RHEIN TECH LABORATORIES, INC.

Engineering Solutions & ElectromagneticCompatibility Services

# FCC & IC
# Class 2 Permissive Change Report

**Harris Corporation**
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## Vehicular Repeater Base System
## Model Numbers: VRBS-7020 & VRBS-7030

**FCC ID: OWDTR-0058-E**
**IC: 3636B-0058**

**September 13, 2011**

| Standards Referenced for this Report | |
|---|---|
| Part 2: 2010 | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| Part 90: 2010 | Private Land Mobile Radio Services |
| TIA-EIA-603-C August 2004 | Land Mobile FM or PM Communications Equipment – Measurement and Performance Standards |
| Industry Canada RSS-119 Issue 11 | Land Mobile and Fixed Radio Transmitters and Receivers Operating in the Frequency Range 27.41- 960 MHz |

| Frequency Range | Rated Transmit Power (W) (Conducted) | Measured Frequency Tolerance (ppm) | Emission Designator |
|---|---|---|---|
| 768 – 776 (IC) | 0.25 – 4.0 | 1.1 | 8K48F1D/E (4-level C4FM, P25) |
| 763 – 776 (FCC) | 0.25 – 4.0 | 1.1 | 8K40F1D/E (4-level C4FM, P25) |
| 851 – 869 (FCC & IC) | 0.25 – 4.0 | 1.1 | 8K40F1D/E (4-level C4FM, P25) |

**Report Prepared By: Daniel Baltzell**

**Document Number: 2011127**



*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), 90.541(b), 90.542(a)(6) | Complies |
| Spurious Emissions at Antenna Terminals | 2.1051, 90.210 | Complies |
| Field strength of spurious radiation | 2.1053(a), 90.543(c) | Complies |
| Occupied Bandwidth/Emission Masks | 2.1049(c)(1), 90.543(d) | Complies |
| Adjacent Channel Power | 90.543 | Complies |
| Modulation Characteristics | 2.1047(a)(b) | Complies |

## 2 General Information

The following Class 2 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 VRBS-7020 and VRBS-7030; FCC ID: OWDTR-0058-E, IC: 3636B-0058.

The purpose of this Class 2 Permissive Change is to expand the certified frequency ranges for both the FCC and IC certifications for the currently certified model, Vehicular Repeater Base System. The justification for expanding the frequency via a Class 2 Permissive Change is that the original hardware could always support these additional frequencies, but was not enabled to do so.

We seek to expand the FCC and IC frequency bands with the addition of 851 – 869 MHz.

Additionally, we are seeking to expand the IC certification for the 700 MHz band up to 776 MHz (770 MHz was the highest permitted frequency in this band at the time of the original filing). We are also seeking to expand the FCC certification for the 700 MHz band up to 776 MHz, as allowed per FCC waiver DA 11-846 (775 MHz was the highest permitted frequency in this band at the time of the original filing).

This filing also supports the addition of two additional model numbers for IC, VRBS-7020 and VRBS-7030, which are electrically identical to the original model certified from a transmit perspective.

The radio is subject to FCC DoC. DoC testing was performed and the data is contained in a separate DoC report.

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

### 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 certification was granted on 02/10/2010; the original IC certification was issued on 02/26/10.

### 2.3 Grant Notes

The power is continuously variable from 0.25 W to 4 W.

## 3 Tested System Details

The test sample was received on August 16, 2011. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable.

**Table 3-1: Equipment Under Test (EUT)**

| Part | Manufacturer | Model | PN/SN | FCC ID | RTL Bar Code |
|---|---|---|---|---|---|
| Vehicular Repeater Base System | Harris Corporation | VRBS-7020 VRBS-7030 | N/A | OWDTR-0058-E | See individual bar codes below |
| 700/800 MHz VRB Filter | Harris Corporation | FL-017937-030 | 3BT814-565 | N/A | 20391 |
| Traffic Control Module | Harris Corporation | M7300 700/800 MHz Radio | A4016D001113 | N/A | 20392 |
| Vehicular Repeater Base | Harris Corporation | RU-018053-001 | A4016A001115 | N/A | 20393 |
| Antenna | Harris Corporation | AN-225001-004 | 700/800 MHz 2dB | N/A | 20397 |
| 800 MHz VRB Filter | Harris Corporation | FL017937-020 | 3BD814-447 | N/A | 20396 |
| Option Cable | Harris Corporation | CA-012349-003 | VRBS Option Cable | N/A | N/A |

