Class II Permissive Change Report

Harris Corporation
221 Jefferson Ridge Parkway
Lynchburg, VA 24501

Model: XG-100P Portable Radio
FCC ID: AQZ-XG-100P00

November 19, 2013

Standards Referenced for this Report	
Part 2: 2012	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 22: 2012	Public Portable Services
TIA-102.CCAA August 2011	Two-Slot Time Division Multiple Access Transceiver Measurement Methods
TIA-102.CCAB October 2011	Two - Slot Time Division Multiple Access Transceiver Performance Recommendations
TIA-EIA-603-C August 2004	Land Portable FM or PM Communications Equipment – Measurement and Performance Standards

FCC Rule Parts	Frequency Range (MHz)	Rated Transmit Power (W) (Conducted)	Frequency Tolerance (ppm)	Emission Designator (Transmit Mode)
22	136–174	1-6.3	0.5	16K0F3E (Analog Voice; WB)
22	136–174	1-6.3	0.5	11K0F3E (Analog Voice; NB)
22	136–174	1-6.3	0.5	8K40F1D/E (4-level C4FM; P25)
22	136–174	1-6.3	0.5	8K10DXW (H-CPM TDMA)
22	380-520	1-5.25	0.5	16K0F3E (Analog Voice; WB)
22	380-520	1-5.25	0.5	11K0F3E (Analog Voice; NB)
22	380-520	1-5.25	0.5	8K40F1D/E (4-level C4FM; P25)
22	380-520	1-5.25	0.5	8K10DXW (H-CPM TDMA)

Report Prepared by Test Engineer: Daniel W. Baltzell

Report Number: 2013231

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 Test Result Summary

Test	FCC Reference	Result
RF Power Output	§2.1046(a), §22.565(f)	Complies
Spurious Emissions at Antenna Terminals	§2.1051, §22.359(a)	Complies
Field Strength of Spurious Radiation	§2.1053(a), §22.359(a)	Complies
Occupied Bandwidth/Emission Limitations	§2.1049(c)(1), §22.359(b)	Complies

2 General Information

The following Class II Permissive Change Report is prepared on behalf of Harris Corporation. in accordance with the Federal Communications Commission. The Equipment Under Test (EUT) was the XG-100P VHF UHF Portable Radio, FCC ID: AQZ-XG-100P00.

The purpose of this Class 2 Permissive Change is to add Part 22 operations.

All measurements contained in this application were conducted in accordance with the applicable FCC Rules and Regulations in CFR 47 Parts 2 and 22. 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)

The original FCC grant was issued February 5, 2010; permissive change grants were issued January, 3, 2012 and March 12, 2013.

2.3 Grant Notes

Output power is the manufacturer’s rated power at the antenna terminal.

2.4 Tested System Details

The test sample was received on February 15, 2013. The identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test are list below.

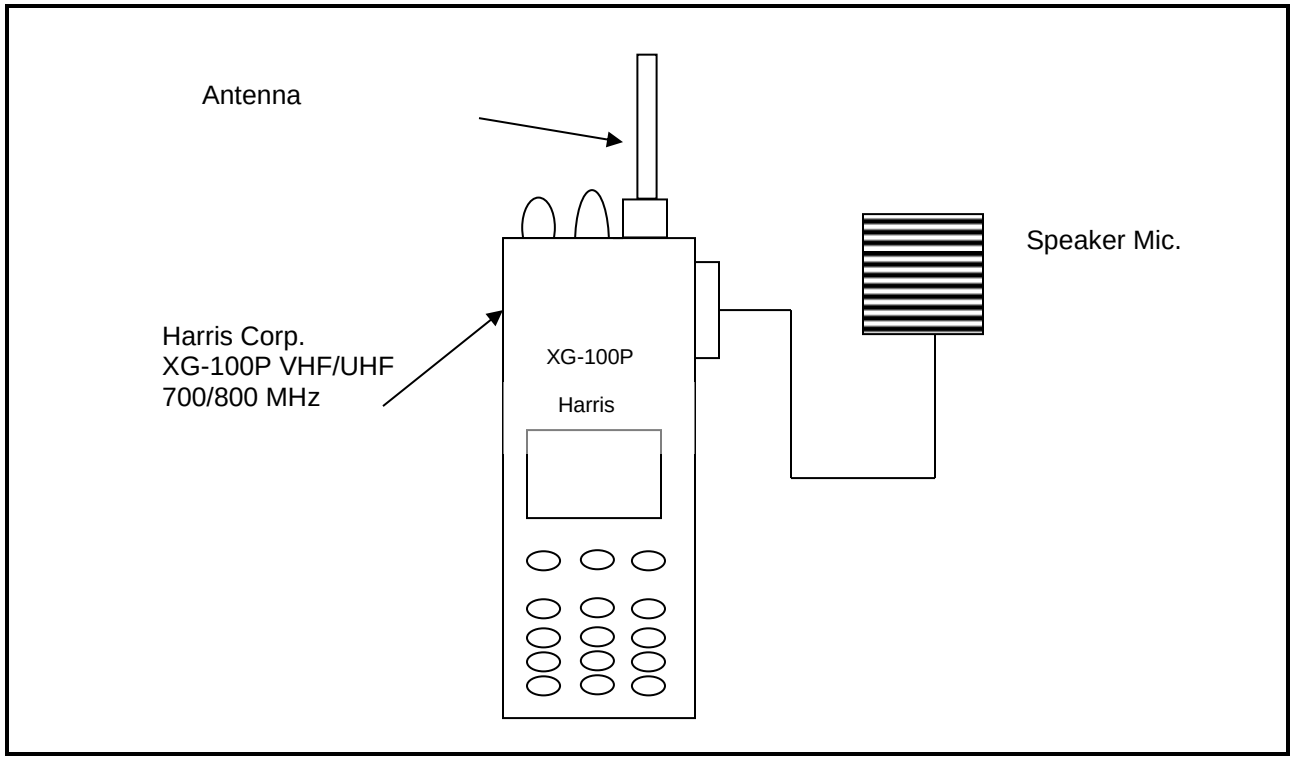
Table 2-1: Equipment under Test (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	Cable Description	RTL Bar Code
XG-100P Transceiver	Harris Corporation.	XG-100P	XP-100F / A40200014521	AQZ-XG-100P00	N/A	20595

Table 2-2: Auxiliary Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	Cable Description	RTL Bar Code
7.4V, 26Wh Battery	Harris Corporation.	Lithium Ion Polymer	12082-0300-01 / 023368	N/A	N/A	20600

Figure 2-1: Configuration of Tested System



3 FCC Rules and Regulations Part 2.1046(a): RF Power Output: Conducted; Part 22.565(f) Transmitting Power Limits

3.1 Test Procedure

ANSI TIA-603-C-2004, section 2.2.1

The EUT was connected with an appropriate 50 ohm attenuator and the attenuator loss was accounted for.

3.2 Test Data

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

Frequency (MHz)	RF Power Measured (dBm)*	RF Power Measured (Watt)*
152.015	38.5	7.1
158.710	38.5	7.1
459.100	37.5	5.6

Table 3-2: Test Equipment Used for Testing RF Power Output - Conducted

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
901536	Weinschel Corp.	48-40-34 DC-18GHz	Attenuator, 100W 40dB	BK5883	12/14/13

Test Personnel:

Daniel Baltzell		November 14, 2013
EMC Test Engineer	Signature	Date of Test

4 FCC Rules and Regulations Part 2.1051: Spurious Emissions At Antenna Terminals; 22.359(a): Emission Limitations

4.1 Test Procedure

TIA-102.CCAA August 2011, section 2.2.7, TIA-102.CCAB October 2011, section 3.2.7

The transmitter was interfaced with a spectrum analyzer through an appropriate 50 ohm attenuator. The transmitter was operated at maximum power. Attenuator losses were accounted for.

4.2 Test Data

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

Per FCC 2.1051, the magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

No spurious emissions were found to be within 20 dB of the limit, therefore no data is reported.

