



TEST REPORT

EUT Description	WLAN and BT, 2x2 PCIe M.2 2230 adapter card
Brand Name	Intel®
Model Name	BE201NGW
FCC ID / IC ID	PD9BE201NG ; 1000M-BE201NG
Date of Test Start/End	2023-11-10 / 2024-01-18
Features	2x2 WiFi - Bluetooth® (see section 5)

Applicant	Intel Corporation SAS
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Reference Standards	FCC CFR Title 47 Part 15 E RSS-247 issue 3, RSS-Gen A1 issue 5 - A1 (see section 1)
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Test Report identification	231109-03.TR02
Revision Control	Rev. 00 This test report revision replaces any previous test report revision (see section 8)

The test results relate only to the samples tested.
 Reference to accreditation shall be used only by full reproduction of test report.

Issued by _____ Reviewed by _____

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1. Standards, reference documents and applicable test methods

FCC ISED	<ol style="list-style-type: none"> 1. FCC Title 47 CFR part 15 – Subpart E – Unlicensed National Information Infrastructure Devices. 2021-10-01 Edition 2. FCC Title 47 CFR part 15 – Subpart C – §15.209 Radiated emission limits; general requirements. 2021-10-01 Edition 3. FCC OET KDB 662911 D01 v02r01 - Emissions Testing of Transmitters with Multiple Outputs in the Same Band. 4. FCC OET KDB 789033 D02 v02r01 - Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) devices part 15, subpart E 5. ANSI C63.10-2013 American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. 6. FCC OET KDB 291074 D01 v01 - General Requirements 7. FCC OET KDB 291074 D02 v01 - EMC Measurement 8. FCC OET KDB 291074 D03 v01 - QA General Questions and Answers 9. FCC OET KDB 291074 D04 v01 – UN5GHz Checklist v01 10. RSS-247 Issue 3 - Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices. 11. RSS-Gen Issue 5 A1- General Requirements for Compliance of Radio Apparatus
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2. General conditions, competences and guarantees

- ✓ Tests performed under FCC standards identified in section 1 are covered by A2LA accreditation.
- ✓ Tests performed under ISED standards identified in section 1 are covered by Cofrac accreditation.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 laboratory accredited by the American Association for Laboratory Accreditation (A2LA) with the certificate number 3478.01.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an Accredited Test Firm recognized by the FCC, with Designation Number FR0011.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is an ISO/IEC 17025:2017 testing laboratory accredited by the French Committee for Accreditation (Cofrac) with the certificate number 1-6736.
- ✓ Intel Corporation SAS Wireless RF Lab (Intel WRF Lab) is a Registered Test Site listed by ISED, with ISED company number 1000Y and CAB identifier FR0005.
- ✓ Intel WRF Lab only provides testing services and is committed to providing reliable, unbiased test results and interpretations.
- ✓ Intel WRF Lab is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.
- ✓ Intel WRF Lab has developed calibration and proficiency programs for its measurement equipment to ensure correlated and reliable results to its customers.
- ✓ This report is only referred to the item that has undergone the test.
- ✓ This report does not imply an approval of the product by the Certification Bodies or competent Authorities.

3. Environmental Conditions

- ✓ At the site where the measurements were performed the following limits were not exceeded during the tests:

Temperature	23.2 °C ± 2.6°C
Humidity	39.3% ± 14.5%

4. Test samples

Sample	Control #	Description	Model	Serial #	Date of receipt	Note
#01	231109-03.S04	WiFi 7 Module	BE201NGW	A002A5B1A56C	2023-11-10	Used for all other RF conducted tests
	231109-03.S53	WiFi 7 Module	BE201NGW	4C496C6BD41A	2023-12-21	
	200203-01.S10	Laptop	HP (HSN-I38C)	000951007L	2023-04-24	
	231109-03.S31	CRF DB 2230 BNJ Extender Board	PCB00862-00_A	ASS00862-01-0A	2023-11-10	

5. EUT Features

The herein information is provided by the customer.

Intel WRF Lab declines any responsibility for the accuracy of the stated customer provided information, especially if it has any impact on the correctness of test results presented in this report.

Brand Name	Intel®		
Model Name	BE201NGW		
Software Version	DRTU.05312.99.0.84 / DRTU.05490.99.0.85		
Driver Version	99.0.84.6 / 99.0.85.2		
Prototype / Production	Production		
Supported Radios	802.11b/g/n/ax/be	2.4GHz	
	802.11a/n/ac/ax/be	5.2GHz	
		5.6GHz	
		5.8GHz	
		5.9GHz	
	802.11ax/be	6.0GHz	
	Bluetooth	2.4GHz	
Antenna Information	Transmitter	Chain A(1)	Chain B(2)
	Manufacturer	Intel WRF Lab	Intel WRF Lab
	Antenna type	PIFA	PIFA
	Part number	WRF-Tri Band-Antenna	WRF-Tri Band-Antenna
	Declared antenna gain (dBi)	+5.15	+5.15

6. Remarks and comments

1. No deviations were made from the test methods listed in section 1 of this report
2. Only the worst-case plot per bandwidth and test case measurements have been reported excepted for band edge measurements where all plots are reported

7. Test Verdicts summary

The statement of conformity to applicable standards in the table below are based on the measured values, without taking into account the measurement uncertainties.

7.1. 802.11 a/n/ac/ax/be – U-NII- 4

FCC part	RSS part	Test name	Verdict
15.407 (a) (3)	RSS-247 Clause 6.2.5.2	Maximum output power	P
14.407 (e)	RSS-247 Clause 6.2.5.2	6dB Emission Bandwith	P
15.407 (a) (3)	RSS-247 Clause 6.2.5.2	Power spectral density	P
15.407 (b) (5)	RSS-247 Clause 6.2.5.3	Undesirable emissions limits: out of band (conducted)	P

8. Document Revision History

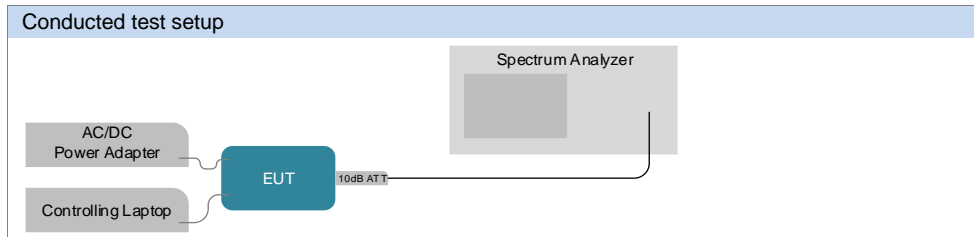
Revision #	Modified by	Revision Details
Rev. 00	T.MATHIEU	First Issue

Annex A. Test & System Description

A.1 Measurement System

Measurements were performed using the following setups, made in accordance to the general provisions of ANSI C63.10 2013.

The DUT was installed in a test fixture and this test fixture is connected to a laptop computer and AC/DC power adapter. The laptop computer was used to configure the EUT to continuously transmit at a specified output power using all different modes and modulation schemes, using the Intel proprietary tool DRTU.



A.2 Test Equipment List

Conducted setup

ID#	Device	Type/Model	Serial #	Manufacturer	Cal. Date	Cal. Due Date
266-000	Spectrum Analyzer	FSV30	103307	Rohde & Schwarz	2022-04-26	2024-04-26
131-000	Spectrum Analyzer	FSV40	101425	Rohde & Schwarz	2022-07-10	2024-07-10
019-000	RF cable 50cm	PE360-50CM	N/A	PASTERNAK	2023-03-03	2024-03-03
019-002	10dB Attenuator + MH4	N/A	N/A	N/A	2023-03-03	2024-03-03
018-003	RF cable 50cm	PE360-50CM	N/A	PASTERNAK	2023-03-03	2024-03-03
018-001	10dB Attenuator + MH4	N/A	N/A	N/A	2023-03-03	2024-03-03
407-000	Temp & Humidity Logger	RA12E-TH1-RAS	RA12-E16EDA	AVITECH	2023-07-12	2025-07-12
413-000	Measurement SW v1.5.4.2	Octopi	N/A	Step AT	N/A	N/A

Choose a building block.

A.3 Measurement Uncertainty Evaluation

The system uncertainty evaluation is shown in the table below with a coverage factor of $k = 2$ to indicate a 95% level of confidence:

Measurement type	Uncertainty	Unit
Timing	± 0.12	%
Power Spectral density	± 1.47	dB
Occupied bandwidth	± 2.07	%
Conducted Power	± 1.03	dB
Conducted Spurious Emission <26.5 GHz	± 3.45	dB

Annex B. Test Results U-NII-4

The herein test results were performed by:

Test case measurement	Test Personnel
6dB and 99% Bandwidth	T.MATHIEU
Maximum output power & Maximum PSD	T.MATHIEU
Undesirable emission limits: out of band	T.MATHIEU

B.1 Test Conditions

For 802.11a mode the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, but not simultaneously.

For 802.11n20 & 802.11ax/be20 (20 MHz channel bandwidth), 802.11n40 and 802.11ax/be40 (40MHz channel bandwidth) 802.11ac80 & 802.11ax/be80 (80MHz channel bandwidth), 802.11ac160 & 802.11ax/be160 (160MHz channel bandwidth) modes the EUT can transmit at both CHAIN A and CHAIN B RF outputs individually, and also simultaneously.

The following data rates were selected based on preliminary testing that identified those rates as the worst cases for output power and spurious levels at the band edges:

Transmission	Mode	Bandwidth (MHz)	Worst Case Data Rate
SISO	802.11a	20	6Mbps
	802.11n	20	HT0
		40	HT0
	802.11ac	80/160	VHT0
	802.11ax/be	20/40/80/160	MCS0
MIMO	802.11n	20/40	HT8
	802.11ac	80/160	VHT0
	802.11ax/be	20/40/80/160	MCS0

B.2 Test Results Tables

B.2.1 6dB & 99% Bandwidth

Test limits

FCC part	RSS-247	Limits
15.407 (e)	6.2.5.2	For equipment operating in the band 5725-5895 MHz, the minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

The conducted setup shown in section *Test & System Description* was used to measure the 6dB & 99% Bandwidth. The antenna terminal of the EUT is connected to the spectrum analyzer through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Results tables

Mode	Rate	Antenna	Channel	Freq [MHz]	6dB BW [MHz]	99% BW [MHz]
802.11a	6Mbps	SISO A	169	5845	15.02	16.68
			173	5865	15.26	16.68
			177	5885	15.30	16.76
		SISO B	169	5845	15.07	16.68
			173	5865	15.12	16.72
			177	5885	15.10	16.72
802.11n20	HT0	SISO A	169	5845	14.27	17.76
			173	5865	14.96	17.84
			177	5885	15.92	17.80
		SISO B	169	5845	13.89	17.72
			173	5865	14.95	17.92
			177	5885	16.31	17.84
	HT8	MIMO A	169	5845	15.05	17.80
			173	5865	14.99	17.84
			177	5885	15.46	17.80
		MIMO B	169	5845	16.26	17.76
			173	5865	16.89	17.80
			177	5885	16.03	17.76
802.11n40	HT0	SISO A	167	5835	33.85	36.40
			175	5875	35.05	36.16
			167	5835	35.05	36.32
		SISO B	175	5875	35.09	36.16
			167	5835	33.83	36.16
			175	5875	33.80	36.08
	HT8	MIMO A	167	5835	34.97	36.08
			175	5875	35.08	36.08
			167	5835	35.08	36.08
		MIMO B	175	5875	35.08	36.08
			167	5835	35.08	36.08
			175	5875	35.08	36.08
802.11ac80	VHT0	SISO A	171	5855	75.25	75.20
		SISO B			73.92	75.20
		MIMO A			70.13	75.04
		MIMO B			70.19	75.04
802.11ac160	VHT0	SISO A	163	5815	148.88	153.73
		SISO B			152.68	153.63
		MIMO A			153.93	153.92
		MIMO B			153.88	153.28

Max Value

Mode	Rate	Antenna	Channel	Freq [MHz]	6dB BW [MHz]	99% BW [MHz]
802.11ax/be20	MCS0	SISO A	169	5845	16.96	18.92
					173	18.96
					177	19.00
		SISO B	169	5845	16.44	18.96
					173	18.96
					177	18.92
		MIMO A	169	5845	17.99	18.92
					173	19.04
					177	19.00
		MIMO B	169	5845	14.99	18.96
					173	18.88
					177	18.96
802.11ax/be40	MCS0	SISO A	167	5835	35.37	37.76
					175	37.60
		SISO B	167	5835	36.35	37.68
					175	37.60
		MIMO A	167	5835	36.28	37.68
					175	37.60
MIMO B	167	5835	35.69	37.60		
			175	37.68		
802.11ax/be80	MCS0	SISO A	171	5855	72.64	76.80
		SISO B			70.08	76.96
		MIMO A			73.92	76.80
		MIMO B			70.19	76.96
802.11ax/be160	MCS0	SISO A	163	5815	148.93	155.18
		SISO B			146.38	154.98
		MIMO A			152.68	155.20
		MIMO B			151.43	154.88

Max Value

See Section B.3.1, B.3.2 for the screenshot results.

B.2.2 Maximum output power & Maximum power spectral Density

Test limits

FCC part	RSS-247	Limits
15.407 (a) (3) (iii)	6.2.5.2	For client devices operating under the control of an indoor access point in the 5.850-5.895 GHz band, the maximum power spectral density must not exceed 14 dBm e.i.r.p. in any 1-megahertz band, and the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm. Client devices operating on a channel that spans the 5.725-5.850 GHz and 5.850-5.895 GHz bands must not exceed an e.i.r.p. of 30 dBm.
15.407 (a) (12)	-	Power spectral density measurement: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. Measurements in the 5.725-5.895 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less.

Test procedure

The Maximum Conducted Output Power was measured using the channel integration method over the entire 99% occupied bandwidth according to section E) 2) d) (Method SA-2) of KDB 789033

The maximum power spectral density (PSD) was measured using the method according to section F) of KDB 789033.

In the measure-and-sum approach for MIMO mode, the conducted emission level (e.g., transmit power or power in specified bandwidth) is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically in linear power units to determine the total emission level from the device.

The EIRP power (dBm) is calculated by adding the declared maximum antenna gain to the measured conducted power.

The conducted setup shown in section *Test & System Description* was used to measure the maximum conducted output power and power spectral density. The antenna terminal of the EUT is connected to the spectrum analyser through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.