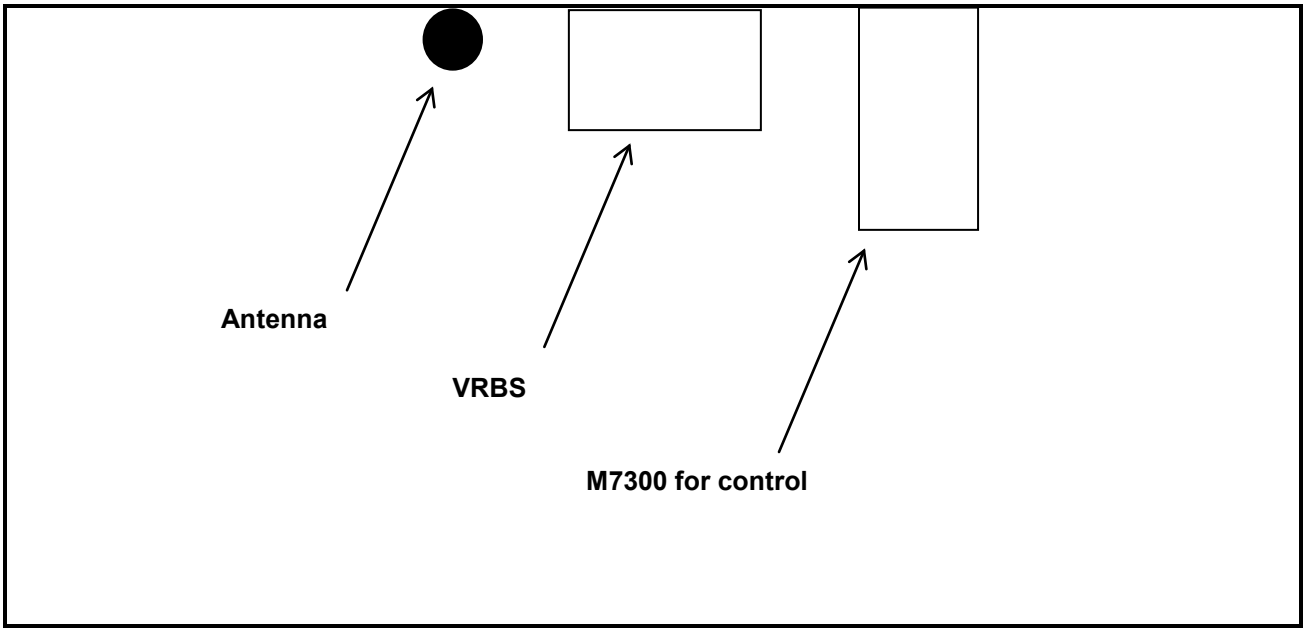



**Figure 3-1: Configuration of Tested System**

## 4 FCC Rules and Regulations Part 2.1033(C)(8) Voltages and Currents through the Final Amplifying Stage

Nominal DC Voltage: **13.8 VDC**
Current: **6 A**

## 5 FCC Rules and Regulations Part 2.1046(a): RF Power Output: Conducted, Part 90.541(b)/90.542(a)(6): Transmitting Power Limits; RSS-119 4.1 Transmitter Output Power

### 5.1 Test Procedure

ANSI/TIA-603-2004, section 2.2.1

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

### 5.2 Test Data

**Table 5-1: RF Power Output: Carrier Output Power**

| Frequency (MHz) | Power (dBm) | Power (W) |
|---|---|---|
| 775.9875 | 36.0 | 4.0 |
| 851.0125 | 36.0 | 4.0 |
| 862.5 | 36.1 | 4.1 |
| 868.9875 | 36.0 | 4.0 |

**Table 5-2: 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 | 1/11/12 |
| 901356 | Agilent Technologies | E9323A | Power Sensor | 31764-264 | 1/20/12 |
| 901338 | MCE Weinschel | 48-40-34 | Attenuator, 40 dB, DC-18 GHz, 100 W | BM0556 | 7/15/12 |

**Test Personnel:**

| Daniel Baltzell | | August 24, 2011 |
|---|---|---|
| EMC Test Engineer | Signature | Date of Test |

# 6 FCC Rules and Regulations Part 2.1051: Spurious Emissions at Antenna Terminals; Part 90.210: Emission Limitations; RSS-119 5.8 Transmitter Unwanted Emissions

## 6.1 Test Procedure

ANSI/TIA-603-2004, Section 2.2.13

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

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 NBOTP (Narrow Band OpenSkyTrunking Protocol) mode.

## 6.2 Test Data

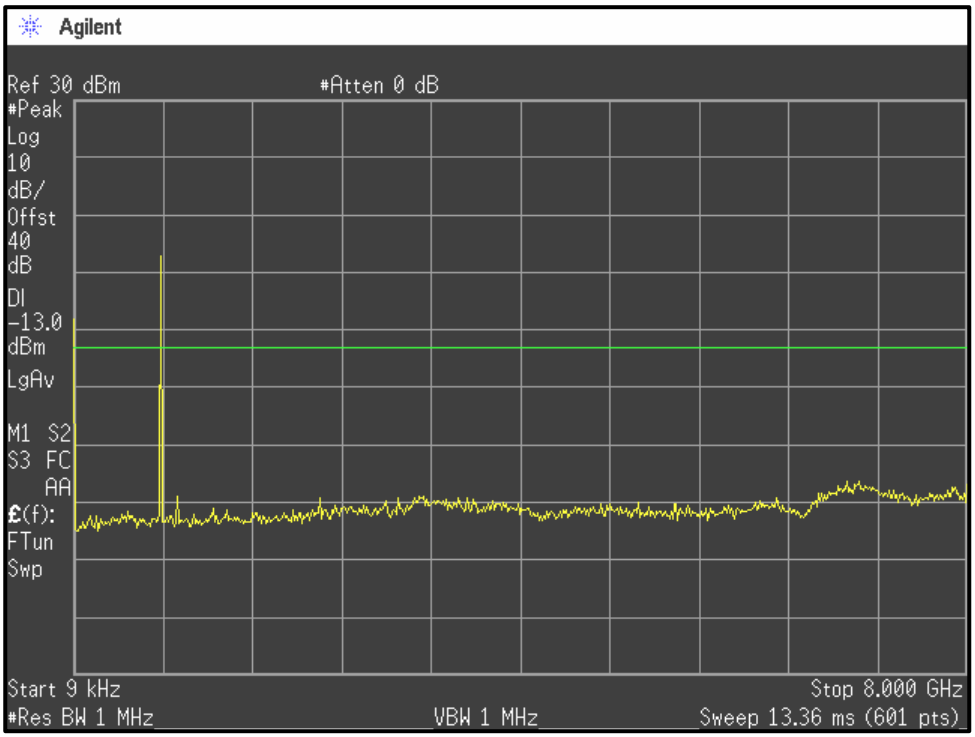
Frequency range of measurement per Part 2.1057: 9 kHz to 10 x Fc