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

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
901536	Weinschel Corp.	48-40-34 DC-18GHz	Attenuator, 100W 40dB	BK5883	12/14/13
901131	Par Electronics	118-174 (25W)	VHF Notch Filter	N/A	2/29/14
901135	Par Electronics	400-512 (25W)	UHF Notch Filter	N/A	2/29/14

Test Personnel:

Daniel Baltzell		November 14, 2013
EMC Test Engineer	Signature	Date of Test

5 FCC Rules and Regulations Part 2.1049(c)(1): Occupied Bandwidth; 22.359(b): Emission Limitations

5.1 Test Procedure

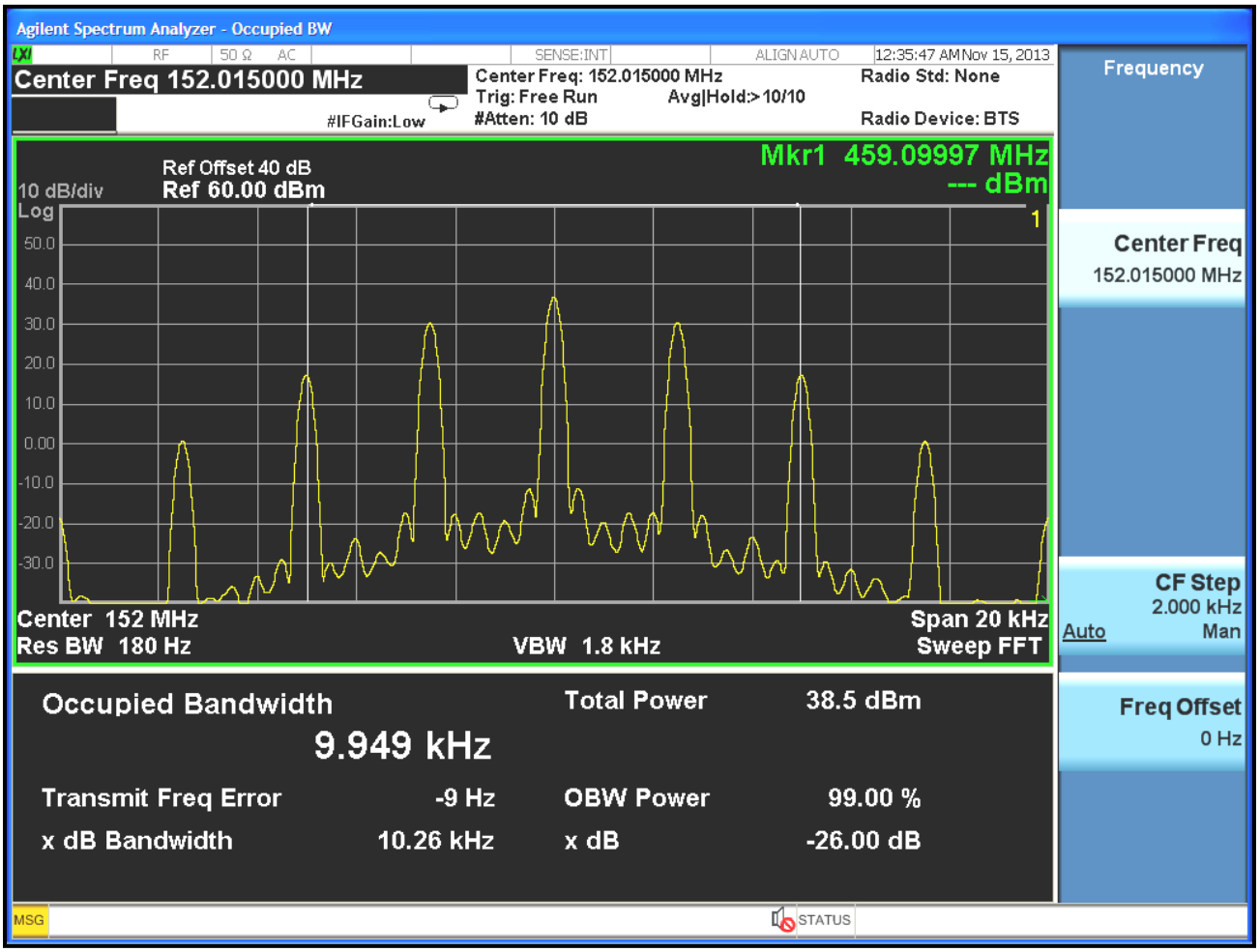
ANSI TIA-603-C-2004, Section 2.2.11, TIA-102.CCAA August 2011, section 2.2.5, TIA-102.CCAB October 2011, section 3.2.5

The transmitter was interfaced with a spectrum analyzer through an appropriate 50 ohm attenuator and a notch filter. The transmitter was operated at maximum power. Attenuator losses were accounted for.

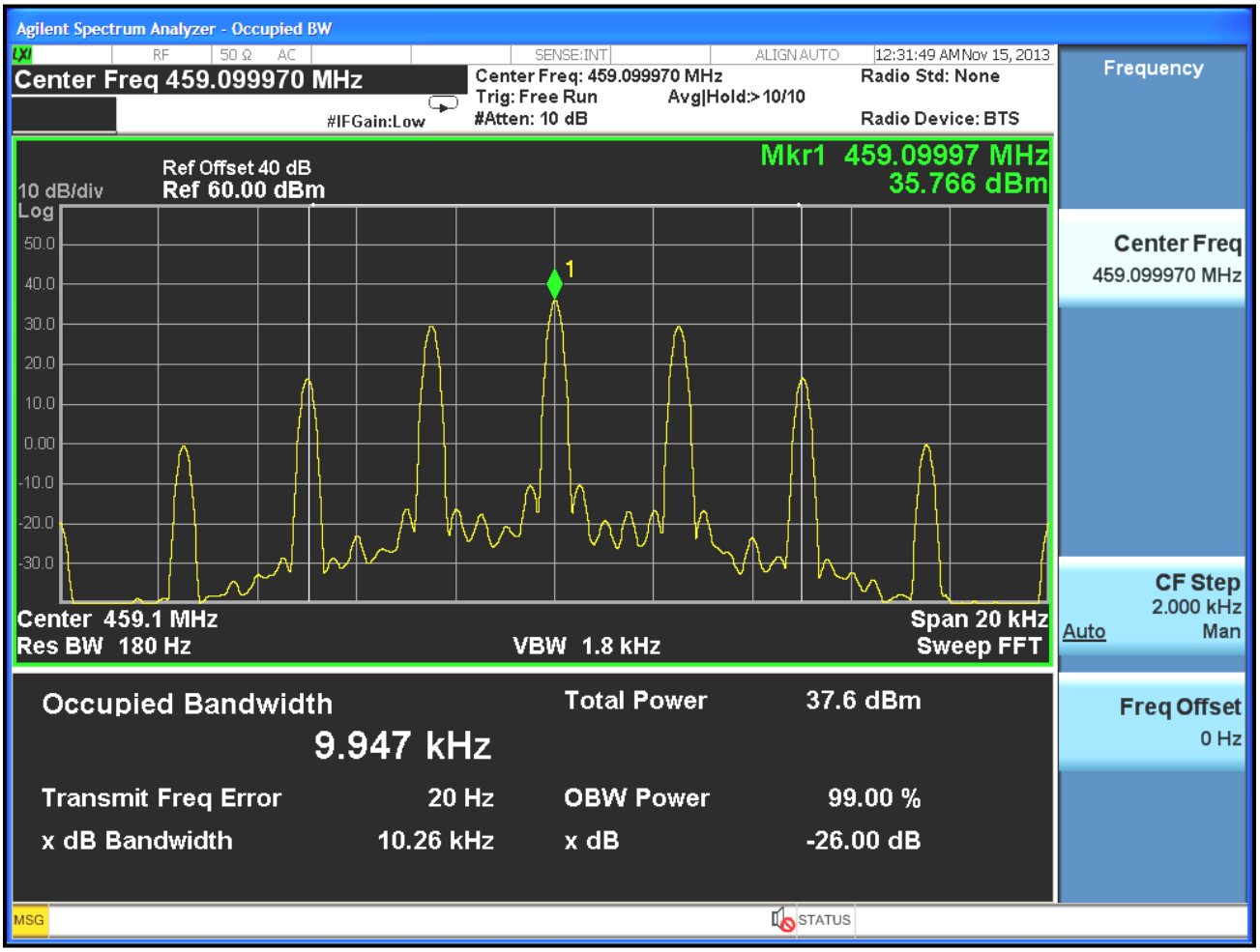
§22.359(a) *Out of band emissions:* The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log (P) dB.
(b) Measurement procedure: In the 60 kHz bands immediately outside and adjacent to the authorized frequency range or channel, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e., 30 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2 Test Data