Results tablesDuty cycle

Mode	Rate	Antenna	Duty Cycle [%]
802.11a	6Mbps	SISO A	97.739
		SISO B	97.739
802.11n20	HT0	SISO A	98.785
		SISO B	98.785
	HT8	MIMO A	99.574
		MIMO B	99.574
802.11ax/be20	MCS0	SISO A	98.778
		SISO B	98.778
		MIMO A	99.671
		MIMO B	99.671
802.11n40	HT0	SISO A	98.8
		SISO B	98.8
	HT8	MIMO A	99.353
		MIMO B	99.353
802.11ax/be40	MCS0	SISO A	98.793
		SISO B	98.793
		MIMO A	99.895
		MIMO B	99.895
802.11ac80	VHT0	SISO A	98.795
		SISO B	98.795
		MIMO A	98.777
		MIMO B	98.777
802.11ax/be80	MCS0	SISO A	98.793
		SISO B	98.793
		MIMO A	98.784
		MIMO B	98.784
802.11ac160	VTH0	SISO A	98.796
		SISO B	98.796
		MIMO A	98.283
		MIMO B	98.283
802.11ax/be160	MCS0	SISO A	98.784
		SISO B	98.784
		MIMO A	98.0
		MIMO B	98.0

Maximum output power – U-NII-4 Channels

Mode	Rate	Channel	Freq [MHz]	Antenna	Average Conducted Output Power [dBm]	Avg Max* Conducted Output Power [dBm]	Avg Max* EIRP [dBm]	Avg Max* Conducted Output Power [mW]
802.11a	6Mbps	169	5845	SISO A	18.99	19.09	24.24	81.08
				SISO B	18.89	18.99	24.14	79.24
		173	5865	SISO A	18.92	19.02	24.17	79.79
				SISO B	18.95	19.05	24.20	80.34
		177	5885	SISO A	19.42	19.52	24.67	89.52
SISO B	19.05			19.15	24.30	82.21		
802.11n20	HT0	169	5845	SISO A	19.34	19.34	24.49	85.90
				SISO B	19.48	19.48	24.63	88.72
		173	5865	SISO A	19.37	19.37	24.52	86.50
				SISO B	19.50	19.50	24.65	89.13
		177	5885	SISO A	19.39	19.39	24.54	86.90
				SISO B	19.45	19.45	24.60	88.10
	HT8	169	5845	MIMO A	16.58	16.58	21.73	45.50
				MIMO B	16.31	16.31	21.46	42.76
				Combined A+B	19.46	19.46	24.61	88.26
		173	5865	MIMO A	16.60	16.60	21.75	45.71
				MIMO B	16.35	16.35	21.50	43.15
				Combined A+B	19.49	19.49	24.64	88.86
		177	5885	MIMO A	16.55	16.55	21.70	45.19
				MIMO B	16.34	16.34	21.49	43.05
				Combined A+B	19.46	19.46	24.61	88.24
802.11n40	HT0	167	5835	SISO A	23.01	23.01	28.16	199.99
				SISO B	23.12	23.12	28.27	205.12
		175	5875	SISO A	22.78	22.78	27.93	189.67
				SISO B	23.00	23.00	28.15	199.53
	HT8	167	5835	MIMO A	19.67	19.67	24.82	92.68
				MIMO B	20.02	20.02	25.17	100.46
				Combined A+B	22.86	22.86	28.01	193.14
		175	5875	MIMO A	19.70	19.70	24.85	93.33
				MIMO B	20.01	20.01	25.16	100.23
Combined A+B	22.87	22.87	28.02	193.56				
802.11ac80	VHT0	171	5855	SISO A	21.70	21.70	26.85	147.91
				SISO B	23.09	23.09	28.24	203.70
				MIMO A	21.54	21.54	26.69	142.56
				MIMO B	21.48	21.48	26.63	140.60
				Combined A+B	24.52	24.52	29.67	283.17
802.11ac160	VHT0	163	5815	SISO A	17.29	17.29	22.44	53.58
				SISO B	18.96	18.96	24.11	78.70
				MIMO A	16.90	16.90	22.05	48.98
				MIMO B	17.18	17.18	22.33	52.24
				Combined A+B	20.05	20.05	25.20	101.22

* Maximum values are the duty cycle compensated values calculated from the average (measured)

Max Value

Min Value

Mode	Rate	Channel	Freq [MHz]	Antenna	Average Conducted Ouput Power [dBm]	Avg Max* Conducted Ouput Power [dBm]	Avg Max*. EIRP [dBm]	Avg Max* Conducted Ouput Power [mW]
802.11ax/be20	MCS0	169	5845	SISO A	19.77	19.77	24.92	94.84
				SISO B	19.95	19.95	25.10	98.86
				MIMO A	16.48	16.48	21.63	44.46
				MIMO B	16.76	16.76	21.91	47.42
				Combined A+B	19.63	19.63	24.78	91.89
		173	5865	SISO A	19.77	19.77	24.92	94.84
				SISO B	19.89	19.89	25.04	97.50
				MIMO A	16.51	16.51	21.66	44.77
				MIMO B	16.78	16.78	21.93	47.64
				Combined A+B	19.66	19.66	24.81	92.41
		177	5885	SISO A	19.71	19.71	24.86	93.54
				SISO B	19.93	19.93	25.08	98.40
				MIMO A	16.49	16.49	21.64	44.57
				MIMO B	16.49	16.49	21.64	44.57
				Combined A+B	19.50	19.50	24.65	89.13
802.11ax/be40	MCS0	167	5835	SISO A	23.13	23.13	28.28	205.59
				SISO B	23.08	23.08	28.23	203.24
				MIMO A	20.06	20.06	25.21	101.39
				MIMO B	19.87	19.87	25.02	97.05
				Combined A+B	22.98	22.98	28.13	198.44
		175	5875	SISO A	22.73	22.73	27.88	187.50
				SISO B	22.95	22.95	28.10	197.24
				MIMO A	20.00	20.00	25.15	100.00
				MIMO B	20.35	20.35	25.50	108.39
				Combined A+B	23.19	23.19	28.34	208.39
802.1axc80	MCS0	171	5855	SISO A	21.58	21.58	26.73	143.88
				SISO B	23.10	23.10	28.25	204.17
				MIMO A	21.48	21.48	26.63	140.60
				MIMO B	21.46	21.46	26.61	139.96
				Combined A+B	24.48	24.48	29.63	280.56
802.11ax/be160	MCS0	163	5815	SISO A	17.71	17.71	22.86	59.02
				SISO B	18.82	18.82	23.97	76.21
				MIMO A	17.10	17.10	22.25	51.29
				MIMO B	17.02	17.02	22.17	50.35
				Combined A+B	20.07	20.07	25.22	101.64

* Maximum values are the duty cycle compensated values calculated from the average (measured)

Max Value

Min Value

See Section B.3.3 for the screenshot results

Maximum Power Spectral Density (PSD) – U-NII-4 channels

Mode	Rate	Channel	Freq [MHz]	Antenna	Average conducted PSD [dBm/500kHz]	Max.* conducted PSD [dBm/500kHz]	Max.* conducted PSD [dBm/MHz]	EIRP PSD [dBm/MHz]	
802.11a	6Mbps	169	5845	SISO A	5.19	5.29	8.30	13.45	
				SISO B	5.15	5.25	8.26	13.41	
		173	5865	SISO A	5.13	5.23	8.24	13.39	
				SISO B	5.18	5.28	8.29	13.44	
		177	5885	SISO A	5.62	5.72	8.73	13.88	
				SISO B	5.31	5.41	8.42	13.57	
802.11n20	HT0	169	5845	SISO A	5.41	5.41	8.42	13.57	
				SISO B	5.49	5.49	8.50	13.65	
		173	5865	SISO A	5.39	5.39	8.40	13.55	
				SISO B	5.52	5.52	8.53	13.68	
		177	5885	SISO A	5.41	5.41	8.42	13.57	
				SISO B	5.51	5.51	8.52	13.67	
	HT8	169	5845	MIMO A	2.59	2.59	5.60	10.75	
				MIMO B	2.43	2.43	5.44	10.59	
				Combined A+B	5.52	5.52	8.53	13.68	
		173	5865	MIMO A	2.57	2.57	5.58	10.73	
				MIMO B	2.39	2.39	5.40	10.55	
				Combined A+B	5.49	5.49	8.50	13.65	
	177	5885	MIMO A	2.58	2.58	5.59	10.74		
			MIMO B	2.39	2.39	5.40	10.55		
			Combined A+B	5.50	5.50	8.51	13.66		
	802.11n40	HT0	167	5835	SISO A	5.54	5.54	8.55	13.70
					SISO B	5.70	5.70	8.71	13.86
			175	5875	SISO A	5.35	5.35	8.36	13.51
SISO B					5.57	5.57	8.58	13.73	
HT8		167	5835	MIMO A	2.26	2.26	5.27	10.42	
				MIMO B	2.60	2.60	5.61	10.76	
				Combined A+B	5.44	5.44	8.45	13.60	
		175	5875	MIMO A	2.20	2.20	5.21	10.36	
				MIMO B	2.60	2.60	5.61	10.76	
				Combined A+B	5.41	5.41	8.43	13.58	
802.11ac80	VHT0	171	5855	SISO A	1.18	1.18	4.19	9.34	
				SISO B	2.66	2.66	5.67	10.82	
				MIMO A	1.05	1.05	4.06	9.21	
				MIMO B	0.98	0.98	3.99	9.14	
				Combined A+B	4.03	4.03	7.04	12.19	
802.11ac160	VHT0	163	5815	SISO A	-6.21	-6.21	-3.20	1.95	
				SISO B	-4.53	-4.53	-1.52	3.63	
				MIMO A	-6.54	-6.54	-3.53	1.62	
				MIMO B	-6.32	-6.32	-3.31	1.84	
				Combined A+B	-3.42	-3.42	-0.41	4.74	

* Maximum values are the duty cycle compensated values calculated from the average (measured)

Mode	Rate	Channel	Freq [MHz]	Antenna	Average conducted PSD [dBm/500kHz]	Max.* conducted PSD [dBm/500kHz]	Max.* conducted PSD [dBm/MHz]	EIRP PSD [dBm/MHz]
802.11ax/be20	MCS0	169	5845	SISO A	5.58	5.58	8.59	13.74
				SISO B	5.77	5.77	8.78	13.93
				MIMO A	2.29	2.29	5.30	10.45
				MIMO B	2.59	2.59	5.60	10.75
				Combined A+B	5.45	5.45	8.46	13.61
		173	5865	SISO A	5.55	5.55	8.56	13.71
				SISO B	5.72	5.72	8.73	13.88
				MIMO A	2.28	2.28	5.29	10.44
				MIMO B	2.59	2.59	5.60	10.75
		177	5885	Combined A+B	5.45	5.45	8.46	13.61
				SISO A	5.57	5.57	8.58	13.73
				SISO B	5.75	5.75	8.76	13.91
802.11ax/be40	MCS0	167	5835	MIMO A	2.30	2.30	5.31	10.46
				MIMO B	2.29	2.29	5.30	10.45
				Combined A+B	5.31	5.31	8.32	13.47
				SISO A	5.51	5.51	8.52	13.67
				SISO B	5.44	5.44	8.45	13.60
		175	5875	MIMO A	2.43	2.43	5.44	10.59
				MIMO B	2.29	2.29	5.30	10.45
				Combined A+B	5.37	5.37	8.38	13.53
				SISO A	5.08	5.08	8.09	13.24
				SISO B	5.34	5.34	8.35	13.50
				MIMO A	2.37	2.37	5.38	10.53
				MIMO B	2.72	2.72	5.73	10.88
Combined A+B	5.56	5.56	8.57	13.72				
802.1axc80	MCS0	171	5855	SISO A	0.97	0.97	3.98	9.13
				SISO B	2.56	2.56	5.57	10.72
				MIMO A	0.85	0.85	3.86	9.01
				MIMO B	0.79	0.79	3.80	8.95
				Combined A+B	3.83	3.83	6.84	11.99
802.11ax/be160	MCS0	163	5815	SISO A	-5.90	-5.90	-2.89	2.26
				SISO B	-4.79	-4.79	-1.78	3.37
				MIMO A	-6.49	-6.49	-3.48	1.67
				MIMO B	-6.47	-6.47	-3.46	1.69
				Combined A+B	-3.47	-3.47	-0.46	4.69

* Maximum values are the duty cycle compensated values calculated from the average (measured)

Note :PSD [dBm/500KHz] is the actual measurement done using RBW = 500KHz. To obtain the PSD [dBm/1MHz] a correction factor is applied: $10\log\left(\frac{1MHz}{500kHz}\right) = +3.01dB$

B.2.3 Undesirable emission limits : out of band (Conducted)

Test limits

FCC part	RSS-247	Limits
15.407 (b) (4)	6.2.5.3	All emissions below 5.725 GHz shall not exceed an e.i.r.p of -27 dBm/MHz at 5.65GHz increasing linearly to 10dBm/MHz at 5.7 GHz, and from 5.7GHz increasing linearly to a level of 15.6 dBm/MHz at 5.72GHz, and from 5.72 GHz increasing linearly to a level of 27dBm/MHz at 5.725GHz.
15.407 (b) (5) (ii)	6.2.5.3	All emissions at or above 5.895GHz shall not exceed an e.i.r.p of -5dBm/MHz and shall decrease linearly to an e.i.r.p of -27dBm/MHz at or above 5.925GHz.
15.35 (b)	-	Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz. When average radiated emission measurements are specified in this part, including average emission measurements below 1000 MHz, there also is a limit on the peak level of the radio frequency emissions. Unless otherwise specified, e.g., see §§ 15.250, 15.252, 15.253(d), 15.255, 15.256, and 15.509 through 15.519, the limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device, e.g., the total peak power level. Note that the use of a pulse desensitization correction factor may be needed to determine the total peak emission level. The instruction manual or application note for the measurement instrument should be consulted for determining pulse desensitization factors, as necessary.

Test procedure

The conducted setup shown in section *Test & System Description* was used to measure undesirable emissions on the Band Edge domain. The antenna terminal of the EUT is connected to the spectrum analyzer through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss and the declared antenna gain.

For lower OOBE, Peak detector is used according to FCC OET KDB 789033 D02 v02r01.

For upper OOBE, RMS detector is used according to FCC OET KDB 291074 D02 v01 - EMC Measurement

Integration method as described in KDB Publication 789033.3.d)(ii) can be used in order to optimize the power. In this report, the integration method is applied in the band 5895 - 5896MHz and compared with interpolation limit of curve (-5.367dBm/MHz EIRP) at 5895.5MHz.

