



Engineering Solutions & Electromagnetic Compatibility Services

## 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**

*This report may not be reproduced, except in full, without the written approval of Rhein Tech Laboratories, Inc. and Harris Corporation. The test results relate only to the product tested.*

*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.*

## Table of Contents

|       |                                                                                                                                                                         |    |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1     | General Information.....                                                                                                                                                | 5  |
| 1.1   | Test Facility.....                                                                                                                                                      | 5  |
| 1.2   | Related Submittal(s)/Grant(s).....                                                                                                                                      | 5  |
| 2     | Tested System Details .....                                                                                                                                             | 6  |
| 3     | FCC Rules and Regulations Part 90 §90.1215(a) and Part 2 §2.1046(a): Peak Output Power .....                                                                            | 9  |
| 3.1   | Test Procedure .....                                                                                                                                                    | 9  |
| 3.2   | Test Data .....                                                                                                                                                         | 9  |
| 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 ..... | 10 |
| 4.1   | Test Procedure .....                                                                                                                                                    | 10 |
| 4.2   | Test Data .....                                                                                                                                                         | 10 |
| 5     | FCC Rules and Regulations Part §2.1049(c)(1); §90.210; RSS-119 4.2.1, 4.2.2: Occupied Bandwidth.....                                                                    | 17 |
| 5.1   | Test Procedure .....                                                                                                                                                    | 17 |
| 5.2   | Test Data .....                                                                                                                                                         | 17 |
| 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.....                         | 47 |
| 6.1   | Test Procedure .....                                                                                                                                                    | 47 |
| 6.2   | Test Data .....                                                                                                                                                         | 47 |
| 6.2.1 | CFR 47 Part 90.210 Requirements .....                                                                                                                                   | 47 |
| 7     | Conclusion.....                                                                                                                                                         | 49 |

## Table of Tables

|            |                                                                       |    |
|------------|-----------------------------------------------------------------------|----|
| Table 2-1: | Test System Details .....                                             | 6  |
| Table 2-2: | Equipment Under Test (EUT).....                                       | 6  |
| Table 2-3: | MASTR III 800 MHz Base Station Radio Components .....                 | 7  |
| Table 2-4: | Support Equipment.....                                                | 8  |
| Table 3-1: | RF Power Output (High Power): Carrier Output Power (Unmodulated)..... | 9  |
| Table 3-2: | RF Power Output (Rated Power) .....                                   | 9  |
| Table 3-3: | Test Equipment for Testing RF Power Output - Conducted .....          | 9  |
| Table 4-1: | Test Equipment for Testing Conducted Spurious Emissions .....         | 16 |
| Table 5-1: | Test Equipment for Testing Occupied Bandwidth .....                   | 46 |
| Table 6-1: | Field Strength of Spurious Radiation - 851.025 MHz.....               | 47 |
| Table 6-2: | Field Strength of Spurious Radiation - 860.525 MHz.....               | 48 |
| Table 6-3: | Field Strength of Spurious Radiation - 868.9875 MHz.....              | 48 |
| Table 6-4: | Test Equipment for Testing Field Strength of Spurious Radiation ..... | 49 |

## Table of Plots

|            |                                                                               |    |
|------------|-------------------------------------------------------------------------------|----|
| Plot 4-1:  | Conducted Spurious Emissions - 851.025 MHz; Low Power.....                    | 10 |
| Plot 4-2:  | Conducted Spurious Emissions - 851.025 MHz; High Power .....                  | 11 |
| Plot 4-3:  | Conducted Spurious Emissions - 860.525 MHz; Low Power .....                   | 12 |
| Plot 4-4:  | Conducted Spurious Emissions - 860.525 MHz; High Power .....                  | 13 |
| Plot 4-5:  | Conducted Spurious Emissions - 868.9875 MHz; Low Power.....                   | 14 |
| Plot 4-6:  | Conducted Spurious Emissions - 868.9875 MHz; High Power .....                 | 15 |
| Plot 5-1:  | Occupied Bandwidth – 851.025 MHz; Mask B; Wide Band; Analog FM.....           | 17 |
| Plot 5-2:  | Occupied Bandwidth – 860.525 MHz; Mask B; Wide Band; Analog FM.....           | 18 |
| Plot 5-3:  | Occupied Bandwidth – 868.9875 MHz; Mask B; Wide Band; Analog FM.....          | 19 |
| Plot 5-4:  | Occupied Bandwidth – 851.025 MHz; Mask B; NPSPAC; Analog FM .....             | 20 |
| Plot 5-5:  | Occupied Bandwidth – 860.525 MHz; Mask B; NPSPAC; Analog FM .....             | 21 |
| Plot 5-6:  | Occupied Bandwidth – 868.9875 MHz; Mask B; NPSPAC; Analog FM .....            | 22 |
| Plot 5-7:  | Occupied Bandwidth – 851.025 MHz; Mask D; NPSPAC; Analog FM; IC.....          | 23 |
| Plot 5-8:  | Occupied Bandwidth – 860.525 MHz; Mask D; NPSPAC; Analog FM; IC.....          | 24 |
| Plot 5-9:  | Occupied Bandwidth – 868.9875 MHz; Mask D; NPSPAC; Analog FM; IC .....        | 25 |
| Plot 5-10: | Occupied Bandwidth – 851.025 MHz; Mask H; Wide Band; 2-Level FSK.....         | 26 |
| Plot 5-11: | Occupied Bandwidth – 851.025 MHz; Mask G; Wide Band; 2-Level FSK; IC .....    | 27 |
| Plot 5-12: | Occupied Bandwidth – 860.525 MHz; Mask G; Wide Band; 2-Level FSK.....         | 28 |
| Plot 5-13: | Occupied Bandwidth – 868.9875 MHz; Mask G; Wide Band; 2-Level FSK.....        | 29 |
| Plot 5-14: | Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; 2-Level FSK .....      | 30 |
| Plot 5-15: | Occupied Bandwidth – 851.025 MHz; Mask D; Narrow Band; 2-Level FSK; IC .....  | 31 |
| Plot 5-16: | Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; 2-Level FSK .....      | 32 |
| Plot 5-17: | Occupied Bandwidth – 860.525 MHz; Mask D; Narrow Band; 2-Level FSK; IC .....  | 33 |
| Plot 5-18: | Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; 2-Level FSK .....     | 34 |
| Plot 5-19: | Occupied Bandwidth – 868.9875 MHz; Mask D; Narrow Band; 2-Level FSK; IC ..... | 35 |
| Plot 5-20: | Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; 9600 C4FM.....         | 36 |
| Plot 5-21: | Occupied Bandwidth – 851.025 MHz; Mask D; Narrow Band; 9600 C4FM; IC .....    | 37 |
| Plot 5-22: | Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; 9600 C4FM; IC .....    | 38 |
| Plot 5-23: | Occupied Bandwidth – 860.525 MHz; Mask D; Narrow Band; 9600 C4FM; IC .....    | 39 |
| Plot 5-24: | Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; 9600 C4FM .....       | 40 |
| Plot 5-25: | Occupied Bandwidth – 868.9875 MHz; Mask D; Narrow Band; 9600 C4FM; IC .....   | 41 |

|            |                                                                        |    |
|------------|------------------------------------------------------------------------|----|
| Plot 5-26: | Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; NPSPAC.....     | 42 |
| Plot 5-27: | Occupied Bandwidth – 851.025 MHz; Mask G; Narrow Band; NPSPAC; IC..... | 43 |
| Plot 5-28: | Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; NPSPAC .....    | 44 |
| Plot 5-29: | Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; NPSPAC .....   | 45 |

## Table of Figures

|             |                                      |   |
|-------------|--------------------------------------|---|
| Figure 2-1: | Configuration of Tested System ..... | 8 |
|-------------|--------------------------------------|---|

## Table of Appendixes

|             |                                          |    |
|-------------|------------------------------------------|----|
| Appendix A: | Description of Change .....              | 50 |
| Appendix B: | Agency Authorization Letter.....         | 51 |
| Appendix C: | FCC Confidentiality Request Letter ..... | 52 |
| Appendix D: | IC Letters.....                          | 53 |
| Appendix E: | IC Confidentiality Request Letter .....  | 54 |
| Appendix F: | Block Diagram .....                      | 55 |
| Appendix G: | Technical Operational Description .....  | 56 |
| Appendix H: | Parts Lists .....                        | 57 |
| Appendix I: | Schematics.....                          | 58 |
| Appendix J: | Internal Photographs.....                | 59 |
| Appendix K: | Test Configuration Photographs .....     | 62 |

## Table of Photographs

|               |                                       |    |
|---------------|---------------------------------------|----|
| Photograph 1: | Revised PA .....                      | 59 |
| Photograph 2: | Revised PA .....                      | 60 |
| Photograph 3: | Revised PA .....                      | 61 |
| Photograph 4: | Radiated Emissions (Front View) ..... | 62 |
| Photograph 5: | Radiated Emissions (Rear View) .....  | 63 |

## 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**

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

**Table 2-2: Equipment Under Test (EUT)**

| Part                                          | Manufacturer          | Model   | PN/SN | FCC ID       | RTL Bar Code |
|-----------------------------------------------|-----------------------|---------|-------|--------------|--------------|
| MASTR III<br>800 MHz<br>Base Station<br>Radio | Harris<br>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.

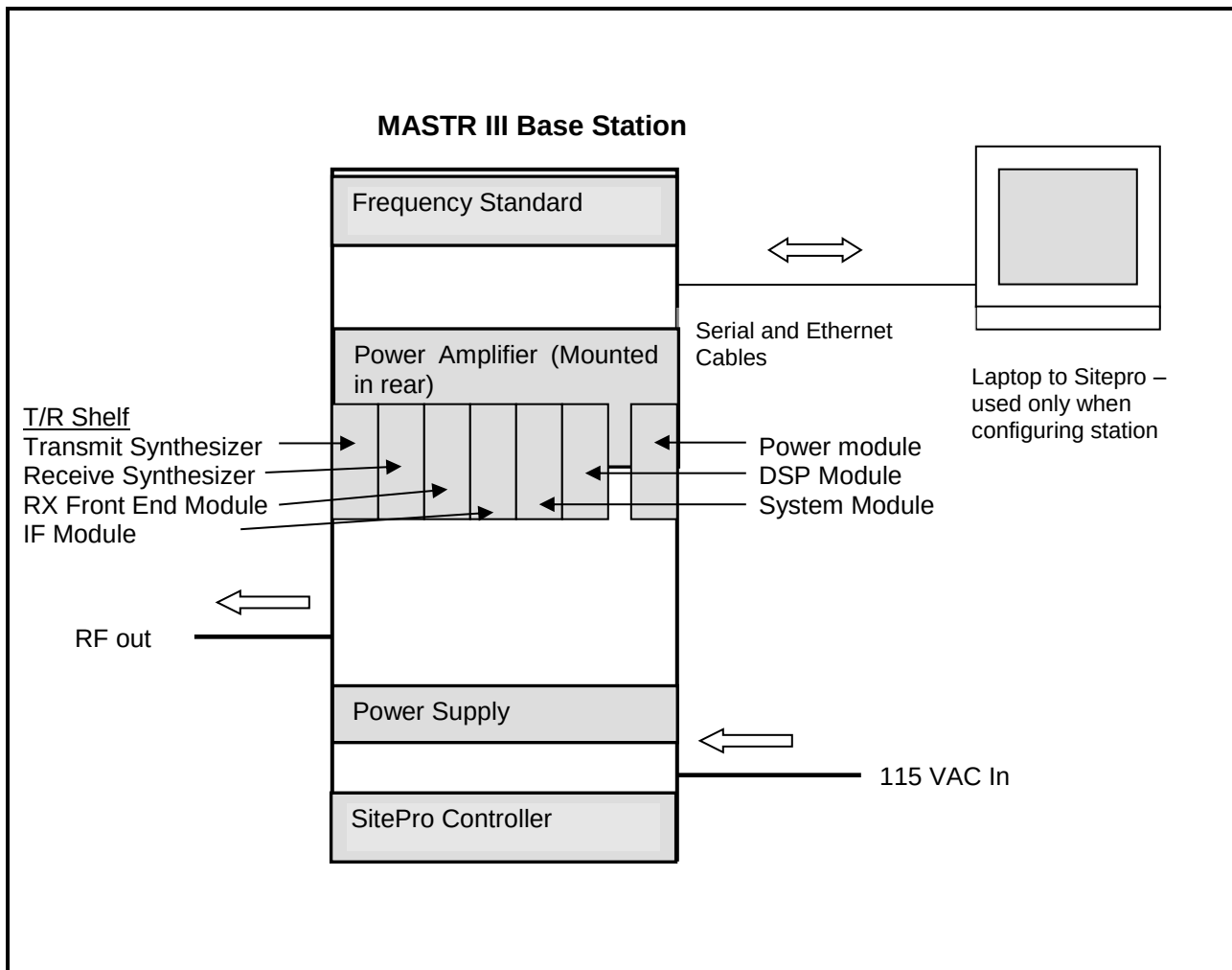
**Table 2-3: MASTR III 800 MHz Base Station Radio Components**

| 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)**

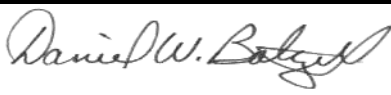
| Frequency (MHz) | High Power Rated (W)* | Low Power Rated (W)* |
|-----------------|-----------------------|----------------------|
| 851-870         | 100                   | 10                   |

\* 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  $\Omega$  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.

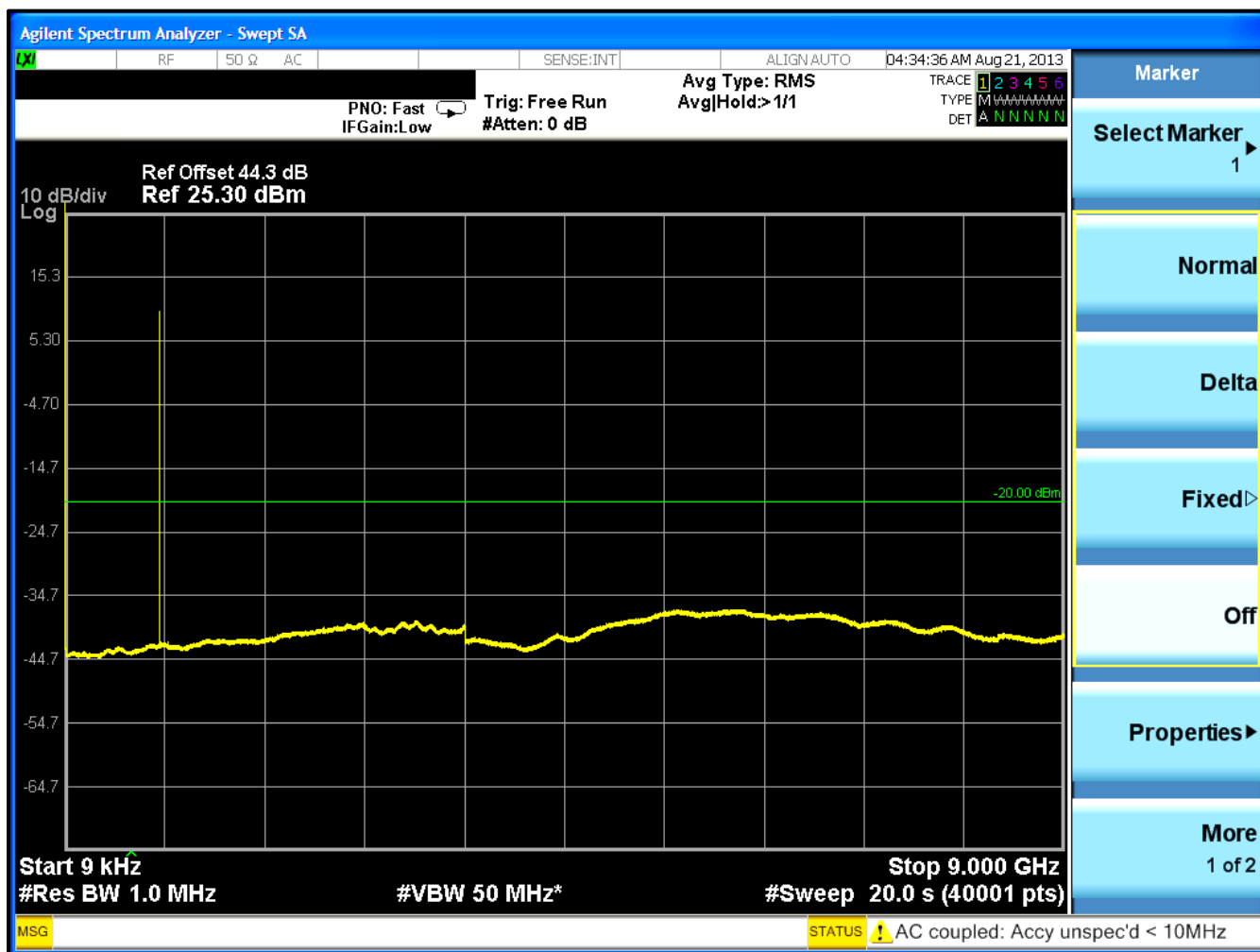
##### 4.2 Test Data

Frequency range of measurement per Part 2.1057: 9 kHz to 10x $F_c$ .

