



Test report No. : 4789400505A-US-R1-V0
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Issued date : Nov. 27, 2020
FCC ID : VGY2865

RADIO TEST REPORT

Product : 35b & G.Fast Security Router
Model Name : Vigor 2866FVac
Series Model : Refer to Ch.6.1 Note 1
FCC ID : VGY2865
Test Regulation : FCC 47 CFR Part 15 Subpart E (Section 15.407)
Received Date : Mar. 2, 2020
Test Date : Jun. 8, 2020 ~ Nov. 27, 2020
Issued Date : Nov. 27, 2020

Applicant : DrayTek Corp.
No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park,
Hsin-Chu, Taiwan 303 R.O.C

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report are responsible of the test sample(s) provided by the client only and are not to be used to indicate applicability to other similar products.

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Doc No: 17-EM-F0878 / 5.0



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1. Attestation of Test Results

APPLICANT: DrayTek Corp.
 No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu, Taiwan 303 R.O.C

MANUFACTURER DrayTek Corp.
 No.26 Fu Shing Rd., HuKou County, Hsin-Chu Industrial Park, Hsin-Chu, Taiwan 303 R.O.C

EUT DESCRIPTION: 35b & G.Fast Security Router

BRAND: DrayTek

MODEL: Vigor 2866FVac

SERIES MODEL: Refer to Ch.6.1 Note 1

SAMPLE STAGE: Engineering sample

DATE of TESTED: Jun. 8, 2020 ~ Nov. 27, 2020

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart E (Section 15.407)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Cindy Hsin

Cindy Hsin
 Project Handler

Date : Nov. 27, 2020

Approved and Authorized By:

Mike Cai

Mike Cai
 Engineer Project Associate

Date : Nov. 27, 2020

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.407(e)	6dB Bandwidth	PASS
15.403(i)	26dB Bandwidth	PASS
2.1049	Occupied Bandwidth	See Note2
15.407(a)(1/3)	Conducted Output Power	PASS
15.407(a)(1/3)	Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.407(b) (1/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS
15.407(b)(6)	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS

Note:

1. For the Radiated Band Edge and OOB test plots were recorded in Appendix I, the Radiated Emissions test plots were recorded in Appendix II.
2. The Occupied Bandwidth was reference only.

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3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB 789033 D02 General UNII Test Procedure New Rules v02r01, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013 and KDB 662911 D01 Multiple Transmitter Output v02r01.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=3398

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5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance at mains terminals ports	0.15MHz ~ 30MHz	2	1.5
RF Conducted	9 kHz - 40GHz	2	1.0
Radiated disturbance below 30MHz	9 kHz - 30 MHz	2	1.9
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	2	5.4
Radiated disturbance above 1GHz	1GHz ~ 40GHz	2	4.7

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6. Equipment under Test

6.1. Description of EUT

Product	35b & G.Fast Security Router	
Brand Name	DrayTek	
Model Name	Vigor 2866FVac	
Series Model	Vigor 2865ac, Vigor 2865Vac, Vigor 2865Fac, Vigor 2865FVac, Vigor 2866ac, Vigor 2866Vac, Vigor 2866Fac, Vigor 2927ac, Vigor 2927Vac, Vigor 2927Fac, Vigor 2927FVac, Vigor 2923ac, Vigor 2923Vac, Vigor 2923Fac, Vigor 2923FVac, Vigor 2925ac, Vigor 2925Vac, Vigor 2925Fac, Vigor 2925FVac, Vigor 2926_v1ac, Vigor 2926_v1Vac, Vigor 2926_v1Fac, Vigor 2926_v1FVac	
S/N	209001DAA41E018	
Operating Frequency	5180 ~ 5240 MHz 5745 ~ 5825 MHz	
Modulation	256QAM, 64QAM, 16QAM, QPSK, BPSK	
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to MCS15 802.11ac: up to MCS9	
Number of Channel	5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11 ac (VHT40)
		1 for 802.11ac (VHT80)
	5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11 ac (VHT40)
		1 for 802.11ac (VHT80)
Maximum Output Power	Non-Beamforming Mode: 5180 ~ 5240 MHz: 25.58 dBm 5745 ~ 5825 MHz: 24.66 dBm Beamforming Mode: 5180 ~ 5240 MHz: 21.27 dBm 5745 ~ 5825 MHz: 23.50 dBm	
Normal Voltage	12Vdc from adapter	

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Note:

1. The models difference table as below:

Main Model Name	DSL	G. fast	SFP	WWAN	LAN	Wi-Fi 2.4G	Wi-Fi 5G	FXS
Vigor 2866FVac	VDDSL2/35b	V	V	-	Eth/RJ45x5	V	V	V
Series Model Name	DSL	G. fast	SFP	WWAN	LAN	Wi-Fi 2.4G	Wi-Fi 5G	FXS
Vigor 2865ac	VDDSL2/35b	-	-	-	Eth/RJ45x6	V	V	-
Vigor 2865Vac	VDDSL2/35b	-	-	-	Eth/RJ45x6	V	V	V
Vigor 2865Fac	VDDSL2/35b	-	V	-	Eth/RJ45x5	V	V	-
Vigor 2865FVac	VDDSL2/35b	-	V	-	Eth/RJ45x5	V	V	V
Vigor 2866ac	VDDSL2/35b	V	-	-	Eth/RJ45x6	V	V	-
Vigor 2866Vac	VDDSL2/35b	V	-	-	Eth/RJ45x6	V	V	V
Vigor 2866Fac	VDDSL2/35b	V	V	-	Eth/RJ45x5	V	V	-
Vigor 2927ac	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor 2927Vac	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor 2927Fac	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor 2927FVac	-	-	V	-	Eth/RJ45x6	V	V	V
Vigor 2923ac	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor 2923Vac	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor 2923Fac	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor 2923FVac	-	-	V	-	Eth/RJ45x6	V	V	V
Vigor 2925ac	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor 2925Vac	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor 2925Fac	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor 2925FVac	-	-	V	-	Eth/RJ45x6	V	V	V
Vigor 2926_v1ac	-	-	-	-	Eth/RJ45x6	V	V	-
Vigor 2926_v1Vac	-	-	-	-	Eth/RJ45x6	V	V	V
Vigor 2926_v1Fac	-	-	V	-	Eth/RJ45x6	V	V	-
Vigor 2926_v1FVac	-	-	V	-	Eth/RJ45x6	V	V	V

Note:

- The above model are declared by manufacturer for market segmentation that difference between main model and the series model is the combination of hardware design and appearance, there is nothing changed to RF related part that does not affect the RF characteristics.

