



## MEASUREMENT REPORT

### FCC PART 15.407

### (WLAN 802.11a/n/ac/ax)

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**FCC ID** : 2ALJ3AP35X  
**Applicant** : HAN Networks Co., Ltd.  
**Application Type** : Certification  
**Product** : HAN Access Point  
**Model No.** : AP351  
**Brand Name** : HANNETWORKS, HAN NETWORKS  
**FCC Classification** : Unlicensed National Information Infrastructure (NII)  
**FCC Rule Part(s)** : Part15 Subpart E (Section 15.407)  
**Test Procedure(s)** : ANSI C63.10-2013  
**Receive Date** : March 17,2021  
**Test Date** : March 30~June 22, 2021

**Tested By** : *Fran Chen*  
( Fran Chen )  
**Reviewed By** : *Paddy Chen*  
( Paddy Chen )  
**Approved By** : *Chenz Ker*  
( Chenz Ker )



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

## Revision History

Report No.	Version	Description	Issue Date	Note
2107TW0105-U3	1.0	Original Report	2021-08-01	Valid

Note: This is a copy report based on MRT original report (report No.: 2105TW0102-U3). It only changed the information of the applicant and the product. The hardware and software of the product are the same.

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## 2. PRODUCT INFORMATION

### 2.1. Equipment Description

Product Name:	HAN Access Point
Model No.:	AP351
Brand Name:	HANNETWORKS, HAN NETWORKS
Wi-Fi Specification:	802.11a/b/g/n/ac/ax
Bluetooth Specification	V 5.1 Single Mode
Operating Temperature:	0 ~ 45 °C
Power Type:	PoE input or AC adapter input
Operating Environment:	Indoor Use
<b>Accessories</b>	
AC/DC Adapter	Model: ADP-50GR B Input: 100-240V ~ 50/60Hz, 1.3A Output: 48.0V, 1.042A, 50.1W MAX
PoE Injector	Model: POE60U-1BT-X Input: 100-240V ~ 1.5A, 50/60Hz Output: 56.0V, 0.535A, (Pin 3,6+ to pin 1,2 Return); 56V dc, 0.535A(pin 4,5+ to Pin 7,8 Return)

Note: The AC/DC adapter and PoE Injector are not sold with product.

### 2.2. Product Specification Subjective to this Report

Frequency Range:	For 802.11a/n-HT20/ac-VHT20/ax-HE20: 5180~5320MHz, 5500~5720MHz, 5745~5825MHz For 802.11n-HT40/ac-VHT40/ax-HE40: 5190~5310MHz, 5510~5710MHz, 5755~5795MHz For 802.11ac-VHT80/ax-HE80: 5210MHz, 5290MHz, 5530MHz, 5610 MHz, 5690 MHz, 5775MHz For 802.11ac-VHT160/ax-HE160: 5250MHz
Type of Modulation:	802.11a/n/ac: OFDM 802.11ax: OFDMA
Data Rate:	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 600Mbps 802.11ac: up to 3466.4Mbps 802.11ax: up to 4804Mbps
<b>Scan Antenna</b>	
Frequency Range:	For 802.11a: 5180~5320MHz, 5745~5825MHz

	For 802.11n-HT40/ac-VHT40: 5190~5310MHz, 5755~5795MHz For 802.11ac-VHT80: 5210MHz, 5775MHz
Type of Modulation:	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps 802.11 ac: up to 433Mbps

Note:

1. For other features of this EUT, test report will be issued separately.
2. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.



### 2.3. Working Frequencies for this report

802.11a/n-HT20/ac-VHT20/ax-HE20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	144	5720 MHz	149	5745 MHz
153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--

802.11n-HT40/ac-VHT40/ax-HE40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz
142	5710 MHz	151	5755 MHz	159	5795 MHz

802.11ac-VHT80/ax-HE80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	138	5690 MHz	155	5775 MHz

802.11ac-VHT160/ax-HE160

Channel	Frequency	Channel	Frequency	Channel	Frequency
50	5250 MHz	--	--	--	--

## 2.4. Description of Available Antennas

Antenna Type	Frequency Band (MHz)	T <sub>x</sub> Paths	Max Antenna Gain (dBi)	Directional Gain (dBi)		Beamforming Directional Gain (dBi)
				For Power	For PSD	
PIFA Antenna	2400 ~ 2483.5	4	3.9	3.9	9.92	9.92
Dipole Antenna	5150 ~ 5350	4	3.8	3.8	9.82	9.82
PIFA & Dipole Antenna	5470 ~ 5850	8	3.9	BW ≥ 40M, 3.9 BW = 20M, 6.9	12.93	12.93
<b>Scanning</b>						
Dipole Antenna	2400 ~ 2483.5	1	3.5	3.5	3.5	--
Dipole Antenna	5150 ~ 5250 & 5725 ~ 5850	1	3.9	3.9	3.9	--
<b>Bluetooth</b>						
Dipole Antenna	2400 ~ 2483.5	1	3.5	3.5	3.5	--
Remark: <ol style="list-style-type: none"> <li>The EUT supports Cyclic Delay Diversity (CDD) mode and beamforming mode.</li> <li>All antenna information (Antenna type and Peak Gain) is provided by the manufacturer.</li> <li>High gain antenna power setting will be reduced according to difference value of antenna gain declared by applicant.</li> </ol>						

## 2.5. Test Mode

Test Mode	Mode 1: Transmit by 802.11a (6Mbps)
	Mode 2: Transmit by 802.11ac-VHT20 (MCS0)
	Mode 3: Transmit by 802.11ac-VHT40 (MCS0)
	Mode 4: Transmit by 802.11ac-VHT80 (MCS0)
	Mode 5: Transmit by 802.11ac-VHT160 (MCS0)
	Mode 6: Transmit by 802.11ax-HE20 (MCS0)
	Mode 7: Transmit by 802.11ax-HE40 (MCS0)
	Mode 8: Transmit by 802.11ax-HE80 (MCS0)
	Mode 9: Transmit by 802.11ax-HE160 (MCS0)
	Mode 10: Transmit by 802.11a (6Mbps) -Scan Antenna
	Mode 11: Transmit by 802.11ac-VHT20 (MCS0) -Scan Antenna
	Mode 12: Transmit by 802.11ac-VHT40 (MCS0) -Scan Antenna
	Mode 13: Transmit by 802.11ac-VHT80 (MCS0) -Scan Antenna

Note:

1. Due to the same modulation & power setting between 802.11n and 802.11ac, so 802.11n-HT20 and HT40 are covered by 802.11ac-VHT20 and VHT40 in this report.
2. The EUT can't operate in the same frequency band at the same time.

## 2.6. Description of Test Software

The test utility software used during testing was "QSPR", and the version was "v50-00186".

## 2.7. Duty Cycle

5GHz (NII) operation is possible in 20MHz, 40MHz, 80MHz and 160MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

### Low band:

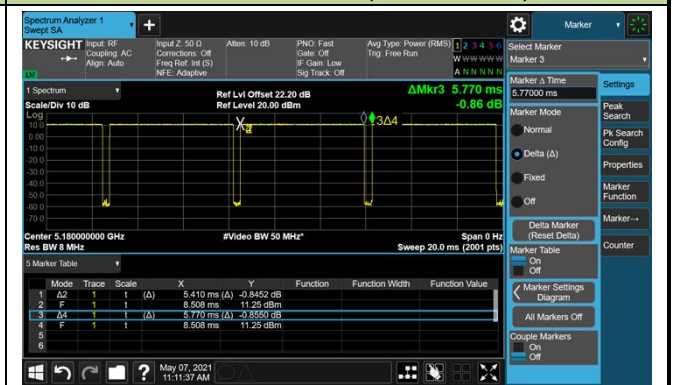
Test Mode	Duty Cycle
802.11a-5180MHz	94.52%
802.11ac-VHT20-5180MHz	93.76%
802.11ac-VHT40-5190MHz	93.90%
802.11ac-VHT80-5210MHz	93.26%
802.11ac-VHT160-5250MHz	93.60%
802.11ax-HE20-5180MHz	93.93%
802.11ax-HE40-5190MHz	94.08%
802.11ax-HE80-5210MHz	93.93%
802.11ax-HE160-5250MHz	85.51%

### Duty Cycle (T = Transmission Duration)

802.11a (T=1.968ms)



802.11ac-VHT20(T=5.410ms)



802.11ac-VHT40(T=5.390ms)



802.11ac-VHT80(T=5.400ms)

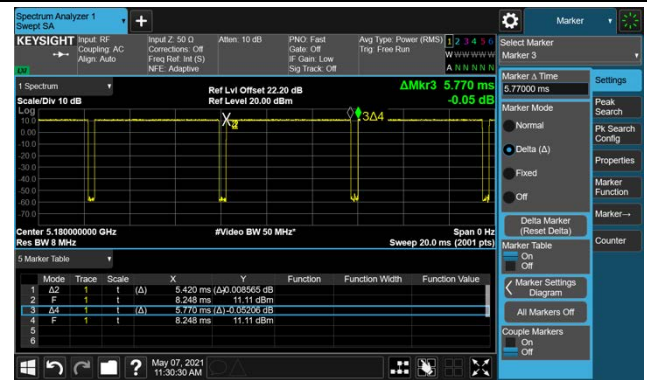


## Duty Cycle (T = Transmission Duration)

802.11ac-VHT160(T=5.410ms)



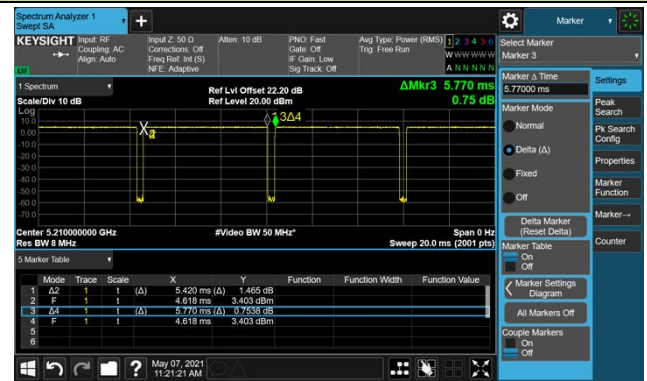
802.11ax-HE20(T=5.420ms)



