



Project No: TM-2201000101P
Report No.: TMWK2201000141KR

FCC ID: KA2R18A1

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Rev.: 02

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART E

Test Standard	FCC Part 15.407
Product name	AX1800 Wi-Fi 6 AI Router, AX1800 SMART ROUTER
Brand Name	D-Link
Model No.	R18
Test Result	Pass
Statements of Conformity	Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc.(Wugu Laboratory)

Approved by:

David Huang

David Huang
Supervisor

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	July 19, 2022	Initial Issue	ALL	Doris Chu
01	July 27, 2022	See the following Note Rev. (01)	P.125, 129, 133	Doris Chu
02	August 4, 2022	See the following Note Rev. (02)	ALL	Doris Chu

Rev. (01)

1. Revised output power in section 4.3.

Rev. (02)

1. Remove Meteorological frequency bands data.

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	D-Link Corporation 14420 Myford Road Suite 100 Irvine California United States 92606
Manufacturer	D-Link Corporation 14420 Myford Road Suite 100 Irvine California United States 92606
Equipment	AX1800 Wi-Fi 6 AI Router, AX1800 SMART ROUTER
Model No.	R18
Model Discrepancy	N/A
Trade Name	D-Link
Received Date	January 17, 2022
Date of Test	February 9 ~ June 22, 2022
Power Operation	Power from Power Adapter AMIGO / AMS159A-1201000FU I/P: 100-240Vac, 50-60Hz, 0.5A O/P: 12Vdc, 1.0A

Remark:

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

1.2 EUT CHANNEL INFORMATION

Frequency Range	UNII-1	
	IEEE 802.11a	5180 ~ 5240 MHz
	IEEE 802.11n HT 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11ac VHT 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11n HT 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 80 MHz	5210 MHz
	IEEE 802.11ax HE 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11ax HE 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ax HE 80 MHz	5210 MHz
	UNII-2a	
	IEEE 802.11a	5260 ~ 5320 MHz
	IEEE 802.11n HT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11ac VHT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11n HT 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 80 MHz	5290 MHz
	IEEE 802.11ax HE 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11ax HE 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ax HE 80 MHz	5290 MHz
	UNII-2c	
	IEEE 802.11a	5500 ~ 5720 MHz
	IEEE 802.11n HT 20 MHz	5500 ~ 5720 MHz
	IEEE 802.11ac VHT 20 MHz	5500 ~ 5720 MHz
	IEEE 802.11n HT 40 MHz	5510 ~ 5710 MHz
	IEEE 802.11ac VHT 40 MHz	5510 ~ 5710 MHz
	IEEE 802.11ac VHT 80 MHz	5530 ~ 5690 MHz
	IEEE 802.11ax HE 20 MHz	5500 ~ 5720 MHz
	IEEE 802.11ax HE 40 MHz	5510 ~ 5710 MHz
	IEEE 802.11ax HE 80 MHz	5530 ~ 5690 MHz
	UNII-3	
	IEEE 802.11a	5745 ~ 5825 MHz
	IEEE 802.11n HT 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11ac VHT 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11n HT 40 MHz	5755 ~ 5795 MHz
	IEEE 802.11ac VHT 40 MHz	5755 ~ 5795 MHz
	IEEE 802.11ac VHT 80 MHz	5775 MHz
	IEEE 802.11ax HE 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11ax HE 40 MHz	5755 ~ 5795 MHz
	IEEE 802.11ax HE 80 MHz	5775 MHz



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Modulation Type	1. IEEE 802.11a mode: OFDM 2. IEEE 802.11n HT 20 MHz mode: OFDM 3. IEEE 802.11ac VHT 20 MHz mode: OFDM 4. IEEE 802.11n HT 40 MHz mode: OFDM 5. IEEE 802.11ac VHT 40 MHz mode: OFDM 6. IEEE 802.11ac VHT 80 MHz mode: OFDM 7. IEEE 802.11ax HE 20 MHz mode: OFDMA 8. IEEE 802.11ax HE 40 MHz mode: OFDMA 9. IEEE 802.11ax HE 80 MHz mode: OFDMA
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Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
☐ 1 MHz or less	1	Middle
☐ 1 MHz to 10 MHz	2	1 near top and 1 near bottom
☒ More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Specification	☐ PIFA ☐ PCB ☒ Dipole ☐ Coils
Antenna Gain	Chain 0: 5150~5250: Gain: 5.30 dBi 5250~5350: Gain: 5.30 dBi 5470~5725: Gain: 5.30 dBi 5725~5850: Gain: 4.80 dBi Chain 1: 5150~5250: Gain: 4.90 dBi 5250~5350: Gain: 4.90 dBi 5470~5725: Gain: 4.90 dBi 5725~5850: Gain: 4.30 dBi Power Directional Gain: 5150~5250: Gain: 8.11 dBi 5250~5350: Gain: 8.11 dBi 5470~5725: Gain: 8.11 dBi 5725~5850: Gain: 7.56dBi
Antenna Trade / Model	Chain 0: LYNwave / AOX21X-091050-00 Chain 1: LYNwave / AOX21X-091051-00
Antenna connector	MHF compatible

Notes:

1. Power Directional Gain = $10 \cdot \log \{ [10^{(Ant1/20)} + 10^{(Ant2/20)} + \dots + 10^{(Ant N /20)}]^2 / N \text{ ANT} \}$ dBi
2. The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 2.1183
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87
Channel Bandwidth	+/- 1.8006
RF output power	+/- 1.8009
Power Spectral density	+/- 1.7998

Remark:

- 1.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

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1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Jack Chen	-
Radiation	Tony Chao, Czerny Lin	-
RF Conducted	Jack Chen, Allen Shen	-

Remark: The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC public Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309.

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Signal Analyzer	KEYSIGHT	N9010B	MY59071573	05/25/2021	05/24/2022
EXA Signal Analyzer	KEYSIGHT	N9010B	MY55460167	09/07/2021	09/06/2022
Power Meter	Anritsu	ML2496A	2136002	12/06/2021	12/05/2022
Power Sensor	Anritsu	MA2411B	1911386	08/19/2021	08/18/2022
Power Sensor	Anritsu	MA2411B	1911387	08/19/2021	08/18/2022
Software	Radio Test Software Ver. 21				

AC Power Line Conducted Emission Test Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
CABLE	EMCI	CFD300-NL	CERF	06/28/2021	06/27/2022
EMI Test Receiver	R&S	ESCI	100064	07/05/2021	07/04/2022
LISN	SCHWARZBECK	NSLK 8127	8127-01068	01/17/2022	01/16/2023
Software	EZ-EMC(CCS-3A1-CE-wugu)				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Required.

3M 966 Chamber Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/19/2021	07/18/2022
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/23/2022	02/22/2023
Coaxial Cable	EMCI	EMC105	190914+1111	09/17/2021	09/16/2022
Coaxial Cable	Woken	J-1099	201709090004	12/23/2021	12/22/2022
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	12/28/2021	12/27/2022
High Pass Filters	MICRO TRONICS	HPM13195	003	02/10/2022	02/09/2023
Horn Antenna	ETS LINDGREN	3116	00026370	11/30/2021	11/29/2022
Horn Antenna	ETS LINDGREN	3117	00055165	07/29/2021	07/28/2022
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/05/2021	12/04/2022
Loop Ant	COM-POWER	AL-130	121051	04/07/2021	04/06/2022
Pre-Amplifier	EMEC	EM330	060609	02/23/2022	02/22/2023
Pre-Amplifier	HP	8449B	3008A00965	12/24/2021	12/23/2022
Pre-Amplifier	MITEQ	AMF-6F-1800 4000-37-8P	985646	09/08/2021	09/07/2022
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	12/06/2021	12/05/2022
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180419c				

Remark:

- Each piece of equipment is scheduled for calibration once a year.
- N.C.R. = No Calibration Required.

Dynamic Frequency Selection					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Attenuator	E-INSTRUMENT	EPA-600H	EC1400050	07/08/2021	07/07/2022
Coaxial Cable	Woken	WC12	DC004	06/28/2021	06/27/2022
Directional Couplers	Agilent	87301D	MY44350252	07/26/2021	07/25/2022
Power Divider	Marvelous Microwave	MVE8586	16011206	07/20/2021	07/19/2022
Power Divider	Solvang Technology	STI08-0015	008	07/26/2021	07/25/2022
Vector Signal Generator	KEYSIGHT	N5182B/N5182BX07	MY61252828/ MY59362552	02/22/2022	02/22/2023
Spectrum Analyzer	R&S	FSU 26	100258	06/17/2021	06/16/2022
Software	GPIBSHOT, DFS-Aggregate-Time FSU, LANLook				

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	Lan Cable	Nienyi	NYS4709	N/A	N/A

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H
2	wireless card	Netgear	A6210	N/A	PY313400249
3	NB	Lenovo	20175	N/A	TX2-RTL8723AS
4	AP	ASUS	RT-AX88U	N/A	MSQ-RTAXHP00

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.407, KDB 789033 D02.

2. TEST SUMMARY

FCC Standard Sec.	Chapter	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207	4.1	AC Conducted Emission	Pass
15.407(a)	4.2	26dB Bandwidth	Pass
15.407(e)	4.2	6dB Bandwidth	Pass
2.1049	4.2	Occupied Bandwidth (99%)	Pass
15.407(a)	4.3	Output Power Measurement	Pass
15.407(a)	4.4	Power Spectral Density	Pass
15.407(b)	4.5	Radiation Band Edge	Pass
15.407(b)	4.5	Radiation Spurious Emission	Pass
15.407(h)	5	Dynamic Frequency Selection	Pass

Summary of Dynamic Frequency of Selection Test For Master

UNII	Description	Limit	Result
U-NII Band 2-A 5250-5350MHz	Channel Availability Check Time	> 60sec	Pass
	U-NII Detection Bandwidth	> 100% of the U-NII 99% transmission power bandwidth	Pass
	Statistical Performance Check	Type 1,2,3,4 >= 60% Type 1~4 and 5 >= 80% Type 6 >= 70%	Pass
	Channel Move Time	< 10 sec	Pass
	Channel Closing Transmission Time	< 200 ms + aggregate of 60 ms over remaining 10 s period	Pass
	Non-Occupancy Period Test	> 30 minutes	Pass
U-NII Band 2-C 5470-5725MHz	Channel Availability Check Time	> 60sec	Pass
	U-NII Detection Bandwidth	> 100% of the U-NII 99% transmission power bandwidth	Pass
	Statistical Performance Check	Type 1,2,3,4 >= 60% Type 1~4 and 5 >= 80% Type 6 >= 70%	Pass
	Channel Move Time	< 10 sec	Pass
	Channel Closing Transmission Time	< 200 ms + aggregate of 60 ms over remaining 10 s period	Pass
	Non-Occupancy Period Test	> 30 minutes	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE EUT CHANNEL NUMBER OF OPERATING CONDITION