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2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx,Rx Function
802.11a	2TX,2RX
802.11n (HT20)	2TX,2RX
802.11n (HT40)	2TX,2RX
802.11ac (VHT20)	2TX,2RX
802.11ac (VHT40)	2TX,2RX
802.11ac (VHT80)	2TX,2RX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report.

3. The EUT contains following accessory devices

Product	Brand	Model	Description	Remark
AC adapter 1	Channel Well Technology	2ABN036F	Input: 100-240Vac, 1.0A Output: 12Vdc, 3A Length: 1.5m	Optional
AC adapter 2	Channel Well Technology	2ABL030F	Input: 100-240Vac, 1.0A Output: 12Vdc, 2.5A Length: 1.5m	Optional
AC adapter 3	Channel Well Technology	2ABL024F	Input: 100-240Vac, 1.0A Output: 12Vdc, 2A Length: 1.5m	Optional
RJ-45 Cable (Ethernet)	Tung-Li	5U422-20	Length: 3meter, non-shielded cable	-
RJ-11 Cable	N/A	N/A	Length: 1.8meter, non-shielded cable, 6P4C	-

4. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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6.2. Channel List

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz	-	-

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

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6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	24~26°C / 63~67%RH	120Vac / 60 Hz	Jun. 8, 2020 ~ Nov. 27, 2020	Patrick Kuan
Radiated Spurious Emission	966-2	23~27°C / 63~70%RH	120Vac / 60 Hz	Jun. 8, 2020 ~ Sep. 11, 2020	WaterNil Guan / Patrick Kuan
AC power Line Conducted Emission	SR1	23~26°C / 60~64%RH	120Vac / 60 Hz	Sep. 10, 2020~ Sep. 11, 2020	Patrick Kuan

FCC Test Firm Registration Number: 498077

6.4. Description Of Available Antennas

Ant. No.	Brand Name	Model Name	Antenna Type	Antenna Gain(dBi)
Ant 0	Walsin	RFDPA131300SBLB805	Dipole	3.9
Ant 1	Walsin	RFDPA131300SBLB806	Dipole	3.9
Ant 2	Angeei	DPD2430SRW	Dipole	3.5
Ant 3	Angeei	DPD2430SRB	Dipole	3.5

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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6.5. Test Mode Applicability and Tested Channel Detail

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- For the antenna position used radiated emission pre-scan and the worst-case emissions are reported.
- The fundamental of the EUT was investigated in three orthogonal axes X/Y/Z, it was determined that X axis was worst-case. Therefore, all final radiated testing was performed with the EUT in X axis.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For AC power line conducted emissions, the pre-scan has been determined by 2ABL030F adapter of AC power 120Vac/60Hz (worst case).
- Pre-scan radiation has been determined by the Model: Vigor 2866FVac (the worst case).

Non-Beamforming Mode

Test item	Mode	Frequency Band (MHz)	Modulation Technology	Available Channel	Test Channel	Data Rate
Radiated Emissions (Above 1GHz)	802.11a	5180-5240 5745-5825	OFDM	36 to 48 149 to 165	36, 44, 48 149, 157, 165	6.0
	802.11ac (VHT20)		OFDM	36 to 48 149 to 165	36, 44, 48 149, 157, 165	MCS0
	802.11ac (VHT40)		OFDM	38 to 46 151 to 159	38, 46 151, 159	MCS0
	802.11ac (VHT80)		OFDM	42, 155	42, 155	MCS0
Radiated Emissions (Below 1GHz)	802.11a	5180-5240 5745-5825	OFDM	36 to 48 149 to 165	157	MCS0
AC Power Line Conducted Emission	802.11a	5180-5240 5745-5825	OFDM	36 to 48 149 to 165	157	MCS0
Antenna Port Conducted Measurement	802.11a	5180-5240 5745-5825	OFDM	36 to 48 149 to 165	36, 44, 48 149, 157, 165	6.0
	802.11ac (VHT20)		OFDM	36 to 48 149 to 165	36, 44, 48 149, 157, 165	MCS0
	802.11ac (VHT40)		OFDM	38 to 46 151 to 159	38, 46 151, 159	MCS0
	802.11ac (VHT80)		OFDM	42, 155	42, 155	MCS0

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Beamforming Mode

Test item	Mode	Frequency Band (MHz)	Modulation Technology	Available Channel	Test Channel	Data Rate
Radiated Emissions (Above 1GHz)	802.11ac (VHT20)	5180-5240 5745-5825	OFDM	36 to 48 149 to 165	36, 44, 48 149, 157, 165	MCS0 (Nss1)
	802.11ac (VHT40)		OFDM	38 to 46 151 to 159	38, 46 151, 159	MCS0 (Nss1)
	802.11ac (VHT80)		OFDM	42, 155	42, 155	MCS0 (Nss1)
Radiated Emissions (Below 1GHz)	802.11ac (VHT40)	5180-5240 5745-5825	OFDM	38 to 46 151 to 159	159	MCS0 (Nss1)
Antenna Port Conducted Measurement	802.11ac (VHT20)	5180-5240 5745-5825	OFDM	36 to 48 149 to 165	36, 44, 48 149, 157, 165	MCS0 (Nss1)
	802.11ac (VHT40)		OFDM	38 to 46 151 to 159	38, 46 151, 159	MCS0 (Nss1)
	802.11ac (VHT80)		OFDM	42, 155	42, 155	MCS0 (Nss1)

Co-Location Mode

Test item	Mode	Modulation Technology	Modulation Type	Available Channel	Test Channel	Data Rate
Radiated Emissions	802.11n (HT20)	DSSS	DBPSK	1 to 11	6+157	MCS0
	802.11a	OFDM	BPSK	36 to 48 149 to 165		6.0

