Engineering and Testing for EMC and Safety Compliance

FCC & IC Certification Report

Model: Client 4.9GHz, 802.16 VBB, 5/10
Model #: VM-WM4900-CL001

Harris Corporation
221 Jefferson Ridge Parkway
Lynchburg, VA 24501
Daryl Popowitch
Phone: (434) 455-9527

FCC ID: BV8WM4900CL
IC: 3670A-WM4900CL

October 27, 2010

Standards Referenced for this Report	
Part 2: 2009	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 90: 2009	Private Land Mobile Radio Services
ANSI TIA-603-C-2004	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA/EIA – 102.CAAA; 2002	Digital C4FM/CQPSK Transceiver Measurement Methods
Industry Canada RSS-111 Issue 3, 2009	Broadband Public Safety Equipment Operating in the Band 4940-4990 MHz

Frequency Range (MHz)	Rated Peak Transmit Power (W)	Measured Frequency Tolerance (ppm)	Emission Designator
4942.5-4987.5	0.5	15.0	4M61X7D
4945.0-4985.0	1.0	20.4	9M22X7D

Report Prepared by Test Engineer: Daniel Baltzell

Document Number: 2010195

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 FCC and Industry Canada Certification Application 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 **Model: Client 4.9 GHz, 802.16 VBB, 5/10, Model #: VM-WM4900-CL001**; **FCC ID: BV8WM4900CL, IC: 3670A-WM4900CL**. 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 portions of FCC Rules and Regulations CFR 47 Parts 2 and 90, and Industry Canada RSS-111. 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)

N/A.

2 Tested System Details

The test sample was received on October 13, 2010. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable. The device was programmed for multiple modes of operation and modulation types.

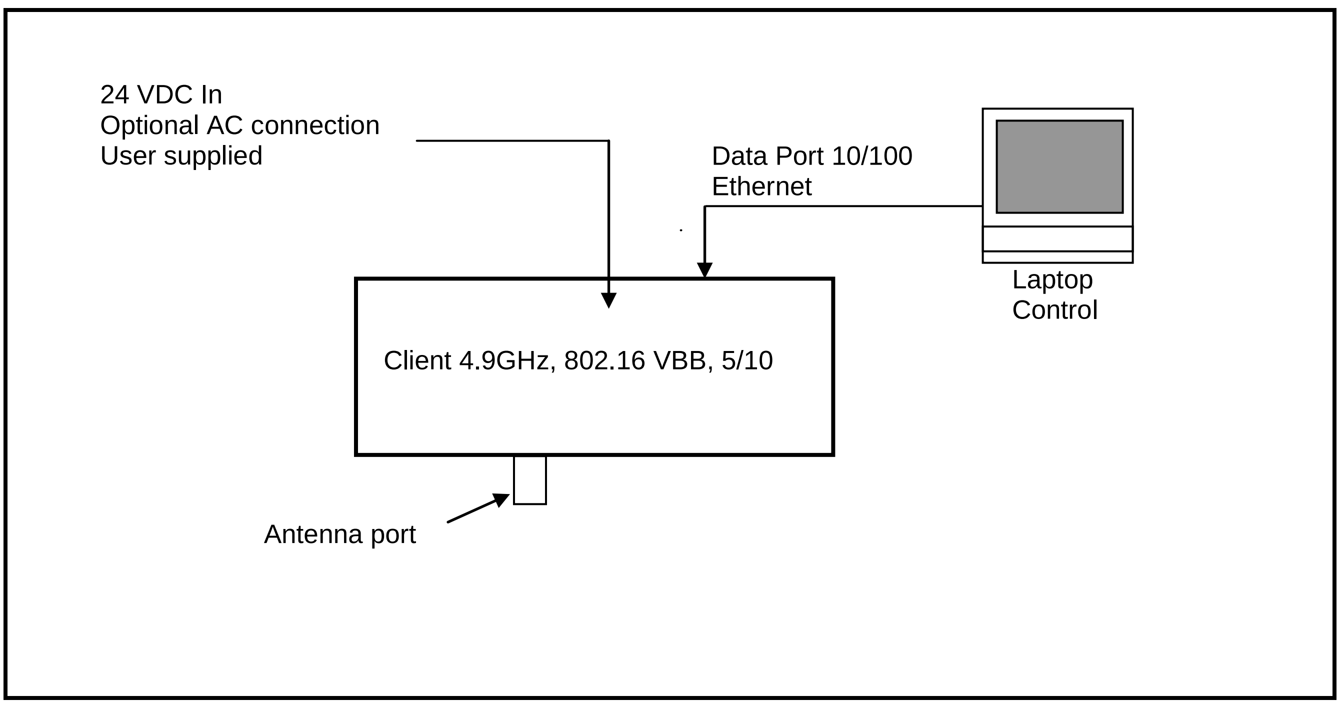
Table 2-1: Equipment Under Test (EUT)

Part	Manufacturer	Model	Serial Number	FCC ID	Cable	RTL Bar Code
Client 4.9GHz, 802.16 VBB, 5/10	Harris Corporation	VM-WM4900-CL001	A40145010133	BV8WM4900CL	N/A	19923

Table 2-2: Accessory Equipment

Part	Manufacturer	Model	Serial Number	FCC ID	Cable	RTL Bar Code
Laptop	Dell	D620	SC080137	N/A	N/A	19919

Figure 2-1: Configuration of Tested System



3 FCC Rules and Regulations §2.1046(a): RF Power Output: Conducted; §90.1215(a): Peak Output Power; RSS-111 §5.3: Transmitter Output Power and Channel Bandwidth

§90.1215: The transmitting power of stations operating in the 4940-4990 MHz band must not exceed the maximum limits in this section.

(a) The peak transmit power should not exceed:

Channel Bandwidth (MHz)	**Low Power Device Peak Transmitter Power (dBm)**	**High Power Device Peak Transmitter Power (dBm)**
1…………………………….	7.0	20.0
5…………………………….	14.0	27.0
10…………………………..	17.0	30.0
15…………………………..	18.8	31.8
20…………………………..	20.0	33.0

3.1 Test Procedure

TIA-603-C Section 2.2.1

The EUT transmitter output was connected through an appropriate 50-ohm attenuator to a spectrum analyzer. The peak transmit power was measured as a conducted emission over the interval of continuous transmission in terms of an RMS equivalent voltage with a 1 second sweep and a resolution bandwidth of 8 MHz.

A 10 dB attenuator was used between the EUT and the spectrum analyzer for all power measurements. No cable was used between the EUT and the analyzer.

The system loss was measured to be 10 dB and entered as an offset into the spectrum analyzer.

3.2 Test Data

The EUT complies with 47CFR2.1046 and 90.1215(a). The EUT does not exceed 30 dBm at carrier frequency.

Table 3-1: RF Power Output: Carrier Output Power - 5 MHz Bandwidth

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
1	4942.5	26.8	27.0
5	4962.5	26.8	27.0
10	4987.5	26.4	27.0

*Measurement accuracy: +/-.3 dB

Table 3-2: RF Power Output: Carrier Output Power - 10 MHz Bandwidth

Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
1	4945	29.9	30.0
3	4965	29.9	30.0
5	4985	30.0	30.0

*Measurement accuracy: +/-.3 dB

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

Rated Power
0.5 W for 5 MHz BW
1.0 W for 10 MHz BW

Table 3-4: Test Equipment for Testing RF Power Output – Conducted

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448	Spectrum Analyzer	US44020346	11/11/10

Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	October 14, 2010
Test Engineer	Signature	Date Of Tests

4 FCC Rules and Regulations §90.1215(a): Peak Power Spectral Density; RSS-111 §5.3: Transmitter Output Power and Channel Bandwidth

High power devices are limited to a peak power spectral density of 21 dBm per 1 MHz.

The peak power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A resolution bandwidth less than the measurement bandwidth can be used, provided that the measured power is integrated to show total power over the measurement bandwidth. If the resolution bandwidth is approximately equal to the measurement bandwidth, and much less than the emission bandwidth of the equipment under test, the measured results shall be corrected for any difference between the resolution bandwidth of the test instrument and its actual noise bandwidth.

Limit determined by antenna gain:

Antenna Gain (dBi)	Limit (dBm)
Up to 26 dBi	21

4.1 Test Procedure

The EUT transmitter output was connected through the appropriate 50-ohm attenuator to a spectrum analyzer. Resolution bandwidth was set to 1% of occupied bandwidth and video bandwidth was set to a value greater than the resolution bandwidth. Peak search was used to find peak spectral density within 5 or 10 MHz signal band-width and centered within the 1 MHz span of measurement; the spectrum analyzer integrated measurement plot was taken.

4.2 Test Data

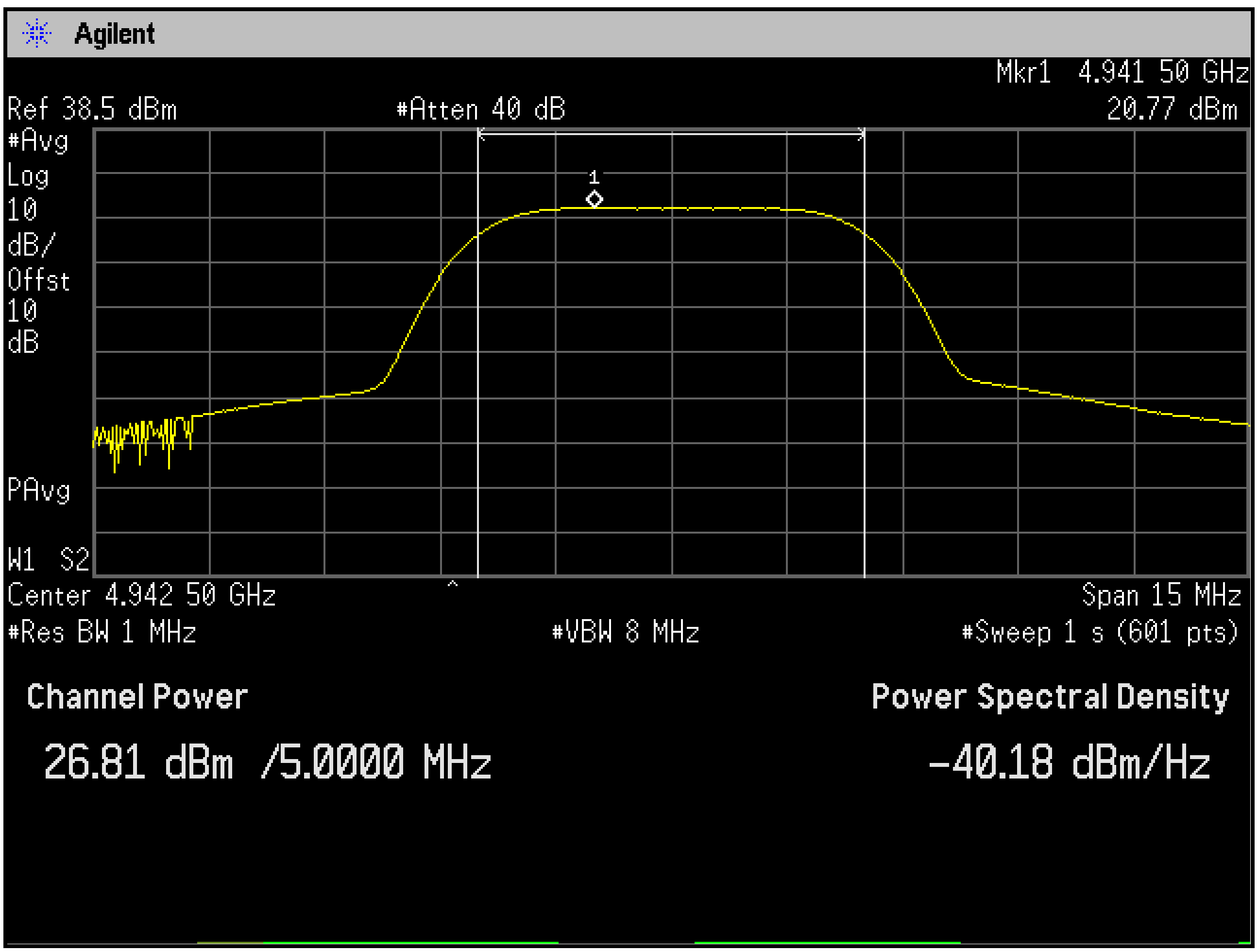
The EUT complies with 47 CFR 2.1046 and 90.1215(a). The EUT does not exceed 21 dBm at carrier frequency.

