

# RADIO TEST REPORT

## FCC 47 CFR PART 15 SUBPART E

<b>Test Standard</b>	<b>FCC Part 15.407</b>
<b>FCC ID</b>	<b>ACJ9TGWL17A</b>
<b>Brand name</b>	<b>Panasonic</b>
<b>Applicant</b>	<b>Panasonic Corporation of North America</b>
<b>Product name</b>	<b>WIFI module</b>
<b>Model No.</b>	<b>WL17A</b>
<b>Test Result</b>	<b>Pass</b>

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:

A handwritten signature in black ink that reads 'Sam Chuang'.

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Sam Chuang  
Manager

Reviewed by:

A handwritten signature in black ink that reads 'Jerry Chuang'.

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Jerry Chuang  
Engineer

## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	February 21, 2018	Initial Issue	ALL	Allison Chen
01	March 26, 2018	1. Revised power table.	P.61-66	Allison Chen
02	March 31, 2018	1. Revised power table.	P.61-64	Allison Chen
03	April 16, 2018	1. Add test data for 99%OBW.	P.18-25, P.62-88	Allison Chen

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## 1. GENERAL INFORMATION

### 1.1 EUT INFORMATION

Applicant	Panasonic Corporation of North America Two Riverfront Plaza, 9th Floor Newark, NJ 07102-5490 United States
Manufacturer	LITE-ON TECHNOLOGY (Changzhou) CO., LTD A9 Building, No.88 Yanghu Road, Wujin Hi-Tech Industrial Development Zone, Changzhou City, Jiangsu Province 213100 China
Equipment	WIFI module
Model Name	WL17A
Model Discrepancy	N/A
Received Date	January 15, 2018
Date of Test	January 16 ~ February 12, 2018
Power Operation	Powered from host device (DC 5V)
HW Version	V01
SW Version	V2

Output Power(W)	<b>For 1TX:</b>			
	<b>Band</b>	<b>Mode</b>	<b>Frequency Range (MHz)</b>	<b>Output Power (W)</b>
	U-NII-1	IEEE 802.11a	5180 ~ 5240	0.0527
		IEEE 802.11n 20 MHz	5180 ~ 5240	0.0627
		IEEE 802.11n 40 MHz	5190 ~ 5230	0.0585
		IEEE 802.11ac VHT 80 MHz	5210	0.0273
	U-NII-2a	IEEE 802.11a	5260 ~ 5320	0.0661
		IEEE 802.11n 20 MHz	5260 ~ 5320	0.0774
		IEEE 802.11n 40 MHz	5270 ~ 5310	0.0673
		IEEE 802.11ac VHT 80 MHz	5290	0.0225
	U-NII-2c	IEEE 802.11a	5500 ~ 5700	0.0614
		IEEE 802.11n 20 MHz	5500 ~ 5700	0.0782
		IEEE 802.11n 40 MHz	5510 ~ 5670	0.0767
		IEEE 802.11ac VHT 80 MHz	5530	0.0361
	U-NII-3	IEEE 802.11a	5745 ~ 5825	0.1079
		IEEE 802.11n 20 MHz	5745 ~ 5825	0.1253
		IEEE 802.11n 40 MHz	5755 ~ 5795	0.1330
		IEEE 802.11ac VHT 80 MHz	5775	0.0789
	<b>For 2TX:</b>			
	<b>Band</b>	<b>Mode</b>	<b>Frequency Range (MHz)</b>	<b>Output Power (W)</b>
	U-NII-1	IEEE 802.11n 20 MHz	5180 ~ 5240	0.0625
		IEEE 802.11n 40 MHz	5190 ~ 5230	0.0602
		IEEE 802.11ac VHT 80 MHz	5210	0.0266
	U-NII-2a	IEEE 802.11n 20 MHz	5260 ~ 5320	0.0778
		IEEE 802.11n 40 MHz	5270 ~ 5310	0.0782
		IEEE 802.11ac VHT 80 MHz	5290	0.0252
	U-NII-2c	IEEE 802.11n 20 MHz	5500 ~ 5700	0.0774
		IEEE 802.11n 40 MHz	5510 ~ 5670	0.0766
IEEE 802.11ac VHT 80 MHz		5530	0.0265	
U-NII-3	IEEE 802.11n 20 MHz	5745 ~ 5825	0.1288	
	IEEE 802.11n 40 MHz	5755 ~ 5795	0.1285	
	IEEE 802.11ac VHT 80 MHz	5775	0.1413	

## 1.2 EUT CHANNEL INFORMATION

Frequency Range	<b>UNII-1</b>	
	IEEE 802.11a	5180 ~ 5240 MHz
	IEEE 802.11n 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11n 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 20 MHz	5180 ~ 5240 MHz
	IEEE 802.11ac VHT 40 MHz	5190 ~ 5230 MHz
	IEEE 802.11ac VHT 80 MHz	5210 MHz
	<b>UNII-2a</b>	
	IEEE 802.11a	5260 ~ 5320 MHz
	IEEE 802.11n 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11n 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 20 MHz	5260 ~ 5320 MHz
	IEEE 802.11ac VHT 40 MHz	5270 ~ 5310 MHz
	IEEE 802.11ac VHT 80 MHz	5290 MHz
	<b>UNII-2c</b>	
	IEEE 802.11a	5500 ~ 5700 MHz
	IEEE 802.11n 20 MHz	5500 ~ 5700 MHz
	IEEE 802.11n 40 MHz	5510 ~ 5670 MHz
	IEEE 802.11ac VHT 20 MHz	5500 ~ 5700 MHz
	IEEE 802.11ac VHT 40 MHz	5510 ~ 5670 MHz
	IEEE 802.11ac VHT 80 MHz	5530 MHz
	<b>UNII-3</b>	
	IEEE 802.11a	5745 ~ 5825 MHz
	IEEE 802.11n 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11n 40 MHz	5755 ~ 5795 MHz
	IEEE 802.11ac VHT 20 MHz	5745 ~ 5825 MHz
	IEEE 802.11ac VHT 40 MHz	5755 ~ 5795 MHz
IEEE 802.11ac VHT 80 MHz	5775 MHz	
Modulation Type	<ol style="list-style-type: none"> <li>1. IEEE 802.11a mode: OFDM</li> <li>2. IEEE 802.11n 20 MHz mode: OFDM</li> <li>3. IEEE 802.11n 40 MHz mode: OFDM</li> <li>4. IEEE 802.11ac VHT 20 MHz mode: OFDM</li> <li>5. IEEE 802.11ac VHT 40 MHz mode: OFDM</li> <li>6. IEEE 802.11ac VHT 80 MHz mode: OFDM</li> </ol>	

**Remark:**

Refer as ANSI 63.10:2013 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
<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

<b>Antenna Type</b>	<input checked="" type="checkbox"/> PIFA <input type="checkbox"/> PCB <input type="checkbox"/> Dipole <input type="checkbox"/> Coils				
<b>Antenna Gain</b>	Brand	P/N	Type	Peak Gain	Worst case
	LYNwave	ALA110-222050-300011	PIFA	5 dBi	V
	1. Power Directional Gain: 5 dBi 2. Power Density Directional Gain: 5 dBi				

**Notes:**

1. Power Directional Gain:  $10\text{LOG}(((10^{\wedge}(\text{Ant1}/10)+10^{\wedge}(\text{Ant2}/10))/2))$
2. Power Density Directional Gain:  $10\text{LOG}(((10^{\wedge}(\text{Ant1}/10)+10^{\wedge}(\text{Ant2}/10))/2))+10\text{log}(\text{NTX}/\text{NSS})$

### 1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 30 to 1000 MHz	+/- 3.97
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 1 to 18GHz	+/- 3.58
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 18 to 26 GHz	+/- 3.59
Semi Anechoic Chamber (966 Chamber_B) / Radiated Emission, 26 to 40 GHz	+/- 3.81
Conducted Emission (Mains Terminals), 9kHz to 30MHz	+/- 2.48

**Remark:**

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

## 1.5 FACILITIES AND TEST LOCATION

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

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)

Test site	Test Engineer	Remark
AC Conduction Room	Eric Lee	-
Radiation	Jerry Chuang	-
RF Conducted	Eric Lee	-

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

## 1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Power Meter	Anritsu	ML2495A	1033009	04/11/2017	04/10/2018
Power Sensor	Anritsu	MA2411B	917072	07/03/2017	07/02/2018
Spectrum Analyzer	R&S	FSV 40	101073	10/02/2017	10/01/2018
Directional Coupler	Agilent	87301D	MY44350252	07/25/2017	07/24/2018
SUCOFLEX Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Divider	Solvang Technology	2-18GHz 4Way	STI08-0015	07/26/2017	07/25/2018

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
Bilog Antenna	Sunol Sciences	JB3	A030105	06/20/2017	06/19/2018
Pre-Amplifier	EMEC	EM330	60609	06/07/2017	06/06/2018
Spectrum Analyzer	Agilent	E4446A	US42510252	11/27/2017	11/26/2018
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
Pre-Amplifier	HP	8449B	3008A00965	06/27/2017	06/26/2018
Filter	N/A	2400-2500	N/A	N/A	N/A
Filter	N/A	0-6000	N/A	N/A	N/A
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	07/31/2017	07/30/2018
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	07/31/2017	07/30/2018
Horn Antenna	EMCO	3117	55165	02/20/2017	02/19/2018
Loop Ant	COM-POWER	AL-130	121051	03/21/2018	03/20/2019

AC Conducted Emissions Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
LISN	R&S	ENV216	101054	05/18/2017	05/17/2018
LISN	SCHWARZBECK	NSLK 8127	8127-541	02/14/2017	02/13/2018
EMI Test Receiver	R&S	ESCI	100064	05/17/2017	05/16/2018

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



Adaptivity / DFS Test Site					
Equipment	Manufacturer	Model	S/N	Cal Date	Cal Due
SMA Power Divider	CCS	STI08-0015	008	07/27/2017	07/26/2018
Spectrum Analyzer	R&S	FSU 20Hz....26.5GHz	100258	06/27/2017	06/26/2018
SMA Power Divider	CCS	STI08-0015	008	07/27/2017	07/26/2018
Vector Signal Generator	R&S	SMU 200A	102239	03/13/2017	03/12/2018

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

## 1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

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

Support Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
1	NB(G)	Lenovo	IBM 1951	N/A	CJ6UPA3489WL

## 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 662911 D01 v02r01, KDB 789033 D02 v02r01, KDB 905462 D02 v02.

## 2. TEST SUMMERY

<b>FCC Standard Sec.</b>	<b>Chapter</b>	<b>Test Item</b>	<b>Result</b>
15.203	1.2	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
15.403(i)	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 WORST MODE OF OPERATING CONDITION

<p>Operation mode</p>	<p>1. IEEE 802.11a mode: 6Mbps                  2. IEEE 802.11n 20 MHz mode: MCS0                  3. IEEE 802.11n 40 MHz mode: MCS0                  4. IEEE 802.11ac VHT 20 MHz mode: MCS0                  5. IEEE 802.11ac VHT 40 MHz mode: MCS0                  6. IEEE 802.11ac VHT 80 MHz mode: MCS0</p>																																																																																
<p>Operating Frequency Range &amp; Number of Channels</p>		<table border="1"> <thead> <tr> <th>Mode</th> <th>Frequency Range (MHz)</th> <th>Number of Channels</th> </tr> </thead> <tbody> <tr> <td rowspan="6">U-NII-1</td> <td>IEEE 802.11a</td> <td>5180 ~ 5240</td> <td>4 Channels</td> </tr> <tr> <td>IEEE 802.11n 20 MHz</td> <td>5180 ~ 5240</td> <td>4 Channels</td> </tr> <tr> <td>IEEE 802.11n 40 MHz</td> <td>5190 ~ 5230</td> <td>2 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 20 MHz</td> <td>5180 ~ 5240</td> <td>4 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 40 MHz</td> <td>5190 ~ 5230</td> <td>2 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 80 MHz</td> <td>5210</td> <td>1 Channels</td> </tr> <tr> <td rowspan="6">U-NII-2a</td> <td>IEEE 802.11a</td> <td>5260 ~ 5320</td> <td>4 Channels</td> </tr> <tr> <td>IEEE 802.11n 20 MHz</td> <td>5260 ~ 5320</td> <td>4 Channels</td> </tr> <tr> <td>IEEE 802.11n 40 MHz</td> <td>5270 ~ 5310</td> <td>2 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 20 MHz</td> <td>5260 ~ 5320</td> <td>4 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 40 MHz</td> <td>5270 ~ 5310</td> <td>2 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 80 MHz</td> <td>5290</td> <td>1 Channels</td> </tr> <tr> <td rowspan="6">U-NII-2c</td> <td>IEEE 802.11a</td> <td>5500 ~ 5700</td> <td>11 Channels</td> </tr> <tr> <td>IEEE 802.11n 20 MHz</td> <td>5500 ~ 5700</td> <td>11 Channels</td> </tr> <tr> <td>IEEE 802.11n 40 MHz</td> <td>5510 ~ 5670</td> <td>5 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 20 MHz</td> <td>5500 ~ 5700</td> <td>11 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 40 MHz</td> <td>5510 ~ 5670</td> <td>5 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 80 MHz</td> <td>5530</td> <td>1 Channels</td> </tr> <tr> <td rowspan="6">U-NII-3</td> <td>IEEE 802.11a</td> <td>5745 ~ 5825</td> <td>5 Channels</td> </tr> <tr> <td>IEEE 802.11n 20 MHz</td> <td>5745 ~ 5825</td> <td>5 Channels</td> </tr> <tr> <td>IEEE 802.11n 40 MHz</td> <td>5755 ~ 5795</td> <td>2 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 20 MHz</td> <td>5745 ~ 5825</td> <td>5 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 40 MHz</td> <td>5755 ~ 5795</td> <td>2 Channels</td> </tr> <tr> <td>IEEE 802.11ac VHT 80 MHz</td> <td>5775</td> <td>1 Channels</td> </tr> </tbody> </table>	Mode	Frequency Range (MHz)	Number of Channels	U-NII-1	IEEE 802.11a	5180 ~ 5240	4 Channels	IEEE 802.11n 20 MHz	5180 ~ 5240	4 Channels	IEEE 802.11n 40 MHz	5190 ~ 5230	2 Channels	IEEE 802.11ac VHT 20 MHz	5180 ~ 5240	4 Channels	IEEE 802.11ac VHT 40 MHz	5190 ~ 5230	2 Channels	IEEE 802.11ac VHT 80 MHz	5210	1 Channels	U-NII-2a	IEEE 802.11a	5260 ~ 5320	4 Channels	IEEE 802.11n 20 MHz	5260 ~ 5320	4 Channels	IEEE 802.11n 40 MHz	5270 ~ 5310	2 Channels	IEEE 802.11ac VHT 20 MHz	5260 ~ 5320	4 Channels	IEEE 802.11ac VHT 40 MHz	5270 ~ 5310	2 Channels	IEEE 802.11ac VHT 80 MHz	5290	1 Channels	U-NII-2c	IEEE 802.11a	5500 ~ 5700	11 Channels	IEEE 802.11n 20 MHz	5500 ~ 5700	11 Channels	IEEE 802.11n 40 MHz	5510 ~ 5670	5 Channels	IEEE 802.11ac VHT 20 MHz	5500 ~ 5700	11 Channels	IEEE 802.11ac VHT 40 MHz	5510 ~ 5670	5 Channels	IEEE 802.11ac VHT 80 MHz	5530	1 Channels	U-NII-3	IEEE 802.11a	5745 ~ 5825	5 Channels	IEEE 802.11n 20 MHz	5745 ~ 5825	5 Channels	IEEE 802.11n 40 MHz	5755 ~ 5795	2 Channels	IEEE 802.11ac VHT 20 MHz	5745 ~ 5825	5 Channels	IEEE 802.11ac VHT 40 MHz	5755 ~ 5795	2 Channels	IEEE 802.11ac VHT 80 MHz	5775	1 Channels
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**Remark:**

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.
2. Covered modes are test reduction modes. The output powers on the covered modes are equal to or less than the mode referenced and use the same module
3. The mode IEEE 802.11ac VHT20 and VHT40 are only different in control messages with IEEE 802.11n 20 and n 40 MHz, and have same power setting. Therefore, the highest power(IEEE 802.11n 20 and n 40 MHz) were test conducted and radiated measurement and recorded in this report.

### 3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Voltage/Hz	DC 5V
Test Mode	Mode 1:EUT power by host system.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Band edge, Emission for Unwanted and Fundamental
Voltage/Hz	DC 5V
Test Mode	Mode 1:EUT power by host system.
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)
Worst Polarity	<input checked="" type="checkbox"/> Horizontal <input type="checkbox"/> Vertical

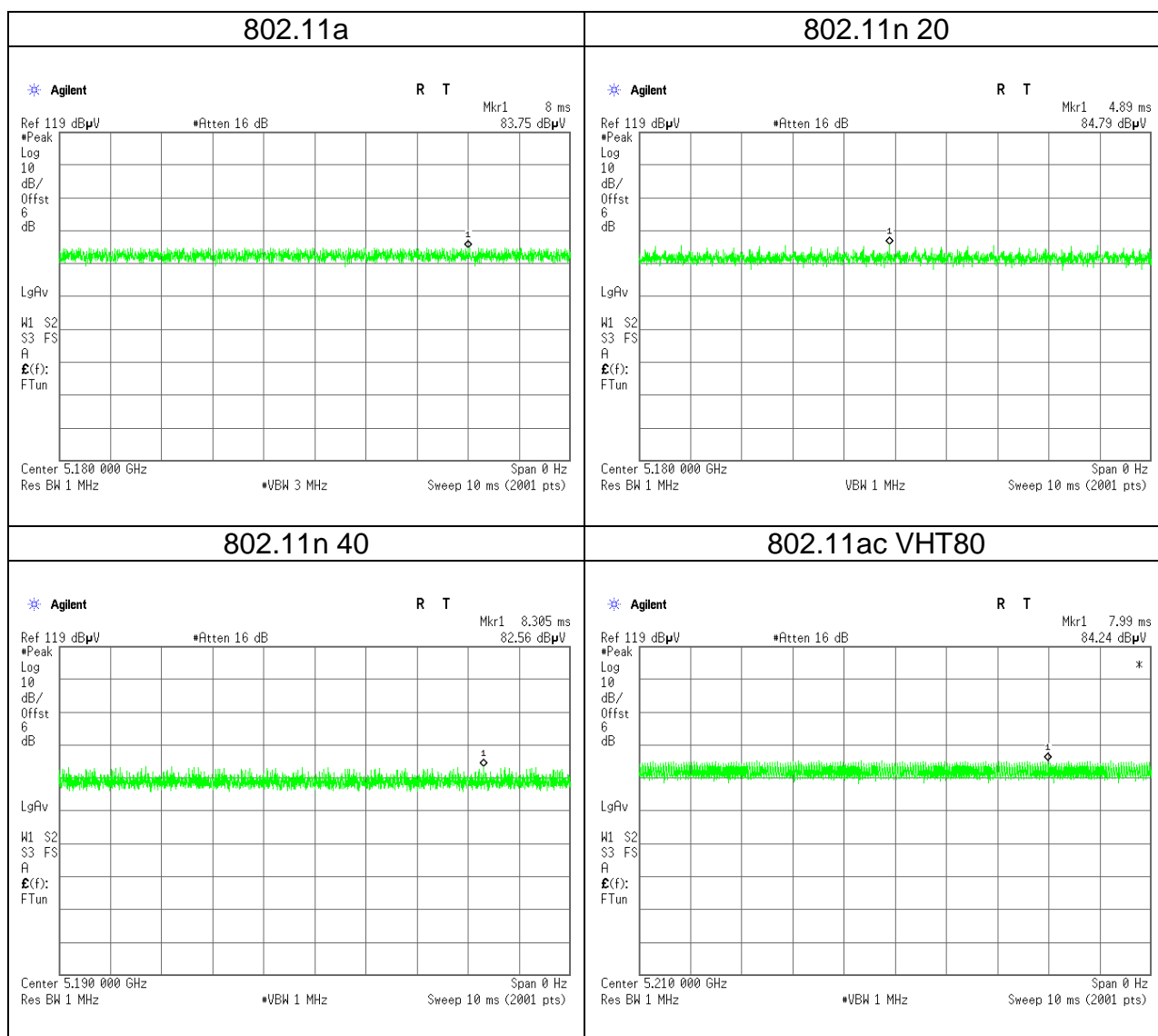
Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Voltage/Hz	DC 5V
Test Mode	Mode 1:EUT power by host system.
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

*Remark:*

- 1. The worst mode was record in this test report.*
- 2. EUT pre-scanned in three axis ,X, Y, Z and two polarity, Horizontal and Vertical for radiated measurement. The worst case(X-Plane and Horizontal) 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.*

### 3.3 EUT DUTY CYCLE

Duty Cycle				
Configuration	TX ON (ms)	TX ALL (ms)	Duty Cycle (%)	Duty Factor(dB)
802.11a	-	-	100.00%	0.00
802.11n 20	-	-	100.00%	0.00
802.11n 40	-	-	100.00%	0.00
802.11ac VHT80	-	-	100.00%	0.00



## 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

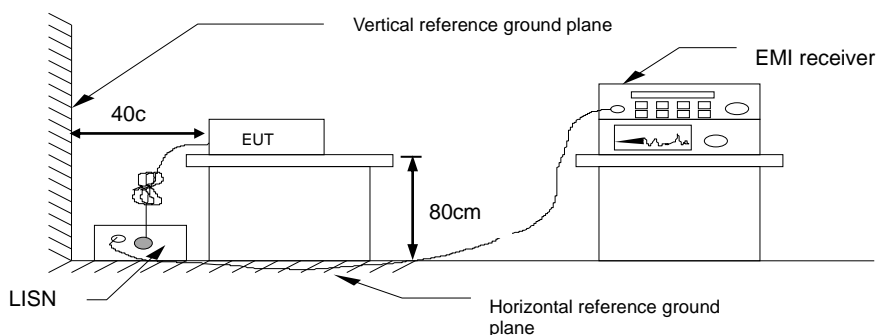
\* Decreases with the logarithm of the frequency.

#### 4.1.2 Test Procedure

Test method Refer as ANSI 63.10:2013 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

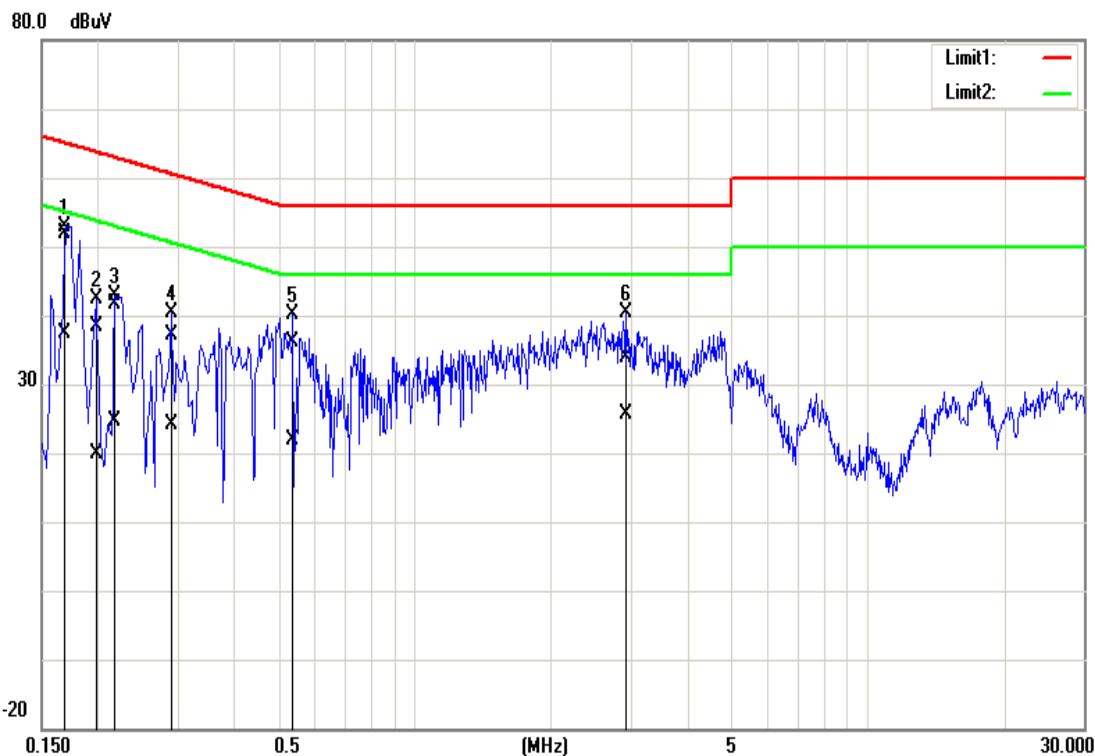


#### 4.1.4 Test Result

**Pass.**

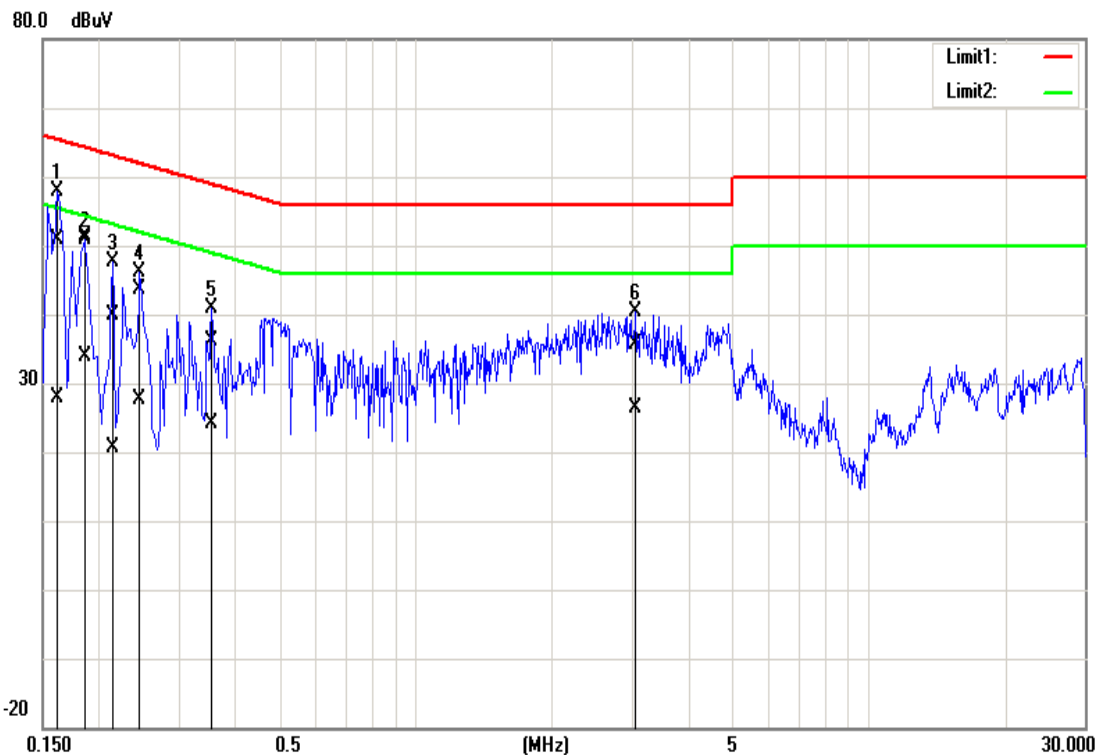
**Test Data**

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	---	Test Date	January 18, 2018
Phase:	Line	Test Engineer	Eric Lee



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
0.1700	51.89	37.45	0.05	51.94	37.50	64.96	54.96	-13.02	-17.46	Pass
0.1980	38.29	19.71	0.05	38.34	19.76	63.69	53.69	-25.35	-33.93	Pass
0.2180	41.67	24.53	0.05	41.72	24.58	62.89	52.89	-21.17	-28.31	Pass
0.2900	37.11	24.16	0.05	37.16	24.21	60.52	50.52	-23.36	-26.31	Pass
0.5380	36.09	21.78	0.05	36.14	21.83	56.00	46.00	-19.86	-24.17	Pass
2.9460	33.89	25.43	0.11	34.00	25.54	56.00	46.00	-22.00	-20.46	Pass

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 50%RH
Test Voltage:	---	Test Date	January 18, 2018
Phase:	Neutral	Test Engineer	Eric Lee



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBu )	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.1620	50.79	27.79	0.12	50.91	27.91	65.36	55.36	-14.45	-27.45	Pass
0.1860	51.32	33.78	0.12	51.44	33.90	64.21	54.21	-12.77	-20.31	Pass
0.2140	39.83	20.49	0.12	39.95	20.61	63.05	53.05	-23.10	-32.44	Pass
0.2460	43.63	27.39	0.12	43.75	27.51	61.89	51.89	-18.14	-24.38	Pass
0.3540	35.93	23.93	0.13	36.06	24.06	58.87	48.87	-22.81	-24.81	Pass
3.0580	35.41	26.08	0.19	35.60	26.27	56.00	46.00	-20.40	-19.73	Pass



## 4.2 26 DB BANDWIDTH, 6DB BANDWIDTH AND OCCUPIED BANDWIDTH(99%)

### 4.2.1 Test Limit

**26 dB Bandwidth** : For reporting purposes only.

**6 dB Bandwidth** : Least 500kHz.

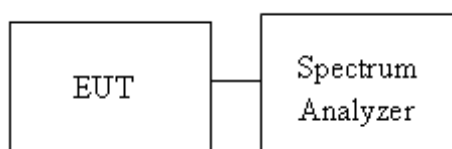
**Occupied Bandwidth(99%)** : For reporting purposes only.

