

FCC ID: WS2-WG3221B
Report No.: T191111W02-RP4

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RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART E

Test Standard	FCC Part 15.407
Brand name	JORJIN
Product name	WiFi and Bluetooth module
Model No.	WG3221-00
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，不可部分複製。

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	March 9, 2020	Initial Issue	ALL	Doris Chu
01	March 26, 2020	- Added S/N, SW Test Tool and SW Tool version in section 1.1 - Revised Date of Test in section 1.1. - Revised section 1.6. - Added Support Equipment in section 1.7. - Added Remark in section 3.1. - Revised Duty Cycle data in section 3.3. - Revised IEEE 802.11n HT40 Mid Frequency to 5550. - Revised MCS8 to MCS0 in section 4.3.4. - Revised section 4.3.2 Test Procedure and 4.3.3 Test Setup. - Revised IEEE 802.11n HT20 5240 test data. - Revised Band Edge data. - Added Radiation setup photo.	P.4, P.9, P.11, P.13, P.15, P.23, P.61, P.52, P.53-P.56, P.59, P.64, P.88-89, A-1-A-3	Doris Chu
02	April 16, 2020	- Revised section 1.1 and 1.6. - Revised some of test data 26dB Bandwidth and 6dB Bandwidth in section 4.2. - Revised test data: power spectral density in section 4.4. - Revised radiated bandedge test mode title in section 4.5. - Added 5610 MHz data.	P.4, P.10, P.21-26, P.28-29, P.31, P.34-37, P.55, P.59-75, P.131, P.133, P.179, P.181	Doris Chu
03	April 22, 2020	- Revised section 1.6. - Added 5610MHz data for spurious emission in section 4.5.	P.9, P.110-111, P.158-159, P.206-207, P.286-287, P.362-363, P.438-439	Doris Chu



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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	Jorjin Technologies Inc. 17F.-1, NO.239, SEC. 1, DATONG RD., XIZHI DIST. New Taipei City, 22161 Taiwan
Manufacturer	Jorjin Technologies Inc. 17F.-1, NO.239, SEC. 1, DATONG RD., XIZHI DIST. New Taipei City, 22161 Taiwan
Equipment	WiFi and Bluetooth module
Model No.	WG3221-00
Model Discrepancy	N/A
Trade Name	JORJIN
Received Date	November 11, 2019
Date of Test	November 26, 2019 ~ April 15, 2020
Power Operation	Power from host device.
HW Version	WG3221-00B-R01
SW Version	goldenBoardData_HW_191005
S/N	00199438FD7E
SW Test Tool	Qualcomm QRCT
SW Tool version	3.0.298.0



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Output Power(W)		Band	Mode	Frequency Range (MHz)	Output Power (W)
		U-NII-1	IEEE 802.11a	5180 ~ 5240	0.0418
			IEEE 802.11n HT 20 MHz	5180 ~ 5240	0.0292
			IEEE 802.11n HT 40 MHz	5190 ~ 5230	0.0274
			IEEE 802.11ac VHT 80 MHz	5210	0.0183
		U-NII-2a	IEEE 802.11a	5260 ~ 5320	0.0466
			IEEE 802.11n HT 20 MHz	5260 ~ 5320	0.0357
			IEEE 802.11n HT 40 MHz	5270 ~ 5310	0.0270
			IEEE 802.11ac VHT 80 MHz	5290	0.0197
		U-NII-2c	IEEE 802.11a	5500 ~ 5700	0.0371
			IEEE 802.11n HT 20 MHz	5500 ~ 5700	0.0361
			IEEE 802.11n HT 40 MHz	5510 ~ 5670	0.0340
			IEEE 802.11ac VHT 80 MHz	5530 ~ 5610	0.0191
		U-NII-3	IEEE 802.11a	5745 ~ 5825	0.0377
			IEEE 802.11n HT 20 MHz	5745 ~ 5825	0.0317
			IEEE 802.11n HT 40 MHz	5755 ~ 5795	0.0301
			IEEE 802.11ac VHT 80 MHz	5775	0.0249

1.2 EUT CHANNEL INFORMATION

Frequency Range	<table border="1"> <tr><td colspan="2">UNII-1</td></tr> <tr><td>IEEE 802.11a</td><td>5180 ~ 5240 MHz</td></tr> <tr><td>IEEE 802.11n HT 20 MHz</td><td>5180 ~ 5240 MHz</td></tr> <tr><td>IEEE 802.11n HT 40 MHz</td><td>5190 ~ 5230 MHz</td></tr> <tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5210 MHz</td></tr> <tr><td colspan="2">UNII-2a</td></tr> <tr><td>IEEE 802.11a</td><td>5260 ~ 5320 MHz</td></tr> <tr><td>IEEE 802.11n HT 20 MHz</td><td>5260 ~ 5320 MHz</td></tr> <tr><td>IEEE 802.11n HT 40 MHz</td><td>5270 ~ 5310 MHz</td></tr> <tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5290 MHz</td></tr> <tr><td colspan="2">UNII-2c</td></tr> <tr><td>IEEE 802.11a</td><td>5500 ~ 5700 MHz</td></tr> <tr><td>IEEE 802.11n HT 20 MHz</td><td>5500 ~ 5700 MHz</td></tr> <tr><td>IEEE 802.11n HT 40 MHz</td><td>5510 ~ 5670 MHz</td></tr> <tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5530 ~ 5610 MHz</td></tr> <tr><td colspan="2">UNII-3</td></tr> <tr><td>IEEE 802.11a</td><td>5745 ~ 5825 MHz</td></tr> <tr><td>IEEE 802.11n HT 20 MHz</td><td>5745 ~ 5825 MHz</td></tr> <tr><td>IEEE 802.11n HT 40 MHz</td><td>5755 ~ 5795 MHz</td></tr> <tr><td>IEEE 802.11ac VHT 80 MHz</td><td>5775 MHz</td></tr> </table>	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
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Modulation Type	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:

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	Trade Name	Model Number	Antenna	Band	Wi-Fi 5G Peak Gain
	Unictron	AA222	PCB	UNII-1	3.46
				UNII-2a	3.3
				UNII-2c	3.79
				UNII-3	3.91
	JOINSOON ELECTRONICS MFG .CO,LTO	WiFi3dB Antenna	Dipole	UNII-1	2.71
				UNII-2a	2.57
				UNII-2c	2.02
				UNII-3	2.3
	Unictron	AA077	Chip	UNII-1	2.3
				UNII-2a	
				UNII-2c	
				UNII-3	

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 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Dally Hong	-
Radiation	Jerry Chang	-
RF Conducted	Dally Hong	-

Remark: The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.



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1.6 INSTRUMENT CALIBRATION

3M 966 Chamber Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Sunol Sciences	JB3	A030105	07/26/2019	07/25/2020
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/25/2020	02/24/2021
Coaxial Cable	EMCI	EMC105	190914+25111	09/20/2019	09/19/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/15/2020	01/14/2021
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	10/04/2019	10/03/2020
High Pass Filters	MICRO TRONICS	HPM13195	003	02/26/2019	02/25/2020
High Pass Filters	MICRO TRONICS	HPM13195	003	02/25/2020	02/24/2021
Horn Antenna	ETS LINDGREN	3116	26370	12/18/2019	12/17/2020
Horn Antenna	ETS LINDGREN	3116	00026370	12/26/2018	12/25/2019
Loop Ant	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Loop Ant	COM-POWER	AL-130	121051	03/27/2020	03/26/2021
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	EMEC	EM330	060609	02/25/2020	02/24/2021
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/25/2020	02/24/2021
Pre-Amplifier	MITEQ	AMF-6F-2604 00-40-8P	985646	02/26/2019	02/25/2020
Pre-Amplifier	MITEQ	AMF-6F-1800 4000-37-8P	985646	06/18/2019	06/17/2020
Pre-Amplifier	EMEC	EM01G26G	060570	06/27/2019	06/26/2020
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/18/2018	12/17/2019
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	12/18/2018	12/17/2019
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/17/2019	12/16/2020
K Type Cable	Huber+Suhner	SUCOFLEX 102	22470/2	12/17/2019	12/16/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/29/2019	05/28/2020
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				



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RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Coaxial Cable	Woken	WC12	CC003	06/28/2019	06/27/2020
Signal Analyzer	R&S	FSV 40	101073	09/25/2019	09/24/2020
Power Meter	Anritsu	ML2487A	6K00003260	05/22/2019	05/21/2020
Power Seneor	Anritsu	MA2490A	032910	05/22/2019	05/21/2020
Thermostatic/Humidit y Chamber	TAICHY	MHG-150LF	930619	10/04/2019	10/03/2020
Software	N/A				

AC line Conduction Test Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
CABLE	EMCI	CFD300-NL	CERF	06/27/2019	06/26/2020
EMI Test Receiver	R&S	ESCI	100064	07/26/2019	07/25/2020
LISN	SCHWARZBECK	NSLK 8127	8127-541	01/31/2019	01/30/2020
LISN	SCHAFFNER	NNB 41	03/10013	02/13/2019	02/12/2020
Software	EZ-EMC(CCS-3A1-CE)				

Remark:

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



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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
1	NB(J)	acer	MS2392	N/A	PPD-QCNFA34AC
2	NB(J)	Lenovo	T420	N/A	PD97260H

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.



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2. TEST SUMMERY

FCC Standard Sec.	Chapter	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207	4.1	AC Conducted Emission	Pass
15.403(i)	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(g)	4.6	Frequency Stability	Pass
15.407(h)	4.7	Dynamic Frequency Selection	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 802.11n HT 40 MHz mode: MCS0 4. IEEE 802.11ac VHT 80 MHz mode: MCS0		
Operating Frequency		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, 5280, 5320
		IEEE 802.11n HT 20 MHz	5260, 5280, 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

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. The mode IEEE 802.11ac VHT20 and VHT40 are only different in control messages with IEEE 802.11n 20 MHz and HT40, and have same power setting. Therefore, the highest power(IEEE 802.11n 20 MHz and HT40) were test conducted and radiated measurement and recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

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

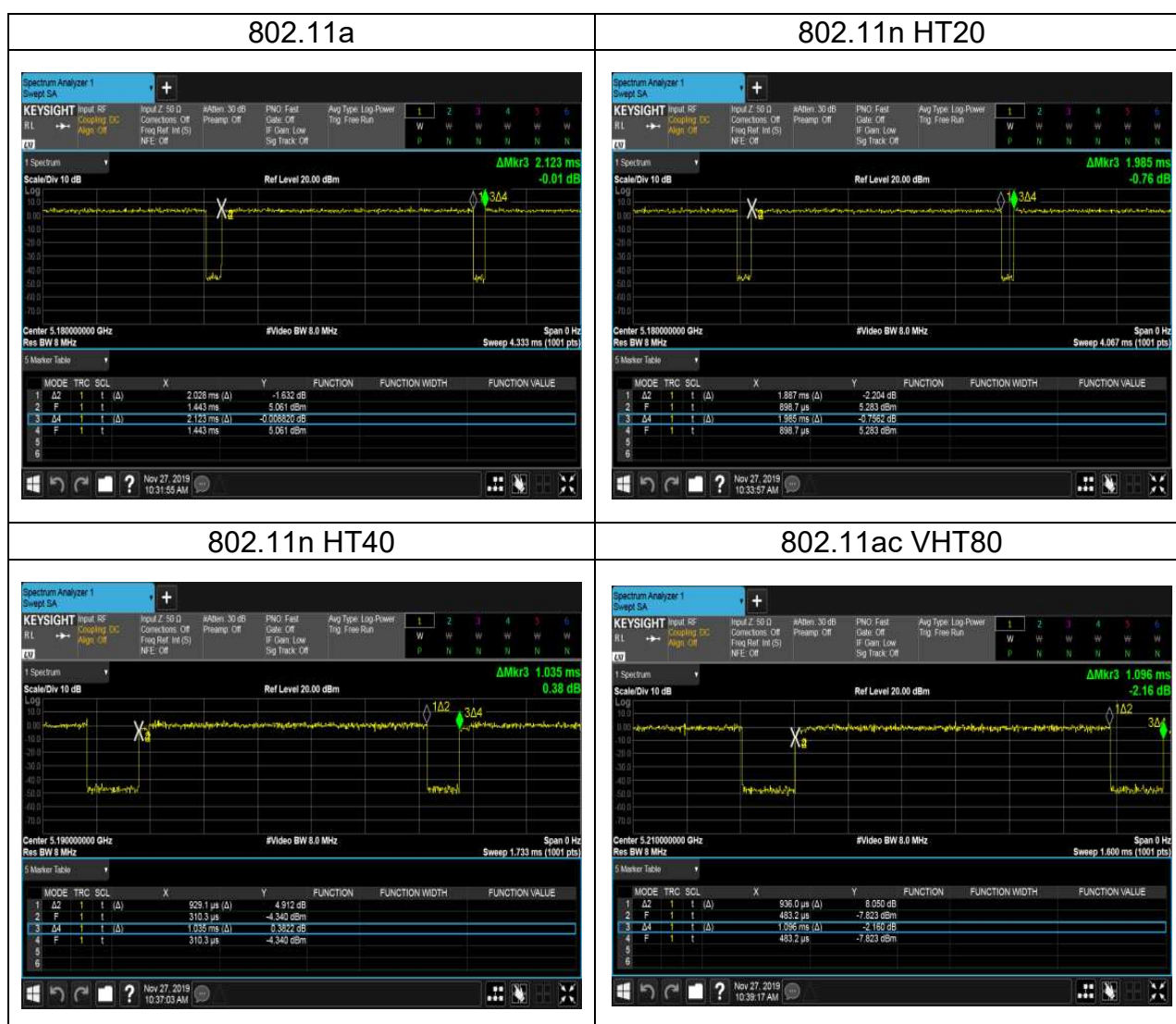
Remark:

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

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3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	95.53	0.20	0.49	1.00
802.11n HT20	95.06	0.22	0.53	1.00
802.11n HT40	89.77	0.47	1.08	2.00
802.11ac VHT80	85.40	0.69	1.07	2.00



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

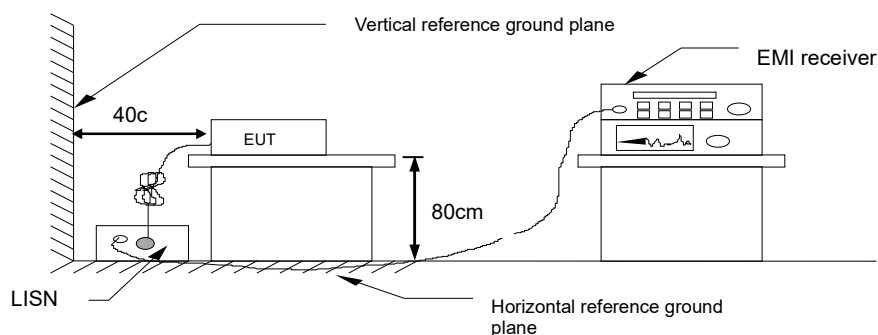
* Decreases with the logarithm of the frequency.

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

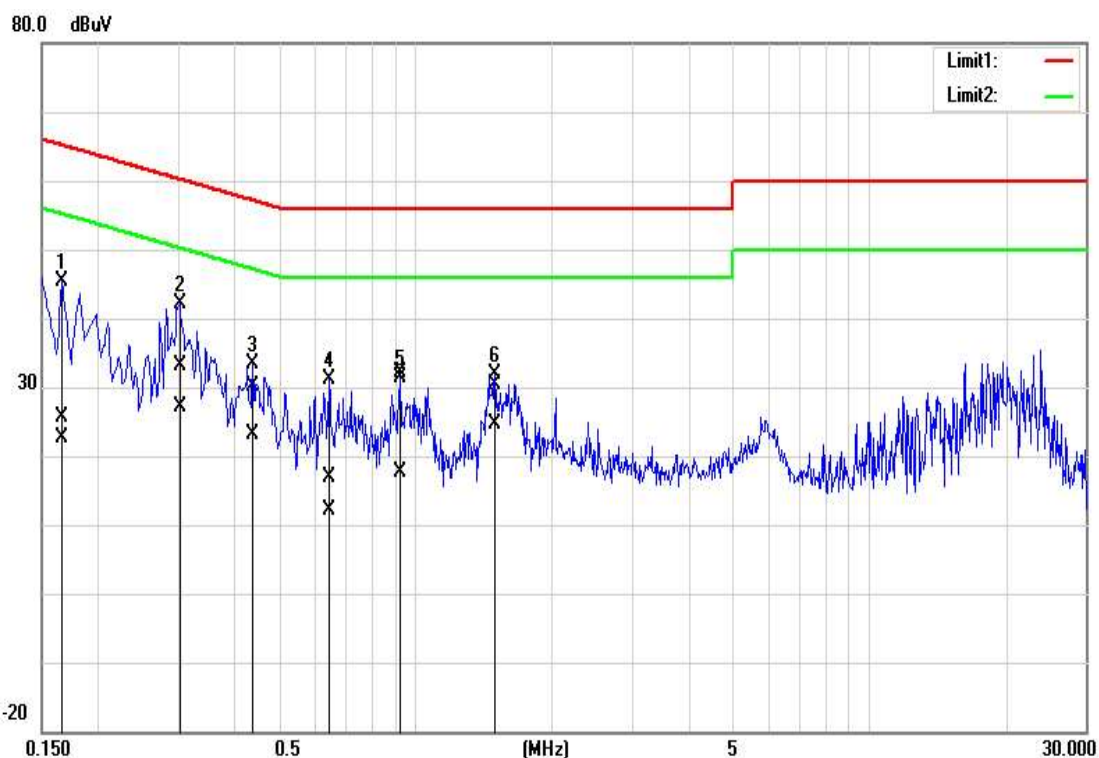


4.1.4 Test Result

Pass.

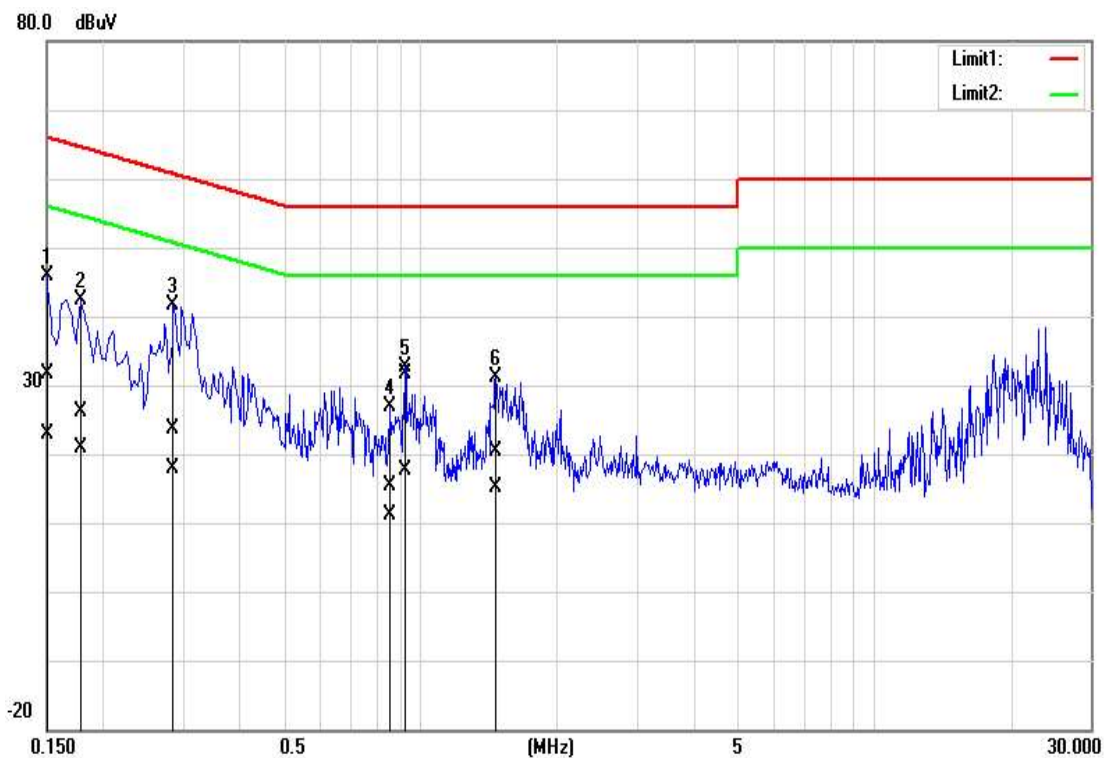
Test Data

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Phase:	Line	Test Date	November 26, 2019
		Test Engineer	Dally Hong



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
0.1660	15.52	12.61	10.14	25.66	22.75	65.16	55.16	-39.50	-32.41	Pass
0.3020	23.08	16.87	10.14	33.22	27.01	60.19	50.19	-26.97	-23.18	Pass
0.4380	19.91	12.92	10.14	30.05	23.06	57.10	47.10	-27.05	-24.04	Pass
0.6460	6.63	1.96	10.15	16.78	12.11	56.00	46.00	-39.22	-33.89	Pass
0.9260	21.85	7.47	10.17	32.02	17.64	56.00	46.00	-23.98	-28.36	Pass
1.5020	20.10	14.54	10.19	30.29	24.73	56.00	46.00	-25.71	-21.27	Pass

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Phase:	Line	Test Date	November 26, 2019
		Test Engineer	Dally Hong



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	21.59	12.98	10.02	31.61	23.00	66.00	56.00	-34.39	-33.00	Pass
0.1780	16.04	10.78	10.02	26.06	20.80	64.58	54.58	-38.52	-33.78	Pass
0.2860	13.54	7.75	10.02	23.56	17.77	60.64	50.64	-37.08	-32.87	Pass
0.8580	5.33	1.11	10.04	15.37	11.15	56.00	46.00	-40.63	-34.85	Pass
0.9260	21.48	7.60	10.04	31.52	17.64	56.00	46.00	-24.48	-28.36	Pass
1.4700	10.34	5.19	10.04	20.38	15.23	56.00	46.00	-35.62	-30.77	Pass



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

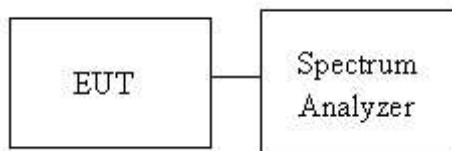
1. This measurement setting are specified in section D of KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW: approximately 1% of the emission bandwidth.
3. Set the VBW>RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26dB down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

4.2.3 Test Setup

4.2.4 Test Result

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	16.3531	-	20.942	-
Mid	5220	16.3531	-	21.3768	-
High	5240	16.3531	-	21.3043	-
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	17.4385	-	21.4493	-
Mid	5220	17.4385	-	21.0145	-
High	5240	17.4385	-	21.4493	-
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	35.8900	-	46.2610	-
High	5230	36.0058	-	47.0720	-
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	75.0217	-	83.2460	-