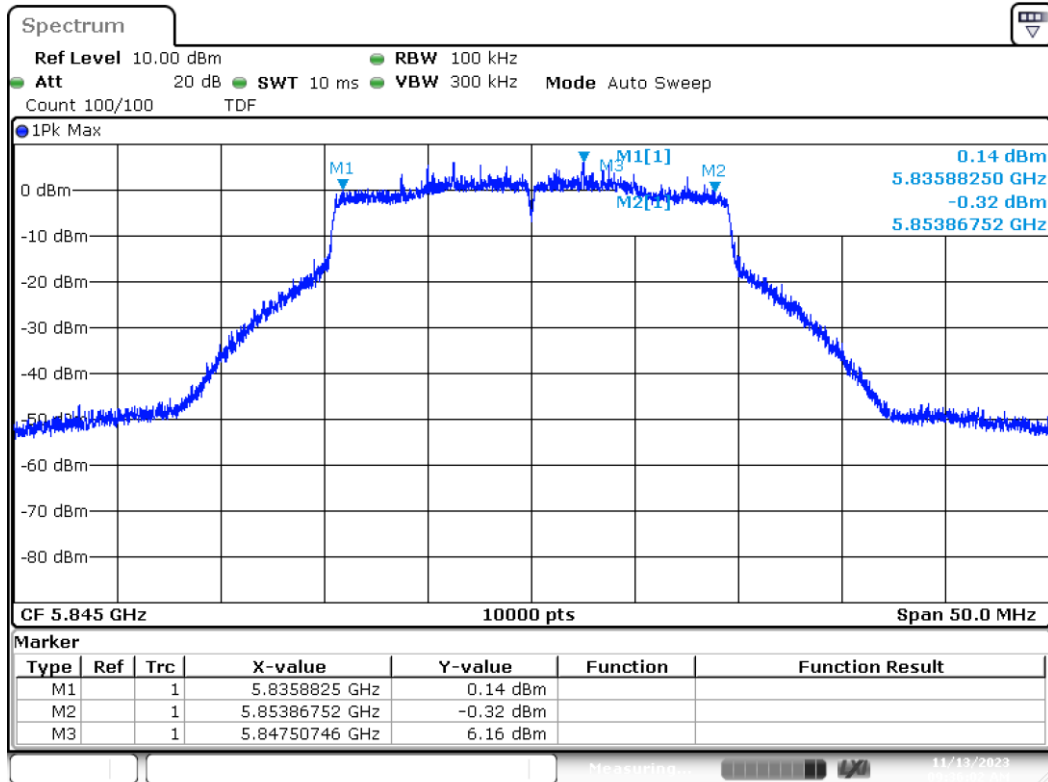
Band Edge measurements above 5895 MHz should also include Peak plots to show compliance with 15.35(b) where the peak emissions must be limited to no more than 20 dB above the average limit.

The RBW is set to 100KHz according to the integration method, the applicable limit is updated accordingly (Shifted by 10dB)

See Section B.3.4 for the screenshot results.

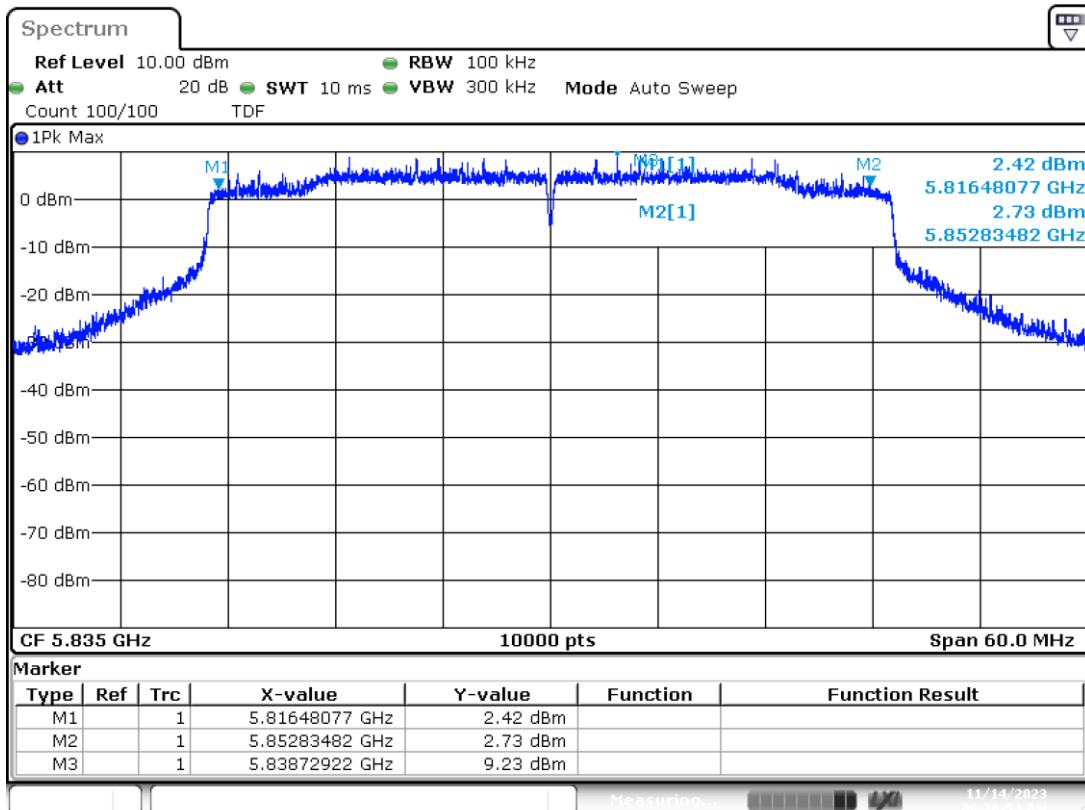
B.3 Test Results Screenshot

B.3.1 6dB Bandwidth

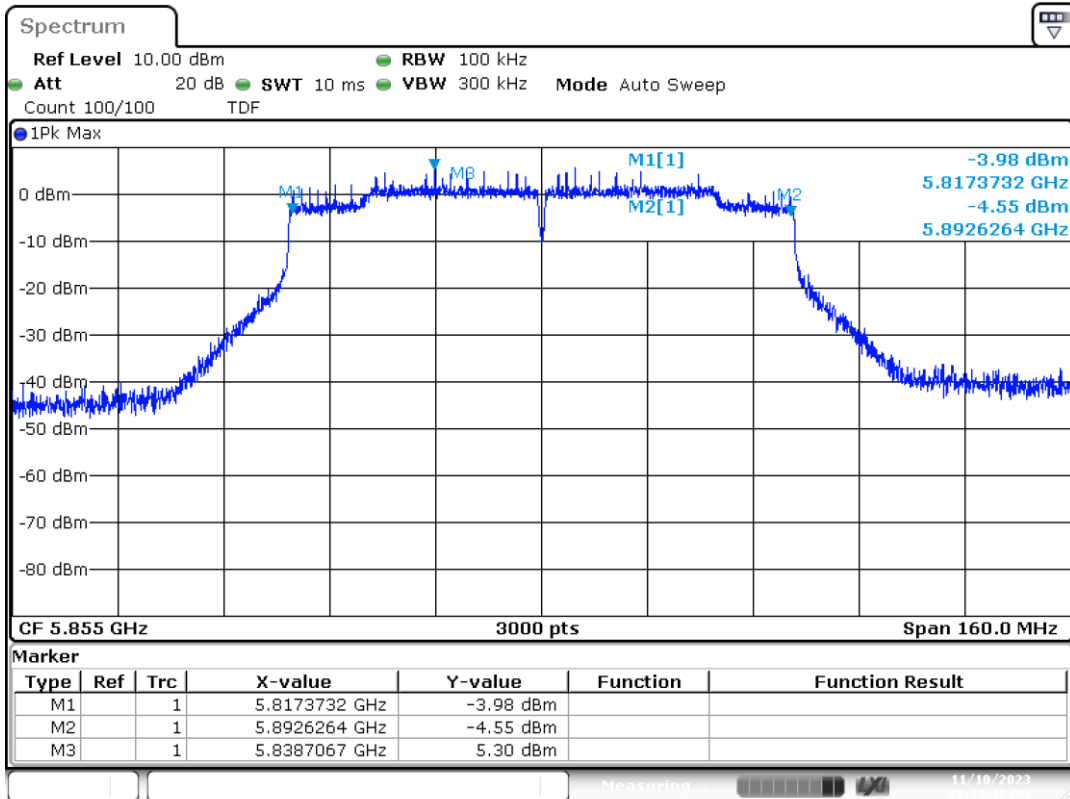


Date: 13 NOV 2023 09:36:02

MIMO-A, 802.11ax/be20, MCS0-CH169

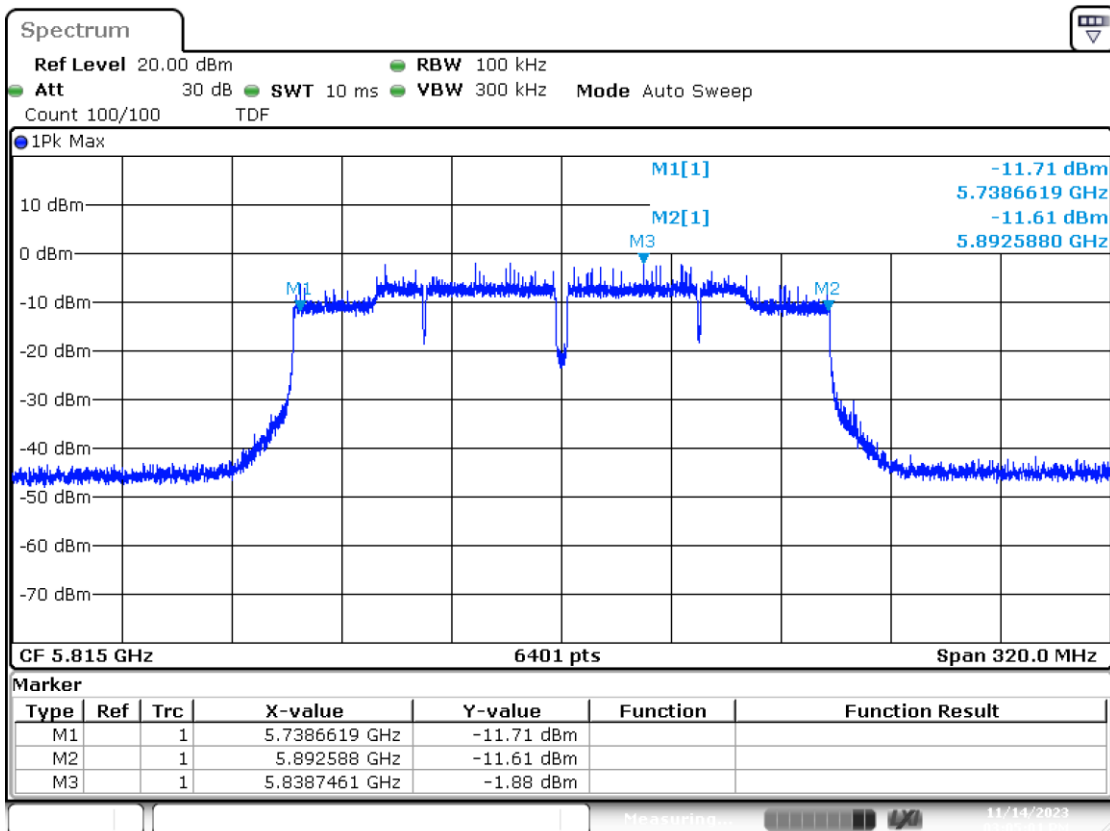


SISO-B, 802.11ax/be40, MCS0-CH167



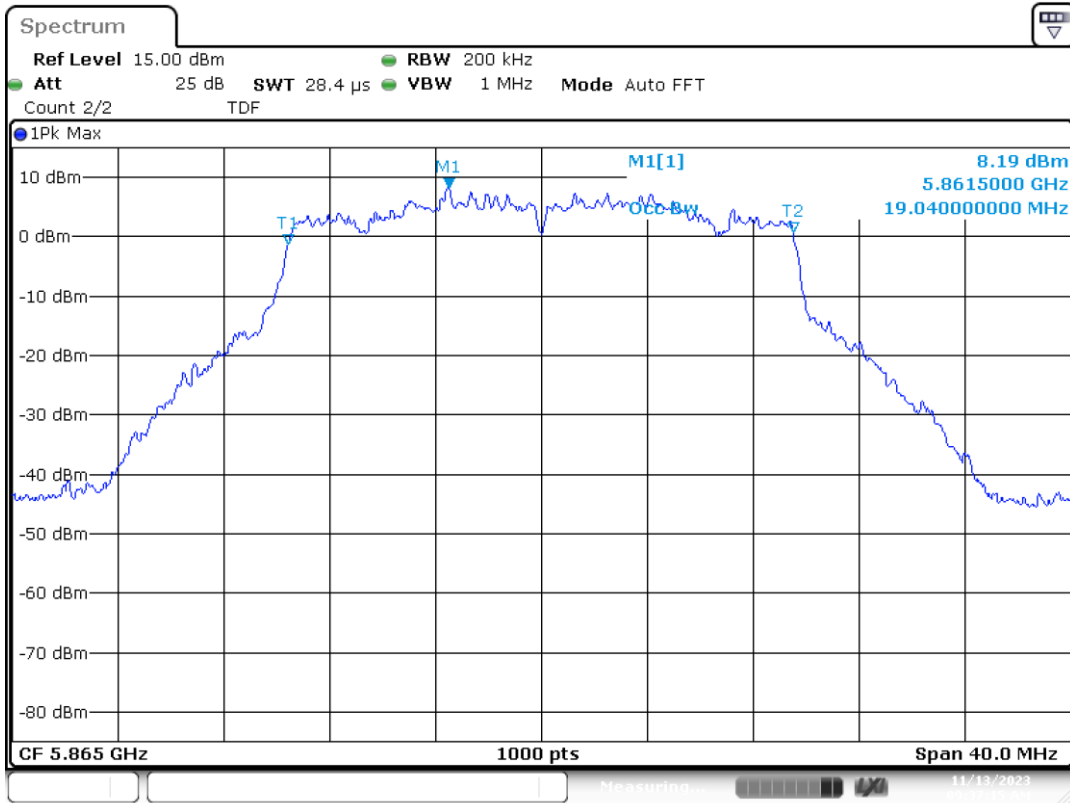
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SISO-A, 802.11ax/be80, VHT0-CH171