Operation mode	1. IEEE 802.11a mode: 6Mbps 2. IEEE 802.11n HT 20 MHz mode: MCS0 3. IEEE 802.11ac VHT 20 MHz mode: MCS0 4. IEEE 802.11n HT 40 MHz mode: MCS0 5. IEEE 802.11ac VHT 40 MHz mode: MCS0 6. IEEE 802.11ac VHT 80 MHz mode: MCS0 7. IEEE 802.11ax HE 20 mode: MCS0 8. IEEE 802.11ax HE 40 mode: MCS0 9. IEEE 802.11ax HE 80 mode: MCS0																																																																																	
Operating Frequency	<table><tr><th></th><th>Mode</th><th>Frequency Range (MHz)</th></tr><tr><td rowspan="9">U-NII-1</td><td>IEEE 802.11a</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5210</td></tr><tr><td>IEEE 802.11ax HE 20 MHz</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11ax HE 40 MHz</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ax HE 80 MHz</td><td>5210</td></tr><tr><td rowspan="9">U-NII-2a</td><td>IEEE 802.11a</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5290</td></tr><tr><td>IEEE 802.11ax HE 20 MHz</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11ax HE 40 MHz</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ax HE 80 MHz</td><td>5290</td></tr><tr><td rowspan="9">U-NII-2c</td><td>IEEE 802.11a</td><td>5500, 5580, 5700, 5720</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5500, 5580, 5700, 5720</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5500, 5580, 5700, 5720</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5510, 5550, 5670, 5710</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5510, 5550, 5670, 5710</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5530, 5690</td></tr><tr><td>IEEE 802.11ax HE 20 MHz</td><td>5500, 5580, 5700, 5720</td></tr><tr><td>IEEE 802.11ax HE 40 MHz</td><td>5510, 5550, 5670, 5710</td></tr><tr><td>IEEE 802.11ax HE 80 MHz</td><td>5530, 5690</td></tr><tr><td rowspan="9">U-NII-3</td><td>IEEE 802.11a</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11n HT 20 MHz</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11ac VHT 20 MHz</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11n HT 40 MHz</td><td>5755, 5795</td></tr><tr><td>IEEE 802.11ac VHT 40 MHz</td><td>5755, 5795</td></tr><tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5775</td></tr><tr><td>IEEE 802.11ax HE 20 MHz</td><td>5745, 5785, 5825</td></tr><tr><td>IEEE 802.11ax HE 40 MHz</td><td>5755, 5795</td></tr><tr><td>IEEE 802.11ax HE 80 MHz</td><td>5775</td></tr></table>				Mode	Frequency Range (MHz)	U-NII-1	IEEE 802.11a	5180, 5220, 5240	IEEE 802.11n HT 20 MHz	5180, 5220, 5240	IEEE 802.11ac VHT 20 MHz	5180, 5220, 5240	IEEE 802.11n HT 40 MHz	5190, 5230	IEEE 802.11ac VHT 40 MHz	5190, 5230	IEEE 802.11ac VHT 80 MHz	5210	IEEE 802.11ax HE 20 MHz	5180, 5220, 5240	IEEE 802.11ax HE 40 MHz	5190, 5230	IEEE 802.11ax HE 80 MHz	5210	U-NII-2a	IEEE 802.11a	5260, 5300, 5320	IEEE 802.11n HT 20 MHz	5260, 5300, 5320	IEEE 802.11ac VHT 20 MHz	5260, 5300, 5320	IEEE 802.11n HT 40 MHz	5270, 5310	IEEE 802.11ac VHT 40 MHz	5270, 5310	IEEE 802.11ac VHT 80 MHz	5290	IEEE 802.11ax HE 20 MHz	5260, 5300, 5320	IEEE 802.11ax HE 40 MHz	5270, 5310	IEEE 802.11ax HE 80 MHz	5290	U-NII-2c	IEEE 802.11a	5500, 5580, 5700, 5720	IEEE 802.11n HT 20 MHz	5500, 5580, 5700, 5720	IEEE 802.11ac VHT 20 MHz	5500, 5580, 5700, 5720	IEEE 802.11n HT 40 MHz	5510, 5550, 5670, 5710	IEEE 802.11ac VHT 40 MHz	5510, 5550, 5670, 5710	IEEE 802.11ac VHT 80 MHz	5530, 5690	IEEE 802.11ax HE 20 MHz	5500, 5580, 5700, 5720	IEEE 802.11ax HE 40 MHz	5510, 5550, 5670, 5710	IEEE 802.11ax HE 80 MHz	5530, 5690	U-NII-3	IEEE 802.11a	5745, 5785, 5825	IEEE 802.11n HT 20 MHz	5745, 5785, 5825	IEEE 802.11ac VHT 20 MHz	5745, 5785, 5825	IEEE 802.11n HT 40 MHz	5755, 5795	IEEE 802.11ac VHT 40 MHz	5755, 5795	IEEE 802.11ac VHT 80 MHz	5775	IEEE 802.11ax HE 20 MHz	5745, 5785, 5825	IEEE 802.11ax HE 40 MHz	5755, 5795	IEEE 802.11ax HE 80 MHz	5775
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	IEEE 802.11n HT 40 MHz	5510, 5550, 5670, 5710																																																																																
	IEEE 802.11ac VHT 40 MHz	5510, 5550, 5670, 5710																																																																																
	IEEE 802.11ac VHT 80 MHz	5530, 5690																																																																																
	IEEE 802.11ax HE 20 MHz	5500, 5580, 5700, 5720																																																																																
	IEEE 802.11ax HE 40 MHz	5510, 5550, 5670, 5710																																																																																
	IEEE 802.11ax HE 80 MHz	5530, 5690																																																																																
U-NII-3	IEEE 802.11a	5745, 5785, 5825																																																																																
	IEEE 802.11n HT 20 MHz	5745, 5785, 5825																																																																																
	IEEE 802.11ac VHT 20 MHz	5745, 5785, 5825																																																																																
	IEEE 802.11n HT 40 MHz	5755, 5795																																																																																
	IEEE 802.11ac VHT 40 MHz	5755, 5795																																																																																
	IEEE 802.11ac VHT 80 MHz	5775																																																																																
	IEEE 802.11ax HE 20 MHz	5745, 5785, 5825																																																																																
	IEEE 802.11ax HE 40 MHz	5755, 5795																																																																																
	IEEE 802.11ax HE 80 MHz	5775																																																																																

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. The system support 802.11a/n ht20/n ht40/ac vht20/40/80/ax he 20/40/80, the ht20/ht40 were reduced since the identical parameters with 802.11ac vht20 and vht40.
3. The worst-case data rates are determined to be as follows for each mode based upon investigations by measuring the average power and PSD across all data rates, bandwidths, and modulations. The device supports SISO and MIMO at 802.11a/n/ac/ax mode, per pre-test, MIMO 2TX mode was the worst and reported.
4. The device supports indoor access points and client devices. Both modes have evaluation power and PSD. Since the power of indoor access points is greater than the client device , the client device will be exempt from bandwidth and radiation tests.
5. The EUT support Beamforming off and beamforming on mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Power supply Mode	Mode 1: EUT power by Adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4
Worst Position	☐ Placed in fixed position. ☒ Placed in fixed position at X-Plane (E2-Plane) ☐ Placed in fixed position at Y-Plane (E1-Plane) ☐ Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Adapter
Worst Mode	☒ Mode 1 ☐ Mode 2 ☐ Mode 3 ☐ Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X,Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

Report No.: TMWK2201000141KR

3.3 EUT DUTY CYCLE

BFM OFF- Master

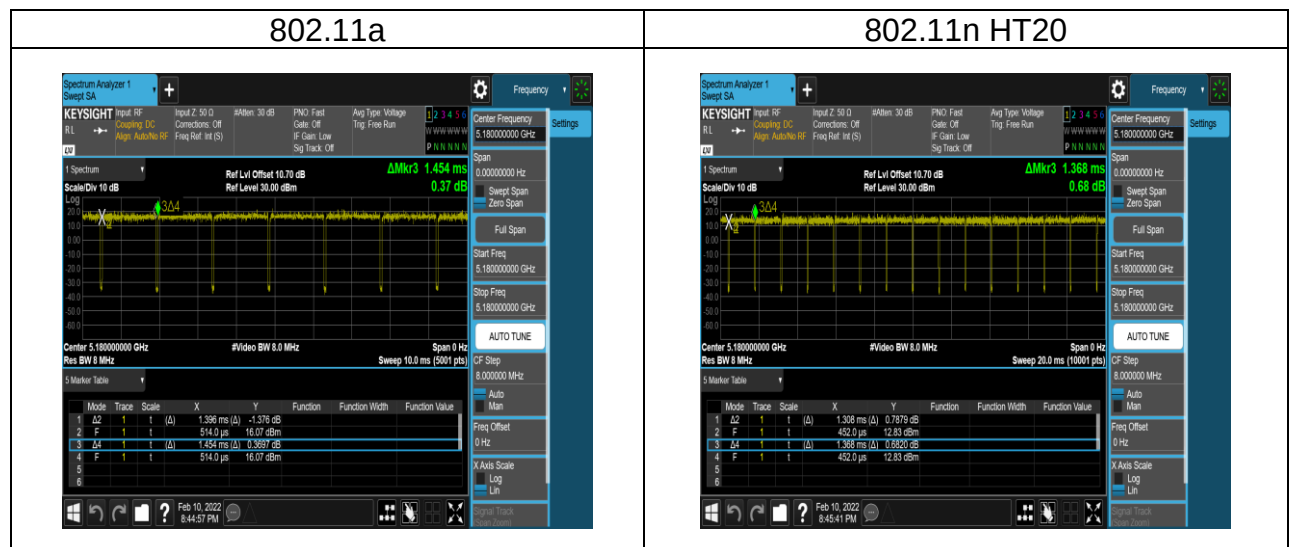
Temperature: 16.5 ~ 23.6°C

Test date: February 10 ~ March 7, 2022

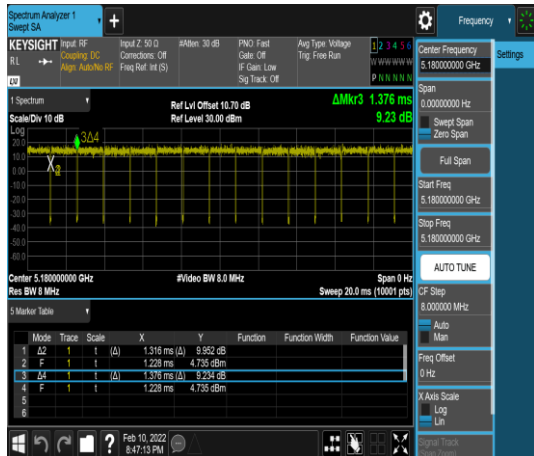
Humidity: 53 ~ 68% RH

Tested by: Jack Chen

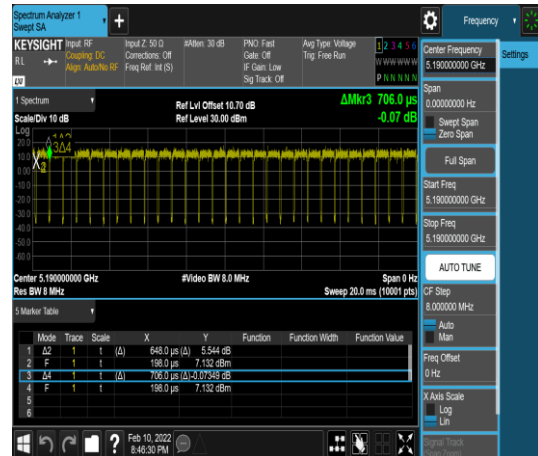
Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	96.01	0.18	0.72	1.00
802.11n_20	95.61	0.19	0.76	1.00
802.11ac_20	95.64	0.19	0.76	1.00
802.11n_40	91.78	0.37	1.54	2.00
802.11ac_40	91.88	0.37	1.52	2.00
802.11ac_80	84.82	0.72	3.09	4.00
802.11ax_20	94.66	0.24	0.97	1.00
802.11ax_40	90.40	0.44	1.83	2.00
802.11ax_80	84.18	0.75	3.36	4.00