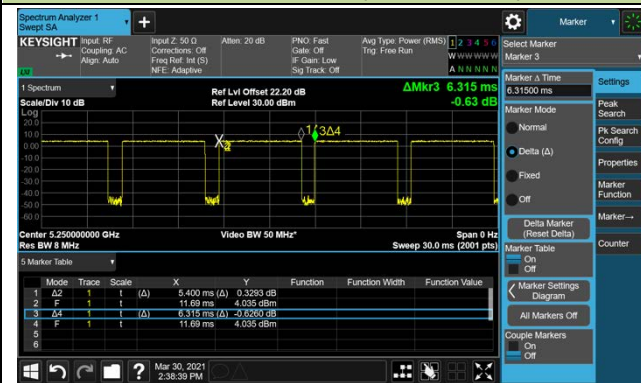
802.11ax-HE40(T=5.400ms)



802.11ax-HE80(T=5.420ms)



802.11ax-HE160(T=5.400ms)

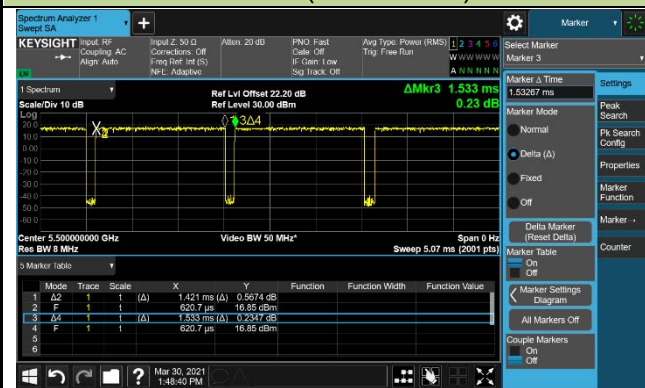


**High band:**

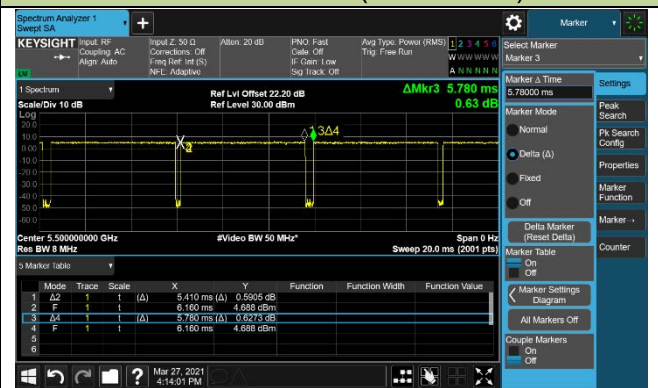
Test Mode	Duty Cycle
802.11a-5500MHz	92.69%
802.11ac-VHT20-5500MHz	93.60%
802.11ac-VHT40-5510MHz	93.58%
802.11ac-VHT80-5530MHz	93.75%
802.11ax-HE20-5500MHz	94.76%
802.11ax-HE40-5510MHz	94.08%
802.11ax-HE80-5530MHz	94.11%

**Duty Cycle (T = Transmission Duration)**

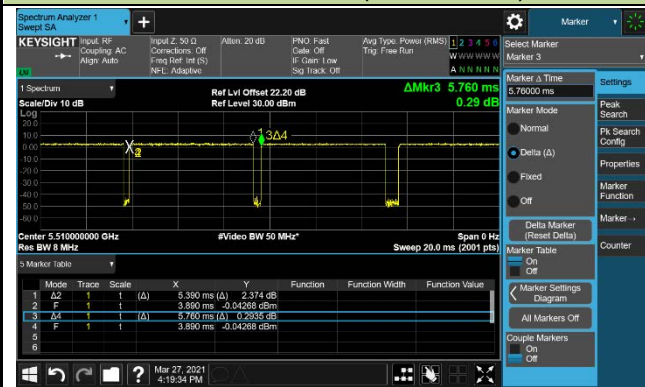
802.11a (T=1.421ms)



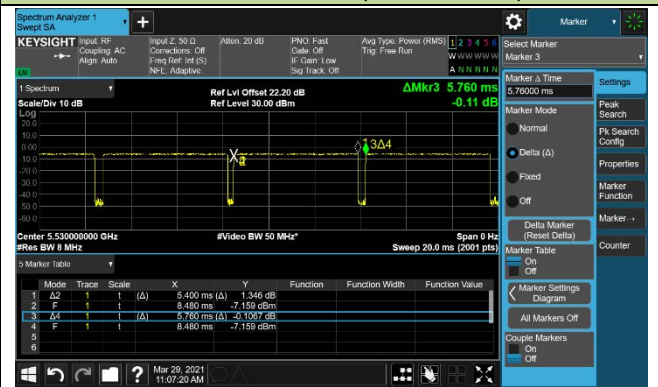
802.11ac-VHT20(T=5.410ms)



802.11ac-VHT40(T=5.390ms)



802.11ac-VHT80(T=5.400ms)



### Duty Cycle (T = Transmission Duration)

802.11ax-HE20(T=5.430ms)



802.11ax-HE40(T=5.400ms)



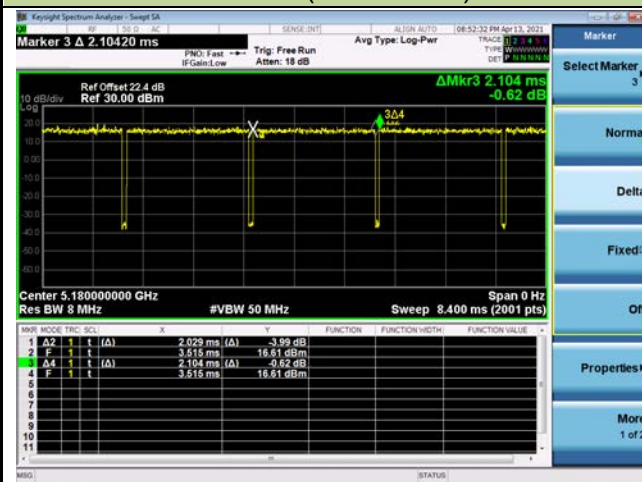
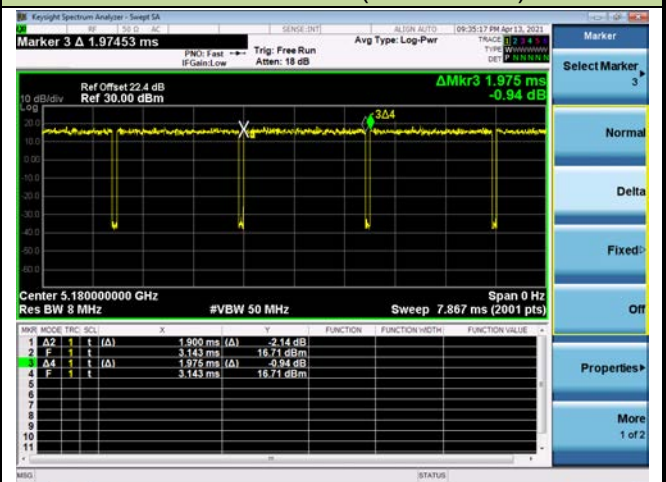
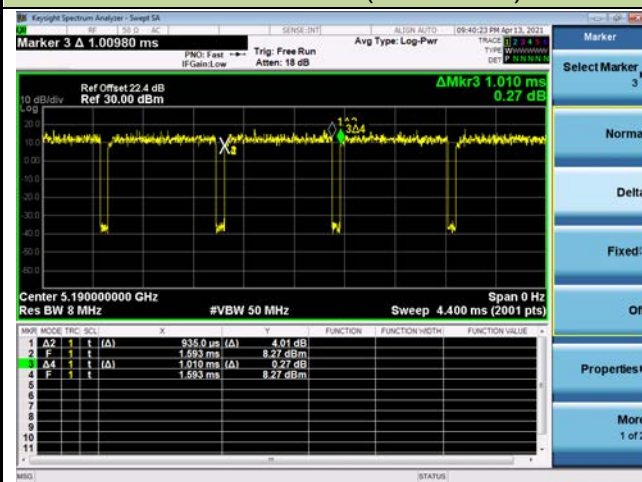
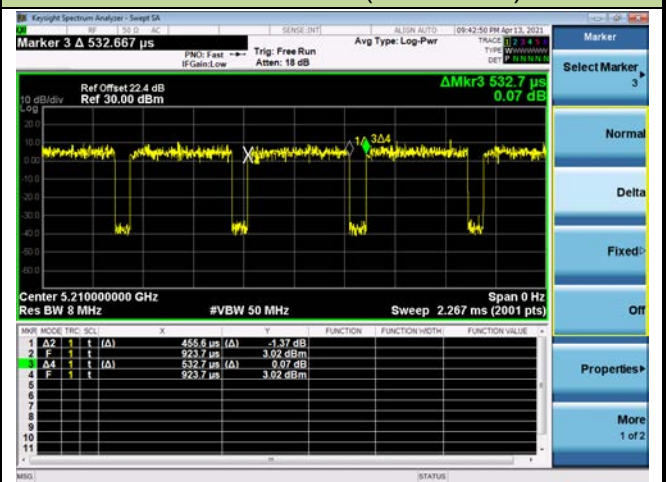
802.11ax-HE80(T=5.430ms)





**Scan Antenna**

Test Mode	Duty Cycle
802.11a-5180MHz	96.44%
802.11ac-VHT20-5180MHz	96.20%
802.11ac-VHT40-5190MHz	94.36%
802.11ac-VHT80-5210MHz	85.53%

