

Project No.: TM-2303000028P
Report No.: TMWK2303000590KR

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Rev.: 00

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART E

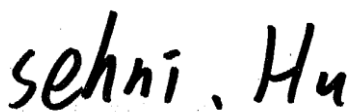
Test Standard	FCC Part 15.407
Product name	AX3000 Dual-Band Wi-Fi 6 Router (Single pack), AX3000 Dual-Band Wi-Fi 6 Mesh System (multi-pack)
Brand Name	D-Link
Model No.	M30
Test Result	Pass
Statements of Conformity	Determination of compliance is based on the results of the compliance measurement, not 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:



Sehni Hu
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	June 20, 2023	Initial Issue	ALL	Allison Chen

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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	AX3000 Dual-Band Wi-Fi 6 Router (Single pack), AX3000 Dual-Band Wi-Fi 6 Mesh System (multi-pack)
Model No.	M30
Model Discrepancy	N/A
Trade Name	D-Link
Received Date	March 25, 2023
Date of Test	March 27 ~ June 15, 2023
Power Operation	Power from Power Adapter AMIGO / AMS159A-1201000FU I/P: 100-240Vac, 50/60Hz, 0.5A O/P: 12Vdc, 1.0A
HW Version	1.00
SW Version	A1
Product category	Master equipment for indoor operation

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 HT20	5180 ~ 5240 MHz
	IEEE 802.11ac VHT20	5180 ~ 5240 MHz
	IEEE 802.11n HT40	5190 ~ 5230 MHz
	IEEE 802.11ac VHT40	5190 ~ 5230 MHz
	IEEE 802.11ac VHT80	5210 MHz
	IEEE 802.11ax HE20	5180 ~ 5240 MHz
	IEEE 802.11ax HE40	5190 ~ 5230 MHz
	IEEE 802.11ax HE80	5210 MHz
	UNII-2a	
	IEEE 802.11a	5260 ~ 5320 MHz
	IEEE 802.11n HT20	5260 ~ 5320 MHz
	IEEE 802.11ac VHT20	5260 ~ 5320 MHz
	IEEE 802.11n HT40	5270 ~ 5310 MHz
	IEEE 802.11ac VHT40	5270 ~ 5310 MHz
	IEEE 802.11ac VHT80	5290 MHz
	IEEE 802.11ac VHT160	5250 MHz
	IEEE 802.11ax HE20	5260 ~ 5320 MHz
	IEEE 802.11ax HE40	5270 ~ 5310 MHz
	IEEE 802.11ax HE80	5290 MHz
	IEEE 802.11ax HE160	5250 MHz
	UNII-2c	
	IEEE 802.11a	5500 ~ 5700 MHz
	IEEE 802.11n HT20	5500 ~ 5700 MHz
	IEEE 802.11ac VHT20	5500 ~ 5700 MHz
	IEEE 802.11n HT40	5510 ~ 5670 MHz
	IEEE 802.11ac VHT40	5510 ~ 5670 MHz
	IEEE 802.11ac VHT80	5530 ~ 5610 MHz
	IEEE 802.11ac VHT160	5570 MHz
	IEEE 802.11ax HE20	5500 ~ 5700 MHz
	IEEE 802.11ax HE40	5510 ~ 5670 MHz
	IEEE 802.11ax HE80	5530 ~ 5610 MHz
	IEEE 802.11ax HE160	5570 MHz
	UNII-3	
	IEEE 802.11a	5745 ~ 5825 MHz
	IEEE 802.11n HT20	5745 ~ 5825 MHz
	IEEE 802.11ac VHT20	5745 ~ 5825 MHz
	IEEE 802.11n HT40	5755 ~ 5795 MHz
	IEEE 802.11ac VHT40	5755 ~ 5795 MHz
	IEEE 802.11ac VHT80	5775 MHz
	IEEE 802.11ax HE20	5745 ~ 5825 MHz
	IEEE 802.11ax HE40	5755 ~ 5795 MHz
	IEEE 802.11ax HE80	5775 MHz

Modulation Type	1. IEEE 802.11a mode: OFDM 2. IEEE 802.11n HT20 mode: OFDM 3. IEEE 802.11n HT40 mode: OFDM 4. IEEE 802.11ac VHT20 mode: OFDM 5. IEEE 802.11ac VHT40 mode: OFDM 6. IEEE 802.11ac VHT80 mode: OFDM 7. IEEE 802.11ac VHT160 mode: OFDM 8. IEEE 802.11ax HE20 mode: OFDMA 9. IEEE 802.11ax HE40 mode: OFDMA 10. IEEE 802.11ax HE80 mode: OFDMA 11. IEEE 802.11ax HE160 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 ☒ Short Dipole ☐ Coils																													
Antenna Gain	<table><tr><th>Band</th><th>5G-0 (Chain 0) Gain (dBi)</th><th>5G-1 (Chain 1) Gain (dBi)</th><th>5G-2 Gain (dBi)</th><th>Total Gain [Note 1] (dBi)</th></tr><tr><td>Band I (U-NII 1) 5150-5250MHz</td><td>2.51</td><td>2.42</td><td>2.12</td><td>5.48</td></tr><tr><td>Band II (U-NII 2a) 5250-5350 MHz</td><td>2.51</td><td>2.42</td><td>2.20</td><td>5.48</td></tr><tr><td>Band III (U-NII 2c) 5470-5725 MHz</td><td>2.51</td><td>2.40</td><td>2.32</td><td>5.47</td></tr><tr><td>Band IV (U-NII 3) 5725-5850MHz</td><td>2.69</td><td>2.47</td><td>2.40</td><td>5.59</td></tr></table>					Band	5G-0 (Chain 0) Gain (dBi)	5G-1 (Chain 1) Gain (dBi)	5G-2 Gain (dBi)	Total Gain [Note 1] (dBi)	Band I (U-NII 1) 5150-5250MHz	2.51	2.42	2.12	5.48	Band II (U-NII 2a) 5250-5350 MHz	2.51	2.42	2.20	5.48	Band III (U-NII 2c) 5470-5725 MHz	2.51	2.40	2.32	5.47	Band IV (U-NII 3) 5725-5850MHz	2.69	2.47	2.40	5.59
	Band	5G-0 (Chain 0) Gain (dBi)	5G-1 (Chain 1) Gain (dBi)	5G-2 Gain (dBi)	Total Gain [Note 1] (dBi)																									
	Band I (U-NII 1) 5150-5250MHz	2.51	2.42	2.12	5.48																									
	Band II (U-NII 2a) 5250-5350 MHz	2.51	2.42	2.20	5.48																									
	Band III (U-NII 2c) 5470-5725 MHz	2.51	2.40	2.32	5.47																									
	Band IV (U-NII 3) 5725-5850MHz	2.69	2.47	2.40	5.59																									
[Note 1]: Since port 2(5G-2) is RX don't count DG.																														
Antenna Trade / Model	5G-0: WIESON / ARY196-0030-016-00 (TX/RX) 5G-1: WIESON / ARY196-0030-018-00 (TX/RX) 5G-2: WIESON / ARY196-0030-017-00 (RX)																													
Antenna connector	MHF compatible																													

Notes:

- Power Directional Gain = $10 \cdot \log \{ [10^{(Ant1/20)} + 10^{(Ant2/20)} + \dots + 10^{(Ant N / 20)}]^2 / N \text{ ANT} \}$ dBi
- 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	± 2.213 dB
Channel Bandwidth	± 2.7 %
RF output power (Spectrum)	± 2.440 dB
Power Spectral density	± 2.739 dB
Radiated Emission_9kHz-30MHz	± 3.761 dB
Radiated Emission_30MHz-200MHz	± 3.473 dB
Radiated Emission_200MHz-1GHz	± 3.946 dB
Radiated Emission_1GHz-6GHz	± 4.797 dB
Radiated Emission_6GHz-18GHz	± 4.803 dB
Radiated Emission_18GHz-26GHz	± 3.459 dB
Radiated Emission_26GHz-40GHz	± 3.297 dB

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.

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.

☐ No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan 24803

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Tony Chao	-
Radiation	Ray Li, Tony Chao, Czerny Lin	-
RF Conducted	David Li	-

Remark: The lab has been recognized as the FCC accredited lab. under the KDB 974614 D01 and is listed in the FCC pubic 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	Cal Date	Cal Due
Power Sensor	Anritsu	MA2411B	1911386	2022-08-08	2023-08-07
Power Sensor	Anritsu	MA2411B	1911387	2022-08-08	2023-08-07
EXA Signal Analyzer	Keysight	N9010B	MY60242460	2023-02-02	2024-02-01
Power Meter	Anritsu	ML2496A	2136002	2022-11-24	2023-11-23
Software	"Radio Test Software Ver. 21 & E3-Ver: 6.11-20180413				

AC Conducted Emissions Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
EMI Test Receiver	R&S	ESCI	100064	2022-06-17	2023-06-16
LISN	TESEQ	LN2-16N	22012	2023-03-08	2024-03-07
Cable	EMCI	CFD300-NL	CERF	2022-06-27	2023-06-26
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	Cal Date	Cal Due
PXA Signal Analyzer	Keysight Technologies	N9030B	MY62291089	2022-10-14	2023-10-13
Loop Antenna	SCHWARZBECK	FMZB 1513_60	1513_60_028	2022-12-27	2023-12-26
Preamplifier	EMEC	EM330	060609	2023-02-22	2024-02-21
Thermo-Hygro Meter	WISEWIND	1206	D07	2022-12-19	2023-12-18
Preamplifier	HP	8449B	3008A00965	2022-12-23	2023-12-22
Bi-Log Antenna	Sunol Sciences	JB3	A030105	2022-08-03	2023-08-02
Cable	Huber+Suhner	104PEA	20995+11112+182330	2023-02-22	2024-02-21
Coaxial Cable	EMCI	EMC105	190914+33953	2022-06-15	2023-06-14
Horn Antenna	ETC	MCTD 1209	DRH13M02003	2023-01-12	2024-01-11
High Pass Filters	MICRO TRONICS	HPM13195	003	2023-02-01	2024-01-31
Horn Antenna	SCHWARZBECK	BBHA9170	1047	2022-12-30	2023-12-29
Pre-Amplifier	EMCI	EMC184045SE	980860	2022-12-27	2023-12-26
Coaxial Cable	EMC	EMC101G-KM-KM-9000	211042	2022-12-06	2023-12-05
Coaxial Cable	EMCI	EMC101G-KM-KM-500	211041	2022-12-06	2023-12-05
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Software	e3 V9-210616c				

Remark:

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

DFS Test (Slave)					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Power Divider	Marvelous Microwave	MVE8586	16011205	2022-06-29	2023-06-28
Cable	Woken	SUMITOMO	13	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	12	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	11	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	10	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	9	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	7	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	6	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	5	2023-03-02	2024-03-01
Power Splitter	Mini-Circuits	ZN2PD-9G-S	777	2022-07-20	2023-07-19
EXA Signal Analyzer	Keysight	N9010B	MY55460167	2022-09-07	2023-09-06
EXA Signal Analyzer	Agilent Technologies	N9010A	MY52220817	2023-03-09	2024-03-08
Attenuator	E-INSTRUMENT	EPA-600H	EC1400050	2022-06-28	2023-06-27
Power Divider	Solvang Technology	STI08-0015	008	2022-07-26	2023-07-25
Power Divider	Solvang Technology	STI08-0015	009	2022-07-26	2023-07-25
Power Divider	Marvelous Microwave	MVE8586	16011206	2022-07-20	2023-07-19
Vector Signal Generator	KEYSIGHT	N5182B/N5182B X07	MY61252828/ MY59362552	2023-02-01	2024-01-31
Software	GPIBShot,DFS-Aggregate-Time FSU,DFS Test Software				

Remark:

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

DFS Test (Master)					
Name of Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Power Divider	Marvelous Microwave	MVE8586	16011205	2022-06-29	2023-06-28
Cable	Woken	SUMITOMO	13	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	12	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	11	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	10	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	9	2023-03-02	2024-03-01
Cable	Woken	SUMITOMO	7	2023-03-02	2024-03-01
EXA Signal Analyzer	Keysight	N9010B	MY55460167	2022-09-07	2023-09-06
EXA Signal Analyzer	Agilent Technologies	N9010A	MY52220817	2023-03-09	2024-03-08
Attenuator	E-INSTRUMENT	EPA-600H	EC1400050	2022-06-28	2023-06-27
Power Divider	Solvang Technology	STI08-0015	008	2022-07-26	2023-07-25
Power Divider	Marvelous Microwave	MVE8586	16011206	2022-07-20	2023-07-19
Vector Signal Generator	KEYSIGHT	N5182B/N5182B X07	MY61252828/ MY59362552	2023-02-01	2024-01-31
Software	GPIBShot,DFS-Aggregate-Time FSU,DFS Test Software				

Remark:

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

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
	N/A					

Support Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
1	NB(E)	Lenovo	IBM 7663	N/A	N/A	N/A
2	NB	Lenovo	TP00075A	N/A	N/A	N/A

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 and KDB 905462 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

Summary of Dynamic Frequency of Selection Test For Slave

UNII	Description	Limit	Result
U-NII Band 2-A 5250-5350MHz	Channel Availability Check Time	> 60sec	N/A
	U-NII Detection Bandwidth	> 100% of the U-NII 99% transmission power bandwidth	N/A
	Statistical Performance Check	Type 1,2,3,4 >= 60% Type 1~4 and 5 >= 80% Type 6 >= 70%	N/A
	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 HT20 mode: MCS0 3. IEEE 802.11n HT40 mode: MCS0 4. IEEE 802.11ac VHT20 mode: MCS0 5. IEEE 802.11ac VHT40 mode: MCS0 6. IEEE 802.11ac VHT80 mode: MCS0 7. IEEE 802.11ac VHT160 mode: MCS0 8. IEEE 802.11ax HE20 mode: MCS0 9. IEEE 802.11ax HE40 mode: MCS0 10. IEEE 802.11ax HE80 mode: MCS0 11. IEEE 802.11ax HE160 mode: MCS0																																															
Operating Frequency	<table><tr><td></td><td>Mode</td><td>Frequency Range (MHz)</td></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 HT20</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11n HT40</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ac VHT20</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11ac VHT40</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ac VHT80</td><td>5210</td></tr><tr><td>IEEE 802.11ax HE20</td><td>5180, 5220, 5240</td></tr><tr><td>IEEE 802.11ax HE40</td><td>5190, 5230</td></tr><tr><td>IEEE 802.11ax HE80</td><td>5210</td></tr><tr><td rowspan="11">U-NII-2a</td><td>IEEE 802.11a</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11n HT20</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11n HT40</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ac VHT20</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11ac VHT40</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ac VHT80</td><td>5290</td></tr><tr><td>IEEE 802.11ac VHT160</td><td>5250</td></tr><tr><td>IEEE 802.11ax HE20</td><td>5260, 5300, 5320</td></tr><tr><td>IEEE 802.11ax HE40</td><td>5270, 5310</td></tr><tr><td>IEEE 802.11ax HE80</td><td>5290</td></tr><tr><td>IEEE 802.11ax HE160</td><td>5250</td></tr></table>				Mode	Frequency Range (MHz)	U-NII-1	IEEE 802.11a	5180, 5220, 5240	IEEE 802.11n HT20	5180, 5220, 5240	IEEE 802.11n HT40	5190, 5230	IEEE 802.11ac VHT20	5180, 5220, 5240	IEEE 802.11ac VHT40	5190, 5230	IEEE 802.11ac VHT80	5210	IEEE 802.11ax HE20	5180, 5220, 5240	IEEE 802.11ax HE40	5190, 5230	IEEE 802.11ax HE80	5210	U-NII-2a	IEEE 802.11a	5260, 5300, 5320	IEEE 802.11n HT20	5260, 5300, 5320	IEEE 802.11n HT40	5270, 5310	IEEE 802.11ac VHT20	5260, 5300, 5320	IEEE 802.11ac VHT40	5270, 5310	IEEE 802.11ac VHT80	5290	IEEE 802.11ac VHT160	5250	IEEE 802.11ax HE20	5260, 5300, 5320	IEEE 802.11ax HE40	5270, 5310	IEEE 802.11ax HE80	5290	IEEE 802.11ax HE160	5250
	Mode	Frequency Range (MHz)																																														
U-NII-1	IEEE 802.11a	5180, 5220, 5240																																														
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U-NII-2a	IEEE 802.11a	5260, 5300, 5320																																														
	IEEE 802.11n HT20	5260, 5300, 5320																																														
	IEEE 802.11n HT40	5270, 5310																																														
	IEEE 802.11ac VHT20	5260, 5300, 5320																																														
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	IEEE 802.11ax HE40	5270, 5310																																														
	IEEE 802.11ax HE80	5290																																														
	IEEE 802.11ax HE160	5250																																														

Operating Frequency		Mode	Frequency Range (MHz)
	U-NII-2c	IEEE 802.11a	5500, 5580, 5700
		IEEE 802.11n HT20	5500, 5580, 5700
		IEEE 802.11n HT40	5510, 5550, 5670
		IEEE 802.11ac VHT20	5500, 5580, 5700
		IEEE 802.11ac VHT40	5510, 5550, 5670
		IEEE 802.11ac VHT80	5530, 5610
		IEEE 802.11ac VHT160	5570
		IEEE 802.11ax HE20	5500, 5580, 5700
		IEEE 802.11ax HE40	5510, 5550, 5670
		IEEE 802.11ax HE80	5530, 5610
		IEEE 802.11ax HE160	5570
	U-NII-3	IEEE 802.11a	5745, 5785, 5825
		IEEE 802.11n HT20	5745, 5785, 5825
		IEEE 802.11n HT40	5755, 5795
		IEEE 802.11ac VHT20	5745, 5785, 5825
		IEEE 802.11ac VHT40	5755, 5795
		IEEE 802.11ac VHT80	5775
		IEEE 802.11ax HE20	5745, 5785, 5825
		IEEE 802.11ax HE40	5755, 5795
		IEEE 802.11ax HE80	5775

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this 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 worst case.
4. The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report
5. The device supports SISO and MIMO at 802.11n20/n40/ac20/ac40/ac80/ac160/ax20/ax40/ax80/ax160 mode, SISO and MIMO's power level is the same,per pre-test, MIMO 2TX mode was the worst and reported.
6. The device supports non_BF and BF modes. Since the non_BF mode has higher power and similar to BF radio frequency characteristics, some test items of BF mode will be exempted.
7. This device only supports FULL RU for AX mode.
8. The device supports Master DFS and TPC , EUT employ a TPC mechanism and TPC have the capability to operate at least 6 dB below highest RF output power .

3.3 EUT DUTY CYCLE

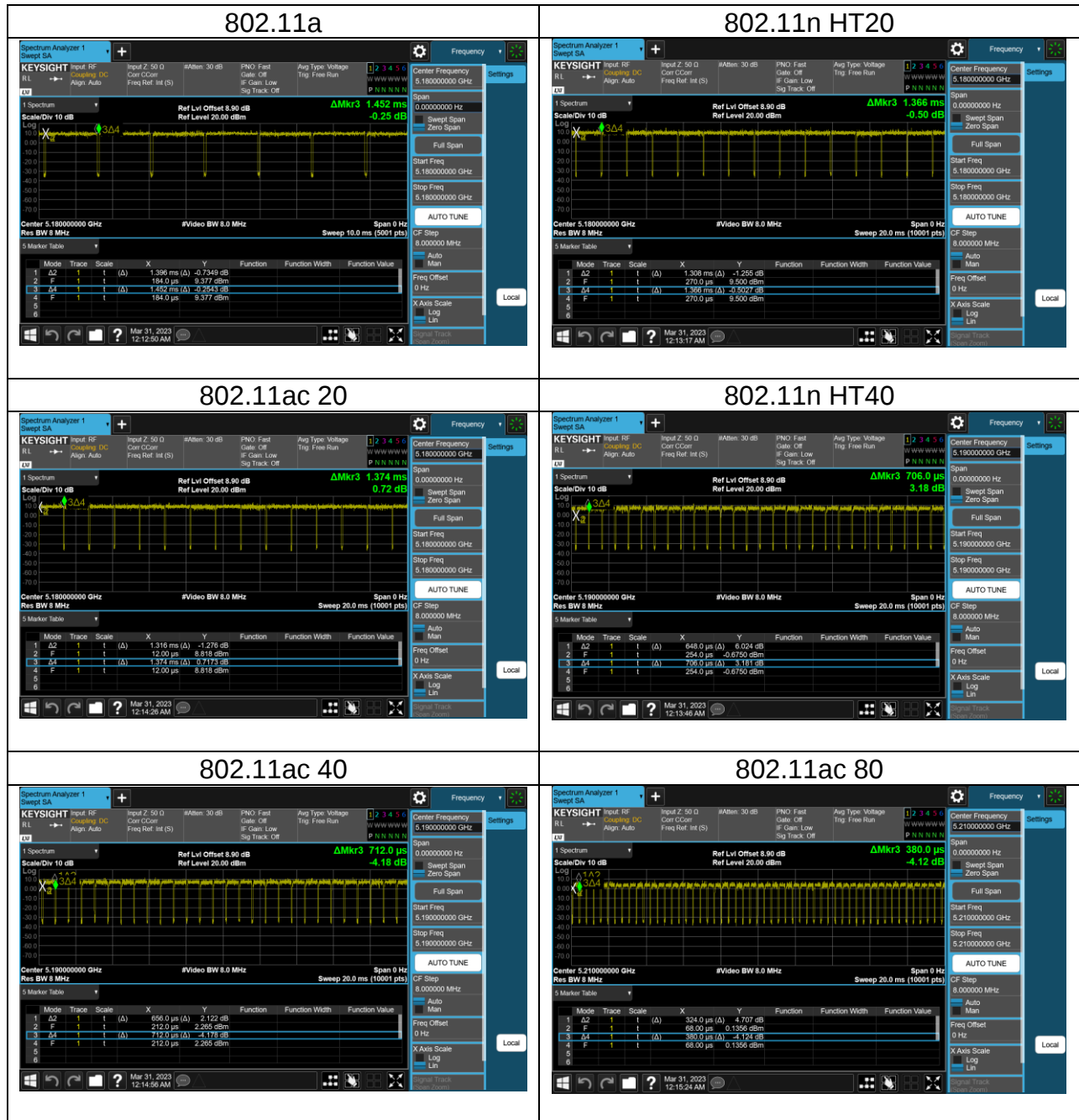
Temperature: 22.6~24.1℃

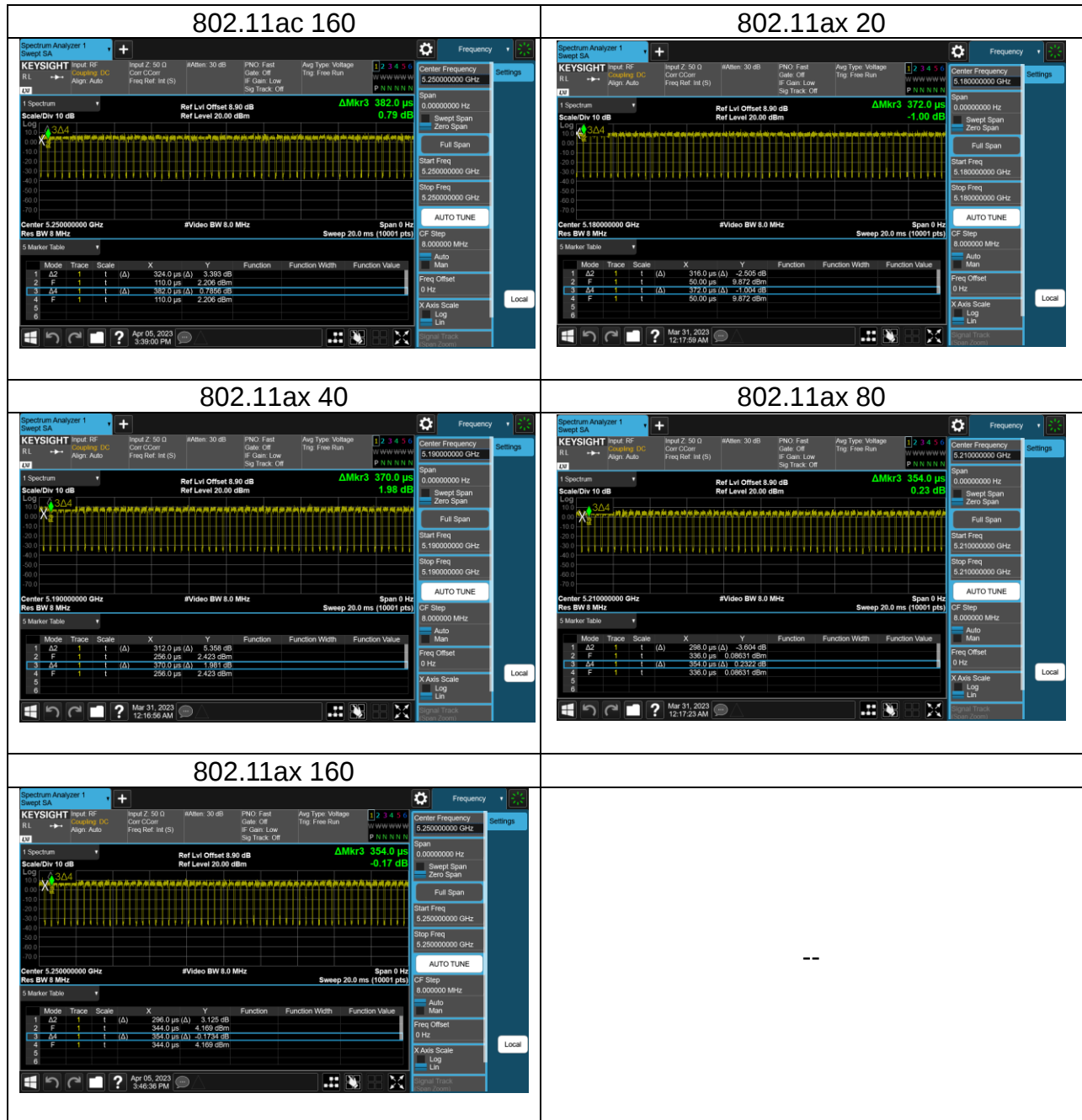
Test date: March 31~June 15, 2023

Humidity: 58~68% RH

Tested by: David Li

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	96.14	0.17	0.72	1.00
802.11n_20	95.75	0.19	0.76	1.00
802.11ac_20	95.78	0.19	0.76	1.00
802.11n_40	91.78	0.37	1.54	2.00
802.11ac_40	92.13	0.36	1.52	2.00
802.11ac_80	85.26	0.69	3.09	4.00
802.11ac_160	84.82	0.72	3.09	4.00
802.11ax_20	84.95	0.71	3.16	4.00
802.11ax_40	84.32	0.74	3.21	4.00
802.11ax_80	84.18	0.75	3.36	4.00
802.11ax_160	83.62	0.78	3.38	4.00