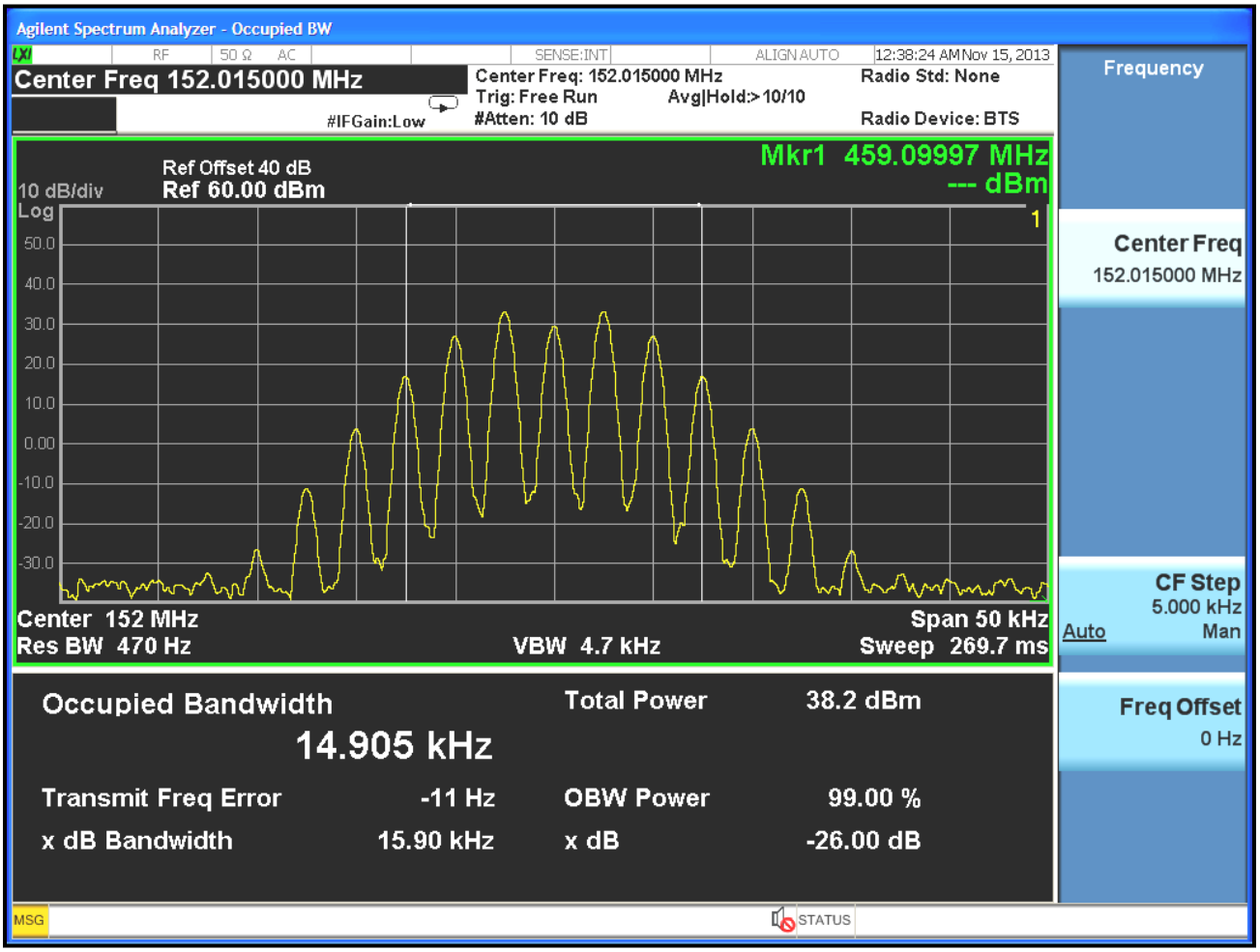
Plot 5-1: Occupied Bandwidth – NB Analog; 152.015 MHz



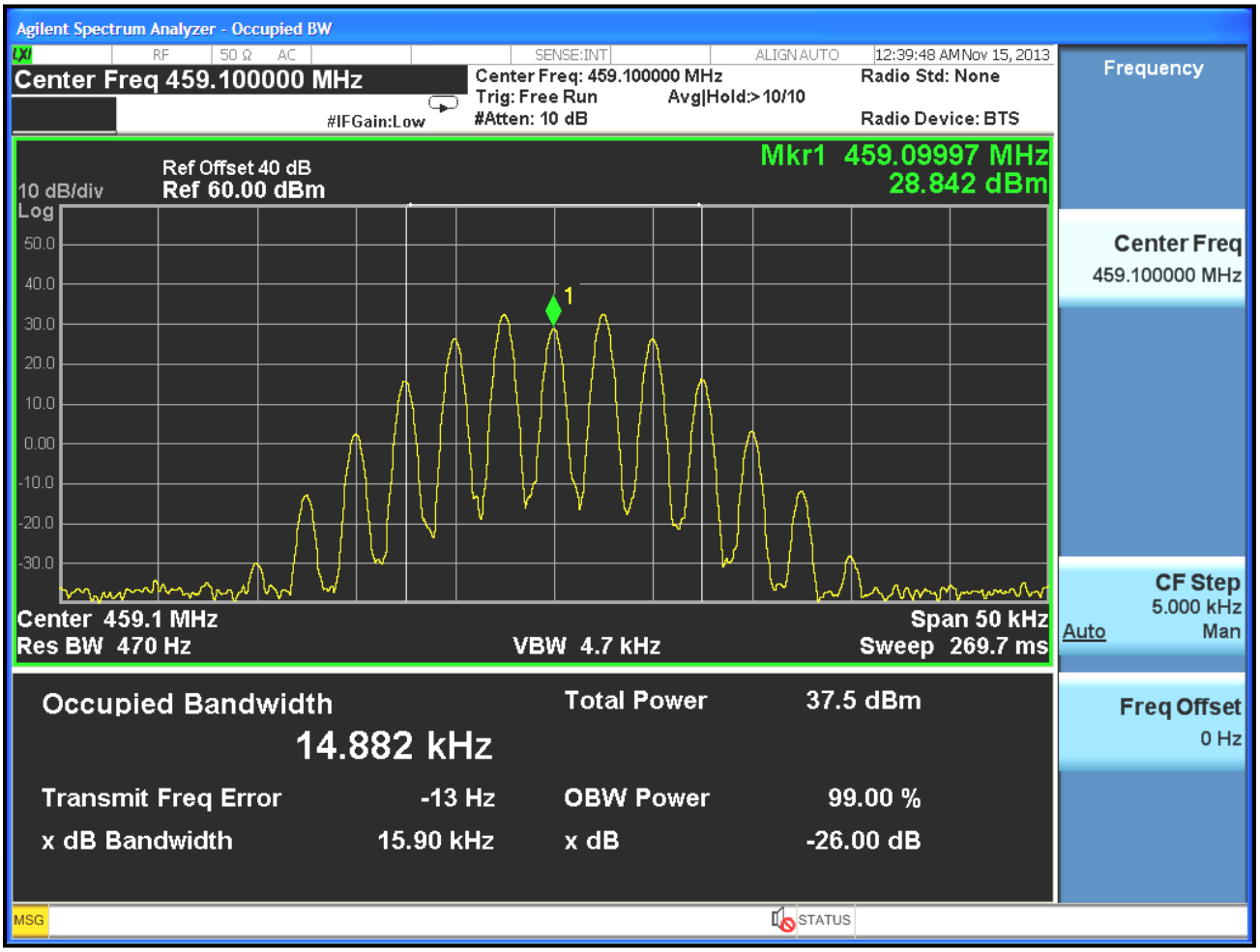
Plot 5-2: Occupied Bandwidth – NB Analog; 459.1 MHz