Table 4-1: RF Power Output: Peak Power Spectral Density

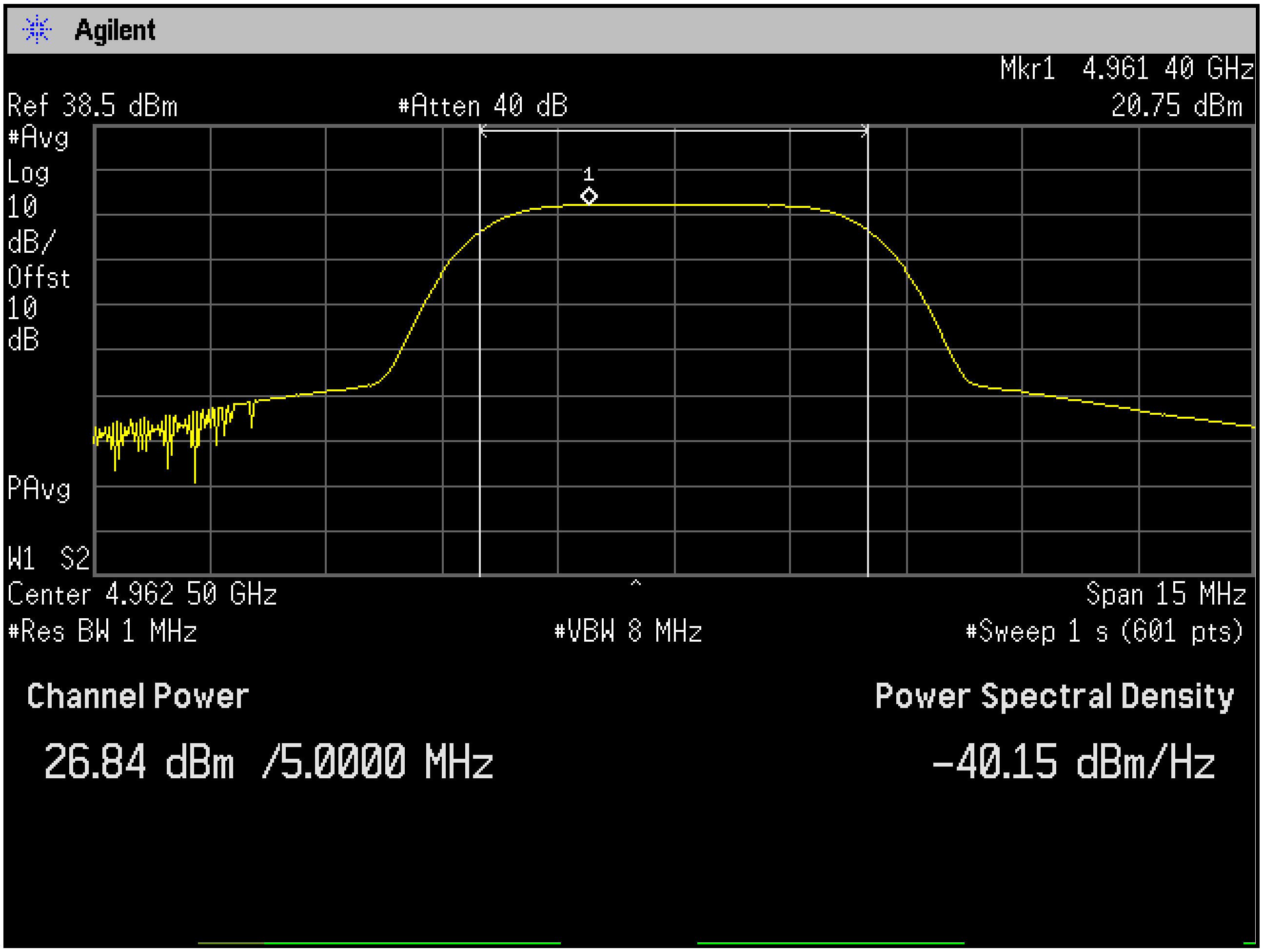
Channel	Frequency (MHz)	Channel BW (MHz)	Measured Peak Power Spectral Density (dBm per one MHz)	Limit (dBm per one MHz)
1	4942.5	5	20.8	21
5	4962.5	5	20.8	21
10	4987.5	5	20.4	21
1	4945	10	20.7	21
3	4965	10	20.7	21
5	4985	10	20.8	21

* Measurement accuracy: +/-.3 dB

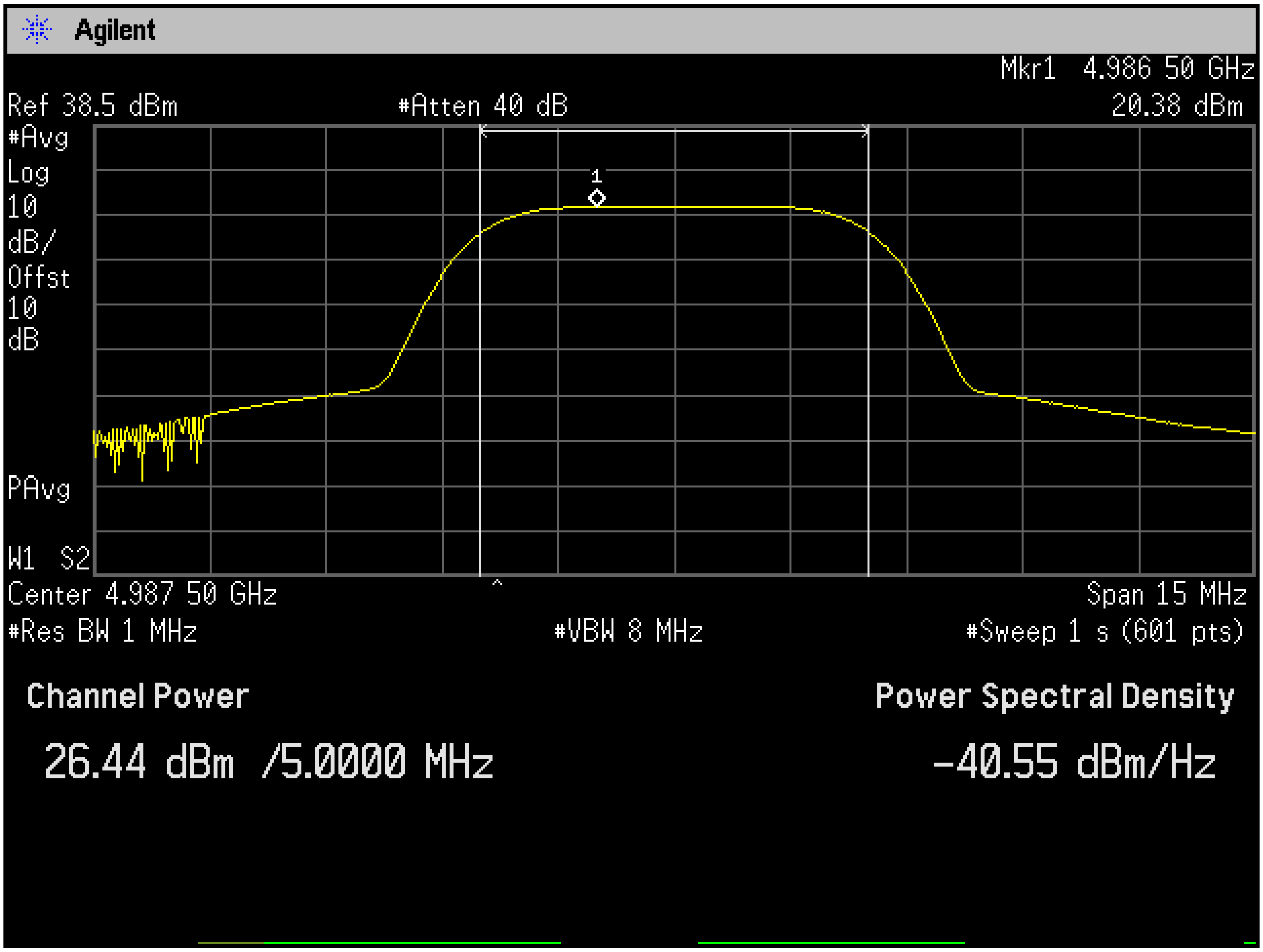
Plot 4-1: Channel Power Output-PSD; Channel 1 – 4942.5 MHz; 5 MHz BW



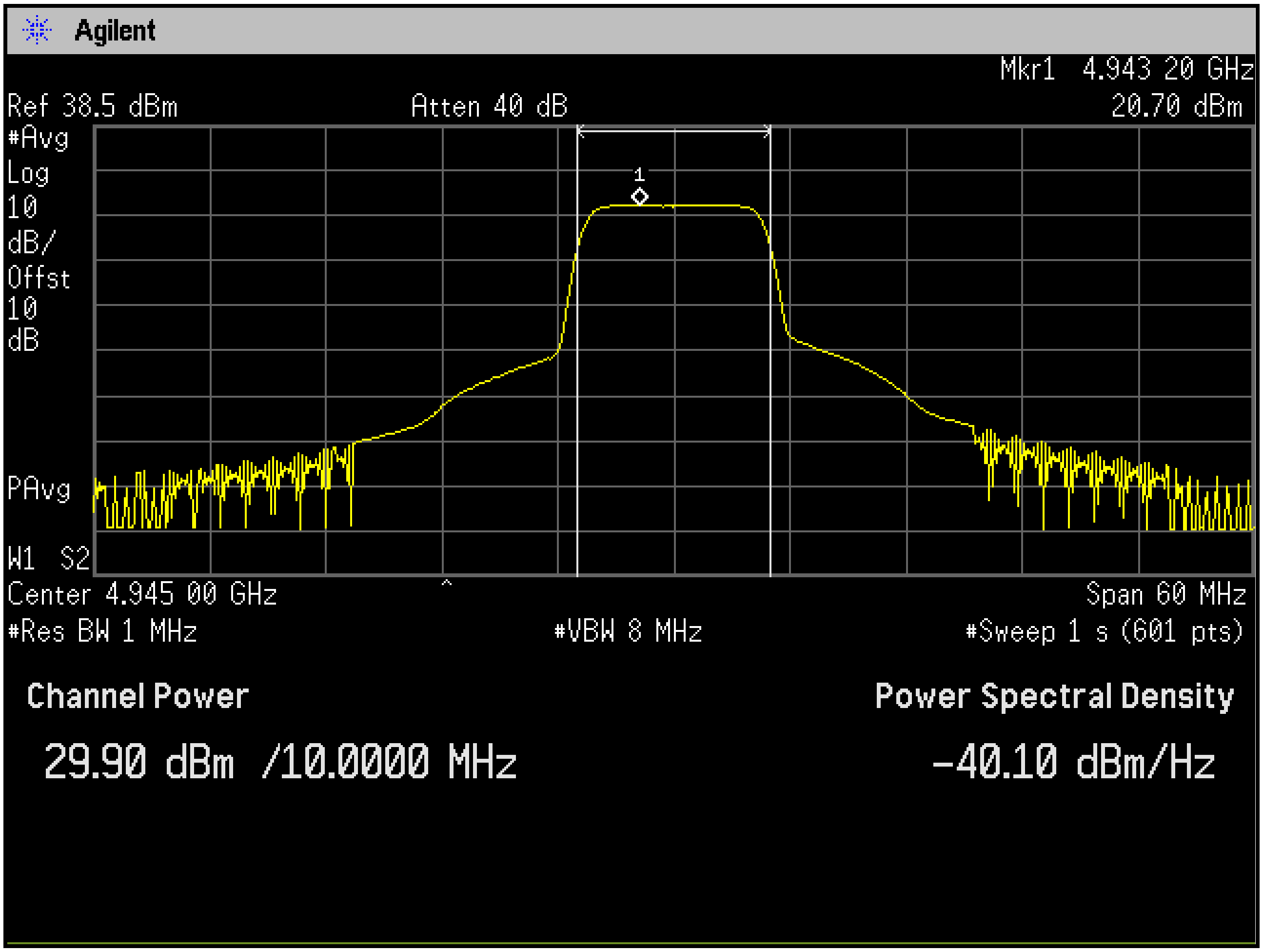
Plot 4-2: Channel Power Output-PSD; Channel 5 – 4962.5 MHz; 5 MHz BW



