

FCC/ISED - TEST REPORT

Report Number : **68.950.22.0769.01** Date of Issue: October 25, 2022

Model : QS02

Product Type : BenQ HDMI Media Streaming

Applicant : Benq Corporation

Address : 16 Jihu Road, Neihu, Taipei 114, Taiwan

Manufacturers : Benq Corporation

Address : 16 Jihu Road, Neihu, Taipei 114, Taiwan

Test Result : **Positive** **Negative**

Total pages including
Appendices : **289**

Any use for advertising purposes must be granted in writing. This technical report may only be quoted in full. This report is the result of a single examination of the object in question and is not generally applicable evaluation of the quality of other products in regular production. For further details, please see testing and certification regulation, chapter A-3.4.

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint
Road 2, Nanshan District
Shenzhen 518052
P.R. China

Telephone: 86 755 8828 6998

Fax: 86 755 8288 5299

FCC Registration No.: 514049

ISED test site number: 10320A



3 Description of the Equipment Under Test

Description of the Equipment Under Test	
Product/PMN:	BenQ HDMI Media Streaming
Model no/HVIN:	QS02
FVIN:	11.1.7
FCC ID:	JVPQS02
IC:	6175A-QS02
Options and accessories:	HDMI Cable, USB Cable
Rating:	Input: 5.0VDC, 1.0A
RF transmission frequency:	Bluetooth BR+EDR: 2402-2480MHz Bluetooth LE: 2402-2480MHz Wi-Fi 2.4G: 2412-2462MHz Wi-Fi 5G: 5150MHz~5350MHz; Wi-Fi 5G: 5470MHz – 5725MHz Wi-Fi 5G: 5725MHz – 5850MHz. Note: until further notice, device subject to this section shall not be capable of transmitting in the band 5600-5650MHz. This restriction is for the protection of Environment Canada’s weather radars operating in this band.
Antenna Type:	PIFA Antenna
Antenna Gain:	Ant 1: 4.47dBi, Ant 2: 4.42dBi
Description of the EUT	The EUT is a BenQ HDMI Media Streaming with Bluetooth, 2.4GHz Wi-Fi and 5GHz Wi-Fi function. Bluetooth TX and RX range is 2402-2480MHz, Wi-Fi TX and RX is 2412-2462MHz, 5150MHz~5350MHz; 5470MHz – 5725MHz, 5725MHz – 5850MHz.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart E	PART 15 - RADIO FREQUENCY DEVICES Subpart E - Intentional Radiators
RSS-Gen Issue 5, Amendment 2, February 2021	General Requirements and Information for the Certification of Radio Apparatus
RSS-247 Issue 2 February 2017	Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSS) and License-Exempt Local Area Network (LE-LAN) Devices

Test Method:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

ANSI C63.10-2013, American National Standard for Testing Unlicensed Wireless Devices

5 Summary of Test Results

Test Condition		Test Result		
		Pass	Fail	N/A
15.207 Conducted Emission AC Power Port	RSS-Gen Clause 8.8 Conducted Emission AC Power Port	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407 a(2), 15.407(e) Emission bandwidth	RSS-247 Clause 6.2 Emission bandwidth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407(a) Maximum Conducted Output Power	RSS-247 Clause 6.2 Maximum Conducted Output Power	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407(a) Maximum Power Spectral Density	RSS-247 Clause 6.2 Maximum Power Spectral Density	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407(b)(1),15.407(b)(2), 15.407(b)(3),15.407(b)(4), 15.407(b)(8),15.407(b)(9), 15.209 Unwanted Emissions	RSS-247 Clause 6.2 RSS-Gen Clause 8.9 Unwanted Emissions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407(b)(1),15.407(b)(2), 15.407(b)(3),15.407(b)(4), Band edge compliance	RSS-247 Clause 6.2 RSS-Gen Clause 8.9 Band edge compliance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407(g) Frequencies Stability	RSS-Gen Clause 6.11 Frequencies Stability	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.407(h) Dynamic Frequency Selection (DFS).	RSS-247 Clause 6.3 Dynamic Frequency Selection (DFS).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15.203 Antenna Requirement	RSS-GEN Clause 6.8 Antenna Requirement	<input checked="" type="checkbox"/> See note1	<input type="checkbox"/>	<input type="checkbox"/>

Note 1: The EUT uses an PIFA antenna, which gain is 4.47dBi for Ant1 and 4.42dBi for Ant2. It is considered sufficiently to comply with the provisions of this section.



6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: FCC ID: JVPQS02, IC: 6175A-QS02 complies with the FCC Part 15.205, 15.207, 15.209,15.407 Subpart and RSS-247 issue 2 and RSS-Gen issue 5 rules.

This report is for the 5GHz Wi-Fi.

SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

o - **Not** Performed

The Equipment Under Test

n - **Fulfills** the general approval requirements.

o - **Does not** fulfill the general approval requirements.

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch.

Sample Received Date: July 22, 2022

Testing Start Date: July 22, 2022

Testing End Date: October 21, 2022

TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch.

Reviewed by:

John Zhi
EMC Project Manager

Prepared by:

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EMC Project Engineer

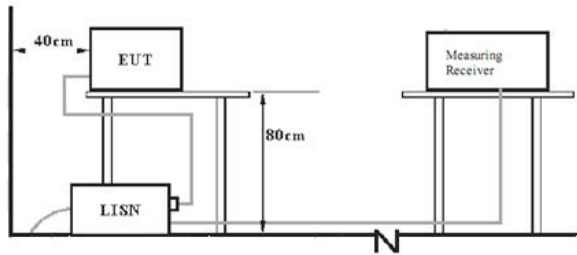
Tested by:



Carry Cai
EMC Test Engineer

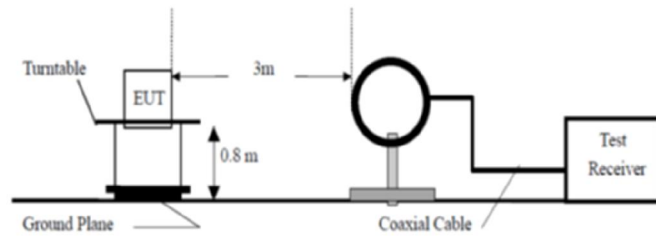
7 Test setups

7.1 AC Power Line Conducted Emission test setups

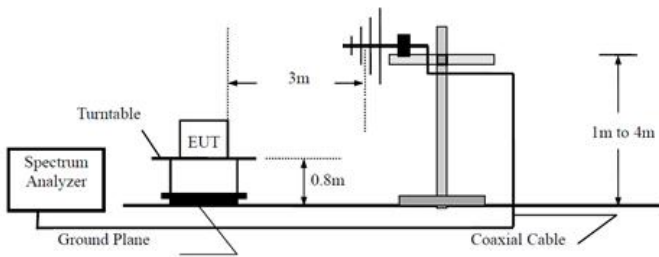


7.2 Radiated test setups

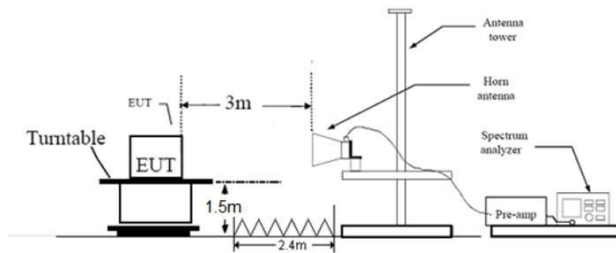
9KHz-30MHz



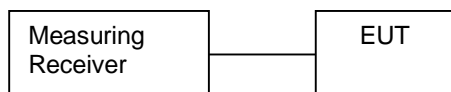
Below 1GHz



Above 1GHz



7.3 Conducted RF test setups





8. Systems test configuration

Characteristics	Description
TX/RX Operating Band	5150 MHz to 5825 MHz
IEEE 802.11 WLAN Mode Supported	802.11a: Support 802.11n20: Support 802.11n40: Support 802.11ac20: Support 802.11ac40: Support 802.11ac80: Support 802.11ax20: Support 802.11ax40: Support 802.11ax80: Support
Channel Bandwidth	20MHz, 40MHz, 80MHz

The system was configured to channel:

Test Mode	Channel (MHz)		
802.11a, 802.11n20, 802.11ac20 802.11ax20	5G WI-FI-Band 1		
	CH36 (5180MHz)	CH40 (5200MHz)	CH46 (5240MHz)
	5G WIFI-Band 2		
	CH52 (5260MHz)	CH56 (5280MHz)	CH64 (5320MHz)
	5G WIFI-Band 3		
	CH100 (5500MHz)	CH116 (5580MHz)	CH140 (5700MHz)
	5G WIFI-Band 4		
CH149 (5745MHz),	CH157(5785MHz)	CH165 (5825MHz)	

Test Mode	Channel (MHz)		
802.11n40, 802.11ac40 802.11ax40	5G WI-FI-Band 1		
	CH38(5190MHz)	CH46 (5230MHz)	
	5G WIFI-Band 2		
	CH54(5270MHz)	CH62(5310MHz)	
	5G WIFI-Band 3		
	CH102(5510MHz)	CH110(5550MHz)	CH134(5670MHz)
	CH 142 (5710MHz)		
	5G WIFI-Band 4		
CH151(5755MHz)	CH159(5795MHz)		

Test Mode	Channel (MHz)		
802.11ac80 802.11ax80	5G WI-FI-Band 1		
	CH42(5210MHz)		
	5G WI-FI-Band 2		
	CH58(5290MHz)		
	5G WIFI-Band 3		
	CH106(5530MHz)	CH138(5690MHz)	
	5G WIFI-Band 4		
CH155(5775MHz)			

9 Technical Requirement

9.1 Conducted emission AC power port

Test Method

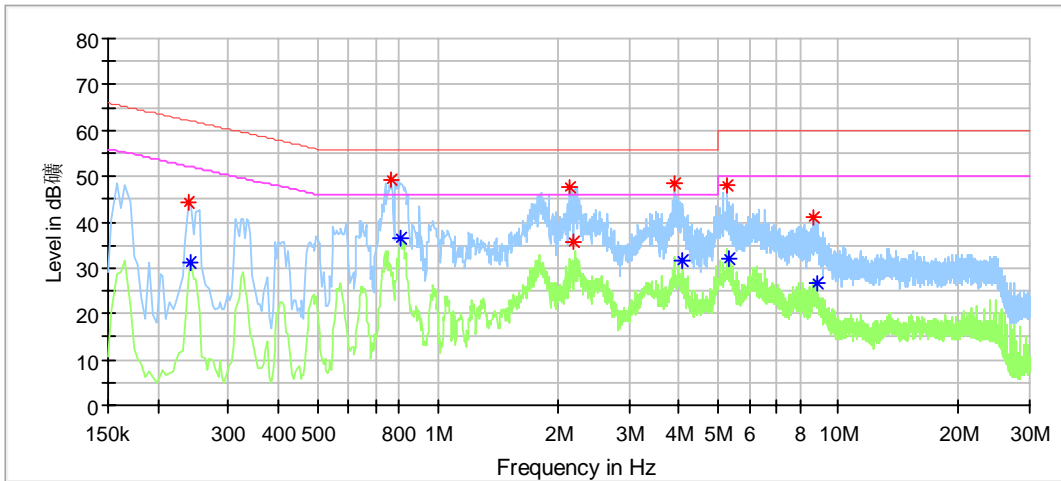
1. The EUT was placed on a table, which is 0.8m above ground plane
2. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.).
3. Maximum procedure was performed to ensure EUT compliance
4. A EMI test receiver is used to test the emissions from both sides of AC line

Limit

Frequency MHz	QP Limit dB μ V	AV Limit dB μ V
0.150-0.500	66-56*	56-46*
0.500-5	56	46
5-30	60	50

Remark: "*" Decreasing linearly with logarithm of the frequency

Product Type : BenQ HDMI Media Streaming
 M/N : QS02
 Operating Condition : Normal working with transmitting
 Test specification : Live
 Comment : AC 120V/60Hz



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB/m)
0.238000	44.27	---	62.17	17.90	L1	9.23
0.242000	---	31.31	62.03	30.71	L1	9.23
0.766000	49.12	---	56.00	6.88	L1	9.20
0.806000	---	36.48	56.00	19.52	L1	9.20
2.134000	47.55	---	56.00	8.45	L1	9.23
2.178000	35.59	---	56.00	20.41	L1	9.23
3.902000	48.37	---	56.00	7.63	L1	9.28
4.094000	---	31.60	56.00	24.40	L1	9.28
5.266000	47.90	---	60.00	12.10	L1	9.31
5.362000	---	32.02	60.00	27.98	L1	9.32
8.674000	41.17	---	60.00	18.83	L1	9.38
8.870000	---	26.47	60.00	33.53	L1	9.38

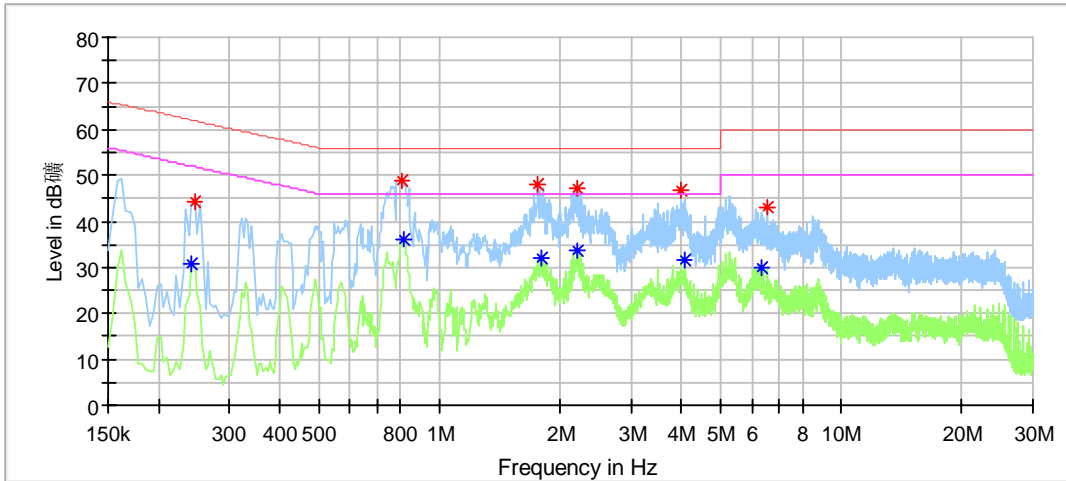
Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

Product Type : BenQ HDMI Media Streaming
 M/N : QS02
 Operating Condition : Normal working with transmitting
 Test specification : Neutral
 Comment : AC 120V/60Hz



Critical Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB/m)
0.242000	---	30.68	62.03	31.35	N	9.39
0.246000	44.40	---	61.89	17.50	N	9.39
0.806000	48.88	---	56.00	7.12	N	9.39
0.818000	---	36.02	56.00	19.98	N	9.39
1.762000	47.83	---	56.00	8.17	N	9.41
1.798000	---	32.08	56.00	23.92	N	9.41
2.206000	---	33.53	56.00	22.47	N	9.42
2.210000	47.12	---	56.00	8.88	N	9.42
3.994000	46.85	---	56.00	9.15	N	9.47
4.090000	---	31.53	56.00	24.47	N	9.47
6.334000	---	30.06	60.00	29.94	N	9.54
6.530000	43.01	---	60.00	16.99	N	9.54

Remark:

Level=Reading Level + Correction Factor

Correction Factor=Cable Loss + LISN Factor

(The Reading Level is recorded by software which is not shown in the sheet)

9.2 Emission bandwidth

The EUT was placed on 0.8m height table, the RF output of EUT was connected to the test receiver by RF cable. The path loss was compensated to the results for each measurement.

