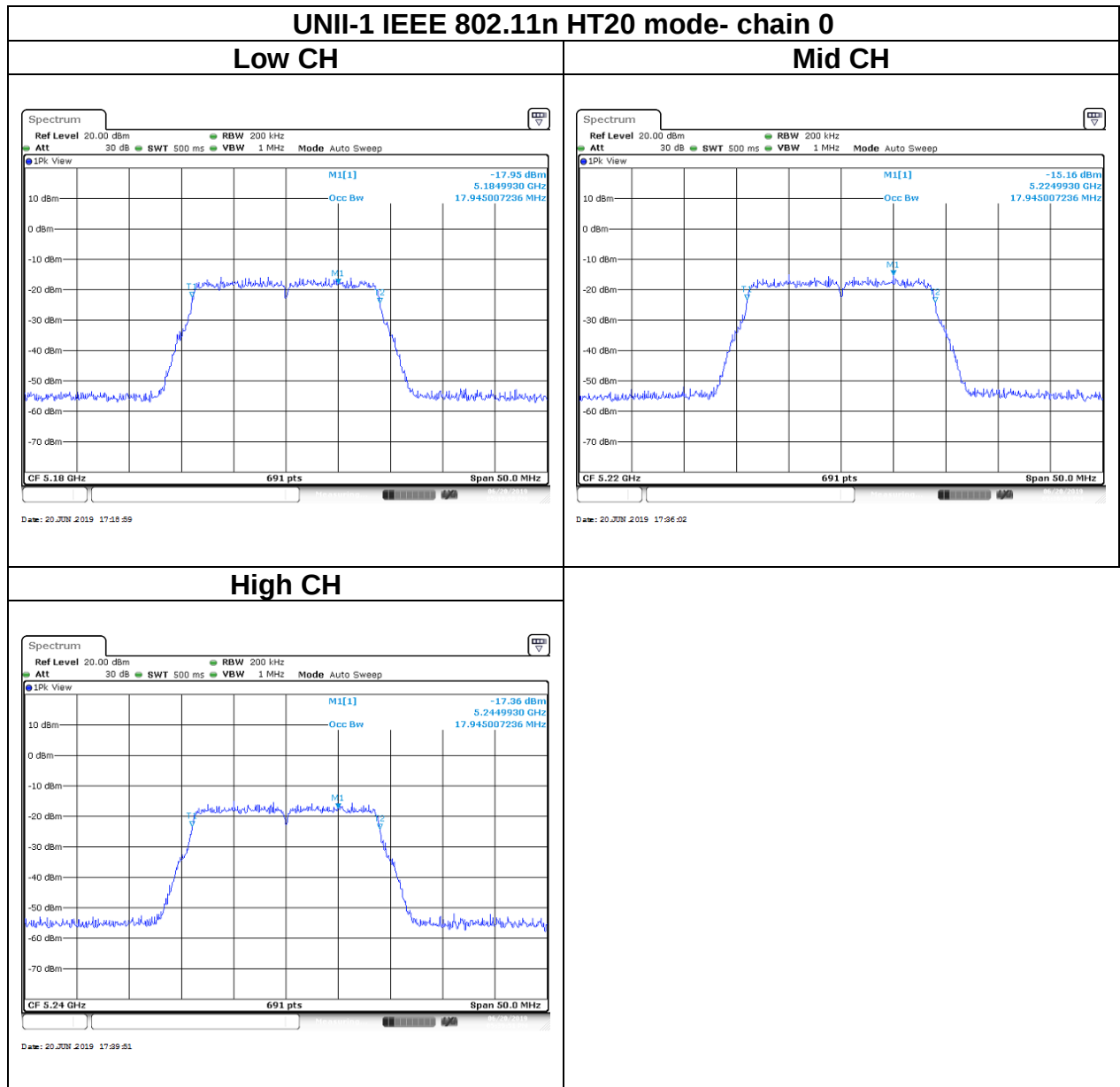


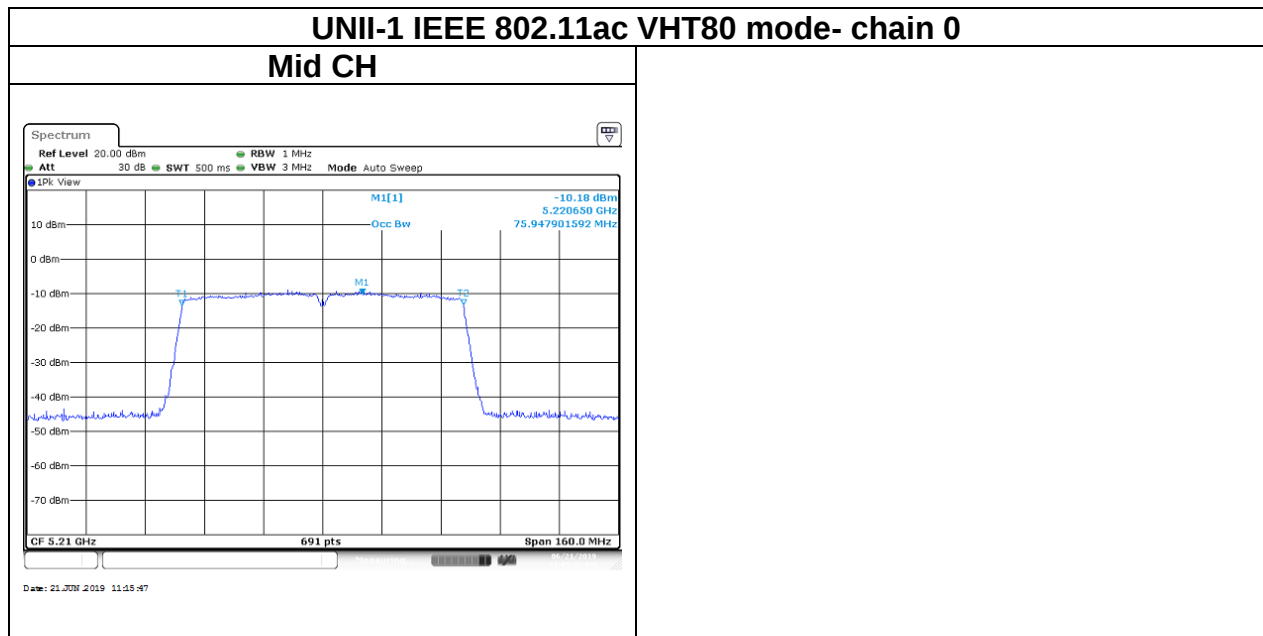
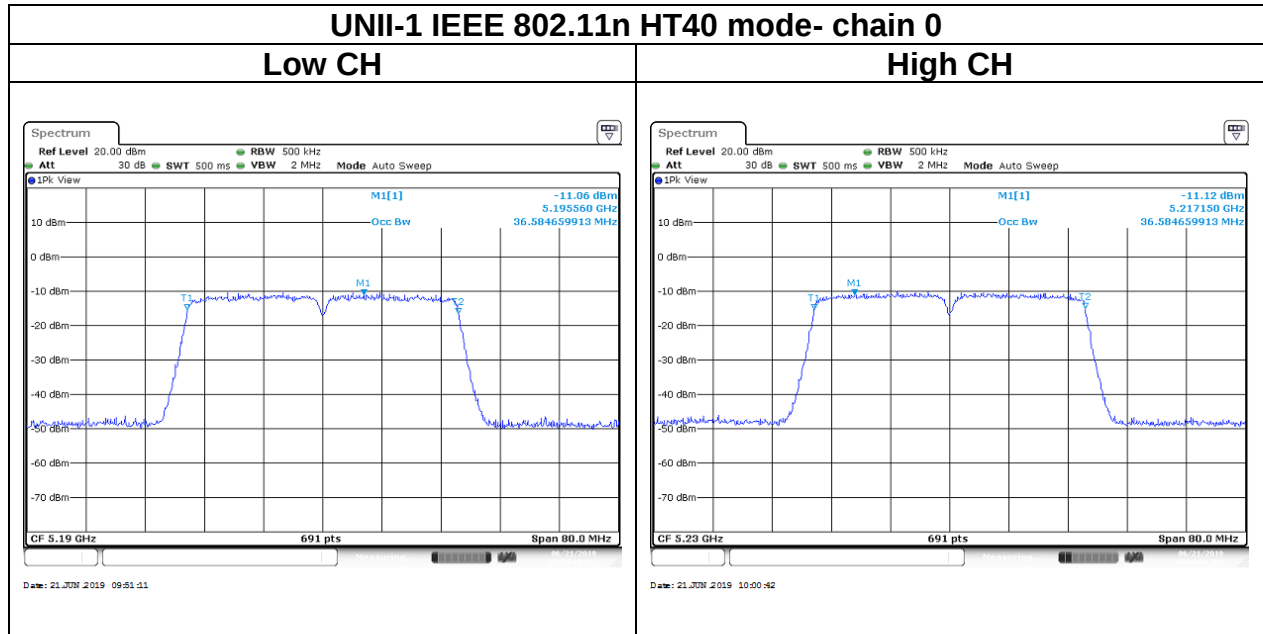


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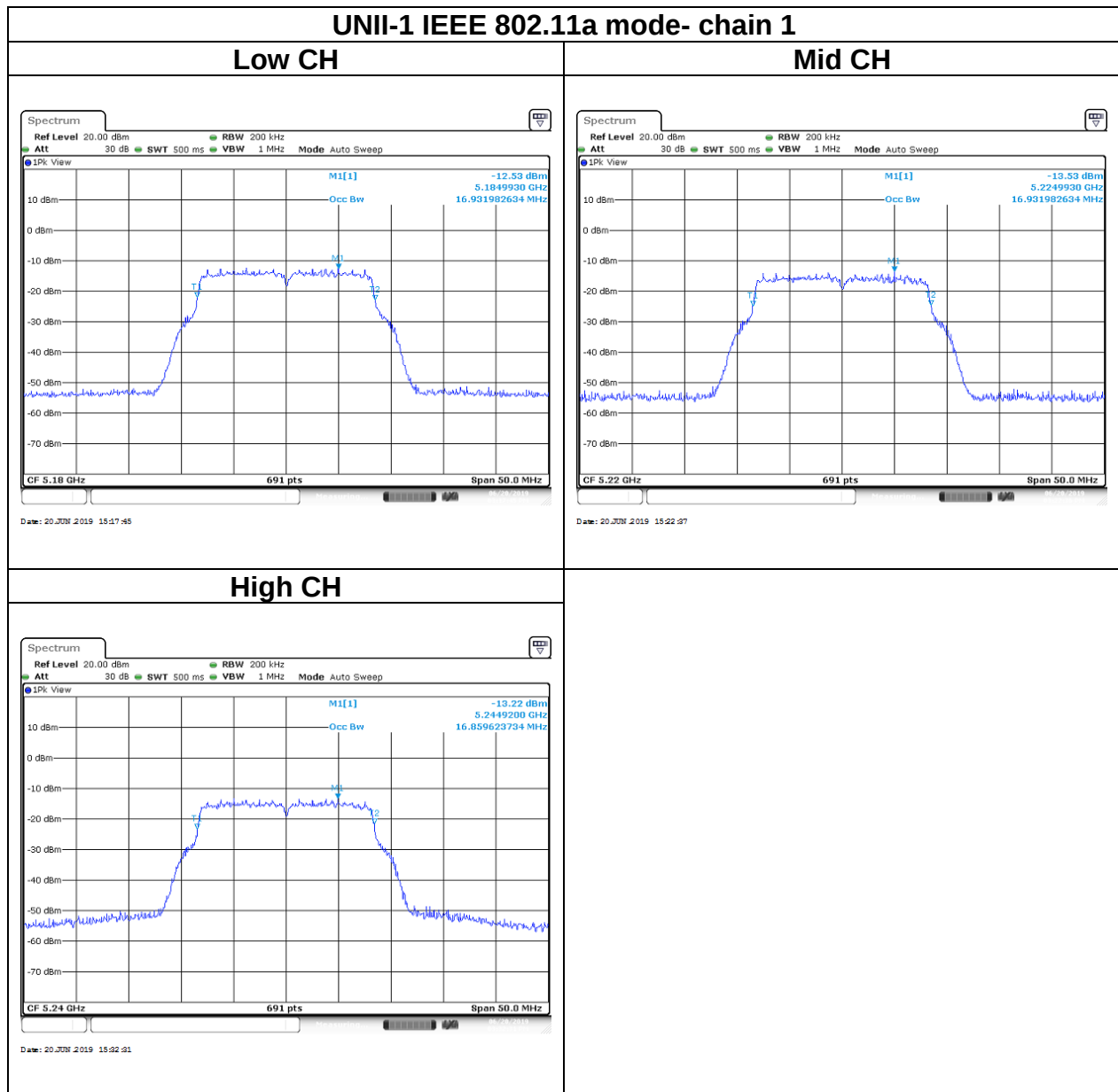


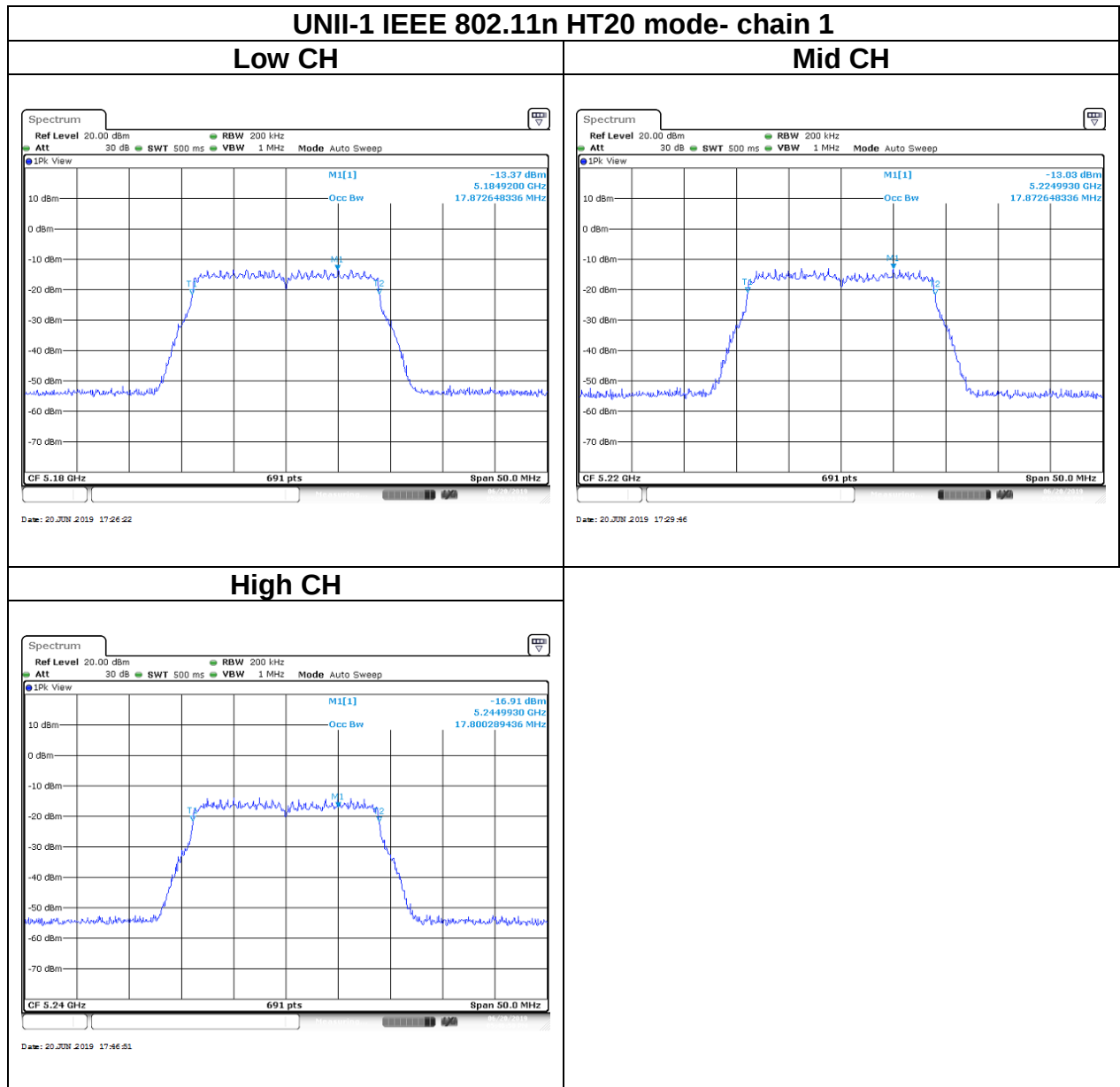
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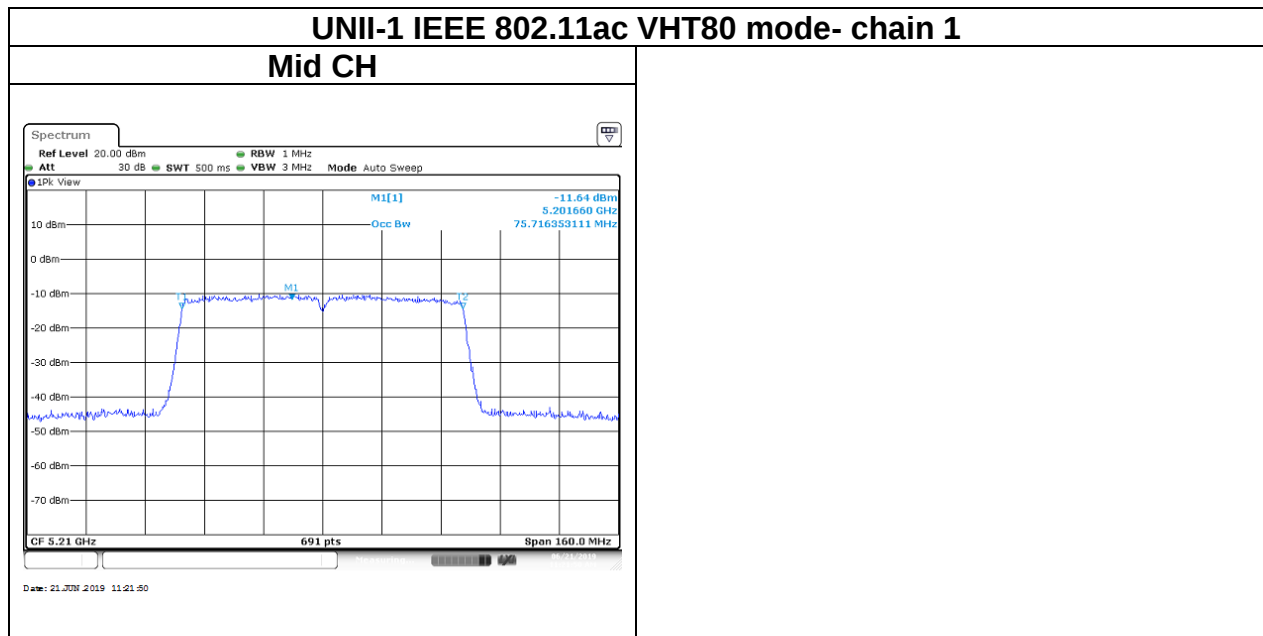
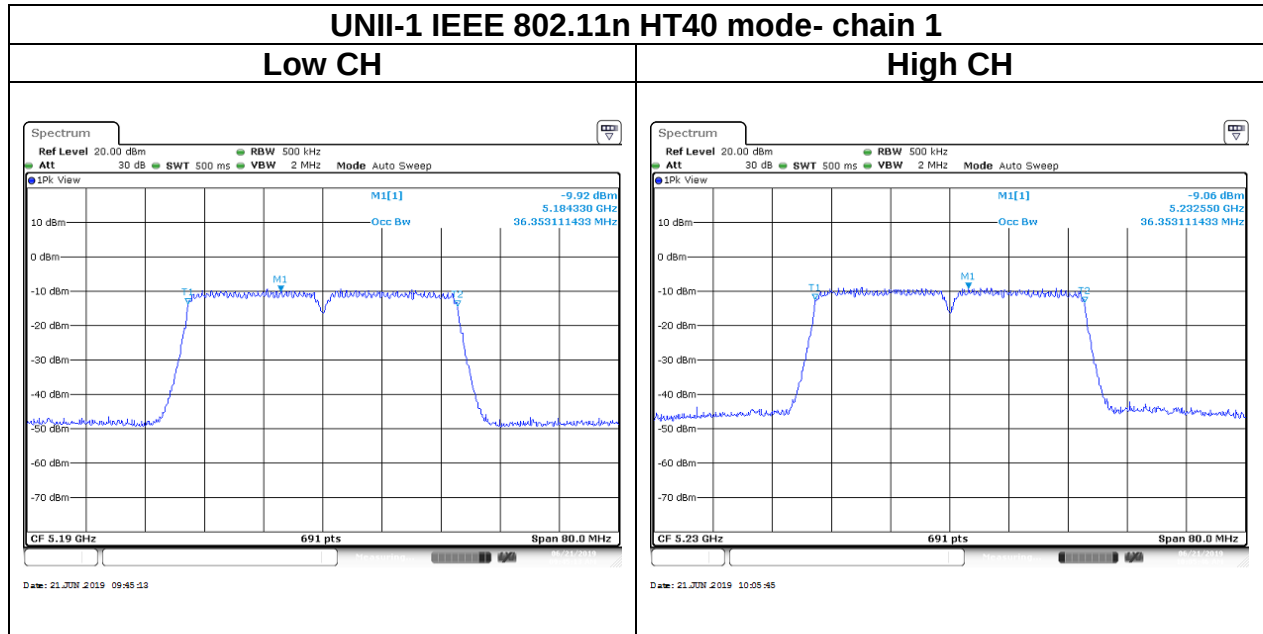
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chain 1









