MEASUREMENT REPORT

FCC PART 15.407 WLAN 802.11a/n/ac/ax

FCC ID: 2AI9TOAW-AP1301H

Applicant: ALE USA Inc.

Application Type: Certification

Product: OmniAccess Stellar

Model No.: OAW-AP1301H

Brand Name: Alcatel-Lucent Enterprise

FCC Classification: Unlicensed National Information Infrastructure (UNII)

FCC Rule Part(s): Part15 Subpart E (Section 15.407)

Test Date: September 03 ~ October 08, 2021

Reviewed By: (Paddy Chen)

Approved By: (Chenz Ker)

Testing Laboratory
3261

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 KDB 789033 D02v02r01. 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
2108TW0001-U3	V1.0	Initial Report	11-12-2021	Invalid
2108TW0001-U3	V1.1	Add Adapter information	12-17-2021	Valid

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General Information

Applicant	ALE USA Inc.
Applicant Address	26801 West Agoura Road, Calabasas, CA 91301, United States
Manufacturer	ALE USA Inc.
Manufacturer Address	26801 West Agoura Road, Calabasas, CA 91301, United States
Test Site	MRT Technology (Taiwan) Co., Ltd
Test Site Address	No. 38, Fuxing Second Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C)
MRT FCC Registration No.	291082
FCC Rule Part(s)	Part 15.407

Test Facility / Accreditations

1. MRT facility is a FCC registered (Reg. No. 291082) test facility with the site description report on file and is designated by the FCC as an Accredited Test Firm.
2. MRT facility is an IC registered (MRT Reg. No. 21723) test laboratory with the site description on file at Industry Canada.
3. MRT Lab is accredited to ISO 17025 by the Taiwan Accreditation Foundation (TAF Cert. No. 3261) in EMC, Telecommunications and Radio testing for FCC (Designation Number: TW3261), Industry Taiwan, EU and TELEC Rules.

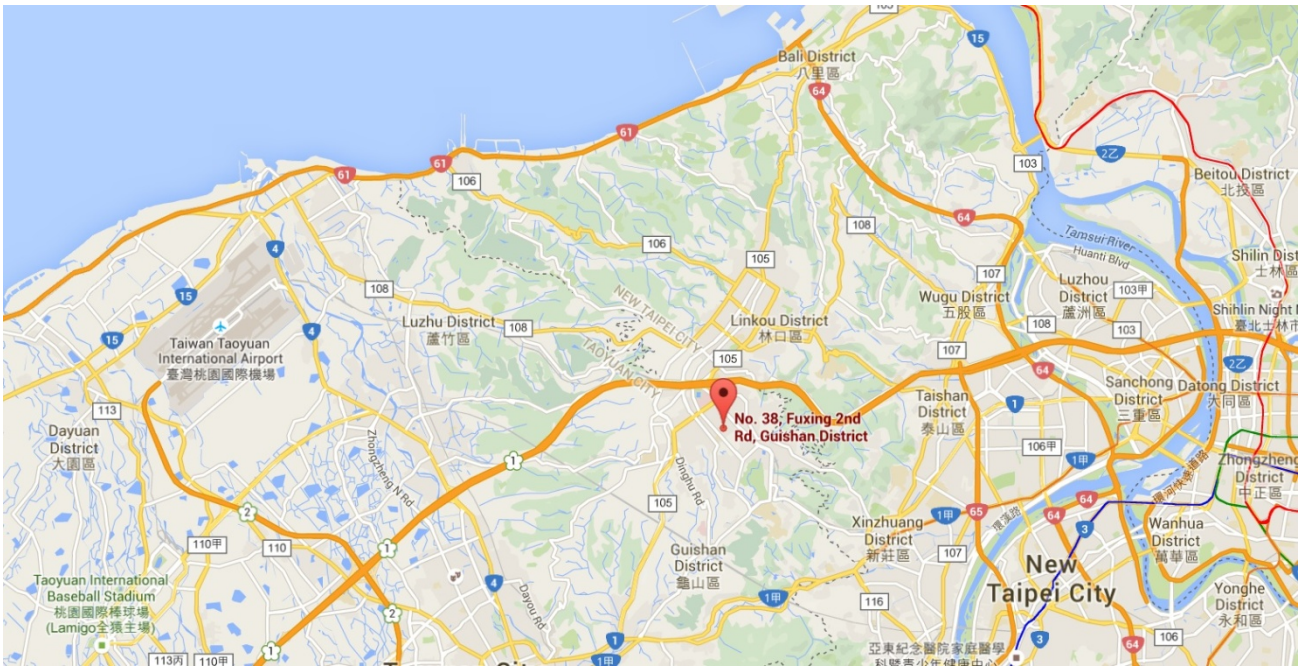
1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taoyuan City. These measurement tests were conducted at the MRT Technology (Taiwan) Co., Ltd. Facility located at No.38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 33377, Taiwan (R.O.C).



2. PRODUCT INFORMATION

2.1. Equipment Description

Product Name	OmniAccess Stellar
Model No.	OAW-AP1301H
Wi-Fi Specification	802.11a/b/g/n/ac/ax
Bluetooth Specification	v5.0 Single mode
Power Type	AC Power Adapter or PoE Injector Input
Operating Environment	Indoor Use
Operating Temperature	0°C ~ 50°C
EUT Identification No.:	20210803Sample#01 (Conducted) 20210906Sample#02 (Radiated & AC conducted emission)
Antenna Information	Refer to Section 2.4
Accessories	
AC Power Adapter 1#	Model: PPL65U-480 Input: 100-240V ~ 50/60Hz, 1.4A Output: 48.0V, 1.36A, 65.28W MAX
AC Power Adapter 2#	Model: ADP-50GR B Input: 100-240V ~ 50/60Hz, 1.3A Output: 48.0V, 1.042A, 50.1W MAX
PoE Injector	Model: PD-9001GR/AT/AC Input: 100-240V ~ 0.67A, 50/60Hz Output: 55.0V, 0.6A
Remark: 1. AC Power Adapter and PoE Injector are not sold with the product. 2. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

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, 5690MHz, 5775MHz
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 300Mbps 802.11ac: up to 866.6Mbps 802.11ax: up to 1201Mbps

Note: For other features of this EUT, test reports will be issued separately.

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

2.4. Description of Available Antennas

Antenna Type	Frequency Band (GHz)	Max Peak Gain (dBi)	CDD Directional Gain (dBi)		BF Directional Gain (dBi)
			For Power	For PSD	
Wi-Fi Antenna (2*2 MIMO)					
PIFA	2.4 ~ 2.5	3.92	3.92	6.93	6.93
	5.15 ~ 5.25	4.41	4.41	7.42	7.42
	5.25 ~ 5.35	4.41	4.41	7.42	7.42
	5.47 ~ 5.725	3.89	3.89	6.90	6.90
	5.725 ~ 5.85	4.25	4.25	7.26	7.26
Bluetooth Antenna					
PIFA	2.4 ~ 2.5	3.85			

Note:

1. The EUT supports Cyclic Delay Diversity (CDD) mode, and CDD signals are correlated.

For CDD transmissions, directional gain is calculated as follows, N_{ANT} = 2, N_{SS} = 1.

If all antennas have the same gain, G_{ANT}, Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,

  Array Gain = 10 log (N_{ANT}/ N_{SS}) dB = 3.01;

- For power measurements on IEEE 802.11 devices,

  Array Gain = 0 dB for $N_{ANT} \leq 4$;

2. The EUT also supports Beam Forming mode, and the Beam Forming support 802.11n/ac/ax, not include 802.11a/b/g. Directional gain = G_{ANT} + BF Gain. BF mode power setting will be less than or equal to CDD power setting.

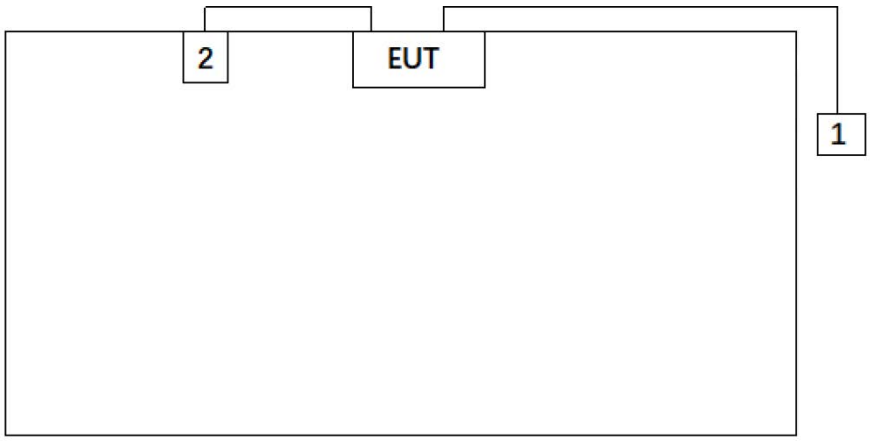
2.5. Test Mode

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 802.11ax-HE20 (MCS0)
	Mode 6: Transmit by 802.11ax-HE40 (MCS0)
	Mode 7: Transmit by 802.11ax-HE80 (MCS0)

Note: Due to the same modulation between 802.11n and 802.11ac, so 802.11n is covered by 802.11ac in this report, meanwhile, power setting for 802.11n will be equal or less than 802.11ac.