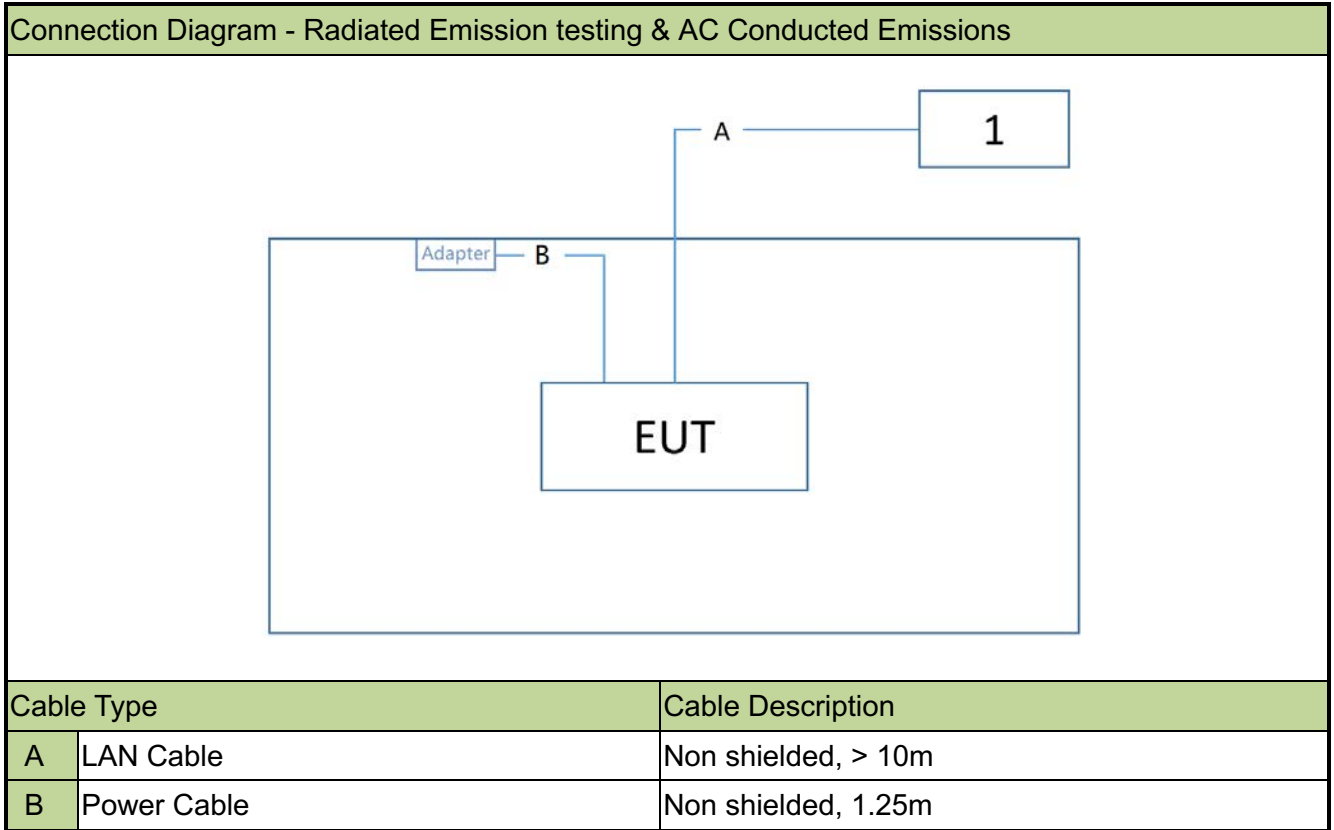
**Duty Cycle (T = Transmission Duration) – Scan Antenna**
**802.11a (T=2.029ms)**

**802.11ac-VHT20(T=1.900ms)**

**802.11ac-VHT40(T=935.0us)**

**802.11ac-VHT80(T=455.6us)**

**2.8. EMI Suppression Device(s)/Modifications**

No EMI suppression device(s) were added and/or no modifications were made during testing.



## 2.9. Configuration of Tested System

This device was tested per the guidance ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.



## 2.10. Test System Details

Product	Manufacturer	Model No.
1   Notebook	Dell	P62G

## 2.11. Test Environment Condition

Ambient Temp.	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

### 3. ANTENNA REQUIREMENTS

**Excerpt from §15.203 of the FCC Rules/Regulations:**

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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 shall be considered sufficient to comply with the provisions of this section.”

- The antenna of the device is **permanently attached**.
- There are no provisions for connection to an external antenna.

**Conclusion:**

The unit complies with the requirement of §15.203.

## 4. TEST EQUIPMENT CALIBRATION DATE

### Conducted Emissions – SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV216	MRTTWA00019	1 year	2022/3/23
Cable	Rosnol	N1C50-RG400-B 1C50-500CM	MRTTWE00013	1 year	2022/6/20
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2022/3/24

### Radiated Emissions – AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Broadband TRILOG Antenna	Schwarzbeck	VULB 9162	MRTTWA00001	1 year	2021/10/5
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2022/3/24
Active Loop Antenna	Schwarzbeck	FMZB 1519B	MRTTWA00002	1 year	2022/5/6
Broadband Horn antenna	Schwarzbeck	BBHA 9120D	MRTTWA00003	1 year	2022/4/21
Breitband Hornantenna	Schwarzbeck	BBHA 9170	MRTTWA00004	1 year	2022/4/28
Broadband Amplifier	Schwarzbeck	BBV 9721	MRTTWA00006	1 year	2022/4/26
Broadband Preamplifier	Schwarzbeck	BBV 9718	MRTTWA00005	1 year	2022/4/21
Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2022/6/15
Cable	Rosnol	K1K50-UP0264- K1K50-4M	MRTTWE00012	1 year	2022/6/20

### Conducted Test Equipment – SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/10/14
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2021/7/14
USB Wideband Power Sensor	KEYSIGHT	U2021XA	MRTTWA00015	1 year	2022/3/24

### Test Software

Software	Version	Function
e3	9.160520a	EMI Test Software
EMI	V3	EMI Test Software

## 5. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

<b>Conducted Emission- Power Line</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 150kHz~30MHz: $\pm 2.53\text{dB}$
<b>Radiated Spurious Emission</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 9kHz~30MHz: $\pm 3.92\text{dB}$ 30MHz~1GHz: $\pm 4.25\text{dB}$ 1GHz~18GHz: $\pm 4.40\text{dB}$ 18GHz~40GHz: $\pm 4.45\text{dB}$
<b>Frequency Error</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): $\pm 78.4\text{Hz}$
<b>Conducted Power</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): $\pm 0.84\text{dB}$
<b>Conducted Spurious Emission</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): $\pm 2.65\text{ dB}$
<b>Occupied Bandwidth</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): 3.3%
<b>Temp. / Humidity</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): $\pm 0.82^{\circ}\text{C} / \pm 3\%$
<b>DC Voltage</b>
Measuring Uncertainty for a Level of Confidence of 95% ( $U=2Uc(y)$ ): $\pm 0.3\%$

## 6. TEST RESULT

### 6.1. Summary

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	N/A	Section 6.2
15.407(e)	6dB Bandwidth	$\geq 500\text{kHz}$		Pass	Section 6.3
15.407(a)(1)(ii), (2), (3)	Maximum Conducted Output Power	Refer to section 7.4		Pass	Section 6.4
15.407(h)(1)	Transmit Power Control	$\leq 24 \text{ dBm}$		Pass	Section 6.5
15.407(a)(1)(ii), (2), (3)	Peak Power Spectral Density	Refer to section 7.6		Pass	Section 6.6
15.407(g)	Frequency Stability	$\pm 20 \text{ ppm}$		Pass	Section 6.7
15.407(b)(1), (2), (3), (4)(i)	Undesirable Emissions	Refer to Section 7.8	Radiated	Pass	Section 6.8 & 6.9
15.205, 15.209 15.407(b)(1), (2), (3), (4)(i)	General Field Strength (Restricted Bands and Radiated Emission)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		Pass	
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 6.10

#### Notes:

- The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- Output power test was verified over all data rates of each mode, and then chose the maximum power output (low data rate) for final test of each channel.
- Test Items “26dB /6dB Bandwidth” & “Band Edge / Out-of-Band Emissions” have been assessed MIMO transmission, and showed the worst test data in this report.
- 802.11ax supports full RB mode. The test results shown in the following sections represent the worst-case emissions.

## 6.2. 26dB Bandwidth Measurement

### 6.2.1. Test Limit

N/A

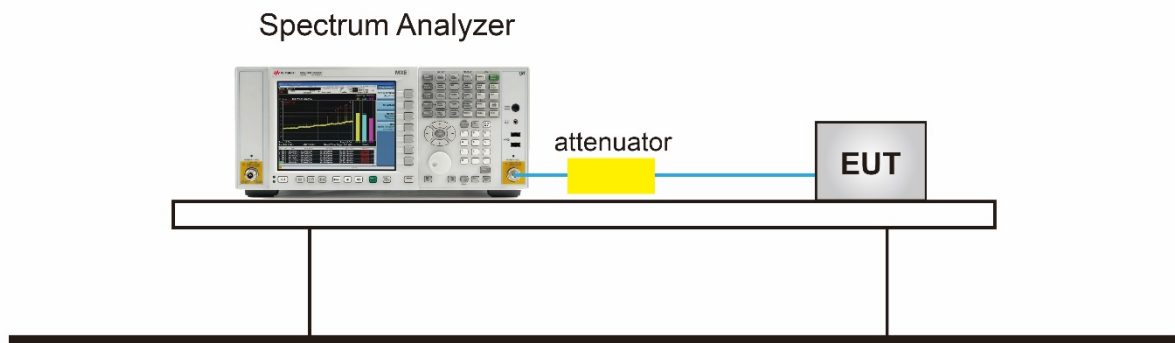
### 6.2.2. Test Procedure used

KDB 789033 D02v02r01- Section C.1

### 6.2.3. Test Setting

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to  $X = 26$ . The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediated power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth.
3. VBW  $\geq 3 \times$  RBW.
4. Detector = Peak.
5. Trace mode = max hold.