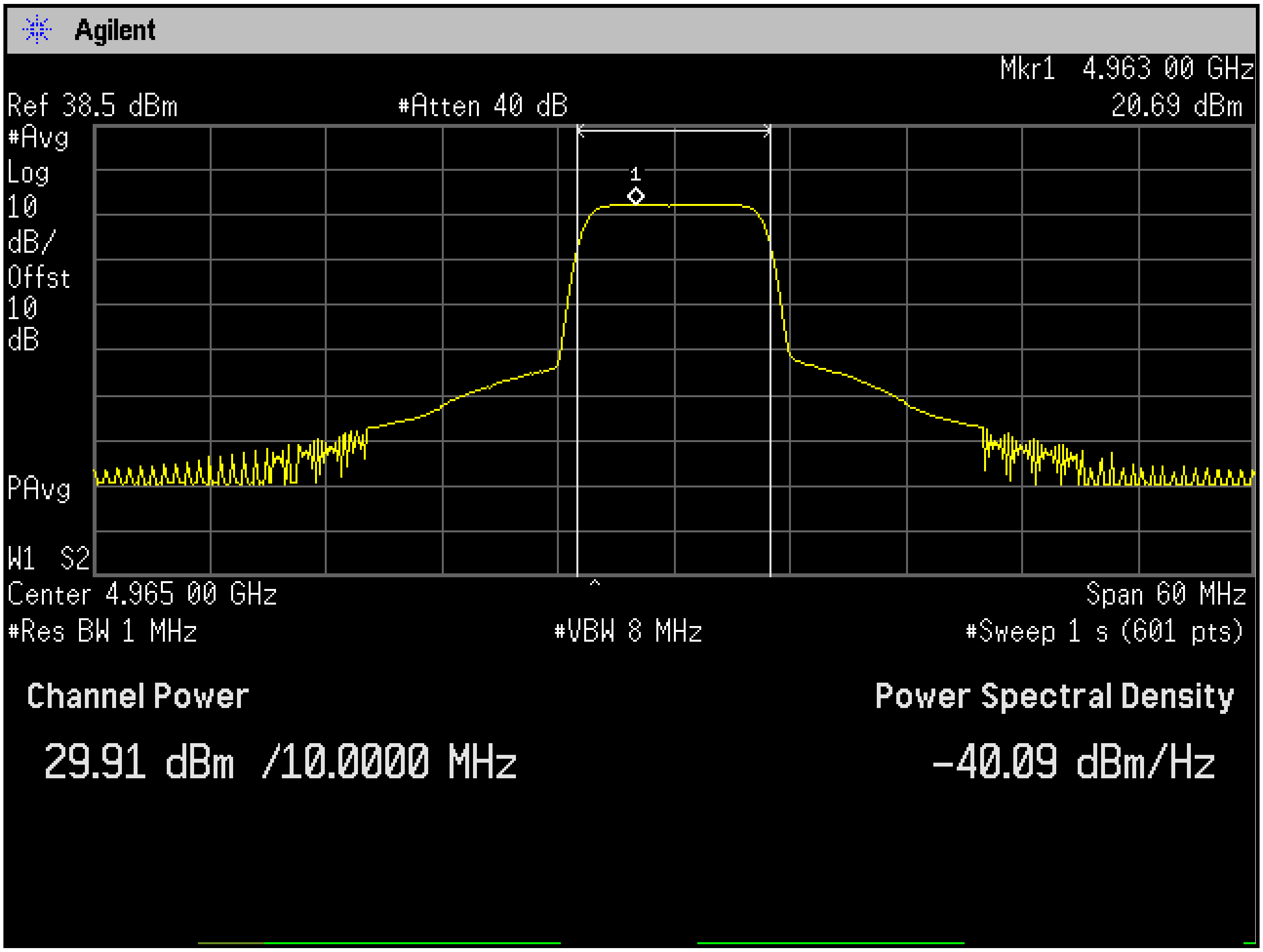
Plot 4-3: Channel Power Output-PSD; Channel 10 – 4987.5 MHz; 5 MHz BW



Plot 4-4: Channel Power Output; Channel 1 – 4945 MHz; 10 MHz BW



Plot 4-5: Channel Power Output-PSD; Channel 3 – 4965 MHz; 10 MHz BW



Plot 4-6: Channel Power Output-PSD; Channel 5 – 4985 MHz; 10 MHz BW

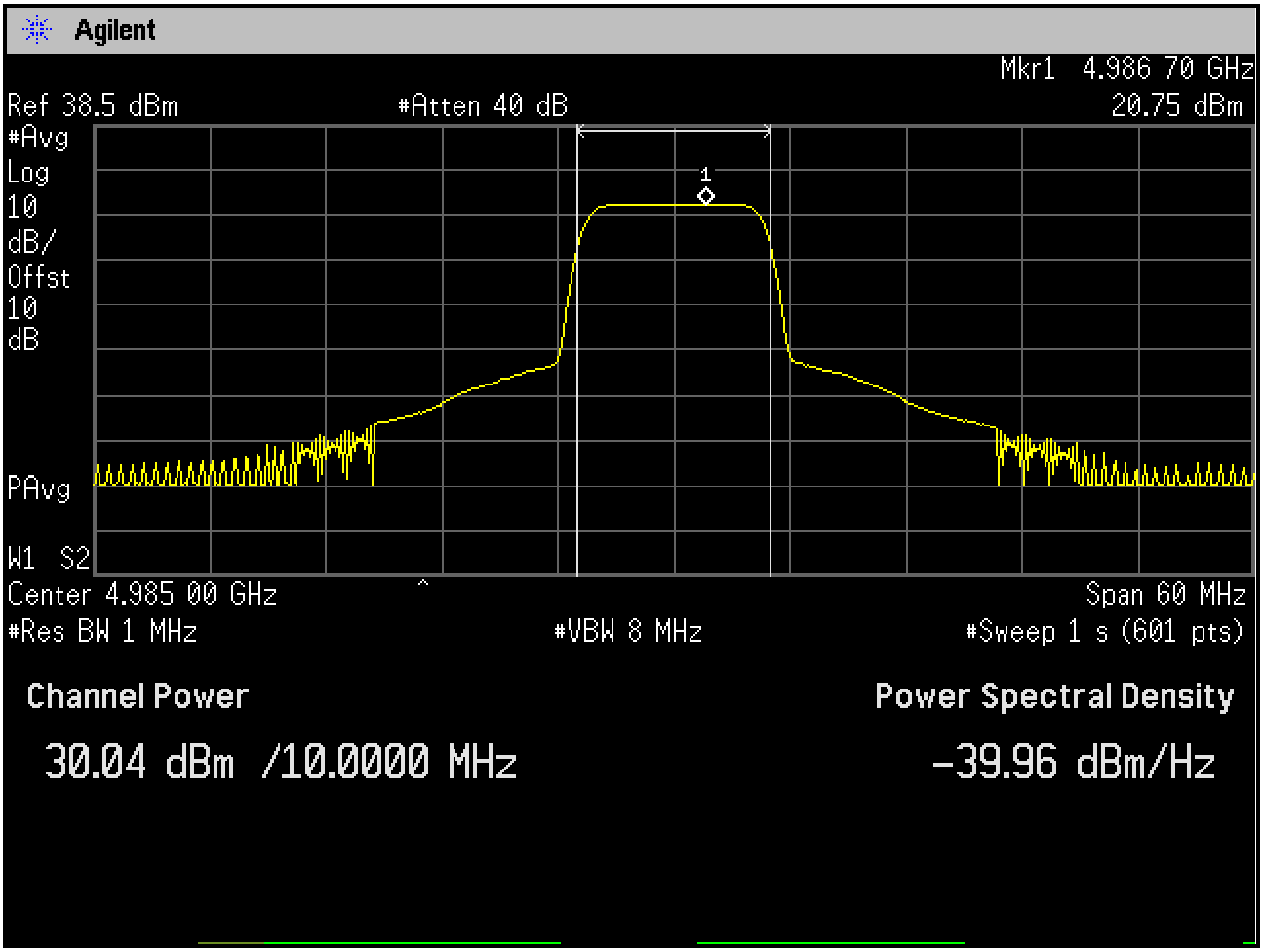


Table 4-2: Test Equipment for Testing Peak Power Spectral Density

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448	Spectrum Analyzer	US44020346	11/11/10
900819	Weinschel Corp	2	10 dB Attenuator; 5 W	BF0830	2/16/11

Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	October 14, 2010
Test Engineer	Signature	Date Of Tests

5 FCC Rules and Regulations §90.210(m) and §2.1049: Occupied Bandwidth (Emissions Masks) and Conducted Spurious Emissions; RSS-111 §5.4: Transmitter Unwanted Emissions

§90.210(m) Emission Mask M: For high power transmitters (greater than 20 dBm) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

(1) On any frequency removed from the assigned frequency between 0–45% of the authorized bandwidth (BW): 0 dB
(2) On any frequency removed from the assigned frequency between 45–50% of the authorized bandwidth: 568 log (% of (BW)/45) dB
(3) On any frequency removed from the assigned frequency between 50–55% of the authorized bandwidth: 26 + 145 log (% of (BW)/50) dB
(4) On any frequency removed from the assigned frequency between 55–100% of the authorized bandwidth: 32 + 31 log (% of (BW)/55) dB attenuation
(5) On any frequency removed from the assigned frequency between 100–150% of the authorized bandwidth: 40 + 57 log (% of (BW)/100) dB attenuation
(6) On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 50 or 55+ 10 log (P) dB, whichever is the lesser attenuation

The zero dB reference is measured relative to the highest average power of the fundamental emission measured across the designated channel bandwidth using a resolution bandwidth of at least 1% of the occupied bandwidth of the fundamental emission and a video bandwidth of 30 kHz. The power spectral density is the power measured within the resolution bandwidth of the measurement device divided by the resolution bandwidth of the measurement device. Emission levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least one percent of the occupied bandwidth.

