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TEST REPORT

SCOPE OF WORK

FCC TESTING–TS9030, RAYDANZ

REPORT NUMBER

191126031SZN-005

ISSUE DATE	**[REVISED DATE]**
16 January 2020	[----------]

PAGES

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101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community,
GuanHu Subdistrict, LongHua District, Shenzhen.

Tel: (86 755) 8601 6288
Fax: (86 755) 8601 6751
www.intertek.com

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TEST REPORT

Intertek Report No.: 191126031SZN-005_updated

RF TEST REPORT

Report No.:	**191126031SZN-005**
Product:	**3.1 Atmos Sound Bar with Wireless Subwoofer, Wireless Subwoofer**
Model No.:	**TS9030, RAYDANZ**
FCC ID:	**2ARUDTS9030**

Applicant:	**TCL entertainment solutions limited**
Test Method/ Standard:	**FCC Part 15 Subpart E; KDB 789033 D02 v02r01; KDB 662911 D01 v02r01; KDB 905462 D02 v02; ANSI C63.10-2013**
Test By:	**Intertek Testing Services Shenzhen Ltd. Longhua Branch 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen, P.R. China.**

Prepared and Checked by:

Winkey Wang
Senior Project Engineer

Approved by:

Kidd Yang
Technical Supervisor
Date: 16 January 2020

Table of Contents

Summary of Tests

FCC Parts	Test	Section	Results
15.203	Antenna Requirement	1.3	Pass
15.407 a (1)/(3)	Maximum output power test	3	Pass
15.407 a (1)/(3)	Power Spectrum Density test	4	Pass
15.407 e	6dB Bandwidth	5	Pass
15.407 b, 15.205, 15.209	Radiated spurious emission test	6	Pass
15.207	AC line conducted emission test	7	Pass
15.407 g	Frequency Stability	8	Pass
15.407 h	DFS: Channel Closing Transmission Time	9.3	Pass
15.407 h	DFS: Channel Move Time	9.3	Pass

1. General information

1.1 Identification of the EUT

Product:	3.1 Atmos Sound Bar with Wireless Subwoofer, Wireless Subwoofer
Model No.:	TS9030, RAYDANZ
Type of Device:	Client device
Nominal Channel Bandwidth:	802.11a/n-HT20 (20 MHz), 802.11n-HT40 (40MHz), 802.11ac (20/40/80MHz)
Operating Frequency:	5150MHz~5250 MHz, 5250MHz~5350MHz, 5470MHz-5725MHZ, 5725MHz~5850MHz
Channel Number:	4 channels for 5180 MHz ~ 5240 MHz (802.11a/n/ac-HT20); 2 channels for 5190 MHz ~ 5230 MHz (802.11n/ac-HT40); 1 channels for 5210 MHz (802.11ac-HT80); 4 channels for 5260 MHz ~ 5320 MHz (802.11a/n/ac-HT20); 2 channels for 5270 MHz ~ 5310 MHz (802.11n/ac-HT40); 1 channels for 5290 MHz (802.11ac-HT80); 11 channels for 5500 MHz ~ 5700 MHz (802.11a/n/ac-HT20); 5 channels for 5510 MHz ~ 5670 MHz (802.11n/ac-HT40); 2 channels for 5530 MHz ~ 5610 MHz (802.11ac-HT80); 5 channels for 5745 MHz ~ 5825 MHz (802.11a/n/ac-HT20); 2 channels for 5755 MHz ~ 5795 MHz (802.11n/ac-HT40); 1 channels for 5775 MHz (802.11ac-HT80);
Modulation:	802.11a: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Rated Power:	AC120V, 60Hz
Test Date(s):	26 November 2019 to 07 January 2020
Note 1:	This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
Note 2:	When determining the test conclusion, the Measurement Uncertainty of test has been considered.

1.2 Additional information about the EUT

The EUT is a 3.1 Atmos Sound Bar with Wireless Subwoofer, Wireless Subwoofer with 5G WIFI technology. The EUT is powered by AC 100-240V~ 50/60Hz.
For more detail features, please refer to User's description as file name “descri.pdf”.

The Model: RAYDANZ are the same as the Model: TS9030 in hardware aspect (circuitry and electrical, mechanical and physical construction), the only differences is the model number and trade mark for trading purpose.

Related Submittal(s) Grants
This is an application for certification of U–NII device (5GHz Wi-Fi transmitter portion).
For the BT transmitter function was tested and demonstrated in report 191126031SZN-002.
For the 2.4GHz WIFI function was tested and demonstrated in report 191126031SZN-003.
For the Normal 2.4G TX function was tested and demonstrated in report 191126031SZN-004.
For other functions were reported in the SDOC report: 191126031SZN-001.

1.3 Antenna description (15.203)

The EUT uses Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

Antenna Gain: 4.25 dBi Max for 5G WIFI.

1.4 Peripherals equipment

Refer List:

Description	Manufacturer	Model No.
iPod (Provided by Intertek)	Apple	A1367
Test TV (Provided by Intertek)	SONY	KDL-24EX520
USB Memory (Provided by Intertek)	SanDisk	SDCZ36-002G-P36
Audio Cable (Provided by Intertek)	N/A	Unshielded, Length 120cm
HDMI In Cable (Provided by Intertek)	UGREEN	Unshielded, Length 175cm
HDMI In Cable (Provided by applicant)	Richsound	Shielded, Length 180cm
Detached AC power cord (Provided by applicant)	Richsound	Unshielded, Length 150cm
Optical Cable (Provided by applicant)	Richsound	Unshielded, Length 120cm
Dummy Load (Provided by Intertek)	N/A	75Ω
Remote control (Provided by applicant)	Provided by applicant	N/A

2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 E, Section15.203, 15.207, 15.209, 15.407 and ANSI C63.10/2013, method of measurement: KDB 789033.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band was all meet limit requirement, thus we evaluate the EUT pass the specified test.

The AC power conducted emissions was invested over the frequency range from 0.15 MHz to 30 MHz using a receiver bandwidth of 9 kHz (15.207 paragraph).

Radiated emissions were invested cover the frequency range from 9KHz to 30MHz using a receiver RBW of 9kHz, from 30 MHz to 1000 MHz using a receiver RBW of 120 kHz record QP reading, and the frequency over 1 GHz using a spectrum analyzer RBW of 1 MHz, VBW of 3MHz, Detector=Peak record for Peak reading, RBW of 1 MHz, VBW of 3MHz, Detector=RMS record for Average reading recorded on the report.

The EUT setup configurations please refer to the photo of radiated setup photos.pdf & conducted setup photos.pdf.

2.2 Operation mode

The EUT was supplied by and it was run in TX mode that was controlled by client provided RF testing program.

The EUT was transmitted continuously during the test. The worst case test result was showed in the report.

With individual verifying, the maximum output power was found at 6 Mbps data rate for 802.11a mode, 6.5 Mbps data rate for 802.11n-HT20 mode, 13.5 Mbps data rate for 802.11n-HT40 mode, 29.3Mbps data rate for 802.11ac. The final tests were executed under these conditions and recorded in this report individually.

Table for Parameters of Test Software Setting
During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Test Software: fw_bcm43456c5_ag_mfg V1.0

3. Maximum Output Power test (FCC 15.407)

3.1 Operating environment

Temperature:	25	℃
Relative Humidity:	55	%
Atmospheric Pressure:	1011	hPa

3.2 Test setup & procedure

The power output per FCC §15.407(a) was measured on the EUT using a 50 ohm SMA cable connected to Power Meter and the measurement method refer to 789033 D02. Power was read directly and cable loss correction (1.0dB) was added to the reading to obtain power at the EUT antenna terminals.

3.3 Limit

Operating Frequency (MHz)	Max Conducted TX Power	Max EIRP
5150~5250	30dBm (1W) for master device	4W (36dBm) with 6dBi antenna
	24dBm (250mW) for client device	
5250~5350	24dBm (250mW) or 11dBm+ 10logB*	1W (30dBm) with 6dBi antenna
5470~5725	24dBm (250mW) or 11dBm+ 10logB*	
5725~5850	30dBm (1W)	4W (36dBm) with 6dBi antenna

Remark: 1) *Where B is the 26dB emission Bandwidth in MHz.

2) The device was declared as client device.

3) Tx Power Reduction (dBm-by-dBi) required when antenna exceeds 6dBi.

4) Max antenna gain= 4.25 dBi< 6 dBi.

3.4 Measured data of Maximum Output Power test results

5150 MHz ~ 5250 MHz, 5250MHz~5350MHz, 5470MHz-5725MHZ, 5725 MHz ~ 5850 MHz

Max Conducted TX Power

Test Mode	Channel	Result	Limit	Verdict
11A	5180	16.00	24	PASS
	5200	16.18	24	PASS
	5240	16.48	24	PASS
	5260	18.46	24	PASS
	5280	18.26	24	PASS
	5320	17.87	24	PASS
	5500	15.74	24	PASS
	5580	16.77	24	PASS
	5700	16.89	24	PASS
	5745	16.93	30	PASS
	5785	16.79	30	PASS
	5825	16.69	30	PASS
11N20	5180	16.68	24	PASS
	5200	17.08	24	PASS
	5240	16.39	24	PASS
	5260	18.62	24	PASS
	5280	18.65	24	PASS
	5320	17.91	24	PASS
	5500	16.21	24	PASS
	5580	17.13	24	PASS
	5700	16.56	24	PASS
	5745	16.60	30	PASS
	5785	16.23	30	PASS
	5825	16.51	30	PASS
11N40	5190	16.79	24	PASS
	5230	16.98	24	PASS
	5270	17.27	24	PASS
	5310	17.02	24	PASS
	5510	14.96	24	PASS
	5550	15.50	24	PASS
	5670	15.92	24	PASS
	5755	15.44	30	PASS
	5795	15.87	30	PASS
11AC20	5180	15.59	24	PASS
	5200	15.79	24	PASS
	5240	16.19	24	PASS
	5260	18.10	24	PASS
	5280	18.23	24	PASS
	5320	17.56	24	PASS
	5500	15.60	24	PASS
	5580	16.77	24	PASS
	5700	16.32	24	PASS
	5745	16.36	30	PASS

	5785	16.21	30	PASS
	5825	16.51	30	PASS
11AC40	5190	16.66	24	PASS
	5230	17.11	24	PASS
	5270	17.20	24	PASS
	5310	17.04	24	PASS
	5510	15.11	24	PASS
	5550	15.61	24	PASS
	5670	15.96	24	PASS
	5755	15.52	30	PASS
	5795	15.51	30	PASS
11AC80	5210	15.43	24	PASS
	5290	15.71	24	PASS
	5530	15.57	24	PASS
	5610	14.83	24	PASS
	5775	13.71	30	PASS

MAX EIRP

Test Mode	Channel	Output Power (dBm)	ANT. Gain (dBi)	E.I.R.P (dBm)	Limit	Verdict
11A	5180	16.00	4.25	20.25	36	PASS
	5200	16.18	4.25	20.43	36	PASS
	5240	16.48	4.25	20.73	36	PASS
	5260	18.46	4.25	22.71	30	PASS
	5280	18.26	4.25	22.51	30	PASS
	5320	17.87	4.25	22.12	30	PASS
	5500	15.74	4.25	19.99	30	PASS
	5580	16.77	4.25	21.02	30	PASS
	5700	16.89	4.25	21.14	30	PASS
	5745	16.93	4.25	21.18	36	PASS
	5785	16.79	4.25	21.04	36	PASS
	5825	16.69	4.25	20.94	36	PASS
11N20	5180	16.68	4.25	20.93	36	PASS
	5200	17.08	4.25	21.33	36	PASS
	5240	16.39	4.25	20.64	36	PASS
	5260	18.62	4.25	22.87	30	PASS
	5280	18.65	4.25	22.90	30	PASS
	5320	17.91	4.25	22.16	30	PASS
	5500	16.21	4.25	20.46	30	PASS
	5580	17.13	4.25	21.38	30	PASS
	5700	16.56	4.25	20.81	30	PASS
	5745	16.60	4.25	20.85	36	PASS
	5785	16.23	4.25	20.48	36	PASS
	5825	16.51	4.25	20.76	36	PASS
11N40	5190	16.79	4.25	21.04	36	PASS
	5230	16.98	4.25	21.23	36	PASS
	5270	17.27	4.25	21.52	30	PASS
	5310	17.02	4.25	21.27	30	PASS
	5510	14.96	4.25	19.21	30	PASS
	5550	15.50	4.25	19.75	30	PASS
	5670	15.92	4.25	20.17	30	PASS
	5755	15.44	4.25	19.69	36	PASS
	5795	15.87	4.25	20.12	36	PASS
11AC20	5180	15.59	4.25	19.84	36	PASS
	5200	15.79	4.25	20.04	36	PASS
	5240	16.19	4.25	20.44	36	PASS
	5260	18.10	4.25	22.35	30	PASS
	5280	18.23	4.25	22.48	30	PASS
	5320	17.56	4.25	21.81	30	PASS
	5500	15.60	4.25	19.85	30	PASS
	5580	16.77	4.25	21.02	30	PASS
	5700	16.32	4.25	20.57	30	PASS
	5745	16.36	4.25	20.61	36	PASS
	5785	16.21	4.25	20.46	36	PASS
	5825	16.51	4.25	20.76	36	PASS

11AC40	5190	16.66	4.25	20.91	36	PASS
	5230	17.11	4.25	21.36	36	PASS
	5270	17.20	4.25	21.45	30	PASS
	5310	17.04	4.25	21.29	30	PASS
	5510	15.11	4.25	19.36	30	PASS
	5550	15.61	4.25	19.86	30	PASS
	5670	15.96	4.25	20.21	30	PASS
	5755	15.52	4.25	19.77	36	PASS
	5795	15.51	4.25	19.76	36	PASS
11AC80	5210	15.43	4.25	19.68	36	PASS
	5290	15.71	4.25	19.96	30	PASS
	5530	15.57	4.25	19.82	30	PASS
	5610	14.83	4.25	19.08	30	PASS
	5775	13.71	4.25	17.96	36	PASS

4. Power Spectrum Density test (FCC 15.407)

4.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1011	hPa

4.2 Test setup & procedure

Method of Measurement:

The power spectrum density per FCC §15.407(a) was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 1MHz/500KHz, the video bandwidth set at 3 MHz/2MHz (measurement method refer to KDB 789033 D02). Power spectrum density was read directly and cable loss (1.0 dB) reading to obtain power at the EUT antenna terminals.

4.3 Limit

Operating Frequency (MHz)	Max Conducted Power Spectral Density
5150~5250	*17dBm/MHz for master device
	11dBm/MHz for mobile/portable client device
5250~5350	11dBm/MHz
5470~5725	11dBm/MHz
5725~5850	30dBm/500KHz

Remark: 1) *The device was declared as Slave device.

2) Tx Power Reduction (dBm-by-dBi) required when antenna exceeds 6dBi.

3) Ant gain = 4.25 dBi< 6 dBi.

4.4 Measured data of Power Spectrum Density test results

5150 MHz ~ 5250 MHz, 5250MHz~5350MHz, 5470MHz-5725MHZ, 5725 MHz ~ 5850 MHz

Test Mode	Channel	Result	Limit	Verdict
11A	5180	6.40	11	PASS
	5200	6.64	11	PASS
	5240	6.86	11	PASS
	5260	9.25	11	PASS
	5280	8.73	11	PASS
	5320	7.87	11	PASS
	5500	6.12	11	PASS
	5580	7.12	11	PASS
	5700	7.32	11	PASS
	5745	6.59	30	PASS
	5785	6.15	30	PASS
	5825	6.01	30	PASS
11N20	5180	6.85	11	PASS
	5200	7.05	11	PASS
	5240	6.27	11	PASS
	5260	8.17	11	PASS
	5280	8.49	11	PASS
	5320	7.93	11	PASS
	5500	6.26	11	PASS
	5580	7.07	11	PASS
	5700	6.02	11	PASS
	5745	5.10	30	PASS
	5785	5.09	30	PASS
	5825	5.41	30	PASS
11N40	5190	3.36	11	PASS
	5230	3.76	11	PASS
	5270	4.20	11	PASS
	5310	3.76	11	PASS
	5510	1.70	11	PASS
	5550	2.25	11	PASS
	5670	2.76	11	PASS
	5755	1.24	30	PASS
	5795	1.70	30	PASS
11AC20	5180	5.67	11	PASS
	5200	5.80	11	PASS
	5240	6.00	11	PASS
	5260	7.82	11	PASS

	5280	7.98	11	PASS
	5320	7.11	11	PASS
	5500	5.69	11	PASS
	5580	6.48	11	PASS
	5700	6.13	11	PASS
	5745	4.70	30	PASS
	5785	4.68	30	PASS
	5825	5.44	30	PASS
11AC40	5190	3.61	11	PASS
	5230	4.39	11	PASS
	5270	4.16	11	PASS
	5310	3.63	11	PASS
	5510	1.97	11	PASS
	5550	2.32	11	PASS
	5670	2.50	11	PASS
	5755	1.22	30	PASS
	5795	-13.19	30	PASS
11AC80	5210	-14.64	11	PASS
	5290	-14.53	11	PASS
	5530	-16.59	11	PASS
	5610	-1.00	11	PASS
	5775	-2.75	30	PASS

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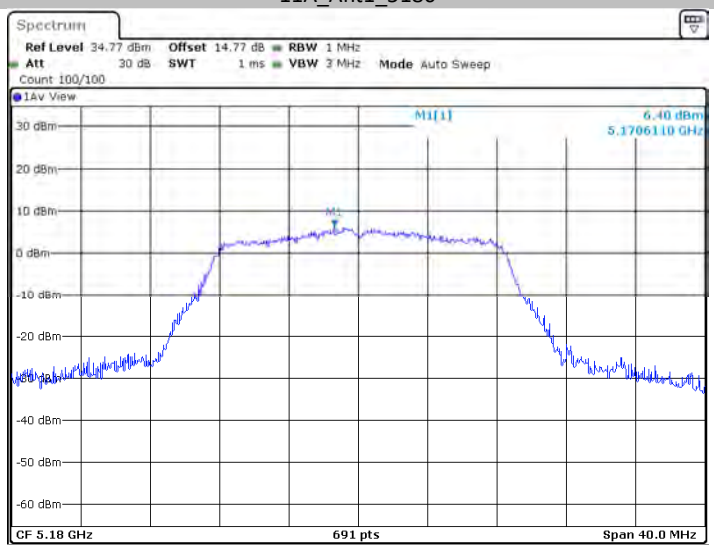

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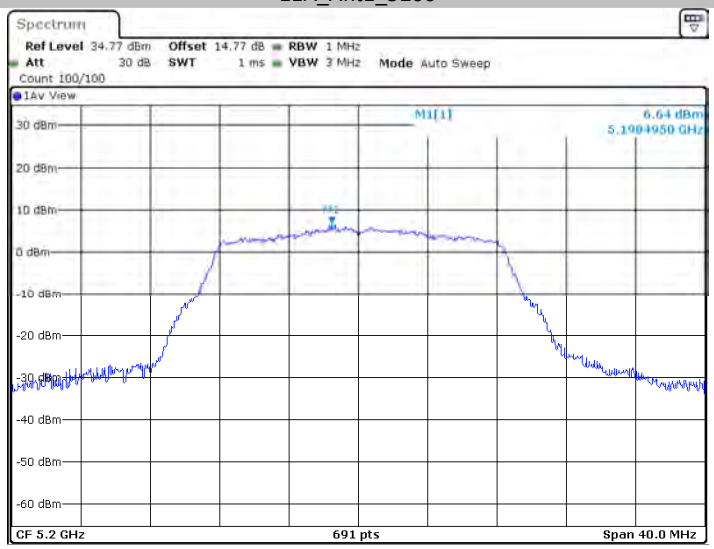

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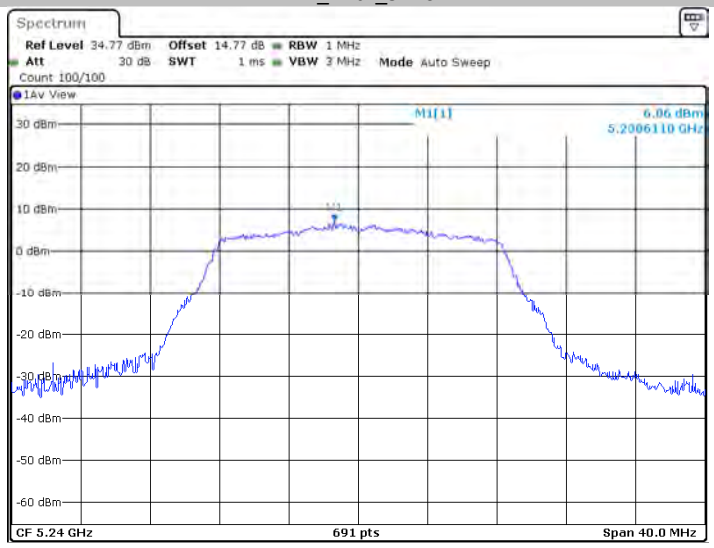

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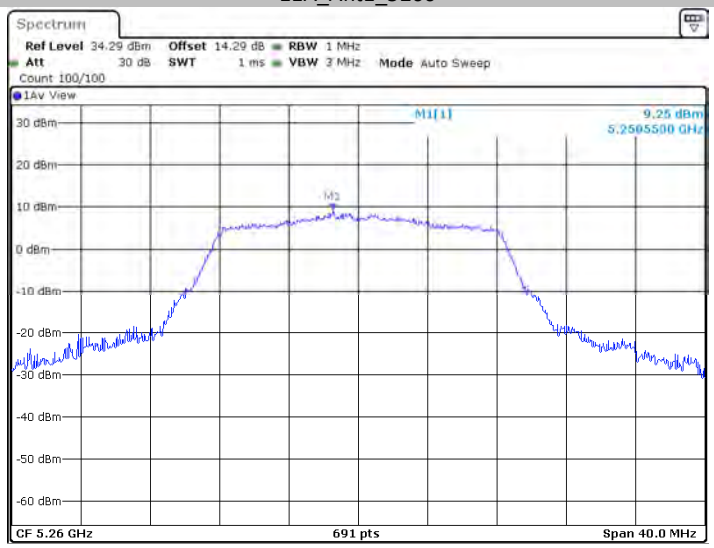

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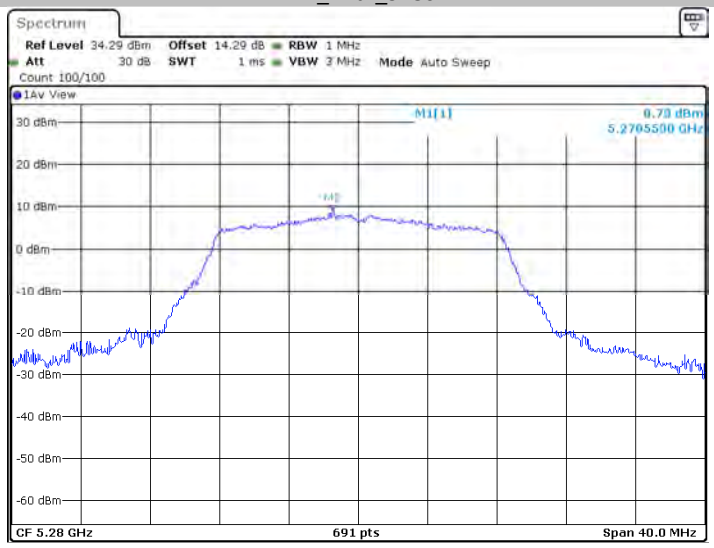

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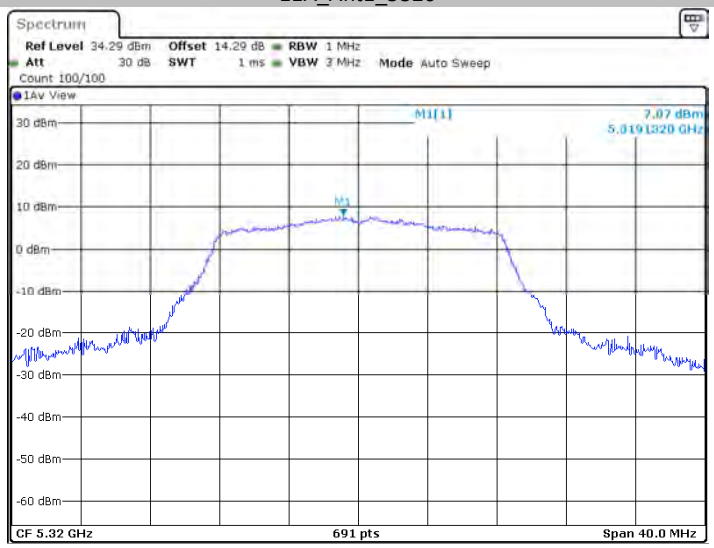

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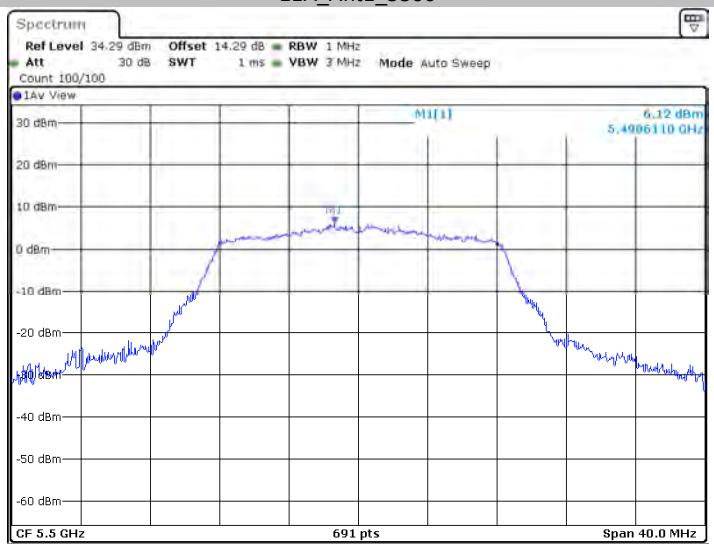

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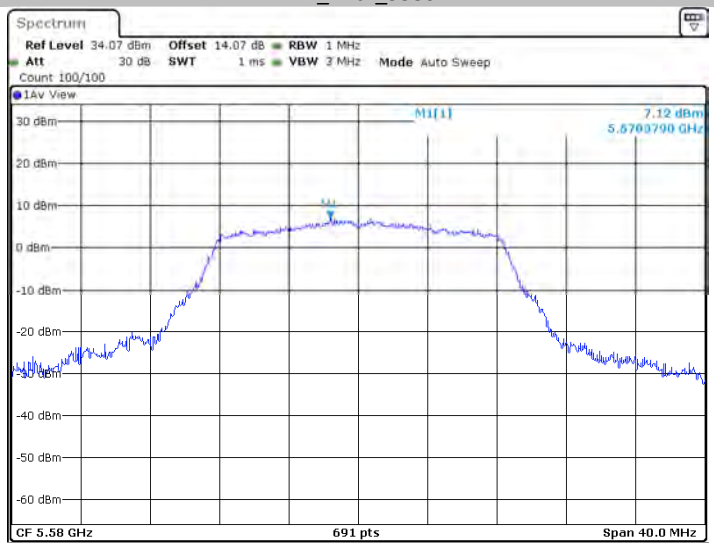

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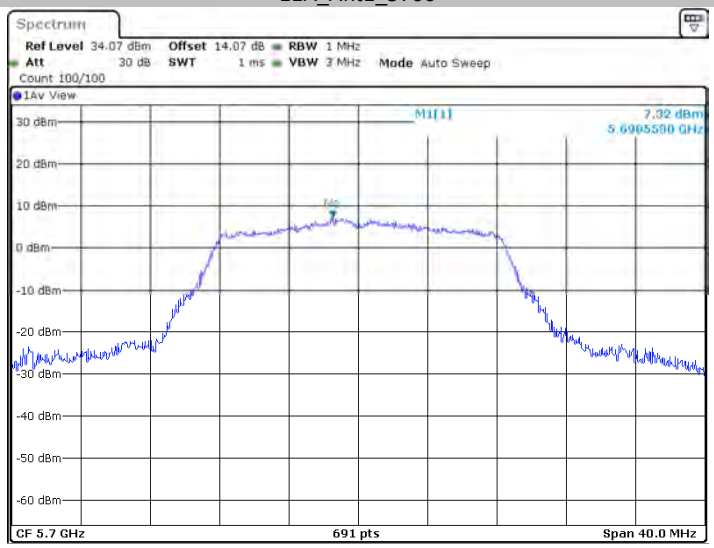

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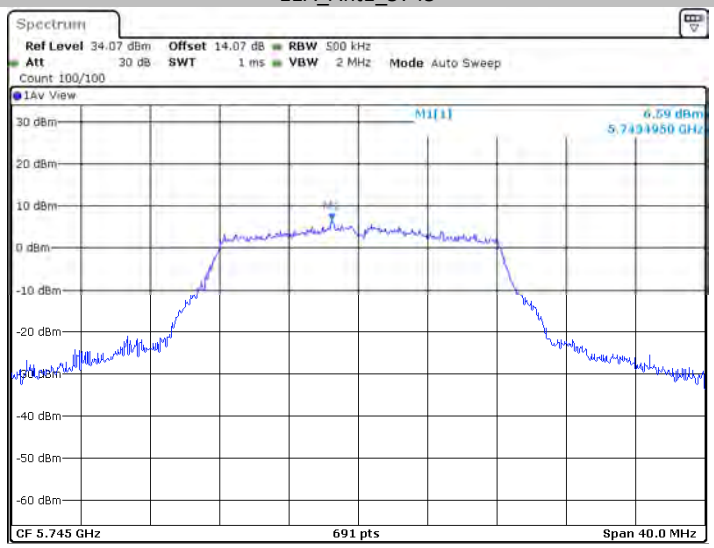

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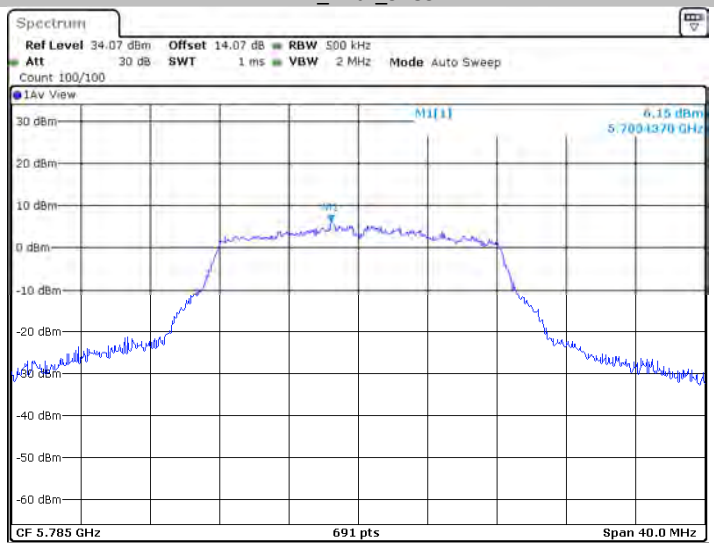

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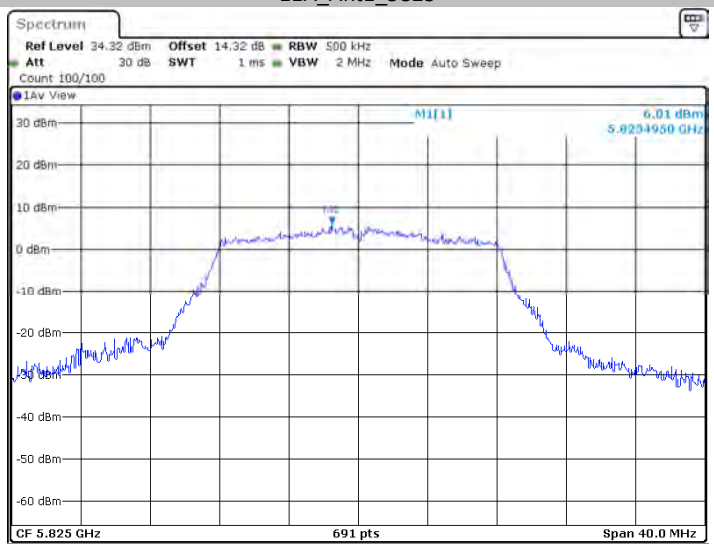

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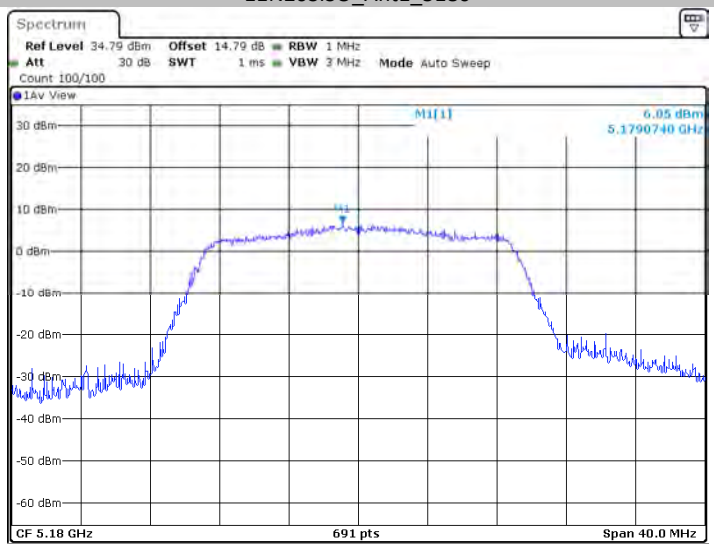

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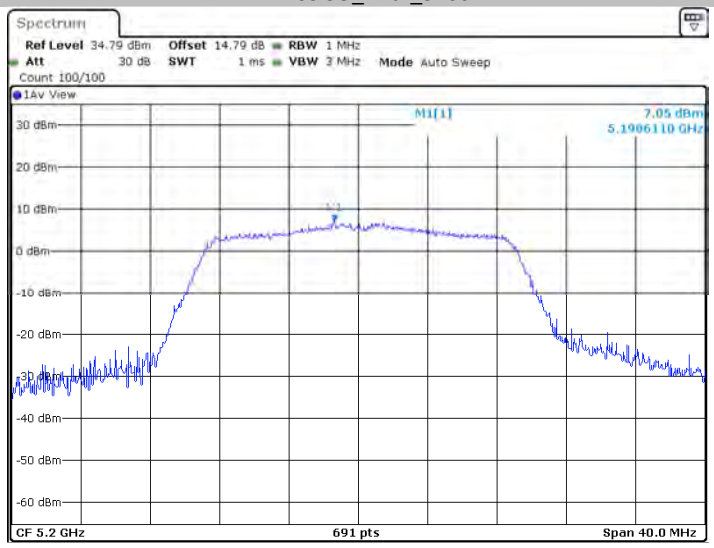

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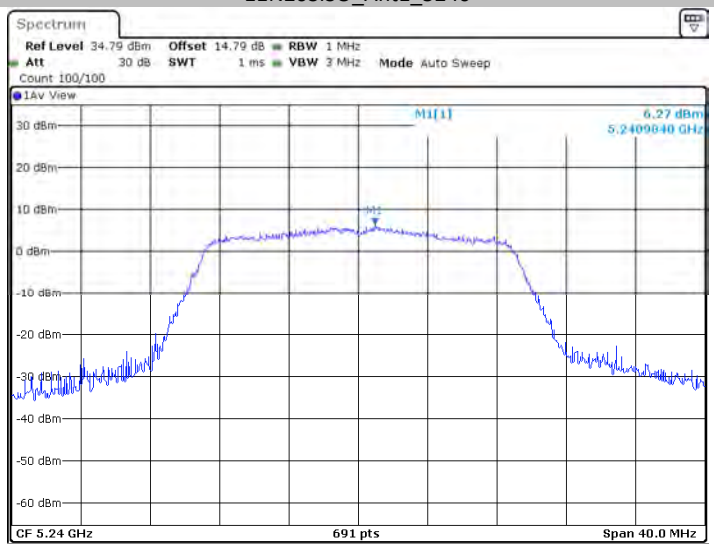

