

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART E

INDUSTRY CANADA RSS-247

Test Standard	FCC Part 15.407+ RSS-247 issue 2 and RSS-GEN issue 5
Product name	Neat Pad
Brand Name	neat.
Model No.	A1
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:



Kevin Tsai
Deputy Manager

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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Rev.: 00

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	September 14, 2021	Initial Issue	ALL	Doris Chu

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	For FCC Neatframe AS Martin Linges Vei 25 Fornebu Fornebu 1364 Norway For IC Neatframe Limited The Charter Building Charter Place UXBRIDGE United Kingdom UB8 1JG United Kingdom Of Great Britain And Northern Ireland
Manufacturer	Neatframe Limited The Charter Building Charter Place UXBRIDGE United Kingdom UB8 1JG United Kingdom Of Great Britain And Northern Ireland
Equipment	Neat Pad
Model No.	A1
Model Discrepancy	N/A
Trade Name	neat.
Received Date	August 13, 2021
Date of Test	August 19 ~ September 11, 2021
Power Supply	Power from Power Adapter. 1. Model: POE16R-1AFG I/P: 100-240VAC, 50-60Hz, 0.8A, 32-44VA O/P: 56VDC, 0.275A 2. Model: POE16R-1AFG6 I/P: 100-240VAC, 50-60Hz, 0.8A O/P: 56VDC, 0.275A, 15.4W
HW Version	E08WWNFB2M5E.NPADA11
SW Version	V5.12.1.3
EUT Serial #	NA12017000590

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.

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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 802.11n HT 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 80 MHz	5210 MHz
	UNII-2a	
	IEEE 802.11a	5260 ~ 5320 MHz
	IEEE 802.11n HT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11n HT 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 80 MHz	5290 MHz
	UNII-2c	
	IEEE 802.11a	5500 ~ 5700 MHz
	IEEE 802.11n HT 20 MHz	5500 ~ 5700 MHz
	IEEE 802.11n HT 40 MHz	5510 ~ 5670 MHz
	IEEE 802.11ac VHT 80 MHz	5530, 5610 MHz
	UNII-3	
IEEE 802.11a	5745 ~ 5825 MHz	
IEEE 802.11n HT 20 MHz	5745 ~ 5825 MHz	
IEEE 802.11n HT 40 MHz	5755 ~ 5795 MHz	
IEEE 802.11ac VHT 80 MHz	5775 MHz	
Modulation Type	<ol style="list-style-type: none"> 1. IEEE 802.11a mode: OFDM 2. IEEE 802.11n HT 20 MHz mode: OFDM 3. IEEE 802.11n HT 40 MHz mode: OFDM 4. IEEE 802.11ac VHT 80 MHz mode: OFDM 	

Remark:

1. Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels.
2. For Canada the EUT Frequency Range 5600~5650MHz will be disabled.

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Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
<input type="checkbox"/> 1 MHz or less	1	Middle
<input type="checkbox"/> 1 MHz to 10 MHz	2	1 near top and 1 near bottom
<input checked="" type="checkbox"/> More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	<input checked="" type="checkbox"/> FPC <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils
Antenna Gain	<p>FPA2927-1A: 5150~5250: Gain: 2.63 dBi 5250~5350: Gain: 2.63 dBi 5470~5725: Gain: 1.89 dBi 5725~5850: Gain: 3.11 dBi</p> <p>FPA2927-2A: 5150~5250: Gain: 1.60 dBi 5250~5350: Gain: 1.60 dBi 5470~5725: Gain: 2.42 dBi 5725~5850: Gain: 2.92 dBi</p> <p>Power Directional Gain: 5150~5250: Gain: 5.14 dBi 5250~5350: Gain: 5.14 dBi 5470~5725: Gain: 5.17 dBi 5725~5850: Gain: 6.03 dBi</p>
Antenna Connector	i-pex

Notes:

- 1.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 and RSS-Gen 6.8.
2. Power Directional Gain = $10 \cdot \log \{ [10^{(Ant1/20)} + 10^{(Ant2/20)} + \dots + 10^{(Ant N /20)}]^2 / N \text{ ANT} \}$ dBi

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1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
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

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.)

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Jack Chen	-
Radiation	Ray Li	-
RF Conducted	Lance Chen	-

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
Coaxial Cable	Woken	WC12	CC003	06/28/2021	06/27/2022
Coaxial Cable	Woken	WC12	CC001	06/28/2021	06/27/2022
Power Meter	Anritsu	ML2487A	6K00003260	05/24/2021	05/23/2022
Power Sensor	Anritsu	MA2490A	032910	05/24/2021	05/23/2022
EXA Signal Analyzer	KEYSIGHT	N9010B	MY55460167	09/07/2020	09/06/2021
Software	Radio Test Software Ver. 21				

Conducted Emission 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	SCHAFFNER	NNB 41	03/10013	02/02/2021	02/01/2022
Software	EZ-EMC(CCS-3A1-CE)				

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3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/19/2021	07/18/2022
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/24/2021	02/23/2022
Coaxial Cable	EMCI	EMC105	190914+327109/4	09/19/2020	09/18/2021
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/06/2021	01/05/2022
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	09/30/2020	09/29/2021
High Pass Filters	MICRO TRONICS	HPM13195	003	02/08/2021	02/07/2022
Horn Antenna	ETS LINDGREN	3116	00026370	12/11/2020	12/10/2021
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/09/2020	12/08/2021
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	12/09/2020	12/08/2021
Pre-Amplifier	EMEC	EM330	060609	02/24/2021	02/23/2022
Pre-Amplifier	HP	8449B	3008A00965	02/25/2021	02/24/2022
Pre-Amplifier	MITEQ	AMF-6F-18004000-37-8P	985646	09/02/2020	09/01/2021
Signal Analyzer	R&S	FSV 40	101073	09/17/2020	09/16/2021
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 6.11-20180413				

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

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1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

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

Support Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
1	NB(J)	TOSHIBA	PT345T-00L002	N/A	PD97260H	1000M-7260H

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, KDB 905462 D02, RSS-247 Issue 2 and RSS-GEN Issue 5.

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2. TEST SUMMARY

FCC Standard Sec.	IC Standard Sec.	Chapter	Test Item	Result
15.203	RSS-Gen (6.8)	1.3	Antenna Requirement	Pass
15.207	RSS-Gen (8.8)	4.1	AC Conducted Emission	Pass
15.403(i)	-	4.2	26dB Bandwidth	Pass
15.407(e)	RSS-247(6.2.4)	4.2	6dB Bandwidth	Pass
15.403(i)	RSS-Gen (6.7)	4.2	Occupied Bandwidth (99%)	Pass
15.407(a)	RSS-247(6.2.1.1) RSS-247(6.2.2.1) RSS-247(6.2.3.1) RSS-247(6.2.4.1)	4.3	Output Power Measurement	Pass
15.407(a)	RSS-247(6.2.1.1) RSS-247(6.2.2.1) RSS-247(6.2.3.1) RSS-247(6.2.4.1)	4.4	Power Spectral Density	Pass
15.407(b)	RSS-247(6.2.1.2) RSS-247(6.2.2.2) RSS-247(6.2.3.2) RSS-247(6.2.4.2)	4.5	Radiation Band Edge	Pass
15.407(b)	RSS-247(6.2.1.2) RSS-247(6.2.2.2) RSS-247(6.2.3.2) RSS-247(6.2.4.2)	4.5	Radiation Spurious Emission	Pass

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3. DESCRIPTION OF TEST MODES

3.1 THE EUT CHANNEL NUMBER OF OPERATING CONDITION

<p>Operation mode</p>	<ol style="list-style-type: none"> 1. IEEE 802.11a mode: 6Mbps 2. IEEE 802.11n HT 20 MHz mode: MCS8 3. IEEE 802.11n HT 40 MHz mode: MCS8 4. IEEE 802.11ac VHT 80 MHz mode: MCS0 																																							
<p>Operating Frequency</p>		<table border="1"> <thead> <tr> <th data-bbox="727 792 1054 846">Mode</th> <th data-bbox="1054 792 1401 846">Frequency Range (MHz)</th> </tr> </thead> <tbody> <tr> <td data-bbox="727 846 1054 878" rowspan="4">U-NII-1</td> <td data-bbox="1054 846 1401 878">IEEE 802.11a</td> <td data-bbox="1401 846 1476 878">5180, 5220, 5240</td> </tr> <tr> <td data-bbox="1054 878 1401 909">IEEE 802.11n HT 20 MHz</td> <td data-bbox="1401 878 1476 909">5180, 5220, 5240</td> </tr> <tr> <td data-bbox="1054 909 1401 940">IEEE 802.11n HT 40 MHz</td> <td data-bbox="1401 909 1476 940">5190, 5230</td> </tr> <tr> <td data-bbox="1054 940 1401 972">IEEE 802.11ac VHT 80 MHz</td> <td data-bbox="1401 940 1476 972">5210</td> </tr> <tr> <td data-bbox="727 972 1054 1003" rowspan="4">U-NII-2a</td> <td data-bbox="1054 972 1401 1003">IEEE 802.11a</td> <td data-bbox="1401 972 1476 1003">5260, 5300, 5320</td> </tr> <tr> <td data-bbox="1054 1003 1401 1034">IEEE 802.11n HT 20 MHz</td> <td data-bbox="1401 1003 1476 1034">5260, 5300, 5320</td> </tr> <tr> <td data-bbox="1054 1034 1401 1066">IEEE 802.11n HT 40 MHz</td> <td data-bbox="1401 1034 1476 1066">5270, 5310</td> </tr> <tr> <td data-bbox="1054 1066 1401 1097">IEEE 802.11ac VHT 80 MHz</td> <td data-bbox="1401 1066 1476 1097">5290</td> </tr> <tr> <td data-bbox="727 1097 1054 1128" rowspan="4">U-NII-2c</td> <td data-bbox="1054 1097 1401 1128">IEEE 802.11a</td> <td data-bbox="1401 1097 1476 1128">5500, 5580, 5700</td> </tr> <tr> <td data-bbox="1054 1128 1401 1160">IEEE 802.11n HT 20 MHz</td> <td data-bbox="1401 1128 1476 1160">5500, 5580, 5700</td> </tr> <tr> <td data-bbox="1054 1160 1401 1191">IEEE 802.11n HT 40 MHz</td> <td data-bbox="1401 1160 1476 1191">5510, 5550, 5670</td> </tr> <tr> <td data-bbox="1054 1191 1401 1223">IEEE 802.11ac VHT 80 MHz</td> <td data-bbox="1401 1191 1476 1223">5530, 5610</td> </tr> <tr> <td data-bbox="727 1223 1054 1254" rowspan="4">U-NII-3</td> <td data-bbox="1054 1223 1401 1254">IEEE 802.11a</td> <td data-bbox="1401 1223 1476 1254">5745, 5785, 5825</td> </tr> <tr> <td data-bbox="1054 1254 1401 1285">IEEE 802.11n HT 20 MHz</td> <td data-bbox="1401 1254 1476 1285">5745, 5785, 5825</td> </tr> <tr> <td data-bbox="1054 1285 1401 1317">IEEE 802.11n HT 40 MHz</td> <td data-bbox="1401 1285 1476 1317">5755, 5795</td> </tr> <tr> <td data-bbox="1054 1317 1401 1348">IEEE 802.11ac VHT 80 MHz</td> <td data-bbox="1401 1317 1476 1348">5775</td> </tr> </tbody> </table>	Mode	Frequency Range (MHz)	U-NII-1	IEEE 802.11a	5180, 5220, 5240	IEEE 802.11n HT 20 MHz	5180, 5220, 5240	IEEE 802.11n HT 40 MHz	5190, 5230	IEEE 802.11ac VHT 80 MHz	5210	U-NII-2a	IEEE 802.11a	5260, 5300, 5320	IEEE 802.11n HT 20 MHz	5260, 5300, 5320	IEEE 802.11n HT 40 MHz	5270, 5310	IEEE 802.11ac VHT 80 MHz	5290	U-NII-2c	IEEE 802.11a	5500, 5580, 5700	IEEE 802.11n HT 20 MHz	5500, 5580, 5700	IEEE 802.11n HT 40 MHz	5510, 5550, 5670	IEEE 802.11ac VHT 80 MHz	5530, 5610	U-NII-3	IEEE 802.11a	5745, 5785, 5825	IEEE 802.11n HT 20 MHz	5745, 5785, 5825	IEEE 802.11n HT 40 MHz	5755, 5795	IEEE 802.11ac VHT 80 MHz	5775
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	IEEE 802.11n HT 40 MHz	5755, 5795																																						
	IEEE 802.11ac VHT 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. For Canada the EUT Frequency Range 5600~5650MHz will be disabled.
3. The system support 802.11a/n HT20/n HT40/ac VHT20/40/80, the VHT20/VHT40 were reduced since the identical parameters with 802.11n HT20 and HT40.
4. The worst-case data rates are determined to be as follows for each mode based upon investigations by evaluate the average power and PSD across all data rates, bandwidths, and modulations. The device supports SISO and MIMO at 802.11a/n/ac mode, per pre-test, MIMO 2TX mode was the worst and reported.