Limits: (43+10LOG P(W)) for wideband and 50 + 10 LOG P(W)) for narrowband

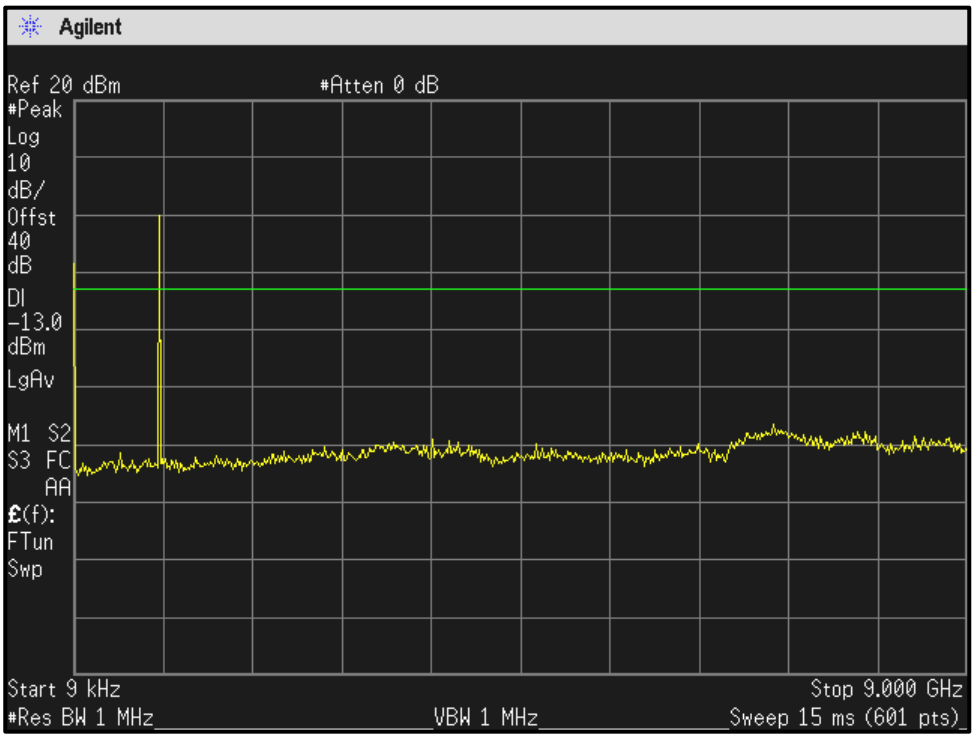
The following channels (in MHz) were investigated:

775.9875, 851.0125, 862.5 and 868.9875 MHz

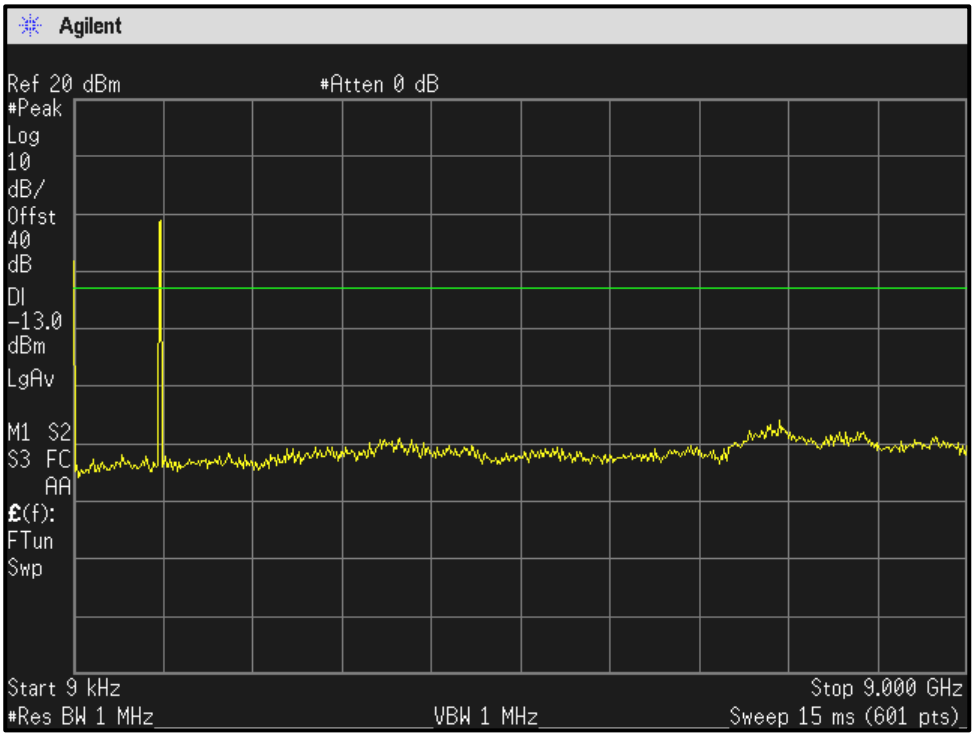
**Plot 6-1: Spurious Emissions at Antenna Terminals – 775.9875 MHz**



