FCC TEST REPORT

FCC ID: 2BDJ4-UL153

On Behalf of

Shenzhen Ucalcul Technology Co., Ltd

Notebook

Model No.: UL153, GN10B, ReviBook, ECOBOOK, Sbook, VenBook, N15 Zero, UL141, UL143, UL141-M, UL154Y, UL154N, UL155-TY, UL143-TY, UL140N, UL156-3Y

Prepared for	:	Shenzhen Ucalcul Technology Co., Ltd
Address	:	401, Building A, Jiewei Industrial City Phase III, Shangmugu, Pinghu Street, Longgang District, Shenzhen

Prepared By	:	Shenzhen PSI Testing Co., Ltd.
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Report Number	:	psi2412022-C02-R04
Date of Receipt	:	December 9, 2024
Date of Test	:	December 10, 2024-January 13, 2024
Date of Report	:	January 13, 2024
Version Number	:	V0

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TEST REPORT DECLARATION

Applicant	:	Shenzhen Ucalcul Technology Co., Ltd
Address	:	401, Building A, Jiewei Industrial City Phase III, Shangmugu, Pinghu Street, Longgang District, Shenzhen
Manufacturer	:	Shenzhen Ucalcul Technology Co., Ltd
Address	:	401, Building A, Jiewei Industrial City Phase III, Shangmugu, Pinghu Street, Longgang District, Shenzhen
EUT Description	:	Notebook
	(A) Model No.	: UL153, GN10B, ReviBook, ECOBOOK, Sbook, VenBook, N15 Zero, UL141, UL143, UL141-M, UL154Y, UL154N, UL155-TY, UL143-TY, UL140N, UL156-3Y
	(B) Trademark	: N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart E

ANSI C63.10:2013

Test Result: PASS

The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart E&RSS-247 limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

Tested by (name + signature).....:	Jensen Wang Test Engineer	Jensen Wang
Approved by (name + signature)…....:	Simple Guan Project Manager	Simple Guan
Date of issue……..:	January 13, 2024	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	January 13, 2024	Initial released Issue	Jensen Wang

1 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	Section 15.203 Section 7.1.4 RSS-Gen Issue 5	PASS
AC Power Line Conducted Emission	Section 15.207 Section 7.2.4 RSS-GEN(8.8), ANSI C63.10	PASS
occupied bandwidth	Section 15.407 (e)	PASS
Peak Transmit Power	Section 15.407(a), RSS-247 5.4(2)	PASS
Power Spectral Density	Section 15.407(a), RSS-247 5.2(2)	PASS
Undesirable Emission	Section 15.407(b), RSS-247 5.5	PASS
Radiated Emission	Section 15.407(b)&15.209 Section 5.5 RSS-Gen(8.9), RSS-247(5.5), ANSI C63.10	PASS
Band Edge	15.205, RSS-247 Issue 2, ANSI C63.10	PASS
Frequency Stability	15.407(f), RSS-GEN(6.11)	PASS

Remark:

1. Pass: The EUT complies with the essential requirements in the standard.
2. Frequency Stability: The manufacturer stated in the user's manual.
3. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.

1.1 Measurement Uncertainty

Item	Uncertainty
Uncertainty for Power Line Conducted Emissions Test	2.17dB
Uncertainty for Radiation Emission test in 3m chamber (below 30MHz)	3.5dB
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	2.74dB(Polarize: V)
	2.76dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 18GHz)	4.29dB(Polarize: V)
	4.82dB(Polarize: H)
Uncertainty for Radiation Emission test in 3m chamber (18GHz to 40GHz)	4.31dB(Polarize: V)
	4.30dB(Polarize: H)
Uncertainty for radio frequency	48.24KHz
Uncertainty for conducted RF Power	0.41dB
Uncertainty for Power Spectral Density	0.39 dB
Occupied-Bandwidth	968Hz
Conducted-Spurious Emission	1.26dB

2 General Information

2.1 General Description of EUT

EUT Name	:	Notebook
Model	:	UL153, GN10B, ReviBook, ECOBOOK, Sbook, VenBook, N15 Zero, UL141, UL143, UL141-M, UL154Y, UL154N, UL155-TY, UL143-TY, UL140N, UL156-3Y
Diff	:	There is no difference except the name of the model. All tests are made with the UL153 model.
Test Voltage	:	DC 12V from adapter, DC 7.6V from battery.

Radio Technology	:	5G WIFI
Operation frequency	:	802.11a/802.11ac20/802.11n(HT20): 5180-5240MHz, 5745-5825MHz 802.11ac40/802.11n(HT40): 5190-5230MHz, 5755-5795MHz 802.11ac80: 5210MHz, 5775MHz
Channel separation	:	20MHz for 802.11a/802.11ac20/802.11n(HT20) 40MHz for 802.11ac40/802.11n(HT40) 80MHz for 802.11ac80
Modulation technology:	:	IEEE 802.11n: OFDM (64QAM,16QAM,QPSK,BPSK) IEEE 802.11a: OFDM (64QAM,16QAM,QPSK,BPSK) IEEE 802.11ac: OFDM (64QAM,16QAM, 256QAM,QPSK,BPSK)
Antenna Type	:	Internal antenna, Maximum Gain is 1.32dBi.
PMN	:	N/A
HVIN	:	N/A
Software version	:	N/A
Hardware version/FVIN	:	N/A
Note	:	Antenna information is provided by applicant. Testing lab is not responsible for the accuracy of the information.

2.2 Test mode

Transmitting mode Keep the EUT in transmitting with modulation.
EUT was test with 99% duty cycle at its maximum power control level.

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

2.3 Test Facility

Shenzhen PSI Testing Co., Ltd.

1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 13, 2023 File on Federal Communication Commission
Registration Number: 916281

2.4 Description of Support Units

Accessories 1	:	POWER SUPPLY
Manufacturer	:	Dongguan Guangshu Electrical Technology Co.,LTD
Model	:	P36W-120200U
Rating	:	Input: 100-240V~50/60Hz 1.5A Output: DC 12.0V/2.0A

2.5 Deviation from Standards

None.

2.6 Abnormalities from Standard Conditions

None.

2.7 Other Information Requested by the Customer

None.

2.8 Additional instructions

Software (Used for test) from client

Channel	Power level
Lowest	Default
Middle	Default
Highest	Default

3 Test Instruments list

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Last Cal.	Cal. Interval
1.	9*6*6 anechoic chamber	SKET	9*6*6	N/A	/	2022.12.20	3 Year
2.	Test Receiver	Rohde&Schwarz	ESCI 7	101032/003	4.42 SP3	2024.12.18	1 Year
3.	L.I.S.N.#1	Rohde&Schwarz	ENV216	102282	/	2024.12.18	1 Year
4.	L.I.S.N.#2	RFT	NNB111	13835240	/	2024.12.18	1 Year
5.	Loop Antenna	Schwarz beck	FMZB 1519B	00128	/	2023.04.03	2 Year
6.	Bilog Antenna	Schwarz beck	VULB 9168	01448	/	2024.12.25	2 Year
7.	Spectrum Analyzer	Rohde&Schwarz	FSV-40N	101648	3.70	2024.12.18	1 Year
8.	Horn Antenna	Schwarz beck	BBHA 9120 D	02706	/	2024.12.25	2 Year
9.	Amplifier	SKET	LAPA_01G18G-45dB	SK2022032901	/	2024.12.18	1 Year
10.	Horn Antenna	Schwarz beck	BBHA 9170	00946	/	2024.12.24	2 Year
11.	Amplifier	SKET	LNPA_0118G-45	SK2020010801	/	2024.12.18	1 Year
12	RF Power Probe	Rohde&Schwarz	NRP-Z11	1138.3004.02-1111533-Fz	/	2024.12.18	1 Year
13	RF Sensor Unit	Tachoy	TR1029-2	20220428P008	/	2024.12.18	1 Year
14	Spectrum Analyzer	Agilent	N9020A	MY51281067	A.14.03	2024.12.18	1 Year
15	Temp. & Humid Chamber	Auchno	9606	/	/	2024.12.18	1 Year
16	Regulated DC Power Supply	Xinouhua	ADC120V10A	202211251638		2024.12.18	1 Year

For Test Software Information

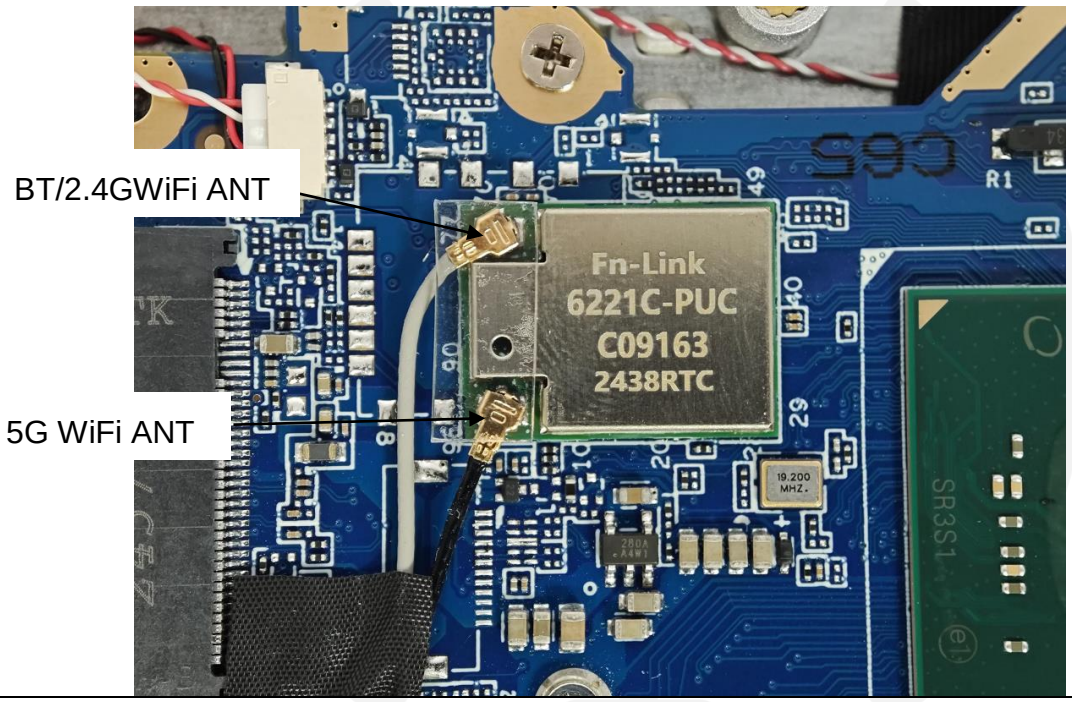
Item	Software Name	Manufacturer	Version
RE	EZ_EMC	Farad	PSI-3A1
CE	EZ_EMC	Farad	PSI-3A1
RF	RTS	TACHOY	V1.0.0

4 Test results and Measurement Data

4.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
E.U.T Antenna:	

Internal antenna, Maximum Gain is 1.32dBi, for 5180-5240MHz, 5745-5845MHz

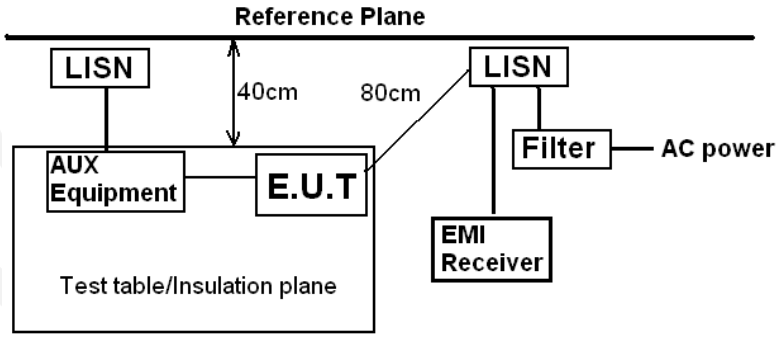


4.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207, RSS-Gen §8.8
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

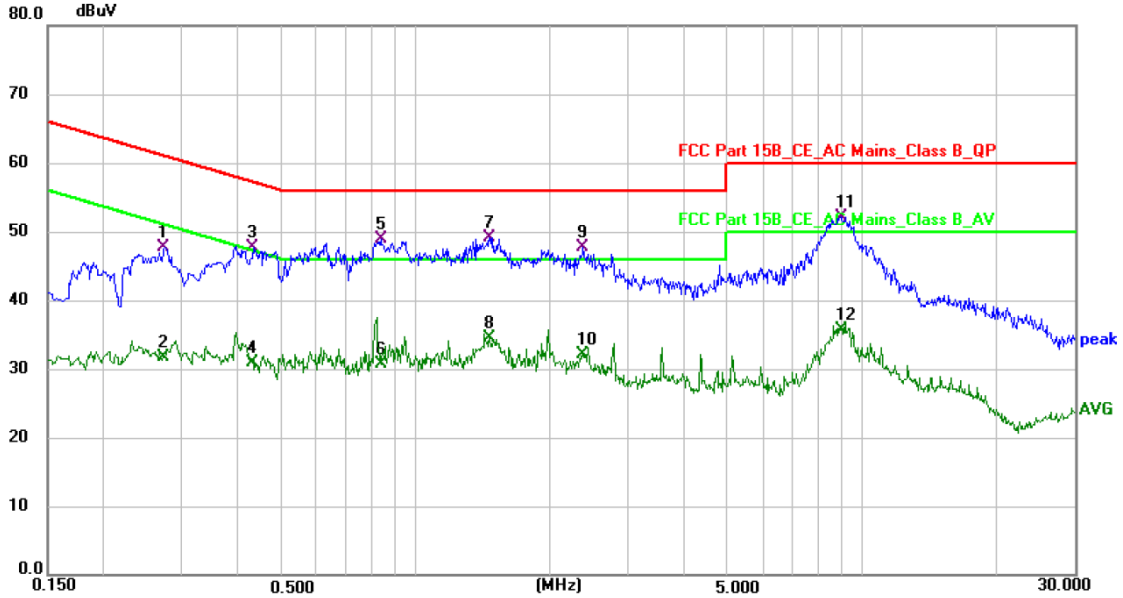
* Decreases with the logarithm of the frequency.