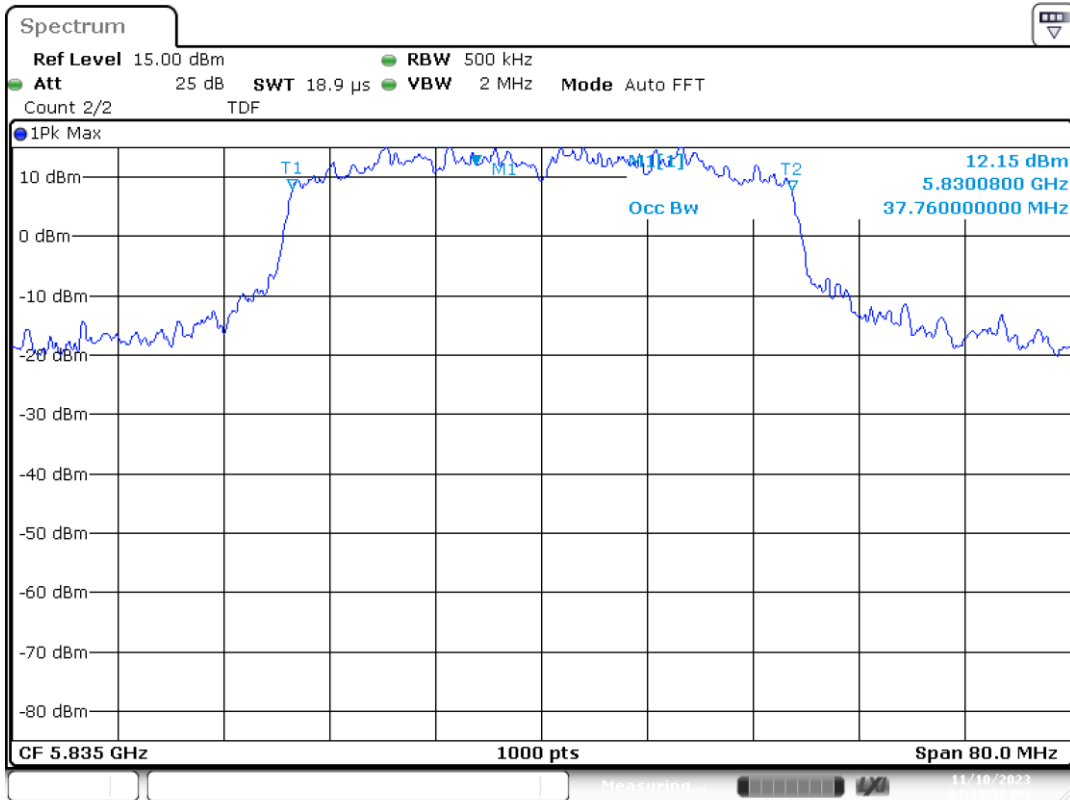
MIMO-A, 802.11ax/be160, VHT0-CH163

B.3.2 99% Bandwidth



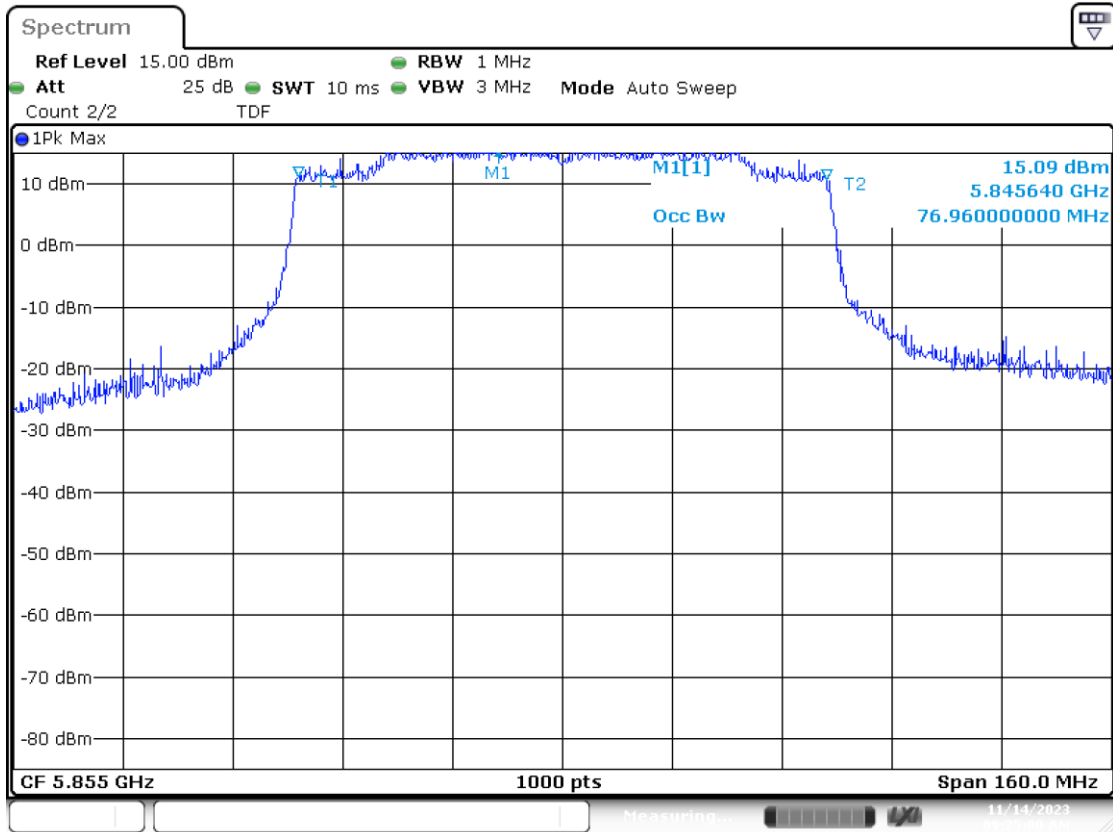
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MIMO-A, 802.11ax/be20, MCS0-CH173

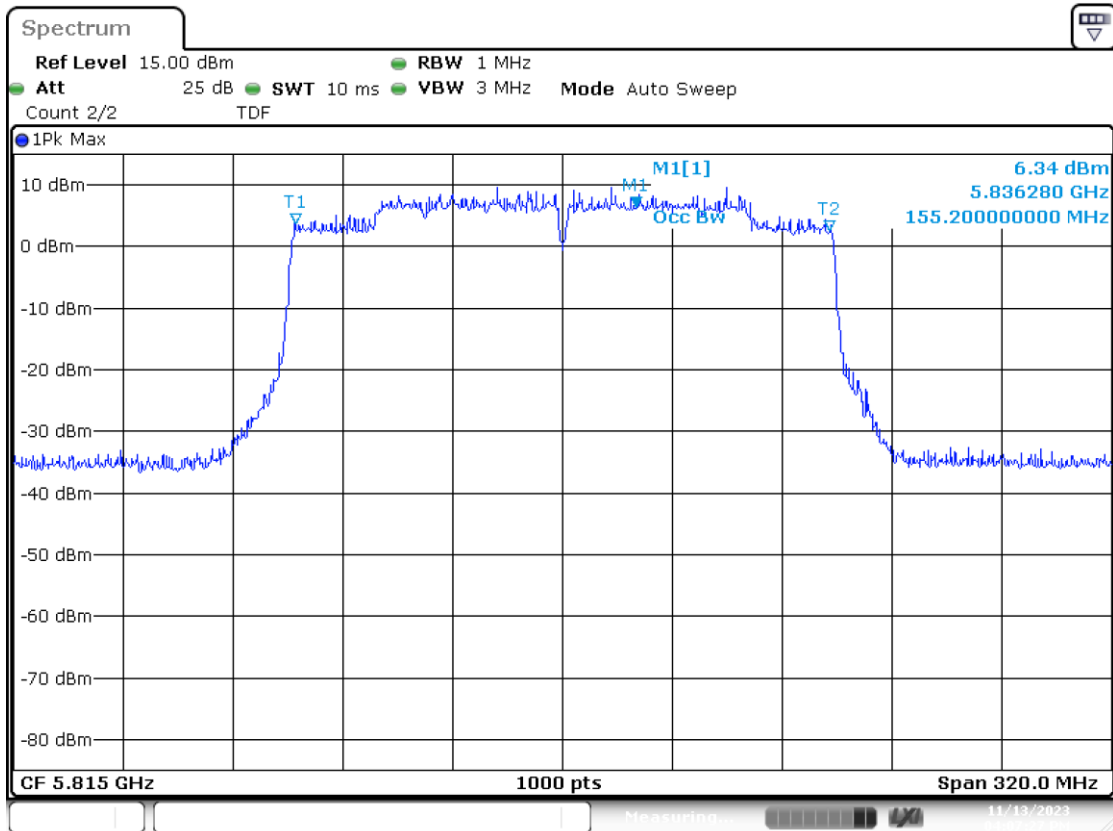


Date: 10.NOV.2023 16:30:58

SISO-A, 802.11ax/be40, MCS0-CH167

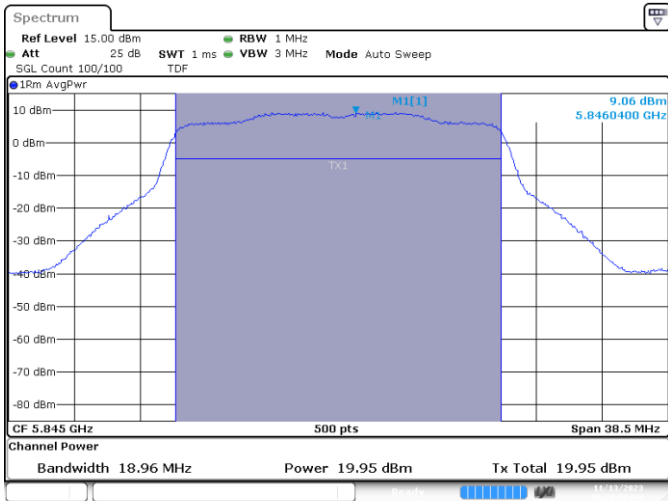


SISO-B, 802.11ax/be80, MCS0-CH171

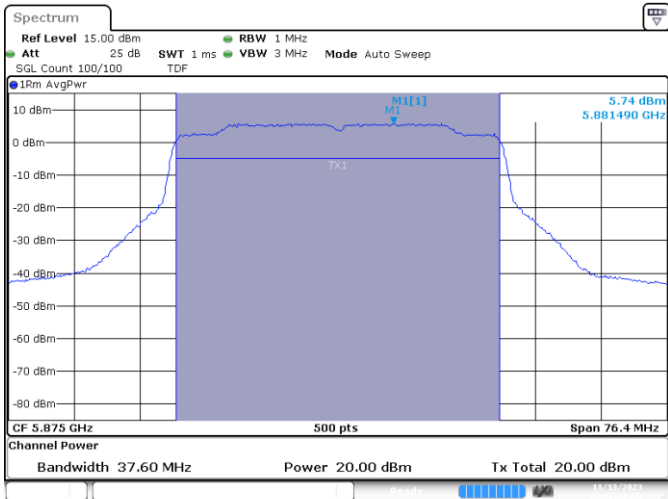


MIMO-A, 802.11ax/be160, MCS0-CH163

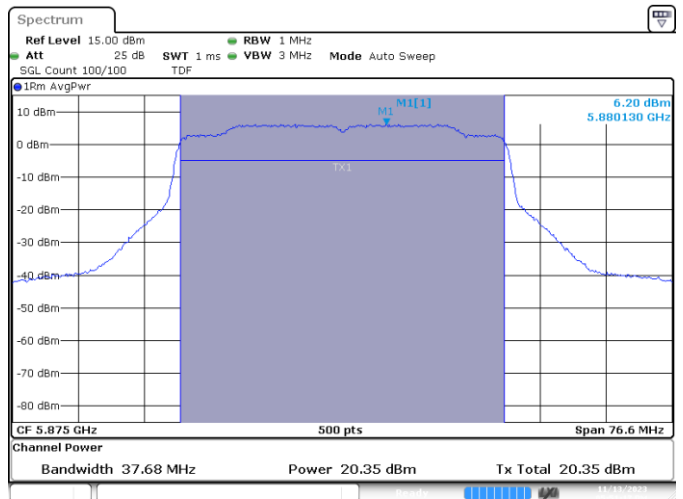
B.3.3 Maximum output power



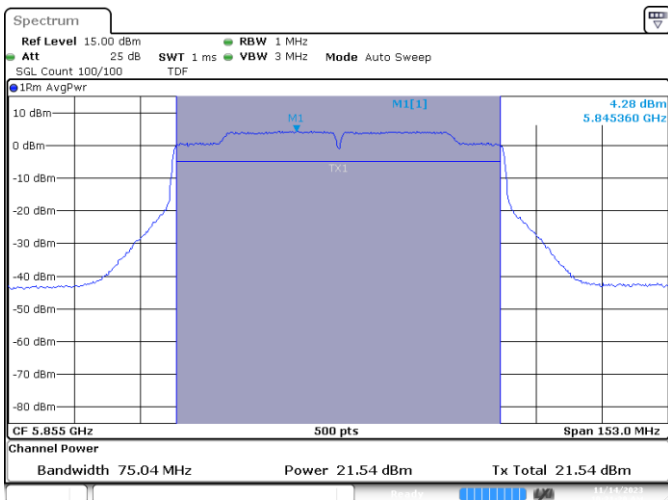
SISO-B, 802.11ax/be20, MCS0-CH-169



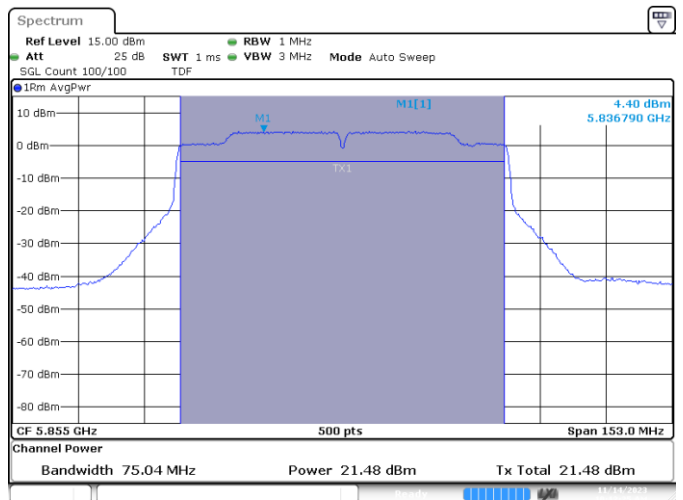
MIMO-A, 802.11ax/be40, MCS0-CH-175



MIMO-B, 802.11ax/be40, MCS0-CH-175

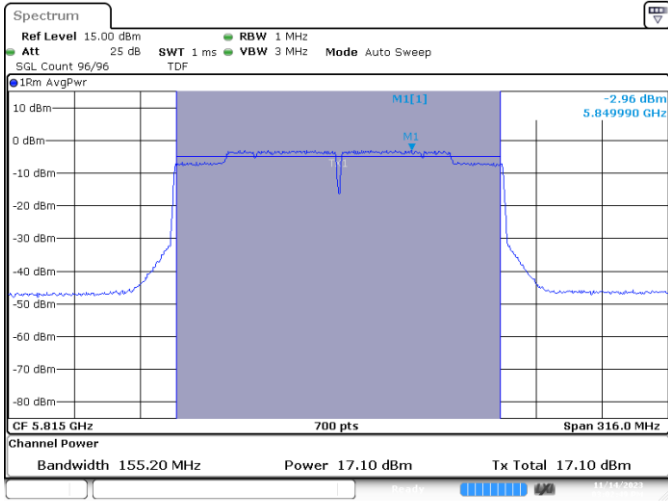


MIMO-A, 802.11ac80, VHT0-CH171

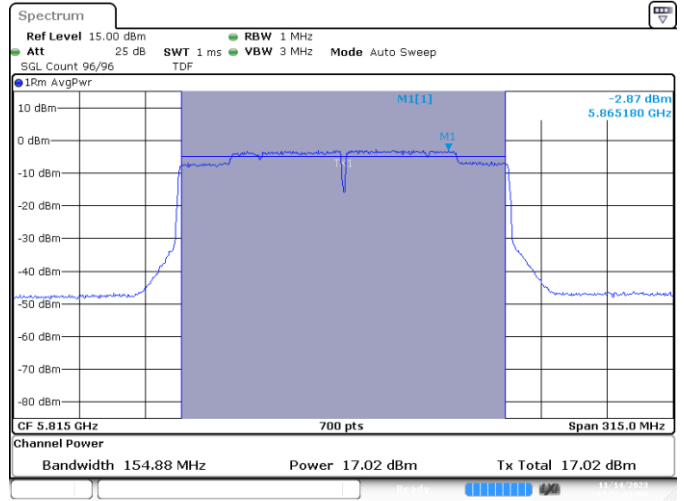


MIMO-B, 802.11ac80, VHT0-CH171

Test Report N° 231109-03.TR02

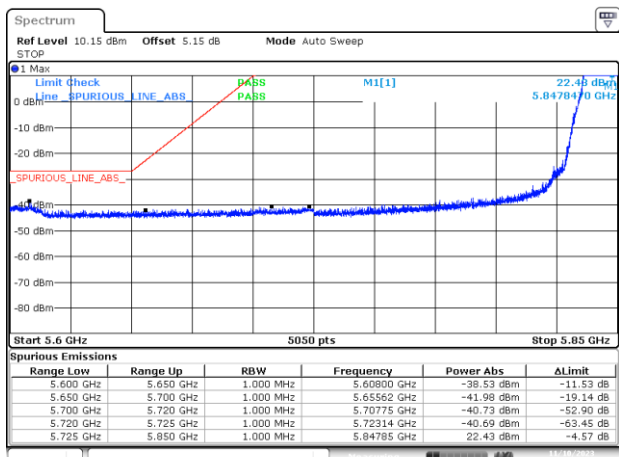


MIMO-A,802.11ax/be160,MCS0-CH163



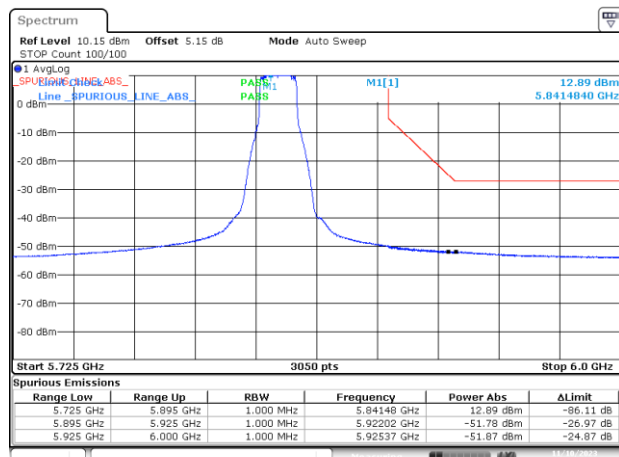
MIMO-B,802.11ax/be160,MCS0-CH163

B.3.4 Undesirable emission limits : out of band (Conducted)



