

FCC - TEST REPORT

Report Number : **68.950.19.0509.01** Date of Issue: May 25, 2019

Model : **SPCC1**

Product Type : Camera

Applicant : GoPro, Inc.

Address : 3000 Clearview Way, San Mateo, CA 94402, USA

Manufacturer : GoPro, Inc.

Address : 3000 Clearview Way, San Mateo, CA 94402, USA

Test Result : ☒ **Positive** ☐ **Negative**

Total pages including
Appendices : **120**

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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
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FCC Designation Number: CN5009

FCC Registration Number: 514049

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3 Description of the Equipment Under Test

Description of the Equipment Under Test

Product:	Camera
Model no.:	SPCC1
FCC ID:	CNFSPCC1
Rating:	3.85VDC
RF Transmission Frequency:	5.180GHz~5.240GHz; 5.260GHz~5.320GHz; 5.500GHz~5.700GHz; 5.745GHz~5.825GHz
Modulation:	802.11a: BPSK, QPSK, 16QAM, 64QAM 802.11n: BPSK, QPSK, 16QAM, 64QAM 802.11ac: BPSK, QPSK, 16QAM, 64QAM, 256QAM
Antenna Type:	Integral Metal Antenna
Antenna Gain:	3.2dBi max for 5G
Description of the EUT:	The Equipment Under Test (EUT) is a Camera supports 2.4GHz Bluetooth/WIFI, 5GHz WIFI functions.

4 Summary of Test Standards

Test Standards	
FCC Part 15 Subpart E, 10-1-2018 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart E - Unlicensed National Information Infrastructure Devices
FCC Part 15 Subpart C 10-1-2018 Edition	PART 15 - RADIO FREQUENCY DEVICES Subpart C - Intentional Radiators

Test Method:

FCC KDB 558074 D01 15.247 Meas Guidance v05r02

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

Technical Requirements				
FCC Part 15 Subpart E, FCC Part 15 Subpart C				
Test Condition	Pages	Test Result		
		Pass	Fail	N/A
15.207 Conducted Emission AC Power Port	13	☒	☐	☐
15.407(e) Emission bandwidth	16	☒	☐	☐
15.407(a)(i) Maximum Conducted Output Power	22	☒	☐	☐
15.407(a)(i) Maximum Power Spectral Density	25	☒	☐	☐
15.407(b)(1), 15.407(b)(2), 15.407(b)(3), 15.407(b)(4), 15.407(b)(6) 15.407(b)(7) 15.209 Unwanted Emissions	28	☒	☐	☐
15.407(b)(i), 15.407(b)(5), 15.407(b)(7), 15.209 Band edge compliance	78	☒	☐	☐
15.407(g) Frequencies Stability	108	☒	☐	☐
15.407(h) Dynamic Frequency Selection (DFS).	114	☒	☐	☐
15.203 Antenna Requirement	See note 1	☒	☐	☐

Remark: [a](#) The EUT is Clients Device without Radar Detection.

Note 1: The EUT uses an Integrated antenna, which gain is 3.2dBi. In accordance to 15.203, 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: CNFSPCC1, complies with Section 15.207, 15.209, 15.205, 15.247 of the FCC Part 15, Subpart C

The Model: SPCC1 supports Bluetooth Low Energy/WIFI/GPS & Galileo receiving functions, power by 3.85Vdc, 1600mAh supplied by a rechargeable Lithium Ion Battery or 5Vdc supplied by USB type C port.

The TX and RX range is 2402MHz-2480MHz for Bluetooth, 2412MHz – 2462MHz for 2.4GHzWIFI, 5180MHz – 5320MHz, 5500MHz – 5700MHz, 5745MHz – 5825MHz for 5GHzWIFI, 1575.42MHz for GNSS (only GPS and Galileo) Receiver supported highest resolutions: 5.6K.

This report is for the 5GHz WIFI band 1/2/3/4.

SUMMARY:

All tests according to the regulations cited on page 5 were

■ - Performed

□ - **Not** Performed

The Equipment Under Test

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

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

Sample Received Date: April 28, 2019

Testing Start Date: April 28, 2019

Testing End Date: May 25, 2019

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

Reviewed by:

Prepared by:

Tested by:



John Zhi
EMC Project Manager

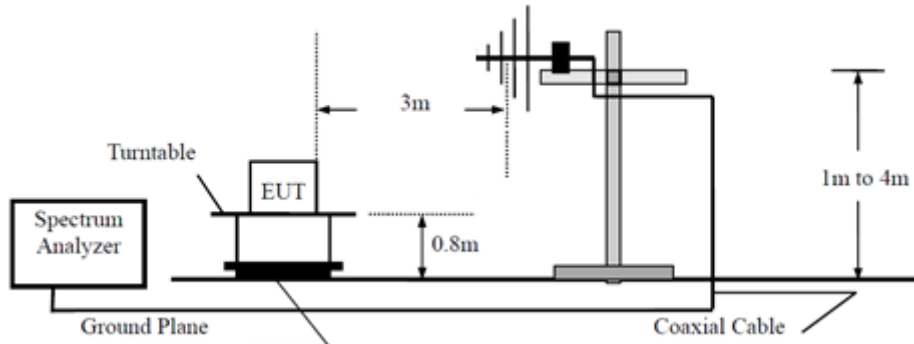
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EMC Project Engineer

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EMC Test Engineer

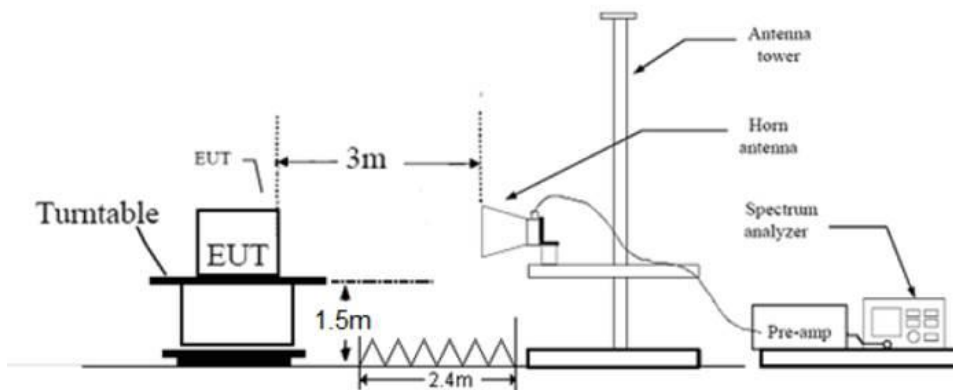
7 Test setups

7.1 Radiated test setups

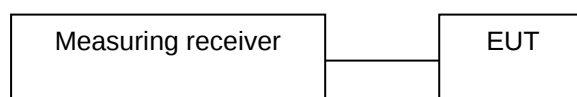
Below 1GHz



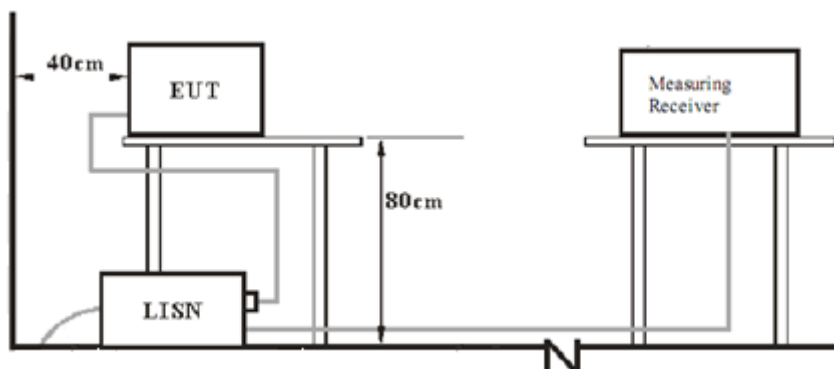
Above 1GHz



7.2 Conducted RF test setups



7.3 AC Power Line Conducted Emission test setups



8. Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.	S/N
Laptop	Lenovo	T460S	---
USB Type C cable	GoPro	0.55m (Length)	---
AC Adapter	Apple	A1401	---

Test software information:

Test Software Version	QRCT (V3.0-00230) from QUALCOMM			
Band	Mode	Freq (MHz)	Power level from QRCT	Packet Type
5G WIFI U-NII-1	802.11a	5180	15	11g 6 Mbps
	802.11a	5200	15	11g 6 Mbps
	802.11a	5240	15	11g 6 Mbps
	802.11n HT20	5180	15.5	MCS0 6.5 Mbps
	802.11n HT20	5200	15.5	MCS0 6.5 Mbps
	802.11n HT20	5240	15.5	MCS0 6.5 Mbps
	802.11n HT40	5190	16	MCS0 13.5 Mbps (40MHz)
	802.11n HT40	5230	16	MCS0 13.5 Mbps (40MHz)
	802.11ac VHT20	5180	15	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5200	15	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5240	15	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT40	5190	16	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT40	5230	16	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT80	5210	15.5	11ac NGI 29.3 Mbps (80MHz)
5G WIFI U-NII-2A	802.11a	5260	14	11g 6 Mbps
	802.11a	5280	14	11g 6 Mbps
	802.11a	5320	14	11g 6 Mbps
	802.11n HT20	5260	14.5	MCS0 6.5 Mbps
	802.11n HT20	5280	14.5	MCS0 6.5 Mbps
	802.11n HT20	5320	14.5	MCS0 6.5 Mbps
	802.11n HT40	5270	15	MCS0 13.5 Mbps (40MHz)
	802.11n HT40	5310	15	MCS0 13.5 Mbps (40MHz)
	802.11ac VHT20	5260	14.5	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5280	14.5	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5320	14.5	11ac NGI 6.5 Mbps (20MHz)

	802.11ac VHT40	5270	14.5	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT40	5310	14.5	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT80	5290	14.5	11ac NGI 29.3 Mbps (80MHz)
5G WIFI U-NII-2C	802.11a	5500	15	11g 6 Mbps
	802.11a	5580	15	11g 6 Mbps
	802.11a	5700	14	11g 6 Mbps
	802.11a	5720_UNII-2C	14	11g 6 Mbps
	802.11a	5720_UNII-3	14	11g 6 Mbps
	802.11n HT20	5500	15.5	MCS0 6.5 Mbps
	802.11n HT20	5580	15.5	MCS0 6.5 Mbps
	802.11n HT20	5700	14.5	MCS0 6.5 Mbps
	802.11n HT20	5720_UNII-2C	14.5	MCS0 6.5 Mbps
	802.11n HT20	5720_UNII-3	14.5	MCS0 6.5 Mbps
	802.11n HT40	5510	17	MCS0 13.5 Mbps (40MHz)
	802.11n HT40	5550	17.5	MCS0 13.5 Mbps (40MHz)
	802.11n HT40	5670	16	MCS0 13.5 Mbps (40MHz)
	802.11n HT40	5710_UNII-2C	16	MCS0 13.5 Mbps (40MHz)
	802.11n HT40	5710_UNII-3	16	MCS0 13.5 Mbps (40MHz)
	802.11ac VHT20	5500	15	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5580	15.5	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5700	14.5	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5720_UNII-2C	14.5	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT20	5720_UNII-3	14.5	11ac NGI 6.5 Mbps (20MHz)
	802.11ac VHT40	5510	16.5	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT40	5550	17.5	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT40	5670	16	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT40	5710_UNII-2C	16	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT40	5710_UNII-3	16	11ac NGI 13.5 Mbps (40MHz)
	802.11ac VHT80	5530	16.5	11ac NGI 29.3 Mbps (80MHz)
	802.11ac VHT80	5690_UNII-2C	15.5	11ac NGI 29.3 Mbps (80MHz)
	802.11ac VHT80	5690_UNII-3	15.5	11ac NGI 29.3 Mbps (80MHz)
5G WIFI U-NII-3	802.11a	5745	9	11g 6 Mbps
	802.11a	5785	10	11g 6 Mbps
	802.11a	5825	11	11g 6 Mbps
	802.11n HT20	5745	9	MCS0 6.5 Mbps
	802.11n HT20	5785	10	MCS0 6.5 Mbps
	802.11n HT20	5825	11	MCS0 6.5 Mbps

802.11n HT40	5755	10	MCS0 13.5 Mbps (40MHz)
802.11n HT40	5795	11	MCS0 13.5 Mbps (40MHz)
802.11ac VHT20	5745	9	11ac NGI 6.5 Mbps (20MHz)
802.11ac VHT20	5785	10	11ac NGI 6.5 Mbps (20MHz)
802.11ac VHT20	5825	11	11ac NGI 6.5 Mbps (20MHz)
802.11ac VHT40	5755	10	11ac NGI 13.5 Mbps (40MHz)
802.11ac VHT40	5795	11	11ac NGI 13.5 Mbps (40MHz)
802.11ac VHT80	5775	10	11ac NGI 29.3 Mbps (80MHz)

The system was configured to channel:

Test Mode	Channel (MHz)		
802.11a, 802.11n HT20 802.11ac VHT20	5G WIFI-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)
	CH 142 (5710MHz)		
	5G WIFI-Band 4		
CH149 (5745MHz),	CH157(5785MHz)	CH165 (5825MHz)	

Test Mode	Channel (MHz)		
802.11n HT40 802.11ac VHT40	5G WIFI-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 144 (5720MHz)		
	5G WIFI-Band 4		
	CH151(5755MHz)	CH159(5795MHz)	

Test Mode	Channel (MHz)	
802.11ac VHT80	5G WIFI-Band 1	
	CH42(5210MHz)	
	5G WIFI-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

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

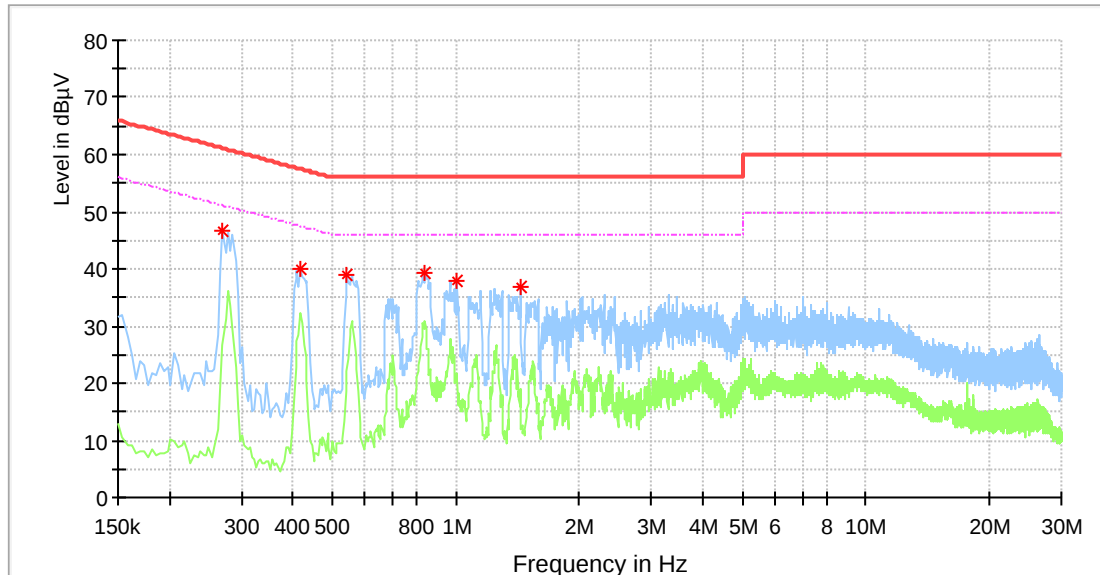
According to §15.207, conducted emissions limit as below:

Frequency MHz	QP Limit dBμV	AV Limit dBμV
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

Conducted Emission

Product Type : Camera
 M/N : SPCC1
 Operating Condition : Charging + TX
 Test Specification : Power Line, Live
 Comment : AC 120V/60Hz (External adapter)



Frequency (MHz)	MaxPeak* (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. ** (dB)
0.270000	46.74	---	61.12	14.38	L1	10.2
0.418000	40.09	---	57.49	17.40	L1	10.3
0.542000	38.99	---	56.00	17.01	L1	10.3
0.842000	39.37	---	56.00	16.63	L1	10.3
1.006000	37.85	---	56.00	18.15	L1	10.3
1.438000	36.82	---	56.00	19.18	L1	10.3

Remark :

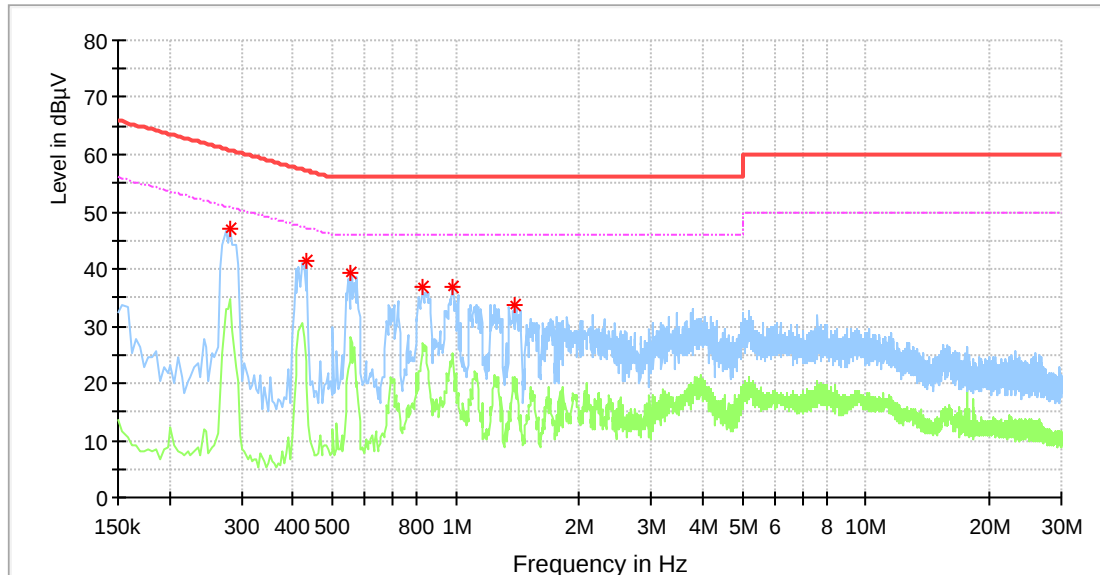
*Level=Reading Level + Correction Factor

**Correction Factor=Cable Loss + LISN Factor

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

Conducted Emission

Product Type : Camera
 M/N : SPCC1
 Operating Condition : Charging + TX
 Test Specification : Power Line, Neutral
 Comment : AC 120V/60Hz (External adapter)



Frequency (MHz)	MaxPeak* (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. ** (dB)
0.282000	46.90	---	60.76	13.86	N	10.2
0.434000	41.42	---	57.18	15.76	N	10.3
0.554000	39.25	---	56.00	16.75	N	10.3
0.830000	36.74	---	56.00	19.26	N	10.3
0.986000	36.76	---	56.00	19.24	N	10.3
1.394000	33.78	---	56.00	22.22	N	10.3

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

1、 Test Method of 26dB Bandwidth

According to KDB789033 D02

- 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 KDB789033 D02

- a) Set RBW = 100KHz
- b) Set the video bandwidth (VBW) $\geq 3 \times \text{RBW}$
- 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: $\geq 500\text{KHz}$

3、 Test Method of 99% Bandwidth

According to KDB789033 D02

- 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 $\geq 3 \cdot \text{RBW}$
- 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:

TestMode	Antenna	Channel	26db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	20.160	5170.040	5190.200	---	PASS
		5200	20.000	5189.880	5209.880	---	PASS
		5240	20.000	5230.120	5250.120	---	PASS
		5260	20.000	5249.880	5269.880	---	PASS
		5280	19.800	5270.280	5290.080	---	PASS
		5320	19.640	5310.080	5329.720	---	PASS
		5500	19.240	5490.680	5509.920	---	PASS
		5580	19.000	5570.560	5589.560	---	PASS
		5700	19.160	5690.320	5709.480	---	PASS
		5720	19.120	5710.440	5729.560	---	PASS
		5720_UNII-2C	14.56	5710.440	5725	---	PASS
		5720_UNII-3	4.56	5725	5729.560	---	PASS
		5745	19.040	5735.400	5754.440	---	PASS
		5785	19.520	5775.240	5794.760	---	PASS
11N20SISO	Ant1	5825	19.120	5815.600	5834.720	---	PASS
		5180	20.760	5169.680	5190.440	---	PASS
		5200	20.640	5190.040	5210.680	---	PASS
		5240	20.760	5229.920	5250.680	---	PASS
		5260	20.640	5249.800	5270.440	---	PASS
		5280	20.360	5270.040	5290.400	---	PASS
		5320	20.000	5310.000	5330.000	---	PASS
		5500	19.920	5490.000	5509.920	---	PASS
		5580	19.760	5570.120	5589.880	---	PASS
		5700	19.840	5690.120	5709.960	---	PASS
		5720	19.840	5710.080	5729.920	---	PASS
		5720_UNII-2C	14.92	5710.080	5725	---	PASS
		5720_UNII-3	4.92	5725	5729.920	---	PASS
		5745	20.000	5735.040	5755.040	---	PASS
11N40SISO	Ant1	5785	19.800	5775.120	5794.920	---	PASS
		5825	19.760	5815.160	5834.920	---	PASS
		5190	47.040	5166.480	5213.520	---	PASS
		5230	48.880	5204.560	5253.440	---	PASS
		5270	46.000	5246.400	5292.400	---	PASS
		5310	46.240	5286.480	5332.720	---	PASS
		5510	49.280	5483.920	5533.200	---	PASS
		5550	52.720	5526.880	5579.600	---	PASS
		5670	45.360	5648.080	5693.440	---	PASS
		5710	50.640	5685.760	5736.400	---	PASS
		5710_UNII-2C	39.24	5685.760	5725	---	PASS
		5710_UNII-3	11.4	5725	5736.400	---	PASS
		5755	45.200	5732.440	5777.640	---	PASS
		5795	45.280	5772.120	5817.400	---	PASS
11AC20SISO	Ant1	5180	20.320	5169.920	5190.240	---	PASS
		5200	20.320	5189.920	5210.240	---	PASS
		5240	20.160	5229.960	5250.120	---	PASS
		5260	20.520	5249.840	5270.360	---	PASS
		5280	20.760	5269.920	5290.680	---	PASS
		5320	20.200	5310.040	5330.240	---	PASS
		5500	20.040	5490.000	5510.040	---	PASS
		5580	20.000	5569.960	5589.960	---	PASS
		5700	19.880	5690.000	5709.880	---	PASS
		5720	19.840	5710.080	5729.920	---	PASS

		5720_UNII-2C	14.92	5710.080	5725	---	PASS
		5720_UNII-3	4.92	5725	5729.920	---	PASS
		5745	20.000	5735.080	5755.080	---	PASS
		5785	19.840	5775.120	5794.960	---	PASS
		5825	20.160	5815.160	5835.320	---	PASS
11AC40SISO	Ant1	5190	46.080	5167.040	5213.120	---	PASS
		5230	49.680	5203.200	5252.880	---	PASS
		5270	47.680	5246.000	5293.680	---	PASS
		5310	47.600	5285.920	5333.520	---	PASS
		5510	49.440	5483.600	5533.040	---	PASS
		5550	66.800	5517.440	5584.240	---	PASS
		5670	52.720	5646.400	5699.120	---	PASS
		5710	47.600	5686.160	5733.760	---	PASS
		5710_UNII-2C	38.84	5686.160	5725	---	PASS
		5710_UNII-3	8.76	5725	5733.760	---	PASS
		5755	41.600	5734.120	5775.720	---	PASS
		5795	44.400	5772.920	5817.320	---	PASS
11AC80SISO	Ant1	5210	84.480	5168.720	5253.200	---	PASS
		5290	83.840	5247.600	5331.440	---	PASS
		5530	84.160	5487.280	5571.440	---	PASS
		5690	116.480	5638.640	5755.120	---	PASS
		5690_UNII-2C	86.36	5638.640	5725	---	PASS
		5690_UNII-3	30.12	5725	5755.120	---	PASS
		5775	82.400	5733.560	5815.960	---	PASS

99% Bandwidth Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5180	16.623	5171.728	5188.352	---	PASS
		5200	16.663	5191.728	5208.392	---	PASS
		5240	16.703	5231.688	5248.392	---	PASS
		5260	16.623	5251.728	5268.352	---	PASS
		5280	16.663	5271.688	5288.352	---	PASS
		5320	16.623	5311.728	5328.352	---	PASS
		5500	16.623	5491.728	5508.352	---	PASS
		5580	16.623	5571.688	5588.312	---	PASS
		5700	16.623	5691.688	5708.312	---	PASS
		5720	16.623	5711.688	5728.312	---	PASS
		5720_UNII-2C	13.312	5711.688	5725	---	PASS
		5720_UNII-3	3.312	5725	5728.312	---	PASS
		5745	16.583	5736.728	5753.312	---	PASS
		5785	16.583	5776.728	5793.312	---	PASS
11N20SISO	Ant1	5180	17.702	5171.169	5188.871	---	PASS
		5200	17.662	5191.209	5208.871	---	PASS
		5240	17.702	5231.169	5248.871	---	PASS
		5260	17.702	5251.169	5268.871	---	PASS
		5280	17.662	5271.209	5288.871	---	PASS
		5320	17.662	5311.209	5328.871	---	PASS
		5500	17.622	5491.209	5508.831	---	PASS
		5580	17.662	5571.169	5588.831	---	PASS
		5700	17.662	5691.169	5708.831	---	PASS
		5720	17.662	5711.169	5728.831	---	PASS
		5720_UNII-2C	13.831	5711.169	5725	---	PASS
		5720_UNII-3	3.831	5725	5728.831	---	PASS
		5745	17.622	5736.209	5753.831	---	PASS
		5785	17.622	5776.209	5793.831	---	PASS
11N40SISO	Ant1	5190	36.444	5171.858	5208.302	---	PASS
		5230	36.444	5211.858	5248.302	---	PASS
		5270	36.204	5251.938	5288.142	---	PASS
		5310	36.204	5291.938	5328.142	---	PASS
		5510	36.284	5491.858	5528.142	---	PASS
		5550	36.523	5531.778	5568.302	---	PASS
		5670	36.364	5651.858	5688.222	---	PASS
		5710	36.364	5691.778	5728.142	---	PASS
		5710_UNII-2C	33.222	5691.778	5725	---	PASS
		5710_UNII-3	3.142	5725	5728.142	---	PASS
		5755	36.284	5736.858	5773.142	---	PASS
		5795	36.124	5776.938	5813.062	---	PASS
11AC20SISO	Ant1	5180	17.662	5171.209	5188.871	---	PASS
		5200	17.662	5191.209	5208.871	---	PASS
		5240	17.702	5231.169	5248.871	---	PASS
		5260	17.662	5251.209	5268.871	---	PASS
		5280	17.662	5271.209	5288.871	---	PASS
		5320	17.662	5311.169	5328.831	---	PASS
		5500	17.622	5491.209	5508.831	---	PASS
		5580	17.662	5571.169	5588.831	---	PASS
		5700	17.662	5691.169	5708.831	---	PASS
		5720	17.662	5711.169	5728.831	---	PASS
		5720_UNII-2C	13.831	5711.169	5725	---	PASS

		5720_UNII-3	3.831	5725	5728.831	---	PASS
		5745	17.622	5736.209	5753.831	---	PASS
		5785	17.622	5776.209	5793.831	---	PASS
		5825	17.622	5816.209	5833.831	---	PASS
11AC40SISO	Ant1	5190	36.523	5171.778	5208.302	---	PASS
		5230	36.364	5211.858	5248.222	---	PASS
		5270	36.204	5251.938	5288.142	---	PASS
		5310	36.204	5291.938	5328.142	---	PASS
		5510	36.364	5491.778	5528.142	---	PASS
		5550	36.763	5531.778	5568.541	---	PASS
		5670	36.523	5651.778	5688.302	---	PASS
		5710	36.444	5691.778	5728.222	---	PASS
		5710_UNII-2C	33.222	5691.778	5725	---	PASS
		5710_UNII-3	3.222	5725	5728.222	---	PASS
		5755	36.204	5736.858	5773.062	---	PASS
		5795	36.204	5776.858	5813.062	---	PASS
11AC80SISO	Ant1	5210	75.604	5172.278	5247.882	---	PASS
		5290	75.285	5252.438	5327.722	---	PASS
		5530	75.125	5492.278	5567.403	---	PASS
		5690	76.084	5651.958	5728.042	---	PASS
		5690_UNII-2C	73.042	5651.958	5725	---	PASS
		5690_UNII-3	3.042	5725	5728.042	---	PASS
		5775	75.125	5737.438	5812.562	---	PASS

6dB Bandwidth Test Result

TestMode	Antenna	Channel	6db EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	Ant1	5745	15.200	5737.400	5752.600	0.5	PASS
		5785	15.200	5777.400	5792.600	0.5	PASS
		5825	15.200	5817.400	5832.600	0.5	PASS
11N20SISO	Ant1	5745	15.200	5737.400	5752.600	0.5	PASS
		5785	15.200	5777.400	5792.600	0.5	PASS
		5825	15.200	5817.400	5832.600	0.5	PASS
11N40SISO	Ant1	5755	35.280	5737.400	5772.680	0.5	PASS
		5795	35.280	5777.400	5812.680	0.5	PASS
11AC20SISO	Ant1	5745	15.240	5737.400	5752.640	0.5	PASS
		5785	15.200	5777.400	5792.600	0.5	PASS
		5825	15.200	5817.400	5832.600	0.5	PASS
11AC40SISO	Ant1	5755	35.280	5737.400	5772.680	0.5	PASS
		5795	35.280	5777.400	5812.680	0.5	PASS
11AC80SISO	Ant1	5775	75.520	5737.240	5812.760	0.5	PASS

9.3 Maximum conducted output power

Test Method

According to KDB789033 D02(E) Method 3

Limits: For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26dB emission bandwidth in megahertz.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

Note:

1. Maximum Conducted Output Power=Conducted Output Power + Correction Factor
2. EIRP= Maximum Conducted Output Power + ANT Gain

Test result as below table

IEEE 802.11a modulation Test Result

Band	Channel	Frequency (MHz)	Average Power (dBm)	Power Limit (dBm)
5.2G Band	Low	5180	16.9	24.00
	Middle	5200	17.1	24.00
	High	5240	17.1	24.00
5.2G Band	Low	5260	16.3	24.00
	Middle	5280	16.5	24.00
	High	5320	16.0	24.00
5.5G Band	Low	5500	15.7	24.00
	Middle	5580	16.0	24.00
	High	5700	14.8	24.00
	High	5720	14.5	24.00
5.8G Band	Low	5745	10.2	30.00
	Middle	5785	9.8	30.00
	High	5825	10.4	30.00

IEEE 802.11n HT20 modulation Test Result

Band	Channel	Frequency (MHz)	Average Power (dBm)	Power Limit (dBm)
5.2G Band	Low	5180	17.3	24.00
	Middle	5200	17.3	24.00
	High	5240	17.3	24.00
5.2G Band	Low	5260	16.5	24.00
	Middle	5280	16.7	24.00
	High	5320	16.3	24.00
5.5G Band	Low	5500	15.4	24.00
	Middle	5580	16.2	24.00
	High	5700	15.0	24.00
	High	5720	14.9	24.00
5.8G Band	Low	5745	9.9	30.00
	Middle	5785	9.5	30.00
	High	5825	9.8	30.00

IEEE 802.11ac VHT20 modulation Test Result

Band	Channel	Frequency (MHz)	Average Power (dBm)	Power Limit (dBm)
5.2G Band	Low	5180	16.8	24.00
	Middle	5200	16.8	24.00
	High	5240	16.8	24.00
5.2G Band	Low	5260	16.4	24.00
	Middle	5280	16.7	24.00
	High	5320	16.3	24.00
5.5G Band	Low	5500	15.5	24.00
	Middle	5580	16.3	24.00
	High	5700	15.1	24.00
	High	5720	15.1	24.00
5.8G Band	Low	5745	9.9	30.00
	Middle	5785	9.9	30.00
	High	5825	9.9	30.00

IEEE 802.11n HT40 modulation Test Result

Band	Channel	Frequency (MHz)	Average Power (dBm)	Power Limit (dBm)
5.2G Band	Low	5190	17.6	24.00
	High	5230	17.6	24.00
5.2G Band	Low	5270	16.6	24.00
	High	5310	16.7	24.00
5.5G Band	Low	5510	16.9	24.00
	Middle	5550	17.6	24.00
	High	5670	16.9	24.00
	High	5710	16.1	24.00
5.8G Band	Low	5755	10.4	30.00
	High	5795	9.9	30.00

IEEE 802.11ac VHT40 modulation Test Result

Band	Channel	Frequency (MHz)	Average Power (dBm)	Power Limit (dBm)
5.2G Band	Low	5190	17.8	24.00
	High	5230	17.7	24.00
5.2G Band	Low	5270	16.2	24.00
	High	5310	16.4	24.00
5.5G Band	Low	5510	16.5	24.00
	Middle	5550	17.7	24.00
	High	5670	17.0	24.00
	High	5710	16.0	24.00
5.8G Band	Low	5755	10.6	30.00
	High	5795	10.0	30.00

IEEE 802.11ac VHT80 modulation Test Result

Band	Channel	Frequency (MHz)	Average Power (dBm)	Power Limit (dBm)
5.2G Band	Low	5210	17.2	24.00
5.2G Band	High	5290	16.7	24.00
5.5G Band	Low	5530	16.7	24.00
	High	5690	16.3	24.00
5.8G Band	High	5775	9.6	30.00

9.4 Maximum power spectral density

Test Method

According to KDB789033 D02

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the

above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth

specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

- a) Set $RBW \geq 1/T$, where T is defined in section II.B.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
- d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
- e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHz is available on nearly all spectrum analyzers.

Limit: The maximum power spectral density shall not exceed 11dBm for the 5.15-5.25GHz, 5.25-5.35GHz, 5.47-5.725 GHz Band and 30dBm for the 5.8GHz Band in any 1 megahertz band.

Test Result

TestMode	Antenna	Channel	Result(dBm/3KHz)	Limit(dBm/3KHz)	Verdict
11A	Ant1	5180	4.09	<=11	PASS
		5200	4.06	<=11	PASS
		5240	4.23	<=11	PASS
		5260	3	<=11	PASS
		5280	3.47	<=11	PASS
		5320	3.39	<=11	PASS
		5500	2.62	<=11	PASS
		5580	3.03	<=11	PASS
		5700	2.36	<=11	PASS
		5720 UNII-2C	1.96	<=11	PASS
		5720 UNII-3	-1.25	<=11	PASS
		5745	-5.27	<=30	PASS
		5785	-5.04	<=30	PASS
		5825	-4.98	<=30	PASS
11N20SISO	Ant1	5180	4.55	<=11	PASS
		5200	4.48	<=11	PASS
		5240	4.69	<=11	PASS
		5260	3.8	<=11	PASS
		5280	4.13	<=11	PASS
		5320	3.94	<=11	PASS
		5500	3.32	<=11	PASS
		5580	3.77	<=11	PASS
		5700	3.12	<=11	PASS
		5720 UNII-2C	2.64	<=11	PASS
		5720 UNII-3	-0.84	<=11	PASS
		5745	-4.51	<=30	PASS
		5785	-4.42	<=30	PASS
		5825	-4.92	<=30	PASS
11N40SISO	Ant1	5190	1.39	<=11	PASS
		5230	1.64	<=11	PASS
		5270	0.55	<=11	PASS
		5310	0.86	<=11	PASS
		5510	0.97	<=11	PASS
		5550	1.72	<=11	PASS
		5670	0.74	<=11	PASS
		5710 UNII-2C	0.26	<=11	PASS
		5710 UNII-3	-4.53	<=11	PASS
		5755	-7.52	<=30	PASS
		5795	-7.21	<=30	PASS
11AC20SISO	Ant1	5180	4.13	<=11	PASS
		5200	4.26	<=11	PASS
		5240	4.22	<=11	PASS
		5260	3.81	<=11	PASS
		5280	3.99	<=11	PASS
		5320	3.77	<=11	PASS
		5500	2.92	<=11	PASS
		5580	3.58	<=11	PASS
		5700	2.78	<=11	PASS
		5720 UNII-2C	2.39	<=11	PASS
		5720 UNII-3	-1.08	<=11	PASS
		5745	-5.18	<=30	PASS
		5785	-4.92	<=30	PASS
		5825	-4.96	<=30	PASS
11AC40SISO	Ant1	5190	1.28	<=11	PASS
		5230	1.47	<=11	PASS
		5270	-0.09	<=11	PASS
		5310	0.26	<=11	PASS
		5510	1.43	<=11	PASS

		5550	1.69	<=11	PASS
		5670	0.56	<=11	PASS
		5710 UNII-2C	0.35	<=11	PASS
		5710 UNII-3	-4.07	<=11	PASS
		5755	-7.7	<=30	PASS
		5795	-7.64	<=30	PASS
11AC80SISO	Ant1	5210	-1.2	<=11	PASS
		5290	-1.52	<=11	PASS
		5530	-1.19	<=11	PASS
		5690 UNII-2C	-1.76	<=11	PASS
		5690 UNII-3	-8.71	<=11	PASS
		5775	-10.28	<=30	PASS

9.5 Unwanted emissions

Test Method

According to KBD789033 D02

Limits:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

The provisions of §15.205 apply to intentional radiators operating under this section.

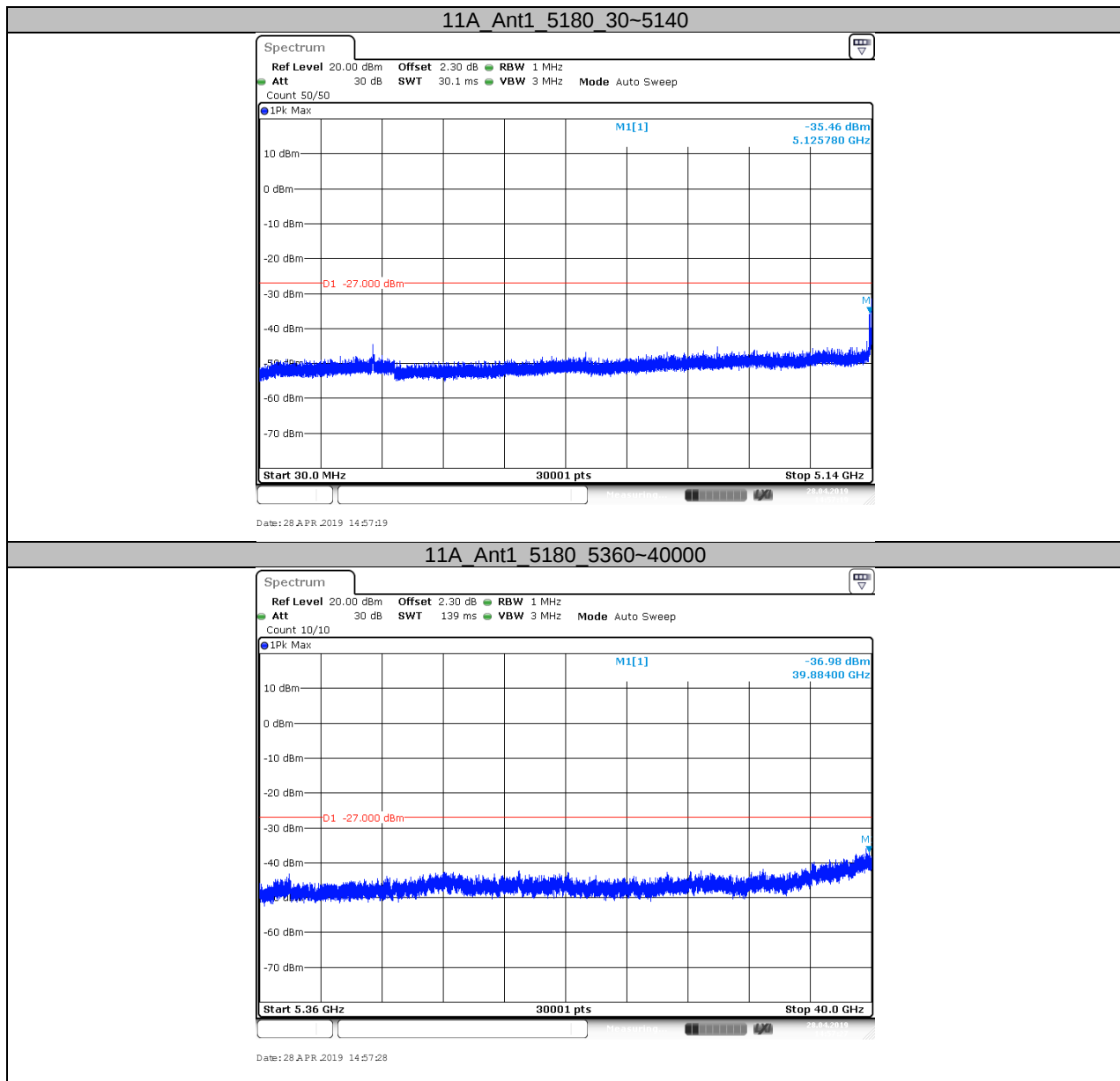
Test result:

TestMode	Antenna	Channel	FreqRange	Max. Fre	Max. Level	Limit	Verdict
11A	Ant1	5180	30~5140	30~5140	-35.46	<=-27	PASS
		5180	5360~40000	5360~40000	-36.98	<=-27	PASS
		5200	30~5140	30~5140	-40.76	<=-27	PASS
		5200	5360~40000	5360~40000	-36.29	<=-27	PASS
		5240	30~5140	30~5140	-45.3	<=-27	PASS
		5240	5360~40000	5360~40000	-37.07	<=-27	PASS
		5260	30~5140	30~5140	-44.89	<=-27	PASS
		5260	5360~40000	5360~40000	-36.56	<=-27	PASS
		5280	30~5140	30~5140	-45.25	<=-27	PASS
		5280	5360~40000	5360~40000	-37.59	<=-27	PASS
		5320	30~5140	30~5140	-45.51	<=-27	PASS
		5320	5360~40000	5360~40000	-36.26	<=-27	PASS
		5500	30~5460	30~5460	-35.8	<=-27	PASS
		5500	5735~40000	5735~40000	-36.54	<=-27	PASS
		5580	30~5460	30~5460	-45.31	<=-27	PASS
		5580	5735~40000	5735~40000	-36.74	<=-27	PASS
		5700	30~5460	30~5460	-45.26	<=-27	PASS
		5700	5735~40000	5735~40000	-36.84	<=-27	PASS
		5720	30~5460	30~5460	-44.97	<=-27	PASS
		5720	5925~40000	5925~40000	-36.52	<=-27	PASS
		5745	30~5650	30~5650	-44.39	<=-27	PASS
		5745	5925~40000	5925~40000	-36.29	<=-27	PASS
		5785	30~5650	30~5650	-44.72	<=-27	PASS
		5785	5925~40000	5925~40000	-37.1	<=-27	PASS
		5825	30~5650	30~5650	-45.16	<=-27	PASS
		5825	5925~40000	5925~40000	-37.07	<=-27	PASS
11N20SISO	Ant1	5180	30~5140	30~5140	-33.37	<=-27	PASS
		5180	5360~40000	5360~40000	-36.81	<=-27	PASS
		5200	30~5140	30~5140	-37.68	<=-27	PASS
		5200	5360~40000	5360~40000	-36.39	<=-27	PASS
		5240	30~5140	30~5140	-44.61	<=-27	PASS
		5240	5360~40000	5360~40000	-36.81	<=-27	PASS
		5260	30~5140	30~5140	-45.52	<=-27	PASS
		5260	5360~40000	5360~40000	-36.7	<=-27	PASS
		5280	30~5140	30~5140	-45.54	<=-27	PASS
		5280	5360~40000	5360~40000	-36.67	<=-27	PASS
		5320	30~5140	30~5140	-45.35	<=-27	PASS
		5320	5360~40000	5360~40000	-37.23	<=-27	PASS
		5500	30~5460	30~5460	-31.89	<=-27	PASS
		5500	5735~40000	5735~40000	-36.73	<=-27	PASS
		5580	30~5460	30~5460	-44.83	<=-27	PASS
		5580	5735~40000	5735~40000	-37.22	<=-27	PASS
		5700	30~5460	30~5460	-44.7	<=-27	PASS
		5700	5735~40000	5735~40000	-36.39	<=-27	PASS
		5720	30~5460	30~5460	-44.76	<=-27	PASS
		5720	5925~40000	5925~40000	-36.77	<=-27	PASS
		5745	30~5650	30~5650	-45.37	<=-27	PASS
		5745	5925~40000	5925~40000	-37.62	<=-27	PASS
		5785	30~5650	30~5650	-43.84	<=-27	PASS
		5785	5925~40000	5925~40000	-36.05	<=-27	PASS
		5825	30~5650	30~5650	-44.58	<=-27	PASS
		5825	5925~40000	5925~40000	-36.7	<=-27	PASS
11N40SISO	Ant1	5190	30~5140	30~5140	-40.38	<=-27	PASS
		5190	5360~40000	5360~40000	-36.83	<=-27	PASS
		5230	30~5140	30~5140	-38.44	<=-27	PASS
		5230	5360~40000	5360~40000	-36.36	<=-27	PASS
		5270	30~5140	30~5140	-44.61	<=-27	PASS
		5270	5360~40000	5360~40000	-36.94	<=-27	PASS
		5310	30~5140	30~5140	-45.5	<=-27	PASS

