter Spurious Emission (802. 11a, CH149 5745MHz)

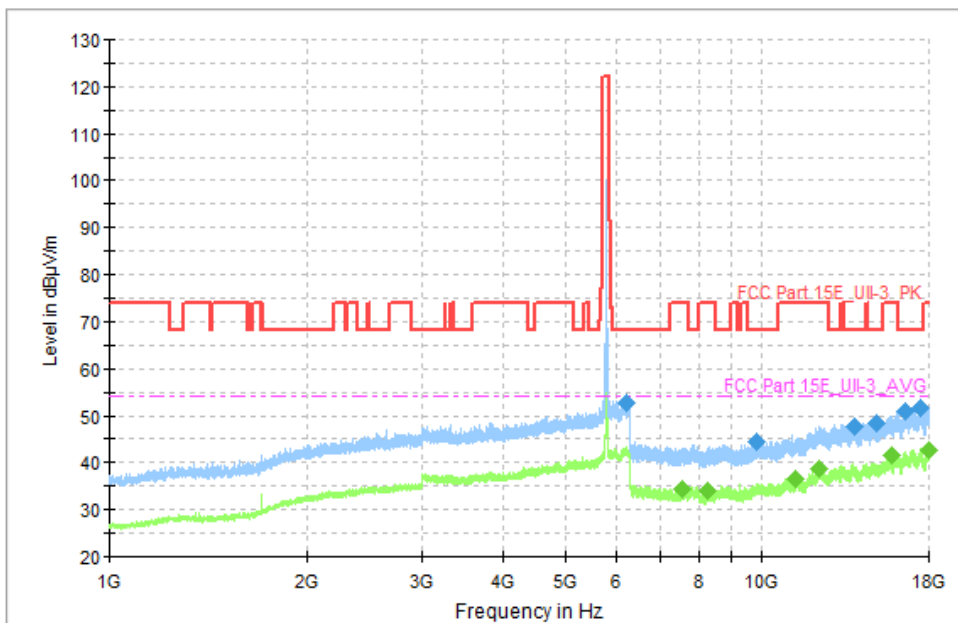


Fig. 37 Transmitter Spurious Emission (802. 11a, CH157 5785MHz)

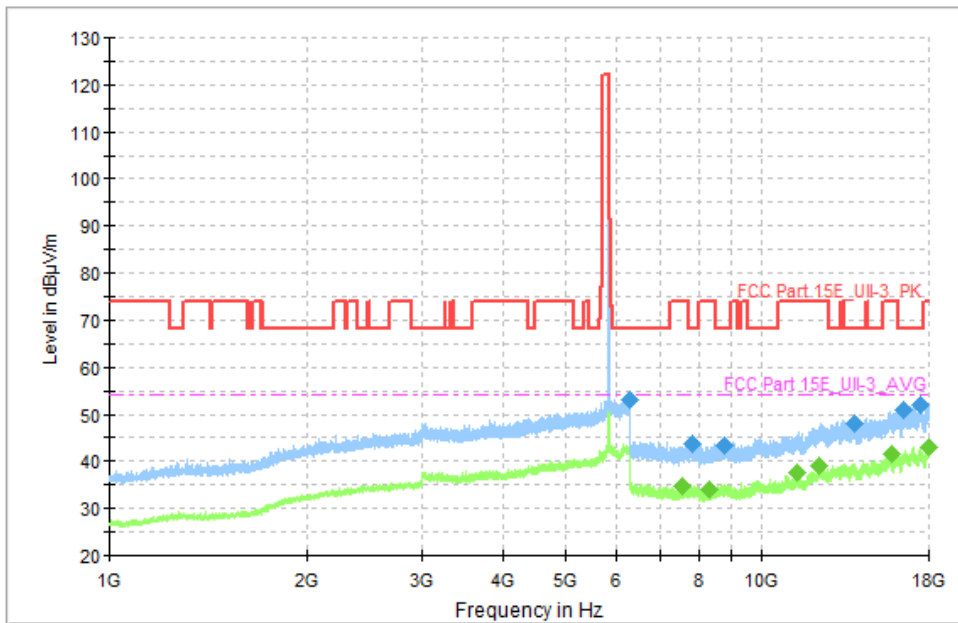


Fig. 38 Transmitter Spurious Emission (802. 11a, CH165 5825MHz)

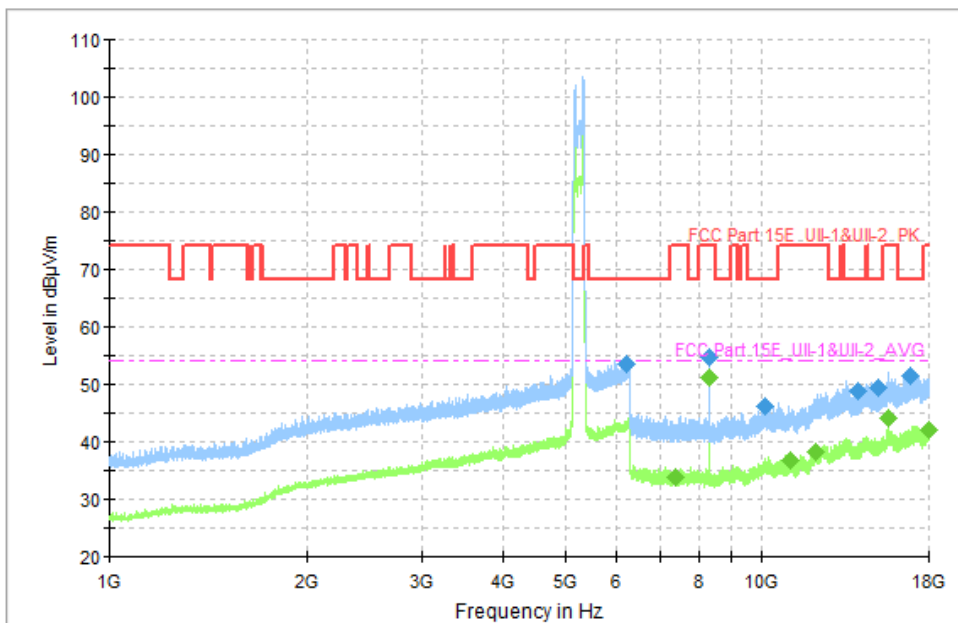


Fig. 39 Transmitter Spurious Emission (802.11n-HT40, CH38 5190MHz)

