FCC/IC Class II Permissive Change Report

Harris Corporation
221 Jefferson Ridge Parkway
Lynchburg, VA 28511

Model: MASTR III 800 MHz

FCC ID: OWDTR-0036-E
IC: 3636B-0036

October 18, 2013

Standards Referenced for this Report	
Part 2: 2012	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 90: 2012	Private Land Mobile Radio Services
ANSI TIA-603-C-2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
RSS-119 Issue 11, June 2011	Radio Transmitters and Receivers Operating in the Land Mobile and Fixed Services in the Frequency Range 27.41-960 MHz
SRSP-502 Issue 4, October 1999	Technical Requirements for Land Mobile and Fixed Radio Services Operating in the Bands 806-821/851-866 MHz and 821-824/866-869 MHz

Frequency Range (MHz)	Rated Transmit Power (W) (Conducted)	Measured Frequency Tolerance (ppm)	Emission Designator
851-870	100.0	1	16K0F3E (Analog Voice; WB)
851-870	100.0	1	14K0F3E (Analog Voice; NB (NPSPAC))
851-870	100.0	1	10K8F1D/E (2-level FSK; WB)
851-870	100.0	1	8K20F1D/E (2-level FSK; NB)
851-870	100.0	1	10K5F1D/E (2-level FSK; NB (NPSPAC))
851-870	100.0	1	7K80F1D/E (4-level C4FM; P25)

Report Prepared by Test Engineer: Daniel W. Baltzell

Document Number: 2013129

These tests are accredited and meet the requirements of ISO/IEC 17025 as verified by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1445.

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1 General Information

The following Class II Permissive Change 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 **MASTR III 800 MHz Base Station Radio, FCC ID: OWDTR-0036-E**, **IC: 3636B-0036**. The test results reported in this document relate only to the item that was tested.

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

1.1 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.

1.2 Related Submittal(s)/Grant(s)

This Class II Permissive Change is to address a PA change. The original FCC certification was granted on October 11, 2004; a Class II Permissive Change was granted on February 12, 2006.

2 Tested System Details

The test sample was received on August 12, 2013. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

Table 2-1: Test System Details

Model Tested	MASTR III 800 MHz Base Station Radio (Model TR-0036)
Frequency Band	851-870 MHz
Modulation Type	2-level Frequency Shift Keying (FSK), P25, Analog FM
Channel Step Size	6.25 kHz
Channel Bandwidth	12.5 kHz
Primary Power	120 V 5A or 230 V 3A. Range 85 to 264 VAC.
Rated Transmitter Output Power	Continuously variable from 5-100 W
Duty Cycle	100% maximum

Table 2-2: Equipment Under Test (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
MASTR III 800 MHz Base Station Radio	Harris Corporation	TR-0036	N/A	OWDTR-0036-E	20510

The MASTR III 800 MHz Base Station Radio includes the components shown in Table 2-3.

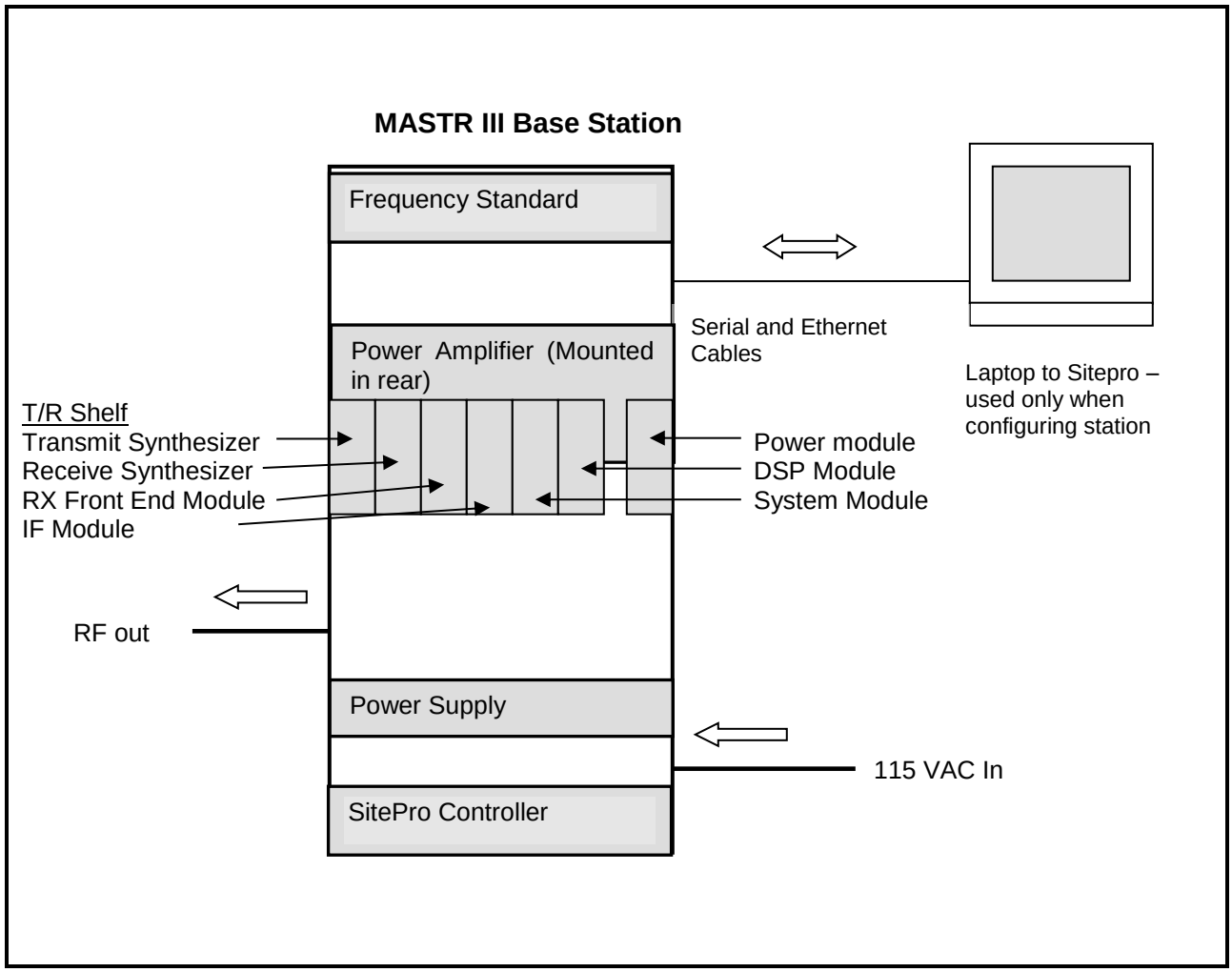
Table 2-3: MASTR III 800 MHz Base Station Radio Components

Description	Part Number	Frequency (MHz)	Serial Number	Revision
Transmit Synthesizer Module	EA101685V5	851.025	C1324C2BFE3	E
Transmit Synthesizer Module	EA101685V5	860.525	C1324C2BFE8	E
Transmit Synthesizer Module	EA101685V5	869.975	C1317C29669	E
Transmit Synthesizer Module	EA101685V5	860.550	C1317C2966F	E
Receiver Synthesizer Module	EA101684V5	806.025	C1325C2C669	B
Receiver Synthesizer Module	EA101684V5	815.525/815.550	C1325C2C664	B
Receiver Synthesizer Module	EA101684V5	824.975	C1325C2C663	B
Receiver Front End Module	19D902782G5	N/A	SLR04121546	R2A
Receiver IF Module	EA101794V1	70.2 MHz	C1116B02677	D
System Module	19D902590G6	N/A	N/A	8A
DSP Module	EA101800V1	N/A	C1028AED5A1	E
Power Module	19D902589G2	N/A	C1029AEDB9D	A
Power Supply	PS103010V120	N/A	4688020076	N/A
SitePro	EA101209V11	N/A	N/A	N/A
Power Amplifier	EA-101292-021	N/A	041183395	PC1
MASTR III T/R Shelf	SXRB1J	N/A	N/A	C
Frequency Standard	QFS-106	10 MHz	9817	N/A

Table 2-4: Support Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Laptop	Dell	Latitude D620	N/A	N/A	20508

Figure 2-1: Configuration of Tested System



3 FCC Rules and Regulations Part 90 §90.1215(a) and Part 2 §2.1046(a): Peak Output Power

3.1 Test Procedure

ANSI TIA-603-2004, section 2.2.1.

The EUT was connected with a power sensor/meter through an appropriate 50 ohm attenuator. Attenuator loss was accounted for.

3.2 Test Data

Table 3-1: RF Power Output (High Power): Carrier Output Power (Unmodulated)

Frequency (MHz)	High Power Measured (Watt)*	Low Power Measured (Watt)*
851.025	106.7	10.3
860.525	106.1	10.4
868.9875	101.2	10.1

* conducted antenna port power

Table 3-2: RF Power Output (Rated Power)

Frequency (MHz)	High Power Rated (W)*	Low Power Rated (W)*
851-870	100	10

* conducted antenna port power

Table 3-3: Test Equipment for Testing RF Power Output - Conducted

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901355	JFW Industries	50FH-003-300	300W 3DB DC1000 MHz Attenuator	N/A	3/25/16
901536	Aeroflex	48-40-34	40 dB Attenuator	CB6627	10/14/13
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz - 26.5 GHz)	MY51250846	4/16/14
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 W. Baltzell		August 13, 2013
Test Engineer	Signature	Date of Test

4 FCC Rules and Regulations Part 2 §2.1051: Spurious Emissions at Antenna Terminals; Part 90 §90.210: Emissions Masks; RSS-119 §4.2: Transmitter Unwanted Emissions

4.1 Test Procedure

ANSI TIA-603-C-2004, Section 2.2.13.

The transmitter is terminated with a 50 Ω load and interfaced with a spectrum analyzer. The device uses digital modulation modulated to its maximum extent using a pseudo random data sequence of 9600 bps for analog FM, 2-level data, and/or C4FM modes.

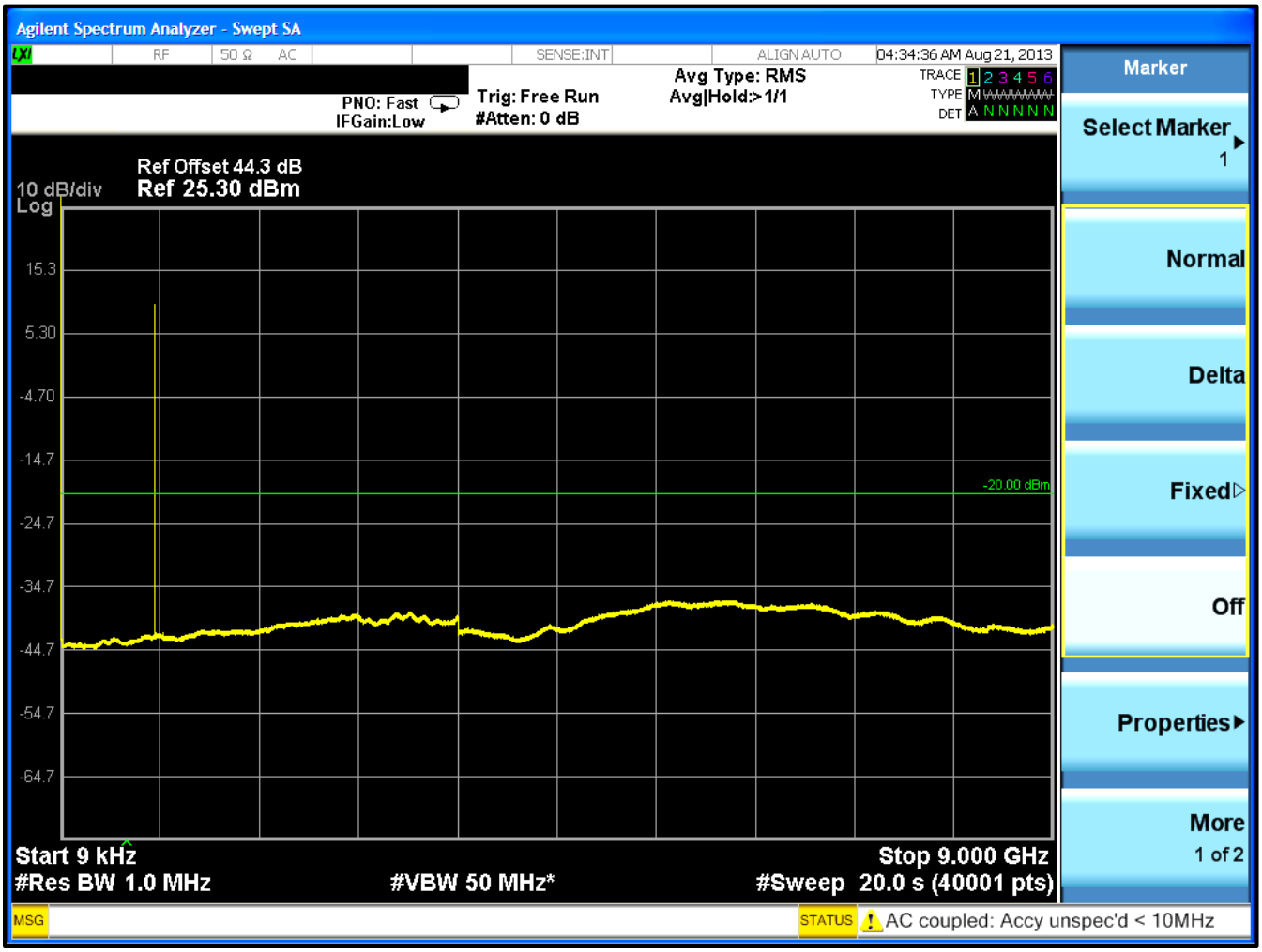
4.2 Test Data

Frequency range of measurement per Part 2.1057: 9 kHz to 10xFc.

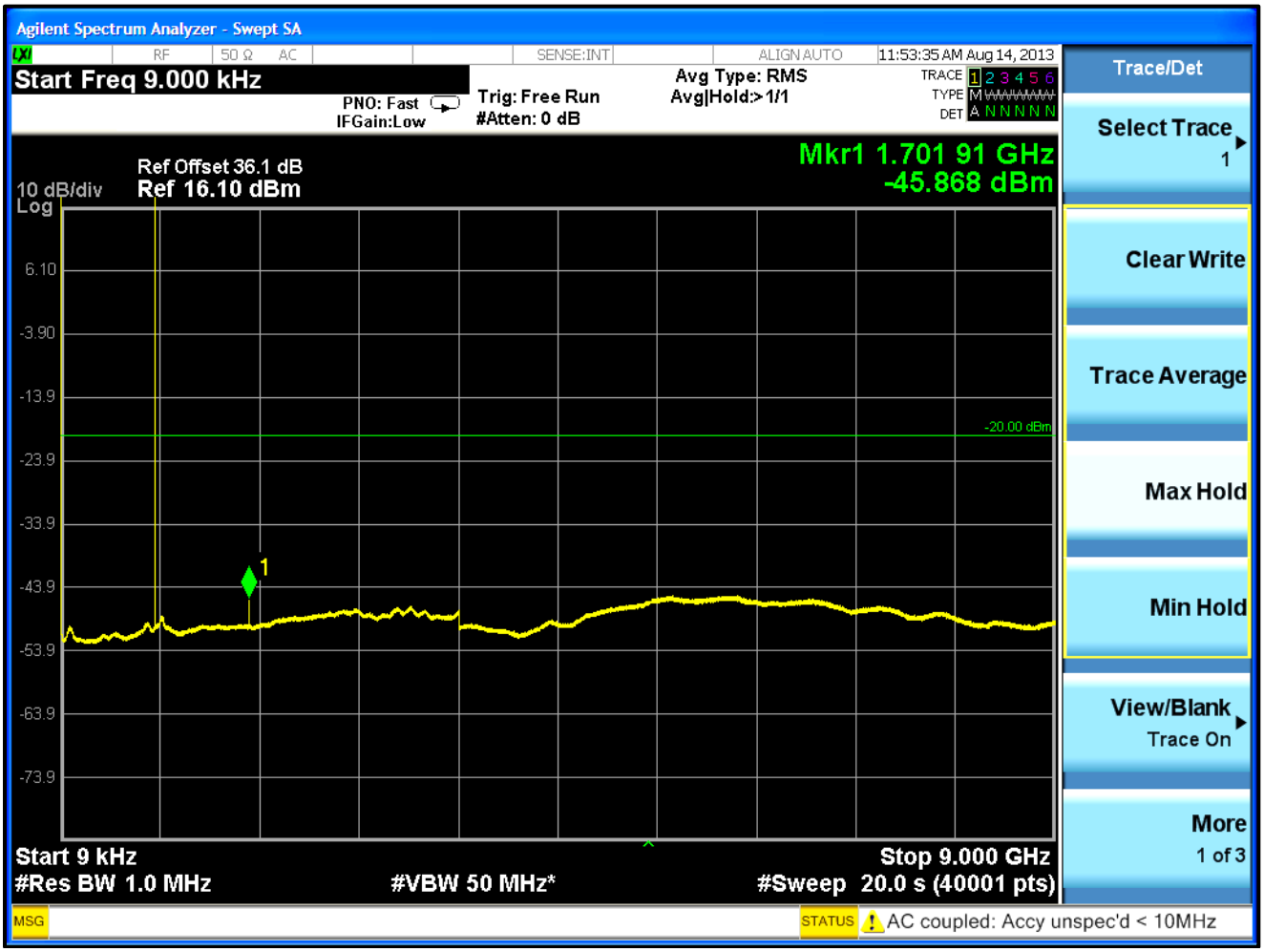
Limit: P(dBm) – (43 + 10xLOG P(W))

The worst case (unwanted emissions) channels are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