1、 Test Method of 26dB Bandwidth

According to C63.10

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Limit: No limit

2、 Test Method of 6dB Bandwidth

According to C63.10

- a) Set RBW = 100KHz
- b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Limit: ≥ 500 KHz

3、 Test Method of 99% Bandwidth

According to C63.10

- a) Set center frequency to the nominal EUT channel center frequency
- b) Set span = 1.5 times to 5.0 times the OBW.
- c) Set RBW = 1 % to 5 % of the OBW
- d) Set VBW $\geq 3 \cdot$ RBW
- e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- f) Use the 99 % power bandwidth function of the instrument (if available).
- g) If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Limit: No limit



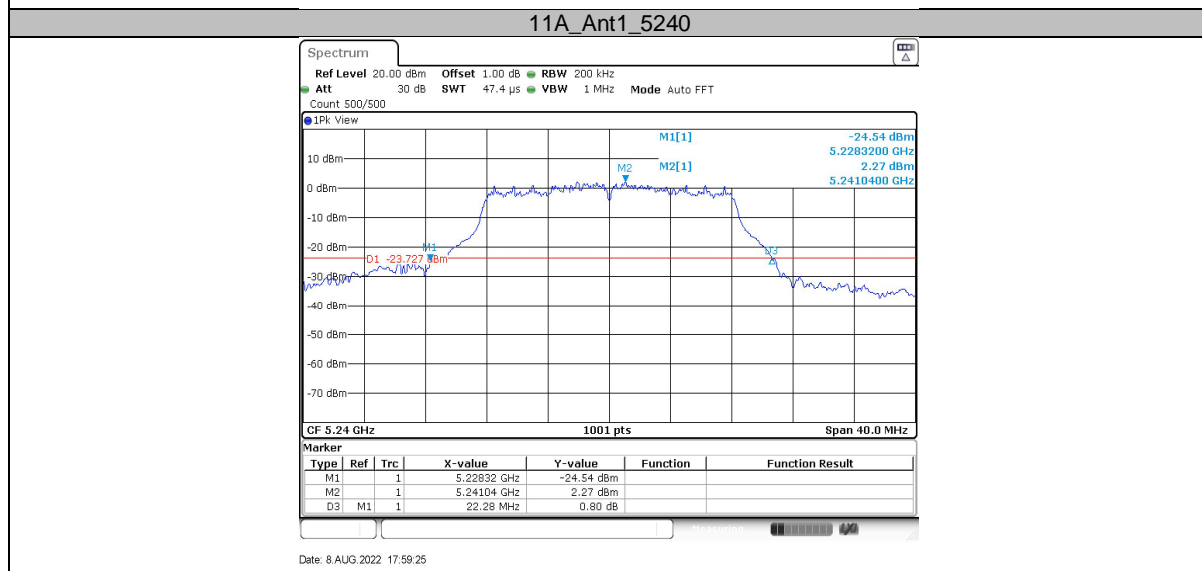
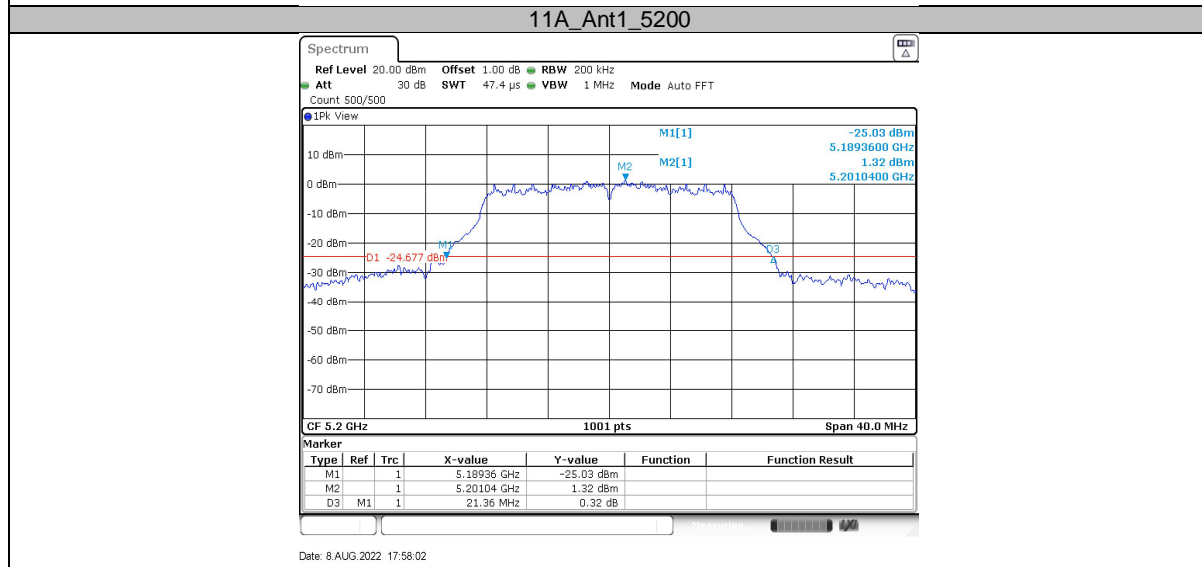
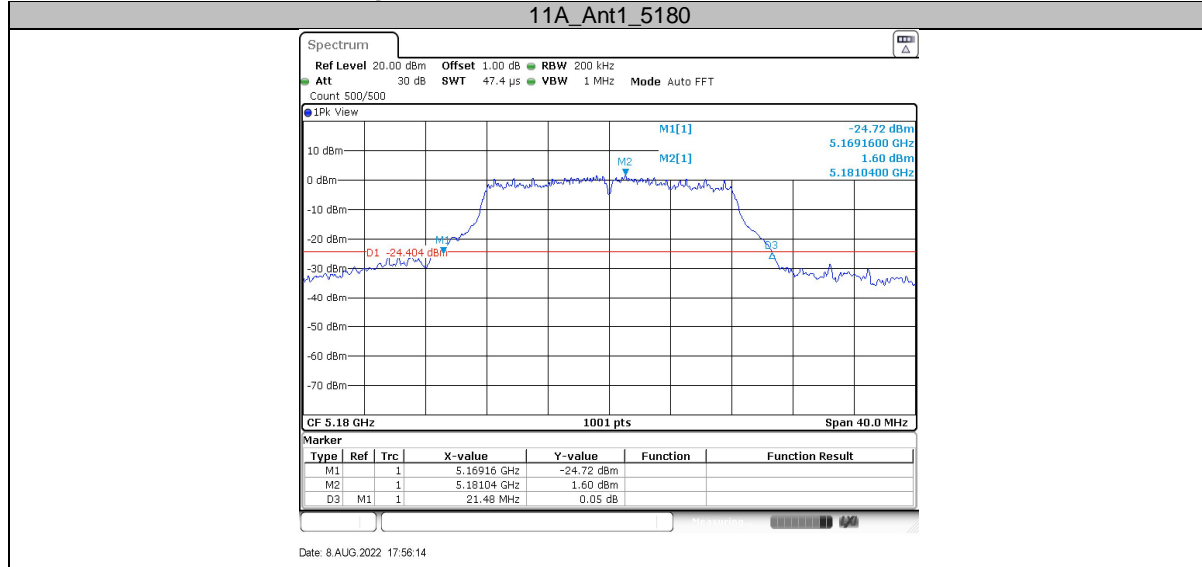
26dB Bandwidth Test result:

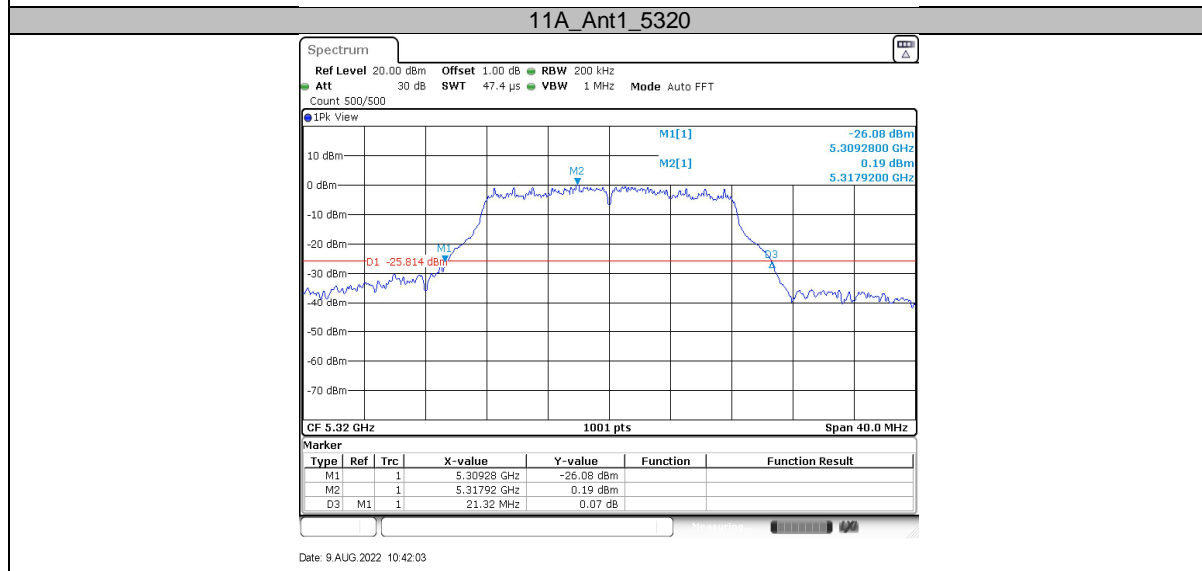
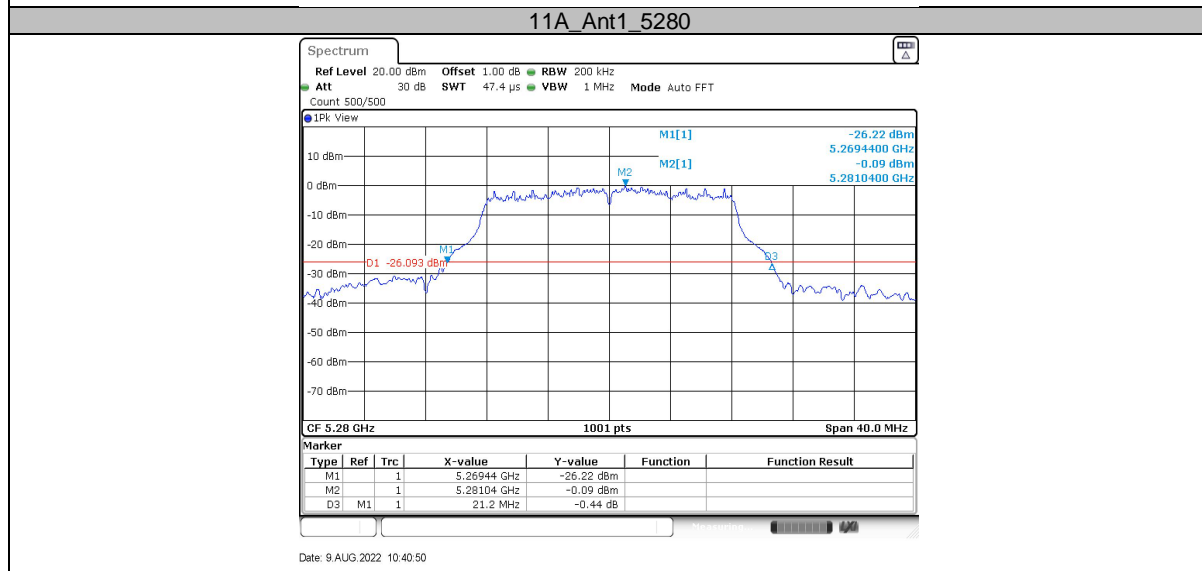
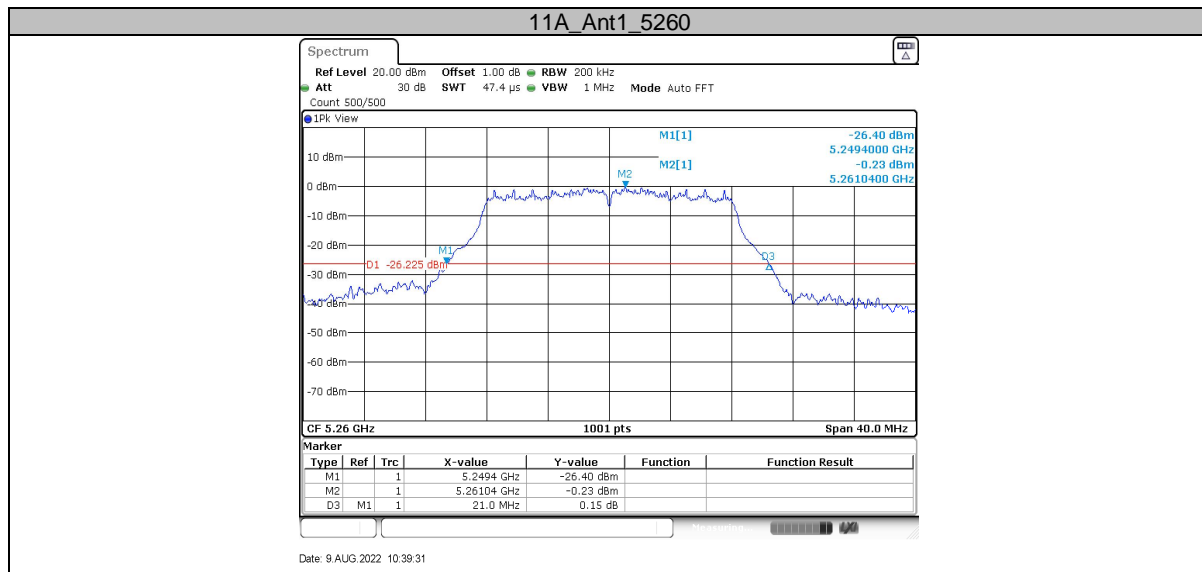
Test Mode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	21.480	5169.160	5190.640	---	PASS
		5200	21.360	5189.360	5210.720	---	PASS
		5240	22.280	5228.320	5250.600	---	PASS
		5260	21.000	5249.400	5270.400	---	PASS
		5280	21.200	5269.440	5290.640	---	PASS
		5320	21.320	5309.280	5330.600	---	PASS
		5500	24.800	5485.880	5510.680	---	PASS
		5580	21.320	5569.360	5590.680	---	PASS
		5700	21.080	5689.440	5710.520	---	PASS
		5720	21.440	5709.200	5730.640	---	PASS
		5720_UNII-2C	15.8	5709.200	5725	---	PASS
5720_UNII-3	5.64	5725	5730.640	---	PASS		
11N20SISO	Ant1	5180	21.520	5169.200	5190.720	---	PASS
		5200	21.560	5189.120	5210.680	---	PASS
		5240	21.440	5229.280	5250.720	---	PASS
		5260	21.800	5249.000	5270.800	---	PASS
		5280	21.800	5268.960	5290.760	---	PASS
		5320	22.120	5308.640	5330.760	---	PASS
		5500	21.640	5489.200	5510.840	---	PASS
		5580	21.720	5569.280	5591.000	---	PASS
		5700	21.600	5689.120	5710.720	---	PASS
		5720	21.600	5709.160	5730.760	---	PASS
		5720_UNII-2C	15.84	5709.160	5725	---	PASS
5720_UNII-3	5.76	5725	5730.760	---	PASS		
11N40SISO	Ant1	5190	40.640	5169.520	5210.160	---	PASS
		5230	40.080	5210.080	5250.160	---	PASS
		5270	40.400	5249.840	5290.240	---	PASS
		5310	45.440	5284.720	5330.160	---	PASS
		5510	40.560	5489.760	5530.320	---	PASS
		5550	40.400	5529.760	5570.160	---	PASS
		5670	43.840	5649.840	5693.680	---	PASS
		5710	40.720	5689.600	5730.320	---	PASS
		5710_UNII-2C	35.4	5689.600	5725	---	PASS
		5710_UNII-3	5.32	5725	5730.320	---	PASS
11AC20SISO	Ant1	5180	21.640	5169.120	5190.760	---	PASS
		5200	22.120	5188.680	5210.800	---	PASS
		5240	21.560	5229.280	5250.840	---	PASS
		5260	21.520	5249.120	5270.640	---	PASS
		5280	22.560	5268.320	5290.880	---	PASS
		5320	21.440	5309.240	5330.680	---	PASS
		5500	21.640	5489.200	5510.840	---	PASS
		5580	21.520	5569.280	5590.800	---	PASS
		5700	21.600	5689.160	5710.760	---	PASS
		5720	21.760	5709.000	5730.760	---	PASS
		5720_UNII-2C	16	5709.000	5725	---	PASS
5720_UNII-3	5.76	5725	5730.760	---	PASS		
11AC40SISO	Ant1	5190	40.640	5169.520	5210.160	---	PASS
		5230	40.640	5209.600	5250.240	---	PASS
		5270	40.480	5249.840	5290.320	---	PASS
		5310	42.640	5287.520	5330.160	---	PASS
		5510	41.040	5489.840	5530.880	---	PASS
		5550	40.640	5529.600	5570.240	---	PASS
		5670	48.560	5649.680	5698.240	---	PASS
		5710	40.400	5689.760	5730.160	---	PASS
		5710_UNII-2C	35.24	5689.760	5725	---	PASS
		5710_UNII-3	5.16	5725	5730.160	---	PASS
11AC80SISO	Ant1	5210	82.560	5168.720	5251.280	---	PASS
		5290	82.400	5249.040	5331.440	---	PASS
		5530	82.240	5489.040	5571.280	---	PASS
		5690	82.720	5648.720	5731.440	---	PASS