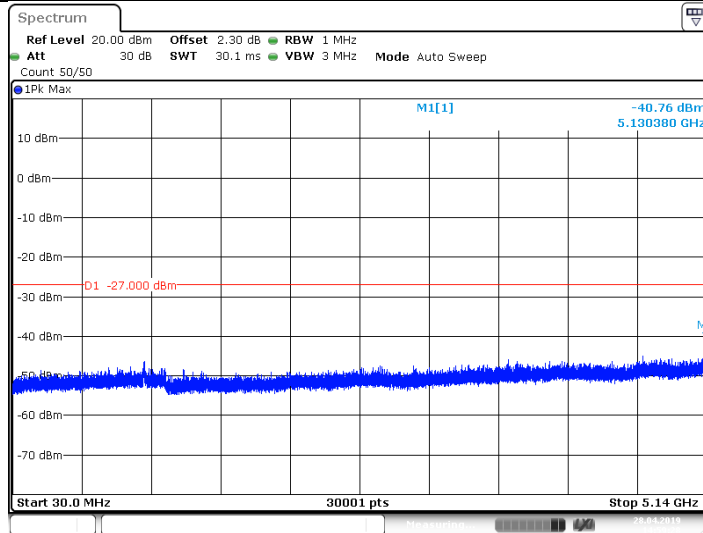
		5310	5360~40000	5360~40000	-36.08	<=-27	PASS
		5510	30~5460	30~5460	-31.21	<=-27	PASS
		5510	5735~40000	5735~40000	-35.44	<=-27	PASS
		5550	30~5460	30~5460	-35.83	<=-27	PASS
		5550	5735~40000	5735~40000	-36.47	<=-27	PASS
		5670	30~5460	30~5460	-36.32	<=-27	PASS
		5670	5735~40000	5735~40000	-37.41	<=-27	PASS
		5710	30~5460	30~5460	-37.36	<=-27	PASS
		5710	5925~40000	5925~40000	-36.04	<=-27	PASS
		5755	30~5650	30~5650	-44.87	<=-27	PASS
		5755	5925~40000	5925~40000	-36.73	<=-27	PASS
		5795	30~5650	30~5650	-42.21	<=-27	PASS
11AC20SISO	Ant1	5795	5925~40000	5925~40000	-37.32	<=-27	PASS
		5180	30~5140	30~5140	-29.79	<=-27	PASS
		5180	5360~40000	5360~40000	-37.18	<=-27	PASS
		5200	30~5140	30~5140	-41.34	<=-27	PASS
		5200	5360~40000	5360~40000	-37.14	<=-27	PASS
		5240	30~5140	30~5140	-44.61	<=-27	PASS
		5240	5360~40000	5360~40000	-37.38	<=-27	PASS
		5260	30~5140	30~5140	-45.63	<=-27	PASS
		5260	5360~40000	5360~40000	-36.41	<=-27	PASS
		5280	30~5140	30~5140	-45.35	<=-27	PASS
		5280	5360~40000	5360~40000	-37.23	<=-27	PASS
		5320	30~5140	30~5140	-44.98	<=-27	PASS
		5320	5360~40000	5360~40000	-37.23	<=-27	PASS
		5500	30~5460	30~5460	-31.85	<=-27	PASS
		5500	5735~40000	5735~40000	-37.6	<=-27	PASS
		5580	30~5460	30~5460	-44.8	<=-27	PASS
		5580	5735~40000	5735~40000	-36.95	<=-27	PASS
		5700	30~5460	30~5460	-44.99	<=-27	PASS
		5700	5735~40000	5735~40000	-36.22	<=-27	PASS
		5720	30~5460	30~5460	-44.85	<=-27	PASS
		5720	5925~40000	5925~40000	-36.98	<=-27	PASS
		5745	30~5650	30~5650	-44.69	<=-27	PASS
		5745	5925~40000	5925~40000	-36.85	<=-27	PASS
		5785	30~5650	30~5650	-44.96	<=-27	PASS
		5785	5925~40000	5925~40000	-35.35	<=-27	PASS
		5825	30~5650	30~5650	-44.96	<=-27	PASS
		5825	5925~40000	5925~40000	-37.25	<=-27	PASS
11AC40SISO	Ant1	5190	30~5140	30~5140	-31.4	<=-27	PASS
		5190	5360~40000	5360~40000	-36.67	<=-27	PASS
		5230	30~5140	30~5140	-34.57	<=-27	PASS
		5230	5360~40000	5360~40000	-36.19	<=-27	PASS
		5270	30~5140	30~5140	-45.89	<=-27	PASS
		5270	5360~40000	5360~40000	-36.7	<=-27	PASS
		5310	30~5140	30~5140	-44.51	<=-27	PASS
		5310	5360~40000	5360~40000	-30.09	<=-27	PASS
		5510	30~5460	30~5460	-30.85	<=-27	PASS
		5510	5735~40000	5735~40000	-36.55	<=-27	PASS
		5550	30~5460	30~5460	-35.86	<=-27	PASS
		5550	5735~40000	5735~40000	-36.88	<=-27	PASS
		5670	30~5460	30~5460	-45.21	<=-27	PASS
		5670	5735~40000	5735~40000	-37.21	<=-27	PASS
		5710	30~5460	30~5460	-44.77	<=-27	PASS
		5710	5925~40000	5925~40000	-36.96	<=-27	PASS
		5755	30~5650	30~5650	-40.87	<=-27	PASS
		5755	5925~40000	5925~40000	-36.85	<=-27	PASS
		5795	30~5650	30~5650	-44.53	<=-27	PASS
		5795	5925~40000	5925~40000	-37.5	<=-27	PASS
11AC80SISO	Ant1	5210	30~5140	30~5140	-23.68	<=-27	PASS
		5210	5360~40000	5360~40000	-36	<=-27	PASS
		5290	30~5140	30~5140	-39.55	<=-27	PASS
		5290	5360~40000	5360~40000	-28.29	<=-27	PASS
		5530	30~5460	30~5460	-27.53	<=-27	PASS

		5530	5735~40000	5735~40000	-36.45	<=-27	PASS
		5690	30~5460	30~5460	-36.96	<=-27	PASS
		5690	5925~40000	5925~40000	-37.19	<=-27	PASS
		5775	30~5650	30~5650	-41.48	<=-27	PASS
		5775	5925~40000	5925~40000	-35.89	<=-27	PASS