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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 (POE16R-1AFG) Mode 2: EUT power by Adapter (POE16R-1AFG6)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input checked="" type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT Power by Adapter (POE16R-1AFG) Mode 2: EUT Power by Adapter (POE16R-1AFG6)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> 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 (POE16R-1AFG) Mode 2: EUT Power by Adapter (POE16R-1AFG6)
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> 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.

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3.3 EUT DUTY CYCLE

Temperature: 20.3 ~ 25.8°C
Tested by: Lance Chen

Humidity: 54 ~ 61% RH
Test date: August 19 ~ 23, 2021

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	90.29	0.44	0.48	1.00
802.11n HT20	52.51	2.80	4.41	5.00
802.11n HT40	50.69	2.95	7.81	8.00
802.11ac VHT80	79.31	1.01	2.17	3.00



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4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a) and RSS-GEN section 8.8,

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

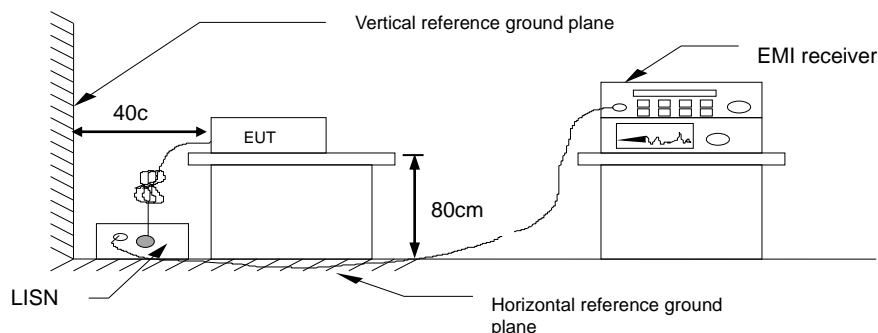
* Decreases with the logarithm of the frequency.

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

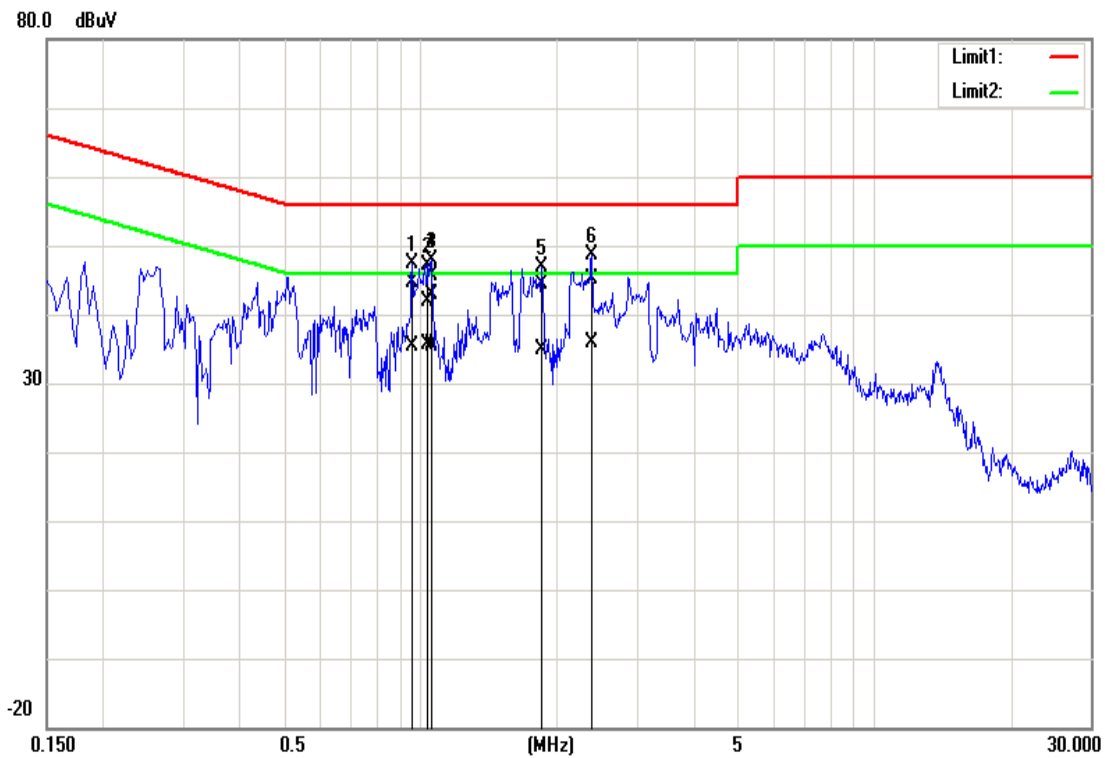


4.1.4 Test Result

PASS

Test Data

Test Mode:	Mode 1	Temp/Hum	27.3(°C)/ 48%RH
Phase:	Line	Test Date	August 20, 2021
		Test Engineer	Jack Chen

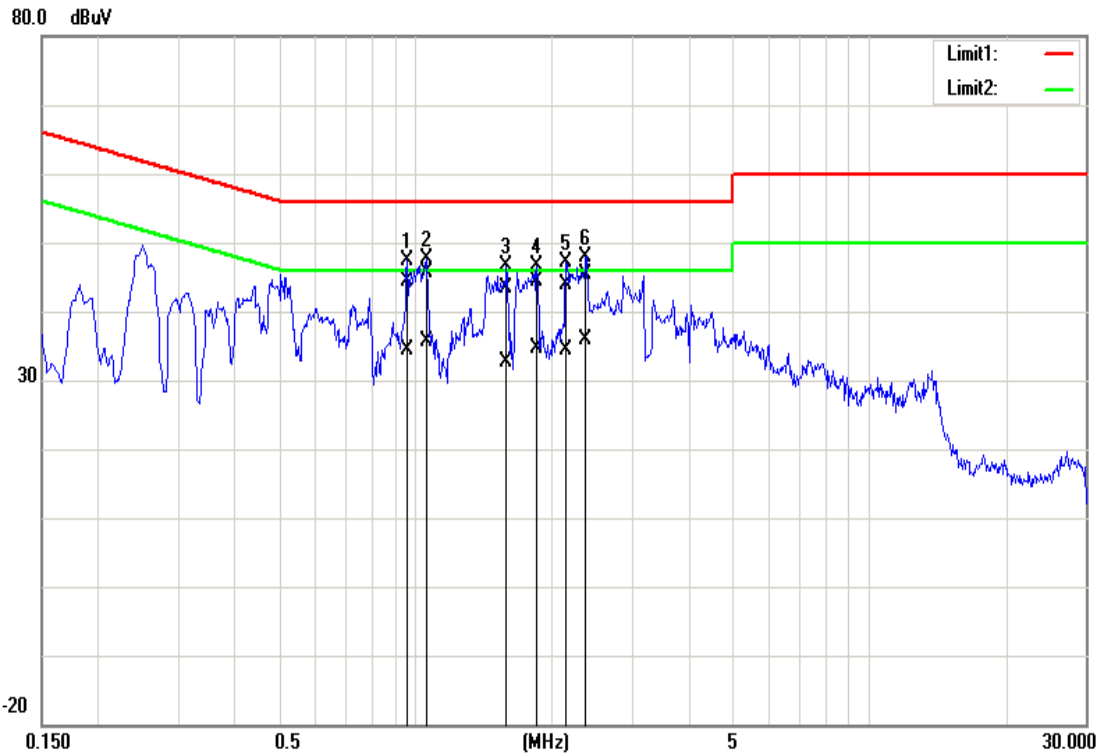


Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.9620	34.24	24.98	10.31	44.55	35.29	56.00	46.00	-11.45	-10.71	Pass
1.0220	31.67	25.30	10.31	41.98	35.61	56.00	46.00	-14.02	-10.39	Pass
1.0420	32.48	25.39	10.31	42.79	35.70	56.00	46.00	-13.21	-10.30	Pass
1.0580	35.22	25.16	10.31	45.53	35.47	56.00	46.00	-10.47	-10.53	Pass
1.8500	34.04	24.44	10.34	44.38	34.78	56.00	46.00	-11.62	-11.22	Pass
2.3860	34.88	25.59	10.34	45.22	35.93	56.00	46.00	-10.78	-10.07	Pass

Note: Correction factor = LISN loss + Cable loss.

Report No.: TMWK2108000371KR

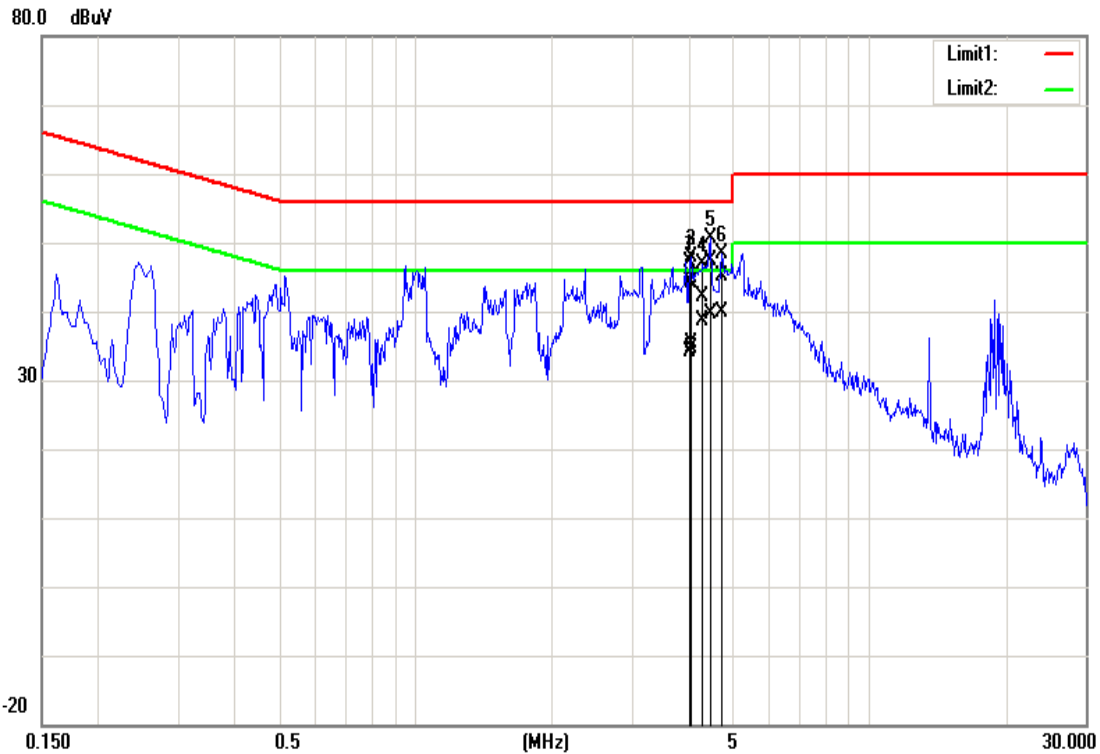
Test Mode:	Mode 1	Temp/Hum	27.3(°C)/ 48%RH
Phase:	Neutral	Test Date	August 20, 2021
		Test Engineer	Jack Chen



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
0.9620	34.01	24.19	10.31	44.32	34.50	56.00	46.00	-11.68	-11.50	Pass
1.0580	35.25	25.21	10.31	45.56	35.52	56.00	46.00	-10.44	-10.48	Pass
1.5900	33.07	22.29	10.33	43.40	32.62	56.00	46.00	-12.60	-13.38	Pass
1.8540	34.09	24.17	10.34	44.43	34.51	56.00	46.00	-11.57	-11.49	Pass
2.1540	33.59	24.10	10.34	43.93	34.44	56.00	46.00	-12.07	-11.56	Pass
2.3820	34.97	25.48	10.34	45.31	35.82	56.00	46.00	-10.69	-10.18	Pass

Note: Correction factor = LISN loss + Cable loss.