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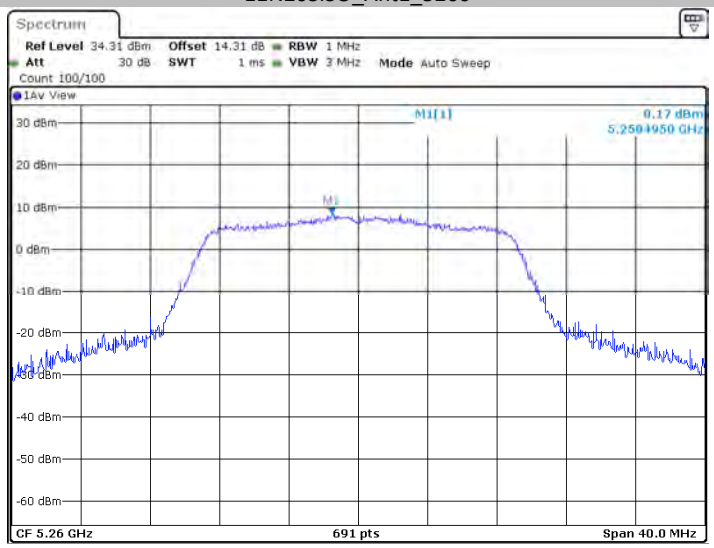

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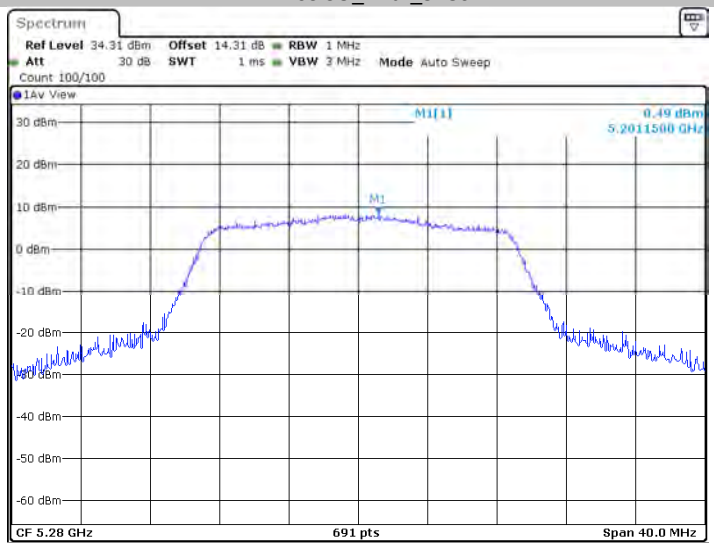

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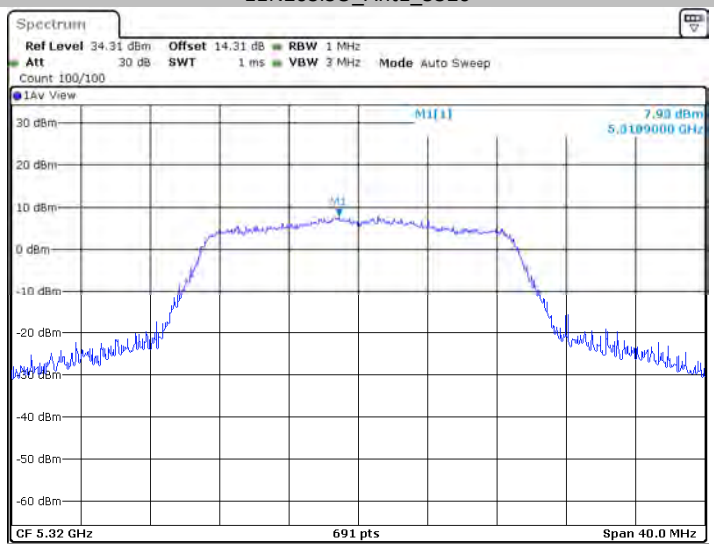

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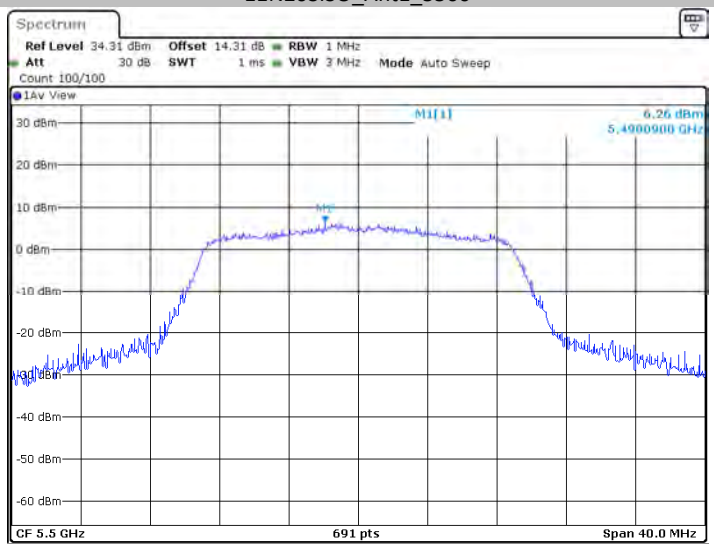

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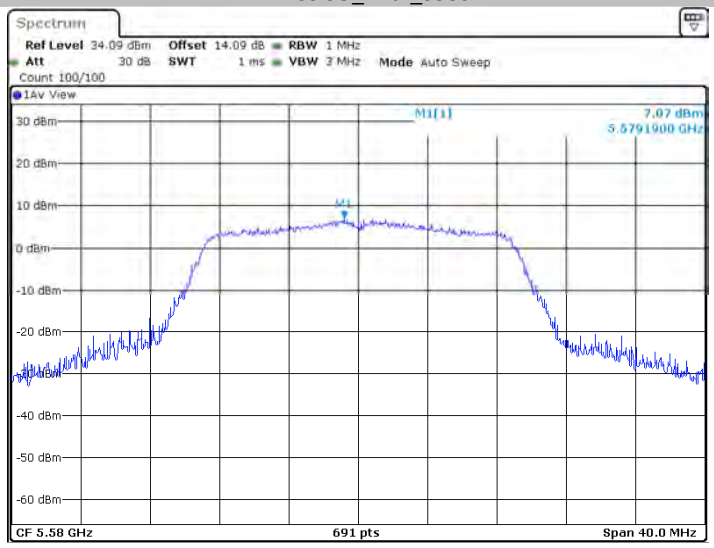

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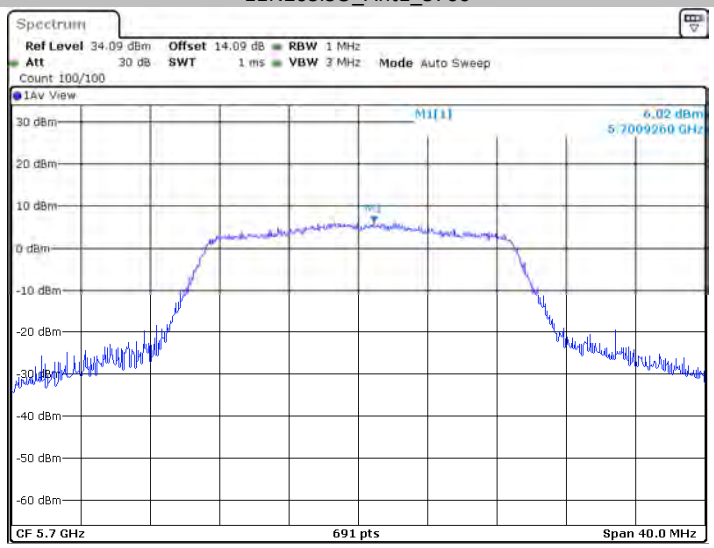

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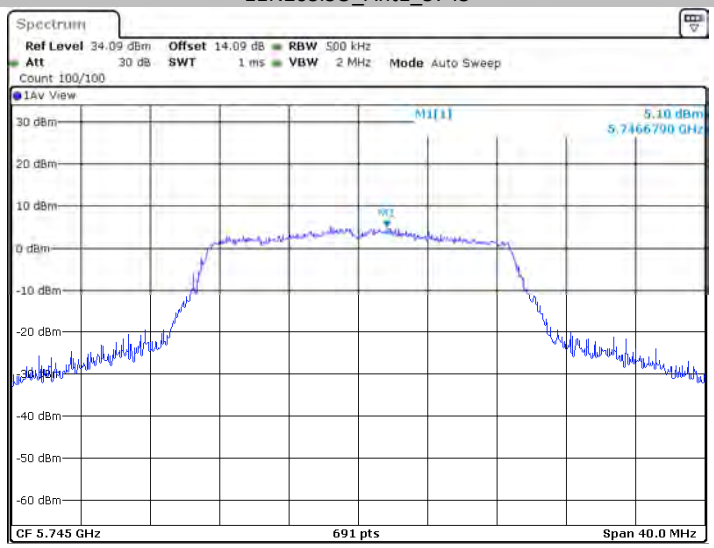

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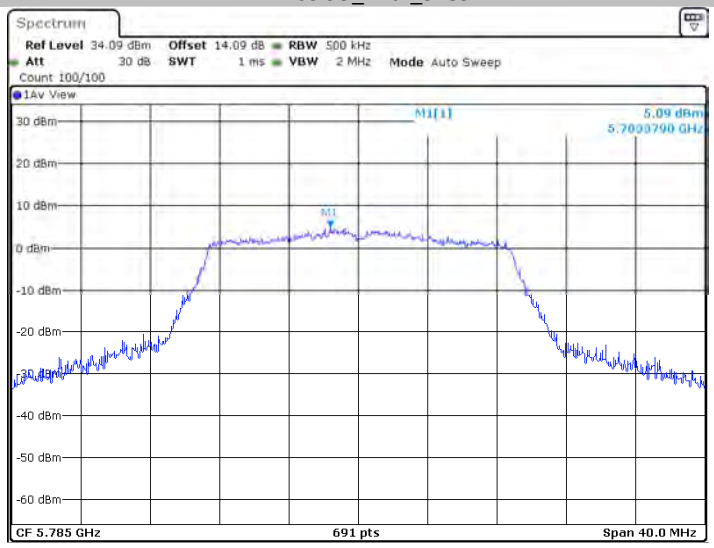

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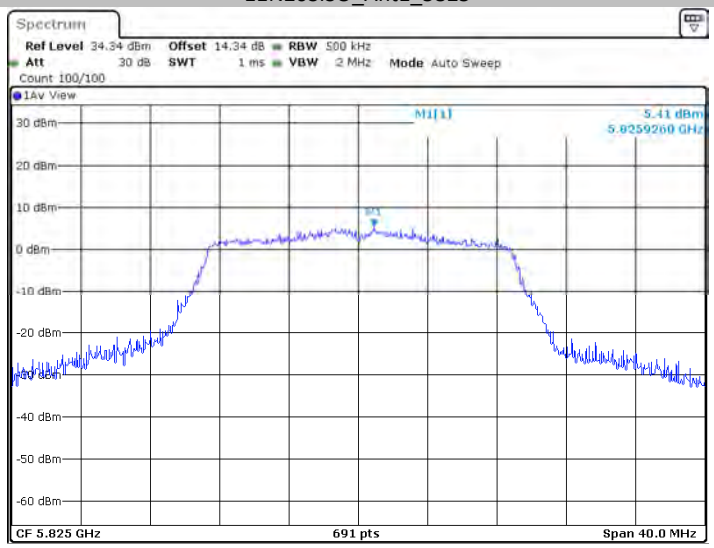

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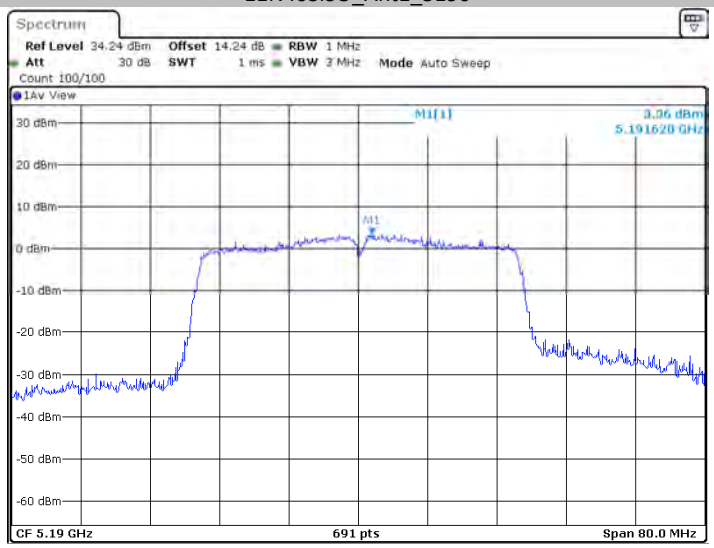

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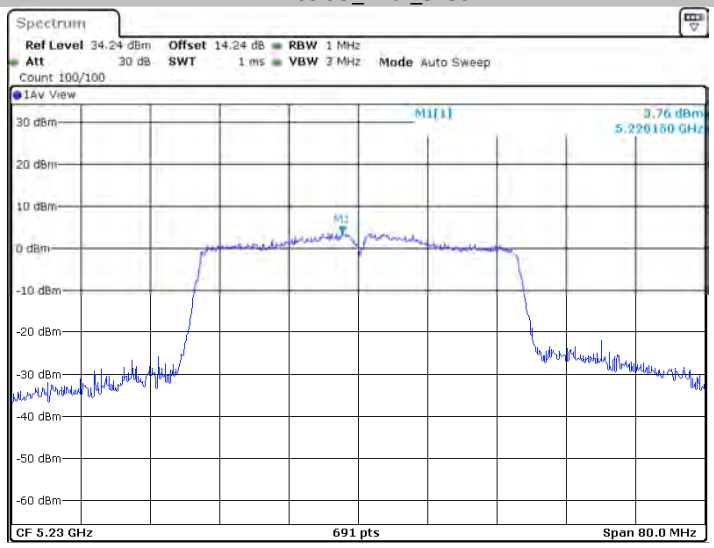

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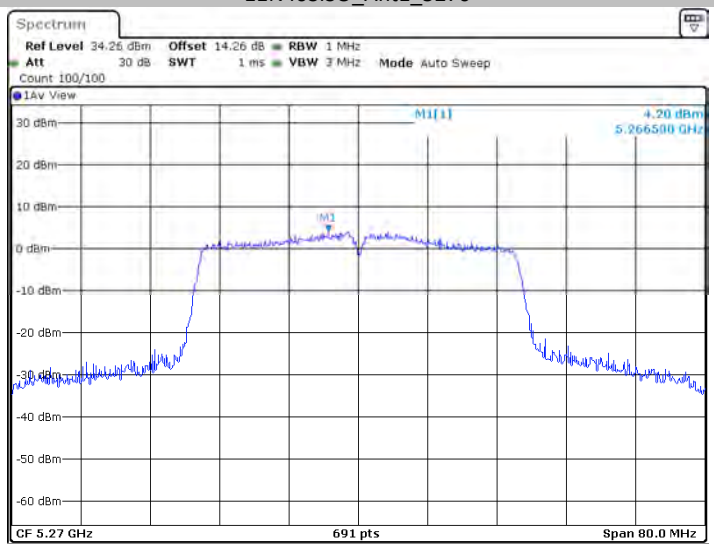

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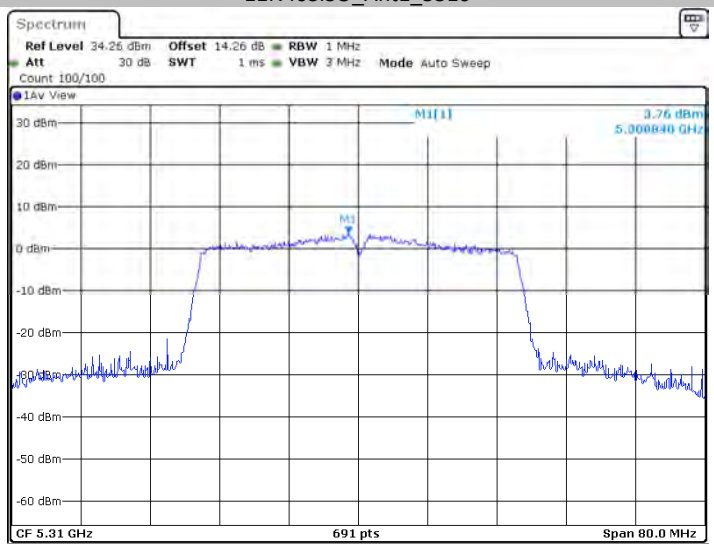

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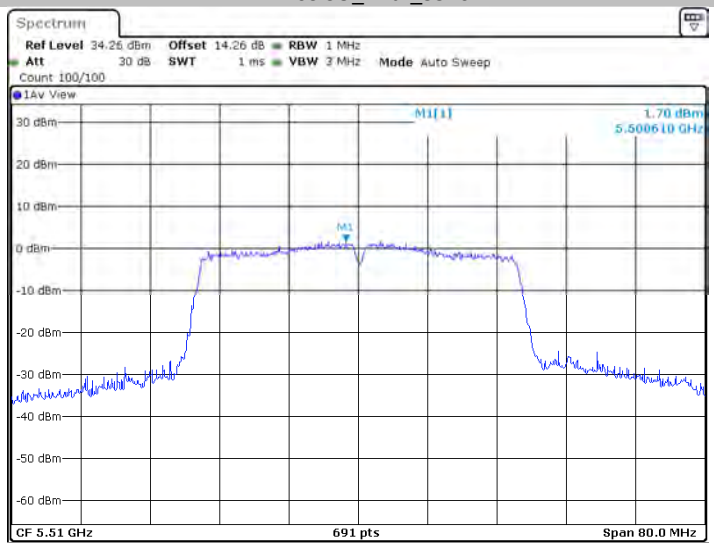

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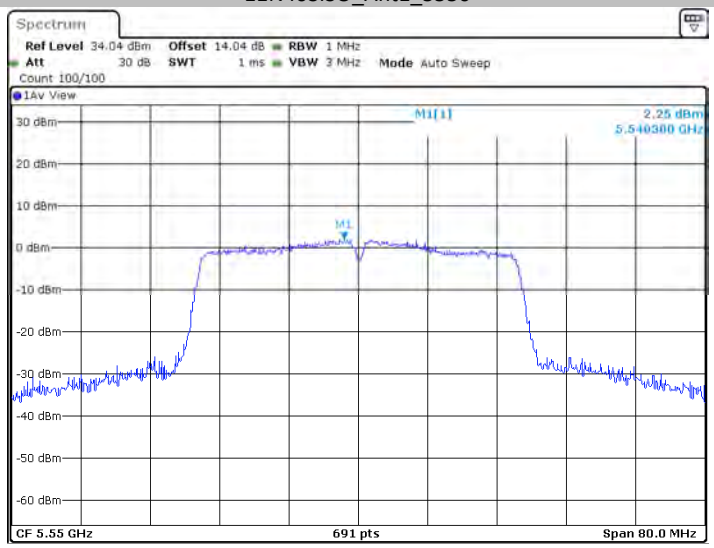

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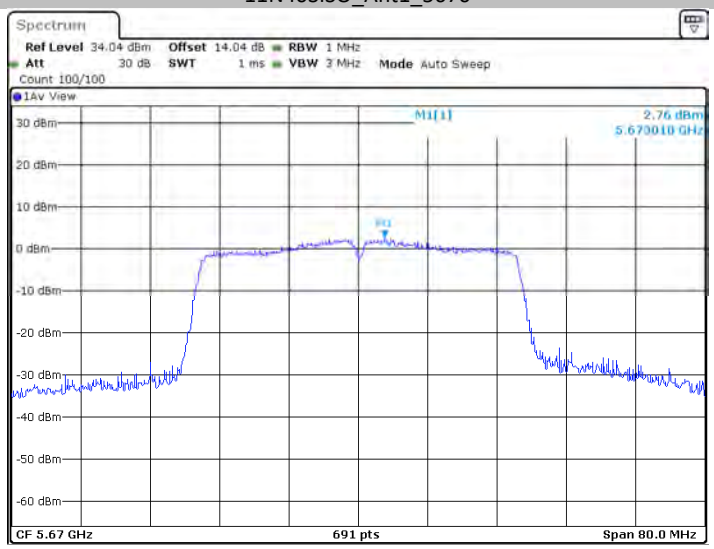

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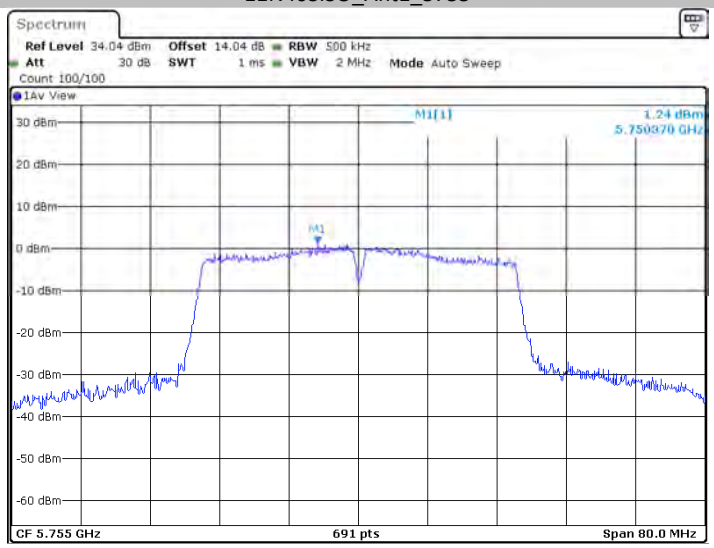

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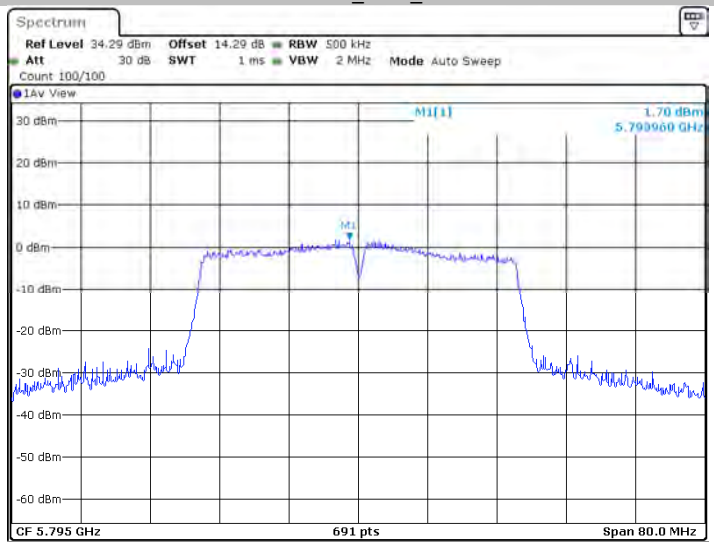

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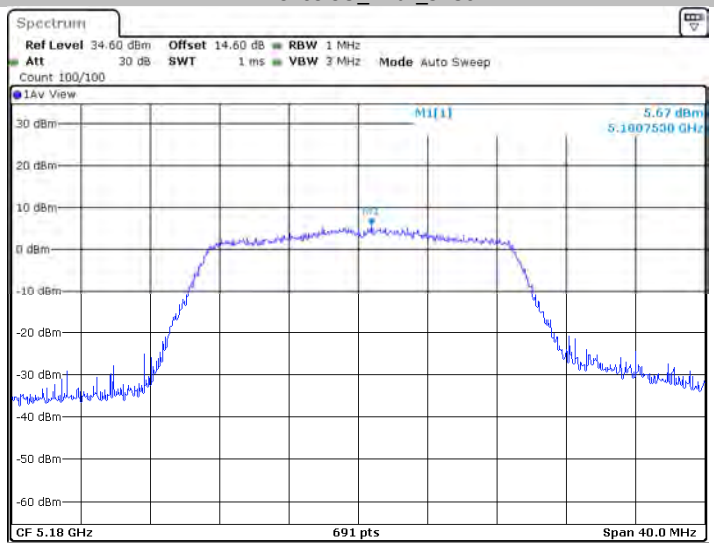

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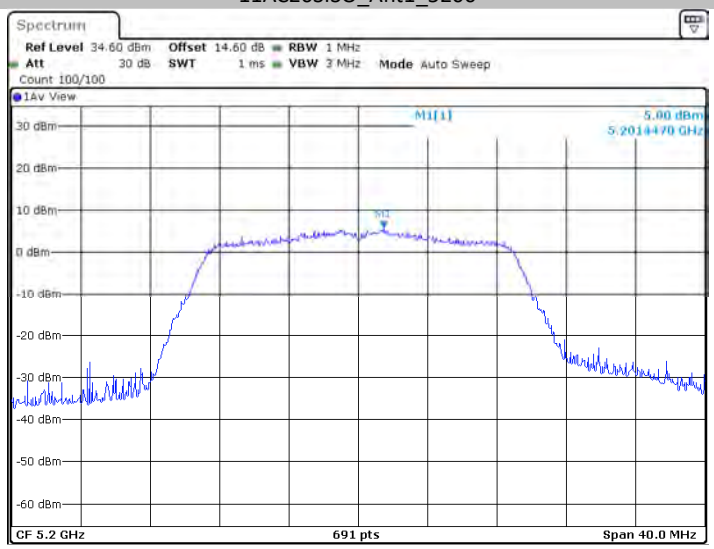

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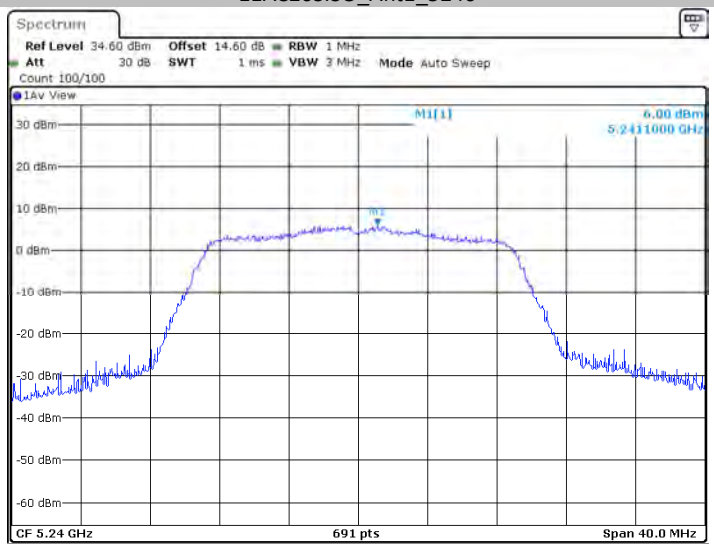

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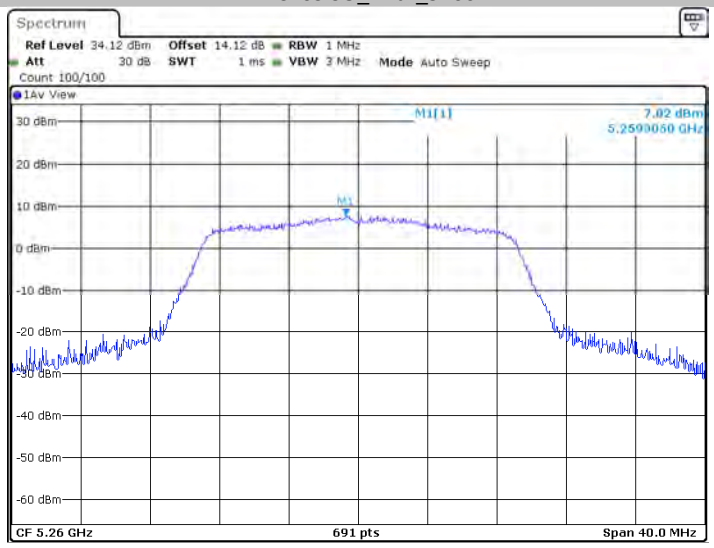

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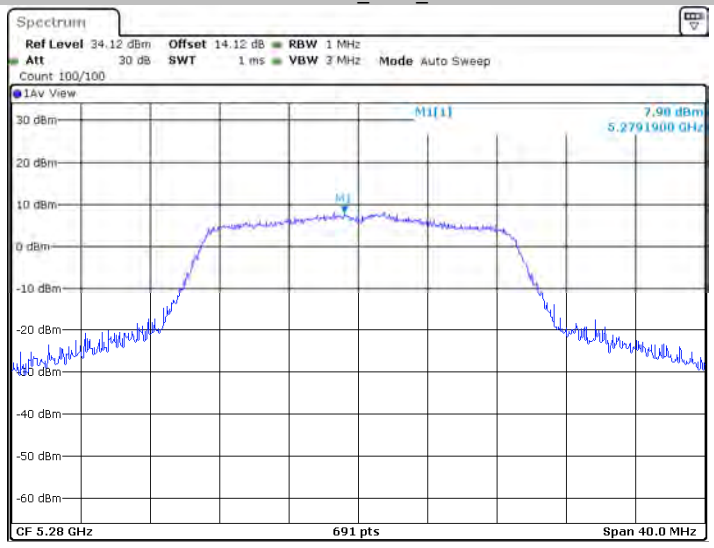

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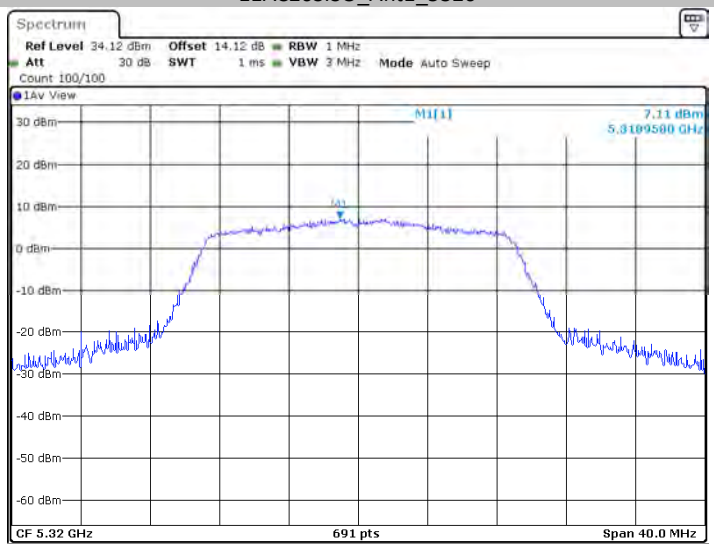

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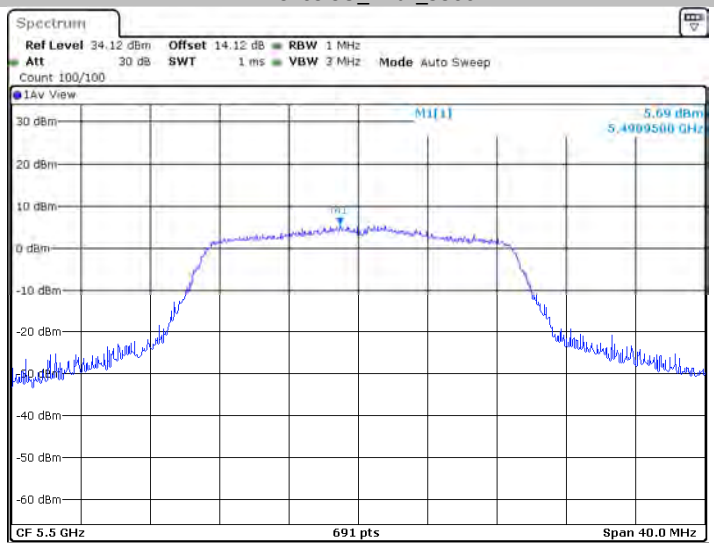

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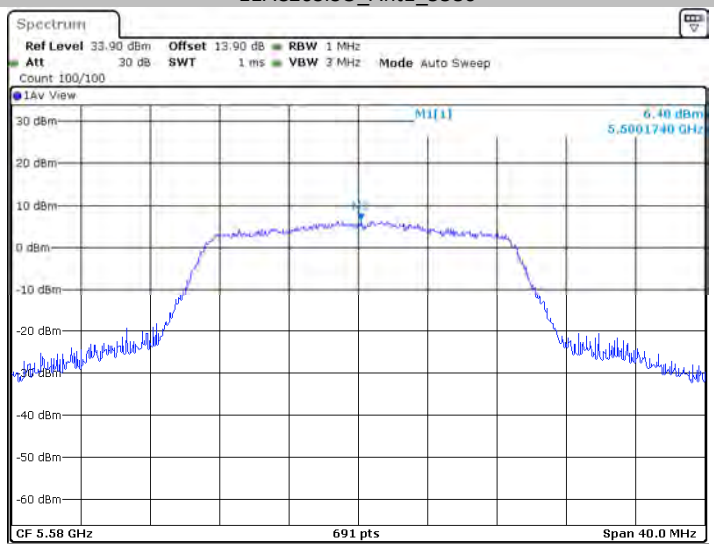

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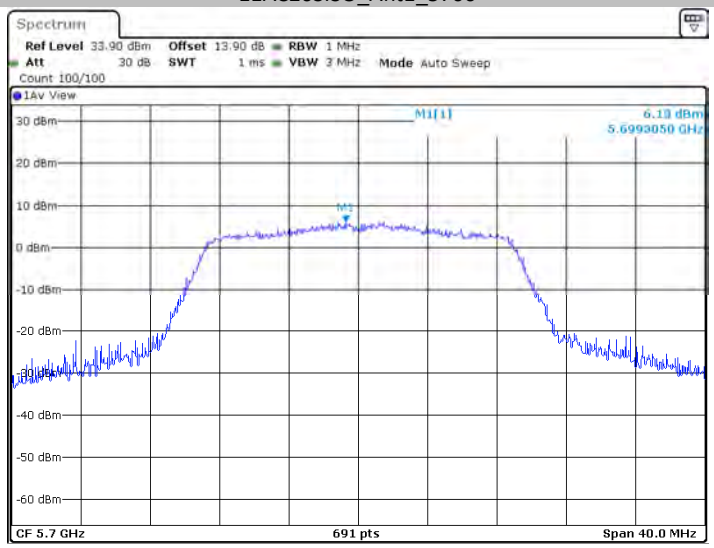

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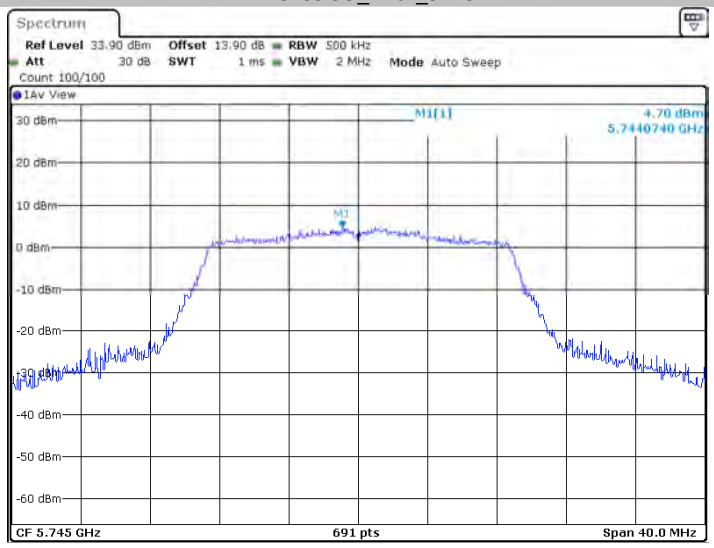

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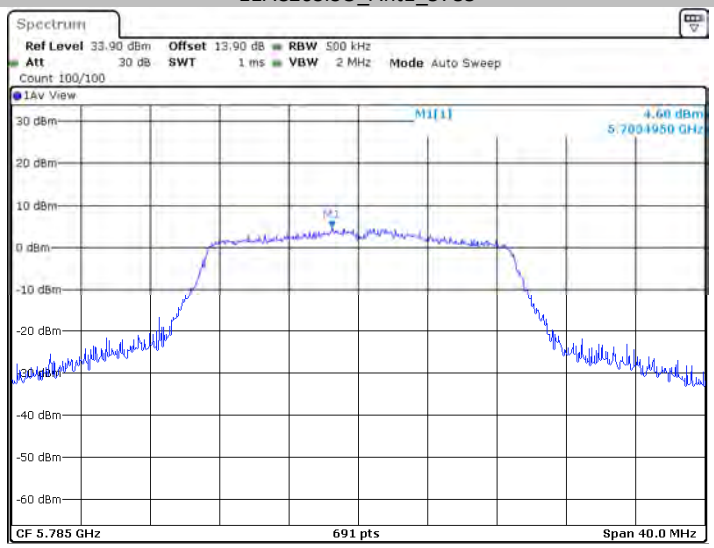