Test procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Measurement Data

An initial pre-scan was performed on the line and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

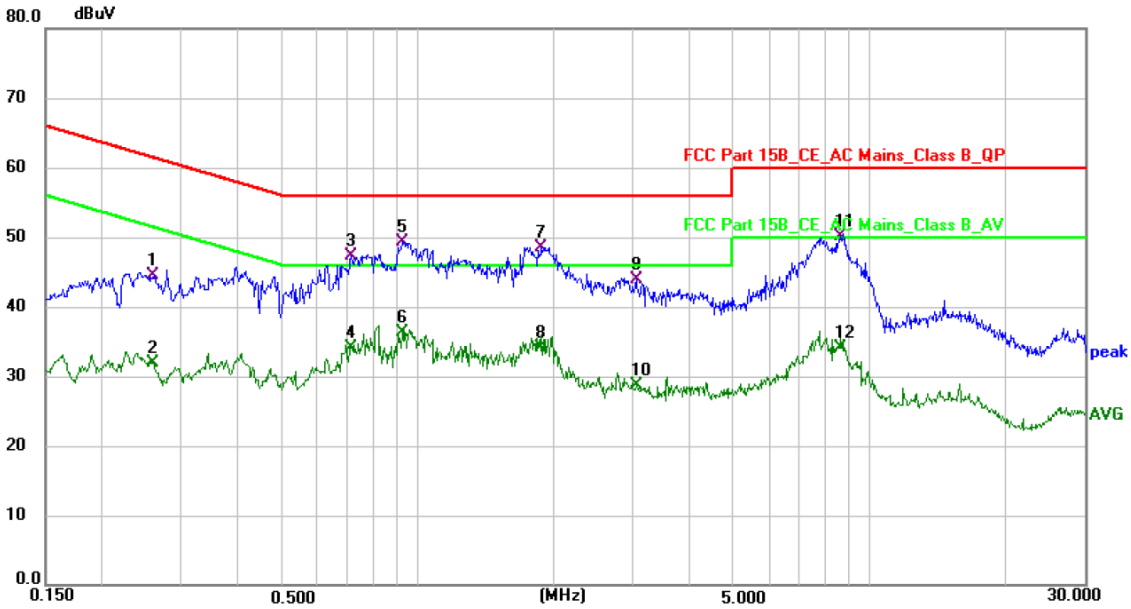
Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2740	37.81	9.98	47.79	61.00	-13.21	QP
2	0.2740	21.75	9.98	31.73	51.00	-19.27	AVG
3	0.4328	38.00	9.71	47.71	57.20	-9.49	QP
4	0.4328	21.13	9.71	30.84	47.20	-16.36	AVG
5	0.8380	39.42	9.42	48.84	56.00	-7.16	QP
6	0.8380	21.19	9.42	30.61	46.00	-15.39	AVG
7 *	1.4660	39.80	9.40	49.20	56.00	-6.80	QP
8	1.4660	25.08	9.40	34.48	46.00	-11.52	AVG
9	2.3820	38.26	9.39	47.65	56.00	-8.35	QP
10	2.3820	22.74	9.39	32.13	46.00	-13.87	AVG
11	8.9660	42.51	9.58	52.09	60.00	-7.91	QP
12	8.9660	26.21	9.58	35.79	50.00	-14.21	AVG

Note: *:Maximum data x:Over limit !:over margin Level = Reading + Factor Margin = Level - Limit

Neutral:

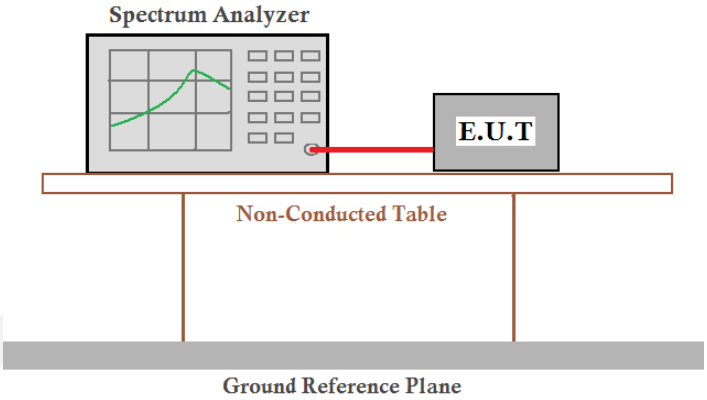


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2600	34.61	9.89	44.50	61.43	-16.93	QP
2	0.2600	21.98	9.89	31.87	51.43	-19.56	AVG
3	0.7140	37.52	9.77	47.29	56.00	-8.71	QP
4	0.7140	24.35	9.77	34.12	46.00	-11.88	AVG
5 *	0.9260	39.68	9.58	49.26	56.00	-6.74	QP
6	0.9260	26.67	9.58	36.25	46.00	-9.75	AVG
7	1.8780	39.25	9.29	48.54	56.00	-7.46	QP
8	1.8780	24.83	9.29	34.12	46.00	-11.88	AVG
9	3.0540	34.32	9.56	43.88	56.00	-12.12	QP
10	3.0540	19.23	9.56	28.79	46.00	-17.21	AVG
11	8.6140	40.77	9.43	50.20	60.00	-9.80	QP
12	8.6140	24.74	9.43	34.17	50.00	-15.83	AVG

Note: *:Maximum data x:Over limit !:over margin Level = Reading + Factor Margin = Level - Limit

All modes and channels have been tested and only the A 5180MHz mode with the worst data is listed.

4.3 Emission Bandwidth and 99% Occupied Bandwidth

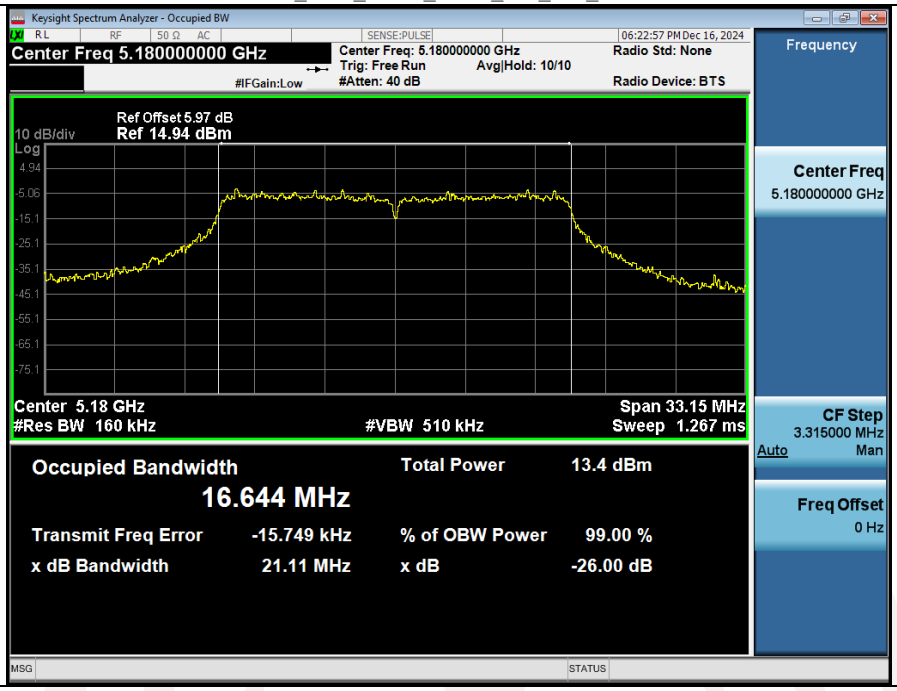
Test Requirement:	FCC Part15 E Section 15.407, RSS-Gen §6.7; RSS-247 §6.2
Test Method:	KDB 789033 D02 General UNII Test Procedures New Rules v02r01
Limit:	N/A
Test setup:	
Test procedure:	According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 3.0 for details
Test mode:	Refer to section 2.2 for details
Test results:	Pass

Measurement Data:

Band 1 (5150-5250 MHz):

Condition	Antenna	Modulation	Frequency(MHz)	-26dB_Emission_Bandwidth(MHz)	Occupied Bandwidth(MHz)
NVNT	ANT1	802.11a	5180.00	22.44	16.64
NVNT	ANT1	802.11a	5200.00	22.24	16.66
NVNT	ANT1	802.11a	5240.00	22.85	16.65
NVNT	ANT1	802.11n(HT20)	5180.00	22.58	17.82
NVNT	ANT1	802.11n(HT20)	5200.00	23.15	17.81
NVNT	ANT1	802.11n(HT20)	5240.00	22.69	17.85
NVNT	ANT1	802.11ac(VHT20)	5180.00	23.11	17.82
NVNT	ANT1	802.11ac(VHT20)	5200.00	23.57	17.83
NVNT	ANT1	802.11ac(VHT20)	5240.00	23.02	17.82
NVNT	ANT1	802.11n(HT40)	5190.00	44.39	36.58
NVNT	ANT1	802.11n(HT40)	5230.00	44.22	36.45
NVNT	ANT1	802.11ac(VHT40)	5190.00	44.59	36.59
NVNT	ANT1	802.11ac(VHT40)	5230.00	43.18	36.51
NVNT	ANT1	802.11ac(VHT80)	5210.00	83.58	76.04

99%_OCB_NVNT_ANT1_802_11a_5180



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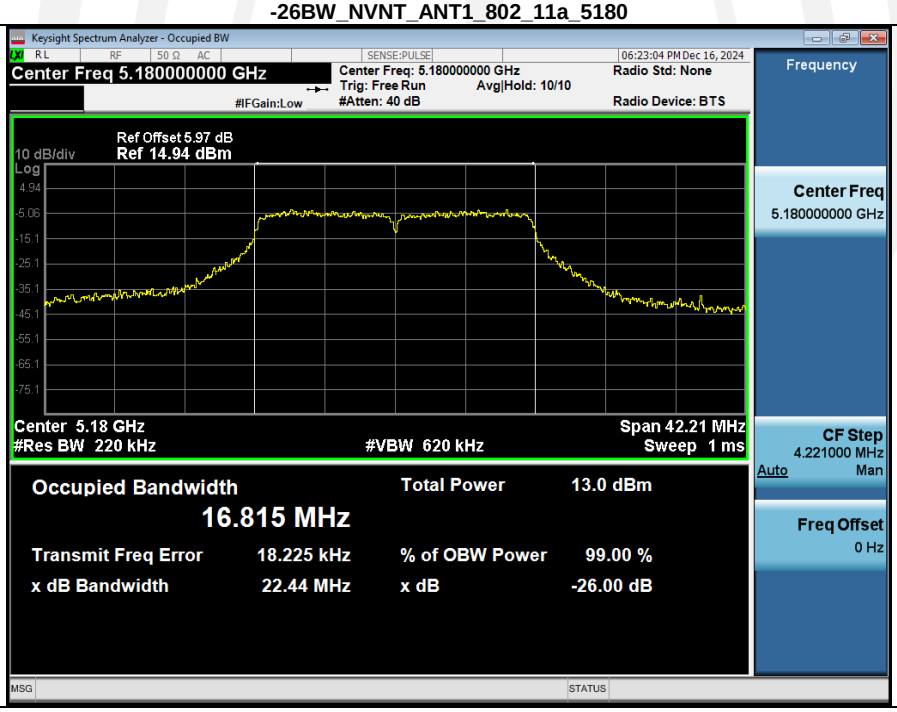

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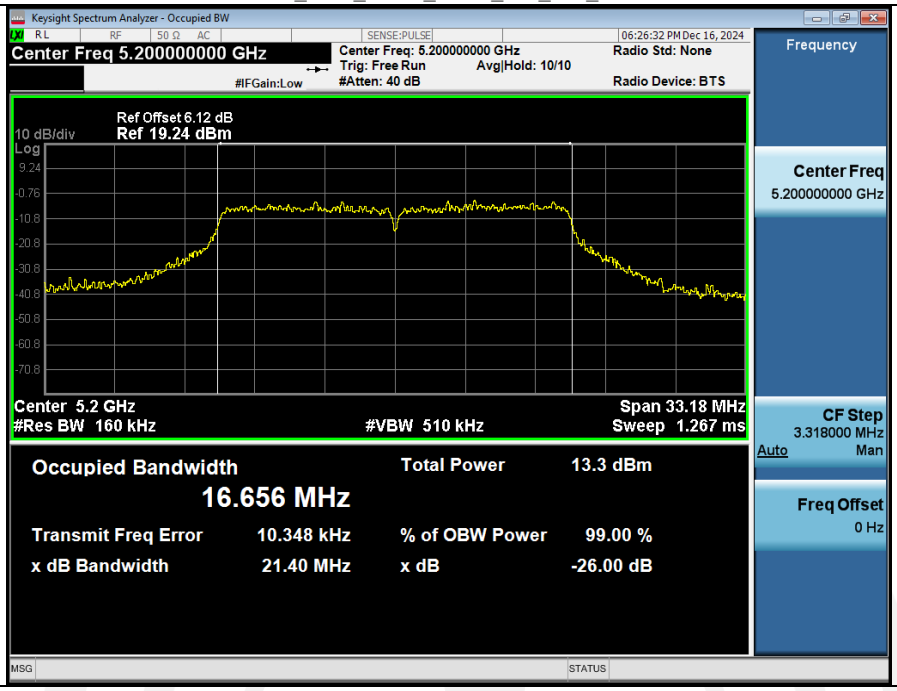