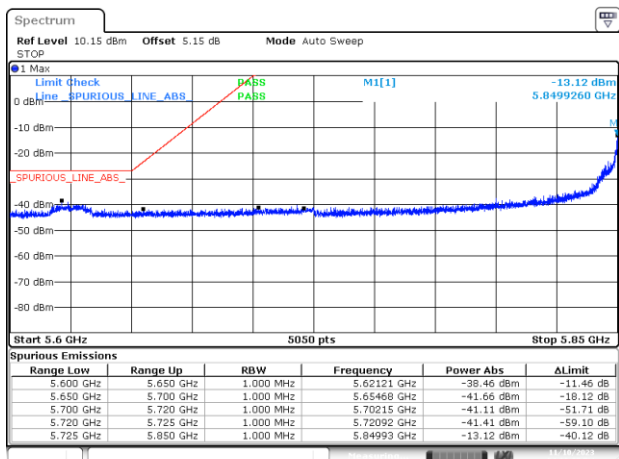
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BE-NR-LOW, SISO-A, 802.11a20-6Mbps, Ch169



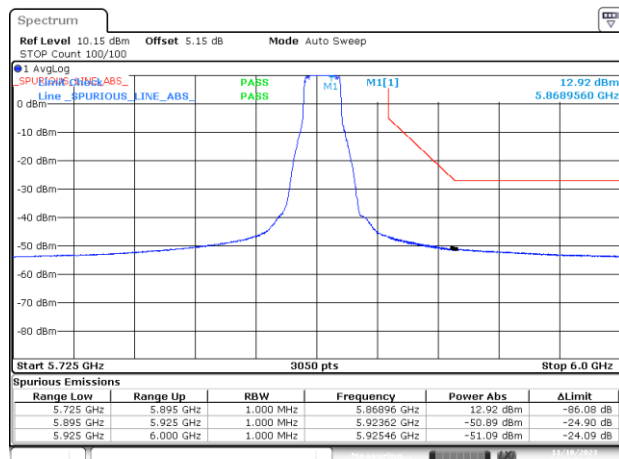
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BE-NR-HIGH, SISO-A, 802.11a20-6Mbps, Ch169



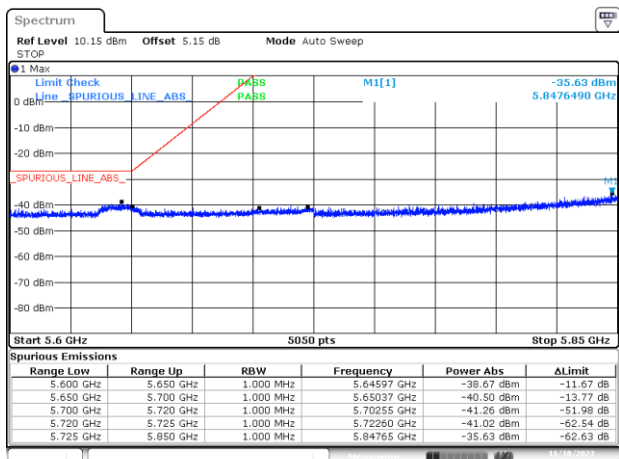
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BE-NR-LOW, SISO-A, 802.11a20-6Mbps, Ch173



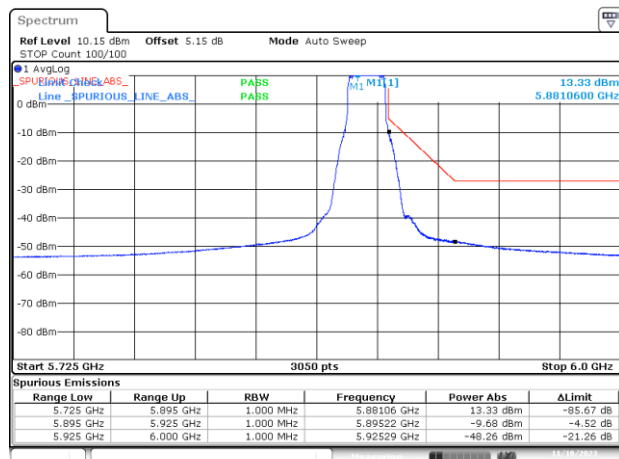
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BE-NR-HIGH, SISO-A, 802.11a20-6Mbps, Ch173



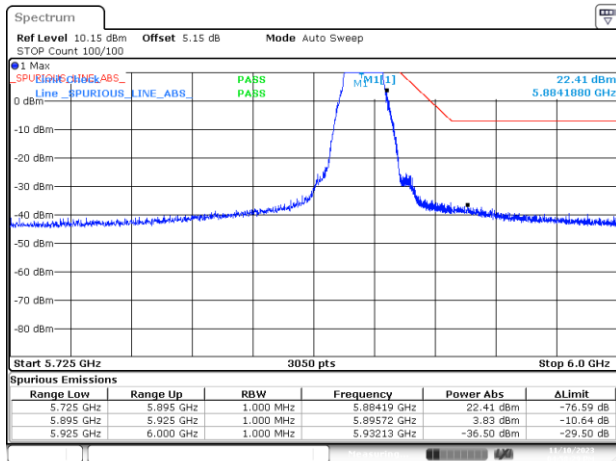
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BE-NR-LOW, SISO-A, 802.11a20-6Mbps, Ch177



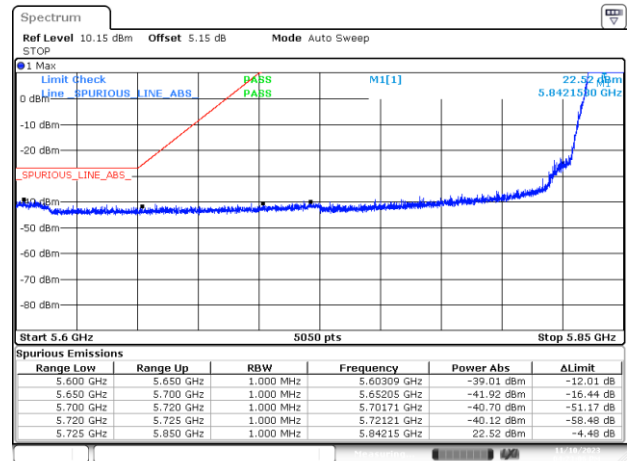
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BE-NR-HIGH, SISO-A, 802.11a20-6Mbps, Ch177



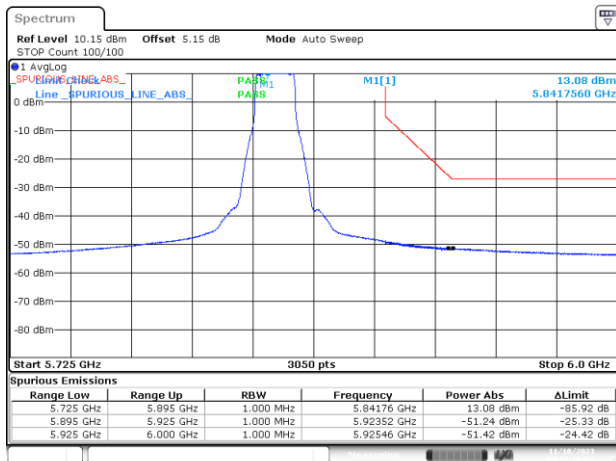
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BE-NR-HIGH-PEAK, SISO-A, 802.11a20-6Mbps, Ch177



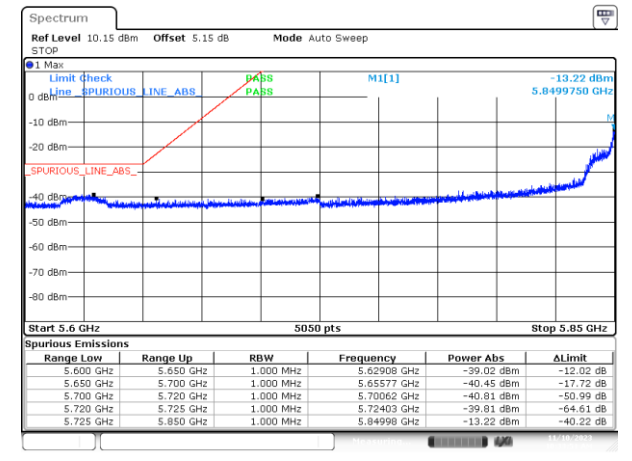
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BE-NR-LOW, SISO-A, 802.11n20-HT0, Ch169



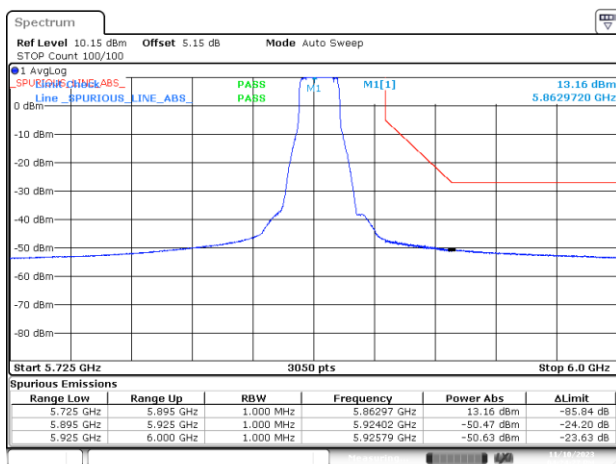
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BE-NR-HIGH, SISO-A, 802.11n20-HT0, Ch169



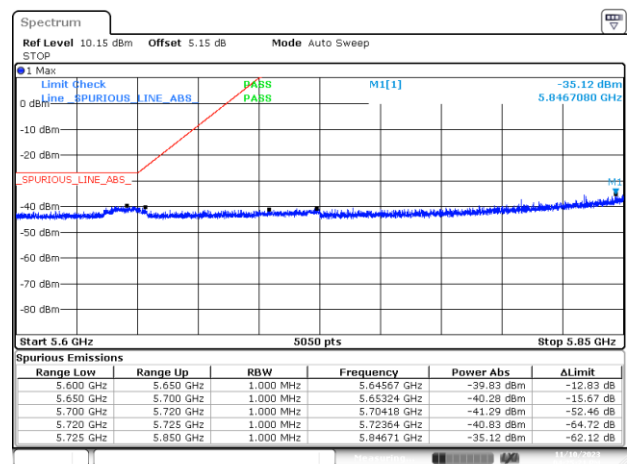
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BE-NR-LOW, SISO-A, 802.11n20-HT0, Ch173



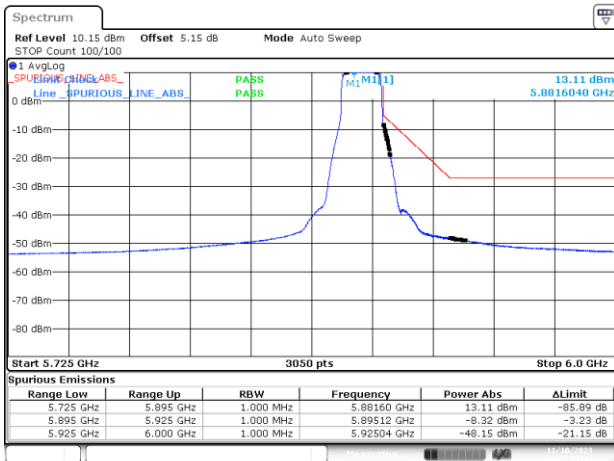
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BE-NR-HIGH, SISO-A, 802.11n20-HT0, Ch173



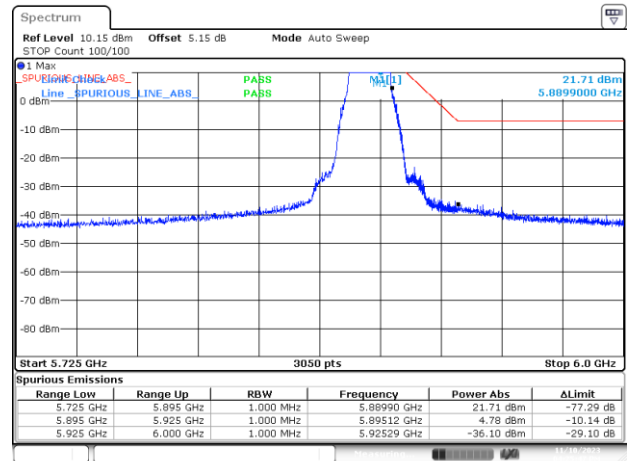
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BE-NR-LOW, SISO-A, 802.11n20-HT0, Ch177