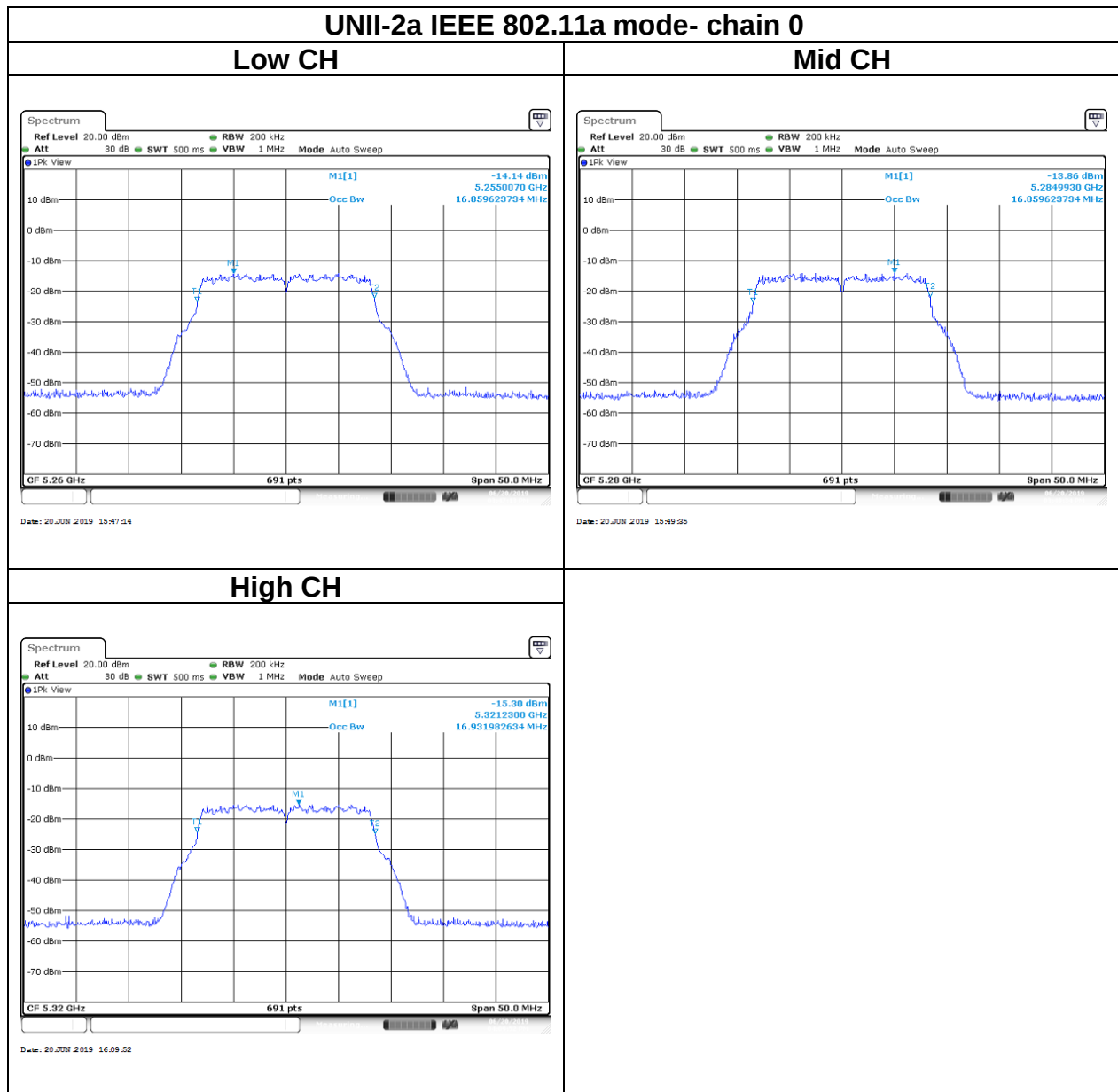
Report No.: T190503D05-A-RP4

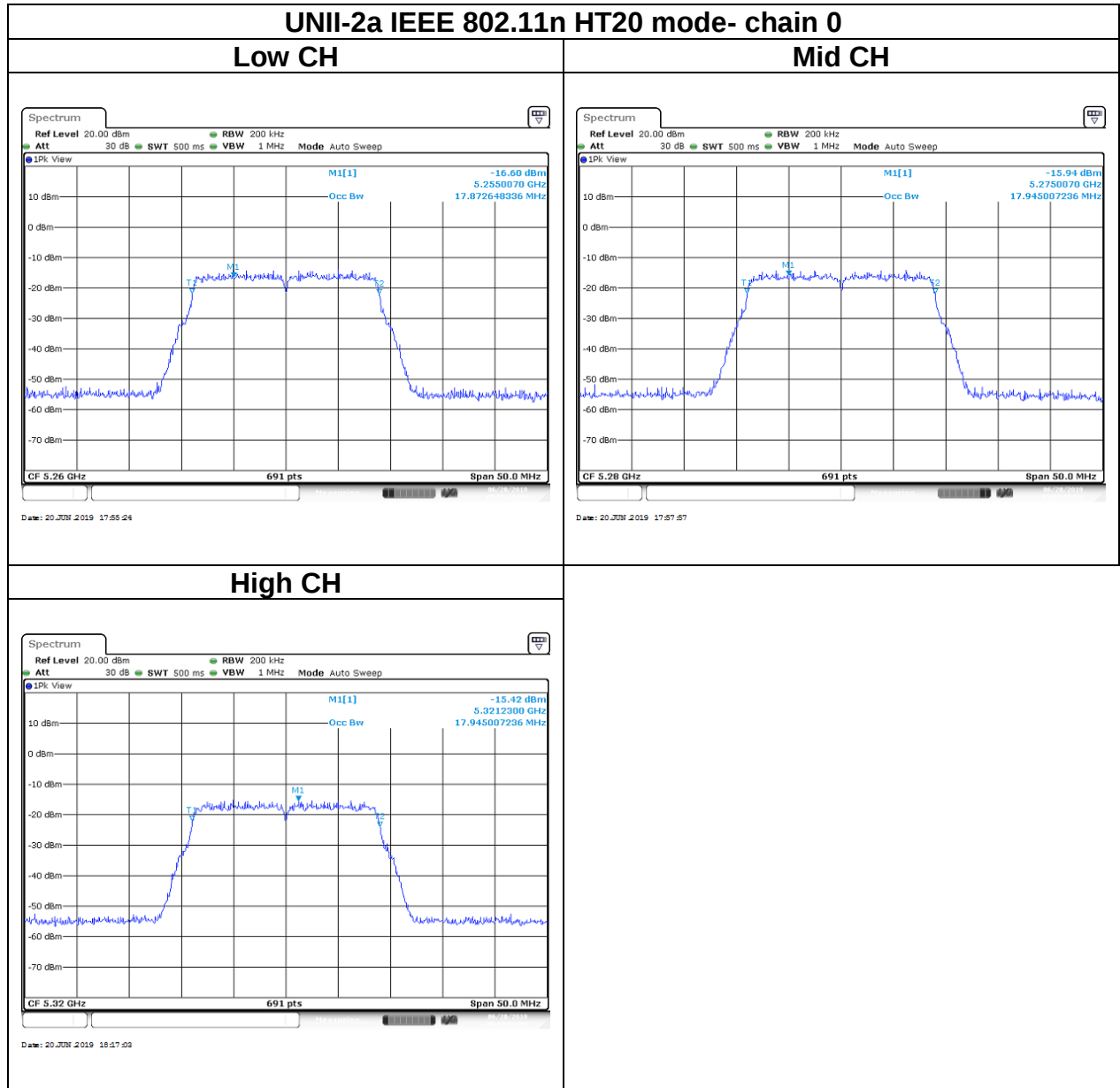
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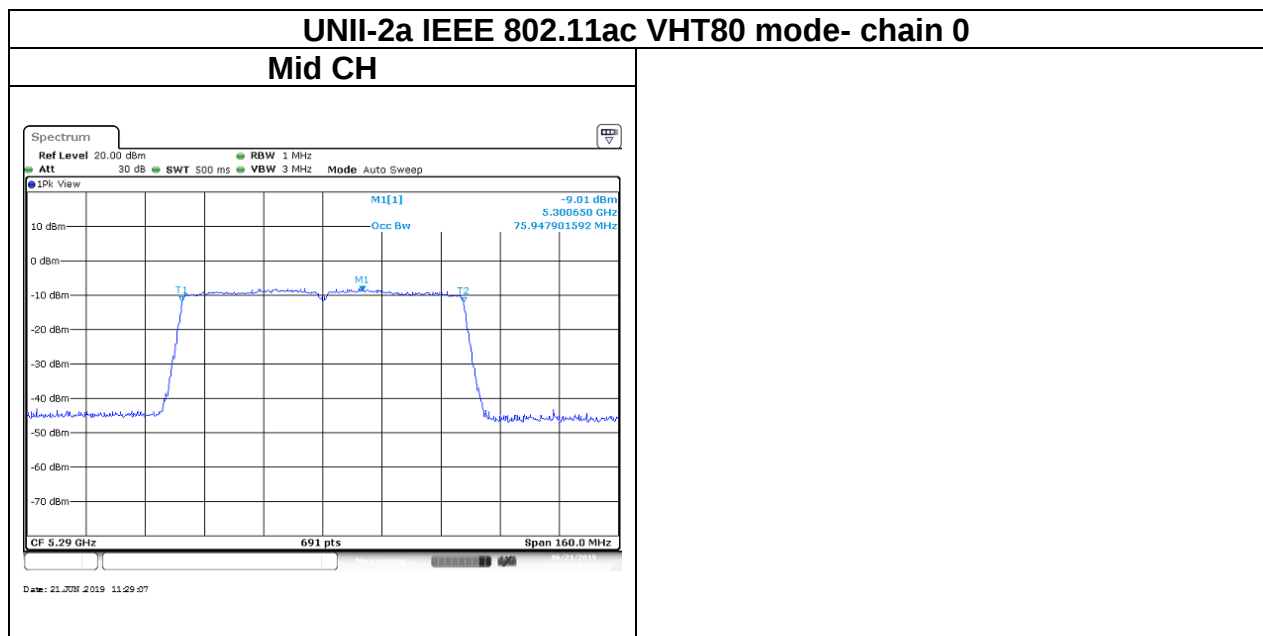
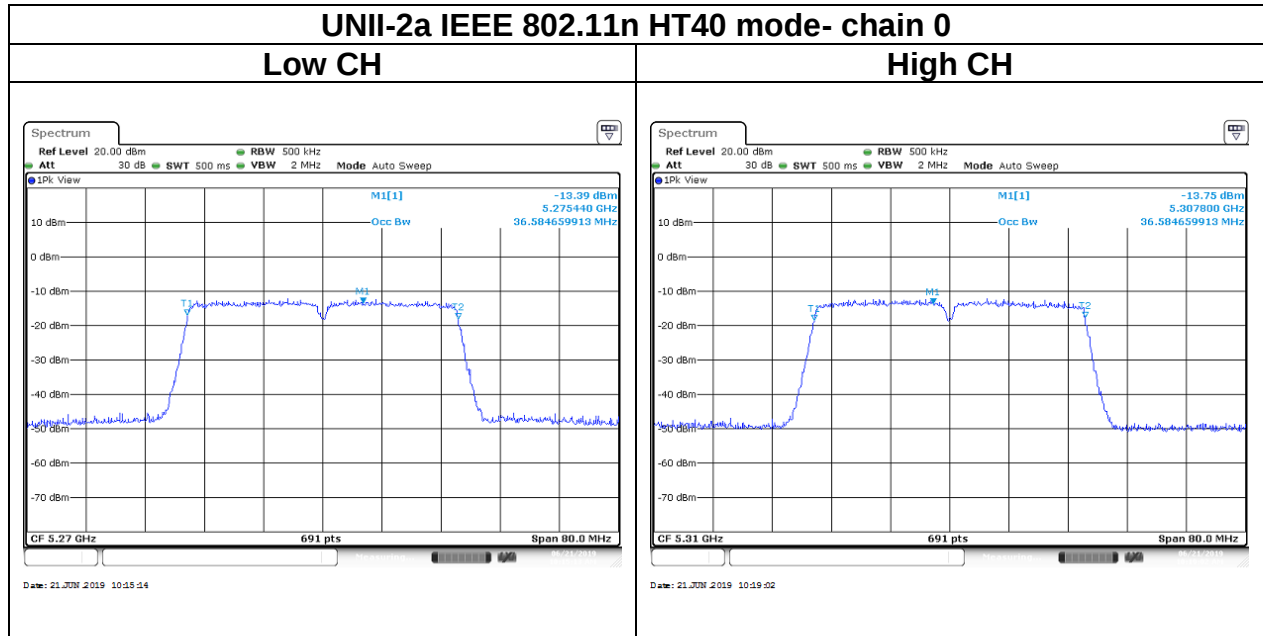
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Test Data (BANDWIDTH 99%)

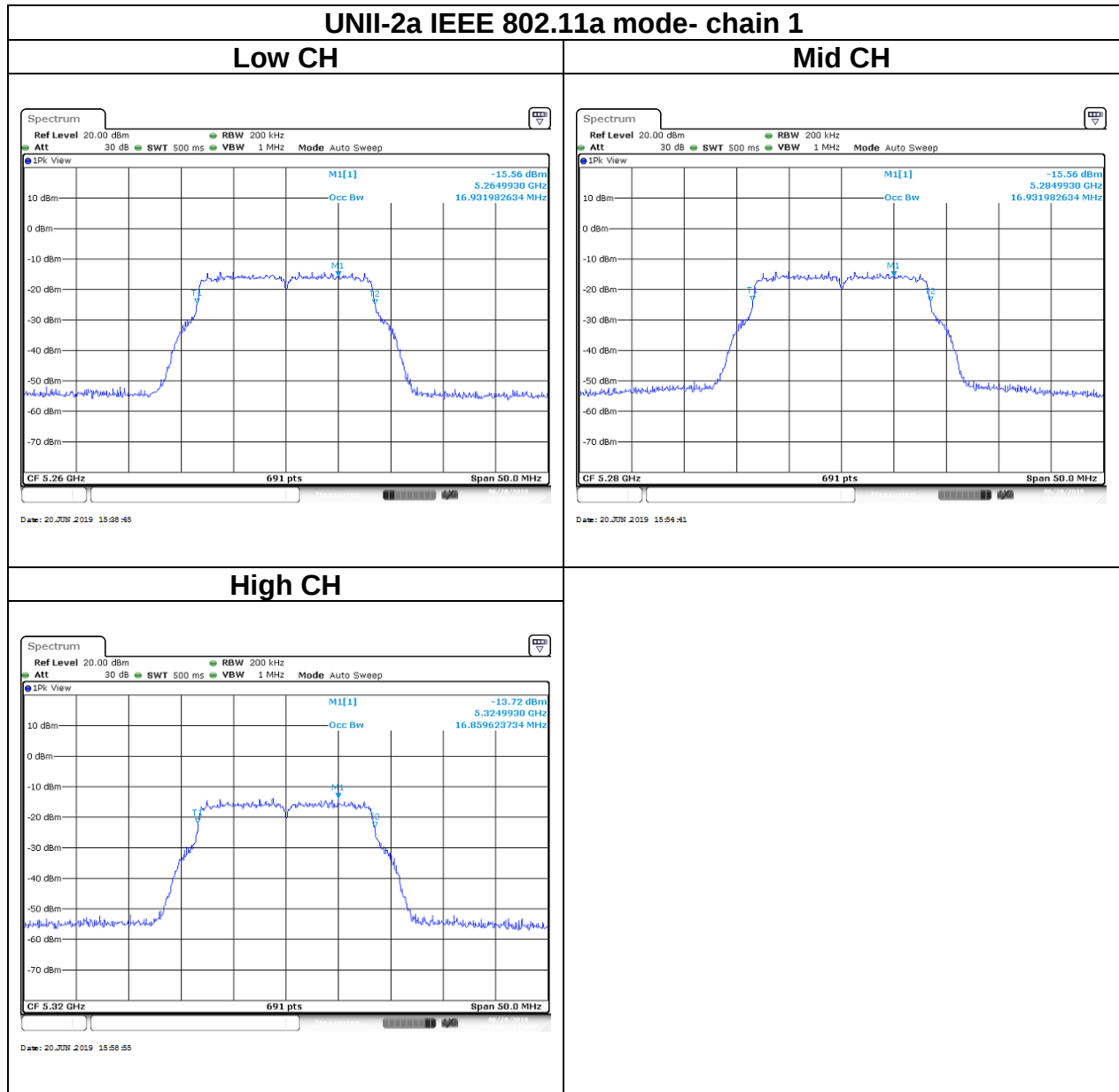
chain 0







chain 1

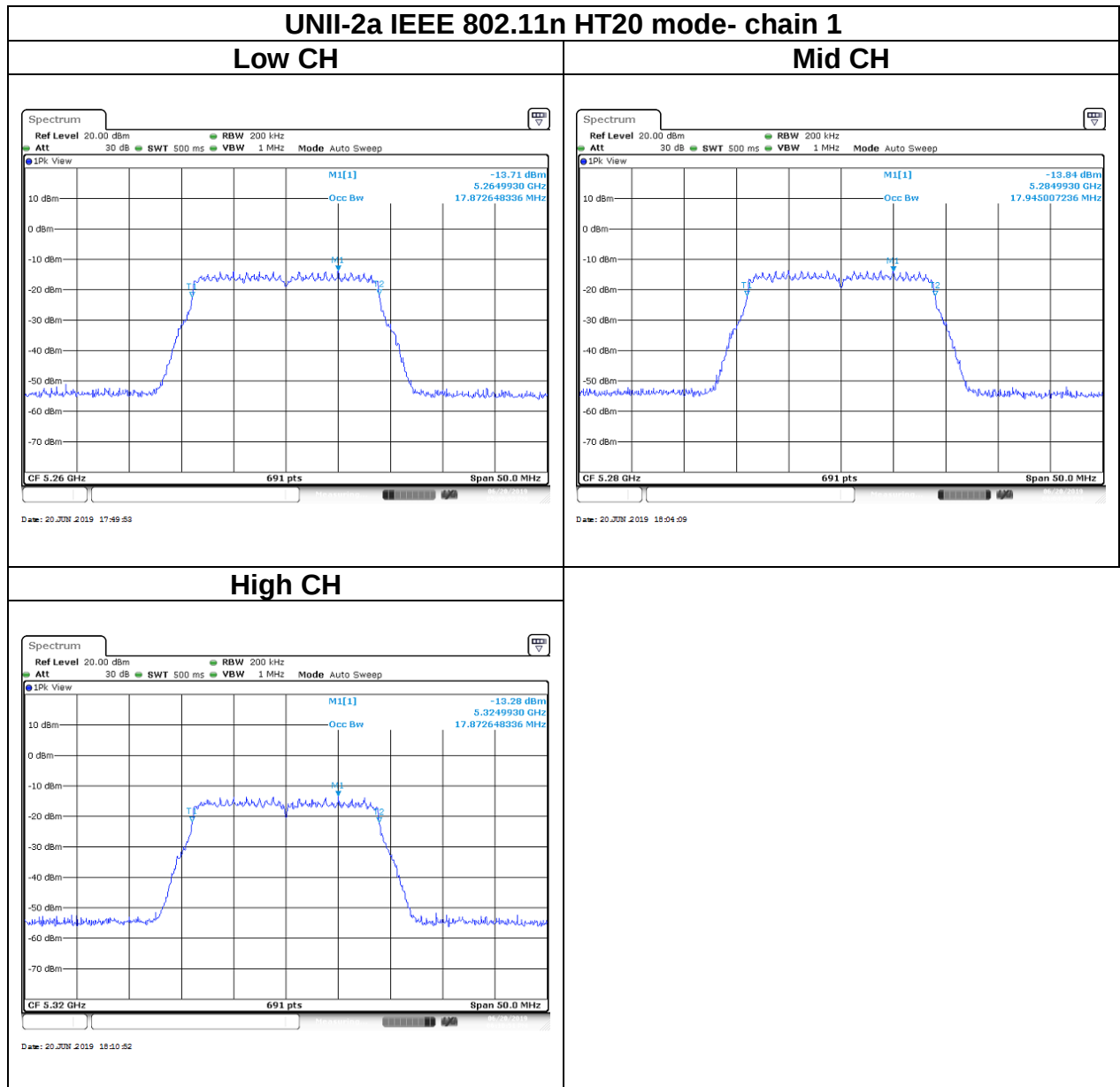


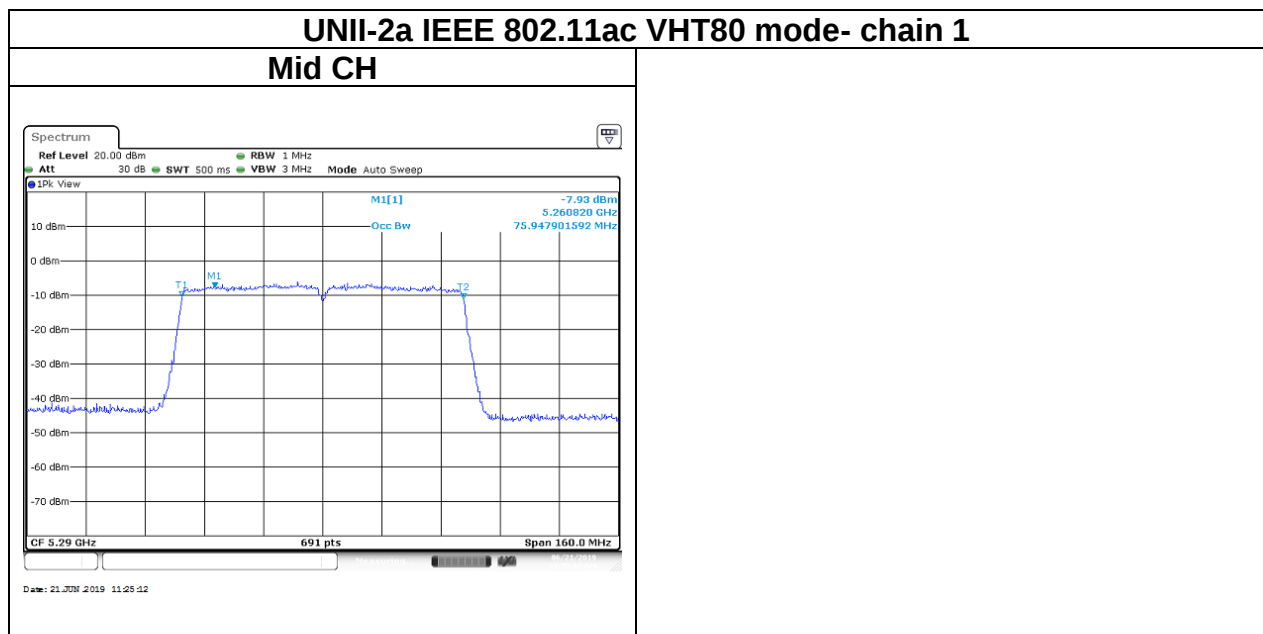
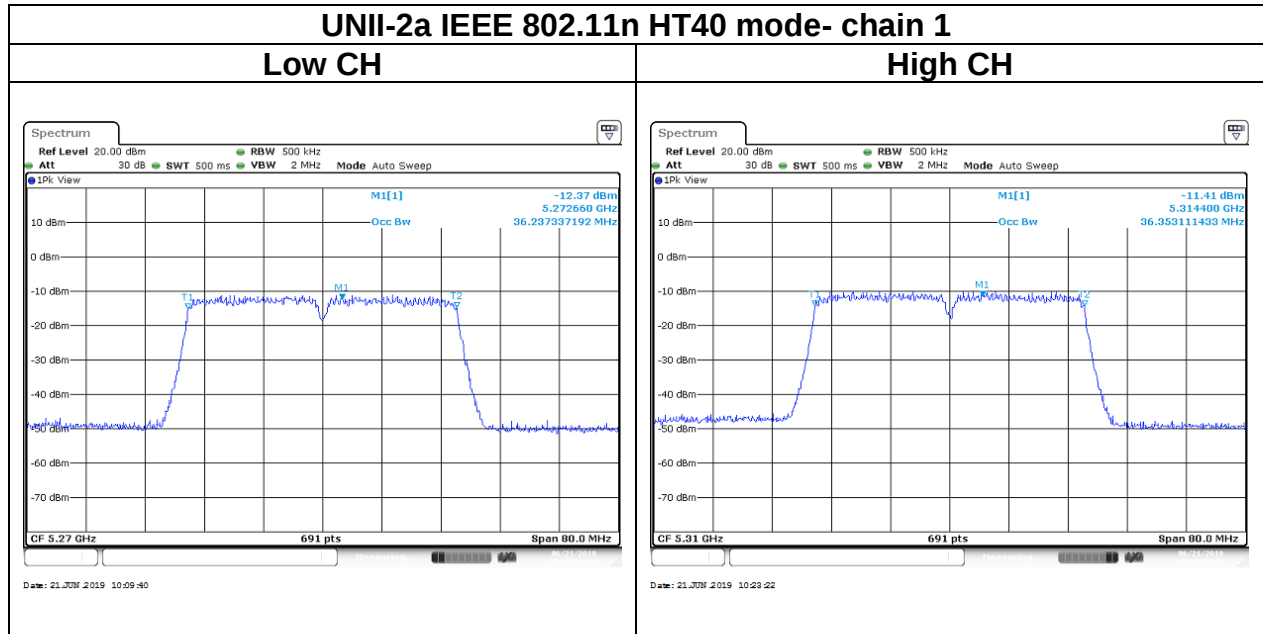