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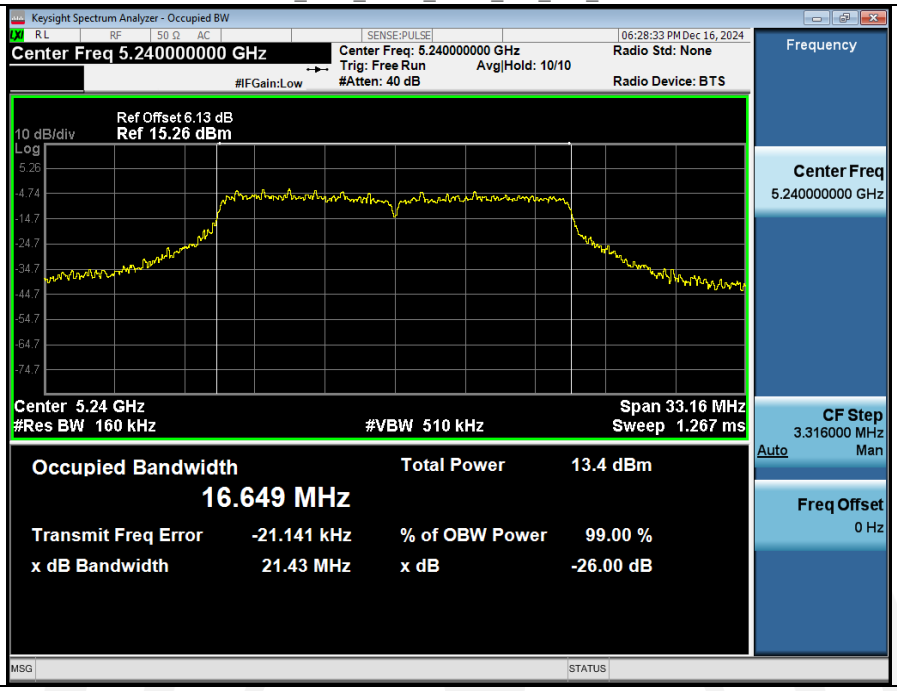

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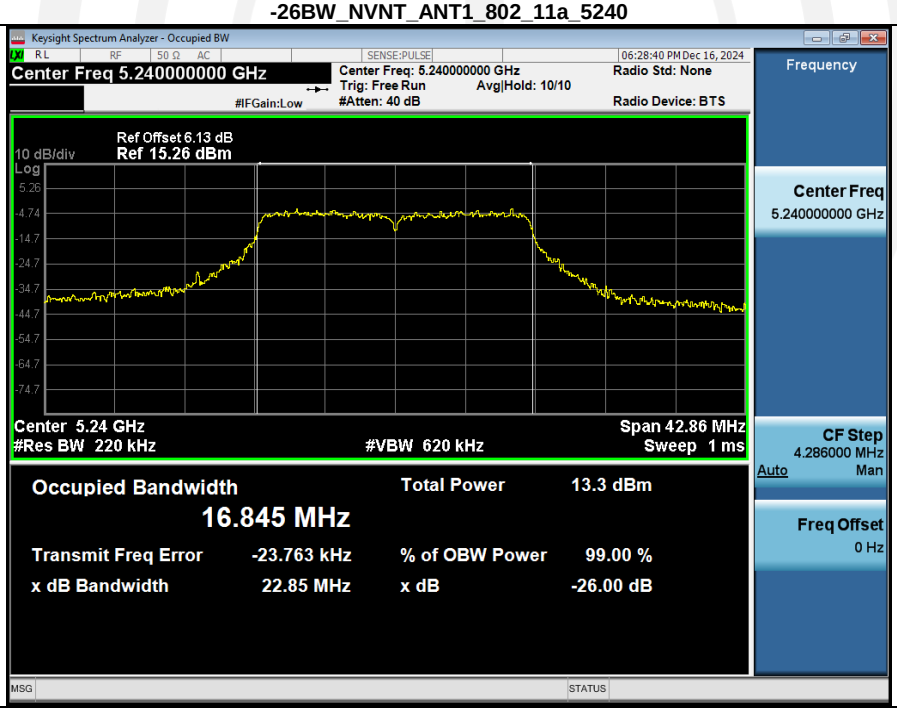

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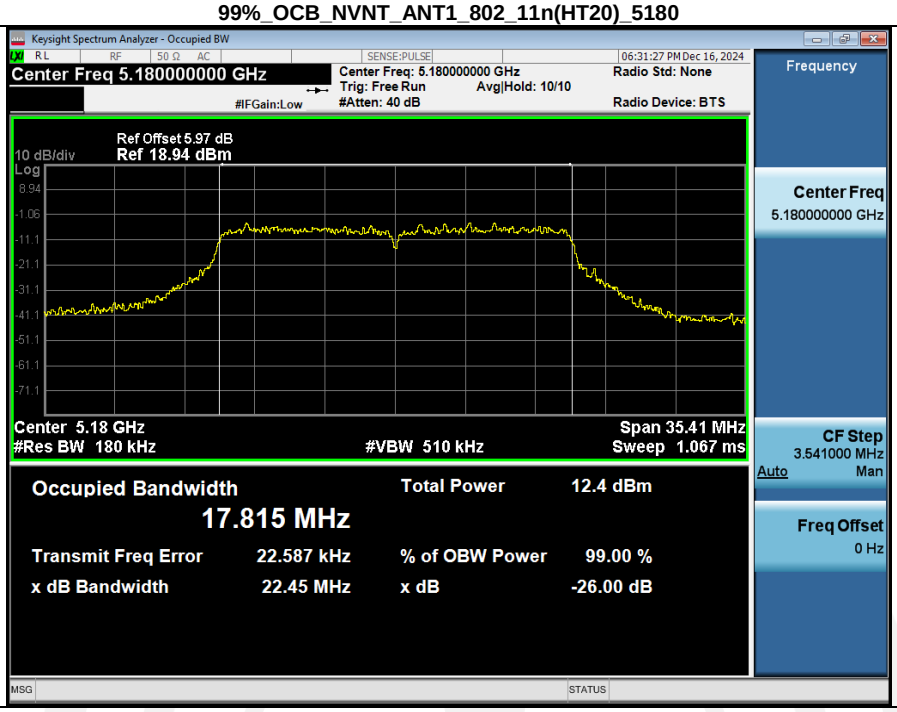

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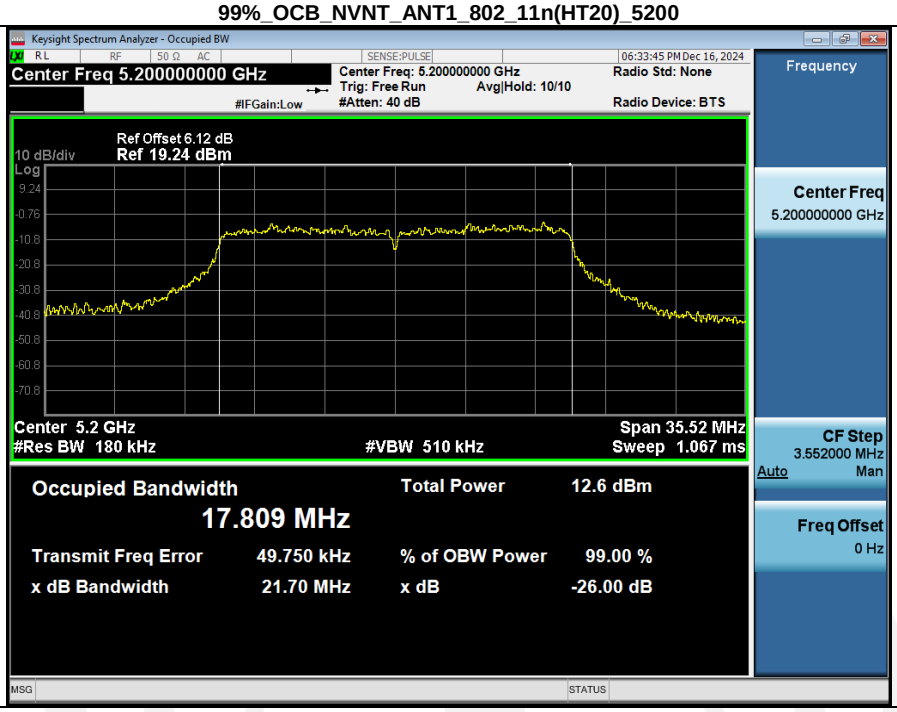
99%_OCB_NVNT_ANT1_802_11n(HT20)_5200



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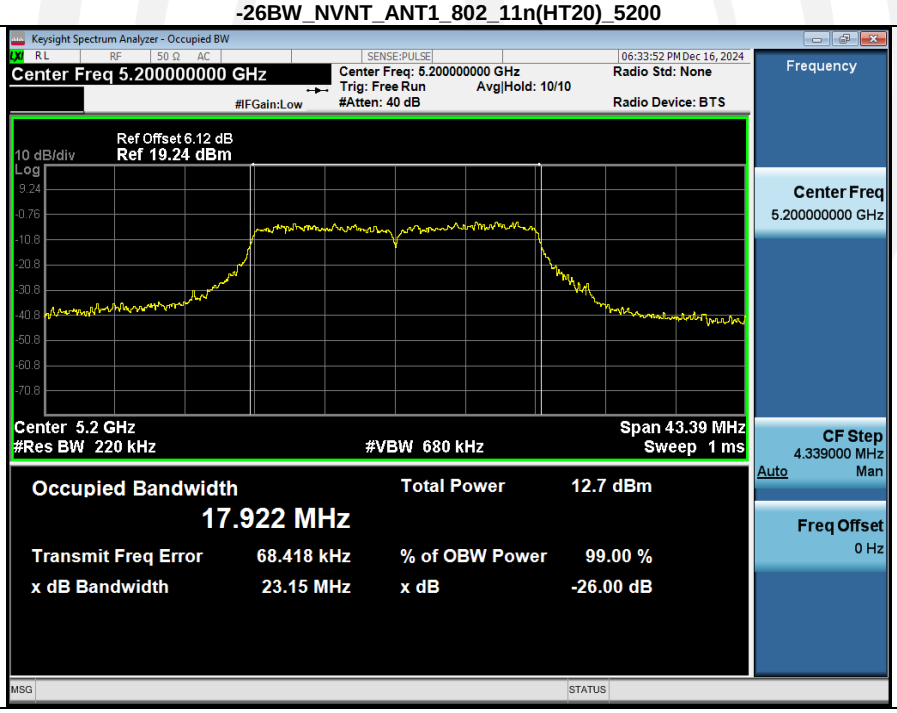

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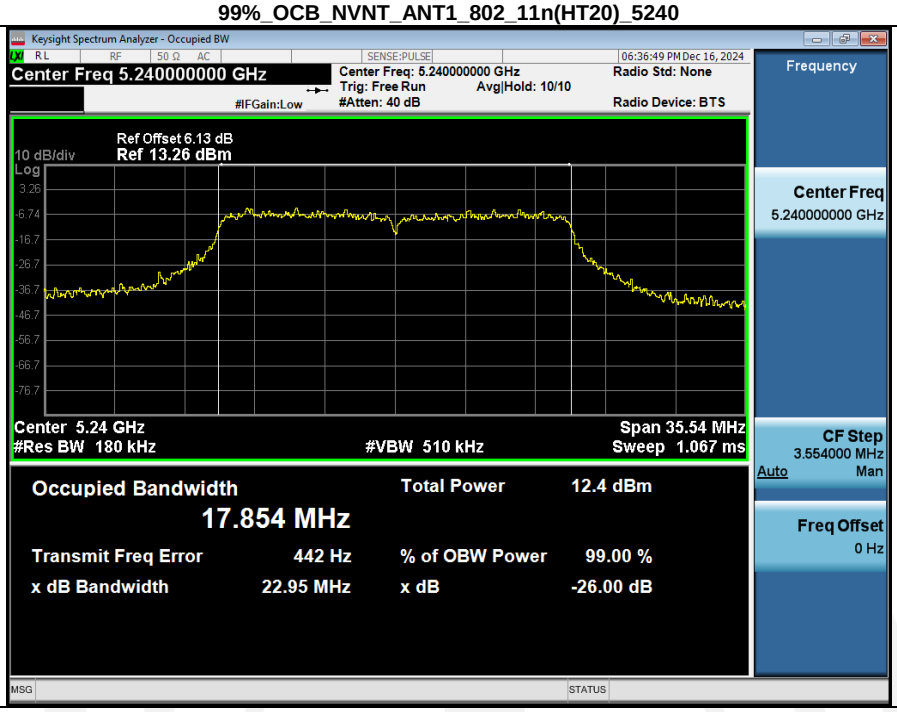

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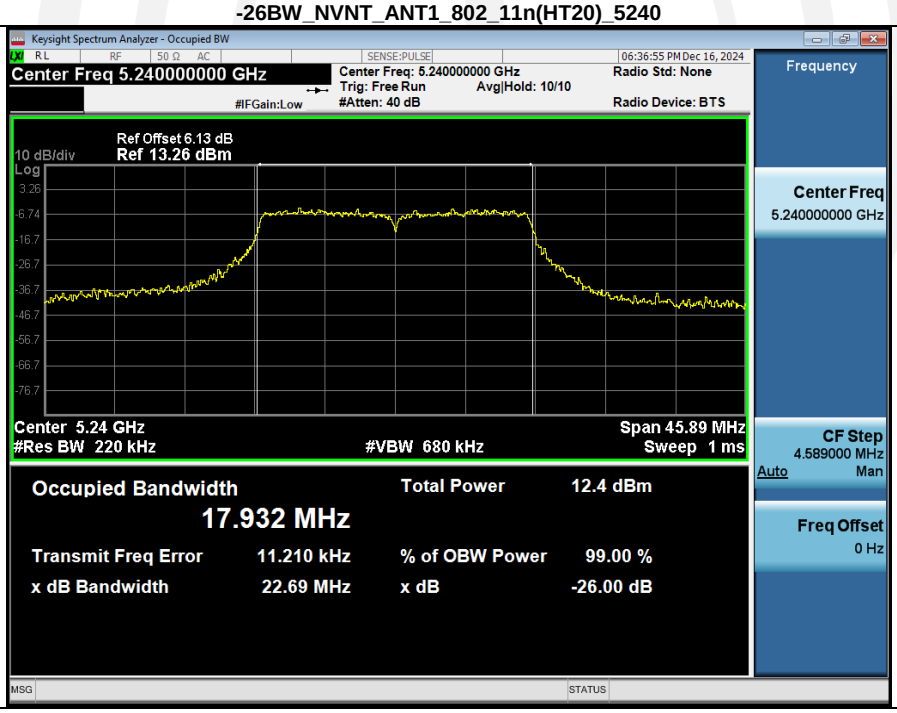