2.6. Configuration of Test System

The 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.



Product		Manufacturer	Model No.
1	Notebook	DELL	Precision 3510
2	AC Adapter	PHIHONG	PPL65U-480

Note 1: The test utility software used during testing was “QSPR”, and the version was “v50-00186”.

Note 2: Detail power setting refer to operation description.

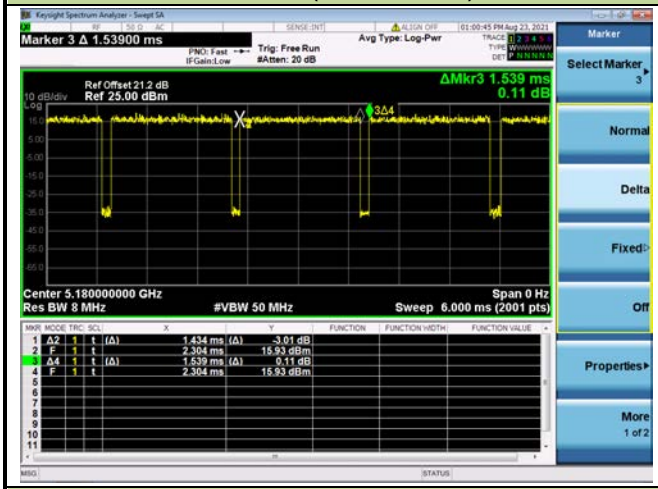
2.7. Duty Cycle

5GHz (NII) operation is possible in 20MHz, 40MHz and 80MHz 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:

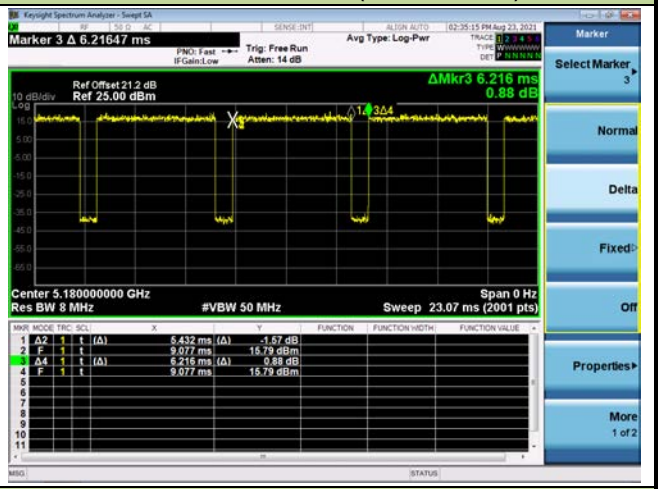
Test Mode	Duty Cycle
802.11a	93.18%
802.11ac-VHT20	87.39%
802.11ac-VHT40	92.52%
802.11ac-VHT80	88.86%
802.11ax-HE20	94.78%
802.11ax-HE40	94.60%
802.11ax-HE80	94.40%

Duty Cycle (T = Transmission Duration)

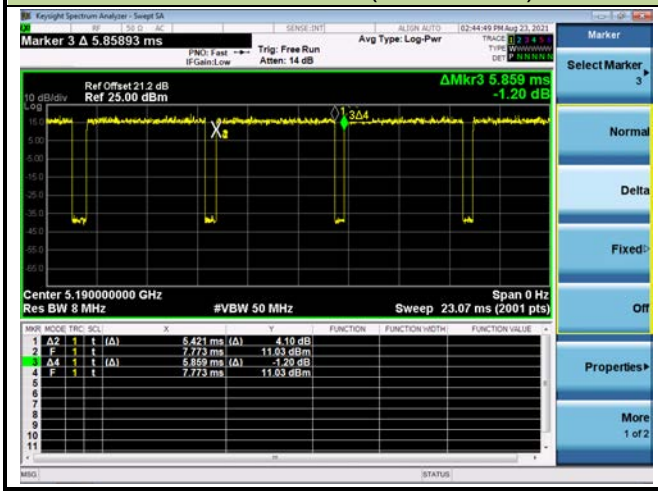
802.11a (T=1.434ms)



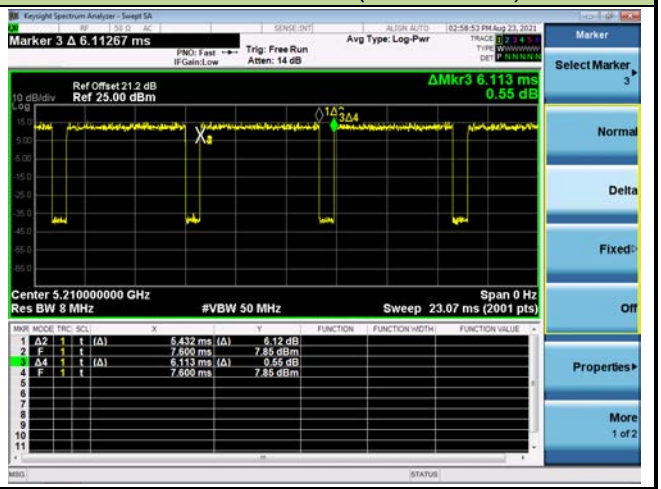
802.11ac-VHT20 (T=5.432ms)

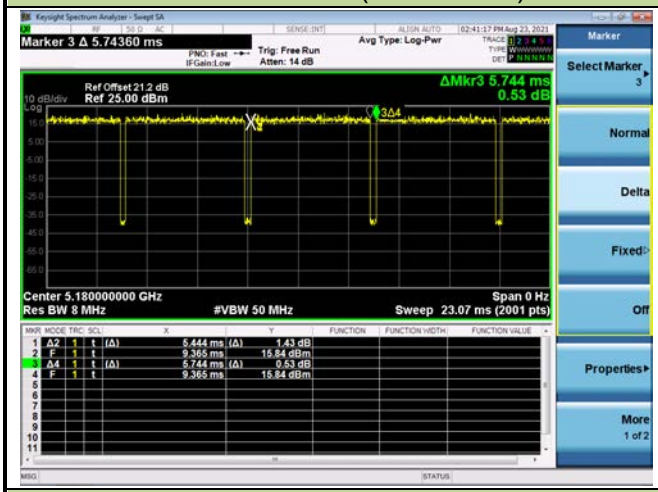
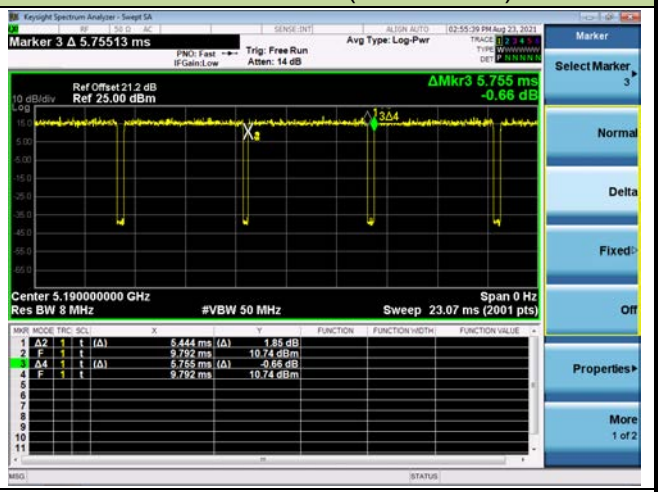
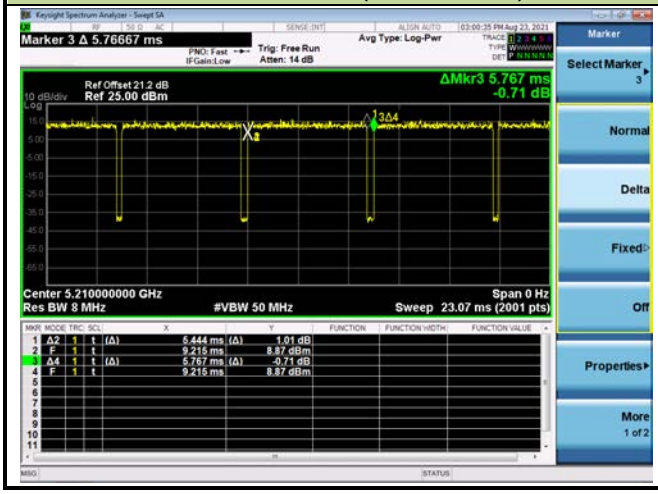


802.11ac-VHT40 (T=5.421ms)



802.11ac-VHT80 (T=5.432ms)



Duty Cycle (T = Transmission Duration)	
802.11ax-HE20 (T=5.444ms)	802.11ax-HE40 (T=5.444ms)
	
802.11ax-HE80 (T=5.444ms)	
	

2.8. Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ANSI C63.10-2013
- FCC KDB 789033 D02v02r01
- FCC KDB 662911 D01v02r01
- FCC KDB 414788 D01v01r01

2.9. EMI Suppression Device(s)/Modifications

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

2.10. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION OF TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 789033 D02v02r01 were used in the measurement.