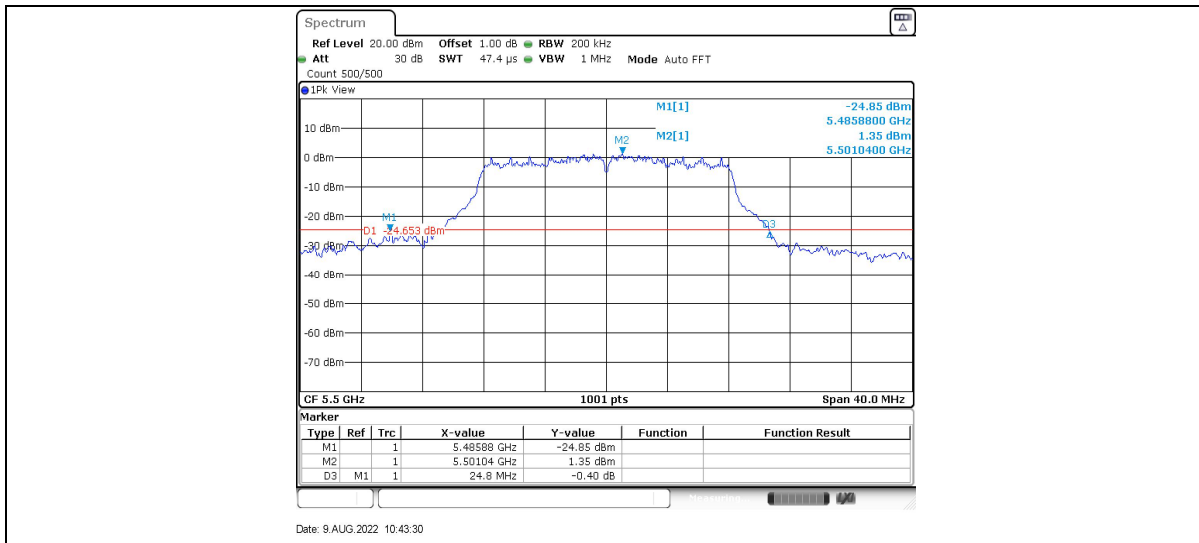


		5690_UNII-2C	76.28	5648.720	5725	---	PASS
		5690_UNII-3	6.44	5725	5731.440	---	PASS
11AX20SISO	Ant1	5180	21.320	5169.360	5190.680	---	PASS
		5200	21.560	5189.280	5210.840	---	PASS
		5240	21.400	5229.280	5250.680	---	PASS
		5260	21.400	5249.200	5270.600	---	PASS
		5280	21.320	5269.280	5290.600	---	PASS
		5320	21.560	5309.160	5330.720	---	PASS
		5500	21.360	5489.360	5510.720	---	PASS
		5580	21.360	5569.360	5590.720	---	PASS
		5700	21.440	5689.280	5710.720	---	PASS
		5720	21.960	5708.880	5730.840	---	PASS
		5720_UNII-2C	16.12	5708.880	5725	---	PASS
		5720_UNII-3	5.84	5725	5730.840	---	PASS
		11AX40SISO	Ant1	5190	40.560	5169.840	5210.400
5230	40.480			5209.840	5250.320	---	PASS
5270	40.560			5249.760	5290.320	---	PASS
5310	40.400			5289.840	5330.240	---	PASS
5510	40.720			5489.600	5530.320	---	PASS
5550	40.640			5529.680	5570.320	---	PASS
5670	40.480			5649.840	5690.320	---	PASS
5710	40.560			5689.760	5730.320	---	PASS
5710_UNII-2C	35.24			5689.760	5725	---	PASS
5710_UNII-3	5.32			5725	5730.320	---	PASS
11AX80SISO	Ant1	5210	82.560	5168.880	5251.440	---	PASS
		5290	95.520	5235.760	5331.280	---	PASS
		5530	82.080	5489.040	5571.120	---	PASS
		5690	82.720	5648.720	5731.440	---	PASS
		5690_UNII-2C	76.28	5648.720	5725	---	PASS
		5690_UNII-3	6.44	5725	5731.440	---	PASS