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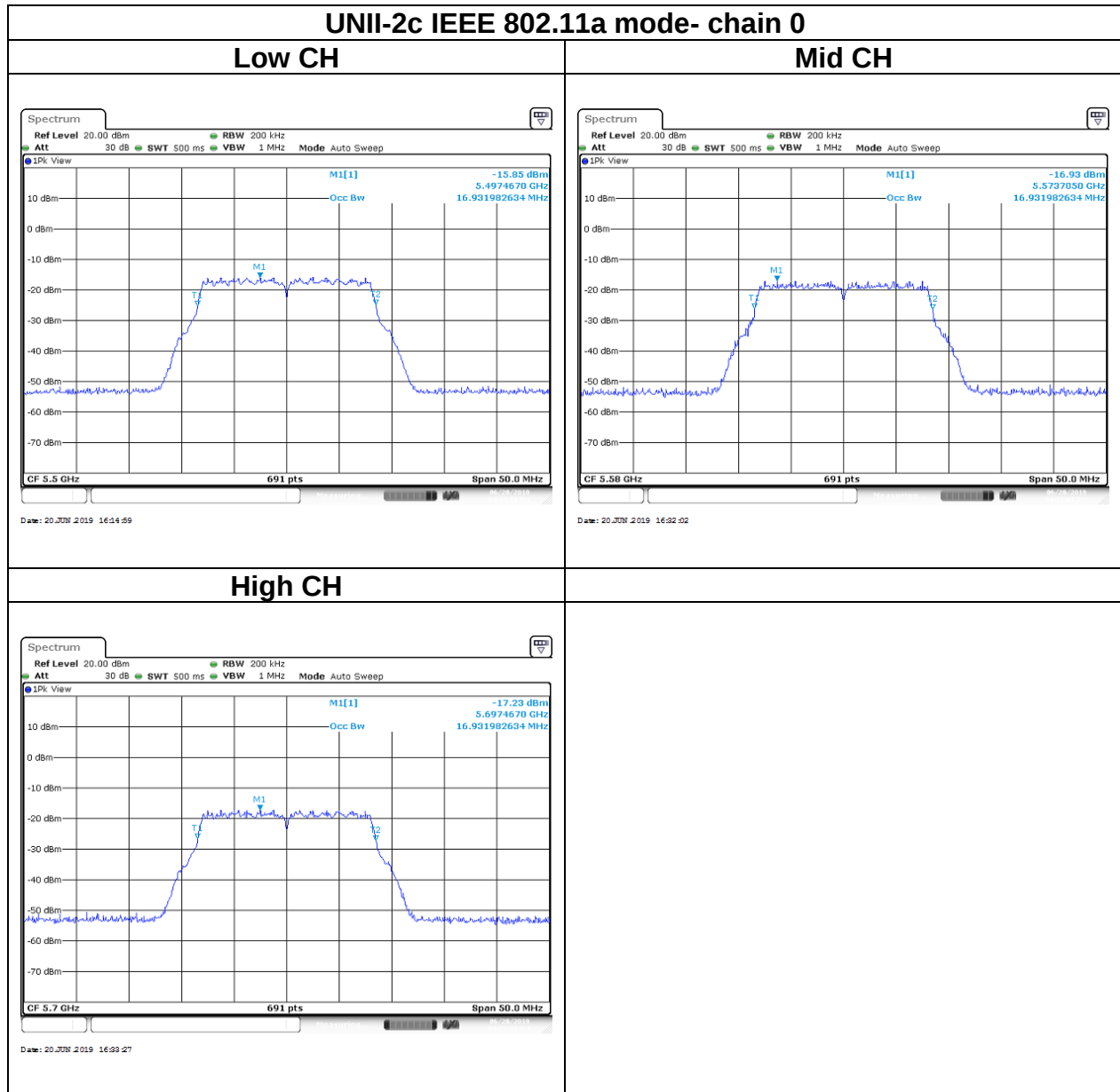


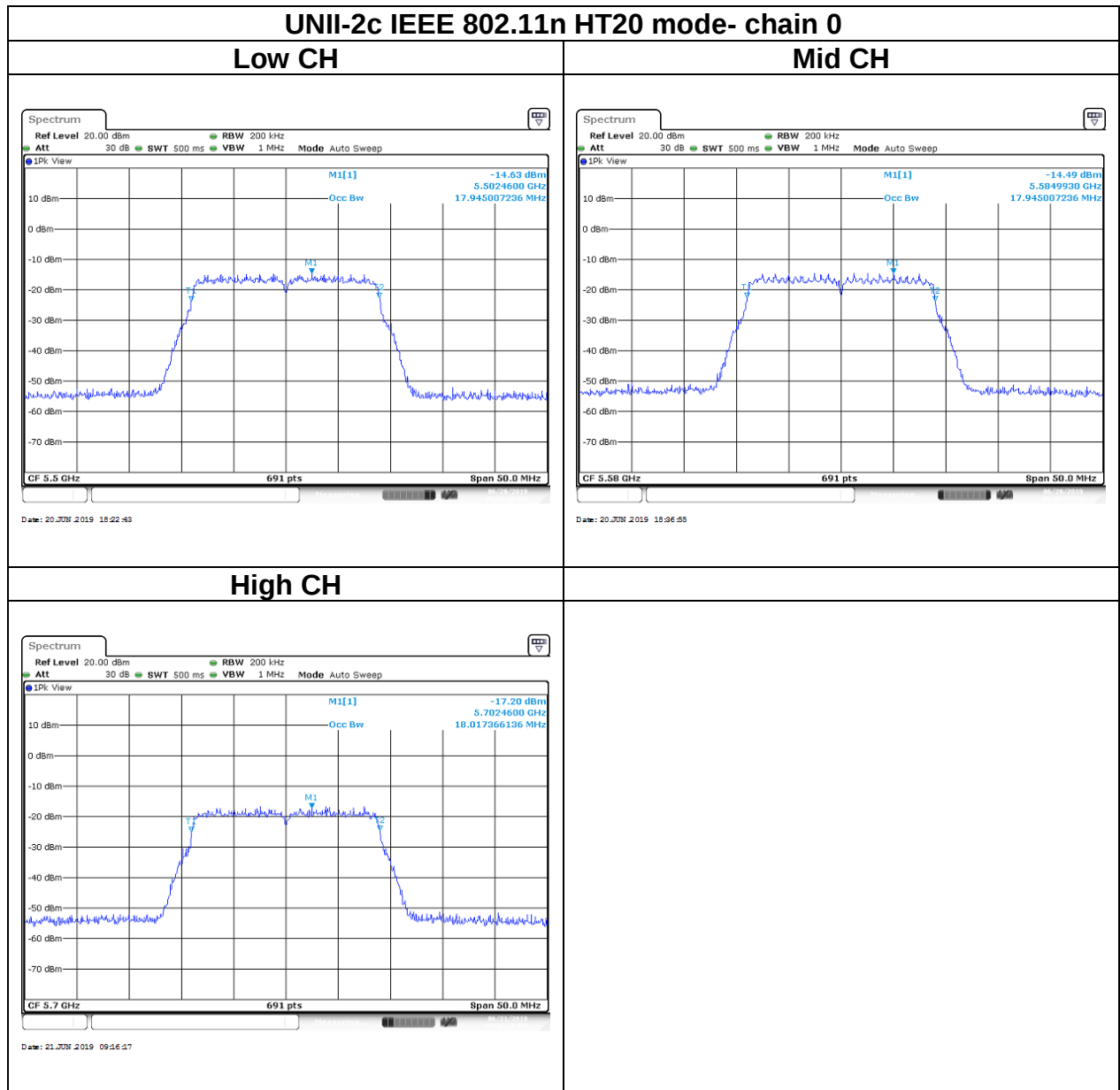


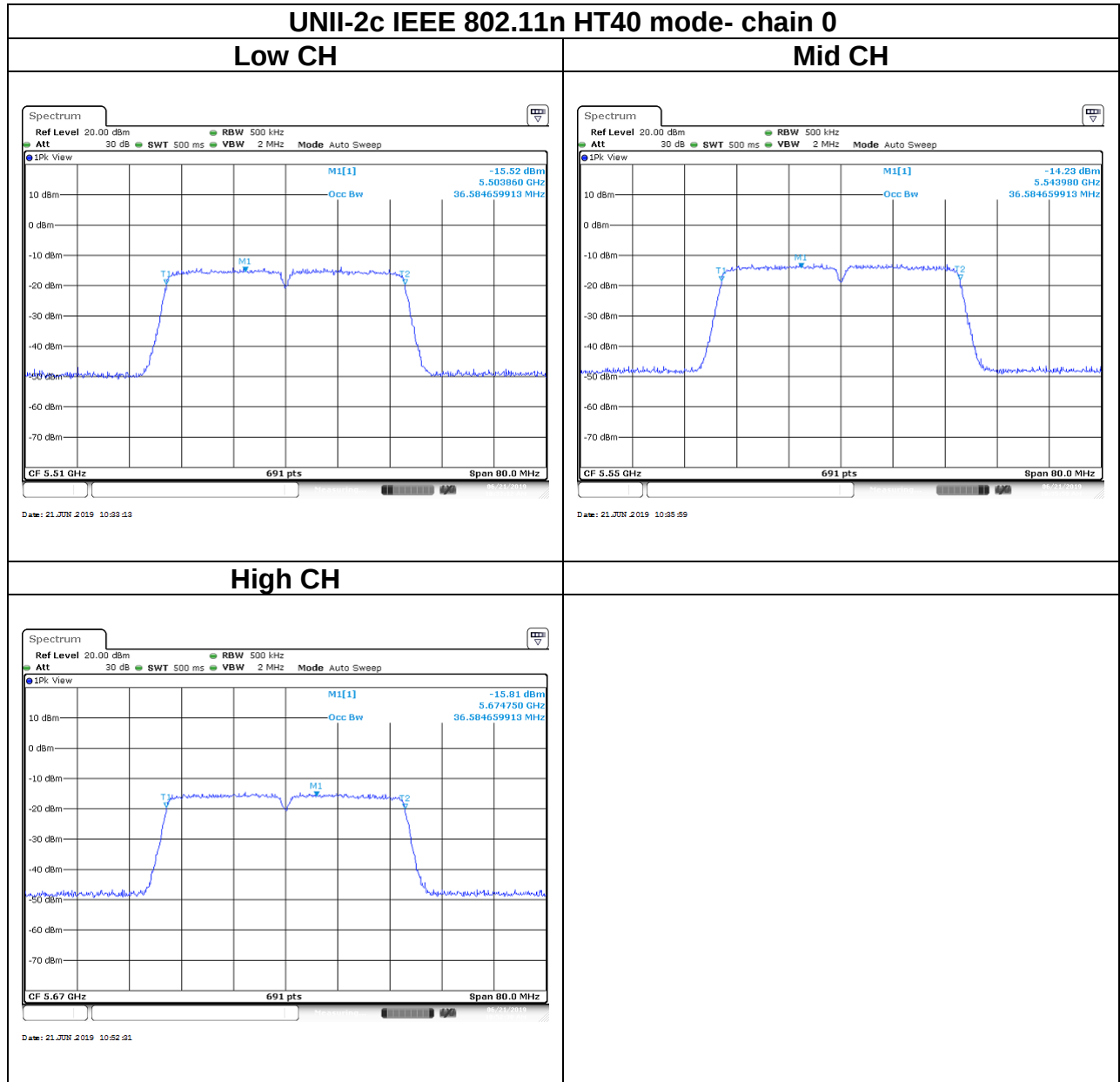
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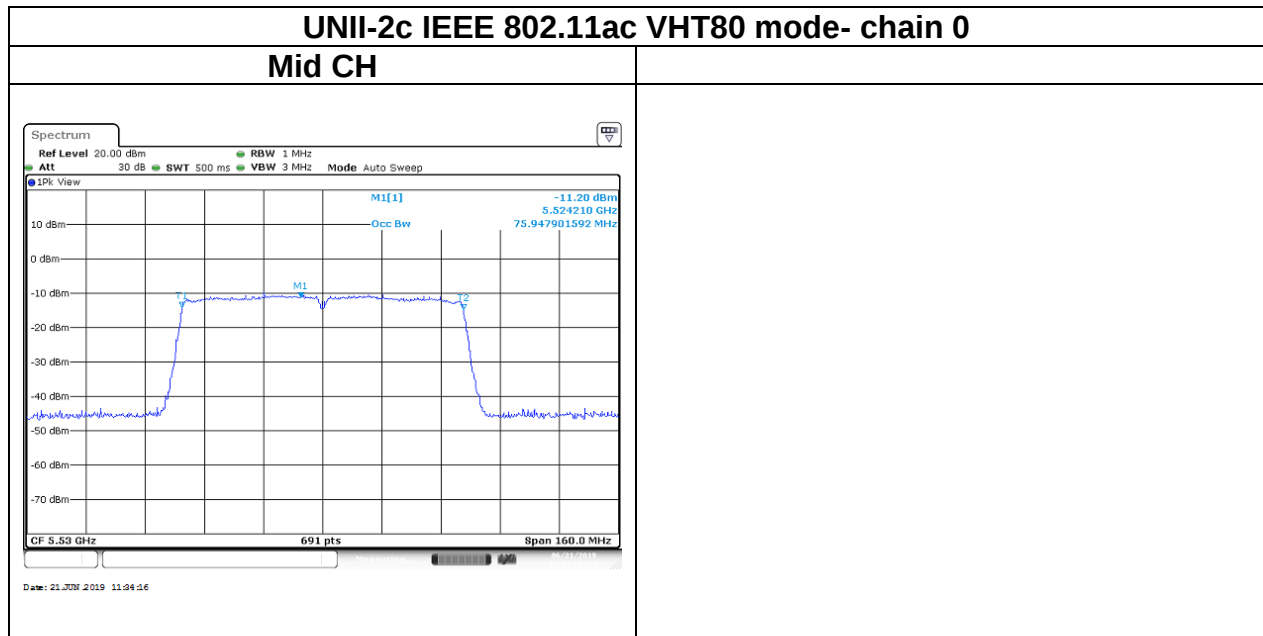
Test Data (BANDWIDTH 99%)

