RHEIN TECH LABORATORIES, INC.

Engineering Solutions & Electromagnetic Compatibility Services

FCC & ISED Certification Report

L3Harris Technologies
221 Jefferson Ridge Parkway
Lynchburg, VA 24501
Contact: Thomas Camper
Thomas.Camper@L3Harris.com

Model: XL-95P
Multi-Band Portable, V/U

FCC ID: OWDTR-0166-E
IC: 3636B-0166

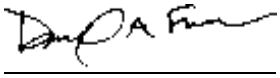
March 24, 2023

Standards Referenced for this Report	
Part 2: 2021	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 15: 2021	Radio Frequency Devices
Part 22: 2021	Public Mobile Services
Part 74: 2021	Experimental Radio, Auxiliary, Special Broadcast and Other Program Distributional Services
Part 80: 2021	Stations In The Maritime Services
Part 90: 2021	Private Land Portable Radio Services
ANSI C63.26-2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
RSS-119 Issue 12	Land Mobile and Fixed Radio Transmitters and Receivers 27.41 to 960.0 MHz

Report Prepared By: Daniel W. Baltzell

Document Number: 2022003TNF

I, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this test report. No modifications were made to the equipment during testing in order to achieve compliance with these standards. Furthermore, there was no deviation from, additions to, or exclusions from the standards referenced above.

Signature: 

Date: March 24, 2023

Typed/Printed Name: Desmond A. Fraser

Position: President

Grant Note	FCC Rule Part	Frequency Range (MHz)	Rated Conducted Output Power (W)	Frequency Tolerance (ppm)	Emission Designator	Transmit Mode
EF, ES	22, 74, 80, 90	136 – 174	6.0	0.2	11K0F3E	Analog FM (Narrowband)
EF, ES	22, 74, 80, 90	406.1 – 522	5.0	0.2	11K0F3E	
EF, ES	22, 74, 80, 90	136 – 174	6.0	0.2	11K7F1D/E	2-level FSK 9600 Data/Digital Voice (Narrowband)
EF, ES	22, 74, 80, 90	406.1 – 522	5.0	0.2	11K7F1D/E	
EF, ES	22, 74, 80, 90	136 – 174	6.0	0.2	8K40F1D/E	C4FM Data/Voice
EF, ES	22, 74, 80, 90	406.1 – 522	5.0	0.2	8K40F1D/E	
EF, ES	22, 74, 80, 90	136 – 174	6.0	0.2	8K10DXW	H-CPM (TDMA) Data/Voice
EF, ES	22, 74, 80, 90	406.1 – 522	5.0	0.2	8K10DXW	

This device contains functions that are not operational in U.S Territories except as noted in the filing. The grant is requested to list extended frequencies as noted in the filing and Section 2.927(b) applies to this application.

Additionally, as this is a combined FCC and ISED test report, there are test frequencies contained within this report that may not be authorized for use in either the United States or Canada. Any data presented in this report between 378 and 406.0 MHz is for engineering use only per L3Harris Technologies request.

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1 Test Summary

Test	FCC Reference	ISED Reference	Result
RF Power Output	2.1046(a), 90.205, 80.215, 74.461, 22.565, 22.659	RSS-119 4.1, 5.4	Complies
Spurious Emissions at Antenna Terminals	2.1051, 22.359, 74.462, 80.211, 90.210	RSS-119 5.5, 5.8	Complies
Field Strength of Spurious Radiation	2.1053(a), 22.359, 80.211(f)(3), 90.210	RSS-119 5.5, 5.8	Complies
Occupied Bandwidth/ Emission Masks	2.1049(c)(1), 22.359(b), 74.462, 80.205, 80.211, 90.210	RSS-119 5.5, 5.8	Complies
Frequency Stability vs. Temperature and Voltage	2.1055, 22.355, 74.464, 80.209, 90.213	RSS-119 5.3	Complies
Modulation Characteristics	2.1047(a)(b), 74.463, 80.213	RSS-119 5.2	Complies
Transient Frequency Response	74.462(c), 90.214	RSS-119 5.9	N/A

2 General Information

The following certification report is prepared on behalf of **L3Harris Technologies** in accordance with the Federal Communications Commission and Innovation, Science and Economic Development (ISED) Canada. The Equipment Under Test (EUT) was the XL-95P V/U, FCC ID: OWDTR-0166-E, IC: 3636B-0166 (HVIN: XL-x5-V/U).

All measurements contained in this application were conducted in accordance with the applicable sections of FCC Rules and Regulations CFR 47 Parts 2 and 90. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

The Part 15 test results for the receiver portion of the EUT are documented in an SDoC report.

2.1 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc. 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170.

ISED CAB ID: US0079, Company Number: 2956A

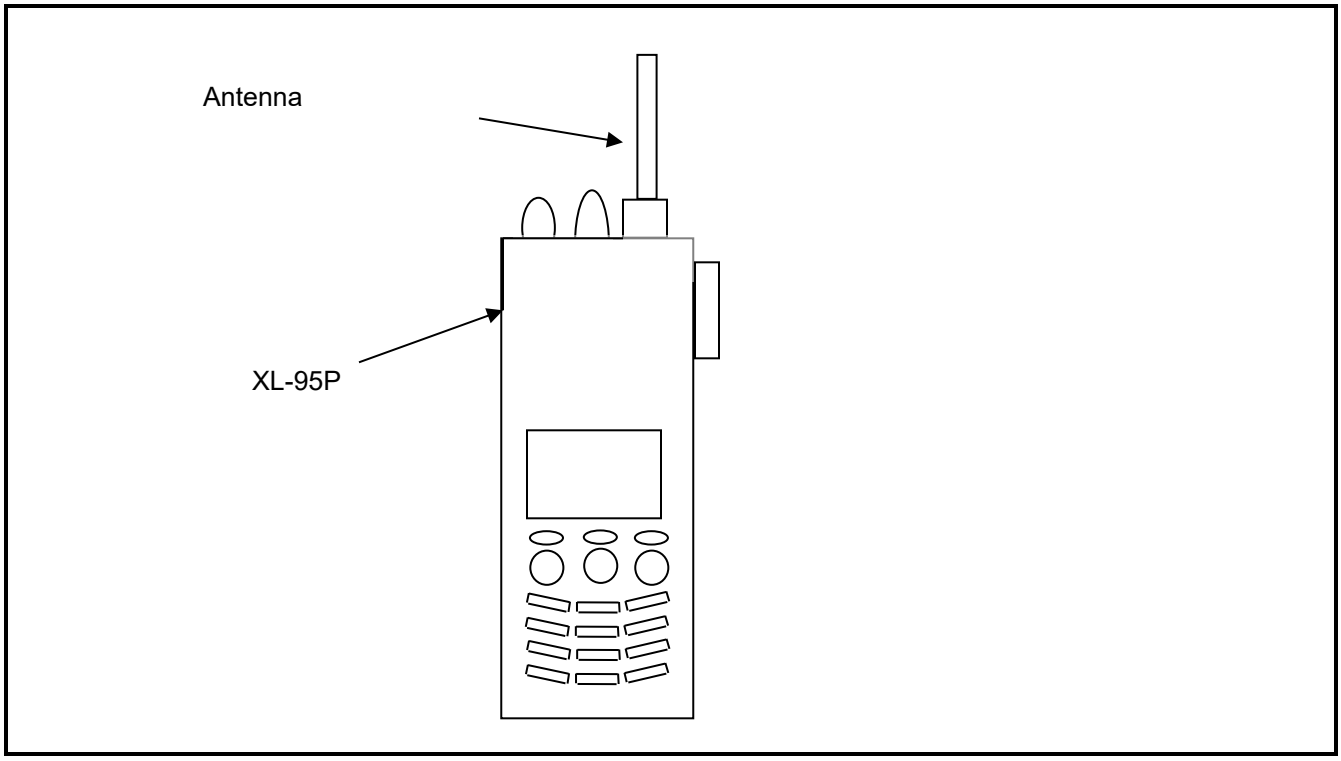
2.2 Tested System Details

The test sample was received on August 22, 2022. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable. The device was programmed for multiple modes of operation and modulation types.

Table 2-1: Equipment Under Test (EUT)

Part	Manufacturer	Model	PN/SN	RTL Bar Code
Radio	L3Harris	XL-95P	A40199E24A-001	24159
Radio	L3Harris	XL-95P	A40199E24A-002	24216
Antenna, Full Spectrum	L3Harris	14035-4000-01	N/A	24157
7.4 V Lithium Ion Battery	L3Harris	BT-023406-005 Rev PG#	KPAM	20166
Handset	L3Harris	MC-011617-651	N/A	21109

Figure 2-1: Configuration of Tested System



3 FCC Part 2.1033(C)(8): Voltages and Currents through the Final Amplifying Stage

7.2VDC / 1.6 A

4 FCC Part 2.1046(a): RF power output: Conducted; Parts 90.205, Transmitting power and antenna height requirements; 80.215: Transmitter Power; 22.565: Transmitting power limits; §22.659: Effective Radiated Power Limits; Part 74.461: Transmitter Power; ISED RSS-119 4.1: Transmitter Output Power

4.1 Test Procedure

ANSI C63.26-2015, section 5.2

The EUT was connected to a coaxial attenuator having a 50 Ω load impedance.

Manufacturer's Rated Power: VHF: 6.0 W; UHF: 5.0 W

4.2 Test Data

Table 4-1: RF Conducted Output Power - Measured

Frequency (MHz)	Power (dBm)	Power (W)
136.0125	37.9	6.2
138.0125	37.9	6.2
143.9875	37.8	6.1
148.0125	37.9	6.1
150.0125	37.9	6.1
156.8000	37.8	6.0
162.0125	37.6	5.8
173.9875	37.7	5.9
378.0125	36.9	4.9
406.1125	36.9	4.9
418.0000	36.9	4.9
429.9875	36.9	4.9
450.0125	37.0	5.0
453.9875	37.0	5.0
456.0125	36.8	4.7
459.0250	37.0	5.0
459.9750	37.0	5.0
469.9875	37.0	5.0
511.9875	37.0	5.0
521.9875	36.9	4.9

Notes: Data presented is for analog mode. All other modes were investigated and found to have equivalent power within measurement tolerances.

Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.8 dB

Results: Pass

Table 4-2: Test Equipment Used For Testing RF Power Output - Conducted

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2024
901139	MCE Weinschel	48-20-34	Attenuator, 20 dB, DC-18 GHz, 100 W	BK5859	09/21/2022
901350	Meterman	33XR	Multimeter	040402802	10/18/2023

Test Personnel:

Daniel W. Baltzell		August 25, 2022
EMC Test Engineer	Signature	Date of Test

5 FCC Part 2.1051: Spurious Emissions at Antenna Terminals; Part 74.462: Authorized Bandwidth and Emissions; Part 90.210: Emission Limitations; §80.211: Emission Limitations; §22.359: Emission Limitations; ISED RSS-119 5.8: Transmitter Unwanted Emissions

5.1 Test Procedure

ANSI C63.26-2015, section 5.7

The transmitter is terminated with a 50 Ω load and interfaced with a spectrum analyzer.

Device with digital modulation: Modulated to its maximum extent using a pseudo-random data sequence.

5.2 Test Data

Frequency range of measurement per §2.1057: 9 kHz to 10 x Fc

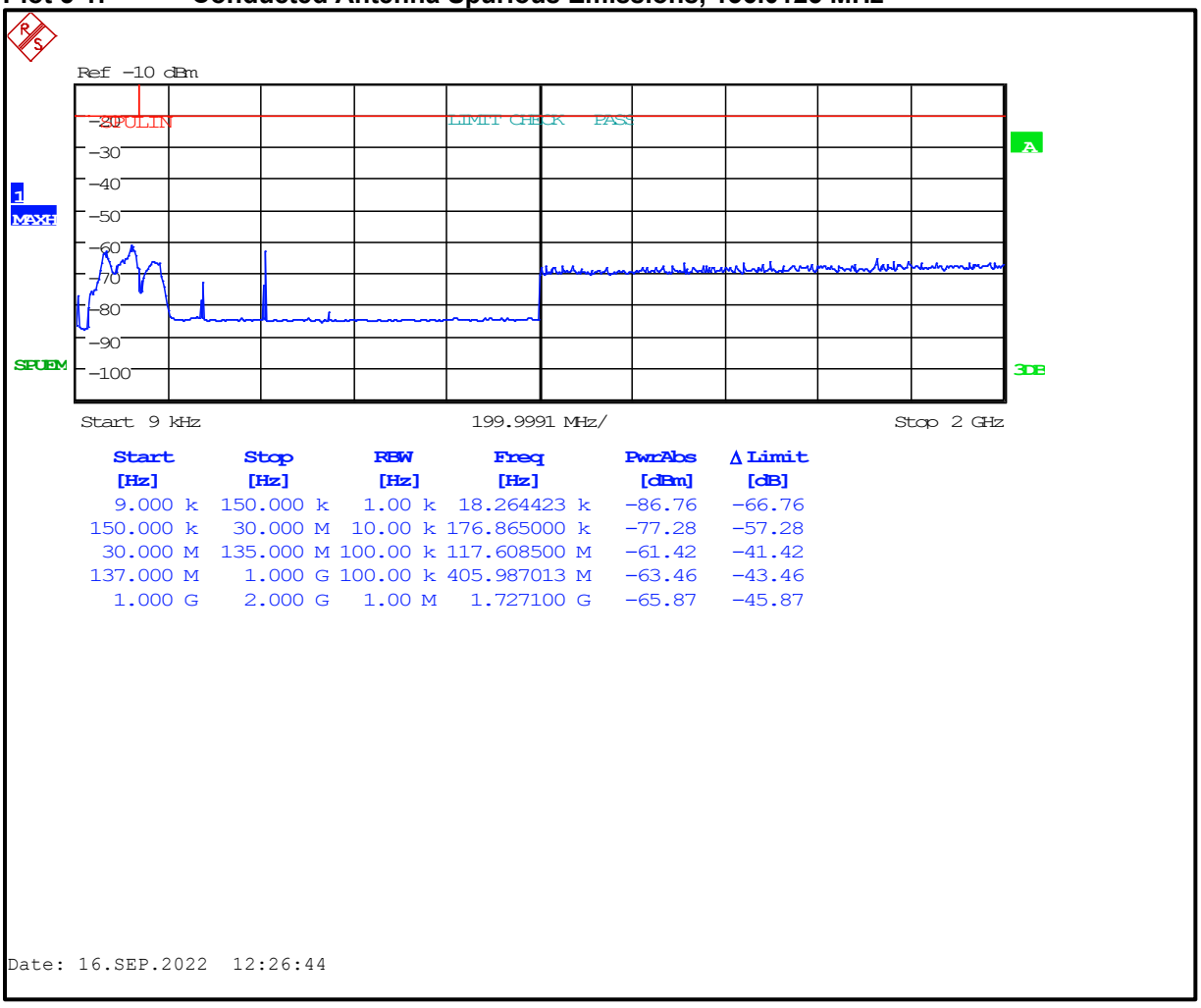
Limits: (43 + 10 LOG P(W)) for wideband and 50 + 10 LOG P(W)) for narrowband. A worst case limit of 50 + 10 Log P(W) was used.

The following channels (in MHz) were investigated:

Frequency (MHz)	
136.0125	378.0125
138.0125	406.1125
143.9875	418.0000
148.0125	429.9875
150.0125	450.0125
156.8000	453.9875
162.0125	456.0125
173.9875	459.0250
	459.9750
	469.9875
	511.9875
	521.9875

Both high and low power settings were checked; high power was found to be worst case. All modes were investigated and analog mode is presented as representative data.

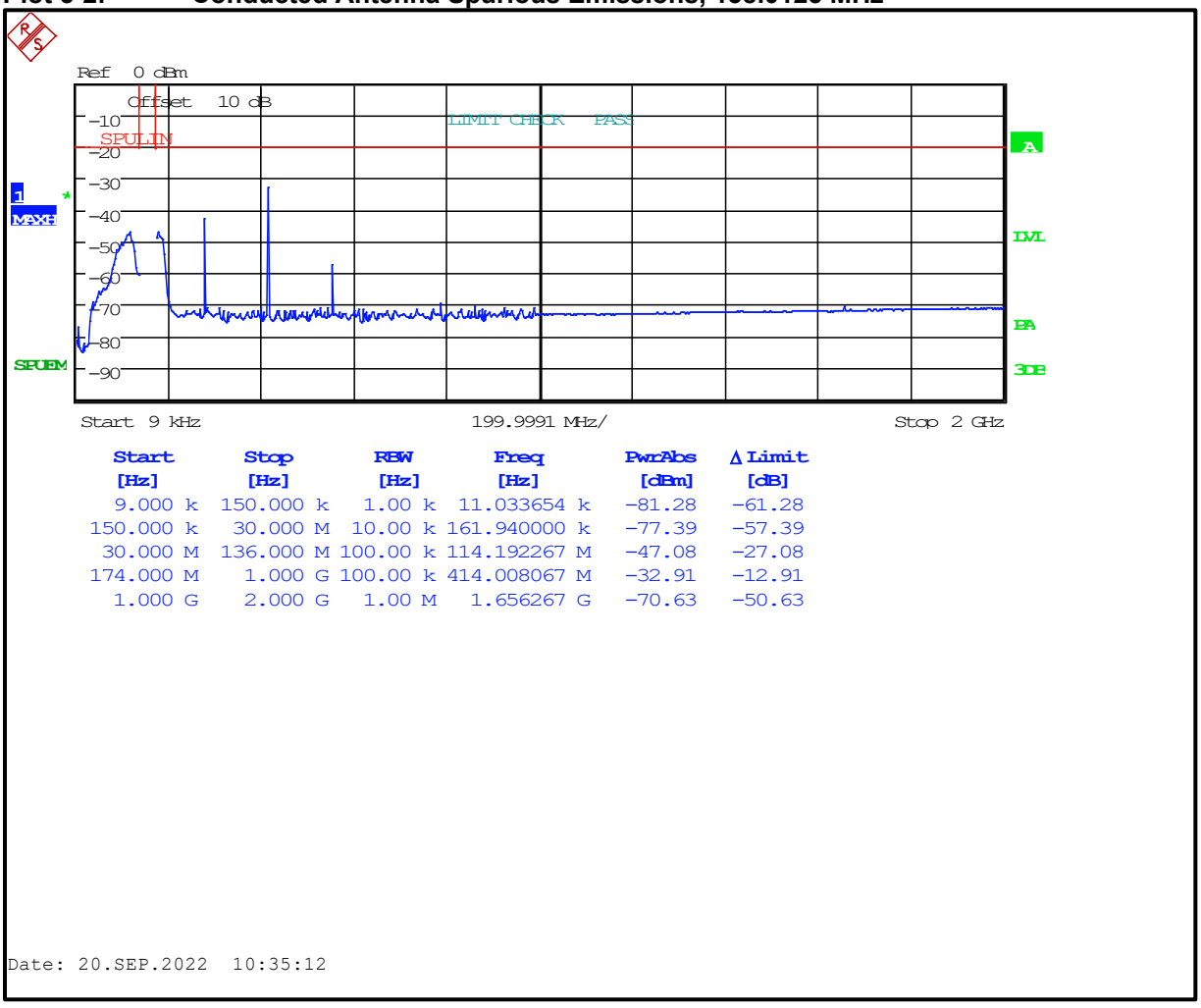
Plot 5-1: Conducted Antenna Spurious Emissions, 136.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	18.264423 k	-86.76	-66.76
150.000 k	30.000 M	10.00 k	176.865000 k	-77.28	-57.28
30.000 M	135.000 M	100.00 k	117.608500 M	-61.42	-41.42
137.000 M	1.000 G	100.00 k	405.987013 M	-63.46	-43.46
1.000 G	2.000 G	1.00 M	1.727100 G	-65.87	-45.87

Date: 16.SEP.2022 12:26:44

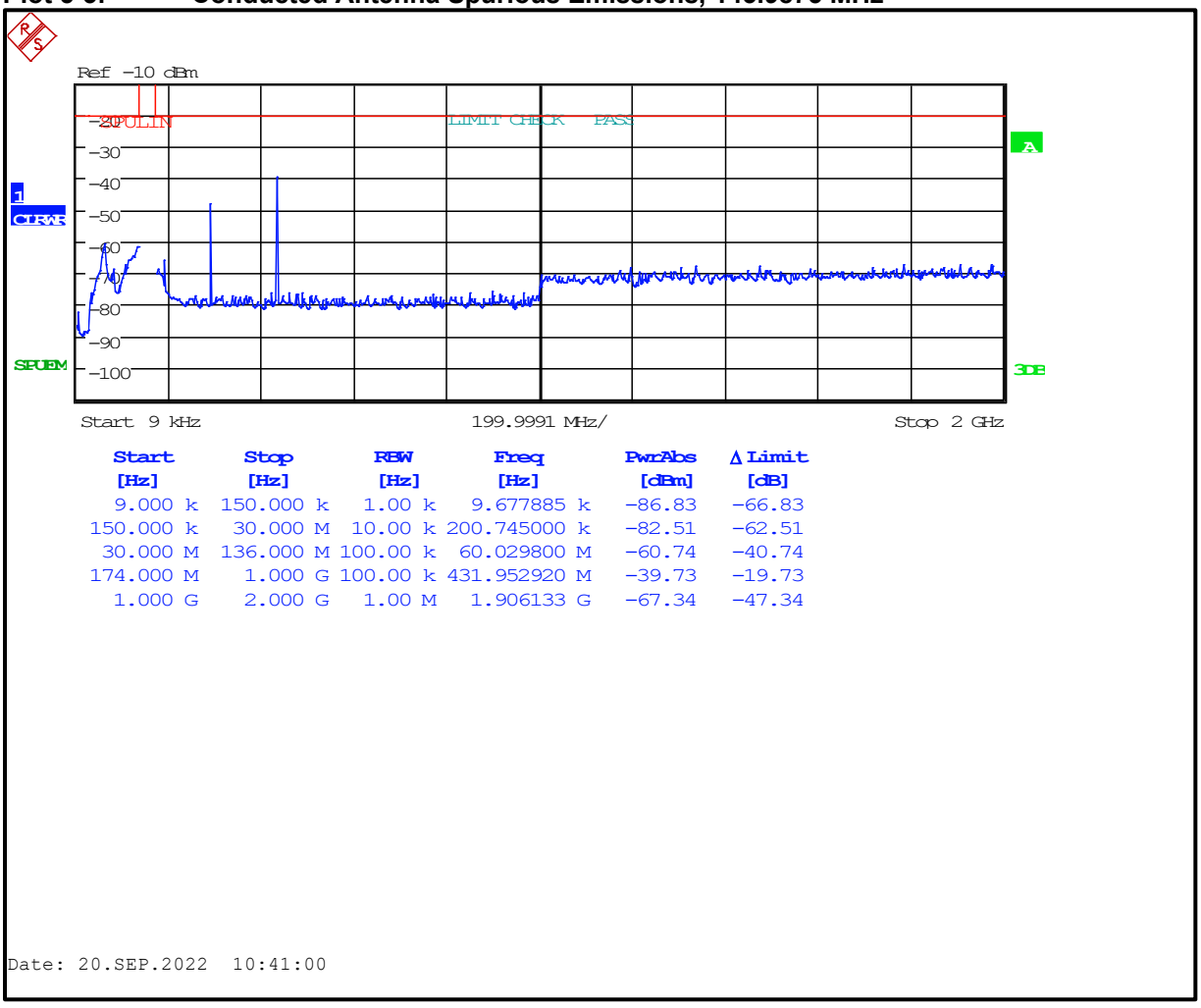
Plot 5-2: Conducted Antenna Spurious Emissions, 138.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	11.033654 k	-81.28	-61.28
150.000 k	30.000 M	10.00 k	161.940000 k	-77.39	-57.39
30.000 M	136.000 M	100.00 k	114.192267 M	-47.08	-27.08
174.000 M	1.000 G	100.00 k	414.008067 M	-32.91	-12.91
1.000 G	2.000 G	1.00 M	1.656267 G	-70.63	-50.63

Date: 20.SEP.2022 10:35:12

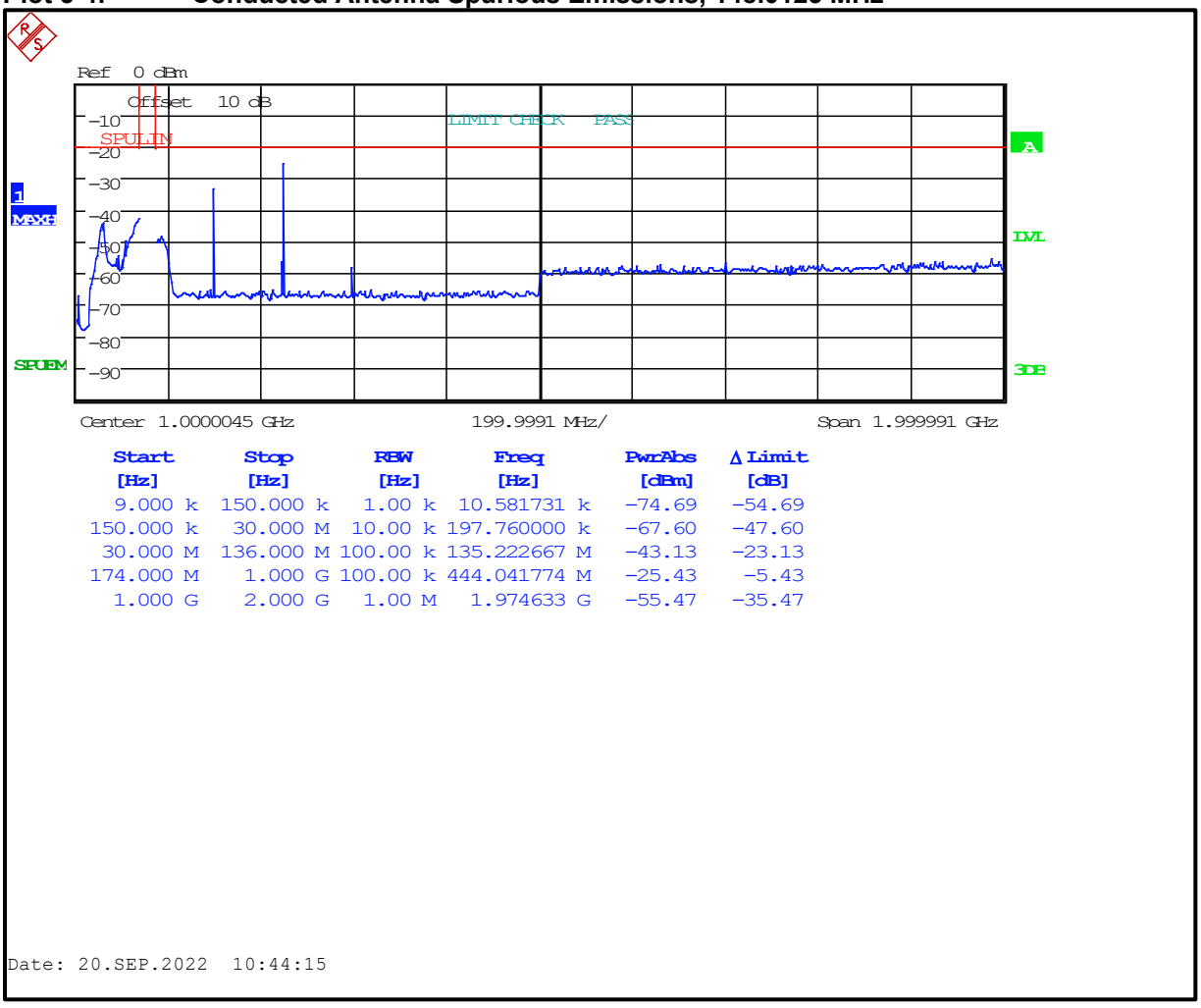
Plot 5-3: Conducted Antenna Spurious Emissions, 143.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.677885 k	-86.83	-66.83
150.000 k	30.000 M	10.00 k	200.745000 k	-82.51	-62.51
30.000 M	136.000 M	100.00 k	60.029800 M	-60.74	-40.74
174.000 M	1.000 G	100.00 k	431.952920 M	-39.73	-19.73
1.000 G	2.000 G	1.00 M	1.906133 G	-67.34	-47.34

Date: 20.SEP.2022 10:41:00

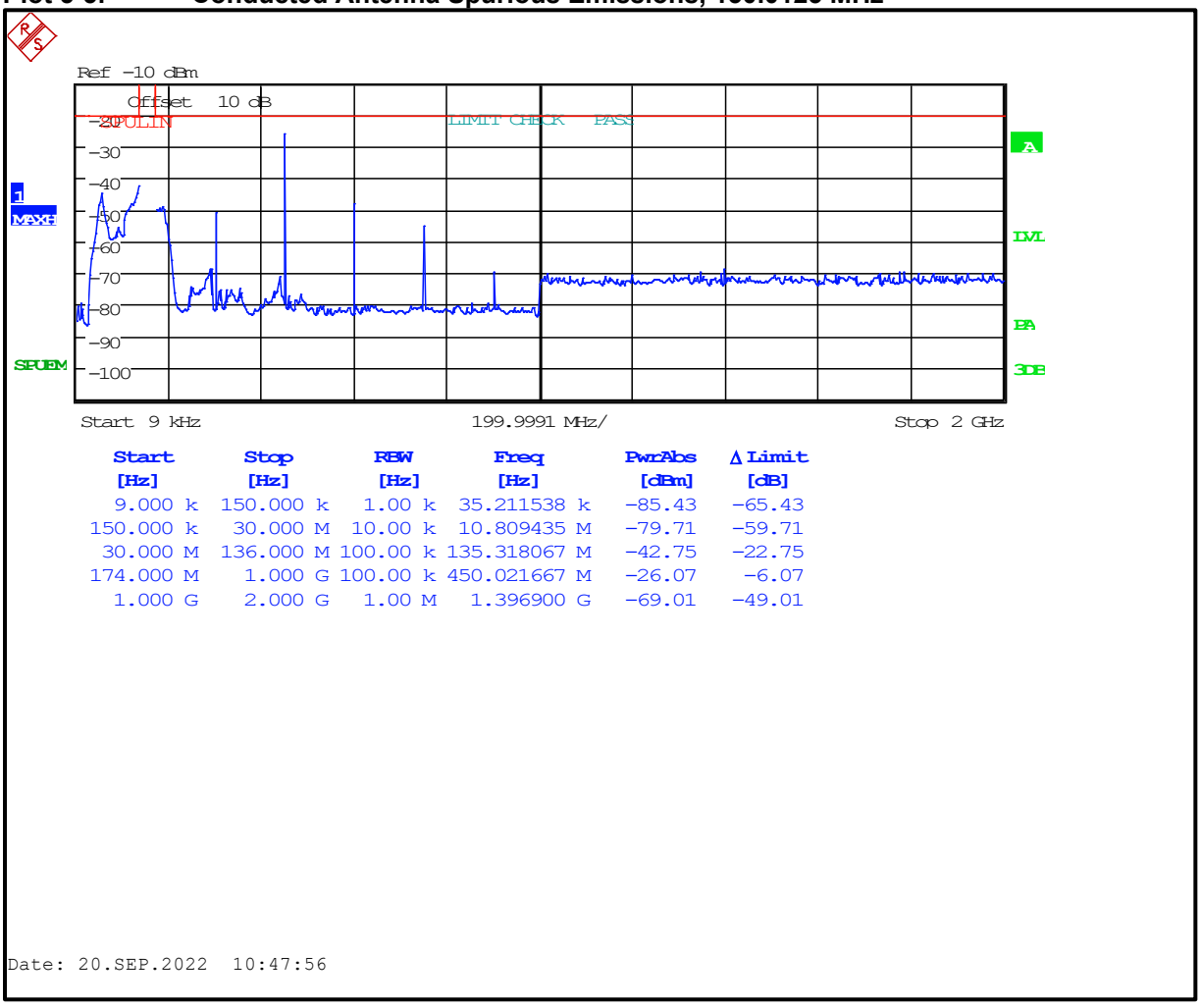
Plot 5-4: Conducted Antenna Spurious Emissions, 148.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	10.581731 k	-74.69	-54.69
150.000 k	30.000 M	10.00 k	197.760000 k	-67.60	-47.60
30.000 M	136.000 M	100.00 k	135.222667 M	-43.13	-23.13
174.000 M	1.000 G	100.00 k	444.041774 M	-25.43	-5.43
1.000 G	2.000 G	1.00 M	1.974633 G	-55.47	-35.47

Date: 20.SEP.2022 10:44:15

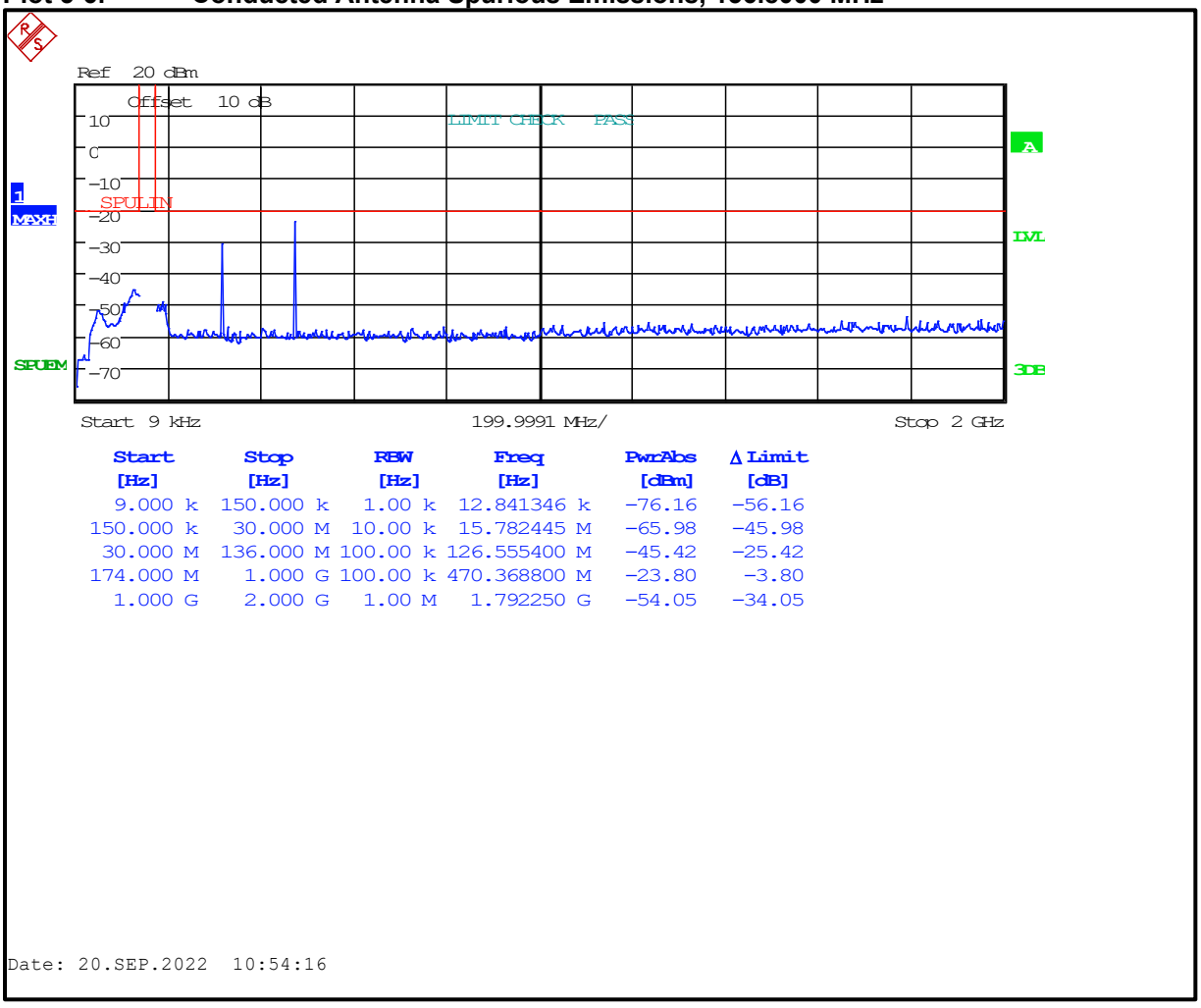
Plot 5-5: Conducted Antenna Spurious Emissions, 150.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	35.211538 k	-85.43	-65.43
150.000 k	30.000 M	10.00 k	10.809435 M	-79.71	-59.71
30.000 M	136.000 M	100.00 k	135.318067 M	-42.75	-22.75
174.000 M	1.000 G	100.00 k	450.021667 M	-26.07	-6.07
1.000 G	2.000 G	1.00 M	1.396900 G	-69.01	-49.01

Date: 20.SEP.2022 10:47:56

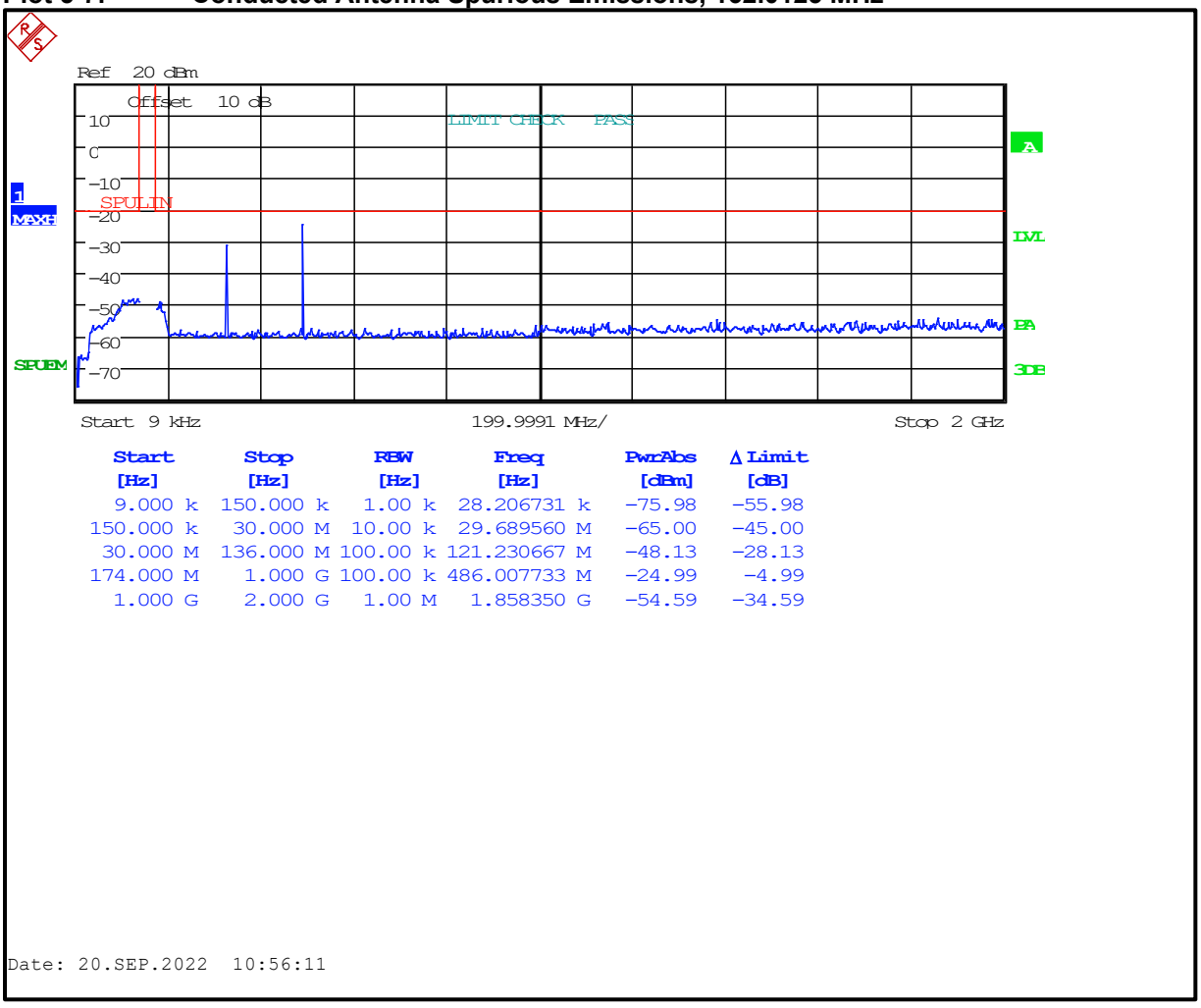
Plot 5-6: Conducted Antenna Spurious Emissions, 156.8000 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	12.841346 k	-76.16	-56.16
150.000 k	30.000 M	10.00 k	15.782445 M	-65.98	-45.98
30.000 M	136.000 M	100.00 k	126.555400 M	-45.42	-25.42
174.000 M	1.000 G	100.00 k	470.368800 M	-23.80	-3.80
1.000 G	2.000 G	1.00 M	1.792250 G	-54.05	-34.05

Date: 20.SEP.2022 10:54:16

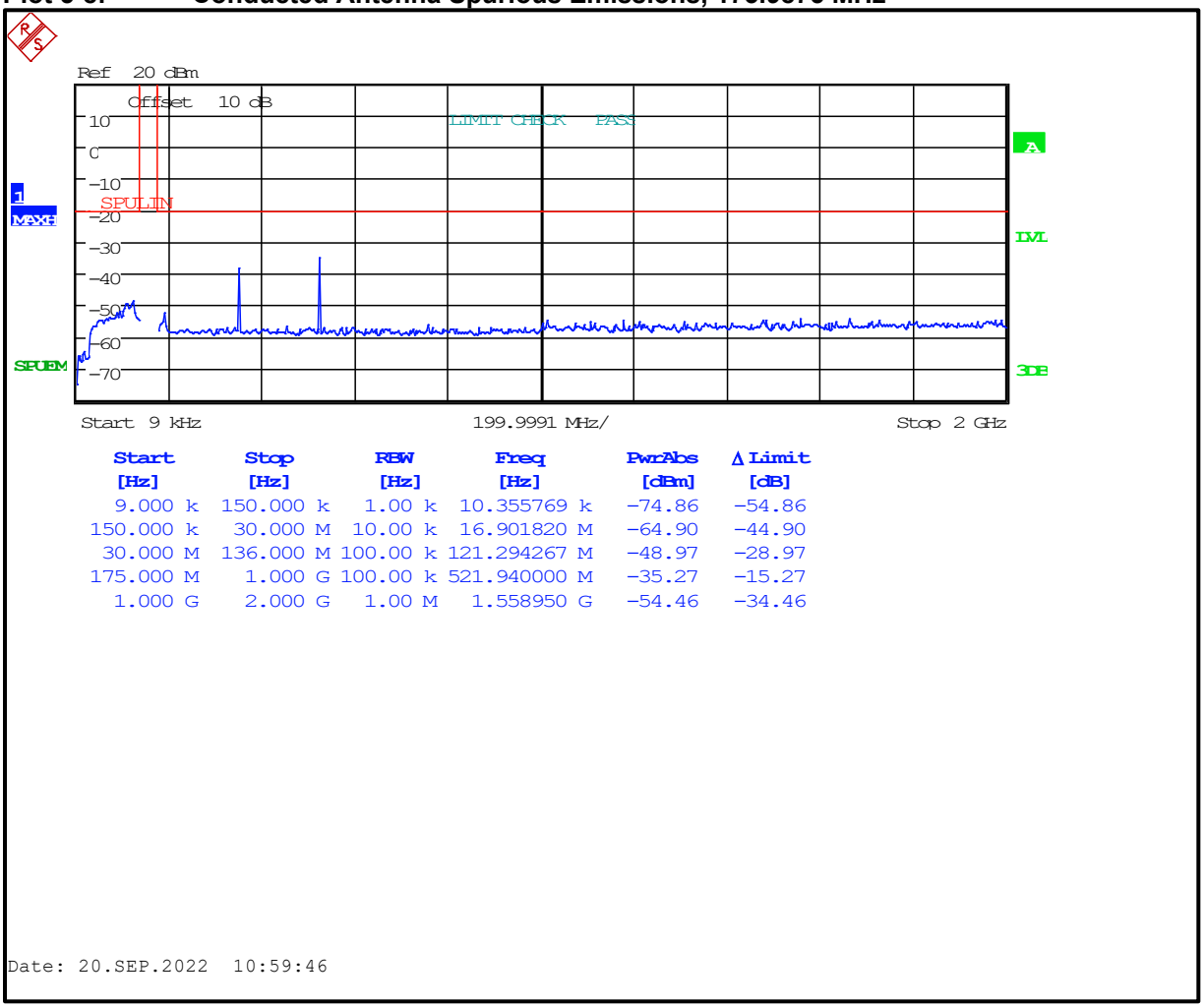
Plot 5-7: Conducted Antenna Spurious Emissions, 162.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	28.206731 k	-75.98	-55.98
150.000 k	30.000 M	10.00 k	29.689560 M	-65.00	-45.00
30.000 M	136.000 M	100.00 k	121.230667 M	-48.13	-28.13
174.000 M	1.000 G	100.00 k	486.007733 M	-24.99	-4.99
1.000 G	2.000 G	1.00 M	1.858350 G	-54.59	-34.59

Date: 20.SEP.2022 10:56:11

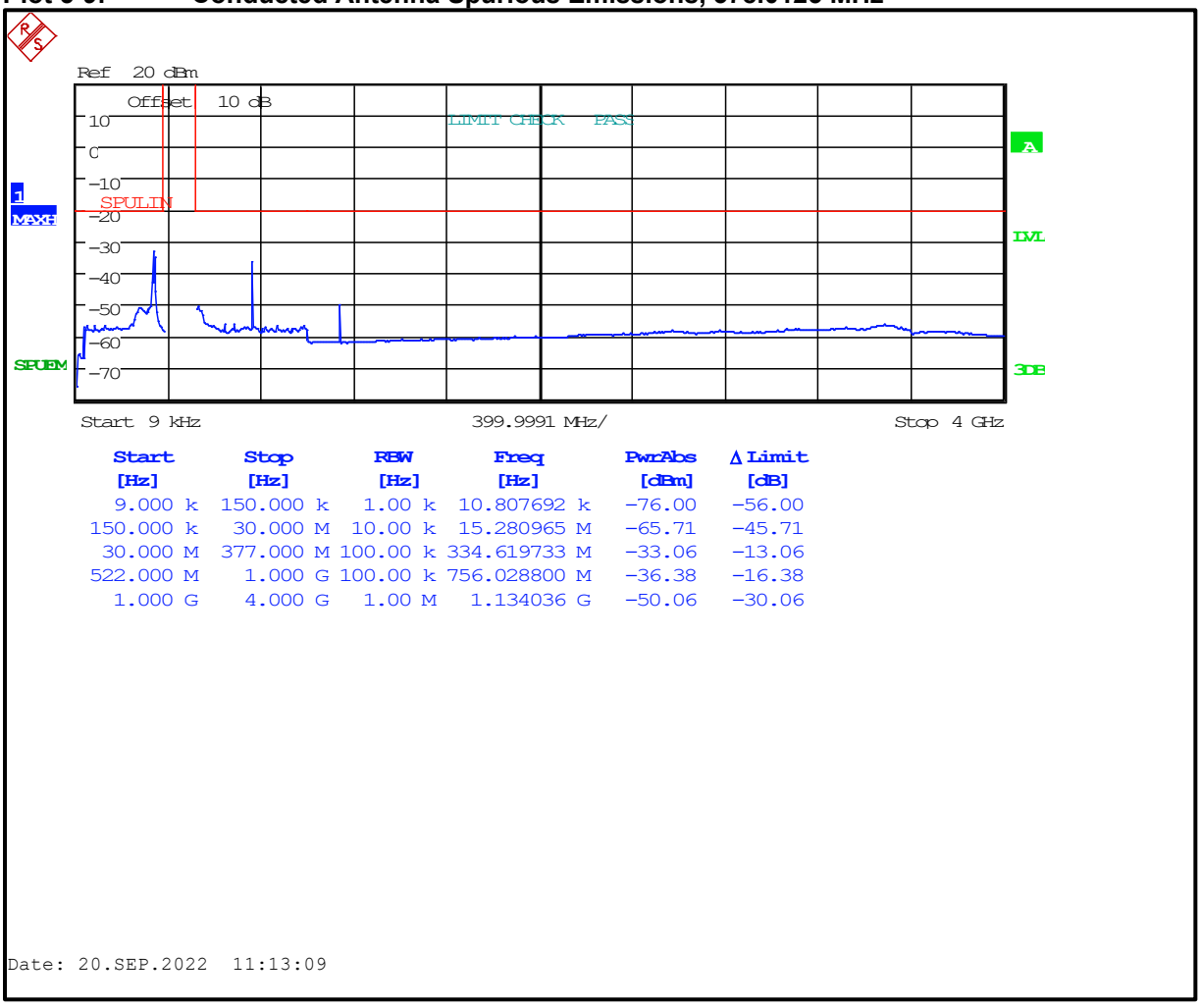
Plot 5-8: Conducted Antenna Spurious Emissions, 173.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	10.355769 k	-74.86	-54.86
150.000 k	30.000 M	10.00 k	16.901820 M	-64.90	-44.90
30.000 M	136.000 M	100.00 k	121.294267 M	-48.97	-28.97
175.000 M	1.000 G	100.00 k	521.940000 M	-35.27	-15.27
1.000 G	2.000 G	1.00 M	1.558950 G	-54.46	-34.46