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6.6. Duty cycle

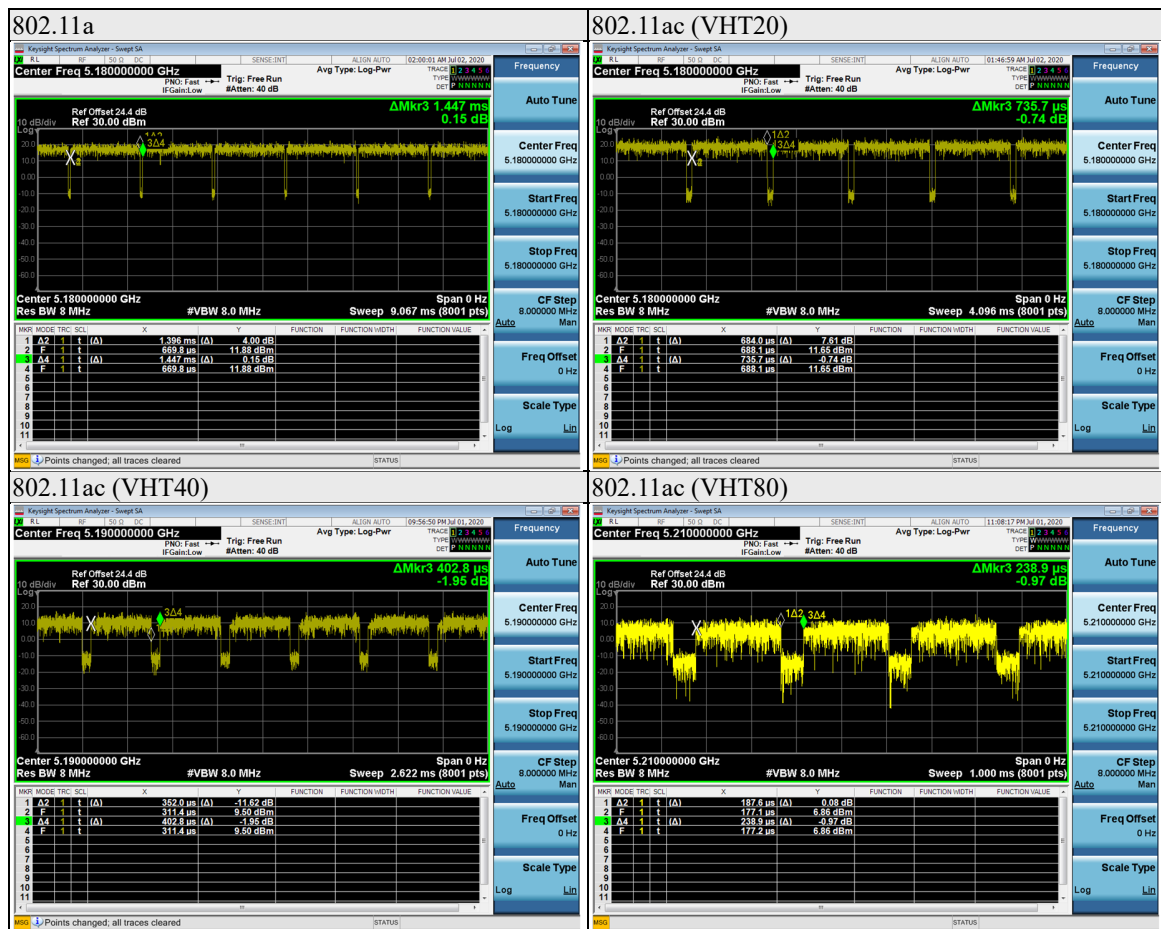
Non-Beamforming Mode

802.11a: Duty cycle = $1.396/1.447 = 0.965$, Duty factor = $10 * \log(1/0.965) = 0.16$

802.11ac (VHT20): Duty cycle = $0.684/0.736 = 0.929$, Duty factor = $10 * \log(1/0.929) = 0.32$

802.11ac (VHT40): Duty cycle = $0.352/0.403 = 0.873$, Duty factor = $10 * \log(1/0.873) = 0.59$

802.11ac (VHT80): Duty cycle = $0.188/0.239 = 0.787$, Duty factor = $10 * \log(1/0.787) = 1.04$



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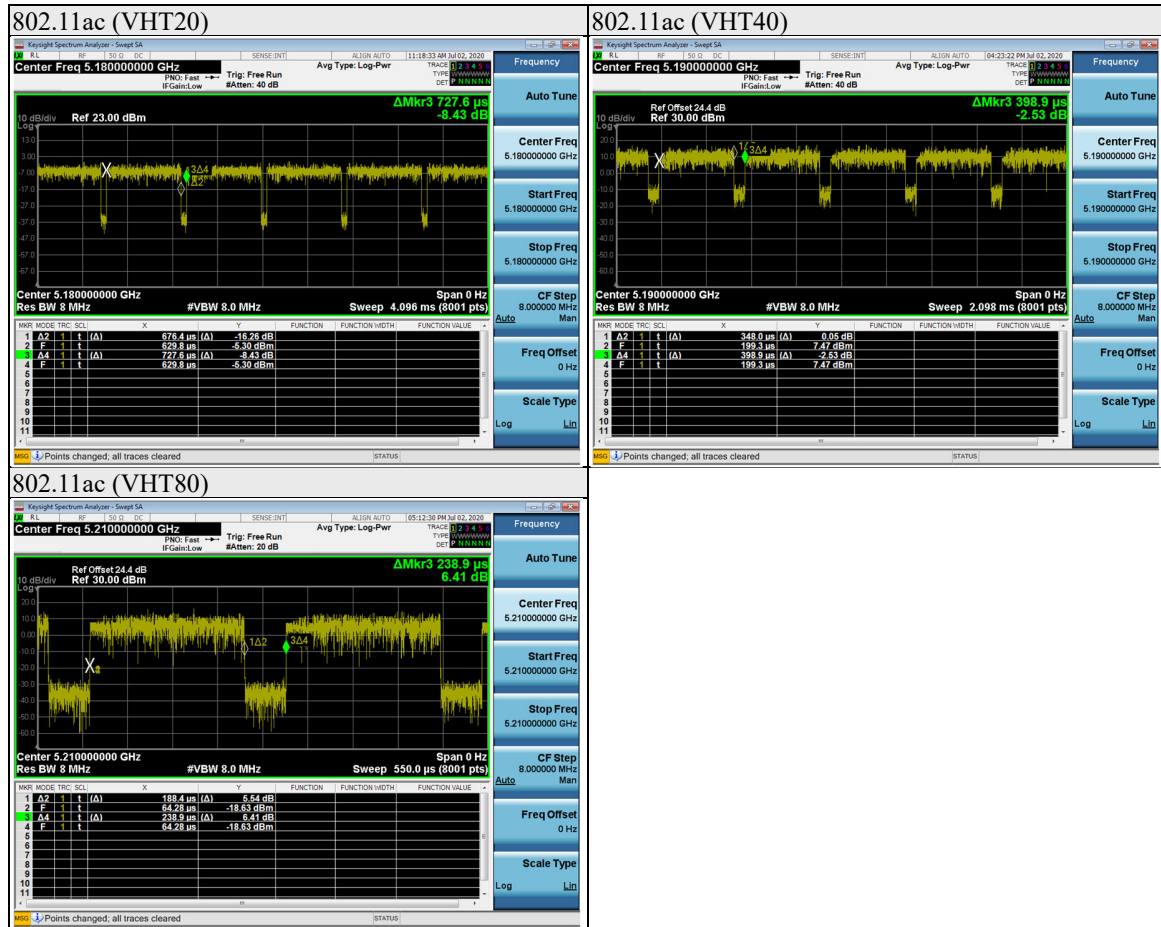


