

Report No.: SEWM2208000155RG04  
Rev.: 02  
Page: 1 of 608

# TEST REPORT

**Application No.:** SEWM2208000155RG  
**Applicant:** NCXX Inc.  
**Address of Applicant:** 2-32-1, Kunuginome, Hanamaki, Iwate-Pref 025-0323, Japan  
**Manufacturer:** NCXX Inc.  
**Address of Manufacturer:** 2-32-1, Kunuginome, Hanamaki, Iwate-Pref 025-0323, Japan  
**EUT Description:** 5G Portable Modem  
**Model No.:** UNX-05G  
**Trade Mark:** NCXX  
**FCC ID:** SLKUNX-05G  
**Standards:** FCC 47 CFR Part 2, Subpart J  
FCC 47 CFR Part 15, Subpart E  
**Date of Receipt:** 2022/08/30  
**Date of Test:** 2022/09/06 to 2022/10/22  
**Date of Issue:** 2022/12/20

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:



Panta Sun  
Wireless Laboratory Manager



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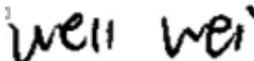
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## 1 Version

<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2022/10/27		Original
02		2022/12/20		Add the wave parameter of Type5 on Page342~399

This report supersedes our previous report SEWM2208000155RG04, issued on 2022/10/27, which is hereby deemed null and void.

<b>Prepared By</b>	 <b>(Tizzy Song) / Test Engineer</b>
<b>Checked By</b>	 <b>(Well Wei) / Reviewer</b>

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## 2 Test Summary

Test Item	Band <sup>[1]</sup>	FCC rules No.	Test Requirements	Test Result	Result
Antenna Requirement	--	15.203/15.407(a)	--	Clause 4.1	PASS
26dB Emission Bandwidth	Band I Band II-A Band II-C	15.407(a)(1) 15.407(a)(2) 15.407(a)(2)	No limit.	Clause 4.5	Reporting only
99% Occupied Bandwidth	Band I Band II-A Band II-C	KDB 789033 D02§ D	No limit.	Clause 4.7	Reporting only
Duty Cycle	Band I Band II-A Band II-C	--	No limit.	Clause 4.3	Reporting only
Maximum Conducted Output Power	Band I Band II-A Band II-C	15.407(a)(ii) 15.407(a)(2)	< 1W <MIN{250mW,11dBm+10*Ig(EBW)}	Clause 4.4	PASS
Maximum Power Spectral Density	Band I Band II-A Band II-C	15.407(a) (ii) 15.407(a)(2)	<17dBm/MHz <11dBm/MHz	Clause 4.8	PASS
Unwanted Emissions that fall Out of the Restricted Bands (Radiated)	Band I	15.209 15.407(b)	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.15-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).	Clause 4.9	PASS
	Band II-A	15.407(b) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.25-5.35 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		PASS
	Band II-C	15.407(b) 15.209	F<1GHz: §15.209/§7.2.5 limit (QP). F≥1GHz & out-restricted: <-27dBm/MHz PK e.i.r.p. (exl. 5.47-5.725 GHz). F≥1GHz & in-restricted: §15.209/§7.2.5 limit (AV&PK).		PASS
Unwanted Emissions in the Restricted Bands (Radiated)	Band I Band II-A Band II-C	15.209	---	Clause 4.10	PASS

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AC Power Line Conducted Emissions	Band I Band II-A Band II-C	15.207	---	Clause 4.2	PASS																				
Dynamic Frequency Selection	Band II-A Band II-C	15.407	<p><b>DFS Detection Thresholds:</b></p> <table border="1"> <tr><td>Maximum Transmit Power</td><td>Value (See Notes 1, 2, and 3)</td></tr> <tr><td>EIRP ≥ 200 milliwatt</td><td>-64 dBm</td></tr> <tr><td>EIRP &lt; 200 milliwatt and power spectral density &lt; 10 dBm/MHz</td><td>-62 dBm</td></tr> <tr><td>EIRP &lt; 200 milliwatt that do not meet the power spectral density requirement</td><td>-64 dBm</td></tr> </table> <p><b>Note 1:</b> This is the level at the input of the receiver assuming a 0 dBi receive antenna.</p> <p><b>Note 2:</b> Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.</p> <p><b>Note 3:</b> EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.</p> <p><b>DFS Response Requirement:</b></p> <table border="1"> <tr><td>Parameter</td><td>Value</td></tr> <tr><td>Non-occupancy period</td><td>Minimum 30 minutes</td></tr> <tr><td>Channel Availability Check Time</td><td>60 seconds</td></tr> <tr><td>Channel Move Time</td><td>10 seconds</td></tr> <tr><td>Channel Closing Transmission Time</td><td>200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.</td></tr> <tr><td>U-NII Detection Bandwidth</td><td>Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.</td></tr> </table> <p><b>Note 1:</b> <i>Channel Move Time</i> and the <i>Channel Closing Transmission Time</i> should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.</p> <p><b>Note 2:</b> The <i>Channel Closing Transmission Time</i> is comprised of 200 milliseconds starting at the beginning of the <i>Channel Move Time</i> plus any additional intermittent control signals required to facilitate the channel (an aggregate of 60 milliseconds over remaining 10 second period). The aggregate duration of control signals will not count quiet periods in between transmissions.</p> <p><b>Note 3:</b> During the <i>U-NII Detection Bandwidth</i> detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.</p>	Maximum Transmit Power	Value (See Notes 1, 2, and 3)	EIRP ≥ 200 milliwatt	-64 dBm	EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm	EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm	Parameter	Value	Non-occupancy period	Minimum 30 minutes	Channel Availability Check Time	60 seconds	Channel Move Time	10 seconds	Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.	U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.	Clause 4.11	PASS
Maximum Transmit Power	Value (See Notes 1, 2, and 3)																								
EIRP ≥ 200 milliwatt	-64 dBm																								
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm																								
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm																								
Parameter	Value																								
Non-occupancy period	Minimum 30 minutes																								
Channel Availability Check Time	60 seconds																								
Channel Move Time	10 seconds																								
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.																								
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.																								
Frequency Stability	Band I Band II-A Band II-C	15.407(g)	Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual	N/A	N/A																				
<p><b>Note 1:</b></p> <p>Band I: 5150-5250MHz</p> <p>Band II-A: 5250-5350MHz</p> <p>Band II-C: 5470-5725MHz</p>																									

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### 3 General Information

#### 3.1 Details of Client

Applicant:	NCXX Inc.
Address of Applicant:	2-32-1, Kunuginome, Hanamaki, Iwate-Pref 025-0323, Japan
Manufacturer:	NCXX Inc.
Address of Manufacturer:	2-32-1, Kunuginome, Hanamaki, Iwate-Pref 025-0323, Japan

#### 3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Tizzy Song, Ives Cheng

#### 3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

##### • A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

##### • Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

##### • FCC –Designation Number: CN1312

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Designation Number: CN1312.

Test Firm Registration Number: 717327

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### 3.4 General Description of EUT

EUT Description:	5G Portable Modem	
Model No.:	UNX-05G	
Trade Mark:	NCXX	
Hardware Version:	SRT851N_V1.02	
Software Version:	UNX-05G_8.0.7_EQ100	
IMEI:	RF Conducted	354942230001013
	RSE & AC power line	354942230001435
WLAN Mode Supported:	802.11a:	20 MHz channel bandwidth
	802.11n:	20 MHz / 40 MHz channel bandwidth
	802.11ac:	20 MHz / 40 MHz / 80 MHz / 160 MHz channel bandwidth
	802.11ax:	20 MHz / 40 MHz / 80 MHz / 160 MHz channel bandwidth
Operation Frequency:	5150MHz to 5250MHz	
	5250MHz to 5350MHz	
	5470MHz to 5725MHz	
Modulation Type:	802.11a:	OFDM (BPSK, QPSK, 16QAM, 64QAM)
	802.11n:	OFDM (BPSK, QPSK, 16QAM, 64QAM)
	802.11ac:	OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
	802.11ax:	OFDM /OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM)
Channel Spacing:	20MHz:	802.11a/n(HT20)/ac(VHT20)/ax(HE20)
	40MHz:	802.11n(HT40)/ac(VHT40)/ax(HE40)
	80MHz:	802.11ac(VHT80)/ax(HE80)
	160MHz:	802.11ac(VHT160)/ax(HE160)
Antenna Type:	<input type="checkbox"/> External, <input checked="" type="checkbox"/> Integrated	
Antenna Gain:	5150MHz to 5250MHz: 1.3dBi(Wifi0); 1.5dBi(Wifi1); 5250MHz to 5350MHz: 1.4dBi(Wifi0); 1.5dBi(Wifi1); 5470MHz to 5725MHz: 1.5dBi(Wifi0); 1.4dBi(Wifi1);	
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.	
Smart System:	<input checked="" type="checkbox"/> SISO	802.11a/n/ac/ax
	<input checked="" type="checkbox"/> MIMO	802.11n/ac/ax: 2Tx & 2Rx
DFS Function:	<input checked="" type="checkbox"/> Master	
	<input type="checkbox"/> Slave with radar detection	<input type="checkbox"/> Slave without radar detection
TPC Function:	<input checked="" type="checkbox"/> Support <input type="checkbox"/> Not Support	
Use Conditions:	Indoor	



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RF Cable:	2dB
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Remark:

In FCC 15.31, for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table, and the selected channel to perform the test as below:

Frequency Range of Operation Operating Frequency Range (in each Band)	Number of Measurement Frequencies Required	Location of Measurement Frequency in Band of Operation
1 MHz or less	1	centre
1 MHz to 10 MHz	2	1 near high end, 1 near low end
Greater than 10 MHz	3	1 near high end, 1 near centre

**For UNII Band I:**

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac/ax 20MHz	The Lowest channel	5180
	The Middle channel	5200
	The Highest channel	5240
IEEE 802.11n/ac/ax 40MHz	The Lowest channel	5190
	The Highest channel	5230
IEEE 802.11ac/ax 80MHz	The Middle channel	5210

**For UNII Band II-A:**

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac/ax 20MHz	The Lowest channel	5260
	The Middle channel	5280
	The Highest channel	5320
IEEE 802.11n/ac/ax 40MHz	The Lowest channel	5270
	The Highest channel	5310
IEEE 802.11ac/ax 80MHz	The Middle channel	5290

**Straddle channel**

Mode	Channel	Frequency(MHz)
IEEE 802.11ax 160MHz	The Middle channel	5250

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**For UNII Band II-C:**

Mode	Channel	Frequency(MHz)
IEEE 802.11a/n/ac/ax 20MHz	The Lowest channel	5500
	The Middle channel	5580
	The Highest channel	5700
IEEE 802.11n/ac/ax 40MHz	The Lowest channel	5510
	The Middle channel	5550
	The Highest channel	5670
IEEE 802.11ac/ax 80MHz	The Lowest channel	5530
	The Highest channel	5610
IEEE 802.11ax 160MHz	The Middle channel	5570

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### 3.5 Test Environment and Mode

Environment Parameter	101 kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	22~23	5

Remark:  
NV: Normal Voltage  
NT: Normal Temperature

### 3.6 Description of Support Units

The EUT has been tested as an independent unit.

### 3.7 Worst-case configuration and mode

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. Following are the worst-case data rates set for test:

Modulation Type	SISO - Data Rate	MIMO - Data Rate
802.11a	6 Mbps	12 Mbps
802.11n (HT 20)	MCS0 (6.5 Mbps)	MCS0 (13 Mbps)
802.11n (HT 40)	MCS0 (13.5 Mbps)	MCS0 (27 Mbps)
802.11ac (VHT 20)	MCS0 (6.5 Mbps)	MCS0 (13 Mbps)
802.11ac (VHT 40)	MCS0 (13.5 Mbps)	MCS0 (27 Mbps)
802.11ac (VHT 80)	MCS0 (29.3 Mbps)	MCS0 (58.5 Mbps)
802.11ac (VHT 160)	MCS0 (58.5 Mbps)	MCS0 (117 Mbps)
802.11ax (HE 20)	MCS0 (8 Mbps)	MCS0 (16 Mbps)
802.11ax (HE 40)	MCS0 (16 Mbps)	MCS0 (32 Mbps)
802.11ax (HE 80)	MCS0 (34 Mbps)	MCS0 (68 Mbps)
802.11ax (HE 160)	MCS0 (68 Mbps)	MCS0 (136 Mbps)

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## 4 Test results and Measurement Data

## 4.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15 Section 15.203
<p>The antenna is External antenna and no consideration of replacement. The best case gain of the antenna is 5150MHz to 5250MHz: 1.3dBi(Wifi0); 1.5dBi(Wifi1);* 5250MHz to 5350MHz: 1.4dBi(Wifi0); 1.5dBi(Wifi1);* 5470MHz to 5725MHz: 1.5dBi(Wifi0); 1.4dBi(Wifi1);*</p>	

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**Cyclic Delay Diversity (CDD) System:**

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

If all antennas have the same gain,  $G_{ANT}$ , Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

- For power spectral density (PSD) measurements on all devices,  
 $Array Gain = 10 \log(N_{ANT}/N_{SS}=1) \text{ dB}$ .

- For power measurements on IEEE 802.11 devices:

 $Array Gain = 0 \text{ dB (i.e., no array gain) for } N_{ANT} \leq 4;$  $Array Gain = 0 \text{ dB (i.e., no array gain) for channel widths } \geq 40 \text{ MHz for any } N_{ANT};$  $Array Gain = 5 \log(N_{ANT}/N_{SS}=1) \text{ dB or } 3 \text{ dB, whichever is less, for 20-MHz channel widths with } N_{ANT} \geq 5.$ Unequal antenna gains, with equal transmit powers. For antenna gains given by  $G_1, G_2, \dots, G_N \text{ dBi}$ 

- If transmit signals are correlated, then

 $Directional gain = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi [Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]}$ 

- If all transmit signals are completely uncorrelated, then

 $Directional gain = 10 \log[(10^{G_1/10} + 10^{G_2/10} + \dots + 10^{G_N/10}) / N_{ANT}] \text{ dBi}$ **The Power and PSD limit should be modified if the directional gain of eut is over 6dbi.**

The EUT supports CDD System.

Operation Frequency	ANT Gain1 (dBi)	ANT Gain2 (dBi)	Power DG (dBi)	PSD DG (dBi)	Power Limit Reduction (dBm)	PSD Limit Reduction (dBm)
5150MHz to 5250MHz	1.3	1.5	1.40	4.41	0	0
5250MHz to 5350MHz	1.4	1.5	1.45	4.46	0	0
5470MHz to 5725MHz	1.5	1.4	1.45	4.46	0	0

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## 4.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency range (MHz)		Limit (dBuV)
			Quasi-peak
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
* Decreases with the logarithm of the frequency.			
Test Procedure:	<ol style="list-style-type: none"><li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li><li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a <math>50\Omega/50\mu\text{H} + 5\Omega</math> linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li><li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,</li><li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li><li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.</li></ol>		

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Test Setup:	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates at lowest, middle and highest channel.
Final Test Mode:	Refer to section 3.7 for details. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass

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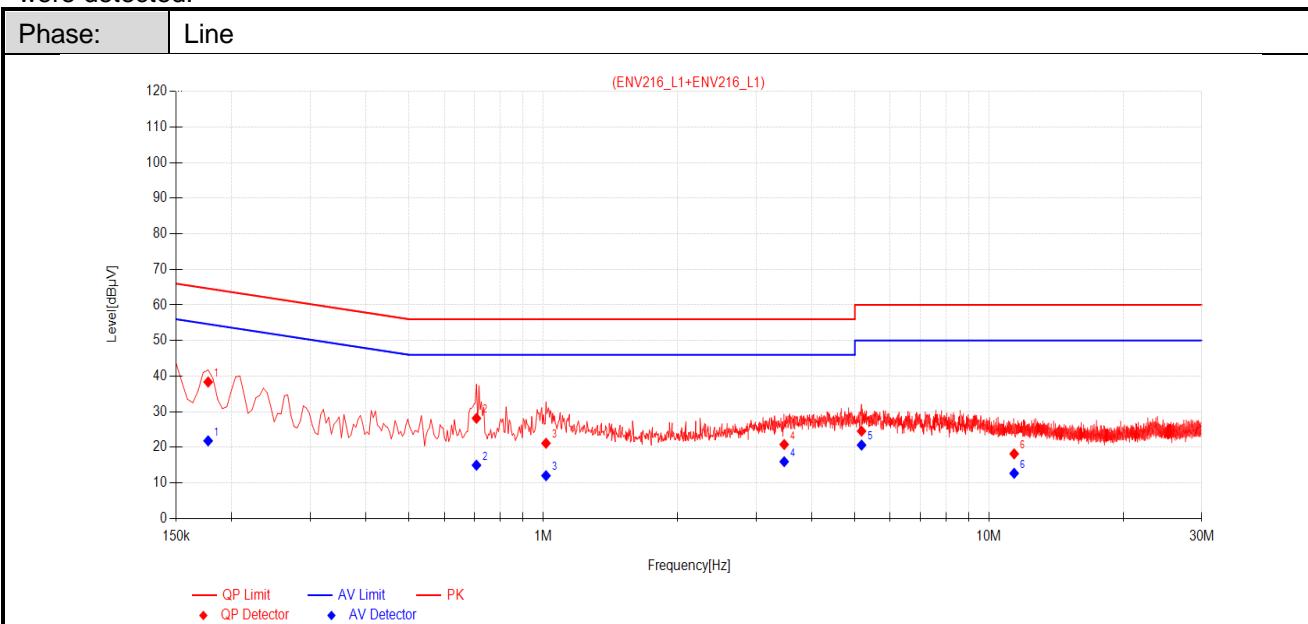


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### Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



Final Data List												
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBμV]	QP Value [dBμV]	QP Limit [dBμV]	QP Margin [dB]	AV Reading [dBμV]	AV Value [dBμV]	AV Limit [dBμV]	AV Margin [dB]	Verdict	
1	0.1770	10.75	27.60	38.35	64.63	26.28	11.07	21.82	54.63	32.81	PASS	
2	0.7080	10.57	17.59	28.16	56.00	27.84	4.41	14.98	46.00	31.02	PASS	
3	1.0140	10.50	10.64	21.14	56.00	34.86	1.53	12.03	46.00	33.97	PASS	
4	3.4710	10.70	10.10	20.80	56.00	35.20	5.28	15.98	46.00	30.02	PASS	
5	5.1765	10.65	13.90	24.55	60.00	35.45	9.98	20.63	50.00	29.37	PASS	
6	11.3865	10.60	7.58	18.18	60.00	41.82	2.10	12.70	50.00	37.30	PASS	

#### Remark:

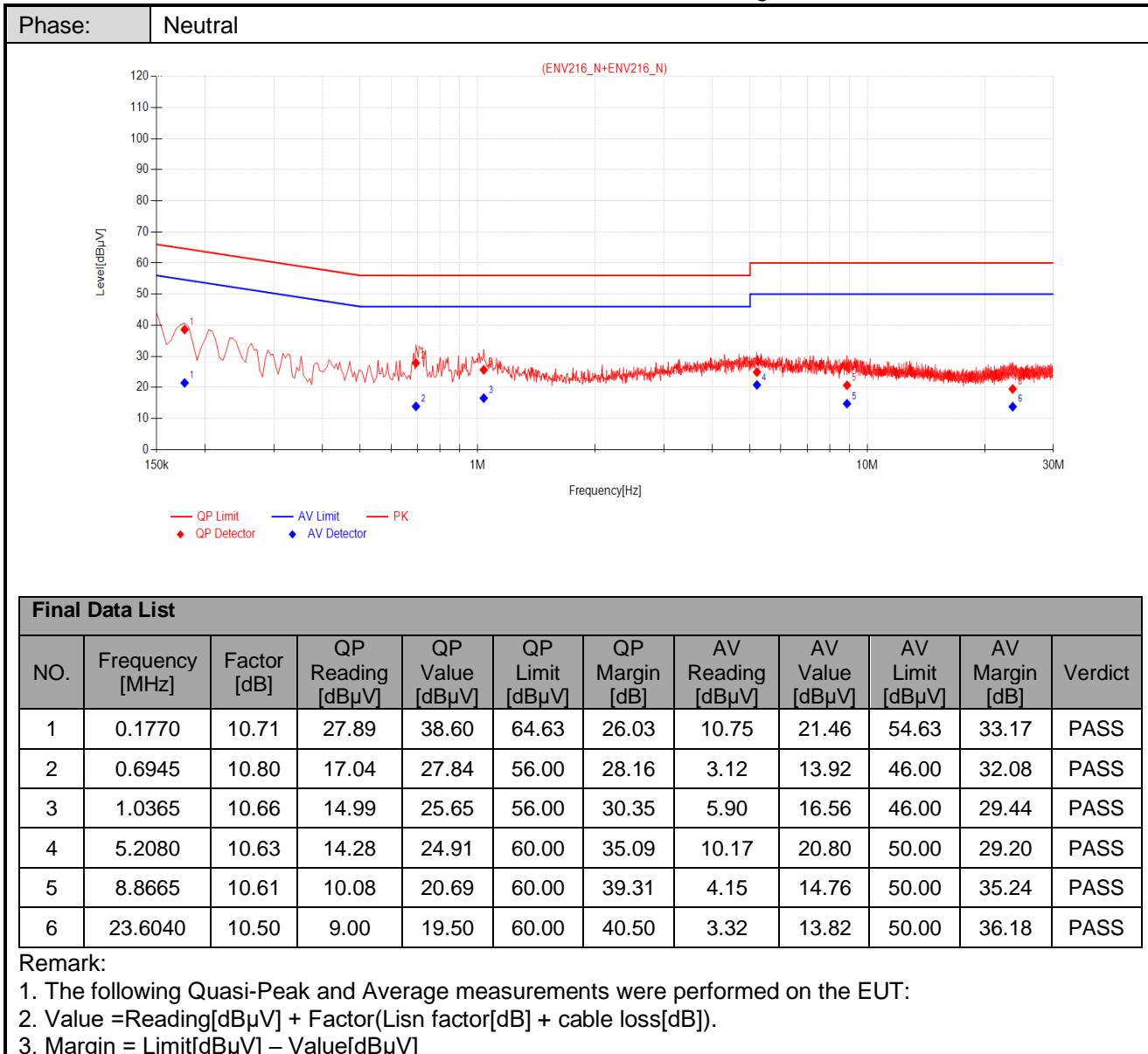
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Value =Reading[dBμV] + Factor(Lsn factor[dB] + cable loss[dB]).
3. Margin = Limit[dBμV] – Value[dBμV]

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## 4.3 Duty Cycle

The detailed test data see: **Appendix**



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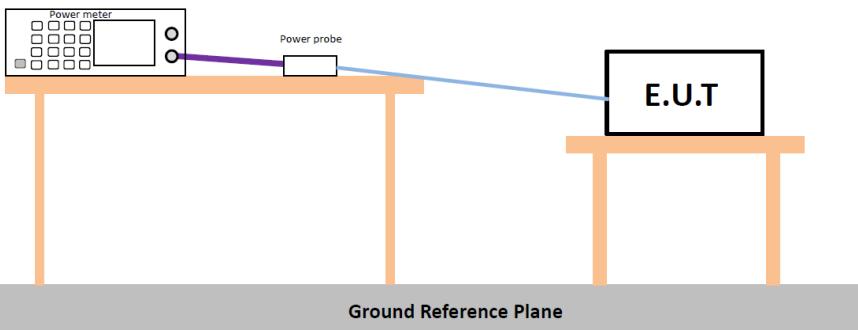
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#### 4.4 Conducted Output Power

Test Requirement:	47 CFR Part 15 Section 15.407(a)(ii)	
Test Method:	ANSI C63.10 :2013 Section 12.3.3	
Test Setup:	 <p>* Test with power meter (Detector function: Average)</p>	
Test Instruments:	Refer to section 6 for details.	
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates	
Final Test Mode:	Refer to section 3.7 for details.	
Limit:	Frequency Band	Limit
	5150-5250MHz	Not exceed 1W(30dBm)
	5250-5350MHz	The lesser of 250mW(24dBm) or $11 + 10\log B$
	5470-5725MHz	The lesser of 250mW(24dBm) or $11 + 10\log B$
	*Where B is the 26dB emission bandwidth in MHz	
Test Results:	Pass	
The detailed test data see: <b>Appendix</b>		

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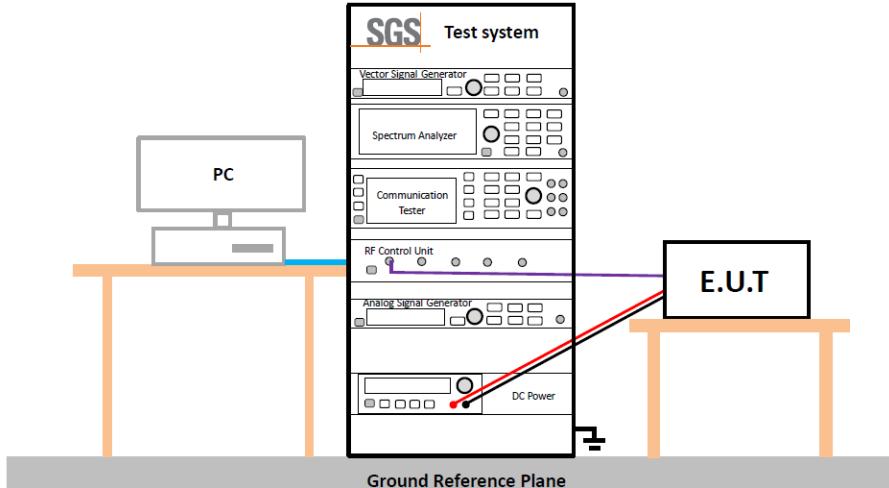
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## 4.5 26dB Emission Bandwidth

Test Requirement:	47 CFR Part 15 Section 15.407(a), KDB 789033 D02& C
Test Method:	ANSI C63.10: 2013 Section 12.4.1
Test Setup:	
Instruments Used:	Refer to section 6 for details.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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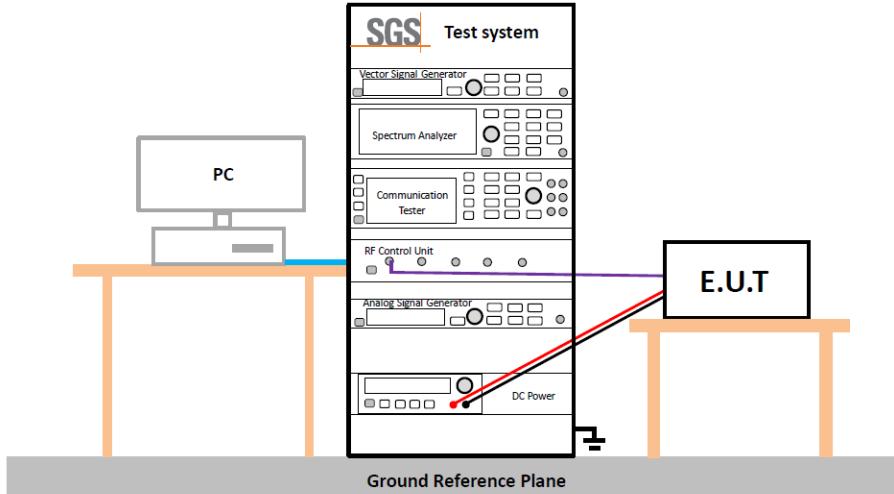
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## 4.6 99% Occupied Bandwidth