chain 0

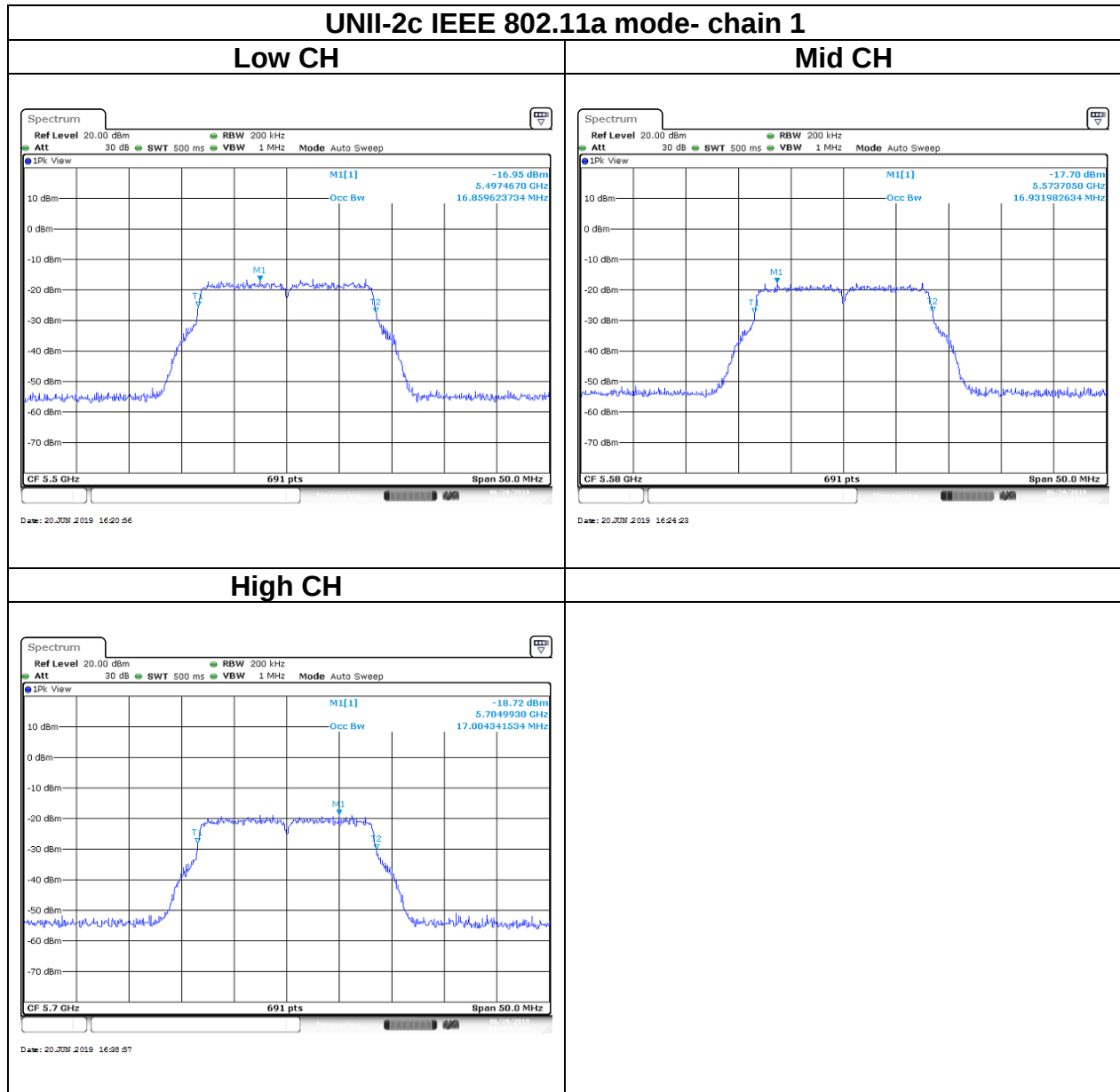


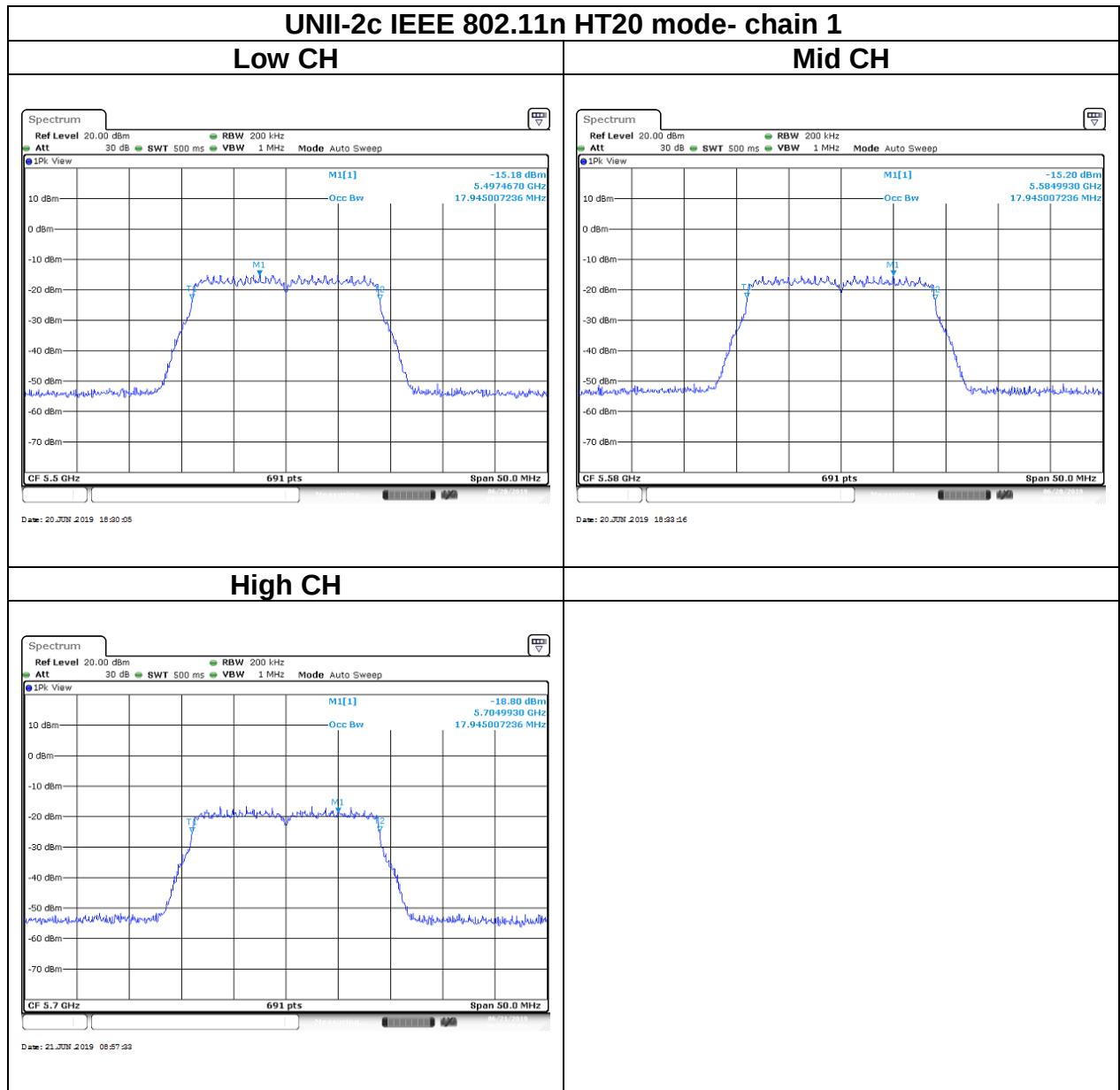


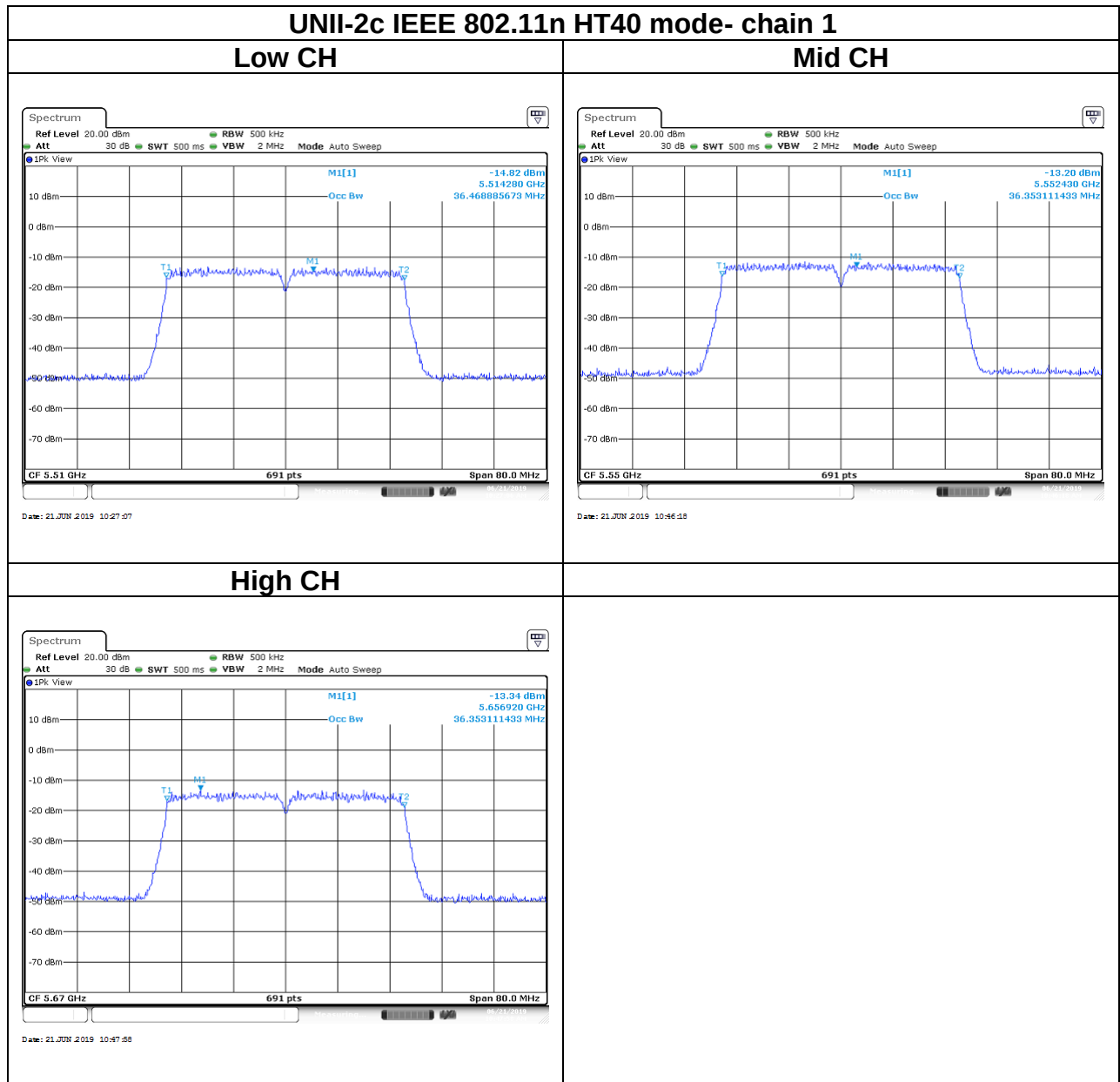


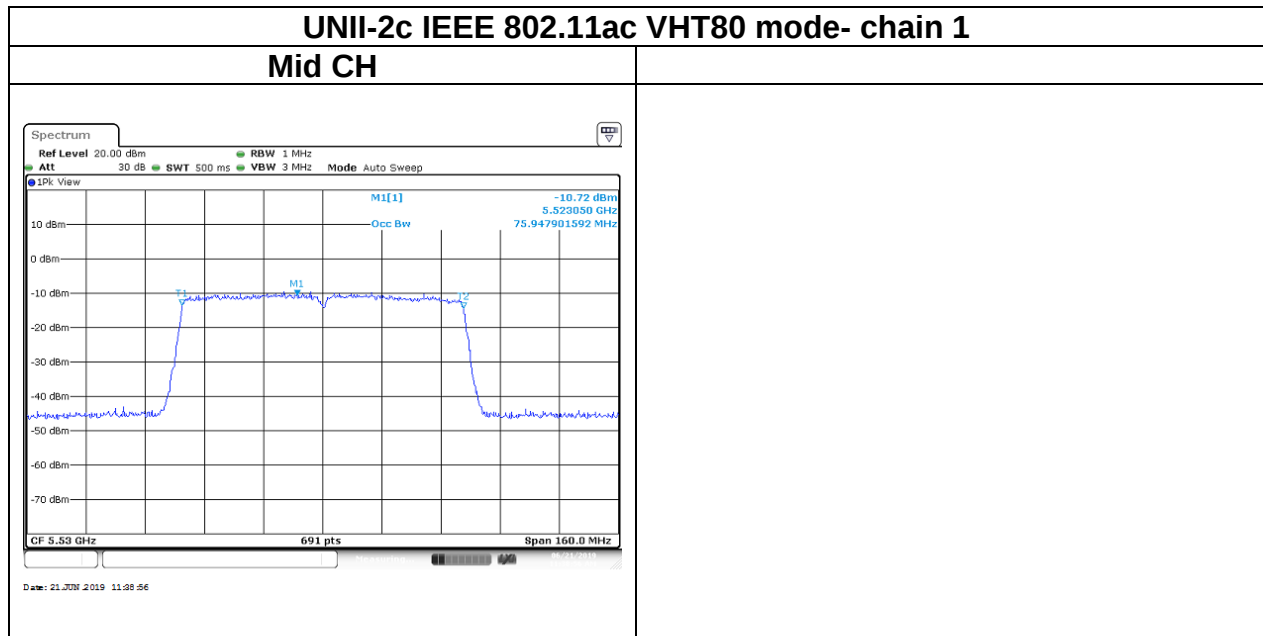


chain 1











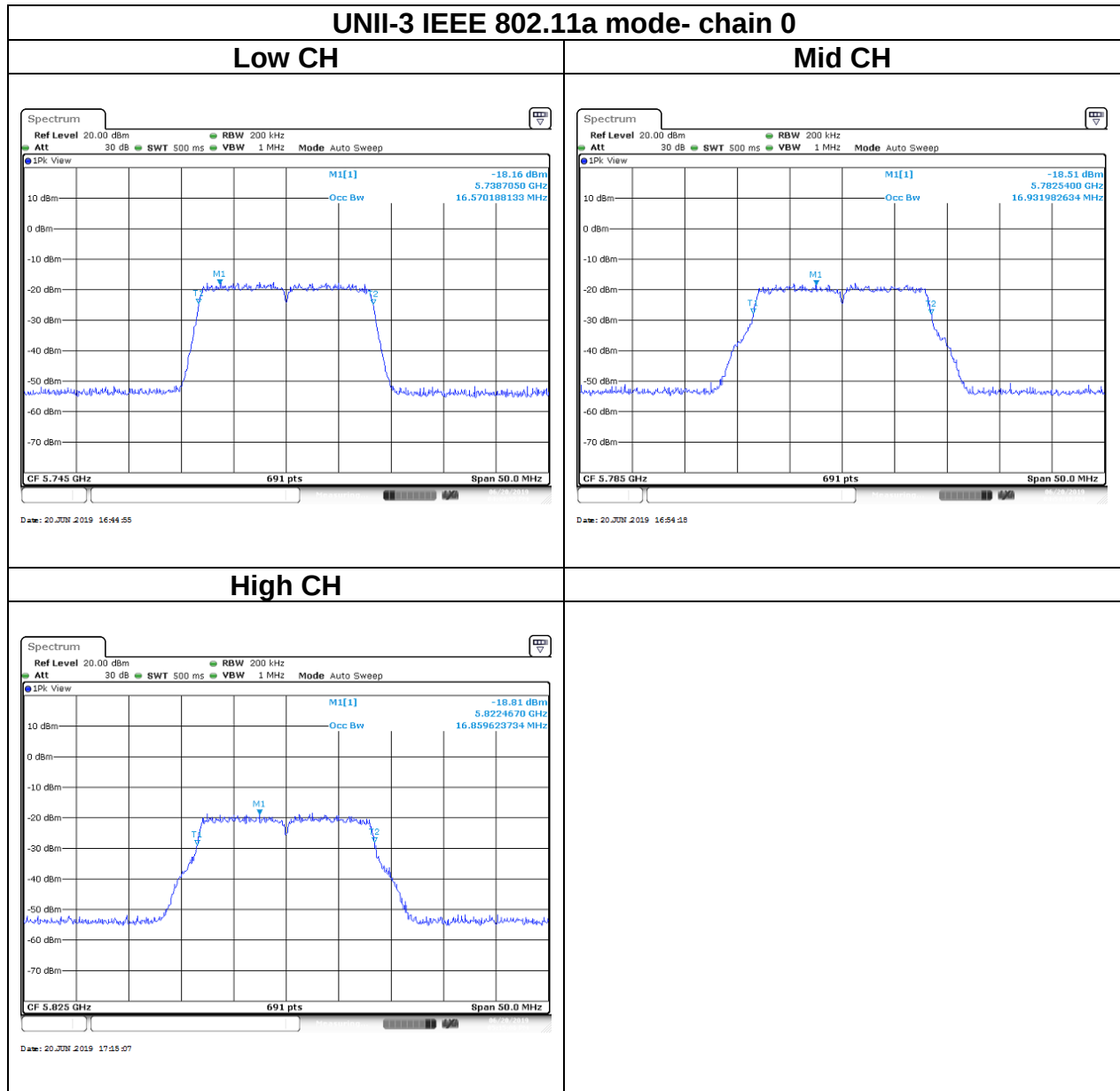
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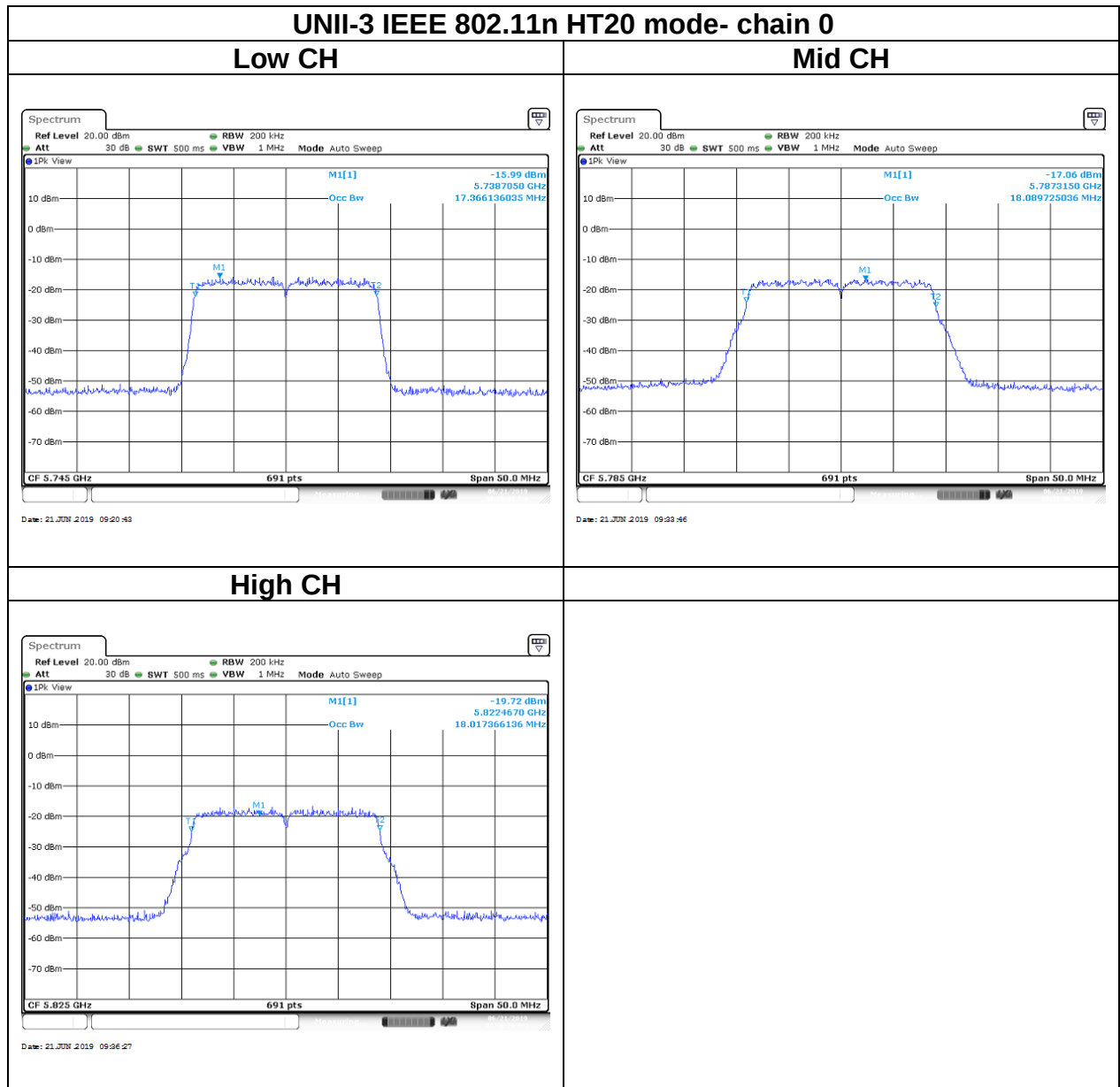
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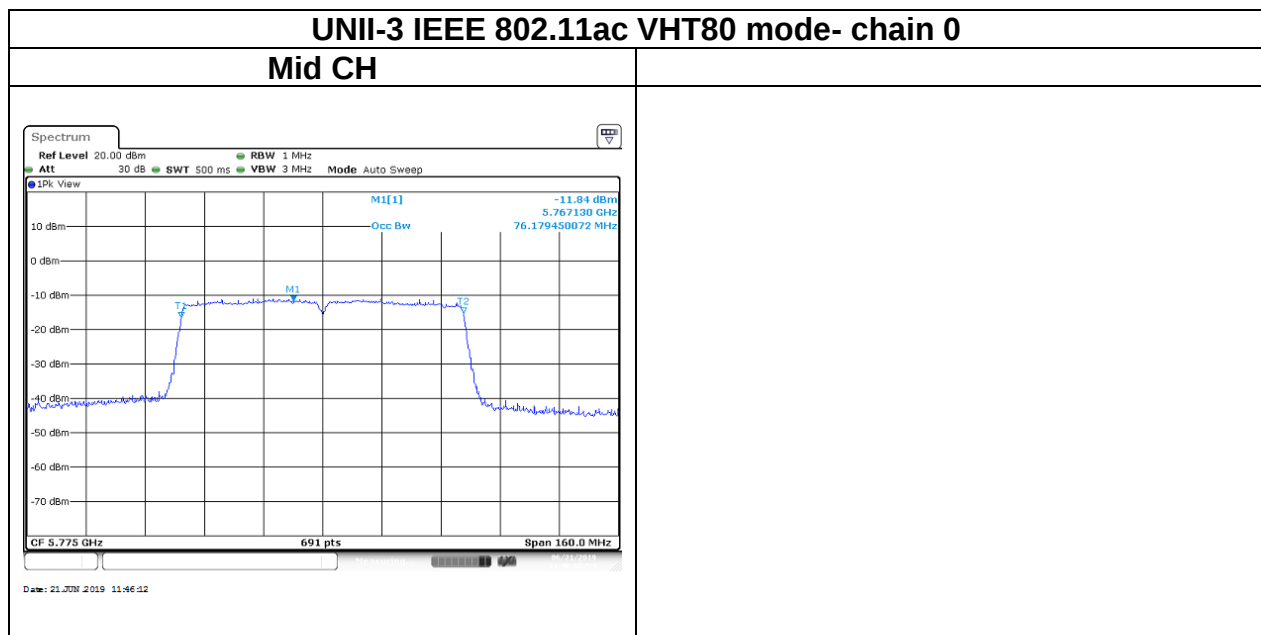
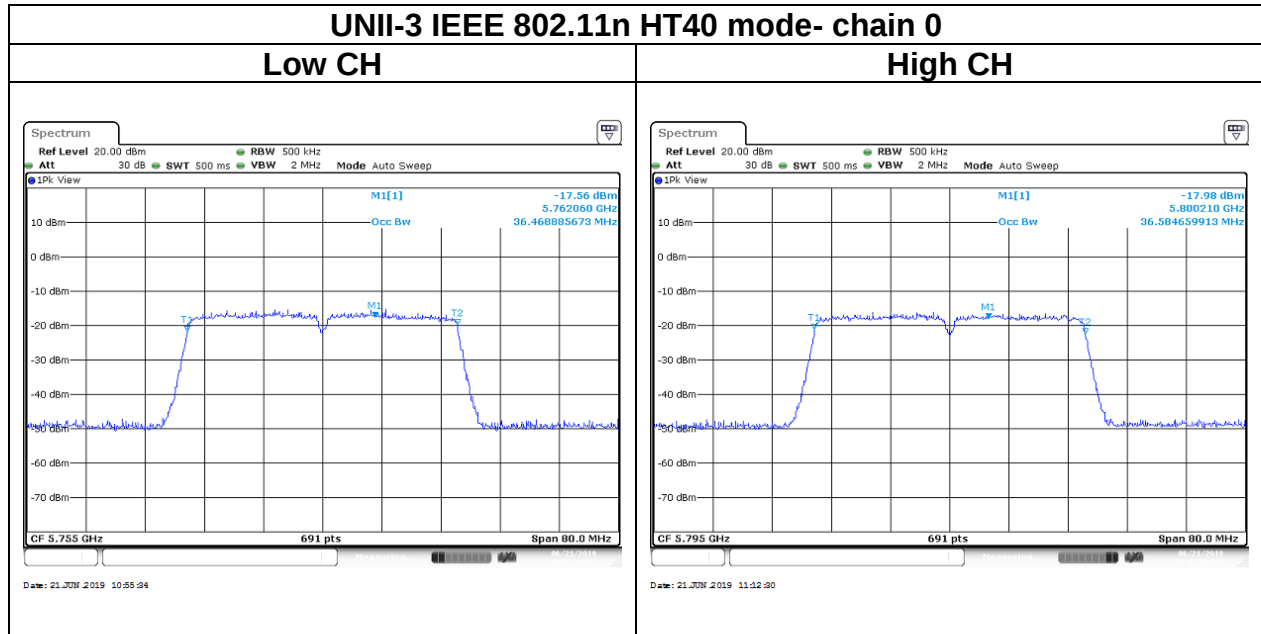
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Test Data (BANDWIDTH 99%)

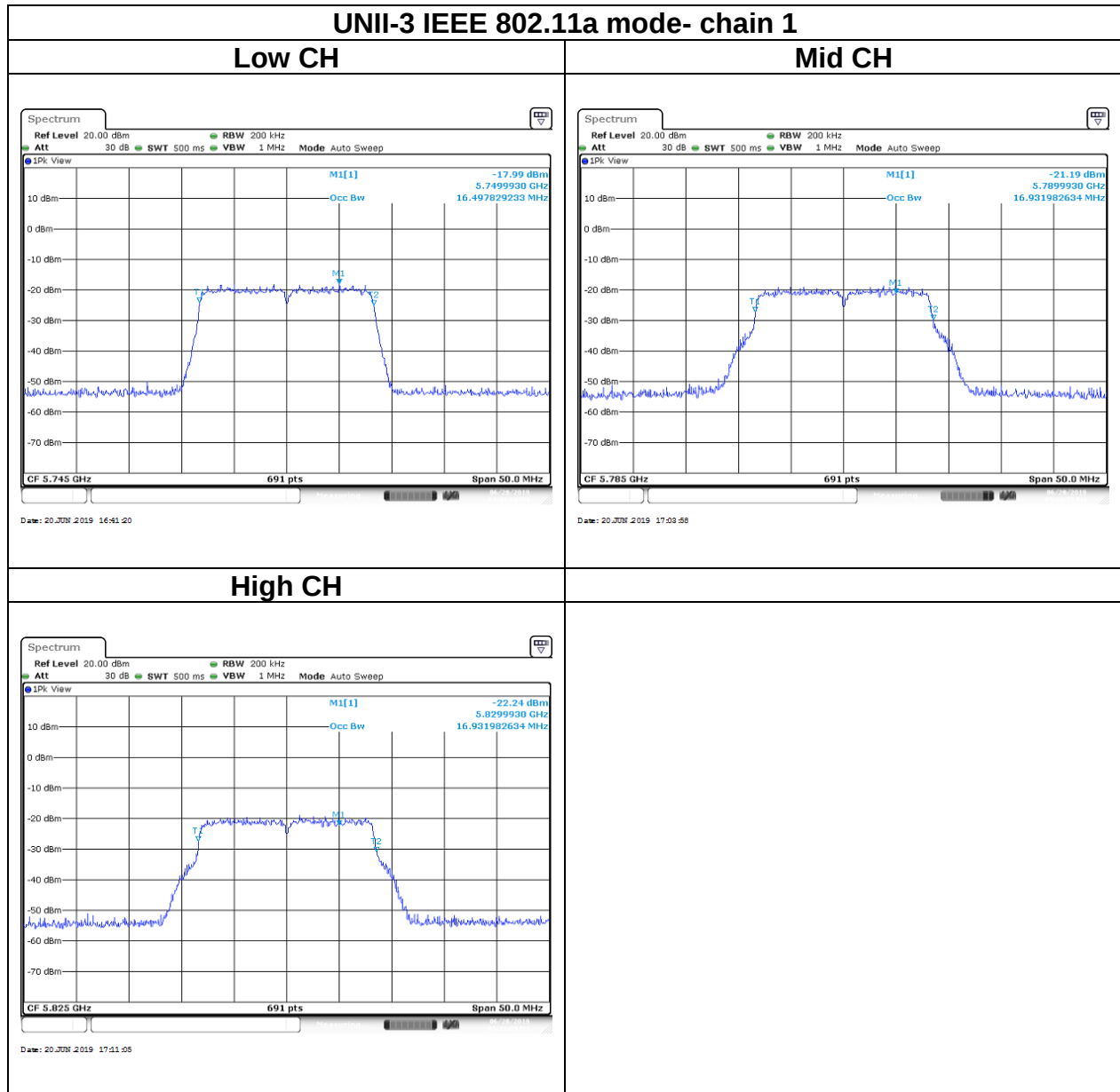
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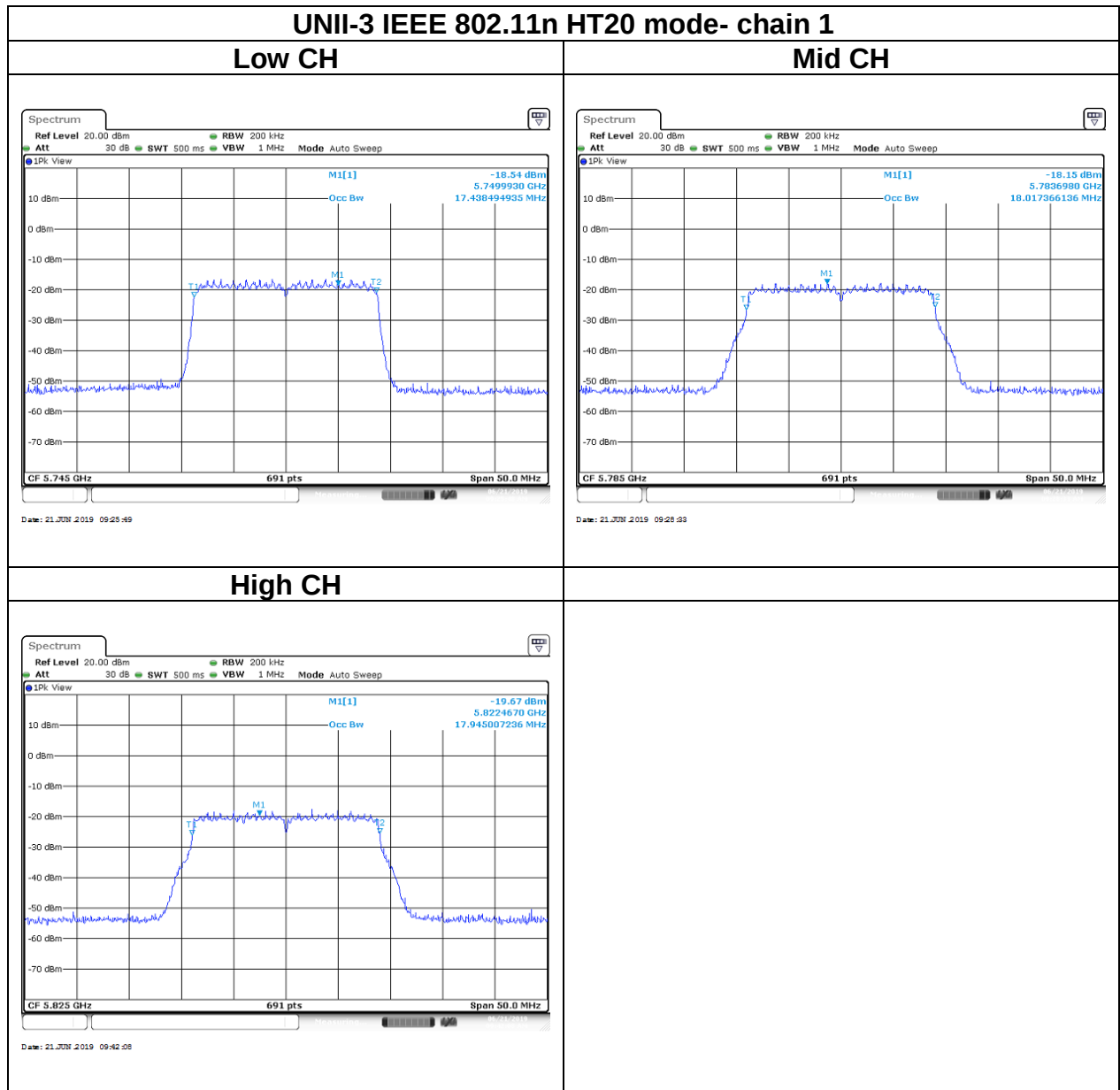