### 4.2.2 Test Procedure

Test method Refer as KDB 789033 D02 v02r01 Section C, D, and ANSI 63.10:2013 clause 6.9.2,

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,
  - (1) BW=20MHz : SA set RBW = 300kHz, VBW = 1MHz and Detector = Peak, to measurement 26 dB Bandwidth
  - (2) BW=40MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth
  - (3) BW=80MHz : SA set RBW = 1MHz, VBW = 3MHz and Detector = Peak, to measurement 26 dB Bandwidth
4. UNII-3, SA set RBW = 100kHz, VBW = 300kHz and Detector = Peak, to measurement 6 dB Bandwidth
5. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth
6. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

### 4.2.3 Test Setup



### 4.2.4 Test Result

For 1TX:

<b>UNII-1 5150-5250 MHz</b>					
<b>Test mode: IEEE 802.11a mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5180	16.4978	-	25.0725	-
Mid	5220	18.2344	-	38.0435	-
High	5240	18.3791	-	37.971	-
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5180	17.6555	-	21.8116	-
Mid	5220	18.0173	-	33.4058	-
High	5240	17.9450	-	31.7391	-
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5190	36.5846	-	44.87	-
High	5230	36.8162	-	49.391	-
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Mid	5210	75.7163	-	83.478	-

<b>UNII-2a 5250-5350 MHz</b>					
<b>Test mode: IEEE 802.11a mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5260	18.0897	-	38.7681	-
Mid	5280	17.0043	-	33.8406	-
High	5320	17.1490	-	34.6377	-
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5260	17.6555	-	21.7391	-
Mid	5280	17.6555	-	21.7391	-
High	5320	17.7279	-	22.029	-
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5270	36.9319	-	45.333	-
High	5310	36.5846	-	45.101	-
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Mid	5290	75.7163	-	83.478	-

<b>UNII-2c 5475-5725 MHz</b>					
<b>Test mode: IEEE 802.11a mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5500	17.8002	-	34.2029	-
Mid	5580	18.3791	-	34.7826	-
High	5700	18.3068	-	35.3623	-
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5500	17.8002	-	21.5942	-
Mid	5580	19.4645	-	21.5942	-
High	5700	17.6555	-	21.8841	-
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5510	36.7004	-	44.986	-
Mid	5500	37.3950	-	45.217	-
High	5670	36.9319	-	45.449	-
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Mid	5530	75.4848	-	83.246	-

<b>UNII-3 5725-5825MHz</b>					
<b>Test mode: IEEE 802.11a mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Low	5745	18.8133	-	16.4348	-
Mid	5785	18.7409	-	16.4348	-
High	5825	17.0043	-	16.4348	-
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Low	5745	19.3198	-	17.6522	-
Mid	5785	18.0897	-	17.6522	-
High	5825	18.0897	-	17.6087	-
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Low	5755	37.3950	-	36.406	-
High	5795	37.3950	-	36.406	-
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Mid	5775	75.7163	-	76.29	-

**For 2TX:**

<b>UNII-1 5150-5250 MHz</b>					
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5180	17.6555	17.6555	21.6667	21.8116
Mid	5220	17.6555	18.0173	21.6667	33.4058
High	5240	17.6555	17.9450	21.5942	31.7391
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5190	36.7004	36.5846	44.986	44.87
High	5230	36.8162	36.8162	49.855	49.391
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Mid	5210	75.9479	75.7163	83.246	83.478

<b>UNII-2a 5250-5350 MHz</b>					
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5260	17.6555	18.3068	21.7391	37.971
Mid	5280	17.6555	18.3068	21.7391	37.2464
High	5320	17.7279	17.8002	22.029	25.942
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5270	36.8162	36.9319	45.449	45.333
High	5310	36.8162	36.5846	45.333	45.101
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Mid	5290	75.9479	75.7163	83.478	83.478

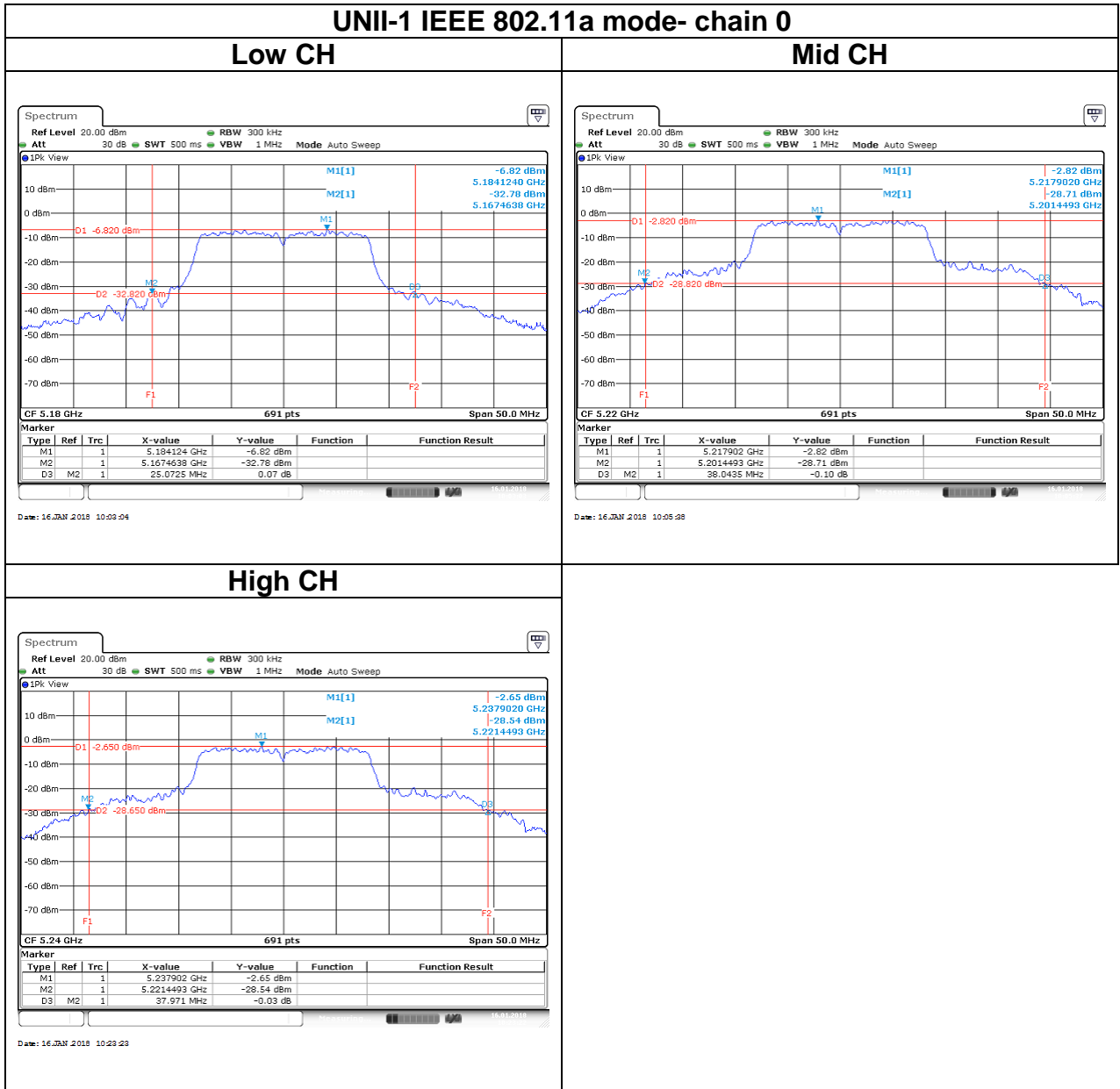
<b>UNII-2c 5475-5725 MHz</b>					
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5500	17.8726	17.8002	21.6667	21.5942
Mid	5580	17.9450	19.4645	21.5217	21.5942
High	5700	17.6555	17.6555	21.8841	21.8841
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Low	5510	36.7004	36.7004	44.986	44.986
Mid	5500	37.3950	37.3950	45.217	45.217
High	5670	37.0477	36.9319	45.101	45.449
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 26dB BW (MHz)</b>	<b>Chain 1 26dB BW (MHz)</b>
Mid	5530	75.7163	75.4848	83.478	83.246



<b>UNII-3 5725-5825MHz</b>					
<b>Test mode: IEEE 802.11n 20 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Low	5745	17.8002	19.3198	17.6522	17.6522
Mid	5785	18.4515	18.0897	17.6522	17.6522
High	5825	18.3791	18.0897	17.6522	17.6087
<b>Test mode: IEEE 802.11n 40 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Low	5755	37.8581	37.3950	36.406	36.406
High	5795	38.0897	37.3950	36.522	36.406
<b>Test mode: IEEE 802.11ac VHT80 mode</b>					
<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Chain 0 OBW(99%) (MHz)</b>	<b>Chain 1 OBW(99%) (MHz)</b>	<b>Chain 0 6dB BW (MHz)</b>	<b>Chain 1 6dB BW (MHz)</b>
Mid	5775	75.9479	75.7163	76.522	76.29

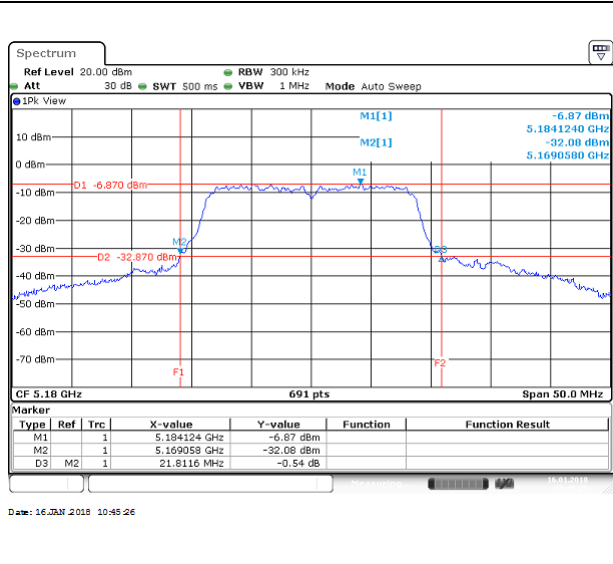
# Test Data (26dB)

For 1TX:

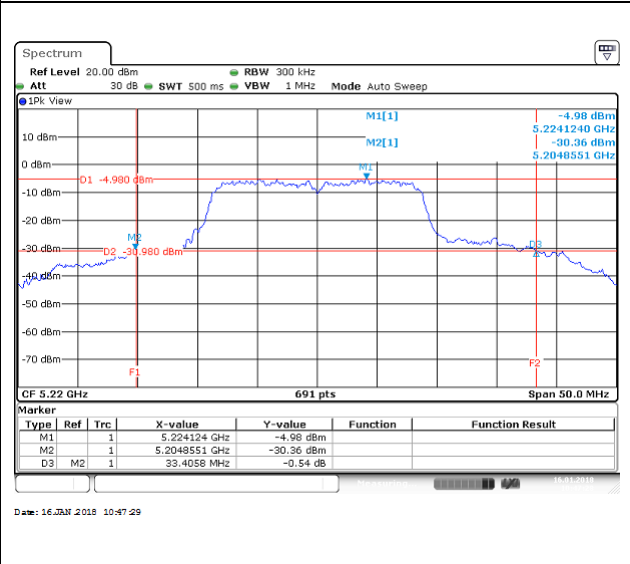


**UNII-1 IEEE 802.11n 20 mode- chain 0**

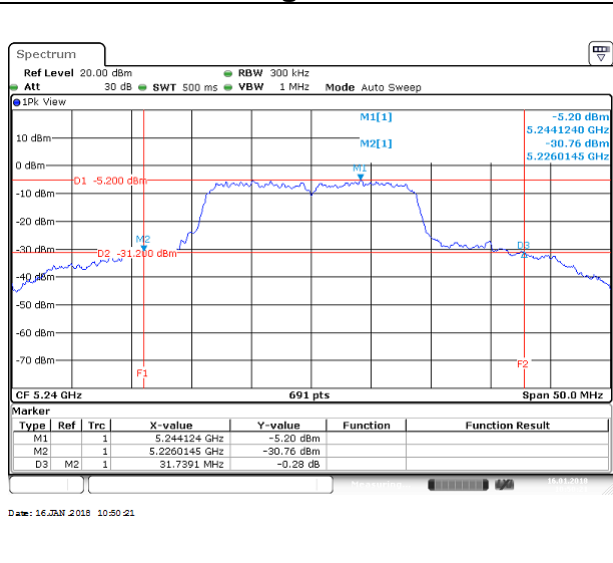
**Low CH**

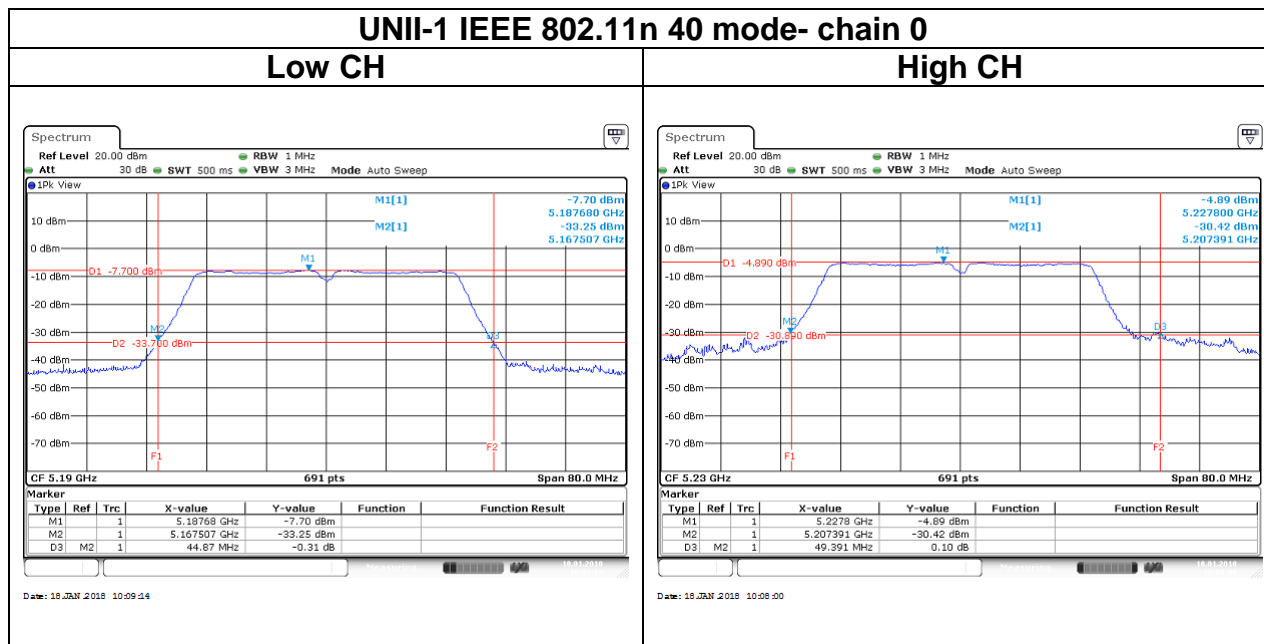


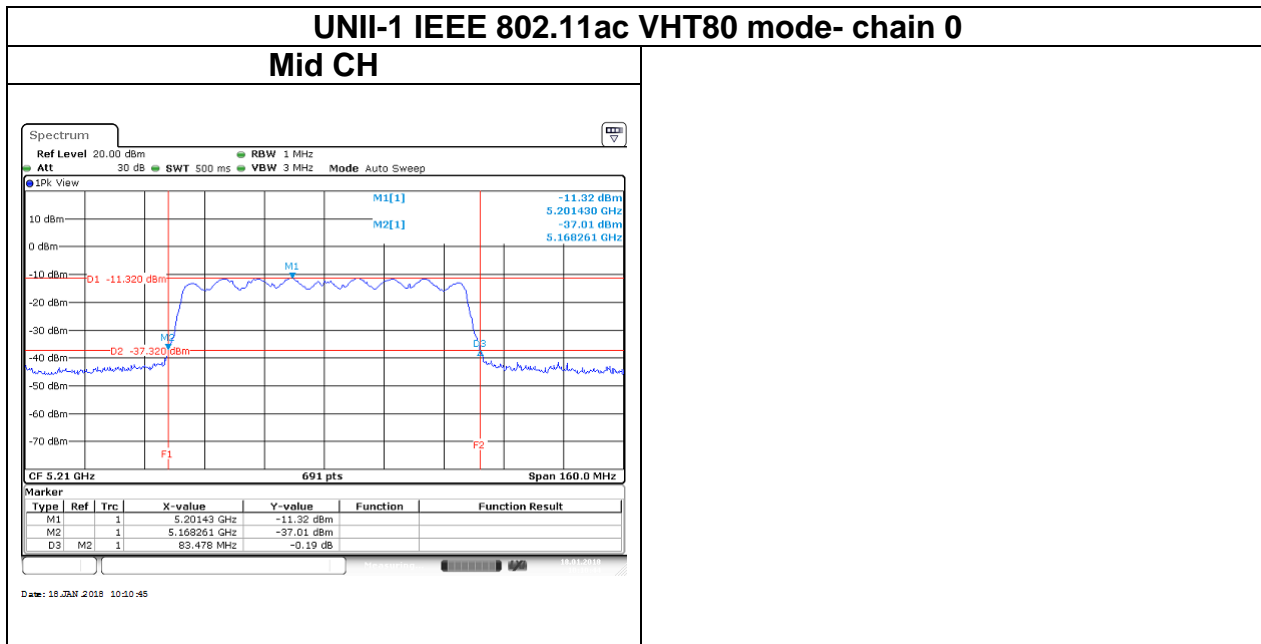
**Mid CH**



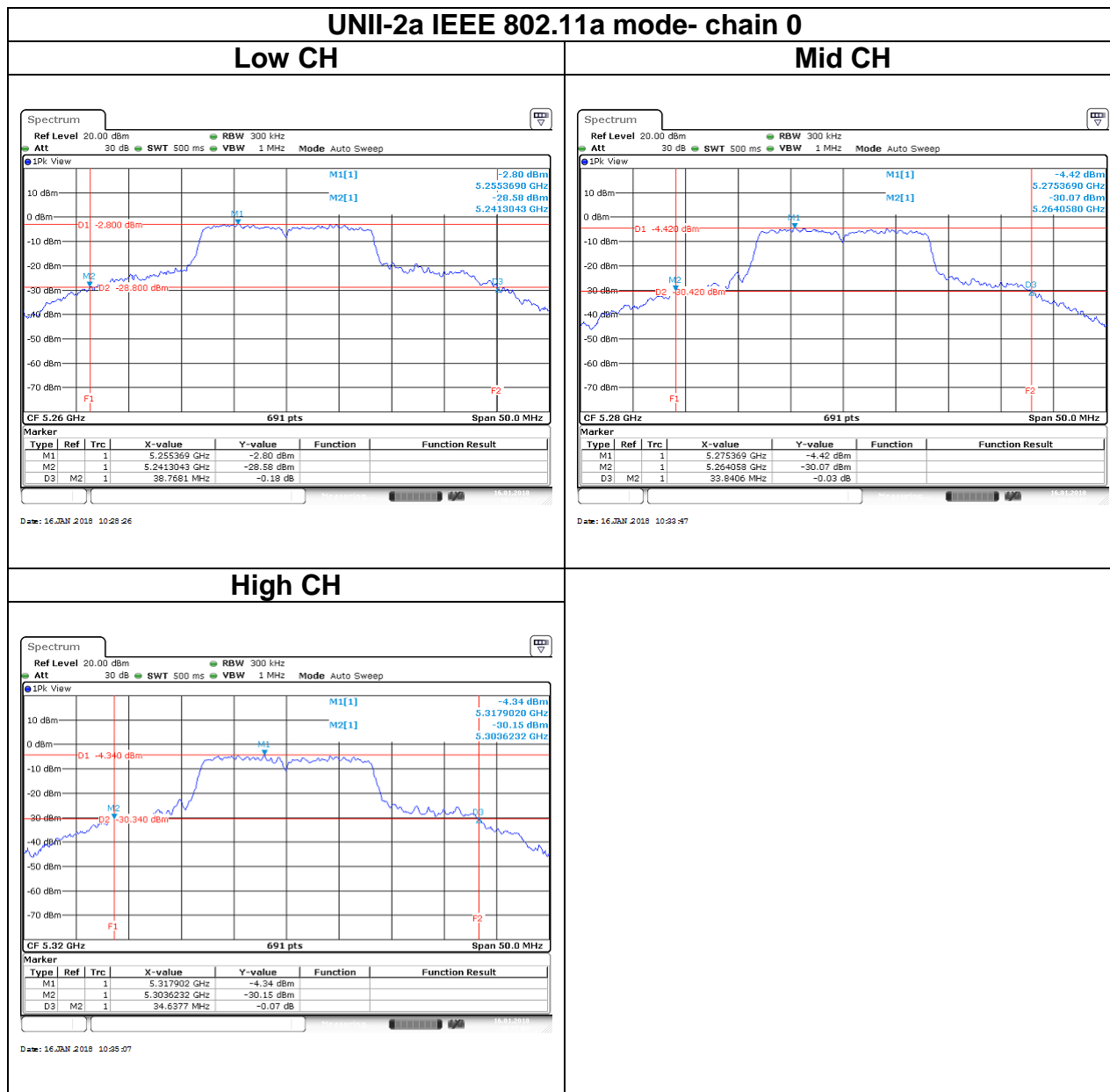
**High CH**





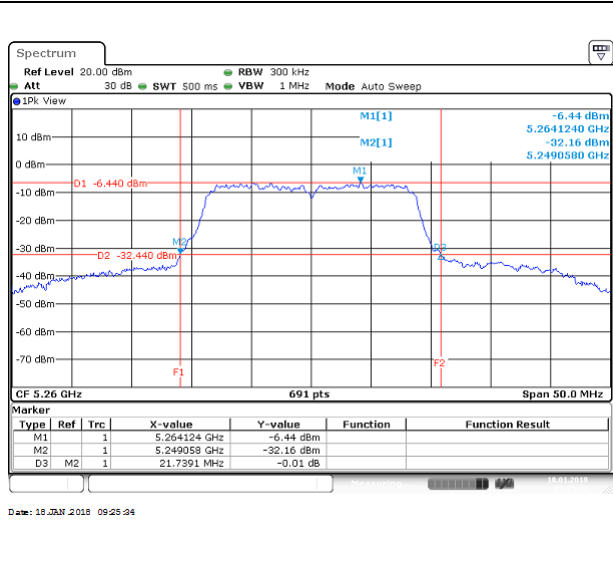


# Test Data (26dB)

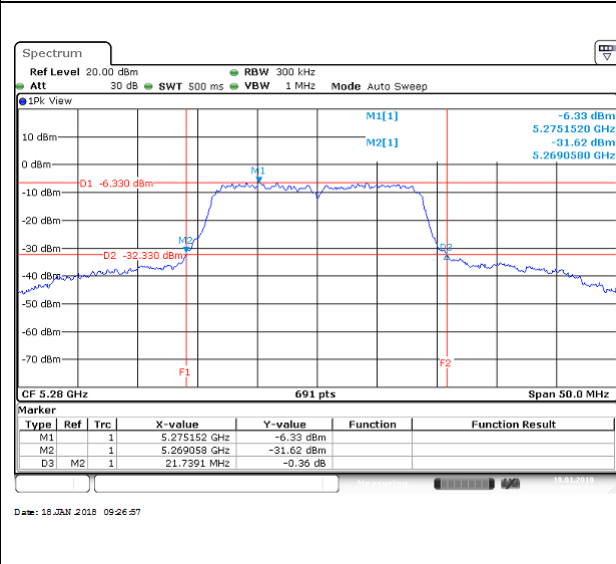


**UNII-2a IEEE 802.11n 20 mode- chain 0**

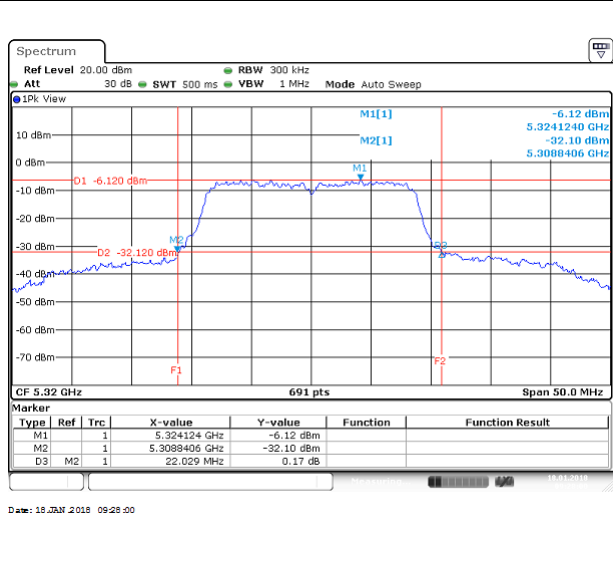
**Low CH**

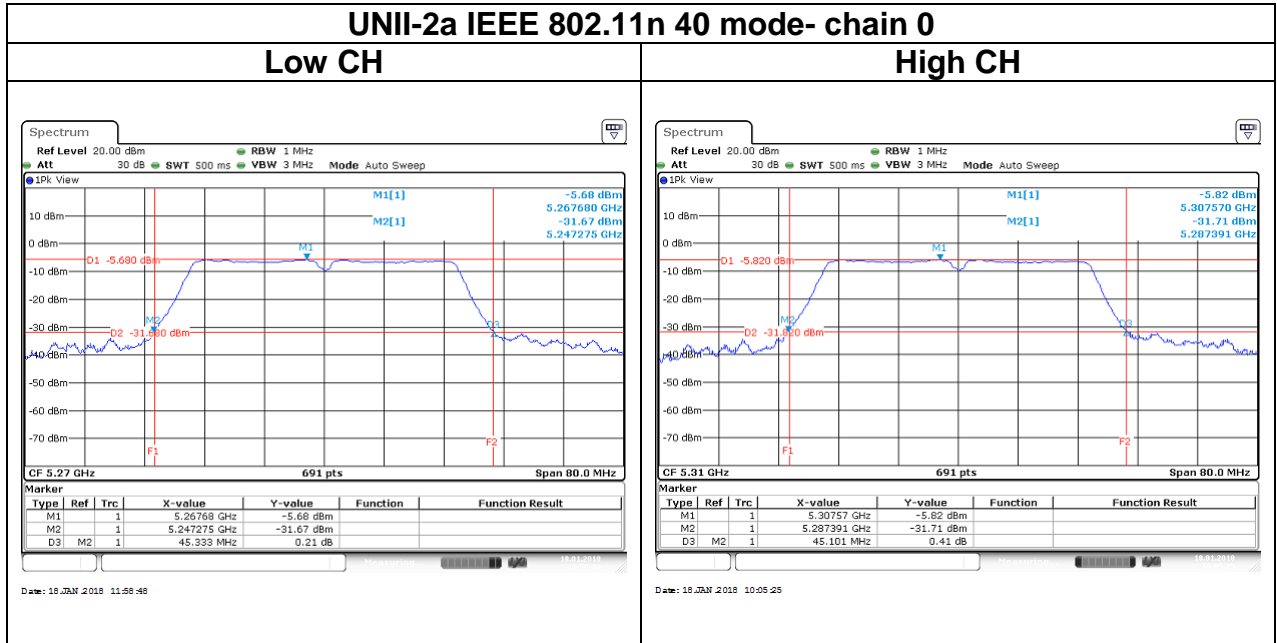


**Mid CH**

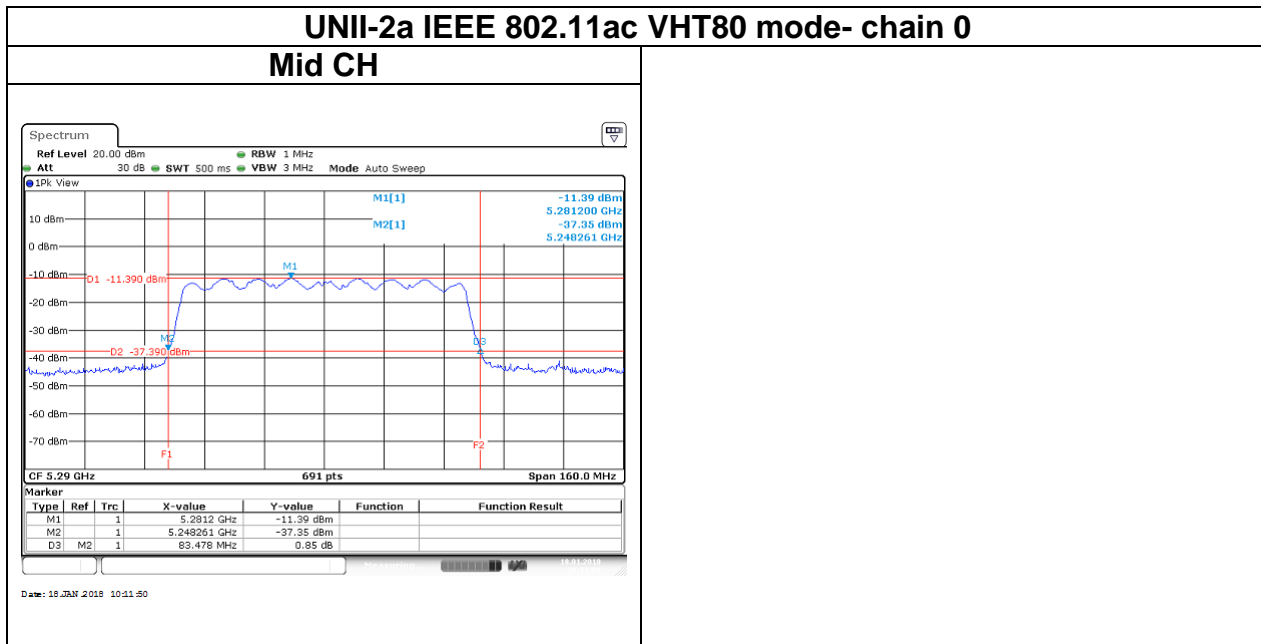


**High CH**

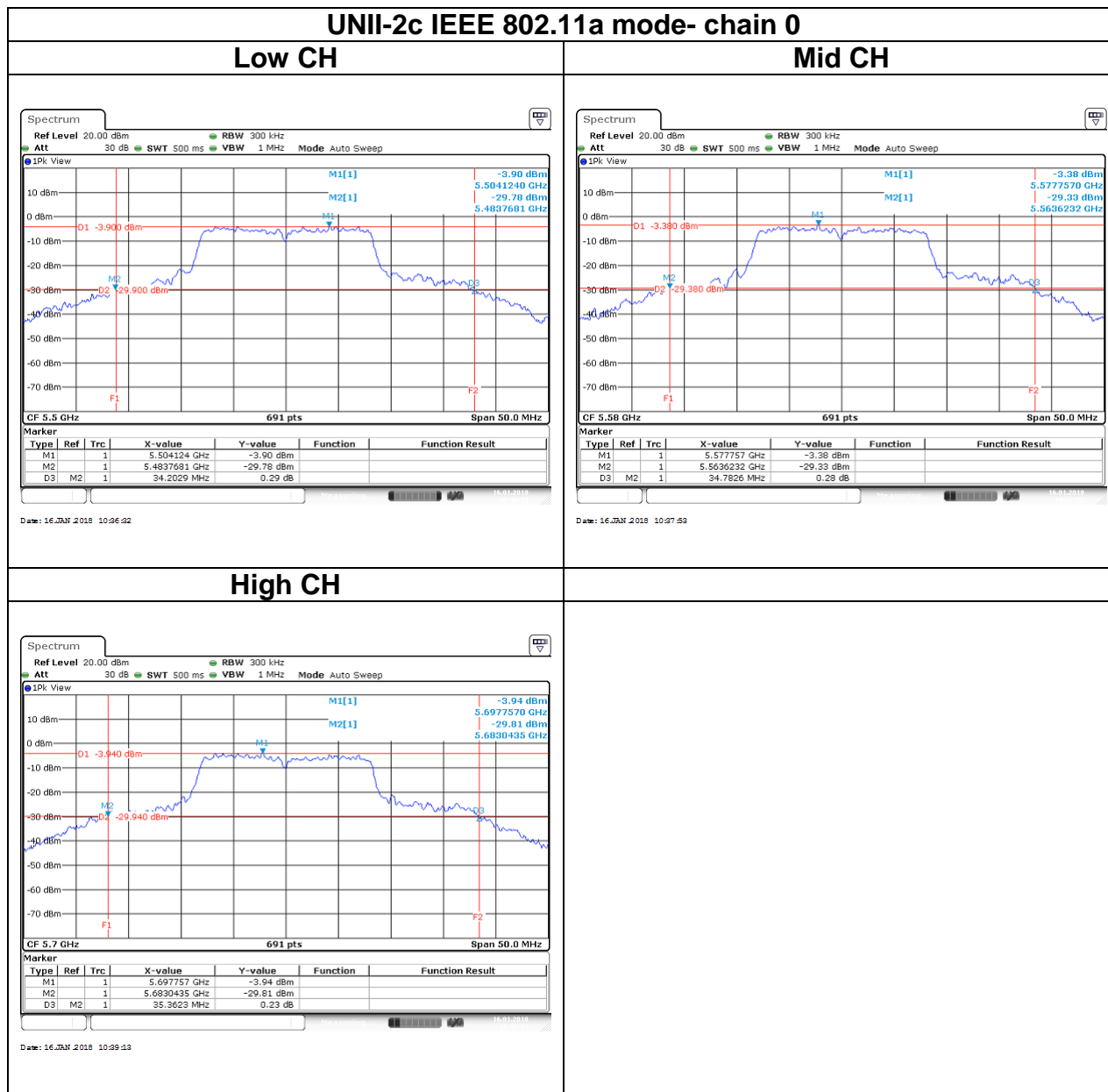






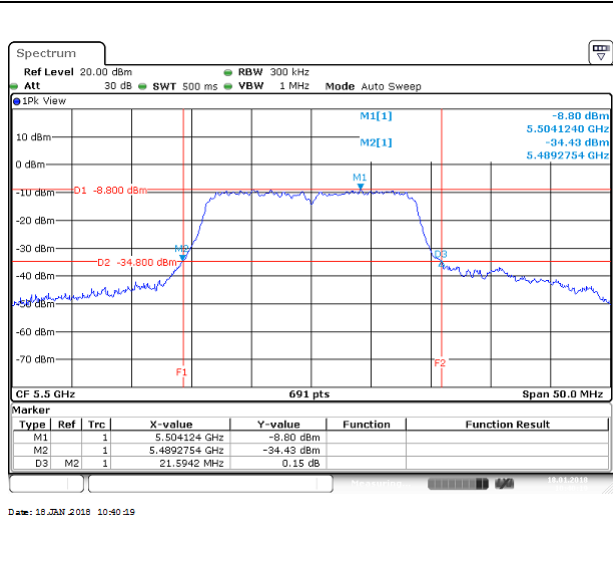


## Test Data (26dB)

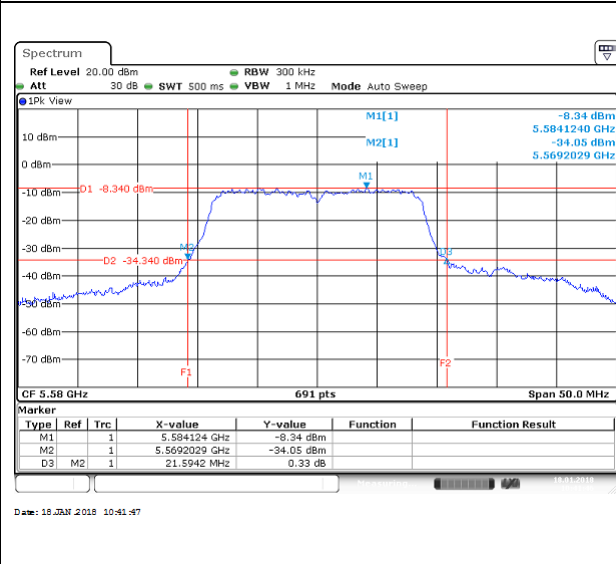


**UNII-2c IEEE 802.11n 20 mode- chain 0**

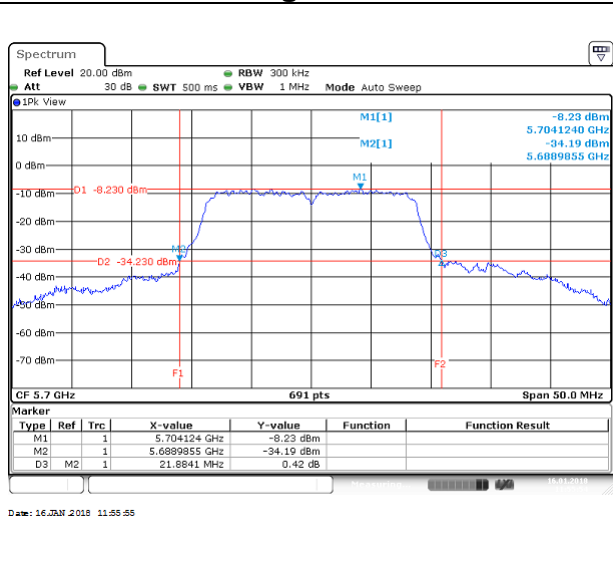
**Low CH**



**Mid CH**

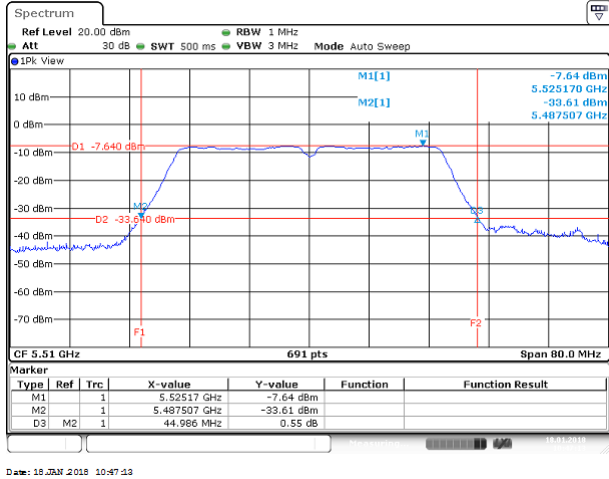


**High CH**

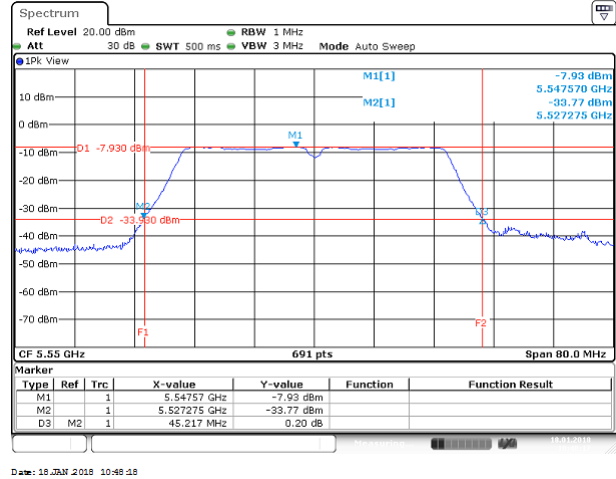


**UNII-2c IEEE 802.11n 40 mode- chain 0**

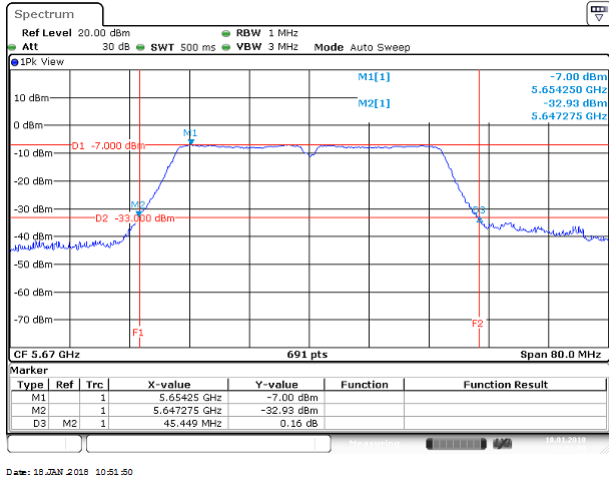
**Low CH**

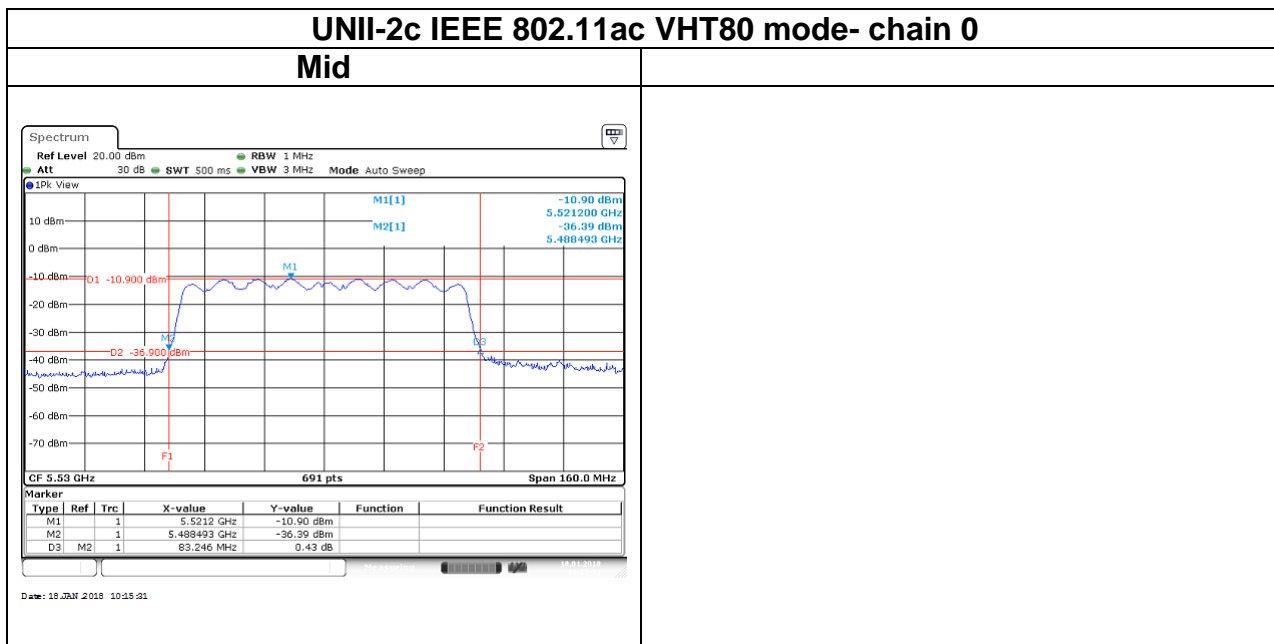


**Mid CH**



**High CH**

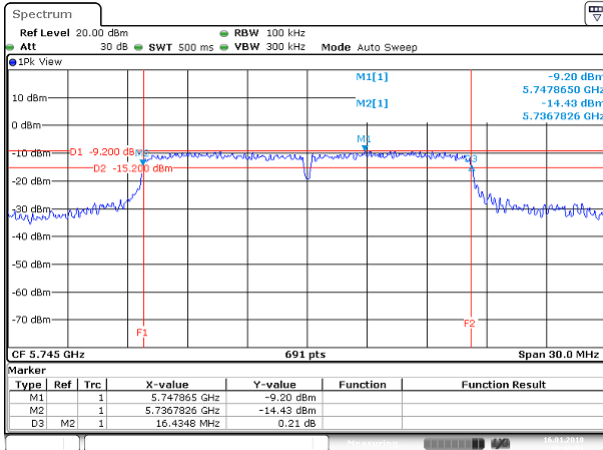




**Test Data (6dB)**

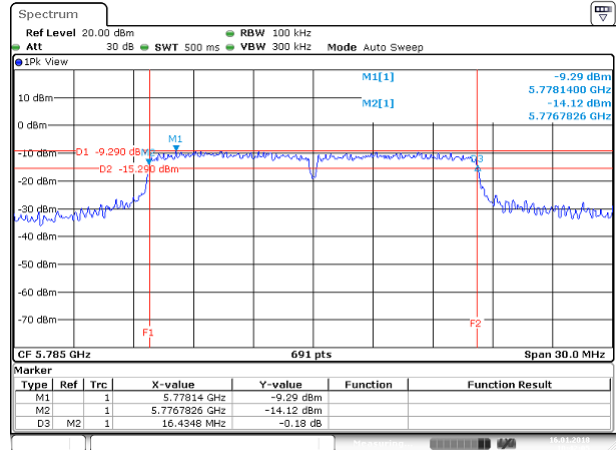