Date: 20.SEP.2022 10:59:46

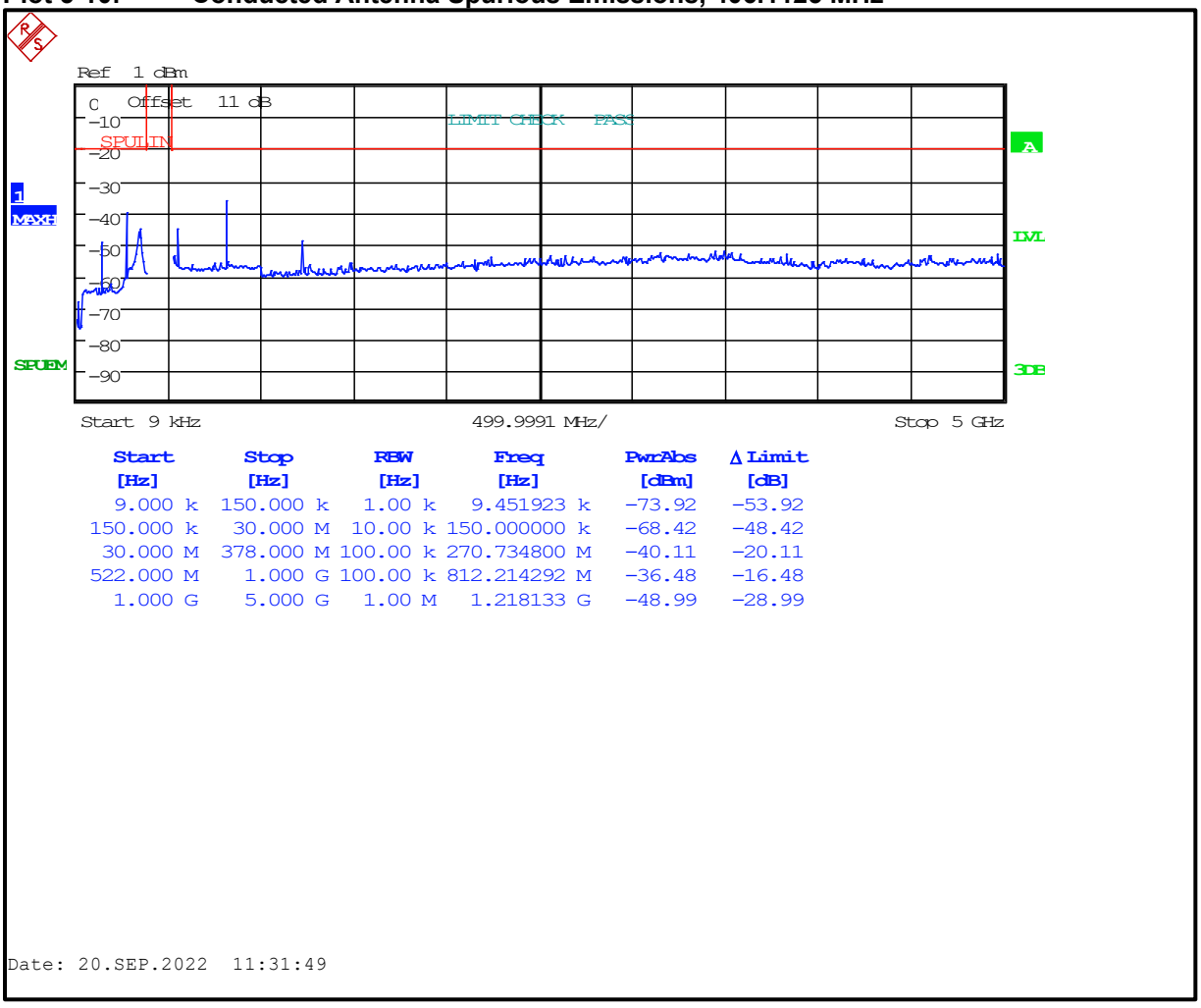
Plot 5-9: Conducted Antenna Spurious Emissions, 378.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	10.807692 k	-76.00	-56.00
150.000 k	30.000 M	10.00 k	15.280965 M	-65.71	-45.71
30.000 M	377.000 M	100.00 k	334.619733 M	-33.06	-13.06
522.000 M	1.000 G	100.00 k	756.028800 M	-36.38	-16.38
1.000 G	4.000 G	1.00 M	1.134036 G	-50.06	-30.06

Date: 20.SEP.2022 11:13:09

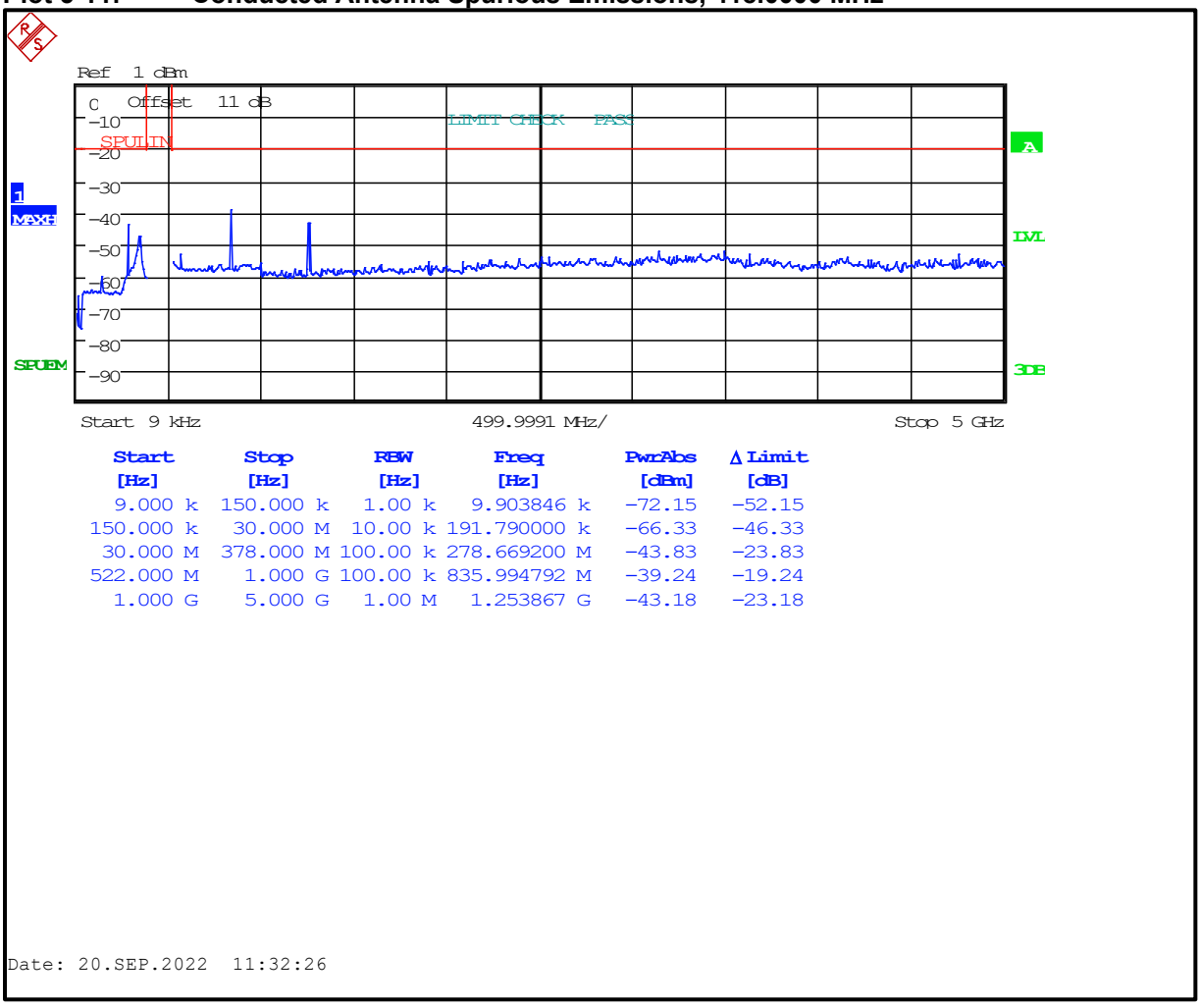
Plot 5-10: Conducted Antenna Spurious Emissions, 406.1125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.451923 k	-73.92	-53.92
150.000 k	30.000 M	10.00 k	150.000000 k	-68.42	-48.42
30.000 M	378.000 M	100.00 k	270.734800 M	-40.11	-20.11
522.000 M	1.000 G	100.00 k	812.214292 M	-36.48	-16.48
1.000 G	5.000 G	1.00 M	1.218133 G	-48.99	-28.99

Date: 20.SEP.2022 11:31:49

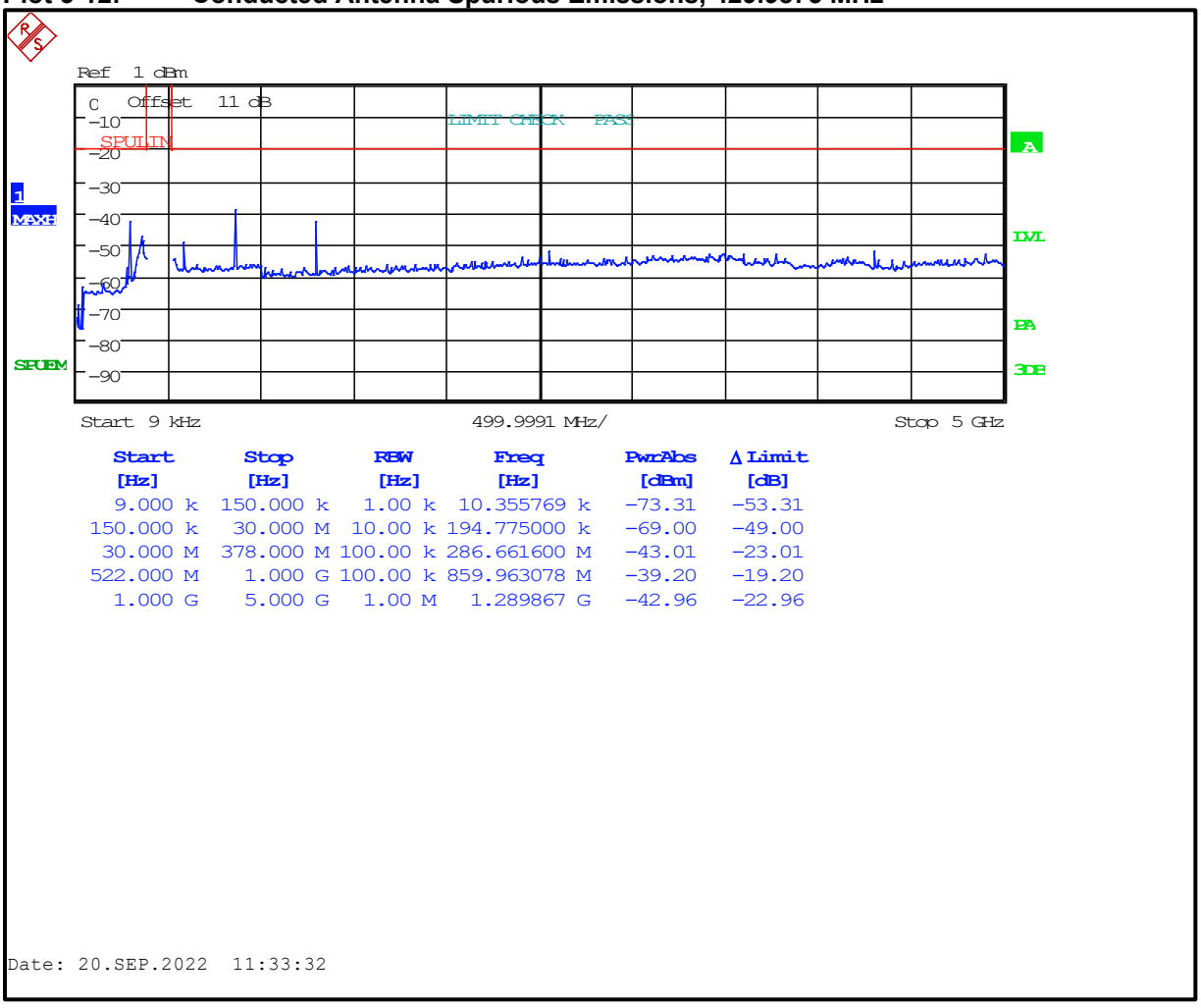
Plot 5-11: Conducted Antenna Spurious Emissions, 418.0000 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.903846 k	-72.15	-52.15
150.000 k	30.000 M	10.00 k	191.790000 k	-66.33	-46.33
30.000 M	378.000 M	100.00 k	278.669200 M	-43.83	-23.83
522.000 M	1.000 G	100.00 k	835.994792 M	-39.24	-19.24
1.000 G	5.000 G	1.00 M	1.253867 G	-43.18	-23.18

Date: 20.SEP.2022 11:32:26

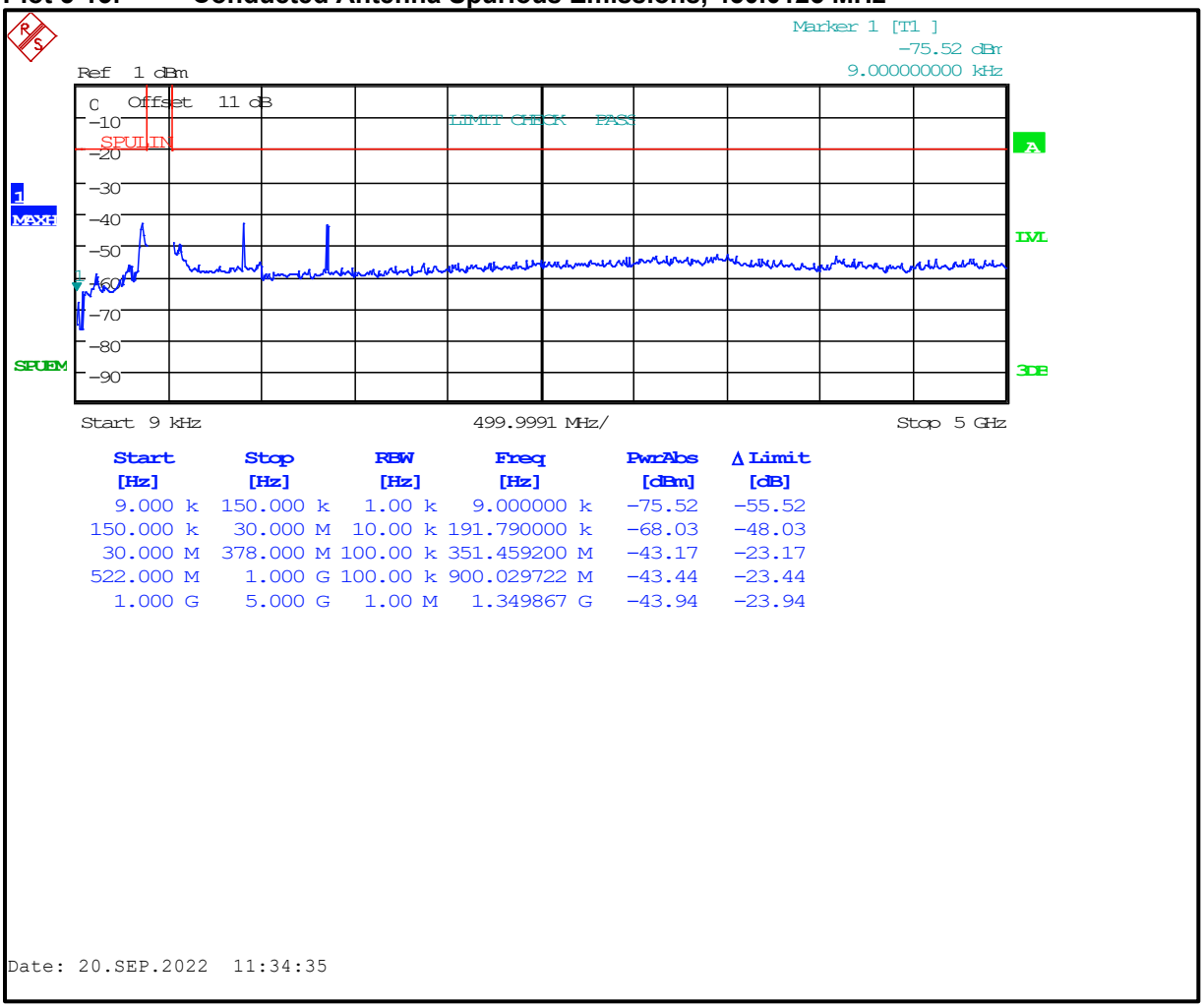
Plot 5-12: Conducted Antenna Spurious Emissions, 429.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	10.355769 k	-73.31	-53.31
150.000 k	30.000 M	10.00 k	194.775000 k	-69.00	-49.00
30.000 M	378.000 M	100.00 k	286.661600 M	-43.01	-23.01
522.000 M	1.000 G	100.00 k	859.963078 M	-39.20	-19.20
1.000 G	5.000 G	1.00 M	1.289867 G	-42.96	-22.96

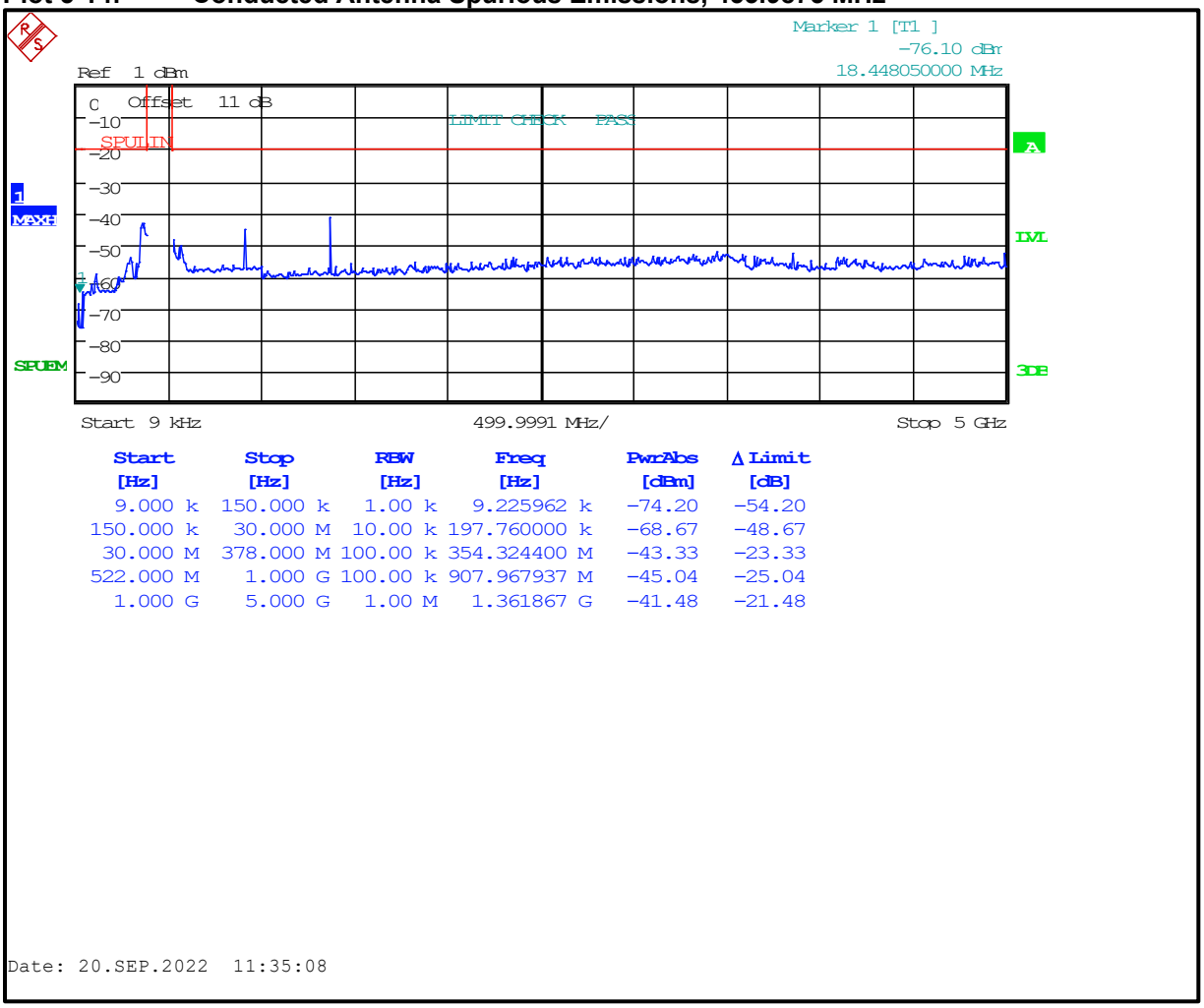
Date: 20.SEP.2022 11:33:32

Plot 5-13: Conducted Antenna Spurious Emissions, 450.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.000000 k	-75.52	-55.52
150.000 k	30.000 M	10.00 k	191.790000 k	-68.03	-48.03
30.000 M	378.000 M	100.00 k	351.459200 M	-43.17	-23.17
522.000 M	1.000 G	100.00 k	900.029722 M	-43.44	-23.44
1.000 G	5.000 G	1.00 M	1.349867 G	-43.94	-23.94

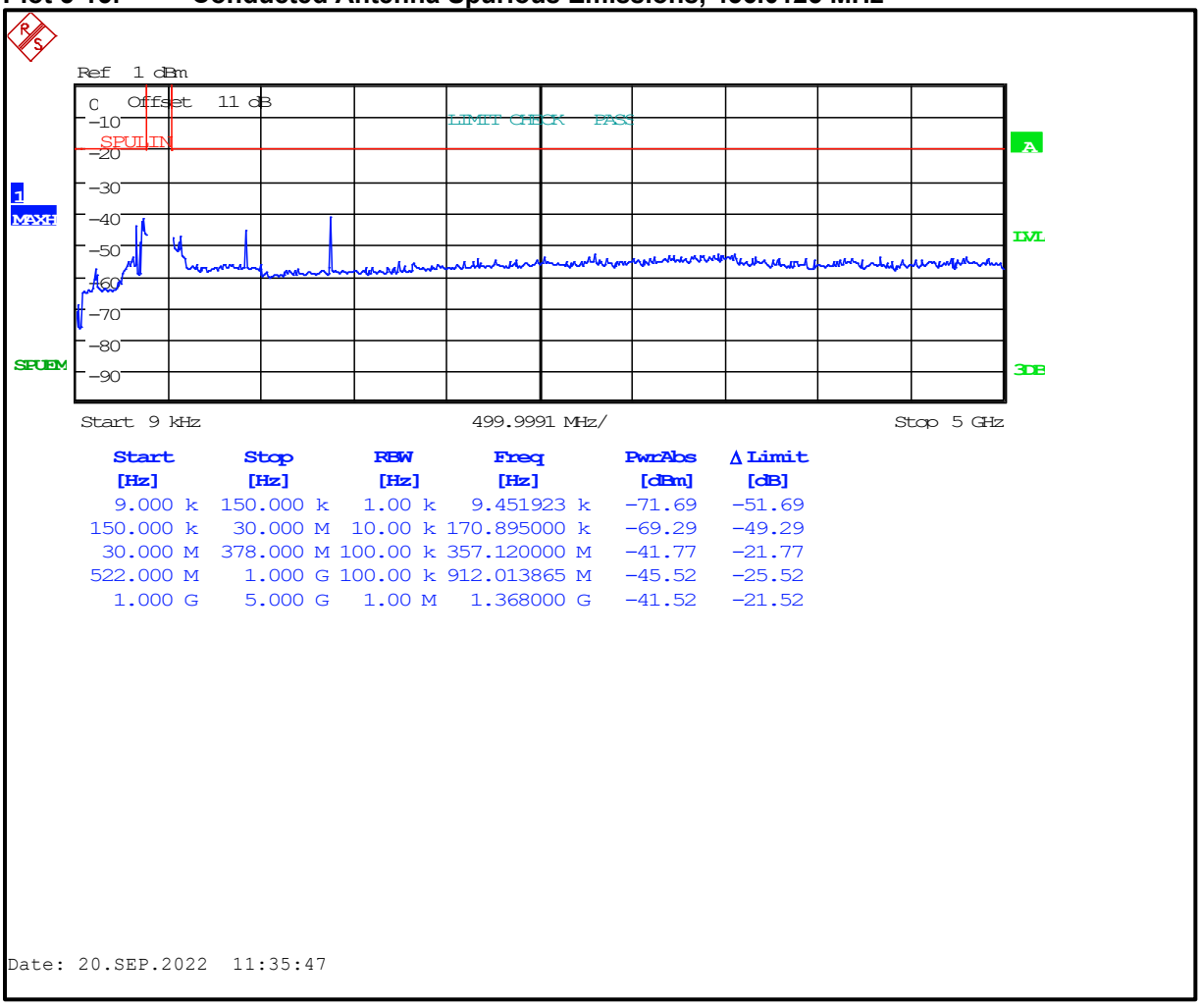
Plot 5-14: Conducted Antenna Spurious Emissions, 453.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.225962 k	-74.20	-54.20
150.000 k	30.000 M	10.00 k	197.760000 k	-68.67	-48.67
30.000 M	378.000 M	100.00 k	354.324400 M	-43.33	-23.33
522.000 M	1.000 G	100.00 k	907.967937 M	-45.04	-25.04
1.000 G	5.000 G	1.00 M	1.361867 G	-41.48	-21.48

Date: 20.SEP.2022 11:35:08

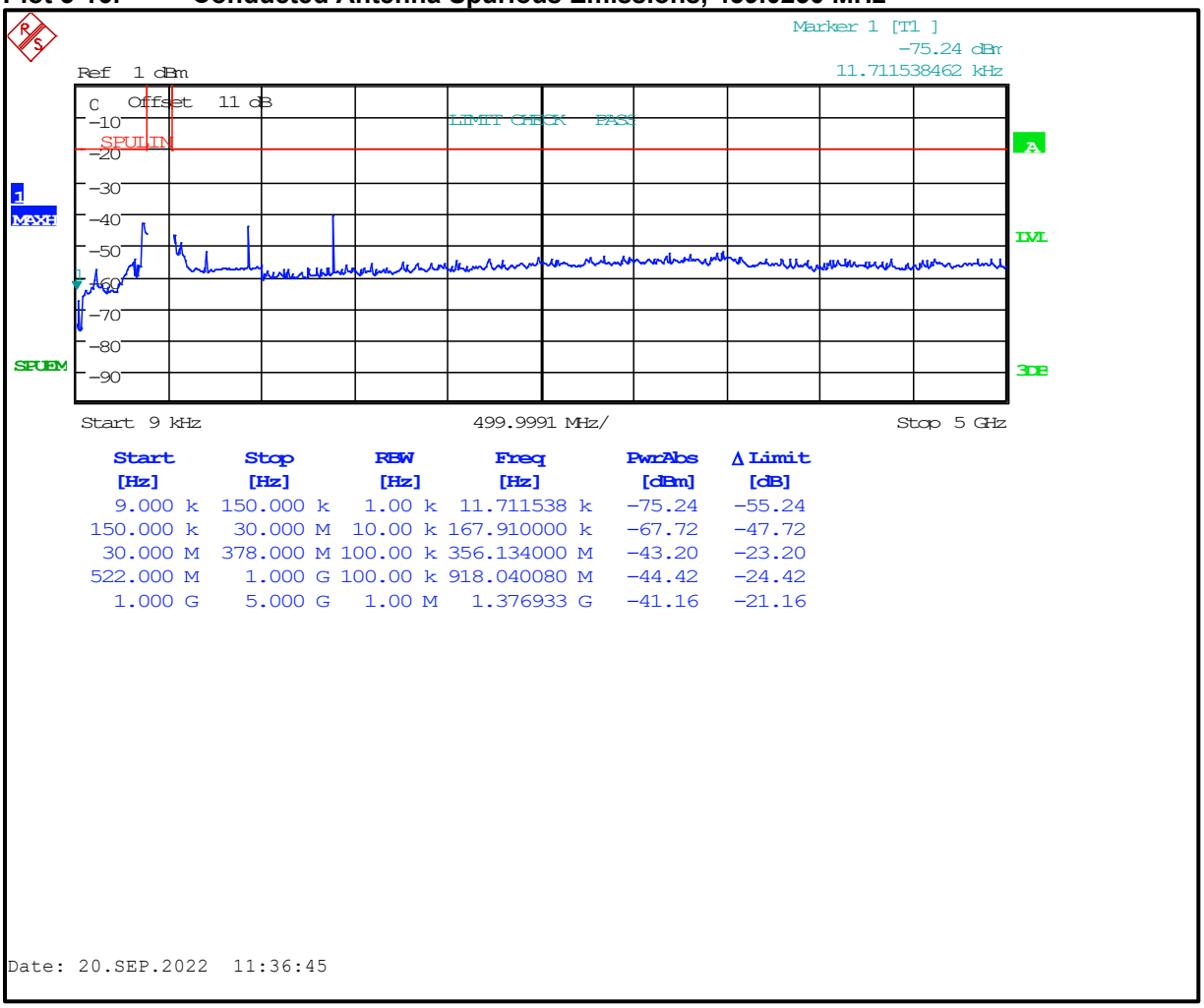
Plot 5-15: Conducted Antenna Spurious Emissions, 456.0125 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.451923 k	-71.69	-51.69
150.000 k	30.000 M	10.00 k	170.895000 k	-69.29	-49.29
30.000 M	378.000 M	100.00 k	357.120000 M	-41.77	-21.77
522.000 M	1.000 G	100.00 k	912.013865 M	-45.52	-25.52
1.000 G	5.000 G	1.00 M	1.368000 G	-41.52	-21.52

Date: 20.SEP.2022 11:35:47

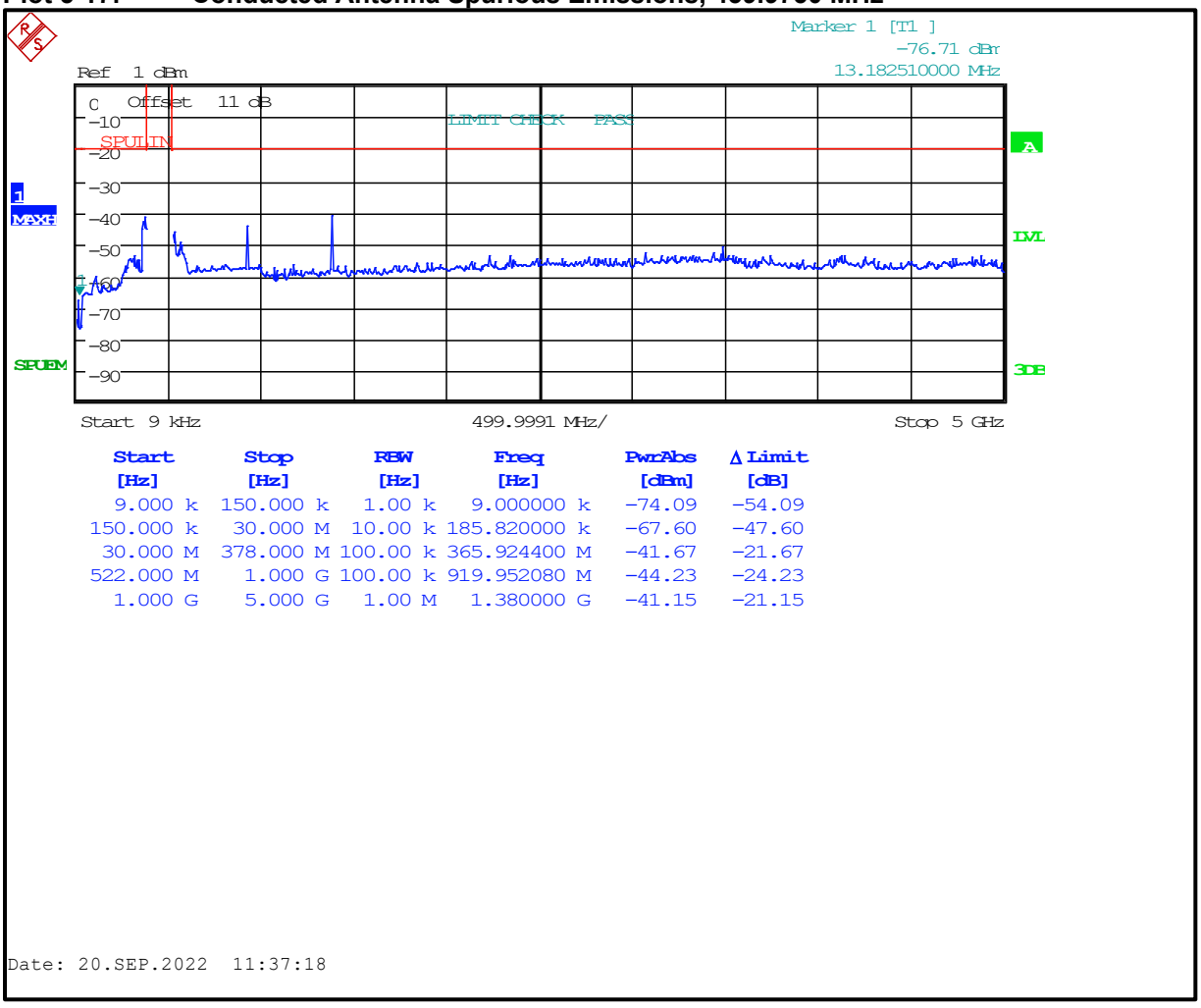
Plot 5-16: Conducted Antenna Spurious Emissions, 459.0250 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	11.711538 k	-75.24	-55.24
150.000 k	30.000 M	10.00 k	167.910000 k	-67.72	-47.72
30.000 M	378.000 M	100.00 k	356.134000 M	-43.20	-23.20
522.000 M	1.000 G	100.00 k	918.040080 M	-44.42	-24.42
1.000 G	5.000 G	1.00 M	1.376933 G	-41.16	-21.16

Date: 20.SEP.2022 11:36:45

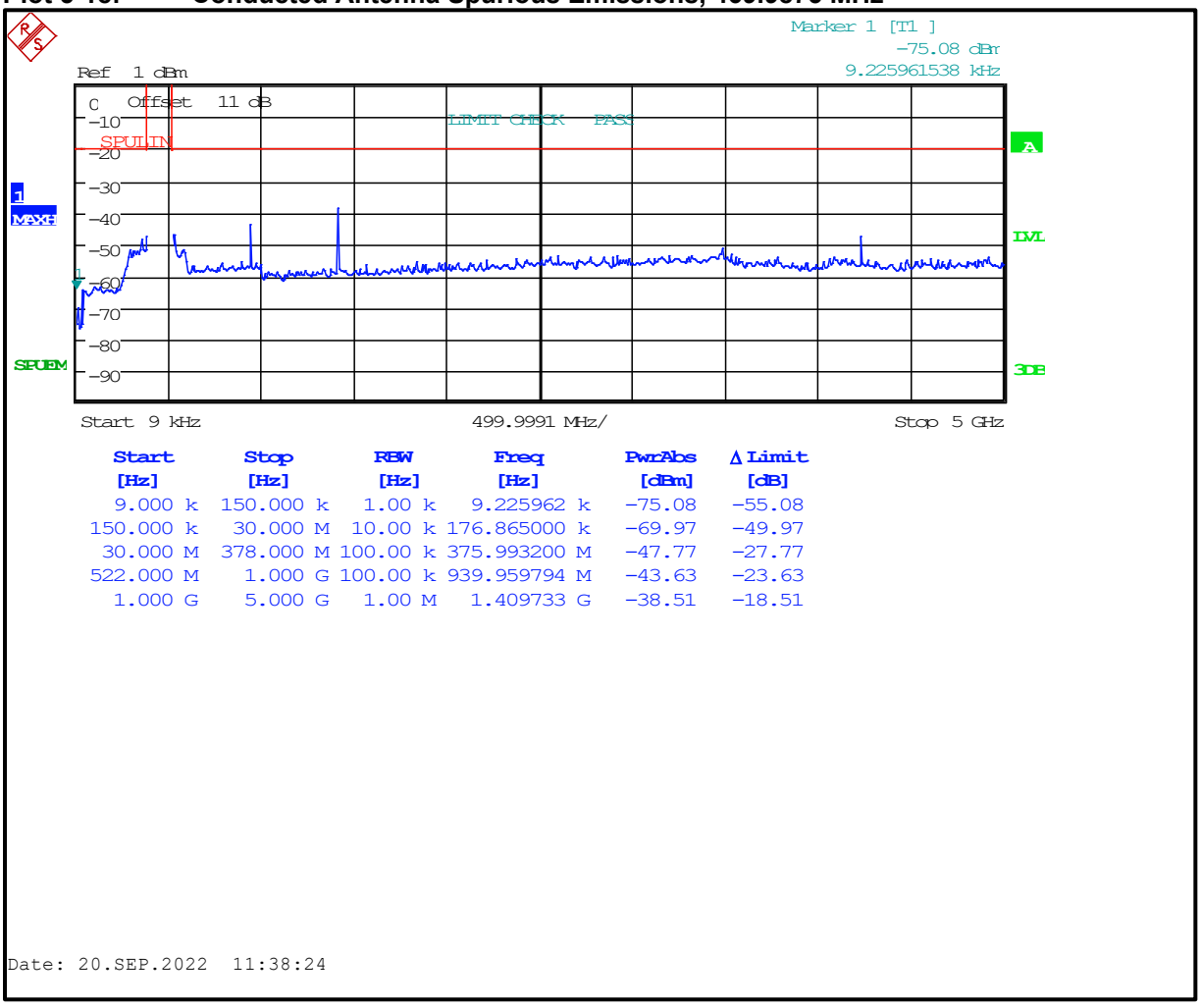
Plot 5-17: Conducted Antenna Spurious Emissions, 459.9750 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.000000 k	-74.09	-54.09
150.000 k	30.000 M	10.00 k	185.820000 k	-67.60	-47.60
30.000 M	378.000 M	100.00 k	365.924400 M	-41.67	-21.67
522.000 M	1.000 G	100.00 k	919.952080 M	-44.23	-24.23
1.000 G	5.000 G	1.00 M	1.380000 G	-41.15	-21.15

Date: 20.SEP.2022 11:37:18

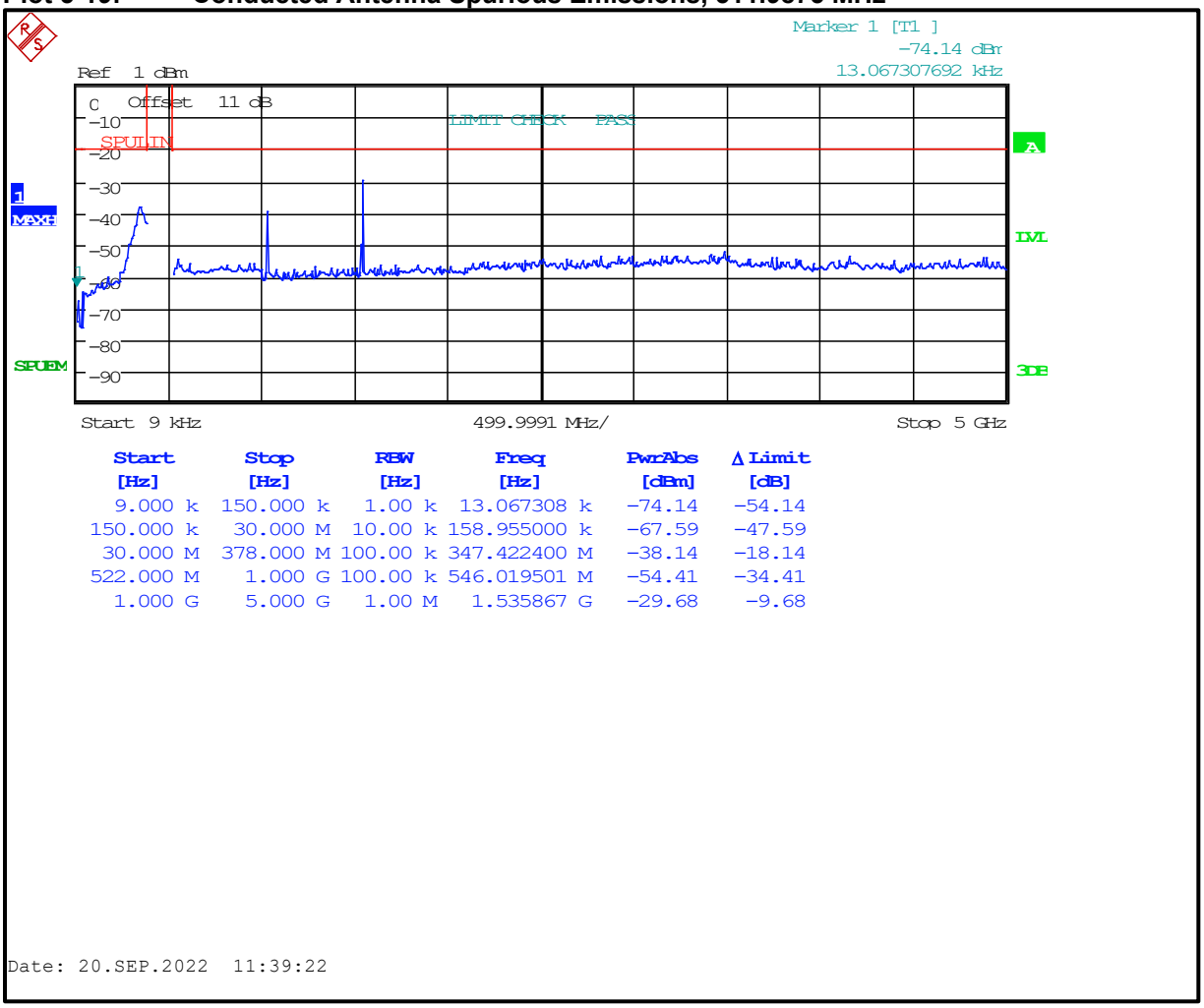
Plot 5-18: Conducted Antenna Spurious Emissions, 469.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	9.225962 k	-75.08	-55.08
150.000 k	30.000 M	10.00 k	176.865000 k	-69.97	-49.97
30.000 M	378.000 M	100.00 k	375.993200 M	-47.77	-27.77
522.000 M	1.000 G	100.00 k	939.959794 M	-43.63	-23.63
1.000 G	5.000 G	1.00 M	1.409733 G	-38.51	-18.51

Date: 20.SEP.2022 11:38:24

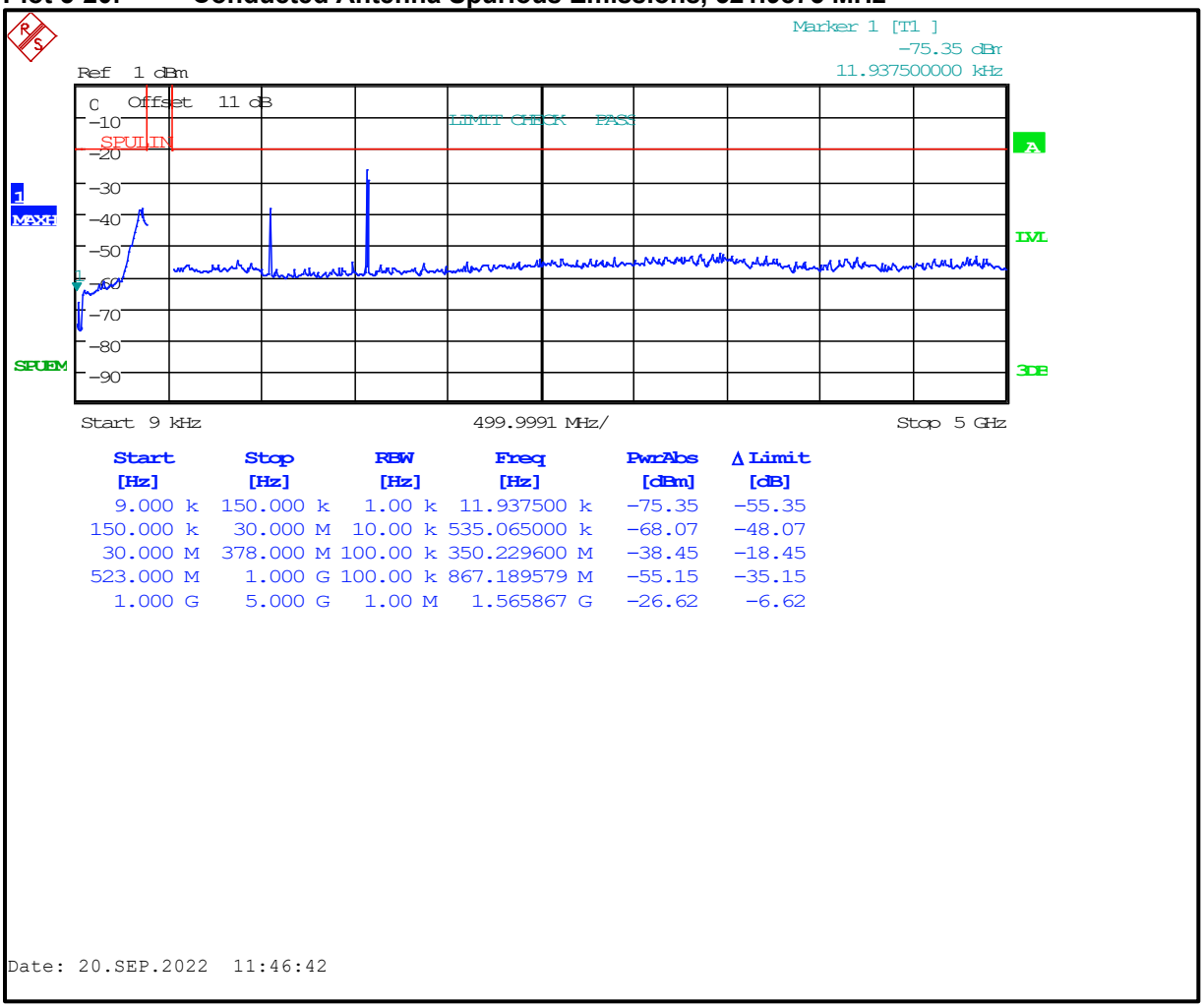
Plot 5-19: Conducted Antenna Spurious Emissions, 511.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	13.067308 k	-74.14	-54.14
150.000 k	30.000 M	10.00 k	158.955000 k	-67.59	-47.59
30.000 M	378.000 M	100.00 k	347.422400 M	-38.14	-18.14
522.000 M	1.000 G	100.00 k	546.019501 M	-54.41	-34.41
1.000 G	5.000 G	1.00 M	1.535867 G	-29.68	-9.68

Date: 20.SEP.2022 11:39:22

Plot 5-20: Conducted Antenna Spurious Emissions, 521.9875 MHz



Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	Δ Limit [dB]
9.000 k	150.000 k	1.00 k	11.937500 k	-75.35	-55.35
150.000 k	30.000 M	10.00 k	535.065000 k	-68.07	-48.07
30.000 M	378.000 M	100.00 k	350.229600 M	-38.45	-18.45
523.000 M	1.000 G	100.00 k	867.189579 M	-55.15	-35.15
1.000 G	5.000 G	1.00 M	1.565867 G	-26.62	-6.62

Date: 20.SEP.2022 11:46:42

Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±0.8 dB

Results: Pass

Table 5-1: Test Equipment Used For Testing Spurious Emissions

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2024
900819	MCE Weinschel	2	Attenuator, 10 dB, DC-18 GHz, 5 W	BF0830	09/21/2022
901129	Par Electronics	188-174 (25W)	VHF Notch Filters	N/A	10/15/2022
901135	Par Electronics	400-512 (25W)	UHF Notch Filter	N/A	10/15/2022
901133	Par Electronics	400-512 (25W)	UHF Notch Filter	N/A	10/15/2022

Test Personnel:

Daniel W. Baltzell		September 16-20, 2022
EMC Test Engineer	Signature	Dates of Test

6 FCC §2.1053(a): Field Strength of Spurious Radiation; §22.359: Emission Limitations; §80.211: Emission Limitations; ISED RSS-119 5.8.9.2: Out-of-band Emission Limit

6.1 Test Procedure

FCC 2.1053 - ANSI C63.26-2015 section 5.5.3

The spurious emissions levels were measured, and the device under test was replaced by a substitution antenna connected to a signal generator. This signal generator level was then corrected by subtracting the cable loss from the substitution antenna to the signal generator, and the gain of the antenna (dBi) was added to achieve the EIRP level, then converted from the corrected signal generator level (dBm) to dBc.