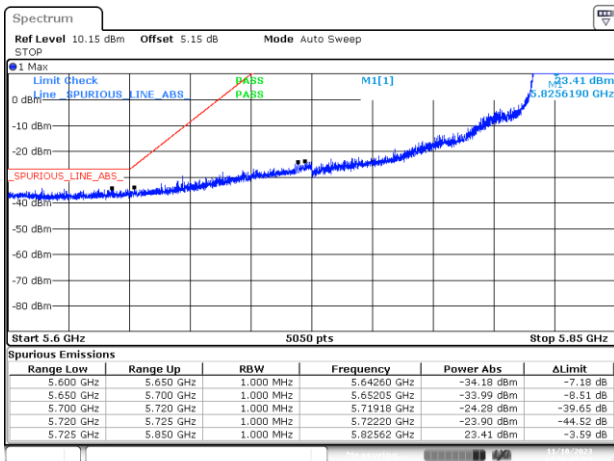
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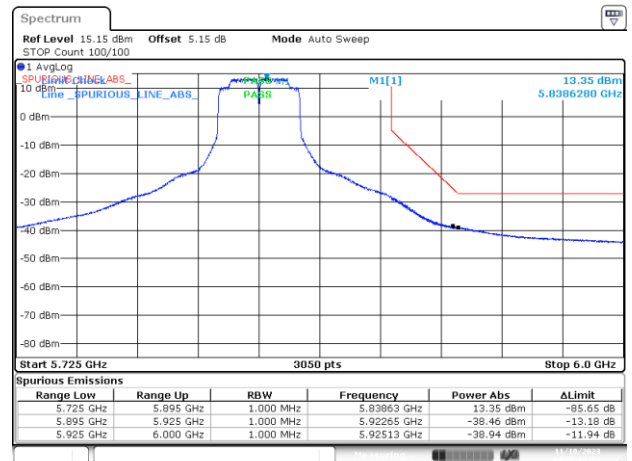
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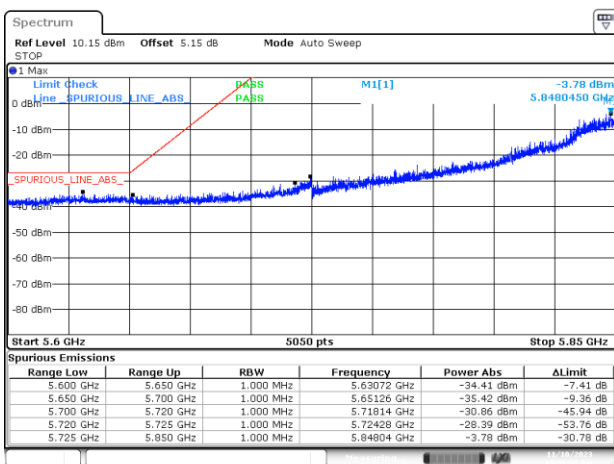
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BE-NR-LOW, SISO-A, 802.11n40-HT0, Ch167



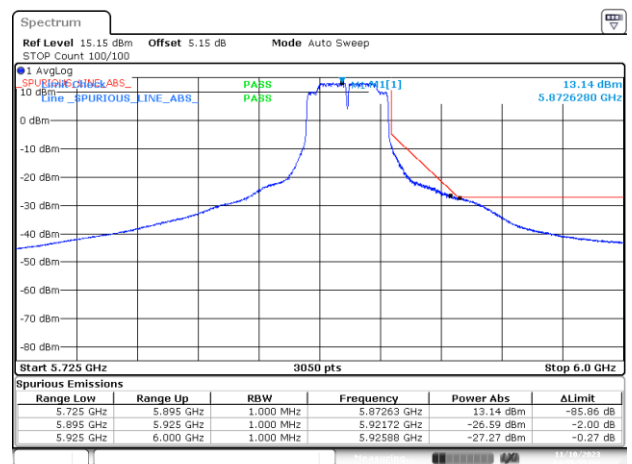
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BE-NR-HIGH, SISO-A, 802.11n40-HT0, Ch167



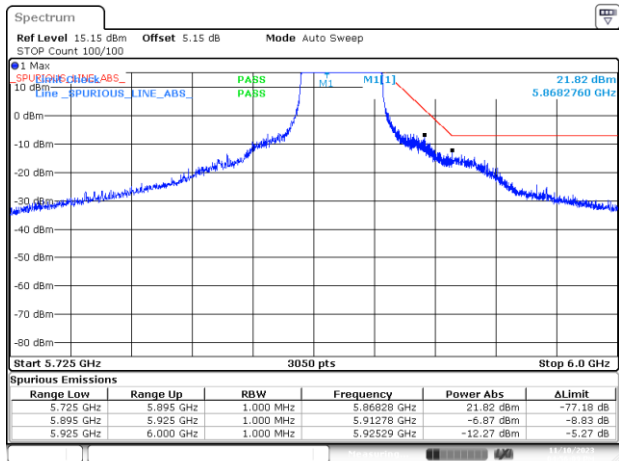
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BE-NR-LOW, SISO-A, 802.11n40-HT0, Ch175



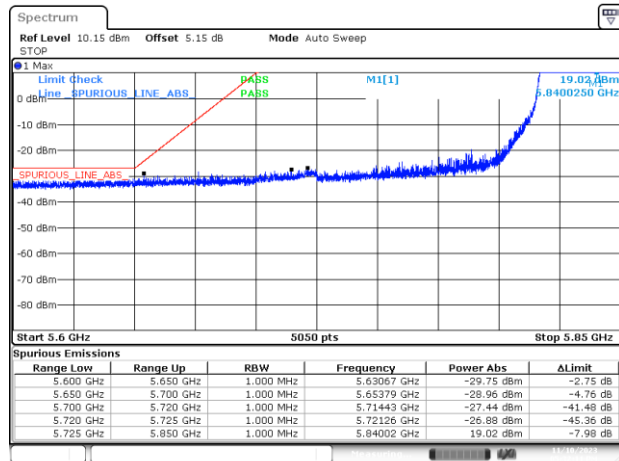
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BE-NR-HIGH, SISO-A, 802.11n40-HT0, Ch175



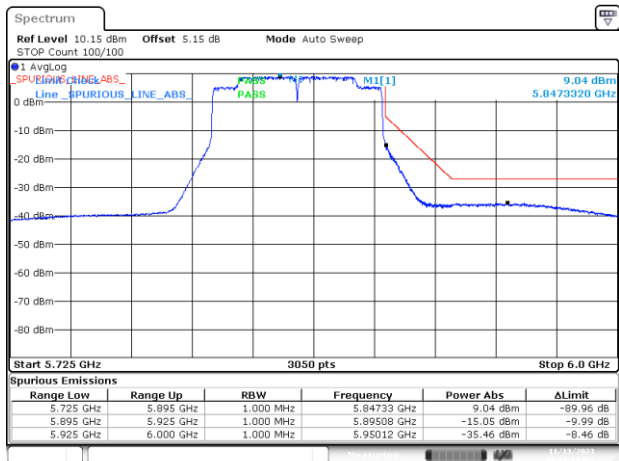
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BE-NR-HIGH-PEAK, SISO-A, 802.11n40-HT0, Ch175



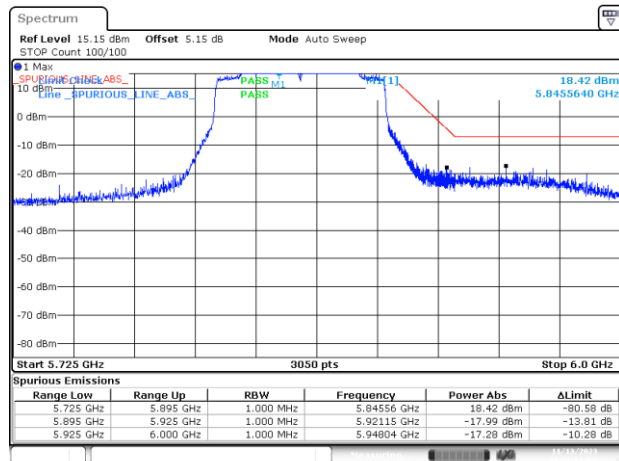
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BE-NR-LOW, SISO-A, 802.11ac80-VHT0, Ch171



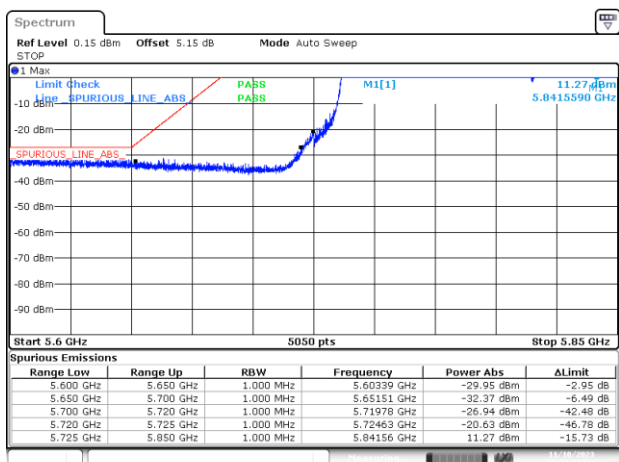
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BE-NR-HIGH, SISO-A, 802.11ac80-VHT0, Ch171



Date: 13 NOV 2023 08:22:12

BE-NR-HIGH-PEAK, SISO-A, 802.11ac80-VHT0, Ch171



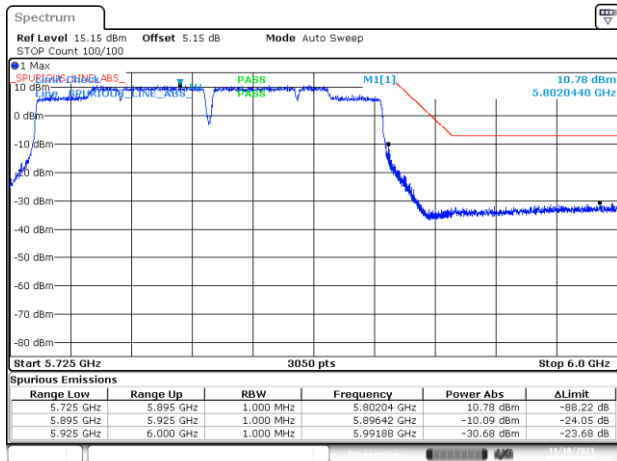
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BE-NR-LOW, SISO-A, 802.11ac160-VHT0, Ch163



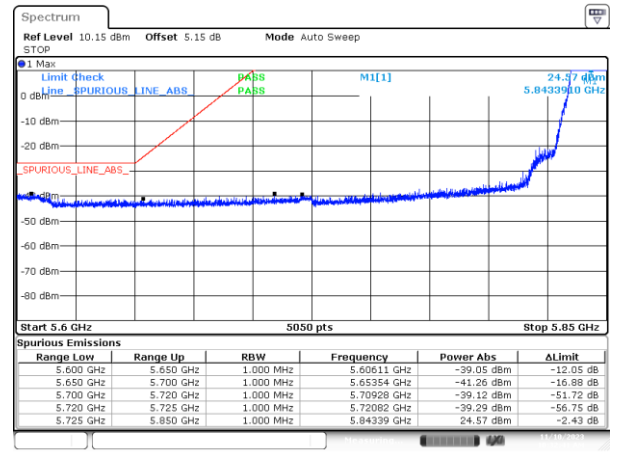
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BE-NR-HIGH, SISO-A, 802.11ac160-VHT0, Ch163



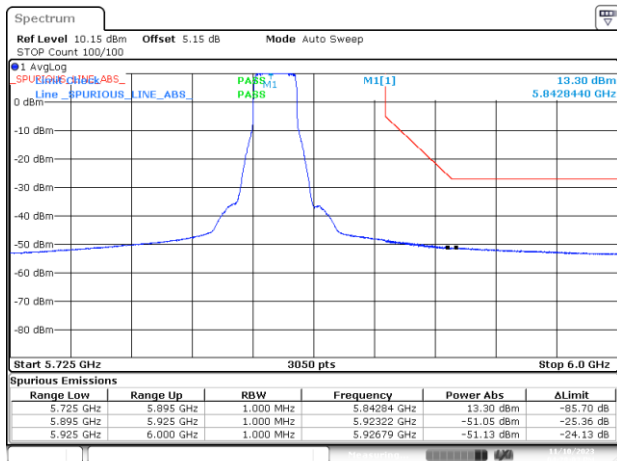
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BE-NR-HIGH-PEAK, SISO-A, 802.11ac160-VHT0, Ch163



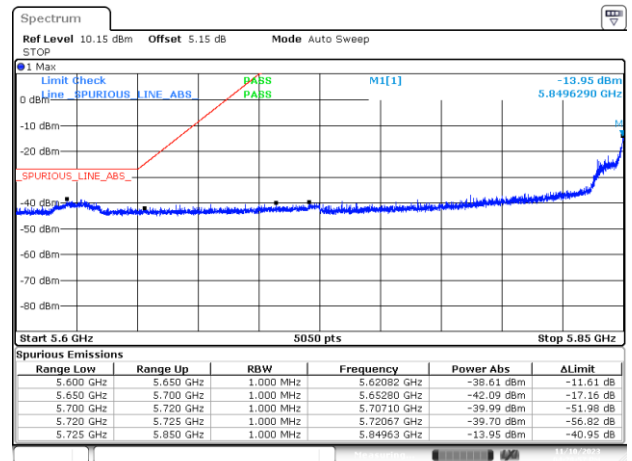
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BE-NR-LOW, SISO-A, 802.11ax20-MCS0, Ch169



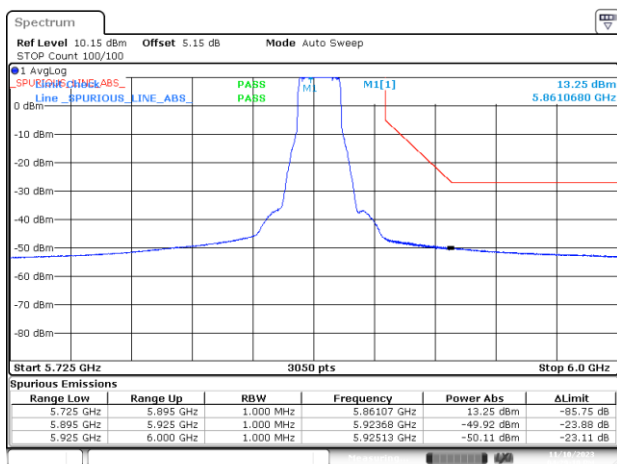
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BE-NR-HIGH, SISO-A, 802.11ax20-MCS0, Ch169



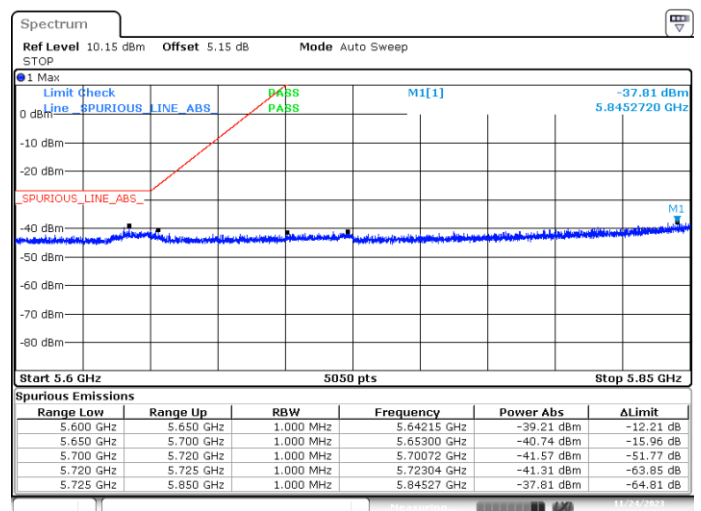
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BE-NR-LOW, SISO-A, 802.11ax20-MCS0, Ch173