**UNII-3 IEEE 802.11a mode- chain 0**

**Low CH**



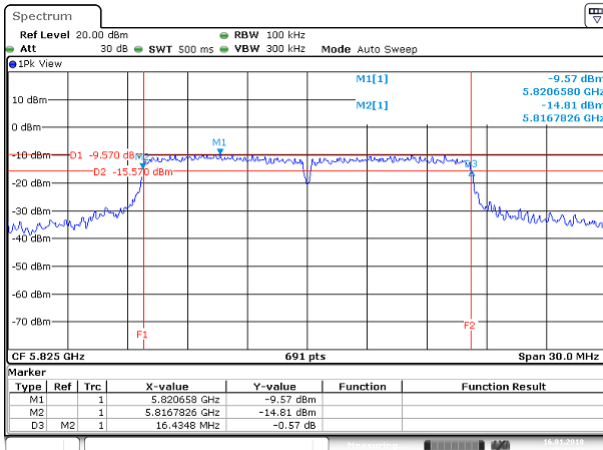
Date: 16 JAN 2018 10:40:51

**Mid CH**



Date: 16 JAN 2018 10:42:05

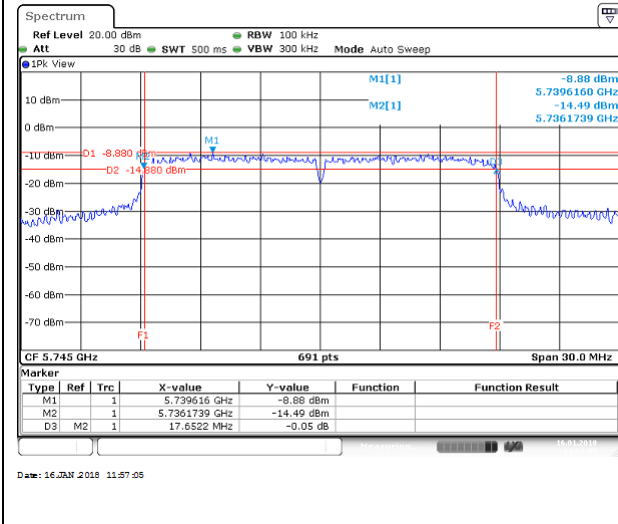
**High CH**



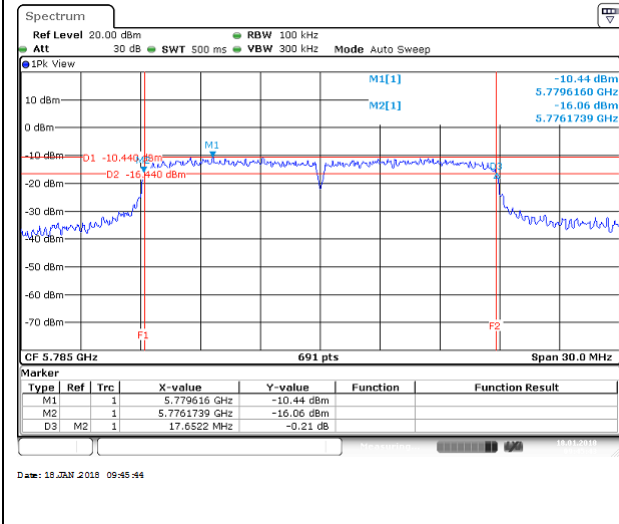
Date: 16 JAN 2018 10:43:23

**UNII-3 IEEE 802.11n 20 mode- chain 0**

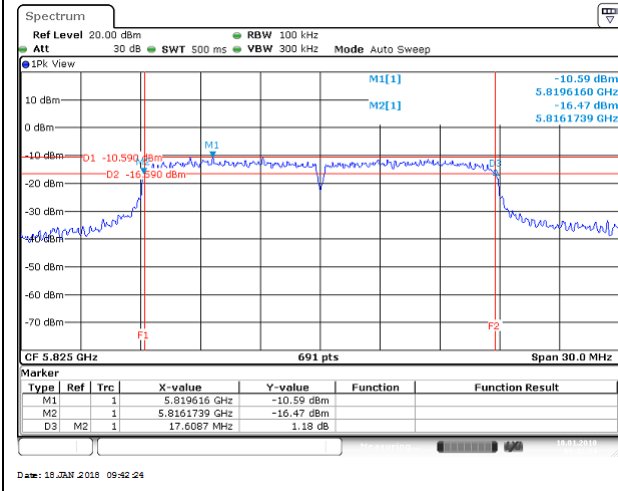
**Low CH**

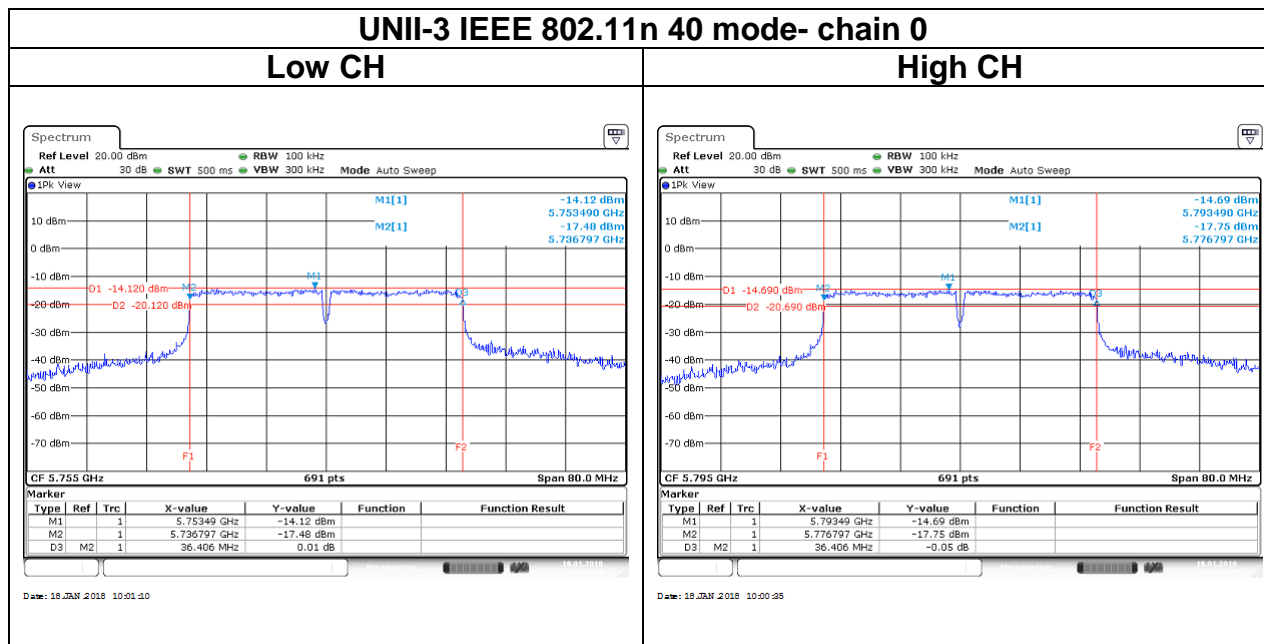


**Mid CH**

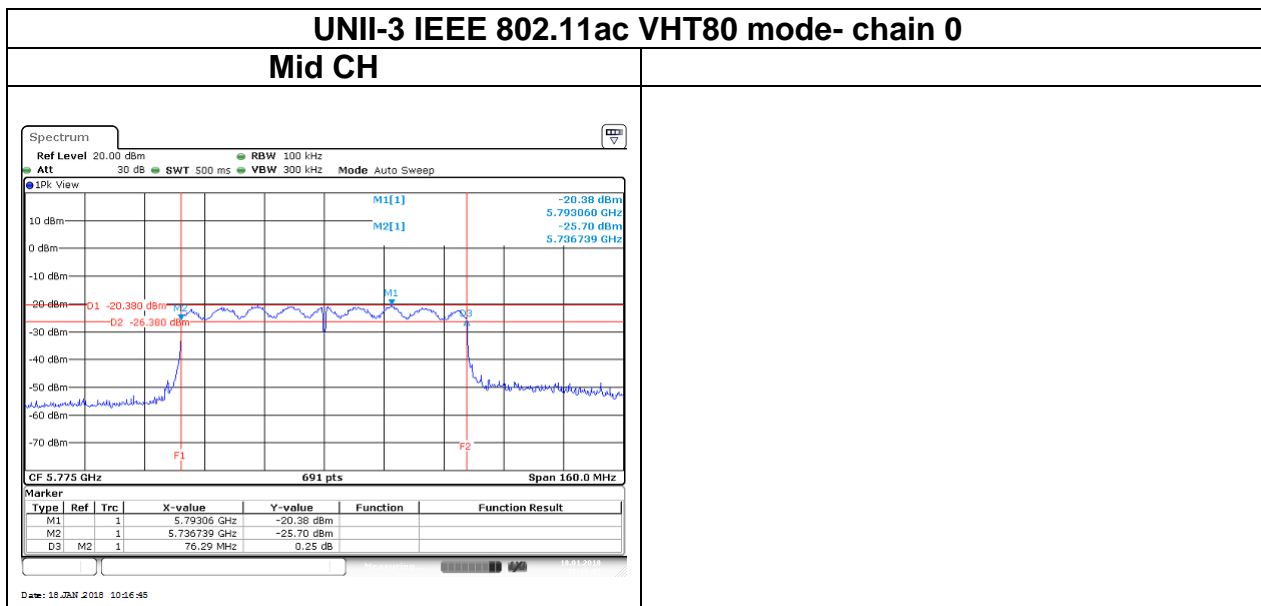


**High CH**



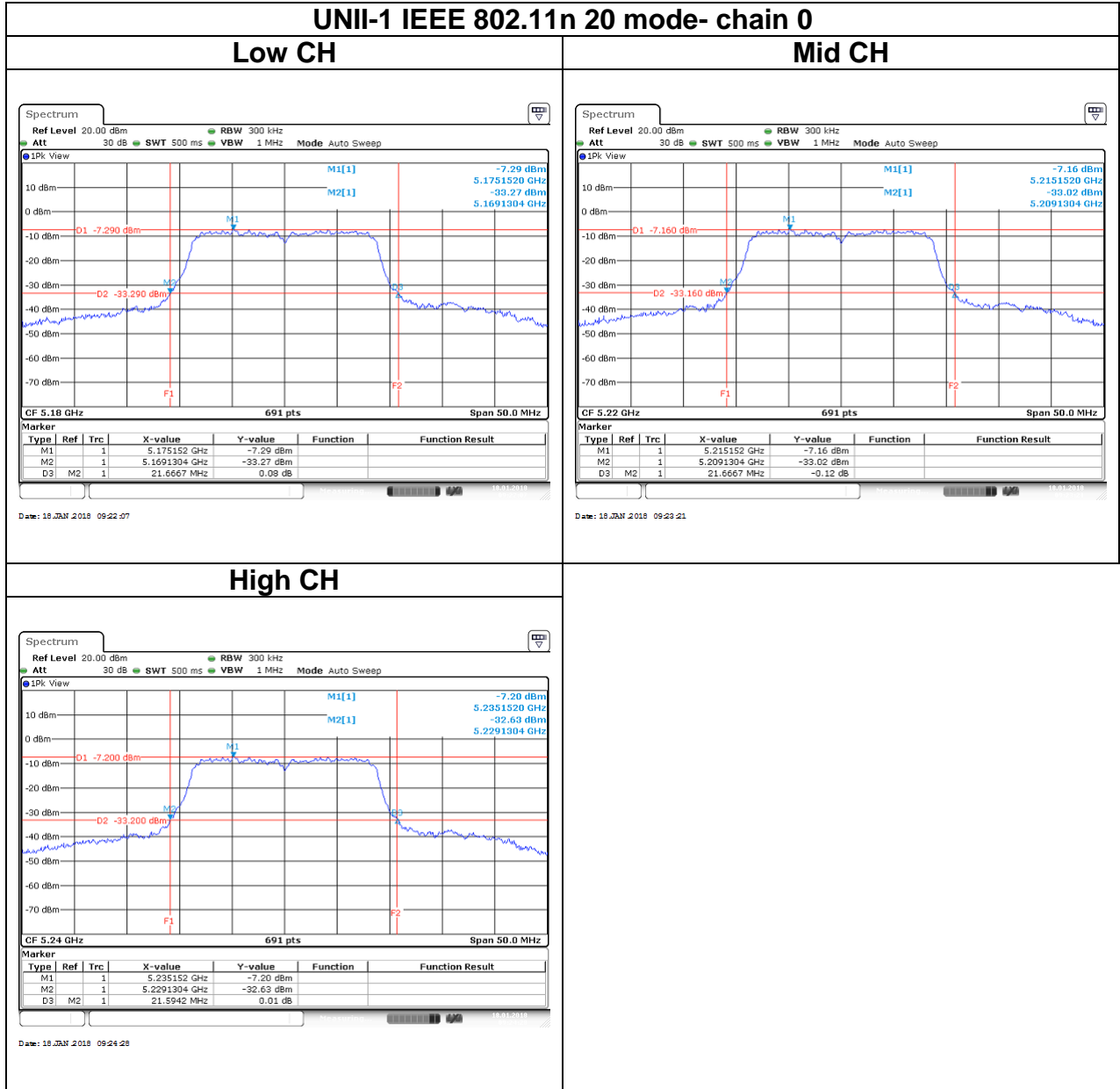






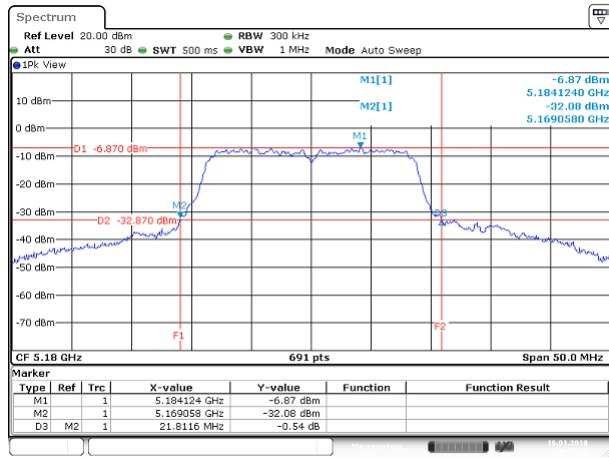
# Test Data (26dB)

For 2TX:



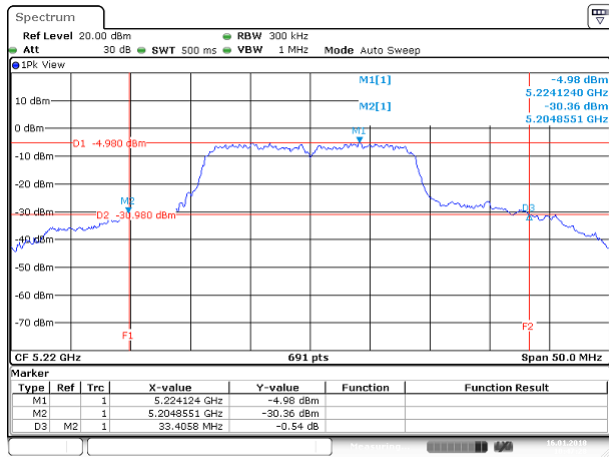
**UNII-1 IEEE 802.11n 20 mode- chain 1**

**Low CH**



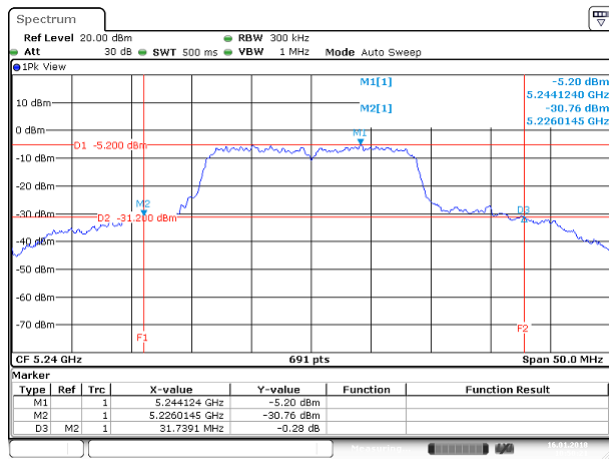
Date: 16 JAN 2018 10:45:26

**Mid CH**

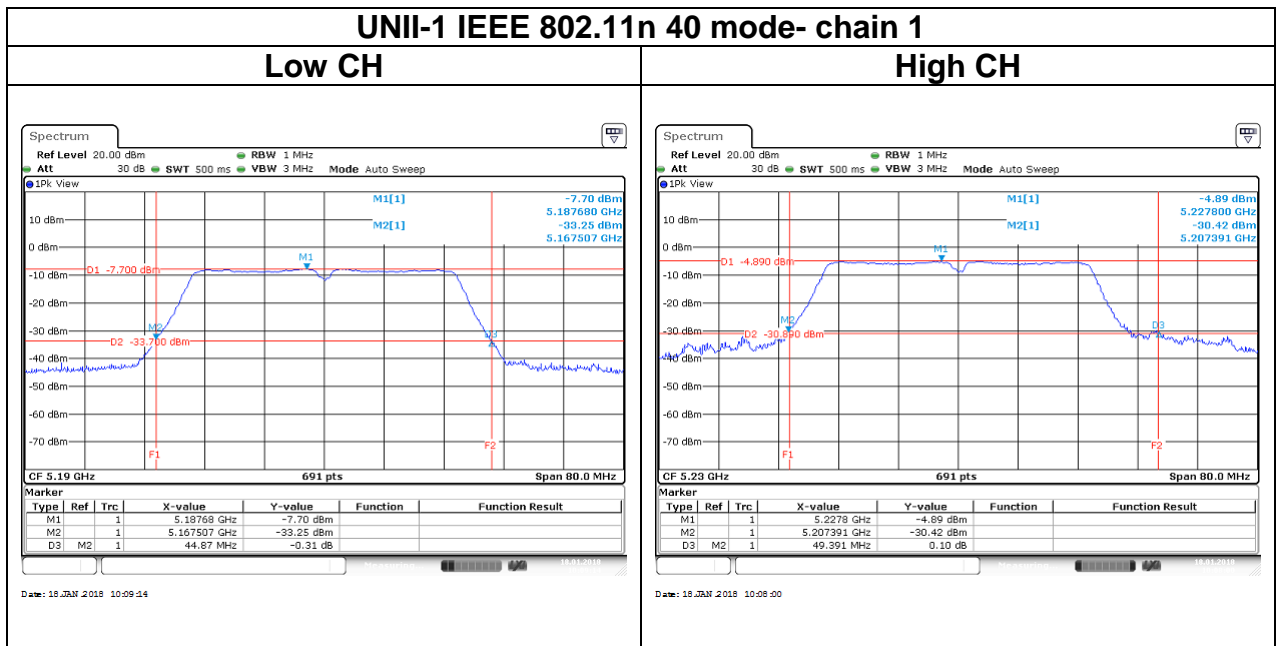
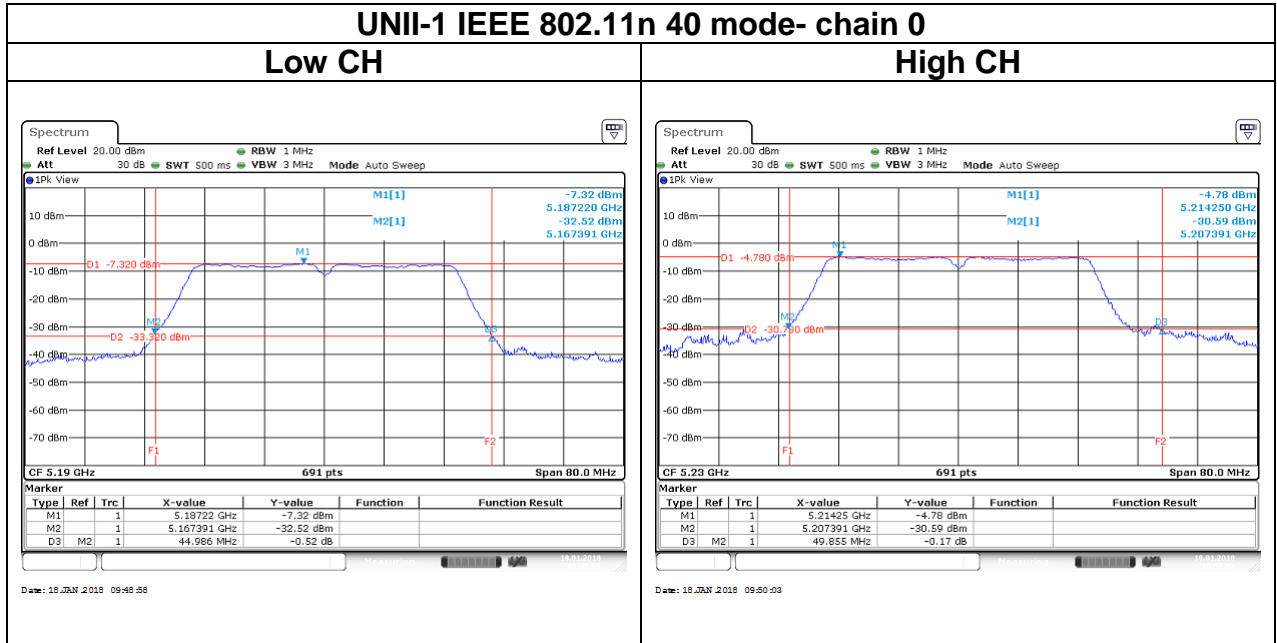


Date: 16 JAN 2018 10:47:29

**High CH**

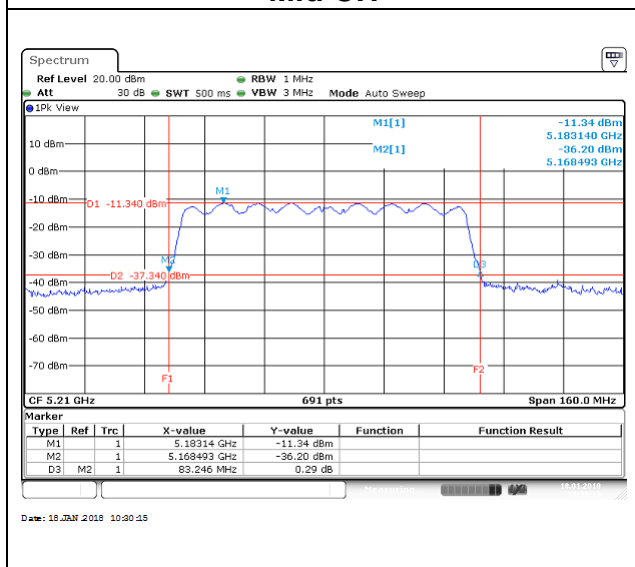


Date: 16 JAN 2018 10:50:21



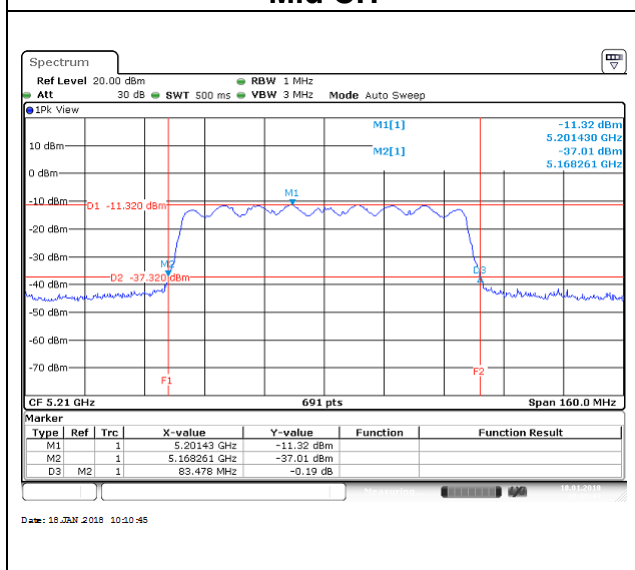
**UNII-1 IEEE 802.11ac VHT80 mode- chain 0**

**Mid CH**

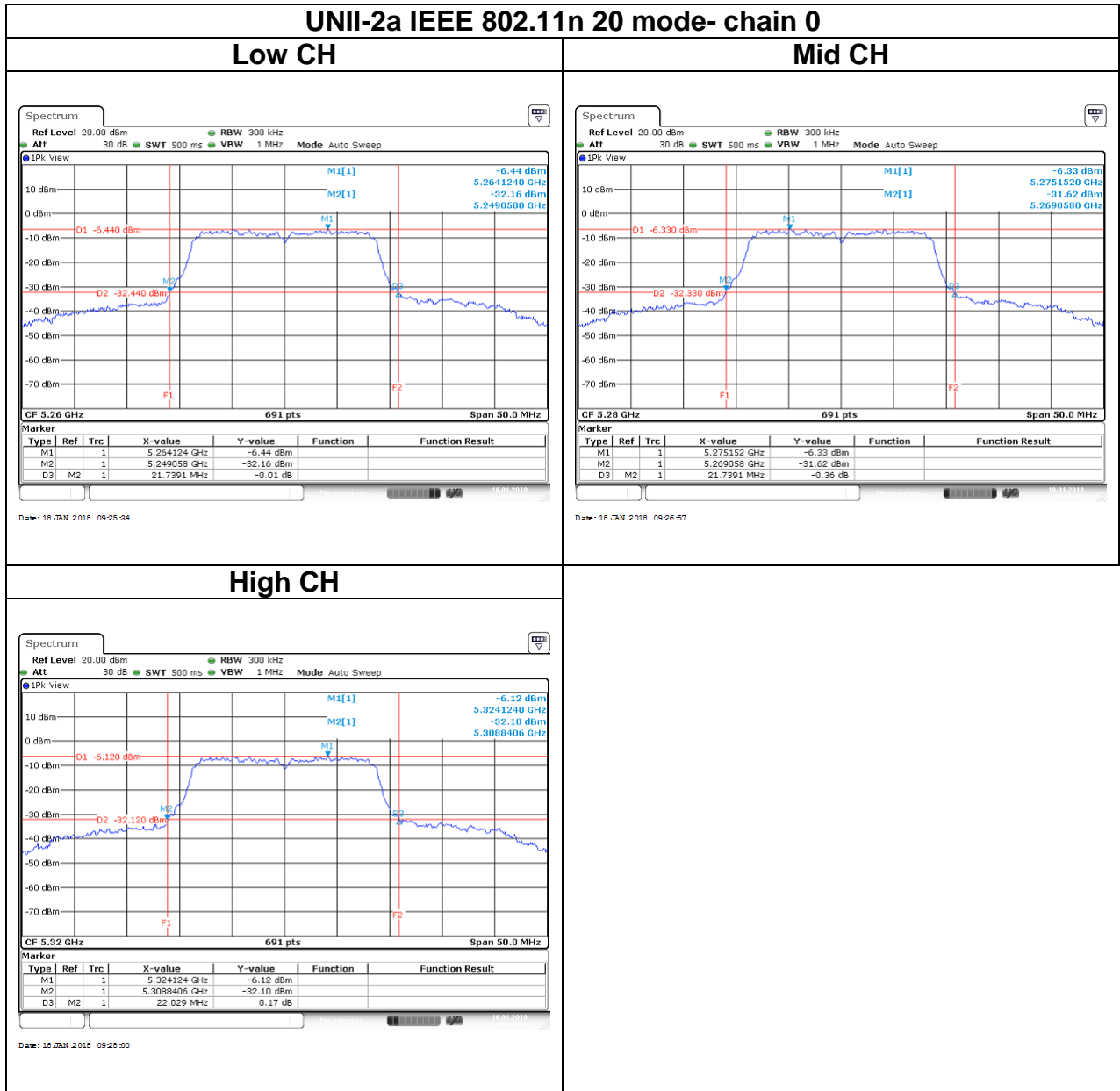


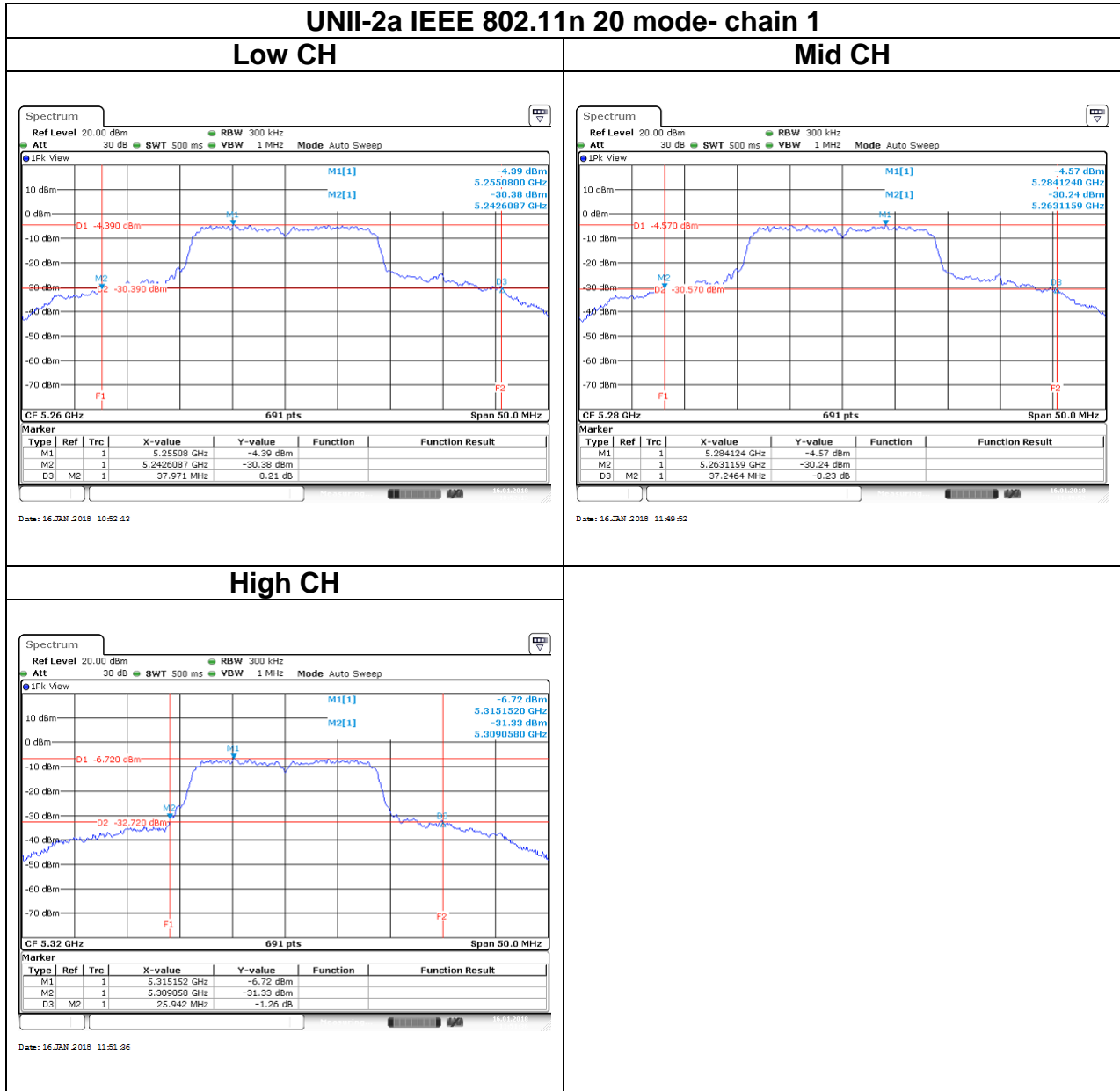
**UNII-1 IEEE 802.11ac VHT80 mode- chain 1**

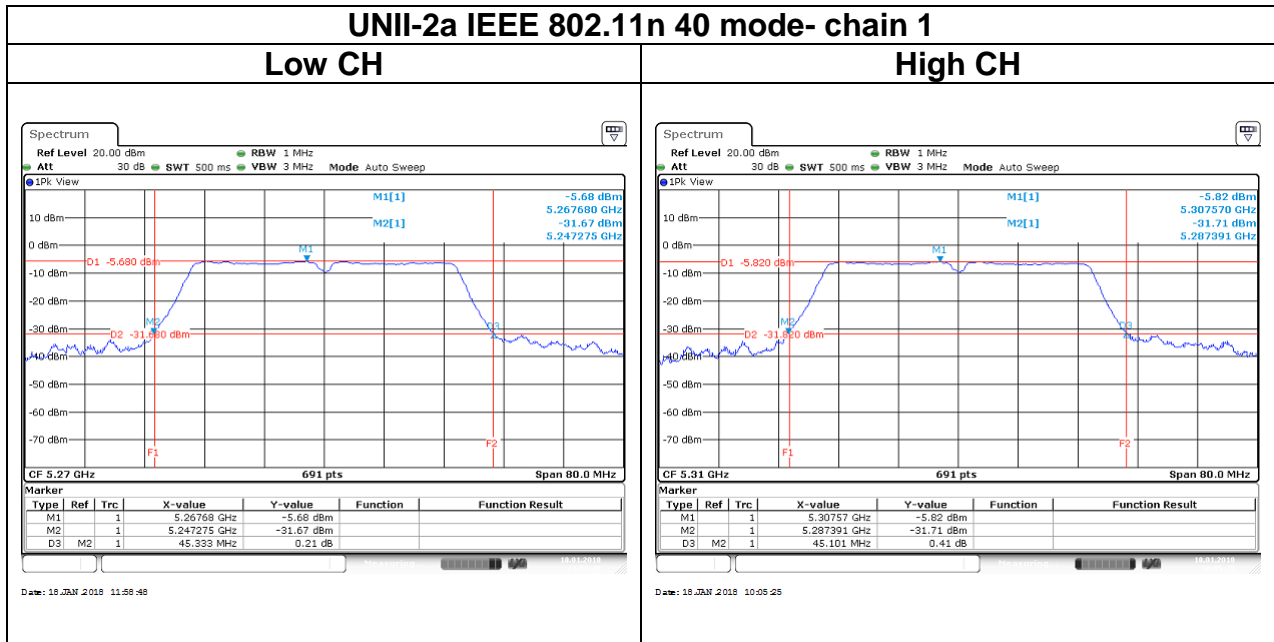
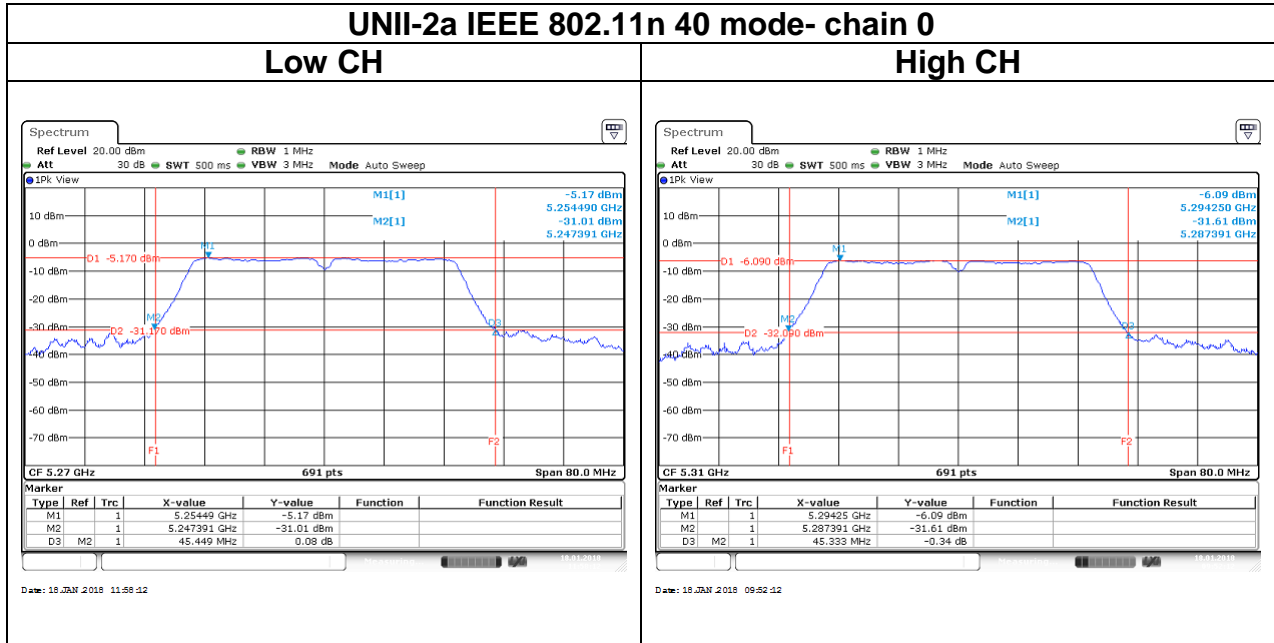
**Mid CH**