Beamforming Mode

802.11ac (VHT20): Duty cycle = $0.6764/0.7276 = 0.93$, Duty factor = $10 * \log(1/0.93) = 0.32$

802.11ac (VHT40): Duty cycle = $0.348/0.3989 = 0.872$, Duty factor = $10 * \log(1/0.872) = 0.59$

802.11ac (VHT80): Duty cycle = $0.1884/0.2389 = 0.789$, Duty factor = $10 * \log(1/0.789) = 1.03$



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7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	Nov. 13, 2019	1 year
				Nov. 11, 2020	
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	Dec. 17, 2019	1 year
Loop Antenna	ETS lindgren	6502	00213440	Dec. 19, 2019	1 year
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	Jan. 3, 2020	1 year
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	Jan. 3, 2020	1 year
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	Dec. 27, 2019	1 year
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	Feb. 4, 2020	1 year
				Jun. 9, 2020	
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	Feb. 4, 2020	1 year
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	May 19, 2020	1 year
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	Jan. 8, 2020	1 year
				Jul. 2, 2020	
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	Jan. 8, 2020	1 year

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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Antenna Port Conducted Measurement					
Spectrum Analyzer	Keysight	N9010A	MY56070834	Nov. 6, 2019	1 year
Pulse Power Sensor	Anritsu	MA2411B	1531202	Dec. 23, 2019	1 year
Power Meter	Anritsu	ML2495A	1645002	Dec. 23, 2019	1 year
Temperature & Humidity Test Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA1701-010	Mar. 23, 2020	1 year
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	Nov. 19, 2019	1 year
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	Aug. 19, 2020	1 year
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	Aug. 12, 2020	1 year
Cables	HARBOUR INDUSTRIES	LL142	170205-5000-1	Feb. 5, 2020	1 year

UL Software		
Description	Name	Version
Radiated measurement	EZ_EMG	1.1.4.2
Conducted measurement	Keysight.TestSystem	1.0.0.0
AC power Line Conducted Emission	EZ_EMG	1.1.4.2

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8. Description of Test Setup

Support Equipment

Equipment	Brand Name	Model Name	S/N	Remark
Notebook	DELL	Latitude E5470	3JFKWF2	N/A
Notebook	DELL	Latitude E5470	JVSKWF2	N/A
Connector	N/A	N/A	N/A	RJ-45 to RJ-45
USB Device	Transcend	N/A	N/A	8GB
Fiber Module	Fiberpon	SFP+10G-T	N/A	N/A
Rx Device (BF Client)	DrayTek	Vigor 2866LFBVac	N/A	FW: r89624_Beta

I/O Cables

Equipment	Brand Name	Model Name	S/N	Remark
RJ-45 cable	N/A	N/A	N/A	Length : 10m
RJ-45 cable	N/A	N/A	N/A	Length : 1.5m
RJ-45 cable	N/A	N/A	N/A	Length : 1.5m
RJ-45 cable	N/A	N/A	N/A	Length : 1.5m
RJ-45 cable	N/A	N/A	N/A	Length : 1.5m
RJ-45 cable	N/A	N/A	N/A	Length : 1.5m

Test Setup

Controlled using a bespoke application (QA tool) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

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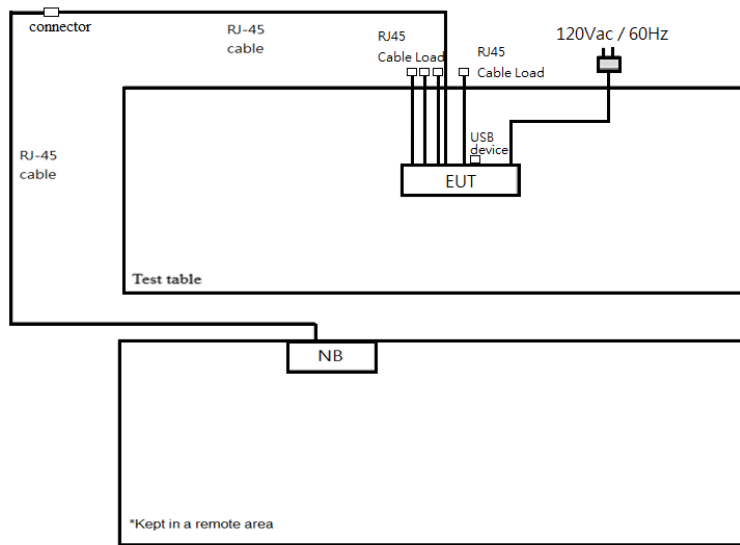
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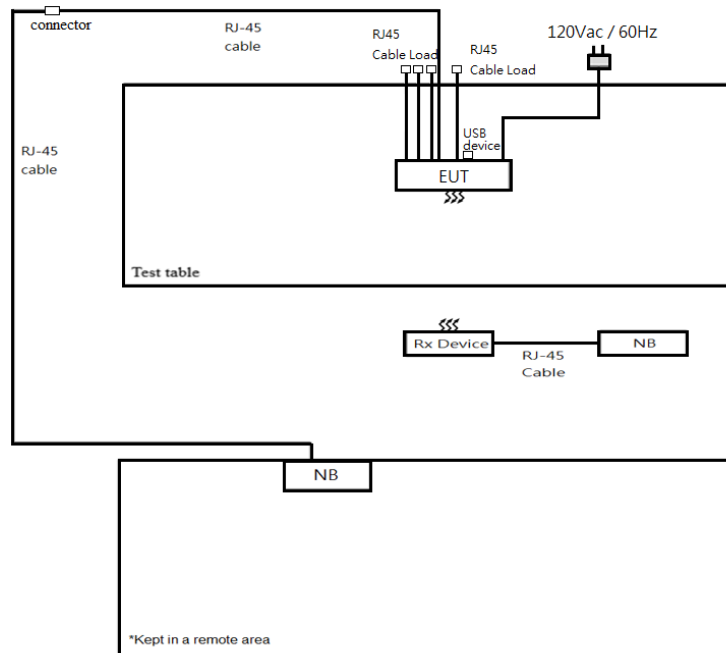