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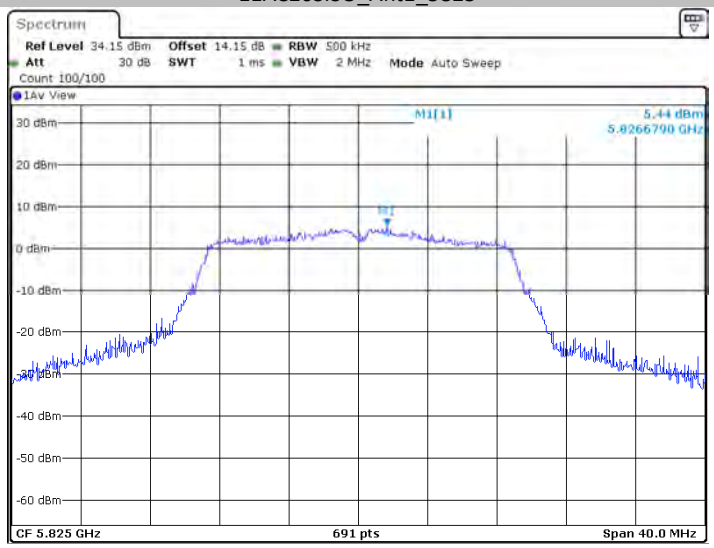

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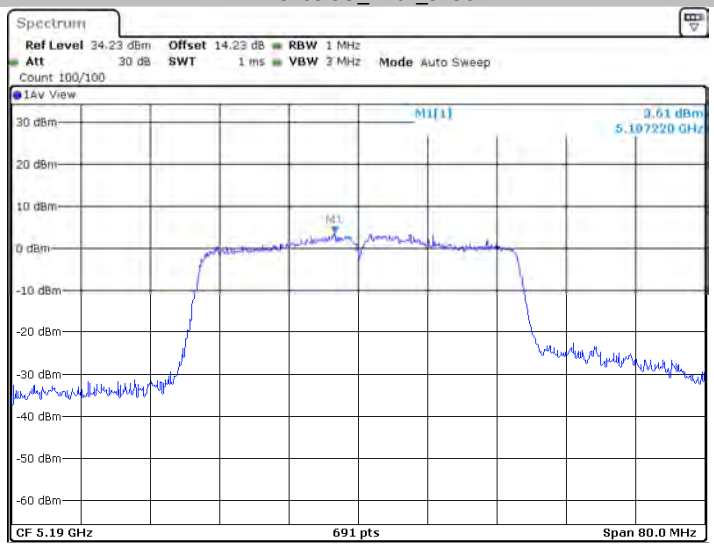

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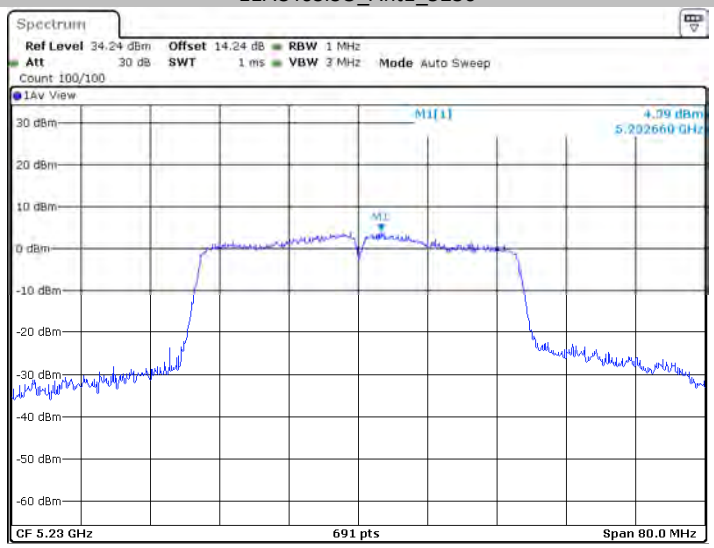

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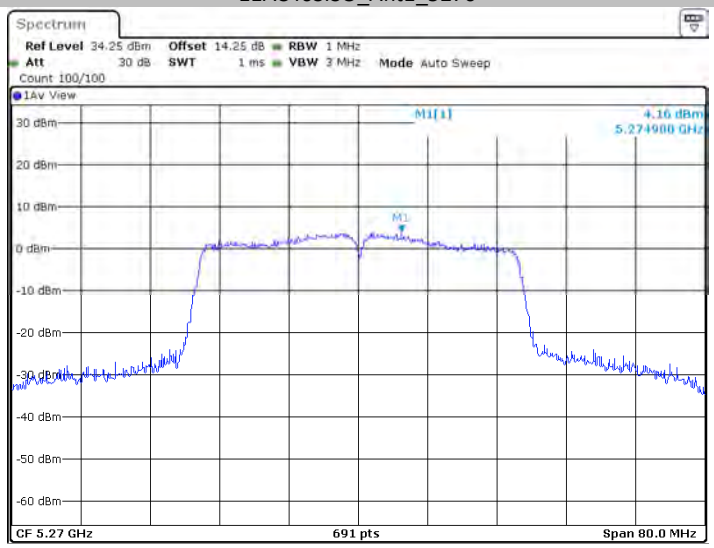

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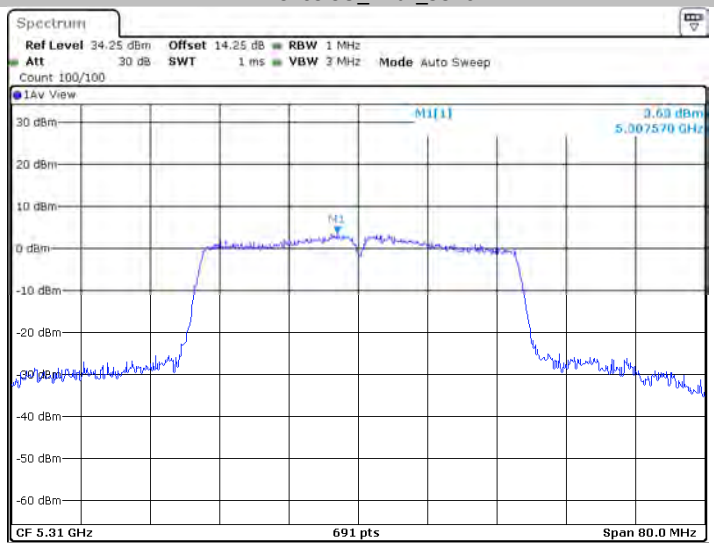

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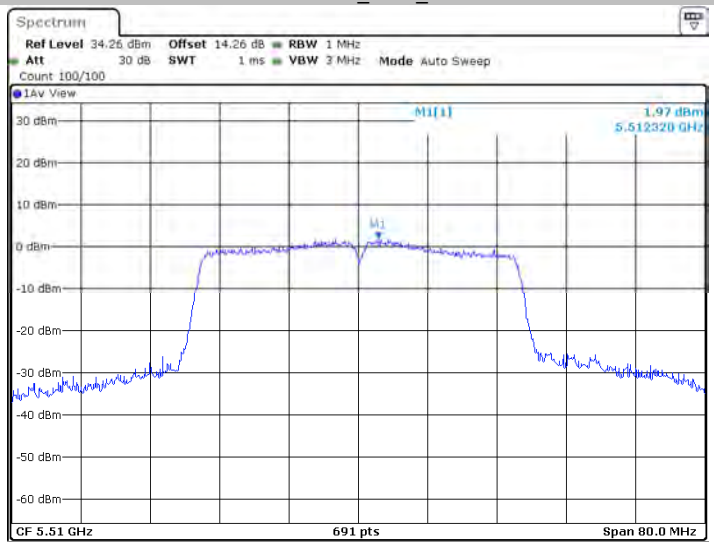

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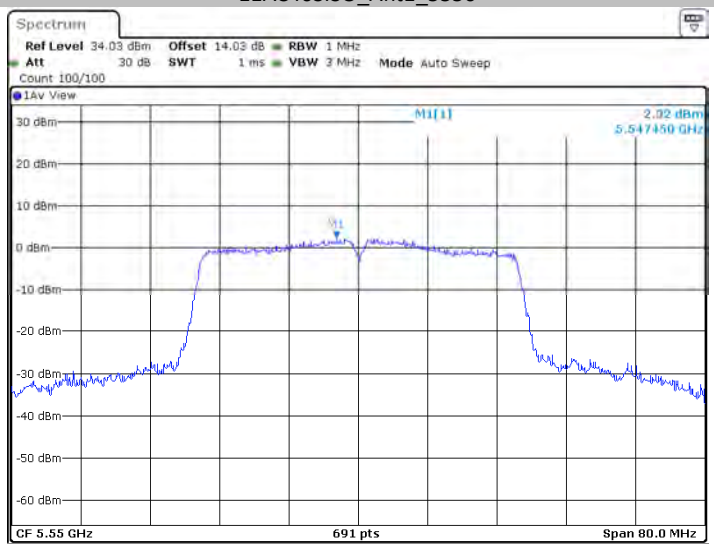

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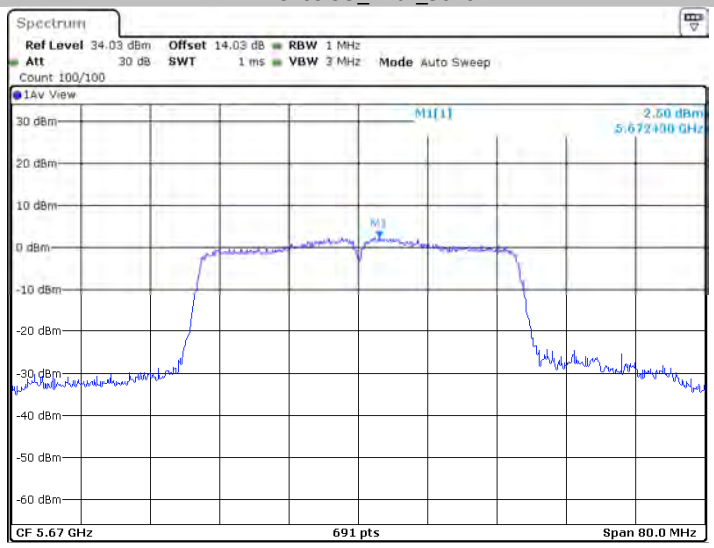

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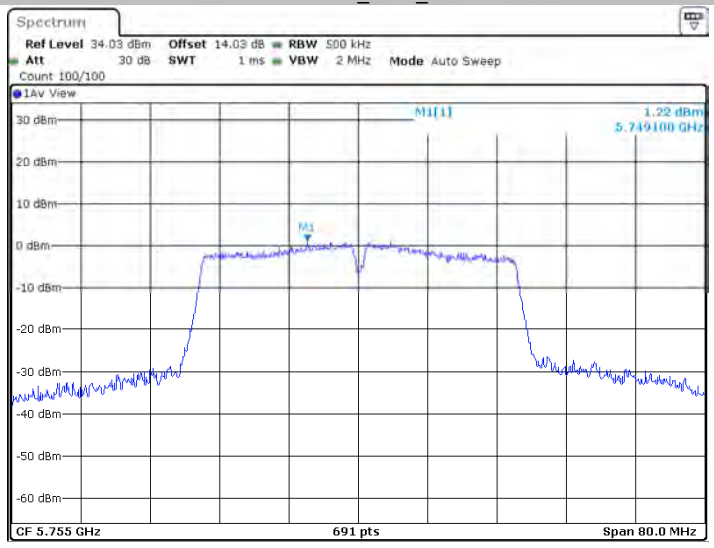

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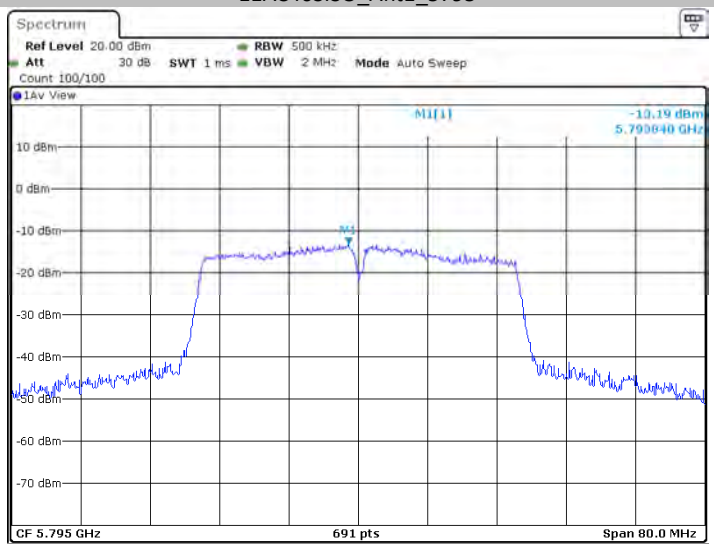

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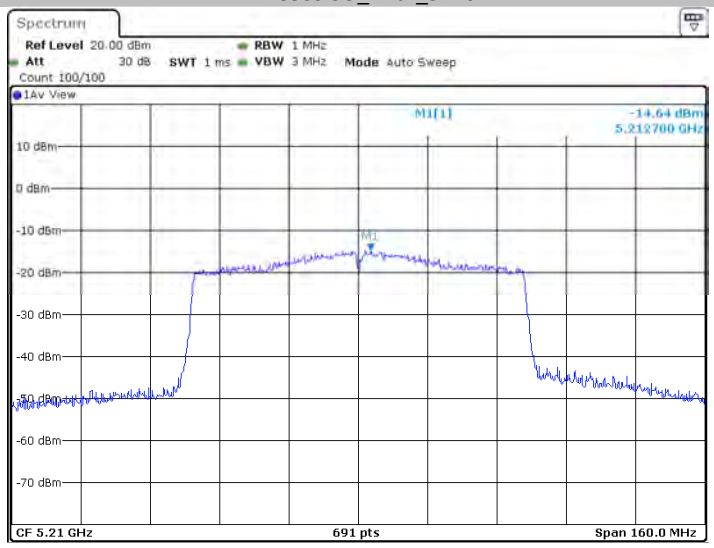

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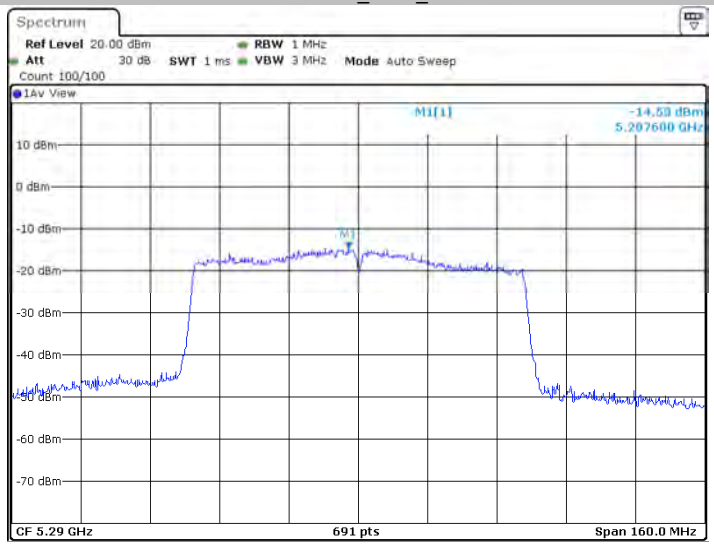

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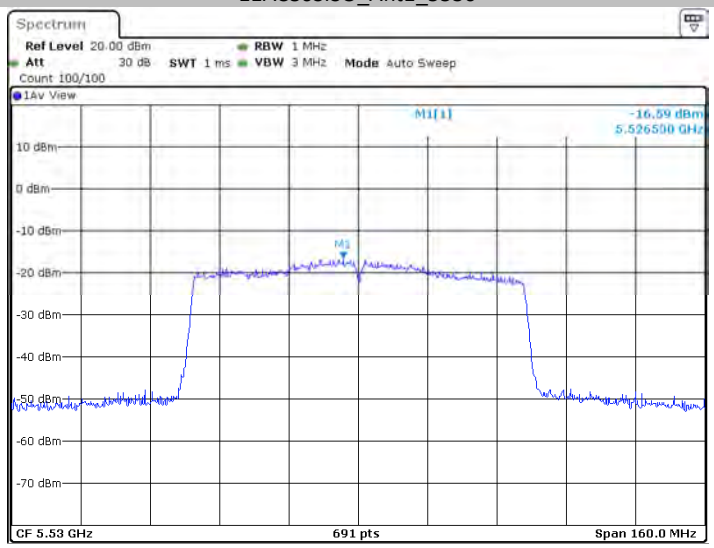

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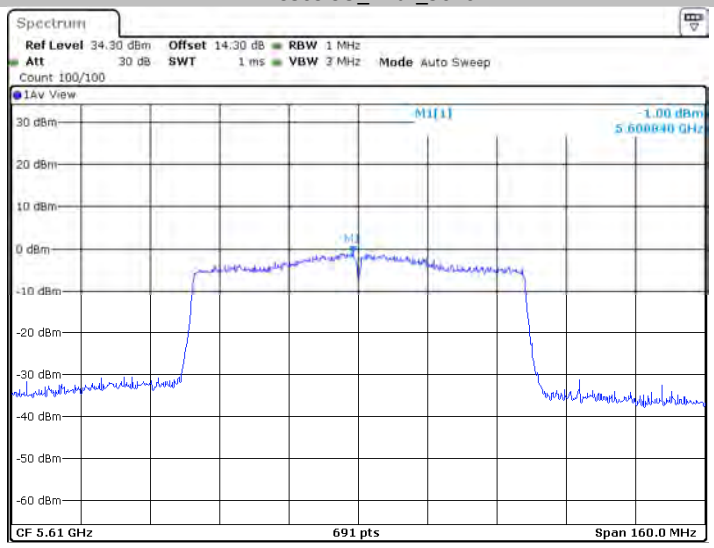

Date: 6.DEC.2019 19:18:04

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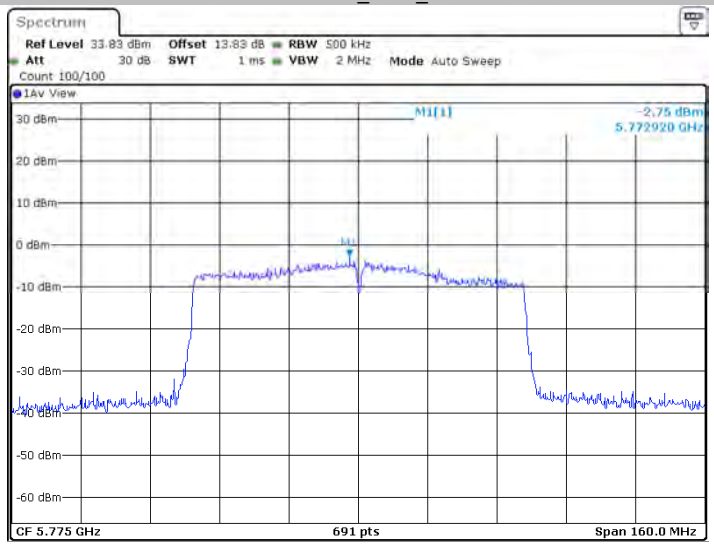


Date: 6.DEC.2019 19:42:16

5. Minimum 6 dB RF Bandwidth (FCC 15.407)

5.1 Operating environment

Temperature:	25	℃
Relative Humidity:	50	%
Atmospheric Pressure:	1011	hPa

5.2 Test setup & procedure

The Minimum 6 dB RF Bandwidth per 789033 D02 was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set at 100KHz, and set the video bandwidth (VBW) ≥ 3 x RBW. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

For 26dB down Emission Bandwidth

The 26dB down Emission Bandwidth per 789033 D02 was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set RBW = approximately 1% of the emission bandwidth. Set the VBW > RBW, Detector = Peak, Trace mode = max hold (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%).

For 99% Occupied Bandwidth

The 99% Occupied Bandwidth per 789033 D02 was measured from the antenna port of the EUT using a 50 ohm spectrum analyzer with the resolution bandwidth set center frequency to the nominal EUT channel center frequency, set span = 1.5 times to 5.0 times the OBW, set RBW = 1 % to 5 % of the OBW, set VBW ≥ 3x RBW, The 99% occupied bandwidth was determined from where the channel output spectrum intersected the display line.

5.3 Limit

Operating Frequency (MHz)	Minimum 6 dB RF Bandwidth Limit
5150~5250	N/A
5250~5350	N/A
5470~5725	N/A
5725~ 5850	≥500KHz

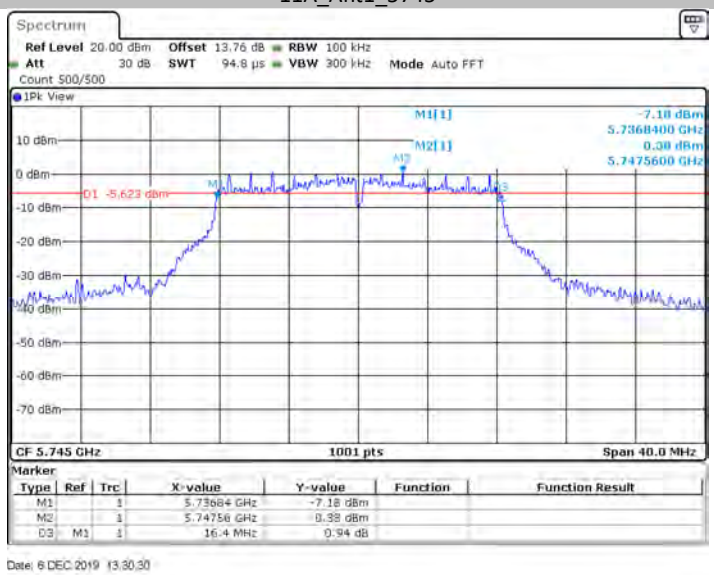
Note: 99% Occupied Bandwidth within the U-NII-1 band and 26dB Emission Bandwidth for reference. The plots are attached as below: "26dB OBW" and "99% OBW"

5.4 Measured data of 6dB down Emission Bandwidth test results

Test Mode	Channel	6dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	5745	16.400	5736.840	5753.240	0.5	PASS
	5785	16.400	5776.840	5793.240	0.5	PASS
	5825	16.360	5816.880	5833.240	0.5	PASS
11N20	5745	17.360	5736.280	5753.640	0.5	PASS
	5785	17.360	5776.280	5793.640	0.5	PASS
	5825	17.640	5816.280	5833.920	0.5	PASS
11N40	5755	36.240	5736.840	5773.080	0.5	PASS
	5795	36.240	5776.840	5813.080	0.5	PASS
11AC20	5745	17.640	5736.240	5753.880	0.5	PASS
	5785	17.400	5776.240	5793.640	0.5	PASS
	5825	16.960	5816.280	5833.240	0.5	PASS
11AC40	5755	35.920	5736.840	5772.760	0.5	PASS
	5795	36.080	5776.840	5812.920	0.5	PASS
11AC80	5775	75.520	5737.240	5812.760	0.5	PASS

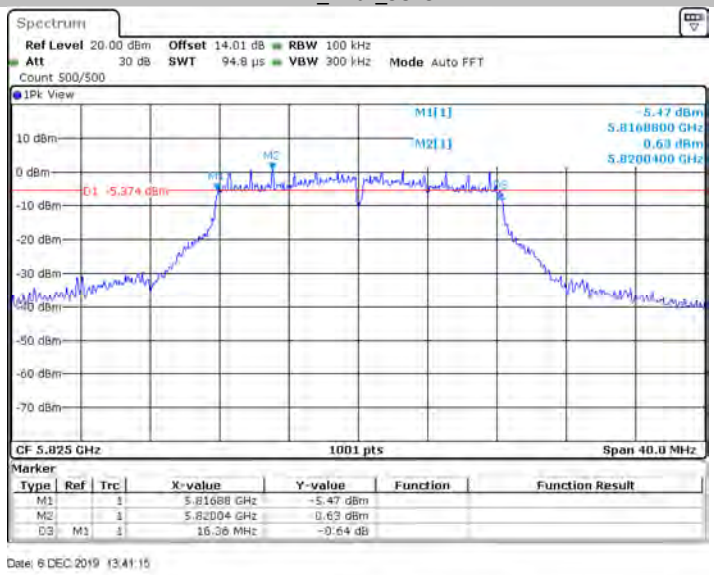
The test plots are attached as below.

11A_Ant1_5745

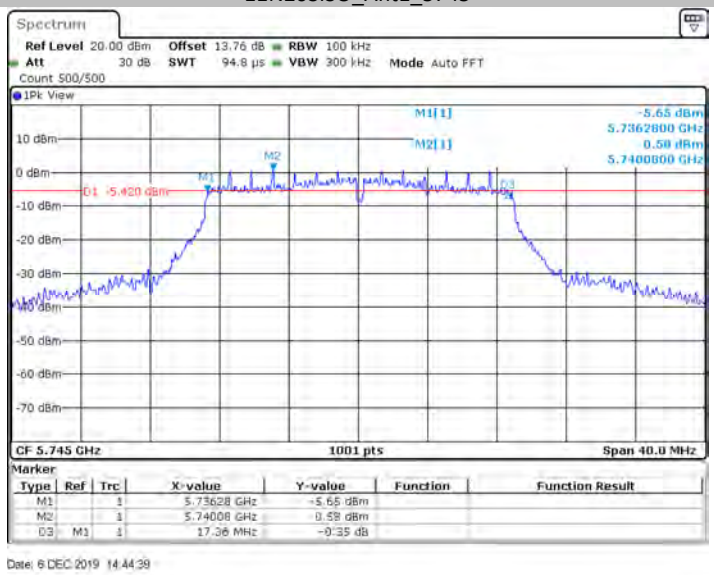


11A_Ant1_5785

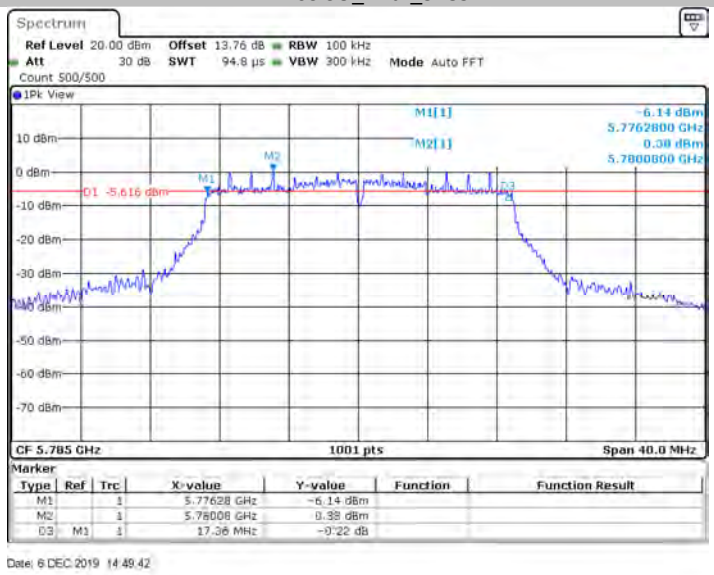
11A_Ant1_5825



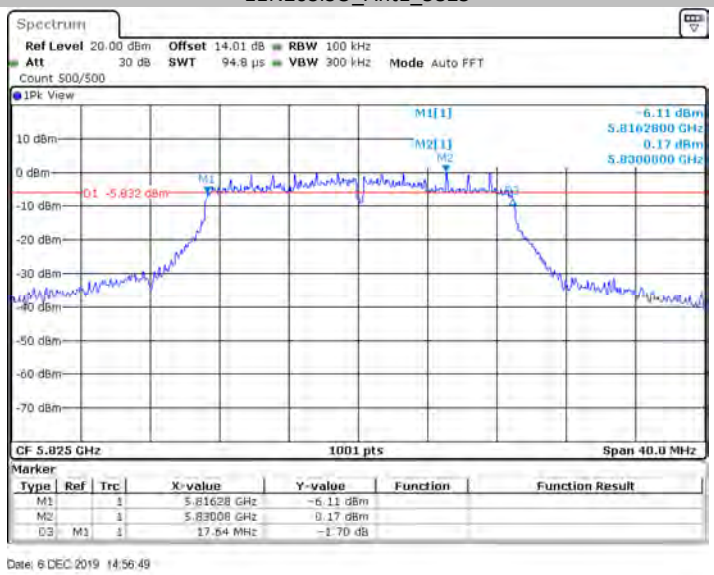
11N20SISO_Ant1_5745



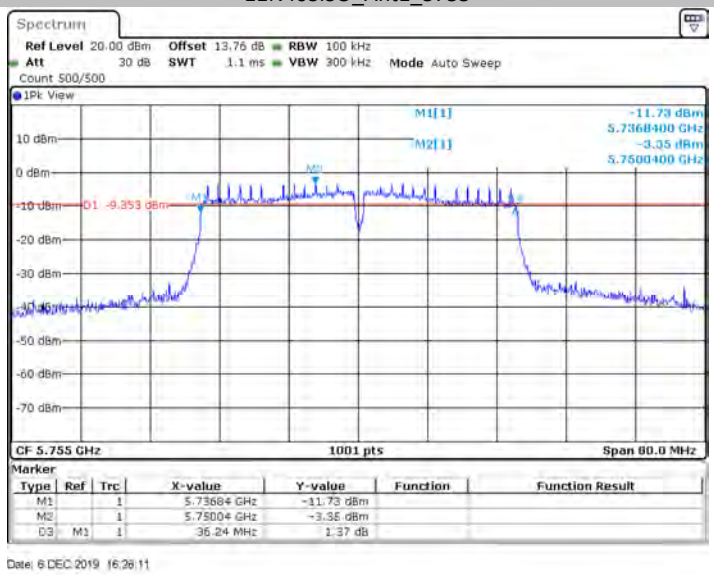
11N20SISO_Ant1_5785



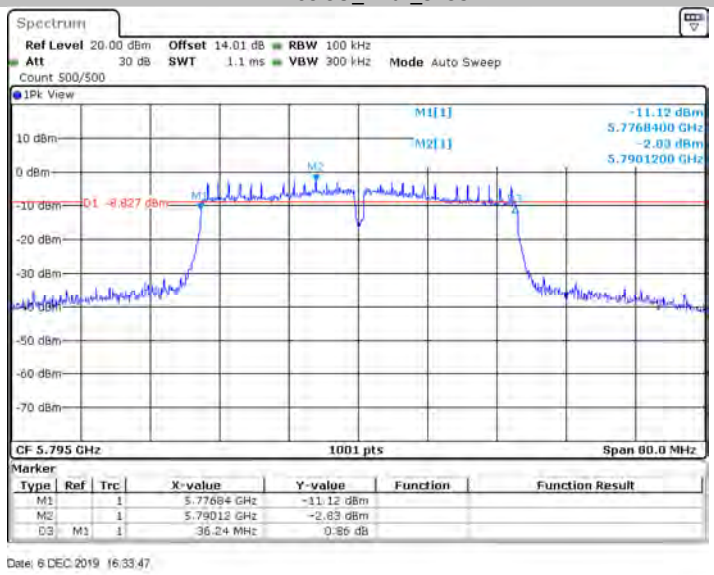
11N20SISO_Ant1_5825



11N40SISO_Ant1_5755



11N40SISO_Ant1_5795



11AC20SISO_Ant1_5745

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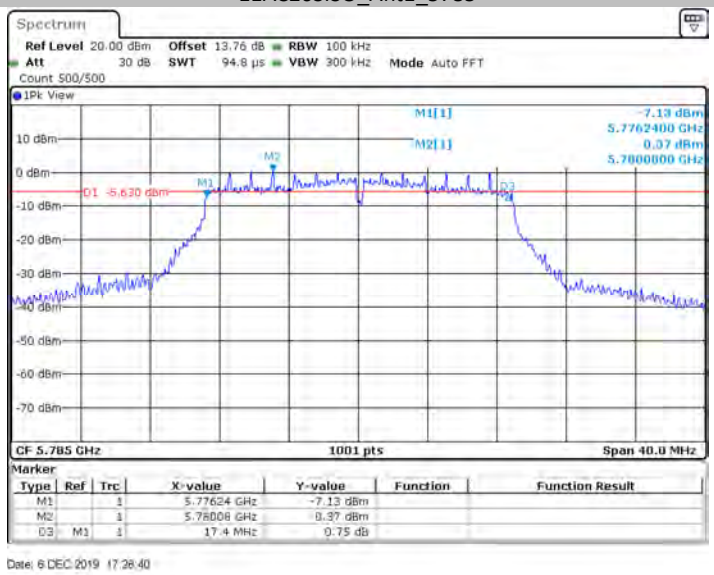

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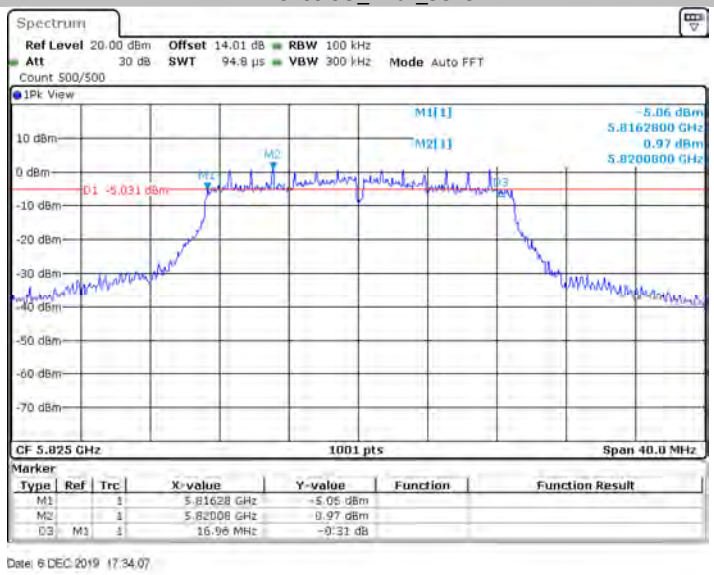

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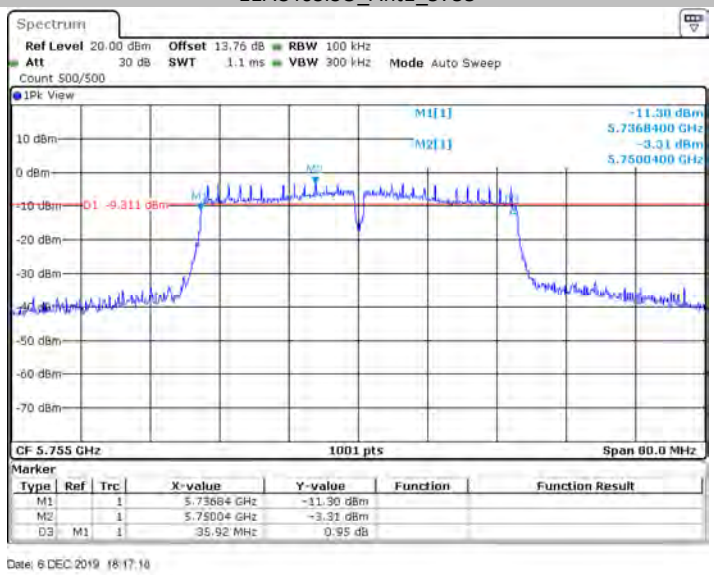

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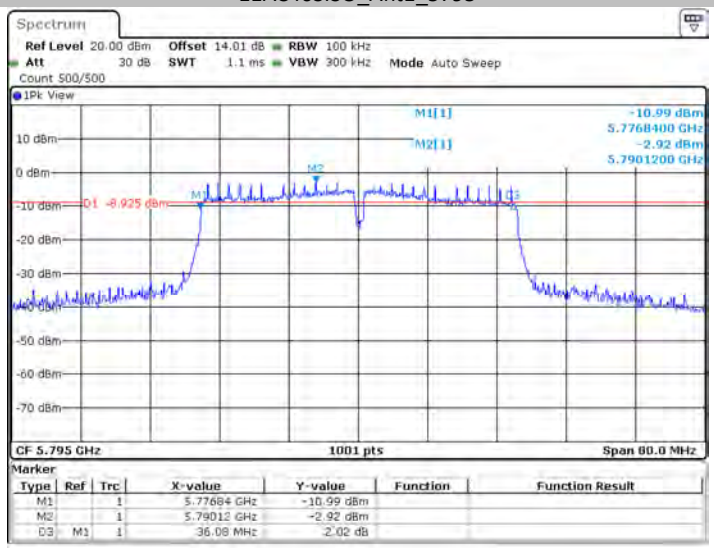
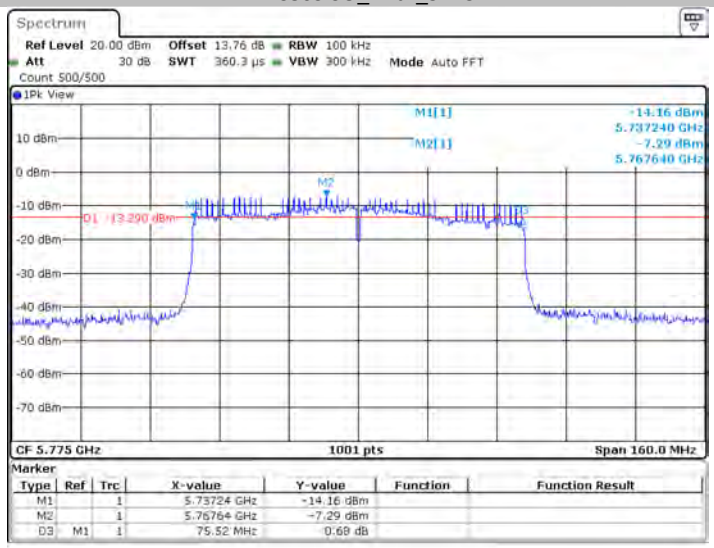