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	16.3531	-	25.8696	-
Mid	5280	16.2808	-	25.5797	-
High	5320	16.3531	-	22.6812	-
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	17.3661	-	22.1014	-
Mid	5280	17.4385	-	25.2174	-
High	5320	17.4385	-	21.8841	-
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	36.0058	-	45.9130	-
High	5310	36.0058	-	49.1590	-
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	75.0217	-	82.5510	-

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	16.3531	-	21.1594	-
Mid	5580	16.3531	-	25.2174	-
High	5700	16.7149	-	31.3768	-
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	17.3661	-	20.6522	-
Mid	5580	17.5109	-	21.1594	-
High	5700	17.5832	-	25.2174	-
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	36.0058	-	50.0870	-
Mid	5550	36.1216	-	56.8120	-
High	5670	36.3531	-	64.9280	-
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	75.2533	-	83.7100	-
High	5610	75.2533	-	82.4300	-

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)
Low	5745	17.2938	-	15.1304	-
Mid	5785	16.4978	-	15.1304	-
High	5825	16.4978	-	15.1304	-
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)
Low	5745	17.7279	-	15.4783	-
Mid	5785	17.5832	-	15.1304	-
High	5825	17.5832	-	15.1304	-
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)
Low	5755	36.3531	-	33.855	-
High	5795	36.1216	-	35.014	-
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)
Mid	5775	75.4848	-	72.58	-

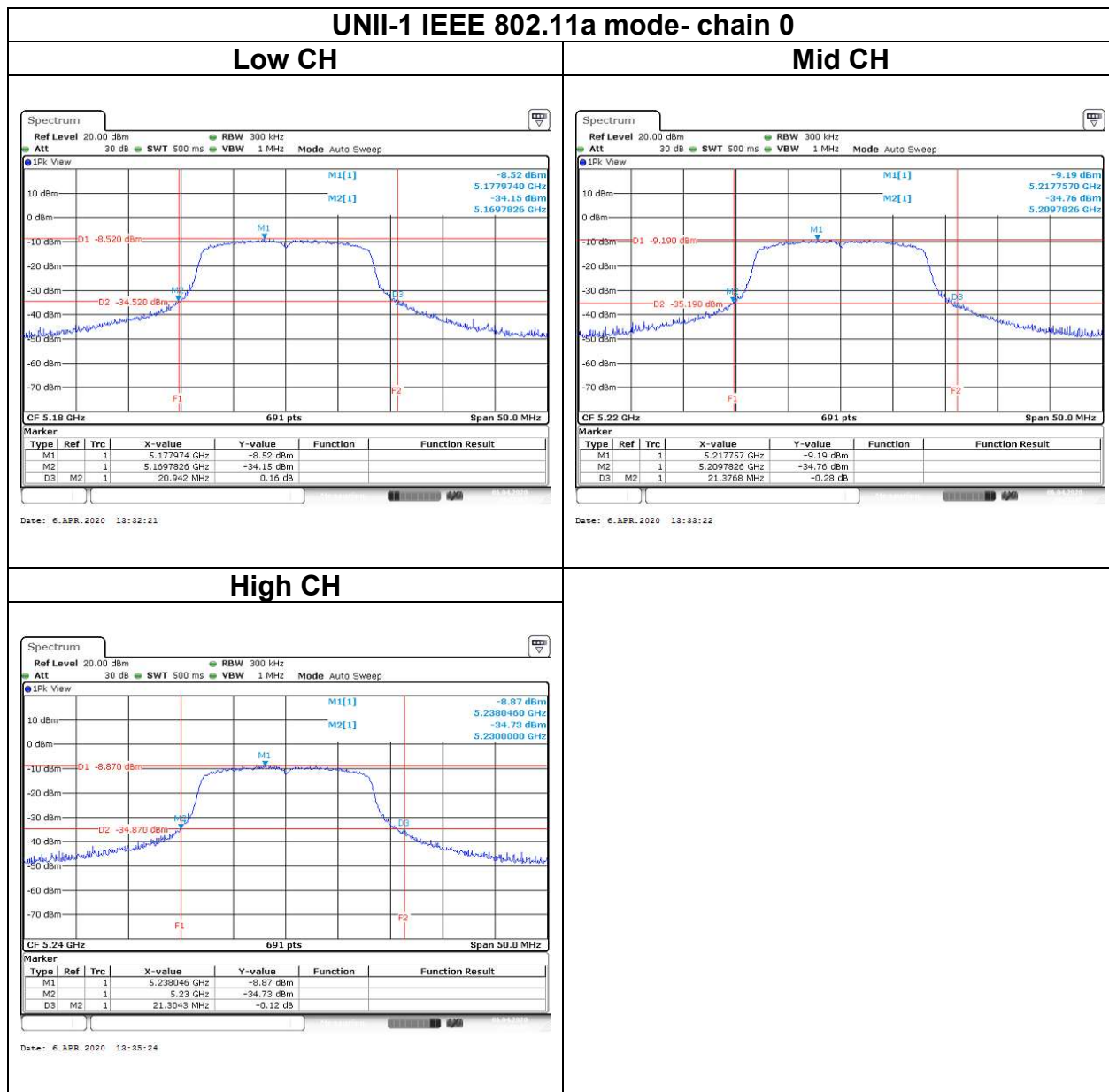


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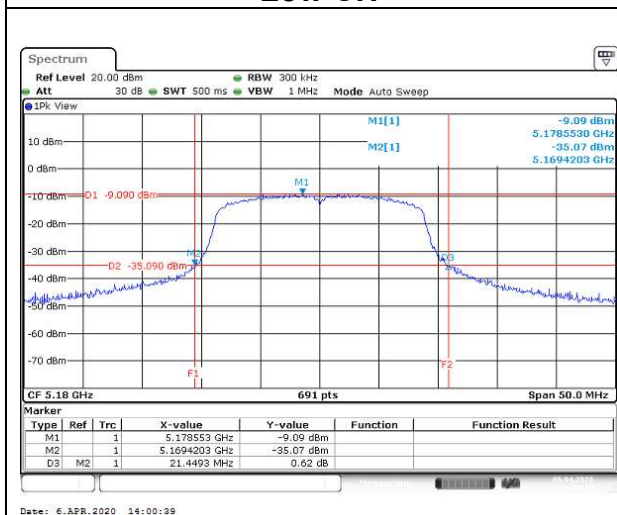
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Test Data (26dB BANDWIDTH)

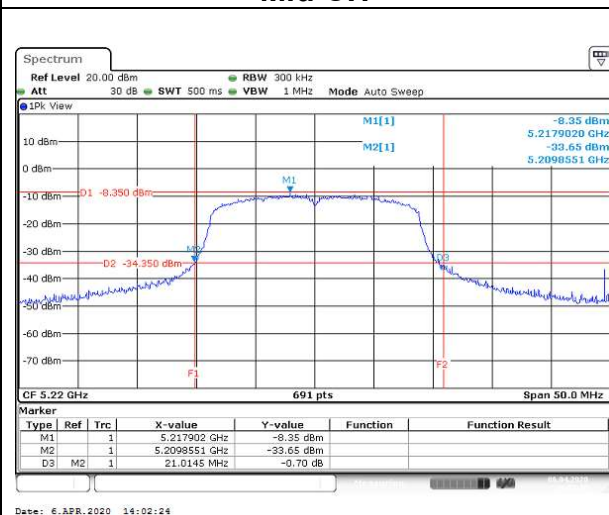


UNII-1 IEEE 802.11n HT20 mode- chain 0

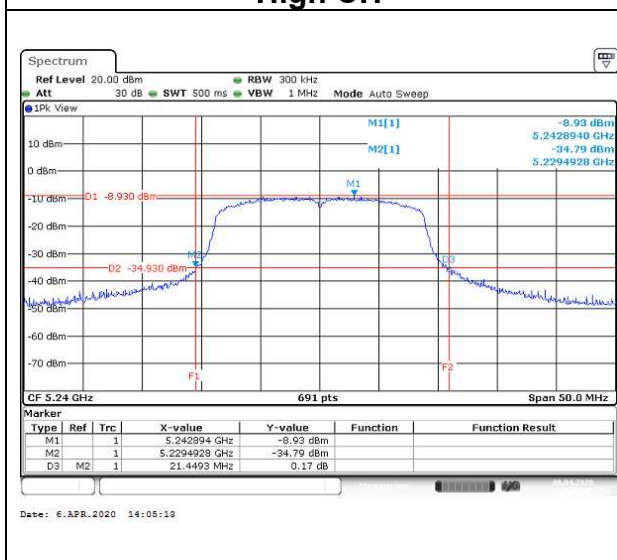
Low CH



Mid CH



High CH

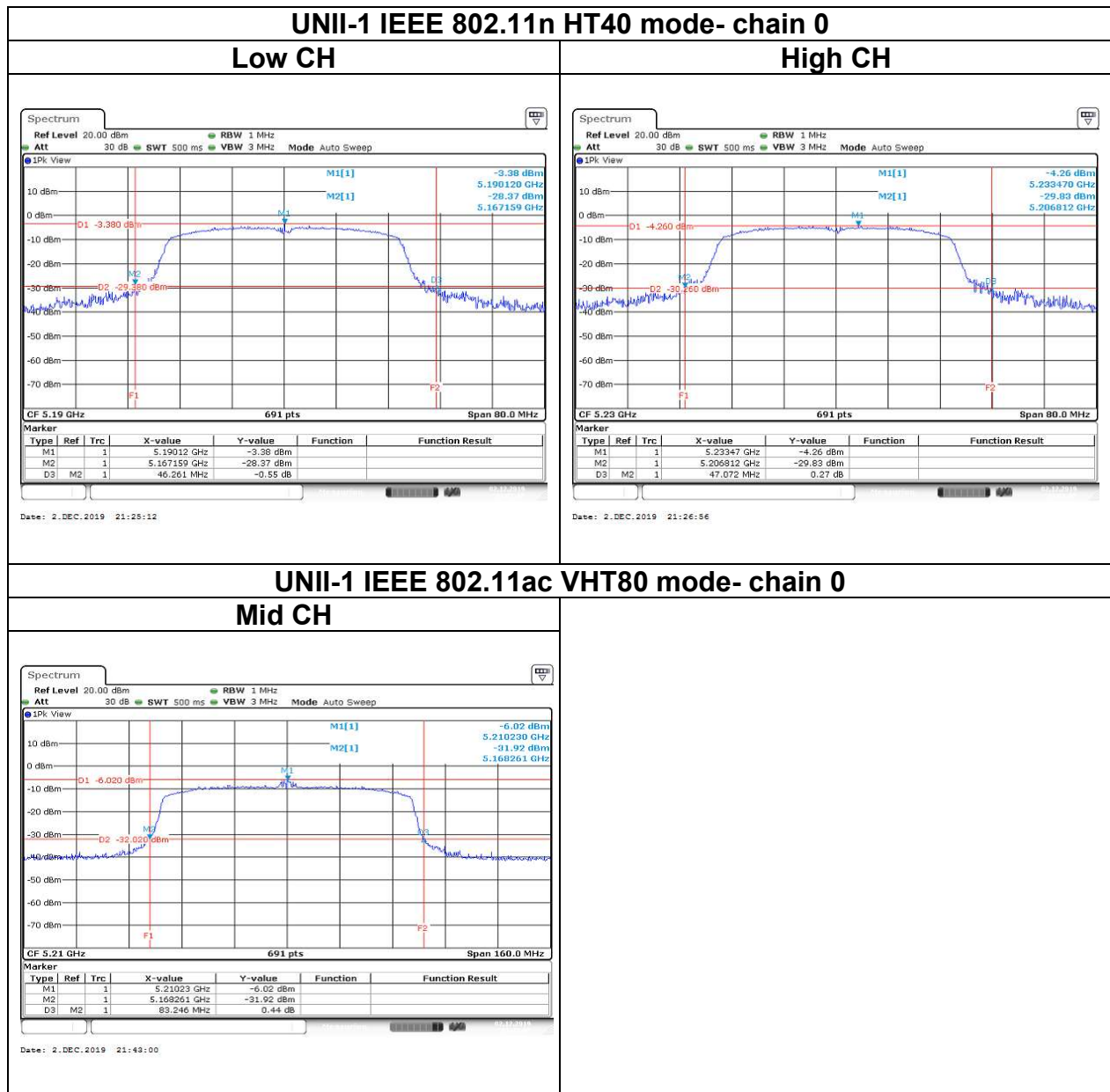




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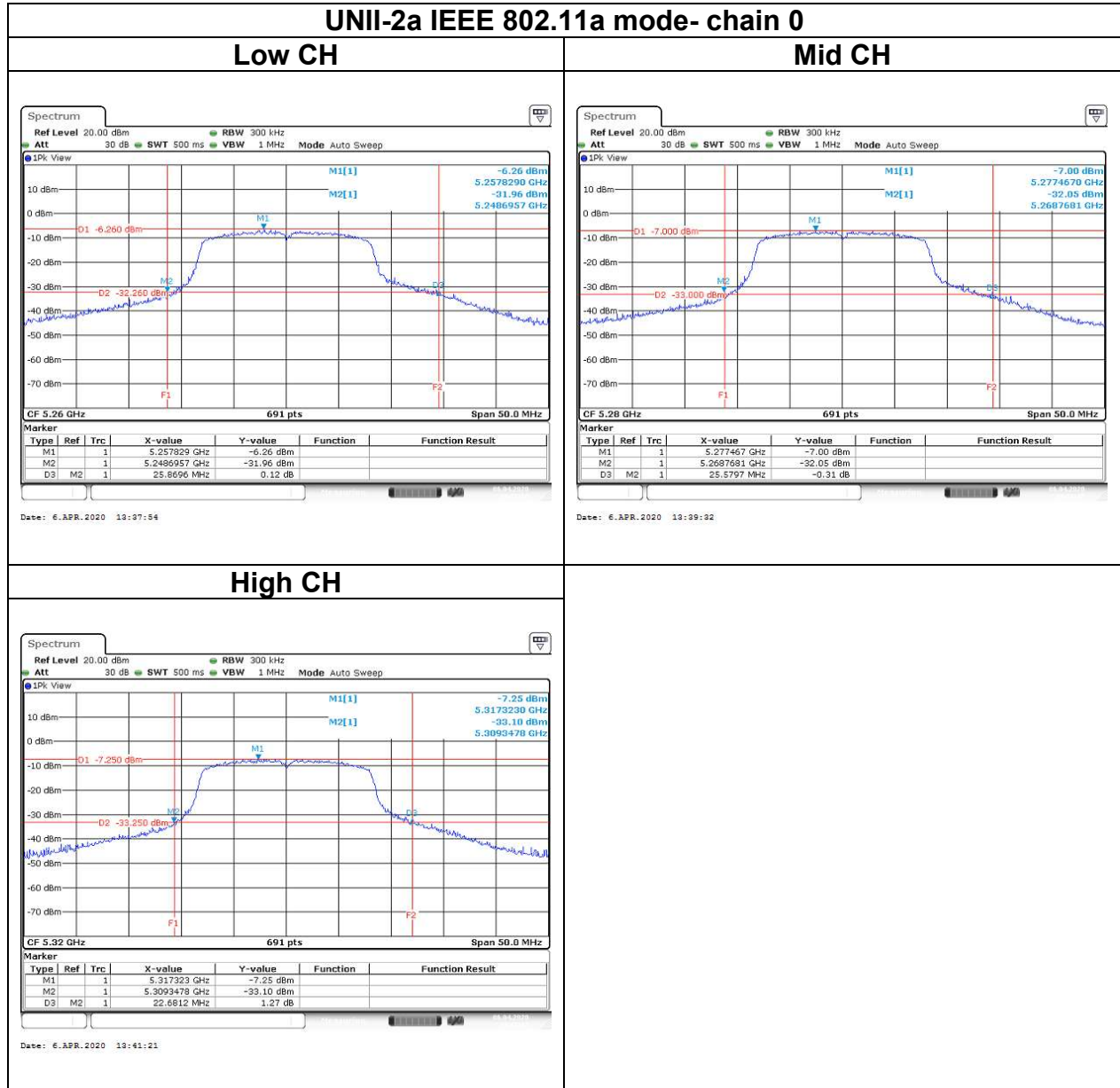


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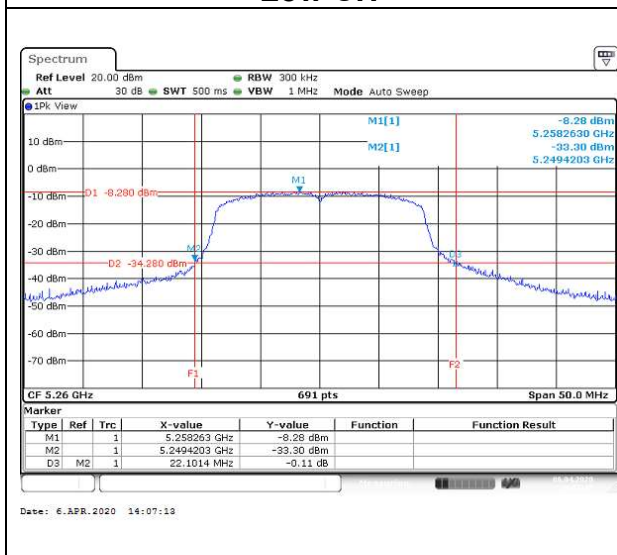
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Test Data (26dB BANDWIDTH)