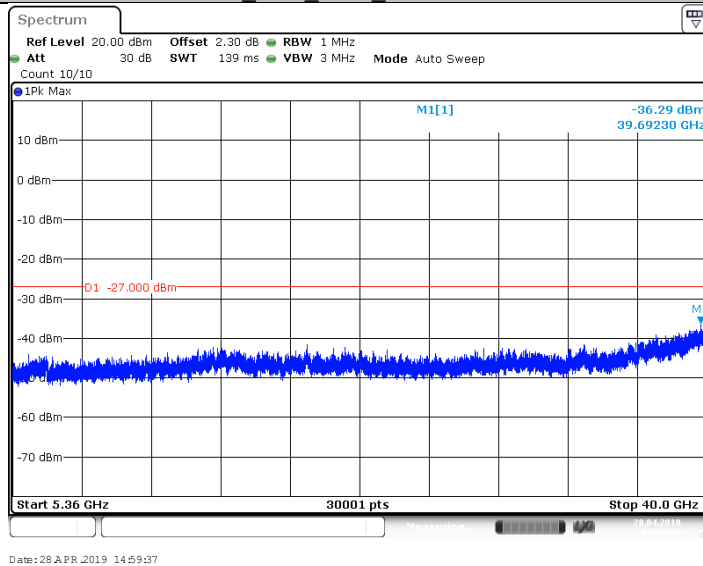
Test Graphs



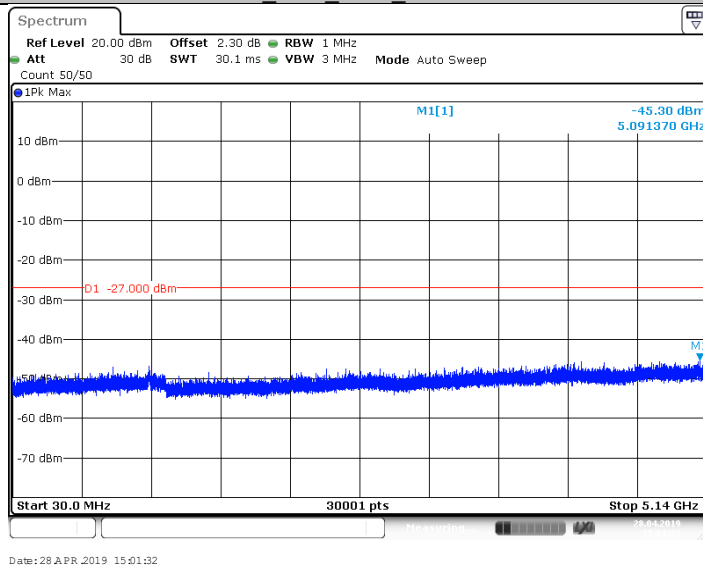
11A_Ant1_5200_30~5140



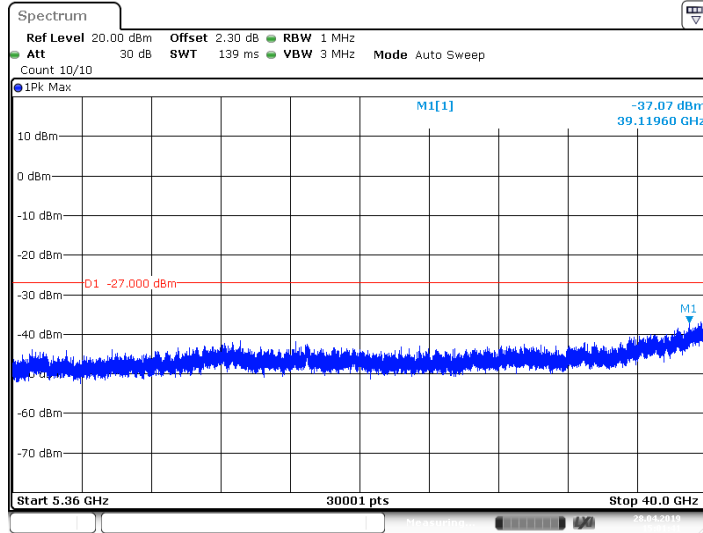
11A_Ant1_5200_5360~40000



11A_Ant1_5240_30~5140

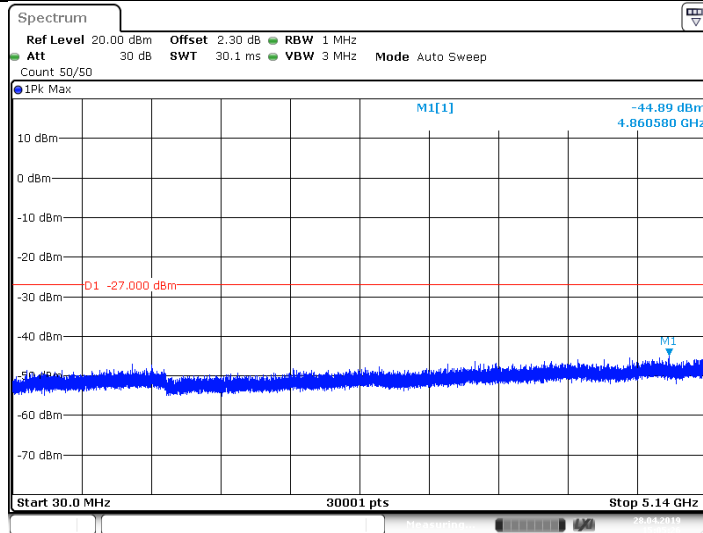


11A_Ant1_5240_5360~40000



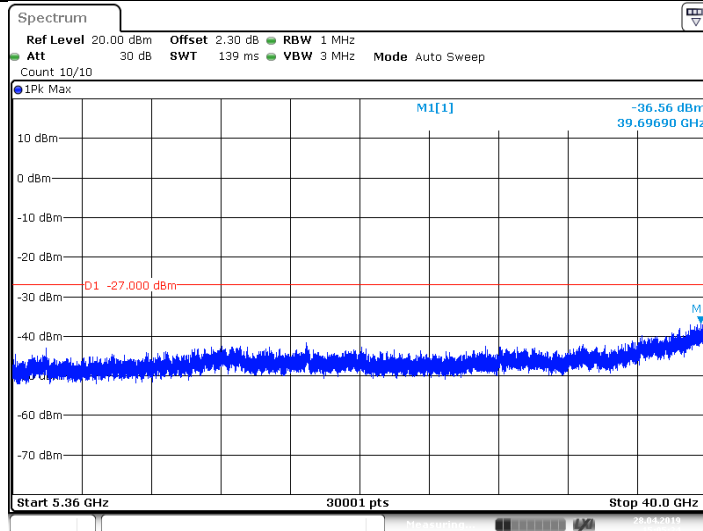
Date: 28 APR 2019 15:01:41

11A_Ant1_5260_30~5140



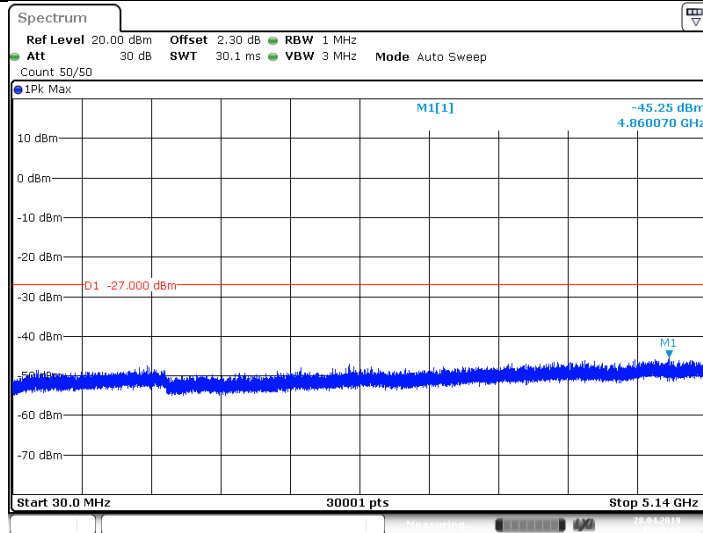
Date: 28 APR 2019 15:05:26

11A_Ant1_5260_5360~40000



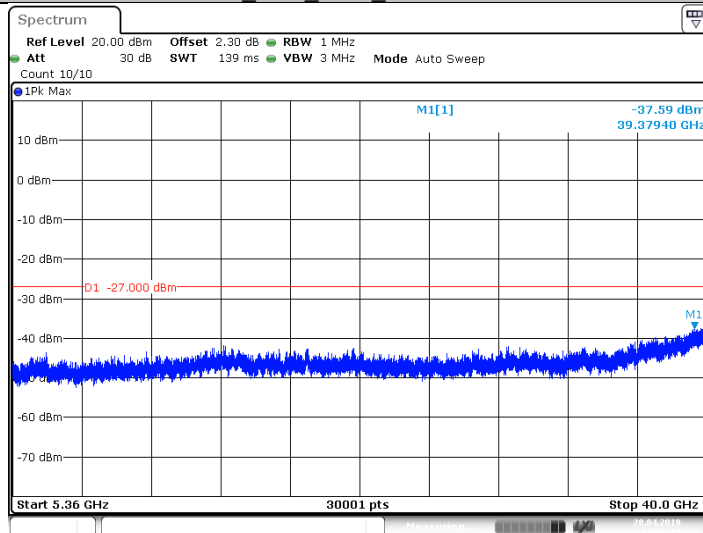
Date: 28 APR 2019 15:05:35

11A_Ant1_5280_30~5140



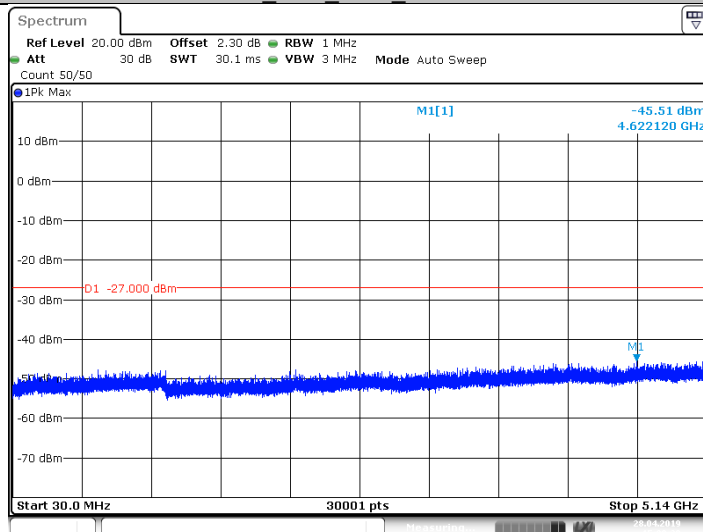
Date: 28 APR 2019 15:07:05

11A_Ant1_5280_5360~40000



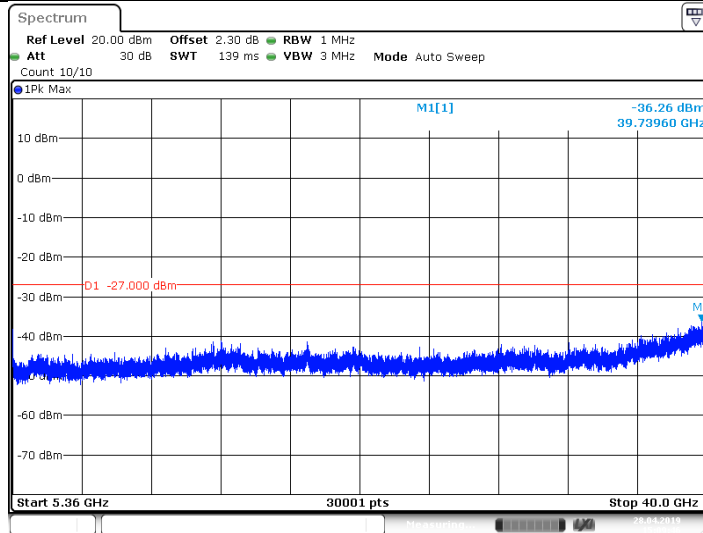
Date: 28 APR 2019 15:07:14

11A_Ant1_5320_30~5140



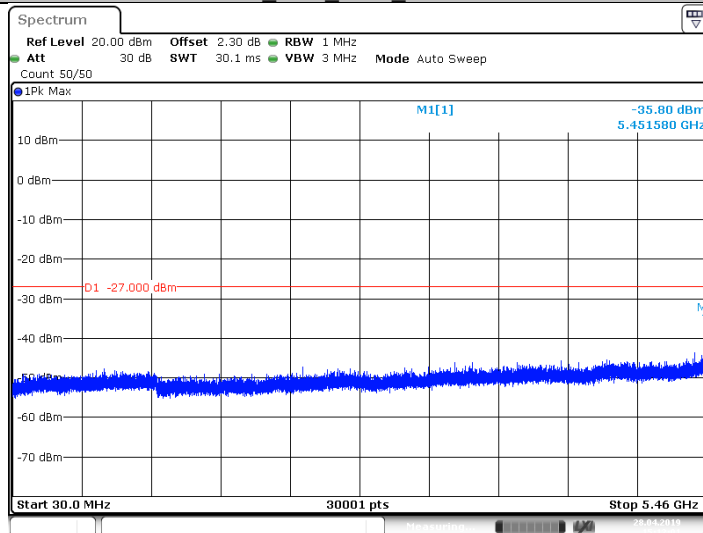
Date: 28 APR 2019 15:09:38

11A_Ant1_5320_5360~40000



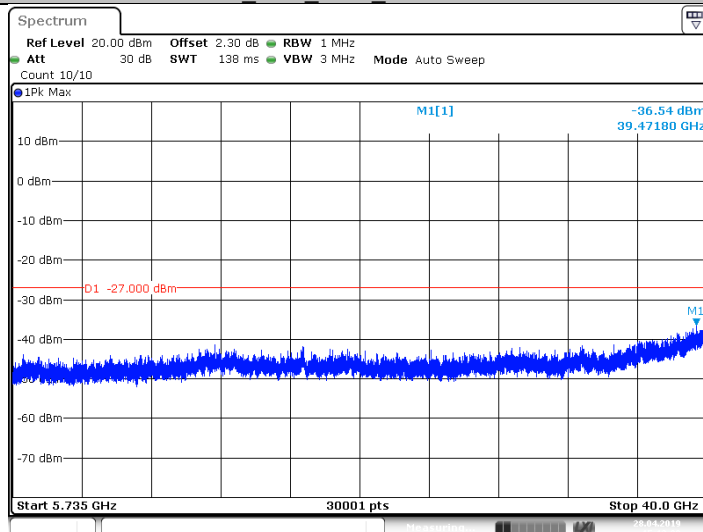
Date: 28 APR 2019 15:09:47

11A_Ant1_5500_30~5460



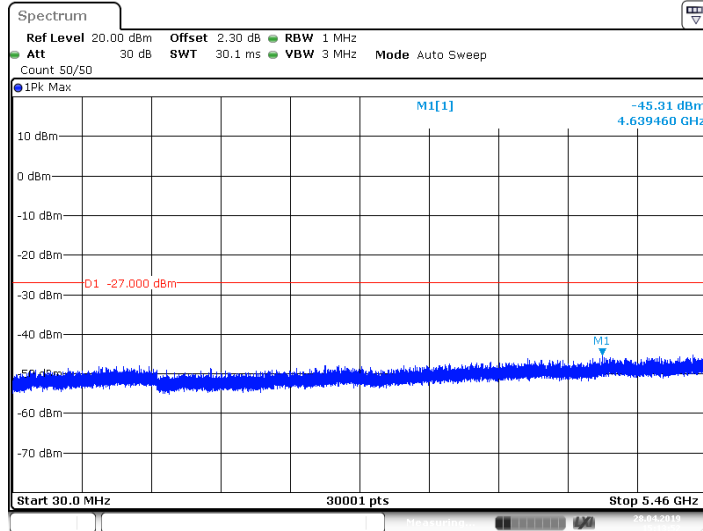
Date: 28 APR 2019 15:12:01

11A_Ant1_5500_5735~40000



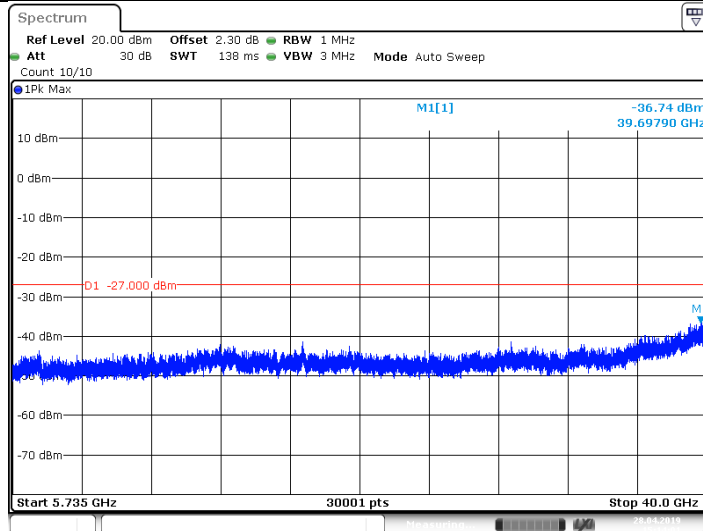
Date: 28 APR 2019 15:12:10

11A_Ant1_5580_30~5460



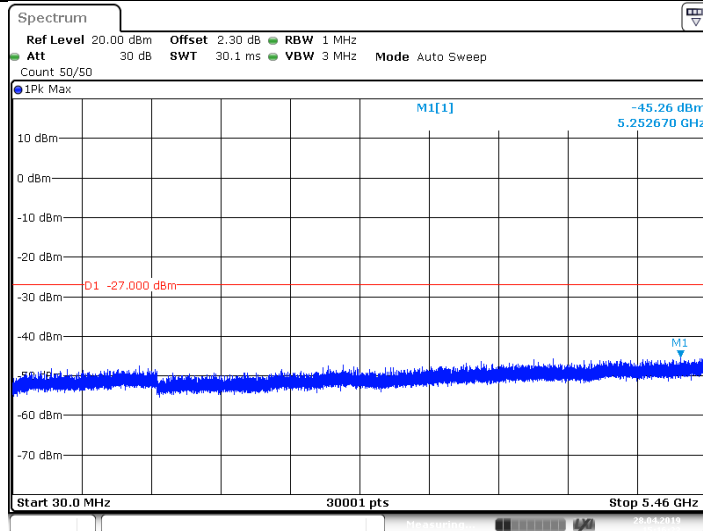
Date: 28 APR 2019 15:13:52

11A_Ant1_5580_5735~40000



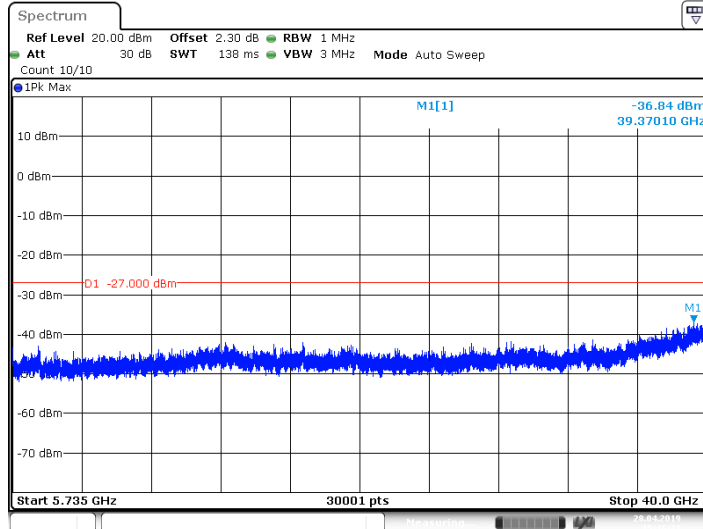
Date: 28 APR 2019 15:14:01

11A_Ant1_5700_30~5460



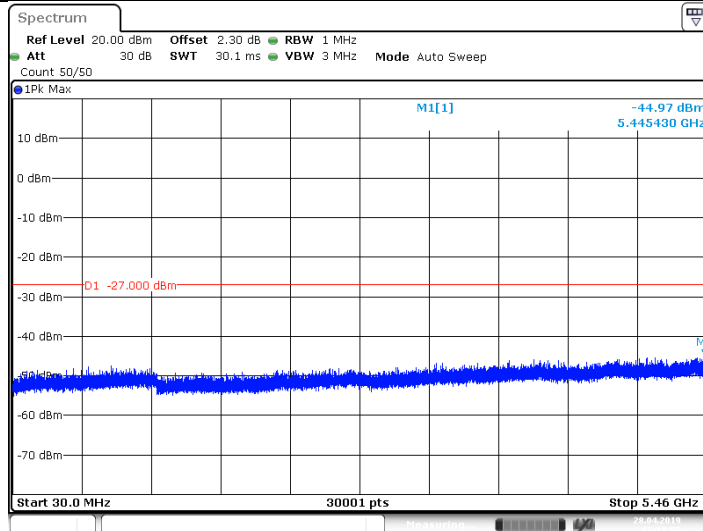
Date: 28 APR 2019 15:16:23

11A_Ant1_5700_5735~40000



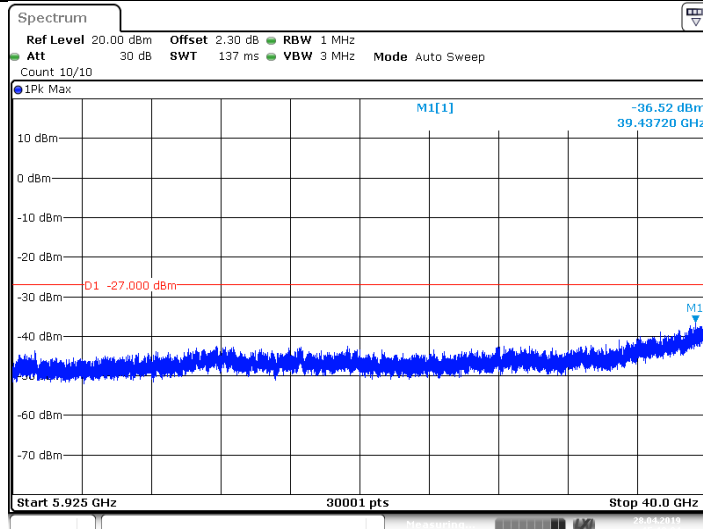
Date: 28 APR 2019 15:16:32

11A_Ant1_5720_30~5460



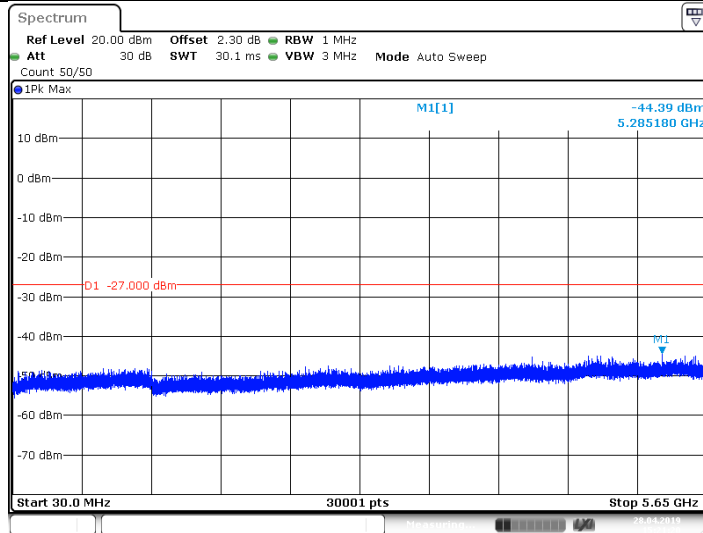
Date: 28 APR 2019 15:18:56

11A_Ant1_5720_5925~40000



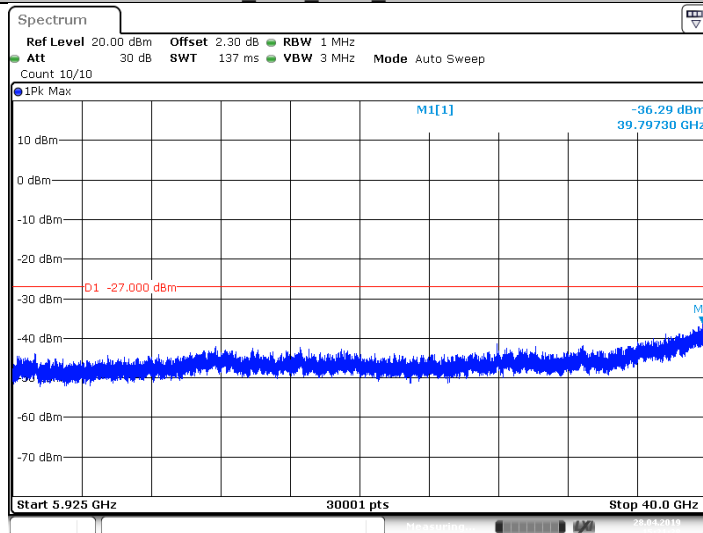
Date: 28 APR 2019 15:19:04

11A_Ant1_5745_30~5650



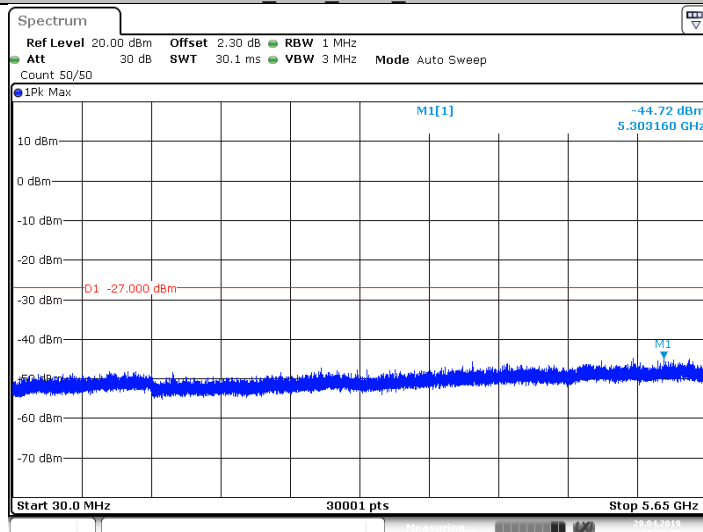
Date: 28 APR 2019 15:21:20

11A_Ant1_5745_5925~40000



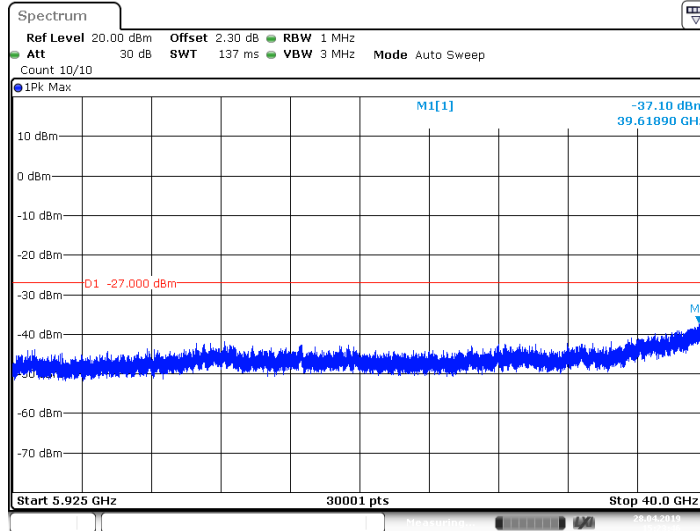
Date: 28 APR 2019 15:21:29

11A_Ant1_5785_30~5650



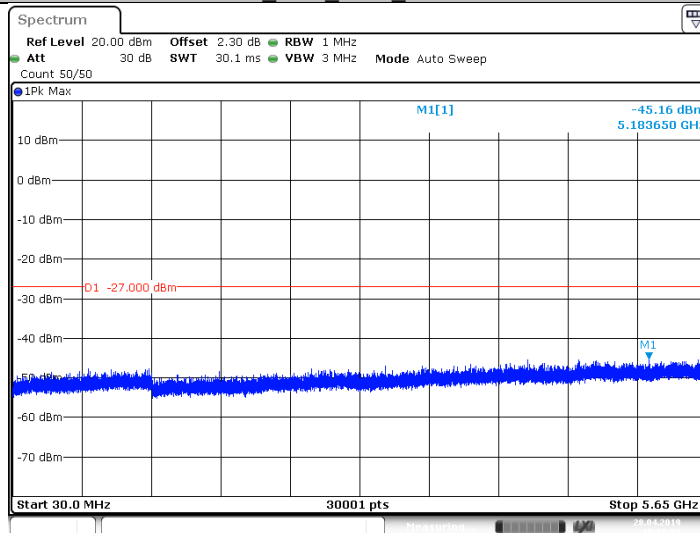
Date: 28 APR 2019 15:23:38

11A_Ant1_5785_5925~40000



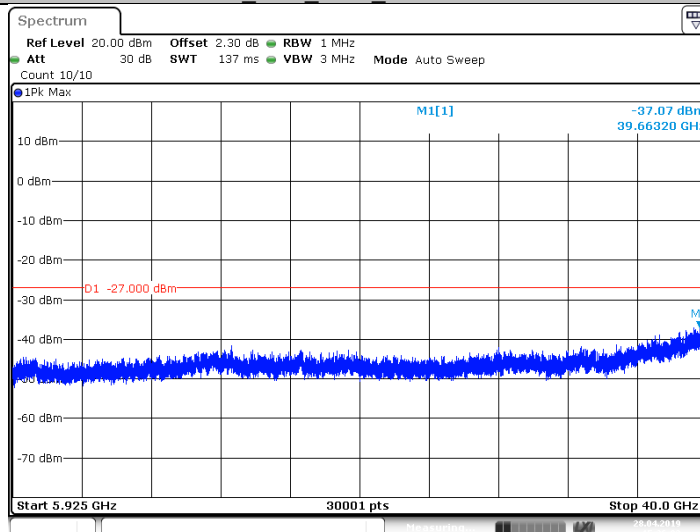
Date: 28 APR 2019 15:23:47

11A_Ant1_5825_30~5650



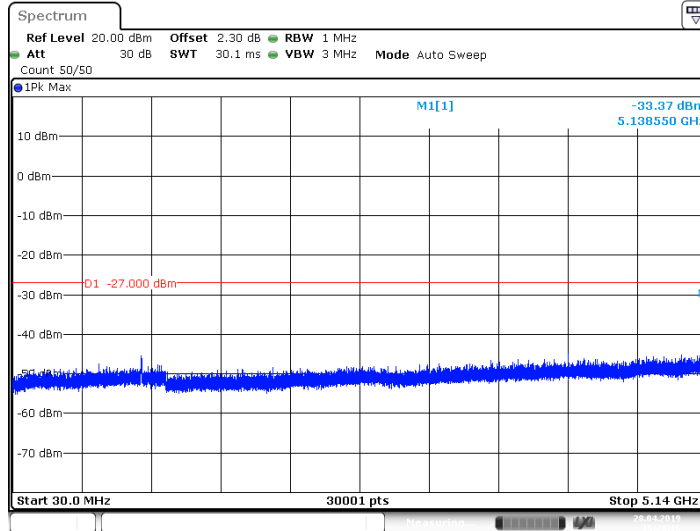
Date: 28 APR 2019 15:25:53

11A_Ant1_5825_5925~40000



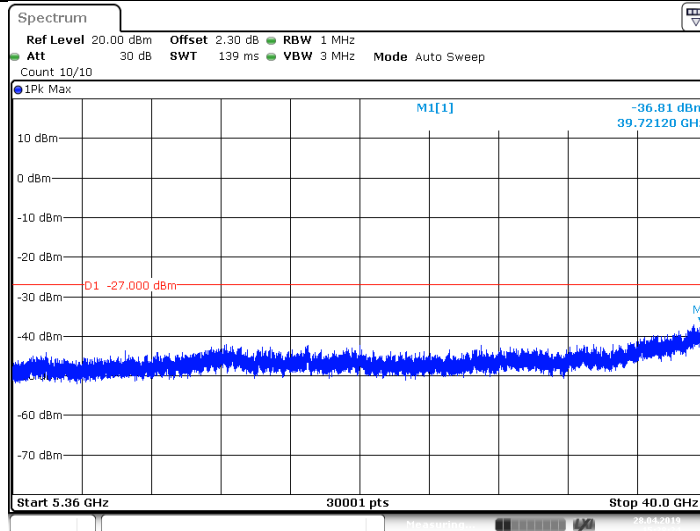
Date: 28 APR 2019 15:26:02

11N20SISO_Ant1_5180_30~5140



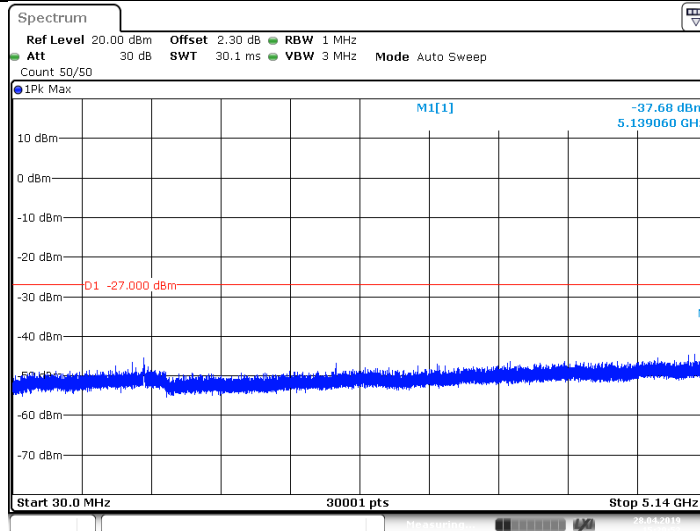
Date: 28 APR 2019 15:28:16

11N20SISO_Ant1_5180_5360~40000



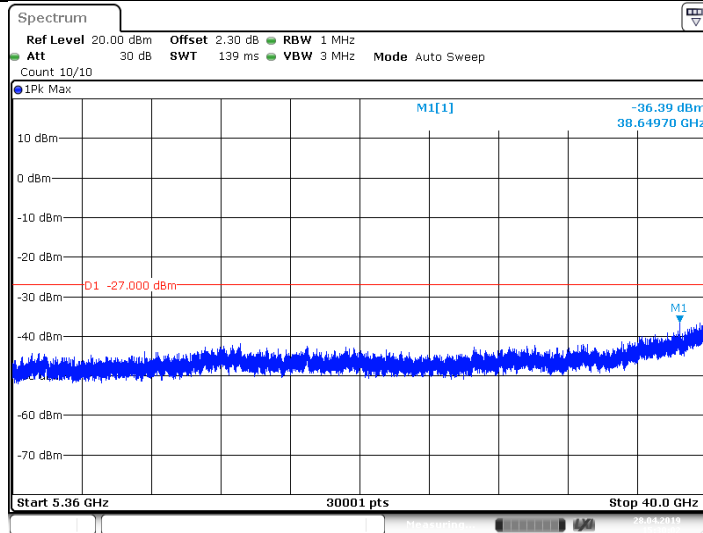
Date: 28 APR 2019 15:28:25

11N20SISO_Ant1_5200_30~5140



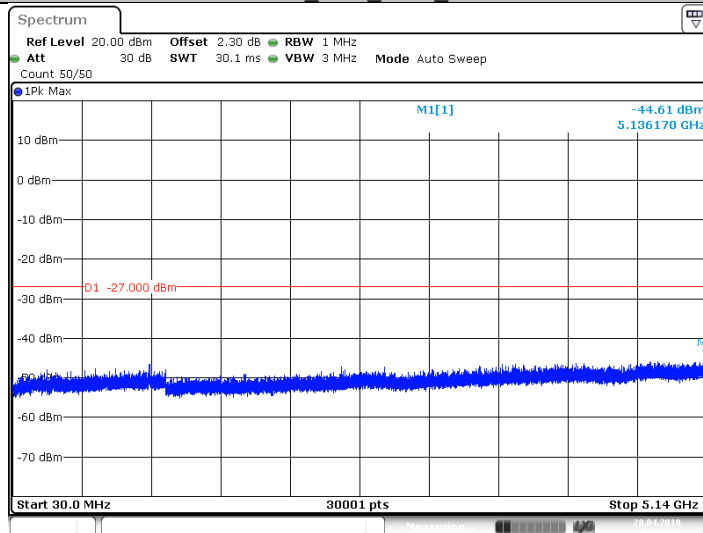
Date: 28 APR 2019 15:29:53

11N20SISO_Ant1_5200_5360~40000



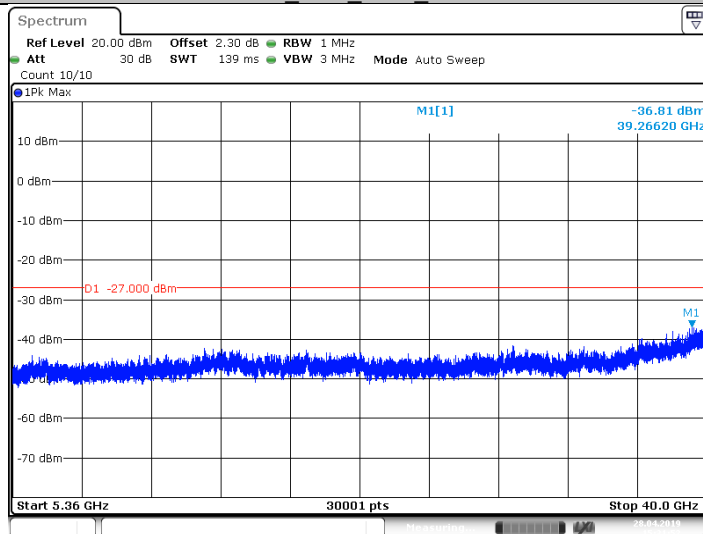
Date: 28 APR 2019 15:30:02

11N20SISO_Ant1_5240_30~5140



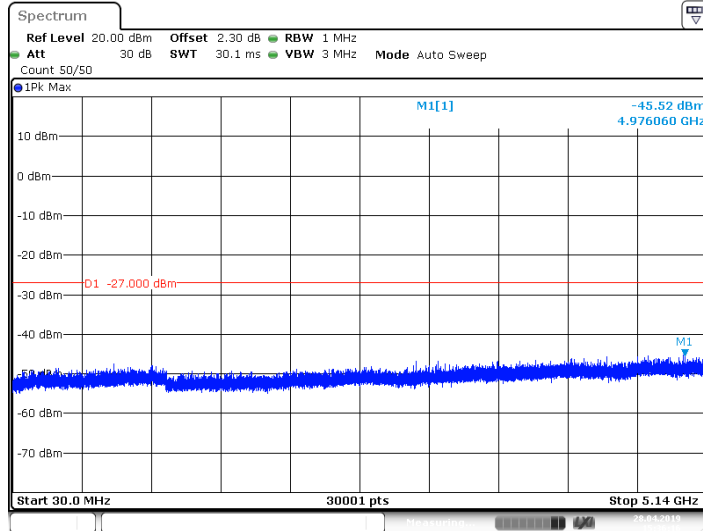
Date: 28 APR 2019 15:31:43

11N20SISO_Ant1_5240_5360~40000

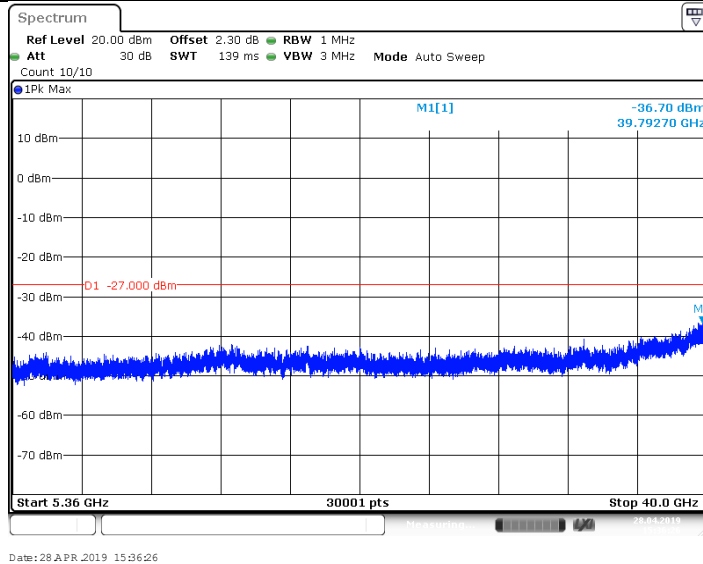


Date: 28 APR 2019 15:31:52

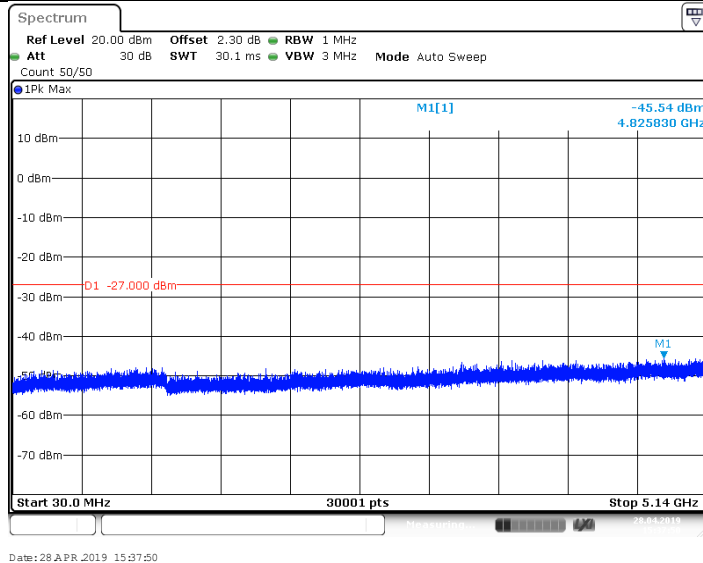
11N20SISO_Ant1_5260_30~5140



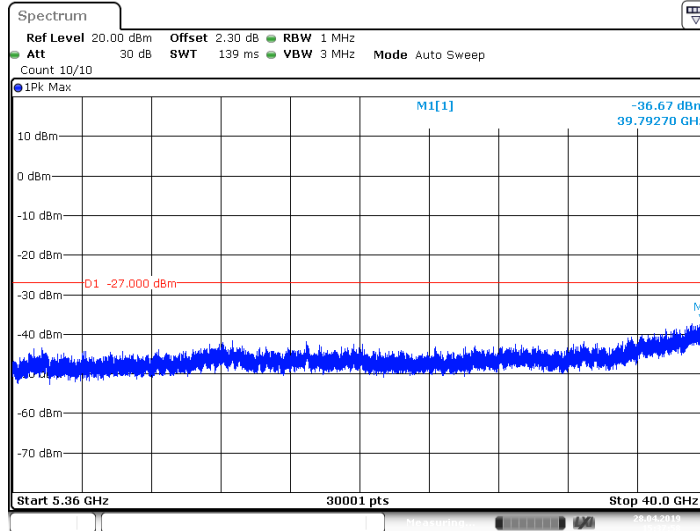
11N20SISO_Ant1_5260_5360~40000



11N20SISO_Ant1_5280_30~5140

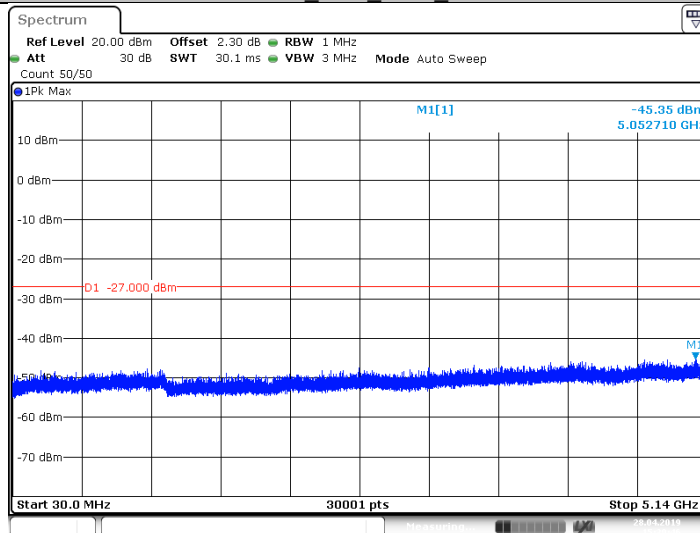


11N20SISO_Ant1_5280_5360~40000



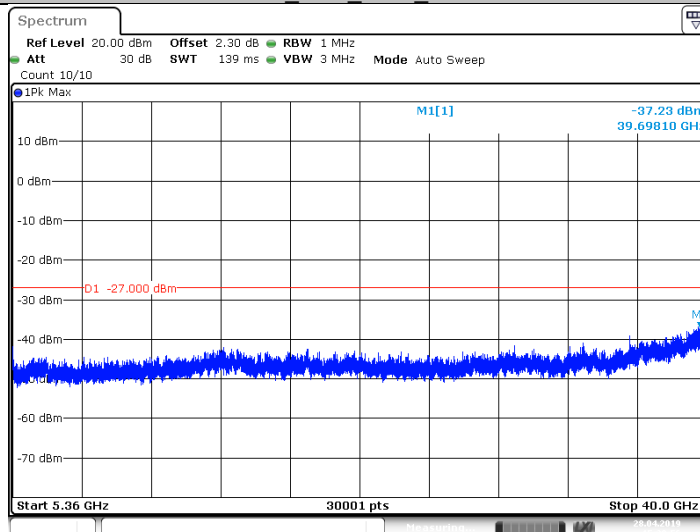
Date: 28 APR 2019 15:37:59

11N20SISO_Ant1_5320_30~5140



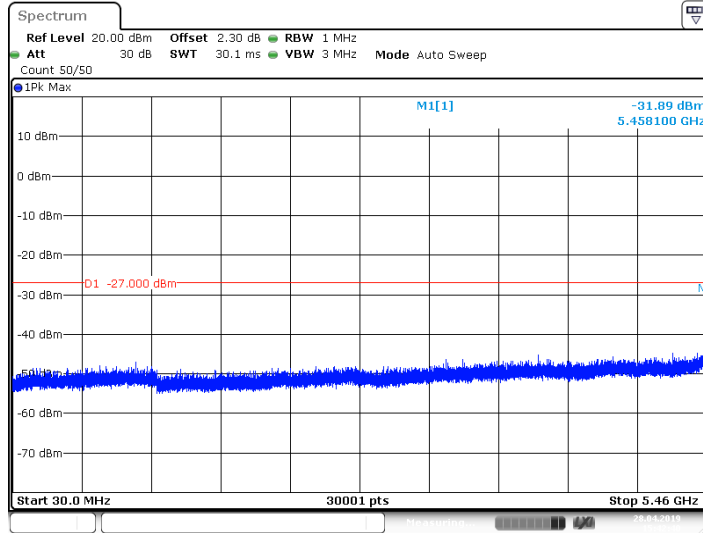
Date: 28 APR 2019 15:39:47

11N20SISO_Ant1_5320_5360~40000



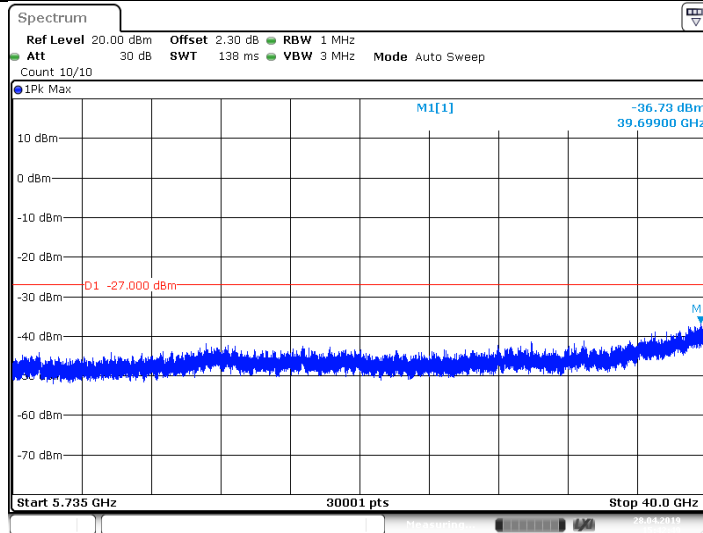
Date: 28 APR 2019 15:39:55

11N20SISO_Ant1_5500_30~5460



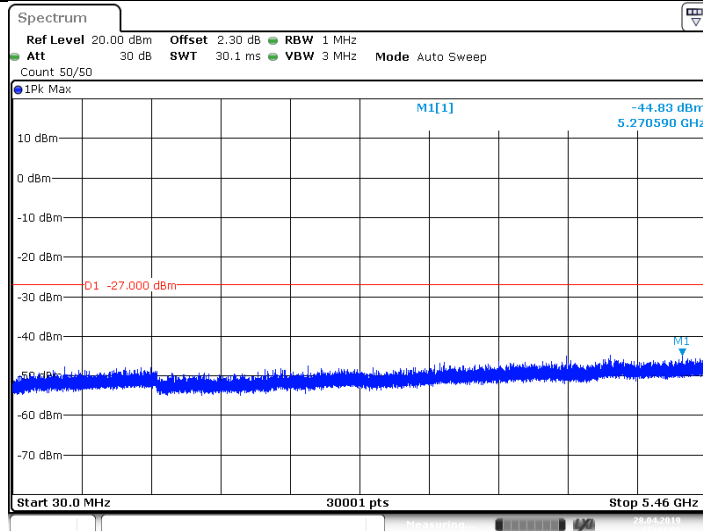
Date: 28 APR 2019 15:42:40

11N20SISO_Ant1_5500_5735~40000



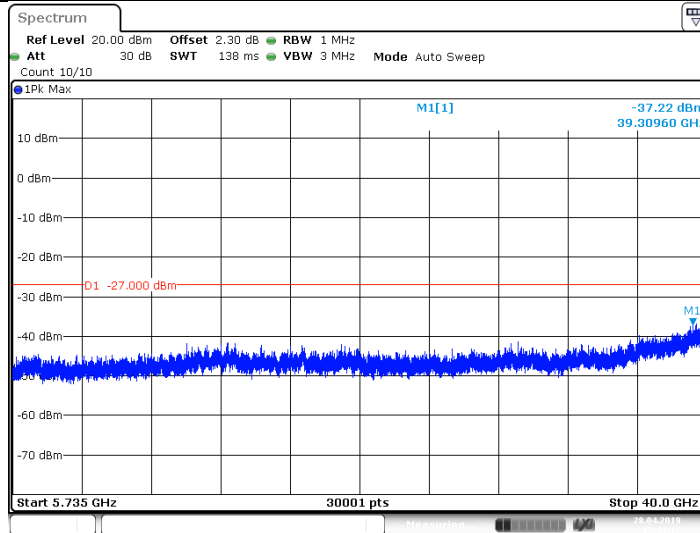
Date: 28 APR 2019 15:42:49

11N20SISO_Ant1_5580_30~5460



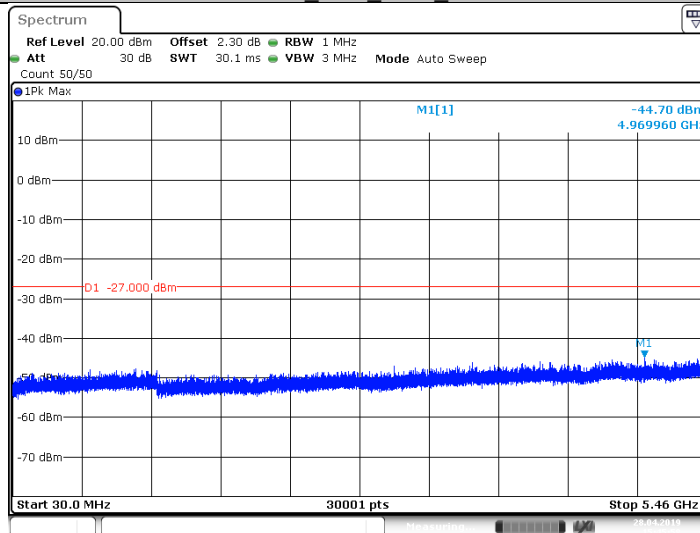
Date: 28 APR 2019 15:44:09

11N20SISO_Ant1_5580_5735~40000



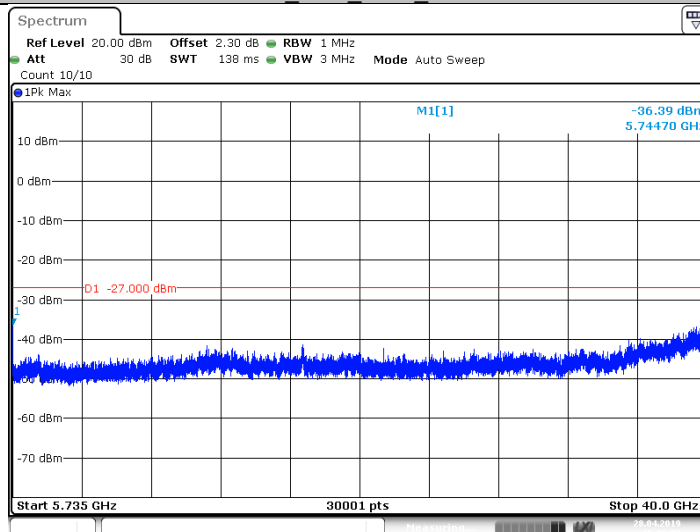
Date: 28 APR 2019 15:44:18

11N20SISO_Ant1_5700_30~5460



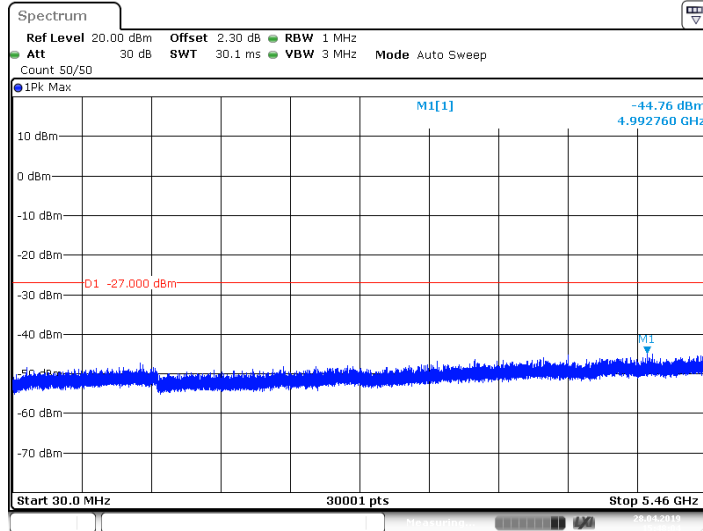
Date: 28 APR 2019 15:45:59

11N20SISO_Ant1_5700_5735~40000

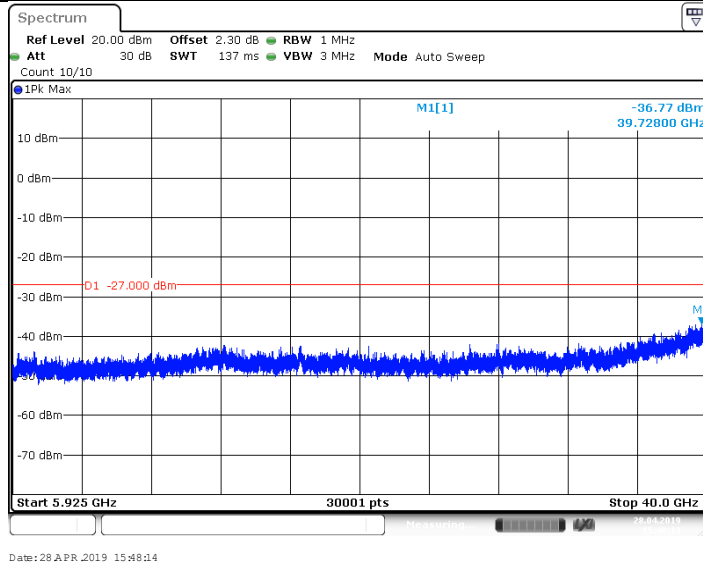


Date: 28 APR 2019 15:46:07

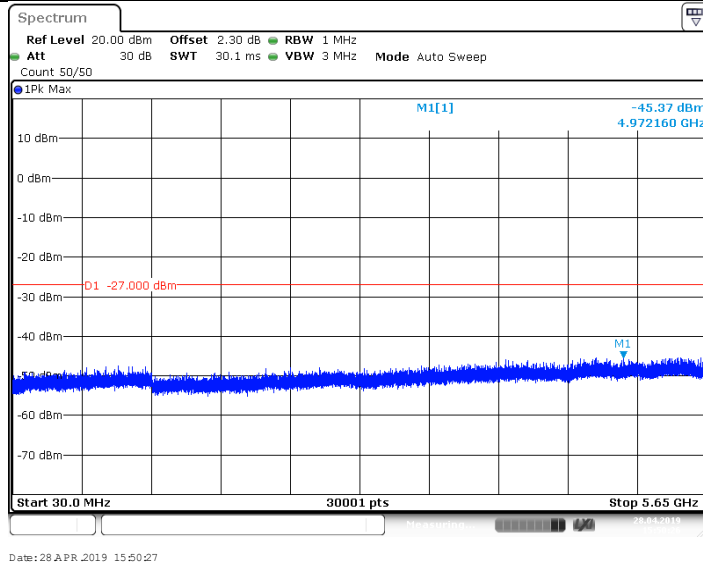
11N20SISO_Ant1_5720_30~5460



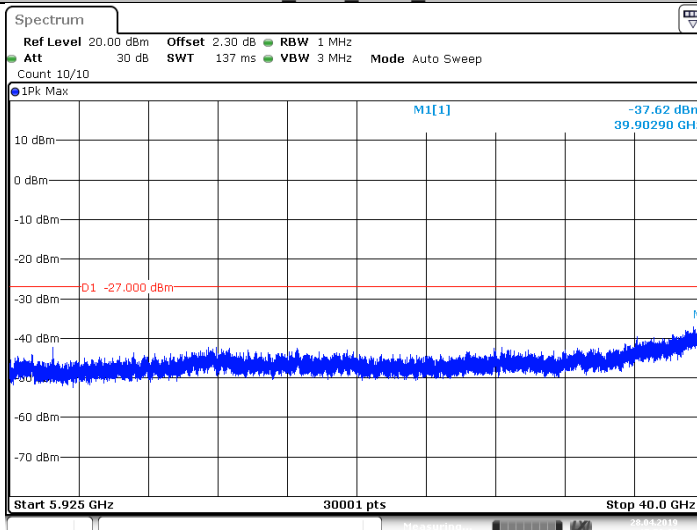
11N20SISO_Ant1_5720_5925~40000



11N20SISO_Ant1_5745_30~5650

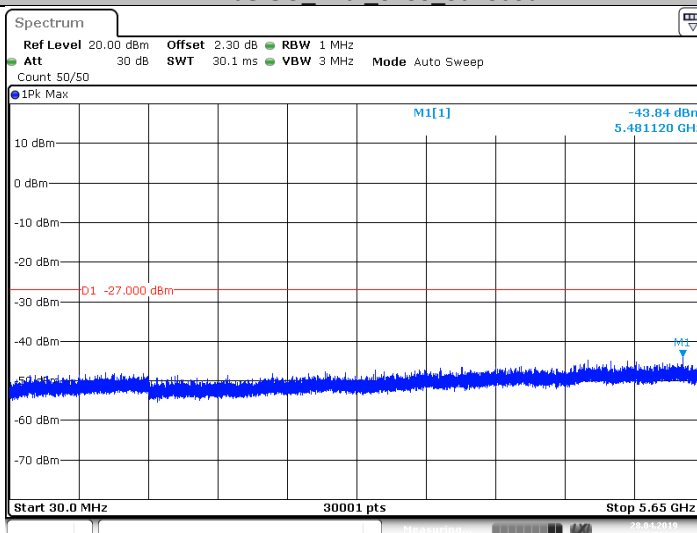


11N20SISO_Ant1_5745_5925~40000



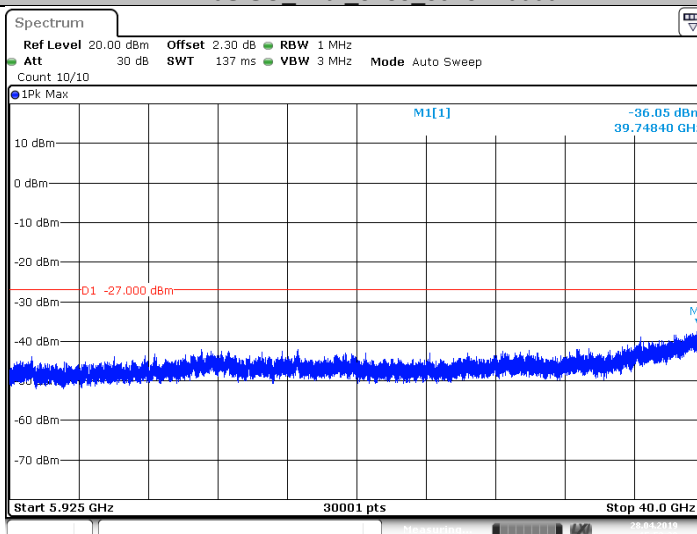
Date: 28 APR 2019 15:50:35

11N20SISO_Ant1_5785_30~5650



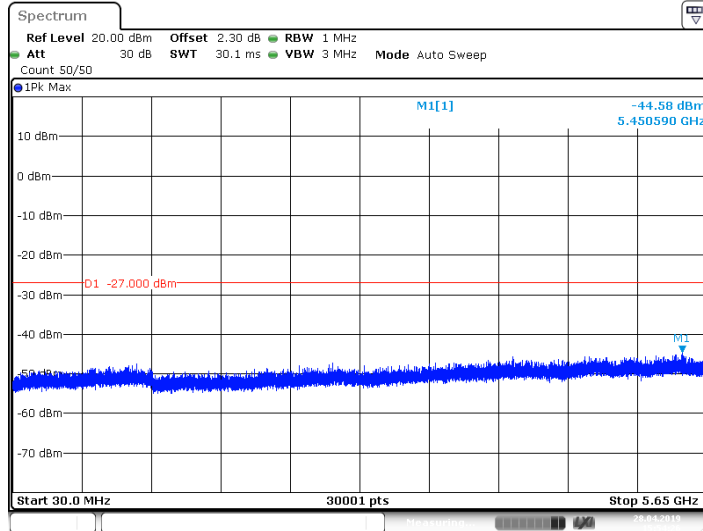
Date: 28 APR 2019 15:52:19

11N20SISO_Ant1_5785_5925~40000

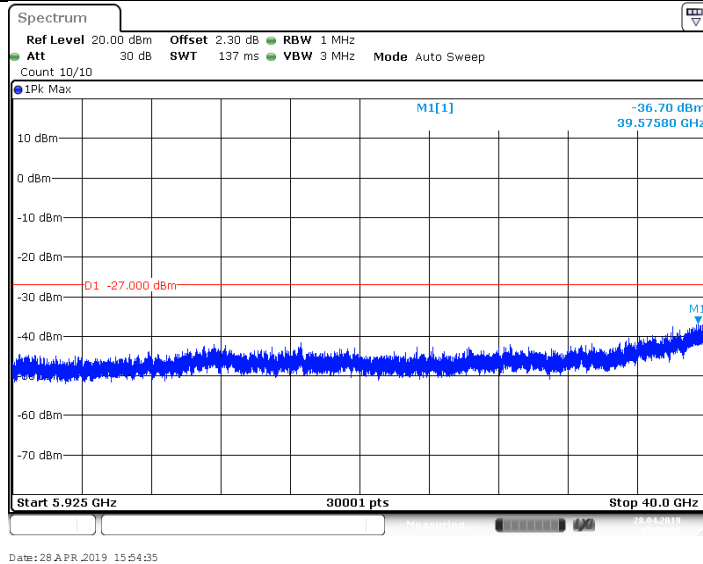


Date: 28 APR 2019 15:52:28

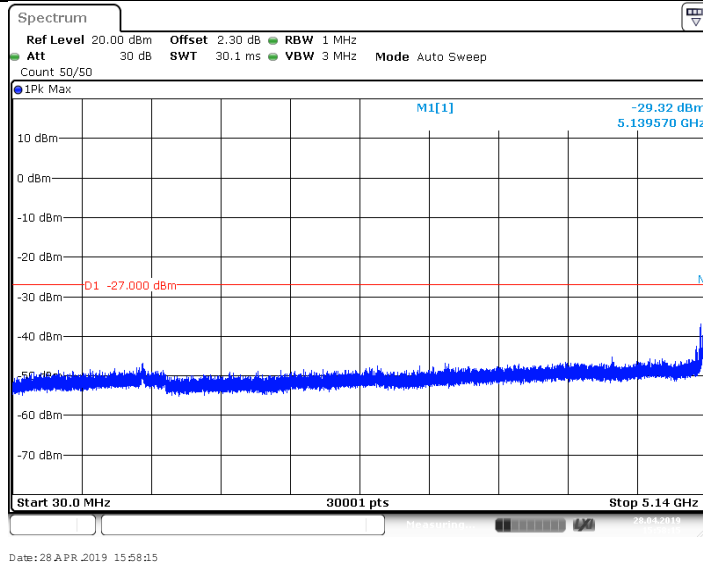
11N20SISO_Ant1_5825_30~5650



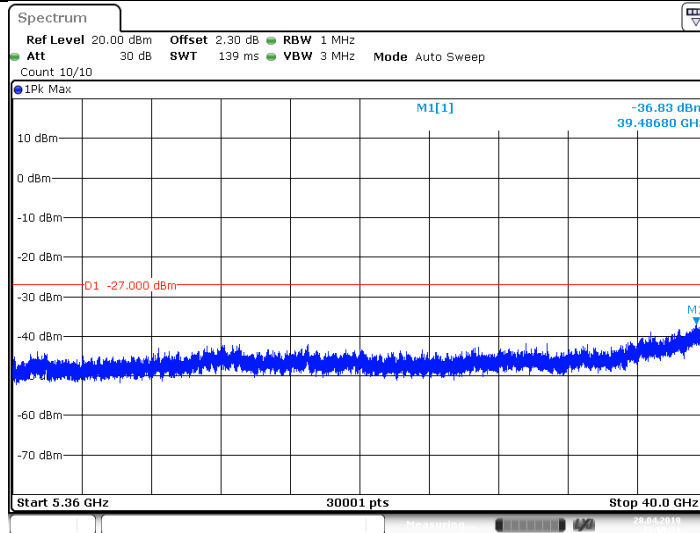
11N20SISO_Ant1_5825_5925~40000



11N40SISO_Ant1_5190_30~5140

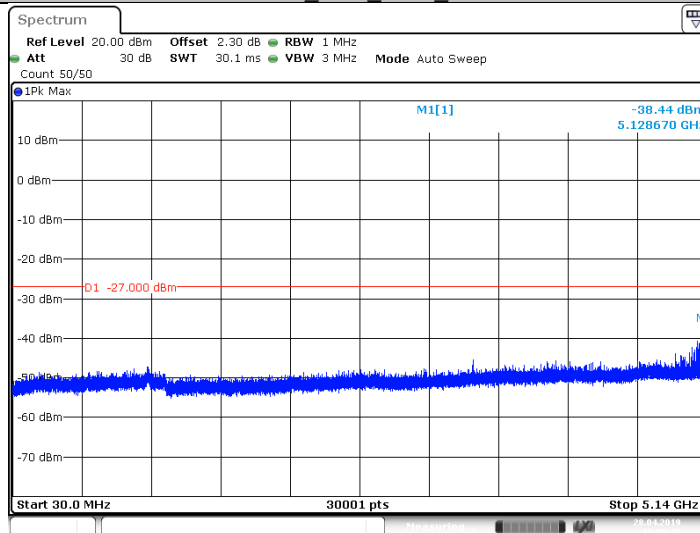


11N40SISO_Ant1_5190_5360~40000



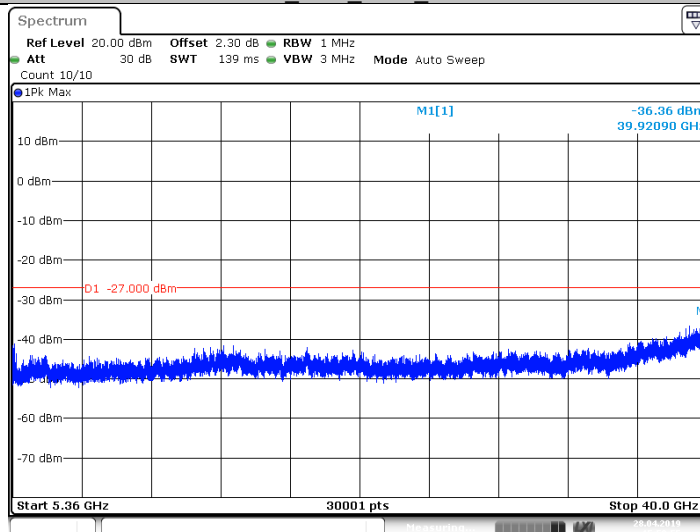
Date: 28 APR 2019 15:58:24

11N40SISO_Ant1_5230_30~5140



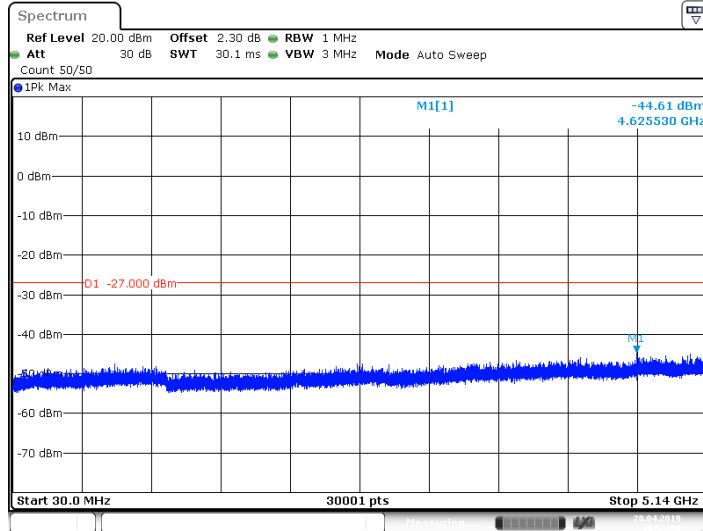
Date: 28 APR 2019 15:59:47

11N40SISO_Ant1_5230_5360~40000



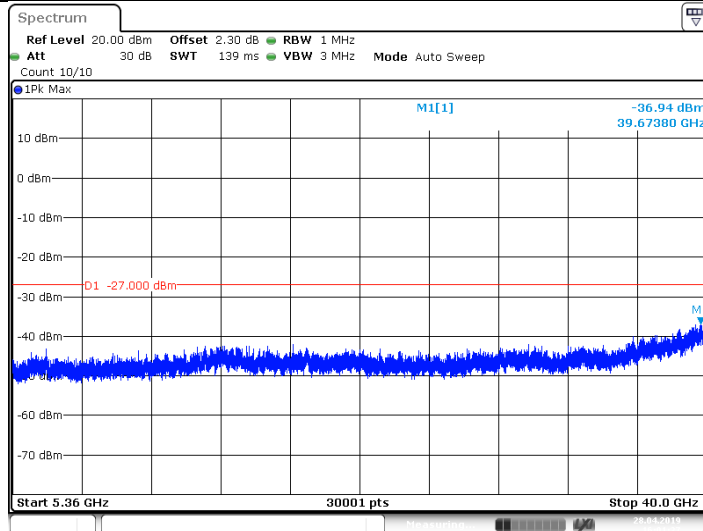
Date: 28 APR 2019 15:59:56

11N40SISO_Ant1_5270_30~5140



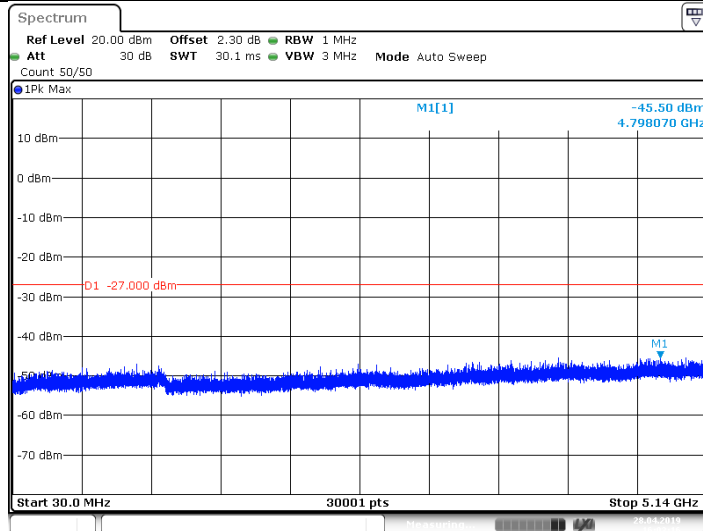
Date: 28 APR 2019 16:01:29

11N40SISO_Ant1_5270_5360~40000



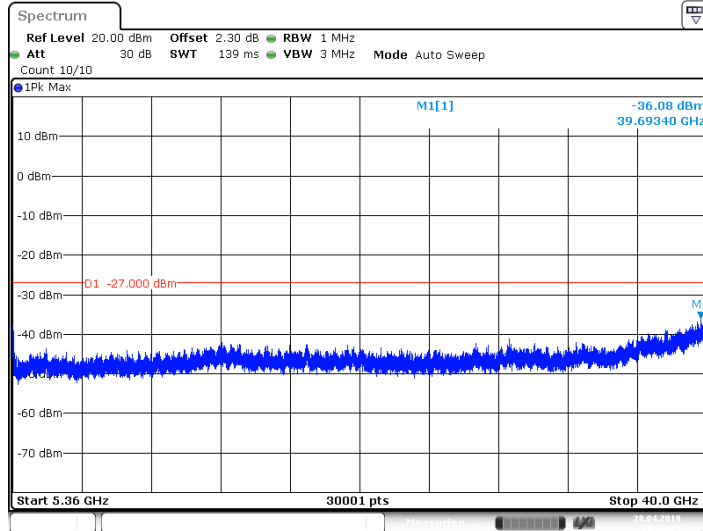
Date: 28 APR 2019 16:01:38

11N40SISO_Ant1_5310_30~5140



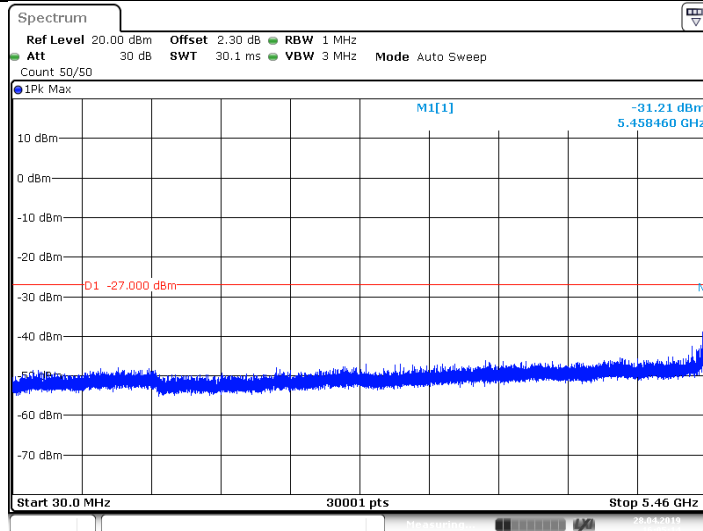
Date: 28 APR 2019 16:03:16

11N40SISO_Ant1_5310_5360~40000



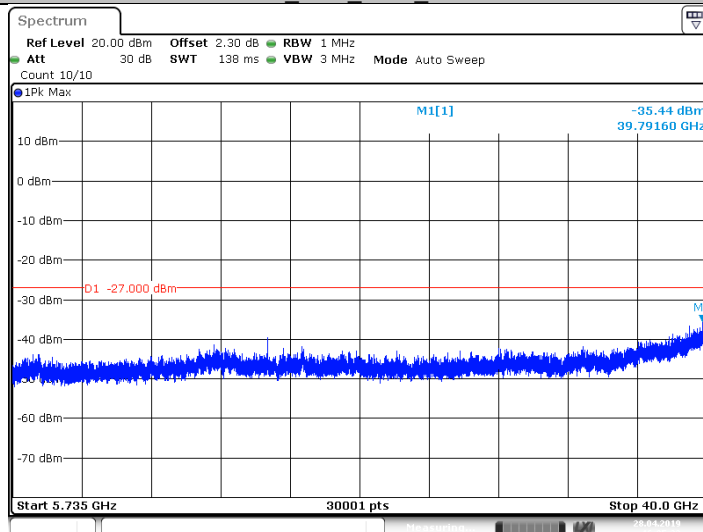
Date: 28 APR 2019 16:03:25

11N40SISO_Ant1_5510_30~5460



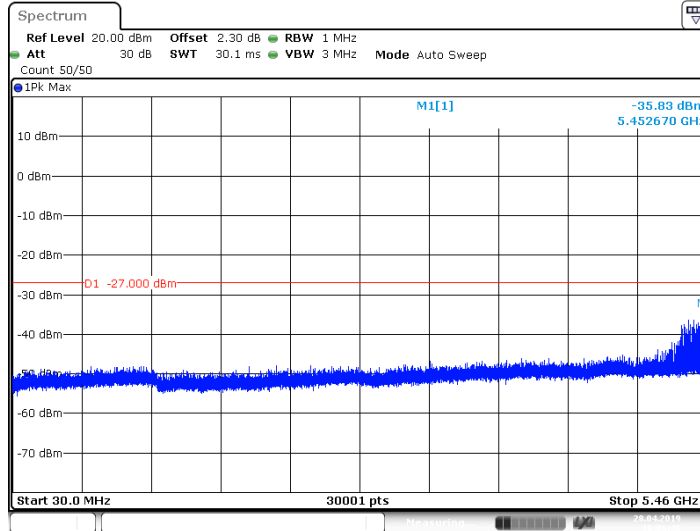
Date: 28 APR 2019 16:05:14

11N40SISO_Ant1_5510_5735~40000



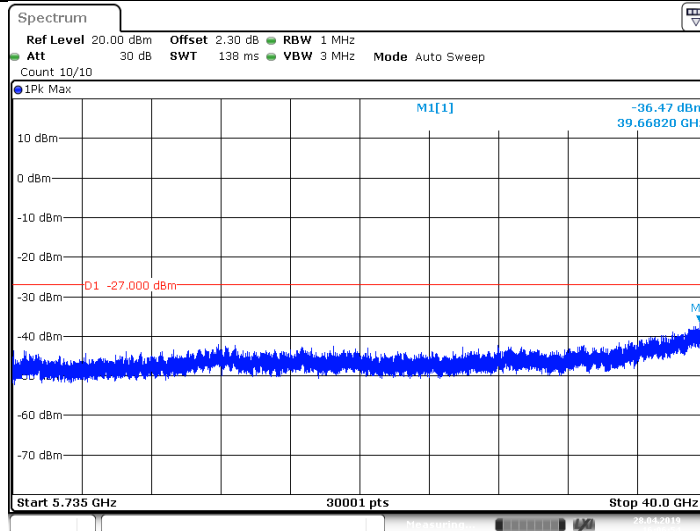
Date: 28 APR 2019 16:05:23

11N40SISO_Ant1_5550_30~5460



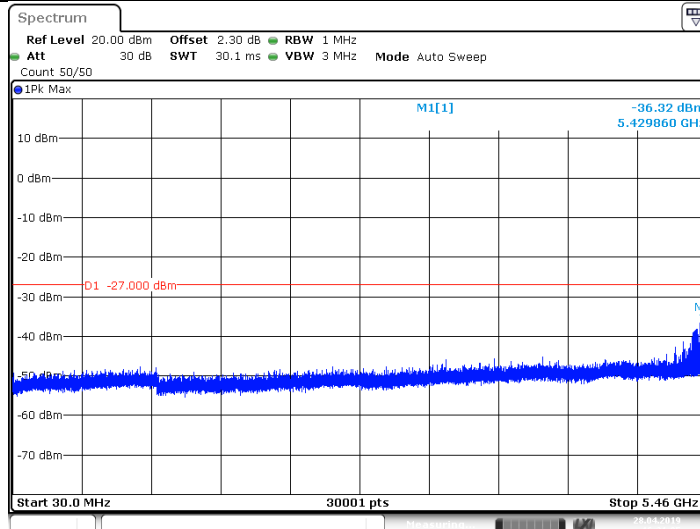
Date: 28 APR 2019 16:06:46

11N40SISO_Ant1_5550_5735~40000



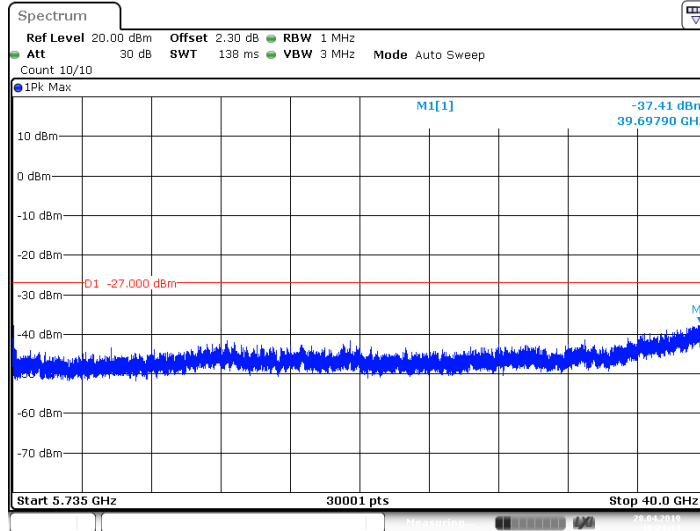
Date: 28 APR 2019 16:06:55

11N40SISO_Ant1_5670_30~5460



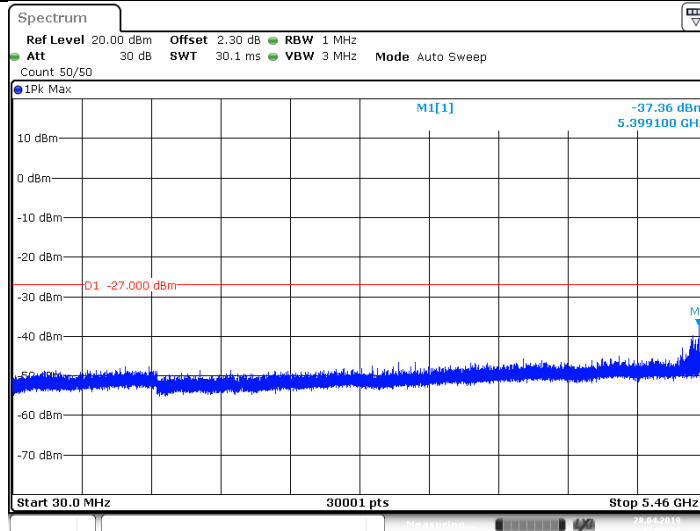
Date: 28 APR 2019 16:21:05

11N40SISO_Ant1_5670_5735~40000



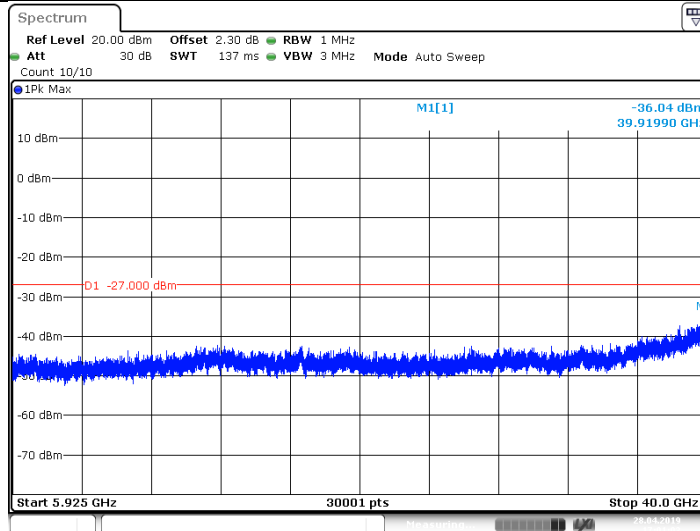
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11N40SISO_Ant1_5710_30~5460