Setup Diagram for Test

Non-Beamforming Mode



Beamforming Mode



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9. Test Results

9.1. 6dB Bandwidth

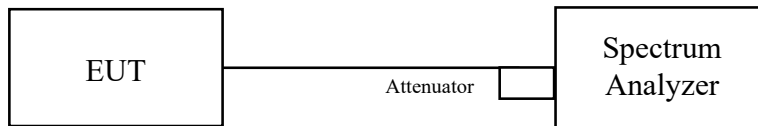
Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

Non-Beamforming Mode

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	13.402	14.096	0.5	Pass
157	5785	15.003	14.823	0.5	Pass
165	5825	15.723	14.062	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.09	15.123	0.5	Pass
157	5785	15.026	15.101	0.5	Pass
165	5825	16.293	15.131	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	33.795	35.077	0.5	Pass
159	5795	35.017	35.032	0.5	Pass

802.11ac (VHT80)

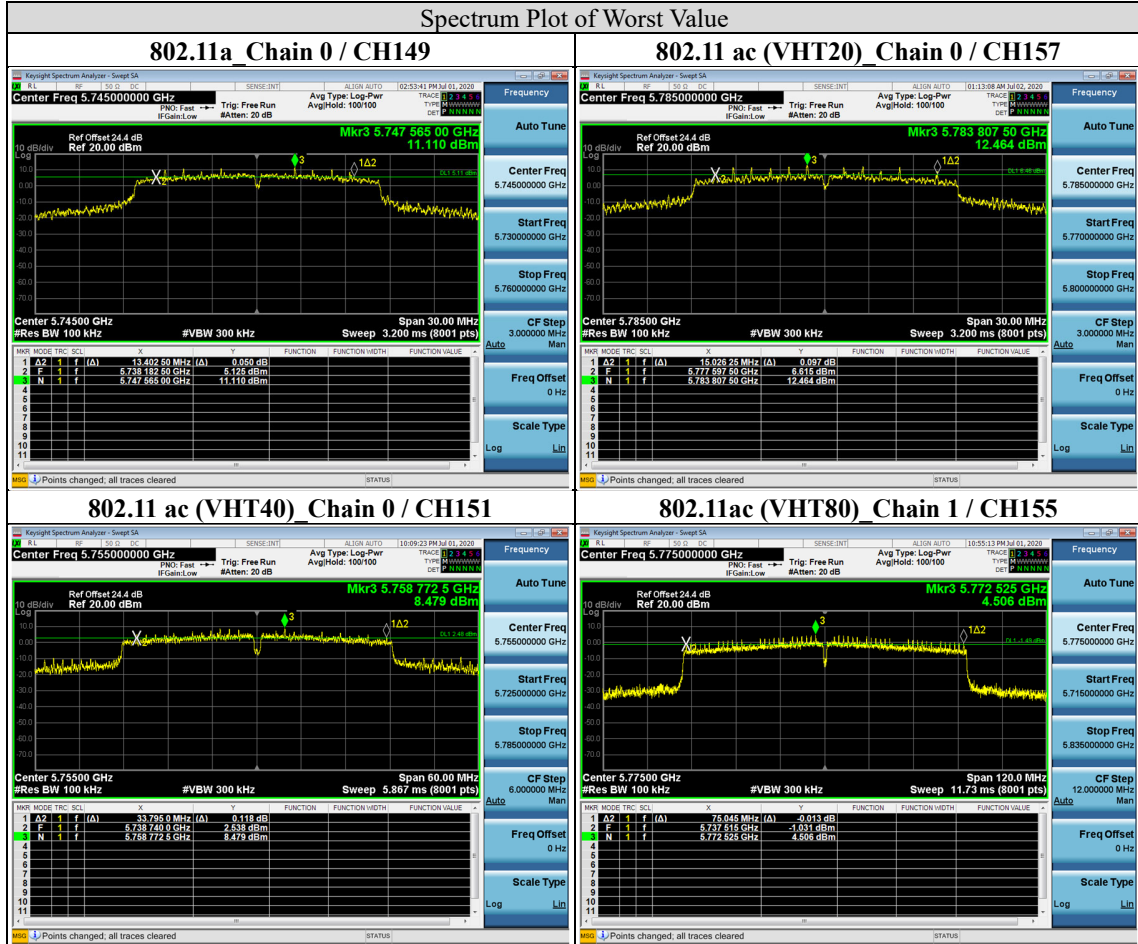
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.045	75.045	0.5	Pass

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Beamforming Mode

802.11ac (VHT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	15.116	15.086	0.5	Pass
157	5785	15.071	15.101	0.5	Pass
165	5825	15.008	15.068	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	33.855	35.085	0.5	Pass
159	5795	35.078	35.055	0.5	Pass

802.11ac (VHT80)