Date: 6.DEC.2019 18:22:29

11AC80SISO_Ant1_5775



Date: 6.DEC.2019 19:41:33

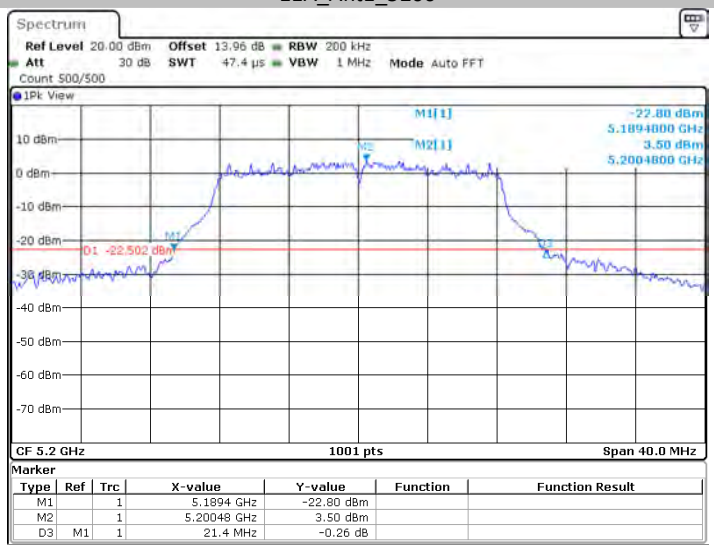
26dB OBW

Test Mode	Channel	26dB EBW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11A	5180	21.240	5169.440	5190.680	---	PASS
	5200	21.400	5189.400	5210.800	---	PASS
	5240	21.440	5229.360	5250.800	---	PASS
	5260	21.240	5249.360	5270.600	---	PASS
	5280	21.160	5269.400	5290.560	---	PASS
	5320	21.280	5309.360	5330.640	---	PASS
	5500	21.160	5489.400	5510.560	---	PASS
	5580	21.200	5569.400	5590.600	---	PASS
	5700	21.360	5689.360	5710.720	---	PASS
	5745	21.160	5734.400	5755.560	---	PASS
	5785	21.160	5774.320	5795.480	---	PASS
	5825	21.240	5814.320	5835.560	---	PASS
11N20	5180	23.000	5169.400	5192.400	---	PASS
	5200	21.520	5189.320	5210.840	---	PASS
	5240	21.880	5229.280	5251.160	---	PASS
	5260	21.920	5249.280	5271.200	---	PASS
	5280	21.440	5269.320	5290.760	---	PASS
	5320	21.480	5309.400	5330.880	---	PASS
	5500	21.440	5489.360	5510.800	---	PASS
	5580	21.520	5569.360	5590.880	---	PASS
	5700	21.680	5689.400	5711.080	---	PASS
	5745	21.680	5734.360	5756.040	---	PASS
	5785	21.600	5774.320	5795.920	---	PASS
	5825	21.920	5813.920	5835.840	---	PASS
11N40	5190	47.440	5170.000	5217.440	---	PASS
	5230	45.520	5210.000	5255.520	---	PASS
	5270	48.800	5248.960	5297.760	---	PASS
	5310	41.840	5289.680	5331.520	---	PASS
	5510	41.760	5489.680	5531.440	---	PASS
	5550	42.560	5527.920	5570.480	---	PASS
	5670	41.680	5649.920	5691.600	---	PASS
	5755	49.360	5732.840	5782.200	---	PASS
	5795	44.720	5770.520	5815.240	---	PASS
11AC20	5180	21.600	5169.400	5191.000	---	PASS
	5200	21.480	5189.320	5210.800	---	PASS
	5240	21.720	5229.280	5251.000	---	PASS
	5260	21.600	5249.200	5270.800	---	PASS
	5280	21.600	5269.240	5290.840	---	PASS
	5320	21.960	5308.840	5330.800	---	PASS
	5500	21.600	5489.280	5510.880	---	PASS
	5580	21.720	5569.080	5590.800	---	PASS
	5700	21.480	5689.320	5710.800	---	PASS
	5745	21.800	5734.200	5756.000	---	PASS
	5785	23.080	5773.280	5796.360	---	PASS
	5825	22.320	5813.720	5836.040	---	PASS
11AC40	5190	48.880	5169.920	5218.800	---	PASS
	5230	41.920	5210.000	5251.920	---	PASS
	5270	41.200	5249.840	5291.040	---	PASS
	5310	41.280	5289.760	5331.040	---	PASS
	5510	42.720	5490.000	5532.720	---	PASS
	5550	41.120	5529.920	5571.040	---	PASS
	5670	41.840	5649.920	5691.760	---	PASS
	5755	42.160	5734.760	5776.920	---	PASS
	5795	40.640	5774.680	5815.320	---	PASS
11AC80	5210	84.160	5169.200	5253.360	---	PASS
	5290	82.080	5249.040	5331.120	---	PASS
	5530	81.760	5489.200	5570.960	---	PASS
	5610	83.360	5568.880	5652.240	---	PASS
	5775	88.000	5733.560	5821.560	---	PASS

11A_Ant1_5180

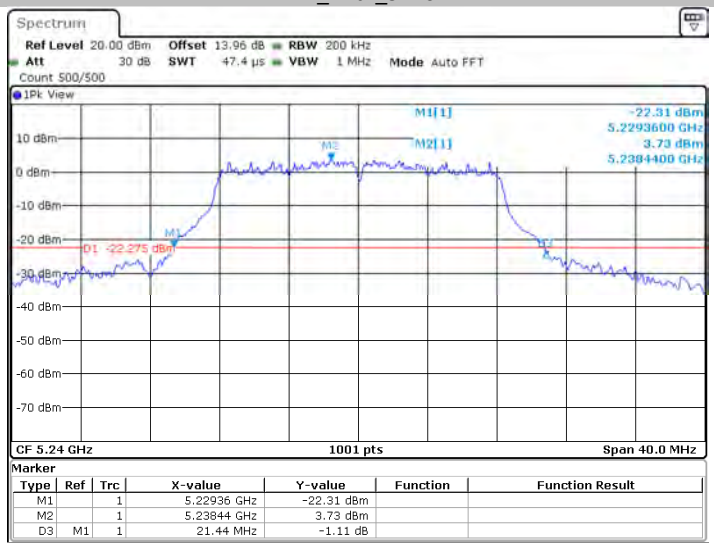
Date: 6.DEC.2019 11:16:01

11A_Ant1_5200



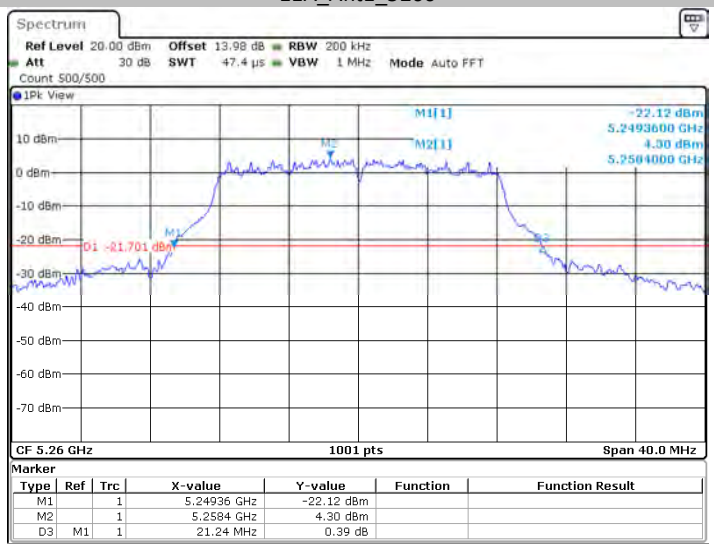
Date: 6.DEC.2019 11:23:09

11A_Ant1_5240



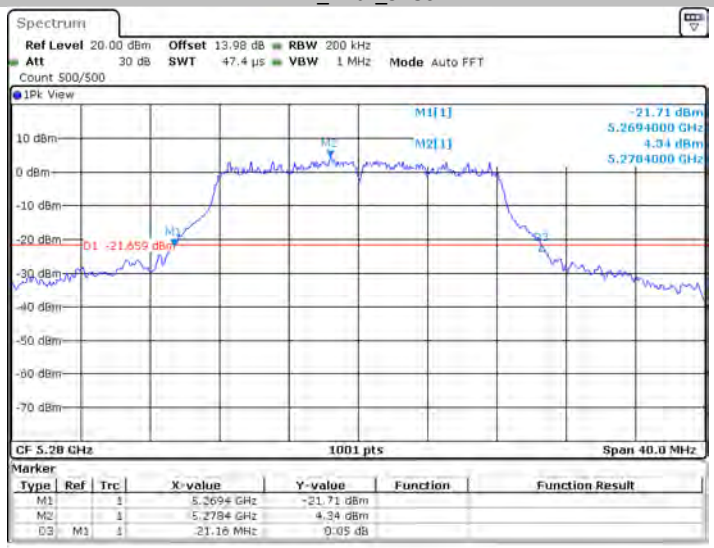
Date: 6.DEC.2019 11:28:03

11A_Ant1_5260



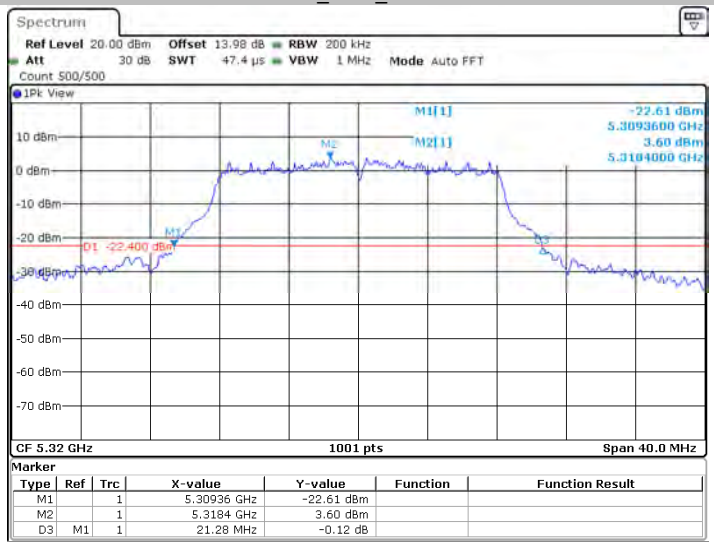
Date: 6.DEC.2019 11:33:19

11A_Ant1_5280



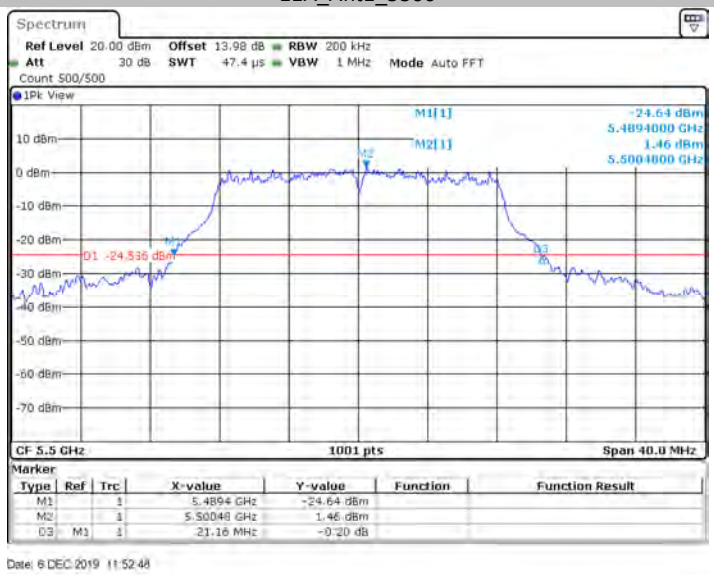
Date: 6.DEC.2019 11:38:43

11A_Ant1_5320



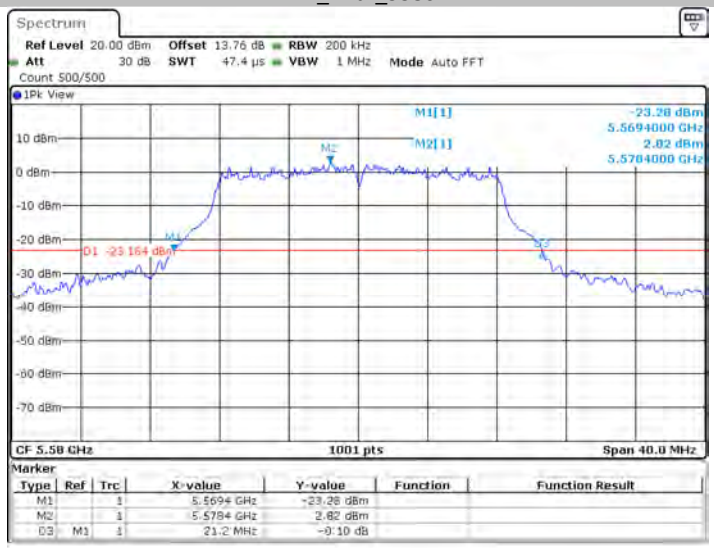
Date: 6.DEC.2019 11:43:32

11A_Ant1_5500



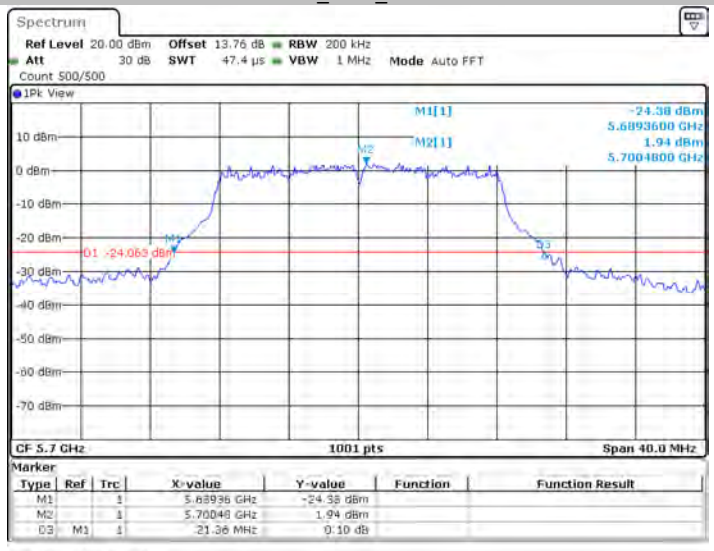
Date: 6.DEC.2019 11:52:48

11A_Ant1_5580



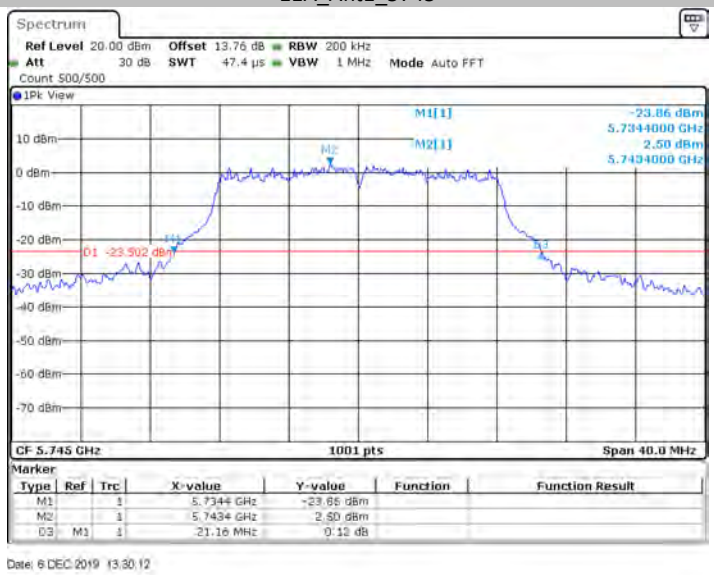
Date: 6.DEC.2019 11:57:24

11A_Ant1_5700

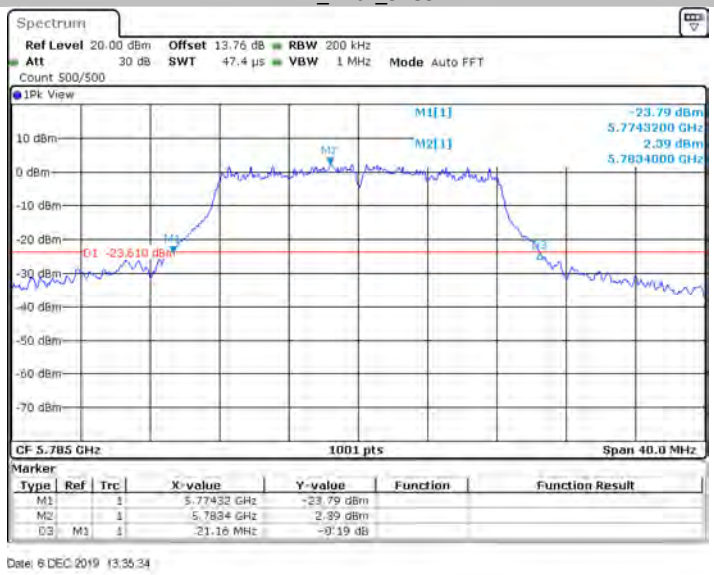


Date: 6.DEC.2019 13:19:35

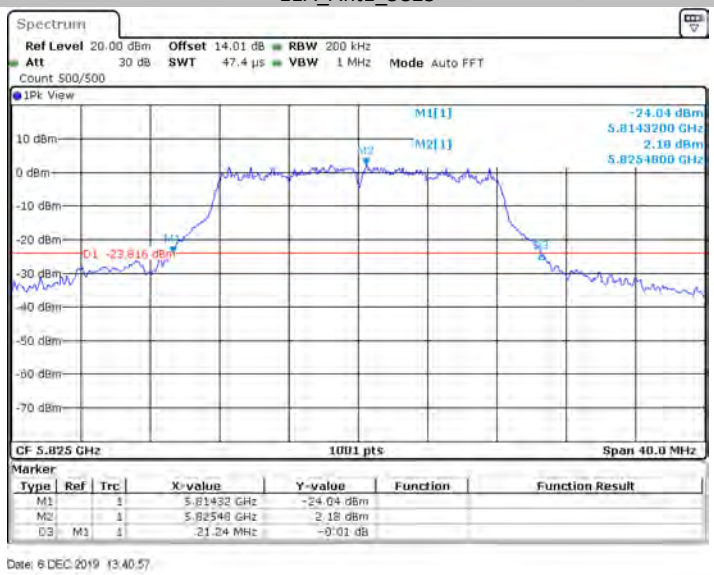
11A_Ant1_5745



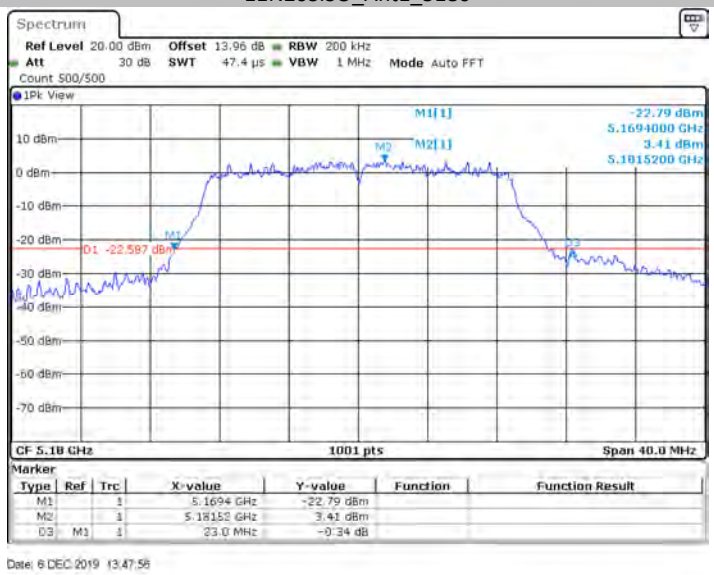
11A_Ant1_5785



11A_Ant1_5825



11N20SISO_Ant1_5180



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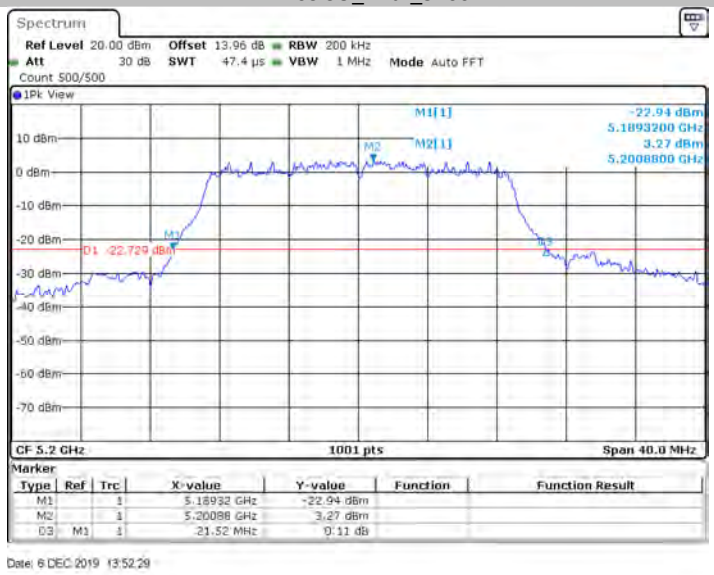

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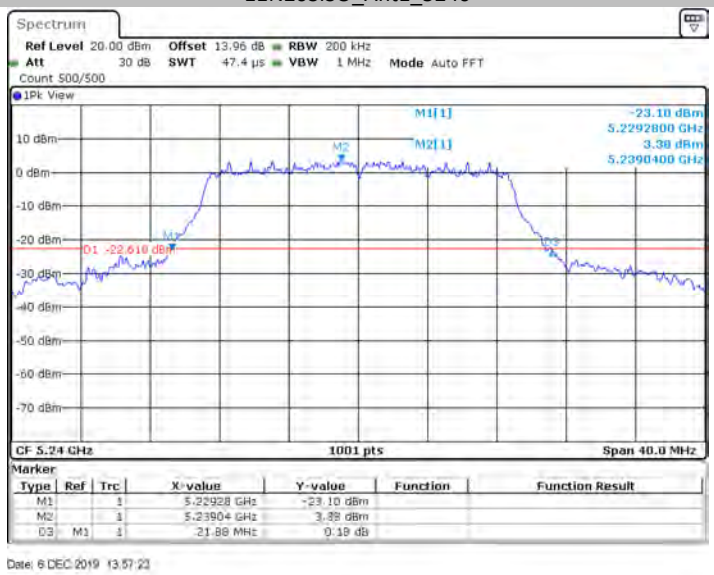
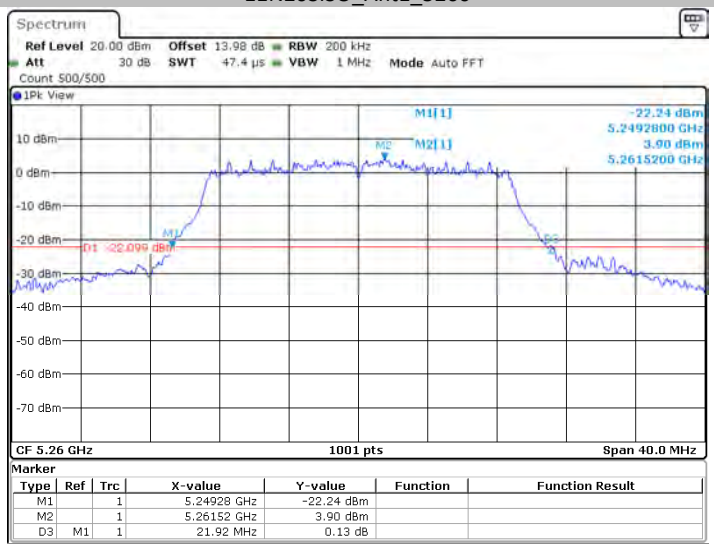


11N20SISO_Ant1_5260



Date: 6.DEC.2019 14:01:58

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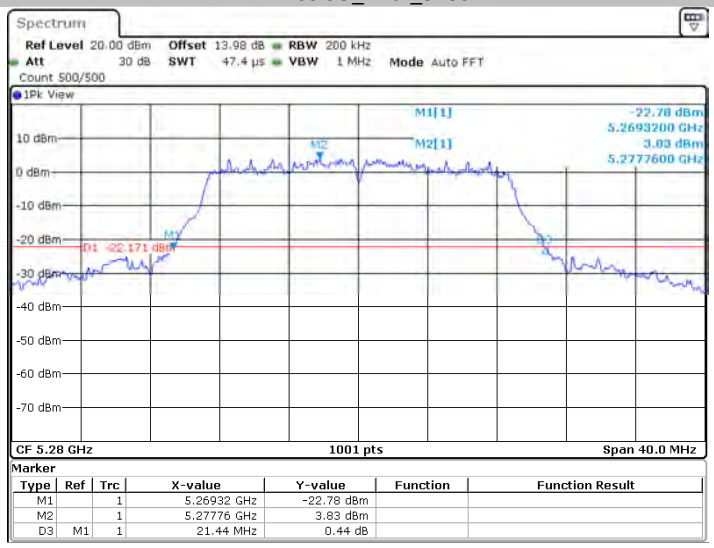

Date: 6.DEC.2019 14:06:37

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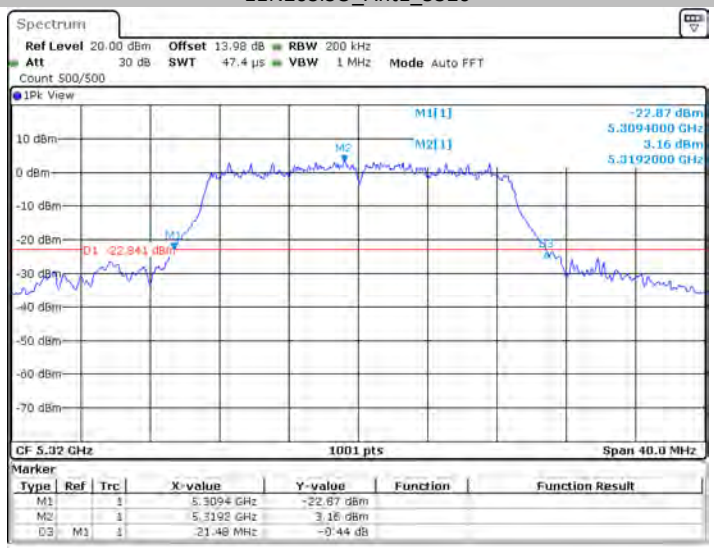
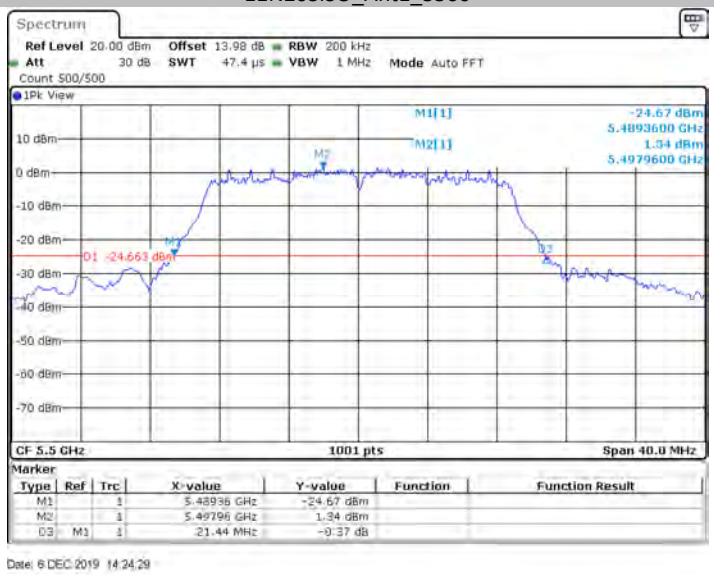


Date: 6.DEC.2019 14:13:00

11N20SISO_Ant1_5500



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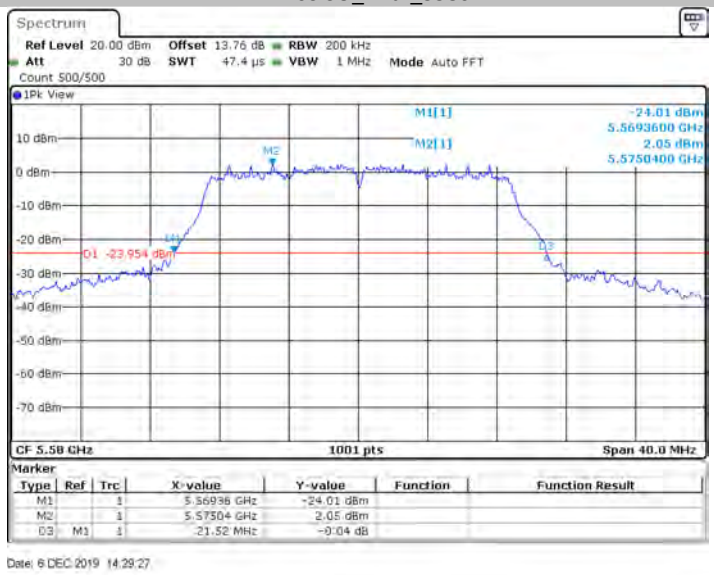

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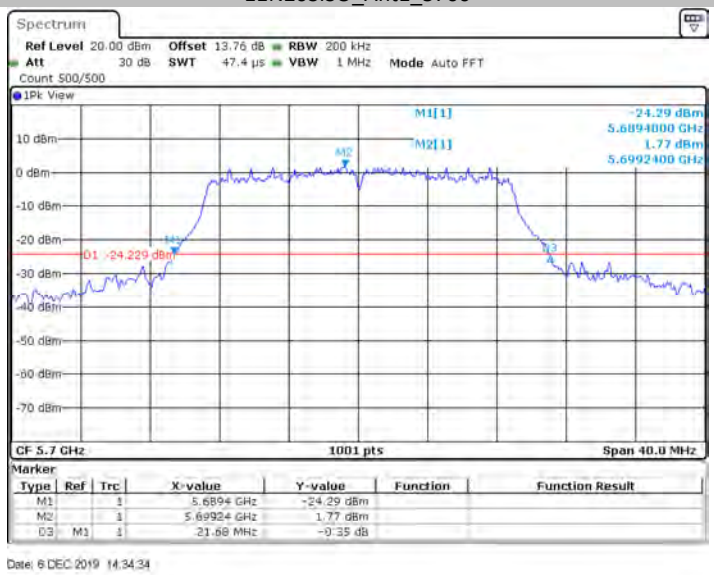

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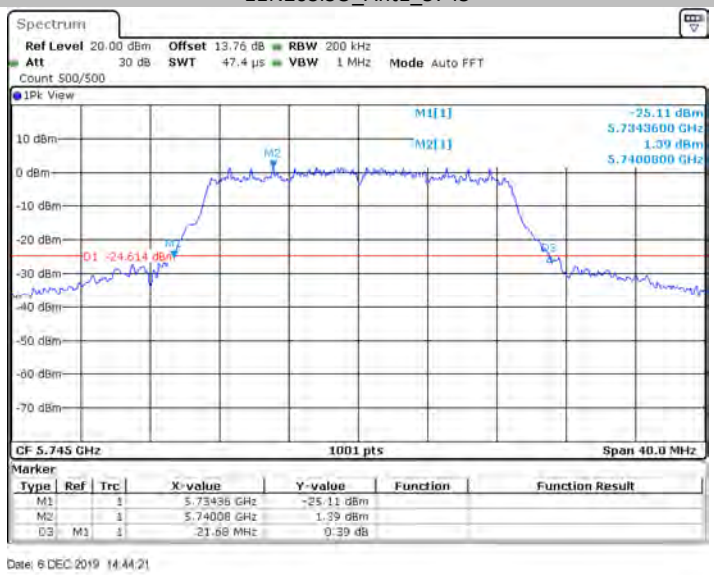

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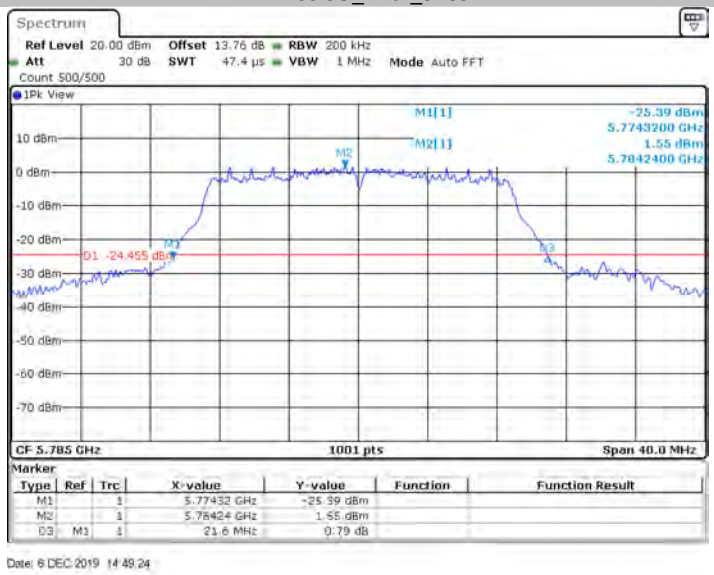

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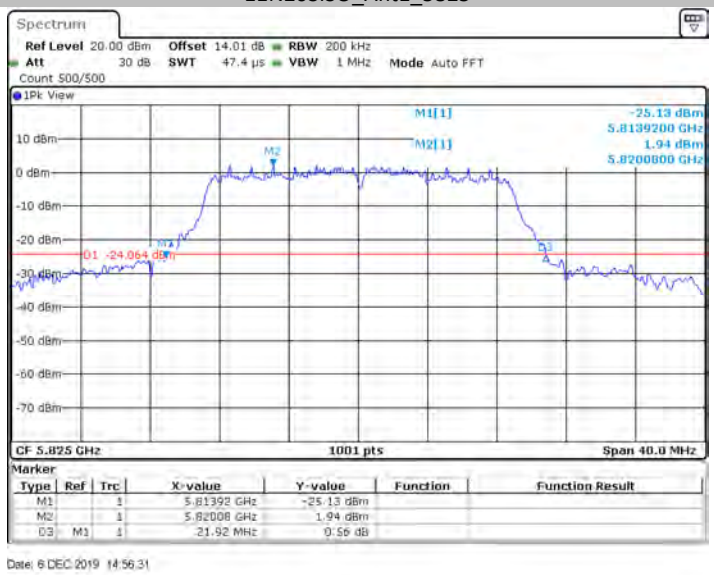
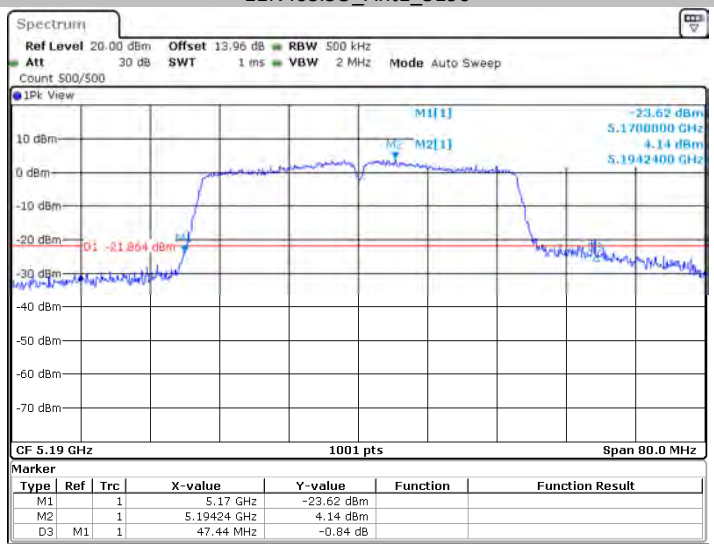
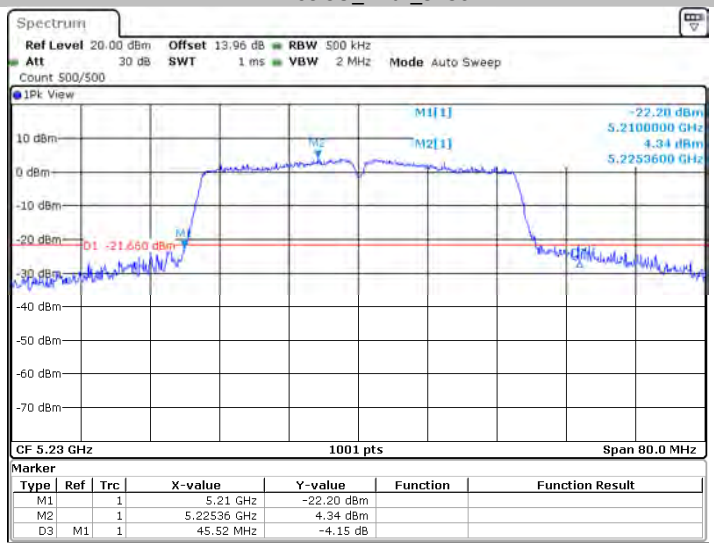