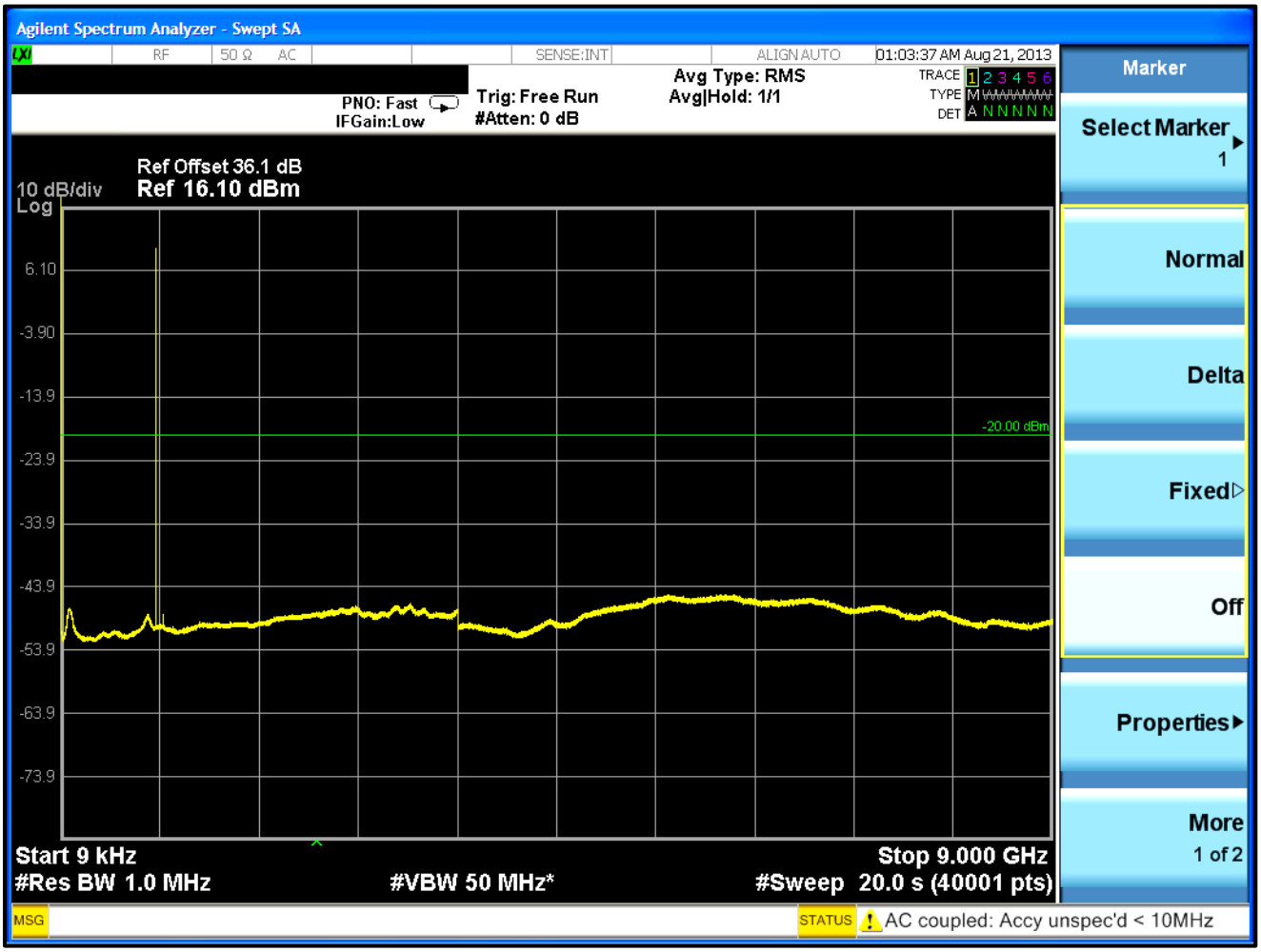
Plot 4-1: Conducted Spurious Emissions - 851.025 MHz; Low Power



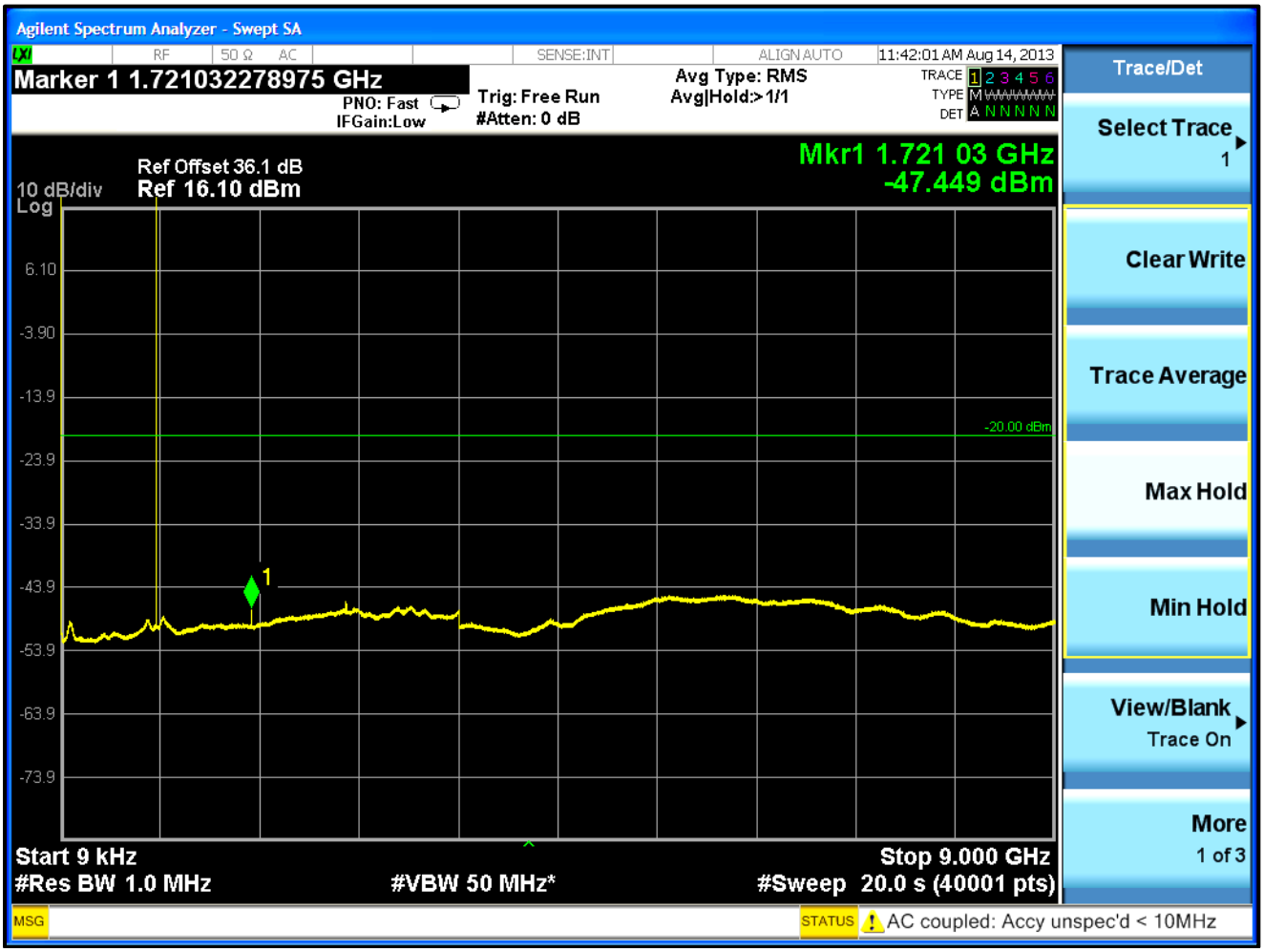
Plot 4-2: Conducted Spurious Emissions - 851.025 MHz; High Power



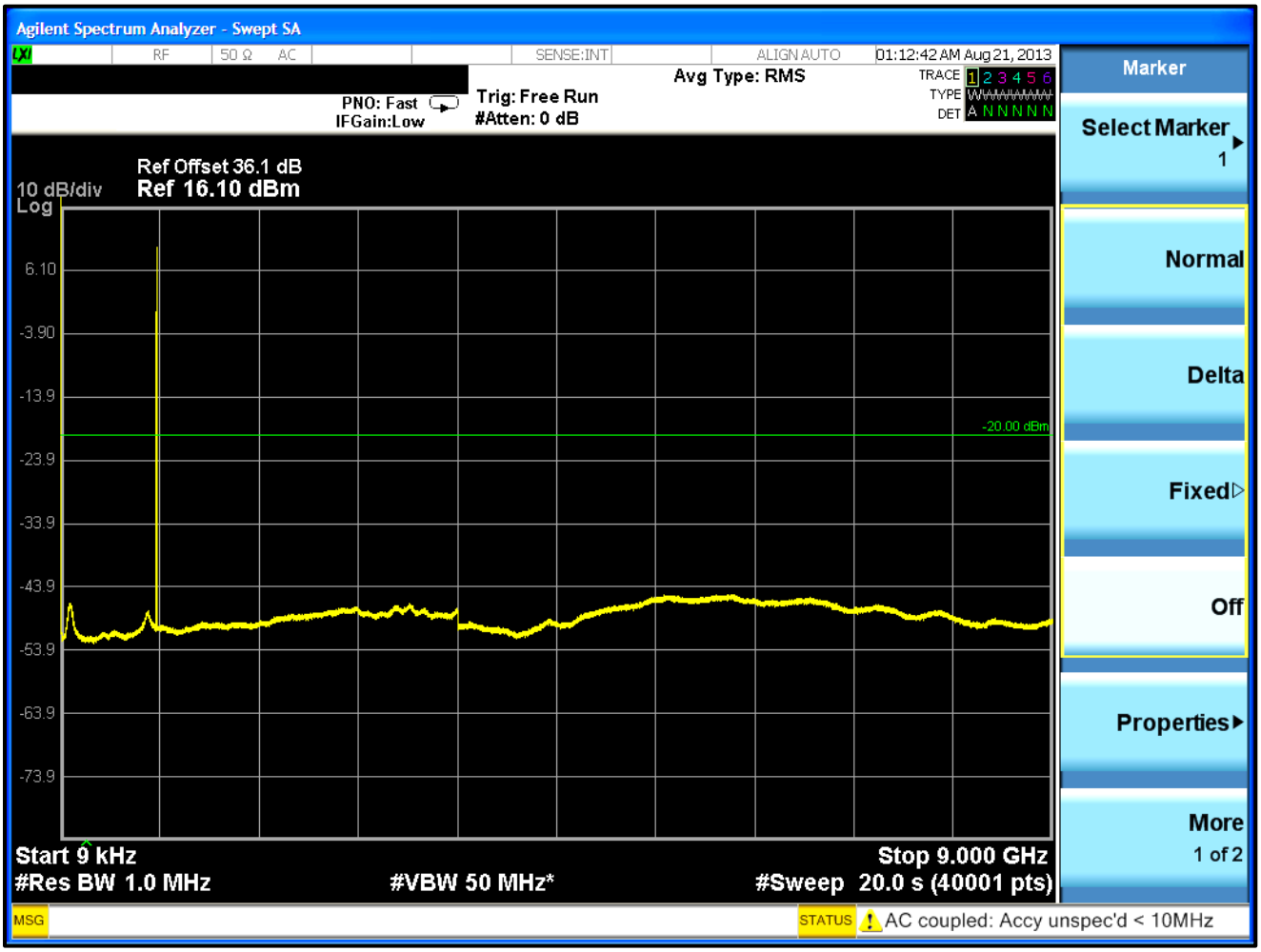
Plot 4-3: Conducted Spurious Emissions - 860.525 MHz; Low Power



Plot 4-4: Conducted Spurious Emissions - 860.525 MHz; High Power



Plot 4-5: Conducted Spurious Emissions - 868.9875 MHz; Low Power

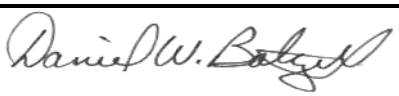


Plot 4-6: Conducted Spurious Emissions - 868.9875 MHz; High Power

Table 4-1: Test Equipment for Testing Conducted Spurious Emissions

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901355	JFW Industries	50FH-003-300	300W 3DB DC1000 MHz Attenuator	N/A	3/25/16
901536	Aeroflex	48-40-34	40 dB Attenuator	CB6627	10/14/13
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz-26.5 GHz)	MY51250846	4/16/14
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
901132	PAR Electronics	UHFSN(806-902)	UHF Notch Filter	N/A	3/1/14
900948	Weinschel Corporation	47-10-43	Attenuator DC-18 GHz 10 dB 50W	BH1487	3/18/14
901139	Weinschel Corp.	48-20-34 DC-18GHz	Attenuator, 100W 20dB	BK5859	3/25/16

Test Personnel:

Daniel W. Baltzell		August 14-21, 2013
Test Engineer	Signature	Dates of Test

5 FCC Rules and Regulations Part §2.1049(c)(1); §90.210; RSS-119 4.2.1, 4.2.2: Occupied Bandwidth

5.1 Test Procedure

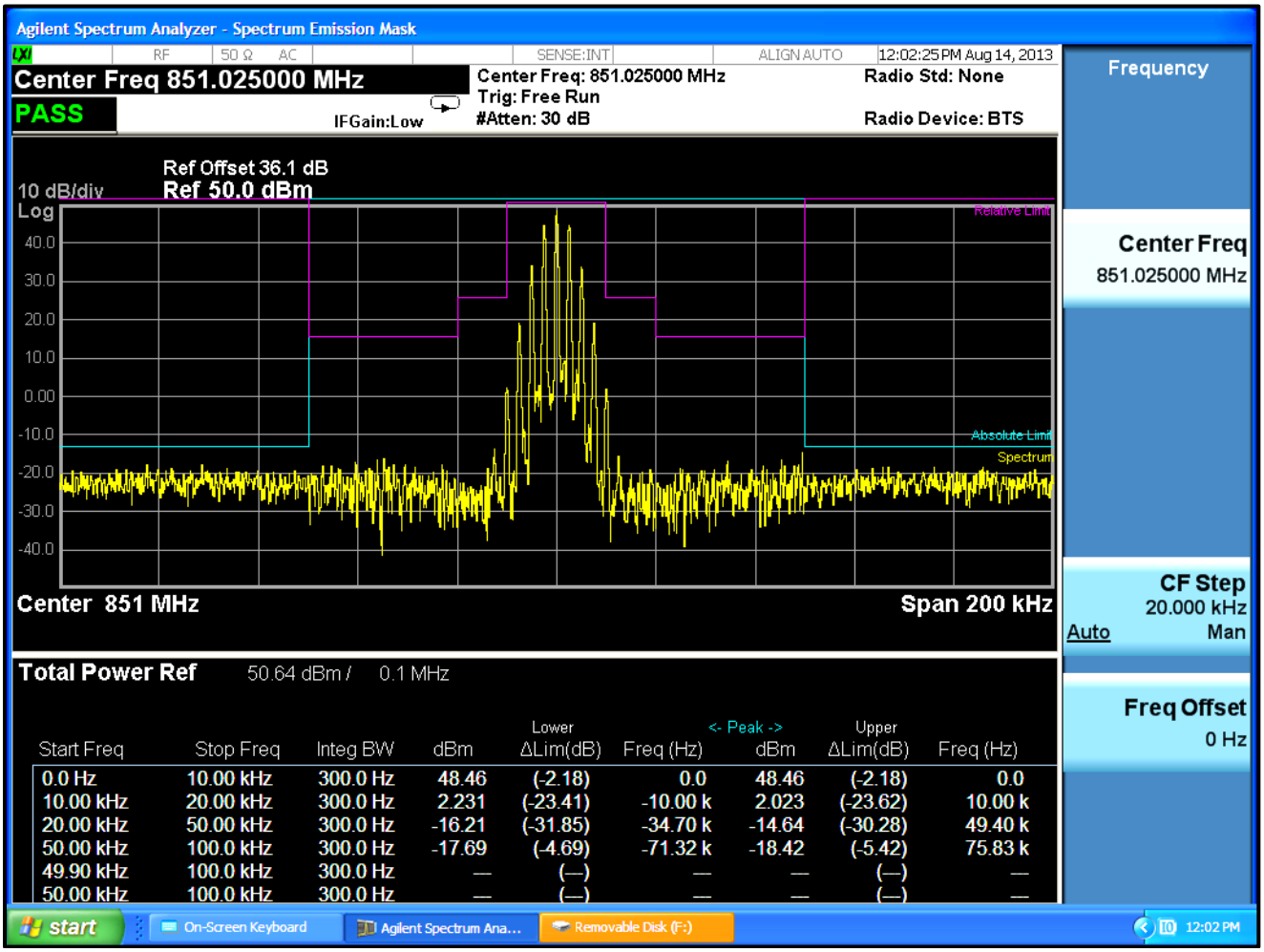
Analog – Modulated with a 2500 Hz signal level, 16 dB higher than required for 50% deviation at 1 kHz.

Digital - Modulated to its maximum extent using a pseudo random data sequence

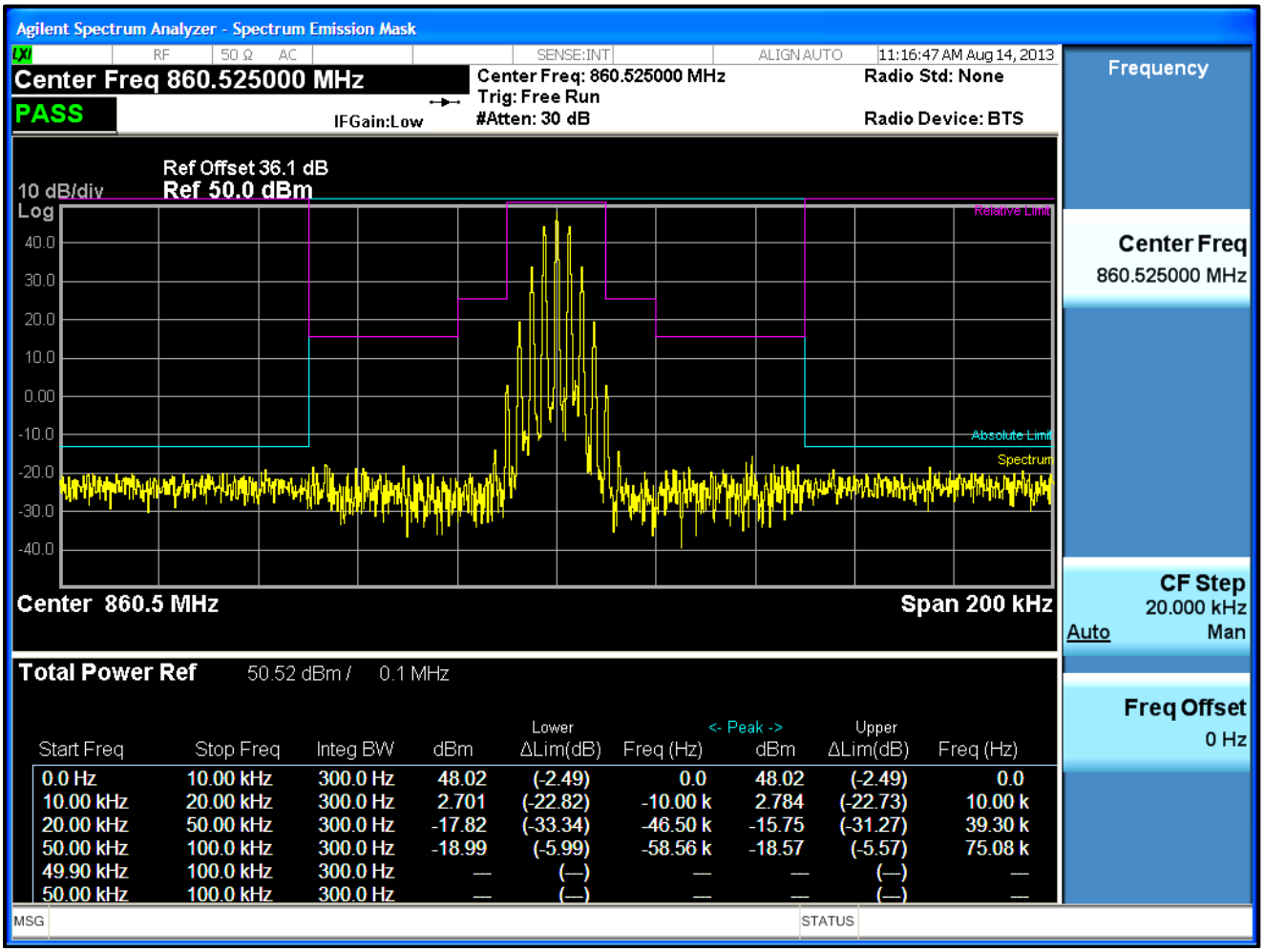
ANSI/TIA/EIA-603-2004, Section 2.2.11.