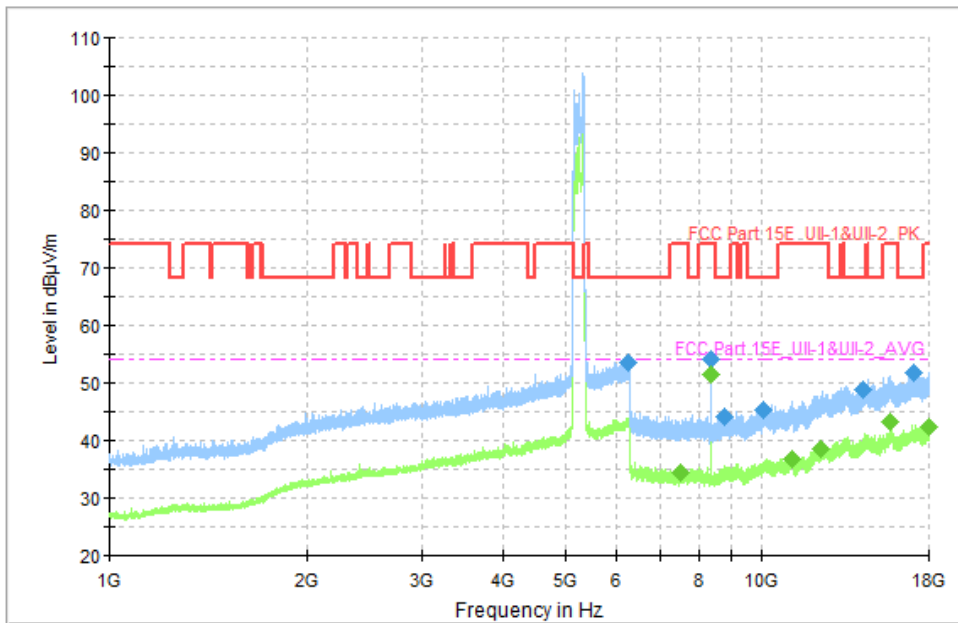


Fig. 40 Transmitter Spurious Emission (802.11n-HT40, CH46 5230MHz)

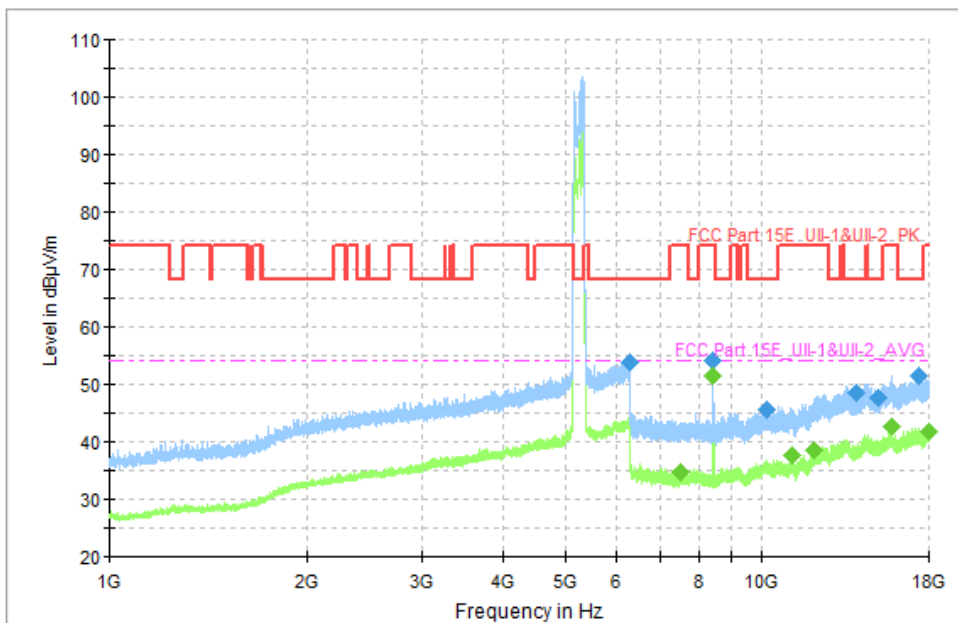


Fig. 41 Transmitter Spurious Emission (802.11n-HT40, CH54 5270MHz)