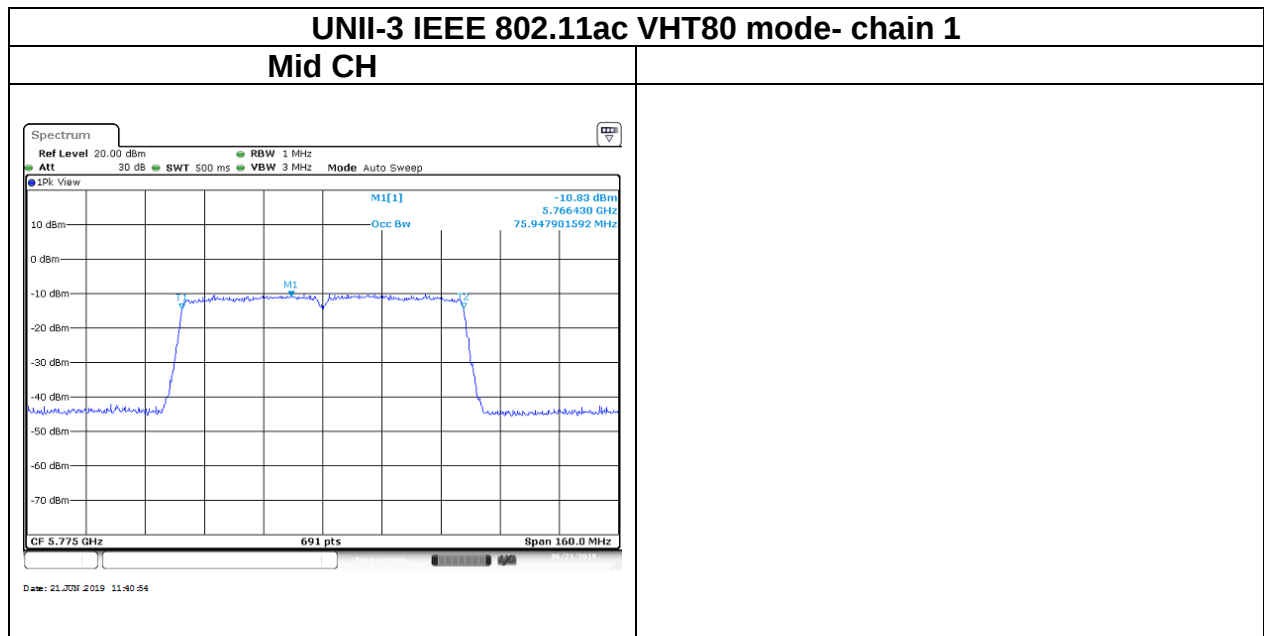
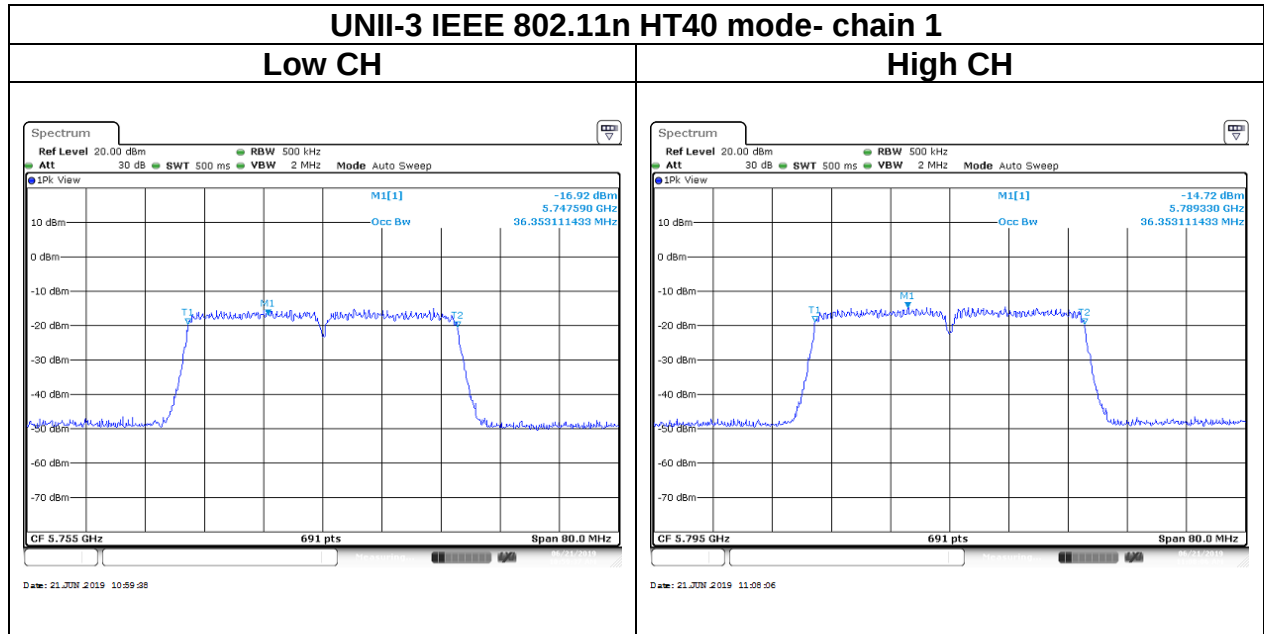




chain 1







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 :

FCC

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.

IC

For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or $1.76 + 10 \log_{10} B$, dBm, whichever is less. Devices shall implement transmitter power control (TPC) in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

For other devices, the maximum e.i.r.p. shall not exceed 200 mW or $10 + 10 \log_{10} B$, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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 $17 + 10 \log_{10} B$, 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.

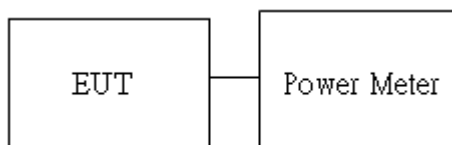
UNII-1 Limit	☒ Antenna not exceed 6 dBi : 24dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 24 – (DG – 6)]
UNII-2a/2c Limit	☒ Antenna not exceed 6 dBi : 24dBm ☐ Antenna with DG greater than 6 dBi : [Limit = 24 – (DG – 6)]
UNII-3 Limit	☒ Antenna not exceed 6 dBi : 30dBm ☐ Antenna with DG greater than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

4.3.2 Test Procedure

Test method Refer as KDB 789033 D02, Section E.3.b.

1. The EUT RF output connected to the power meter 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



4.3.4 Test Result

Conducted output power :

UNII-1																			
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	EIRP AV Total Power (dBm)	AV Total Power (W)	EIRP AV Total Power (W)	DG (dBi)	Limit (dBm)	EIRP Limit (dBm)						
			chain0	chain1	chain0	chain1													
IEEE 802.11a Data rate: 6Mbps	36	5180	6	7	7.63	8.05	10.86	13.04	0.0122	0.0201	2.18	24	23						
	44	5220	7	7	8.72	8.58	11.66	13.84	0.0147	0.0242									
	48	5240	8	7	9.63	9.78	12.72	14.90	0.0187	0.0309									
IEEE 802.11n HT20 Data rate: MCS8	36	5180	6	3	9.22	10.09	11.12	13.30	0.0129	0.0214				2.18	24	23			
	44	5220	6	3	7.94	8.72	11.23	13.41	0.0133	0.0219									
	48	5240	6	2	8.32	8.90	11.47	13.65	0.0140	0.0232									
IEEE 802.11n HT40 Data rate: MCS8	38	5190	10	9	7.43	7.18	14.25	16.43	0.0266	0.0440							2.18	24	23
	46	5230	10	9	6.85	5.70	14.48	16.66	0.0280	0.0463									
IEEE 802.11ac VHT80 Data rate: MCS8	42	5210	11	10	6.16	4.91	13.30	15.48	0.0214	0.0353									

UNII-2a																			
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	EIRP AV Total Power (dBm)	AV Total Power (W)	EIRP AV Total Power (W)	DG (dBi)	Limit (dBm)	EIRP Limit (dBm)						
			chain0	chain1	chain0	chain1													
IEEE 802.11a Data rate: 6Mbps	52	5260	9	9	9.22	10.09	12.69	14.87	0.0186	0.0307	2.18	24	30						
	56	5280	8	7	7.94	8.723	11.36	13.54	0.0137	0.0226									
	64	5320	8	7	8.32	8.903	11.63	13.81	0.0146	0.0241									
IEEE 802.11n HT20 Data rate: MCS8	52	5260	9	8	9.06	9.293	12.19	14.37	0.0166	0.0274				2.18	24	30			
	56	5280	9	8	9.31	9.423	12.38	14.56	0.0173	0.0286									
	64	5320	8	8	8.26	9.553	11.97	14.15	0.0157	0.0260									
IEEE 802.11n HT40 Data rate: MCS8	54	5270	9	8	9.55	9.465	12.52	14.70	0.0179	0.0295							2.18	24	30
	62	5310	9	9	9.79	10.35	13.09	15.27	0.0204	0.0337									
IEEE 802.11ac VHT80 Data rate: MCS8	58	5290	13	14	12.14	13.20	15.71	17.89	0.0372	0.0615									

UNII-2c													
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	EIRP AV Total Power (dBm)	AV Total Power (W)	EIRP AV Total Power (W)	DG (dBi)	Limit (dBm)	EIRP Limit (dBm)
			chain0	chain1	chain0	chain1							
IEEE 802.11a Data rate: 6Mbps	100	5500	7	6	7.43	7.18	10.32	12.50	0.0108	0.0178	2.18	24	30
	116	5580	6	5	6.85	5.7	9.33	11.51	0.0086	0.0142			
	140	5700	6	5	6.16	4.91	8.59	10.77	0.0072	0.0119			
IEEE 802.11n HT20 Data rate: MCS8	100	5500	8	7	8.02	8.26	11.15	13.33	0.0130	0.0215			
	116	5580	8	7	8.33	8.47	11.41	13.59	0.0138	0.0229			
	140	5700	7	7	7.22	6.66	9.96	12.14	0.0099	0.0164			
IEEE 802.11n HT40 Data rate: MCS8	102	5510	7	6	7.49	7.09	10.31	12.49	0.0107	0.0177			
	110	5550	8	8	8.65	8.63	11.65	13.83	0.0146	0.0242			
	134	5670	7	7	7.21	6.98	10.11	12.29	0.0103	0.0169			
IEEE 802.11ac VHT80 Data rate: MCS8	106	5530	11	11	9.92	9.96	12.95	15.13	0.0197	0.0326			



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UNII-3										
Config	CH	Freq. (MHz)	Power Set		AV Power(dBm)		AV Total Power (dBm)	AV Total Power (W)	DG (dBi)	Limit (dBm)
			chain0	chain1	chain0	chain1				
IEEE 802.11a Data rate: 6Mbps	149	5745	3	3	5.87	5.02	8.48	0.0070	2.18	30
	157	5785	2	3	4.77	4.36	7.58	0.0057		
	165	5825	2	3	4.40	4.16	7.30	0.0054		
IEEE 802.11n HT20 Data rate: MCS8	149	5745	6	6	7.44	6.67	10.09	0.0102		
	157	5785	5	5	6.43	5.55	9.03	0.0080		
	165	5825	5	5	6.03	5.18	8.64	0.0073		
IEEE 802.11n HT40 Data rate: MCS8	151	5755	4	4	6.26	5.55	8.93	0.0078		
	159	5795	4	5	6.06	6.01	9.05	0.0080		
IEEE 802.11ac VHT80 Data rate: MCS8	155	5775	11	12	9.14	9.74	12.46	0.0176		

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) and RSS-247 section 6.2.1.1 and section 6.2.4.1

UNII-1 :

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

IC: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz 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 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	-6.19	-3.23	-1.45	11	10
Mid	5220	-5.27	-4.33	-1.76		
High	5240	-4.49	-4.04	-1.25		
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	-6.36	-4.31	-2.20	11	10
Mid	5220	-6.33	-3.92	-1.95		
High	5240	-6.21	-4.75	-2.41		
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	-5.14	-6.06	-2.57	11	10
High	5230	-4.99	-5.35	-2.16		
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	-7.95	-9.2	-5.52	11	10

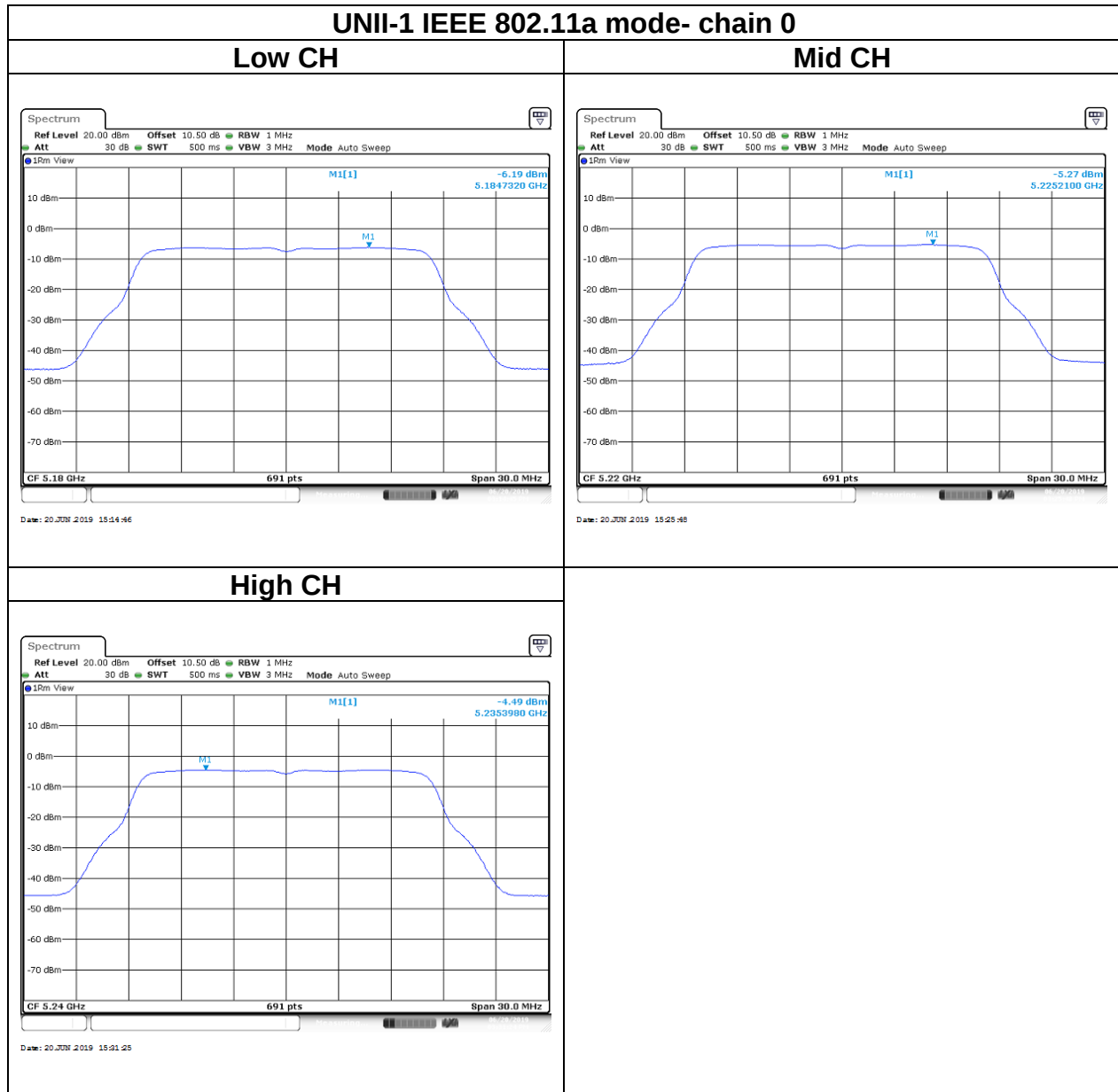
UNII-2a 5250-5350 MHz					
Test mode: IEEE 802.11a mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5260	-4.94	-4.69	-1.80	11
Mid	5280	-4.61	-4.87	-1.73	
High	5320	-5.84	-4.69	-2.22	
Test mode: IEEE 802.11n HT20 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Low	5260	-4.88	-4.94	-1.90	11
Mid	5280	-4.92	-4.64	-1.77	
High	5320	-6.33	-4.71	-2.43	
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	-7.32	-7.28	-4.29	11
High	5310	-7.22	-6.52	-3.85	
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	-6.38	-5.51	-2.91	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	-6.62	-6.9	-3.75	11
Mid	5580	-7.63	-8.16	-4.88	
High	5700	-8.02	-9.38	-5.64	
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	-5.5	-6.17	-2.81	11
Mid	5580	-5.58	-6.32	-2.92	
High	5700	-7.62	-7.49	-4.54	
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	-9.28	-9.67	-6.46	11
Mid	5500	-8.07	-8.32	-5.18	
High	5670	-9.81	-9.94	-6.86	
Test mode: IEEE 802.11ac VHT80 mode					
Channel	Frequency (MHz)	Chain 0 PPSD (dBm)	Chain 1 PPSD (dBm)	Total PPSD (dBm)	Limit (dBm)
Mid	5530	-8.86	-8.62	-5.73	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	-3.4	-2.03	0.35	30
Mid	5785	-3.81	-2.42	-0.05	
High	5825	-4.5	-2.3	-0.25	
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	-0.47	0.69	3.16	30
Mid	5785	-0.98	-1.56	1.75	
High	5825	-2.14	-1.28	1.32	
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	-4.8	-4.36	-1.56	30
High	5795	-5.28	-4.05	-1.61	
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	-3.4	-1.99	0.37	30

Test Data

chain 0

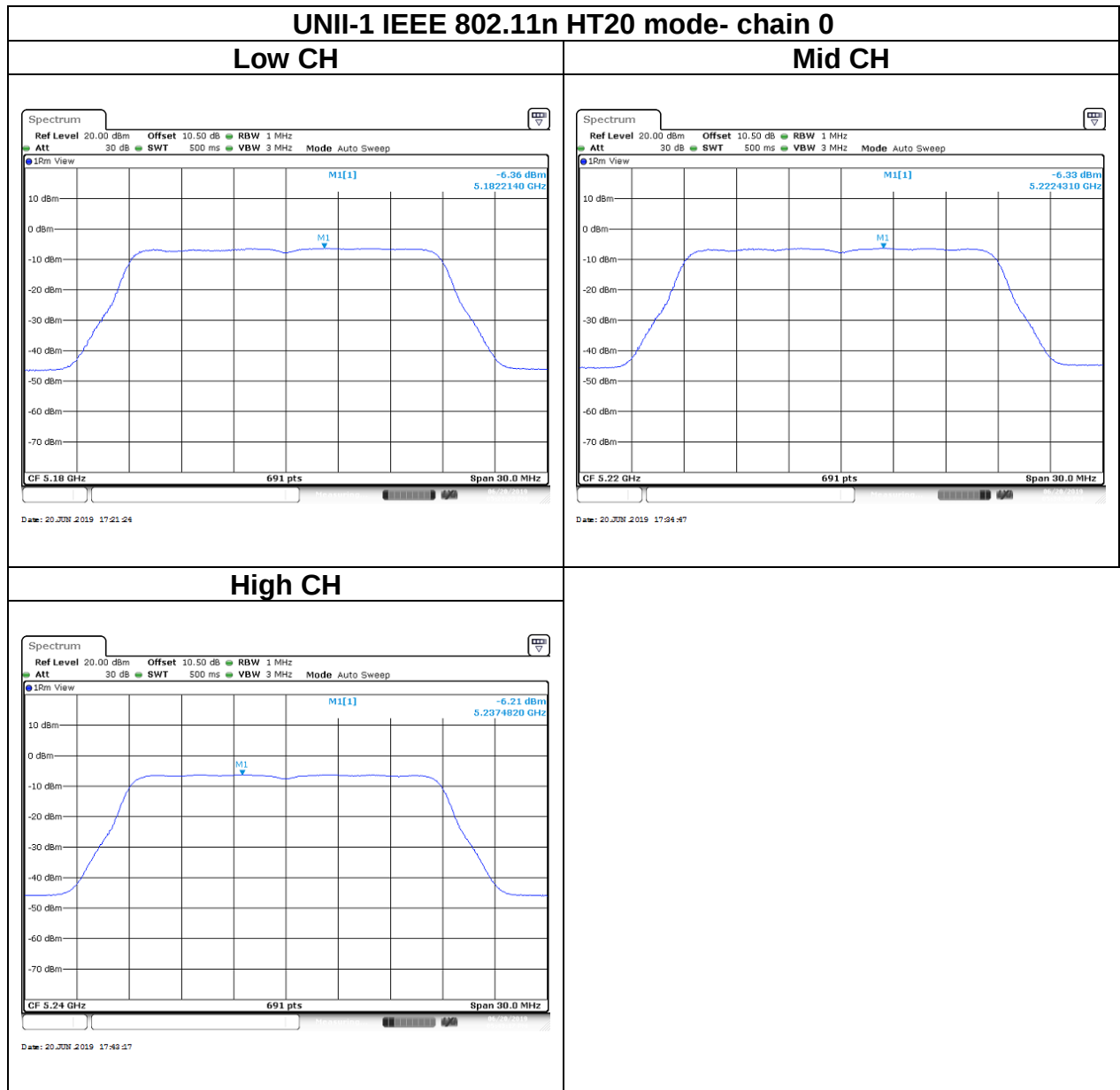


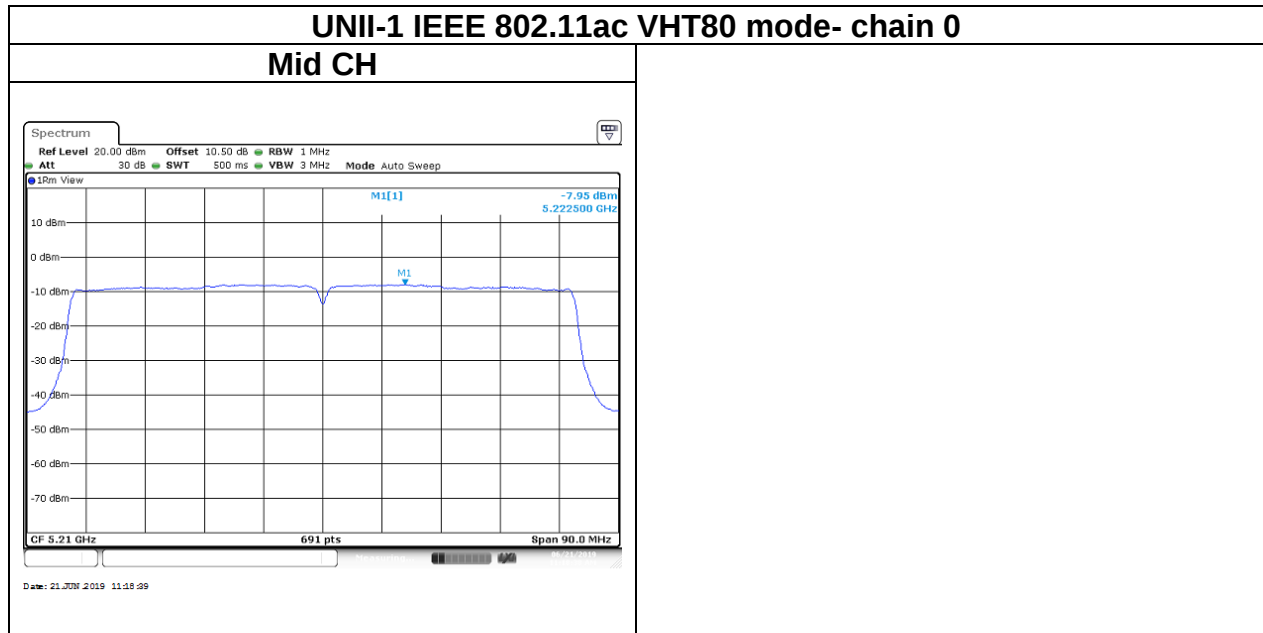
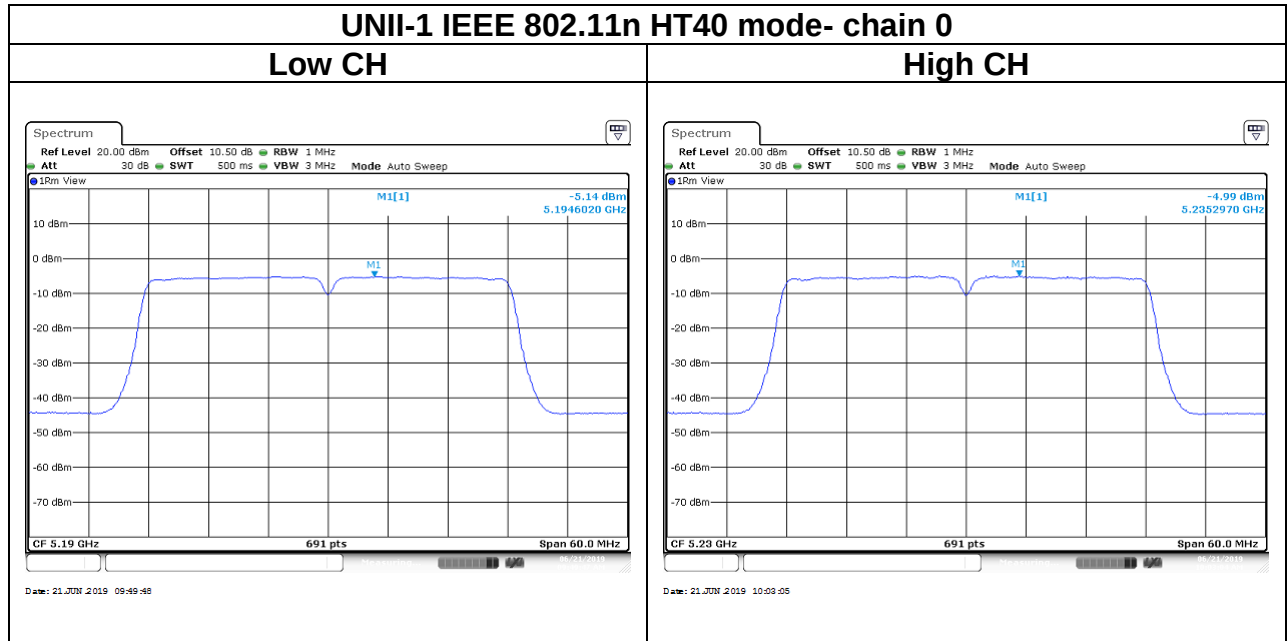