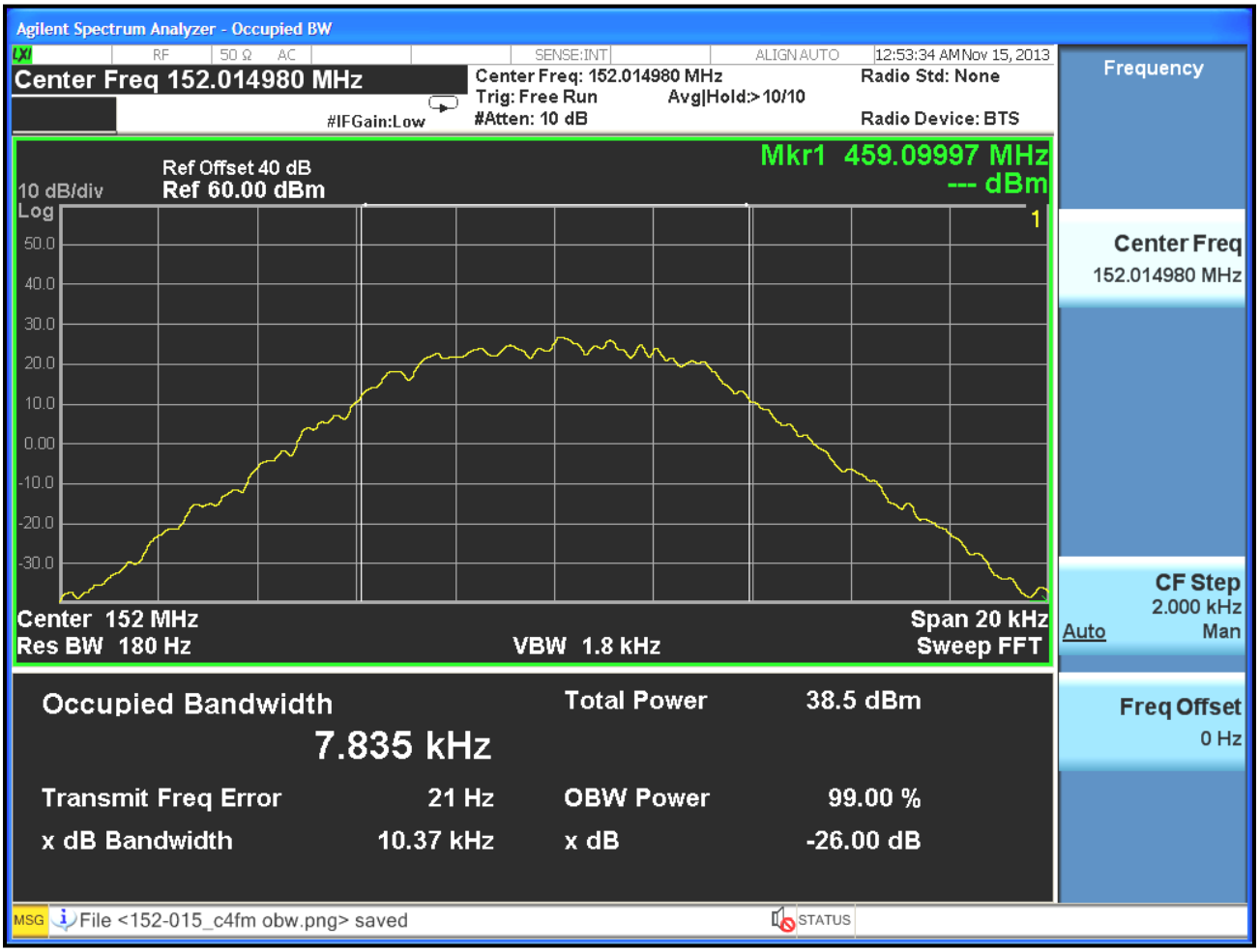
Plot 5-3: Occupied Bandwidth – WB Analog; 152.015 MHz



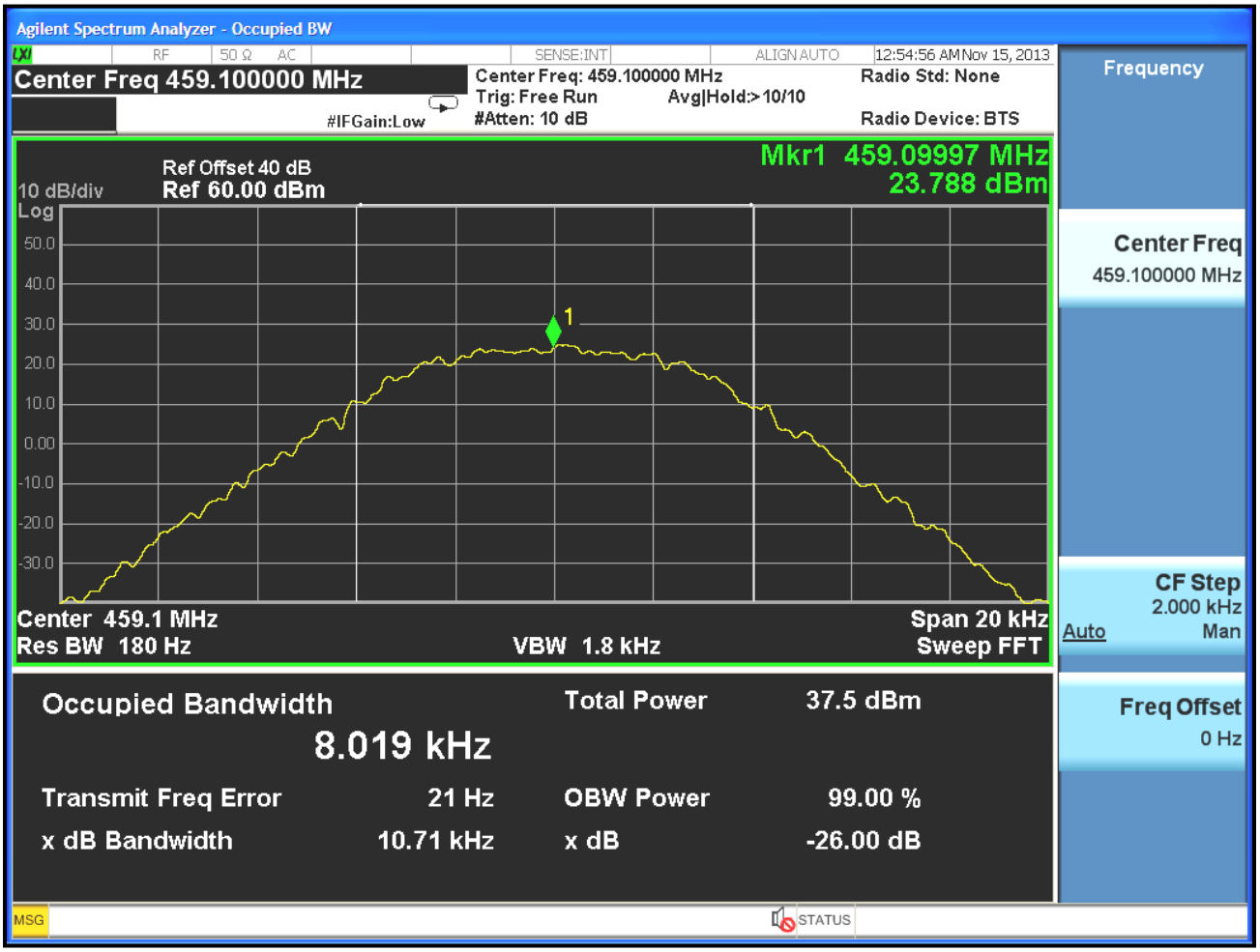
Plot 5-4: Occupied Bandwidth – WB Analog; 459.1 MHz