11N40SISO_Ant1_5190



Date: 6.DEC.2019 15:16:33

11N40SISO_Ant1_5230



Date: 6.DEC.2019 15:25:49

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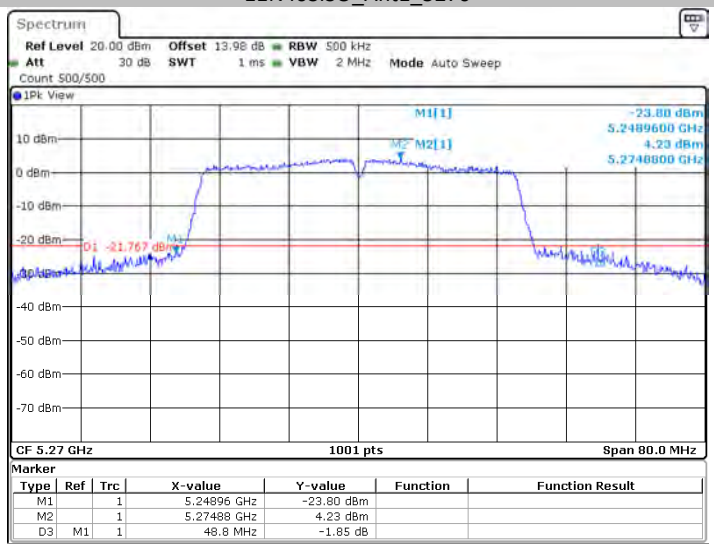
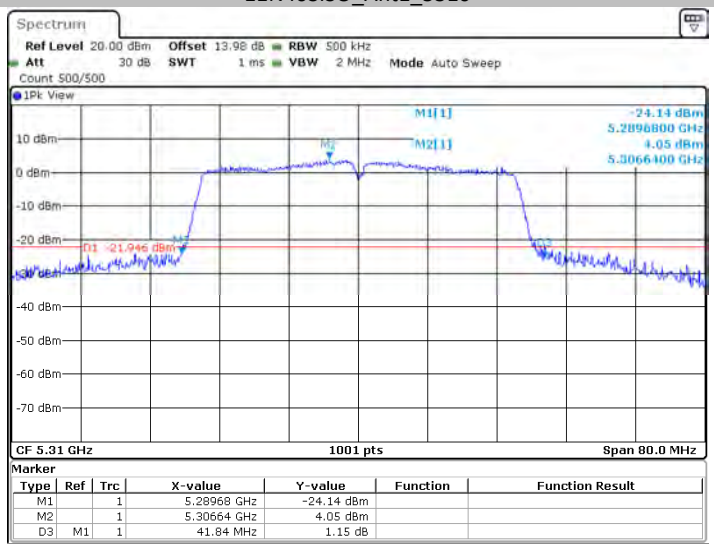


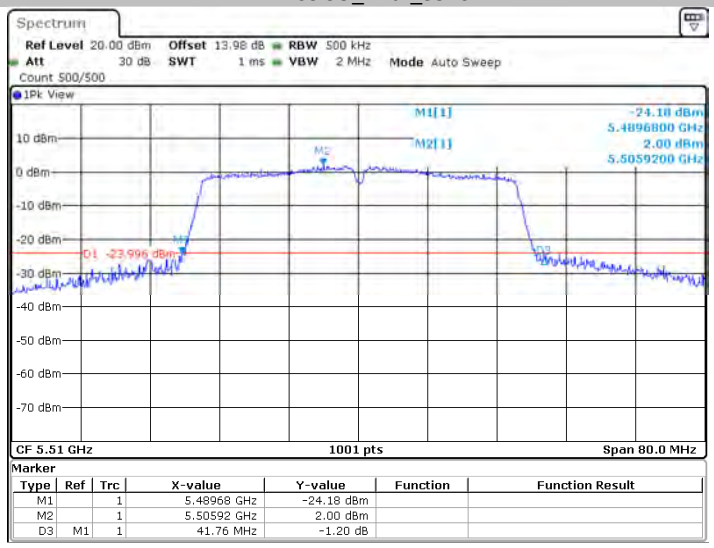
Date: 6.DEC.2019 15:34:18

11N40SISO_Ant1_5310



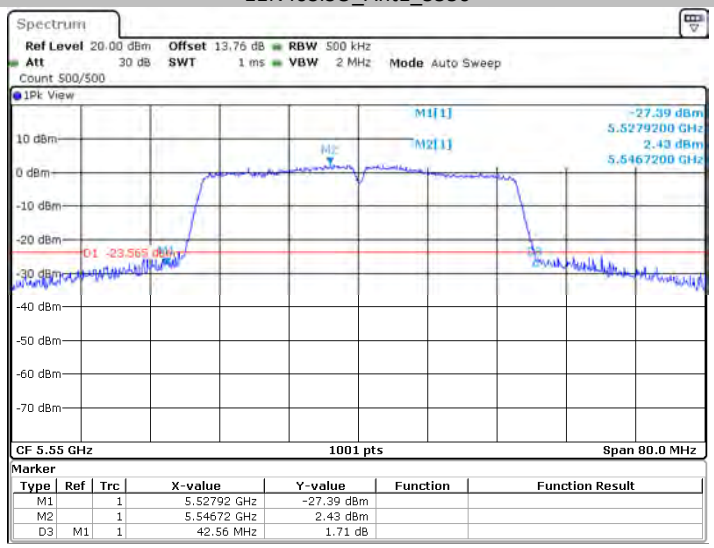
Date: 6.DEC.2019 15:39:30

11N40SISO_Ant1_5510



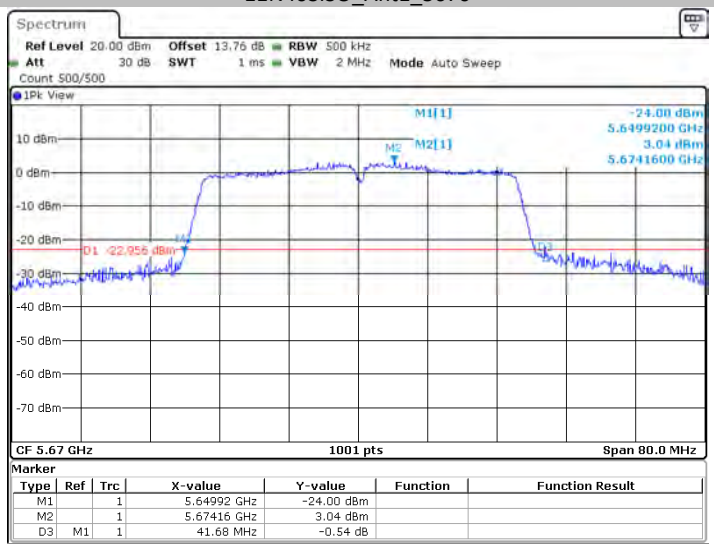
Date: 6.DEC.2019 15:44:24

11N40SISO_Ant1_5550



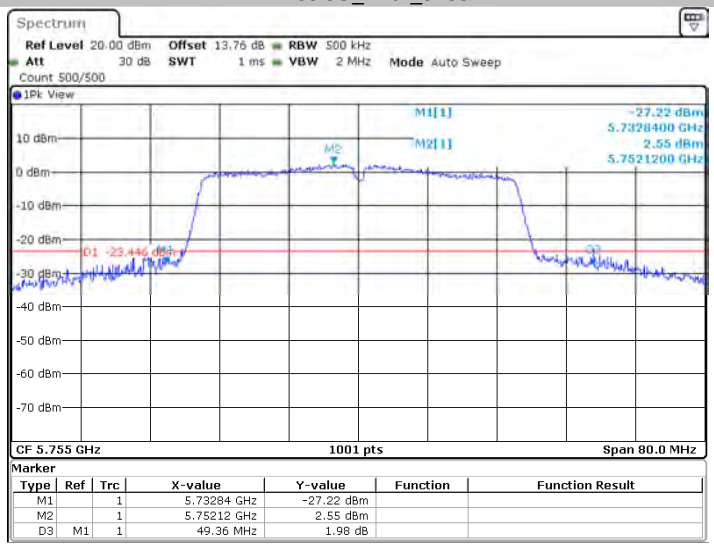
Date: 6.DEC.2019 15:49:18

11N40SISO_Ant1_5670



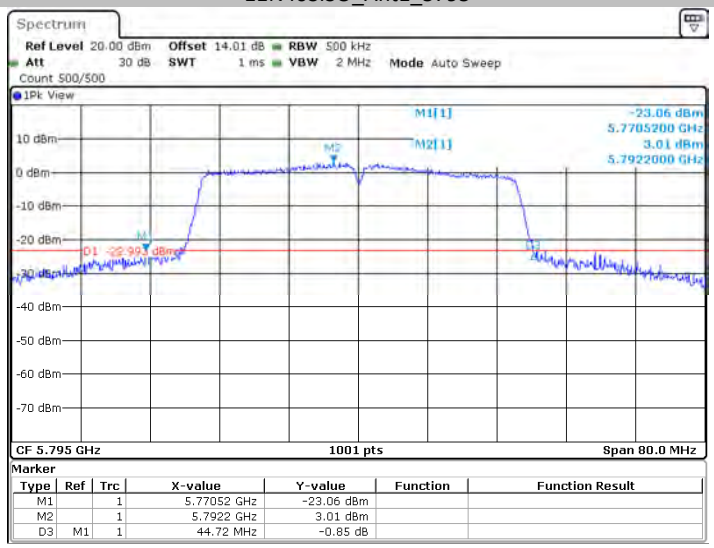
Date: 6.DEC.2019 15:54:12

11N40SISO_Ant1_5755



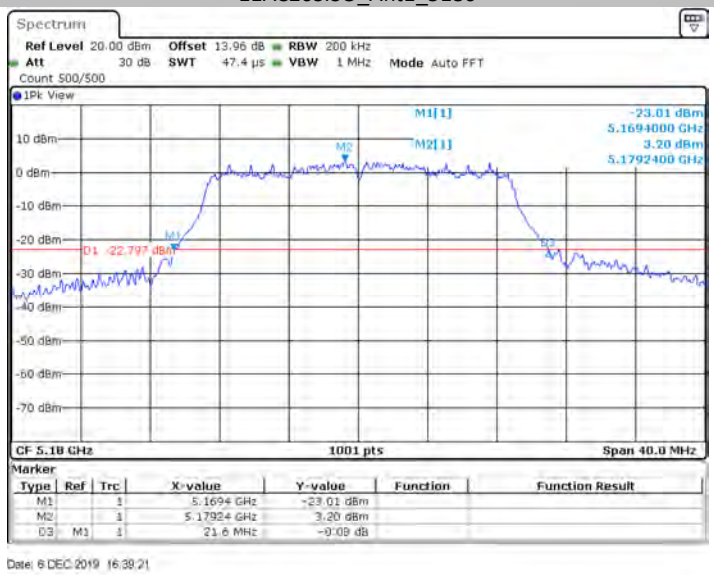
Date: 6.DEC.2019 16:27:51

11N40SISO_Ant1_5795

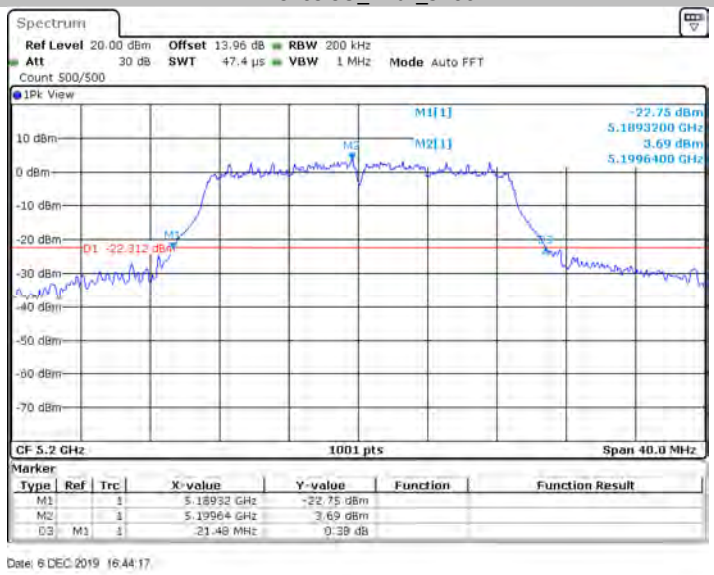


Date: 6.DEC.2019 16:33:27

11AC20SISO_Ant1_5180



11AC20SISO_Ant1_5200



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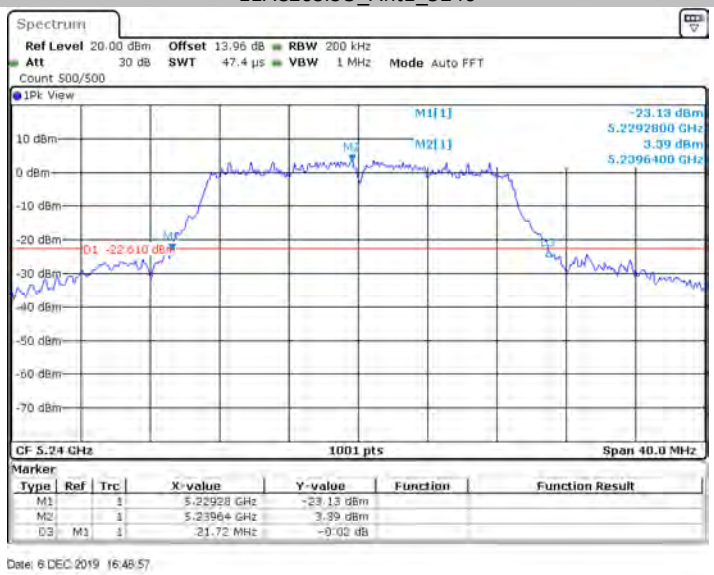

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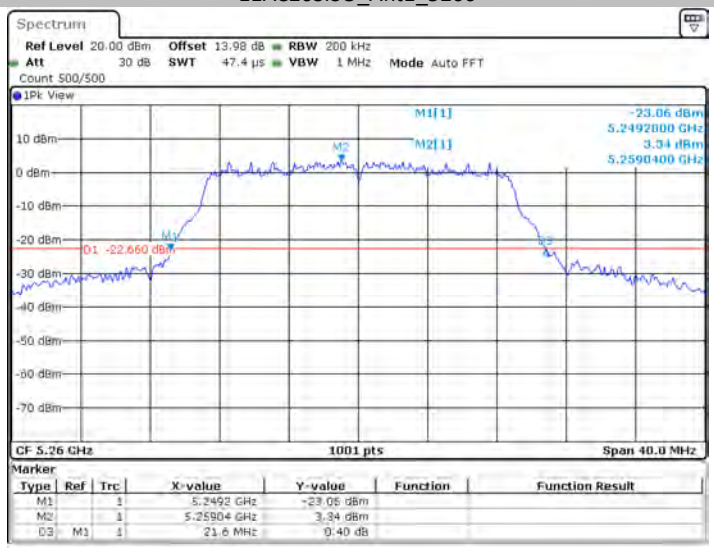

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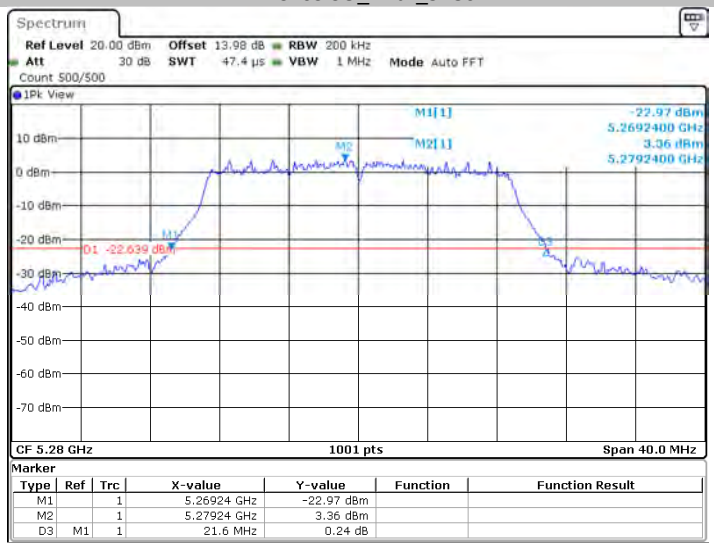
11AC20SISO_Ant1_5280



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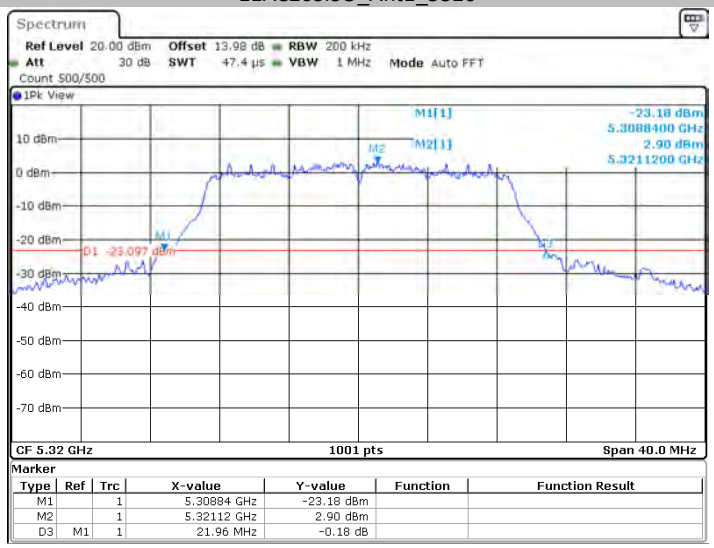

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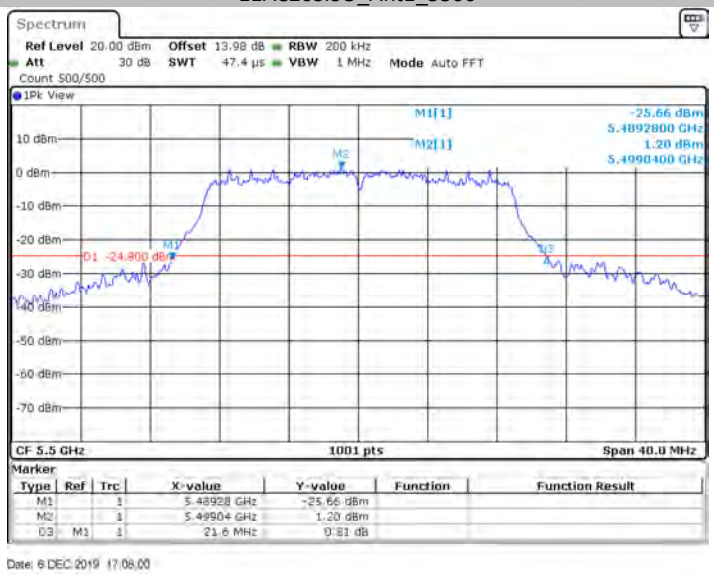

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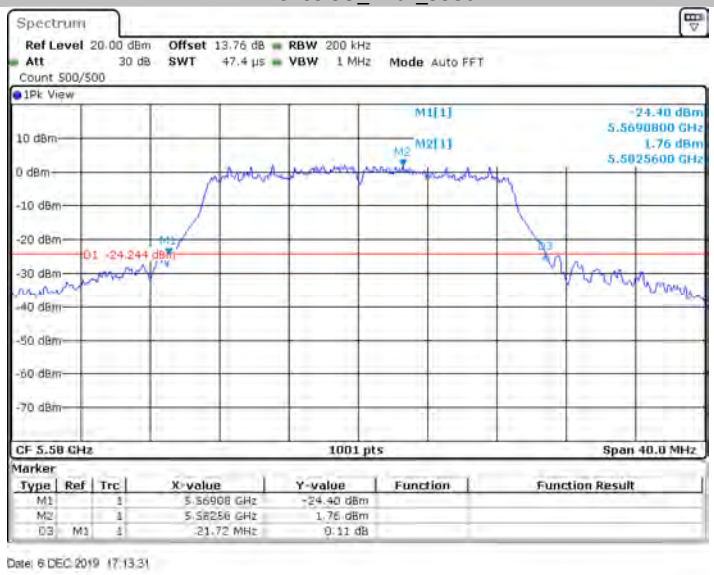

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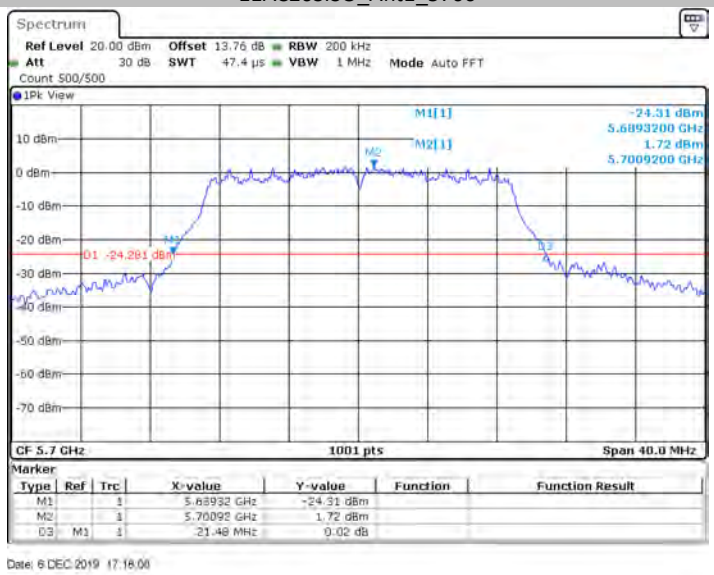

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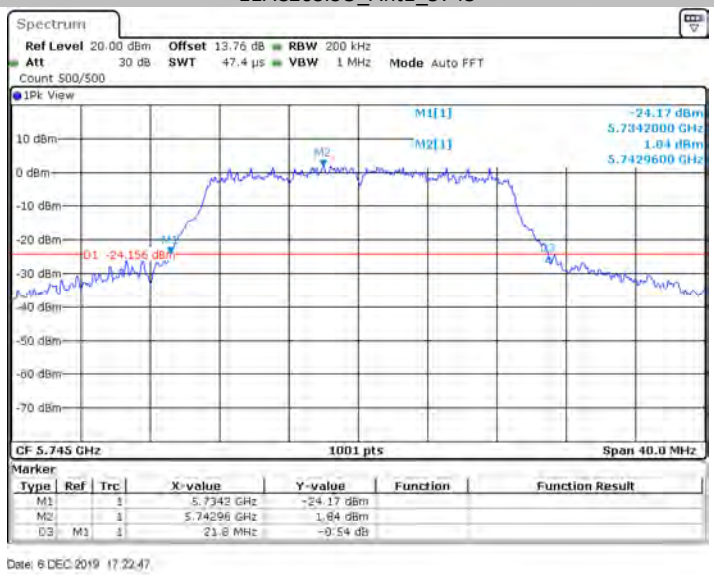

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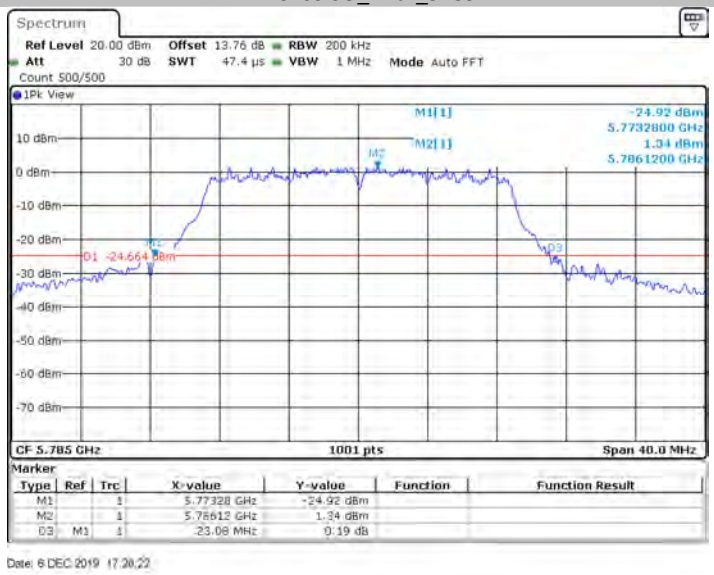

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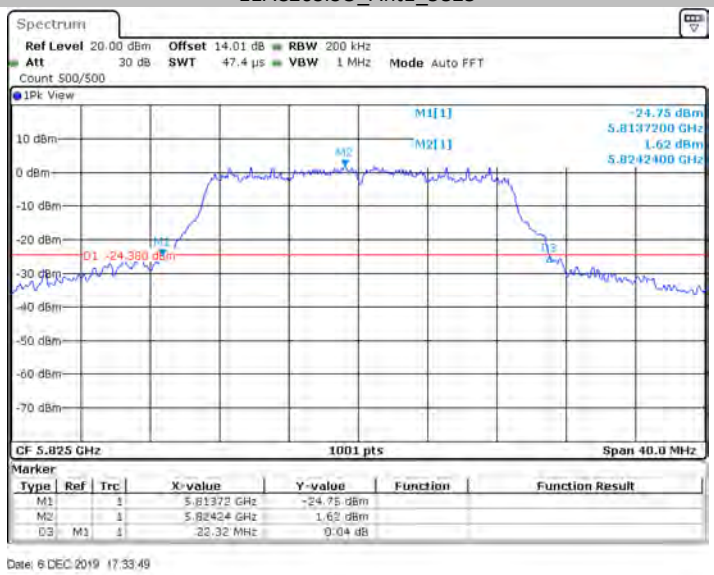

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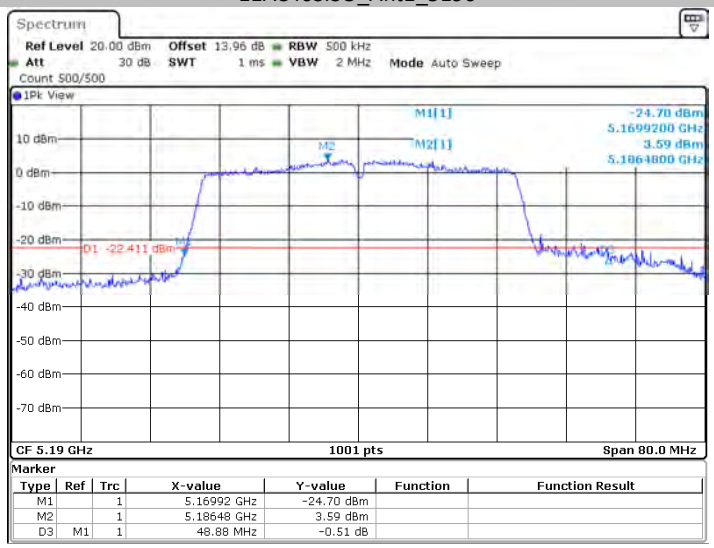

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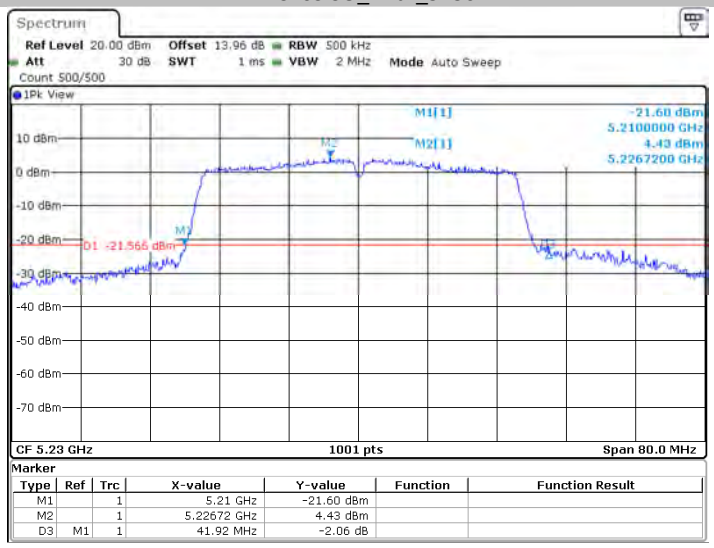

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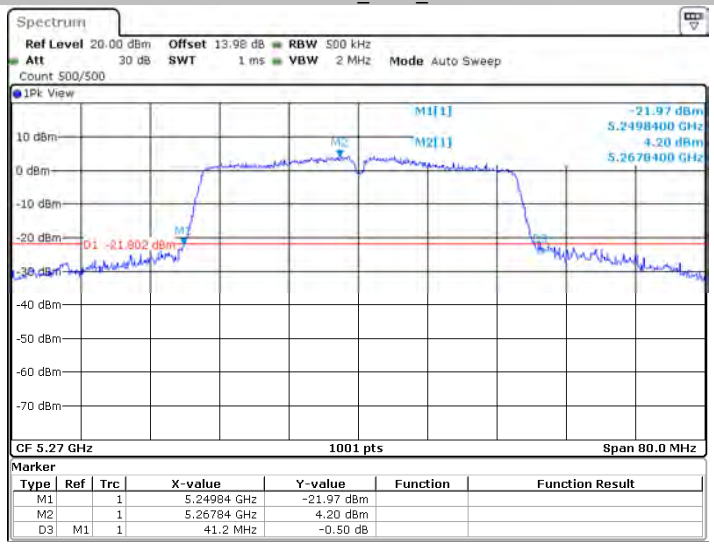

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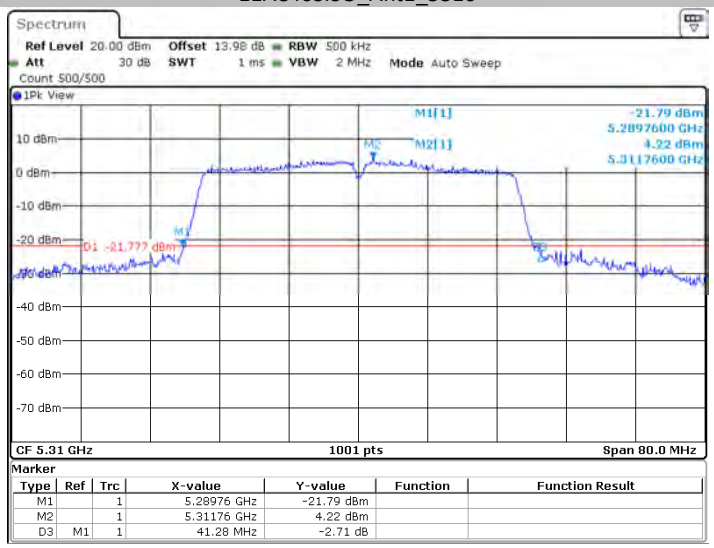

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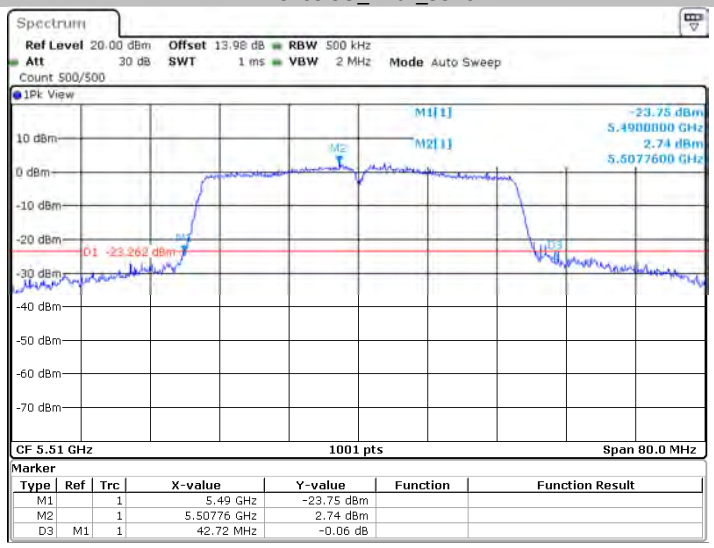

Date: 6.DEC.2019 18:00:17

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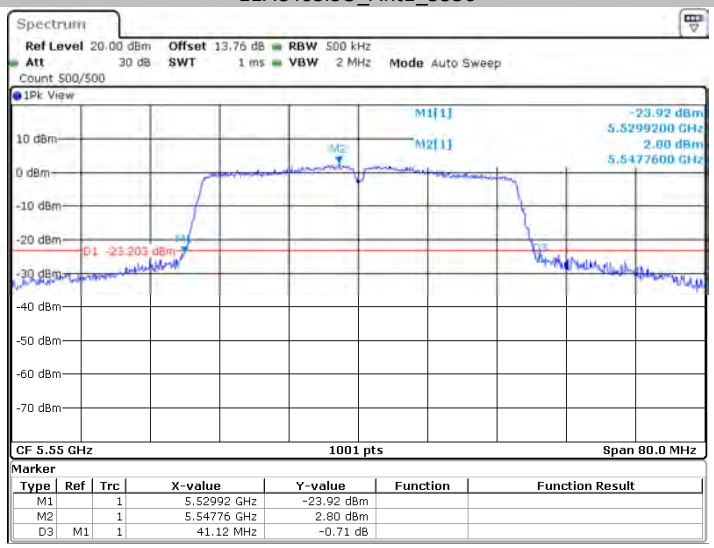

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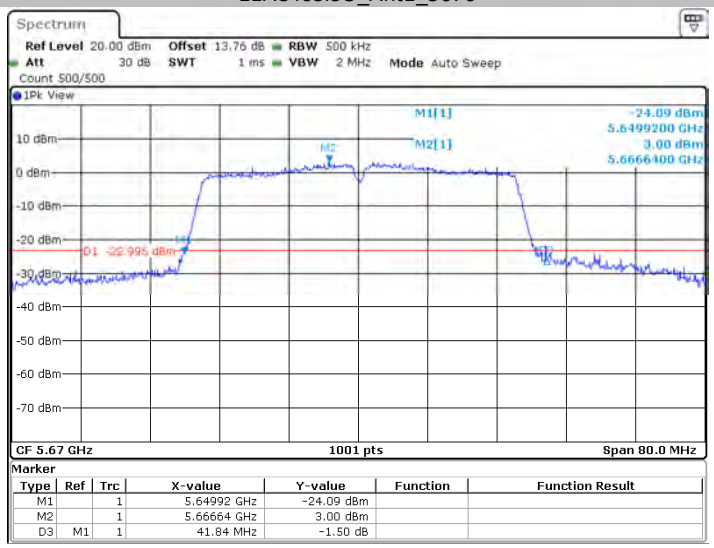

Date: 6.DEC.2019 18:11:56

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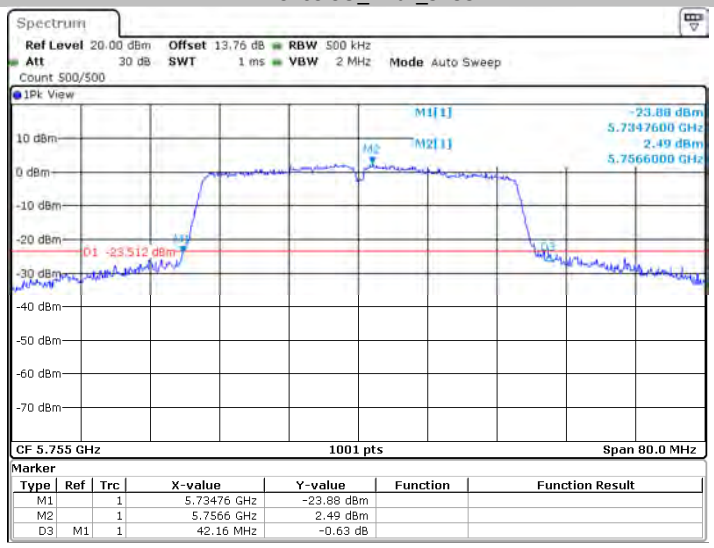