**Test Data (26dB)**



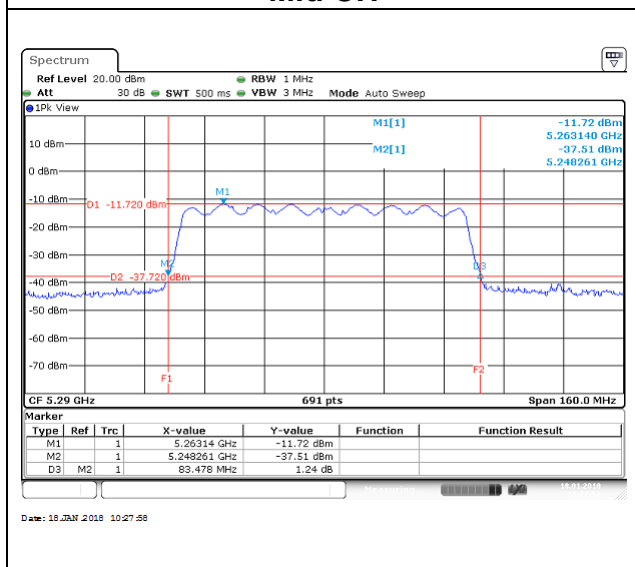






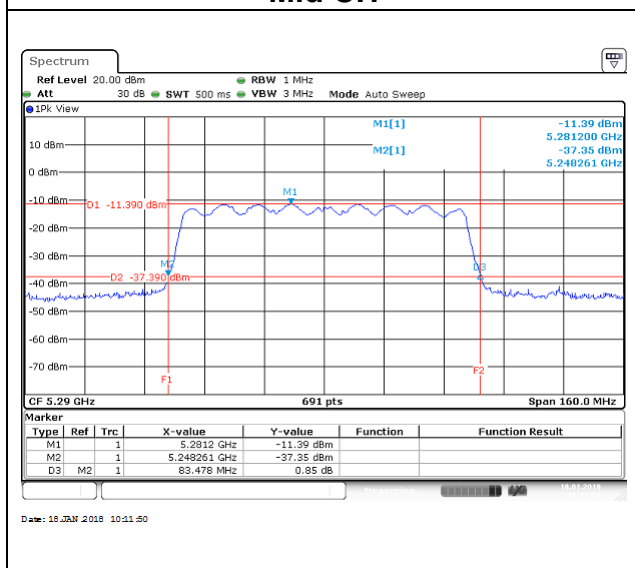
**UNII-2a IEEE 802.11ac VHT80 mode- chain 0**

**Mid CH**

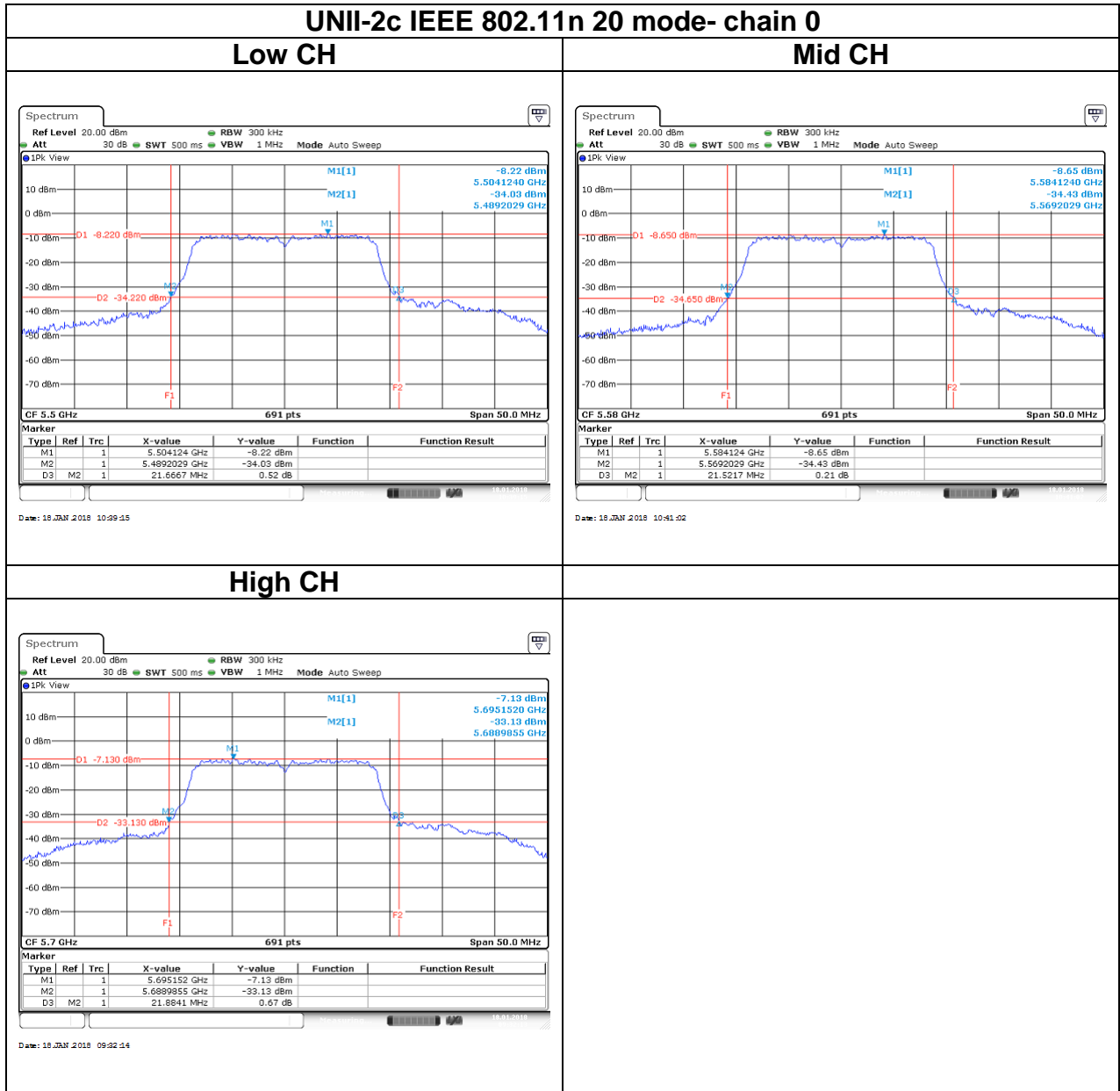


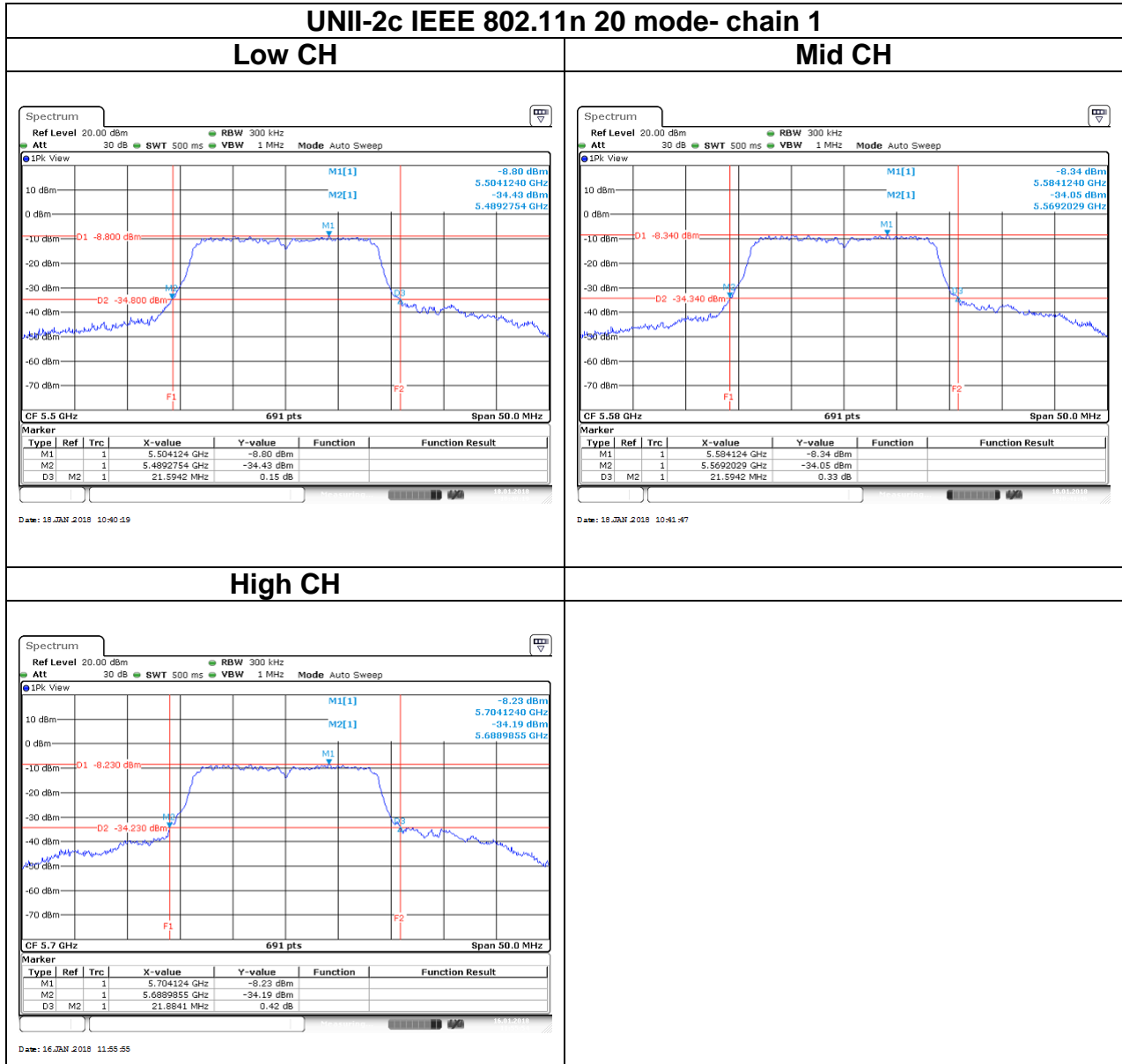
**UNII-2a IEEE 802.11ac VHT80 mode- chain 0**

**Mid CH**



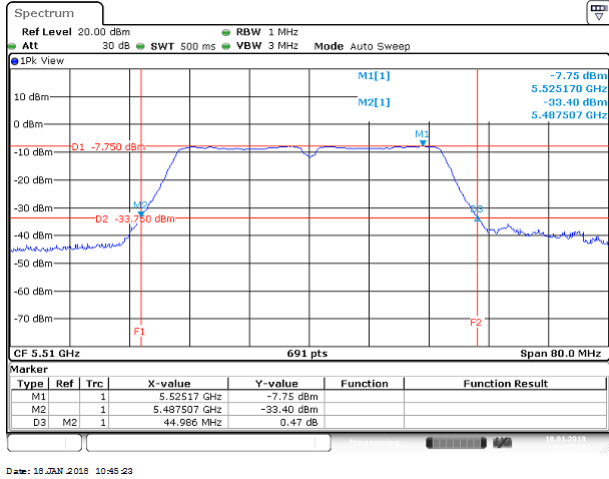
# Test Data (26dB)





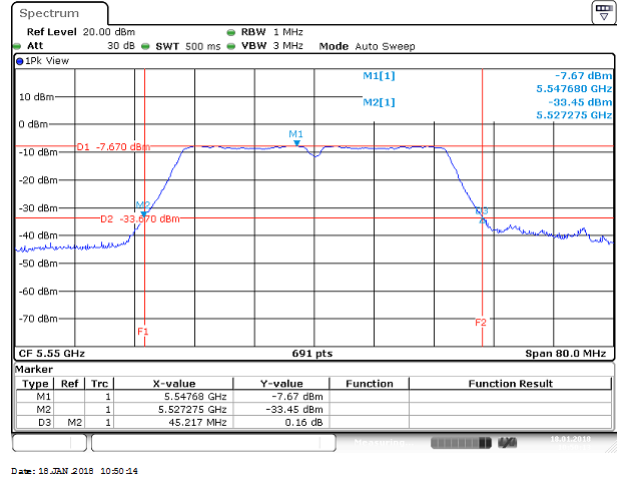
**UNII-2c IEEE 802.11n 40 mode- chain 0**

**Low CH**



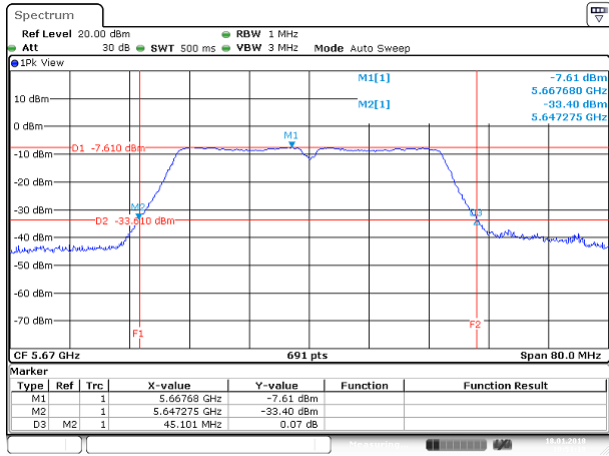
Date: 18 JAN 2018 10:45:23

**Mid CH**

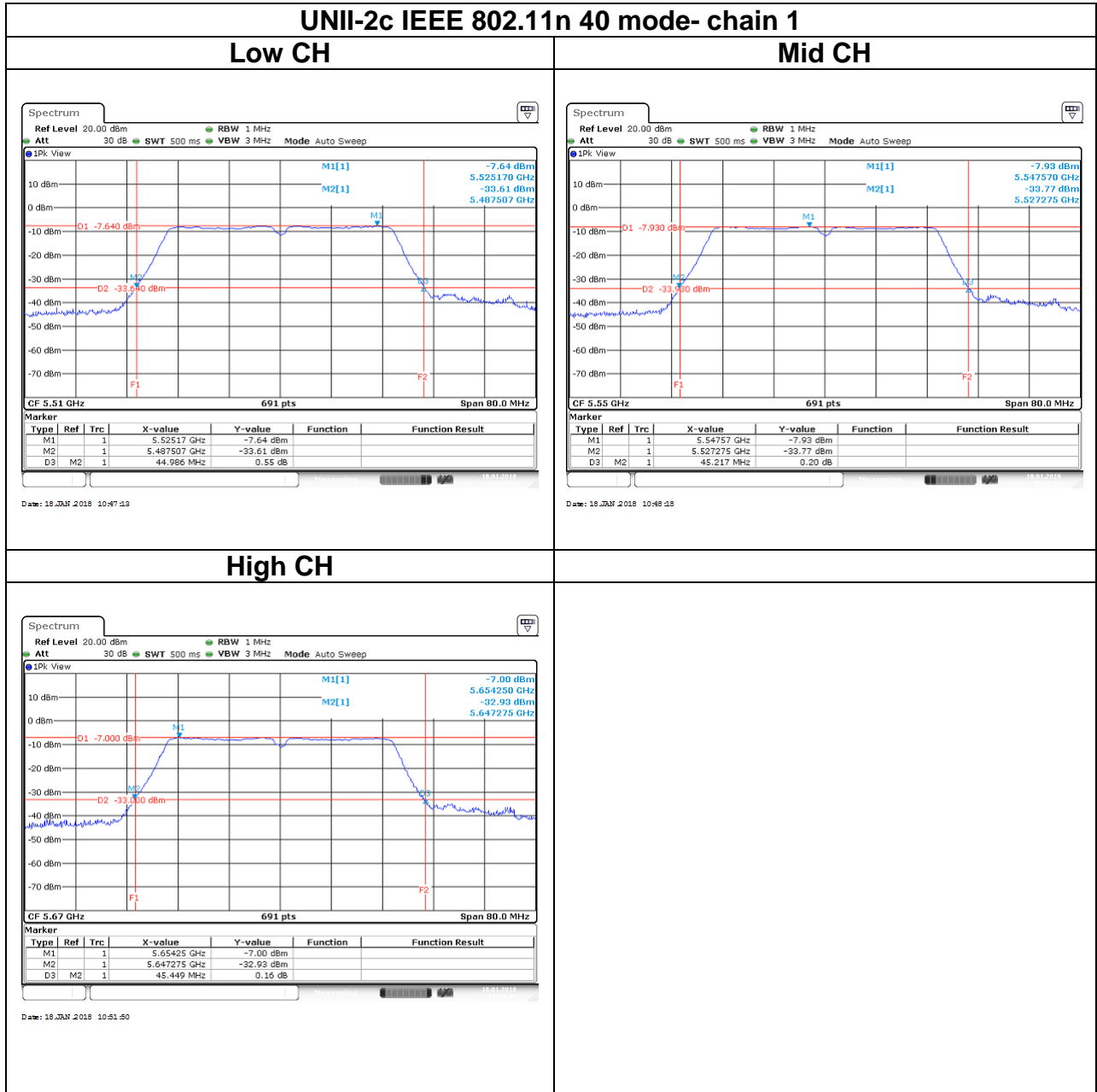


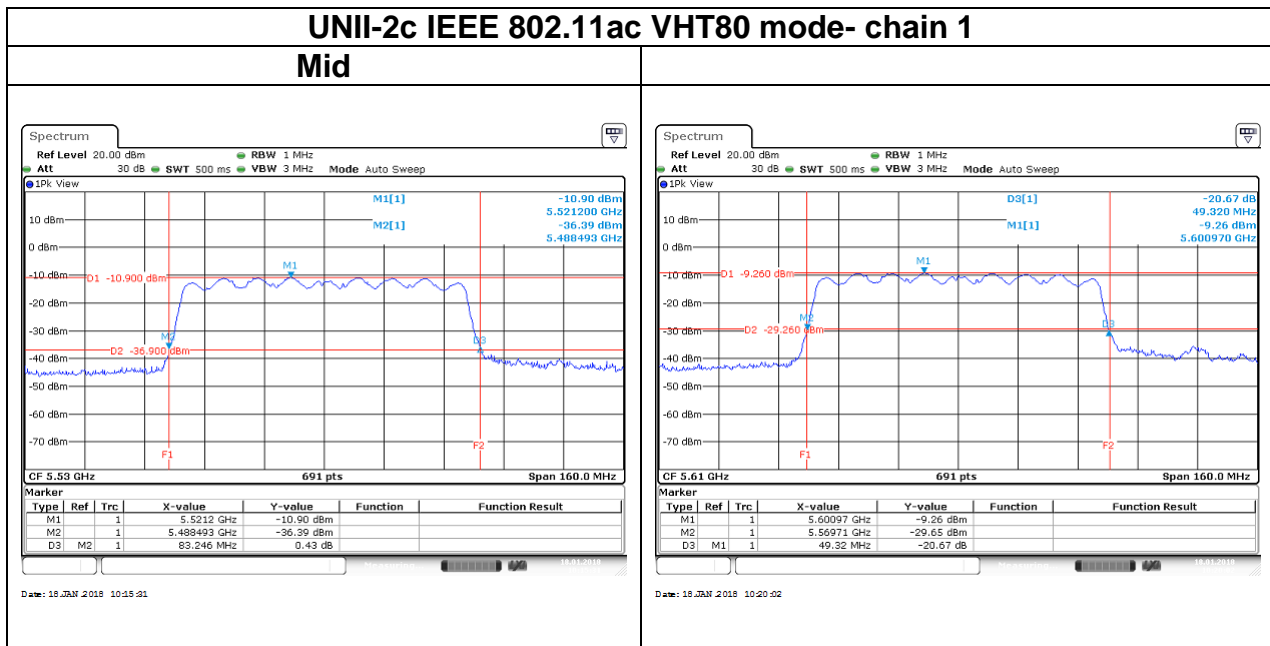
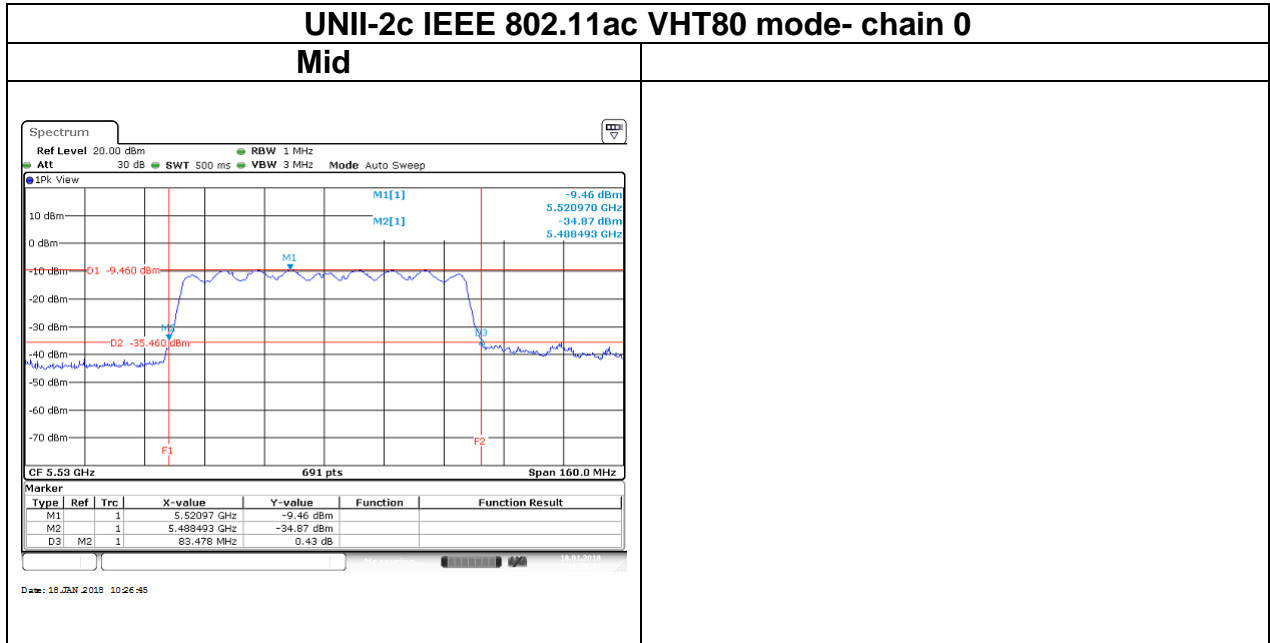
Date: 18 JAN 2018 10:50:14