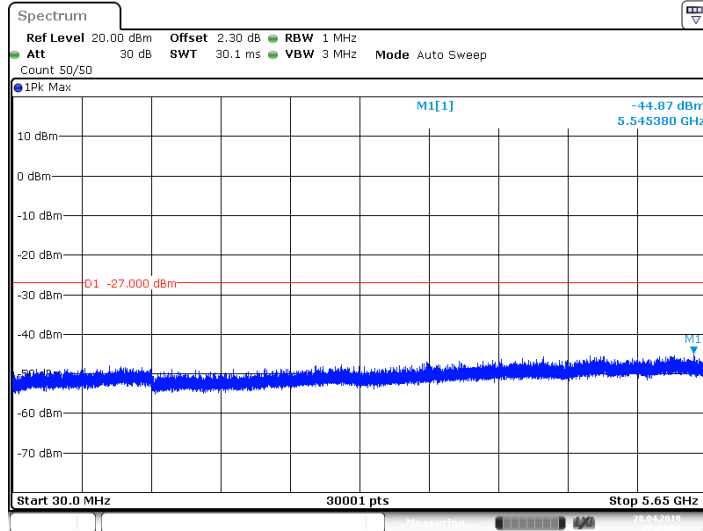
Date: 28 APR 2019 17:00:55

11N40SISO_Ant1_5710_5925~40000



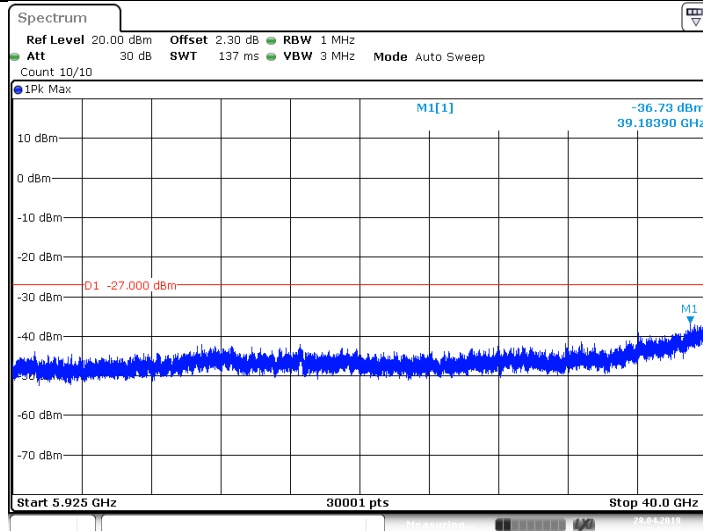
Date: 28 APR 2019 17:01:03

11N40SISO_Ant1_5755_30~5650



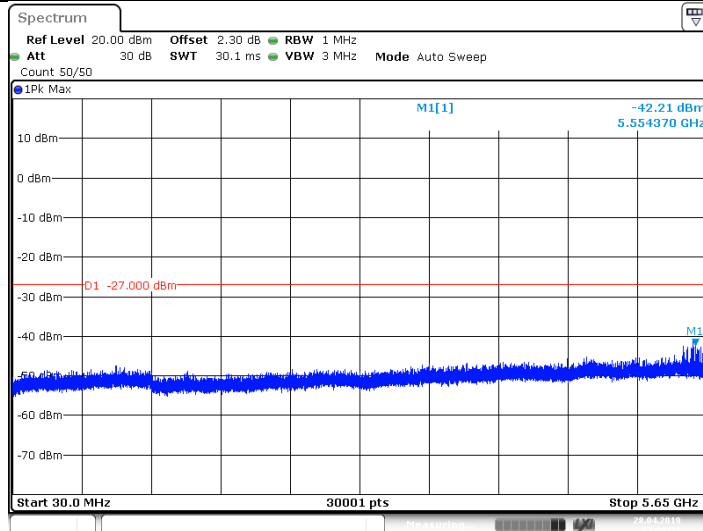
Date: 28 APR 2019 17:04:07

11N40SISO_Ant1_5755_5925~40000



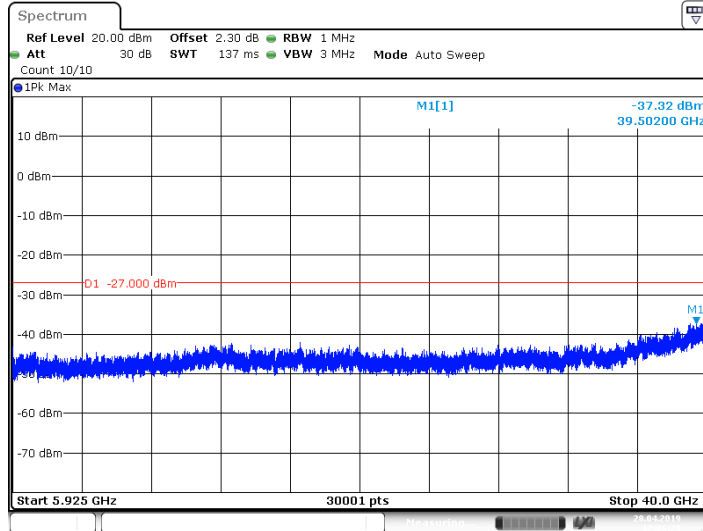
Date: 28 APR 2019 17:04:16

11N40SISO_Ant1_5795_30~5650



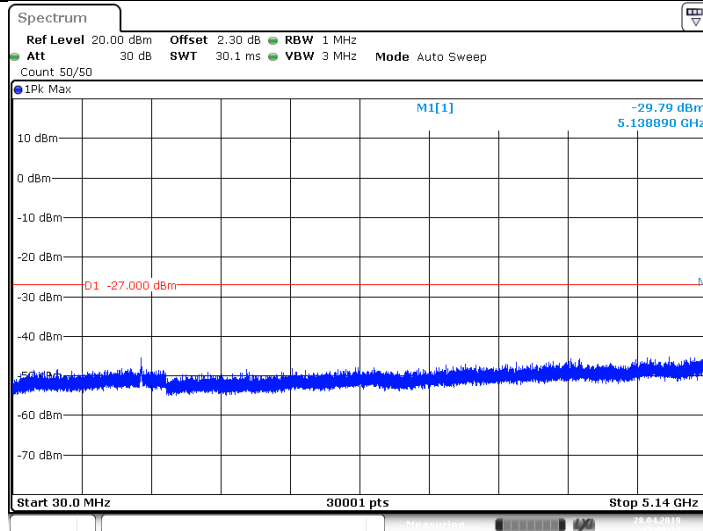
Date: 28 APR 2019 17:06:21

11N40SISO_Ant1_5795_5925~40000



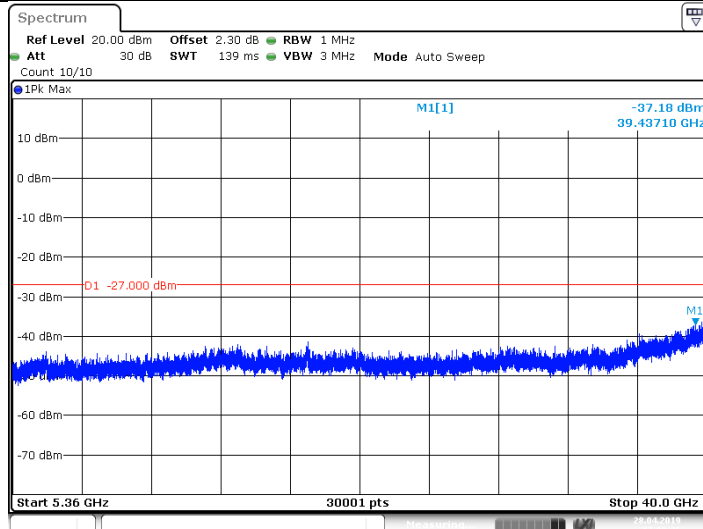
Date: 28 APR 2019 17:06:30

11AC20SISO_Ant1_5180_30~5140



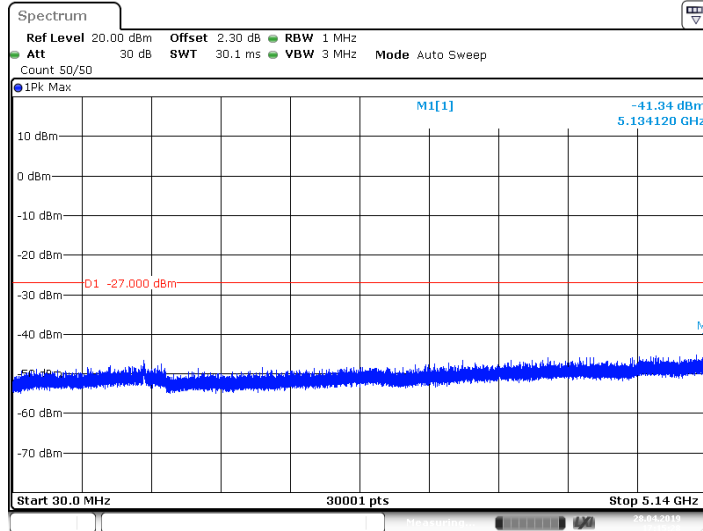
Date: 28 APR 2019 17:08:28

11AC20SISO_Ant1_5180_5360~40000

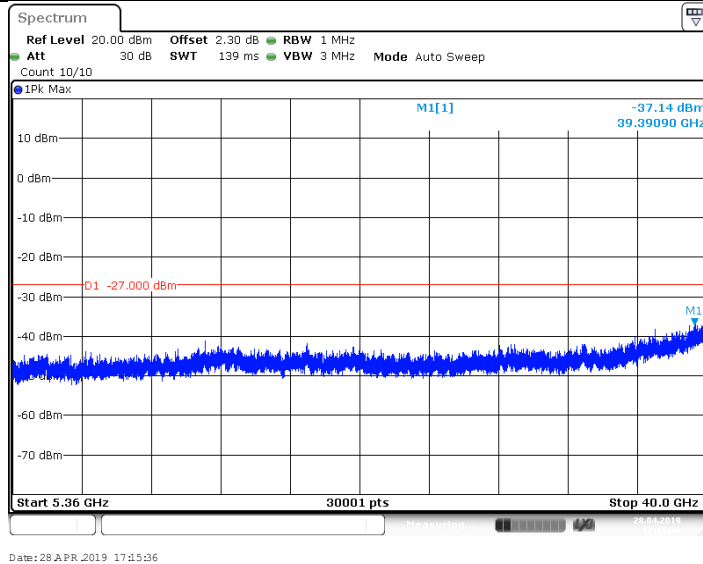


Date: 28 APR 2019 17:08:37

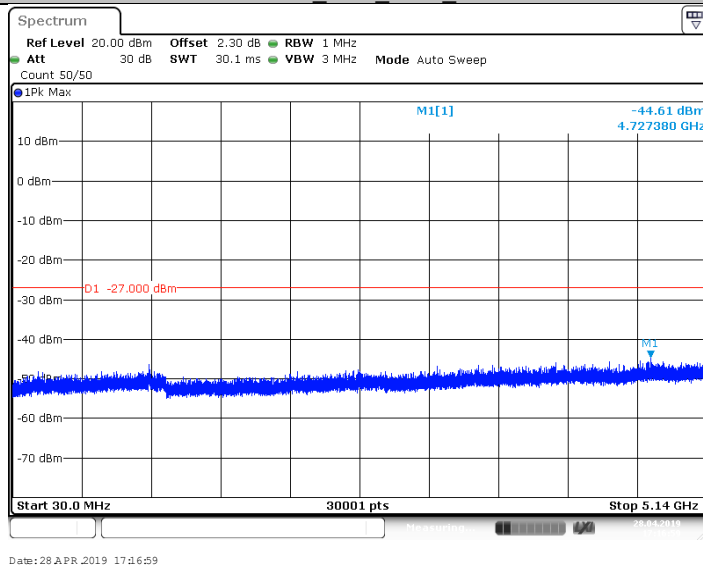
11AC20SISO_Ant1_5200_30-5140



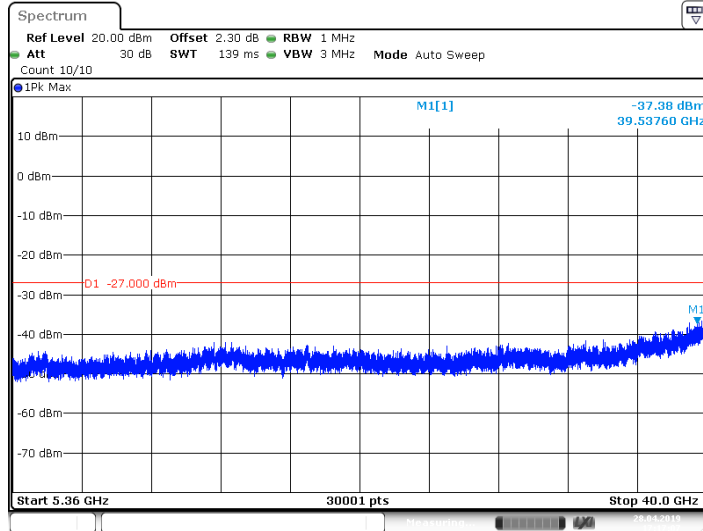
11AC20SISO_Ant1_5200_5360-40000



11AC20SISO_Ant1_5240_30-5140

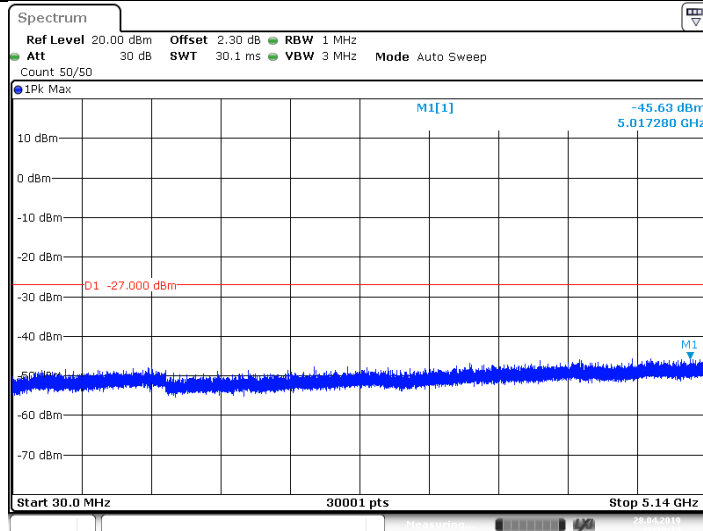


11AC20SISO_Ant1_5240_5360~40000



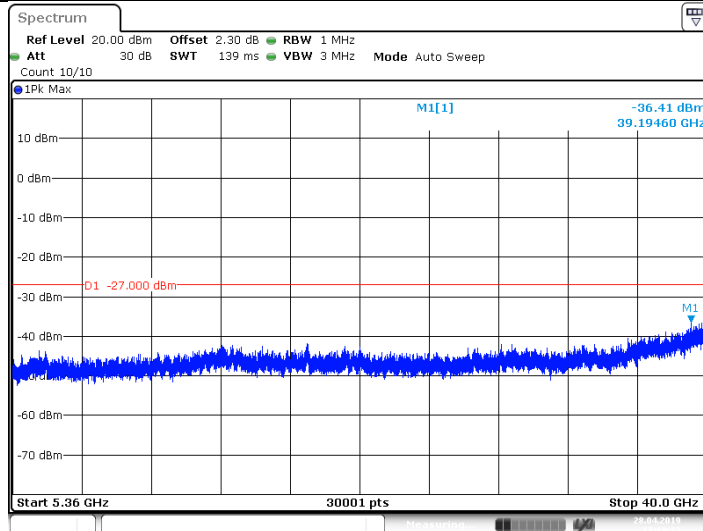
Date: 28 APR 2019 17:17:08

11AC20SISO_Ant1_5260_30~5140



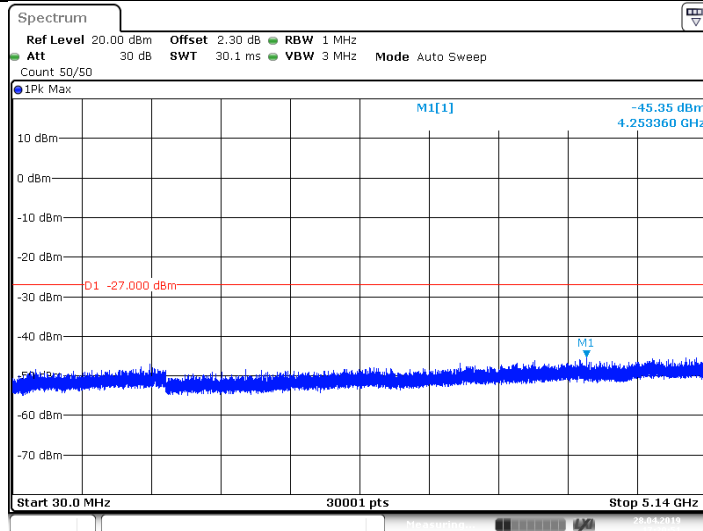
Date: 28 APR 2019 17:19:14

11AC20SISO_Ant1_5260_5360~40000

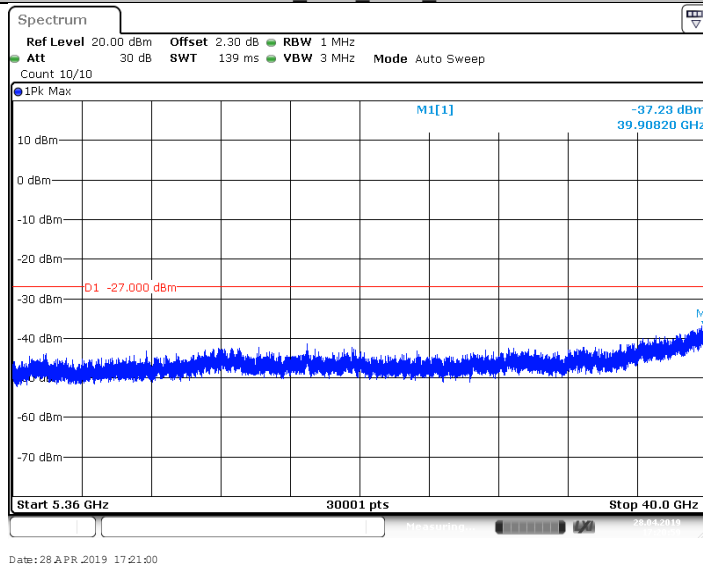


Date: 28 APR 2019 17:19:23

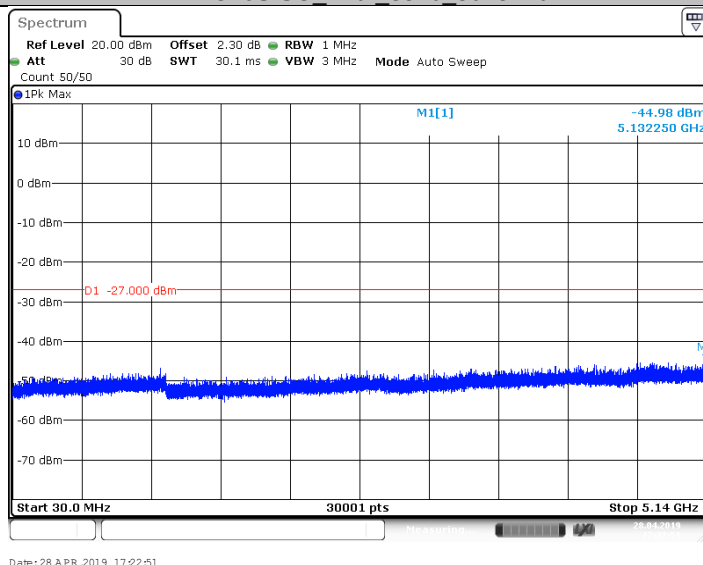
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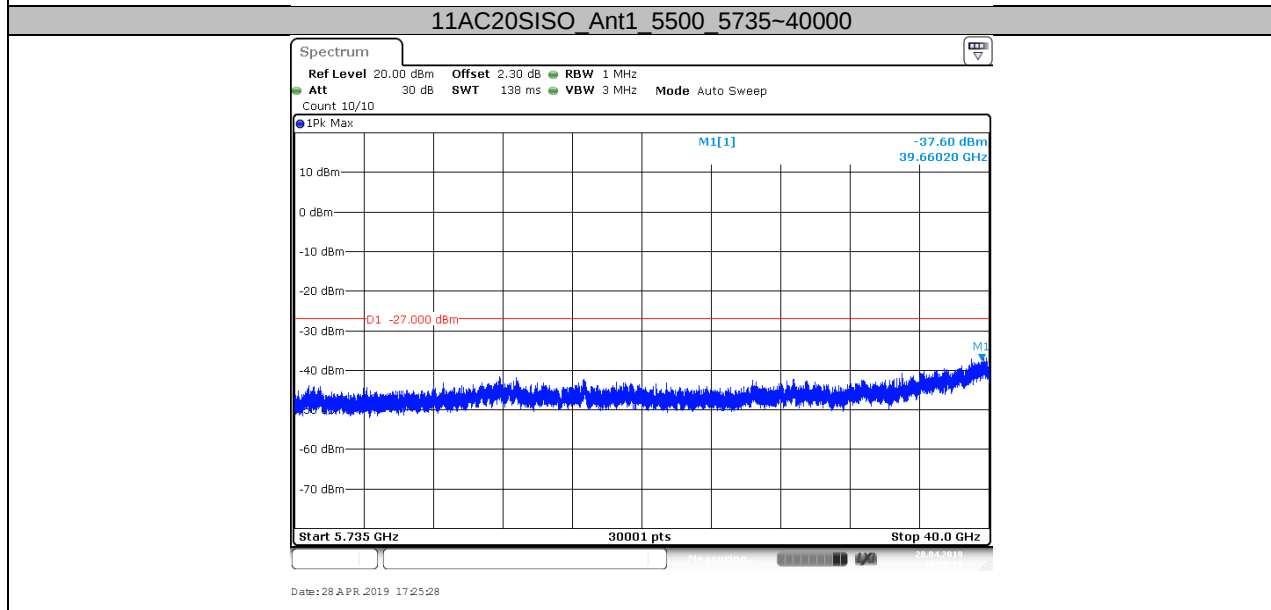


11AC20SISO_Ant1_5280_5360-40000

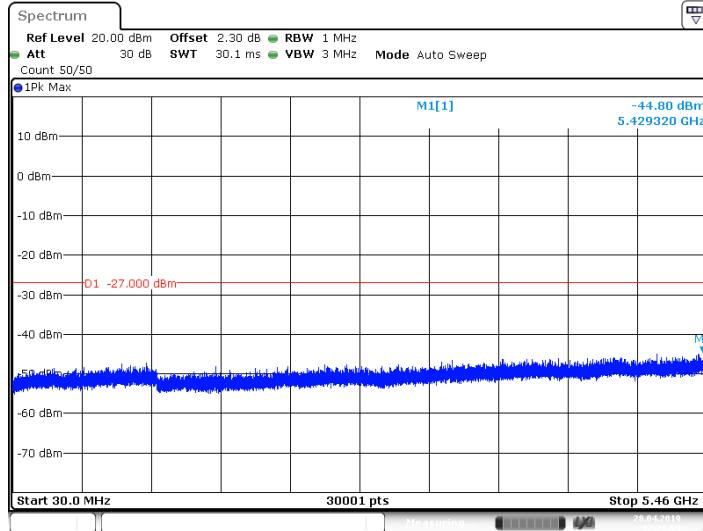


11AC20SISO_Ant1_5320_30-5140



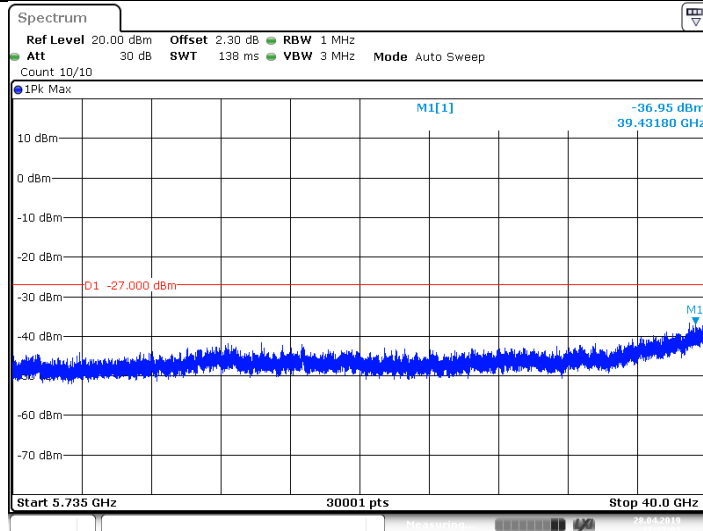


11AC20SISO_Ant1_5580_30-5460



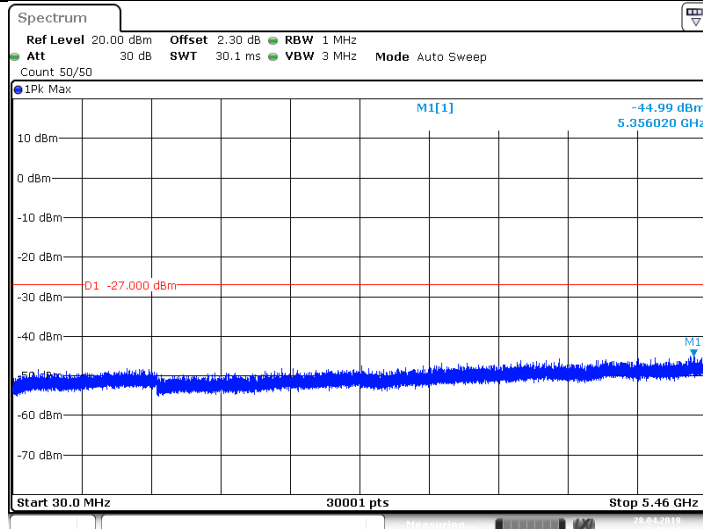
Date: 28 APR 2019 17:26:54

11AC20SISO_Ant1_5580_5735-40000



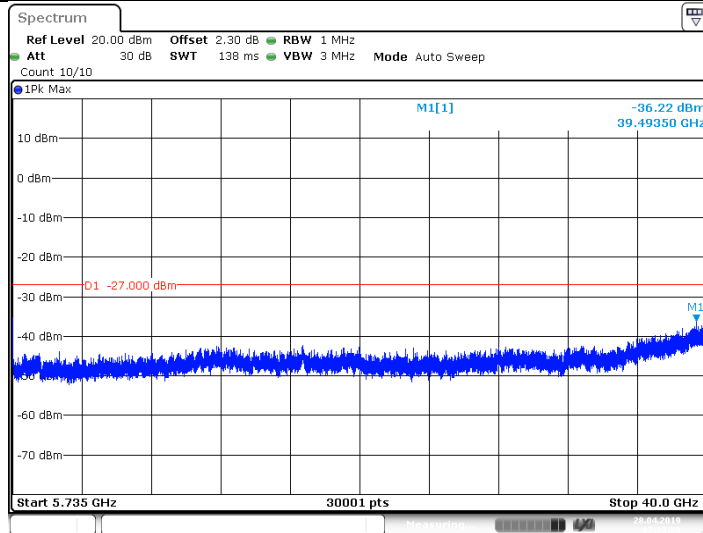
Date: 28 APR 2019 17:27:03

11AC20SISO_Ant1_5700_30-5460



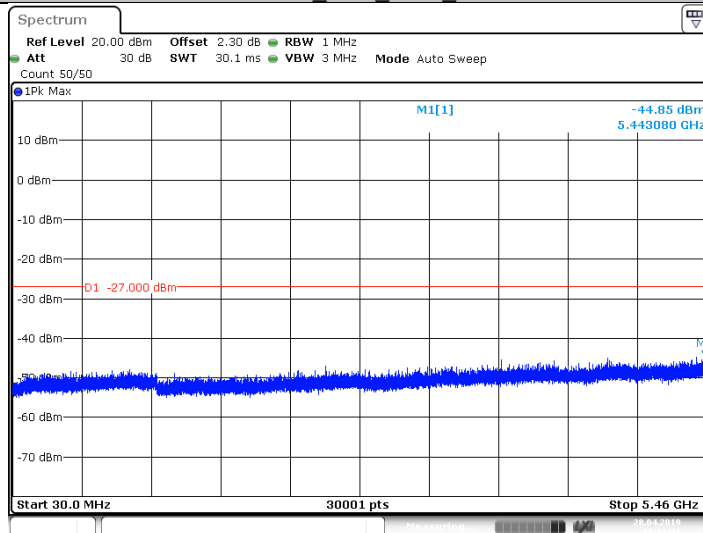
Date: 28 APR 2019 17:28:50

11AC20SISO_Ant1_5700_5735~40000



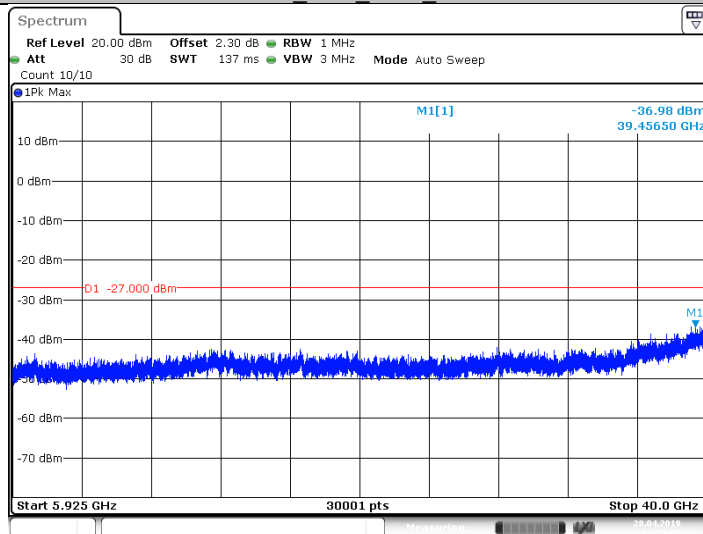
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11AC20SISO_Ant1_5720_30~5460