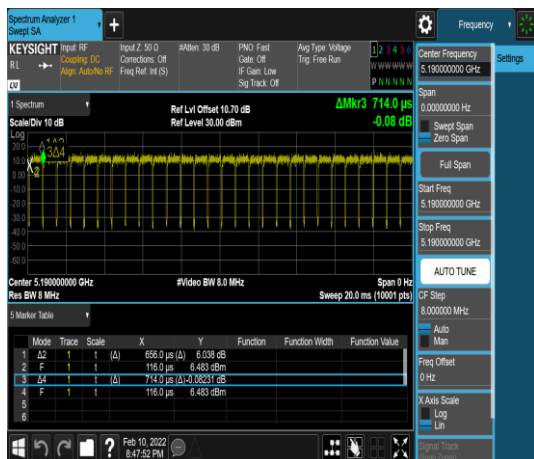
802.11ac 20



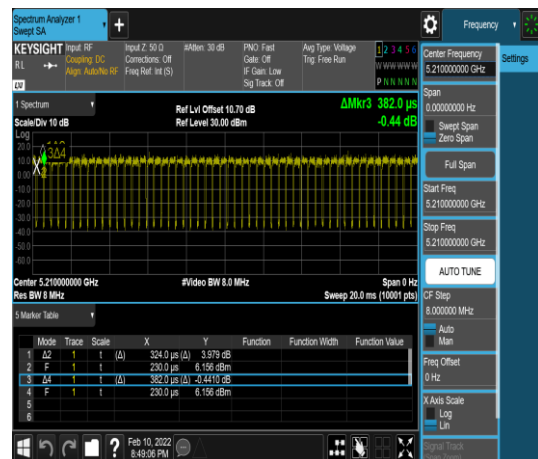
802.11n HT40

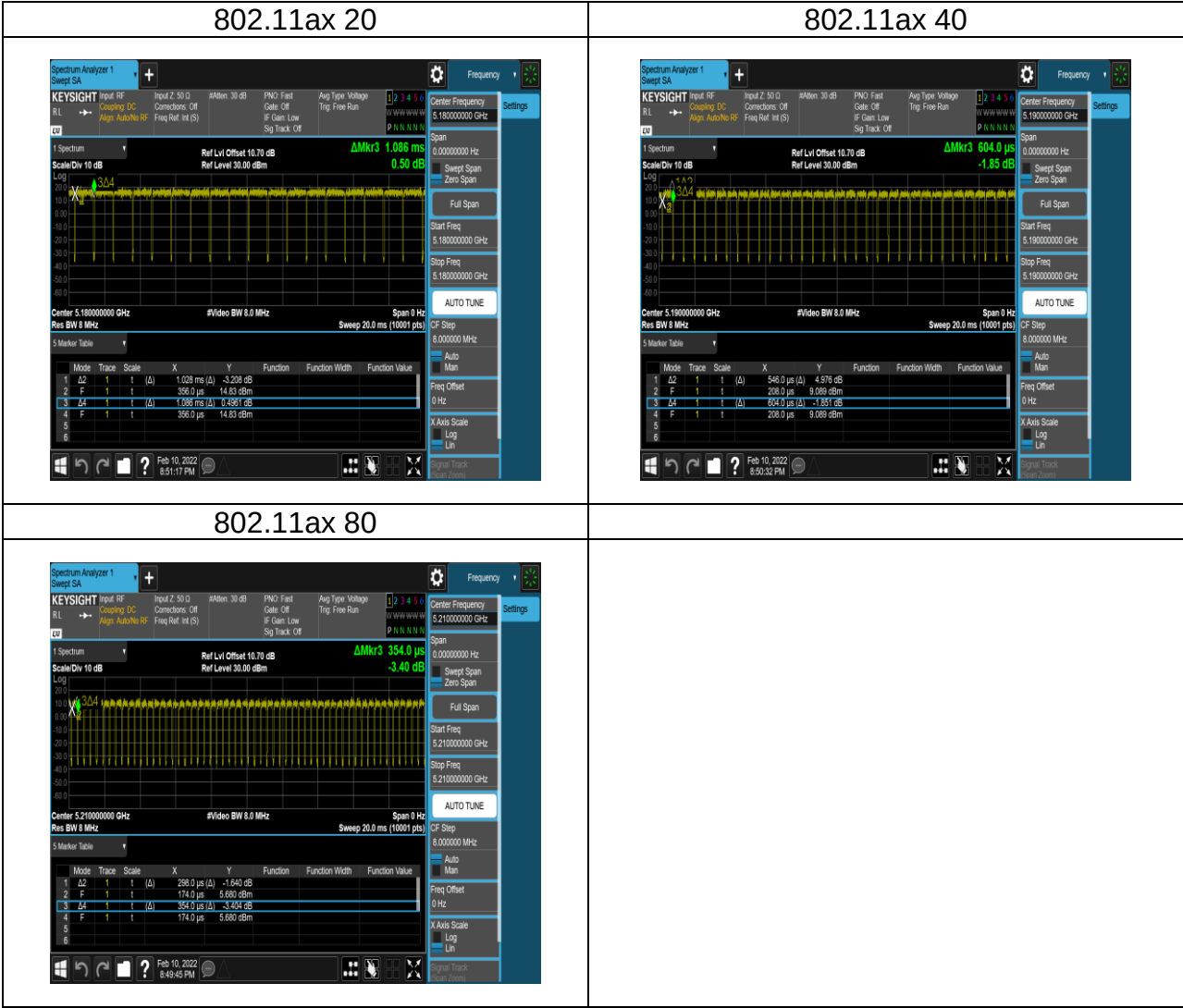


802.11ac 40



802.11ac 80





4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range (MHz)	Limits(dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

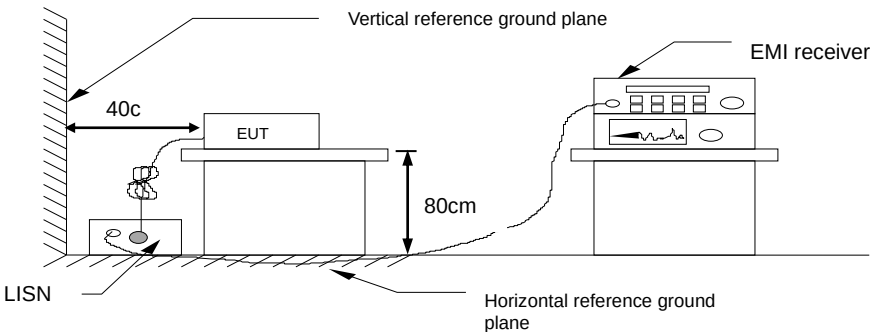
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed on a non-conducted table, which is 0.8m above horizontal ground plane and 0.4m above vertical ground plane.
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

4.1.3 Test Setup



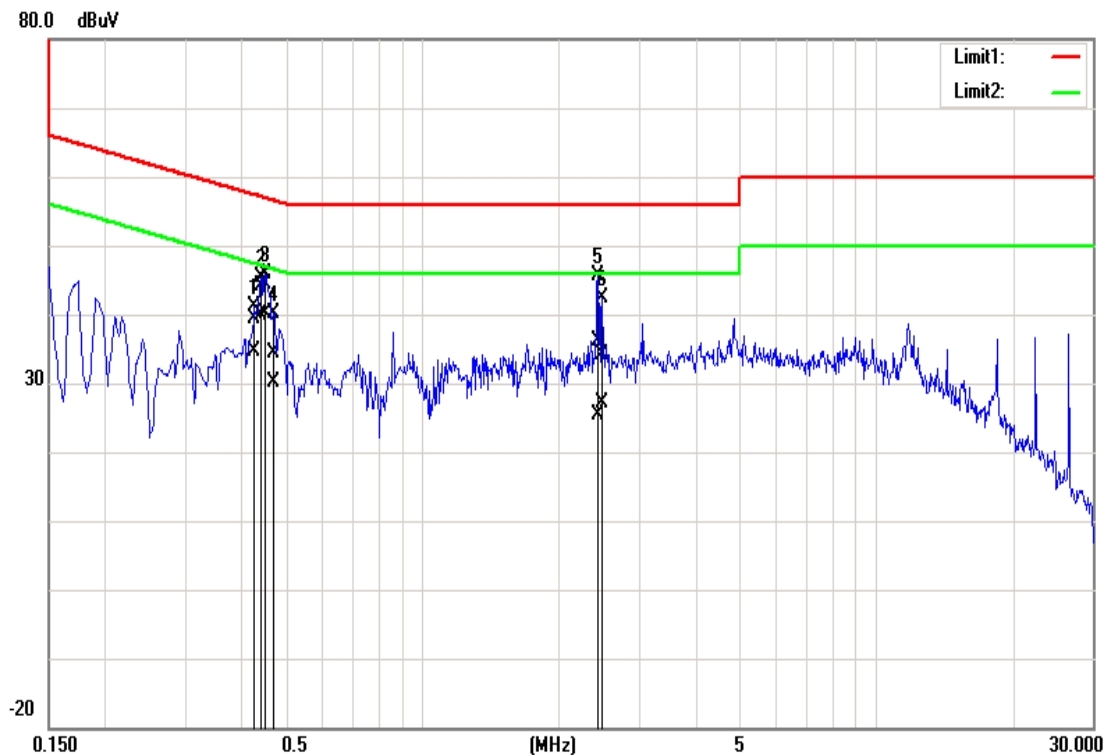
4.1.4 Test Result

Pass.

Report No.: TMWK2201000141KR

Test Data

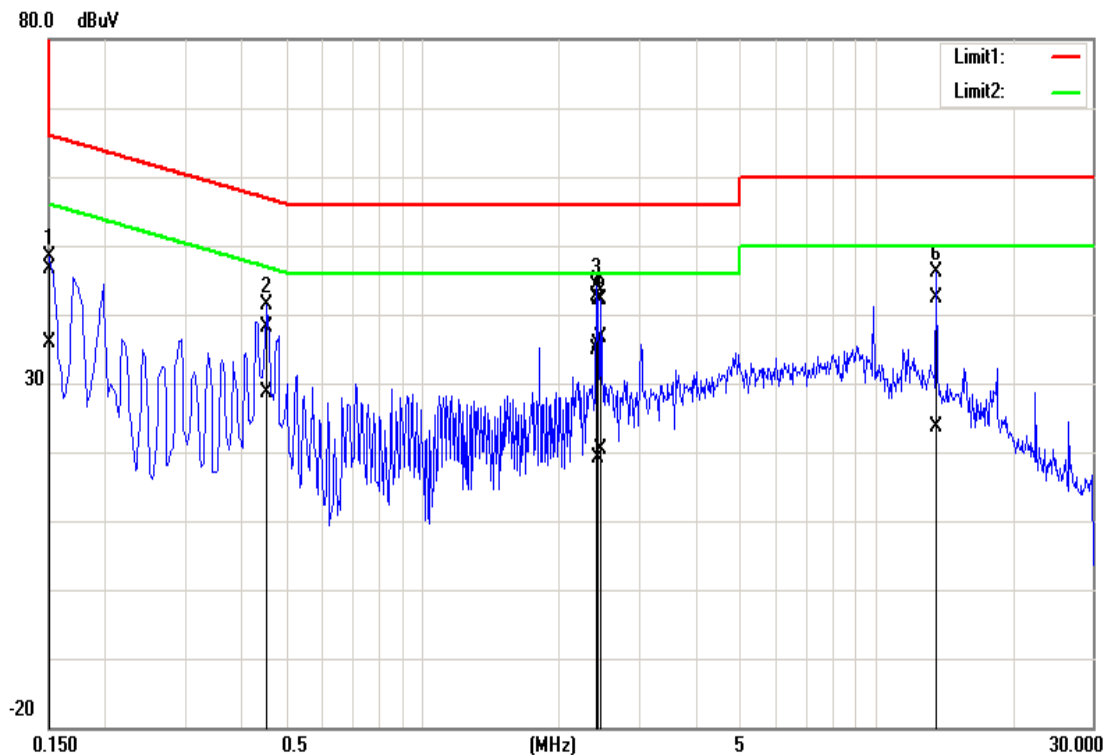
Test Mode:	Mode 1	Temp/Hum	19.9(°C)/ 58%RH
Phase:	Line	Test Date	February 9, 2022
Test Voltage:	120Vac, 60Hz	Test Engineer	Jack Chen



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.4260	39.16	34.59	0.10	39.26	34.69	57.33	47.33	-18.07	-12.64	Pass
0.4420	44.13	39.77	0.10	44.23	39.87	57.02	47.02	-12.79	-7.15	Pass
0.4500	44.34	39.94	0.10	44.44	40.04	56.88	46.88	-12.44	-6.84	Pass
0.4700	34.28	30.10	0.10	34.38	30.20	56.51	46.51	-22.13	-16.31	Pass
2.4460	36.05	25.22	0.16	36.21	25.38	56.00	46.00	-19.79	-20.62	Pass
2.4900	33.88	27.00	0.16	34.04	27.16	56.00	46.00	-21.96	-18.84	Pass

Note: Correction factor = LISN loss + Cable loss.

