RHEIN TECH LABORATORIES, INC.

Engineering Solutions & Electromagnetic Compatibility Services

FCC & IC Certification Report

Harris Corporation
221 Jefferson Ridge Parkway
Lynchburg, VA 24501

Model: XG-25P VHF

FCC ID: OWDTR-0139-E
IC: 3636B-0139

May 18, 2016

Standards Referenced for this Report	
Part 2: 2015	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 22: 2015	Public Portable Services
Part 80: 2015	Stations in the Maritime Services
Part 90: 2015	Private Land Portable Radio Services
TIA-603-D 2010	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
RSS-119 Issue 12	Land Mobile and Fixed Equipment Operating in the Frequency Range 27.41-960 MHz

Report Prepared By: Daniel Baltzell

Document Number: 2015025TNF

This/these test(s) is/are accredited under Rhein Tech Laboratories, Inc. ISO/IEC 17025 accreditation issued by the ANSI-ASQ National Accreditation Board. Refer to certificate and scope of accreditation AT-1445

Frequency Range (MHz)	Rated Conducted Output Power (W)	Frequency Tolerance (ppm)	Emission Designator	TX Mode
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	11K0F3E	Narrow Band Analog (Voice)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	10K8F1D	Narrow Band Digital 2-FSK (9600 Data)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	10K8F1E	Narrow Band Digital 2-FSK (9600 Digital Voice)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	7K80F1D	Narrow Band Digital 2-FSK (4800 Data)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	7K80F1E	Narrow Band Digital 2-FSK (4800 Digital Voice)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	8K40F1D	Narrow Band Digital C4FM (9600 Data)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	8K40F1E	Narrow Band Digital C4FM (9600 Digital Voice)
136 – 174 (FCC) 138 – 174 (IC)	5.0	0.53	8K10DXW	H-CPM TDMA

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1 Test Result Summary

Test	FCC Reference	IC Reference	Result
RF Power Output	2.1046(a), 22.565, 80.215, 90.205	RSS-119 5.4	Complies
Conducted Spurious Emissions	2.1051, 22.359, 90.210, 80.211(f)(3)	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), 80.205, 80.211(f), 90.210	RSS-119 5.5, 5.8	Complies
Frequency Stability vs. Temperature and Voltage	2.1055, 80.209, 90.213	RSS-119 5.3	Complies
Modulation Characteristics	2.1047(a)(b)	N/A	Complies
Transient Frequency Response	90.214	RSS-119 5.9	Complies

2 General Information

The following Type Certification Report is prepared on behalf of **Harris Corporation** in accordance with the Federal Communications Commission and Industry Canada Rules and Regulations. The Equipment Under Test (EUT) was the **XG-25P VHF,** a 5 W Portable Radio**; FCC ID: OWDTR-0139-E, IC: 3636B-0139.**

All measurements contained in this application were conducted in accordance with FCC Rules and Regulations CFR 47 Parts 2, 22, 80, and 90, and Industry Canada RSS-119. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

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. This site has been fully described in a report submitted to, and approved by, the Federal Communications Commission to perform AC line conducted and radiated emissions testing.

2.2 Related Submittal(s)/Grant(s)

N/A

2.3 Grant Notes

Power is continuously variable from 0.5 - 5 W. The grant listed power is rated power.

2.4 Tested System Details

The test samples were received on September 16, 2011 and March 22, 2013. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

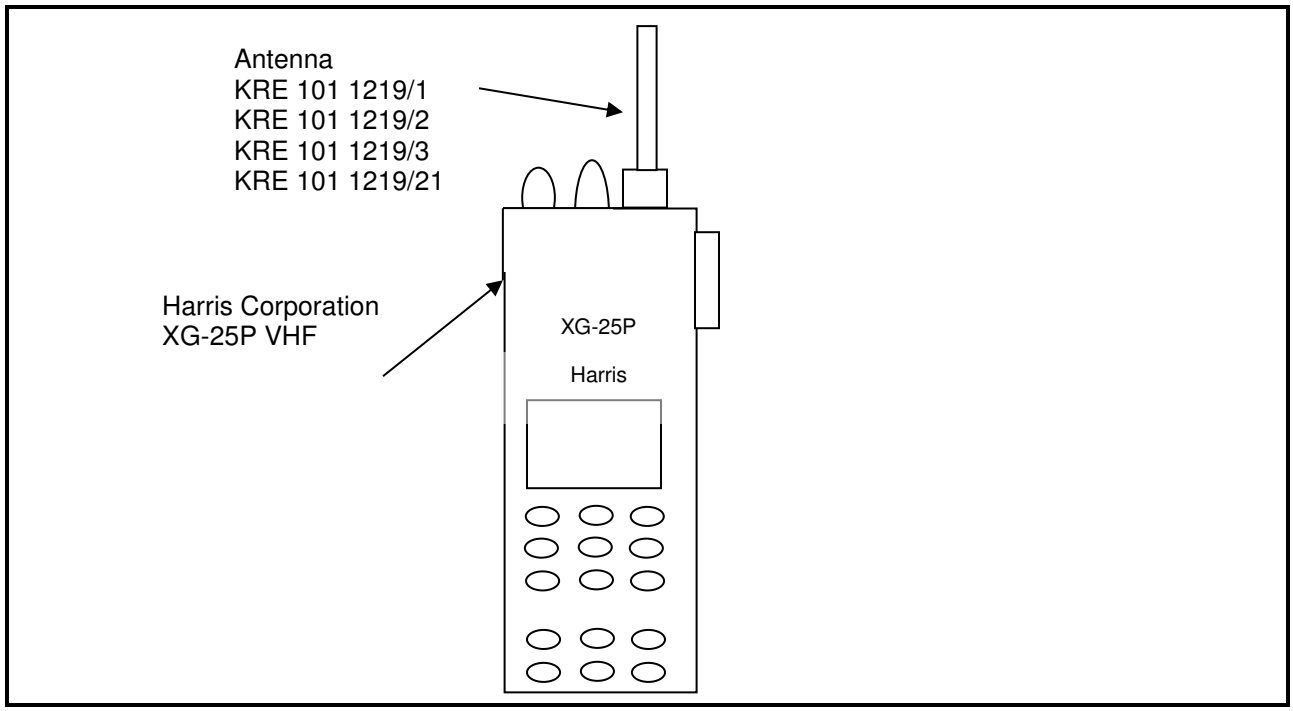
The EUT includes a System model and a Scan model, the difference being that the System model has a DTMF keypad. The System model is considered to be representative of the radio family and to have the worst case emissions, and was therefore used for testing.

The device was programmed for multiple modes of operation and modulation types.

Table 2-1: Equipment Under Test (EUT)

Part	Manufacturer	Model	Serial Number	FCC ID	RTL Bar Code
Portable Radio	Harris Corporation	XG-25P VHF (System) DPXG-PFV1B-e1	A4014F	OWDTR-0139-E	21938
Portable Radio	Harris Corporation	XG-25P VHF (Scan) DPXG-PBV1B-e1	A4014E000024	OWDTR-0139-E	21939
VHF Radio	Harris Corporation	XG-25P	A40125000095	OWDTR-0072-E	20875
VHF Radio	Harris Corporation	XG-25P	A40135001275	OWDTR-0072-E	20880

Figure 2-1: Configuration of Tested System



3 FCC Rules and Regulations Part 2.1033(C)(8) Voltages and Currents Through The Final Amplifying Stage

7.5 VDC Nominal / 2.25 A max

4 Conducted Output Power: FCC Parts 2.1046(A), 22.565, 80.215, 90.205, IC RSS-119 5.4

4.1 Test Procedure

TIA-603-D 2010 Section 2.2.1

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

Part 80.215 Transmitter Power

(a) Transmitter power shown on the radio station authorization is the maximum power the licensee is authorized to use. Power is expressed in the following terms:

(5) For all other emissions: the carrier power multiplied by 1.67.

(e) Ship stations frequencies above 27500 kHz, the maximum power must not exceed the values listed below:

(1) Ship stations 156–162 MHz: 25 W
(2) Marine utility stations and hand-held portable transmitters: 156–162 MHz: 10 W

Manufacturer's Rated Power: 5.0 W

4.2 Test Data

Table 4-1: RF Conducted Output Power - Measured

Frequency (MHz)	High Power (dBm)	High Power (W)
136.0125 (Federal)	37.4	5.5
138.0125 (IC)	37.4	5.5
141.0000 (IC)	37.4	5.5
143.9875 (IC)	37.4	5.5
148.0125 (IC)	37.4	5.5
150.0125 (FCC Part 90)	37.4	5.5
154.0250 (FCC Part 80)	37.4	5.5
162.0000 (FCC/IC)	37.4	5.5
173.1750 (FCC Part 80)	37.4	5.5
173.9875 (FCC Part 90)	37.4	5.5

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

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

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901184	Agilent Technologies	E4416A	EPM-P Power Meter, single channel	GB41050573	1/20/12
901356	Agilent Technologies	E9323A	Power Sensor	31764-264	1/20/12
900957	Weinschel Corp	68-20-43	100W Attenuator 20 dB	LT394	2/14/12

Test Personnel:

Daniel Baltzell		September 21, 2011
EMC Test Engineer	Signature	Date of Test

5 Conducted Spurious Emissions: FCC Parts 2.1051, 22.358, 80.211(f)(3), 90.210, IC RSS-119 5.5, 5.8

5.1 Test Procedure

TIA-603-D 2010 Section 2.2.13

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 – 19,200 bps for OTP and 9,600 bps for P25 modes.
Part 80.217 Suppression of Interference Aboard Ships

(a) A voluntarily-equipped ship station receiver must not cause harmful interference to any receiver required by statute or treaty.

(b) The electromagnetic field from receivers required by statute or treaty must not exceed the following value at a distance over sea water of one nautical mile from the receiver:

Frequency of Interfering Emissions	Power to Artificial Antenna in Microwatts
Below 30 MHz	0.1
30 to 100 MHz	3.0
100 to 300 MHz	1.0
Over 300 MHz	3.0

or

deliver not more than the following amounts of power to an artificial antenna having electrical characteristics equivalent to those of the average receiving antenna(s) used on shipboard:

Frequency of Interfering Emissions	Power to Artificial Antenna in Microwatts
Below 30 MHz	400 (4 dBm)
30 to 100 MHz	4,000 (6 dBm)
100 to 300 MHz	40,000 (16 dBm)
Over 300 MHz	400,000 (26 dBm)

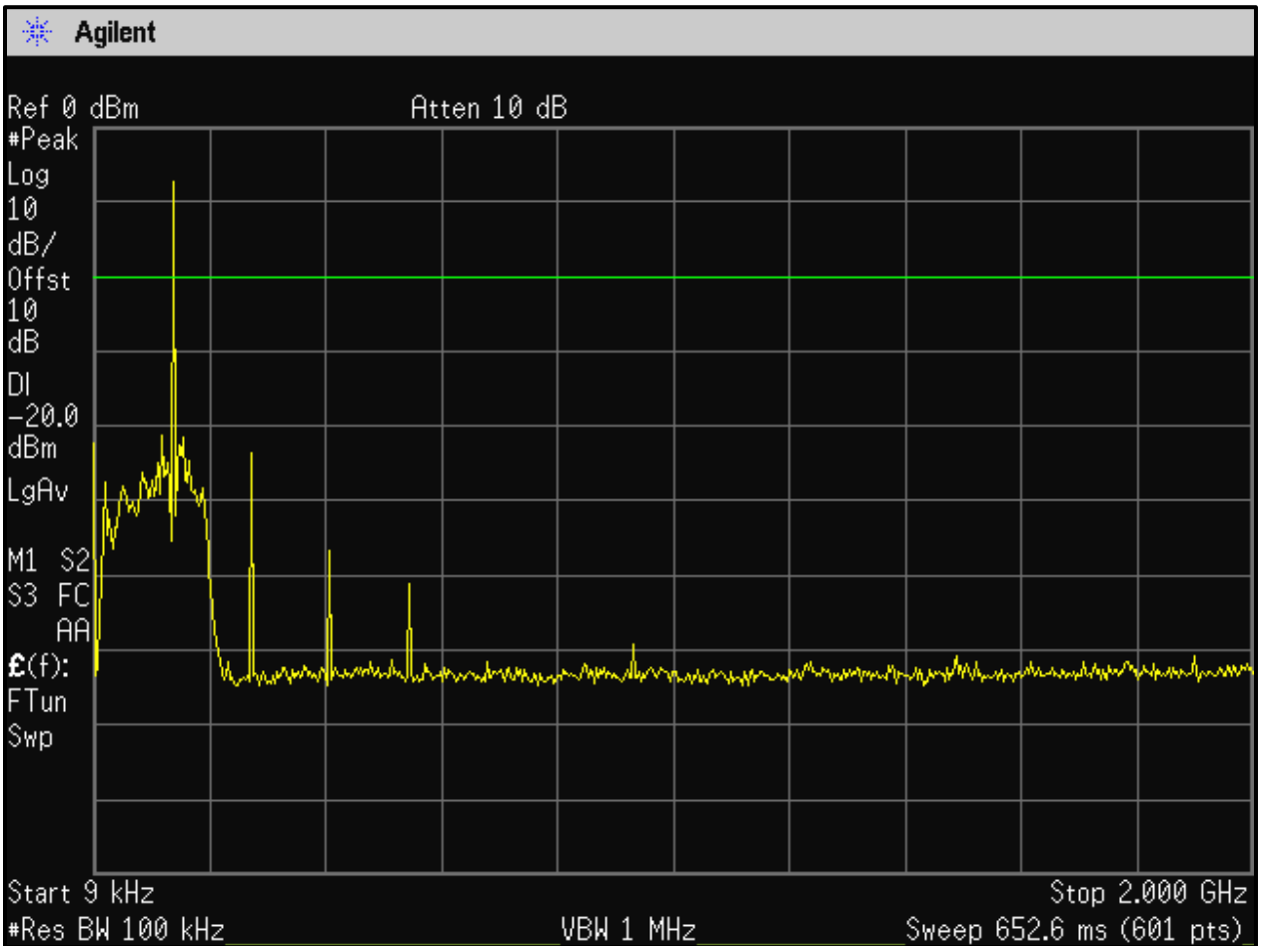
5.2 Test Data

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

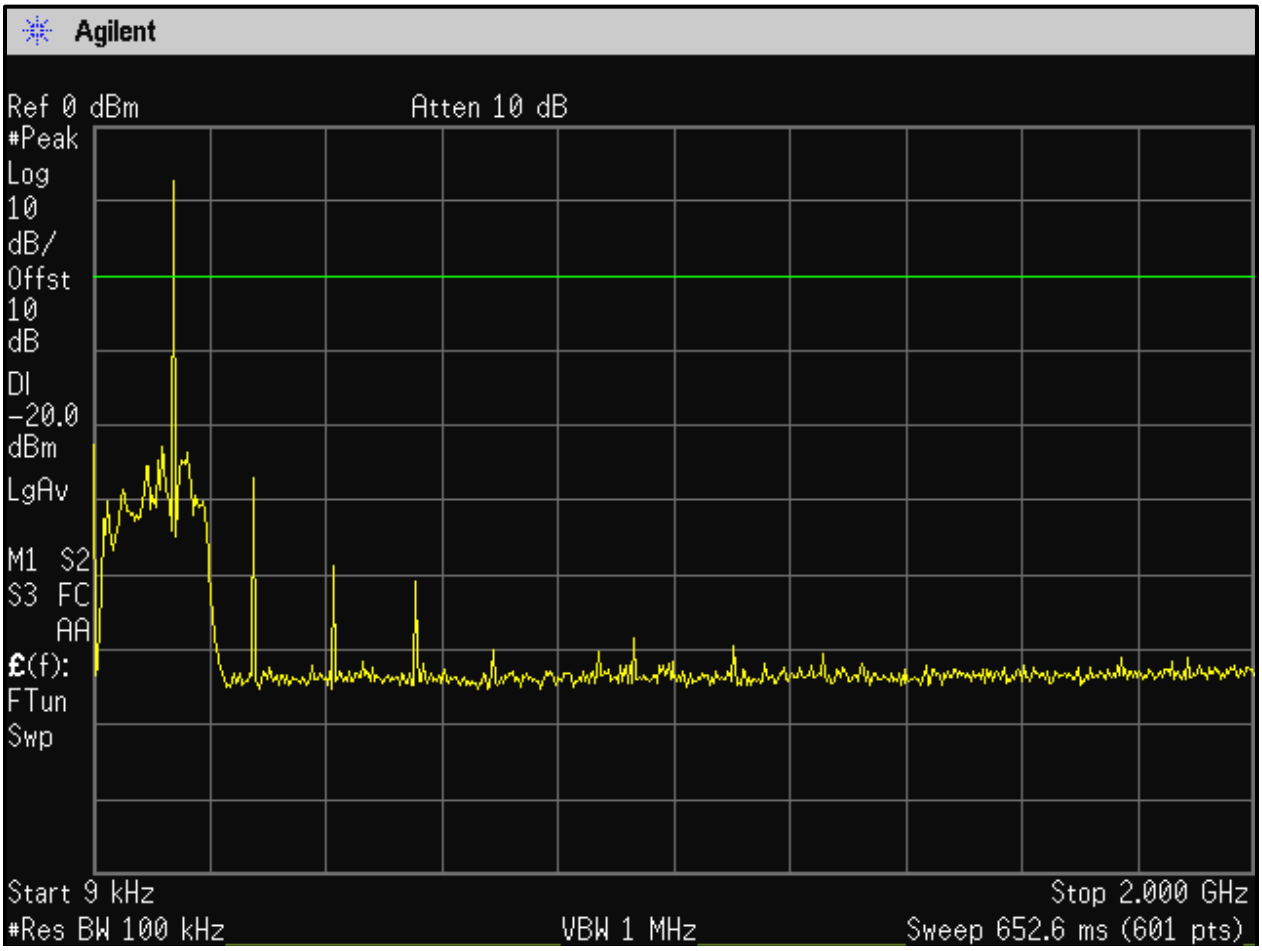
Limits: (50 + 10 LOG P(W))

The following channels (MHz) were investigated: 136.0125, 138.0125, 141.0000, 143.9875, 148.0125, 150.0125, 154.0250, 162.0000, 173.1750 and 173.9875. 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.

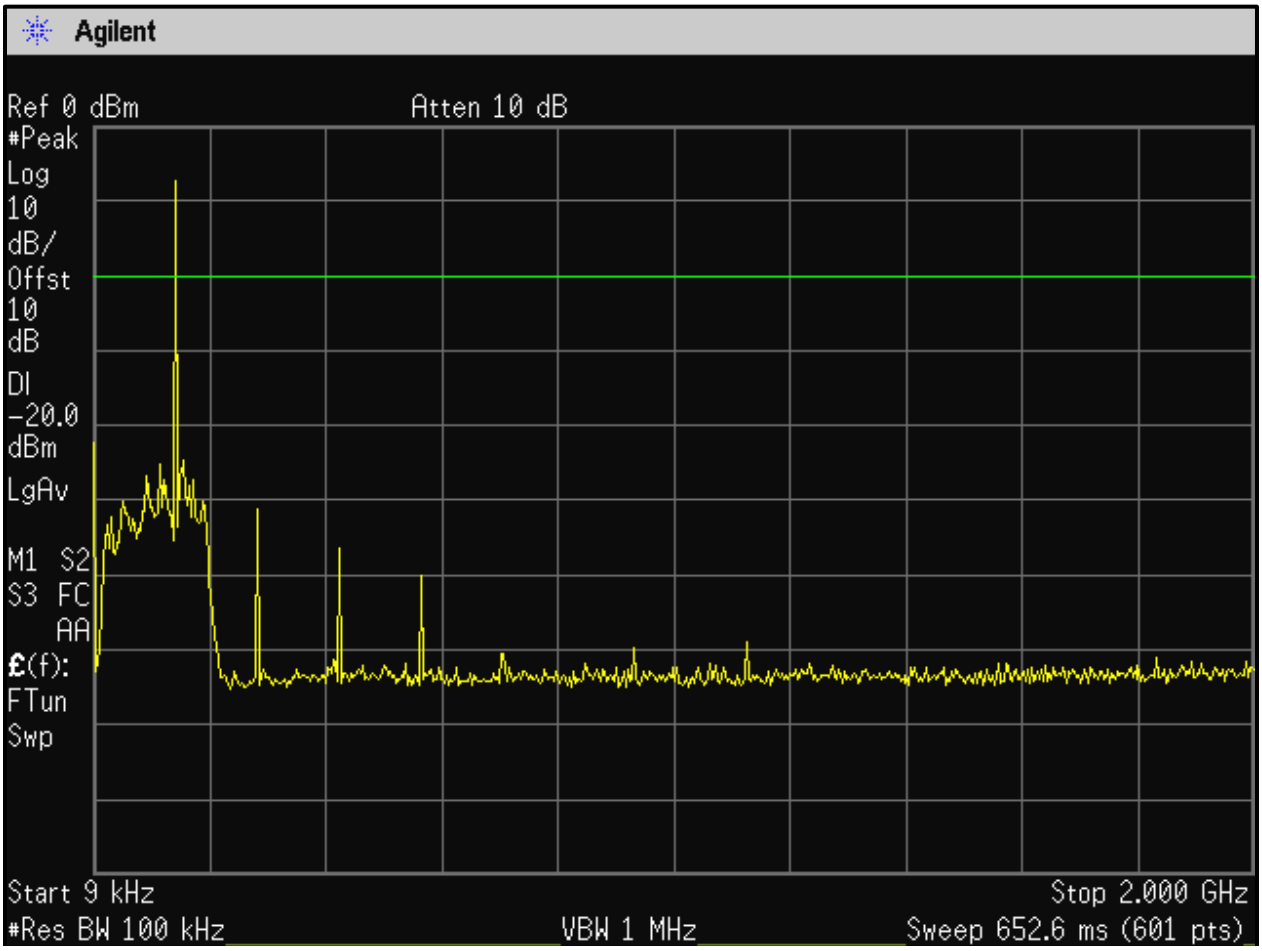
Plot 5-1: Conducted Spurious Emissions - 136.0125 MHz - Analog High Power



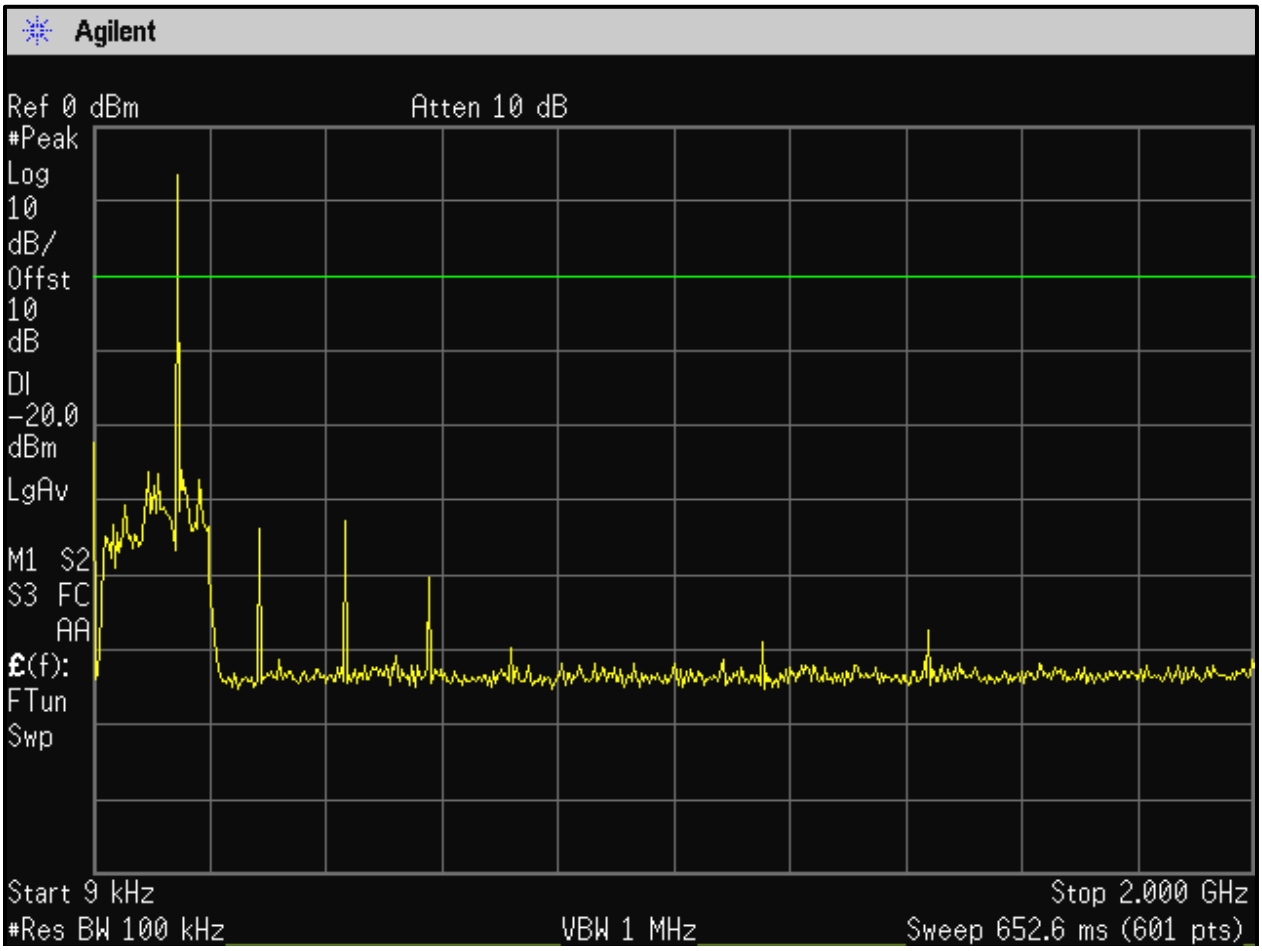
Plot 5-2: Conducted Spurious Emissions – 138.0125 MHz – Analog High Power



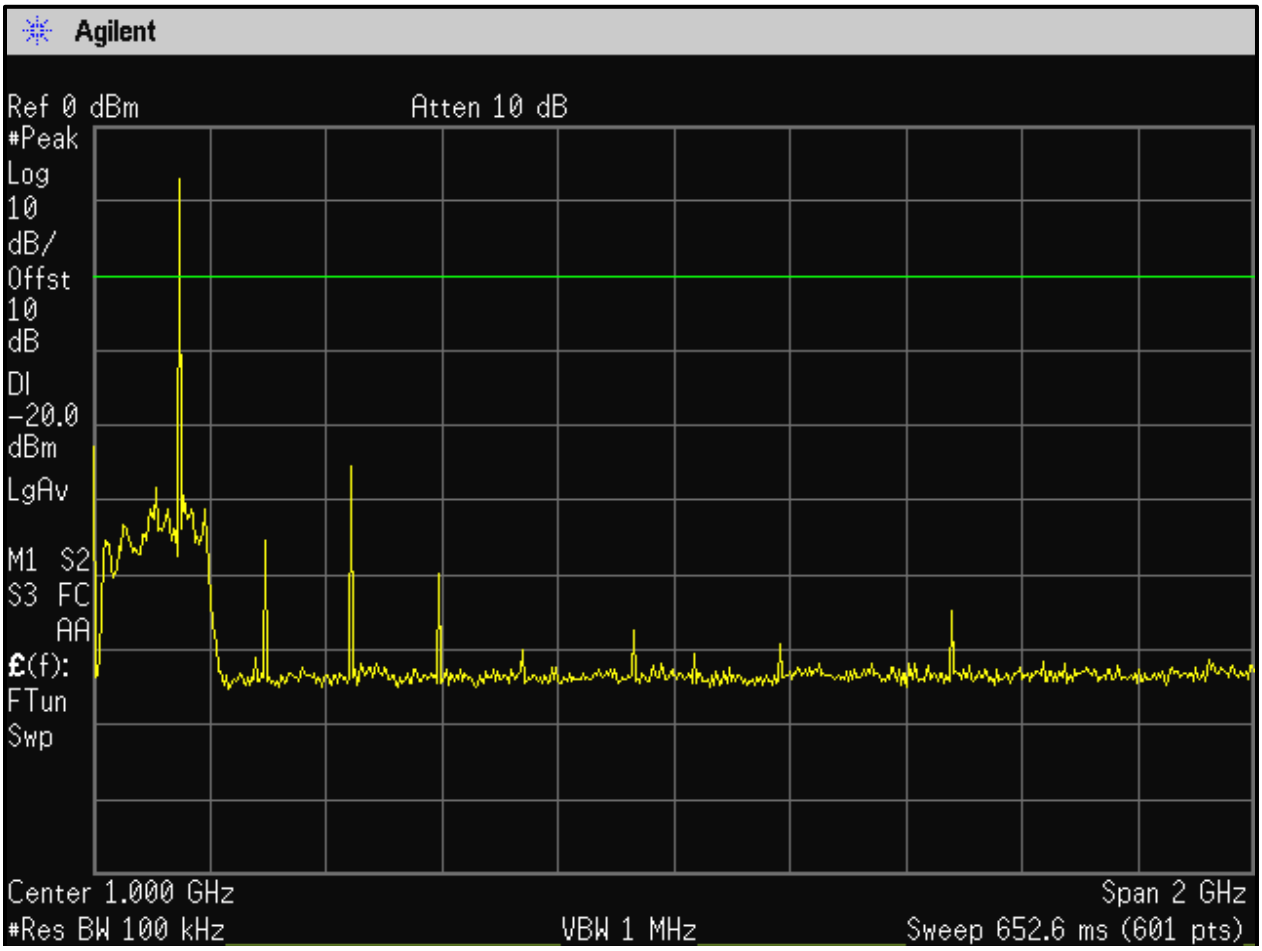
Plot 5-3: Conducted Spurious Emissions – 141.0000 MHz – Analog High Power



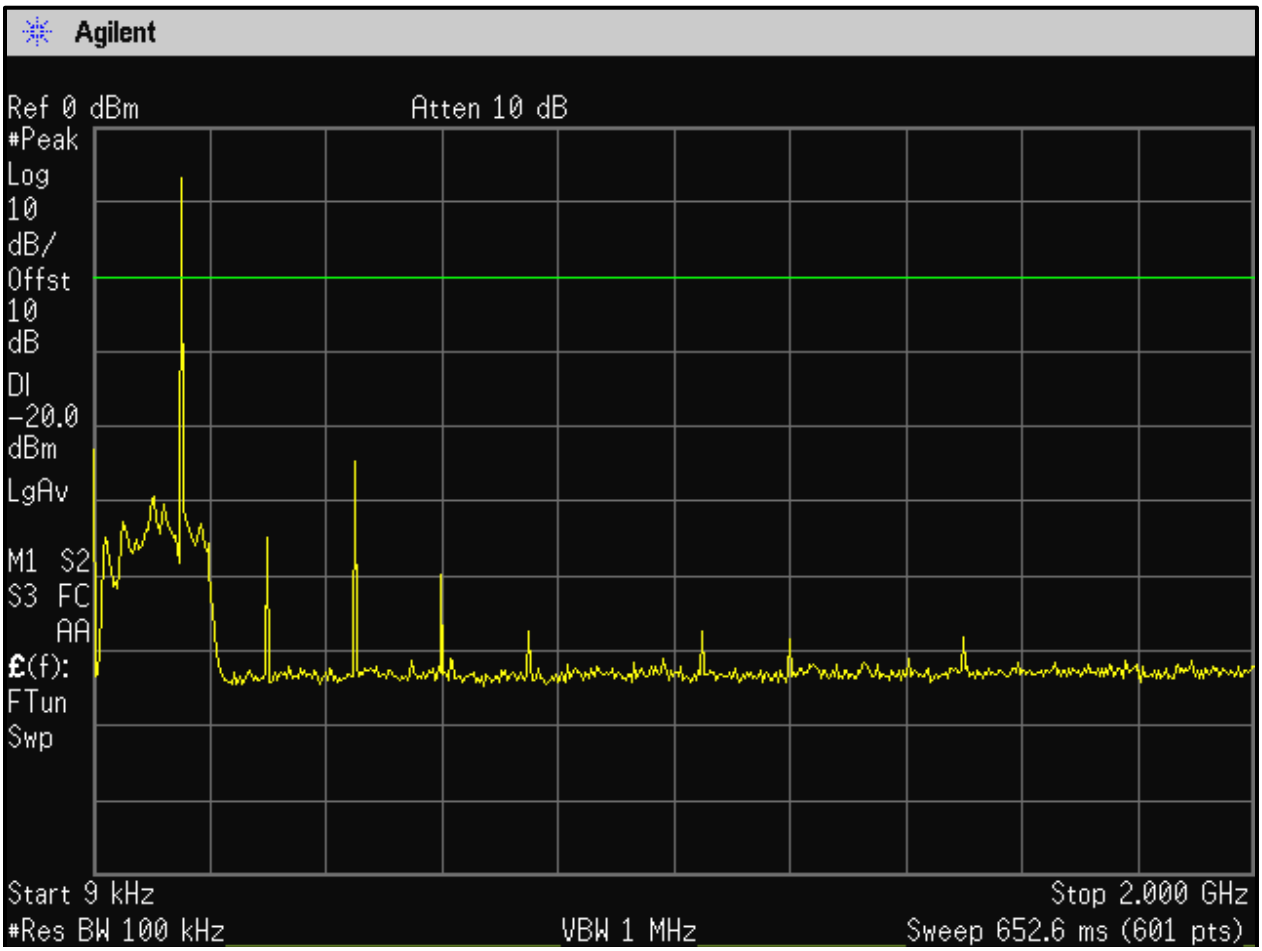
Plot 5-4: Conducted Spurious Emissions – 143.9875 MHz – Analog High Power



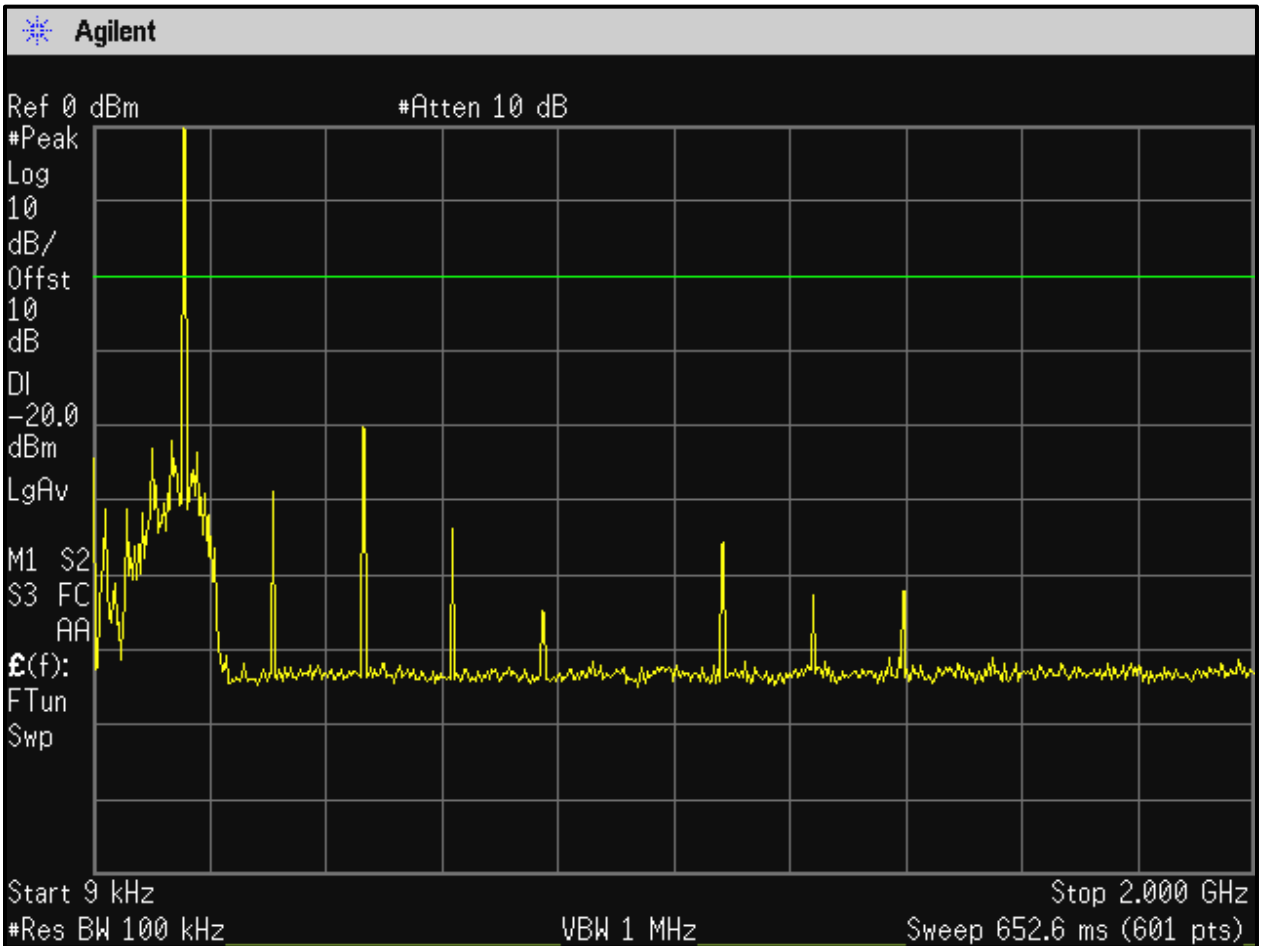
Plot 5-5: Conducted Spurious Emissions - 148.0125 MHz - Analog High Power



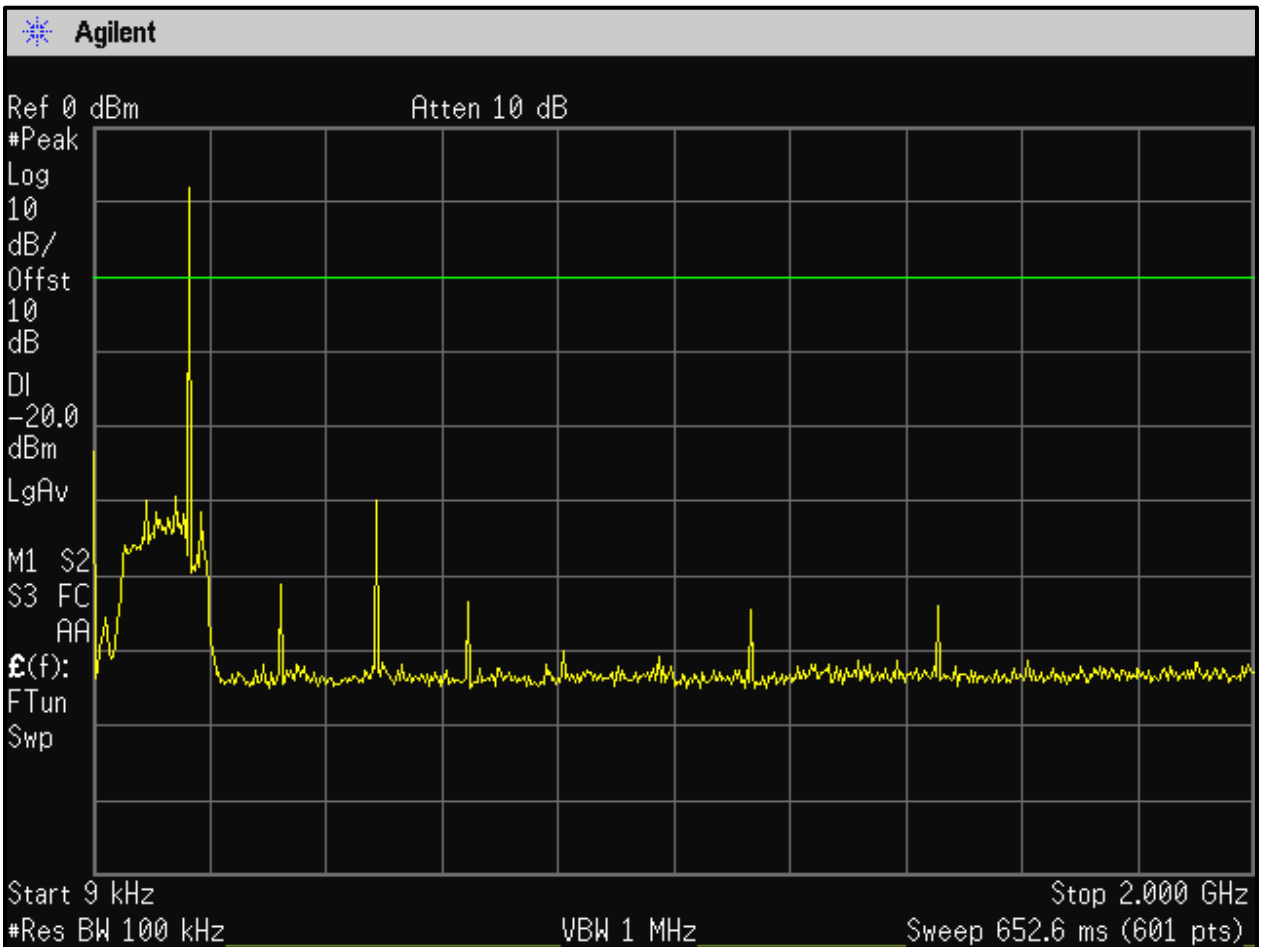
Plot 5-6: Conducted Spurious Emissions – 150.0125 MHz – Analog High Power