Test Requirement:	KDB 789033 D02§ D
Test Method:	ANSI C63.10: 2013 Section 12.4.2
Test Setup:	
Instruments Used:	Refer to section 6 for details.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates
Final Test Mode:	Refer to section 3.7 for details.
Limit:	No restriction limits
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	



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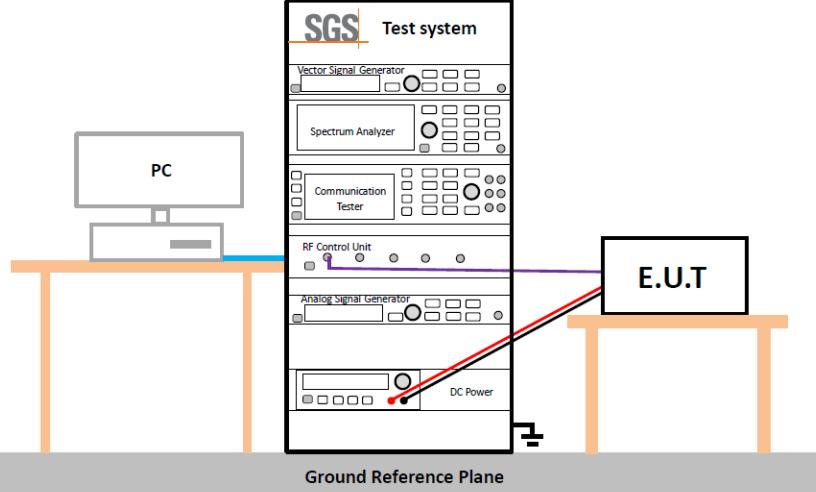
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## 4.7 Power Spectral Density

Test Requirement:	47 CFR Part 15 Section 15.407(a)(ii)								
Test Method:	ANSI C63.10: 2013 Section 12.5 KDB 789033 D02 v02r01, Section F.								
Test Setup:	 <p>The diagram illustrates the test setup. A PC is connected to a vertical stack of test equipment labeled 'SGS Test system'. From top to bottom, the stack includes: Vector Signal Generator, Spectrum Analyzer, Communication Tester, RF Control Unit, Analog Signal Generator, and DC Power supply. A red line connects the RF Control Unit to a rectangular box labeled 'E.U.T' (Equipment Under Test). The entire setup is positioned above a horizontal grey bar labeled 'Ground Reference Plane'.</p>								
Instruments Used:	Refer to section 6 for details.								
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates								
Final Test Mode:	Refer to section 3.7 for details.								
Limit:	<table border="1"> <thead> <tr> <th>Frequency Band</th> <th>Limit</th> </tr> </thead> <tbody> <tr> <td>5150-5250MHz</td> <td>The power spectral density less than 17dBm/1MHz</td> </tr> <tr> <td>5250-5350MHz</td> <td>The power spectral density less than 11dBm/1MHz</td> </tr> <tr> <td>5470-5725MHz</td> <td>The power spectral density less than 11dBm/1MHz</td> </tr> </tbody> </table>	Frequency Band	Limit	5150-5250MHz	The power spectral density less than 17dBm/1MHz	5250-5350MHz	The power spectral density less than 11dBm/1MHz	5470-5725MHz	The power spectral density less than 11dBm/1MHz
Frequency Band	Limit								
5150-5250MHz	The power spectral density less than 17dBm/1MHz								
5250-5350MHz	The power spectral density less than 11dBm/1MHz								
5470-5725MHz	The power spectral density less than 11dBm/1MHz								
Test Results:	Pass								
The detailed test data see: <b>Appendix</b>									

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## 4.8 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15 Section 15.205 and 15.209
Test Method:	ANSI C63.10: 2013 Section 6.4 / 6.5 / 6.6
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)
Test frequency:	9kHz ~ 40GHz (or 10 Harmonic)

Test Setup:

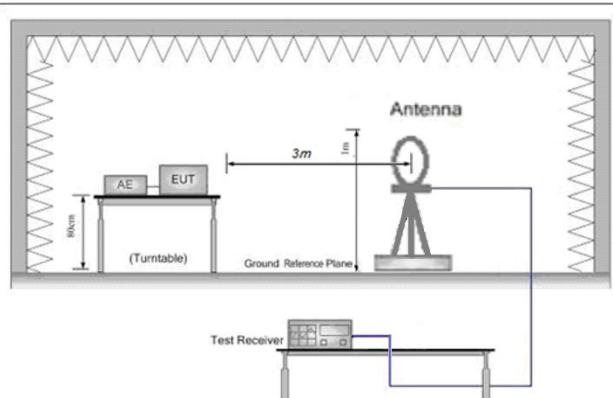


Figure 1. 9kHz to 30MHz

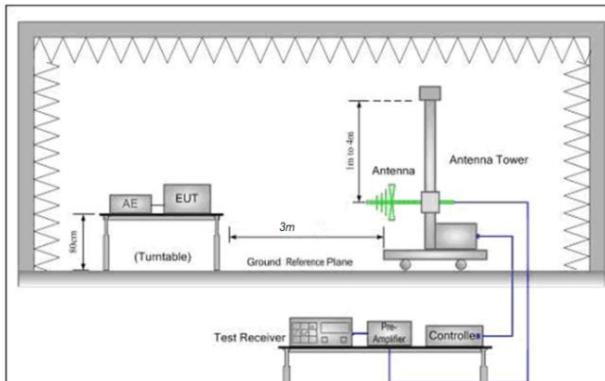


Figure 1. 30MHz to 1GHz

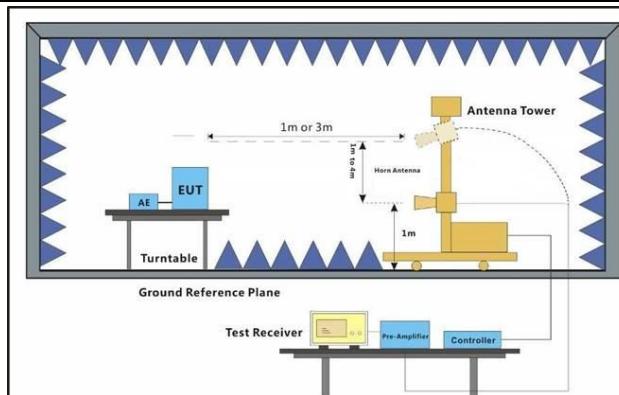


Figure 2. Above 1 GHz

Test Procedure:	<ol style="list-style-type: none"> <li>For below 1GHz test, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>For above 1GHz test, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. (Distance from antenna to EUT is 1m for measurements &gt;18GHz).</li> <li>The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>For each suspected emission, the EUT was arranged to its worst case and</li> </ol>
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	<p>then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>g. Test the EUT in the outermost channels.</p> <p>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which is worse case.</p> <p>i. Repeat above procedures until all frequencies measured was complete.</p> <p>j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported</p> <p>k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.</p> <p>l. At a measurement distance of 1 meter the limit line was increased by <math>20 \times \log(3/1) = 9.54</math> dB.</p>
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"> <li>• RBW = 120 kHz</li> <li>• VBW = 300 kHz</li> <li>• Detector = Peak</li> <li>• Trace mode = max hold</li> </ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"> <li>• RBW = 1 MHz</li> <li>• VBW <math>\geq</math> 3 MHz</li> <li>• Detector = Peak</li> <li>• Sweep time = auto</li> <li>• Trace mode = max hold</li> </ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"> <li>• RBW = 1 MHz</li> <li>• VBW <math>\geq</math> [3 *RBW]</li> <li>• Detector = RMS (power averaging), if span / (# of points in sweep) <math>\leq</math> (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.</li> <li>• Sweep time = auto</li> <li>• Perform a trace average of at least 100 traces.</li> </ul>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Refer to section 3.7 for details.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	

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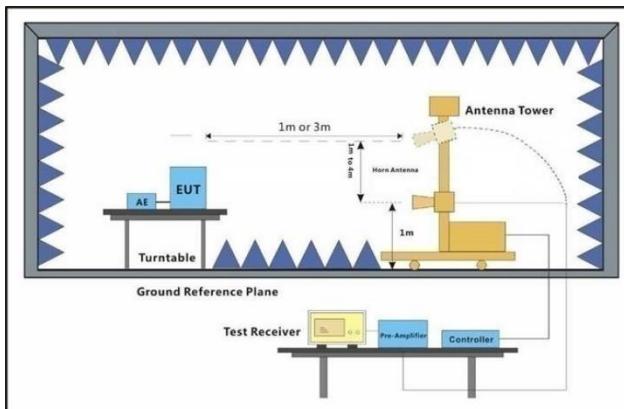
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## 4.9 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15 Section 15.407(b)		
Test Method:	ANSI C63.10: 2013 Section 12.7		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

### Test Setup:



Test Procedure:	<ol style="list-style-type: none"> <li>The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel</li> <li>Test the EUT in the outermost channels.</li> <li>The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.</li> </ol>
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	i. Repeat above procedures until all frequencies measured was complete.
Test Configuration:	<p>Measurements Below 1000MHz</p> <ul style="list-style-type: none"><li>• RBW = 120 kHz</li><li>• VBW = 300 kHz</li><li>• Detector = Peak</li><li>• Trace mode = max hold</li></ul> <p>Peak Measurements Above 1000 MHz</p> <ul style="list-style-type: none"><li>• RBW = 1 MHz</li><li>• VBW <math>\geq</math> 3 MHz</li><li>• Detector = Peak</li><li>• Sweep time = auto</li><li>• Trace mode = max hold</li></ul> <p>Average Measurements Above 1000MHz</p> <ul style="list-style-type: none"><li>• RBW = 1 MHz</li><li>• VBW <math>\geq</math> [3 *RBW]</li><li>• Detector = RMS (power averaging), if span / (# of points in sweep) <math>\leq</math> (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.</li><li>• Sweep time = auto</li><li>• Perform a trace average of at least 100 traces.</li></ul>
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
Final Test Mode:	Refer to section 3.7 for details.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass
The detailed test data see: <b>Appendix</b>	

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## 4.10 Dynamic Frequency Selection

### 4.10.1 DFS Measurement Configuration

Test Condition	Conducted Measurement Use 50Ohms to connect cable/connector calibration and testing, Use wifi0 port for testing. Refer to Section 4.10.7 for test connection.
----------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------

### 4.10.2 DFS Threshold level

DFS Threshold level: (-60.6 )dBm	<input checked="" type="checkbox"/> At the antenna connector <input type="checkbox"/> In front of the antenna
The Interference Radar Detection Threshold Level is (-62dBm + 1.4dBi + 0dB = -60.6dBm). That had been taken into account the output power range and antenna gain.	

### 4.10.3 Power-on cycle

The time required for the Master Device and/or Client Device to complete its power-on cycle(71 S).
----------------------------------------------------------------------------------------------------

### 4.10.4 User Access Restrictions

DFS Controls(Hardware or software) related to radar detection are NOT accessible to the user. Manufacturer statement confirming that information regarding the parameters of the detected Radar Waveforms is not available to the end user.
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

### 4.10.5 Channel Loading/Data Streaming

<input type="checkbox"/>	The data file(MPEG-4) has been transmitting in a streaming mode.
<input checked="" type="checkbox"/>	Software to ping the client is permitted to simulate data transfer with random ping intervals.
<input checked="" type="checkbox"/>	Minimum channel loading of approximately 17%.
<input type="checkbox"/>	Unicast protocol has been used.

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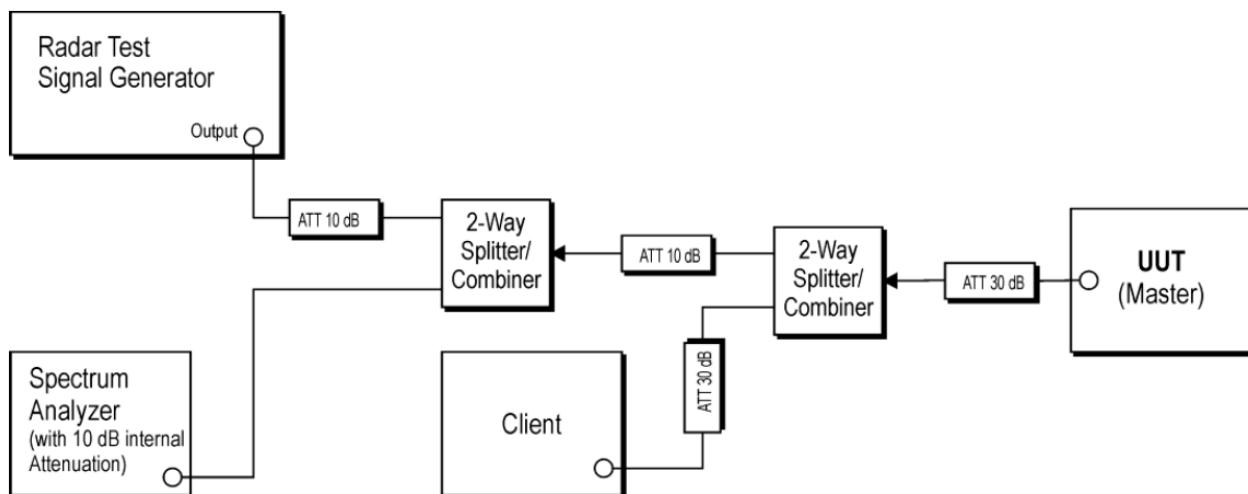
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#### 4.10.6 Conducted Setup of Calibration of DFS Detection Threshold Level



#### 4.10.7 Test Setup



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#### 4.10.8 Applicability of DFS Requirements Prior to Use of a Channel

Requirement	DFS Operational mode		
	Master	Client Without Radar Detection	Client With Radar Detection
<i>Non-Occupancy Period</i>	Yes	Not required	Yes
<i>DFS Detection Threshold</i>	Yes	Not required	Yes
<i>Channel Availability Check Time</i>	Yes	Not required	Not required
<i>U-NII Detection Bandwidth</i>	Yes	Not required	Yes

#### 4.10.9 Applicability of DFS Requirements During Normal Operation

Requirement	DFS Operational mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>DFS Detection Threshold</i>	Yes	Not required
<i>Channel Availability Check Time</i>	Yes	Yes
<i>Channel Move Time</i>	Yes	Yes
<i>U-NII Detection Bandwidth</i>	Yes	Not required

Additional requirements for devices with multiple bandwidth modes	Master Device or Client with Radar Detection	Client Without Radar Detection
<i>U-NII Detection Bandwidth and Statistical Performance Check</i>	All BW modes must be tested	Not required
<i>Channel Move Time and Channel Closing Transmission Time</i>	Test using widest BW mode available	Test using the widest BW mode available for the link
<i>All other tests</i>	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

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#### 4.10.10 DFS Detection Thresholds

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP $\geq$ 200 milliwatt	-64 dBm
EIRP $<$ 200 milliwatt and power spectral density $<$ 10 dBm/MHz	-62 dBm
EIRP $<$ 200 milliwatt that do not meet the power spectral density requirement	-64 dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.  
 Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.  
 Note 3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

#### 4.10.11 Response Requirements

Parameter	Value
<i>Non-occupancy period</i>	Minimum 30 minutes
<i>Channel Availability Check Time</i>	60 seconds
<i>Channel Move Time</i>	10 seconds See Note 1.
<i>Channel Closing Transmission Time</i>	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
<i>U-NII Detection Bandwidth</i>	Minimum 100% of the U-NII 99% transmission power bandwidth. See Note 3.

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.  
 Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.  
 Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

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## 4.10.12 Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI(μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Number of Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a	Roundup $\left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{\text{PRI}_{\mu\text{sec}}} \right) \right\}$	60%	30
		Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A			
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

For example if in Short Pulse Radar Type 1 Test B a PRI of 3066 μsec is selected, the number of pulses

would be 6 1 19 10 Roundup  $\left\{ \left( \frac{1}{360} \right) \cdot \left( \frac{19 \cdot 10^6}{3066} \right) \right\} = \text{Round up } \{17.2\} = 18.$

Table 5a - Pulse Repetition Intervals Values for Test A

Pulse Repetition Frequency Number	Pulse Repetition Frequency (Pulses Per Second)	Pulse Repetition Interval (Microseconds)
1	1930.5	518
2	1858.7	538
3	1792.1	558
4	1730.1	578
5	1672.2	598
6	1618.1	618
7	1567.4	638
8	1519.8	658
9	1474.9	678
10	1432.7	698

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11	1392.8	718
12	1355	738
13	1319.3	758
14	1285.3	778
15	1253.1	798
16	1222.5	818
17	1193.3	838
18	1165.6	858
19	1139	878
20	1113.6	898
21	1089.3	918
22	1066.1	938
23	326.2	3066

The aggregate is the average of the percentage of successful detections of Short Pulse Radar Types 1-4.

For example, the following table indicates how to compute the aggregate of percentage of successful detections.

Radar Type	Number of Trials	Number of Successful Detections	Minimum Percentage of Successful Detection
1	35	29	82.9%
2	30	18	60%
3	30	27	90%
4	50	44	88%

Aggregate  $(82.9\% + 60\% + 90\% + 88\%)/4 = 80.2\%$

#### 4.10.13 Long Pulse Radar Test Waveform

Radar Type	Pulse Width (usec)	Chirp Width (MHz)	PRI (usec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Each waveform is defined as follows:

- 1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
- 2) There are a total of 8 to 20 Bursts in the 12 second period, with the number of Bursts being randomly chosen. This number is Burst Count.
- 3) Each Burst consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each Burst within the 12 second sequence may have a different number of pulses.
- 4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a Burst will have the same pulse width. Pulses in different Bursts may have different pulse widths.
- 5) Each pulse has a linear frequency modulated chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a transmission period will have the same chirp width. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
- 6) If more than one pulse is present in a Burst, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a Burst, the random time interval between the first and second pulses is chosen independently of the random time interval between the second and third pulses.

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7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to Burst Count. Each interval is of length (12,000,000 / Burst Count) microseconds. Each interval contains one Burst. The start time for the Burst, relative to the beginning of the interval, is between 1 and [(12,000,000 / Burst Count) – (Total Burst Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each Burst is chosen randomly.

#### 4.10.14 Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (usec)	Chirp Width (MHz)	PRI (usec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Number of Trials
6	1	333	9	0.333	300	70%	30

For the Frequency Hopping Radar Type, the same Burst parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm: If a segment does not contain at least 1 frequency within the U-NII Detection Bandwidth of the UUT, then that segment is not used.

The detailed test data see: **Appendix**

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## 5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.54dB
2	RF power density, conducted	±1.03dB
3	Spurious emissions, conducted	±0.54dB
4	Radio Frequency	±1.0 %
5	Duty Cycle	±0.37%
6	Occupied Bandwidth	±1.0 %
7	Conduction Emission	± 2.90dB (150kHz to 30MHz)
8	Radiated Emission	± 3.13dB (9k -30MHz)
		± 4.80dB (30M -1GHz)
		± 4.80dB (1GHz to 18GHz)
		± 4.80dB (Above 18GHz)

Remark:

The  $U_{lab}$  (lab Uncertainty) is less than  $U_{cispri/ETSI}$  (CISPR/ETSI Uncertainty), so the test results  
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;  
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

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## 6 Equipment List

RF Test Equipment					
Equipment	Manufacturer	Model No.	Inventory No.	Cal Date	Cal Due Date
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2022/02/16	2023/02/15
Signal Analyzer	ROHDE&SCHWARZ	FSV3030	SUWI-01-02-02	2022/05/17	2023/05/16
Measurement Software	Tonscend	JS1120-3 Test System V3.1.55	SUWI-02-09-09	NCR	NCR
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2022/02/15	2023/02/14
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2021/12/04	2022/12/03
Pulse power sensor	Anritsu	MA2411b	SUWI-01-32-01	2021/12/04	2022/12/03
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2022/02/15	2023/02/14

CE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Shielding Room	Brilliant-emc	N/A	SUWI-04-03-01	2021/05/08	2024/05/07
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19	2023/02/18
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2022/02/16	2023/02/15
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-01	2022/02/19	2023/02/18
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-02	2022/02/19	2023/02/18
Measurement Software	Tonscend	JS32-CE 4.0.0.2	SUWI-02-09-05	NCR	NCR
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2022/2/15	2023/2/14

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RSE Test System					
Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2022/02/16	2023/02/15
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19	2023/02/18
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9163	SUWI-01-11-01	2021/05/16	2023/05/15
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2021/05/16	2023/05/15
Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2022/02/14	2023/02/13
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2022/02/14	2023/02/13
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2022/02/19	2023/02/18
Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/06/10	2023/06/09
Measurement Software	Tonscend	JS32-RSE 4.0.0.1	SUWI-02-09-06	NCR	NCR

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## 7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.



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# Appendix



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## Emission Bandwidth

### Test Result

TestMode	Antenna	Frequency[MHz]	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11a-SISO	Wifi0	5180	19.60	5170.08	5189.68	---	---
	Wifi1	5180	19.68	5170.08	5189.76	---	---
	Wifi0	5220	19.52	5210.04	5229.56	---	---
	Wifi1	5220	19.44	5210.24	5229.68	---	---
	Wifi0	5240	19.48	5230.04	5249.52	---	---
	Wifi1	5240	19.36	5230.24	5249.60	---	---
	Wifi0	5260	19.56	5249.96	5269.52	---	---
	Wifi1	5260	19.40	5250.20	5269.60	---	---
	Wifi0	5300	19.44	5290.08	5309.52	---	---
	Wifi1	5300	19.40	5290.28	5309.68	---	---
	Wifi0	5320	19.52	5310.00	5329.52	---	---
	Wifi1	5320	19.52	5310.20	5329.72	---	---
	Wifi0	5500	19.68	5489.96	5509.64	---	---
	Wifi1	5500	19.44	5490.20	5509.64	---	---
	Wifi0	5580	19.60	5570.00	5589.60	---	---
	Wifi1	5580	19.36	5570.32	5589.68	---	---
	Wifi0	5700	19.68	5689.96	5709.64	---	---
	Wifi1	5700	19.28	5690.36	5709.64	---	---
11n20MIMO	Wifi0	5180	20.52	5169.68	5190.20	---	---
	Wifi1	5180	20.48	5169.72	5190.20	---	---
	Wifi0	5220	20.76	5209.52	5230.28	---	---
	Wifi1	5220	20.56	5209.64	5230.20	---	---
	Wifi0	5240	20.80	5229.56	5250.36	---	---
	Wifi1	5240	20.40	5229.72	5250.12	---	---
	Wifi0	5260	20.80	5249.52	5270.32	---	---
	Wifi1	5260	20.60	5249.56	5270.16	---	---
	Wifi0	5300	20.72	5289.52	5310.24	---	---
	Wifi1	5300	20.36	5289.80	5310.16	---	---
	Wifi0	5320	20.72	5309.52	5330.24	---	---
	Wifi1	5320	20.44	5309.72	5330.16	---	---
	Wifi0	5500	20.68	5489.60	5510.28	---	---
	Wifi1	5500	20.56	5489.64	5510.20	---	---
	Wifi0	5580	20.72	5569.52	5590.24	---	---
	Wifi1	5580	20.40	5569.76	5590.16	---	---
	Wifi0	5700	20.52	5689.64	5710.16	---	---
	Wifi1	5700	20.44	5689.72	5710.16	---	---
11n40MIMO	Wifi0	5190	39.92	5170.08	5210.00	---	---
	Wifi1	5190	40.24	5169.84	5210.08	---	---
	Wifi0	5230	40.00	5210.00	5250.00	---	---
	Wifi1	5230	39.92	5210.08	5250.00	---	---
	Wifi0	5270	40.00	5249.92	5289.92	---	---
	Wifi1	5270	40.00	5250.08	5290.08	---	---
	Wifi0	5310	40.08	5290.00	5330.08	---	---
	Wifi1	5310	39.92	5289.92	5329.84	---	---
	Wifi0	5510	40.32	5490.00	5530.32	---	---
	Wifi1	5510	39.76	5490.16	5529.92	---	---
	Wifi0	5550	40.08	5529.76	5569.84	---	---
	Wifi1	5550	40.16	5529.84	5570.00	---	---
	Wifi0	5670	40.16	5649.84	5690.00	---	---
	Wifi1	5670	40.08	5650.00	5690.08	---	---
11ac20MIMO	Wifi0	5180	20.40	5169.76	5190.16	---	---
	Wifi1	5180	20.76	5169.56	5190.32	---	---

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	Wifi0	5220	20.76	5209.52	5230.28	---	---
	Wifi1	5220	20.60	5209.64	5230.24	---	---
	Wifi0	5240	20.80	5229.52	5250.32	---	---
	Wifi1	5240	20.52	5229.68	5250.20	---	---
	Wifi0	5260	20.68	5249.52	5270.20	---	---
	Wifi1	5260	20.56	5249.64	5270.20	---	---
	Wifi0	5300	20.80	5289.48	5310.28	---	---
	Wifi1	5300	20.40	5289.76	5310.16	---	---
	Wifi0	5320	20.92	5309.56	5330.48	---	---
	Wifi1	5320	20.52	5309.60	5330.12	---	---
	Wifi0	5500	20.84	5489.48	5510.32	---	---
	Wifi1	5500	20.52	5489.64	5510.16	---	---
	Wifi0	5580	21.08	5569.48	5590.56	---	---
	Wifi1	5580	20.56	5569.68	5590.24	---	---
	Wifi0	5700	20.88	5689.60	5710.48	---	---
	Wifi1	5700	20.52	5689.68	5710.20	---	---
11ac40MIMO	Wifi0	5190	39.84	5170.16	5210.00	---	---
	Wifi1	5190	40.24	5169.92	5210.16	---	---
	Wifi0	5230	39.92	5210.08	5250.00	---	---
	Wifi1	5230	40.56	5209.92	5250.48	---	---
	Wifi0	5270	40.16	5249.92	5290.08	---	---
	Wifi1	5270	39.92	5250.24	5290.16	---	---
	Wifi0	5310	39.92	5290.08	5330.00	---	---
	Wifi1	5310	40.16	5290.08	5330.24	---	---
	Wifi0	5510	40.00	5490.08	5530.08	---	---
	Wifi1	5510	40.16	5489.92	5530.08	---	---
	Wifi0	5550	39.60	5530.32	5569.92	---	---
	Wifi1	5550	40.00	5530.00	5570.00	---	---
	Wifi0	5670	40.16	5650.08	5690.24	---	---
	Wifi1	5670	39.68	5650.16	5689.84	---	---
11ac80MIMO	Wifi0	5210	82.56	5168.56	5251.12	---	---
	Wifi1	5210	81.76	5169.04	5250.80	---	---
	Wifi0	5290	81.60	5249.20	5330.80	---	---
	Wifi1	5290	82.24	5248.72	5330.96	---	---
	Wifi0	5530	82.88	5488.40	5571.28	---	---
	Wifi1	5530	81.92	5489.04	5570.96	---	---
11ac160MIMO	Wifi0	5250	166.72	5166.48	5333.20	---	---
	Wifi1	5250	165.12	5167.76	5332.88	---	---
11ax20MIMO	Wifi0	5180	21.24	5169.44	5190.68	---	---
	Wifi1	5180	21.00	5169.48	5190.48	---	---
	Wifi0	5220	21.28	5209.40	5230.68	---	---
	Wifi1	5220	21.12	5209.48	5230.60	---	---
	Wifi0	5240	21.08	5229.44	5250.52	---	---
	Wifi1	5240	21.00	5229.48	5250.48	---	---
	Wifi0	5260	21.12	5249.36	5270.48	---	---
	Wifi1	5260	20.96	5249.52	5270.48	---	---
	Wifi0	5300	21.28	5289.32	5310.60	---	---
	Wifi1	5300	21.04	5289.52	5310.56	---	---
	Wifi0	5320	21.12	5309.44	5330.56	---	---
	Wifi1	5320	21.12	5309.36	5330.48	---	---
	Wifi0	5500	21.32	5489.24	5510.56	---	---
	Wifi1	5500	21.12	5489.48	5510.60	---	---
	Wifi0	5580	21.12	5569.44	5590.56	---	---
	Wifi1	5580	21.00	5569.52	5590.52	---	---
	Wifi0	5700	21.28	5689.32	5710.60	---	---
	Wifi1	5700	21.24	5689.32	5710.56	---	---
11ax40MIMO	Wifi0	5190	40.80	5169.68	5210.48	---	---