Date: 6.DEC.2019 18:16:58

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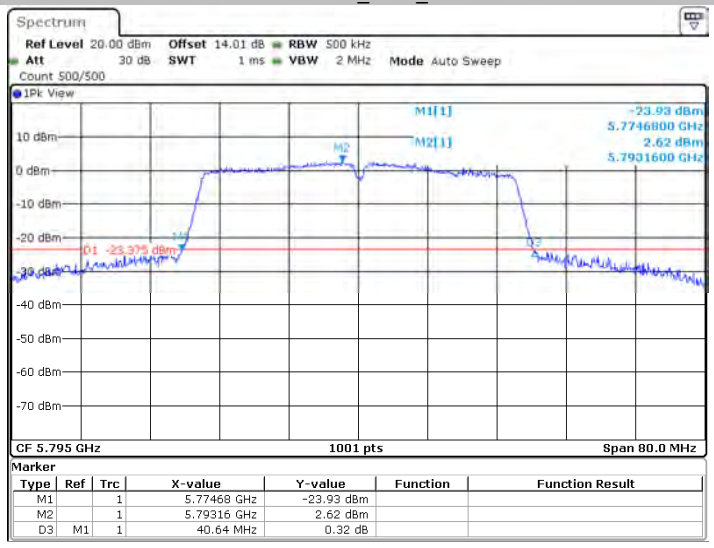

Date: 6.DEC.2019 18:22:09

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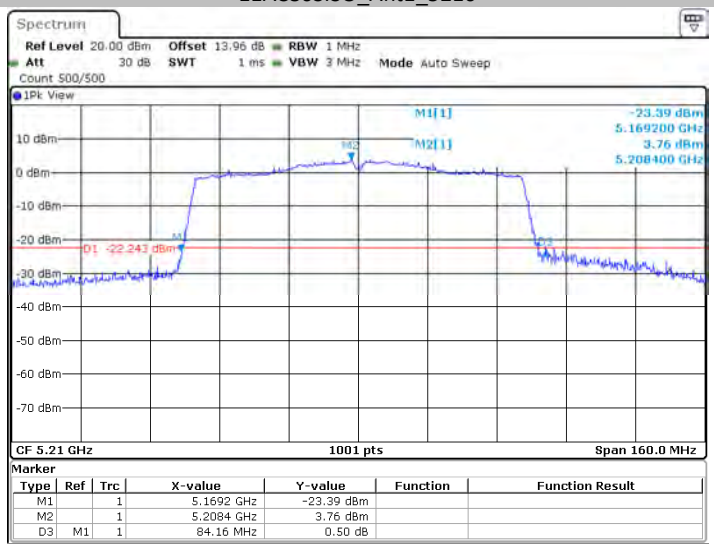

Date: 6.DEC.2019 18:29:52

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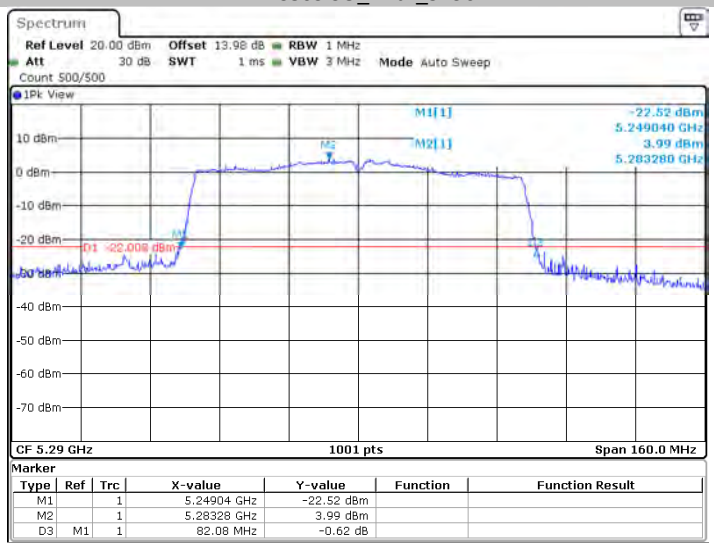

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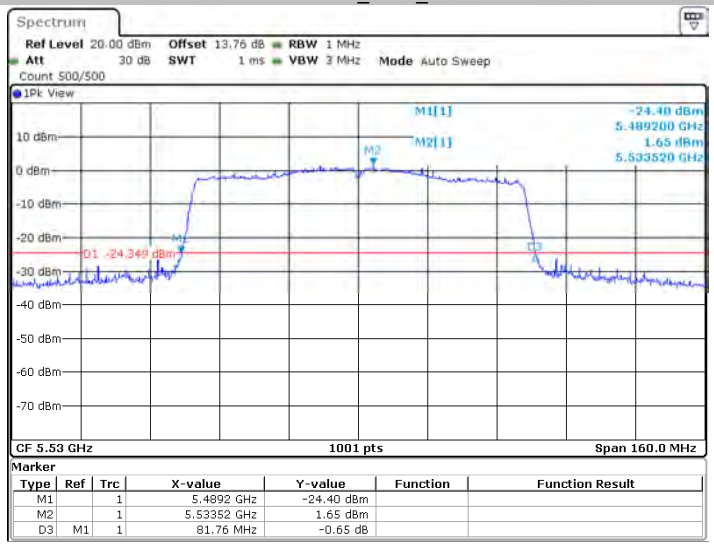

Date: 6.DEC.2019 19:04:24

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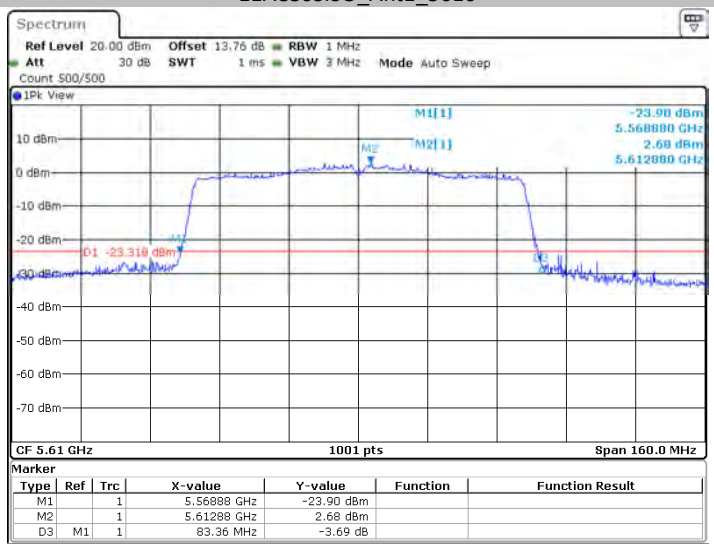

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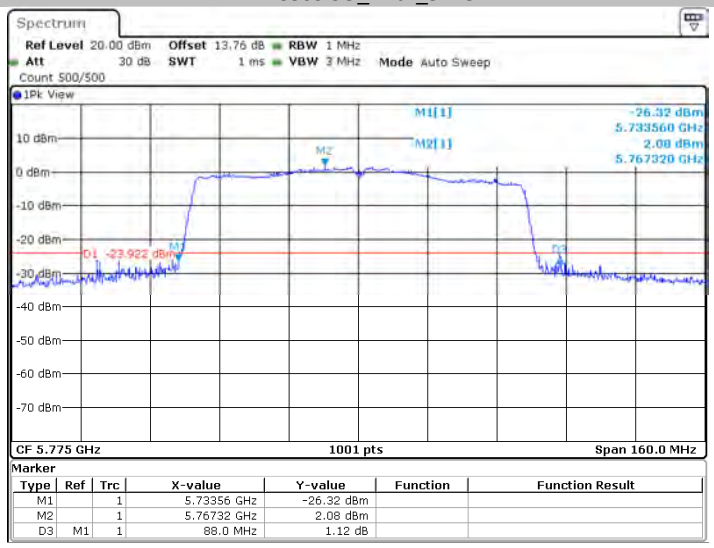

Date: 6.DEC.2019 19:41:15

99% OBW

Test Mode	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
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	5200	17.982	5191.049	5209.031	---	PASS
	5240	17.942	5230.969	5248.911	---	PASS
	5260	17.902	5251.009	5268.911	---	PASS
	5280	17.862	5271.009	5288.871	---	PASS
	5320	18.022	5310.969	5328.991	---	PASS
	5500	17.902	5491.009	5508.911	---	PASS
	5580	17.942	5571.009	5588.951	---	PASS
	5700	17.942	5691.089	5709.031	---	PASS
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	5785	18.022	5775.889	5793.911	---	PASS
	5825	17.982	5815.889	5833.871	---	PASS
11N20	5180	18.741	5170.769	5189.510	---	PASS
	5200	18.901	5190.689	5209.590	---	PASS
	5240	18.821	5230.649	5249.471	---	PASS
	5260	18.941	5250.569	5269.510	---	PASS
	5280	18.781	5270.649	5289.431	---	PASS
	5320	18.861	5310.609	5329.471	---	PASS
	5500	18.861	5490.609	5509.471	---	PASS
	5580	18.821	5570.649	5589.471	---	PASS
	5700	18.821	5690.729	5709.550	---	PASS
	5745	18.941	5735.569	5754.510	---	PASS
	5785	18.861	5775.609	5794.471	---	PASS
	5825	18.901	5815.569	5834.471	---	PASS
11N40	5190	36.763	5171.858	5208.621	---	PASS
	5230	36.843	5211.698	5248.541	---	PASS
	5270	36.763	5251.698	5288.462	---	PASS
	5310	36.763	5291.698	5328.462	---	PASS
	5510	36.923	5491.618	5528.541	---	PASS
	5550	36.923	5531.618	5568.541	---	PASS
	5670	36.923	5651.778	5688.701	---	PASS
	5755	36.923	5736.618	5773.541	---	PASS
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	5240	18.861	5230.649	5249.510	---	PASS
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	5270	36.763	5251.698	5288.462	---	PASS
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	5550	36.923	5531.618	5568.541	---	PASS
	5670	36.763	5651.858	5688.621	---	PASS
	5755	36.923	5736.618	5773.541	---	PASS
	5795	36.843	5776.618	5813.462	---	PASS
11AC80	5210	75.604	5172.438	5248.042	---	PASS
	5290	75.924	5251.958	5327.882	---	PASS
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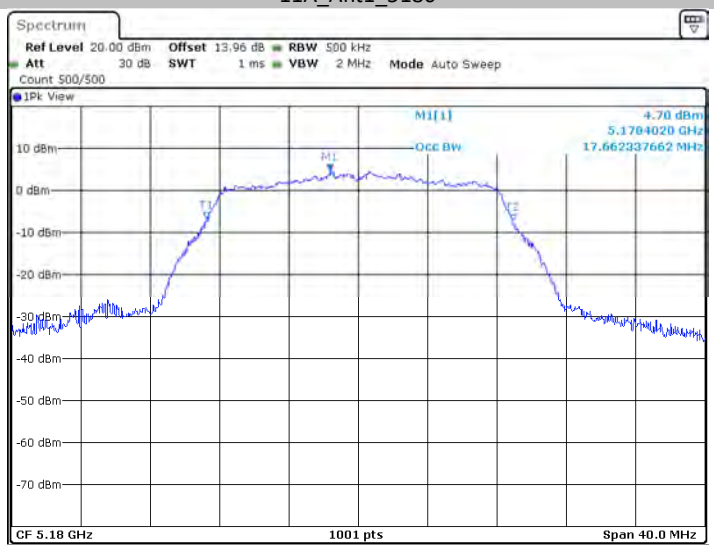

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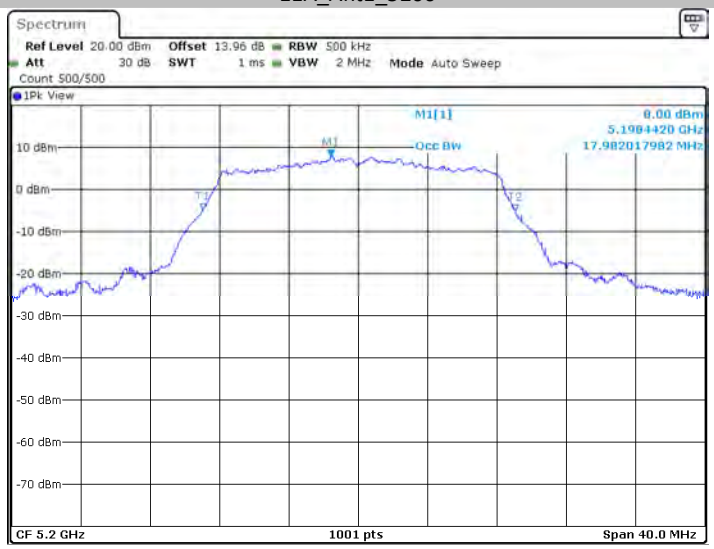
11A_Ant1_5200



Date: 6.DEC.2019 11:23:21

11A_Ant1_5240

Date: 6.DEC.2019 11:28:15

11A_Ant1_5260

Date: 6.DEC.2019 11:33:31

11A_Ant1_5280

Date: 6.DEC.2019 11:38:54

11A_Ant1_5320

Date: 6.DEC.2019 11:43:43

11A_Ant1_5500

Date: 6.DEC.2019 11:52:59

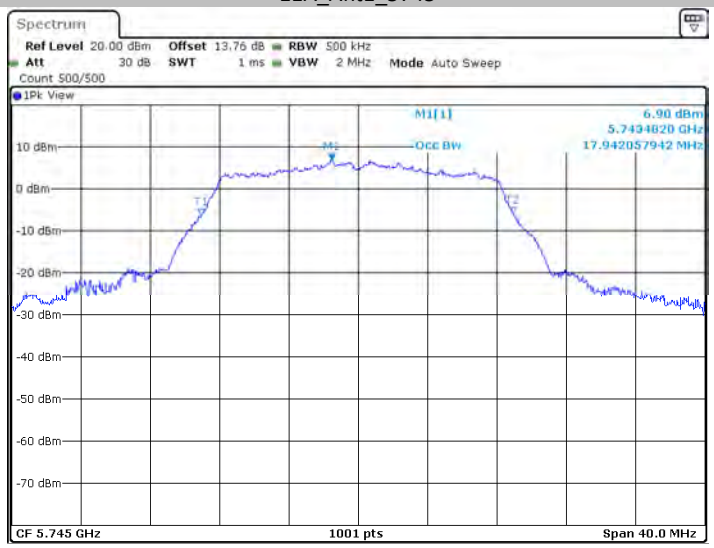
11A_Ant1_5580

Date: 6.DEC.2019 11:57:36

11A_Ant1_5700

Date: 6.DEC.2019 13:19:46

11A_Ant1_5745



Date: 6.DEC.2019 13:30:41

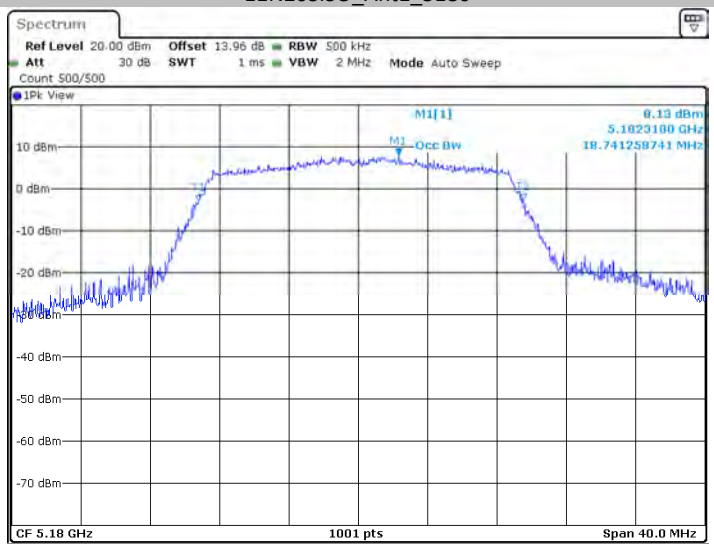
11A_Ant1_5785

Date: 6.DEC.2019 13:36:03

11A_Ant1_5825

Date: 6.DEC.2019 13:41:27

11N20SISO_Ant1_5180



Date: 6.DEC.2019 13:48:07

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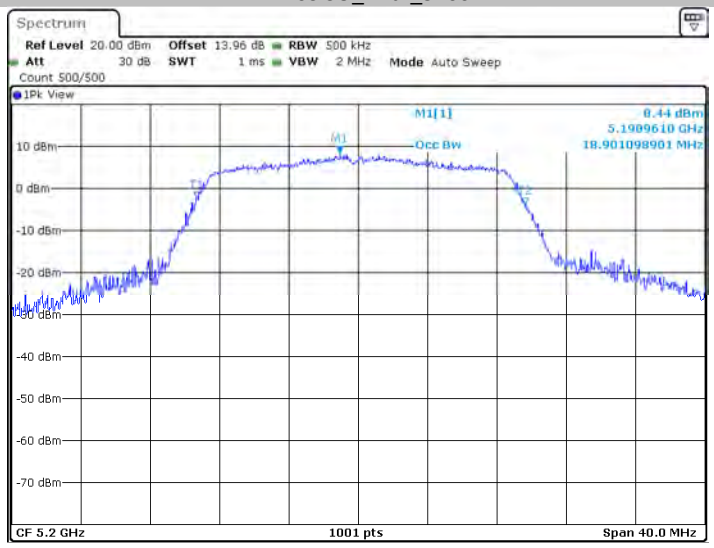
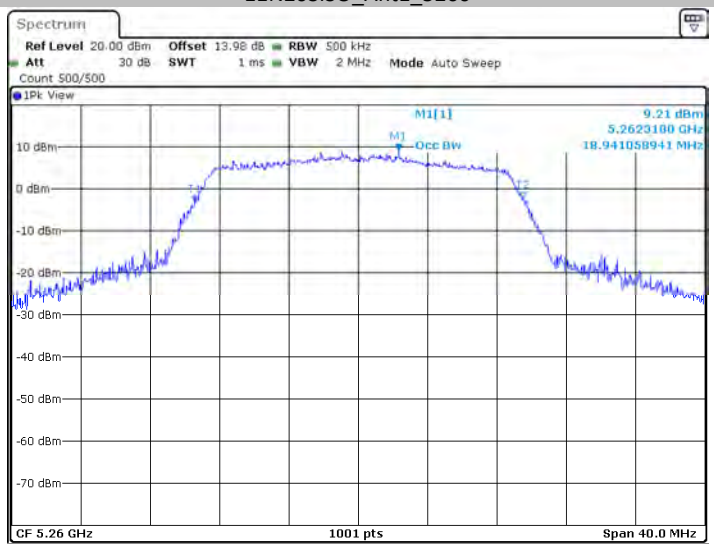


Date: 6.DEC.2019 13:52:40

11N20SISO_Ant1_5240

Date: 6.DEC.2019 13:57:35

11N20SISO_Ant1_5260



Date: 6.DEC.2019 14:02:09

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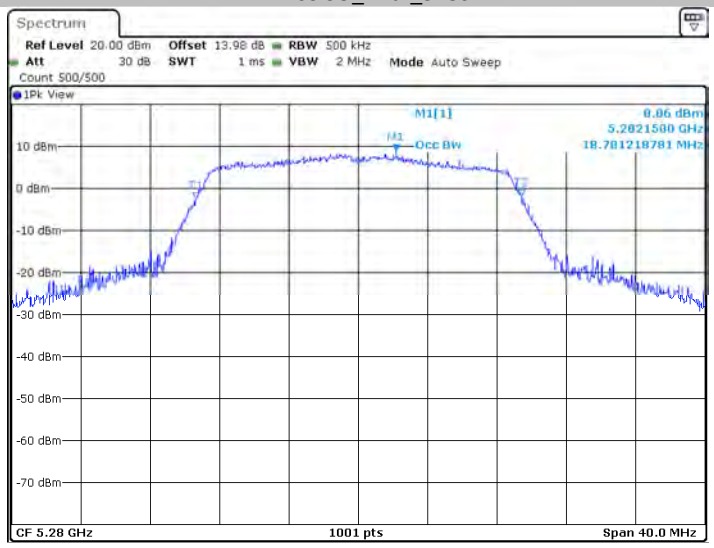

Date: 6.DEC.2019 14:06:49

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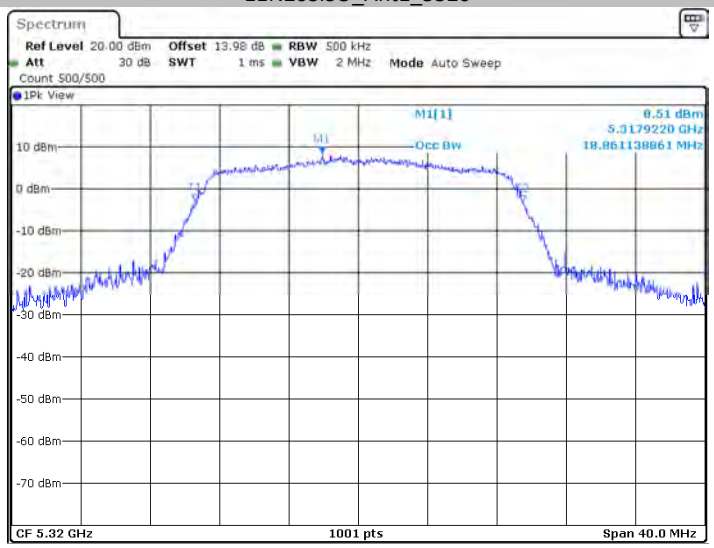


Date: 6.DEC.2019 14:13:11

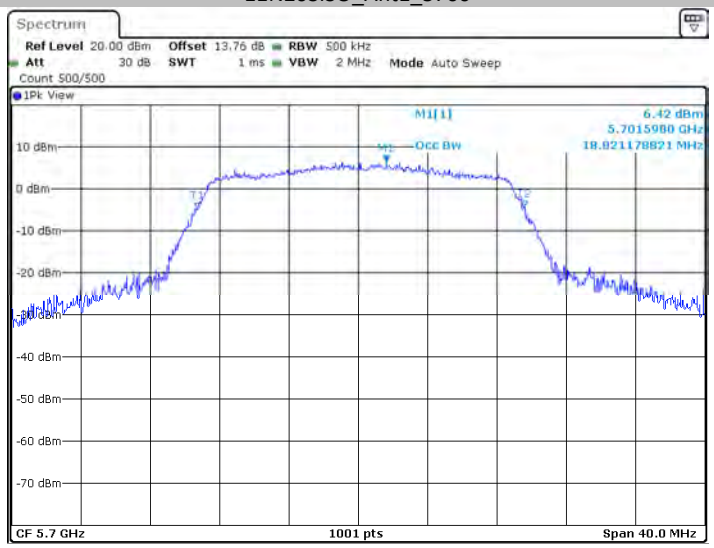
11N20SISO_Ant1_5500

Date: 6.DEC.2019 14:24:40

11N20SISO_Ant1_5580

Date: 6.DEC.2019 14:29:39

11N20SISO_Ant1_5700



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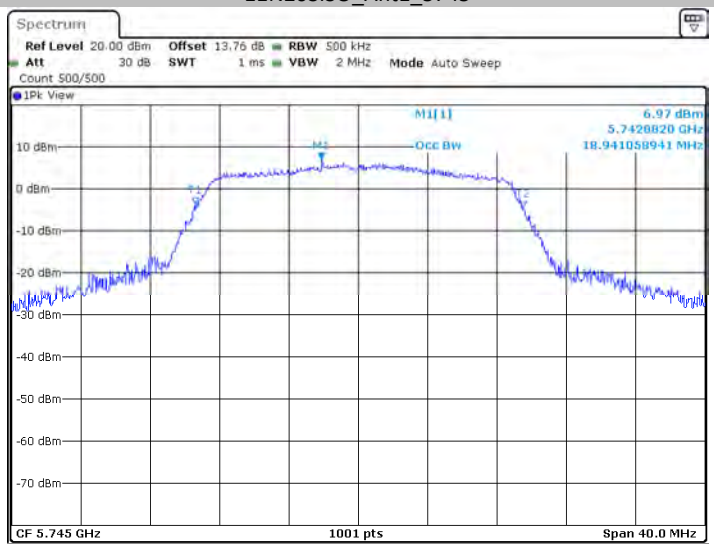
11N20SISO_Ant1_5745



Date: 6.DEC.2019 14:44:51

11N20SISO_Ant1_5785

Date: 6.DEC.2019 14:49:53

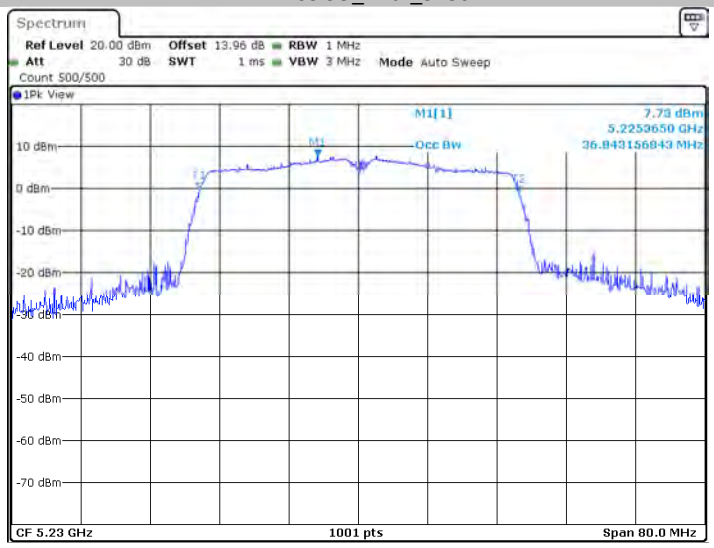
11N20SISO_Ant1_5825

Date: 6.DEC.2019 14:57:00

11N40SISO_Ant1_5190

Date: 6.DEC.2019 15:16:45

11N40SISO_Ant1_5230



Date: 6.DEC.2019 15:26:00

11N40SISO_Ant1_5270

Date: 6.DEC.2019 15:34:29

11N40SISO_Ant1_5310

Date: 6.DEC.2019 15:39:41

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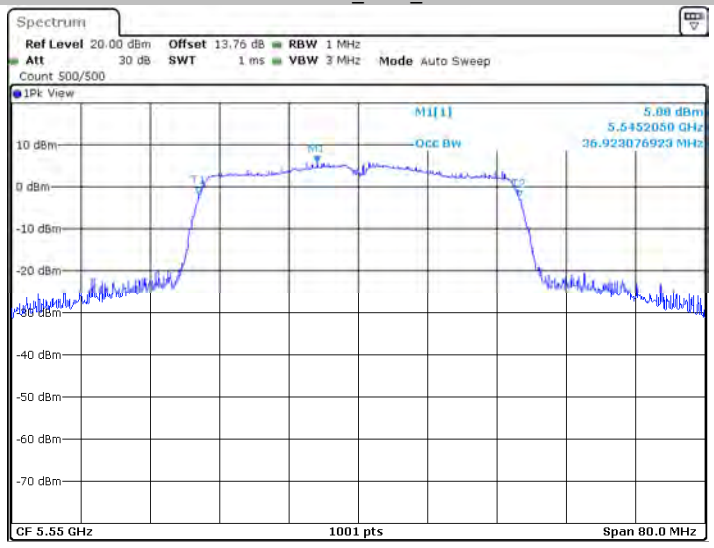
Date: 6.DEC.2019 15:44:36

11N40SISO_Ant1_5550



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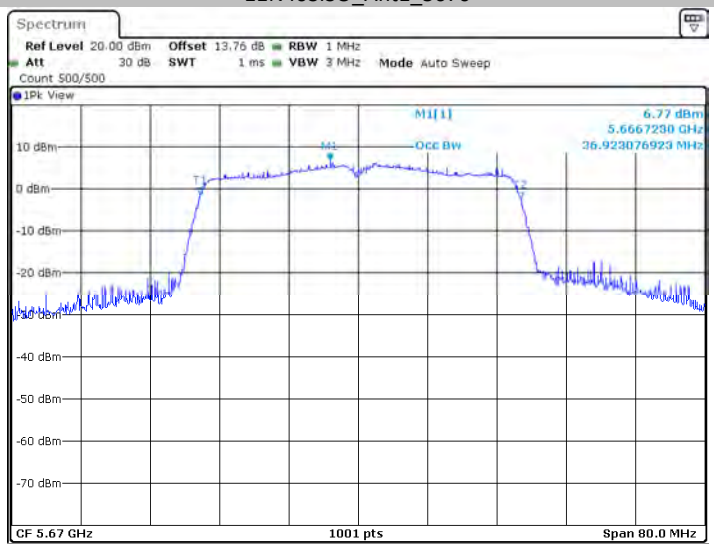
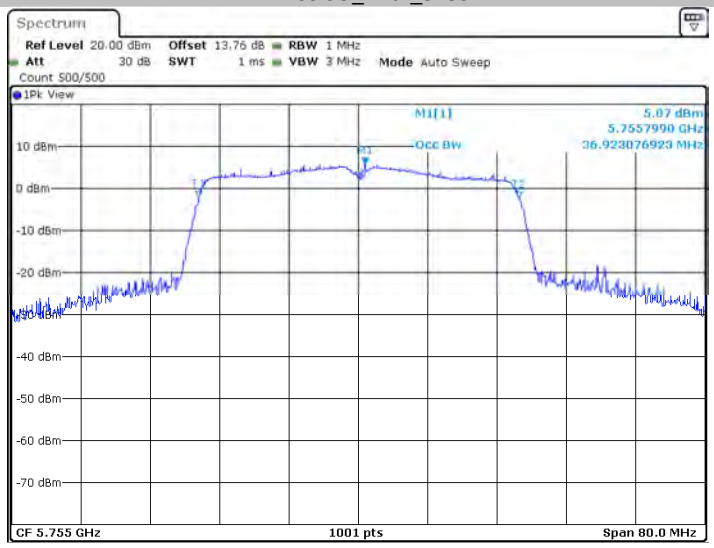
11N40SISO_Ant1_5670



Date: 6.DEC.2019 15:54:23

11N40SISO_Ant1_5755

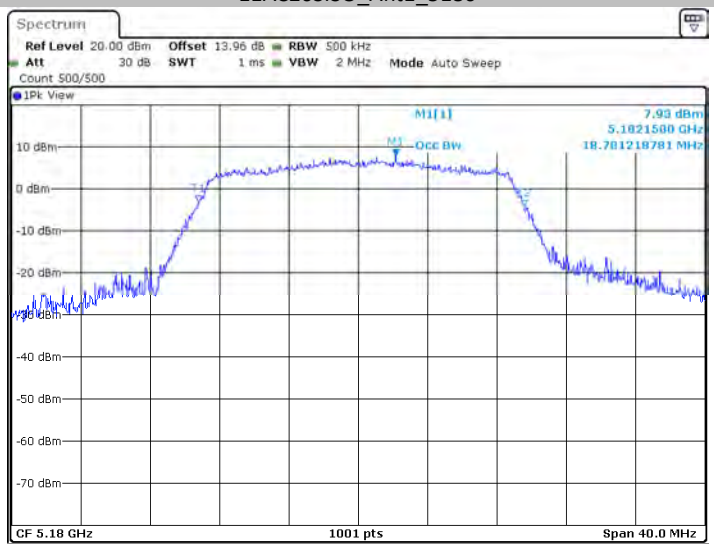


Date: 6.DEC.2019 16:28:22

11N40SISO_Ant1_5795

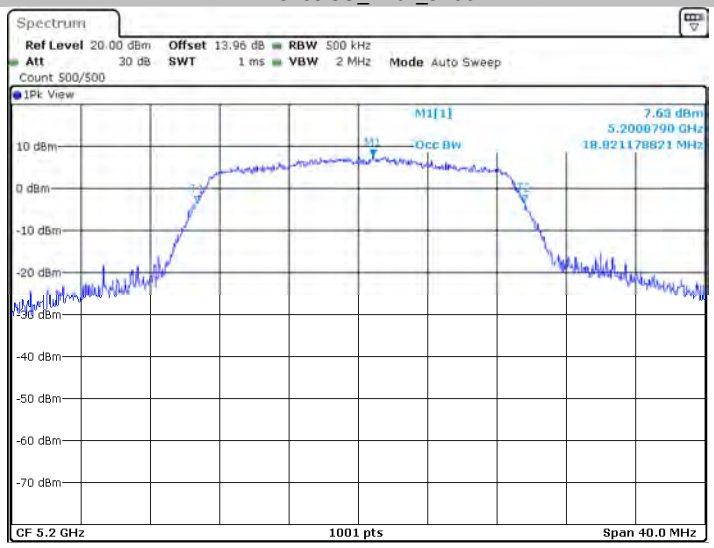
Date: 6.DEC.2019 16:33:58

11AC20SISO_Ant1_5180



Date: 6.DEC.2019 16:39:32

11AC20SISO_Ant1_5200



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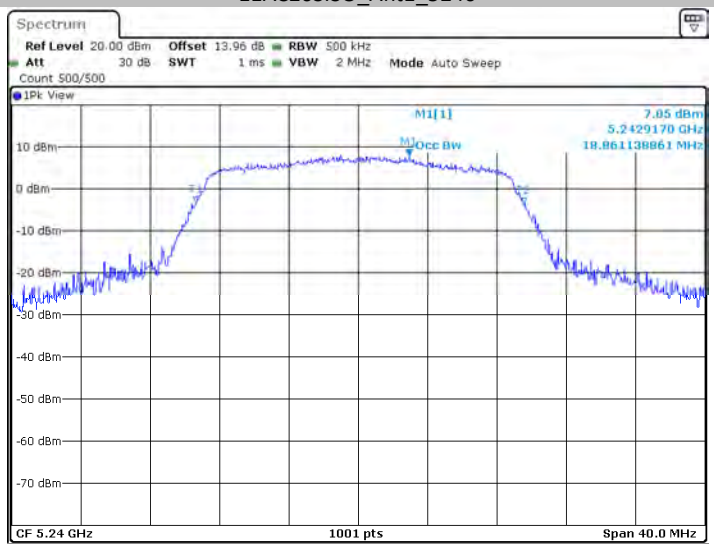

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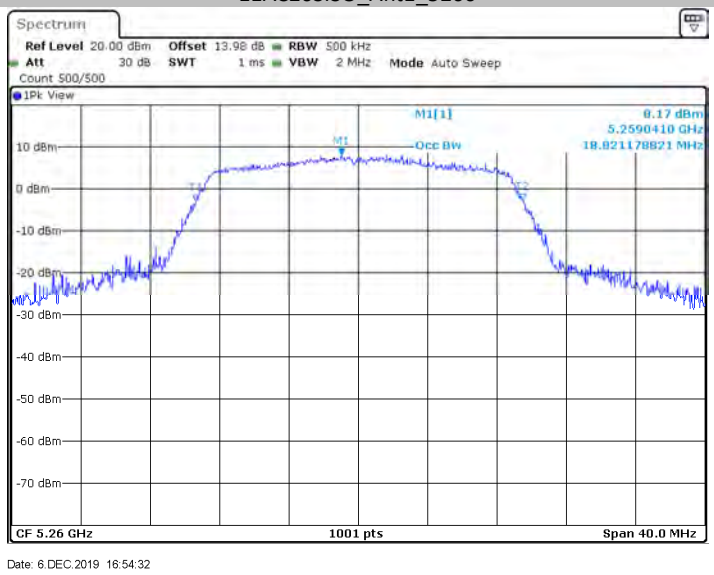

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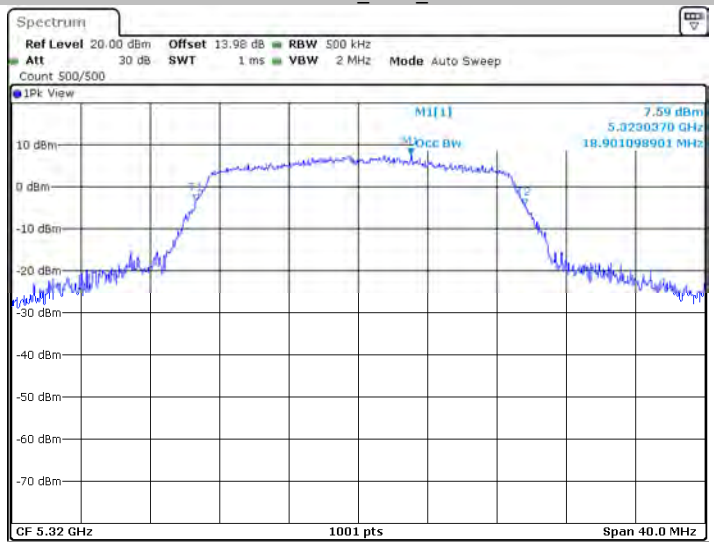