Test Mode:	Mode 2	Temp/Hum	26.1(°C)/ 47%RH
Phase:	Line	Test Date	September 11, 2021
		Test Engineer	Jack Chen

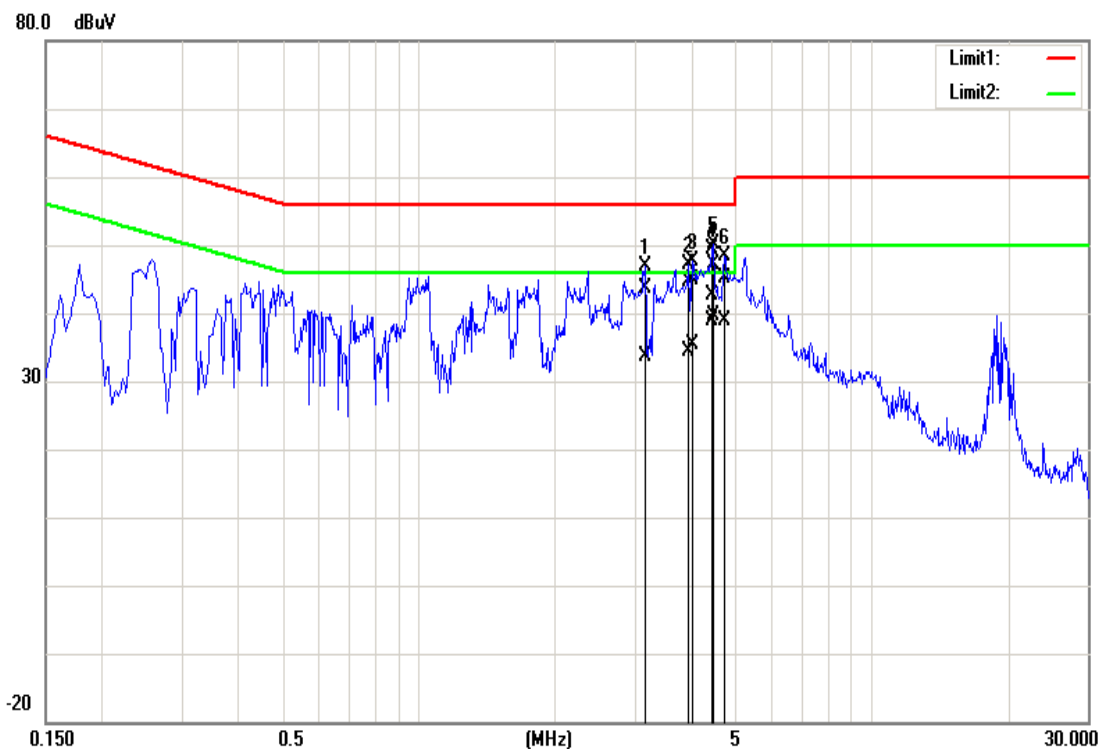


Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
3.9500	33.90	23.83	10.38	44.28	34.21	56.00	46.00	-11.72	-11.79	Pass
4.0260	33.75	24.23	10.38	44.13	34.61	56.00	46.00	-11.87	-11.39	Pass
4.0500	34.53	25.06	10.38	44.91	35.44	56.00	46.00	-11.09	-10.56	Pass
4.3140	31.73	28.20	10.38	42.11	38.58	56.00	46.00	-13.89	-7.42	Pass
4.4740	37.00	29.19	10.38	47.38	39.57	56.00	46.00	-8.62	-6.43	Pass
4.7340	34.83	29.40	10.39	45.22	39.79	56.00	46.00	-10.78	-6.21	Pass

Note: Correction factor = LISN loss + Cable loss.

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Test Mode:	Mode 2	Temp/Hum	26.1(°C)/ 47%RH
Phase:	Neutral	Test Date	September 11, 2021
		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
3.1580	33.37	23.26	10.36	43.73	33.62	56.00	46.00	-12.27	-12.38	Pass
3.9460	34.13	24.03	10.38	44.51	34.41	56.00	46.00	-11.49	-11.59	Pass
4.0460	34.42	24.98	10.38	44.80	35.36	56.00	46.00	-11.20	-10.64	Pass
4.3780	32.31	28.45	10.38	42.69	38.83	56.00	46.00	-13.31	-7.17	Pass
4.4780	36.65	29.16	10.38	47.03	39.54	56.00	46.00	-8.97	-6.46	Pass
4.7300	34.71	28.54	10.39	45.10	38.93	56.00	46.00	-10.90	-7.07	Pass

Note: Correction factor = LISN loss + Cable loss.

Report No.: TMWK2108000371KR

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

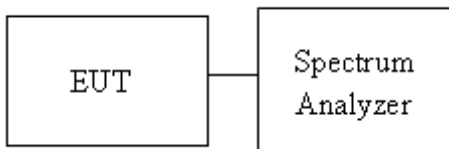
1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW: approximately 1% of the emission bandwidth.
3. Set the VBW>RBW.
4. Detoctor = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26dB down 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 xRBW

4.2.3 Test Setup

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4.2.4 Test Result

Temperature: 20.3 ~ 25.8°C

Humidity: 54 ~ 61% RH

Tested by: Lance Chen

Test date: August 19 ~ 23, 2021

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)
Low	5180	16.359	16.348	18.26	18.24
Mid	5220	16.350	16.364	18.30	18.42
High	5240	16.362	16.384	18.44	18.31
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)
Low	5180	17.614	17.554	19.13	19.20
Mid	5220	17.588	17.595	19.02	19.18
High	5240	17.611	17.654	19.14	19.31
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)
Low	5190	36.073	36.109	40.13	40.31
High	5230	35.980	36.016	39.43	39.72
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)
Mid	5210	74.848	74.852	80.58	80.91

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)
Low	5260	16.347	16.365	18.42	18.22
Mid	5300	16.355	16.357	18.27	18.51
High	5320	16.354	16.357	18.49	18.22
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)
Low	5260	17.588	17.586	19.18	18.90
Mid	5300	17.598	17.603	19.06	19.04
High	5320	17.651	17.623	19.16	19.09
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)
Low	5270	36.031	36.043	40.73	40.44
High	5310	36.023	36.084	40.06	39.96
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)
Mid	5290	74.687	74.630	80.26	80.97

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)
Low	5500	16.344	16.366	18.23	18.40
Mid	5580	16.354	16.360	18.43	18.30
High	5700	16.376	16.384	18.30	18.34
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)
Low	5500	17.608	17.599	19.02	19.12
Mid	5580	17.574	17.591	19.13	19.06
High	5700	17.647	17.638	19.20	19.26
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)
Low	5510	36.043	36.119	39.98	40.22
Mid	5550	36.058	36.019	39.32	39.80
High	5670	36.060	36.054	39.29	39.34
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)
Low	5530	74.648	74.589	80.64	80.88
High	5610	74.628	74.649	80.52	80.94

Report No.: TMWK2108000371KR

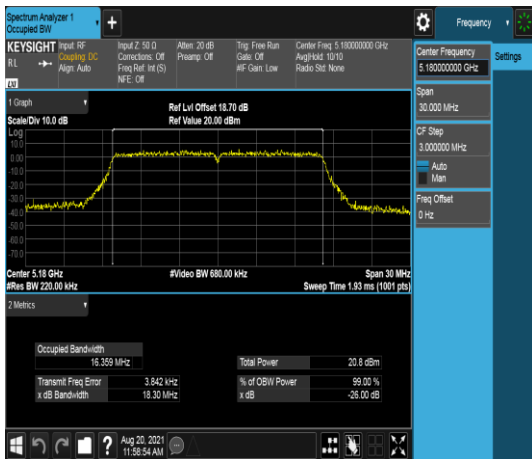
UNII-3 5725-5825MHz						
Test mode: IEEE 802.11a mode						
Channel	Frequency (MHz)	Chain 0 OBW(99%) (MHz)	Chain 1 OBW(99%) (MHz)	Chain 0 6dB BW (MHz)	Chain 1 6dB BW (MHz)	Limit
Low	5745	16.349	16.350	16.34	16.33	>500kHz
Mid	5785	16.346	16.351	16.31	16.38	
High	5825	16.349	16.358	16.33	16.08	
Test mode: 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
Low	5745	17.618	17.596	17.57	17.66	>500kHz
Mid	5785	17.590	17.632	17.62	17.70	
High	5825	17.575	17.565	17.59	17.62	
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
Low	5755	36.086	36.083	35.50	35.44	>500kHz
High	5795	36.161	36.140	35.53	35.56	
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
Mid	5775	74.517	74.685	72.66	73.76	>500kHz

Report No.: TMWK2108000371KR

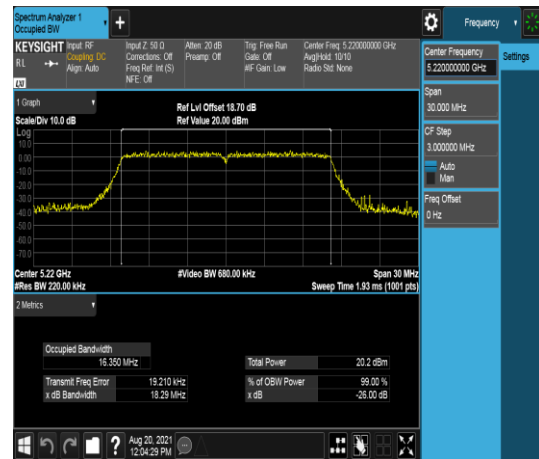
Test Data (99% OBW)