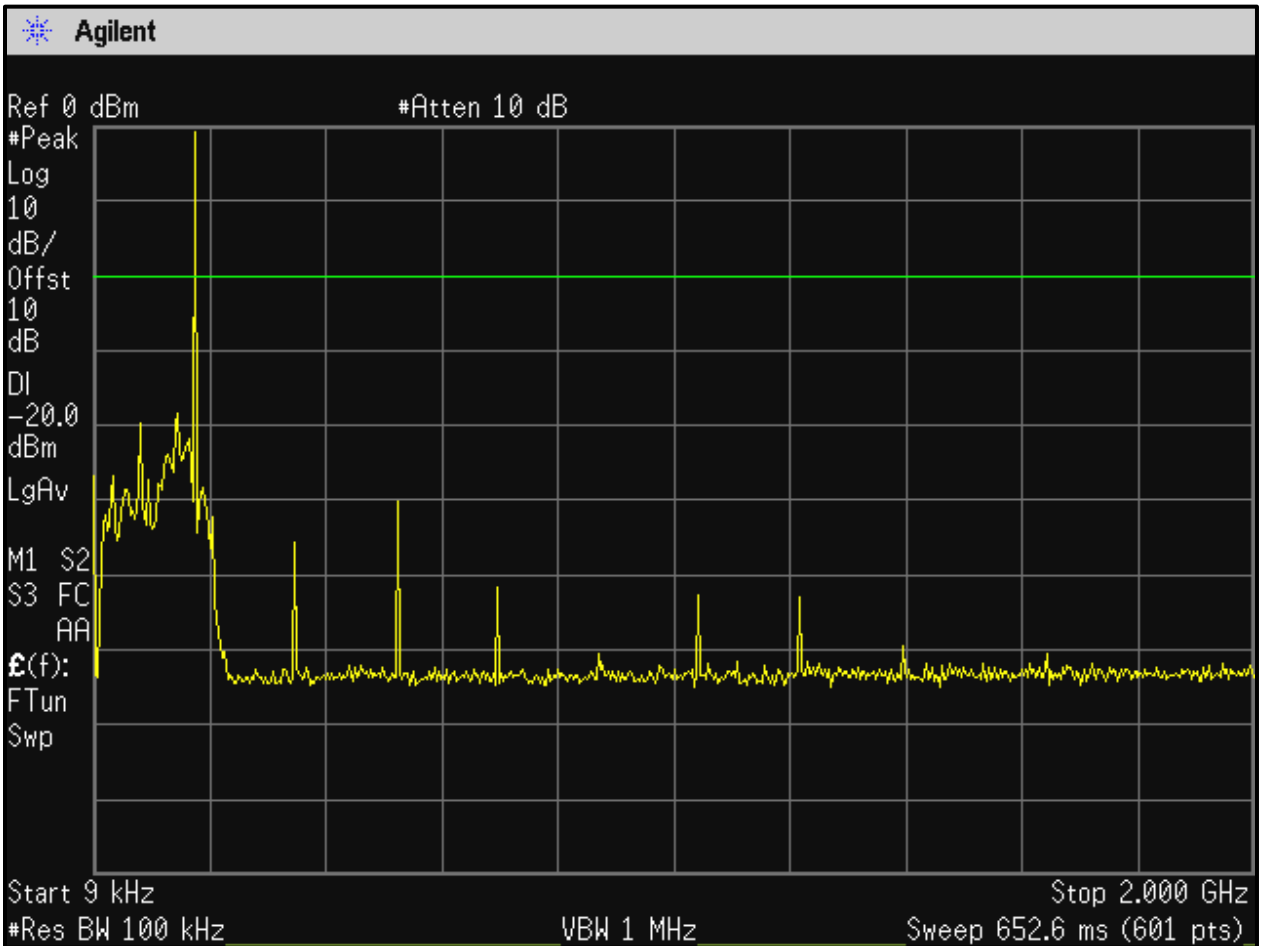
Plot 5-7: Conducted Spurious Emissions – 154.0250 MHz – Analog High Power



Plot 5-8: Conducted Spurious Emissions – 162.0000 MHz – Analog High Power



Plot 5-9: Conducted Spurious Emissions – 173.1750 MHz – Analog High Power



Plot 5-10: Conducted Spurious Emissions – 173.9875 MHz – Analog High Power

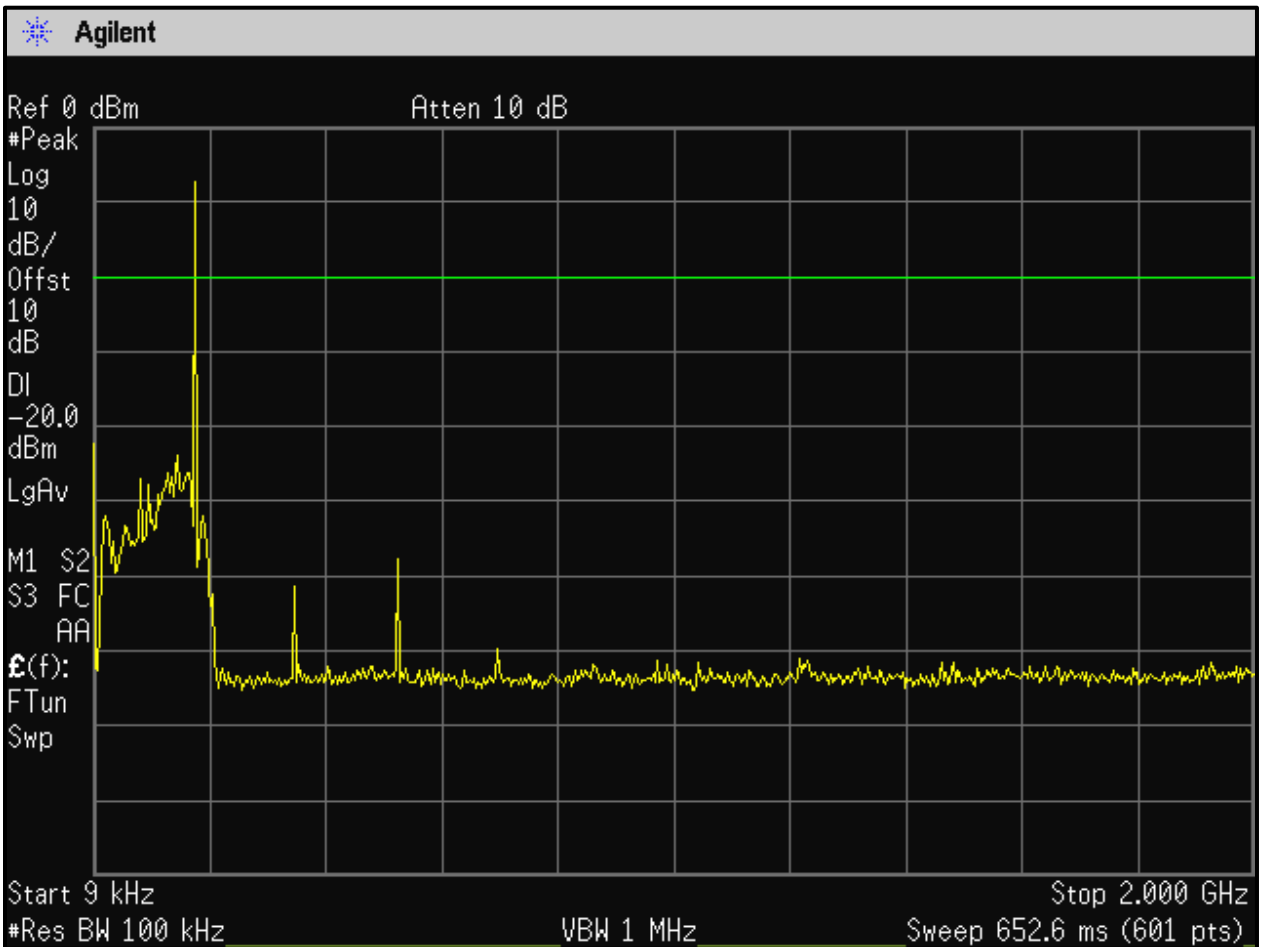


Table 5-1: Test Equipment Used For Testing Conducted Spurious Emissions

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Spectrum Analyzer	US44020346	4/8/12
901129	Par Electronics	118-174 (25W)	VHF Notch Filter	N/A	3/10/12
901337	Narda Microline	766-10	10 dB Attenuator	6242	7/15/12

Test Personnel:

Daniel Baltzell		September 23, 2011
EMC Test Engineer	Signature	Date of Test

6 Radiated Spurious Emissions: FCC Parts 2.1053(a), 22.359, 80.211(f)(3), 90.210, IC RSS-119 5.5, 5.8

6.1 Test Procedure

TIA-603-D 2010 Section 2.2.12

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 and EDACS modes.

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 was further corrected to a half wave dipole.

6.2 Part 80 and 90 Test Data

Table 6-1: Field Strength of Spurious Radiation – 136.0125 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
272.0250	44.6	-81.0	0.6	1.7	117.3	-59.9
408.0375	44.7	-81.8	0.7	1.9	118.0	-60.6
544.0500	37.0	-80.8	0.7	0.5	118.4	-61.0
680.0625	33.4	-80.0	0.8	1.3	116.9	-59.5
816.0750	32.5	-81.9	0.9	1.1	119.1	-61.7
952.0875	35.3	-78.4	0.9	1.6	115.1	-57.7
1088.1000	30.0	-83.4	1.0	4.3	117.5	-60.1
1224.1125	25.6	-87.4	1.0	4.9	120.9	-63.5
1360.1250	24.0	-88.4	1.1	5.6	121.3	-63.9

Table 6-2: Field Strength of Spurious Radiation – 138.0125 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
276.0250	46.2	-79.4	0.6	1.6	115.8	-58.4
414.0375	41.3	-85.2	0.7	1.8	121.5	-64.1
552.0500	29.7	-88.0	0.7	1.3	124.8	-67.4
690.0625	24.6	-88.8	0.8	1.3	125.7	-68.3
828.0750	30.4	-82.5	0.9	1.1	119.7	-62.3
966.0875	26.2	-86.6	0.9	1.7	123.2	-65.8
1104.1000	24.3	-89.6	1.0	4.3	123.7	-66.3
1242.1125	21.5	-91.6	1.0	4.9	125.1	-67.7
1380.1250	15.9	-96.4	1.1	5.7	129.2	-71.8

Table 6-3: Field Strength of Spurious Radiation – 141.0000 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
282.0000	47.8	-77.6	0.6	1.6	114.0	-56.6
423.0000	51.6	-74.9	0.7	1.8	111.2	-53.8
564.0000	33.7	-90.0	0.7	1.3	126.8	-69.4
705.0000	33.5	-79.8	0.8	1.3	116.7	-59.3
846.0000	33.2	-79.7	0.9	1.1	116.9	-59.5
987.0000	34.4	-78.4	0.9	1.8	114.9	-57.5
1128.0000	32.1	-81.2	1.0	4.4	115.2	-57.8
1269.0000	23.2	-89.7	1.0	5.0	123.1	-65.7
1410.0000	29.4	-82.7	1.1	5.9	115.3	-57.9

Table 6-4: Field Strength of Spurious Radiation – 143.9875 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
287.9750	49.0	-76.4	0.5	1.5	112.8	-55.4
431.9625	45.0	-81.1	0.6	1.8	117.3	-59.9
575.9500	31.1	-92.6	0.7	1.3	129.4	-72.0
719.9375	30.9	-82.4	0.8	1.3	119.3	-61.9
863.9250	33.8	-79.0	0.8	1.2	116.0	-58.6
1007.9125	31.0	-81.8	0.8	4.4	115.6	-58.2
1151.9000	26.7	-86.9	0.9	4.5	120.7	-63.3
1295.8875	18.0	-94.8	1.0	5.1	128.1	-70.7
1439.8750	24.8	-87.2	1.1	6.1	119.6	-62.2

Table 6-5: Field Strength of Spurious Radiation – 148.0125 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
296.0250	51.1	-74.3	0.6	1.4	110.9	-53.5
444.0375	46.1	-80.0	0.7	1.7	116.4	-59.0
592.0500	29.5	-90.8	0.8	1.2	127.8	-70.4
740.0625	37.6	-77.7	0.8	1.2	114.7	-57.3
888.0750	35.7	-78.0	0.9	1.3	115.0	-57.6
1036.0875	28.4	-85.8	1.0	4.4	119.8	-62.4
1184.1000	23.0	-90.1	1.0	4.7	123.8	-66.4
1332.1125	24.3	-88.3	1.0	5.4	121.3	-63.9
1480.1250	12.1	-99.7	1.1	6.3	131.9	-74.5

Table 6-6: Field Strength of Spurious Radiation – 150.0125 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
300.0250	50.3	-72.9	0.6	1.4	109.5	-52.1
450.0375	50.6	-75.5	0.7	1.7	111.9	-54.5
600.0500	34.7	-85.3	0.8	1.2	122.3	-64.9
750.0625	38.9	-74.3	0.8	1.2	111.3	-53.9
900.0750	29.2	-83.6	0.9	1.3	120.6	-63.2
1050.0875	30.2	-84.0	1.0	4.4	118.0	-60.6
1200.1000	22.7	-90.6	1.0	4.8	124.2	-66.8
1350.1125	14.4	-98.1	1.1	5.5	131.1	-73.7
1500.1250	13.3	-98.3	1.1	6.5	130.3	-72.9

Table 6-7: Field Strength of Spurious Radiation – 154.0250 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
308.0500	54.3	-72.3	0.6	1.5	108.8	-51.4
462.0750	48.7	-71.7	0.6	1.7	108.0	-50.6
616.1000	29.6	-84.0	0.7	1.2	120.9	-63.5
770.1250	36.4	-78.5	0.8	1.1	115.6	-58.2
924.1500	31.6	-81.2	0.9	1.4	118.1	-60.7
1078.1750	30.1	-83.3	0.9	4.3	117.3	-59.9
1232.2000	23.6	-89.5	1.0	4.9	123.0	-65.6
1386.2250	22.9	-89.4	1.1	5.8	122.1	-64.7
1540.2500	13.3	-98.1	1.2	6.6	130.1	-72.7

Table 6-8: Field Strength of Spurious Radiation – 162.0000 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
324.0000	59.0	-66.4	0.6	1.6	102.8	-45.4
486.0000	46.5	-82.8	0.7	1.5	119.4	-62.0
648.0000	28.6	-96.7	0.8	1.3	133.6	-76.2
810.0000	33.8	-84.0	0.9	1.0	121.3	-63.9
972.0000	32.9	-76.5	0.9	1.7	113.1	-55.7
1134.0000	27.3	-85.8	1.0	4.4	119.8	-62.4
1296.0000	20.7	-90.9	1.0	5.1	124.2	-66.8
1458.0000	14.9	-97.2	1.1	6.2	129.5	-72.1
1620.0000	21.0	-99.5	1.2	6.7	131.4	-74.0

Table 6-9: Field Strength of Spurious Radiation – 173.1750 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
346.3500	58.2	-67.7	0.6	1.8	103.9	-46.5
519.5250	52.8	-67.6	0.6	1.3	104.3	-46.9
692.7000	26.7	-93.3	0.7	1.3	130.1	-72.7
865.8750	39.8	-74.6	0.8	1.2	111.6	-54.2
1039.0500	29.8	-89.9	0.9	4.4	123.8	-66.4
1212.2250	22.3	-92.6	1.0	4.8	126.2	-68.8
1385.4000	20.6	-90.4	1.1	5.8	123.1	-65.7
1558.5750	13.3	-91.2	1.2	6.6	123.2	-65.8
1731.7500	20.3	-96.7	1.3	6.5	128.9	-71.5

Table 6-10: Field Strength of Spurious Radiation – 173.9875 MHz – Analog High Power

Frequency (MHz)	Spectrum Analyzer Level (dBuV/M)	Signal Generator Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Signal Generator (dBc)	Margin (dB)
347.9750	51.5	-66.6	0.6	1.8	102.8	-45.4
521.9625	53.2	-81.6	0.7	1.3	118.4	-61.0
695.9500	27.3	-92.7	0.8	1.3	129.6	-72.2
869.9375	45.8	-68.6	0.9	1.2	105.7	-48.3
1043.9250	31.2	-88.5	1.0	4.4	122.5	-65.1
1217.9130	21.8	-93.1	1.0	4.8	126.7	-69.3
1391.9000	25.2	-99.4	1.1	5.8	132.1	-74.7
1565.8880	13.3	-91.2	1.2	6.7	123.1	-65.7
1739.8750	19.6	-97.4	1.3	6.5	129.6	-72.2

Table 6-11: Test Equipment Used For Testing Field Strength of Spurious Radiation

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900791	Chase	CBL6111B	Bilog Antenna (30 MHz – 2000 MHz)	N/A	1/31/13
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	2/22/12
900933	Hewlett Packard	11975A	Amplifier (2 - 8 GHz)	2304A00348	2/22/12
901516	Insulated Wire, Inc.	KPS-150.01253-2400-KPS-09302008	RF cable, 20'	NA	10/19/11
901517	Insulated Wire Inc.	KPS-150.01253-360-KPS-09302008	RF cable 36"	NA	10/19/11
900878	Rhein Tech Laboratories, Inc.	AM3-1197-0005	3 meter antenna mast, polarizing	Outdoor Range 1	Not Required
901242	Rhein Tech Laboratories, Inc.	WRT-000-0003	Wood rotating table	N/A	Not Required
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	6/14/12
900321	EMCO	3161-03	Horn Antennas (4 – 8 GHz)	9508-1020	6/14/12
900928	Hewlett Packard	83752A	Synthesized Sweeper, (0.01 - 20 GHz)	3610A00866	2/17/12
901262	ETS	3160-9	Double ridged Guide Antenna (1 - 18 GHz)	6748	5/1/12
900724	Antenna Research Associates, Inc.	LPB-2520	LOG/Bicon Antenna (25 – 1000 MHz)	1037	7/17/12
900905	Rhein Tech Laboratories, Inc.	PR-1040	OATS 1 Preamplifier 40dB (30 MHz – 2 GHz)	1006	4/10/12

Test Personnel:

Daniel Baltzell		September 27, 2011
Test Engineer	Signature	Date of Test

6.3 Part 22 Test Data

Limit = 43 + 10 Log (P) dB or 70 dB, whichever is greater. The worst case emissions test data are shown

The EUT transmitting at high power was determined to be the worst case emissions level and is reported in the following tables.

Table 6-12: Field Strength of Spurious Radiation – 152.015 MHz

51 dBc = Limit

Frequency (MHz)	Measured Level (dBuv)	Signal Gen. Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Level (dBc)	Margin (dB)
304.030	69.3	-55.0	0.2	1.4	104.7	-53.7
456.045	62.9	-59.5	0.2	1.7	109.0	-58.0
608.060	30.5	-88.6	0.2	1.3	138.5	-87.5
760.075	31.7	-84.2	0.2	0.9	134.6	-83.6
912.090	32.3	-84.5	0.3	0.9	134.8	-83.8
1064.105	33.9	-82.5	0.3	3.0	130.8	-79.8
1216.120	25.9	-92.8	0.3	3.3	140.8	-89.8
1368.135	28.5	-87.1	0.3	4.6	133.9	-82.9
1520.150	25.5	-92.2	0.4	5.6	137.9	-86.9

Table 6-13: Field Strength of Spurious Radiation – 158.71 MHz

50.9 dBc = Limit

Frequency (MHz)	Measured Level (dBuv)	Signal Gen. Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Level (dBc)	Margin (dB)
317.420	59.7	-64.8	0.2	1.5	114.4	-63.5
476.130	63.2	-58.8	0.2	1.6	108.3	-57.4
634.840	35.6	-83.0	0.2	1.3	132.8	-81.9
793.550	35.9	-81.0	0.2	0.7	131.5	-80.6
952.260	35.8	-80.9	0.3	1.2	130.8	-79.9
1110.970	31.0	-85.3	0.3	2.9	133.6	-82.7
1269.680	32.3	-83.5	0.3	3.9	130.8	-79.9
1428.390	22.9	-92.5	0.3	4.9	138.8	-87.9
1587.100	22.4	-95.1	0.4	6.6	139.8	-88.9

Table 6-14: Test Equipment Used for Testing Field Strength of Spurious Radiation

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900791	Chase	CBL6111B	Bilog Antenna (30 MHz – 2000 MHz)	N/A	1/31/14
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz - 26.5 GHz)	MY51250846	4/16/14
900905	Rhein Tech Laboratories	PR-1040	OATS 1 Preamplifier 40dB (30 MHz – 2 GHz)	1006	8/20/13
901158	Compliance Design, Inc.	Roberts Dipole Antenna	Adjustable Elements Dipole Antennas (25 - 1000 MHz)	00401	3/6/14
901262	ETS	3160-9	Double ridged Guide Antenna (1 - 18 GHz)	6748	5/11/14
900928	Hewlett Packard	83752A	Synthesized Sweeper (0.01 - 20 GHz)	3610A00866	3/20/15
901592	Insulated Wire Inc.	KPS-1503-3600-KPR	SMK RF Cables 20’	NA	8/16/14
901593	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 36”	NA	8/16/14
901594	Insulated Wire Inc.	KPS-1503-360-KPR	SMK RF Cables 36”	NA	8/16/14

Test Personnel:

Daniel Baltzell		August 9, 2013
Test Engineer	Signature	Date of Test

7 Occupied Bandwidth and Spectrum Masts: FCC Parts 2.1049(c)(1), 22.359(b), 80.205, 80.211, 90.210, IC RSS-119 5.5, 5.8

Occupied Bandwidth - Compliance with the Emission Masks

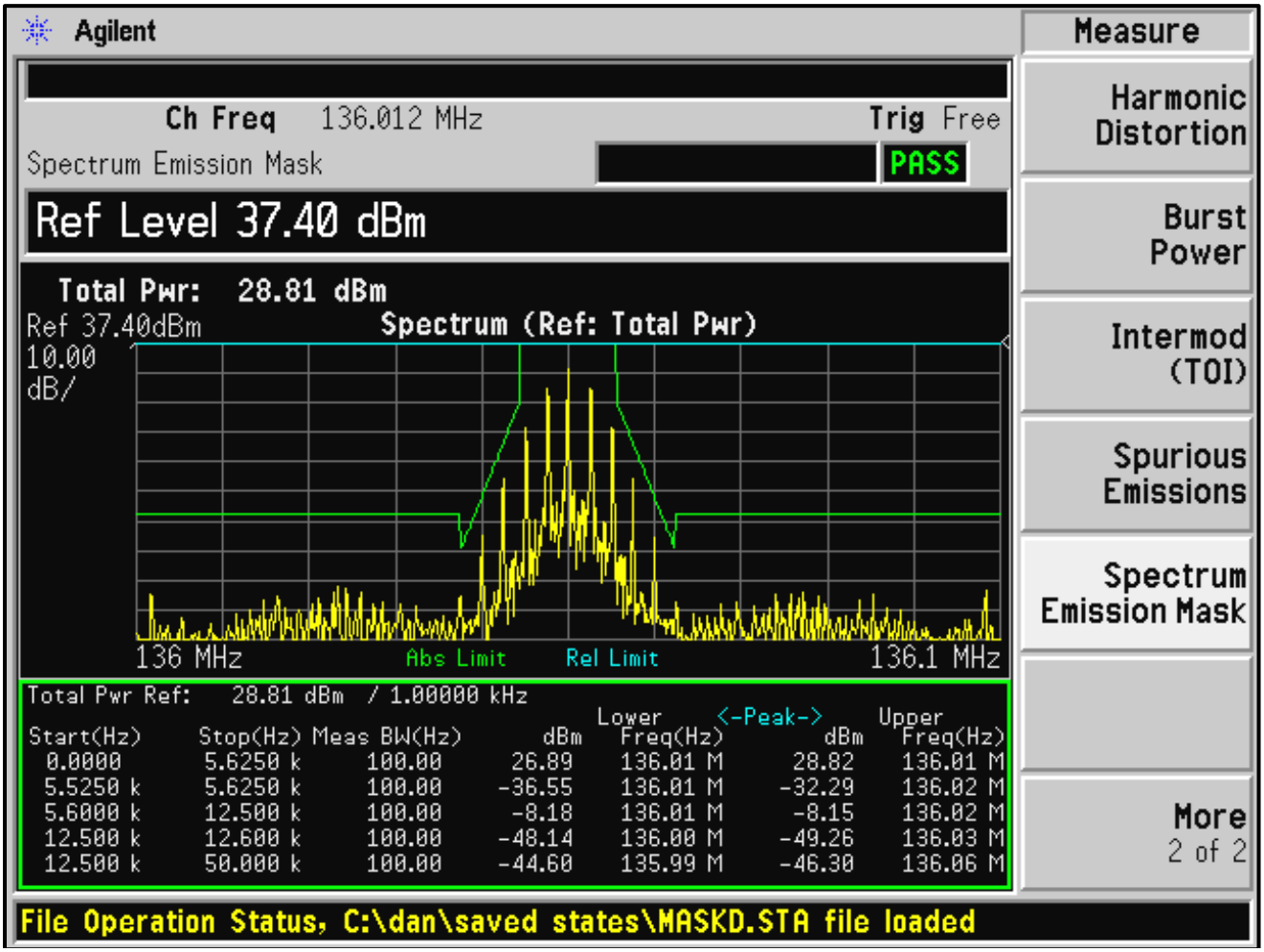
7.1 Test Procedure

TIA-603-D 2010 Section 2.2.11

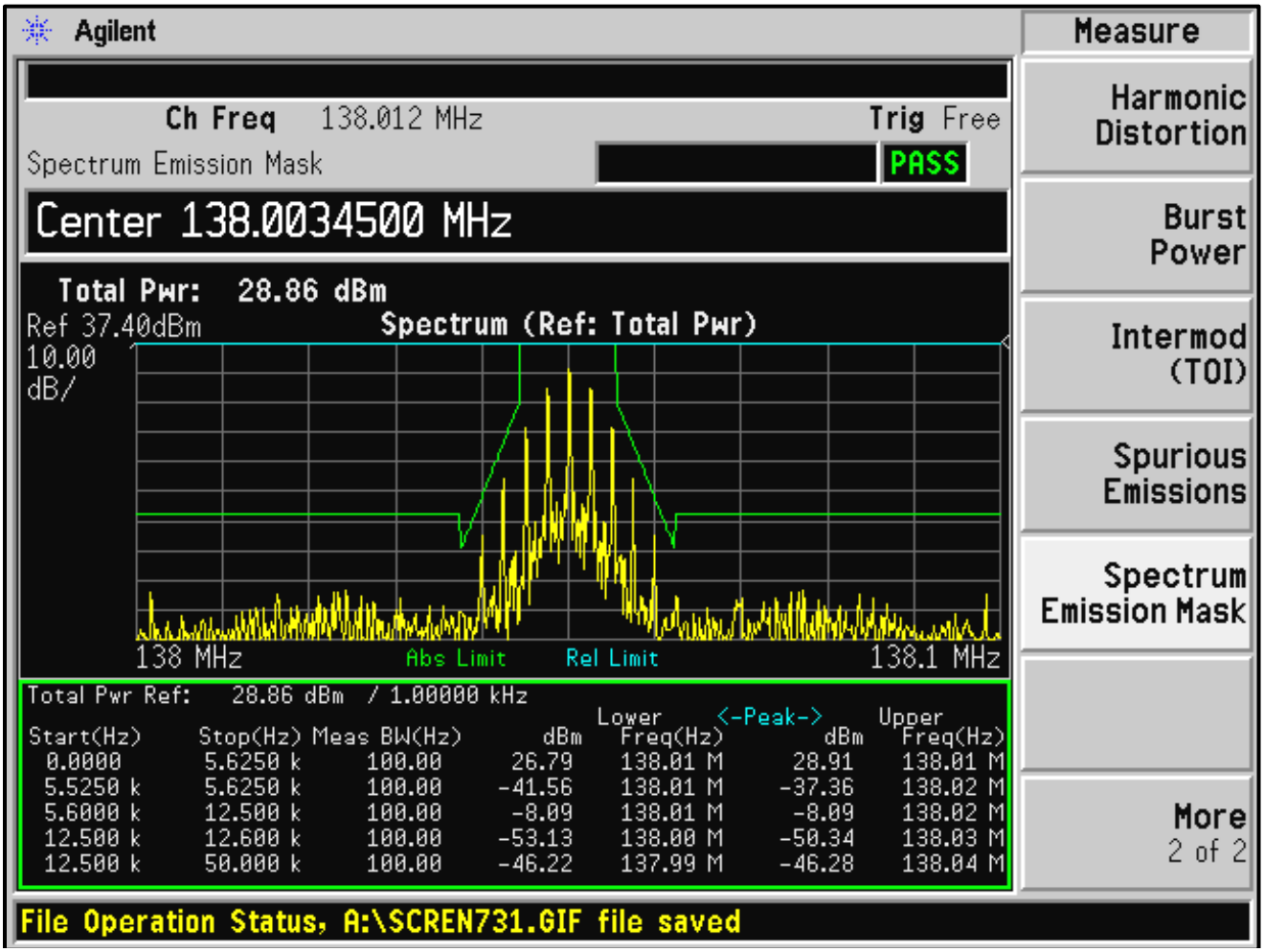
Device with digital modulation: Modulated to its maximum extent using a pseudo-random data sequence – 19,200 bps for OTP and 9,600 bps for P25 and EDACS modes.

7.2 Part 90 Test Data

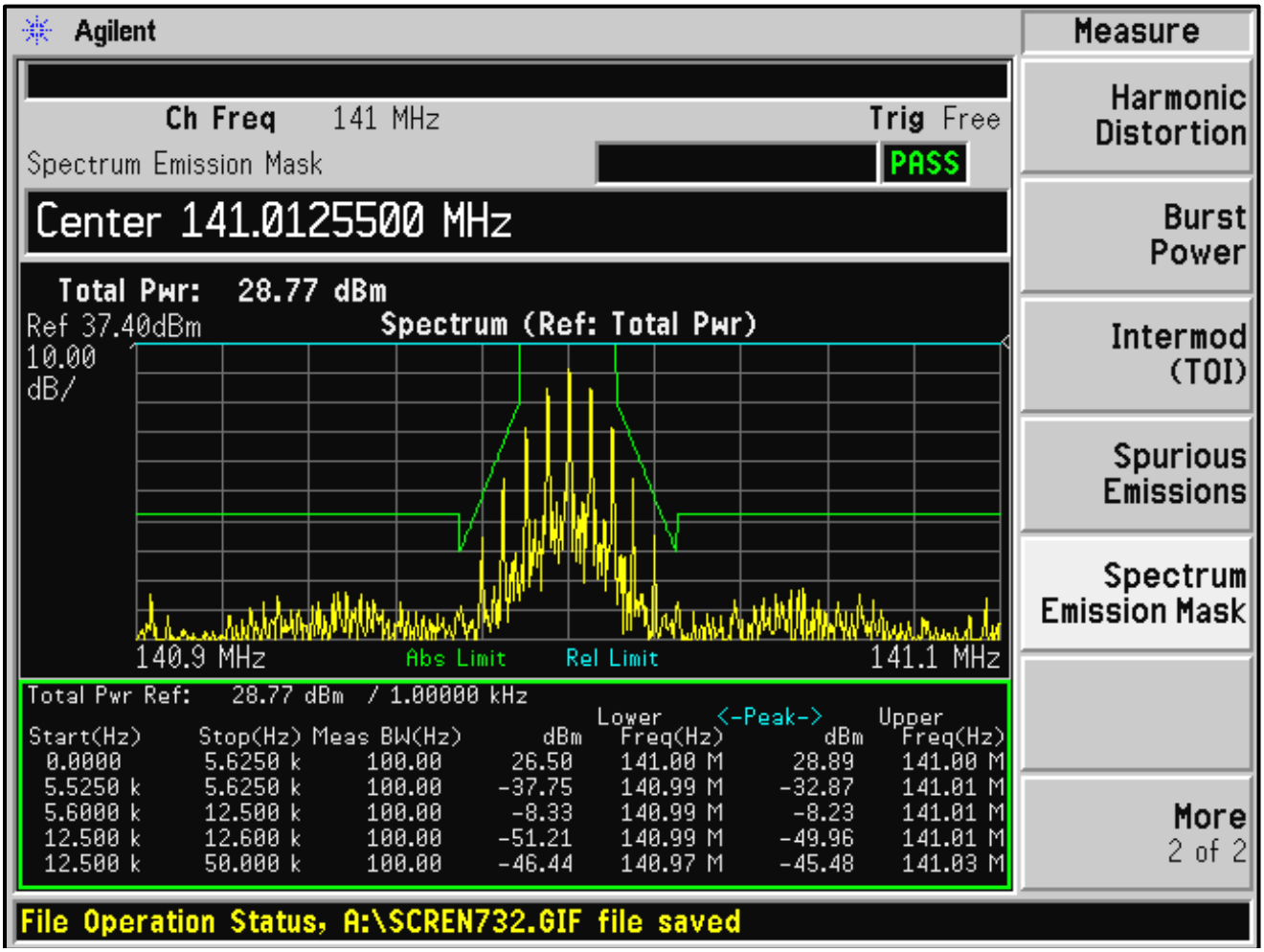
Plot 7-1: Occupied Bandwidth – 136.0125 MHz; Analog (Mask D)



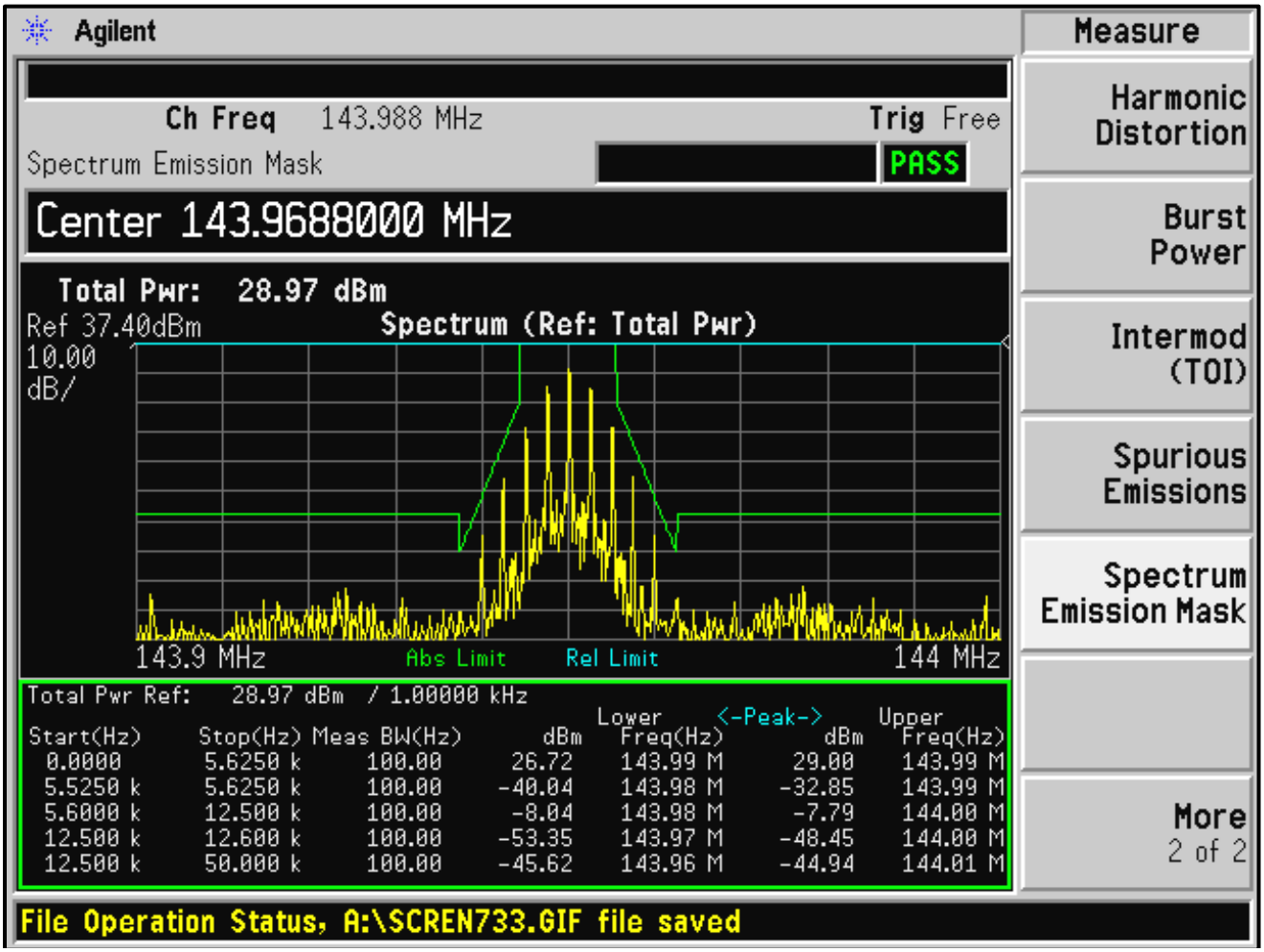
Plot 7-2: Occupied Bandwidth – 138.0125 MHz; Analog (Mask D)