Test Mode:	Mode 1	Temp/Hum	19.9(°C)/ 58%RH
Phase:	Neutral	Test Date	February 9, 2022
Test Voltage:	120Vac, 60Hz	Test Engineer	Jack Chen



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1500	46.64	35.81	0.09	46.73	35.90	66.00	56.00	-19.27	-20.10	Pass
0.4540	37.96	28.47	0.10	38.06	28.57	56.80	46.80	-18.74	-18.23	Pass
2.4180	42.39	34.65	0.16	42.55	34.81	56.00	46.00	-13.45	-11.19	Pass
2.4380	35.58	18.99	0.16	35.74	19.15	56.00	46.00	-20.26	-26.85	Pass
2.4740	36.49	20.15	0.16	36.65	20.31	56.00	46.00	-19.35	-25.69	Pass
13.5660	42.04	23.37	0.38	42.42	23.75	60.00	50.00	-17.58	-26.25	Pass

Note: Correction factor = LISN loss + Cable loss.

4.2 26dB BANDWIDTH, 6dB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

4.2.1 Test Limit

26 dB Bandwidth : For reporting purposes only.

6 dB Bandwidth : Least 500kHz.

Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

26dB

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW: approximately 1% of the emission bandwidth.
3. Set the VBW>RBW.
4. Detoctor = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26dB down from the peak of the emission. Compare this with the RBW setting of the analyser. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

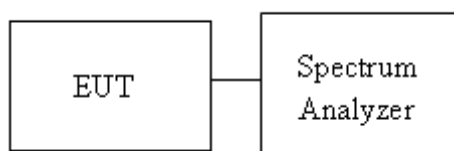
6dB

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = 100 kHz.
3. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
4. Detoctor = 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.

99%

1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set center frequency to the nominal EUT channel center frequency.
3. Set span = 1.5 times to 5.0 times the OBW.
4. Set RBW = 1 % to 5% of the OBW.
5. Set VBW $\geq 3 \times$ RBW

4.2.3 Test Setup



4.2.4 Test Result

BFM OFF- Master

Temperature: 16.5 ~ 23.6°C

Test date: February 10 ~ March 7, 2022

Humidity: 53 ~ 68% RH

Tested by: Jack Chen

UNII-1 5150-5250 MHz

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
36	5180	16.490	16.475	19.81	19.81
44	5220	16.473	16.500	19.52	19.86
48	5240	16.541	16.457	19.86	20.26

Test mode: IEEE 802.11ac VHT20 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
36	5180	17.632	17.594	20.12	20.02
44	5220	17.608	17.634	20.66	20.23
48	5240	17.618	17.638	20.52	19.79

Test mode: IEEE 802.11ac VHT40 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
38	5190	35.815	35.791	40.40	39.54
46	5230	36.239	35.987	50.00	49.73

Test mode: IEEE 802.11ac VHT80 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
42	5210	74.926	75.061	79.12	78.72

Test mode: IEEE 802.11ax HE20 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
36	5180	full	19.007	18.967	23.64	27.22
44	5220	full	18.982	18.998	26.95	22.53
48	5240	full	19.000	18.966	23.86	23.10

Test mode: IEEE 802.11ax HE40 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
38	5190	full	37.448	37.405	39.36	39.13
46	5230	full	37.880	37.707	50.00	50.00

Test mode: IEEE 802.11ax HE80 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
42	5210	full	76.540	76.676	80.08	79.77

UNII-2a 5250-5350 MHz

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
52	5260	16.452	16.431	19.89	19.64
60	5300	16.440	16.425	19.88	19.53
64	5320	16.463	16.443	20.00	19.79

Test mode: IEEE 802.11ac VHT20 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
52	5260	17.625	17.605	20.02	20.27
60	5300	17.623	17.579	20.16	20.16
64	5320	17.570	17.611	20.01	19.99

Test mode: IEEE 802.11ac VHT40 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
54	5270	35.907	35.738	40.00	39.15
62	5310	35.767	35.788	40.02	39.53

Test mode: IEEE 802.11ac VHT80 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
58	5290	75.054	74.996	79.22	78.86

Test mode: IEEE 802.11ax HE20 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
52	5260	full	19.009	18.948	20.91	22.00
60	5300	full	18.968	18.992	21.91	21.14
64	5320	full	18.955	18.968	23.95	24.01

Test mode: IEEE 802.11ax HE40 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
54	5270	full	37.553	37.496	39.50	39.35
62	5310	full	37.544	37.534	39.34	39.29

Test mode: IEEE 802.11ax HE80 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
58	5290	full	76.625	76.507	79.69	79.67

UNII-2c 5475-5725 MHz

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
100	5500	16.450	16.449	19.93	19.60
116	5580	16.472	16.454	20.06	19.81
140	5700	16.491	16.453	19.57	19.84
144	5720(U-NII 2C)	13.216	13.214	14.89	14.84
144	5720(U-NII 3)	3.216	3.214	4.89	4.84

Test mode: IEEE 802.11ac VHT20 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
100	5500	17.593	17.604	20.30	19.82
116	5580	17.587	17.609	20.22	20.01
140	5700	17.620	17.589	20.14	20.16
144	5720(U-NII 2C)	13.801	13.815	15.07	15.05
144	5720(U-NII 3)	3.801	3.815	5.07	5.05

Test mode: IEEE 802.11ac VHT40 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
102	5510	35.826	35.652	39.80	39.40
110	5550	35.802	35.748	39.82	39.21
134	5670	35.836	35.861	40.17	39.49
142	5710(U-NII 2C)	32.889	32.908	34.98	34.88
142	5710(U-NII 3)	2.889	2.908	4.98	4.88

Test mode: IEEE 802.11ac VHT80 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
106	5530	74.833	75.040	79.02	78.83
138	5690(U-NII 2C)	72.514	72.411	74.57	74.23
138	5690(U-NII 3)	2.514	2.411	4.57	4.23

Test mode: IEEE 802.11ax HE20 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
100	5500	full	18.964	18.958	21.31	22.56
116	5580	full	18.940	18.958	21.63	22.10
140	5700	full	18.981	18.955	24.81	21.70
144	5720(U-NII 2C)	full	14.489	14.476	16.27	15.80
144	5720(U-NII 3)	full	4.489	4.476	6.27	5.80

Test mode: IEEE 802.11ax HE40 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
102	5510	full	37.572	37.438	39.34	39.23
110	5550	full	37.557	37.420	39.33	39.05
134	5670	full	37.533	37.395	39.60	38.96
142	5710(U-NII 2C)	full	33.711	33.721	34.71	34.64
142	5710(U-NII 3)	full	3.711	3.721	4.71	4.64

Test mode: IEEE 802.11ax HE80 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
106	5530	full	76.448	76.312	79.77	79.70
138	5690(U-NII 2C)	full	73.261	73.275	74.81	74.95
138	5690(U-NII 3)	full	3.261	3.275	4.81	4.95

UNII-3 5750-5825 MHz

Test mode: IEEE 802.11a mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
149	5745	17.936	16.785	15.17	15.70
157	5785	17.809	16.767	16.33	16.29
165	5825	17.330	16.905	15.52	16.06

Test mode: IEEE 802.11ac VHT20 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
149	5745	18.851	17.933	17.55	16.93
157	5785	18.532	17.939	12.33	16.33
165	5825	18.410	18.137	16.93	17.33

Test mode: IEEE 802.11ac VHT40 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
151	5755	38.427	36.355	25.17	26.43
159	5795	40.383	36.496	25.69	32.55

Test mode: IEEE 802.11ac VHT80 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
155	5775	74.886	74.755	67.69	66.40

Test mode: IEEE 802.11ax HE20 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
149	5745	full	20.214	19.244	18.97	17.81
157	5785	full	19.936	19.253	18.29	17.87
165	5825	full	19.938	19.496	16.95	17.96