5.2 Test Data

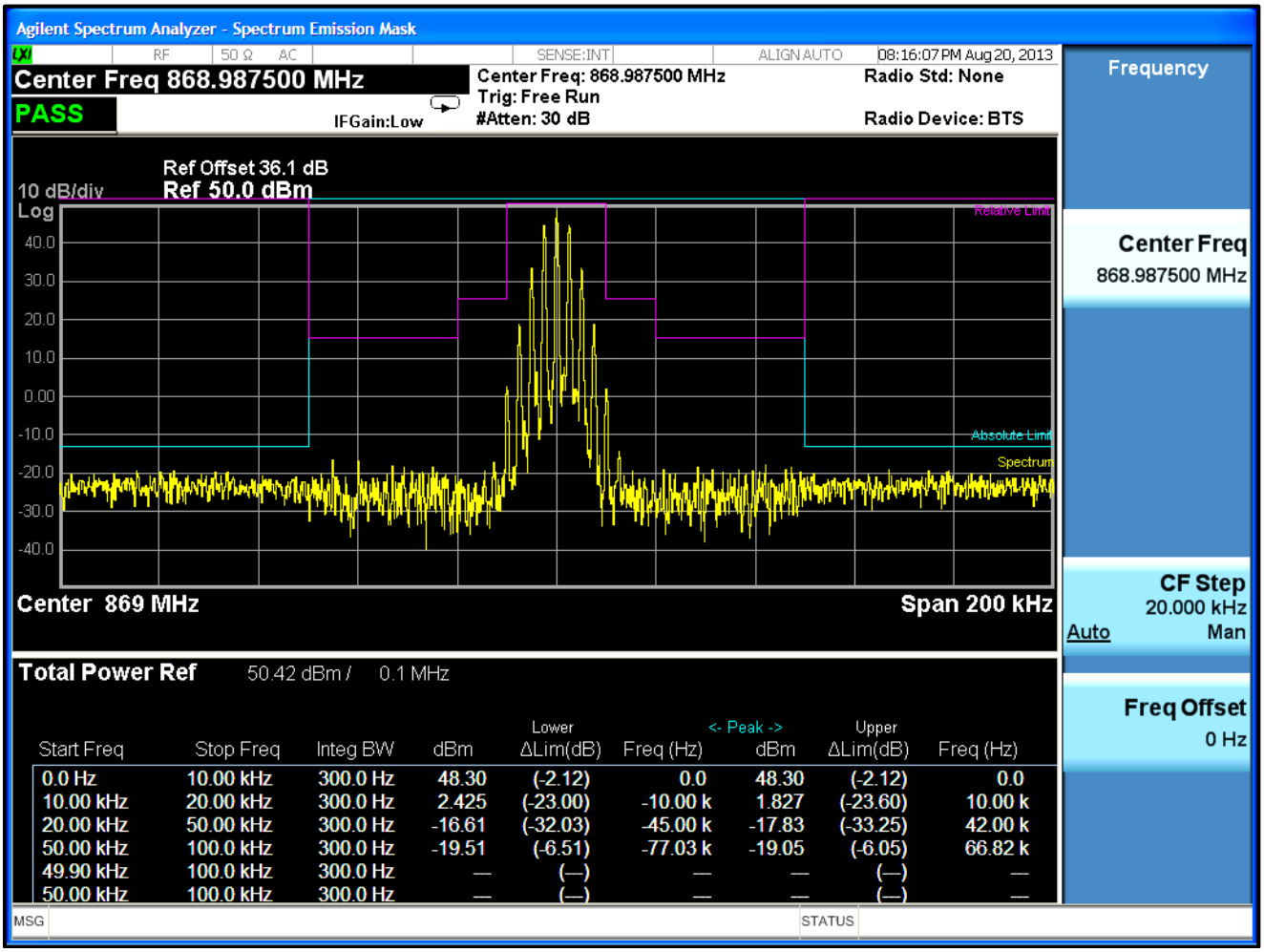
Plot 5-1: Occupied Bandwidth – 851.025 MHz; Mask B; Wide Band; Analog FM



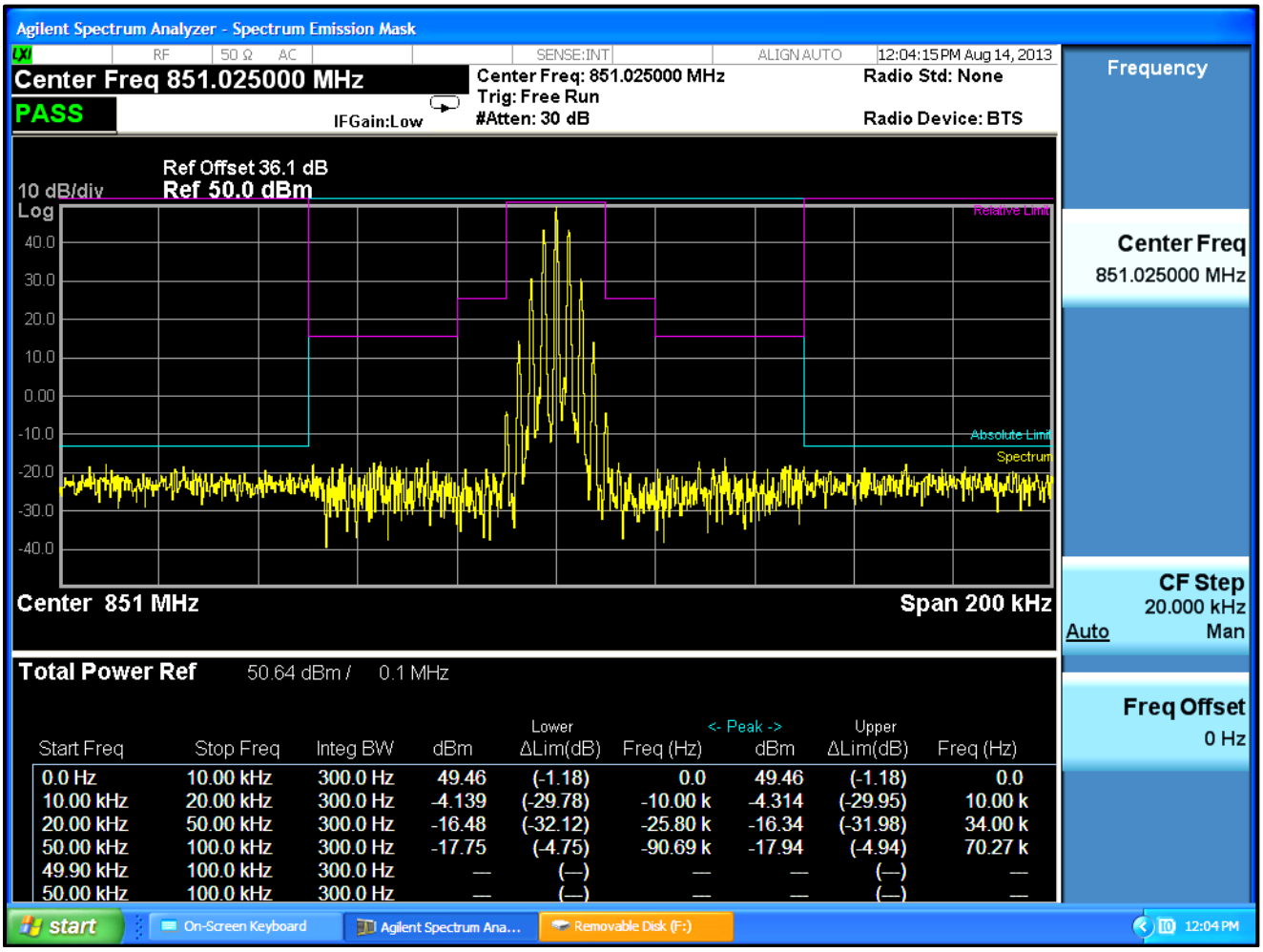
Plot 5-2: Occupied Bandwidth – 860.525 MHz; Mask B; Wide Band; Analog FM



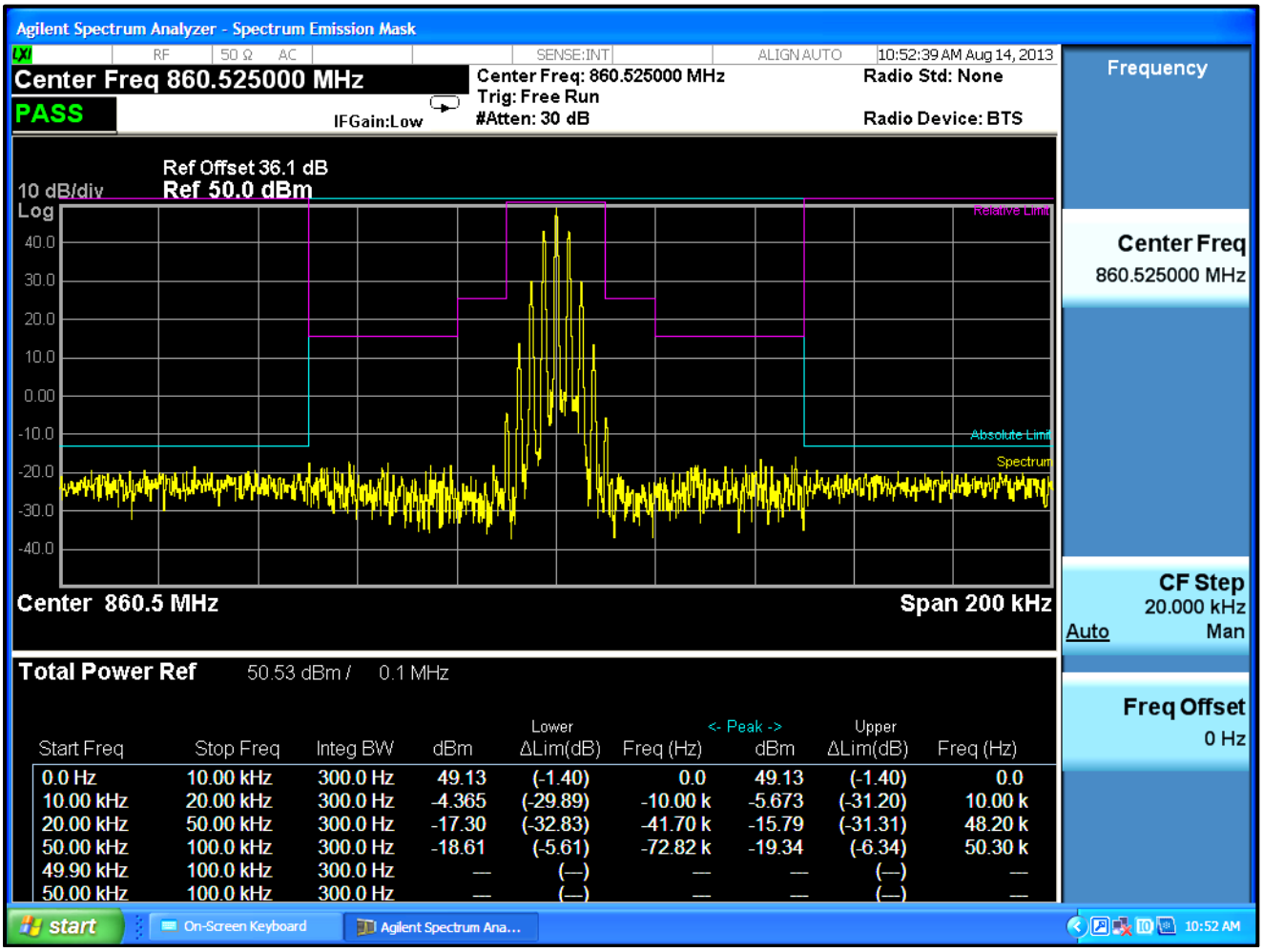
Plot 5-3: Occupied Bandwidth – 868.9875 MHz; Mask B; Wide Band; Analog FM



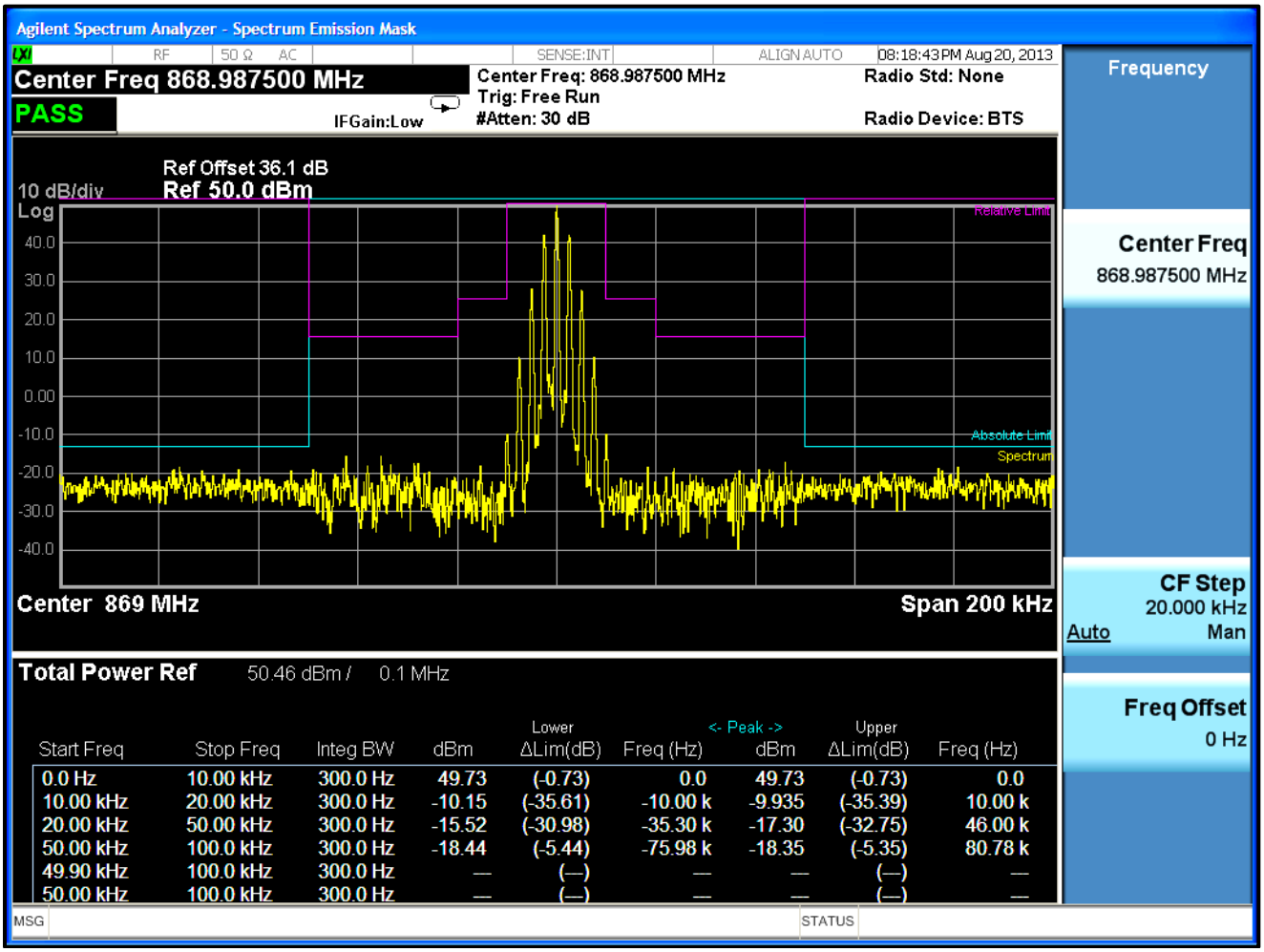
Plot 5-4: Occupied Bandwidth – 851.025 MHz; Mask B; NPSPAC; Analog FM