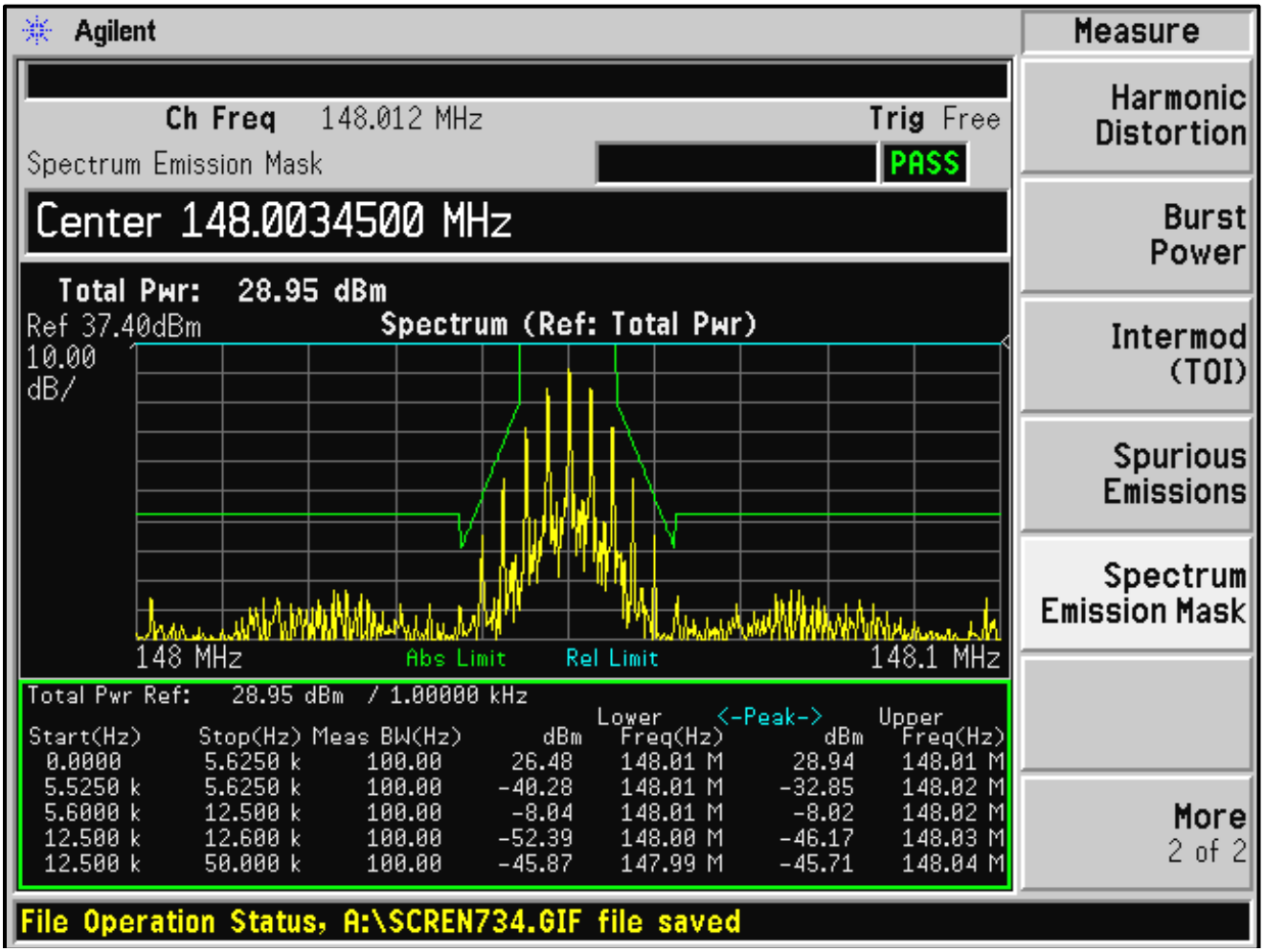
Plot 7-3: Occupied Bandwidth – 141.0000 MHz; Analog (Mask D)



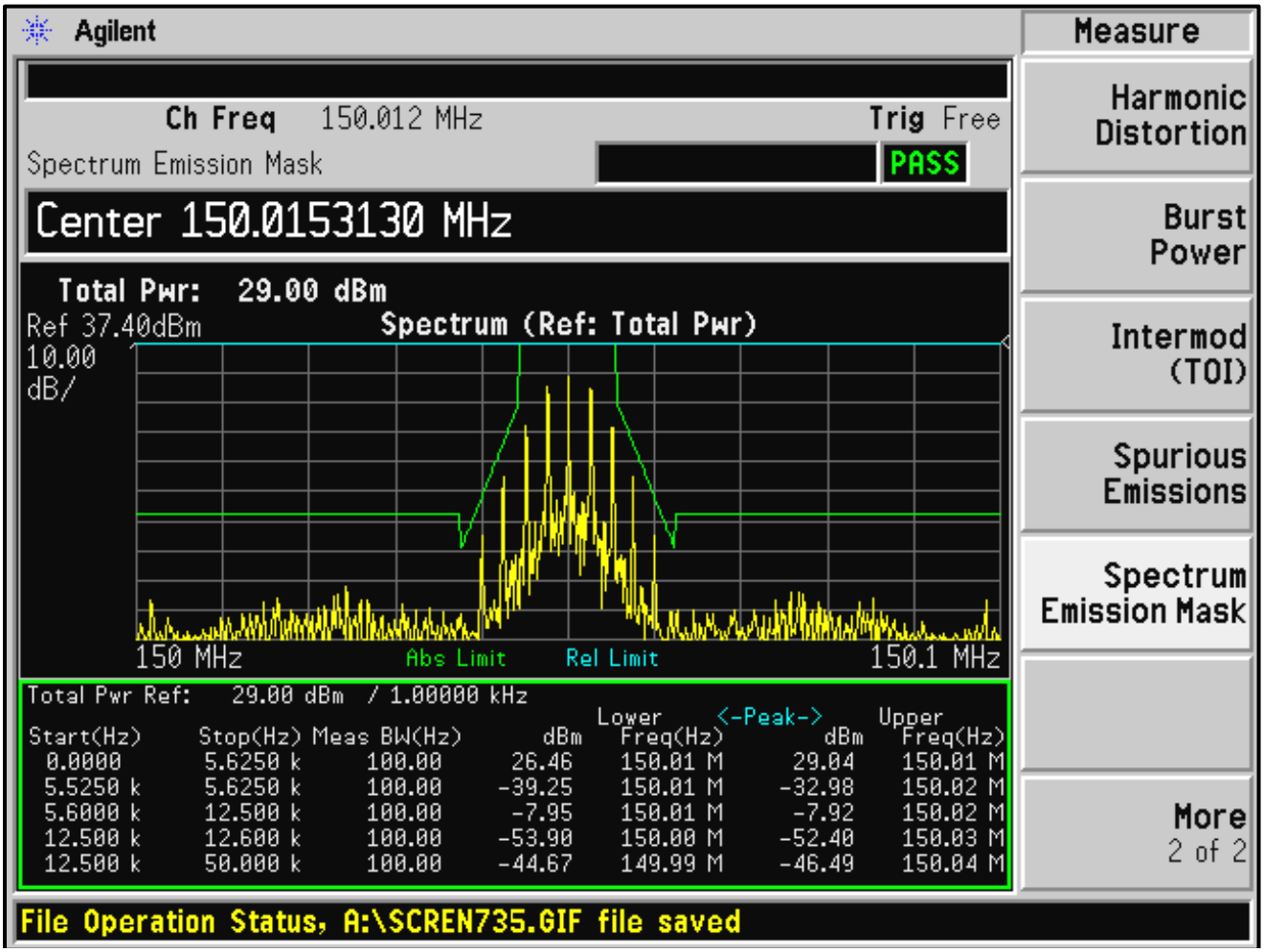
Plot 7-4: Occupied Bandwidth – 143.9875 MHz; Analog (Mask D)



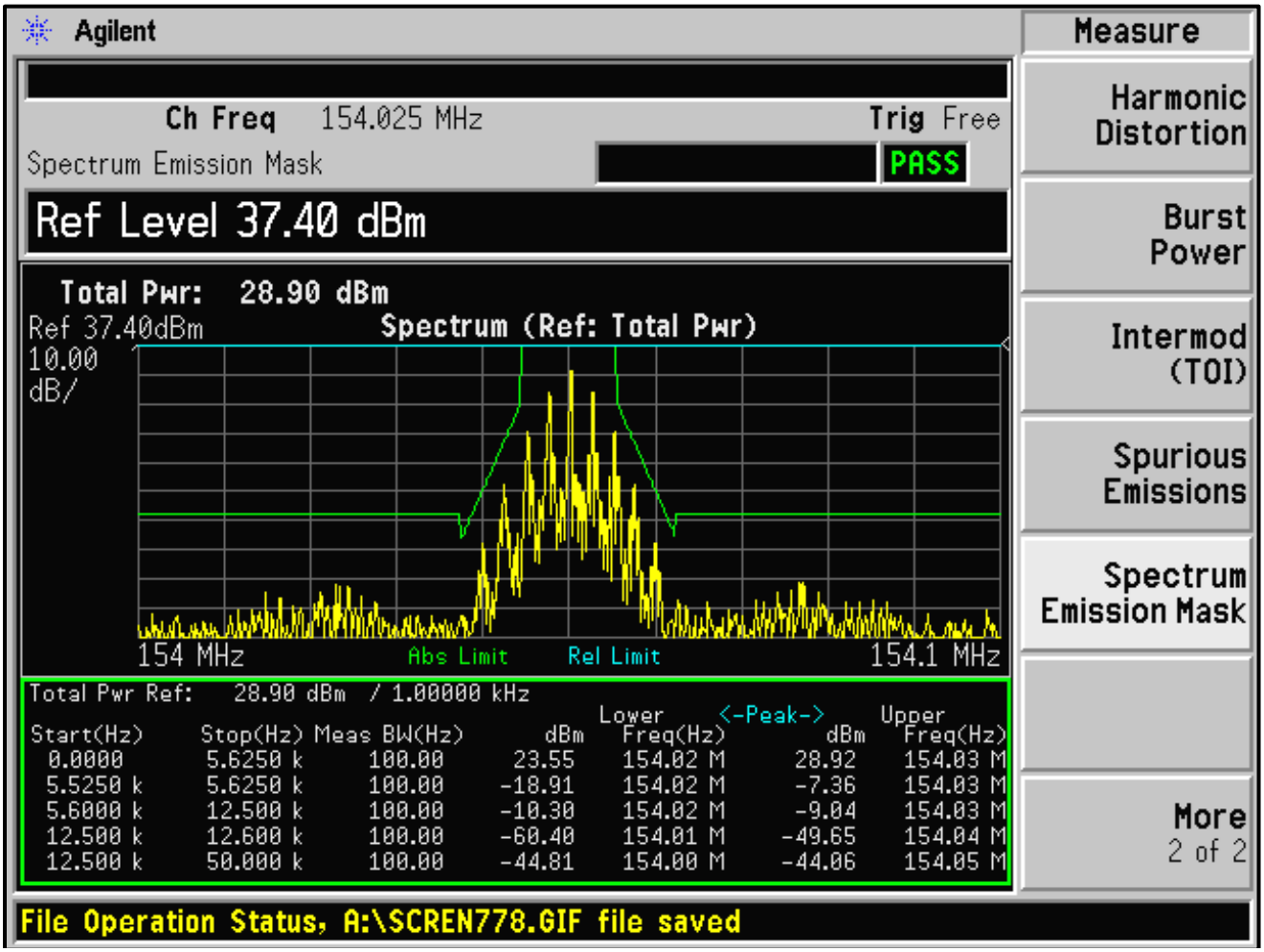
Plot 7-5: Occupied Bandwidth – 148.0125 MHz; Analog (Mask D)



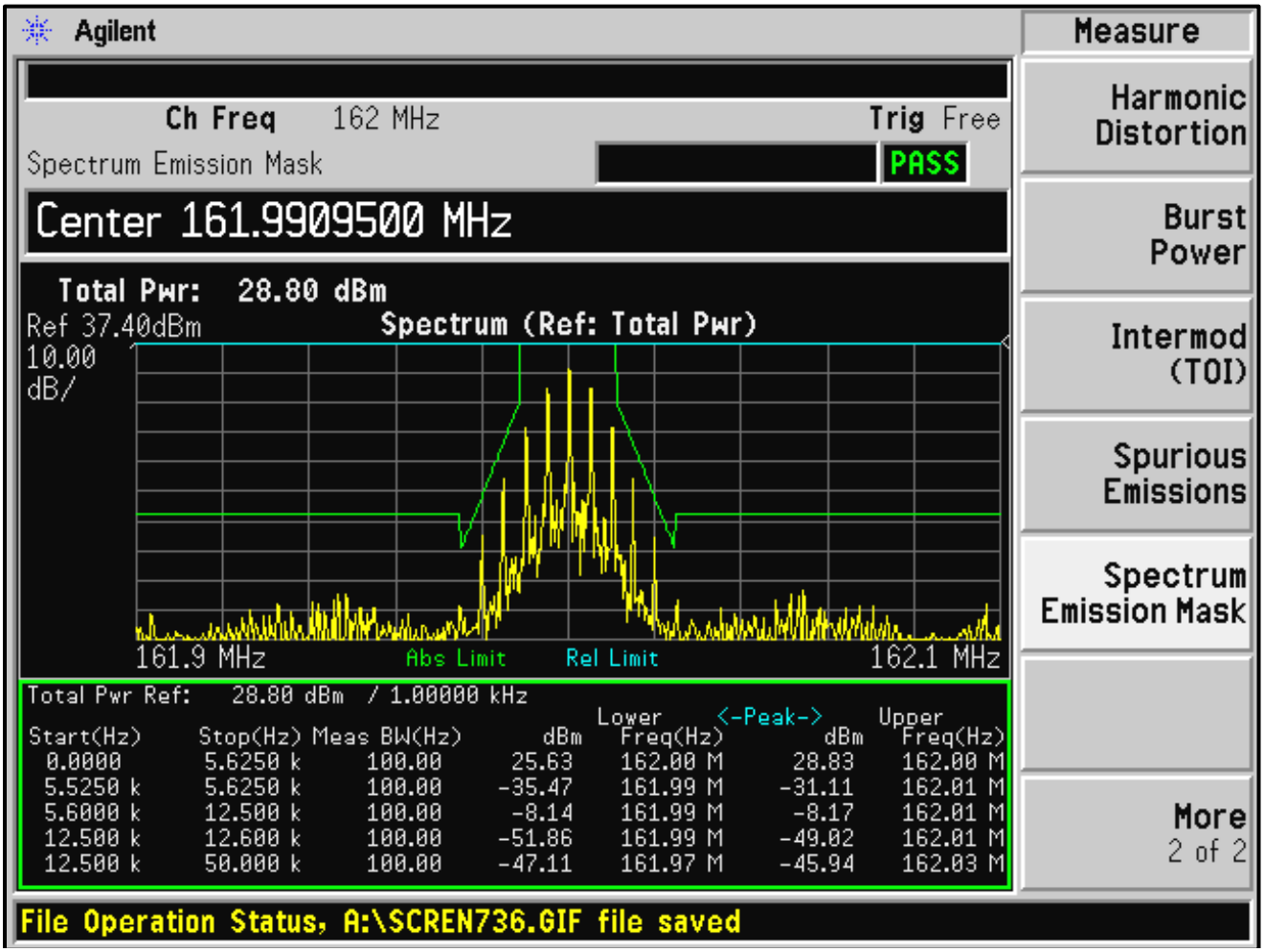
Plot 7-6: Occupied Bandwidth – 150.0125 MHz; Analog (Mask D)



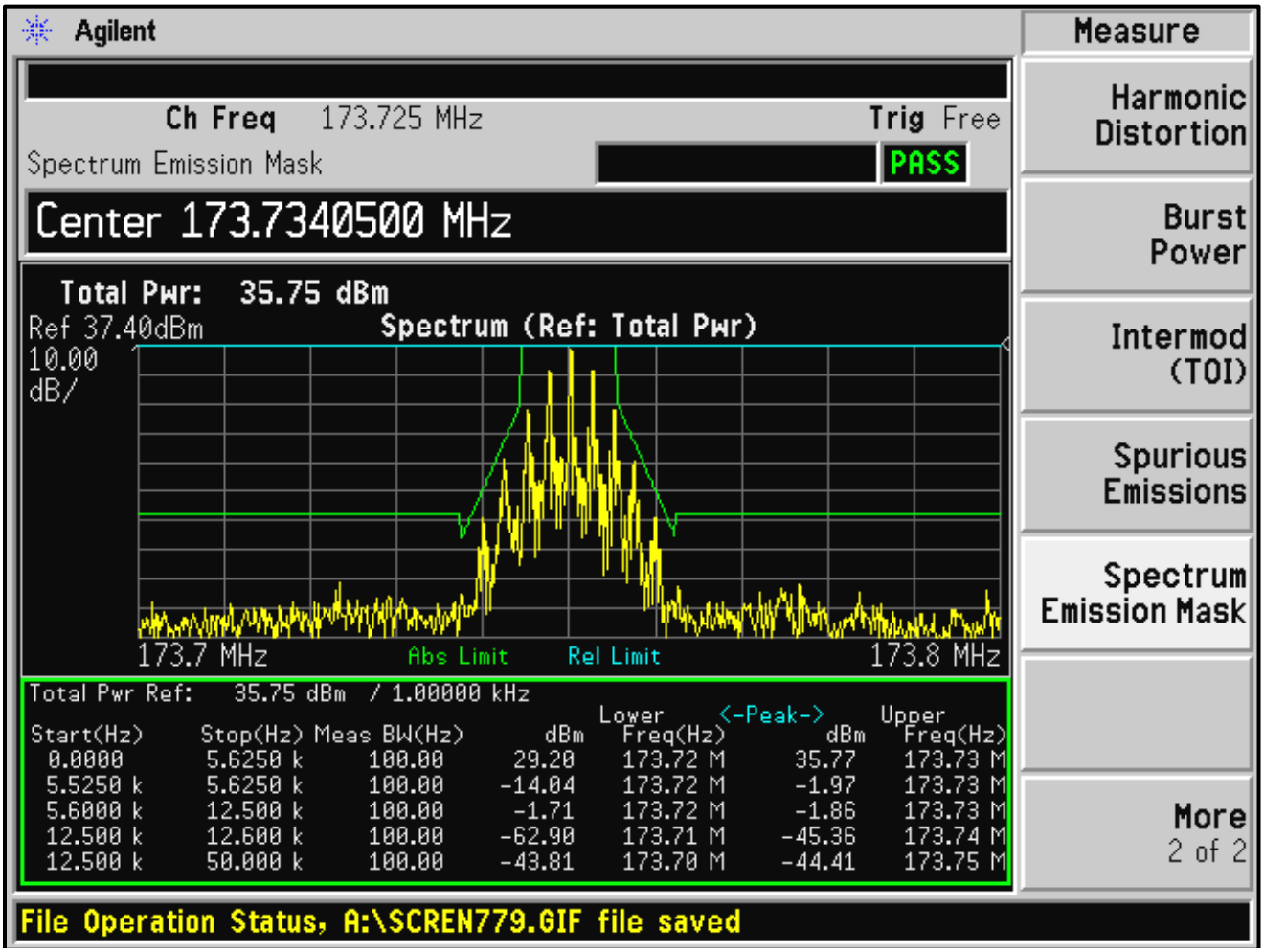
Plot 7-7: Occupied Bandwidth – 154.0250 MHz; Analog (Mask D)



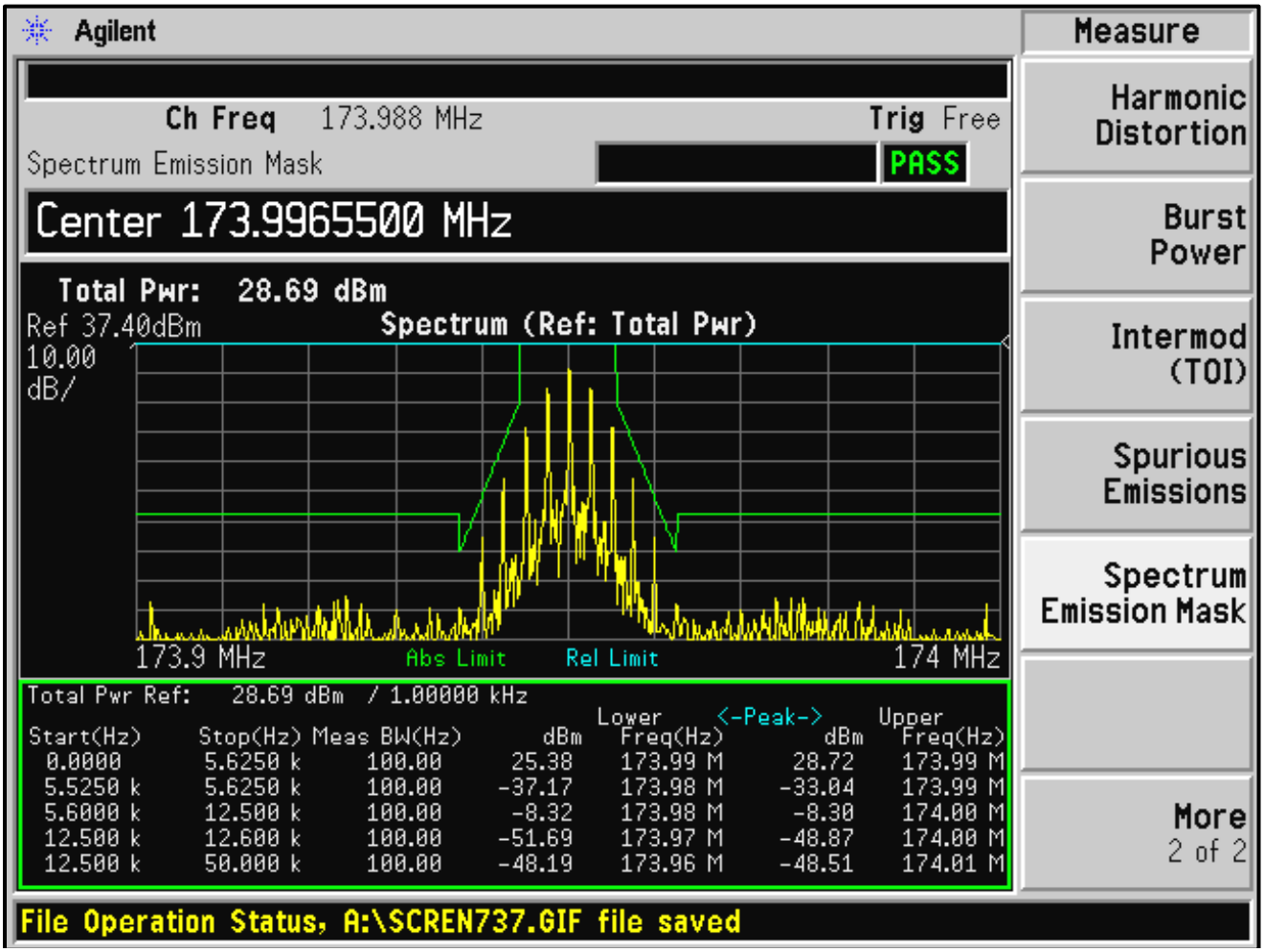
Plot 7-8: Occupied Bandwidth – 162.0000 MHz; Analog (Mask D)



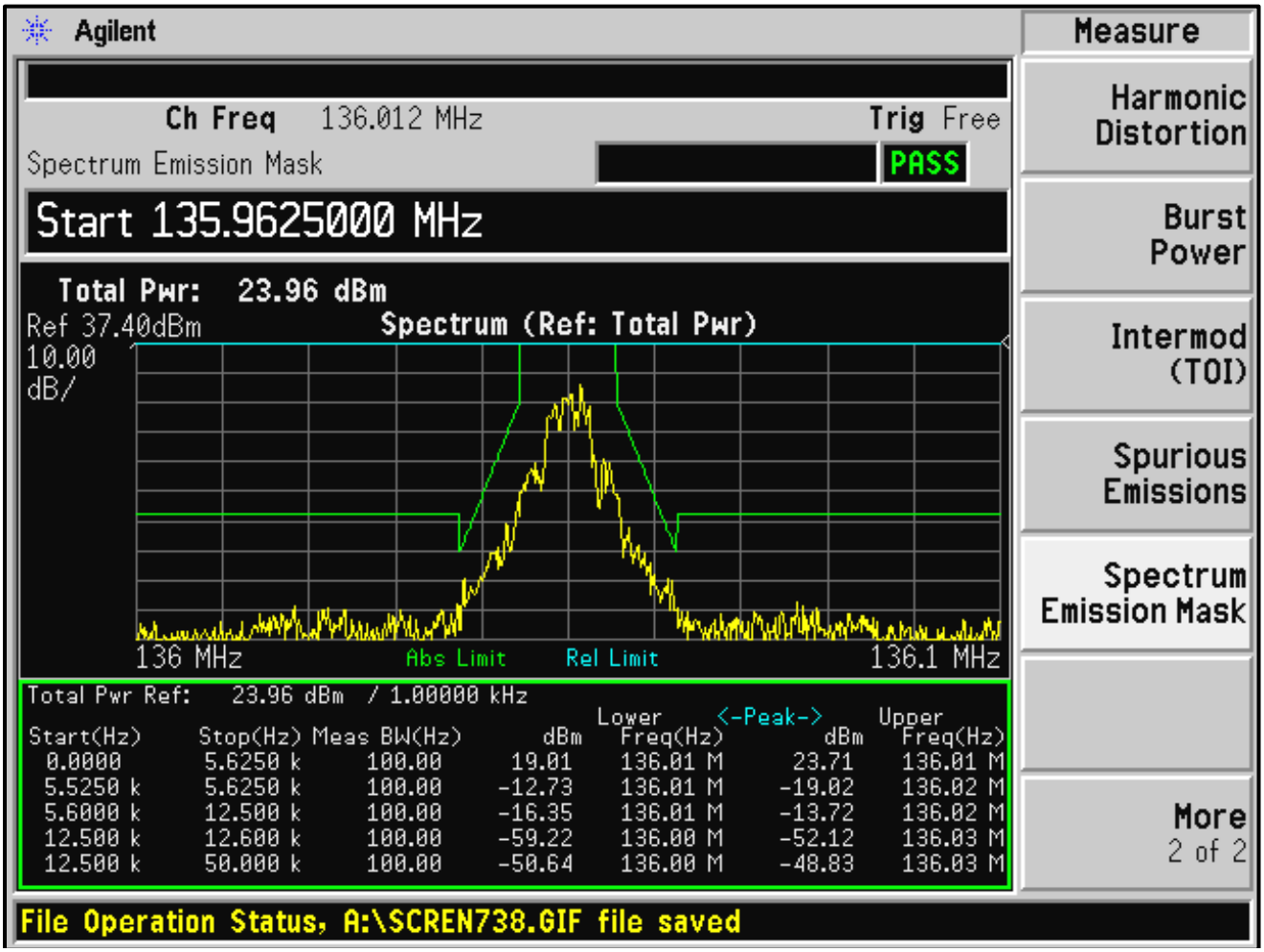
Plot 7-9: Occupied Bandwidth – 173.7250 MHz; Analog (Mask D)



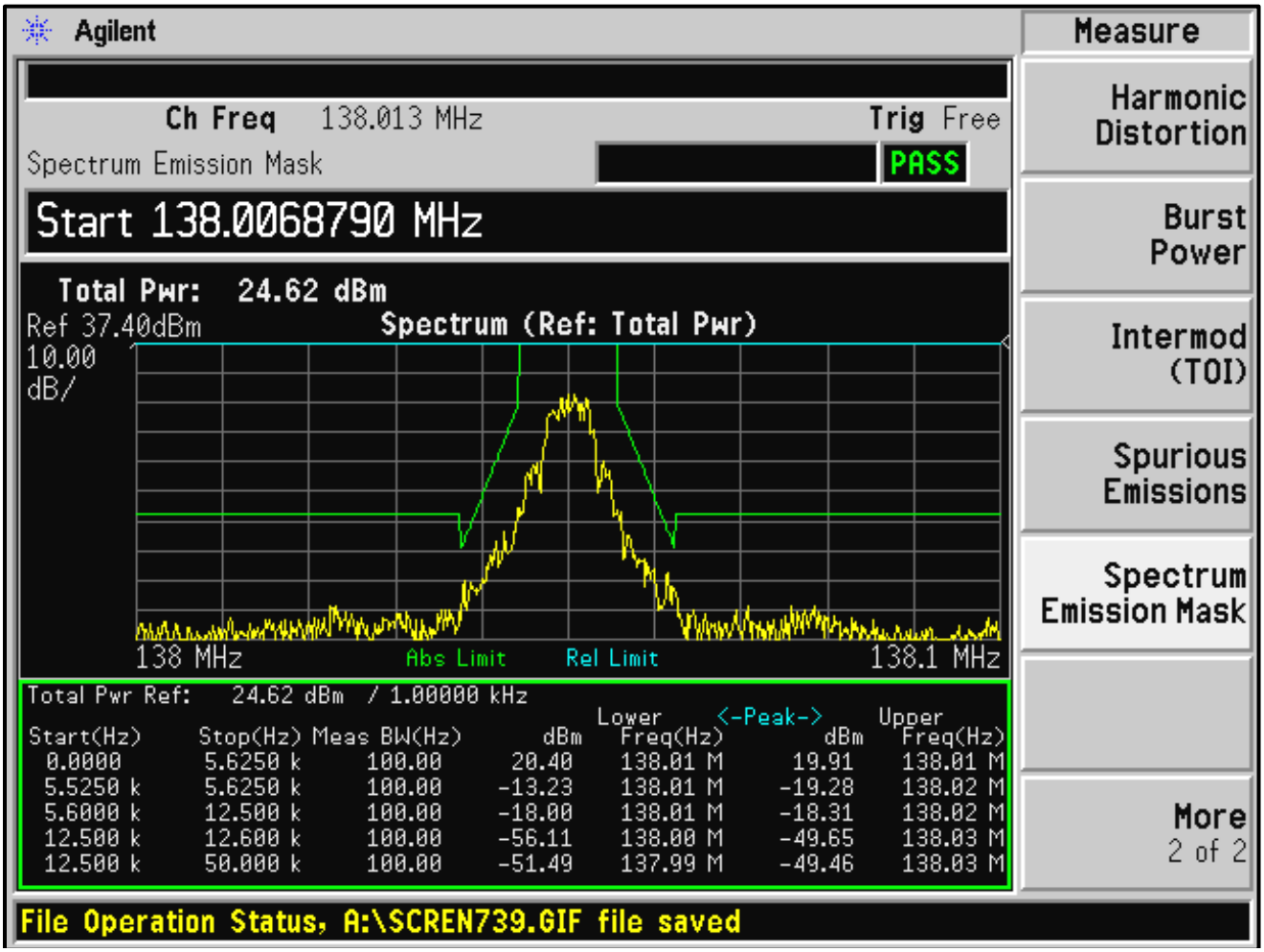
Plot 7-10: Occupied Bandwidth – 173.9875 MHz; Analog (Mask D)



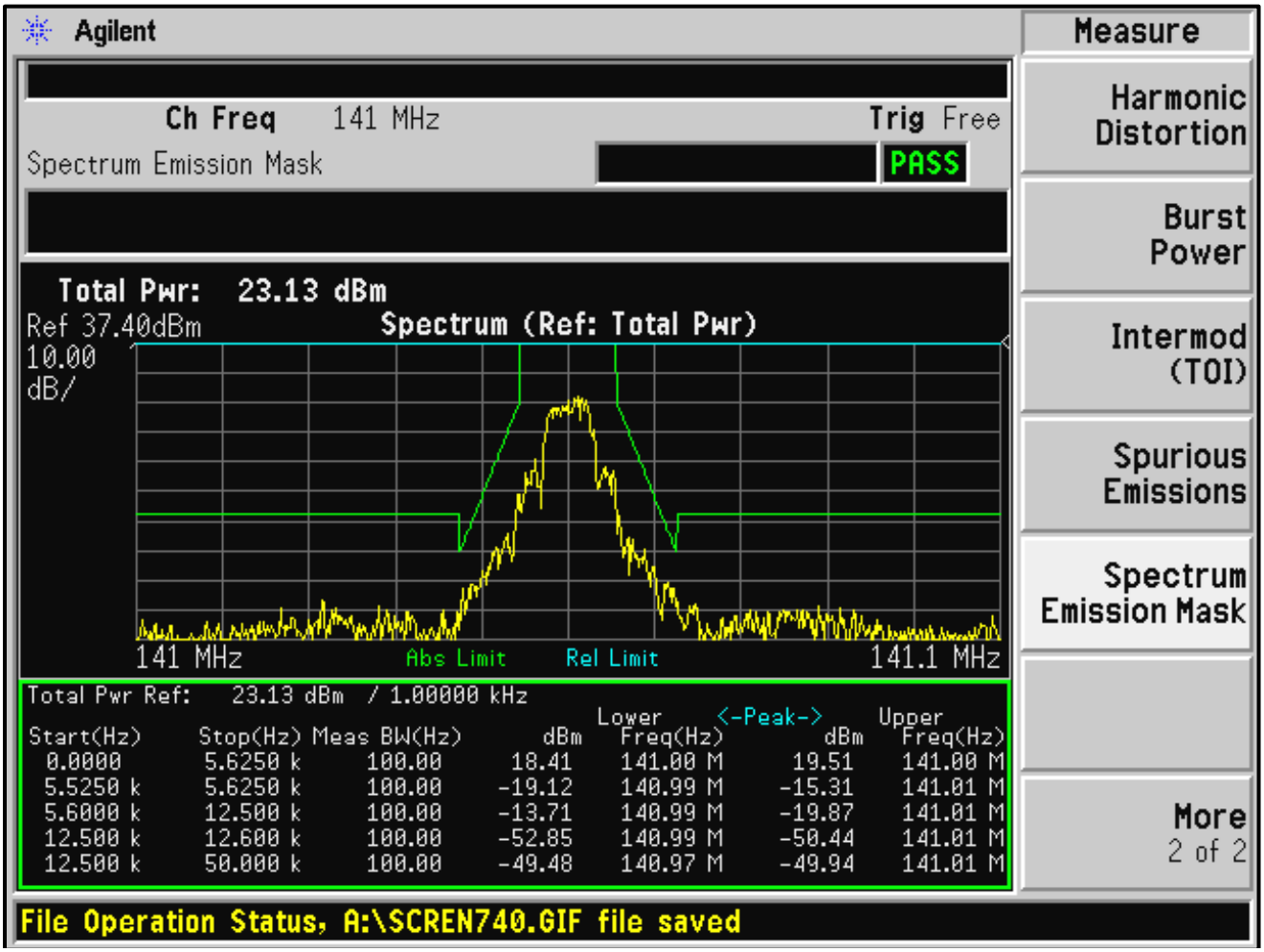
Plot 7-11: Occupied Bandwidth – 136.0125 MHz; 2 level NB 4800 (Mask D)



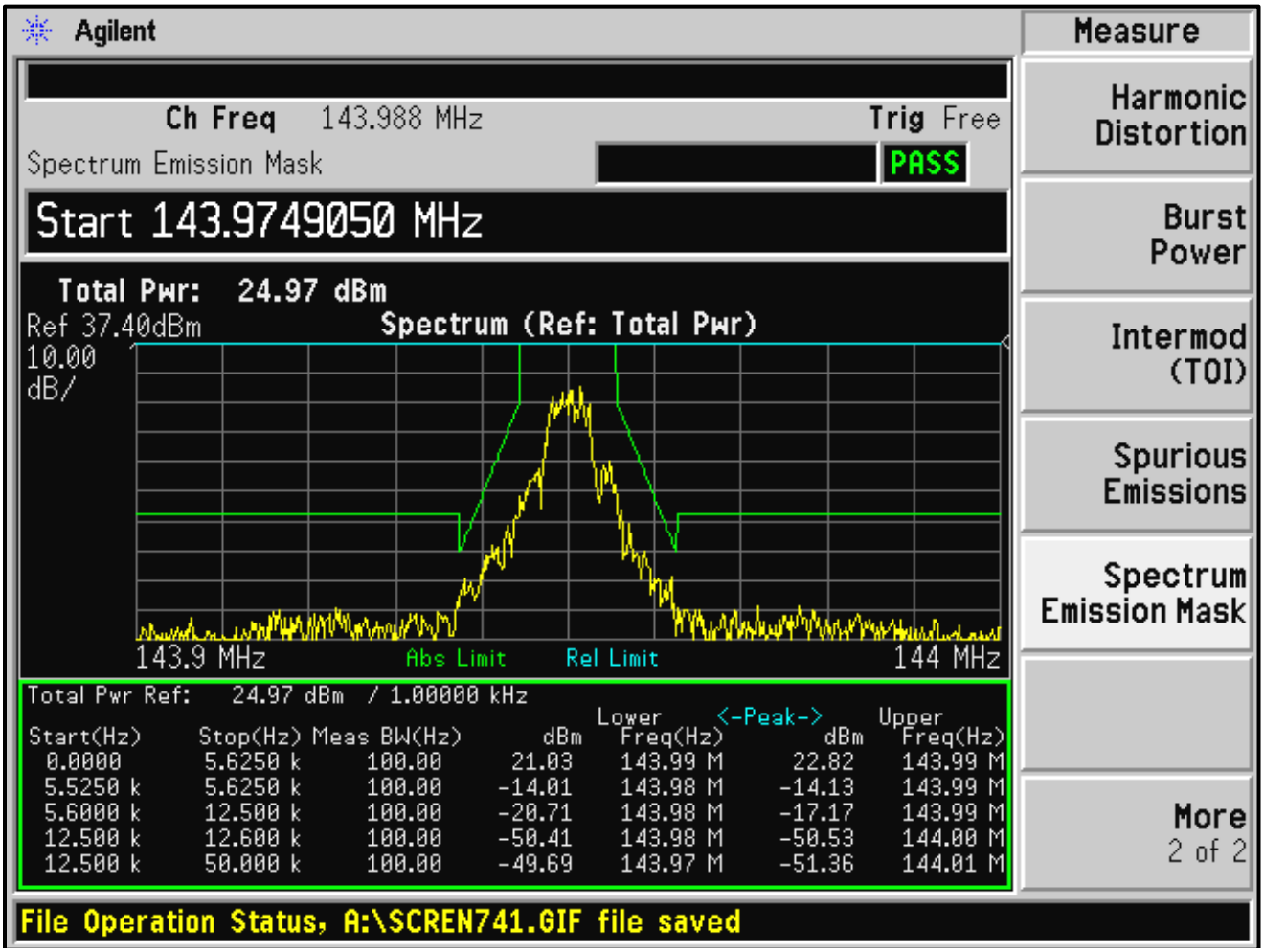
Plot 7-12: Occupied Bandwidth – 138.0125 MHz; 2 level NB 4800 (Mask D)



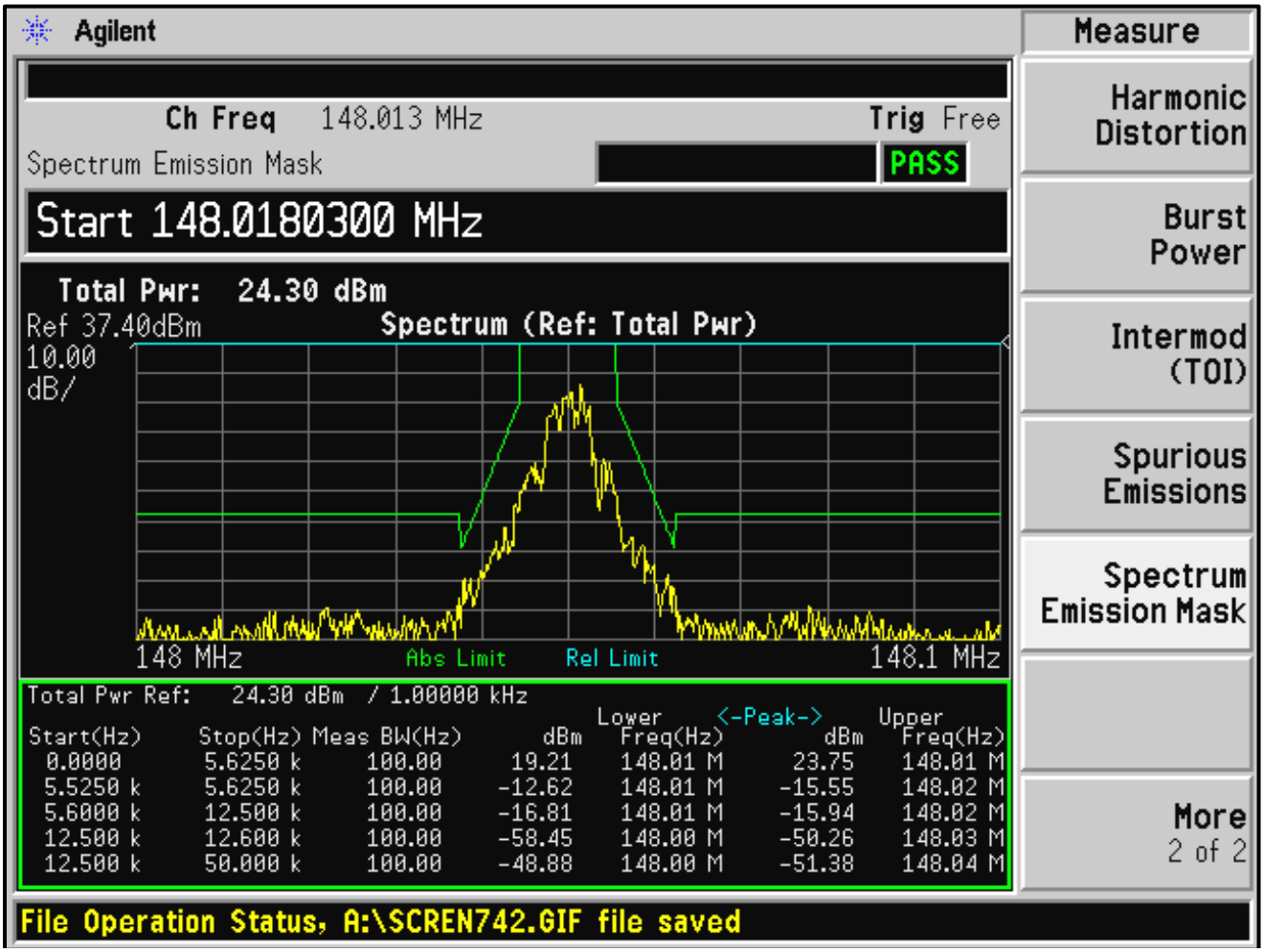
Plot 7-13: Occupied Bandwidth – 141.0000 MHz; 2 level NB 4800 (Mask D)