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. 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.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions -SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Two-Line V-Network	R&S	ENV 216	MRTTWA00019	1 year	2022/3/23
Two-Line V-Network	R&S	ENV 216	MRTTWA00020	1 year	2022/4/24
8-Wire ISN (T8)	R&S	ENY81	MRTTWA00018	1 year	2022/5/30
EMI Test Receiver	R&S	ESR3	MRTTWA00045	1 year	2022/5/25
Temperature/Humidity Meter	TFA	35.1083	MRTTWA00050	1 year	2022/6/3

Radiated Emissions – AC1/AC2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Active Loop Antenna	SCHWARZBECK	FMZB 1519B	MRTTWA00002	1 year	2022/4/27
Broadband TRILOG Antenna	SCHWARZBECK	VULB 9162	MRTTWA00001	1 year	2022/10/4
Broadband Horn Antenna	SCHWARZBECK	BBHA 9120D	MRTTWA00003	1 year	2022/4/24
Broadband Horn Antenna	RFSPIN	DRH18-E	MRTTWA00087	1 year	2022/6/28
Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	MRTTWA00004	1 year	2022/4/24
Broadband Preamplifier	SCHWARZBECK	BBV 9718	MRTTWA00005	1 year	2022/4/24
Broadband Preamplifier	EMC Instruments corporation	EMC118A45SE	MRTTWA00088	1 year	2022/6/28
Broadband Amplifier	SCHWARZBECK	BBV 9721	MRTTWA00006	1 year	2022/4/24
Signal Analyzer	R&S	FSV40	MRTTWA00007	1 year	2022/3/23
EMI Test Receiver	R&S	ESR3	MRTTWA00009	1 year	2022/3/24
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/11/14
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00010	1 year	2022/6/28
Cable	Rosnol	K1K50-UP0264-K1K50-4M	MRTTWE00012	1 year	2022/6/20
Antenna Cable	HUBERSUHNER	SF106	MRTTWE00034	1 year	2022/6/28
Cable	HUBERSUHNER	EMC105-NM-NM-3000	MRTTWE00035	1 year	2022/6/28
Temperature/Humidity Meter	TFA	35.1078.10.IT	MRTTWA00032	1 year	2022/6/6

Conducted Test Equipment

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
X-Series USB Peak and Average Power Sensor	KEYSIGHT	U2021XA	MRTTWA00014	1 year	2022/4/21
EXA Signal Analyzer	KEYSIGHT	N9010A	MRTTWA00012	1 year	2021/11/14
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTTWA00074	1 year	2022/7/19

Attenuator	WTI	218FS-20	MRTTWE00027	1 year	2022/6/16
Attenuator	WTI	218FS-10	MRTTWE00028	1 year	2022/6/16
Attenuator	WTI	218FS-06	MRTTWE00029	1 year	2022/6/16
Temperature/Humidity Meter	TFA	35.1083	MRTTWA00050	1 year	2022/6/3

Software	Version	Function
v3	9.160520a	EMI Test Software

6. 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.

AC Conducted Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: 2.53dB
Radiated Emission Measurement
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: 4.25dB 1GHz ~ 40GHz: 4.45dB
Conducted Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 0.84dB
Conducted Spurious Emission
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ± 2.65 dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 3.3%
Temp. / Humidity
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±0.82°C/ ±3%
Frequency Error
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): ±78.4Hz

7. TEST RESULT

7.1. Summary

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.407(a)	26dB Bandwidth	N/A	Conducted	--	Section 7.2
15.407(e)	6dB Bandwidth	≥ 500kHz		Pass	Section 7.3
15.407(a)(1)(ii), (2), (3)(i)	Maximum Conducted Output Power	≤ 30dBm (NII-1 & NII-3) ≤ 250mW (NII-2)		Pass	Section 7.4
15.407(a)(1)(ii), (2), (3)(i), (12)	Peak Power Spectral Density	≤ 17dBm/MHz (NII-1) ≤ 11dBm/MHz (NII-2) ≤ 30dBm/500kHz (NII-3)		Pass	Section 7.5
15.407(b)(1), (2), (3), (4)(i)	Undesirable Emissions	Refer to Section 7.6	Radiated	Pass	Section 7.6 & 7.7
15.407(b)(8), (9), (10)	General Field Strength (Restricted Bands and Radiated Emission)	Emissions in restricted bands must meet the radiated limits detailed in15.209		Pass	
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.8

Notes:

1) 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.
2) For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
3) Determining compliance is based on the test results met the regulation limits or requirements declared by clients, and the test results don't take into account the value of measurement uncertainty.
4) EUT supports one configuration only in 802.11ax full RU mode.

7.2. 26dB Bandwidth Measurement

7.2.1.Test Limit

N/A

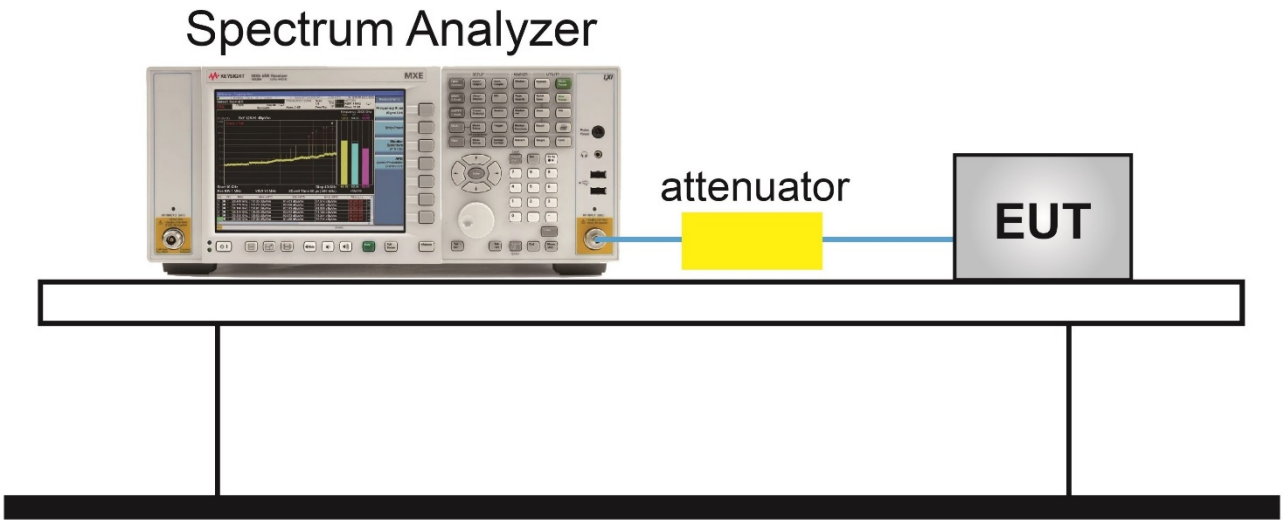
7.2.2.Test Procedure used

KDB 789033 D02v02r01- Section C.1

7.2.3.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 ≥ 3×RBW.
4. Detector = Peak.
5. Trace mode = max hold.