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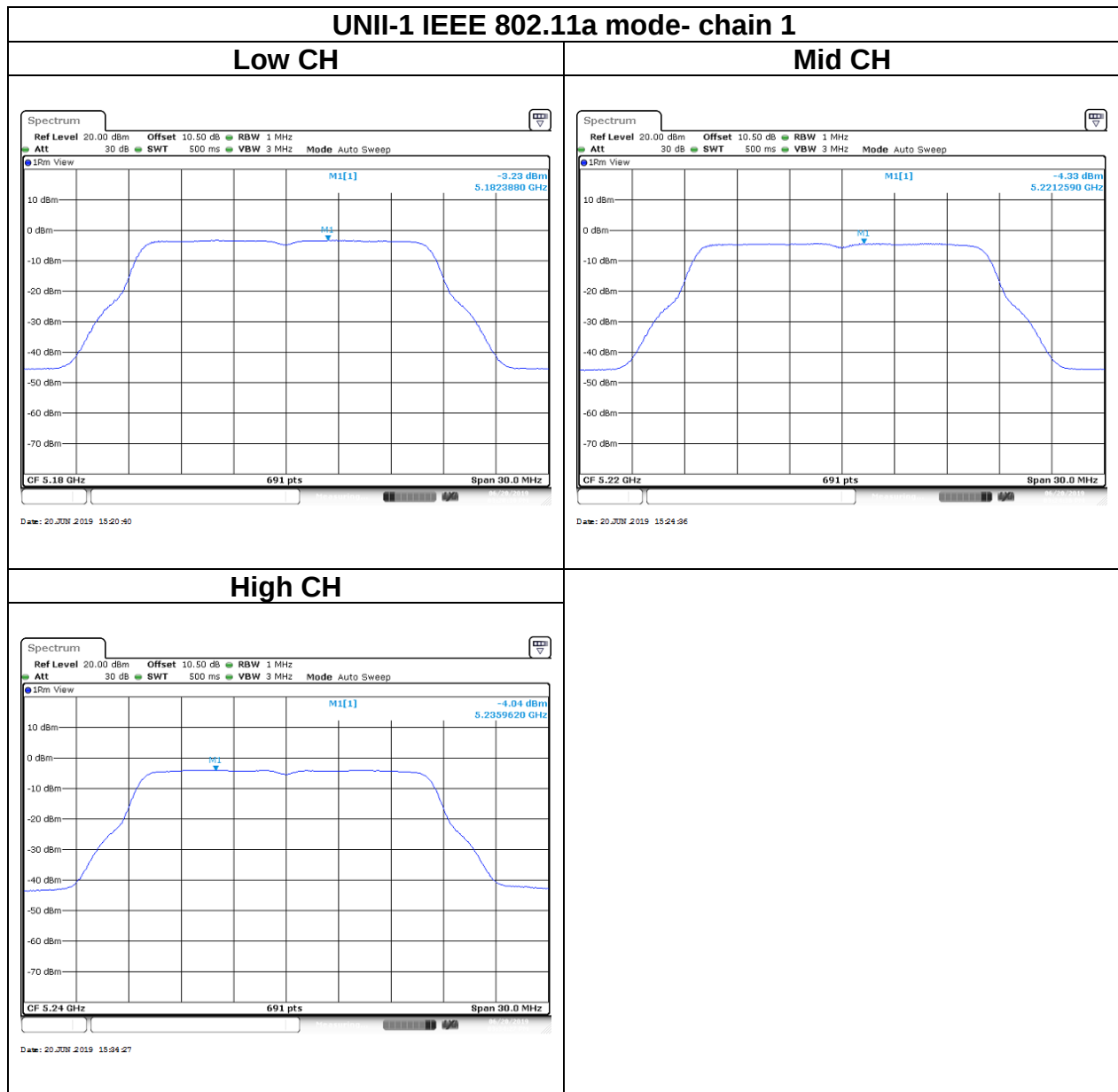
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chain 1

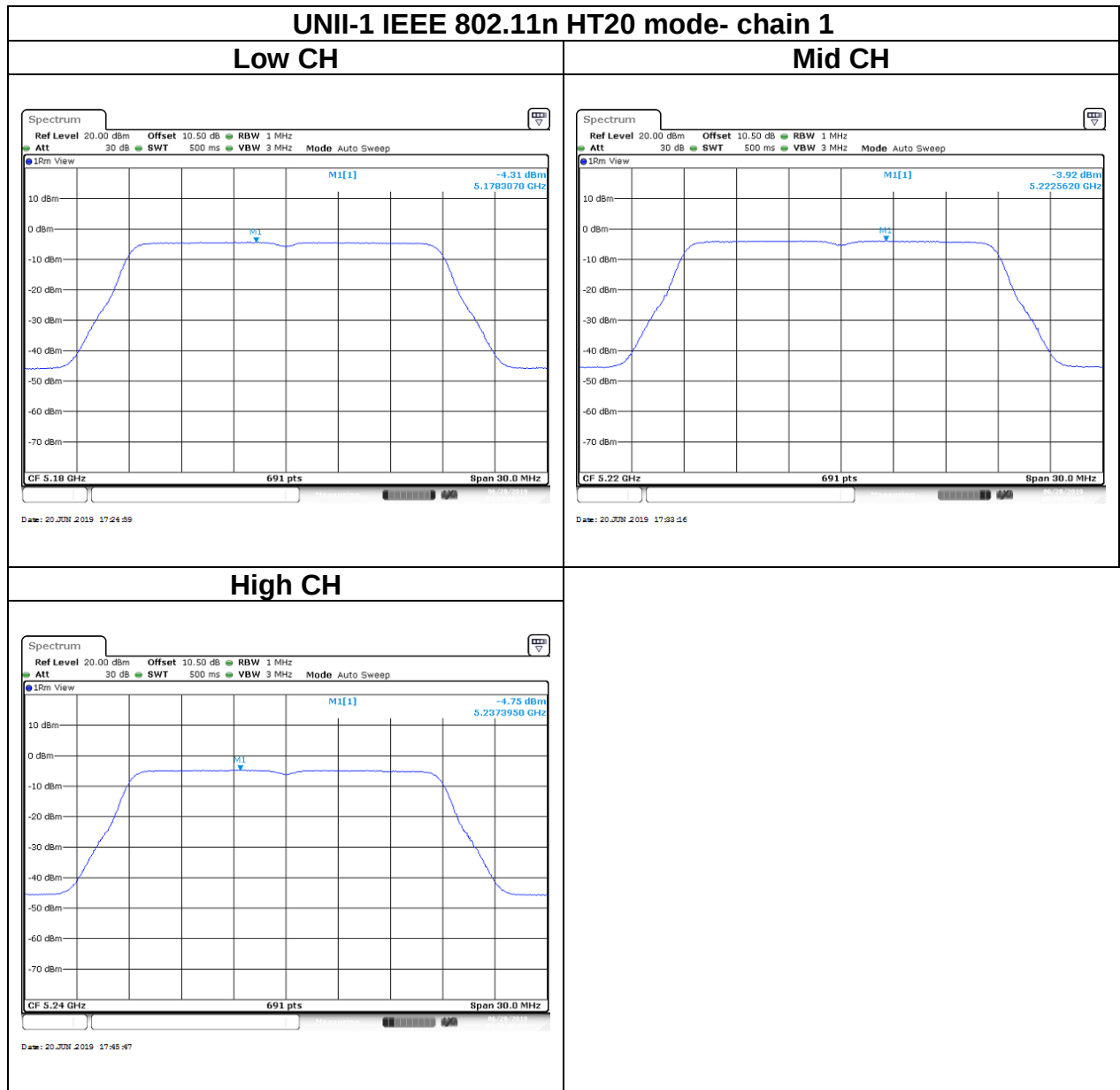


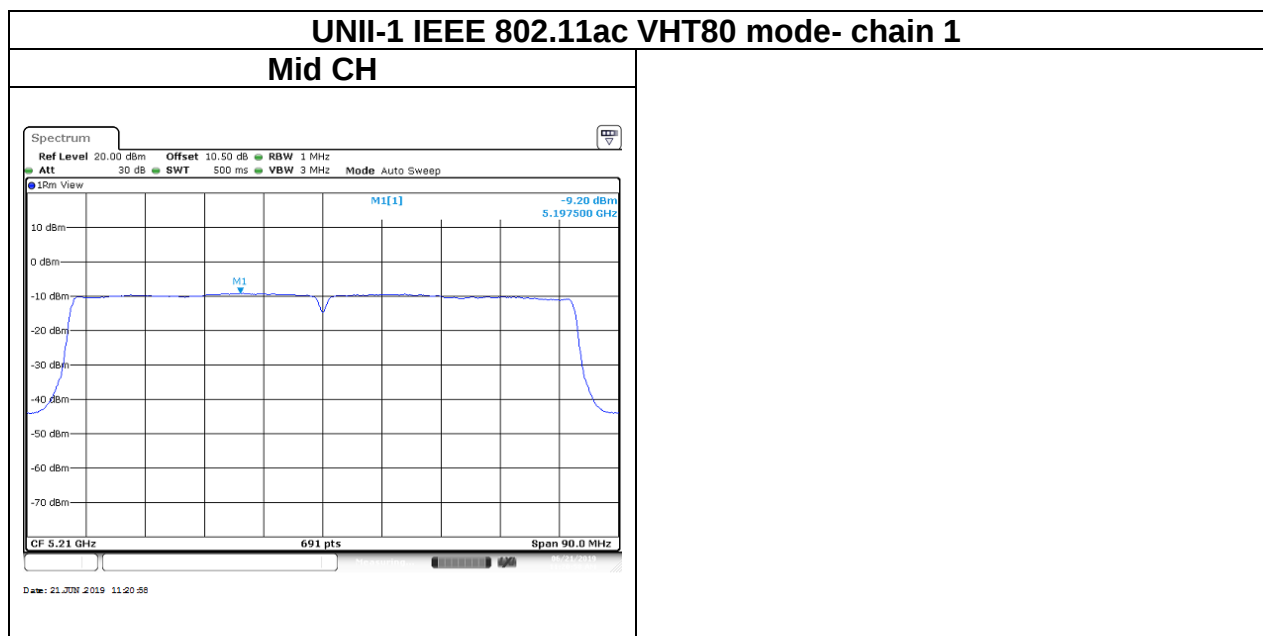
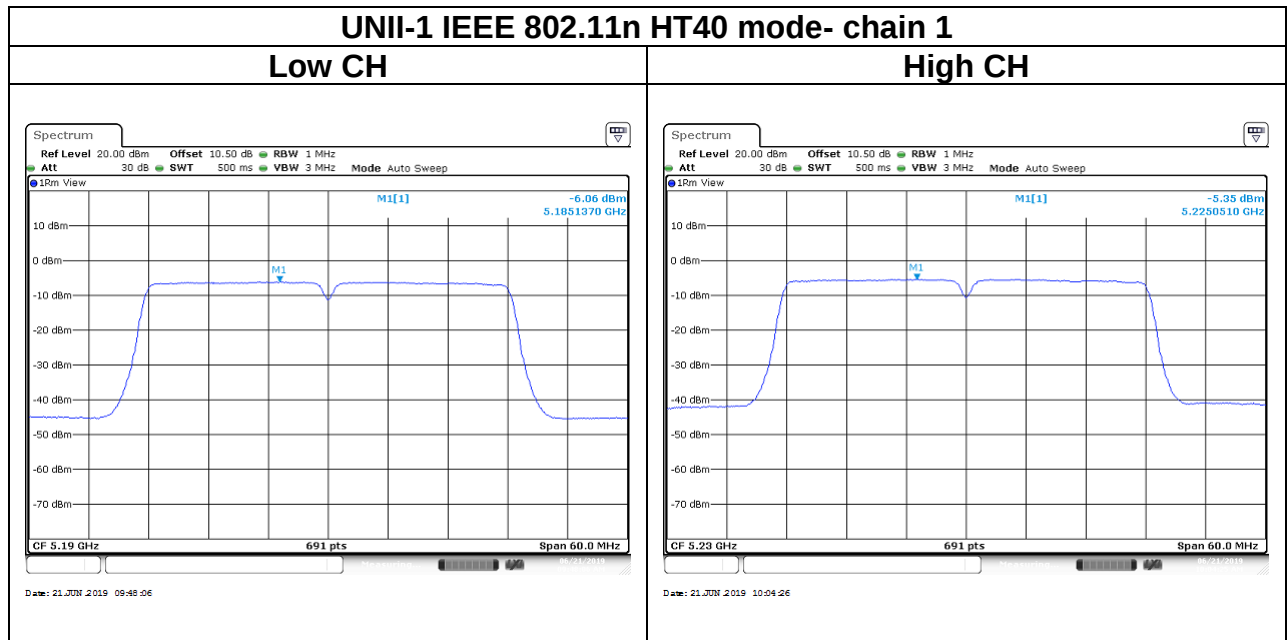


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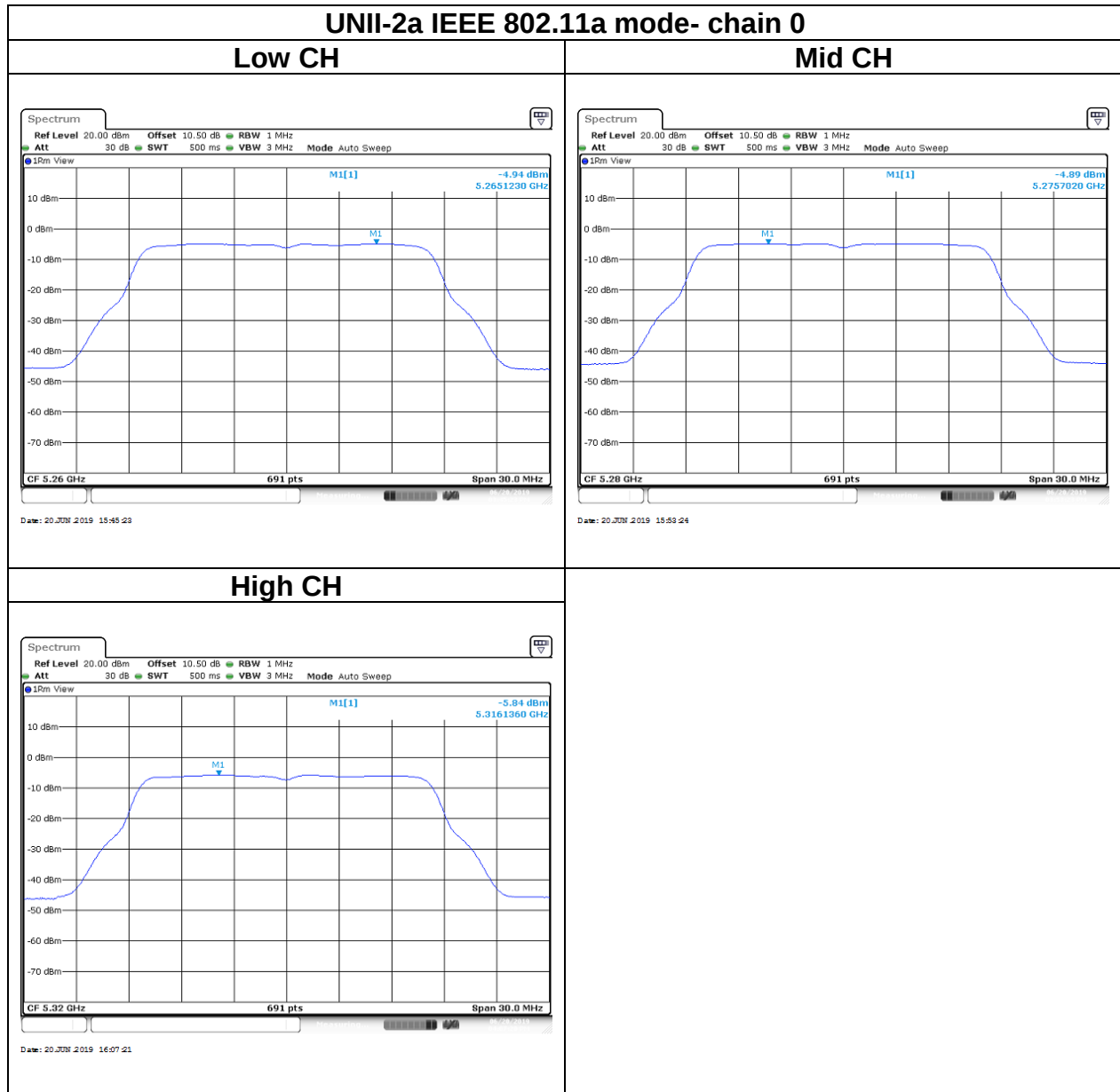
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Test Data

chain 0

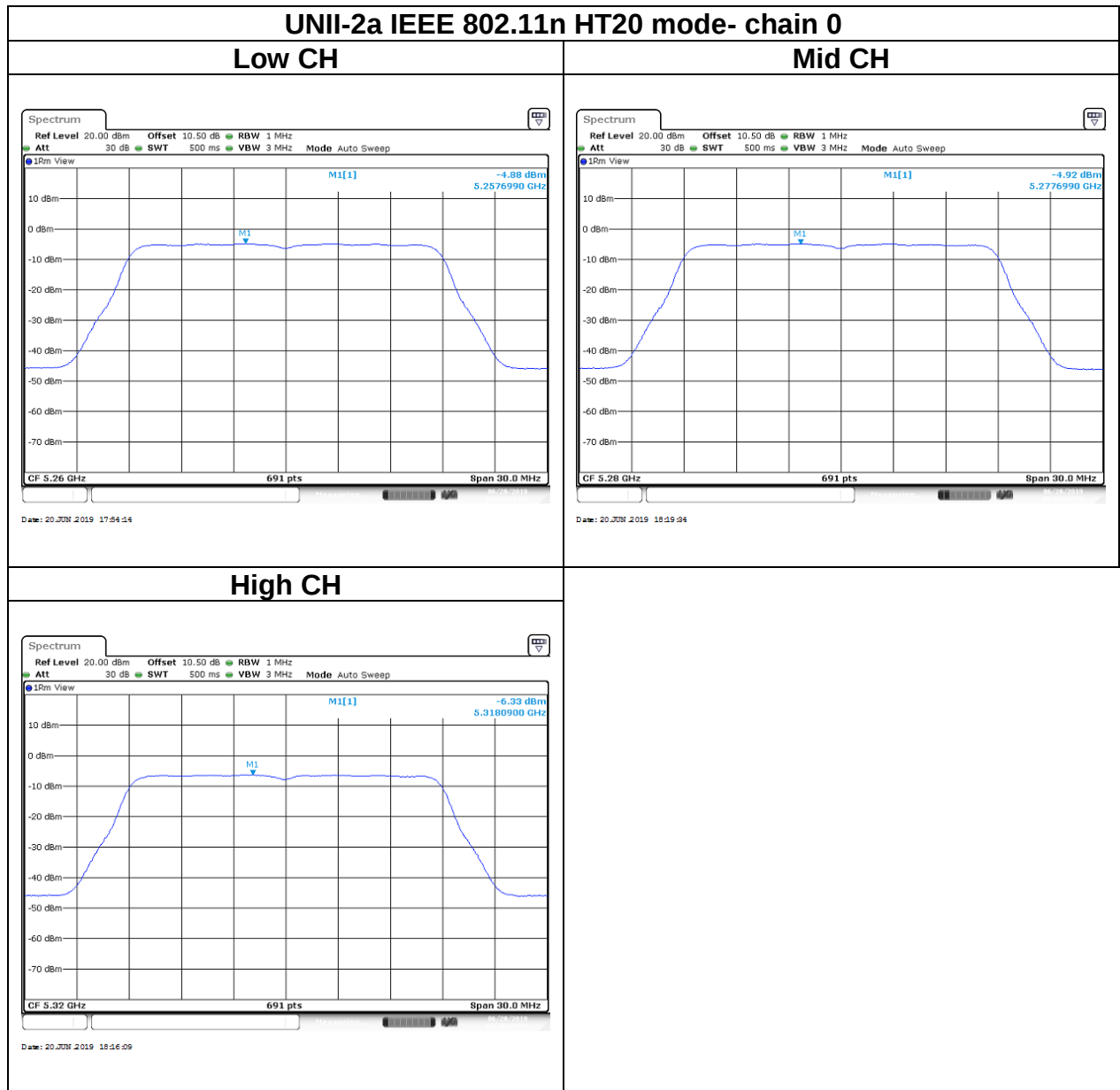


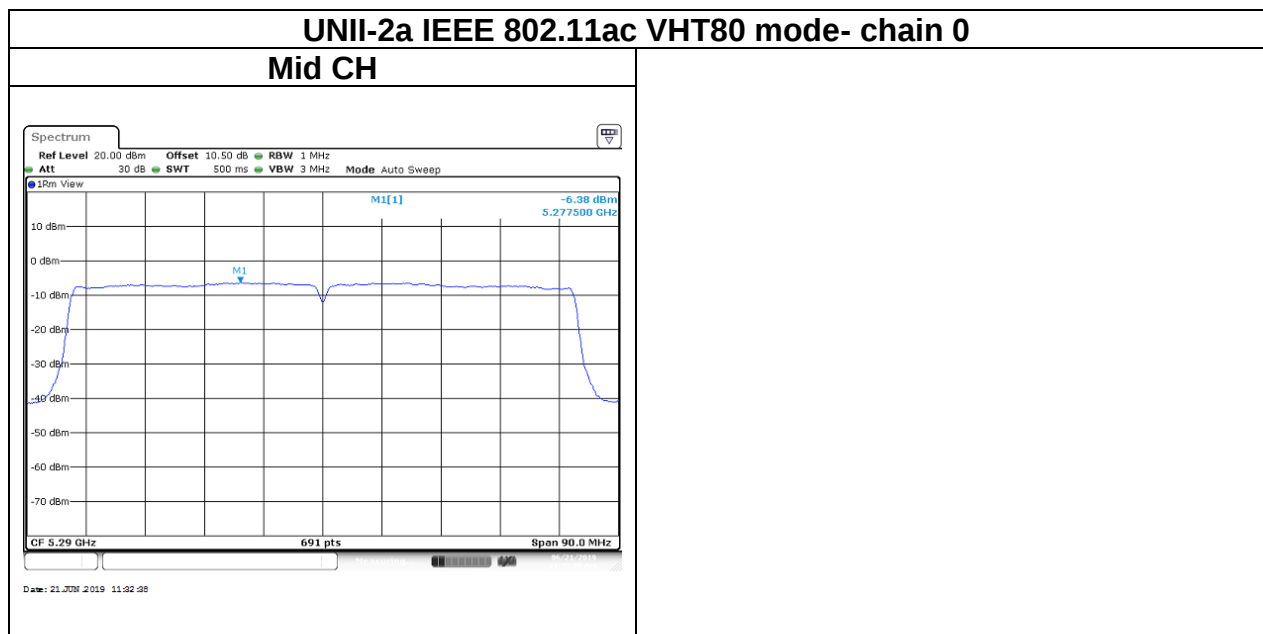
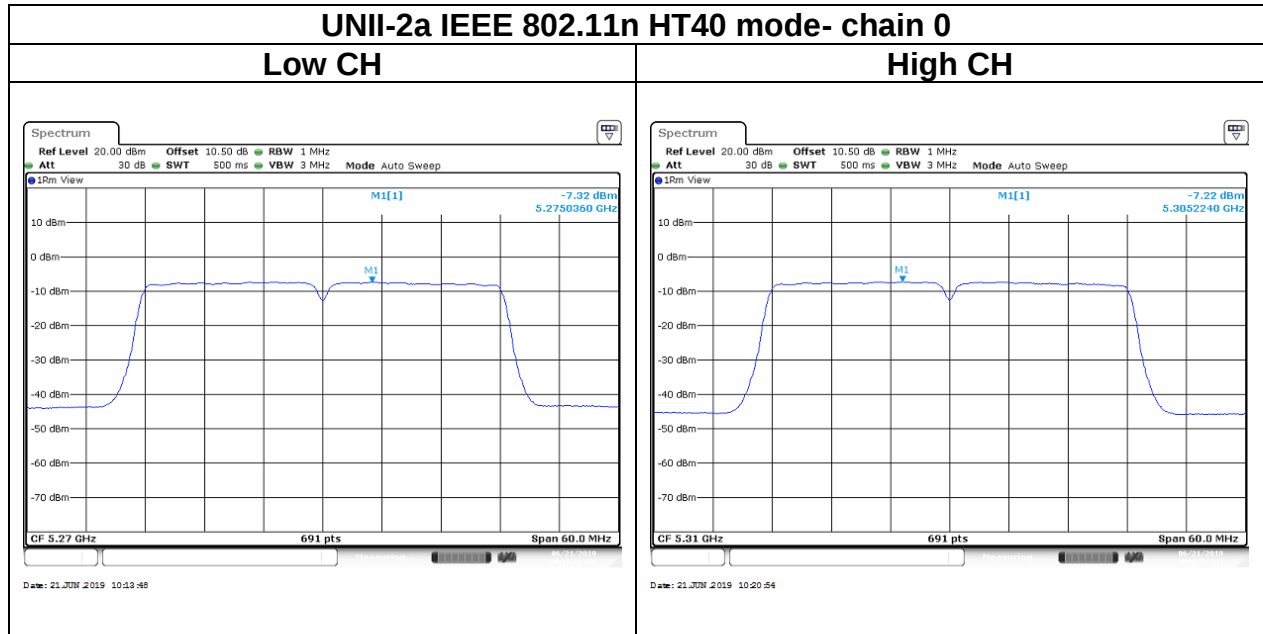