Analog Modulation: The transmitter is terminated with a 50 Ω load and is modulated with a 2,500 Hz sine wave at an input level 16 dB greater than that required to produce 50% of the rated system deviation at 1,000 Hz.

Device with digital modulation: Modulated to its maximum extent using a pseudo-random data sequence – 19,200 bps for OTP and 9,600 bps for P25.

Additionally, radiated emissions were investigated with the licensed and unlicensed (DSS, DTS, NII) transmitters transmitting simultaneously. No non-compliances were found.

6.1.1 §2.1053 Requirements

Limit: 50+10LogP narrowband limit used as worst case limit.

ANSI C63.26-2015, Section 5.5 Radiated Emission Testing.

6.2 Test Data

6.2.1 Field Strength of Spurious Radiation

Table 6-1: Field Strength of Spurious Radiation; 136.0125 MHz

Fundamental Power Measured = 37.9 dBm; 6.2W; Limit = 57.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
272.0250	26.1	-55.5	0.4	-0.1	93.9	-36.0
408.0375	34.4	-46.4	0.5	-0.4	85.2	-27.3
544.0500	11.1	-62.2	0.5	-1.0	101.6	-43.7
680.0625	10.6	-63.9	0.6	-1.4	103.8	-45.9
816.0750	5.5	-65.0	0.6	-1.6	105.1	-47.2
952.0875	31.4	-38.2	0.7	-1.4	78.2	-20.3
1088.1000	23.4	-47.2	0.7	4.6	81.3	-23.3
1224.1125	24.7	-47.2	0.8	4.8	81.1	-23.1
1360.1250	2.0	-69.5	0.8	5.6	102.6	-44.7

Table 6-2: Field Strength of Spurious Radiation; 138.0125 MHz

Fundamental Power Measured = 37.9 dBm; 6.2W; Limit = 57.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
276.0250	30.2	-49.5	0.4	-0.1	87.9	-30.0
414.0375	35.3	-43.9	0.5	-0.4	82.7	-24.8
552.0500	34.9	-39.8	0.5	-1.1	79.3	-21.4
690.0625	13.6	-62.9	0.6	-1.4	102.8	-44.9
828.0750	5.2	-65.0	0.6	-1.5	105.1	-47.2
966.0875	29.2	-42.1	0.7	-1.5	82.2	-24.3
1104.1000	21.7	-48.2	0.7	4.6	82.2	-24.3
1242.1125	14.6	-57.3	0.8	4.9	91.1	-33.2
1380.1250	13.8	-57.3	0.8	5.8	90.2	-32.3

Table 6-3: Field Strength of Spurious Radiation; 143.9875 MHz

Fundamental Power Measured = 37.8 dBm; 6.1W; Limit = 57.8 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
287.9750	36.8	-44.9	0.4	-0.2	83.4	-25.5
431.9625	36.7	-42.5	0.5	-0.4	81.2	-23.4
575.9500	35.5	-38.5	0.5	-1.2	78.1	-20.3
719.9375	34.0	-39.5	0.6	-1.4	79.3	-21.5
863.9250	27.9	-45.7	0.6	-1.5	85.6	-27.8
1007.9125	27.7	-43.2	0.7	4.4	77.3	-19.5
1151.9000	16.7	-55.6	0.7	4.7	89.5	-31.7
1295.8875	18.0	-53.4	0.8	5.1	86.9	-29.1
1439.8750	14.2	-57.0	0.8	6.1	89.5	-31.7

Table 6-4: Field Strength of Spurious Radiation; 148.0125 MHz

Fundamental Power Measured = 37.9 dBm; 6.1W; Limit = 57.8 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
296.0250	25.0	-57.1	0.4	-0.2	95.6	-37.7
444.0375	41.0	-41.2	0.5	-0.4	80.0	-22.1
592.0500	23.0	-52.6	0.5	-1.4	92.4	-34.5
740.0625	39.5	-33.5	0.6	-1.5	73.4	-15.6
888.0750	37.6	-32.2	0.6	-1.4	72.1	-14.2
1036.0875	25.4	-44.2	0.7	4.4	78.3	-20.4
1184.1000	22.1	-50.1	0.7	4.7	84.0	-26.1
1332.1125	19.0	-52.2	0.8	5.4	85.4	-27.6
1480.1250	16.6	-54.0	0.8	6.3	86.4	-28.5

Table 6-5: Field Strength of Spurious Radiation; 150.0125 MHz

Fundamental Power Measured = 37.9 dBm; 6.1W; Limit = 57.8 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
300.0250	17.9	-64.4	0.4	-0.2	102.9	-45.1
450.0375	41.4	-40.5	0.5	-0.4	79.3	-21.4
600.0500	31.9	-42.6	0.5	-1.4	82.4	-24.6
750.0625	17.0	-55.7	0.6	-1.5	95.7	-37.8
900.0750	26.1	-46.1	0.6	-1.3	86.0	-28.1
1050.0875	24.9	-45.7	0.7	4.5	79.8	-21.9
1200.1000	19.9	-52.6	0.7	4.7	86.5	-28.6
1350.1125	16.1	-55.5	0.8	5.6	88.6	-30.7
1500.1250	12.2	-58.6	0.9	6.4	90.9	-33.0

Table 6-6: Field Strength of Spurious Radiation; 156.8000 MHz

Fundamental Power Measured = 37.8 dBm; 6.0W; Limit = 57.7 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
313.6000	34.1	-48.7	0.4	-0.2	87.1	-29.4
470.4000	36.3	-42.8	0.5	-0.5	81.6	-23.8
627.2000	15.9	-59.2	0.5	-1.4	98.9	-41.2
784.0000	13.0	-59.0	0.6	-1.6	98.9	-41.2
940.8000	11.2	-58.5	0.7	-1.4	98.4	-40.6
1097.6000	29.0	-41.6	0.7	4.6	75.5	-17.7
1254.4000	20.0	-51.9	0.8	4.9	85.5	-27.7
1411.2000	18.1	-53.4	0.8	6.0	86.0	-28.2
1568.0000	17.3	-54.2	0.9	6.7	86.2	-28.4

Table 6-7: Field Strength of Spurious Radiation; 162.0125 MHz

Fundamental Power Measured = 37.6 dBm; 5.8W; Limit = 57.6 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
324.0250	35.1	-44.5	0.4	-0.2	82.8	-25.2
486.0375	35.6	-43.4	0.5	-0.6	82.1	-24.5
648.0500	12.8	-62.7	0.5	-1.4	102.3	-44.7
810.0625	18.0	-53.4	0.6	-1.6	93.2	-35.6
972.0750	4.6	-65.0	0.7	-1.5	104.8	-47.2
1134.0875	36.2	-34.3	0.7	4.7	68.0	-10.4
1296.1000	26.1	-45.7	0.8	5.1	79.0	-21.4
1458.1125	21.5	-49.4	0.8	6.2	81.6	-24.0
1620.1250	18.0	-52.5	0.9	6.7	84.3	-26.7

Table 6-8: Field Strength of Spurious Radiation; 173.9875 MHz

Fundamental Power Measured = 37.7 dBm; 5.9W; Limit = 57.7 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
347.9750	58.2	-26.8	0.4	-0.3	65.3	-7.6
521.9625	41.8	-37.1	0.5	-0.8	76.1	-18.4
695.9500	34.9	-42.0	0.6	-1.4	81.7	-24.0
869.9375	29.0	-41.0	0.6	-1.5	80.8	-23.1
1043.9250	24.3	-45.3	0.7	4.5	79.2	-21.5
1217.9125	22.4	-49.5	0.8	4.8	83.2	-25.5
1391.9000	1.0	-70.2	0.8	5.9	102.8	-45.1
1565.8875	13.2	-58.3	0.9	6.7	90.2	-32.5
1739.8750	13.7	-56.6	0.9	6.5	88.7	-31.0

Table 6-9: Field Strength of Spurious Radiation; 378.0125 MHz

Fundamental Power Measured = 36.9 dBm; 4.9W; Limit = 56.8 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
756.0250	41.4	-38.0	0.6	-1.5	77.0	-20.1
1134.0375	31.4	-38.4	0.7	4.7	71.4	-14.5
1512.0500	-0.5	-72.3	0.9	6.5	103.6	-46.7
1890.0625	7.2	-63.1	1.0	6.3	94.7	-37.8
2268.0750	26.5	-40.1	1.1	7.2	70.9	-14.0
2646.0875	26.7	-51.0	1.2	7.6	81.5	-24.6
3024.1000	21.3	-56.2	1.3	7.3	87.1	-30.2
3402.1125	24.4	-52.6	1.4	7.6	83.3	-26.4
3780.1250	7.6	-68.6	1.5	7.0	100.0	-43.1

Table 6-10: Field Strength of Spurious Radiation; 406.1125 MHz

Fundamental Power Measured = 36.9 dBm; 4.9W; Limit = 56.8 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
812.2250	35.9	-37.3	0.4	-0.2	74.8	-18.0
1218.3375	43.6	-26.0	0.5	-0.6	64.0	-7.1
1624.4500	23.2	-48.0	0.5	-1.4	86.9	-30.0
2030.5625	31.0	-39.1	0.6	-1.6	78.2	-21.3
2436.6750	38.0	-39.9	0.7	-1.5	79.0	-22.1
2842.7875	23.8	-54.0	0.7	4.7	86.9	-30.1
3248.9000	20.8	-56.4	0.8	5.1	88.9	-32.1
3655.0125	25.5	-50.3	0.8	6.2	81.8	-24.9
4061.1250	18.8	-56.9	0.9	6.7	88.0	-31.1

Table 6-11: Field Strength of Spurious Radiation; 418.0000 MHz

Fundamental Power Measured = 36.9 dBm; 4.9W; Limit = 56.8 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
836.0000	42.4	-32.5	0.4	-0.3	70.1	-13.3
1254.0000	42.1	-27.5	0.5	-0.8	65.7	-8.8
1672.0000	43.2	-27.8	0.6	-1.4	66.7	-9.8
2090.0000	33.7	-34.9	0.6	-1.5	73.9	-17.0
2508.0000	28.0	-49.6	0.7	4.5	82.7	-25.8
2926.0000	21.6	-56.1	0.8	4.8	88.9	-32.1
3344.0000	23.0	-54.2	0.8	5.9	86.0	-29.1
3762.0000	13.4	-62.5	0.9	6.7	93.6	-36.7
4180.0000	-3.7	-78.6	0.9	6.5	109.9	-53.0

Table 6-12: Field Strength of Spurious Radiation; 429.9875 MHz

Fundamental Power Measured = 36.9 dBm; 4.9W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
859.9750	35.1	-40.1	0.6	-1.5	79.1	-22.2
1289.9625	39.3	-31.7	0.7	4.7	64.7	-7.8
1719.9500	17.8	-53.5	0.9	6.5	84.8	-27.9
2149.9375	36.5	-31.5	1.0	6.3	63.1	-6.2
2579.9250	22.2	-55.3	1.1	7.2	86.1	-29.2
3009.9125	20.5	-56.7	1.2	7.6	87.2	-30.3
3439.9000	21.5	-55.4	1.3	7.3	86.3	-29.4
3869.8875	-2.9	-78.8	1.4	7.6	109.5	-52.6
4299.8750	7.7	-67.0	1.5	7.0	98.4	-41.5

Table 6-13: Field Strength of Spurious Radiation; 450.0125 MHz

Fundamental Power Measured = 37.0 dBm; 5.0W; Limit = 57.0 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
900.0250	47.8	-27.9	0.6	-1.3	66.9	-9.9
1350.0375	38.4	-31.2	0.8	5.6	63.5	-6.4
1800.0500	18.0	-52.8	0.9	6.7	84.1	-27.1
2250.0625	38.2	-30.0	1.1	7.1	61.0	-4.0
2700.0750	17.1	-60.6	1.2	7.7	91.1	-34.1
3150.0875	17.0	-60.7	1.3	7.1	92.0	-35.0
3600.1000	12.0	-64.0	1.4	7.6	94.9	-37.8
4050.1125	1.0	-74.7	1.5	7.8	105.5	-48.5
4500.1250	-6.9	-76.6	1.6	8.8	106.4	-49.4

Table 6-14: Field Strength of Spurious Radiation; 453.9875 MHz

Fundamental Power Measured = 37 dBm; 5.0W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
907.9750	49.3	-26.6	0.6	-1.4	65.6	-8.6
1361.9625	29.3	-41.3	0.8	5.7	73.4	-16.5
1815.9500	35.7	-35.6	1.0	6.6	66.9	-9.9
2269.9375	33.6	-34.0	1.1	7.2	64.9	-7.9
2723.9250	19.7	-58.1	1.2	7.8	88.5	-31.6
3177.9125	22.2	-55.4	1.3	7.1	86.7	-29.7
3631.9000	14.7	-61.2	1.4	7.5	92.1	-35.2
4085.8875	0.8	-75.1	1.5	8.0	105.7	-48.7
4539.8750	-9.5	-79.4	1.6	8.8	109.2	-52.2

Table 6-15: Field Strength of Spurious Radiation; 456.0125 MHz

Fundamental Power Measured = 36.8 dBm; 4.7W; Limit = 56.7 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
912.0250	55.4	-20.5	0.6	-1.4	59.3	-2.5
1368.0375	33.6	-37.0	0.8	5.7	68.9	-12.1
1824.0500	20.4	-50.4	1.0	6.6	81.5	-24.8
2280.0625	35.8	-31.6	1.1	7.2	62.2	-5.5
2736.0750	14.3	-63.4	1.2	7.8	93.6	-36.8
3192.0875	18.7	-59.0	1.3	7.0	90.1	-33.3
3648.1000	13.8	-61.9	1.5	7.4	92.7	-35.9
4104.1125	11.3	-64.5	1.6	8.1	94.8	-38.0
4560.1250	12.6	-57.2	1.6	8.9	86.7	-30.0

Table 6-16: Field Strength of Spurious Radiation; 459.0250 MHz

Fundamental Power Measured = 37 dBm; 5.0W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
918.0500	52.0	-24.0	0.6	-1.4	63.0	-6.1
1377.0750	30.8	-38.6	0.8	5.8	70.6	-13.6
1836.1000	22.2	-48.6	1.0	6.5	80.0	-23.0
2295.1250	33.2	-34.0	1.1	7.3	64.7	-7.8
2754.1500	12.2	-65.6	1.2	7.8	96.0	-39.0
3213.1750	18.3	-59.4	1.3	7.1	90.7	-33.7
3672.2000	15.9	-59.8	1.5	7.3	90.9	-34.0
4131.2250	9.9	-65.5	1.6	8.2	95.8	-38.9
4590.2500	12.0	-58.1	1.7	8.9	87.8	-30.9

Table 6-17: Field Strength of Spurious Radiation; 459.9750 MHz

Fundamental Power Measured = 37 dBm; 5.0W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
919.9500	48.9	-27.1	0.6	-1.4	66.1	-9.2
1379.9250	33.8	-36.8	0.8	5.8	68.8	-11.8
1839.9000	23.3	-48.1	1.0	6.5	79.5	-22.6
2299.8750	33.1	-34.0	1.1	7.3	64.7	-7.8
2759.8500	17.3	-60.6	1.2	7.8	91.0	-34.0
3219.8250	19.3	-58.4	1.3	7.1	89.7	-32.7
3679.8000	19.4	-56.1	1.5	7.3	87.2	-30.3
4139.7750	20.4	-54.9	1.6	8.2	85.2	-28.2
4599.7500	23.9	-45.9	1.7	8.9	75.6	-18.7

Table 6-18: Field Strength of Spurious Radiation; 469.9875 MHz

Fundamental Power Measured = 37 dBm; 5.0W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
939.9750	45.9	-30.4	0.7	-1.4	69.5	-12.5
1409.9625	38.1	-31.0	0.8	6.0	62.8	-5.8
1879.9500	25.9	-45.1	1.0	6.3	76.7	-19.7
2349.9375	33.9	-32.6	1.1	7.3	63.4	-6.4
2819.9250	16.7	-61.0	1.2	7.9	91.3	-34.4
3289.9125	37.2	-40.2	1.4	7.1	71.4	-14.5
3759.9000	26.5	-49.3	1.5	7.0	80.7	-23.7
4229.8875	18.3	-56.7	1.6	8.6	86.7	-29.7
4699.8750	17.8	-52.6	1.7	9.0	82.3	-25.3

Table 6-19: Field Strength of Spurious Radiation; 511.9875 MHz

Fundamental Power Measured = 37 dBm; 5.0W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
1023.9750	36.0	-39.5	0.7	4.4	72.8	-15.8
1535.9625	34.3	-37.6	0.9	6.5	68.9	-11.9
2047.9500	23.0	-47.5	1.0	6.6	78.9	-21.9
2559.9375	23.1	-54.8	1.2	7.4	85.6	-28.6
3071.9250	12.6	-64.8	1.3	7.2	95.9	-39.0
3583.9125	11.2	-65.1	1.4	7.6	95.9	-38.9
4095.9000	17.6	-58.2	1.6	8.0	88.7	-31.7
4607.8875	16.1	-53.8	1.7	8.9	83.6	-26.6
5119.8750	7.9	-63.2	1.7	8.7	93.2	-36.3

Table 6-20: Field Strength of Spurious Radiation; 521.9875 MHz

Fundamental Power Measured = 36.9 dBm; 4.9 W; Limit = 56.9 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to Transmit Antenna (dB)	Antenna Gain (dBi)	Corrected Signal Generator Level (dBc)	Margin (dB)
1043.9750	19.7	-41.9	0.7	4.5	75.0	-18.1
1565.9625	0.0	-52.7	0.9	6.7	83.8	-26.9
2087.9500	32.6	-37.9	1.0	6.4	69.5	-12.6
2609.9375	14.8	-45.0	1.2	7.5	75.7	-18.7
3131.9250	0.0	-62.5	1.3	7.1	93.7	-36.8
3653.9125	0.0	-61.4	1.5	7.4	92.4	-35.5
4175.9000	-7.4	-75.2	1.6	8.4	105.3	-48.4
4697.8875	-2.0	-77.3	1.7	9.0	106.9	-50.0
5219.8750	0.0	-72.8	1.8	8.6	102.9	-45.9

6.2.2 Digital/Receiver Radiated Emissions

Table 6-21: Digital/Receiver Radiated Emissions

Emission Frequency (MHz)	Analyzer Reading (dBµV)	Site Correction Factor (dB/m)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pass/ Fail
261.670	31.5	-11.7	19.8	46.0	-26.2	Pass
338.702	29.5	-10.5	19.0	46.0	-27.0	Pass
378.004	30.0	-9.3	20.7	46.0	-25.3	Pass
418.004	30.5	-6.9	23.6	46.0	-22.4	Pass
430.006	29.6	-7.4	22.2	46.0	-23.8	Pass
450.004	36.3	-6.9	29.4	46.0	-16.6	Pass
454.004	26.9	-6.7	20.2	46.0	-25.8	Pass
456.004	27.1	-6.6	20.5	46.0	-25.5	Pass
511.978	29.4	-4.7	24.7	46.0	-21.3	Pass

Measurement uncertainties shown for these tests are expanded uncertainties expressed at the 95% confidence level using a coverage factor K=2. Measurement uncertainty: ±4.6 dB

Results: Pass

Table 6-22: Test Equipment Used For Testing Field Strength of Spurious Radiation & Digital/Receiver Emissions

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900878	Rhein Tech Laboratories	AM3-1197-0005	3 meter antenna mast, polarizing	OATS1	N/A
901727	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 20'	NA	09/21/2022
901729	Insulated Wire Inc.	KPS-1503-3150-KPR	SMK RF Cables 20'	NA	12/06/2022
901242	Rhein Tech Laboratories	WRT-000-0003	Wood rotating table	N/A	N/A
901581	Rohde & Schwarz	FSU	Spectrum Analyzer	1166.1660.50	12/01/2024
901582	Rohde & Schwarz	1167.0000.02	Signal Generator	101903	05/23/2024
900791	Chase	CBL6111B	Bilog Antenna (30 – 2000 MHz)	N/A	10/04/2022
900321	EMCO	3161-03	Horn Antennas (4 – 8 GHz)	9508-1020	08/05/2024
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	08/05/2024
901133	Par Electronics	400-512 (25W)	UHF Notch Filter	N/A	10/15/2022
901129	Par Electronics	188-174 (25W)	VHF Notch Filters	N/A	10/15/2022
901135	Par Electronics	400-512 (25W)	UHF Notch Filter	N/A	10/15/2022
901262	ETS	3160-9	Double ridge Antenna (1 - 18 GHz)	6748	02/08/2025
900913	Hewlett Packard	85462A	EMI Receiver RF Section (9 kHz – 6.5 GHz)	3325A00159	09/16/2024
900914	Hewlett Packard	8546OA	RF Filter Section, 100 kHz - 6.5 GHz	3330A00107	09/16/2024
900905	Rhein Tech Laboratories, Inc.	PR-1040	OATS 1 Preamplifier 40dB (30 MHz – 2 GHz)	1006	09/30/2022

Test Personnel:

Daniel W. Baltzell		September 9-20, 2022
EMC Test Engineer	Signature	Dates of Tests

7 FCC Part 2.1049(c)(1): Occupied Bandwidth; Part 90.210 Authorized Bandwidth; Part 74.462: Authorized Bandwidth and Emissions; Part 80.205: Bandwidths; §80.211: Emission Limitations; ISED RSS-119 5.5: Channel Bandwidth, Authorized Bandwidth, Occupied Bandwidth and Spectrum Masks

7.1 Test Procedure

ANSI C63.26-2015, section 5.4

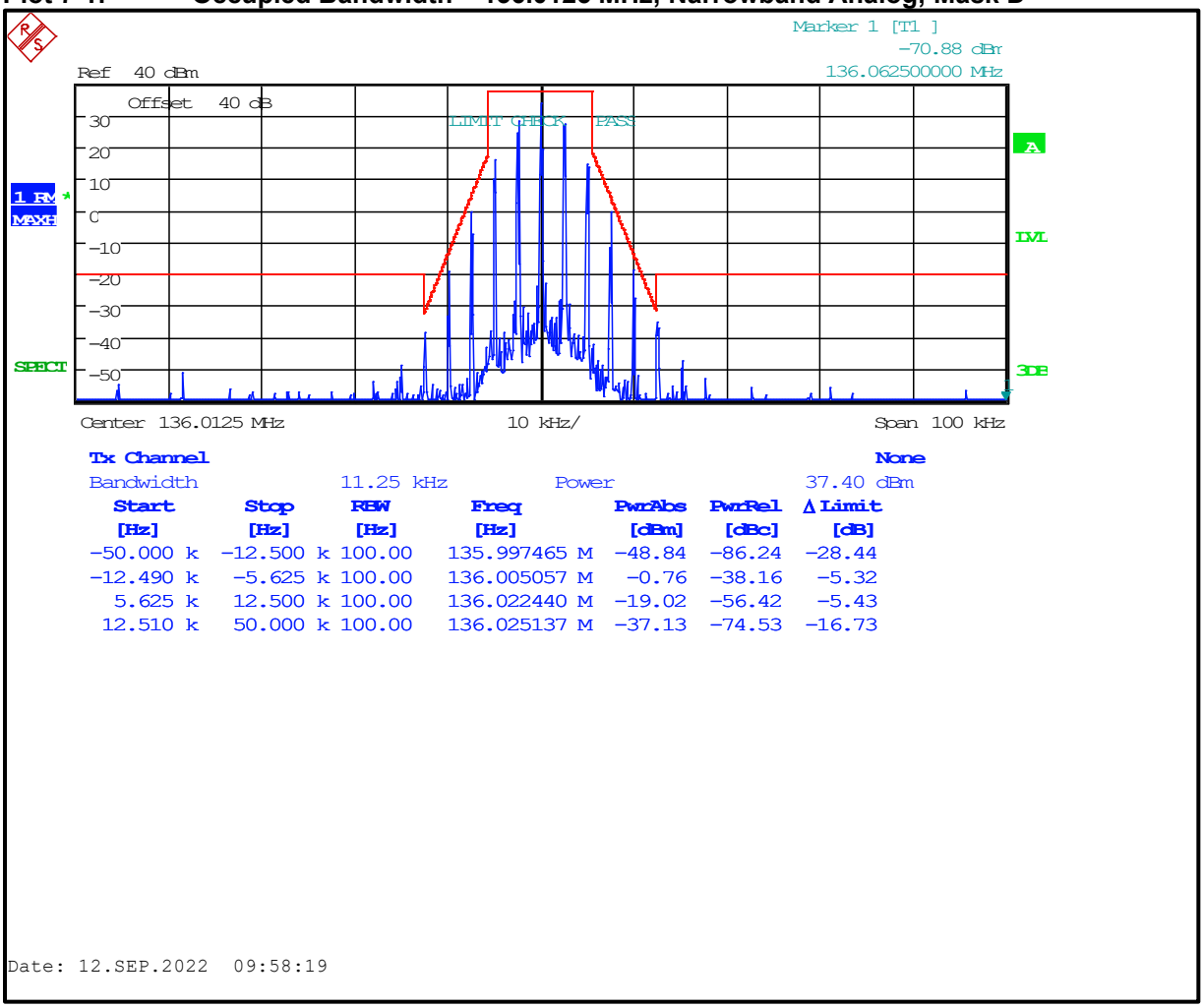
Device with digital modulation: Modulated to its maximum extent using a pseudo-random data sequence.

Applicable FCC Emission Masks		
Frequency Band (MHz)	**Mask for Equipment with Audio Low Pass Filter**	**Mask for Equipment Without Audio Low Pass Filter**
Below 25 [1]	A or B	A or C
25–50.....	B	C
72–76.....	B	C
150–174 [2]	B, D, or E	C, D, or E
150 Paging-only	B	C
220–222	F	F
421–512 [2]	B, D, or E	C, D, or E
450 Paging-only	B	G
806–809/851–854	B	H
809–824/854–869 [3]	B	G
896–901/935–940	I	J
902–928	K	K
929–930	B	G
4940–4990 MHz ……	L or M	L or M
5850–5925 [4]		
All other bands	B	C

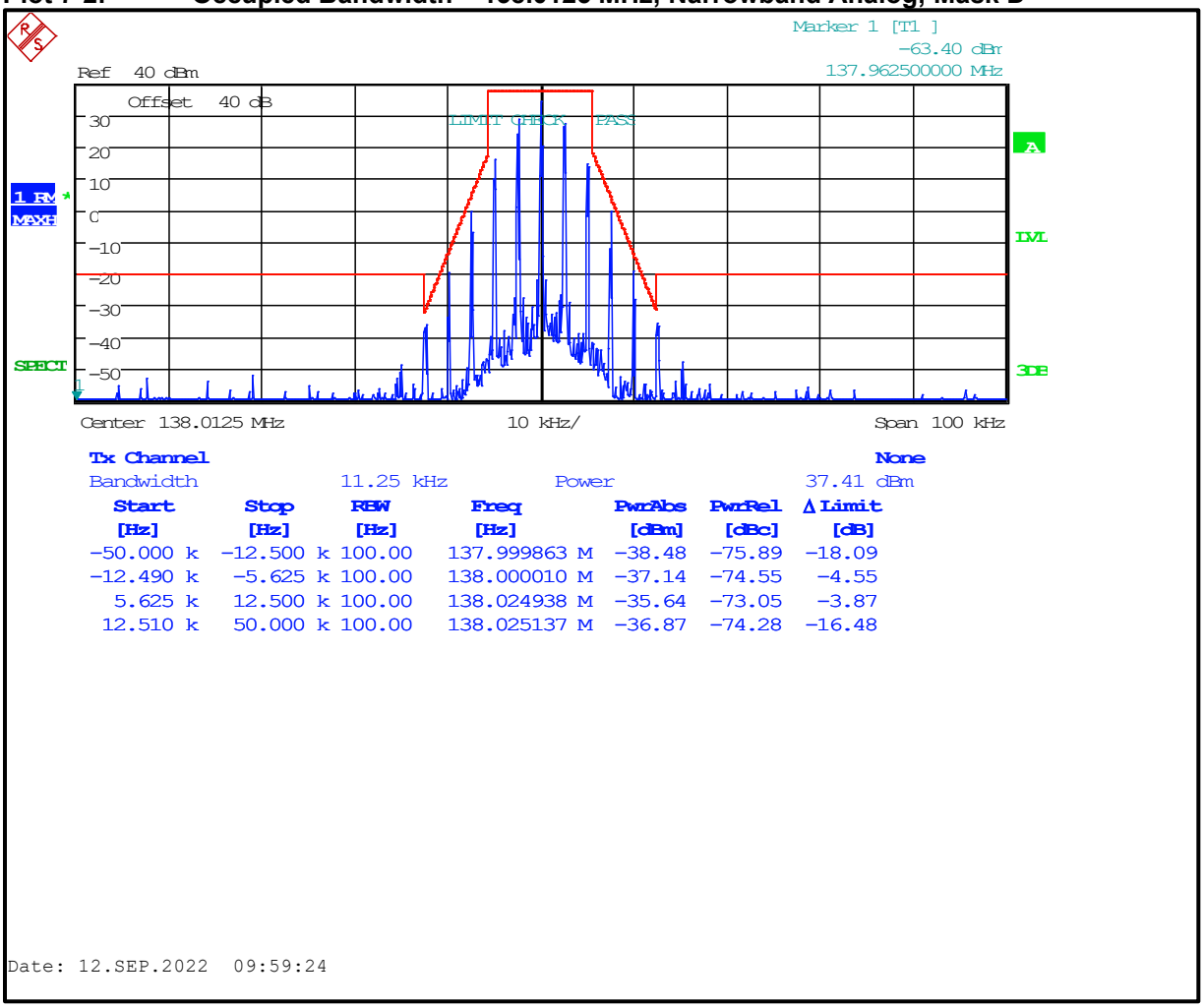
1 Equipment using single sideband J3E emission must meet the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.
2 Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask B or C, as applicable. Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D, and equipment designed to operate with a 6.25 kHz channel bandwidth must meet the requirements of Emission Mask E.
3 Equipment used in this licensed to EA or non-EA systems shall comply with the emission mask provisions of § 90.691.
4 DSRCS Roadside Units equipment in the 5850–5925 MHz band is governed under subpart M of this part.

7.2 Test Data

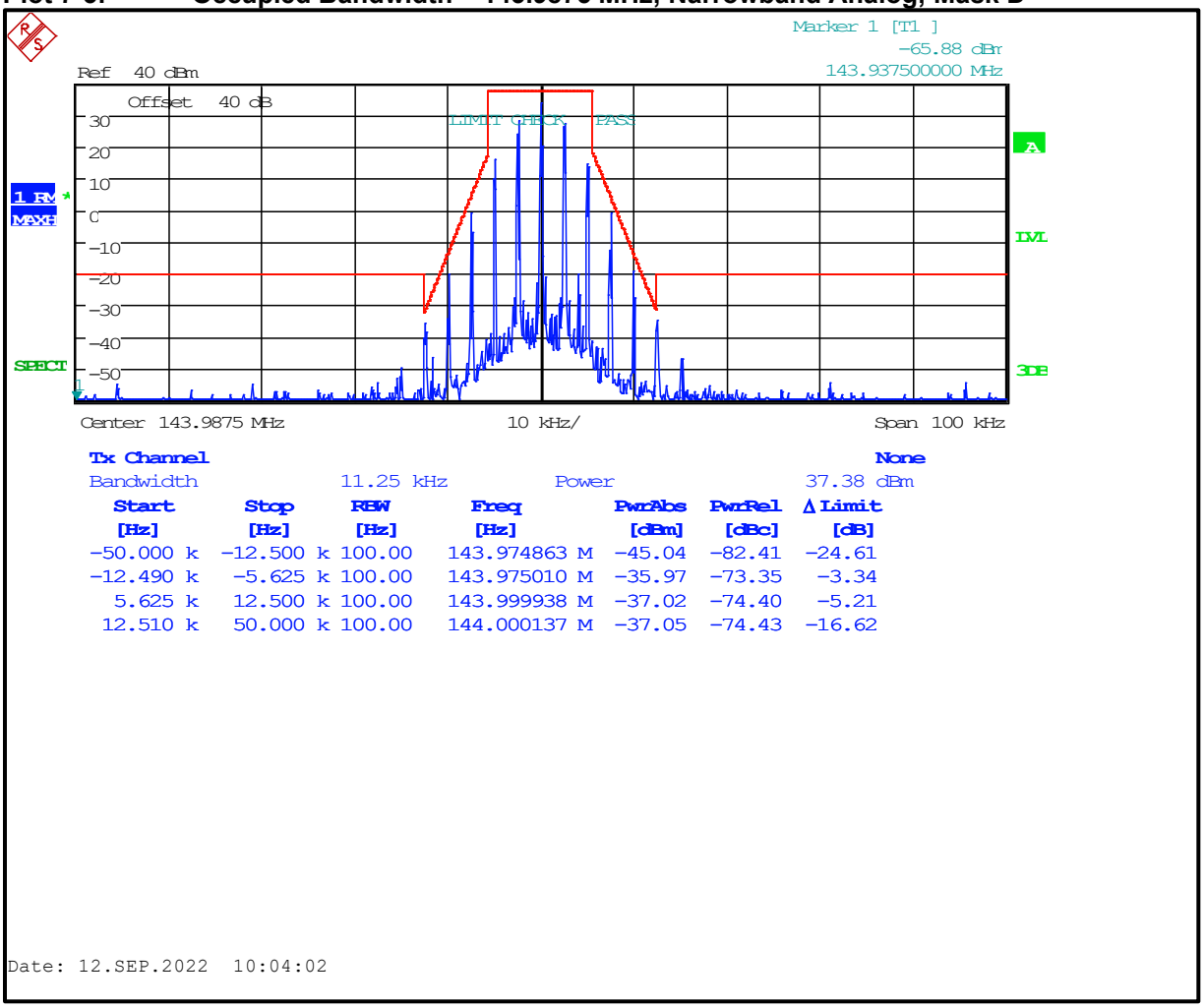
Plot 7-1: Occupied Bandwidth – 136.0125 MHz; Narrowband Analog; Mask D



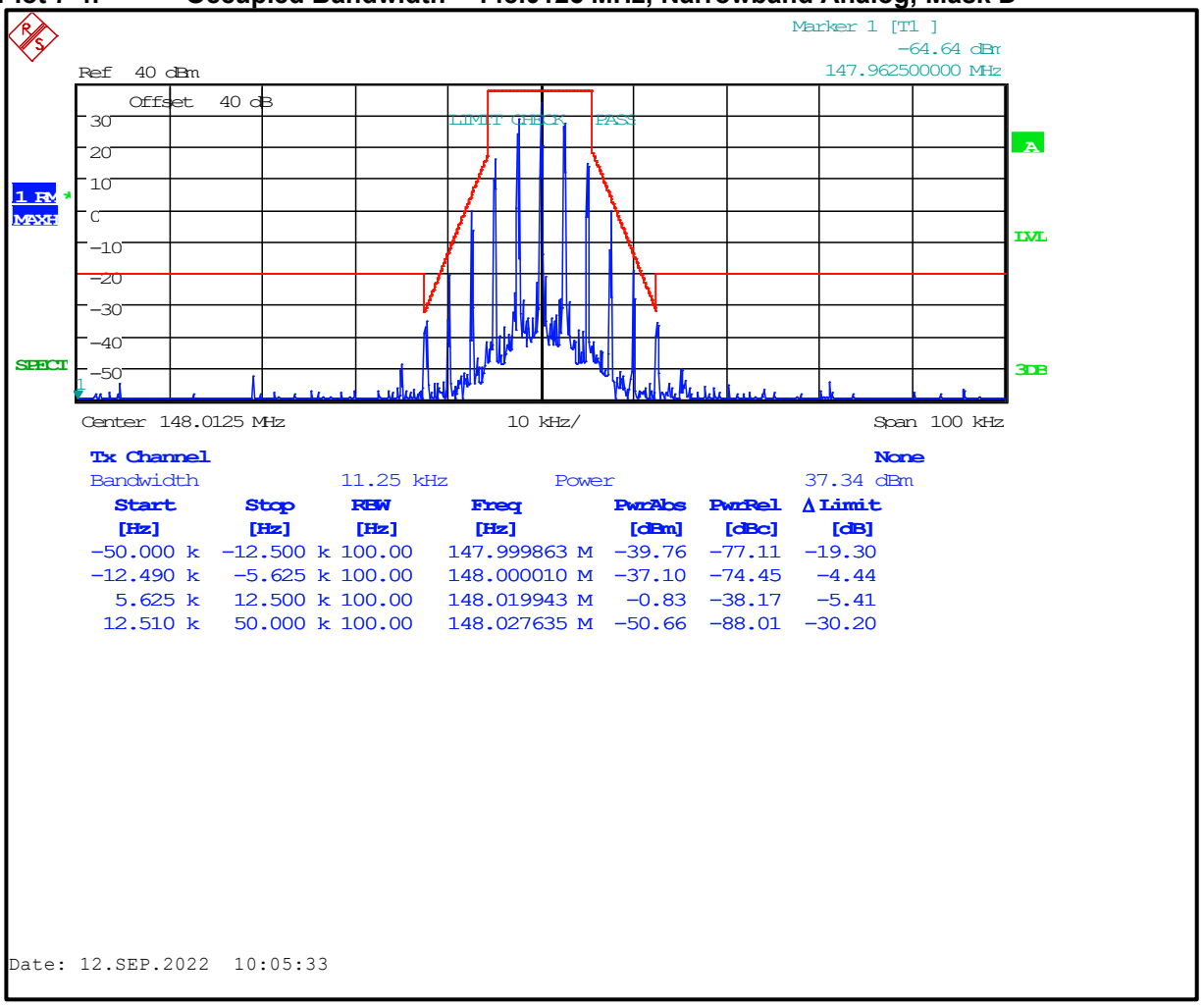
Plot 7-2: Occupied Bandwidth – 138.0125 MHz; Narrowband Analog; Mask D



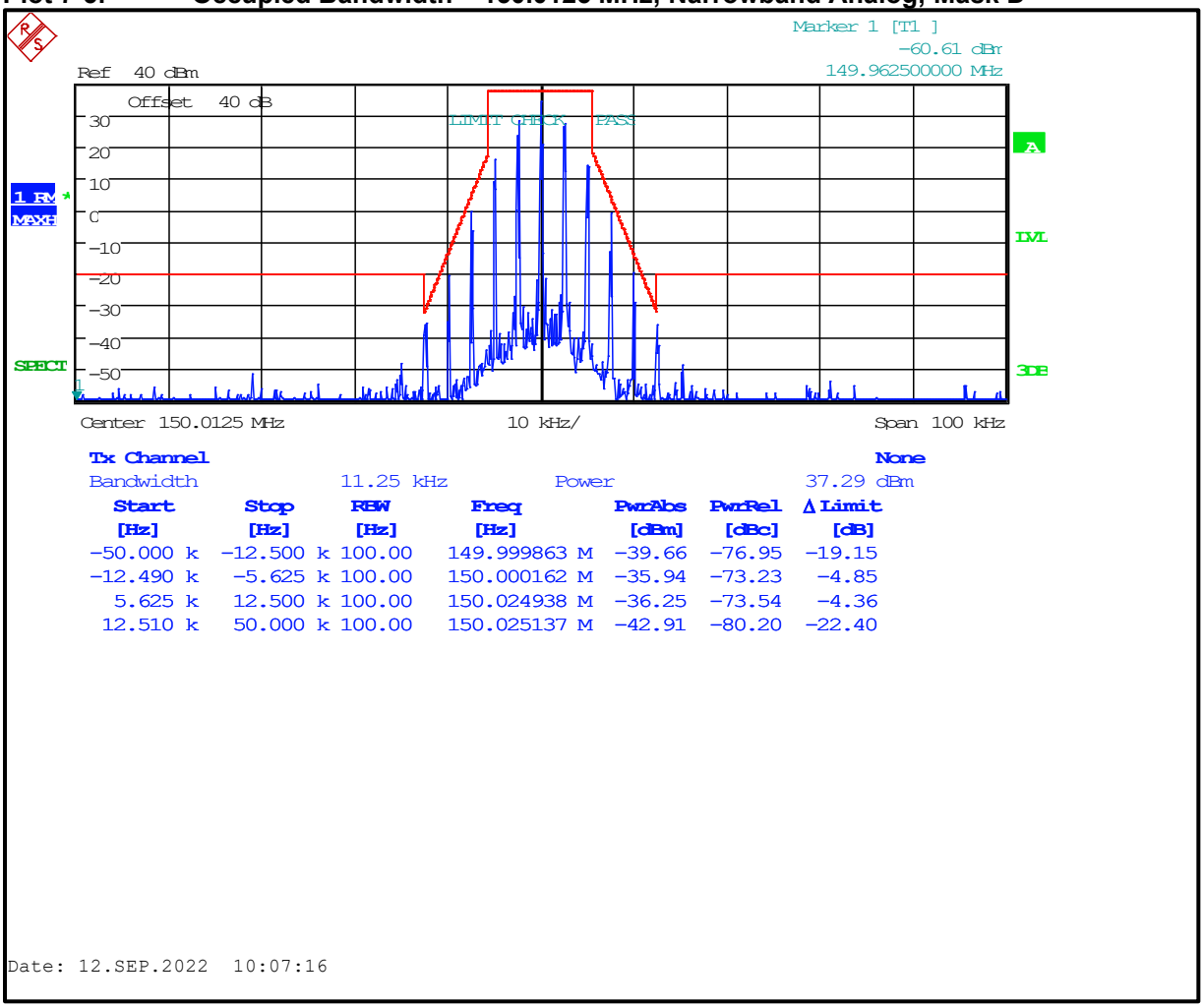
Plot 7-3: Occupied Bandwidth – 143.9875 MHz; Narrowband Analog; Mask D



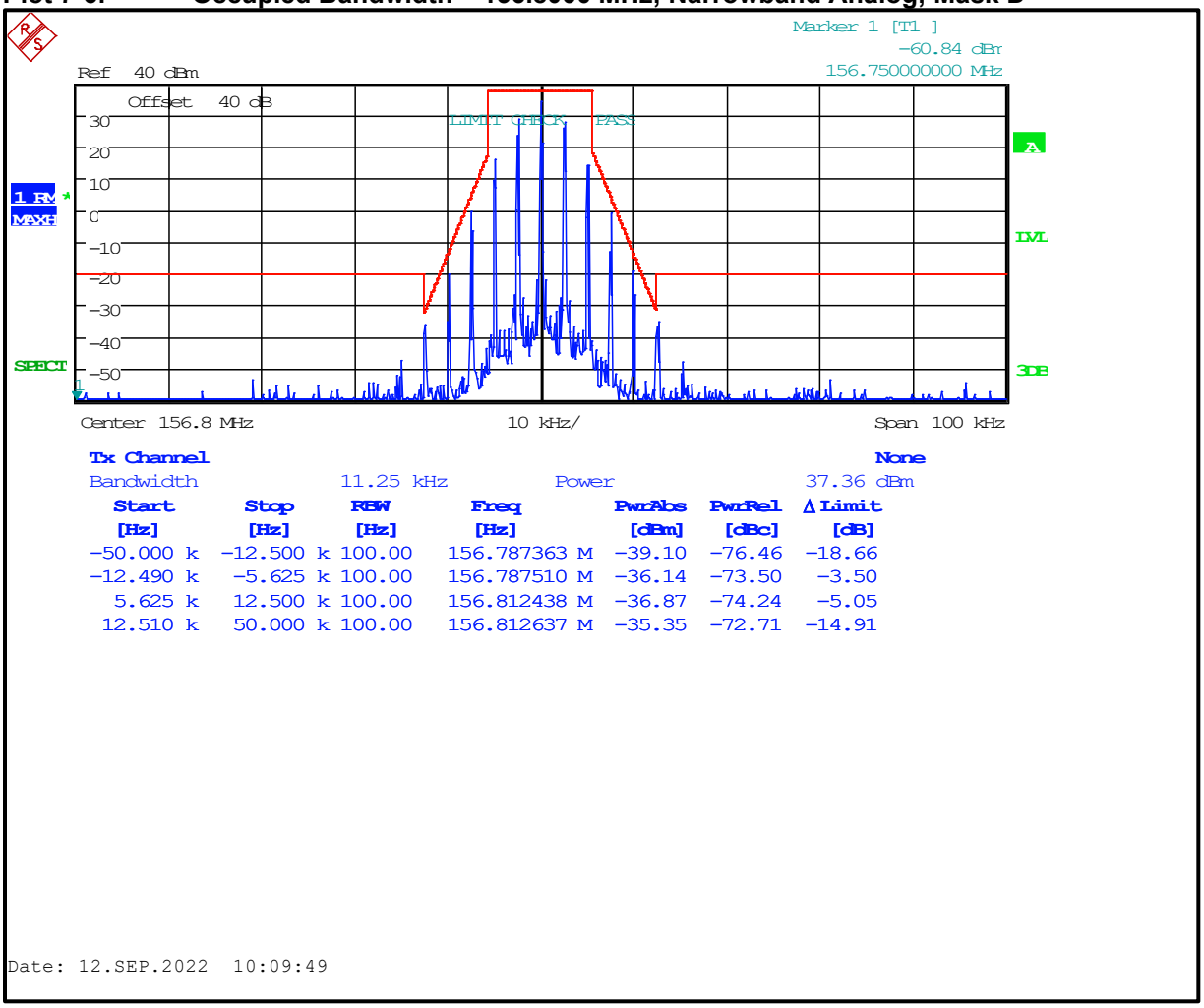
Plot 7-4: Occupied Bandwidth – 148.0125 MHz; Narrowband Analog; Mask D