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	Wifi1	5190	40.56	5169.52	5210.08	---	---
	Wifi0	5230	40.48	5209.60	5250.08	---	---
	Wifi1	5230	40.80	5209.52	5250.32	---	---
	Wifi0	5270	40.48	5249.60	5290.08	---	---
	Wifi1	5270	40.88	5249.52	5290.40	---	---
	Wifi0	5310	40.72	5289.60	5330.32	---	---
	Wifi1	5310	40.80	5289.60	5330.40	---	---
	Wifi0	5510	40.80	5489.52	5530.32	---	---
	Wifi1	5510	40.80	5489.60	5530.40	---	---
	Wifi0	5550	40.64	5529.52	5570.16	---	---
	Wifi1	5550	40.64	5529.68	5570.32	---	---
	Wifi0	5670	40.72	5649.60	5690.32	---	---
	Wifi1	5670	40.80	5649.68	5690.48	---	---
11ax80MIMO	Wifi0	5210	82.72	5168.72	5251.44	---	---
	Wifi1	5210	82.88	5168.40	5251.28	---	---
	Wifi0	5290	82.72	5248.56	5331.28	---	---
	Wifi1	5290	83.20	5248.24	5331.44	---	---
	Wifi0	5530	82.40	5488.72	5571.12	---	---
	Wifi1	5530	82.72	5488.72	5571.44	---	---
11ax160MIMO	Wifi0	5250	165.76	5167.44	5333.20	---	---
	Wifi1	5250	166.08	5167.12	5333.20	---	---

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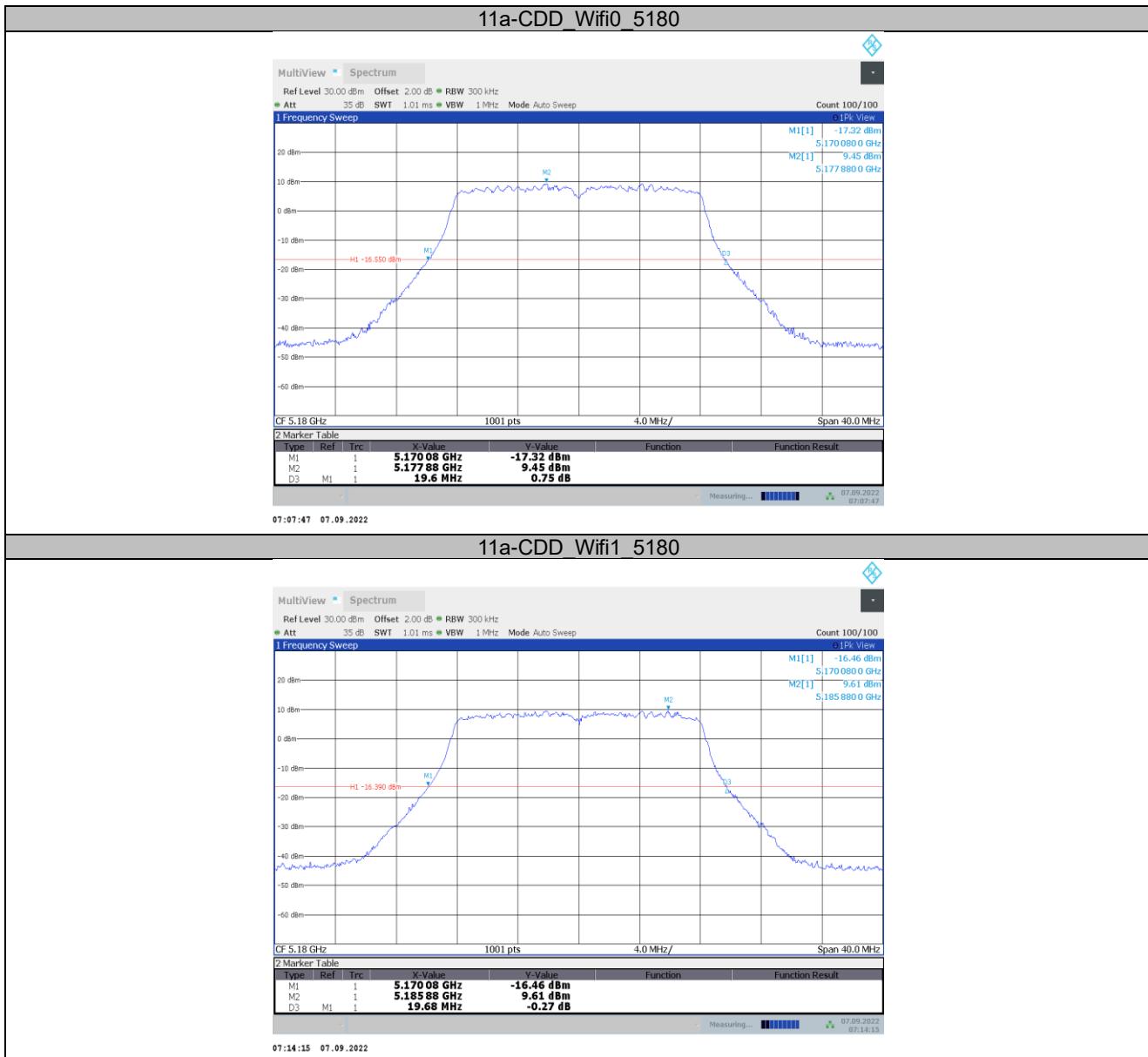
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## Test Graphs