**High CH**

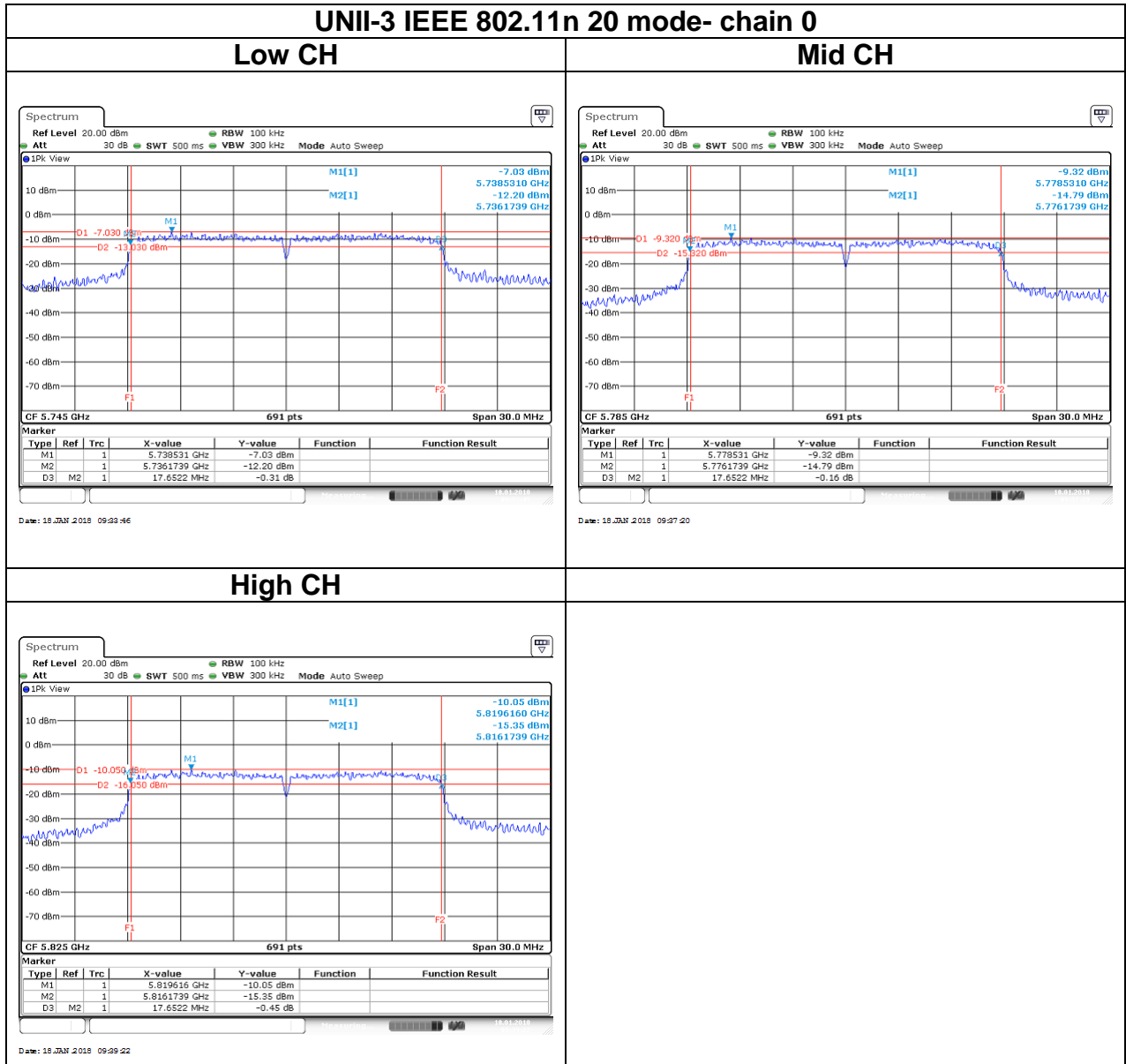


Date: 18 JAN 2018 10:51:18



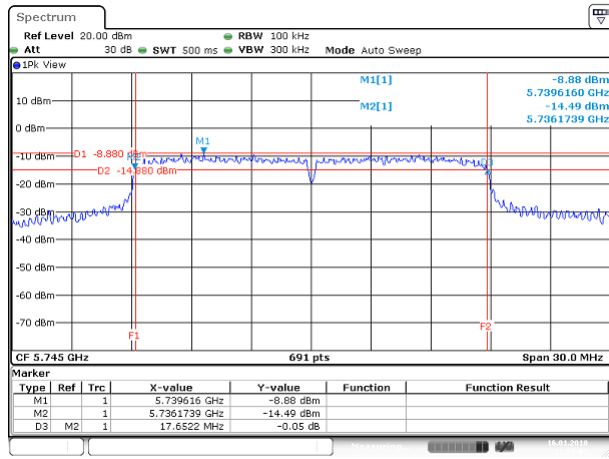


**Test Data (6dB)**



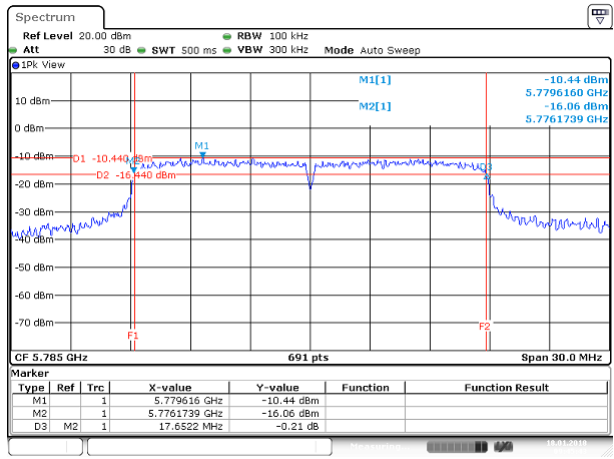
**UNII-3 IEEE 802.11n 20 mode- chain 1**

**Low CH**



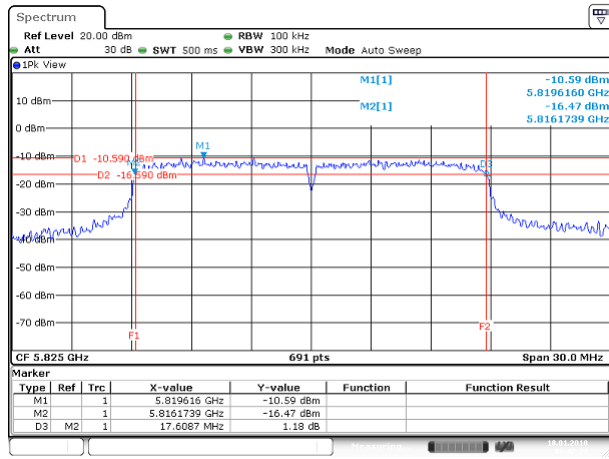
Date: 16 JAN 2018 11:57:05

**Mid CH**



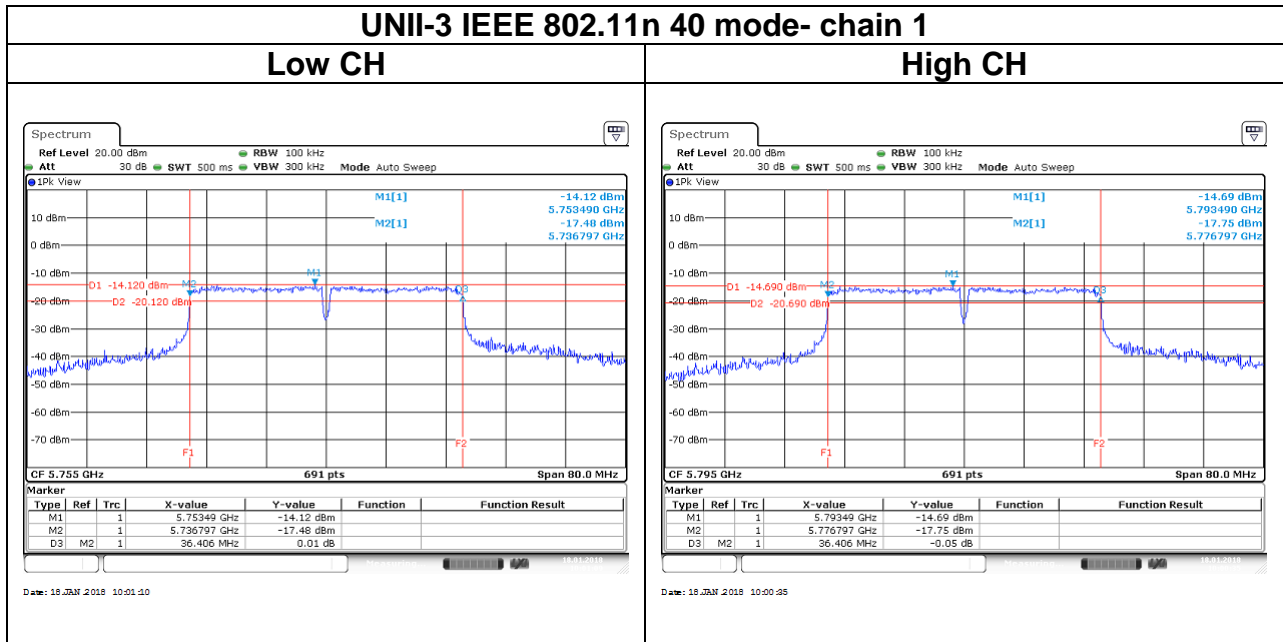
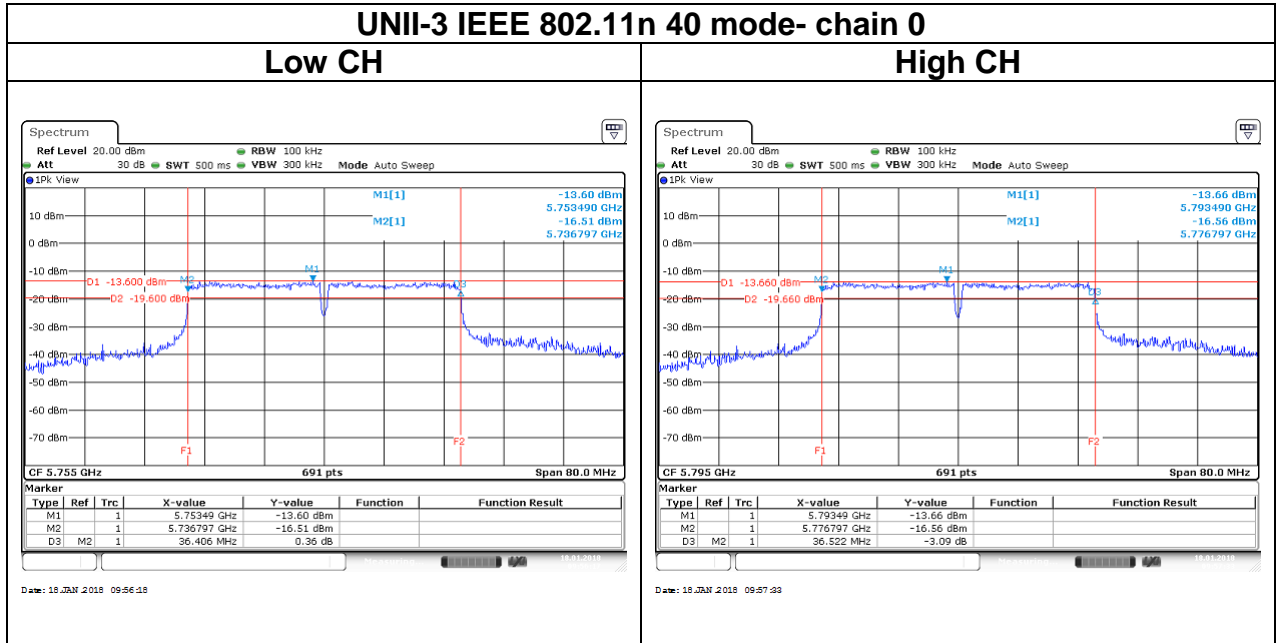
Date: 18 JAN 2018 09:45:44

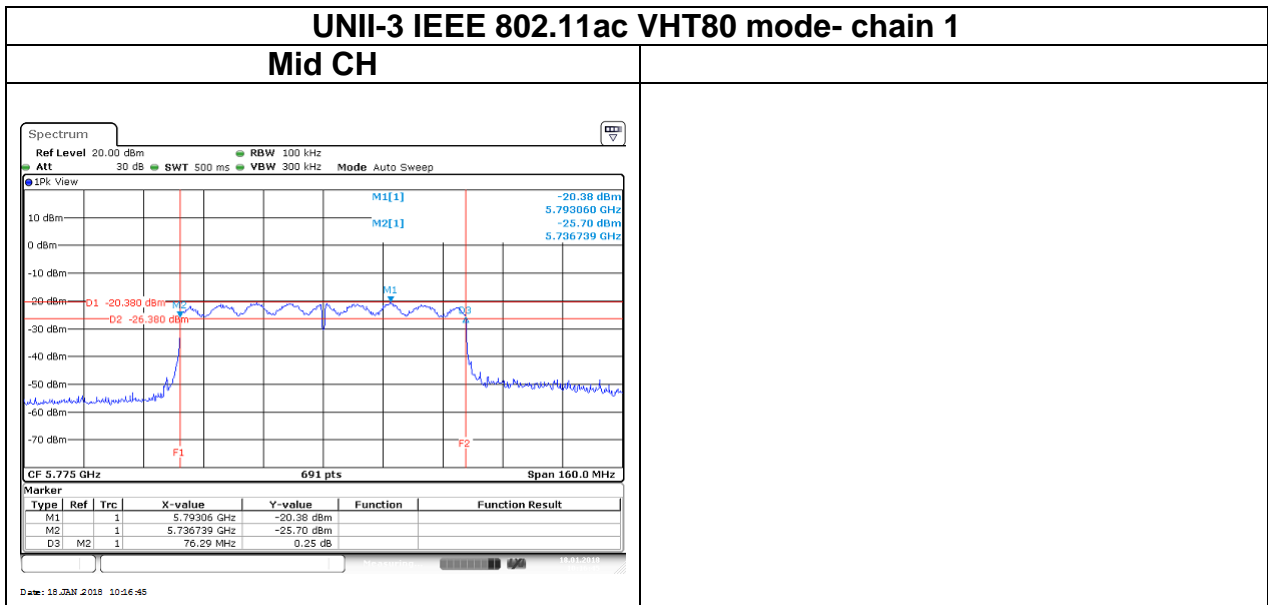
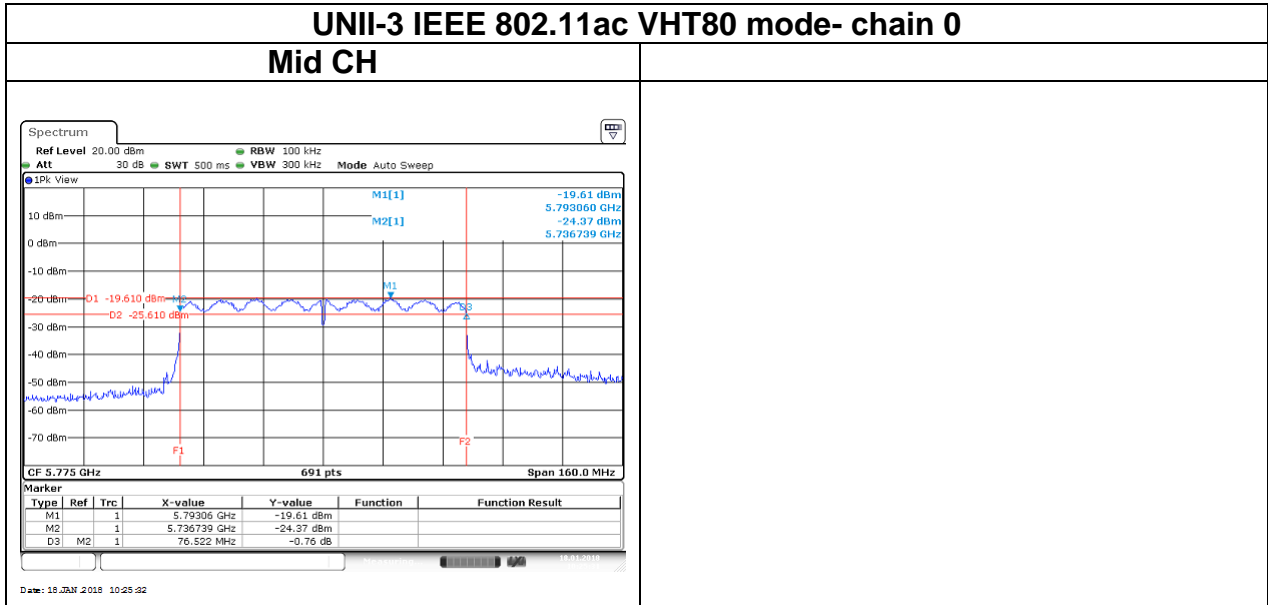
**High CH**



Date: 18 JAN 2018 09:42:24

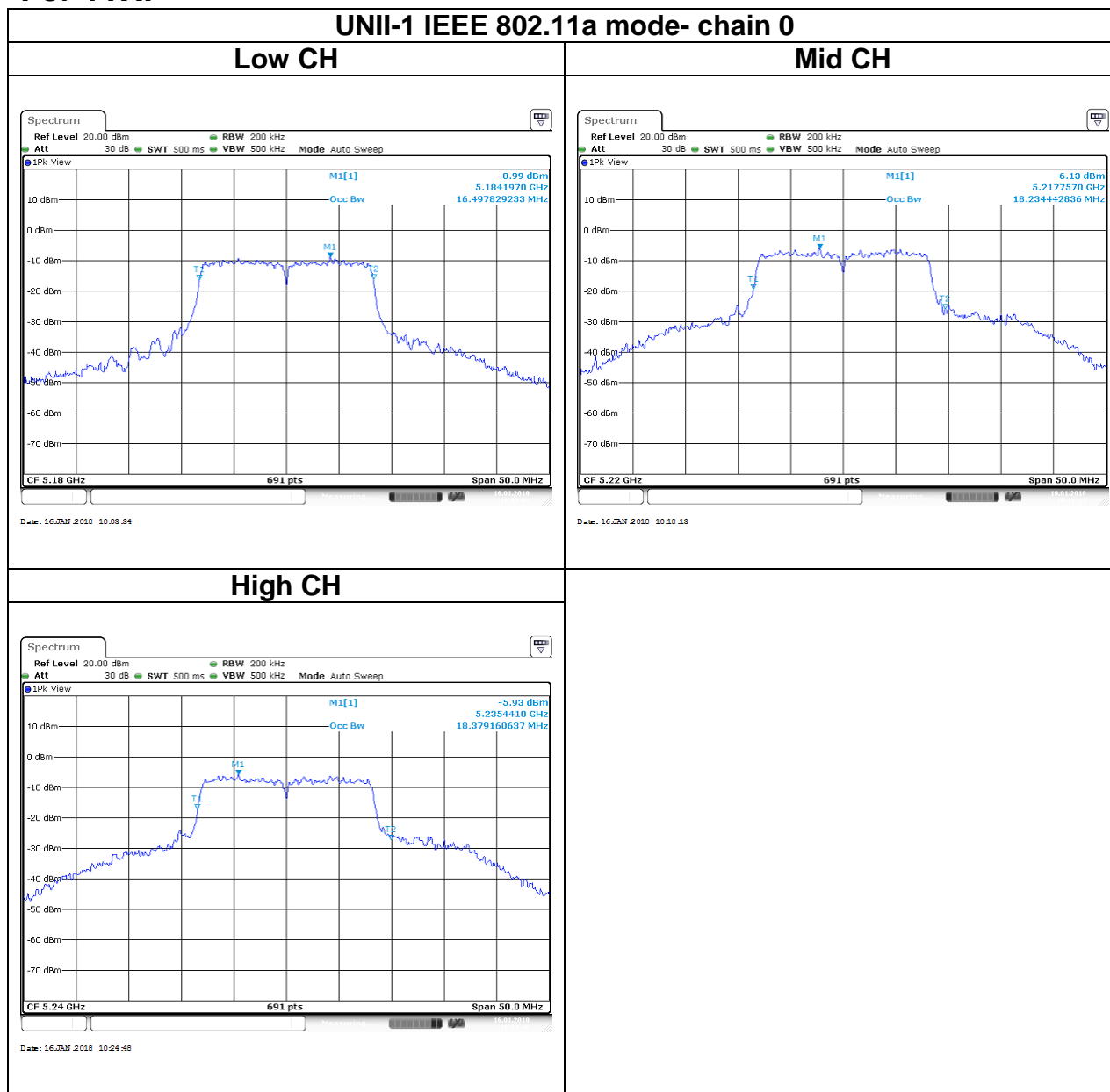


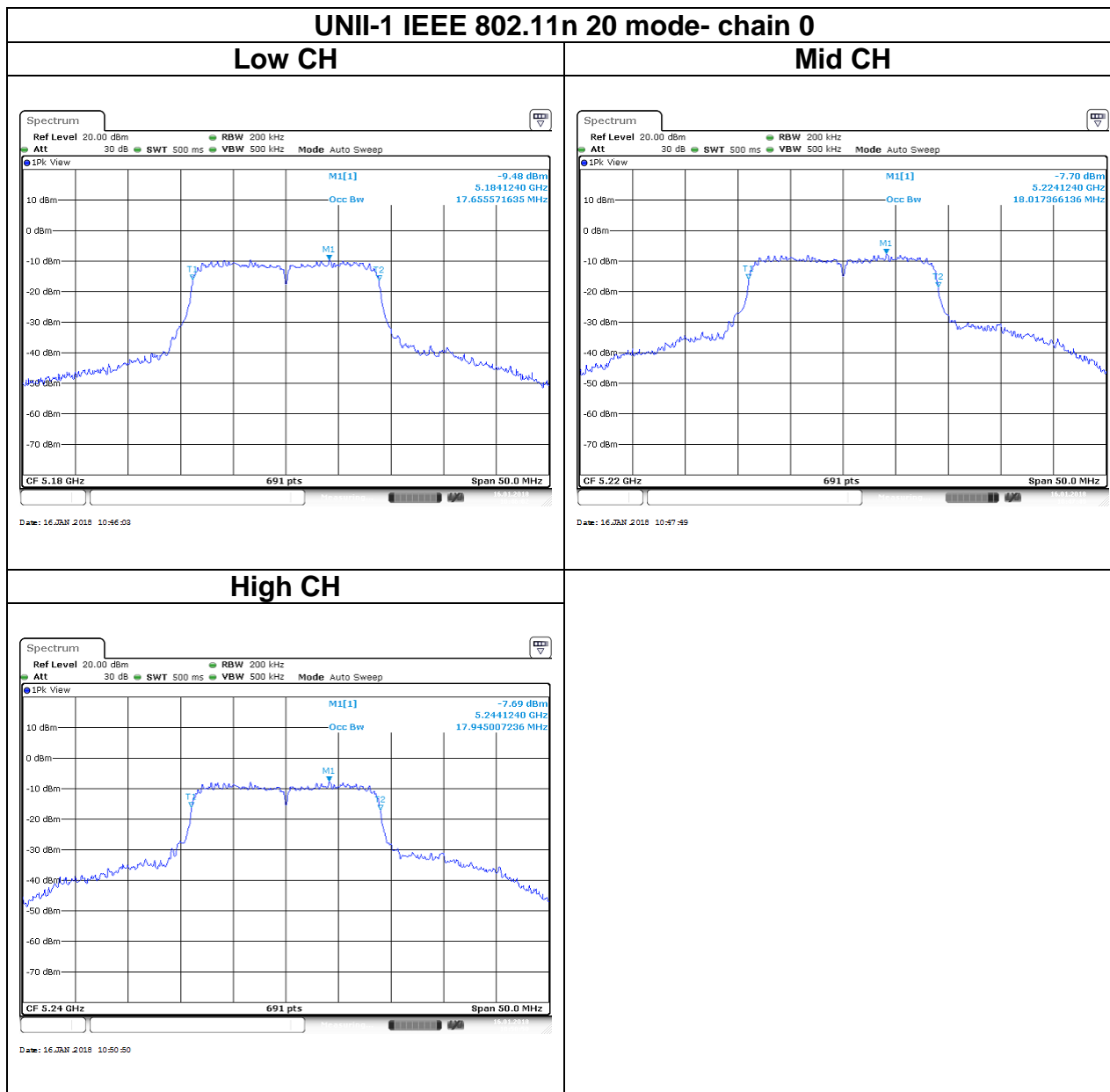


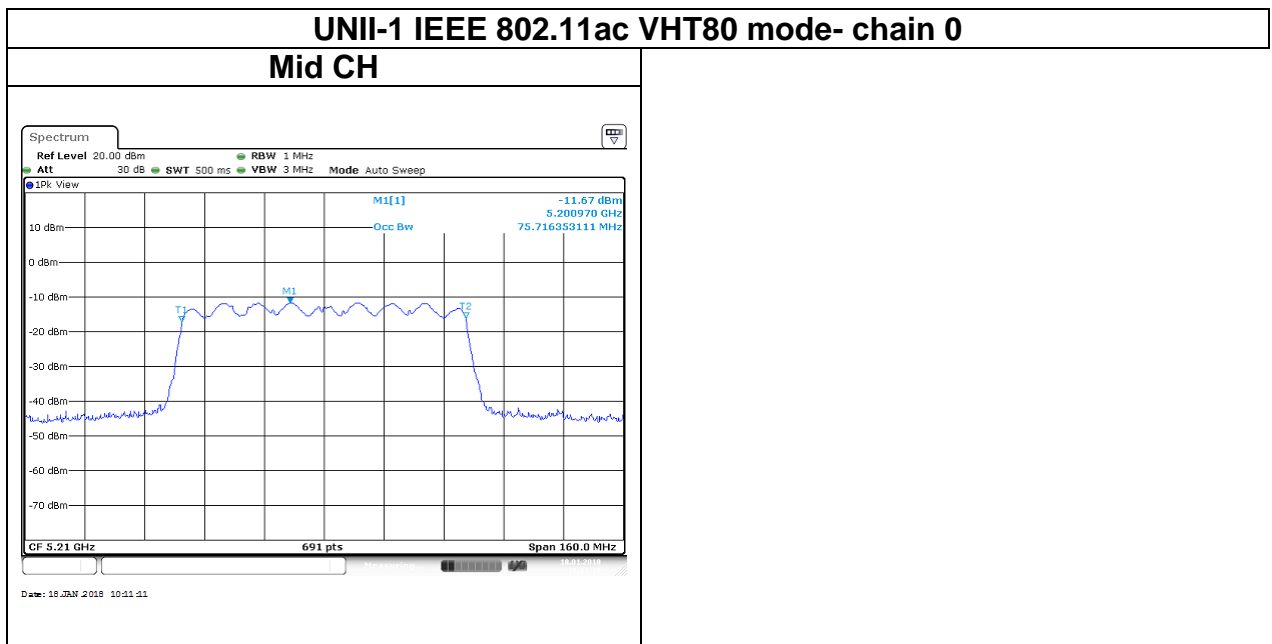
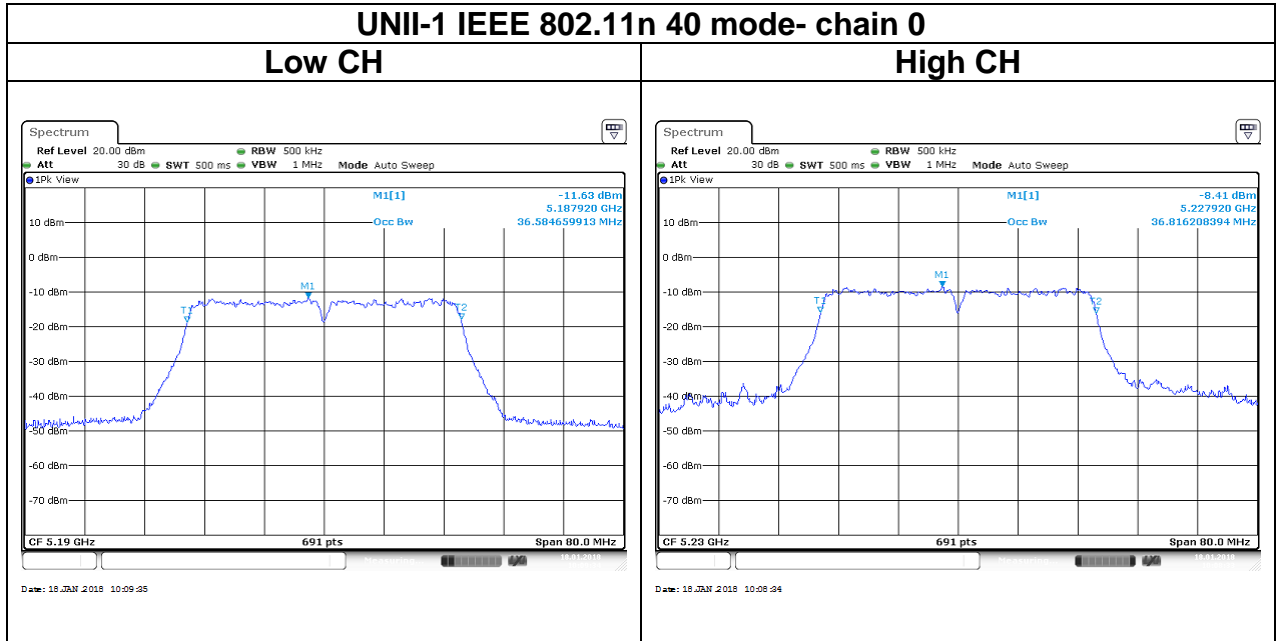