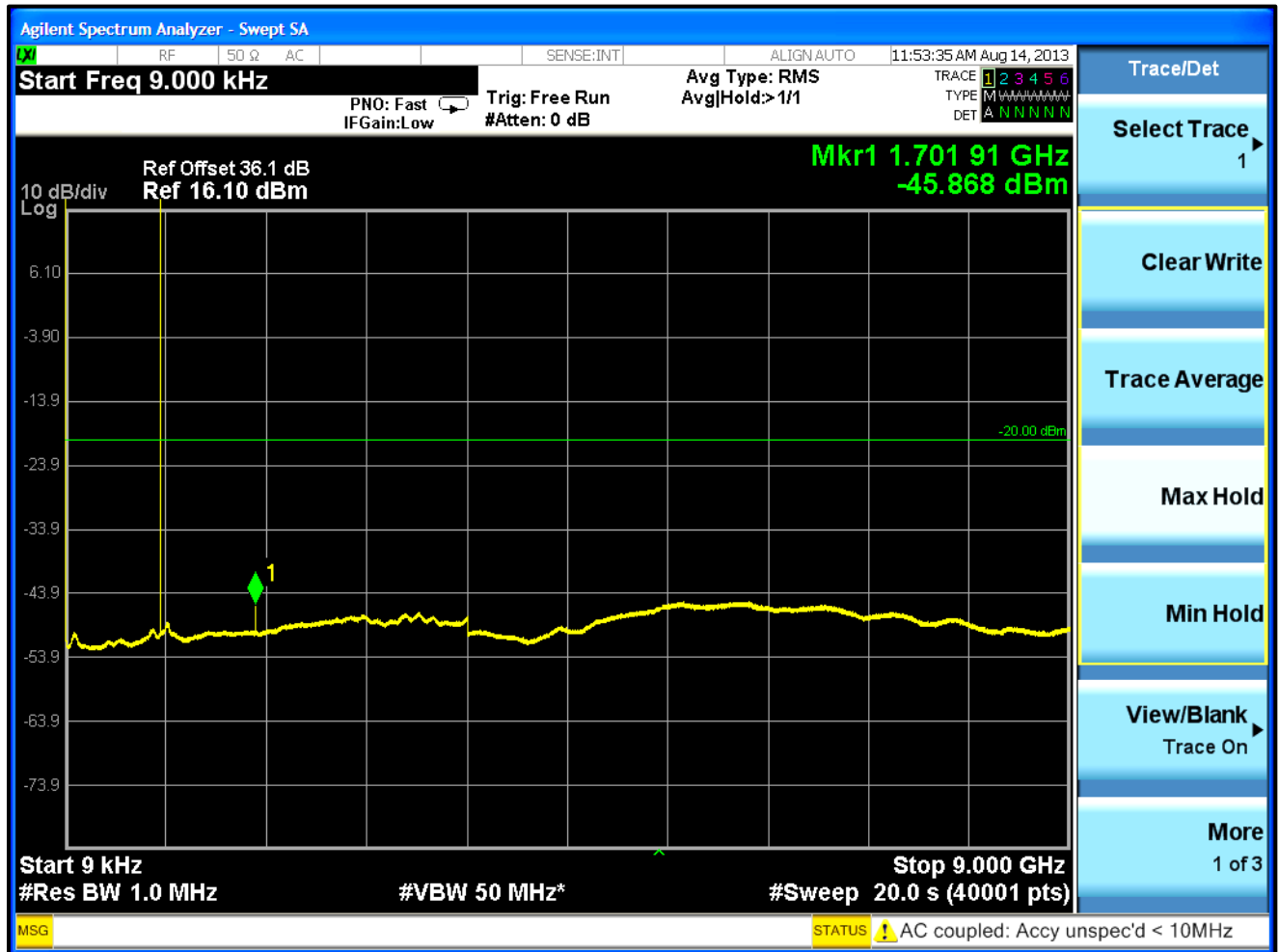
Limit:  $P(\text{dBm}) - (43 + 10 \times \text{LOG } P(\text{W}))$

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.

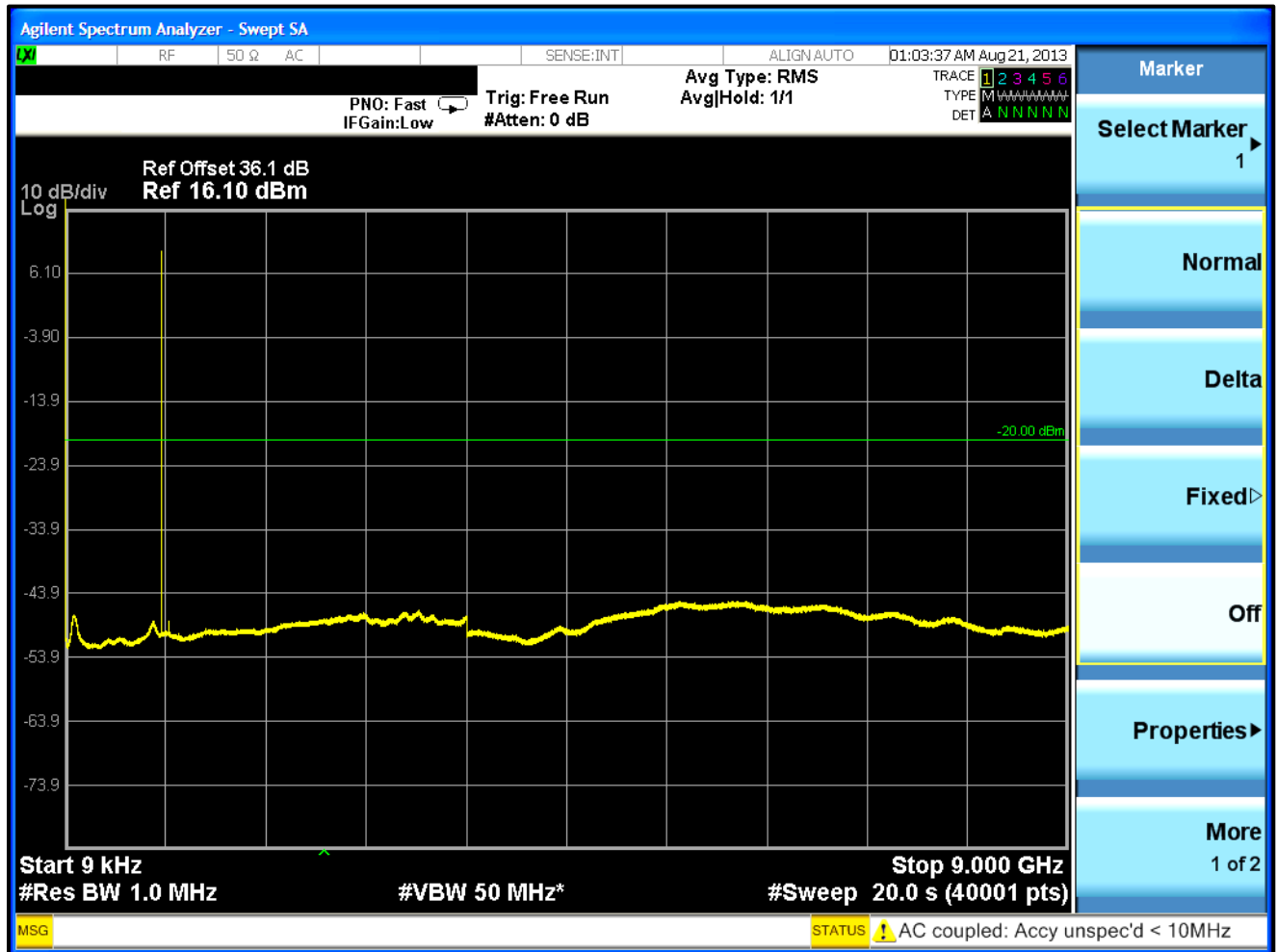
Plot 4-1: Conducted Spurious Emissions - 851.025 MHz; Low Power



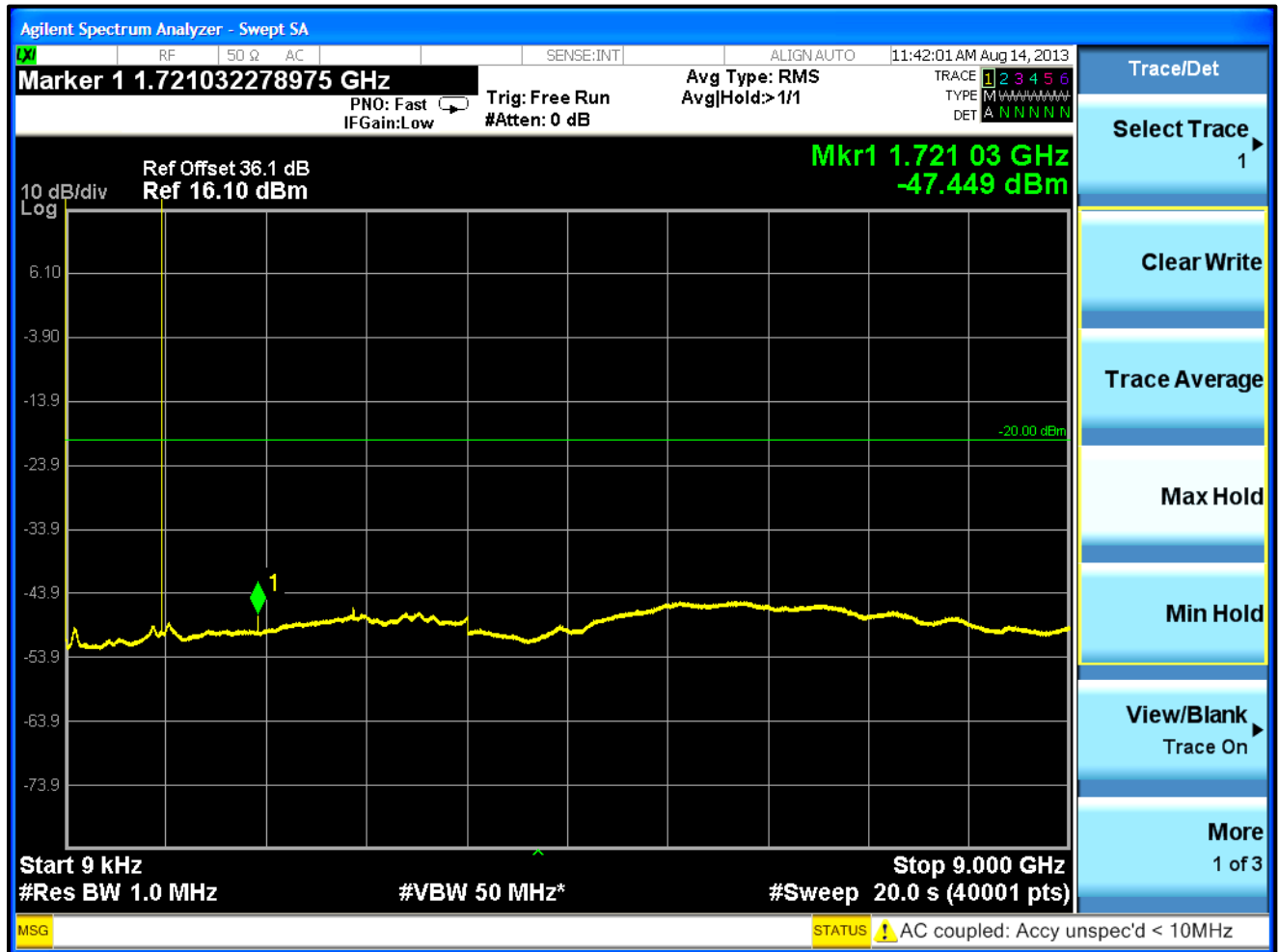
Plot 4-2: Conducted Spurious Emissions - 851.025 MHz; High Power



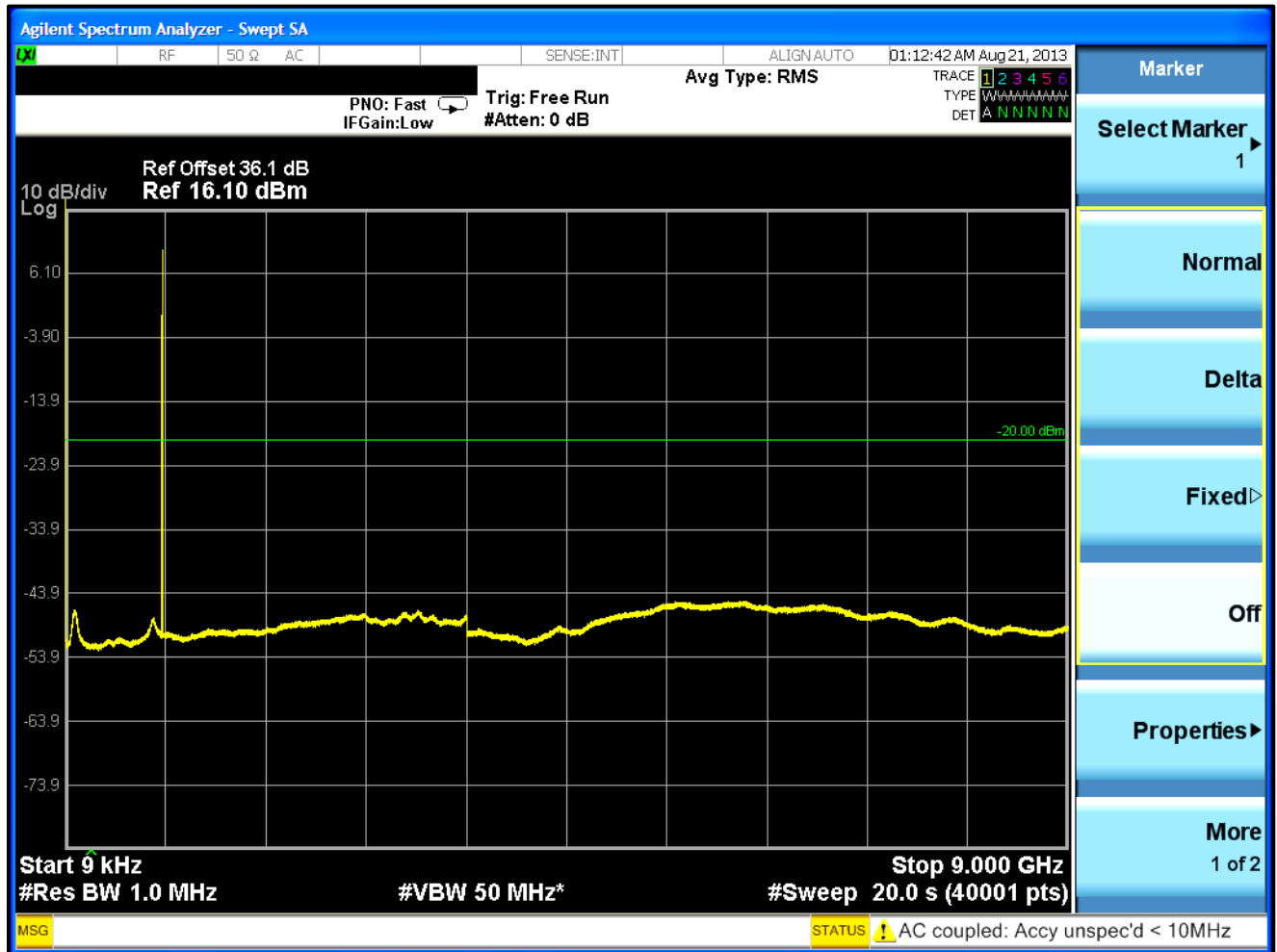
**Plot 4-3: Conducted Spurious Emissions - 860.525 MHz; Low Power**



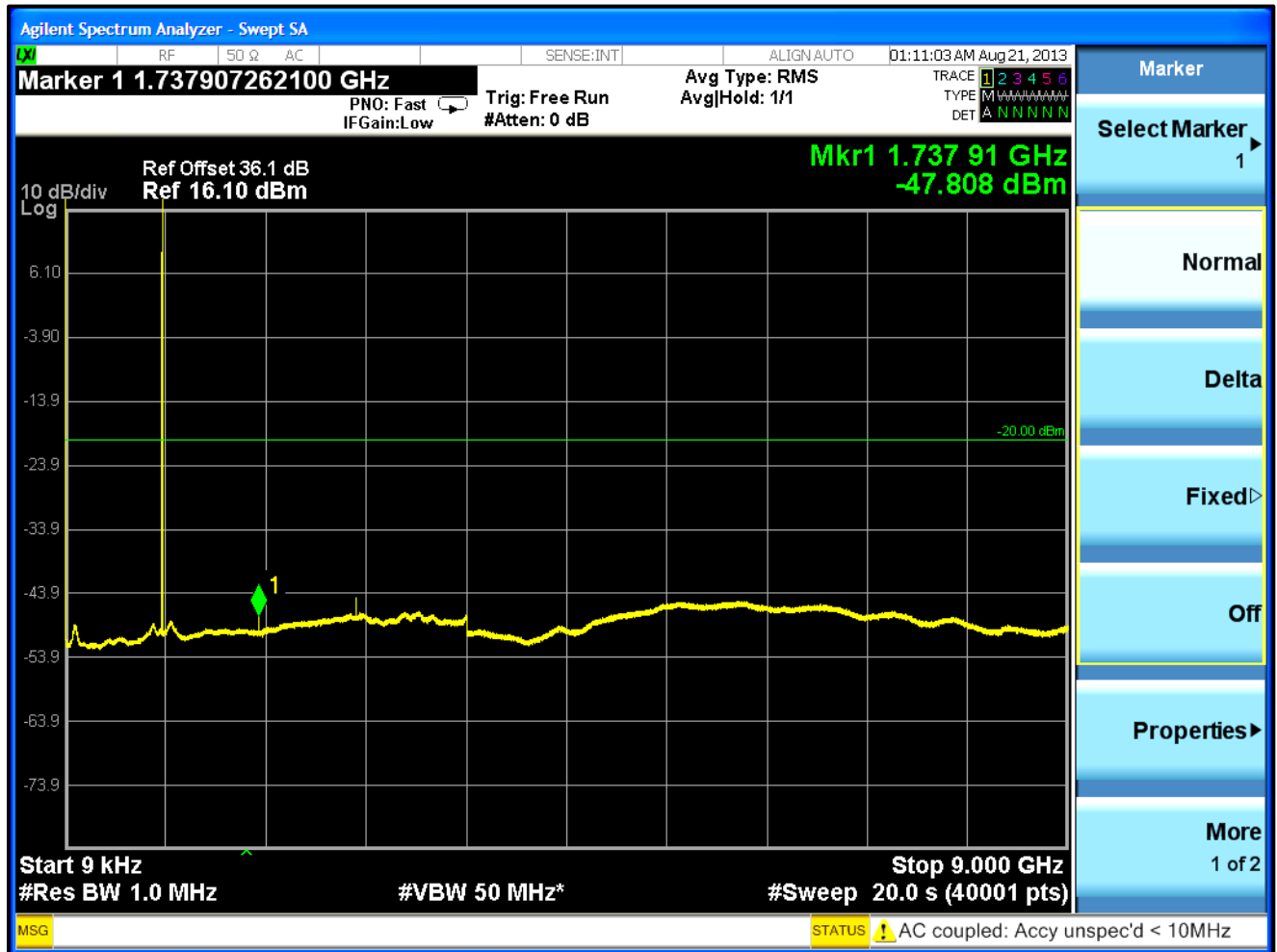
**Plot 4-4: Conducted Spurious Emissions - 860.525 MHz; High Power**



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



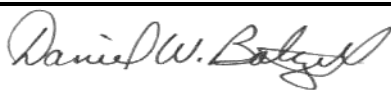
**Plot 4-6: Conducted Spurious Emissions - 868.9875 MHz; High Power**