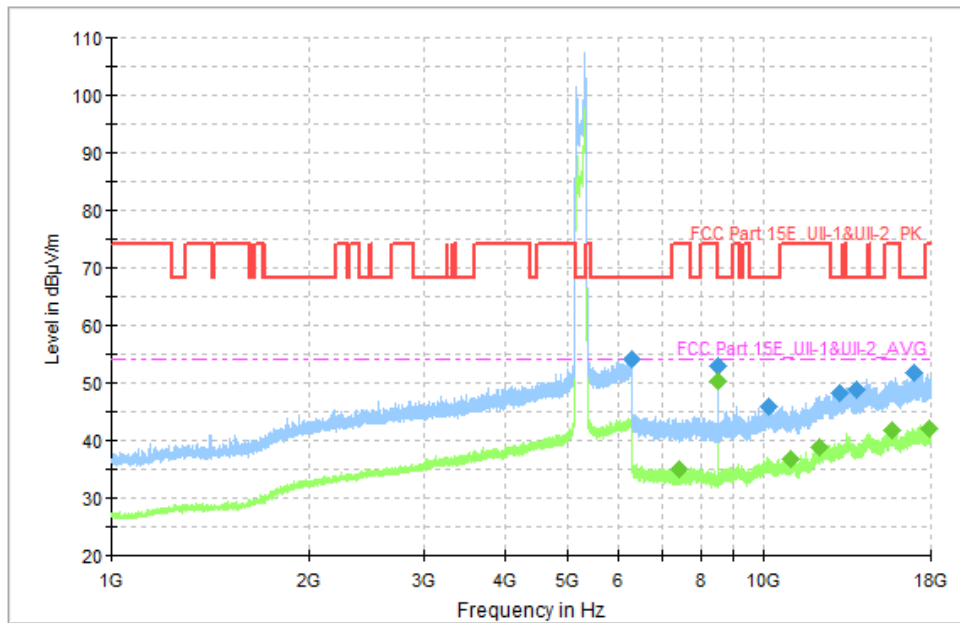


Fig. 42 Transmitter Spurious Emission (802.11n-HT40, CH62 5310MHz)

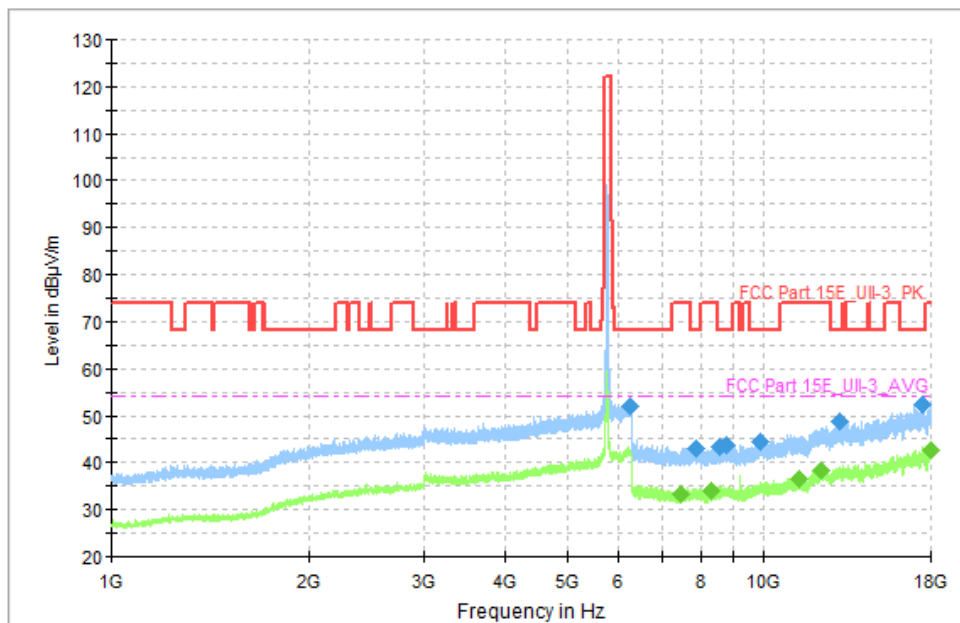


Fig. 43 Transmitter Spurious Emission (802. 11n-HT40, CH151 5755MHz)

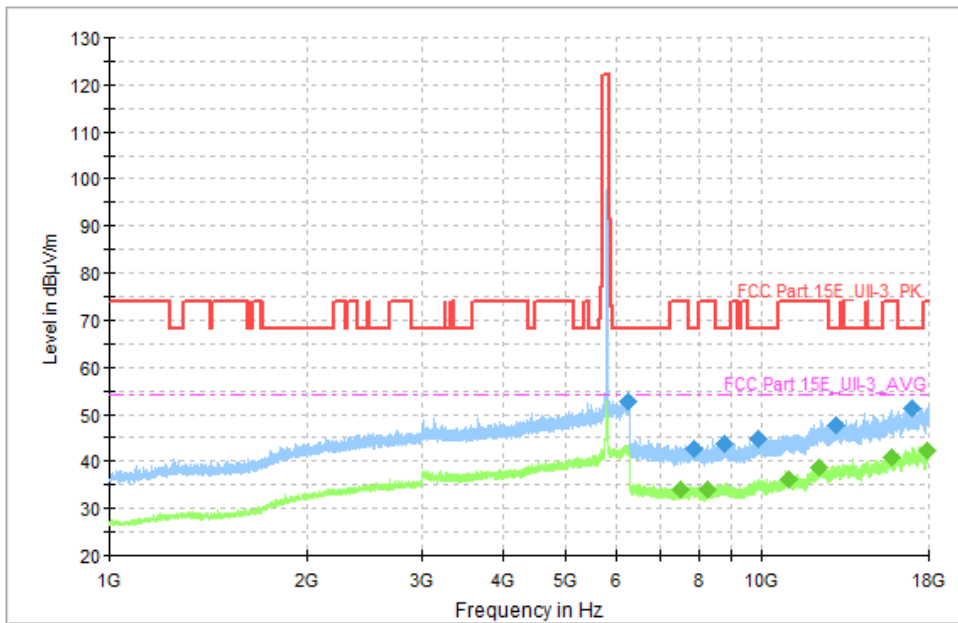


Fig. 44 Transmitter Spurious Emission (802.11n-HT40, CH159 5795MHz)