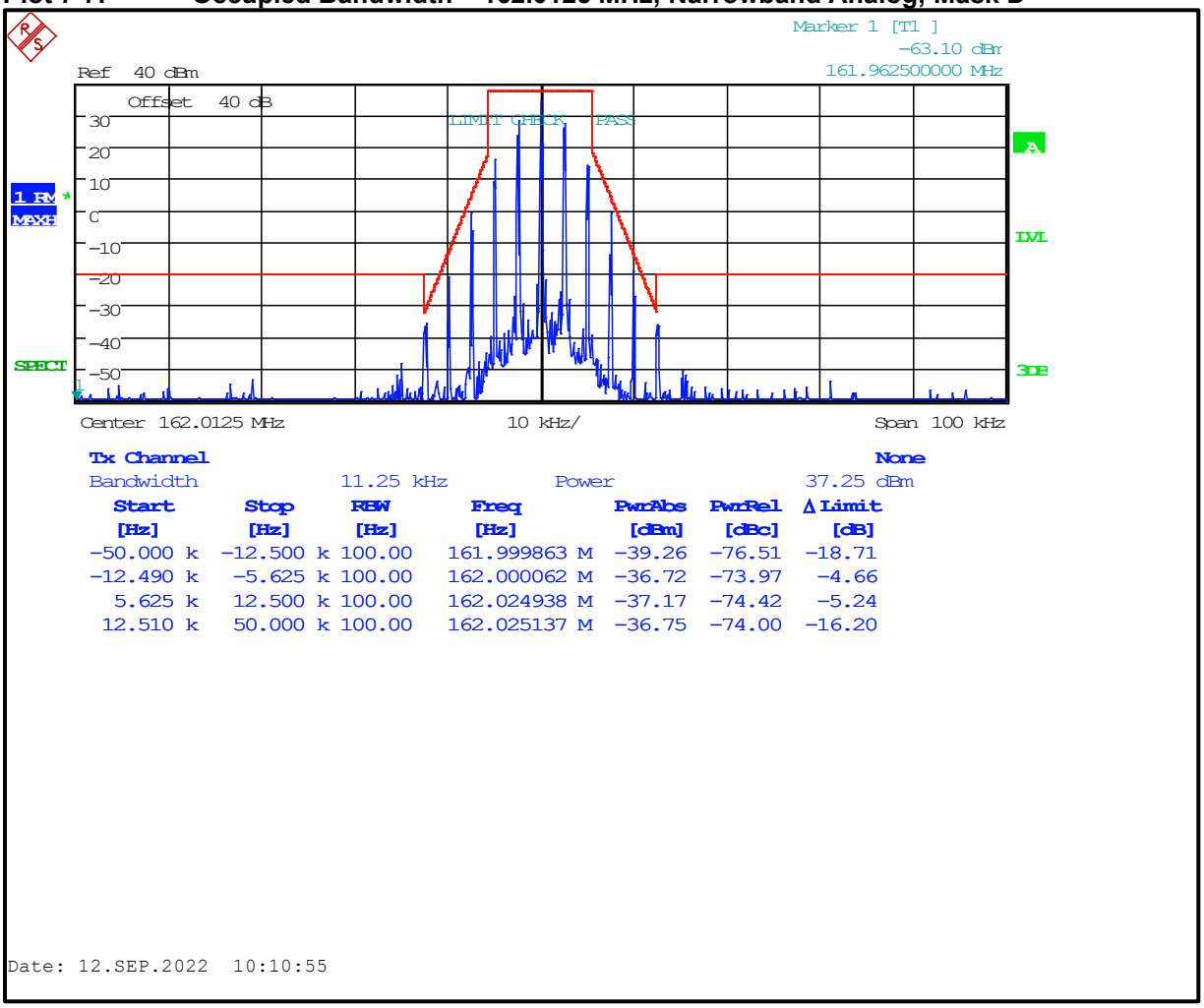
Plot 7-5: Occupied Bandwidth – 150.0125 MHz; Narrowband Analog; Mask D



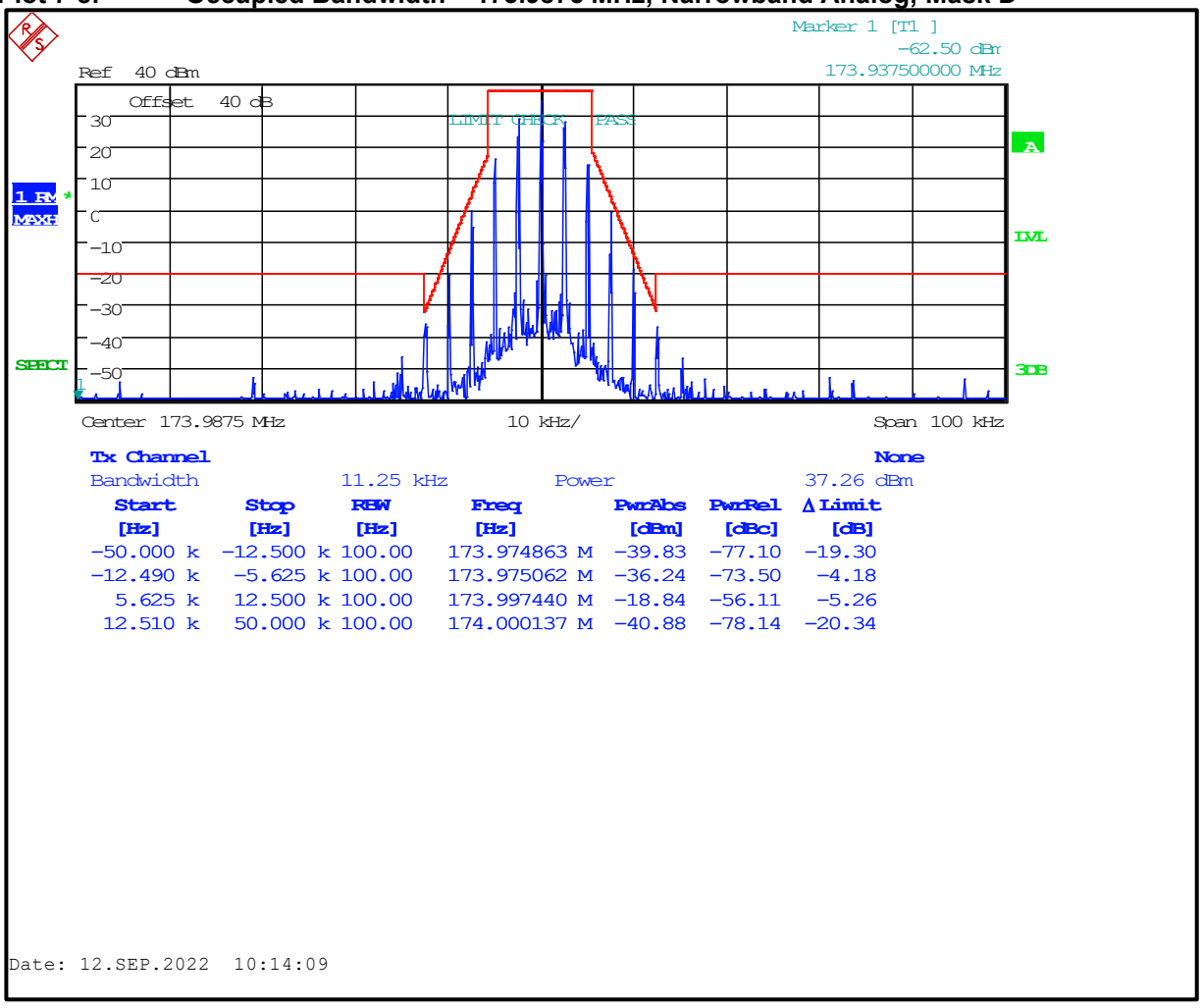
Plot 7-6: Occupied Bandwidth – 156.8000 MHz; Narrowband Analog; Mask D



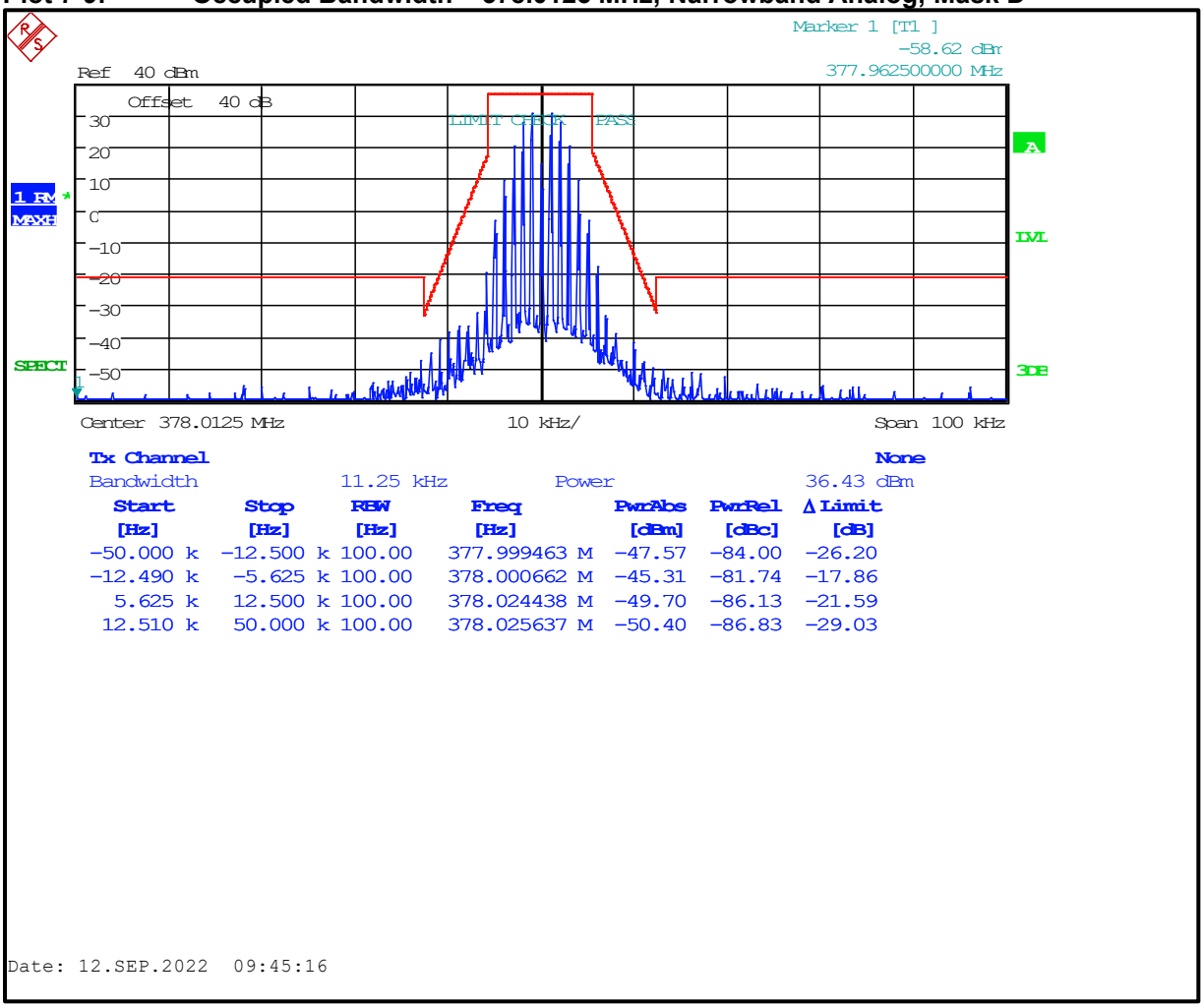
Plot 7-7: Occupied Bandwidth – 162.0125 MHz; Narrowband Analog; Mask D



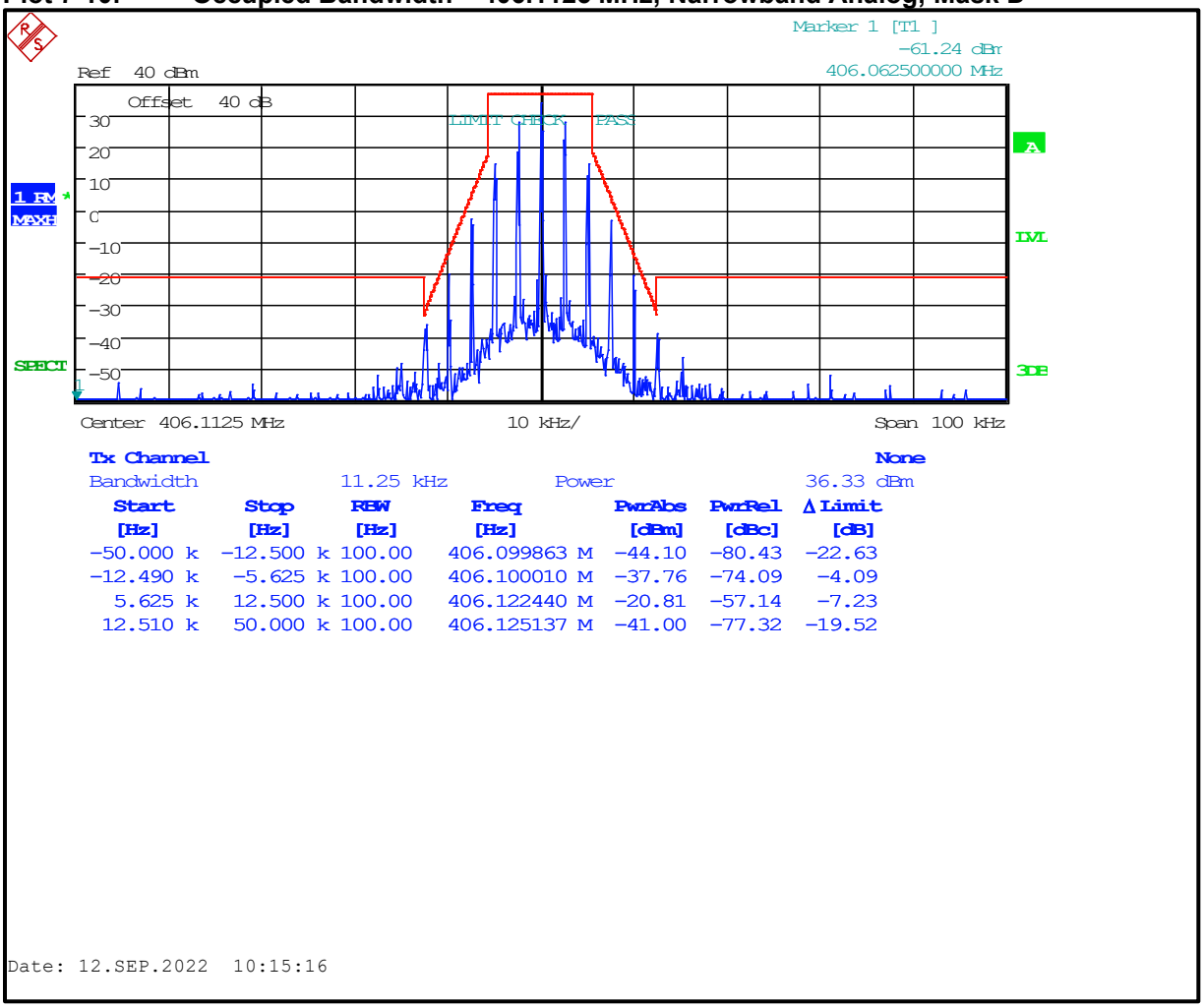
Plot 7-8: Occupied Bandwidth – 173.9875 MHz; Narrowband Analog; Mask D



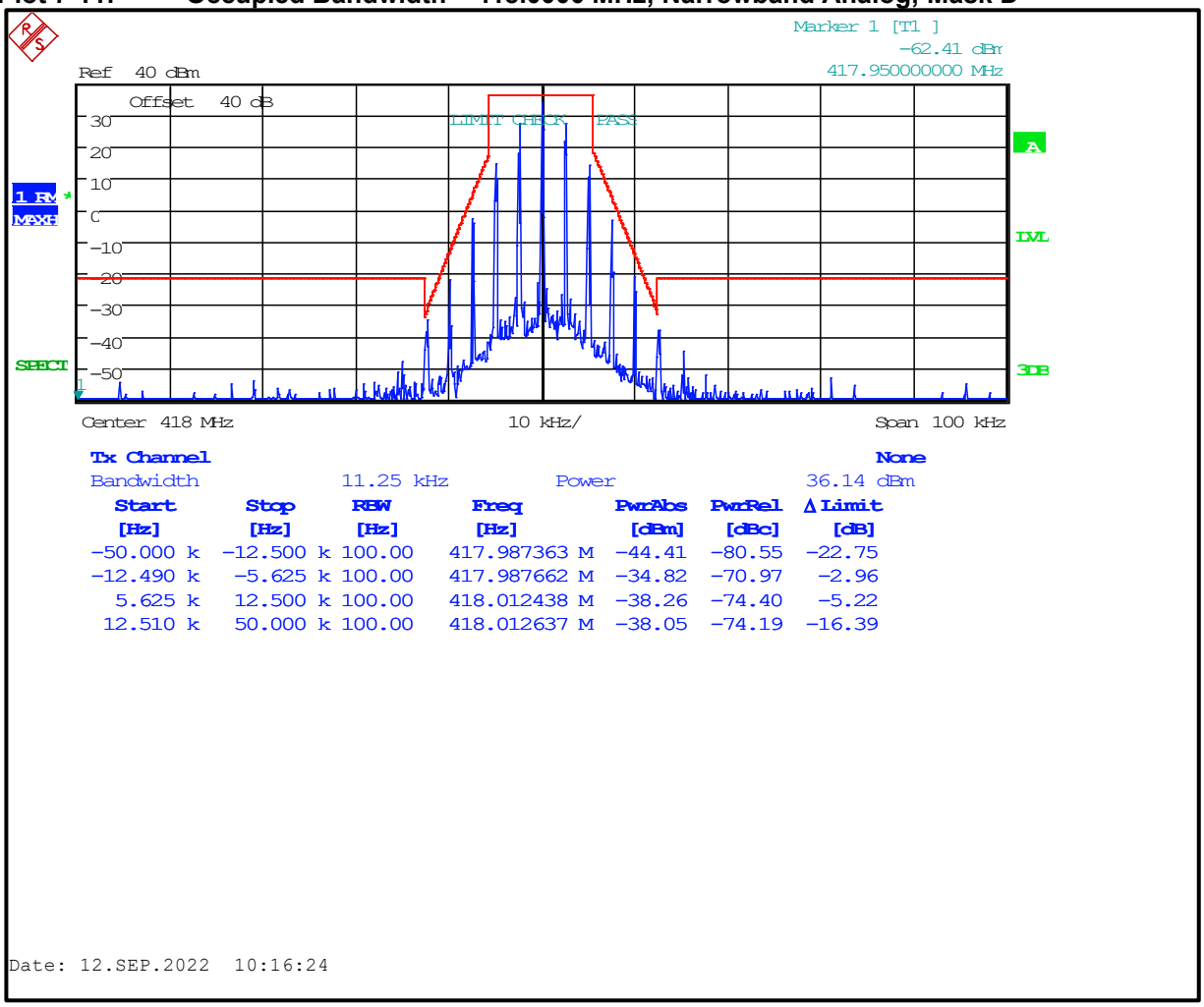
Plot 7-9: Occupied Bandwidth – 378.0125 MHz; Narrowband Analog; Mask D



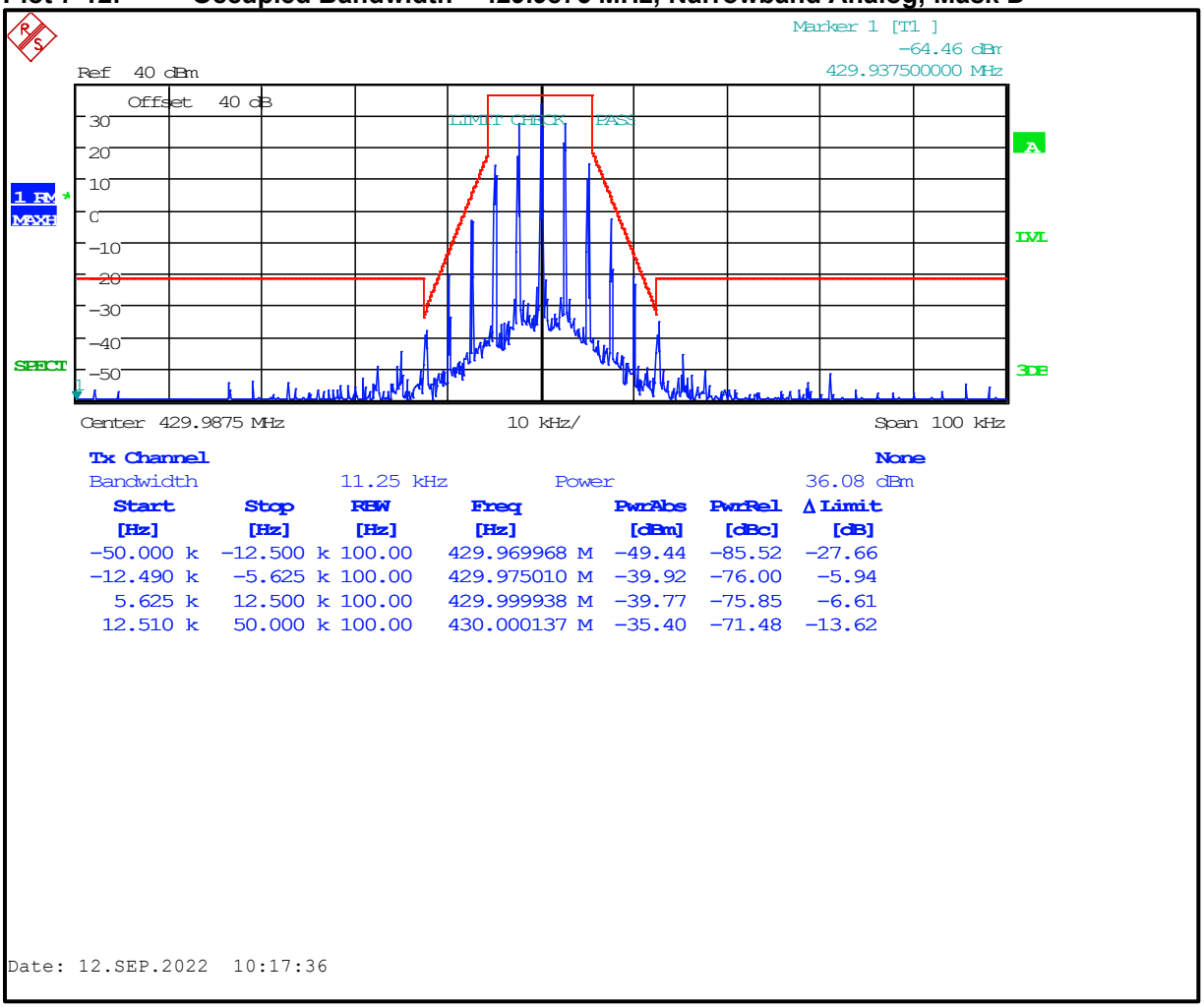
Plot 7-10: Occupied Bandwidth – 406.1125 MHz; Narrowband Analog; Mask D



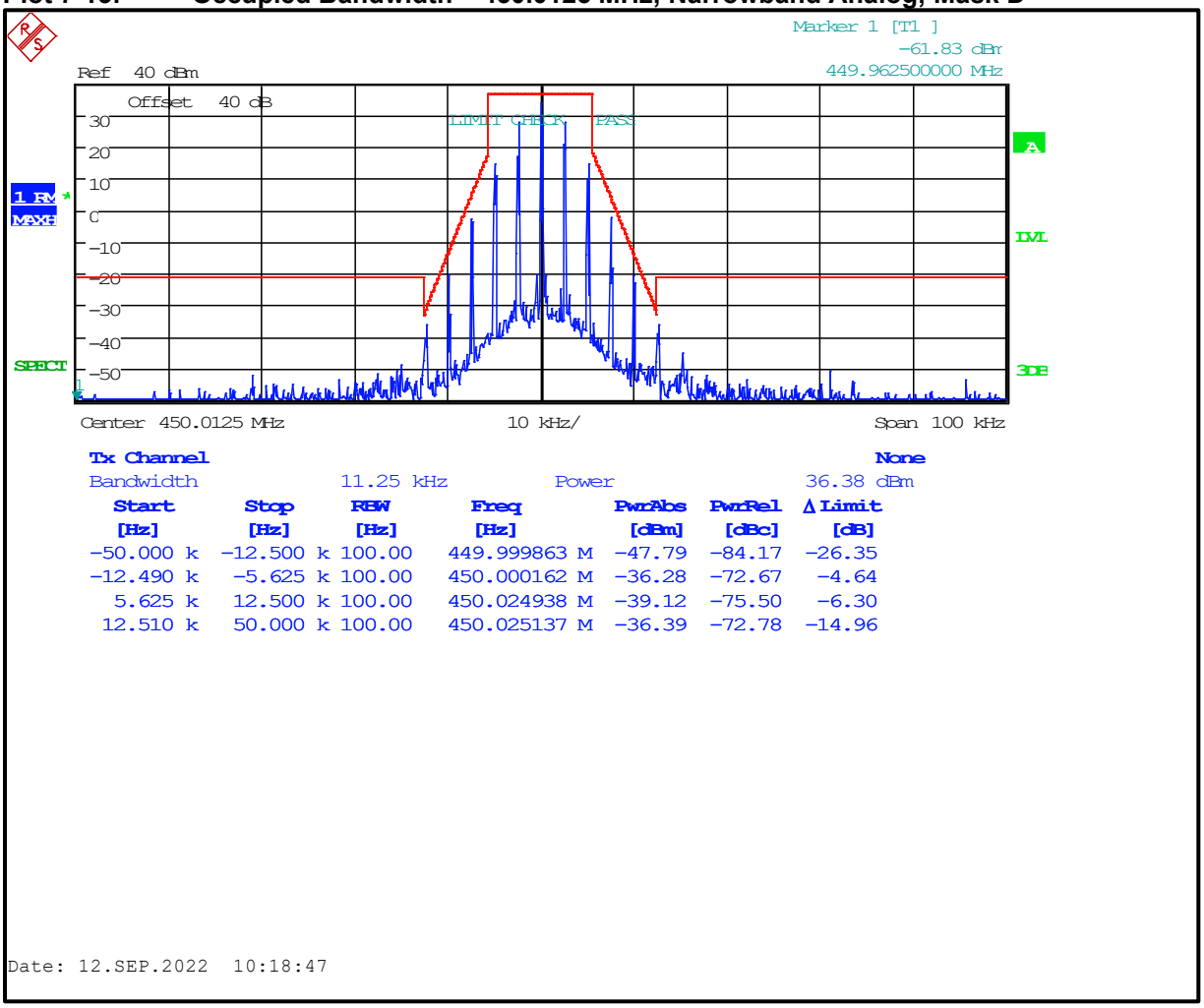
Plot 7-11: Occupied Bandwidth – 418.0000 MHz; Narrowband Analog; Mask D



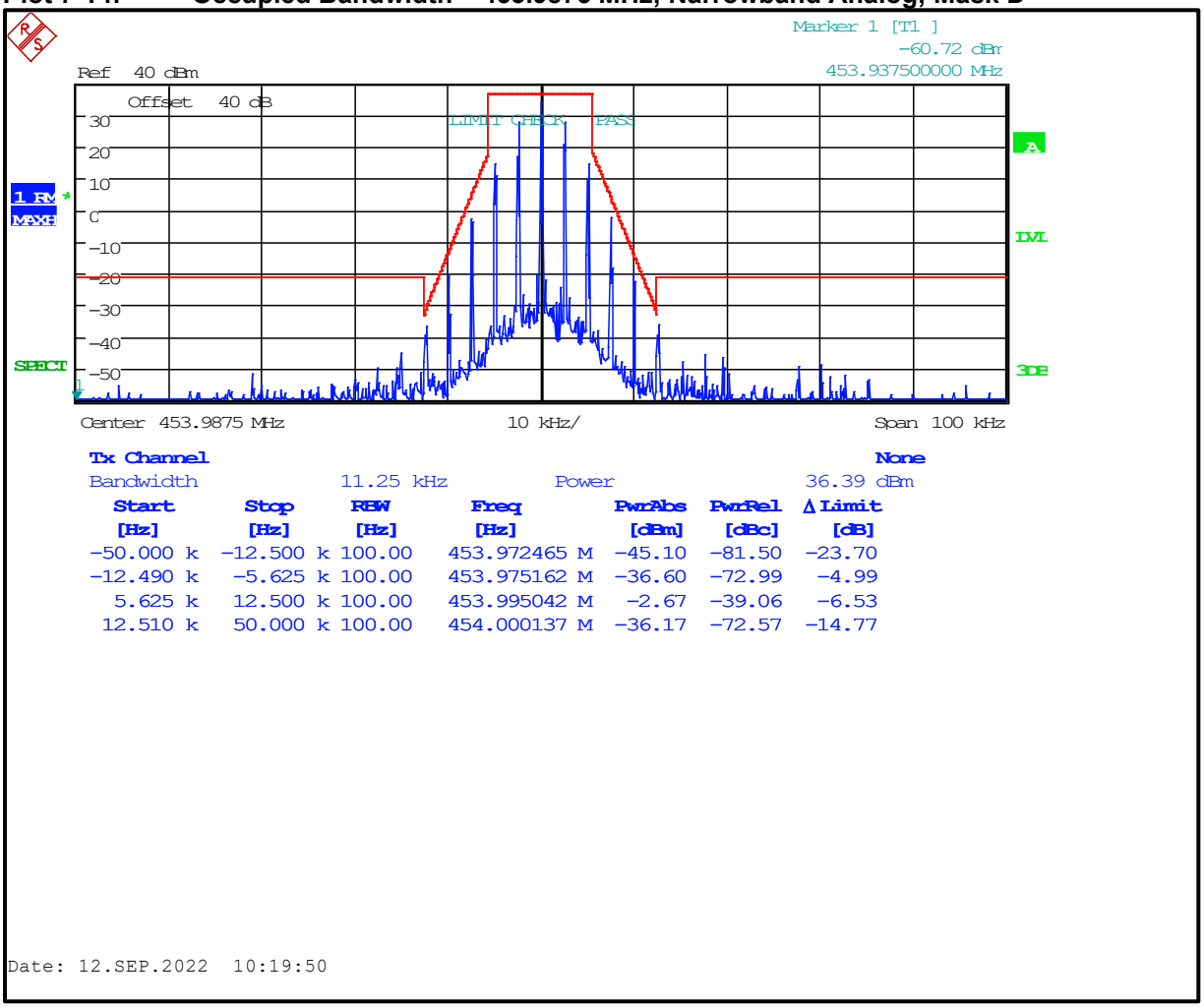
Plot 7-12: Occupied Bandwidth – 429.9875 MHz; Narrowband Analog; Mask D



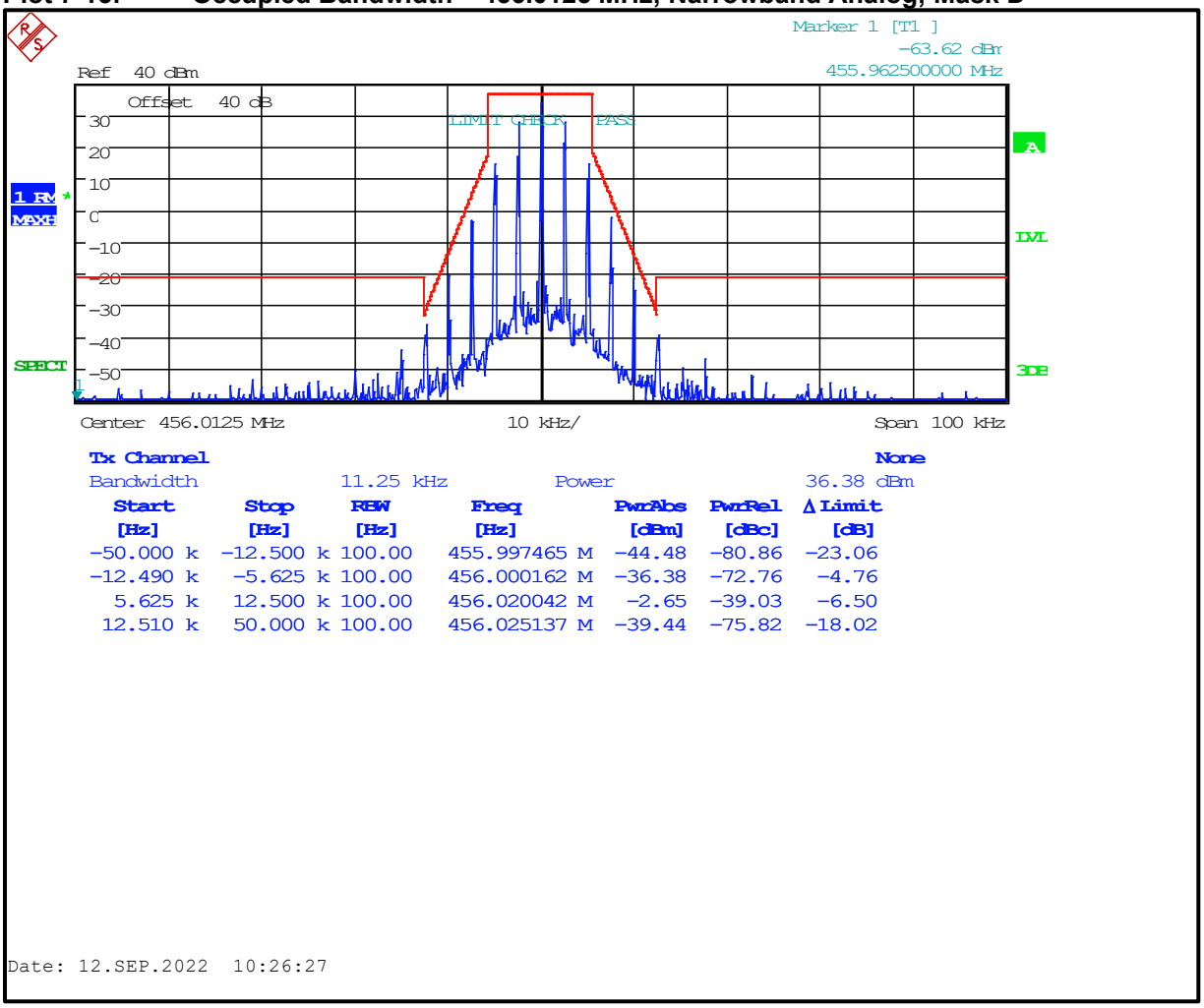
Plot 7-13: Occupied Bandwidth – 450.0125 MHz; Narrowband Analog; Mask D



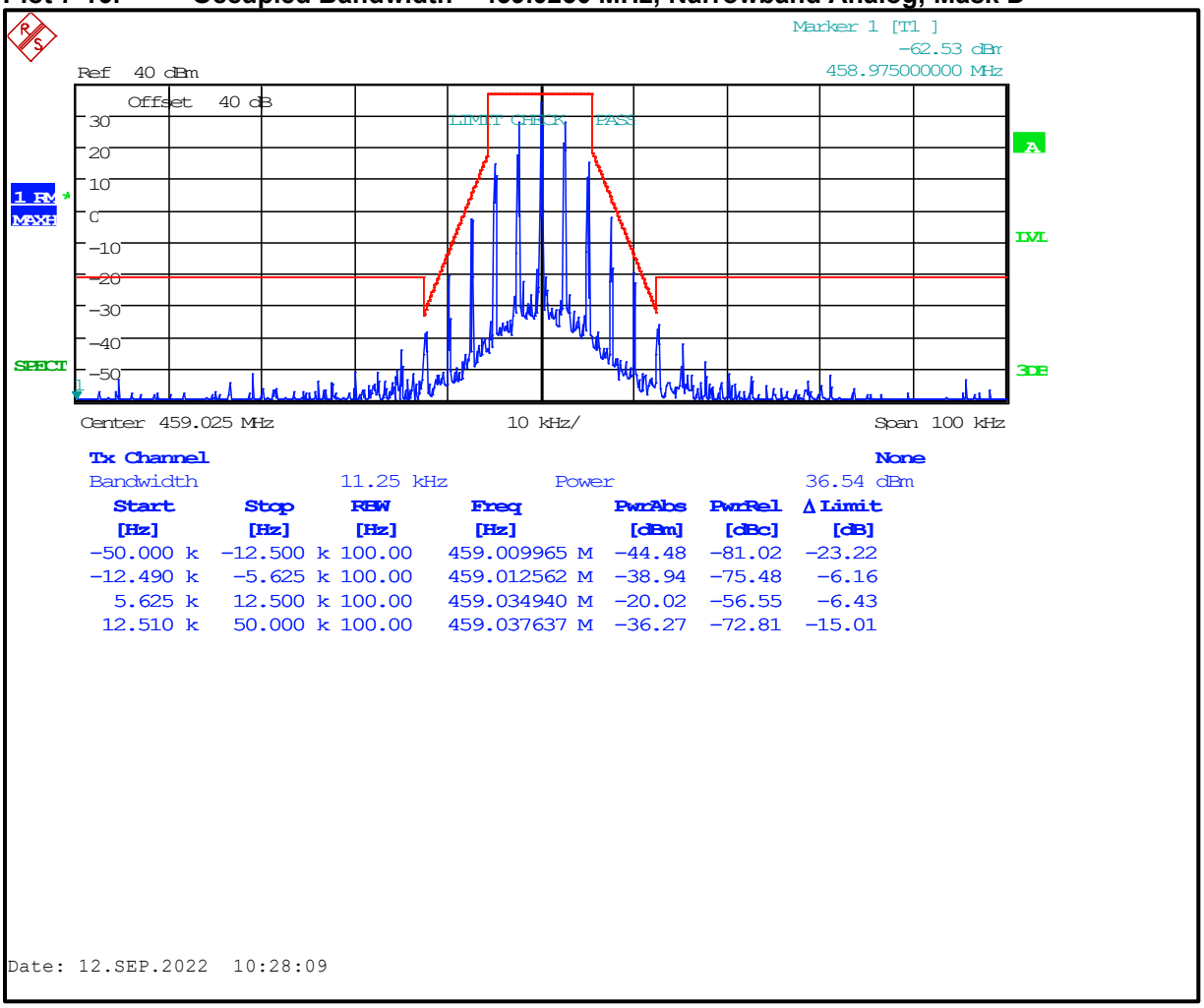
Plot 7-14: Occupied Bandwidth – 453.9875 MHz; Narrowband Analog; Mask D



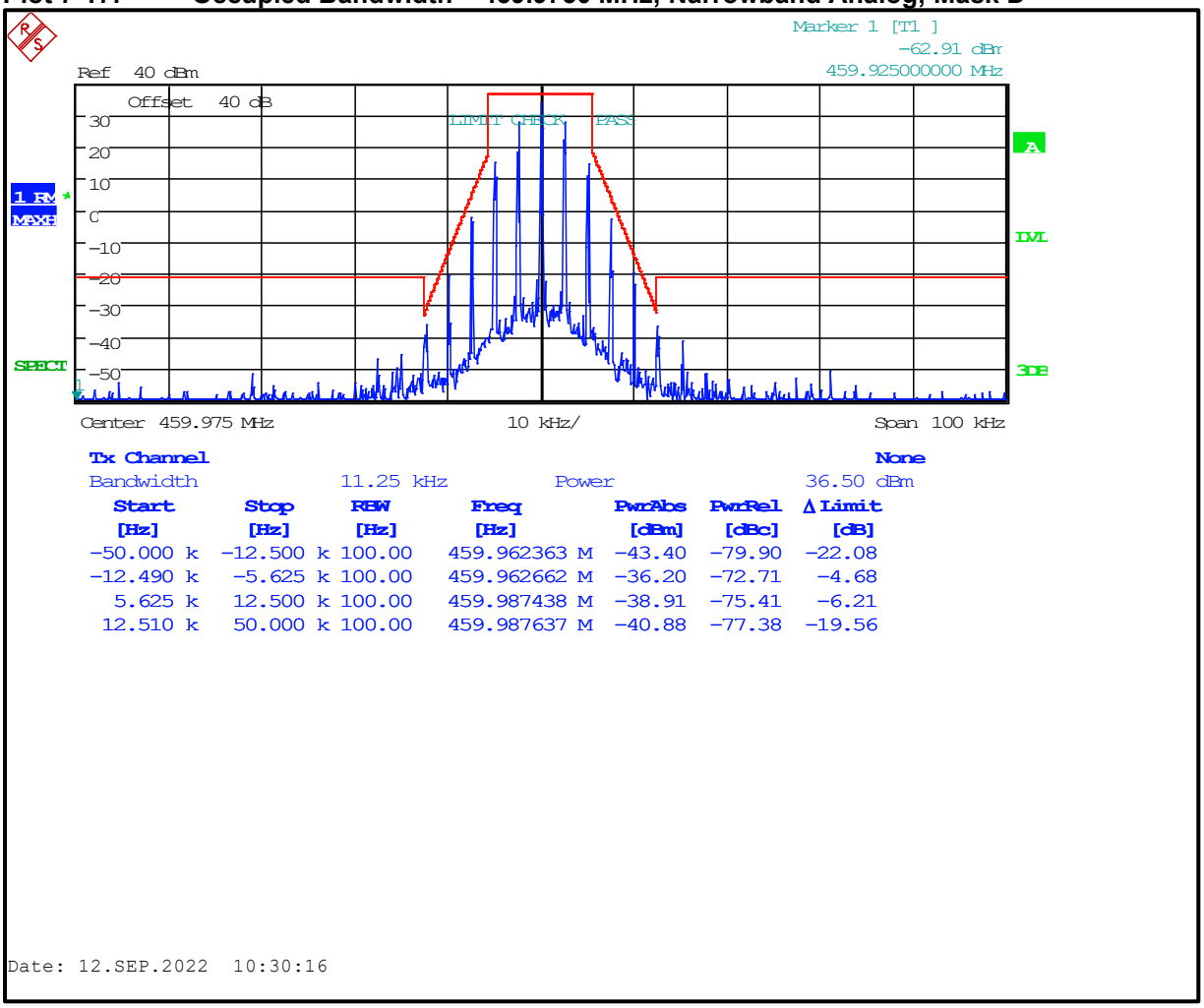
Plot 7-15: Occupied Bandwidth – 456.0125 MHz; Narrowband Analog; Mask D



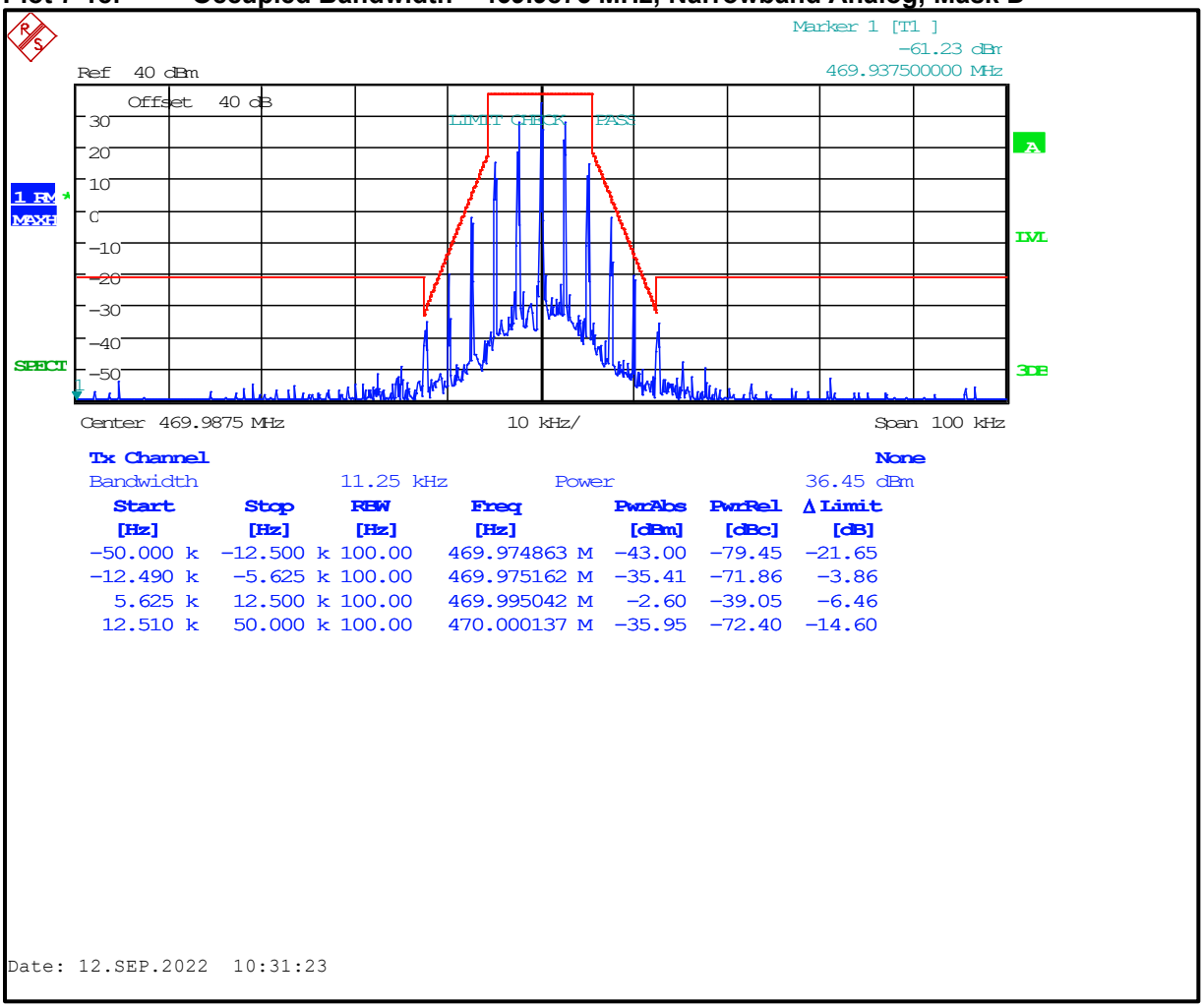
Plot 7-16: Occupied Bandwidth – 459.0250 MHz; Narrowband Analog; Mask D