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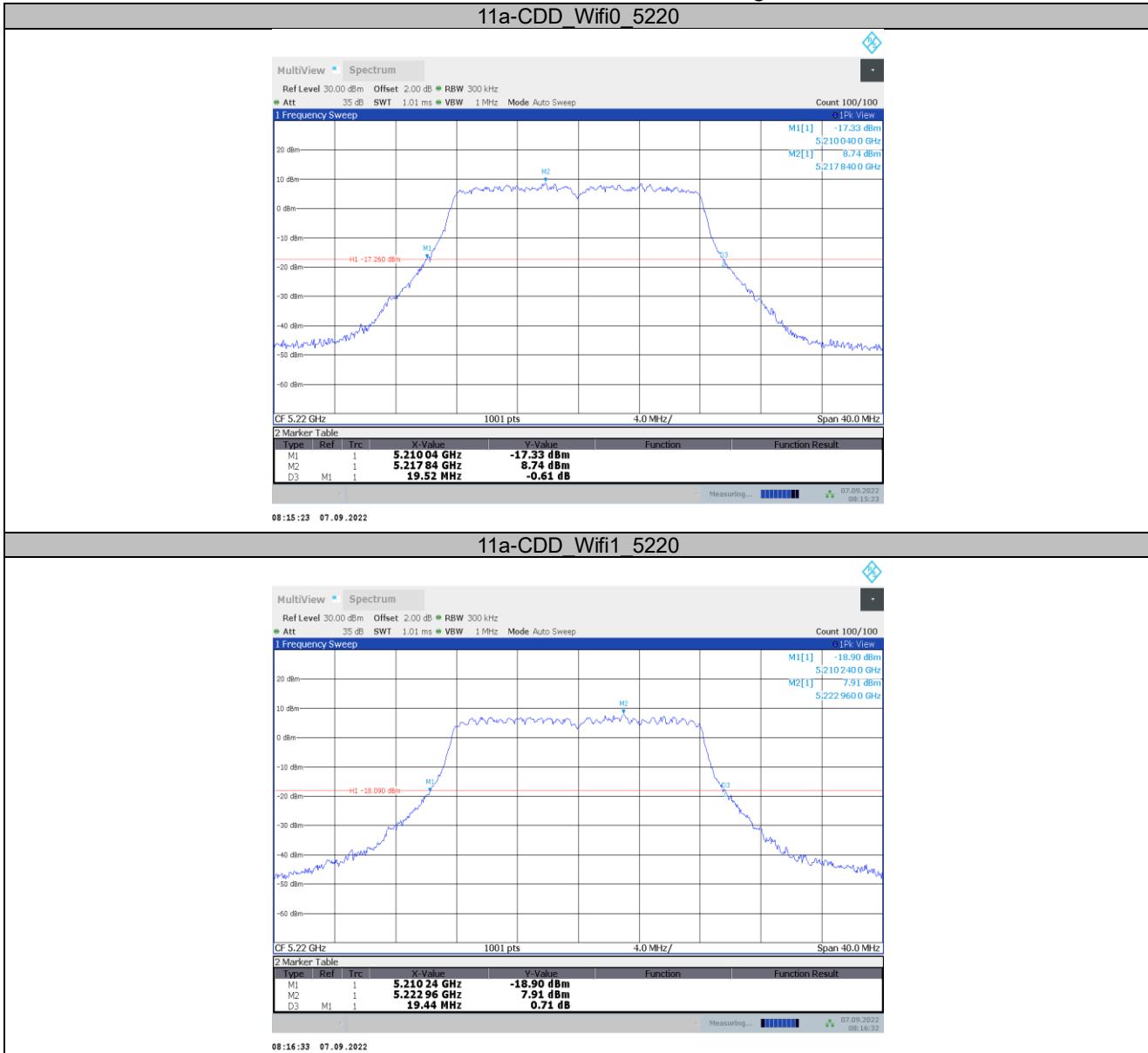
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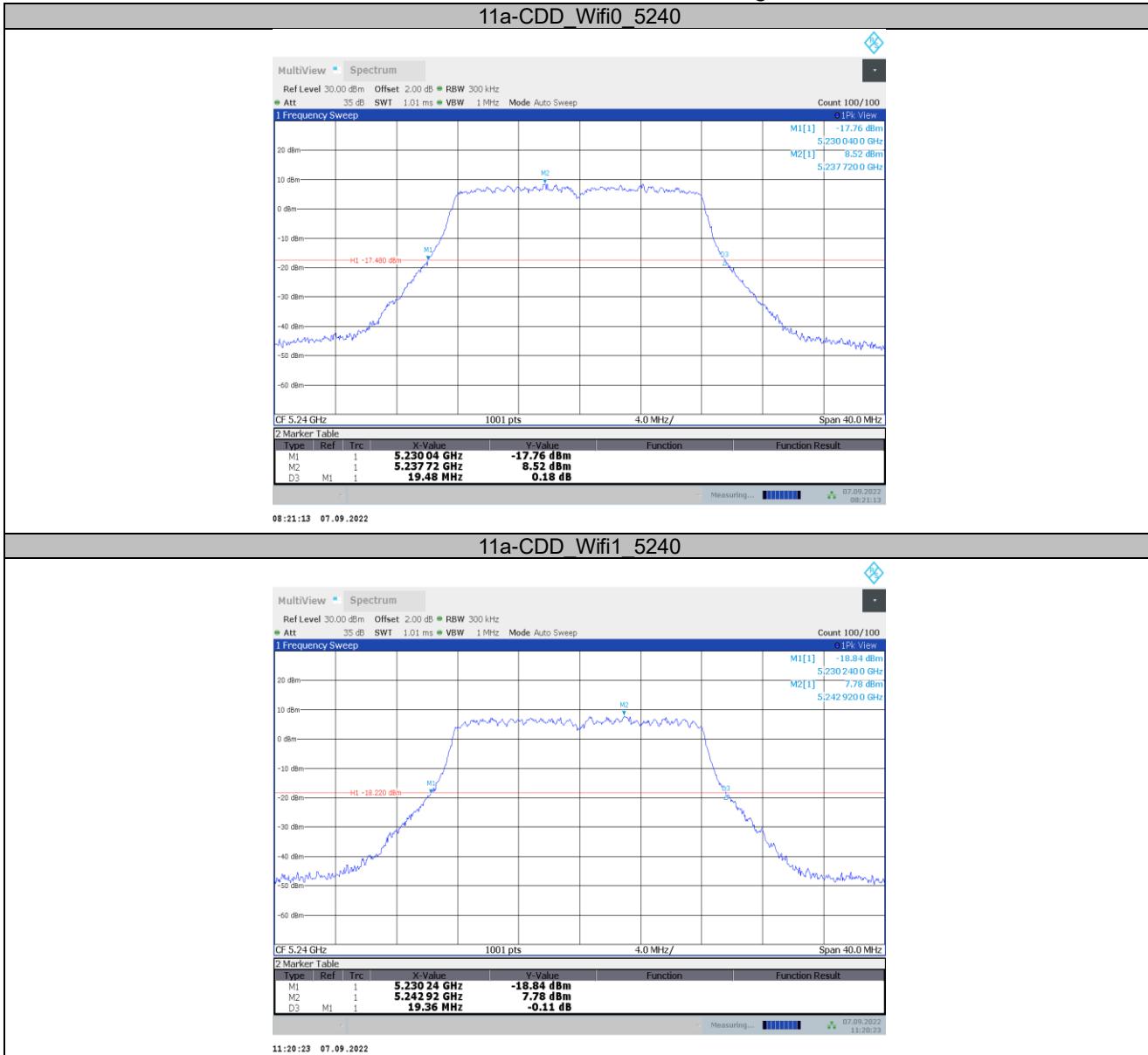
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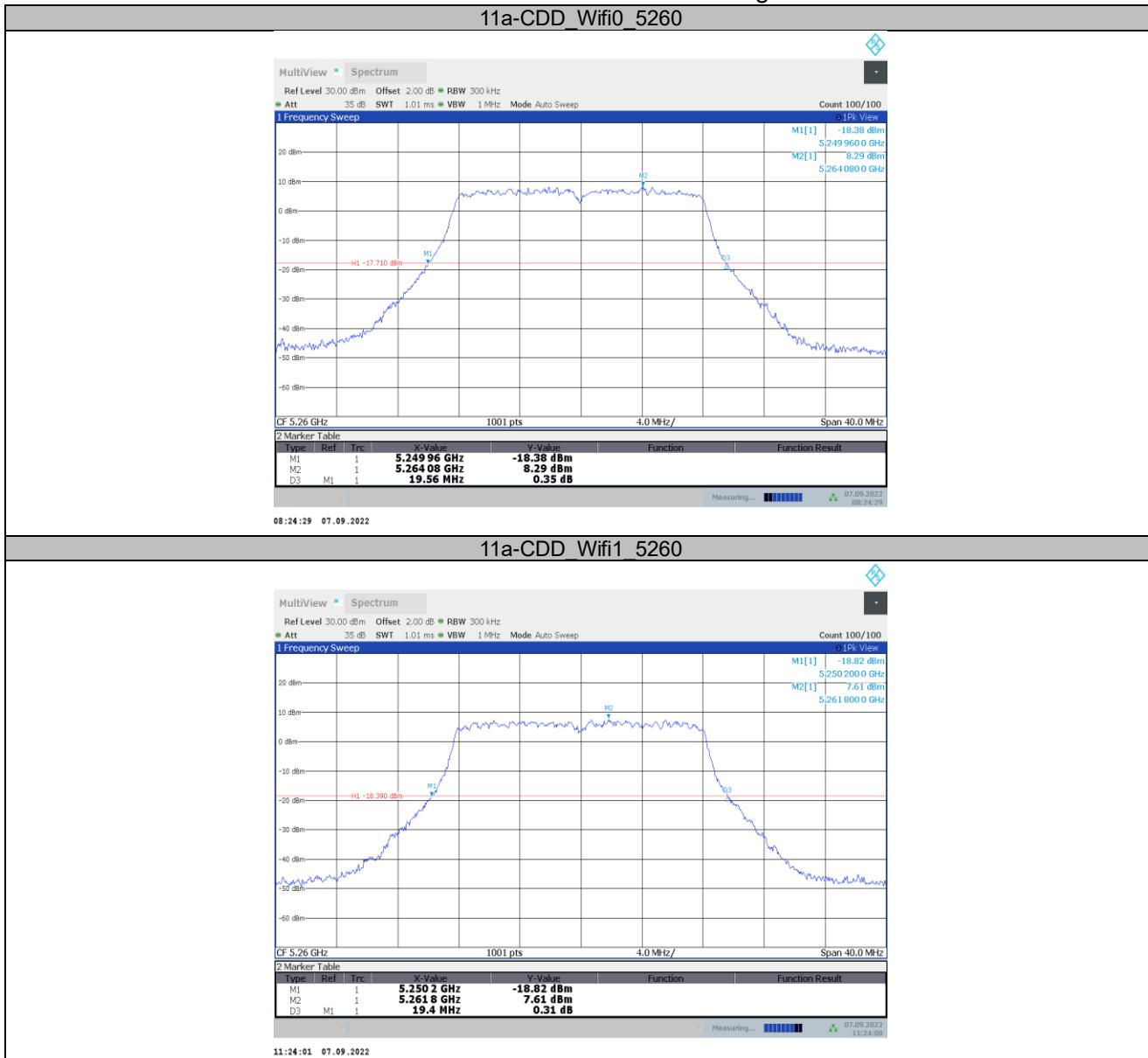
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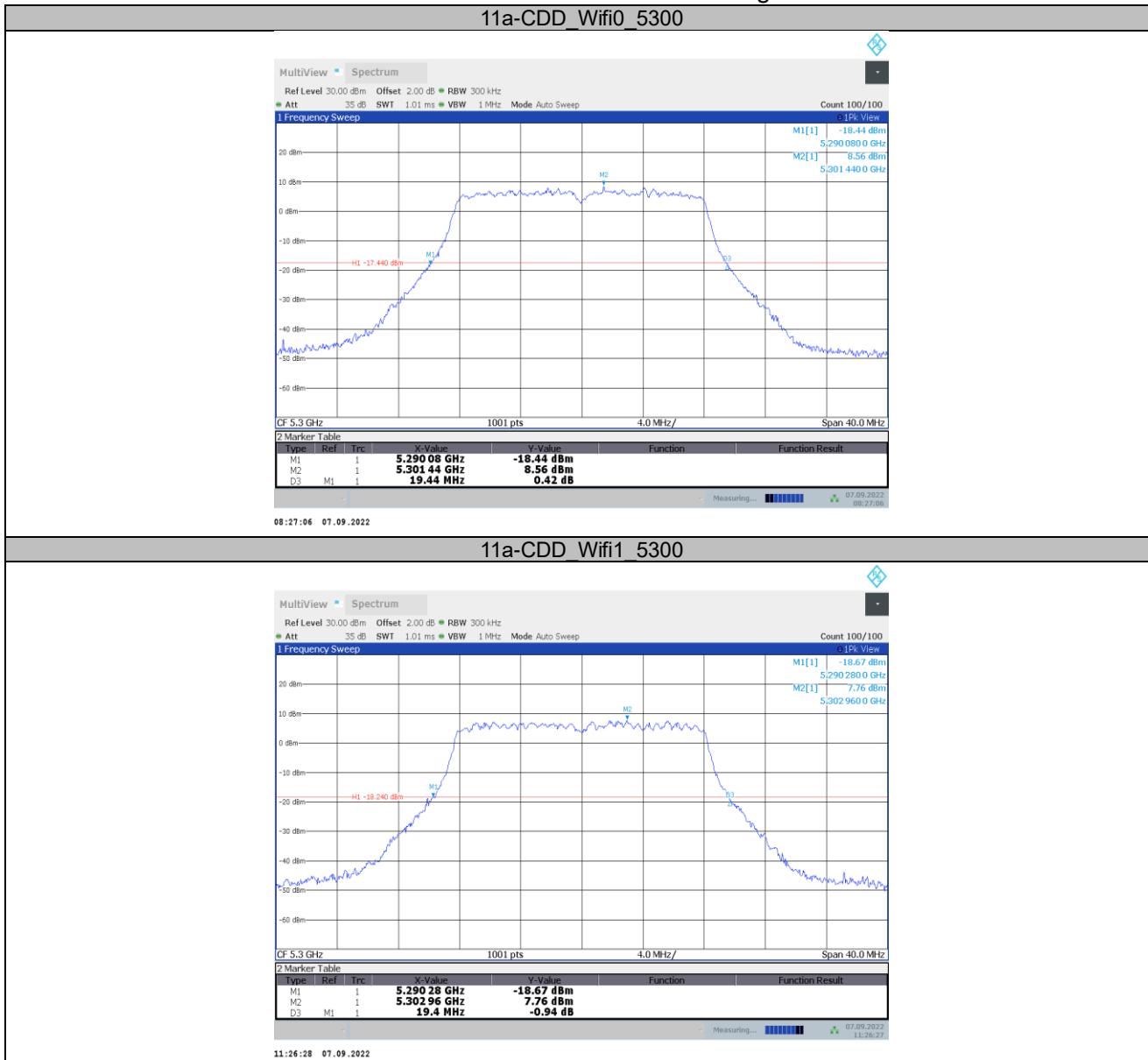
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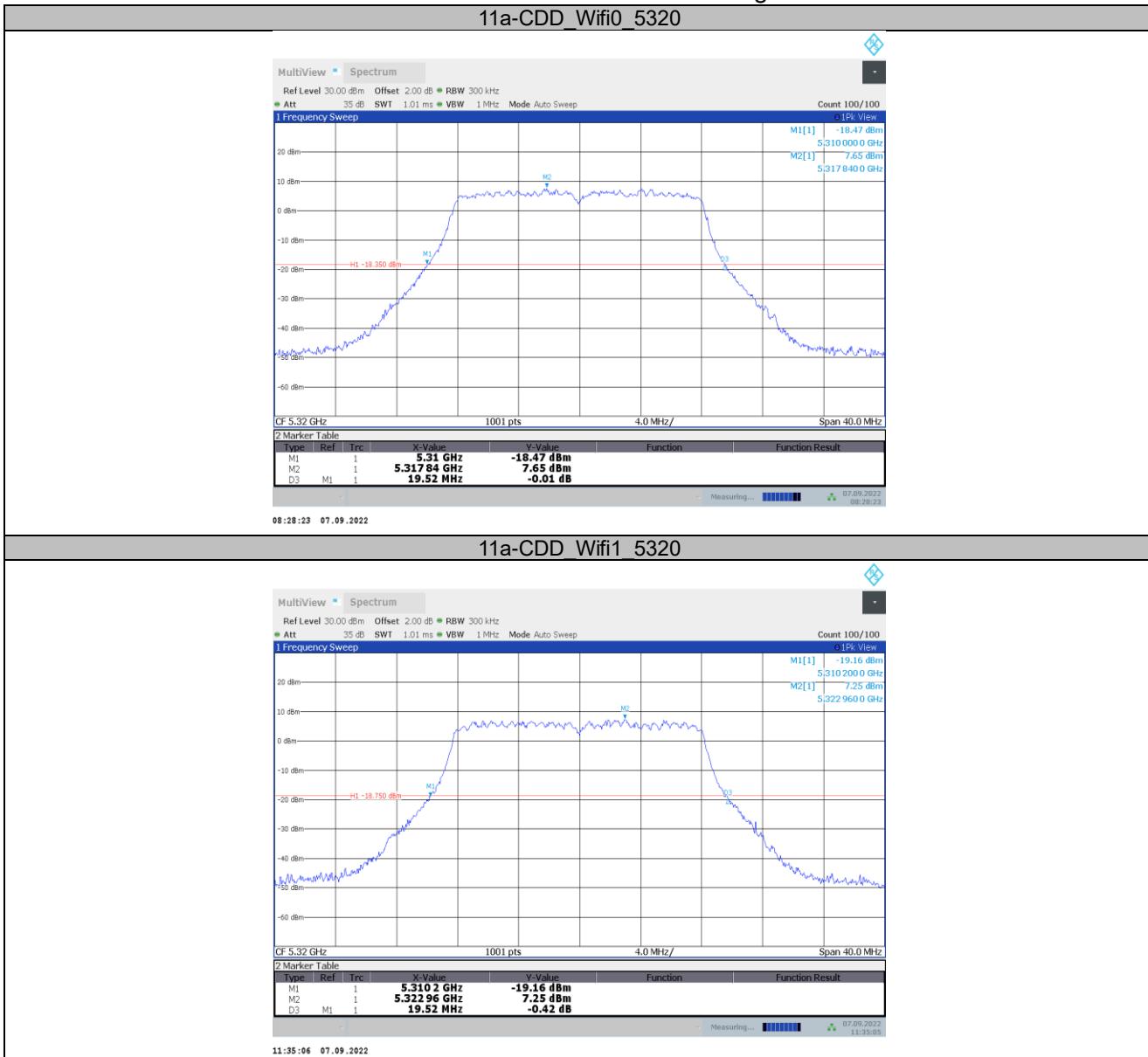
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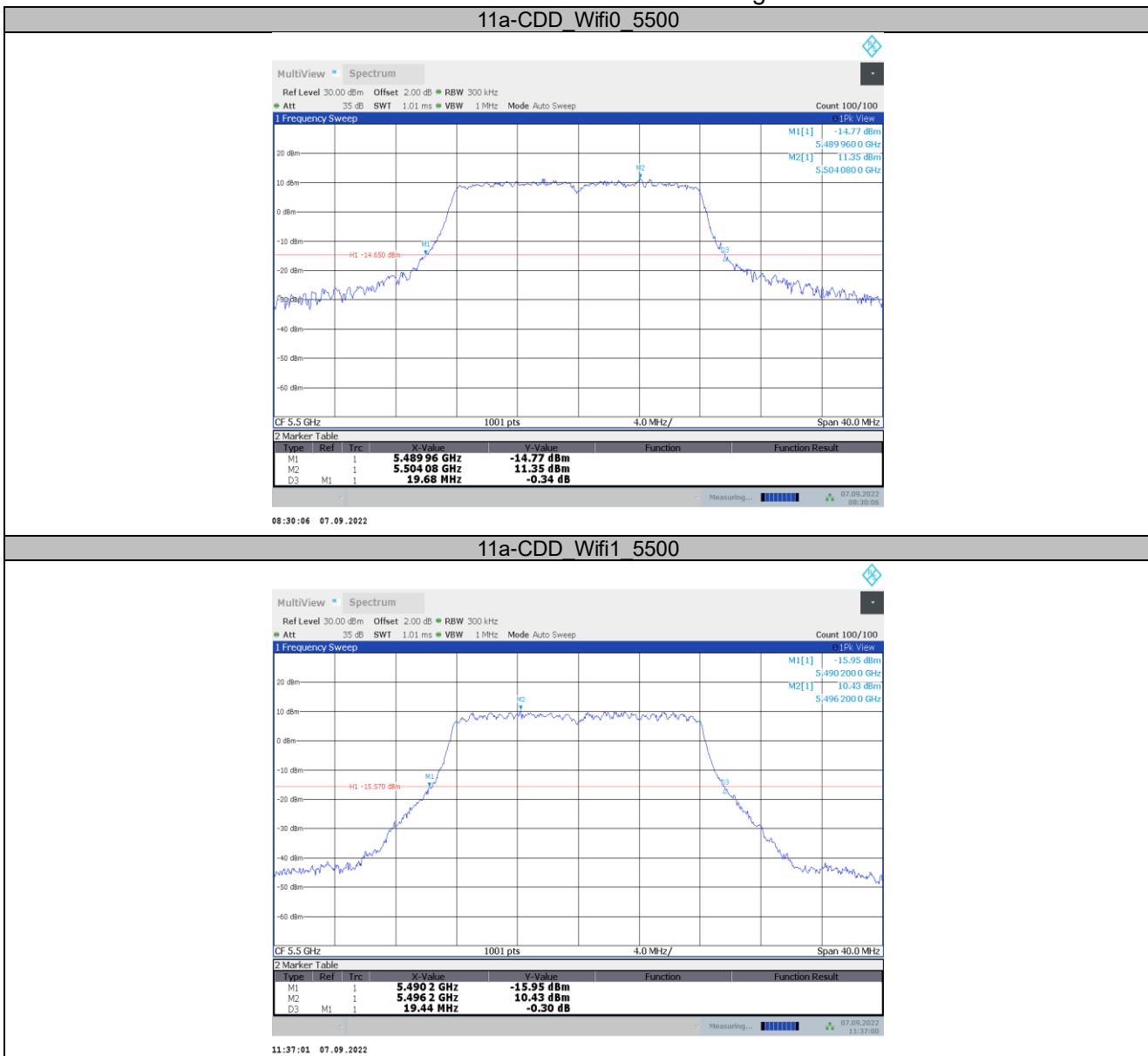
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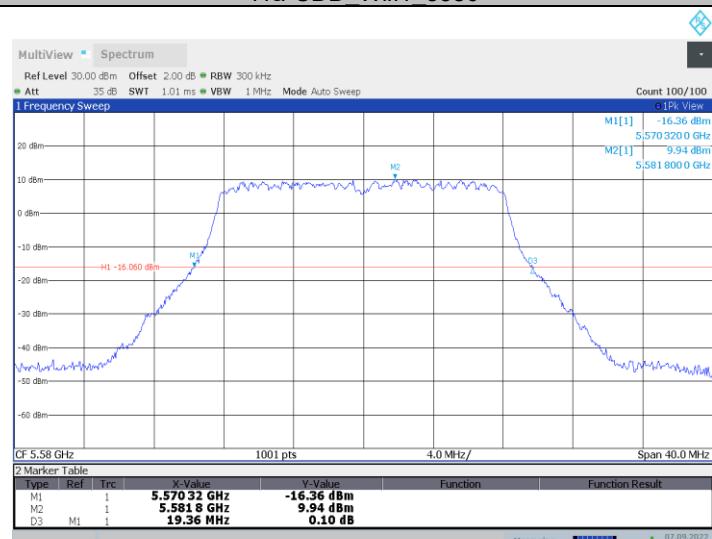
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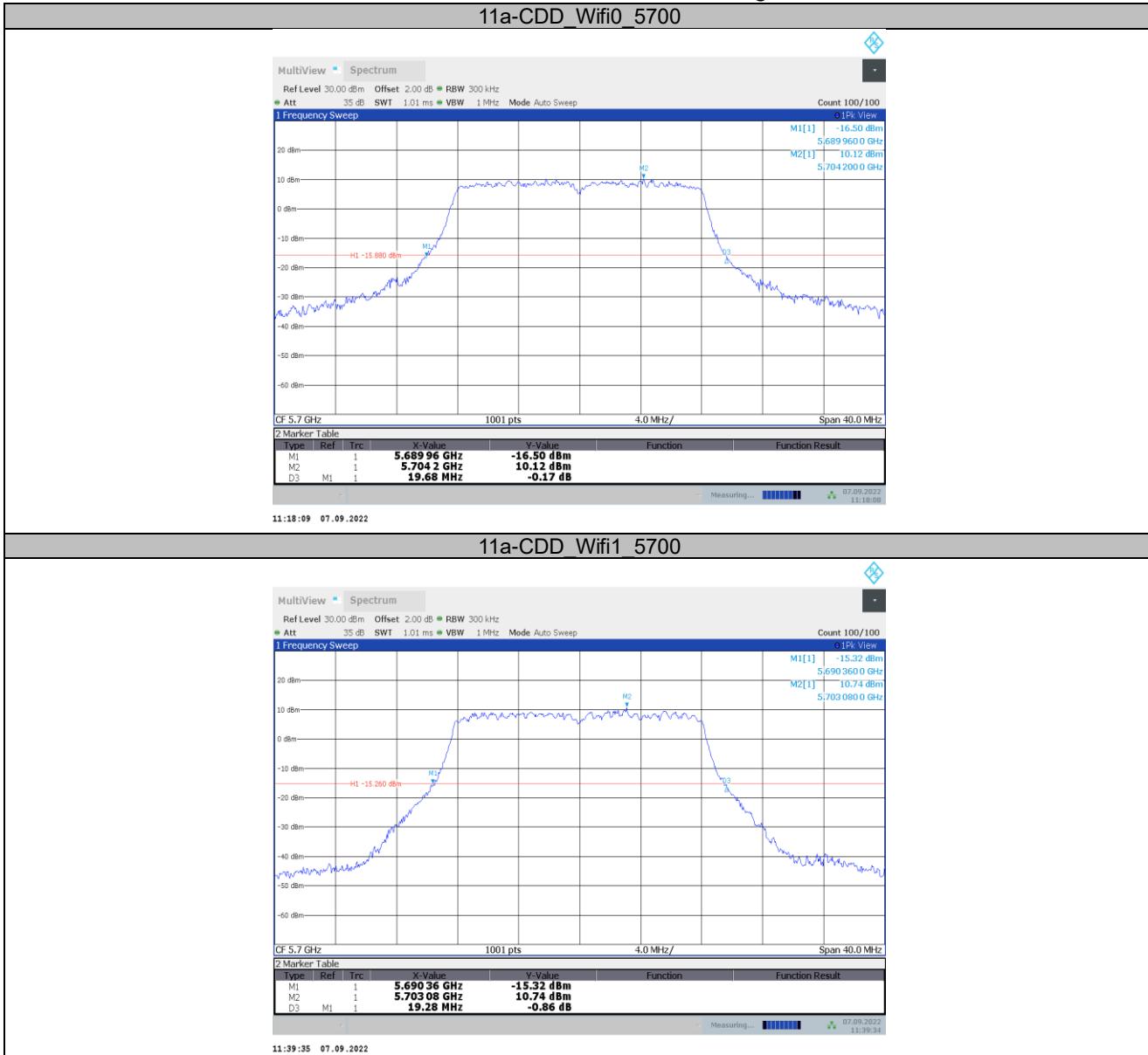
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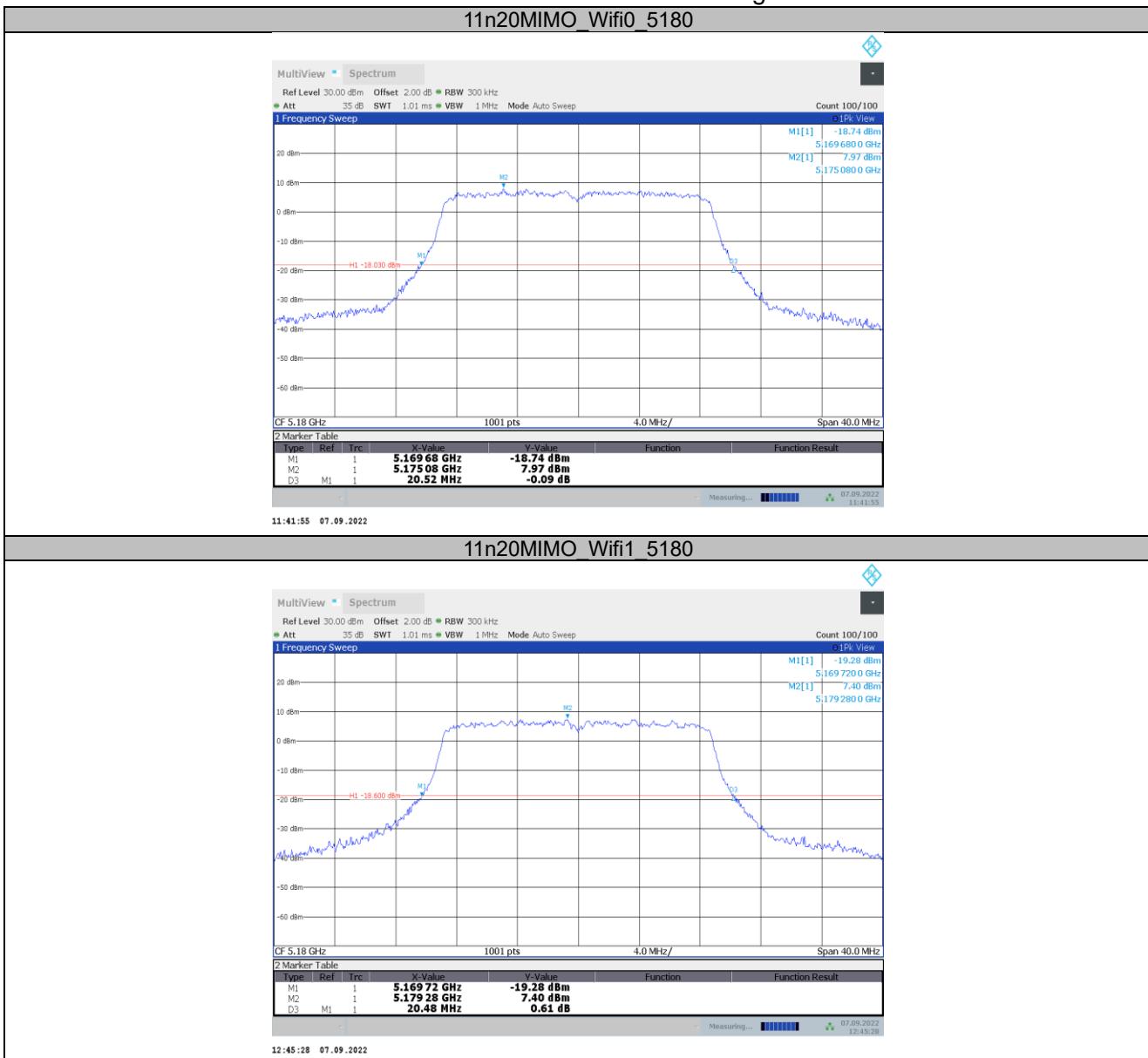
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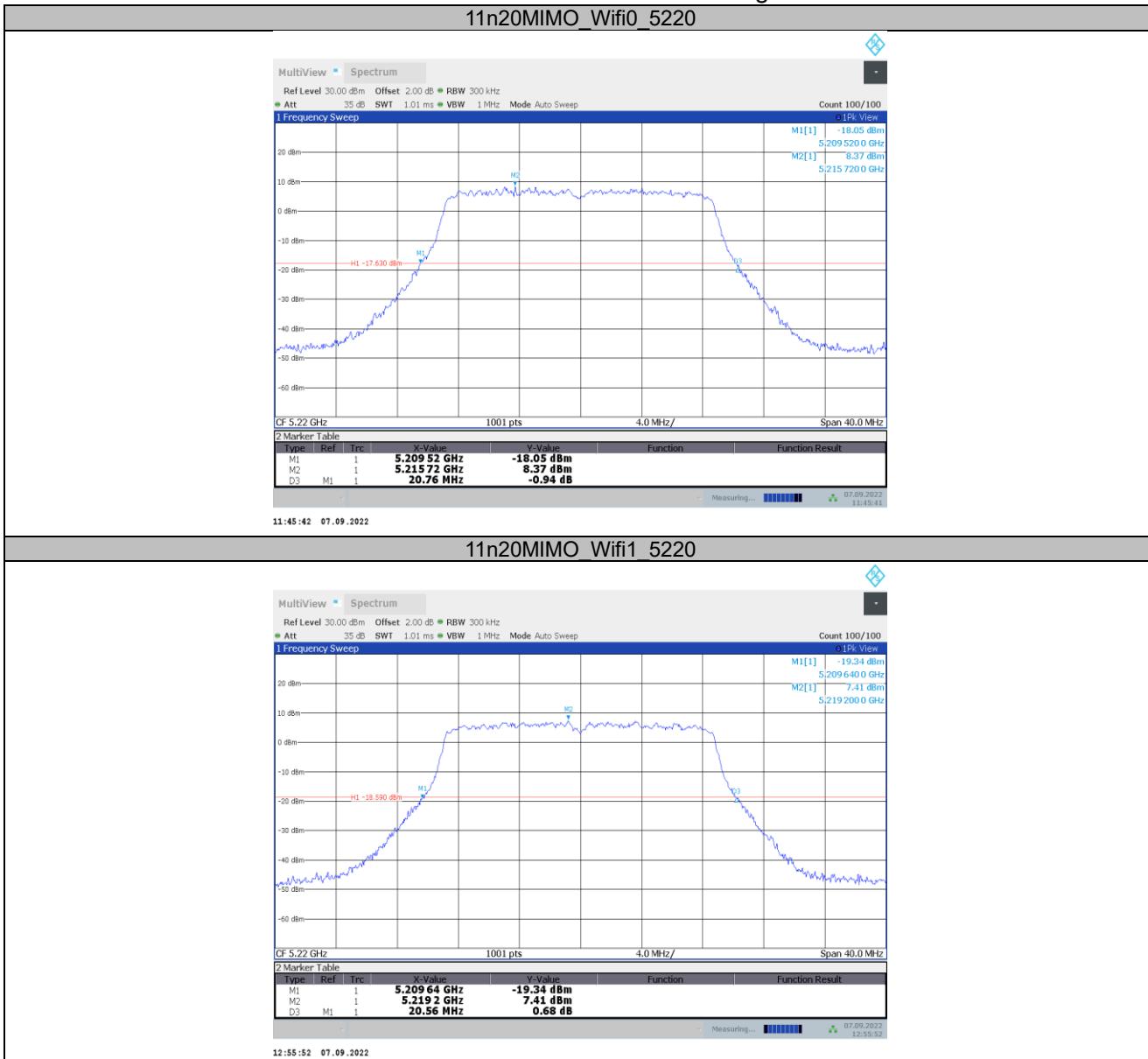
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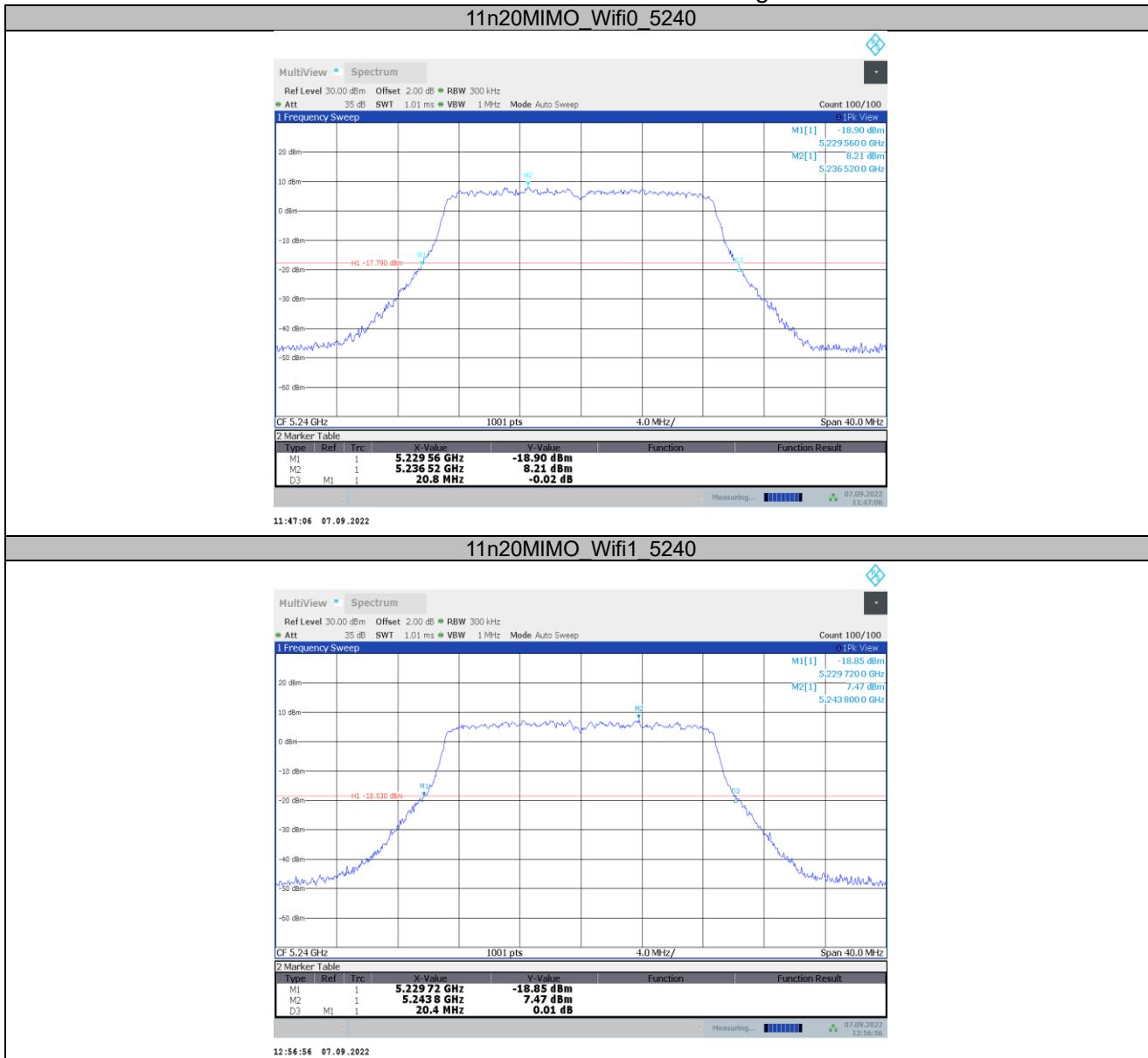
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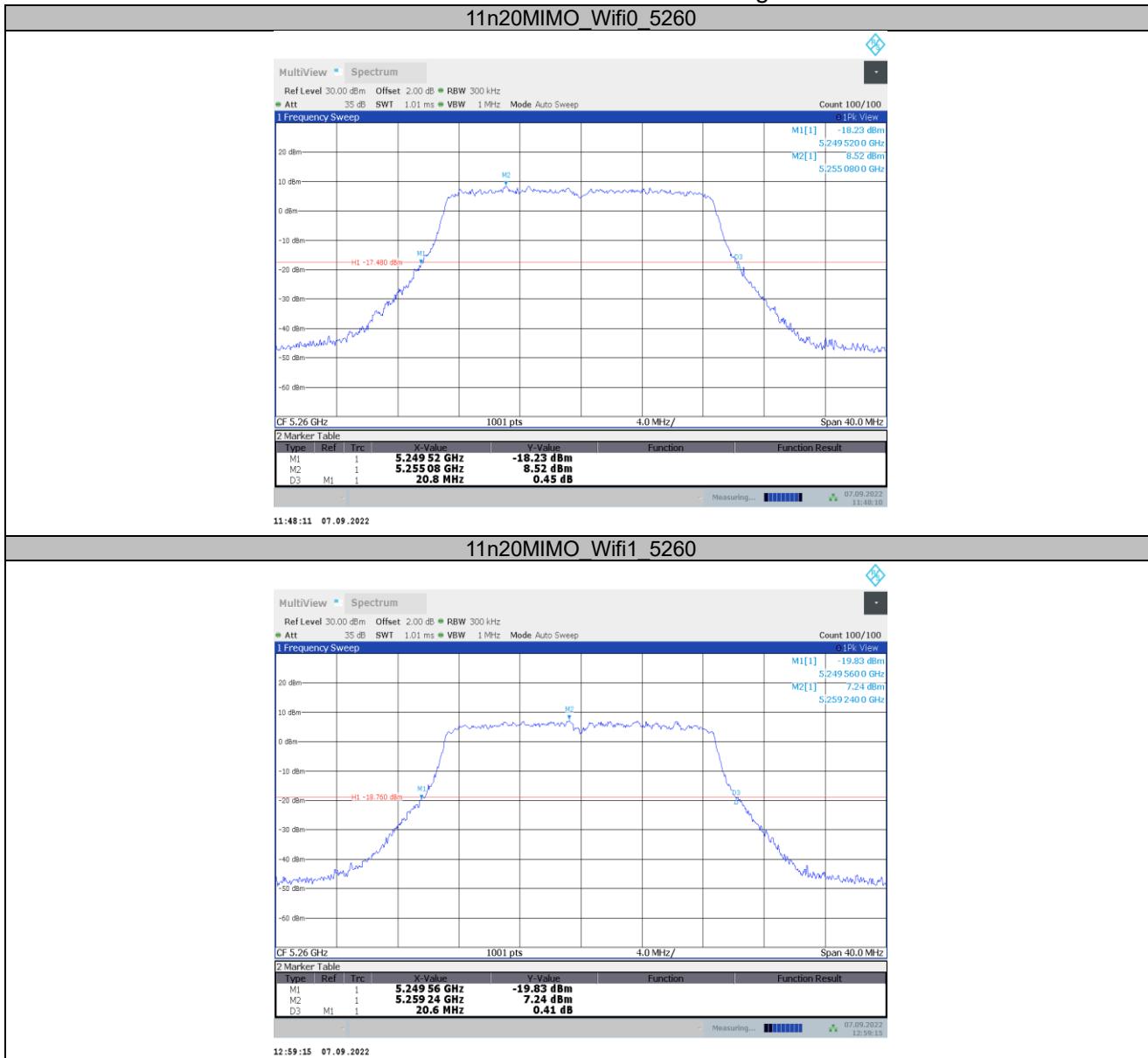
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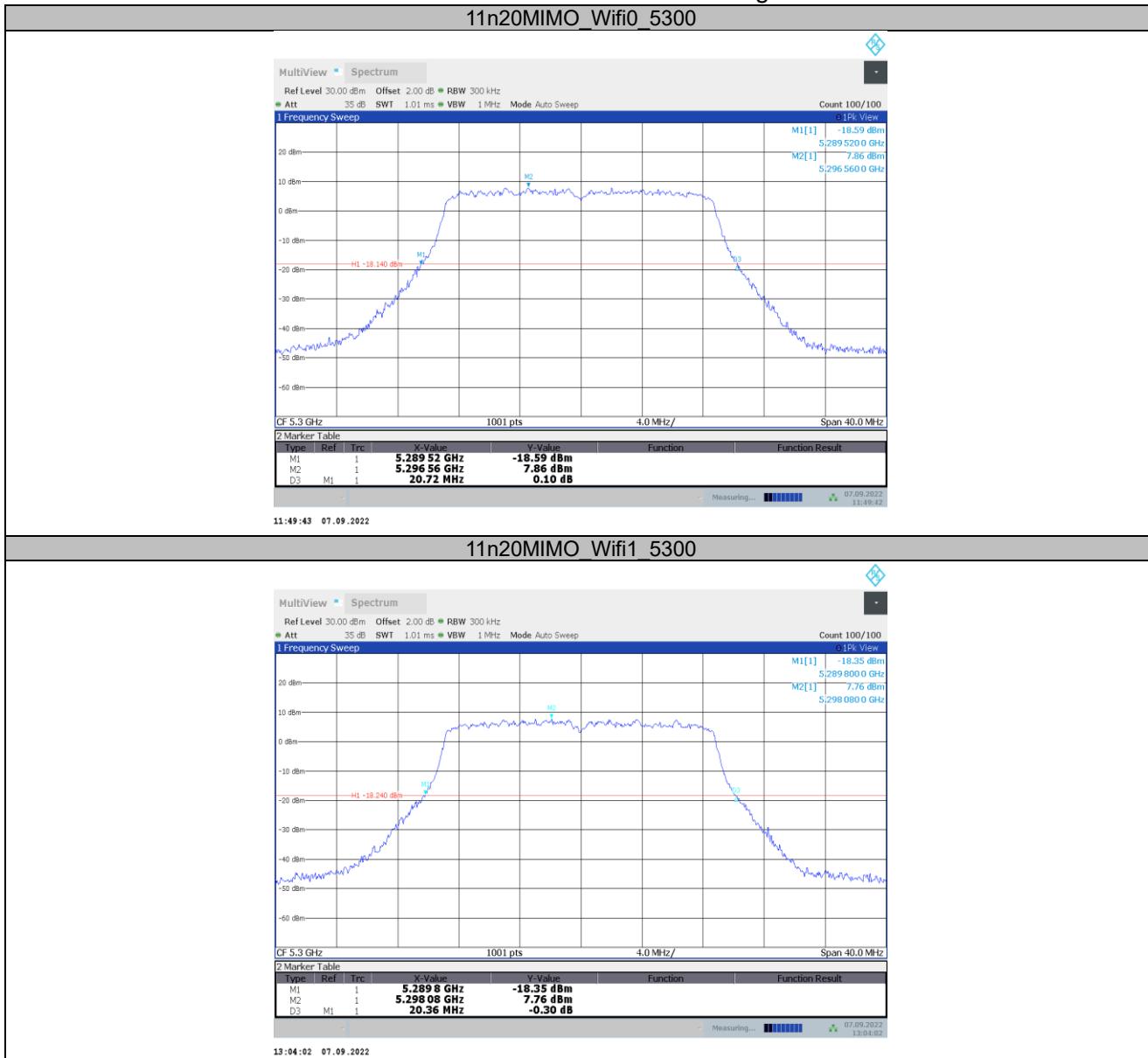
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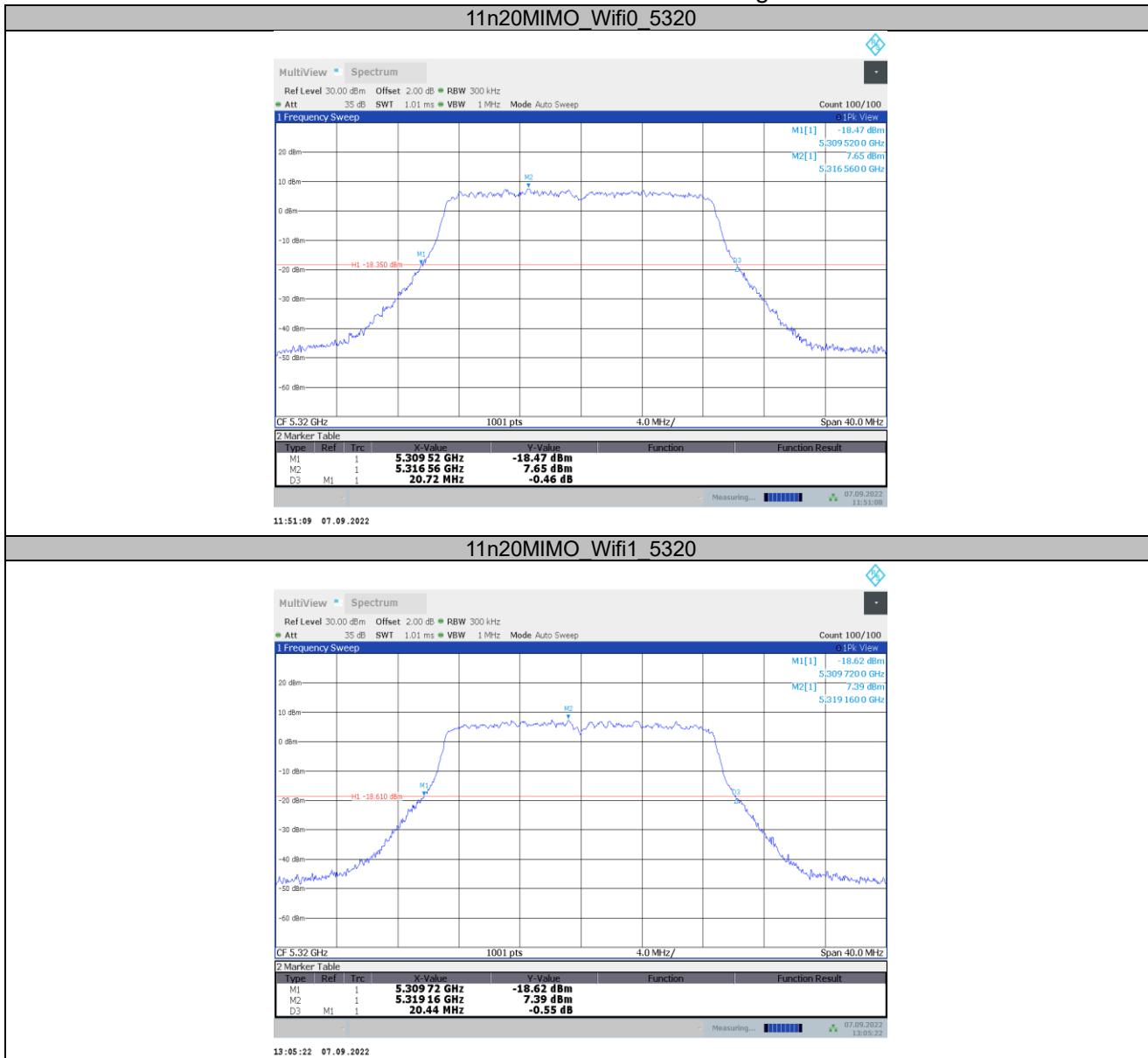
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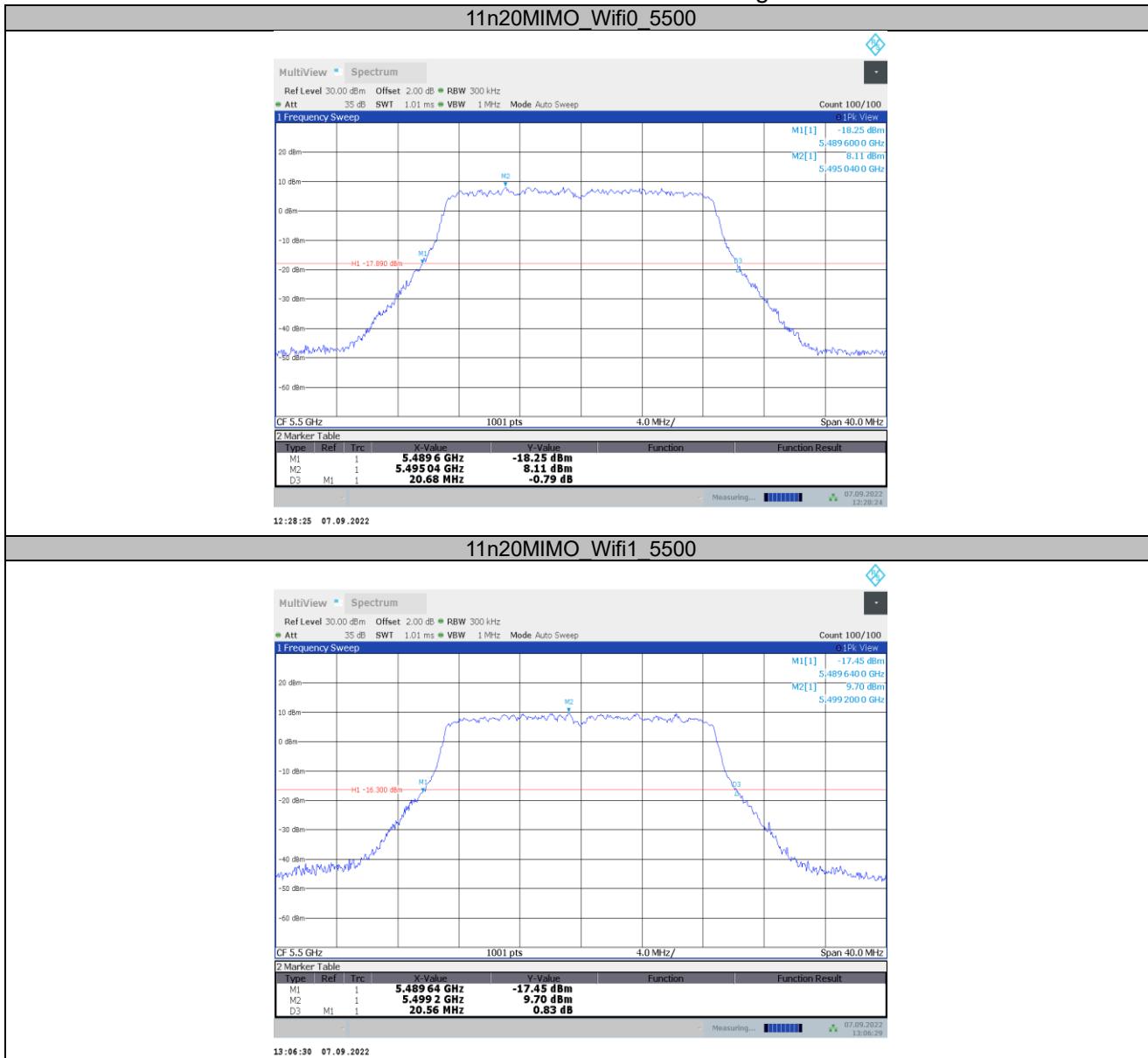