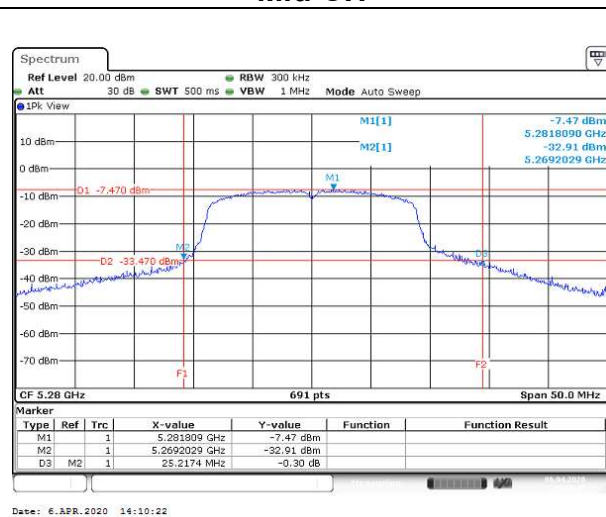


UNII-2a IEEE 802.11n HT20 mode- chain 0

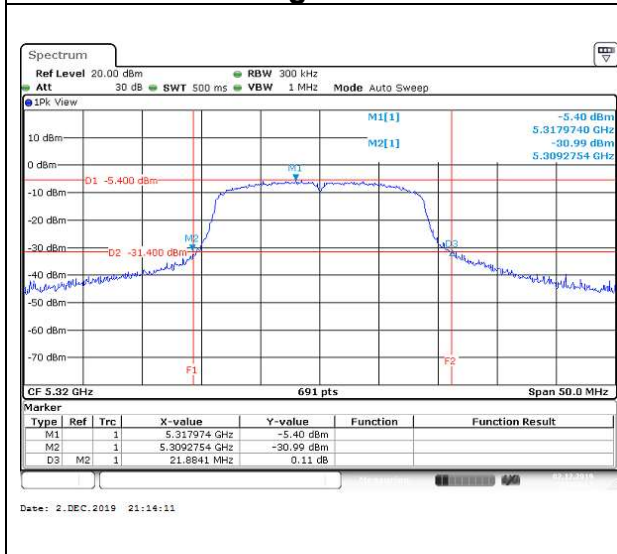
Low CH

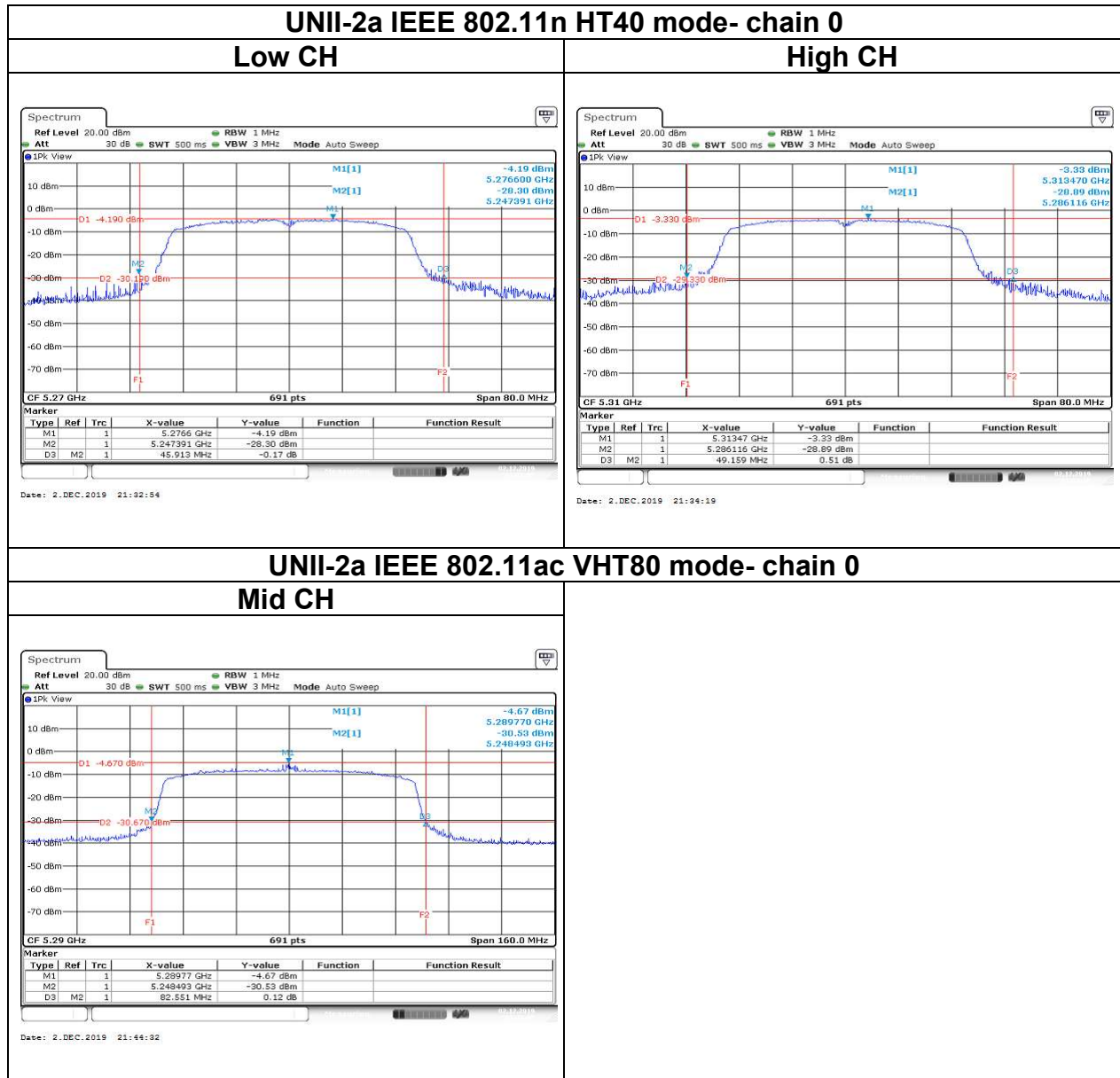


Mid CH

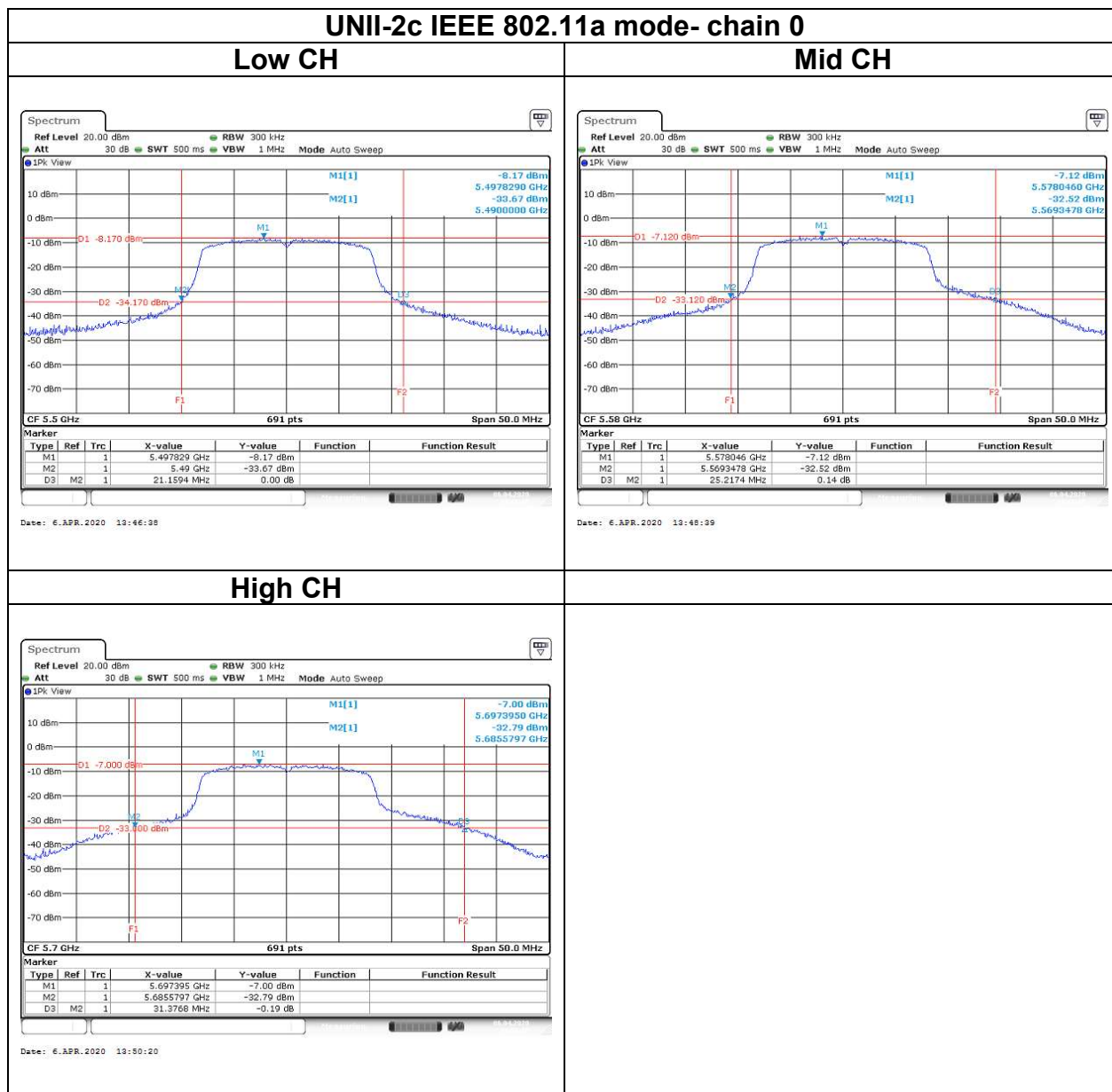


High CH



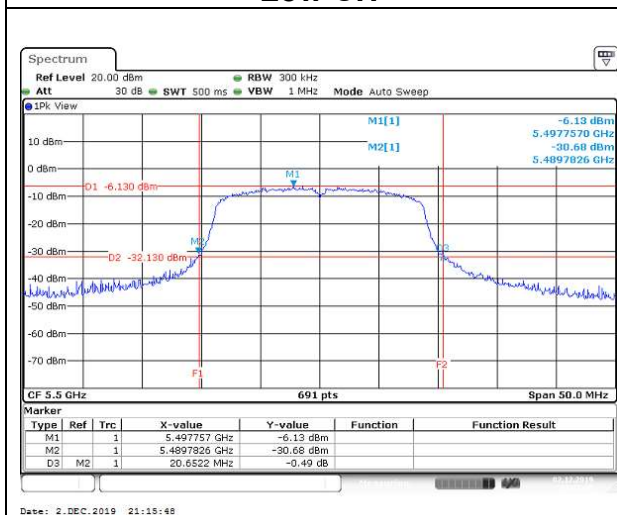


Test Data (26dB BANDWIDTH)

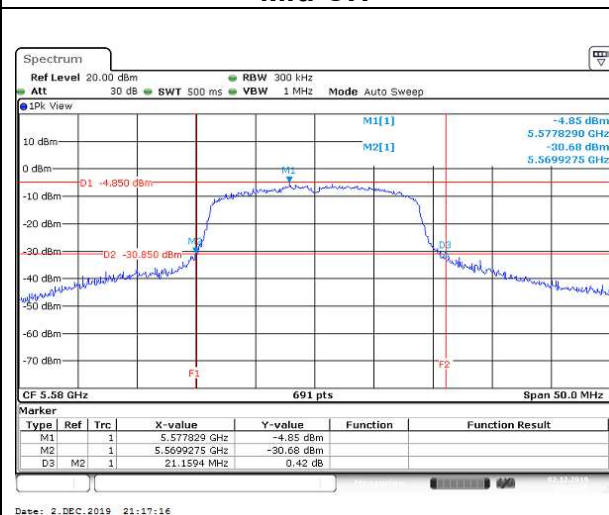


UNII-2c IEEE 802.11n HT20 mode- chain 0

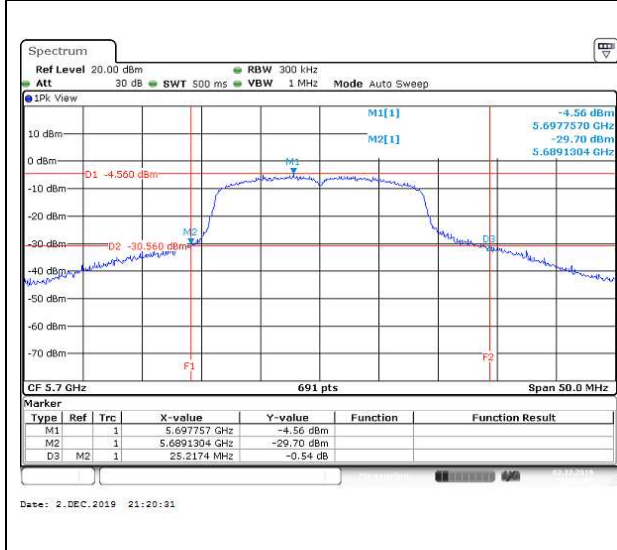
Low CH



Mid CH

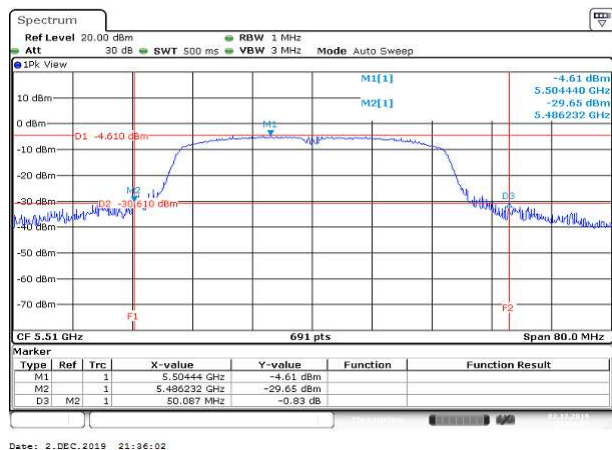


High CH

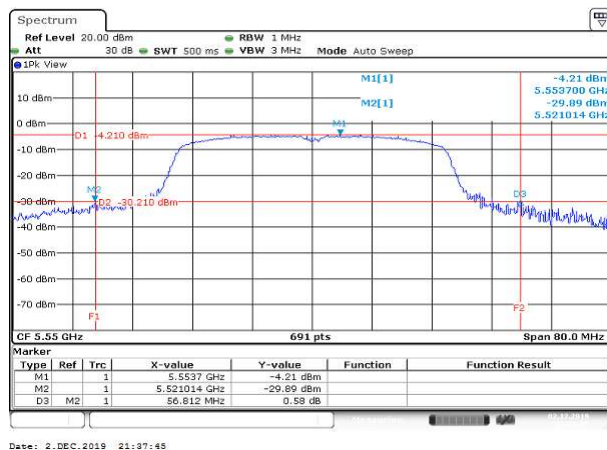


UNII-2c IEEE 802.11n HT40 mode- chain 0

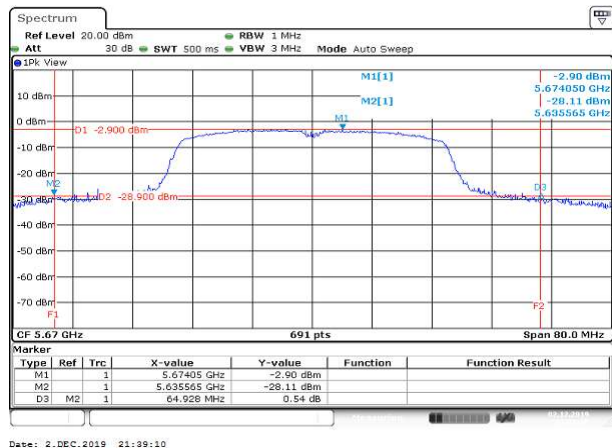
Low CH

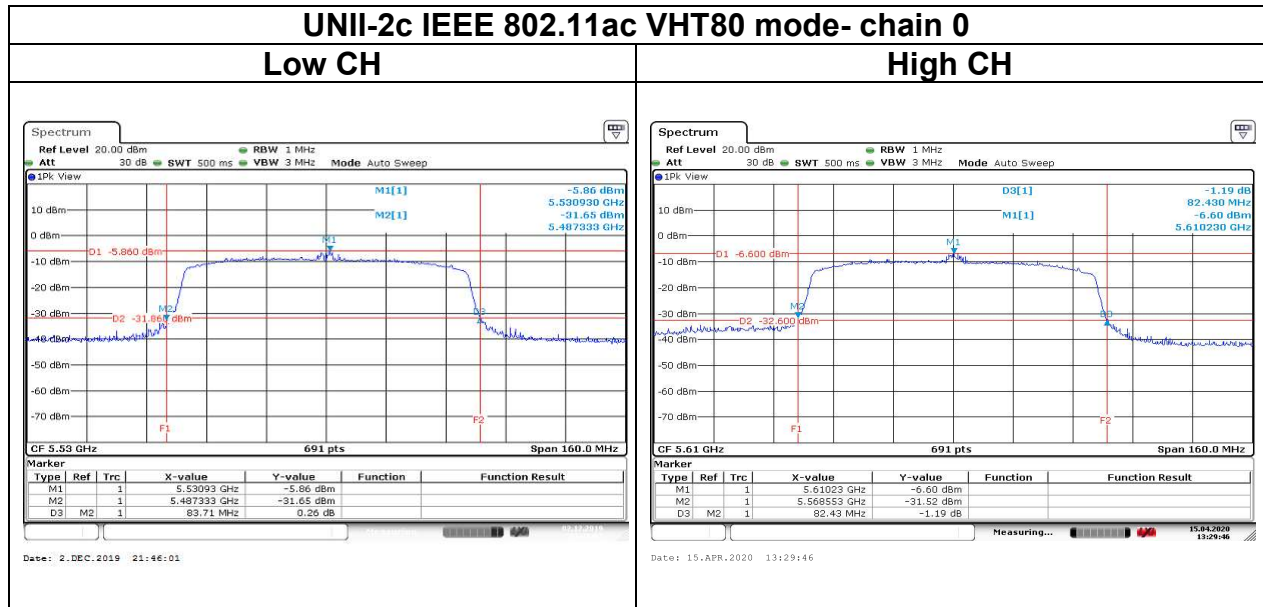


Mid CH

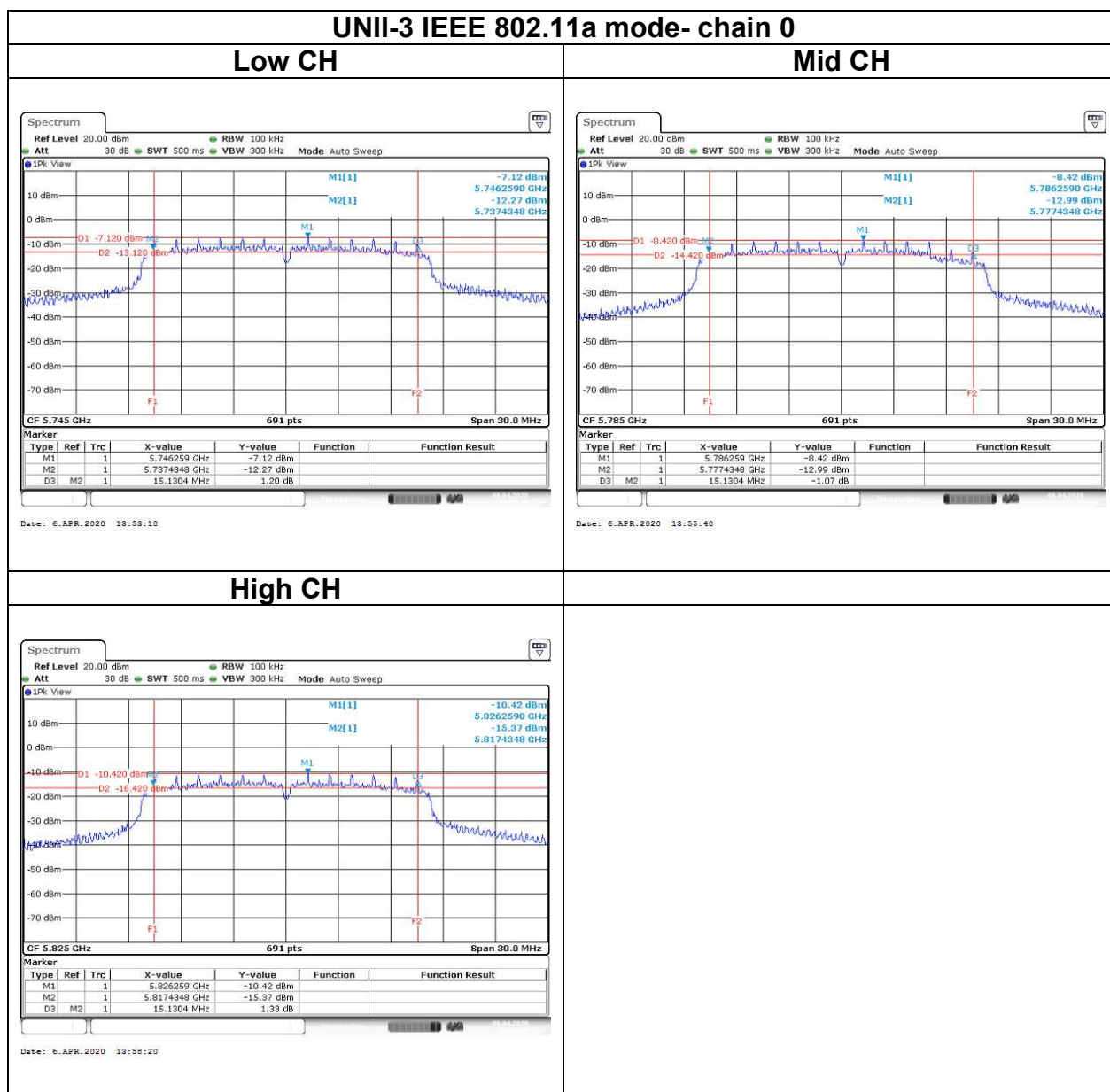


High CH



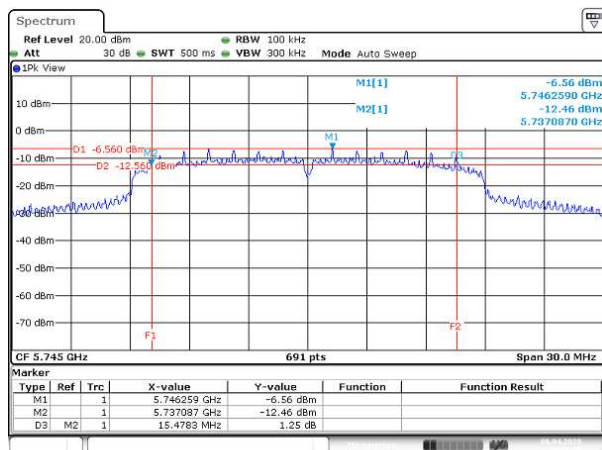


Test Data (6dB BANDWIDTH)