UNII-1 IEEE 802.11a mode - Chain 0

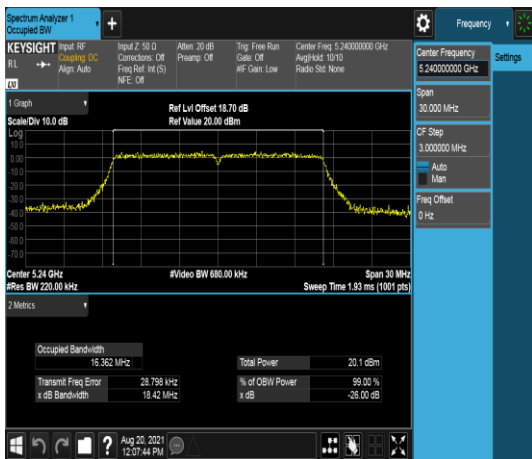
Low CH



Mid CH



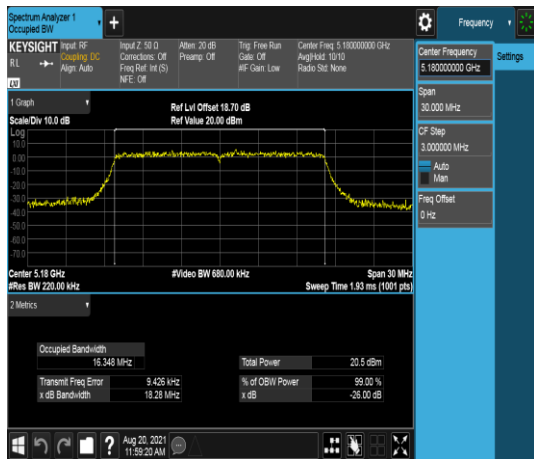
High CH



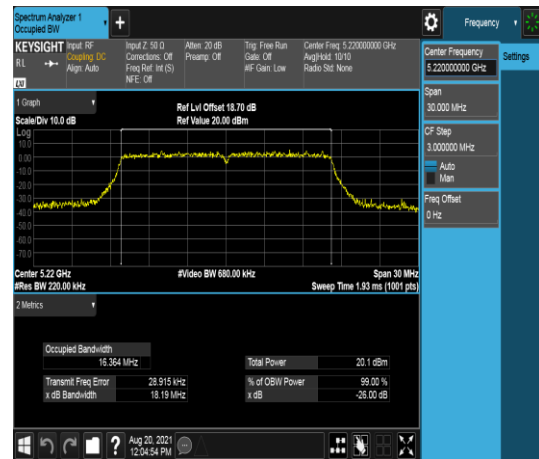
Report No.: TMWK2108000371KR

UNII-1 IEEE 802.11a mode - Chain 1

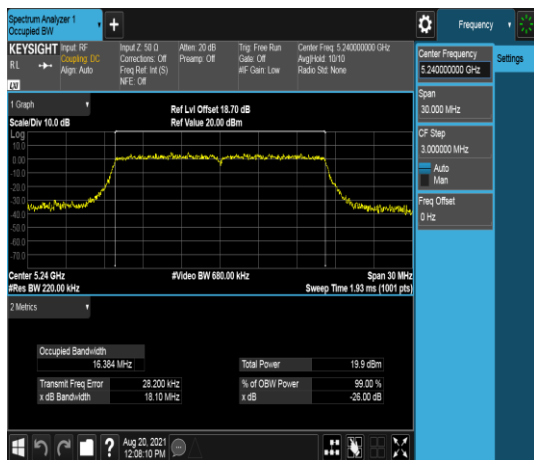
Low CH



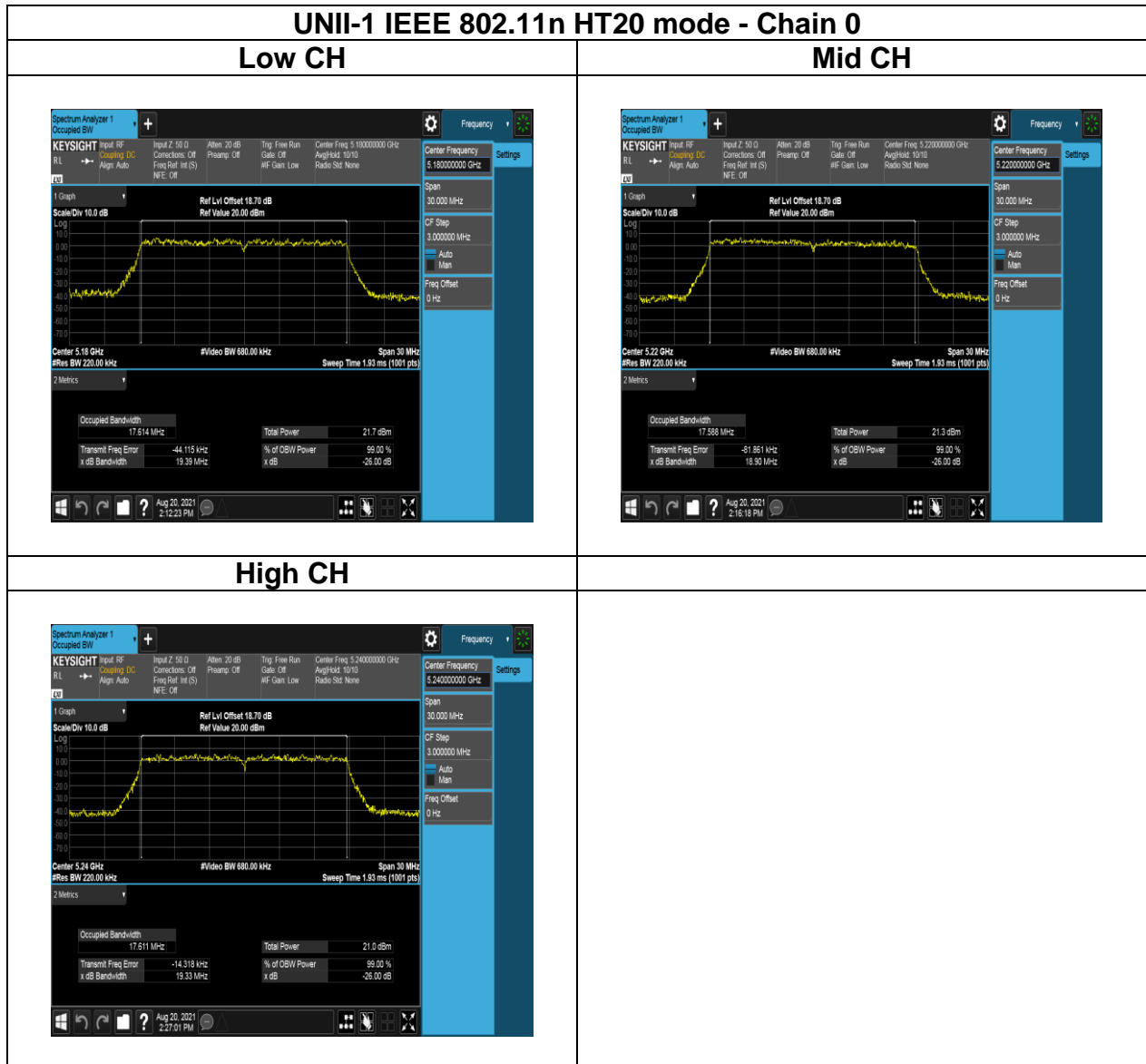
Mid CH



High CH



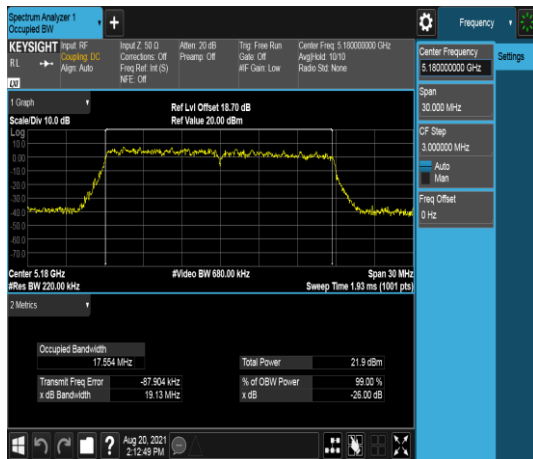
Report No.: TMWK2108000371KR



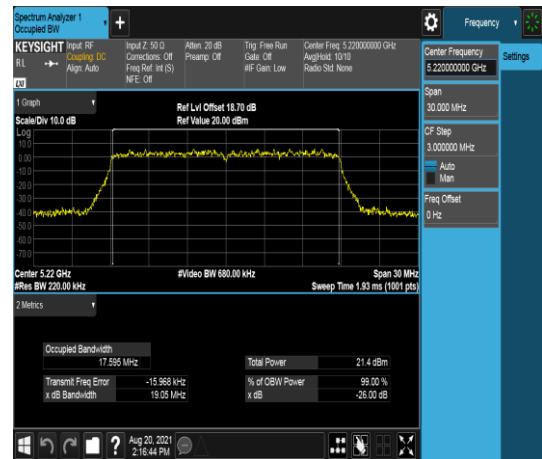
Report No.: TMWK2108000371KR

UNII-1 IEEE 802.11n HT20 mode - Chain 1

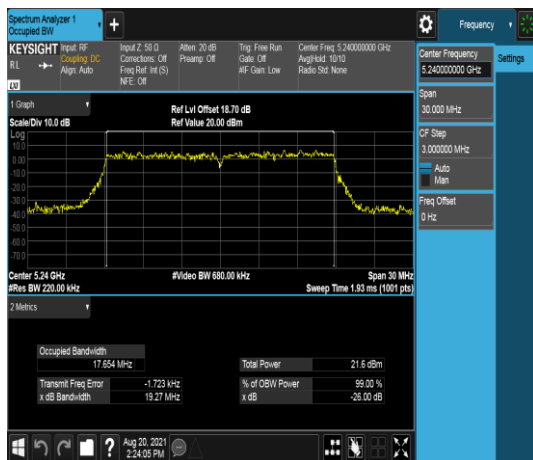
Low CH



Mid CH



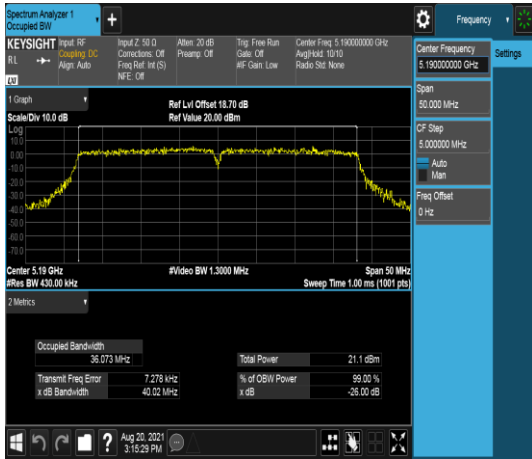
High CH



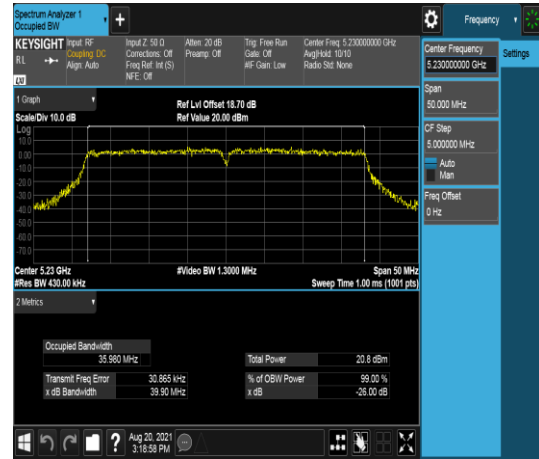
Report No.: TMWK2108000371KR

UNII-1 IEEE 802.11n HT40 mode- Chain 0

Low CH

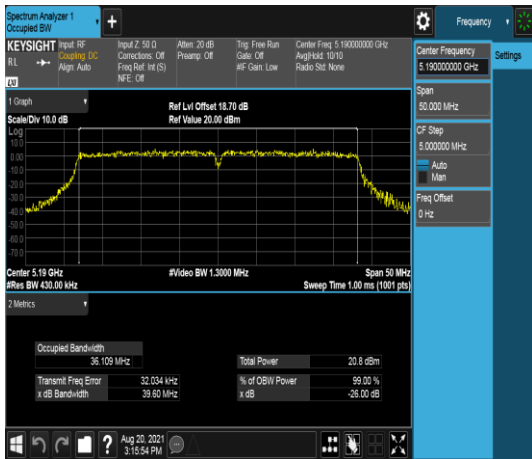


High CH

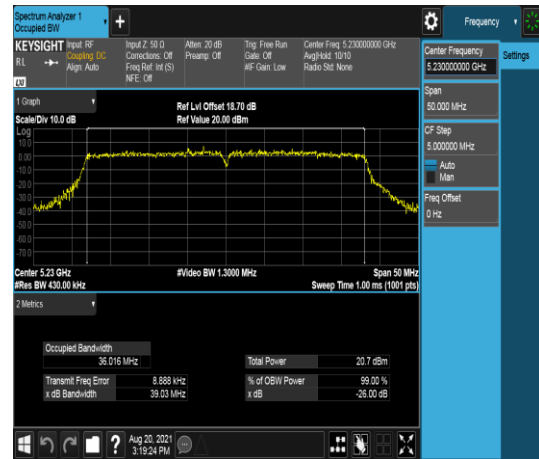


UNII-1 IEEE 802.11n HT40 mode- Chain 1

Low CH



High CH

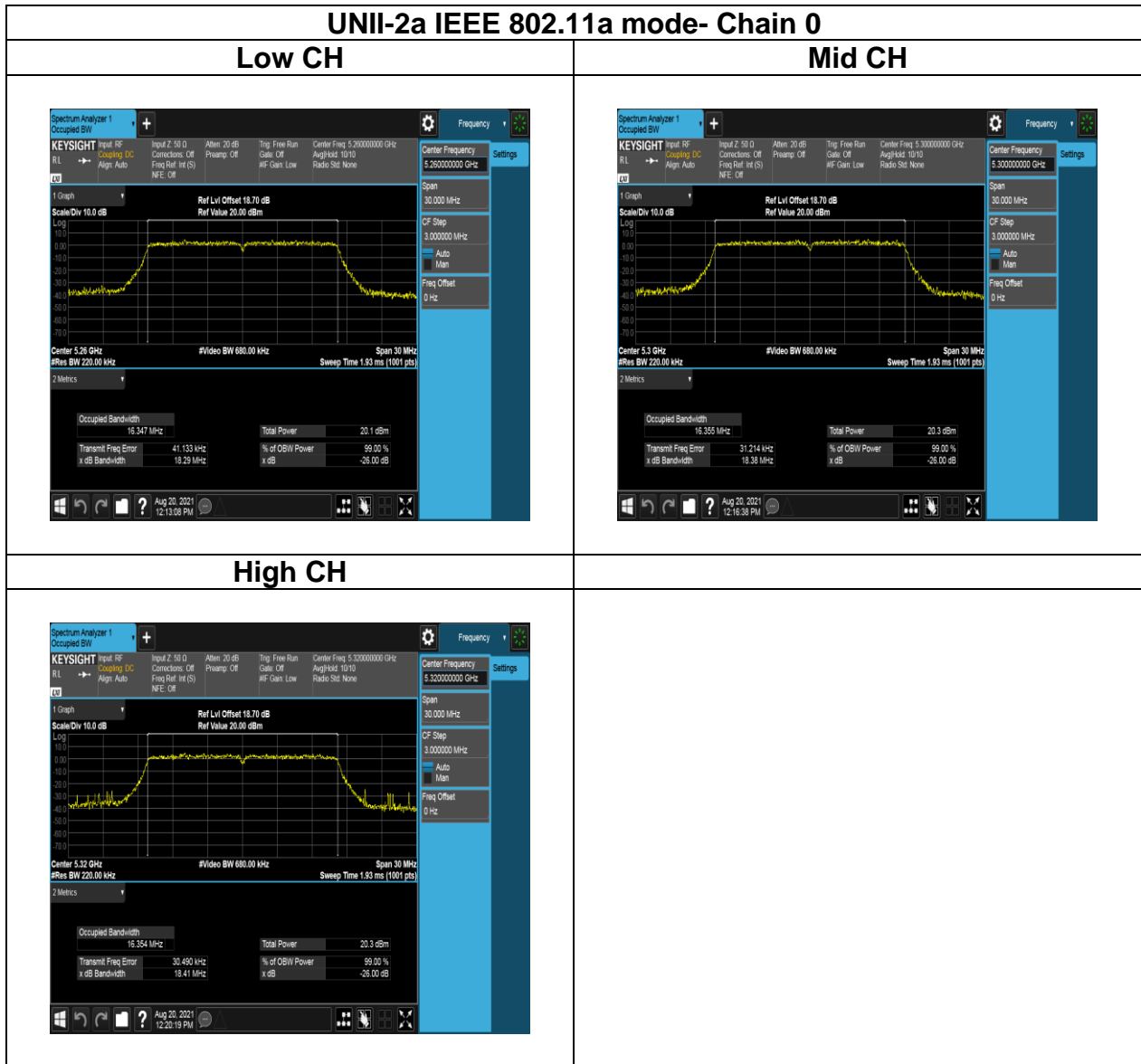


Report No.: TMWK2108000371KR

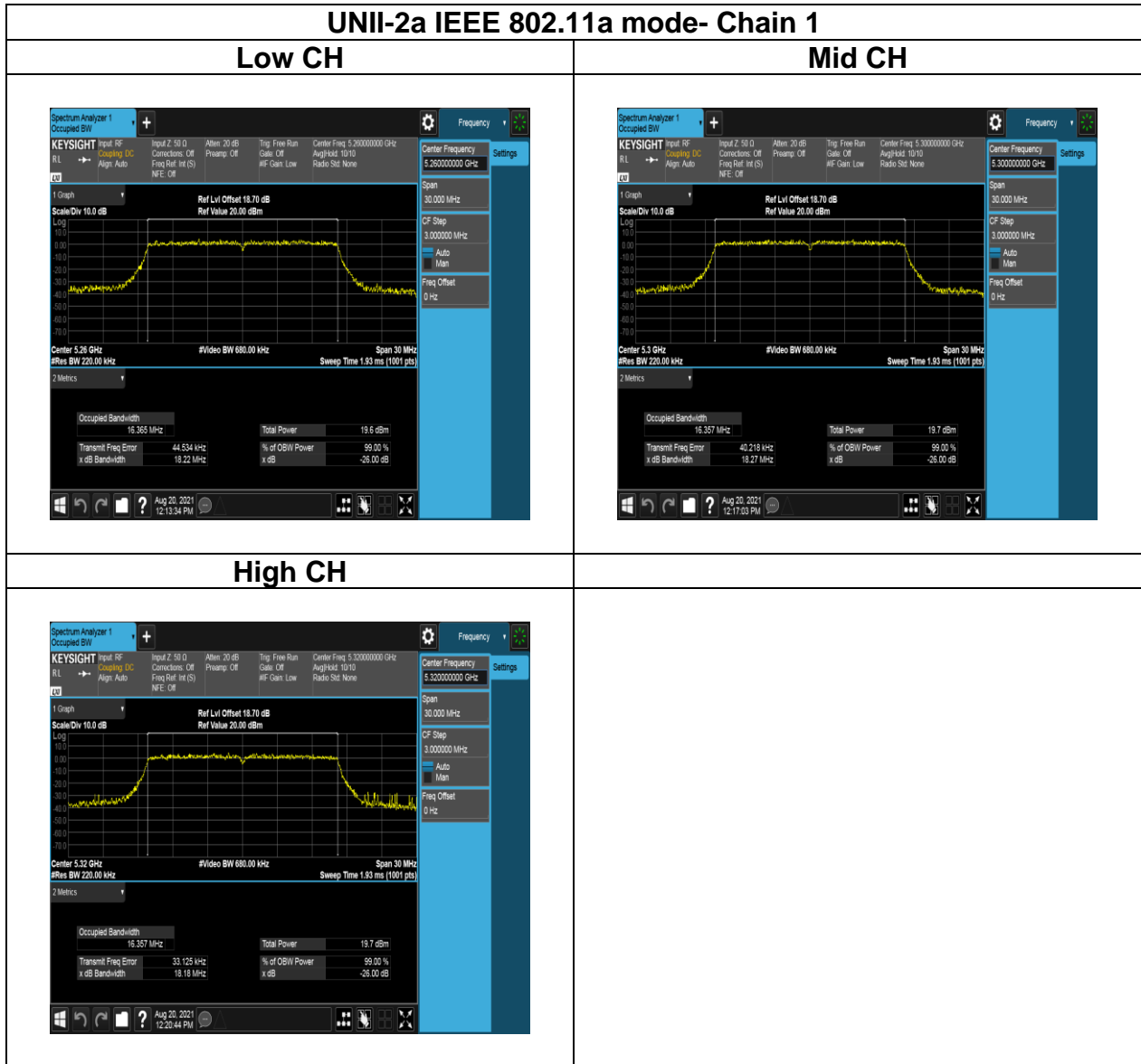
UNII-1 IEEE 802.11ac VHT80 mode- Chain 0													
Low CH													
<p>Keysight Spectrum Analyzer 1 Occupied BW</p> <p>Center Frequency: 5.21000000 GHz Span: 100.00 MHz CF Step: 10.000000 MHz Auto Man Freq Offset: 0 Hz</p> <p>Scale Div: 10.0 dB Log Ref Lvl Offset: 18.70 dB Ref Value: 20.00 dBm</p> <p>Center: 5.21 GHz #Video BW: 2.700 MHz Span: 100 MHz #Res BW: 820.00 MHz Sweep Time: 1.00 ms (1001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>74.848 MHz</td> <td>Total Power</td> <td>19.9 dBm</td> </tr> <tr> <td>Transmit Freq Error</td> <td>91.765 