Report No.: TMWK2303000590KR

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

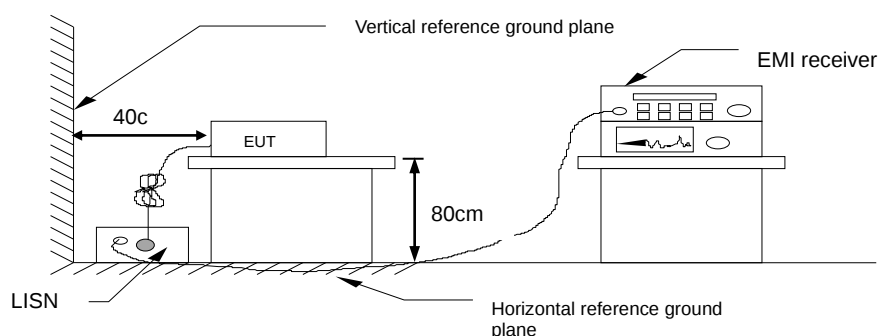
* Decreases with the logarithm of the frequency.

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

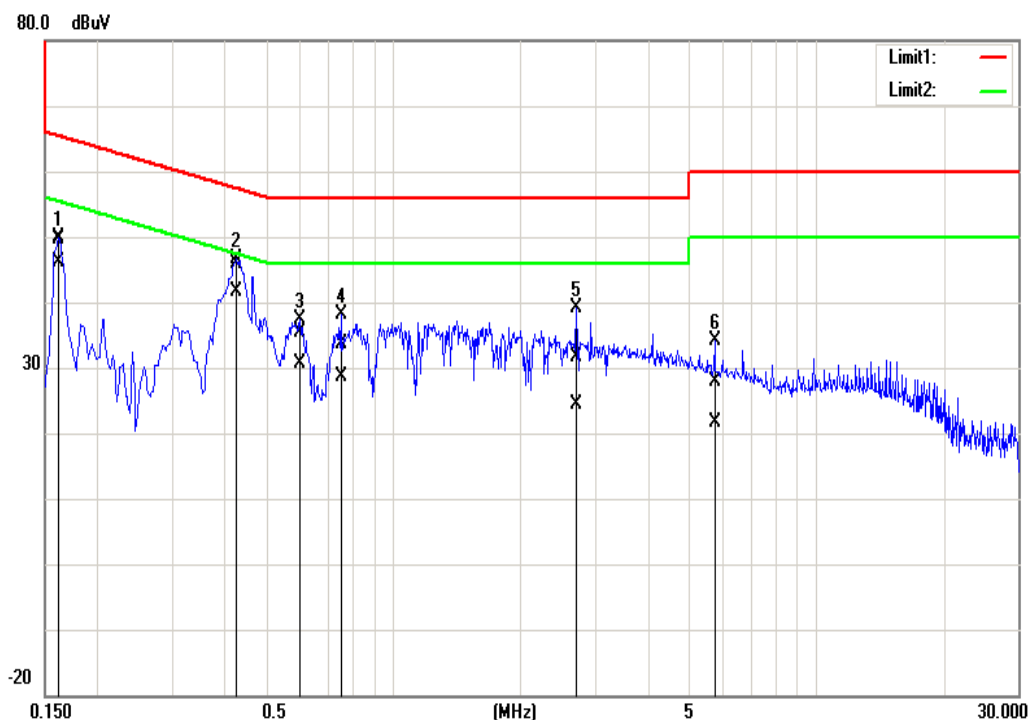


4.1.4 Test Result

Pass.

Test Data

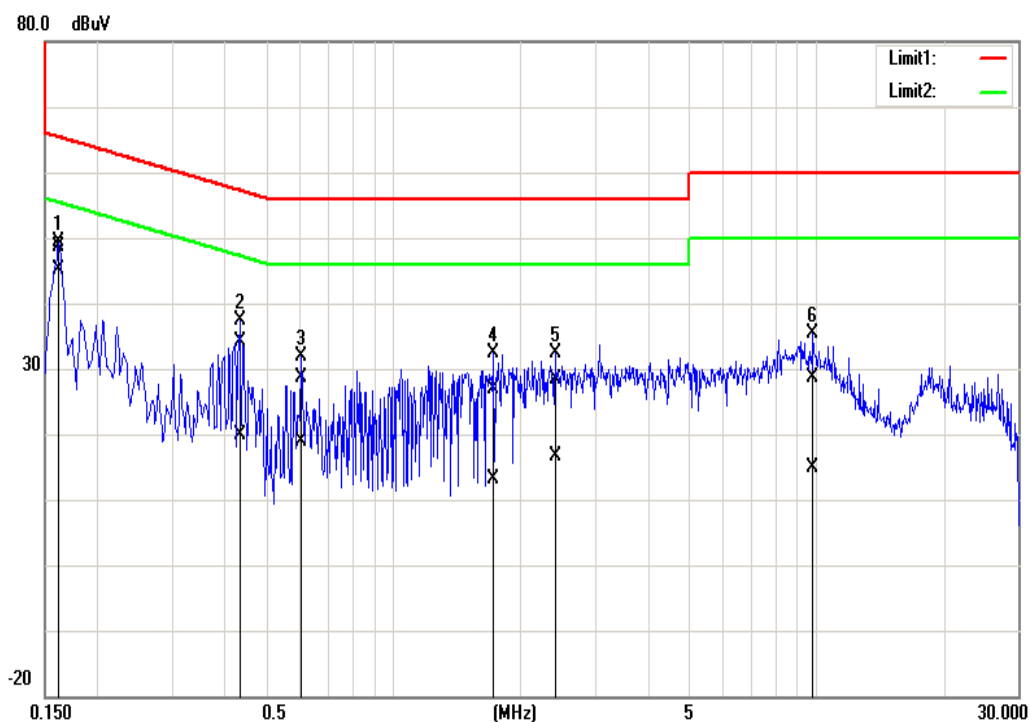
Test Mode:	Mode 1	Temp/Hum	23.4(°C)/ 58%RH
Phase:	Line	Test Date	April 6, 2023
Test Voltage:	120Vac, 60Hz	Test Engineer	Tony Chao



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (d uV)	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
0.1620	49.59	46.06	0.15	49.74	46.21	65.36	55.36	-15.62	-9.15	Pass
0.4260	45.76	41.44	0.15	45.91	41.59	57.33	47.33	-11.42	-5.74	Pass
0.6020	35.24	30.50	0.15	35.39	30.65	56.00	46.00	-20.61	-15.35	Pass
0.7540	33.58	28.48	0.16	33.74	28.64	56.00	46.00	-22.26	-17.36	Pass
2.7100	31.42	24.07	0.23	31.65	24.30	56.00	46.00	-24.35	-21.70	Pass
5.7580	27.51	21.47	0.28	27.79	21.75	60.00	50.00	-32.21	-28.25	Pass

Note: 1. Correction factor = LISN loss + Cable loss.

Test Mode:	Mode 1	Temp/Hum	23.4(°C)/ 58%RH
Phase:	Neutral	Test Date	April 6, 2023
Test Voltage:	120Vac, 60Hz	Test Engineer	Tony Chao



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
0.1620	48.45	44.94	0.20	48.65	45.14	65.36	55.36	-16.71	-10.22	Pass
0.4340	33.99	19.78	0.19	34.18	19.97	57.18	47.18	-23.00	-27.21	Pass
0.6060	28.38	18.58	0.19	28.57	18.77	56.00	46.00	-27.43	-27.23	Pass
1.7260	26.59	12.91	0.24	26.83	13.15	56.00	46.00	-29.17	-32.85	Pass
2.4180	28.08	16.43	0.26	28.34	16.69	56.00	46.00	-27.66	-29.31	Pass
9.8580	28.21	14.59	0.38	28.59	14.97	60.00	50.00	-31.41	-35.03	Pass

Note: 1. 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. Detector = 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. 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.

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 xRBW

4.2.3 Test Setup



Report No.: TMWK2303000590KR

4.2.4 Test Result

Non-Beamforming

Temperature: 22.6~24.1°C

Test date: March 31~June 15, 2023

Humidity: 58~68% RH

Tested by: David Li

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	16.588	16.560	26.11	28.82
44	5220	16.551	16.719	23.09	27.56
48	5240	16.634	16.765	23.95	28.47

Test mode: IEEE 802.11n HT20 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	17.837	17.776	25.59	24.60
44	5220	17.783	17.848	24.82	26.02
48	5240	17.794	17.899	29.16	28.50

Test mode: IEEE 802.11n HT40 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	36.124	36.148	44.19	48.70
46	5230	36.056	36.211	45.24	47.77

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	75.342	75.283	91.89	93.99

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	18.996	19.008	27.91	28.46
44	5220	full	19.013	19.010	23.81	22.10
48	5240	full	18.925	18.985	24.84	26.93

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	37.668	37.641	43.65	43.51
46	5230	full	37.583	37.742	46.00	47.80

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	76.830	76.789	81.18	93.47

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	16.528	16.554	21.95	23.84
60	5300	16.655	16.648	25.27	26.16
64	5320	16.647	16.650	26.63	24.23

Test mode: IEEE 802.11n HT20 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	17.696	17.686	21.53	20.93
60	5300	17.822	17.788	24.91	25.13
64	5320	17.793	17.753	25.90	26.41

Test mode: IEEE 802.11n HT40 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	35.997	36.041	42.34	41.28
62	5310	36.137	36.071	46.25	49.98

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	75.218	75.350	89.46	92.92

Test mode: IEEE 802.11ac VHT160 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
50	5250	152.940	153.860	160.80	169.10

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	18.930	18.961	21.26	21.47
60	5300	full	19.051	18.995	26.50	27.47
64	5320	full	19.039	18.966	26.12	27.88

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	37.485	37.609	39.40	44.22
62	5310	full	37.611	37.600	48.94	49.12

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	76.769	76.896	81.47	85.64

Test mode: IEEE 802.11ax HE160 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)
50	5250	Full	154.170	155.380	161.90	162.00

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	16.720	16.599	25.79	27.28
116	5580	16.576	16.558	24.73	20.70
140	5700	16.641	16.542	23.40	23.24

Test mode: IEEE 802.11n HT20 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	17.810	17.742	25.77	26.33
116	5580	17.693	17.671	21.19	20.92
140	5700	17.773	17.748	23.40	25.17

Test mode: IEEE 802.11n HT40 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	36.109	36.127	44.52	46.11
110	5550	36.157	36.109	46.92	41.01
134	5670	36.150	36.144	49.96	49.89

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	75.565	75.216	93.97	96.64
122	5610	75.084	75.058	94.44	96.84

Test mode: IEEE 802.11ac VHT160 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 26dB BW (MHz)	Chain 1 26dB BW (MHz)
114	5570	153.970	153.880	166.20	164.70

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	19.002	19.035	21.90	22.03
116	5580	full	18.922	18.956	21.29	21.42
140	5700	full	18.982	18.942	26.08	26.82

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	37.622	37.595	49.60	47.34
110	5550	full	37.668	37.690	42.44	44.30
134	5670	full	37.680	37.578	46.61	49.87

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	77.130	76.910	90.17	80.18
122	5610	full	76.653	76.858	79.63	79.70

Test mode: IEEE 802.11ax HE160 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)
114	5570	full	155.753	155.752	163.60	162.30