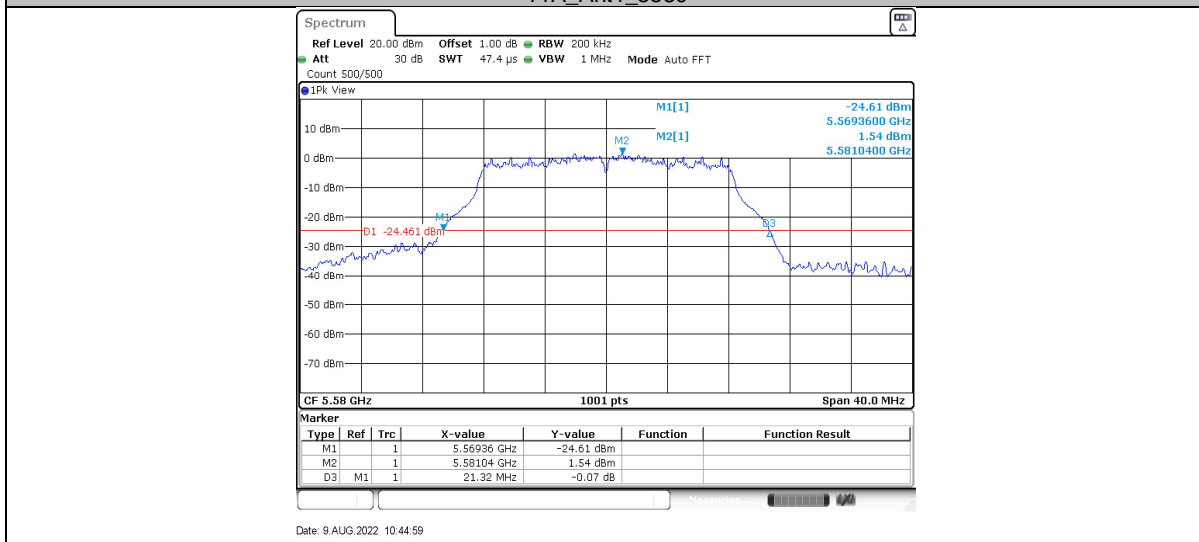
26dB Bandwidth Test Graphs



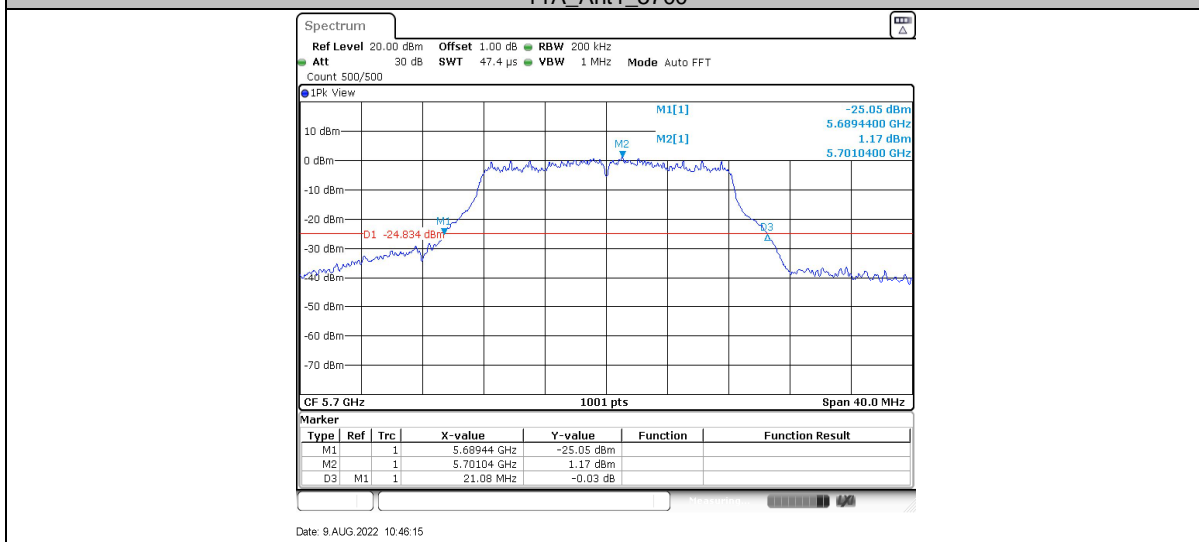




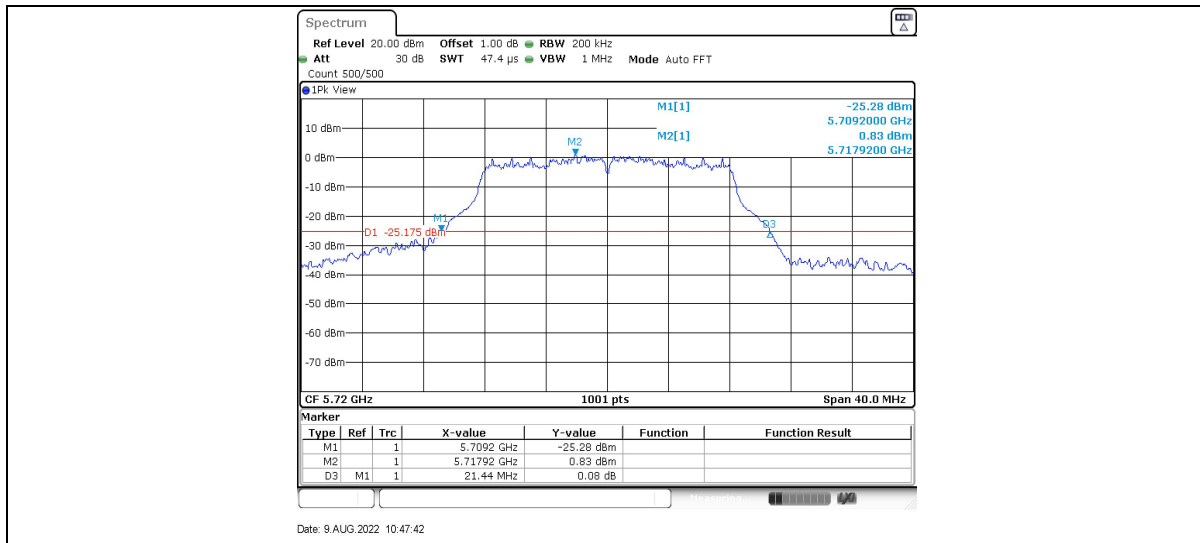
11A_Ant1_5580



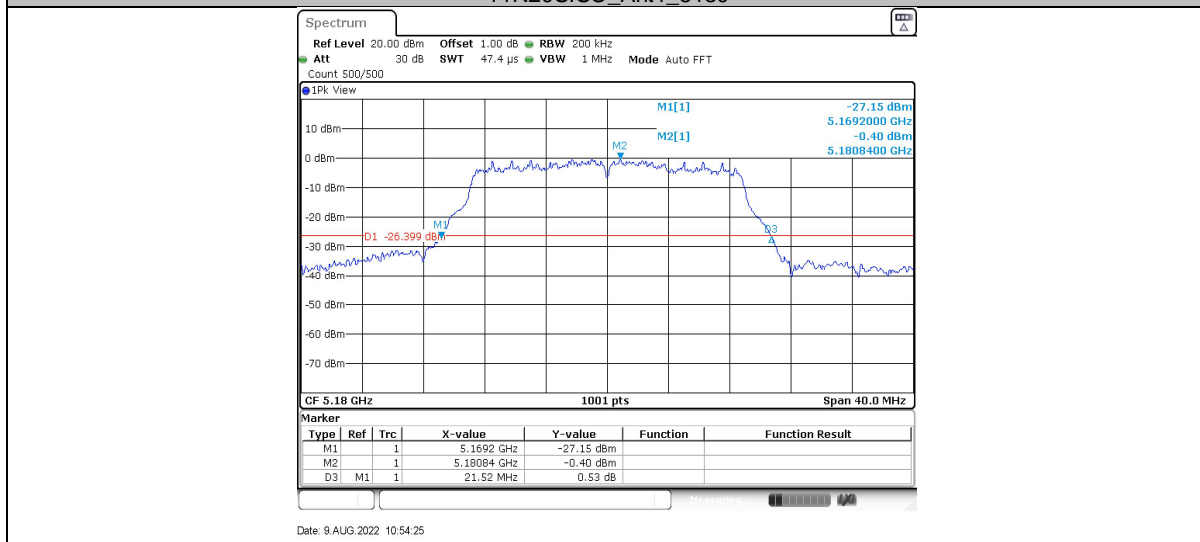
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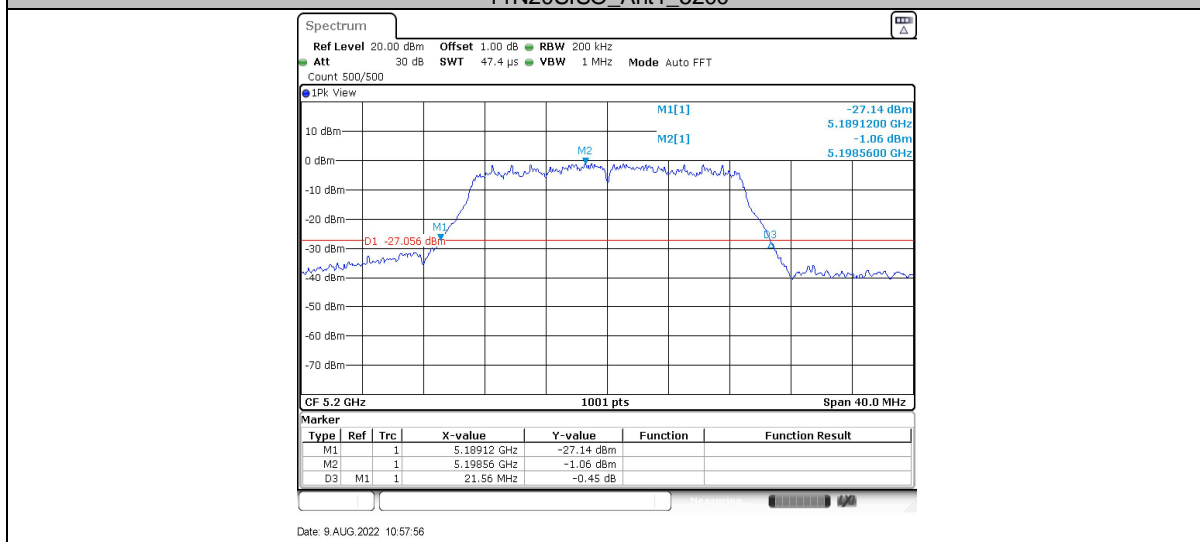
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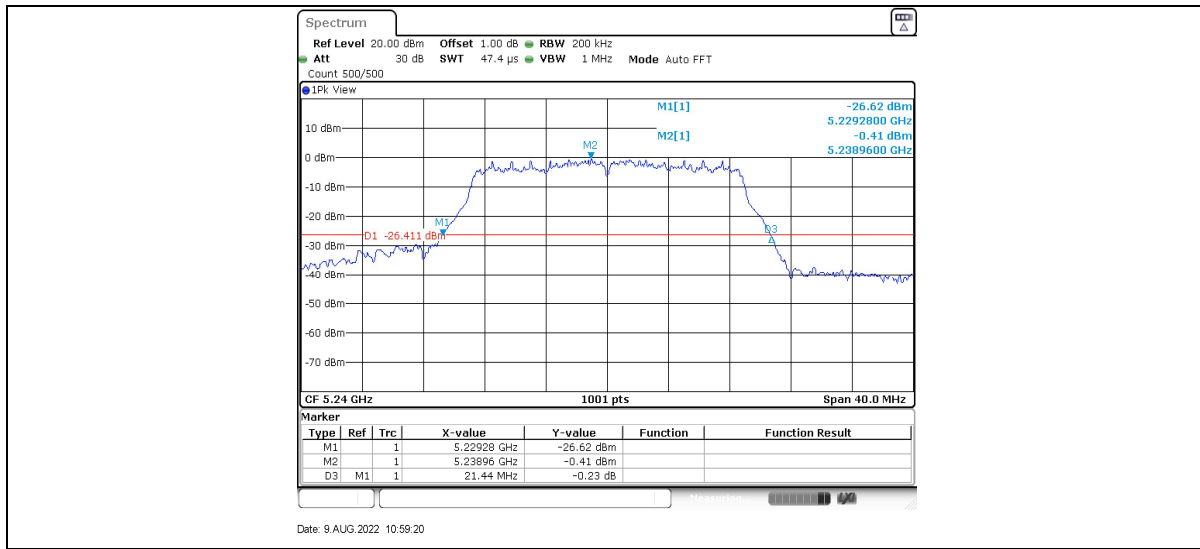
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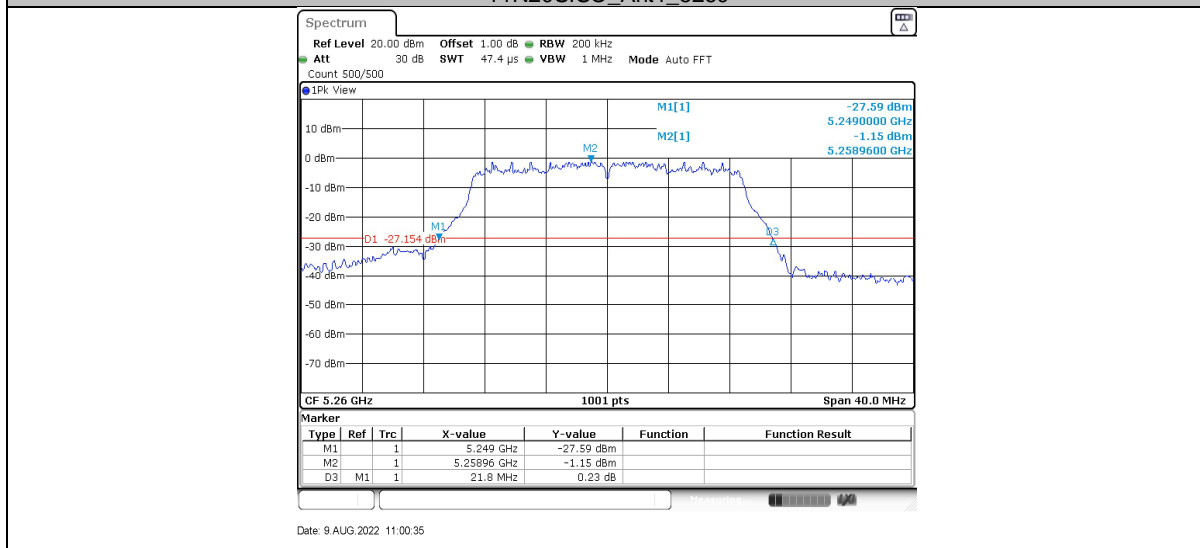
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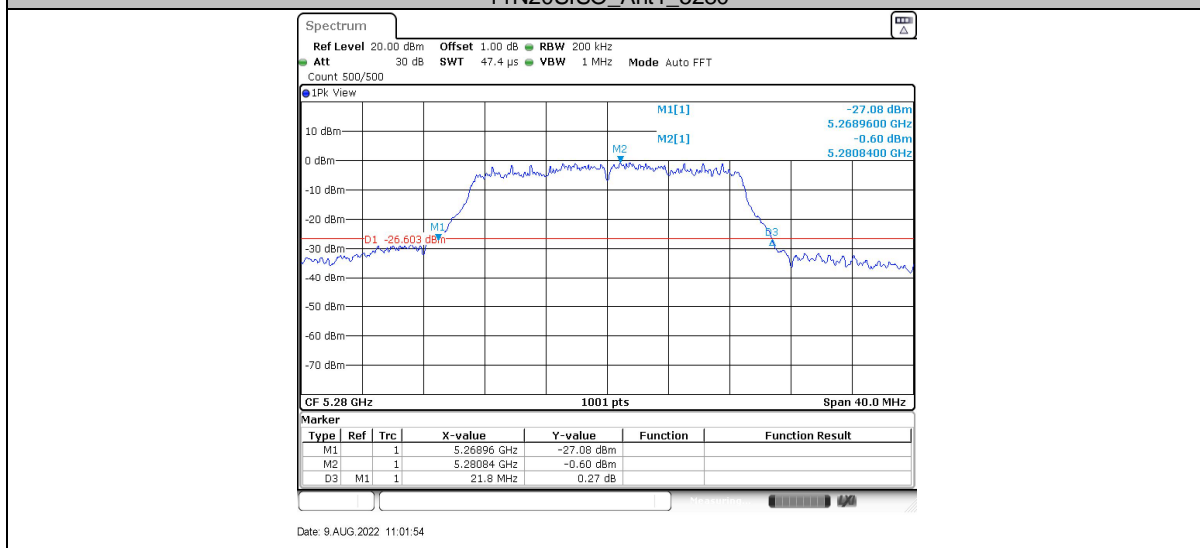
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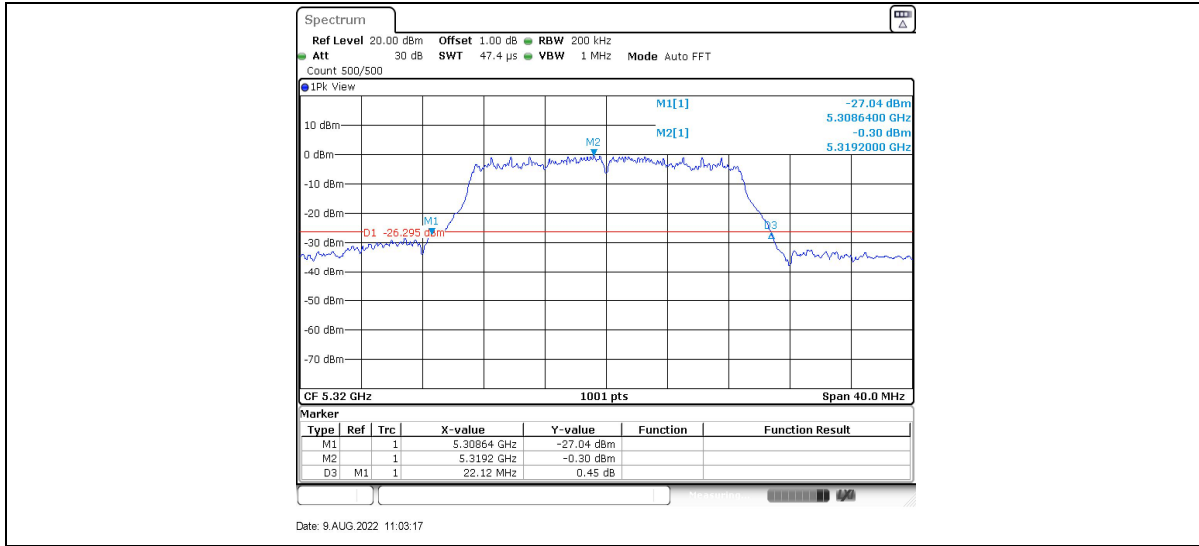