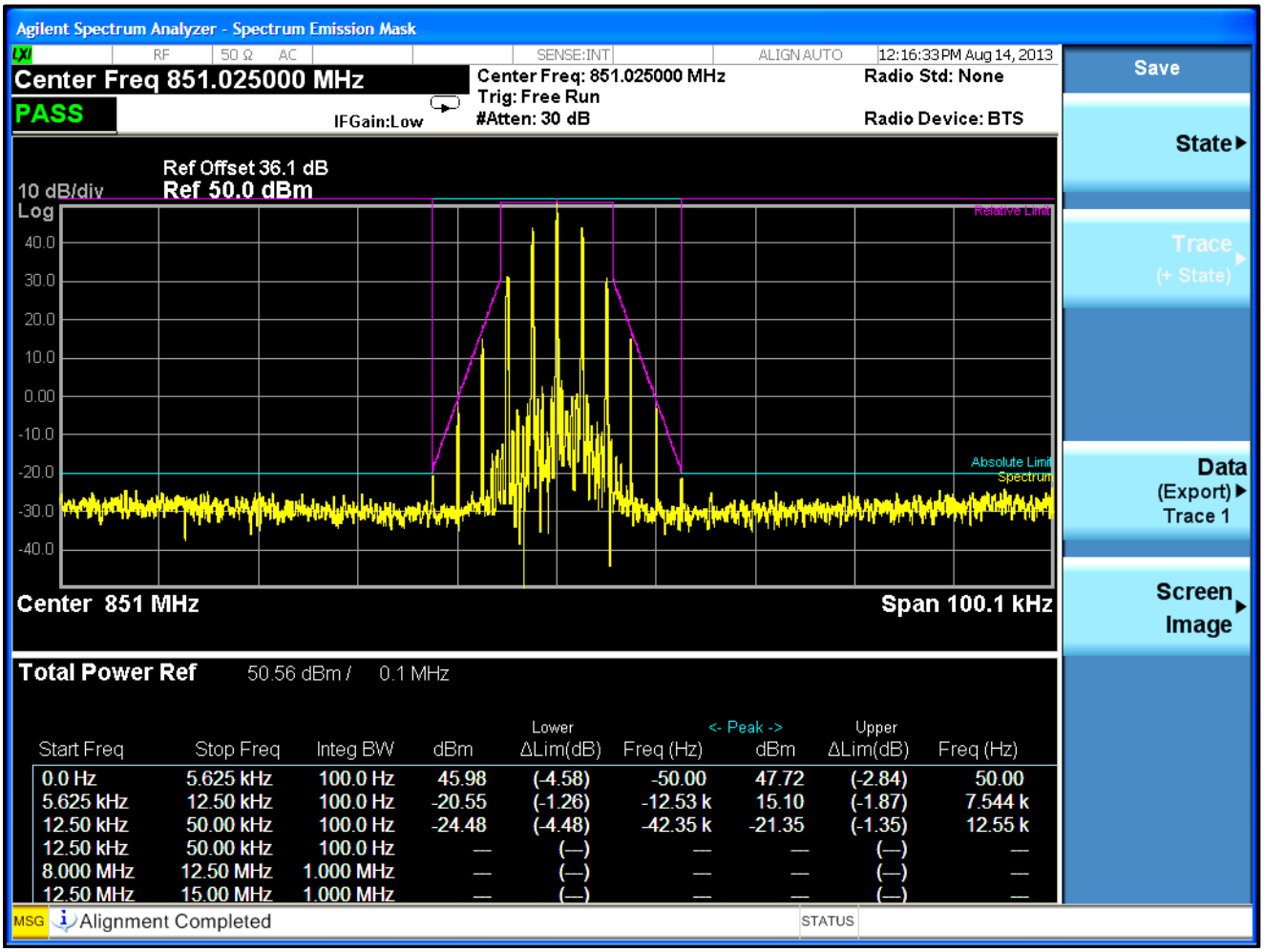
Plot 5-5: Occupied Bandwidth – 860.525 MHz; Mask B; NPSPAC; Analog FM



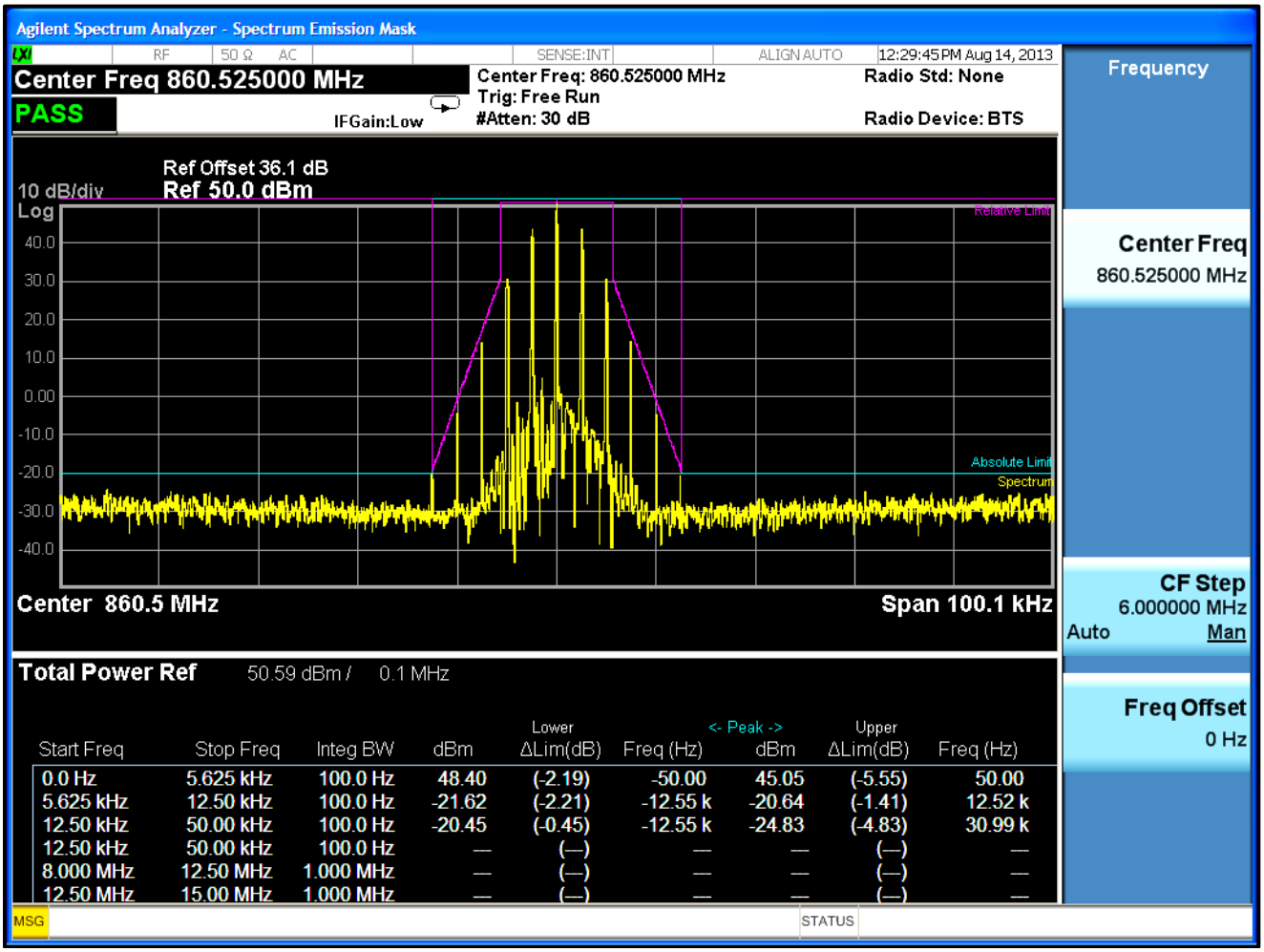
Plot 5-6: Occupied Bandwidth – 868.9875 MHz; Mask B; NPSPAC; Analog FM



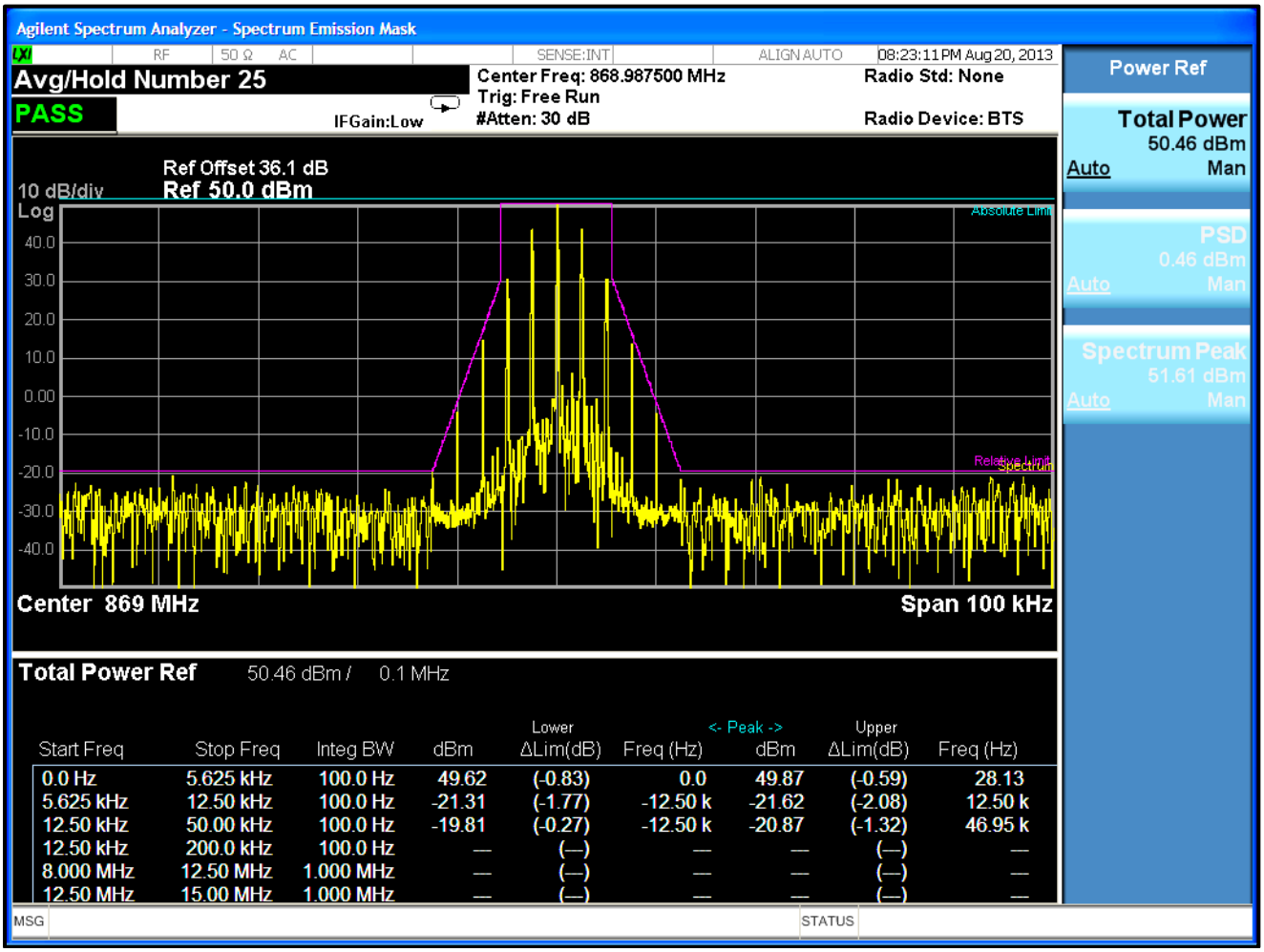
Plot 5-7: Occupied Bandwidth – 851.025 MHz; Mask D; NPSPAC; Analog FM; IC



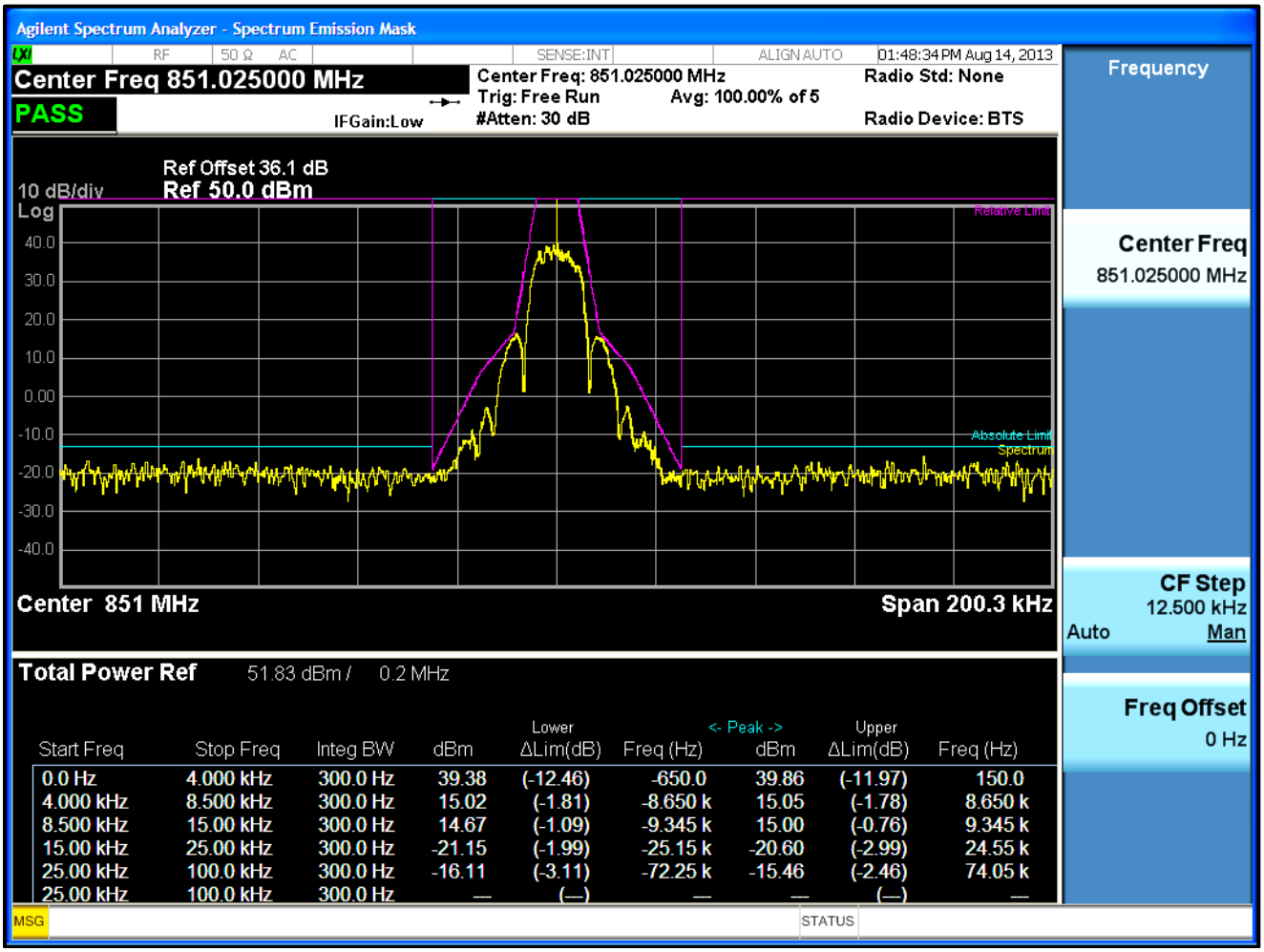
Plot 5-8: Occupied Bandwidth – 860.525 MHz; Mask D; NPSPAC; Analog FM; IC



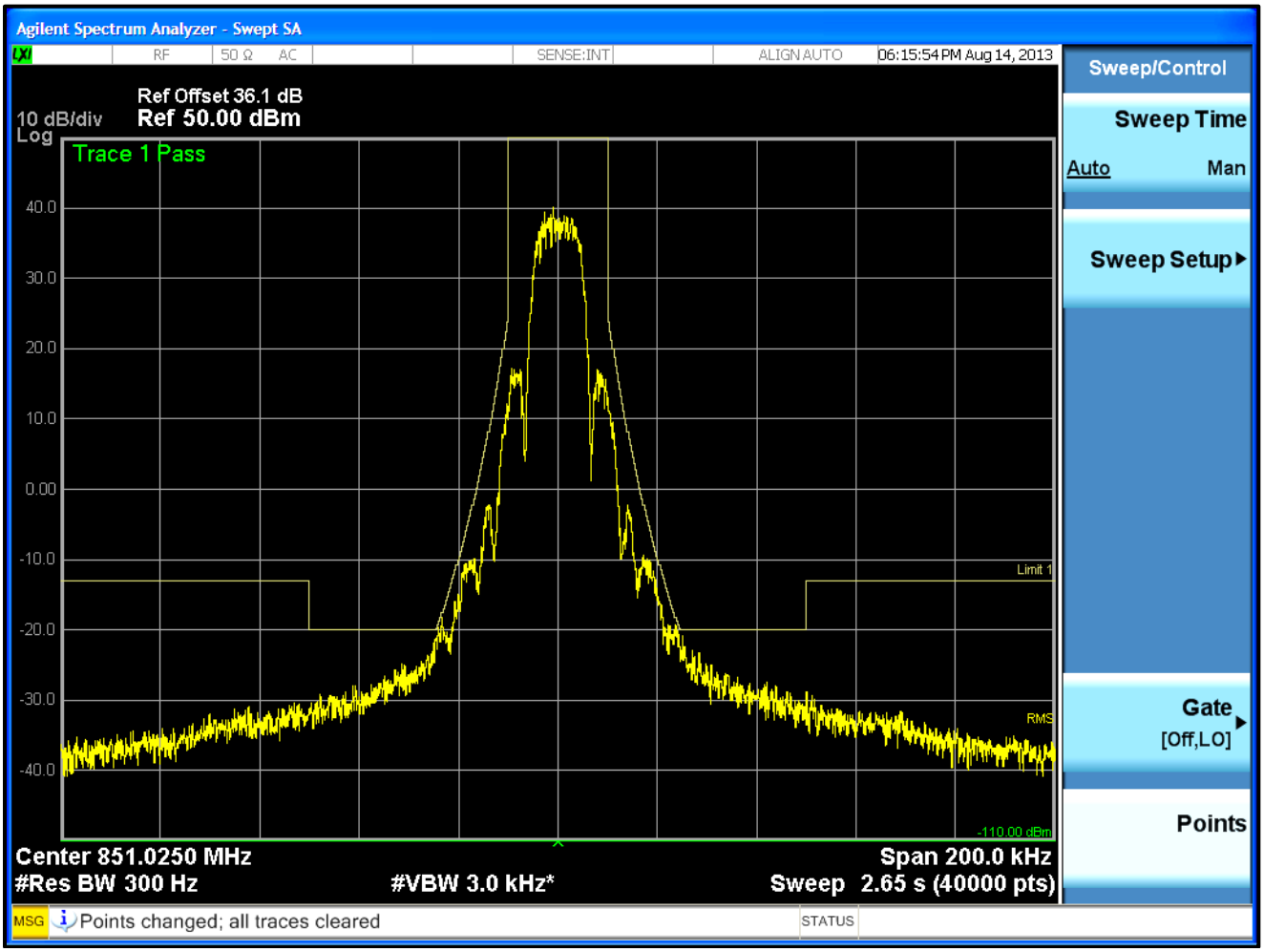
Plot 5-9: Occupied Bandwidth – 868.9875 MHz; Mask D; NPSPAC; Analog FM; IC