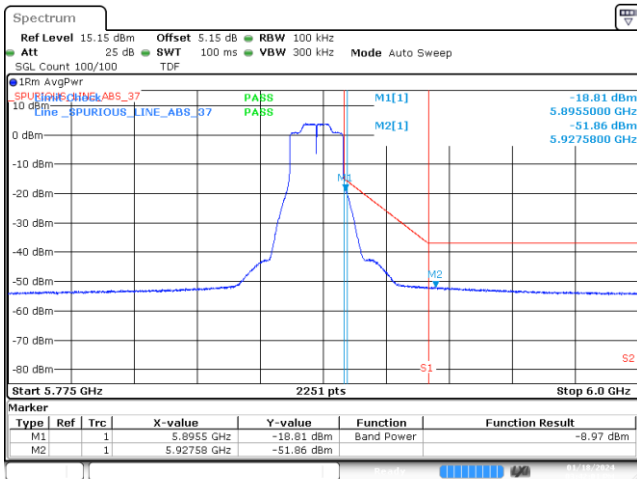


Date: 10 NOV 2023 16:29:10

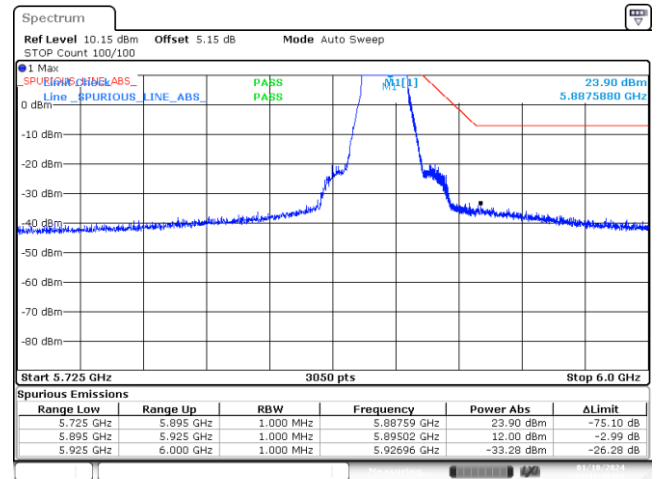
BE-NR-HIGH, SISO-A, 802.11ax20-MCS0, Ch173



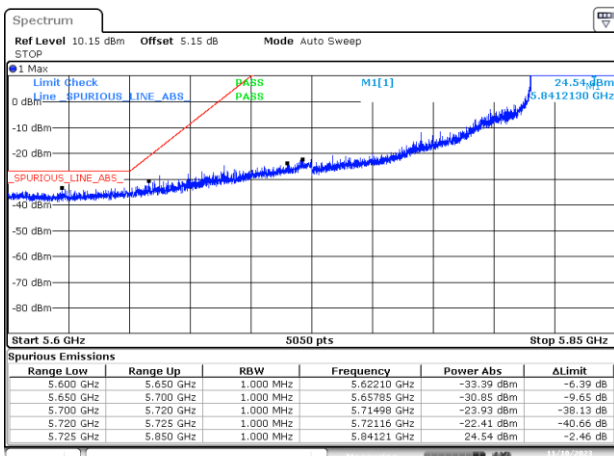
BE-NR-LOW, SISO-A, 802.11ax20-MCS0, Ch177



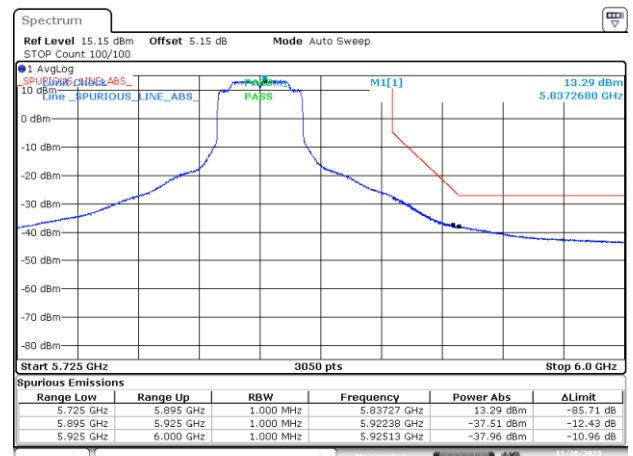
BE-NR-HIGH, SISO-A, 802.11ax20-MCS0, Ch177



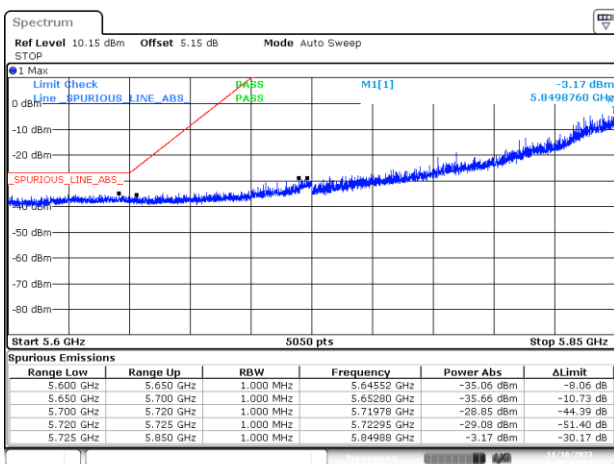
BE-NR-HIGH-PEAK, SISO-A, 802.11ax20-MCS0, Ch177



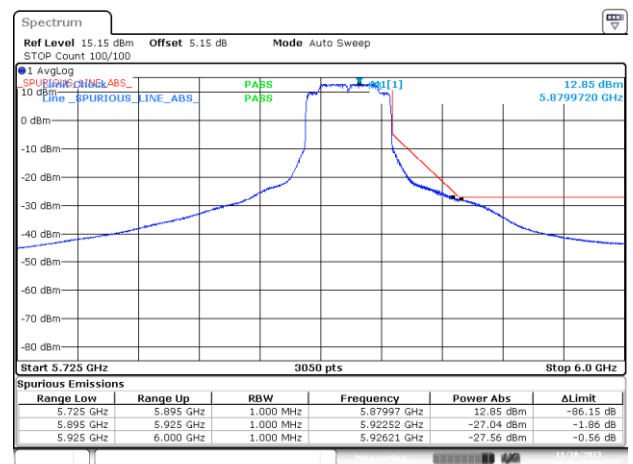
BE-NR-LOW, SISO-A, 802.11ax40-MCS0, Ch167



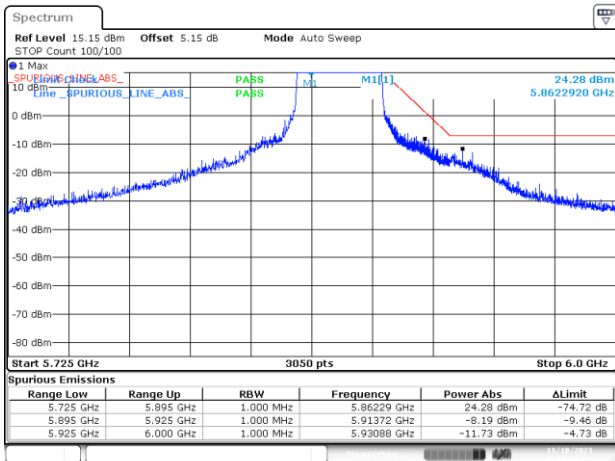
BE-NR-HIGH, SISO-A, 802.11ax40-MCS0, Ch167



BE-NR-LOW, SISO-A, 802.11ax40-MCS0, Ch175

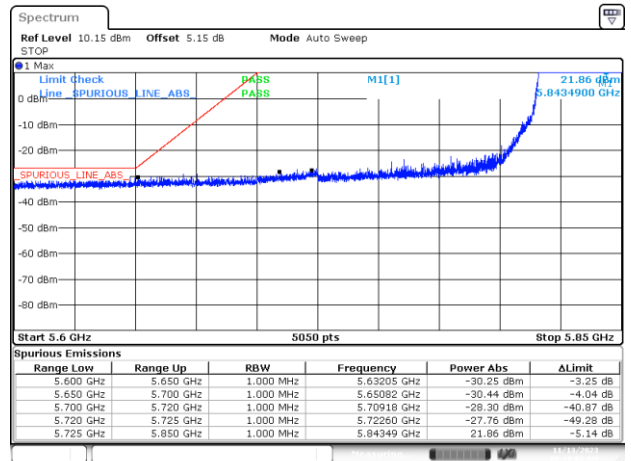


BE-NR-HIGH, SISO-A, 802.11ax40-MCS0, Ch175



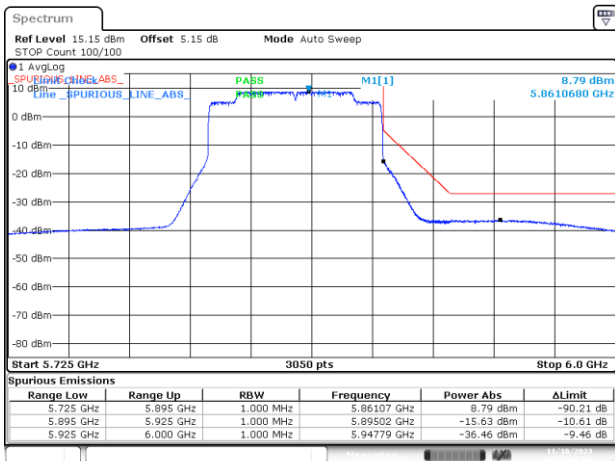
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BE-NR-HIGH-PEAK, SISO-A, 802.11ax40-MCS0, Ch175



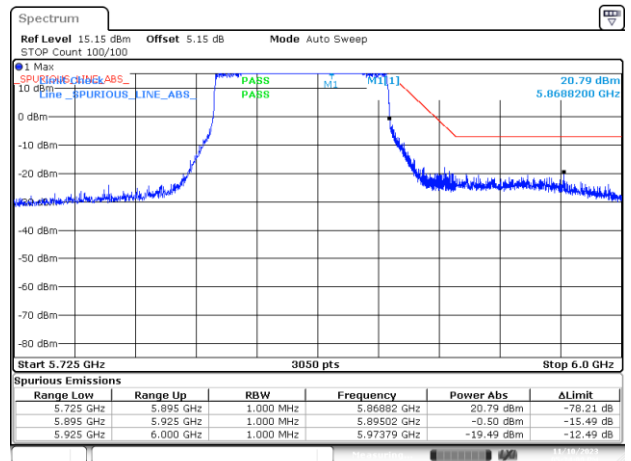
Date: 13 NOV 2023 08:19:07

BE-NR-LOW, SISO-A, 802.11ax80-MCS0, Ch171



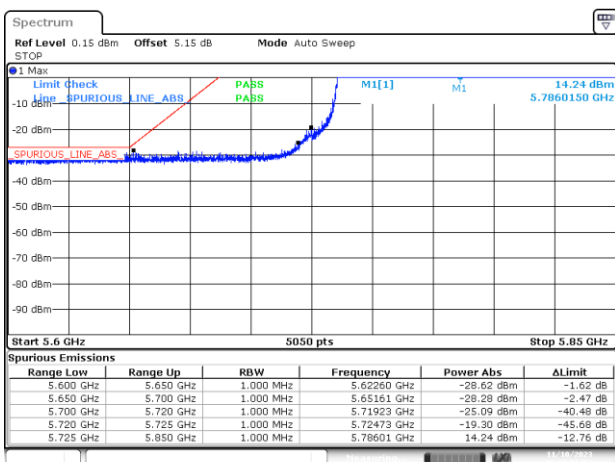
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BE-NR-HIGH, SISO-A, 802.11ax80-MCS0, Ch171



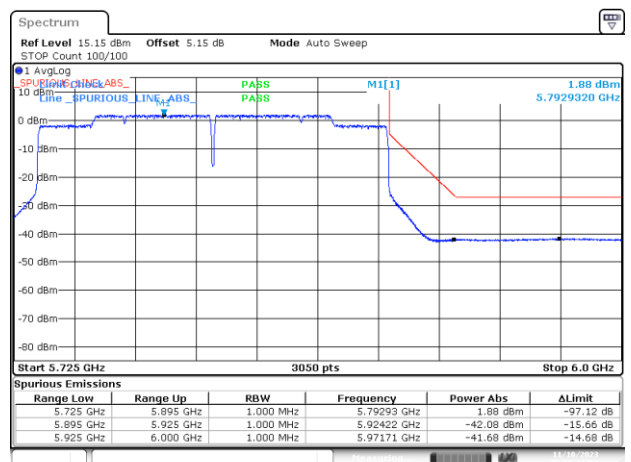
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BE-NR-HIGH-PEAK, SISO-A, 802.11ax80-MCS0, Ch171



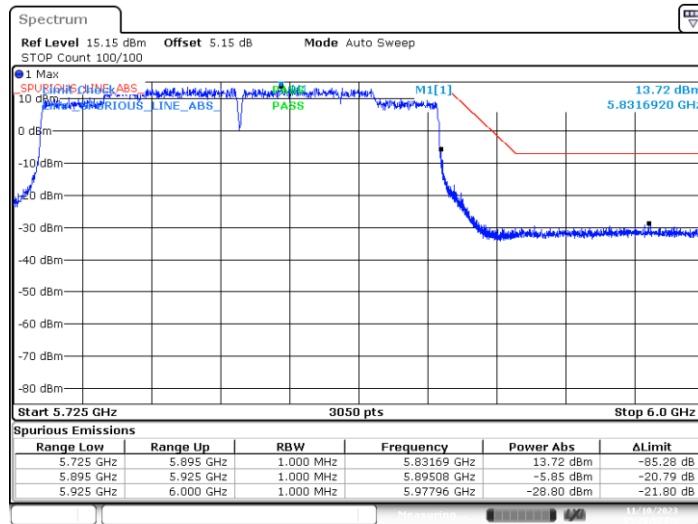
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BE-NR-LOW, SISO-A, 802.11ax160-MCS0, Ch163



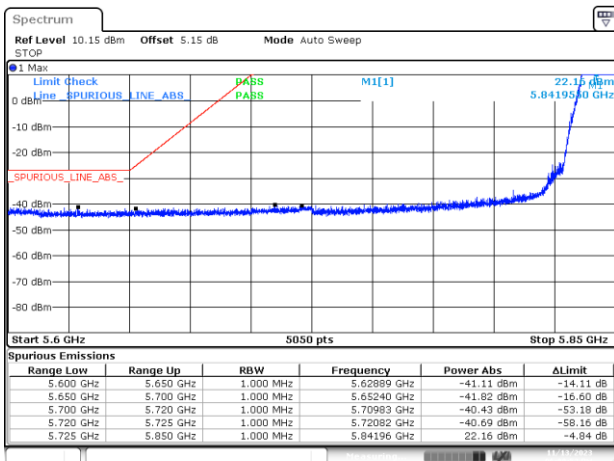
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BE-NR-HIGH, SISO-A, 802.11ax160-MCS0, Ch163