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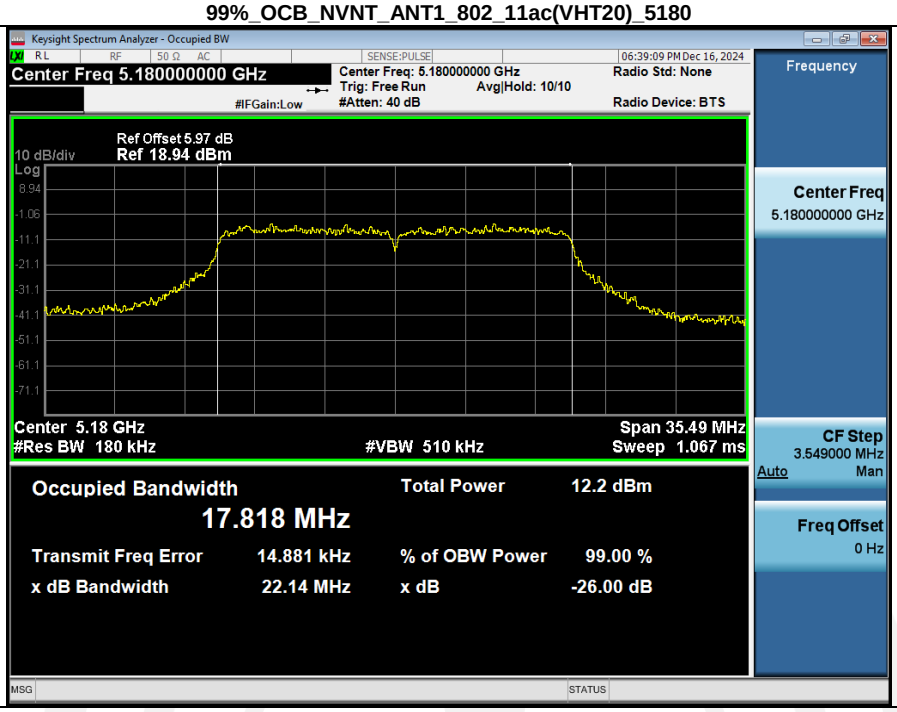

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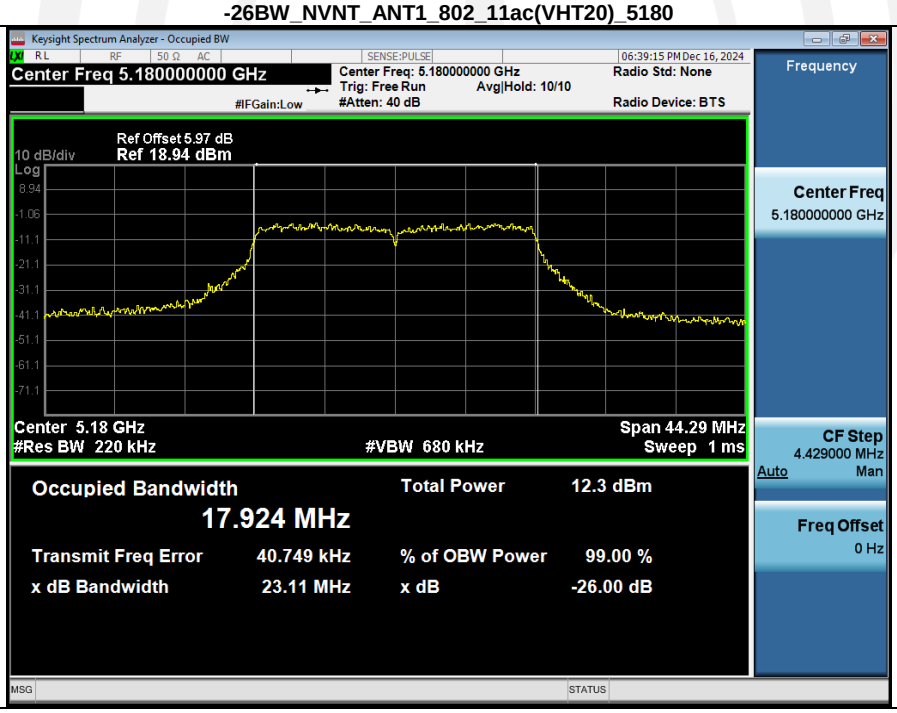
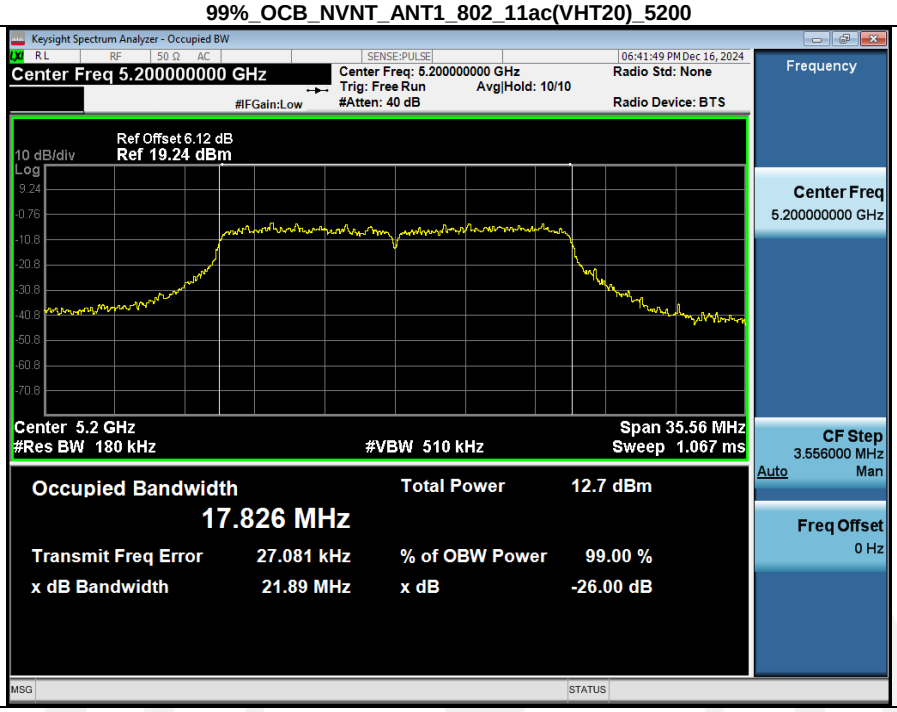


99%_OCB_NVNT_ANT1_802_11ac(VHT20)_5200



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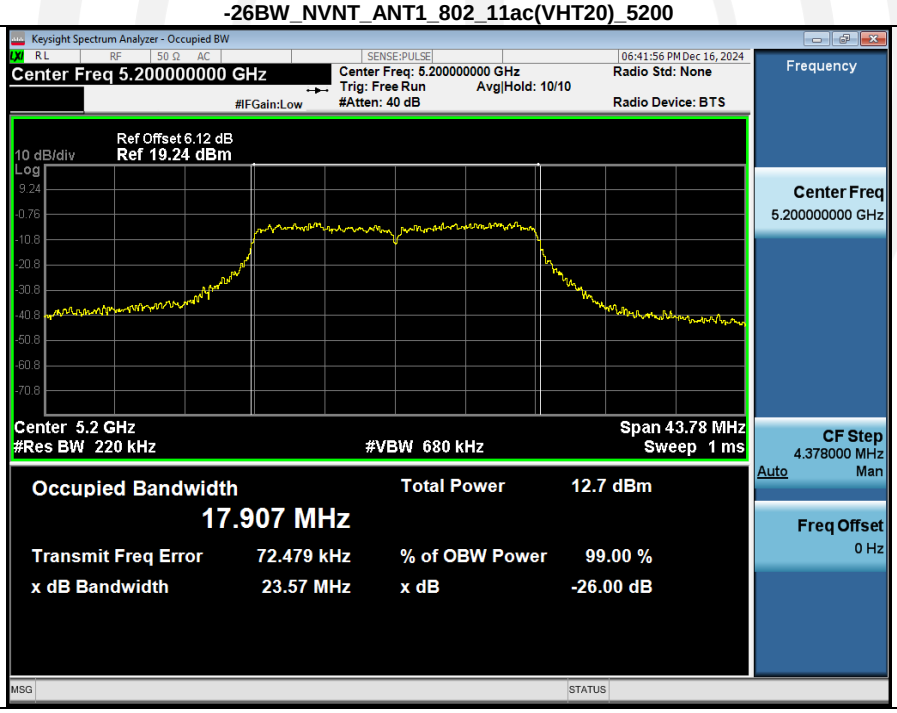

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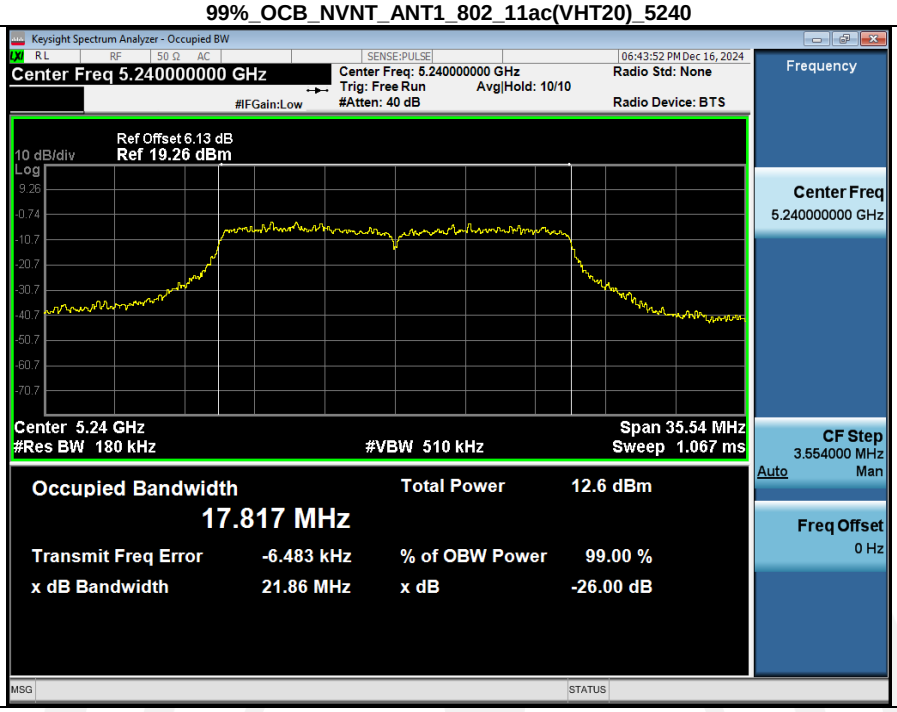

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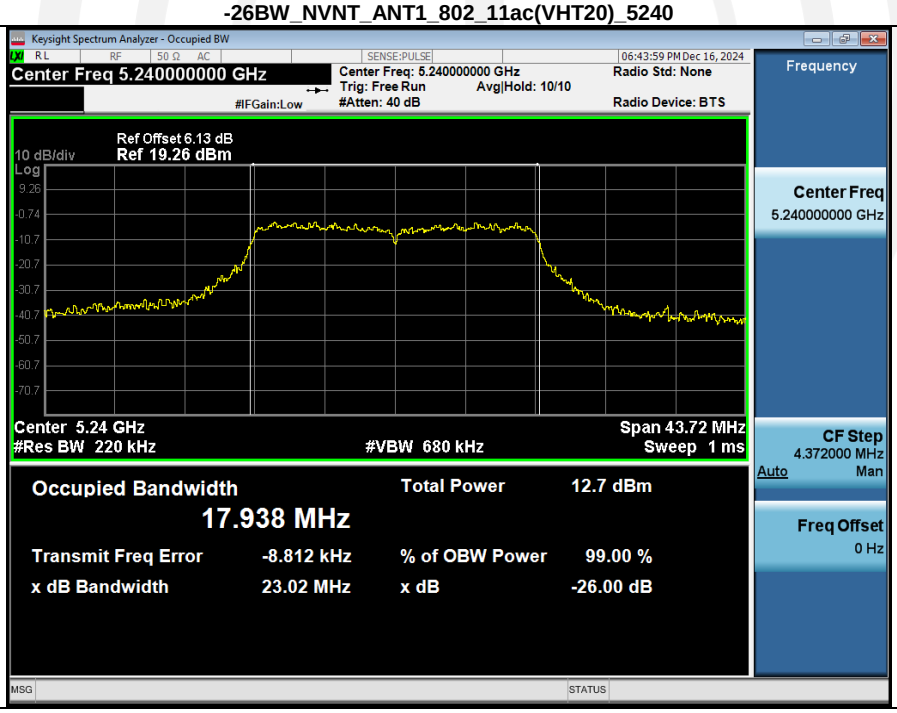

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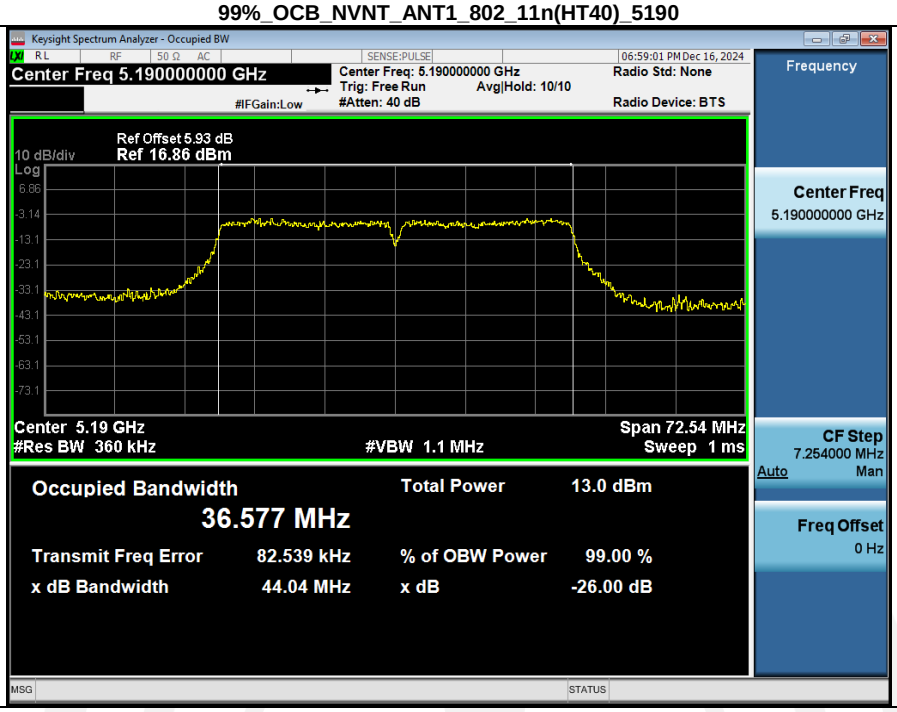