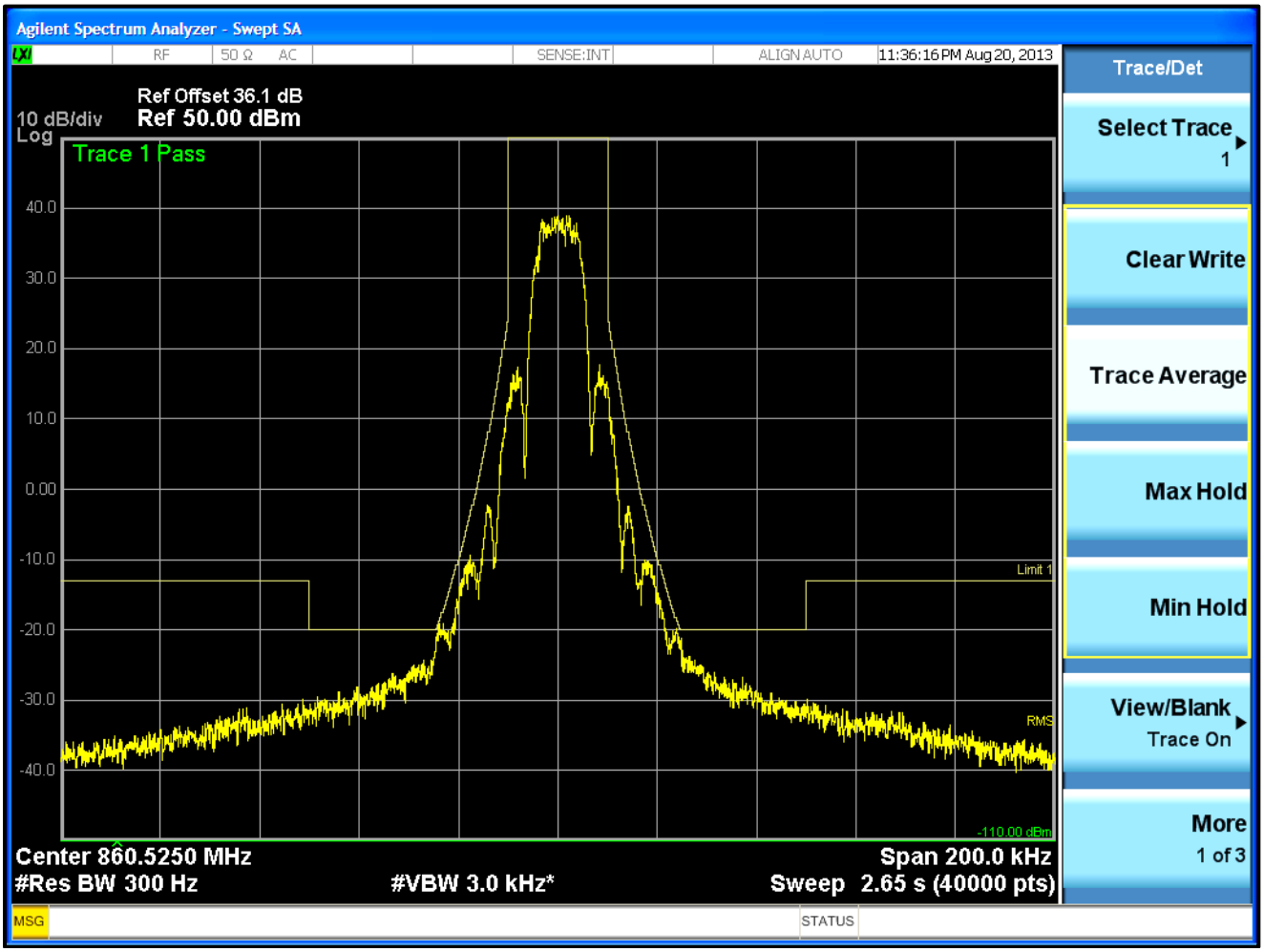
Plot 5-10: Occupied Bandwidth – 851.025 MHz; Mask H; Wide Band; 2-Level FSK



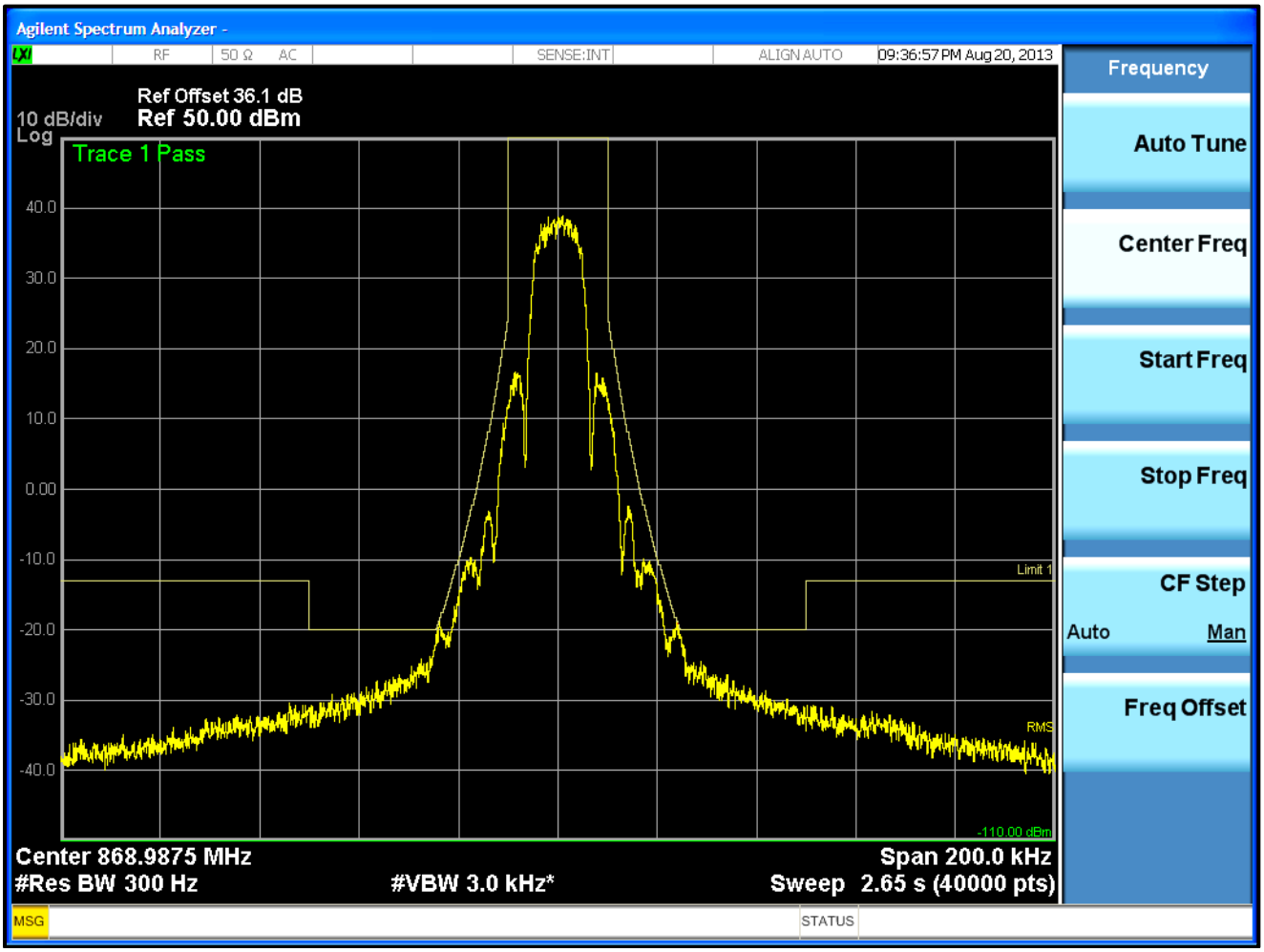
Plot 5-11: Occupied Bandwidth – 851.025 MHz; Mask G; Wide Band; 2-Level FSK; IC



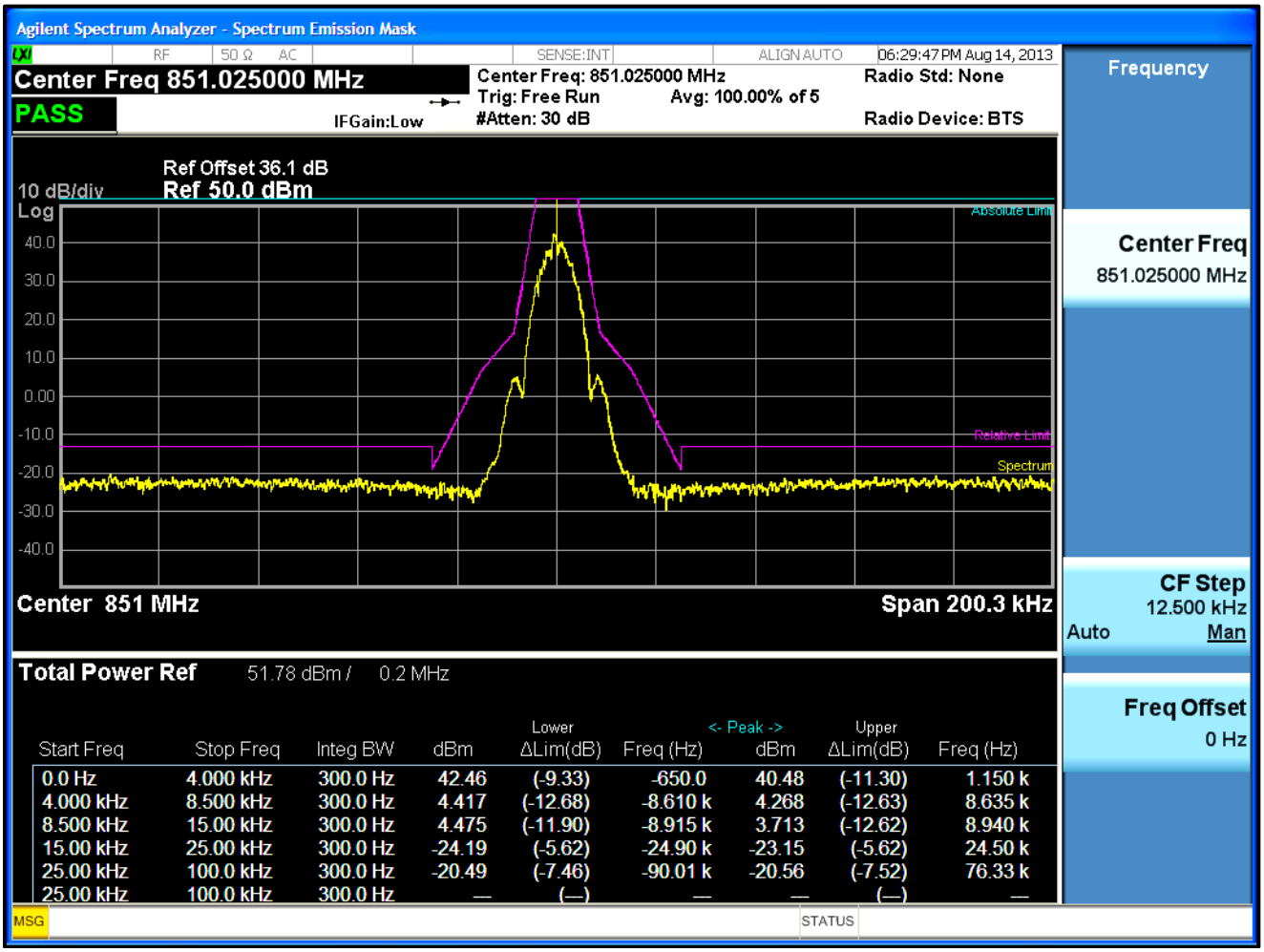
Plot 5-12: Occupied Bandwidth – 860.525 MHz; Mask G; Wide Band; 2-Level FSK



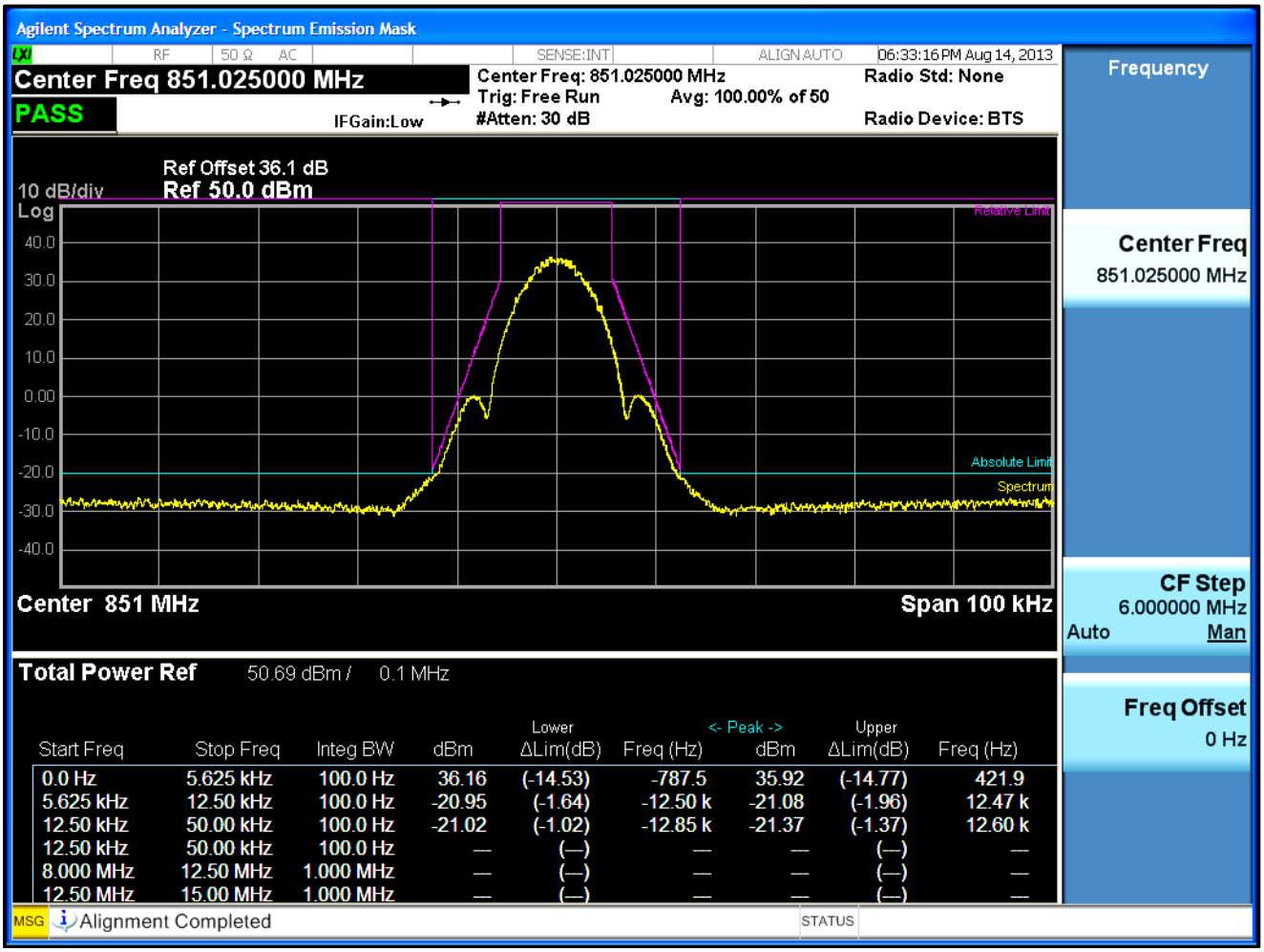
Plot 5-13: Occupied Bandwidth – 868.9875 MHz; Mask G; Wide Band; 2-Level FSK



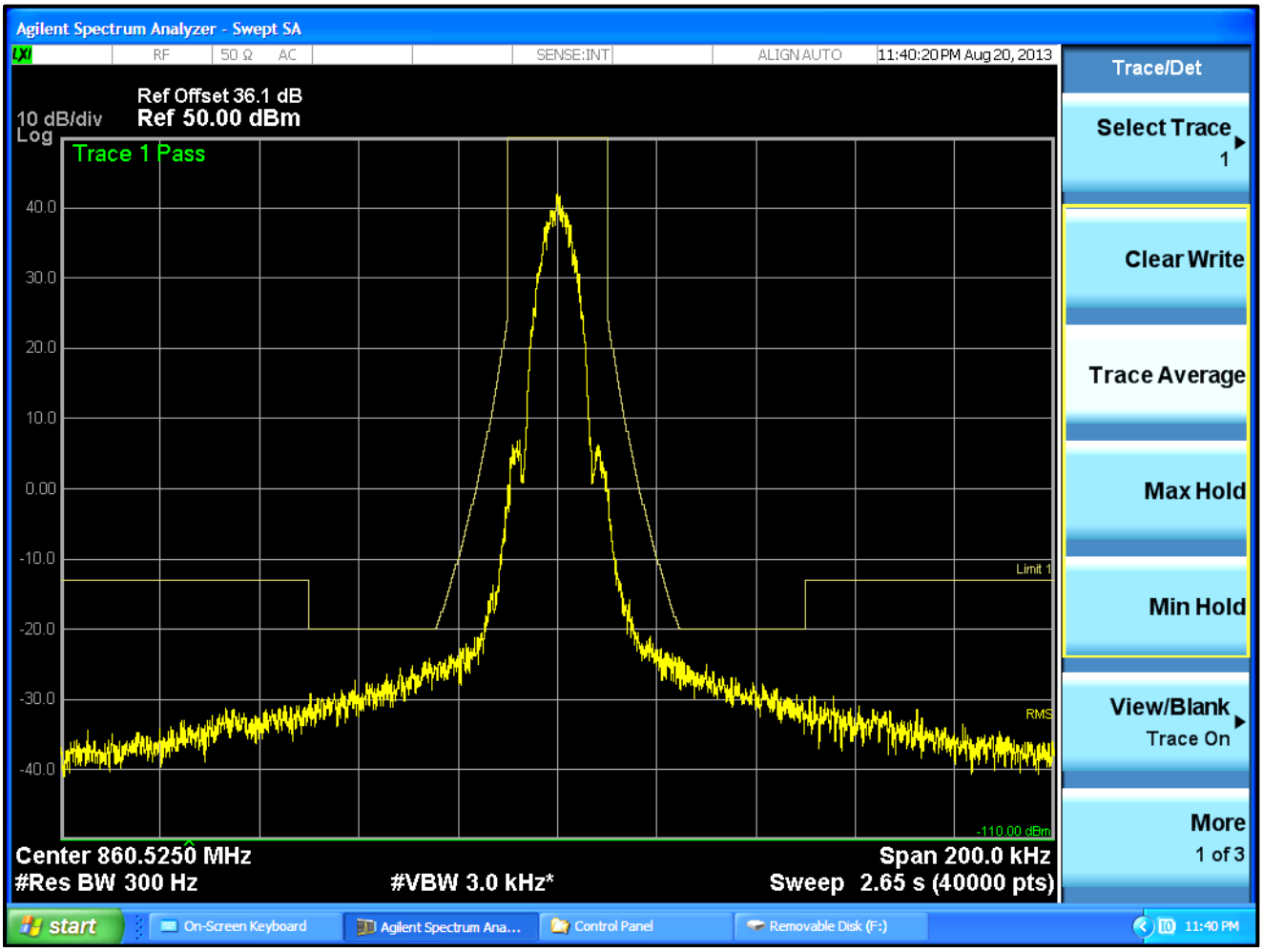
Plot 5-14: Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; 2-Level FSK