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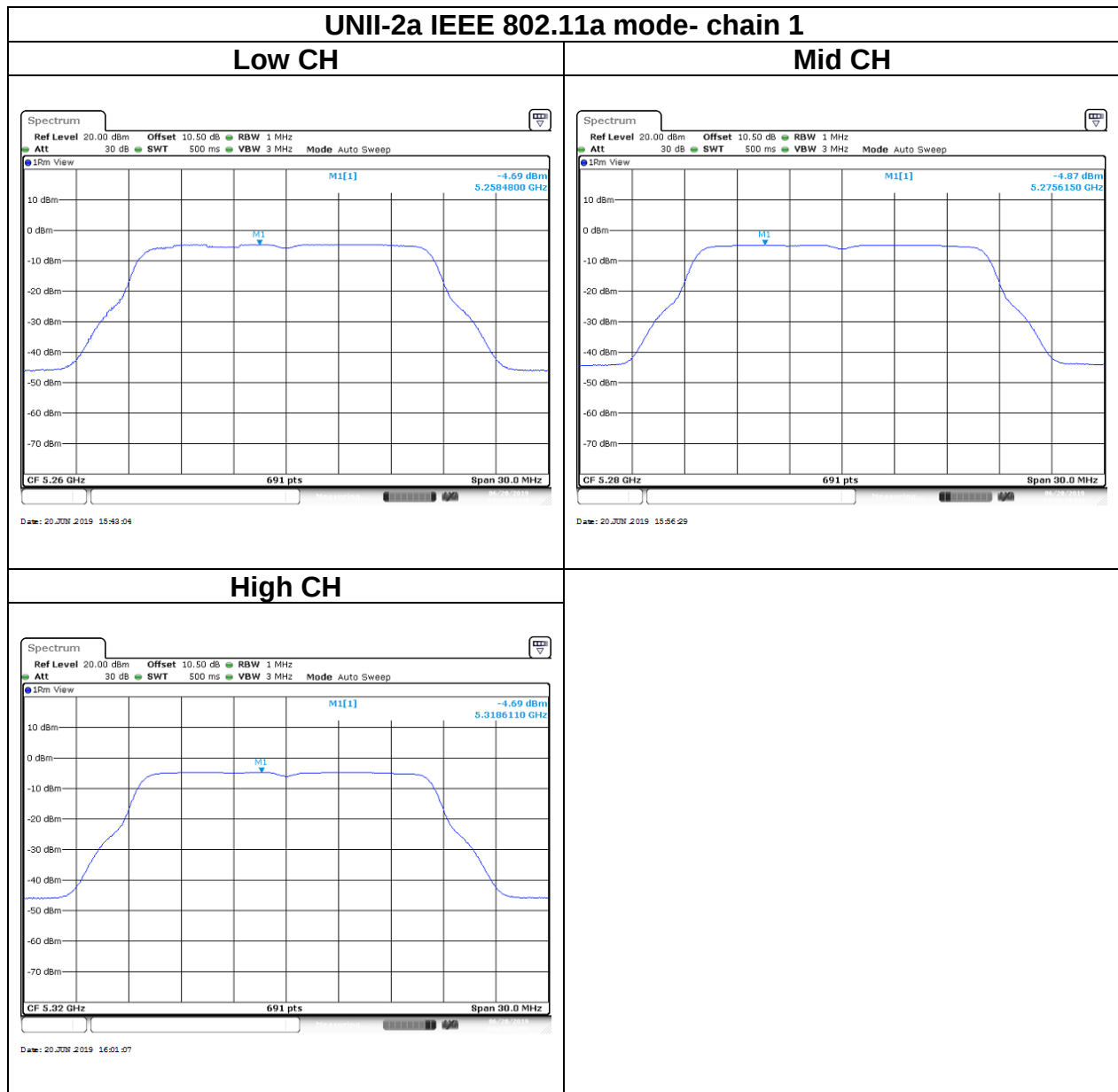


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chain 1

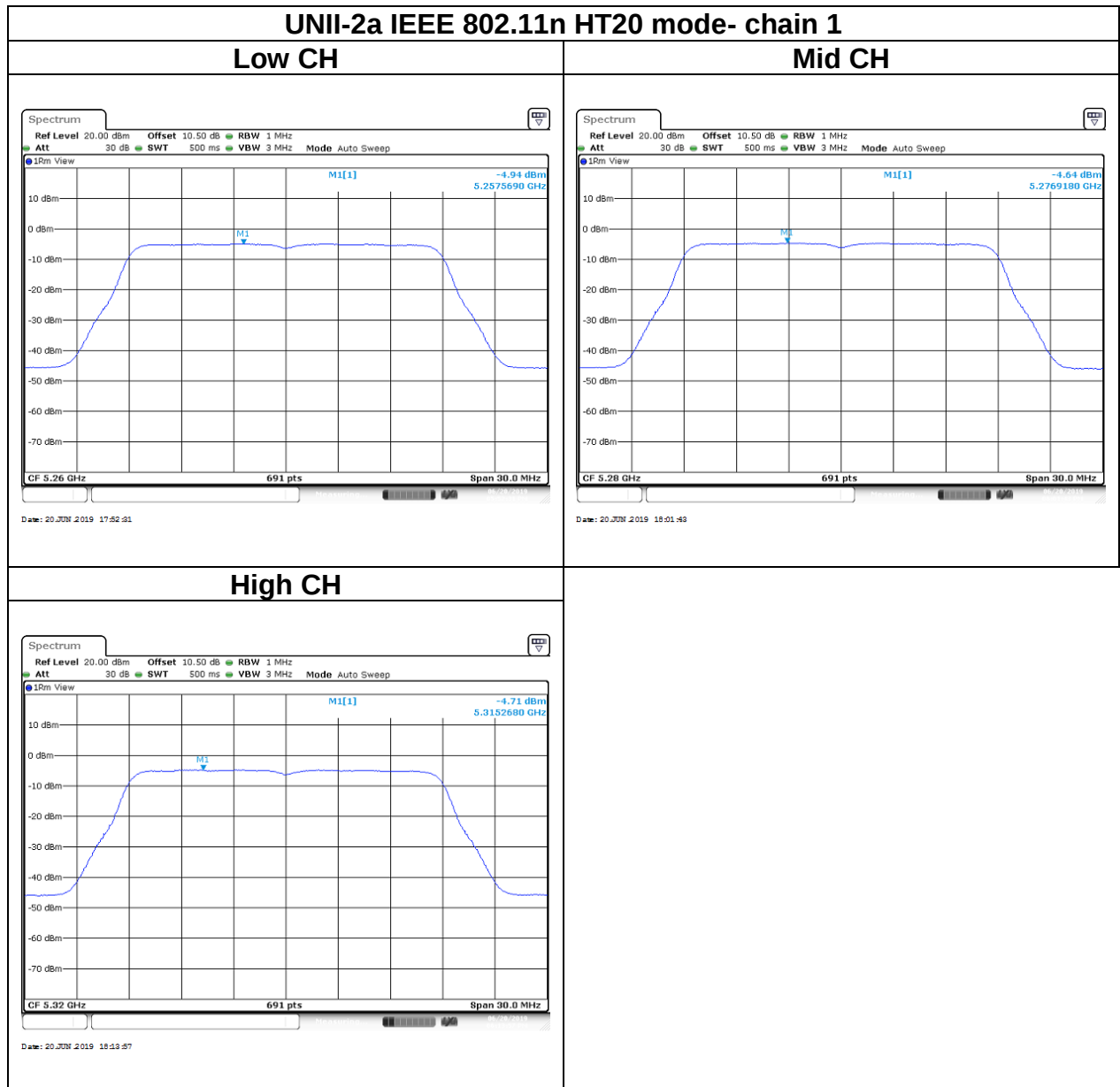


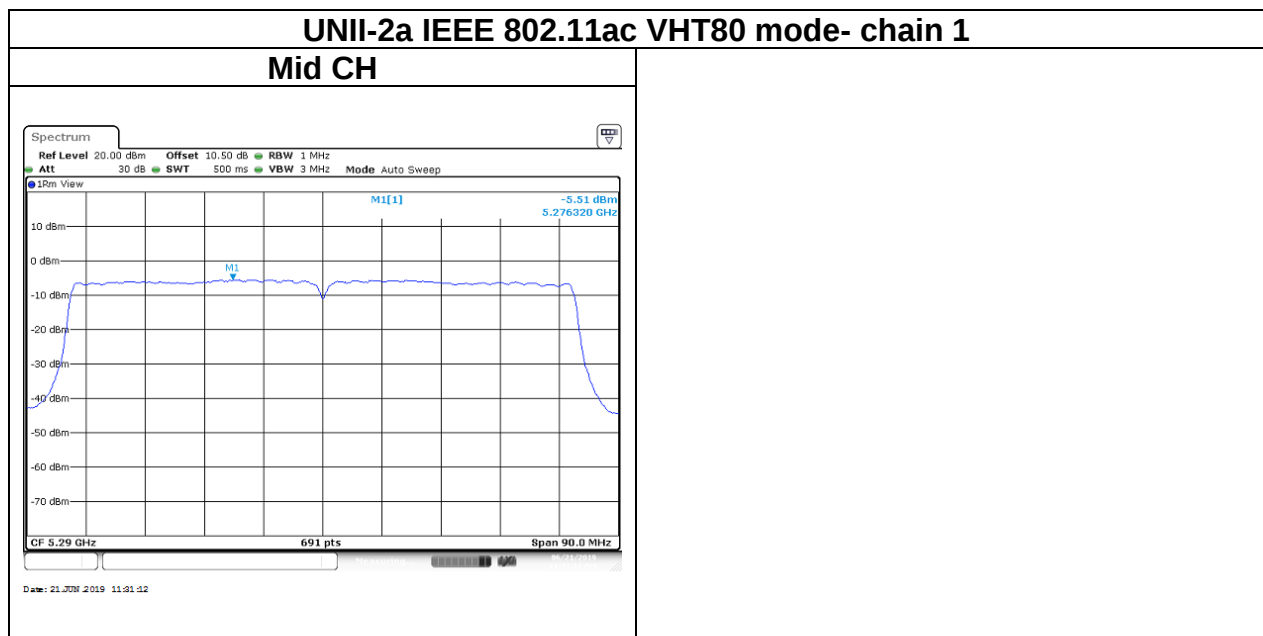
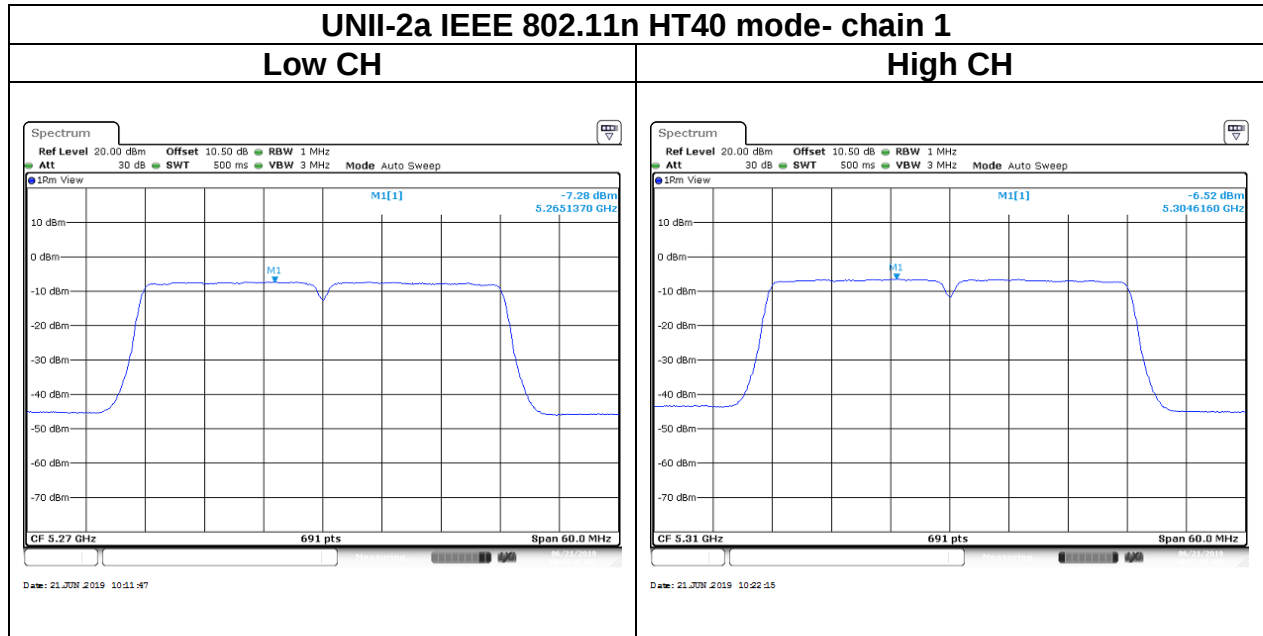


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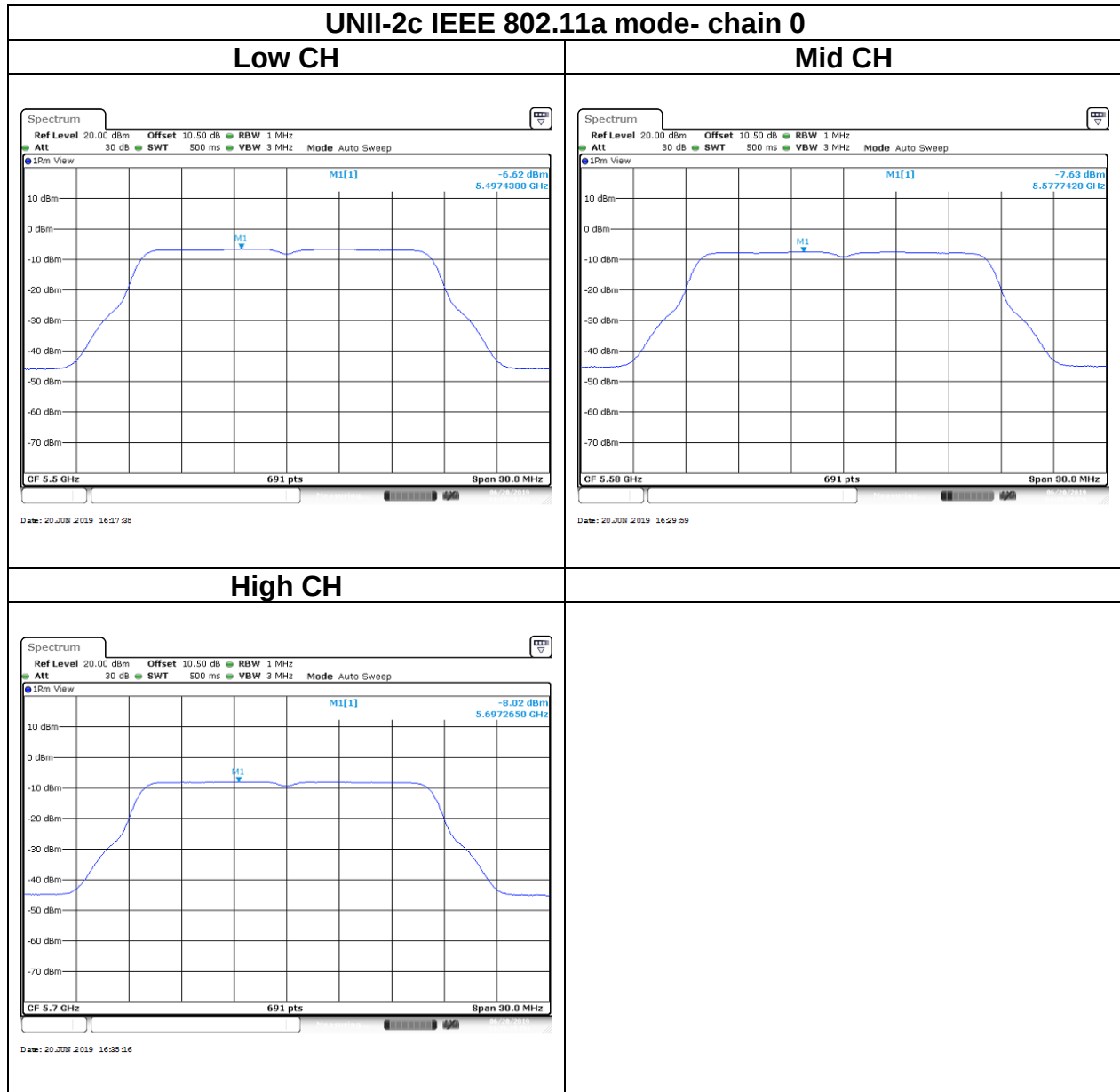
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Test Data

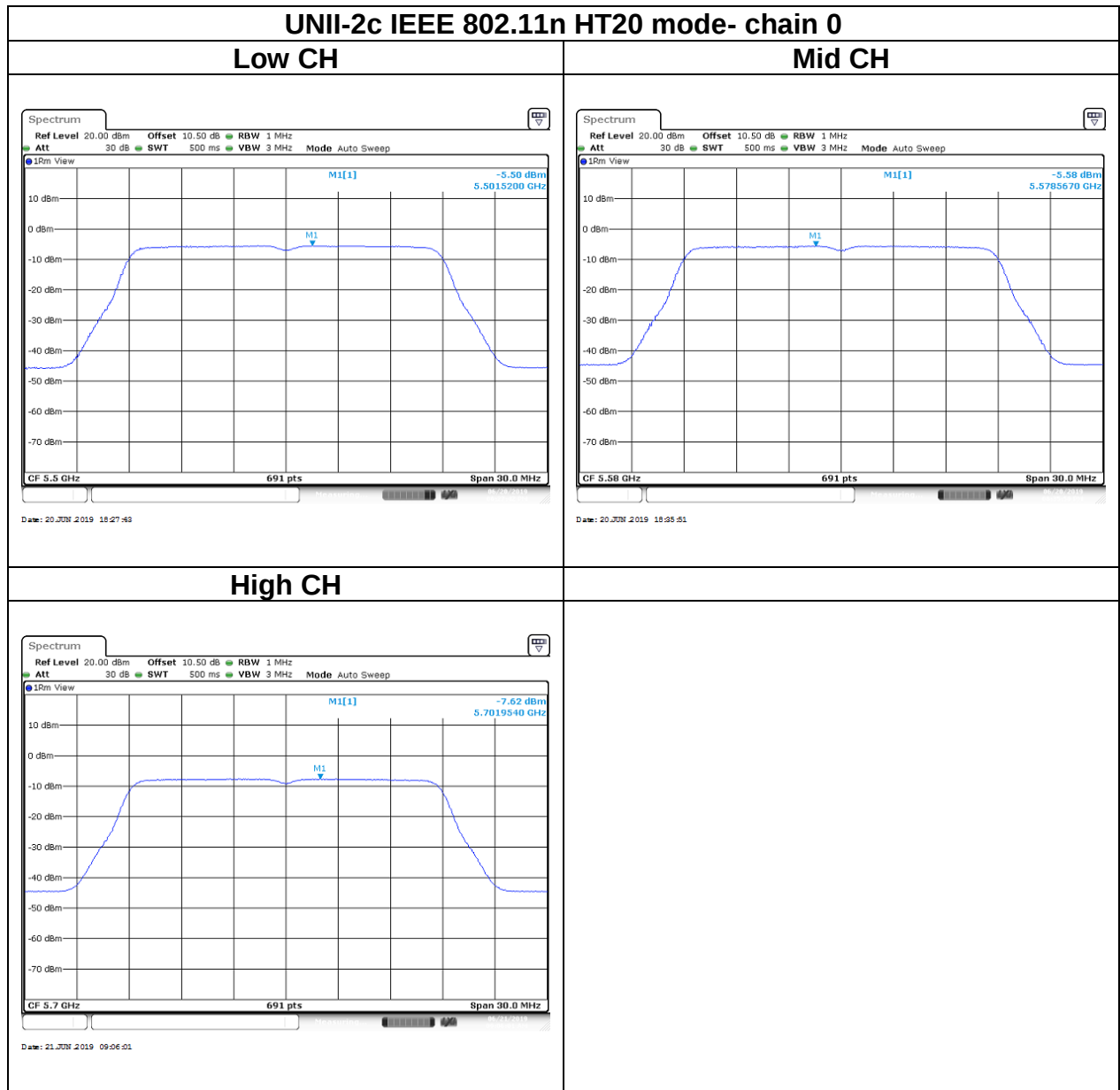
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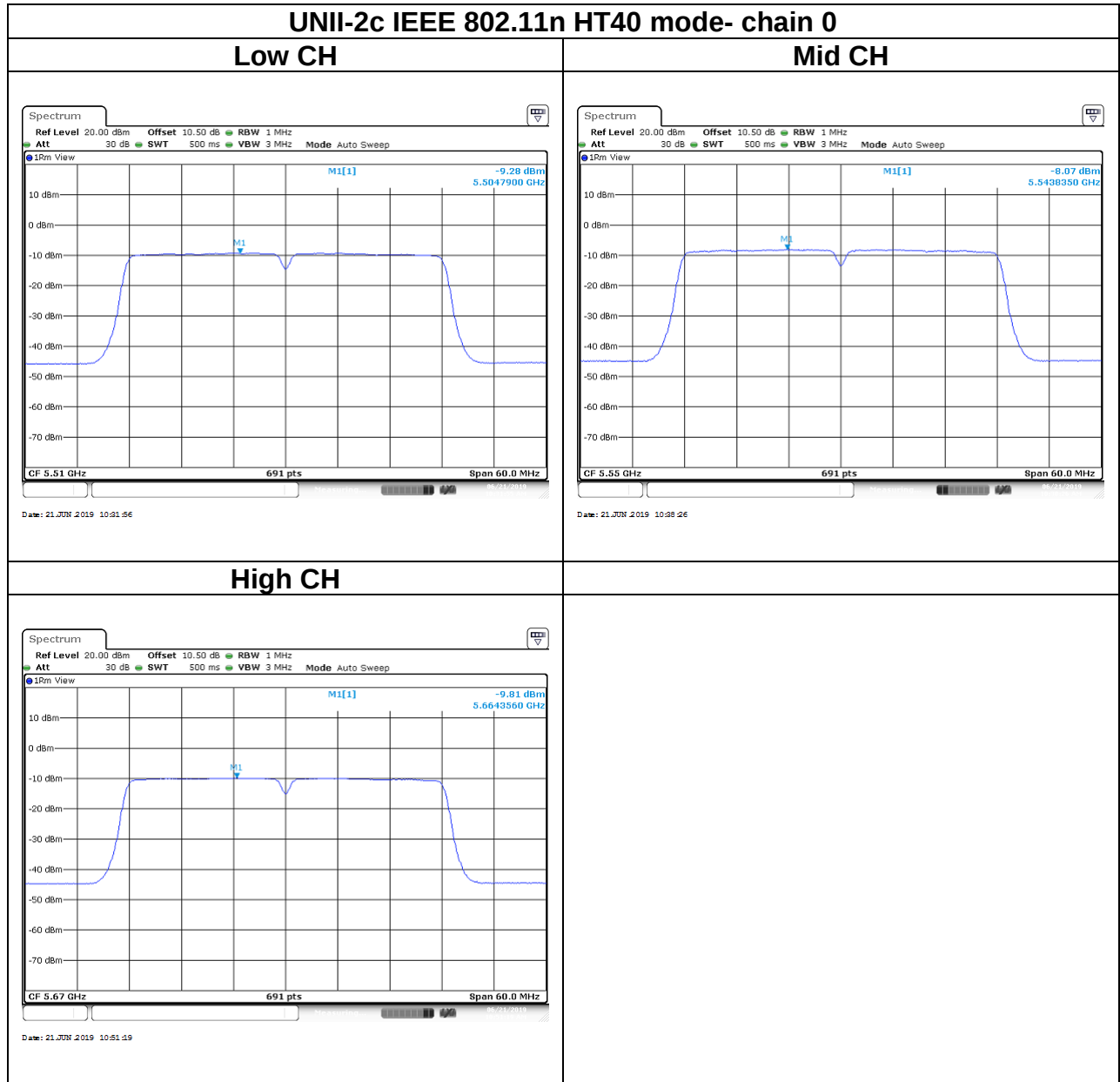