7.2.4.Test Setup



7.2.5.Test Result

Product	OmniAccess Stellar	Temperature	26°C
Test Engineer	Eric Lin	Relative Humidity	61%
Test Site	SR2	Test Date	2021/09/05~2021/09/22

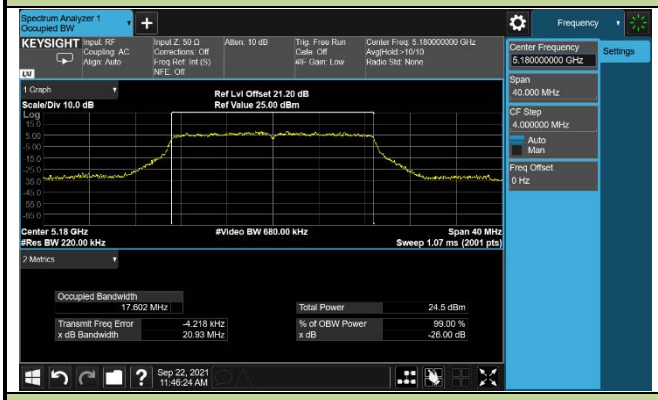
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11a	6Mbps	36	5180	19.86	16.39
802.11a	6Mbps	44	5220	20.14	16.36
802.11a	6Mbps	48	5240	20.46	16.35
802.11a	6Mbps	52	5260	19.92	16.36
802.11a	6Mbps	60	5300	20.52	16.38
802.11a	6Mbps	64	5320	20.53	16.41
802.11a	6Mbps	100	5500	19.88	16.36
802.11a	6Mbps	116	5580	20.08	16.38
802.11a	6Mbps	140	5700	19.97	16.37
802.11a	6Mbps	144	5720	20.05	16.38
802.11a	6Mbps	149	5745	21.88	16.52
802.11a	6Mbps	157	5785	23.83	16.62
802.11a	6Mbps	165	5825	23.73	16.56
802.11ac-VHT20	MCS0	36	5180	21.12	17.62
802.11ac-VHT20	MCS0	44	5220	21.30	17.63
802.11ac-VHT20	MCS0	48	5240	20.90	17.53
802.11ac-VHT20	MCS0	52	5260	20.48	17.58
802.11ac-VHT20	MCS0	60	5300	20.96	17.59
802.11ac-VHT20	MCS0	64	5320	21.31	17.59
802.11ac-VHT20	MCS0	100	5500	20.74	17.55
802.11ac-VHT20	MCS0	116	5580	21.12	17.59
802.11ac-VHT20	MCS0	140	5700	20.98	17.55
802.11ac-VHT20	MCS0	144	5720	20.94	17.59
802.11ac-VHT20	MCS0	149	5745	22.37	17.70
802.11ac-VHT20	MCS0	157	5785	26.06	17.78
802.11ac-VHT20	MCS0	165	5825	23.49	17.74

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ac-VHT40	MCS0	38	5190	40.15	36.07
802.11ac-VHT40	MCS0	46	5230	39.96	36.06
802.11ac-VHT40	MCS0	54	5270	47.10	36.30
802.11ac-VHT40	MCS0	62	5310	40.55	36.13
802.11ac-VHT40	MCS0	102	5510	40.07	36.07
802.11ac-VHT40	MCS0	110	5550	40.68	36.18
802.11ac-VHT40	MCS0	134	5670	40.34	36.07
802.11ac-VHT40	MCS0	142	5710	41.16	36.13
802.11ac-VHT40	MCS0	151	5755	41.90	36.22
802.11ac-VHT40	MCS0	159	5795	54.57	36.40
802.11ac-VHT80	MCS0	42	5210	82.07	75.35
802.11ac-VHT80	MCS0	58	5290	81.50	75.52
802.11ac-VHT80	MCS0	106	5530	81.87	75.44
802.11ac-VHT80	MCS0	122	5610	82.84	75.56
802.11ac-VHT80	MCS0	138	5690	81.86	75.60
802.11ac-VHT80	MCS0	155	5775	81.92	75.41
802.11ax-HE20	MCS0	36	5180	21.14	18.88
802.11ax-HE20	MCS0	44	5220	21.76	18.98
802.11ax-HE20	MCS0	48	5240	21.18	18.85
802.11ax-HE20	MCS0	52	5260	21.46	18.94
802.11ax-HE20	MCS0	60	5300	21.58	18.94
802.11ax-HE20	MCS0	64	5320	21.93	18.95
802.11ax-HE20	MCS0	100	5500	21.22	18.93
802.11ax-HE20	MCS0	116	5580	22.16	18.94
802.11ax-HE20	MCS0	140	5700	21.28	18.93
802.11ax-HE20	MCS0	144	5720	21.22	18.88
802.11ax-HE20	MCS0	149	5745	23.42	19.00
802.11ax-HE20	MCS0	157	5785	25.02	19.05
802.11ax-HE20	MCS0	165	5825	23.72	18.99

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
802.11ax-HE40	MCS0	38	5190	41.27	37.74
802.11ax-HE40	MCS0	46	5230	40.87	37.67
802.11ax-HE40	MCS0	54	5270	42.47	37.87
802.11ax-HE40	MCS0	62	5310	41.10	37.75
802.11ax-HE40	MCS0	102	5510	41.14	37.76
802.11ax-HE40	MCS0	110	5550	42.84	37.92
802.11ax-HE40	MCS0	134	5670	41.43	37.79
802.11ax-HE40	MCS0	142	5710	48.05	37.92
802.11ax-HE40	MCS0	151	5755	42.04	37.83
802.11ax-HE40	MCS0	159	5795	41.85	37.88
802.11ax-HE80	MCS0	42	5210	82.04	77.16
802.11ax-HE80	MCS0	58	5290	81.52	75.46
802.11ax-HE80	MCS0	106	5530	81.55	75.41
802.11ax-HE80	MCS0	122	5610	81.73	77.24
802.11ax-HE80	MCS0	138	5690	81.81	77.37
802.11ax-HE80	MCS0	155	5775	81.34	75.31

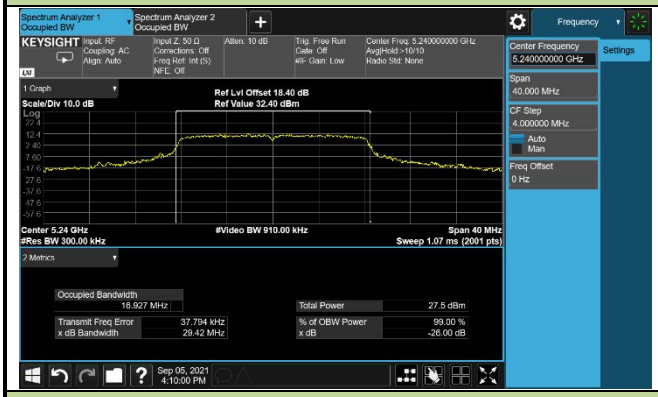
802.11a 26dB Bandwidth & 99% Bandwidth

Channel 36 (5180MHz)



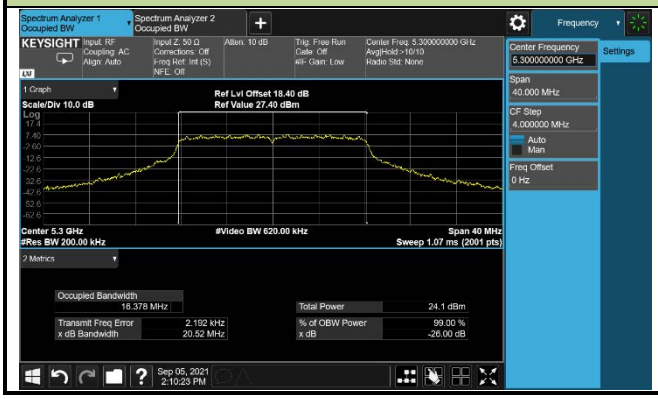
Channel 44 (5220MHz)

Channel 48 (5240MHz)



Channel 52 (5260MHz)

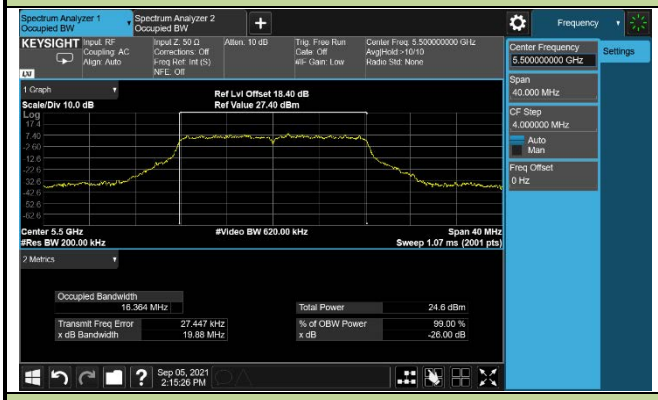
Channel 60 (5300MHz)



Channel 64 (5320MHz)