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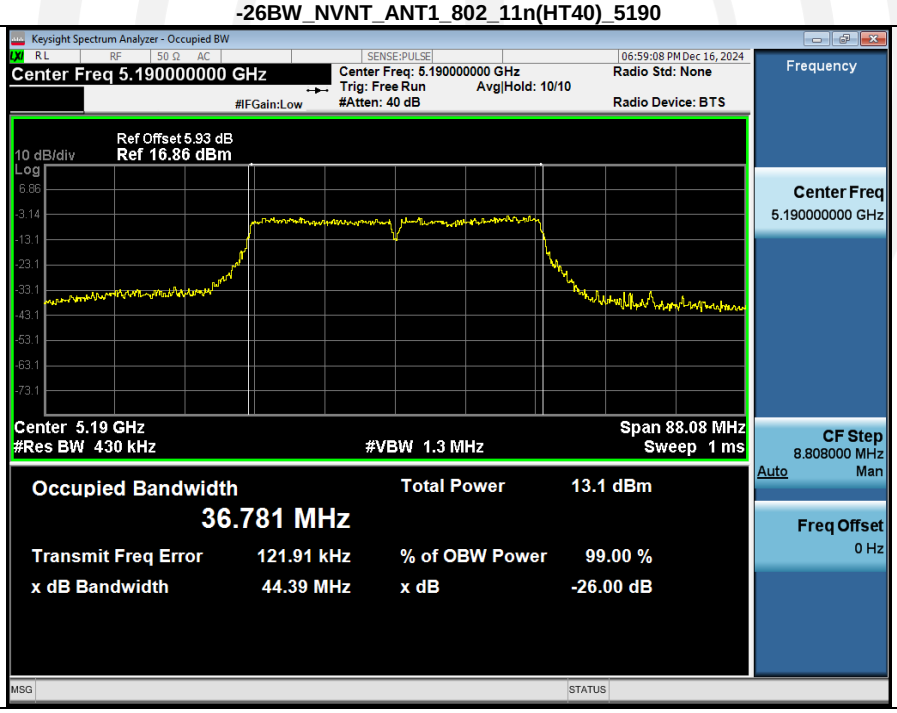

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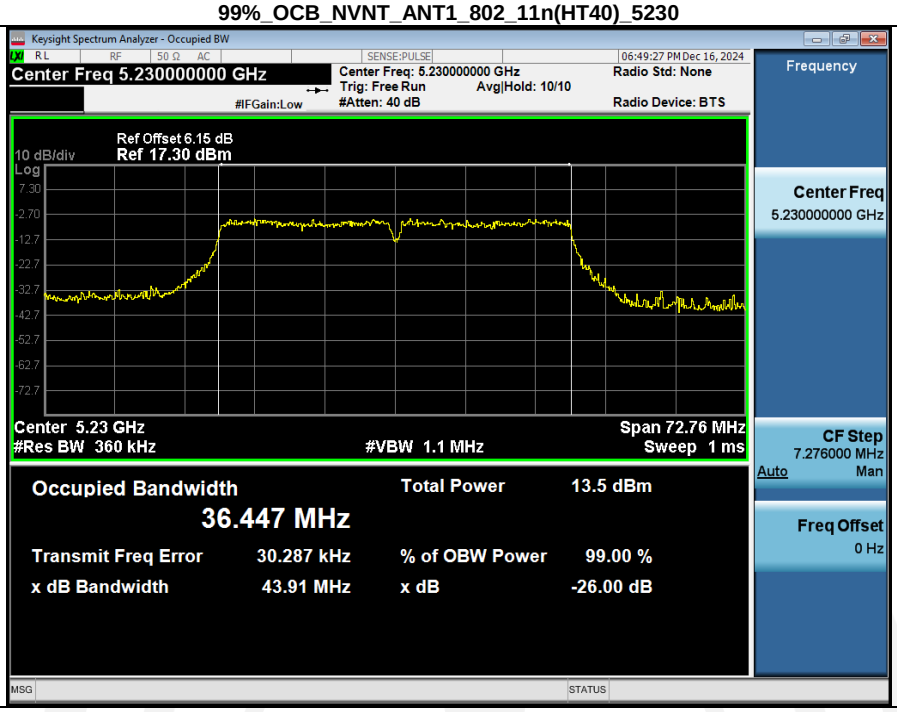

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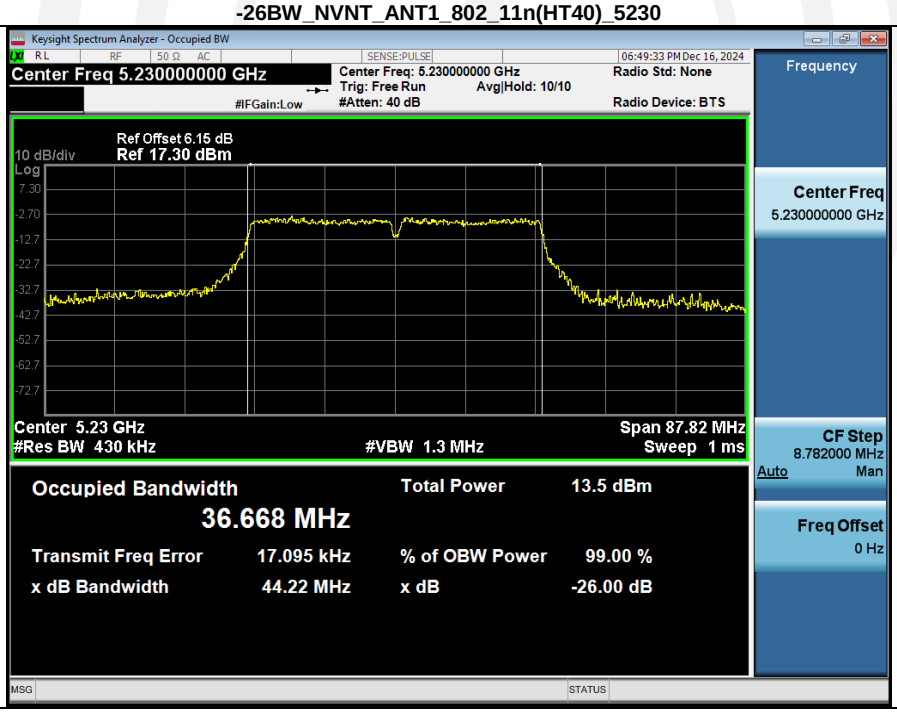

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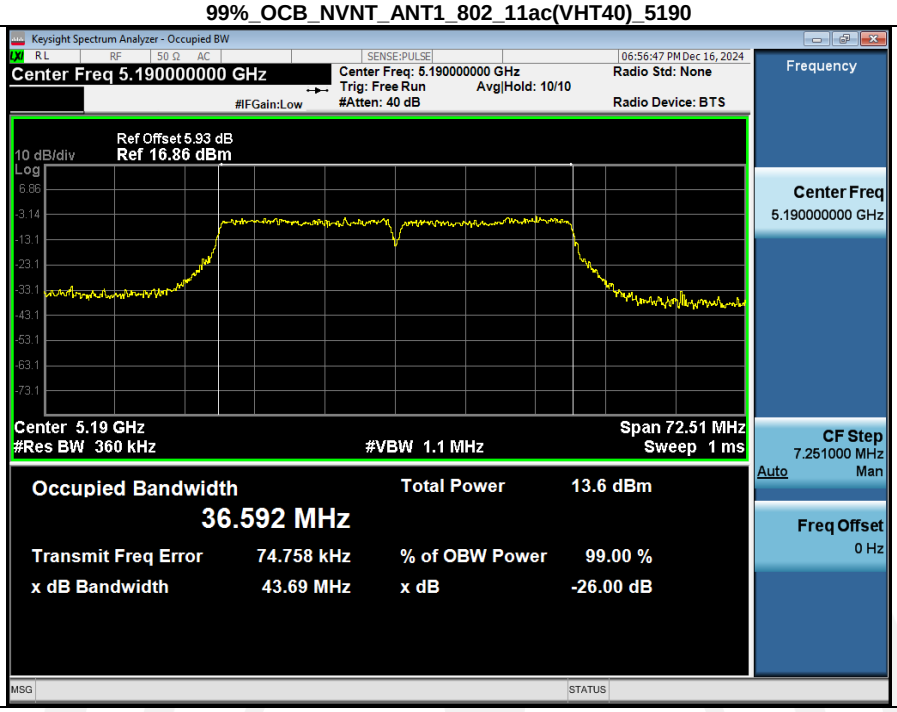

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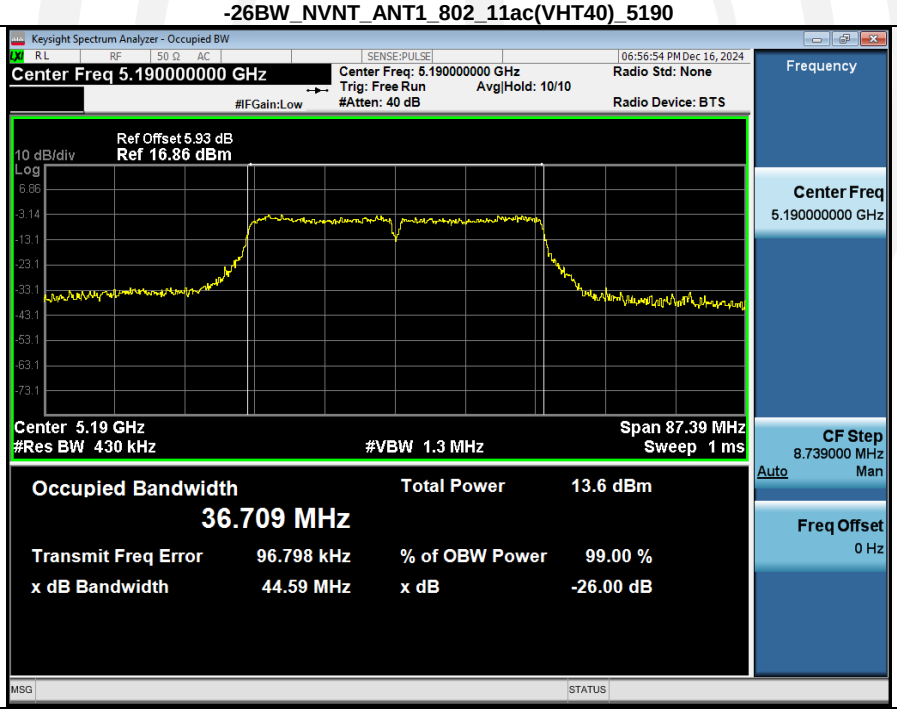

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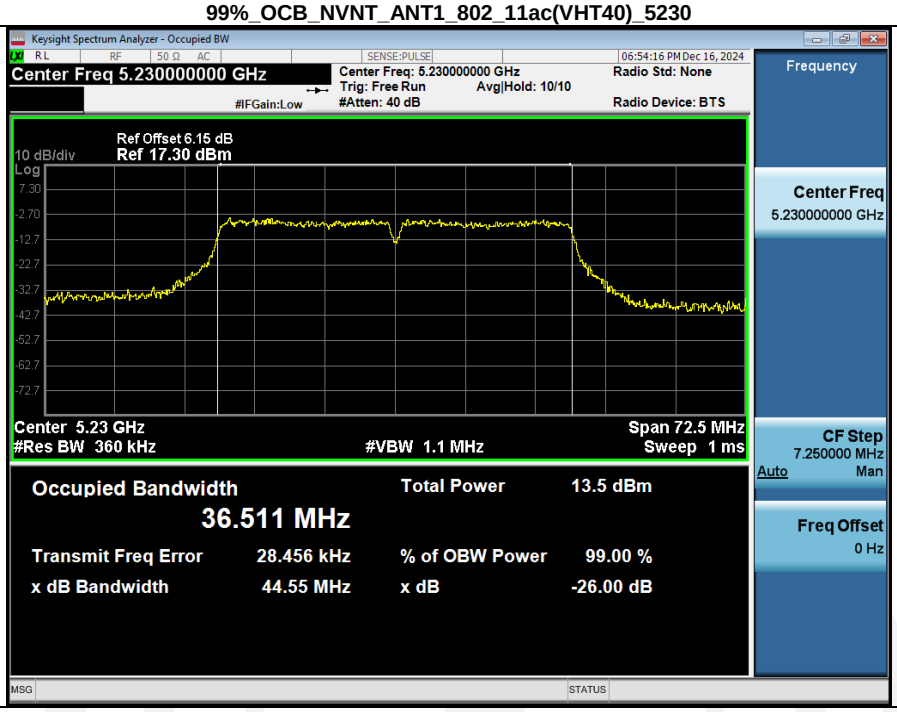