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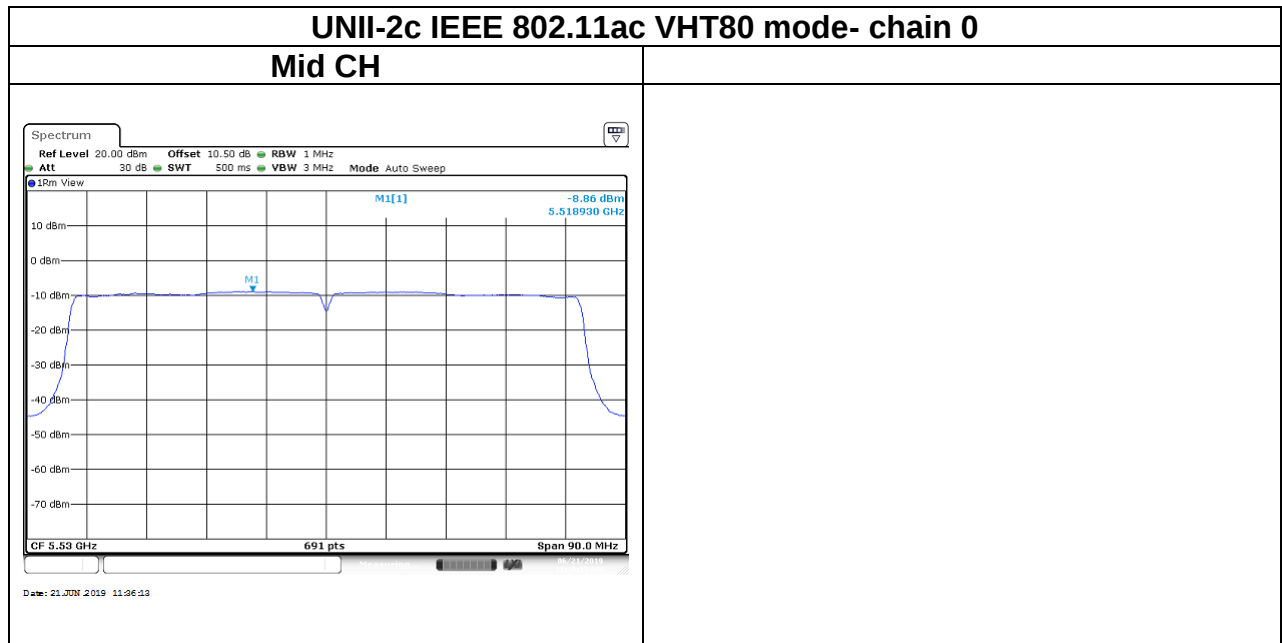




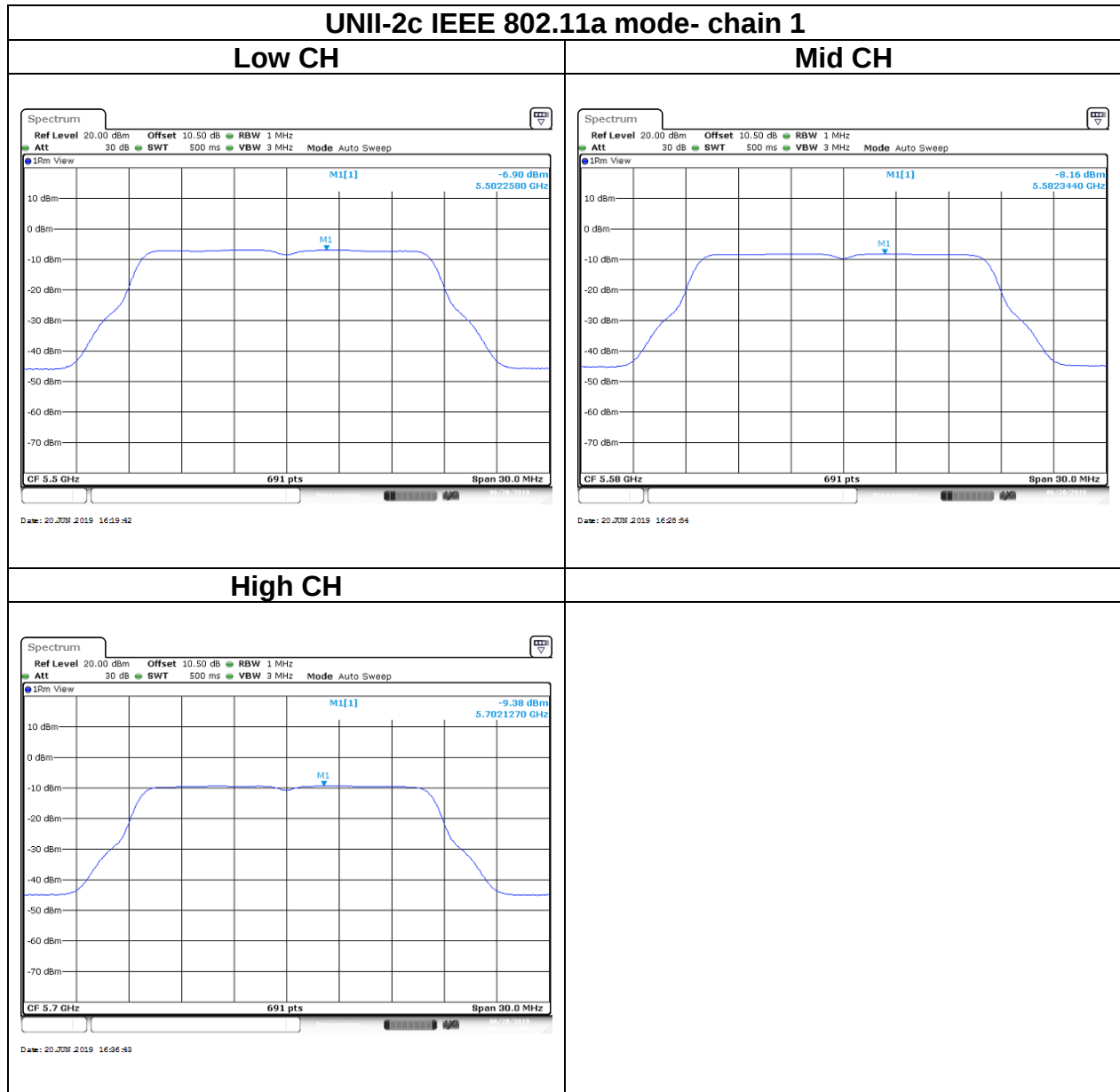


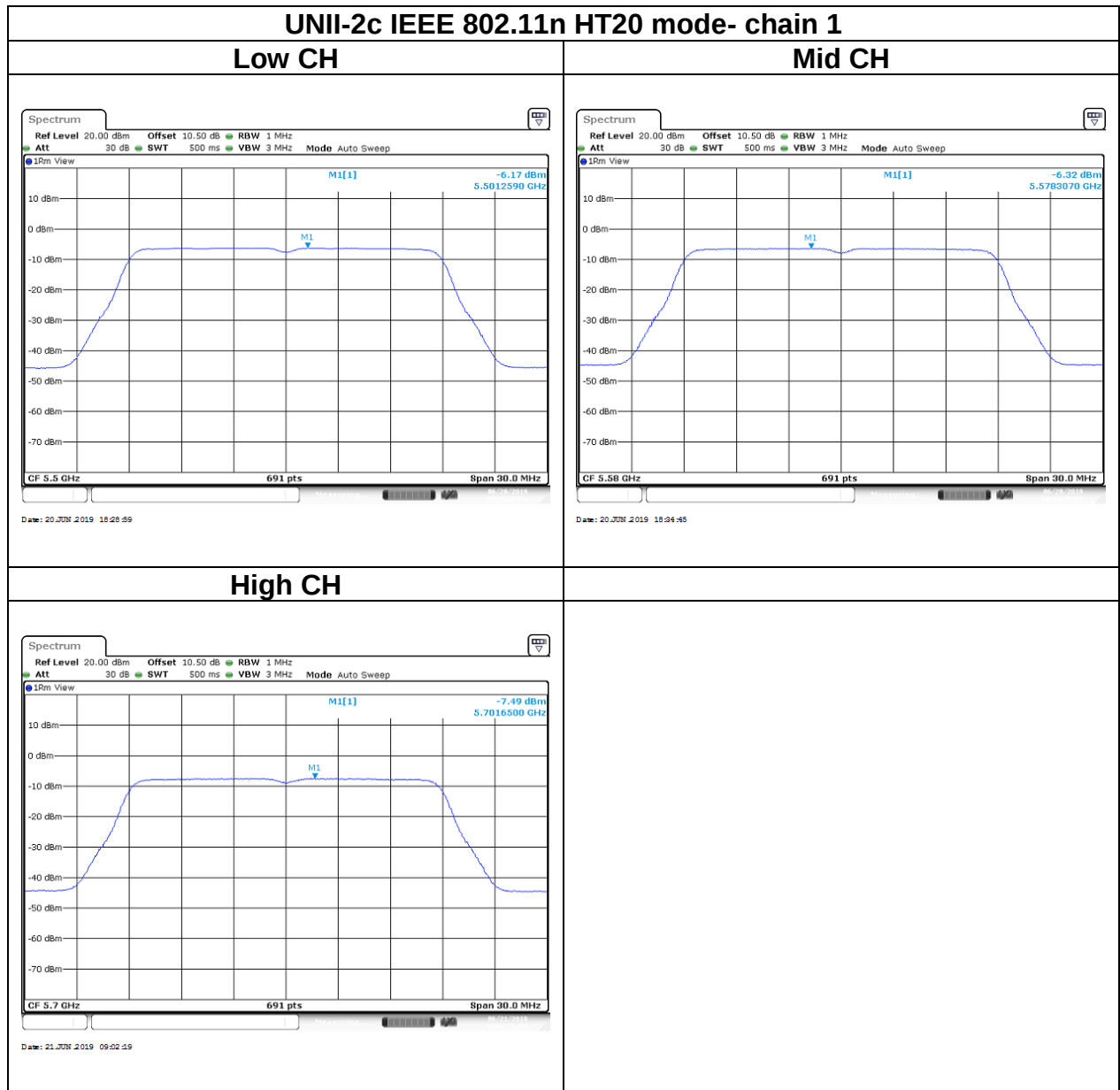
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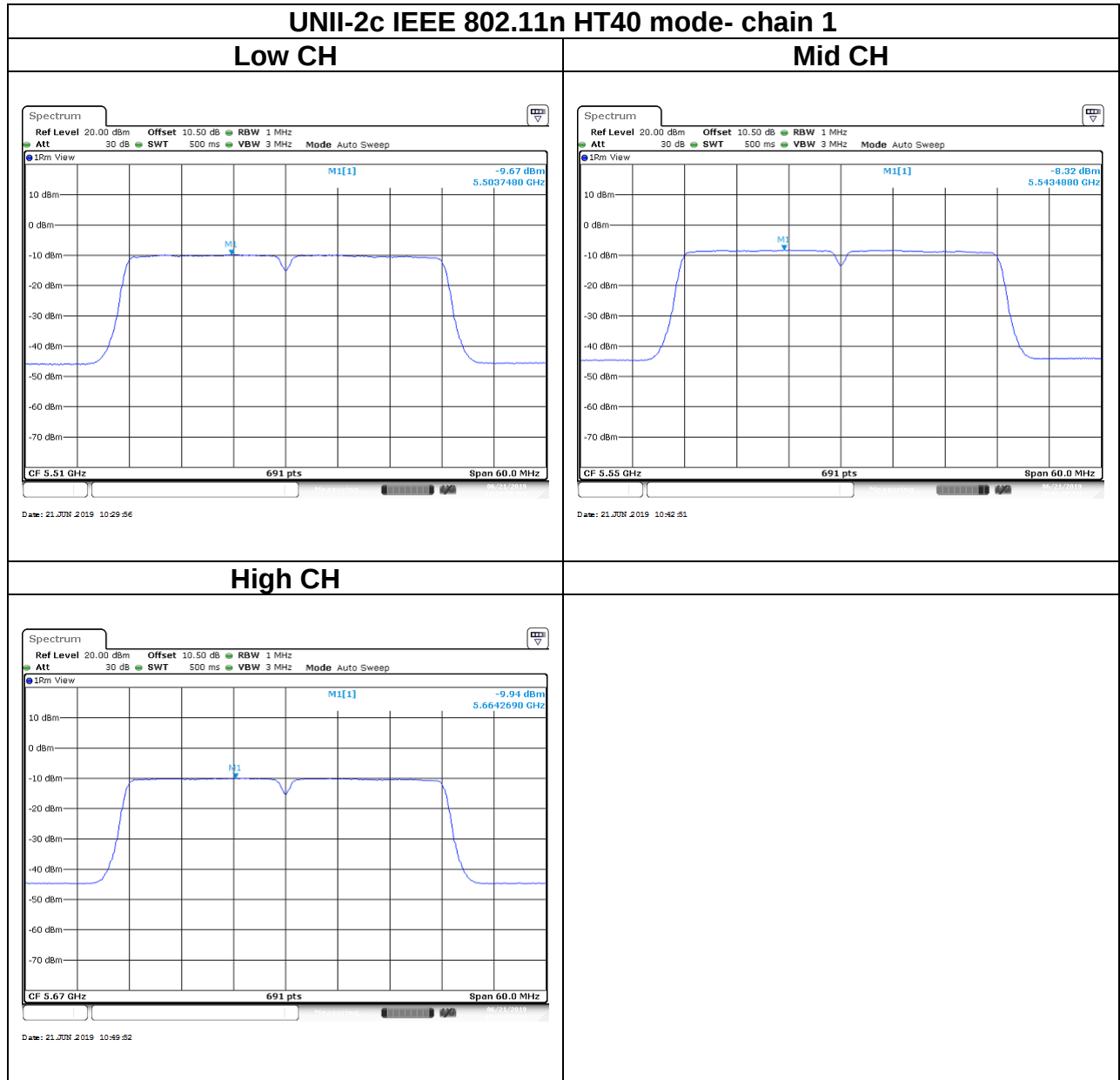
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chain 1





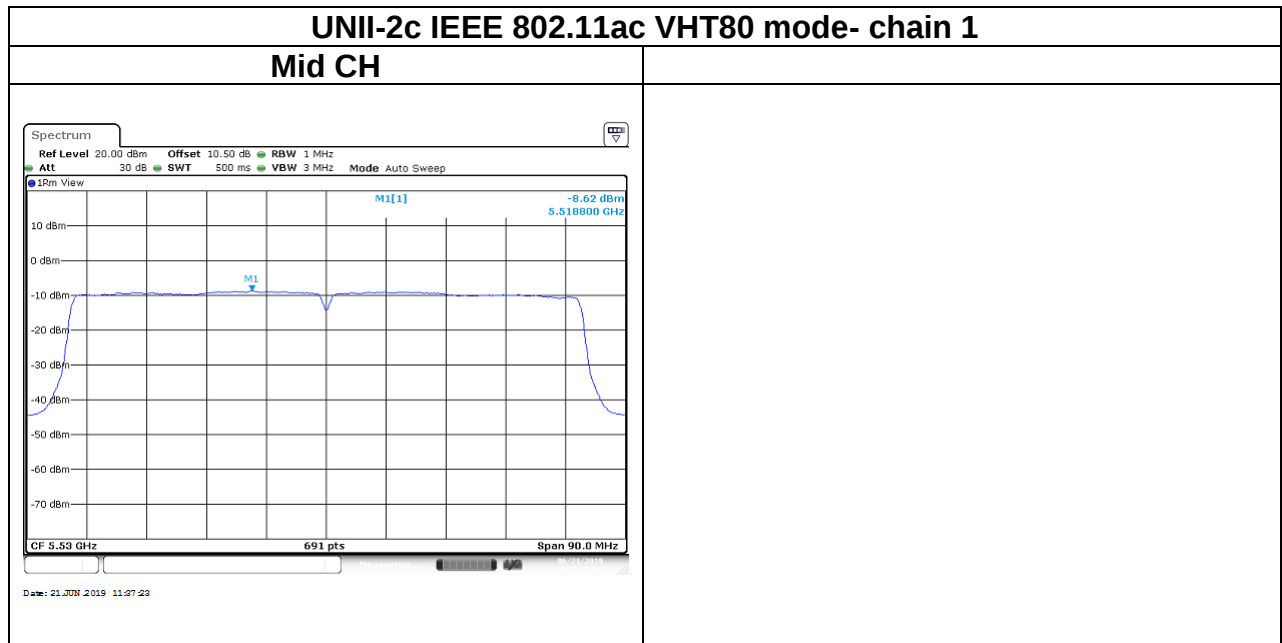




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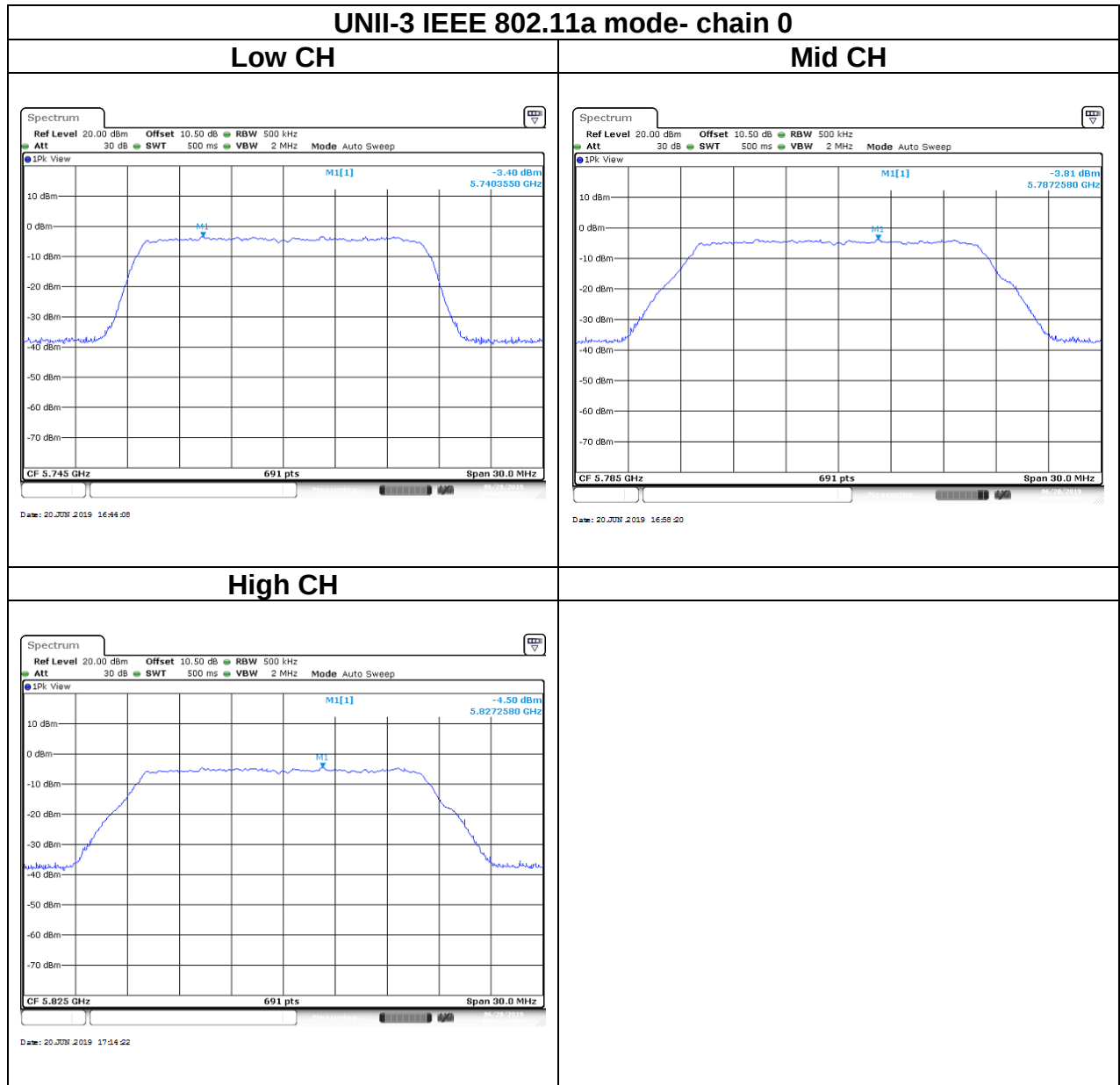
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Test Data

chain 0





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