**Plot 6-2: Spurious Emissions at Antenna Terminals – 851.0125 MHz**




**Plot 6-3: Spurious Emissions at Antenna Terminals – 862.5 MHz**



**Plot 6-4: Spurious Emissions at Antenna Terminals – 868.9875 MHz**

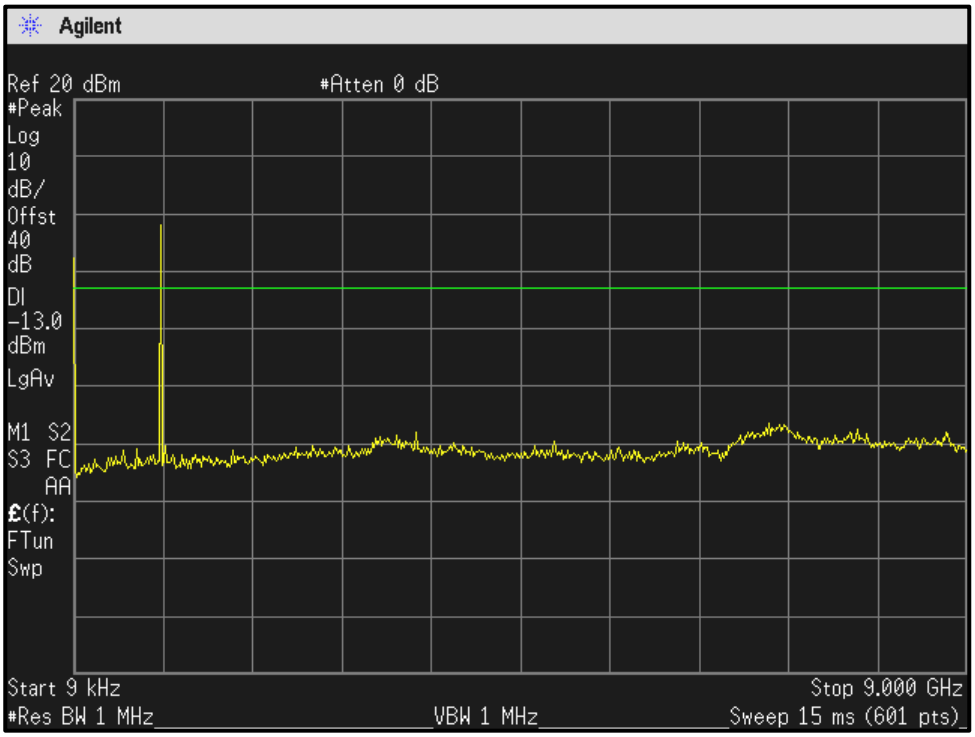



**Table 6-1: Test Equipment Used For Testing Spurious Emissions**

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| 901413 | Agilent Technologies | E4448A | Spectrum Analyzer | US44020346 | 12/29/12 |
| 901338 | MCE Weinschel | 48-40-34 | Attenuator, 40 dB, DC-18 GHz, 100 W | BM0556 | 7/15/12 |
| 901128 | Par Electronics | 806-902 (25W) | UHF Notch Filter | N/A | 3/10/12 |

**Test Personnel:**

| Daniel Baltzell | | August 24, 2011 |
|---|---|---|
| EMC Test Engineer | Signature | Date of Test |

## 7 FCC Rules and Regulations Part 90.543(a): Emission Limitations: ACP Requirements; RSS-119 4.3 Adjacent Channel Power (ACP) Measurement for Equipment in the Bands 764-776 MHz and 794-806 MHz

Effective October 23, 2007, transmitters designed to operate in the 769–775 MHz and 799–805 MHz frequency bands must meet the emission limitations in paragraphs (a) through (d) of this section. Transmitters operating in the 763–768 MHz and 793–798 MHz bands must meet the emission limitations in (e) of this section.

### 7.1 Test Procedure

ANSI/TIA-603-C-2004, FCC 2.2.14 Unwanted Emissions: Adjacent Channel Power Ratio

Device with digital modulation: modulated to its maximum extent using a pseudo-random data sequence – 9600 bps.

For a Portable transmitter designed to operate with a 12.5 kHz channel bandwidth, the ACP shall be in accordance with the values in the following table:

| Offset from Center Frequency (kHz) | Measurement Bandwidth (kHz) | Maximum ACP Relative (dBc) |
|---|---|---|
| (+/-)9.375 | 6.25 | -40 |
| (+/-)15.625 | 6.25 | -60 |
| (+/-)21.875 | 6.25 | -60 |
| (+/-)37.5 | 25 | -60 |
| (+/-)62.5 | 25 | -65 |
| (+/-)87.5 | 25 | -65 |
| (+/-)150 | 100 | -65 |
| (+/-)250 | 100 | -65 |
| (+/-)350 | 100 | -65 |
| >400 kHz to 12 MHz | 30(s) | -75 |
| 12 MHz to paired receive band | 30(s) | -75 |
| In the paired receive band | 30(s) | -100 |

FCC Rules and Regulations §90.543(b)

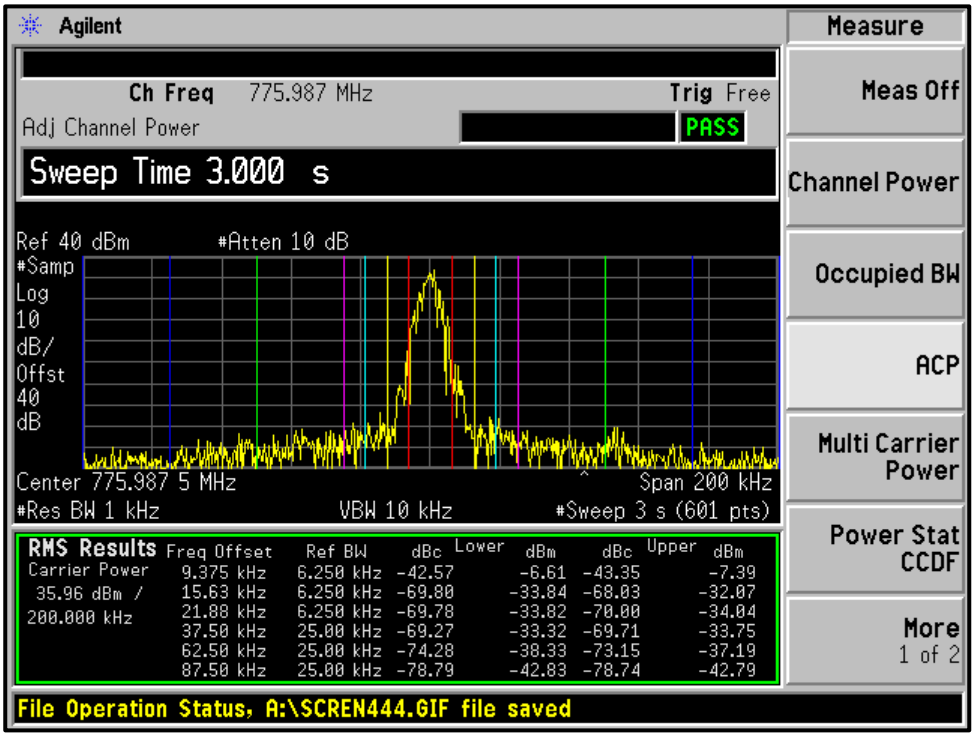
Setting Reference Level - §90.543(b)(1): Using a spectrum analyzer capable of ACP measurements, set the measurement bandwidth to the channel size. Set the frequency offset of the measurement to zero and adjust the center frequency of the spectrum analyzer to give the power level in the measurement bandwidth. Record this power as the reference power level.