### 6.2.4. Test Setup



### 6.2.5. Test Result

Test Site	SR2	Test Engineer	Peter
Test Date	2021/04/14~2021/05/05	Test Item	26dB Bandwidth

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6Mbps	36	5180	19.41	16.53
802.11a	6Mbps	44	5220	19.27	16.52
802.11a	6Mbps	48	5240	19.14	16.53
802.11a	6Mbps	52	5260	19.28	16.55
802.11a	6Mbps	60	5300	19.88	16.51
802.11a	6Mbps	64	5320	19.70	16.48
802.11a	6Mbps	100	5500	19.14	16.36
802.11a	6Mbps	116	5580	18.87	16.36
802.11a	6Mbps	140	5700	18.98	16.37
802.11a	6Mbps	144	5720	19.48	16.36
802.11a	6Mbps	149	5745	19.13	16.35
802.11a	6Mbps	157	5785	19.15	16.42
802.11a	6Mbps	165	5825	18.99	16.37
802.11ac-VHT20	MCS0	36	5180	20.86	17.73
802.11ac-VHT20	MCS0	44	5220	20.92	17.72
802.11ac-VHT20	MCS0	48	5240	20.43	17.72
802.11ac-VHT20	MCS0	52	5260	20.30	17.75
802.11ac-VHT20	MCS0	60	5300	21.30	17.74
802.11ac-VHT20	MCS0	64	5320	20.94	17.76
802.11ac-VHT20	MCS0	100	5500	20.13	17.59
802.11ac-VHT20	MCS0	116	5580	20.35	17.56
802.11ac-VHT20	MCS0	140	5700	20.18	17.60
802.11ac-VHT20	MCS0	144	5720	20.17	17.58
802.11ac-VHT20	MCS0	149	5745	19.79	17.58
802.11ac-VHT20	MCS0	157	5785	20.21	17.61
802.11ac-VHT20	MCS0	165	5825	20.11	17.58

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ac-VHT40	MCS0	38	5190	38.79	35.81
802.11ac-VHT40	MCS0	46	5230	38.50	35.92
802.11ac-VHT40	MCS0	54	5270	38.32	36.03
802.11ac-VHT40	MCS0	62	5310	38.50	35.96
802.11ac-VHT40	MCS0	102	5510	39.46	36.10
802.11ac-VHT40	MCS0	110	5550	39.22	36.12
802.11ac-VHT40	MCS0	134	5670	40.07	36.08
802.11ac-VHT40	MCS0	142	5710	39.57	36.12
802.11ac-VHT40	MCS0	151	5755	39.38	36.14
802.11ac-VHT40	MCS0	159	5795	39.30	36.10
802.11ac-VHT80	MCS0	42	5210	79.38	74.81
802.11ac-VHT80	MCS0	58	5290	79.92	75.61
802.11ac-VHT80	MCS0	106	5530	79.96	75.21
802.11ac-VHT80	MCS0	122	5610	80.84	75.40
802.11ac-VHT80	MCS0	138	5690	80.49	75.43
802.11ac-VHT80	MCS0	155	5775	80.10	75.54
802.11ac-VHT160	MCS0	50	5250	161.70	152.63
802.11ax-HE20	MCS0	36	5180	20.63	19.02
802.11ax-HE20	MCS0	44	5220	21.24	19.06
802.11ax-HE20	MCS0	48	5240	20.60	19.04
802.11ax-HE20	MCS0	52	5260	20.99	19.07
802.11ax-HE20	MCS0	60	5300	21.30	19.04
802.11ax-HE20	MCS0	64	5320	21.08	19.04
802.11ax-HE20	MCS0	100	5500	21.16	18.94
802.11ax-HE20	MCS0	116	5580	20.96	18.91
802.11ax-HE20	MCS0	140	5700	20.99	18.93
802.11ax-HE20	MCS0	144	5720	21.17	18.93
802.11ax-HE20	MCS0	149	5745	20.85	18.98
802.11ax-HE20	MCS0	157	5785	20.29	18.91
802.11ax-HE20	MCS0	165	5825	20.68	18.91



Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ax-HE40	MCS0	38	5190	39.73	37.57
802.11ax-HE40	MCS0	46	5230	39.88	37.61
802.11ax-HE40	MCS0	54	5270	39.70	37.71
802.11ax-HE40	MCS0	62	5310	40.29	37.53
802.11ax-HE40	MCS0	102	5510	39.43	37.67
802.11ax-HE40	MCS0	110	5550	40.37	37.70
802.11ax-HE40	MCS0	134	5670	40.07	37.70
802.11ax-HE40	MCS0	142	5710	40.27	37.71
802.11ax-HE40	MCS0	151	5755	40.35	37.71
802.11ax-HE40	MCS0	159	5795	40.34	37.74
802.11ax-HE80	MCS0	42	5210	80.63	76.40
802.11ax-HE80	MCS0	58	5290	81.16	77.20
802.11ax-HE80	MCS0	106	5530	80.48	76.97
802.11ax-HE80	MCS0	122	5610	80.55	77.02
802.11ax-HE80	MCS0	138	5690	81.40	76.99
802.11ax-HE80	MCS0	155	5775	80.21	77.22
802.11ax-HE160	MCS0	50	5250	161.80	153.96

Note: The Data only show the max power Antenna Port in the test report.

Test Site	SR2	Test Engineer	Peter
Test Date	2021/05/06~2021/06/22	Test Item	26dB Bandwidth
Test Mode	Scan Antenna		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6Mbps	36	5180	32.53	18.69
802.11a	6Mbps	44	5220	34.17	19.00
802.11a	6Mbps	48	5240	31.82	18.37
802.11a	6Mbps	149	5745	34.00	19.13
802.11a	6Mbps	157	5785	33.84	19.61
802.11a	6Mbps	165	5825	34.49	19.14
802.11ac-VHT20	MCS0	36	5180	32.17	19.03
802.11ac-VHT20	MCS0	44	5220	34.66	19.34
802.11ac-VHT20	MCS0	48	5240	30.57	18.74
802.11ac-VHT20	MCS0	149	5745	35.88	19.44
802.11ac-VHT20	MCS0	157	5785	34.13	19.39
802.11ac-VHT20	MCS0	165	5825	32.87	19.24
802.11ac-VHT40	MCS0	38	5190	52.87	36.93
802.11ac-VHT40	MCS0	46	5230	75.90	39.73
802.11ac-VHT40	MCS0	151	5755	77.62	38.94
802.11ac-VHT40	MCS0	159	5795	76.34	39.21
802.11ac-VHT80	MCS0	42	5210	101.90	76.50
802.11ac-VHT80	MCS0	155	5775	148.10	79.01

802.11a 26dB Bandwidth & 99% Bandwidth

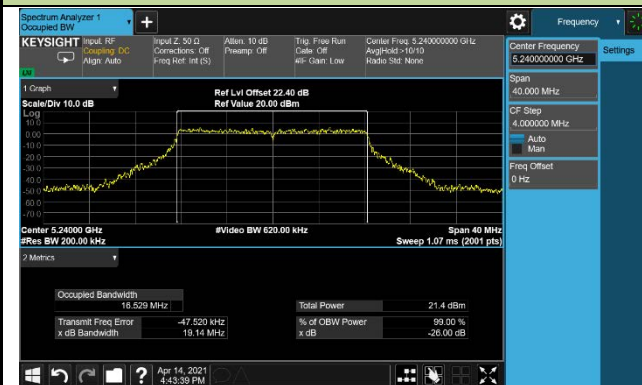
Channel 36 (5180MHz)



Channel 44 (5220MHz)



Channel 48 (5240MHz)



Channel 52 (5260MHz)



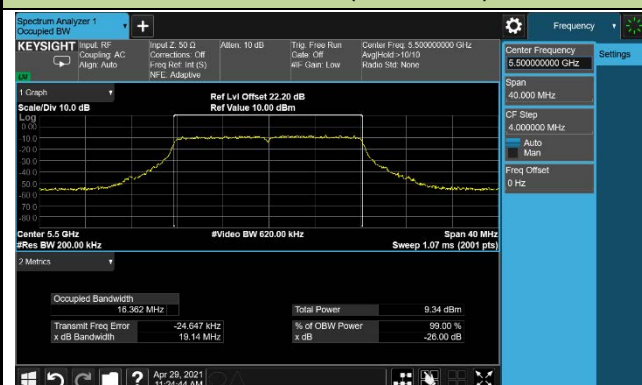
Channel 60 (5300MHz)



Channel 64 (5320MHz)