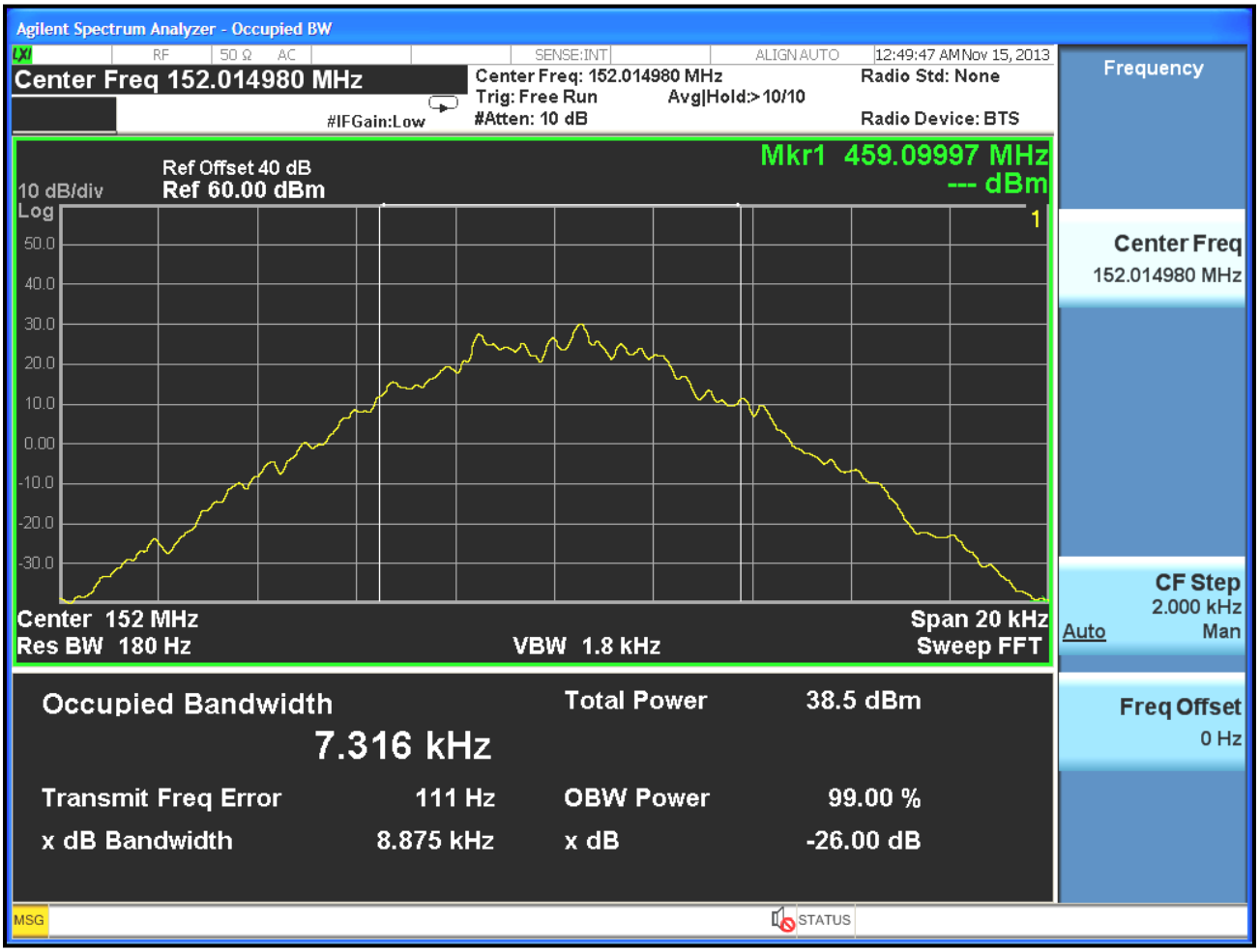
Plot 5-5: Occupied Bandwidth – H-CPM; 152.015 MHz



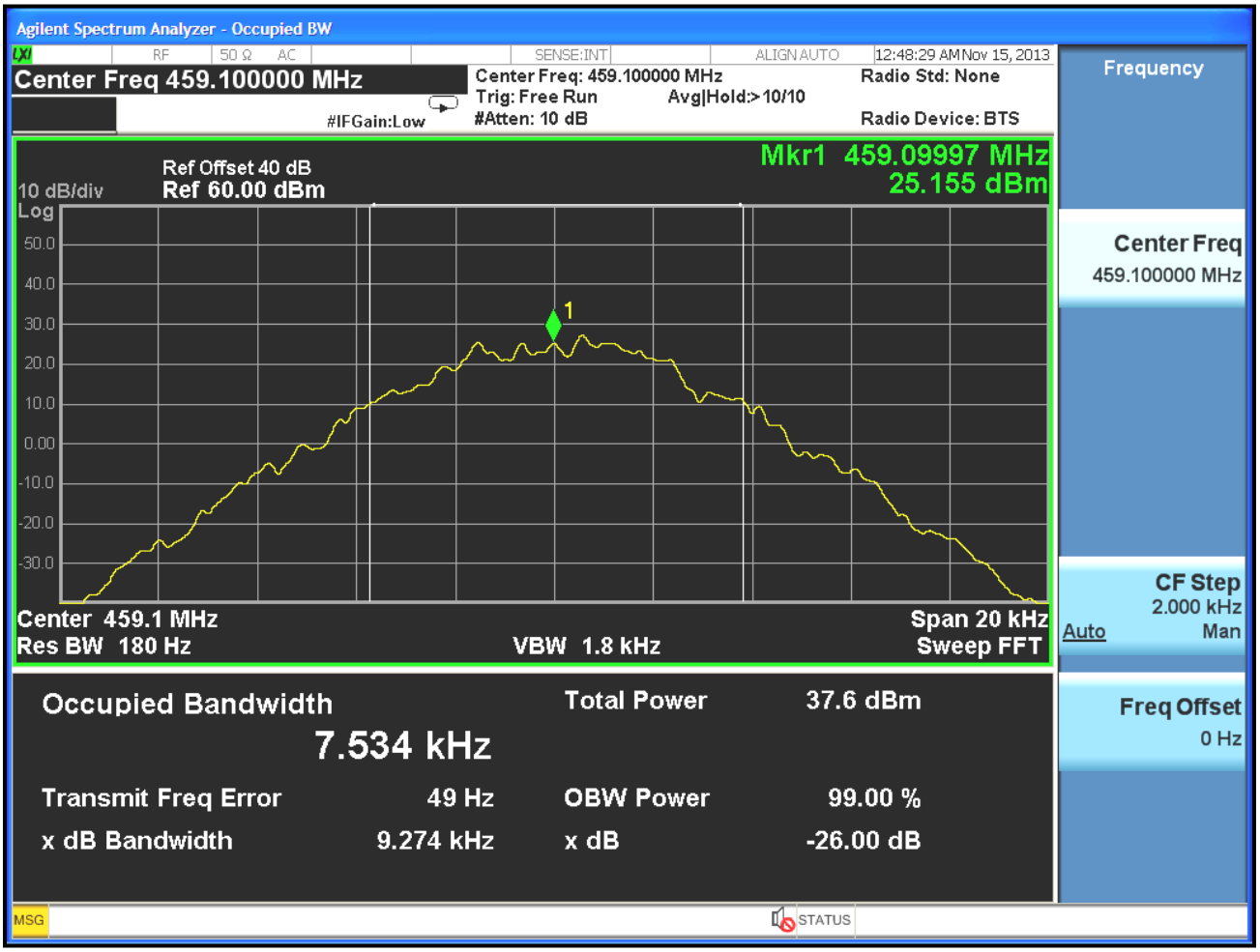
Plot 5-6: Occupied Bandwidth – H-CPM; 459.1 MHz