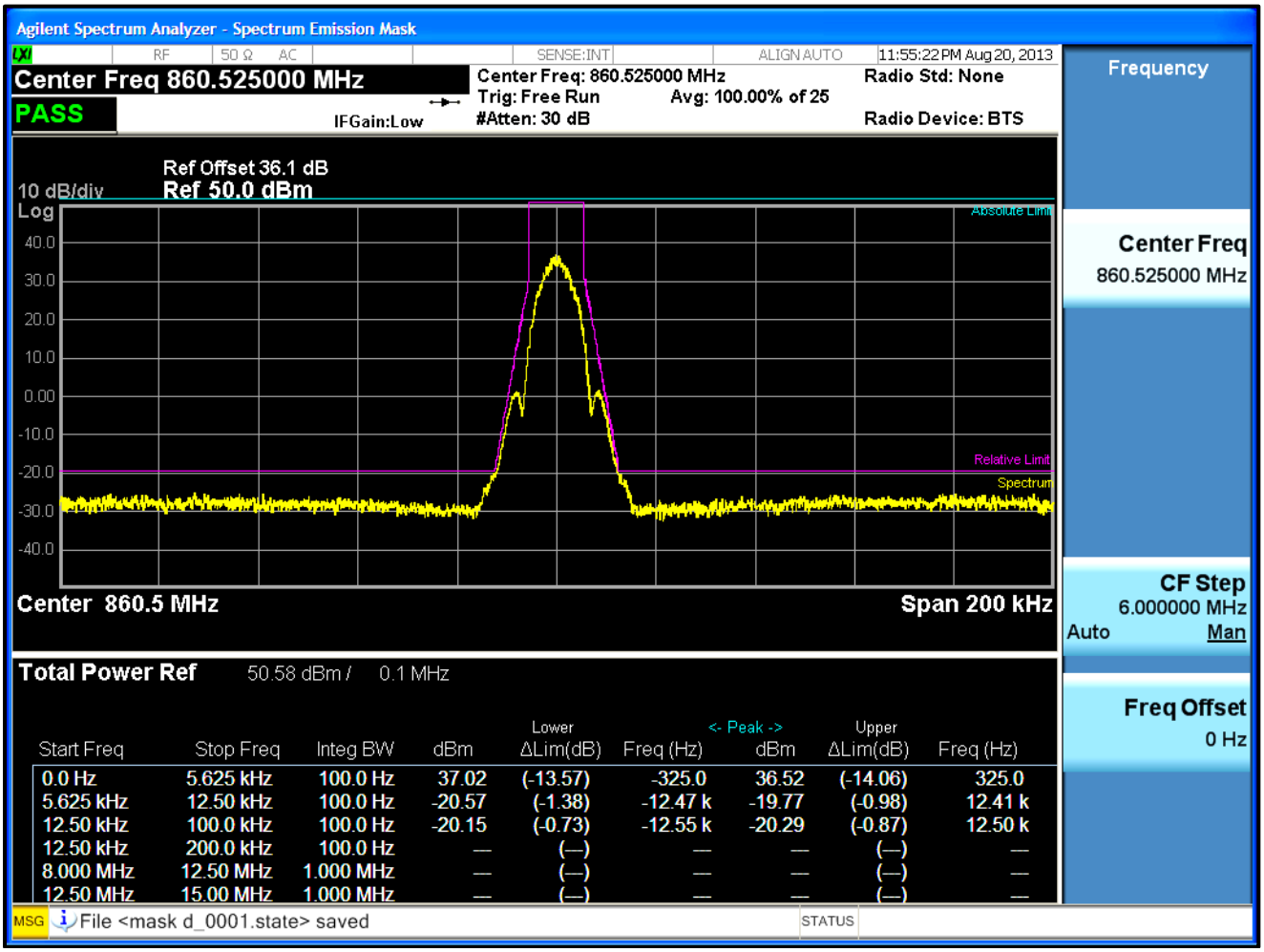
Plot 5-15: Occupied Bandwidth – 851.025 MHz; Mask D; Narrow Band; 2-Level FSK; IC



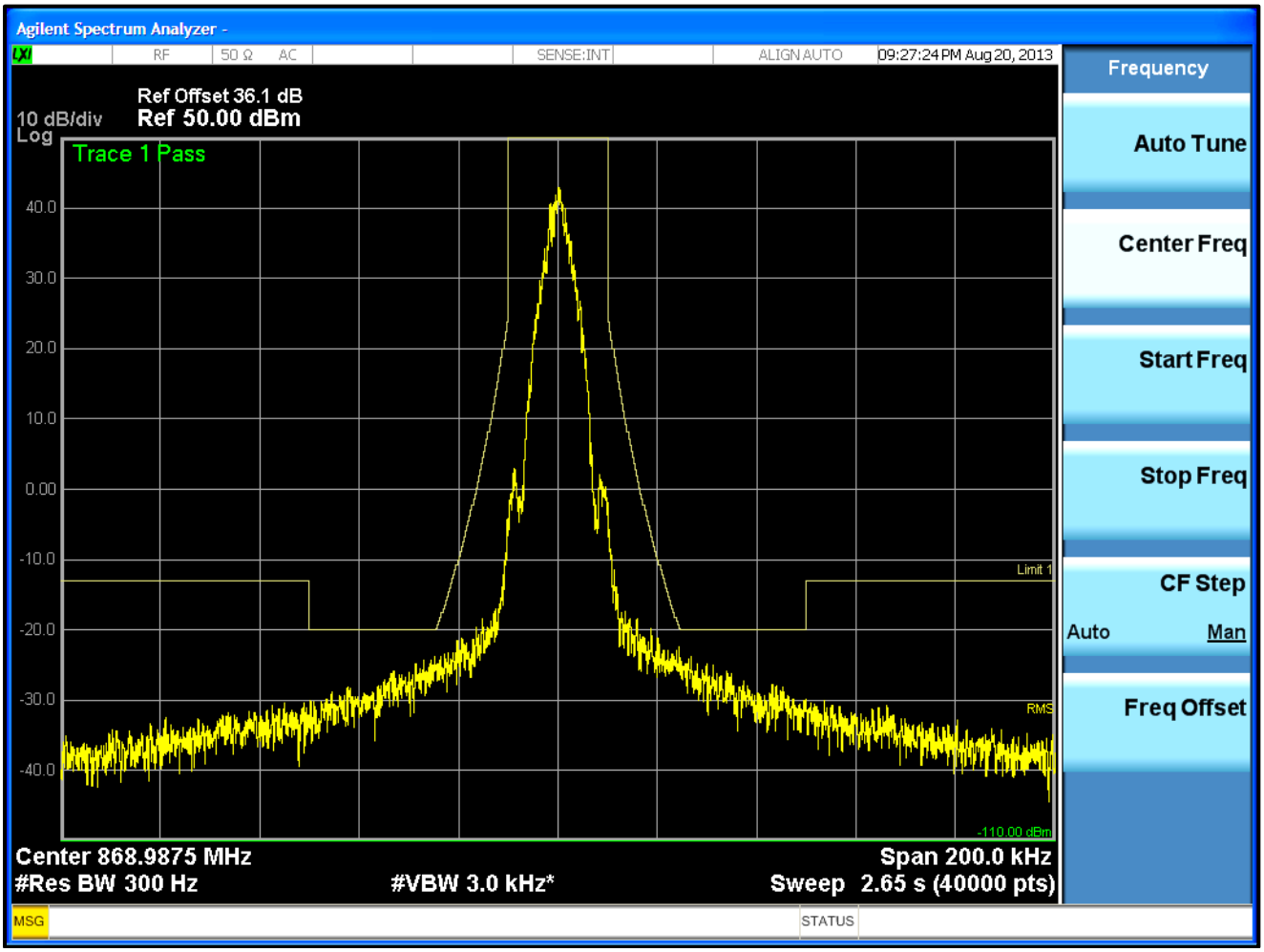
Plot 5-16: Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; 2-Level FSK



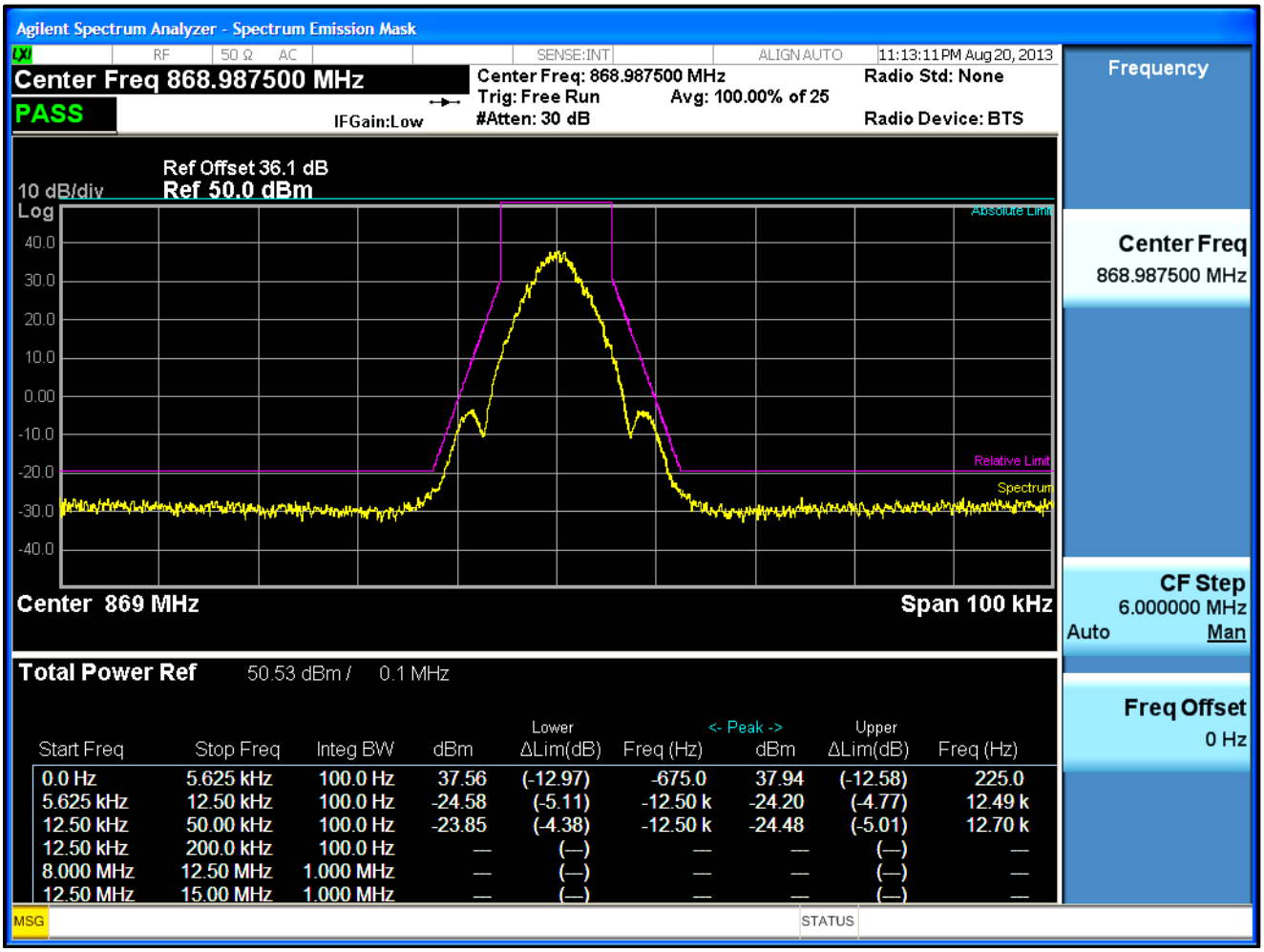
Plot 5-17: Occupied Bandwidth – 860.525 MHz; Mask D; Narrow Band; 2-Level FSK; IC



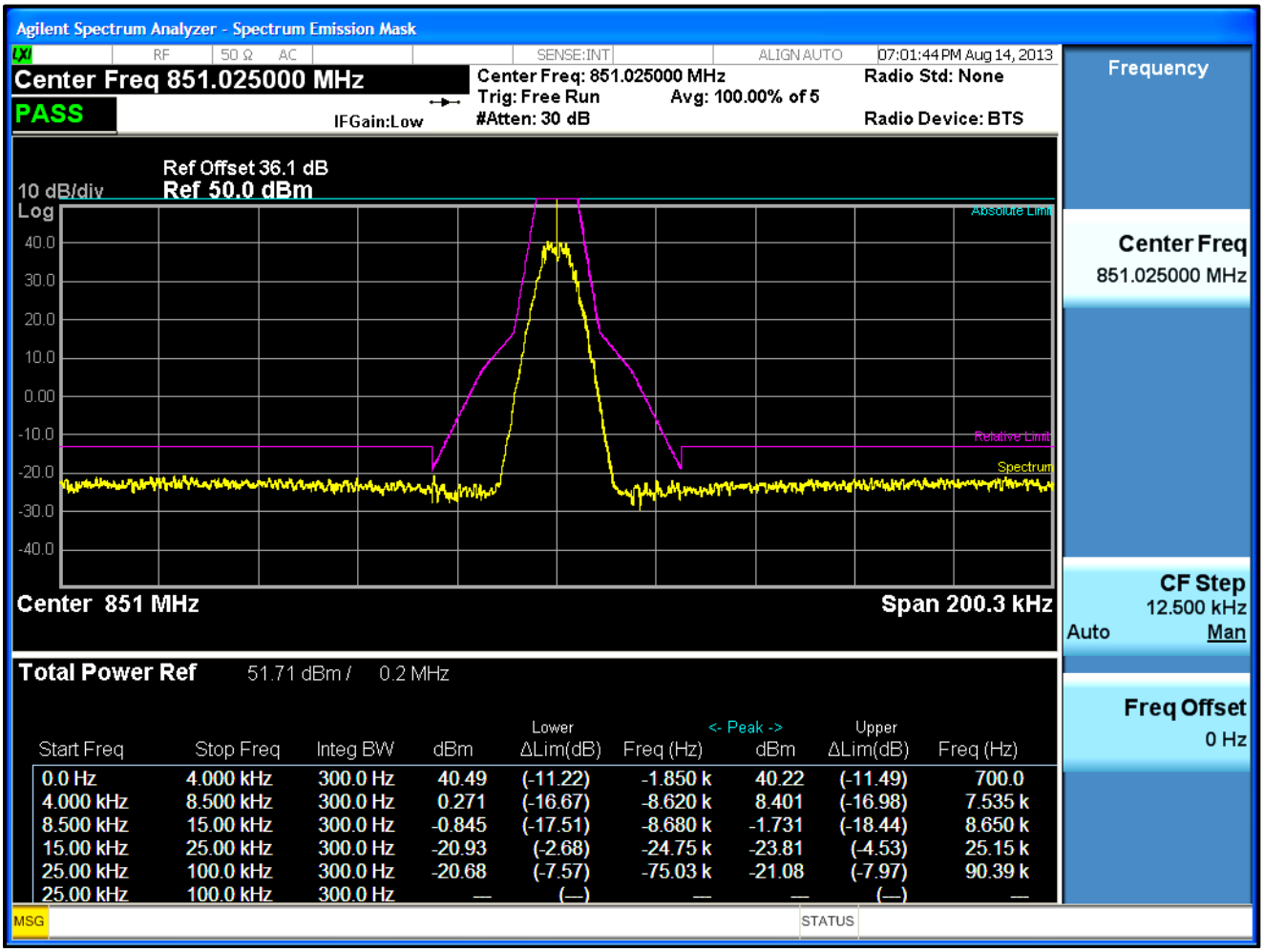
Plot 5-18: Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; 2-Level FSK



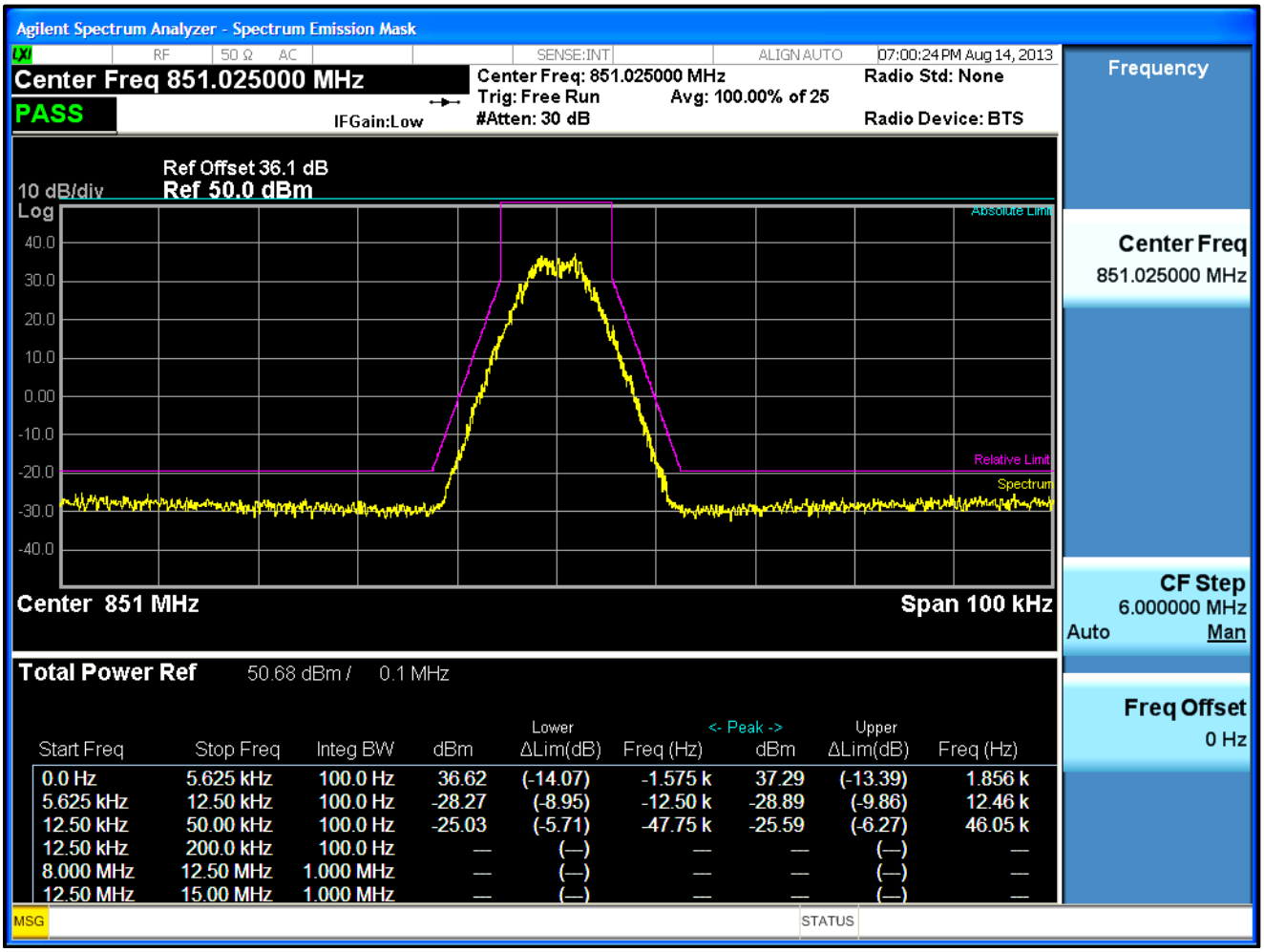
Plot 5-19: Occupied Bandwidth – 868.9875 MHz; Mask D; Narrow Band; 2-Level FSK; IC