Measuring the power level at the frequency offset <600 kHz - §90.543(b)(2): Using a spectrum analyzer capable of adjacent channel power (ACP) measurements, set the measurement bandwidth as shown in the table. Measure ACP in dBm. These measurements are made at maximum power. Calculate the coupled power by subtracting the measurements made in this step from the reference power level. The absolute ACP values must be less than the values given in the table for each condition.

Measuring the power level at the frequency offset >600 kHz - §90.543(b)(3): Set the spectrum analyzer to 30 kHz resolution bandwidth, 1 MHz video bandwidth and sample detection mode. Sweep +/-6 MHz from the carrier frequency. Set the reference level to the RMS value of the transmitter power and note the power. The response at frequencies >600 kHz must be less than the values listed in the table.

## 7.2 Test Data

**Plot 7-1: Adjacent Channel Power – 775.9875 MHz (9.375 - 87.5 kHz)**




**Plot 7-2: Adjacent Channel Power – 775.9875 MHz (87.5 - 350 kHz)**

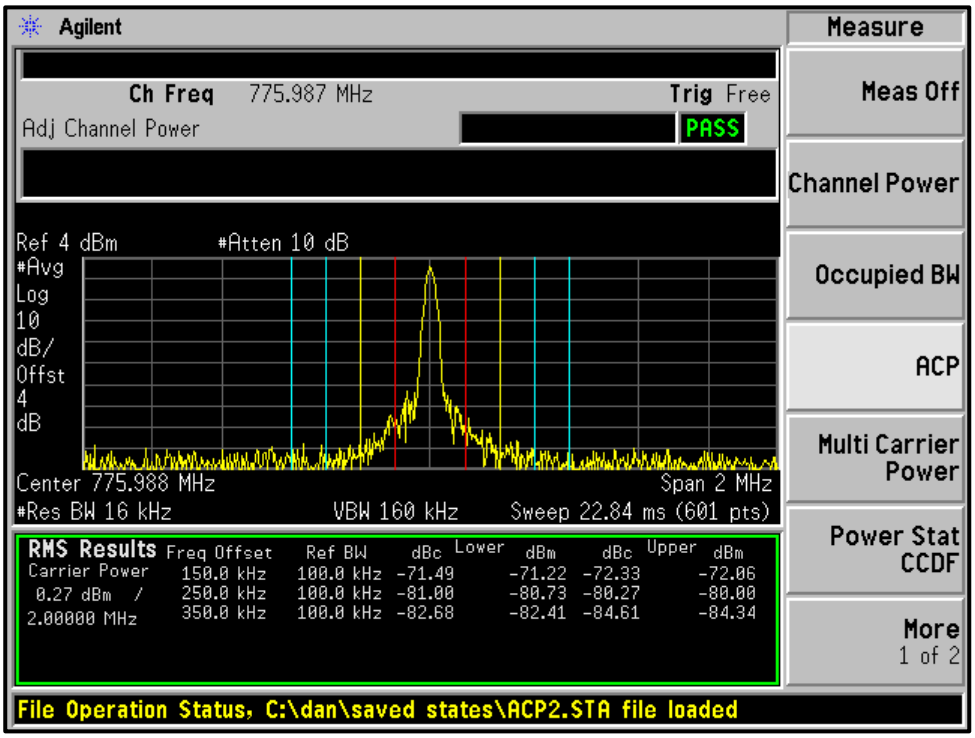


**Table 7-1: Adjacent Channel Power – 775.9875 MHz (>400 kHz)**

| Offset from Center Frequency (kHz) | Measurement BW (kHz) | Max ACP (dBc) | Measured ACP (dBc) |
|---|---|---|---|
| >400 to 12 MHz | 30(s) | -75 | -78.4 |
| 12 MHz to receive band | 30(s) | -75 | -102.8 |
| In receive band | 30(s) | -100 | -103.0 |

**Table 7-2: Test Equipment Used For Testing ACP Requirements**

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| 901413 | Agilent Technologies | E4448A | Spectrum Analyzer | US44020346 | 12/29/12 |
| 901338 | MCE Weinschel | 48-40-34 | Attenuator, 40 dB, DC-18 GHz, 100 W | BM0556 | 7/15/12 |

**Test Personnel:**

| Daniel Baltzell | | August 24, 2011 |
|---|---|---|
| EMC Test Engineer | Signature | Date of Test |

## 8 FCC Rules and Regulations Part 90.210(g) and Part 2.1053(a): Field Strength of Spurious Radiation; Part 90.543(f): Out of Band Emissions Limit; RSS-119 5.8.9.2 Out-of-band Emission Limit

### 8.1 Test Procedure

ANSI/TIA-603-2004, section 2.2.12

The device uses digital modulation modulated to its maximum extent using a pseudo-random data sequence of 9600 bps for NBOTP (Narrow Band OpenSky Trunking Protocol) mode.

The spurious emissions levels were measured, and the device under test was replaced by a substitution antenna connected to a signal generator. This signal generator level was then corrected by subtracting the cable loss from the substitution antenna to the signal generator, and the gain of the antenna (dBi) was added to achieve the EIRP level, then converted from the corrected signal generator level (dBm) to dBc, or dBW for 700 MHz band, and compared to the limit.

For emissions in the 1559-1610 band, Part 15.543(f) states: "For operations in the 763–775 MHz and 793–805 MHz bands, all emissions including harmonics in the band 1559–1610 MHz shall be limited to -70 dBW/MHz equivalent isotropically radiated power (EIRP) for wideband signals, and -80 dBW EIRP for discrete emissions of less than 700 Hz bandwidth. For the purpose of equipment authorization, a transmitter shall be tested with an antenna that is representative of the type that will be used with the equipment in normal operation."