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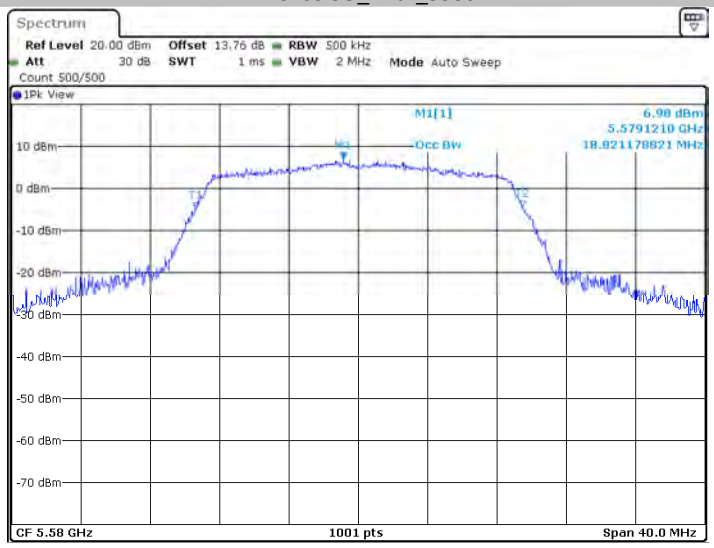

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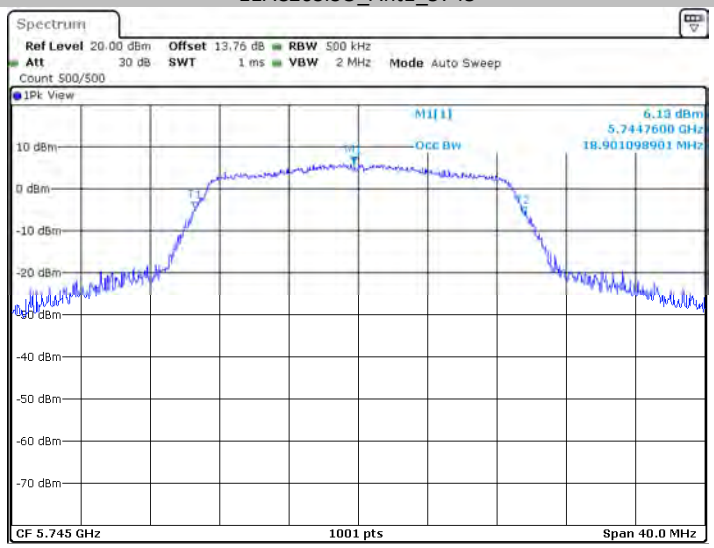

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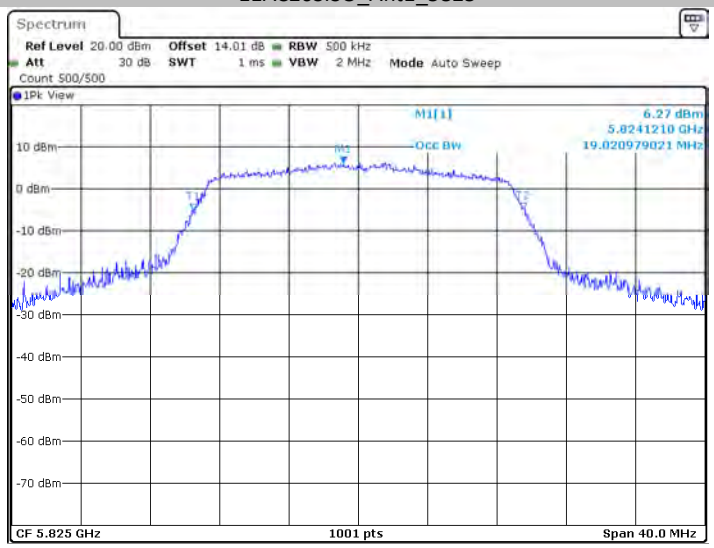

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Date: 6.DEC.2019 17:55:41

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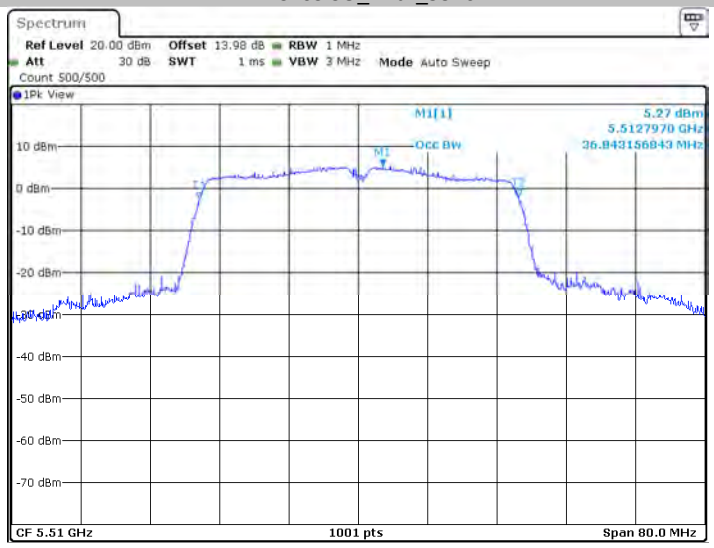

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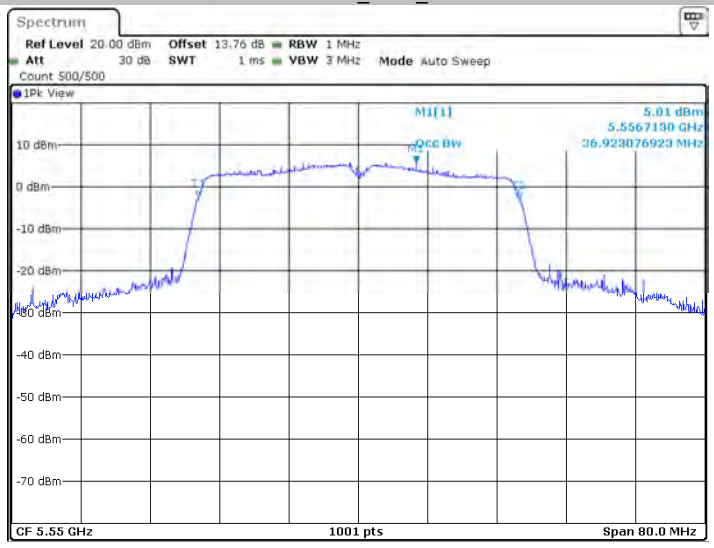

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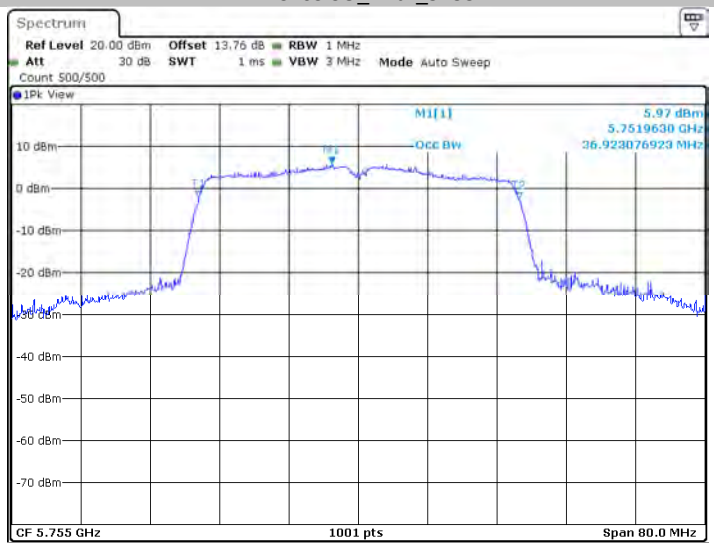

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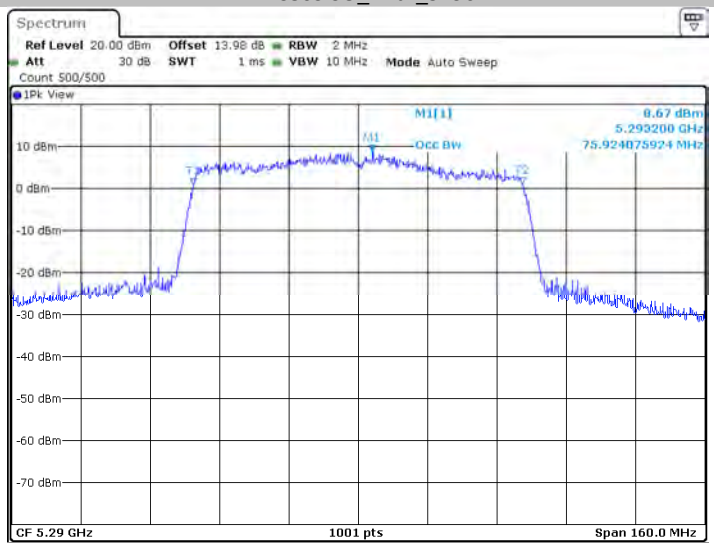
Date: 6.DEC.2019 18:30:04

11AC80SISO_Ant1_5290



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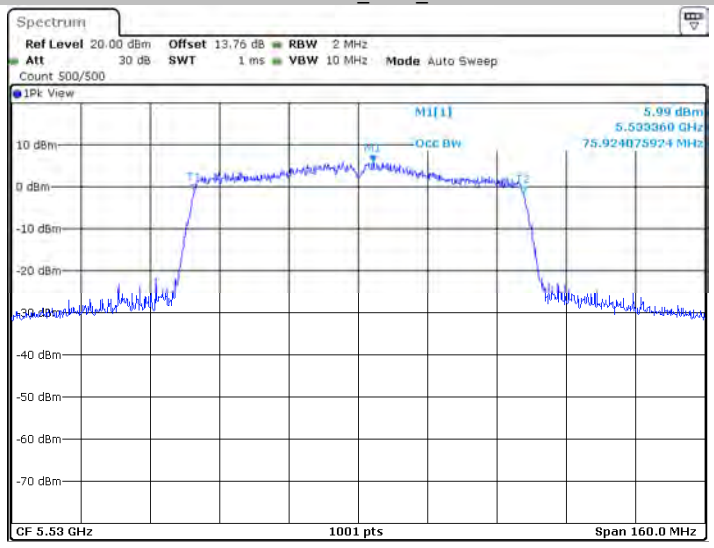

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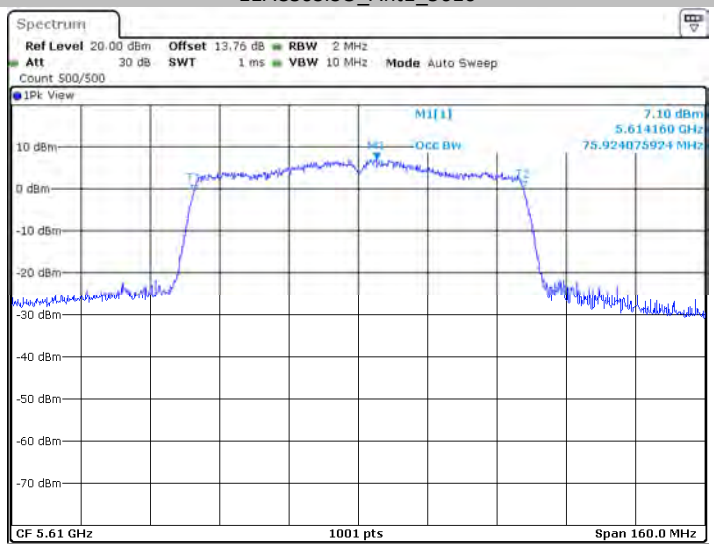

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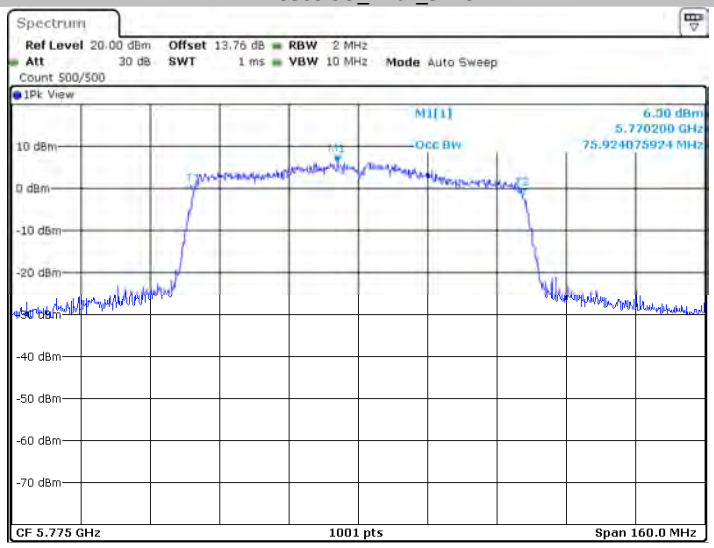


Date: 6.DEC.2019 19:41:45

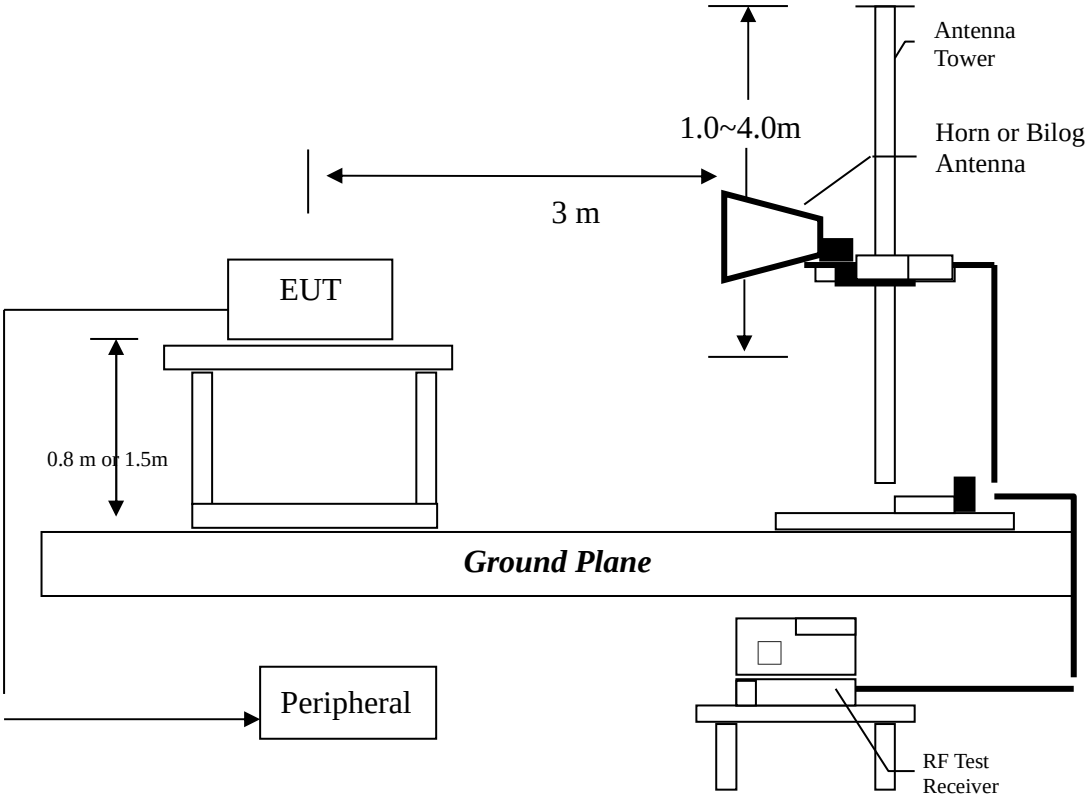
6. Radiated Emission test (FCC 15.205 & 15.209 & 15.407)

6.1 Operating environment

Temperature:	22	℃
Relative Humidity:	55	%
Atmospheric Pressure	1010	hPa

6.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emission measurements were performed from 9KHz to tenth harmonic or 40GHz.
The EUT for testing is arranged on a styrene turntable with the height of 0.8m up to 1GHz and 1.5m above 1GHz. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

Testing settings (refer to KDB 789033 D02)
Peak Measurements below 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=120KHz
4, Detector=Quasi-Peak
5, Trace was allowed to stabilize

Peak Measurements above 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=1MHz
4, VBW=3MHz
4, Detector= Peak (Max-hold)
5, Trace was allowed to stabilize

Average Measurements above 1GHz
1, Analyzer center frequency was set to the frequency of the radiated spurious emission.
2, Span=encompass the entire emission
3, RBW=1MHz
4, VBW=3MHz
4, Detector= RMS (Max-hold)
5, Trace was allowed to stabilize

6.3 Limit

The spurious Emission shall test through the 10th harmonic or 40GHz (whichever is lower). In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Notes:
1, All emission out-side of the 5.15-5.35GHz & 5.47-5.725GHz band shall not exceed an EIRP of -27dBm/MHz (68.2dBuV/m, test distance: 3 meter); for band 5.725-5.85GHz, all emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
2, The spectrum is measured from 9KHz to the 10^{th} harmonic of the fundamental frequency of the transmitter using QP detector below 1GHz, above 1GHz, average & peak measurements were taken using for test. The worst-case emission are reported however emission whose levels were not within 20dB of the respective limited were not reported.
3, The test was performed on EUT under 802.11a/n-HT20/40/ac-HT20/40/80 continuously transmitting mode. Simultaneous transmitting was considered during the testing. All mode had been tested, but only the worst-case is recorded in the following graph and table.

Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD

Where FS = Field Strength in dBµV/m
RA = Receiver Amplitude (including preamplifier) in dBµV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD

Example
Assume a receiver reading of 62.0 dBµV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB. The net field strength for comparison to the appropriate emission limit is 32 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 62.0 dBµV
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
PD = 0 dB
FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 dBµV/m

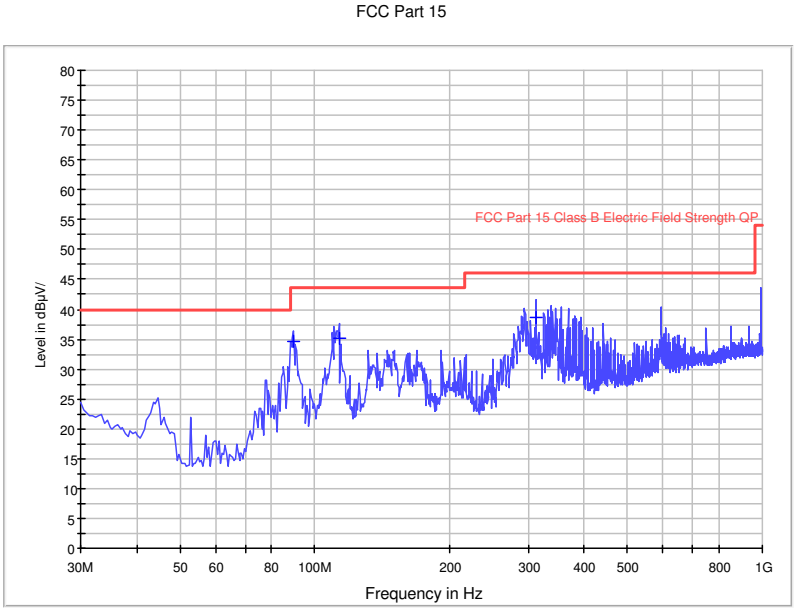
Level in mV/m = Common Antilogarithm [(42 dBµV/m)/20] = 125.9 µV/m

6.4 Radiated spurious emission test data

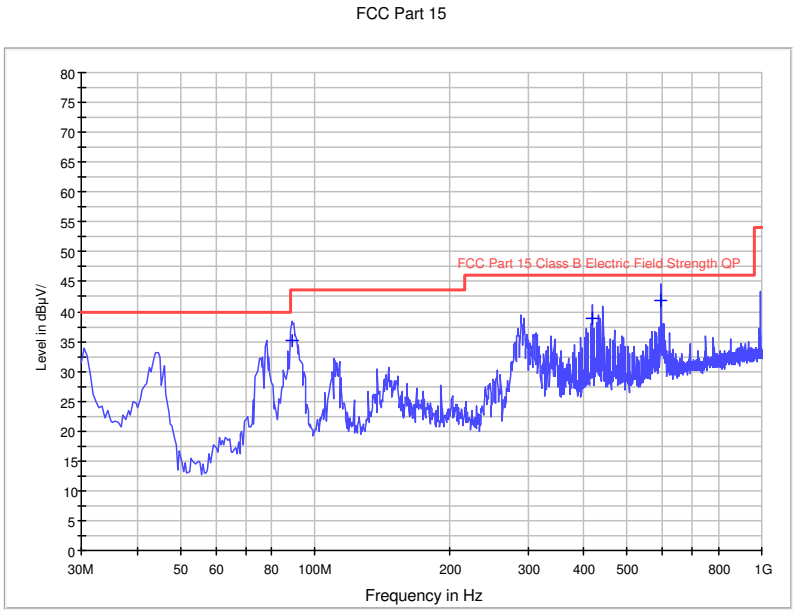
6.4.1 Measurement results: frequencies equal to or less than 1 GHz

Applicant: TCL entertainment solutions limited
Date of Test: January 06, 2020 Model: TS9030
Worst Case Operating Mode: Transmitting (802.11ac-HT40)

ANT Polarity: Horizontal



ANT Polarity: Vertical



Applicant: TCL entertainment solutions limited
Date of Test: January 06, 2020 Model: TS9030
Worst Case Operating Mode: Transmitting (802.11ac-HT40)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	89.655000	45.0	20.0	9.6	34.6	43.5	-8.9
Horizontal	113.420000	45.5	20.0	9.6	35.1	43.5	-8.4
Horizontal	312.270000	41.2	20.0	17.2	38.4	46.0	-7.6
Vertical	88.685000	45.4	20.0	9.5	34.9	43.5	-8.6
Vertical	418.000000	38.5	20.0	20.3	38.8	46.0	-7.2
Vertical	594.027000	37.7	20.0	24.2	41.9	46.0	-4.1

NOTES:
1. Quasi-Peak detector is used for frequency below 1GHz.
2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other harmonic emissions than those reported were detected at a test distance of 0.3-meter.
3. Negative value in the margin column shows emission below limit.
4. All emissions are below the QP limit.

6.4.2 Measurement results: frequency above 1GHz

The worst case occurred at 802.11ac-VHT40
Channel 38/27 Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10380.000	51.1	36.3	38.9	53.7	68.2	-14.5
Horizontal	15570.000	51.5	34.7	41.0	57.8	68.2	-10.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10380.000	41.6	36.3	38.9	44.2	54.0	-9.8
Horizontal	15570.000	39.4	34.7	41.0	45.7	54.0	-8.3

Channel 46/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10460.000	50.1	36.3	38.9	52.7	68.2	-15.5
Horizontal	15690.000	49.3	34.7	41.0	55.6	68.2	-12.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10460.000	41.6	36.3	38.9	44.2	54.0	-9.8
Horizontal	15690.000	39.0	34.7	41.0	45.3	54.0	-8.7

Channel 54/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10540.000	49.6	36.3	38.9	52.2	68.2	-16.0
Horizontal	15810.000	46.0	34.7	41.0	52.3	68.2	-15.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10540.000	40.6	36.3	38.9	43.2	54.0	-10.8
Horizontal	15810.000	37.3	34.7	41.0	43.6	54.0	-10.4

Channel 62/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10620.000	50.6	36.3	38.9	53.2	68.2	-15.0
Horizontal	15930.000	50.2	34.7	41.0	56.5	68.2	-11.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	10620.000	40.6	36.3	38.9	43.2	54.0	-10.8
Horizontal	15930.000	39.1	34.7	41.0	45.4	54.0	-8.6

Channel 102/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11020.000	52.1	36.3	38.9	54.7	68.2	-13.5
Horizontal	16530.000	48.3	34.7	41.0	54.6	68.2	-13.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11020.000	41.0	36.3	38.9	43.6	54.0	-10.4
Horizontal	16530.000	38.6	34.7	41.0	44.9	54.0	-9.1

Channel 118/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11180.000	52.2	36.3	39.0	54.9	68.2	-13.3
Horizontal	16770.000	48.6	34.7	41.2	55.1	68.2	-13.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11180.000	40.7	36.3	39.0	43.4	54.0	-10.6
Horizontal	16770.000	38.6	34.7	41.2	45.1	54.0	-8.9

Channel 134/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11340.000	2.3	36.3	39.0	5.0	68.2	-63.2
Horizontal	17010.000	47.1	34.7	41.2	53.6	68.2	-14.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11340.000	39.6	36.3	39.0	42.3	54.0	-11.7
Horizontal	17010.000	37.1	34.7	41.2	43.6	54.0	-10.4

Channel 151/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11510.000	50.9	36.3	39.0	53.6	68.2	-14.6
Horizontal	17265.000	48.3	34.7	41.2	54.8	68.2	-13.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11510.000	38.6	36.3	39.0	41.3	54.0	-12.7
Horizontal	17265.000	37.4	34.7	41.2	43.9	54.0	-10.1

Channel 159/27Mbps

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11590.000	51.6	36.3	39.0	54.3	68.2	-13.9
Horizontal	17385.000	47.2	34.7	41.2	53.7	68.2	-14.5

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
Horizontal	11590.000	39.6	36.3	39.0	42.3	54.0	-11.7
Horizontal	17385.000	37.1	34.7	41.2	43.6	54.0	-10.4

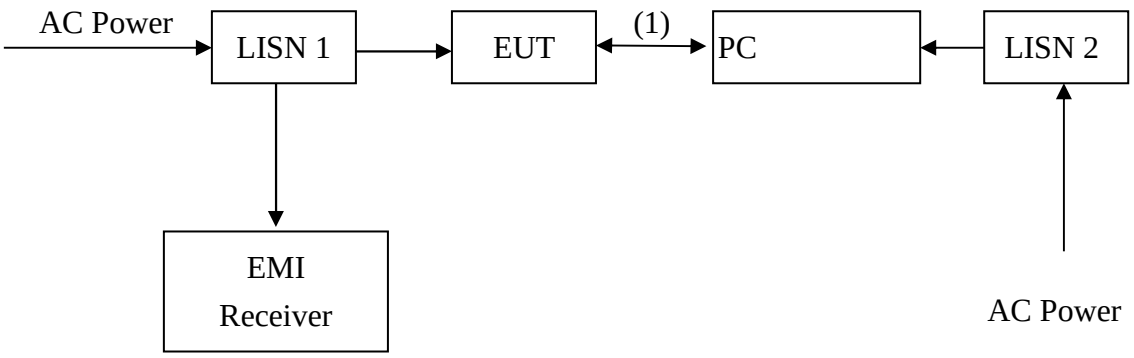
* Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

7. Power Line Conducted Emission test

7.1 Operating environment

Temperature:	23	℃
Relative Humidity:	55	%
Atmospheric Pressure	1011	hPa

7.2 Test setup & procedure



The EUT are connected to the main power through a line impedance stabilization network (LISN). This provides a 50 ohm/50 uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50 ohm/50 uH coupling impedance with 50 ohm termination.
Both sides (Line and Neutral) of AC line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10/2013 on conducted measurement.
The bandwidth of the field strength meter (R & S Test Receiver ESCI 30) is set at 9 kHz.

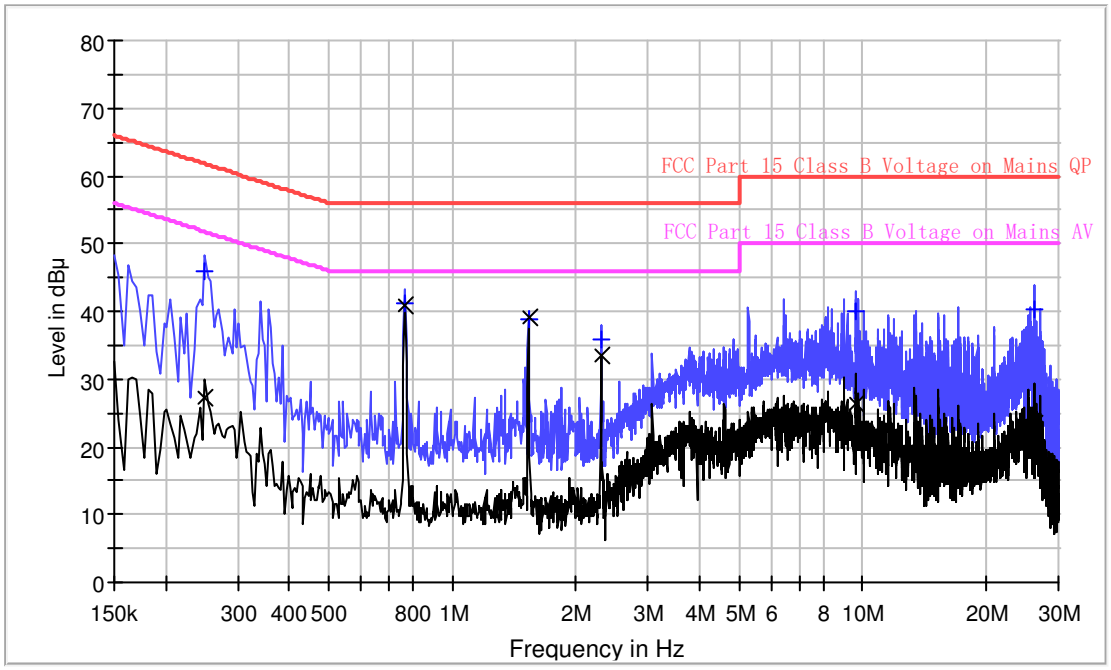
7.3 Limit

Freq. (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56*	56 – 46*
0.50~5.00	56	46
5.00~30.0	60	50

*Decreases with the logarithm of the frequency.

7.4 Power Line Conducted Emission test data

Applicant: TCL entertainment solutions limited
Date of Test: January 06, 2020 Model: TS9030
Worst Case Operating Mode: WIFI Link
Phase: Live



Result Table QP

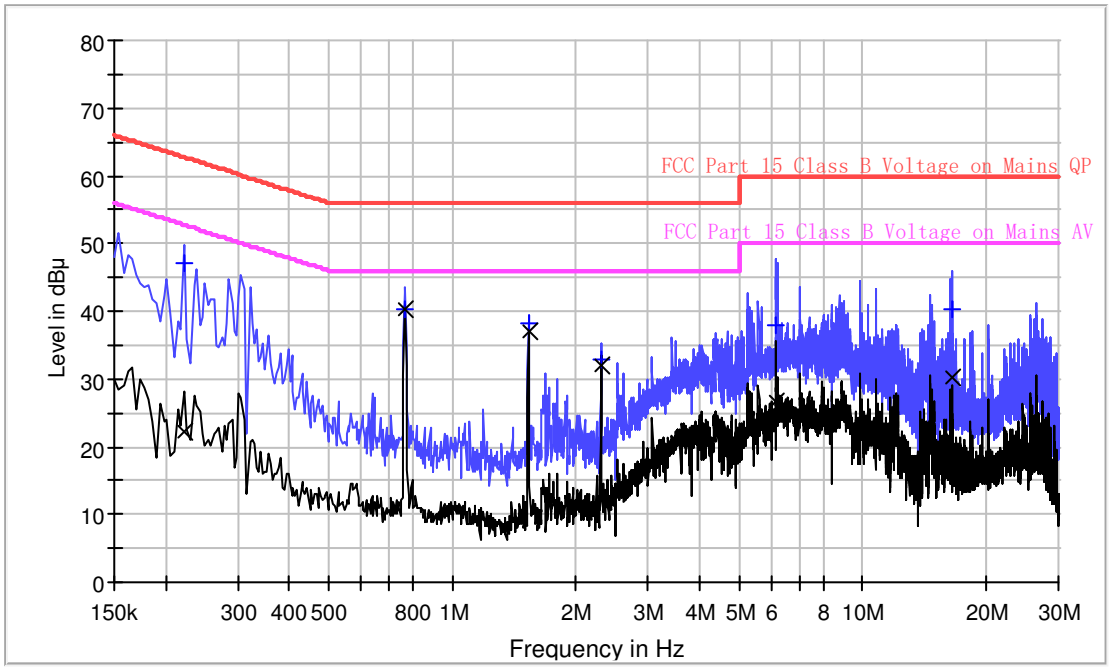
Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.250000	45.8	9.000	L1	9.7	16.0	61.8
0.770000	41.3	9.000	L1	9.7	14.7	56.0
1.538000	38.7	9.000	L1	9.7	17.3	56.0
2.306000	35.8	9.000	L1	9.7	20.2	56.0
9.638000	40.1	9.000	L1	9.9	19.9	60.0
26.342000	40.3	9.000	L1	11.0	19.7	60.0

Result Table AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.250000	27.2	9.000	L1	9.7	24.6	51.8
0.770000	41.0	9.000	L1	9.7	5.0	46.0
1.538000	39.1	9.000	L1	9.7	6.9	46.0
2.306000	33.6	9.000	L1	9.7	12.4	46.0
9.638000	26.3	9.000	L1	9.9	23.7	50.0
26.342000	23.5	9.000	L1	11.0	26.5	50.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

Applicant: TCL entertainment solutions limited
Date of Test: 06 February 2020 Model: TS9030
Worst Case Operating Mode: WIFI Link
Phase: Neutral



Result Table QP

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.222000	47.1	9.000	N	9.7	15.6	62.7
0.770000	40.2	9.000	N	9.7	15.8	56.0
1.538000	38.3	9.000	N	9.7	17.7	56.0
2.302000	32.9	9.000	N	9.8	23.1	56.0
6.154000	37.9	9.000	N	9.9	22.1	60.0
16.510000	40.2	9.000	N	10.3	19.8	60.0

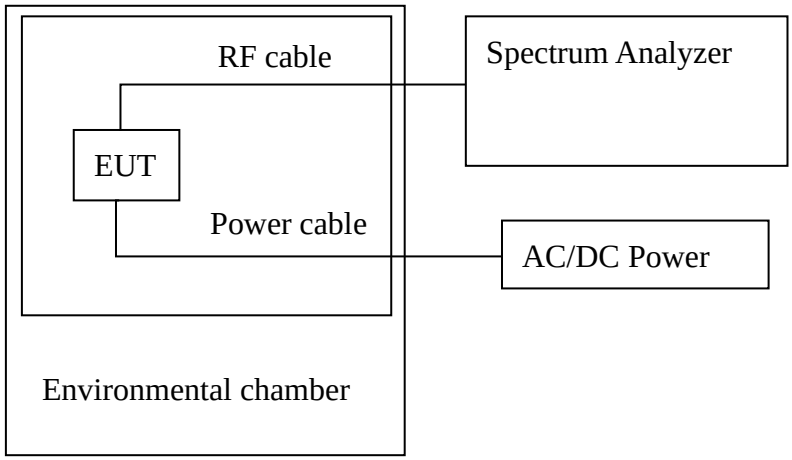
Result Table AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.222000	22.3	9.000	N	9.7	30.4	52.7
0.770000	40.2	9.000	N	9.7	5.8	46.0
1.538000	37.1	9.000	N	9.7	8.9	46.0
2.302000	32.1	9.000	N	9.8	13.9	46.0
6.154000	26.8	9.000	N	9.9	23.2	50.0
16.510000	30.1	9.000	N	10.3	19.9	50.0

Remark:
1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Margin (dB) = Limit (dBuV) – Level (dBuV)

8. Frequency Stability Test

8.1 Test setup & procedure



Note1: The frequency stability is measured with the temperature variation range of 0˚C to +45˚C (5˚C increment), and voltage supply variation range of 85% to 115% of nominal AC supply voltage.

2: To ensure emission at the band-edge is maintained within the authorized band, the frequency 802.11a/n-HT20/40/ac-HT20/40/80 channel 36, 48, 52, 64, 100, 140, 149, 165, 38, 46, 54, 62, 102, 134, 151, 159, 42, 58, 106, 122,155 are selected to test and the worst case was reported.

8.2 Frequency Stability Test Data

20˚C is taken as temperature in normal condition.