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)
				Limit: > 500 KHz	
149	5745	16.827	16.952	16.31	16.04
157	5785	16.824	16.917	16.33	16.07
165	5825	16.980	16.996	16.36	16.39

Test mode: IEEE 802.11n HT20 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
				Limit: > 500 KHz	
149	5745	17.974	18.394	17.53	17.58
157	5785	18.019	18.272	17.56	17.61
165	5825	18.181	18.874	17.54	17.60

Test mode: IEEE 802.11n HT40 mode

Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)
				Limit: > 500 KHz	
151	5755	36.273	36.210	35.06	33.76
159	5795	36.056	36.185	33.94	32.61

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)
				Limit: > 500 KHz	
155	5775	75.289	75.220	75.21	75.17

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)
					Limit: > 500 KHz	
149	5745	full	19.095	19.257	18.51	18.13
157	5785	full	19.092	19.164	17.99	17.20
165	5825	full	19.129	19.466	18.69	18.07

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)
					Limit: > 500 KHz	
151	5755	full	37.714	37.709	37.34	35.67
159	5795	full	37.676	37.716	35.11	33.84

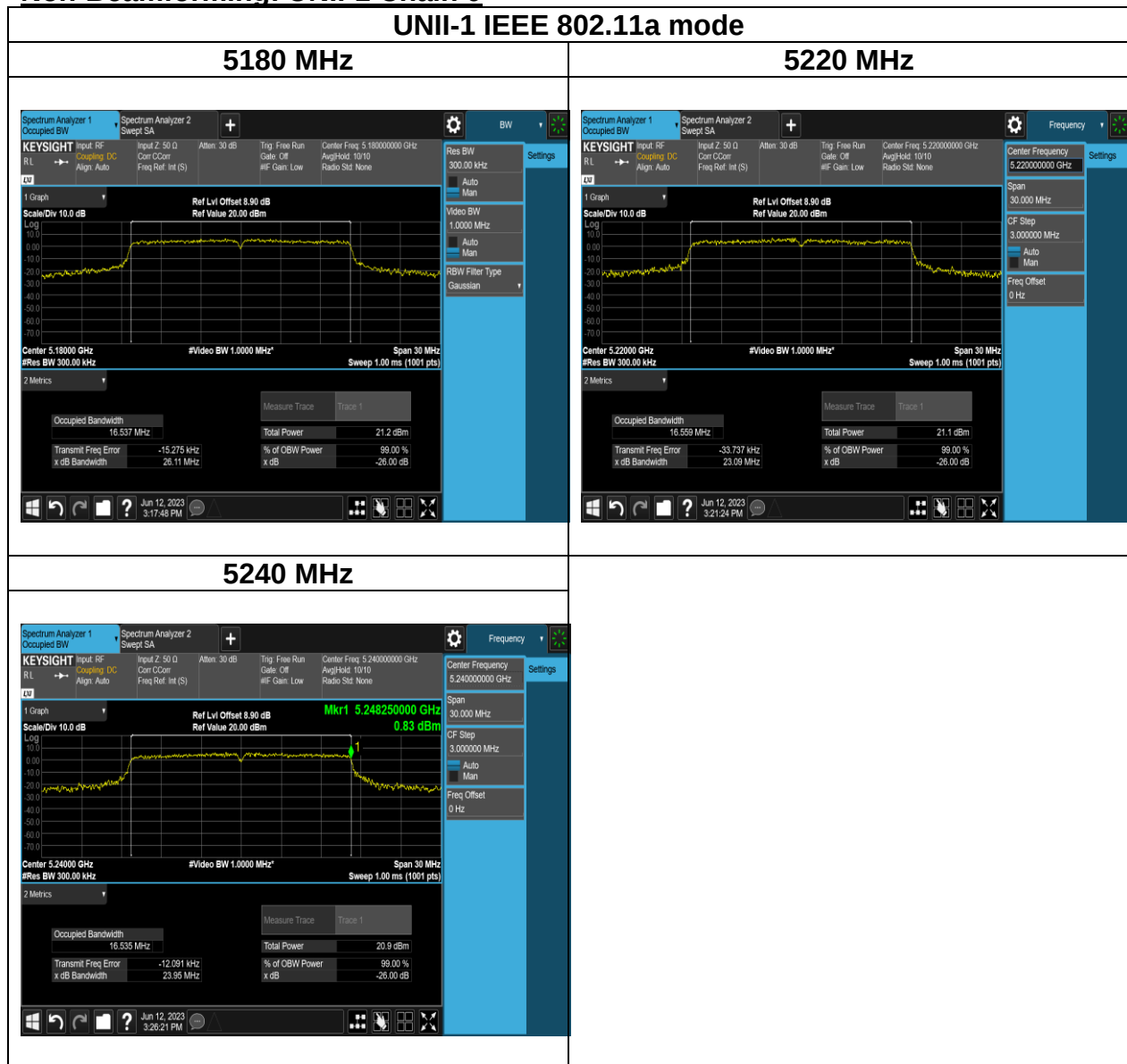
Test mode: IEEE 802.11ax HE80 mode

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)
					Limit: > 500 KHz	
155	5775	full	76.837	76.819	73.84	75.19

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Test Plots (26dB BANDWIDTH)

Non-Beamforming: UNII-1 Chain 0

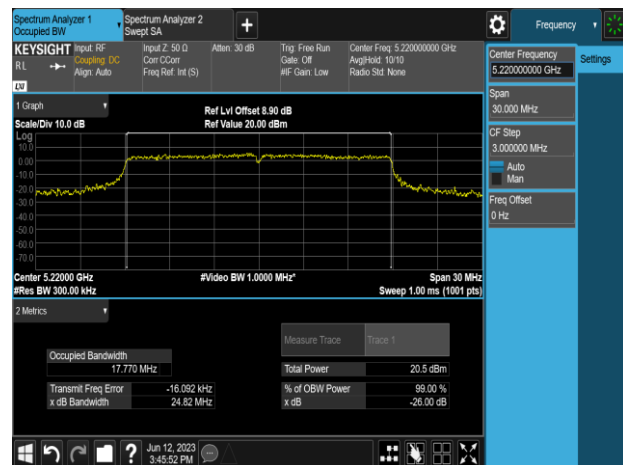


UNII-1 IEEE 802.11n HT20 mode

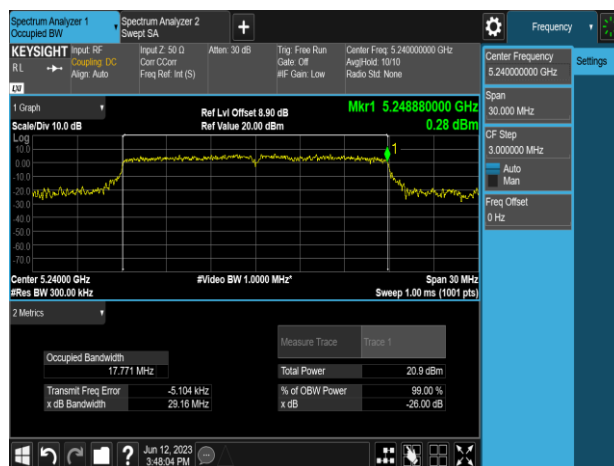
5180 MHz



5220 MHz

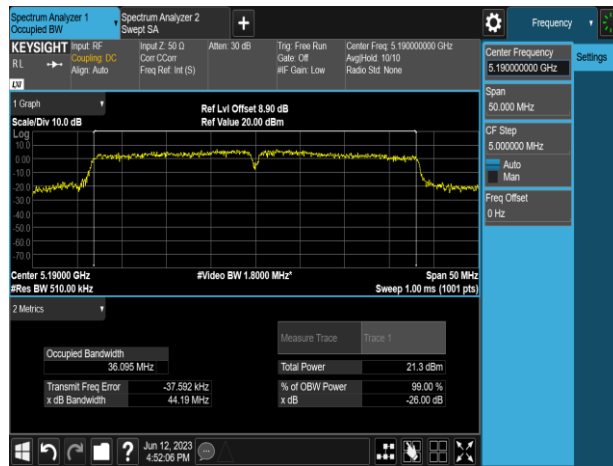


5240 MHz

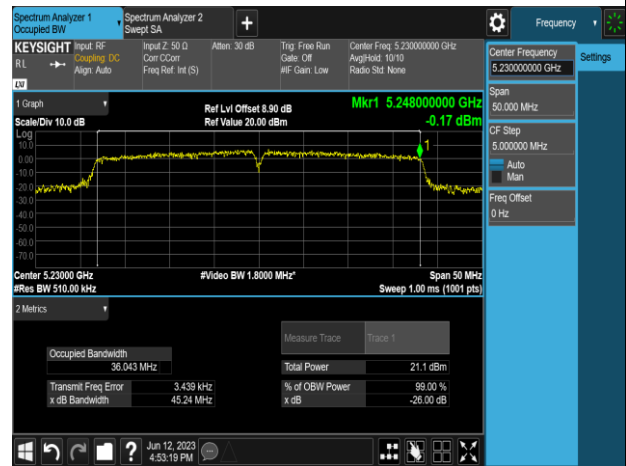


UNII-1 IEEE 802.11n HT40 mode

5190 MHz

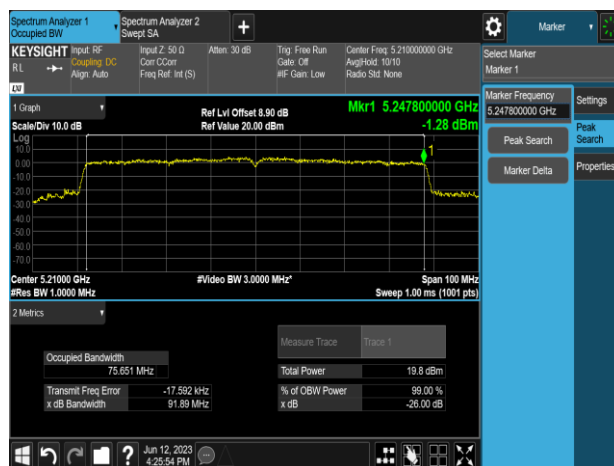


5230 MHz



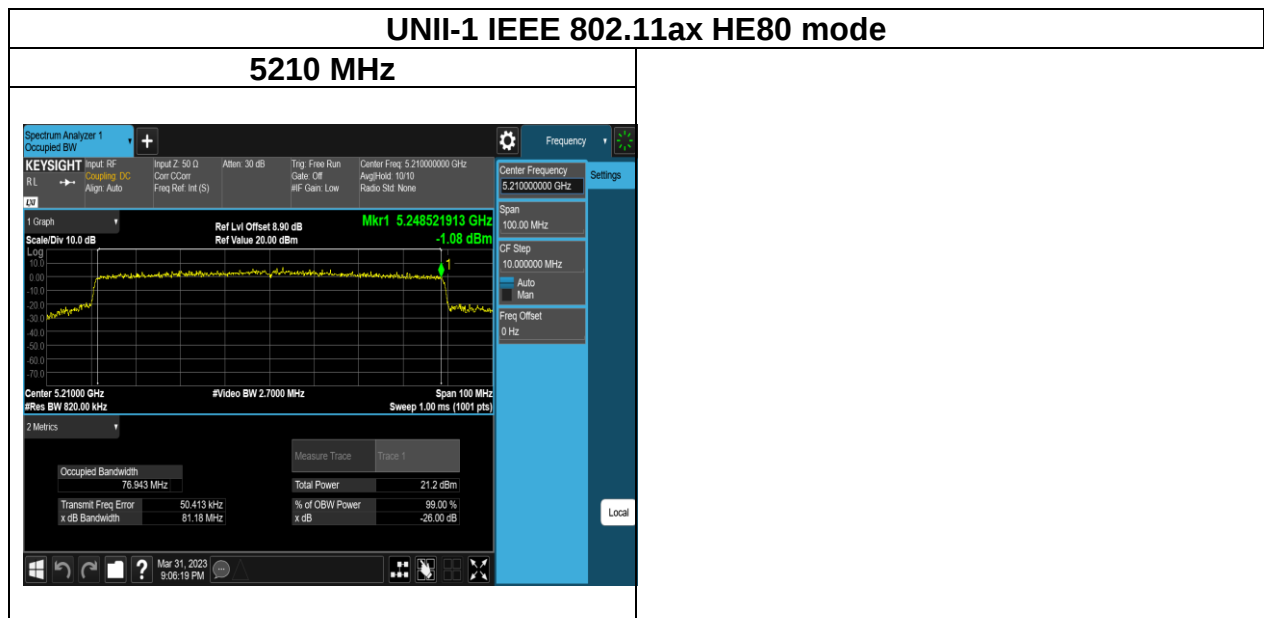
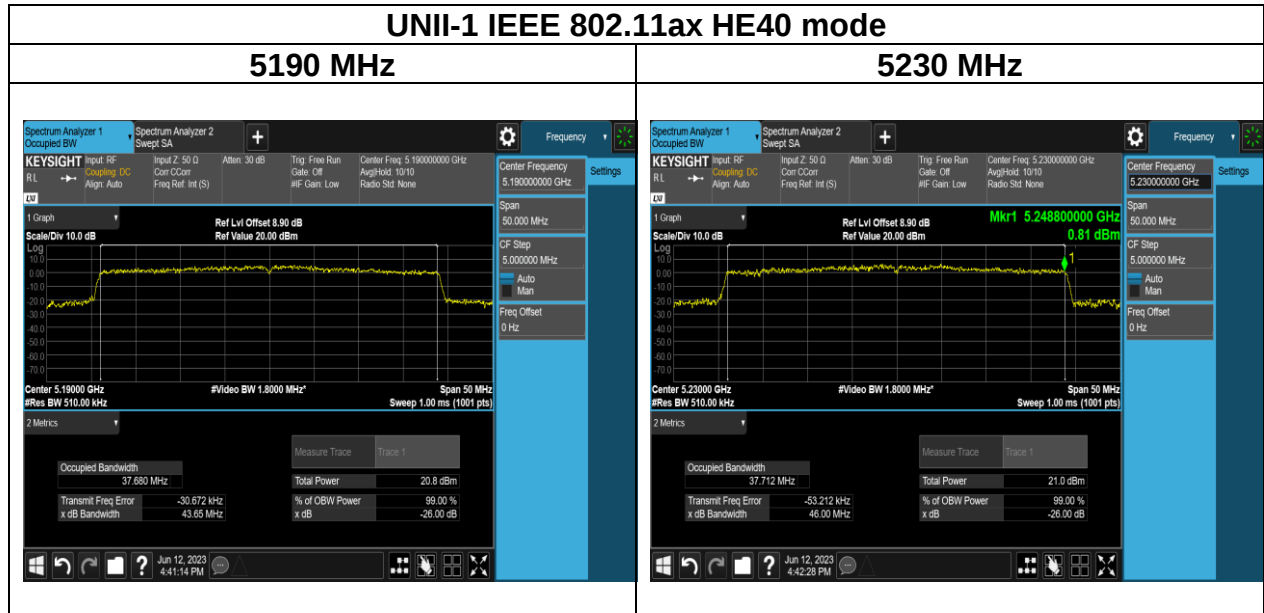
UNII-1 IEEE 802.11ac VHT80 mode