### 8.2 Test Data

**Table 8-1: Field Strength of Spurious Radiation - 775.9875 MHz**

**Conducted Power 36 dBm; 4W; Limit=50+10LogP=56 dBc**

| Frequency (MHz) | Spectrum Analyzer Level (dBuV) | Signal Generator Level (dBm) | Cable Loss to Transmit Antenna (dB) | Substitution Antenna Gain (dBi) | Corrected Signal Generator Level (dBc) | Margin (dB) |
|---|---|---|---|---|---|---|
| 1551.9750 | 44.3 | -30.8 | 1.2 | 6.6 | 61.3 | -5.3 |
| 2327.9630 | 38.5 | -52.7 | 1.6 | 7.3 | 83.0 | -27.0 |
| 3103.9505 | 29.3 | -60.8 | 1.9 | 7.2 | 91.6 | -35.6 |
| 3879.9380 | 28.5 | -57.9 | 2.2 | 7.0 | 89.1 | -33.1 |
| 4655.9255 | 23.5 | -62.3 | 2.4 | 9.0 | 91.7 | -35.7 |
| 5431.9130 | 23.0 | -62.6 | 2.6 | 8.5 | 92.7 | -36.7 |
| 6207.9005 | 23.0 | -62.4 | 2.7 | 8.9 | 92.3 | -36.3 |
| 6983.8880 | 26.9 | -59.6 | 2.8 | 9.6 | 88.9 | -32.9 |
| 7759.8755 | 28.3 | -59.3 | 2.9 | 9.4 | 88.8 | -32.8 |

**Table 8-2: Field Strength of Spurious Radiation - 851.0125 MHz**

**Conducted Power 36 dBm; 4 W; Limit=43+10LogP=49dBc**

| Frequency (MHz) | Spectrum Analyzer Level (dBuV) | Signal Generator Level (dBm) | Cable Loss to Transmit Antenna (dB) | Substitution Antenna Gain (dBi) | Corrected Signal Generator Level (dBc) | Margin (dB) |
|---|---|---|---|---|---|---|
| 1702.0250 | 31.7 | -43.3 | 1.3 | 6.5 | 74.1 | -25.1 |
| 2553.0375 | 29.1 | -61.4 | 1.7 | 7.4 | 91.7 | -42.7 |
| 3404.0500 | 39.1 | -51.8 | 2.0 | 7.6 | 82.3 | -33.3 |
| 4255.0625 | 25.0 | -64.0 | 2.3 | 8.6 | 93.7 | -44.7 |
| 5106.0750 | 24.4 | -61.3 | 2.5 | 8.6 | 91.2 | -42.2 |
| 5957.0875 | 26.0 | -59.5 | 2.7 | 9.2 | 89.0 | -40.0 |
| 6808.1000 | 27.3 | -59.0 | 2.8 | 9.5 | 88.3 | -39.3 |
| 7659.1125 | 28.0 | -59.5 | 2.9 | 9.3 | 89.1 | -40.1 |
| 8510.1250 | 28.3 | -62.7 | 2.9 | 9.2 | 92.4 | -43.4 |

**Table 8-3: Field Strength of Spurious Radiation – 862.5 MHz**

**Conducted Power 36.1 dBm; 4.1 W; Limit=43+10LogP=49.1 dBc**

| Frequency (MHz) | Spectrum Analyzer Level (dBuV) | Signal Generator Level (dBm) | Cable Loss to Transmit Antenna (dB) | Substitution Antenna Gain (dBi) | Corrected Signal Generator Level (dBc) | Margin (dB) |
|---|---|---|---|---|---|---|
| 1725.0 | 28.5 | -46.4 | 1.3 | 6.5 | 77.3 | -28.2 |
| 2587.5 | 29.0 | -61.3 | 1.7 | 7.4 | 91.7 | -42.6 |
| 3450.0 | 41.7 | -50.3 | 2.1 | 7.6 | 80.9 | -31.8 |
| 4312.5 | 23.6 | -66.4 | 2.3 | 8.6 | 96.2 | -47.1 |
| 5175.0 | 24.3 | -61.4 | 2.6 | 8.5 | 91.5 | -42.4 |
| 6037.5 | 24.6 | -60.8 | 2.7 | 9.1 | 90.5 | -41.4 |
| 6900.0 | 26.1 | -60.3 | 2.8 | 9.6 | 89.7 | -40.6 |
| 7762.5 | 27.8 | -59.8 | 2.9 | 9.4 | 89.4 | -40.3 |
| 8625.0 | 28.3 | -60.7 | 2.9 | 9.2 | 90.5 | -41.4 |

**Table 8-4: Field Strength of Spurious Radiation – 868.9875 MHz**

**Conducted Power 36dBm; 4 W; Limit=43+10LogP=49dBc**

| Frequency (MHz) | Spectrum Analyzer Level (dBuV) | Signal Generator Level (dBm) | Cable Loss to Transmit Antenna (dB) | Substitution Antenna Gain (dBi) | Corrected Signal Generator Level (dBc) | Margin (dB) |
|---|---|---|---|---|---|---|
| 1737.9750 | 27.8 | -42.4 | 1.3 | 6.5 | 73.2 | -24.2 |
| 2606.9625 | 30.4 | -60.2 | 1.7 | 7.4 | 90.5 | -41.5 |
| 3475.9500 | 40.0 | -52.6 | 2.1 | 7.6 | 83.1 | -34.1 |
| 4344.9375 | 24.1 | -66.9 | 2.3 | 8.6 | 96.6 | -47.6 |
| 5213.9250 | 23.4 | -62.3 | 2.6 | 8.5 | 92.4 | -43.4 |
| 6082.9125 | 25.3 | -60.1 | 2.7 | 9.1 | 89.7 | -40.7 |
| 6951.9000 | 26.6 | -59.9 | 2.8 | 9.6 | 89.2 | -40.2 |
| 7820.8875 | 28.0 | -59.6 | 2.9 | 9.4 | 89.1 | -40.1 |
| 8689.8750 | 28.0 | -56.0 | 2.9 | 9.2 | 85.8 | -36.8 |

### 8.2.1 CFR 47 Part 90.543(f) Requirements

The worst-case emissions test data are shown.