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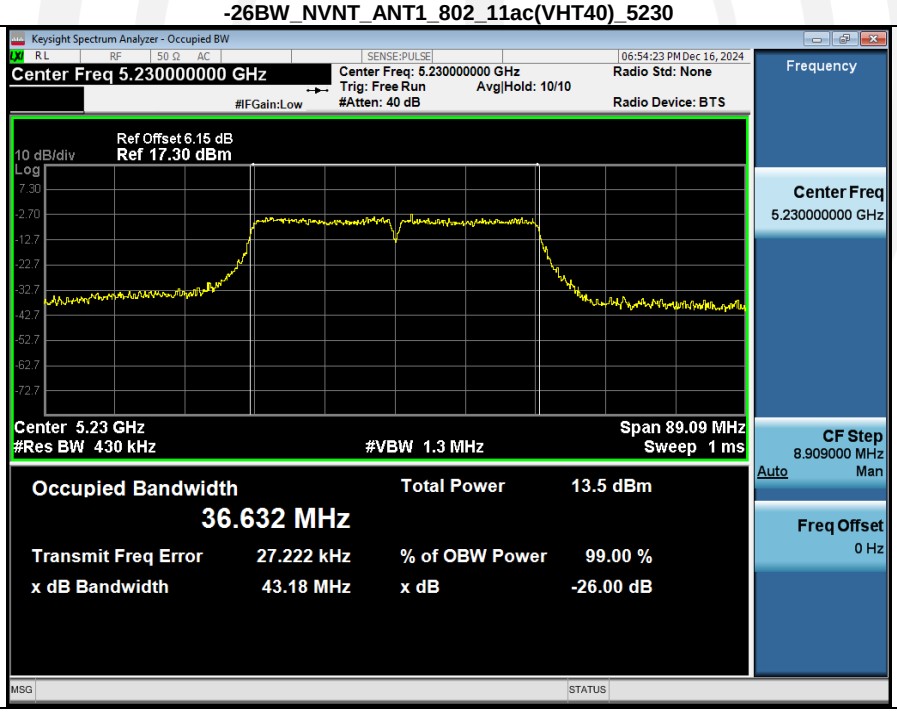

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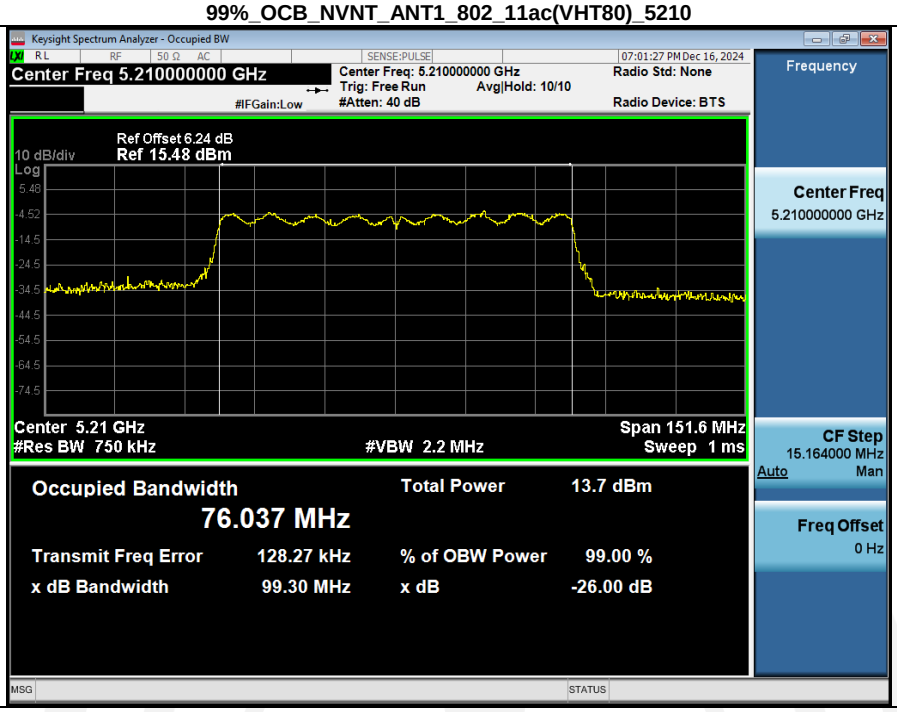
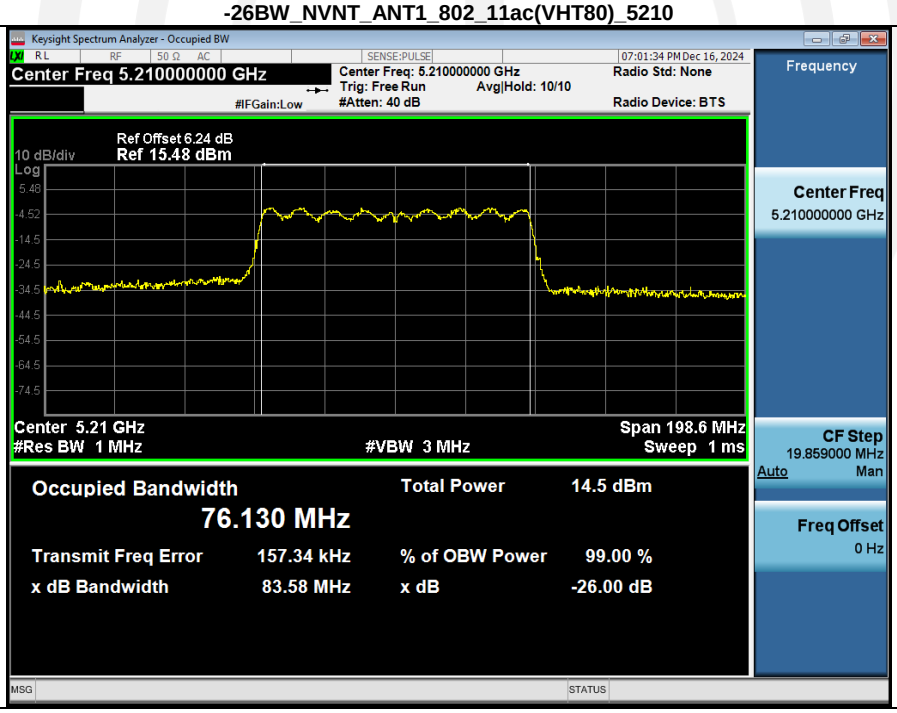


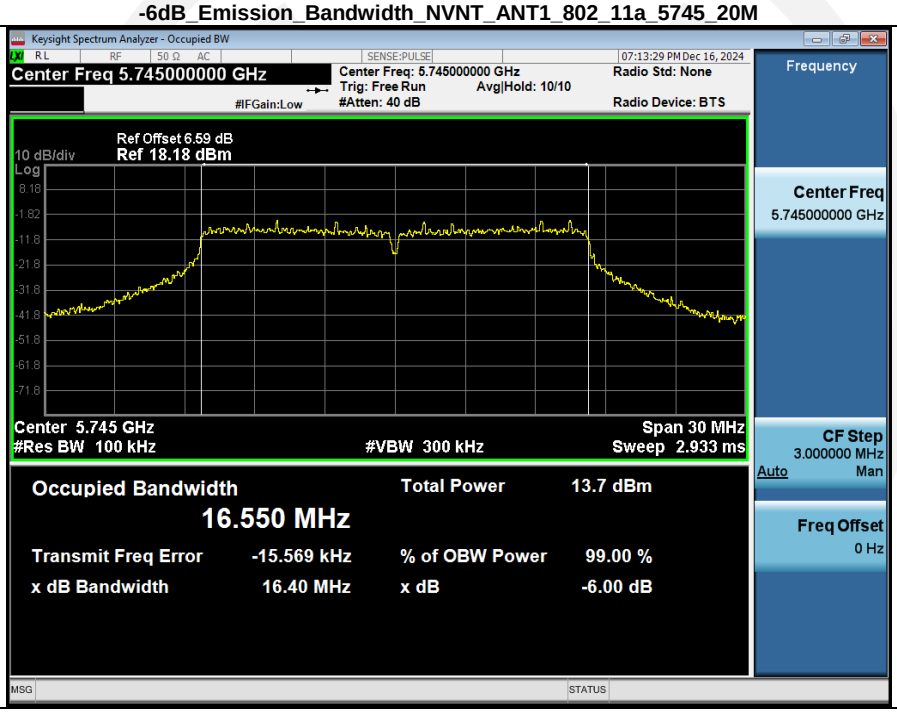
-26BW_NVNT_ANT1_802_11ac(VHT80)_5210



Band 4 (5725-5850 MHz):

Condition	Antenna	Mode	Frequency(MHz)	-6dB_Emission_Bandwidth(MHz)	Limit(MHz)	Result
NVNT	ANT1	802.11a	5745.00	16.399	0.500	Pass
NVNT	ANT1	802.11a	5785.00	16.350	0.500	Pass
NVNT	ANT1	802.11a	5825.00	16.391	0.500	Pass
NVNT	ANT1	802.11n(HT20)	5745.00	17.595	0.500	Pass
NVNT	ANT1	802.11n(HT20)	5785.00	17.338	0.500	Pass
NVNT	ANT1	802.11n(HT20)	5825.00	17.598	0.500	Pass
NVNT	ANT1	802.11ac(VHT20)	5745.00	17.624	0.500	Pass
NVNT	ANT1	802.11ac(VHT20)	5785.00	17.593	0.500	Pass
NVNT	ANT1	802.11ac(VHT20)	5825.00	17.590	0.500	Pass
NVNT	ANT1	802.11n(HT40)	5755.00	36.335	0.500	Pass
NVNT	ANT1	802.11n(HT40)	5795.00	36.109	0.500	Pass
NVNT	ANT1	802.11ac(VHT40)	5755.00	36.341	0.500	Pass
NVNT	ANT1	802.11ac(VHT40)	5795.00	35.985	0.500	Pass
NVNT	ANT1	802.11ac(VHT80)	5775.00	75.613	0.500	Pass

-6dB_Emission_Bandwidth_NVNT_ANT1_802_11a_5745_20M



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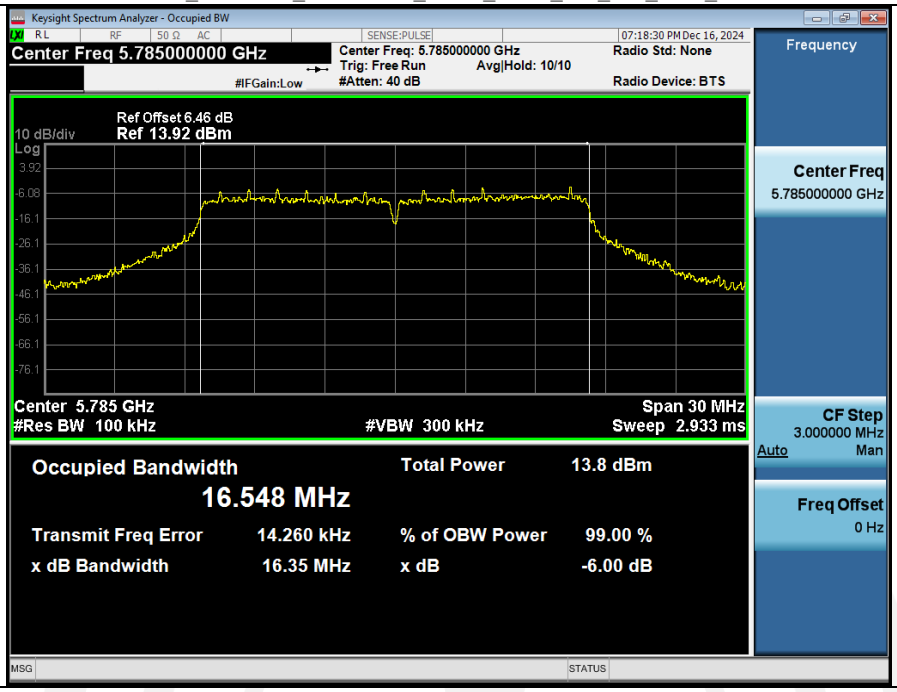

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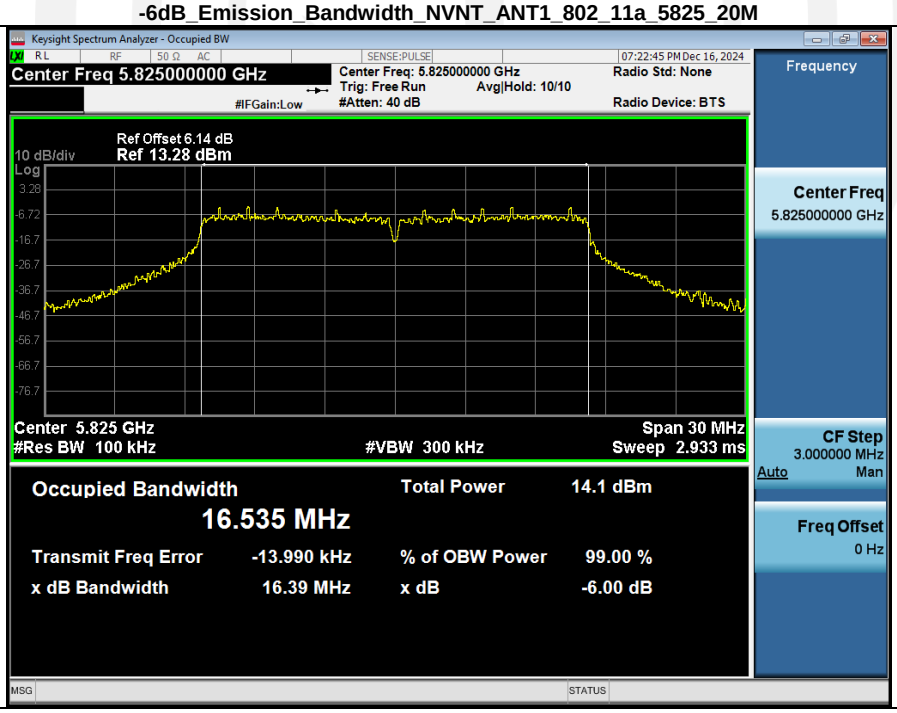
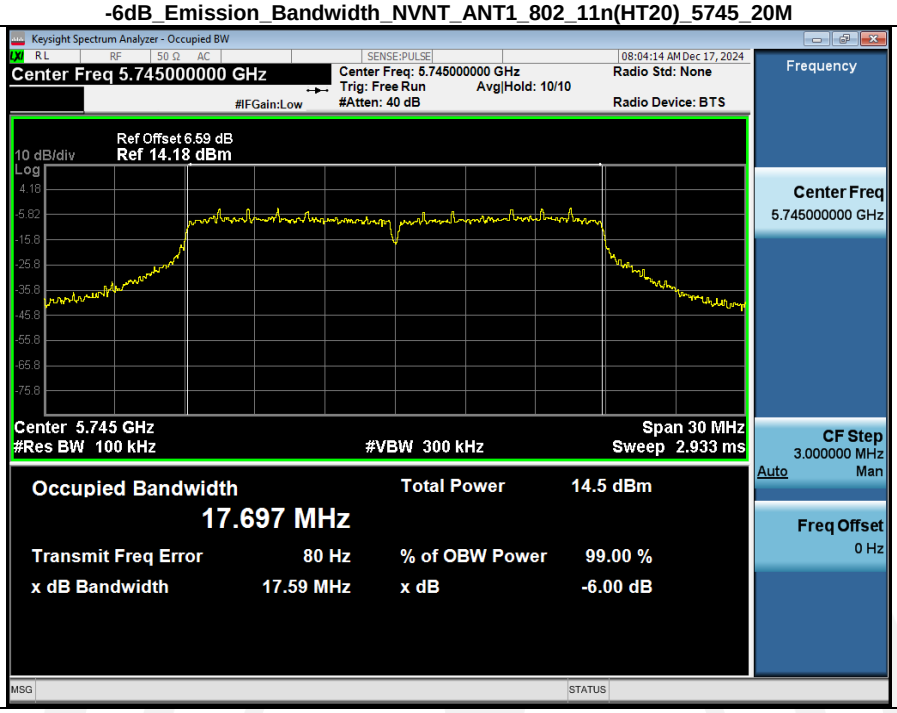