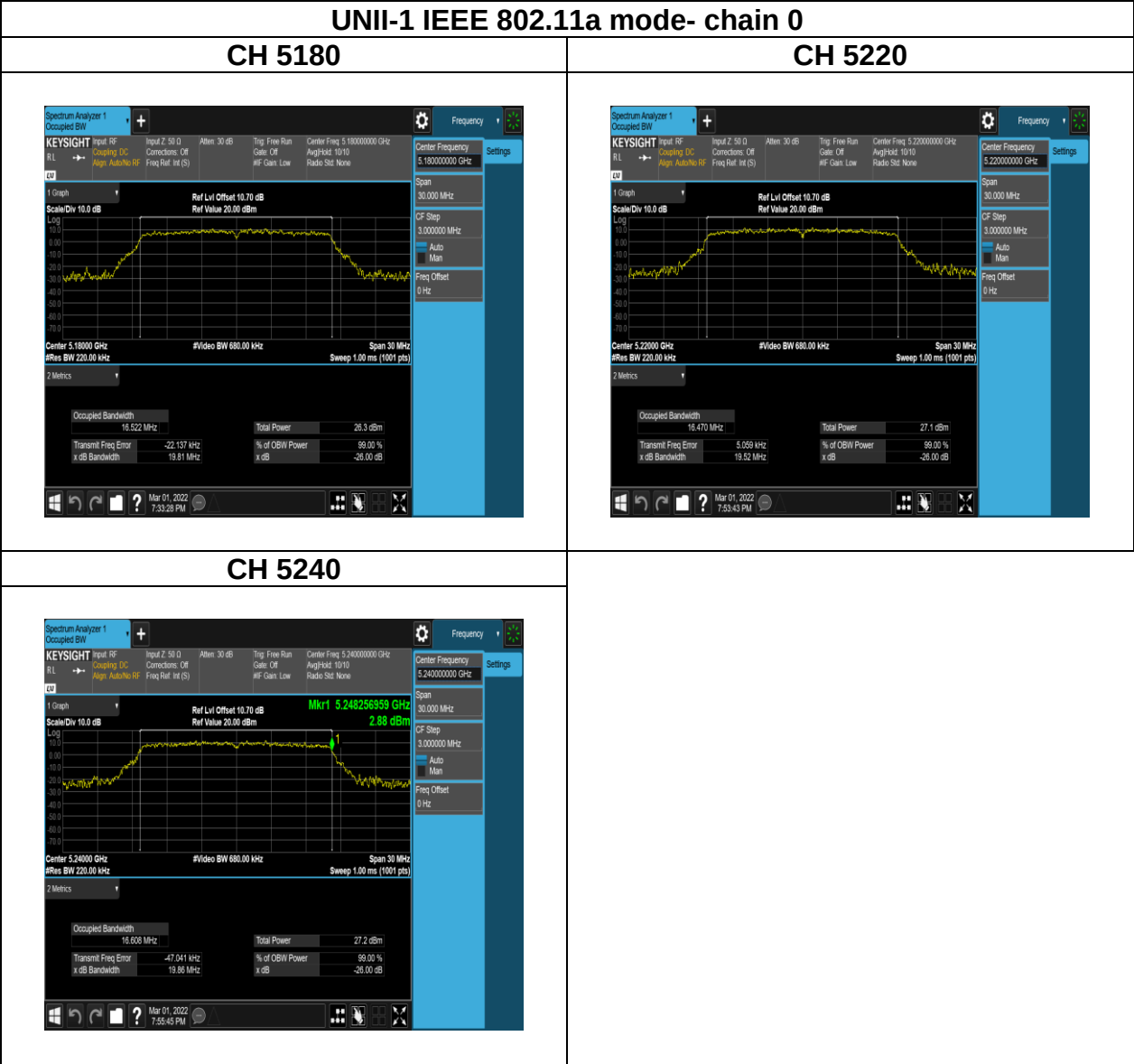
Test mode: IEEE 802.11ax HE40 mode

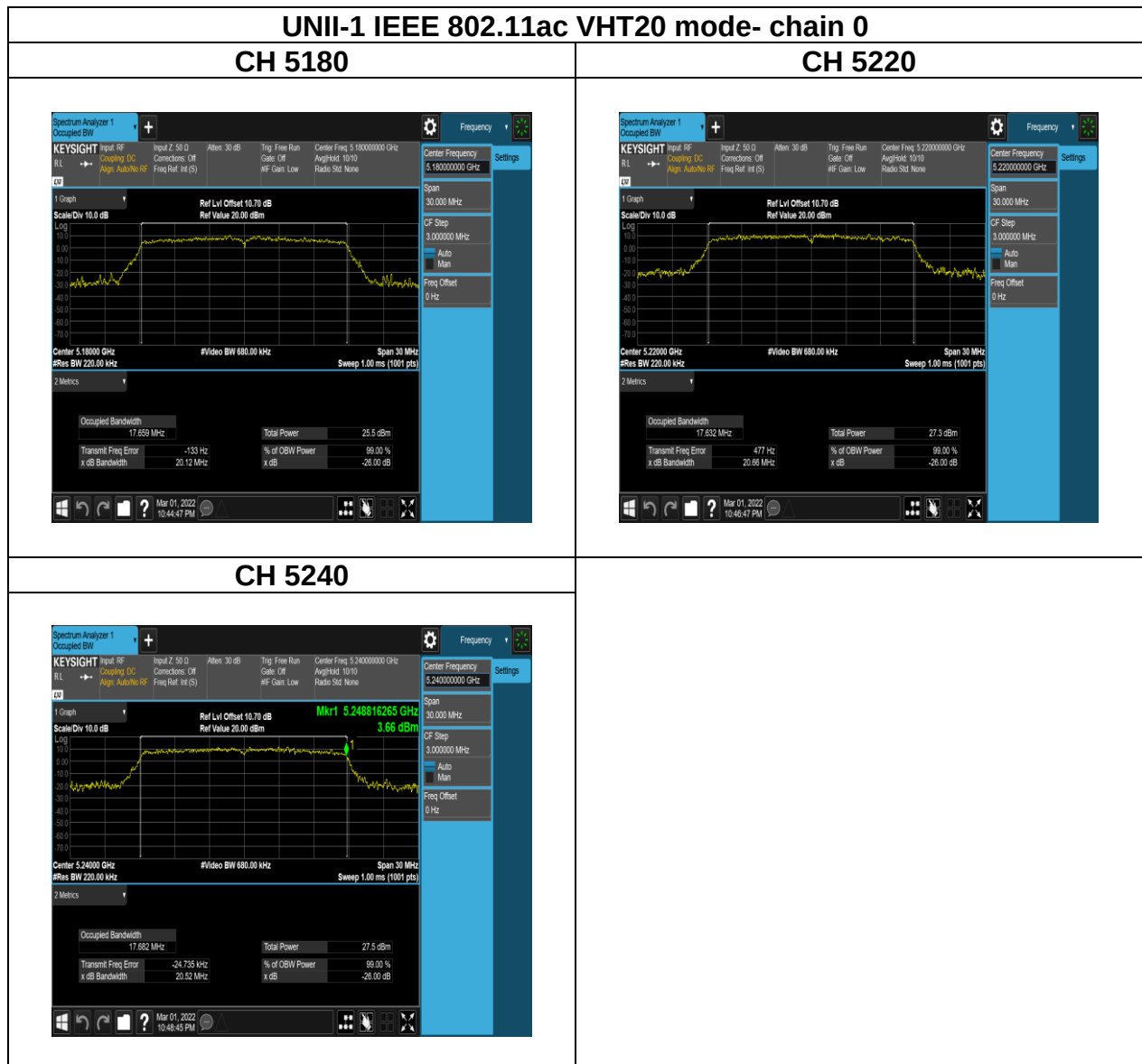
Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
151	5755	full	37.617	37.626	32.60	32.61
159	5795	full	40.329	37.967	35.05	32.61

Test mode: IEEE 802.11ax HE80 mode

Channel	Frequency (MHz)	RU config	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
155	5775	full	76.467	76.424	68.90	66.31

Test Plots (26dB BANDWIDTH)



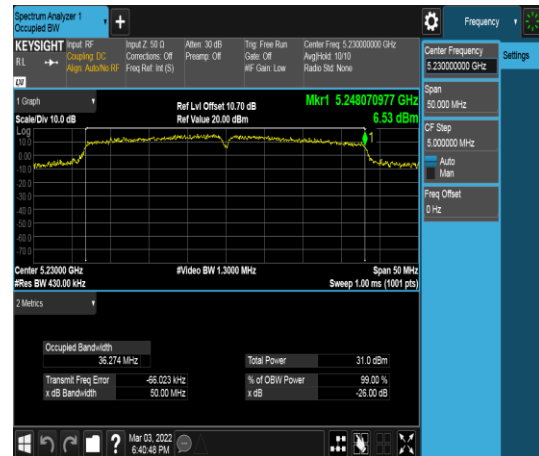


UNII-1 IEEE 802.11ac VHT40 mode- chain 0

CH 5190

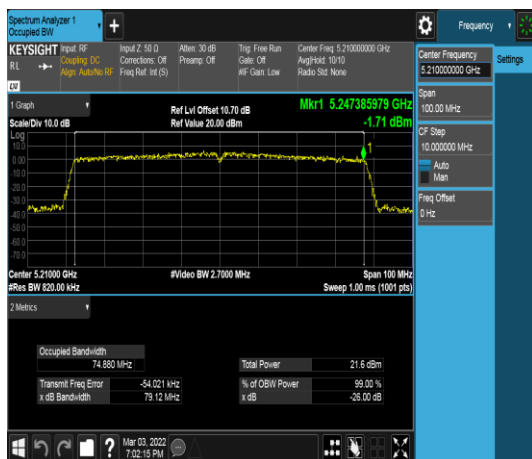


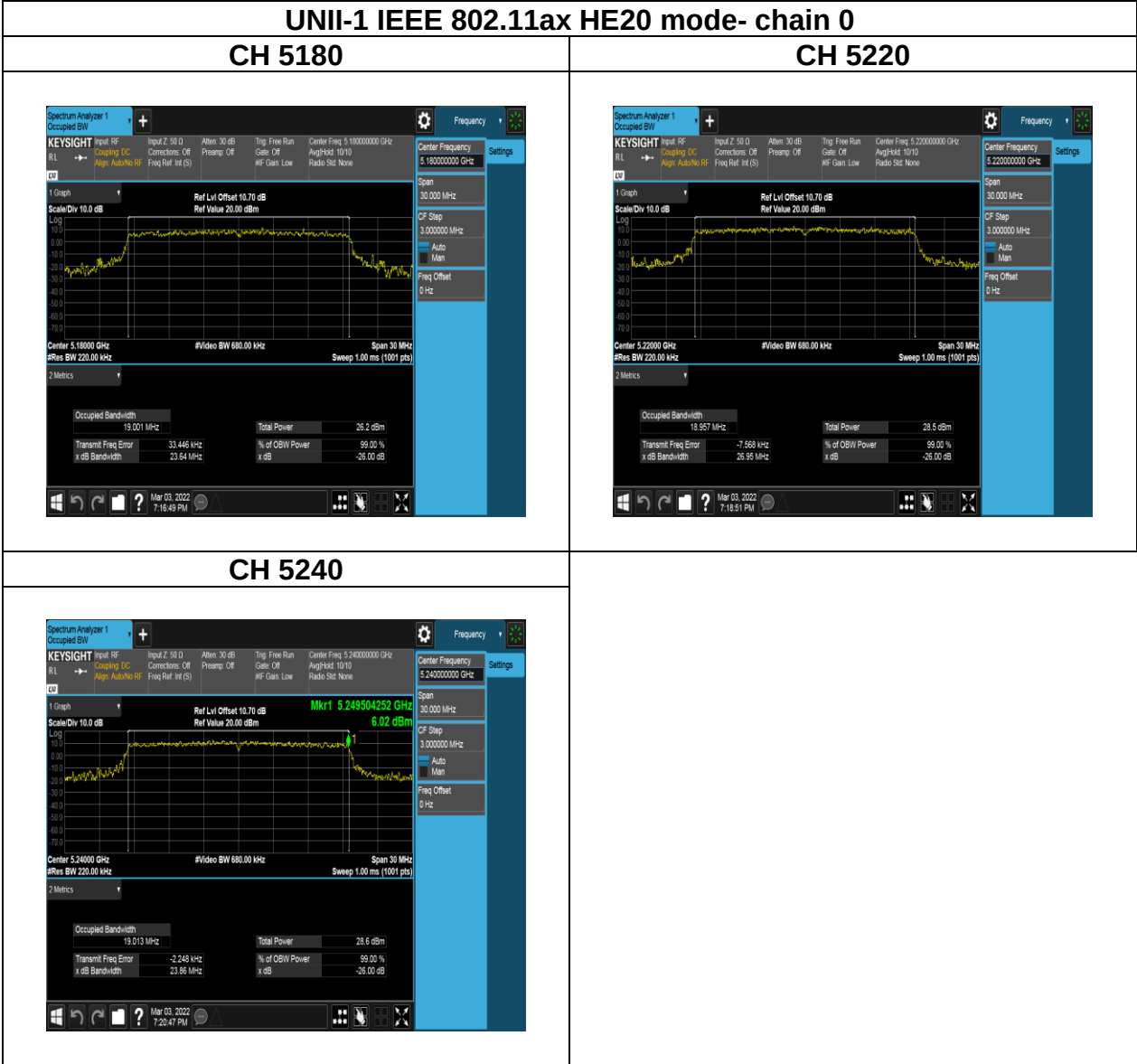
CH 5230



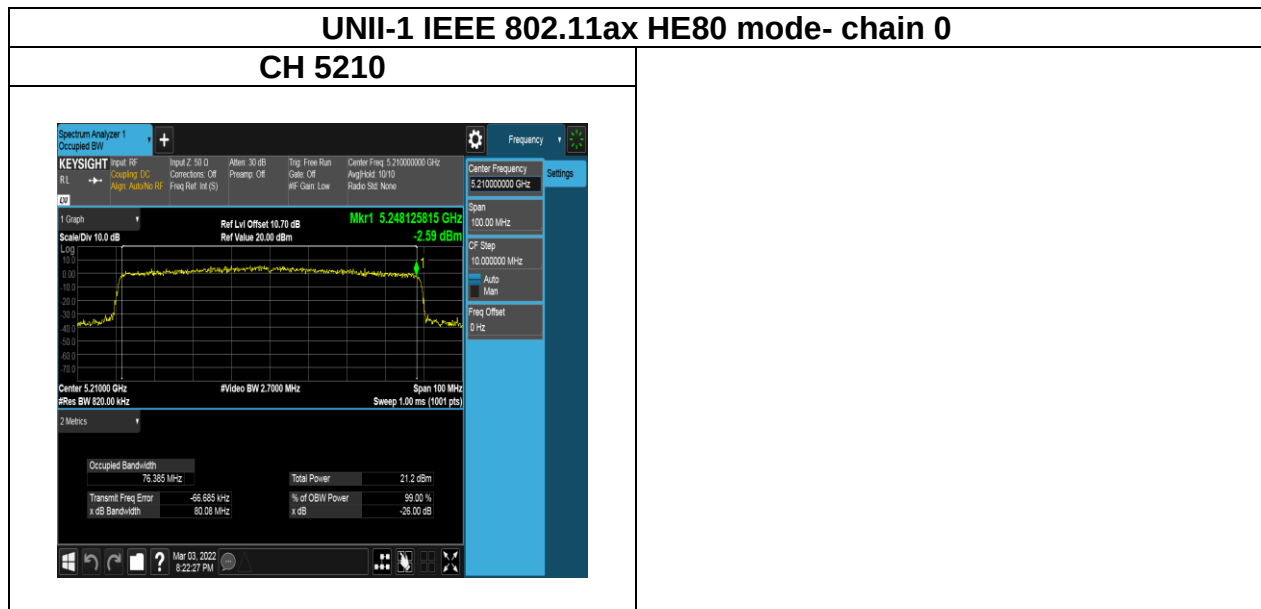
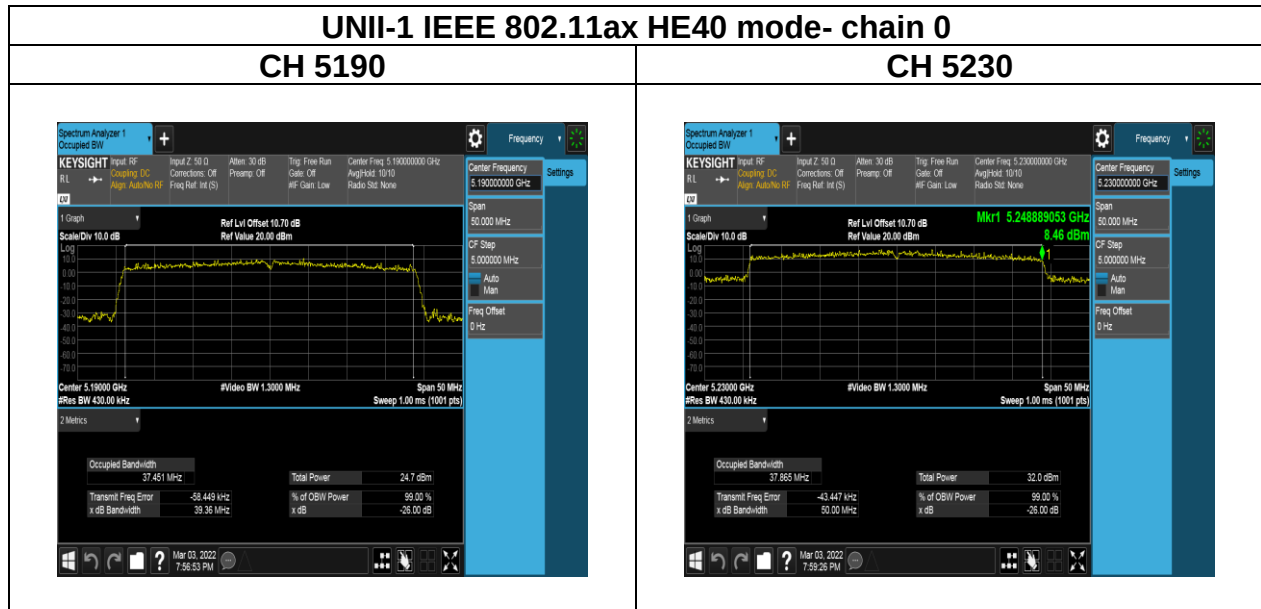
UNII-1 IEEE 802.11ac VHT80 mode- chain 0