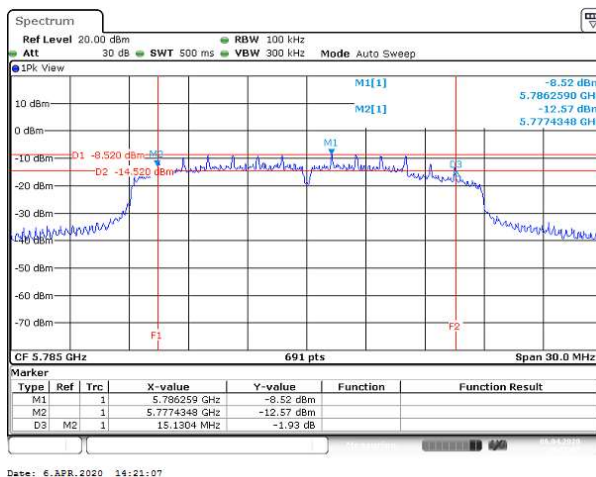


UNII-3 IEEE 802.11n HT20 mode- chain 0

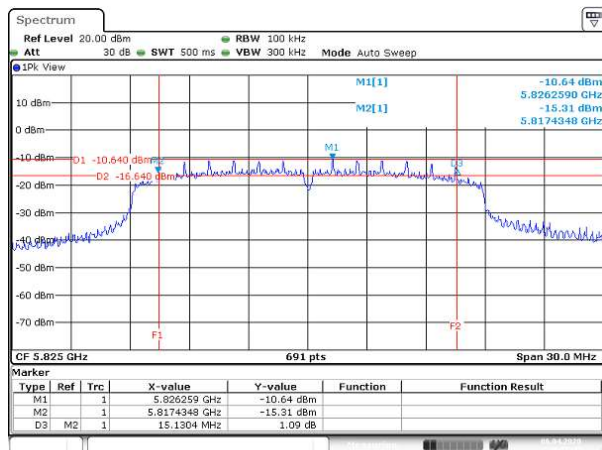
Low CH

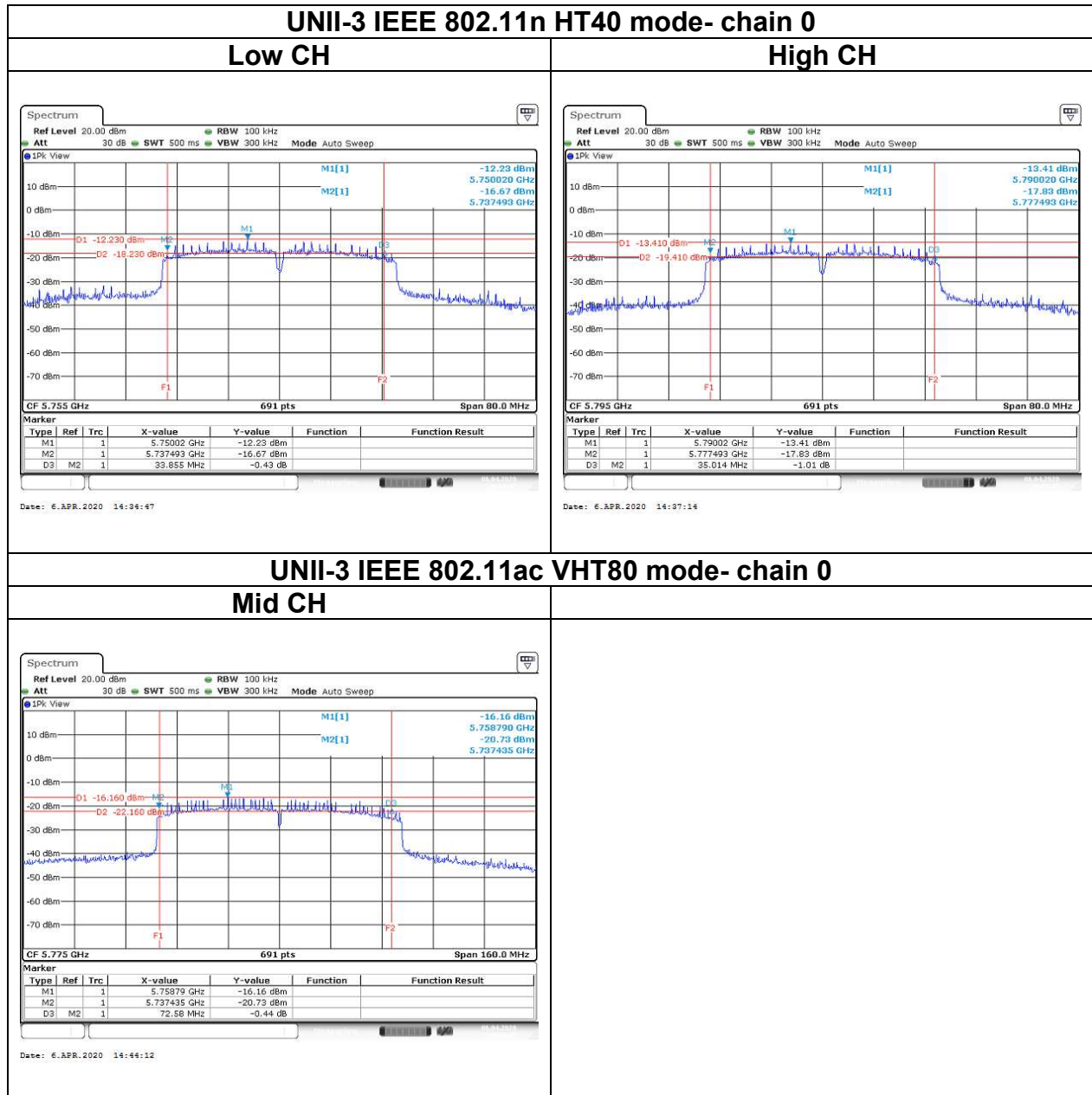


Mid CH

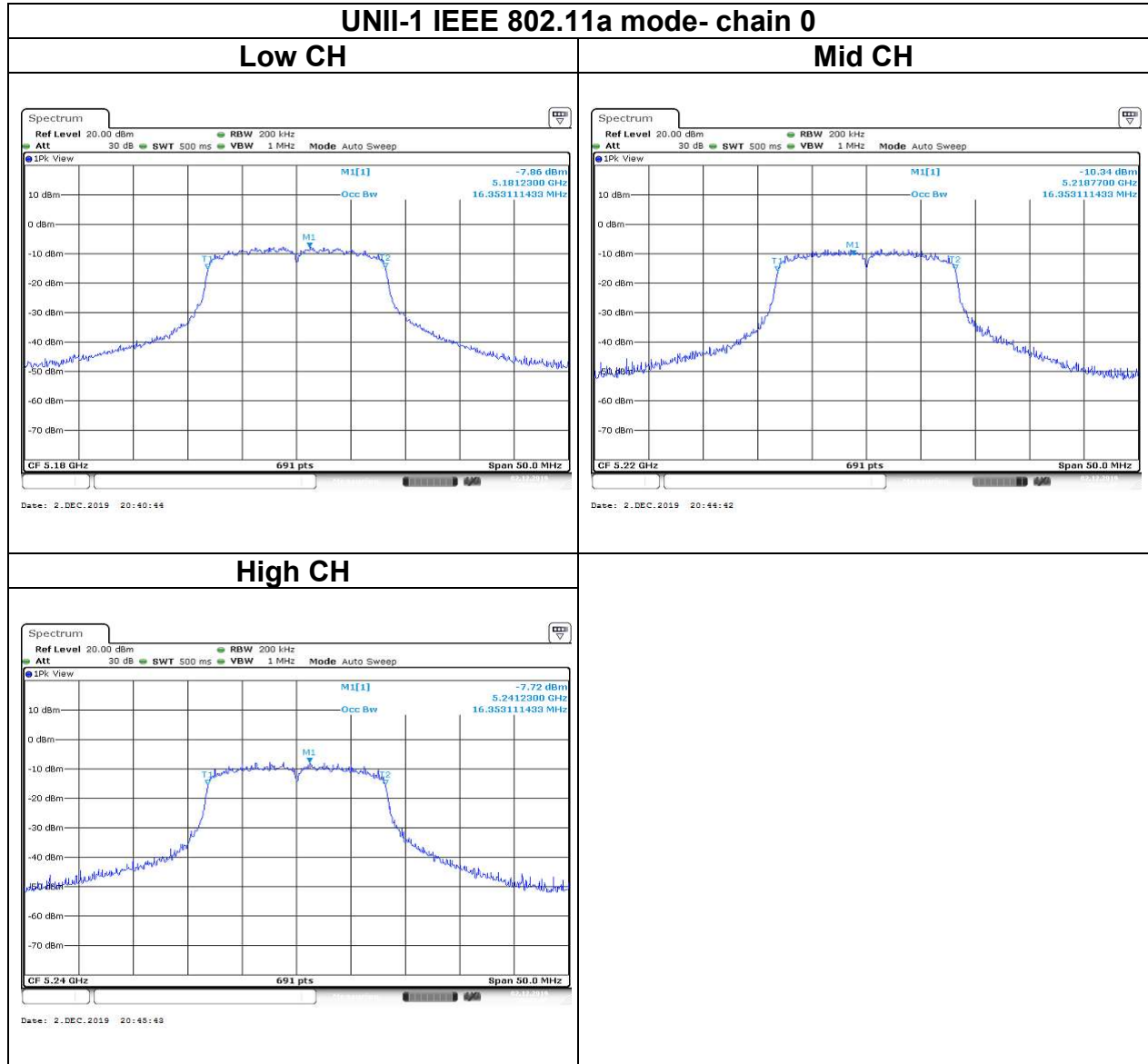


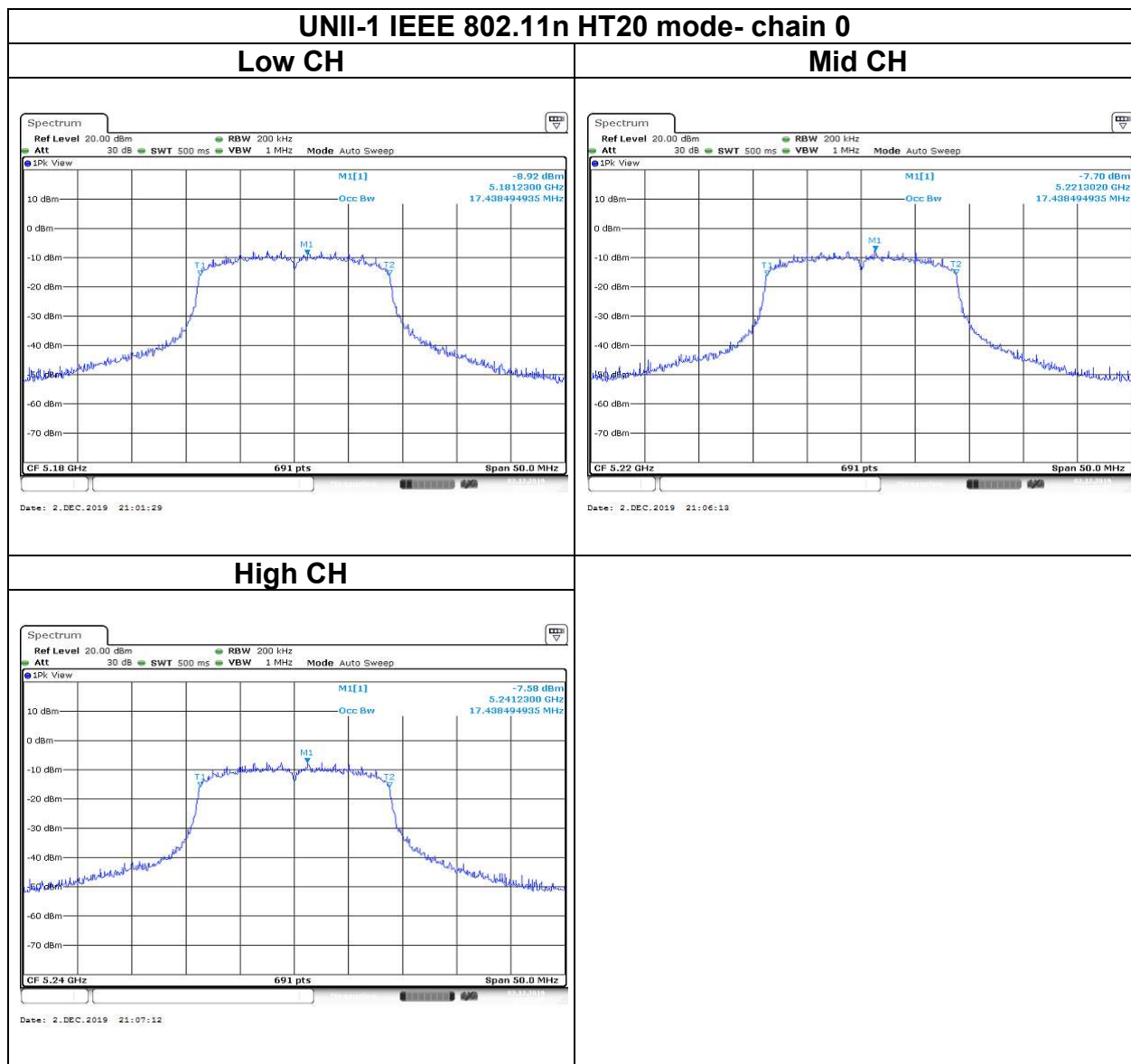
High CH

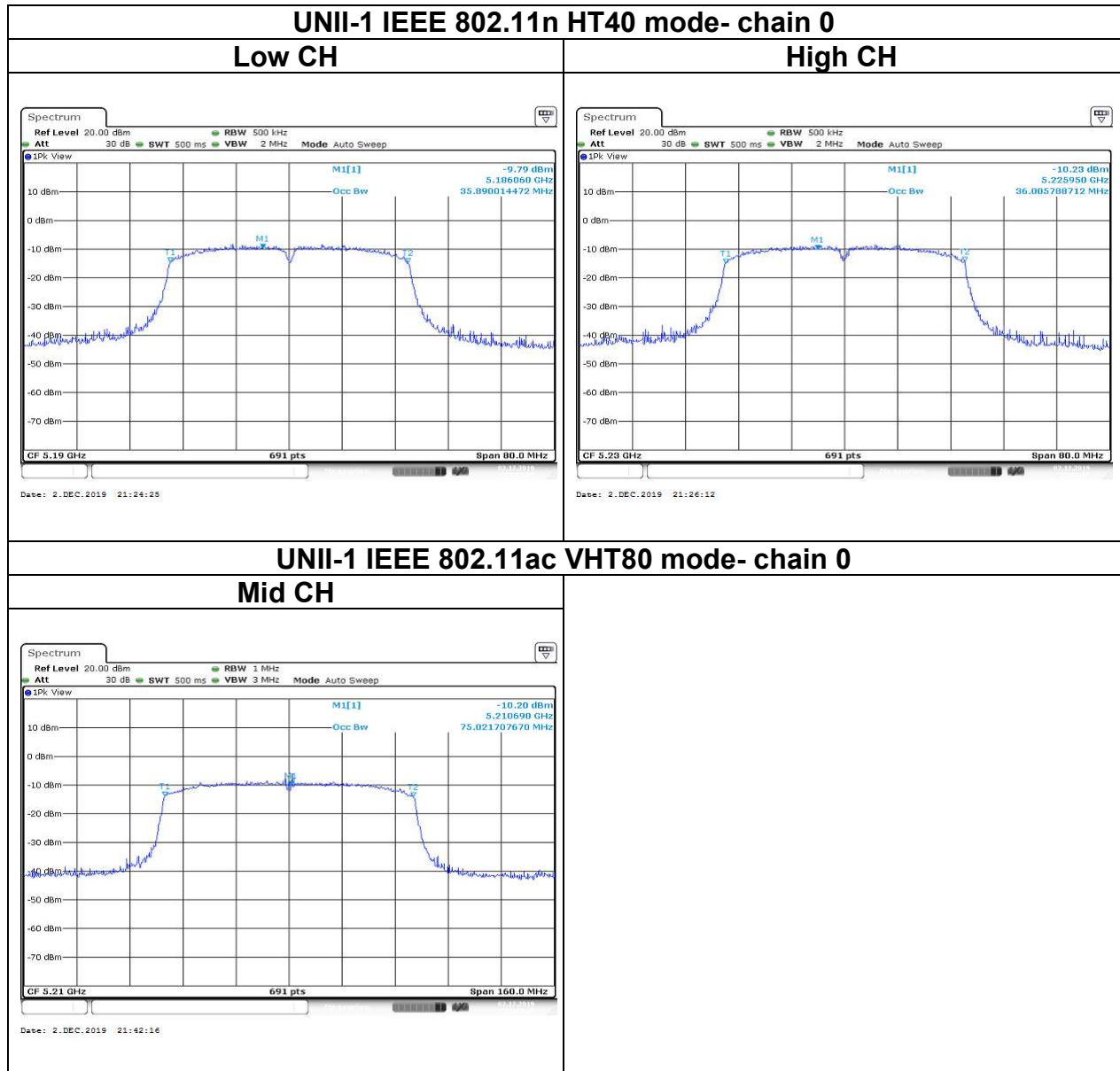




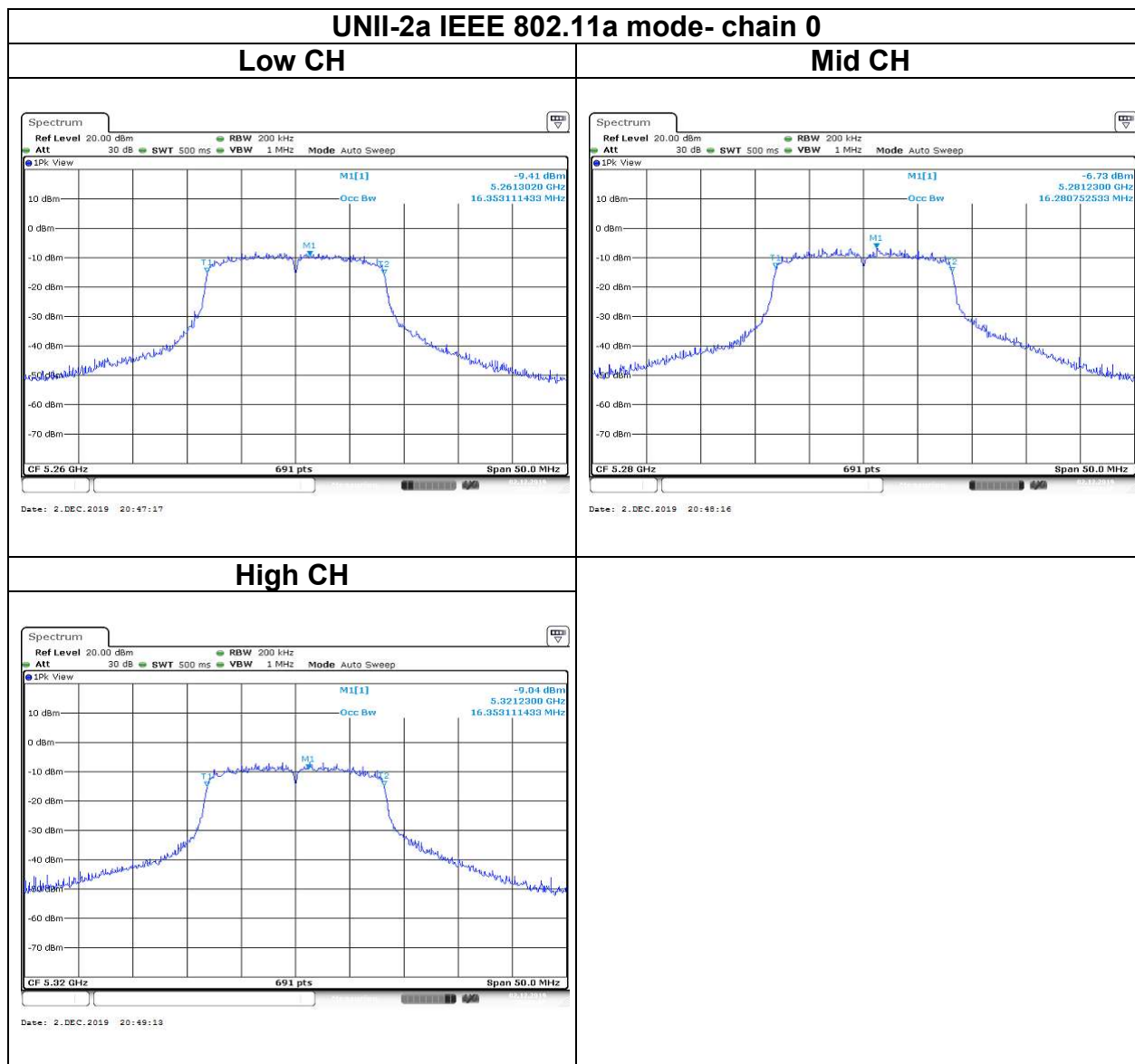
Test Data (BANDWIDTH 99%)

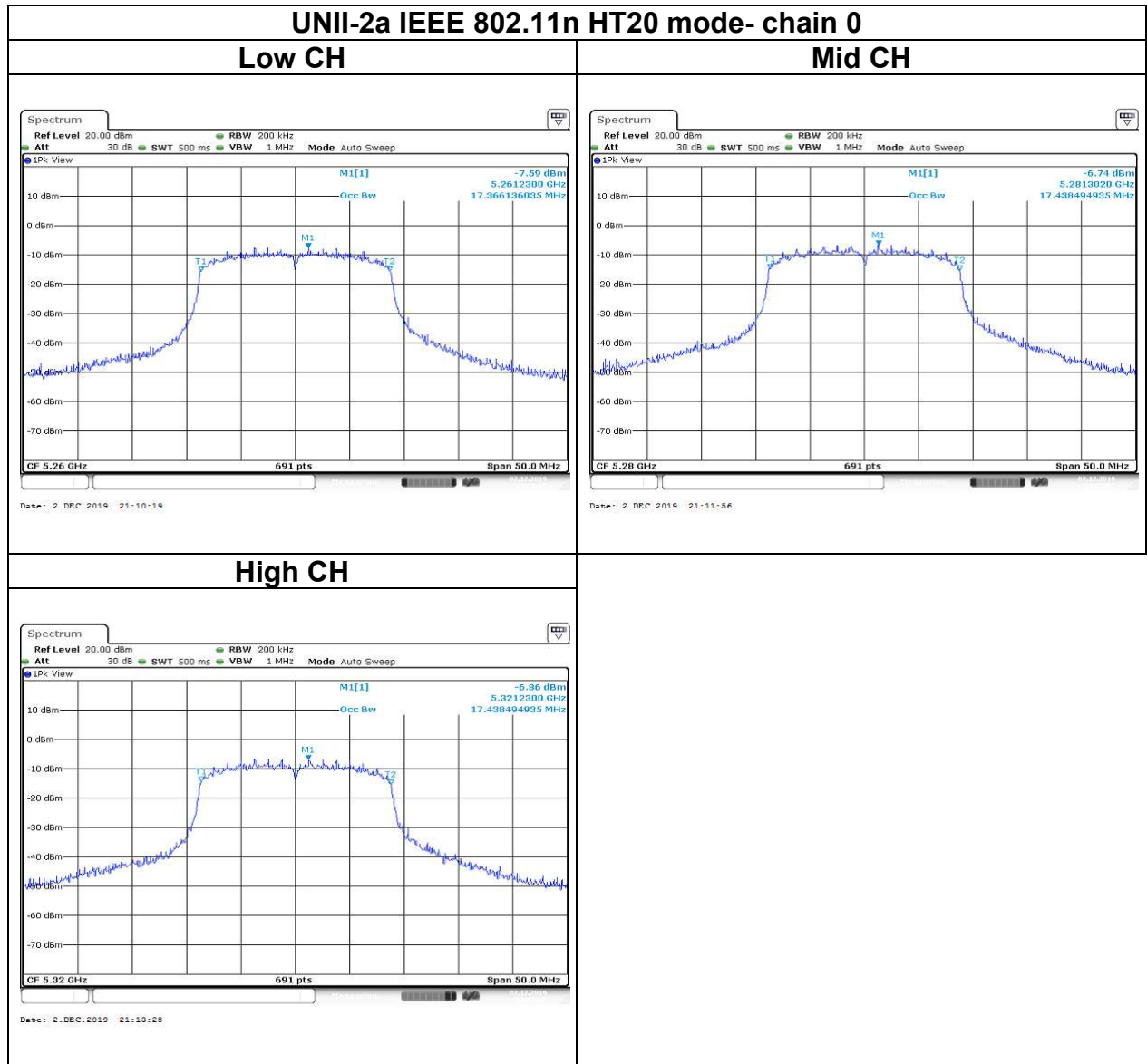


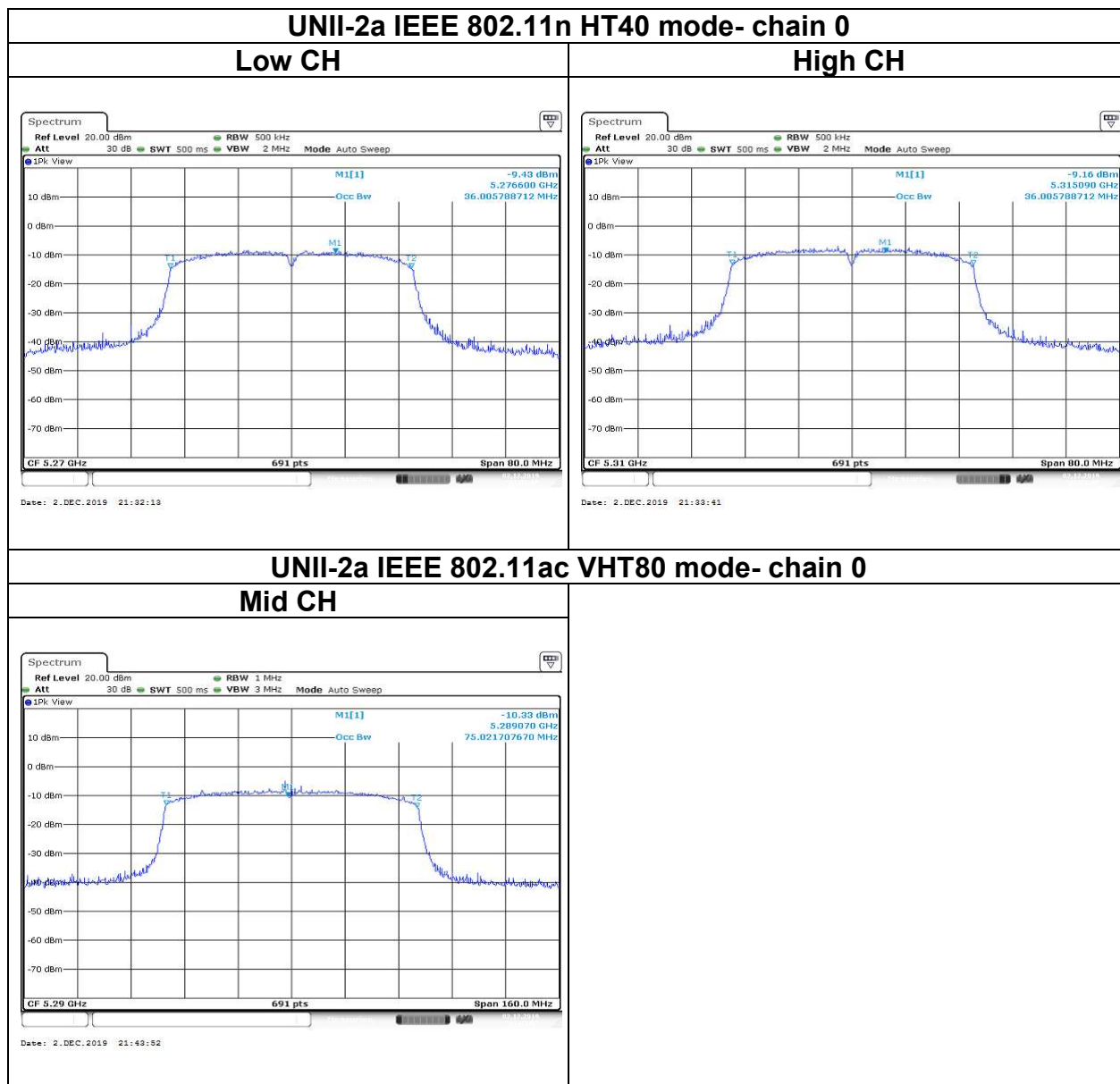




Test Data (BANDWIDTH 99%)