5210 MHz



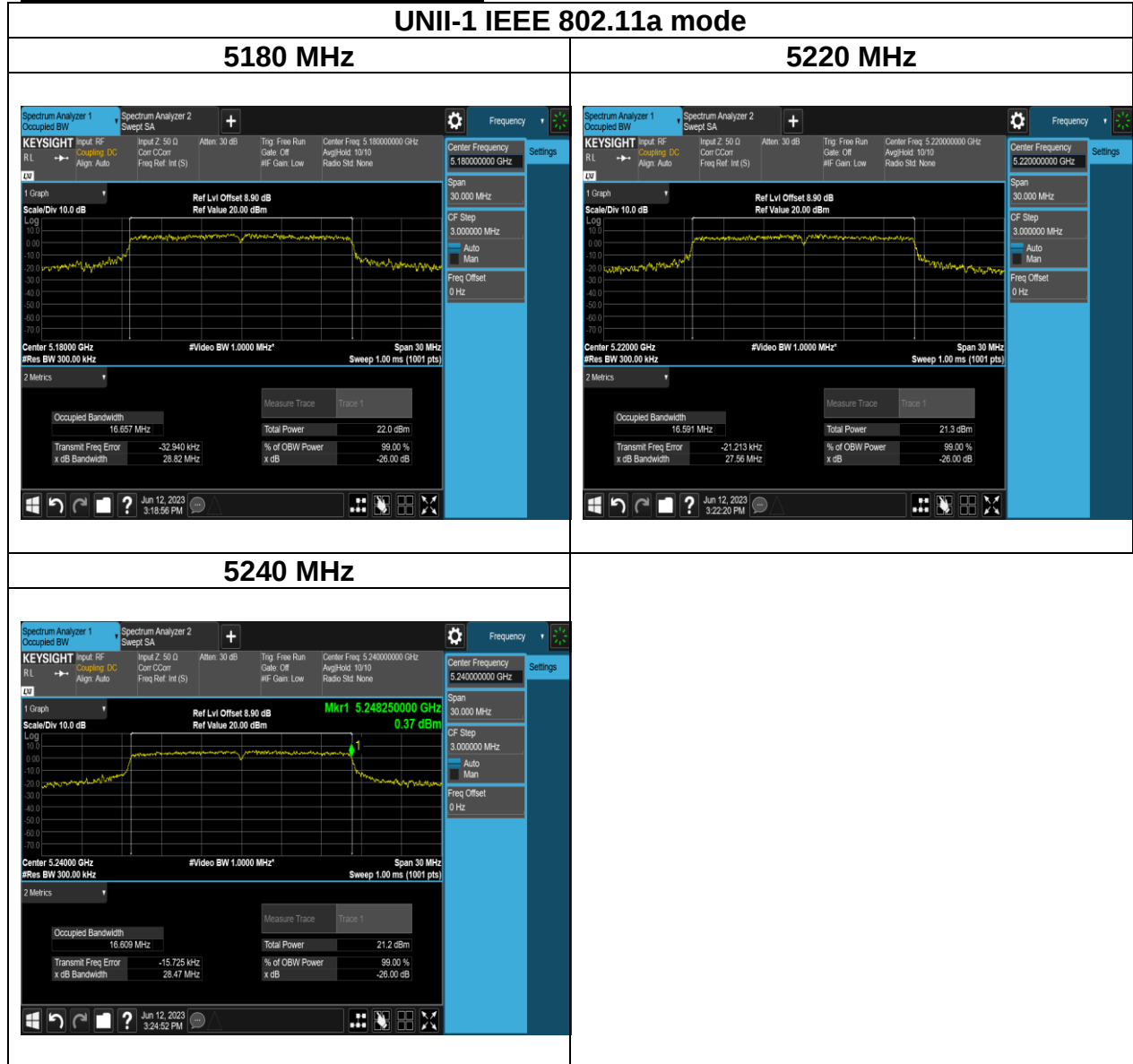


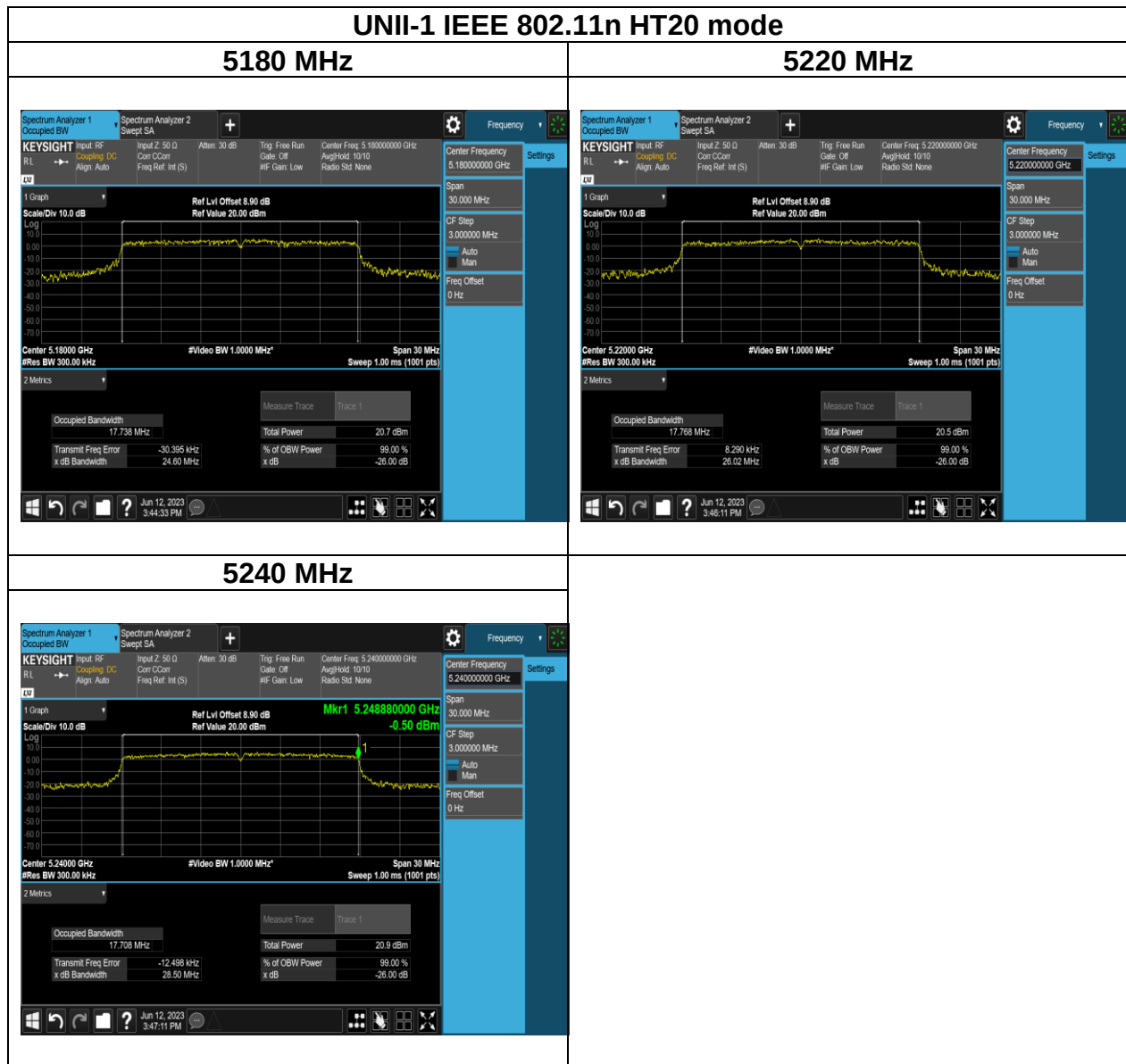
Report No.: TMWK2303000590KR



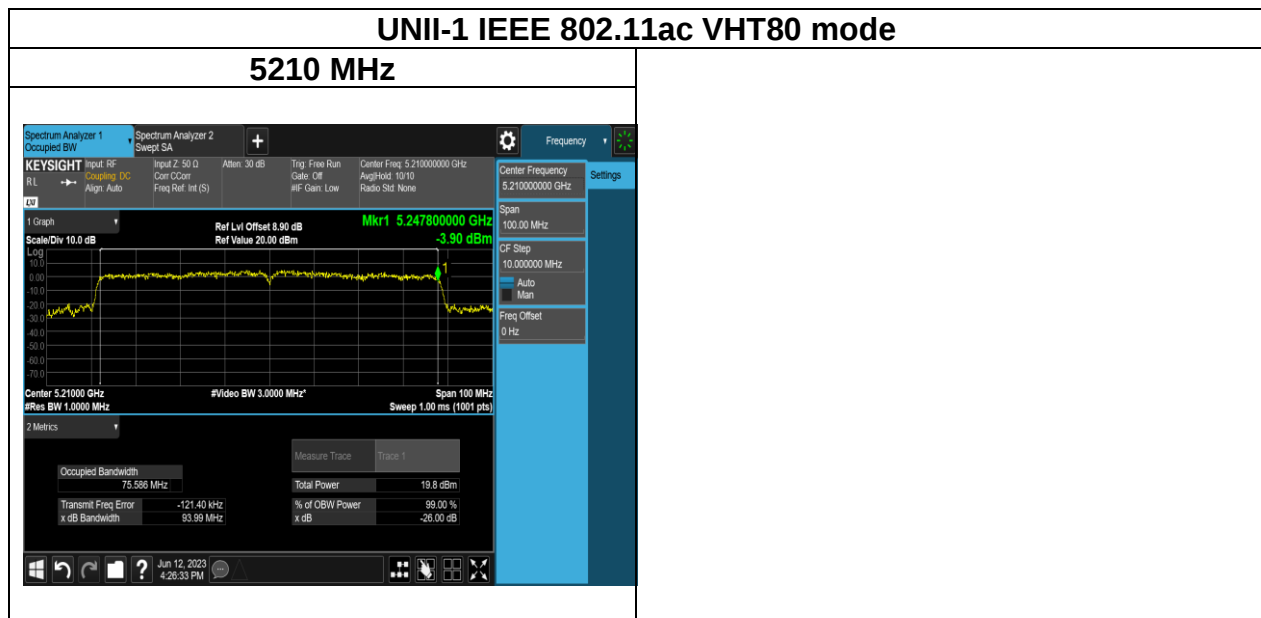
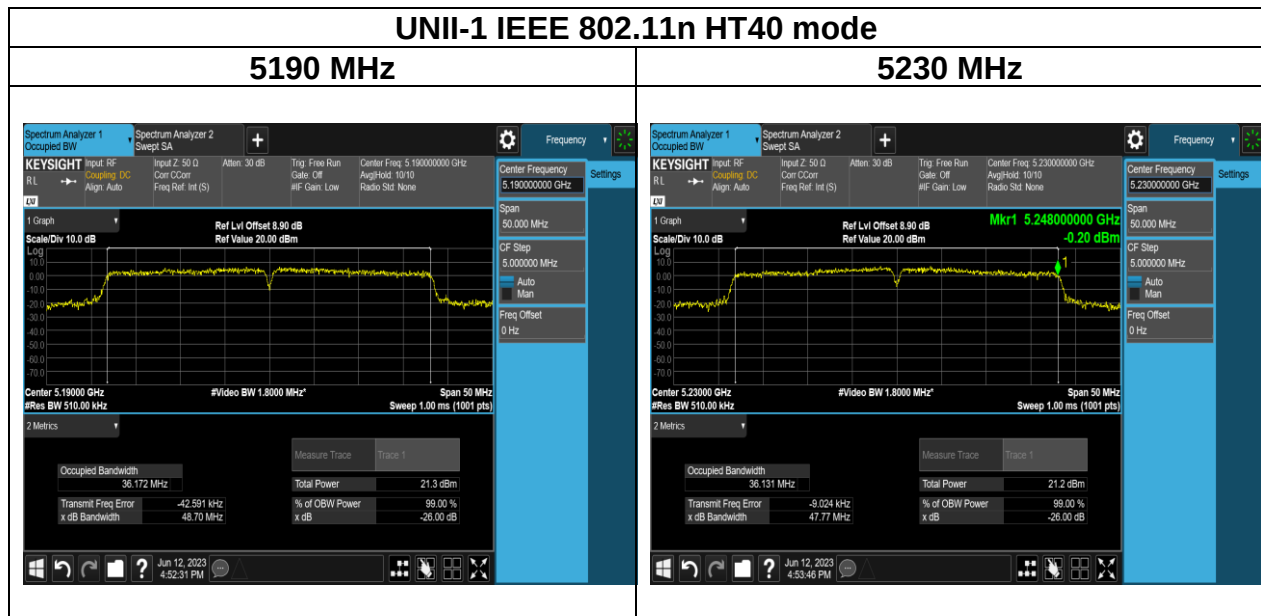
Report No.: TMWK2303000590KR