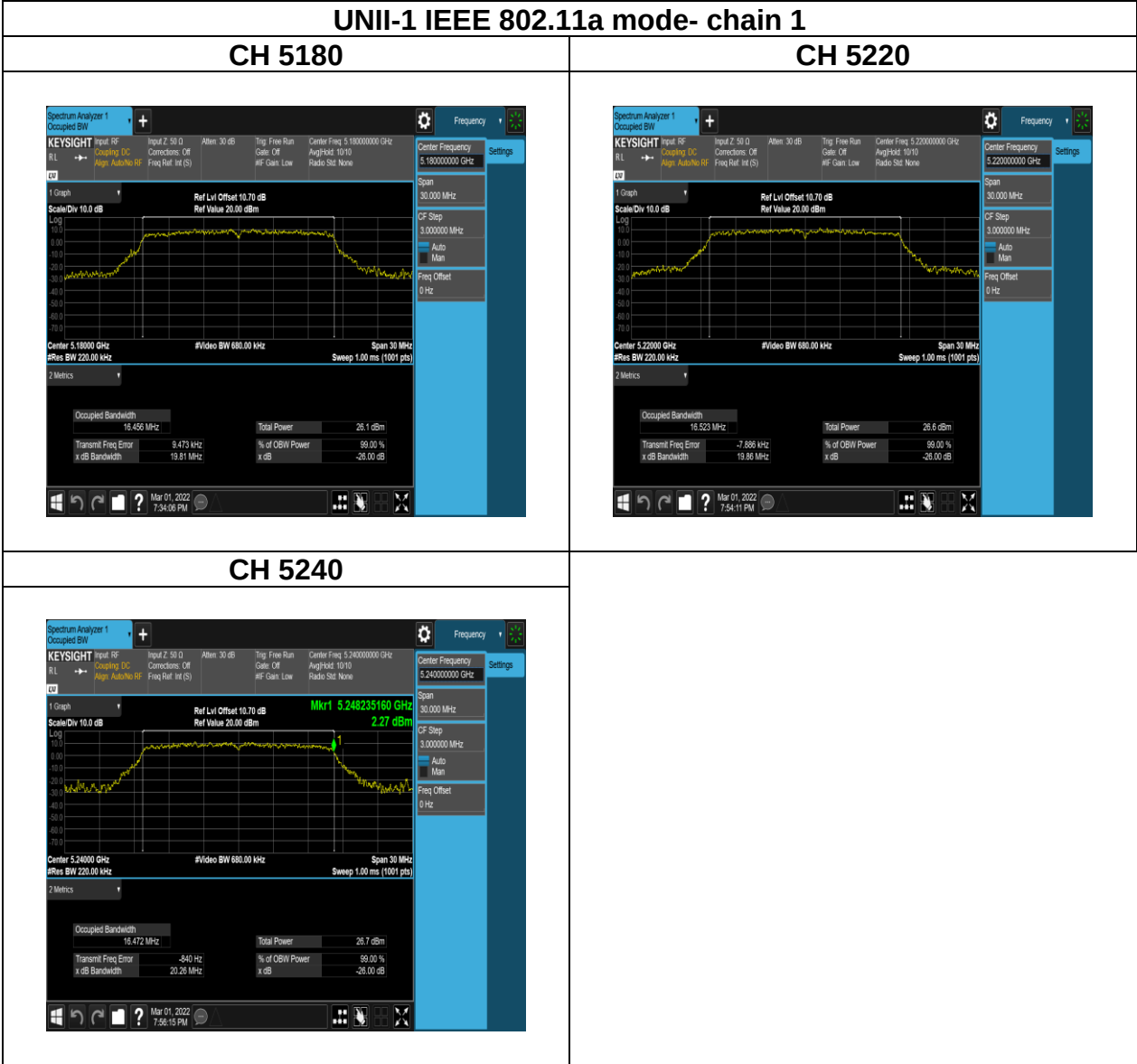
CH 5210



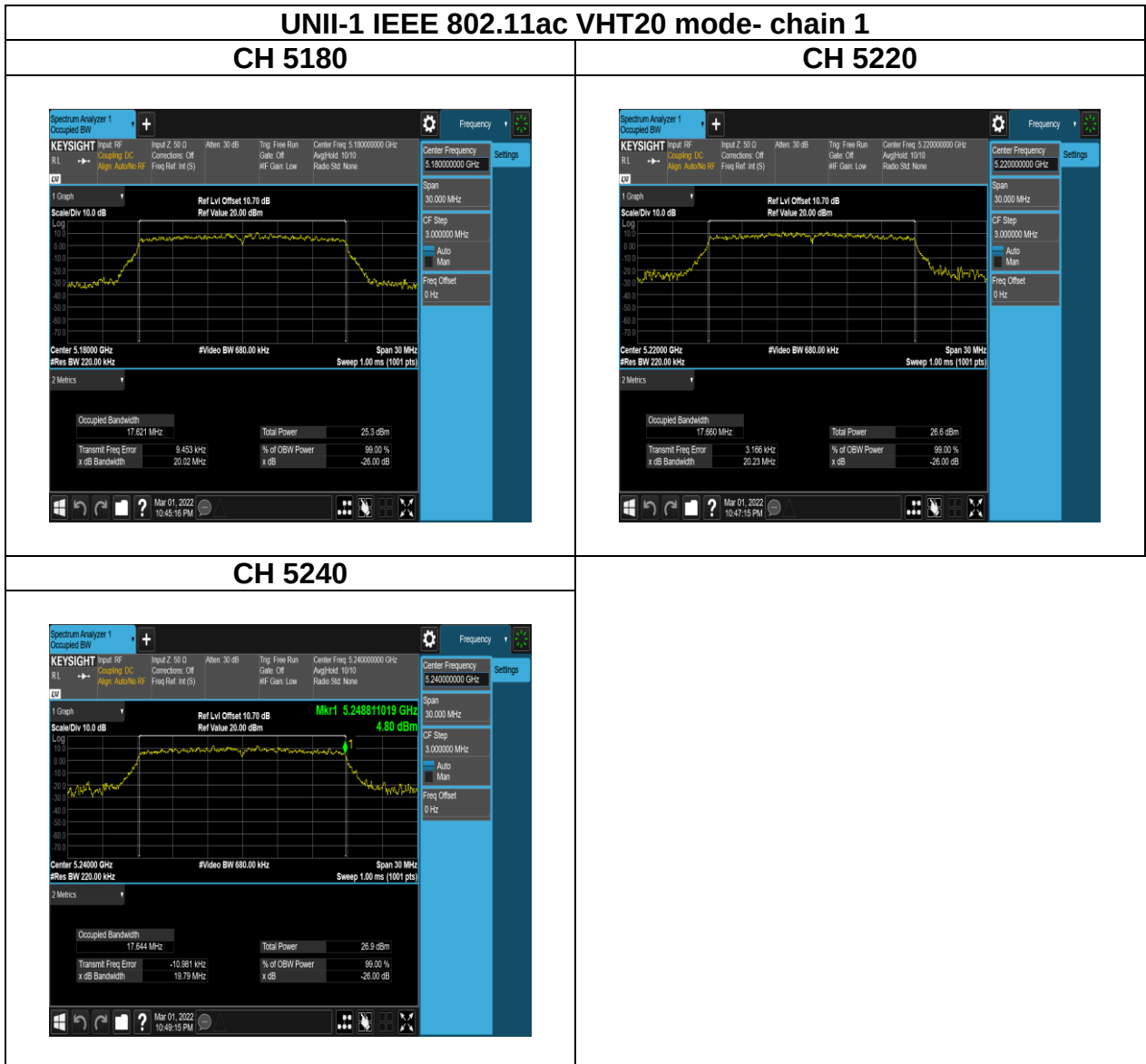


Report No.: TMWK2201000141KR

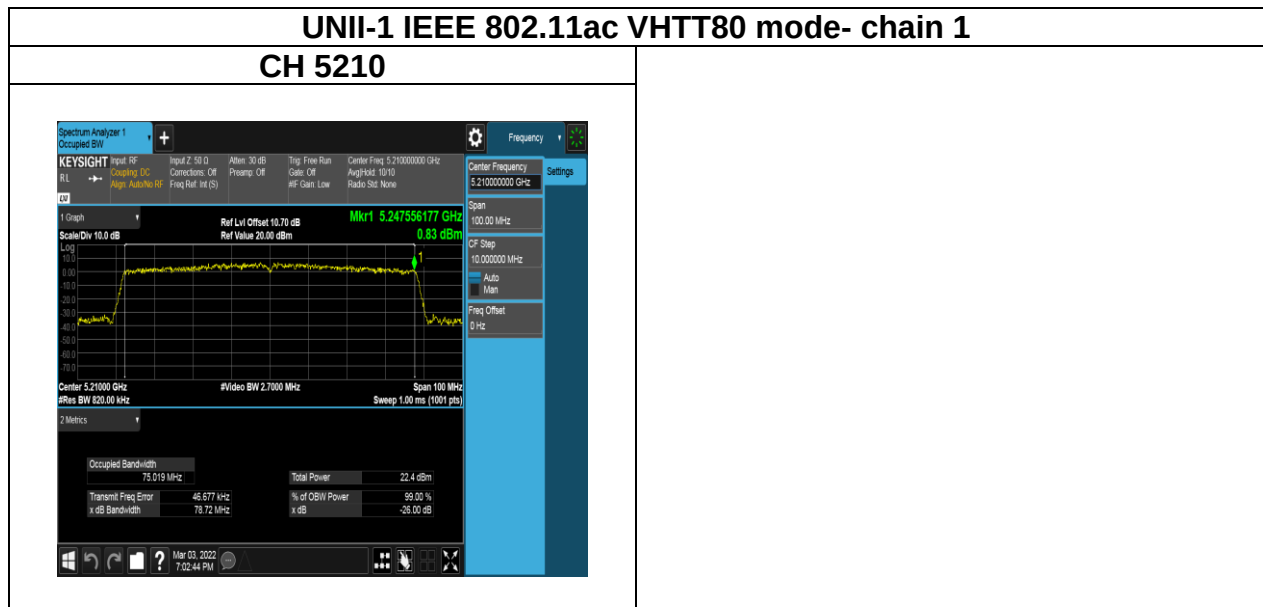
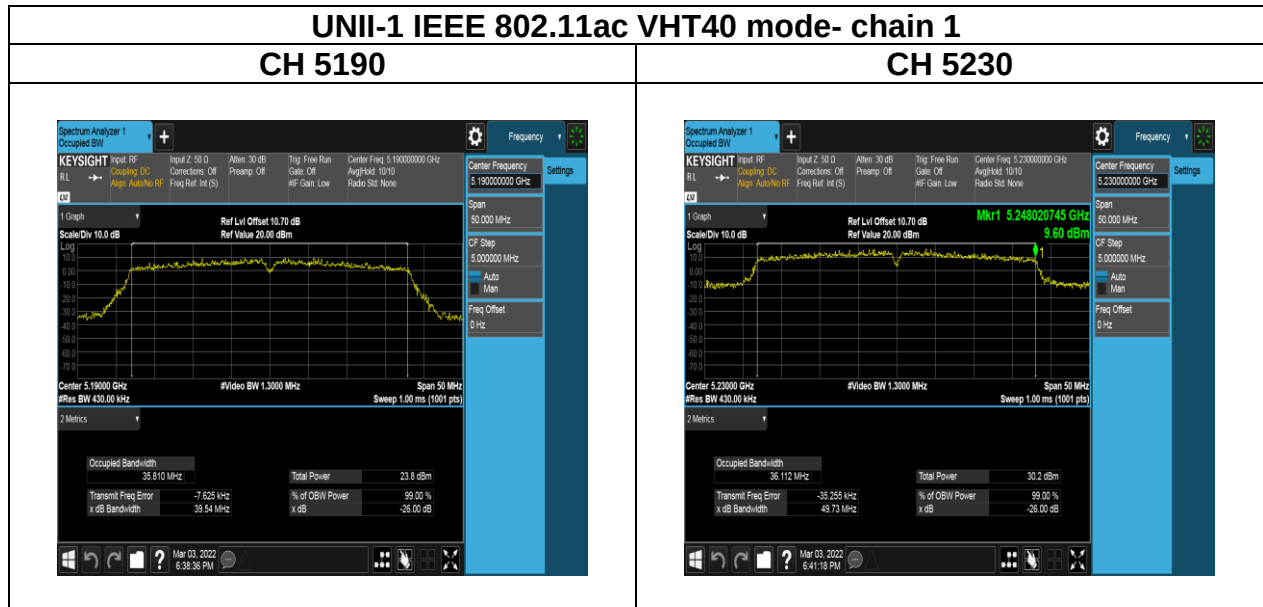