# Test Data (99%OBW)

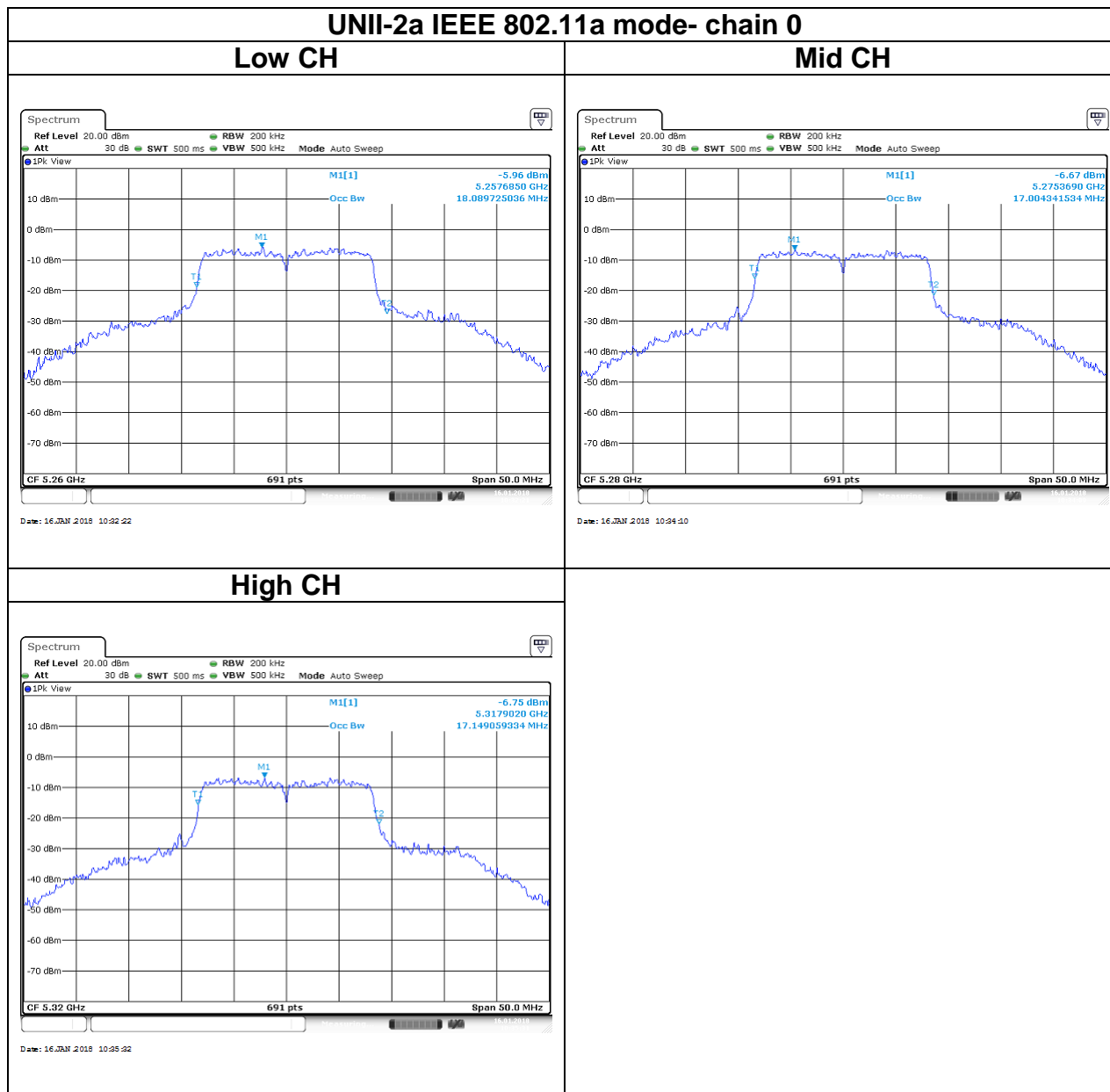
For 1TX:

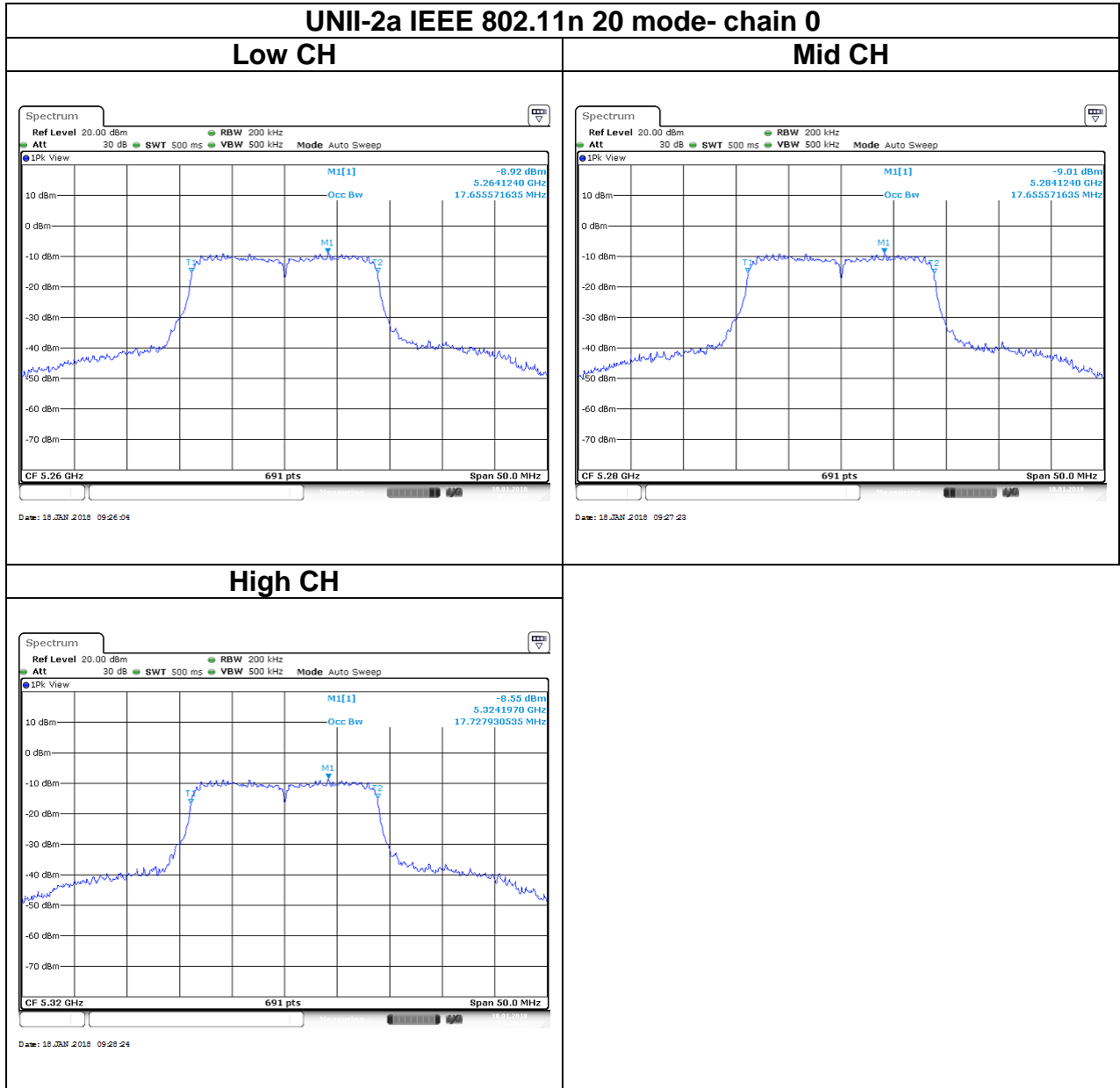


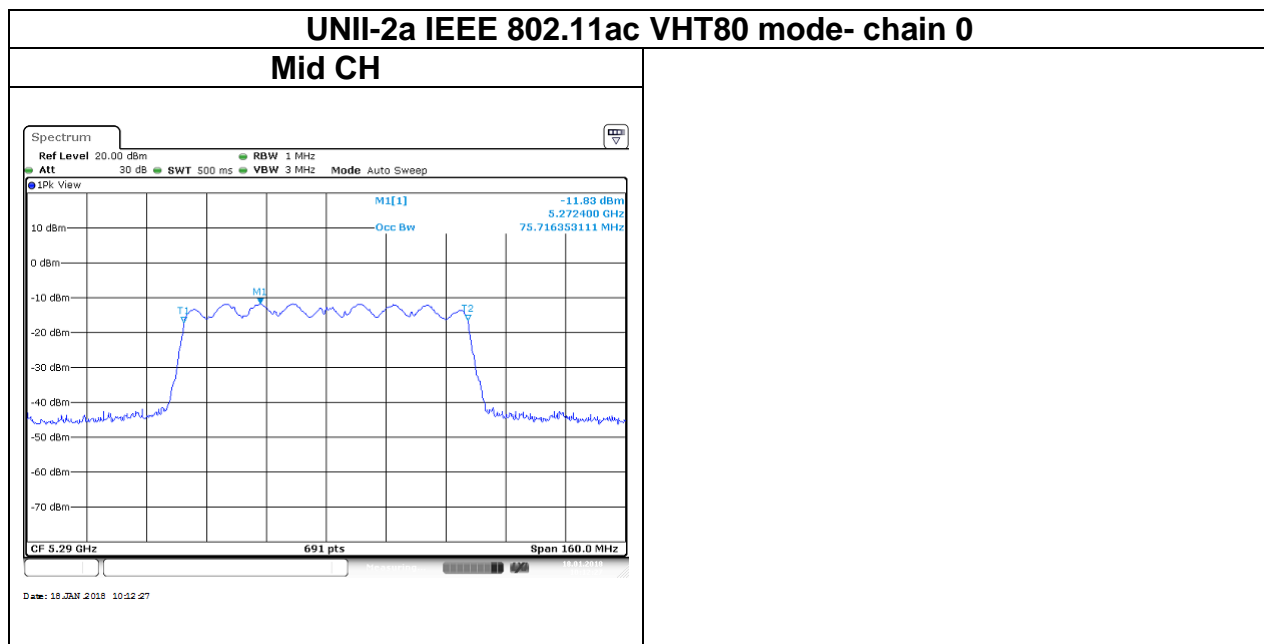
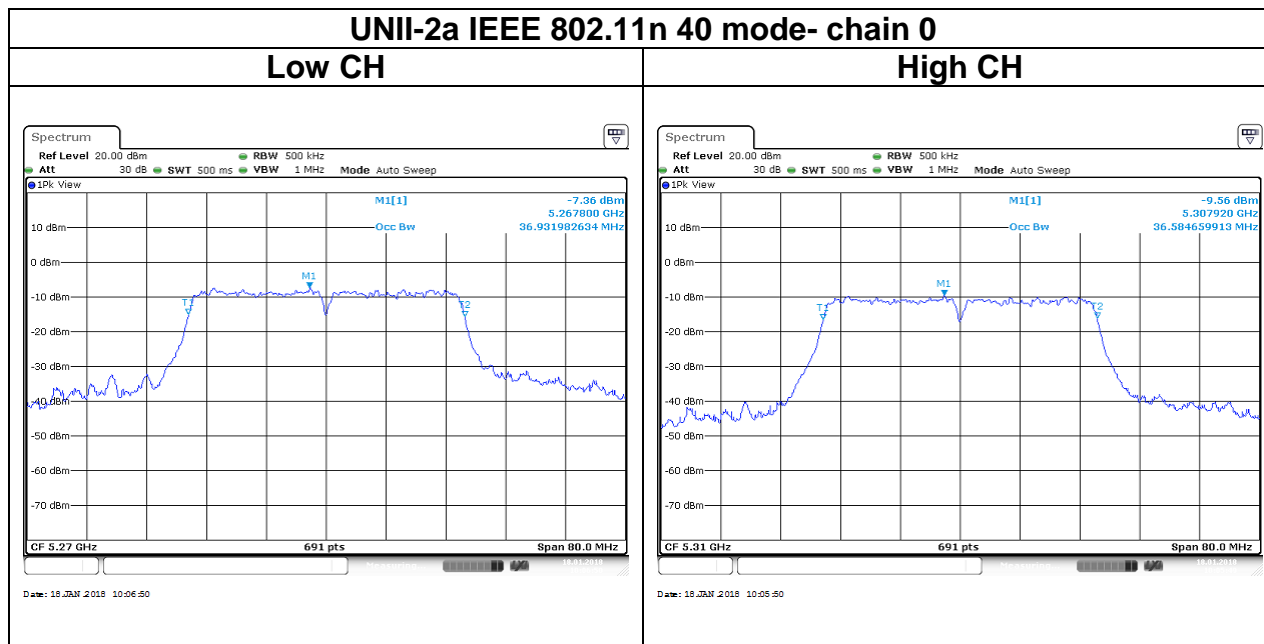




## Test Data (99%OBW)

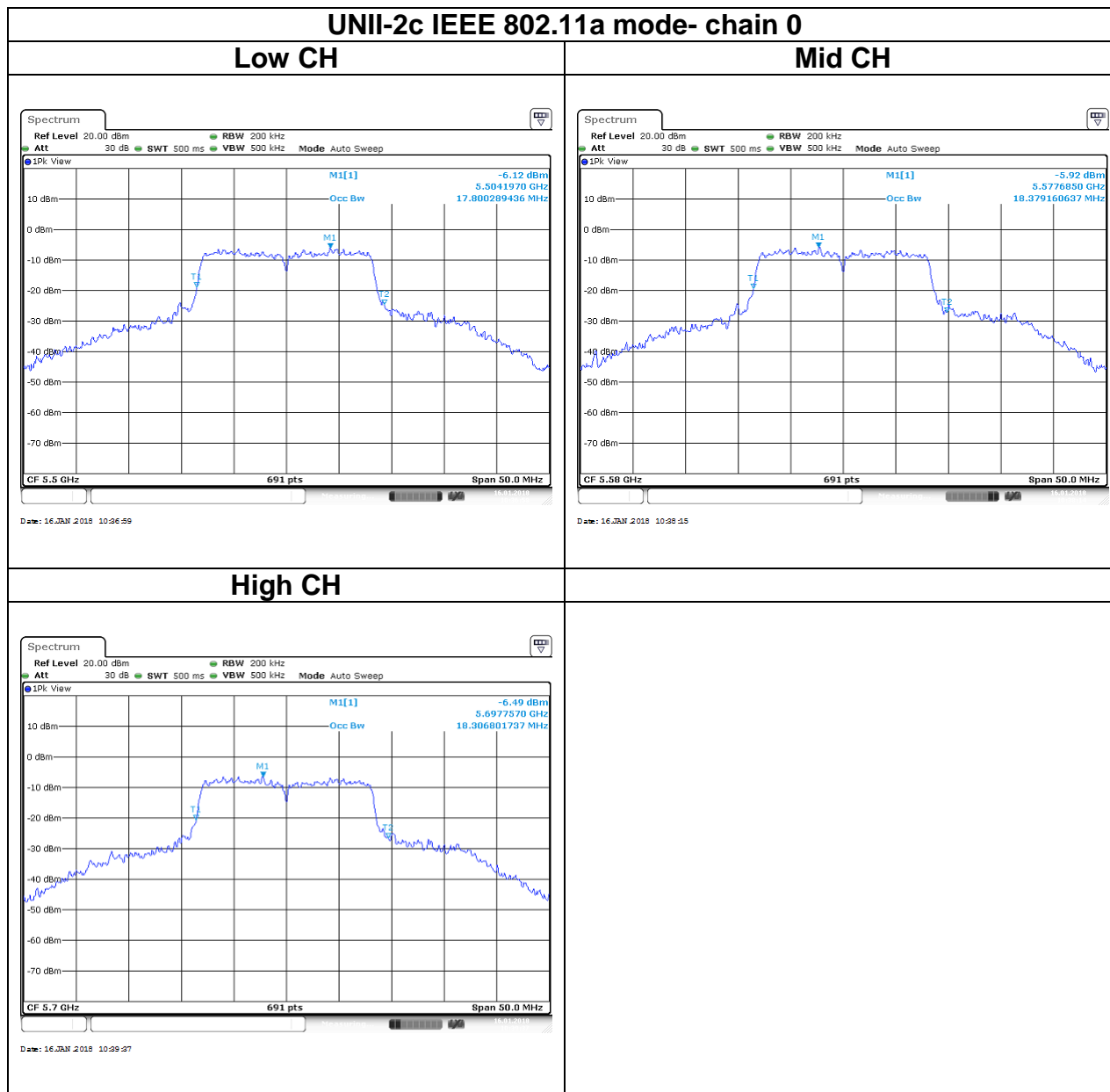


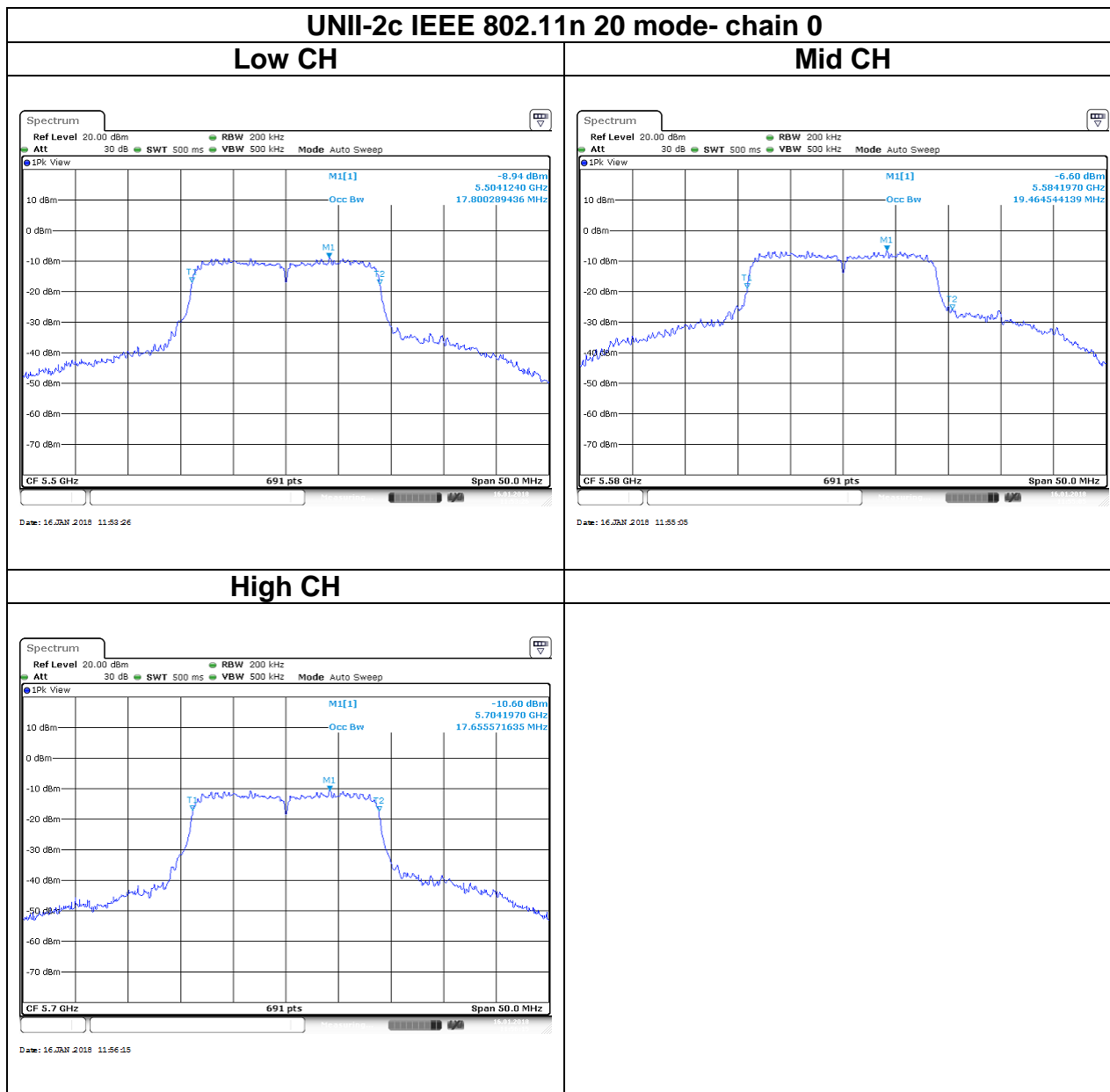






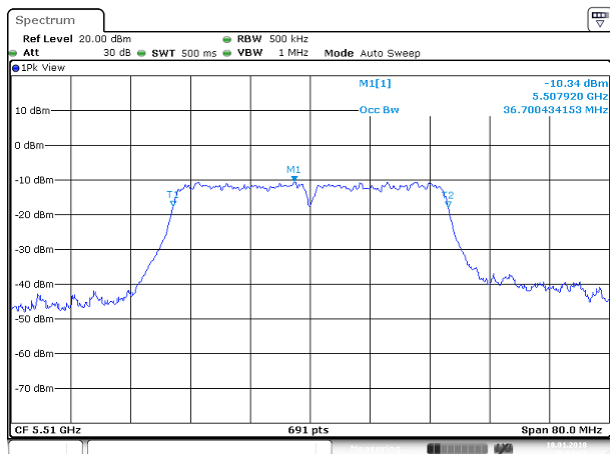
## Test Data (99%OBW)





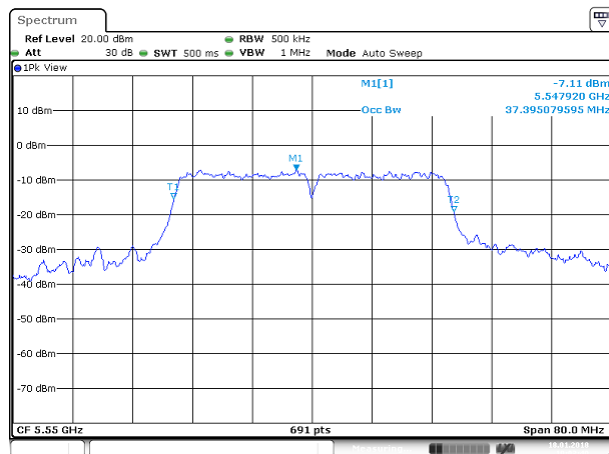
**UNII-2c IEEE 802.11n 40 mode- chain 0**