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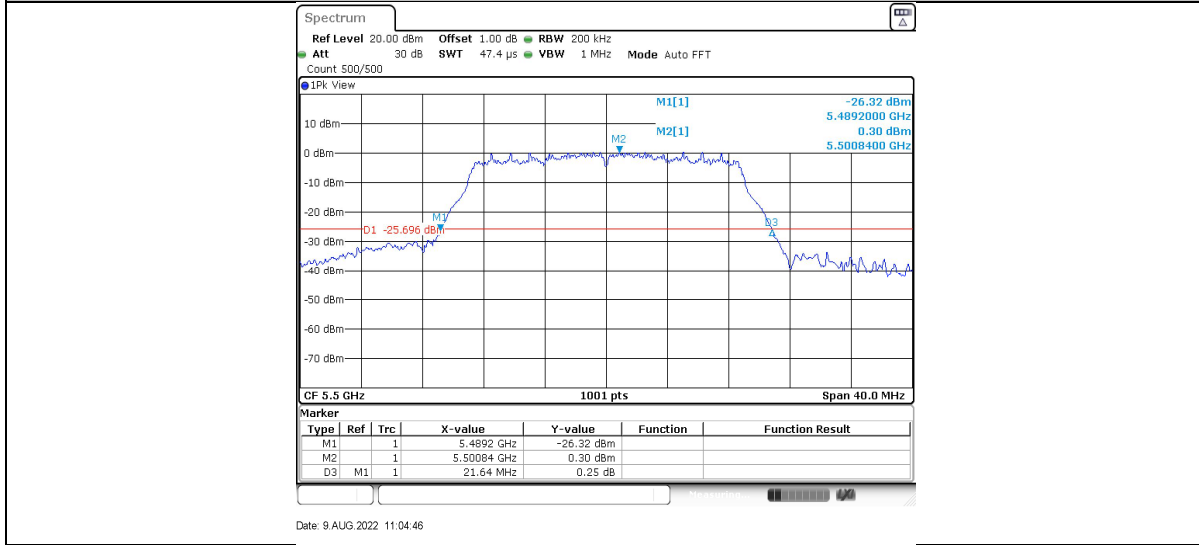
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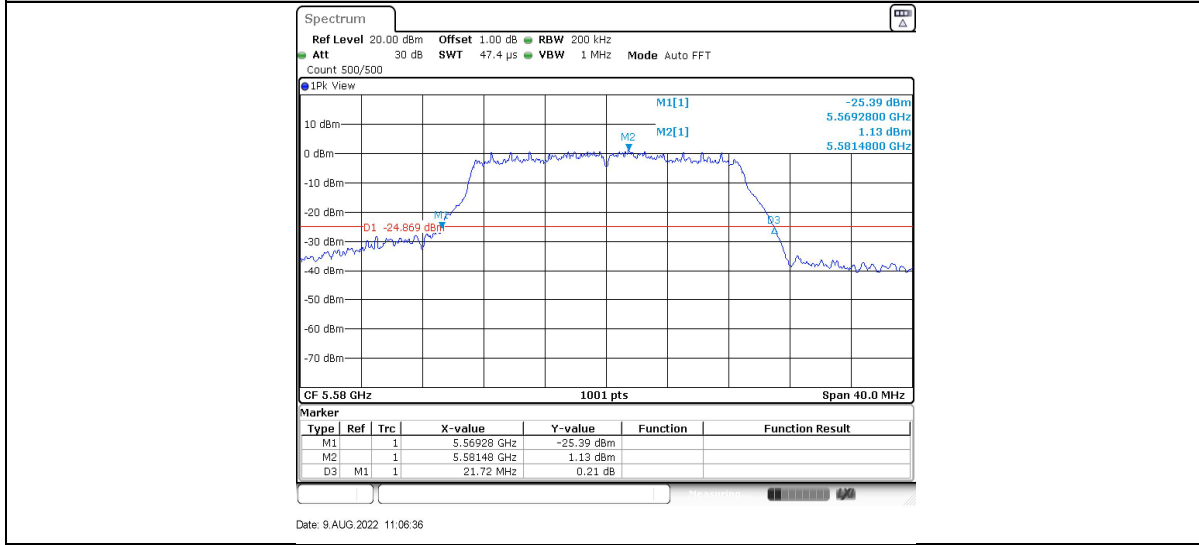
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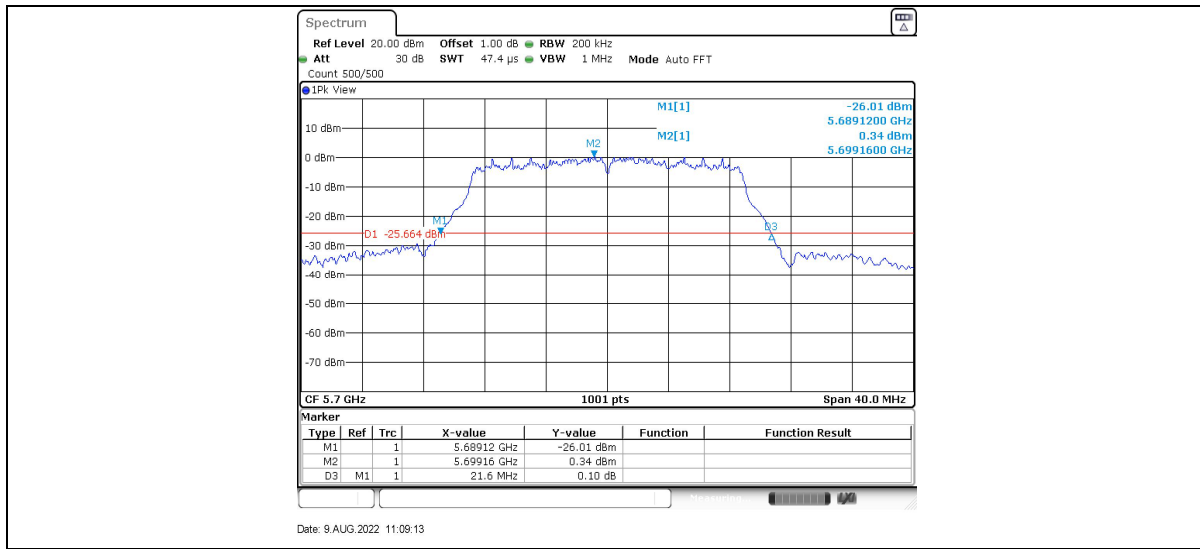
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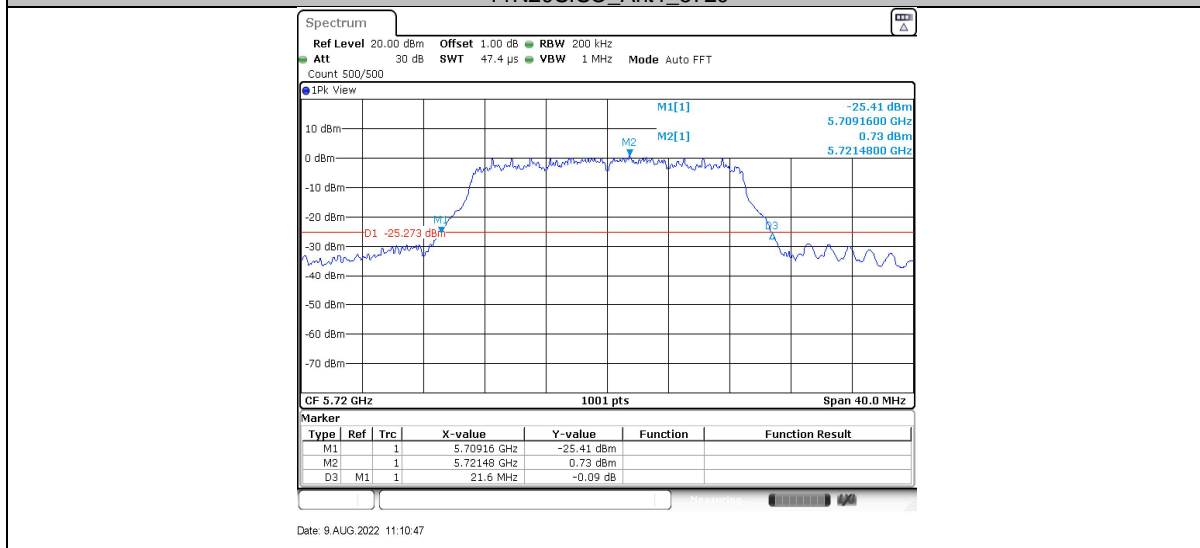
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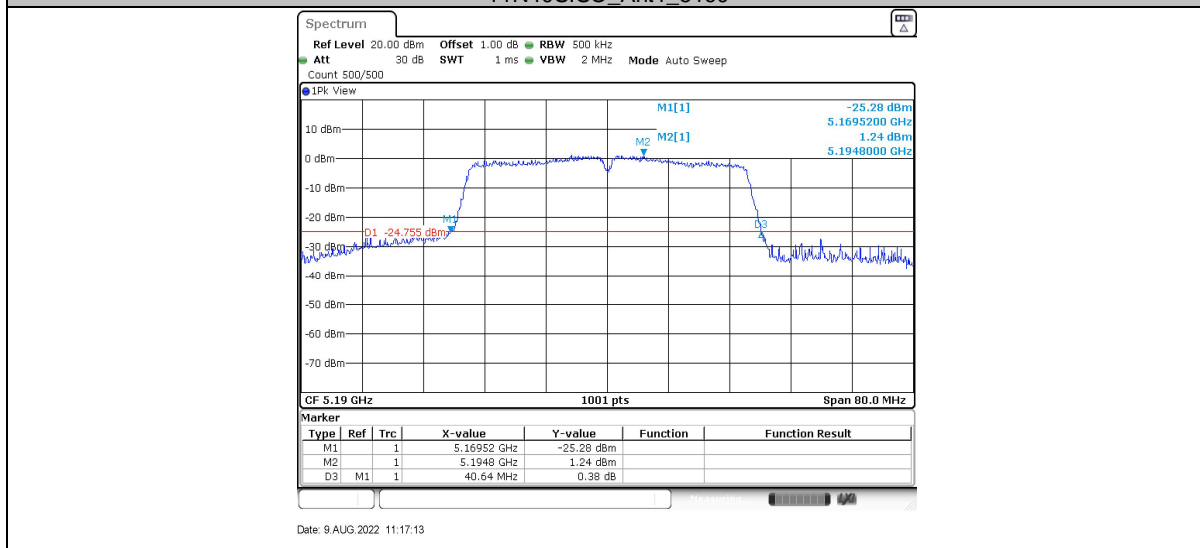
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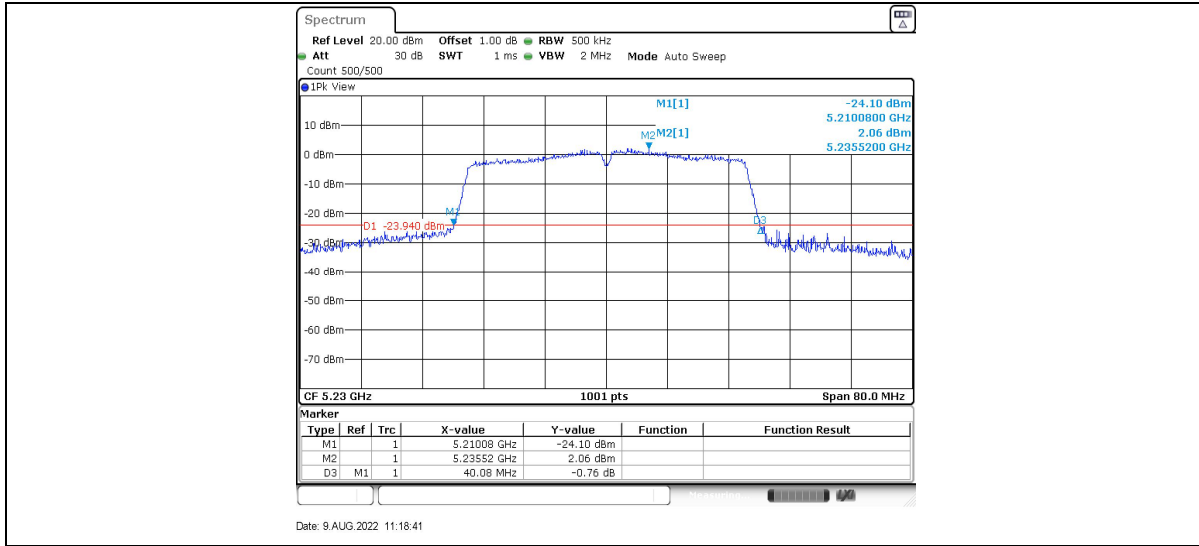
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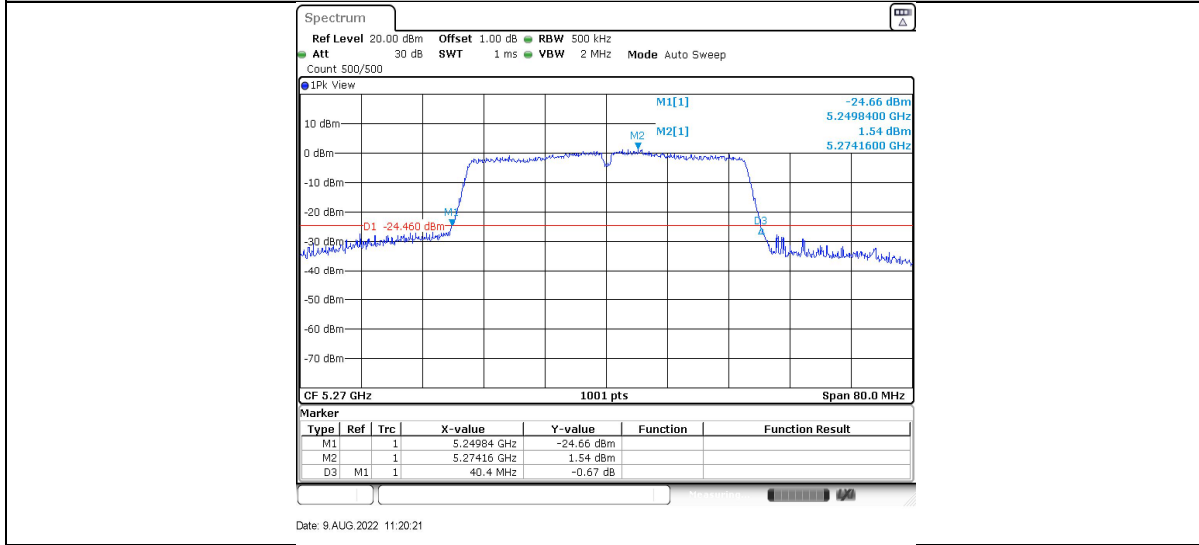
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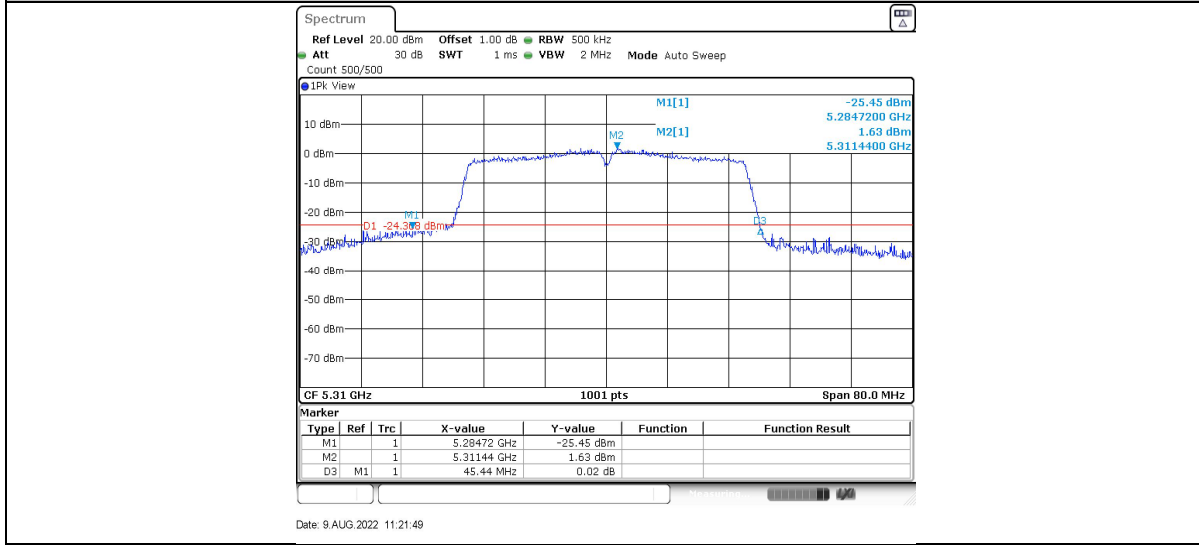