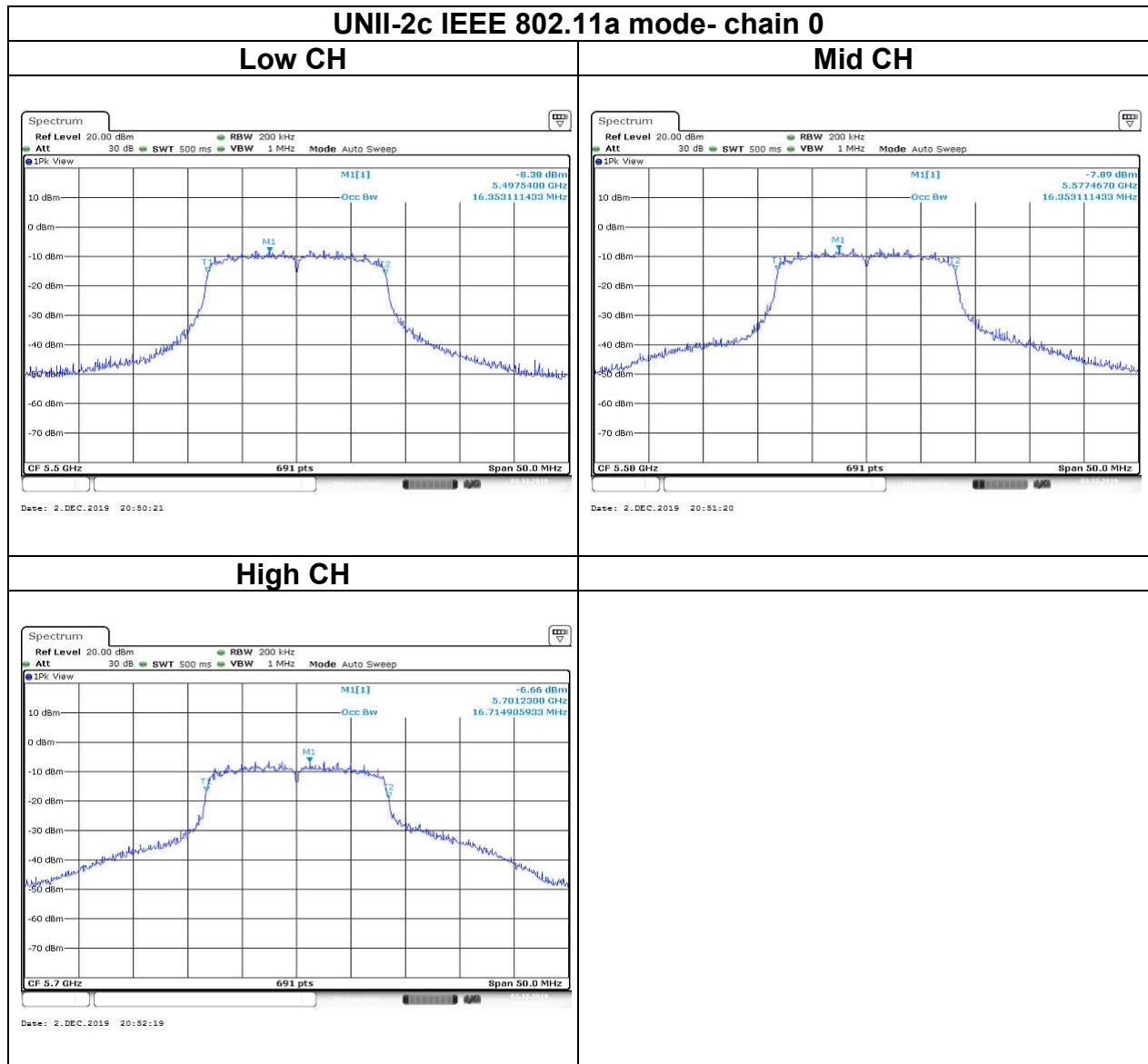


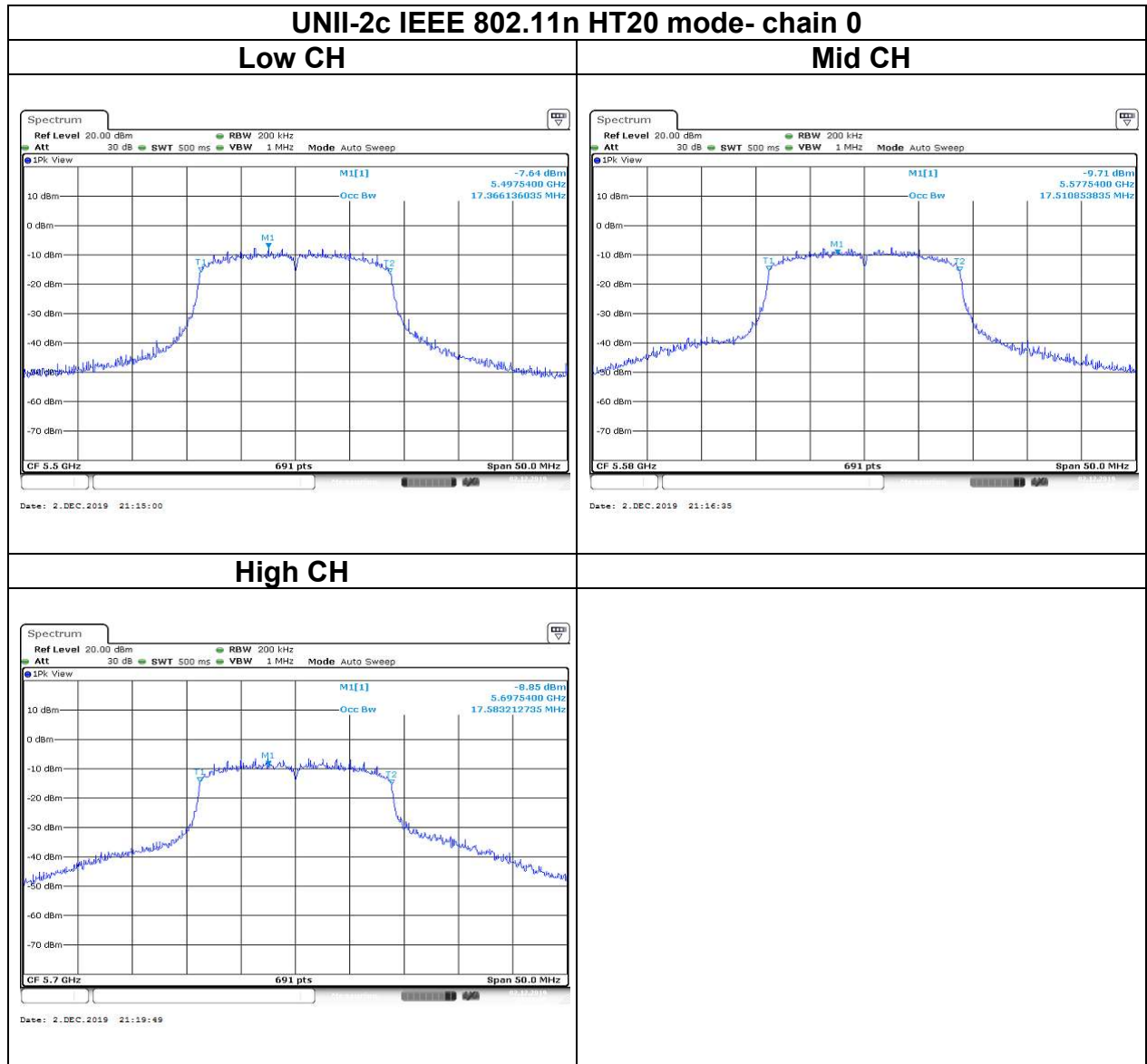
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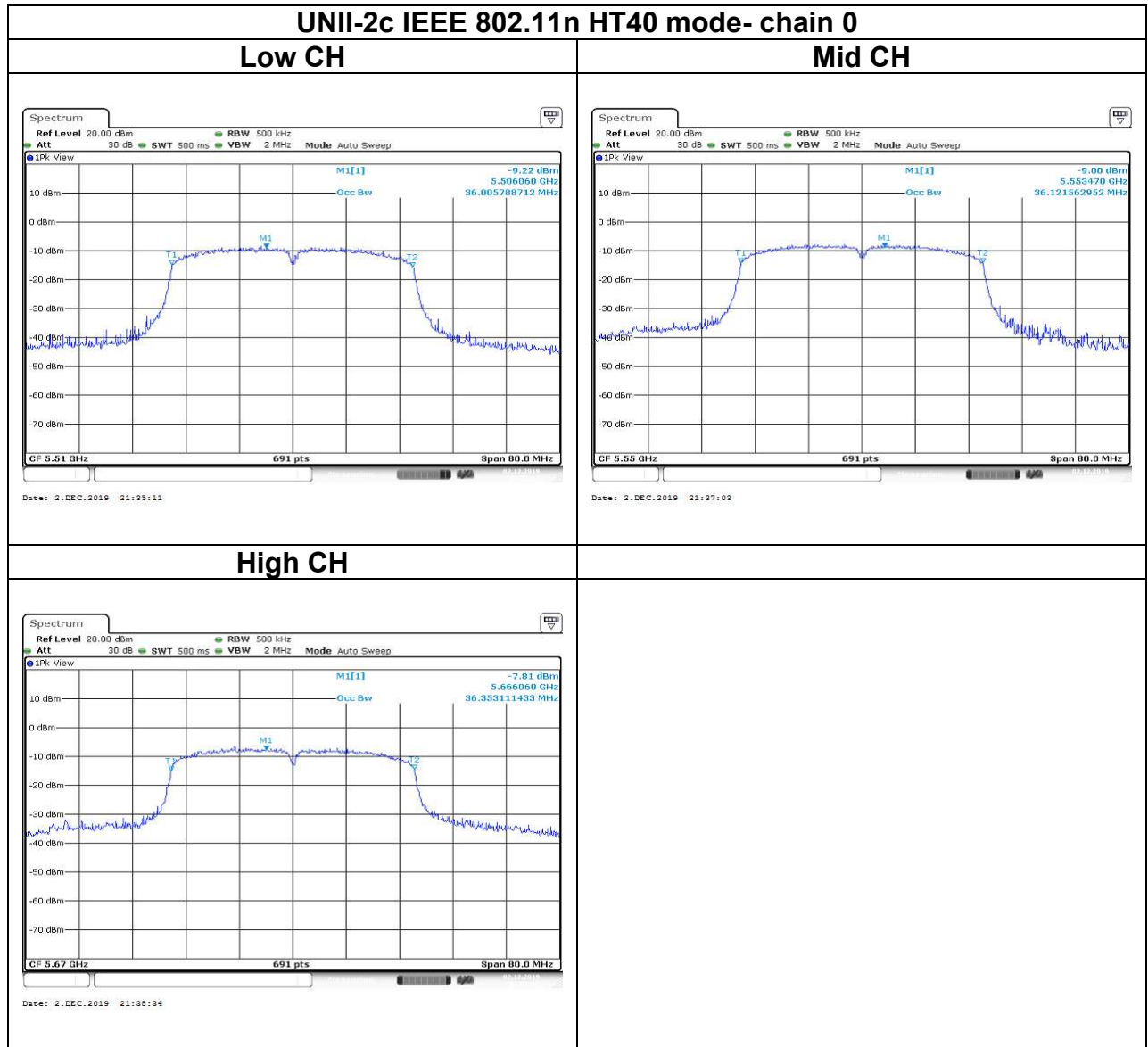
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Test Data (BANDWIDTH 99%)





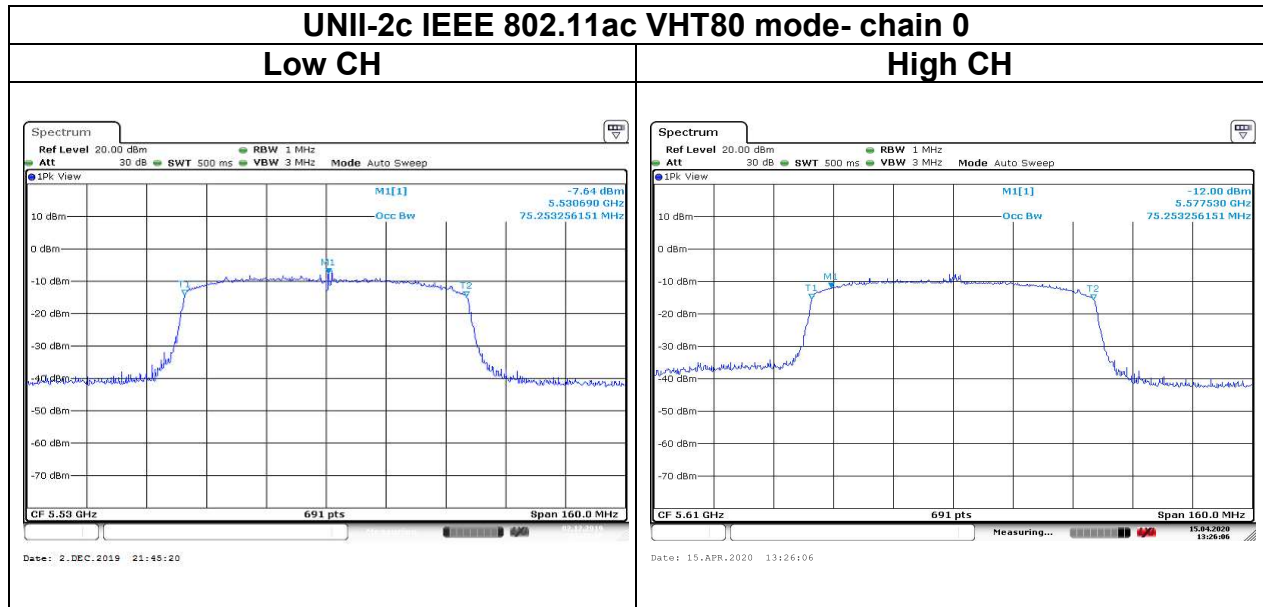




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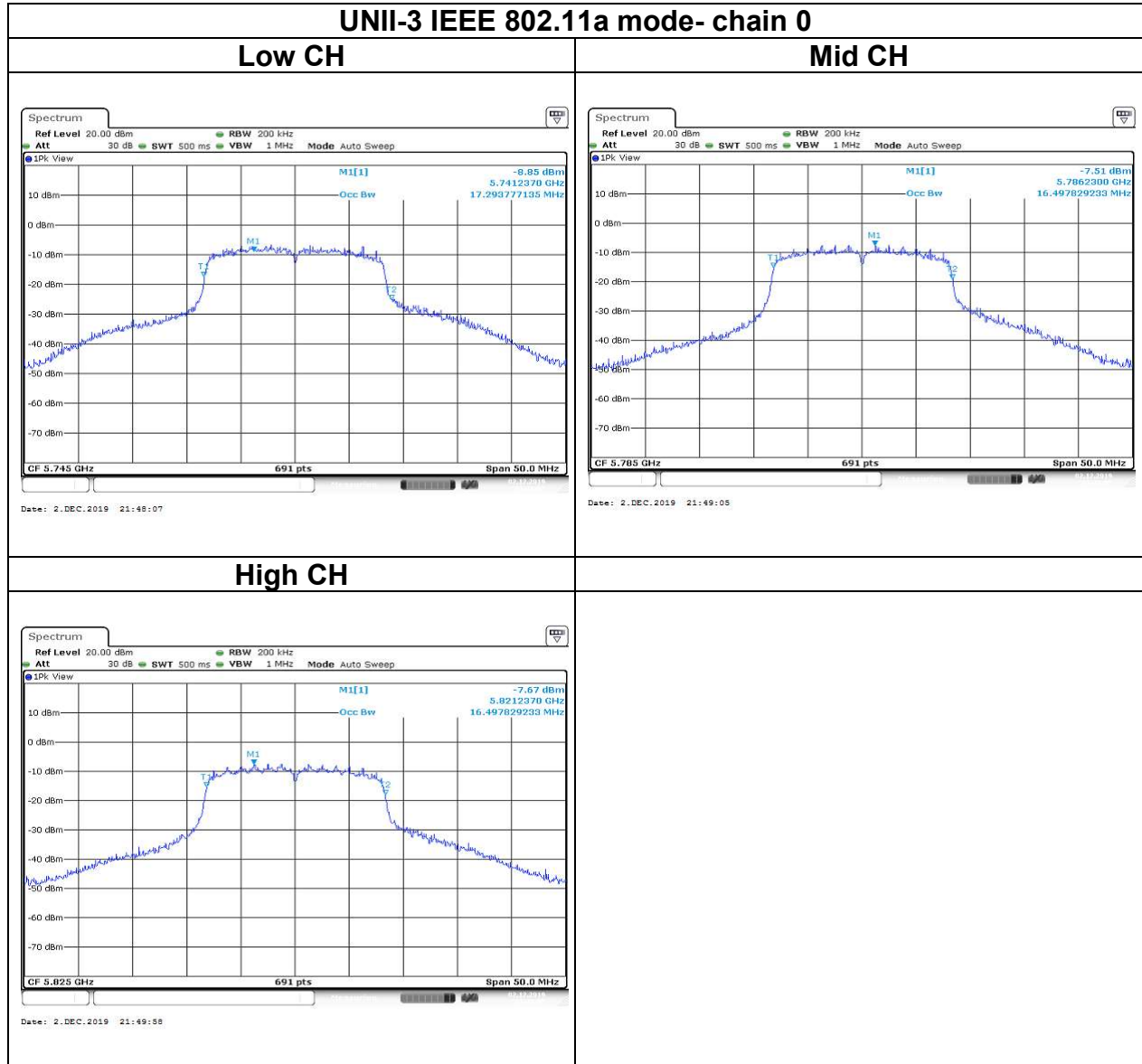
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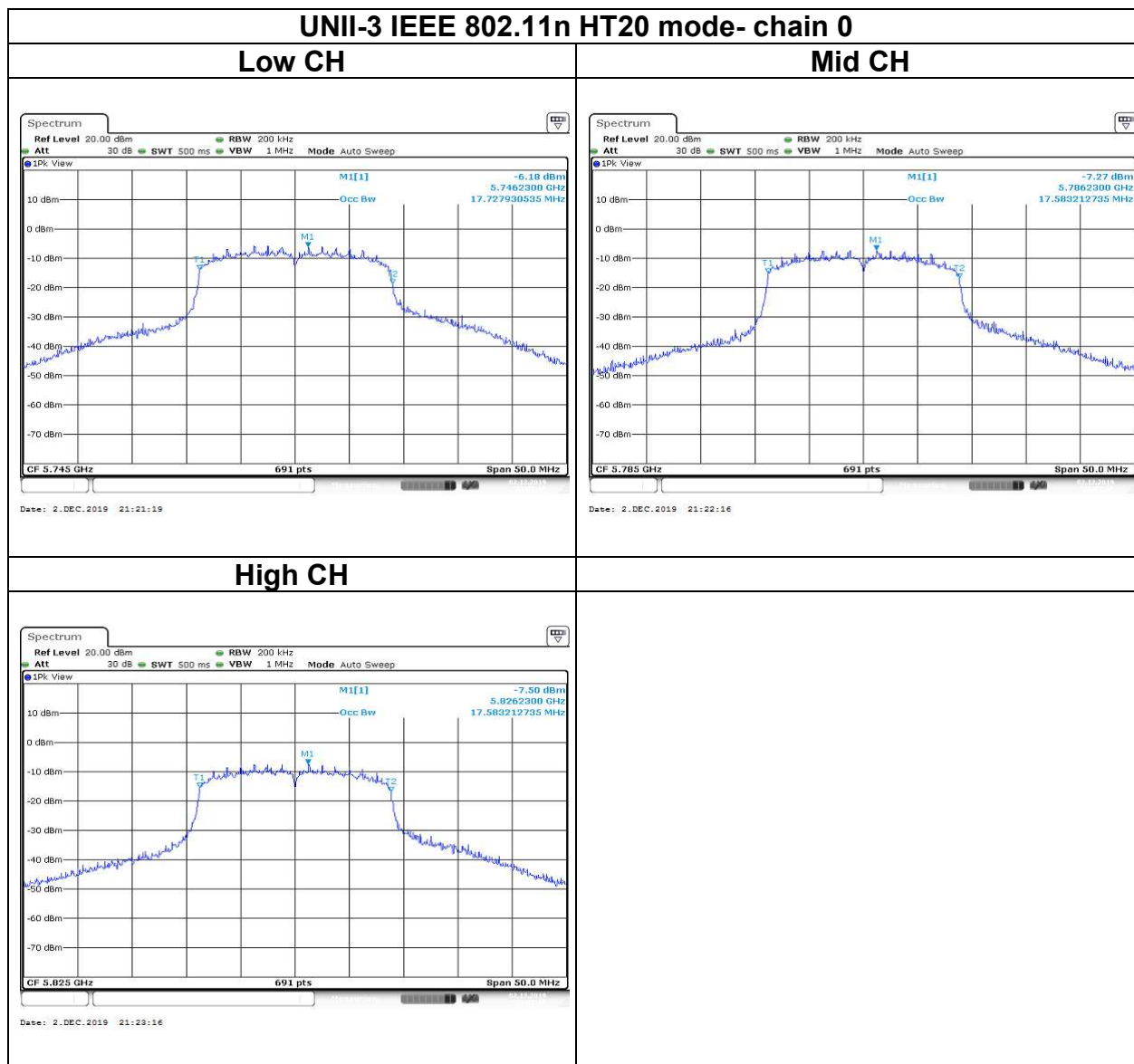
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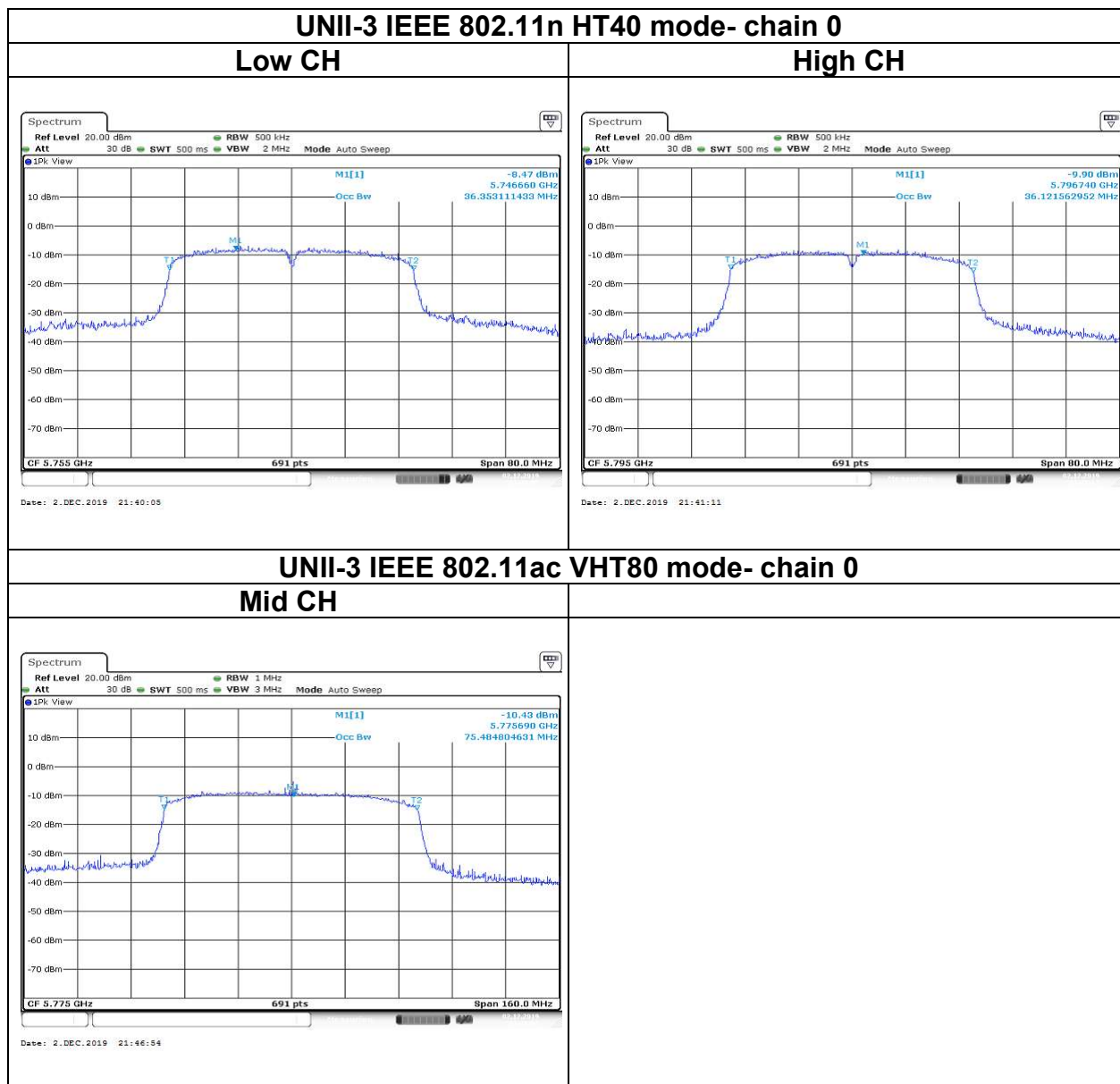