Additionally, testing to the latest FCC interpretation was followed: With regard to the L and M masks in Part 90.210, the rule indicates using a minimum RBW of 1% of the bandwidth to determine the reference level, and a minimum RBW of 1% of the bandwidth to determine the mask skirts. The mask should be developed using the same resolution bandwidth throughout, for the reference level and the mask skirts.

5.1 Test Procedure

TIA-603-C Section 2.2.11, 2.2.13 (with FCC deviations)

The EUT transmitter was connected to a spectrum analyzer through an appropriate 50 ohm attenuator. The reference level for the mask was set using the highest average power of the fundamental emission measured across the channel bandwidth using a RBW of at least 1% of the occupied bandwidth of the fundamental emission (91 kHz for this test) and a VBW of 30 kHz.

5.2 Reference Level Measurements

The following measurements were taken in order to determine the reference level for the mask measurements.

Table 5-1: Mask Levels Used For Mask – 5 MHz Bandwidth

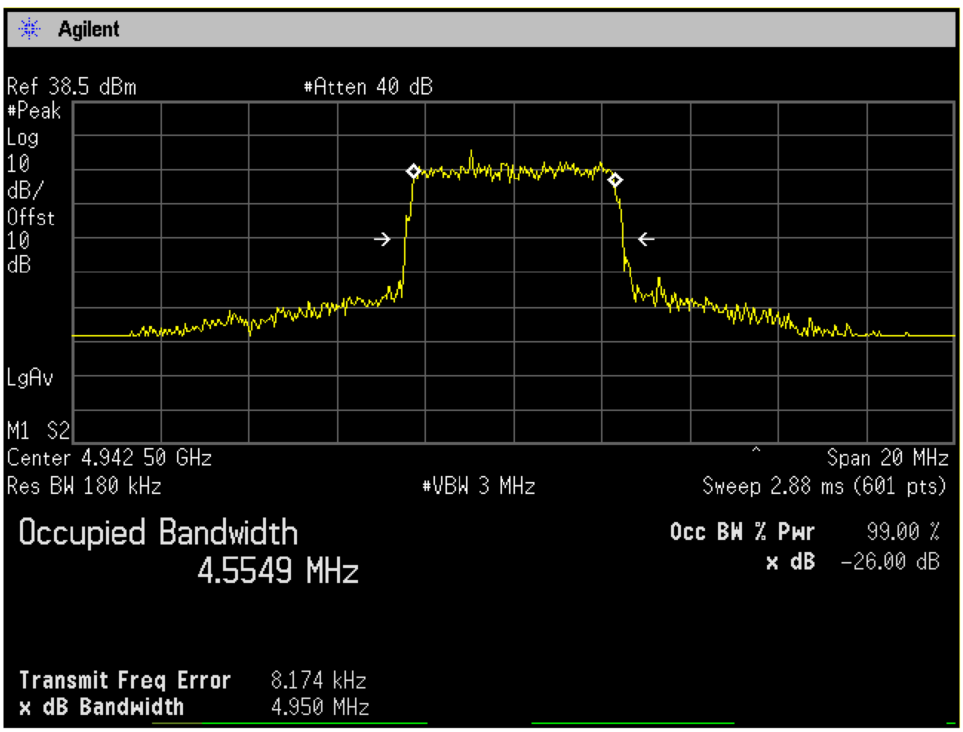
Channel	RBW (kHz)	VBW (kHz)	Level (dBm)
1	47	30	13.89
5	47	30	13.75
10	47	30	13.77

Table 5-2: Mask Levels Used For Mask – 10 MHz Bandwidth

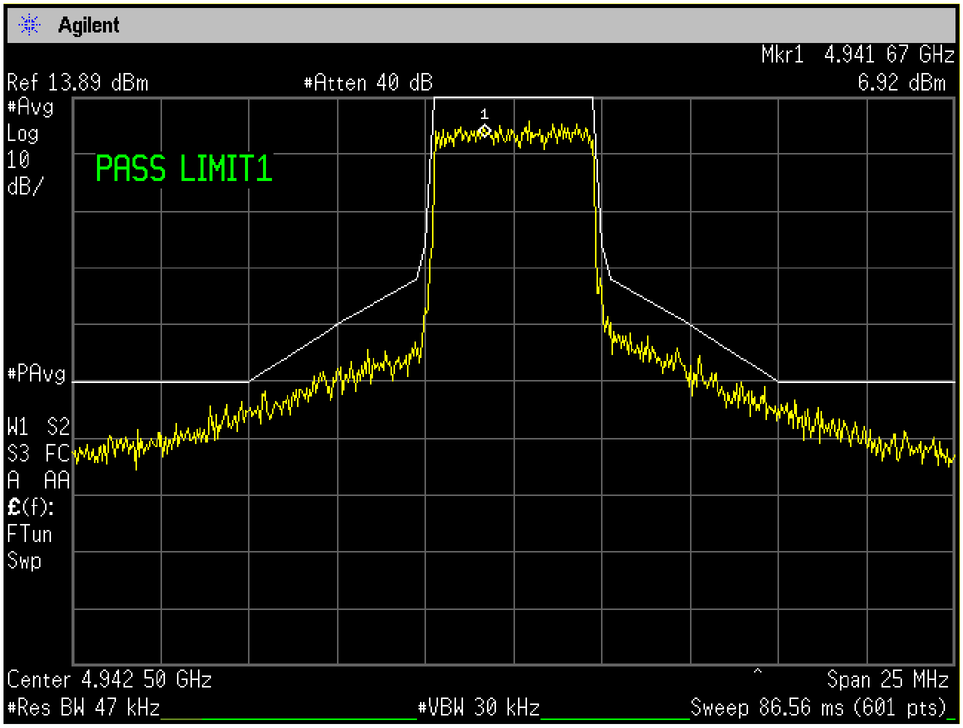
Channel	RBW (kHz)	VBW (kHz)	Level (dBm)
1	91	30	14.88
3	91	30	15.05
5	91	30	14.60

5.3 In Band Spurious Test Data

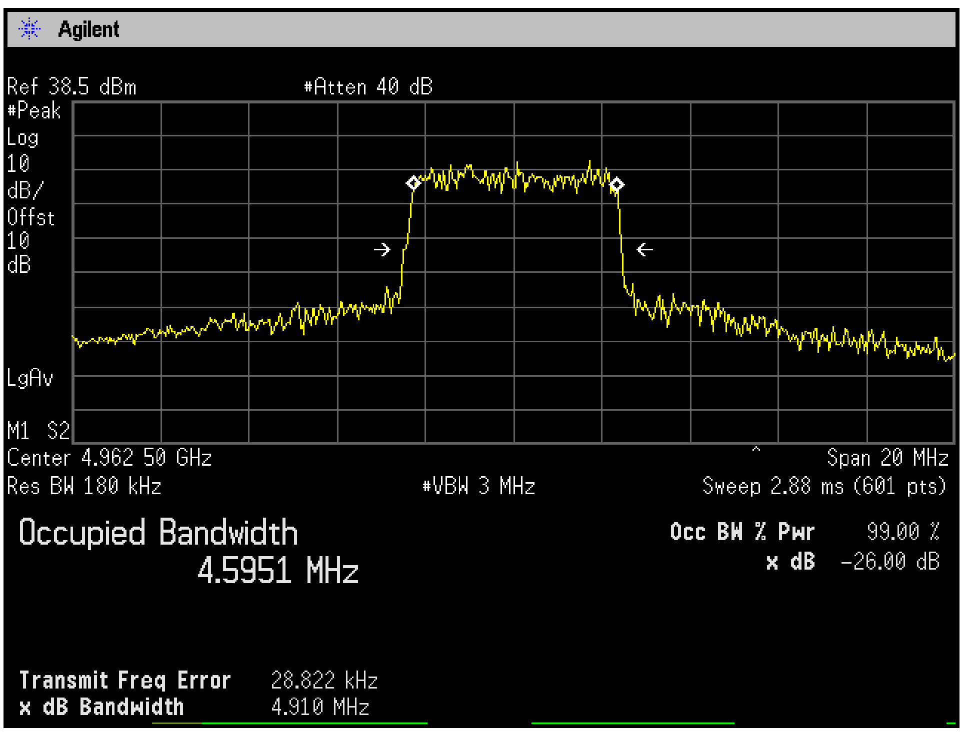
Plot 5-1: Occupied Bandwidth; Channel 1 – 4942.5 MHz; 5 MHz BW



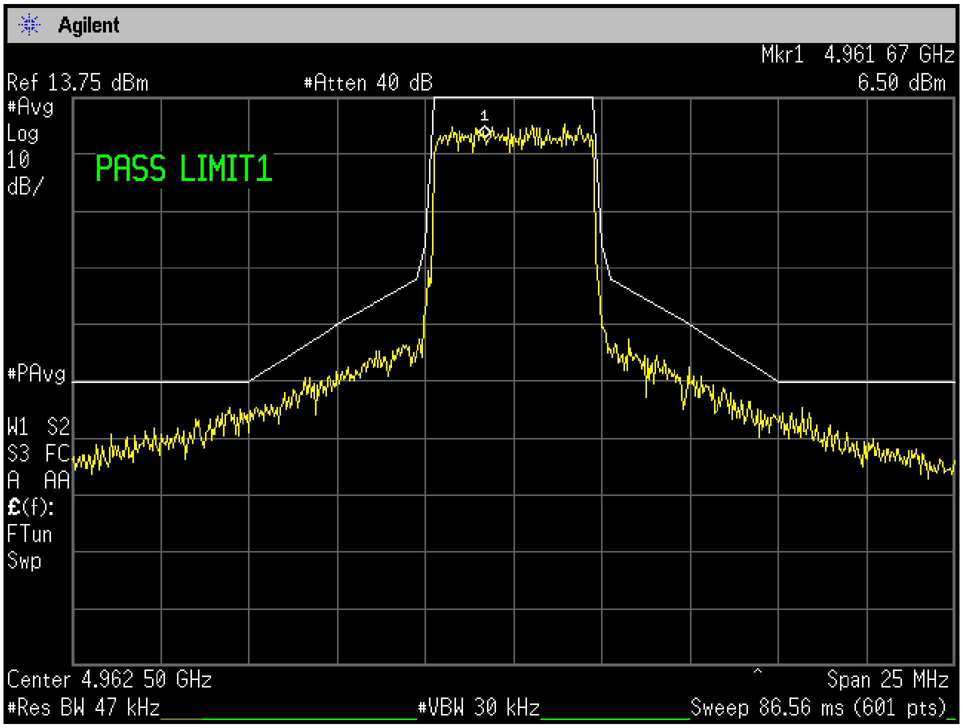
Plot 5-2: Emissions Mask M; Channel 1 – 4942.5 MHz; 5 MHz BW