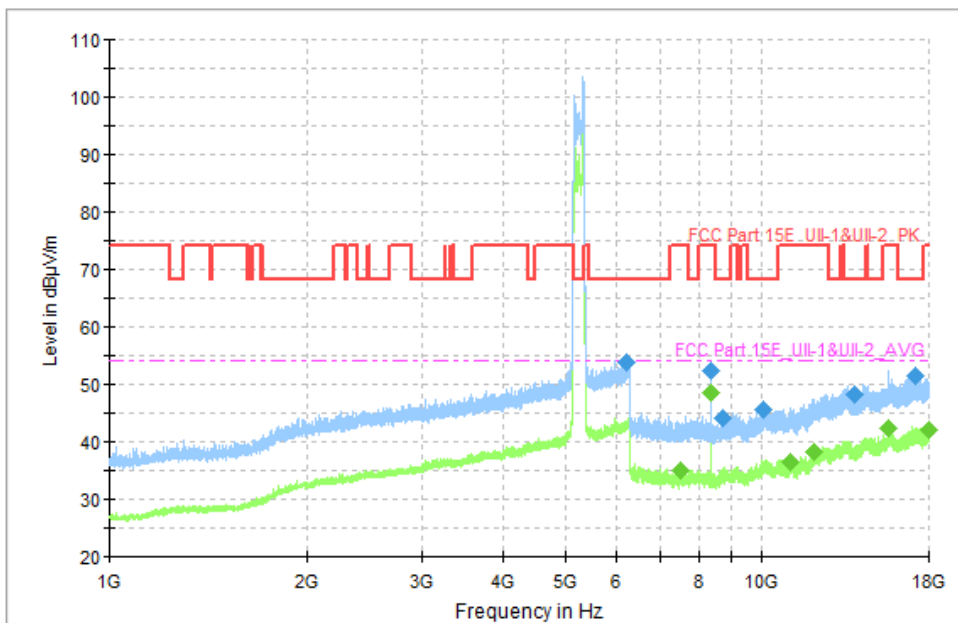


Fig. 45 Transmitter Spurious Emission (802.11ac-VHT80, CH42 5210MHz)

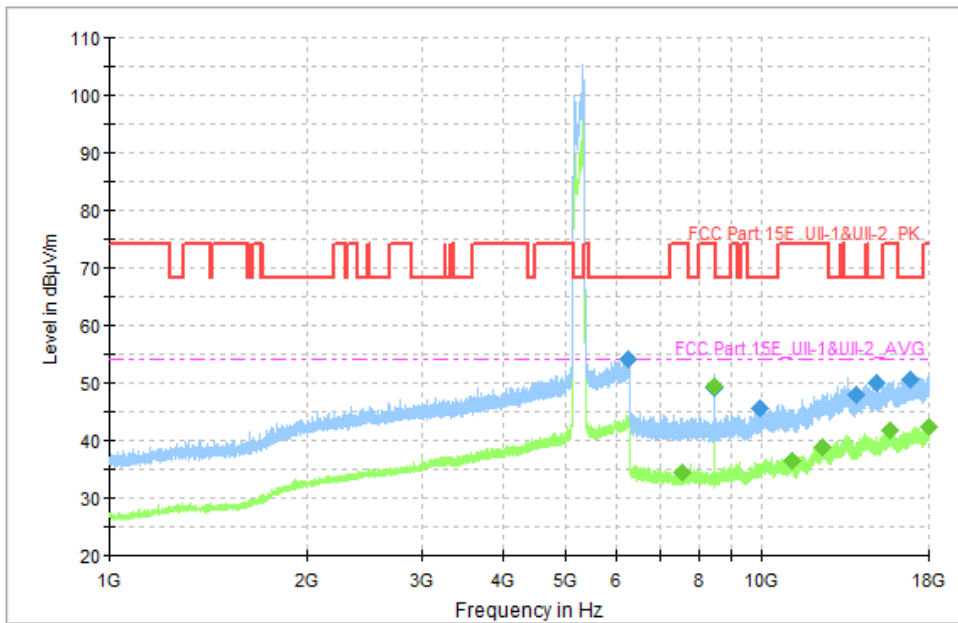


Fig. 46 Transmitter Spurious Emission (802.11ac-VHT80, CH58 5290MHz)

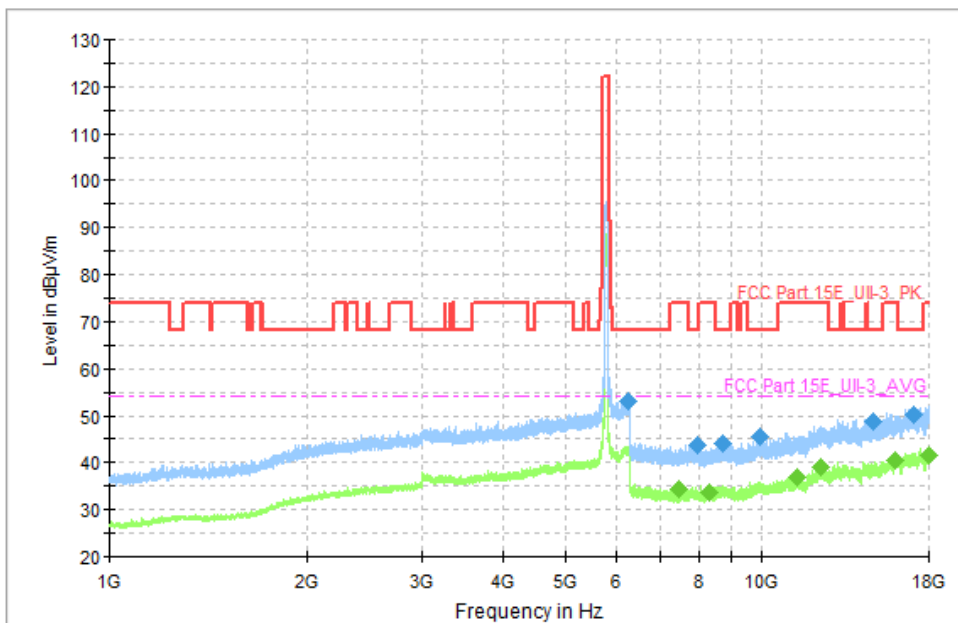


Fig. 47 Transmitter Spurious Emission (802.11ac-VHT80, CH155 5775MHz)