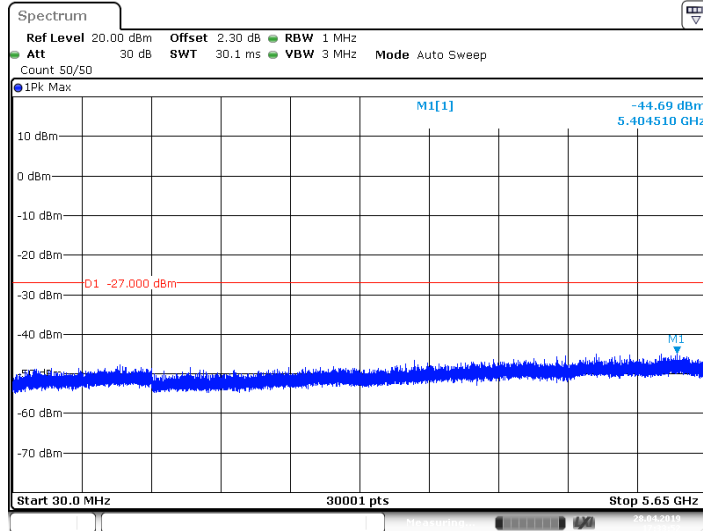
Date: 28 APR 2019 17:31:52

11AC20SISO_Ant1_5720_5925~40000



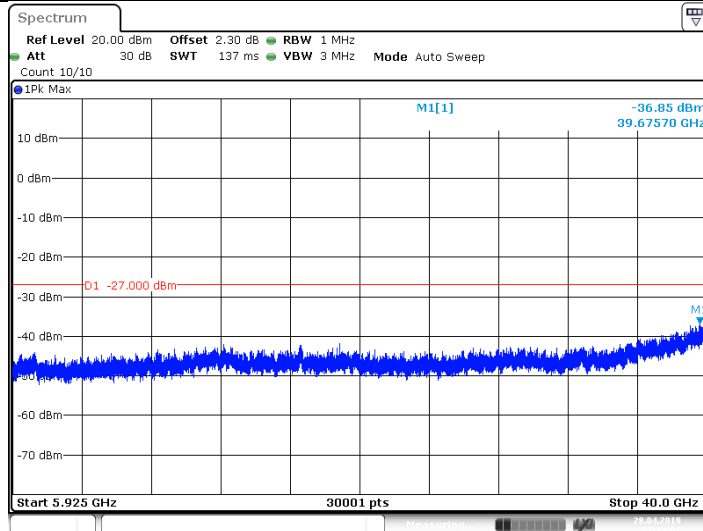
Date: 28 APR 2019 17:32:01

11AC20SISO_Ant1_5745_30-5650



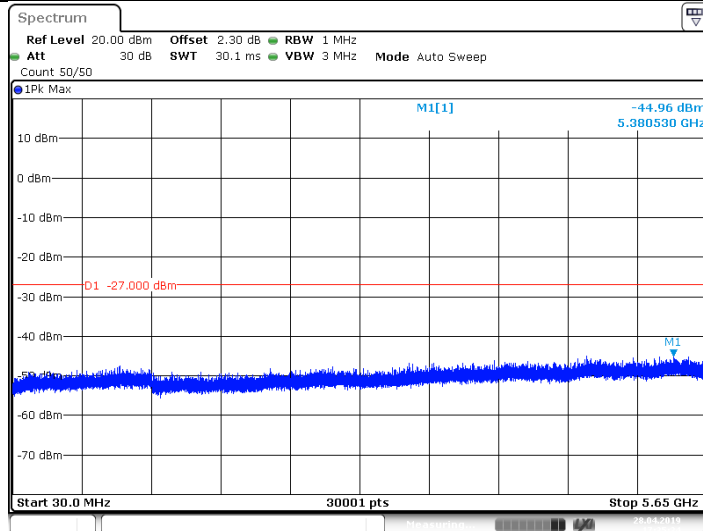
Date: 28 APR 2019 17:33:52

11AC20SISO_Ant1_5745_5925-40000



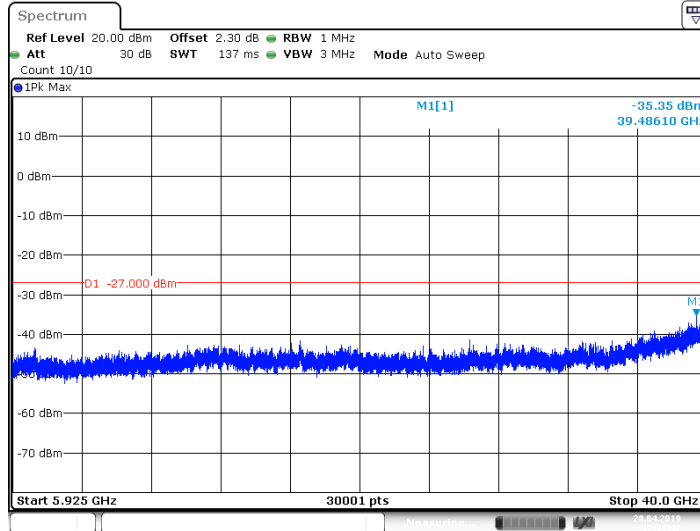
Date: 28 APR 2019 17:34:01

11AC20SISO_Ant1_5785_30-5650



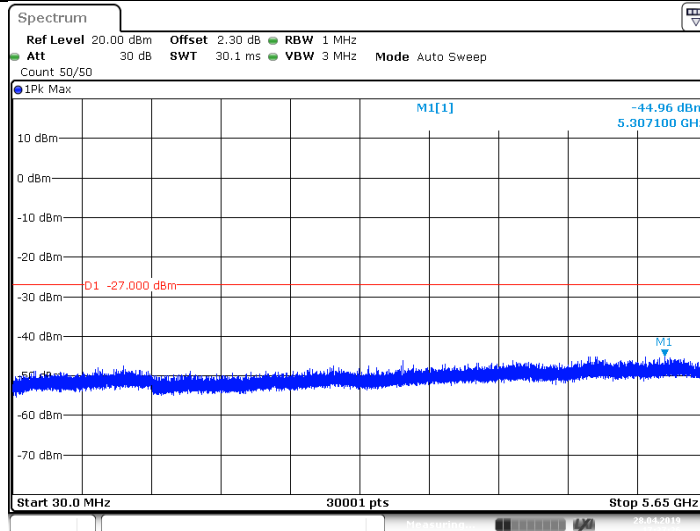
Date: 28 APR 2019 17:35:34

11AC20SISO_Ant1_5785_5925~40000



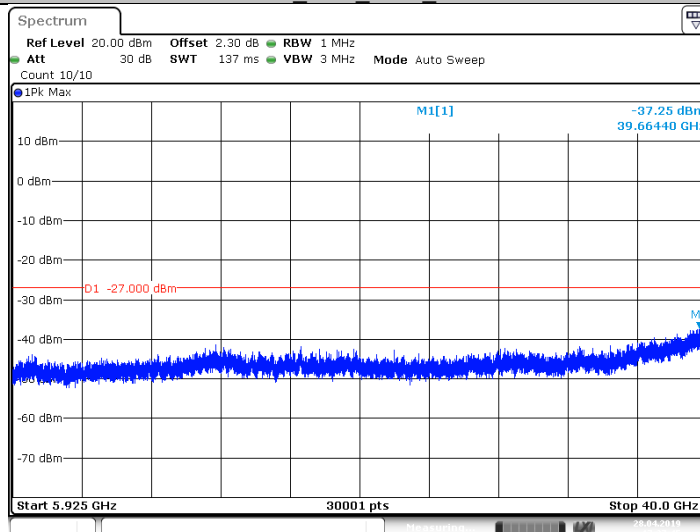
Date: 28 APR 2019 17:35:43

11AC20SISO_Ant1_5825_30~5650



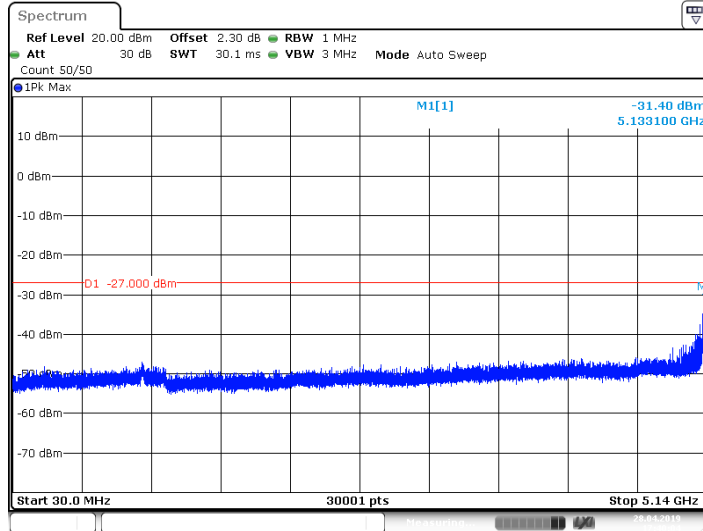
Date: 28 APR 2019 17:37:36

11AC20SISO_Ant1_5825_5925~40000

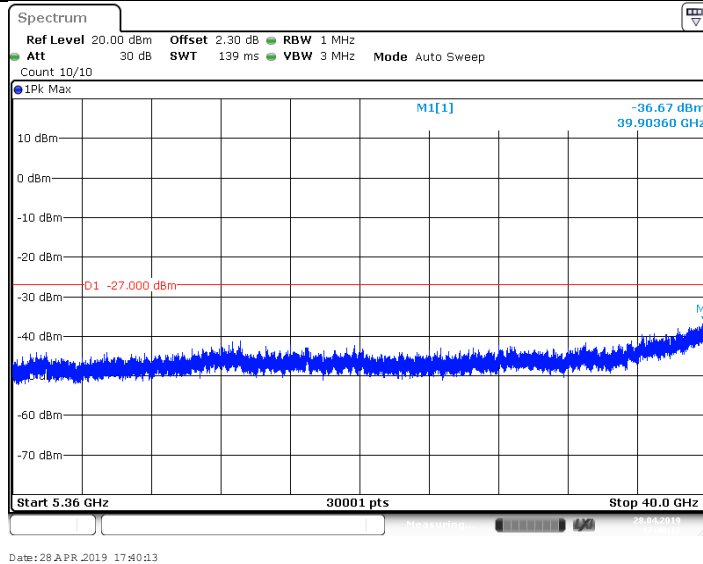


Date: 28 APR 2019 17:37:45

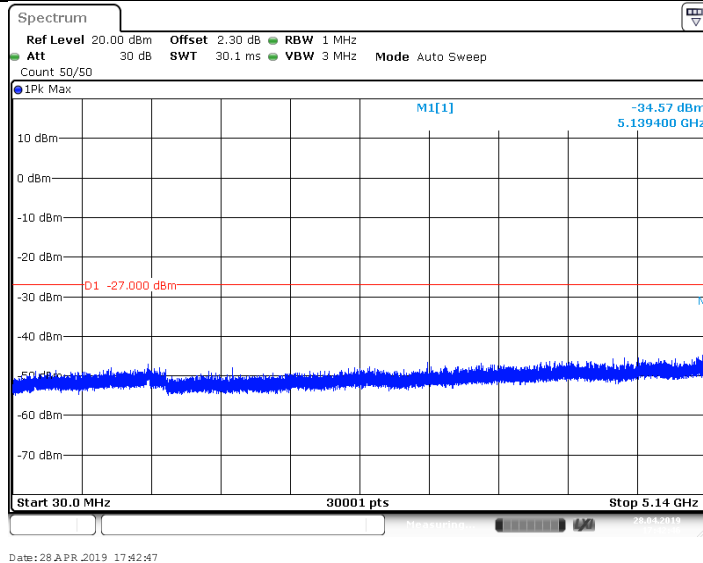
11AC40SISO_Ant1_5190_30-5140



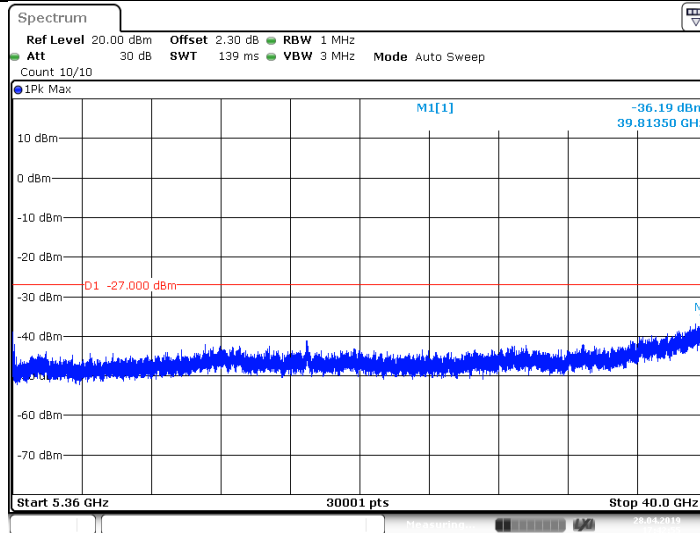
11AC40SISO_Ant1_5190_5360-40000



11AC40SISO_Ant1_5230_30-5140

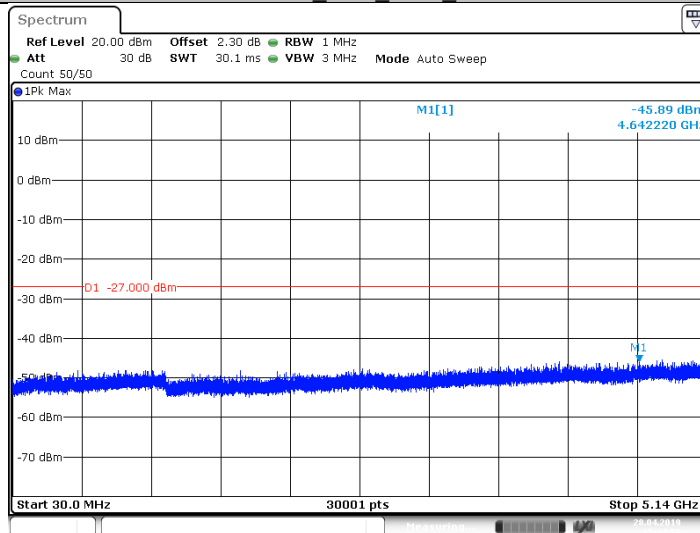


11AC40SISO_Ant1_5230_5360~40000



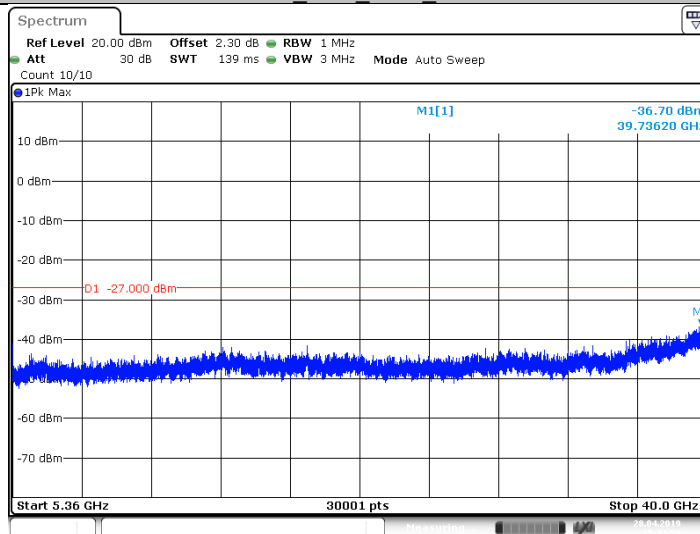
Date: 28 APR 2019 17:42:56

11AC40SISO_Ant1_5270_30~5140



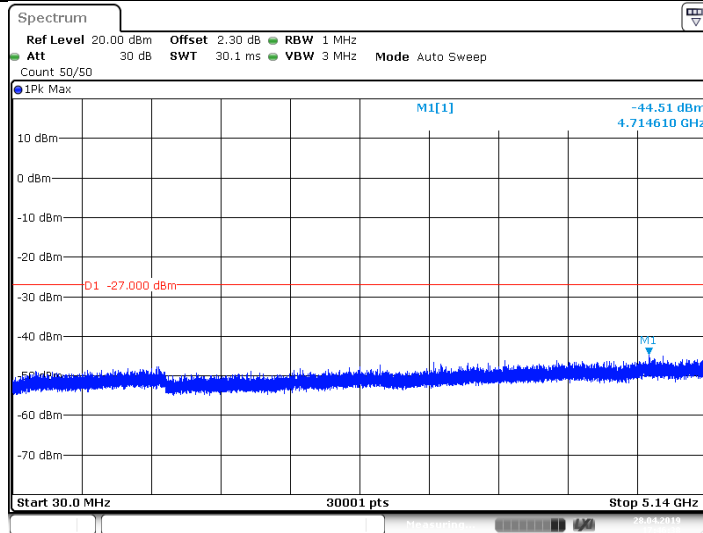
Date: 28 APR 2019 17:44:51

11AC40SISO_Ant1_5270_5360~40000



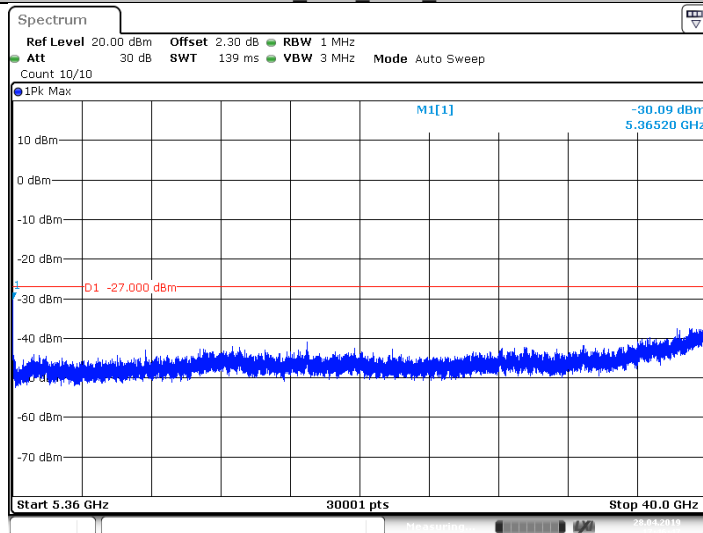
Date: 28 APR 2019 17:44:59

11AC40SISO_Ant1_5310_30-5140



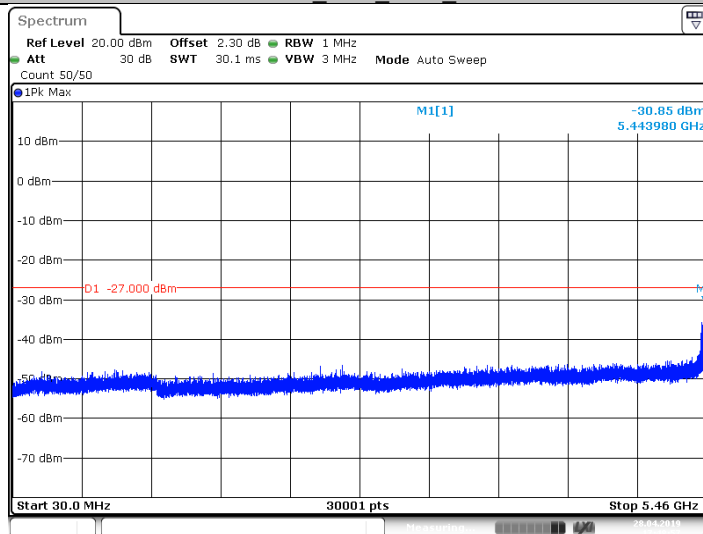
Date: 28 APR 2019 17:46:38

11AC40SISO_Ant1_5310_5360-40000



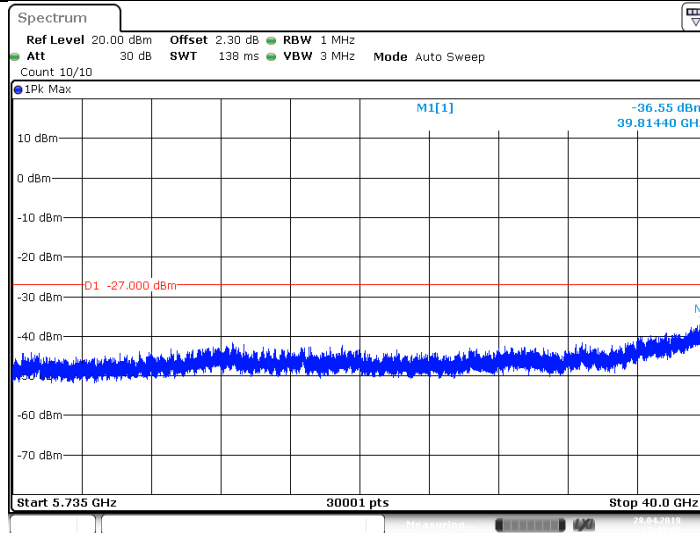
Date: 28 APR 2019 17:46:47

11AC40SISO_Ant1_5510_30-5460



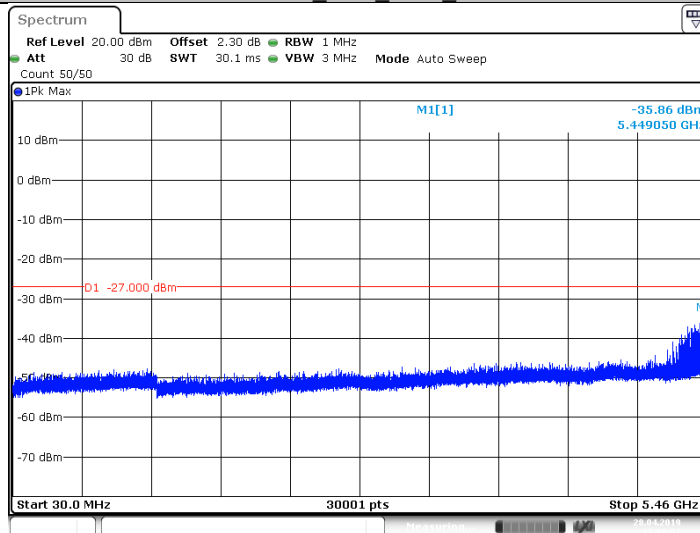
Date: 28 APR 2019 17:48:58

11AC40SISO_Ant1_5510_5735~40000



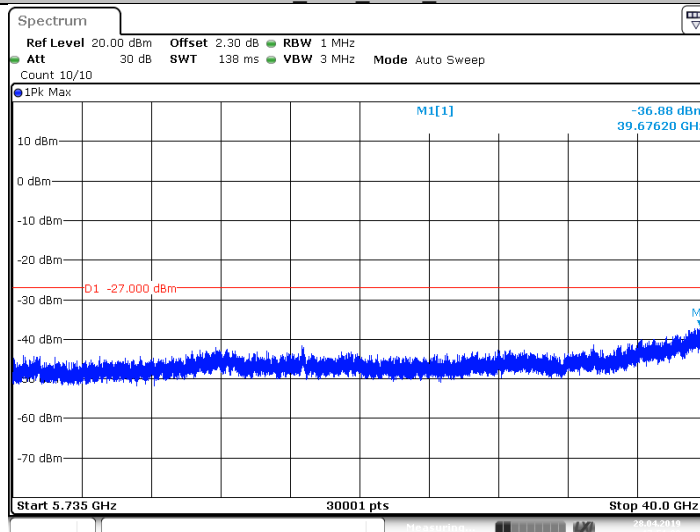
Date: 28 APR 2019 17:49:07

11AC40SISO_Ant1_5550_30~5460



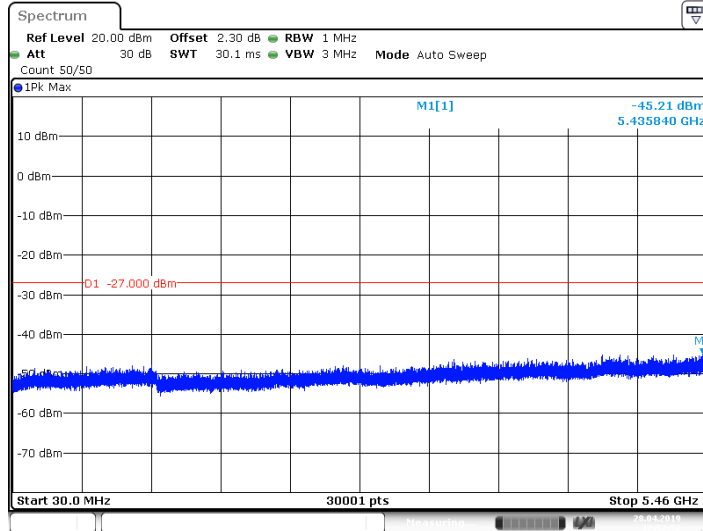
Date: 28 APR 2019 17:50:51

11AC40SISO_Ant1_5550_5735~40000



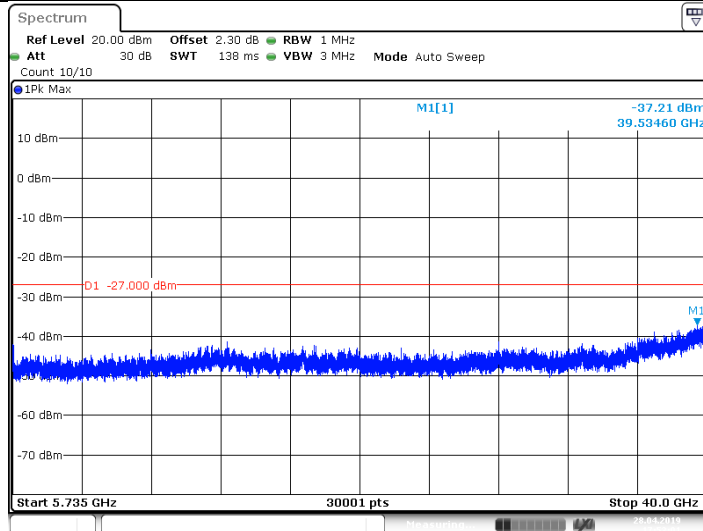
Date: 28 APR 2019 17:51:00

11AC40SISO_Ant1_5670_30-5460



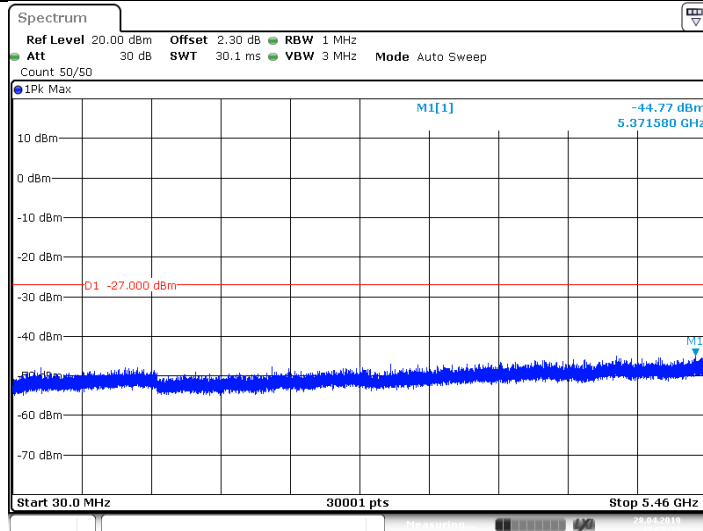
Date: 28 APR 2019 17:52:52

11AC40SISO_Ant1_5670_5735-40000



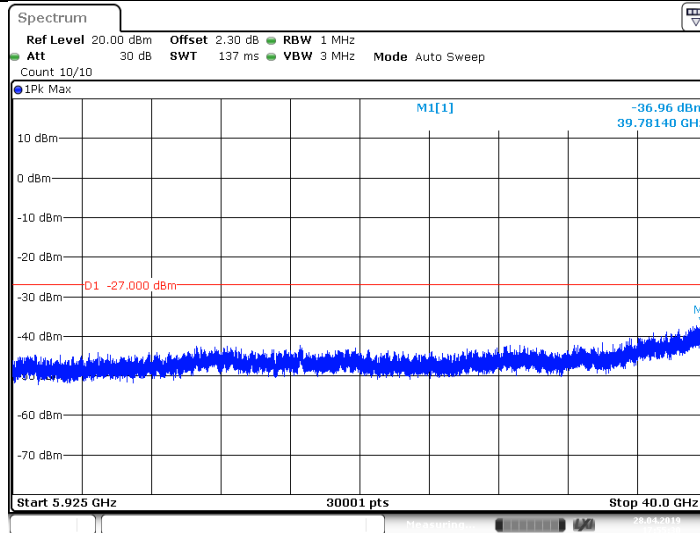
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11AC40SISO_Ant1_5710_30-5460



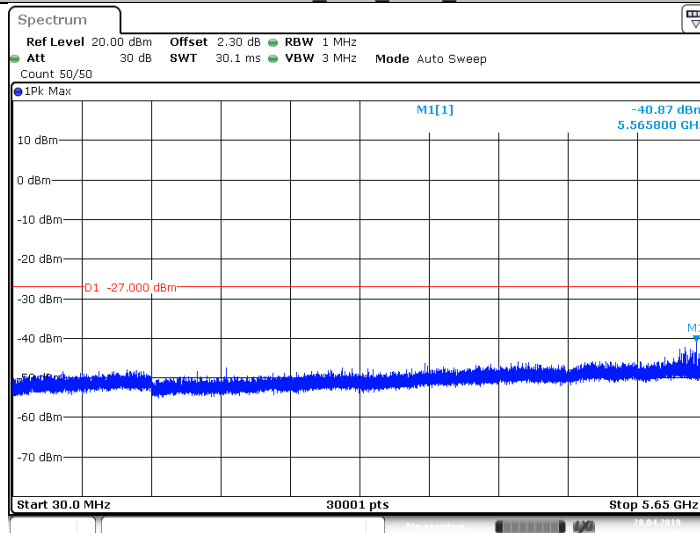
Date: 28 APR 2019 17:55:22

11AC40SISO_Ant1_5710_5925~40000



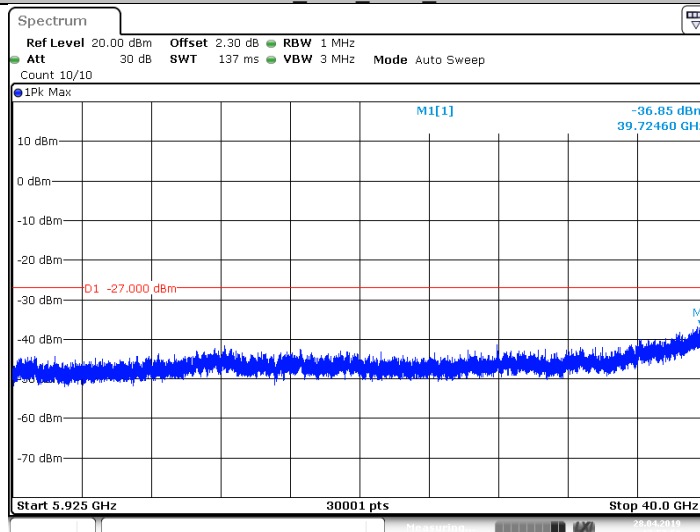
Date: 28 APR 2019 17:55:31

11AC40SISO_Ant1_5755_30~5650



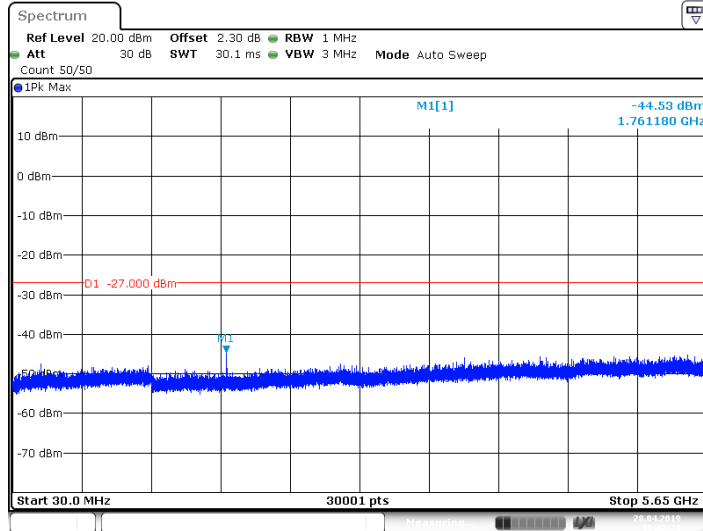
Date: 28 APR 2019 17:57:49

11AC40SISO_Ant1_5755_5925~40000

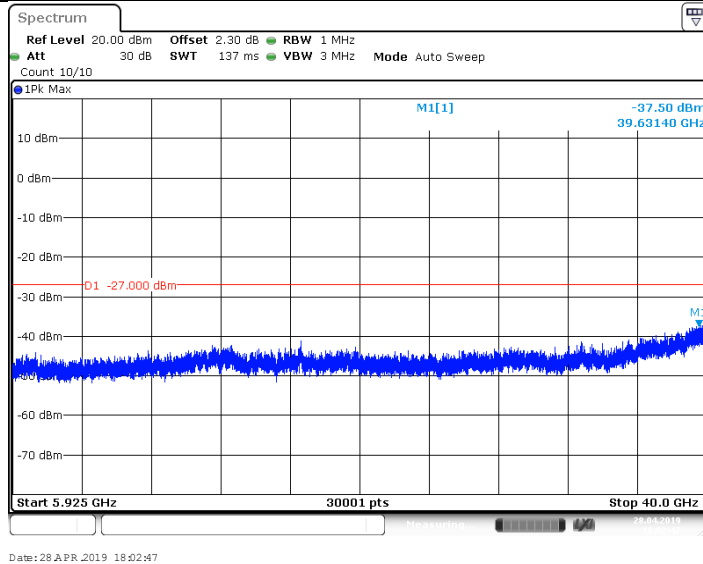


Date: 28 APR 2019 17:57:58

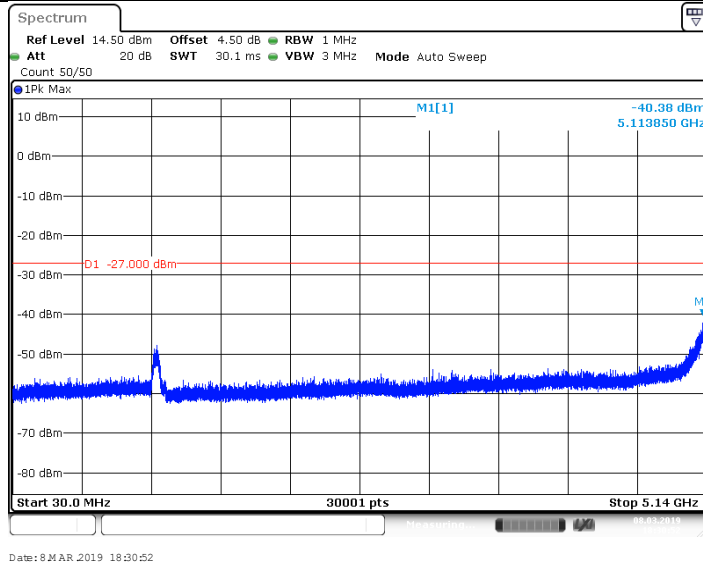
11AC40SISO_Ant1_5795_30-5650



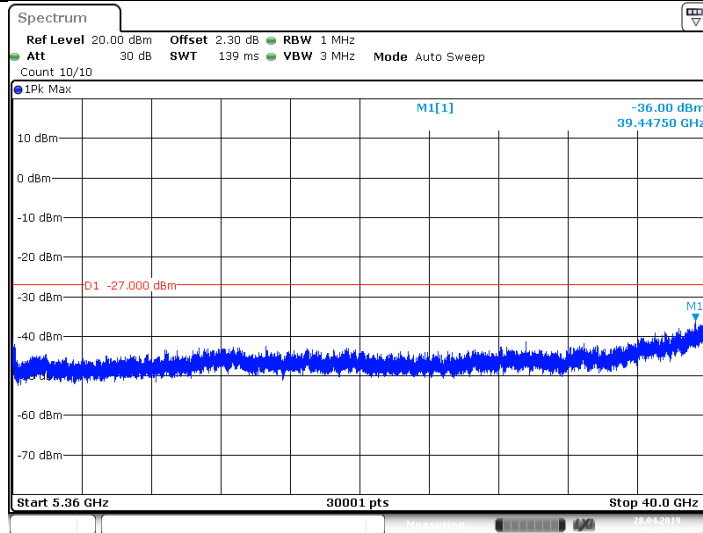
11AC40SISO_Ant1_5795_5925-40000



11AC80SISO_Ant1_5210_30-5140

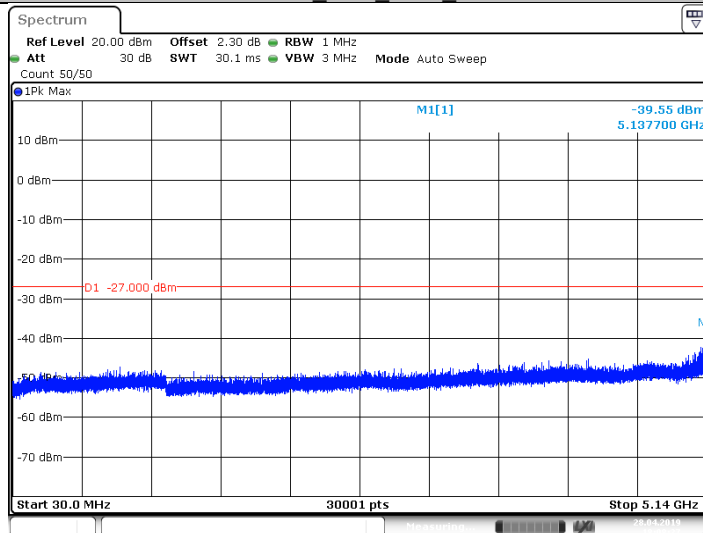


11AC80SISO_Ant1_5210_5360~40000



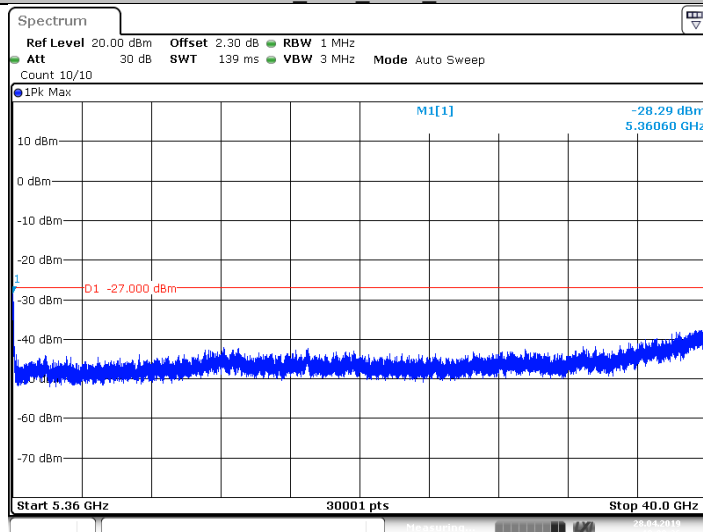
Date: 28 APR 2019 18:06:10

11AC80SISO_Ant1_5290_30~5140



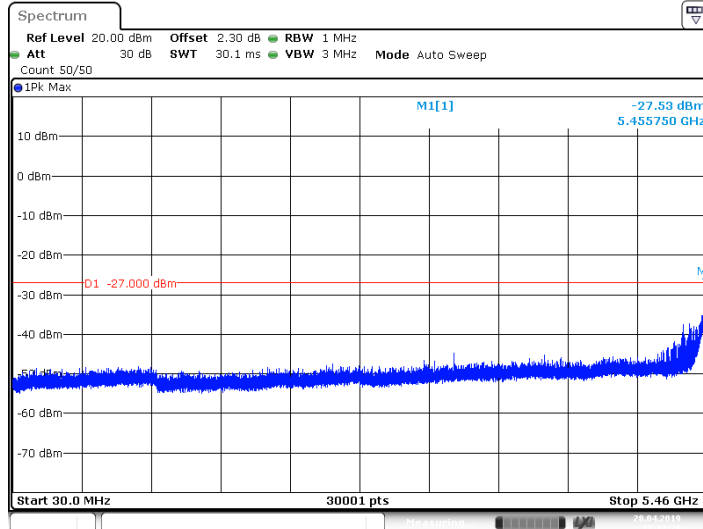
Date: 28 APR 2019 18:08:27

11AC80SISO_Ant1_5290_5360~40000



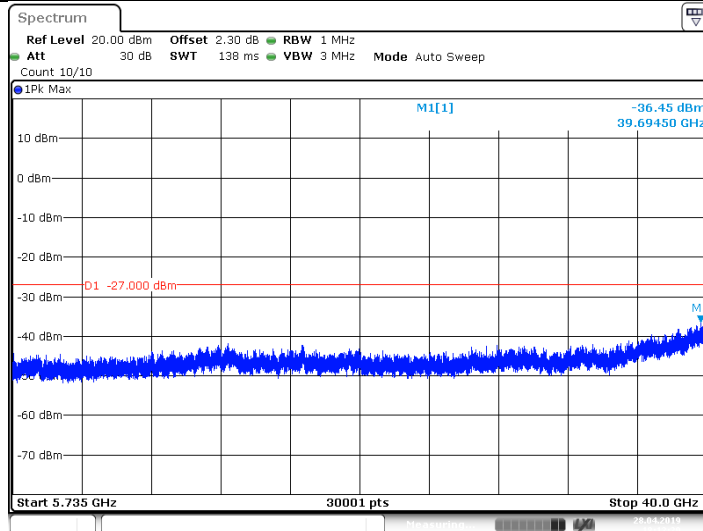
Date: 28 APR 2019 18:08:36

11AC80SISO_Ant1_5530_30-5460



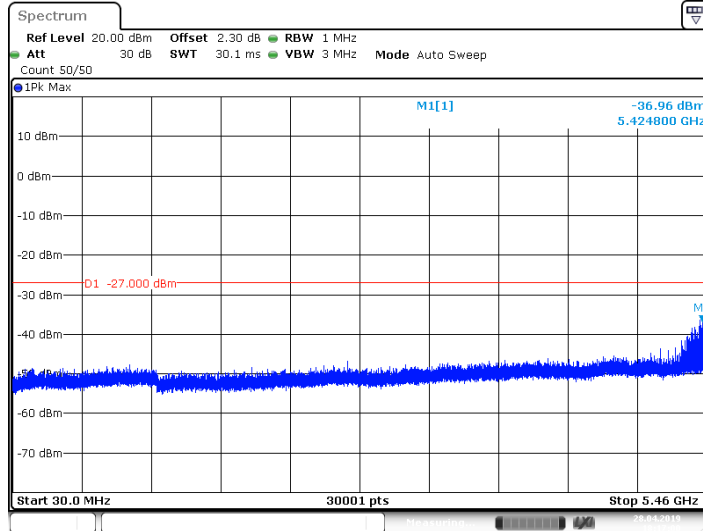
Date: 28 APR. 2019 18:12:21

11AC80SISO_Ant1_5530_5735-40000

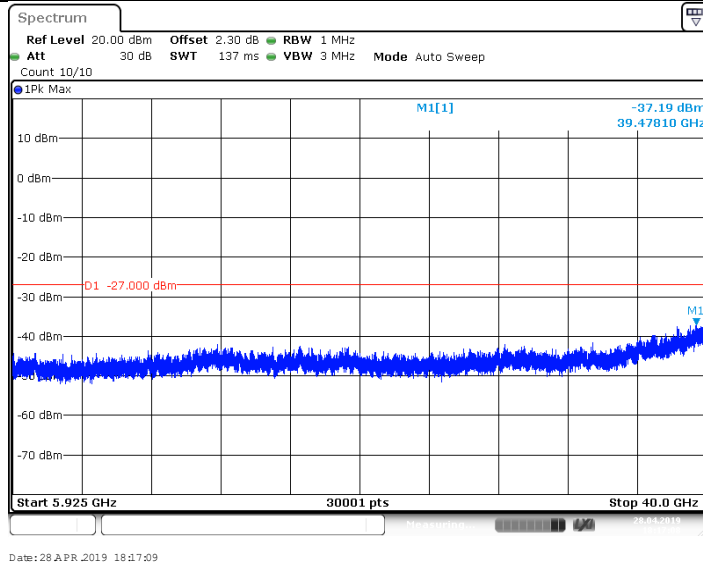


Date: 28 APR. 2019 18:12:30

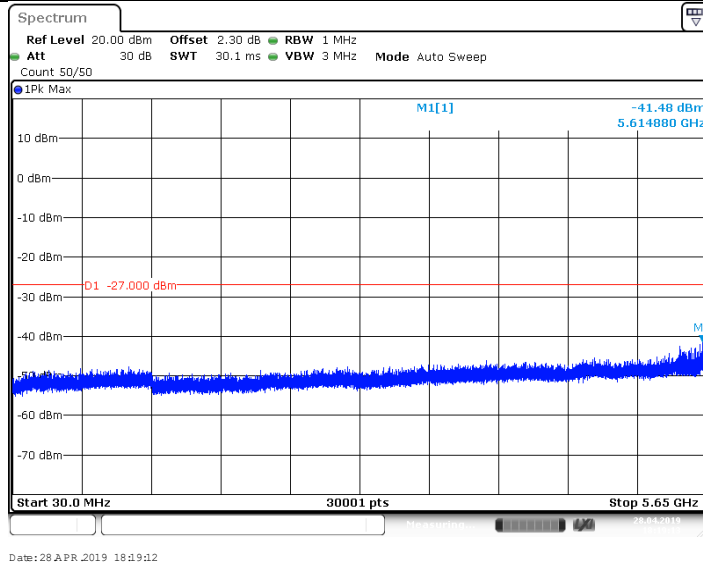
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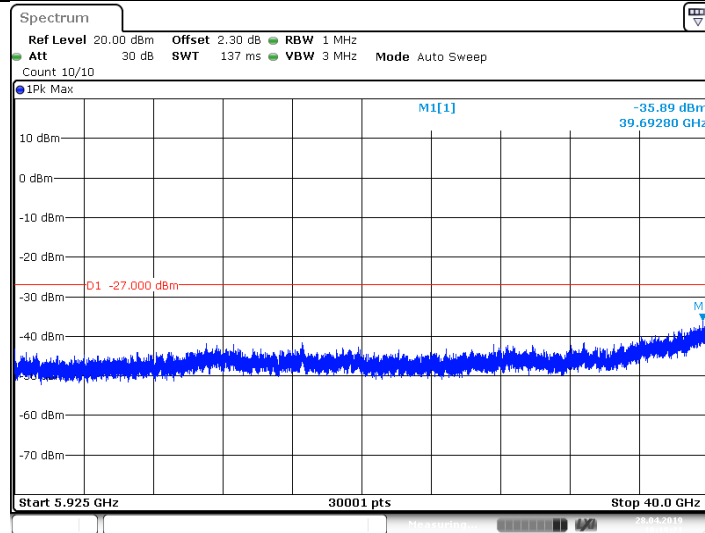
11AC80SISO_Ant1_5690_5925-40000



11AC80SISO_Ant1_5775_30-5650



11AC80SISO_Ant1_5775_5925~40000



Transmitting spurious emission test result as below (Radiated Mode):**Test Method**

1. The EUT was placed on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.
3. The height of antenna 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.
4. 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
5. Use the following spectrum analyzer settings According to C63.10:
For Above 1GHz
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 1MHz, VBW $\geq$ RBW for peak measurement and VBW = 10Hz for average measurement, Sweep = auto, Detector function = peak, Trace = max hold.
For Below 1GHz
Use the following spectrum analyzer settings:
Span = wide enough to capture the peak level of the in-band emission and all spurious
RBW = 100 KHz, VBW $\geq$ RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average ((duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (20log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.

Limit

According to part 15.407b (6), the radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section 15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

SPCC1

802.11a Modulation 5180MHz Test Result

Frequency Range MHz	Frequency MHz	Corr. Factor dB	Emission Level dBuV/m	Polarization	Limit dBuV/m	Margin dB	Detector	Result
25-1000	865.38	-16.1	35.1	Horizontal	46.00	10.82	QP	Pass
25-1000	864.95	-16.1	34.35	Vertical	46.00	11.65	QP	Pass
1000-7000	6906.81	4.8	43.32	Horizontal	74.00	30.68	PK	Pass
1000-7000	3677.68	-0.8	34.70	Vertical	74.00	39.30	PK	Pass
7000-40000	30176.31	1.0	46.08	Horizontal	74.00	27.92	PK	Pass
7000-40000	20377.37	-2.6	42.07	Vertical	74.00	31.93	PK	Pass

Remark:

- (1) Corrected Amplitude = Read level + Corrector factor
Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain.
Below 1GHz: Corrector factor = Antenna Factor + Cable Loss.
(The Reading Level is recorded by software which is not shown in the sheet)
- (2) “*” means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (3) We test all modes and only the worst case for each bandwidth recorded in the report.
- (4) Testing is carried out with frequency rang 9KHz to 40GHz, which below 30MHz and data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

9.6 Band Edge

Test Method

According to KBD789033 D02

Limits:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

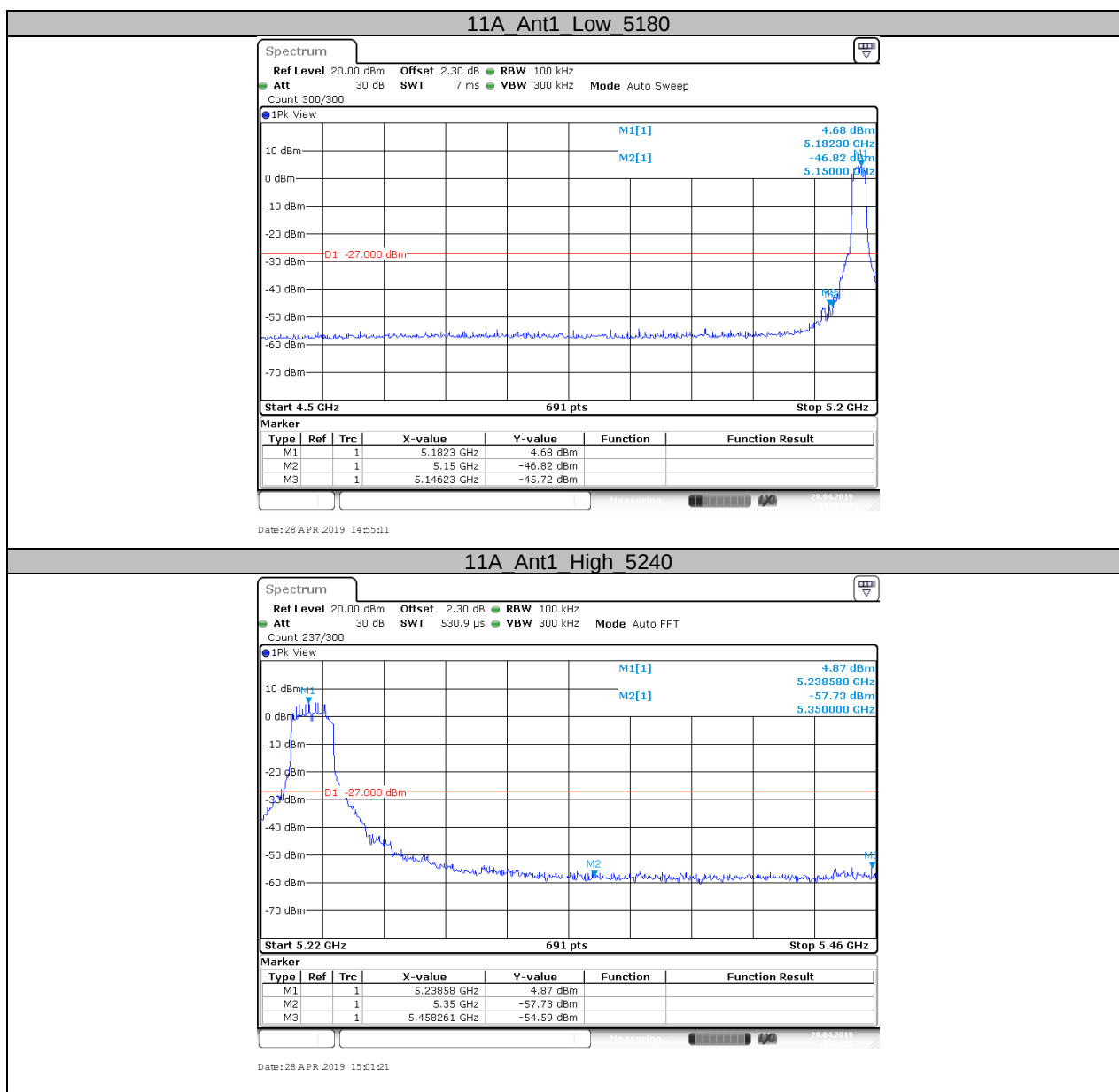
For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.