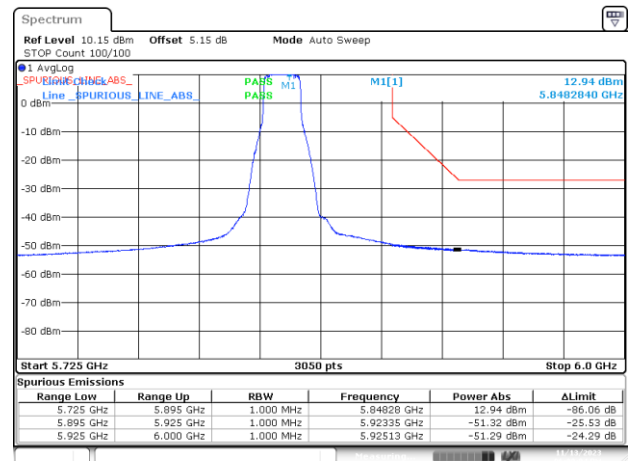


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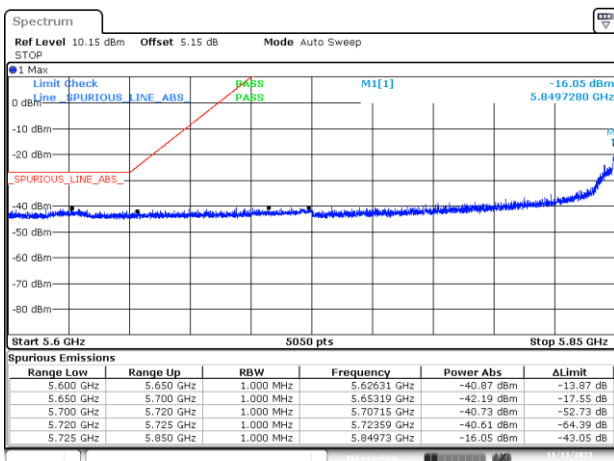
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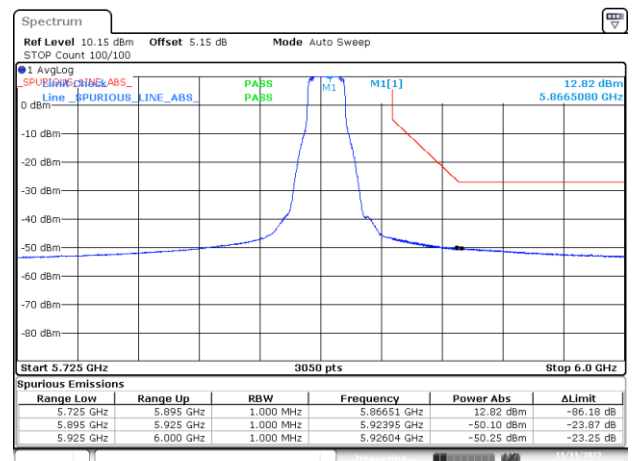
BE-NR-LOW, SISO-B, 802.11a20-6Mbps, Ch169



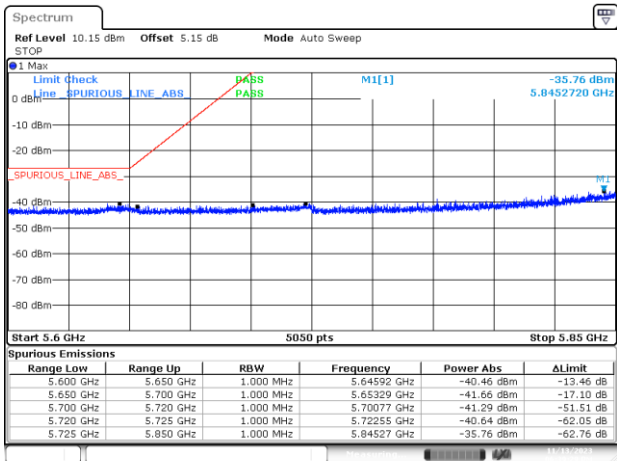
BE-NR-HIGH, SISO-B, 802.11a20-6Mbps, Ch169



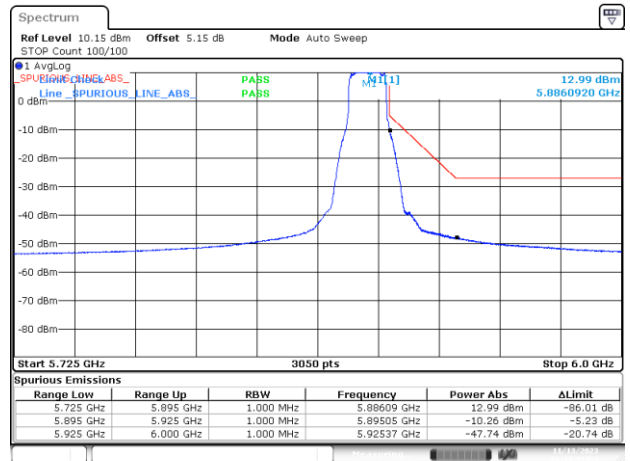
BE-NR-LOW, SISO-B, 802.11a20-6Mbps, Ch173



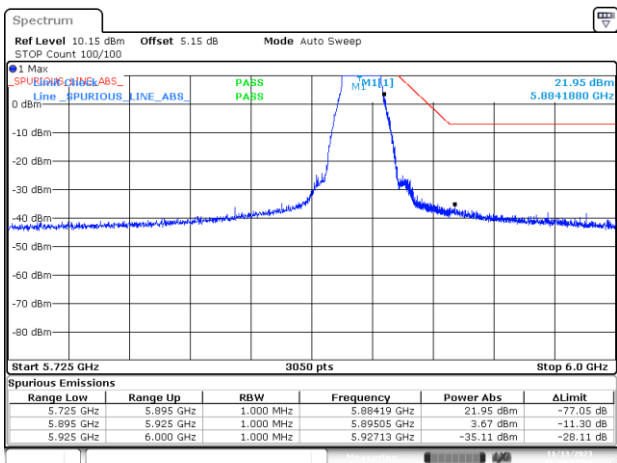
BE-NR-HIGH, SISO-B, 802.11a20-6Mbps, Ch173



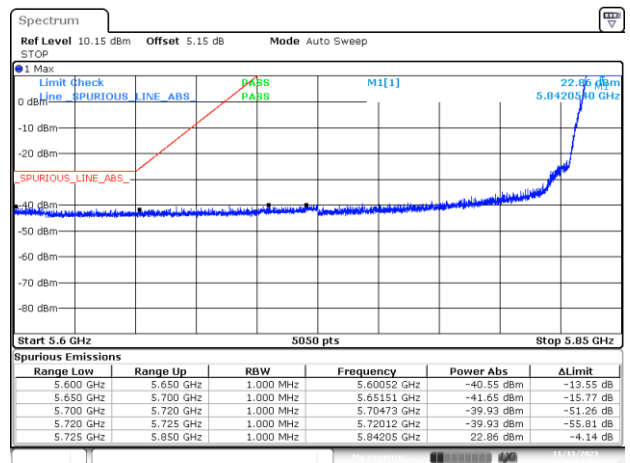
BE-NR-LOW, SISO-B, 802.11a20-6Mbps, Ch177



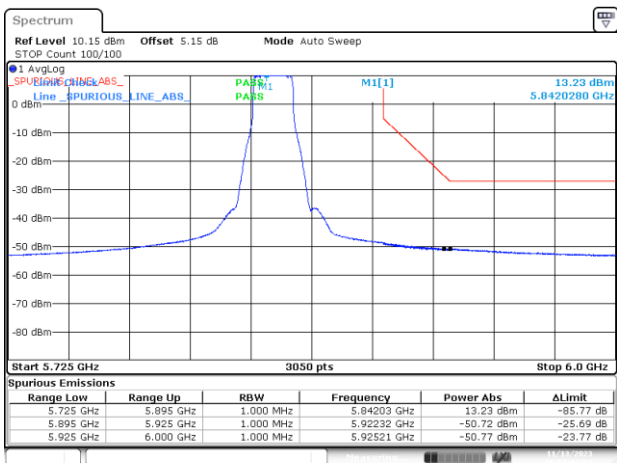
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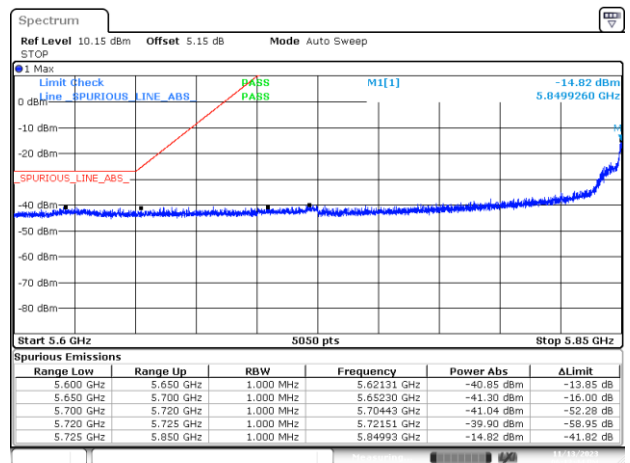
BE-NR-HIGH-PEAK, SISO-B, 802.11a20-6Mbps, Ch177



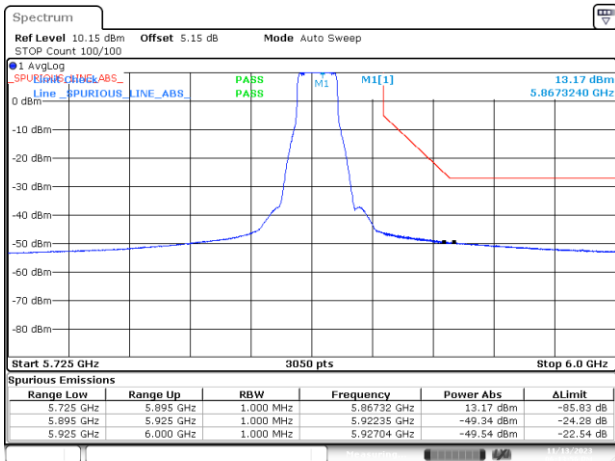
BE-NR-LOW, SISO-B, 802.11n20-HT0, Ch169



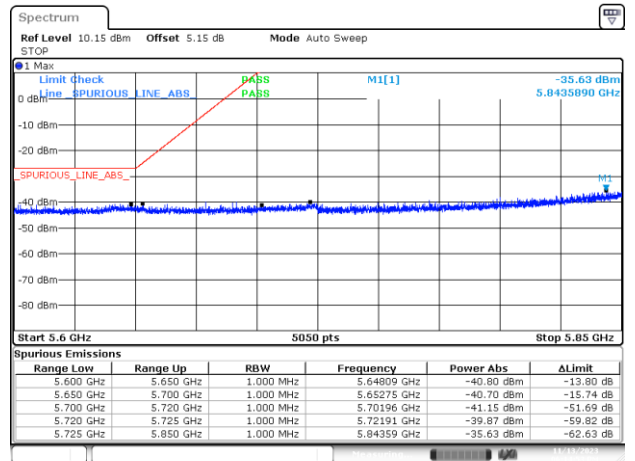
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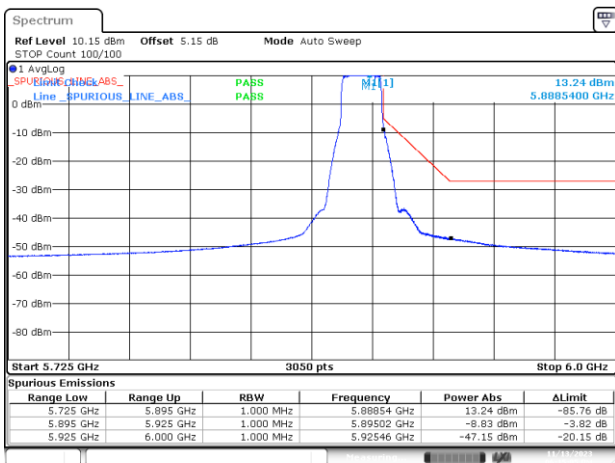
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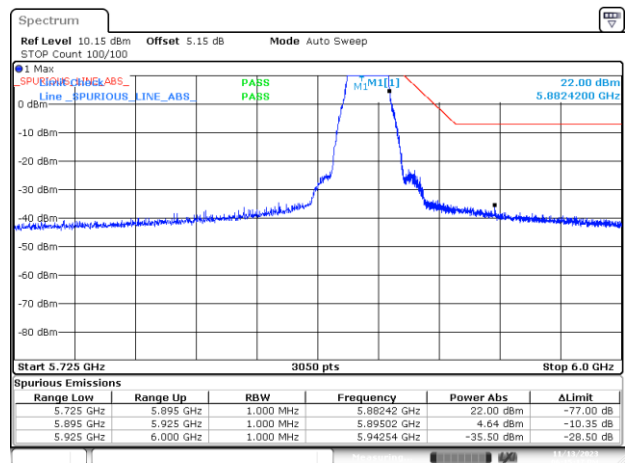
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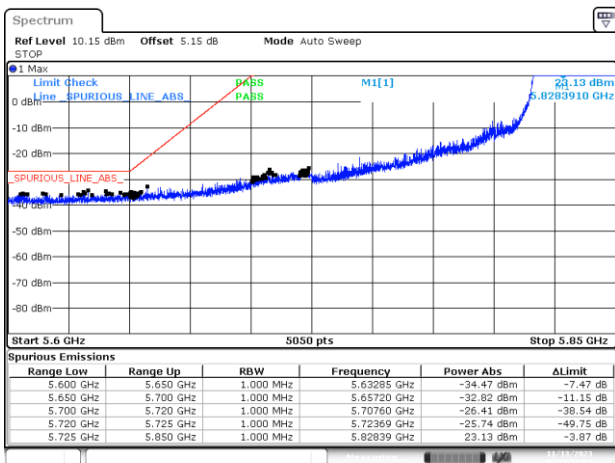
BE-NR-LOW, SISO-B, 802.11n20-HT0, Ch177



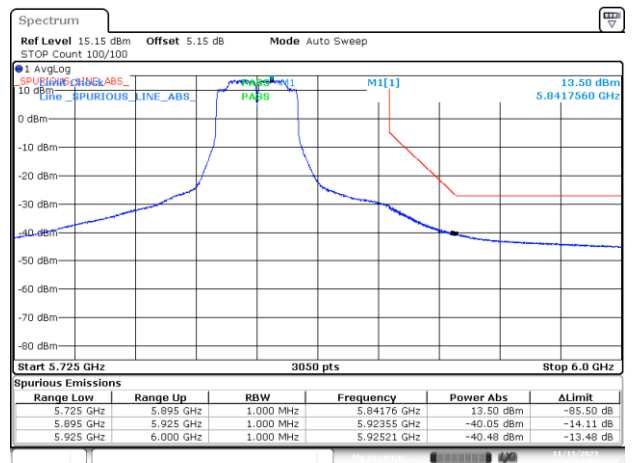
BE-NR-HIGH, SISO-B, 802.11n20-HT0, Ch177



BE-NR-HIGH-PEAK, SISO-B, 802.11n20-HT0, Ch177



BE-NR-LOW, SISO-B, 802.11n40-HT0, Ch167



BE-NR-HIGH, SISO-B, 802.11n40-HT0, Ch167