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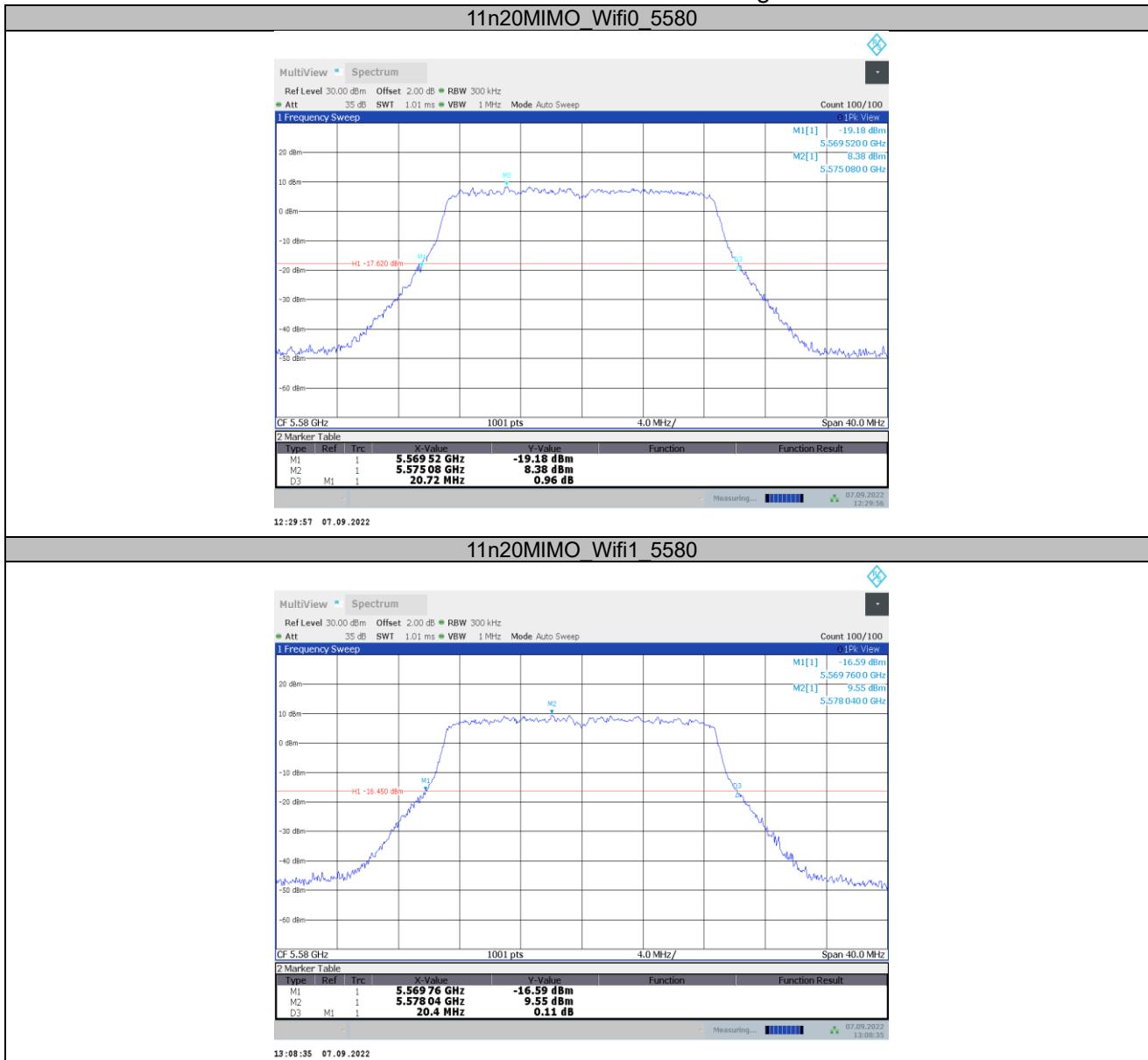
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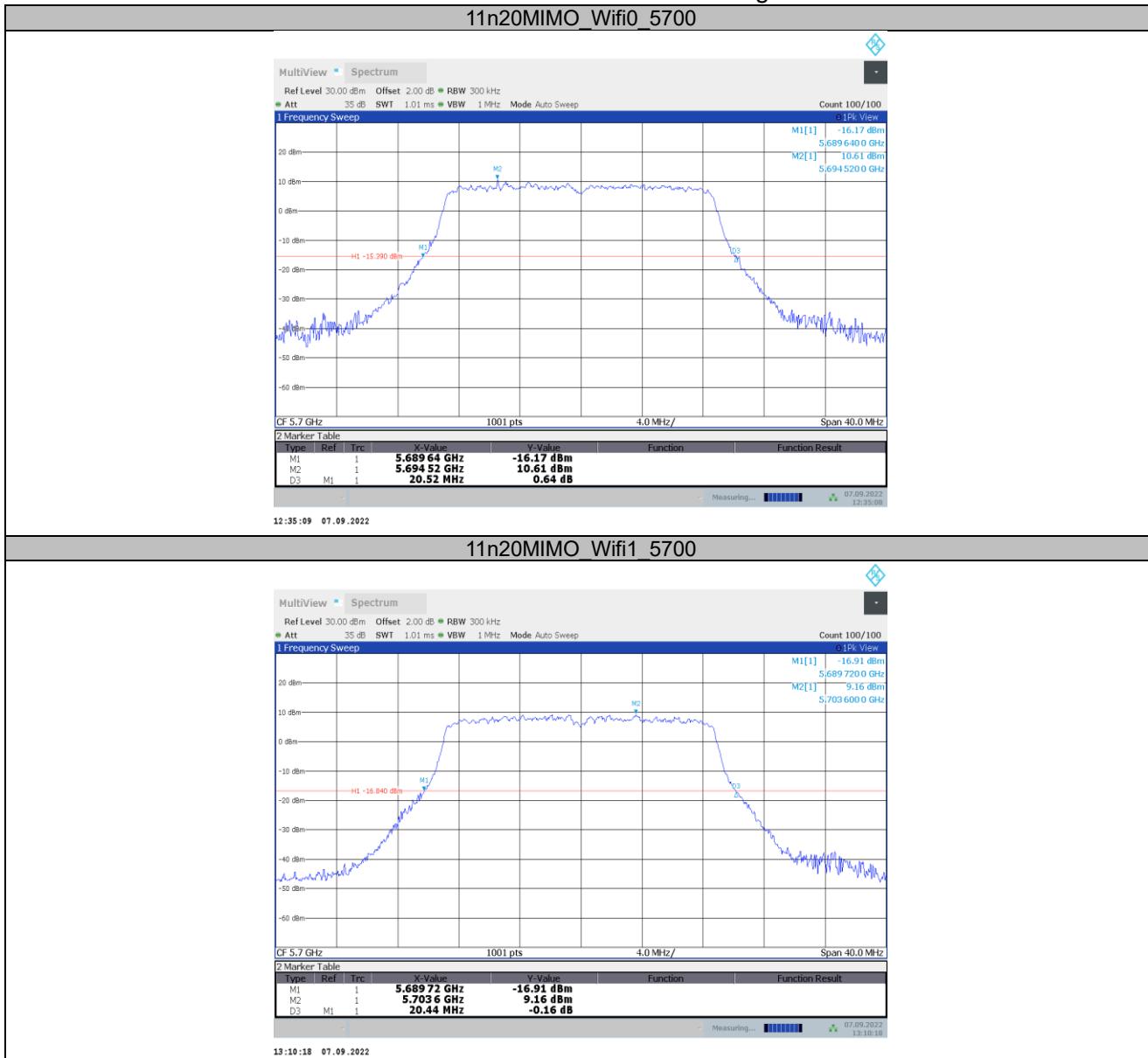
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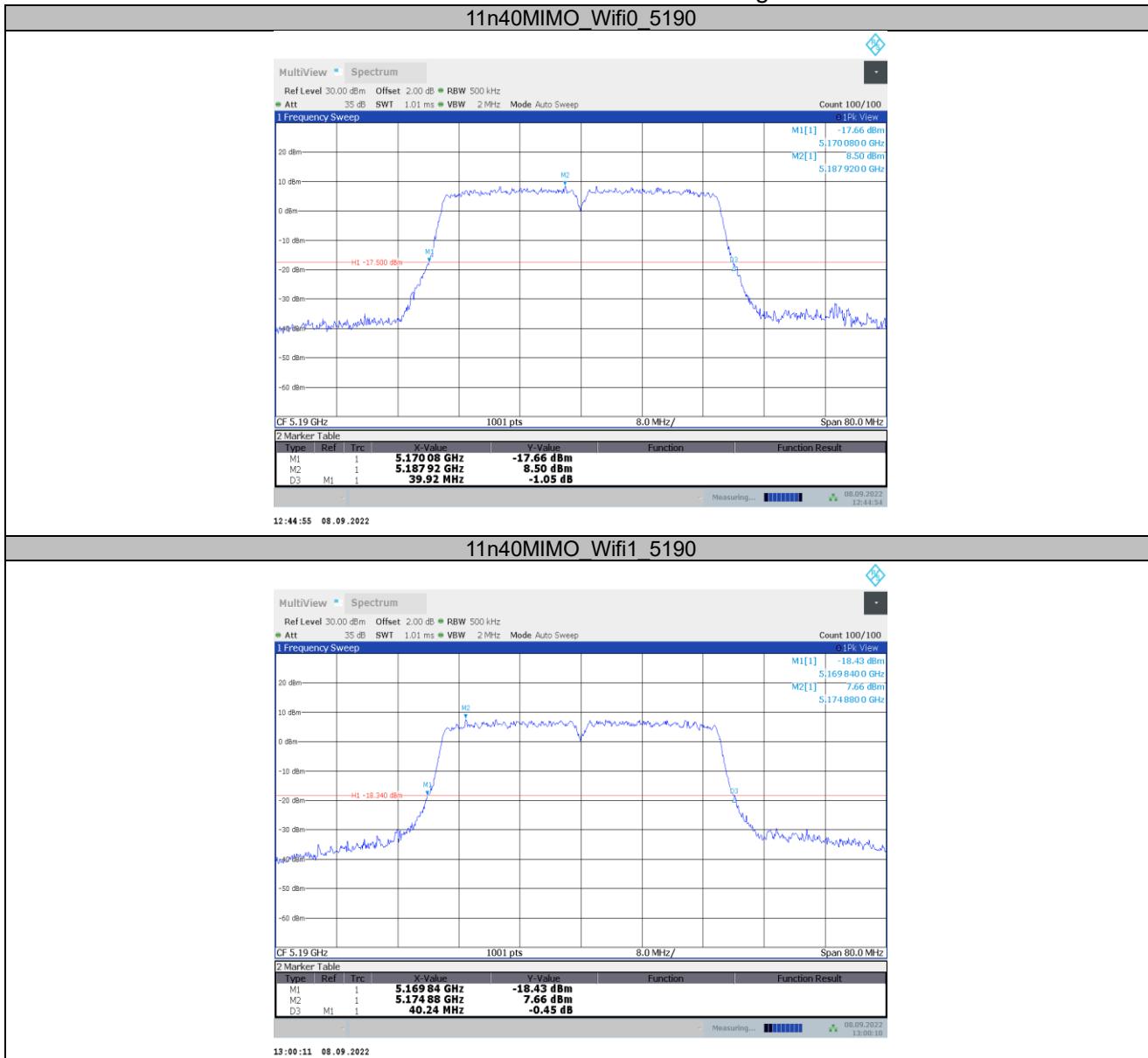
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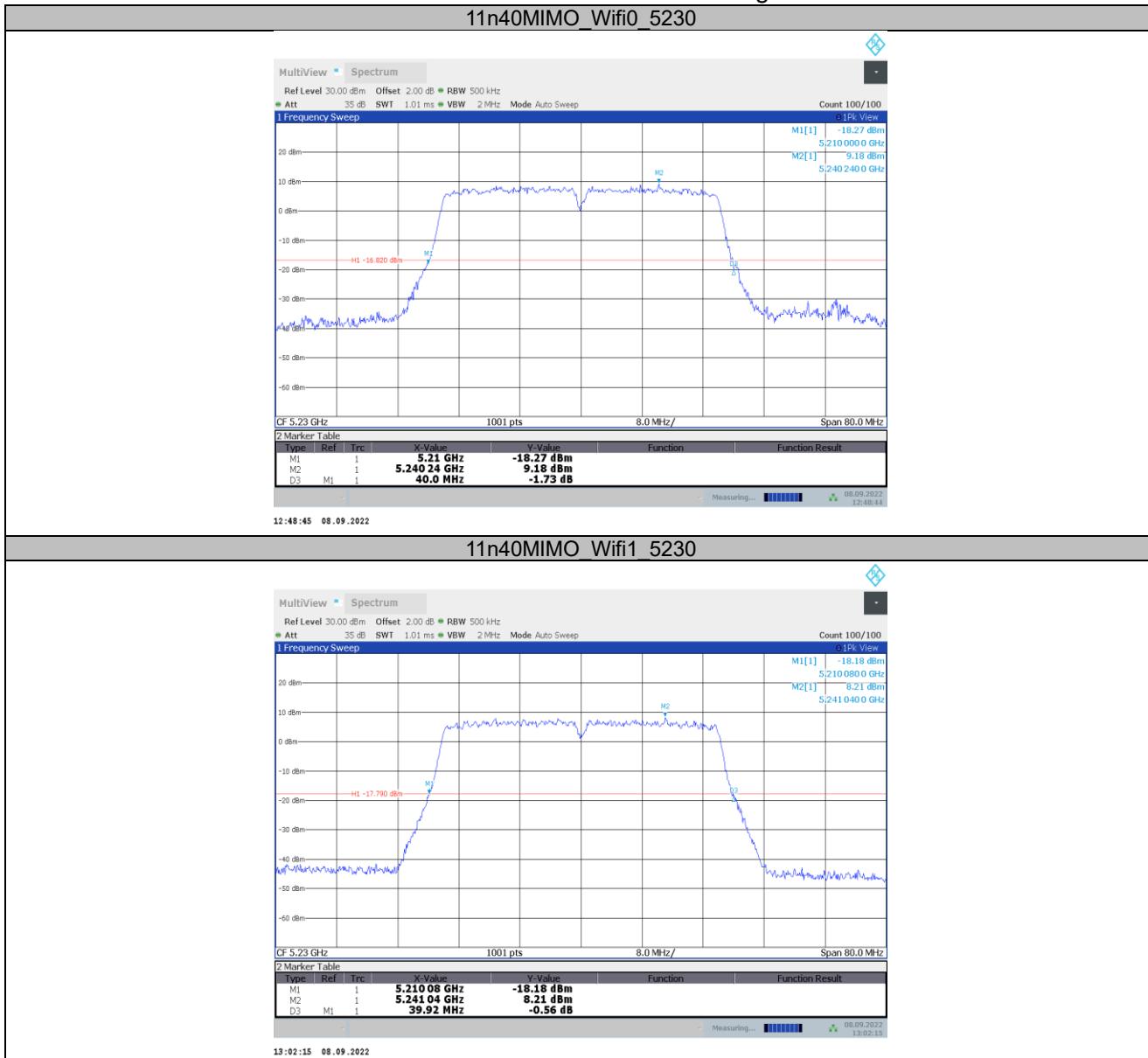
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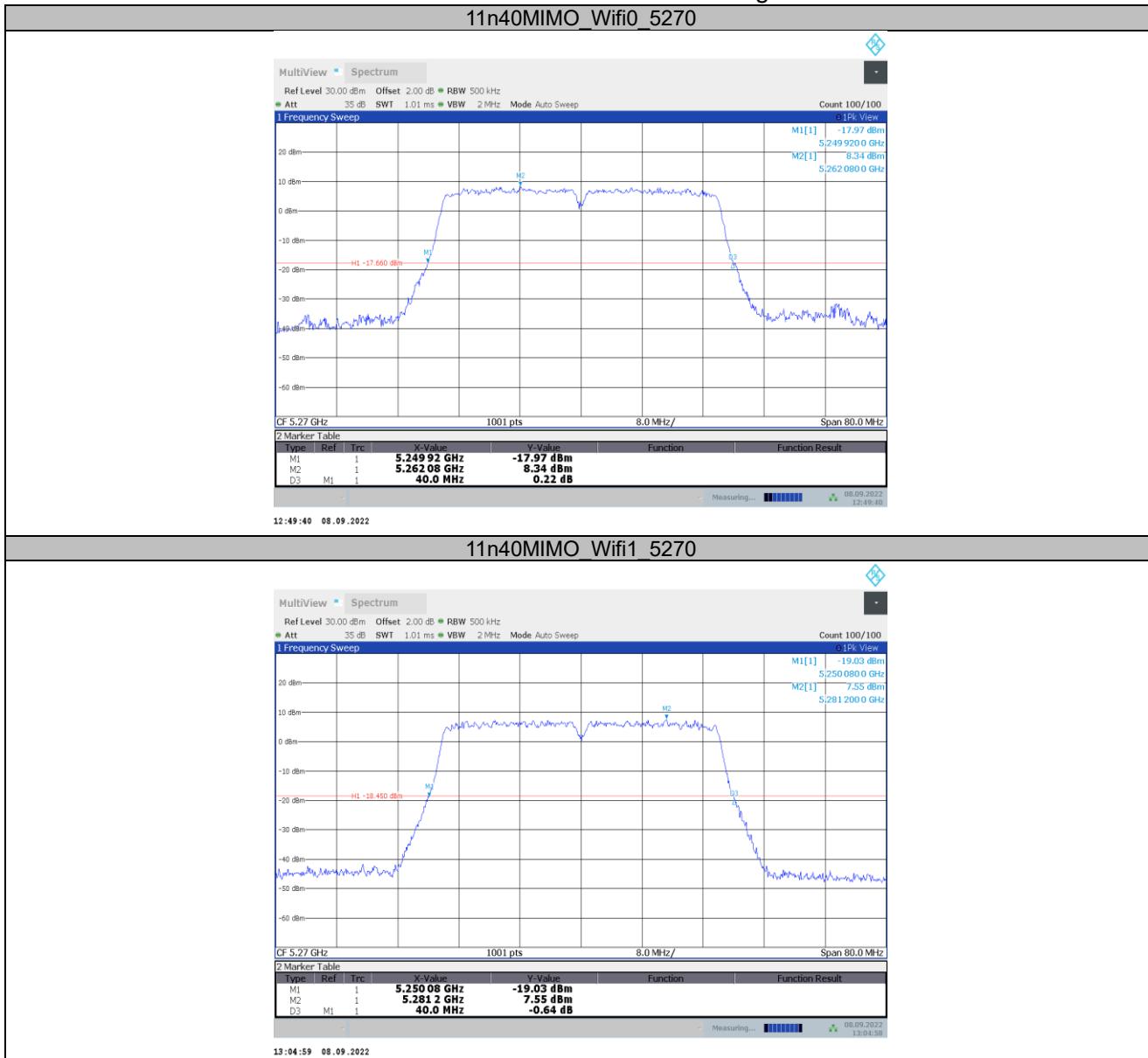
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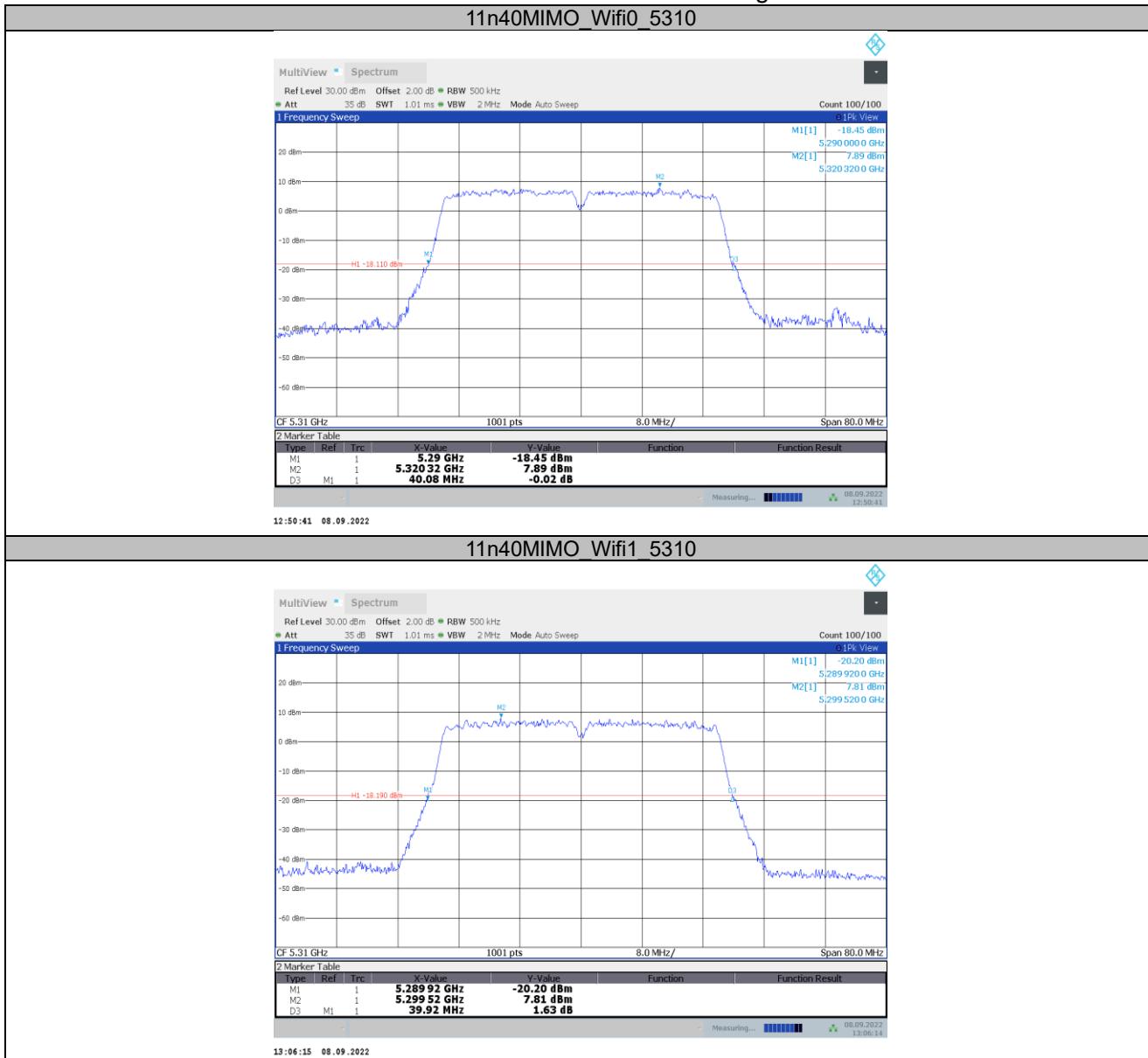
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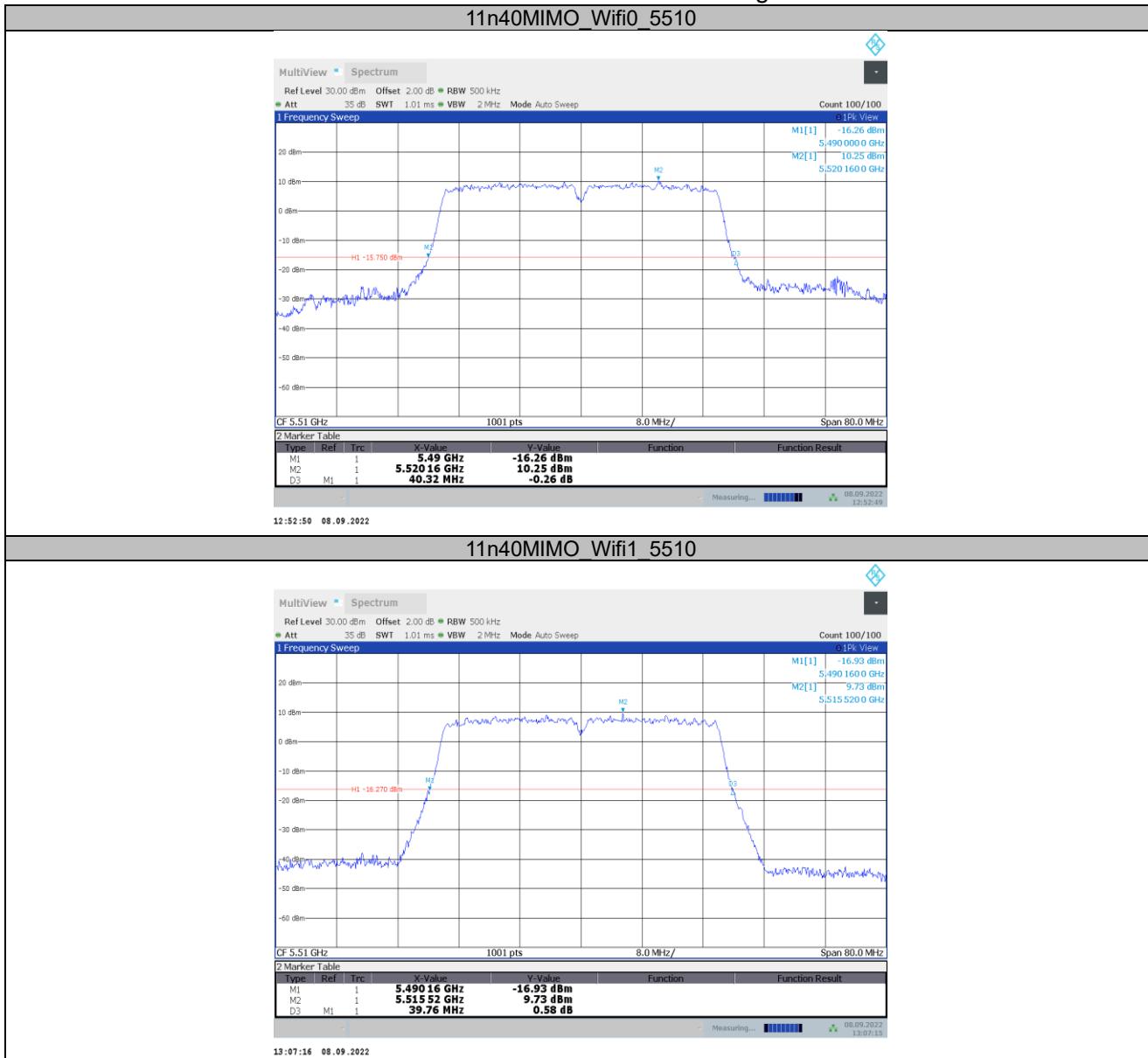
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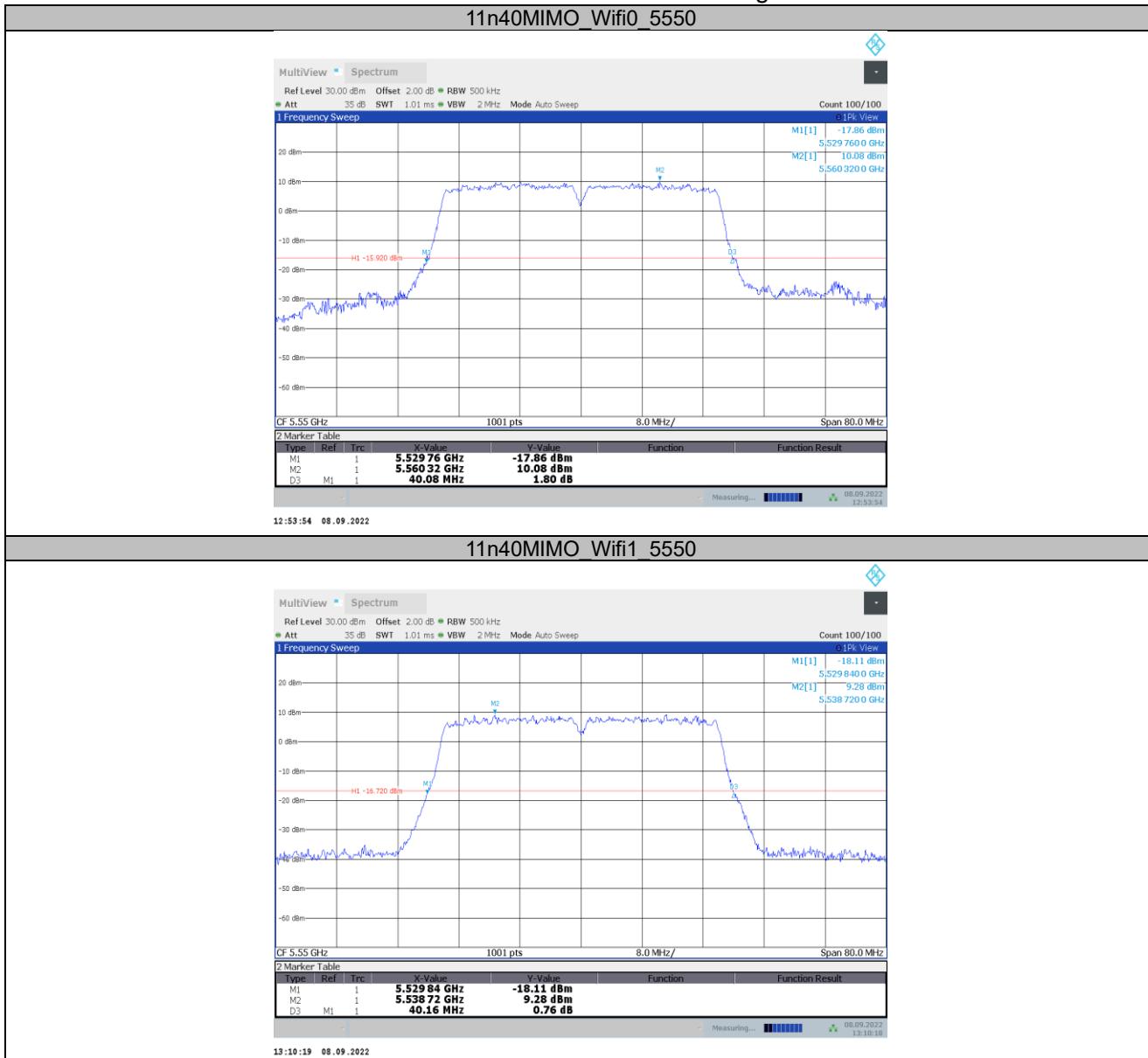
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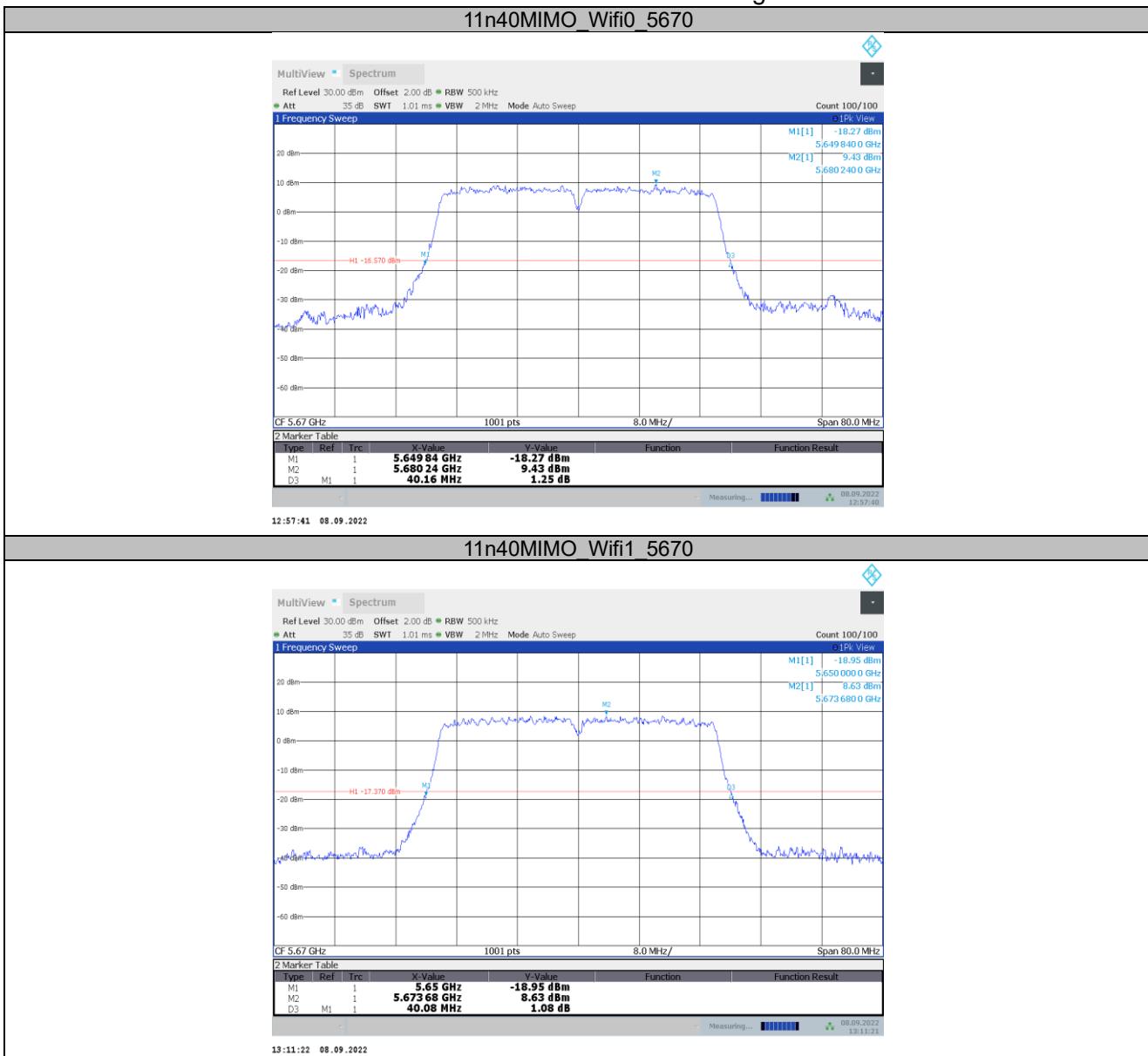
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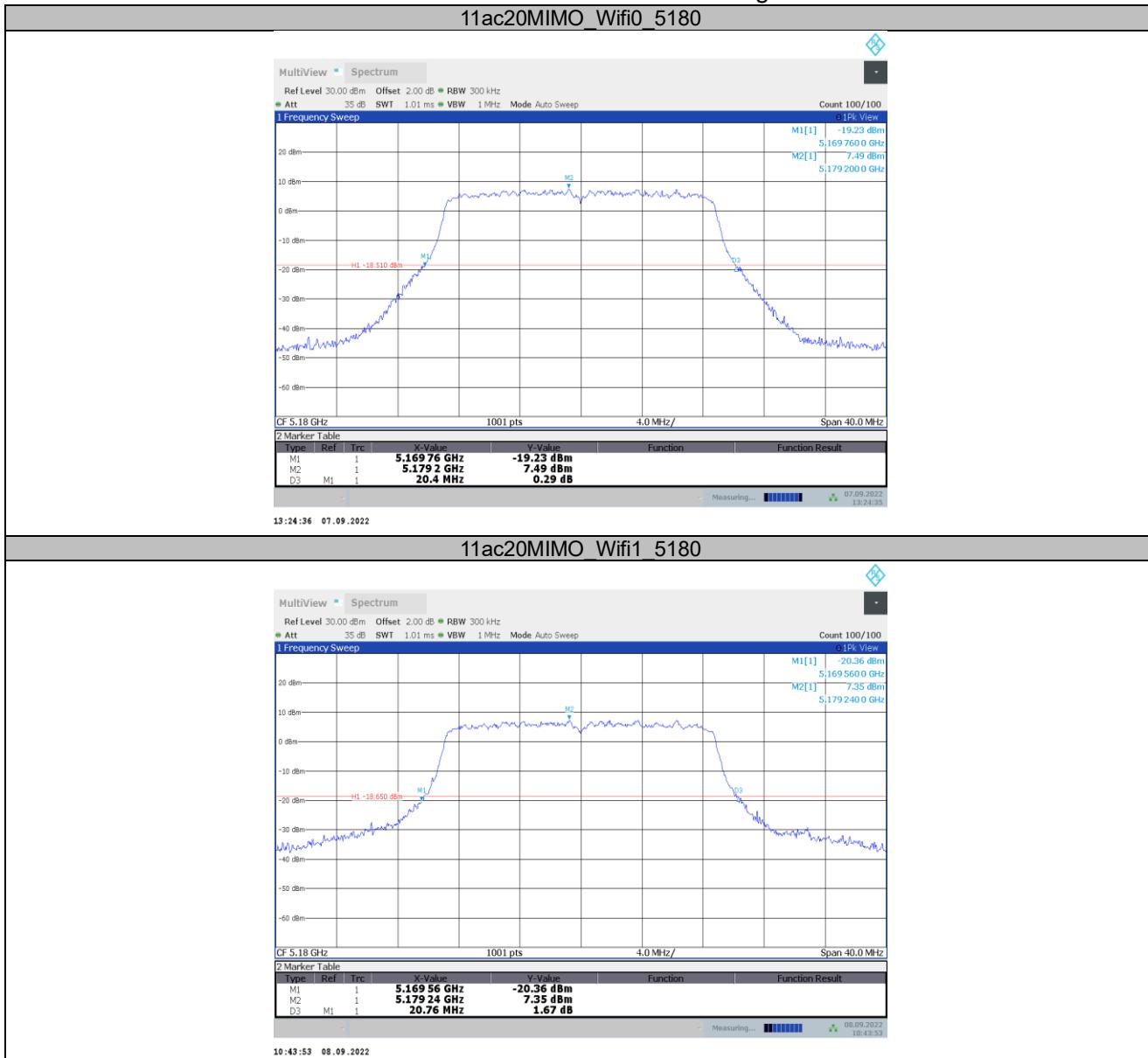
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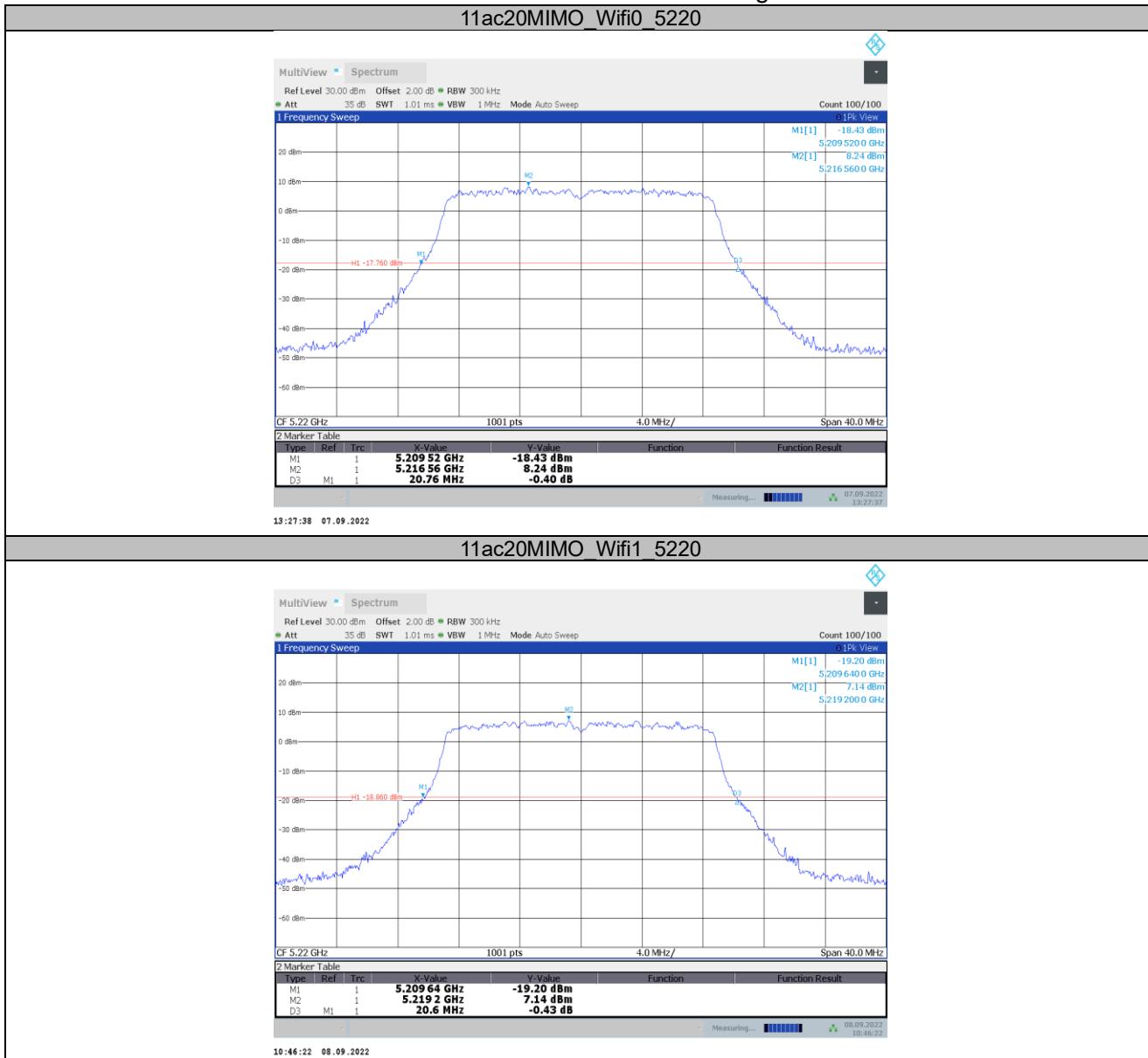
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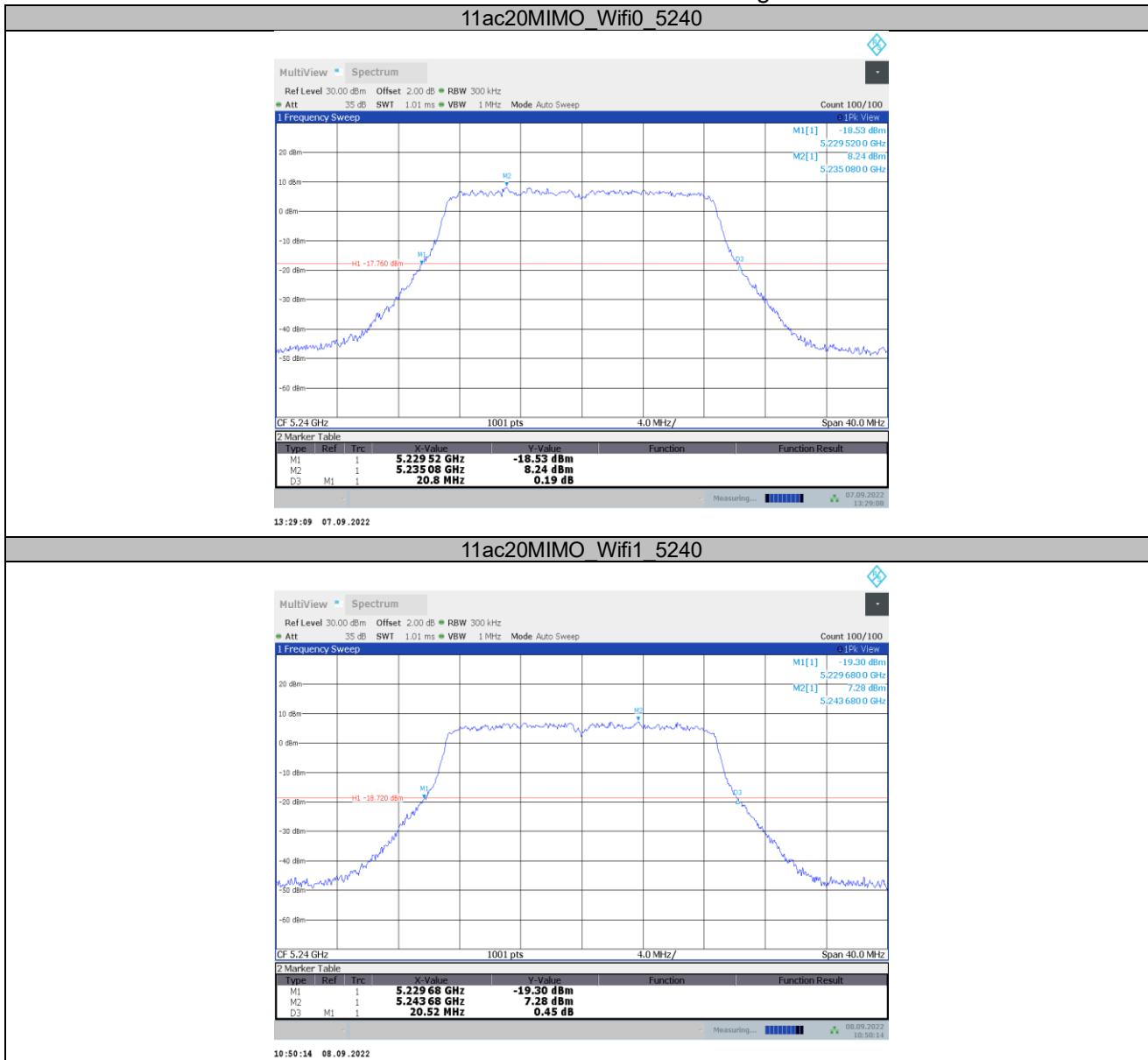
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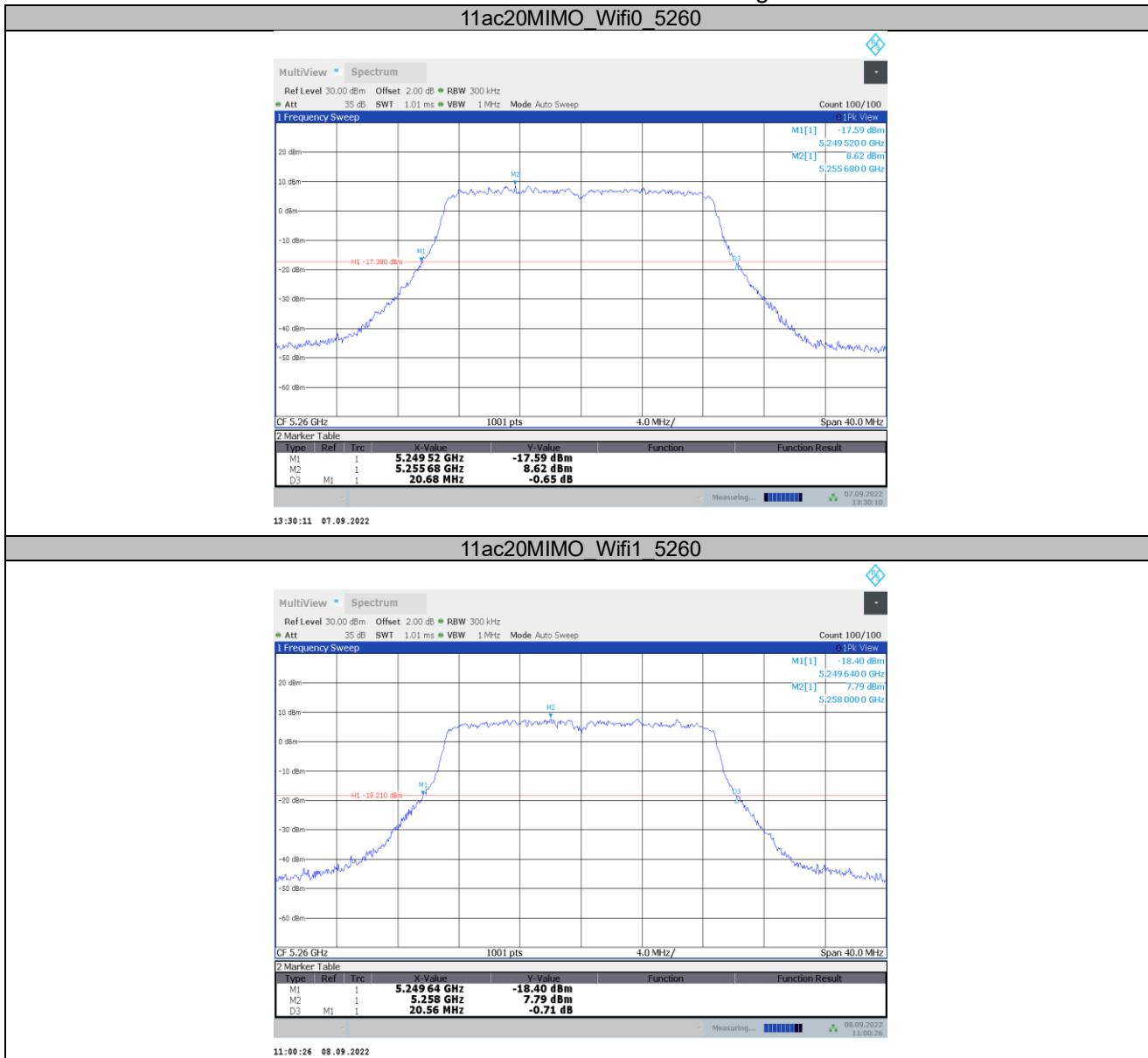
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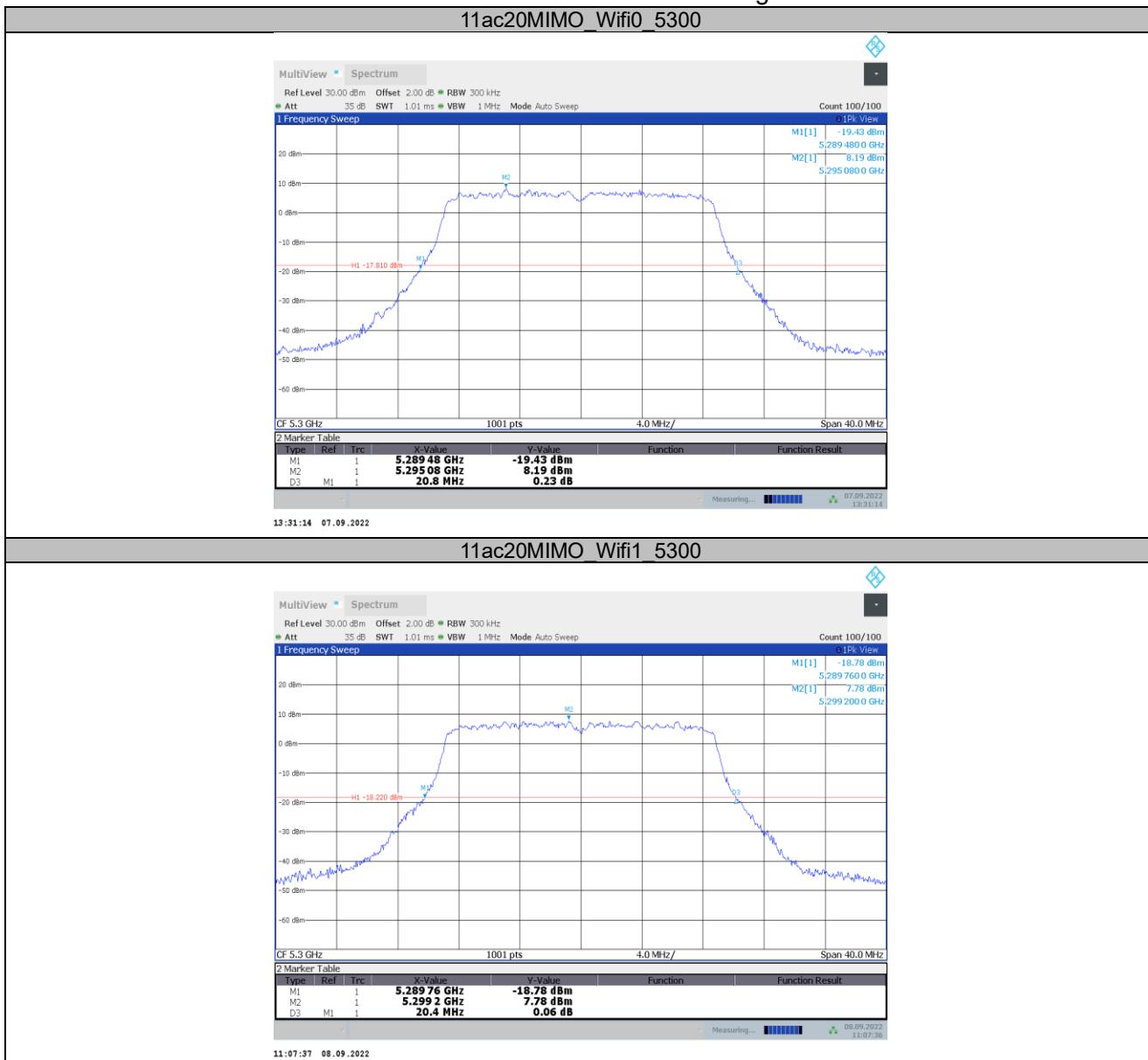


