FCC Test Report

Report No: WD-RF-R-240372-D0

Product Name	**:**	Audio Device
Model Name	**:**	ACVG
FCC ID	**:**	Y4O-ACVG
Applicant	**:**	inMusic Brands, Inc.
Received Date	**:**	Nov. 22, 2024
Tested Date	**:**	Dec. 20, 2024 ~ Jan. 13, 2025
Applicable Standard	**:**	47 CFR FCC Part 15, Subpart E (Section 15.407) 789033 D02 General U-NII Test Procedures New Rules v02r01 ANSI C63.10 : 2013

Testing Laboratory
2965

Wendell Industrial Co., Ltd
Wendell EMC & RF Laboratory

Caution:
This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted.
The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment.
Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results.
This report must not be used to claim product endorsement by TAF or any agency of the government.
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Test Report

Issued Date: January 14, 2025

Project No.: 24Q111801-1

Product Name	Audio Device
Trade Name	AKAI PROFESSIONAL
Model Name	ACVG
FCC ID	Y4O-ACVG
Applicant	inMusic Brands, Inc.
Manufacturer	inMusic Brands, Inc.
EUT Rated Voltage	Battery 14.4V / AC 100-240V, 1.5A 50-60Hz
EUT Test Voltage	AC 120V / 60Hz
EUT Supports Radios Application	WLAN 802.11a/b/g WLAN 802.11n(HT20/40) WLAN 802.11ac(VHT20/40/80) and ax(HE20/40/80) Bluetooth BR/EDR/LE
Applicable Standard	47 CFR FCC Part 15, Subpart E (Section 15.407) 789033 D02 General U-NII Test Procedures New Rules v02r01 ANSI C63.10 : 2013
Output Power	5.18 ~ 5.24 GHz: 20.73 dBm 5.745 ~ 5.825 GHz: 22.32 dBm
Test Result	Complied

Documented : Emma Lu

(Specialist / Emma Lu)

Technical Engineer : Jason Hsieh

(Assistant Section Manager / Jason Hsieh)

Approved : Gary Wu

(Project Manager / Gary Wu)

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Attachment 2: EUT Detailed Photographs

Document Revision History

Report No.	Issue date	Description
WD-RF-R-240372-D0	January 14, 2025	Initial report

Summary of Test Result

Ref. Std. Clause	Test Items	Result
15.407(a)	26dB Bandwidth	Pass
15.407(e)	6dB Bandwidth	Pass
--	99% Occupied Bandwidth	Pass
15.407(a)	Maximum Conducted Output Power	Pass
15.407(a)	Power Spectral Density	Pass
15.407(b) 15.209	Unwanted Emissions	Pass
15.407(g)	Frequency Stability	Pass
15.207	AC Conducted Emission	Pass
15.203 15.407(a)	Antenna Requirement	Pass

1 Generation Information

1.1 Applicant

inMusic Brands, Inc.
200 Scenic View Drive, Cumberland, RI 02864, U.S.A.

1.2 Manufacturer

inMusic Brands, Inc.
200 Scenic View Drive, Cumberland, RI 02864, U.S.A.

1.3 Description of Equipment under Test

Product Name	Audio Device
Model No.	ACVG
FCC ID	Y4O-ACVG
Frequency Range	802.11a/n-HT20/ac-VHT20/ax-HE20:5180~5240MHz, 5745~5825MHz 802.11n-HT40/ac-VHT40/ax-HE40:5190~5230MHz, 5755~5795MHz 802.11ac-VHT80/ax-HE80:5210MHz, 5775MHz
Number of Channels	802.11a/n/ac/ax-20MHz: 6 802.11n/ac/ax-40MHz: 4 802.11ac/ax-80MHz: 2
Data Rate	802.11a：6M - 54 Mbps 802.11n：up to 300 Mbps 802.11ac：up to 866.7 Mbps 802.11ax：up to 1201Mbps
Type of Modulation	802.11a/n/ac: OFDM (BPSK, QPSK, 16~256QAM) 802.11ax: OFDMA (BPSK, QPSK, 16~1024QAM)
Antenna Information	Refer to the table “Antenna List”
EUT Supports Radios Application	WLAN 802.11a/b/g WLAN 802.11n(HT20/40) WLAN 802.11ac(VHT20/40/80) and ax(HE20/40/80) Bluetooth BR/EDR/LE
EUT Rated Voltage	Battery 14.4V / AC 100-240V, 1.5A 50-60Hz
EUT Test Voltage	AC 120V / 60Hz

The EUT uses following adapter.

Trade Name	FSP
Model No.	FSP065-RBBN3
Input Power	AC 100-240V, 1.5A 50-60Hz
Output Power	DC 19.0V/3.42A 65.0W
Power Line	Shielded, 1 Core, 1.4m

Antenna List

No.	Manufacturer	Model No.	Antenna Type	Peak Gain
1	Brito Technology	OTDB1EM60-I0350	PCB Antenna	2 dBi for 5.15 ~ 5.25 GHz 2 dBi for 5.725 ~ 5.85 GHz
2	Brito Technology	OTDB1EM60-I0195	PCB Antenna	2 dBi for 5.15 ~ 5.25 GHz 2 dBi for 5.725 ~ 5.85 GHz

Remark: The antenna of EUT is conforming to FCC 15.203

Test Frequencies in each operating band

Frequency range over which the device operates in each operating band (Note 1)	Number of test frequencies required	Location of test frequencies inside the operating frequency range (Note 1,2)
≤ 1 MHz	1	near center
> 1 MHz and ≤ 10 MHz	2	1 near high end, 1 near low end
> 10 MHz	3	1 near high end, 1 near center, and 1 near low end

Note 1: The frequency range over which the device operates in a given operating band is the difference between the highest and lowest frequencies on which the device can be tuned within that given operating band. The frequency range can be smaller than or equal to the operating band, but cannot be greater than the operating band.

Note 2: In the third column of table 1, “near” means as close as possible to or at the center / low end / high end of the frequency range over which the device operates.

Channel List

802.11a/n/ac/ax HT20/VHT20/HE20		802.11n/ac/ax HT40/VHT40/HE40		802.11ac/ax VHT80/HE80	
Channel	**Frequency(MHz)**	**Channel**	**Frequency(MHz)**	**Channel**	**Frequency(MHz)**
36	5180	38	5190	42	5210
40	5200	46	5230	155	5775
48	5240	151	5755	--	--
149	5745	159	5795	--	--
157	5785	--	--	--	--
165	5825	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Firmware / Software Version

1	**Product Name**	Audio Device
2	**Model No.**	ACVG
3	**Test SW Version**	Putty 0.63.0.0
4	**RF power setting in TEST SW**	☐ RF power setting was not able to alter during testing. ☒ RF power setting was able to alter during testing. (See the following table)

Parameters of test software setting

Type of Modulation	Channel	Frequency (MHz)	Set Value	
			Chain A	Chain B
802.11a	36	5180	15	15
	40	5200	15	15
	48	5240	15	15
	149	5745	15	15
	157	5785	16	16
	165	5825	16	16
802.11ac(VHT20)	36	5180	15	15
	40	5200	15	15
	48	5240	15	15
	149	5745	15	15
	157	5785	16	16
	165	5825	16	16

802.11ac(VHT40)	38	5190	11	11
	46	5230	11	11
	151	5755	16	16
	159	5795	16	16
802.11ac(VHT80)	42	5210	10	10
	155	5775	14	14
802.11ax(HE20)	36	5180	16	16
	40	5200	16	16
	48	5240	16	16
	149	5745	16	16
	157	5785	17	17
	165	5825	17	17
802.11ax(HE40)	38	5190	10	10
	46	5230	10	10
	151	5755	16	16
	159	5795	16	16
802.11ax(HE80)	42	5210	12	12
	155	5775	15	15

1.4 Test Mode Applicability And Tested Channel Detail

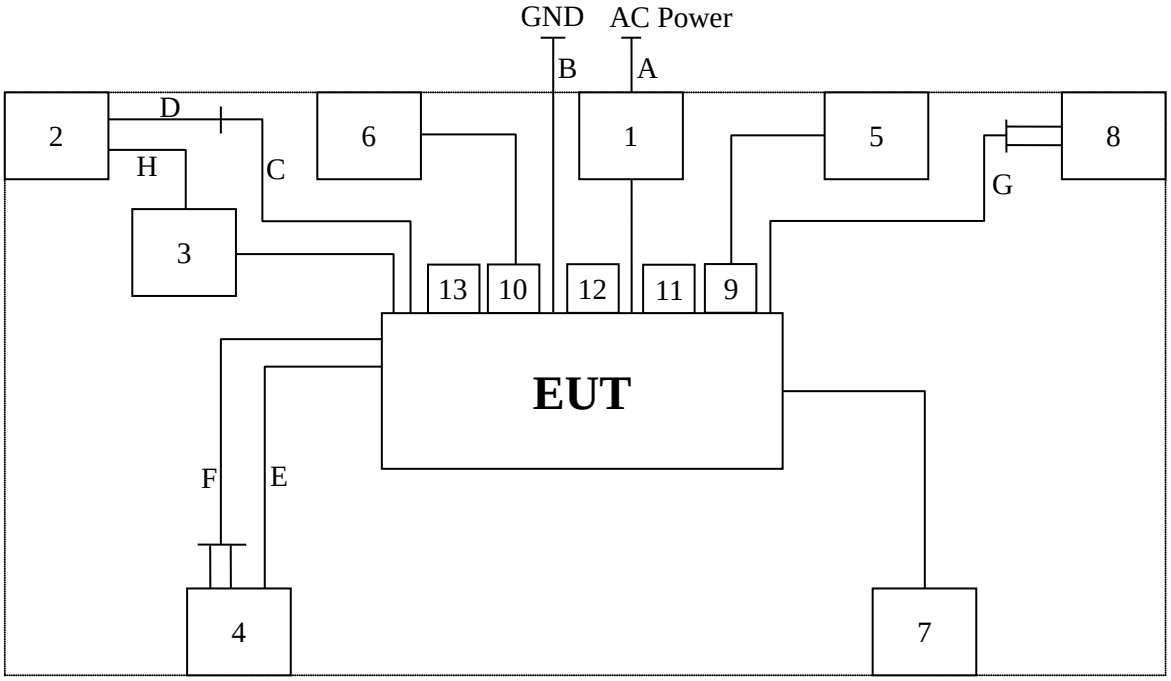
1. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.
2. The worst case was found when positioned on X axis for radiated emission. Following test modes were selected for the final test, and the final worst case is recorded in the report:
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The EUT has been pre-tested under the following mode A：Adapter and mode B：Battery. Test mode A：Adapter was the worst case for final test.
5. Lowest data rates are tested in each mode. Only worst case is shown in the report. (802.11a is 6Mbps、802.11ac/ax-20BW/40BW/80BW is MCS0)
6. The spectrum plot against conducted item only shows the worst case.
7. 802.11ac VHT20 and VHT40 mode are different from 802.11n HT20 and HT40 only in control messages, so for these 4 modes, only 802.11ac VHT20 and VHT40 worst case power modes radiated emission test data are recorded in the report.