Test Mode	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Verdict
11A	5180	120	20	60000	11.583012	PASS
		102	20	75000	14.478764	PASS
		138	20	75000	14.478764	PASS
	5240	120	20	60000	11.450382	PASS
		102	20	60000	11.450382	PASS
		138	20	60000	11.450382	PASS
	5260	120	20	60000	11.406844	PASS
		102	20	60000	11.406844	PASS
		138	20	60000	11.406844	PASS
	5320	120	20	60000	11.278195	PASS
		102	20	60000	11.278195	PASS
		138	20	60000	11.278195	PASS
	5500	120	20	60000	10.909091	PASS
		102	20	60000	10.909091	PASS
		138	20	60000	10.909091	PASS
	5700	120	20	75000	13.157895	PASS
		102	20	75000	13.157895	PASS
		138	20	45000	7.894737	PASS
	5745	120	20	60000	10.443864	PASS
		102	20	45000	7.832898	PASS
		138	20	45000	7.832898	PASS
	5825	120	20	75000	12.875536	PASS
		102	20	60000	10.300429	PASS
		138	20	60000	10.300429	PASS
11N20SISO	5180	120	20	60000	11.583012	PASS
		102	20	30000	5.791506	PASS
		138	20	45000	8.687259	PASS
	5240	120	20	60000	11.450382	PASS
		102	20	60000	11.450382	PASS
		138	20	60000	11.450382	PASS
	5260	120	20	60000	11.406844	PASS
		102	20	60000	11.406844	PASS
		138	20	75000	14.258555	PASS
	5320	120	20	75000	14.097744	PASS
		102	20	60000	11.278195	PASS
		138	20	60000	11.278195	PASS
	5500	120	20	45000	8.181818	PASS
		102	20	60000	10.909091	PASS
		138	20	60000	10.909091	PASS
	5700	120	20	75000	13.157895	PASS
		102	20	75000	13.157895	PASS
		138	20	75000	13.157895	PASS
	5745	120	20	75000	13.05483	PASS
		102	20	60000	10.443864	PASS
		138	20	90000	15.665796	PASS
	5825	120	20	90000	15.450644	PASS
		102	20	90000	15.450644	PASS
		138	20	90000	15.450644	PASS
11N40SISO	5190	120	20	90000	17.34104	PASS
		102	20	60000	11.560694	PASS
		138	20	30000	5.780347	PASS
	5230	120	20	20000	3.824091	PASS
		102	20	90000	17.208413	PASS
		138	20	90000	17.208413	PASS
	5270	120	20	90000	17.077799	PASS
		102	20	60000	11.385199	PASS
		138	20	60000	11.385199	PASS
	5310	120	20	90000	16.949153	PASS
		102	20	60000	11.299435	PASS

		138	20	60000	11.299435	PASS
	5510	120	20	90000	16.333938	PASS
		102	20	90000	16.333938	PASS
		138	20	90000	16.333938	PASS
	5670	120	20	60000	10.582011	PASS
		102	20	90000	15.873016	PASS
		138	20	90000	15.873016	PASS
	5755	120	20	30000	5.212858	PASS
		102	20	30000	5.212858	PASS
		138	20	30000	5.212858	PASS
	5795	120	20	60000	10.353753	PASS
		102	20	90000	15.53063	PASS
		138	20	90000	15.53063	PASS
11AC20SISO	5180	120	20	75000	14.478764	PASS
		102	20	60000	11.583012	PASS
		138	20	75000	14.478764	PASS
	5240	120	20	75000	14.312977	PASS
		102	20	45000	8.587786	PASS
		138	20	60000	11.450382	PASS
	5260	120	20	60000	11.406844	PASS
		102	20	60000	11.406844	PASS
		138	20	60000	11.406844	PASS
	5320	120	20	75000	14.097744	PASS
		102	20	75000	14.097744	PASS
		138	20	75000	14.097744	PASS
	5500	120	20	60000	10.909091	PASS
		120	20	90000	16.363636	PASS
		102	20	60000	10.909091	PASS
	5700	138	20	75000	13.157895	PASS
		120	20	75000	13.157895	PASS
		102	20	60000	10.526316	PASS
	5745	138	20	75000	13.05483	PASS
		120	20	60000	10.443864	PASS
		102	20	60000	10.443864	PASS
	5825	138	20	75000	12.875536	PASS
		120	20	75000	12.875536	PASS
		102	20	75000	12.875536	PASS
11AC40SISO	5190	138	20	90000	17.34104	PASS
		120	20	90000	17.34104	PASS
		102	20	90000	17.34104	PASS
	5230	138	20	90000	17.208413	PASS
		120	20	90000	17.208413	PASS
		102	20	90000	17.208413	PASS
	5270	138	20	90000	17.077799	PASS
		120	20	60000	11.385199	PASS
		102	20	90000	17.077799	PASS
	5310	138	20	60000	11.299435	PASS
		120	20	90000	16.949153	PASS
		102	20	60000	11.299435	PASS
	5510	138	20	90000	16.333938	PASS
		120	20	60000	10.889292	PASS
		102	20	90000	16.333938	PASS
	5670	138	20	90000	15.873016	PASS
		120	20	90000	15.873016	PASS
		102	20	90000	15.873016	PASS
	5755	138	20	90000	15.638575	PASS
		120	20	60000	10.425717	PASS
		102	20	90000	15.638575	PASS
	5795	138	20	30000	5.176877	PASS
		120	20	90000	15.53063	PASS
		102	20	60000	10.353753	PASS
11AC80SISO	5210	138	20	60000	13.03263	PASS
		120	20	60000	11.516315	PASS

		102	20	60000	11.516315	PASS
	5290	138	20	0	0	PASS
		120	20	60000	11.342155	PASS
		102	20	60000	11.342155	PASS
	5530	138	20	60000	10.84991	PASS
		120	20	60000	10.84991	PASS
		102	20	0	0	PASS
	5610	138	20	60000	10.695187	PASS
		120	20	60000	10.695187	PASS
		102	20	60000	11.390374	PASS
	5775	138	20	60000	10.779221	PASS
		120	20	60000	10.38961	PASS
		102	20	60000	10.38961	PASS

Test Mode	Channel	Voltage [Vdc]	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Verdict
11A	5180	120	0	75000	14.478764	PASS
		120	5	75000	14.478764	PASS
		120	15	75000	14.478764	PASS
		120	25	75000	14.478764	PASS
		120	35	60000	11.583012	PASS
		120	45	75000	14.478764	PASS
	5240	120	0	60000	11.450382	PASS
		120	5	75000	14.312977	PASS
		120	15	60000	11.450382	PASS
		120	25	60000	11.450382	PASS
		120	35	60000	11.450382	PASS
		120	45	60000	11.450382	PASS
	5260	120	0	75000	14.258555	PASS
		120	5	75000	14.258555	PASS
		120	15	60000	11.406844	PASS
		120	25	60000	11.406844	PASS
		120	35	60000	11.406844	PASS
		120	45	60000	11.406844	PASS
	5320	120	0	60000	11.363636	PASS
		120	5	60000	11.363636	PASS
		120	15	60000	11.363636	PASS
		120	25	60000	11.363636	PASS
		120	35	60000	11.363636	PASS
		120	45	60000	11.363636	PASS
	5500	120	0	75000	13.636364	PASS
		120	5	60000	10.909091	PASS
		120	15	60000	10.909091	PASS
		120	25	60000	10.909091	PASS
		120	35	60000	10.909091	PASS
		120	45	60000	10.909091	PASS
	5700	120	0	60000	10.526316	PASS
		120	5	60000	10.526316	PASS
		120	15	60000	10.526316	PASS
		120	25	60000	10.526316	PASS
		120	35	75000	13.157895	PASS
		120	45	60000	10.526316	PASS
	5745	120	0	45000	7.832898	PASS
		120	5	45000	7.832898	PASS
		120	15	60000	10.443864	PASS

		120	25	45000	7.832898	PASS
		120	35	45000	7.832898	PASS
		120	45	60000	10.443864	PASS
	5825	120	0	75000	12.875536	PASS
		120	5	60000	10.300429	PASS
		120	15	60000	10.300429	PASS
		120	25	60000	10.300429	PASS
		120	35	60000	10.300429	PASS
		120	45	60000	10.300429	PASS
11N20SISO	5180	120	0	45000	8.687259	PASS
		120	5	75000	14.478764	PASS
		120	15	60000	11.583012	PASS
		120	25	45000	8.687259	PASS
		120	35	45000	8.687259	PASS
		120	45	75000	14.478764	PASS
	5240	120	0	60000	11.450382	PASS
		120	5	60000	11.450382	PASS
		120	15	60000	11.450382	PASS
		120	25	60000	11.450382	PASS
		120	35	45000	8.587786	PASS
		120	45	60000	11.450382	PASS
	5260	120	0	60000	11.406844	PASS
		120	5	60000	11.406844	PASS
		120	15	60000	11.406844	PASS
		120	25	60000	11.406844	PASS
		120	35	60000	11.406844	PASS
		120	45	45000	8.555133	PASS
	5320	120	0	60000	11.278195	PASS
		120	5	60000	11.278195	PASS
		120	15	60000	11.278195	PASS
		120	25	60000	11.278195	PASS
		120	35	60000	11.278195	PASS
		120	45	60000	11.278195	PASS
	5500	120	0	45000	8.181818	PASS
		120	5	45000	8.181818	PASS
		120	15	60000	10.909091	PASS
		120	25	45000	8.181818	PASS
		120	35	75000	13.636364	PASS
		120	45	45000	8.181818	PASS
	5700	120	0	75000	13.157895	PASS
		120	5	90000	15.789474	PASS
		120	15	90000	15.789474	PASS
		120	25	60000	10.526316	PASS
		120	35	75000	13.157895	PASS
		120	45	75000	13.157895	PASS
	5745	120	0	60000	10.443864	PASS
		120	5	75000	13.05483	PASS
		120	15	90000	15.665796	PASS
		120	25	75000	13.05483	PASS
		120	35	75000	13.05483	PASS
		120	45	75000	13.05483	PASS
	5825	120	0	75000	12.964564	PASS
		120	5	75000	12.964564	PASS
		120	15	90000	15.557476	PASS
		120	25	90000	15.557476	PASS
		120	35	90000	15.557476	PASS
		120	45	90000	15.557476	PASS
11N40SISO	5190	120	0	90000	17.34104	PASS
		120	5	90000	17.34104	PASS
		120	15	90000	17.34104	PASS
		120	25	90000	17.34104	PASS
		120	35	90000	17.34104	PASS
		120	45	60000	11.560694	PASS

	5230	120	0	60000	11.472275	PASS
		120	5	60000	11.472275	PASS
		120	15	60000	11.472275	PASS
		120	25	60000	11.472275	PASS
		120	35	90000	17.208413	PASS
		120	45	60000	11.472275	PASS
	5270	120	0	90000	17.077799	PASS
		120	5	60000	11.385199	PASS
		120	15	60000	11.385199	PASS
		120	25	30000	5.6926	PASS
		120	35	60000	11.385199	PASS
		120	45	90000	17.077799	PASS
	5310	120	0	90000	16.949153	PASS
		120	5	30000	5.649718	PASS
		120	15	90000	16.949153	PASS
		120	25	30000	5.649718	PASS
		120	35	60000	11.299435	PASS
		120	45	60000	11.299435	PASS
	5510	120	0	90000	16.333938	PASS
		120	5	90000	16.333938	PASS
		120	15	60000	10.889292	PASS
		120	25	30000	5.444646	PASS
		120	35	60000	10.889292	PASS
		120	45	90000	16.333938	PASS
	5670	120	0	90000	15.873016	PASS
		120	5	90000	15.873016	PASS
		120	15	90000	15.873016	PASS
		120	25	90000	15.873016	PASS
		120	35	90000	15.873016	PASS
		120	45	90000	15.873016	PASS
	5755	120	0	90000	15.638575	PASS
		120	5	60000	10.425717	PASS
		120	15	90000	15.638575	PASS
		120	25	30000	5.212858	PASS
		120	35	60000	10.425717	PASS
		120	45	60000	10.425717	PASS
	5795	120	0	60000	10.353753	PASS
		120	5	90000	15.53063	PASS
		120	15	30000	5.176877	PASS
		120	25	90000	15.53063	PASS
		120	35	90000	15.53063	PASS
		120	45	90000	15.53063	PASS
11AC20SISO	5180	120	0	90000	17.374517	PASS
		120	5	60000	11.583012	PASS
		120	15	75000	14.478764	PASS
		120	25	75000	14.478764	PASS
		120	35	60000	11.583012	PASS
		120	45	75000	14.478764	PASS
	5240	120	0	75000	14.312977	PASS
		120	5	45000	8.587786	PASS
		120	15	60000	11.450382	PASS
		120	25	75000	14.312977	PASS
		120	35	60000	11.450382	PASS
		120	45	75000	14.312977	PASS
	5260	120	0	60000	11.406844	PASS
		120	5	75000	14.258555	PASS
		120	15	75000	14.258555	PASS
		120	25	60000	11.406844	PASS
		120	35	75000	14.258555	PASS
		120	45	75000	14.258555	PASS
	5320	120	0	60000	11.278195	PASS
		120	5	75000	14.097744	PASS
		120	15	75000	14.097744	PASS

		120	25	60000	11.278195	PASS
		120	35	75000	14.097744	PASS
		120	45	75000	14.097744	PASS
	5500	120	0	75000	13.636364	PASS
		120	5	75000	13.636364	PASS
		120	15	60000	10.909091	PASS
		120	25	60000	10.909091	PASS
		120	35	75000	13.636364	PASS
		120	45	60000	10.909091	PASS
	5700	120	0	60000	10.526316	PASS
		120	5	75000	13.157895	PASS
		120	15	75000	13.157895	PASS
		120	25	75000	13.157895	PASS
		120	35	60000	10.526316	PASS
		120	45	75000	13.157895	PASS
	5745	120	0	75000	13.05483	PASS
		120	5	75000	13.05483	PASS
		120	15	60000	10.443864	PASS
		120	25	75000	13.05483	PASS
		120	35	60000	10.443864	PASS
		120	45	75000	13.05483	PASS
	5825	120	0	60000	10.300429	PASS
		120	5	75000	12.875536	PASS
		120	15	75000	12.875536	PASS
		120	25	75000	12.875536	PASS
		120	35	75000	12.875536	PASS
		120	45	75000	12.875536	PASS
11AC40SISO	5190	120	0	90000	17.34104	PASS
		120	5	90000	17.34104	PASS
		120	15	90000	17.34104	PASS
		120	25	90000	17.34104	PASS
		120	35	90000	17.34104	PASS
		120	45	90000	17.34104	PASS
	5230	120	0	90000	17.208413	PASS
		120	5	60000	11.472275	PASS
		120	15	90000	17.208413	PASS
		120	25	90000	17.208413	PASS
		120	35	60000	11.472275	PASS
		120	45	60000	11.472275	PASS
	5270	120	0	90000	17.077799	PASS
		120	5	60000	11.385199	PASS
		120	15	60000	11.385199	PASS
		120	25	90000	17.077799	PASS
		120	35	90000	17.077799	PASS
		120	45	60000	11.385199	PASS
	5310	120	0	90000	16.949153	PASS
		120	5	60000	11.299435	PASS
		120	15	60000	11.299435	PASS
		120	25	60000	11.299435	PASS
		120	35	90000	16.949153	PASS
		120	45	90000	16.949153	PASS
	5510	120	0	90000	16.333938	PASS
		120	5	60000	10.889292	PASS
		120	15	60000	10.889292	PASS
		120	25	60000	10.889292	PASS
		120	35	90000	16.333938	PASS
		120	45	90000	16.333938	PASS
	5670	120	0	90000	15.873016	PASS
		120	5	90000	15.873016	PASS
		120	15	90000	15.873016	PASS
		120	25	90000	15.873016	PASS
		120	35	90000	15.873016	PASS
		120	45	90000	15.873016	PASS

	5755	120	0	90000	15.638575	PASS
		120	5	90000	15.638575	PASS
		120	15	60000	10.425717	PASS
		120	25	60000	10.425717	PASS
		120	35	90000	15.638575	PASS
		120	45	90000	15.638575	PASS
	5795	120	0	90000	15.53063	PASS
		120	5	60000	10.353753	PASS
		120	15	90000	15.53063	PASS
		120	25	90000	15.53063	PASS
		120	35	90000	15.53063	PASS
		120	45	60000	10.353753	PASS
11AC80SISO	5210	120	0	60000	11.516315	PASS
		120	5	60000	11.516315	PASS
		120	15	60000	13.03263	PASS
		120	25	60000	11.516315	PASS
		120	35	60000	11.516315	PASS
		120	45	80000	15.355086	PASS
	5290	120	0	60000	11.342155	PASS
		120	5	60000	11.342155	PASS
		120	15	60000	11.342155	PASS
		120	25	0	0	PASS
		120	35	60000	11.342155	PASS
		120	45	0	0	PASS
	5530	120	0	60000	11.699819	PASS
		120	5	60000	10.84991	PASS
		120	15	60000	11.699819	PASS
		120	25	60000	10.84991	PASS
		120	35	60000	10.84991	PASS
		120	45	60000	10.84991	PASS
	5610	120	0	60000	10.695187	PASS
		120	5	60000	10.695187	PASS
		120	15	60000	10.695187	PASS
		120	25	60000	10.695187	PASS
		120	35	90000	16.042781	PASS
		120	45	60000	11.390374	PASS
	5775	120	0	60000	10.38961	PASS
		120	5	60000	10.38961	PASS
		120	15	60000	10.38961	PASS
		120	25	60000	10.38961	PASS
		120	35	60000	10.38961	PASS
		120	45	60000	10.38961	PASS

Note: All emissions are maintained within the band of operation under all conditions of normal operation as specified in the user manual. It fulfills the requirement of 15.407(g).

9. Dynamic Frequency Selection (DFS) (FCC 15.407)

9.1 Requirement

Applicability of DFS Requirements Prior to Use of a Channel

Requirement	Operational Mode		
	Master	Client Without 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
U-NII Detection Bandwidth	Yes	Not Required	Yes

Applicability of DFS requirements during normal operation

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not Required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not Required

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

Note: EUT is a client without DFS detection capabilities.

9.1.1 DFS Detection Thresholds for Master or Client Devices with DFS Detection

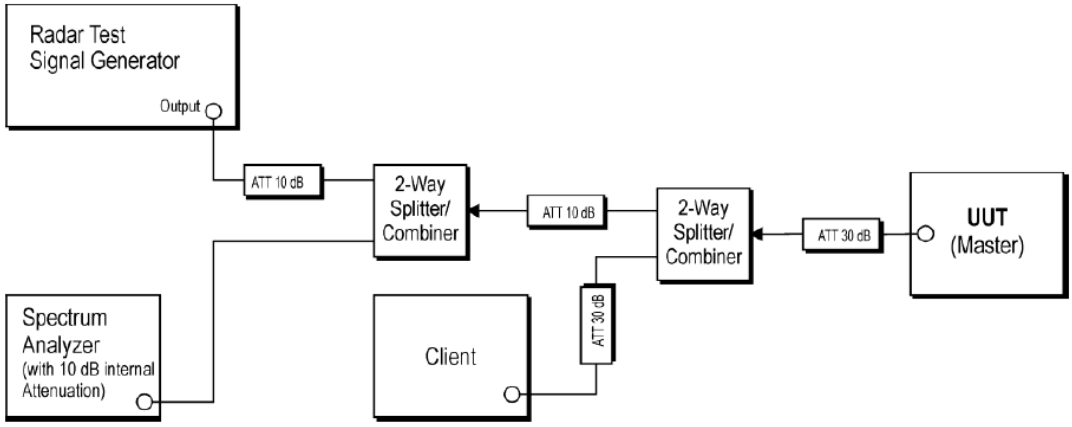
Maximum Transmit Power	Values (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01	

Parameter	Value
Non-Occupancy Period	Minimum 30 minutes
Channel Availability Check Time	60 Seconds
Channel Move Time	10 seconds (see note 1)
Channel Closing Transmission Time	200 ms + an aggregate of 60 ms over remaining 10 Second period. (see note 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (see note 3)
Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst. **Note 2:** The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions. **Note 3:** During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.	

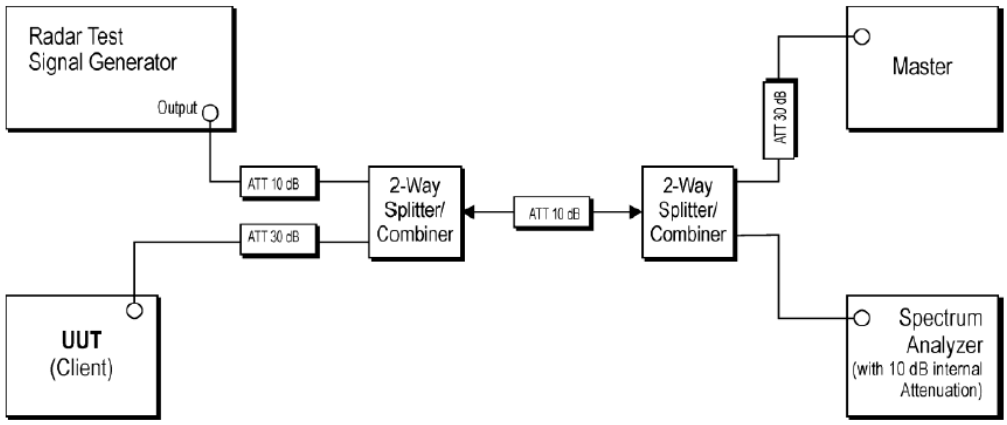
9.1.2 Radar Test Waveforms

Test procedures were made in accordance to KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02, for more radar test waveform details please refer section 6 of KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02.

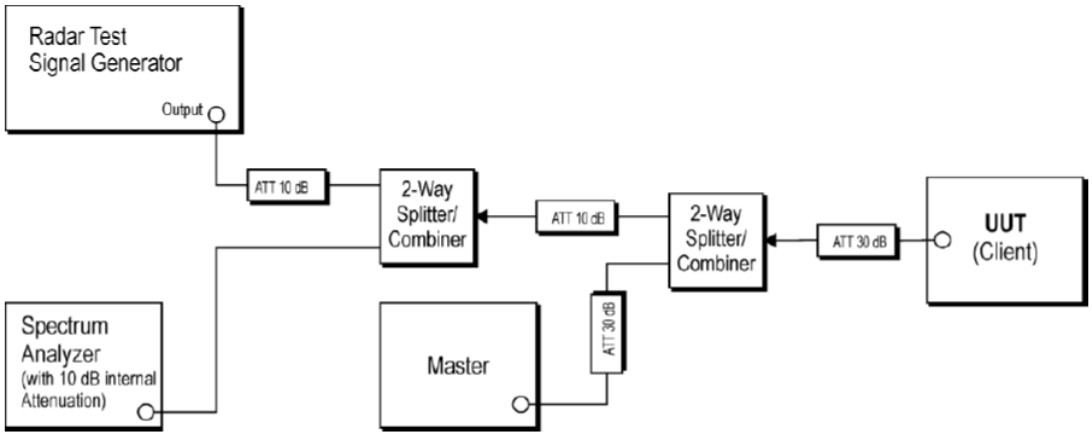
9.2 Test setup



Setup for Master with injection at the Master



Setup for Client with injection at the Master



Setup for Client with injection at the Client

Note: EUT is a client without DFS detection capabilities. Test procedures were made in accordance to KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02. DFS testing was setup as a client with injection into the master.

9.3 In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

9.3.1 Test Procedure

The EUT was configured to communicate with a master device. The test file was streamed from the Master to the Client (EUT) on the selected test channel. Measurements were made while utilizing the widest bandwidth of the EUT.

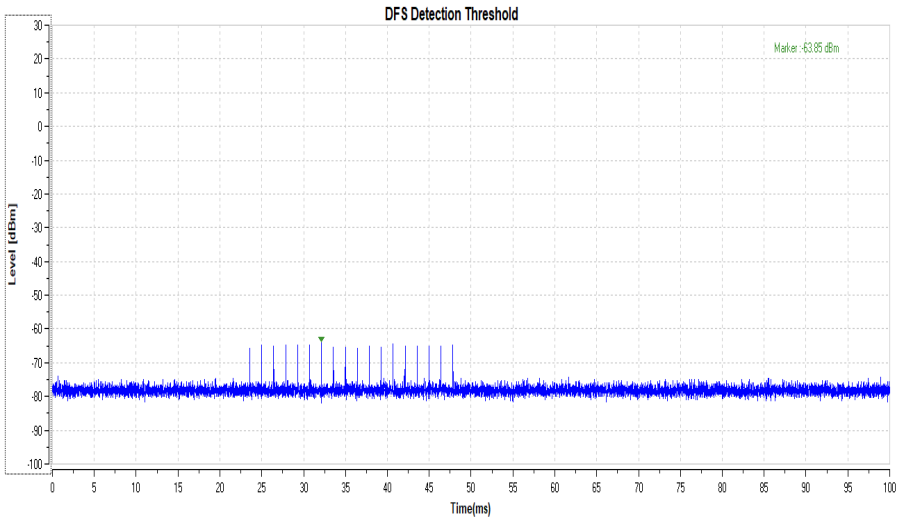
Channel closing transmission time and channel move time were measured by applying a radar type 0 at threshold + 1dB to the EUT. The EUT transmissions were observed on the EUT center channel. The time between the end of the applied radar waveform and the final transmission on the channel is the channel move time. The channel closing transmission time comprises only those fragments of the channel move time during which the EUT transmits.

The Channel Move time shall be less than 10 seconds
The Channel Close time shall be 200ms +60ms of aggregate time.
The Non-occupancy time shall 30 minutes or greater.

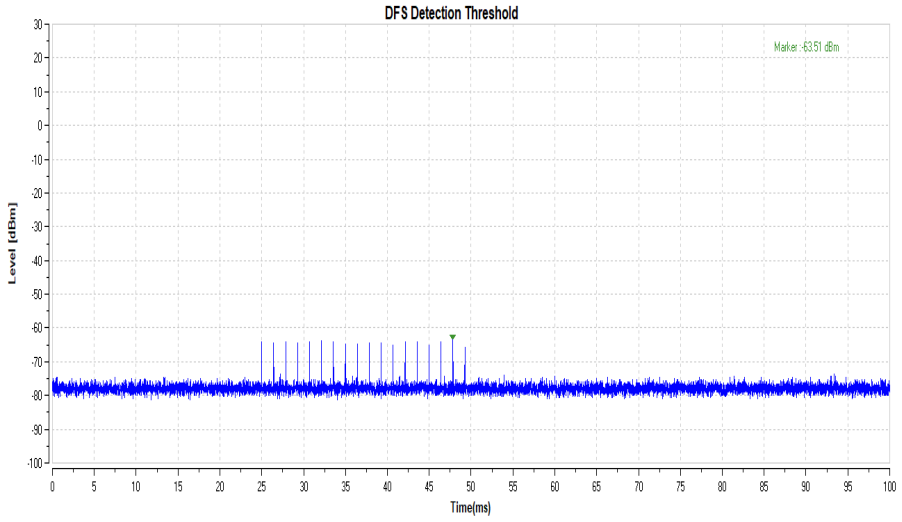
9.3.2 Calibration Results

Radar Type 0 Calibration:

Frequency	Radar Waveform Length:	Detection Threshold level
5290 MHz	0.025704s	-63.85 dBm



Frequency	Radar Waveform Length:	Detection Threshold level
5530 MHz	0.025704s	-63.51 dBm

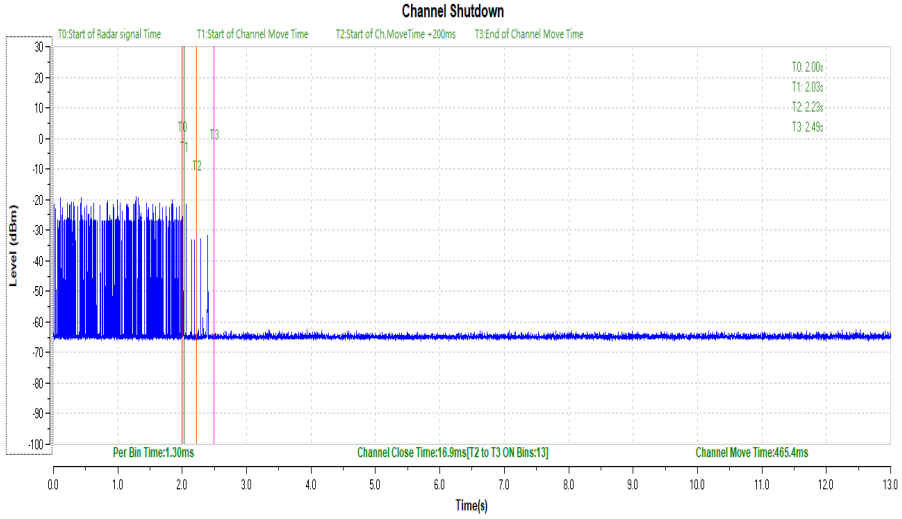


9.3.3 Channel Move time and Channel Closing Transmission Time Test Results

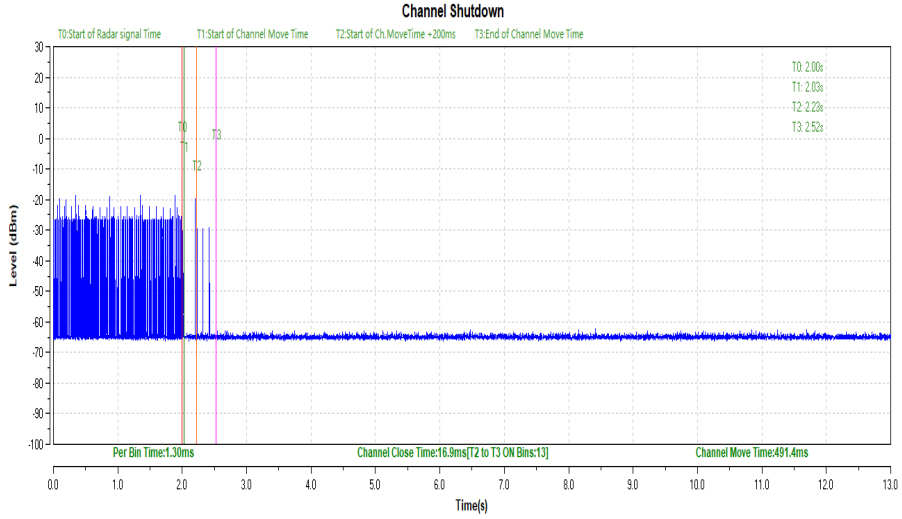
Frequency	Bandwidth	Channel Move Time [ms]	Limit[ms]	Channel Closing Transmission [ms]	Limit[ms]	Verdict
5290MHz	80 MHz	465.4	10000	16.9	260	PASS
5530 MHz	80 MHz	491.4	10000	16.9	260	PASS

Test Graph:

5290 MHz



5530MHz

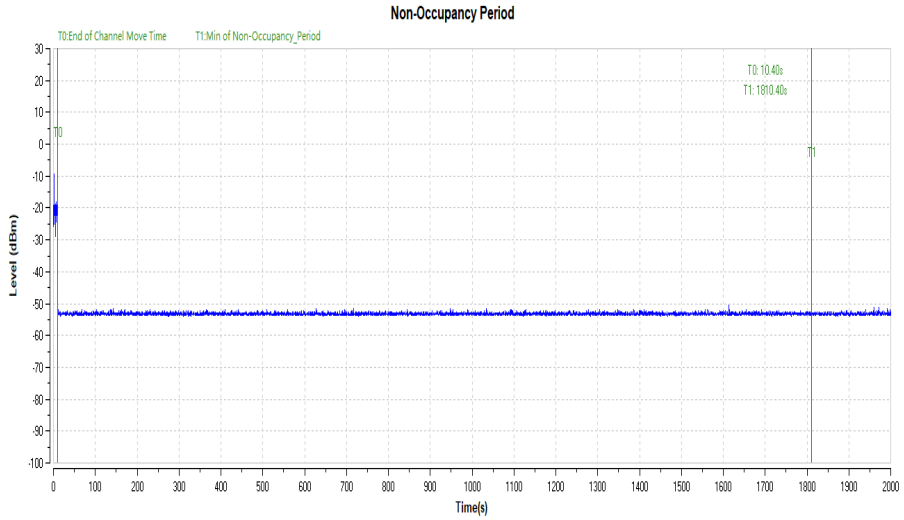


9.3.4 Non-Occupancy Period Test Results

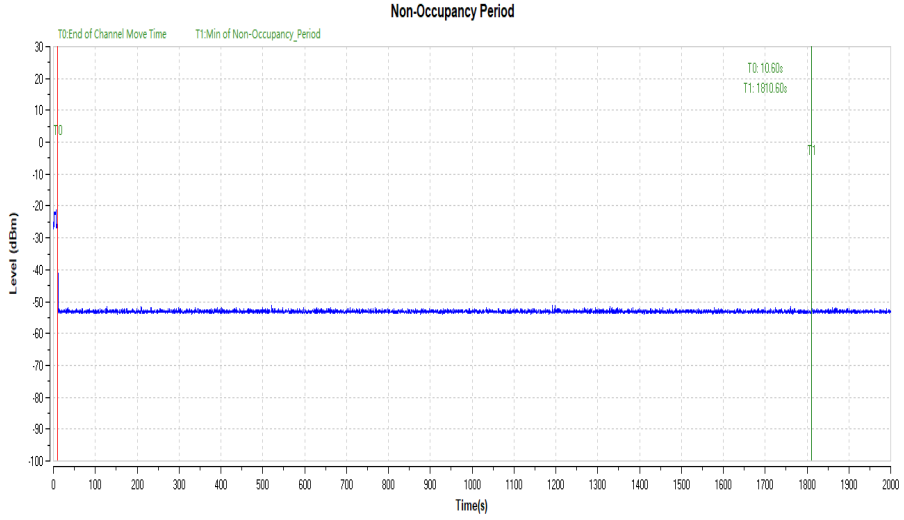
Frequency	Bandwidth	Measured Value	Limit Requirements	Verdict
5290MHz	80 MHz	> 30min	30min	Pass
5530 MHz	80 MHz	> 30min	30min	Pass

Test Graph:

5290 MHz



5530MHz



Appendix A: Test equipment list

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	28-May-2019	28-May-2020
SZ182-02-01	Pulse Power Sensor	Anritsu	MA2411B	1207429	28-May-2019	28-May-2020
SZ070-24	Open Switch and Control Unit with TS8997 option for power measurement test	R&S	OSP120+B157	---	30-Oct-2019	30-Oct-2020
SZ070-20	Combiner	Mini-Circuits	ZN2PD-63-S+	---	28-May-2019	28-May-2020
SZ070-21	Combiner	Mini-Circuits	ZN2PD-63-S+	---	28-May-2019	28-May-2020
SZ056-05	Spectrum Analyzer	Agilent	E4407B	US40522113	24-Dec-2018 24-Dec-2019	24-Dec-2019 24-Dec-2020
SZ180-13	MXG Vector Signal Generator	Keysight	N5182B	MY53051328	29-Oct-2019	29-Oct-2020
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	14-Sep-2018	14-Sep-2020
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	24-May-2019	24-May-2020
SZ061-09	Horn Antenna	ETS	3115	00092346	24-Aug-2019	24-Aug-2021
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	13-Aug-2019	13-Aug-2021
SZ185-01	EMI Receiver	R&S	ESCI	100547	24-Dec-2018 24-Dec-2019	24-Dec-2019 24-Dec-2020
SZ056-06	Signal Analyzer	R&S	FSV40	101101	28-May-2019	28-May-2020
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	5-Jul-2019	5-Jul-2020
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	15-Dec-2018	15-Dec-2020
SZ062-02	RF Cable	RADIALL	RG 213U	--	10-Jun-2019	10-Jun-2020
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	10-Jun-2019	10-Jun-2020
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	10-Jun-2019	10-Jun-2020
SZ067-25	Notch Filter	Micro-Tronics	BRM50716	--	22-Mar-2019	22-Mar-2020
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	22-Mar-2019	22-Mar-2020
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	29-Oct-2019	29-Oct-2020
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	29-Oct-2019	29-Oct-2020
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	28-May-2019	28-May-2020
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2020
SZ016-12	Programmable Temperature & Humidity Chamber	Taili	MHK-120NK	AB0105	17-Jan-2019	17-Jan-2020
SZ006-30	DC Power Supply	Guwei	SPS-3610	GEQ920551	15-Jan-2019	15-Jan-2020

Expanded uncertainty of radiated emission measurement is ±4.9 dB.
Expanded uncertainty of conducted emission measurement is ±3.6 dB.

********** End of Report**********