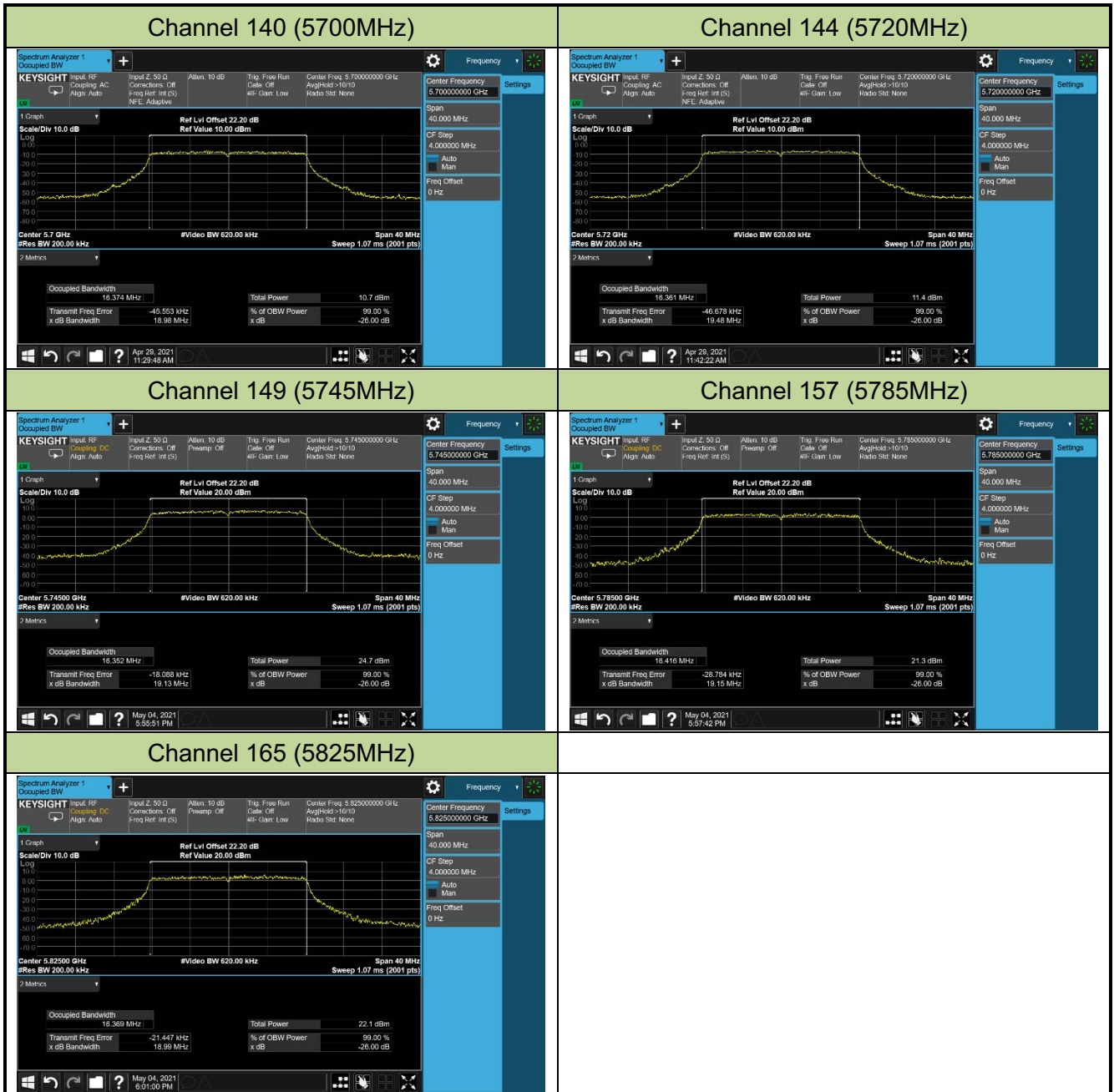


Channel 100 (5500MHz)



Channel 116 (5580MHz)





## 802.11ac-VHT20 26dB Bandwidth &amp; 99% Bandwidth

Channel 36 (5180MHz)



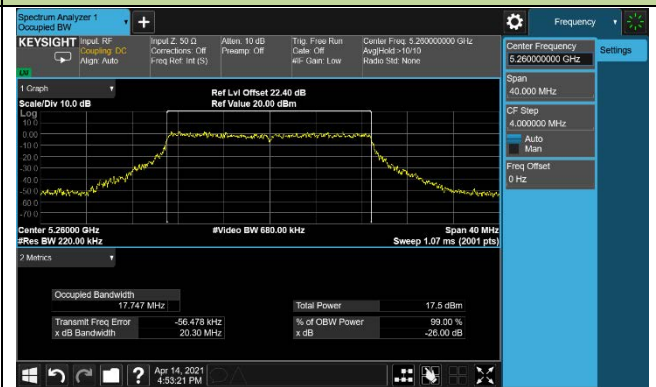
Channel 44 (5220MHz)



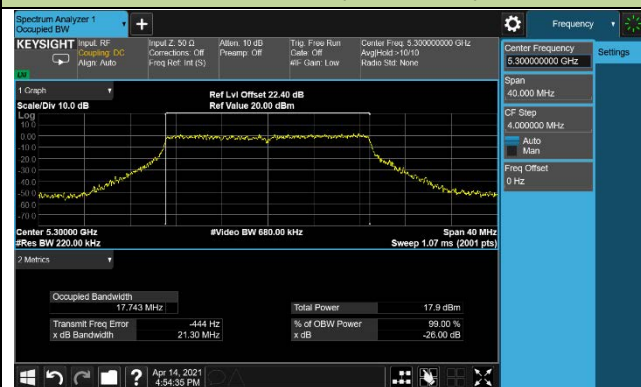
Channel 48 (5240MHz)



Channel 52 (5260MHz)



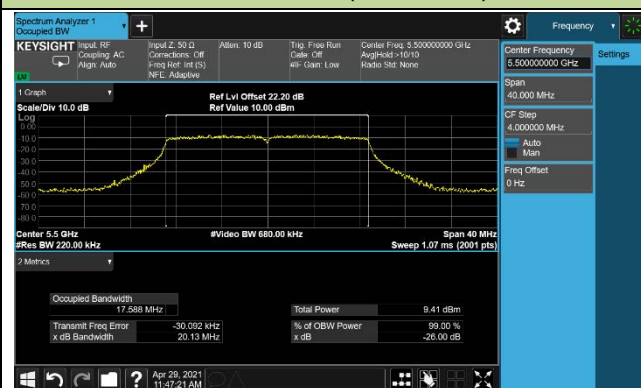
Channel 60 (5300MHz)



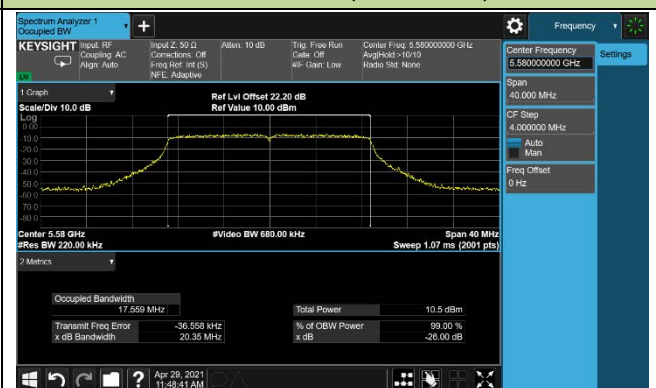
Channel 64 (5320MHz)

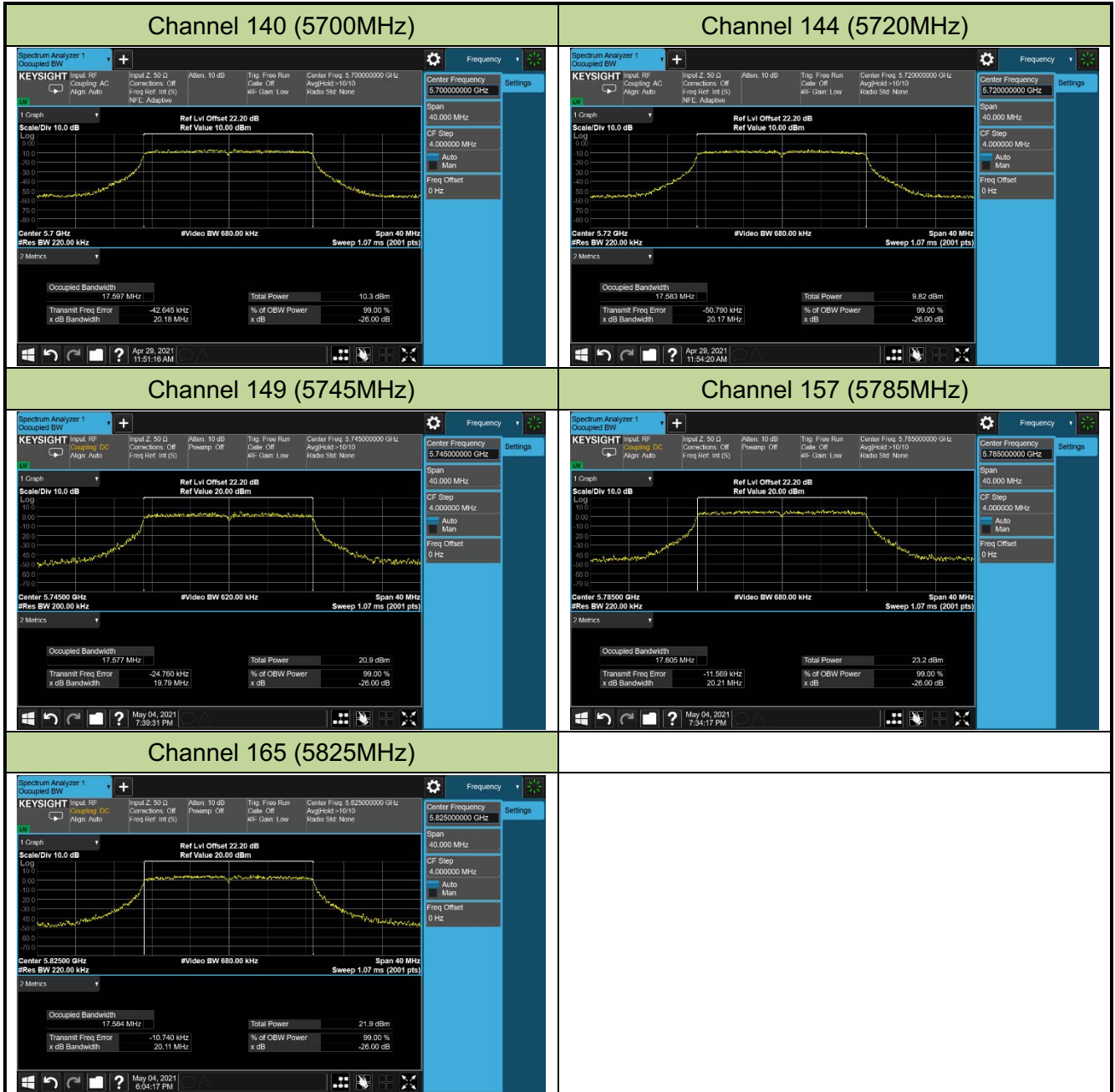


Channel 100 (5500MHz)



Channel 116 (5580MHz)