**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

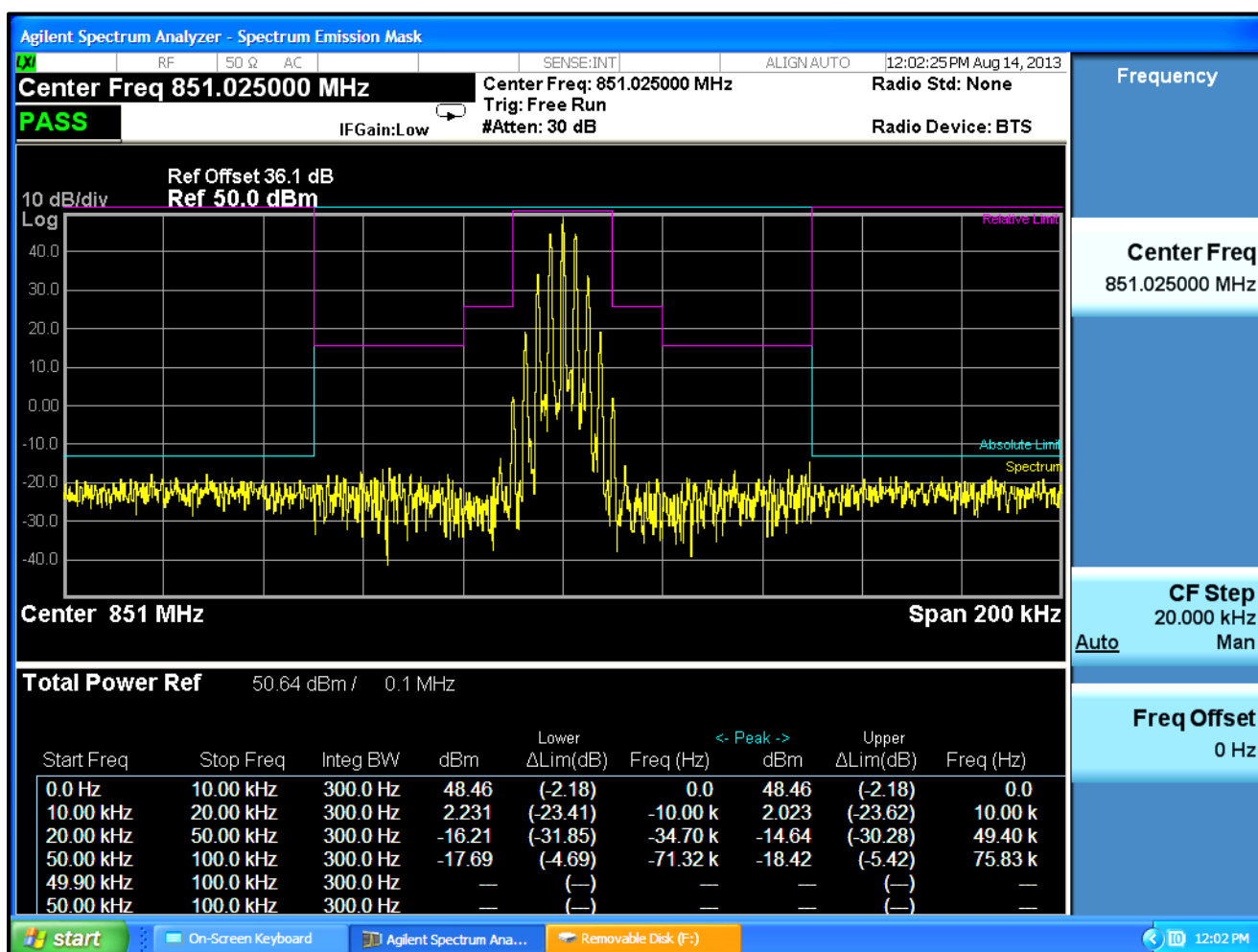
Analog – Modulated with a 2500 Hz signal level, 16 dB higher than required for 50% deviation at 1 kHz.

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

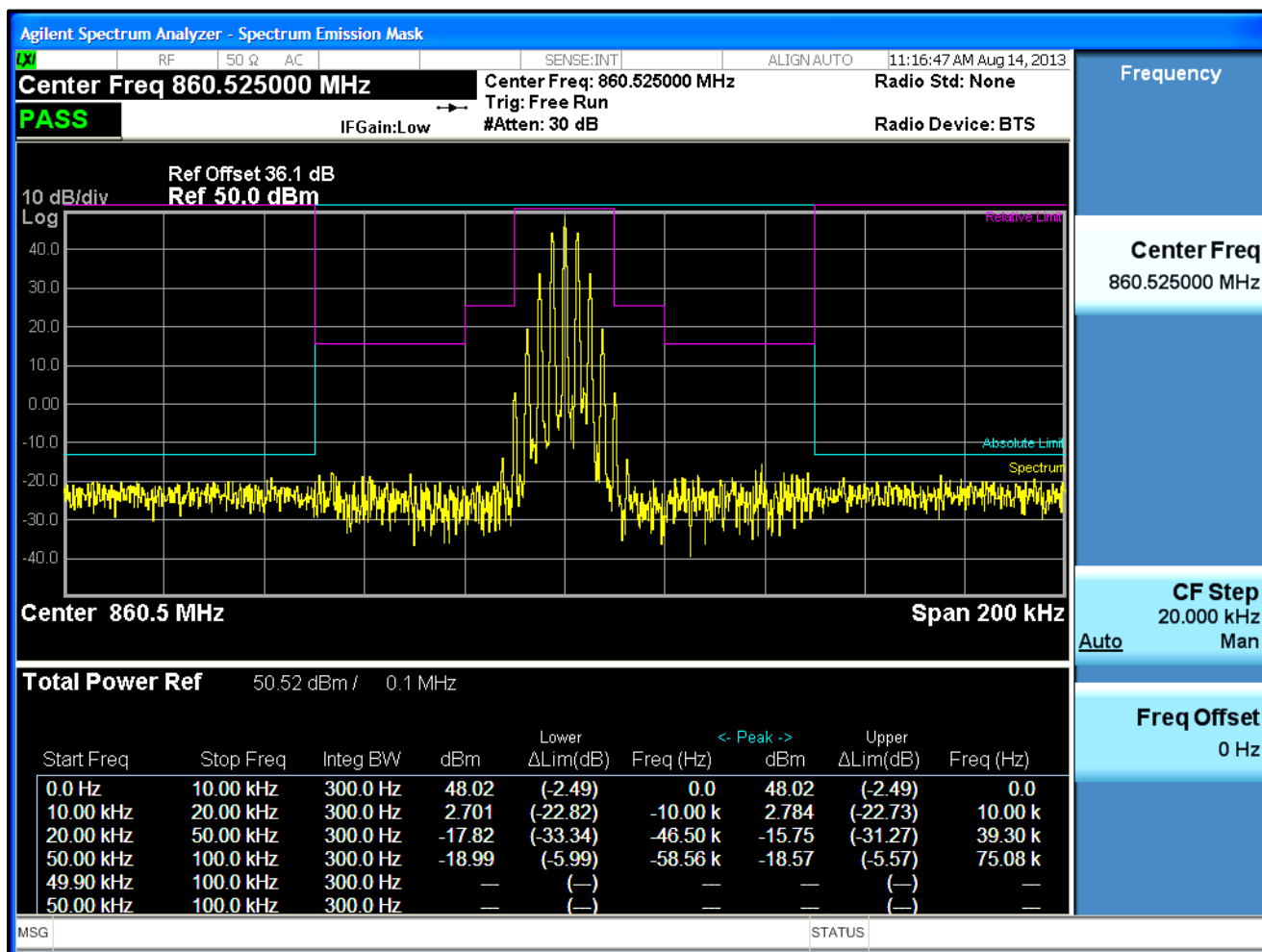
ANSI/TIA/EIA-603-2004, Section 2.2.11.

### 5.2 Test Data

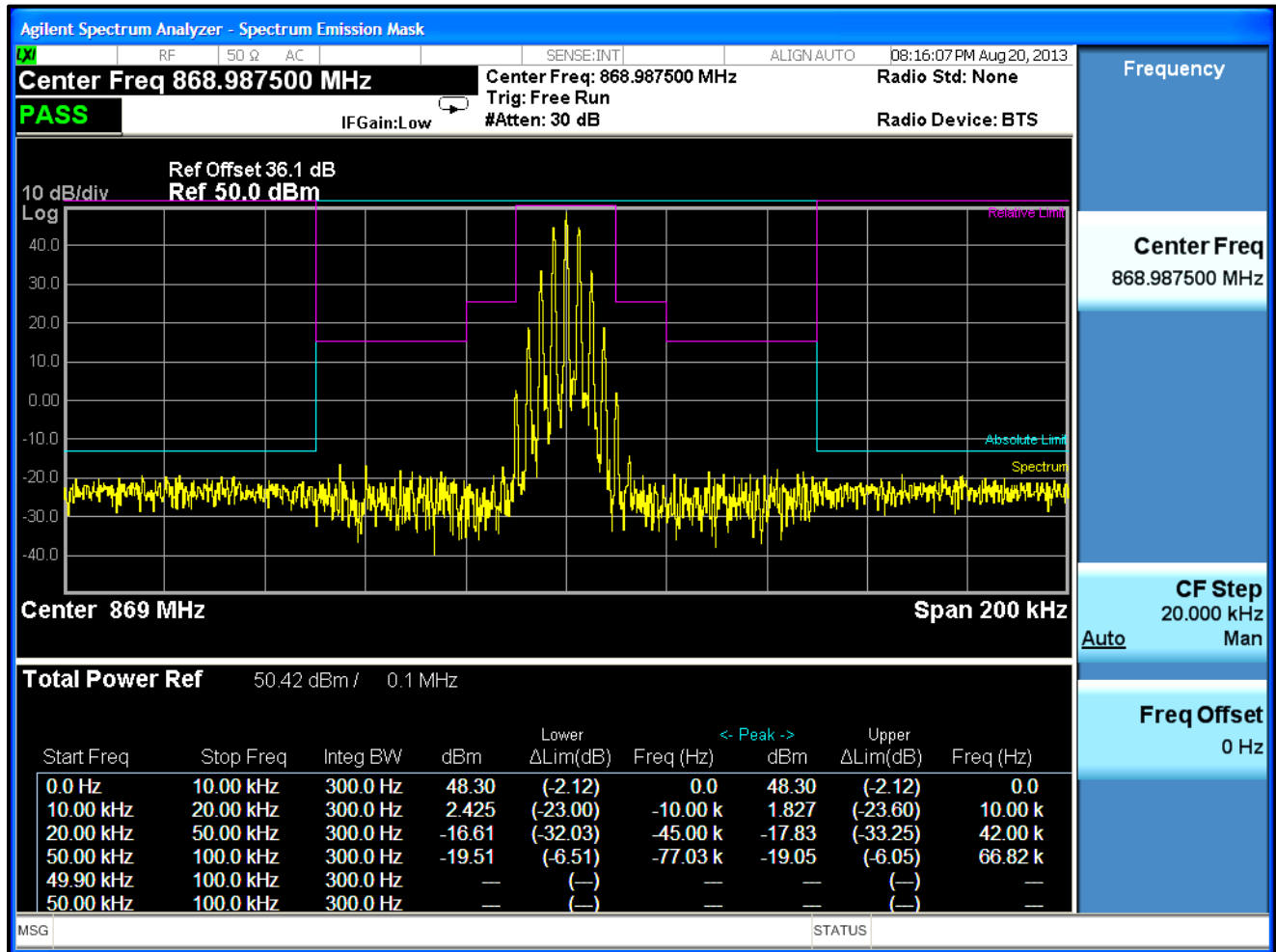
**Plot 5-1: Occupied Bandwidth – 851.025 MHz; Mask B; Wide Band; Analog FM**



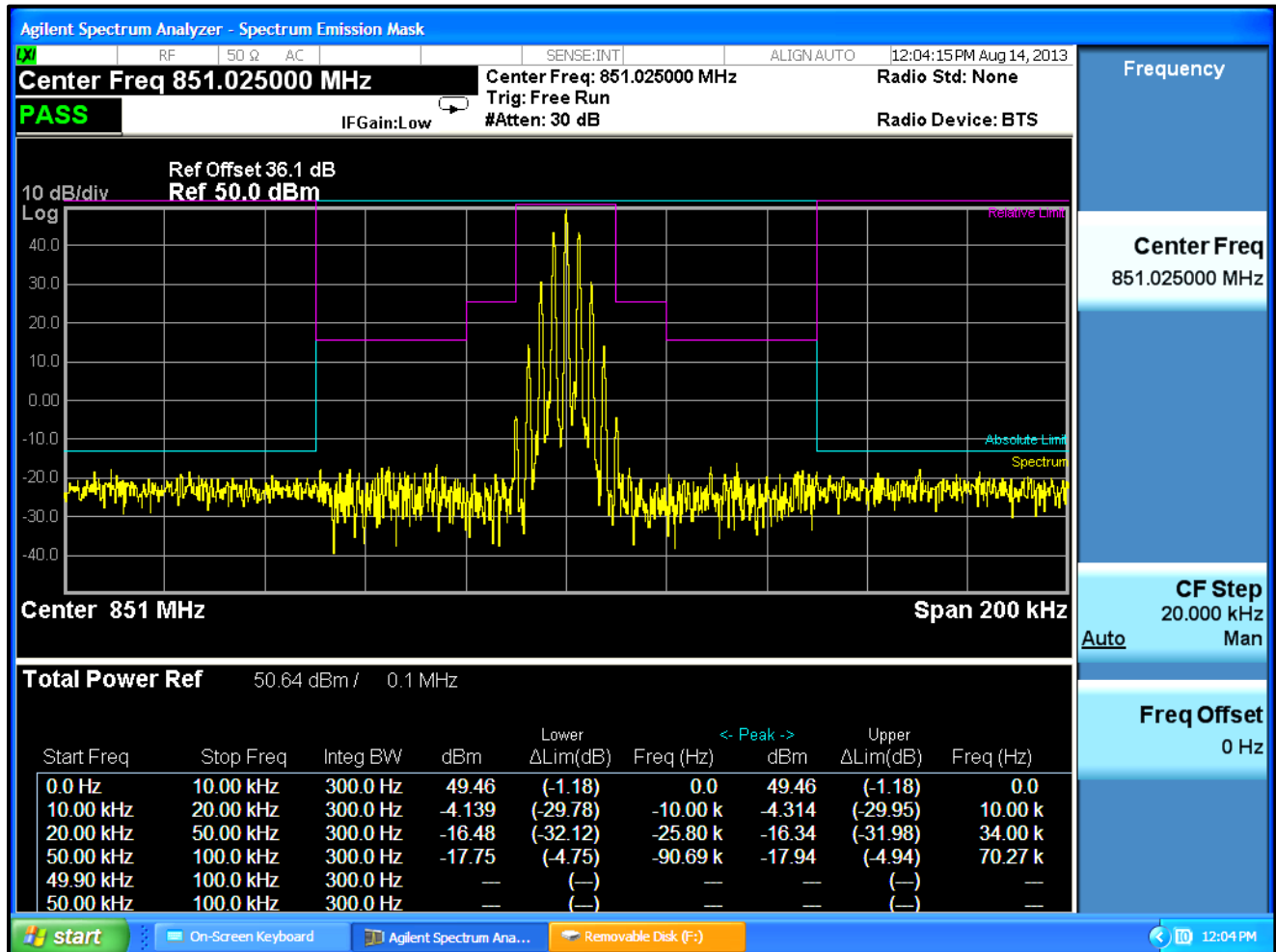
**Plot 5-2: Occupied Bandwidth – 860.525 MHz; Mask B; Wide Band; Analog FM**



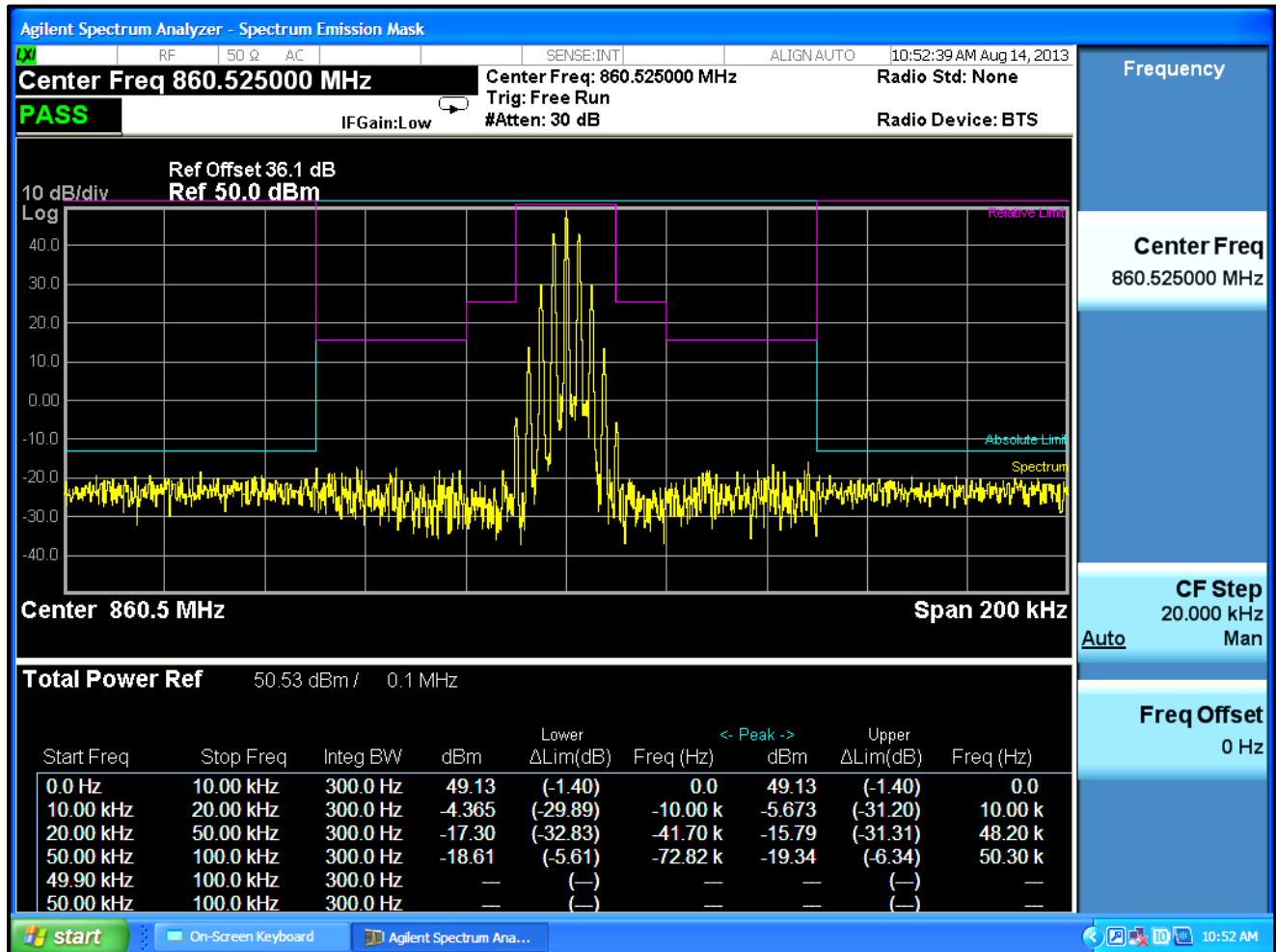
**Plot 5-3: Occupied Bandwidth – 868.9875 MHz; Mask B; Wide Band; Analog FM**