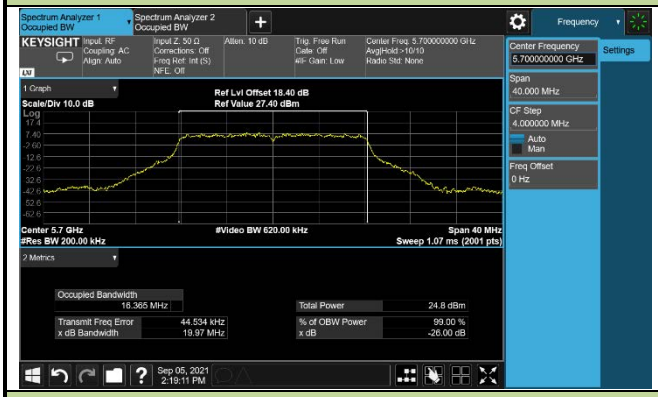
802.11a 26dB Bandwidth & 99% Bandwidth

Channel 100 (5500MHz)



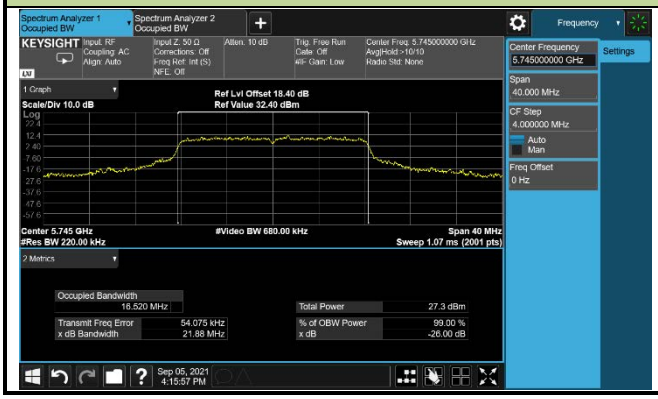
Channel 116 (5580MHz)

Channel 140 (5700MHz)

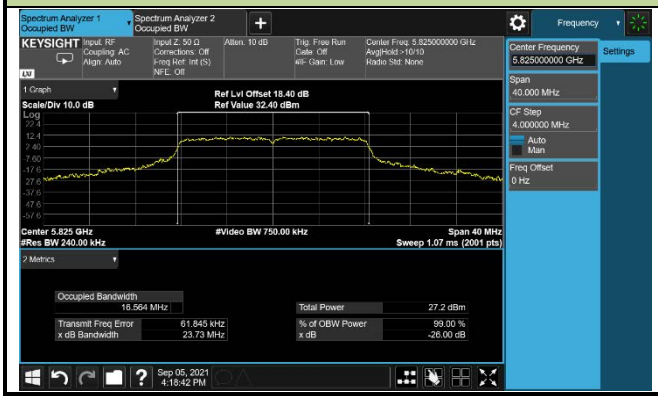


Channel 144 (5720MHz)

Channel 149 (5745MHz)

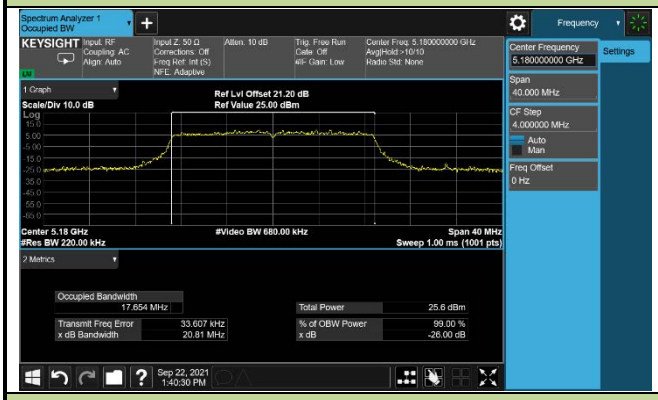


Channel 157 (5785MHz)

802.11a 26dB Bandwidth & 99% Bandwidth	
Channel 165 (5825MHz)	
	

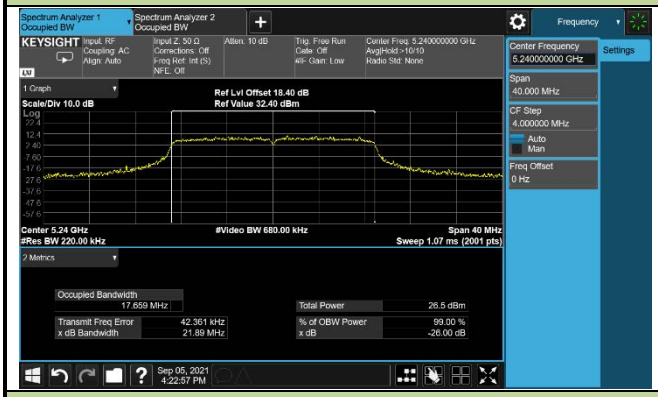
802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth

Channel 36 (5180MHz)



Channel 44 (5220MHz)

Channel 48 (5240MHz)



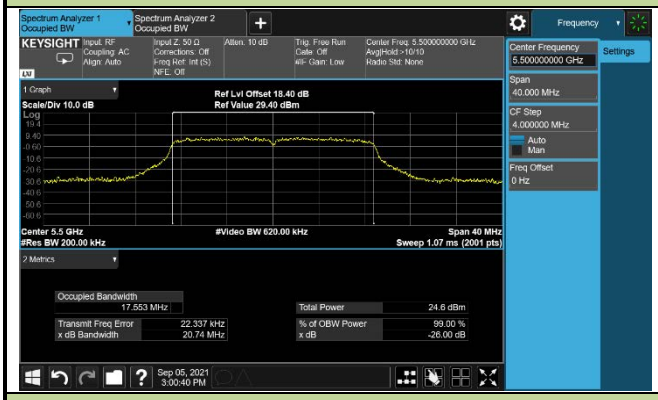
Channel 52 (5260MHz)

Channel 60 (5300MHz)

Channel 64 (5320MHz)

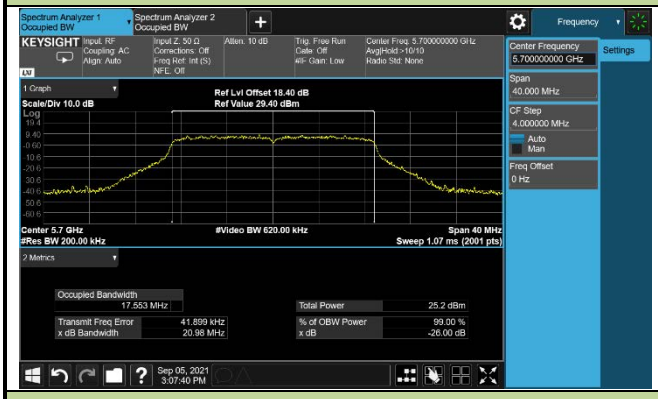
802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth

Channel 100 (5500MHz)



Channel 116 (5580MHz)

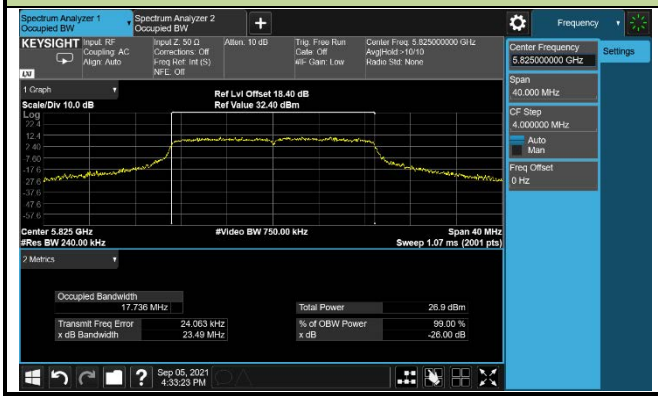
Channel 140 (5700MHz)



Channel 144 (5720MHz)

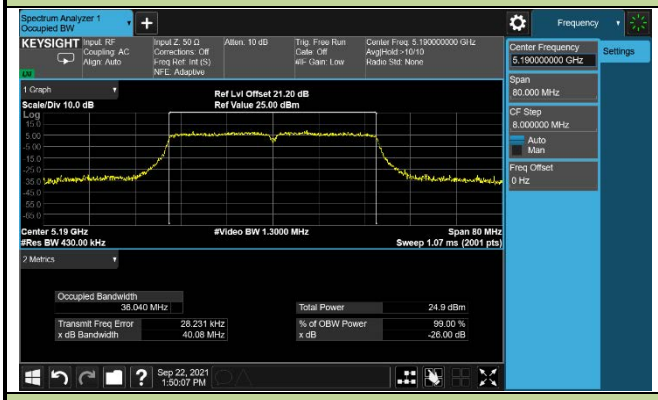
Channel 149 (5745MHz)

Channel 157 (5785MHz)

802.11ac-VHT20 26dB Bandwidth & 99% Bandwidth	
Channel 165 (5825MHz)	
	