EUT Configure Mode	RE < 1G	RE ≥ 1G	ACM	ACP
Mode 1：Transmit (802.11a 6Mbps)	☒	☒	☒	☐
Mode 2：Transmit (802.11ac VHT20 MCS0)	☐	☒	☒	☐
Mode 3：Transmit (802.11ac VHT40 MCS0)	☐	☒	☒	☐
Mode 4：Transmit (802.11ac VHT80 MCS0)	☐	☒	☒	☐
Mode 5：Transmit (802.11ax HE20M MCS0)	☐	☒	☒	☐
Mode 6：Transmit (802.11ax HE40M MCS0)	☐	☒	☒	☐
Mode 7：Transmit (802.11ax HE80M MCS0)	☐	☒	☒	☐
Mode 8：Charging Mode	☐	☐	☐	☒

Note : RE<1G: Radiated Emission below 1GHz RE≥1G: Radiated Emission above 1GHz
ACM: Antenna Port Conducted Measurement ACP: AC Power Line Conducted Emission

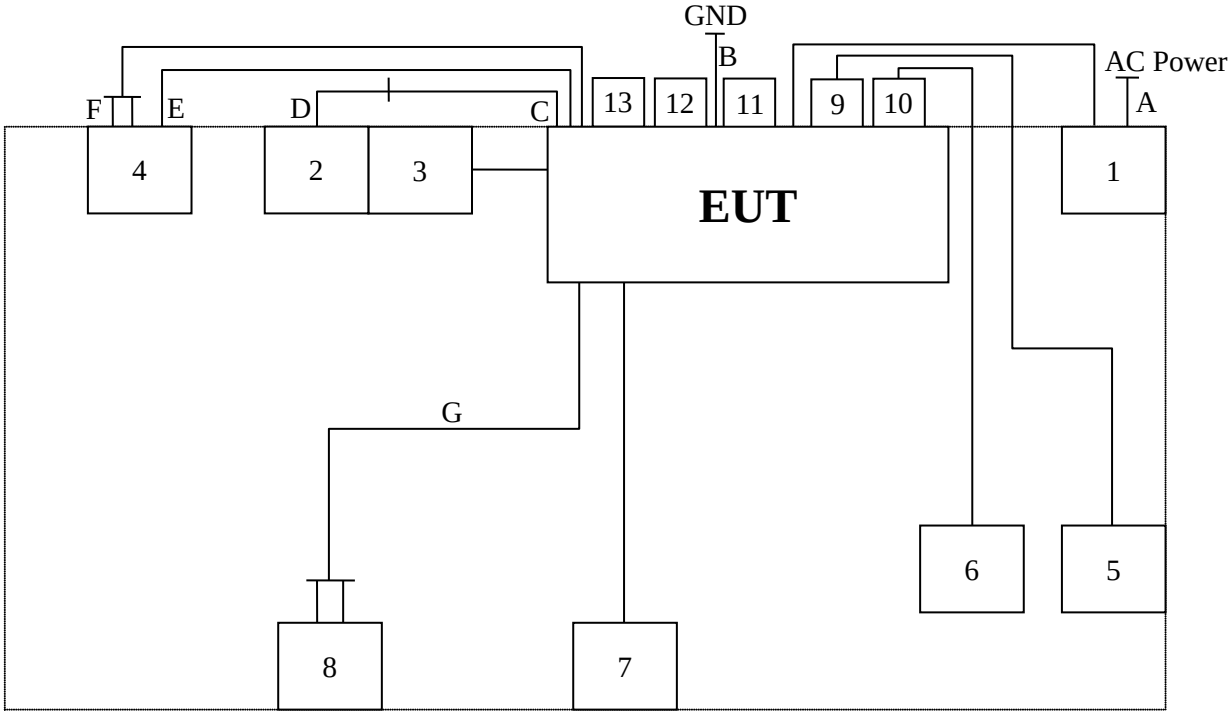
1.5 Configuration of Tested System

Radiation



Test Table

AC Conduction



Test Table

1.6 EUT Exercise Software

1. Setup the EUT as shown in Section 1.5
2. Execute software “Putty 0.63.0.0”.
3. Configure the test mode, the test channel, and the data rate.
4. Press “OK” to start the continuous transmit.
5. Verify that the EUT works properly.

1.7 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Adapter	FSP	FSP065-RBBN3	N/A	Shielded, 1 Core, 1.4m
2	Notebook PC	acer	N16Q1	NXVD4TA023742254707600	N/A
3	Fixture	WD	CH340	N/A	N/A
4	4 in 1 Speaker	WD	SK-04	N/A	N/A
5	Speaker	Dell	AX-210	N/A	Non-shielded, Non-Core, 0.5m
6	Speaker	Dell	AX-210	N/A	Non-shielded, Non-Core, 0.5m
7	Microphone	PX	PK-120	N/A	Non-shielded, Non-Core, 3.2m
8	DVD Player	Dennys	DVD-6400	C7RJMCPHF0GQ	Non-shielded, Non-Core, 1.2m
9	6.3mm to RCA Connector	WD	TRS6.3M-RCA	N/A	N/A
10	6.3mm to RCA Connector	WD	TRS6.3M-RCA	N/A	N/A
11	SD Card& Micro SD Card	ADATA	MSC-2	N/A	N/A
12	Flash drive	SanDisk	SDCZ50-008G	N/A	N/A
13	Flash drive	SanDisk	SDDDC3-032G-G46	BM2407005781Z	N/A

No.	Signal Cable Type	Signal cable Description
A	Power Cable	Non-shielded, Non-Core,1m
B	Ground Cable	Non-shielded, Non-Core, 1.6m
C	RCA Cable	Non-shielded, Non-Core, 1.5m
D	3.5mm to RCA Cable	Non-shielded, Non-Core, 0.3m
E	3.5mm Audio Cable	Non-shielded, 2 Core, 1.5m
F	1 to 2 Audio Cable	Shielded, Non-Core, 1.5m
G	1 to 2 Audio Cable	Shielded, Non-Core, 1.5m
H	USB Cable	Shielded, Non-Core, 1m

Accessories:

No.	Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Adapter	FSP	FSP065-RBBN3	N/A	Shielded, 1 Core, 1.4m

No.	Signal Cable Type	Signal cable Description
A	Power Cable	Non-shielded, Non-Core,1m

1.8 Test Facility

Items	Required (IEC 60068-1)
Temperature (°C)	15-35
Humidity (% RH)	25-75
Barometric pressure (mbar)	860-1060

Description: Accredited by TAF
Accredited Number: 2965

Issued by: Wendell Industrial Co., Ltd

Company Address: 6F/6F-1, No.188, Baoqiao Rd., Xindian Dist.,
New Taipei City 23145, Taiwan R.O.C

Test Lab: Wendell EMC & RF Laboratory

Lab Address: 5F-1, No.188, Baoqiao Rd., Xindian Dist.,
New Taipei City 23145, Taiwan R.O.C

Test Location: No. 119, Wugong 3rd Rd., Wugu Dist.,
New Taipei City 248, Taiwan (R.O.C.)

Designation Number: TW0025

Test Firm Registration Number: 665221

1.9 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence (level based on a coverage factor K=2)

Measurement Project	Condition	Expended Uncertainty
AC Conducted Emission	0.150 ~ 30 MHz	± 2.64 dB
Radiated Emission	0.009 ~ 30 MHz	± 1.8 dB
	30 ~ 1000 MHz	± 1.8 dB
	1000 ~ 18000 MHz	± 3.0 dB
	18000 ~ 40000 MHz	± 3.0 dB
RF Power, Conducted	Conducted Measuring	± 1.3 dB
Occupied Bandwidth	Conducted Measuring	± 2.4 %
Power Density	Conducted Measuring	± 1.2 dB
Duty Cycle	Conducted Measuring	± 0.9 %
Frequency Stability	Conducted Measuring	± 1.4 dB
DC Power Supply	--	± 0.068 ppm
Temperature	--	± 2.1 %
Humidity	--	± 0.58 °C

Note: Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results.

1.10 List of Test Equipment

For Conducted measurements / W08-Conducted Measurement

Equipment		Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
✓	Spectrum analyzer	Keysight	N9010A	SG50420005	2024/08/09	2025/08/08
✓	Wideband Peak Power Meter	Anritsu	ML2495A	1733007	2024/09/05	2025/09/04
✓	Pulse Power Sensor + Precision Adaptor	Anritsu	MA2411B	1726022	2024/09/05	2025/09/04
	Temperature Chamber	TAICHY	MHK-225LK	1061121	2024/04/19	2025/04/18
	Wireless Connectivity Tester	R&S	CMW270	101307	2024/06/04	2025/06/03
✓	Attenuator	MVE	MVE2211-10	CT-9-056	2024/08/08	2026/08/07
	Attenuator	MVE	MVE2211-20	CT-9-057	2024/08/08	2026/08/07
	Attenuator	MVE	MVE2211-30	CT-9-058	2024/08/08	2026/08/07
	Power Divider	MVE	MVE8546	170826003	2024/08/08	2026/08/07
	Power Splitter	MVE	MVE8547	170302047	2024/08/10	2026/08/09
	DC Power Supply	GW INSTEK	GPC-3060D	GER817636	2024/08/05	2025/08/04

Remark:

1. The equipments are calibrated every one year.
2. The Attenuator/ Divider/ Splitter are calibrated every two year.
3. The test instruments marked with "✓" are used to measure the final test results.

For AC Conduction measurements / W08-CE

Equipment		Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
✓	EMI Test Receiver	R&S	ESR3	102309	2024/06/21	2025/06/20
✓	2-Line V-Network LISN	R&S	ENV216	101185	2024/06/20	2025/06/19
✓	LISN	SCHWARZBECK	NSLK 8127RC	05028	2024/06/20	2025/06/19
✓	Transient Limiter	EM Electronics Corporation	EM-7600	857	2024/06/24	2025/06/23
✓	50ohm Cable	EMCI	EMCCFD300-BM-BM-5000	170612	2024/06/24	2025/06/23
✓	50 ohm terminal impedance	HUBER+SUHNER	50 ohm terminal impedance	CT-1-109-1	2024/06/20	2025/06/19

Remark:

1. All equipments are calibrated every one year.
2. The test instruments marked with "✓" are used to measure the final test results.
3. Test Software version: FARAD EZ-EMC Ver.EMC-CON 3A1

For Radiated measurements / W08-996-2

	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
✓	EMI Receiver	Keysight	N9038A	MY51210173	2024/08/21	2025/08/20
✓	Spectrum Analyzer	Keysight	N9010A	MY52220228	2024/08/19	2025/08/18
✓	Active Loop Antenna	Schwarzbeck	FMZB 1513-60B	00033	2024/05/02	2025/05/01
✓	TRILOG super broad Antenna	Schwarzbeck	VULB 9168	VULB 9168-700 & 20E03	2024/07/23	2025/07/22
✓	Horn Antenna	Schwarzbeck	BBHA 9120D	01767	2024/08/15	2025/08/14
✓	Horn Antenna	Schwarzbeck	BBHA 9170	703	2024/08/15	2025/08/14
✓	Pre-Amplifier	EM	EMC330	060774	2024/08/16	2025/08/15
✓	Pre-Amplifier	EMEC	EM01G18G	060648	2024/08/16	2025/08/15
✓	Pre-Amplifier	JPT	JPA0118-55-303K	1910001800055003	2024/08/20	2025/08/19
✓	Pre-Amplifier	EMCI	EMC184045SE	980515	2024/08/16	2025/08/15
✓	Cable	EMEC	EM-CB400	105060103	2024/08/21	2025/08/20
✓	Cable	EMEC	EM-CB400	105060102	2024/08/21	2025/08/20
✓	Cable	EMEC	EM-CB400	105060101	2024/08/21	2025/08/20
✓	RF Cable	HUBER+SUHNER	SF102	MY2752/2	2024/08/21	2025/08/20
✓	RF Cable	MVE	280280.LL266.1200	C90177C	2024/08/21	2025/08/20
✓	RF Cable	EMCI	EMC102-KM-KM-600	190646	2024/08/21	2025/08/20
✓	RF Cable	MVE	140140.LL404.700	B90014C	2024/08/21	2025/08/20
✓	RF Cable	MVE	140140.LL404.300	B90006C	2024/08/21	2025/08/20
	RF Filter	EMEC	BRF-2400-2500	002	2024/08/26	2026/08/25
✓	RF Filter	EMEC	BRF-5150-5350	104	2024/08/26	2026/08/25
✓	RF Filter	EMEC	BRF-5470-5725	092	2024/08/26	2026/08/25
✓	RF Filter	EMEC	BRF-5725-5875	091	2024/08/26	2026/08/25
	RF Filter	EMEC	HPF-2800	002	2024/08/26	2026/08/25
✓	RF Filter	EMEC	HPF-5850	059	2024/08/26	2026/08/25
	SMA Notch Filter	MVE	MFN-902.928.S1	190604001	2024/08/21	2026/08/20

Remark:

1. The equipments are calibrated every one year.
2. The Filter calibrated every two year.
3. The test instruments marked with "✓" are used to measure the final test results.
4. Test Software version: FARAD EZ-EMC Ver.WD-03A1-1

2 Test Result

2.1.1 Applicable Standard

For the band 5.15-5.25 GHz

(1) For an outdoor access point operating:

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For an indoor access point operating:

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For fixed point-to-point access points operating:

For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.

(4) For client devices:

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

2.1.2 Antenna Connected Construction

Non-standard antenna connector is used.