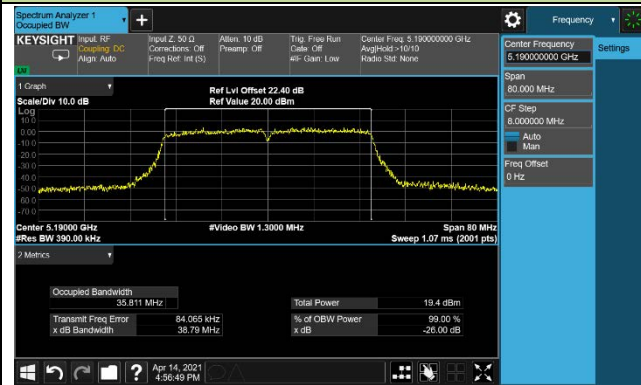




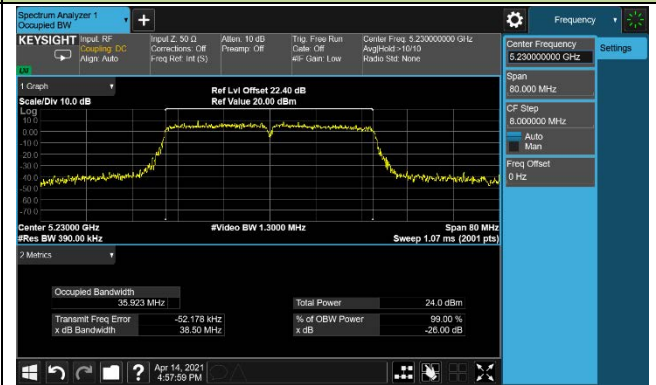


802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth

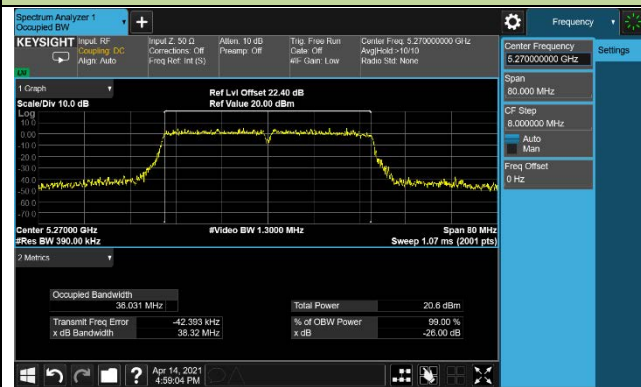
Channel 38 (5190MHz)



Channel 46 (5230MHz)



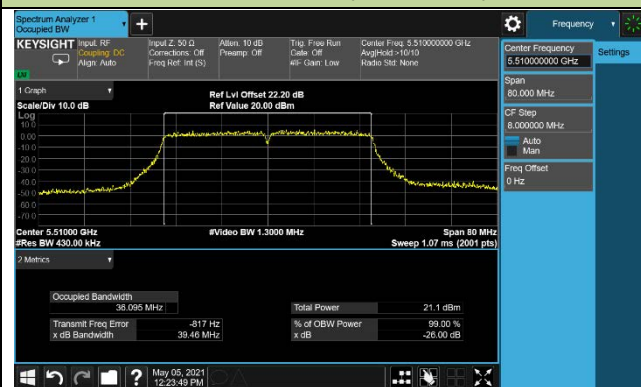
Channel 54 (5270MHz)



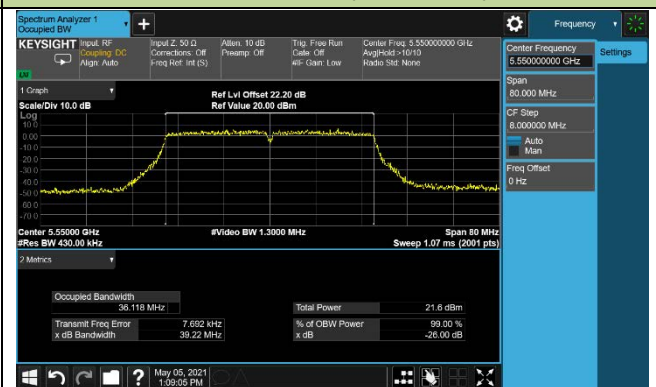
Channel 62 (5310MHz)



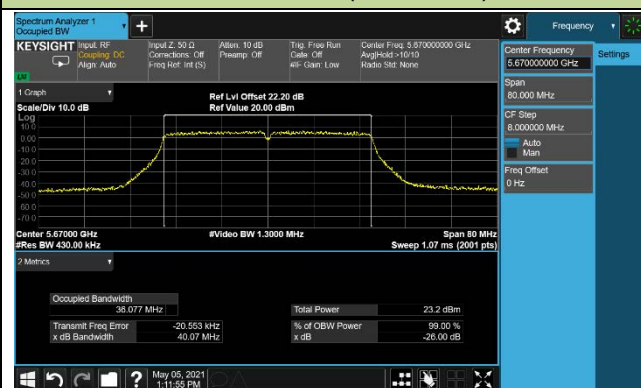
Channel 102 (5510MHz)



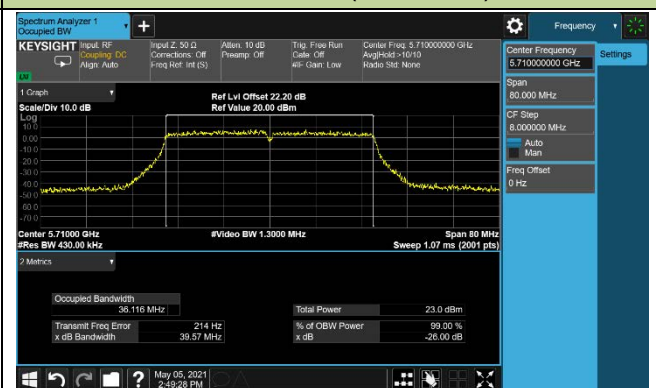
Channel 110 (5550MHz)

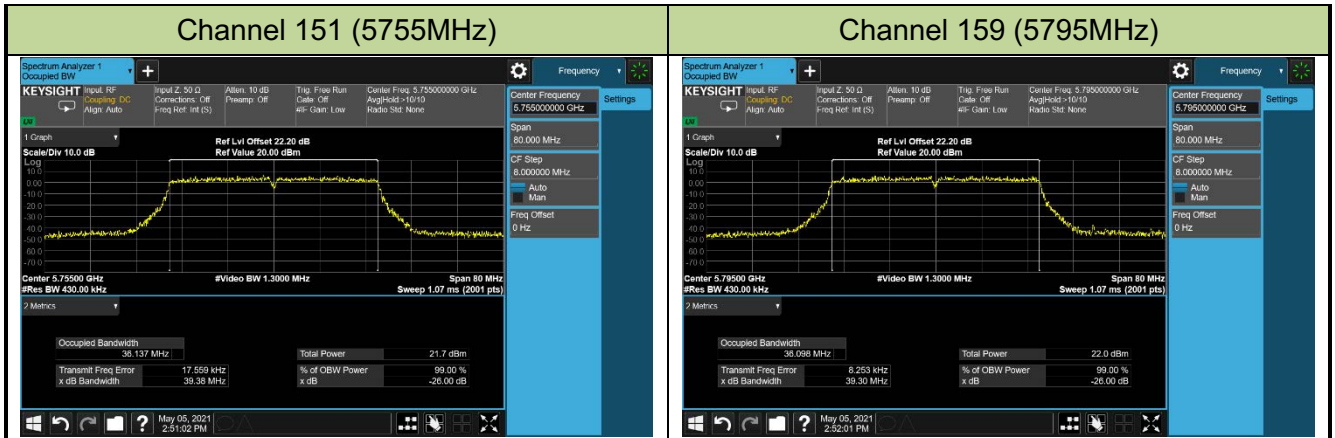


Channel 134 (5670MHz)



Channel 142 (5710MHz)

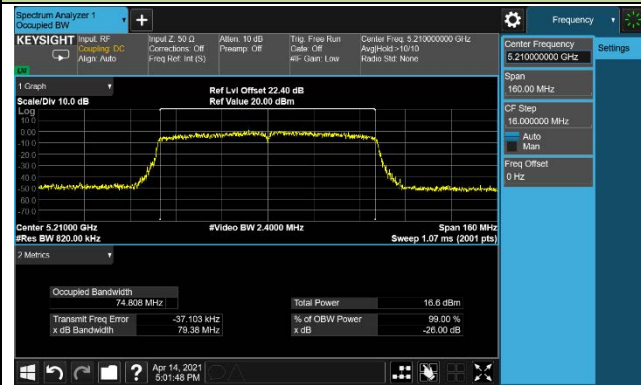






802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth

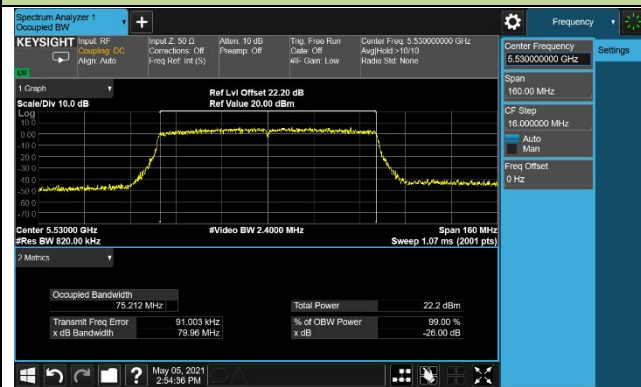
Channel 42 (5210MHz)



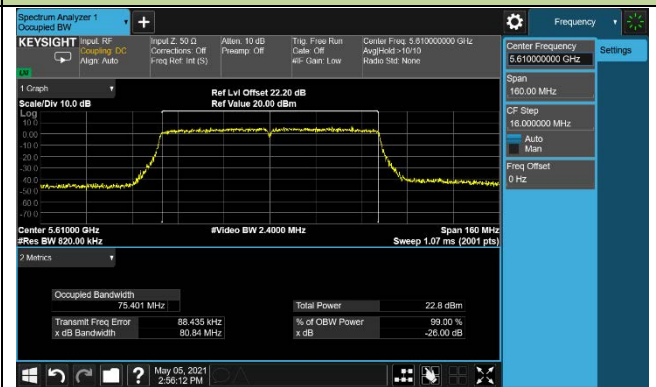
Channel 58 (5290MHz)



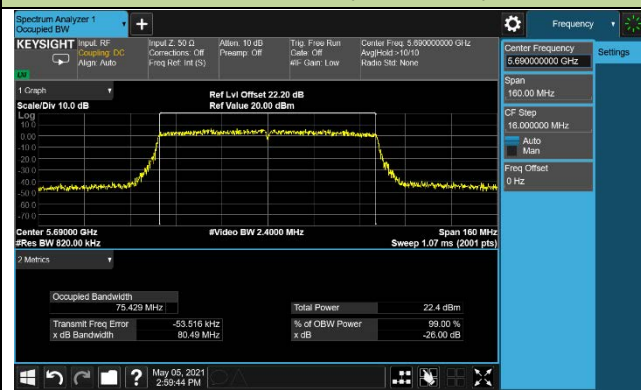
Channel 106 (5530MHz)