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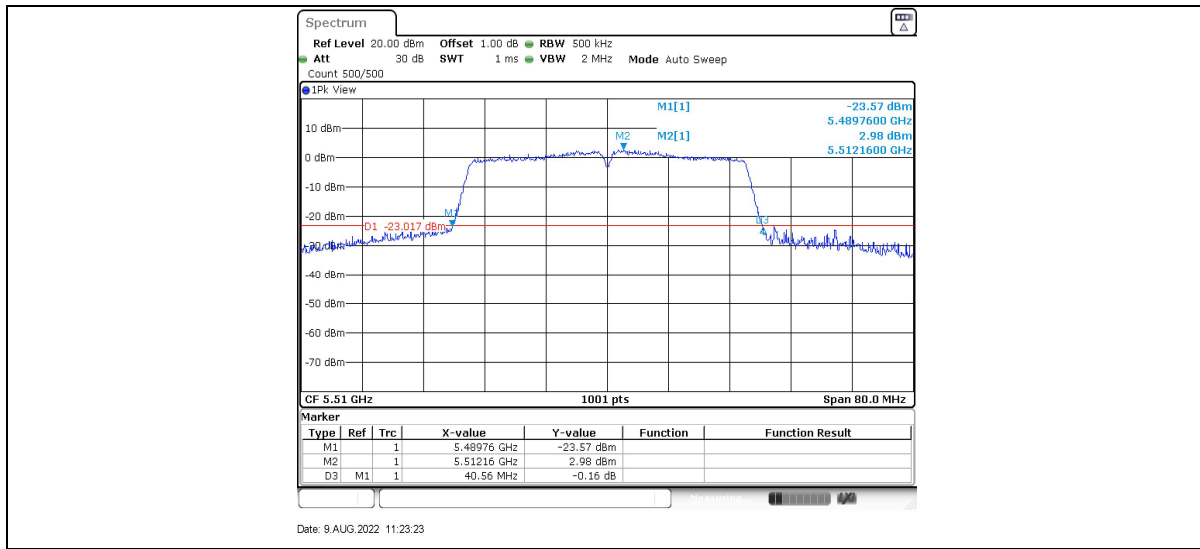
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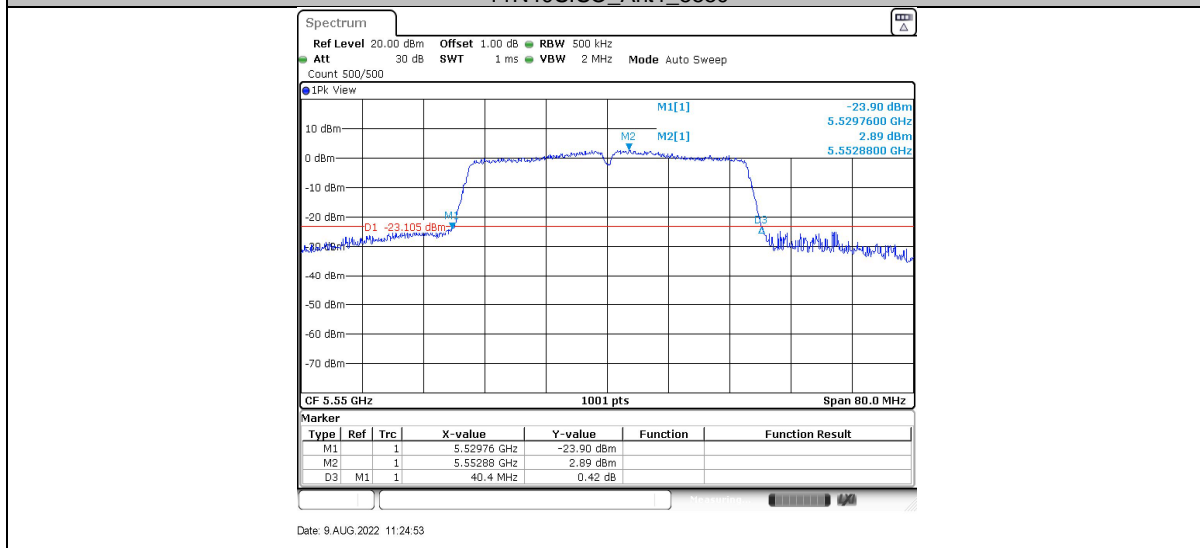
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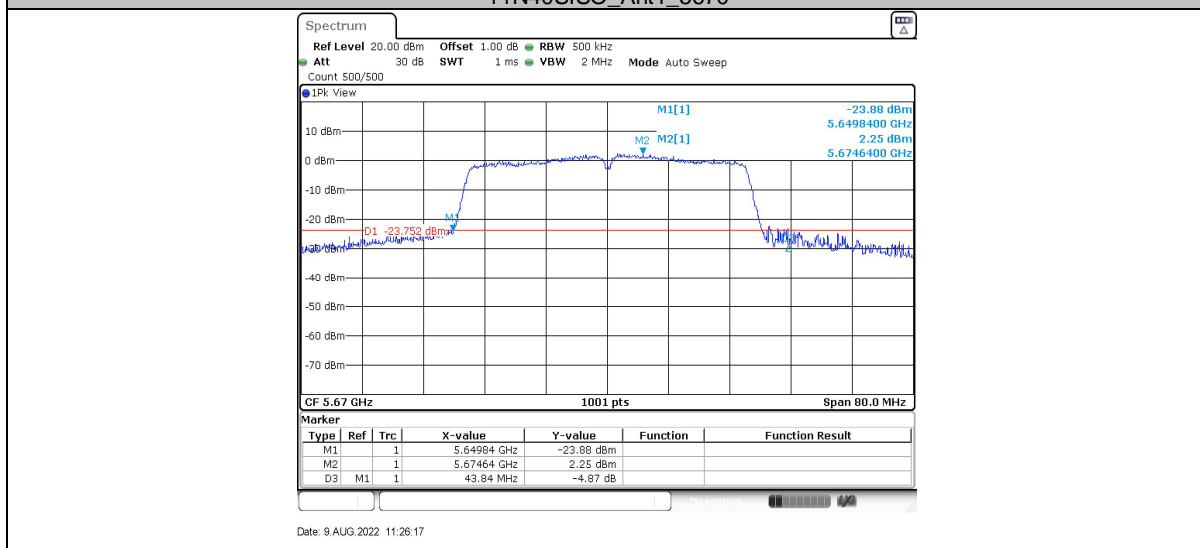
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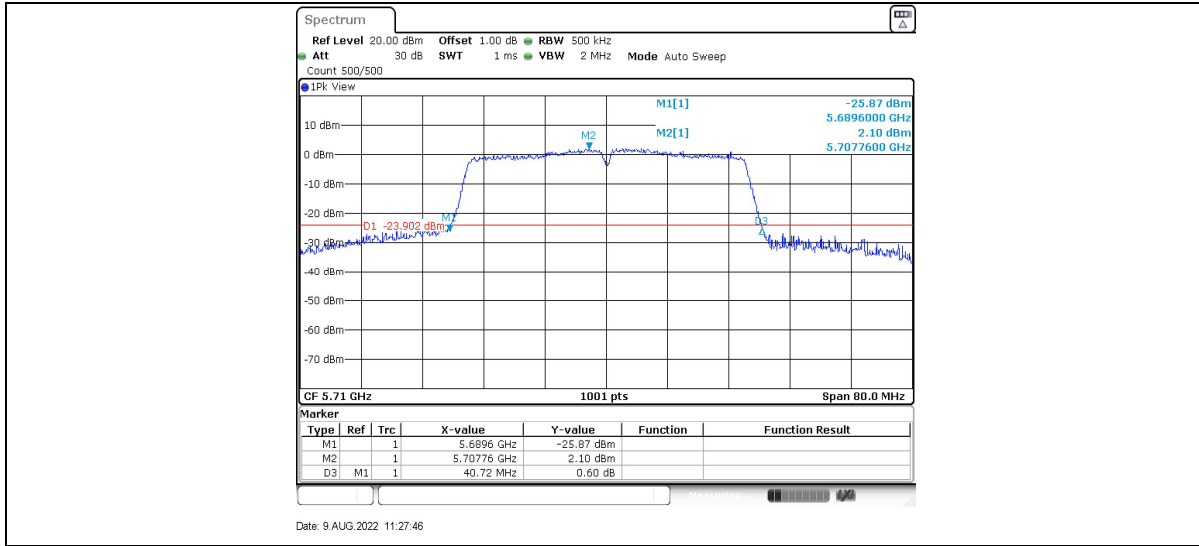
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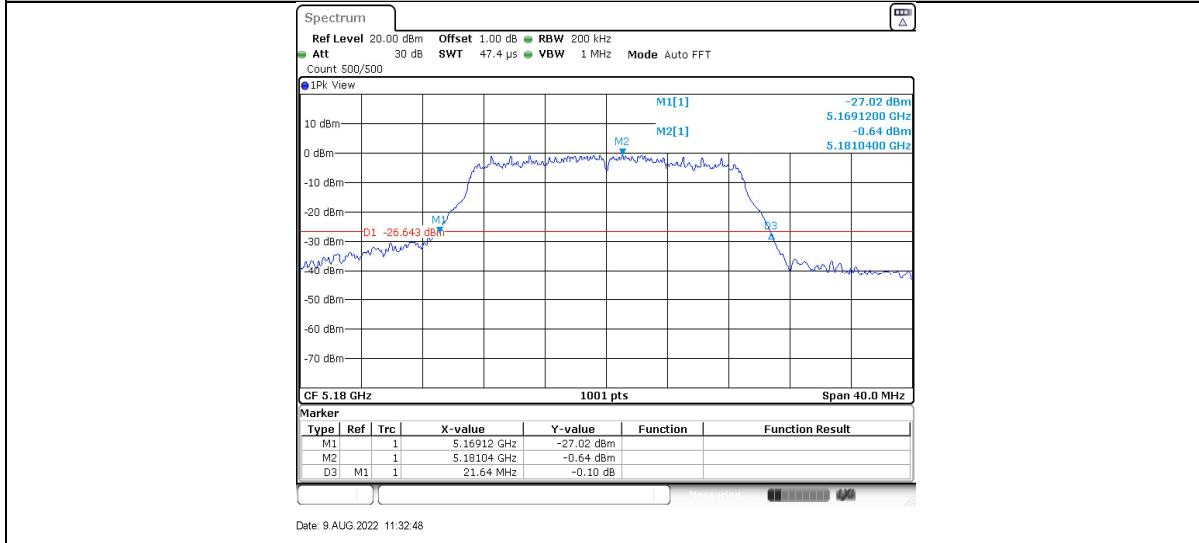
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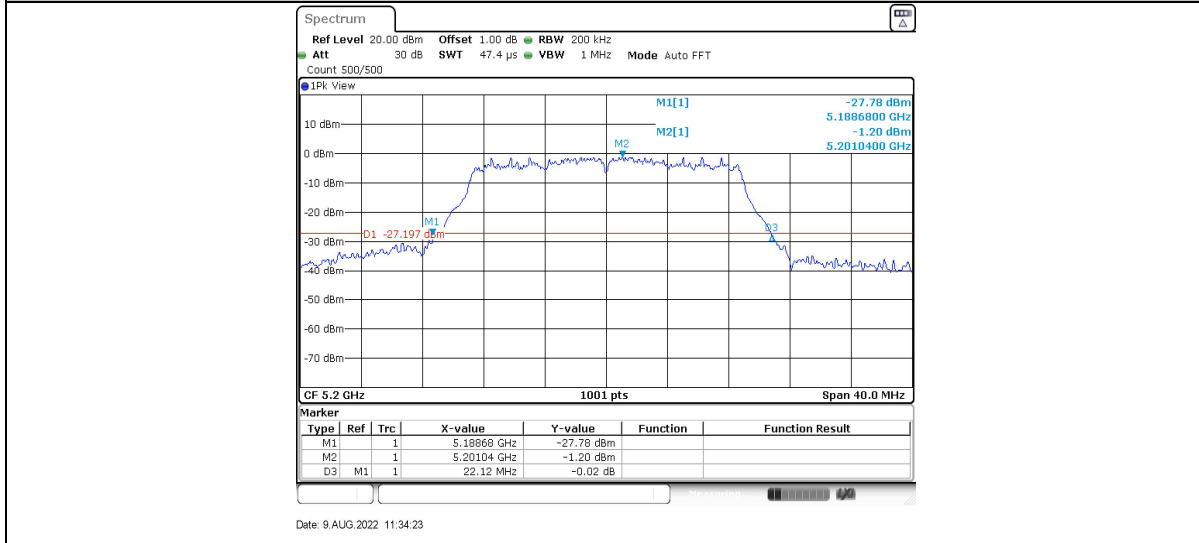
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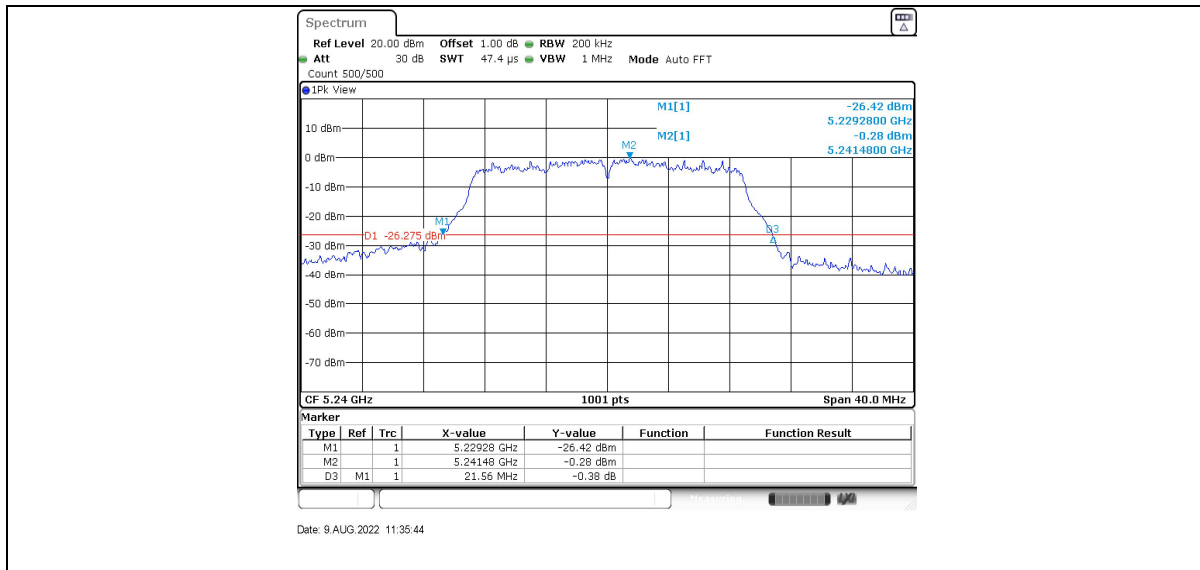