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>80.31 MHz</td> <td>x dB</td> <td>-36.00 dB</td> </tr> </table> <p>Aug 20, 2021 4:14:00 PM</p>	Occupied Bandwidth	74.848 MHz	Total Power	19.9 dBm	Transmit Freq Error	91.765 kHz	% of OBW Power	99.00 %	x dB Bandwidth	80.31 MHz	x dB	-36.00 dB	
Occupied Bandwidth	74.848 MHz	Total Power	19.9 dBm										
Transmit Freq Error	91.765 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	80.31 MHz	x dB	-36.00 dB										
UNII-1 IEEE 802.11ac VHT80 mode- Chain 1													
Low CH													
<p>Keysight Spectrum Analyzer 1 Occupied BW</p> <p>Center Frequency: 5.21000000 GHz Span: 100.00 MHz CF Step: 10.000000 MHz Auto Man Freq Offset: 0 Hz</p> <p>Scale Div: 10.0 dB Log Ref Lvl Offset: 18.70 dB Ref Value: 20.00 dBm</p> <p>Center: 5.21 GHz #Video BW: 2.700 MHz Span: 100 MHz #Res BW: 820.00 MHz Sweep Time: 1.00 ms (1001 pts)</p> <p>2 Metrics</p> <table border="1"> <tr> <td>Occupied Bandwidth</td> <td>74.852 MHz</td> <td>Total Power</td> <td>19.5 dBm</td> </tr> <tr> <td>Transmit Freq Error</td> <td>81.102 kHz</td> <td>% of OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>80.90 MHz</td> <td>x dB</td> <td>-36.00 dB</td> </tr> </table> <p>Aug 20, 2021 4:14:26 PM</p>	Occupied Bandwidth	74.852 MHz	Total Power	19.5 dBm	Transmit Freq Error	81.102 kHz	% of OBW Power	99.00 %	x dB Bandwidth	80.90 MHz	x dB	-36.00 dB	
Occupied Bandwidth	74.852 MHz	Total Power	19.5 dBm										
Transmit Freq Error	81.102 kHz	% of OBW Power	99.00 %										
x dB Bandwidth	80.90 MHz	x dB	-36.00 dB										

Report No.: TMWK2108000371KR

Test Data (99% OBW)