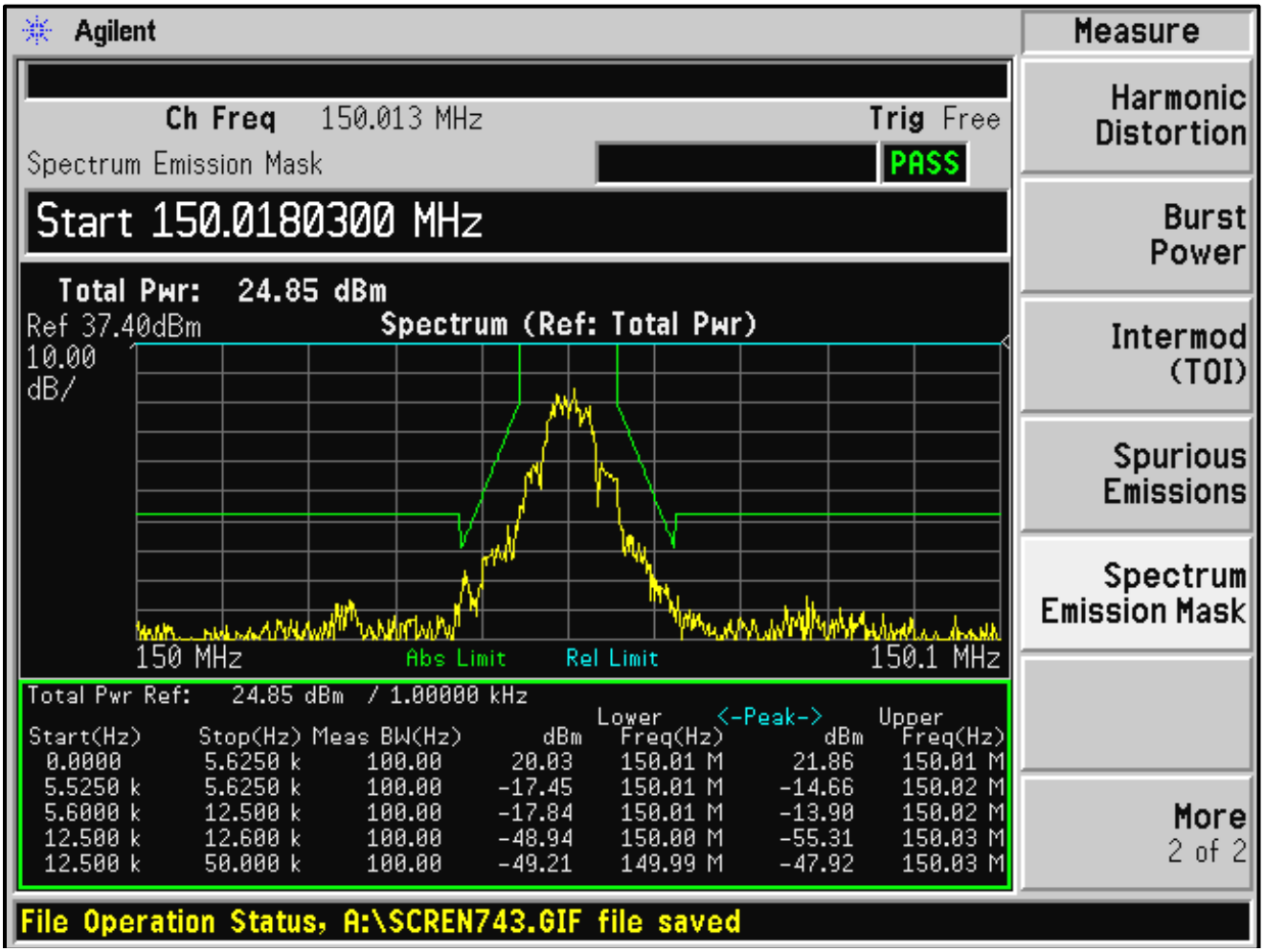
Plot 7-14: Occupied Bandwidth – 143.9875 MHz; 2 level NB 4800 (Mask D)



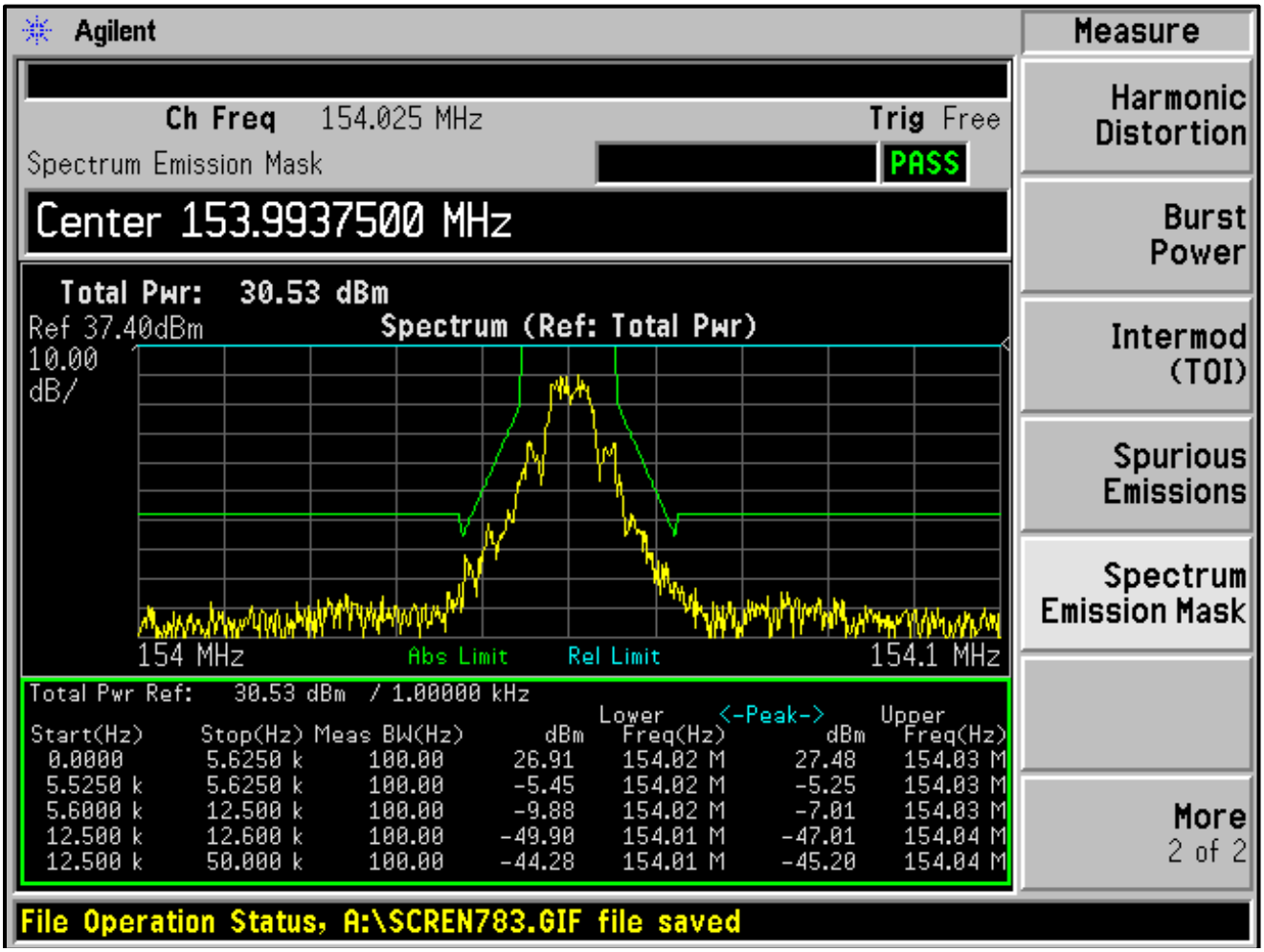
Plot 7-15: Occupied Bandwidth – 148.0125 MHz; 2 level NB 4800 (Mask D)



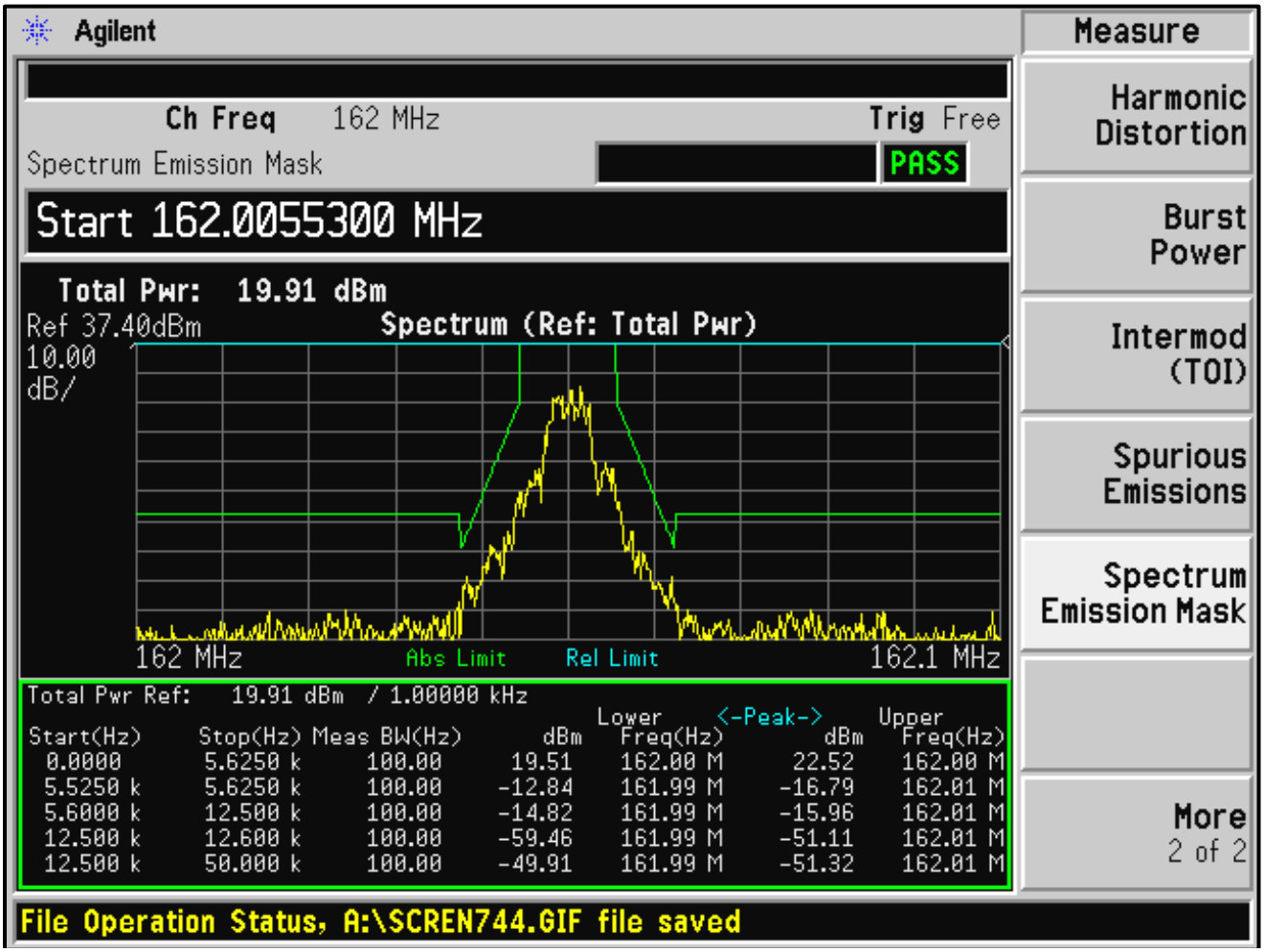
Plot 7-16: Occupied Bandwidth – 150.0125 MHz; 2 level NB 4800 (Mask D)



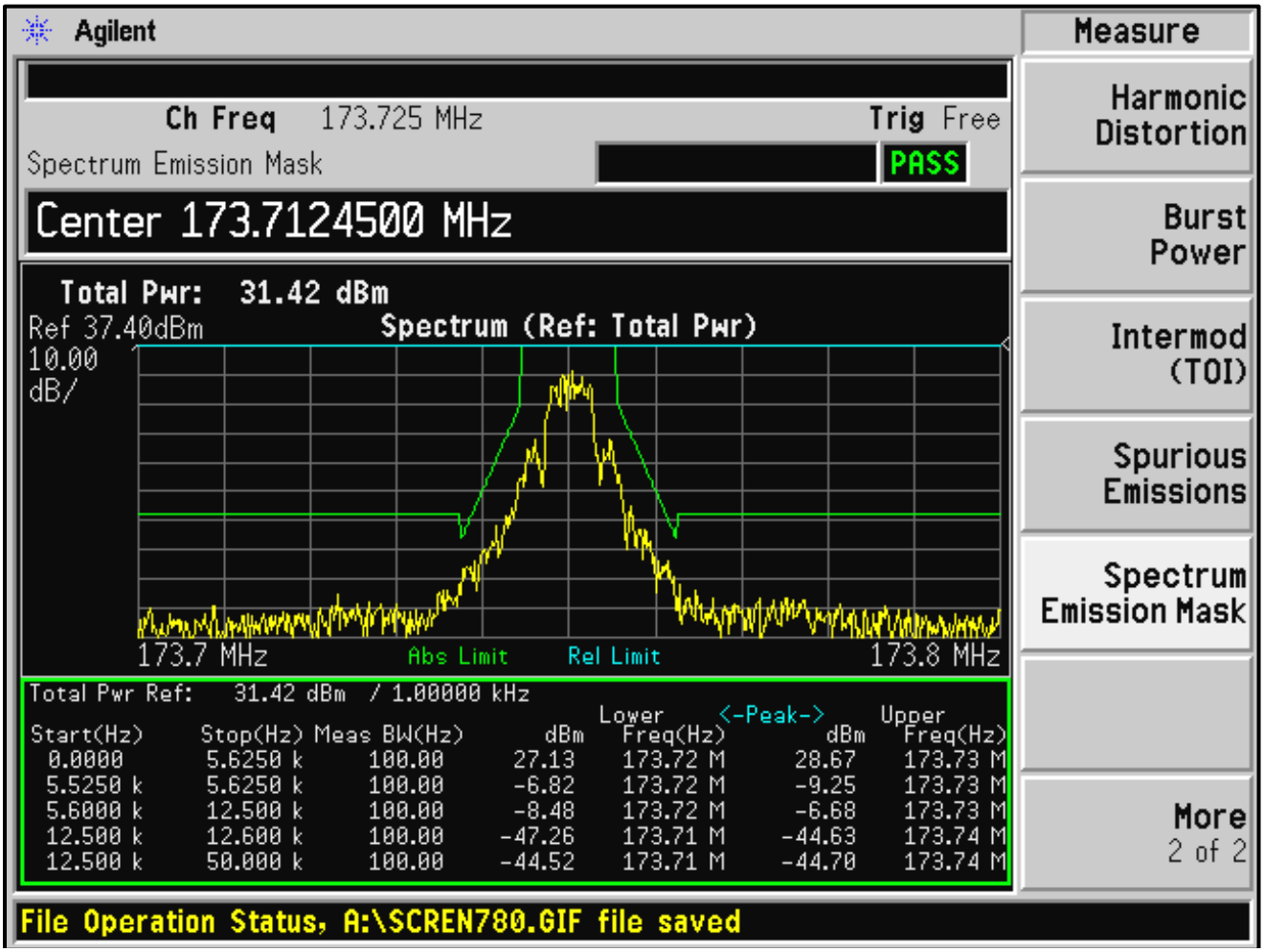
Plot 7-17: Occupied Bandwidth – 154.0250 MHz; 2 level NB 4800 (Mask D)



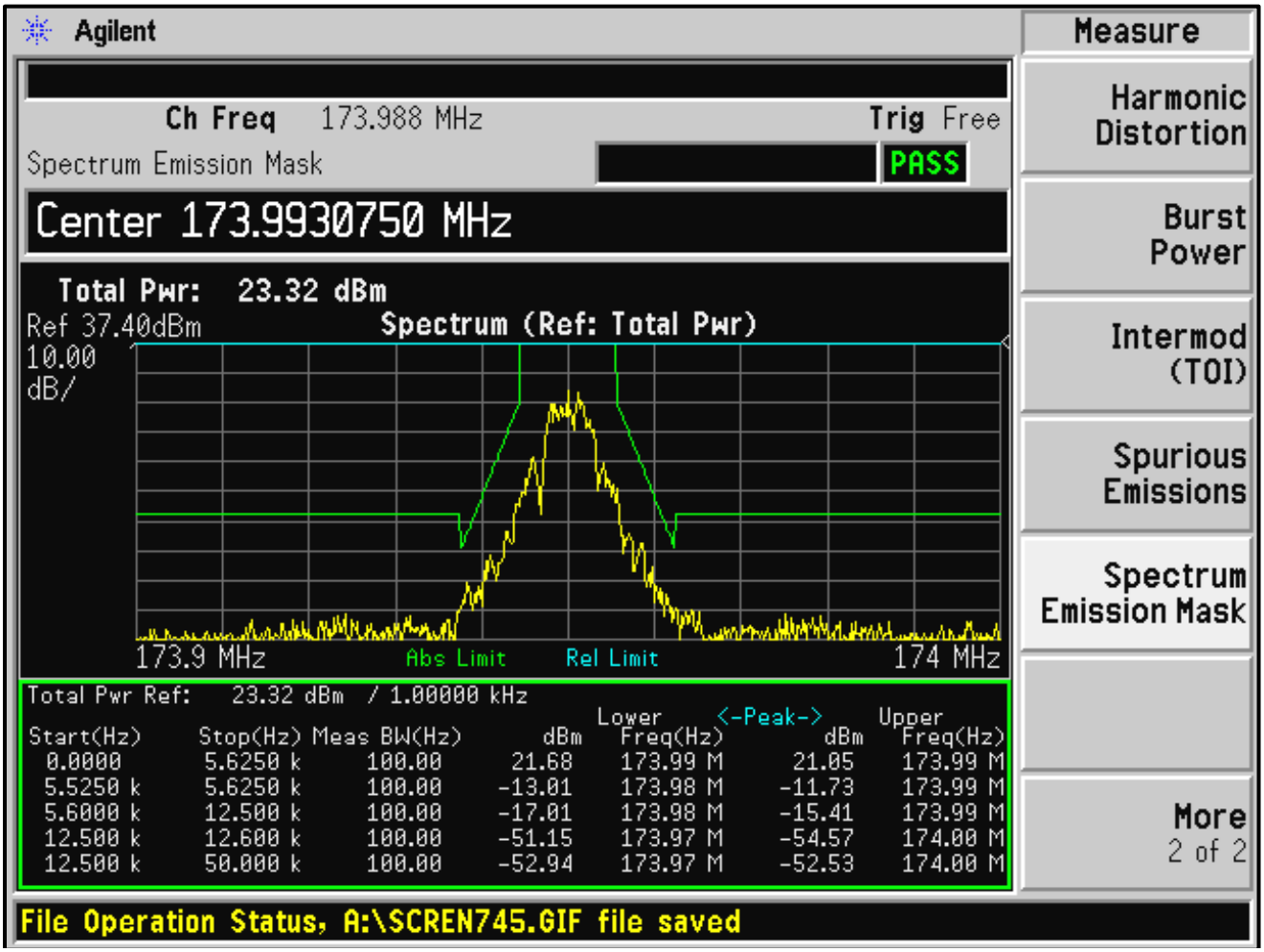
Plot 7-18: Occupied Bandwidth – 162.0000 MHz; 2 level NB 4800 (Mask D)



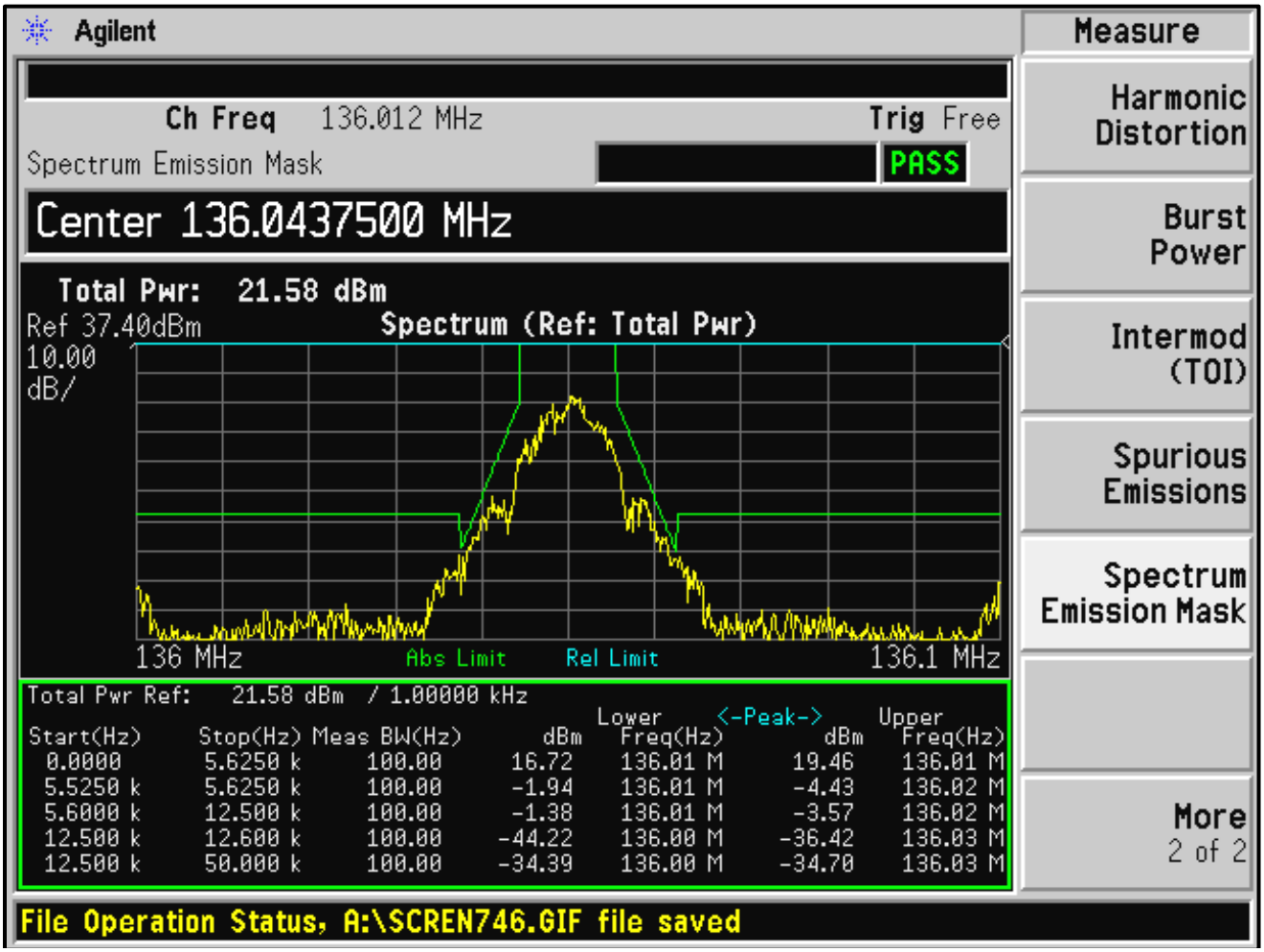
Plot 7-19: Occupied Bandwidth – 173.1750 MHz; 2 level NB 4800 (Mask D)



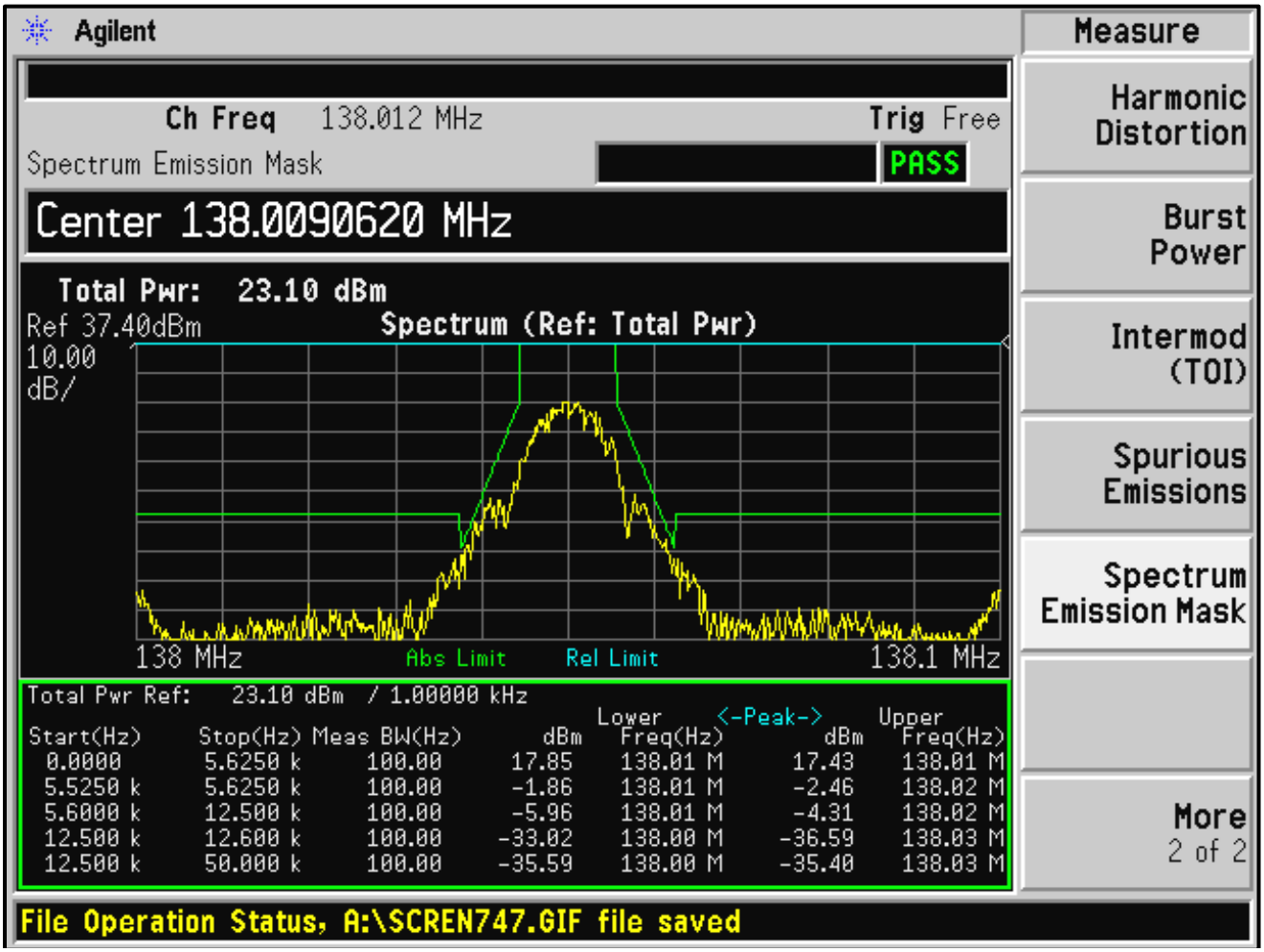
Plot 7-20: Occupied Bandwidth – 173.9875 MHz; 2 level NB 4800 (Mask D)



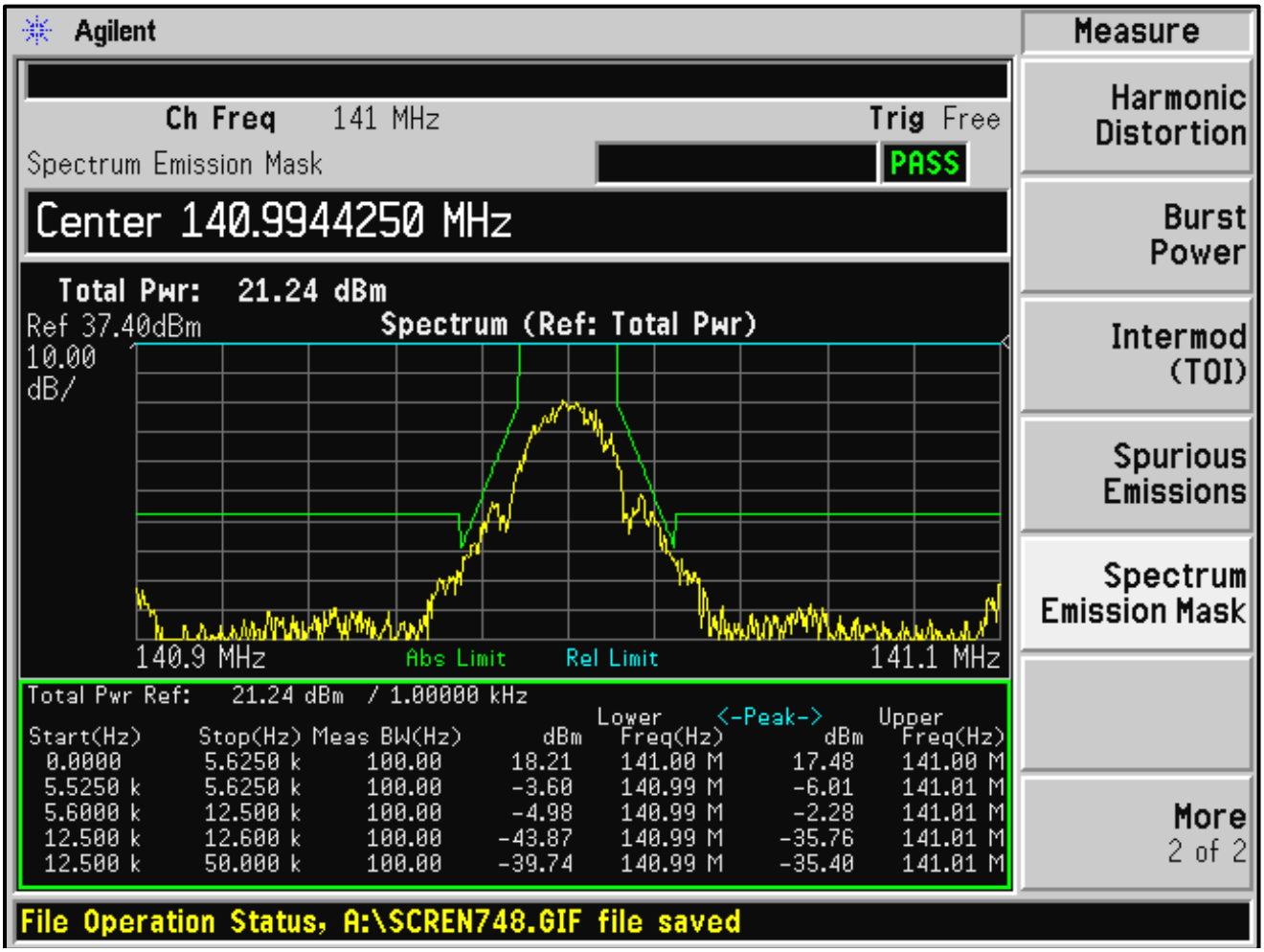
Plot 7-21: Occupied Bandwidth – 136.0125 MHz; 2 level NB 9600 (Mask D)



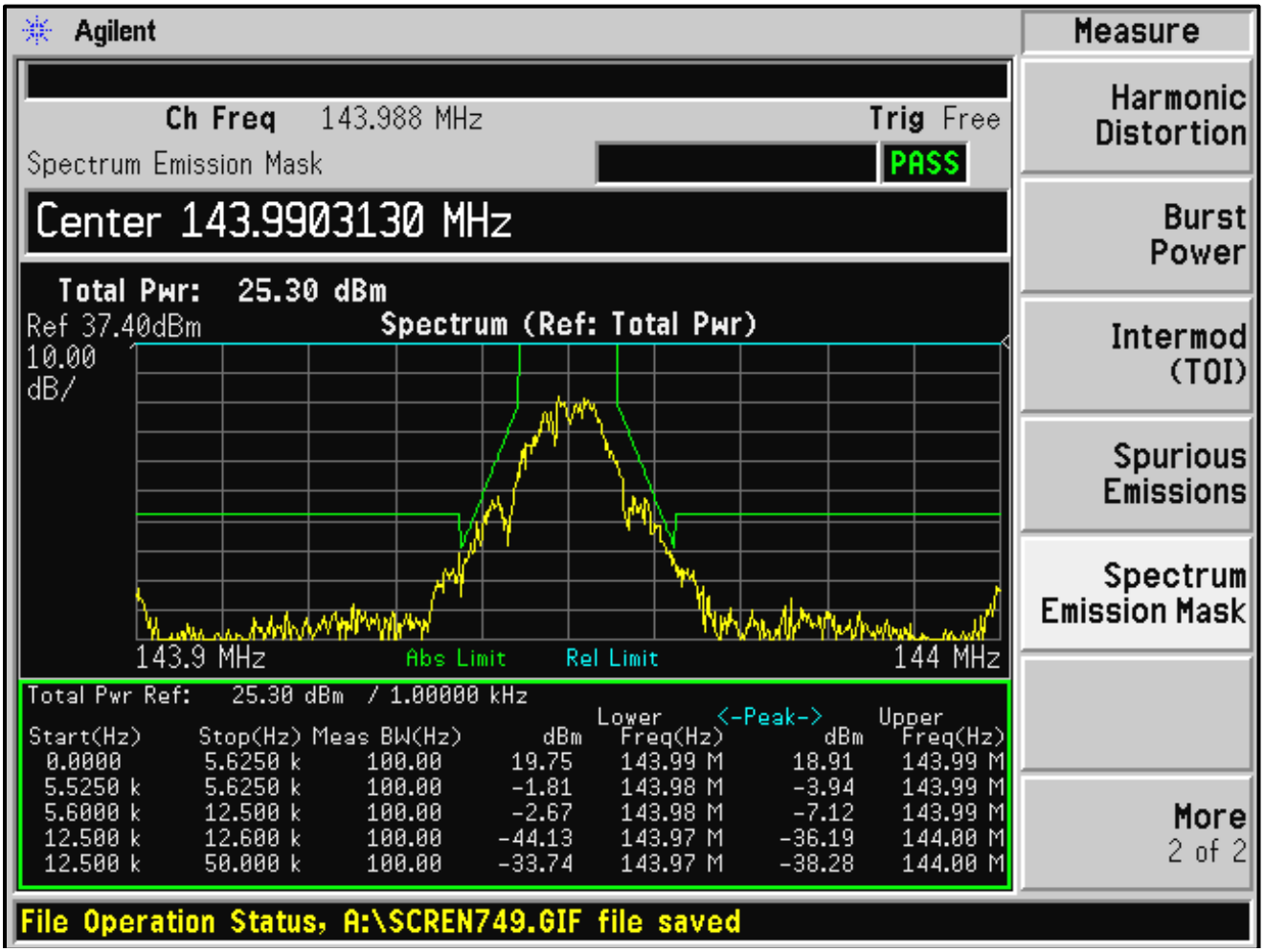
Plot 7-22: Occupied Bandwidth – 138.0125 MHz; 2 level NB 9600 (Mask D)



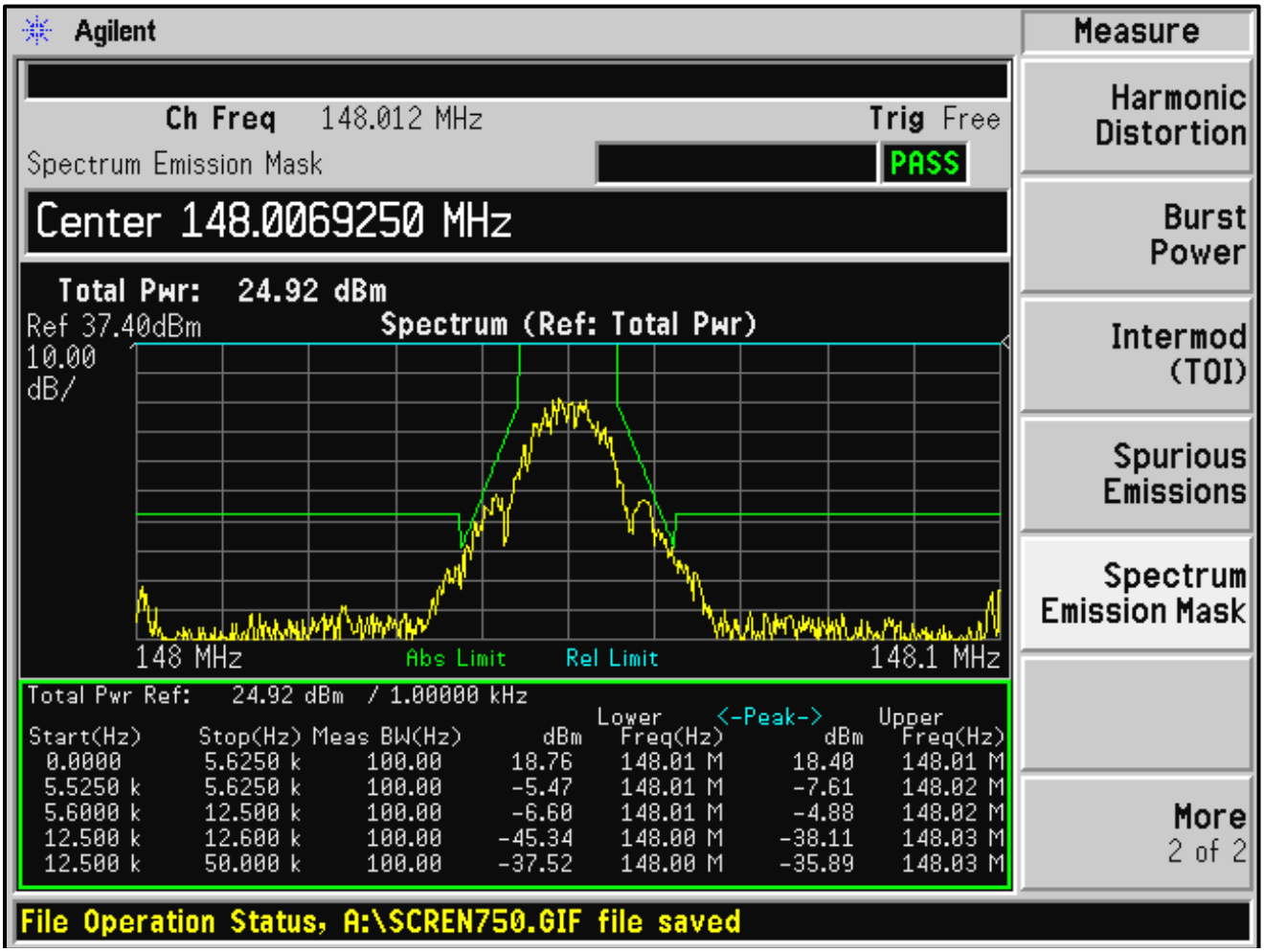
Plot 7-23: Occupied Bandwidth – 141.0000 MHz; 2 level NB 9600 (Mask D)