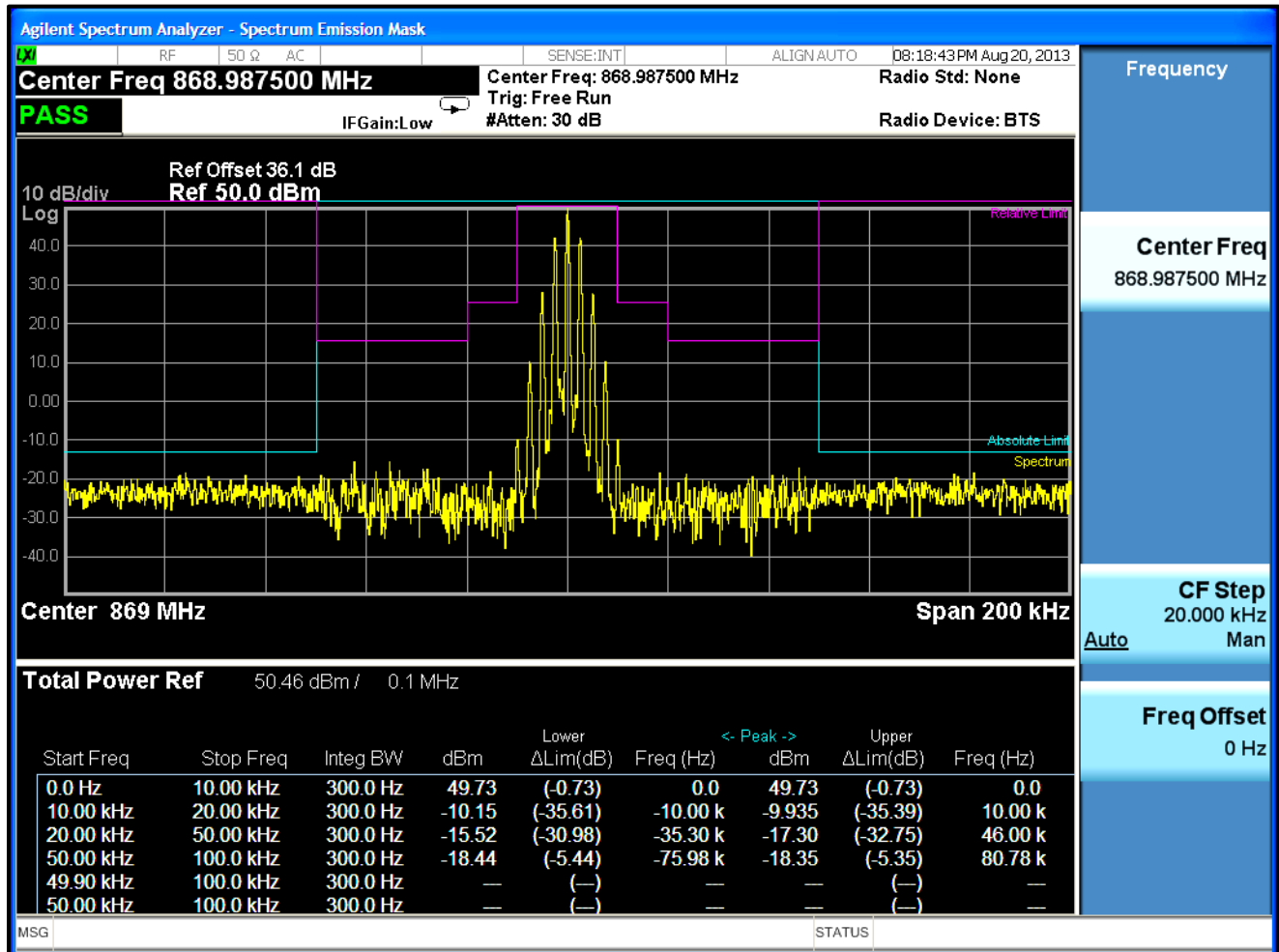
**Plot 5-4: Occupied Bandwidth – 851.025 MHz; Mask B; NPSPAC; Analog FM**



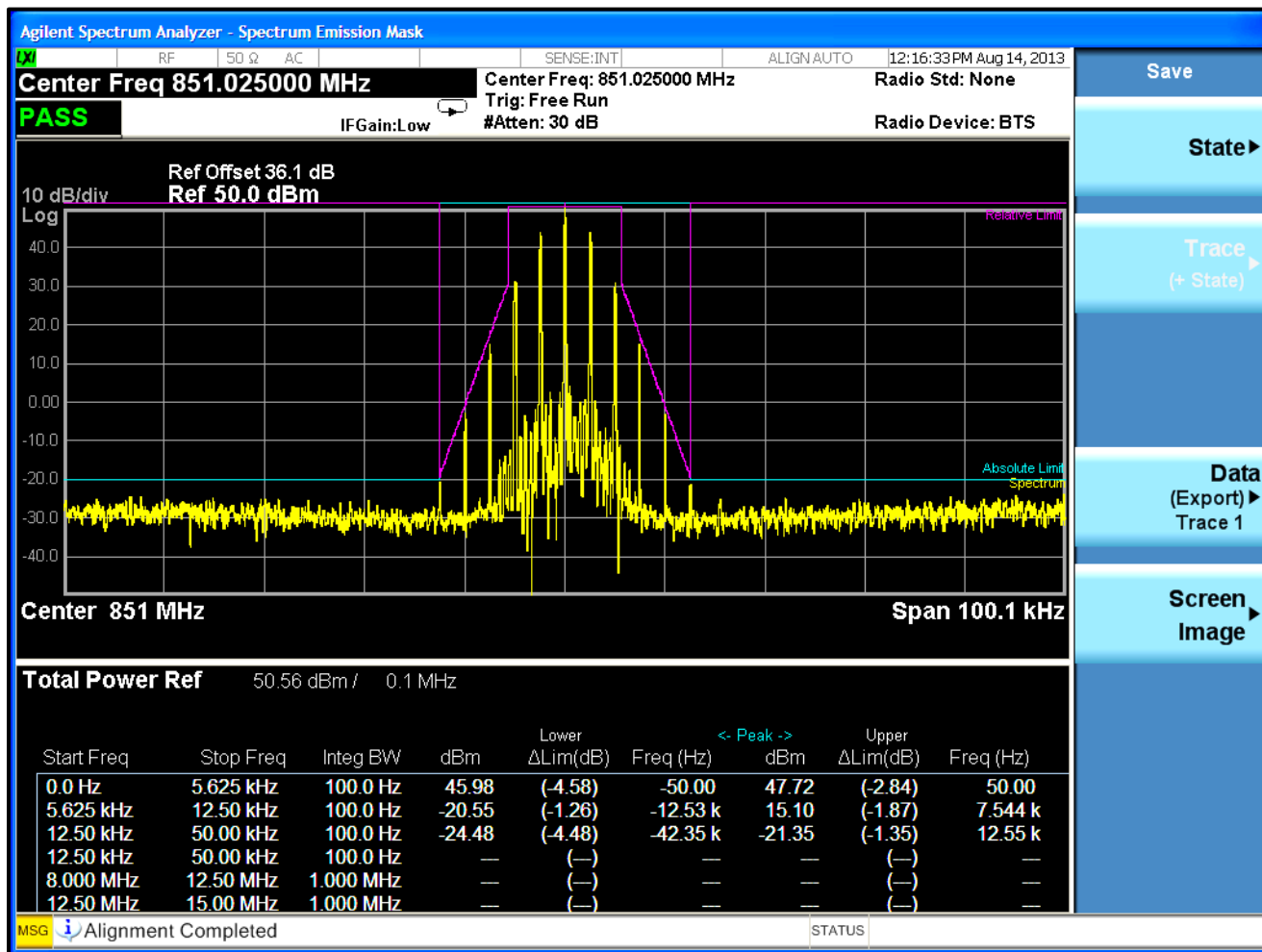
**Plot 5-5: Occupied Bandwidth – 860.525 MHz; Mask B; NPSPAC; Analog FM**



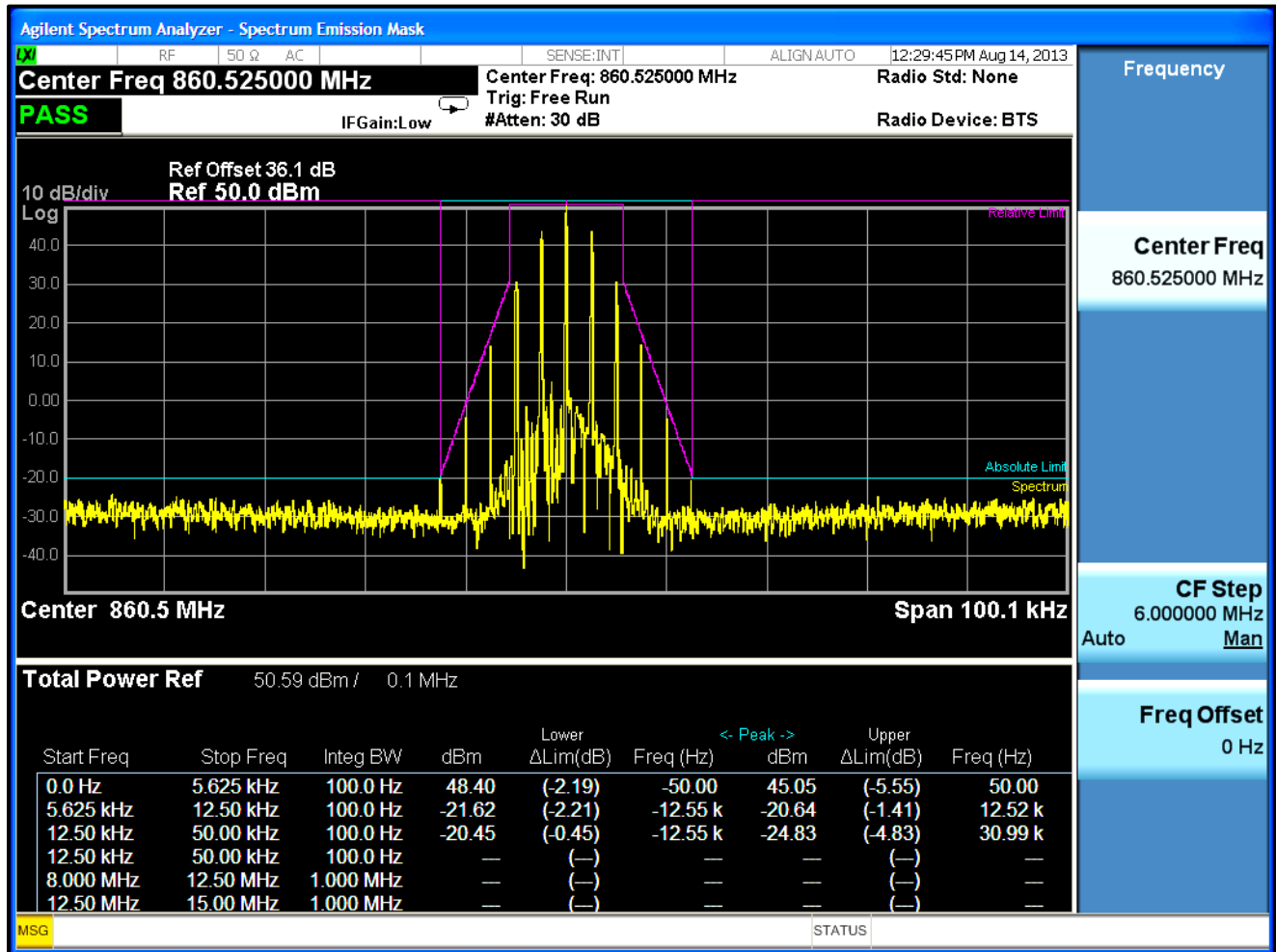
**Plot 5-6: Occupied Bandwidth – 868.9875 MHz; Mask B; NPSPAC; Analog FM**



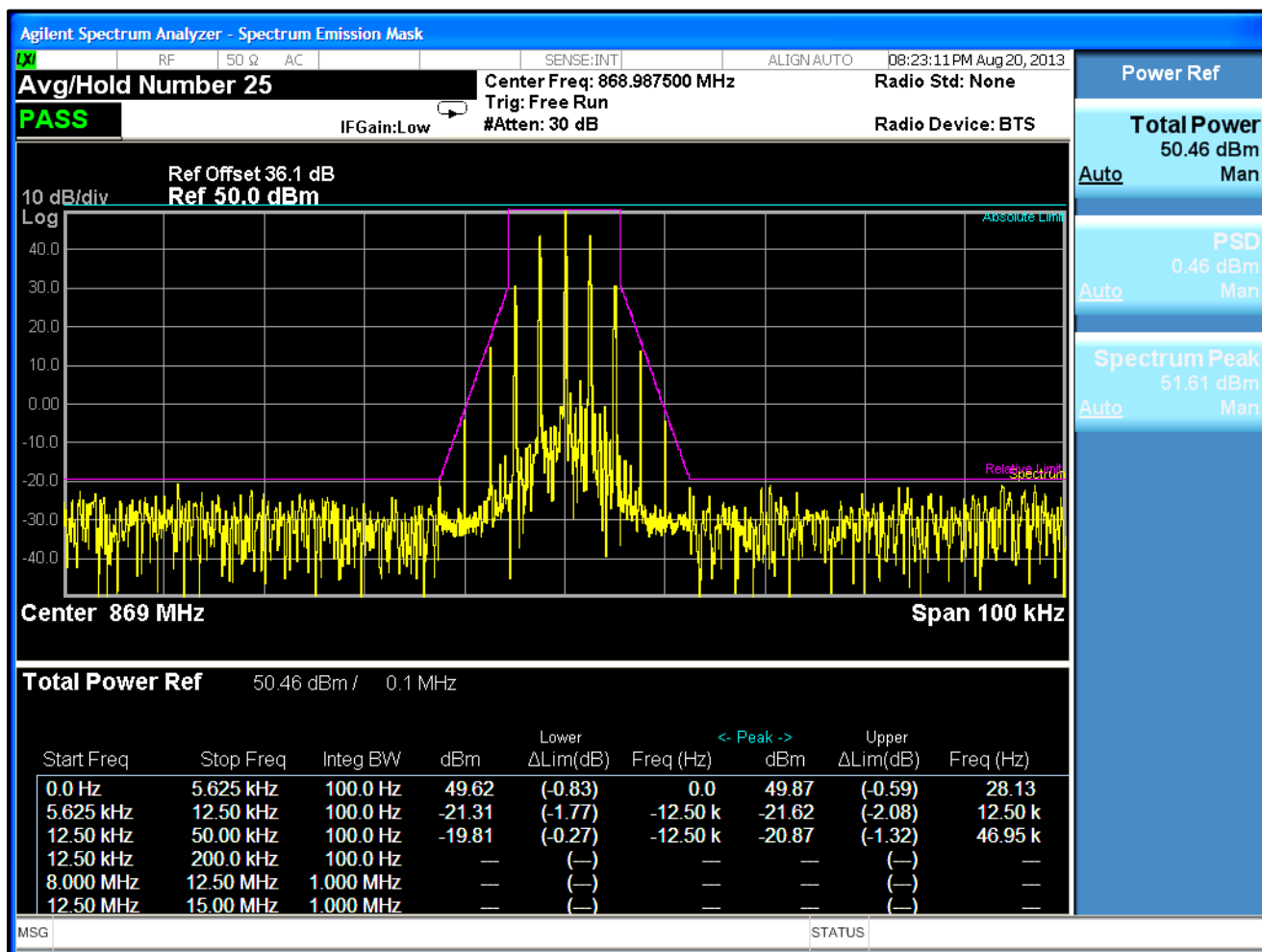
**Plot 5-7: Occupied Bandwidth – 851.025 MHz; Mask D; NPSPAC; Analog FM; IC**



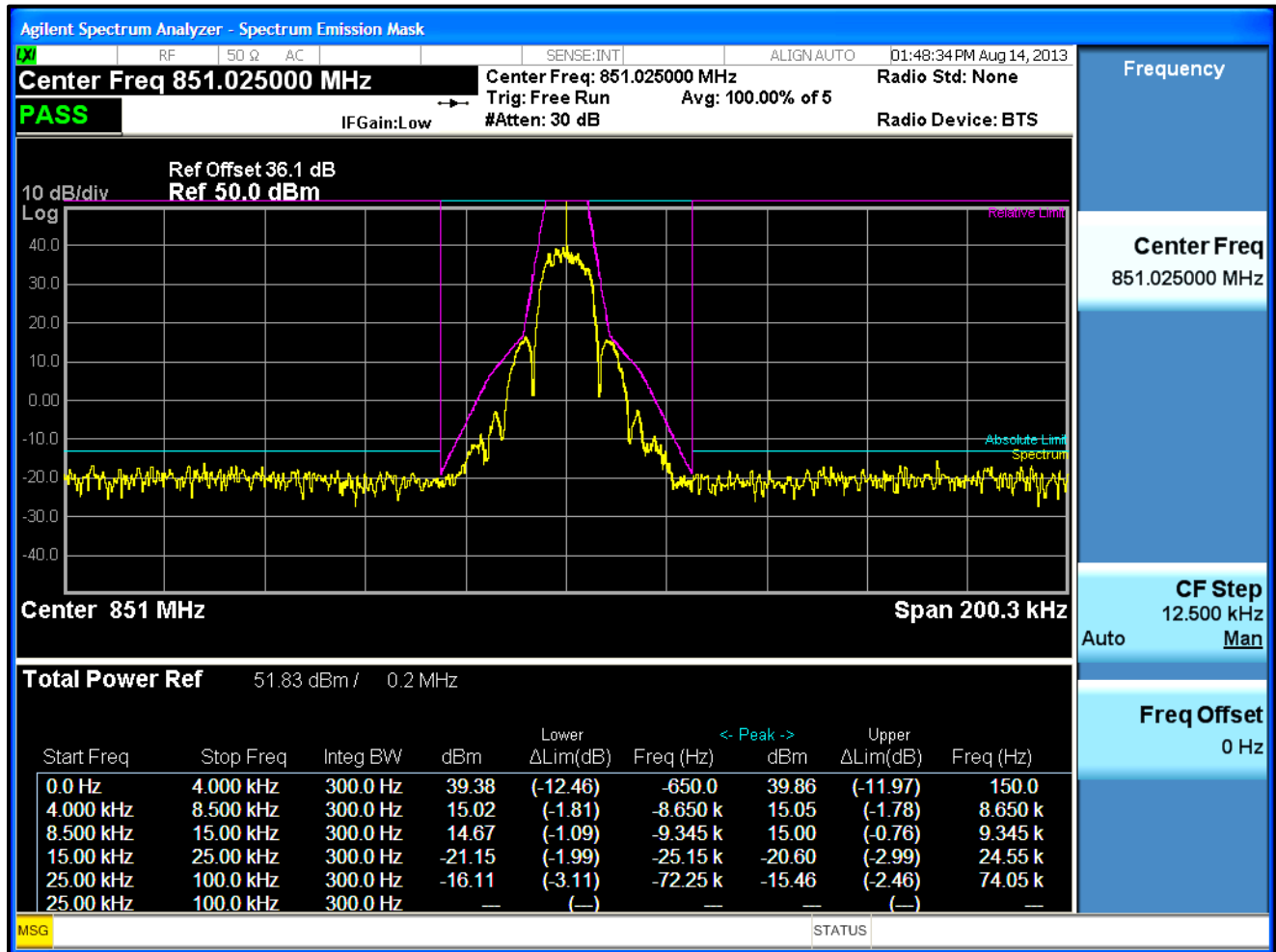
**Plot 5-8: Occupied Bandwidth – 860.525 MHz; Mask D; NPSPAC; Analog FM; IC**