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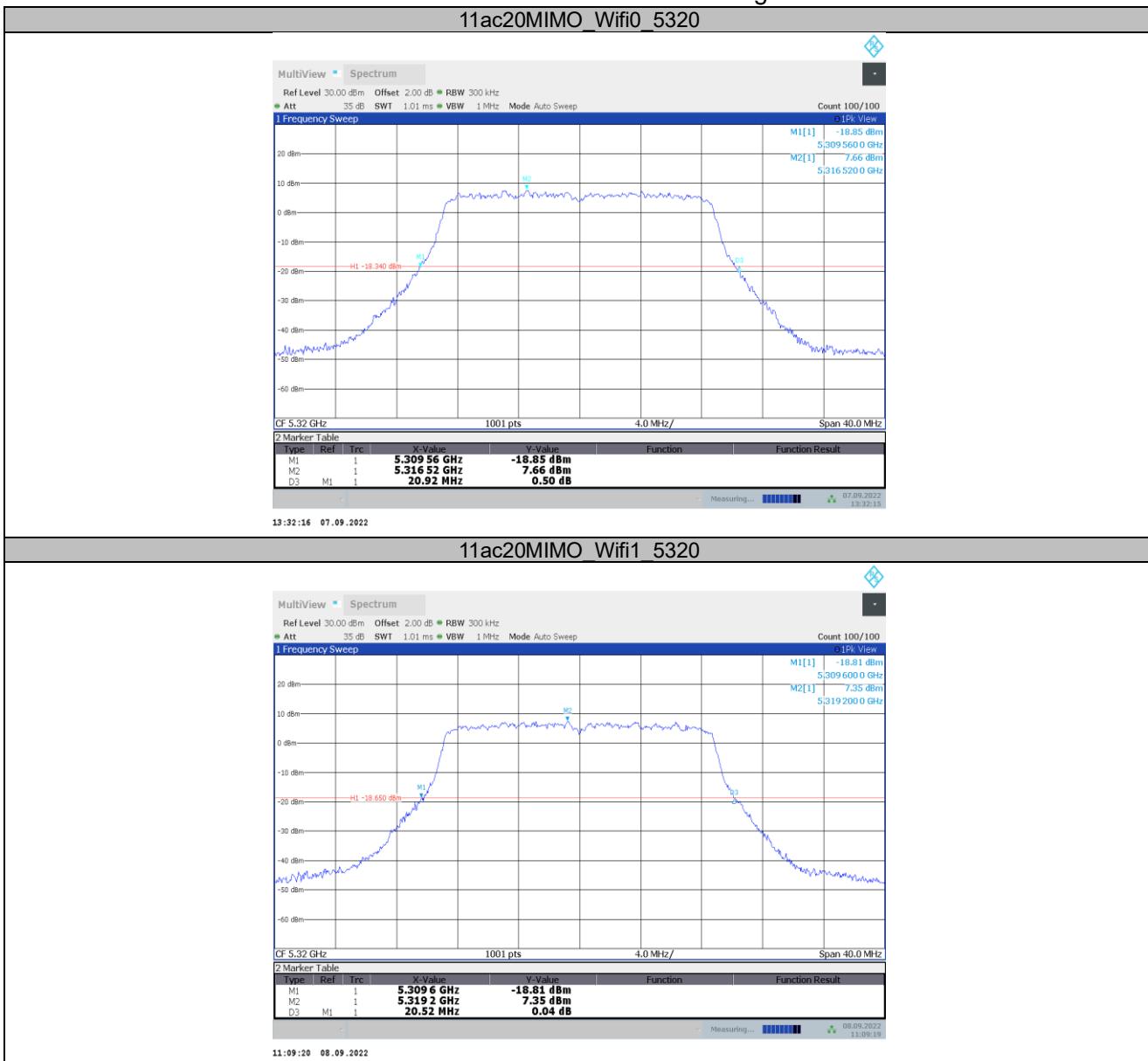
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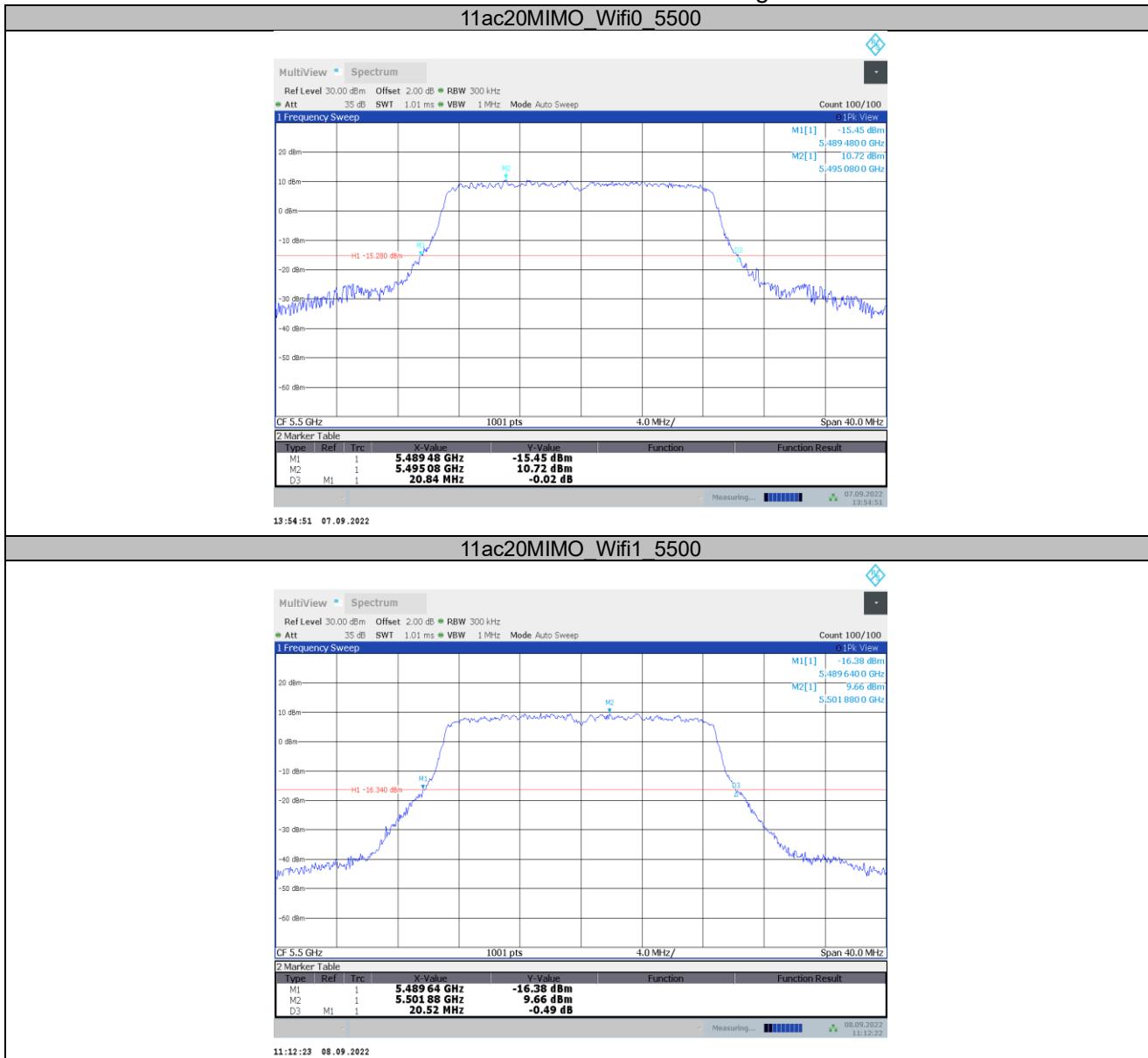
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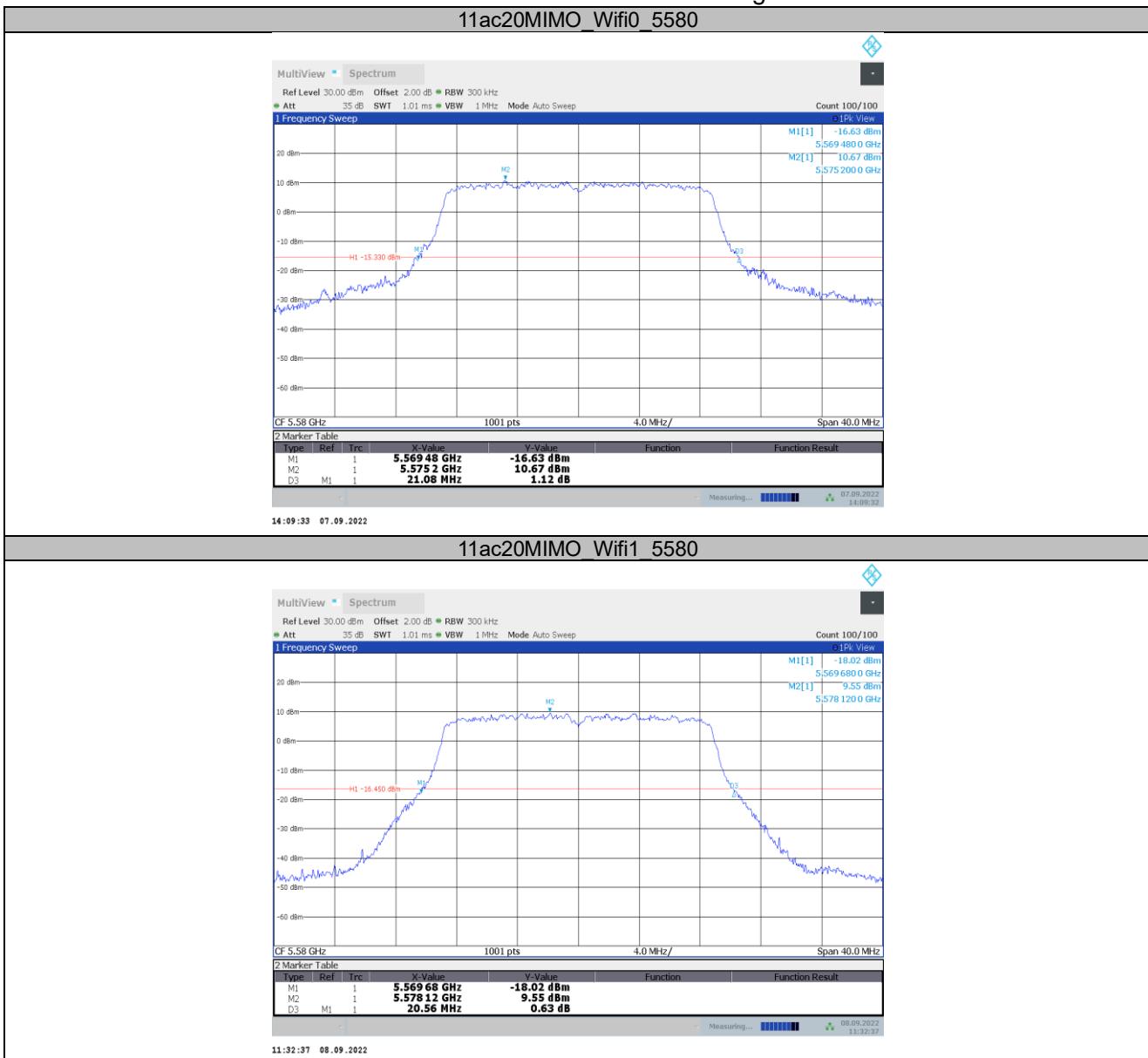
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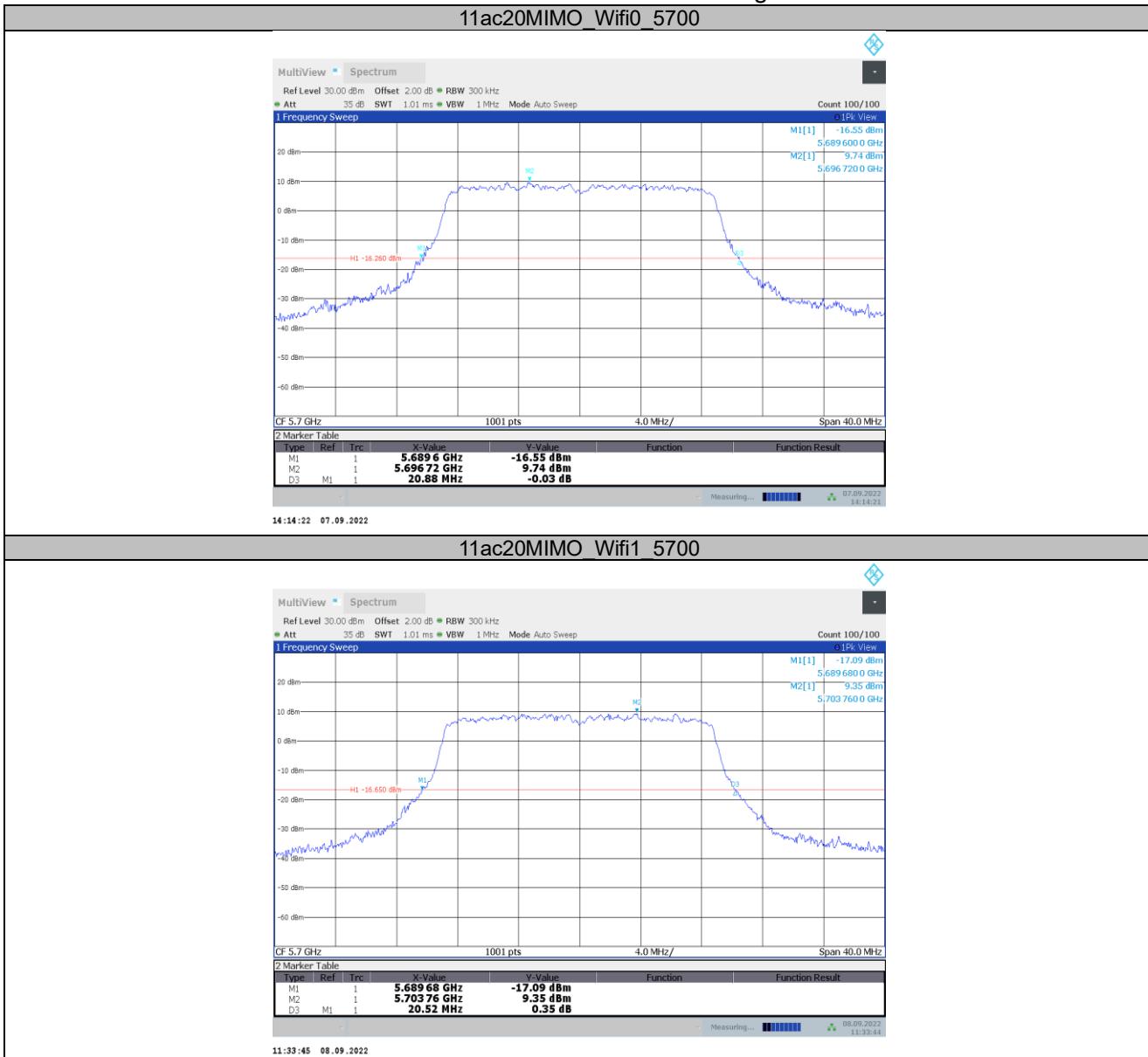
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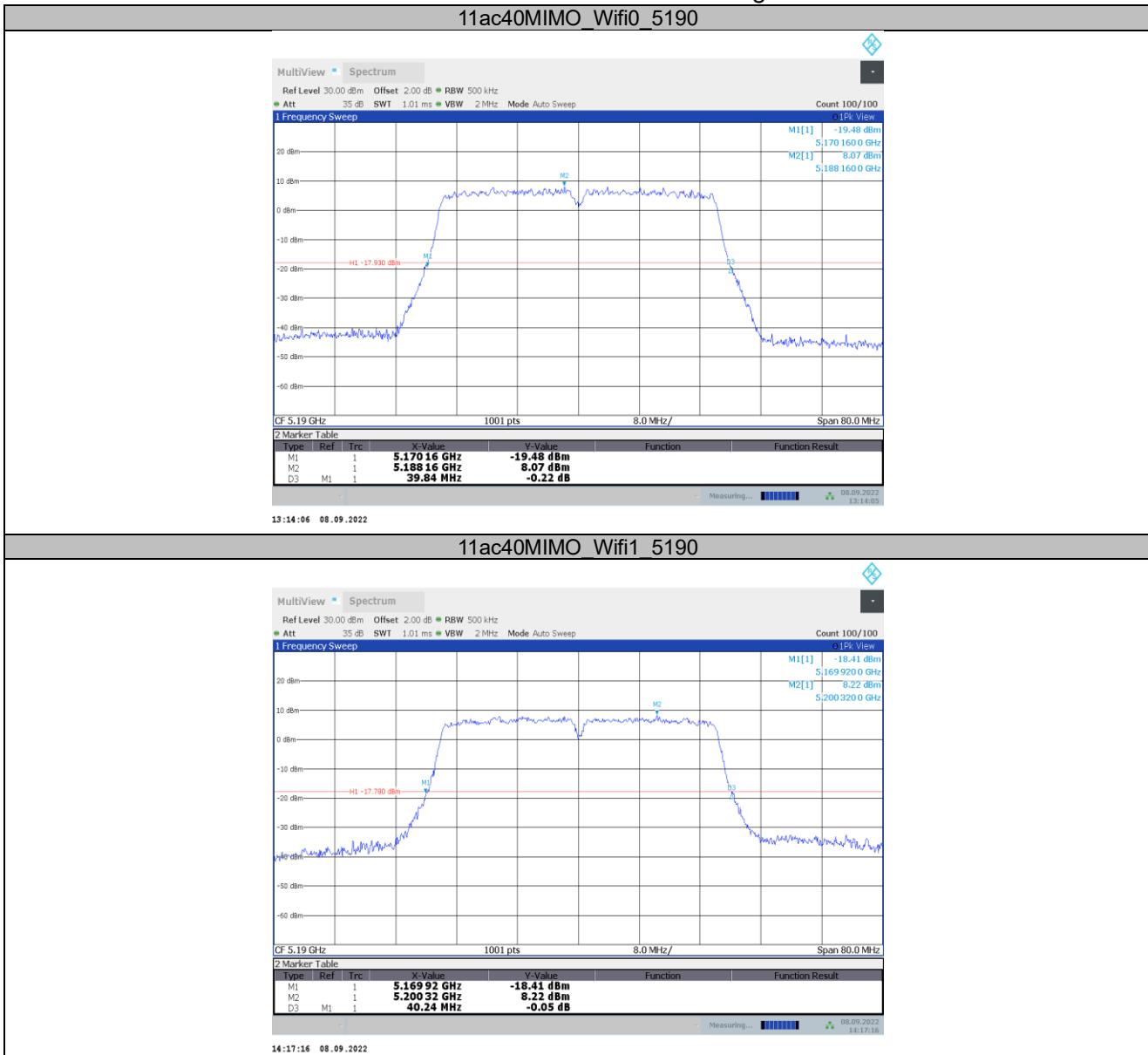
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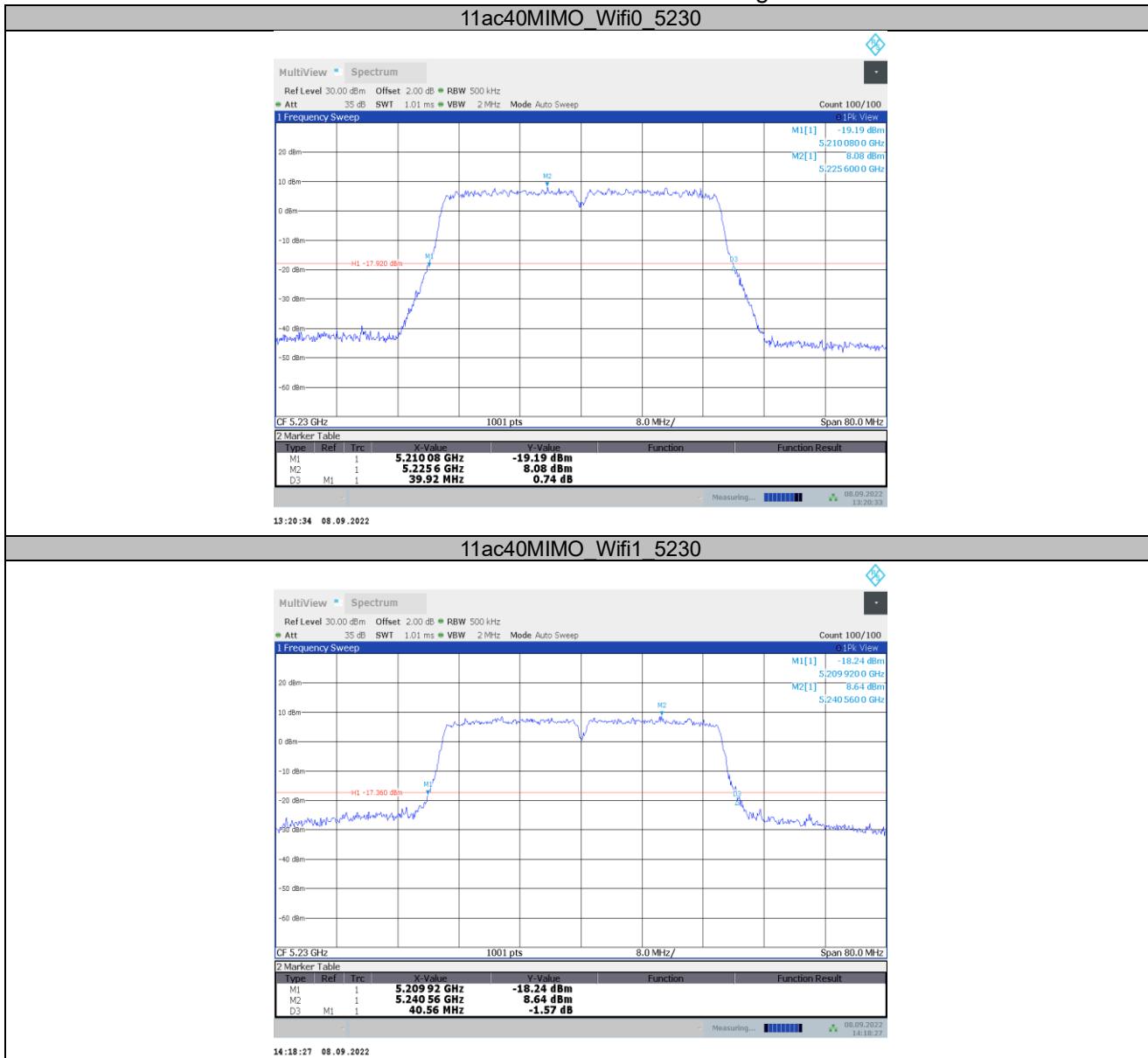
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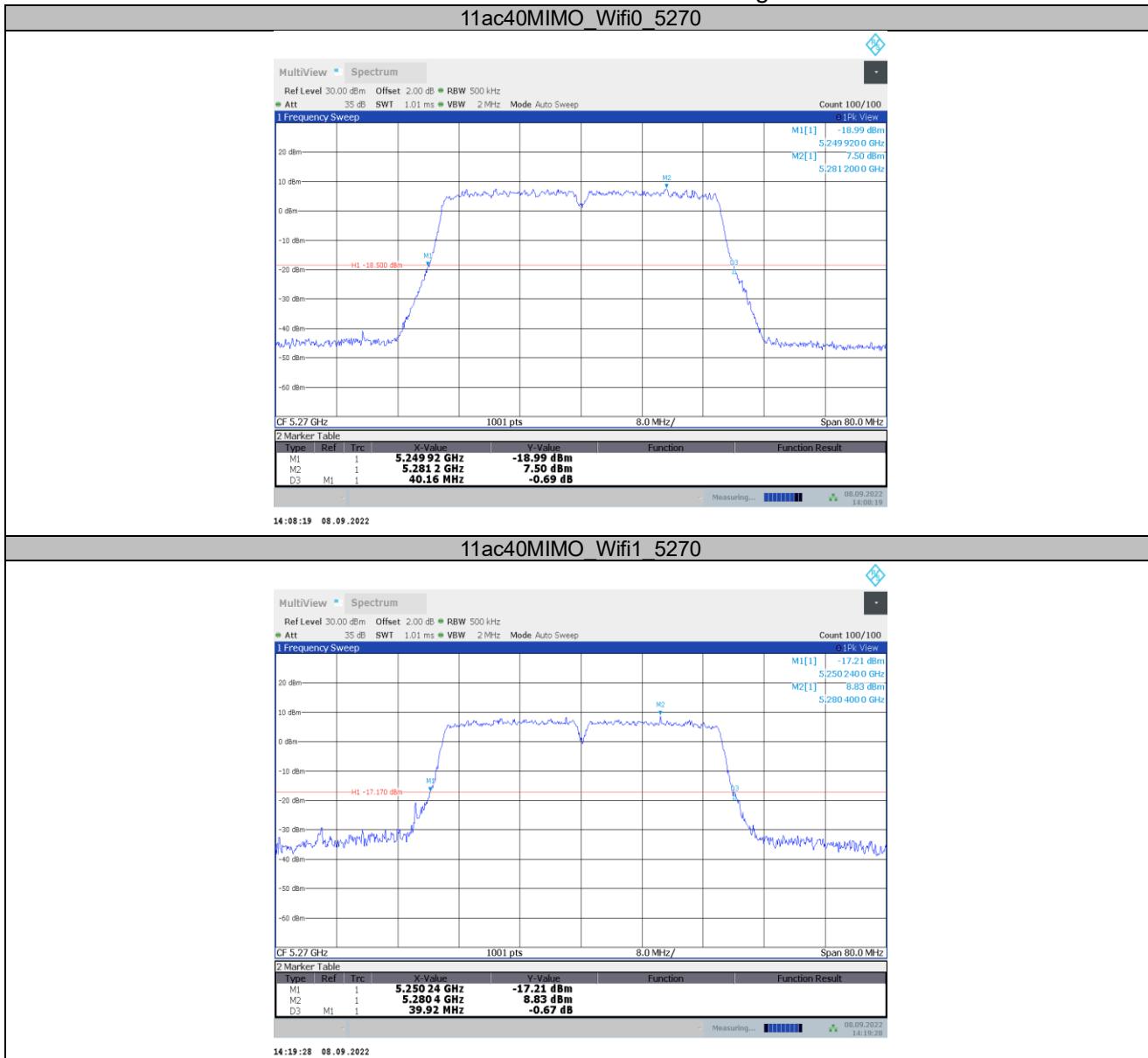
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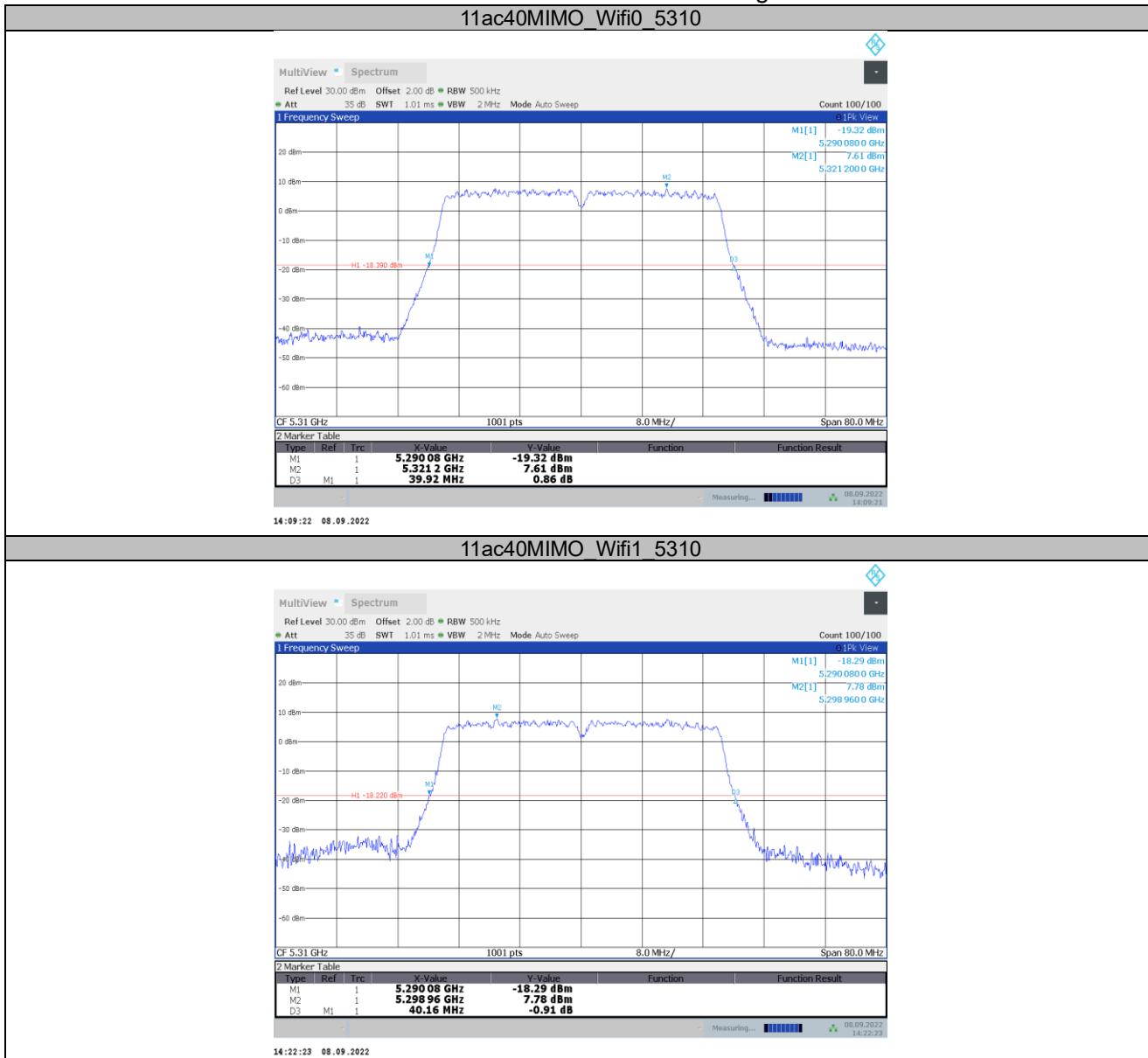
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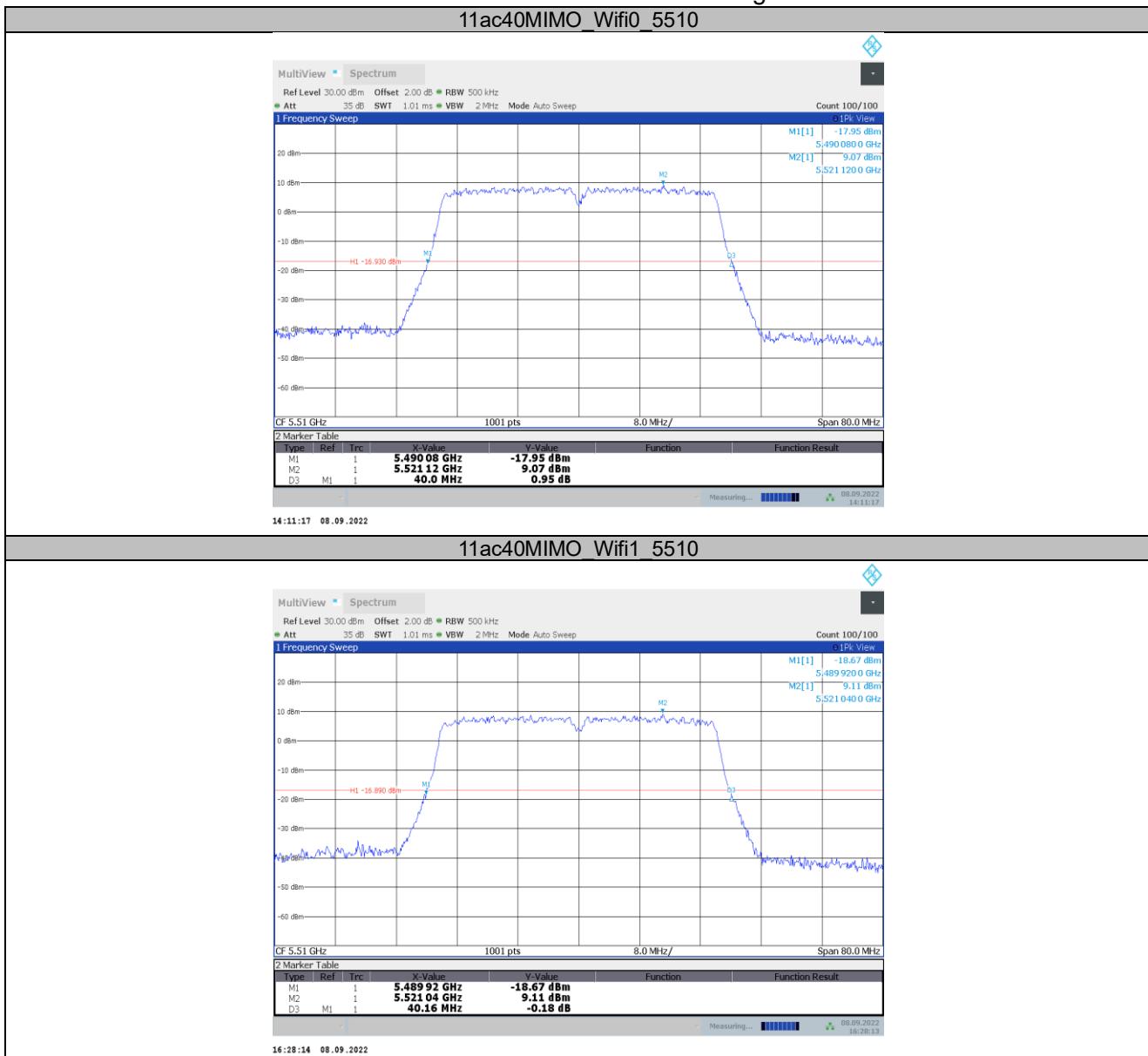