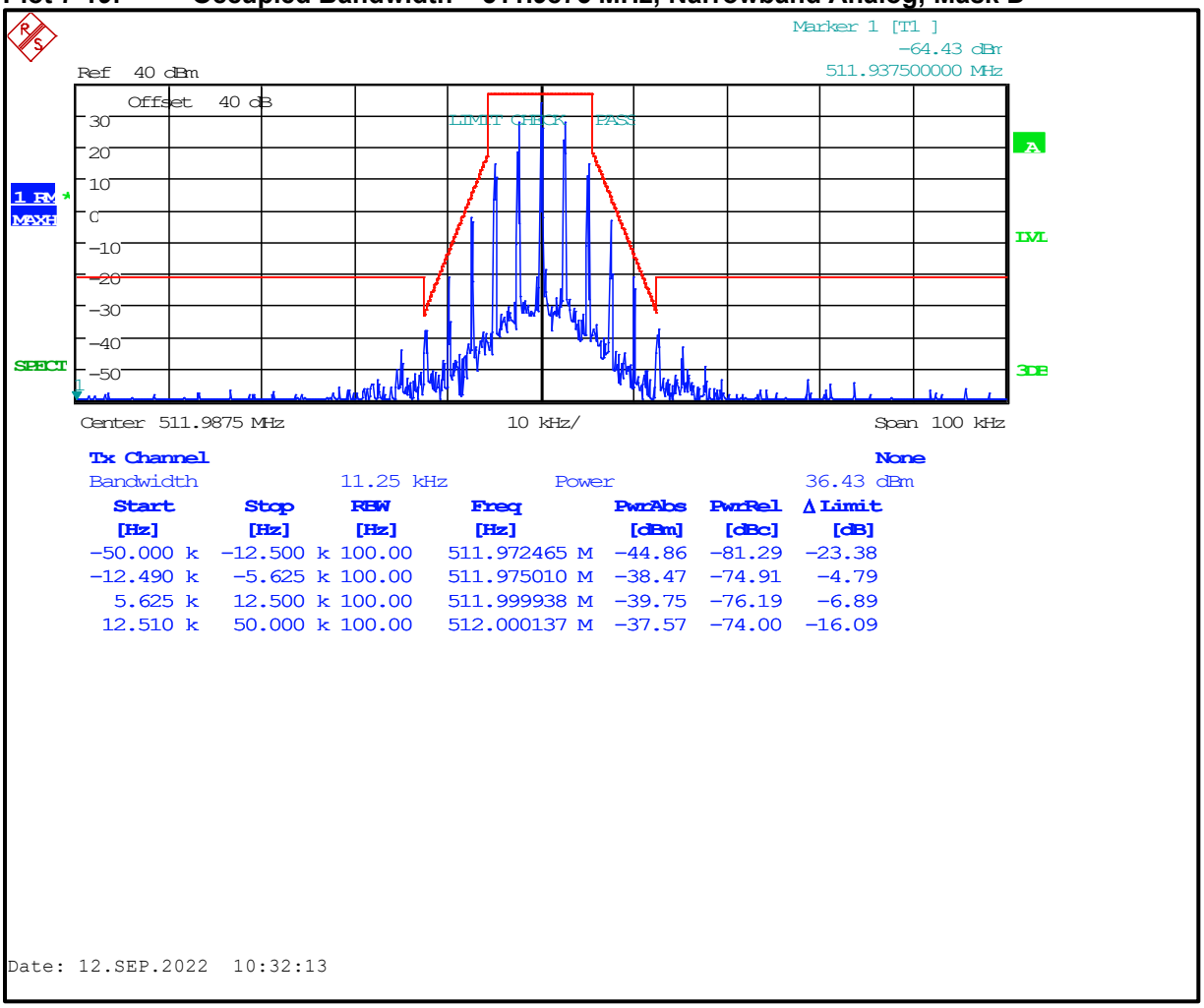
Plot 7-17: Occupied Bandwidth – 459.9750 MHz; Narrowband Analog; Mask D



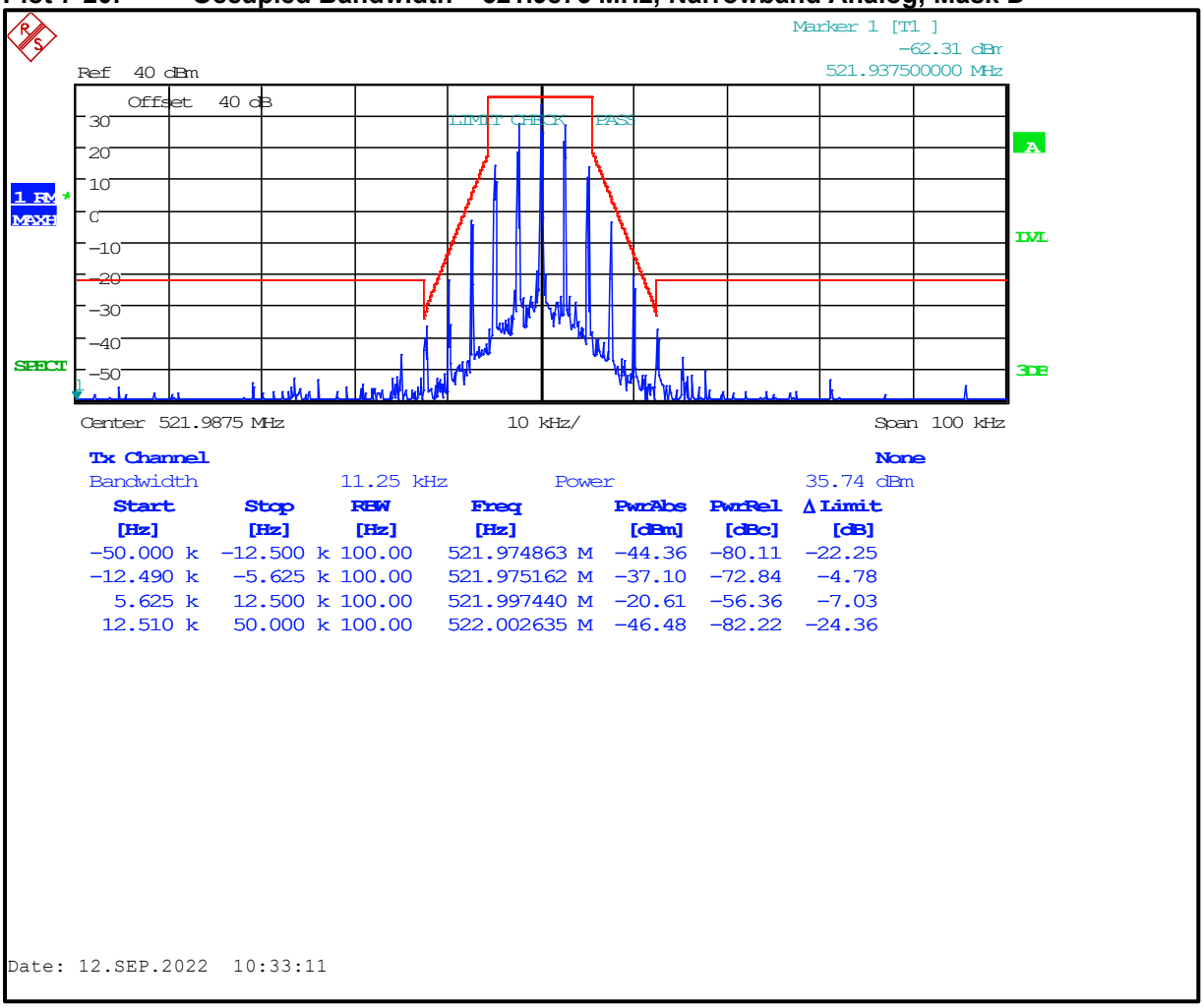
Plot 7-18: Occupied Bandwidth – 469.9875 MHz; Narrowband Analog; Mask D



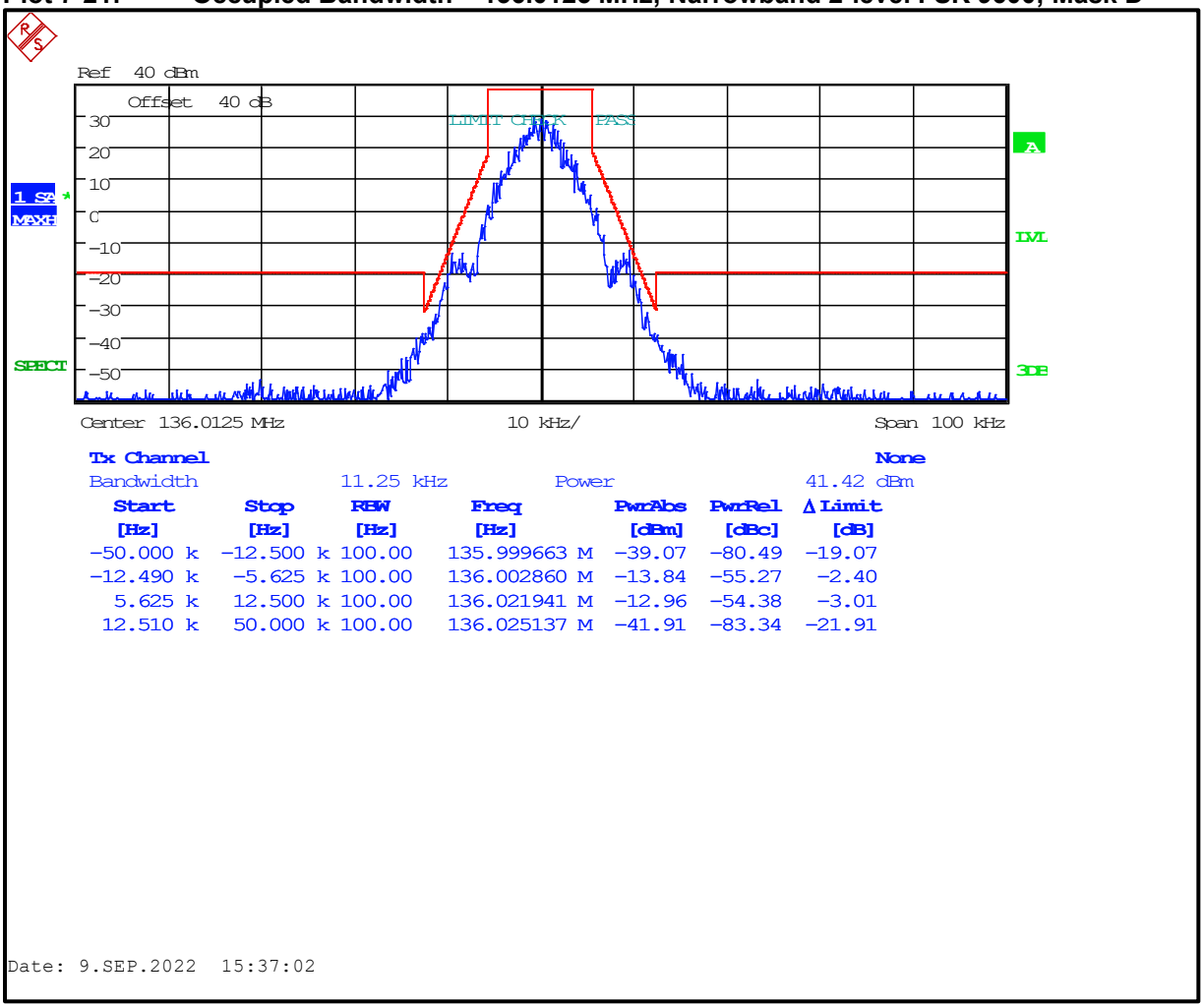
Plot 7-19: Occupied Bandwidth – 511.9875 MHz; Narrowband Analog; Mask D



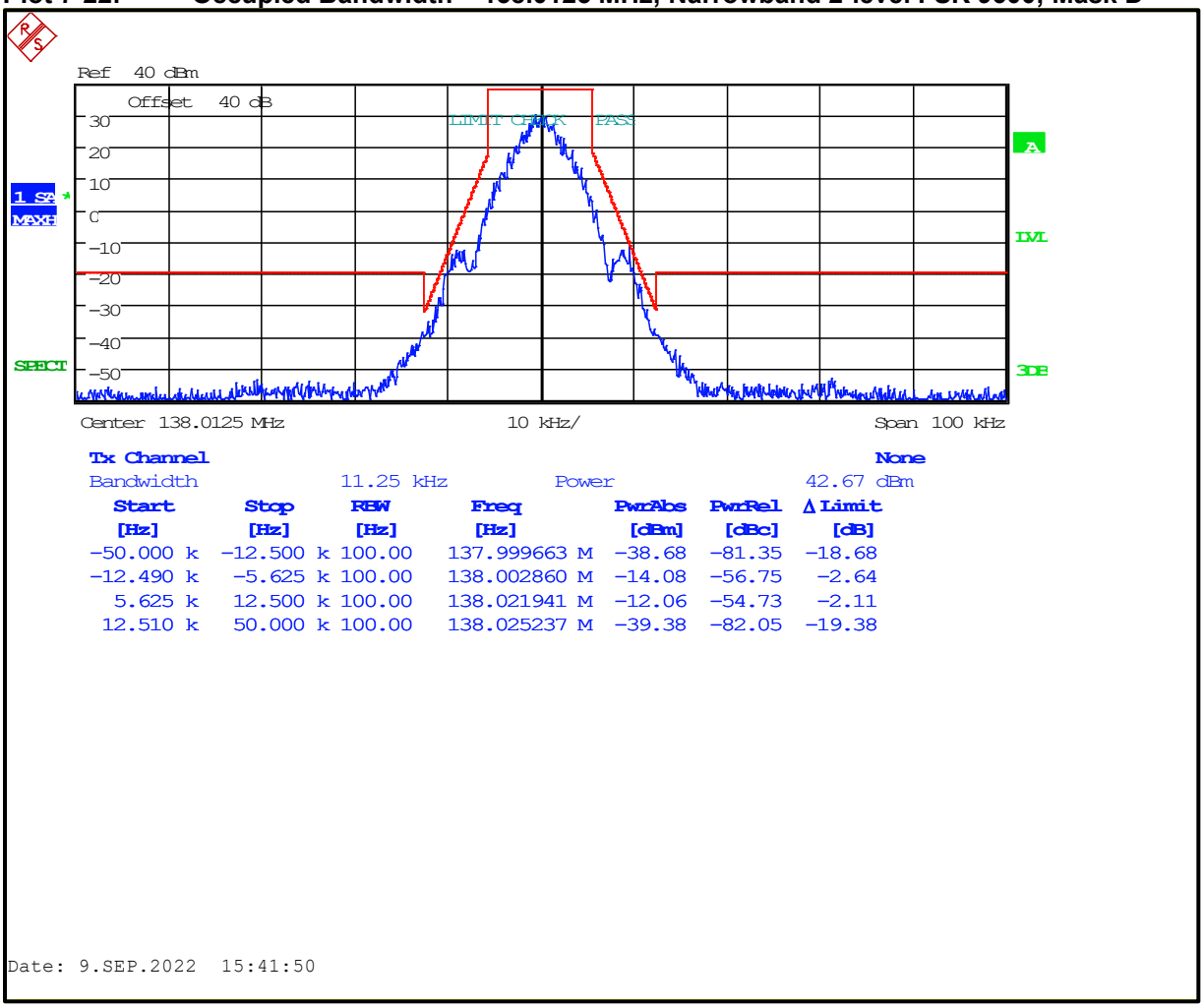
Plot 7-20: Occupied Bandwidth – 521.9875 MHz; Narrowband Analog; Mask D



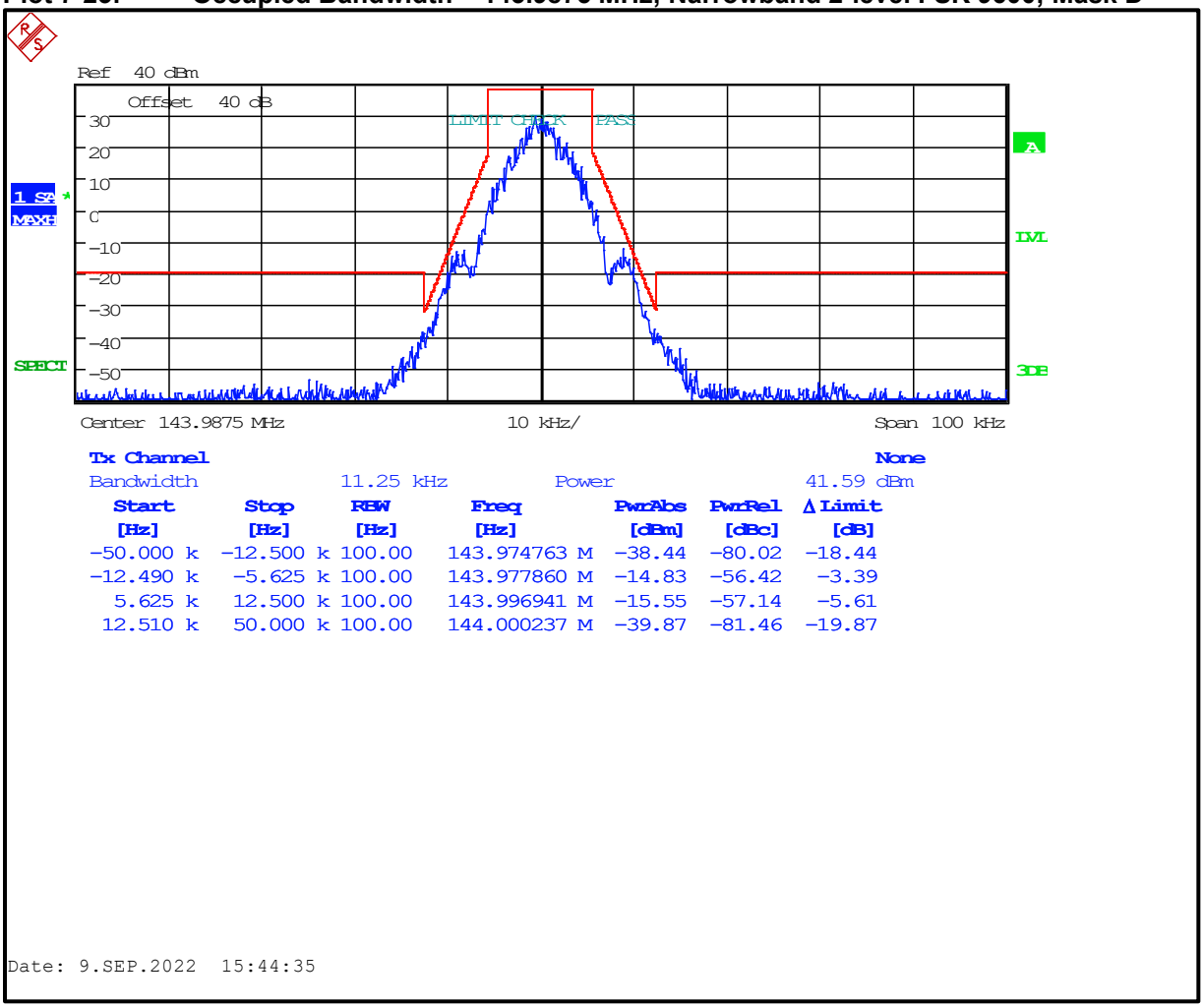
Plot 7-21: Occupied Bandwidth – 136.0125 MHz; Narrowband 2-level FSK 9600; Mask D



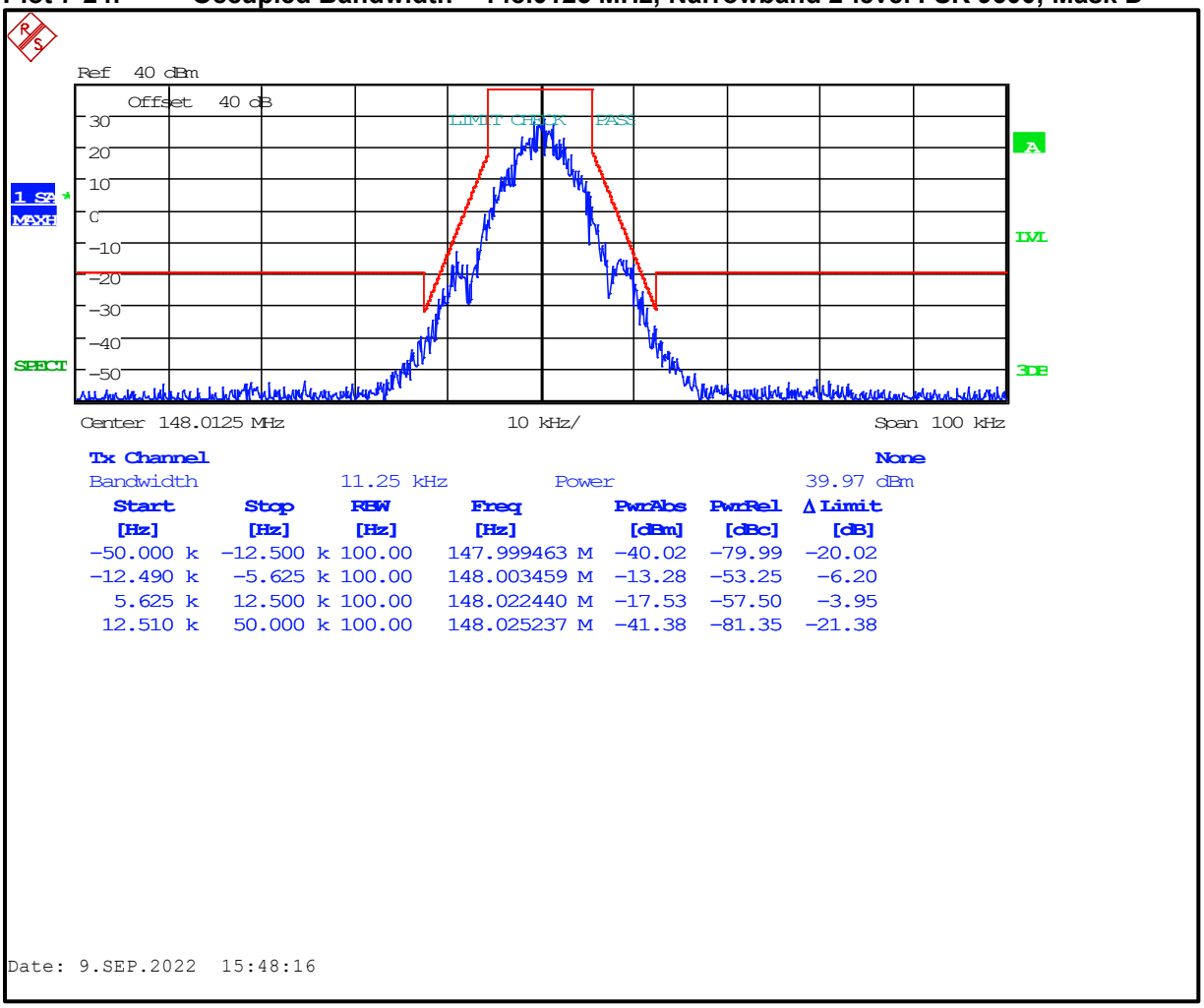
Plot 7-22: Occupied Bandwidth – 138.0125 MHz; Narrowband 2-level FSK 9600; Mask D



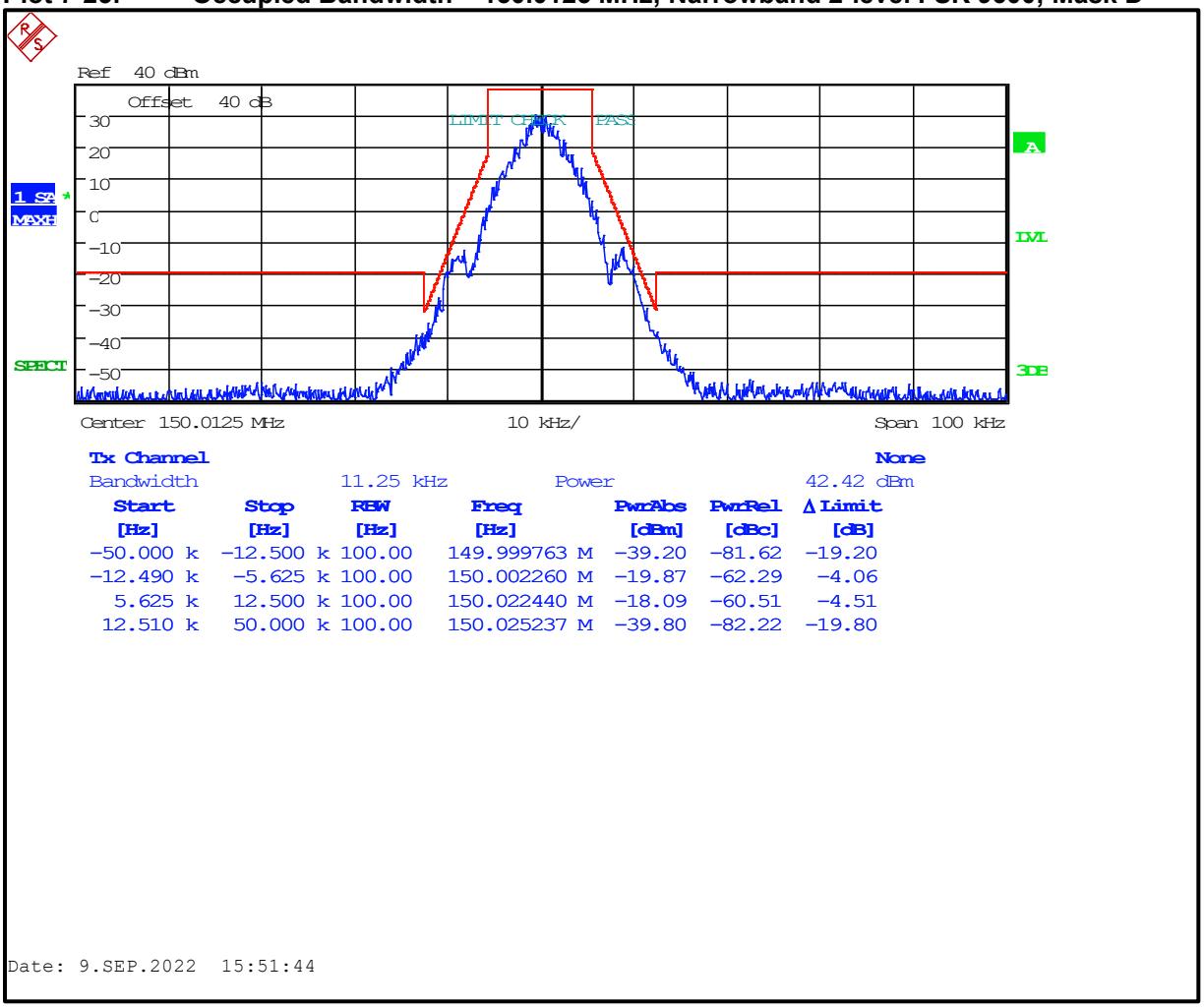
Plot 7-23: Occupied Bandwidth – 143.9875 MHz; Narrowband 2-level FSK 9600; Mask D



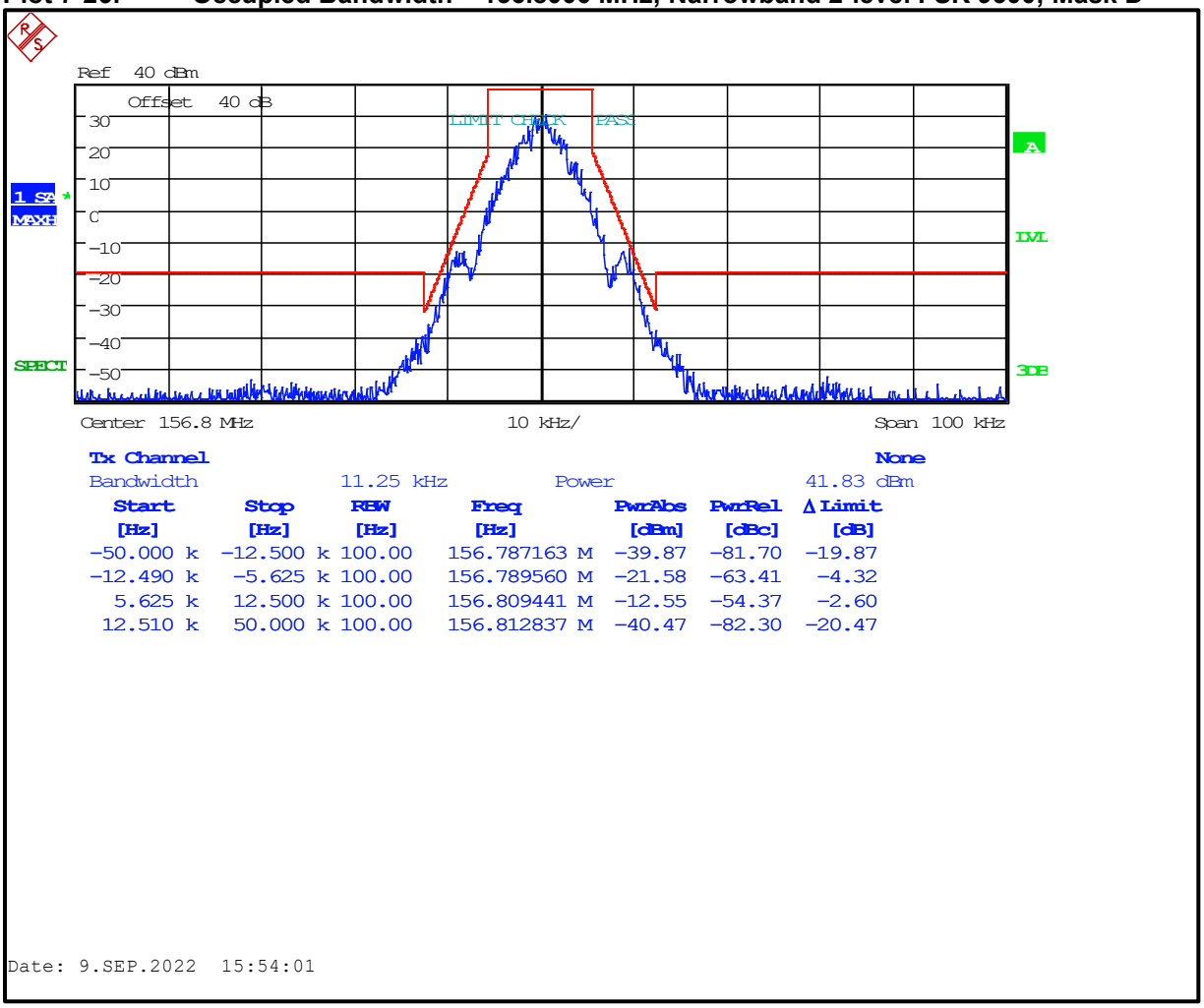
Plot 7-24: Occupied Bandwidth – 148.0125 MHz; Narrowband 2-level FSK 9600; Mask D



Plot 7-25: Occupied Bandwidth – 150.0125 MHz; Narrowband 2-level FSK 9600; Mask D



Plot 7-26: Occupied Bandwidth – 156.8000 MHz; Narrowband 2-level FSK 9600; Mask D



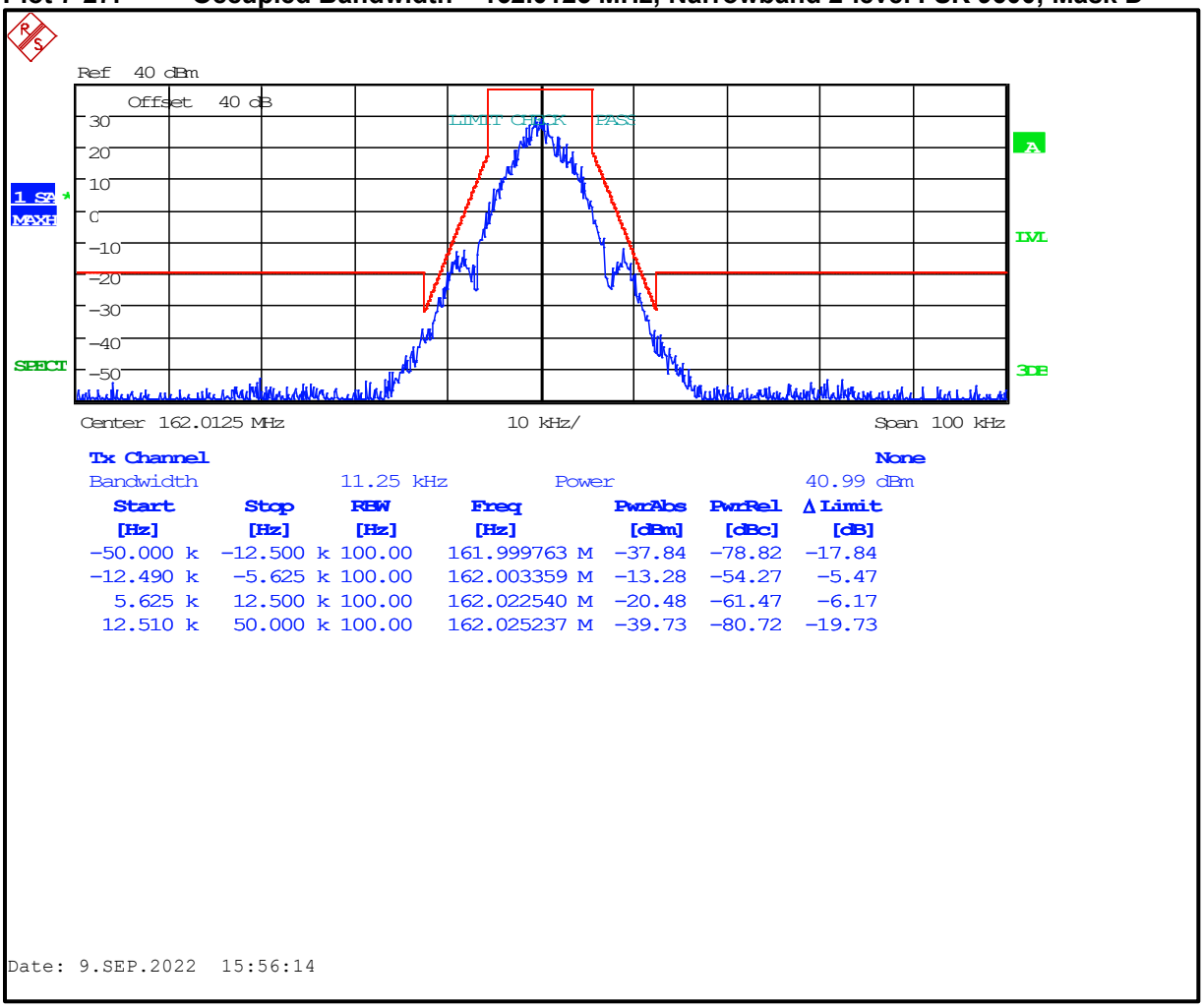
Tx Channel **None**

Bandwidth 11.25 kHz Power 41.83 dBm

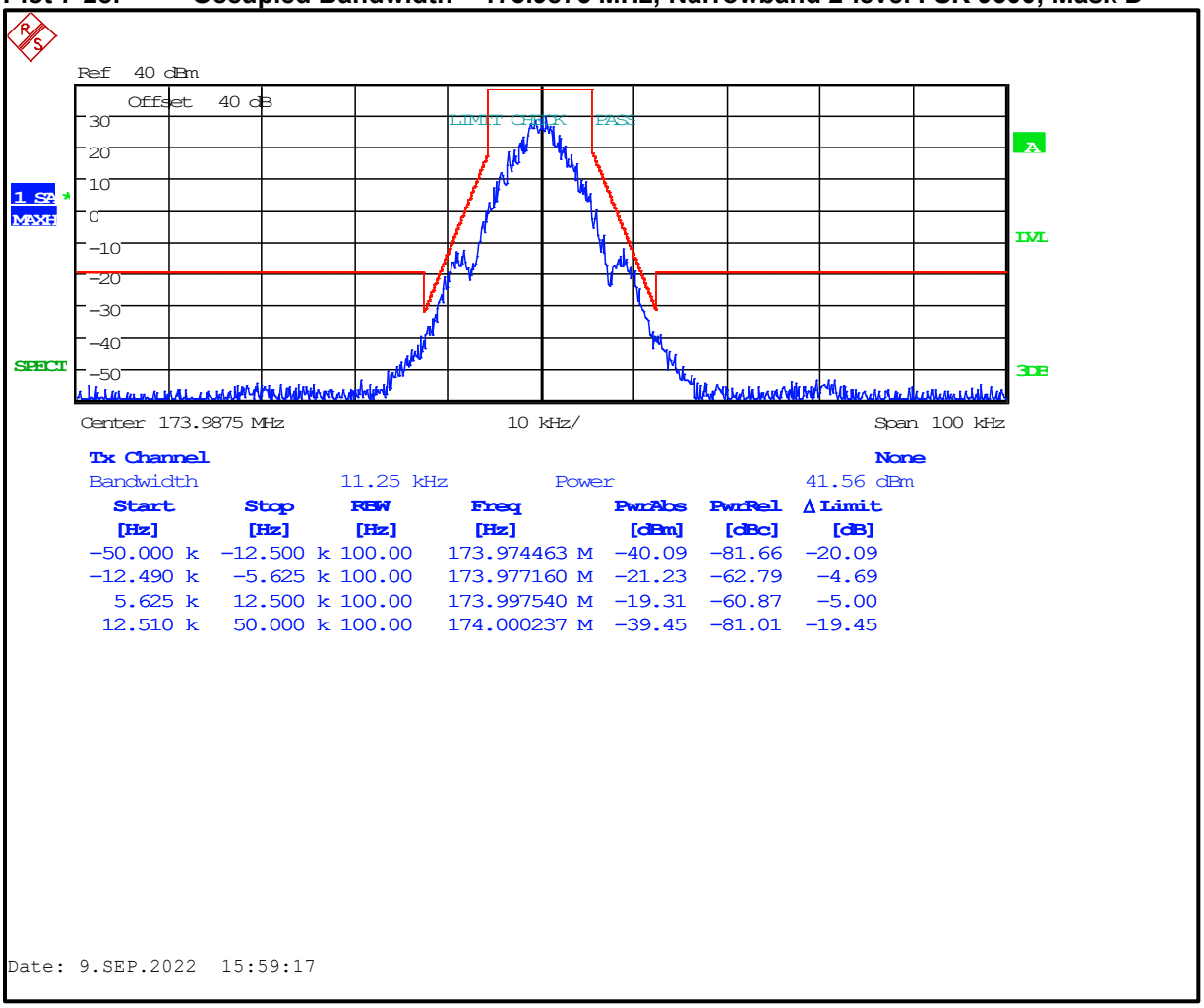
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	Δ Limit [dB]
-50.000 k	-12.500 k	100.00	156.787163 M	-39.87	-81.70	-19.87
-12.490 k	-5.625 k	100.00	156.789560 M	-21.58	-63.41	-4.32
5.625 k	12.500 k	100.00	156.809441 M	-12.55	-54.37	-2.60
12.510 k	50.000 k	100.00	156.812837 M	-40.47	-82.30	-20.47

Date: 9.SEP.2022 15:54:01

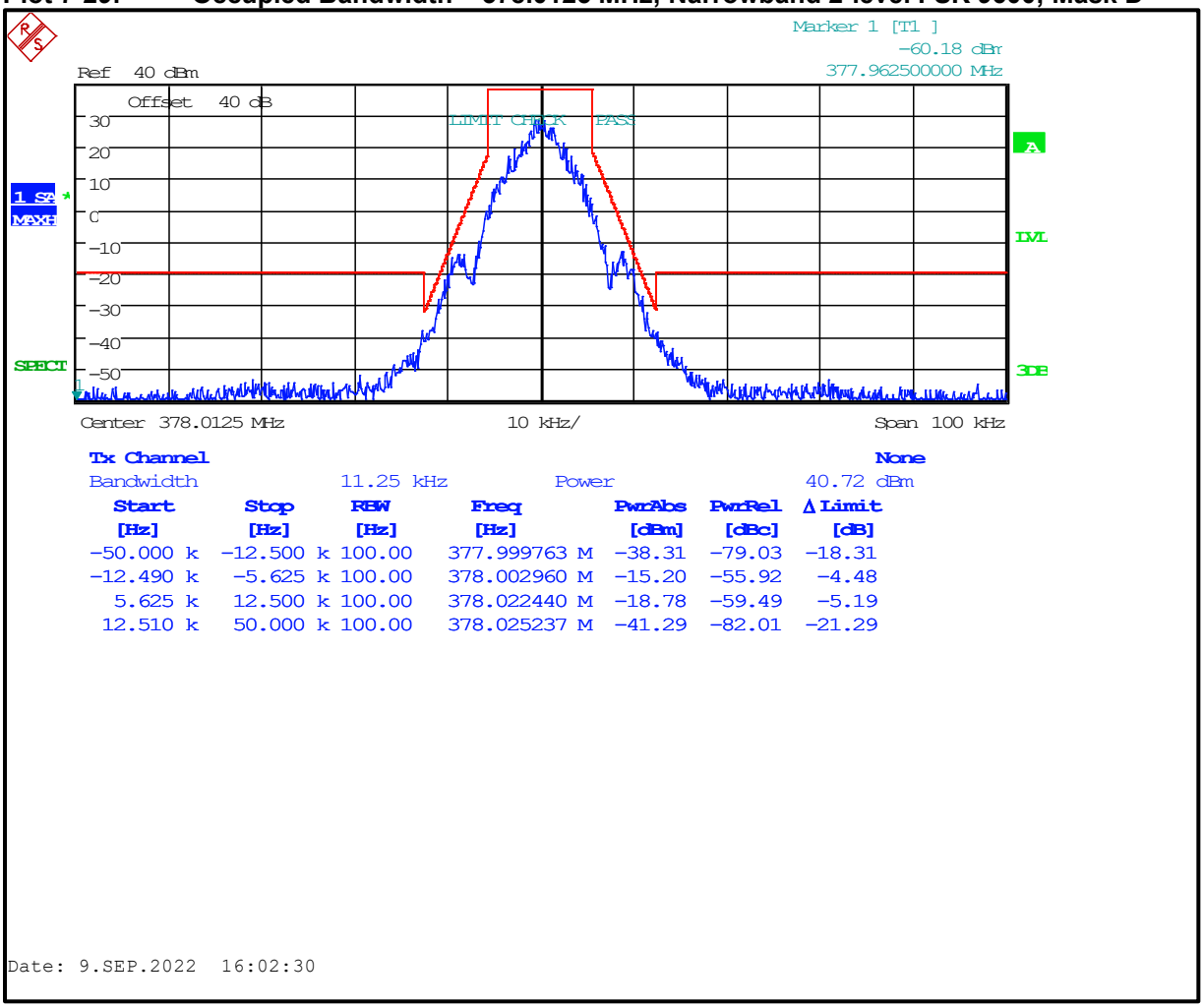
Plot 7-27: Occupied Bandwidth – 162.0125 MHz; Narrowband 2-level FSK 9600; Mask D



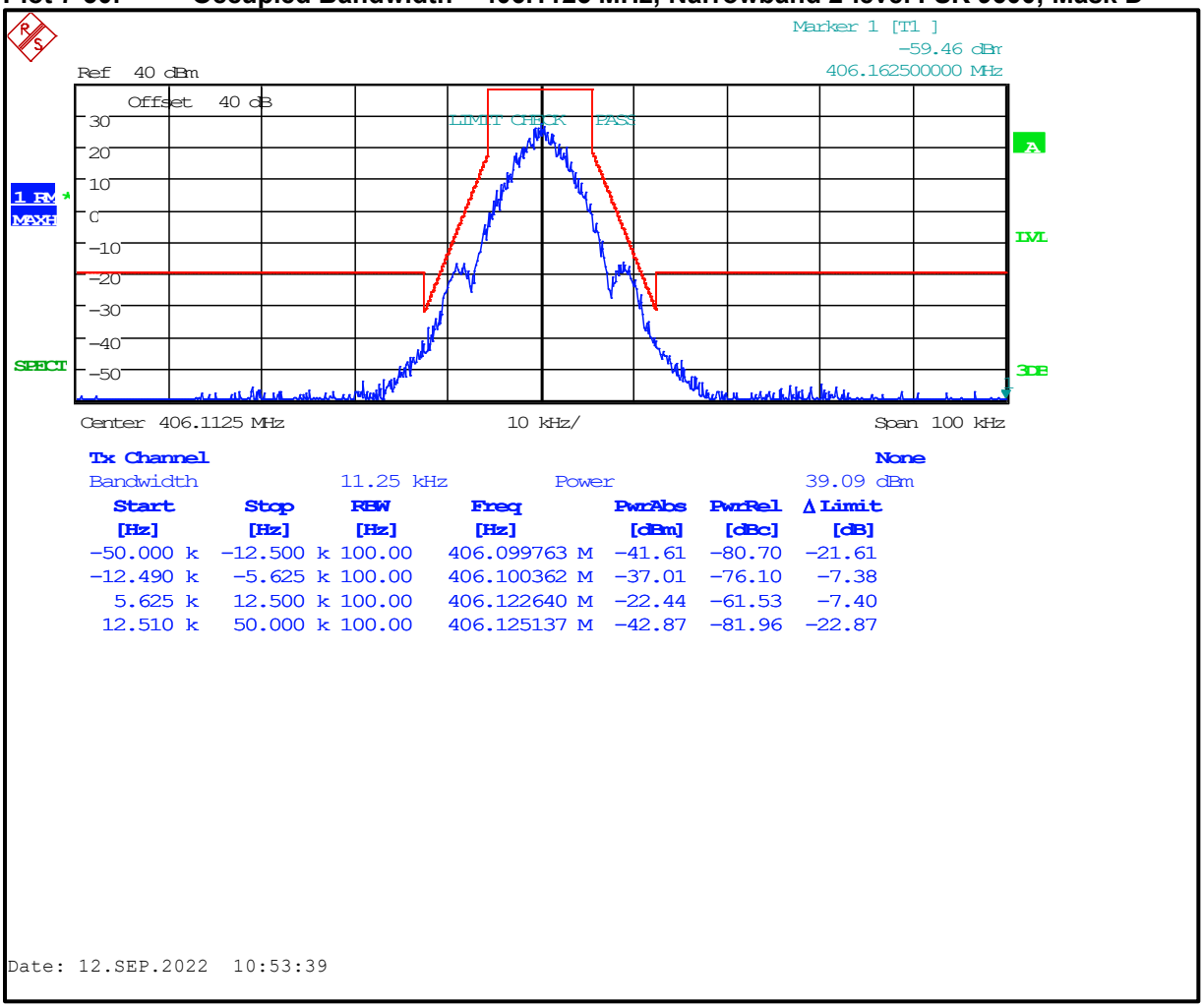
Plot 7-28: Occupied Bandwidth – 173.9875 MHz; Narrowband 2-level FSK 9600; Mask D



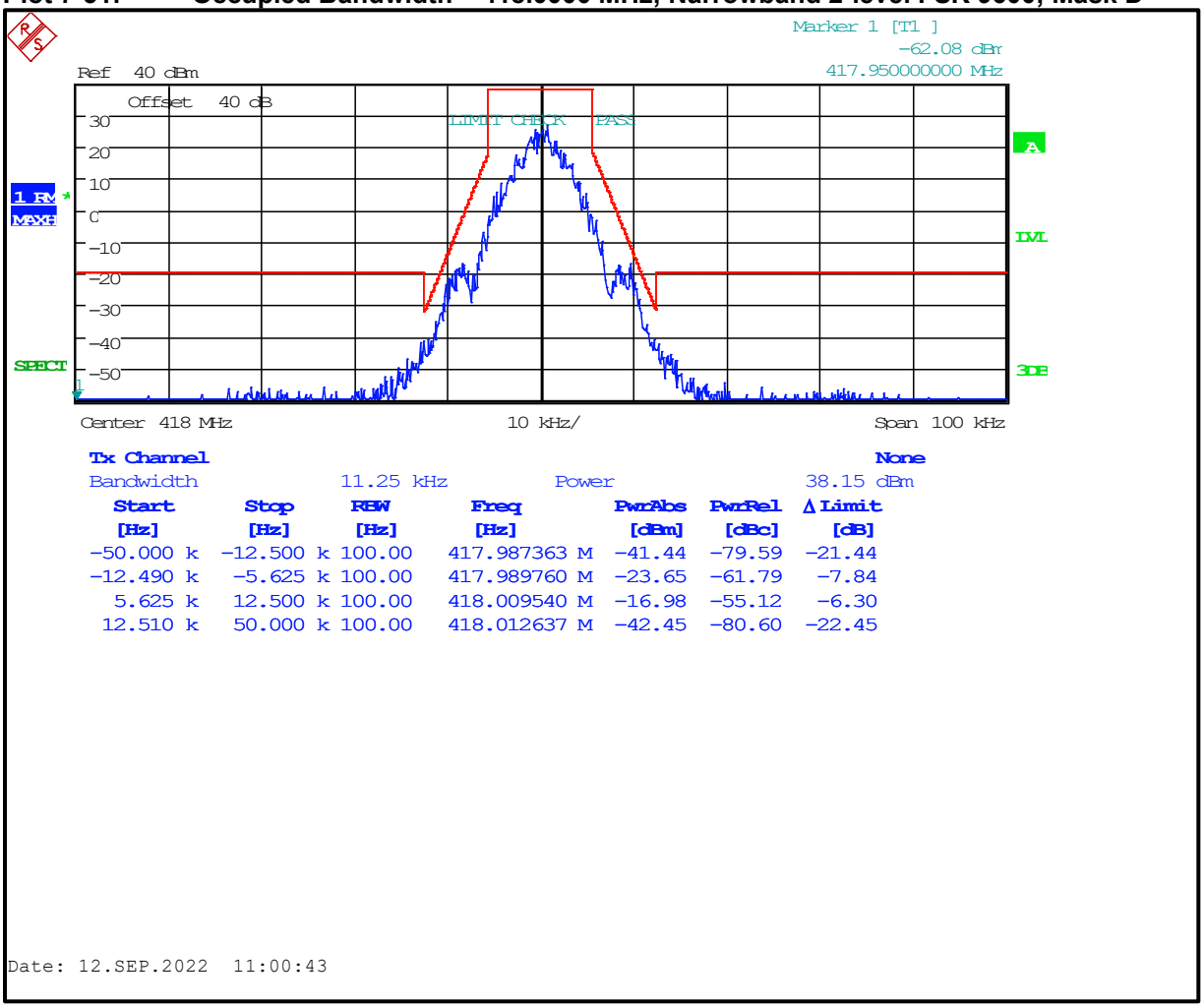
Plot 7-29: Occupied Bandwidth – 378.0125 MHz; Narrowband 2-level FSK 9600; Mask D