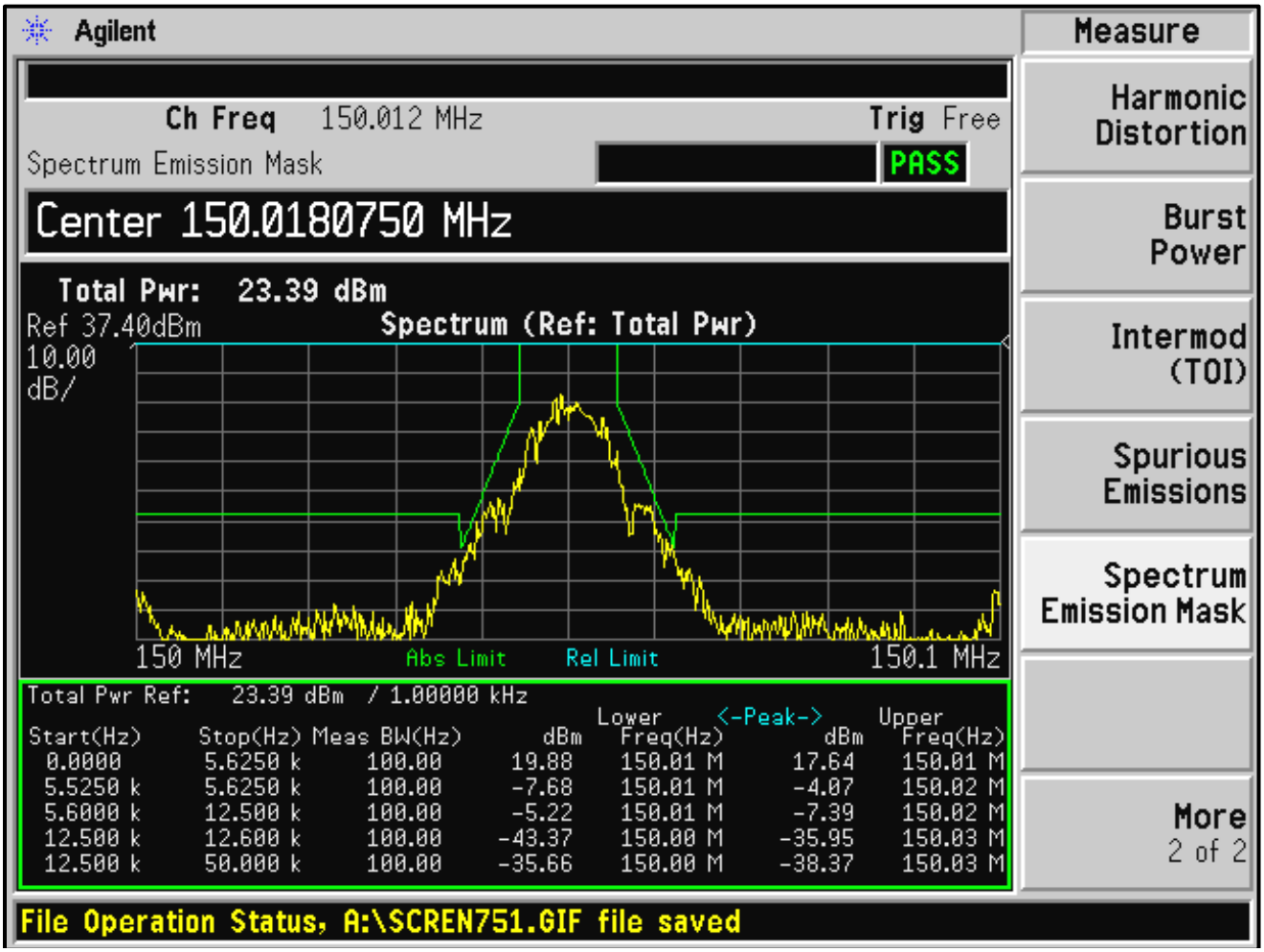
Plot 7-24: Occupied Bandwidth – 143.9875 MHz; 2 level NB 9600 (Mask D)



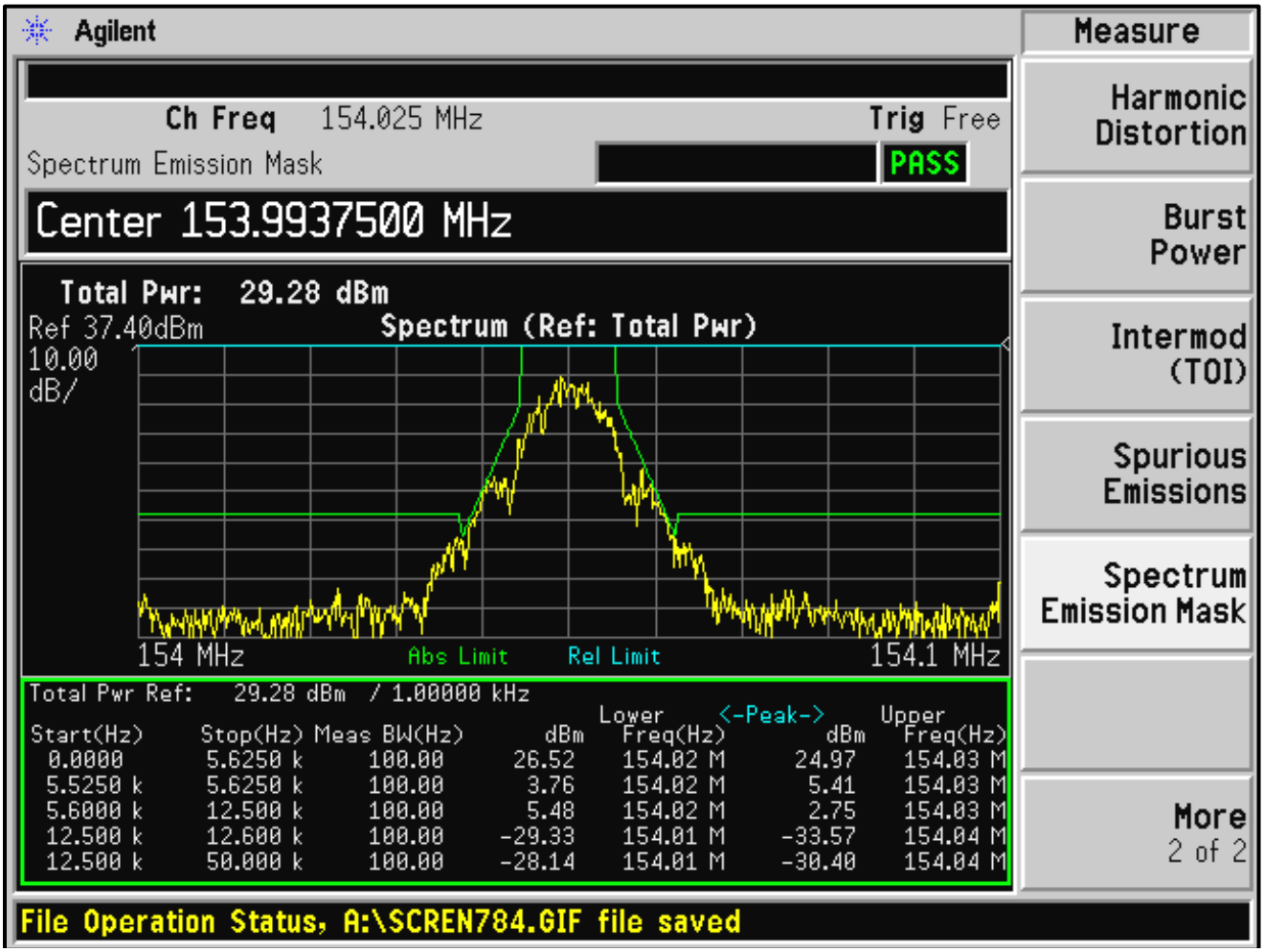
Plot 7-25: Occupied Bandwidth – 148.0125 MHz; 2 level NB 9600 (Mask D)



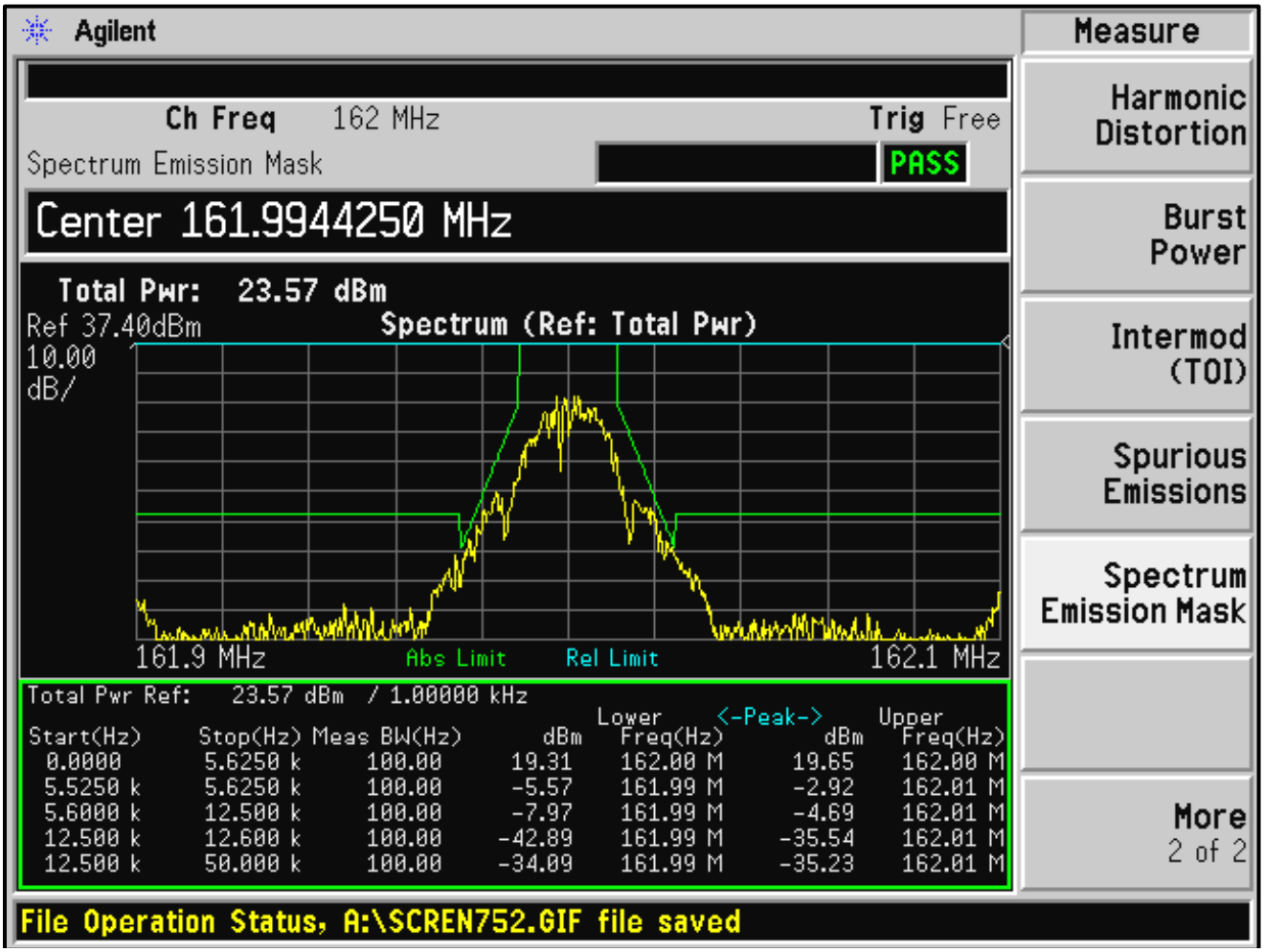
Plot 7-26: Occupied Bandwidth – 150.0125 MHz; 2 level NB 9600 (Mask D)



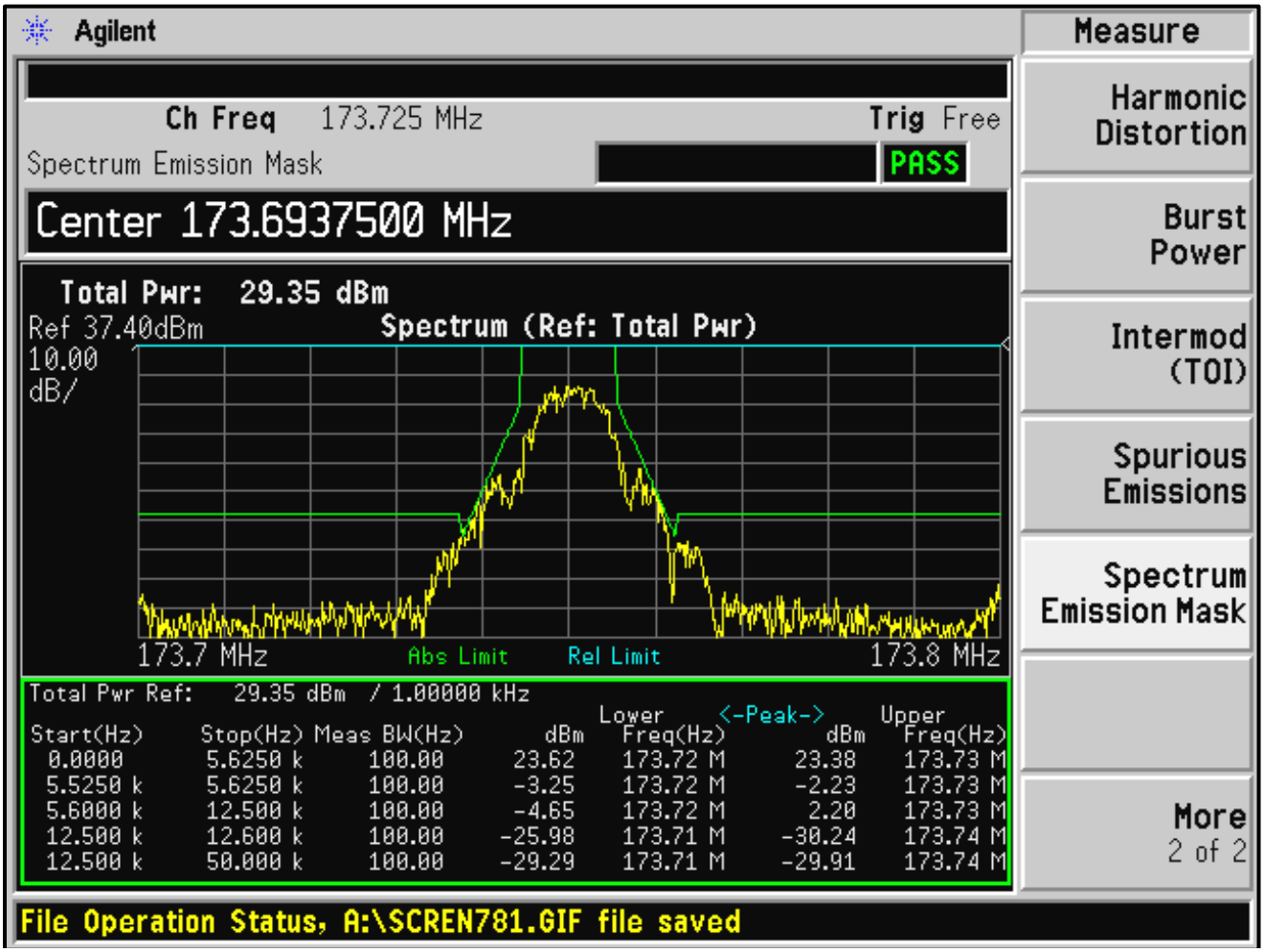
Plot 7-27: Occupied Bandwidth – 154.0250 MHz; 2 level NB 9600 (Mask D)



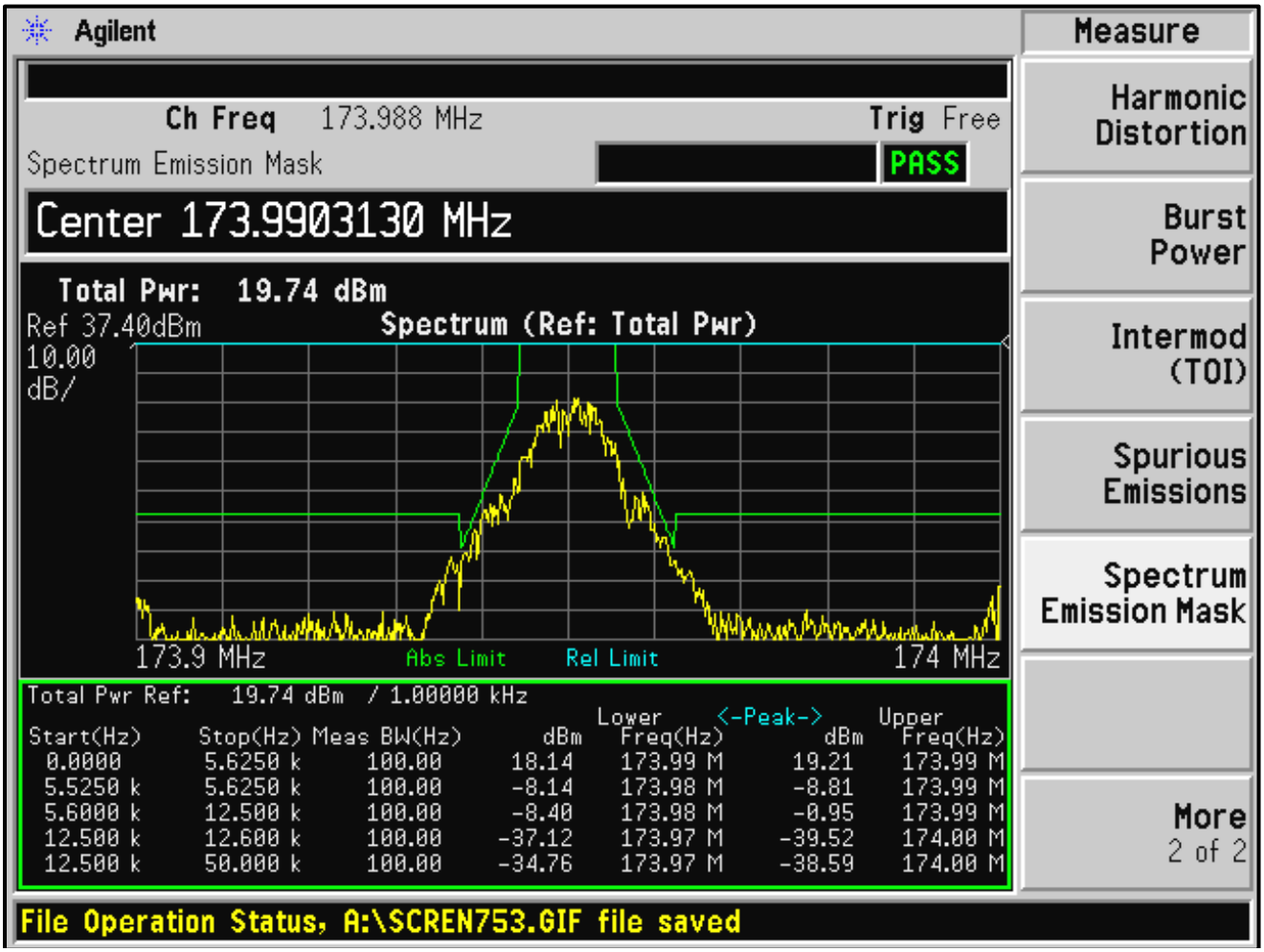
Plot 7-28: Occupied Bandwidth – 162.0000 MHz; 2 level NB 9600 (Mask D)



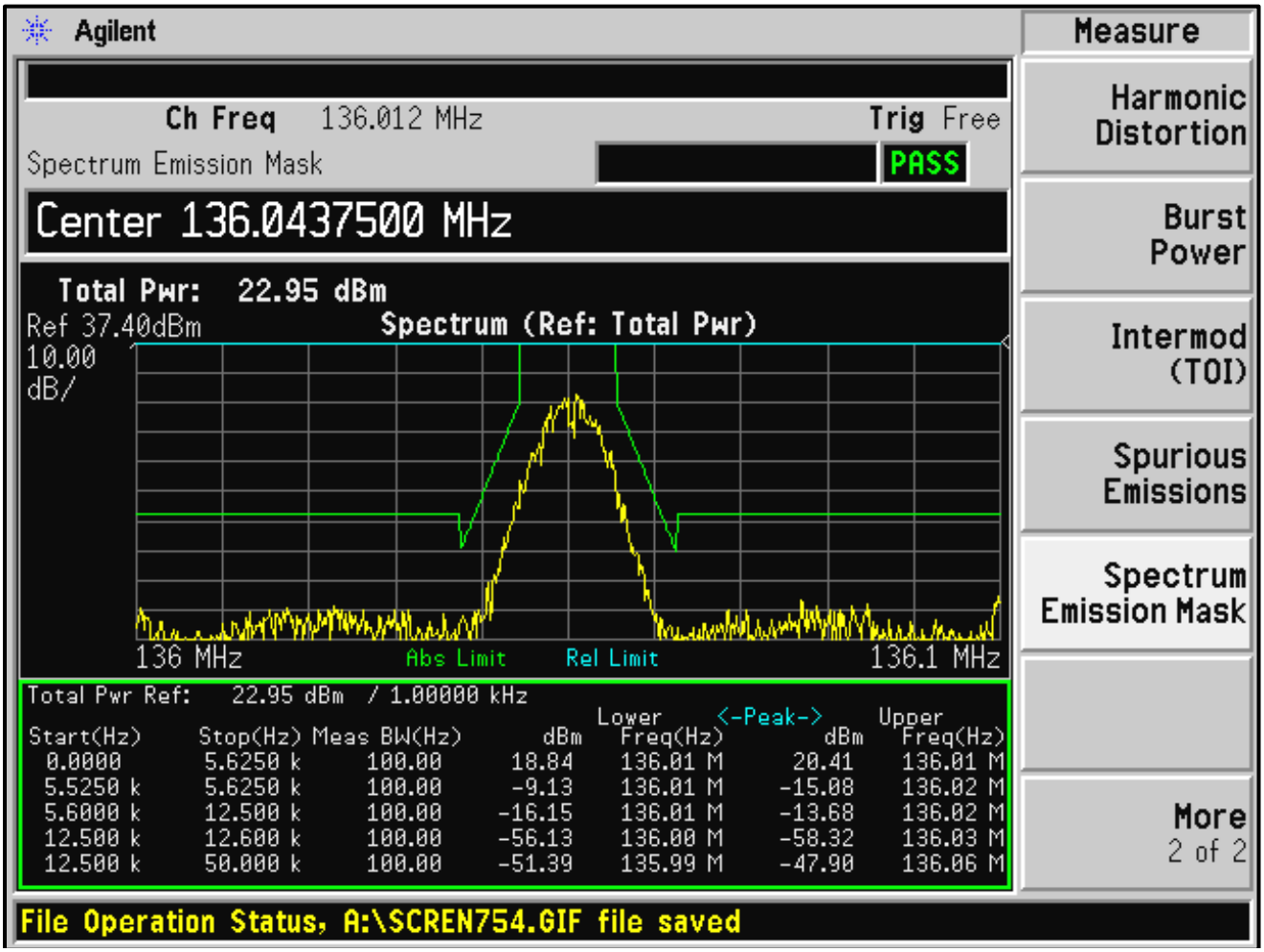
Plot 7-29: Occupied Bandwidth – 173.1750 MHz; 2 level NB 9600 (Mask D)



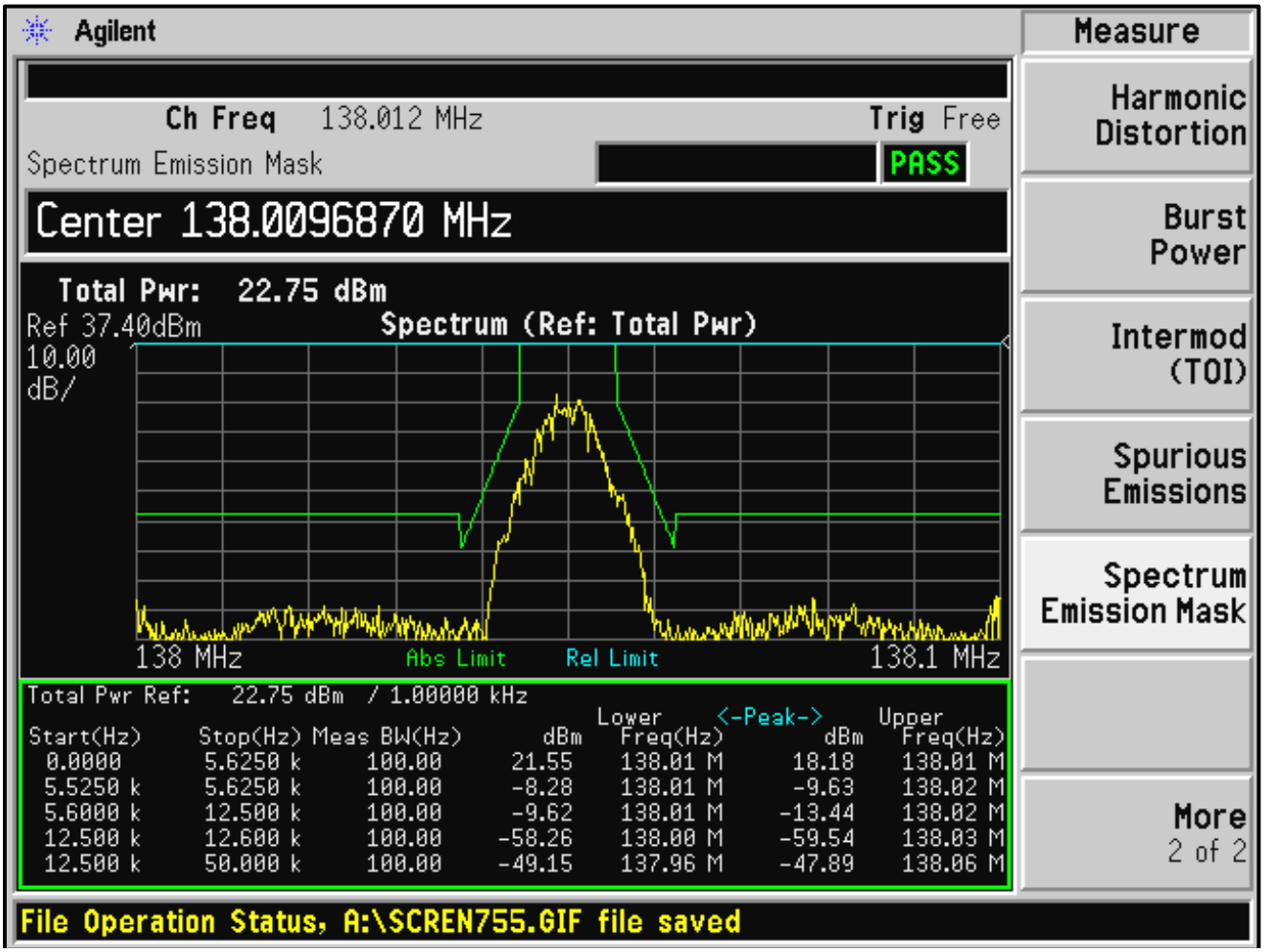
Plot 7-30: Occupied Bandwidth – 173.9875 MHz; 2 level NB 9600 (Mask D)



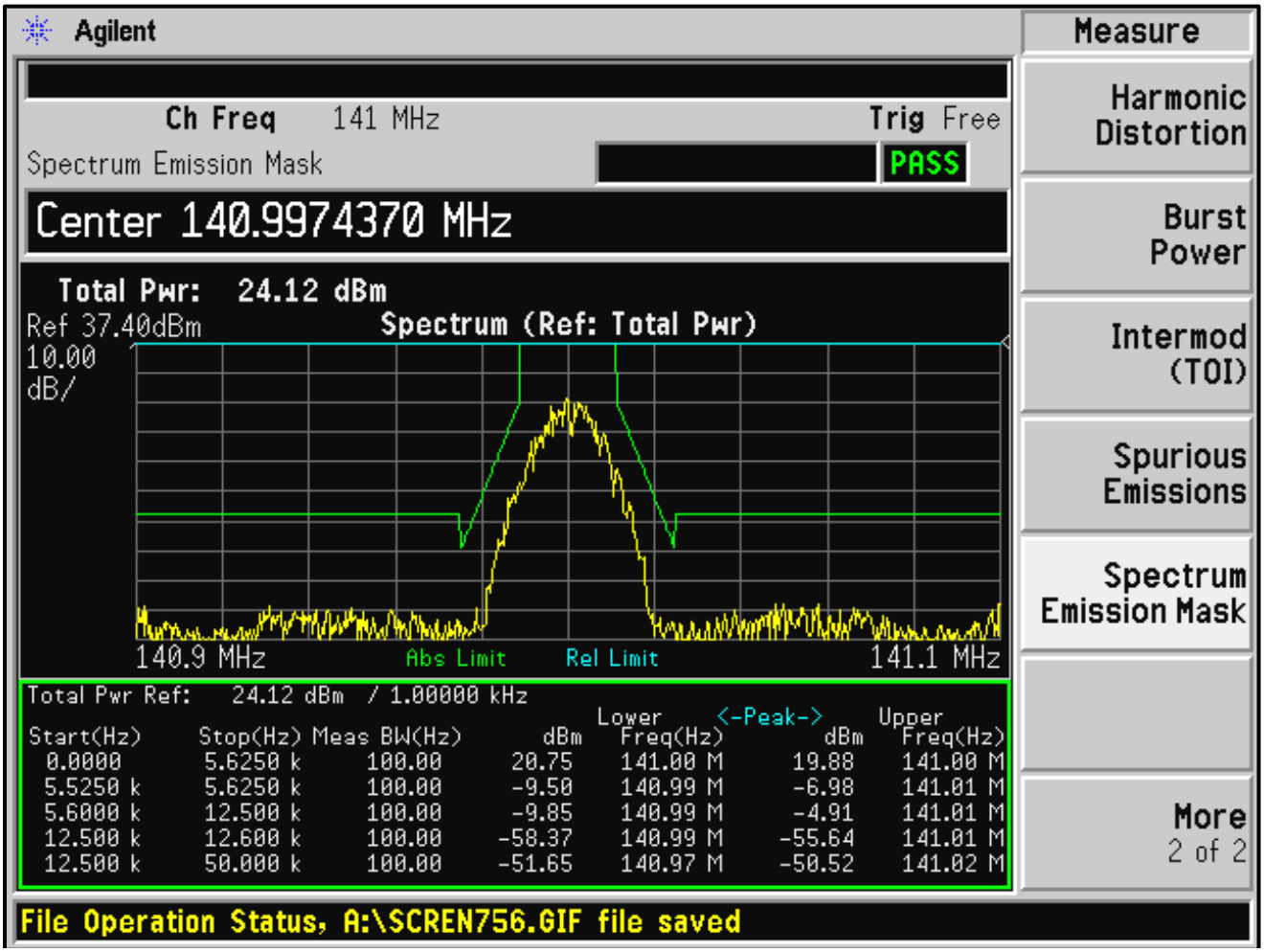
Plot 7-31: Occupied Bandwidth – 136.0125 MHz; P25 (Mask D)



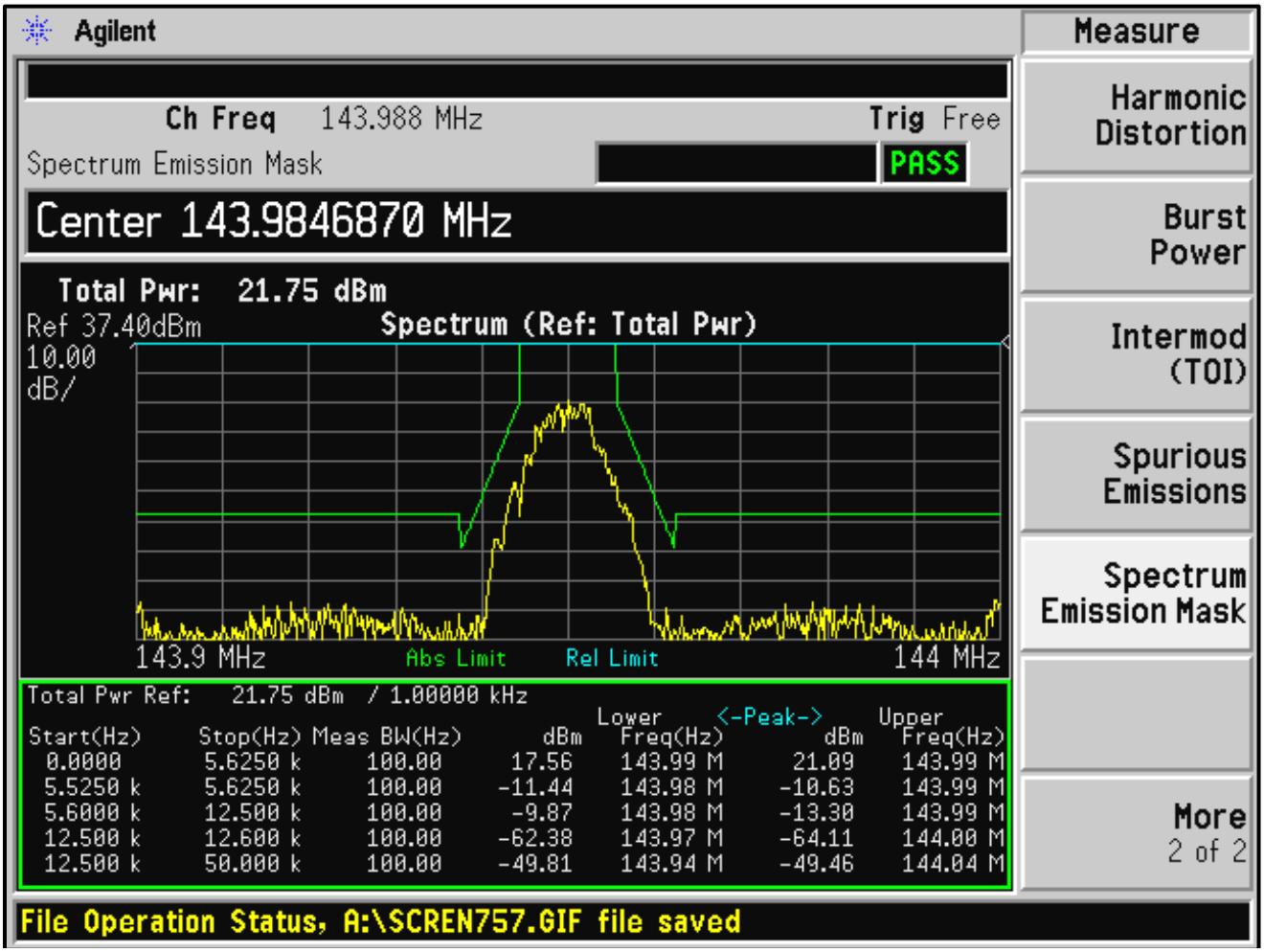
Plot 7-32: Occupied Bandwidth – 138.0125 MHz; P25 (Mask D)



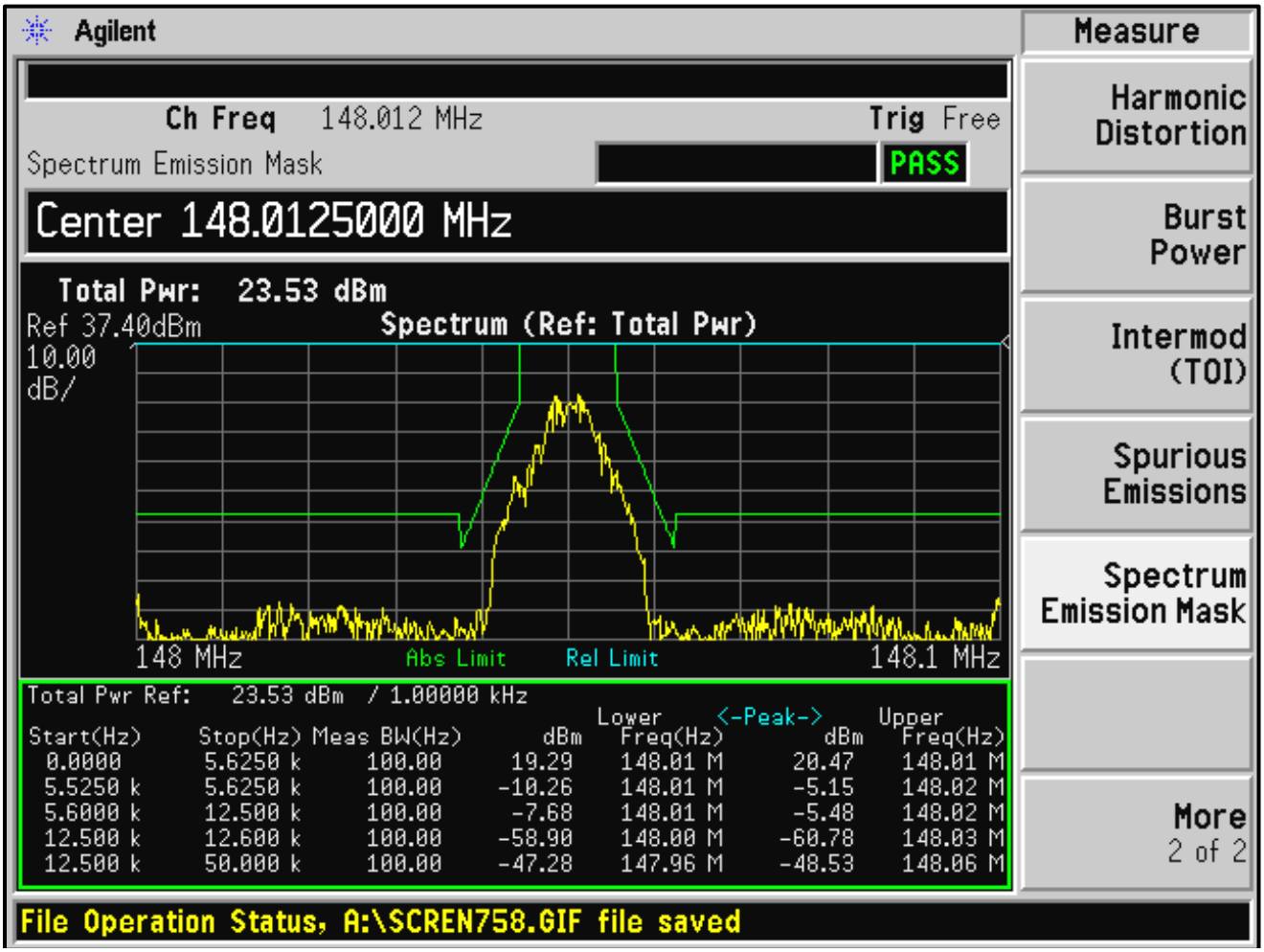
Plot 7-33: Occupied Bandwidth – 141.0000 MHz; P25 (Mask D)