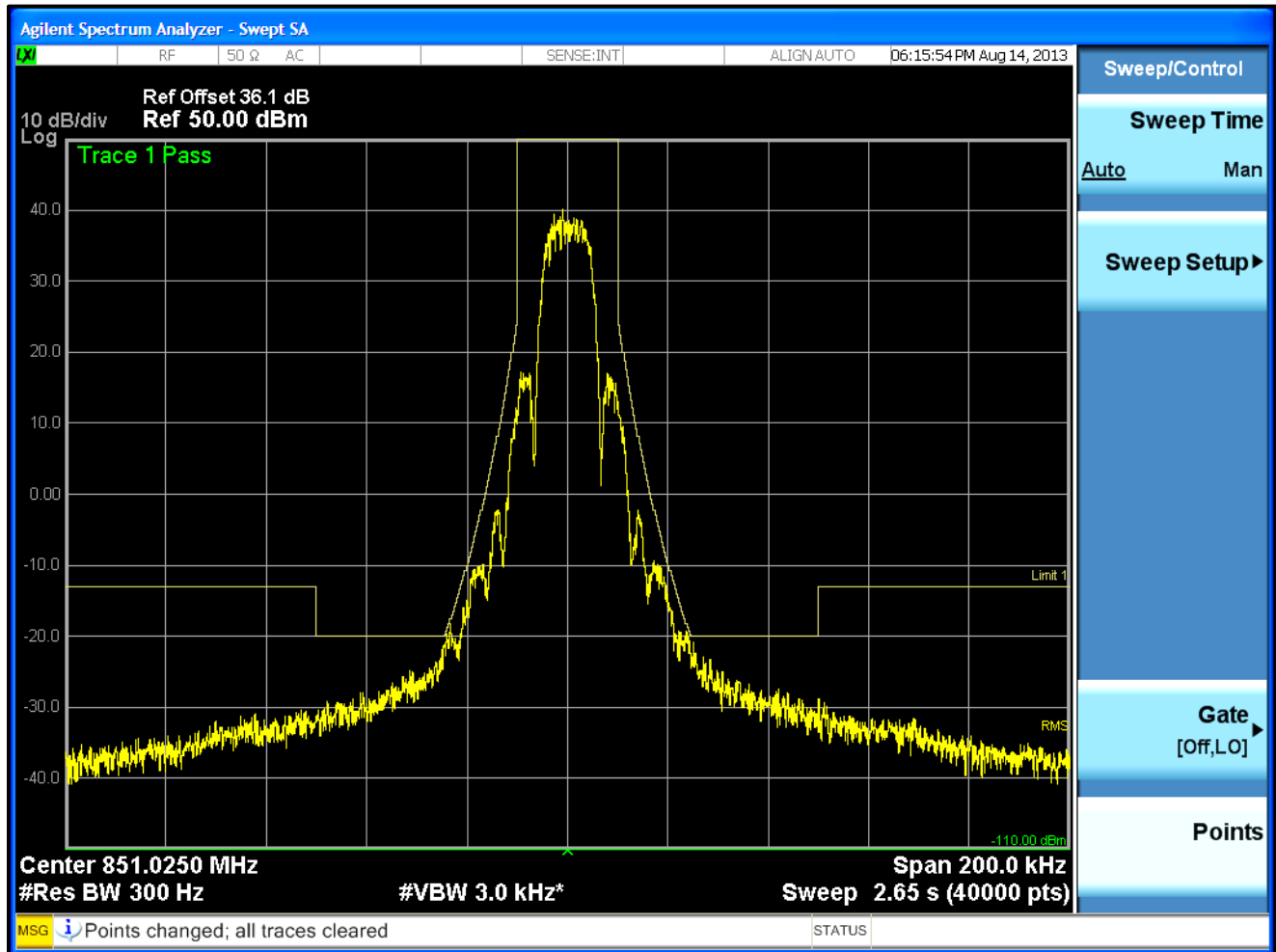
**Plot 5-9: Occupied Bandwidth – 868.9875 MHz; Mask D; NPSPAC; Analog FM; IC**



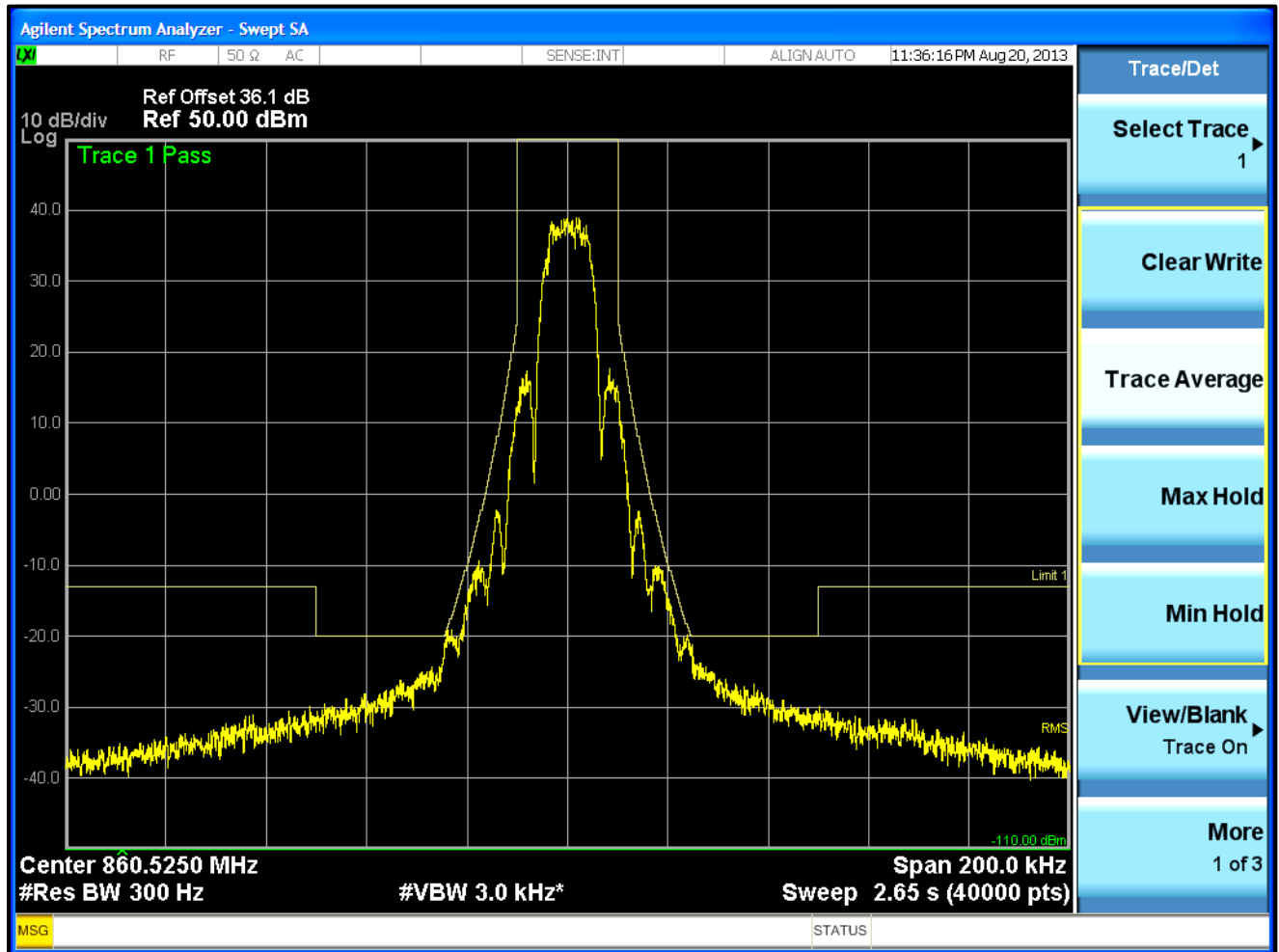
**Plot 5-10: Occupied Bandwidth – 851.025 MHz; Mask H; Wide Band; 2-Level FSK**



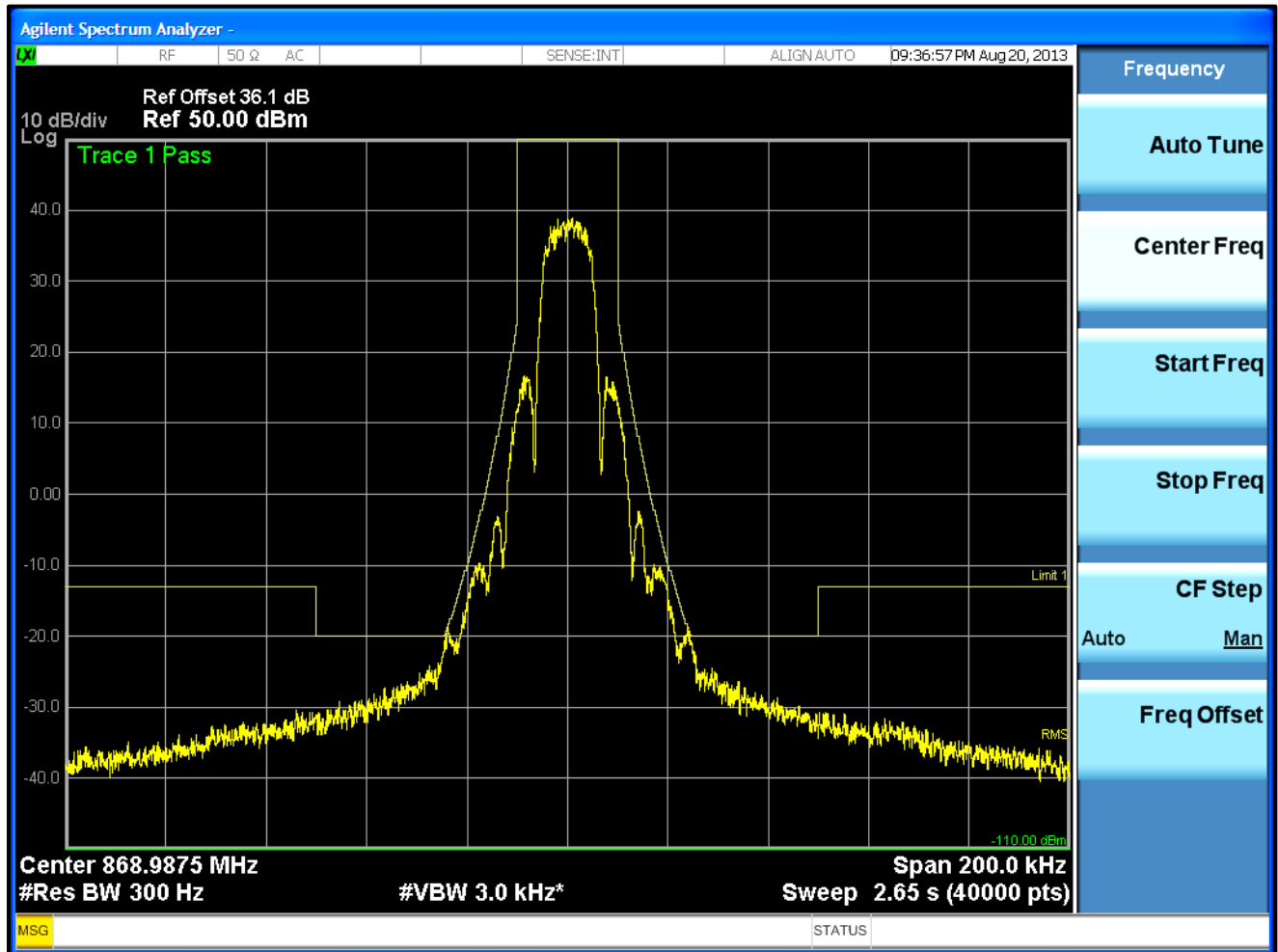
**Plot 5-11: Occupied Bandwidth – 851.025 MHz; Mask G; Wide Band; 2-Level FSK; IC**



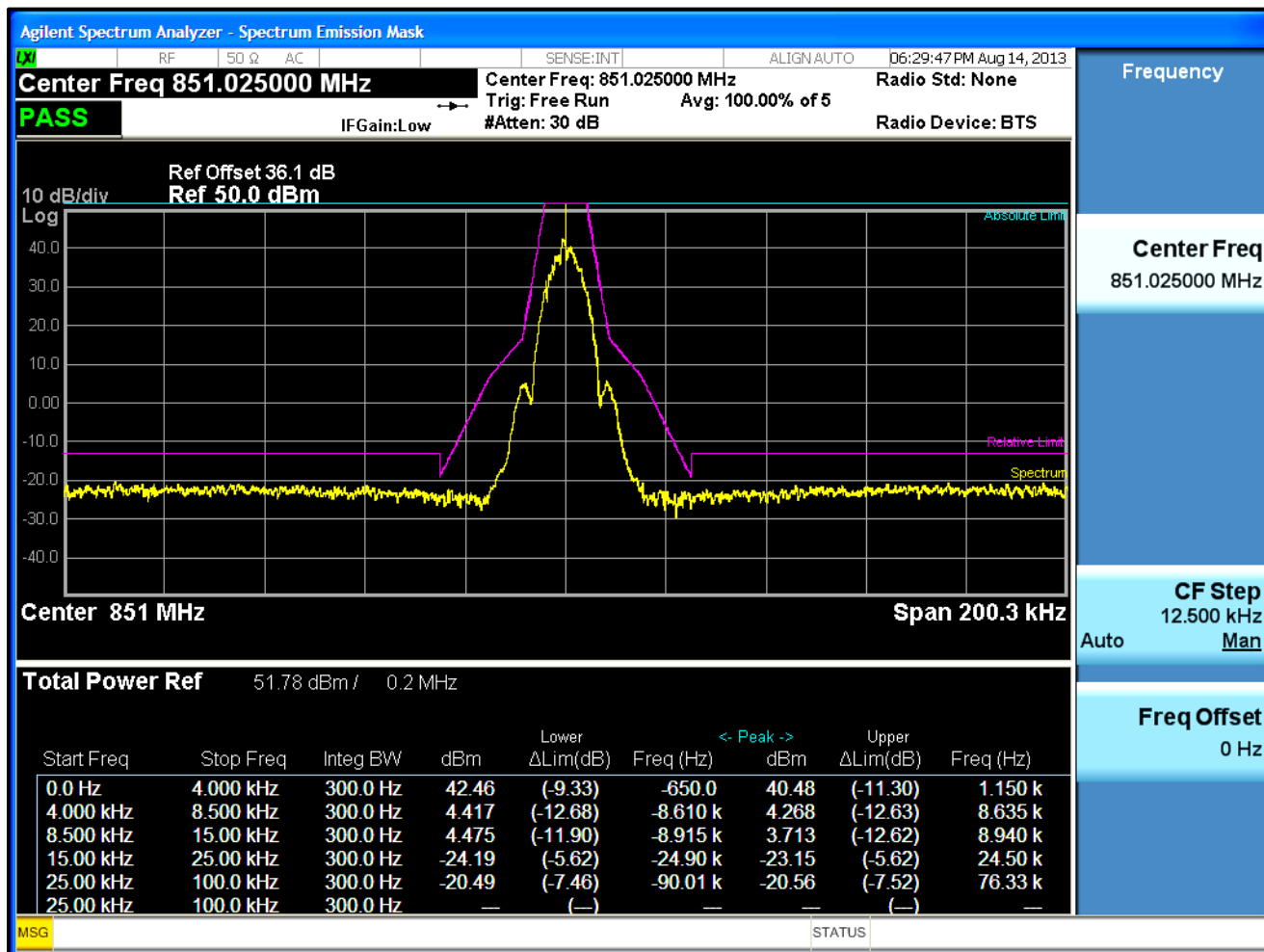
**Plot 5-12: Occupied Bandwidth – 860.525 MHz; Mask G; Wide Band; 2-Level FSK**



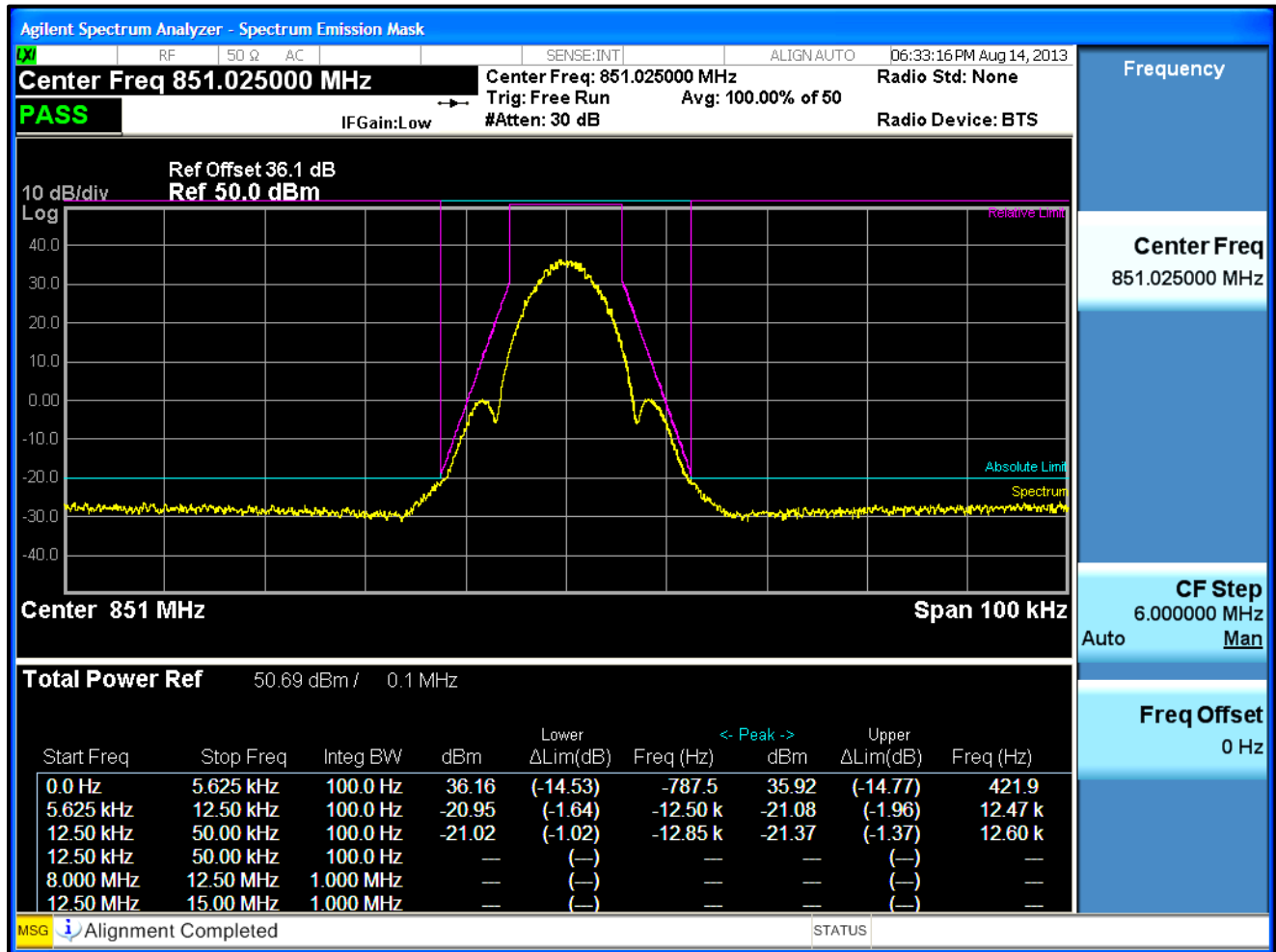
**Plot 5-13: Occupied Bandwidth – 868.9875 MHz; Mask G; Wide Band; 2-Level FSK**