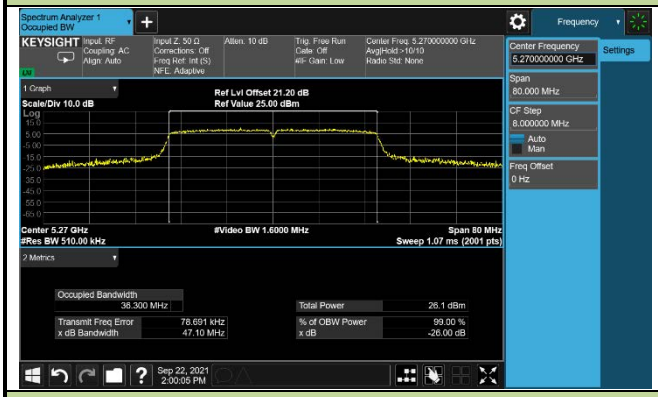
802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth

Channel 38 (5190MHz)



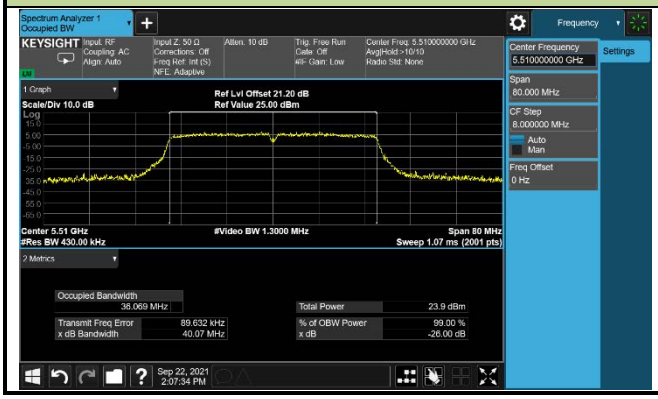
Channel 46 (5230MHz)

Channel 54 (5270MHz)



Channel 62 (5310MHz)

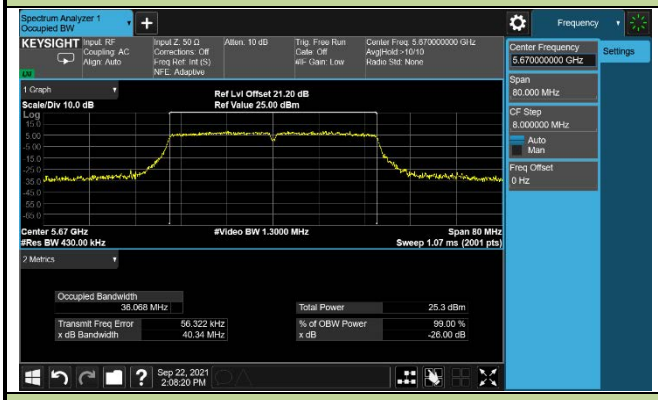
Channel 102 (5510MHz)



Channel 110 (5550MHz)

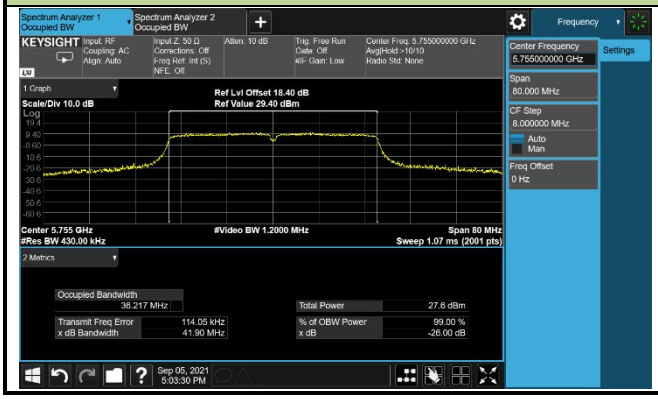
802.11ac-VHT40 26dB Bandwidth & 99% Bandwidth

Channel 134 (5670MHz)



Channel 142 (5710MHz)

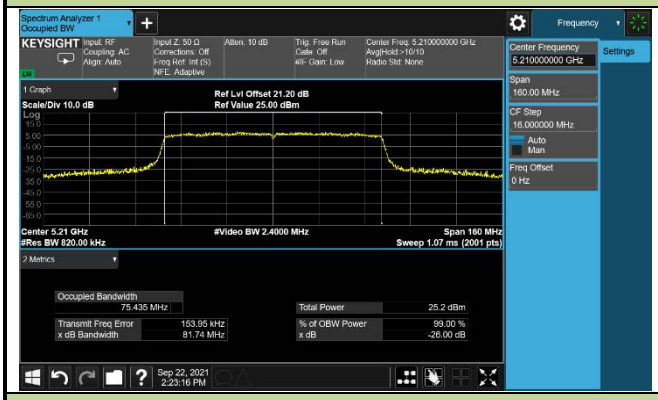
Channel 151 (5755MHz)



Channel 159 (5795MHz)

802.11ac-VHT80 26dB Bandwidth & 99% Bandwidth

Channel 42 (5210MHz)



Channel 58 (5290MHz)

Channel 106 (5530MHz)

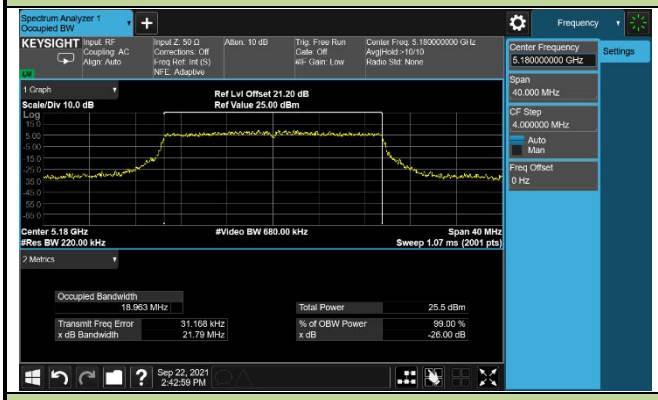
Channel 122 (5610MHz)

Channel 138 (5690MHz)

Channel 155 (5775MHz)

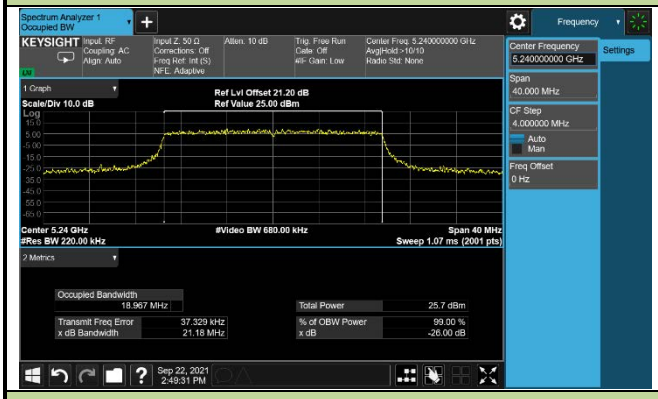
802.11ax-HE20 26dB Bandwidth & 99% Bandwidth

Channel 36 (5180MHz)



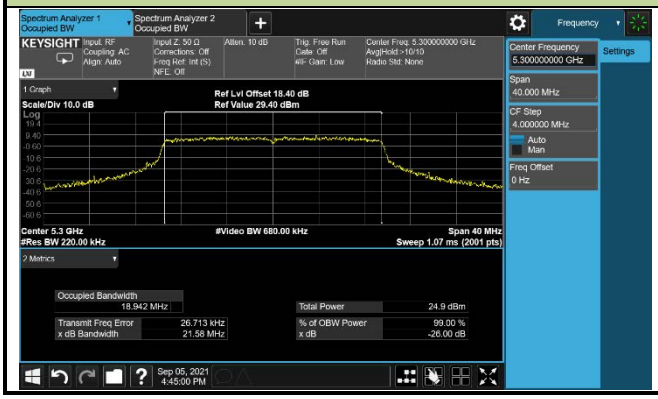
Channel 44 (5220MHz)

Channel 48 (5240MHz)



Channel 52 (5260MHz)

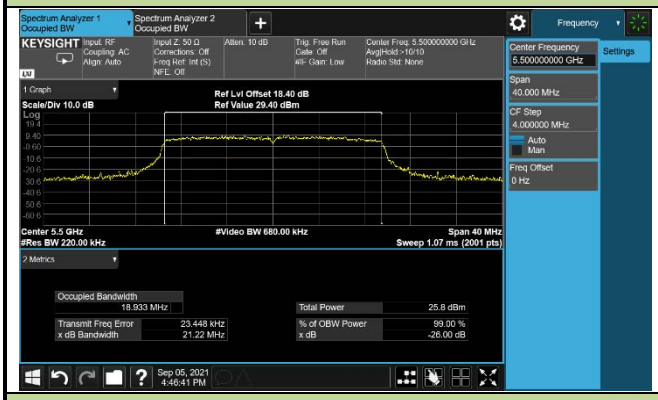
Channel 60 (5300MHz)