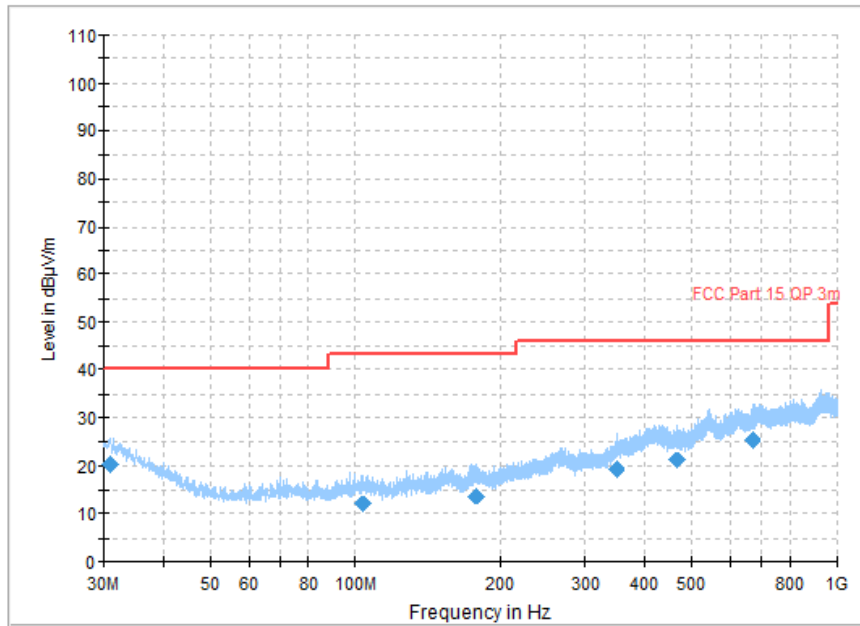


Fig. 48 Transmitter Spurious Emission (All channel, 30MHz~1GHz)

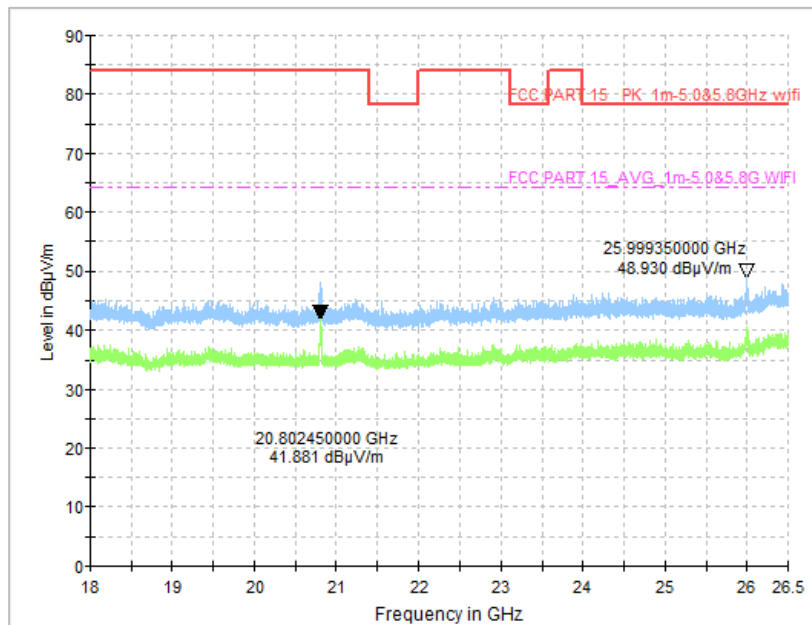


Fig. 49 Transmitter Spurious Emission (All channel, 18GHz~26.5GHz)

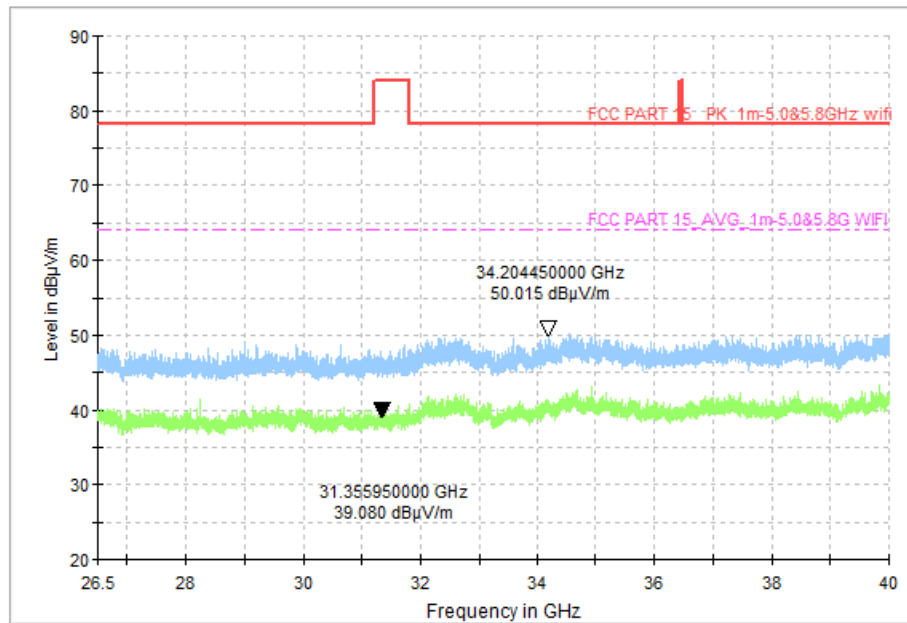


Fig. 50 Transmitter Spurious Emission (All channel, 26.5GHz~40GHz)

**Worst Case Result****802.11a CH48**

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6236.000000	52.96	68.20	15.24	H	18.9
8383.887500	54.14	74.00	19.86	V	5.8
10107.650000	46.27	68.20	21.93	H	7.1
13943.062500	49.14	68.20	19.06	V	12.0
14972.500000	49.19	68.20	19.01	H	12.7
17204.625000	52.70	68.20	15.50	V	17.0

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7409.400000	35.24	54.00	18.76	V	5.2
8383.887500	51.93	54.00	2.07	V	5.8
11093.425000	37.21	54.00	16.79	H	8.5
12035.662500	38.78	54.00	15.22	H	10.6
15717.125000	44.09	54.00	9.91	V	14.3
17959.312500	41.99	54.00	12.01	V	16.5