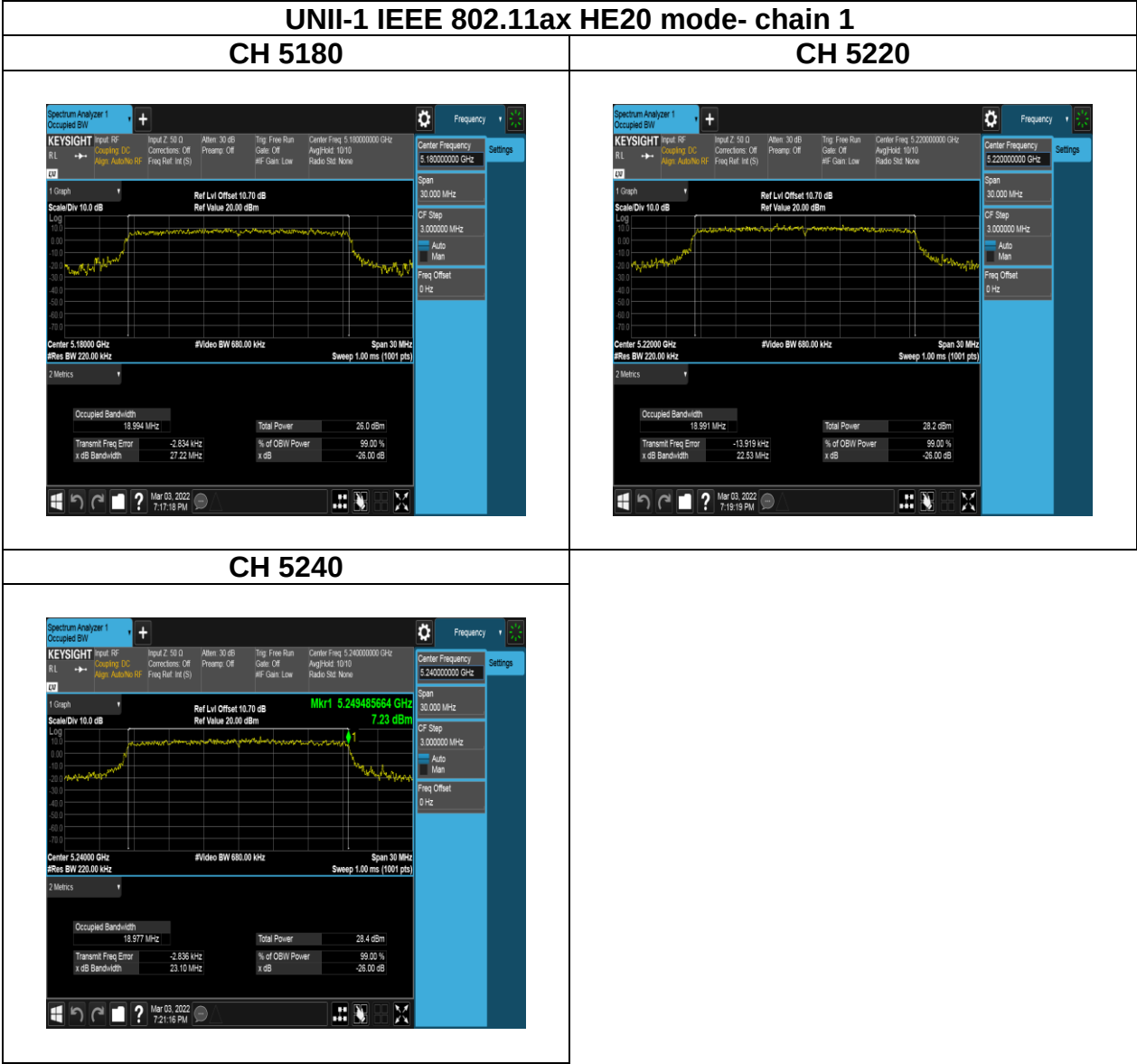


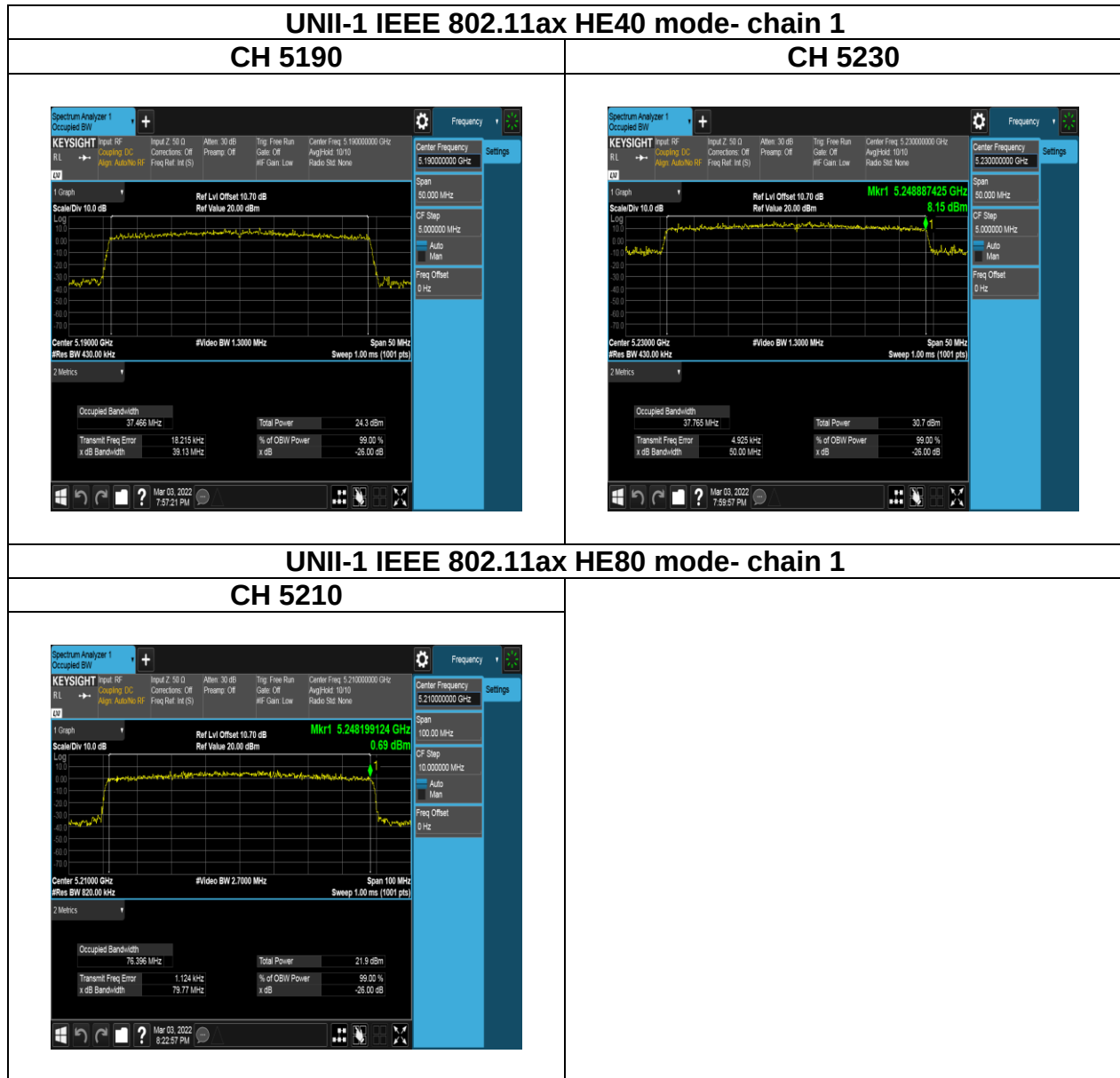
Report No.: TMWK2201000141KR



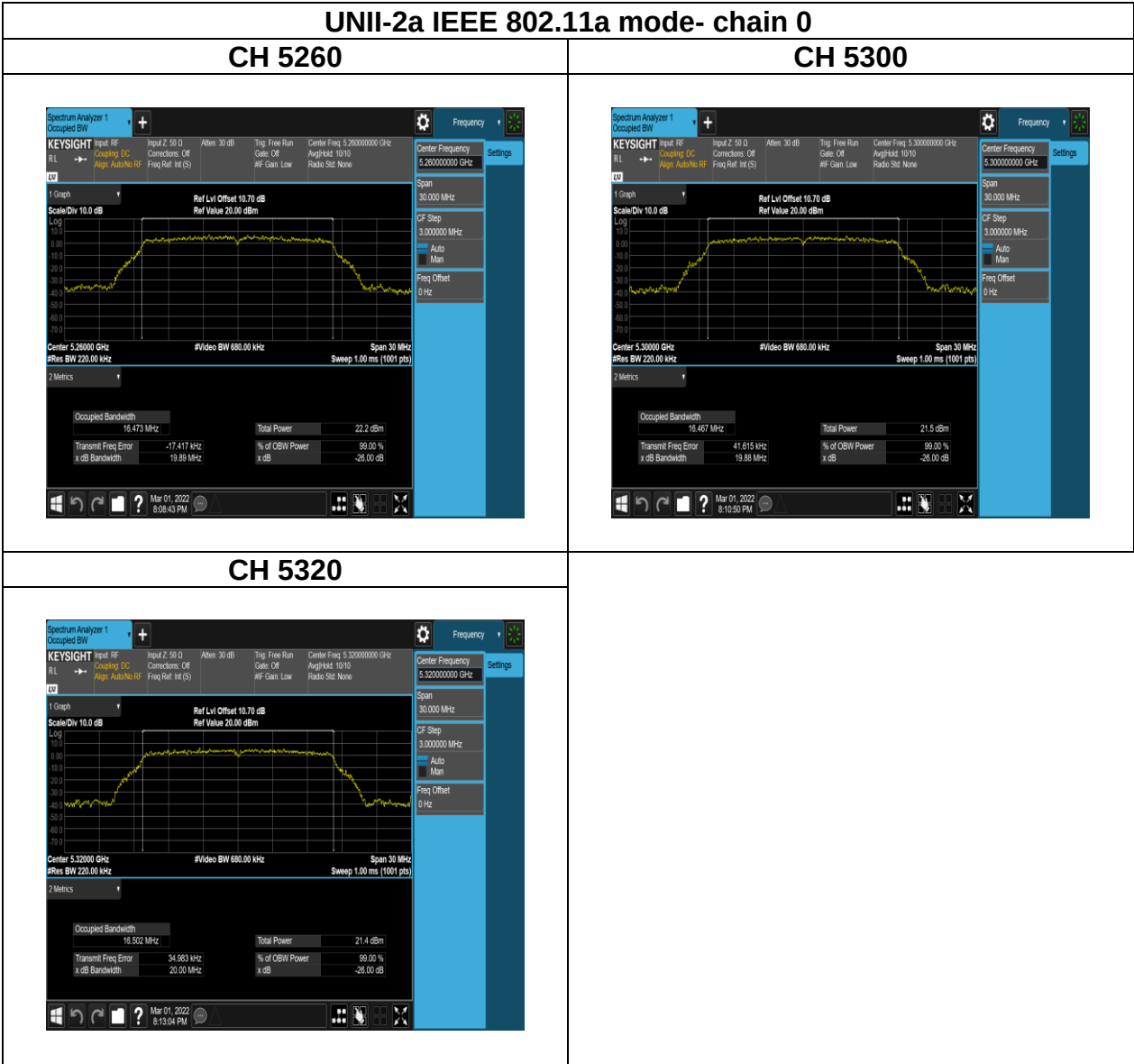
Report No.: TMWK2201000141KR



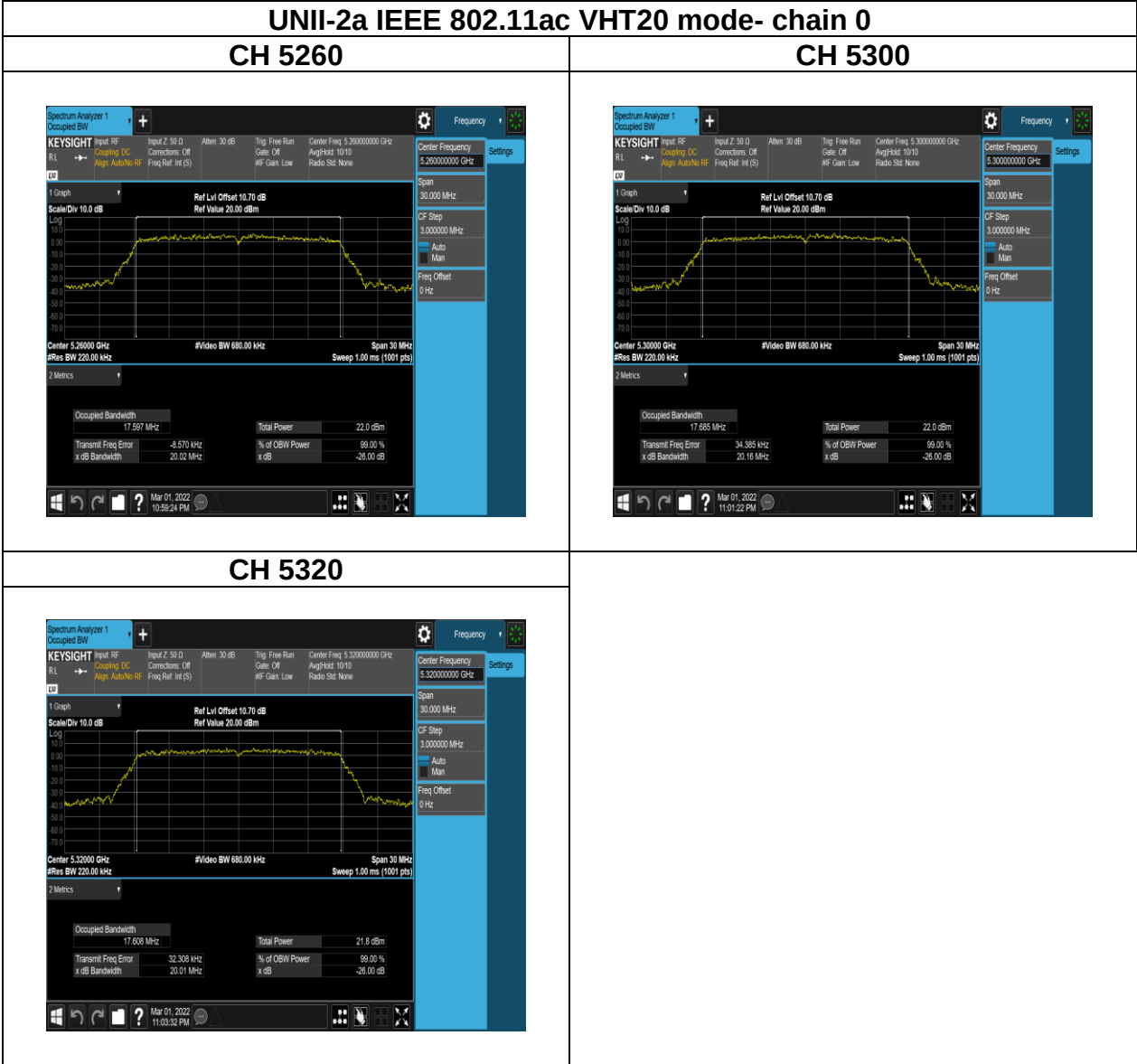




Test Plots (26dB BANDWIDTH)



CH 5320



UNII-2a IEEE 802.11ac VHT40 mode- chain 0

CH 5270