Limit: -80 dBW EIRP for discrete emissions

**Table 8-5: Field Strength of Spurious Radiation – Worst Case Emissions**

| Frequency (MHz) | Spectrum Analyzer Level (dBuV) | Signal Generator Level (dBm) | Cable Loss to Transmit Antenna (dB) | Antenna Gain (dBi) | Corrected Signal Generator Level (dBW) | Margin (dB) |
|---|---|---|---|---|---|---|
| 1559.000 | 40.5 | -71.1 | 1.2 | 6.6 | -95.6 | -15.6 |
| 1566.910 | 39.5 | -70.0 | 1.2 | 6.7 | -94.5 | -14.5 |
| 1571.880 | 39.8 | -69.7 | 1.2 | 6.7 | -94.2 | -14.2 |
| 1590.880 | 38.9 | -70.7 | 1.2 | 6.7 | -95.2 | -15.2 |
| 1600.060 | 38.9 | -70.4 | 1.2 | 6.8 | -94.8 | -14.8 |
| 1600.180 | 42.8 | -68.6 | 1.2 | 6.8 | -93.0 | -13.0 |

**Table 8-6: Test Equipment Used For Testing Field Strength of Spurious Radiation**

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| 900932 | Hewlett Packard | 8449B OPT H02 | Preamplifier (1 - 26.5 GHz) | 3008A00505 | 2/22/12 |
| 900878 | Rhein Tech Laboratories | AM3-1197-0005 | 3 meter antenna mast, polarizing | OATS1 | N/A |
| 901516 | Insulated Wire Inc. | KPS-1503-2400-KPS | RF cable, 20' | NA | 10/19/11 |
| 901517 | Insulated Wire Inc. | KPS-1503-360-KPS | RF cable 36" | NA | 10/19/11 |
| 901242 | Rhein Tech Laboratories | WRT-000-0003 | Wood rotating table | N/A | N/A |
| 900791 | Chase | CBL6111B | Bilog Antenna (30 MHz – 2000 MHz) | N/A | 1/31/13 |
| 900321 | EMCO | 3161-03 | Horn Antennas (4 – 8 GHz) | 9508-1020 | 6/14/12 |
| 900772 | EMCO | 3161-02 | Horn Antenna (2 - 4 GHz) | 9804-1044 | 6/14/12 |
| 901236 | Insulated Wire Inc. | KPS-1503-360-KPS-09302008 | RF cable 36" | NA | 7/8/12 |
| 900928 | Hewlett Packard | 83752A | Synthesized Sweeper, (0.01 - 20 GHz) | 3610A00866 | 2/17/12 |

**Test Personnel:**

| Daniel Baltzell | | August 25, 2011 |
|---|---|---|
| Test Engineer | Signature | Date of Tests |

## 9 FCC Rules and Regulations Part 2.1049(c)(1): Occupied Bandwidth; Part 90.210 Authorized Bandwidth;RSS-119 5.5Channel Spacing, Authorized Bandwidth, Occupied Bandwidth and Spectrum Masks

Occupied Bandwidth - Compliance with the Emission Masks

### 9.1 Test Procedure

ANSI/TIA-603-2004, section 2.2.11 and TIA/EIA-102.CAAA-2002 section 2.2.5

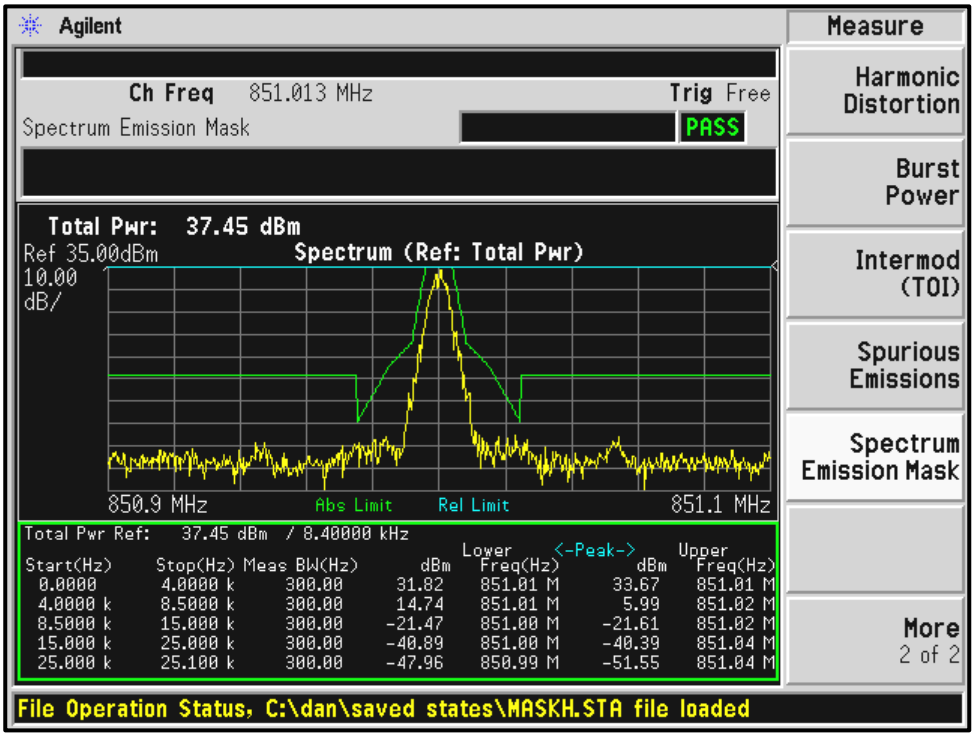
Device with digital modulation: Modulated to its maximum extent using a pseudo-random data sequence.