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Test Data (BANDWIDTH 99%)









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4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3),

UNII-1 :

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24 dBm), whichever power is less. B is the 99% emission bandwidth in megahertz, provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-2a and 2c:

the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. and The maximum e.i.r.p. shall not exceed 1.0 W or $17 + 10 \log B$, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

UNII-1 Limit	☒ Antenna not exceed 6 dBi : 24dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 24 – (DG – 6)]
UNII-2a/2c Limit	☒ Antenna not exceed 6 dBi : 24dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 24 – (DG – 6)]
UNII-3 Limit	☒ Antenna not exceed 6 dBi : 30dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6)]

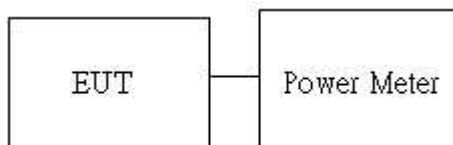
4.3.2 Test Procedure

Test method Refer as KDB 789033 D02, Section E.3.b for BW 20MHz and 40MHz, E.2.b for BW 80MHz.

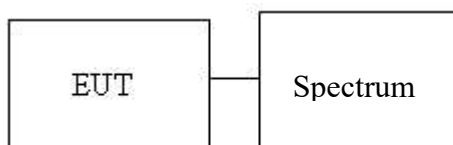
1. The EUT RF output connected to the power meter or spectrum by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Average output power. in the test report.

4.3.3 Test Setup

For BW 20MHz and 40MHz



For BW 80MHz



4.3.4 Test Result

Conducted output power :

UNII-1							
Config	CH	Freq. (MHz)	Power Set	AV Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
IEEE 802.11a Data rate: 6Mbps	36	5180	15	15.19	0.0330	3.46	24
	44	5220	16	15.20	0.0331		
	48	5240	16	16.21	0.0418		
IEEE 802.11n HT20 Data rate: MCS0	36	5180	15	14.65	0.0292		
	44	5220	17	14.59	0.0288		
	48	5240	15	14.48	0.0281		
IEEE 802.11n HT40 Data rate: MCS0	38	5190	15	14.35	0.0272		
	46	5230	15	14.38	0.0274		
IEEE 802.11ac VHT80 Data rate: MCS0	42	5210	13	12.64	0.0183		



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UNII-2a							
Config	CH	Freq. (MHz)	Power Set	AV Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
IEEE 802.11a Data rate: 6Mbps	52	5260	17	15.59	0.0362	3.3	24
	56	5280	16	15.54	0.0358		
	64	5320	16	16.68	0.0466		
IEEE 802.11n HT20 Data rate: MCS0	52	5260	17	15.52	0.0357		
	56	5280	17	15.07	0.0321		
	64	5320	15	15.11	0.0324		
IEEE 802.11n HT40 Data rate: MCS0	54	5270	17	14.04	0.0254		
	62	5310	14	14.32	0.0270		
IEEE 802.11ac VHT80 Data rate: MCS0	58	5290	13	12.95	0.0197		



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UNII-2c							
Config	CH	Freq. (MHz)	Power Set	AV Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
IEEE 802.11a Data rate: 6Mbps	100	5500	16	15.44	0.0350	3.79	24
	116	5580	17	15.69	0.0371		
	120	5600	15	15.34	0.0342		
	140	5700	15	15.51	0.0356		
IEEE 802.11n HT20 Data rate: MCS0	100	5500	15	13.88	0.0244		
	116	5580	18	15.58	0.0361		
	120	5600	14	14.64	0.0291		
	140	5700	14	14.79	0.0301		
IEEE 802.11n HT40 Data rate: MCS0	102	5510	16	15.28	0.0337		
	110	5550	15	14.75	0.0299		
	134	5670	14	15.32	0.0340		
IEEE 802.11ac VHT80 Data rate: MCS0	106	5530	13	12.81	0.0191		
	122	5610	13	13.12	0.0205		



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UNII-3							
Config	CH	Freq. (MHz)	Power Set	AV Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
IEEE 802.11a Data rate: 6Mbps	149	5745	17	15.76	0.0377	3.91	30
	157	5785	18	15.51	0.0356		
	165	5825	18	15.19	0.0330		
IEEE 802.11n HT20 Data rate: MCS0	149	5745	18	15.01	0.0317		
	157	5785	18	14.80	0.0302		
	165	5825	19	14.87	0.0307		
IEEE 802.11n HT40 Data rate: MCS0	151	5755	18	14.73	0.0297		
	159	5795	19	14.78	0.0301		
IEEE 802.11ac VHT80 Data rate: MCS0	155	5775	15	13.96	0.0249		

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

According to §15.407 (a)(1), 15.407(a)(2) and 15.407(a)(3)

UNII-1 :

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

UNII-2a and 2c:

The maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

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

UNII-3:

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

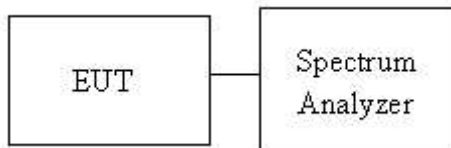
UNII-1 Limit	☒ Antenna not exceed 6 dBi : 11 dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 11 – (DG – 6)]
UNII-2a Limit	☒ Antenna not exceed 6 dBi : 11 dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 11 – (DG – 6)]
UNII-2c Limit	☒ Antenna not exceed 6 dBi : 11 dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 11 – (DG – 6)]
UNII-3 Limit	☒ Antenna not exceed 6 dBi : 30 dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 30 – (DG – 6)]

4.4.2 Test Procedure

Test method Refer as KDB 789033 D02

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. UNII-1, UNII-2a and UNII-2c, SA set RBW = 1MHz, VBW = 3MHz and Detector = RMS, to measurement Power Density.
4. UNII-3, SA set RBW = 500kHz, VBW = 2MHz and Detector = RMS, to measurement Power Density
5. The path loss and Duty Factor were compensated to the results for each measurement by SA.
6. Mark the maximum level.
7. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



4.4.4 Test Result

UNII-1 5150-5250 MHz						
Test mode: IEEE 802.11a mode						
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	FCC Limit (dBm)	IC Limit (dBm)
Low	5180	-0.47	-	-0.47	11	10
Mid	5220	-0.69	-	-0.69		
High	5240	-0.50	-	-0.50		
Test mode: IEEE 802.11n HT20 mode						
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	FCC Limit (dBm)	IC Limit (dBm)
Low	5180	-1.14	-	-1.14	11	10
Mid	5220	-1.27	-	-1.27		
High	5240	-0.99	-	-0.99		
Test mode: IEEE 802.11n HT40 mode						
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	FCC Limit (dBm)	IC Limit (dBm)
Low	5190	-4.46	-	-4.46	11	10
High	5230	-4.24	-	-4.24		
Test mode: IEEE 802.11ac VHT80 mode						
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	FCC Limit (dBm)	IC Limit (dBm)
Mid	5210	-9.88	-	-9.88	11	10

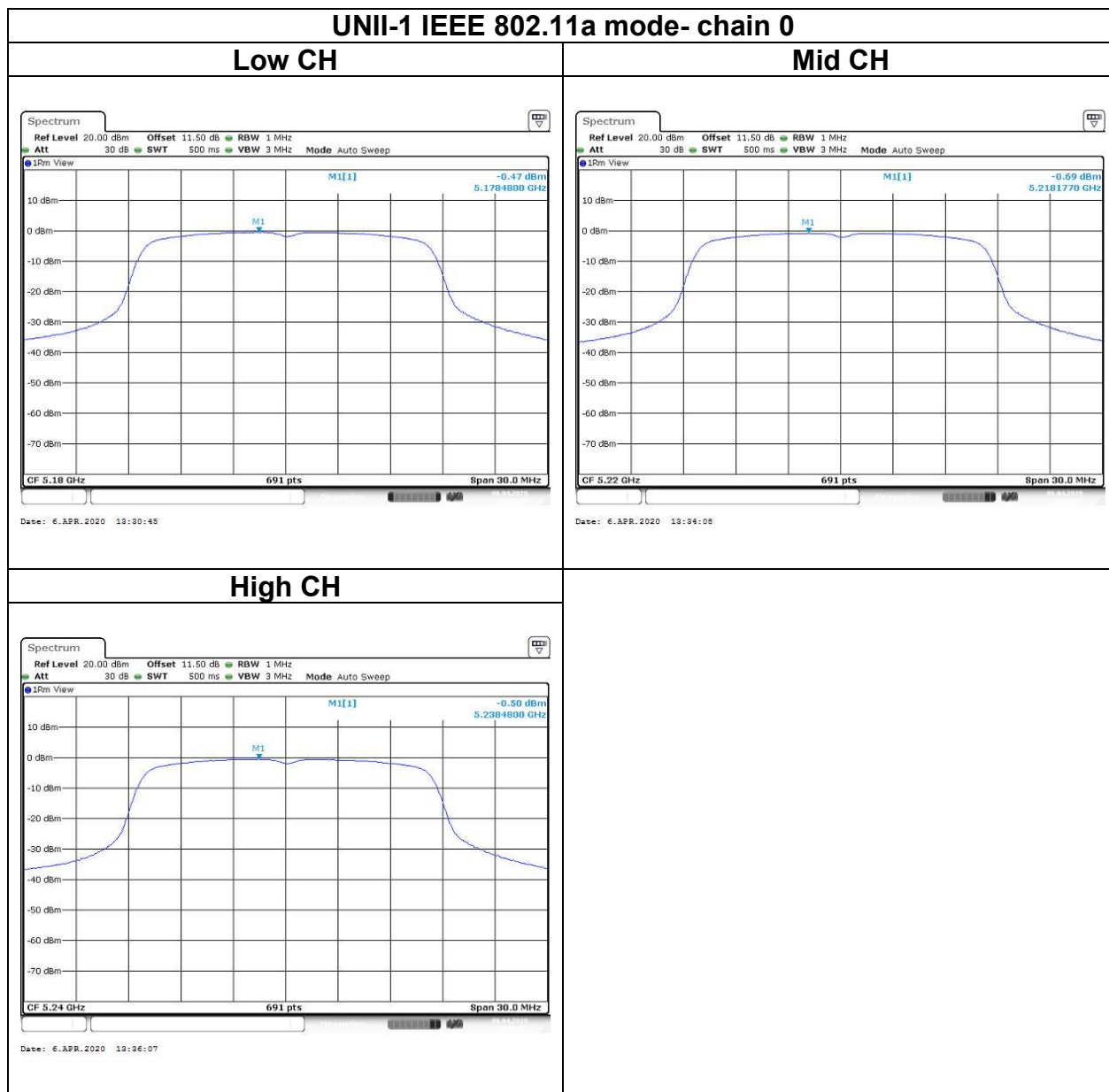
UNII-2a 5250-5350 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5260	1.18	-	1.18	11
Mid	5280	1.26	-	1.26	
High	5320	0.99	-	0.99	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5260	0.01	-	0.01	11
Mid	5280	0.82	-	0.82	
High	5320	0.56	-	0.56	
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5270	-3.04	-	-3.04	11
High	5310	-3.09	-	-3.09	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Mid	5290	-8.78	-	-8.78	11

UNII-2c 5470-5725 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5500	0.21	-	0.21	11
Mid	5580	0.79	-	0.79	
High	5700	1.05	-	1.05	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5500	0.01	-	0.01	11
Mid	5580	0.45	-	0.45	
High	5700	0.86	-	0.86	
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5510	-3.32	-	-3.32	11
Mid	5550	-3.51	-	-3.51	
High	5670	-2.06	-	-2.06	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5530	-9.22	-	-9.22	11
High	5610	-7.90	-	-7.90	11

UNII-3 5725-5825 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5745	7.47	-	7.47	30
Mid	5785	5.66	-	5.66	
High	5825	5.84	-	5.84	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5745	7.40	-	7.40	30
Mid	5785	5.52	-	5.52	
High	5825	4.94	-	4.94	
Test mode: IEEE 802.11n HT40 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5755	2.71	-	2.71	30
High	5795	2.68	-	2.68	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Mid	5775	-0.28	-	-0.28	30