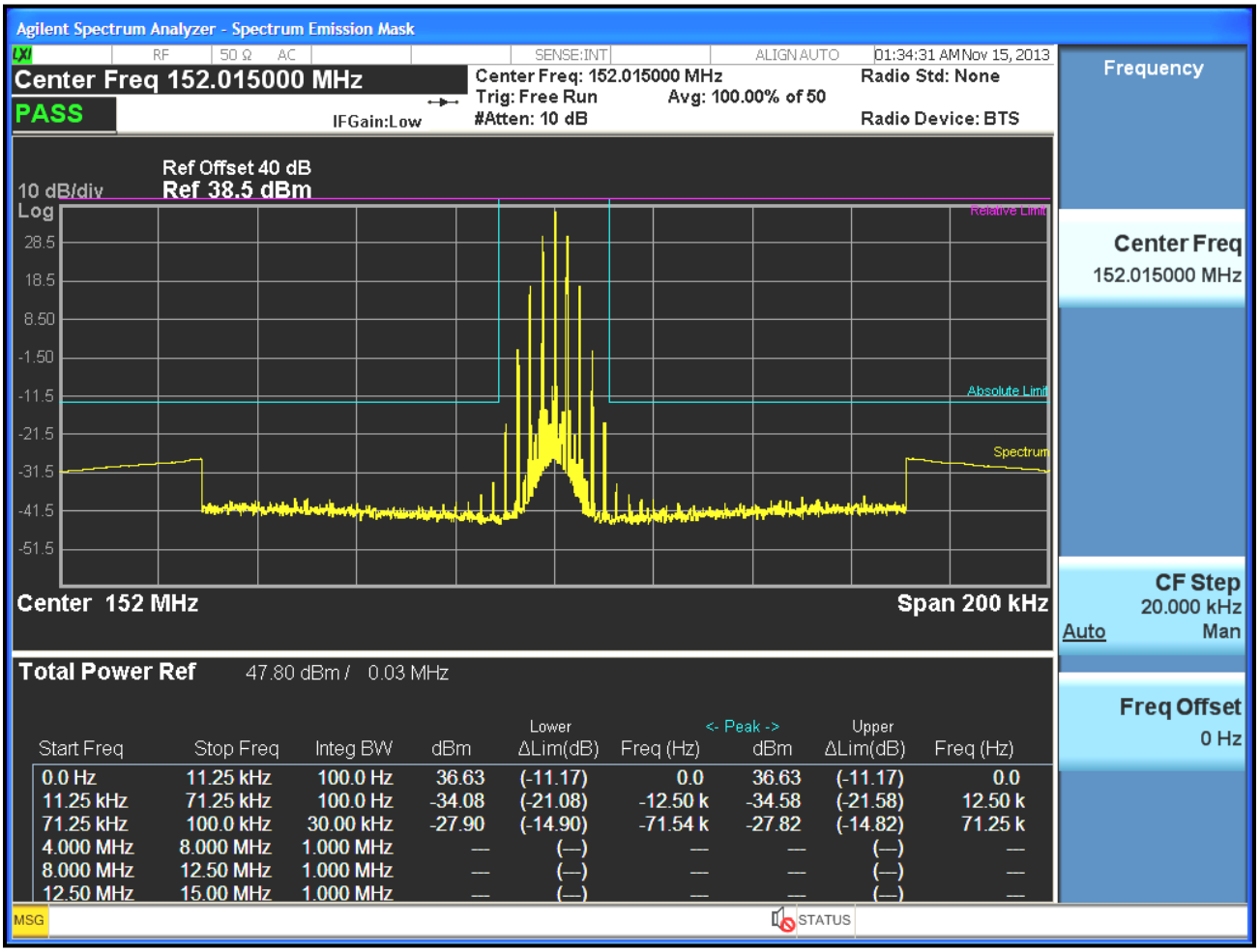
Plot 5-7: Occupied Bandwidth – P25; 152.015 MHz