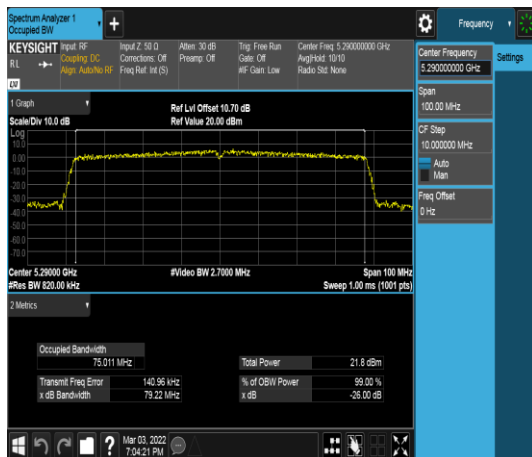


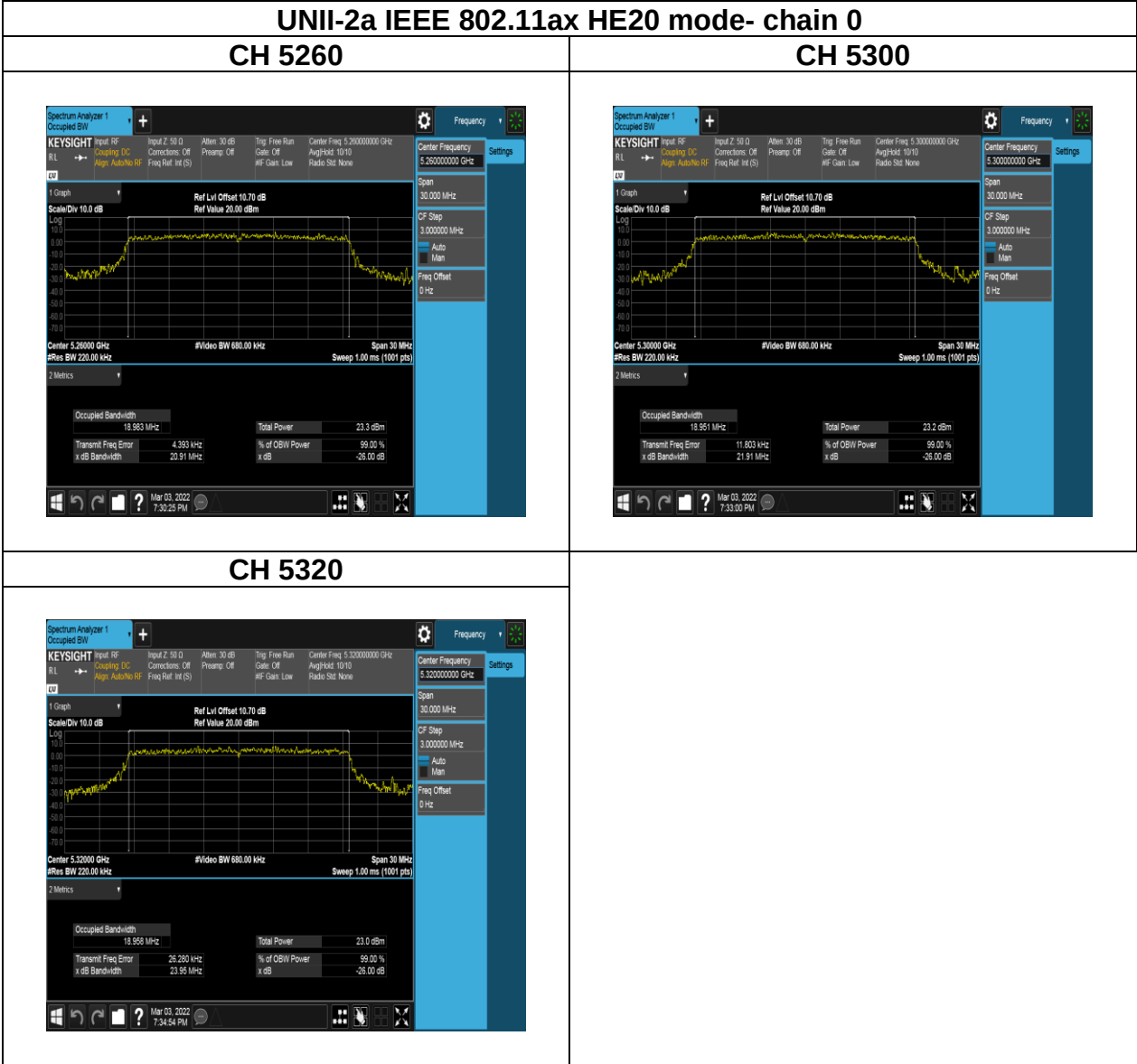
CH 5310



UNII-2a IEEE 802.11ac VHT80 mode- chain 0

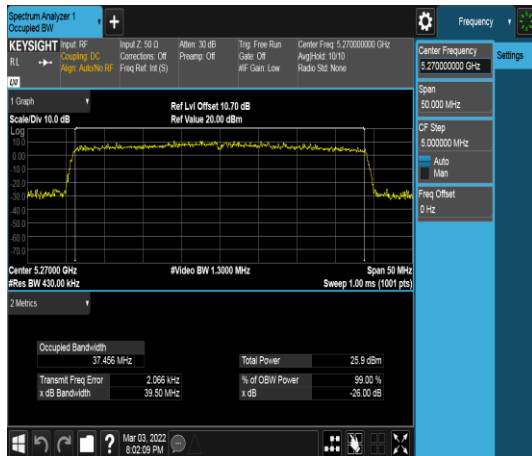
CH 5290



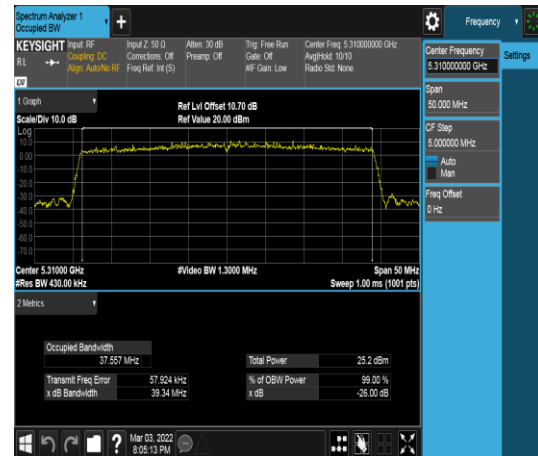


UNII-2a IEEE 802.11ax HE40 mode- chain 0

CH 5270



CH 5310



UNII-2a IEEE 802.11ax HE80 mode- chain 0

CH 5290