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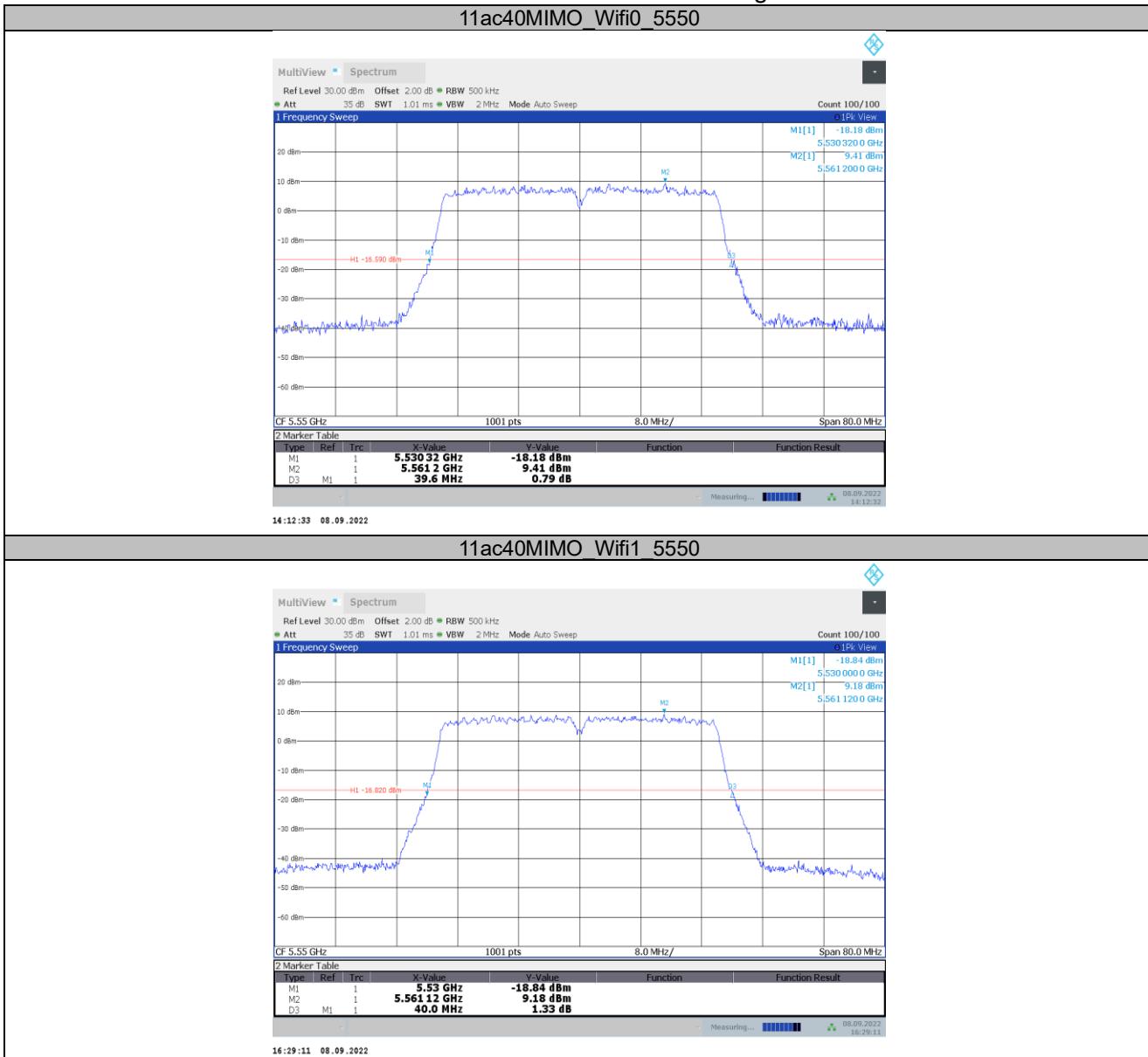
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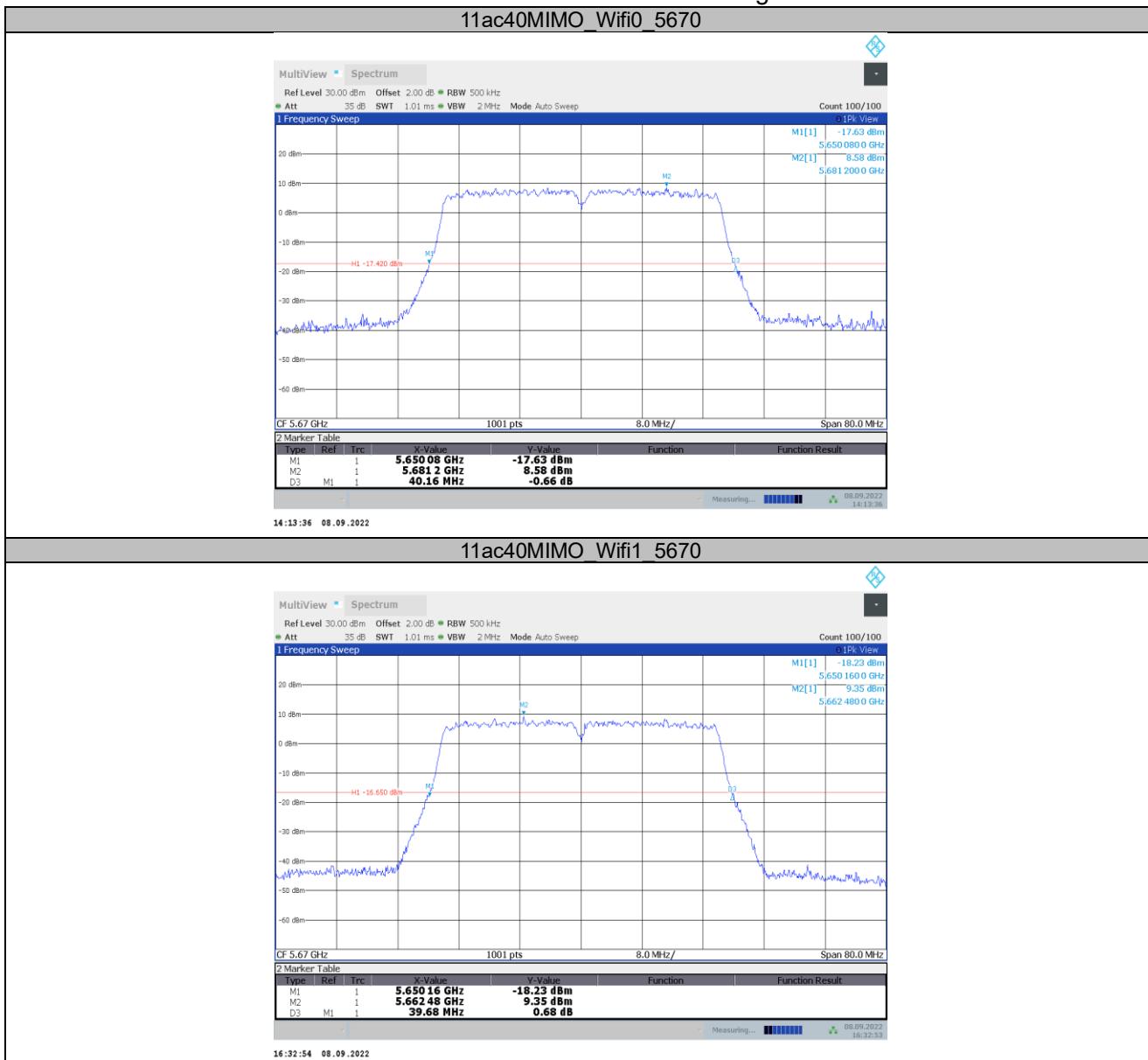