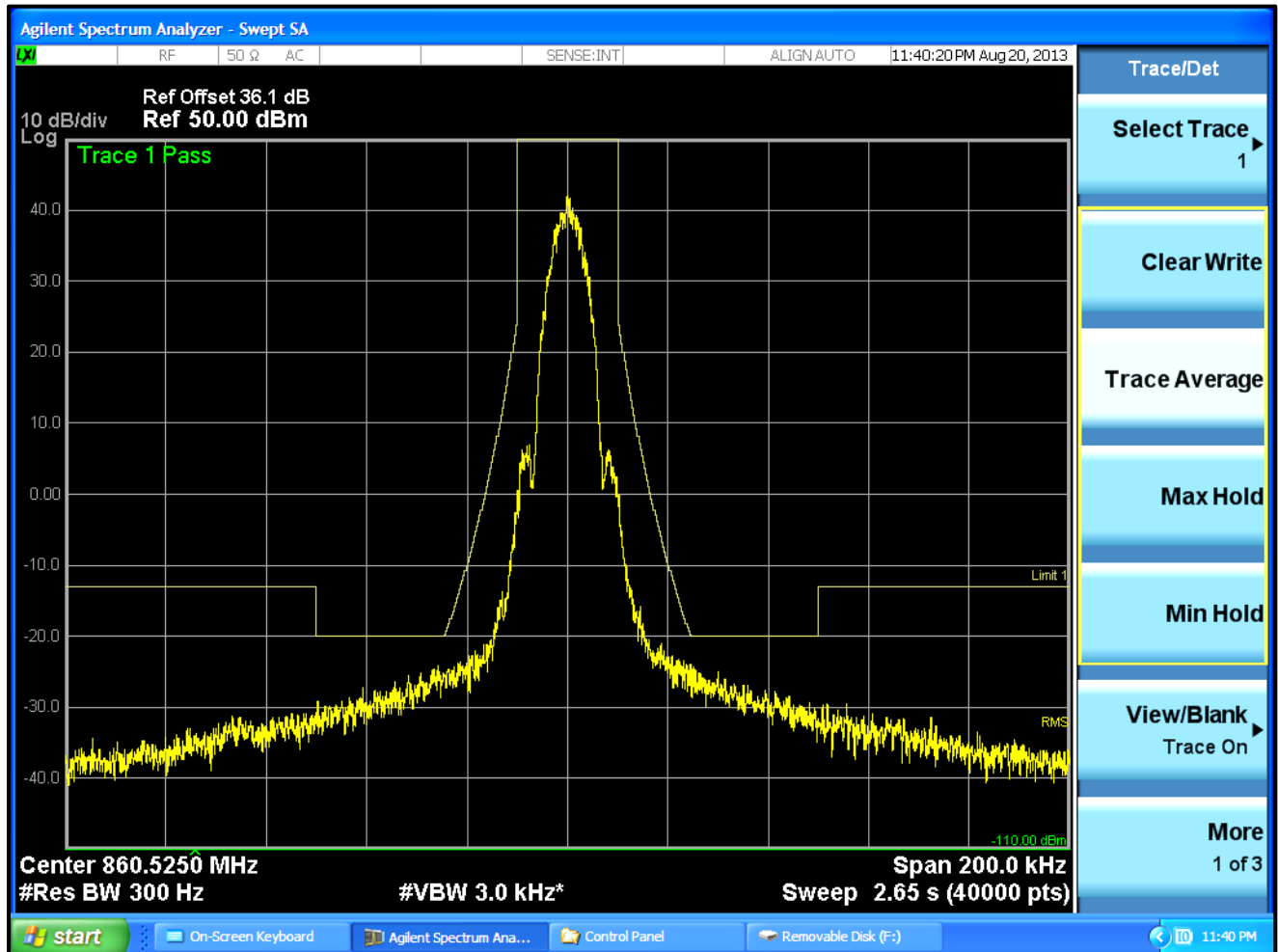
**Plot 5-14: Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; 2-Level FSK**



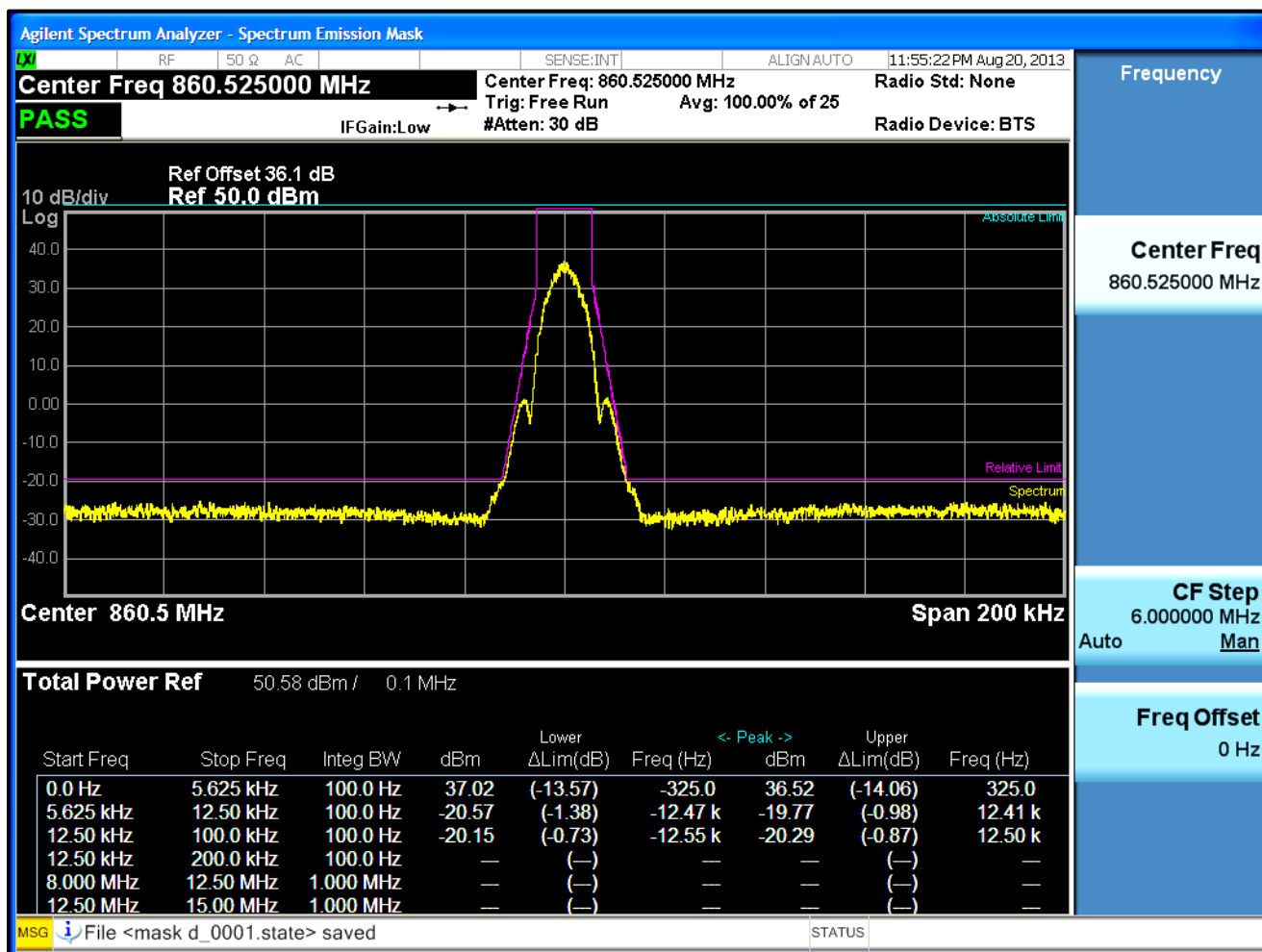
**Plot 5-15: Occupied Bandwidth – 851.025 MHz; Mask D; Narrow Band; 2-Level FSK; IC**



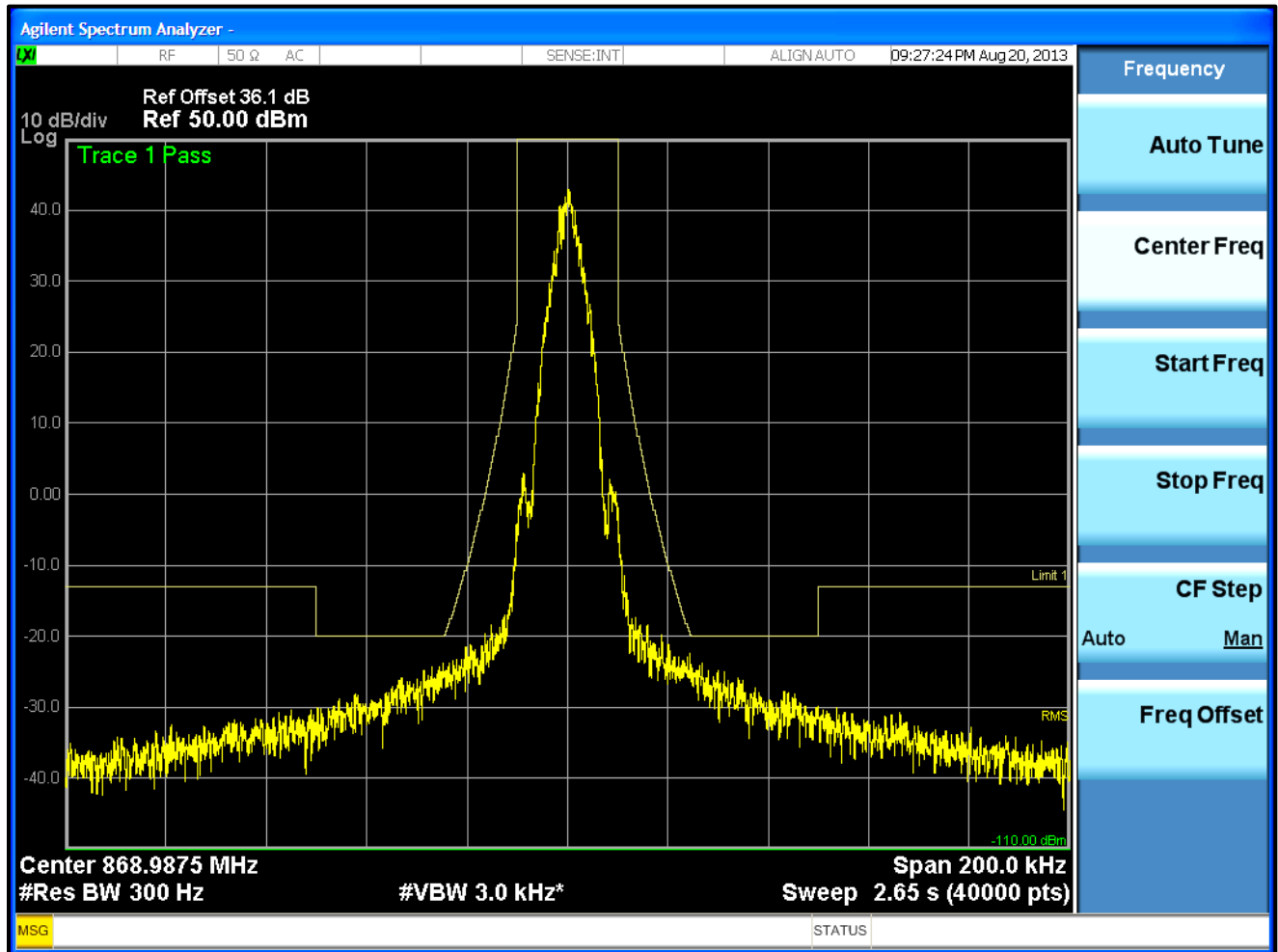
**Plot 5-16: Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; 2-Level FSK**



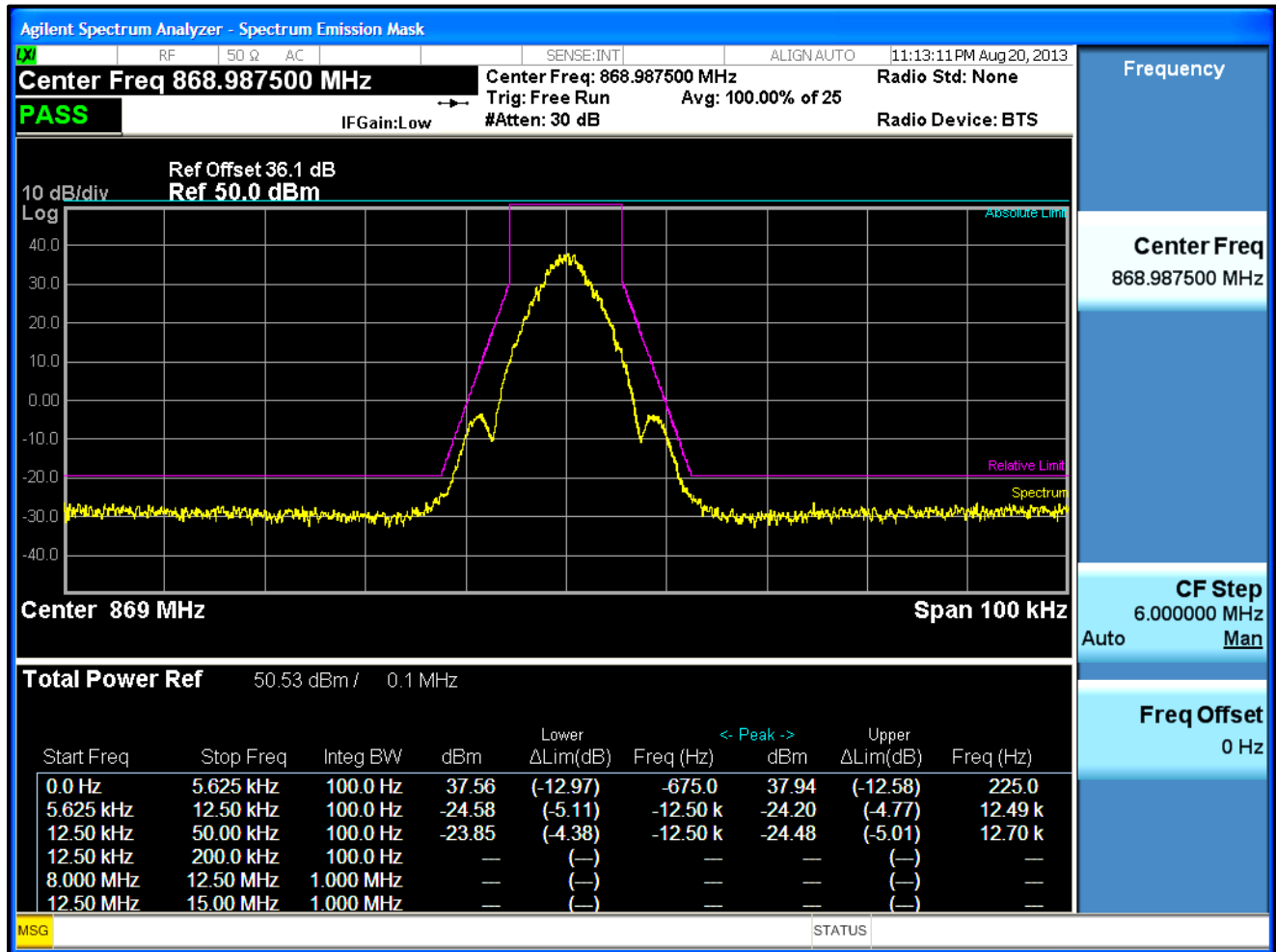
**Plot 5-17: Occupied Bandwidth – 860.525 MHz; Mask D; Narrow Band; 2-Level FSK; IC**