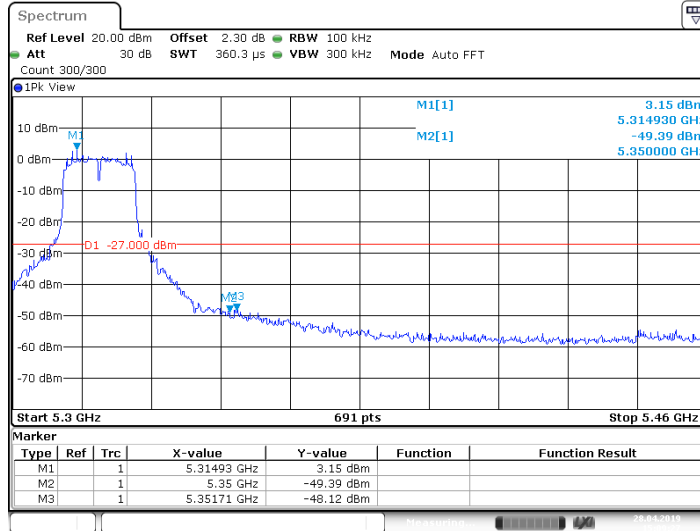
Test Result:

TestMode	Antenna	ChName	Channel	Result	Limit	Verdict
11A	Ant1	Low	5180	-45.72	<=-27	PASS
		High	5240	-54.59	<=-27	PASS
		High	5320	-48.12	<=-27	PASS
		Low	5500	-49	<=-27	PASS
		High	5700	-47.91	<=-27	PASS
		Low	5720	-54.55	<=-27	PASS
11N20SISO	Ant1	High	5720	-55.7	<=-27	PASS
		Low	5180	-43.93	<=-27	PASS
		High	5320	-48.99	<=-27	PASS
		Low	5500	-47.99	<=-27	PASS
		High	5700	-44.84	<=-27	PASS
		Low	5720	-55.29	<=-27	PASS
11N40SISO	Ant1	High	5720	-55.07	<=-27	PASS
		Low	5190	-31.39	<=-27	PASS
		High	5310	-35.28	<=-27	PASS
		Low	5510	-32.03	<=-27	PASS
		High	5670	-41.86	<=-27	PASS
		Low	5710	-53.05	<=-27	PASS
11AC20SISO	Ant1	High	5710	-54.95	<=-27	PASS
		Low	5180	-44.1	<=-27	PASS
		High	5320	-46.87	<=-27	PASS
		Low	5500	-45.28	<=-27	PASS
		High	5700	-42.92	<=-27	PASS
		Low	5720	-55.22	<=-27	PASS
11AC40SISO	Ant1	High	5720	-55.46	<=-27	PASS
		Low	5190	-30.63	<=-27	PASS
		High	5310	-36.27	<=-27	PASS
		Low	5510	-32.93	<=-27	PASS
		High	5670	-43.9	<=-27	PASS
		Low	5710	-54.8	<=-27	PASS
11AC80SISO	Ant1	High	5710	-54.75	<=-27	PASS
		Low	5210	-29.79	<=-27	PASS
		High	5290	-34.36	<=-27	PASS
		Low	5530	-34.69	<=-27	PASS
		High	5690	-52.26	<=-27	PASS

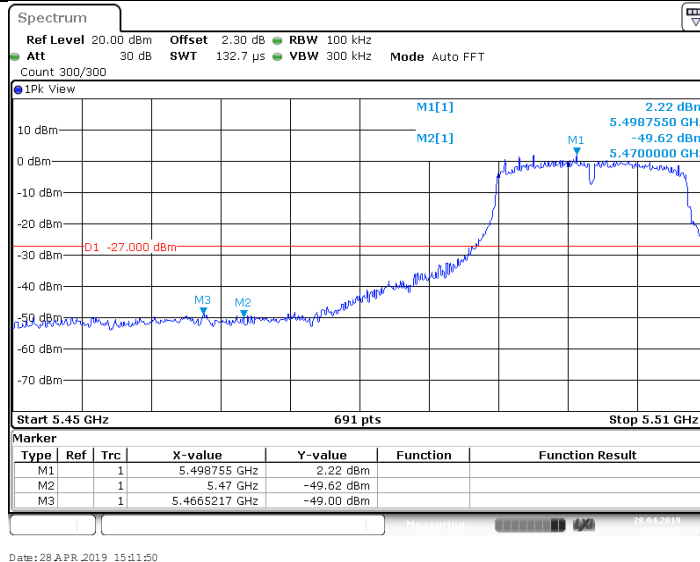
Test Graphs



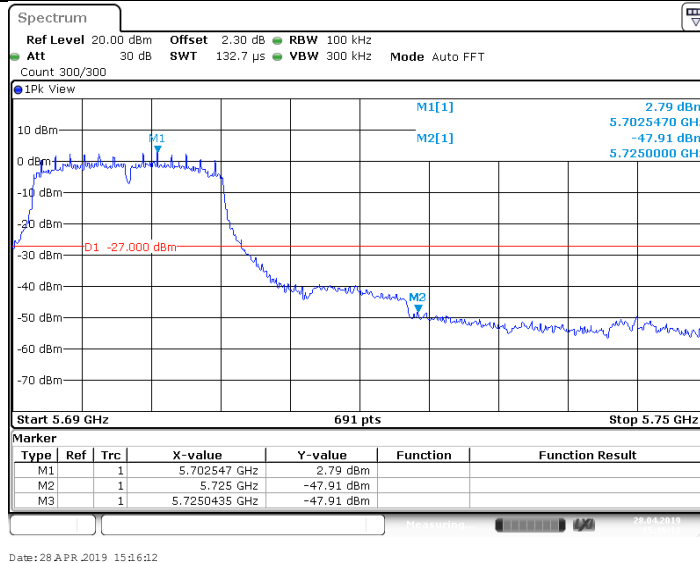
11A Ant1 High 5320



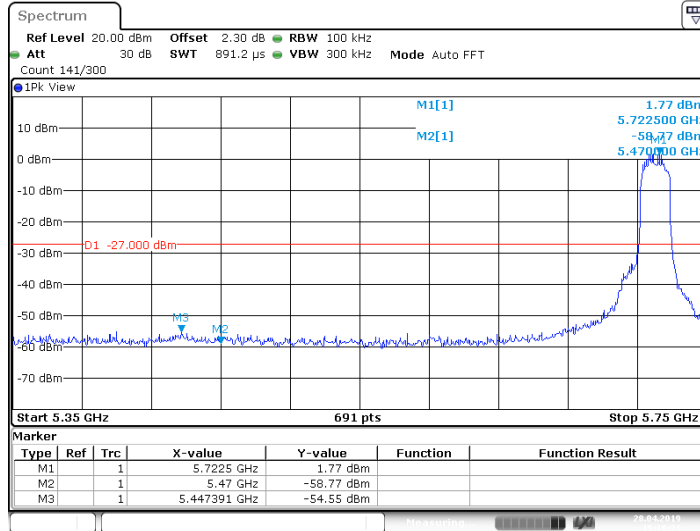
11A Ant1 Low 5500



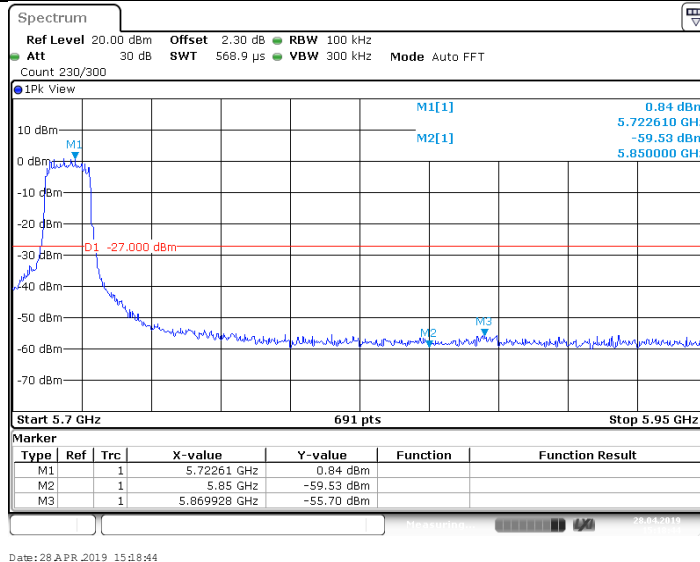
11A Ant1 High 5700



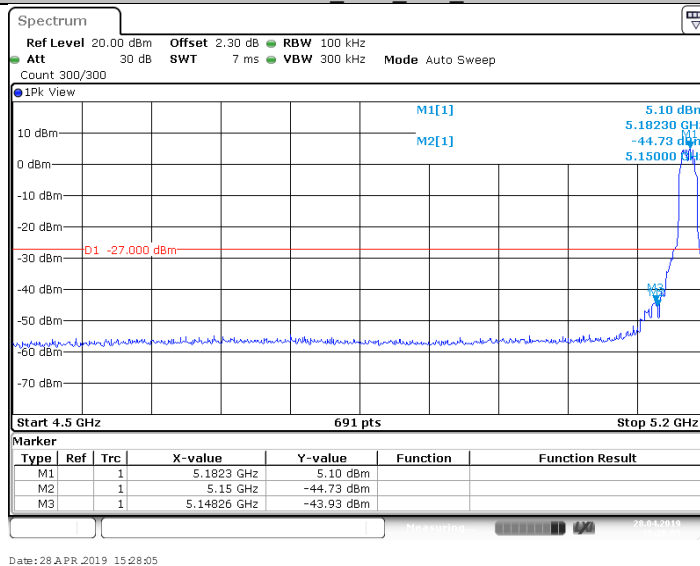
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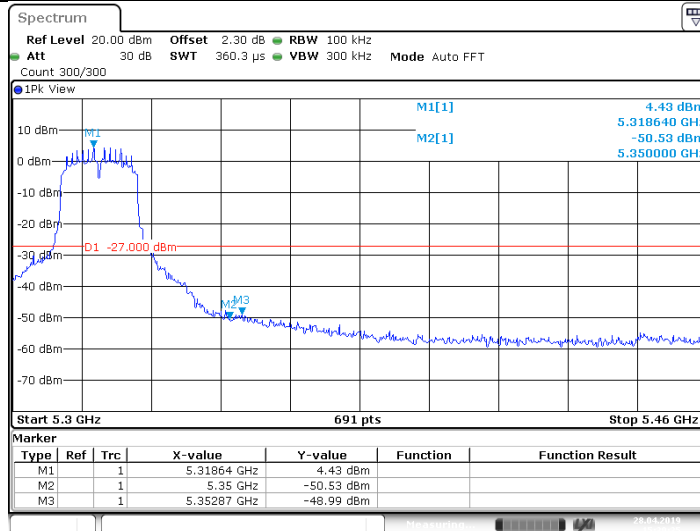
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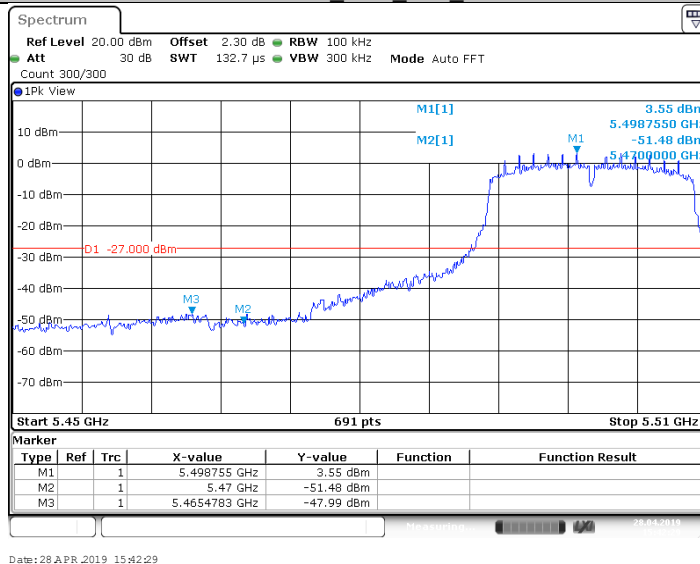
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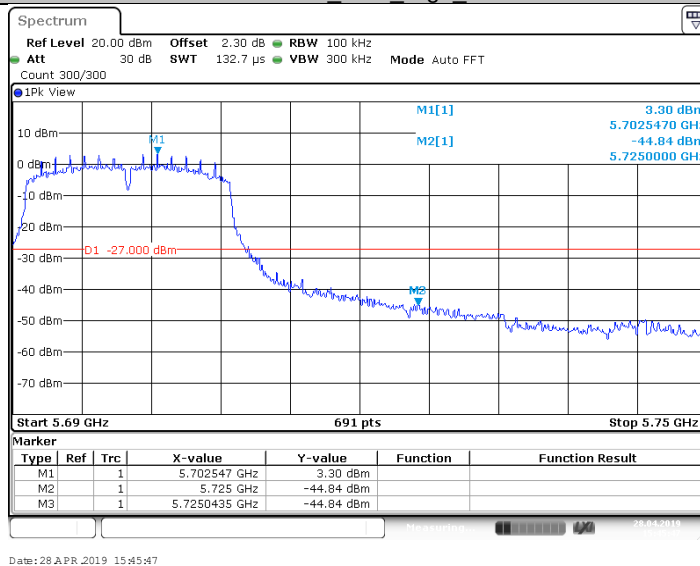
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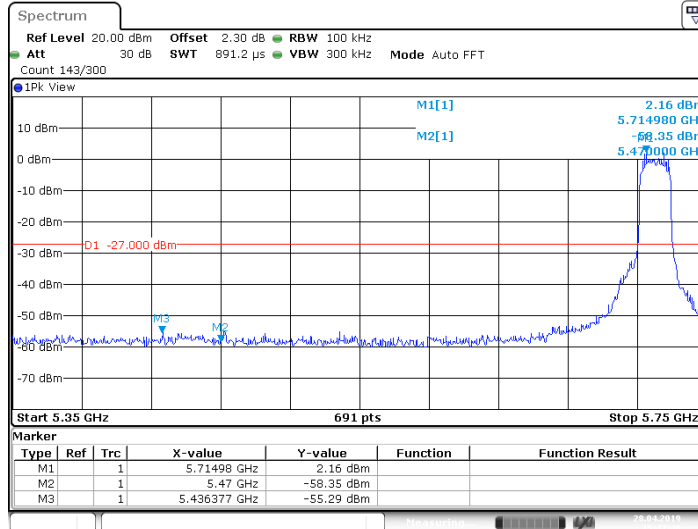
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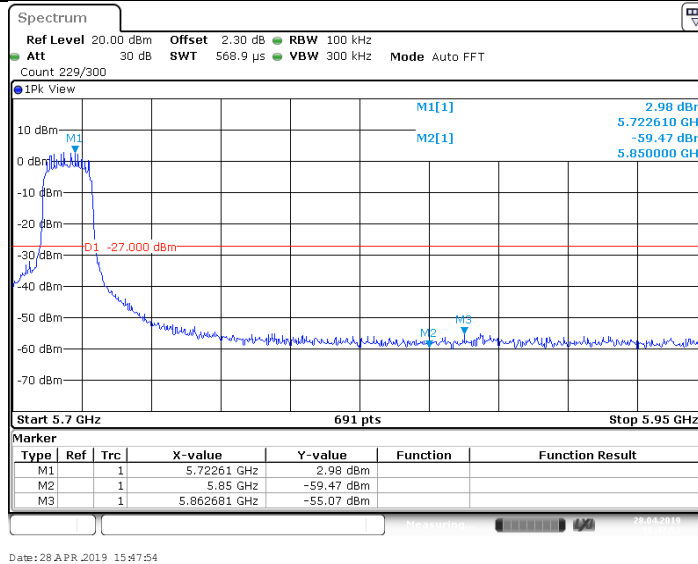
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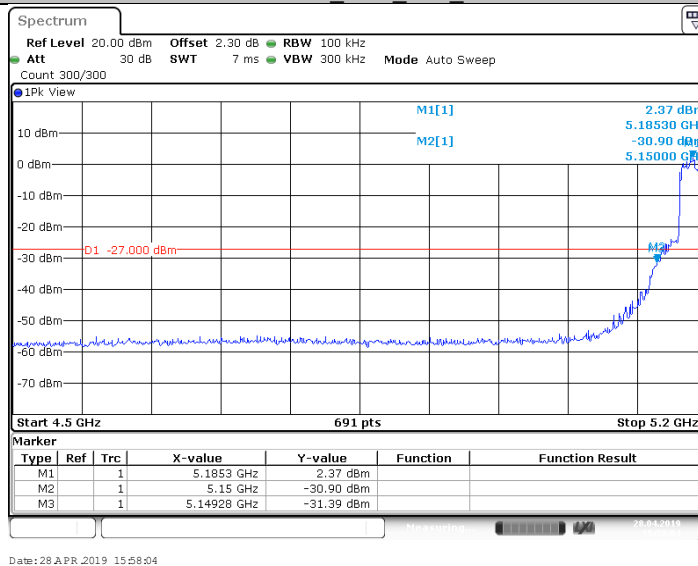
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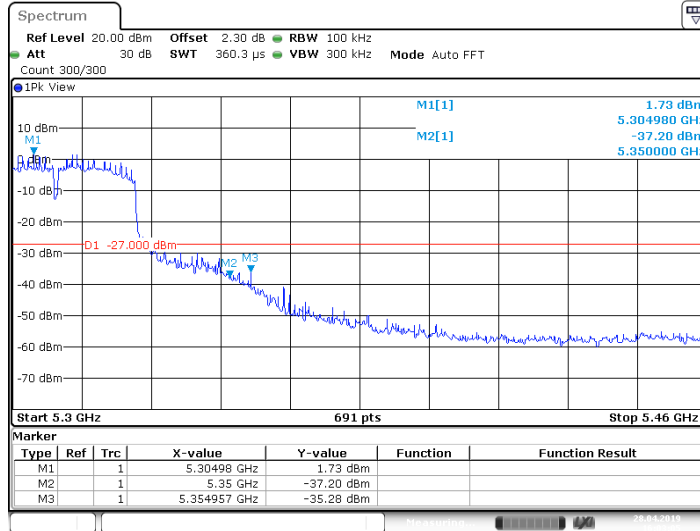
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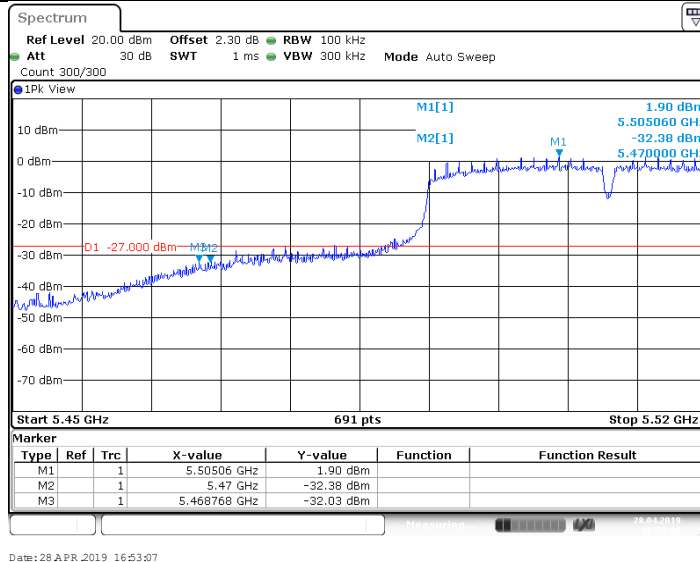
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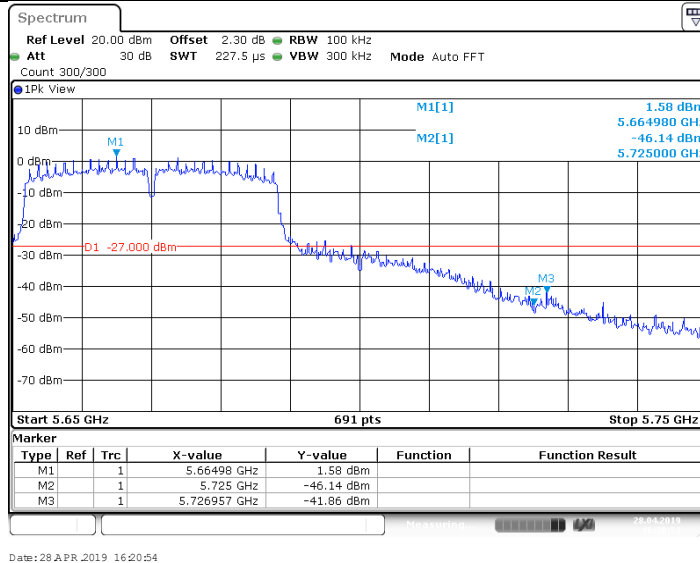
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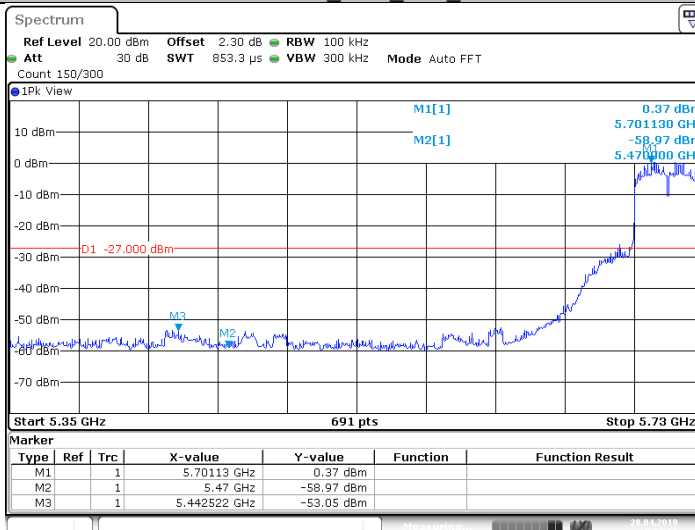
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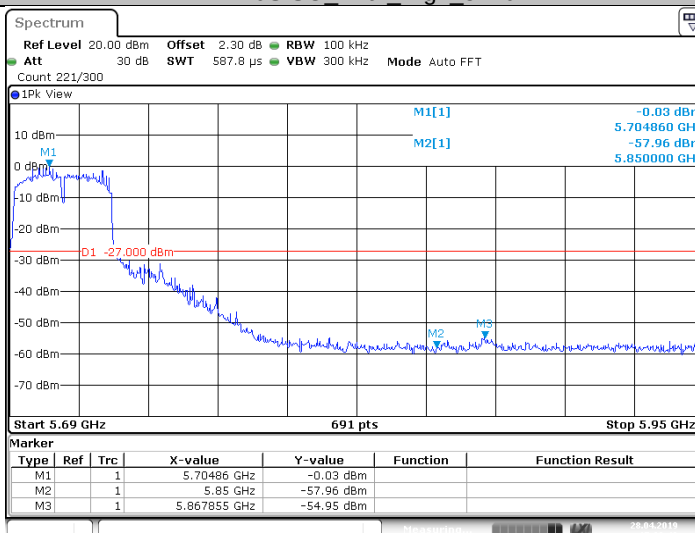


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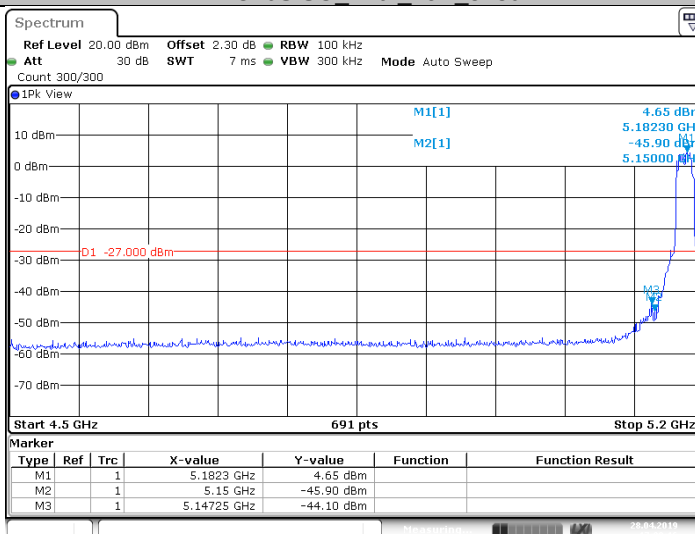
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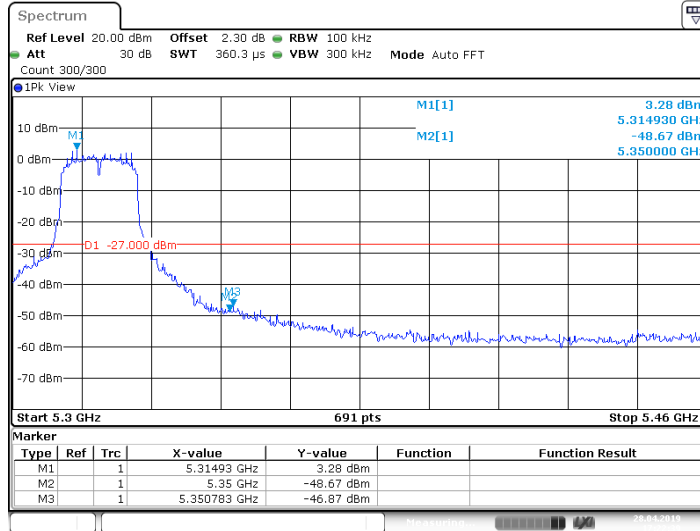
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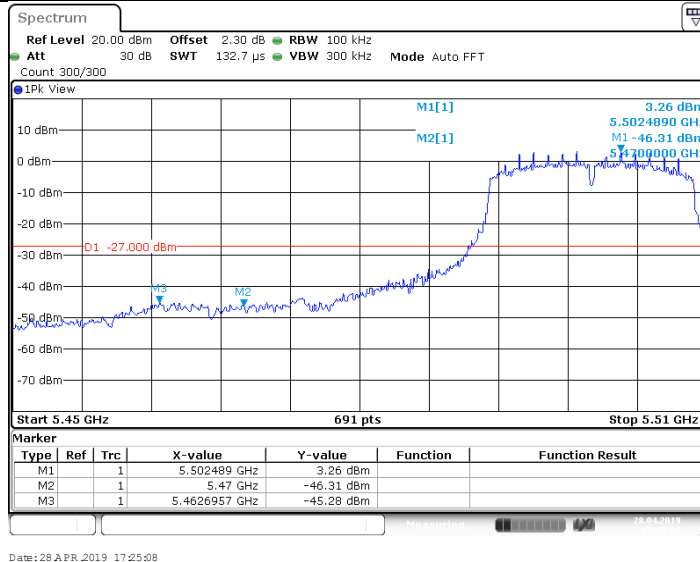


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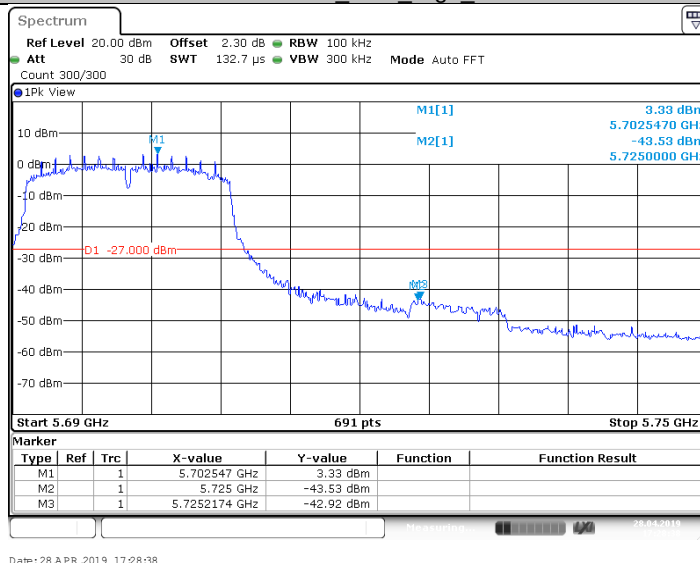
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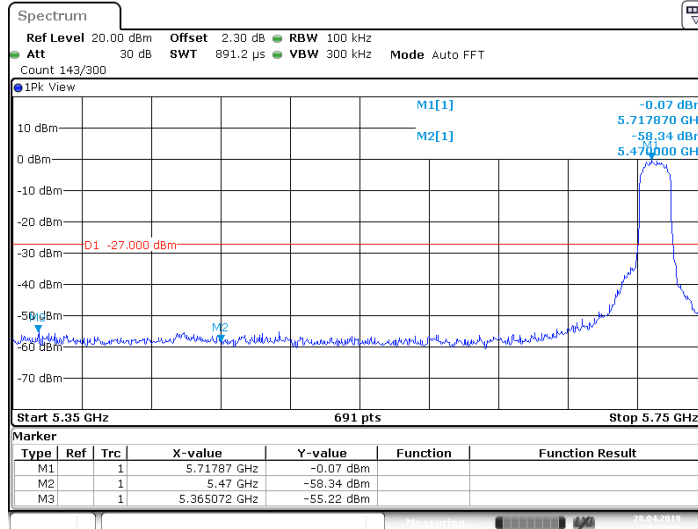
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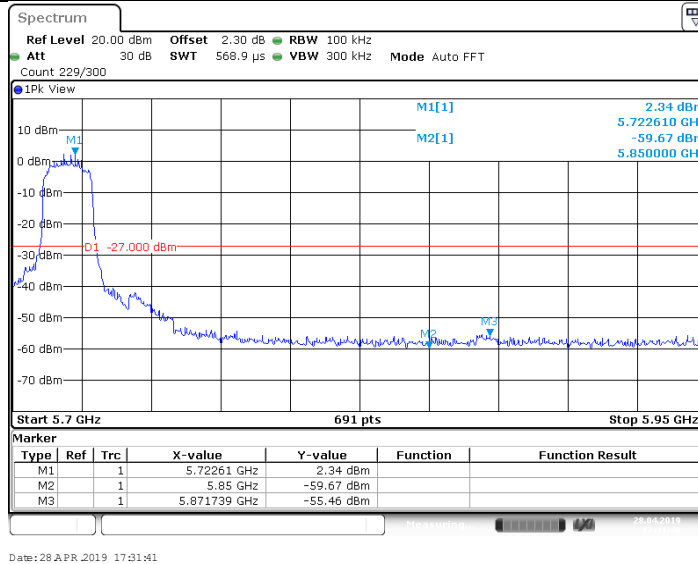
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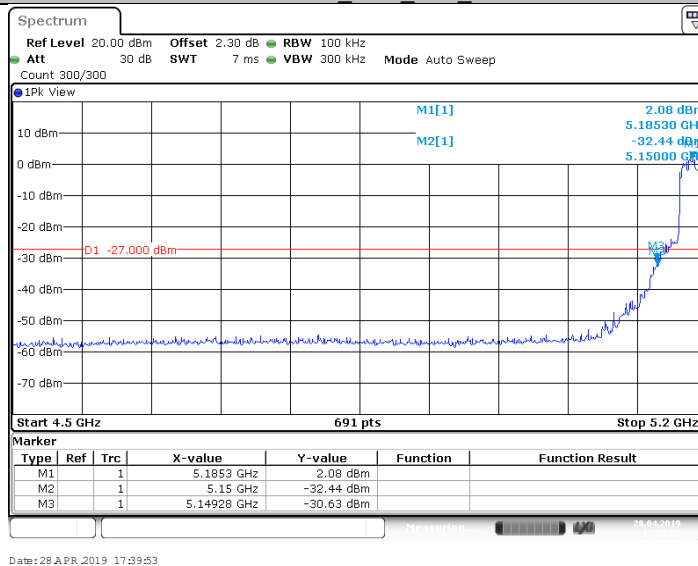
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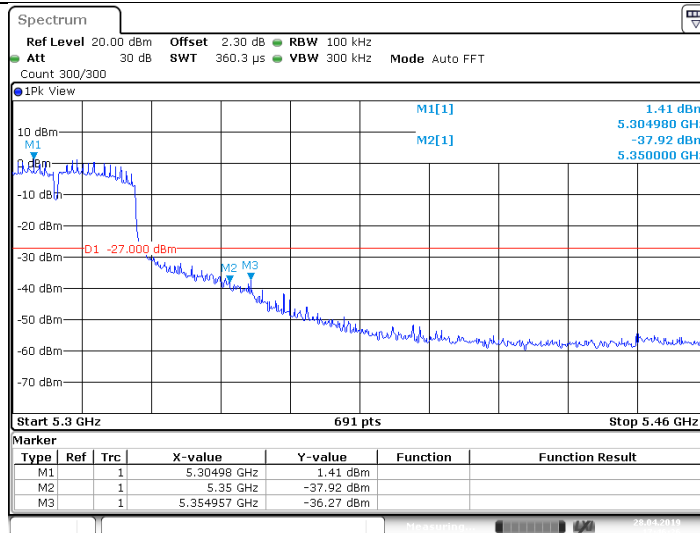
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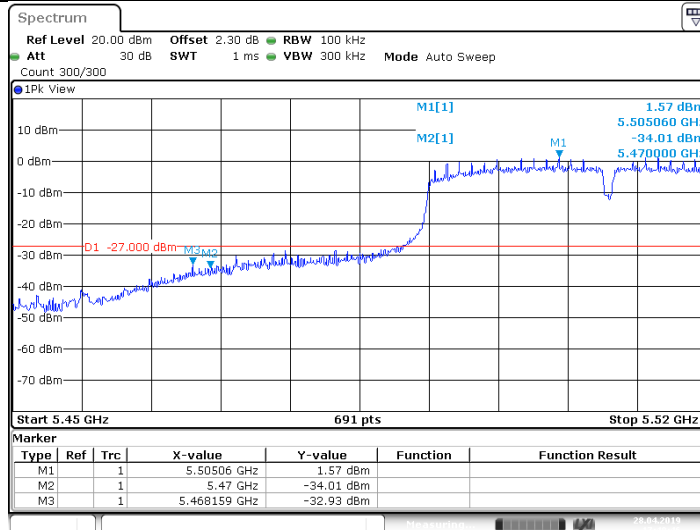


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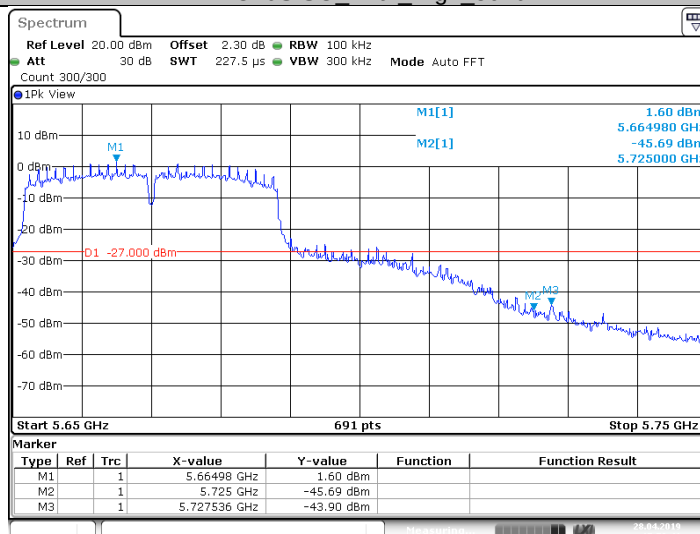
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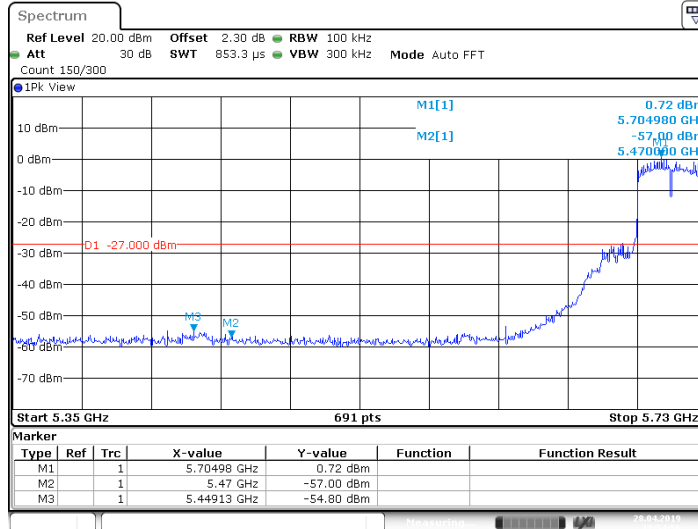
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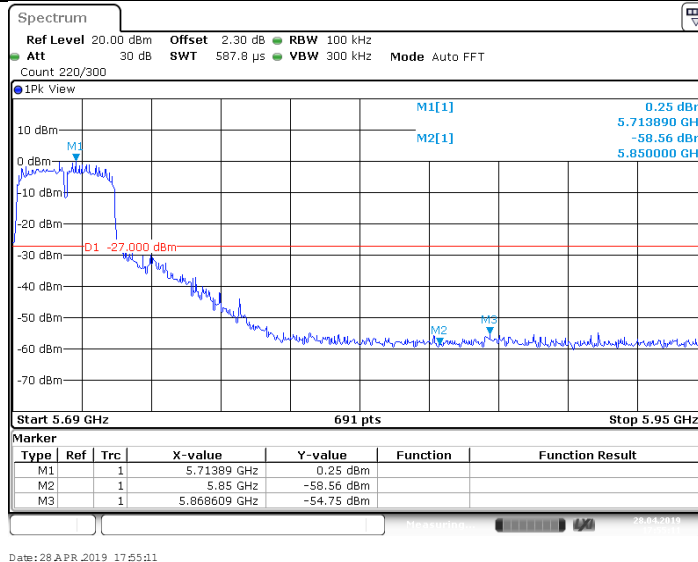


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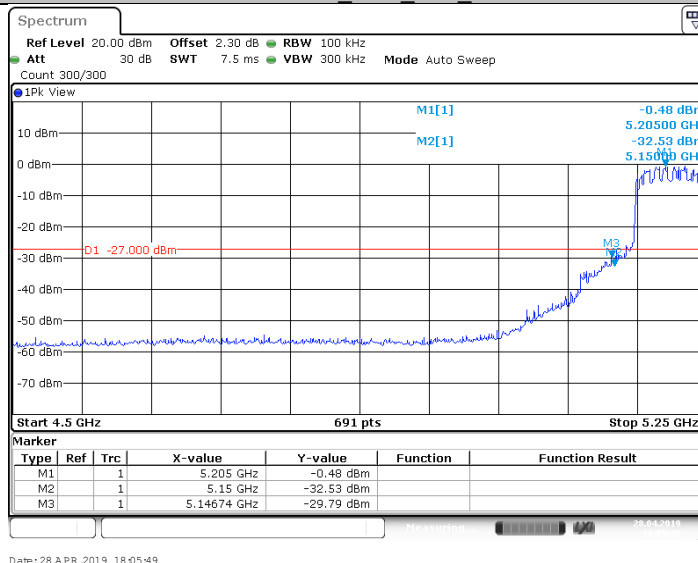
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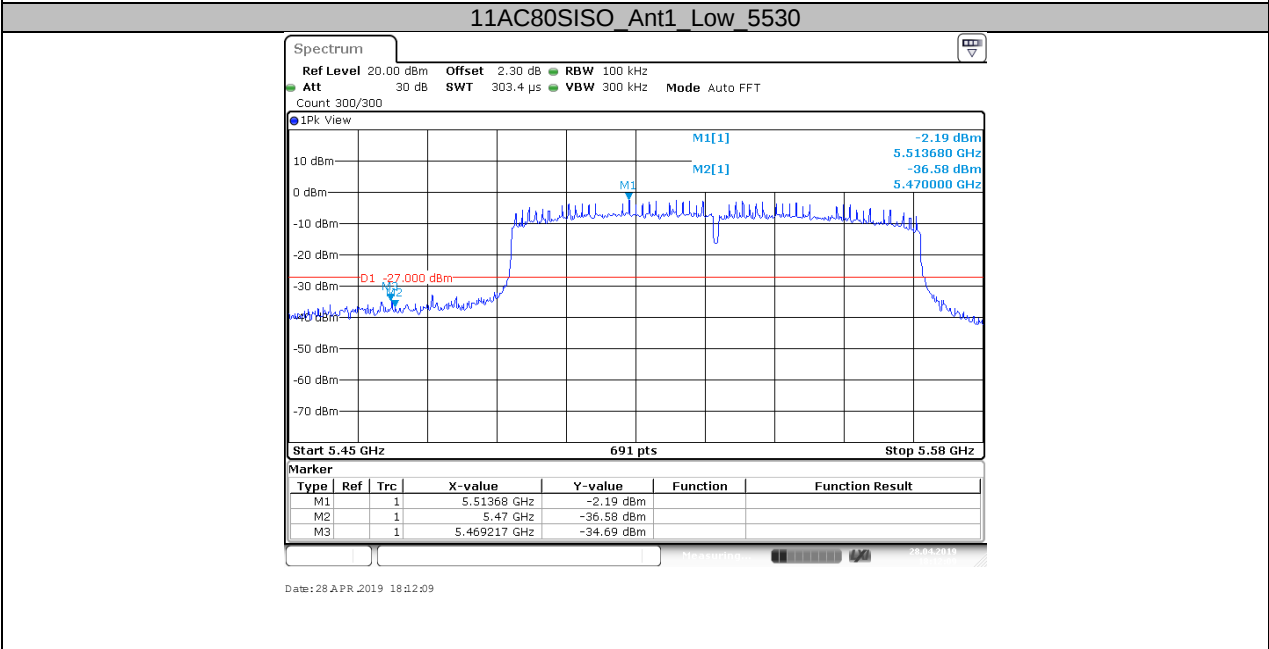
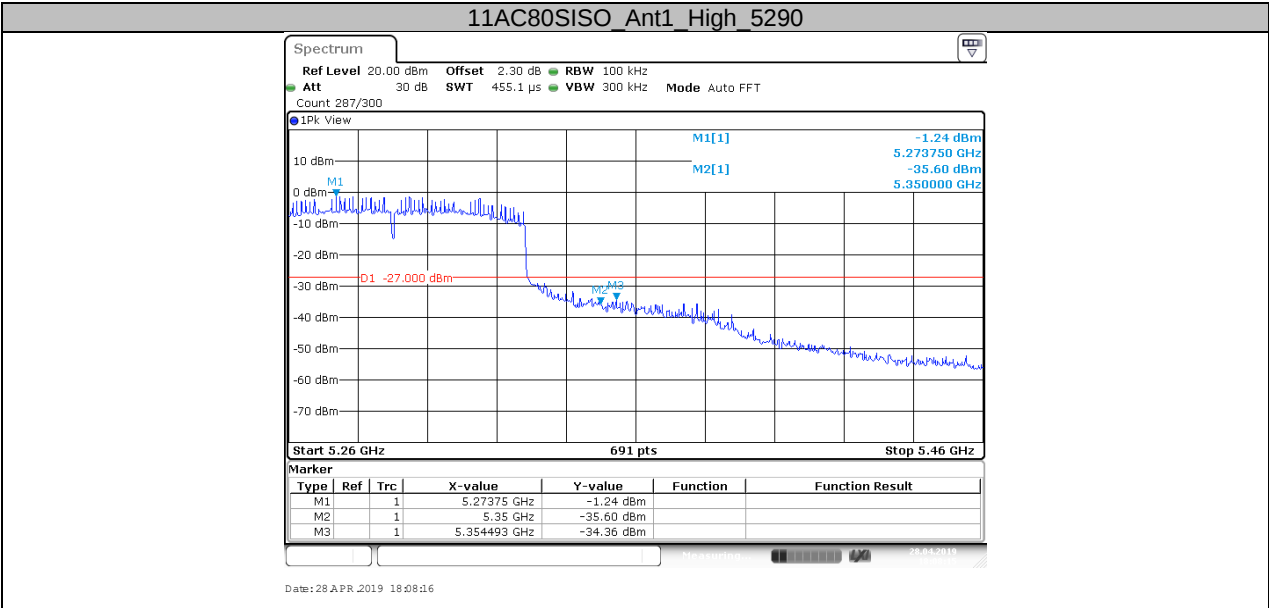