Plot 5-8: Occupied Bandwidth – P25; 459.1 MHz

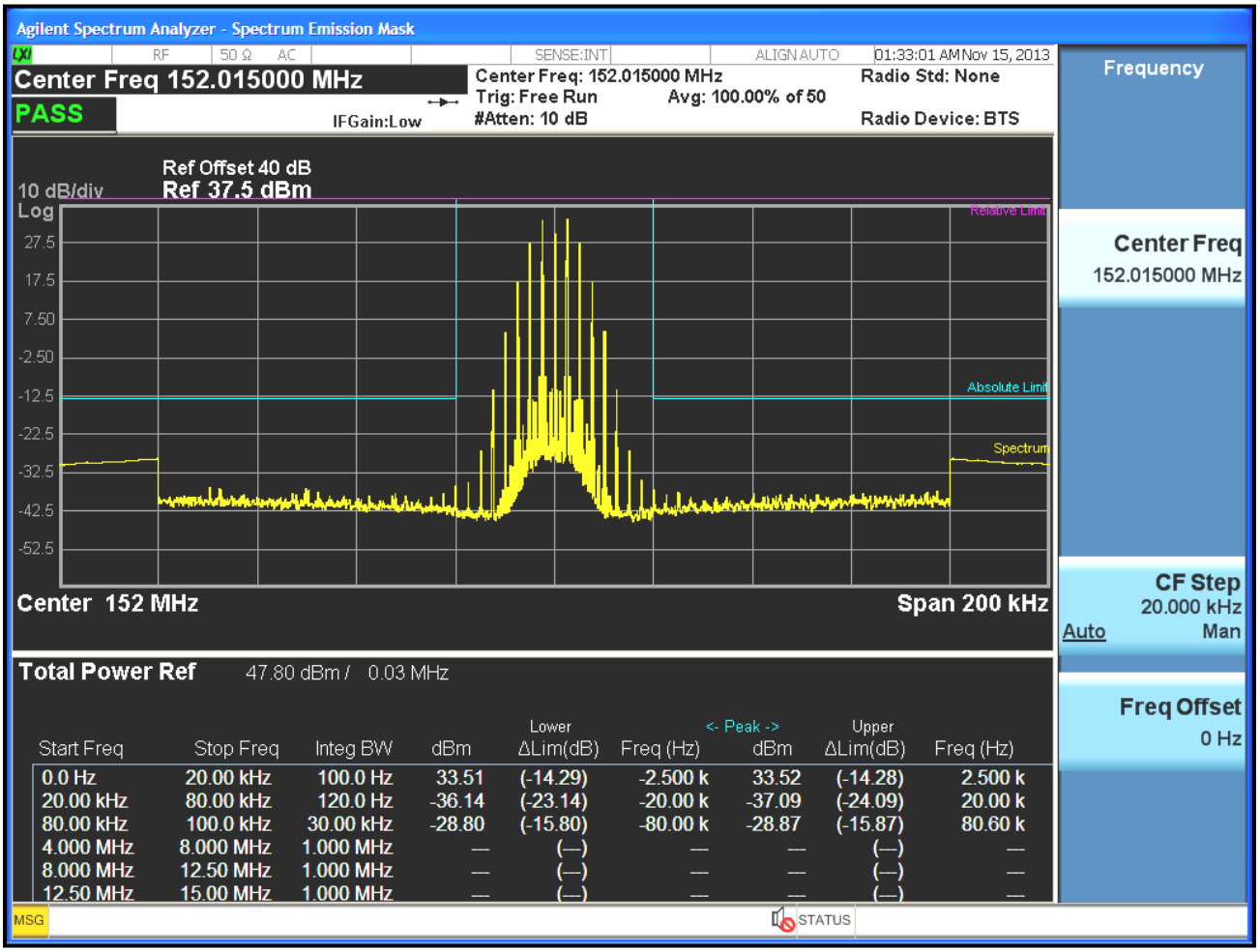


Plot 5-9: Occupied Bandwidth – 152.015 MHz; Mask; NB Analog Voice

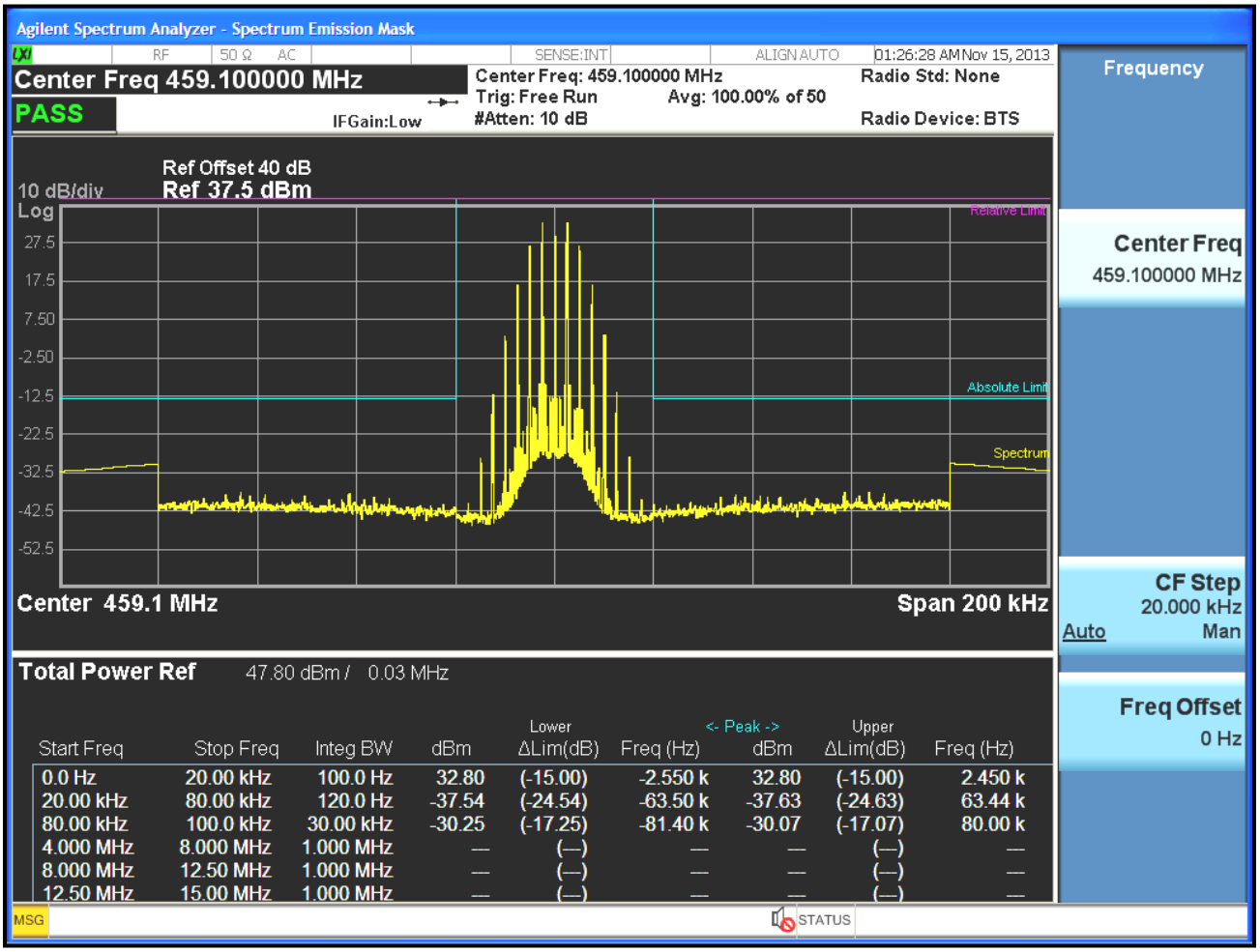


Plot 5-10: Occupied Bandwidth – 459.1 MHz; Mask; NB Analog Voice

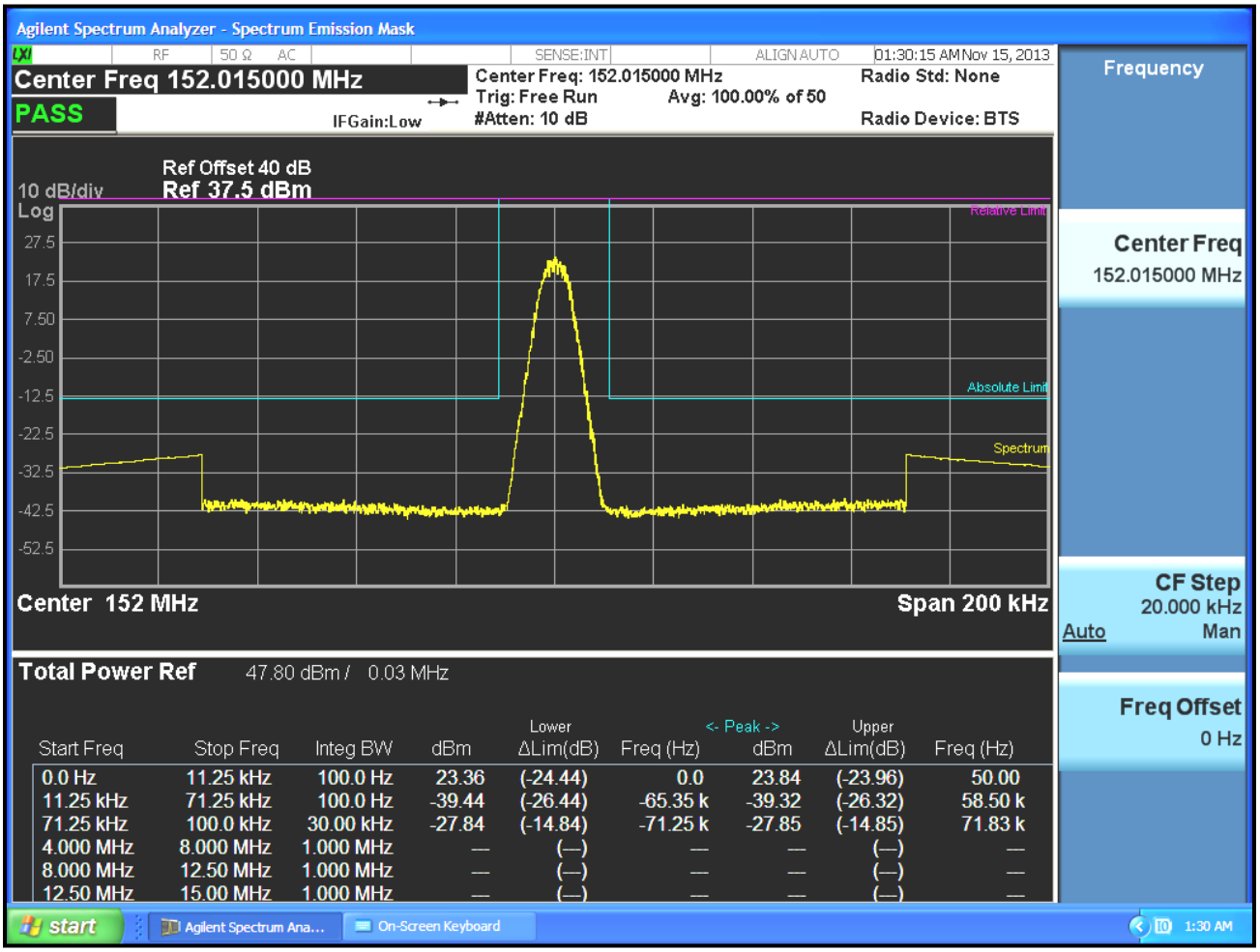
Plot 5-11: Occupied Bandwidth – 152.015 MHz; Mask; WB Analog Voice