802.11a CH64

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6249.500000	53.90	68.20	14.30	H	19.0
8511.812500	53.58	68.20	14.62	V	5.7
10044.225000	45.61	68.20	22.59	V	7.1
14958.062500	49.35	68.20	18.85	H	12.7
15956.000000	52.55	74.00	21.45	V	14.7
17236.125000	51.25	68.20	16.95	V	17.0

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7457.775000	34.49	54.00	19.51	H	5.2
8218.875000	35.15	54.00	18.85	V	6.2
11106.325000	37.90	54.00	16.10	V	8.5
12093.175000	38.55	54.00	15.45	V	10.9
15956.000000	41.50	54.00	12.50	V	14.7
17987.750000	42.04	54.00	11.96	V	16.5



802.11a CH165

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6271.000000	53.11	68.20	15.09	H	18.3
7850.150000	43.65	68.20	24.55	V	5.7
8782.175000	43.37	68.20	24.83	H	5.8
13835.000000	48.01	68.20	20.19	V	12.0
16505.062500	50.77	68.20	17.43	H	15.2
17477.625000	51.98	68.20	16.22	H	17.0

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7557.750000	34.67	54.00	19.33	V	5.4
8293.587500	34.00	54.00	20.00	V	6.1
11305.737500	37.73	54.00	16.27	H	8.7
12230.775000	39.17	54.00	14.83	H	11.4
15786.687500	41.42	54.00	12.58	H	14.6
17957.562500	43.01	54.00	10.99	H	16.5

802.11n HT40 CH46

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6256.500000	53.38	68.20	14.82	H	18.9
8367.762500	54.11	74.00	19.89	V	5.9
8752.075000	44.03	68.20	24.17	V	5.8
10070.562500	45.37	68.20	22.83	H	7.1
14256.750000	48.75	68.20	19.45	V	12.8
17015.625000	51.76	68.20	16.44	V	16.6

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7528.725000	34.55	54.00	19.45	V	5.4
8367.762500	51.39	54.00	2.61	V	5.9
11088.587500	36.89	54.00	17.11	H	8.4
12319.462500	38.52	54.00	15.48	H	11.4
15686.500000	43.18	54.00	10.82	V	14.1
17962.375000	42.35	54.00	11.65	V	16.5



802.11n HT40 CH62

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6274.500000	54.13	68.20	14.07	H	18.9
8495.687500	52.90	74.00	21.10	V	5.7
10147.962500	45.88	68.20	22.32	H	7.2
13031.312500	48.24	68.20	19.96	V	12.0
13891.875000	48.90	68.20	19.30	V	12.0
16957.000000	51.73	68.20	16.47	H	16.4

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7414.237500	35.12	54.00	18.88	V	5.2
8495.687500	50.24	54.00	3.77	V	5.7
11017.637500	36.74	54.00	17.26	V	8.3
12122.200000	38.85	54.00	15.15	V	11.0
15744.687500	41.70	54.00	12.30	H	14.4
17890.187500	42.12	54.00	11.88	H	16.6

802.11n HT40 CH151

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6258.500000	51.83	68.20	16.37	H	18.4
7887.237500	42.95	68.20	25.25	V	5.5
8567.175000	43.39	68.20	24.81	H	5.7
8753.150000	43.61	68.20	24.59	V	5.8
9891.037500	44.50	68.20	23.70	H	6.9
13073.312500	48.59	68.20	19.61	H	12.1

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7485.187500	33.15	54.00	20.85	V	5.3
8286.600000	34.11	54.00	19.89	H	6.1
11299.825000	36.61	54.00	17.39	V	8.7
12236.687500	38.48	54.00	15.52	H	11.4
17993.000000	42.67	54.00	11.33	H	16.5
7485.187500	33.15	54.00	20.85	V	5.3



802.11ac VHT80 CH42

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
6207.000000	53.95	68.20	14.25	H	18.8
8335.512500	52.48	74.00	21.52	V	6.0
8719.825000	44.19	68.20	24.01	V	5.8
10049.600000	45.57	68.20	22.63	H	7.1
13869.125000	48.17	68.20	20.03	V	12.0
17193.250000	51.38	68.20	16.82	V	17.0

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
7517.975000	34.93	54.00	19.07	H	5.3
8335.512500	48.48	54.00	5.52	V	6.0
11085.362500	36.59	54.00	17.41	V	8.4
12007.712500	38.25	54.00	15.75	H	10.5
15618.687500	42.29	54.00	11.71	V	13.8
17965.437500	42.12	54.00	11.88	V	16.5

802.11ac VHT80 CH58

Frequency (MHz)	Max Peak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
6239.000000	54.19	68.20	14.01	H	18.9
8463.437500	49.12	74.00	24.88	V	5.7
9943.175000	45.58	68.20	22.62	V	7.0
13935.625000	48.00	68.20	20.20	V	12.0
15001.812500	50.02	68.20	18.18	V	12.8
16909.750000	50.62	68.20	17.58	V	16.2

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB)
7570.650000	34.41	54.00	19.59	V	5.4
8463.975000	49.48	54.00	4.52	V	5.7
11103.637500	36.57	54.00	17.43	V	8.5
12363.537500	38.83	54.00	15.17	H	11.4
15706.187500	41.88	54.00	12.12	V	14.2
17972.437500	42.23	54.00	11.77	V	16.5

802.11ac VHT80 CH155

Frequency (MHz)	Max Peak (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
6258.000000	53.16	68.20	15.04	H	18.4
7951.737500	43.63	68.20	24.57	H	5.5
8695.100000	43.92	68.20	24.28	H	5.8
9906.087500	45.39	68.20	22.81	V	6.9
14819.812500	48.74	68.20	19.46	H	12.8
17023.500000	50.11	68.20	18.09	H	16.6