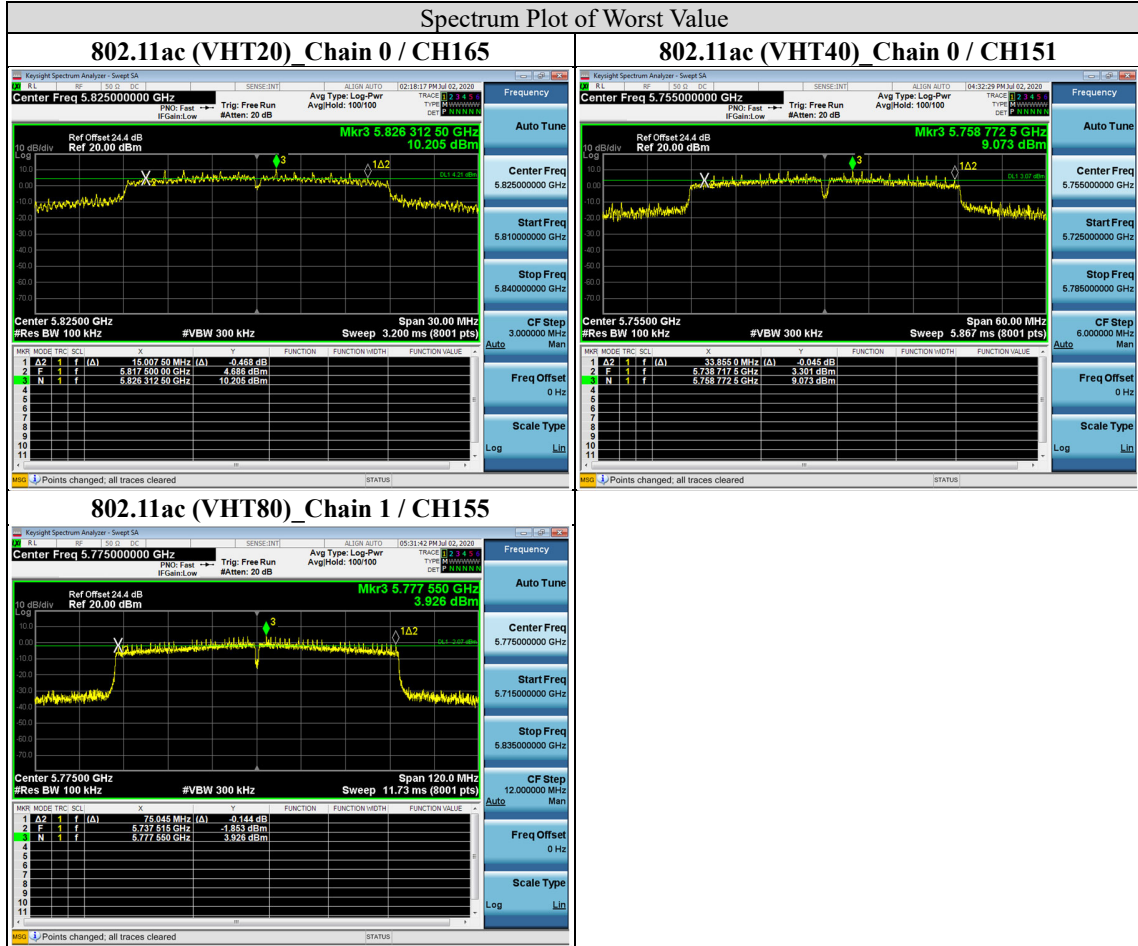
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.045	75.045	0.5	Pass

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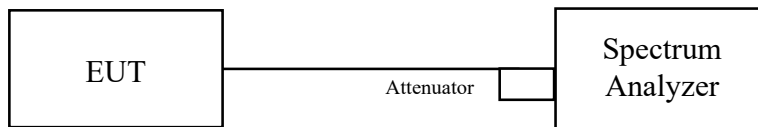


9.2. 26dB Bandwidth

Test procedure

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

Non-Beamforming Mode

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	20.03	19.83	PASS
44	5220	26.42	26.97	PASS
48	5240	29.07	27.91	PASS

802.11ac (VHT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	20.42	20.1	PASS
44	5220	25.97	22.56	PASS
48	5240	23.22	20.12	PASS

802.11ac (VHT40)

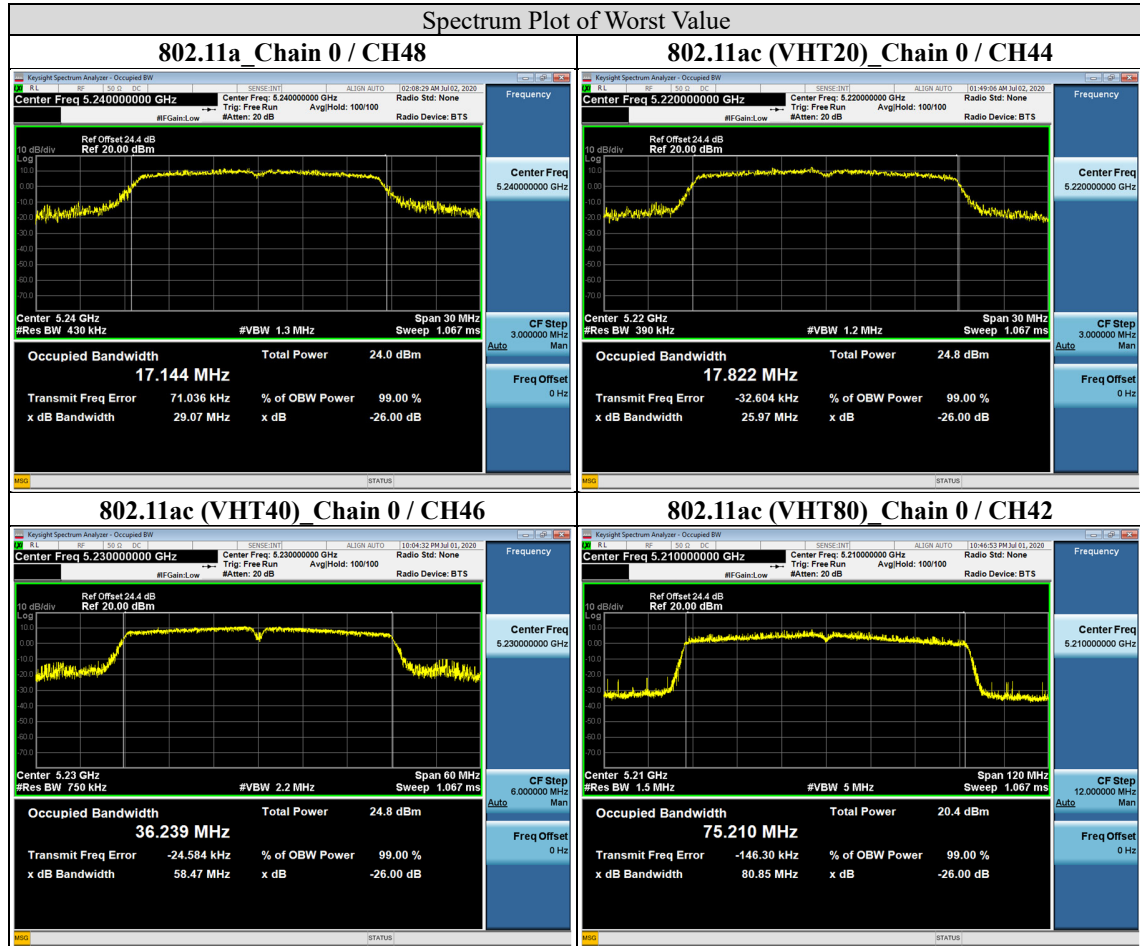
CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	40.16	41.28	PASS
46	5230	58.47	54.41	PASS