Non-Beamforming: UNII-1 Chain 1

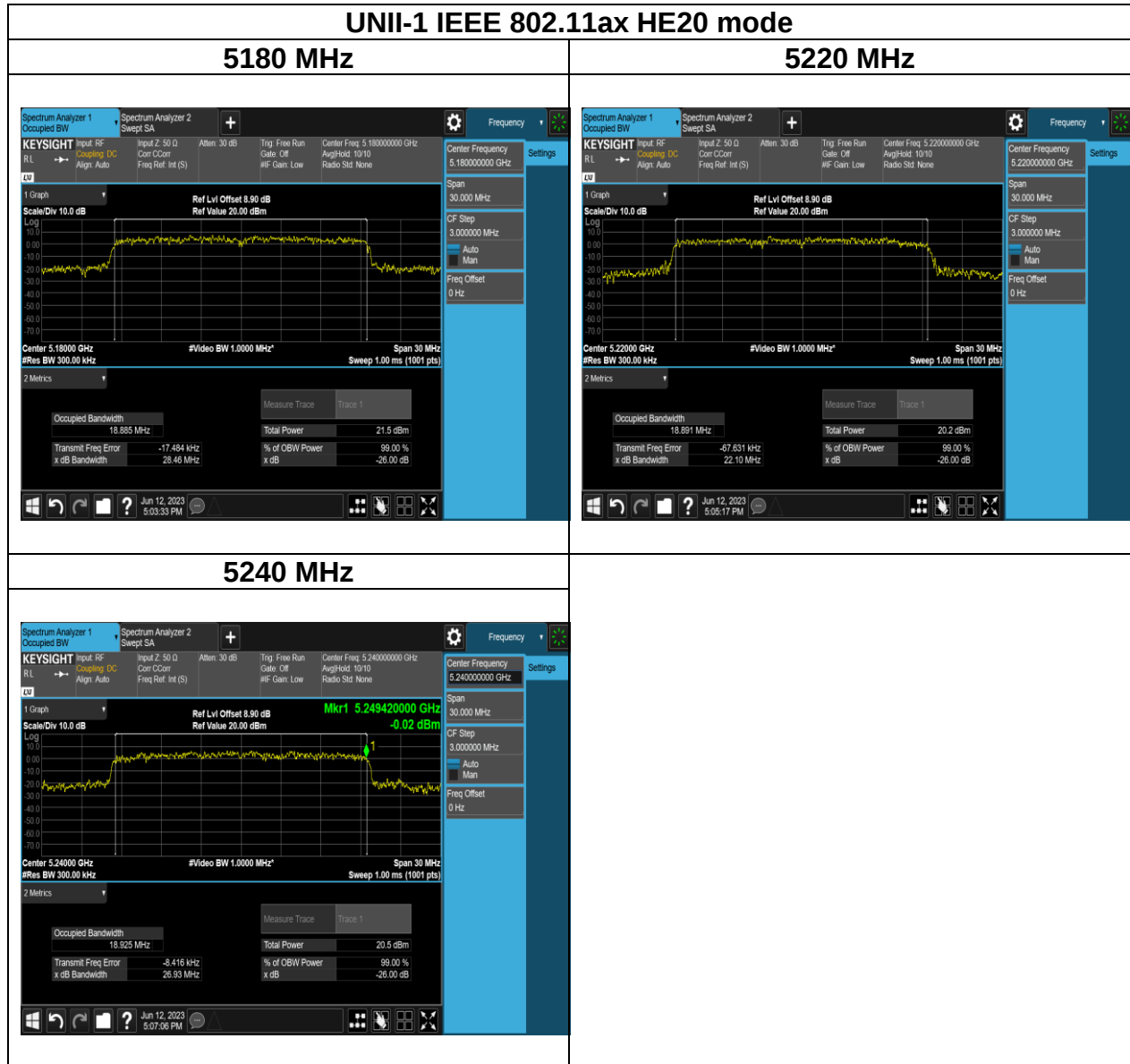




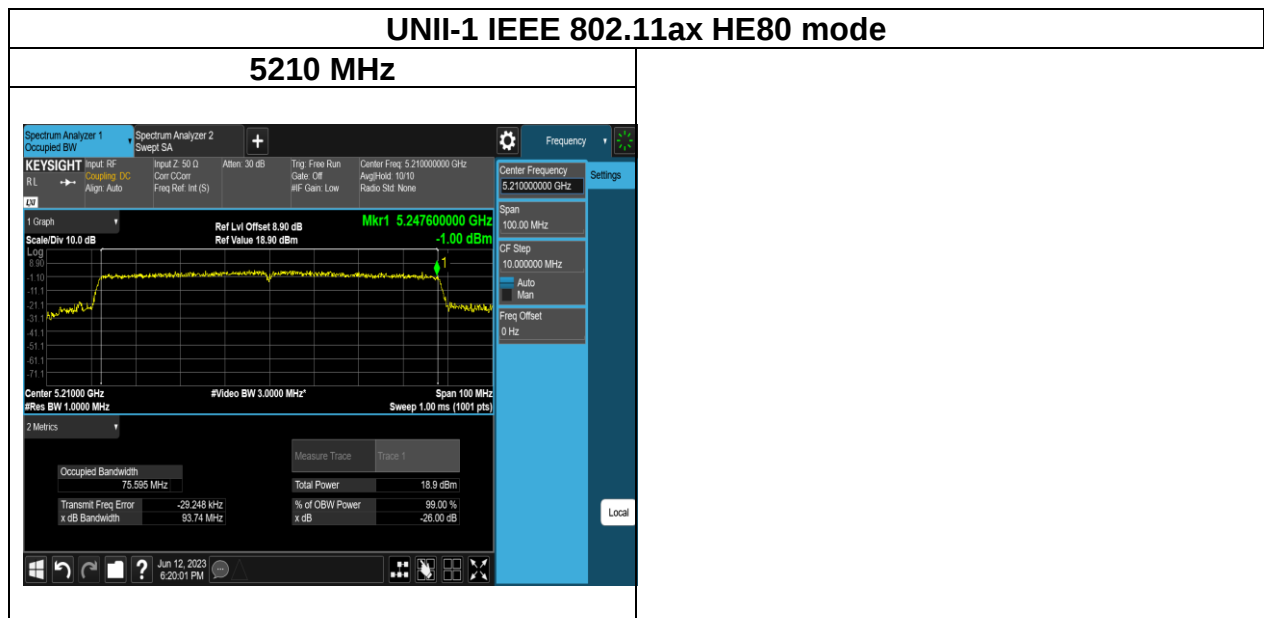
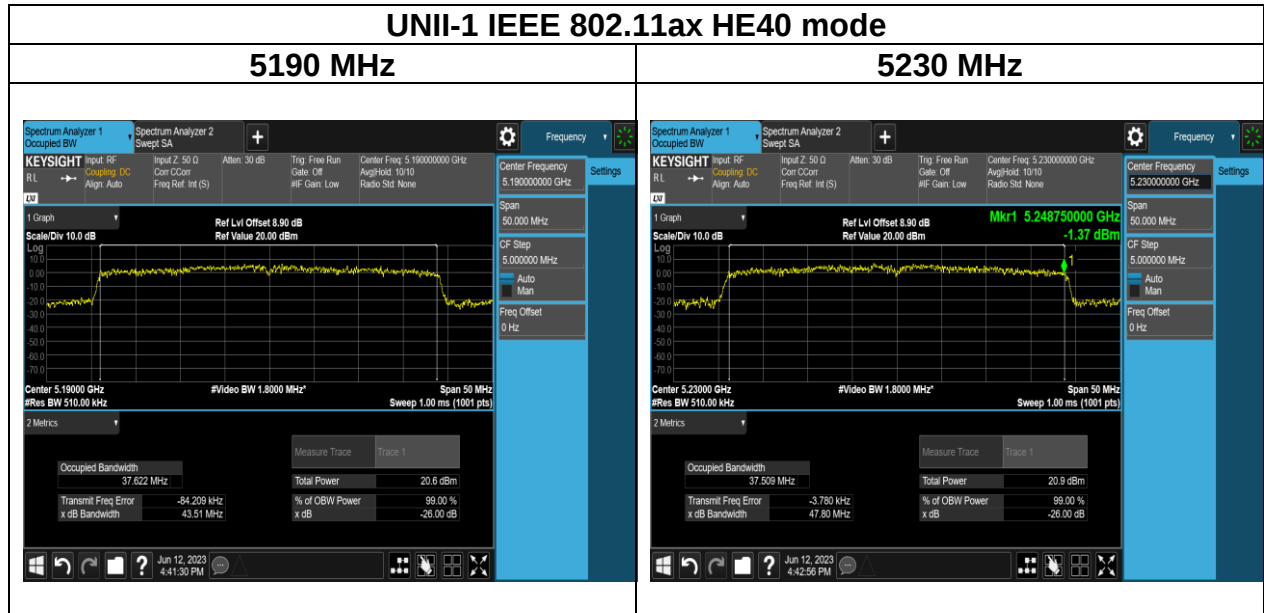
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Report No.: TMWK2303000590KR