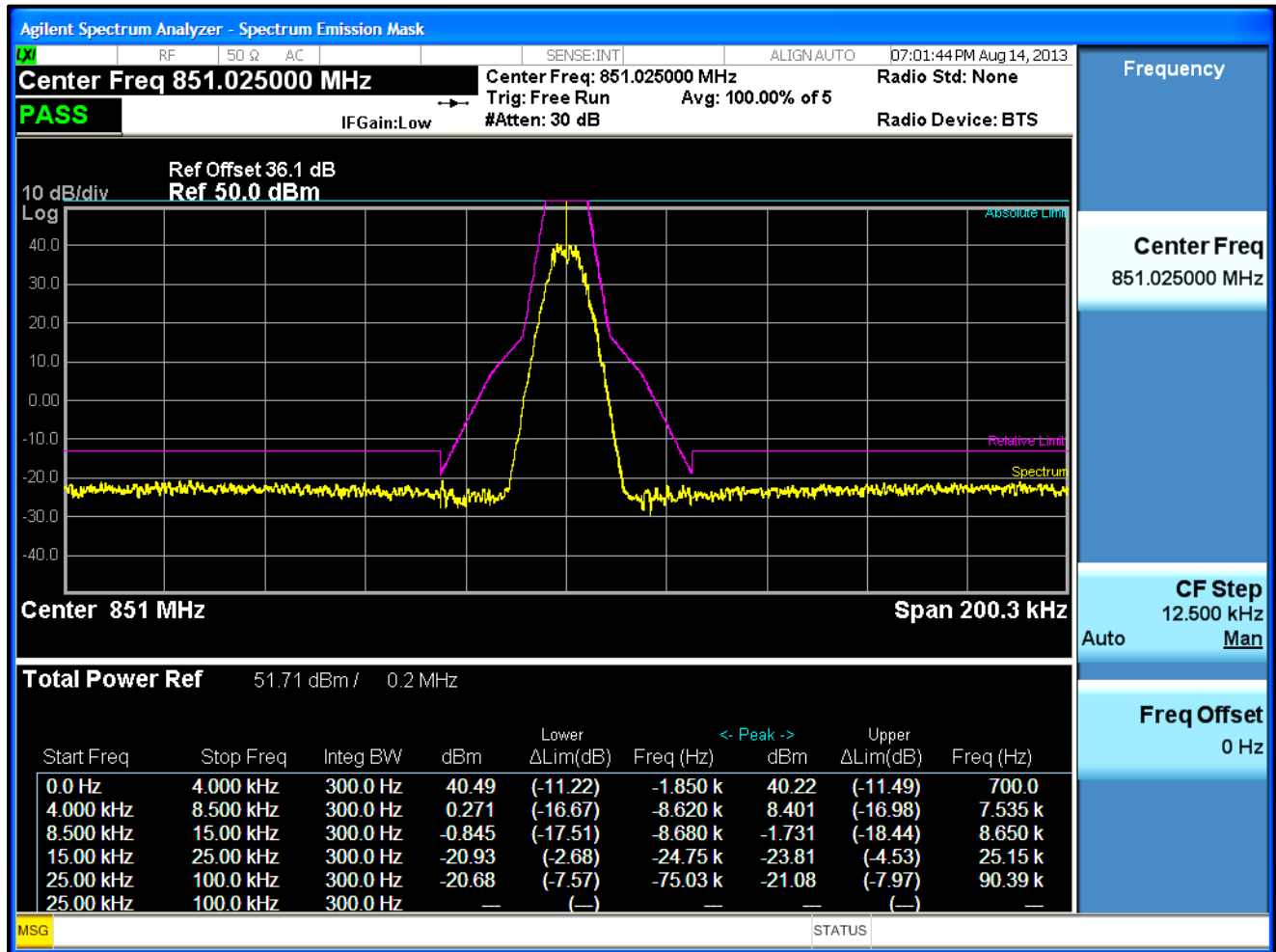
**Plot 5-18: Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; 2-Level FSK**



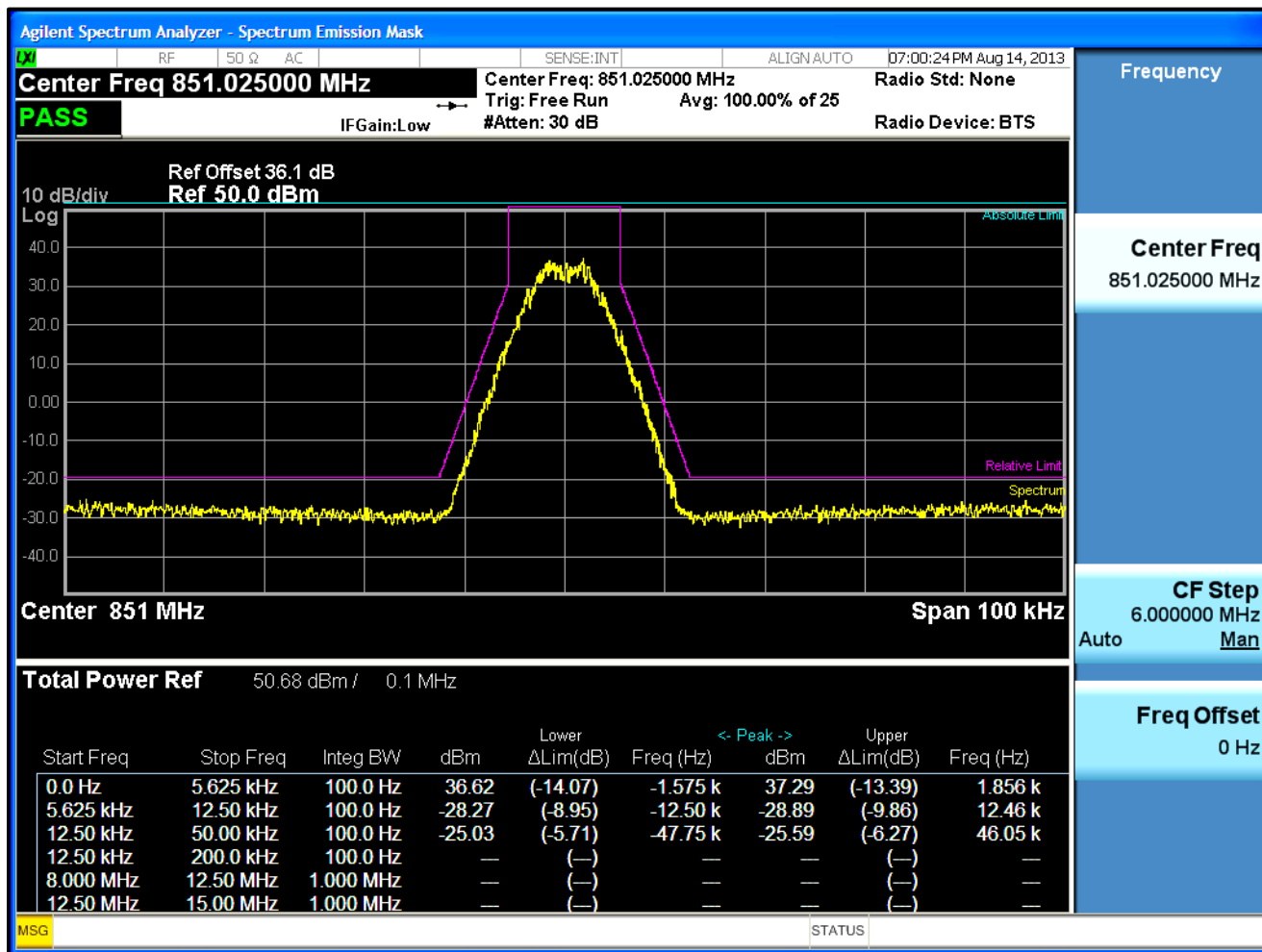
**Plot 5-19: Occupied Bandwidth – 868.9875 MHz; Mask D; Narrow Band; 2-Level FSK; IC**



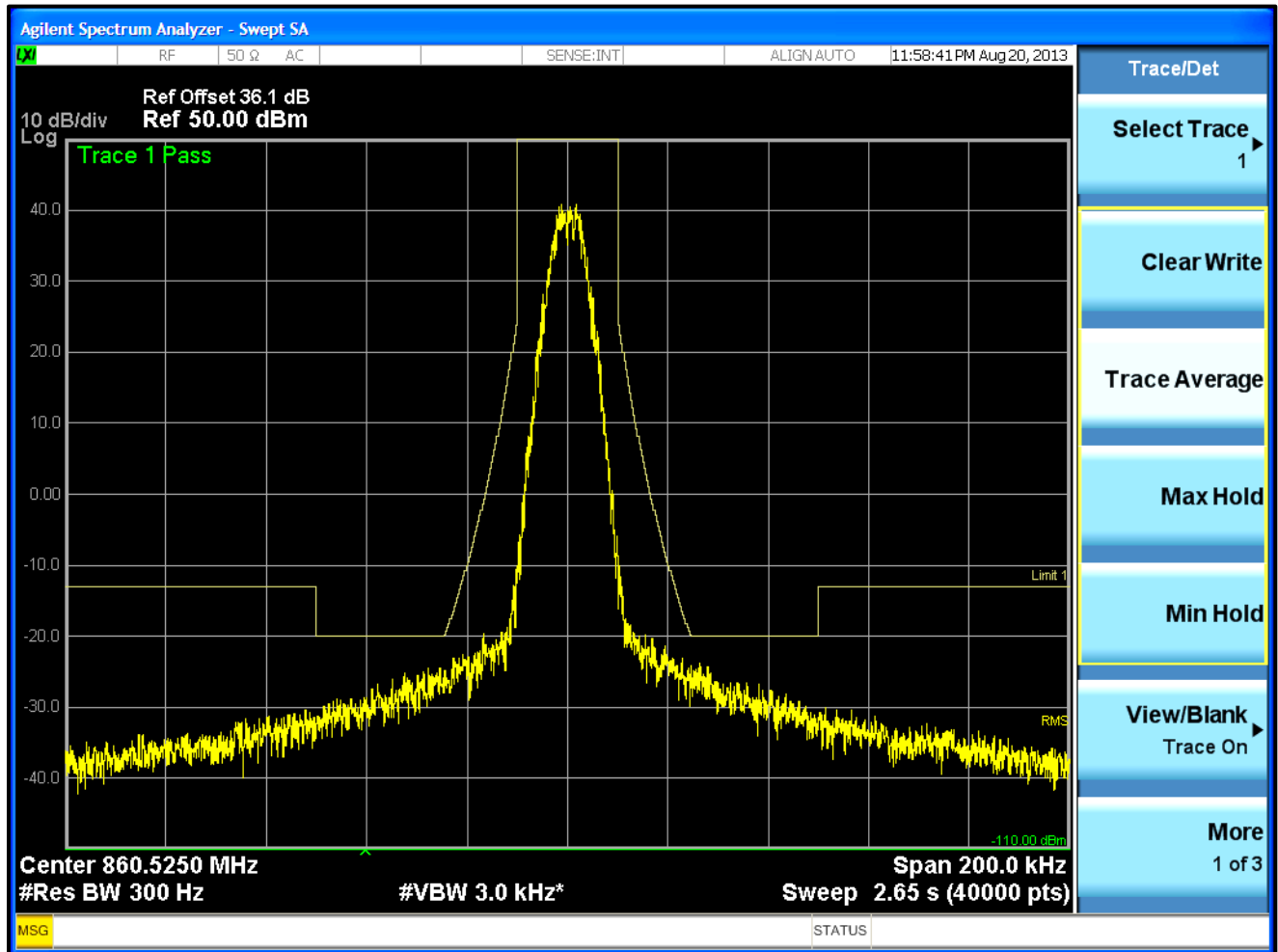
**Plot 5-20: Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; 9600 C4FM**



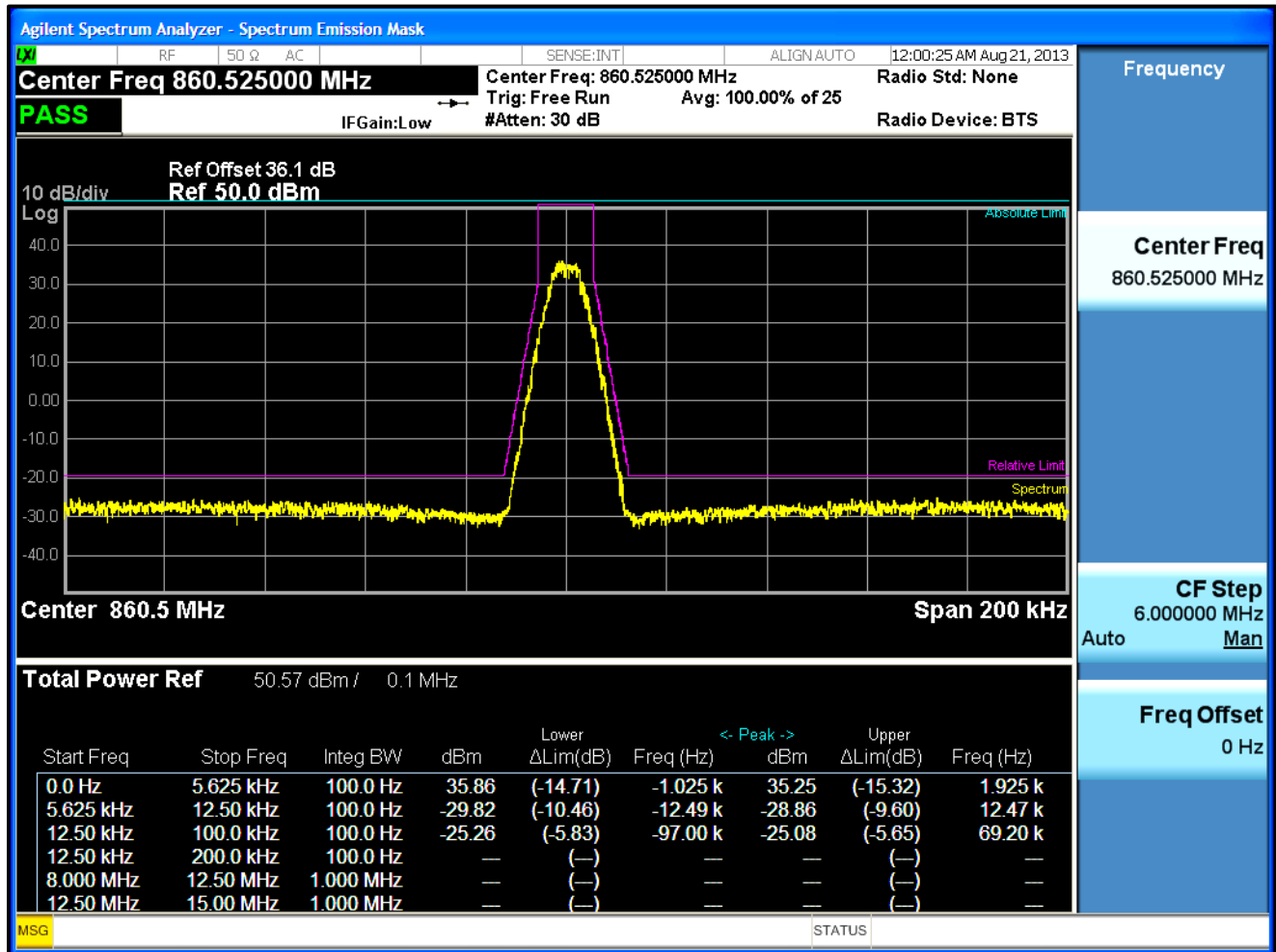
**Plot 5-21: Occupied Bandwidth – 851.025 MHz; Mask D; Narrow Band; 9600 C4FM; IC**



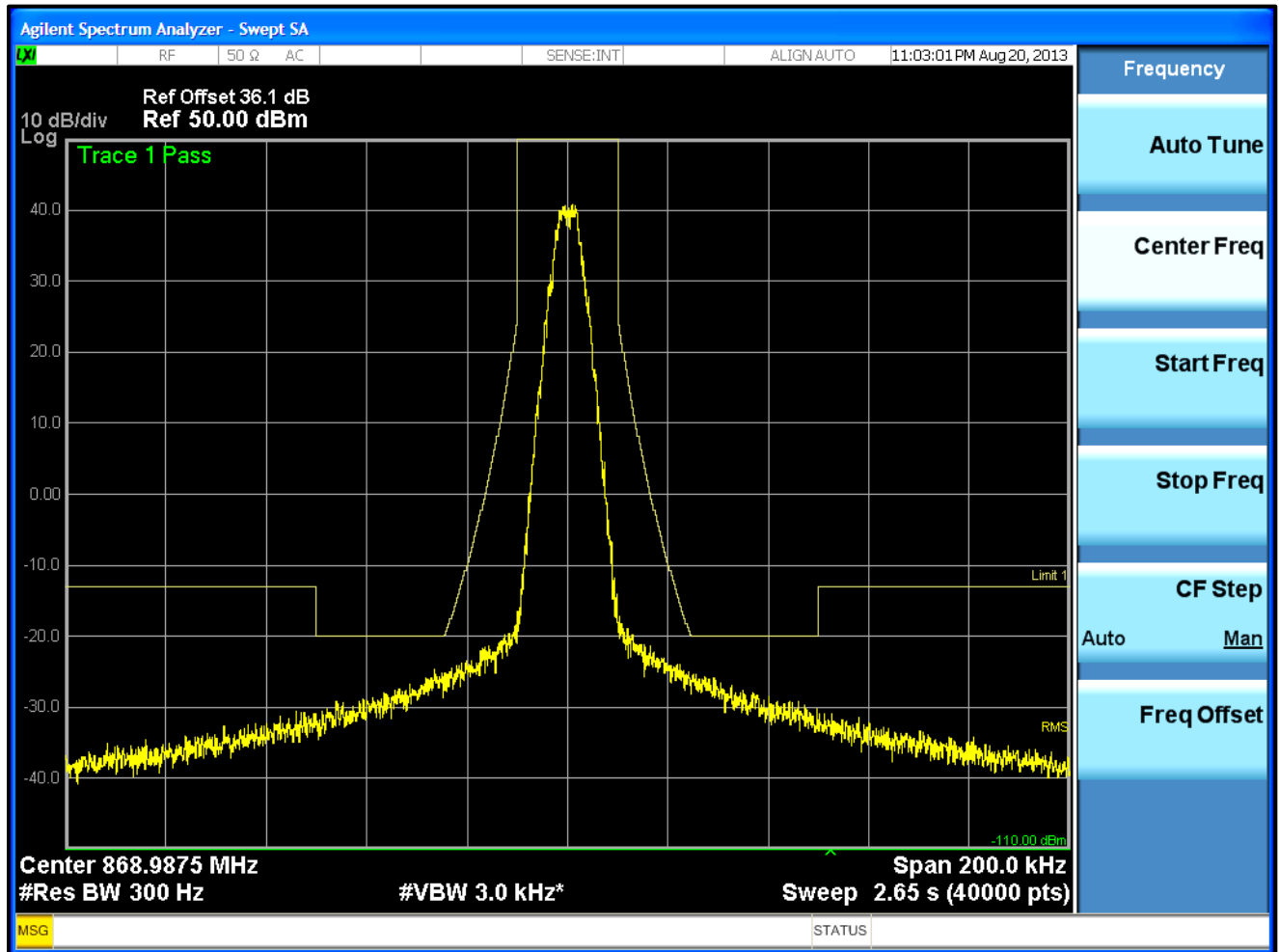
**Plot 5-22: Occupied Bandwidth – 860.525 MHz; Mask G; Narrow Band; 9600 C4FM; IC**