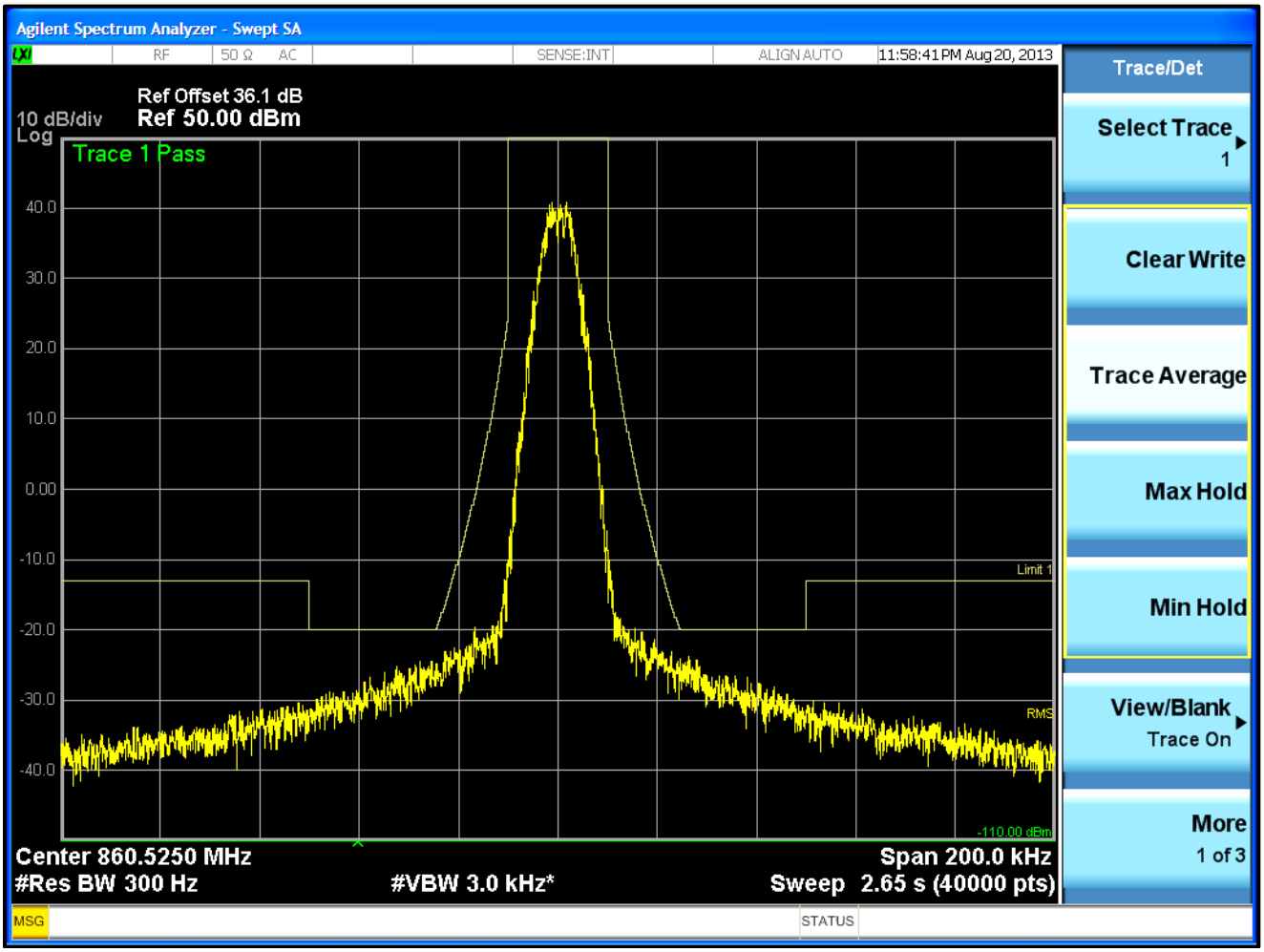
Plot 5-20: Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; 9600 C4FM



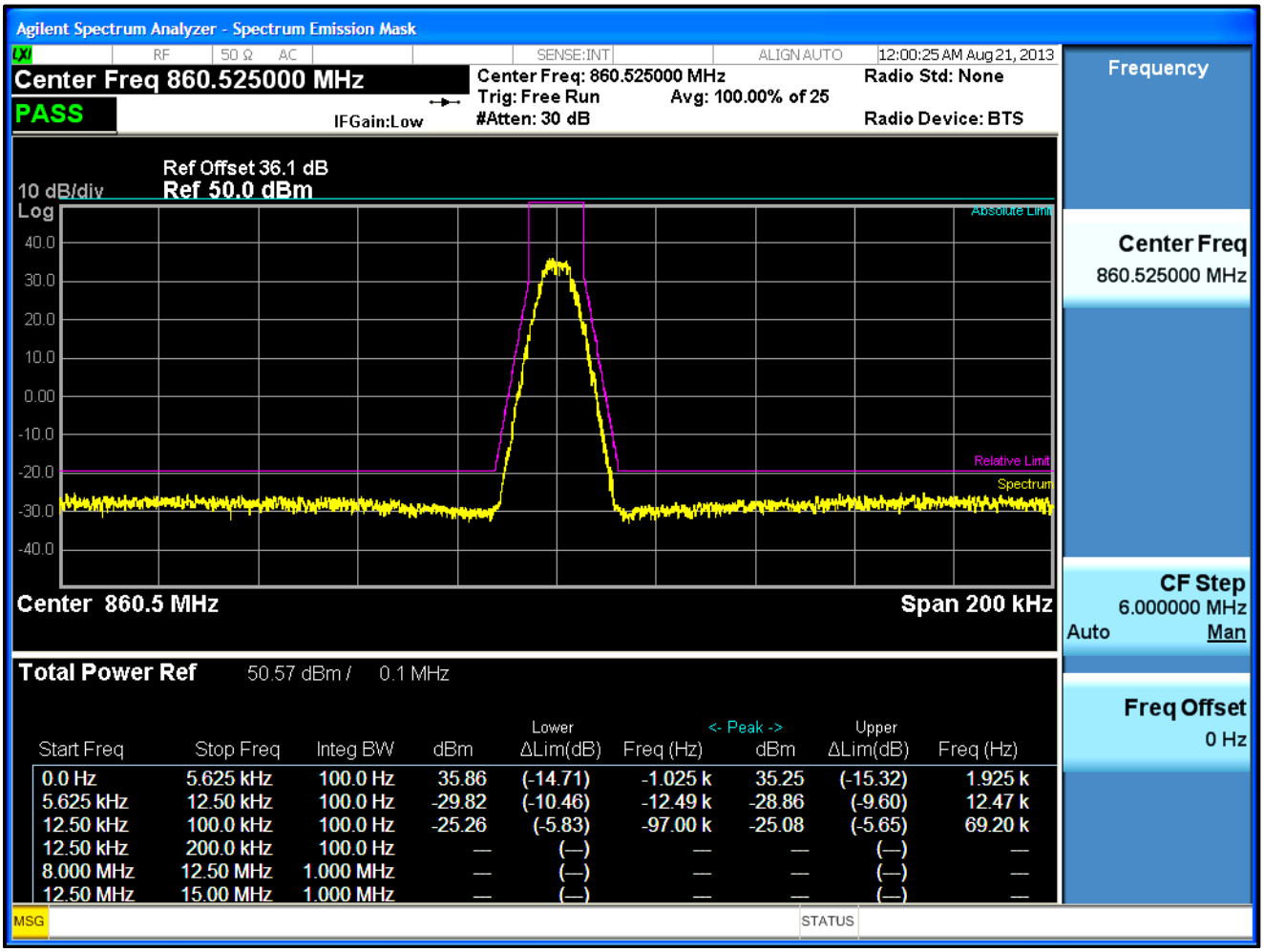
Plot 5-21: Occupied Bandwidth – 851.025 MHz; Mask D; Narrow Band; 9600 C4FM; IC



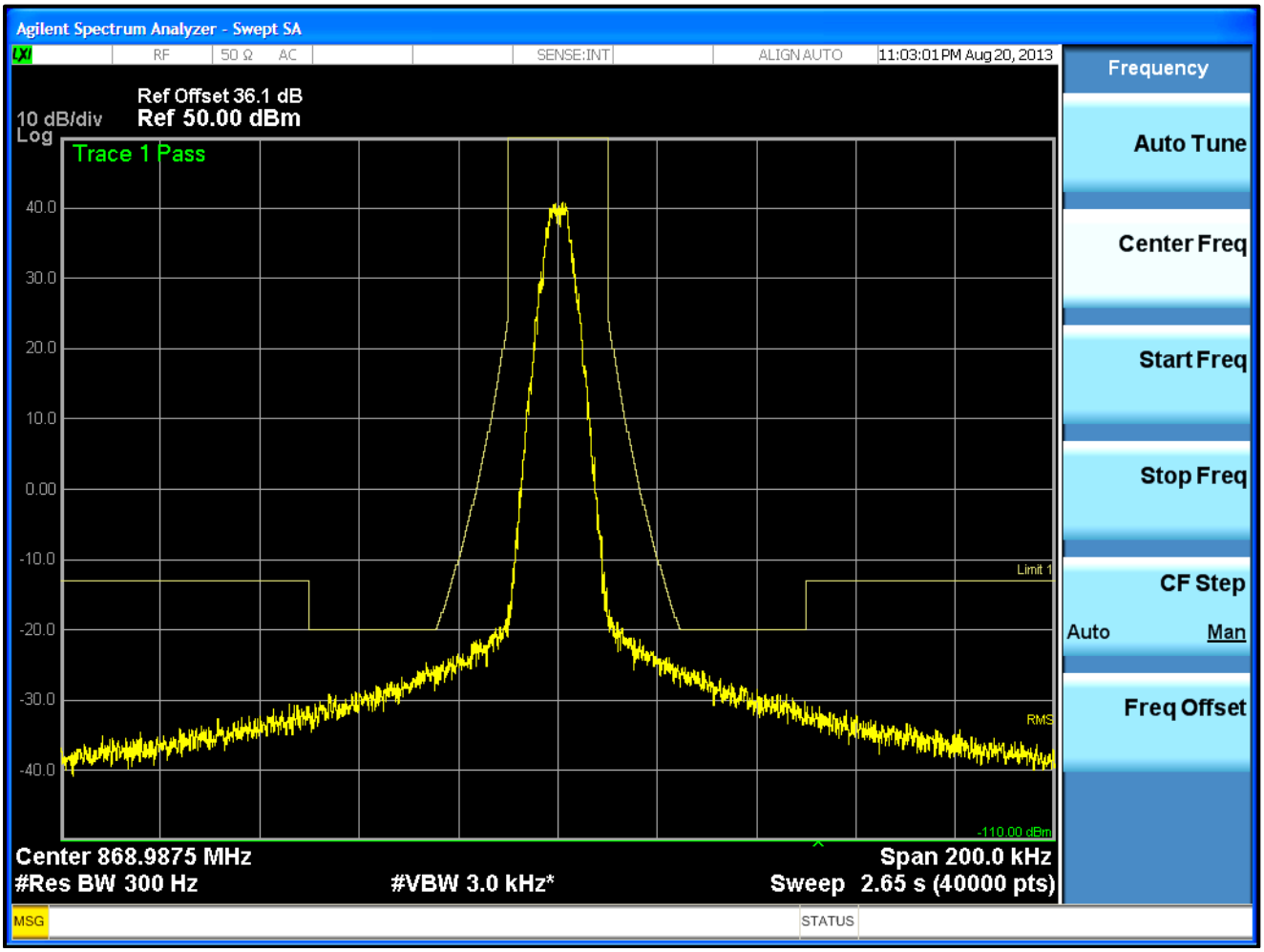
Plot 5-22: Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; 9600 C4FM; IC



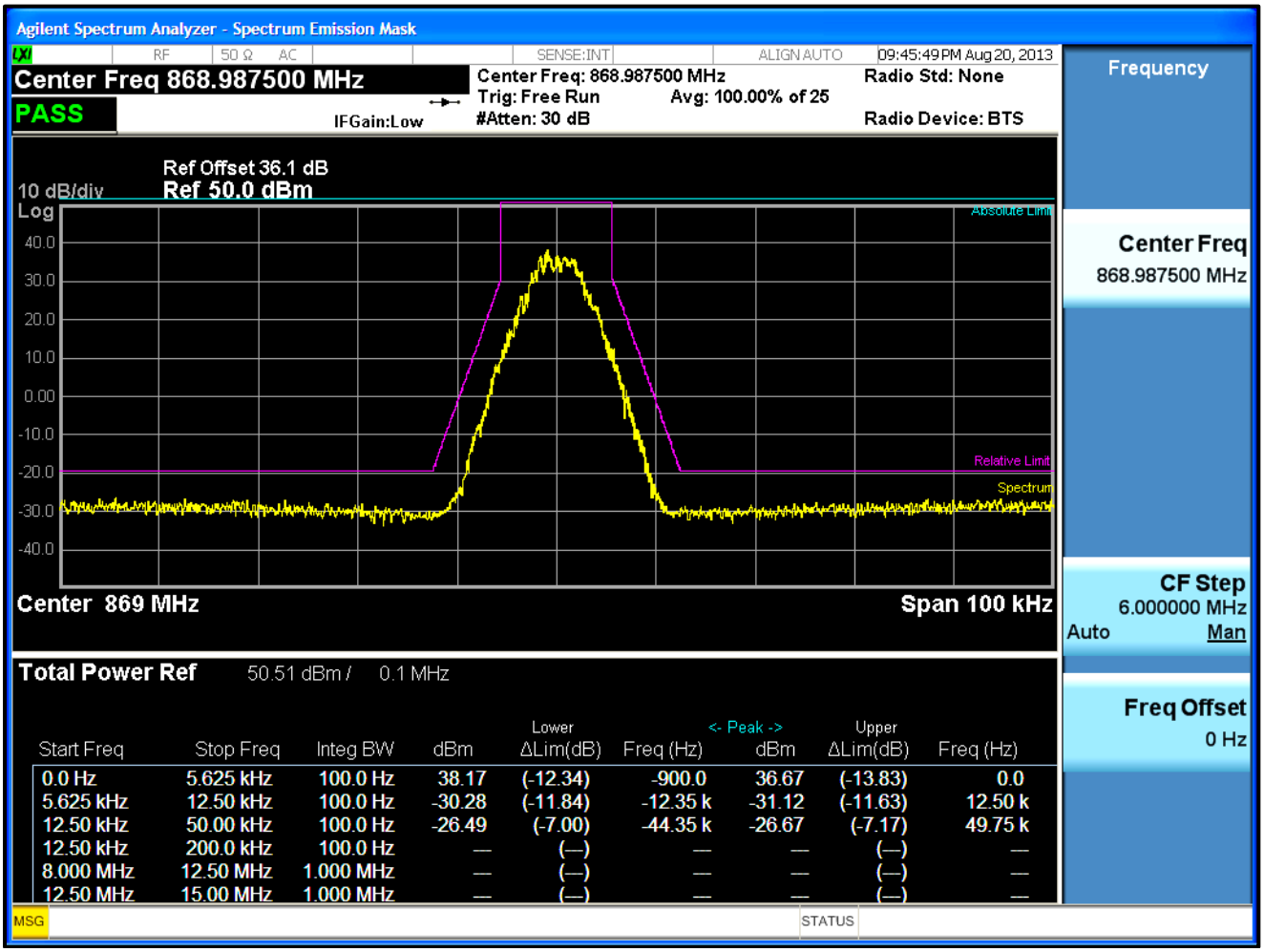
Plot 5-23: Occupied Bandwidth – 860.525 MHz; Mask D; Narrow Band; 9600 C4FM; IC



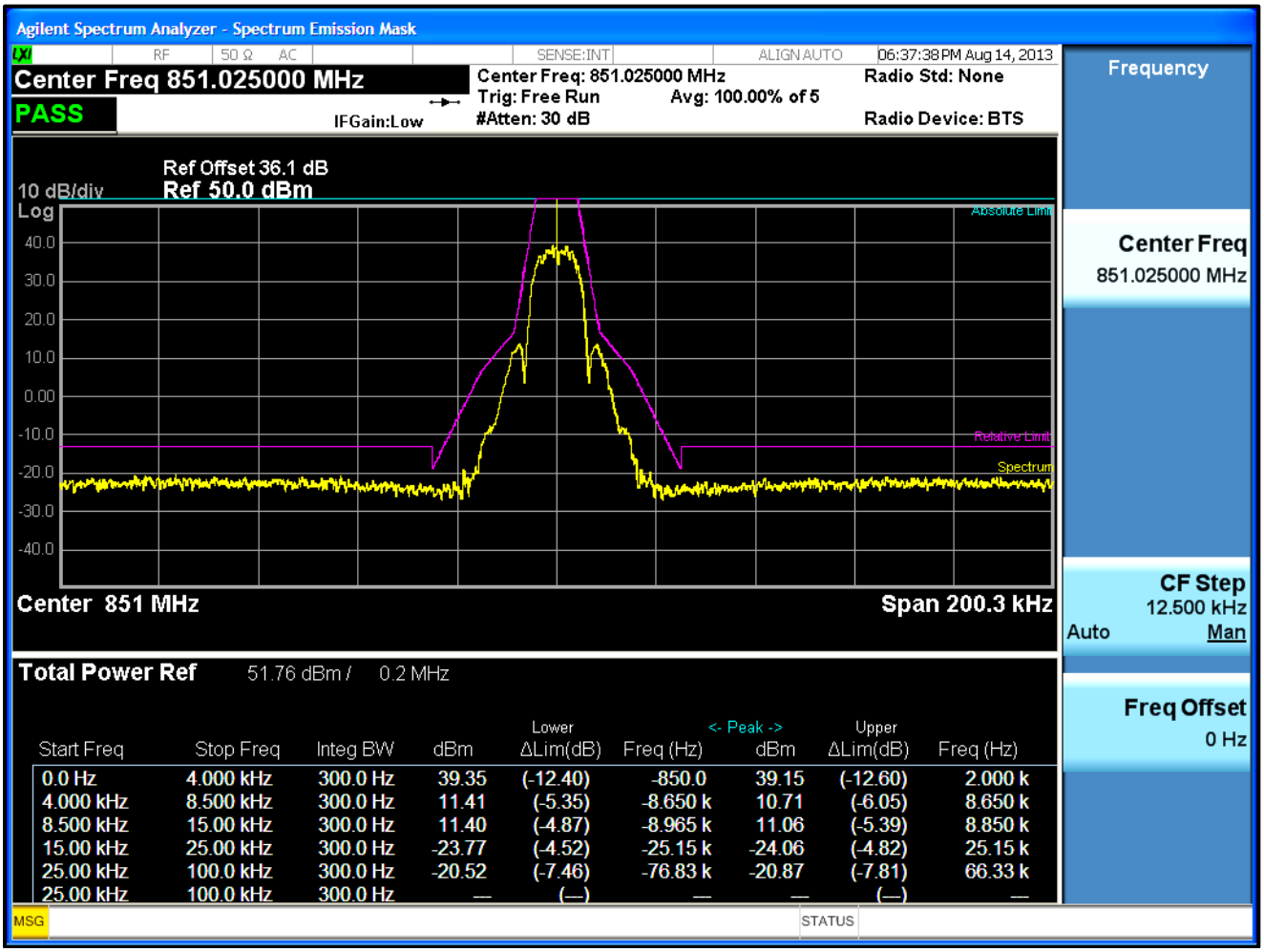
Plot 5-24: Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; 9600 C4FM