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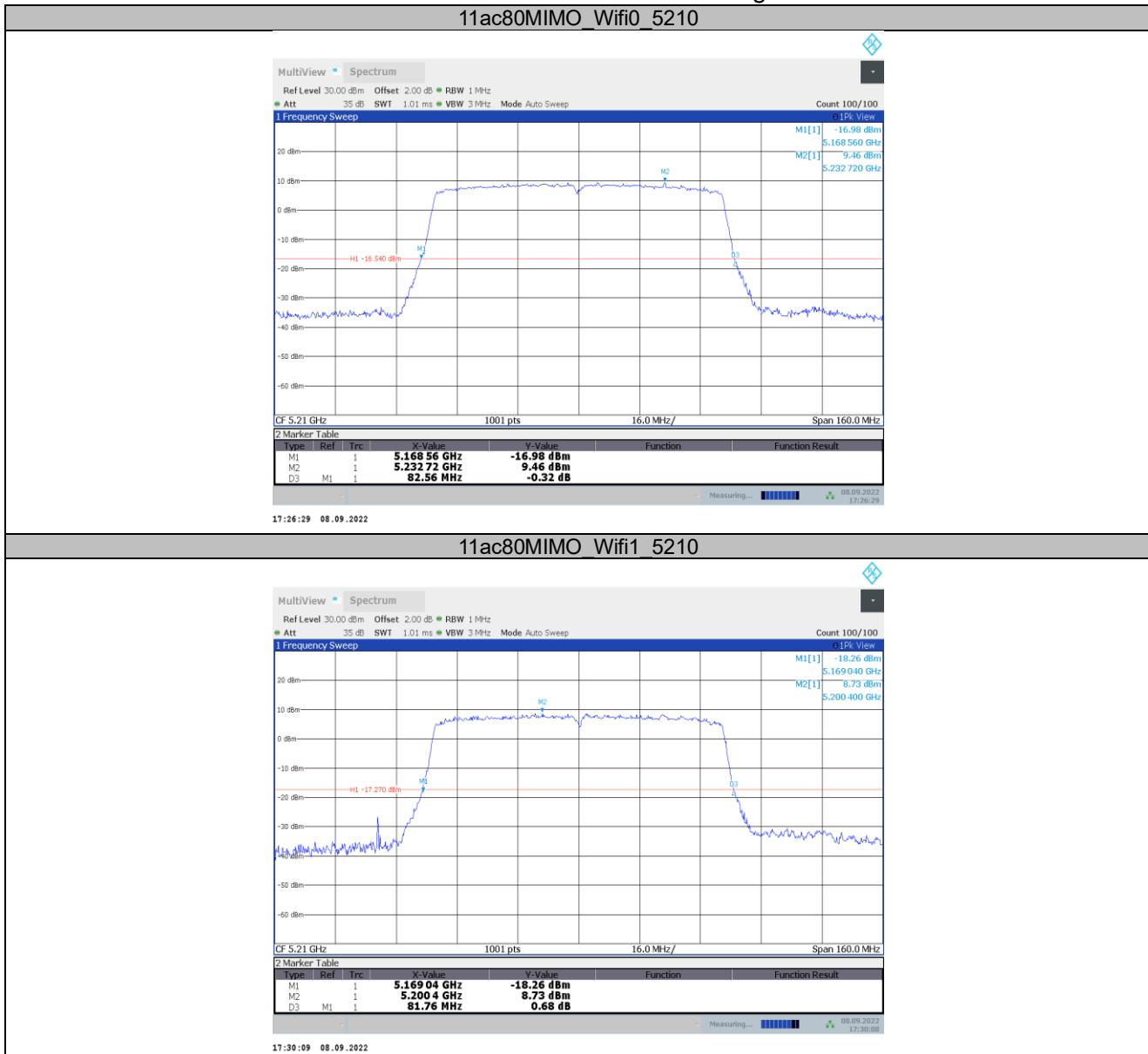
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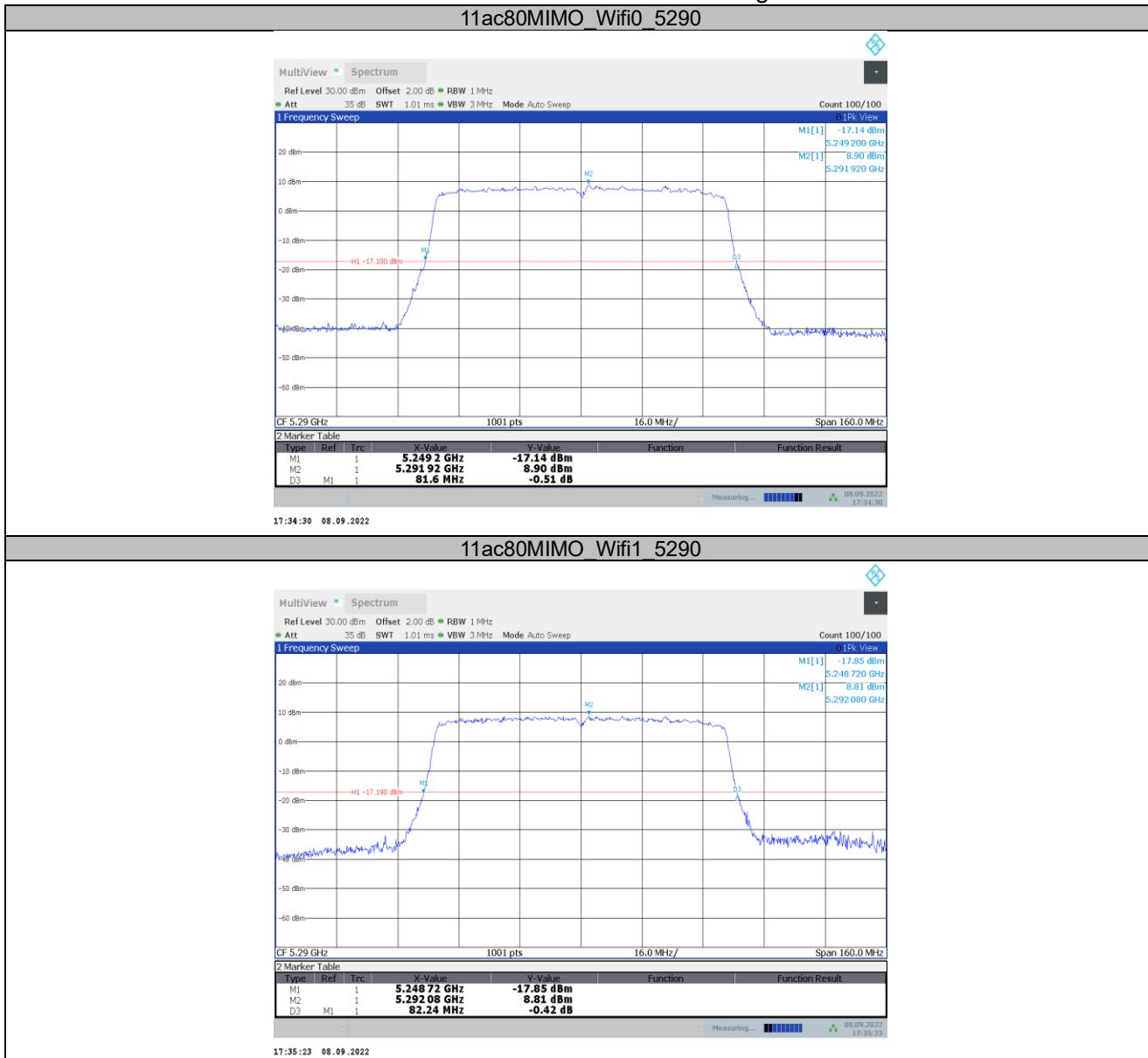
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