Frequency (MHz)	Average (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Pol	Corr. (dB)
7460.462500	34.21	54.00	19.79	V	5.2
8304.875000	33.58	54.00	20.42	V	6.0
11293.375000	36.74	54.00	17.26	V	8.7
12303.875000	38.95	54.00	15.05	H	11.4
15985.312500	40.54	54.00	13.46	V	14.7
17998.687500	41.51	54.00	12.49	V	16.5

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

A.8. 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	$2400/F(\text{kHz})$	300
0.490 - 1.705	$24000/F(\text{kHz})$	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:

Channel	Frequency Range	Test Results	Conclusion
All Channel	9 kHz ~ 30 MHz	Fig.51	P

Conclusion: PASS

Test graphs as below:

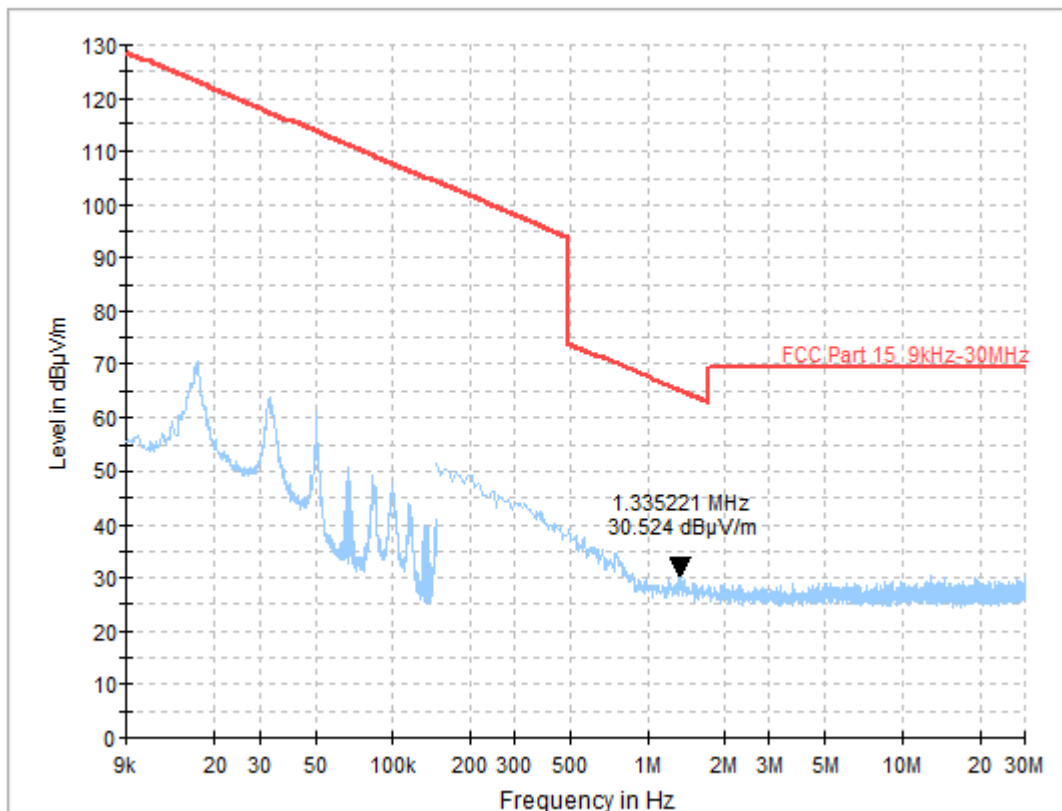


Fig. 51 Radiated Spurious Emission (All Channel, 9 kHz ~30 MHz)

A.9. AC Power Line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

RLAN (Quasi-peak Limit) - AE2

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.52	Fig.53	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) - AE2

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 to 46	Fig.52	Fig.53	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:

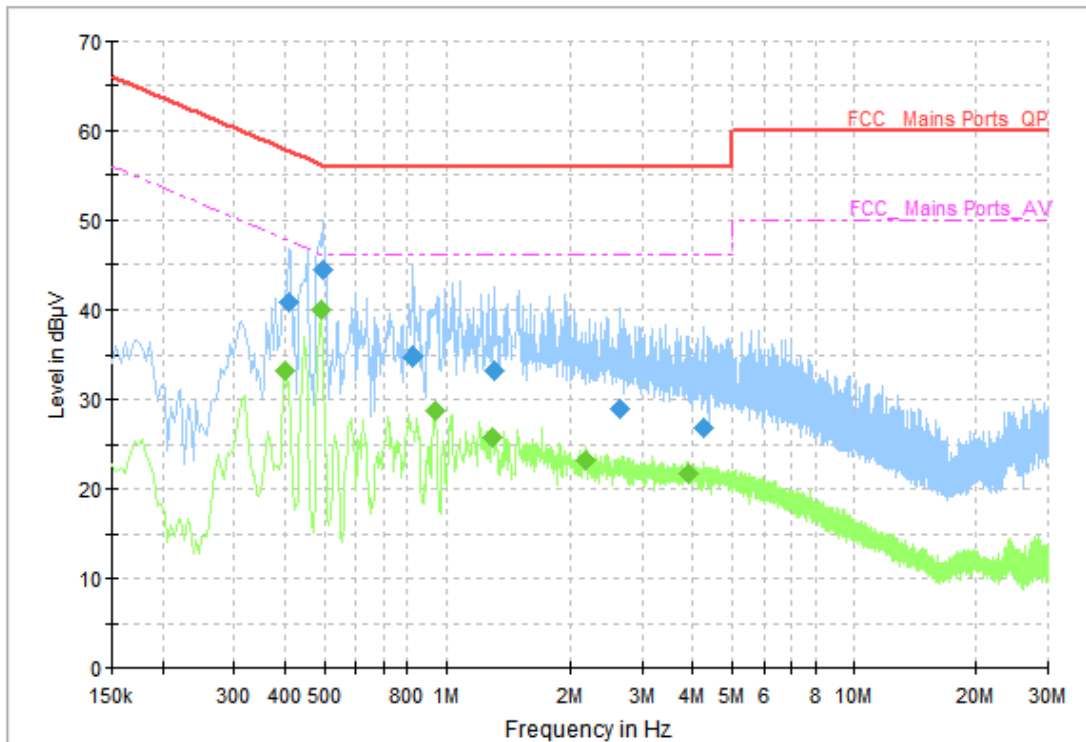


Fig. 52 AC Power line Conducted Emission (Traffic)