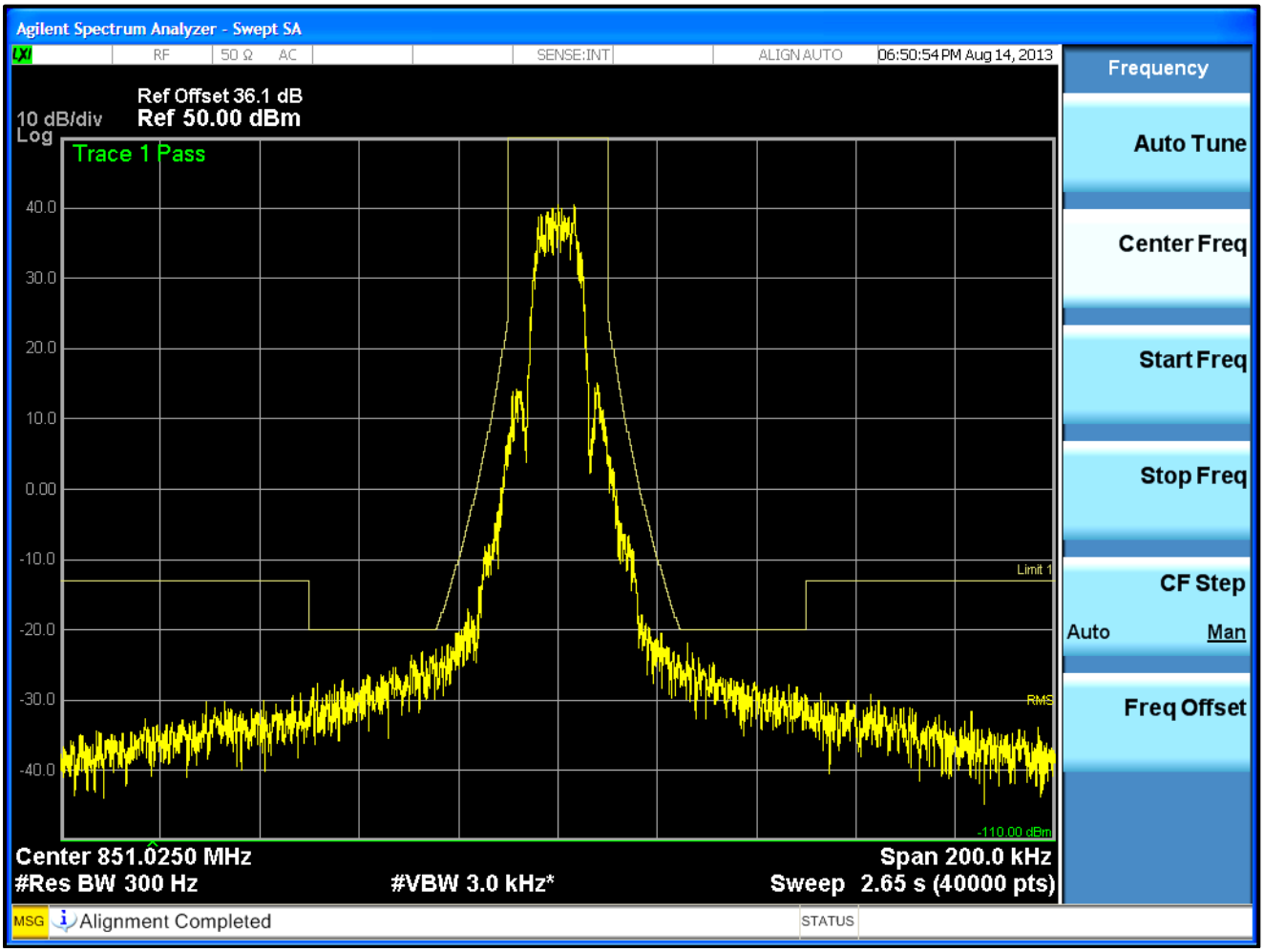
Plot 5-25: Occupied Bandwidth – 868.9875 MHz; Mask D; Narrow Band; 9600 C4FM; IC



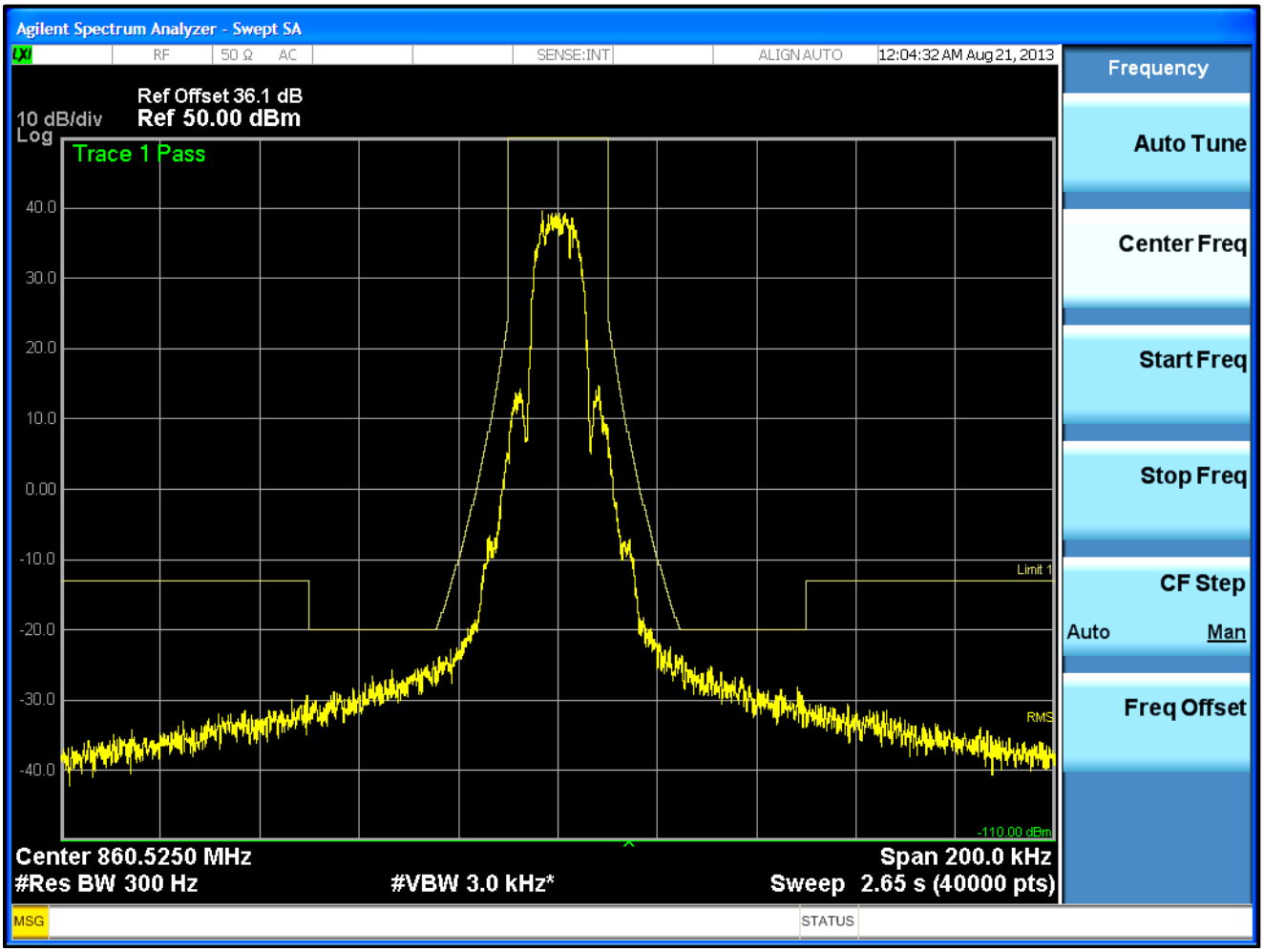
Plot 5-26: Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; NPSPAC



Plot 5-27: Occupied Bandwidth – 851.025 MHz; Mask G; Narrow Band; NPSPAC; IC



Plot 5-28: Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; NPSPAC



Plot 5-29: Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; NPSPAC

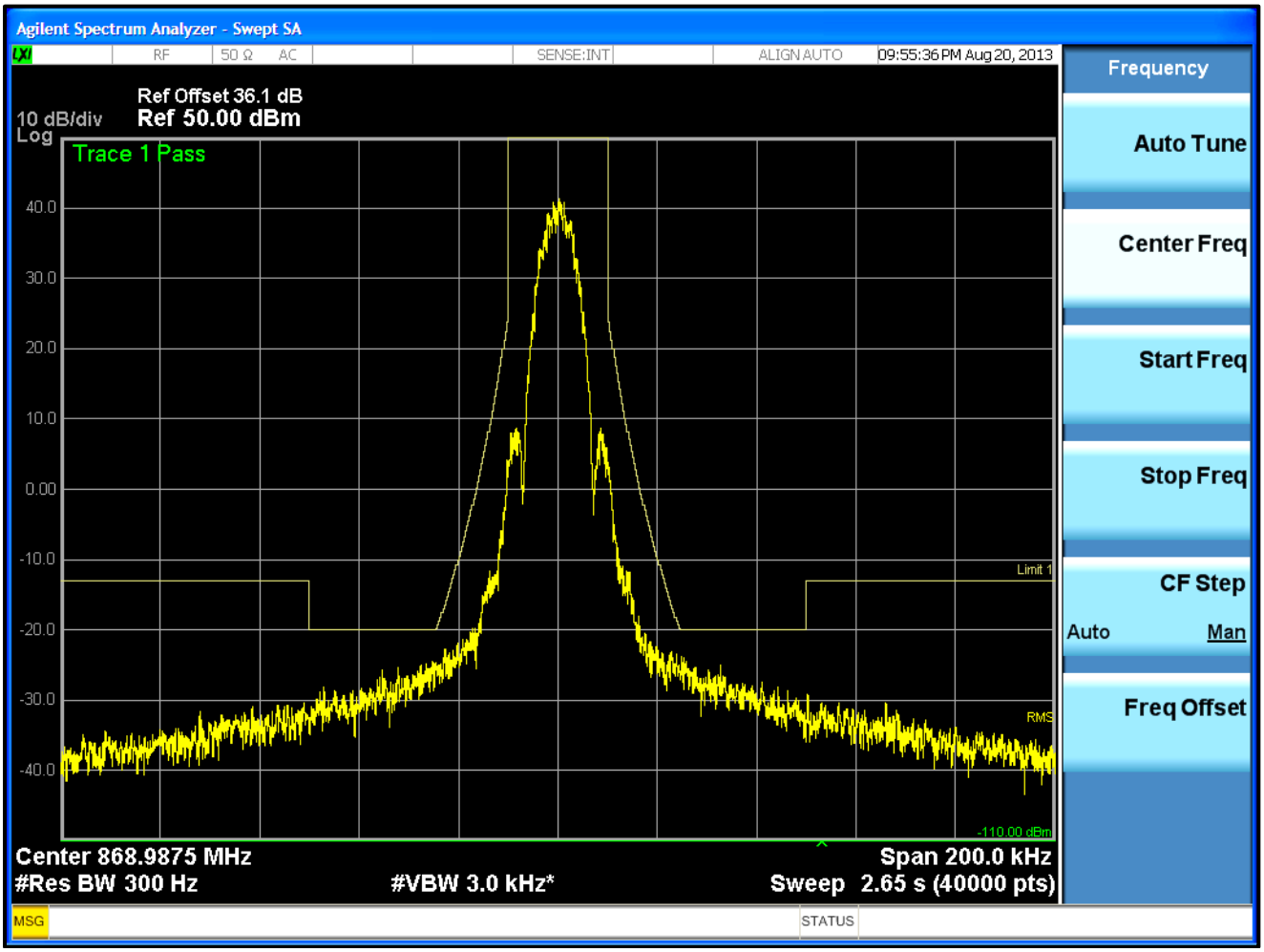
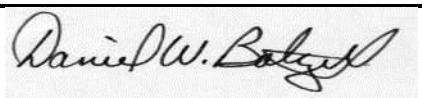


Table 5-1: Test Equipment for Testing Occupied Bandwidth

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901355	JFW Industries	50FH-003-300	300W 3DB DC1000 MHz Attenuator	N/A	3/25/16
901536	Aeroflex	48-40-34	40 dB Attenuator	CB6627	10/14/13
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz - 26.5 GHz)	MY51250846	4/16/14
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:

Dan Baltzell		August 13-21, 2013
Test Engineer	Signature	Dates of Tests

6 FCC Rules and Regulations Part 90 §90.210(g) and Part 2 §2.1053(a): Field Strength of Spurious Radiation; RSS-119 §4.2: Unwanted Emissions

6.1 Test Procedure

ANSI TIA-603-C-2004, section 2.2.12.

The device while using digital modulation is modulated to its maximum extent using a pseudo-random data sequence. The spurious emissions levels were measured in narrowband analog mode and the device under test was replaced by a substitution antenna connected to a signal generator. This maximized 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 Test Data

6.2.1 CFR 47 Part 90.210 Requirements

The worst-case emissions test data are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded per FCC Part 2.1057(c).

Limit: P(dBm) – (50 + 10xLOG P(W))

Table 6-1: Field Strength of Spurious Radiation - 851.025 MHz

Conducted Power= 50.3 dBm; 106.7W; Limit: 50 + 10 Log P = 70.3 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to transmit Antenna (dB)	Antenna Gain (dBd)	EIRP (dBc)	Margin (dB)
1702.050	51.8	-59.2	0.4	7.4	102.2	-32.2
2553.075	51.0	-53.4	0.5	7.5	96.4	-26.4
3404.100	59.0	-51.2	0.6	7.4	94.5	-24.5
4255.125	49.2	-55.5	0.8	8.7	97.5	-27.5
5106.150	47.0	-55.8	0.9	8.7	97.9	-27.9
5957.175	32.9	-60.1	1.0	9.1	101.9	-31.9
6808.200	40.5	-49.9	1.1	9.0	92.0	-22.0
7659.225	38.4	-59.4	1.2	9.3	101.2	-31.2
8510.250	39.7	-54.6	1.3	9.3	96.6	-26.6

Table 6-2: Field Strength of Spurious Radiation - 860.525 MHz

Conducted Power= 50.3 dBm; 106.1 W; Limit: 50 + 10 Log P = 70.3 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to transmit Antenna (dB)	Antenna Gain (dBd)	EIRP (dBc)	Margin (dB)
1721.050	52.7	-58.4	0.4	7.4	101.3	-31.3
2581.575	37.7	-68.1	0.5	7.5	111.1	-41.1
3442.100	57.5	-51.3	0.6	7.5	94.5	-24.5
4302.625	49.7	-54.0	0.8	8.8	96.0	-26.0
5163.150	41.5	-60.6	0.9	8.7	102.8	-32.8
6023.675	23.1	-72.3	1.0	9.0	114.3	-44.3
6884.200	34.7	-40.2	1.1	9.2	82.1	-12.1
7744.725	29.0	-69.5	1.2	9.4	111.3	-41.3
8605.250	31.6	-63.2	1.3	9.3	103.5	-33.4

Table 6-3: Field Strength of Spurious Radiation - 868.9875 MHz

Conducted Power= 50.1 dBm; 101.2 W; Limit: 50 + 10 Log P= 70.1 dBc

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss to transmit Antenna (dB)	Antenna Gain (dBd)	EIRP (dBc)	Margin (dB)
1737.975	60.3	-50.8	0.4	7.5	93.7	-23.7
2606.963	42.0	-63.2	0.5	7.5	106.2	-36.2
3475.950	53.9	-55.0	0.7	7.6	98.1	-28.1
4344.938	42.3	-59.5	0.8	8.8	101.4	-31.4
5213.925	44.7	-55.9	0.9	8.7	98.1	-28.1
6082.913	31.3	-64.6	1.0	8.9	106.7	-36.7
6951.900	44.4	-42.7	1.1	9.3	84.5	-14.5
7820.888	24.9	-73.7	1.2	9.4	115.5	-45.5
8689.875	32.2	-62.0	1.3	9.4	103.9	-33.9

Table 6-4: Test Equipment for Testing Field Strength of Spurious Radiation

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900928	Hewlett Packard	83752A	Synthesized Sweeper, (0.01 - 20 GHz)	3610A00866	3/20/15
900791	Chase	CBL6111B	Bilog Antenna (30 MHz – 2000 MHz)	N/A	2/2/14
900772	EMCO	3161-02	Horn Antenna (2 - 4 GHz)	9804-1044	4/19/14
900321	EMCO	3161-03	Horn Antenna (4.0 - 8.2 GHz)	9508-1020	4/19/14
901262	ETS	3160-9	Double ridged Guide Antenna (1 - 18 GHz)	6748	5/11/14
900932	Hewlett Packard	8449B OPT H02	Preamplifier (1 - 26.5 GHz)	3008A00505	8/10/14
900905	Rhein Tech Laboratories	PR-1040	OATS 1 Preamplifier 40dB (30 MHz – 2 GHz)	1006	8/20/14
901583	Agilent Technologies	N9010A	EXA Signal Analyzer (10 Hz - 26.5 GHz)	MY51250846	4/16/14
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 W. Baltzell		October 12, 2013
Test Engineer	Signature	Date of Test

7 Conclusion

The data in this measurement report shows that the **Harris Corporation** Model **MASTR III 800 MHz Base Station Radio, FCC ID: OWDTR-0036-E, IC: 3636B-0036,** complies with all the applicable requirements of FCC Parts 90, 15 and 2 and Industry Canada RSS-119.