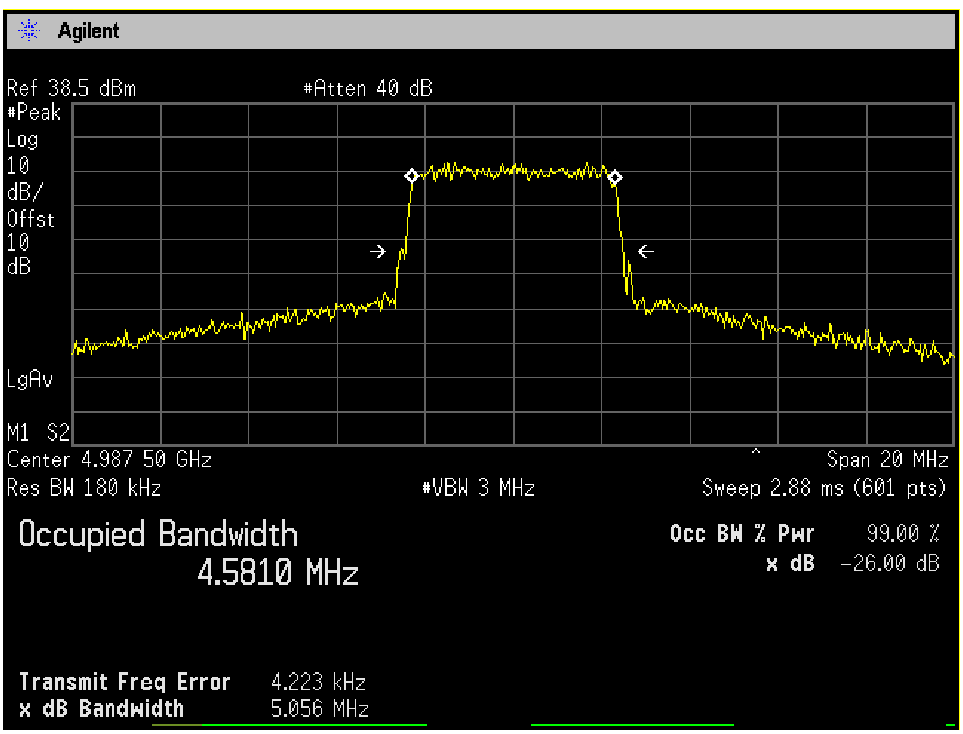
Plot 5-3: Occupied Bandwidth; Channel 3 – 4962.5 MHz; 5 MHz BW



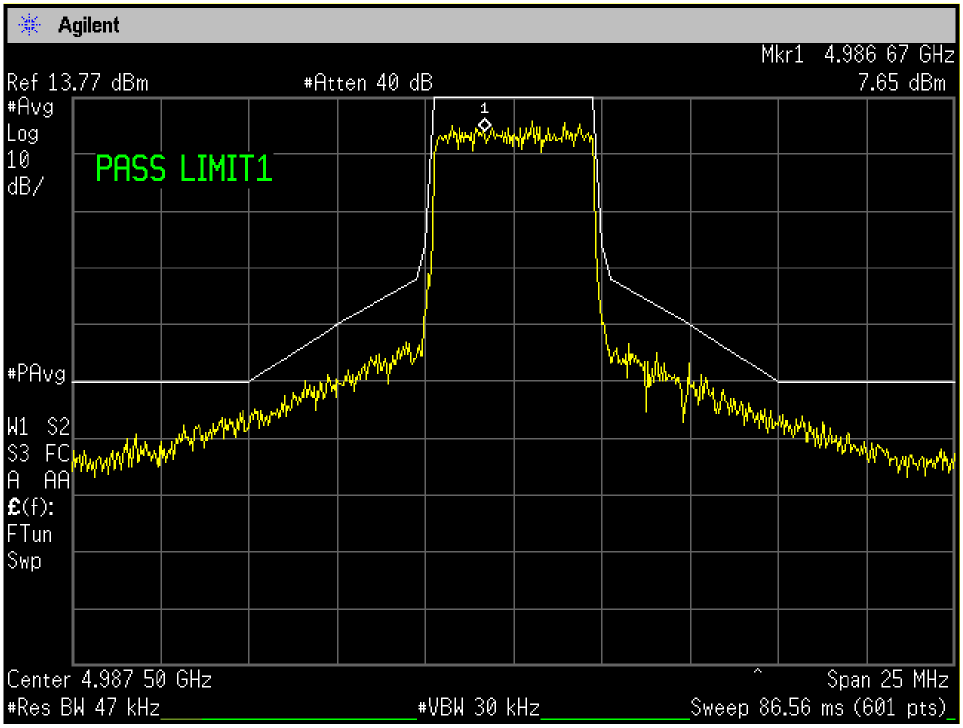
Plot 5-4: **Emissions Mask M; Channel 3 – 4962.5 MHz; 5 MHz BW**



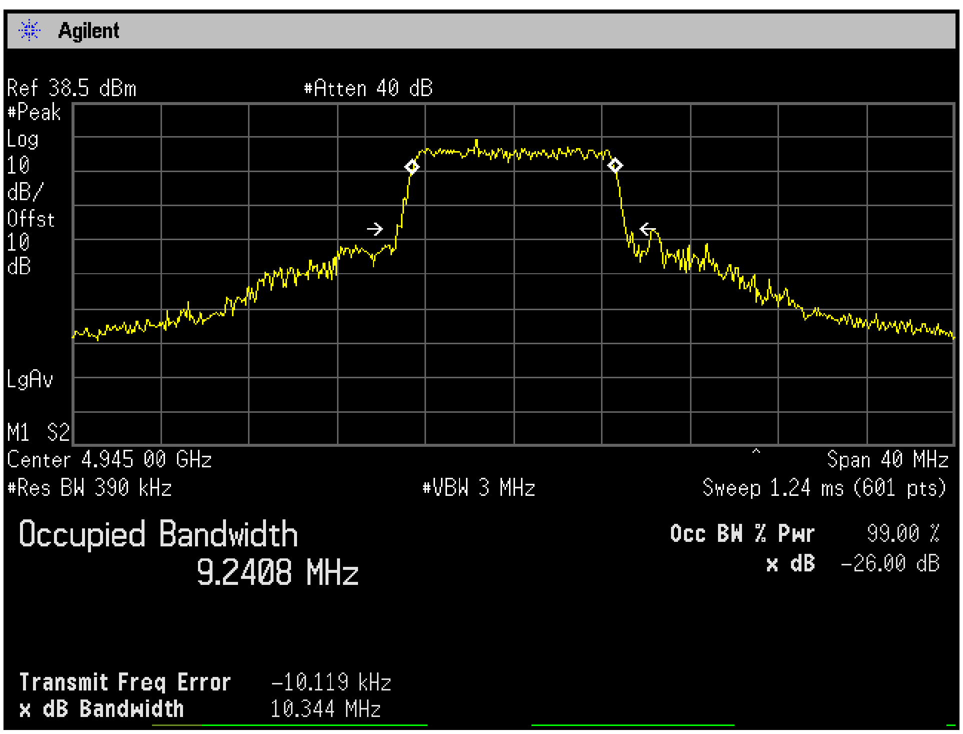
Plot 5-5: **Occupied Bandwidth; Channel 5 – 4987.5 MHz; 5 MHz BW**



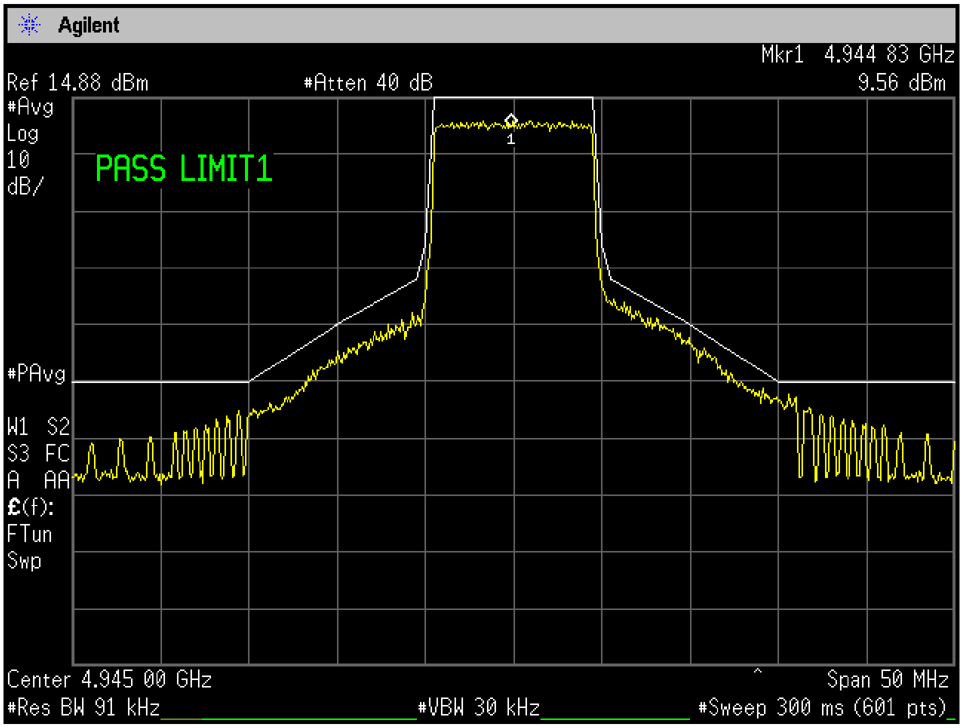
Plot 5-6: Emissions Mask M; Channel 5 – 4987.5 MHz; 5 MHz BW



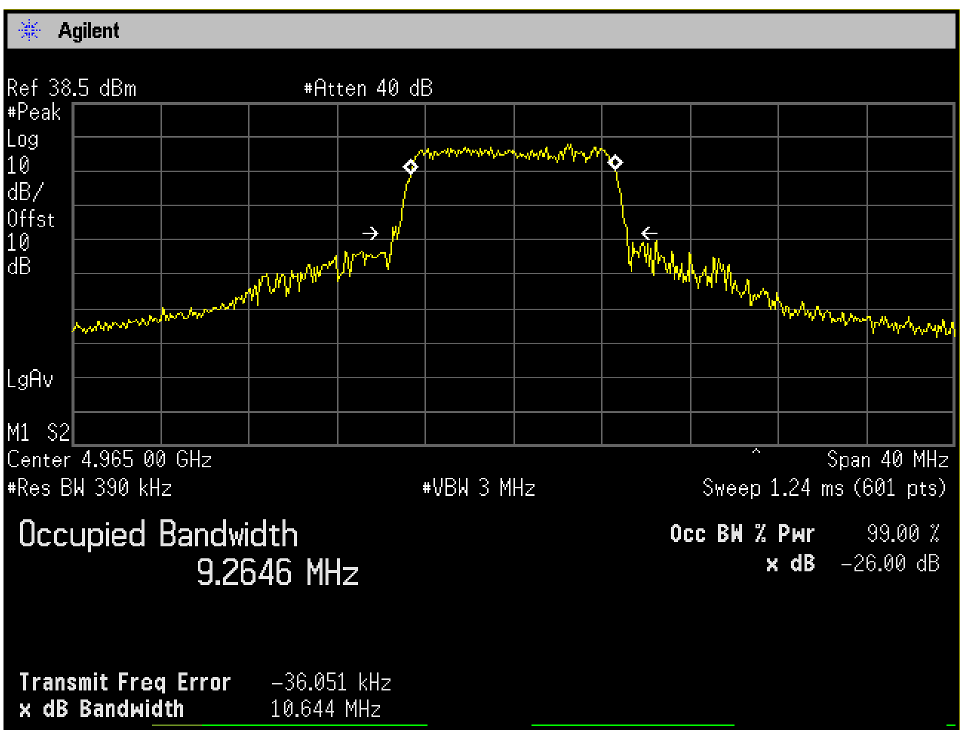
Plot 5-7: Occupied Bandwidth; Channel 1 - 4945 MHz; 10 MHz BW