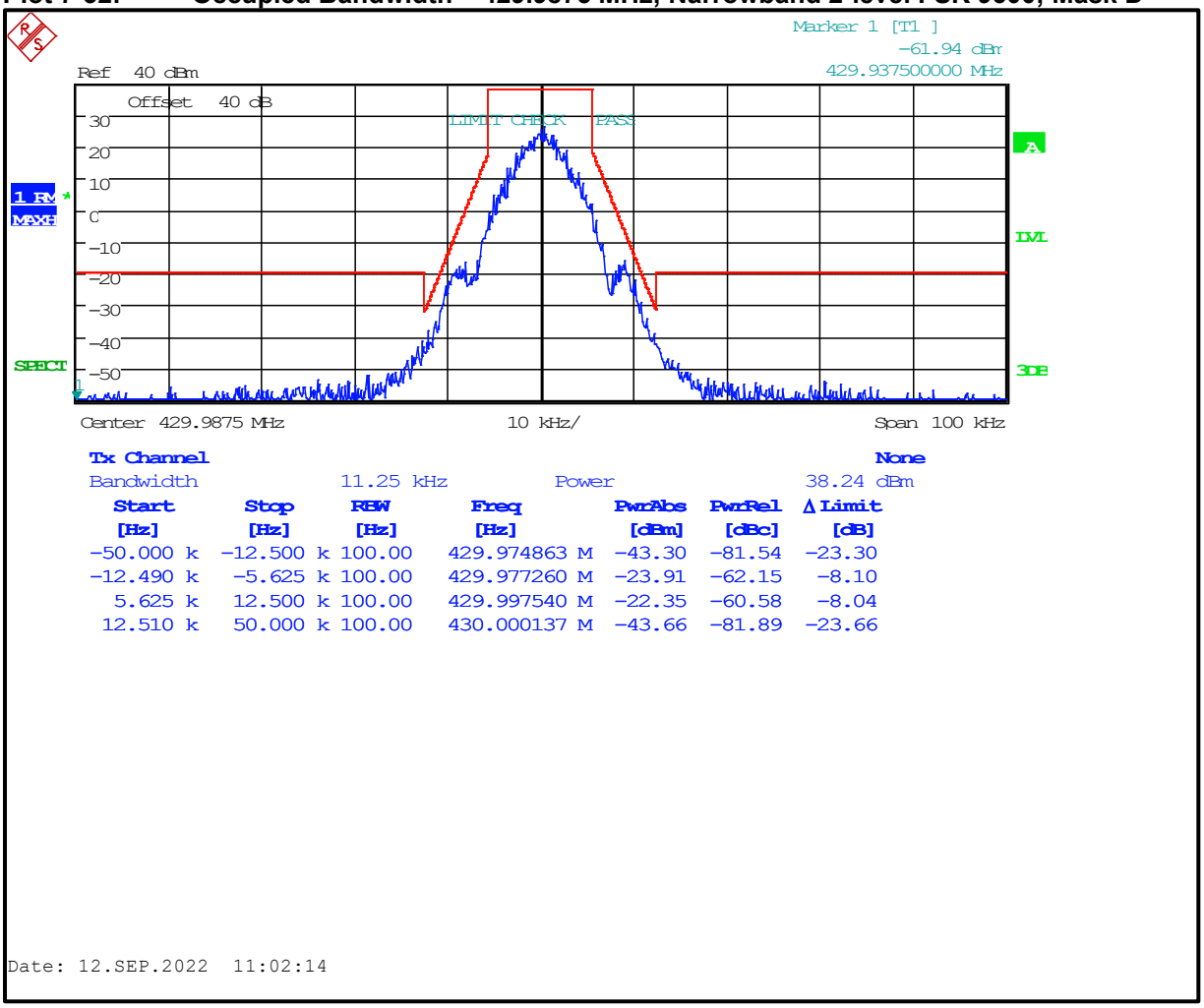
Plot 7-30: Occupied Bandwidth – 406.1125 MHz; Narrowband 2-level FSK 9600; Mask D



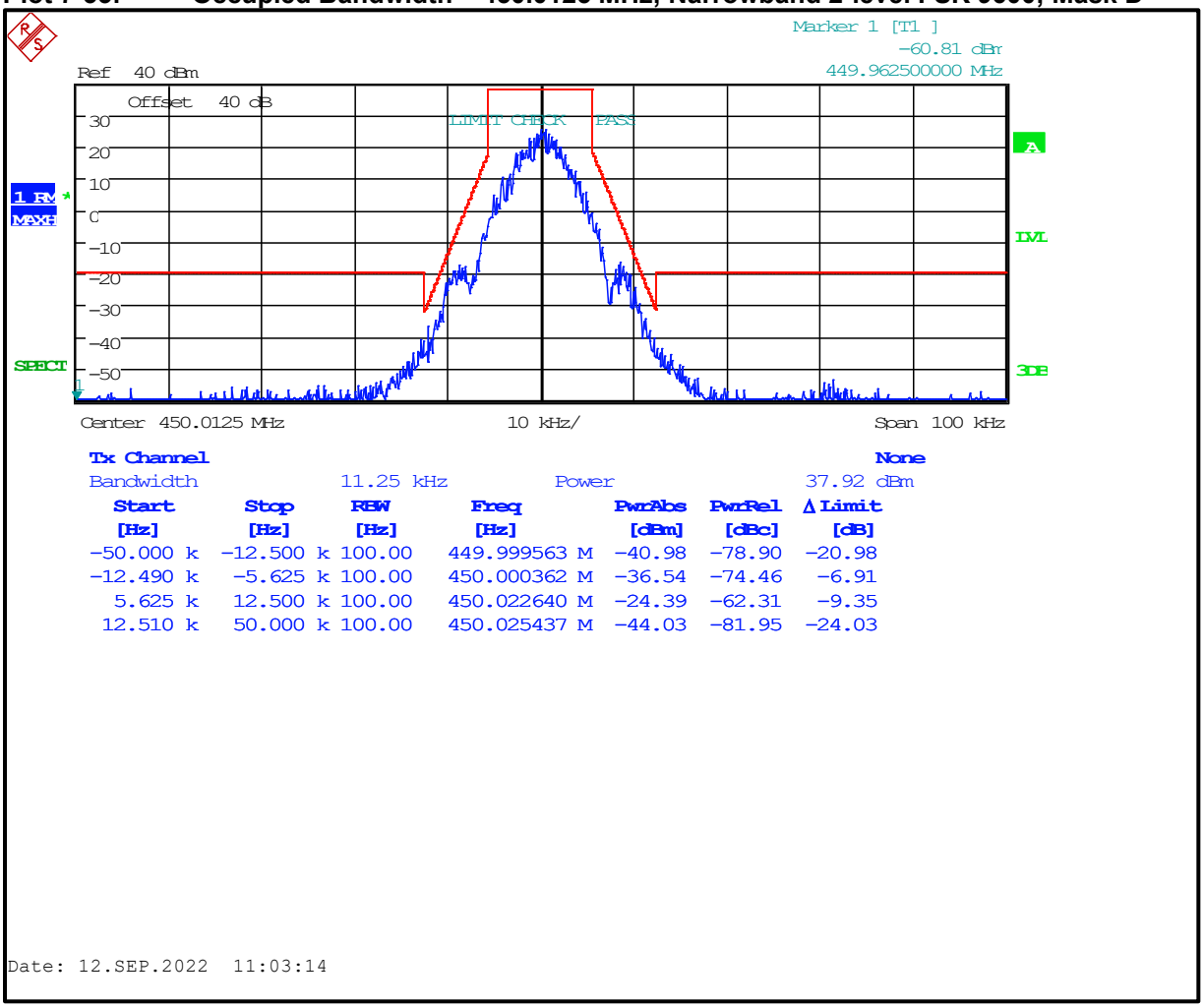
Plot 7-31: Occupied Bandwidth – 418.0000 MHz; Narrowband 2-level FSK 9600; Mask D



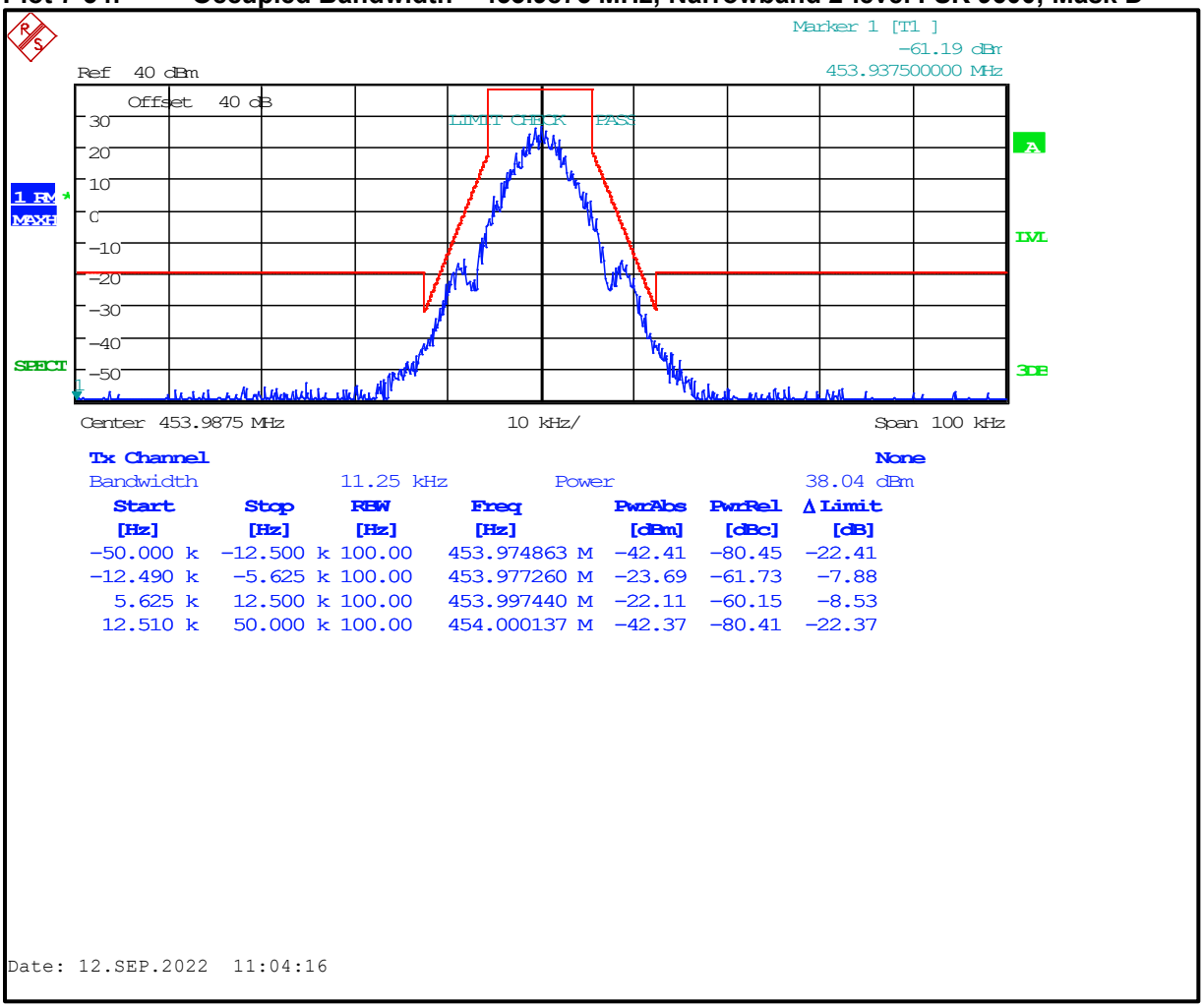
Plot 7-32: Occupied Bandwidth – 429.9875 MHz; Narrowband 2-level FSK 9600; Mask D



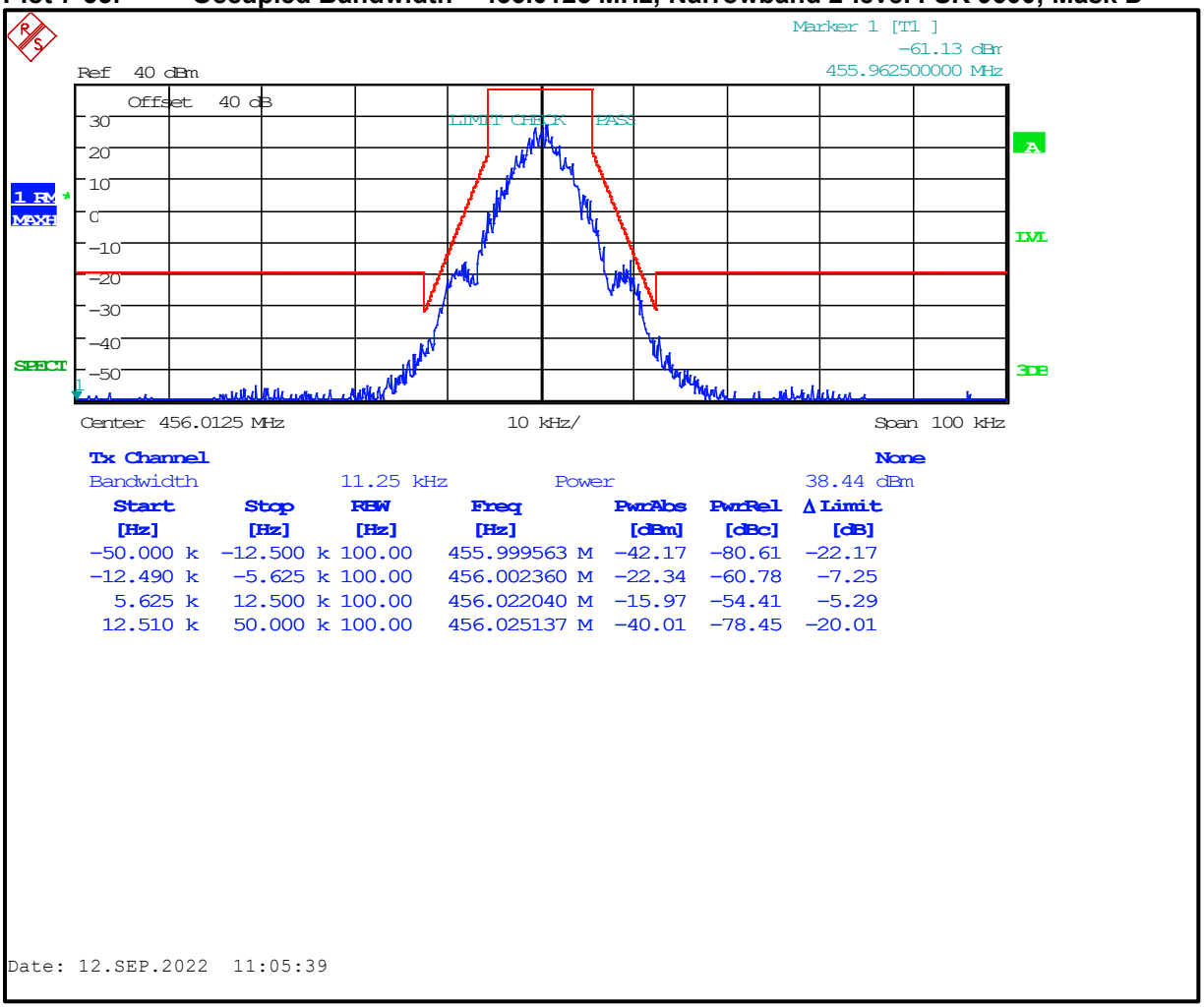
Plot 7-33: Occupied Bandwidth – 450.0125 MHz; Narrowband 2-level FSK 9600; Mask D



Plot 7-34: Occupied Bandwidth – 453.9875 MHz; Narrowband 2-level FSK 9600; Mask D



Plot 7-35: Occupied Bandwidth – 456.0125 MHz; Narrowband 2-level FSK 9600; Mask D



Tx Channel						None
Bandwidth		11.25 kHz	Power			38.44 dBm
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	Δ Limit [dB]
-50.000 k	-12.500 k	100.00	455.999563 M	-42.17	-80.61	-22.17
-12.490 k	-5.625 k	100.00	456.002360 M	-22.34	-60.78	-7.25
5.625 k	12.500 k	100.00	456.022040 M	-15.97	-54.41	-5.29
12.510 k	50.000 k	100.00	456.025137 M	-40.01	-78.45	-20.01

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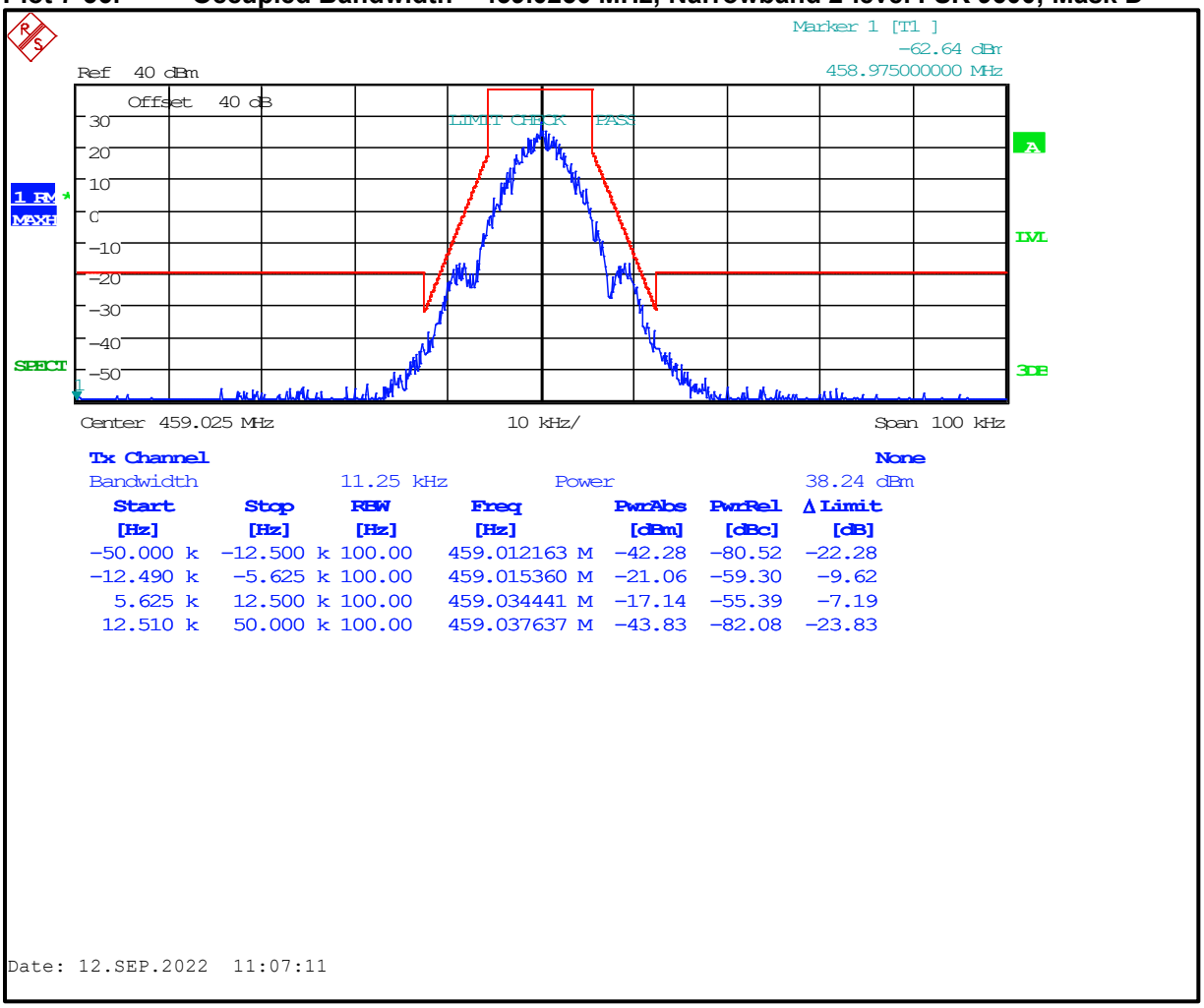
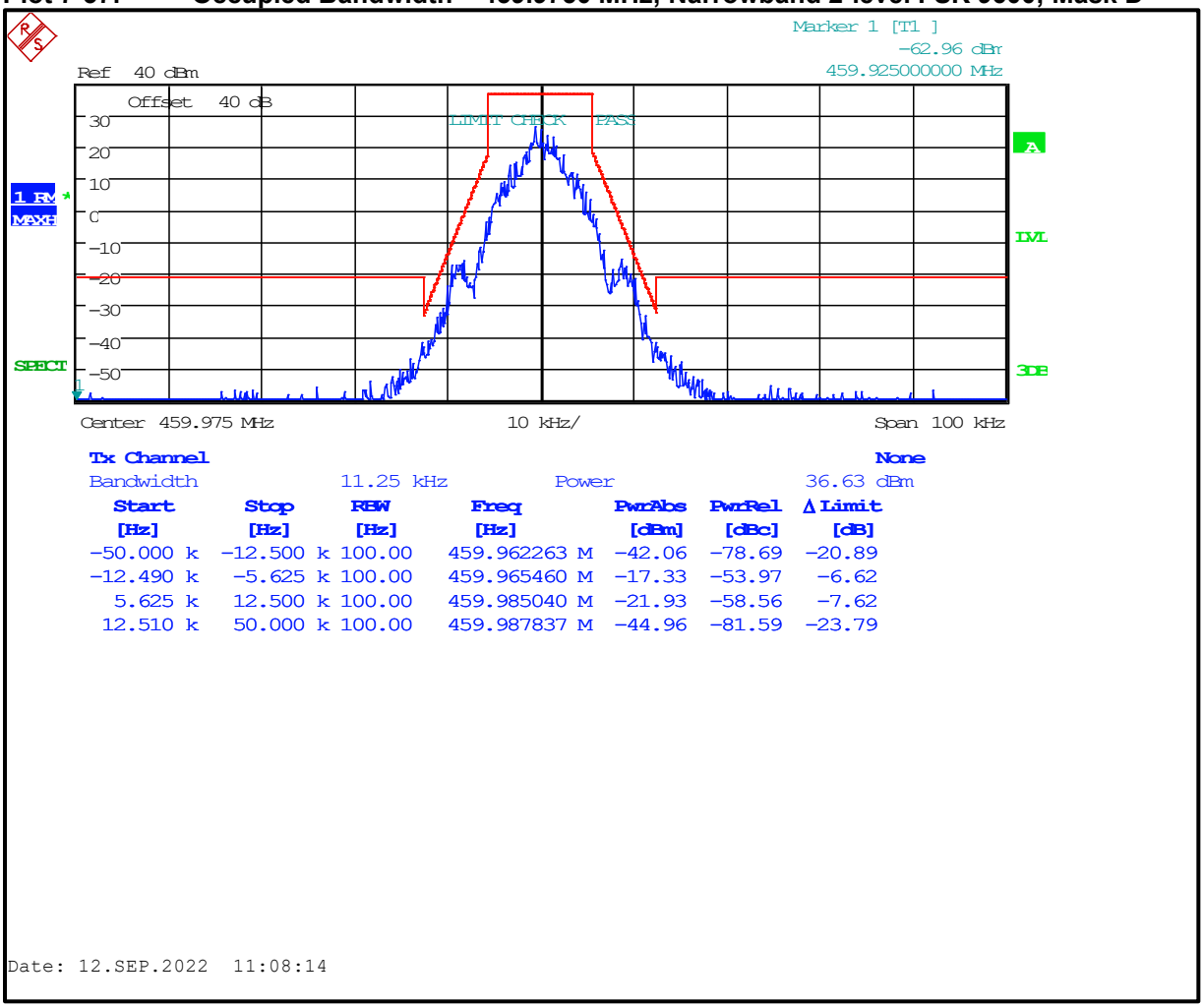
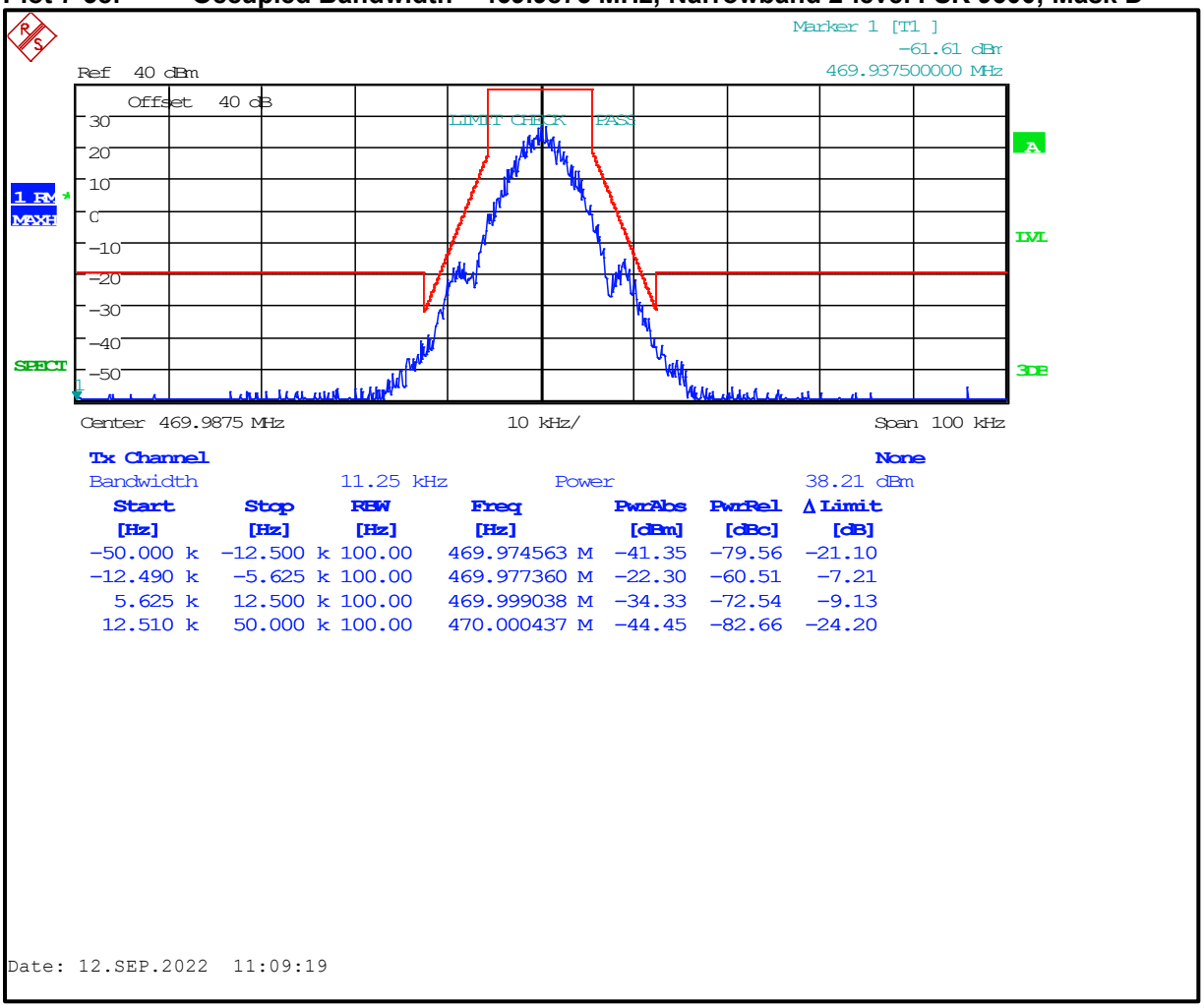
Plot 7-36: Occupied Bandwidth – 459.0250 MHz; Narrowband 2-level FSK 9600; Mask D



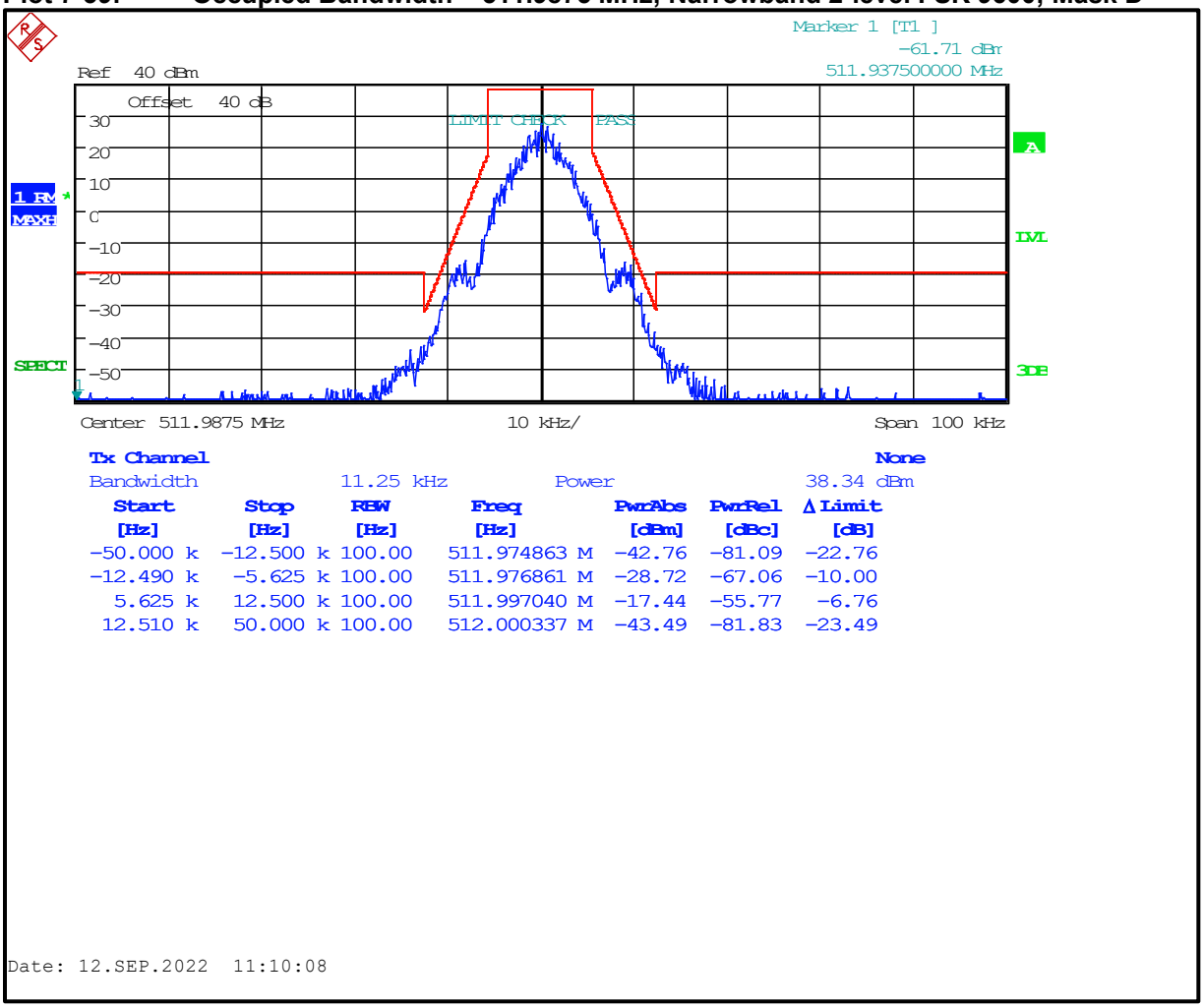
Plot 7-37: Occupied Bandwidth – 459.9750 MHz; Narrowband 2-level FSK 9600; Mask D



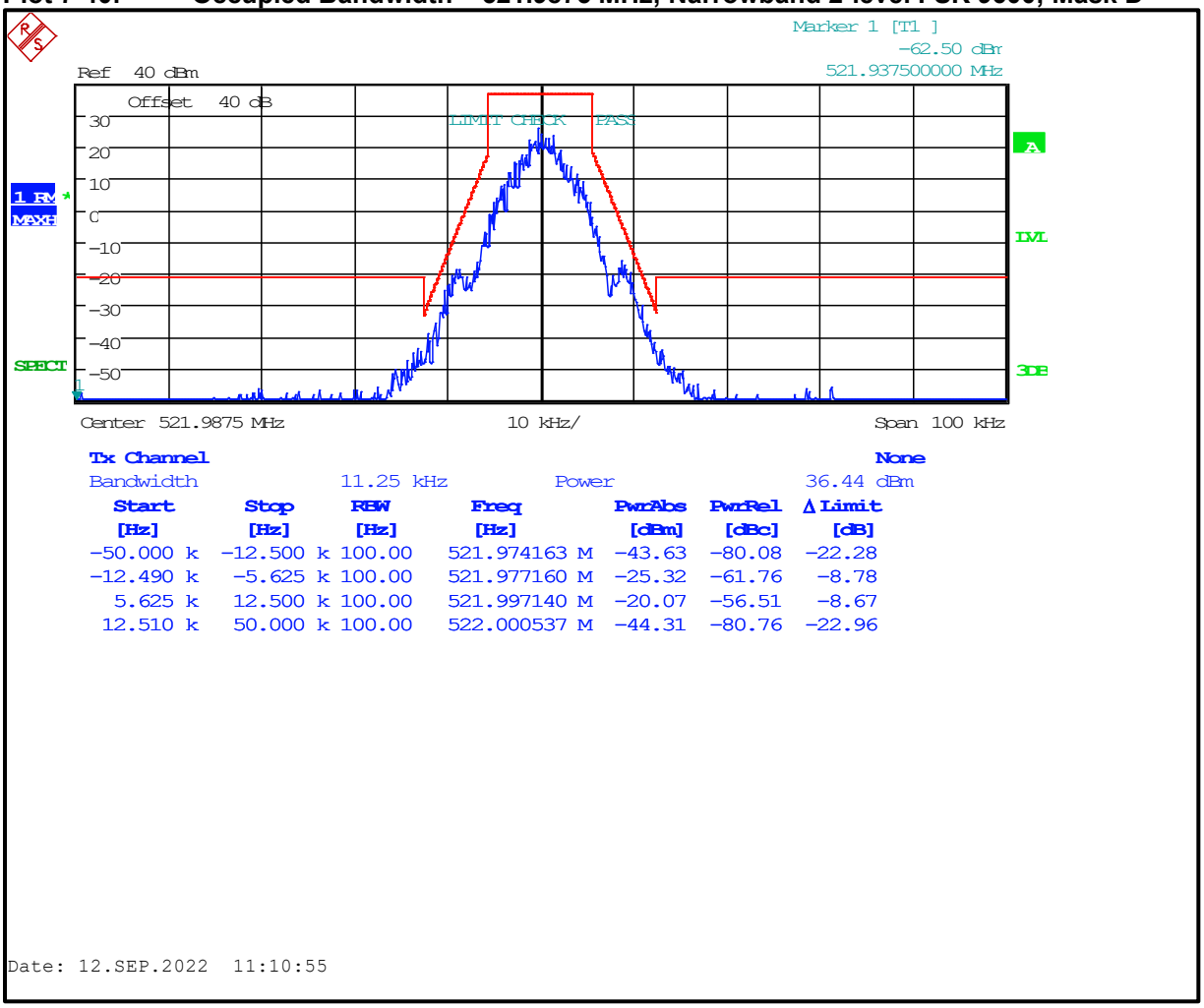
Plot 7-38: Occupied Bandwidth – 469.9875 MHz; Narrowband 2-level FSK 9600; Mask D



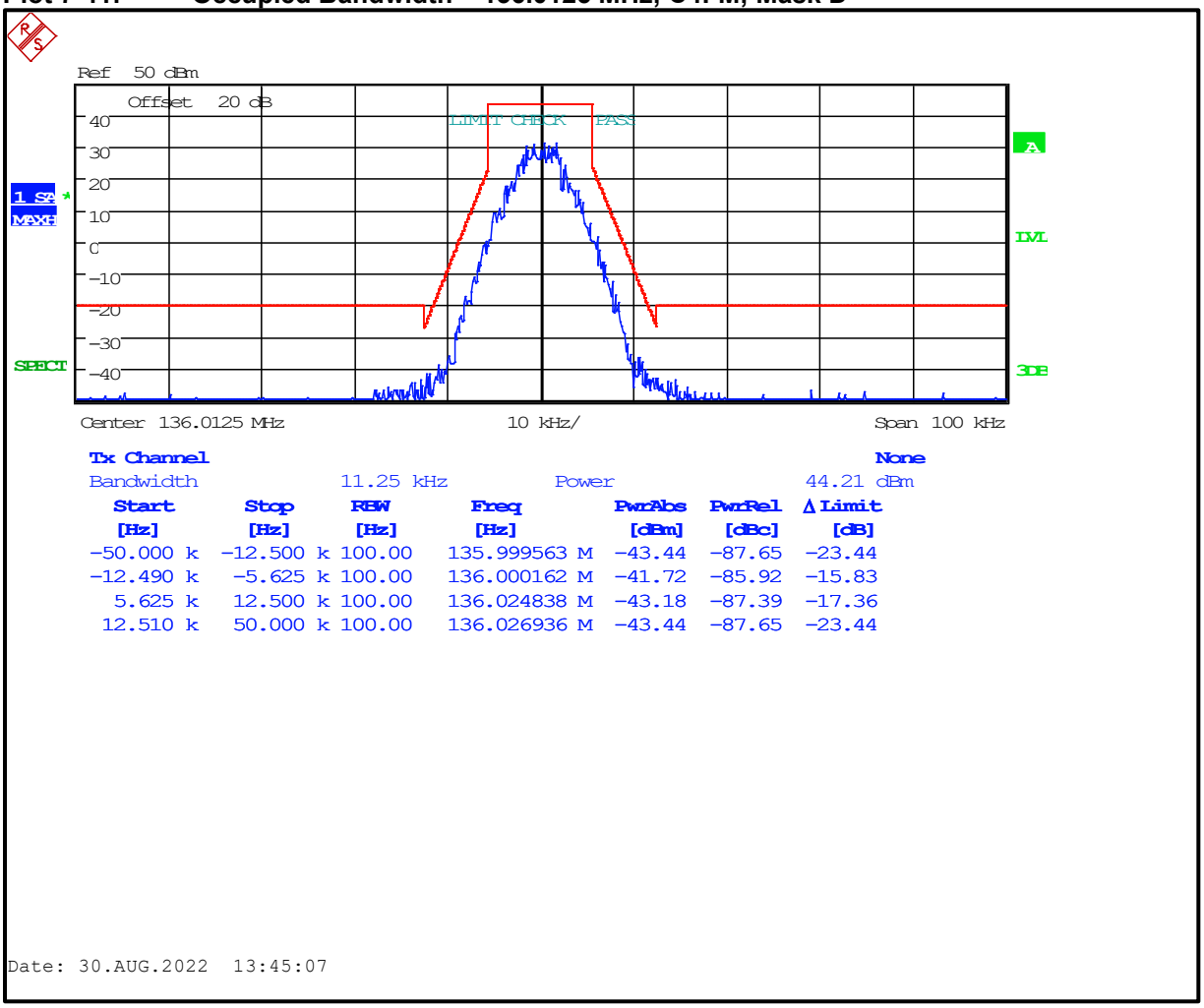
Plot 7-39: Occupied Bandwidth – 511.9875 MHz; Narrowband 2-level FSK 9600; Mask D



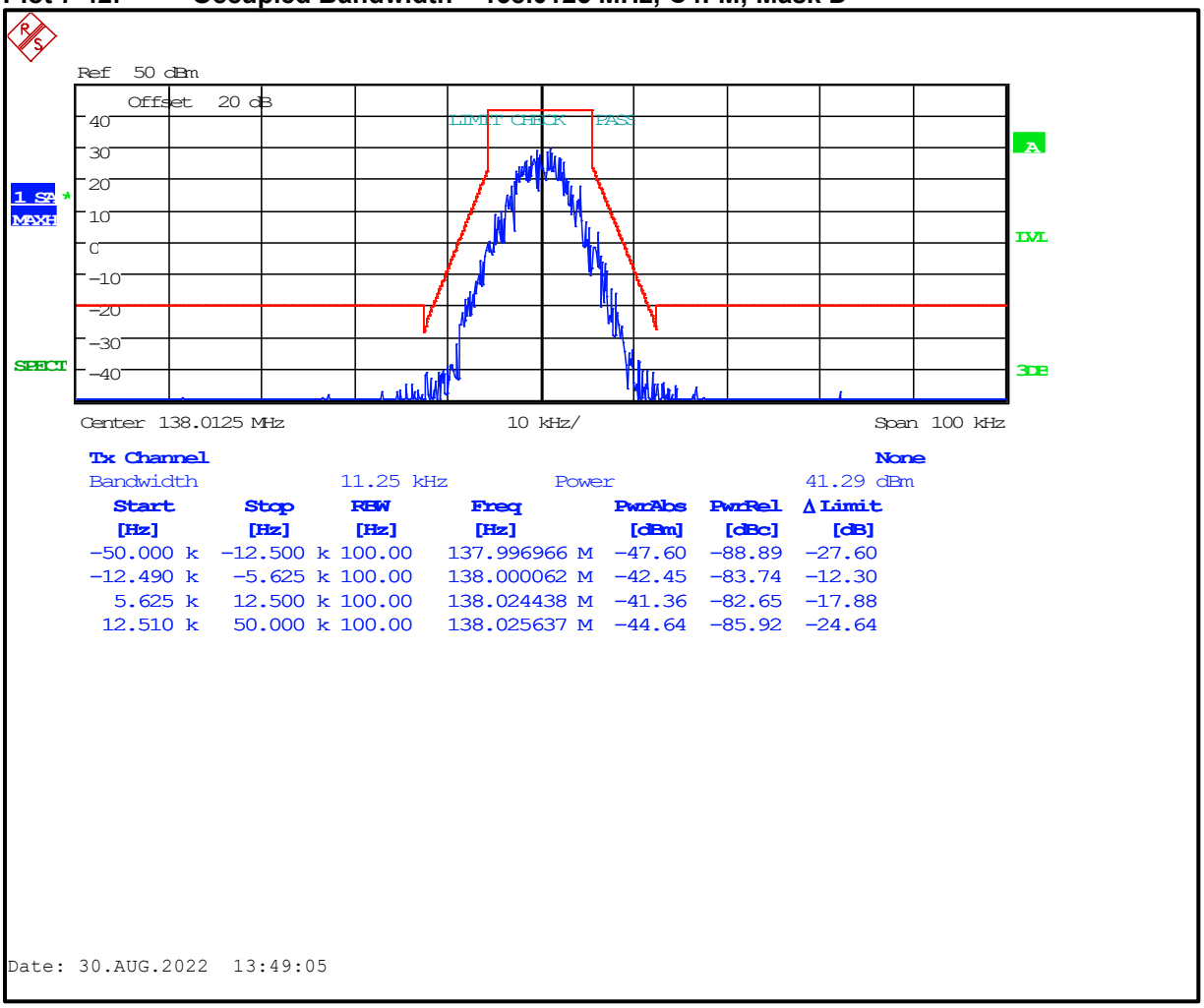
Plot 7-40: Occupied Bandwidth – 521.9875 MHz; Narrowband 2-level FSK 9600; Mask D



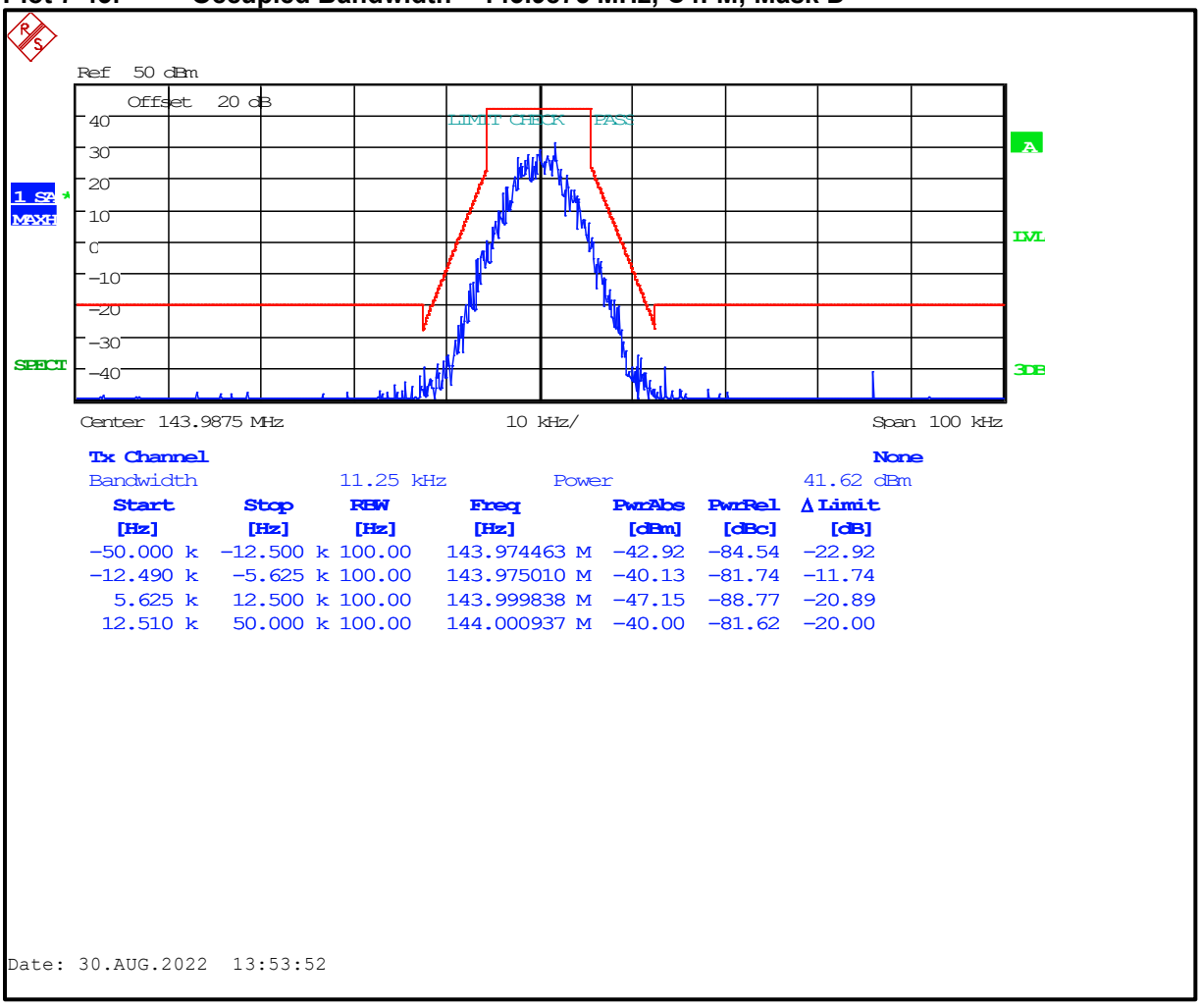
Plot 7-41: Occupied Bandwidth – 136.0125 MHz; C4FM; Mask D