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

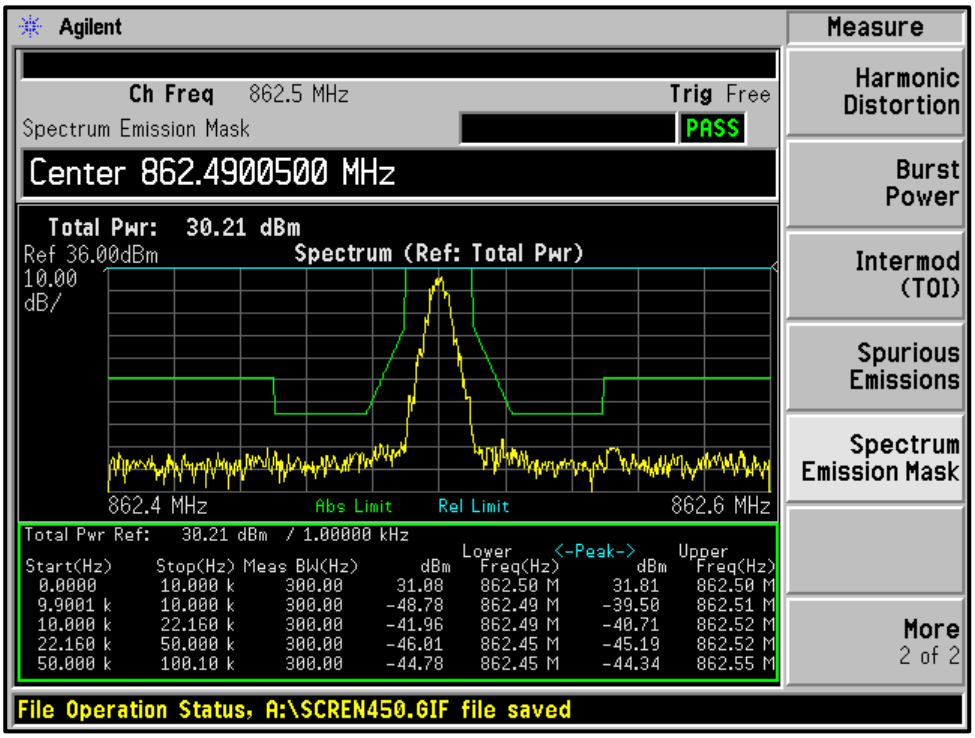
[1] Equipment using single sideband J3E emission must meet the requirements of Emission Mask A. Equipment using other emissions must meet the requirements of Emission Mask B or C, as applicable.
[2] Equipment designed to operate with a 25 kHz channel bandwidth must meet the requirements of Emission Mask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

## 9.2 Test Data

**Plot 9-1: Occupied Bandwidth – 851.0125 MHz; P25; Mask H**




**Plot 9-2: Occupied Bandwidth – 862.5 MHz; P25; Mask G**



**Plot 9-3: Occupied Bandwidth – 868.9875 MHz; P25; Mask G**

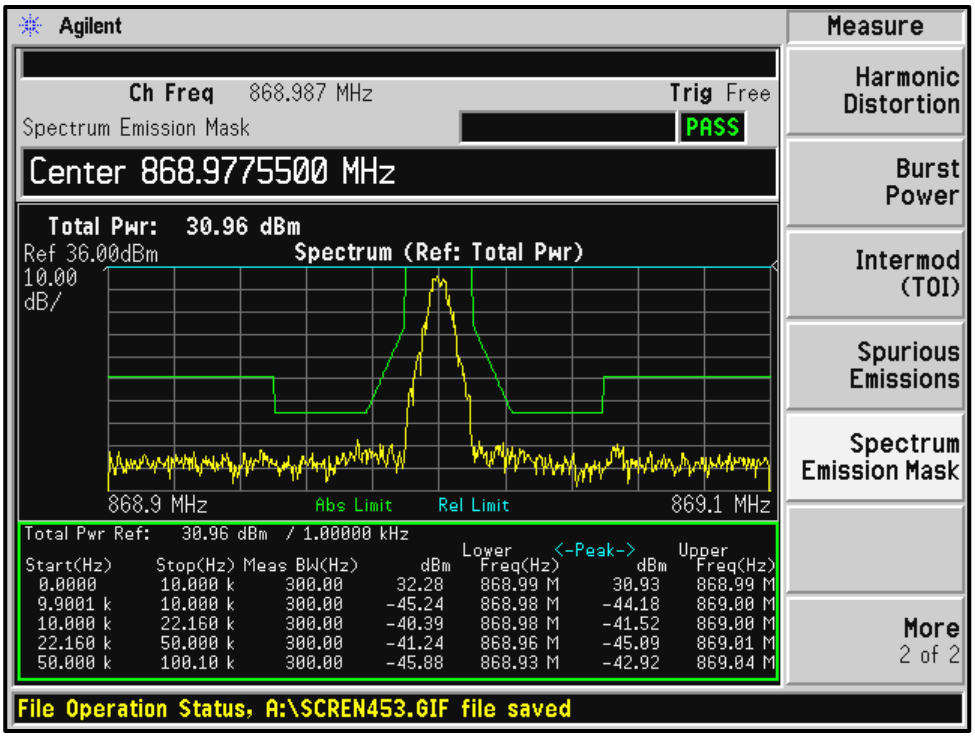



**Table 9-1: Test Equipment Used For Testing Occupied Bandwidth**

| RTL Asset # | Manufacturer | Model | Part Type | Serial Number | Calibration Due Date |
|---|---|---|---|---|---|
| 901215 | Hewlett Packard | 8596EM | Spectrum Analyzer (9 kHz - 12.8 GHz) | 3826A00144 | 1/13/12 |
| 900948 | Weinschel Corporation | 47-10-43 | Attenuator DC-18 GHz 10 dB 50W | BH1487 | 2/14/12 |
| 900819 | Weinschel Corp | 2 | 10 dB Attenuator; 5 W | BF0830 | 2/15/12 |

**Test Personnel:**

| Daniel Baltzell | | August 25, 2011 |
|---|---|---|
| Test Engineer | Signature | Date of Tests |

## 10 FCC Rules and Regulations Part 2.202: Necessary Bandwidth and Emission Bandwidth

Type of Emission: F9W
Digital Voice and Data: 9600 BPS

Calculations:

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

## 11 Conclusion

The data in this measurement report shows that the Harris Corporation Models: Vehicular Repeater Base System, VRBS-7020 and VRBS-7030, FCC ID: OWDTR-0058-E, IC: 3636B-0058, comply with all the applicable requirements for a Class II permissive change for FCC Parts 90, 15 and 2 and IC RSS-119.