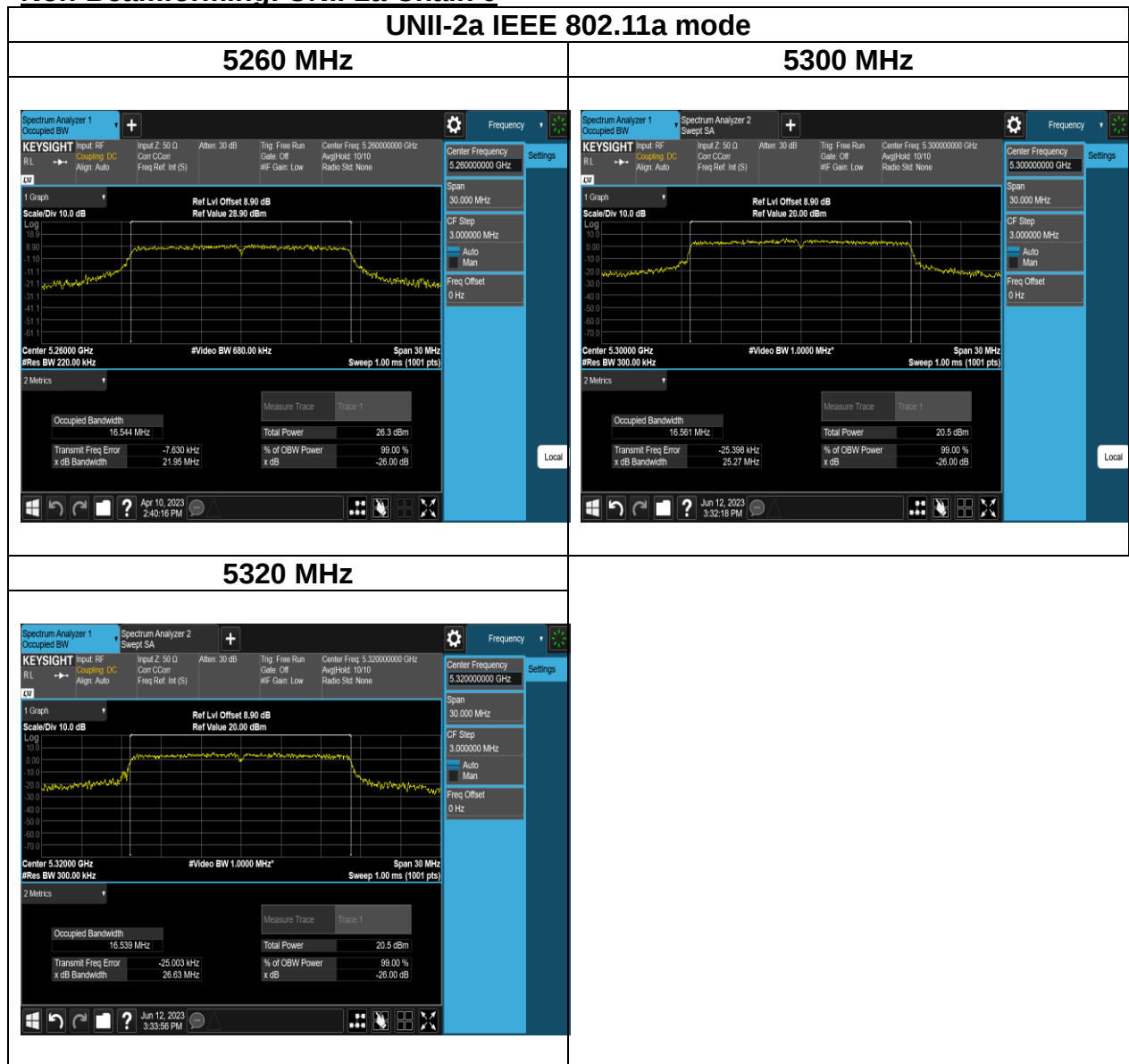
Report No.: TMWK2303000590KR

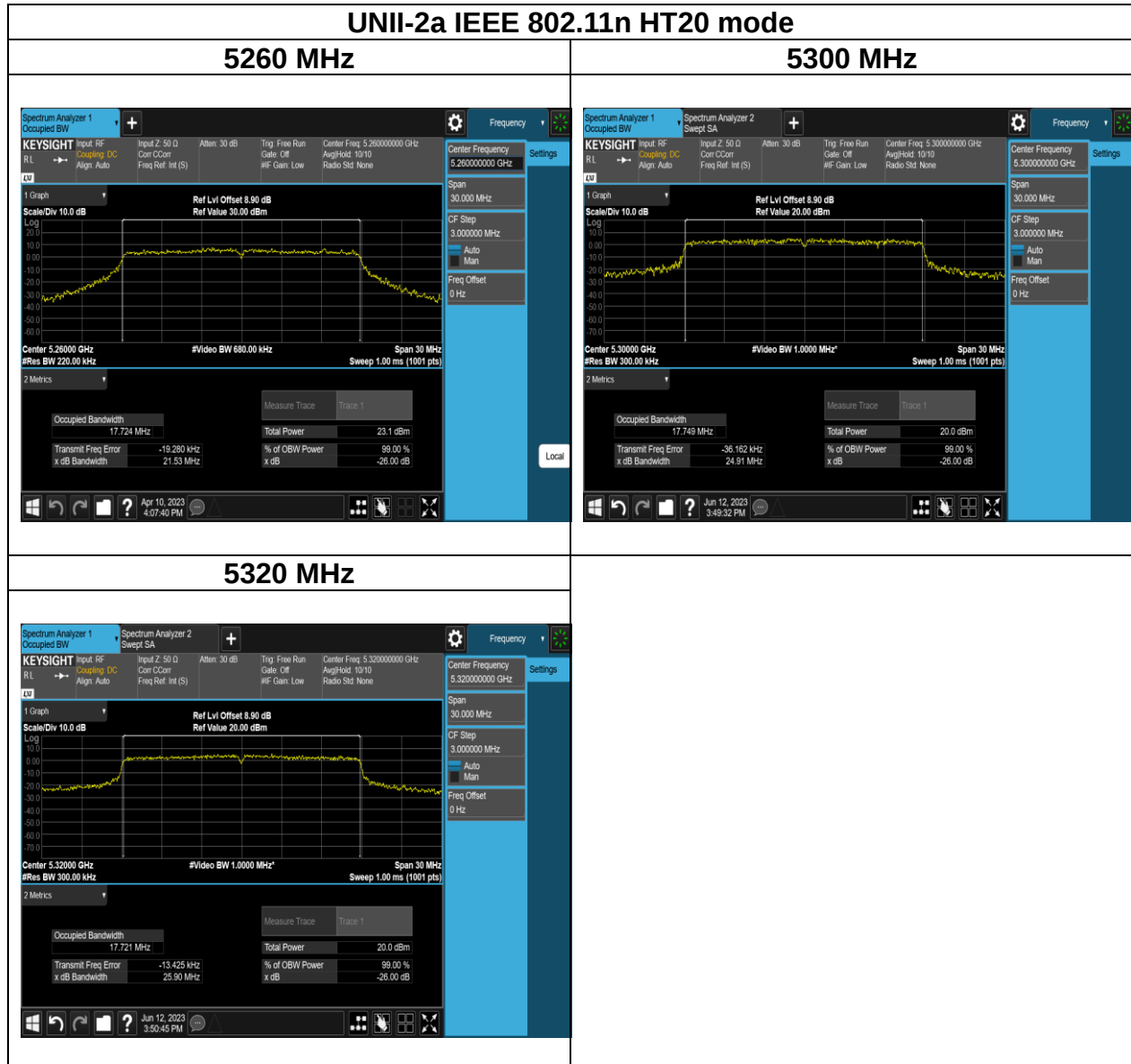


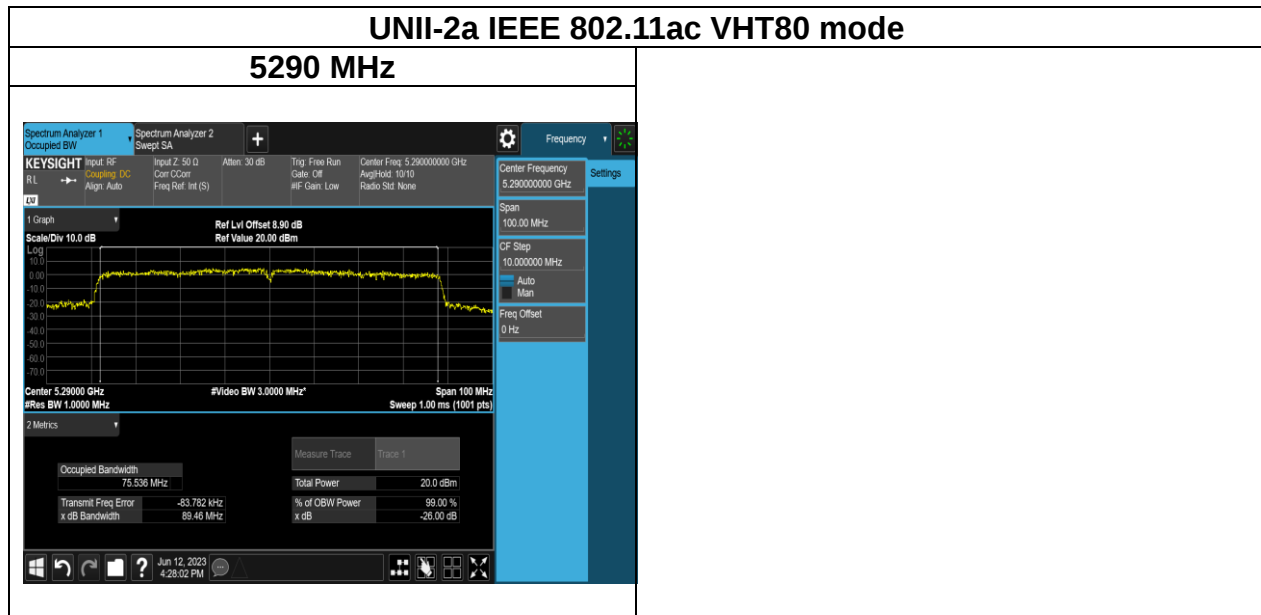
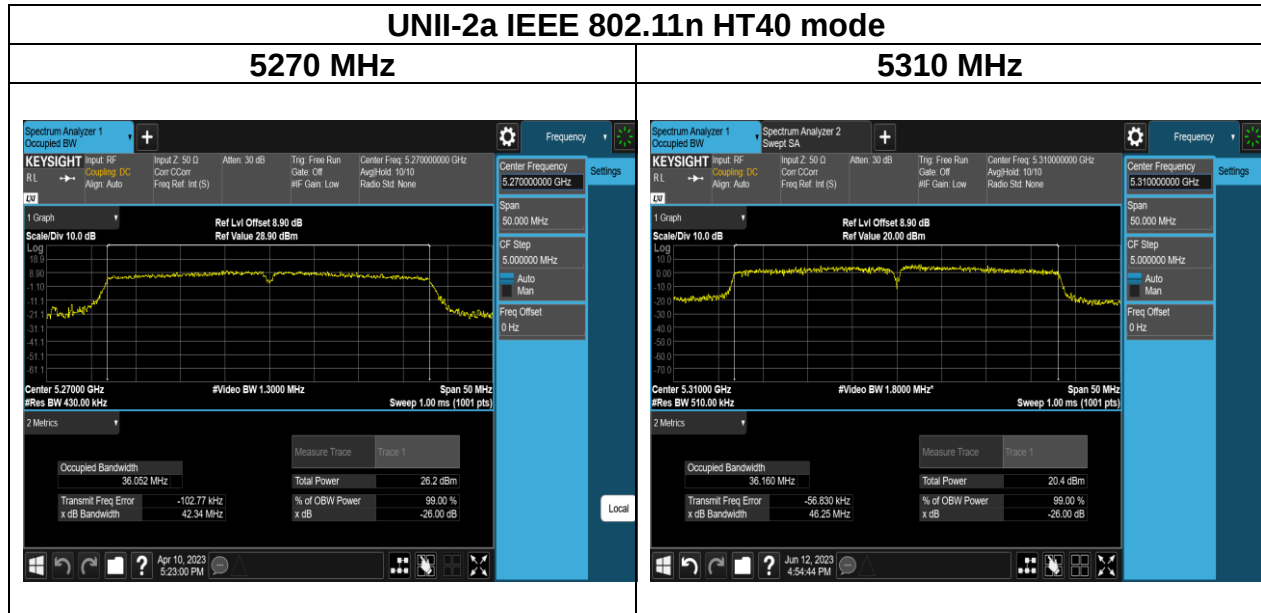
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Test Plots (26dB BANDWIDTH)