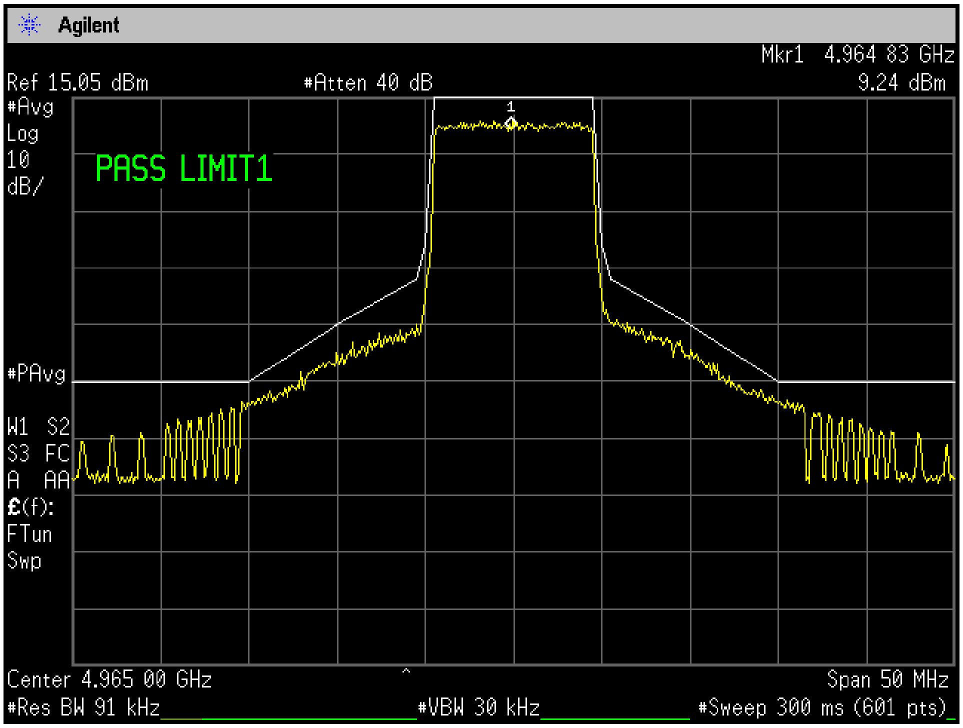
Plot 5-8: Emissions Mask M; Channel 1 - 4945 MHz; 10 MHz BW



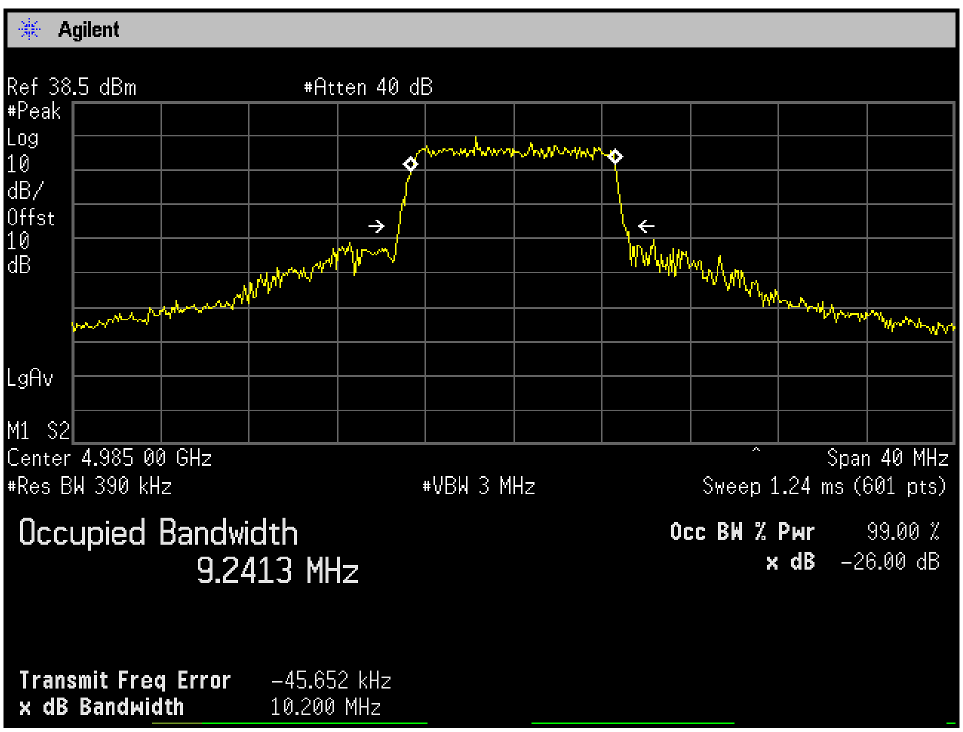
Plot 5-9: Occupied Bandwidth; Channel 3 - 4965 MHz; 10 MHz BW



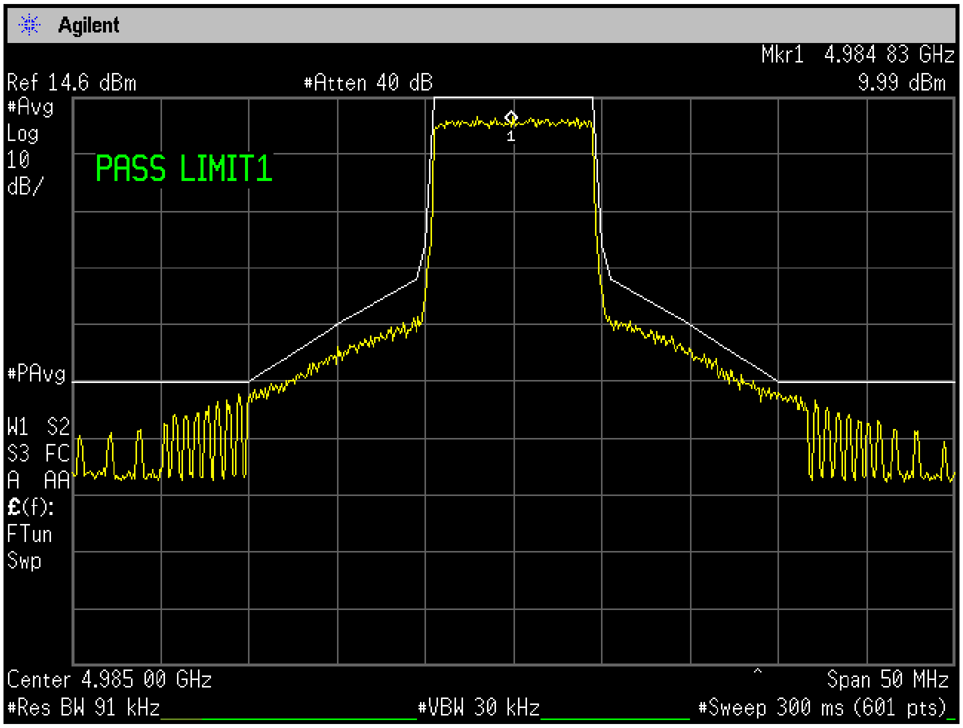
Plot 5-10: Emissions Mask M; Channel 3 - 4965 MHz; 10 MHz BW