2.1.3 Test Result

No.	Manufacturer	Model No.	Antenna Type	Peak Gain
1	Brito Technology	OTDB1EM60-I0350	PCB Antenna	2 dBi for 5.15~5.25GHz 2 dBi for 5.725~5.85GHz
2	Brito Technology	OTDB1EM60-I0195	PCB Antenna	2 dBi for 5.15~5.25GHz 2 dBi for 5.725~5.85GHz

Description of the operating transmit modes：

＊ 802.11a：CDD mode, this port is MIMO
＊ 802.11ac_VHT20：MIMO mode, this port is MIMO
＊ 802.11ac_VHT40：MIMO mode, this port is MIMO
＊ 802.11ac_VHT80：MIMO mode, this port is MIMO
＊ 802.11ax_HE20：MIMO mode, this port is MIMO
＊ 802.11ax_HE40：MIMO mode, this port is MIMO
＊ 802.11ax_HE80：MIMO mode, this port is MIMO

Directional gain calculation：

＊ B1_802.11a：Directional Gain = GANT + Array Gain = 2 dBi ≤ 6dBi
＊ B1_802.11ac_VHT20：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B1_802.11ac_VHT40：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B1_802.11ac_VHT80：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B1_802.11ax_HE20：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B1_802.11ax_HE40：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B1_802.11ax_HE80：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B3_802.11a：Directional Gain = GANT + Array Gain = 2 dBi ≤ 6dBi
＊ B3_802.11ac_VHT20：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B3_802.11ac_VHT40：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B3_802.11ac_VHT80：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B3_802.11ax_HE20：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B3_802.11ax_HE40：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi
＊ B3_802.11ax_HE80：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT} = 5.01 dBi ≤ 6dBi

2.2 Output Power Measurement and Transmit Power Control

2.2.1 Limit

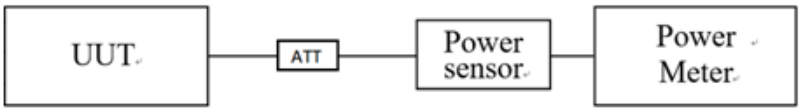
1. For frequency Band 5150~5250MHz:
   (1) Outdoor access point : 1W (30 dBm)
   (2) Indoor access point : 1W (30 dBm)
   (3) Fixed point-to-point access point : 1W (30 dBm)
   (4) Client device : 250mW (24 dBm)
   (5) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For frequency Band 5250~5350MHz and 5470~5725MHz:
   (1) 250mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth (MHz), whichever is lesser.
   (2) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3. For frequency Band 5725~5850MHz:
   (1) The maximum conducted output power over the frequency band of operation shall not exceed 1 W(30 dBm).
   (2) If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Transmit power control (TPC). U-NII devices operating in the 5.25-5.35 GHz band and the 5.47-5.725 GHz band shall employ a TPC mechanism. The U-NII device is required to have the capability to operate at least 6 dB below the mean EIRP value of 30 dBm. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW.

2.2.2 Test Setup



2.2.3 Test Procedure

1. Enable the EUT transmit continuously.
2. Let EUT be connected to the power meter, and record the max. reading.
3. Measurement using a gated RF average power meter, since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

2.2.4 Test Result

Mode	Frequency (MHz)	Average power (dBm)			Limit (dBm)	Result
		Chain A	Chain B	Total		
802.11a	5180	15.31	15.63	18.48	≤ 24	Pass
	5200	15.43	15.83	18.64	≤ 24	Pass
	5240	15.51	15.86	18.70	≤ 24	Pass
	5745	16.59	17.17	19.90	≤ 30	Pass
	5785	17.69	18.02	20.87	≤ 30	Pass
	5825	17.78	18.10	20.95	≤ 30	Pass
802.11ac VHT20	5180	14.88	15.56	18.24	≤ 24	Pass
	5200	15.13	15.82	18.50	≤ 24	Pass
	5240	15.34	15.96	18.67	≤ 24	Pass
	5745	16.47	17.03	19.77	≤ 30	Pass
	5785	16.76	17.19	19.99	≤ 30	Pass
	5825	17.22	17.71	20.48	≤ 30	Pass
802.11ac VHT40	5190	11.16	11.22	14.20	≤ 24	Pass
	5230	11.33	11.47	14.41	≤ 24	Pass
	5755	17.43	18.15	20.82	≤ 30	Pass
	5795	17.44	18.20	20.85	≤ 30	Pass
802.11ac VHT80	5210	10.03	10.30	13.18	≤ 24	Pass
	5775	13.51	14.23	16.90	≤ 30	Pass
802.11ax HE20	5180	16.98	17.68	20.35	≤ 24	Pass
	5200	17.13	17.78	20.48	≤ 24	Pass
	5240	17.38	18.04	20.73	≤ 24	Pass
	5745	17.67	18.32	21.02	≤ 30	Pass
	5785	18.86	19.27	22.08	≤ 30	Pass
	5825	19.09	19.52	22.32	≤ 30	Pass
802.11ax HE40	5190	10.26	10.67	13.48	≤ 24	Pass
	5230	10.53	10.86	13.71	≤ 24	Pass
	5755	17.52	18.08	20.82	≤ 30	Pass
	5795	17.43	17.98	20.72	≤ 30	Pass
802.11ax HE80	5210	12.12	12.51	15.33	≤ 24	Pass
	5775	15.76	16.35	19.08	≤ 30	Pass

Remark:

1. Average Power = Reading value on power meter + cable loss
2. 10 Log(X/mW) = dBm, X=1 watt (Limit)

1 watt = 30 dBm

3. Section E) method 1) of power measurement of KDB 662911 is used for calculating total power.

2.2.5 Transmit Power Control

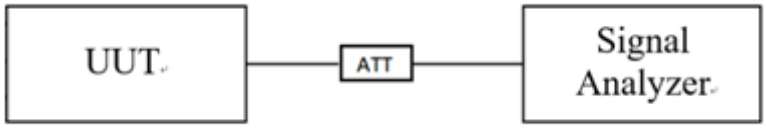
EUT doesn’t support TPC function.

2.3 26dB Bandwidth, 6dB Bandwidth and 99% Occupied Bandwidth Measurement

2.3.1 Limit

Within 5725~5850 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

2.3.2 Test Setup



2.3.3 Test Procedure

1. The following procedure shall be used for measuring 6dB bandwidth:
   (1) Enable the EUT transmit continuously.
   (2) Set RBW = 100 kHz, VBW ≥ 3 RBW, Sweep = auto couple.
   (3) Detector = Peak, Trace mode = max hold.
   (4) 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.
2. The following procedure shall be used for measuring 26 dB bandwidth:
   (1) Set RBW = approximately 1% of the emission bandwidth.
   (2) Set the VBW > RBW, Detector = Peak, Trace mode = max hold
   (3) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
3. The following procedure shall be used for measuring 99% power bandwidth:
   (1) Set center frequency to the nominal EUT channel center frequency.
   (2) Set span = 1.5 times to 5.0 times the OBW.
   (3) Set RBW = 1% to 5% of the OBW.
   (4) Set the VBW ≥ 3 RBW.
   (5) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
   (6) Use the 99% power bandwidth function of the instrument .

(7) If the instrument does not have a 99% power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

2.3.4 Test Result

2.2.4.1 6dB Bandwidth

802.11a

Frequency (MHz)	6dB BW (MHz)		Limit (kHz)	Result
	Chain A	Chain B		
5745	15.19	15.14	> 500	Pass
5785	15.10	15.11	> 500	Pass
5825	15.18	15.09	> 500	Pass

802.11ac VHT20

Frequency (MHz)	6dB BW (MHz)		Limit (kHz)	Result
	Chain A	Chain B		
5745	15.19	15.15	> 500	Pass
5785	15.04	15.18	> 500	Pass
5825	15.15	15.14	> 500	Pass

802.11ac VHT40

Frequency (MHz)	6dB BW (MHz)		Limit (kHz)	Result
	Chain A	Chain B		
5755	36.31	36.37	> 500	Pass
5795	36.33	36.35	> 500	Pass

802.11ac VHT80

Frequency (MHz)	6dB BW (MHz)		limit (kHz)	Result
	Chain A	Chain B		
5775	76.04	76.15	> 500	Pass

802.11ax HE20

Frequency (MHz)	6dB BW (MHz)		Limit (kHz)	Result
	Chain A	Chain B		
5745	16.64	16.47	> 500	Pass
5785	16.35	16.26	> 500	Pass
5825	16.27	16.34	> 500	Pass

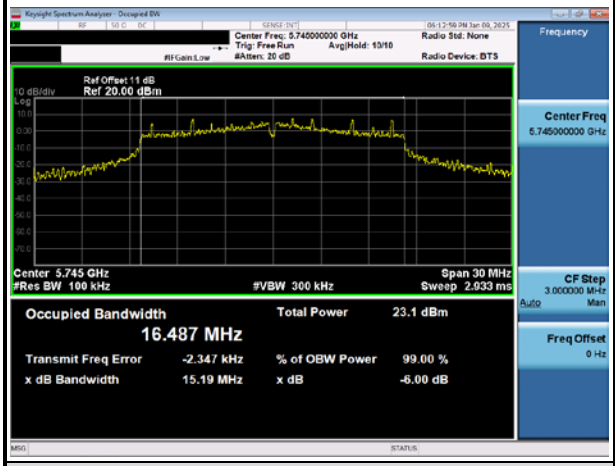
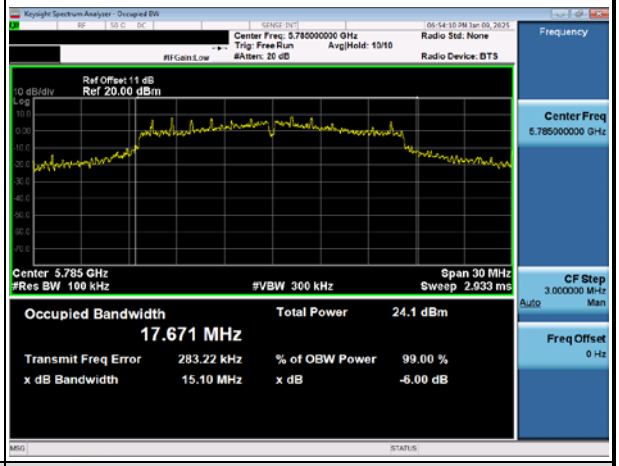
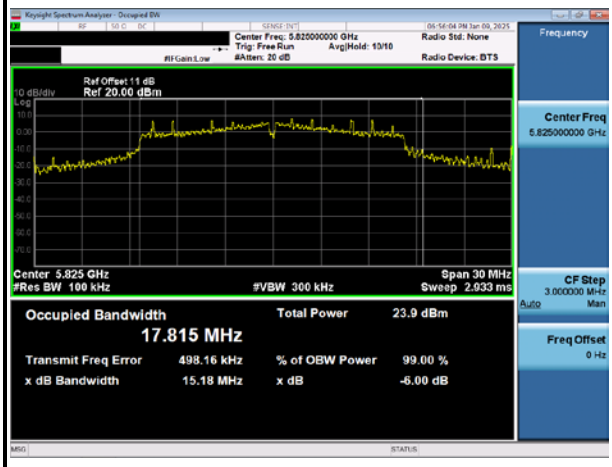
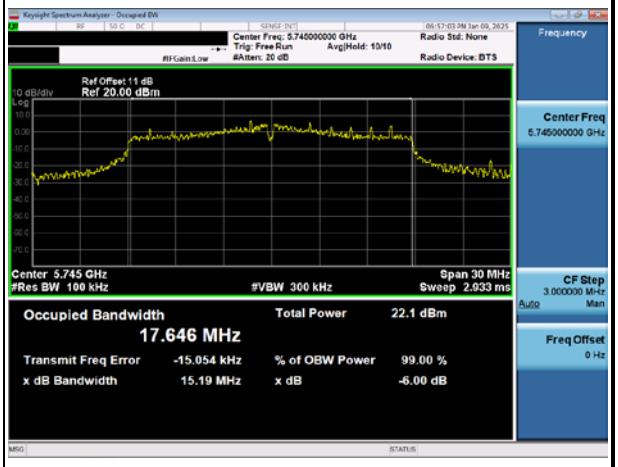
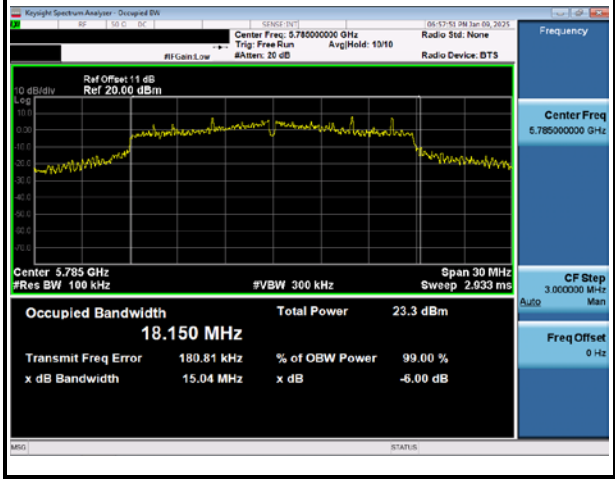
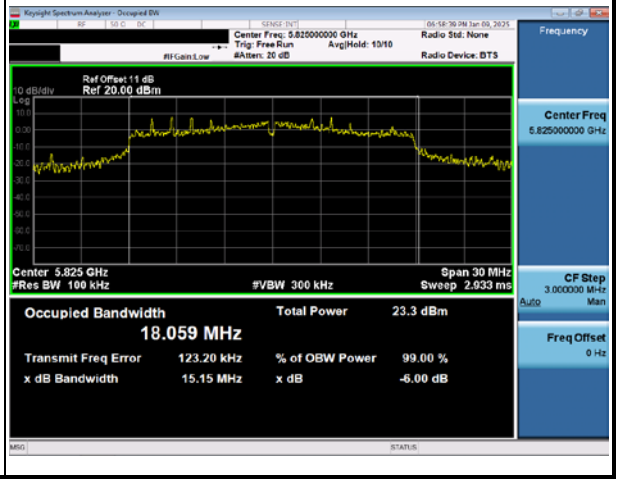
802.11ax HE40