-6dB_Emission_Bandwidth_NVNT_ANT1_802_11n(HT20)_5745_20M



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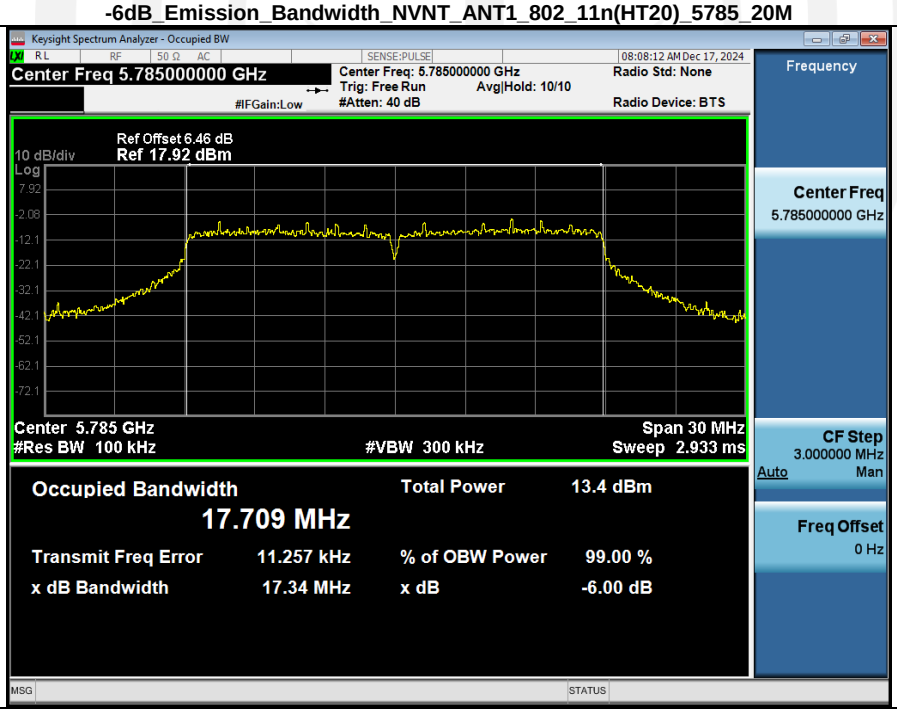

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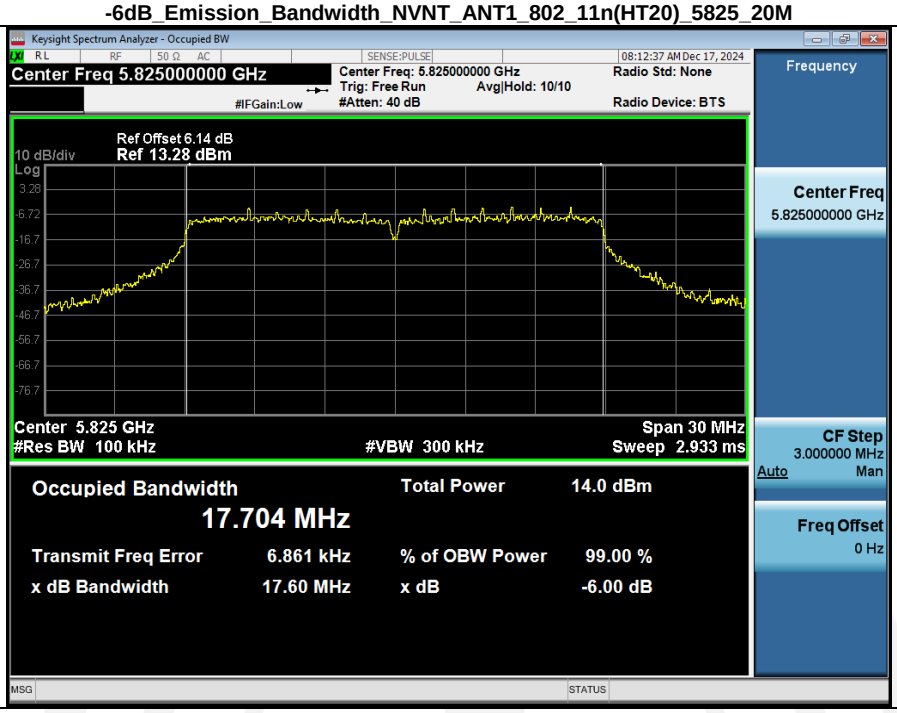
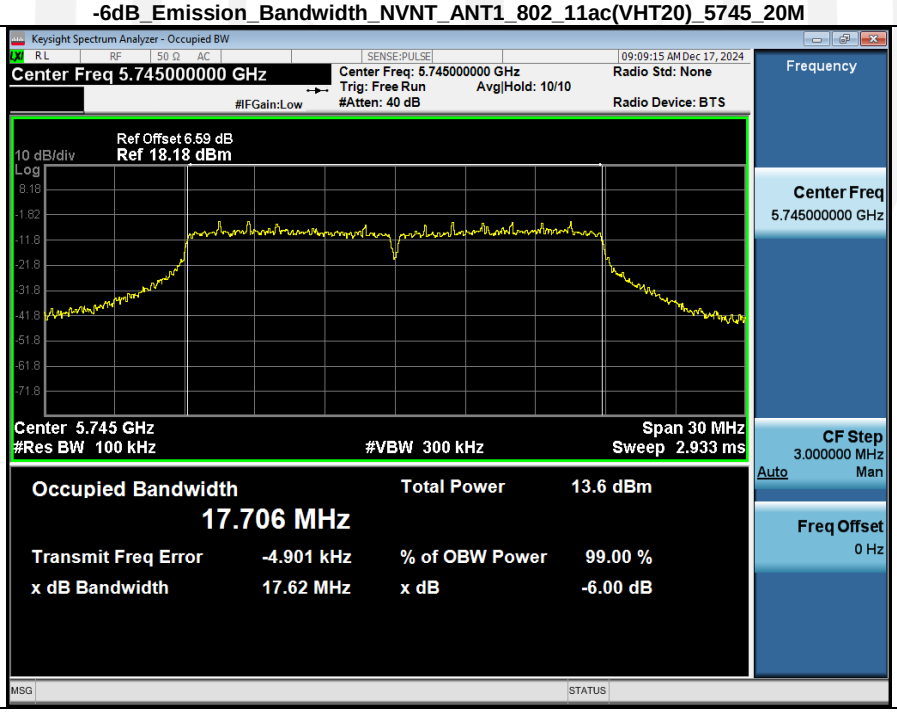


-6dB_Emission_Bandwidth_NVNT_ANT1_802_11ac(VHT20)_5745_20M



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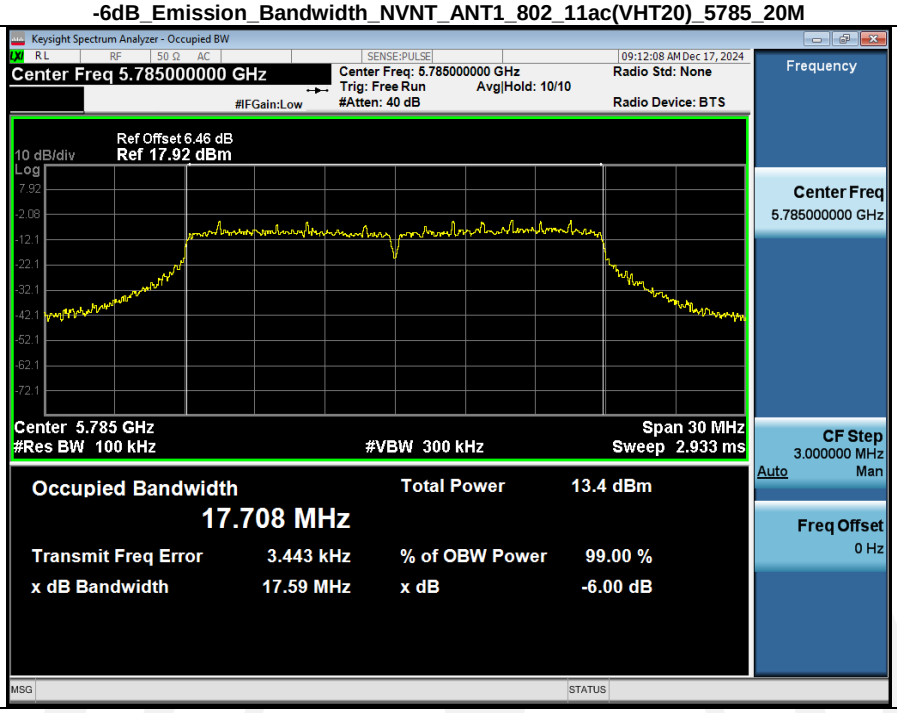

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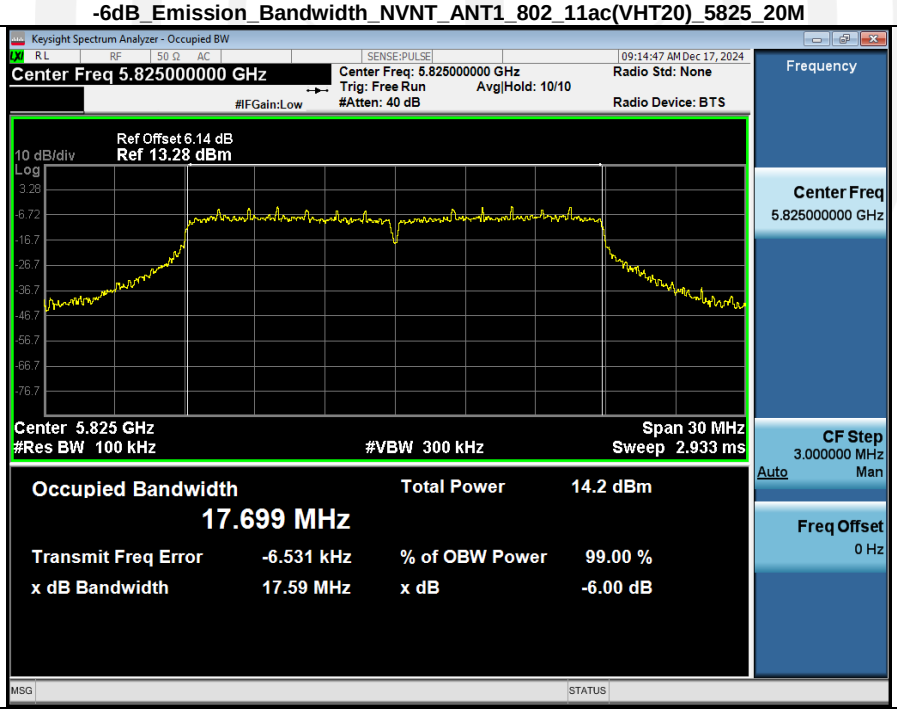
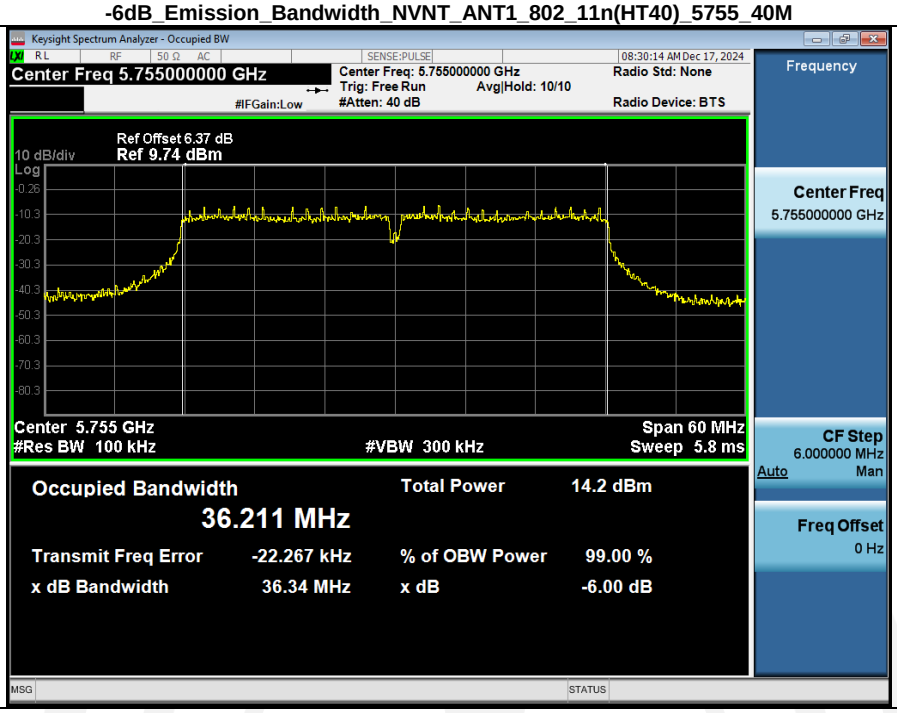
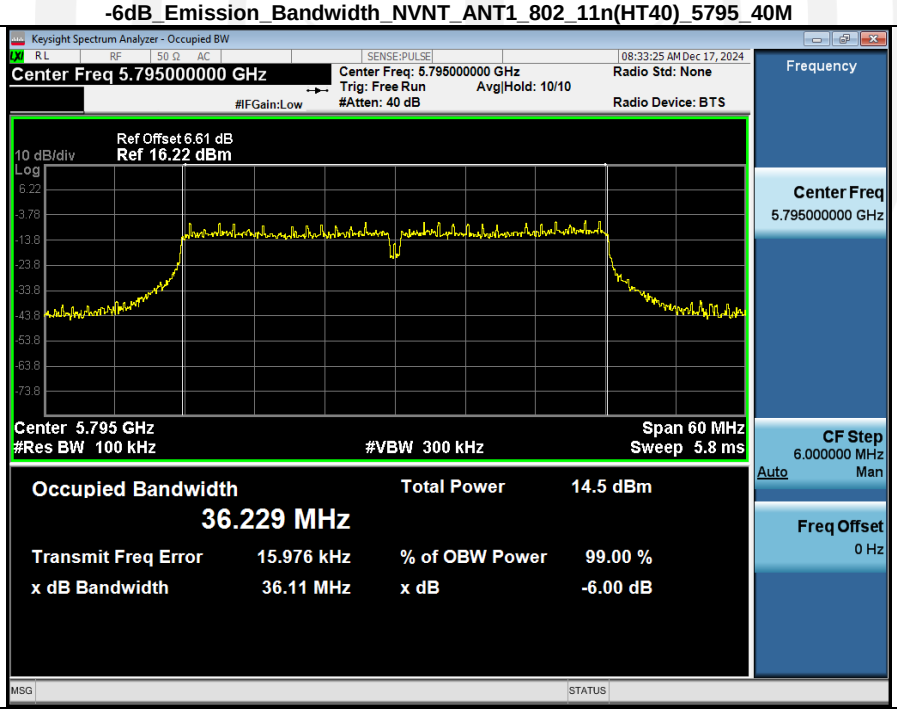