Plot 5-11: Occupied Bandwidth; Channel 5 - 4985 MHz; 10 MHz BW

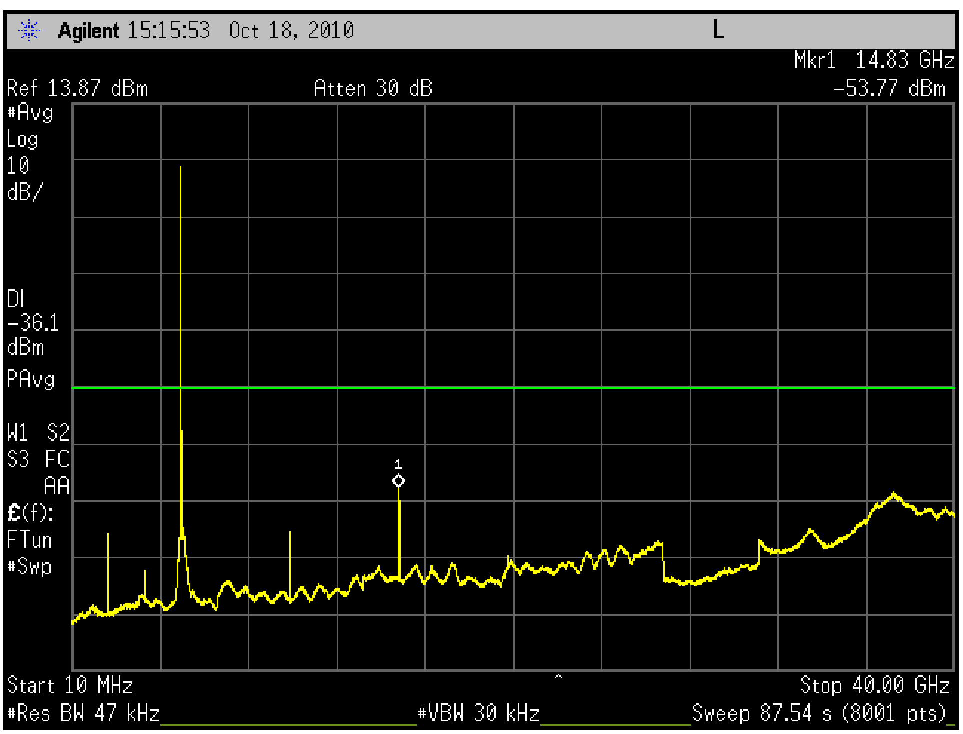


Plot 5-12: Emissions Mask M; Channel 5 - 4985 MHz; 10 MHz BW

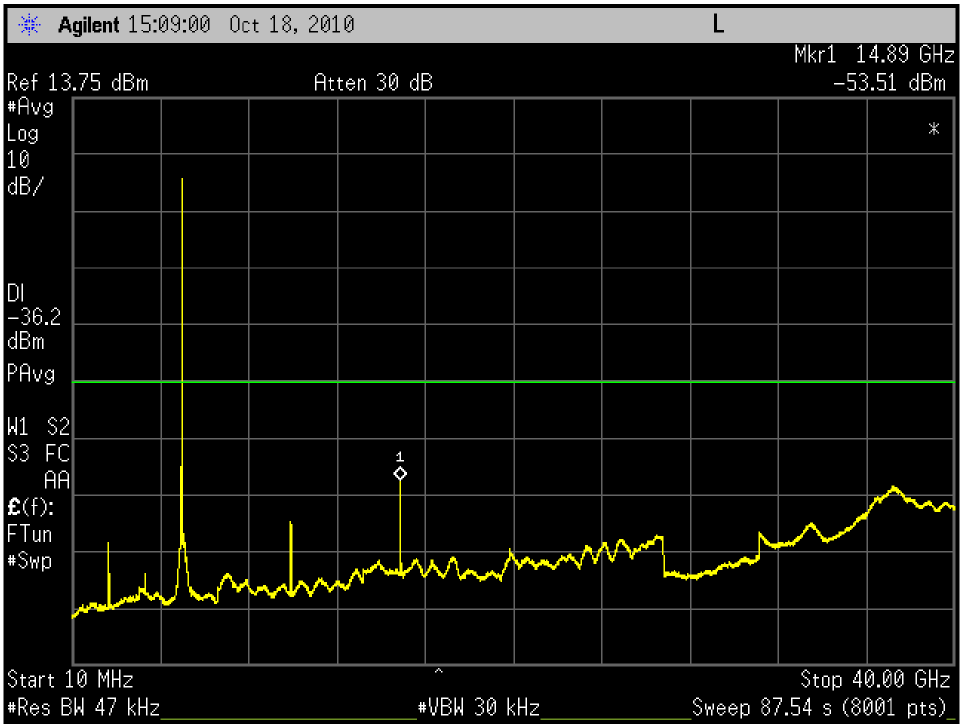


5.4 Out of Band Spurious Test Data

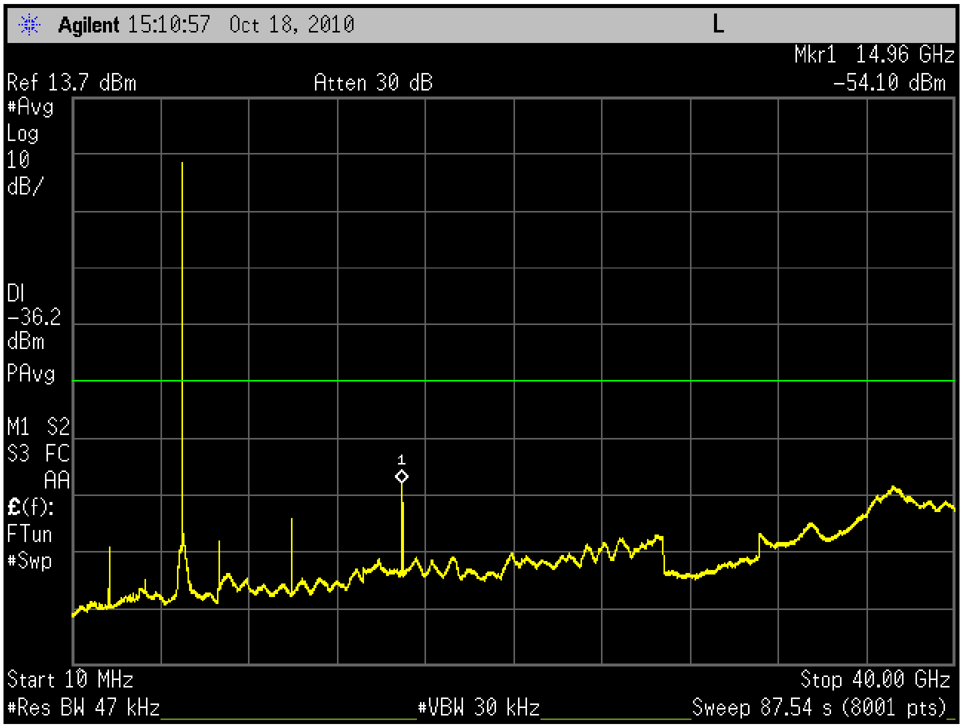
Plot 5-13: Conducted Spurious Emissions; Channel 1 – 4942.5 MHz; 5 MHz BW



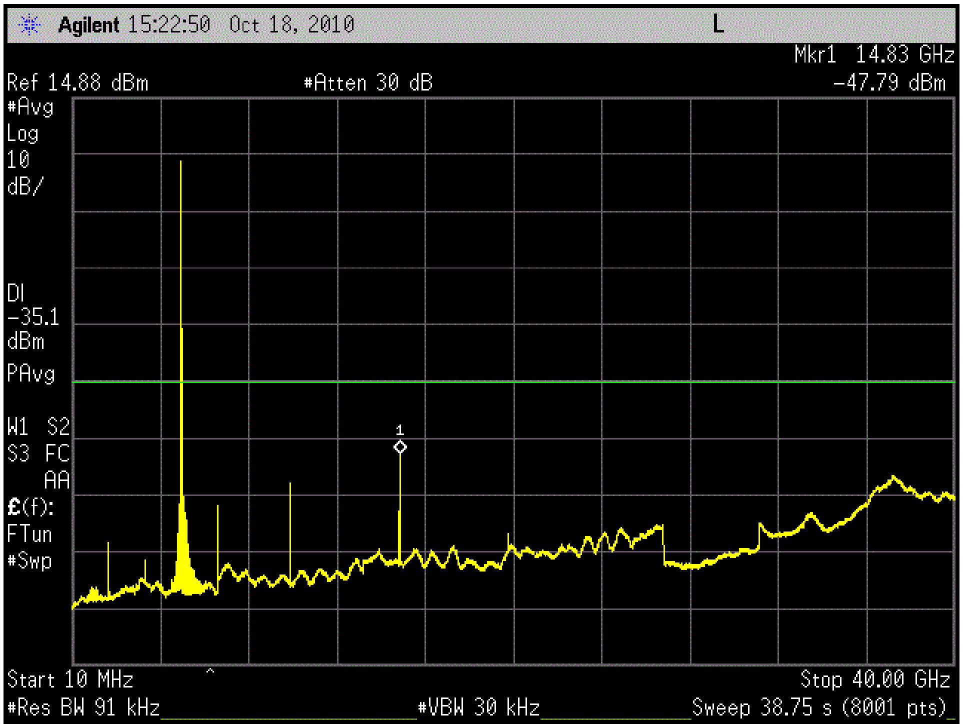
Plot 5-14: Conducted Spurious Emissions; Channel 5 – 4962.5 MHz; 5 MHz BW



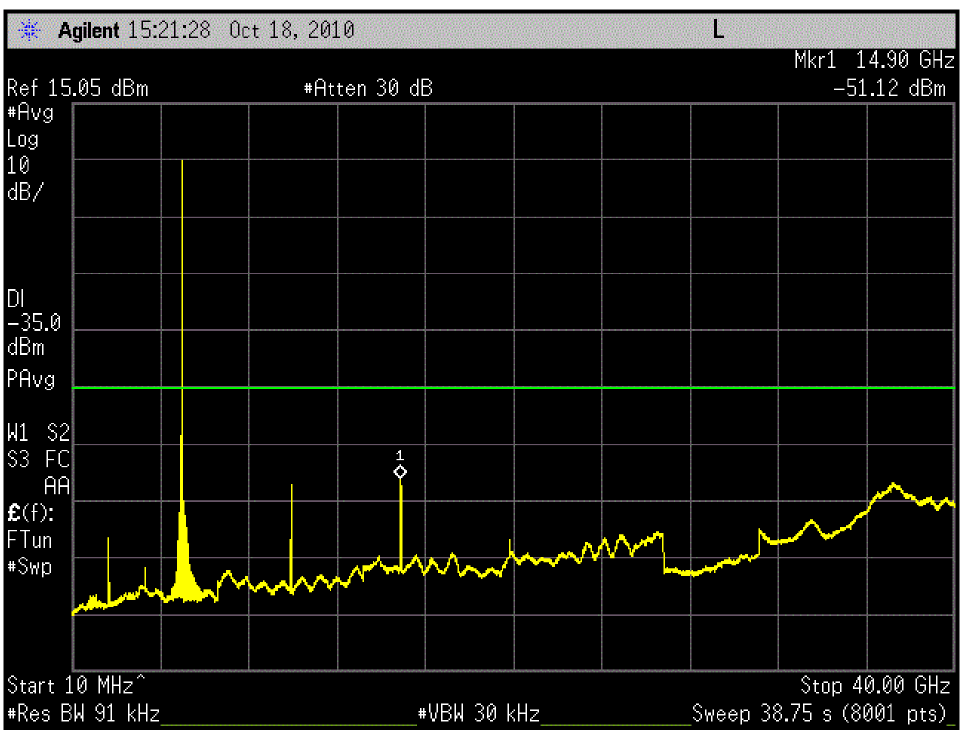
Plot 5-15: Conducted Spurious Emissions; Channel 10 – 4987.5 MHz; 5 MHz BW



Plot 5-16: Conducted Spurious Emissions; Channel 1 – 4945 MHz; 10 MHz BW



Plot 5-17: Conducted Spurious Emissions; Channel 3 – 4965 MHz; 10 MHz BW



Plot 5-18: Conducted Spurious Emissions; Channel 5 – 4985 MHz; 10 MHz BW

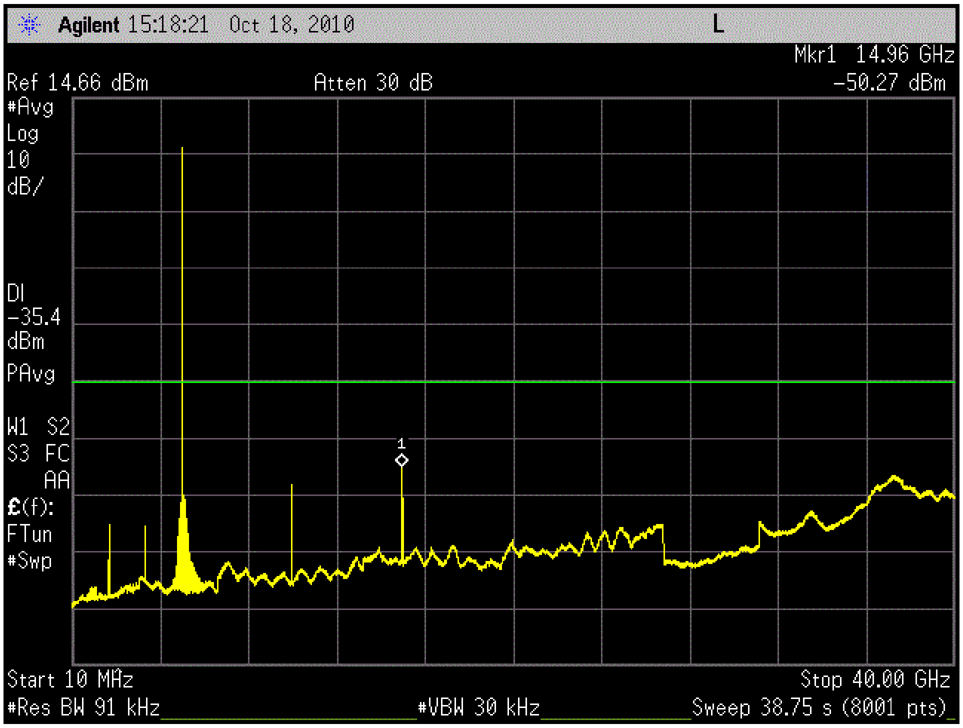


Table 5-3: Test Equipment for Testing Occupied Bandwidth

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
901413	Agilent Technologies	E4448A	Spectrum Analyzer	US44020346	11/11/10
900819	Weinschel Corp.	2	10 dB Attenuator; 5 W	BF0830	2/16/11

Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	October 16 & 18, 2010
Test Engineer	Signature	Dates Of Tests

6 FCC Rules and Regulation §90.213(A) and §2.1055: Frequency Stability; RSS-111 Section 5.2: Transmitter Frequency Stability

§90.213(a): Unless noted elsewhere, transmitters used in the services governed by this part must have minimum frequency stability as specified in table (see 90.213 for table).

Above 2450 MHz, the frequency stability is to be specified in the station authorization.

For equipment authorization purposes, this is a reporting requirement only.

6.1 Test Procedure

TIA-603-C-2004, section 2.3.1 and 2.3.2.

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

The EUT was evaluated over the temperature range -30°C to +60°C.

The temperature was initially set to -30°C and a 2-hour period was observed for stabilization of the EUT. The frequency stability was measured within one minute after application of primary power to the transmitter. The temperature was raised at intervals of 10°C through the range. A ½ hour period was observed to stabilize the EUT at each measurement step, and the frequency stability was measured within one minute after application of primary power to the transmitter. Additionally, the power supply voltage of the EUT was varied +/-15% nominal and range of input voltages.