Measurement Result: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.410000	40.69	57.65	16.95	L1	ON	10
0.498000	44.38	56.03	11.65	N	ON	10
0.826000	34.69	56.00	21.31	L1	ON	10
1.310000	33.29	56.00	22.71	L1	ON	10
2.658000	28.95	56.00	27.05	L1	ON	10
4.270000	26.88	56.00	29.12	L1	ON	10

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	33.35	47.81	14.46	N	ON	10
0.490000	40.00	46.17	6.17	N	ON	10
0.938000	28.75	46.00	17.25	N	ON	10
1.302000	25.92	46.00	20.08	N	ON	10
2.190000	23.33	46.00	22.67	N	ON	10
3.914000	21.84	46.00	24.16	N	ON	10

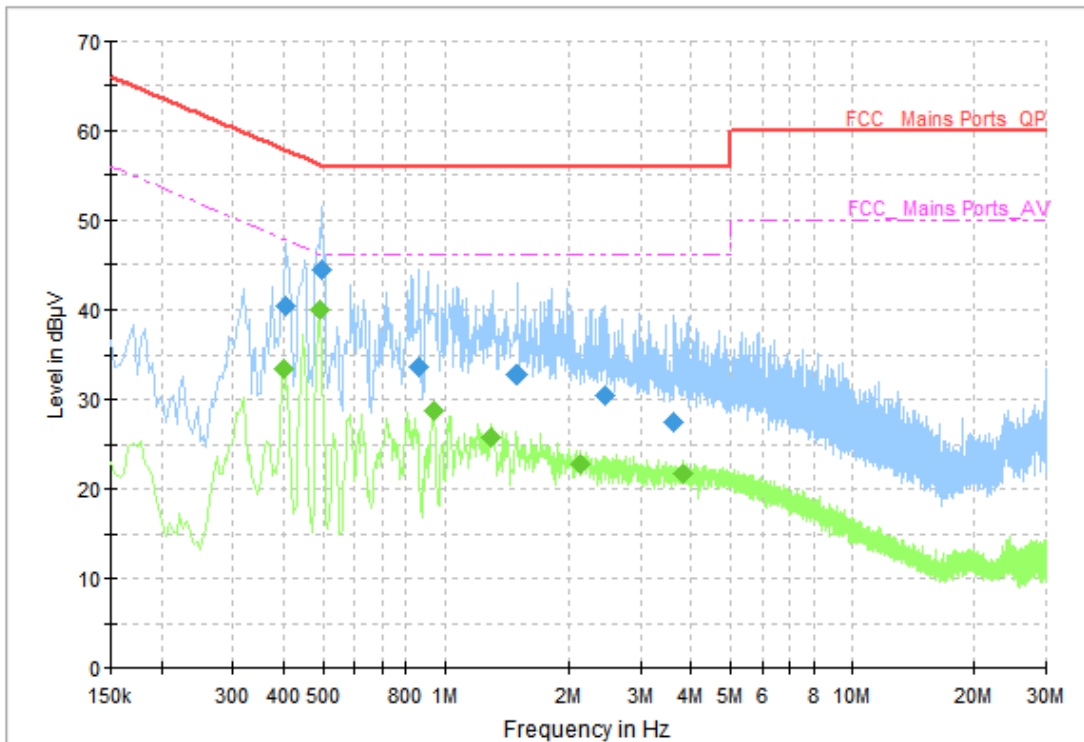


Fig. 53 AC Power line Conducted Emission (Idle)

Measurement Result: Quasi Peak

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406000	40.33	57.73	17.40	L1	ON	10
0.498000	44.34	56.03	11.69	L1	ON	10
0.866000	33.64	56.00	22.36	L1	ON	10
1.490000	32.85	56.00	23.15	L1	ON	10
2.462000	30.45	56.00	25.55	L1	ON	10
3.610000	27.47	56.00	28.53	L1	ON	10

Measurement Result: Average

Frequency (MHz)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.402000	33.59	47.81	14.23	N	ON	10
0.490000	39.88	46.17	6.28	N	ON	10
0.938000	28.83	46.00	17.17	N	ON	10
1.302000	25.85	46.00	20.15	N	ON	10
2.122000	22.76	46.00	23.24	N	ON	10
3.814000	21.82	46.00	24.18	N	ON	10

A.10. Frequency Stability

Manufacturers ensured the EUT meet the requirement of frequency stability, such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

Measurement Condition:

T min = -10°C T nom = 25°C T max = 55°C
 V min = 3.5V V nom = 3.85V V max = 4.4V

Measurement Result:

Mode	Channel	Condition		Frequency	Conclusion
802.11a	5180 MHz (CH36)	T nom	V nom	5179.9842	P
		T max	V nom	5179.9752	P
		T min	V nom	5179.9843	P
		T nom	V max	5179.9725	P
		T nom	V min	5179.9834	P
802.11n HT40	5190 MHz (CH38)	T nom	V nom	5189.9345	P
		T max	V nom	5189.9586	P
		T min	V nom	5189.9654	P
		T nom	V max	5189.9514	P
		T nom	V min	5189.9652	P
802.11ac VHT80	5210 MHz (CH42)	T nom	V nom	5209.9857	P
		T max	V nom	5209.9751	P
		T min	V nom	5209.9783	P
		T nom	V max	5209.9753	P
		T nom	V min	5209.9757	P

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 BODY ***