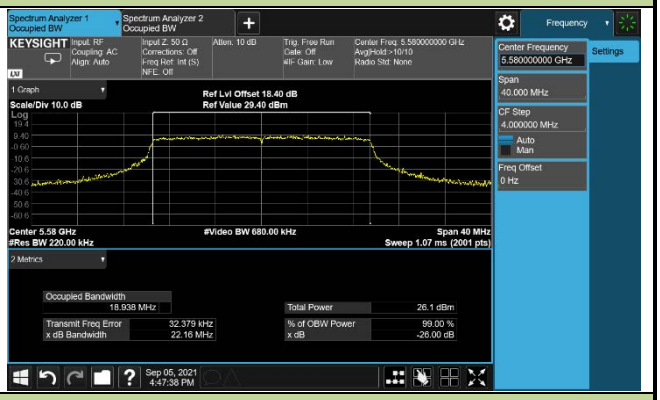
Channel 64 (5320MHz)

802.11ax-HE20 26dB Bandwidth & 99% Bandwidth

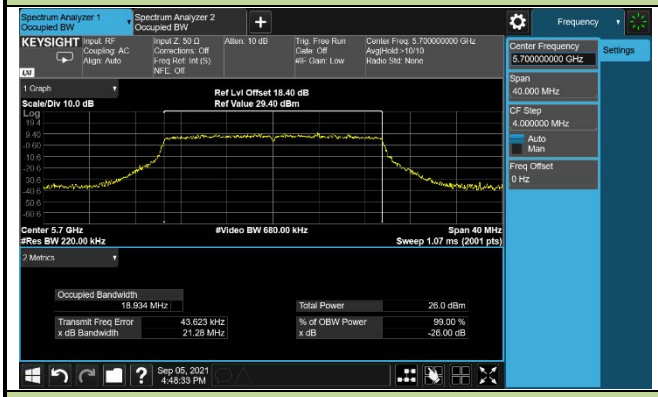
Channel 100 (5500MHz)



Channel 116 (5580MHz)

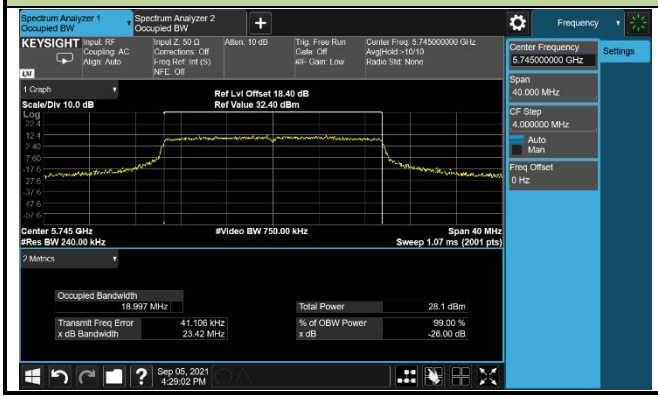


Channel 140 (5700MHz)

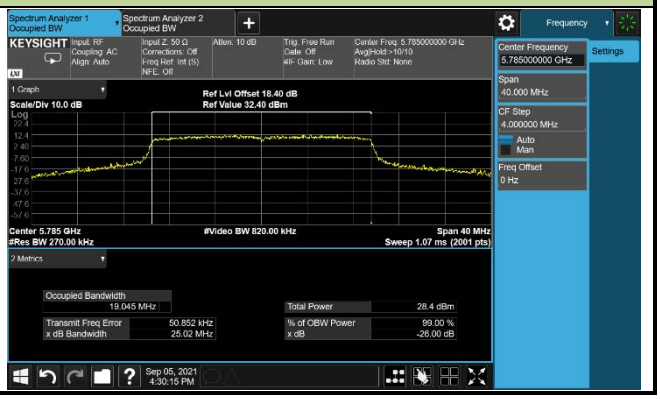


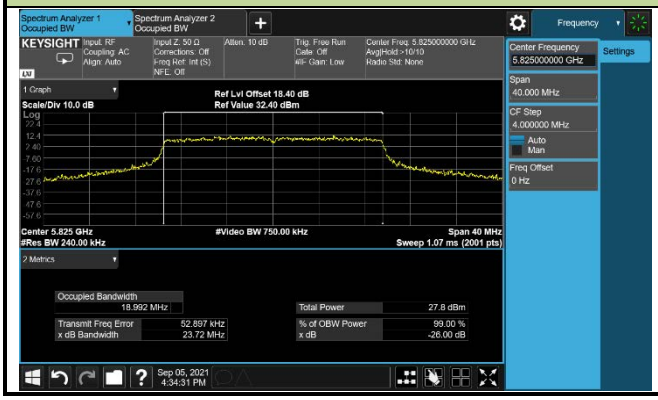
Channel 144 (5720MHz)

Channel 149 (5745MHz)



Channel 157 (5785MHz)



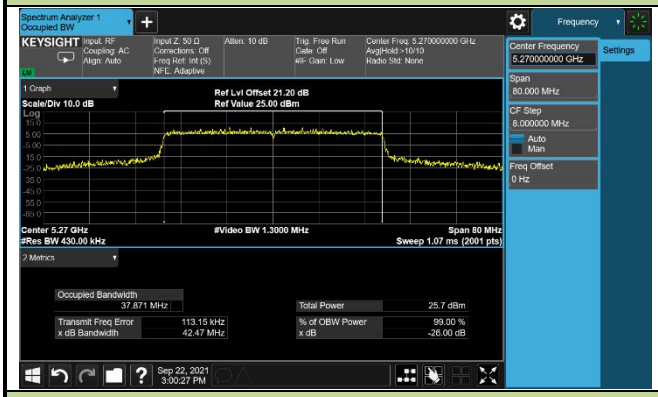
802.11ax-HE20 26dB Bandwidth & 99% Bandwidth	
Channel 165 (5825MHz)	
	

802.11ax-HE40 26dB Bandwidth & 99% Bandwidth

Channel 38 (5190MHz)

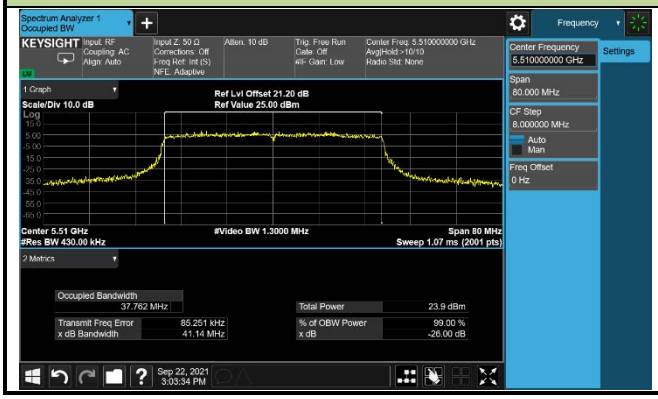
Channel 46 (5230MHz)

Channel 54 (5270MHz)

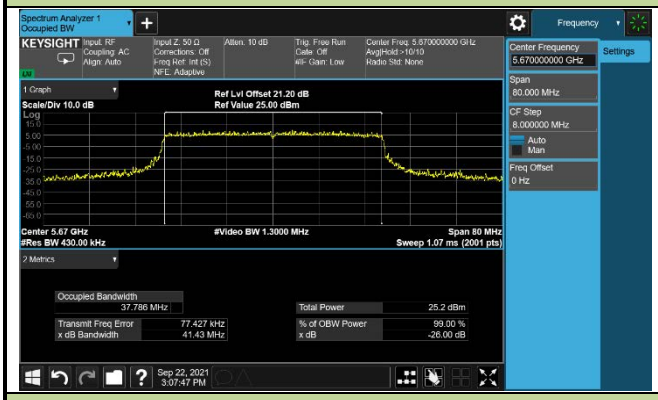
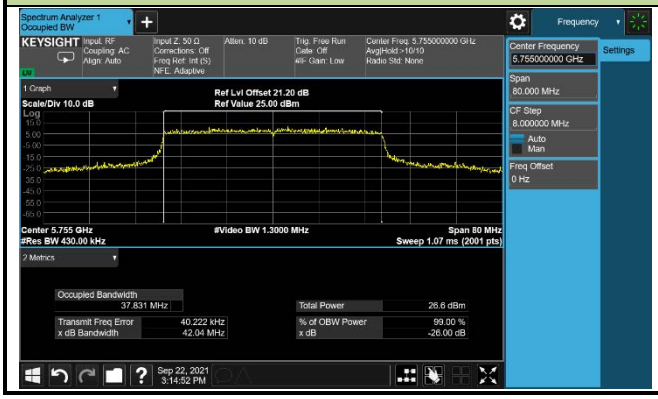