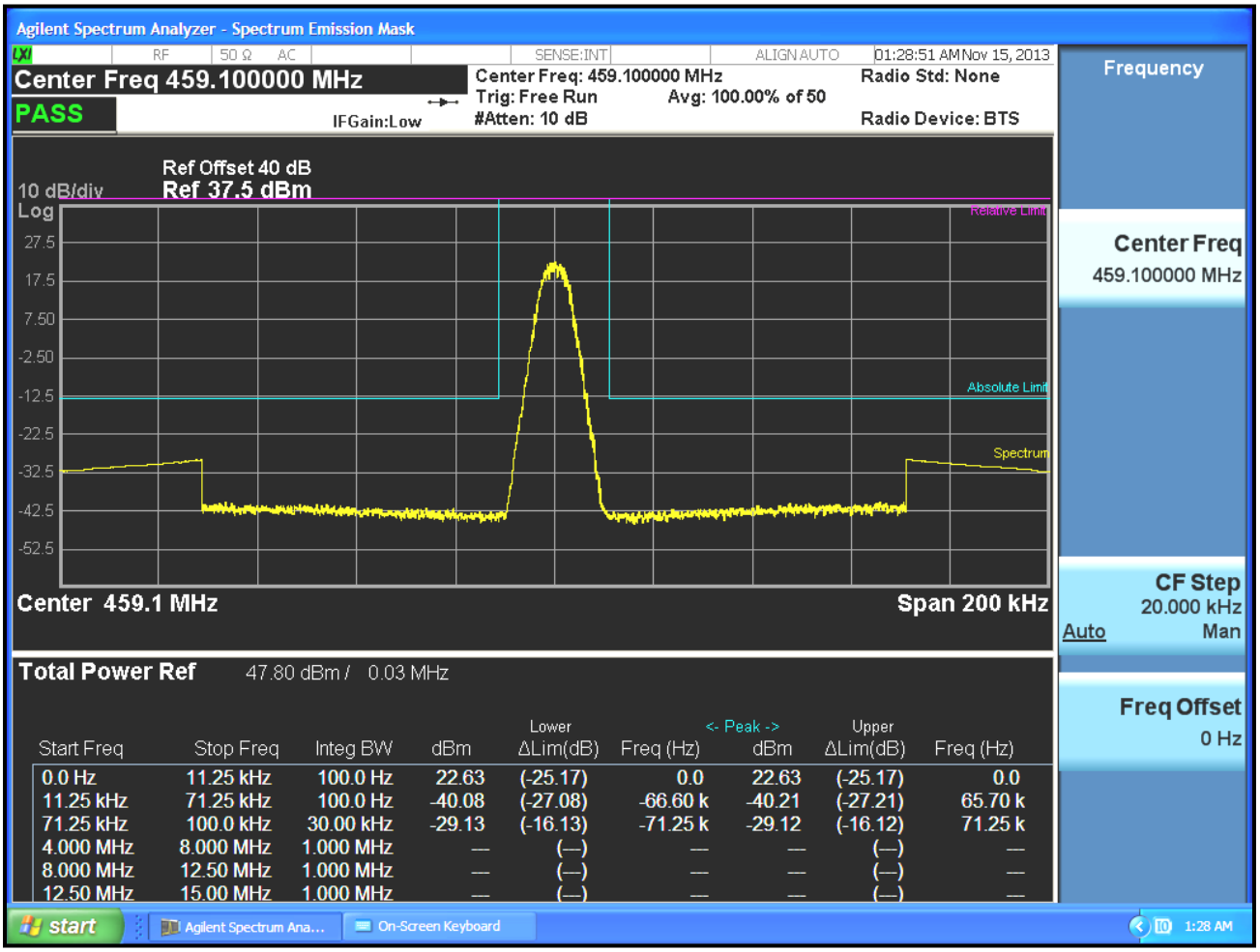
Plot 5-12: Occupied Bandwidth – 459.1 MHz; Mask; WB Analog Voice



Plot 5-13: Occupied Bandwidth – 152.015 MHz; Mask; H-CPM



Plot 5-14: Occupied Bandwidth – 459.1 MHz; Mask; H-CPM



Plot 5-15: Occupied Bandwidth – 152.015 MHz; Mask; P25

Plot 5-16: Occupied Bandwidth – 459.1 MHz; Mask; P25

Table 5-1: Test Equipment Used for Testing Occupied Bandwidth

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
901536	Weinschel Corp.	48-40-34 DC-18GHz	Attenuator, 100W 40dB	BK5883	12/14/13

Test Personnel:

Daniel Baltzell		November 14, 2013
Test Engineer	Signature	Date of Test

6 FCC Rules and Regulations Part 2.1053(a): Field Strength of Spurious Radiation; 22.359(a): Emissions Limitations

6.1 Test Procedure

ANSI TIA-603-C-2004, Section 2.2.12

Analog Modulation: The transmitter is terminated with a 50 ohm 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.

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.

P_d(dBm) = P_g(dBm) – cable loss (dB) + antenna gain (dB)

where: P_d is the dipole equivalent power; P_g is the generator output power into the substitution antenna

6.2 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 6-1: Field Strength of Spurious Radiation – 152.015 MHz

51.5 dBc = Limit

Frequency (MHz)	Measured Level (dBuv)	Signal Gen. Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)	Corrected Level (dBc)	Margin (dB)
304.030	50.1	-66.7	0.3	1.0	104.6	-53.1
456.045	56.0	-59.6	0.2	4.6	93.7	-42.2
608.060	51.8	-62.6	0.3	7.2	94.2	-42.7
760.075	50.2	-65.0	0.3	7.7	96.1	-44.6
912.090	47.1	-64.9	0.4	8.0	95.8	-44.3
1064.105	43.2	-67.6	0.4	7.4	99.2	-47.7
1216.120	50.6	-59.0	0.6	7.3	90.8	-39.3
1368.135	42.6	-63.7	0.5	8.3	94.4	-42.9
1520.150	38.3	-68.2	0.4	9.0	98.1	-46.6

Table 6-2: Field Strength of Spurious Radiation – 459.1 MHz

50.5 dBc = Limit

Frequency (MHz)	Measured Level (dBuv)	Signal Gen. Level (dBm)	Cable4 Loss (dB)	Antenna Gain (dBd)	Corrected Level (dBc)	Margin (dB)
918.2	57.3	-59.5	0.3	1.0	96.4	-45.9
1377.3	52.8	-62.8	0.2	4.6	95.9	-45.4
1836.4	59.0	-57.7	0.3	7.2	88.3	-37.8
2295.5	55.0	-58.2	0.3	7.7	88.3	-37.8
2754.6	33.0	-79.0	0.4	8.0	108.9	-58.4
3213.7	49.0	-61.8	0.4	7.4	92.4	-41.9
3672.8	37.4	-72.2	0.6	7.3	103.0	-52.5
4131.9	31.6	-74.7	0.5	8.3	104.4	-53.9
4591.0	29.3	-77.5	0.4	9.0	106.4	-55.9

Table 6-3: 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	8/20/14
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	4/20/15
901158	Compliance Design, Inc.	Roberts Dipole Antenna	Adjustable Elements Dipole (25 - 1000 MHz Antennas)	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		November 14, 2013
Test Engineer	Signature	Date of Test

7 Conclusion

The data in this measurement report shows that the Harris Corporation. Model XG-100P VHF, UHF Portable Radio, FCC ID: AQZ-XG-100P00, complies with all the applicable requirements of FCC Parts 22 and 2.