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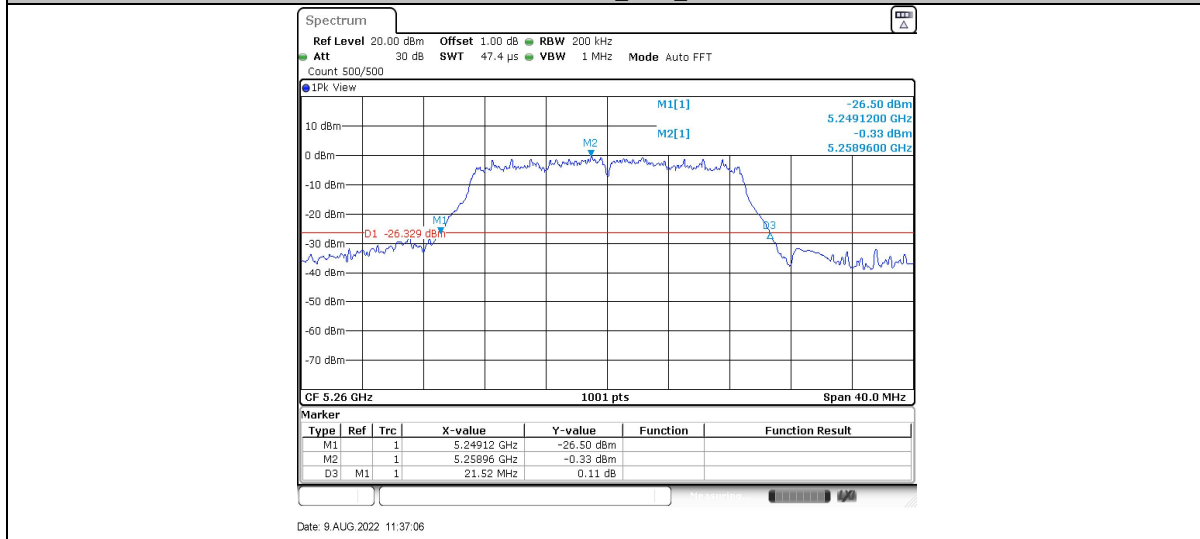
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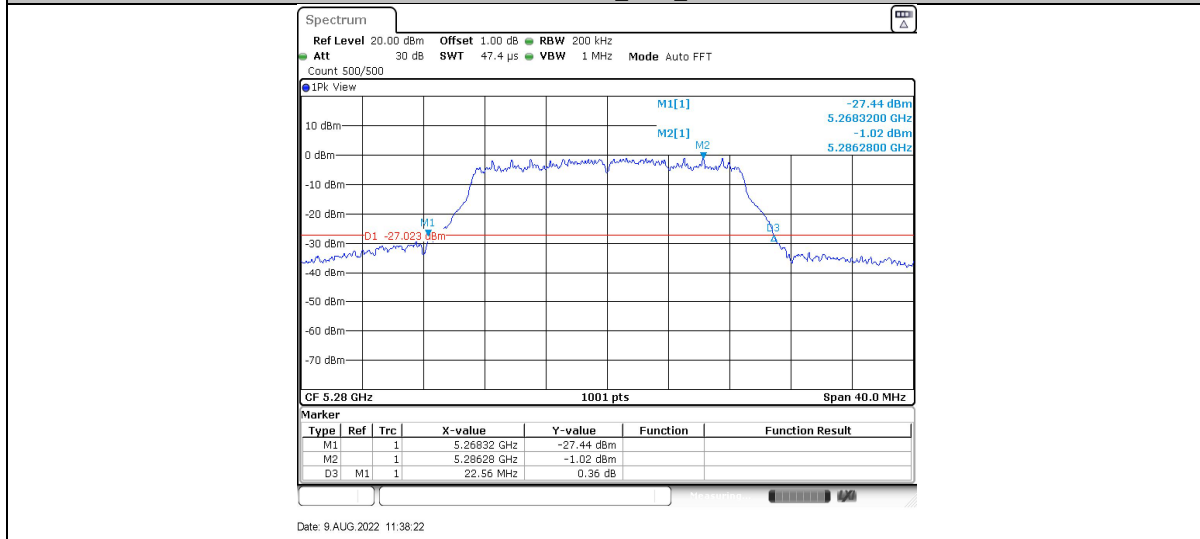
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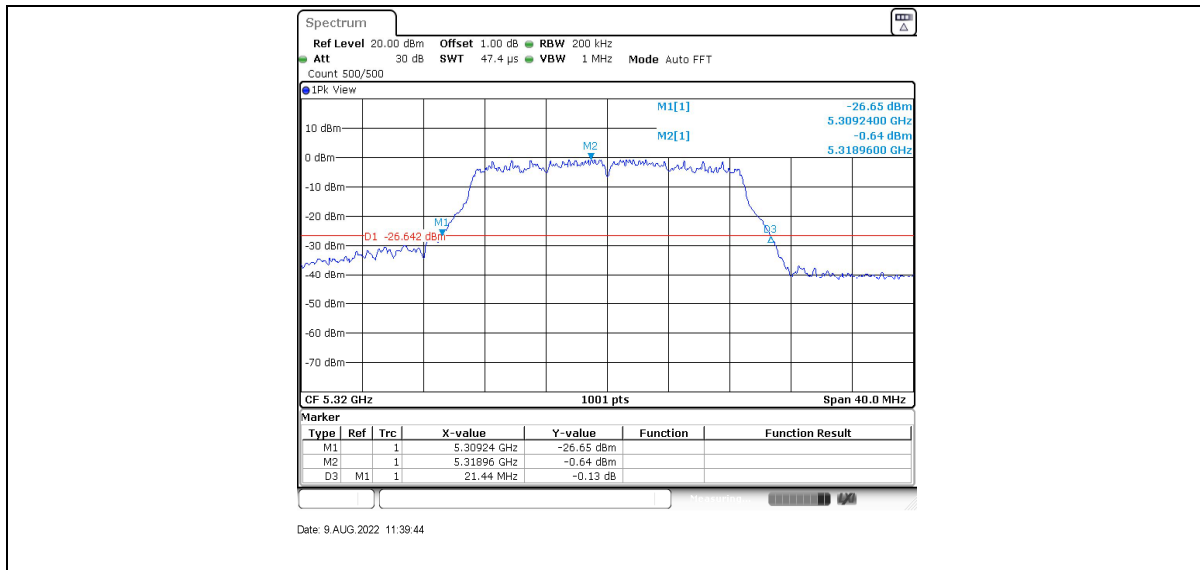
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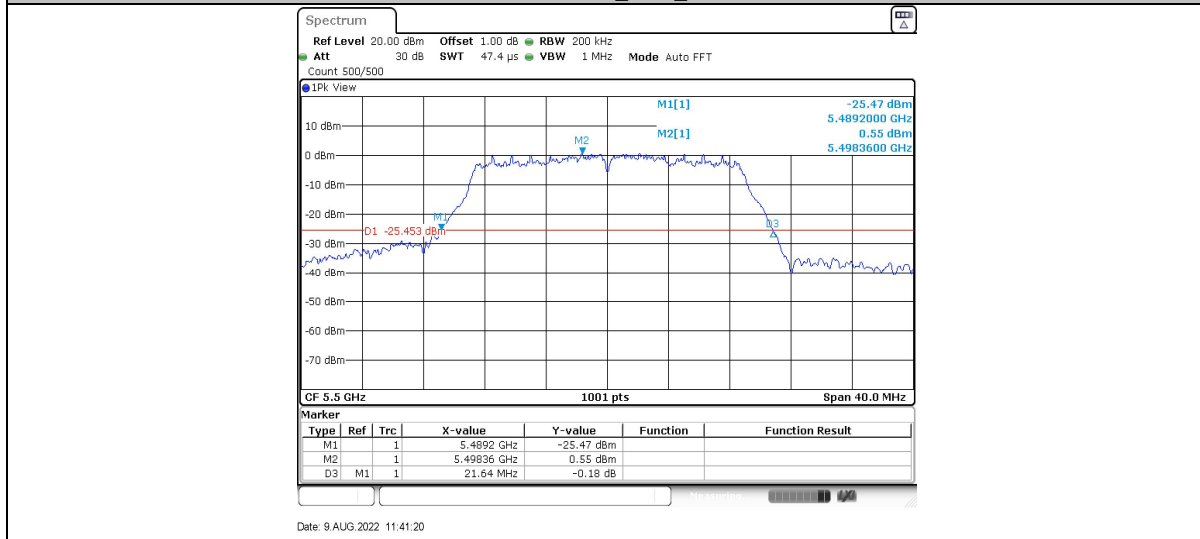
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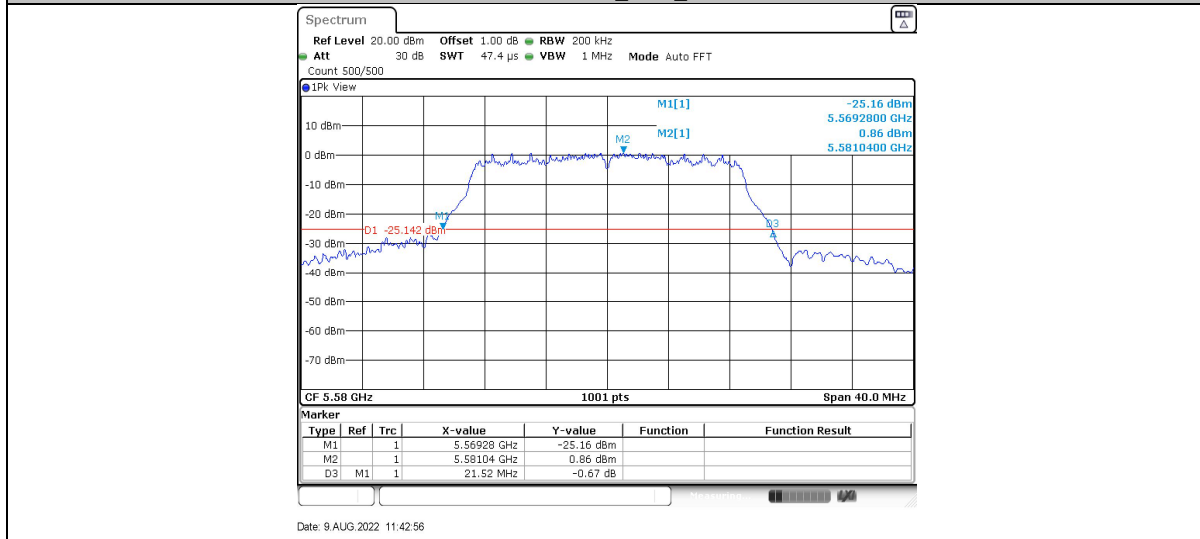
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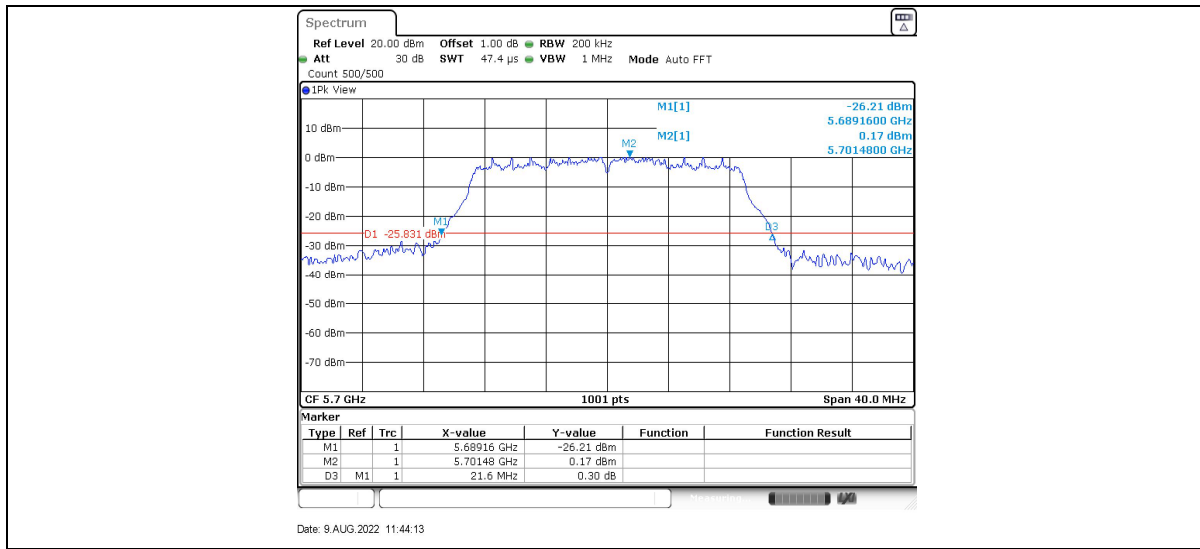
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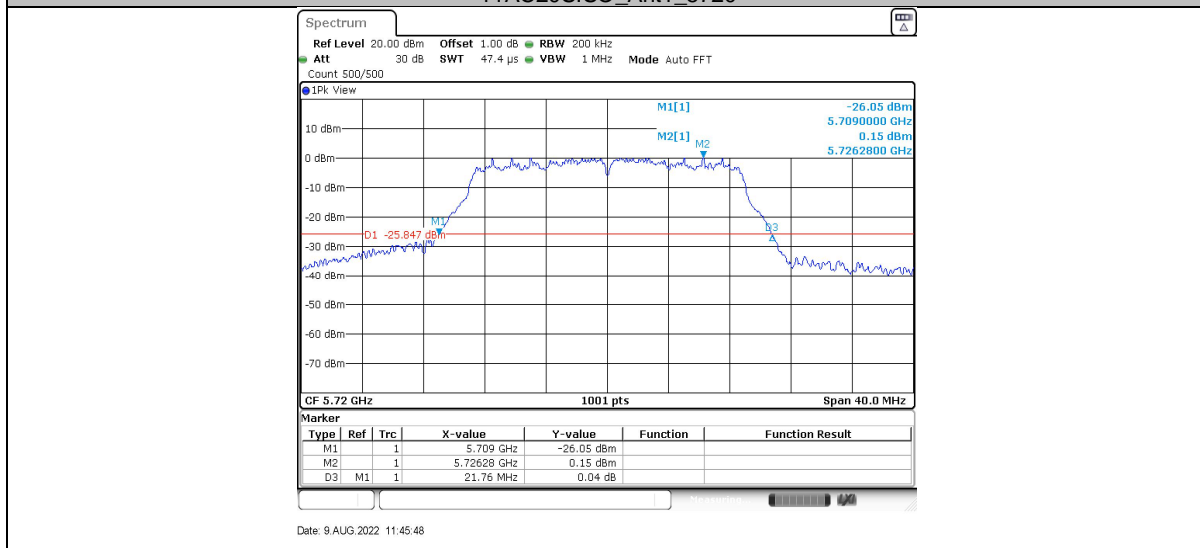
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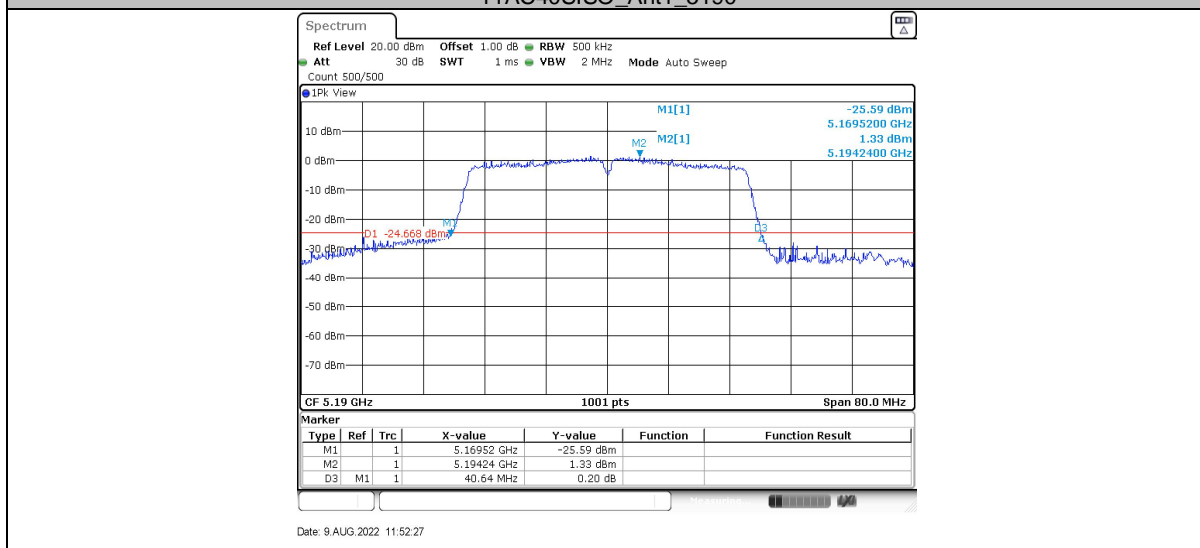