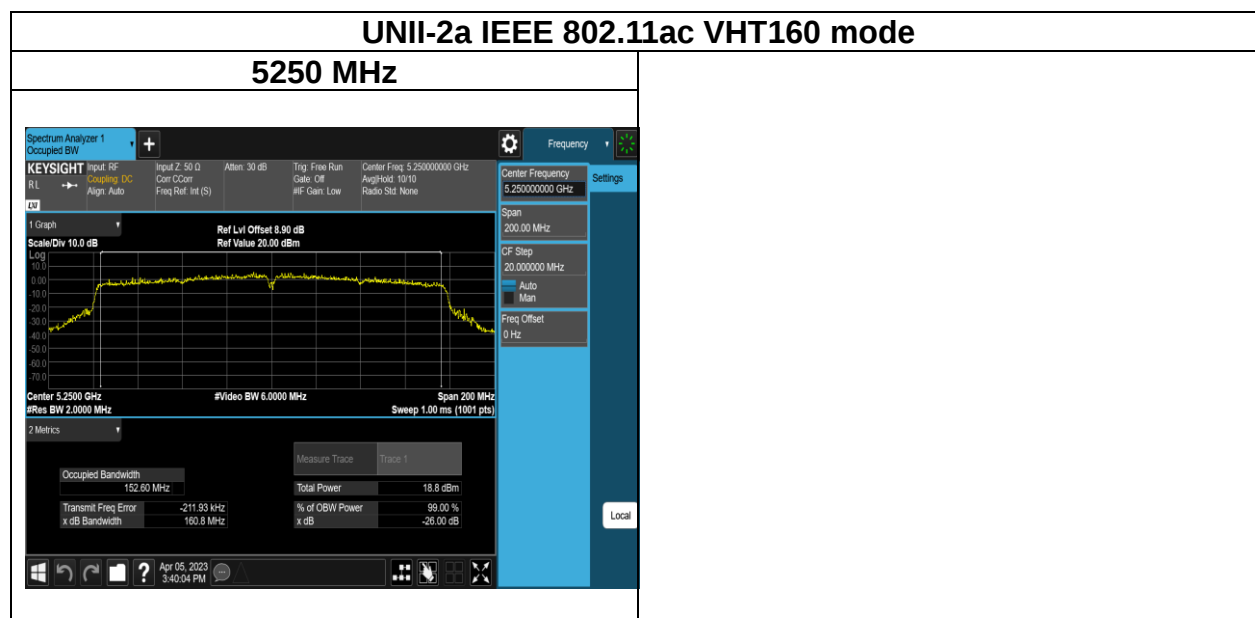
Non-Beamforming: UNII-2a Chain 0



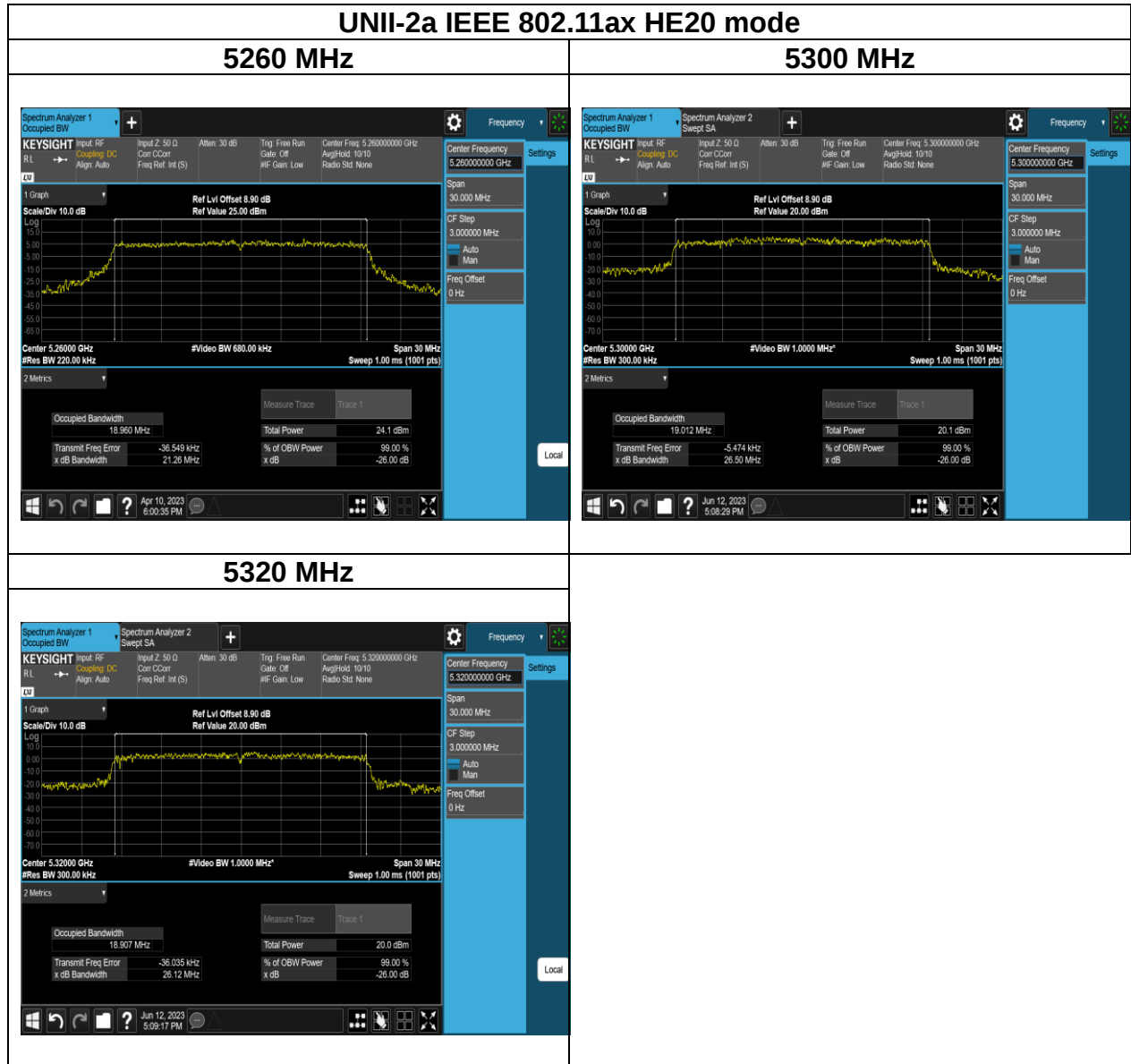


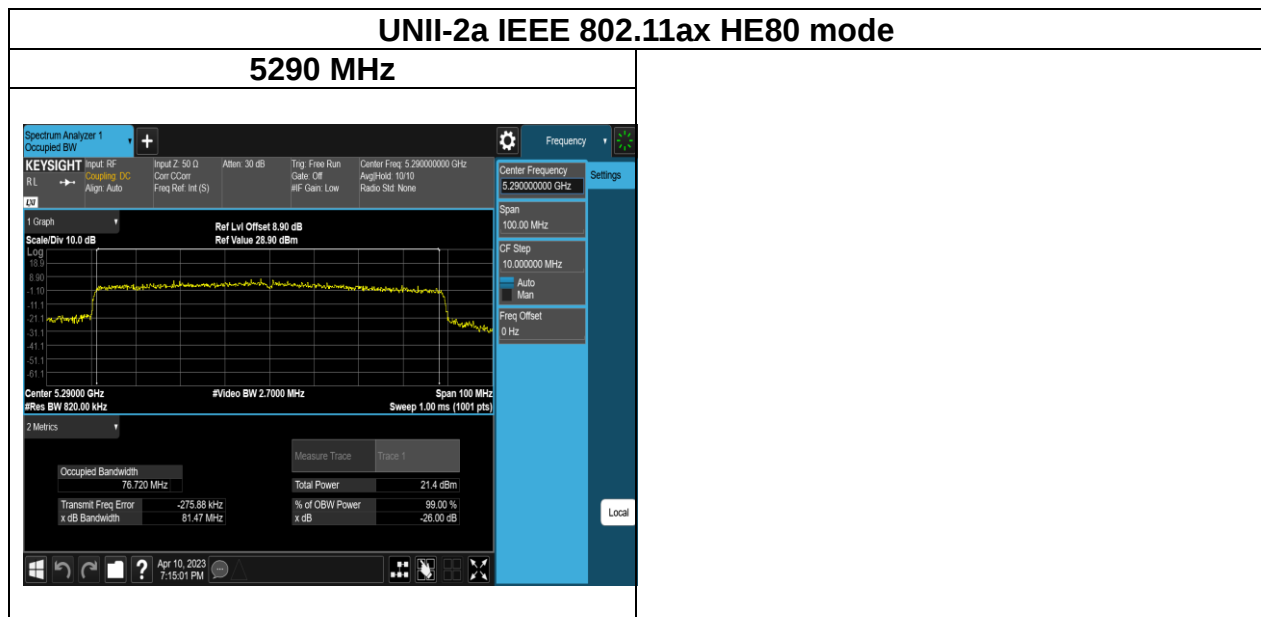
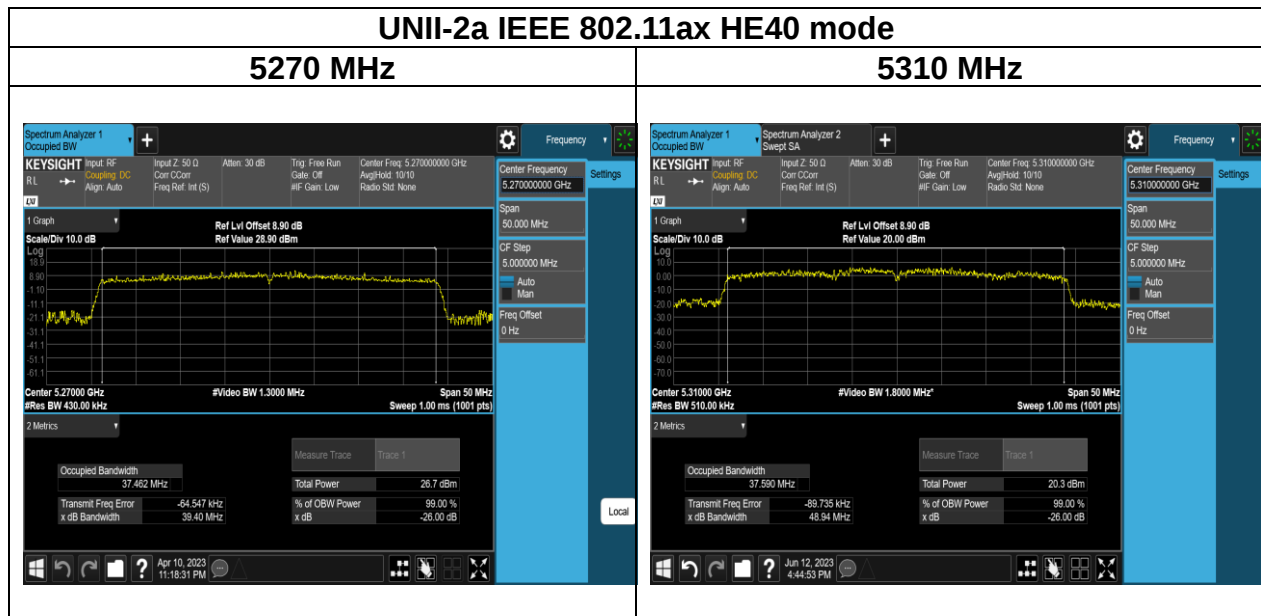


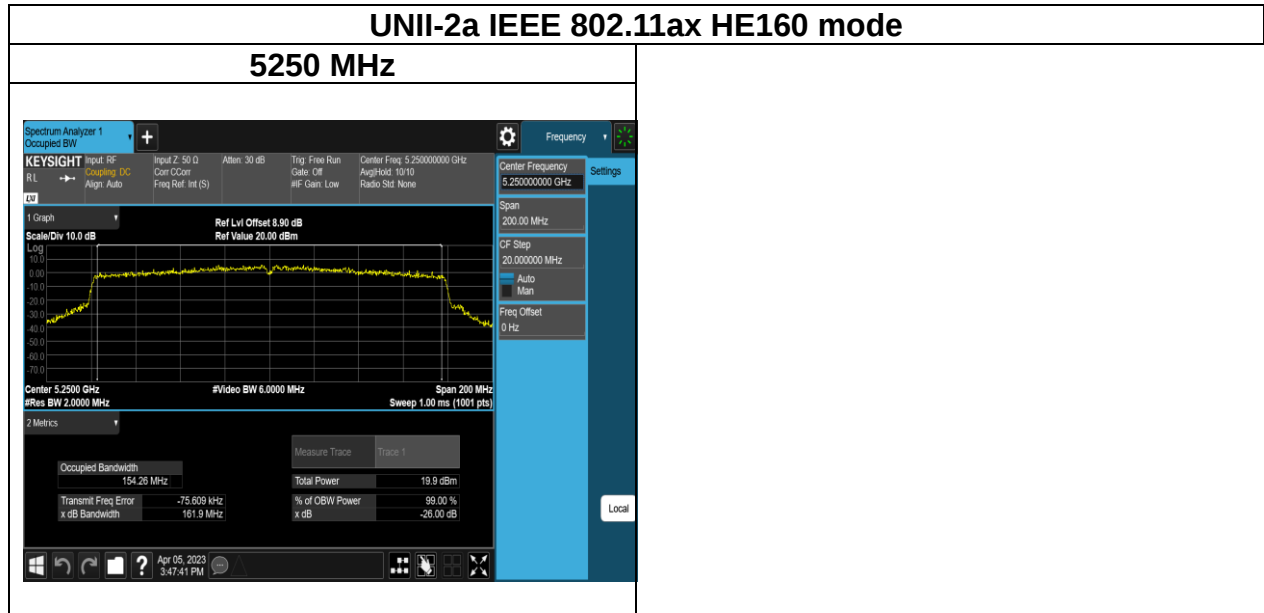
Report No.: TMWK2303000590KR



Report No.: TMWK2303000590KR







Report No.: TMWK2303000590KR

Non-Beamforming: UNII-2a Chain 1