Frequency (MHz)	6dB BW (MHz)		Limit (kHz)	Result
	Chain A	Chain B		
5755	37.27	37.46	> 500	Pass
5795	37.62	37.02	> 500	Pass

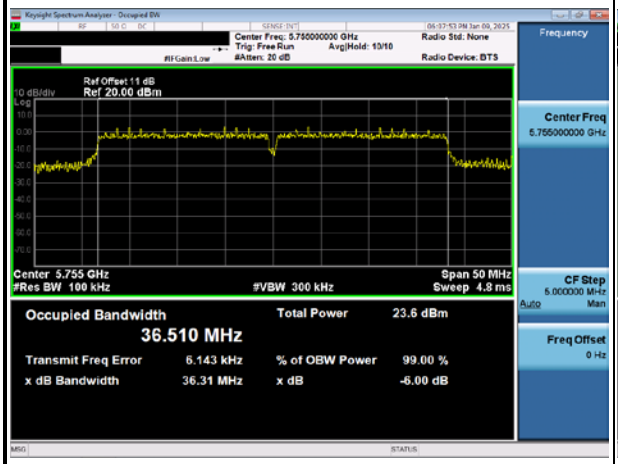
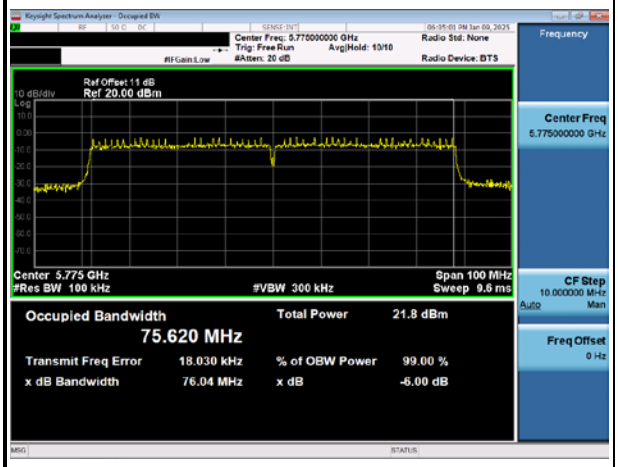
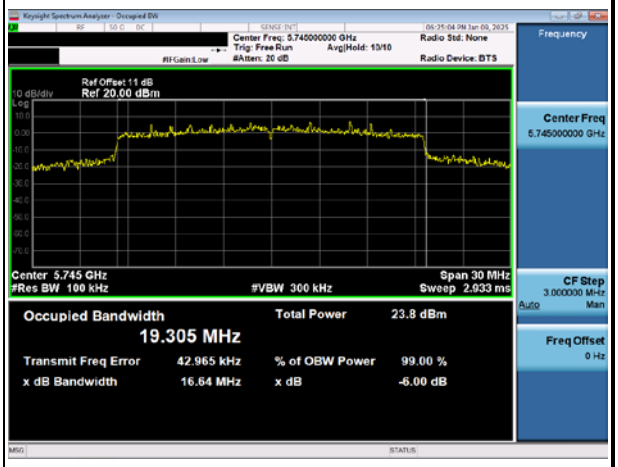
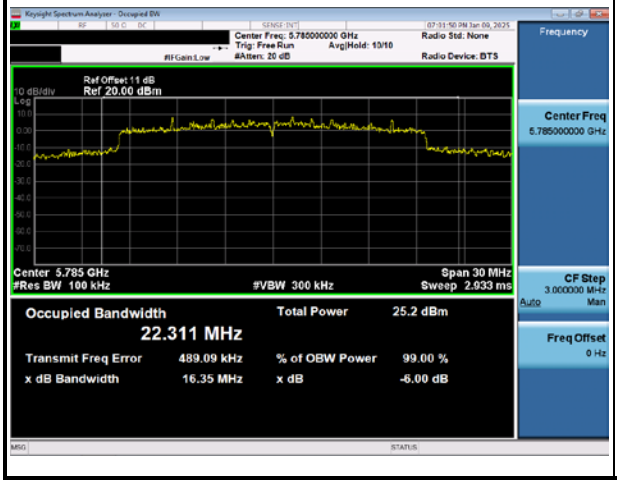
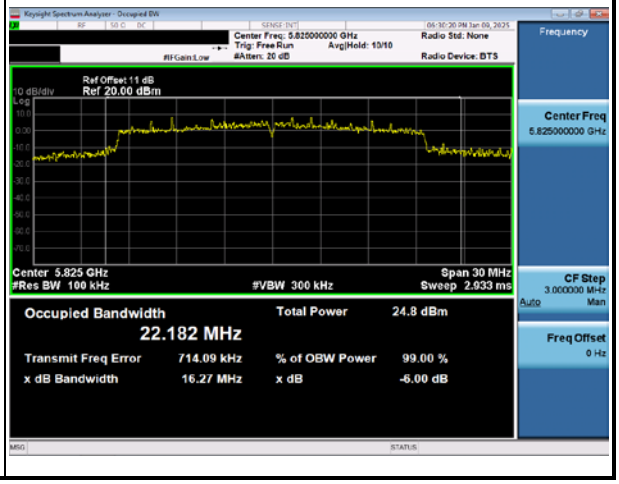
802.11ax HE80

Frequency (MHz)	6dB BW (MHz)		limit (kHz)	Result
	Chain A	Chain B		
5775	77.15	76.37	> 500	Pass

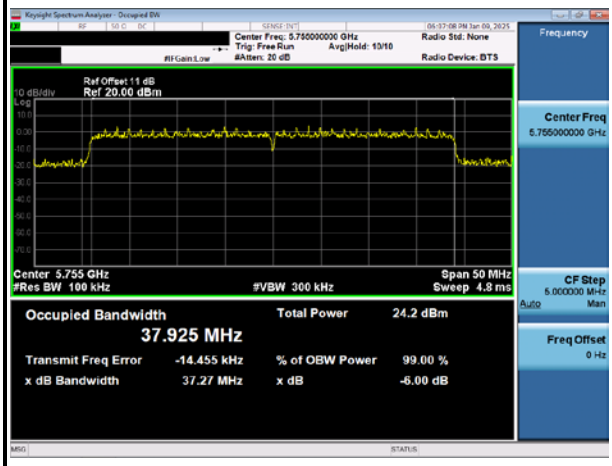
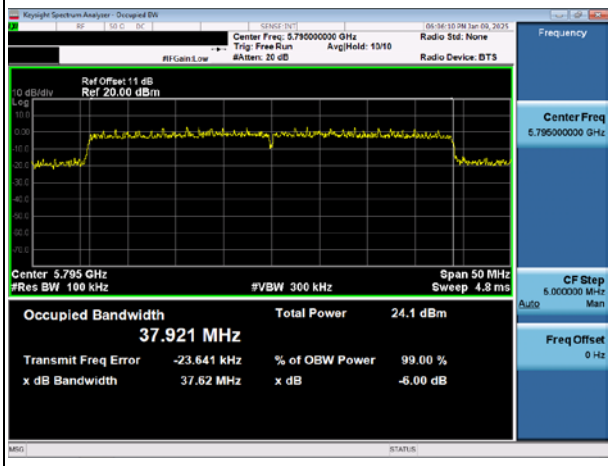
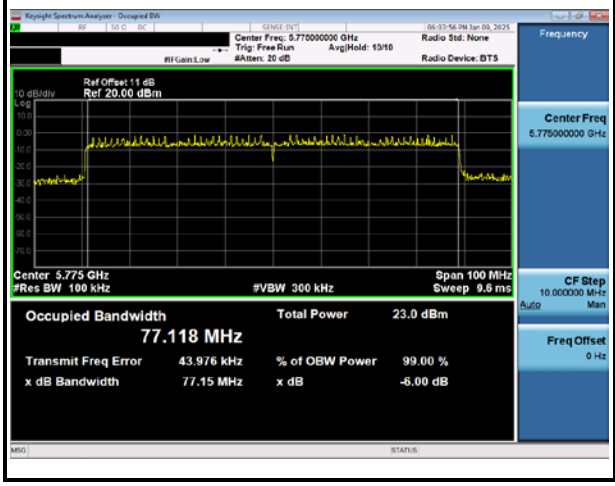
6dB spectrum plot of Chain A value:

802.11a 5745MHz	802.11a 5785MHz
	
802.11a 5825MHz	**802.11ac VHT20 5745MHz**
	
802.11ac VHT20 5785MHz	**802.11ac VHT20 5825MHz**
	

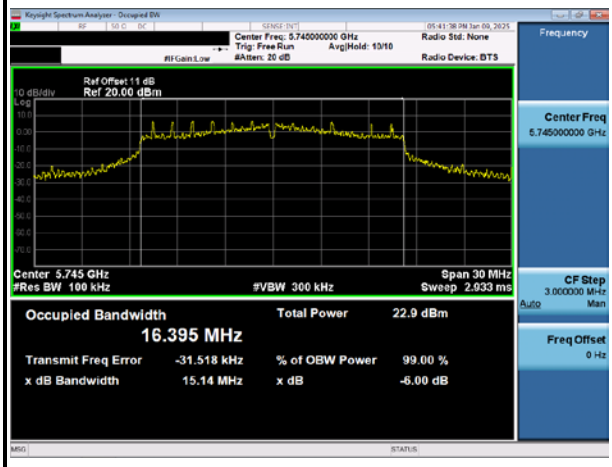
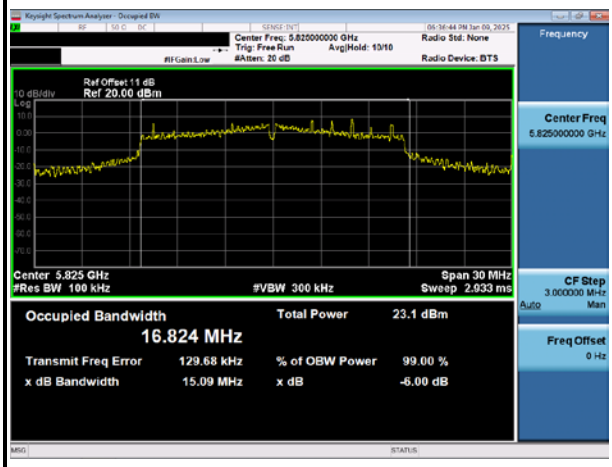
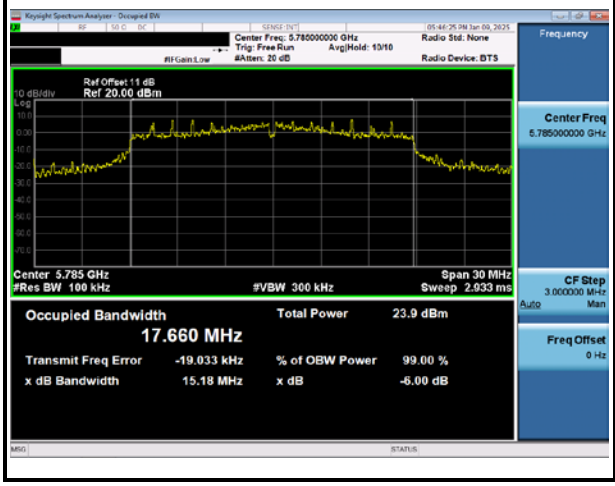
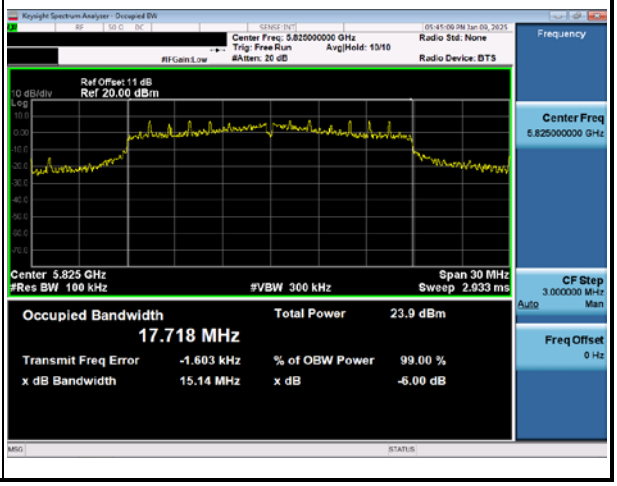
6dB spectrum plot of Chain A value:

802.11ac VHT40 5755MHz	802.11ac VHT40 5795MHz
	
802.11ac VHT80 5775MHz	**802.11ax HE20 5745MHz**
	
802.11ax HE20 5785MHz	**802.11ax HE20 5825MHz**
	

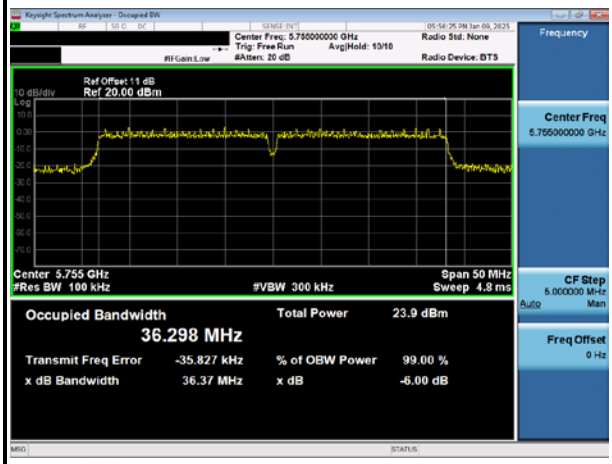
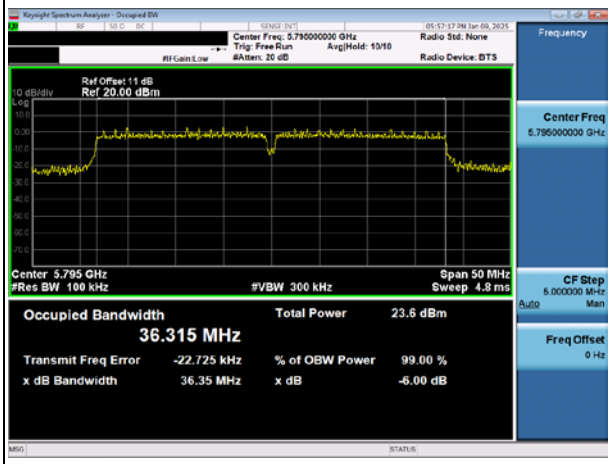
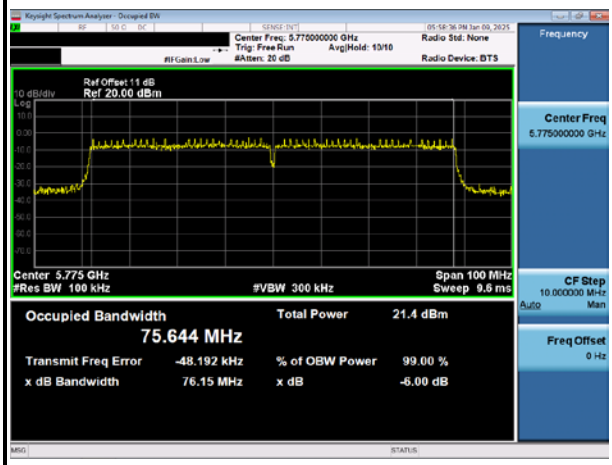
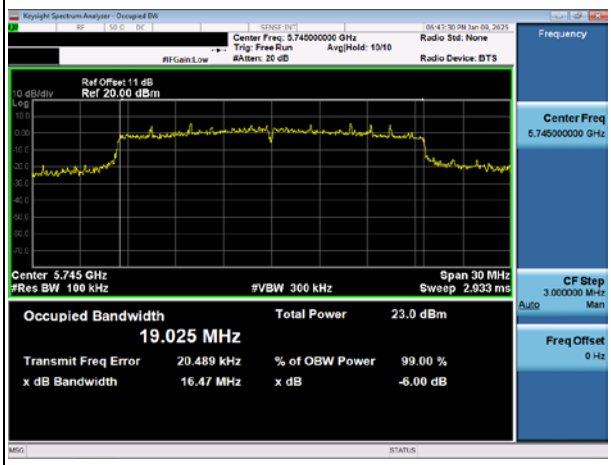
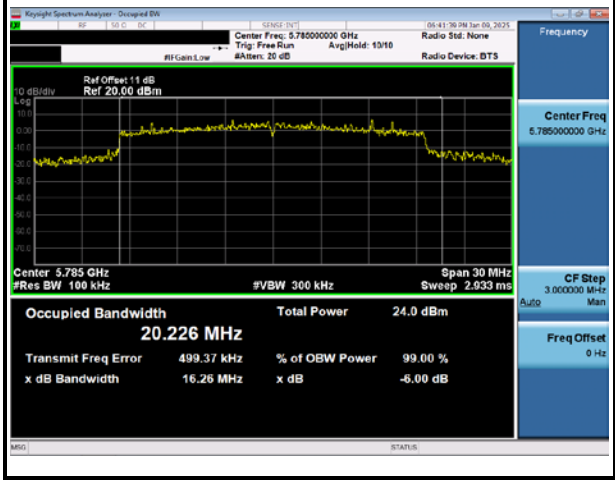
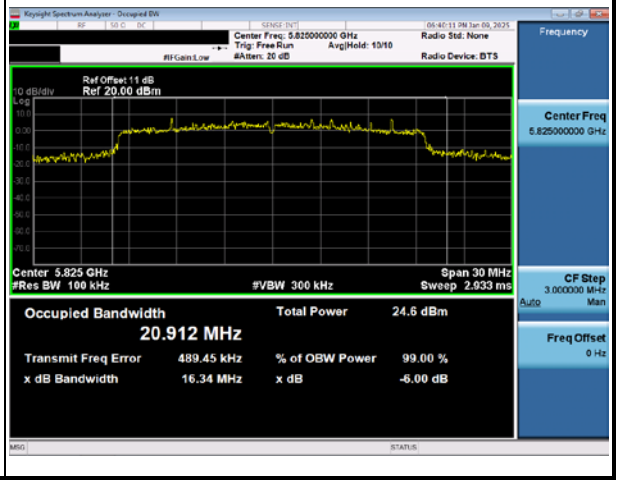
6dB spectrum plot of Chain B value:

802.11ax HE40 5755MHz	802.11ax HE40 5795MHz
	
802.11ax HE80 5775MHz	**--**
	--

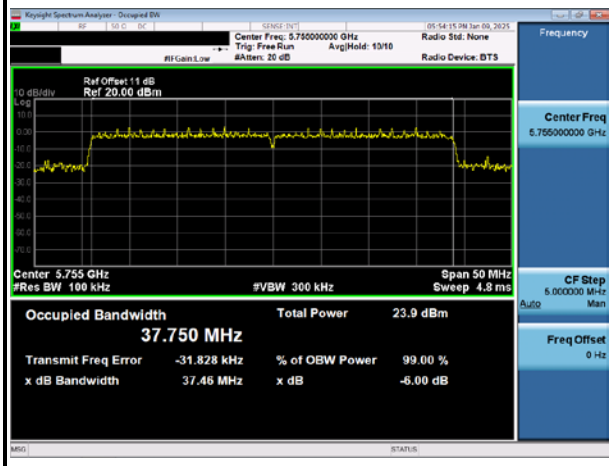
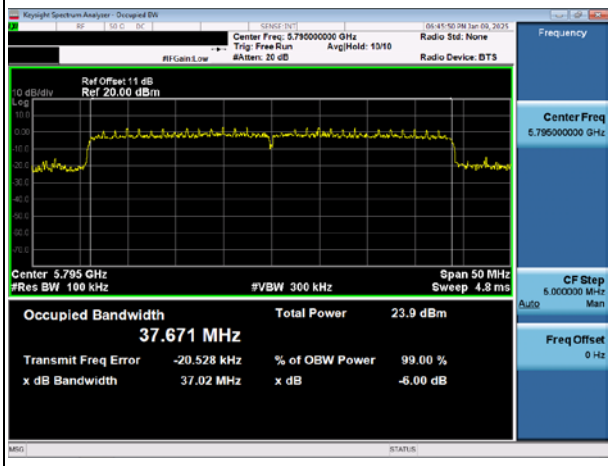
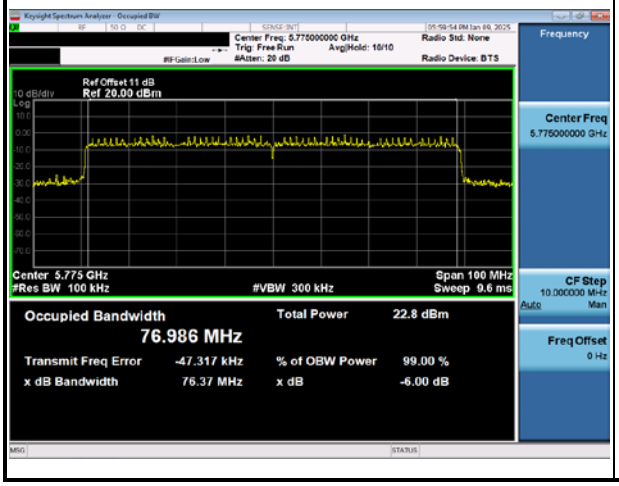
6dB spectrum plot of Chain B value:

802.11a 5745MHz	802.11a 5785MHz
	
802.11a 5825MHz	**802.11ac VHT20 5745MHz**
	
802.11ac VHT20 5785MHz	**802.11ac VHT20 5825MHz**
	

6dB spectrum plot of Chain B value:

802.11ac VHT40 5755MHz	802.11ac VHT40 5795MHz
	
802.11ac VHT80 5775MHz	**802.11ax HE20 5745MHz**
	
802.11ax HE20 5785MHz	**802.11ax HE20 5825MHz**
	

6dB spectrum plot of Chain B value:

802.11ax HE40 5755MHz	802.11ax HE40 5795MHz
	
802.11ax HE80 5775MHz	**--**
	--

2.2.4.2 26dB Bandwidth & 99% Occupied Bandwidth

802.11a

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5180	21.710	22.120	--	--	--	--
5200	22.110	21.710	--	--	--	--
5240	22.020	21.530	--	--	--	--

802.11ac VHT20

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5180	21.580	22.200	--	--	--	--
5200	21.690	21.940	--	--	--	--
5240	21.630	21.830	--	--	--	--

802.11ac VHT40

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5190	39.470	39.900	--	--	--	--
5230	39.420	39.580	--	--	--	--

802.11ac VHT80

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5210	81.200	81.560	--	--	--	--

802.11ax HE20

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5180	27.090	27.180	--	--	--	--
5200	26.870	26.860	--	--	--	--
5240	27.420	26.970	--	--	--	--