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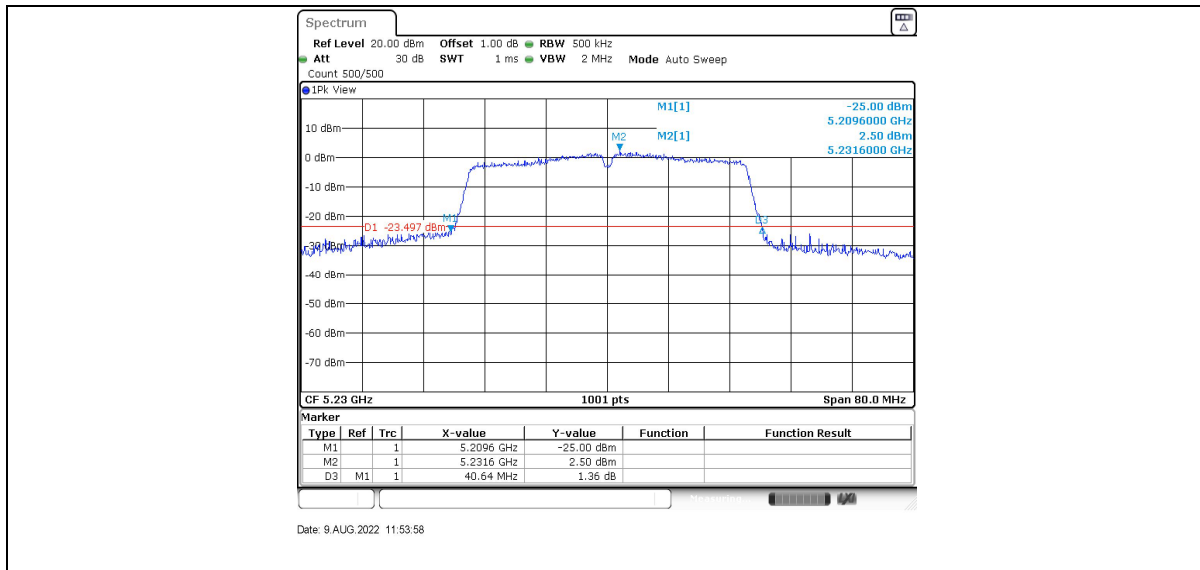
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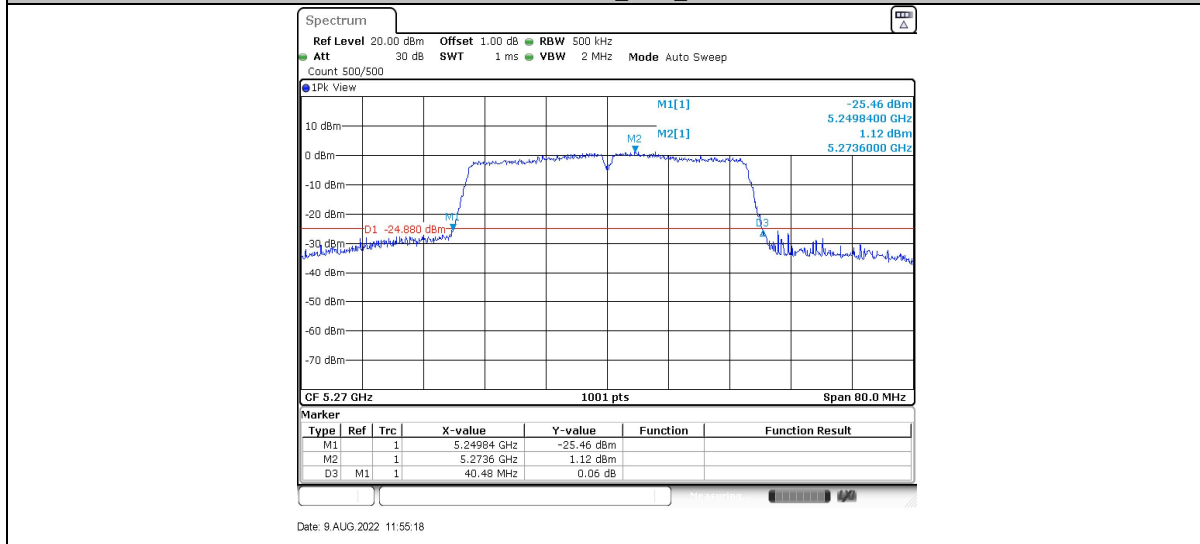
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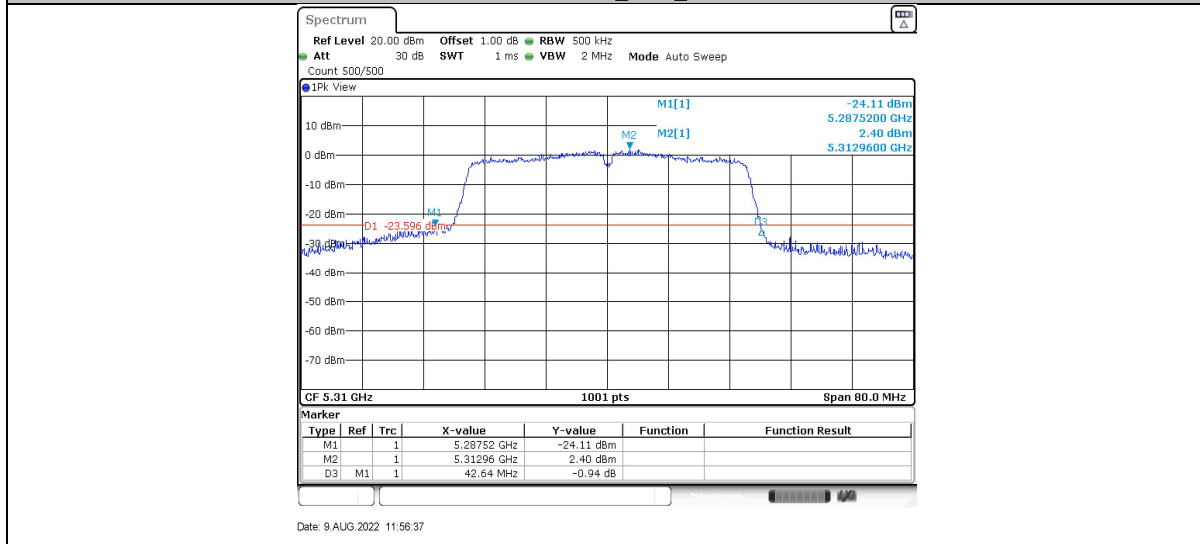
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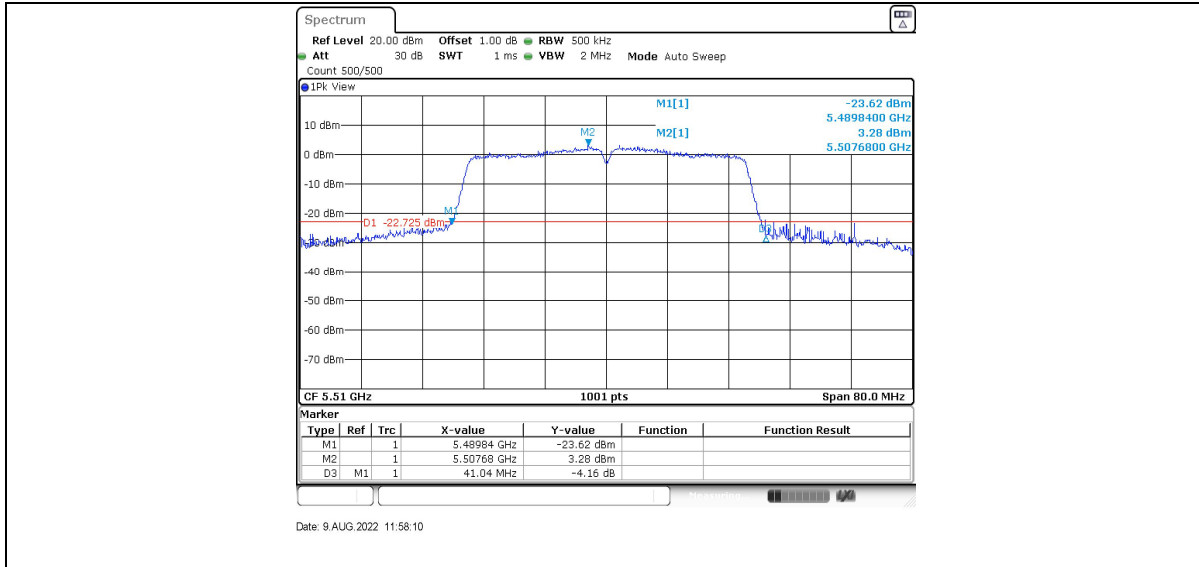
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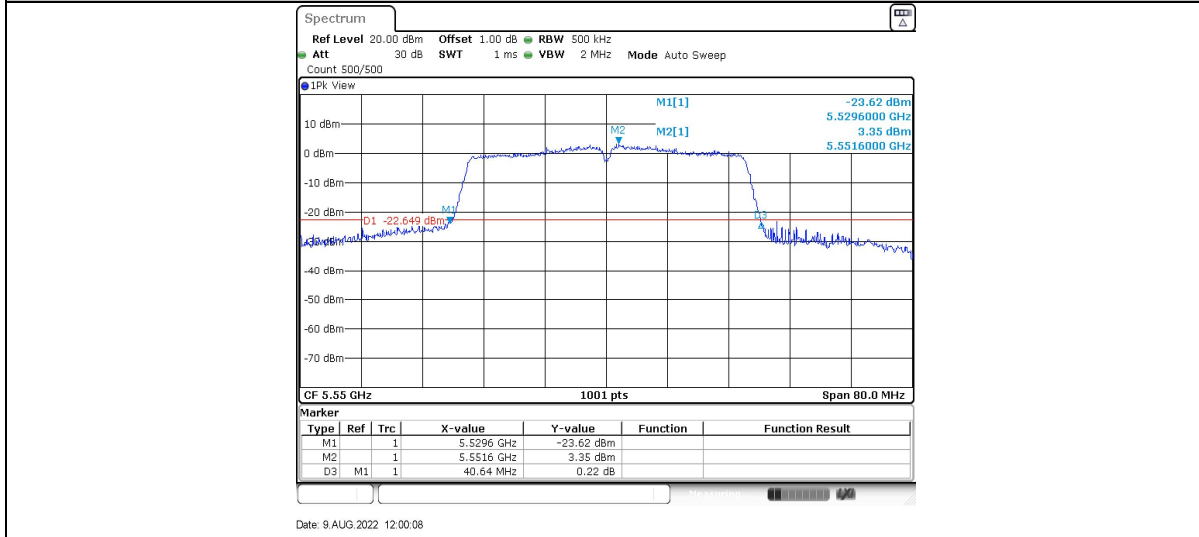
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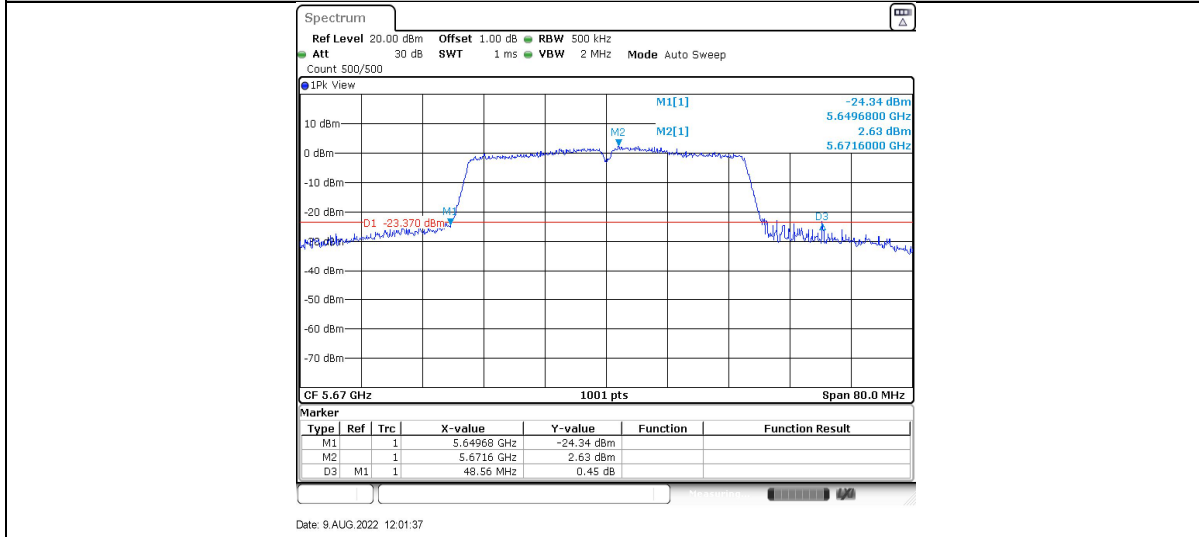
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11AC40SISO_Ant1_5550



11AC40SISO_Ant1_5670



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