**Low CH**



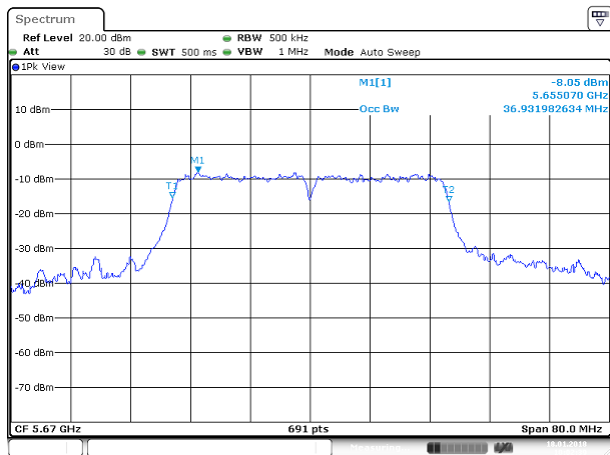
Date: 18 JAN 2018 10:04:47

**Mid CH**



Date: 18 JAN 2018 10:03:41

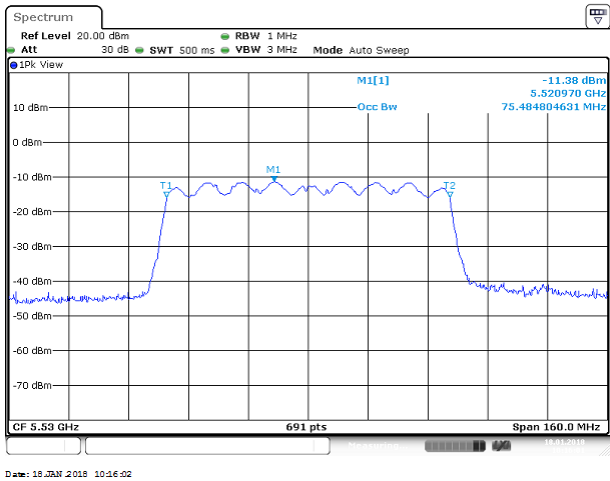
**High CH**



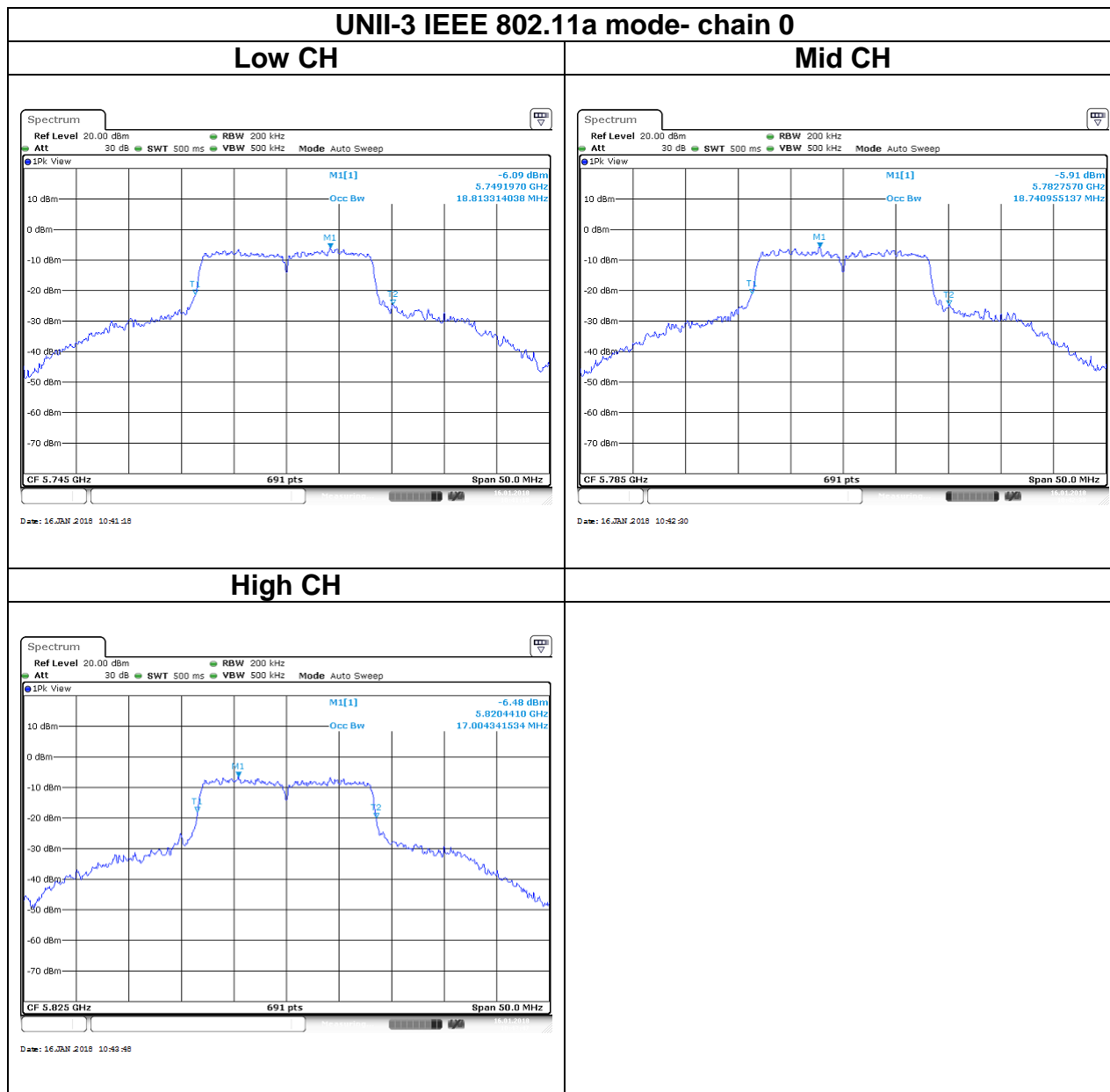
Date: 18 JAN 2018 10:02:40

**UNII-2c IEEE 802.11ac VHT80 mode- chain 0**

**Mid**

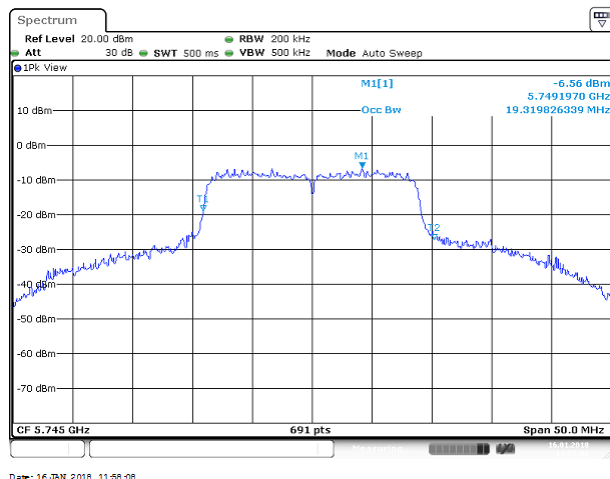


## Test Data (99%OBW)

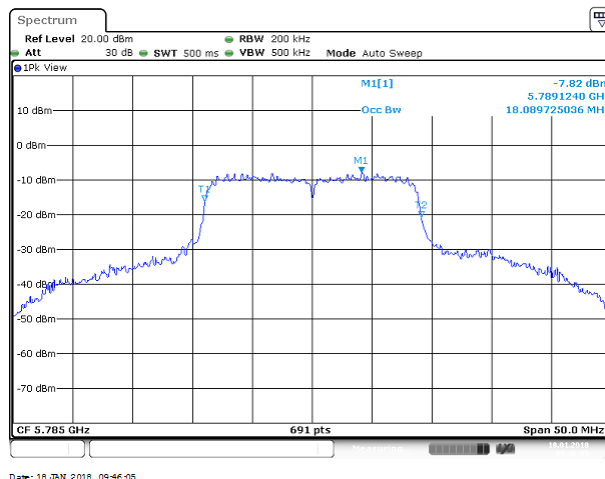


**UNII-3 IEEE 802.11n 20 mode- chain 0**

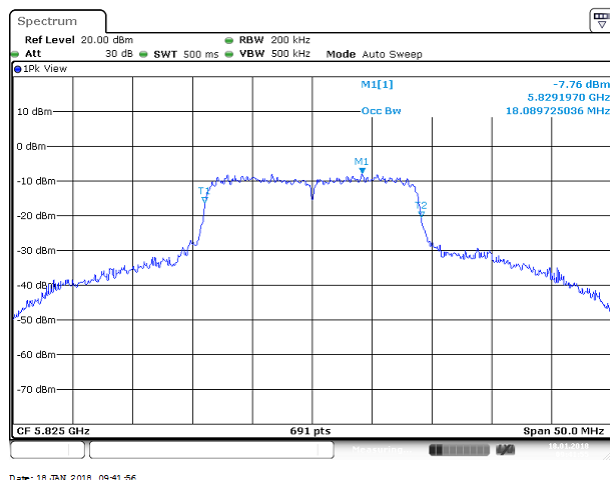
**Low CH**

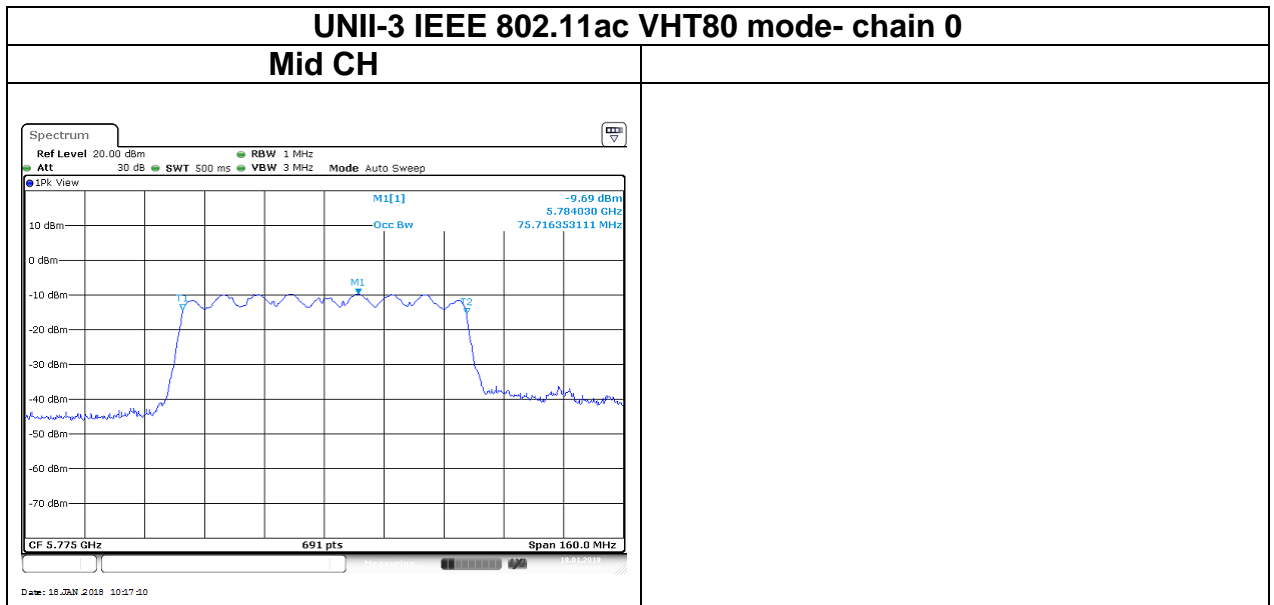
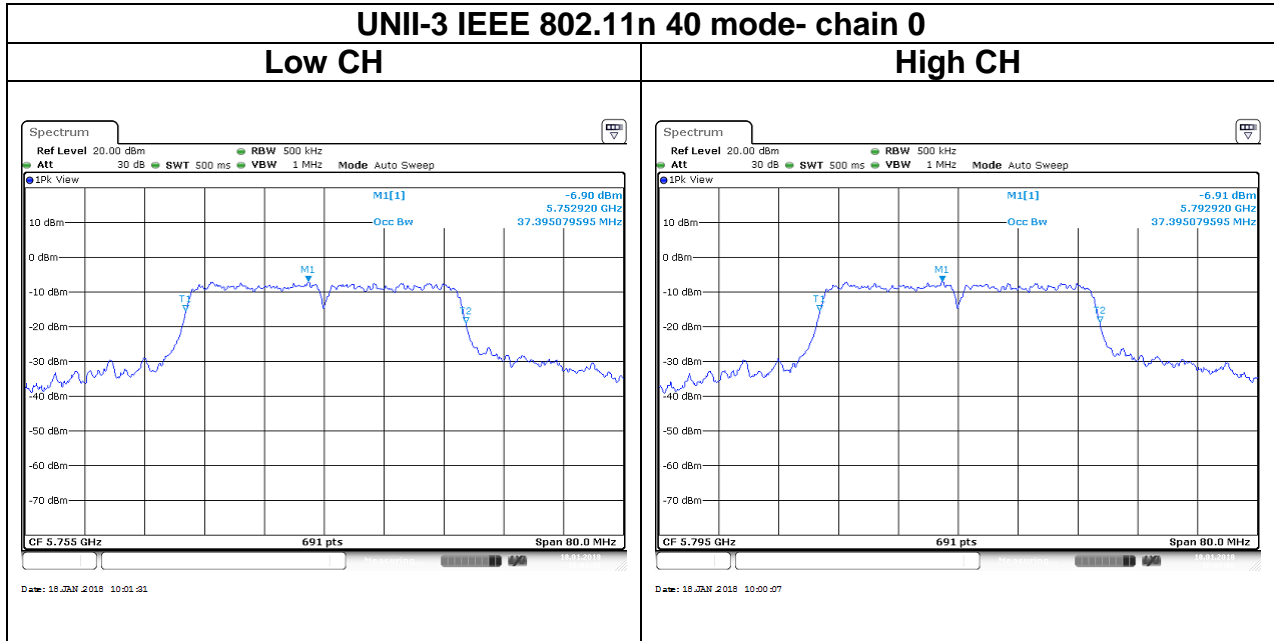


**Mid CH**



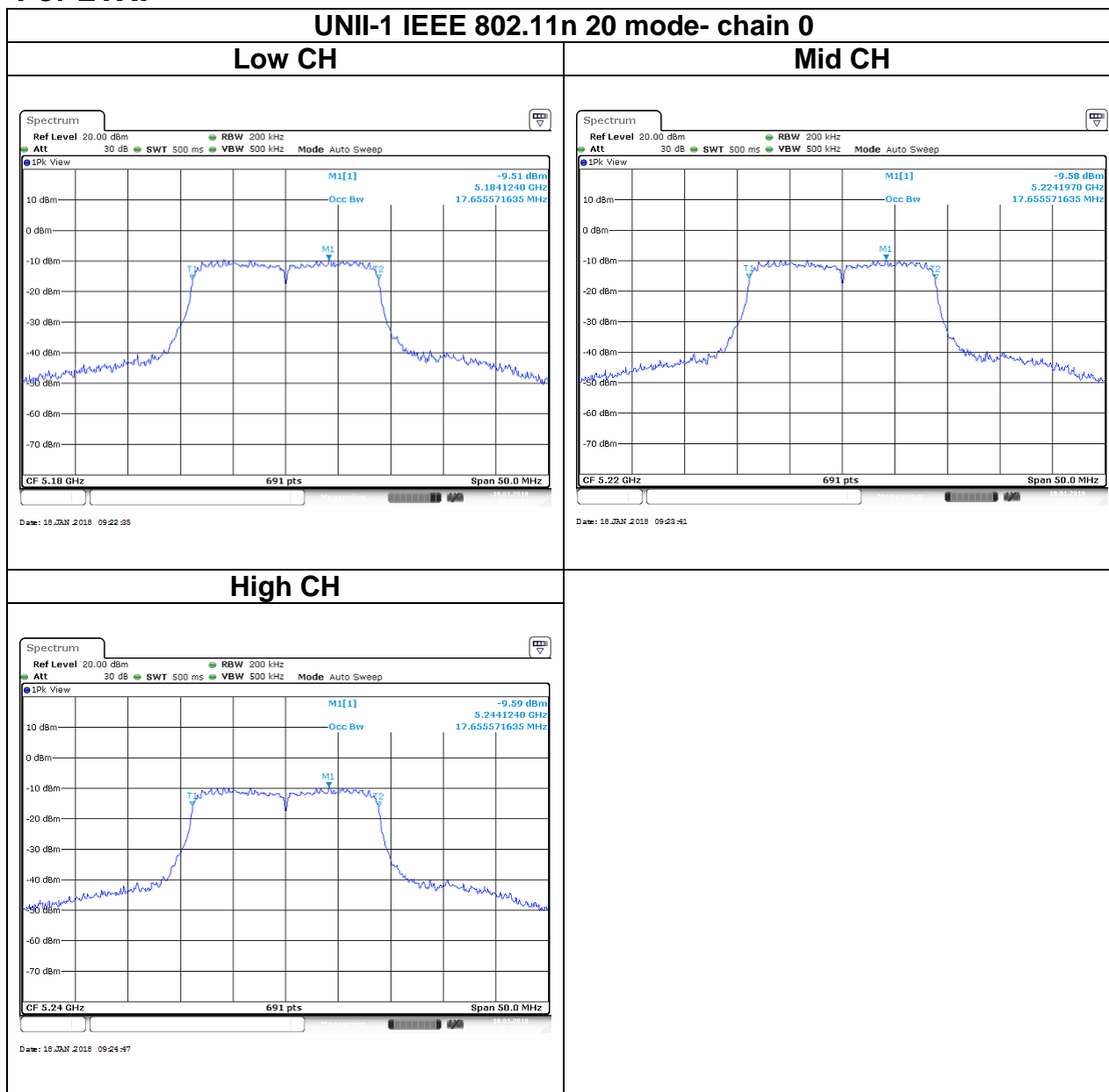
**High CH**



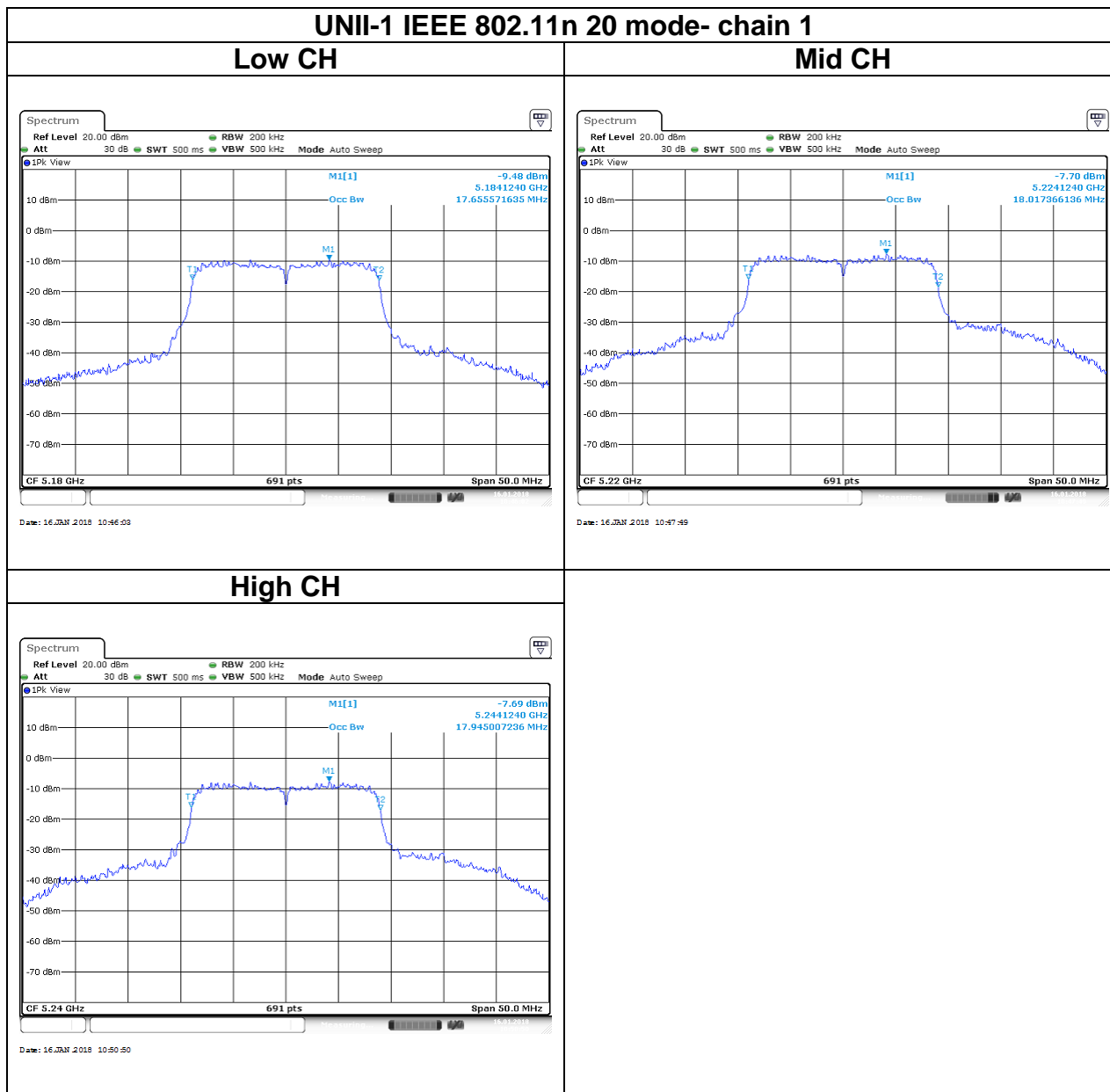


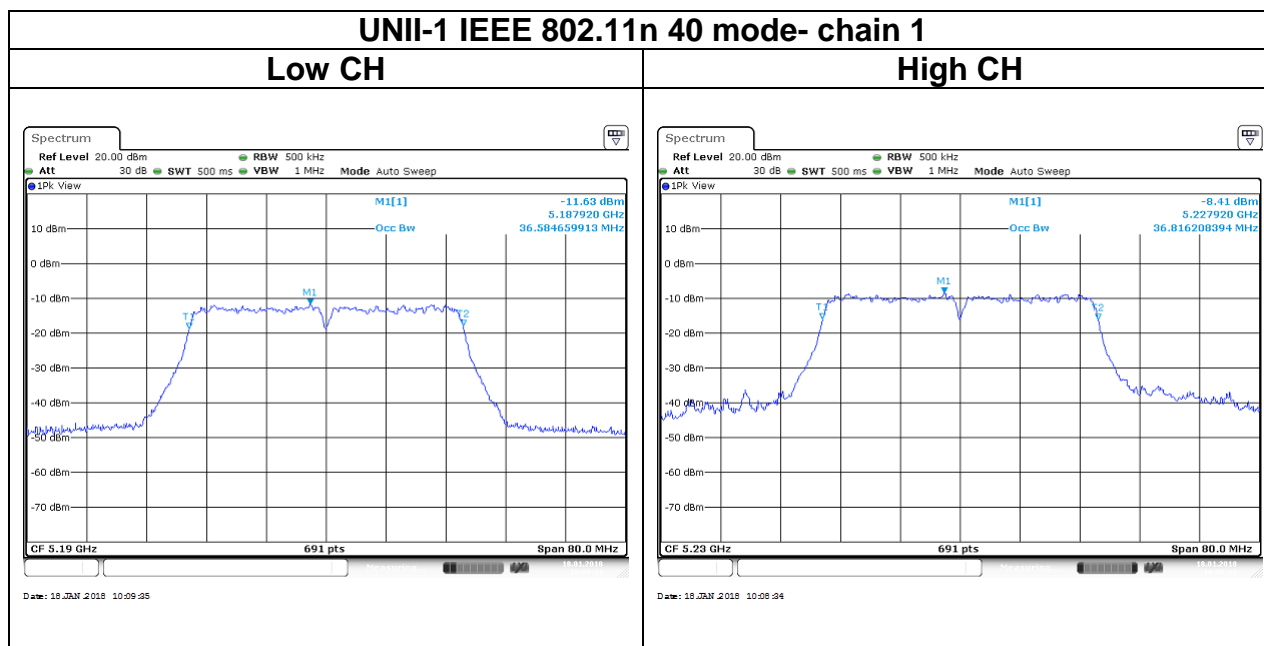
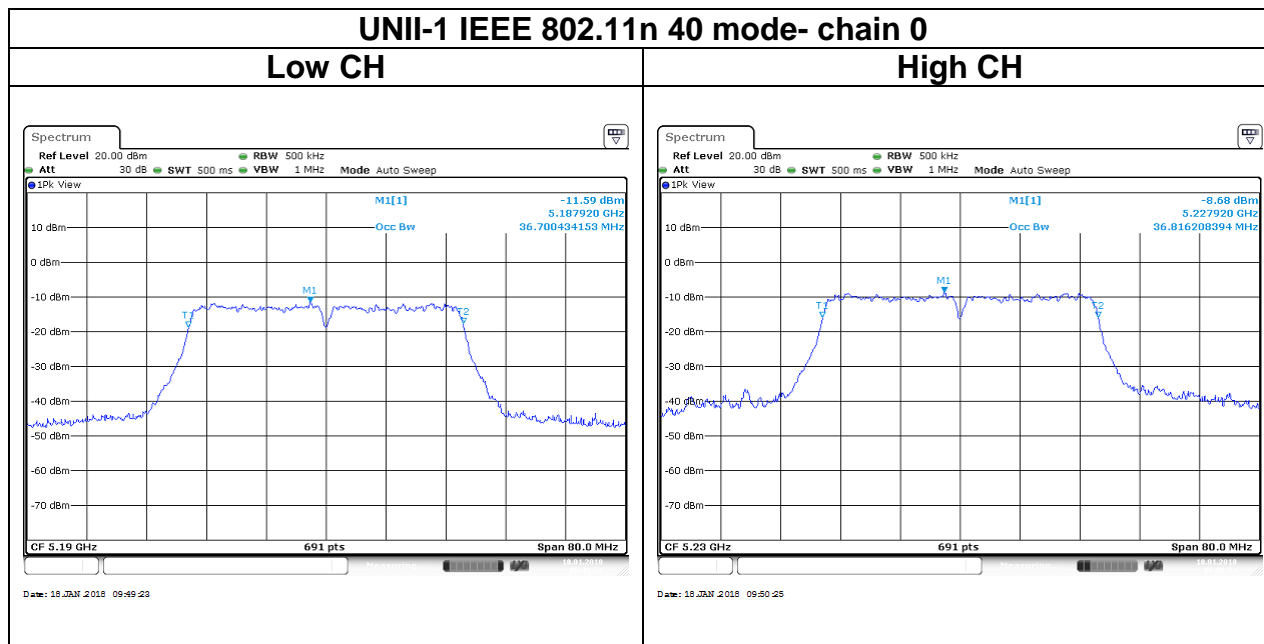
## Test Data (99%OBW)

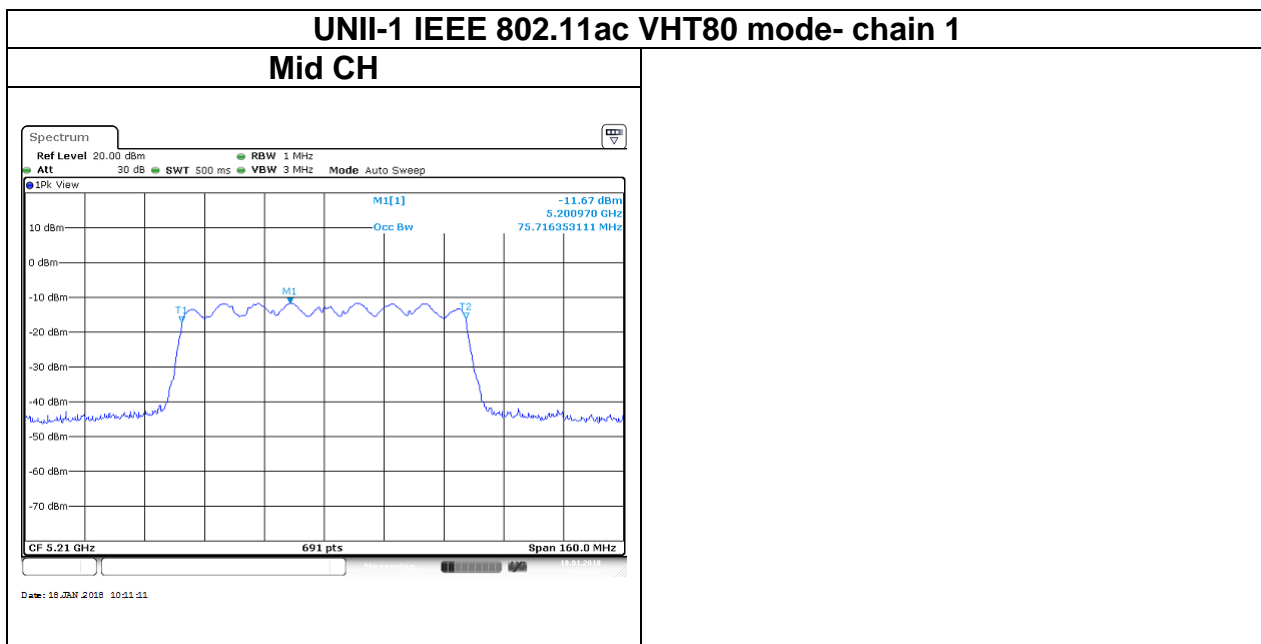
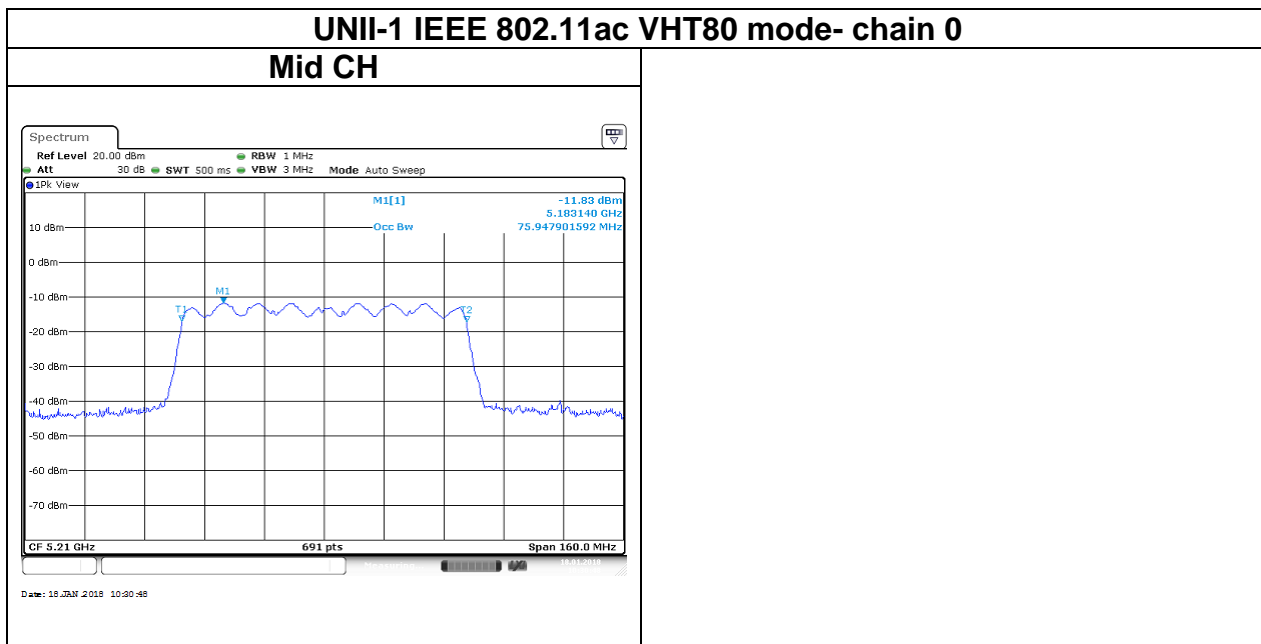
For 2TX:











## Test Data (99%OBW)