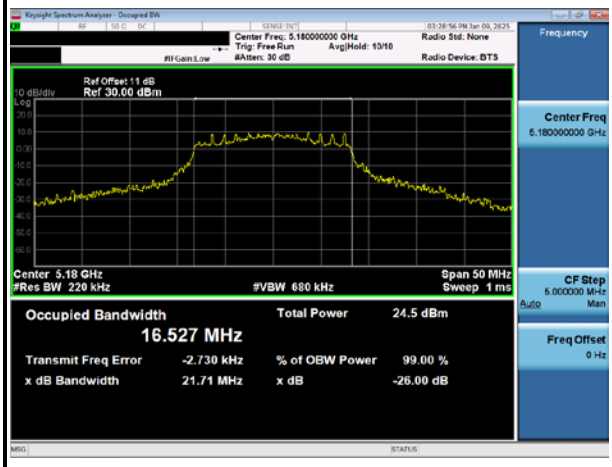
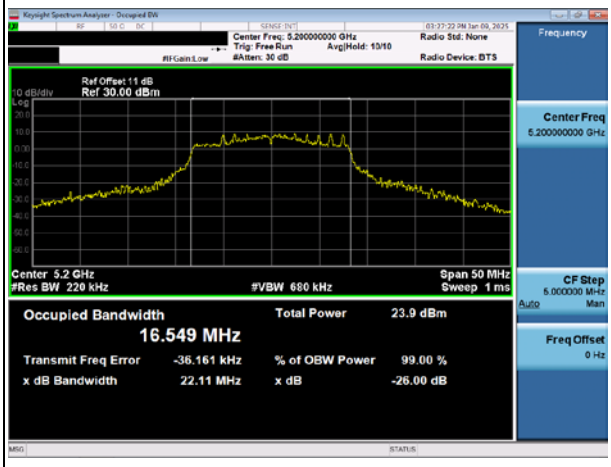
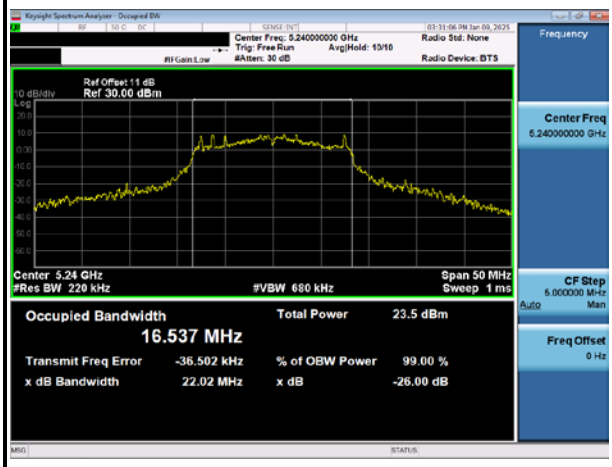
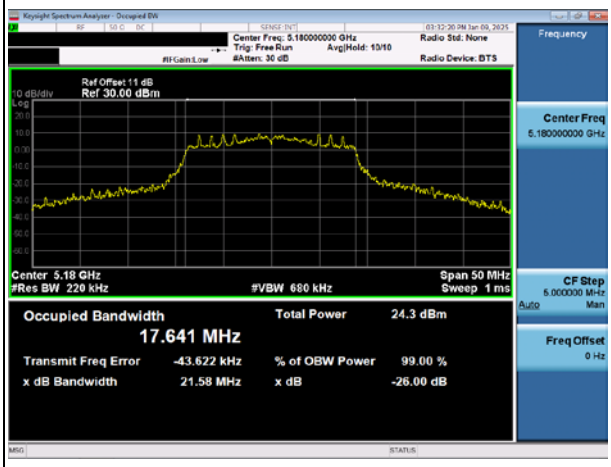
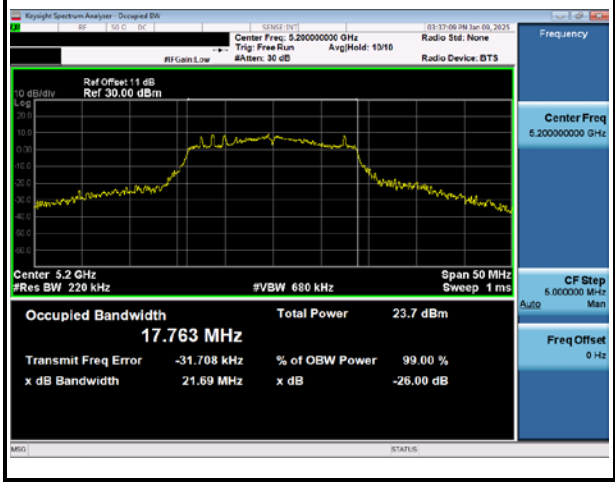
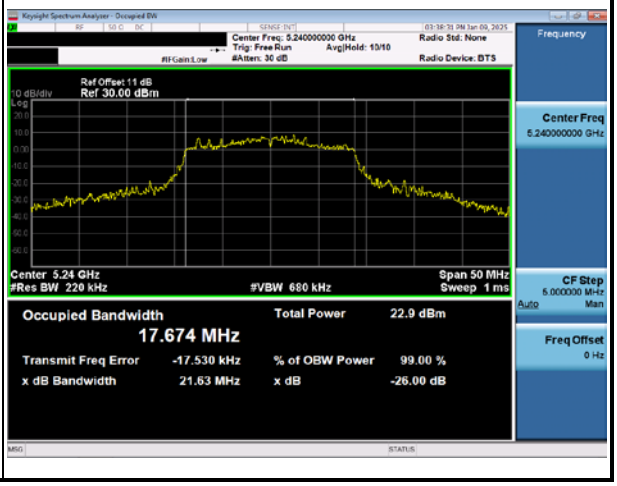
802.11ax HE40

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5190	39.780	40.150	--	--	--	--
5230	39.810	40.010	--	--	--	--

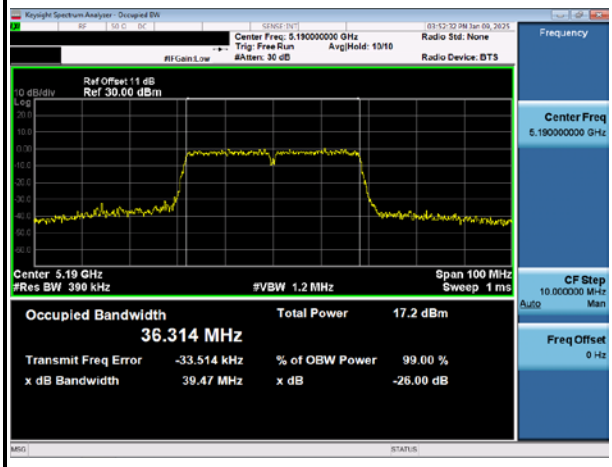
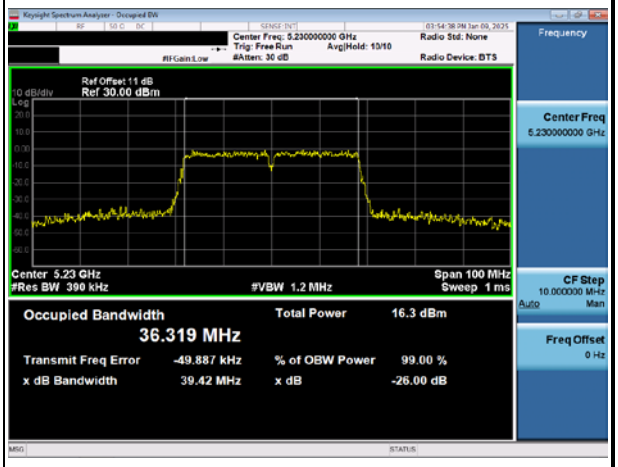
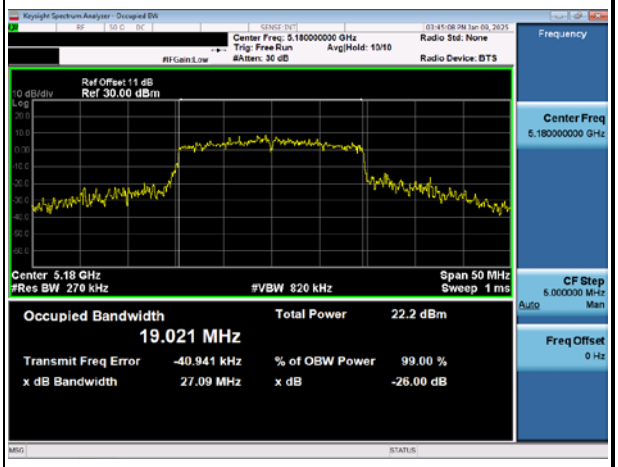
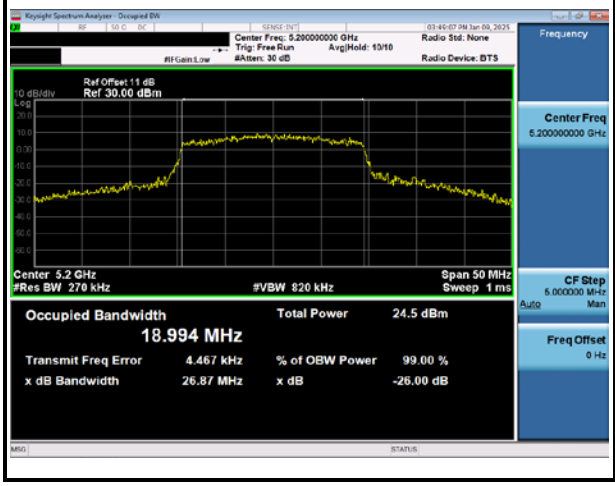
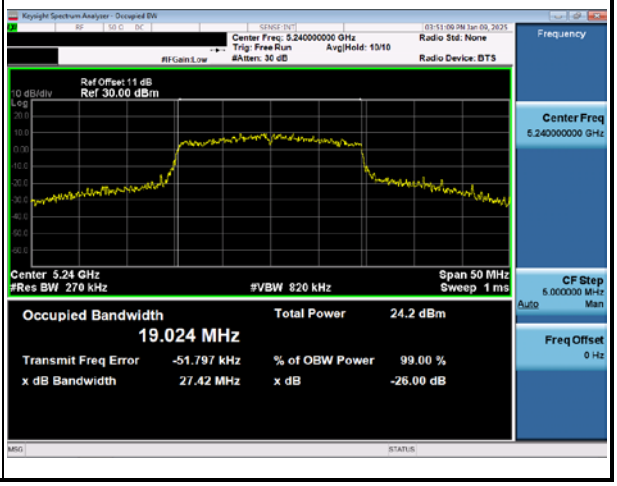
802.11ax HE80

Frequency (MHz)	26dB BW (MHz)		99% OBW (MHz)		Limit (kHz)	Result
	Chain A	Chain B	Chain A	Chain B		
5210	81.530	80.850	--	--	--	--

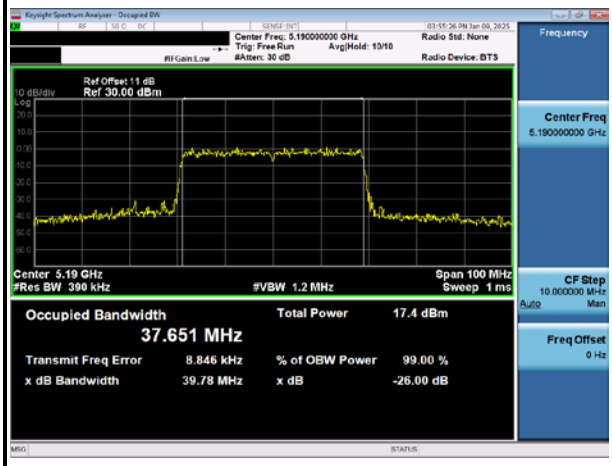
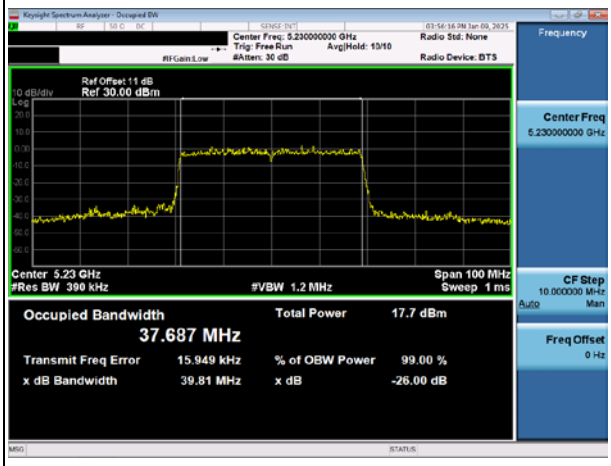
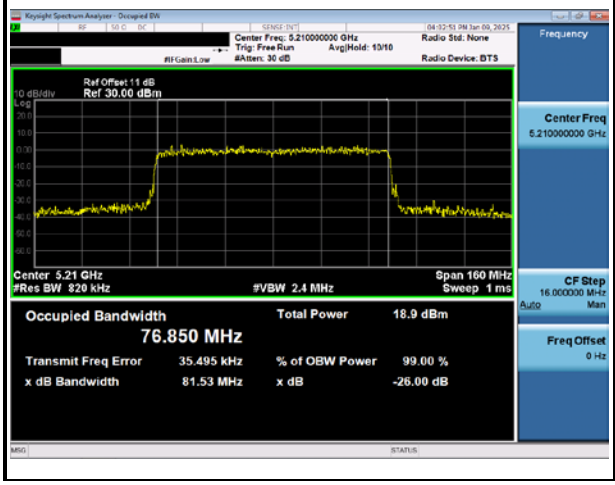
26dB Occupied Bandwidth spectrum plot of Chain A value:

802.11a 5180MHz	802.11a 5200MHz
	
802.11a 5240MHz	**802.11ac VHT20 5180MHz**
	
802.11ac VHT20 5200MHz	**802.11ac VHT20 5240MHz**
	

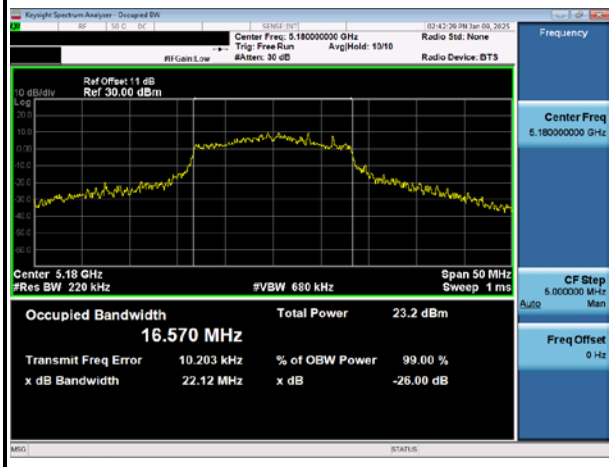
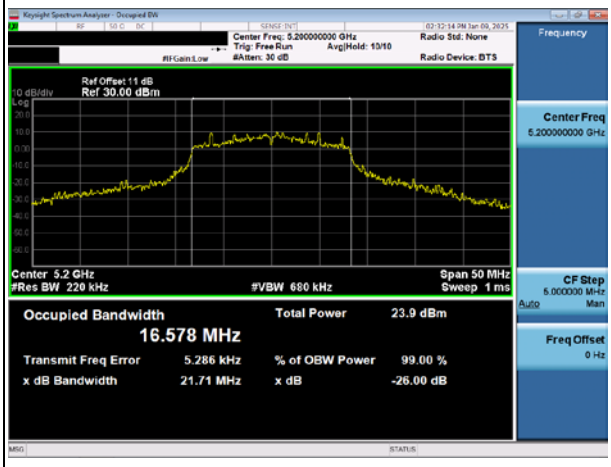
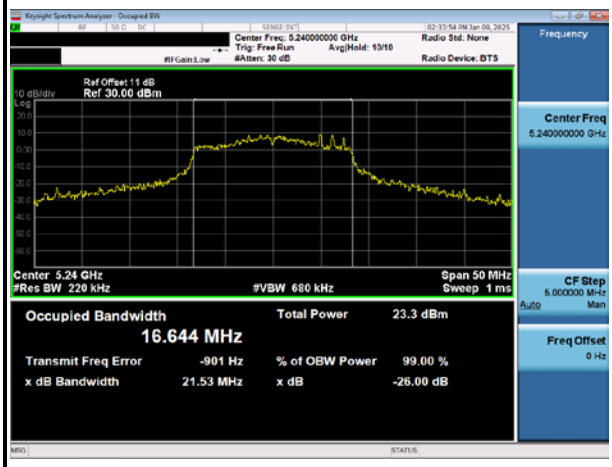
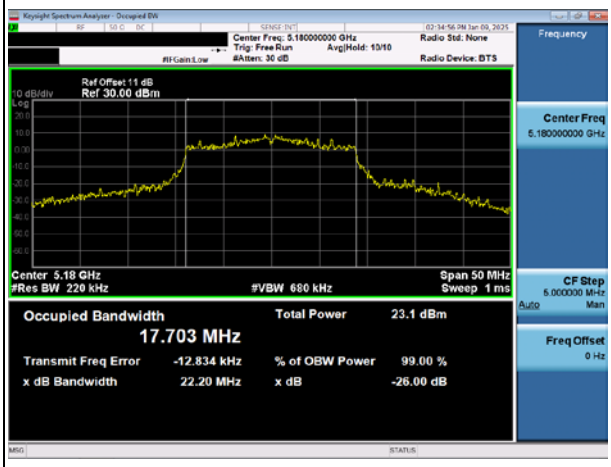
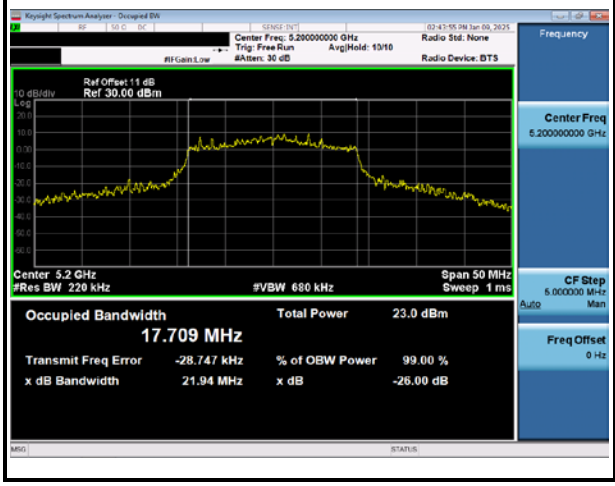
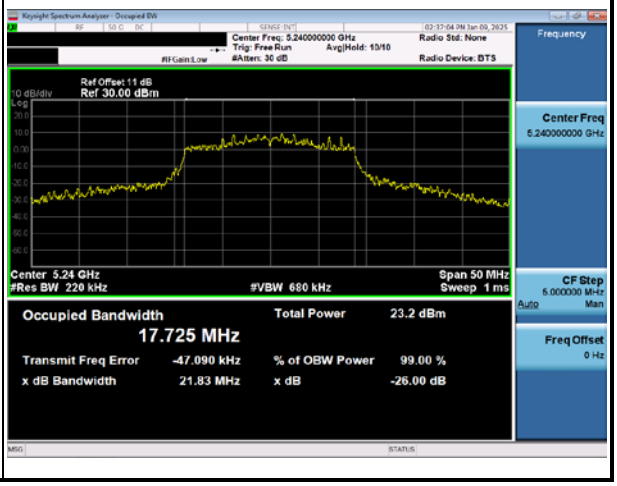
26dB Occupied Bandwidth spectrum plot of Chain A value:

802.11ac VHT40 5190MHz	802.11ac VHT40 5230MHz
	
802.11ac VHT80 5210MHz	**802.11ax HE20 5180MHz**
	
802.11ax HE20 5200MHz	**802.11ax HE20 5240MHz**
	

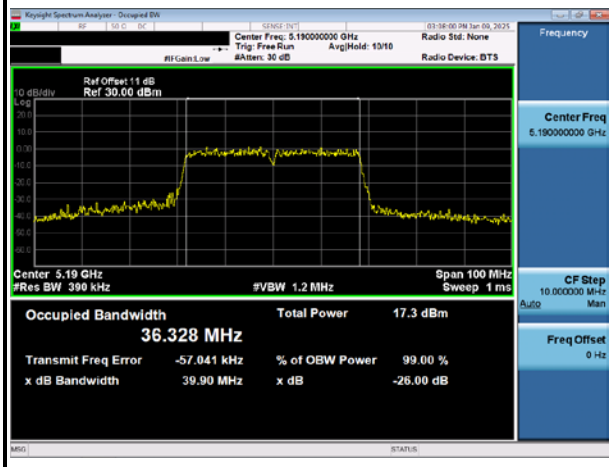
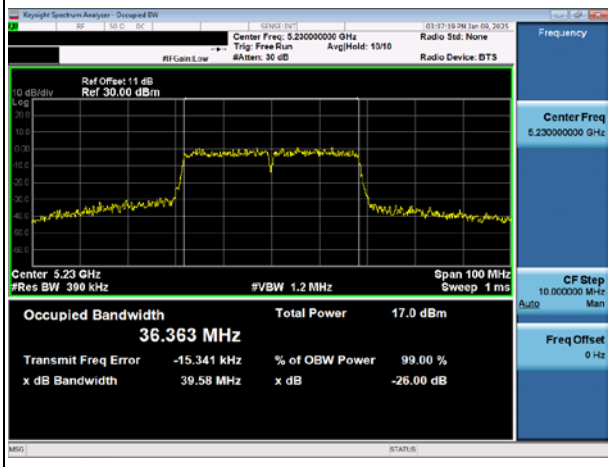
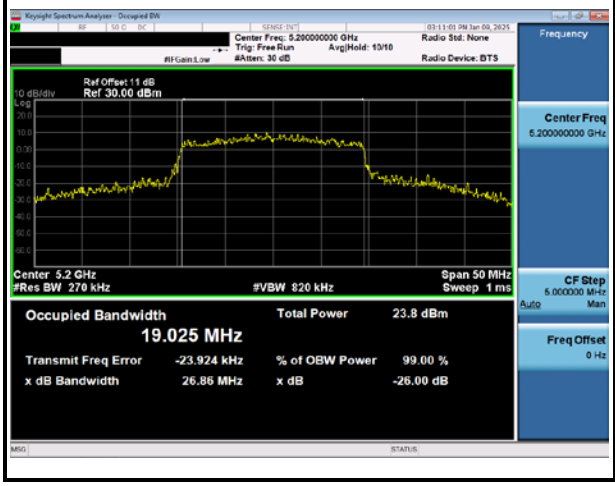
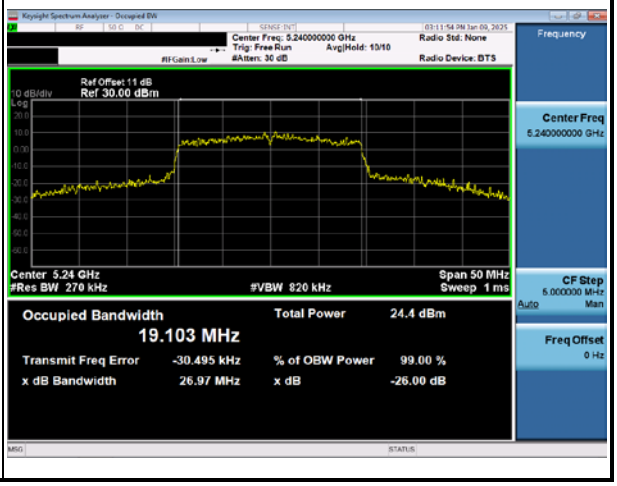
26dB Occupied Bandwidth spectrum plot of Chain A value:

802.11ax HE40 5190MHz	802.11ax HE40 5230MHz
	
802.11ax HE80 5210MHz	**--**
	--

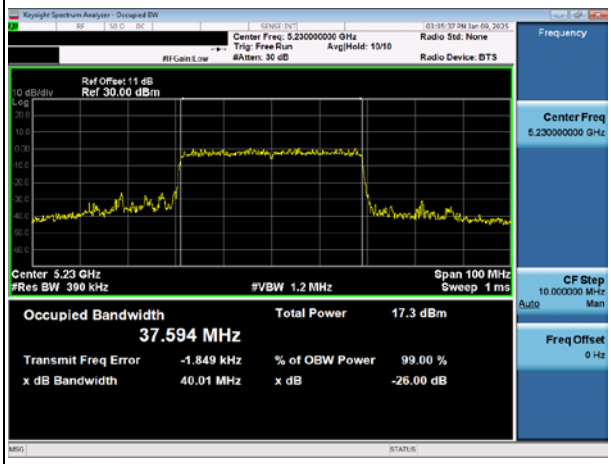
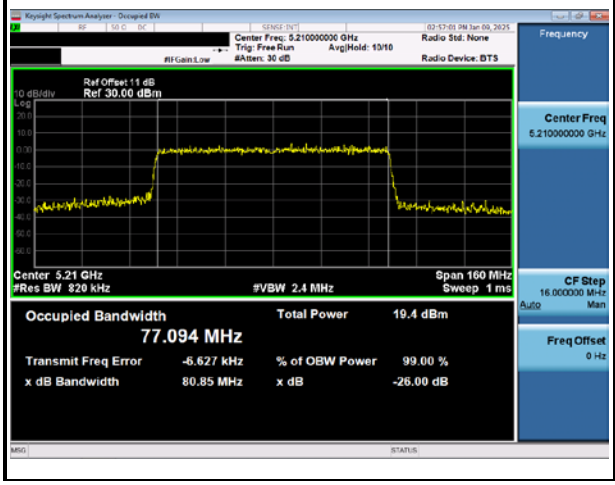
26dB Occupied Bandwidth spectrum plot of Chain B value:

802.11a 5180MHz	802.11a 5200MHz
	
802.11a 5240MHz	**802.11ac VHT20 5180MHz**
	
802.11ac VHT20 5200MHz	**802.11ac VHT20 5240MHz**
	

26dB Occupied Bandwidth spectrum plot of Chain B value:

802.11ac VHT40 5190MHz	802.11ac VHT40 5230MHz
	
802.11ac VHT80 5210MHz	**802.11ax HE20 5180MHz**
	
802.11ax HE20 5200MHz	**802.11ax HE20 5240MHz**
	

26dB Occupied Bandwidth spectrum plot of Chain B value:

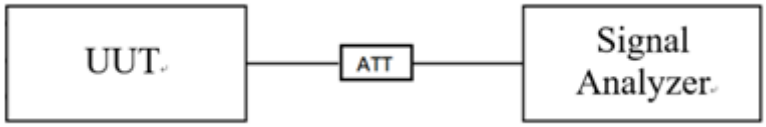
802.11ax HE40 5190MHz	802.11ax HE40 5230MHz
	
802.11ax HE80 5210MHz	**--**
	--

2.4 Power Spectral Density Measurement

2.4.1 Limit

1. For frequency Band 5150~5250MHz:
   (1) Outdoor access point : 17 dBm / MHz
   (2) Indoor access point : 17 dBm / MHz
   (3) Fixed point-to-point access point : 17 dBm / MHz
   (4) Client device : 11 dBm / MHz
2. For frequency Band 5250~5350MHz:
   11 dBm / MHz
3. For frequency Band 5470~5725MHz:
   11 dBm / MHz
4. For frequency Band 5725~5850MHz:
   30 dBm / 500kHz
5. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2.4.2 Test Setup



2.4.3 Test Procedure

1. For frequency band 5150~5250, 5250~5350, 5470~5725MHz
   Method SA-2
   (1) Measure the duty cycle D of the transmitter output signal.
   (2) Set span to encompass the entire 26 dB EBW or 99% OBW of the signal
   (3) Spectrum analyzer set:
      a) RBW = 1 MHz
      b) VBW = 3 MHz
      c) Sweep time = auto
      d) Detector = RMS
      e) Number of points in sweep ≥ [2 span / RBW].
      (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
      f) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.
2. For frequency band 5725~5850 MHz
   Method SA-2
   (1) Measure the duty cycle D of the transmitter output signal.
   (2) Set span to encompass the entire 26 dB EBW or 99% OBW of the signal
   (3) Spectrum analyzer set:
      a) RBW = 100 kHz
      b) VBW = 300 kHz
      c) Sweep time = auto
      d) Detector = RMS
      e) Number of points in sweep ≥ [2 span / RBW].
      (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
      f) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter.

2.4.4 Test Result

For 5150 MHz ~ 5250 MHz

802.11a

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5180	7.20	6.67	9.95	< 11	Pass
5200	7.27	6.94	10.11	< 11	Pass
5240	6.91	7.25	10.09	< 11	Pass

Remark: PSD = Reading value on spectrum analyzer + cable loss + duty factor

802.11ac VHT20

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5180	6.78	6.66	9.73	< 11	Pass
5200	6.87	7.06	9.98	< 11	Pass
5240	6.69	6.86	9.78	< 11	Pass

Remark:

1. PSD = Reading value on spectrum analyzer + cable loss + duty factor
2. Section E) method 2) b) of power density measurement of KDB 662911 is used for calculating total power density.

802.11ac VHT40

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5190	-2.85	-2.83	0.17	< 11	Pass
5230	-2.83	-2.88	0.16	< 11	Pass

Remark:

1. PSD = Reading value on spectrum analyzer + cable loss + duty factor
2. Section E) method 2) b) of power density measurement of KDB 662911 is used for calculating total power density.

802.11ac VHT80

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5210	-7.29	-6.88	-4.07	< 11	Pass

Remark:

1. PSD = Reading value on spectrum analyzer + cable loss + duty factor
2. Section E) method 2) b) of power density measurement of KDB 662911 is used for calculating total power density.

802.11ax HE20

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5180	6.68	7.55	10.15	< 11	Pass
5200	6.66	7.50	10.11	< 11	Pass
5240	6.68	7.35	10.04	< 11	Pass

Remark:

1. PSD = Reading value on spectrum analyzer + cable loss + duty factor
2. Section E) method 2) b) of power density measurement of KDB 662911 is used for calculating total power density.

802.11ax HE40

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5190	-3.89	-3.64	-0.75	< 11	Pass
5230	-3.71	-3.27	-0.47	< 11	Pass

Remark:

1. PSD = Reading value on spectrum analyzer + cable loss + duty factor
2. Section E) method 2) b) of power density measurement of KDB 662911 is used for calculating total power density.

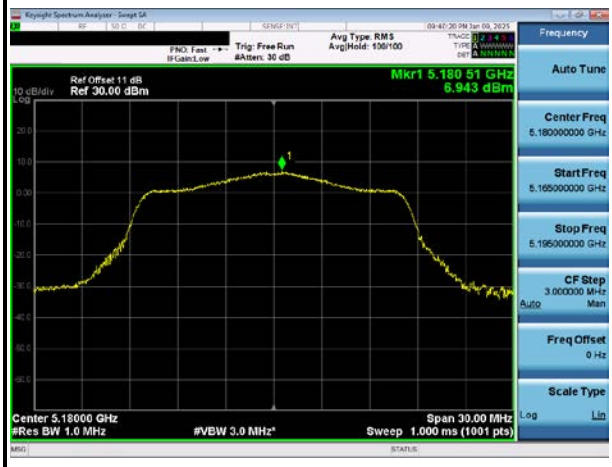
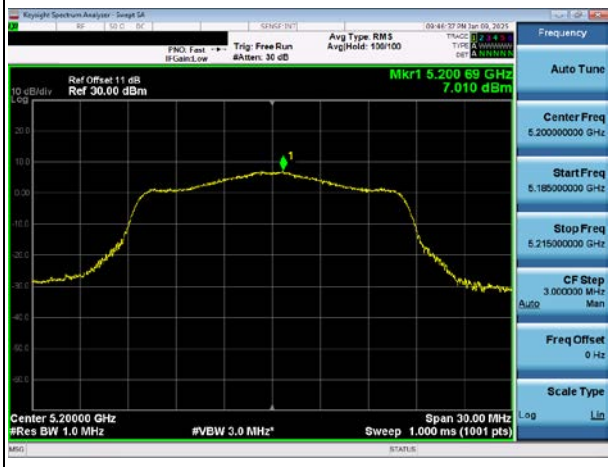
802.11ax HE80

Frequency (MHz)	PSD (dBm)		Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
	Chain A	Chain B			
5210	-5.79	-4.47	-2.07	< 11	Pass

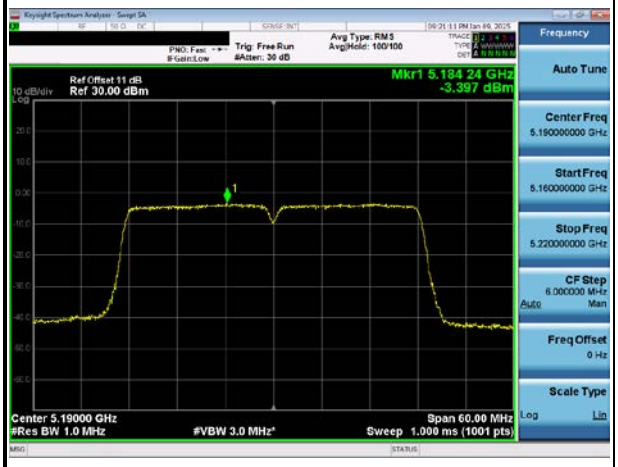
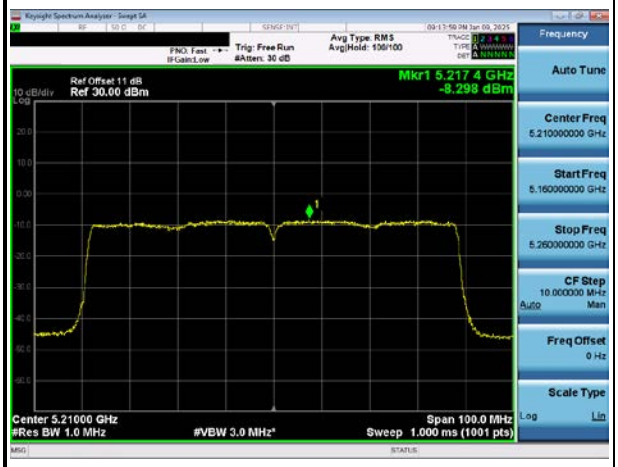
Remark:

1. PSD = Reading value on spectrum analyzer + cable loss + duty factor
2. Section E) method 2) b) of power density measurement of KDB 662911 is used for calculating total power density.

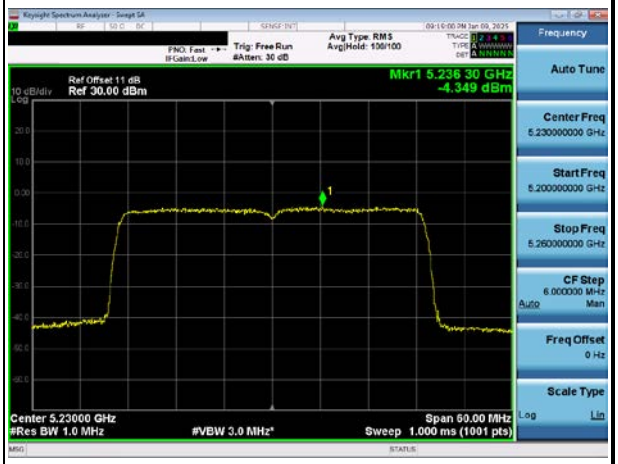
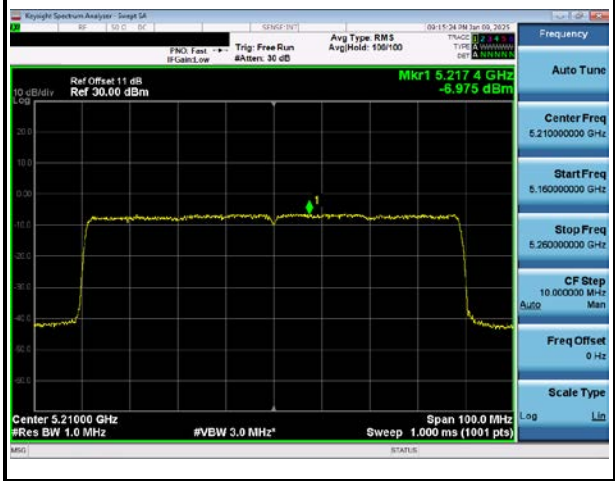
Power Spectral Density spectrum plot of Chain A value:

802.11a 5180MHz	802.11a 5200MHz
	
802.11a 5240MHz	**802.11ac VHT20 5180MHz**
	
802.11ac VHT20 5200MHz	**802.11ac VHT20 5240MHz**
	

Power Spectral Density spectrum plot of Chain A value:

802.11ac VHT40 5190MHz	802.11ac VHT40 5230MHz
	
802.11ac VHT80 5210MHz	**802.11ax HE20 5180MHz**
	
802.11ax HE20 5200MHz	**802.11ax HE20 5240MHz**
	

Power Spectral Density spectrum plot of Chain A value:

802.11ax HE40 5190MHz	802.11ax HE40 5230MHz
	
802.11ax HE80 5210MHz	**--**
	--