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	80.85	80.63	PASS

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Beamforming Mode

802.11ac (VHT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	20.48	20.19	PASS
44	5220	25.34	22.07	PASS
48	5240	24.36	20.92	PASS

802.11ac (VHT40)

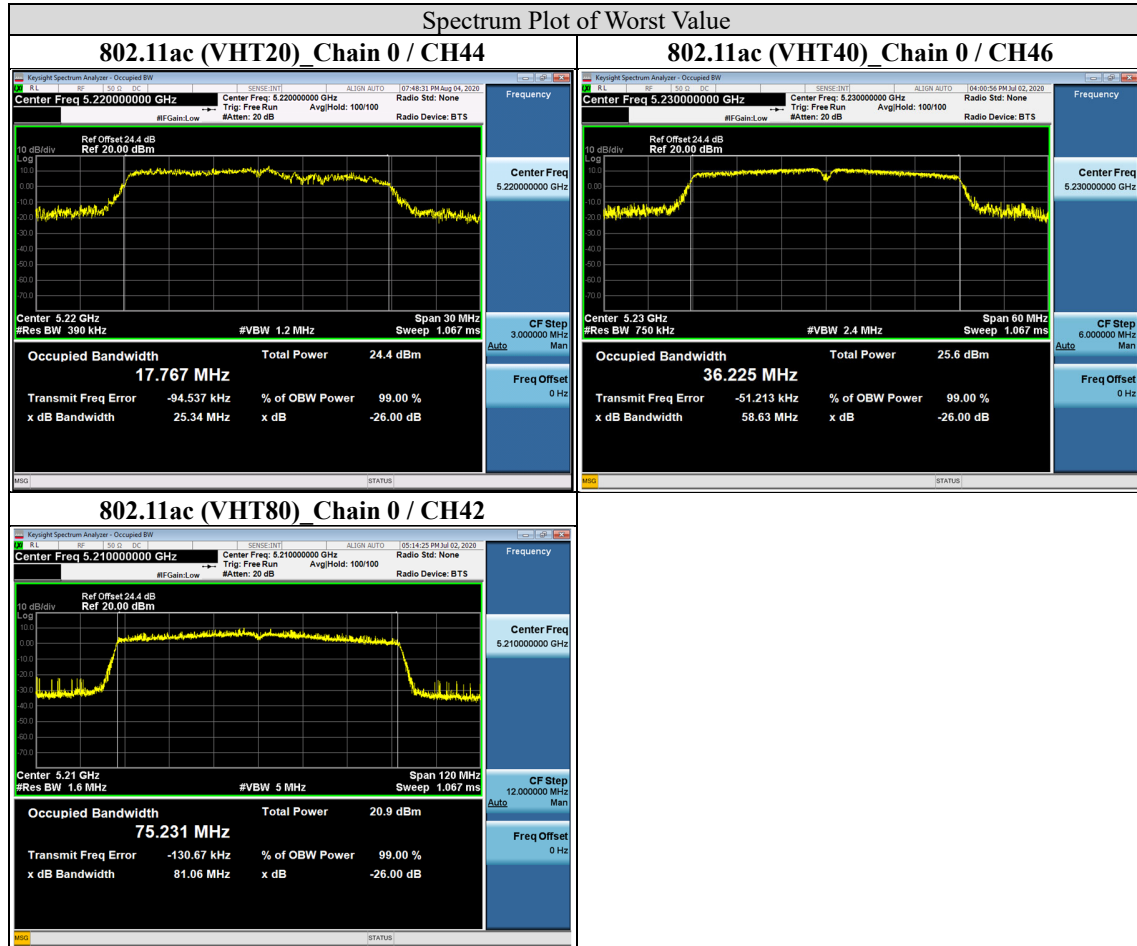
CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	40.83	40.11	PASS
46	5230	58.63	43.37	PASS

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	81.06	79.96	PASS

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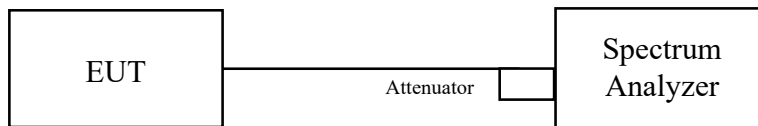


9.3. Occupied Bandwidth

Test procedure

- a. Set center frequency to the nominal EUT channel center frequency.
- b. Set span = 1.5 times to 5.0 times the OBW.
- c. Set RBW = 1% to 5% of the OBW
- d. Set VBW $\geq 3 \times$ RBW
- e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f. Use the 99% power bandwidth function of the instrument (if available).
- g. If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

Non-Beamforming Mode

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	16.643	16.492
44	5220	17.563	18.543
48	5240	17.922	18.22
149	5745	17.475	16.891
157	5785	20.102	16.943
165	5825	23.367	17.023

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	17.662	17.67
44	5220	18.058	18.028
48	5240	17.939	17.978
149	5745	17.929	18.376
157	5785	21.906	18.043
165	5825	23.417	17.789

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802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
38	5190	36	35.942
46	5230	36.372	36.218
151	5755	39.059	36.402
159	5795	40.812	36.619