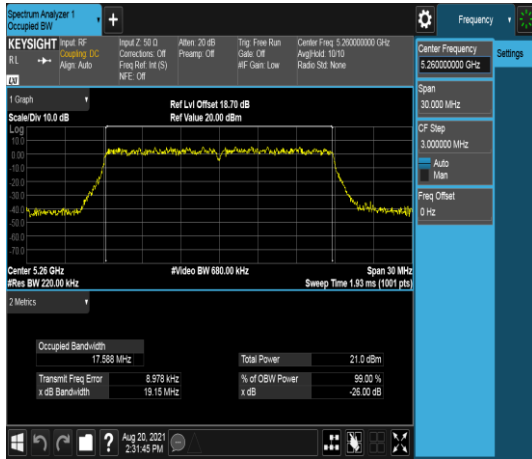
Report No.: TMWK2108000371KR



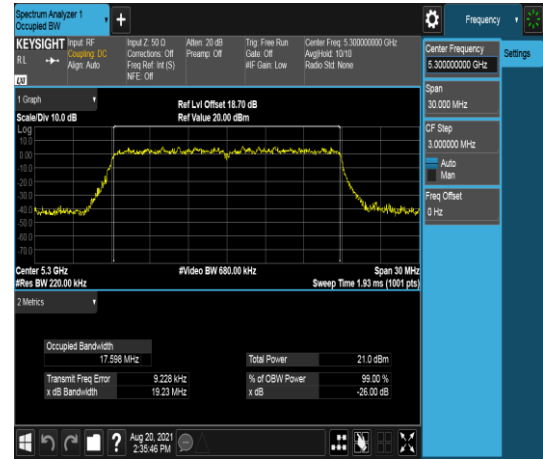
Report No.: TMWK2108000371KR

UNII-2a IEEE 802.11n HT20 mode- Chain 0

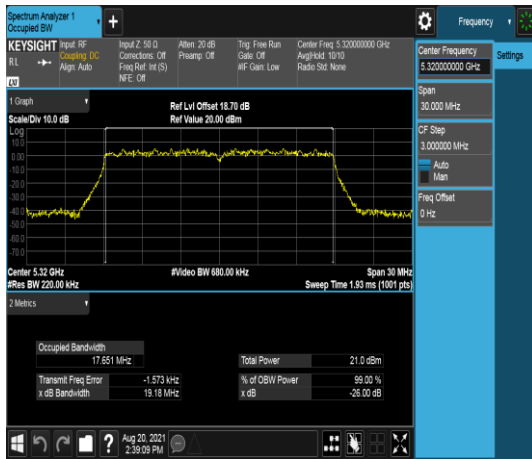
Low CH



Mid CH



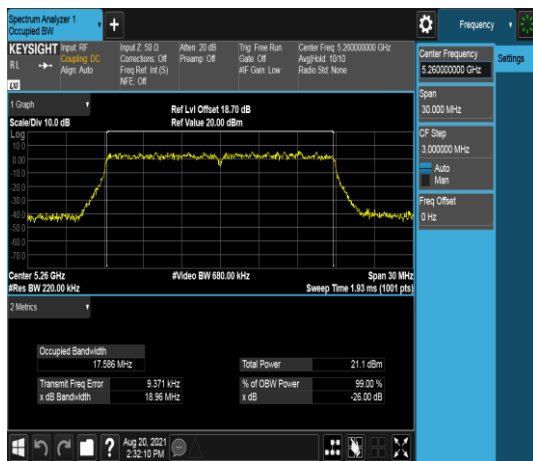
High CH



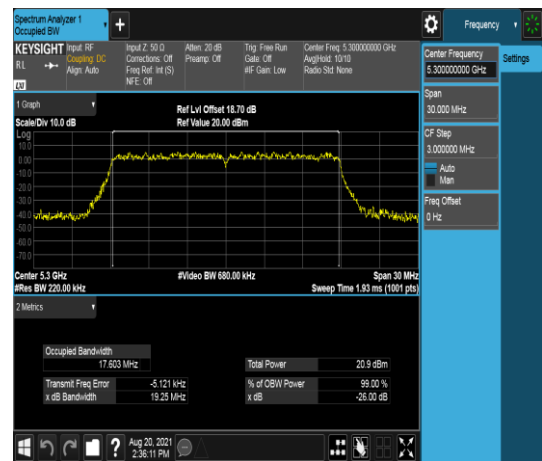
Report No.: TMWK2108000371KR

UNII-2a IEEE 802.11n HT20 mode- Chain 1

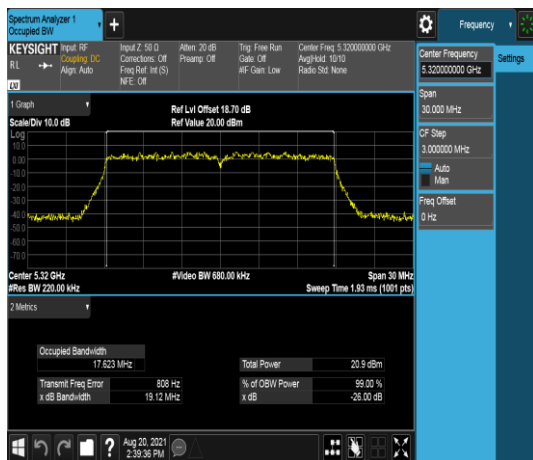
Low CH



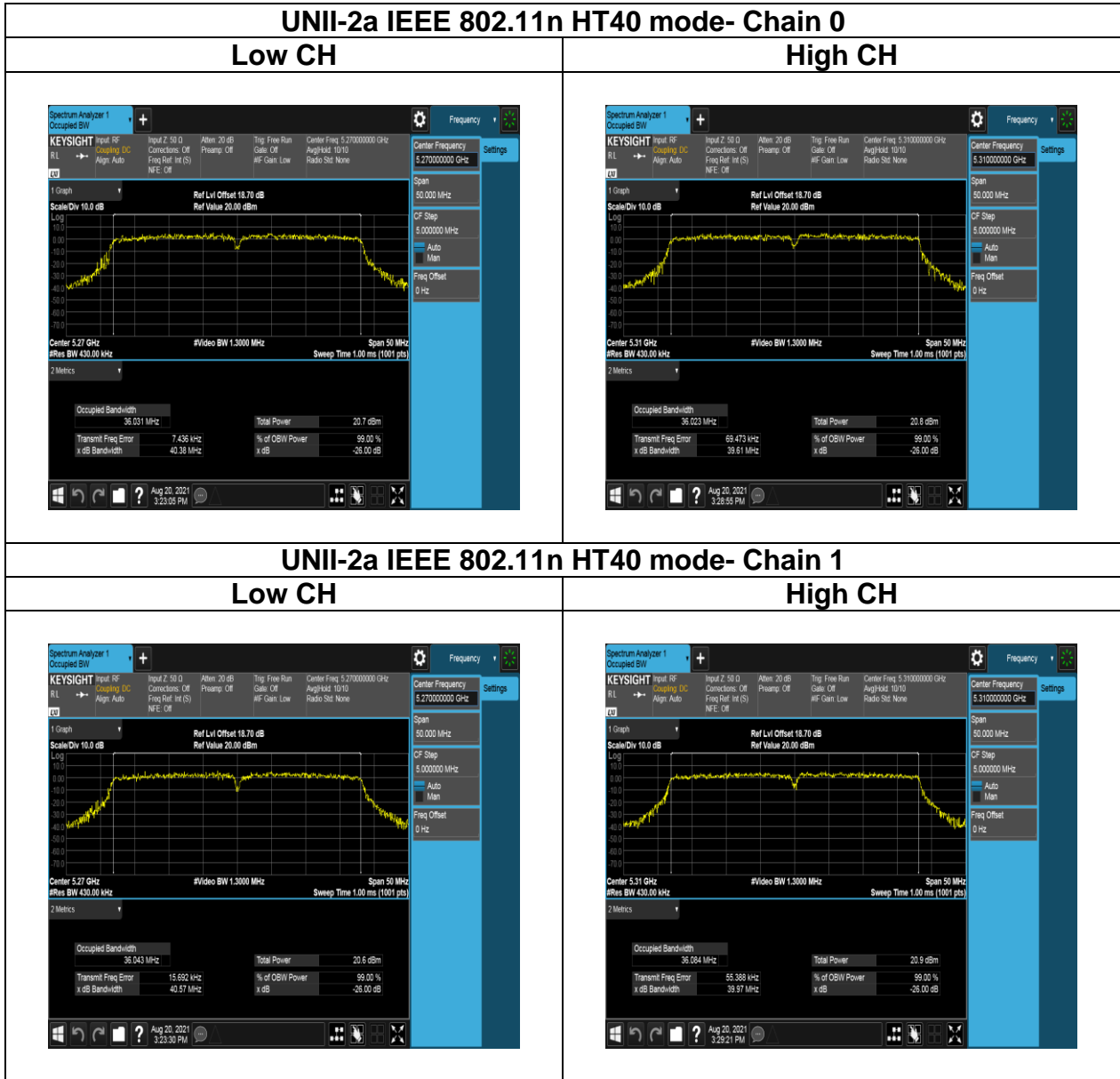
Mid CH



High CH

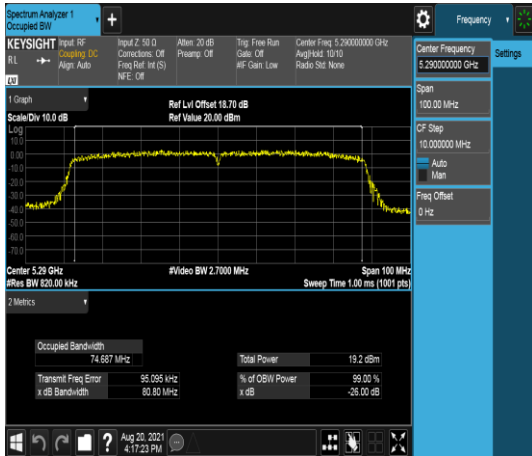


Report No.: TMWK2108000371KR



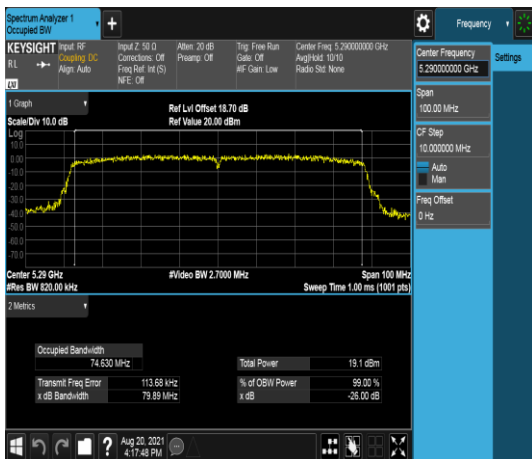
UNII-2a IEEE 802.11ac VHT80 mode- Chain 0

Low CH



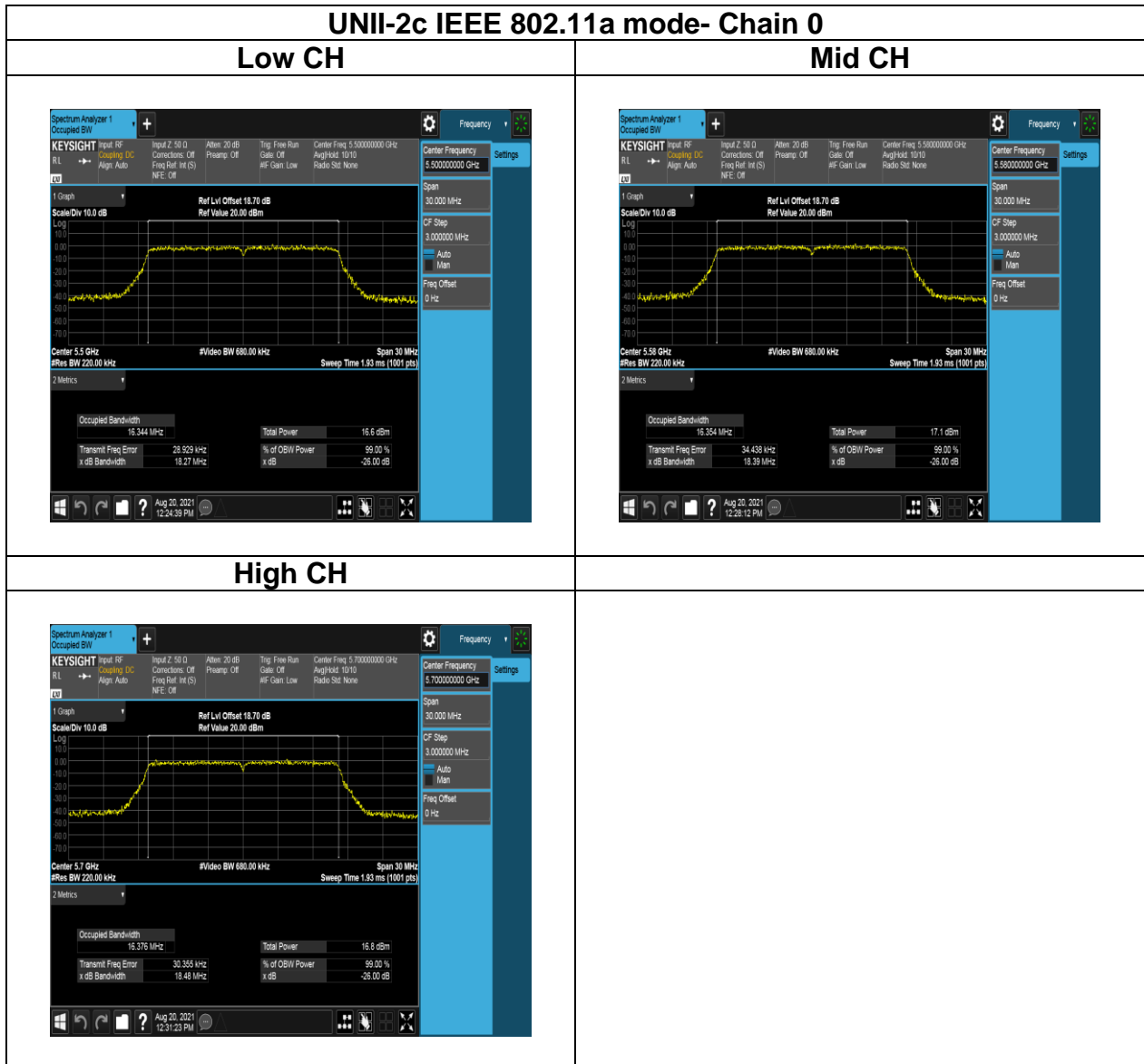
UNII-2a IEEE 802.11ac VHT80 mode- Chain 1

Low CH



Report No.: TMWK2108000371KR

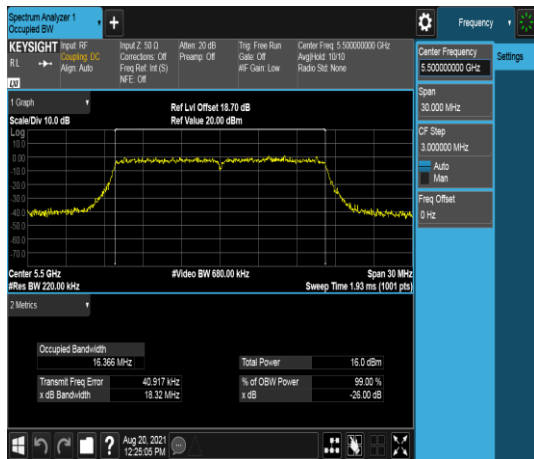
Test Data (99% OBW)