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Test Data

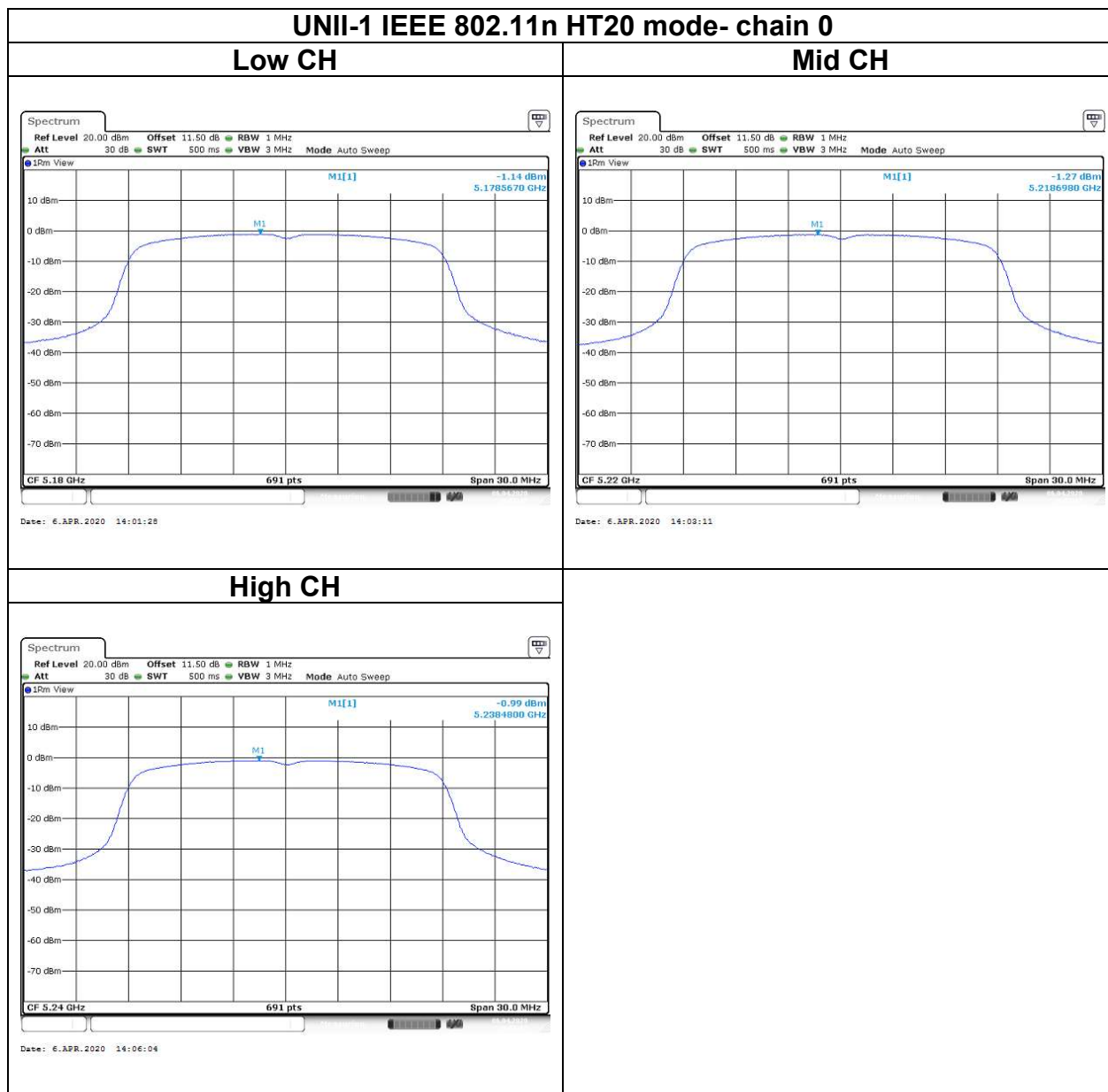


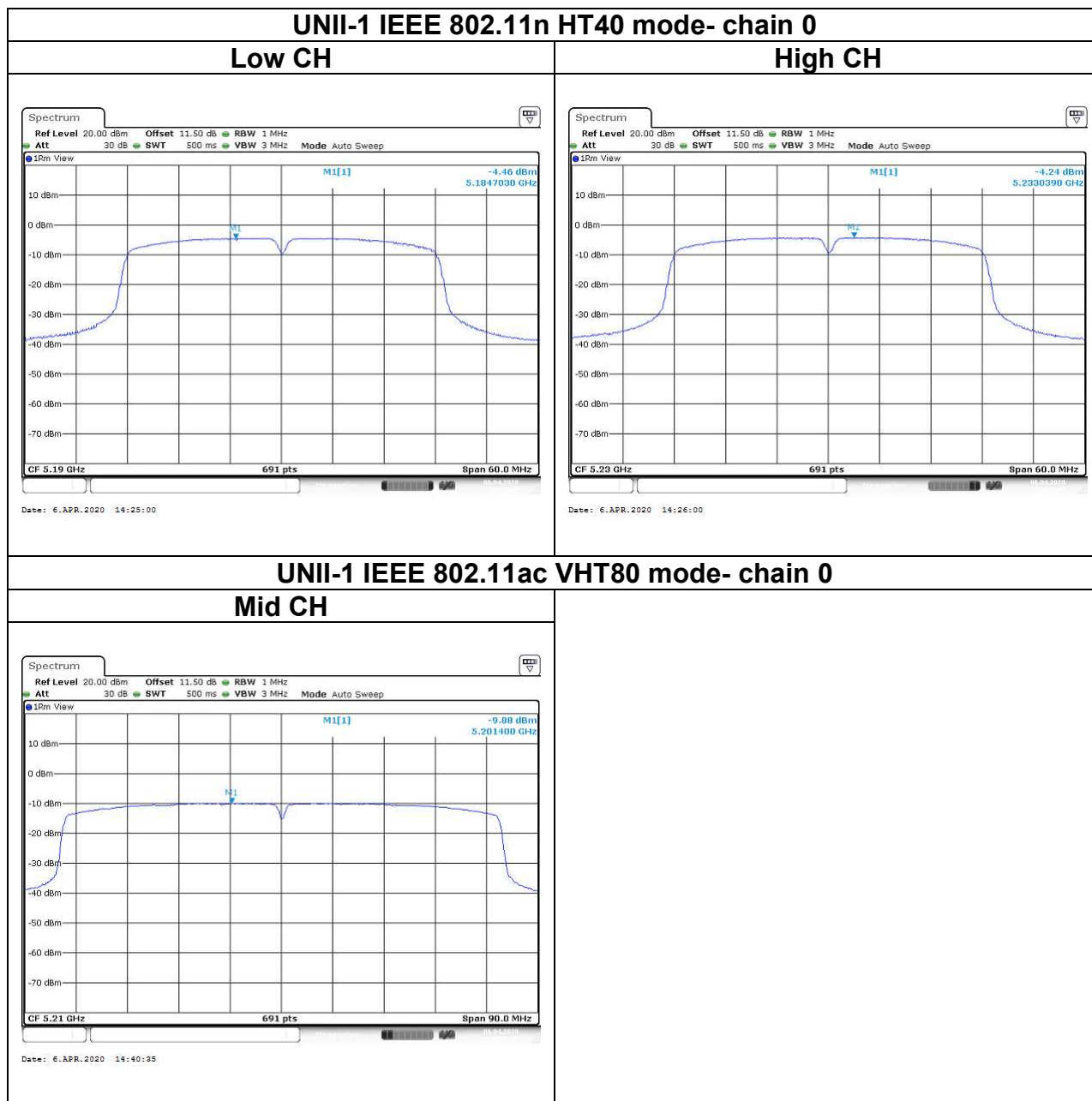


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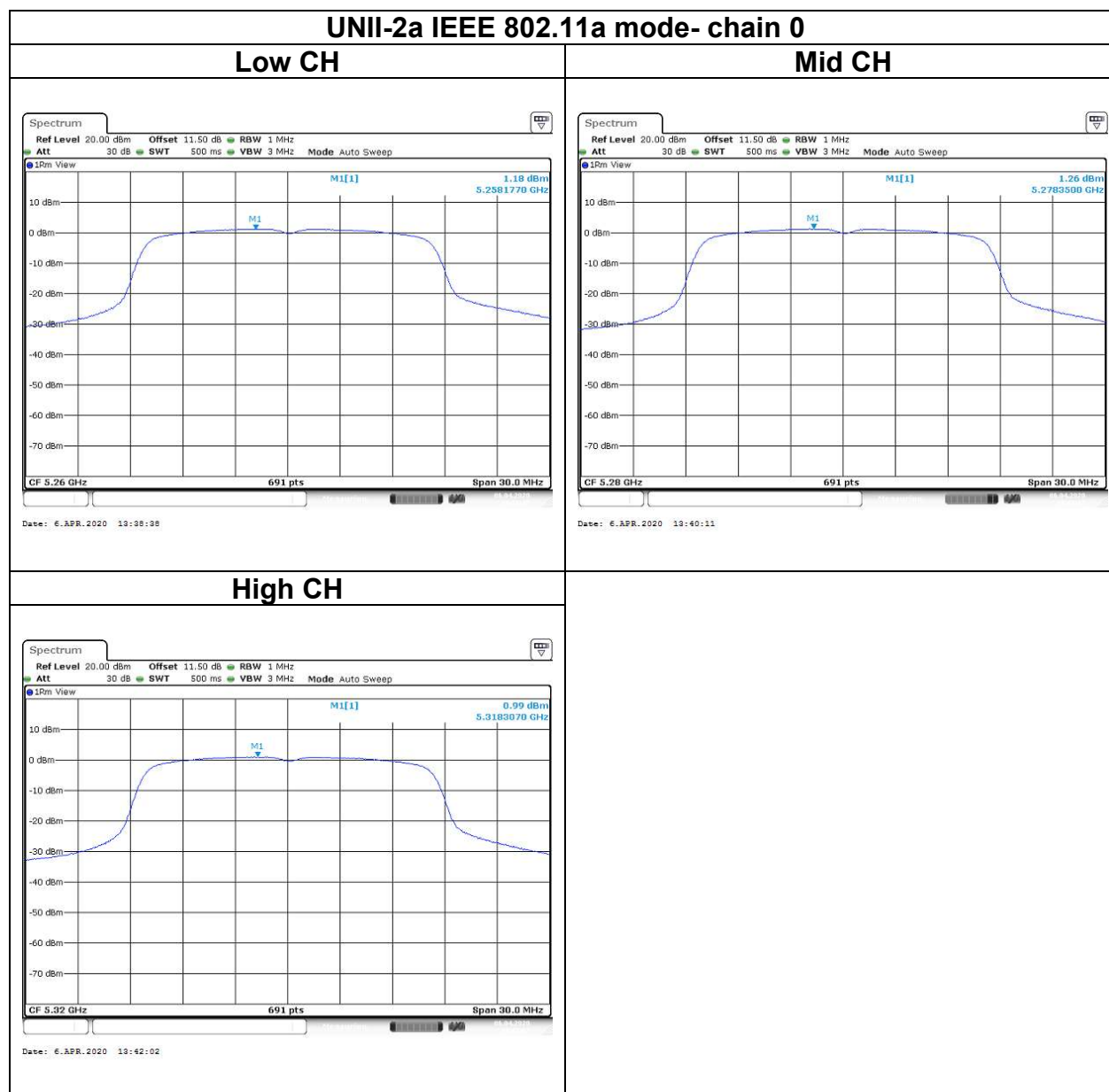
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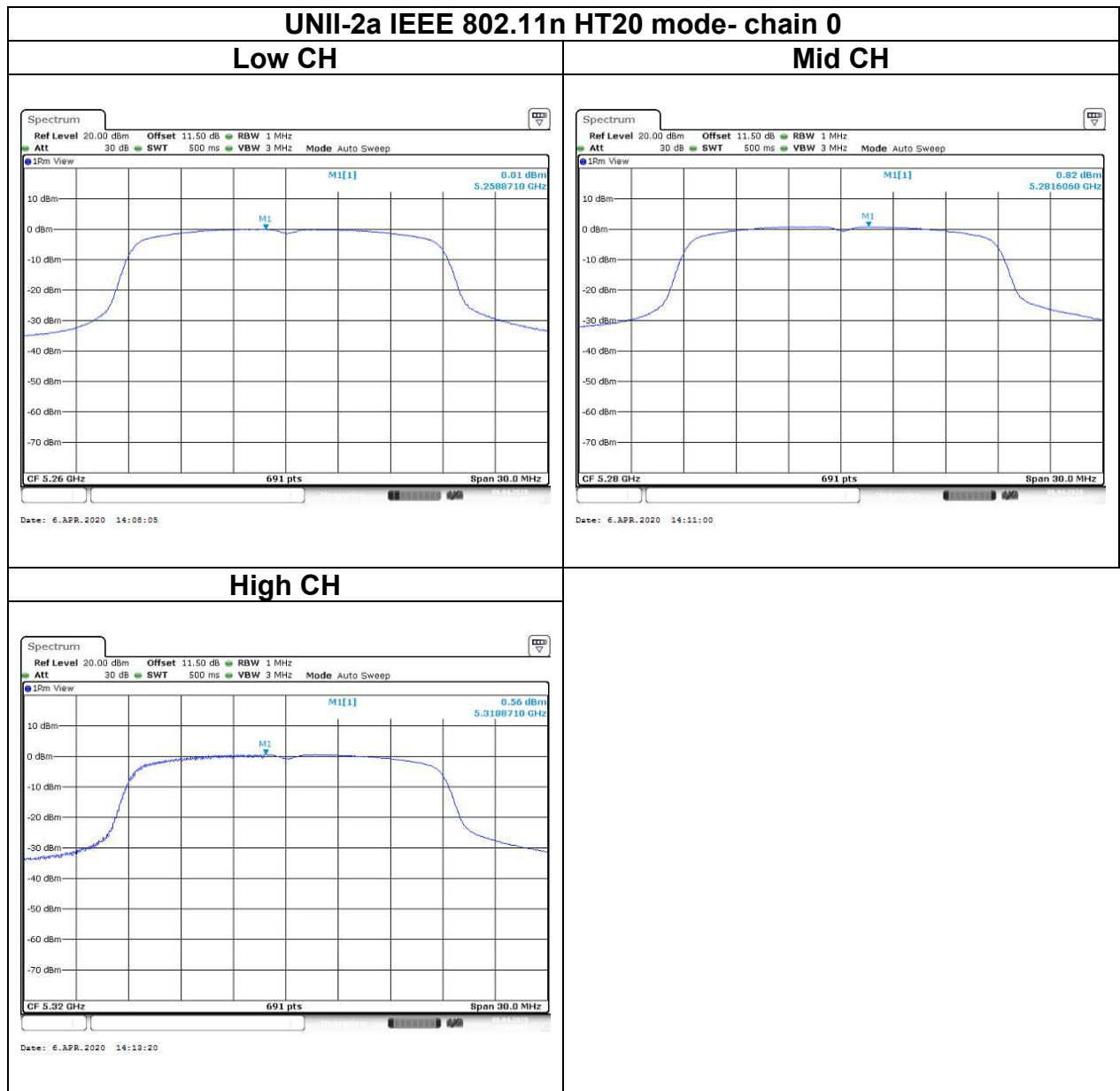


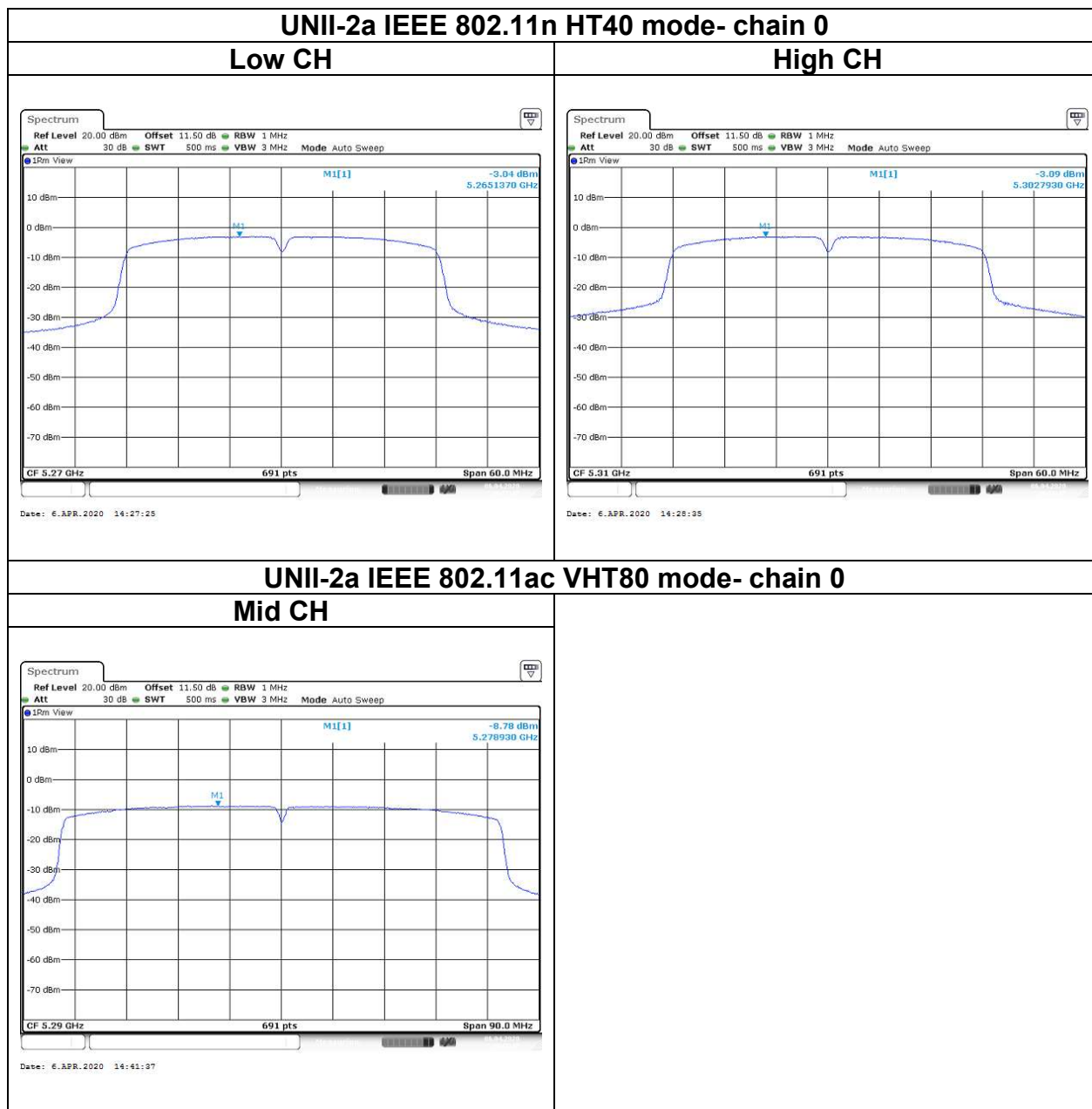


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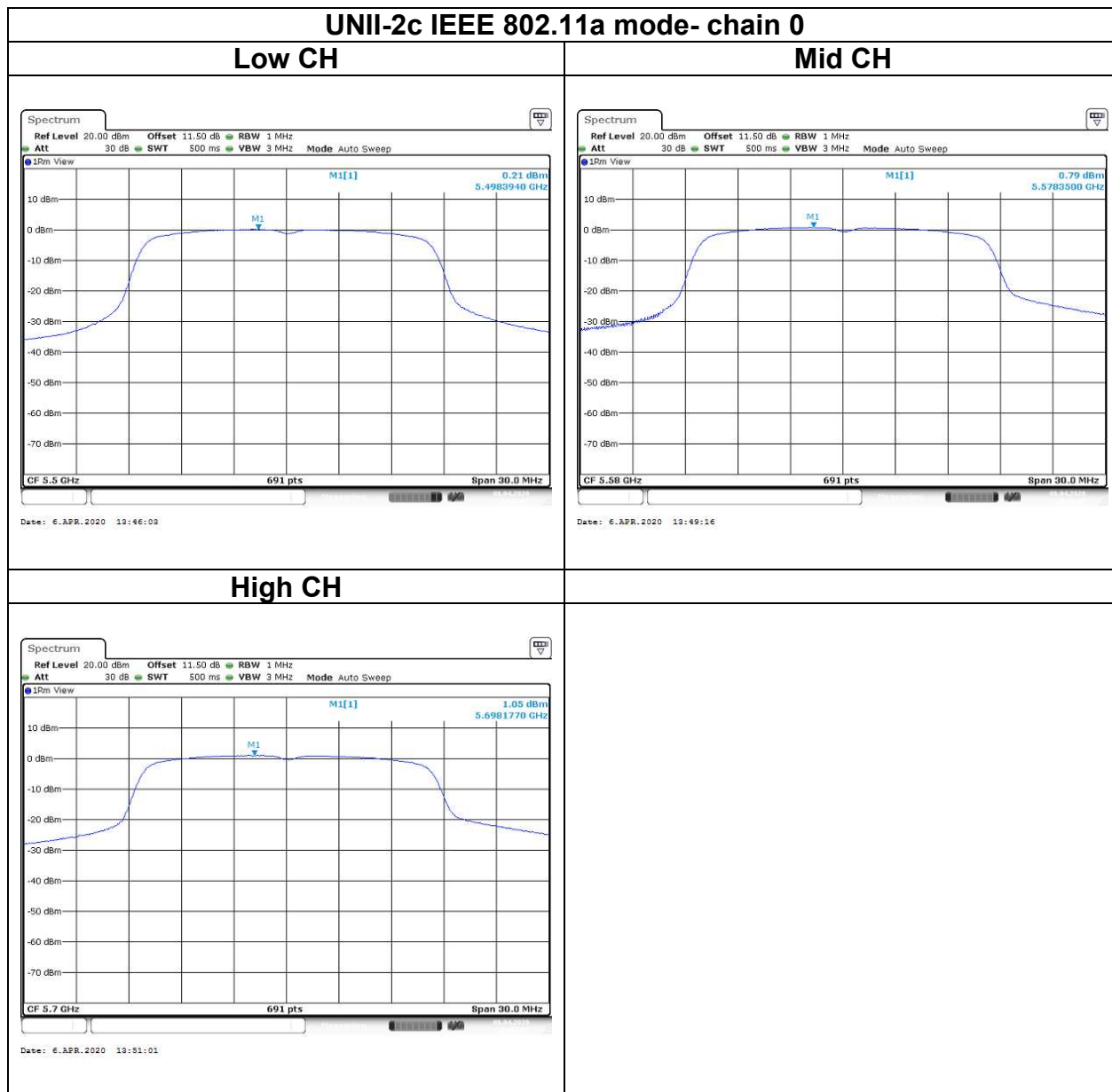
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Test Data

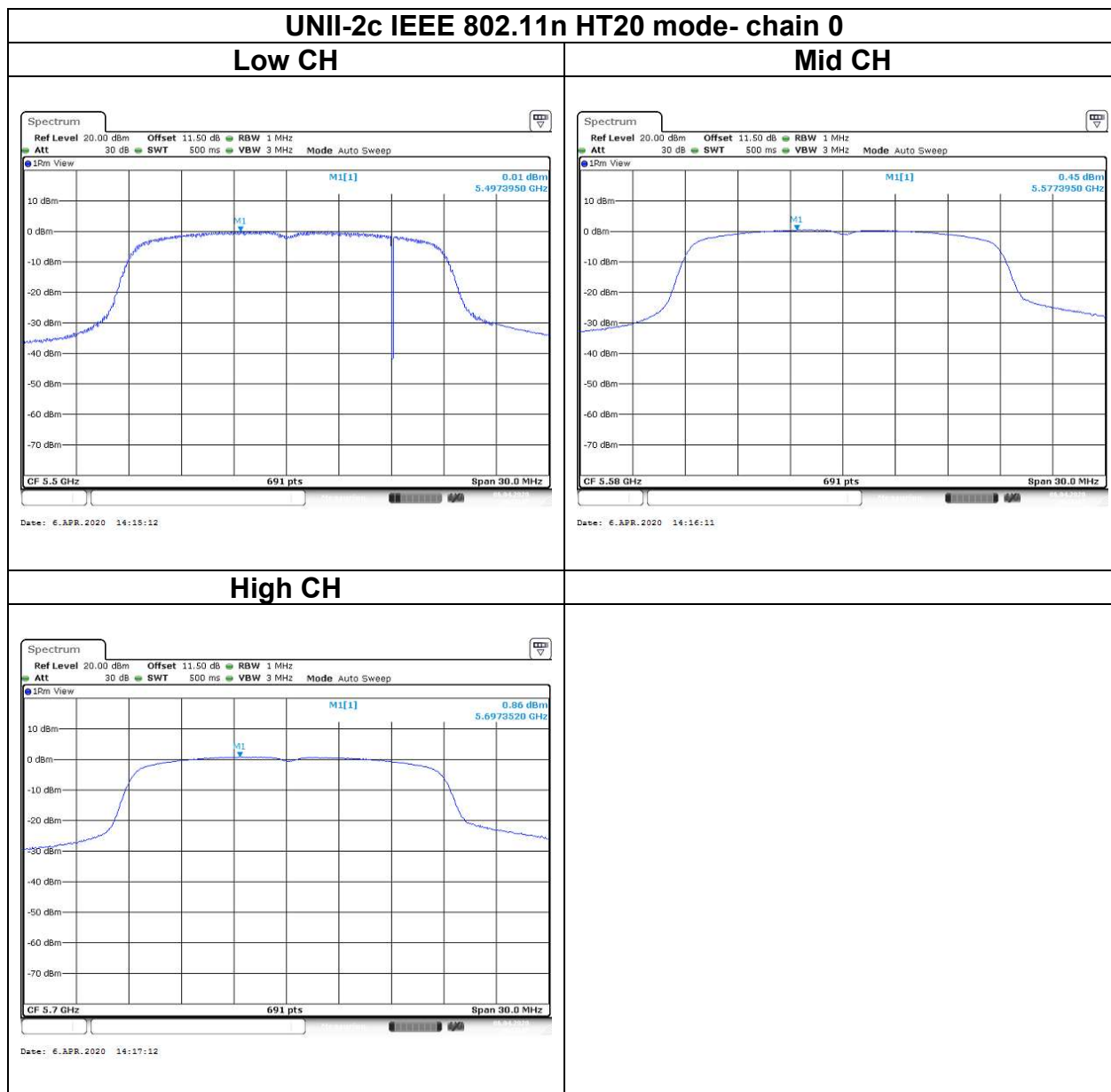


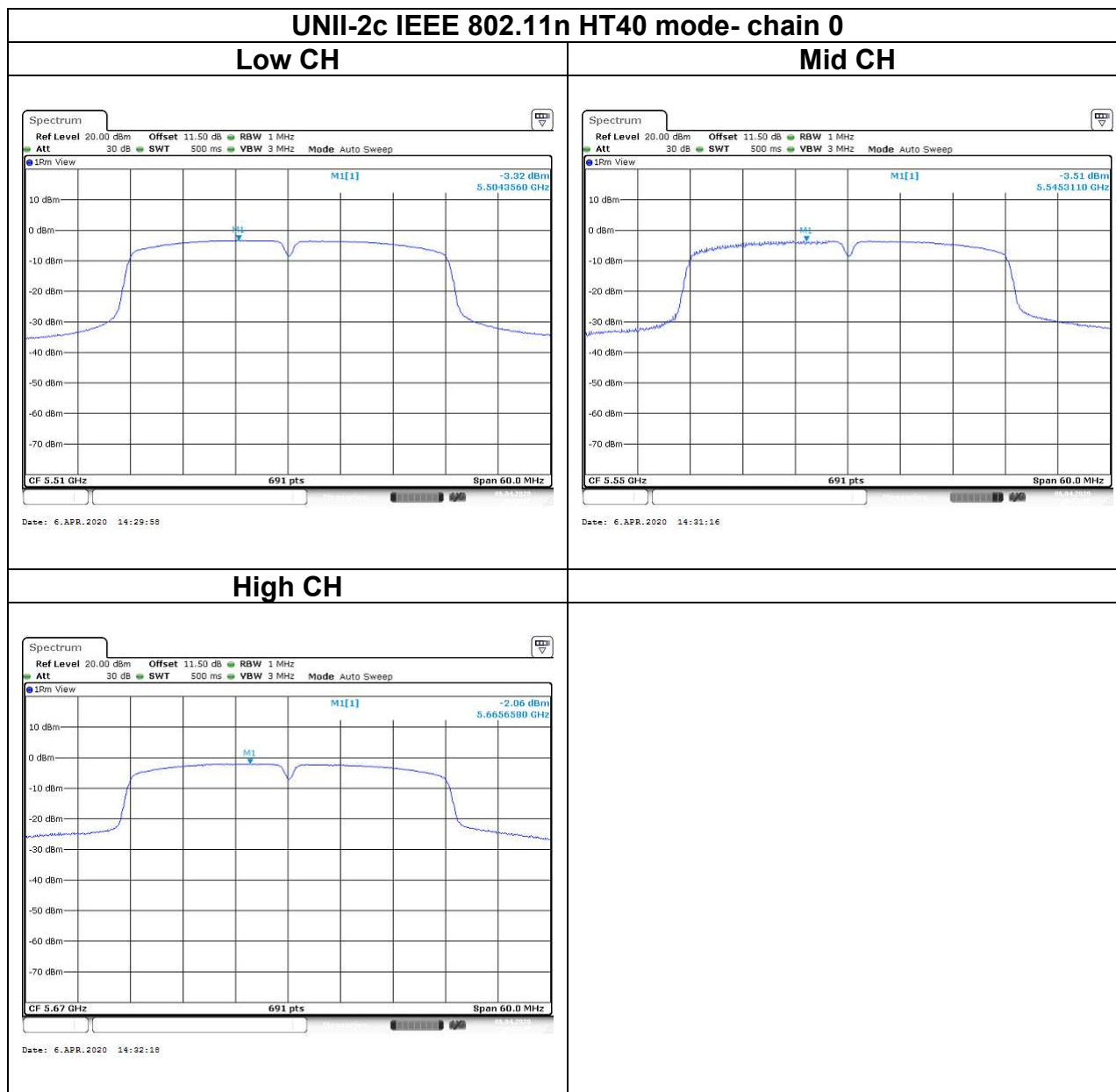


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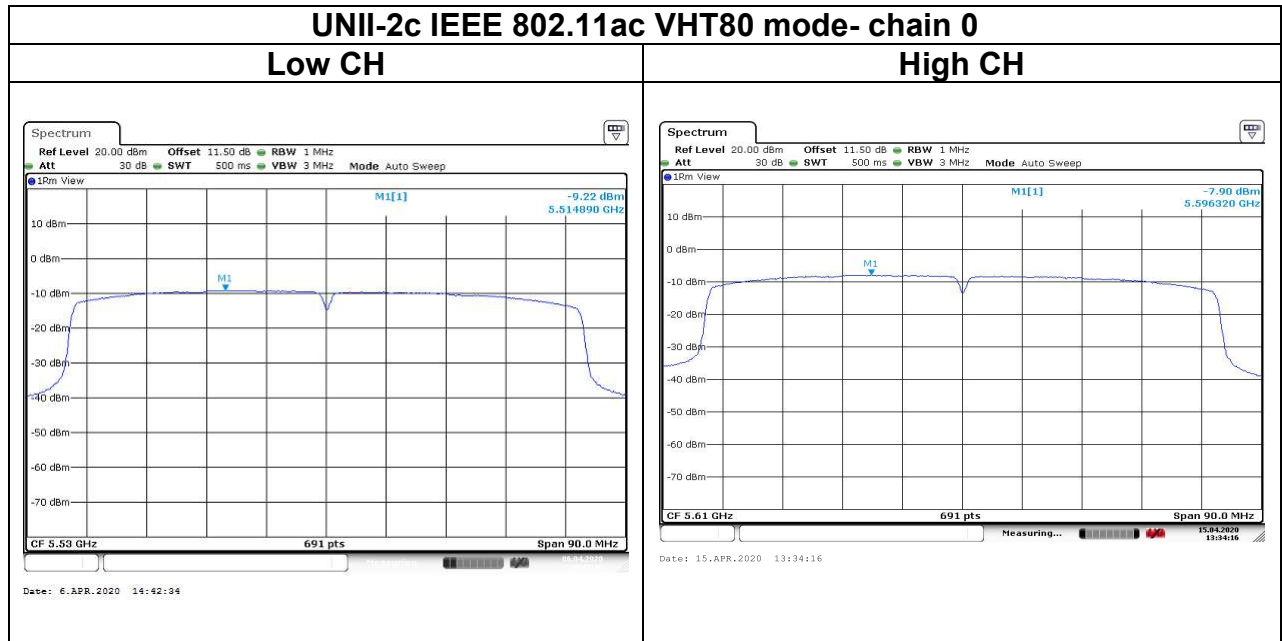