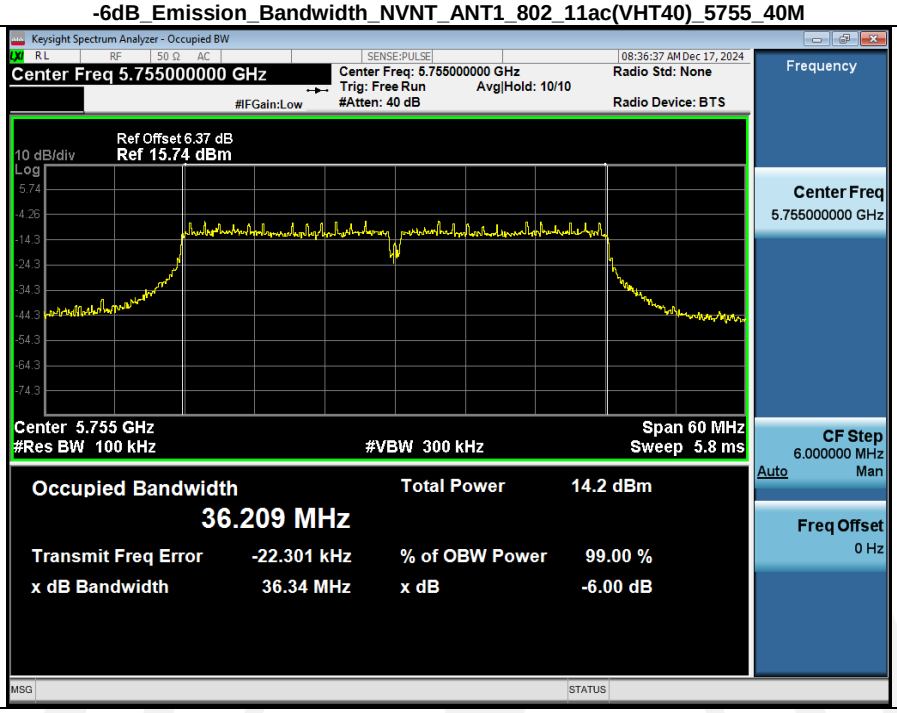
-6dB_Emission_Bandwidth_NVNT_ANT1_802_11n(HT40)_5755_40M



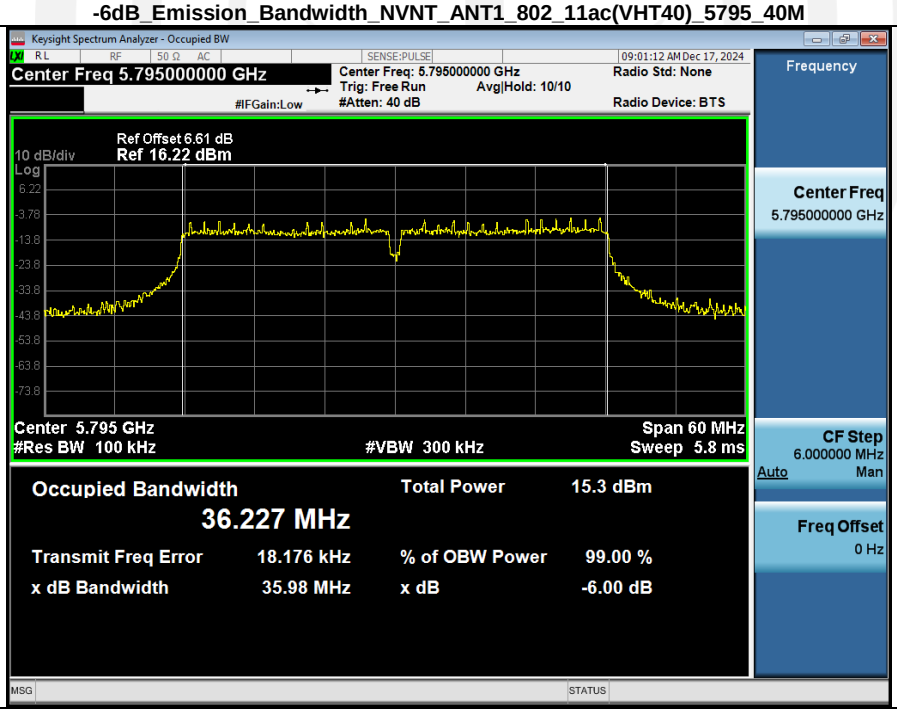
-6dB_Emission_Bandwidth_NVNT_ANT1_802_11n(HT40)_5795_40M



-6dB_Emission_Bandwidth_NVNT_ANT1_802_11ac(VHT40)_5755_40M



-6dB_Emission_Bandwidth_NVNT_ANT1_802_11ac(VHT40)_5795_40M



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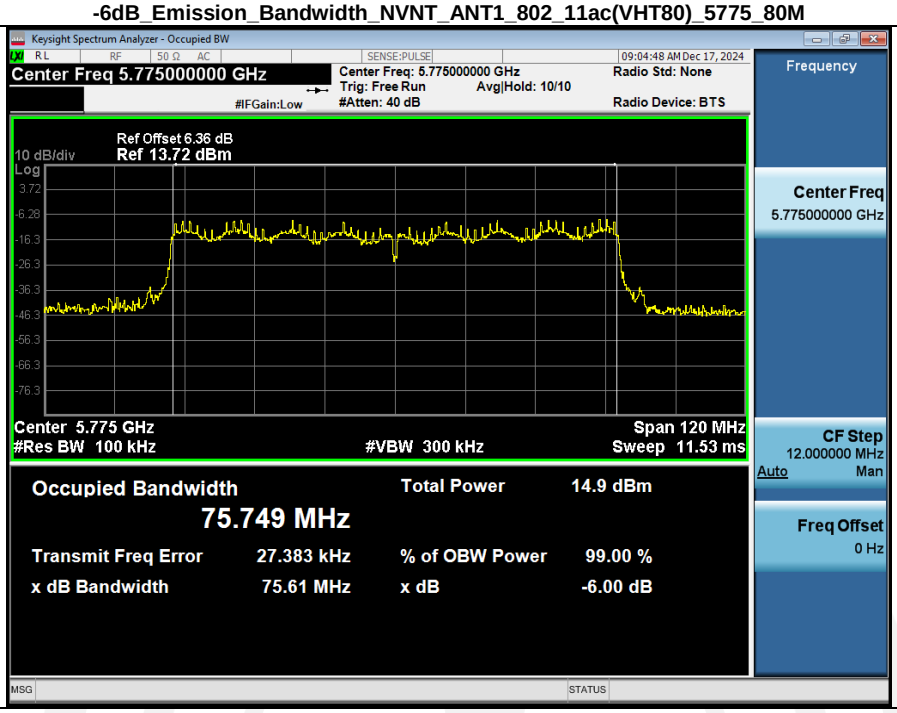
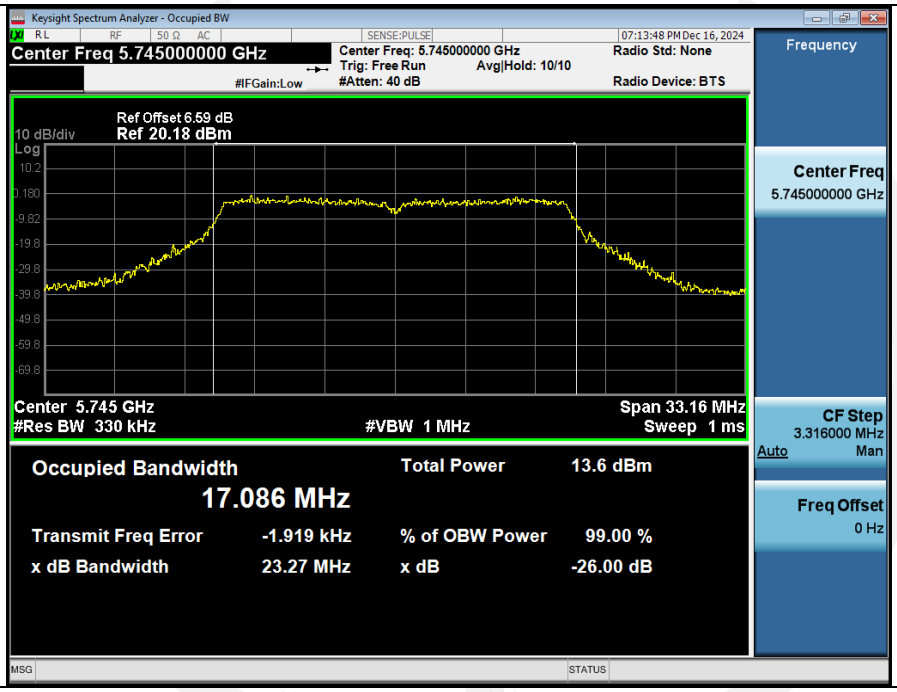
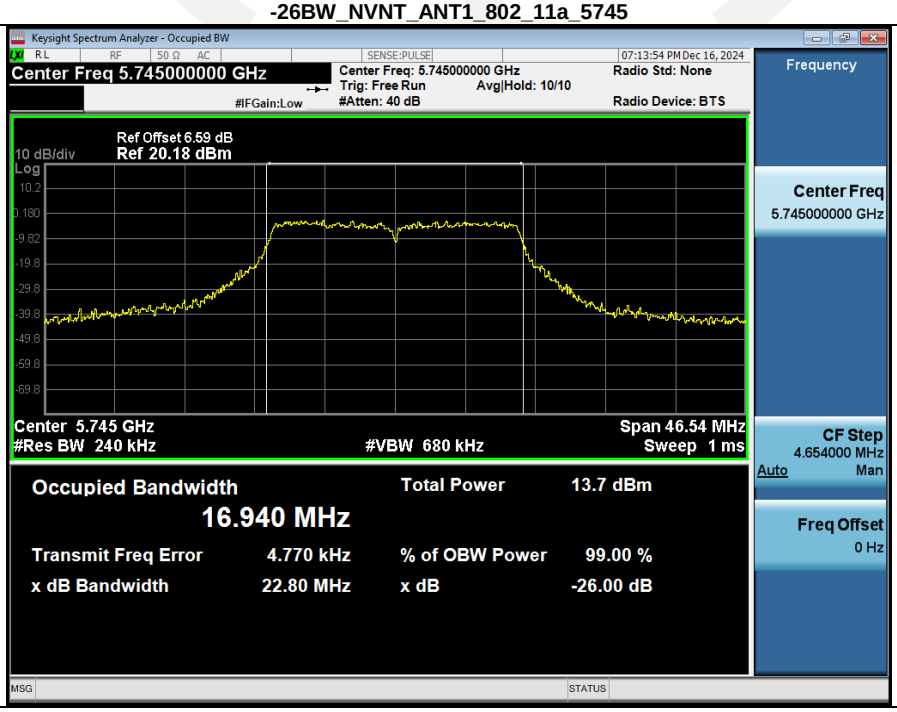


Condition	Antenna	Modulation	Frequency(MHz)	- 26dB_Emission_Bandwidth(MHz)	Occupied Bandwidth(MHz)
NVNT	ANT1	802.11a	5745.00	22.80	17.09
NVNT	ANT1	802.11a	5785.00	22.08	17.12
NVNT	ANT1	802.11a	5825.00	22.32	17.13
NVNT	ANT1	802.11n(HT20)	5745.00	23.01	18.22
NVNT	ANT1	802.11n(HT20)	5785.00	22.94	18.27
NVNT	ANT1	802.11n(HT20)	5825.00	23.31	18.32
NVNT	ANT1	802.11ac(VHT20)	5745.00	23.37	18.21
NVNT	ANT1	802.11ac(VHT20)	5785.00	23.17	18.27
NVNT	ANT1	802.11ac(VHT20)	5825.00	23.29	18.26
NVNT	ANT1	802.11n(HT40)	5755.00	43.81	37.02
NVNT	ANT1	802.11n(HT40)	5795.00	44.68	37.13
NVNT	ANT1	802.11ac(VHT40)	5755.00	44.36	36.88
NVNT	ANT1	802.11ac(VHT40)	5795.00	44.21	37.20
NVNT	ANT1	802.11ac(VHT80)	5775.00	83.64	76.37

99%_OCB_NVNT_ANT1_802_11a_5745



-26BW_NVNT_ANT1_802_11a_5745