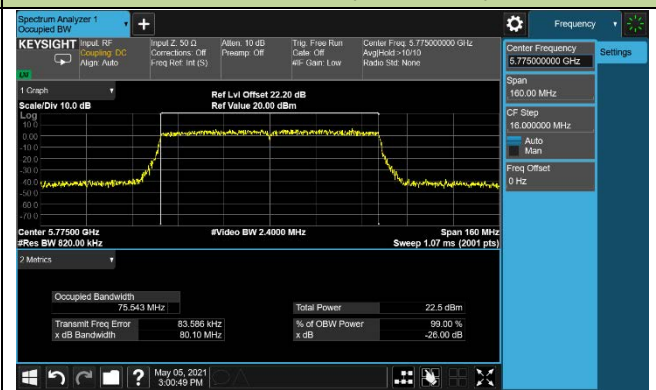
Channel 122 (5610MHz)



Channel 138 (5690MHz)

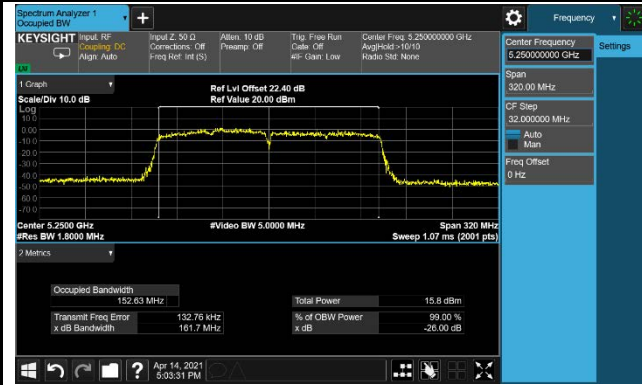


Channel 155 (5775MHz)



802.11ac-VHT160 26dB Bandwidth & 99% Bandwidth

Channel 50 (5250MHz)



## 802.11ax-HE20 26dB Bandwidth &amp; 99% Bandwidth

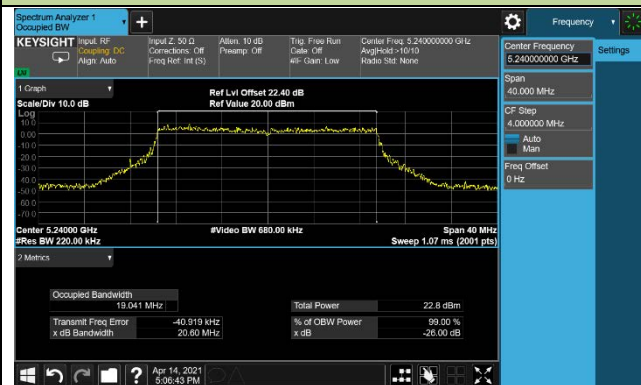
Channel 36 (5180MHz)



Channel 44 (5220MHz)



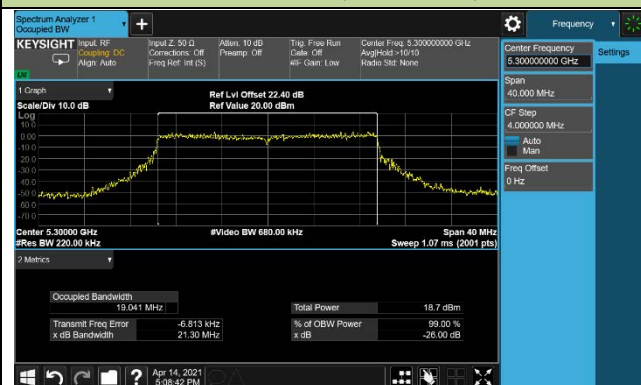
Channel 48 (5240MHz)



Channel 52 (5260MHz)



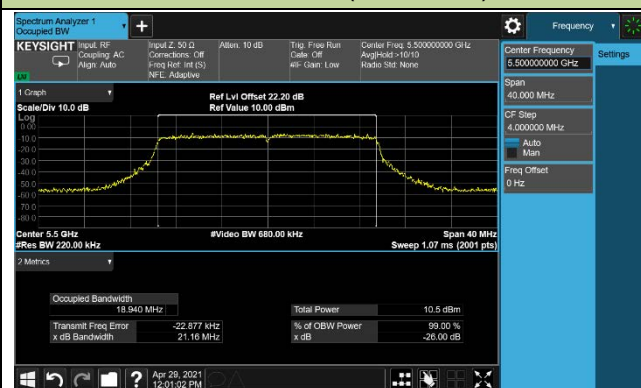
Channel 60 (5300MHz)



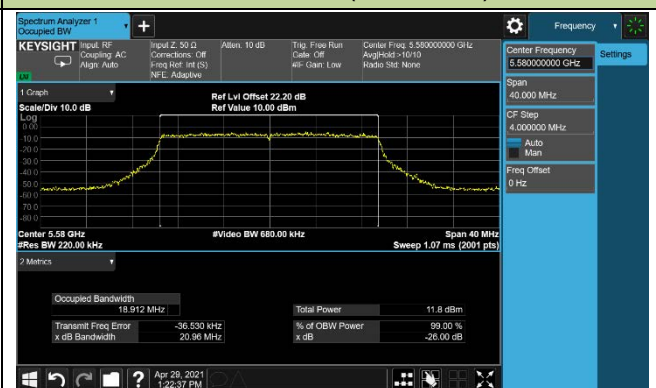
Channel 64 (5320MHz)

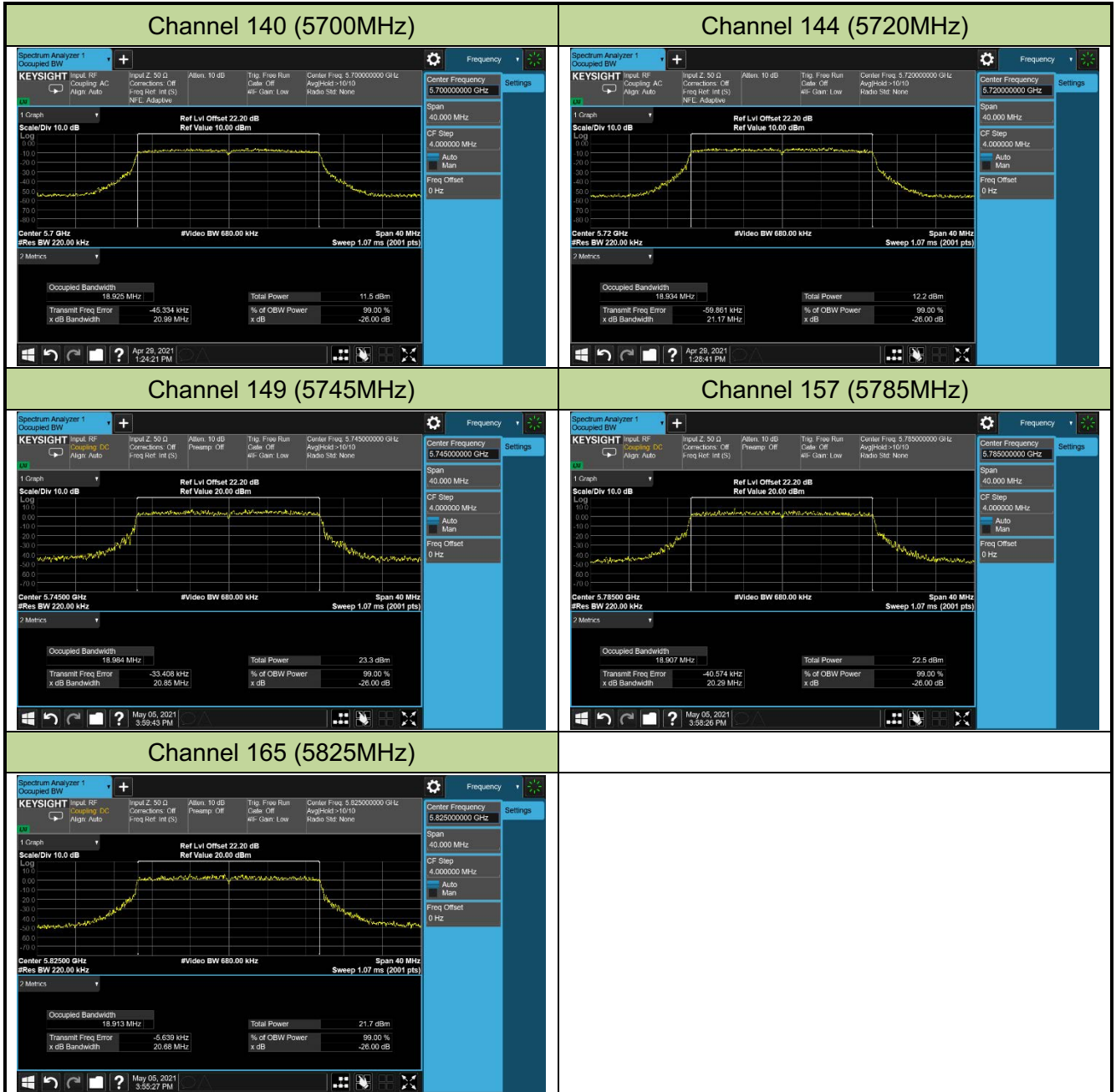


Channel 100 (5500MHz)



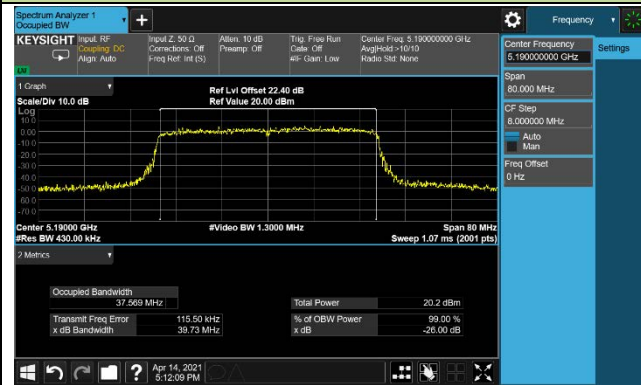
Channel 116 (5580MHz)