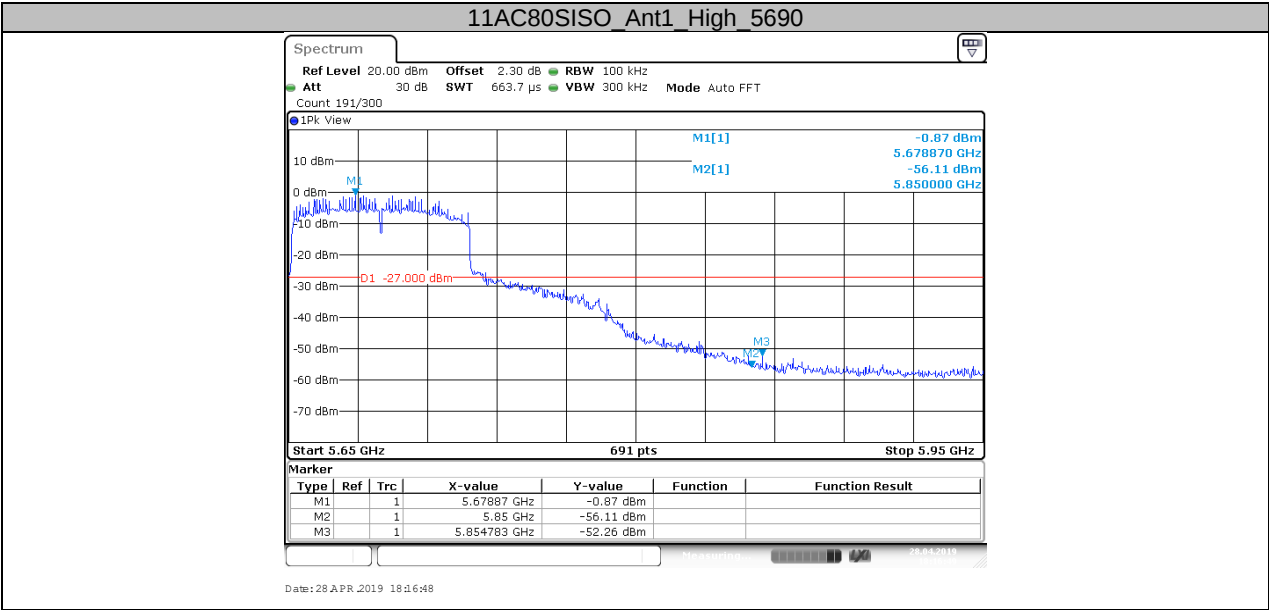
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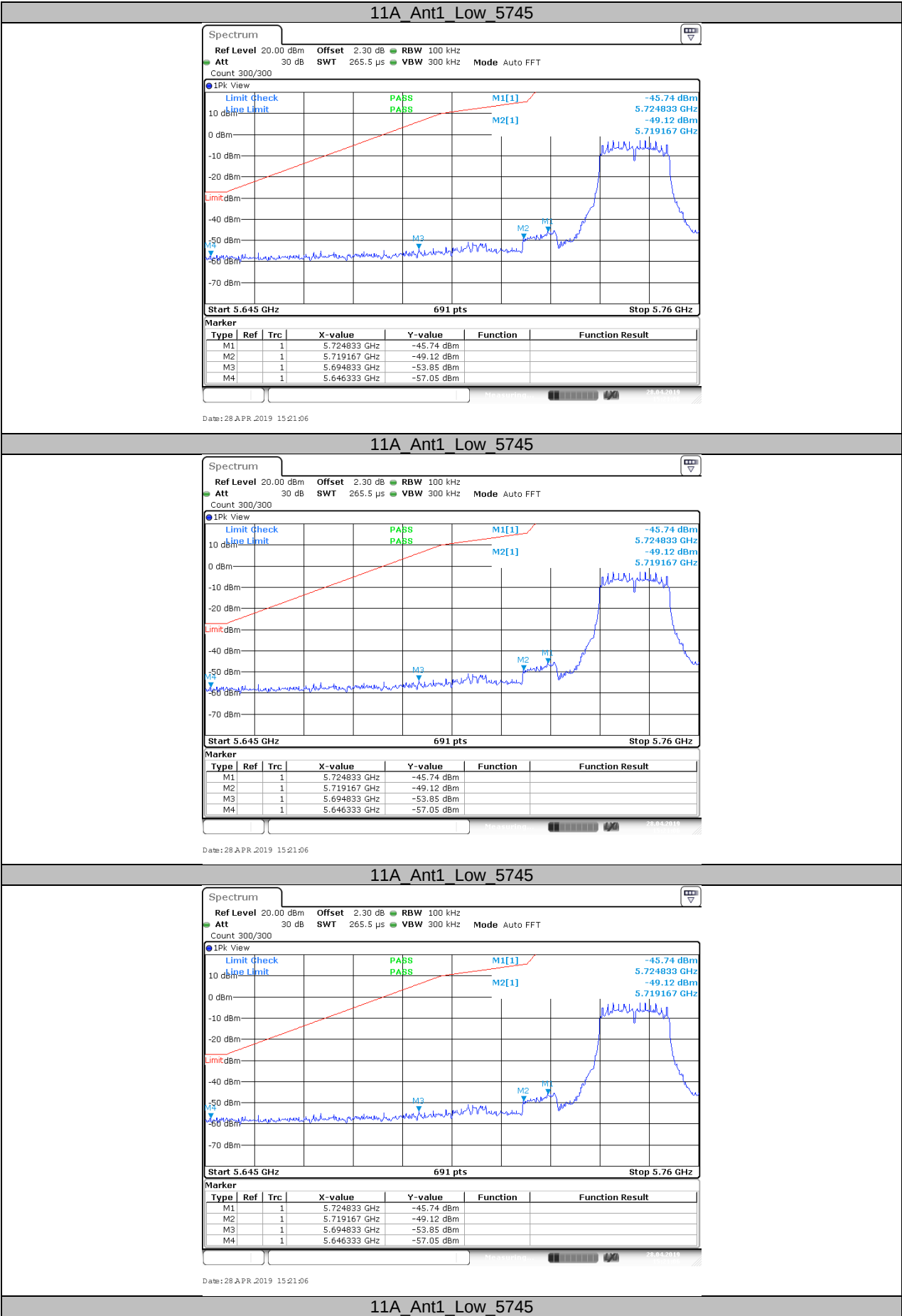


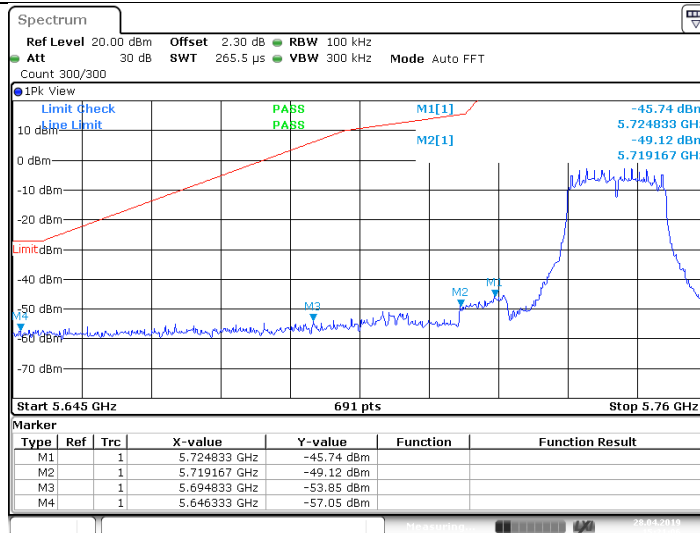
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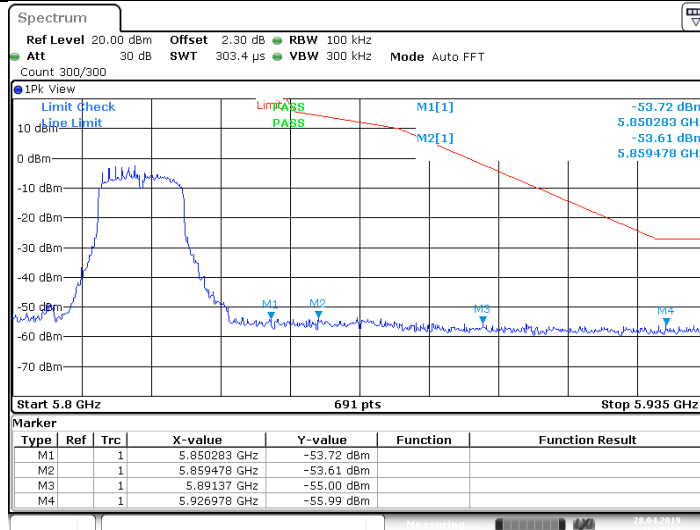






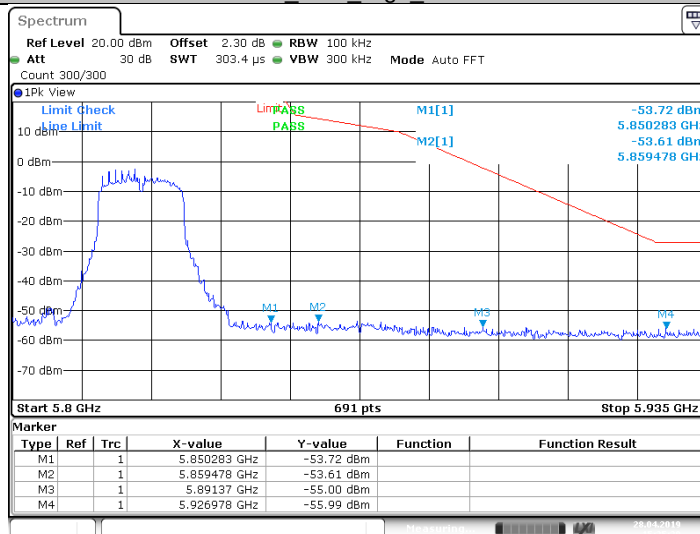
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11A Ant1 High 5825



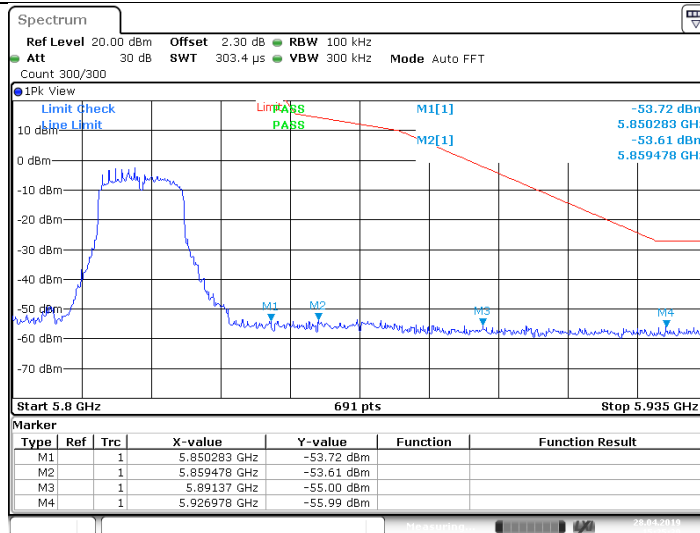
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11A Ant1 High 5825

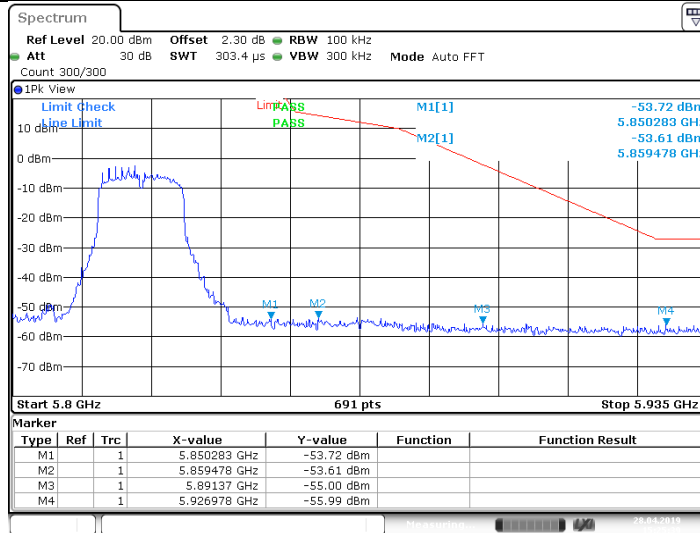


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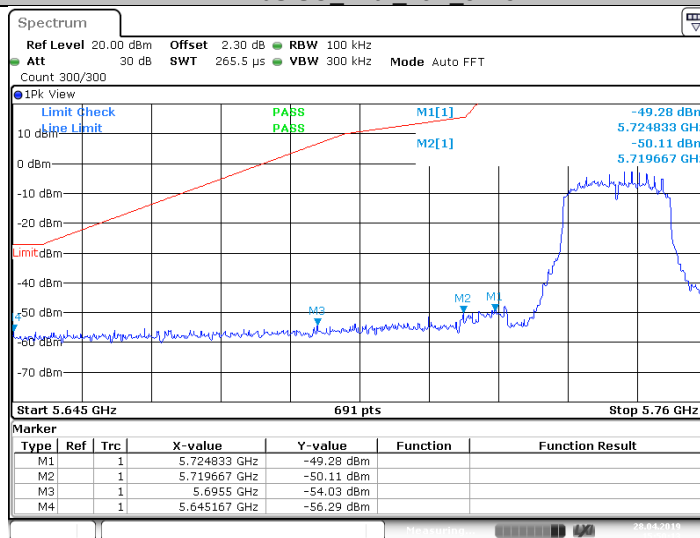
11A Ant1 High 5825



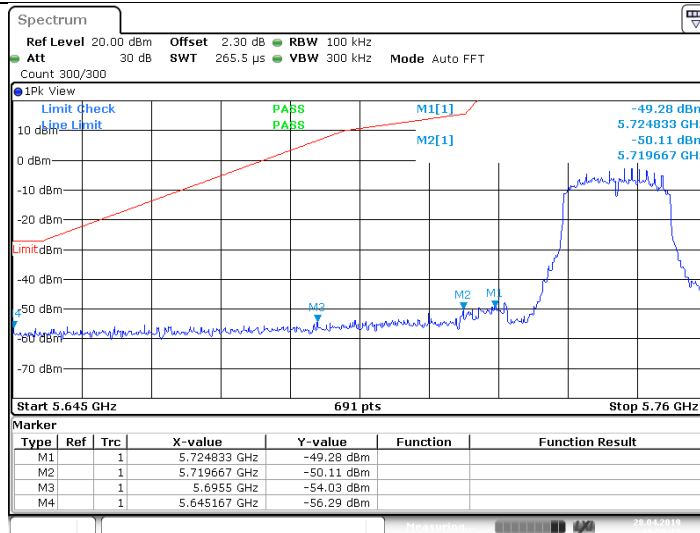
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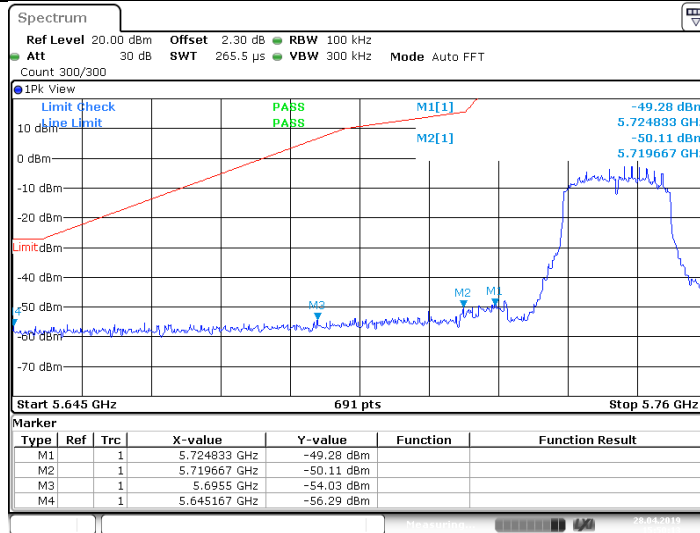
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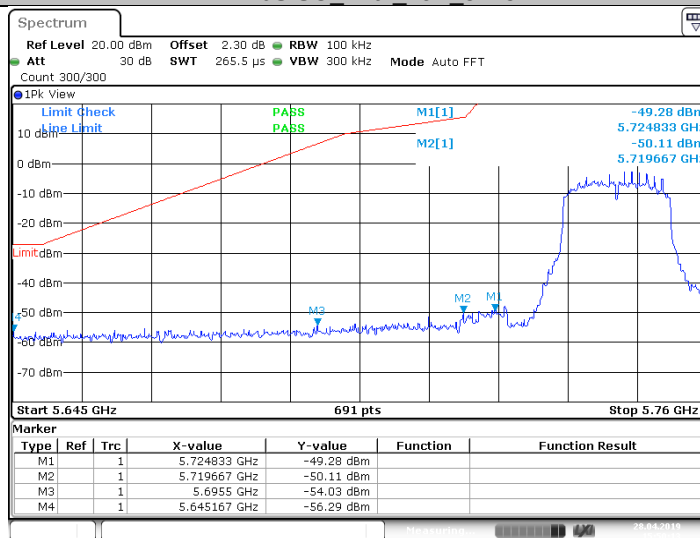
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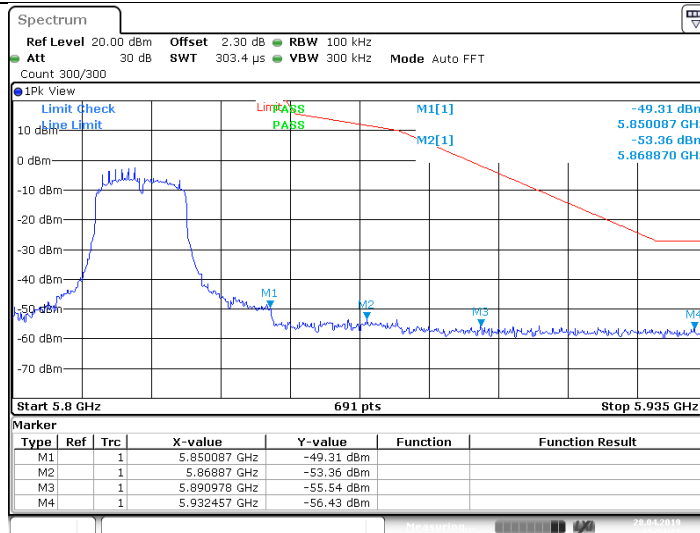
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11N20SISO Ant1 Low 5745

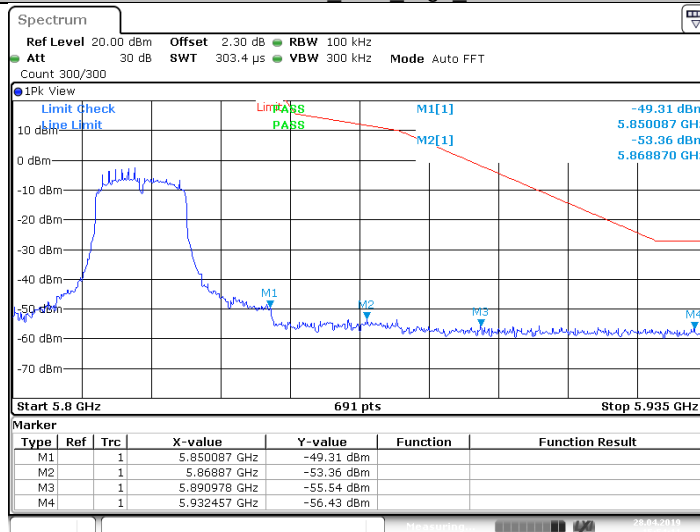


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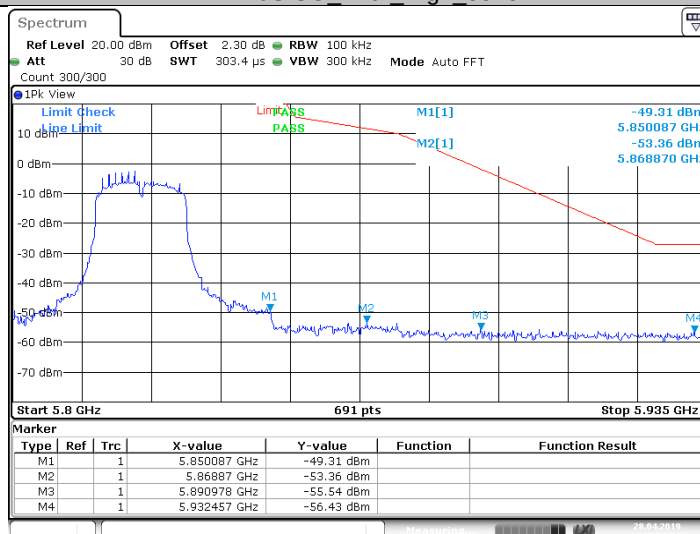
Date: 28 APR 2019 15:54:12

11N20SISO_Ant1_High_5825



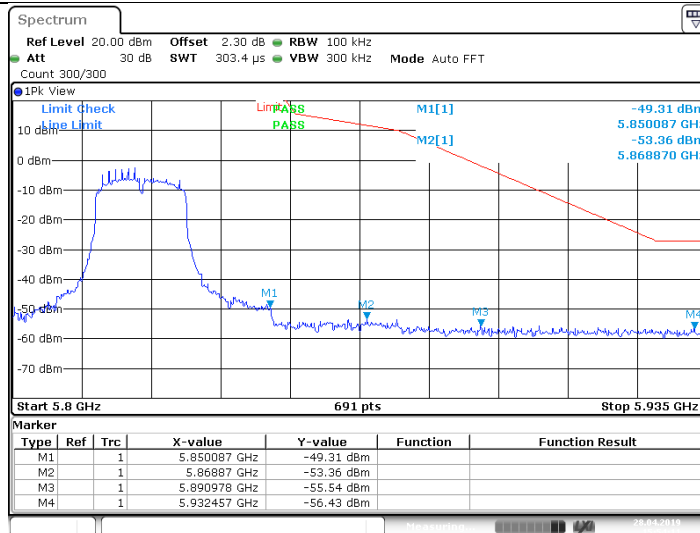
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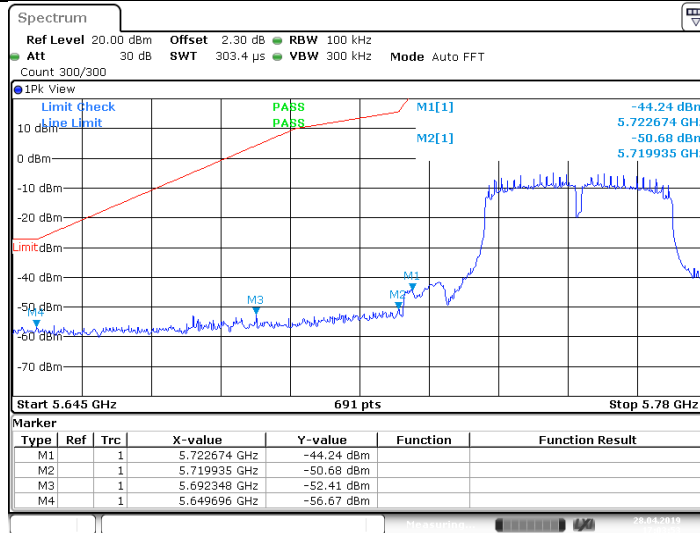
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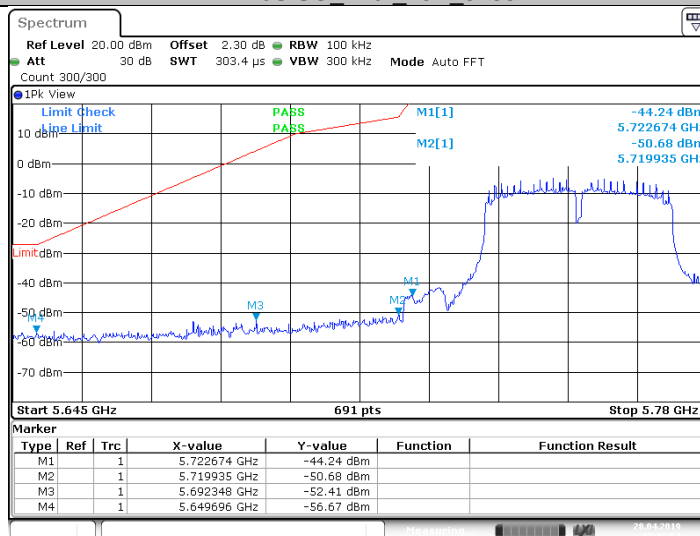
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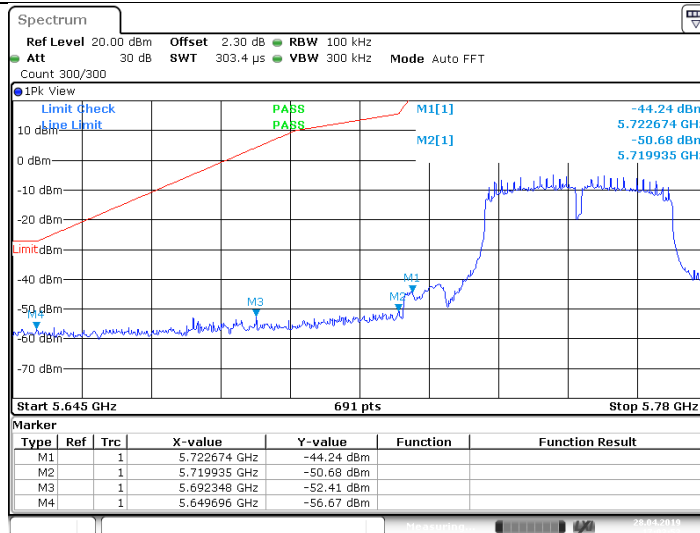
Date: 28 APR 2019 17:03:53

11N40SISO Ant1 Low 5755



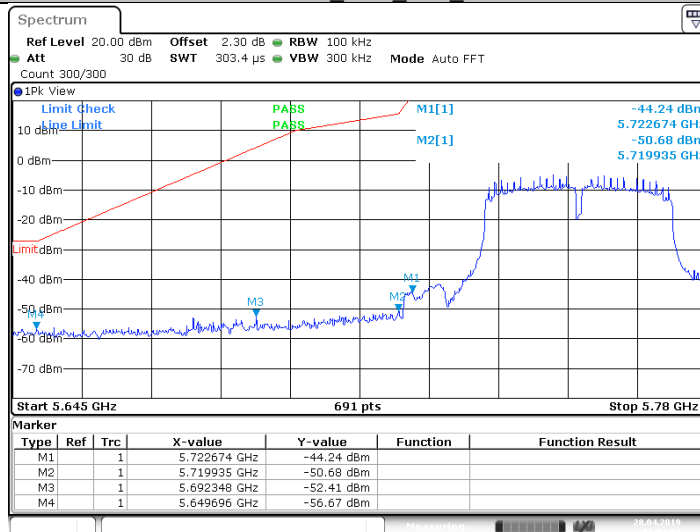
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11N40SISO Ant1 Low 5755



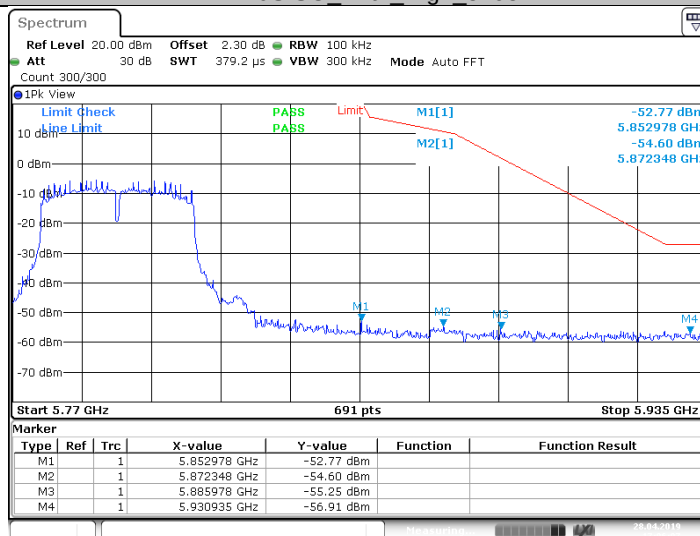
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11N40SISO_Ant1_Low_5755



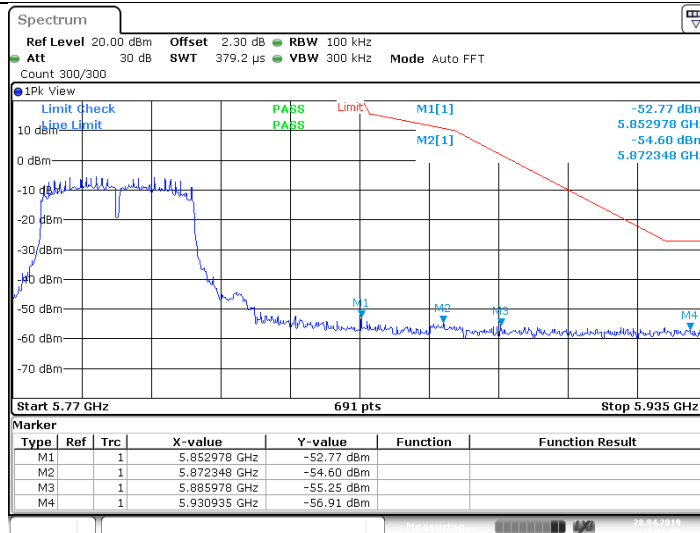
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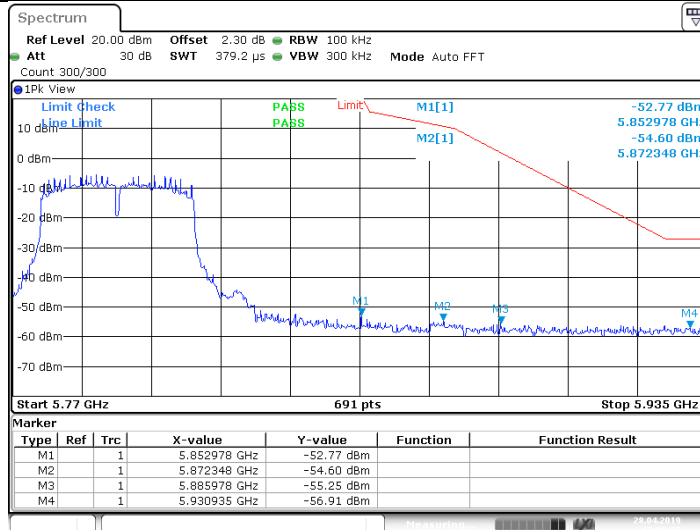
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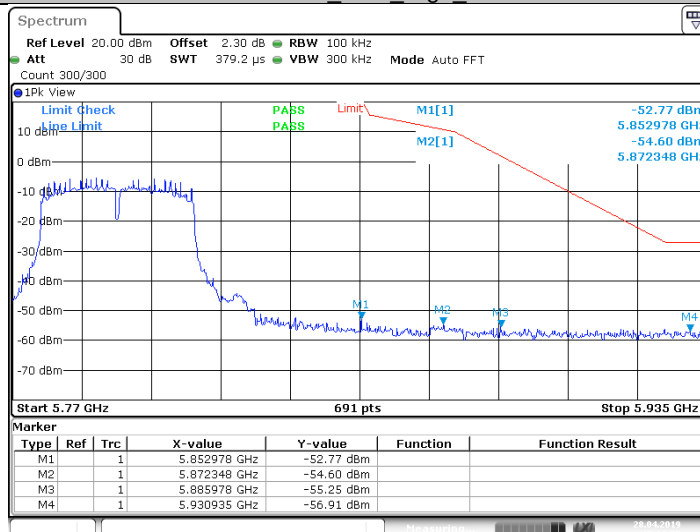
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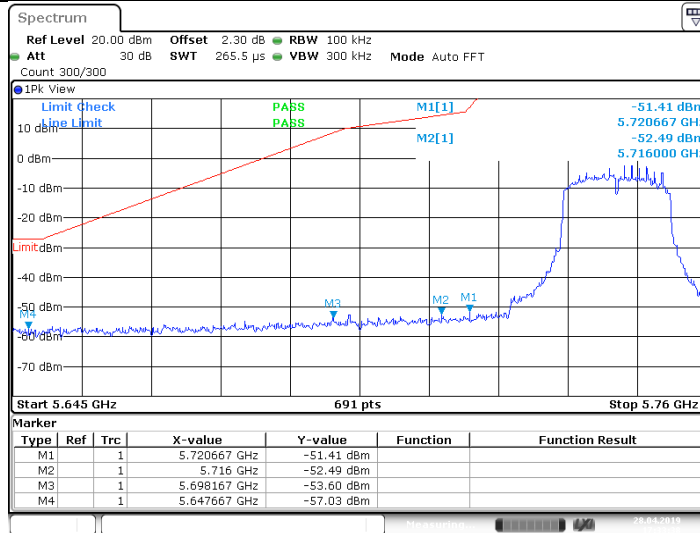
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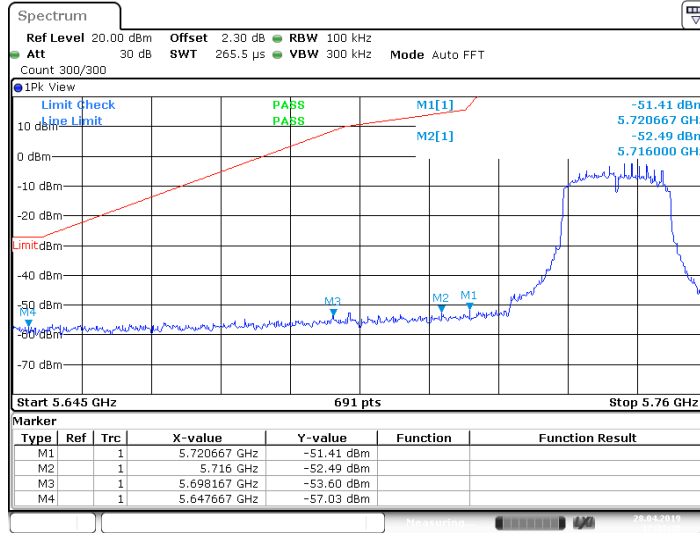


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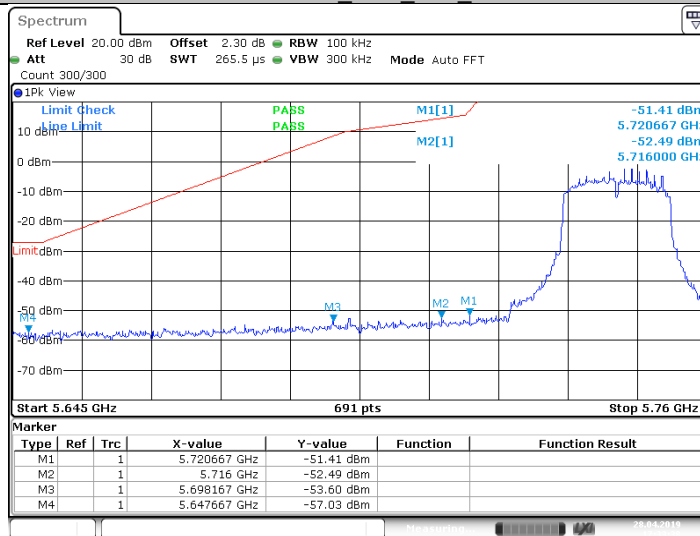
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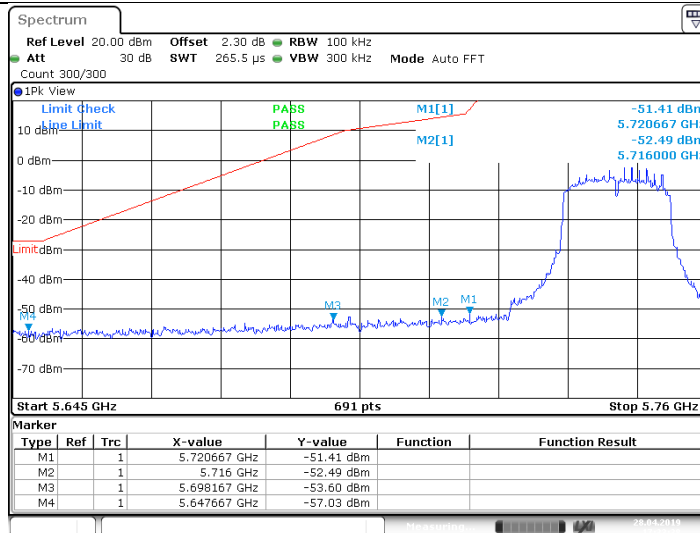
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11AC20SISO_Ant1_Low_5745

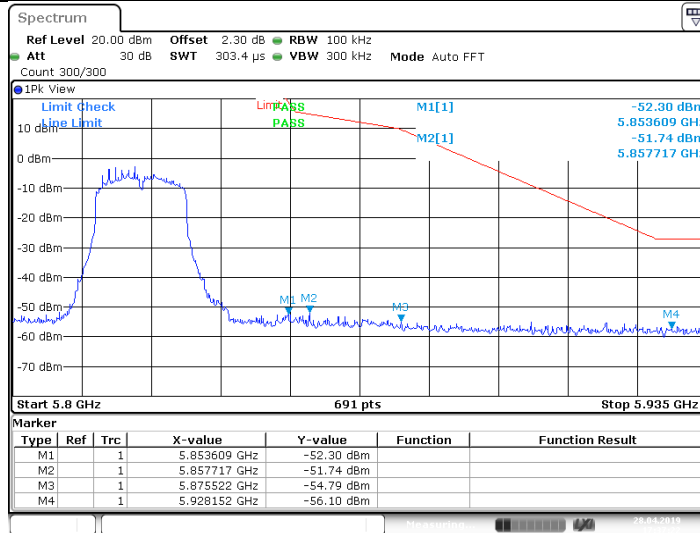


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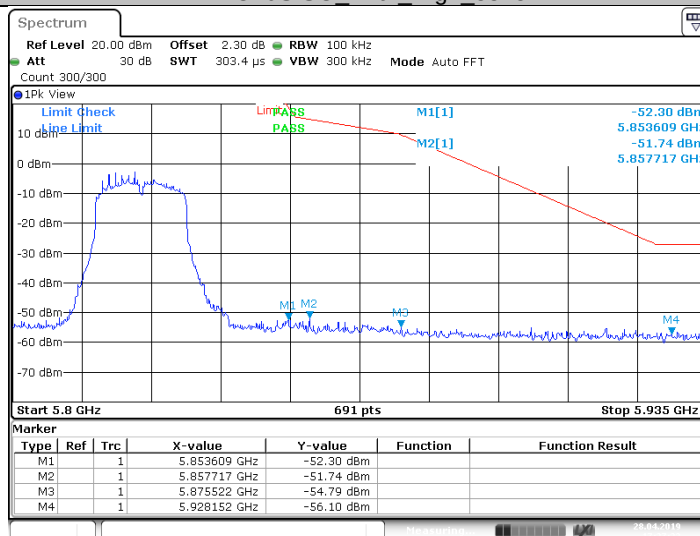
Date: 28 APR 2019 17:33:38

11AC20SISO_Ant1_High_5825



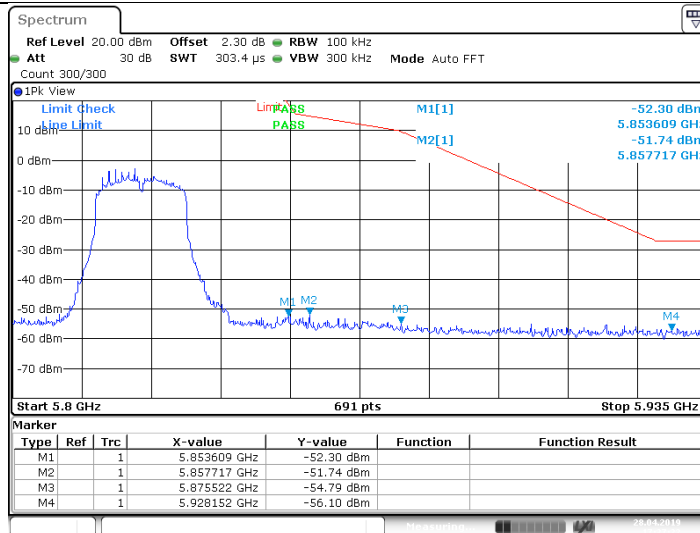
Date: 28 APR 2019 17:37:22

11AC20SISO_Ant1_High_5825



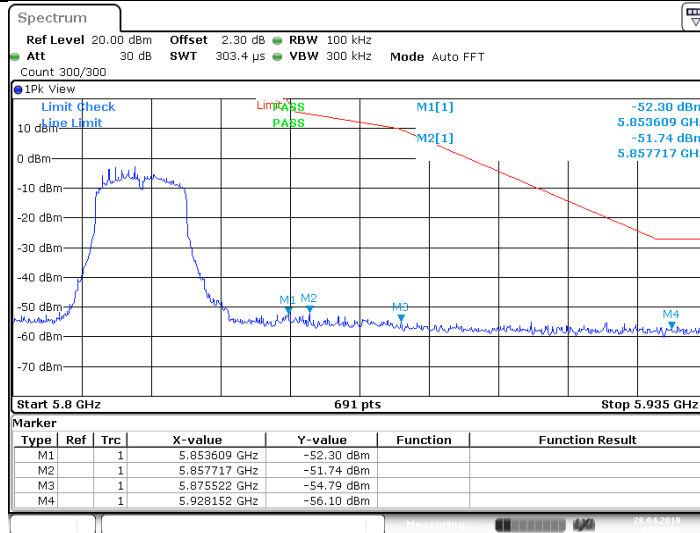
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11AC20SISO_Ant1_High_5825



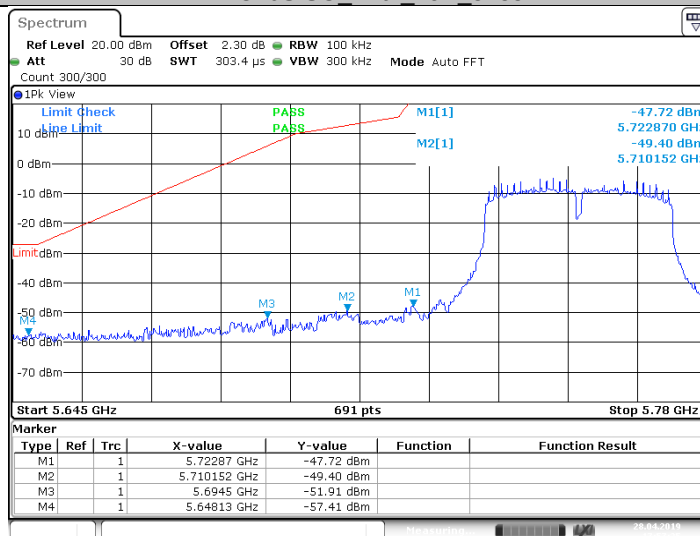
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11AC20SISO_Ant1_High_5825