6.2 Frequency Stability Test Data

Table 6-1: Frequency Stability/Temperature Variation – Channel 1 - 4945 MHz; 10 MHz BW

Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
-30	4945.066049	66.0	13.4
-20	4945.003104	3.1	0.6
-10	4945.089886	89.9	18.2
0	4945.100799	100.8	20.4
10	4945.030545	30.5	6.2
20	4945.000000	0.0	0.0
30	4944.995906	-4.1	-0.8
40	4944.998718	-1.3	-0.3
50	4944.999829	-0.2	0.0
60	4944.998992	-1.0	-0.2

Table 6-2: Frequency Stability/Voltage Variation – Channel 1 - 4945 MHz; 10 MHz BW

Voltage (VDC)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
20.4	4945.004449	4.4	0.9
24	4945.000000	0.0	0.0
27.6	4945.002675	2.7	0.5

Table 6-3: Frequency Stability/Temperature Variation – Channel 3 - 4965 MHz; 10 MHz BW

Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
-30	4965.085371	85.4	17.2
-20	4965.072265	72.3	14.6
-10	4965.059816	59.8	12.1
0	4965.035513	35.5	7.2
10	4965.012320	12.3	2.5
20	4964.999976	0.0	0.0
30	4964.993972	-6.0	-1.2
40	4964.993719	-6.3	-1.3
50	4964.994746	-5.3	-1.1
60	4965.000956	1.0	0.2

Table 6-4: Frequency Stability/Voltage Variation – Channel 3 - 4965 MHz; 10 MHz BW

Voltage (VDC)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
20.4	4965.001972	2.0	0.4
24	4965.000000	0.0	0.0
27.6	4965.003150	3.2	0.6

Table 6-5: Frequency Stability/Temperature Variation – Channel 5 - 4985 MHz; 10 MHz BW

Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
-30	4985.024661	24.7	4.9
-20	4985.009152	9.2	1.9
-10	4985.052621	52.6	10.6
0	4985.012031	12.0	2.4
10	4985.063592	63.6	12.9
20	4984.999969	0.0	0.0
30	4984.994647	-5.4	-1.1
40	4984.994003	-6.0	-1.2
50	4984.999282	-0.7	-0.1
60	4984.993677	-6.3	-1.3

Table 6-6: Frequency Stability/Voltage Variation – Channel 5 - 4985 MHz; 10 MHz BW

Voltage (VDC)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
20.4	4984.994233	-5.8	-1.2
24	4984.999969	0.0	0.0
27.6	4985.001018	1.0	0.2

Table 6-7: Frequency Stability/Temperature Variation – Channel 1 – 4942.5 MHz; 5 MHz BW

Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
-30	4942.572840	72.8	14.7
-20	4942.567255	67.3	13.6
-10	4942.574192	74.2	15.0
0	4942.522266	22.3	4.5
10	4942.506719	6.7	1.4
20	4942.499955	0.0	0.0
30	4942.495384	-4.6	-0.9
40	4942.495630	-4.4	-0.9
50	4942.491841	-8.2	-1.6
60	4942.494224	-5.8	-1.2

Table 6-8: Frequency Stability/Voltage Variation – Channel 1 - 4942.5 MHz; 5 MHz BW

Voltage (VDC)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
20.4	4942.496977	-3.0	-0.6
24	4942.499955	0.0	0.0
27.6	4942.498325	-1.7	-0.3

Table 6-9: Frequency Stability/Temperature Variation – Channel 5 – 4962.5 MHz; 5 MHz BW

Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
-30	4962.546837	46.8	9.4
-20	4962.554238	54.2	11.0
-10	4962.558127	58.1	11.8
0	4962.496249	-3.8	-0.8
10	4962.516521	16.5	3.3
20	4962.499984	0.0	0.0
30	4962.490973	-9.0	-1.8
40	4962.489497	-10.5	-2.1
50	4962.492730	-7.3	-1.5
60	4962.488606	-11.4	-2.3

Table 6-10: Frequency Stability/Voltage Variation – Channel 5 - 4962.5 MHz; 5 MHz BW

Voltage (VDC)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
20.4	4962.499659	-0.3	-0.1
24	4962.499984	0.0	0.0
27.6	4962.497874	-2.1	-0.4

Table 6-11: Frequency Stability/Temperature Variation – Channel 10 – 4987.5 MHz; 5 MHz BW

Temperature (°C)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
-30	4987.520241	20.2	4.1
-20	4987.515232	15.2	3.1
-10	4987.525341	25.3	5.1
0	4987.504225	4.2	0.8
10	4987.498423	-1.6	-0.3
20	4987.500040	0.0	0.0
30	4987.483437	-16.6	-3.3
40	4987.485745	-14.3	-2.9
50	4987.483992	-16.0	-3.2
60	4987.490381	-9.6	-1.9

Table 6-12: Frequency Stability/Voltage Variation – Channel 10 - 4987.5 MHz; 5 MHz BW

Voltage (VDC)	Measured Frequency (MHz)	Delta Frequency (kHz)	ppm
20.4	4987.494574	-5.4	-1.1
24	4987.500040	0.0	0.0
27.6	4987.502089	2.1	0.4

Table 6-13: Test Equipment for Testing Frequency Stability

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due Date
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	7/23/11
901413	Agilent Technologies	E4448	Spectrum Analyzer	US44020346	11/11/10
901350	Meterman	33XR	Multimeter	040402802	11/23/10
901517	Insulated Wire Inc.	KPS-1503-360-KPS-09302008	RF cable 36"	NA	10/19/11

Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	October 21, 2010
Test Engineer	Signature	Date Of Tests

7 FCC Rules and Regulations §90.210(l) and §2.1053(a): Field Strength of Spurious Radiation; RSS-111 §5.4: Transmitter Unwanted Emissions

§90.210(l): Emission Mask M: For high power transmitters (20 dBm or greater) operating in the 4940-4990 MHz frequency band, the power spectral density of the emissions must be attenuated below the output power of the transmitter as follows:

On any frequency removed from the assigned frequency above 150% of the authorized bandwidth: 50 dB

7.1 Test Procedure

TIA-603-C-2004, section 2.2.12

The EUT was set to center channel and output power was set to maximum.

The EUT was placed on a non-conducting table 80 cm above the ground plane. The antenna-to-EUT distance is 3 m. The EUT is rotated through 360 degrees to maximize emissions. The antenna is scanned in both vertical and horizontal polarizations. 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.

The EUT was scanned from 30 MHz to the 10th harmonic of the fundamental. The spectrum analyzer resolution bandwidth was set to 1 MHz, and the video bandwidth was set to 1 MHz.

7.2 Test Data

Table 7-1: Field Strength of Spurious Radiation: Channel 1 – 4945 MHz; 10 MHz BW

Limit = 50 dBc or -20.1 dBm
Conducted Power (Avg) = 29.9 dBm = 0.977 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9890.0	59.5	-17.7	19.9	9.3	-28.3	-20.1	-8.2
14835.0	47.9	-22.4	21.3	10.3	-33.4	-20.1	-13.3
19780.0	29.6	-17.8	26.9	17.9	-26.8	-20.1	-6.7
24725.0	26.6	-17.3	29.4	17.9	-28.8	-20.1	-8.7

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole antenna.

Table 7-2: Field Strength of Spurious Radiation: Channel 3 – 4965 MHz; 10 MHz BW

Limit = 50 dBc or -20.1 dBm
Conducted Power (Avg) = 29.9 dBm = 0.977 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9930.0	54.8	-22.3	19.9	9.2	-33.0	-20.1	-12.9
14895.0	40.6	-29.4	21.3	10.5	-40.2	-20.1	-20.1
19860.0	30.8	-16.3	26.9	17.9	-25.3	-20.1	-5.2
24825.0	26.6	-17.0	29.4	17.9	-28.5	-20.1	-8.4

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole antenna.

Table 7-3: Field Strength of Spurious Radiation: Channel 5 – 4985 MHz; 10 MHz BW

Limit = 50 dBc or -20 dBm
Conducted Power (Avg) = 30 dBm = 1 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9970.0	60.1	-15.9	19.9	9.2	-26.6	-20.0	-6.6
14955.0	40.4	-30.5	21.3	10.6	-41.2	-20.0	-21.2
19940.0	30.7	-16.4	27.0	17.9	-25.5	-20.0	-5.5
24925.0	26.7	-16.4	29.5	17.9	-28.0	-20.0	-8.0

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole antenna.

Table 7-4: Field Strength of Spurious Radiation: Channel 1 – 4942.5 MHz; 5 MHz BW

Limit = 50 dBc or -23.2 dBm
Conducted Power (Avg) = 26.8 dBm = 0.479 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9885.0	55.6	-22.9	18.5	9.3	-32.1	-23.2	-8.9
14827.5	46.4	-26.0	22.7	10.3	-38.4	-23.2	-15.2
19770.0	22.9	-24.6	26.9	17.9	-33.6	-23.2	-10.4
24712.5	23.2	-20.7	29.4	17.9	-32.2	-23.2	-9.0

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole antenna.

Table 7-5: Field Strength of Spurious Radiation: Channel 5 – 4962.5 MHz; 5 MHz BW

Limit = 50 dBc or -23.2 dBm
Conducted Power (Avg) = 26.8 dBm = 0.479 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9925.0	55.2	-23.3	18.5	9.2	-32.6	-23.2	-9.4
14887.5	40.7	-31.7	22.8	10.4	-44.1	-23.2	-20.9
19850.0	24.9	-22.2	26.9	17.9	-31.2	-23.2	-8.0
24812.5	24.2	-19.4	29.4	17.9	-30.9	-23.2	-7.7

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole antenna.

Table 7-6: Field Strength of Spurious Radiation: Channel 10– 4987.5 MHz; 5 MHz BW

Limit = 50 dBc or -23.6 dBm
Conducted Power (Avg) = 26.4 dBm = 0.437 W

Frequency (MHz)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9975.0	52.0	-26.4	18.5	9.2	-35.7	-23.6	-12.1
14962.5	40.3	-31.7	22.9	10.6	-44.0	-23.6	-20.4
19950.0	24.9	-22.2	27.0	10.6	-38.6	-23.6	-15.0
24937.5	24.5	-18.6	29.5	10.6	-37.5	-23.6	-13.9

*This insertion loss corresponds to the cable connecting the RF Signal Generator to the ½ wave dipole antenna.

Table 7-7: Test Equipment 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	12/12/10
901413	Agilent Technologies	E4448	Spectrum Analyzer	US44020346	11/11/10
N/A	Rohde & Schwarz	SMR40	Signal Generator	1104.0002.40	3/15/12
900321	EMCO	3161-03	Horn Antennas (4 – 8 GHz)	9508-1020	6/14/11
900323	EMCO	3160-07	Horn Antennas (8.2 – 12 GHz)	9605-1054	6/14/11
900356	EMCO	3160-08	Horn Antennas (12.4 – 18 GHz)	9607-1044	6/14/11
901218	EMCO	3160-09	Horn Antenna (18 - 26 GHz)	960281-003	6/14/11
900126	Hewlett Packard	11970A	Harmonic Mixer (26.5 - 40 GHz)	2332A01199	10/29/11
901303	EMCO	3160-10	Horn Antenna (26.5 - 40.0 GHz)	960452-007	6/14/11
901262	ETS	3160-9	Double ridged Guide Antenna (1 - 18 GHz)	6748	5/1/11
901426	Insulated Wire Inc.	KPS-1503-3600-KPS	RF cable, 30'	NA	10/19/11
901516	Insulated Wire, Inc.	KPS-1503-2400-KPS-09302008	RF cable, 20'	NA	10/19/11
901517	Insulated Wire Inc.	KPS-1503-360-KPS-09302008	RF cable 36"	NA	10/19/11

Test Personnel:

Daniel Baltzell	Daniel W. Baltzell	October 18, 2010
Test Engineer	Signature	Date Of Tests

8 Conclusion

The data in this measurement report shows that the **Harris Corporation, Model: Client 4.9 GHz, 802.16 VBB, 5/10, Model #: VM-WM4900-CL001**; **FCC ID: BV8WM4900CL, IC: 3670A-WM4900CL,** complies with all the applicable requirements of Parts 90 and 2 of the FCC Rules, and Industry Canada RSS-111.