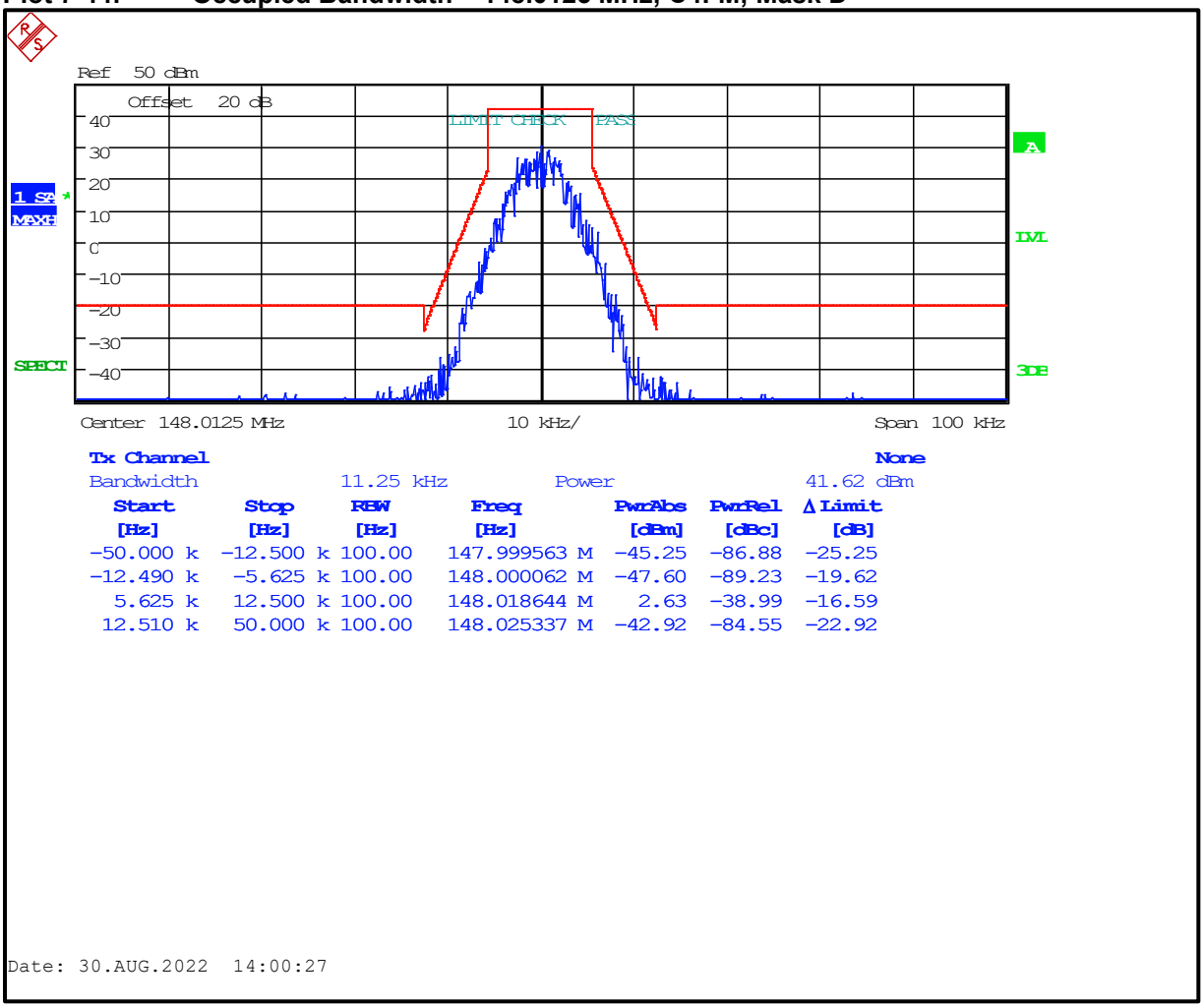
Plot 7-42: Occupied Bandwidth – 138.0125 MHz; C4FM; Mask D



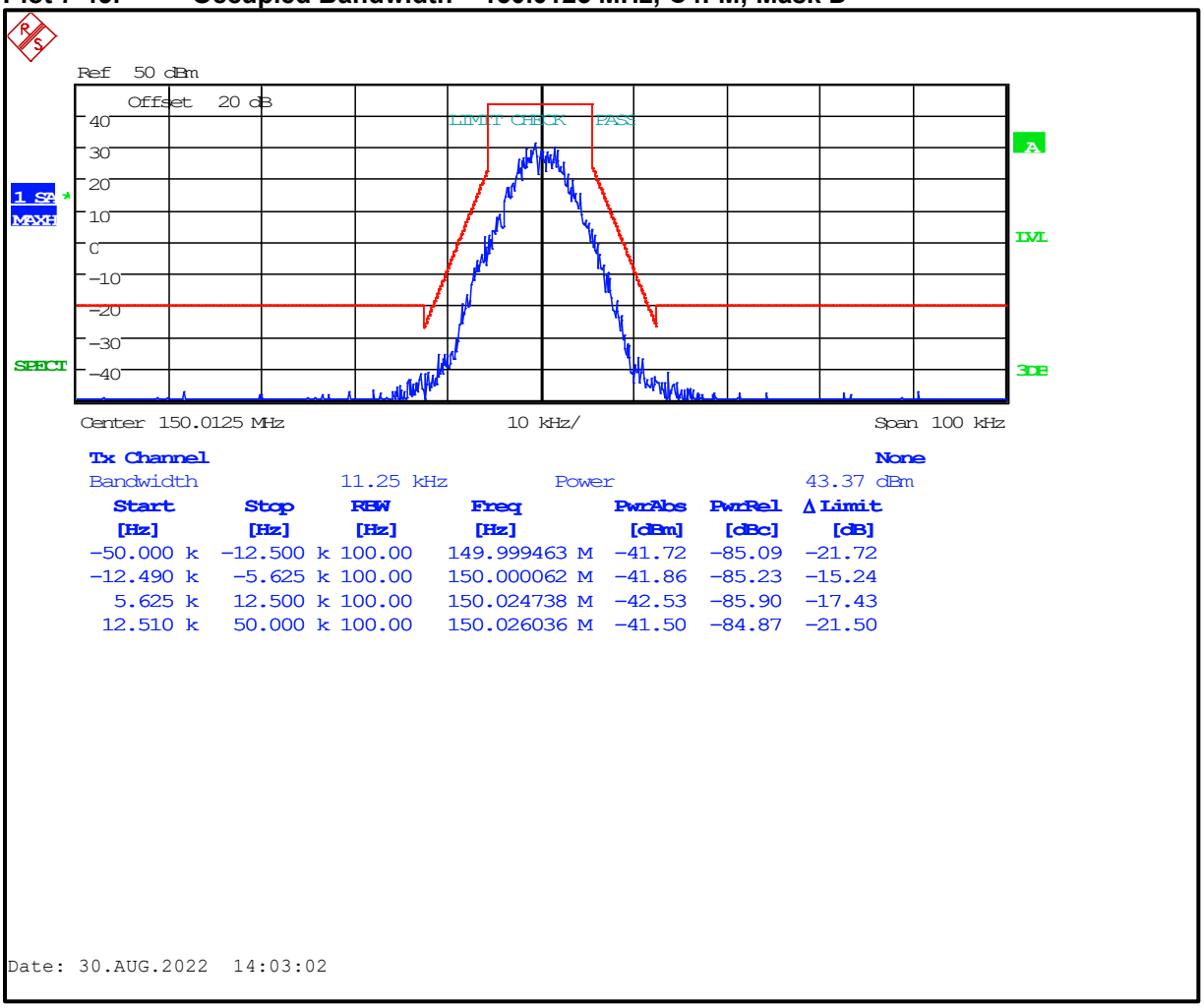
Plot 7-43: Occupied Bandwidth – 143.9875 MHz; C4FM; Mask D



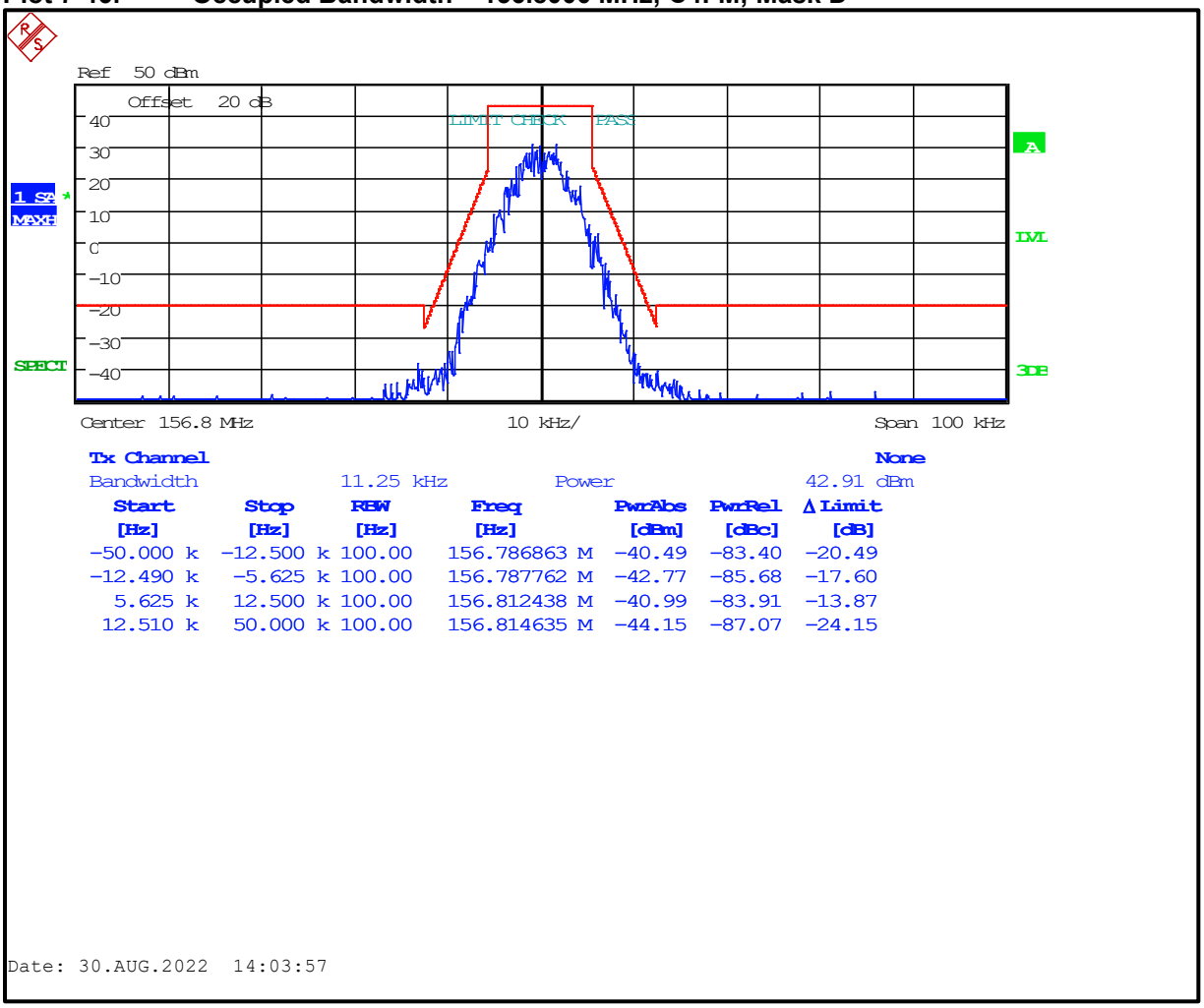
Plot 7-44: Occupied Bandwidth – 148.0125 MHz; C4FM; Mask D



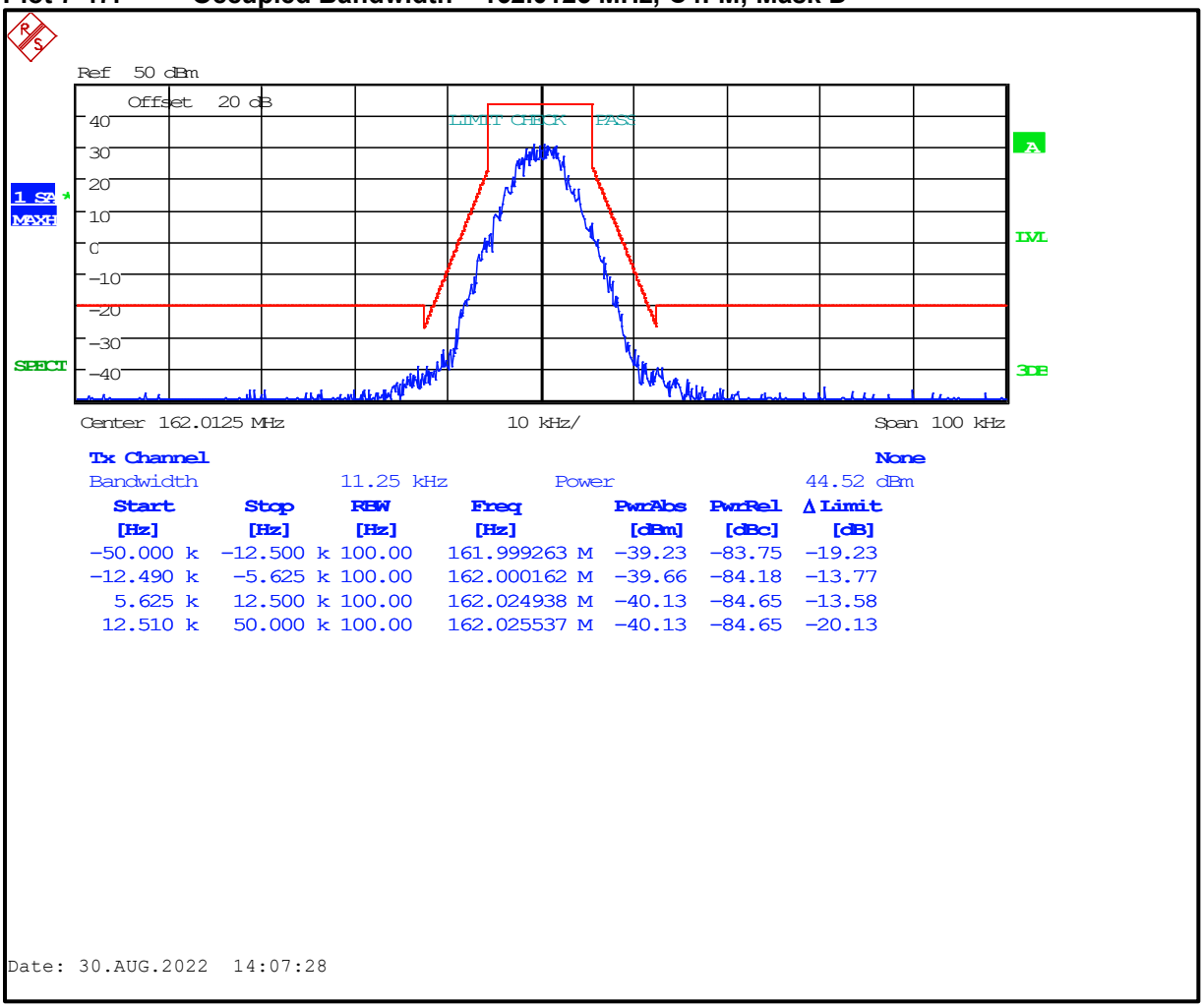
Plot 7-45: Occupied Bandwidth – 150.0125 MHz; C4FM; Mask D



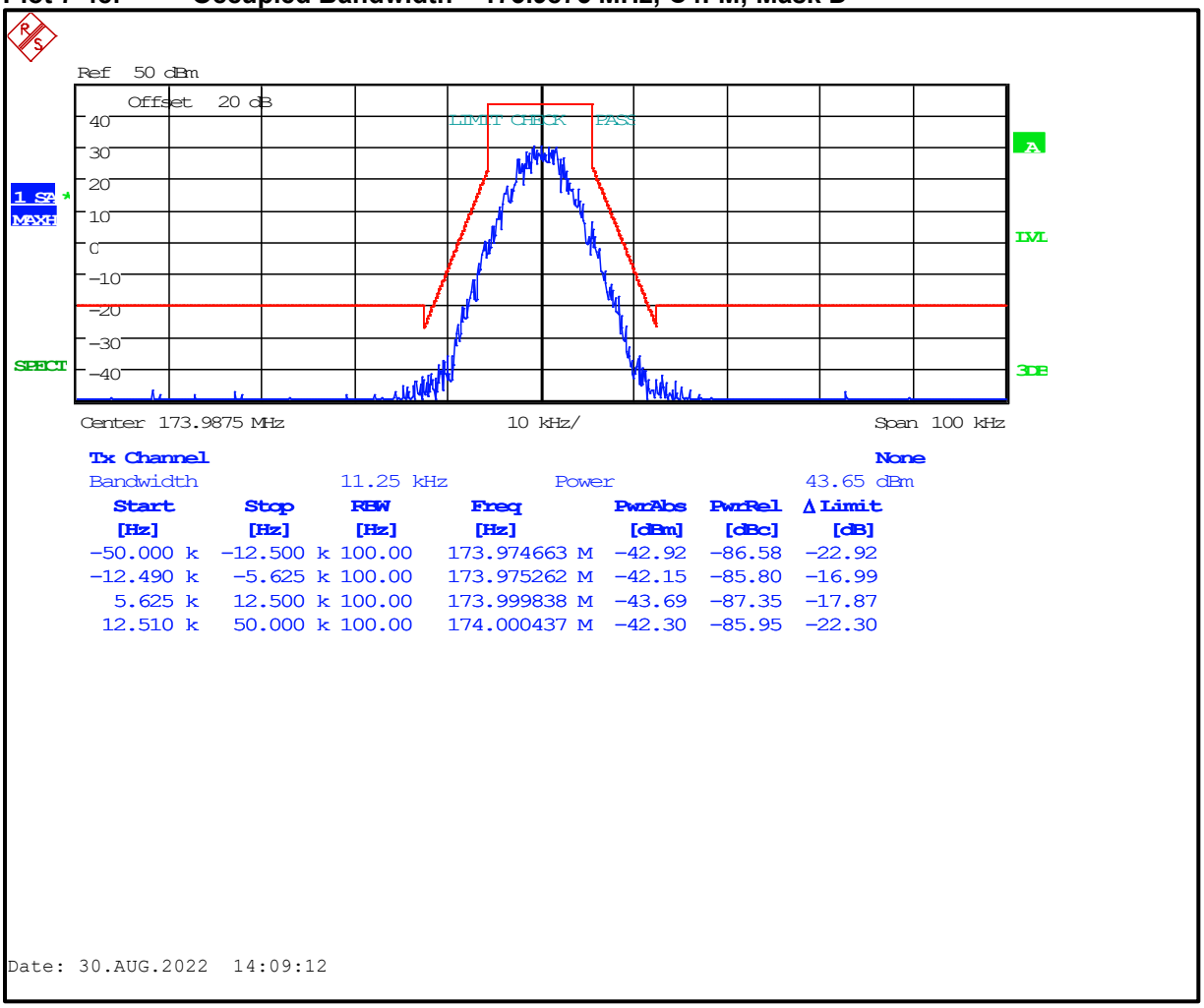
Plot 7-46: Occupied Bandwidth – 156.8000 MHz; C4FM; Mask D



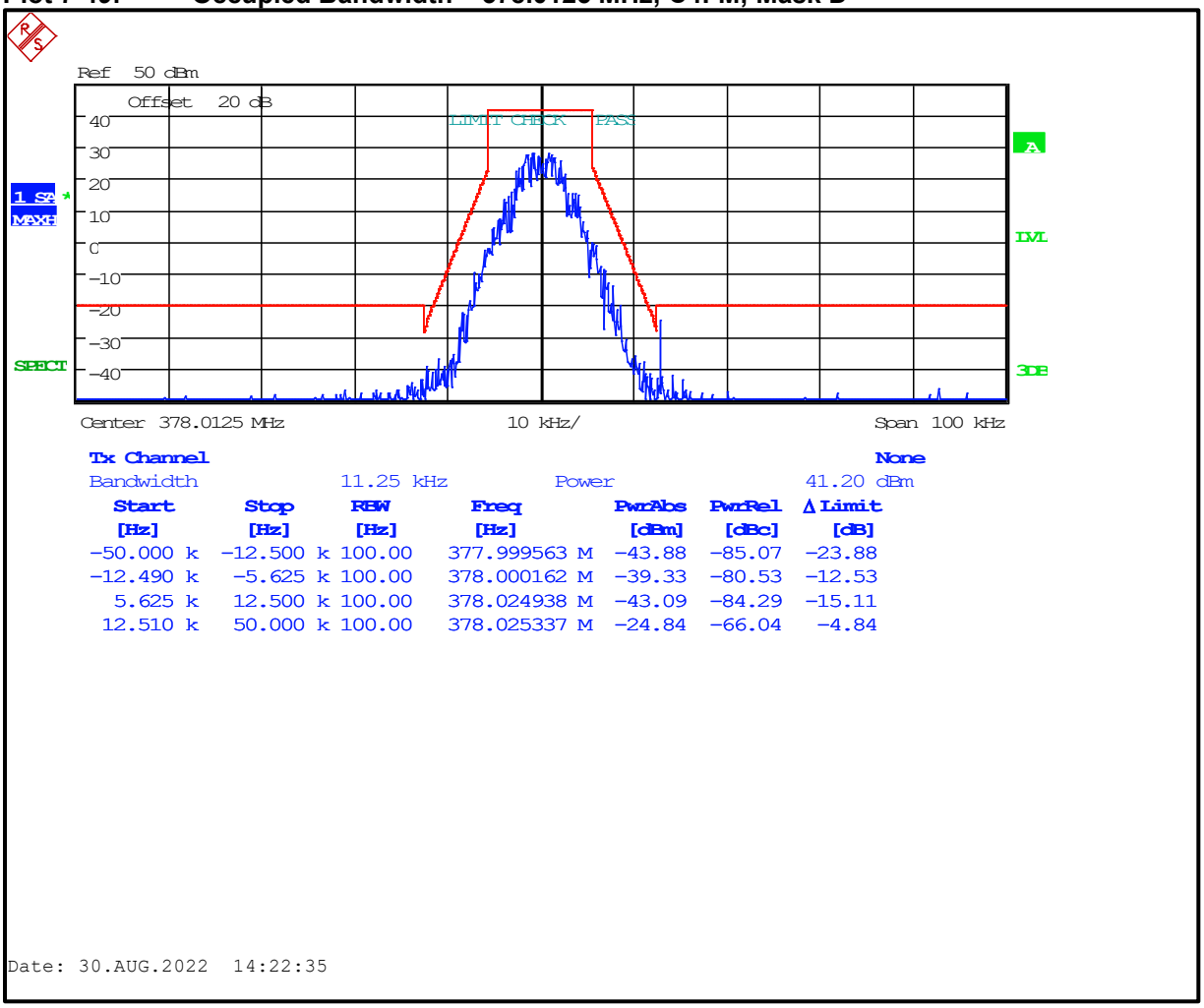
Plot 7-47: Occupied Bandwidth – 162.0125 MHz; C4FM; Mask D



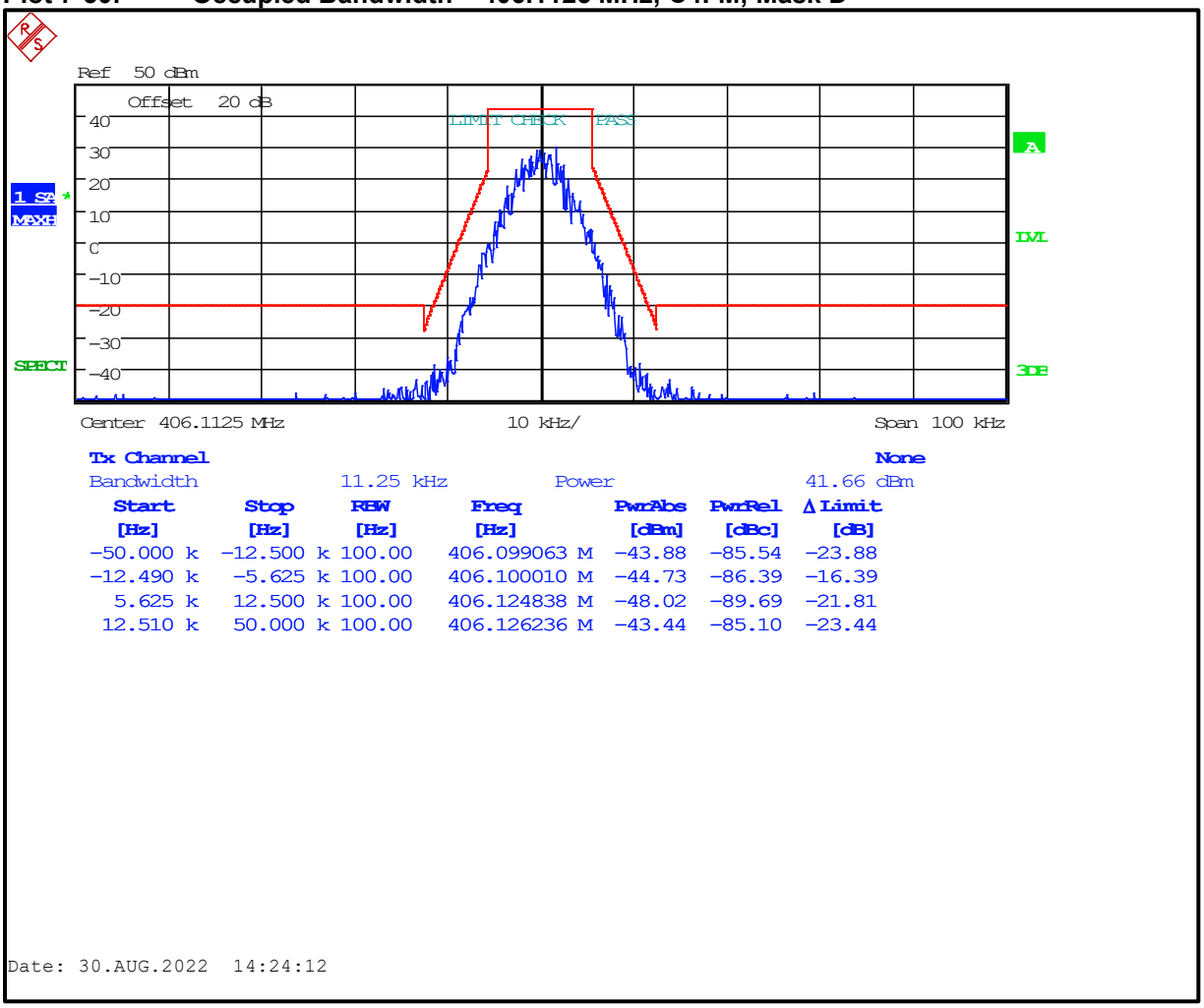
Plot 7-48: Occupied Bandwidth – 173.9875 MHz; C4FM; Mask D



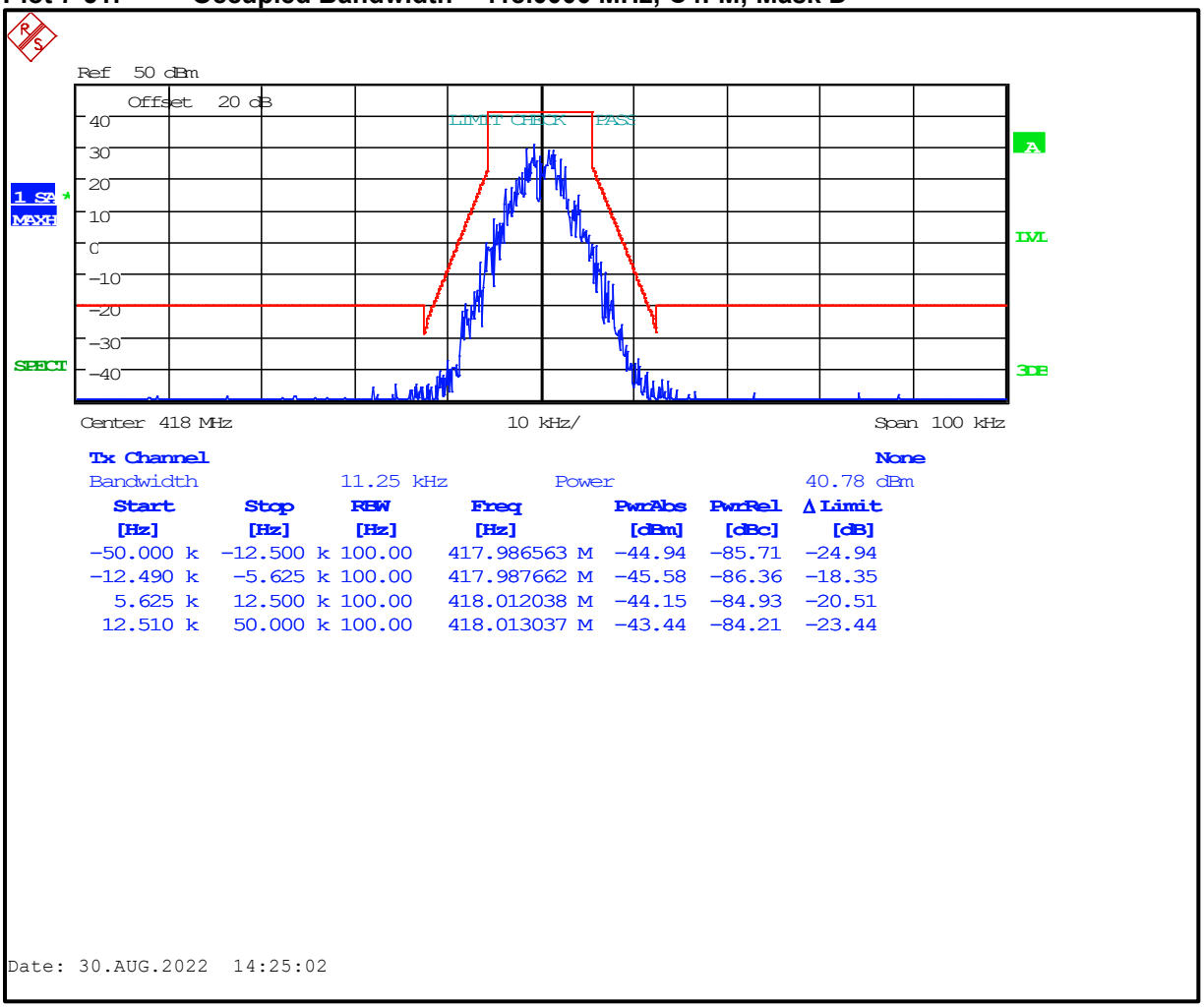
Plot 7-49: Occupied Bandwidth – 378.0125 MHz; C4FM; Mask D



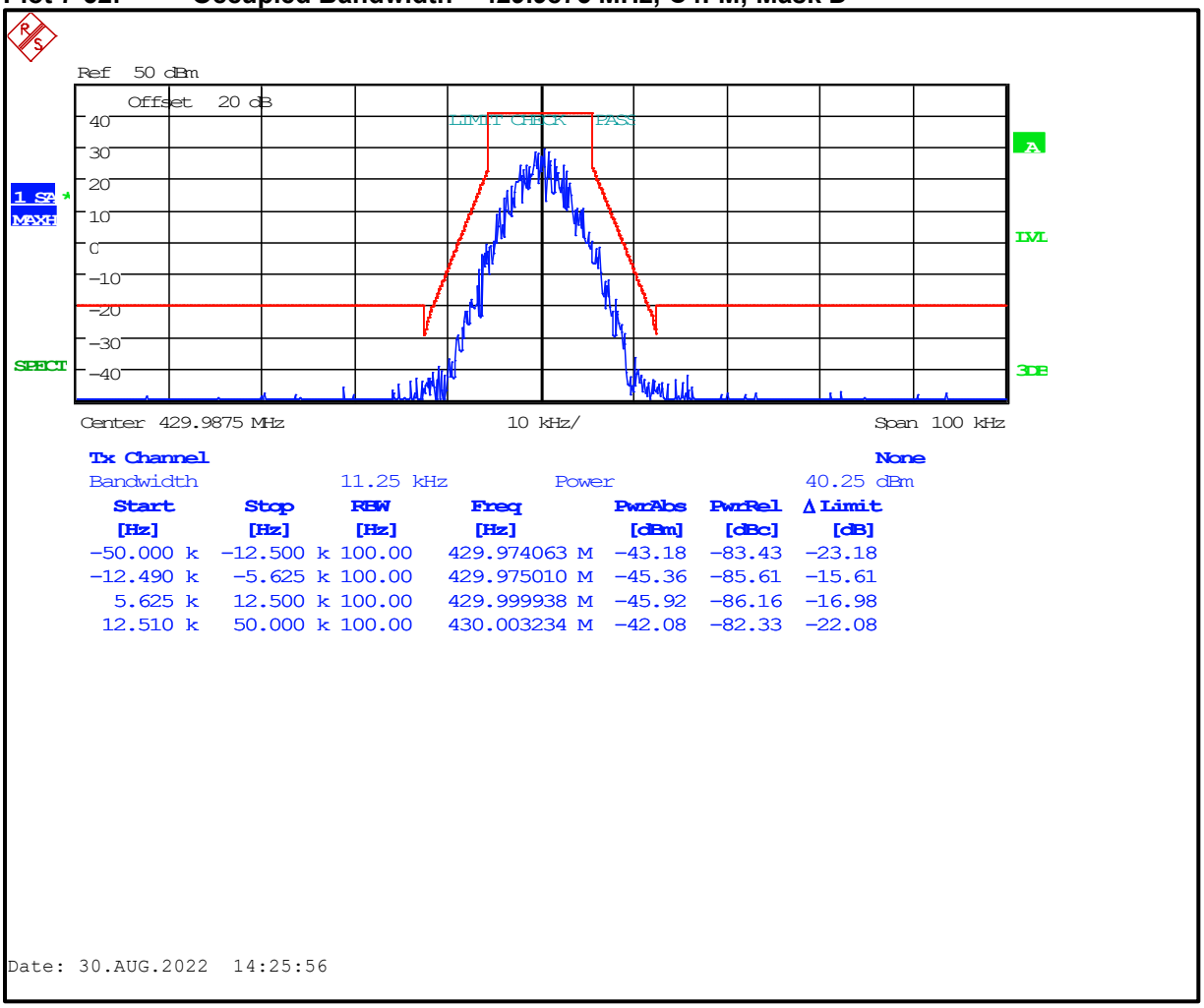
Plot 7-50: Occupied Bandwidth – 406.1125 MHz; C4FM; Mask D



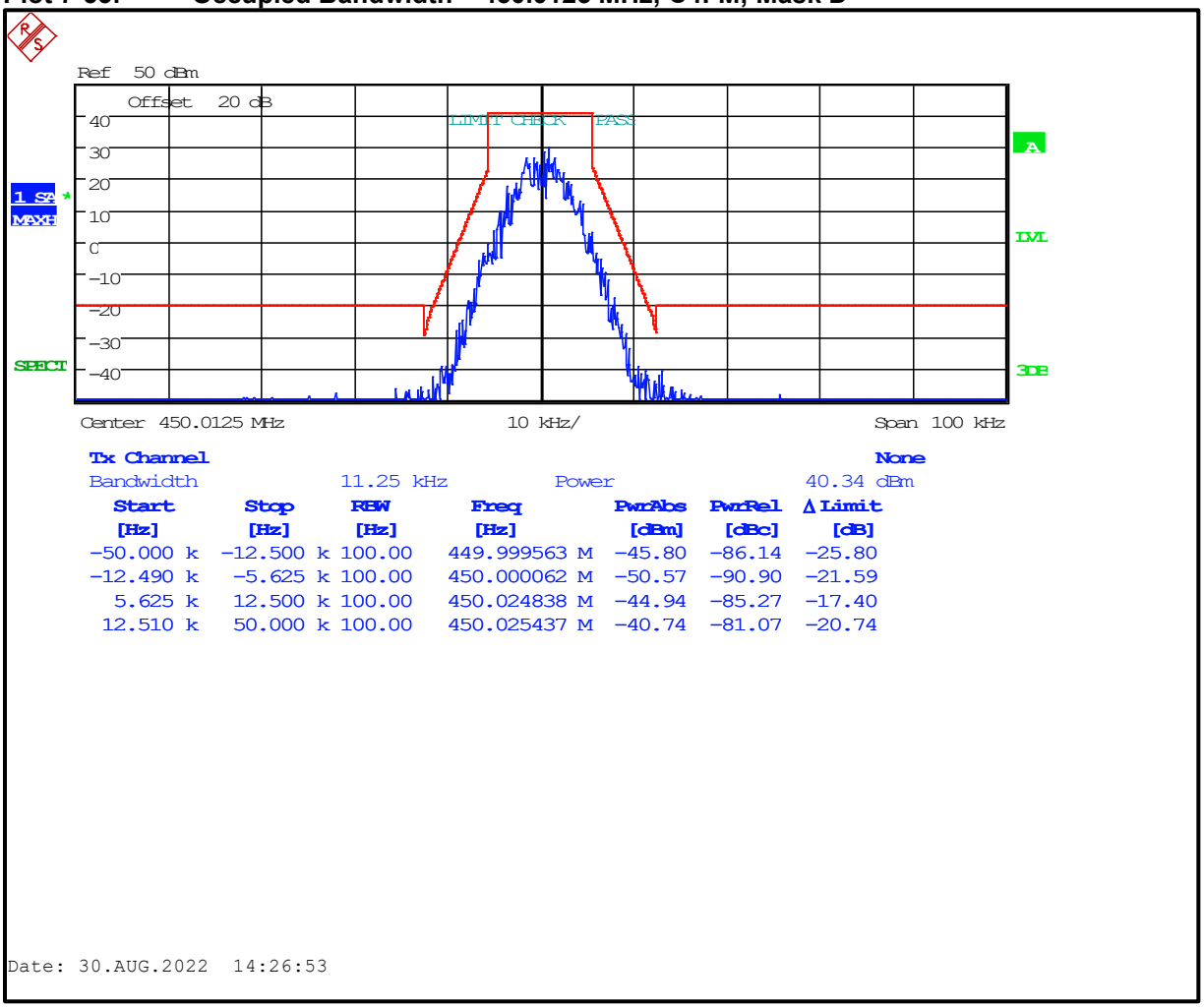
Plot 7-51: Occupied Bandwidth – 418.0000 MHz; C4FM; Mask D



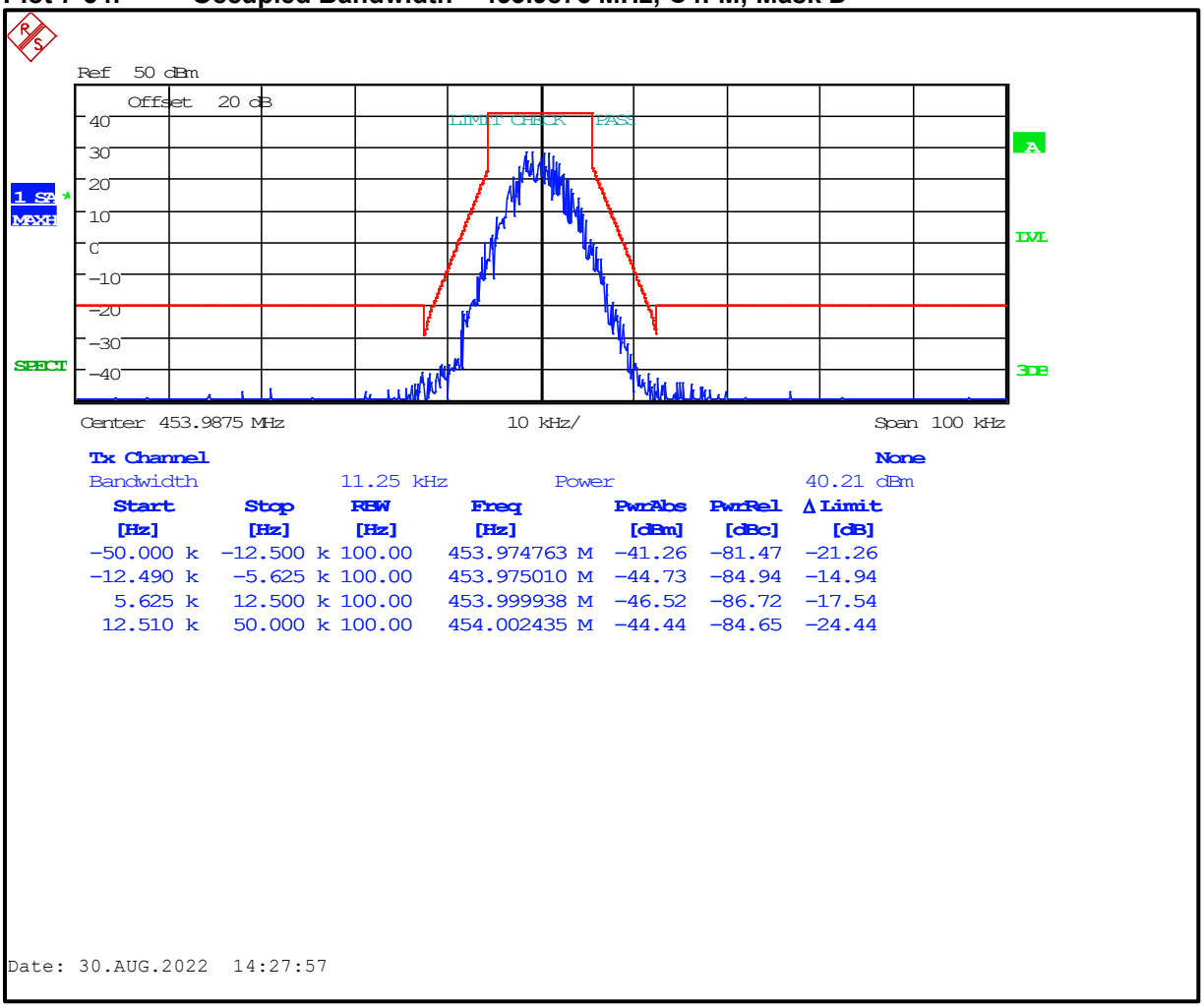
Plot 7-52: Occupied Bandwidth – 429.9875 MHz; C4FM; Mask D



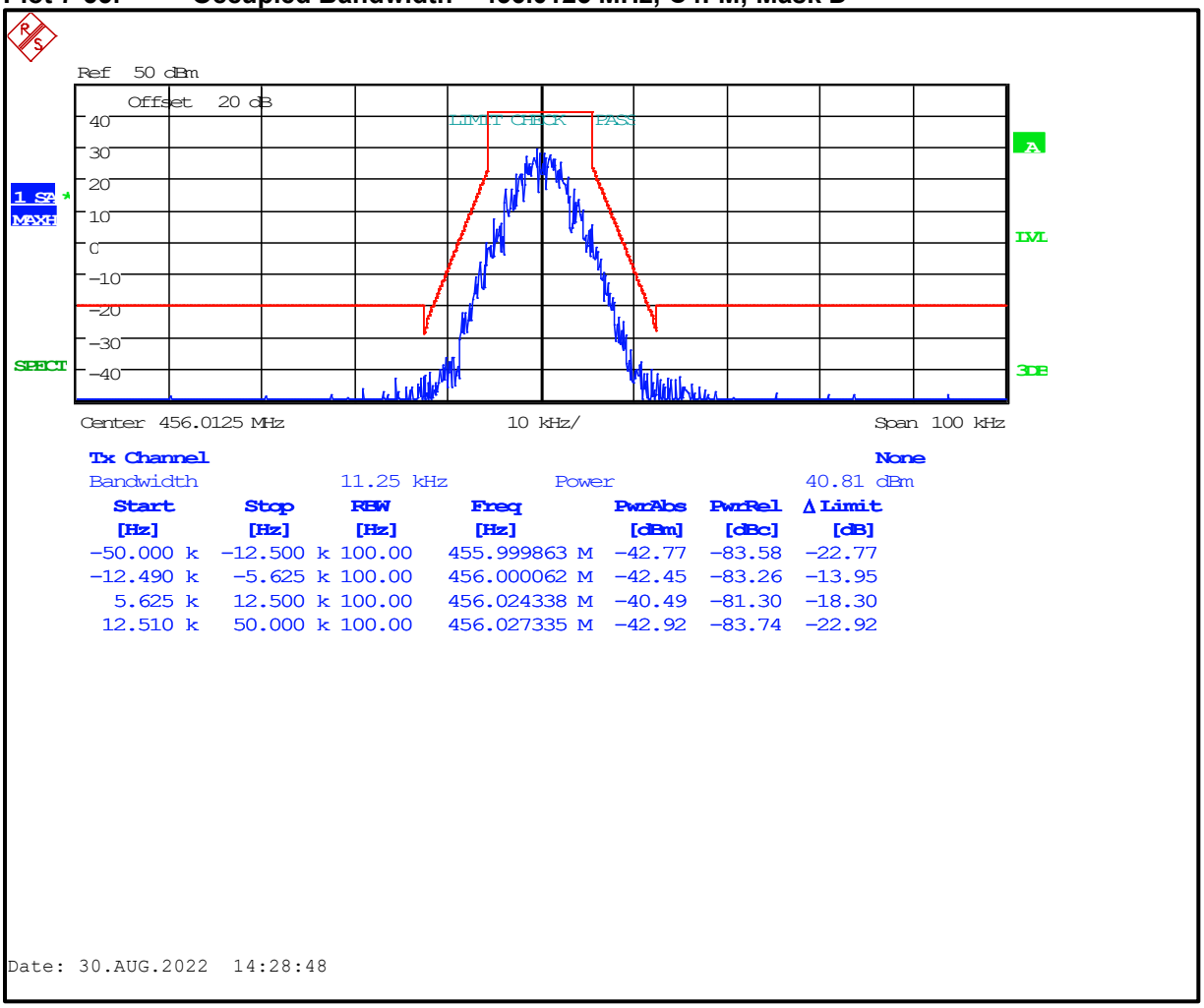
Plot 7-53: Occupied Bandwidth – 450.0125 MHz; C4FM; Mask D