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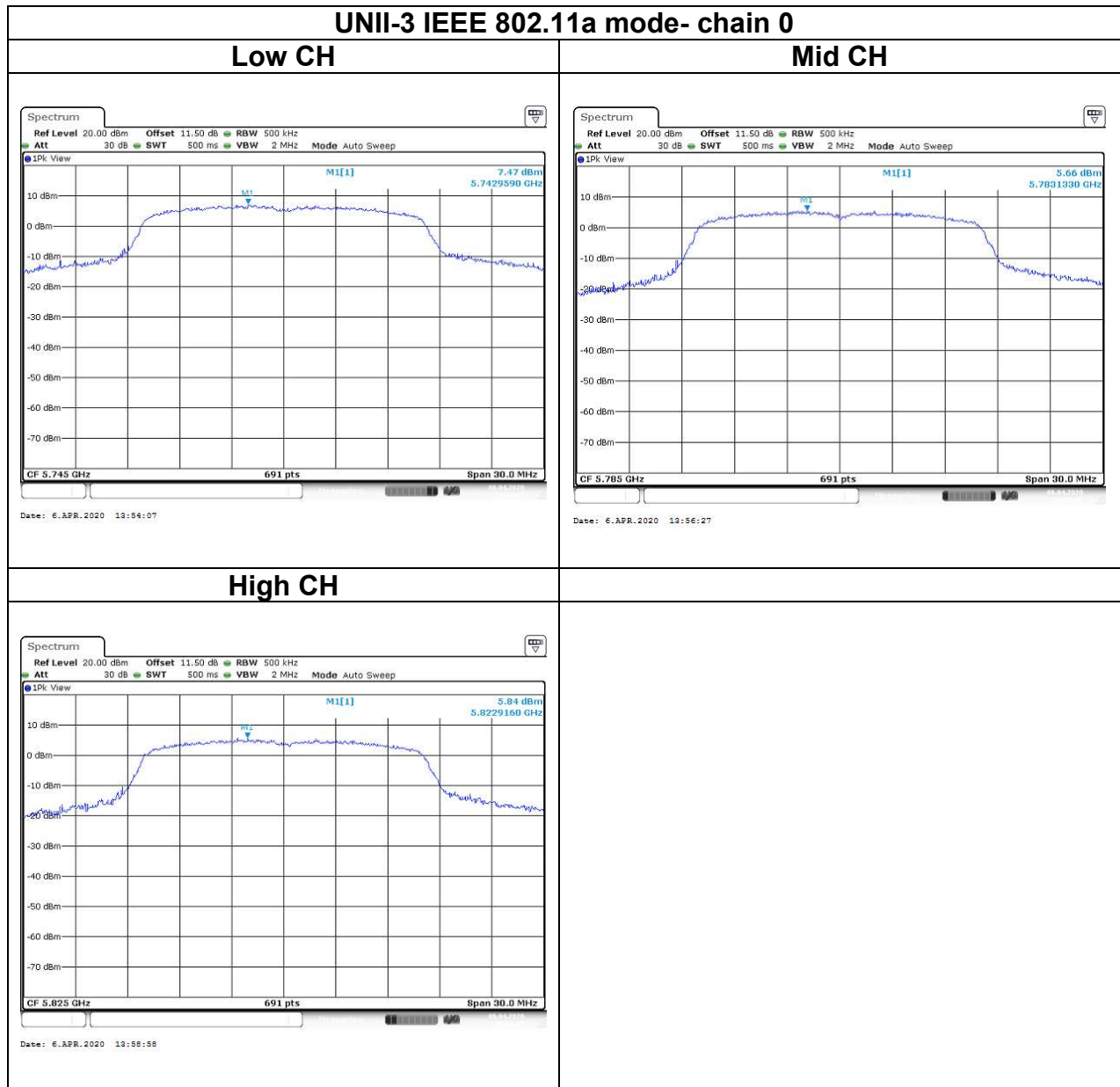


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Test Data

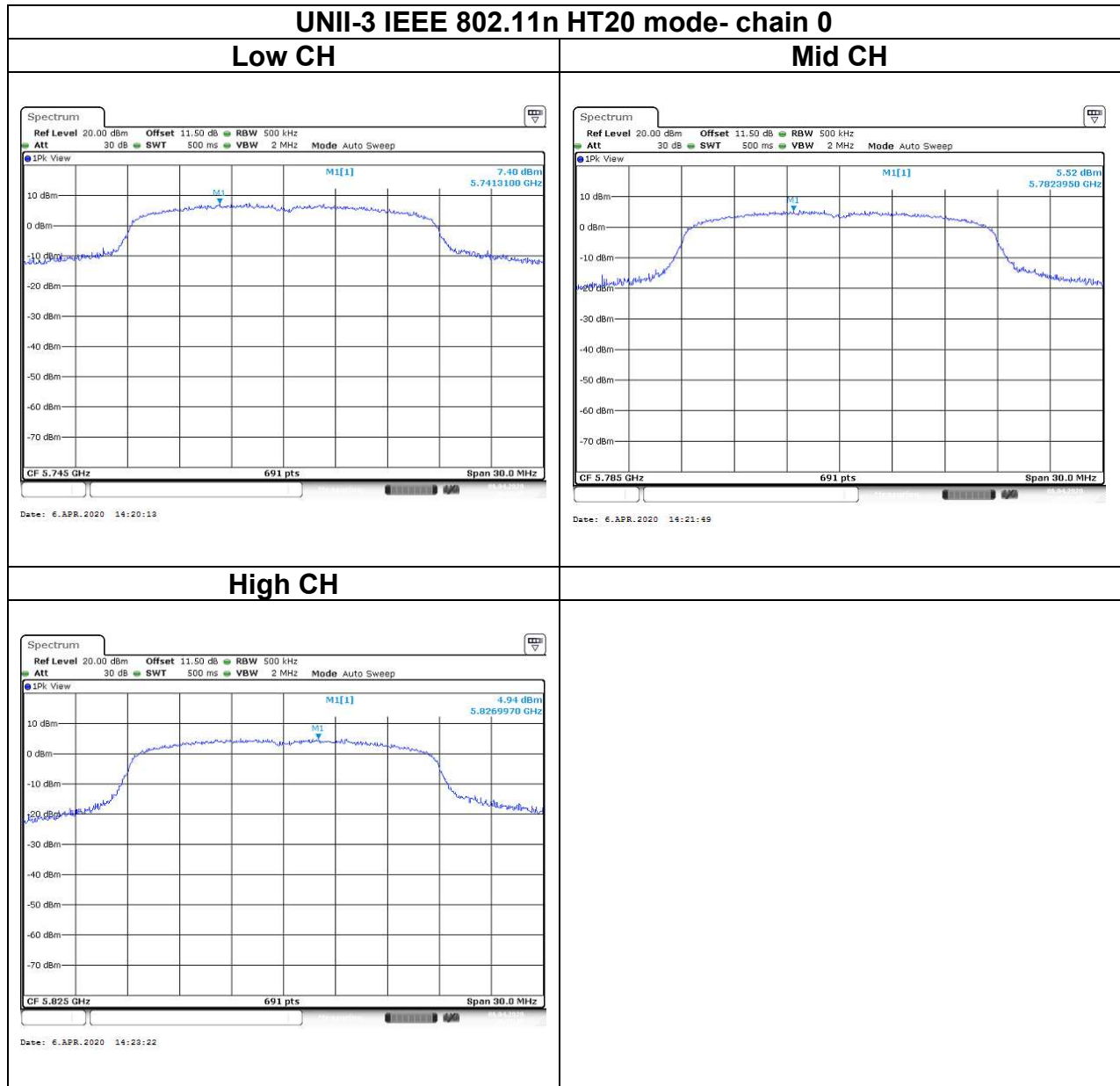


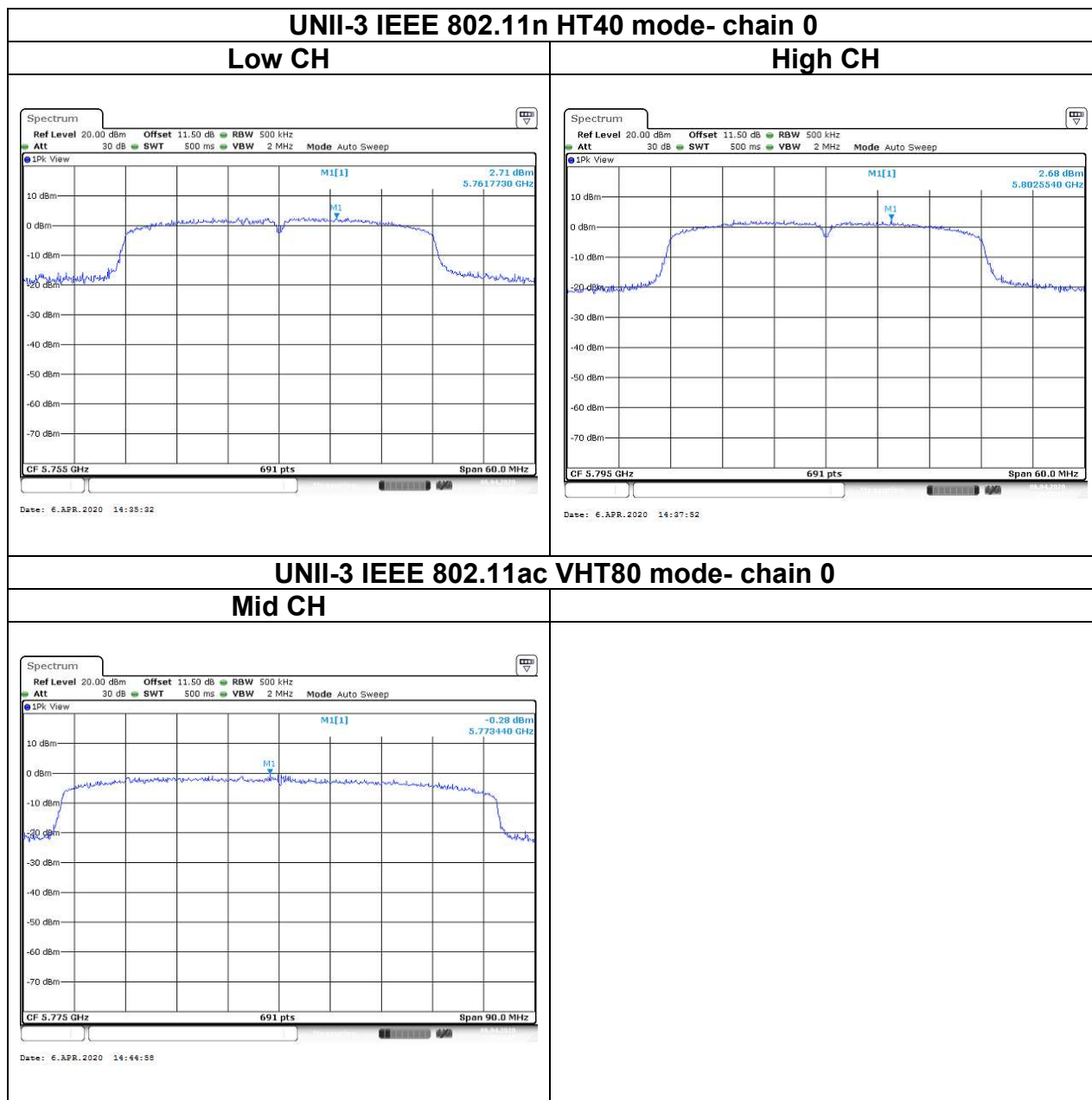


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4.5 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

FCC according to §15.407, §15.209 and §15.205,

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

UNII-1 :

For transmitters operating in the band 5150-5250 MHz, all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p. However, any unwanted emissions that fall into the band 5250-5350 MHz must be 26 dBc, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth, above 5.25 GHz. Otherwise, the transmission is considered as intentional and the devices shall implement dynamic frequency selection (DFS) and transmitter power control (TPC) as per the requirements for the band 5250-5350 MHz

UNII-2a and 2c :

For devices with operating frequencies in the band 5250-5350 MHz but having a channel bandwidth that overlaps the band 5150-5250 MHz, the devices' unwanted emission shall not exceed -27 dBm/MHz e.i.r.p. outside the band 5150-5350 MHz and its power shall comply with the spectral power density for operation within the band 5150-5250 MHz. The device shall be labelled "for indoor use only." Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

UNII-3:

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.



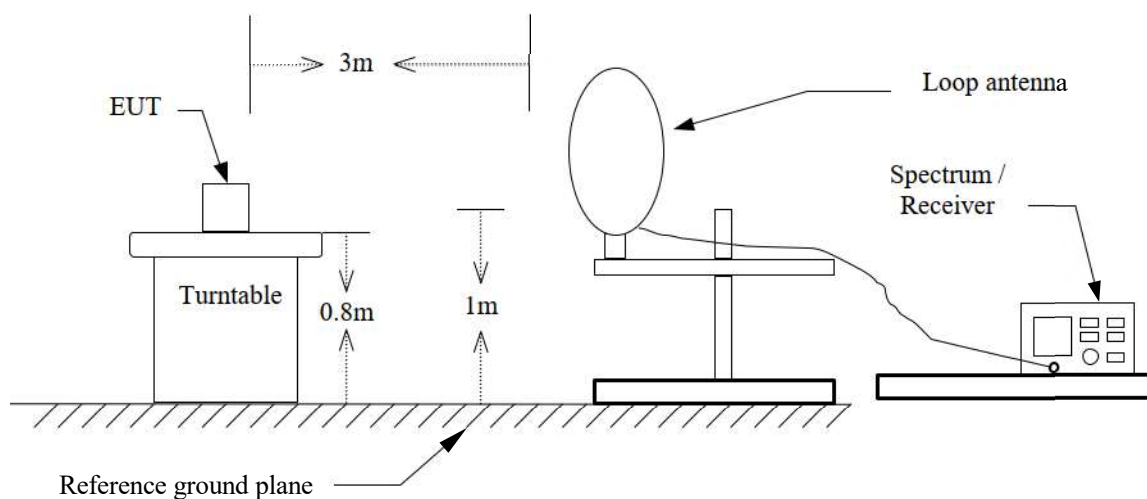
4.5.2 Test Procedure

Test method Refer as KDB 789033 D02.

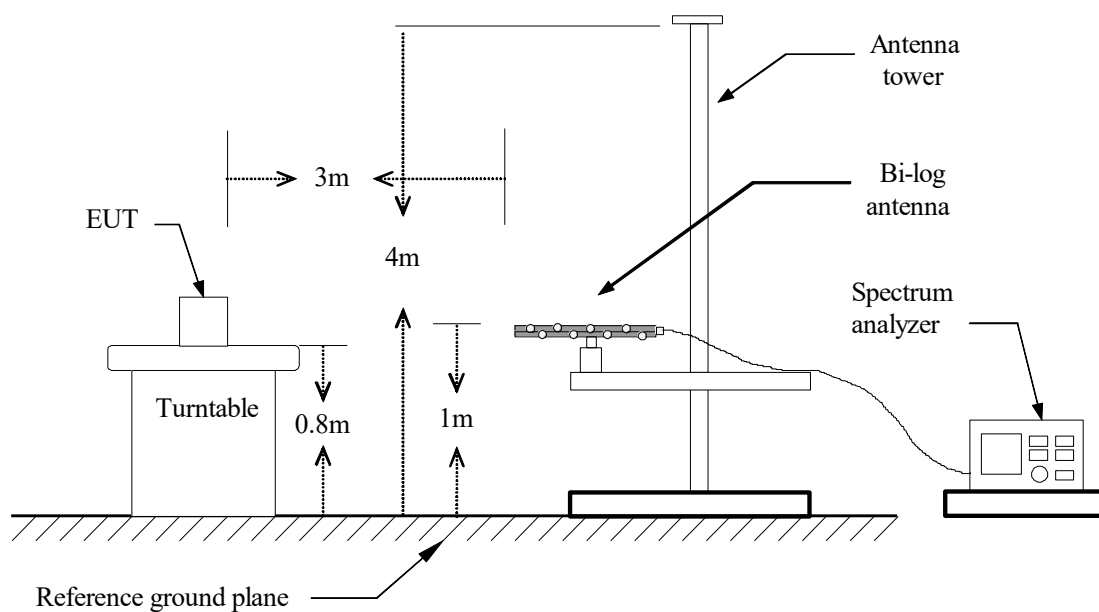
1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10: 2013, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 9kHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.
4. No emission found between lowest internal used/generated frequency to 30MHz (9KHz~30MHz)
5. The SA setting following :
 - (1) Below 1G : RBW = 100kHz, VBW $\geq 3 \times$ RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW ≥ 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
If Duty Cycle $\geq 98\%$, VBW=10Hz.
If Duty Cycle $< 98\%$, VBW=1/T.

4.5.3 Test Setup

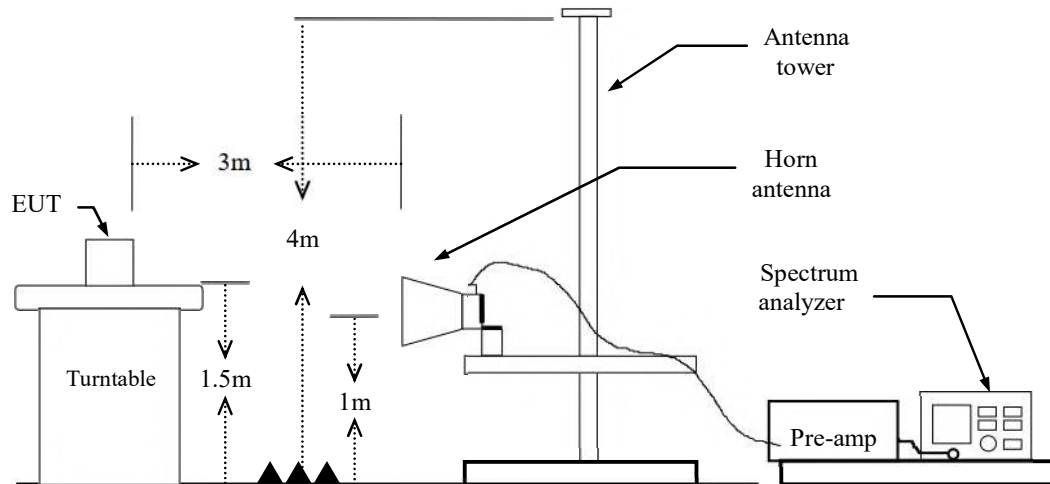
9kHz ~ 30MHz



30MHz ~ 1GHz



Above 1 GHz



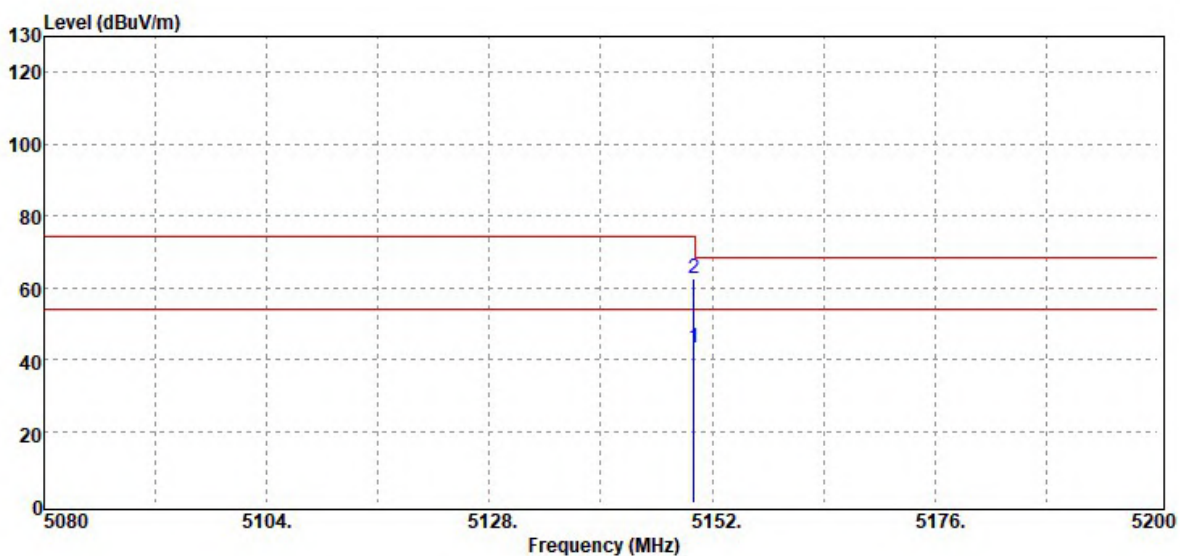
4.5.4 Test Result

Band Edge Test Data

PCB Antenna

Test Data for UNII-1

Test Mode	IEEE 802.11a / 5180MHZ	Temp/Hum	19.1(°C)/ 54%RH
Test Item	Band Edge	Test Date	December 25, 2019
Polarize	Vertical	Test Engineer	Jerry Chang
Detector	Peak and Average		



Frequency (MHz)	Detector Mode PK/QP/AV	Spectrum Reading Level dBμV	Factor dB	Actual FS dBμV/m	Limit @3m dBμV/m	Margin dB
5150.00	Average	38.42	4.92	43.34	54.00	-10.66
5150.00	Peak	57.65	4.92	62.57	74.00	-11.43