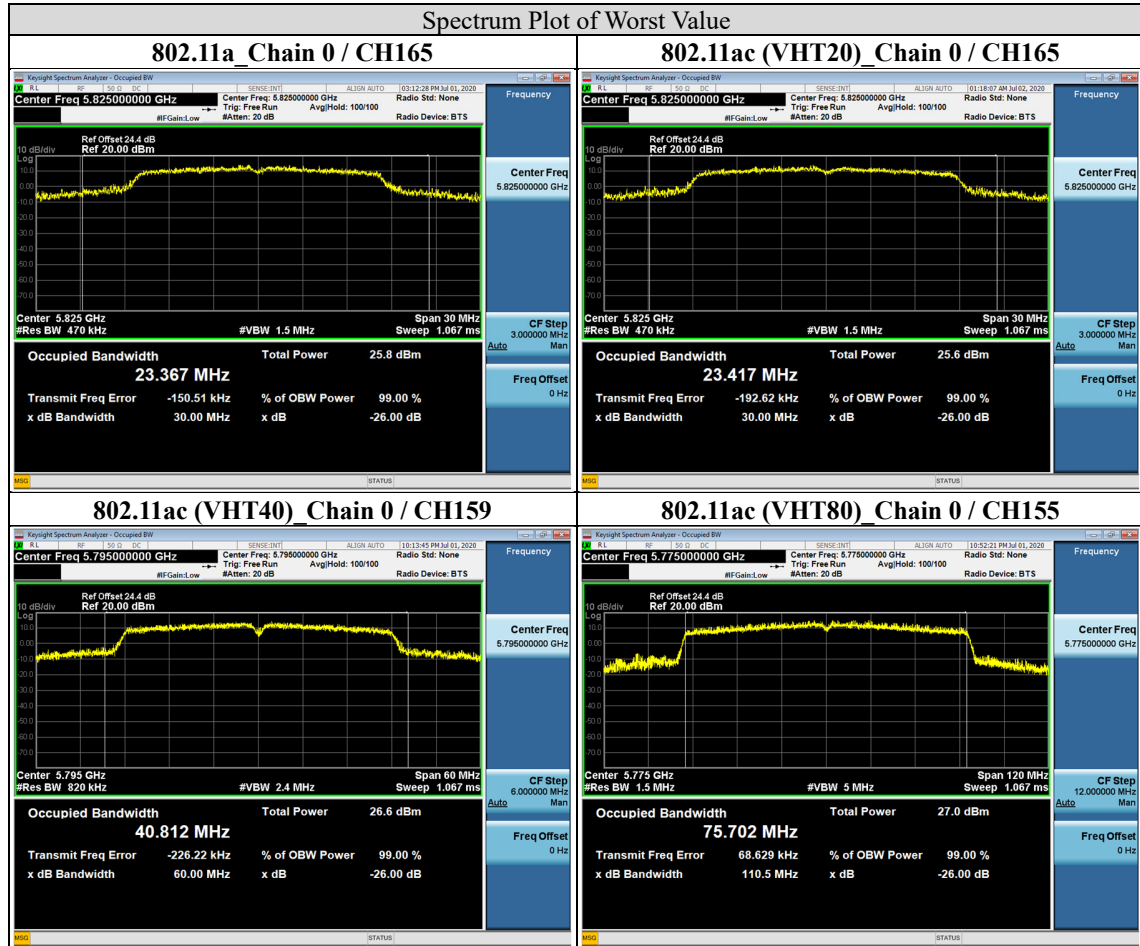
802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
42	5210	75.385	75.255
155	5775	75.702	75.304

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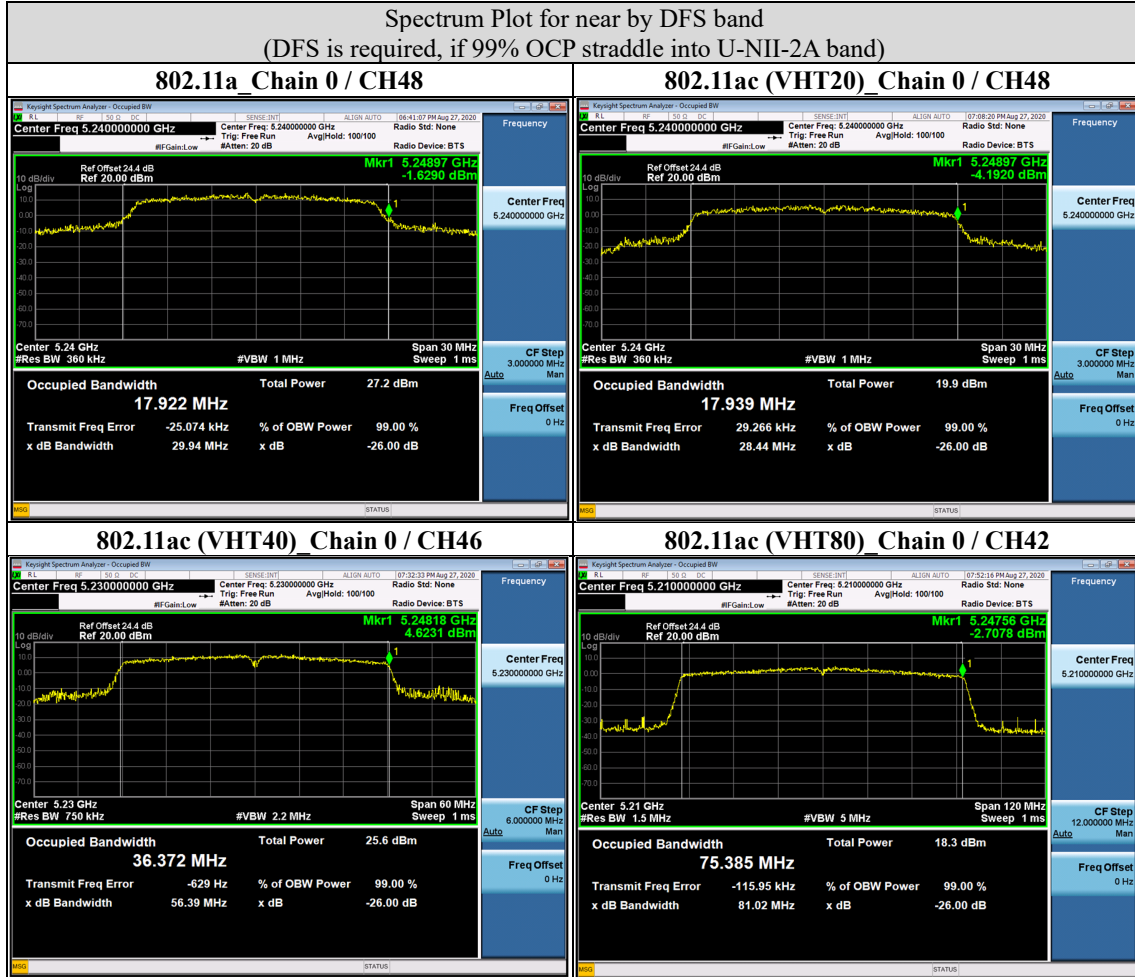
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