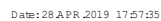
Date: 28 APR 2019 17:37:22

11AC40SISO_Ant1_Low_5755



Date: 28 APR 2019 17:57:35

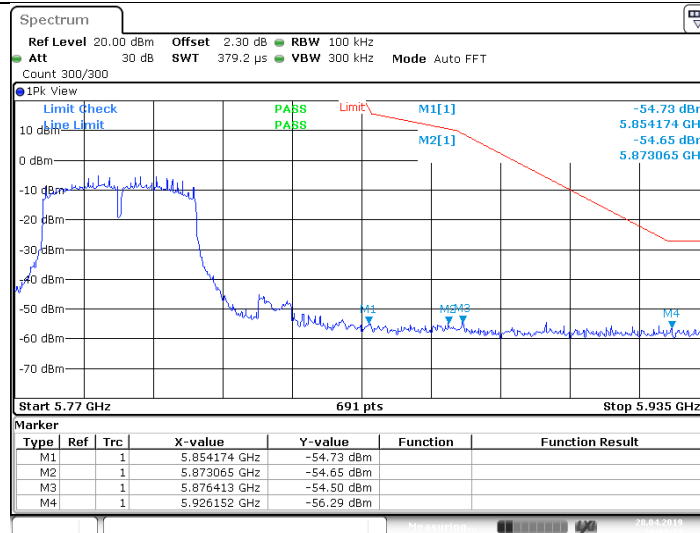
11AC40SISO_Ant1_Low_5755



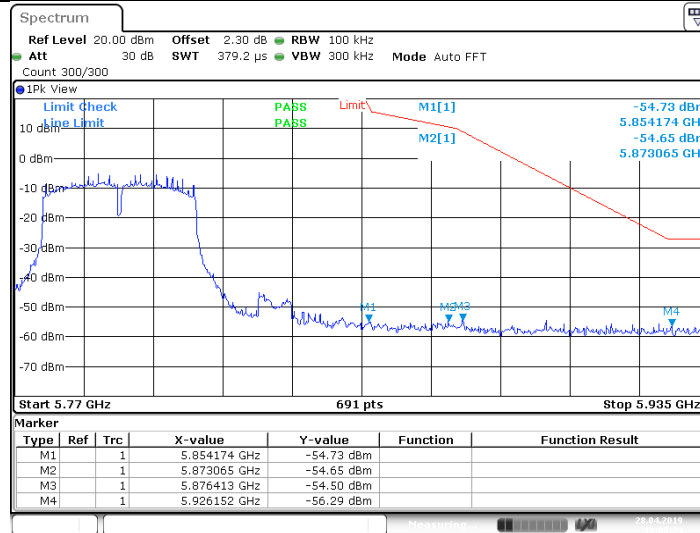
Date: 28 APR 2019 17:57:35

Date: 28 APR 2019 17:57:35

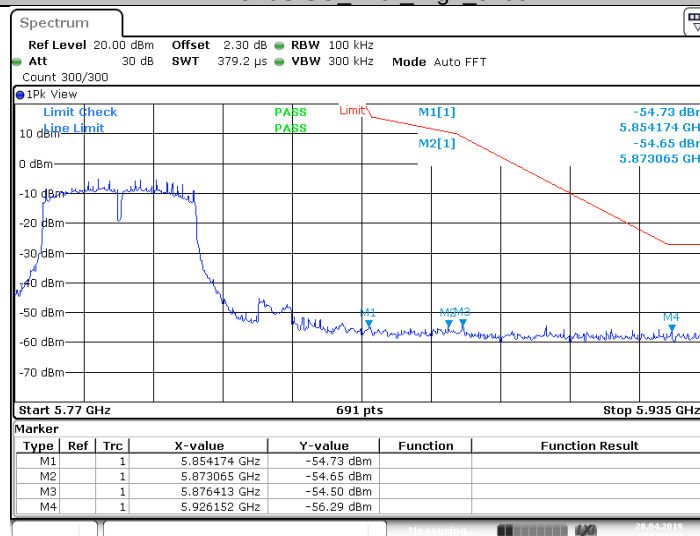
Page 103 of 120



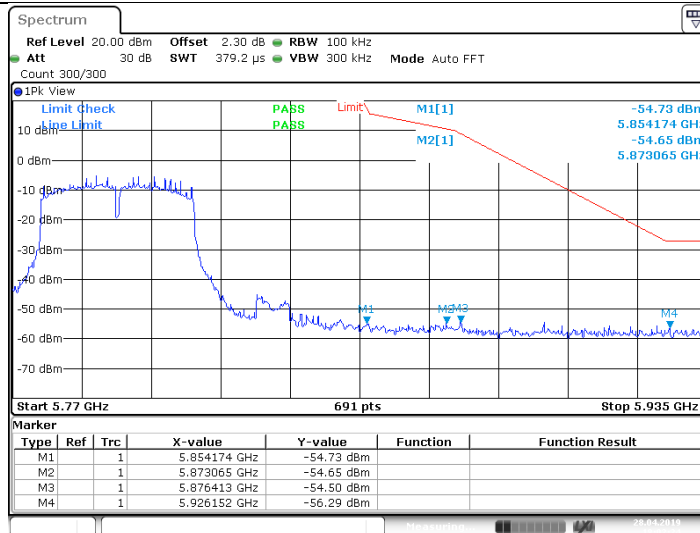
11AC40SISO_Ant1_High_5795



11AC40SISO_Ant1_High_5795

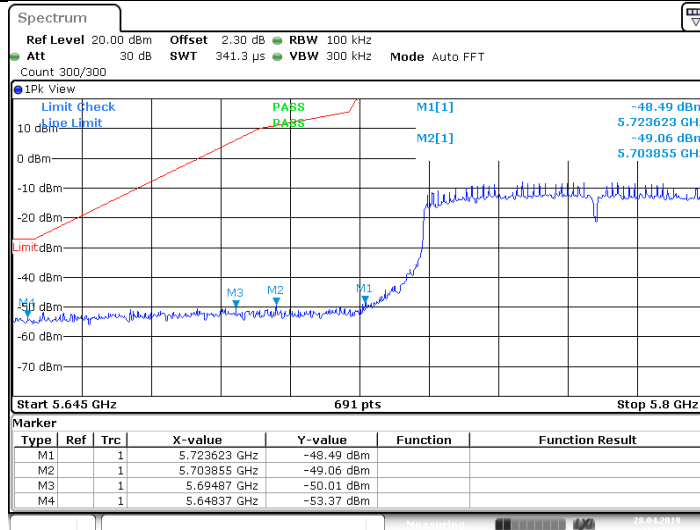


11AC40SISO_Ant1_High_5795



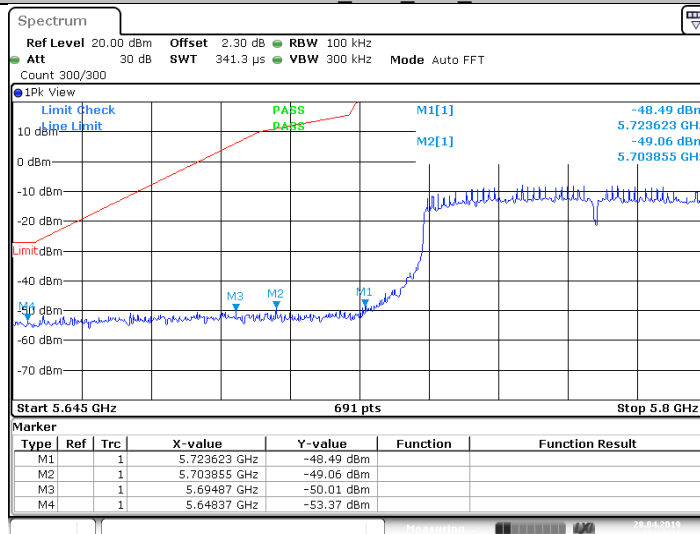
Date: 28 APR 2019 18:02:24

11AC80SISO_Ant1_Low 5775



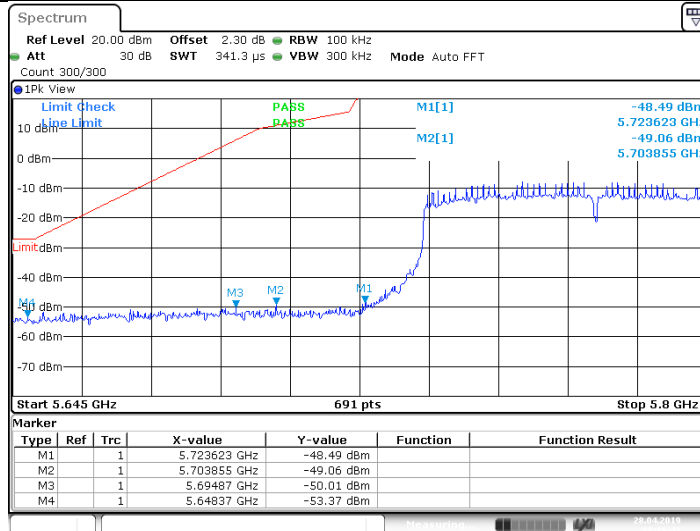
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11AC80SISO_Ant1_Low 5775

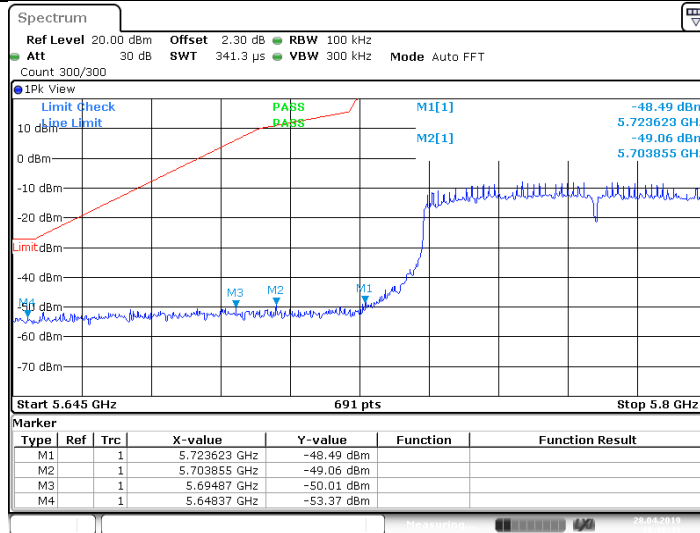


Date: 28 APR 2019 18:18:41

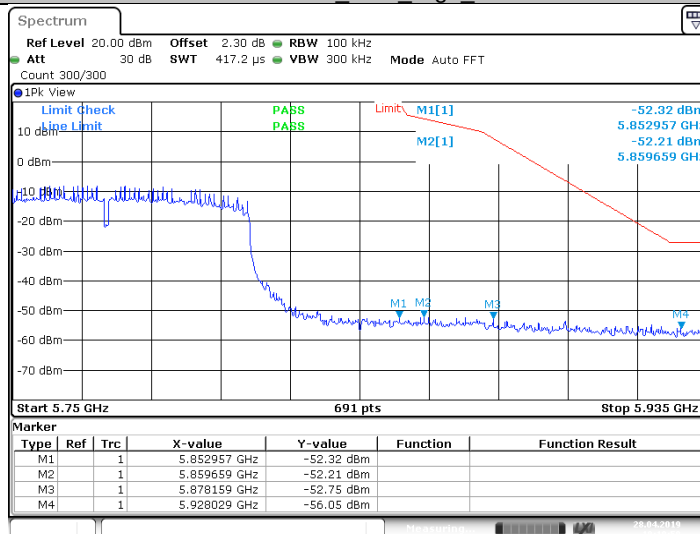
11AC80SISO_Ant1_Low 5775



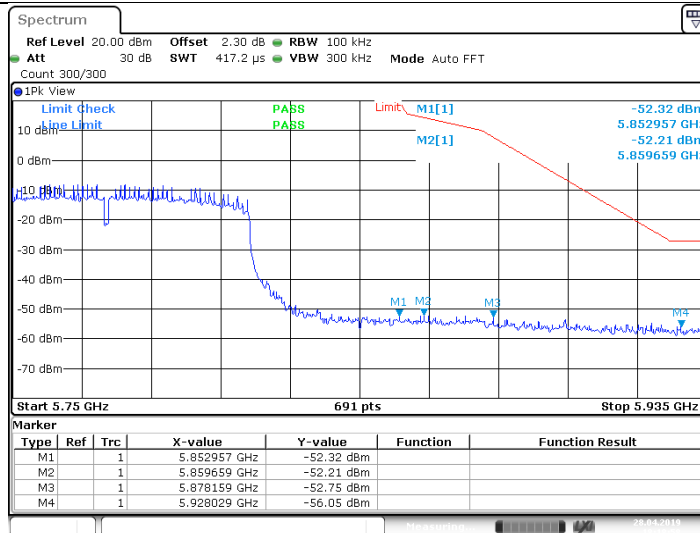
11AC80SISO_Ant1_Low_5775



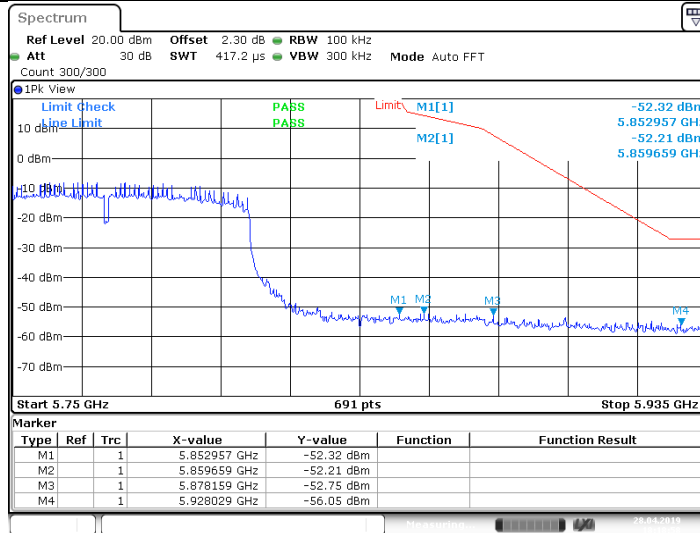
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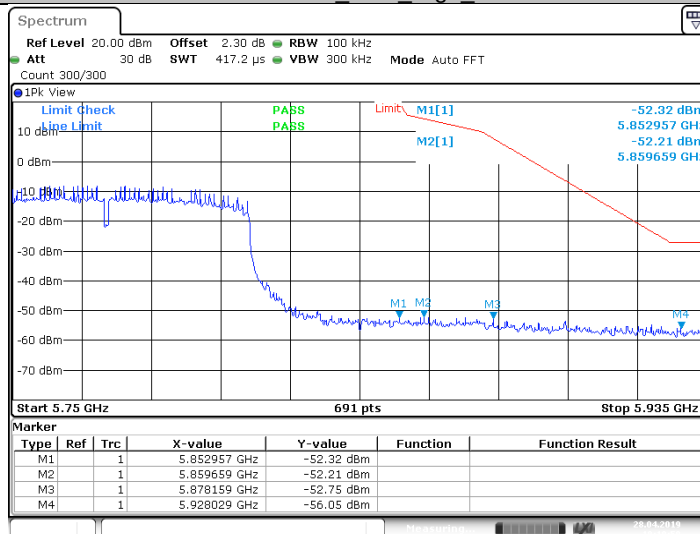
11AC80SISO_Ant1_High_5775



11AC80SISO Ant1_High 5775



11AC80SISO Ant1_High 5775



9.7 Frequencies Stability

Test Method

1. Connect the UUT to the spectrum analyzer
2. Set Centre Frequency of the channel under test.
3. Set Detector PEAK
4. Set RBW: 10KHz, VBW: 3RBW
5. Set Span: Encompass the entire emissions bandwidth (EBW) of the signal.
6. Allow the trace to stabilize, find the peak value of the power envelope and record the frequency, then calculated the frequency drift.

The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value.

User manual temperature is -10°C to 35°C

Limit: 20ppm

Test Results (All conditions and all modes were performed, only list Worst-Case in the report)

Voltage								
TestMode	Antenna	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	Ant1	5180	NV	NT	7000	1.351351	20	PASS
		5180	LV	NT	4000	0.772201	20	PASS
		5180	HV	NT	3000	0.579151	20	PASS
		5200	NV	NT	3000	0.576923	20	PASS
		5200	LV	NT	2000	0.384615	20	PASS
		5200	HV	NT	1000	0.192308	20	PASS
		5240	NV	NT	2000	0.381679	20	PASS
		5240	LV	NT	1000	0.19084	20	PASS
		5240	HV	NT	1000	0.19084	20	PASS
		5260	NV	NT	4000	0.760456	20	PASS
		5260	LV	NT	2000	0.380228	20	PASS
		5260	HV	NT	1000	0.190114	20	PASS
		5280	NV	NT	3000	0.568182	20	PASS
		5280	LV	NT	1000	0.189394	20	PASS
		5280	HV	NT	1000	0.189394	20	PASS
		5320	NV	NT	3000	0.56391	20	PASS
		5320	LV	NT	0	0	20	PASS
		5320	HV	NT	0	0	20	PASS
		5500	NV	NT	-1000	-0.181818	20	PASS
		5500	LV	NT	-2000	-0.363636	20	PASS
		5500	HV	NT	-3000	-0.545455	20	PASS
		5580	NV	NT	-2000	-0.358423	20	PASS
		5580	LV	NT	-2000	-0.358423	20	PASS
		5580	HV	NT	-2000	-0.358423	20	PASS
		5700	NV	NT	0	0	20	PASS
		5700	LV	NT	-1000	-0.175439	20	PASS
		5700	HV	NT	-1000	-0.175439	20	PASS
		5720	NV	NT	0	0	20	PASS
		5720	LV	NT	-1000	-0.174825	20	PASS
		5720	HV	NT	-1000	-0.174825	20	PASS
		5745	NV	NT	0	0	20	PASS
		5745	LV	NT	-1000	-0.174064	20	PASS
		5745	HV	NT	-1000	-0.174064	20	PASS
		5785	NV	NT	-1000	-0.172861	20	PASS
		5785	LV	NT	-1000	-0.172861	20	PASS
		5785	HV	NT	-1000	-0.172861	20	PASS

		5825	NV	NT	1000	0.171674	20	PASS
		5825	LV	NT	0	0	20	PASS
		5825	HV	NT	-1000	-0.171674	20	PASS
11N40SIS O	Ant1	5190	NV	NT	-3000	-0.578035	20	PASS
		5190	LV	NT	-4000	-0.770713	20	PASS
		5190	HV	NT	-4000	-0.770713	20	PASS
		5230	NV	NT	8000	1.529637	20	PASS
		5230	LV	NT	3000	0.573614	20	PASS
		5230	HV	NT	3000	0.573614	20	PASS
		5270	NV	NT	2000	0.379507	20	PASS
		5270	LV	NT	1000	0.189753	20	PASS
		5270	HV	NT	1000	0.189753	20	PASS
		5310	NV	NT	1000	0.188324	20	PASS
		5310	LV	NT	0	0	20	PASS
		5310	HV	NT	-1000	-0.188324	20	PASS
		5510	NV	NT	1000	0.181488	20	PASS
		5510	LV	NT	0	0	20	PASS
		5510	HV	NT	0	0	20	PASS
		5550	NV	NT	2000	0.36036	20	PASS
		5550	LV	NT	1000	0.18018	20	PASS
		5550	HV	NT	1000	0.18018	20	PASS
		5670	NV	NT	19000	3.35097	20	PASS
		5670	LV	NT	17000	2.998236	20	PASS
		5670	HV	NT	16000	2.821869	20	PASS
		5710	NV	NT	12000	2.101576	20	PASS
		5710	LV	NT	11000	1.926445	20	PASS
		5710	HV	NT	11000	1.926445	20	PASS
		5755	NV	NT	9000	1.563858	20	PASS
		5755	LV	NT	8000	1.390096	20	PASS
		5755	HV	NT	7000	1.216334	20	PASS
		5795	NV	NT	7000	1.207938	20	PASS
		5795	LV	NT	5000	0.862813	20	PASS
		5795	HV	NT	5000	0.862813	20	PASS
11AC80SI SO	Ant1	5210	NV	NT	5000	0.959693	20	PASS
		5210	LV	NT	2000	0.383877	20	PASS
		5210	HV	NT	1000	0.191939	20	PASS
		5290	NV	NT	2000	0.378072	20	PASS
		5290	LV	NT	0	0	20	PASS
		5290	HV	NT	-1000	-0.189036	20	PASS
		5530	NV	NT	2000	0.361664	20	PASS
		5530	LV	NT	1000	0.180832	20	PASS
		5530	HV	NT	0	0	20	PASS
		5690	NV	NT	1000	0.175747	20	PASS
		5690	LV	NT	1000	0.175747	20	PASS
		5690	HV	NT	0	0	20	PASS
		5775	NV	NT	3000	0.519481	20	PASS
		5775	LV	NT	1000	0.17316	20	PASS
		5775	HV	NT	1000	0.17316	20	PASS

Temperature								
TestMode	Antenna	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11A	Ant1	5180	NV	-10	3000	0.579151	20	PASS
		5180	NV	0	2000	0.3861	20	PASS
		5180	NV	10	2000	0.3861	20	PASS
		5180	NV	20	2000	0.3861	20	PASS
		5180	NV	35	2000	0.3861	20	PASS
		5200	NV	-10	1000	0.192308	20	PASS
		5200	NV	0	1000	0.192308	20	PASS
		5200	NV	10	1000	0.192308	20	PASS
		5200	NV	20	1000	0.192308	20	PASS
		5200	NV	35	1000	0.192308	20	PASS
		5240	NV	-10	1000	0.19084	20	PASS

		5240	NV	0	1000	0.19084	20	PASS
		5240	NV	10	1000	0.19084	20	PASS
		5240	NV	20	1000	0.19084	20	PASS
		5240	NV	35	1000	0.19084	20	PASS
		5260	NV	-10	1000	0.190114	20	PASS
		5260	NV	0	1000	0.190114	20	PASS
		5260	NV	10	1000	0.190114	20	PASS
		5260	NV	20	1000	0.190114	20	PASS
		5260	NV	35	1000	0.190114	20	PASS
		5280	NV	-10	1000	0.189394	20	PASS
		5280	NV	0	1000	0.189394	20	PASS
		5280	NV	10	1000	0.189394	20	PASS
		5280	NV	20	1000	0.189394	20	PASS
		5280	NV	35	1000	0.189394	20	PASS
		5320	NV	-10	-1000	-0.18797	20	PASS
		5320	NV	0	-1000	-0.18797	20	PASS
		5320	NV	10	-1000	-0.18797	20	PASS
		5320	NV	20	-1000	-0.18797	20	PASS
		5320	NV	35	-1000	-0.18797	20	PASS
		5500	NV	-10	-2000	-0.363636	20	PASS
		5500	NV	0	-2000	-0.363636	20	PASS
		5500	NV	10	-2000	-0.363636	20	PASS
		5500	NV	20	-2000	-0.363636	20	PASS
		5500	NV	35	-2000	-0.363636	20	PASS
		5580	NV	-10	-2000	-0.358423	20	PASS
		5580	NV	0	-2000	-0.358423	20	PASS
		5580	NV	10	-2000	-0.358423	20	PASS
		5580	NV	20	-2000	-0.358423	20	PASS
		5580	NV	35	-2000	-0.358423	20	PASS
		5700	NV	-10	-1000	-0.175439	20	PASS
		5700	NV	0	-1000	-0.175439	20	PASS
		5700	NV	10	-1000	-0.175439	20	PASS
		5700	NV	20	-1000	-0.175439	20	PASS
		5700	NV	35	-1000	-0.175439	20	PASS
		5720	NV	-10	-1000	-0.174825	20	PASS
		5720	NV	0	-1000	-0.174825	20	PASS
		5720	NV	10	-1000	-0.174825	20	PASS
		5720	NV	20	-1000	-0.174825	20	PASS
		5720	NV	35	-1000	-0.174825	20	PASS
		5745	NV	-10	-1000	-0.174064	20	PASS
		5745	NV	0	-1000	-0.174064	20	PASS
		5745	NV	10	-1000	-0.174064	20	PASS
		5745	NV	20	-1000	-0.174064	20	PASS
		5745	NV	35	-1000	-0.174064	20	PASS
		5785	NV	-10	-1000	-0.172861	20	PASS
		5785	NV	0	-1000	-0.172861	20	PASS
		5785	NV	10	-1000	-0.172861	20	PASS
		5785	NV	20	-1000	-0.172861	20	PASS
		5785	NV	35	-1000	-0.172861	20	PASS
		5825	NV	-10	0	0	20	PASS
		5825	NV	0	-1000	-0.171674	20	PASS
		5825	NV	10	-1000	-0.171674	20	PASS
		5825	NV	20	-1000	-0.171674	20	PASS
		5825	NV	35	-1000	-0.171674	20	PASS
11N40SIS O	Ant1	5190	NV	-10	-4000	-0.770713	20	PASS
		5190	NV	0	-4000	-0.770713	20	PASS
		5190	NV	10	-4000	-0.770713	20	PASS
		5190	NV	20	-4000	-0.770713	20	PASS
		5190	NV	35	-4000	-0.770713	20	PASS
		5230	NV	-10	2000	0.382409	20	PASS
		5230	NV	0	2000	0.382409	20	PASS
		5230	NV	10	2000	0.382409	20	PASS
		5230	NV	20	2000	0.382409	20	PASS
		5230	NV	35	1000	0.191205	20	PASS

		5270	NV	-10	1000	0.189753	20	PASS
		5270	NV	0	1000	0.189753	20	PASS
		5270	NV	10	1000	0.189753	20	PASS
		5270	NV	20	0	0	20	PASS
		5270	NV	35	0	0	20	PASS
		5310	NV	-10	-1000	-0.188324	20	PASS
		5310	NV	0	-1000	-0.188324	20	PASS
		5310	NV	10	-1000	-0.188324	20	PASS
		5310	NV	20	-1000	-0.188324	20	PASS
		5310	NV	35	-1000	-0.188324	20	PASS
		5510	NV	-10	0	0	20	PASS
		5510	NV	0	0	0	20	PASS
		5510	NV	10	-1000	-0.181488	20	PASS
		5510	NV	20	0	0	20	PASS
		5510	NV	35	-1000	-0.181488	20	PASS
		5550	NV	-10	1000	0.18018	20	PASS
		5550	NV	0	1000	0.18018	20	PASS
		5550	NV	10	1000	0.18018	20	PASS
		5550	NV	20	1000	0.18018	20	PASS
		5550	NV	35	1000	0.18018	20	PASS
		5670	NV	-10	15000	2.645503	20	PASS
		5670	NV	0	15000	2.645503	20	PASS
		5670	NV	10	14000	2.469136	20	PASS
		5670	NV	20	14000	2.469136	20	PASS
		5670	NV	35	13000	2.292769	20	PASS
		5710	NV	-10	10000	1.751313	20	PASS
		5710	NV	0	10000	1.751313	20	PASS
		5710	NV	10	9000	1.576182	20	PASS
		5710	NV	20	9000	1.576182	20	PASS
		5710	NV	35	9000	1.576182	20	PASS
		5755	NV	-10	7000	1.216334	20	PASS
		5755	NV	0	7000	1.216334	20	PASS
		5755	NV	10	7000	1.216334	20	PASS
		5755	NV	20	6000	1.042572	20	PASS
		5755	NV	35	6000	1.042572	20	PASS
		5795	NV	-10	5000	0.862813	20	PASS
		5795	NV	0	5000	0.862813	20	PASS
		5795	NV	10	5000	0.862813	20	PASS
		5795	NV	20	5000	0.862813	20	PASS
		5795	NV	35	5000	0.862813	20	PASS
11AC80SI SO	Ant1	5210	NV	-10	1000	0.191939	20	PASS
		5210	NV	0	1000	0.191939	20	PASS
		5210	NV	10	0	0	20	PASS
		5210	NV	20	0	0	20	PASS
		5210	NV	35	0	0	20	PASS
		5290	NV	-10	-1000	-0.189036	20	PASS
		5290	NV	0	-1000	-0.189036	20	PASS
		5290	NV	10	-1000	-0.189036	20	PASS
		5290	NV	20	-1000	-0.189036	20	PASS
		5290	NV	35	-1000	-0.189036	20	PASS
		5530	NV	-10	0	0	20	PASS
		5530	NV	0	1000	0.180832	20	PASS
		5530	NV	10	0	0	20	PASS
		5530	NV	20	0	0	20	PASS
		5530	NV	35	0	0	20	PASS
		5690	NV	-10	1000	0.175747	20	PASS
		5690	NV	0	0	0	20	PASS
		5690	NV	10	0	0	20	PASS
		5690	NV	20	0	0	20	PASS
		5690	NV	35	0	0	20	PASS
		5775	NV	-10	1000	0.17316	20	PASS
		5775	NV	0	1000	0.17316	20	PASS
		5775	NV	10	1000	0.17316	20	PASS
		5775	NV	20	0	0	20	PASS



		5775	NV	35	0	0	20	PASS
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9.8 Dynamic Frequency Selection (DFS)

1、 General Test Condition

Parameters of EUT	
Frequency	5250 – 5350 MHz & 5470 – 5725 MHz
Operational Mode	Slave
Modulation:	OFDM
Channel Bandwidth:	20 MHz , 40 MHz, 80 MHz

Note: This device was functioned as a Slave device during the DFS

2、 Test requirement

The manufacturer shall whether the EUT is capable of operating as a master and a client. If the EUT is capable of operating in more than one operating mode then each operating mode shall be tested separately.

DFS Applicability

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

DFS Applicability During Normal Operation

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Radar Detection
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Yes	Not required
Uniform Spreading	Yes	Yes	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

3、Test Limited

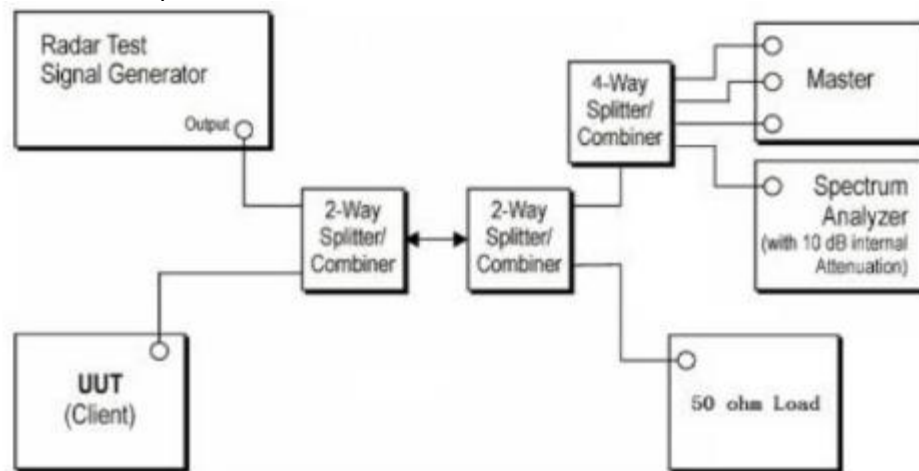
According to KDB 905462 D02 Table 4 DFS Response Requirement Values

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: <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. Note 2: 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 a <i>Channel</i> 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 <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.	

4、Calibration of Radar Waveform

- (1) A 50ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to place of the master.
- (2) The interference Radar Detection Threshold Level is $-62\text{dBm}+3.7\text{dB}+1.5\text{dB}=-55.8\text{dBm}$ that had been taken into account the output power range and antenna gain.
- (3) The following equipment setup was used to calibrate the conducted radar waveform. A vector signal generator was utilized to establish the test signal level for radar type 0. During this process there were no transmissions by either the master or client device. The spectrum analyzer was switched to the zero spans (time domain) at the frequency of the radar waveform generator. Peak detection was used. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3MHz. The spectrum analyzer had offset -1.5dB to compensate RF cable loss 1.5dB.
- (4) The vector signal generator amplitude was set so that the power level measured at the spectrum analyzer was $-62\text{dBm}+3.7\text{dB}+1.5\text{dB}=-55.8\text{dBm}$. Capture the spectrum analyzer plots on short pulse radar waveform.

Conducted Calibration Setup:



Radar Waveform Calibration result:

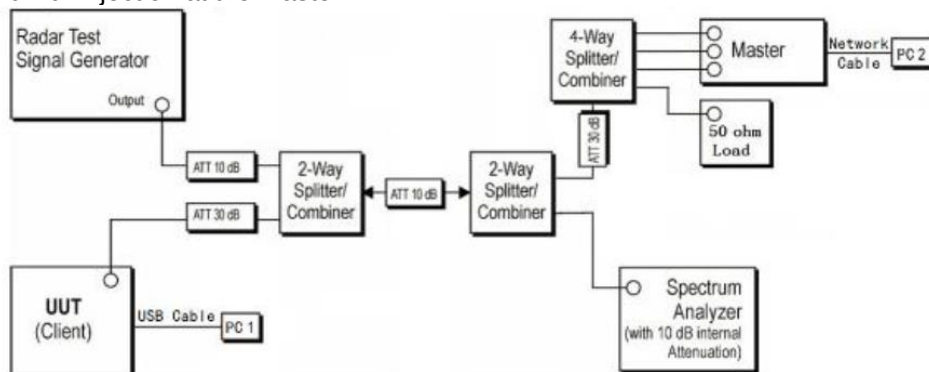
5、Channel Closing Transmission Time, Channel Move Time and Non-Occupancy Period.

Block Diagram of test setup test procedure.

- (1) The Radar Pulse generator is setup to provide a pulse at frequency that the master and client are operating, A type 0 radar pulse with a 1us pulse width and a 1428us PRI is used for the testing.
- (2) The vector signal generator is adjusted to provide the radar burst (18 pulses) at the level of approximately -55.8dBm at the antenna of the master device.
- (3) A trigger is provided from the pulse generator to the DFS monitoring system in order to capture the traffic and the occurrence of the radar pulse.
- (4) EUT will associate with the master at channel. The file "iperf.exe" specified by the FCC is streamed from the PC 2 through the master and the client device to the PC 1 and played in full motion video using test software in order to properly load the network for the entire period of the test.
- (5) When radar burst with a Level equal to the DFS Detection Threshold +1dB is generated on the operating channel of the U-NII device. At time T0 the radar waveform generator sends a burst of pulse of the radar waveform at Detection threshold +1dB.
- (6) Observer the transmissions of the EUT at the end of the radar Burst on the Operating channel. Measure and record the transmissions from the UUT during The observation time (channel move time). One 15 seconds plot is reported for the short pulse radar type 0. The plot for the short pulse radar burst. The channel move time will be calculated based on the zoom in 600ms plot of the short pulse radar type.
- (7) Measurement of the aggregate duration of the channel closed transmission time method. With the spectrum analyzer set to zero span tuned to the center frequency of the EUT operating channel at the radar simulated frequency, peak detection, and max hold, the dwell time per bin is given by: $Dwell(3.0) = S(12000ms)/B(4000)$; where dwell time per spectrum analyzer sampling bin, S is sweep time and B is the number of spectrum analyzer sampling bins. An upper bound of the aggregate duration of the intermittent control signals of channel closing transmission time is calculated by: $C(ms) = N \times Dwell(0.3ms)$; where C is the closing time, N is the number of spectrum analyzer sampling bins (intermittent control signals) showing a U-NII transmission and dwell is the dwell time per bin.
- (8) Measurement the EUT for more than 30 minutes following the channel move time to verify that no transmission or beacons occur on this channel.

Test Setup:

Setup for client with injection at the master.

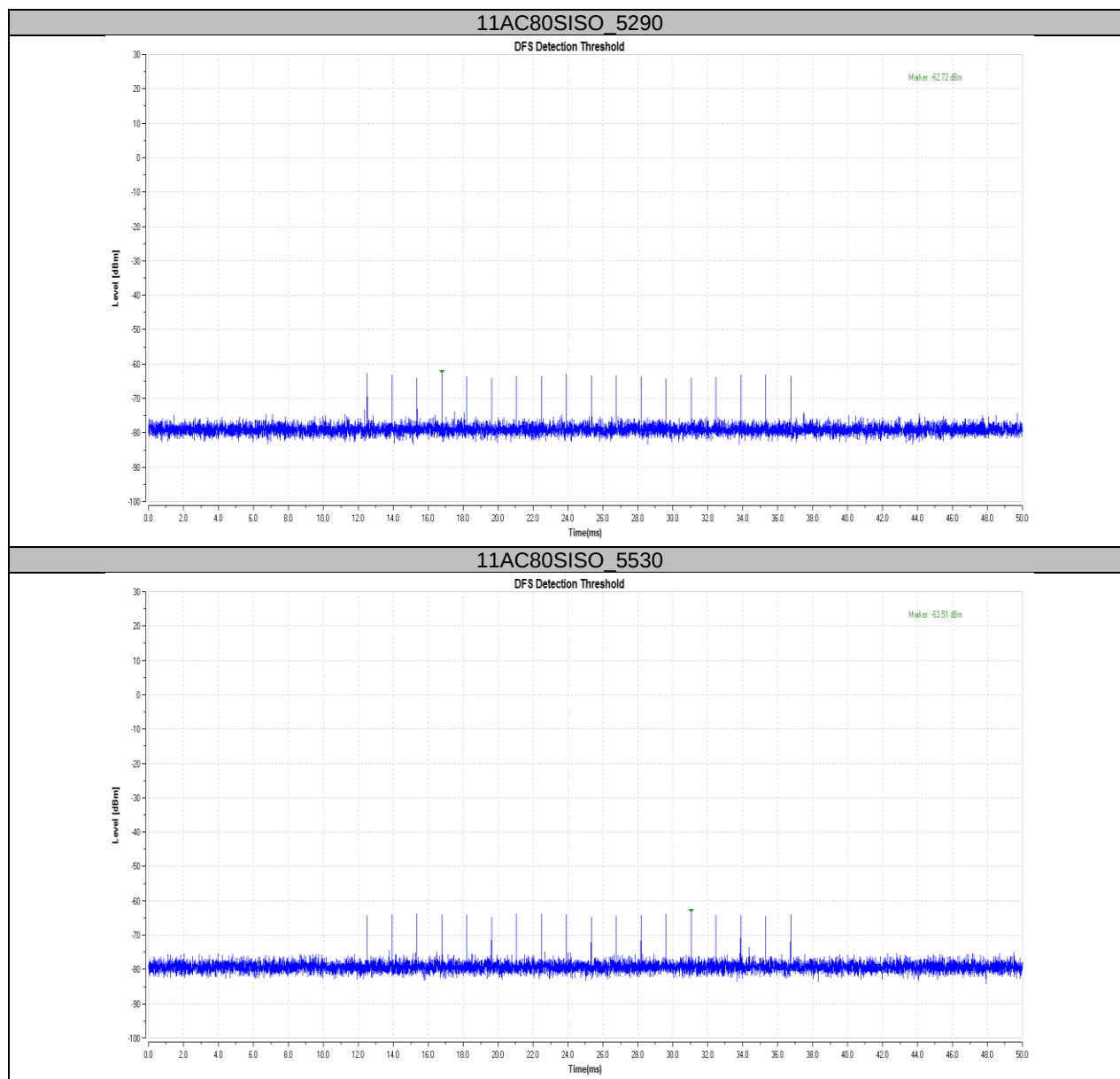


6、Test Result

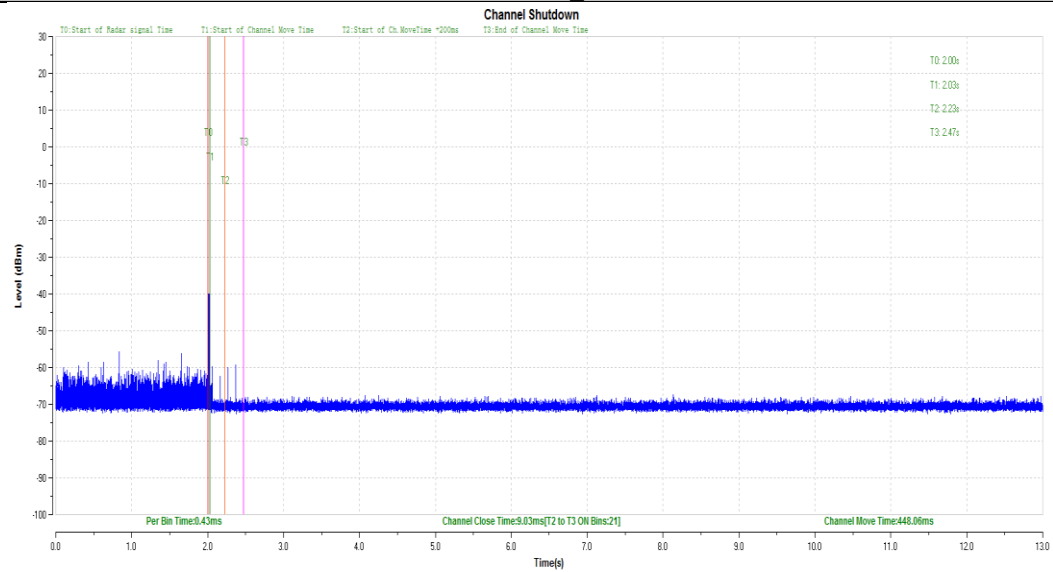
Clause	Test Parameter	Remarks	Pass/Fail
15.407	DFS Detection Threshold	No Applicable	N/A
15.407	Channel Availability Check time	No Applicable	N/A
15.407	Channel Move time	Applicable	Pass
15.407	Channel Closing Transmission Time	Applicable	Pass
15.407	Non-Occupancy Period	Applicable	Pass
15.407	Uniform Spreading	No Applicable	N/A
15.407	U-NII Detection Bandwidth	No Applicable	N/A

TestMode	Channel	CCT[ms]	Limit[ms]	CMT[ms]	Limit[ms]	Verdict
11AC80SISO	5290	9.03	60	448.06	10000	PASS
	5530	30.1	60	452.79	10000	PASS

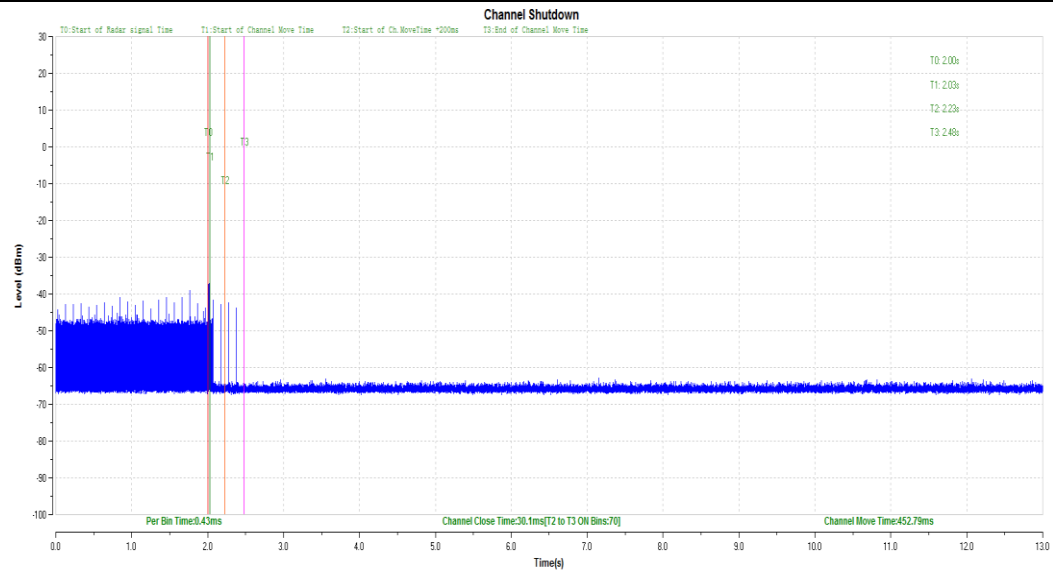
Test Graphs



11AC80SISO_5290



11AC80SISO_5530



10 Test Equipment List

Conducted Emission Test

Description	Manufacturer	Model no.	Serial no.	cal. due date
EMI Test Receiver	Rohde & Schwarz	ESR 3	101782	2019-7-6
LISN	Rohde & Schwarz	ENV4200	100249	2019-7-6
Attenuator	Shanghai Huaxiang	TS2-26-3	080928189	2019-7-6
Test software	Rohde & Schwarz	EMC32	Version9.15.00	N/A

Radiated Emission Test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	101269	2019-7-6
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	707	2019-6-28
Horn Antenna	Rohde & Schwarz	HF907	102295	2019-6-28
Wideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	12827	2019-7-12
Pre-amplifier	Rohde & Schwarz	SCU 40A	100398	2019-7-6
Pre-amplifier	Rohde & Schwarz	SCU 18	102230	2019-7-6
Signal Generator	Rohde & Schwarz	SMY01	839369/005	2019-7-6
Attenuator	Agilent	8491A	MY39264334	2019-7-6
3m Semi-anechoic chamber	TDK	9X6X6	----	2020-7-7
Test software	Rohde & Schwarz	EMC32	Version 9.15.00	N/A

RF conducted test

DESCRIPTION	MANUFACTURER	MODEL NO.	SERIAL NO.	CAL. DUE DATE
Signal Analyzer	Rohde & Schwarz	FSV40	101030	2019-7-6
RF Switch Module	Rohde & Schwarz	OSP120/OSP-B157	101226/100851	2019-7-6
Power Splitter	Weinschel	1580	SC319	2019-7-5
Test software	Tonscend	System for BT/WIFI	Version 2.6	N/A

11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV432 or ENV4200)	3.21dB
Uncertainty for Radiated Spurious Emission 25MHz-3000MHz	Horizontal: 4.91dB; Vertical: 4.89dB;
Uncertainty for Radiated Spurious Emission 3000MHz-18000MHz	Horizontal: 4.80dB; Vertical: 4.79dB;
Uncertainty for Radiated Spurious Emission 18000MHz-40000MHz	Horizontal: 5.05dB; Vertical: 5.04dB;
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10^{-7} or 1%

THE END