802.11ax-HE40 26dB Bandwidth & 99% Bandwidth

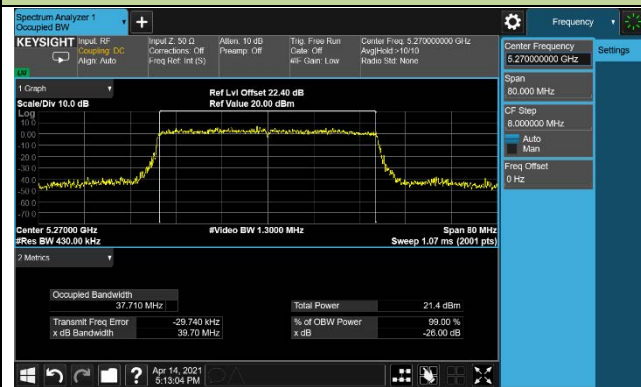
Channel 38 (5190MHz)



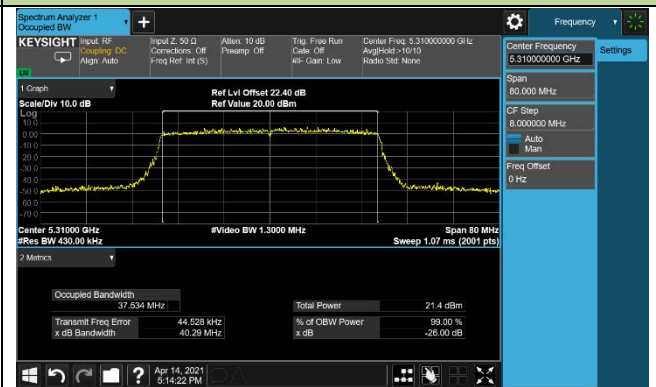
Channel 46 (5230MHz)



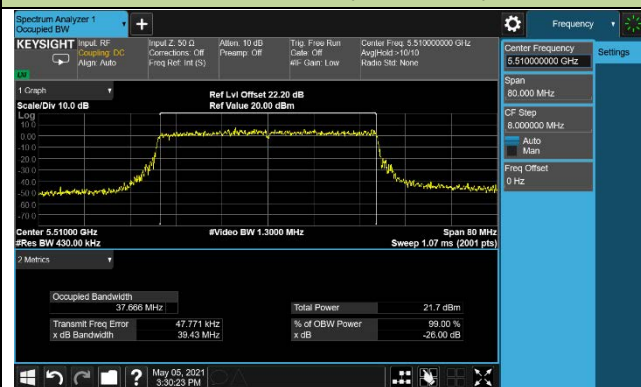
Channel 54 (5270MHz)



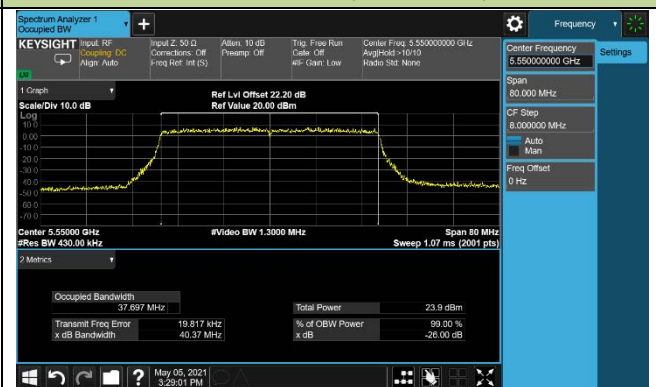
Channel 62 (5310MHz)



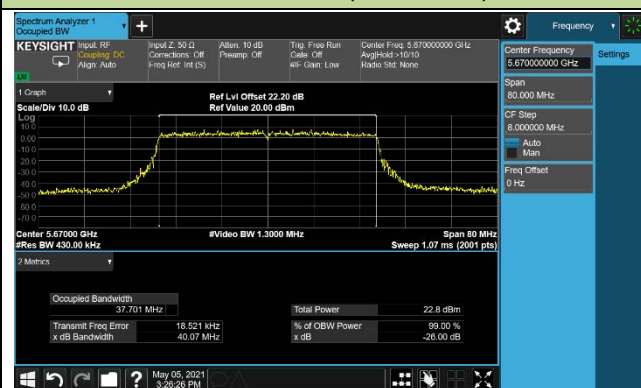
Channel 102 (5510MHz)



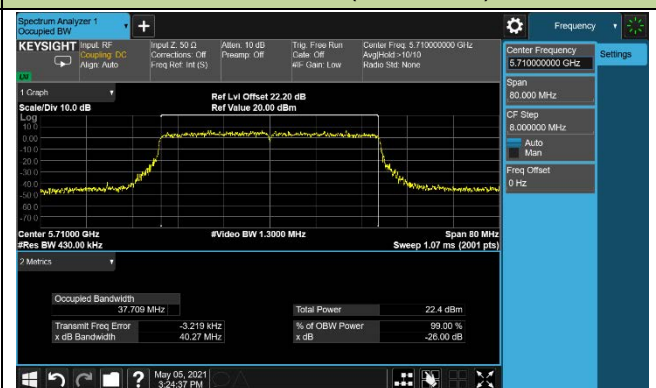
Channel 110 (5550MHz)

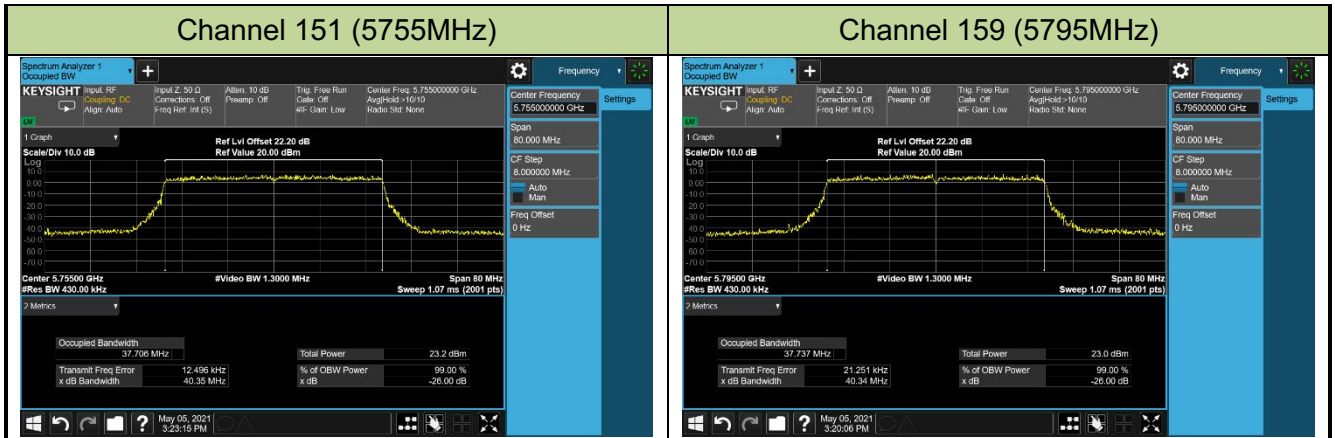


Channel 134 (5670MHz)



Channel 142 (5710MHz)







802.11ax-HE80 26dB Bandwidth & 99% Bandwidth

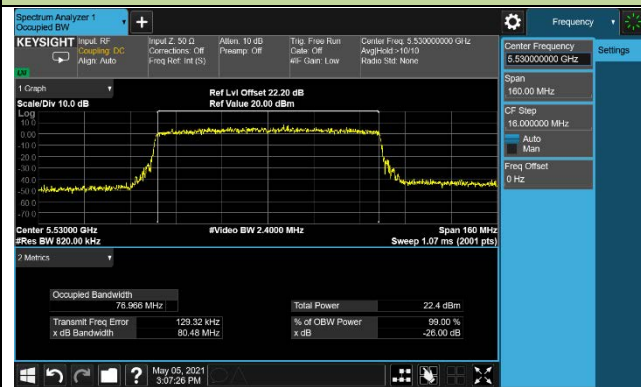
Channel 42 (5210MHz)



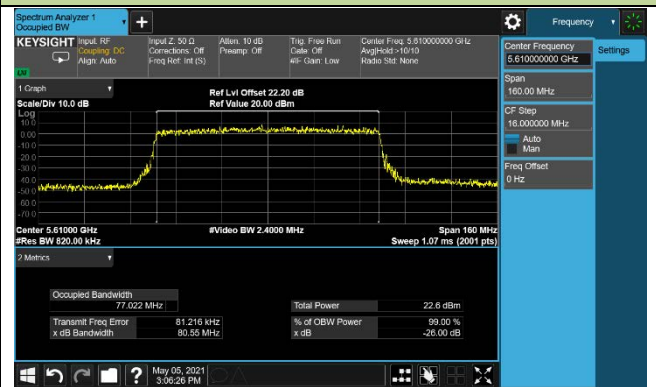
Channel 58 (5290MHz)



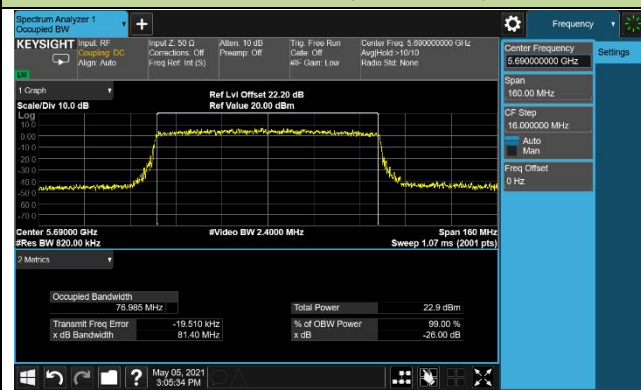
Channel 106 (5530MHz)



Channel 122 (5610MHz)



Channel 138 (5690MHz)



Channel 155 (5775MHz)