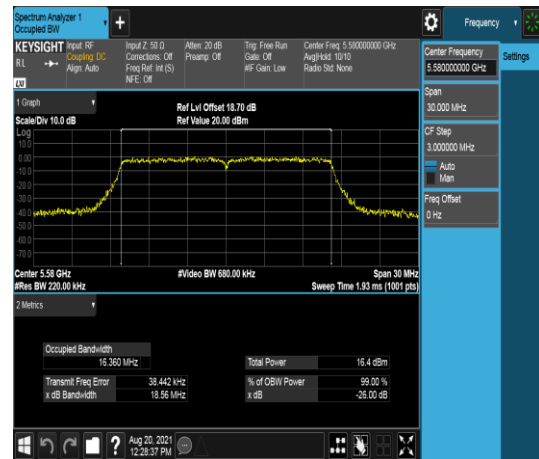
Report No.: TMWK2108000371KR

UNII-2c IEEE 802.11a mode- Chain 1

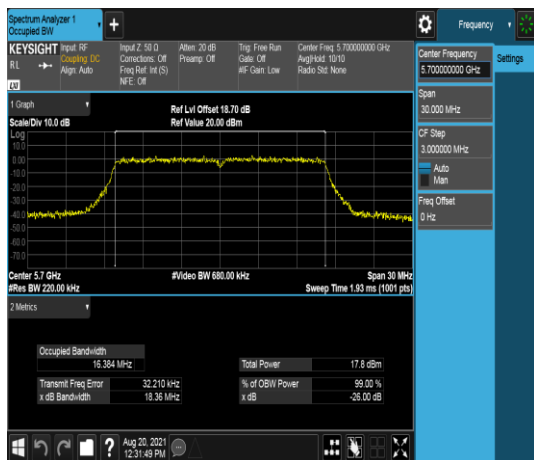
Low CH



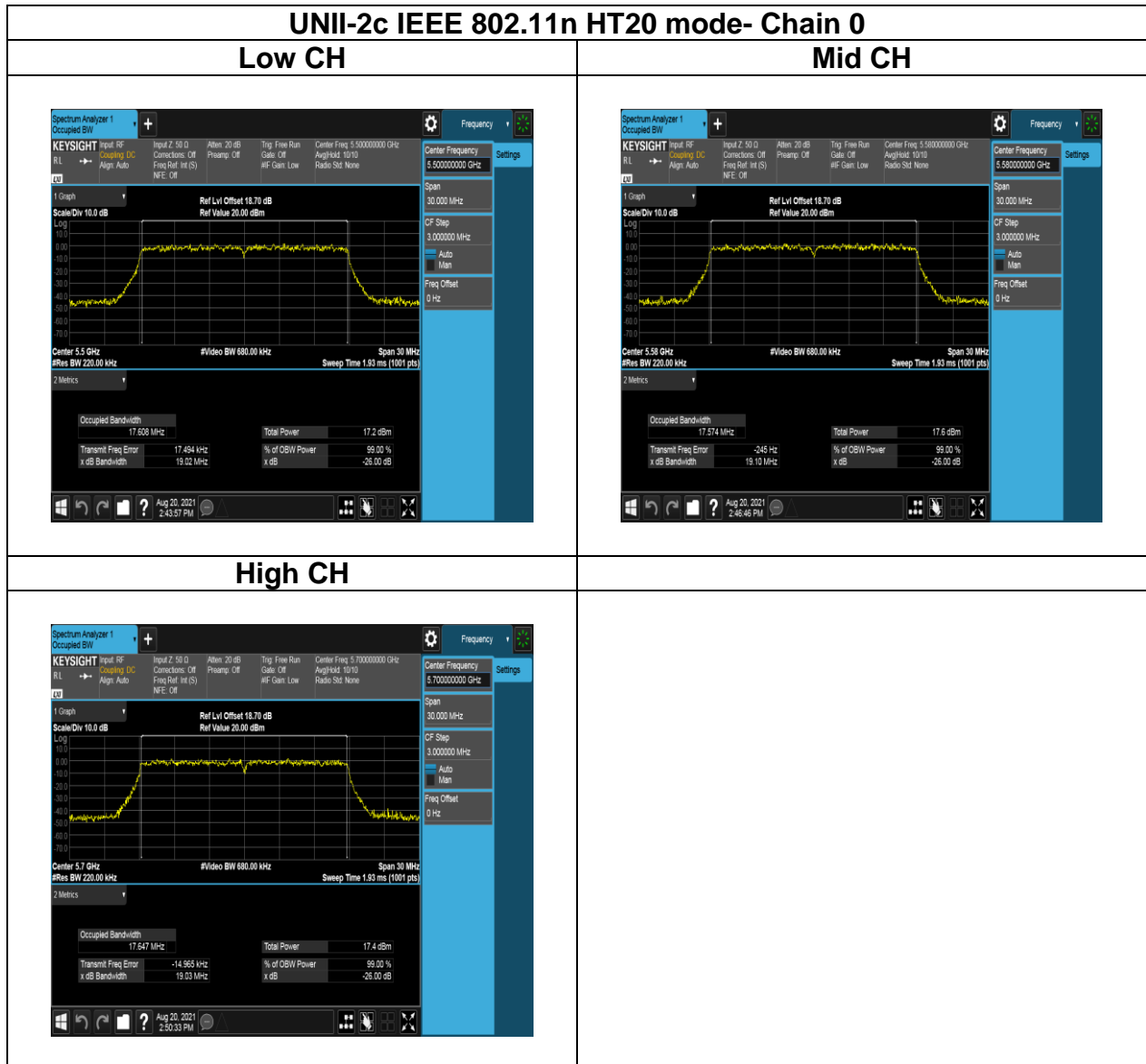
Mid CH



High CH



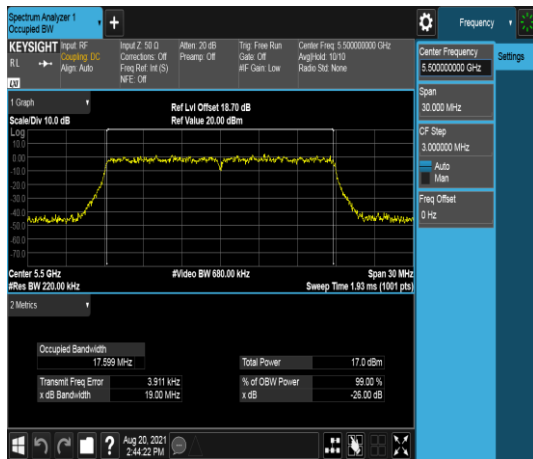
Report No.: TMWK2108000371KR



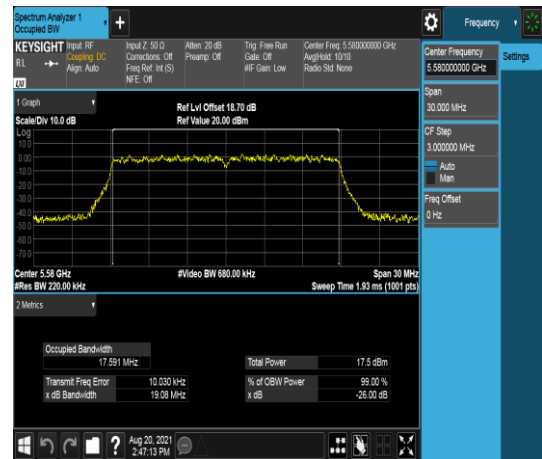
Report No.: TMWK2108000371KR

UNII-2c IEEE 802.11n HT20 mode- Chain 1

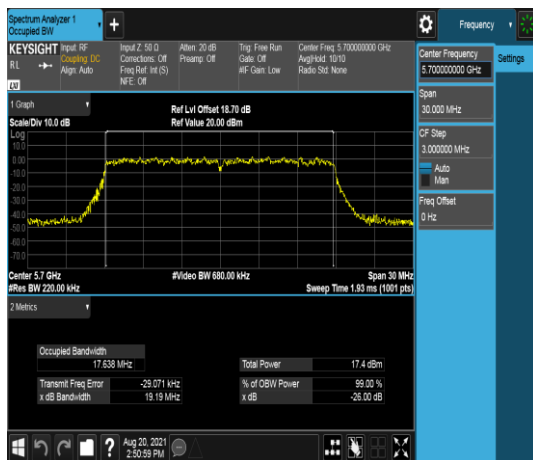
Low CH



Mid CH



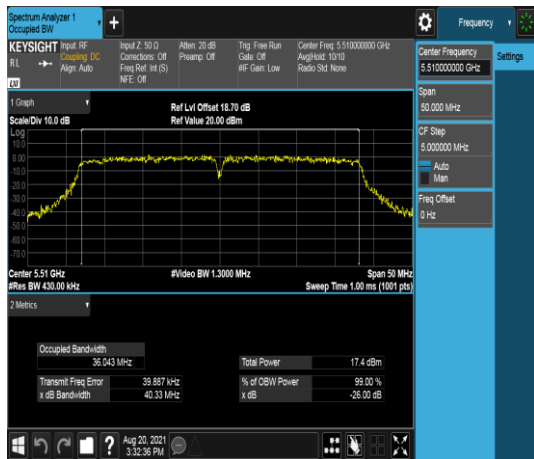
High CH



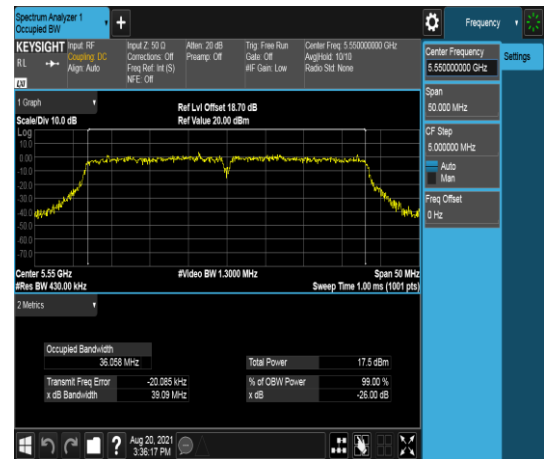
Report No.: TMWK2108000371KR