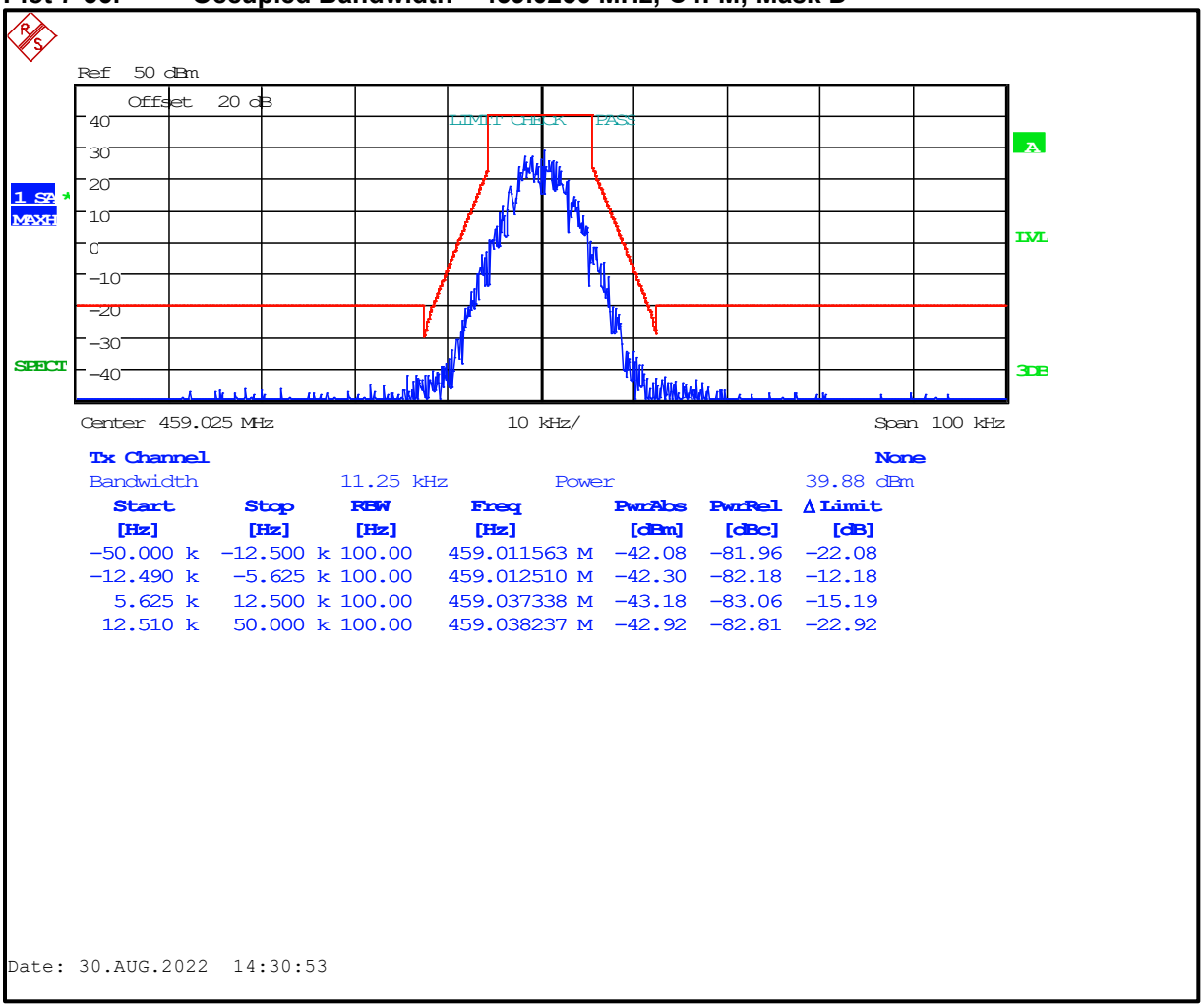
Plot 7-54: Occupied Bandwidth – 453.9875 MHz; C4FM; Mask D



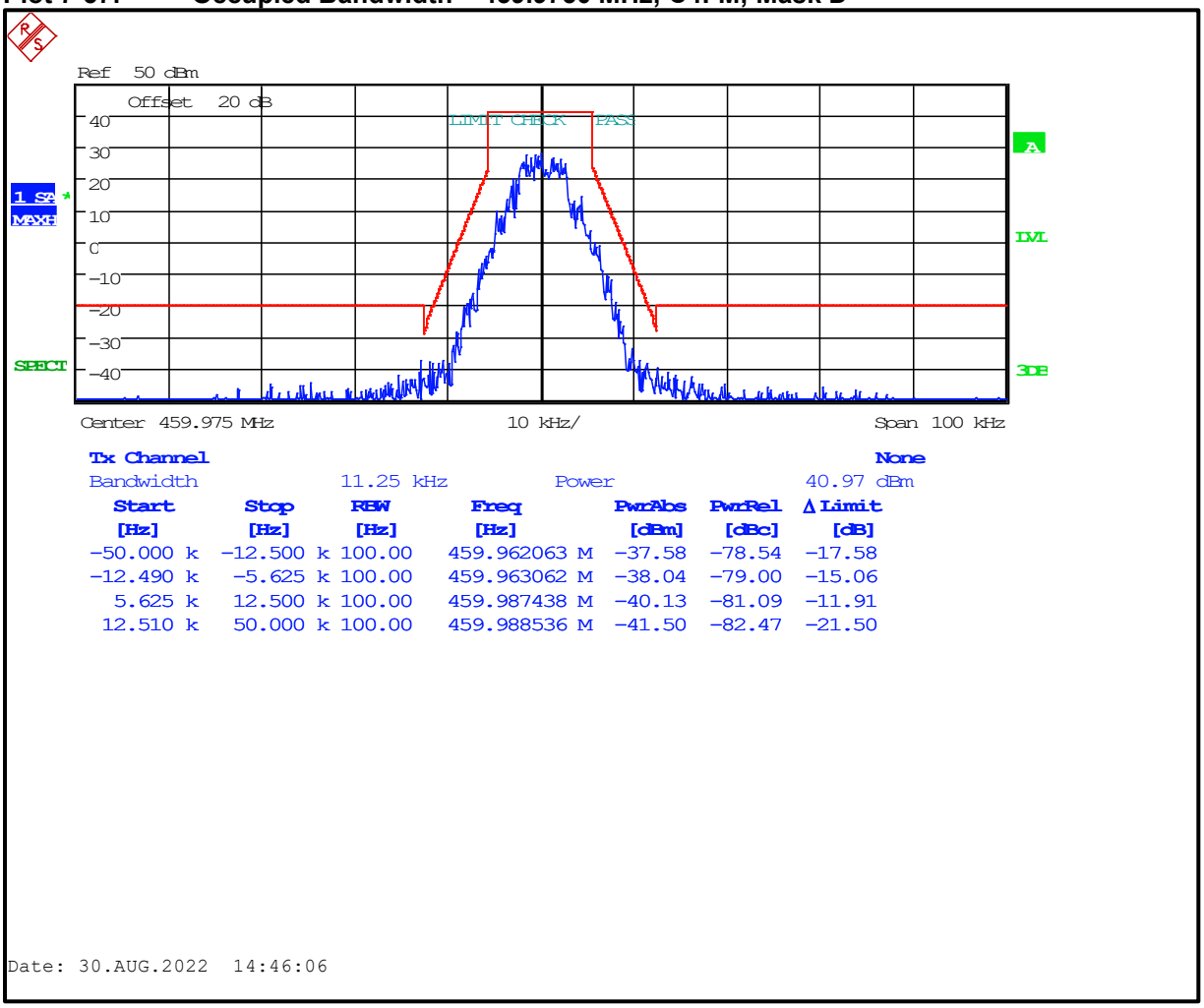
Plot 7-55: Occupied Bandwidth – 456.0125 MHz; C4FM; Mask D



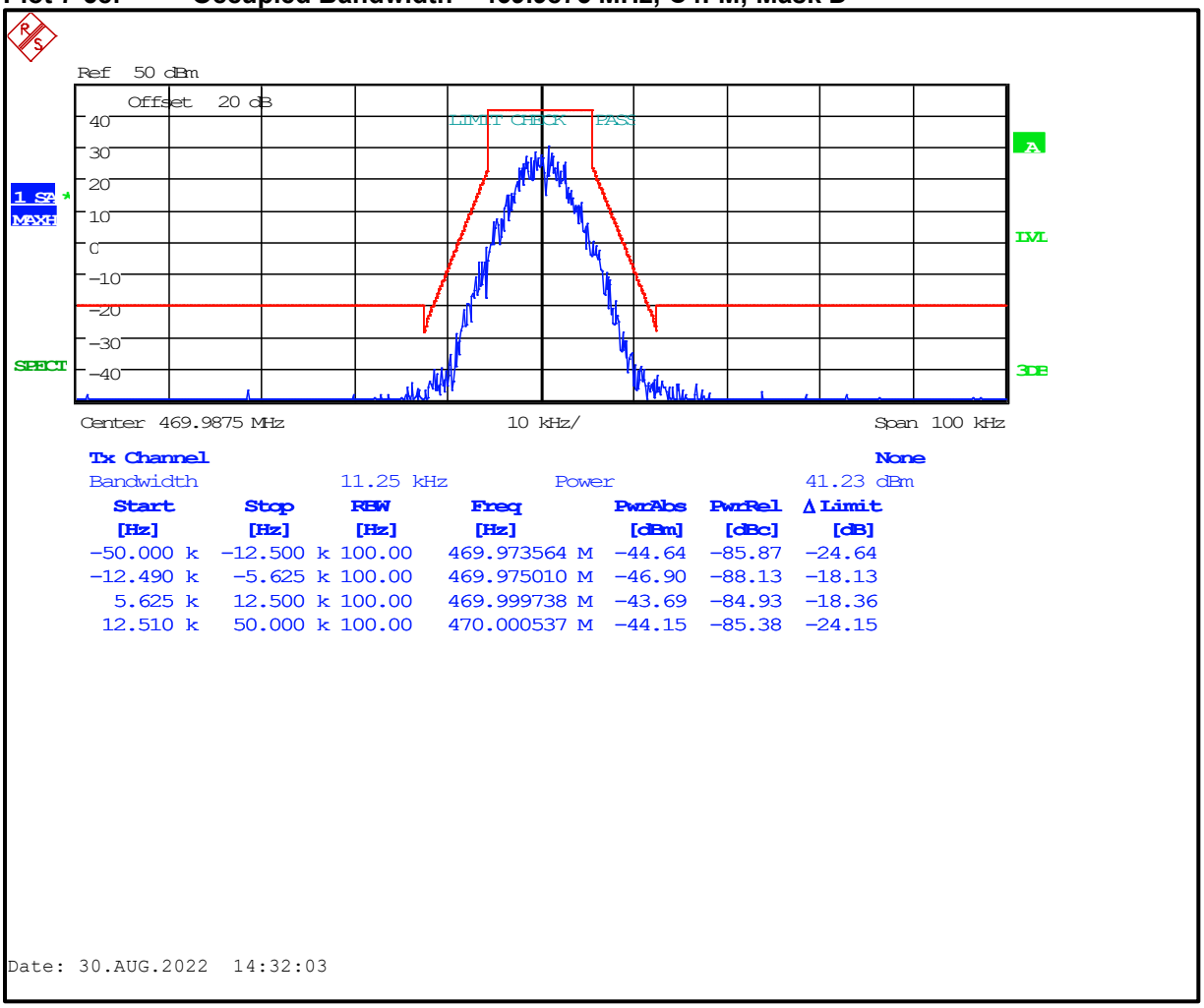
Plot 7-56: Occupied Bandwidth – 459.0250 MHz; C4FM; Mask D



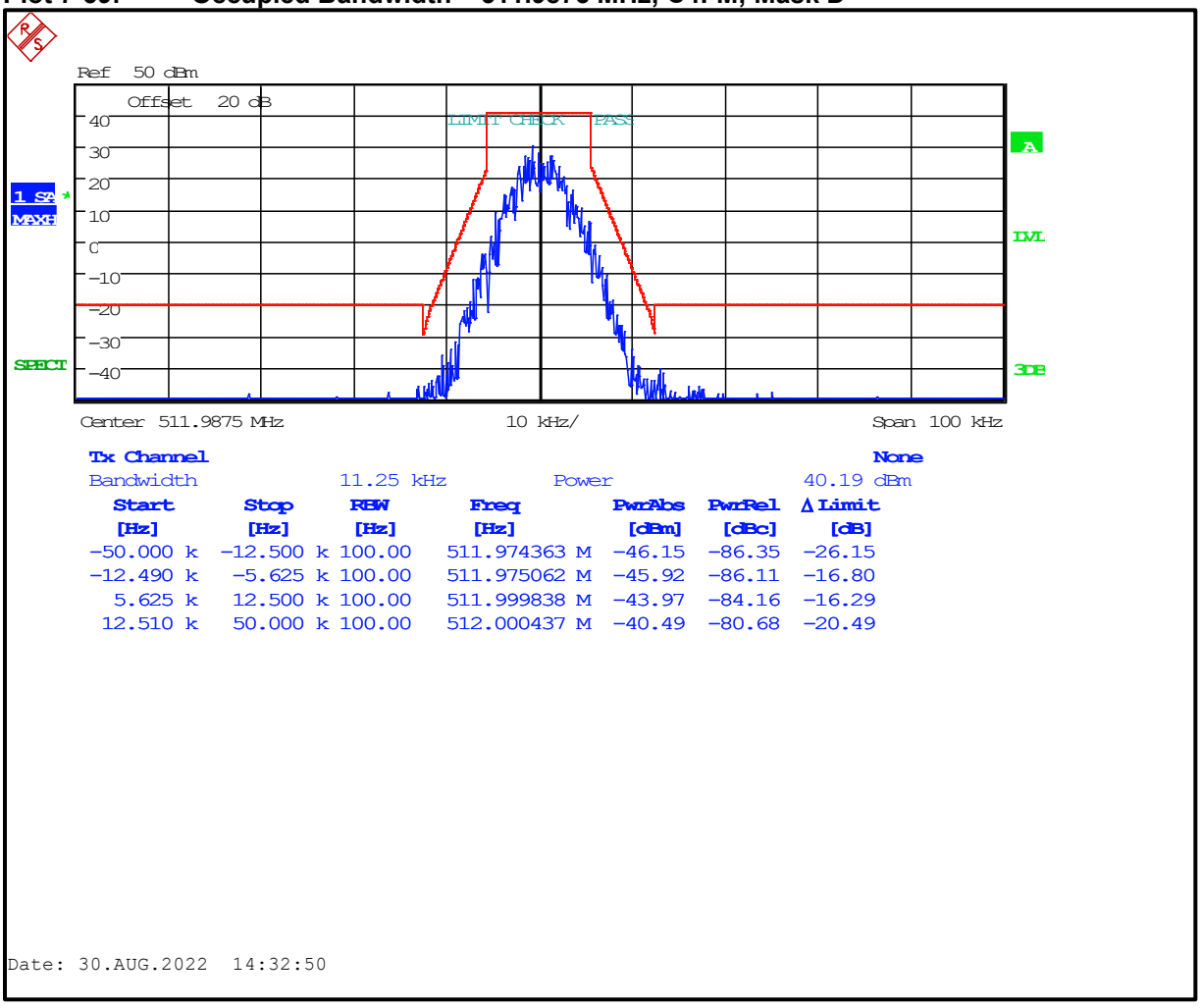
Plot 7-57: Occupied Bandwidth – 459.9750 MHz; C4FM; Mask D



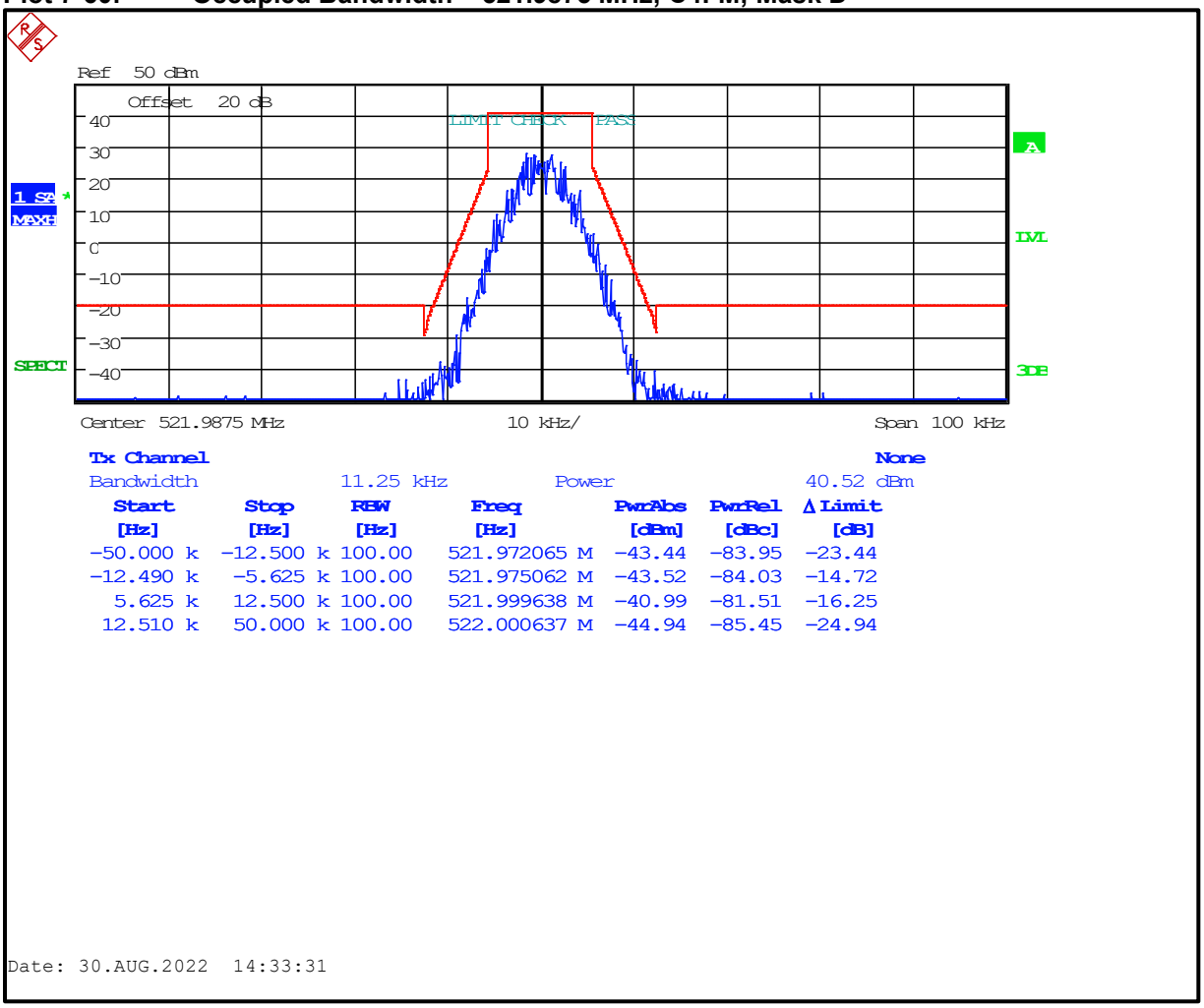
Plot 7-58: Occupied Bandwidth – 469.9875 MHz; C4FM; Mask D



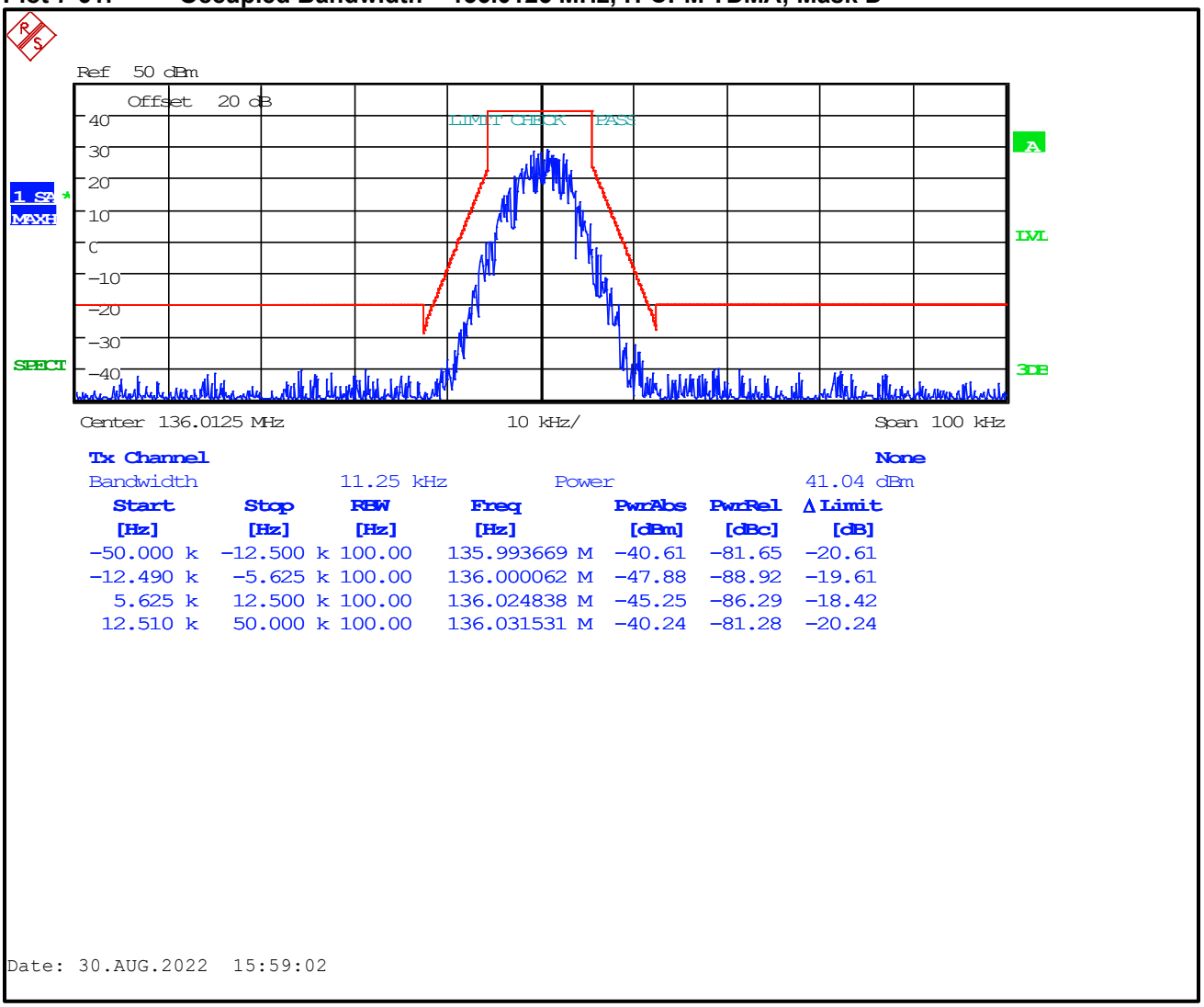
Plot 7-59: Occupied Bandwidth – 511.9875 MHz; C4FM; Mask D



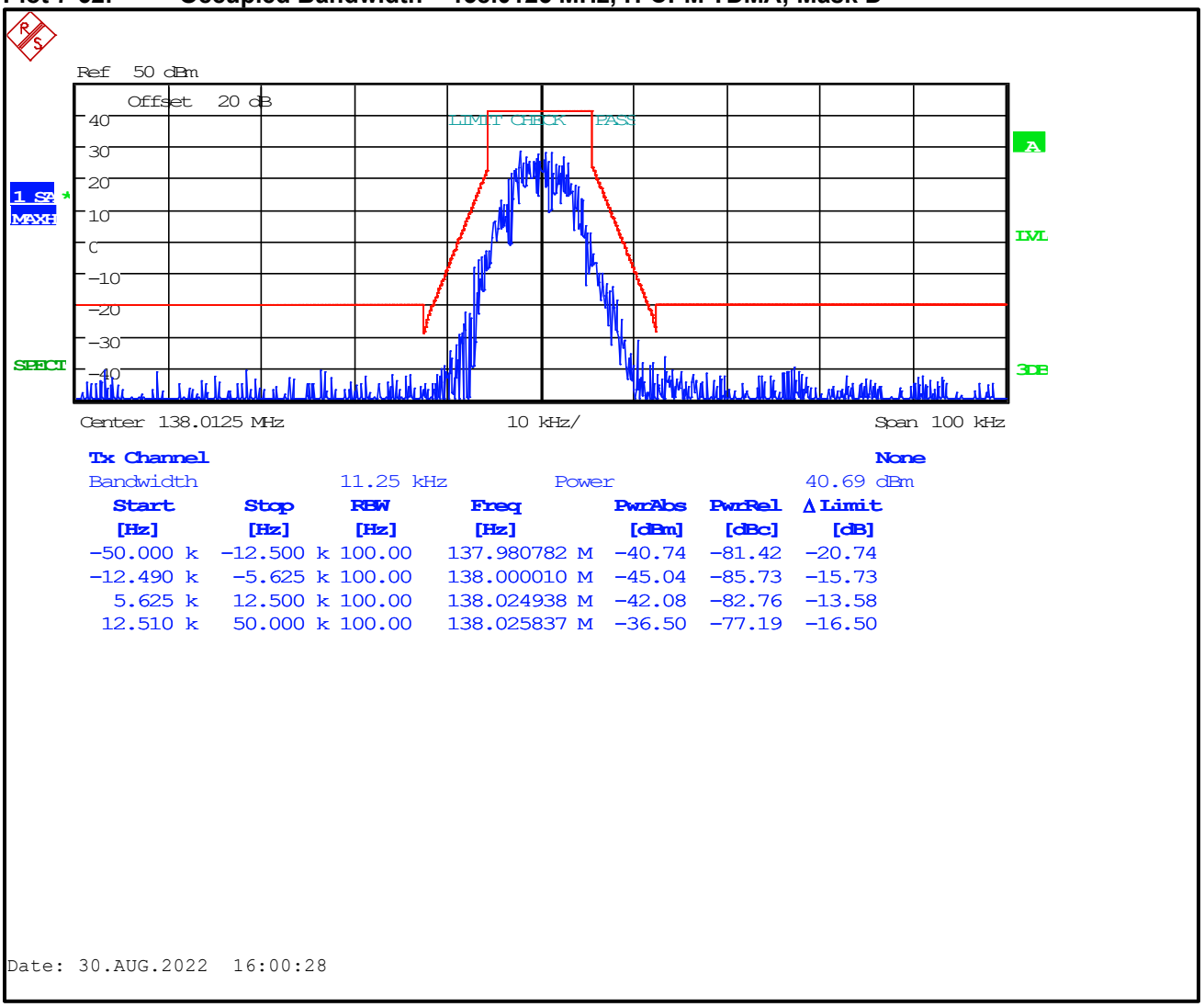
Plot 7-60: Occupied Bandwidth – 521.9875 MHz; C4FM; Mask D



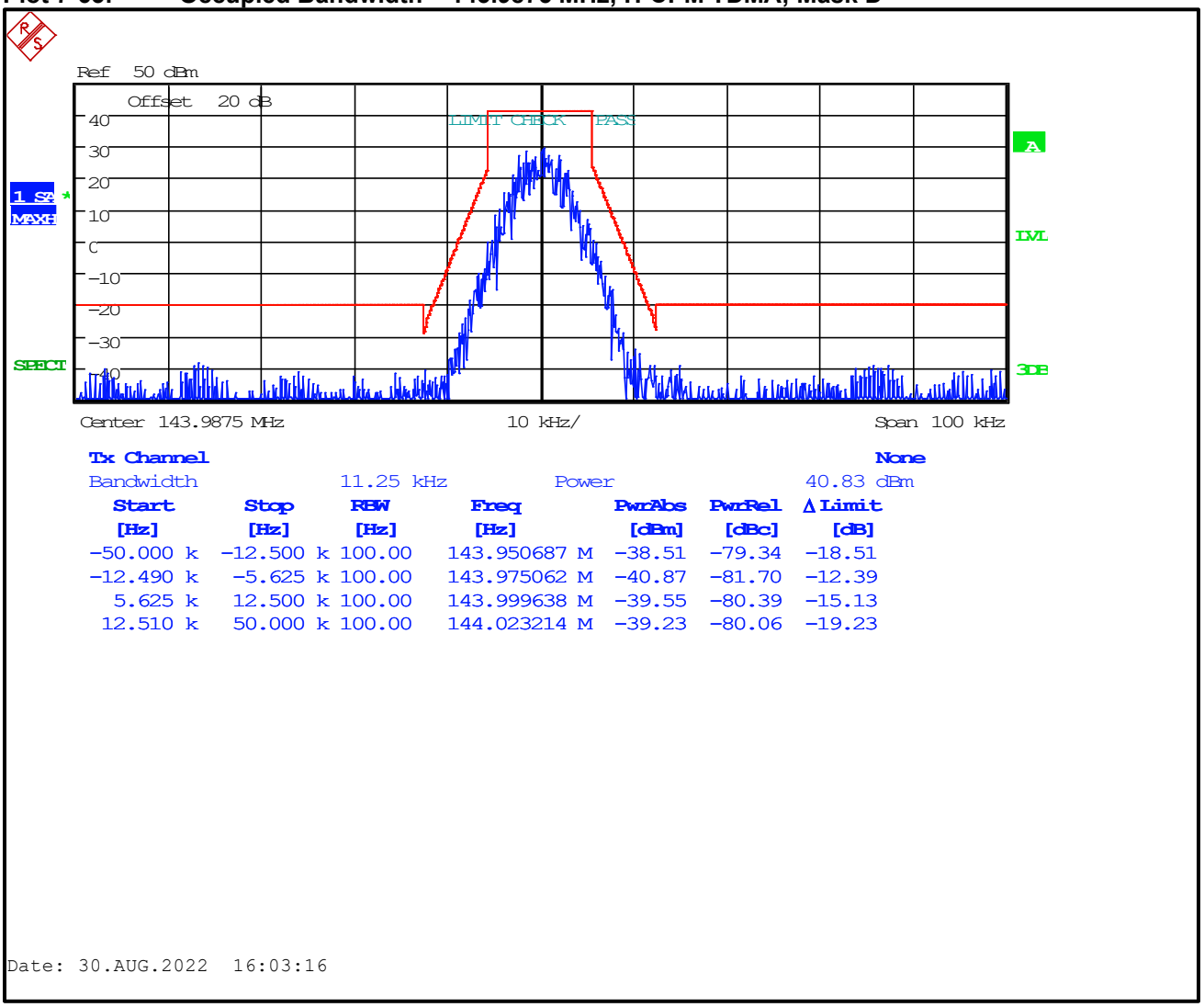
Plot 7-61: Occupied Bandwidth – 136.0125 MHz; H-CPM TDMA; Mask D



Plot 7-62: Occupied Bandwidth – 138.0125 MHz; H-CPM TDMA; Mask D



Plot 7-63: Occupied Bandwidth – 143.9875 MHz; H-CPM TDMA; Mask D



Tx Channel						None
Bandwidth		11.25 kHz		Power		40.83 dBm
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	Δ Limit [dB]
-50.000 k	-12.500 k	100.00	143.950687 M	-38.51	-79.34	-18.51
-12.490 k	-5.625 k	100.00	143.975062 M	-40.87	-81.70	-12.39
5.625 k	12.500 k	100.00	143.999638 M	-39.55	-80.39	-15.13
12.510 k	50.000 k	100.00	144.023214 M	-39.23	-80.06	-19.23

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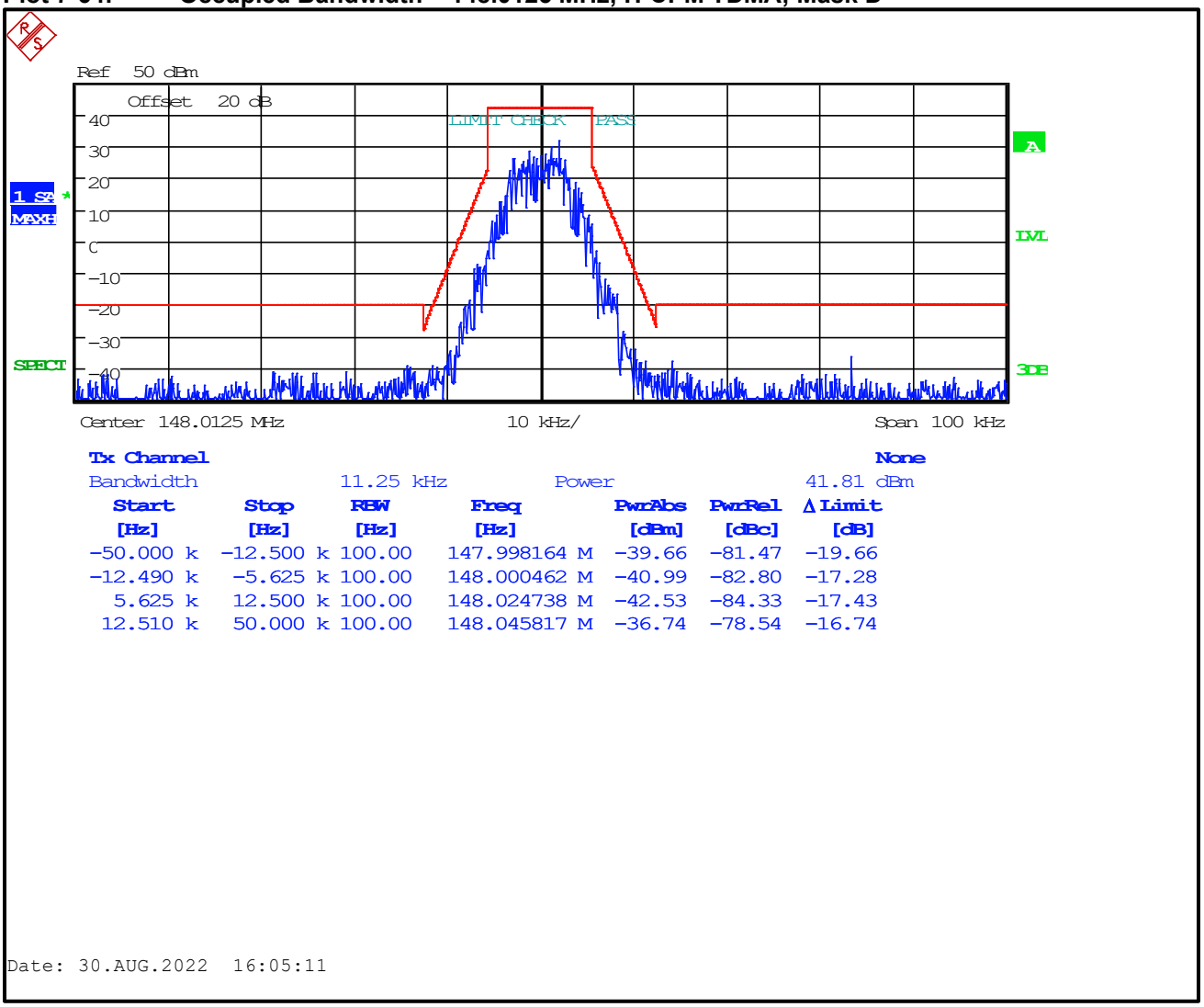
Plot 7-64: Occupied Bandwidth – 148.0125 MHz; H-CPM TDMA; Mask D



Tx Channel						None
Bandwidth		11.25 kHz		Power		41.81 dBm
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	Δ Limit [dB]
-50.000 k	-12.500 k	100.00	147.998164 M	-39.66	-81.47	-19.66
-12.490 k	-5.625 k	100.00	148.000462 M	-40.99	-82.80	-17.28
5.625 k	12.500 k	100.00	148.024738 M	-42.53	-84.33	-17.43
12.510 k	50.000 k	100.00	148.045817 M	-36.74	-78.54	-16.74

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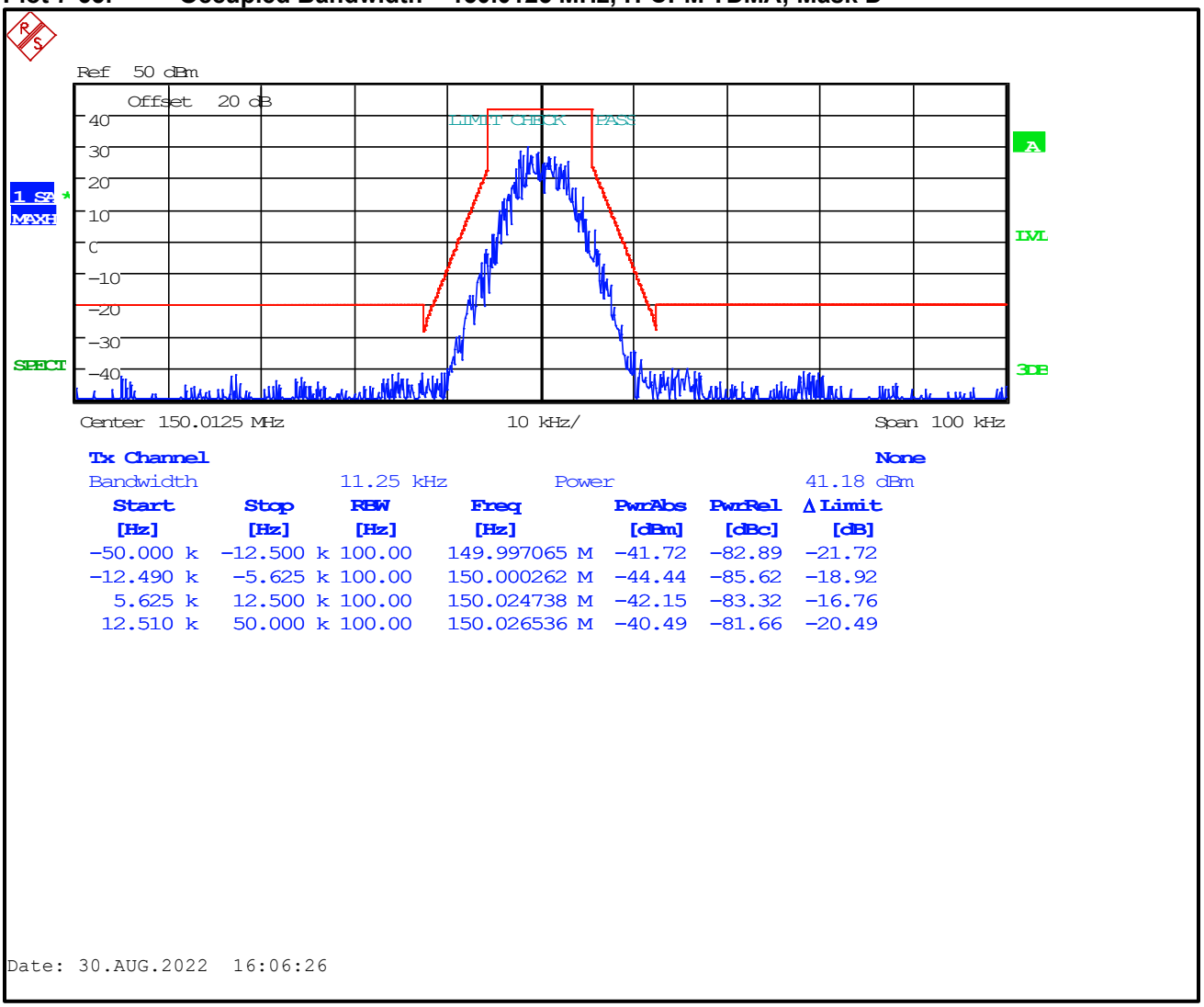
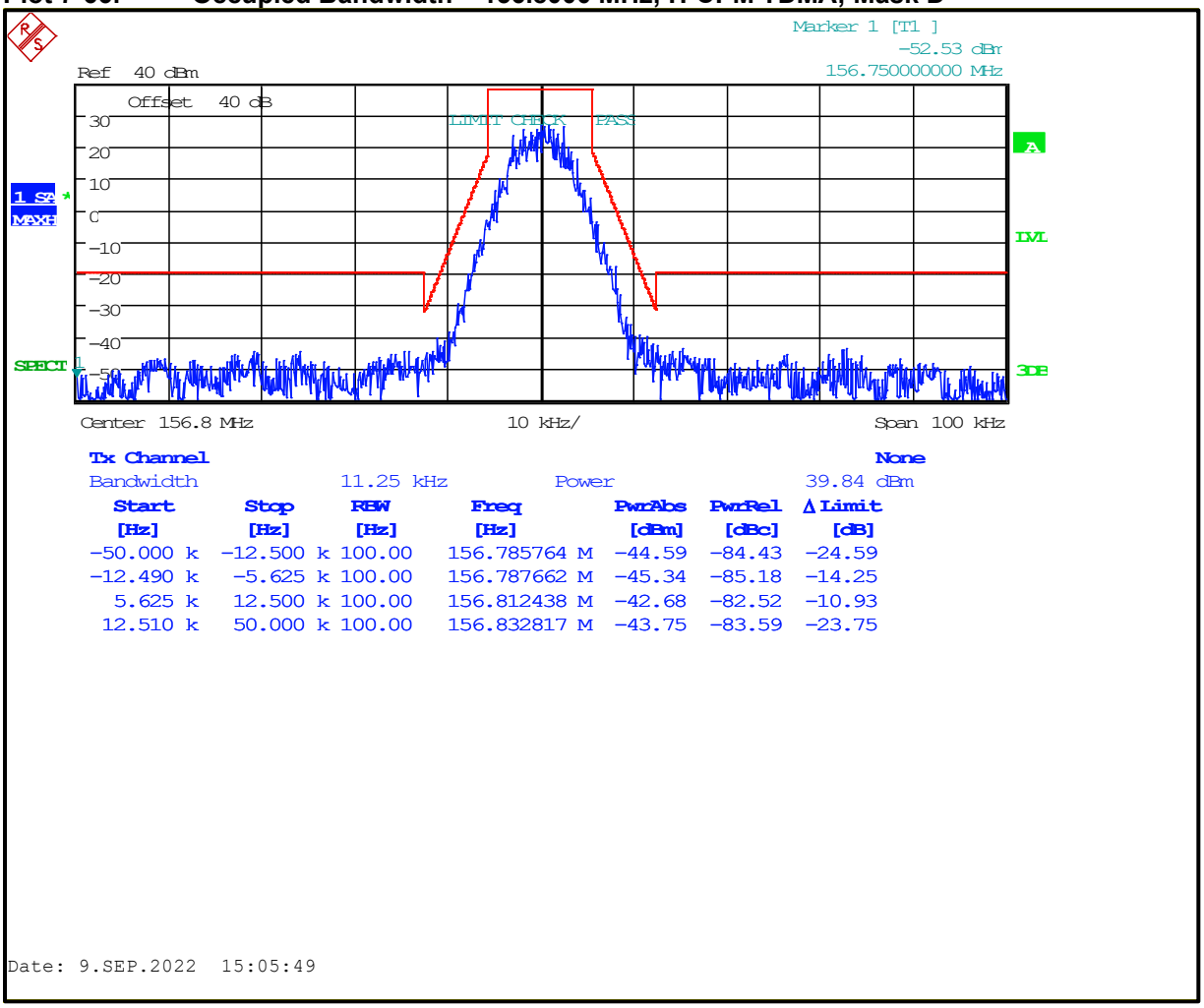
Plot 7-65: Occupied Bandwidth – 150.0125 MHz; H-CPM TDMA; Mask D



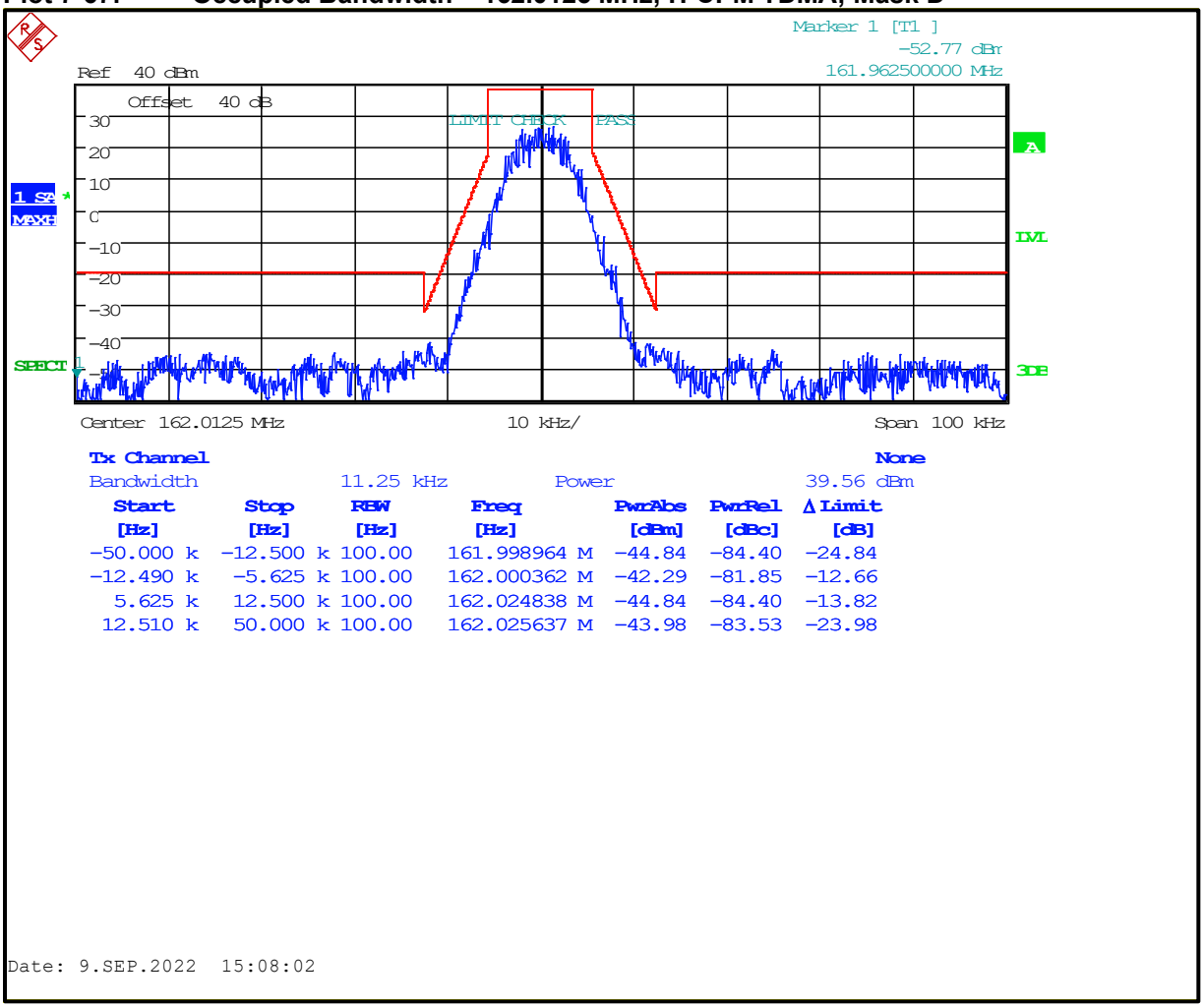
Tx Channel						None
Bandwidth		11.25 kHz		Power		41.18 dBm
Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	Δ Limit [dB]
-50.000 k	-12.500 k	100.00	149.997065 M	-41.72	-82.89	-21.72
-12.490 k	-5.625 k	100.00	150.000262 M	-44.44	-85.62	-18.92
5.625 k	12.500 k	100.00	150.024738 M	-42.15	-83.32	-16.76
12.510 k	50.000 k	100.00	150.026536 M	-40.49	-81.66	-20.49

Date: 30.AUG.2022 16:06:26

Plot 7-66: Occupied Bandwidth – 156.8000 MHz; H-CPM TDMA; Mask D



Plot 7-67: Occupied Bandwidth – 162.0125 MHz; H-CPM TDMA; Mask D



Tx Channel **None**

Bandwidth 11.25 kHz Power 39.56 dBm

Start [Hz]	Stop [Hz]	RBW [Hz]	Freq [Hz]	PwrAbs [dBm]	PwrRel [dBc]	ΔLimit [dB]
-50.000 k	-12.500 k	100.00	161.998964 M	-44.84	-84.40	-24.84
-12.490 k	-5.625 k	100.00	162.000362 M	-42.29	-81.85	-12.66
5.625 k	12.500 k	100.00	162.024838 M	-44.84	-84.40	-13.82
12.510 k	50.000 k	100.00	162.025637 M	-43.98	-83.53	-23.98

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Plot 7-68: Occupied Bandwidth – 173.9875 MHz; H-CPM TDMA; Mask D