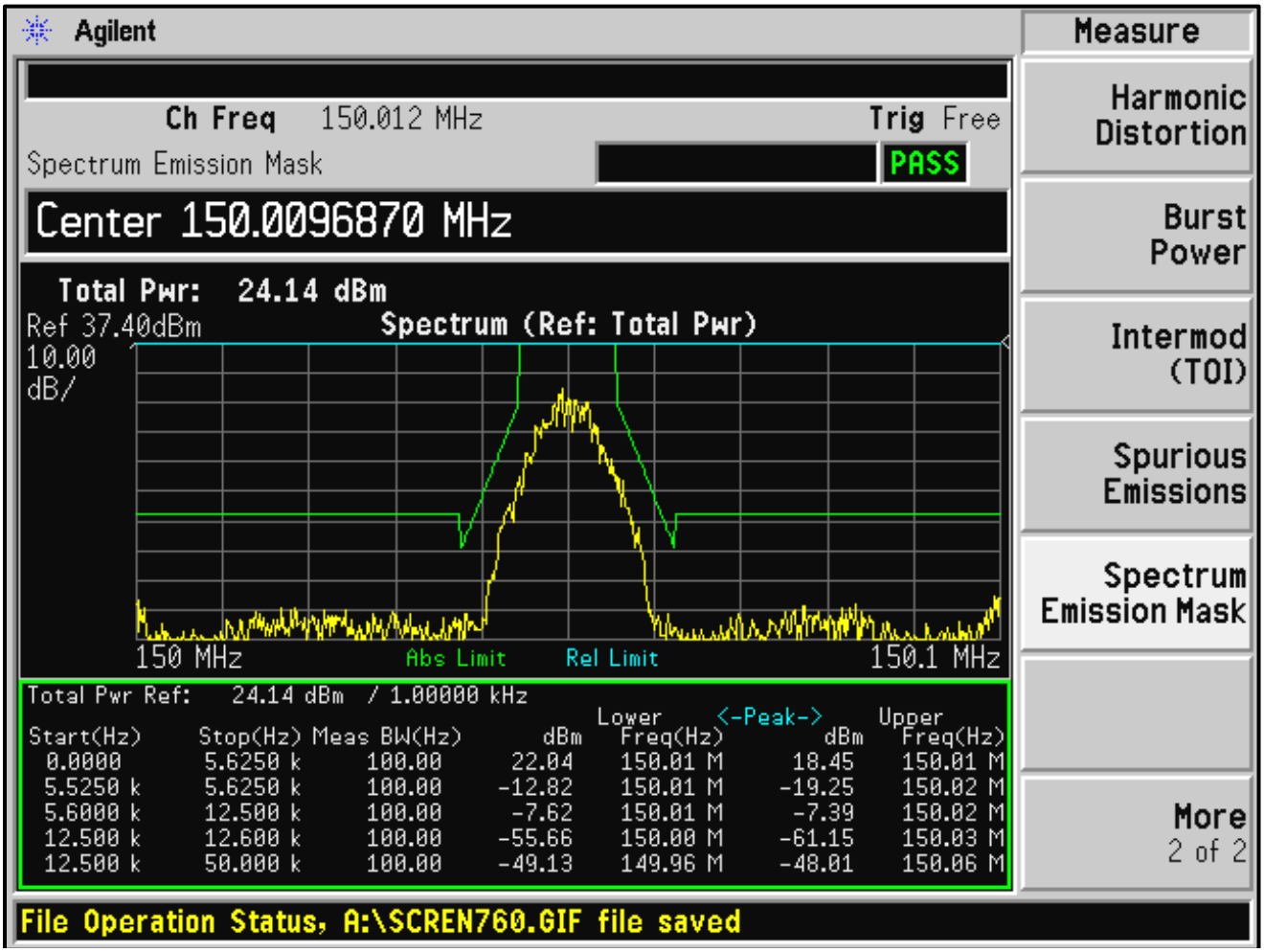
Plot 7-34: Occupied Bandwidth – 143.9875 MHz; P25 (Mask D)



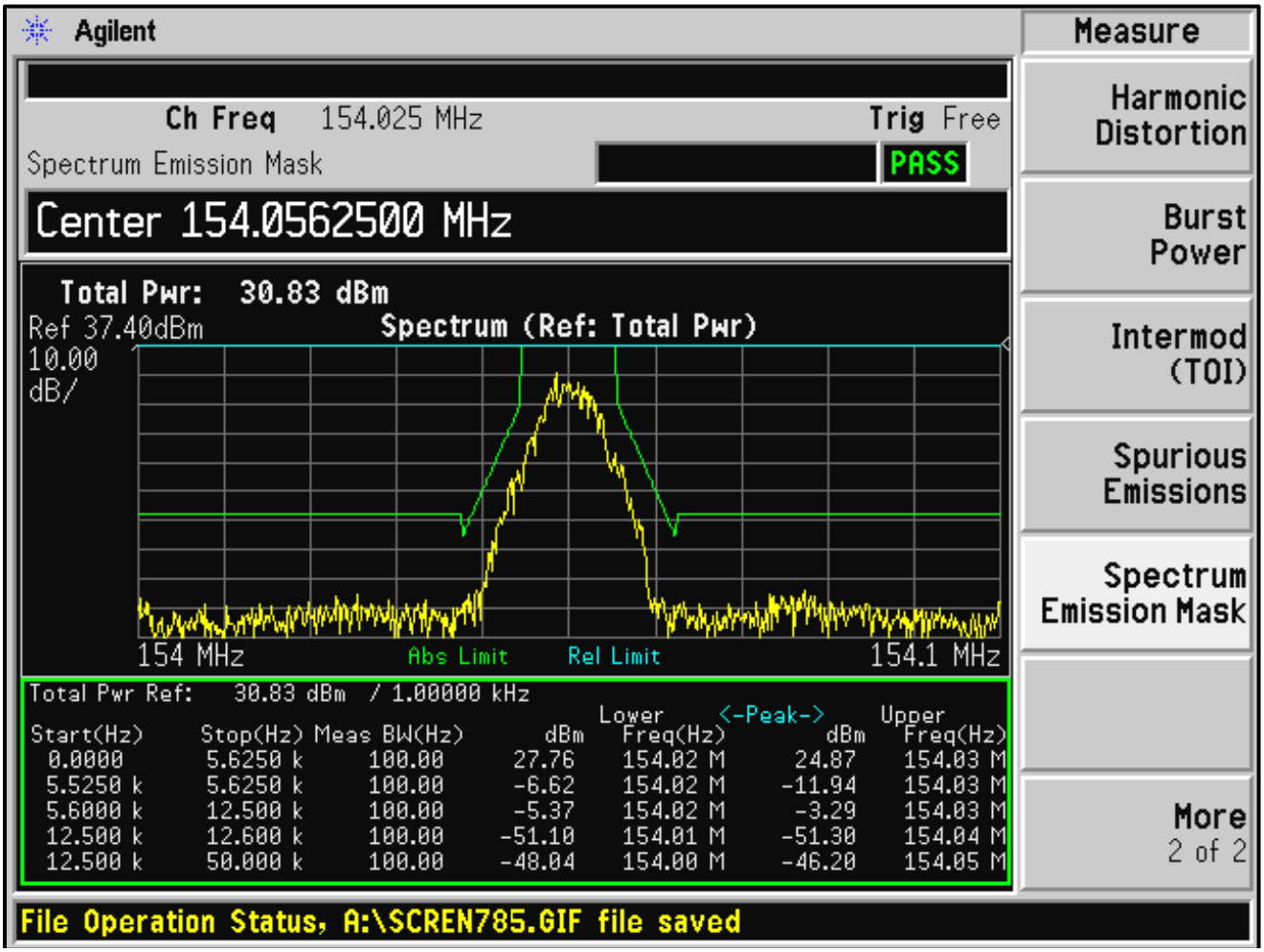
Plot 7-35: Occupied Bandwidth – 148.0125 MHz; P25 (Mask D)



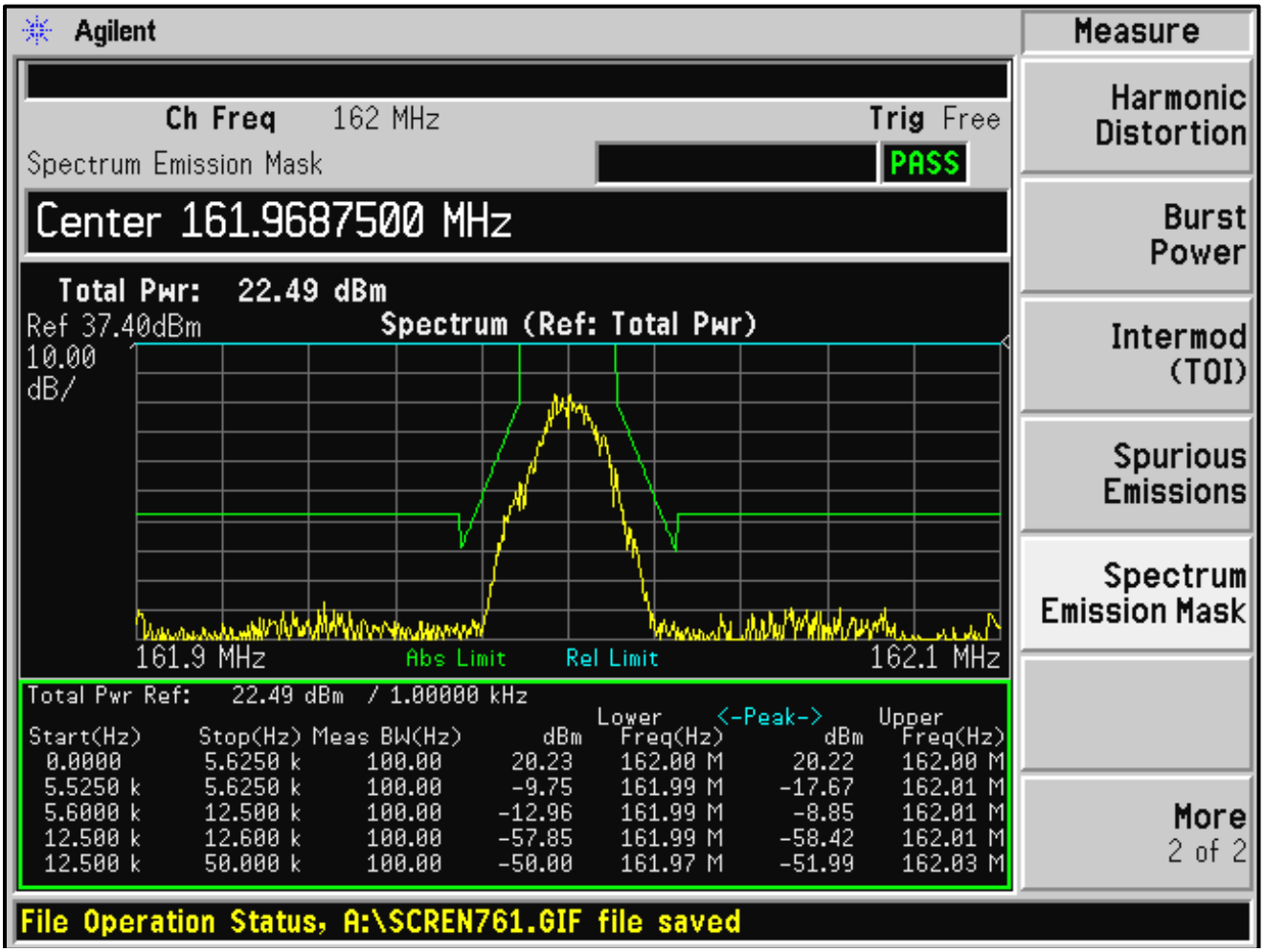
Plot 7-36: Occupied Bandwidth – 150.0125 MHz; P25 (Mask D)



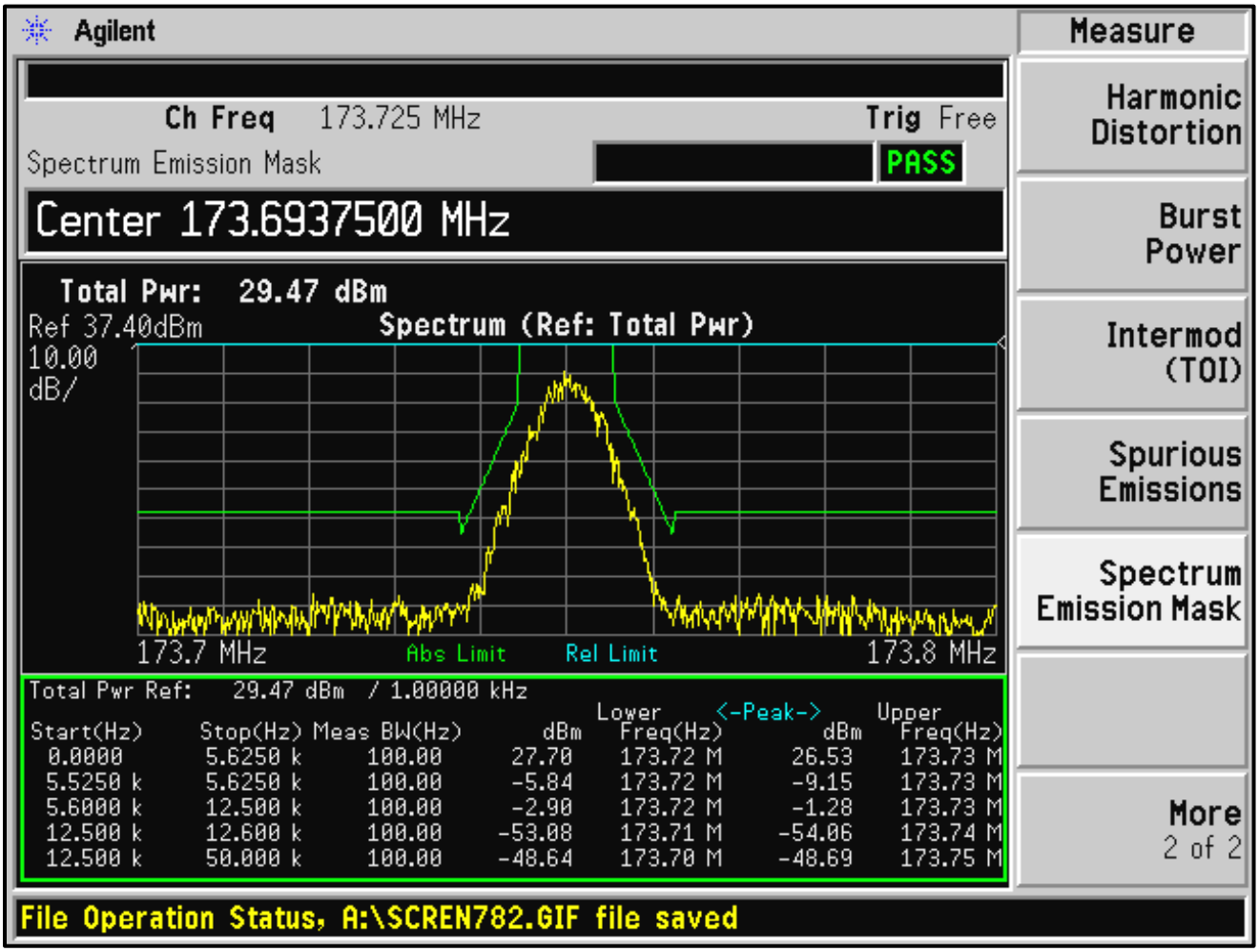
Plot 7-37: Occupied Bandwidth – 154.0250 MHz; P25 (Mask D)



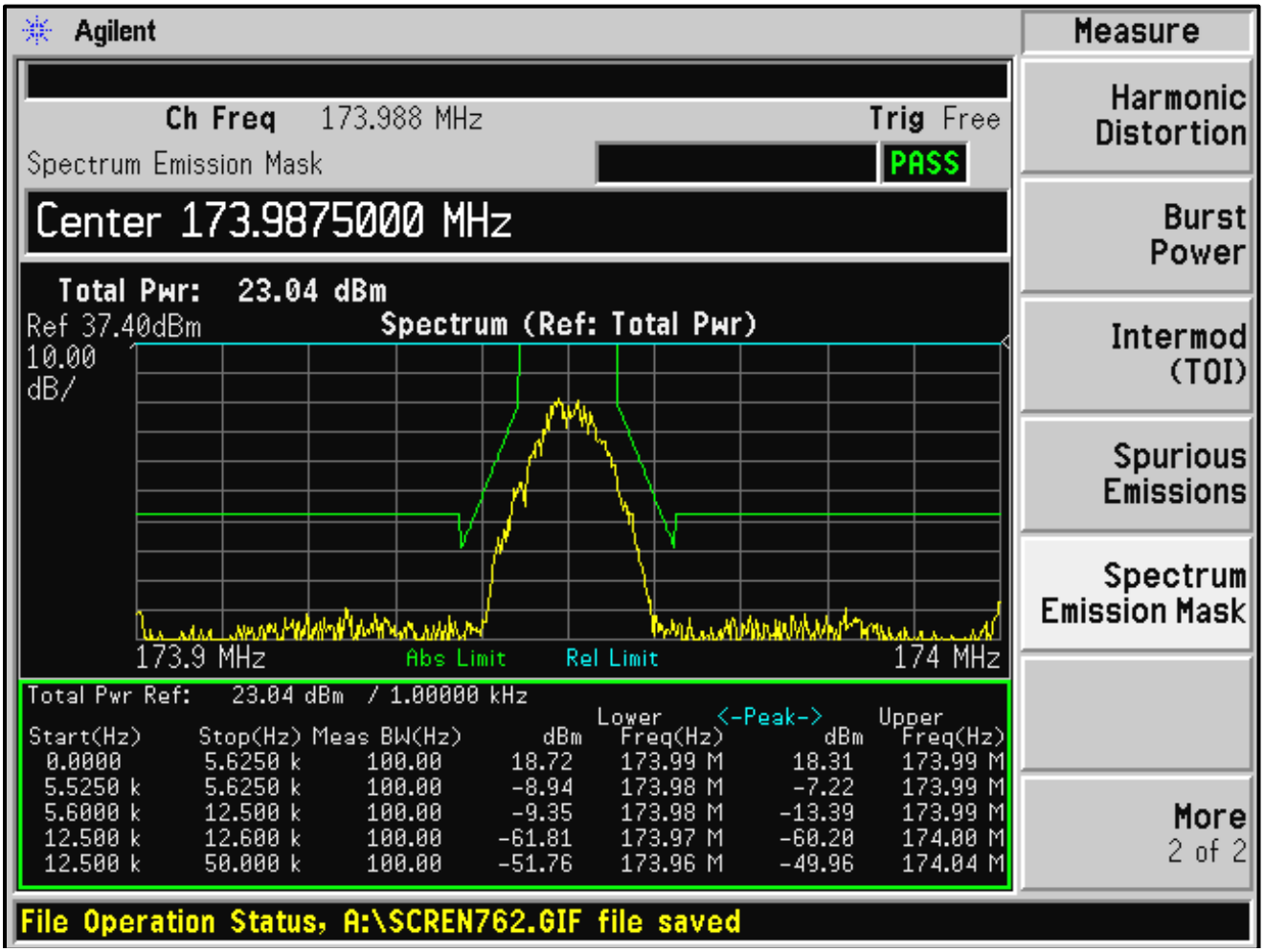
Plot 7-38: Occupied Bandwidth – 162.0000 MHz; P25 (Mask D)



Plot 7-39: Occupied Bandwidth – 173.1750 MHz; P25 (Mask D)

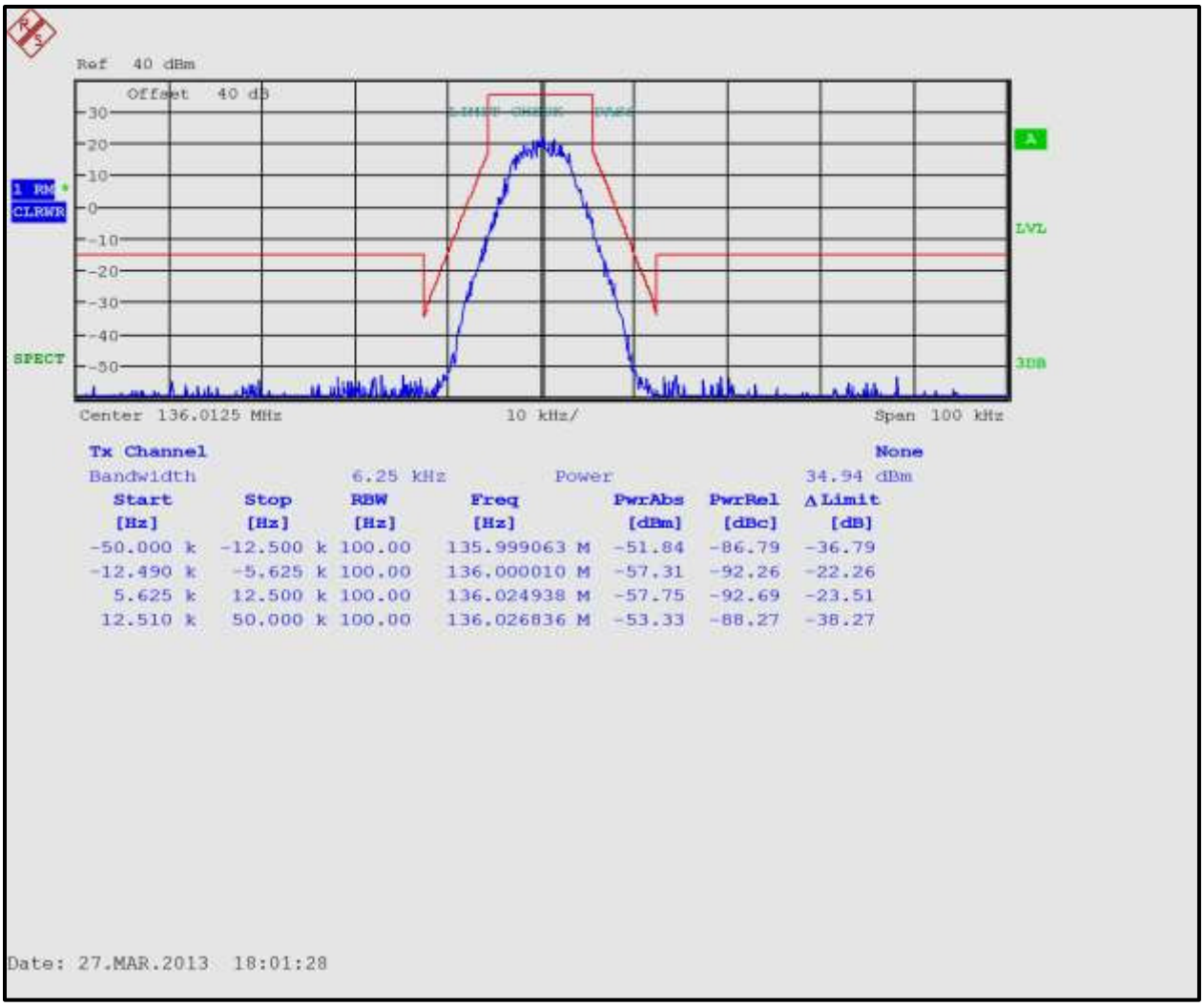


Plot 7-40: Occupied Bandwidth – 173.9875 MHz; P25 (Mask D)

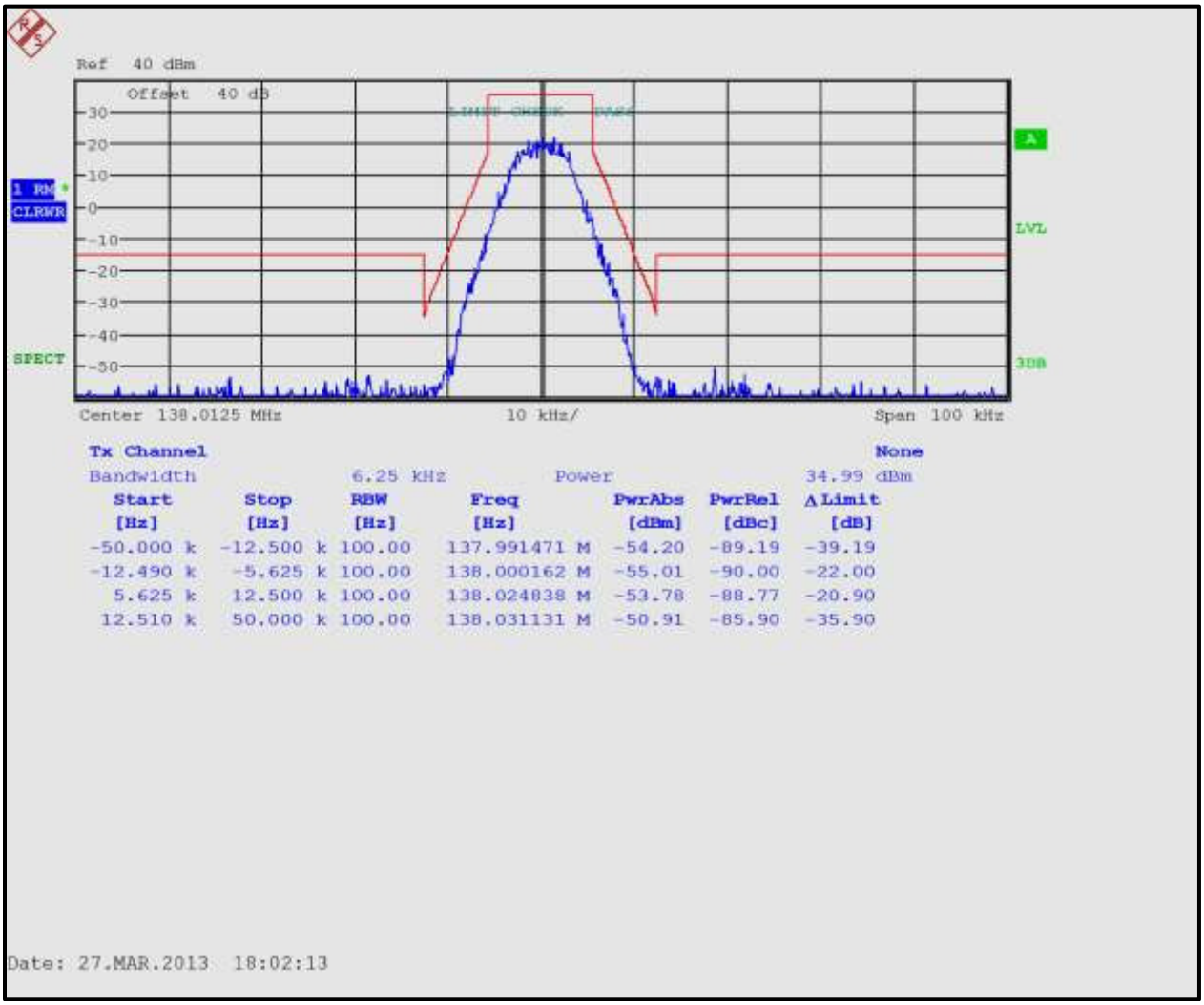


7.3 Part 90 H-CPM Emission Designator

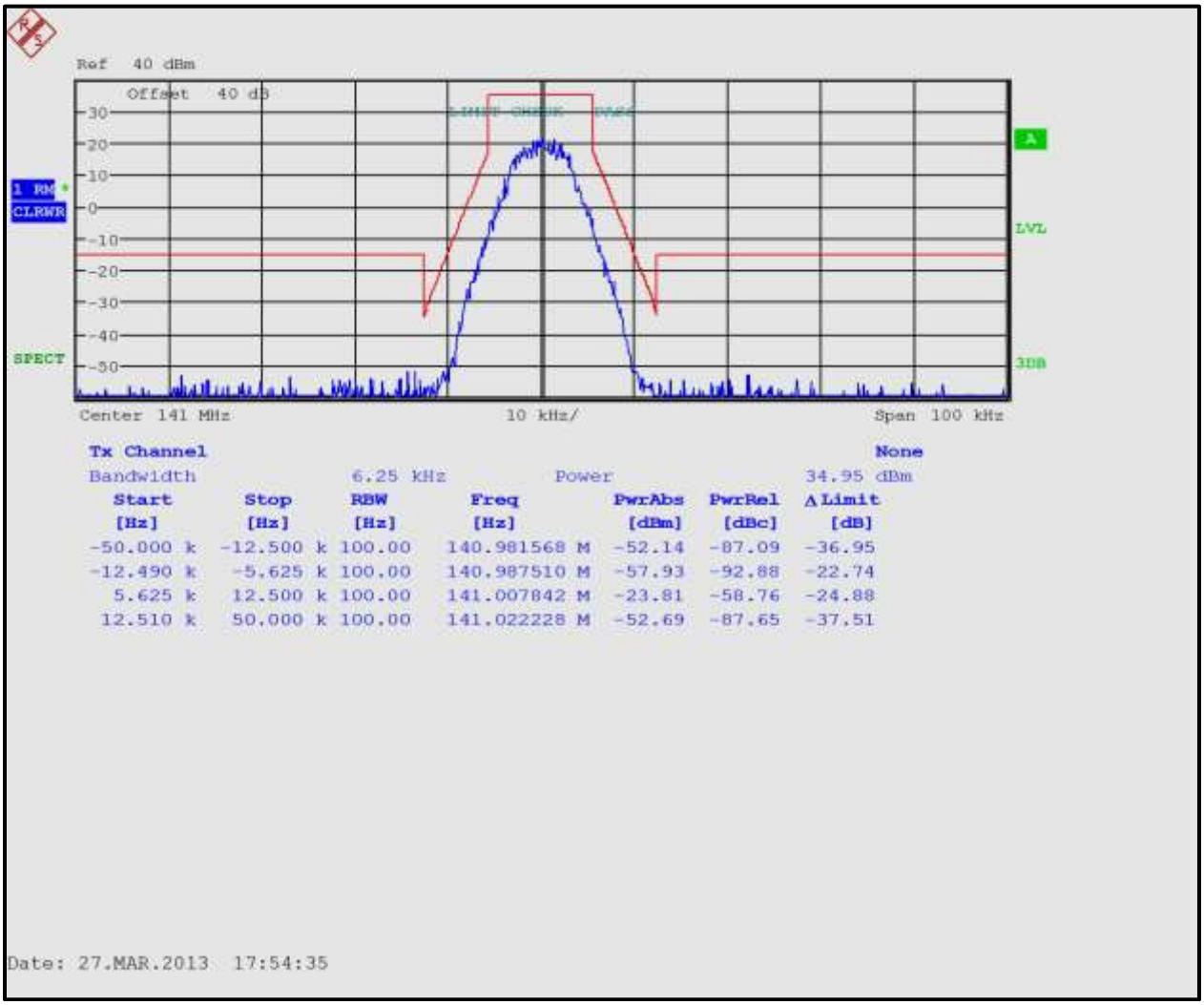
Plot 7-41: Occupied Bandwidth – 136.0125 MHz; H-CPM TDMA (Mask D)



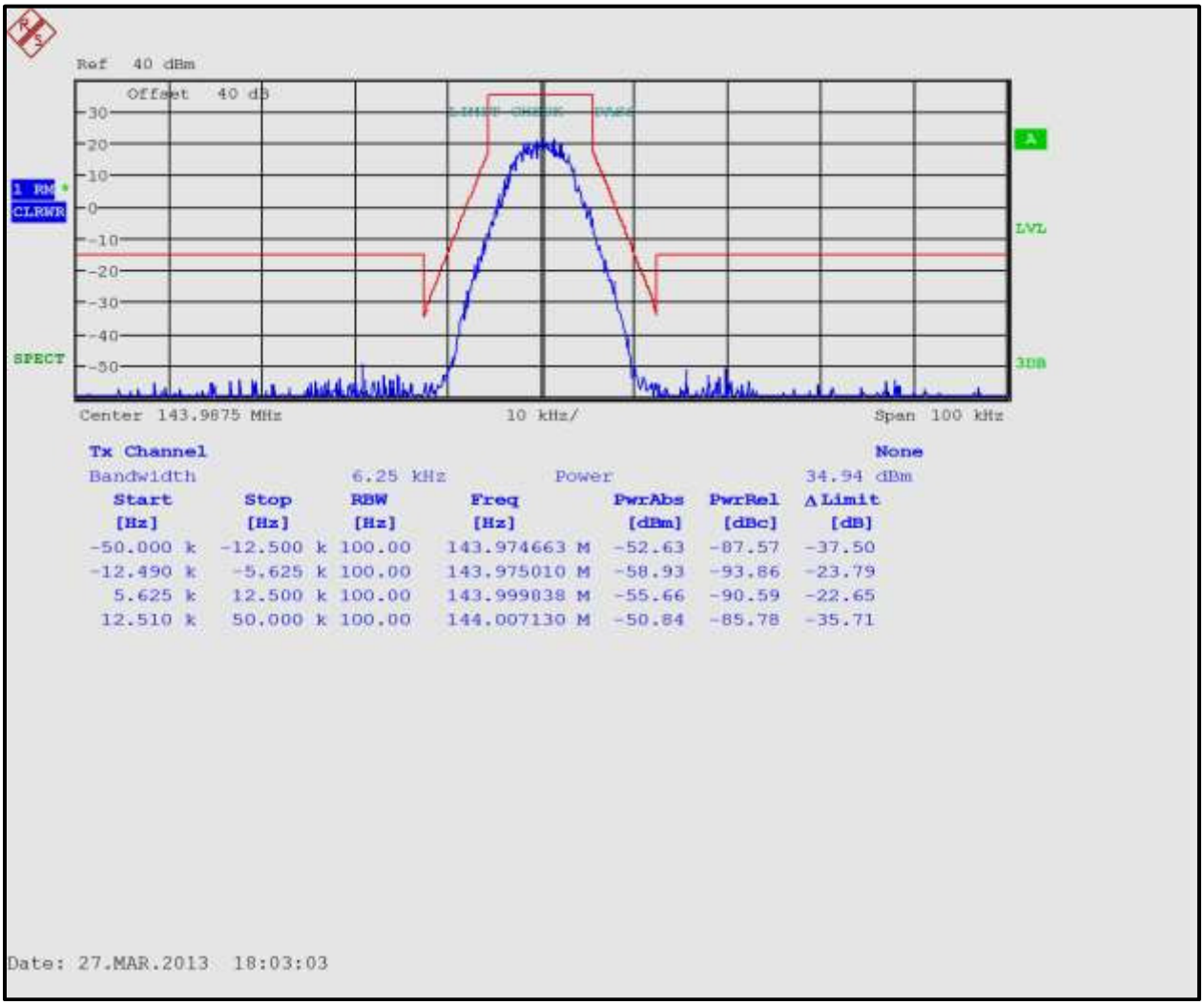
Plot 7-42: Occupied Bandwidth – 138.0125 MHz; H-CPM TDMA (Mask D)



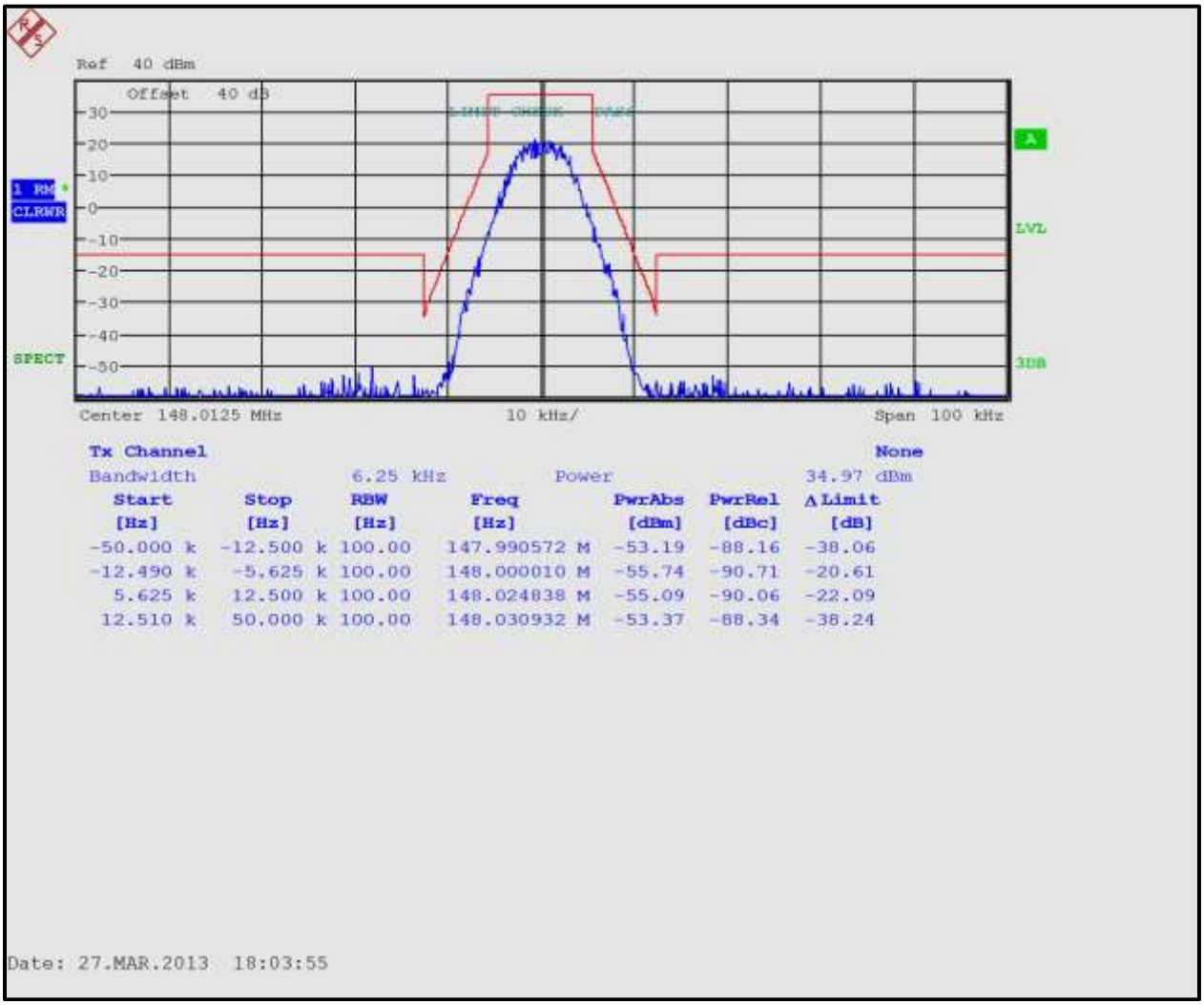
Plot 7-43: Occupied Bandwidth – 141.0000 MHz; H-CPM TDMA (Mask D)



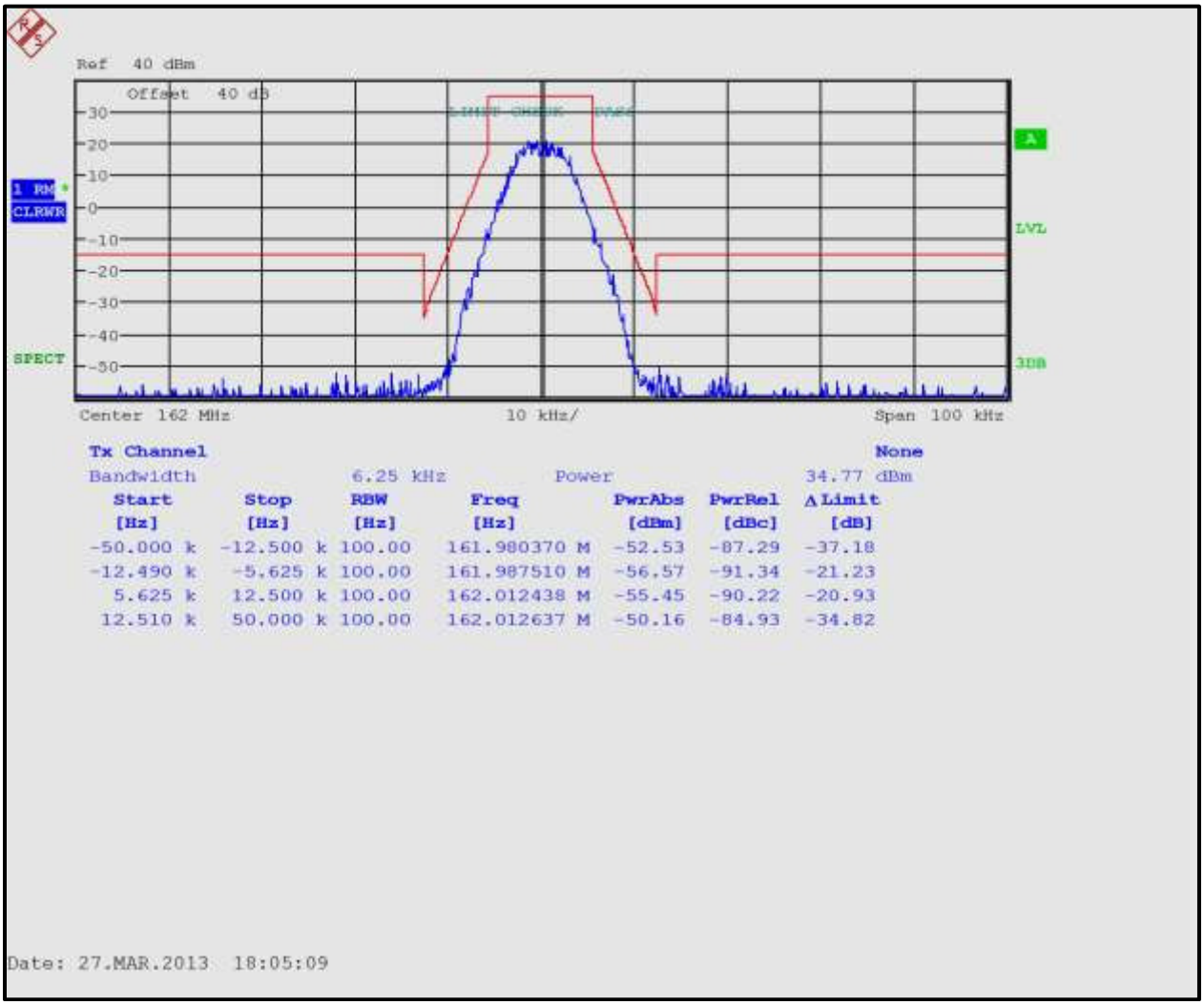
Plot 7-44: Occupied Bandwidth – 143.9875 MHz; H-CPM TDMA (Mask D)