UNII-2c IEEE 802.11n HT40 mode- Chain 0

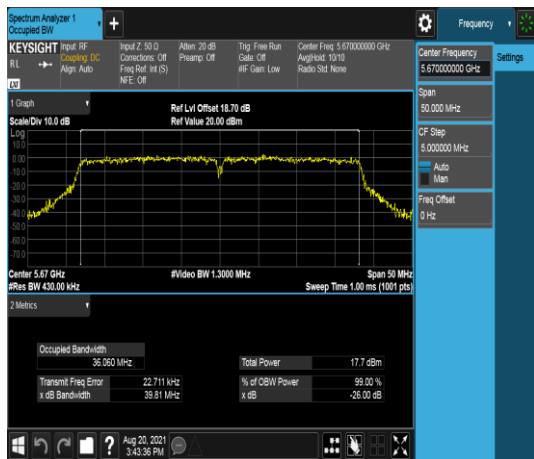
Low CH



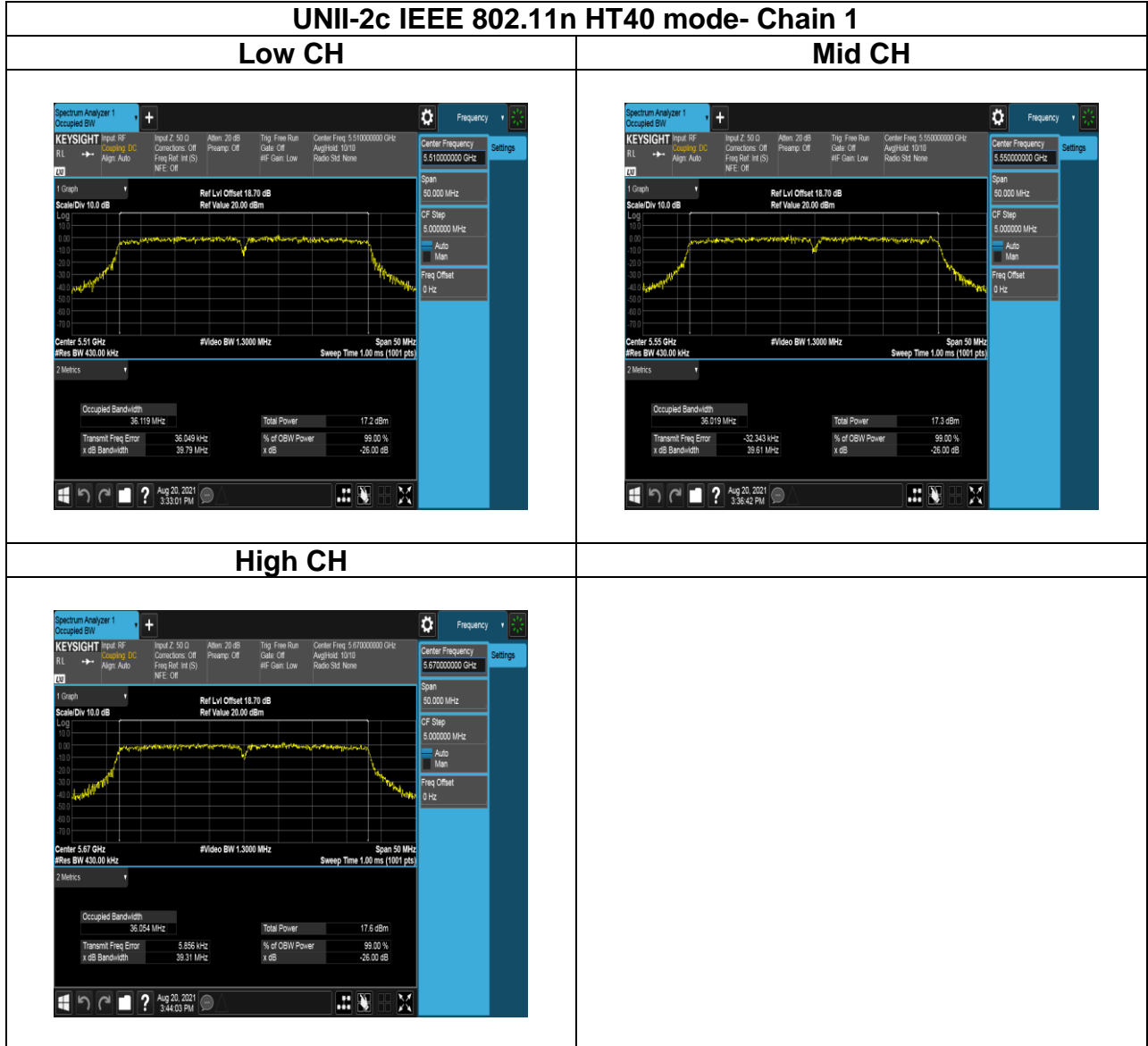
Mid CH



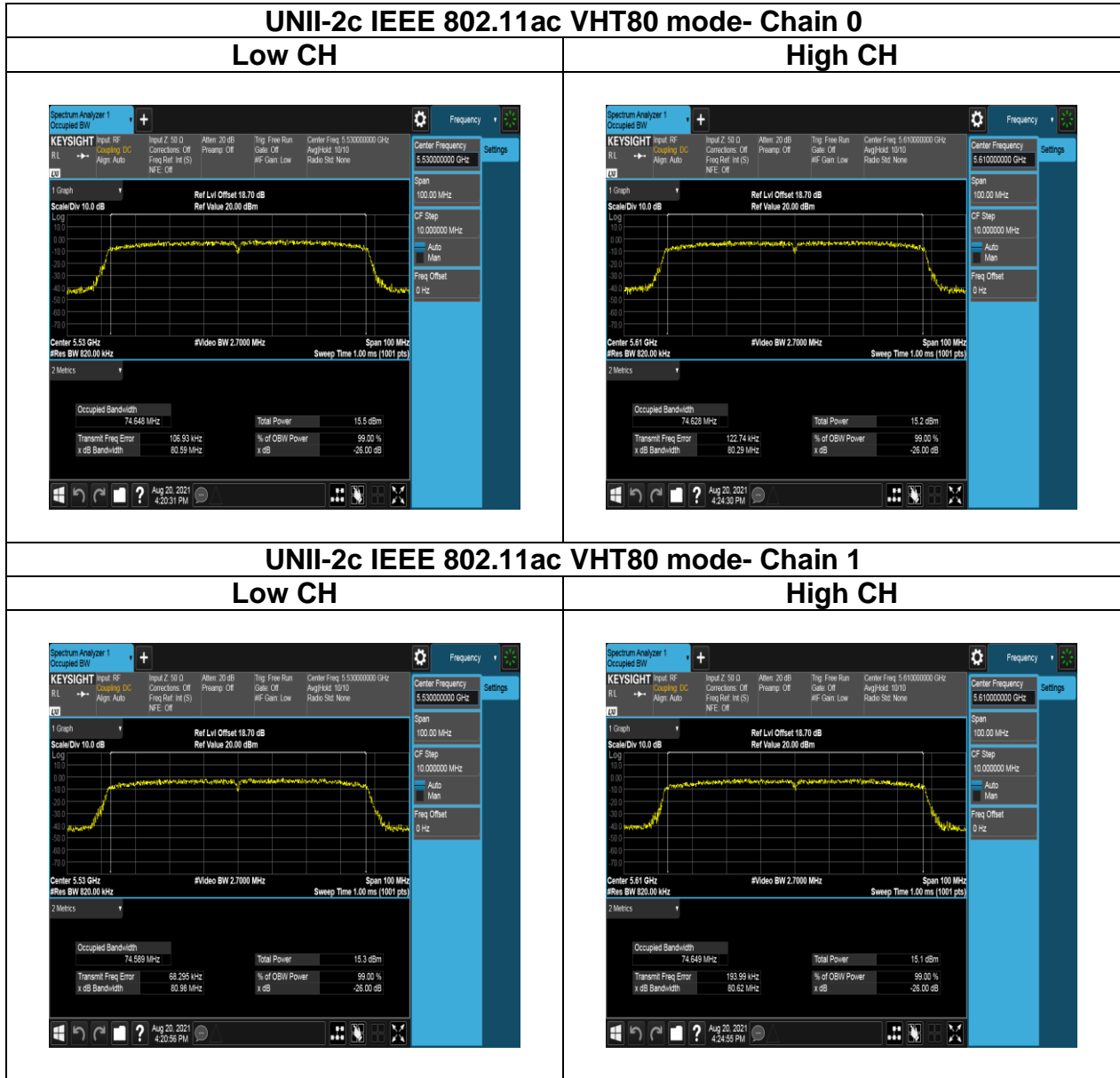
High CH



Report No.: TMWK2108000371KR

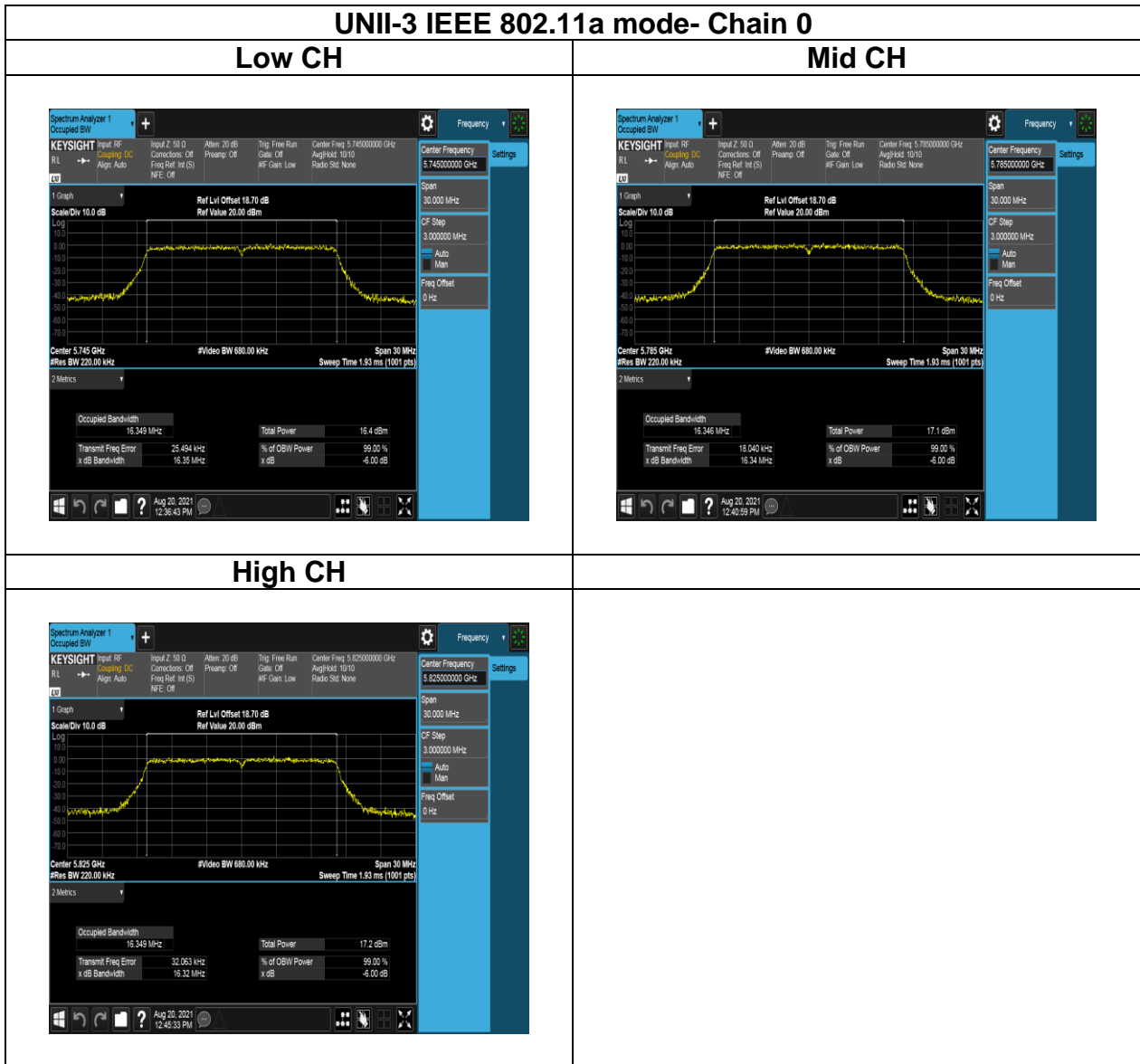


Report No.: TMWK2108000371KR



Report No.: TMWK2108000371KR

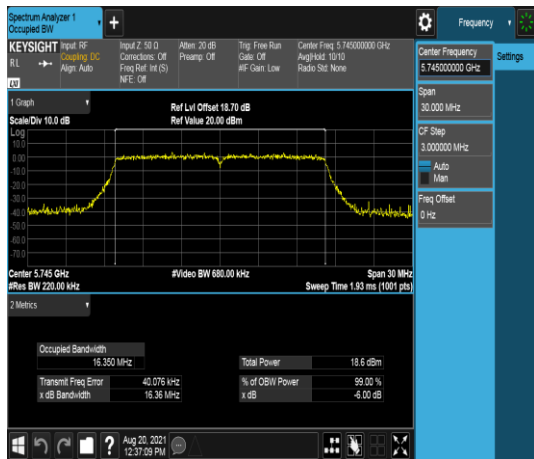
Test Data (99% OBW)



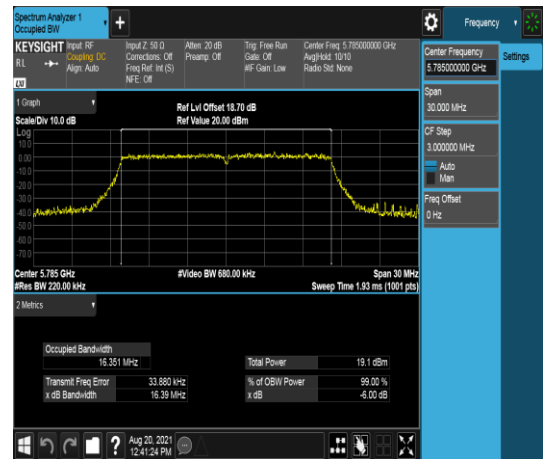
Report No.: TMWK2108000371KR

UNII-3 IEEE 802.11a mode- Chain 1

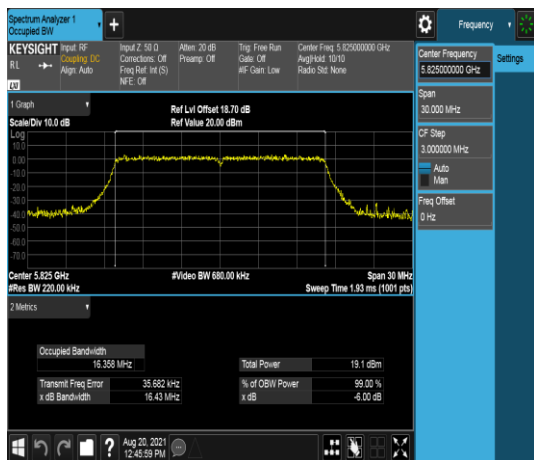
Low CH



Mid CH



High CH



Report No.: TMWK2108000371KR