Channel 62 (5310MHz)

Channel 102 (5510MHz)

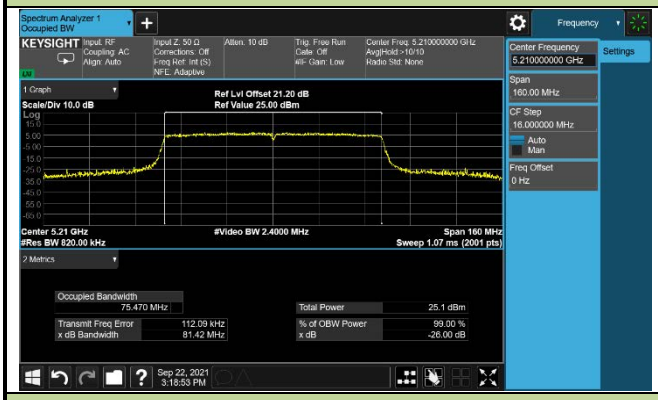


Channel 110 (5550MHz)

802.11ax-HE40 26dB Bandwidth & 99% Bandwidth	
Channel 134 (5670MHz)	Channel 142 (5710MHz)
	
Channel 151 (5755MHz)	Channel 159 (5795MHz)
	

802.11ax-HE80 26dB Bandwidth & 99% Bandwidth

Channel 42 (5210MHz)

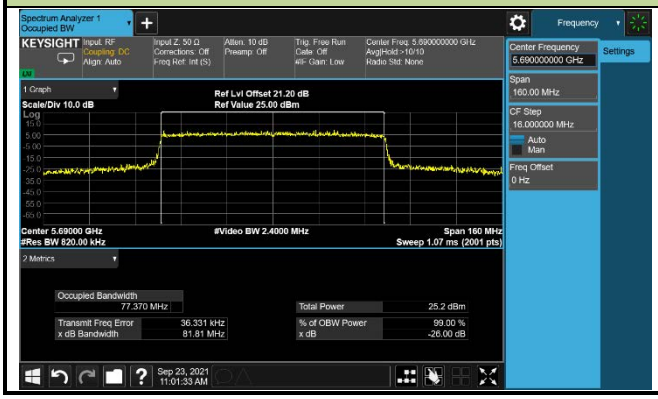


Channel 58 (5290MHz)

Channel 106 (5530MHz)

Channel 122 (5610MHz)

Channel 138 (5690MHz)



Channel 155 (5775MHz)

7.3. 6dB Bandwidth Measurement

7.3.1.Test Limit

The minimum 6dBbandwidth shall be at least 500 kHz.

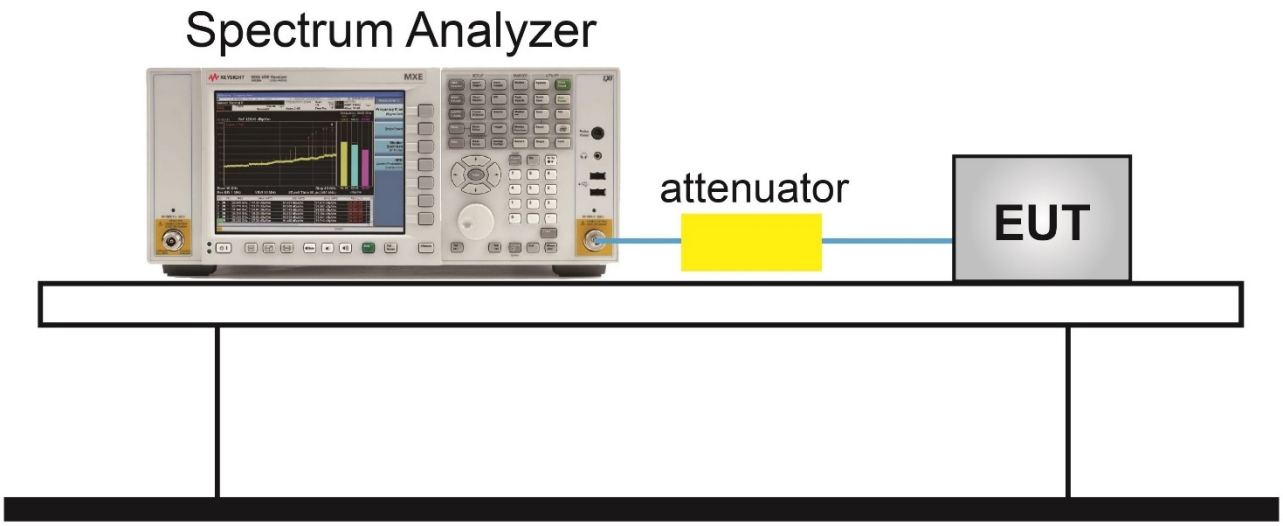
7.3.2.Test Procedure used

KDB 789033 D02v02r01- Section C.2

7.3.3.TestSetting

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 100 kHz.
3. VBW ≥ 3 × RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize.
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

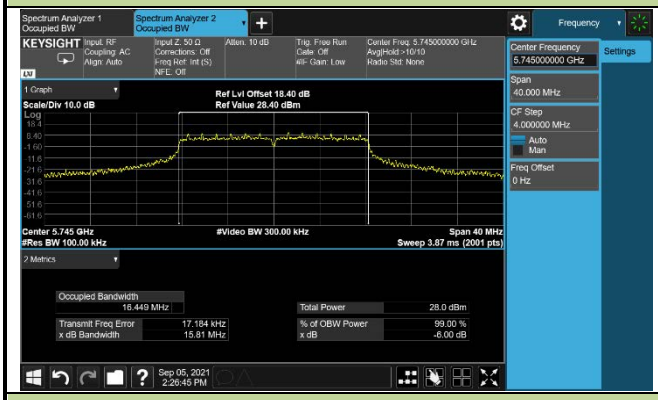
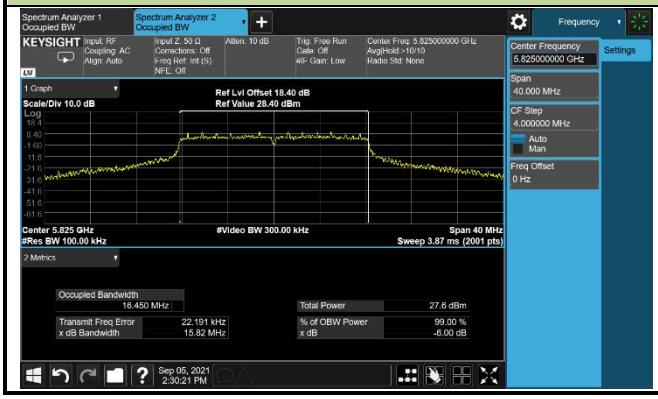
7.3.4.Test Setup



7.3.5.Test Result

Product	OmniAccess Stellar	Temperature	24~26°C
Test Engineer	Eric Lin	Relative Humidity	56~61%
Test Site	SR2	Test Date	2021/09/05~2021/09/22
Frequency Band	U-NII-3		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
802.11a	6Mbps	149	5745	15.81	≥ 0.5	Pass
802.11a	6Mbps	157	5785	16.01	≥ 0.5	Pass
802.11a	6Mbps	165	5825	15.82	≥ 0.5	Pass
802.11ac-VHT20	MCS0	149	5745	16.94	≥ 0.5	Pass
802.11ac-VHT20	MCS0	157	5785	16.95	≥ 0.5	Pass
802.11ac-VHT20	MCS0	165	5825	15.73	≥ 0.5	Pass
802.11ac-VHT40	MCS0	151	5755	36.30	≥ 0.5	Pass
802.11ac-VHT40	MCS0	159	5795	37.90	≥ 0.5	Pass
802.11ac-VHT80	MCS0	155	5775	75.20	≥ 0.5	Pass
802.11ax-HE20	MCS0	149	5745	18.21	≥ 0.5	Pass
802.11ax-HE20	MCS0	157	5785	17.15	≥ 0.5	Pass
802.11ax-HE20	MCS0	165	5825	17.53	≥ 0.5	Pass
802.11ax-HE40	MCS0	151	5755	37.79	≥ 0.5	Pass
802.11ax-HE40	MCS0	159	5795	37.62	≥ 0.5	Pass
802.11ax-HE80	MCS0	155	5775	77.31	≥ 0.5	Pass

802.11a 6dB Bandwidth	
Channel 149 (5745MHz)	Channel 157 (5785MHz)
	
Channel 165 (5825MHz)