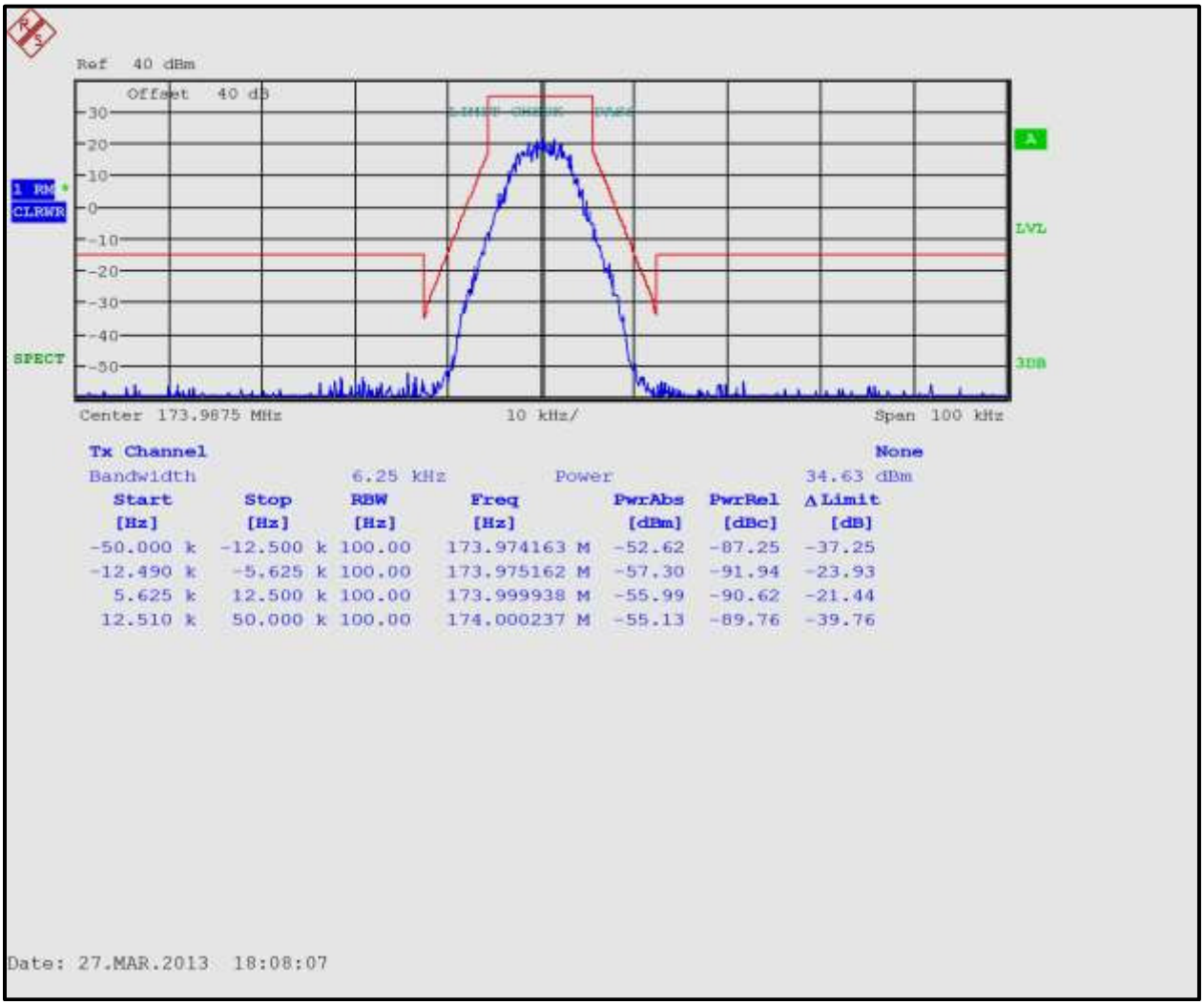
Plot 7-45: Occupied Bandwidth – 148.0125 MHz; H-CPM TDMA (Mask D)



Plot 7-46: Occupied Bandwidth – 162.0000 MHz; H-CPM TDMA (Mask D)

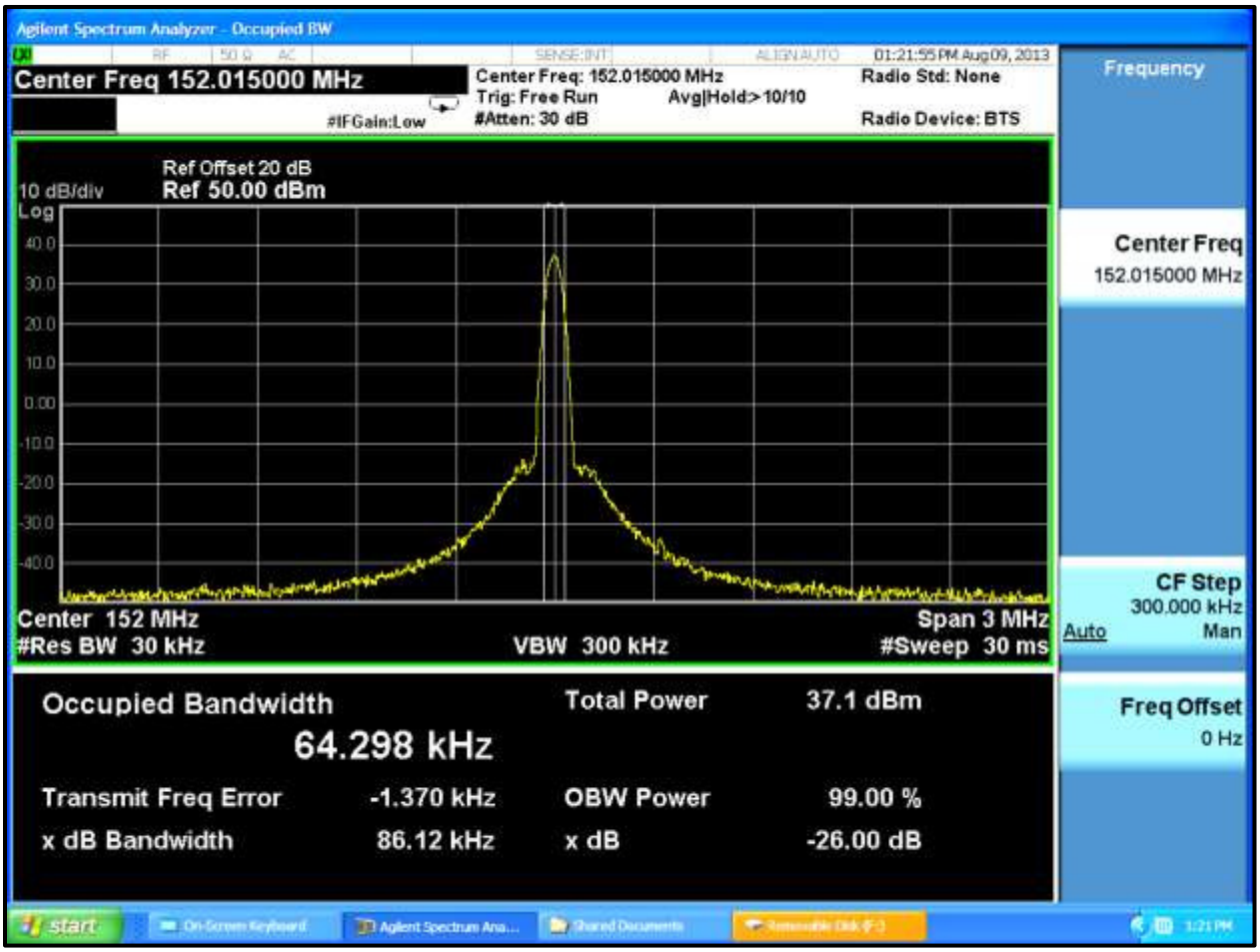


Plot 7-47: Occupied Bandwidth – 173.0125 MHz; H-CPM TDMA (Mask D)

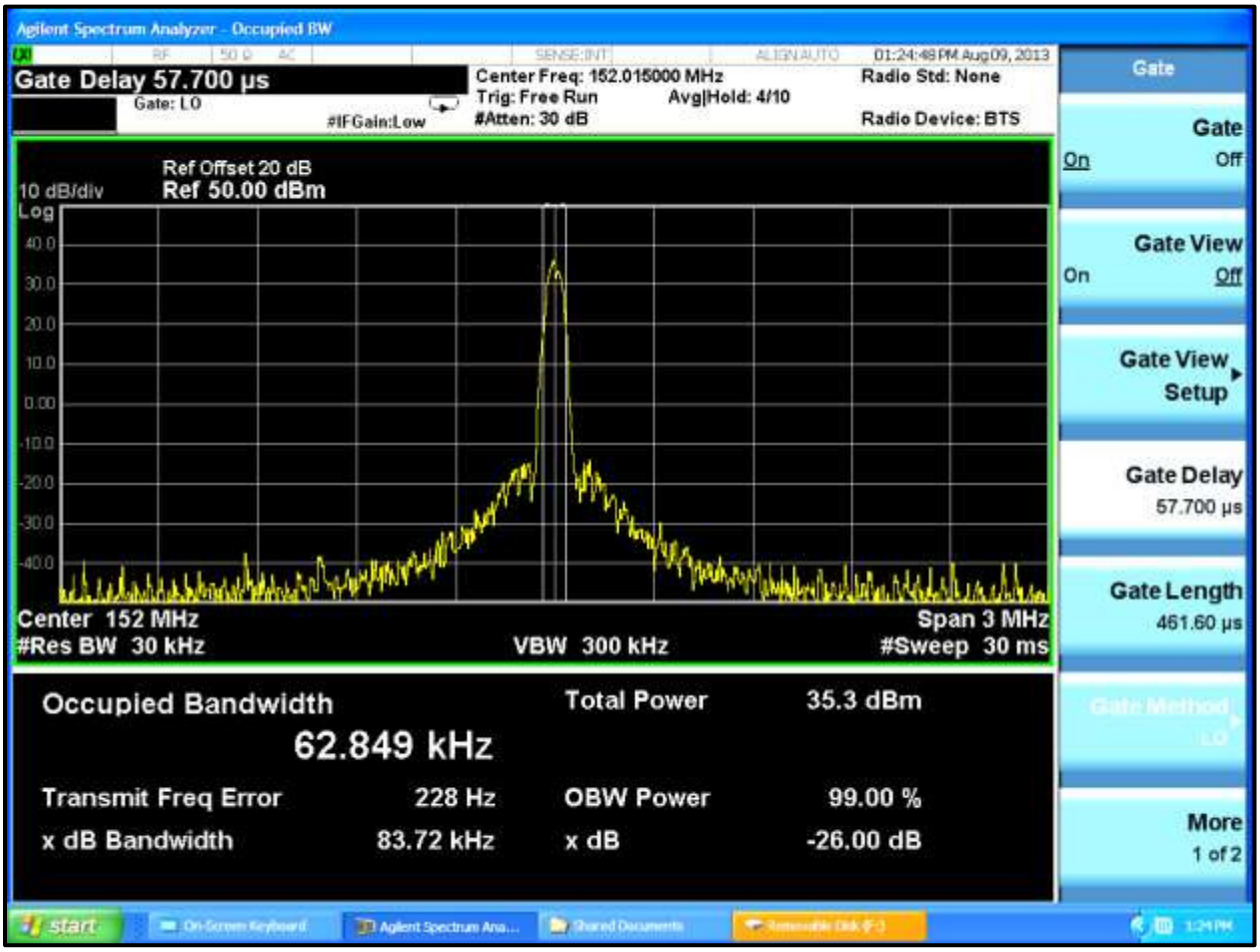


7.4 Part 22 Test Data

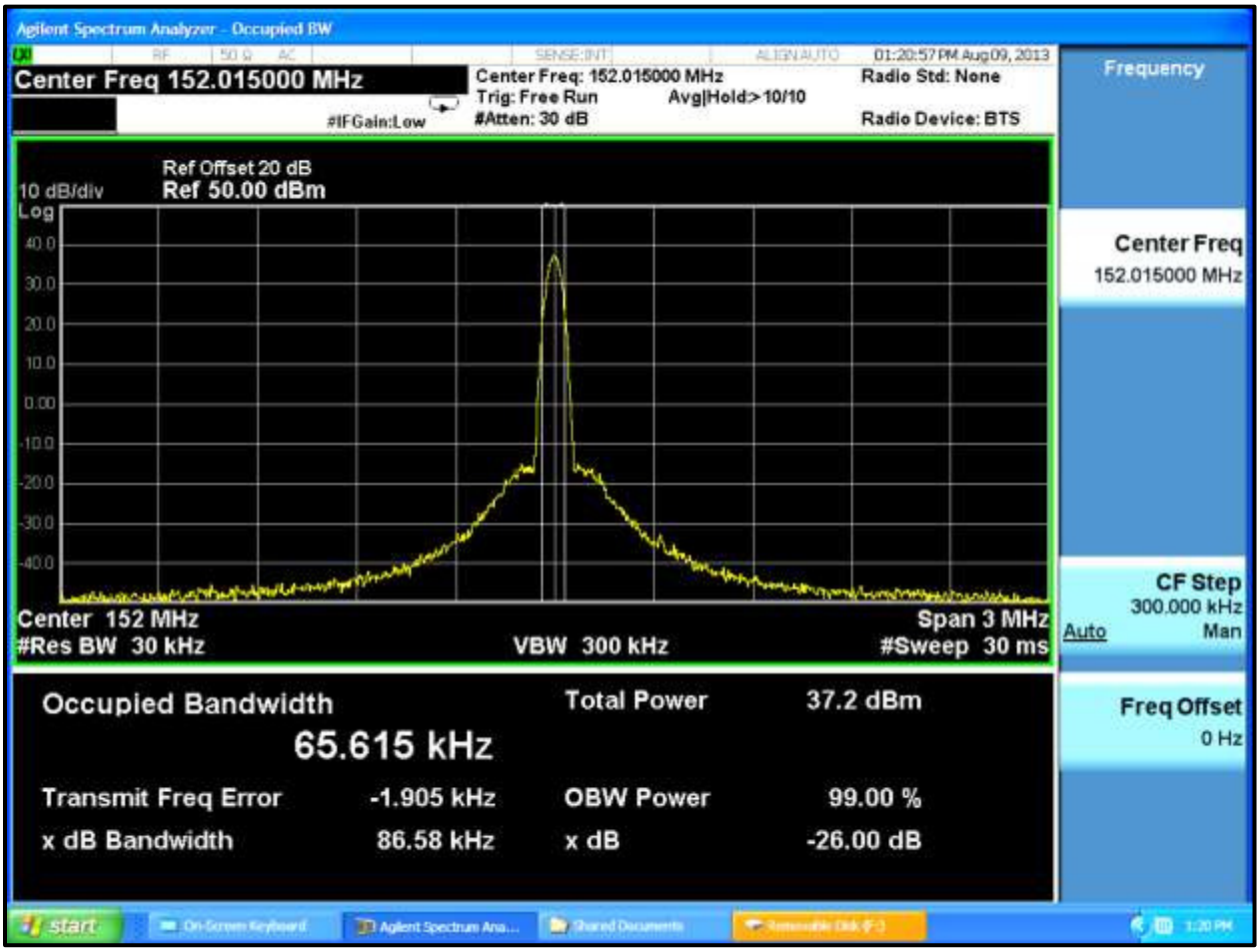
Plot 7-48: Occupied Bandwidth – NB Analog



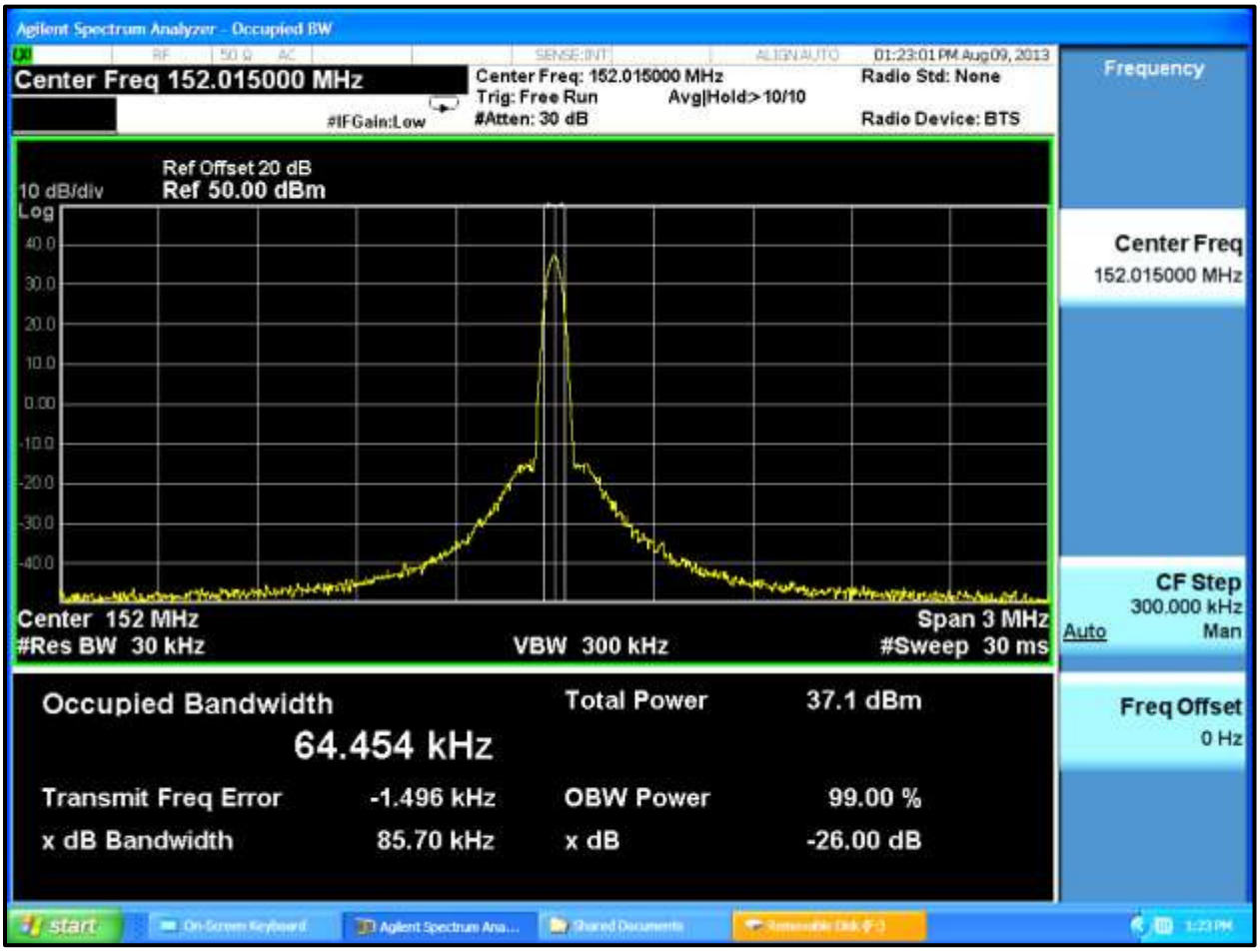
Plot 7-49: Occupied Bandwidth – H-CP/M TDMA



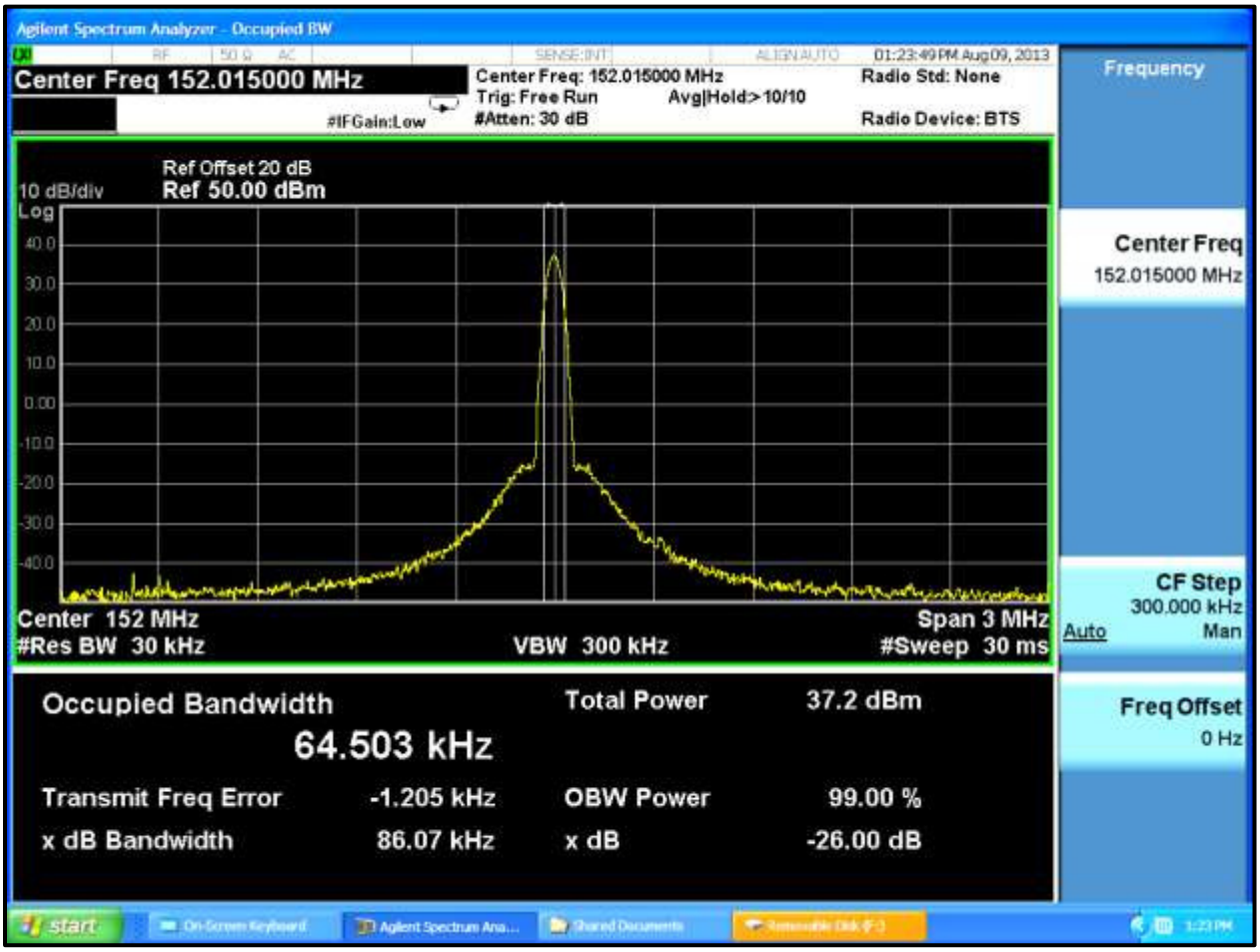
Plot 7-50: Occupied Bandwidth – 2 Level NB 9600 FSK



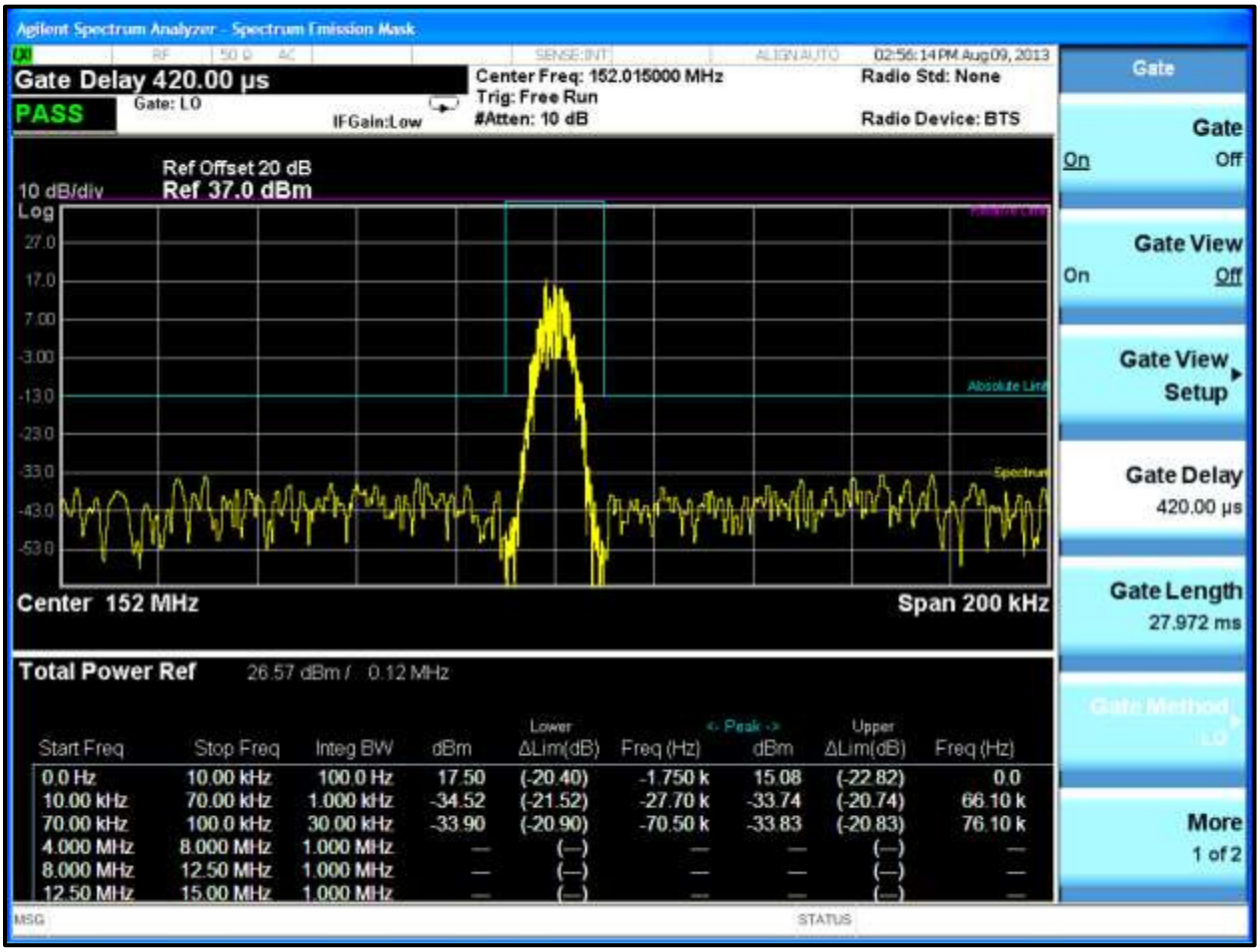
Plot 7-51: Occupied Bandwidth – 2 Level NB 4800 FSK



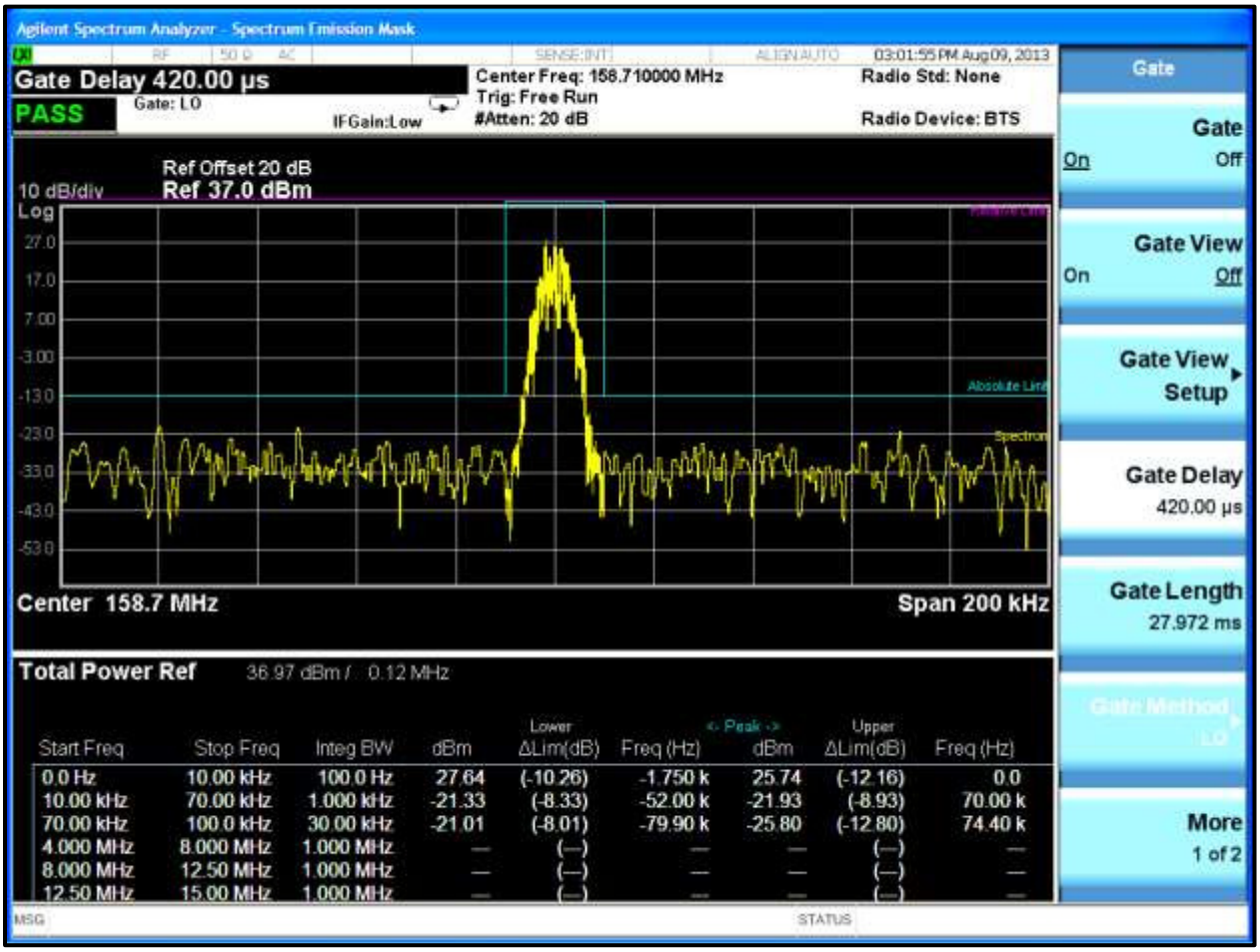
Plot 7-52: Occupied Bandwidth – P25



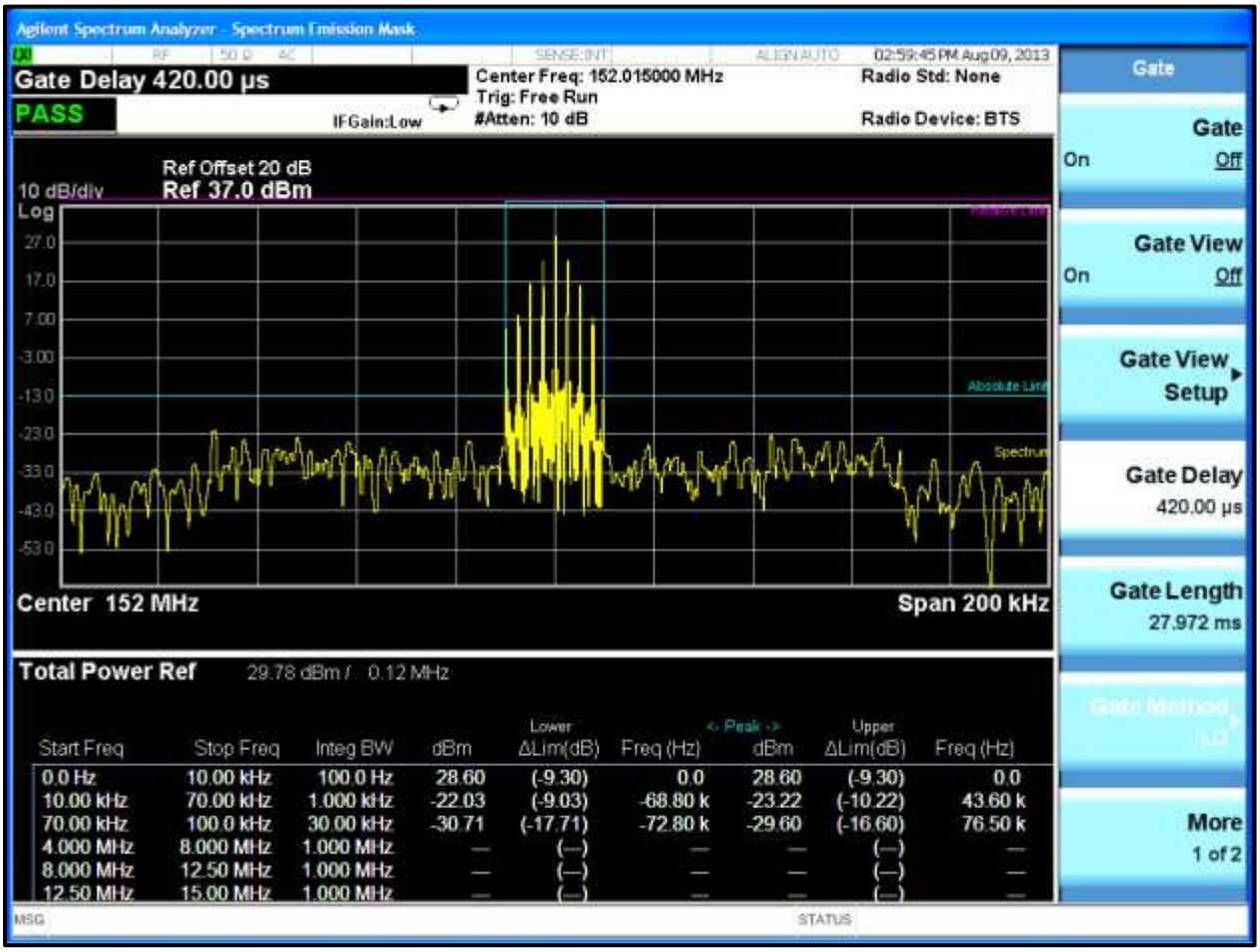
Plot 7-53: Occupied Bandwidth – 152.015 MHz; Mask; H-CPM TDMA