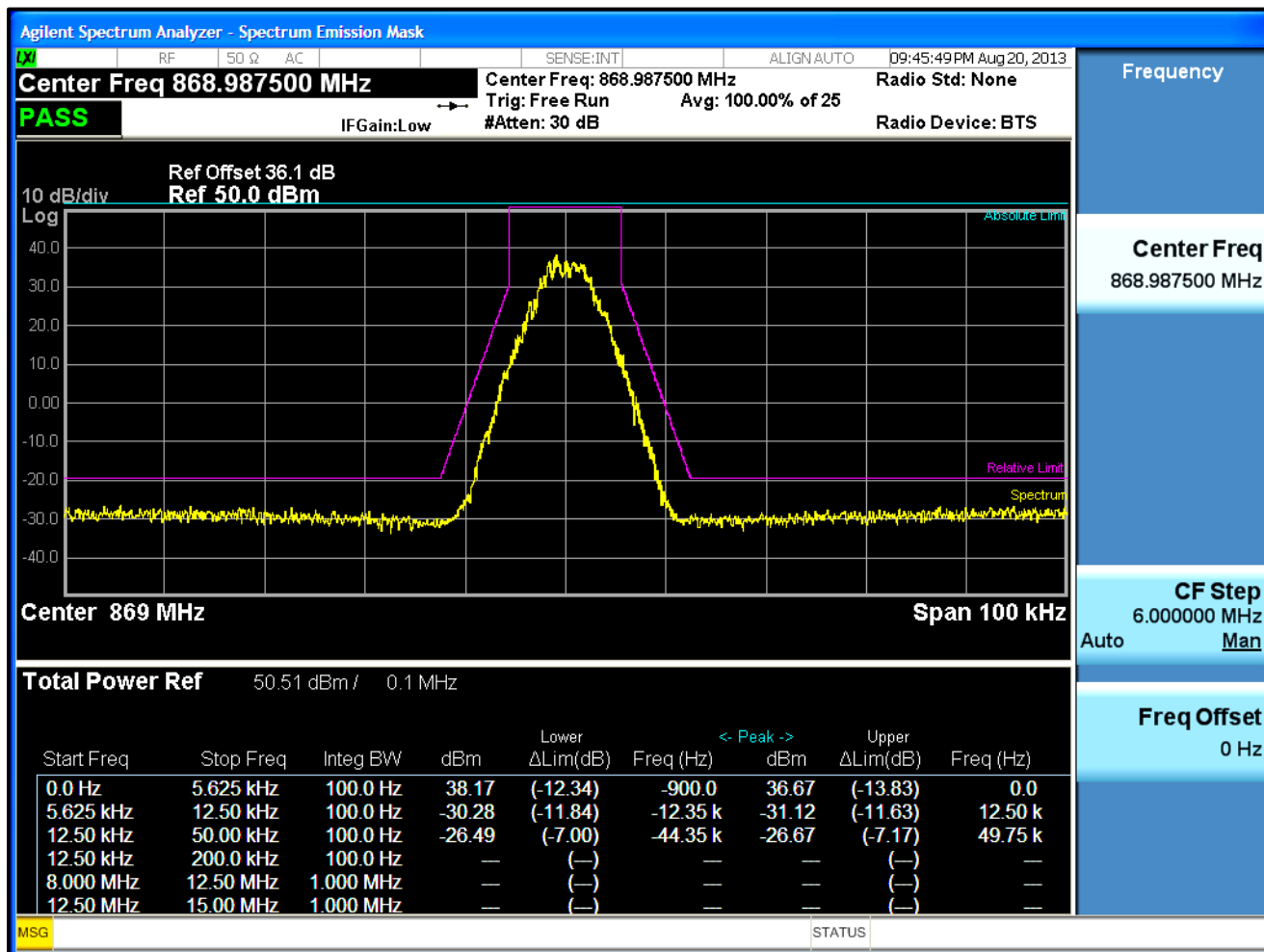
**Plot 5-23: Occupied Bandwidth – 860.525 MHz; Mask D; Narrow Band; 9600 C4FM; IC**



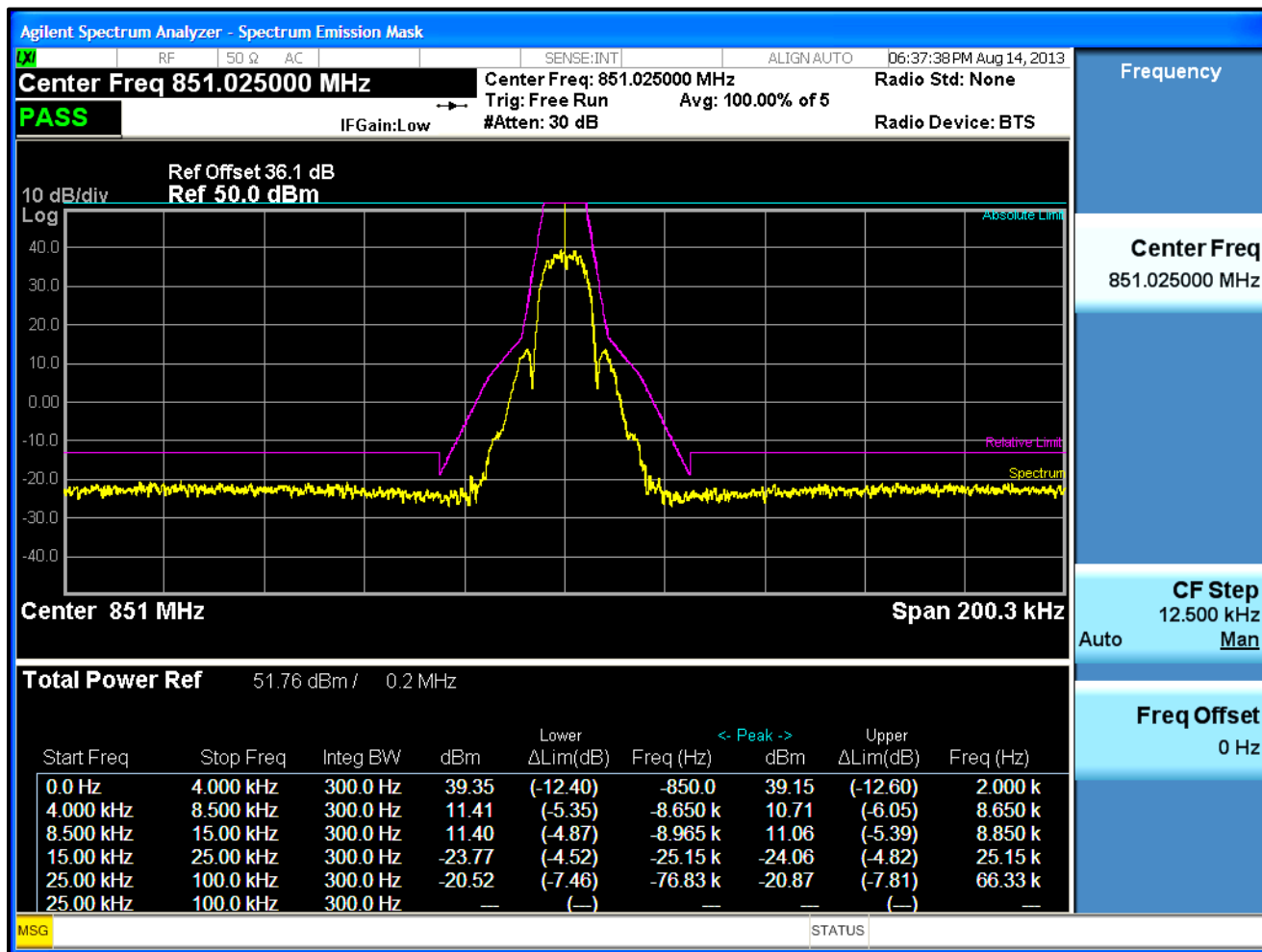
**Plot 5-24: Occupied Bandwidth – 868.9875 MHz; Mask G; Narrow Band; 9600 C4FM**



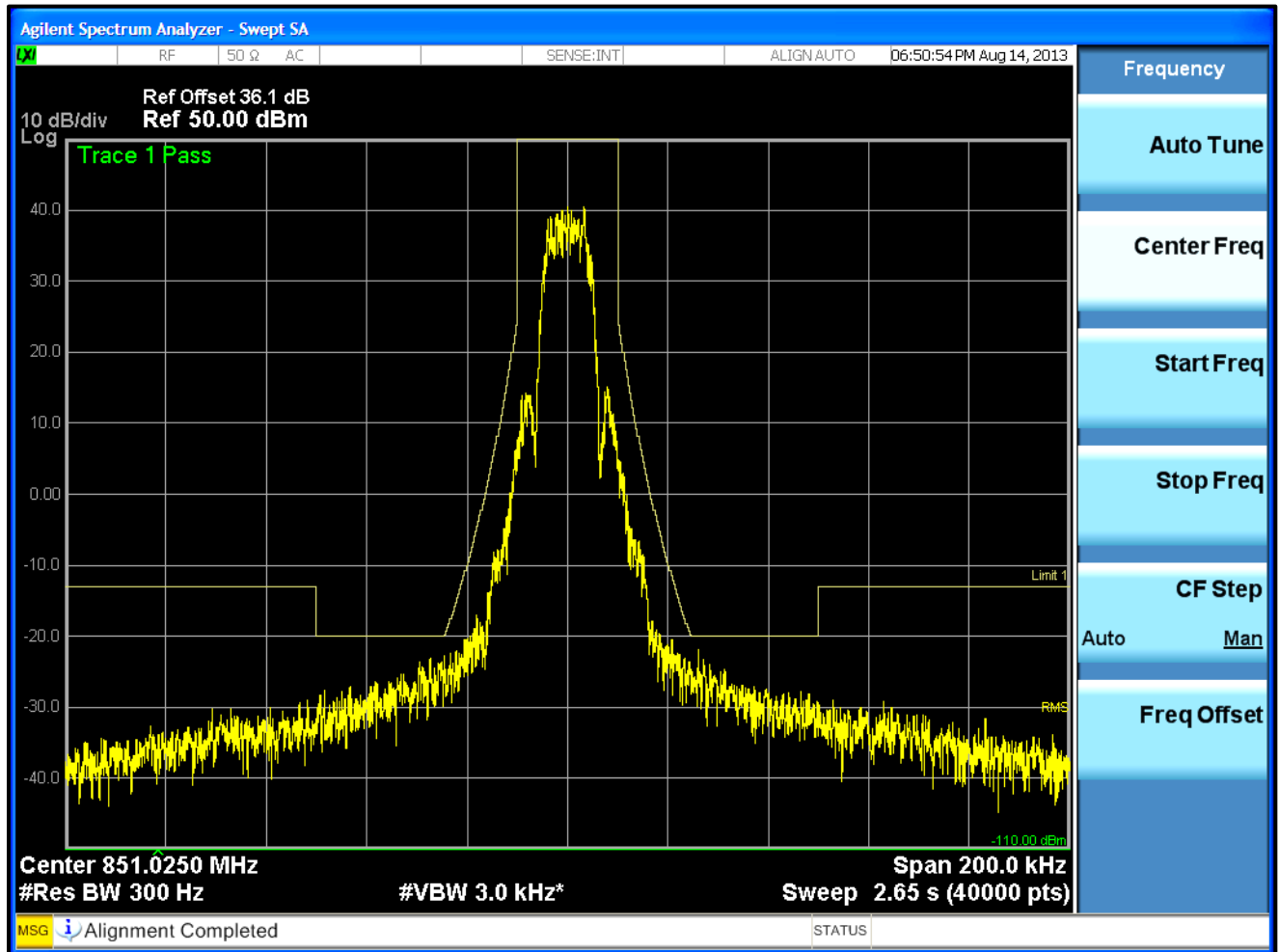
**Plot 5-25: Occupied Bandwidth – 868.9875 MHz; Mask D; Narrow Band; 9600 C4FM; IC**



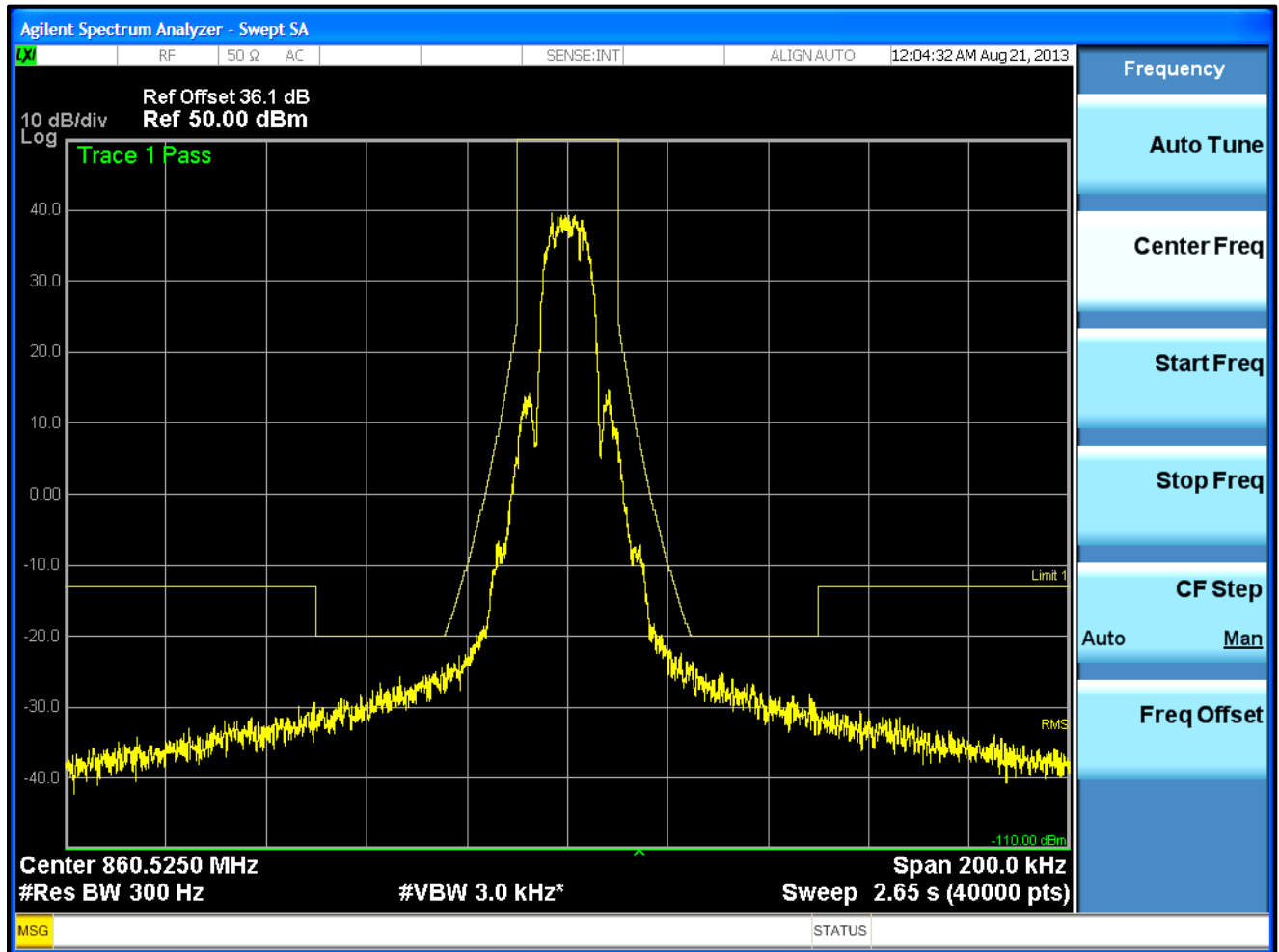
**Plot 5-26: Occupied Bandwidth – 851.025 MHz; Mask H; Narrow Band; NPSPAC**



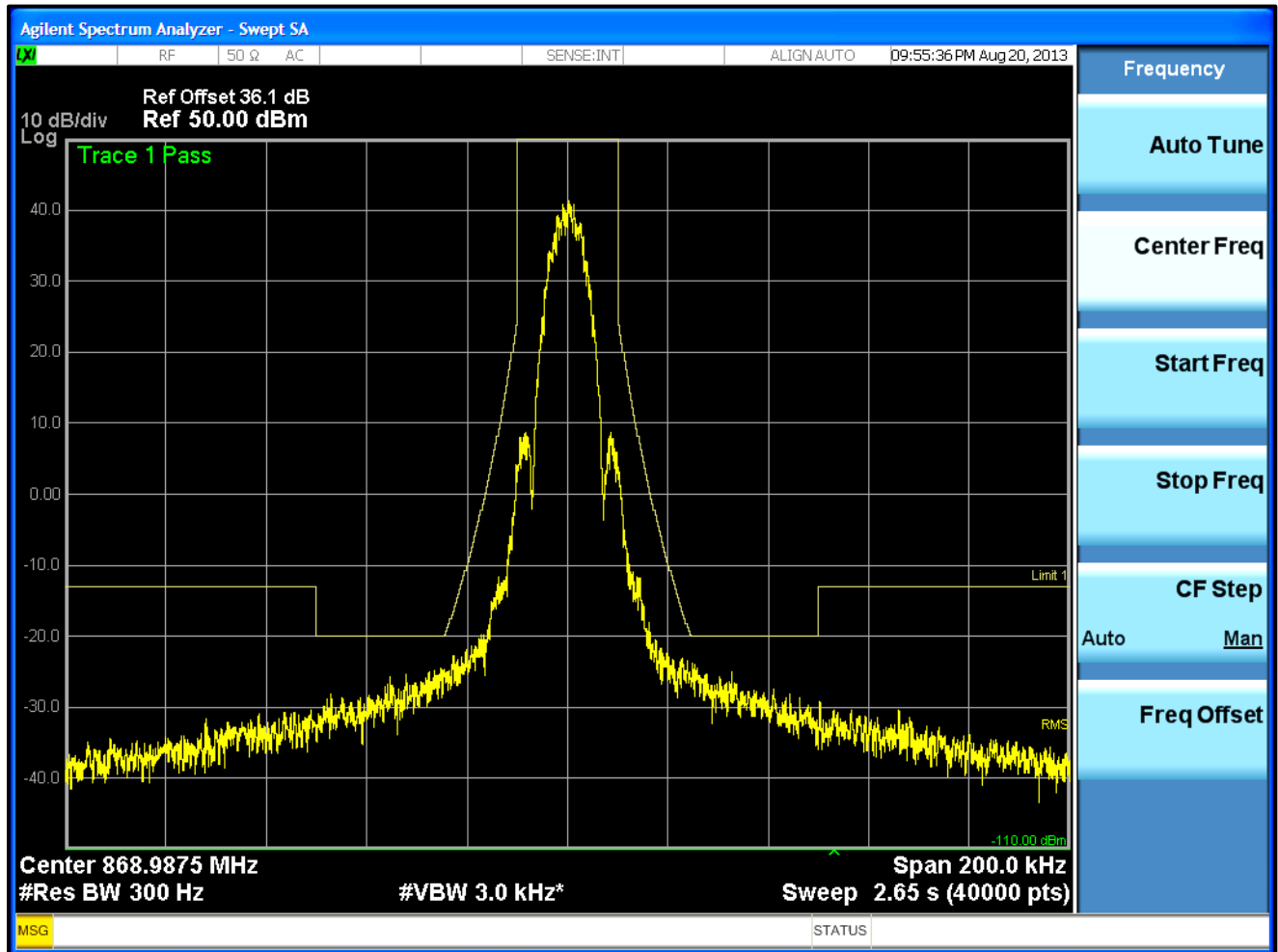
**Plot 5-27: Occupied Bandwidth – 851.025 MHz; Mask G; Narrow Band; NPSPAC; IC**



**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:  $P(\text{dBm}) - (50 + 10 \times \text{LOG } P(\text{W}))$

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

**Conducted Power= 50.3 dBm; 106.7W; Limit:  $50 + 10 \text{ Log } P = 70.3 \text{ dBc}$**

| 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.