Plot 7-54: Occupied Bandwidth – 158.710 MHz; Mask; H-CPM TDMA

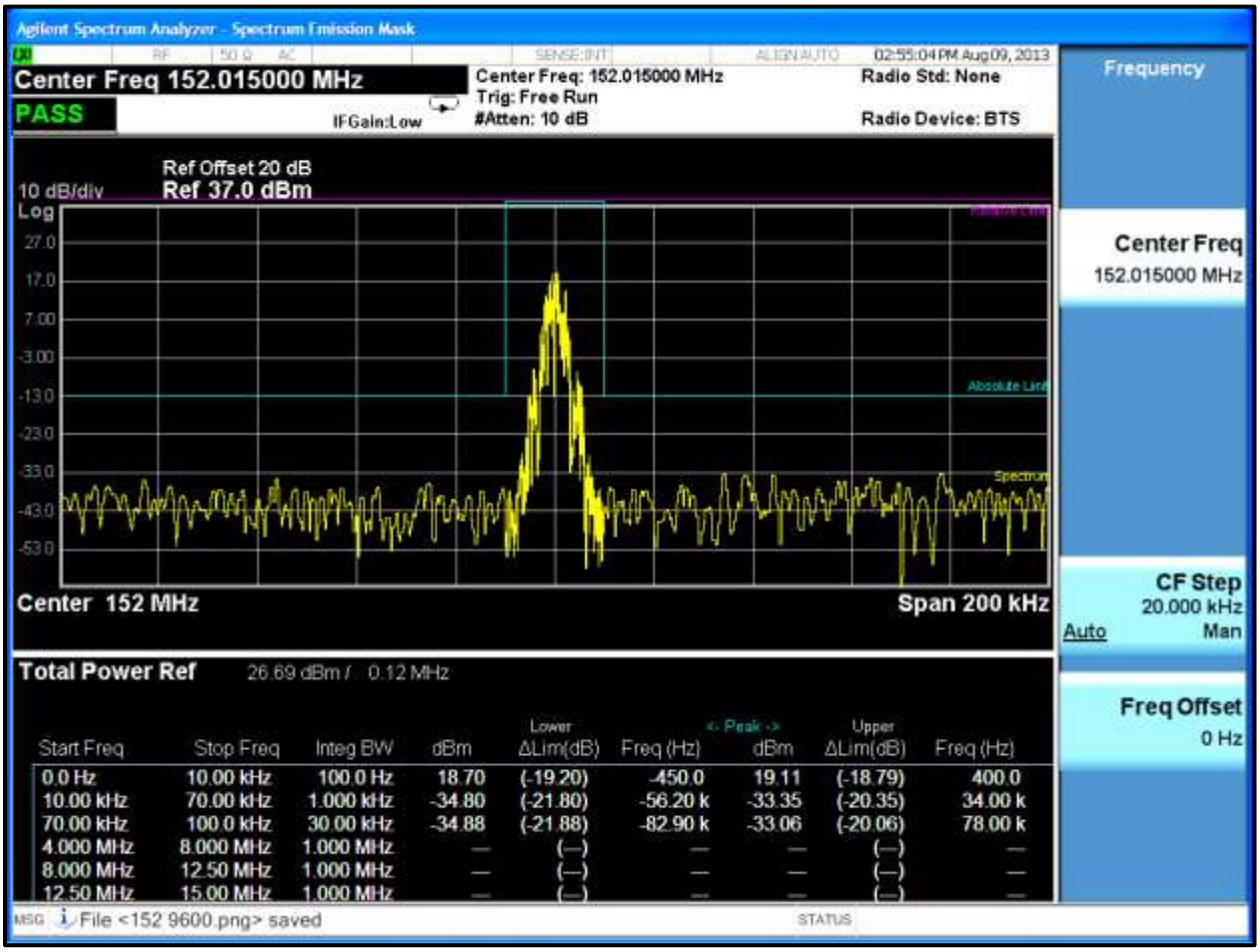


Plot 7-55: Occupied Bandwidth – 152.015 MHz; Mask; NB Analog Voice

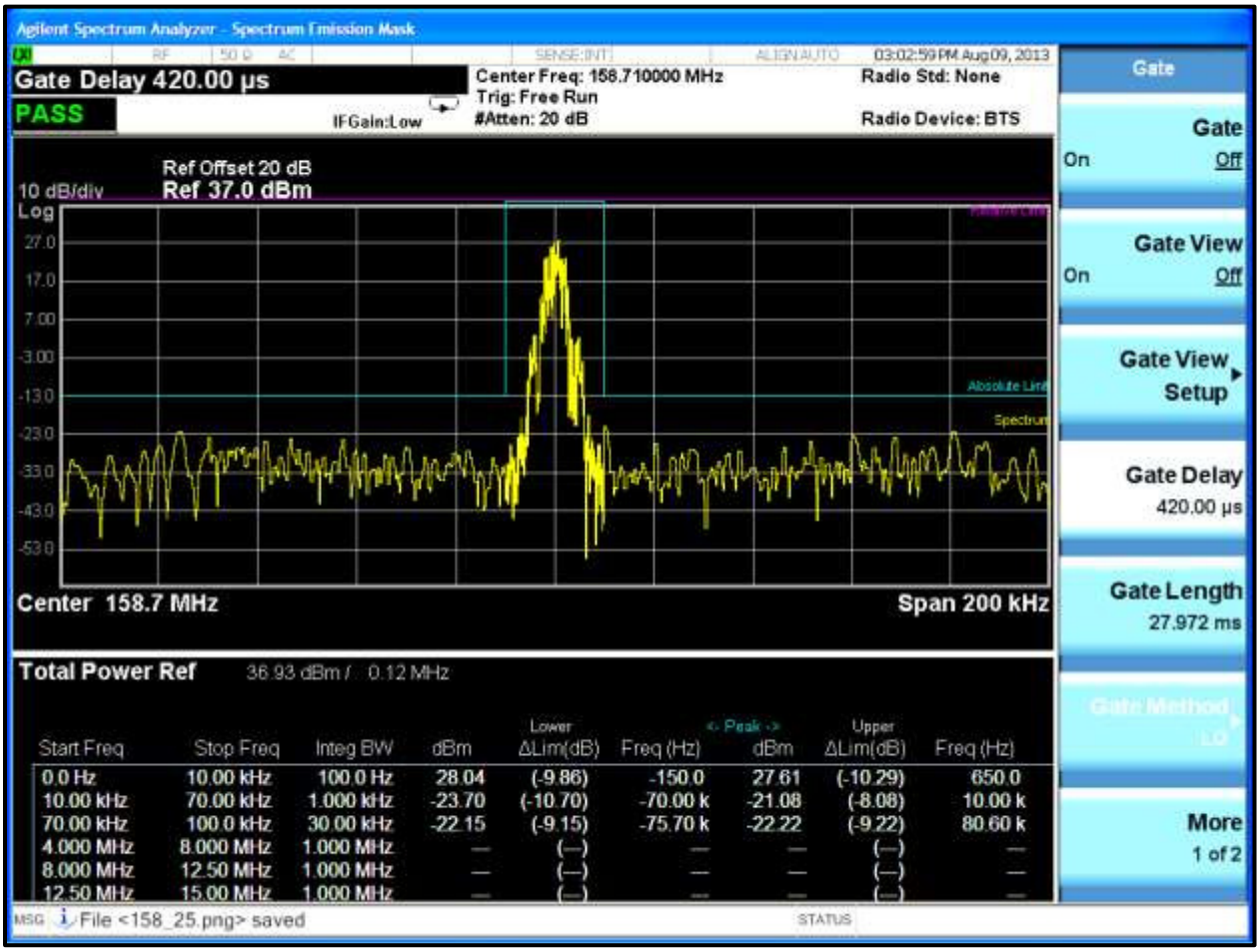


Plot 7-56: Occupied Bandwidth – 158.710 MHz; Mask; NB Analog Voice

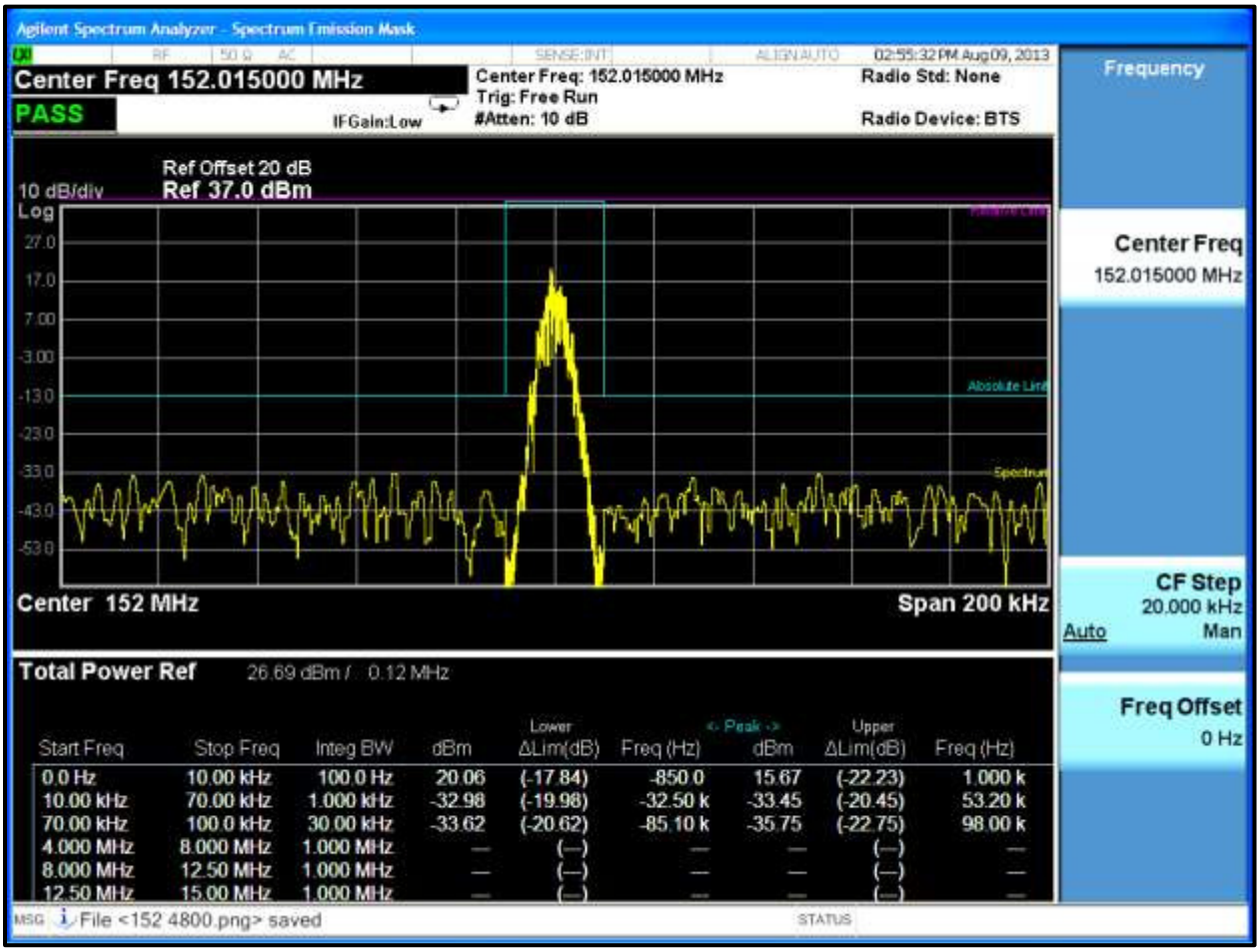
Plot 7-57: Occupied Bandwidth – 152.015 MHz; Mask; 2 Level NB 4800 FSK



Plot 7-58: Occupied Bandwidth – 158.710 MHz; Mask; 2 Level NB 4800 FSK

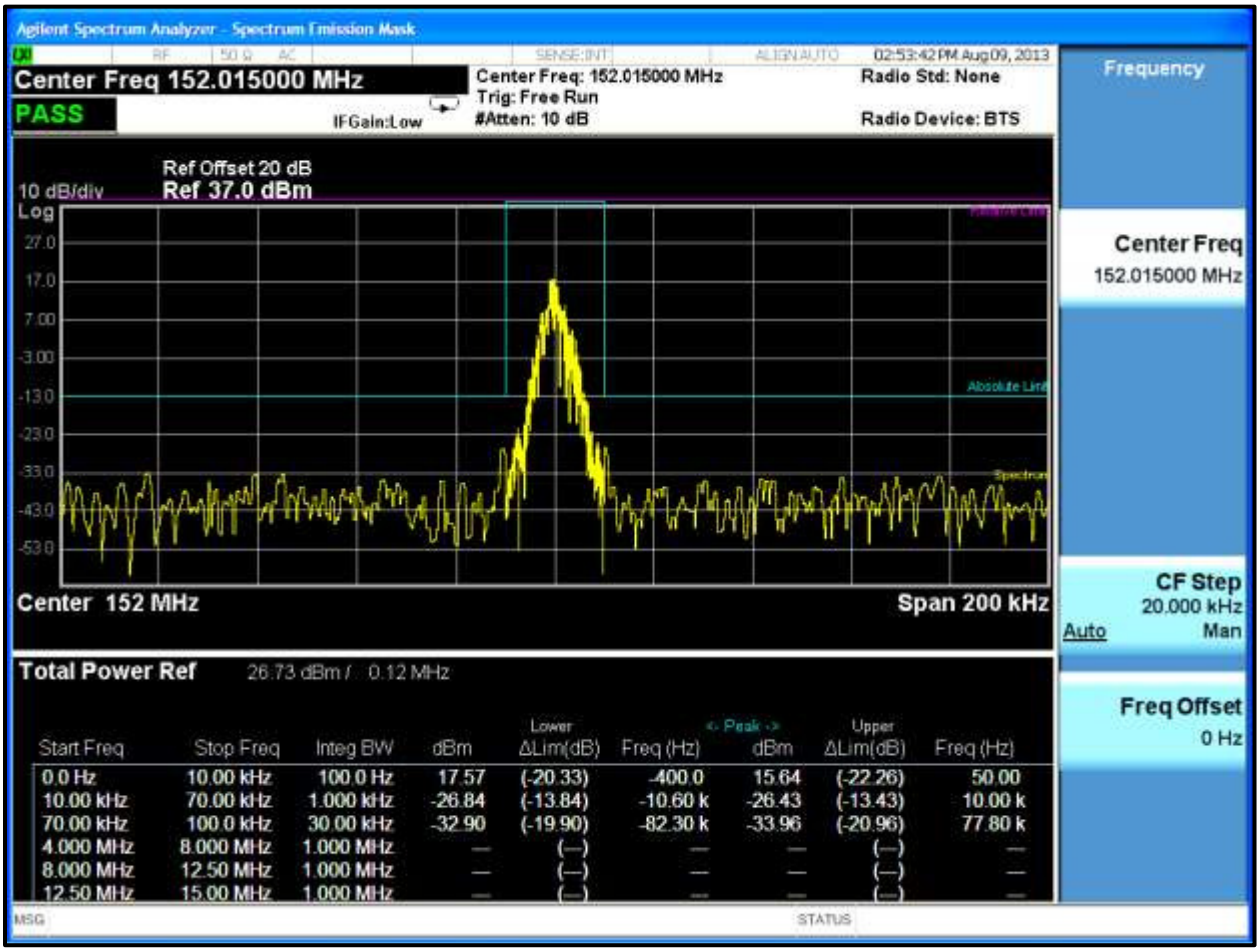


Plot 7-59: Occupied Bandwidth – 152.015 MHz; Mask; P25



Plot 7-60: Occupied Bandwidth – 158.710 MHz; Mask; P25

Plot 7-61: Occupied Bandwidth – 152.015 MHz; Mask; 2 Level NB 9600 FSK



Plot 7-62: Occupied Bandwidth – 158.710 MHz; Mask; 2 Level NB 9600 FSK

Table 7-1: Part 90 Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	PSA Spectrum Analyzer	US44020346	4/8/12
901057	Hewlett Packard	3336B	Synthesizer/ Level Generator	2514A02585	3/4/12
901337	Narda Microline	766-10	Attenuator (DC-4GHz, 10 dB, 20W)	6242	7/15/12

Test Personnel:

Daniel Baltzell — Signature — September 23, 2011
Test Engineer — Date of Test

Table 7-2: Part 90 H-CPM Emission Designator Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901581	Rohde & Schwarz	1166.1660.50	Spectrum Analyzer	2001006	6/3/13
901537	Weinschel Corp	48-40-34	Attenuator, 40 dB, 100W	CB66628	12/14/13

Test Personnel:

Daniel Baltzell — Signature — March 27, 2013
Test Engineer — Date of Test

Table 7-3: Part 22 Test Equipment

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz - 26.5 GHz)	MY51250846	4/16/14
901139	Weinschel Corp.	48-20-34 DC-18GHz	Attenuator, 100W 20 dB	BK5859	3/25/16

Test Personnel:

Daniel Baltzell — Signature — August 9, 2013
Test Engineer — Date of Test

8 Frequency Stability: FCC Parts 2.1055, 80.209, 90.213, IC RSS-119 5.3

8.1 Test Procedure

TIA-603-D 2010 Section 2.2.2

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency. The EUT was evaluated over the temperature range -30°C to +60°C. The temperature was initially set to -30°C and a 2-hour period was observed for stabilization of the EUT. The frequency stability was measured within one minute after application of primary power to the transmitter. The temperature was raised at intervals of 10 degrees centigrade through the range. A ½-hour period was observed to stabilize the EUT at each measurement step and the frequency stability was measured within one minute after application of primary power to the transmitter. The measurement was noted and normalized to 20°C. The voltage stability was measured at +/- 15% and normalized to 20°C.

Part 90.213 limit: 5 ppm for mobile stations (including portables) designed to operate with a 12.5 kHz channel bandwidth

Part 80.209 limit: 10 ppm for the 156 – 162 MHz band below 3 Watts, 5 ppm for carriers between 3 -100 W.

8.2 Test Data

Table 8-1: Temperature Frequency Stability – 155 MHz

Temperature (°C)	Measured Frequency (Hz)	ppm
-30	154.999831	0.53
-20	154.999858	0.35
-10	154.999899	0.09
0	154.999913	0.00
10	154.999907	0.04
20 (reference)	**154.999913**	**0.00**
30	154.999928	0.10
40	154.999935	0.14
50	154.999949	0.23
60	154.999939	0.17

8.2.1 Frequency Stability/Voltage Variation

Table 8-2: Frequency Stability/Voltage Variation – 155 MHz

Voltage (VDC)	Measured Frequency (Hz)	ppm
5.6 (Battery End-Point)	154.999918	0.03
6.375	154.999915	0.01
7.5 (reference)	**154.999913**	**0.00**
8.625	154.999914	0.01

The worst-case deviation was found to be 0.53 ppm.

Result: The EUT is compliant.

Table 8-3: Test Equipment Used For Testing Frequency Stability

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	01/13/13
901300	Agilent Technologies	53131A	Frequency Counter	MY40001345	07/18/12
901350	Meterman	33XR	Multimeter	040402802	12/28/12

Test Personnel:

Daniel Baltzell		September 26, 2011
Test Engineer	Signature	Date of Test

9 Modulation Characteristics: FCC Parts 2.1047, 80.213

Part 80.213 Modulation requirements
(a)(2) When phase or frequency modulation is used in the 156–162 MHz band, the peak modulation must be maintained between 75 and 100 percent. A frequency deviation of ±5 kHz is defined as 100 percent peak modulation.
(b) Radiotelephone transmitters using A3E, F3E and G3E emission must have a modulation limiter to prevent any modulation over 100 percent. This requirement does not apply to survival craft transmitters, to transmitters that do not require a license, or to transmitters whose output power does not exceed 3 watts.
(d) Ship and coast station transmitters operating in the 156–162 MHz and 216–220 MHz bands must be capable of proper operation with a frequency deviation that does not exceed ±5 kHz when using any emission authorized by §80.207.
(e) Coast station transmitters operating in the 156–162 MHz band must be equipped with an audio low-pass filter. The filter must be installed between the modulation limiter and the modulated radio frequency stage. At frequencies between 3 kHz and 20 kHz, it must have an attenuation greater than at 1 kHz by at least 60log10(f/3) dB where "f" is the audio frequency in kilohertz. At frequencies above 20 kHz, the attenuation must be at least 50 dB greater than at 1 kHz.

9.1 Test Procedures

9.1.1 Audio Frequency Response

TIA-603-D 2010 Section 2.2.6

The audio frequency response is the degree of closeness to which the frequency deviation of the transmitter follows a prescribed characteristic.

The input audio level at 1000 Hz was set to produce 20% of the rated system deviation. This point is shown as the 0 dB reference level, noted DEVref. The audio signal generator was varied from 100 Hz to 5 kHz with the input level held constant. The deviation in kHz was recorded using a modulation analyzer as DEVfreq. The response in dB relative to 1 kHz was calculated as follows:

Audio Frequency Response = 20 LOG (DEVfreq/DEVref)

9.1.2 Audio Low Pass Filter Response

TIA-603-D 2010 Section 2.2.15

The Audio Low Pass Filter Response is the frequency response of the post limiter low pass filter circuit above 3000 Hz.

9.1.3 Modulation Limiting

TIA-603-D 2010 Section 2.2.3

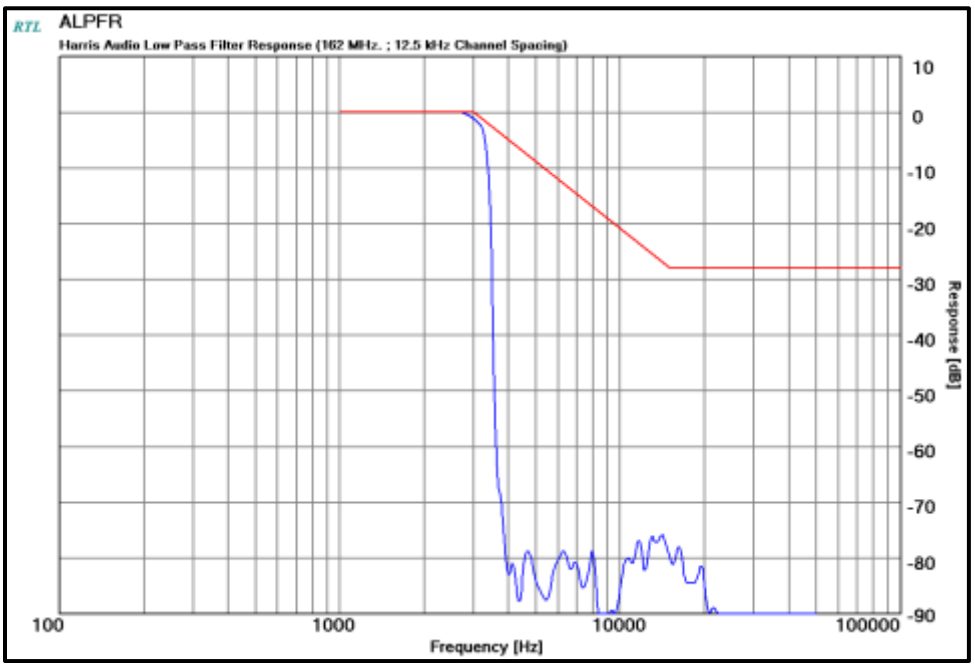
The transmitter was adjusted for full rated system deviation. The audio input level was adjusted for 60% of rated system deviation at 1000 Hz. Using this level (0 dB) as a reference, the audio input level was varied from the reference +/-20 dB for modulation frequencies of 300 Hz, 1,000 Hz, and 2,500 Hz. The system deviation obtained as a function of the input level was recorded. Both positive and negative peak deviations were recorded.

9.2 Test Data

Plot 9-1: Modulation Characteristics - Audio Frequency Response – 162.0000 MHz

9.2.1 Audio Low Pass Filter Response

Plot 9-2: Modulation Characteristics – Audio Low Pass Filter – 162.0000 MHz



9.2.2 Modulation Limiting

Plot 9-3: Modulation Characteristics – Modulation Limiting – 162.0000 MHz; Positive Peak

Plot 9-4: Modulation Characteristics – Modulation Limiting – 162.0000 MHz; Negative Peak

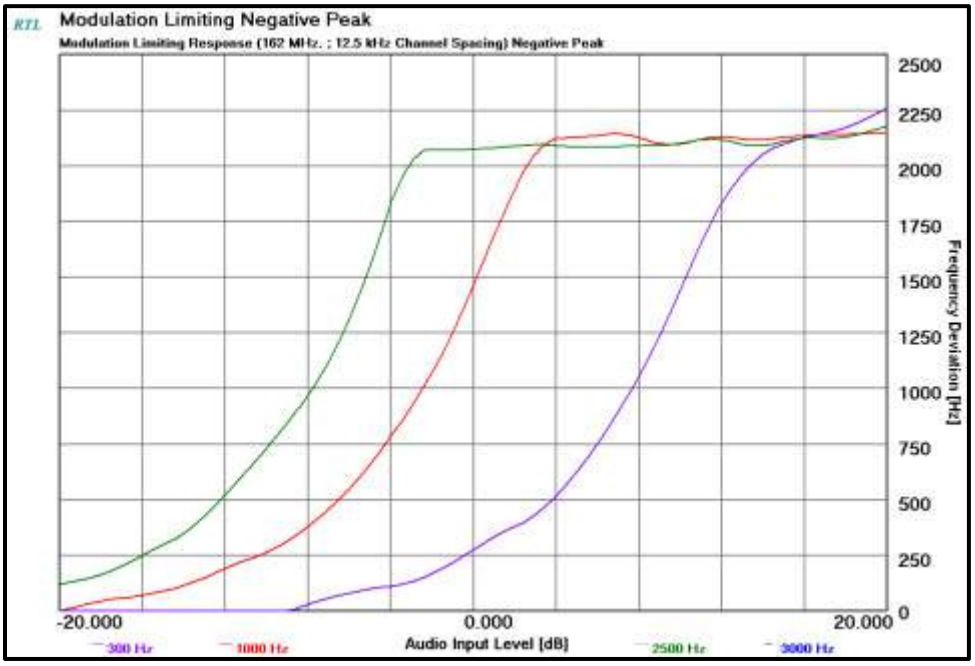


Table 9-1: Test Equipment Used For Testing Modulation Requirements

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901057	Hewlett Packard	3336B	Synthesizer/ Level Generator	2514A02585	3/4/12
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	10/7/11
901139	Weinschel Corp.	48-20-34 DC-18GHz	Attenuator, 100W 40dB	BK5859	2/17/12

Test Personnel:

Daniel Baltzell		September 23, 2011
Test Engineer	Signature	Date of Test

10 Transient Frequency Behavior: FCC Part 90.214, IC RSS-119 5.9

10.1 Test Procedure

TIA-603-D 2010 Section 2.2.19

Part 90.214 Transient Frequency Behavior

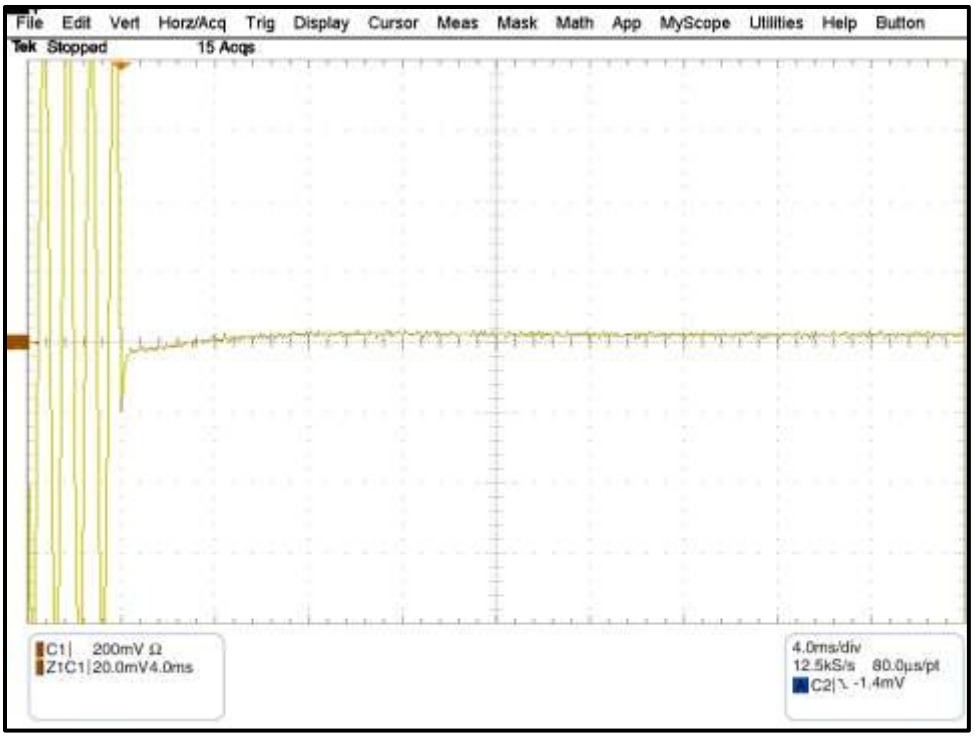
Transmitters designed to operate in the 150–174 MHz and 421–512 MHz frequency bands must maintain transient frequencies within the maximum frequency difference limits during the time intervals indicated:

Time intervals [1,2]	Maximum frequency difference [3]	All equipment	
		150 to 174 MHz	421 to 512 MHz
Transient Frequency Behavior for Equipment Designed to Operate on 25 kHz Channels			
t_1 [4]	±25.0 kHz	5.0 ms	10.0 ms
t_2	±12.5 kHz	20.0 ms	25.0 ms
t_3 [4]	±25.0 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 12.5 kHz Channels			
t_1 [4]	±12.5 kHz	5.0 ms	10.0 ms
t_2	±6.25 kHz	20.0 ms	25.0 ms
t_3 [4]	±12.5 kHz	5.0 ms	10.0 ms
Transient Frequency Behavior for Equipment Designed to Operate on 6.25 kHz Channels			
t_1 [4]	±6.25 kHz	5.0 ms	10.0 ms
t_2	±3.125 kHz	20.0 ms	25.0 ms
t_3 [4]	±6.25 kHz	5.0 ms	10.0 ms

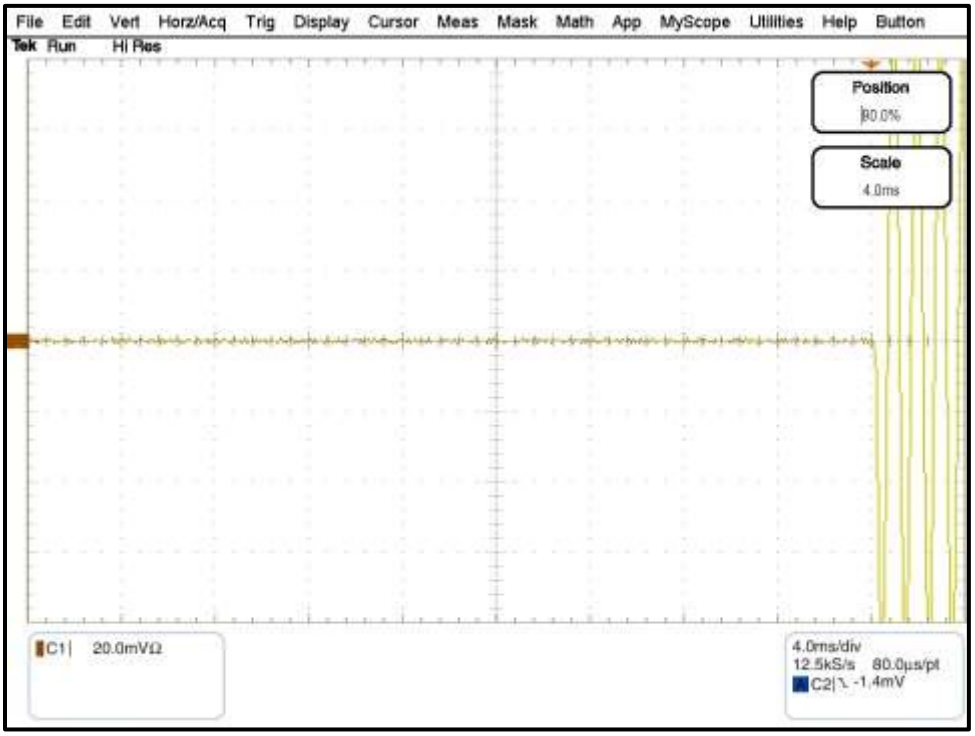
[1] t_{on} is the instant when a 1 kHz test signal is completely suppressed, including any capture time due to phasing.
t_1 is the time period immediately following t_{on}.
t_2 is the time period immediately following t_1.
t_3 is the time period from the instant when the transmitter is turned off until t_{off}.
t_{off} is the instant when the 1 kHz test signal starts to rise.
[2] During the time from the end of t_2 to the beginning of t_3, the frequency difference must not exceed the limits specified in § 90.213.
[3] Difference between the actual transmitter frequency and the assigned transmitter frequency.
[4] If the transmitter carrier output power rating is 6 watts or less, the frequency difference during this time period may exceed the maximum frequency difference for this time period.

10.2 Test Data

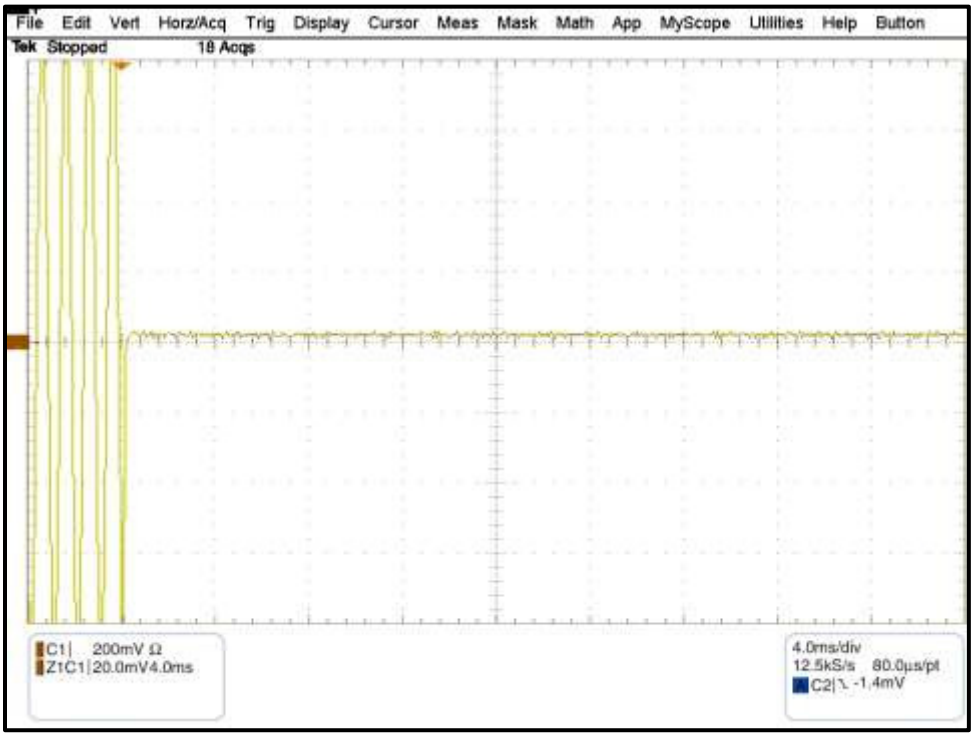
Plot 10-1: Transient Frequency Behavior – 136.0000 MHz; High Power; Carrier ON Time



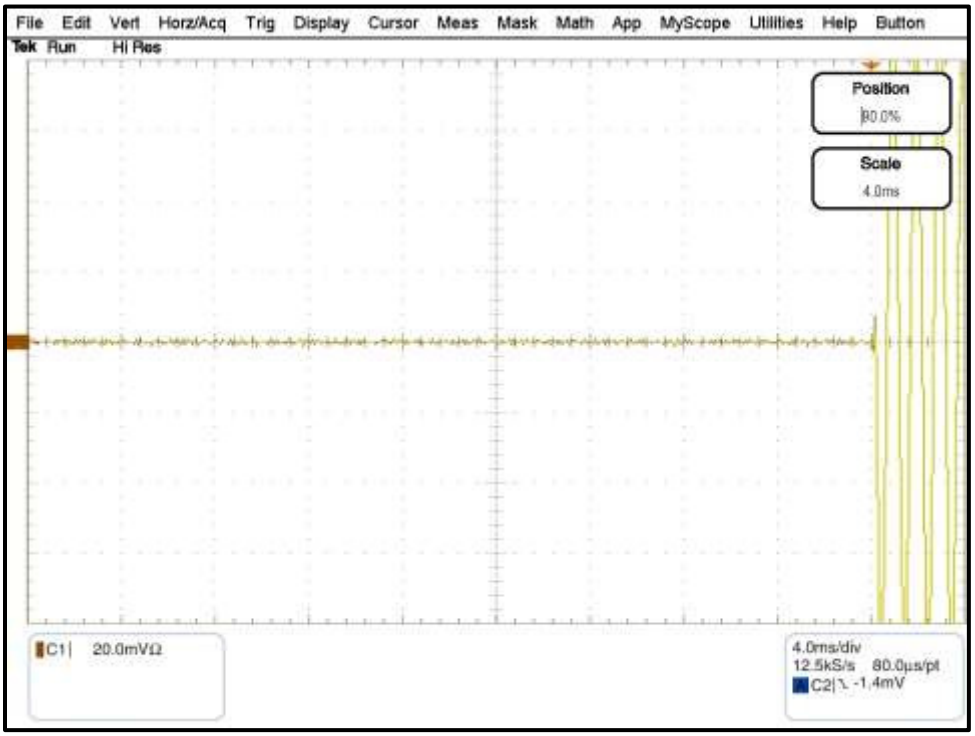
Plot 10-2: Transient Frequency Behavior – 136.0000 MHz; High Power; Carrier OFF Time



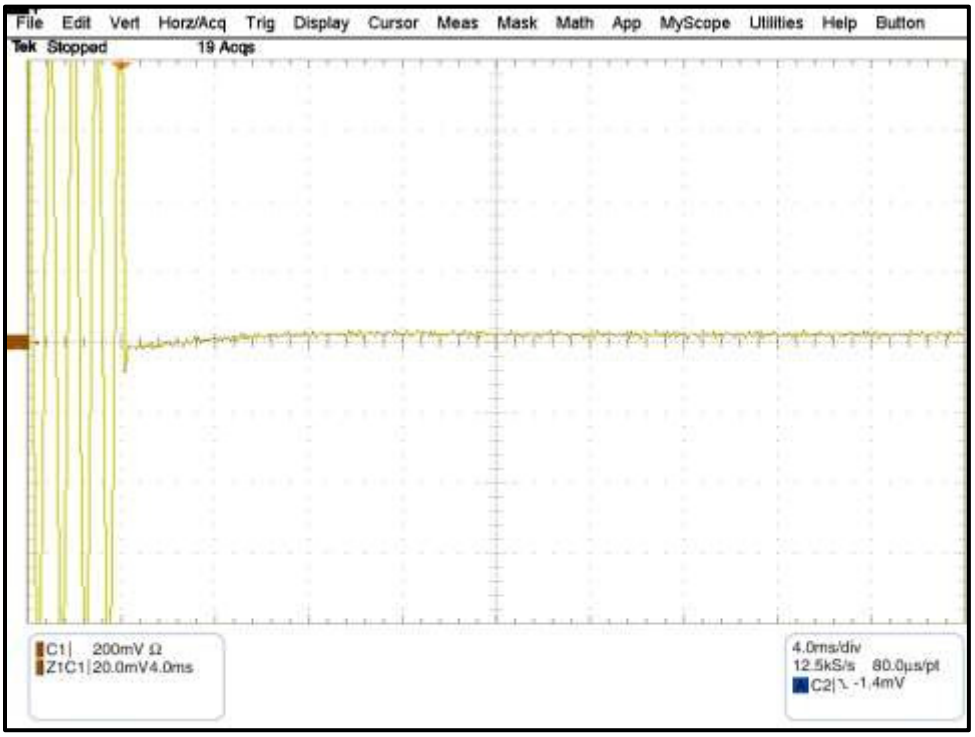
Plot 10-3: Transient Frequency Behavior – 155.0000 MHz; High Power; Carrier ON Time



Plot 10-4: Transient Frequency Behavior – 155.0000 MHz; High Power; Carrier OFF Time



Plot 10-5: Transient Frequency Behavior – 174.0000 MHz; High Power; Carrier ON Time



Plot 10-6: Transient Frequency Behavior – 174.0000 MHz; High Power; Carrier OFF Time

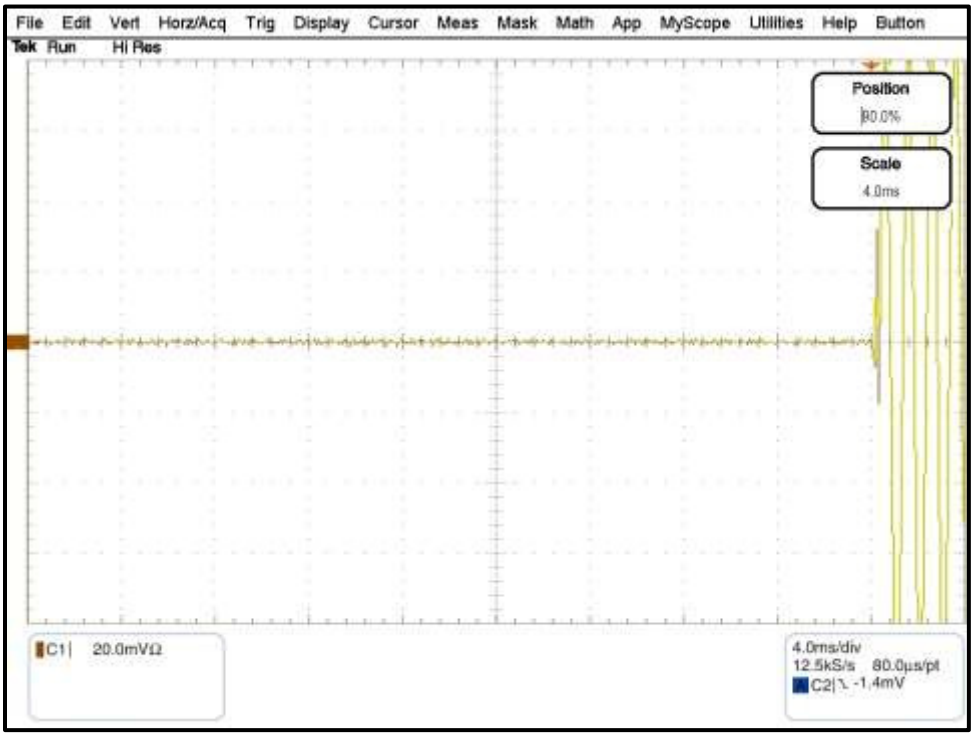


Table 10-1: Test Equipment Used For Testing Transient Frequency Behavior

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901118	Hewlett Packard	8901A Opt. 002-003	Modulation Analyzer	2406A00178	10/7/11
901514	Tektronix	TDS7404B	Oscilloscope	B010161	6/28/12
900917	Hewlett Packard	8648C	Synthesized. Signal Generator (9 kHz - 3200 MHz)	3537A01741	10/20/11
900948	Weinschel	47-10-43	Attenuator DC-18 GHz 10 dB 50W	BH148.01257	2/17/12
901511	Pasternack	PE 2003	Power Divider (10 MHz - 1 GHz)	NA	N/A
901463	Werlatone Inc.	C1795	Directional Coupler, 100W, 40 dB, 1 - 1000 MHz	4067	2/18/12
901263	Agilent Technologies	.01-12 GHz	SMA Detector	2936A05505	N/A

Test Personnel:

Daniel Baltzell		September 26, 2011
Test Engineer	Signature	Date of Test

11 FCC Rules and Regulations Part 2.202: Necessary Bandwidth and Emission Bandwidth

Type of Emission: F3E, F1D, F1E

Voice – 12.5 kHz channel separation
Calculation:
Max modulation (M) in kHz: 3.0
Max deviation (D) in kHz: 2.5
Constant factor (K): 1 (assumed)
Bn = 2xM+2xDK = 11.0 kHz
Emission designator: 11K0F3E

Digital Voice and Data (9600N) – 12.5 kHz channel spacing
Calculation:
Data rate in bps (R) = 9600
Peak deviation of carrier (D) = 2130
Bn = 3.86D + 0.27RK = 3.86(2130) + 0.27(9600)(1) = 10,814 kHz
Emission designator: 10K8F1D, 10K8F1E

Digital Voice and Data (4800N) – 12.5 kHz channel spacing
Calculation:
Data rate in bps (R) = 4800
Peak deviation of carrier (D) = 1685
Bn = 3.86D + 0.27RK = 3.86(1350) + 0.27(4800)(1) = 7.800 kHz
Emission designator: 7K80F1D, 7K80F1E

P25 – 4-level FSK 9600
Calculation:
Data rate in bps (R) = 4800
Peak deviation of carrier (D) = 1800
Bn = $[4800/\log_2(2) + 2 (1800) (1) = 8.400$ kHz
Emission designator: 8K40F1D, 8K40F1E

12 Conclusion

The data in this measurement report shows that the **Harris Corporation** Model **XG-25P VHF, FCC ID: OWDTR-0139-E, IC: 3636B-0139,** complies with the applicable requirements of Parts 2, 22, 80 and 90 of the FCC Rules, and Industry Canada RSS-119 Issue 12.