Engineering and Testing for EMC and Safety Compliance

Certification Report

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Model: 4.9 GHz VIDA Broadband Base Station
4940 – 4990 MHz

FCC ID: BV8VIDA-BB
IC: 3670A-VIDABB

October 20, 2006

Standards Referenced for this Report	
Part 2: 2006	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
Part 90: 2006	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 1	Broadband Public Safety Equipment Operating in the Band 4940-4990 MHz

Frequency Range	Rated Transmit Power (W) Conducted	Measured Frequency Tolerance (ppm)	Emission Designator
4940-4990 MHz	0.5	1.4	5M0X7D

Report Prepared by Test Engineer: Daniel Biggs

Document Number: 2006156

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1 General Information

The following Certification Report is prepared on behalf of **M/A-COM, Inc**. in accordance with the Federal Communications Commission and Industry Canada. The Equipment Under Test (EUT) was the **4.9 GHz VIDA Broadband Base Station; FCC ID: BV8VIDA-BB**, **IC: 3670A-VIDABB**. 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 is an original application report.

2 Tested System Details

The test sample was received on October 9, 2006. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable. The 4.9 GHz VIDA Broadband Base Station implements the 802.16-2004 protocol in a 5 MHz channel, delivering an over-the-air throughput of 4–19 Mbps. The system was tested at a data rate of 6 Mb/s at 5 MHz channel bandwidth. The base station used for testing was AC powered; there is also a version that is powered by DC voltage, to be included in this certification also. The RF portions of both versions are identical. The difference between the versions is digital and power circuitry. Both versions were tested for Part 15 unintentional emissions; this data is contained in a separate DoC report.

Model Tested	4.9 GHz VIDA Broadband Base Station
Frequency Band	4940–4990 MHz
Modulation Type	OFDM, QPSK, BPSK, 16 QAM, 64 QAM
Channel Step Size	1 MHz
Channel Bandwidth	5 MHz
Primary Power	110 VAC/24 VDC
Rated Transmitter Output Power	0.5 - .005 W (27 dBm to 7 dBm programmable with 1 dB step)
Duty Cycle	50% maximum

Table 2-1: Equipment Under Test (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Base Station (AC powered)	M/A-Com, Inc.	4.9 GHz VIDA Broadband Base Station	MAVM-VMXBA	BV8VIDA-BB	17540
Base Station (DC powered)	M/A-Com, Inc.	4.9 GHz VIDA Broadband Base Station	MAVM-VMXBD	BV8VIDA-BB	17541
Antenna (26 dBi gain)	MTI	Linear Vertical	MT-466003	N/A	17334
GPS Antenna Kit	M/A-Com, Inc.	GPS	ANPC185B-Y-180-SM	N/A	17336

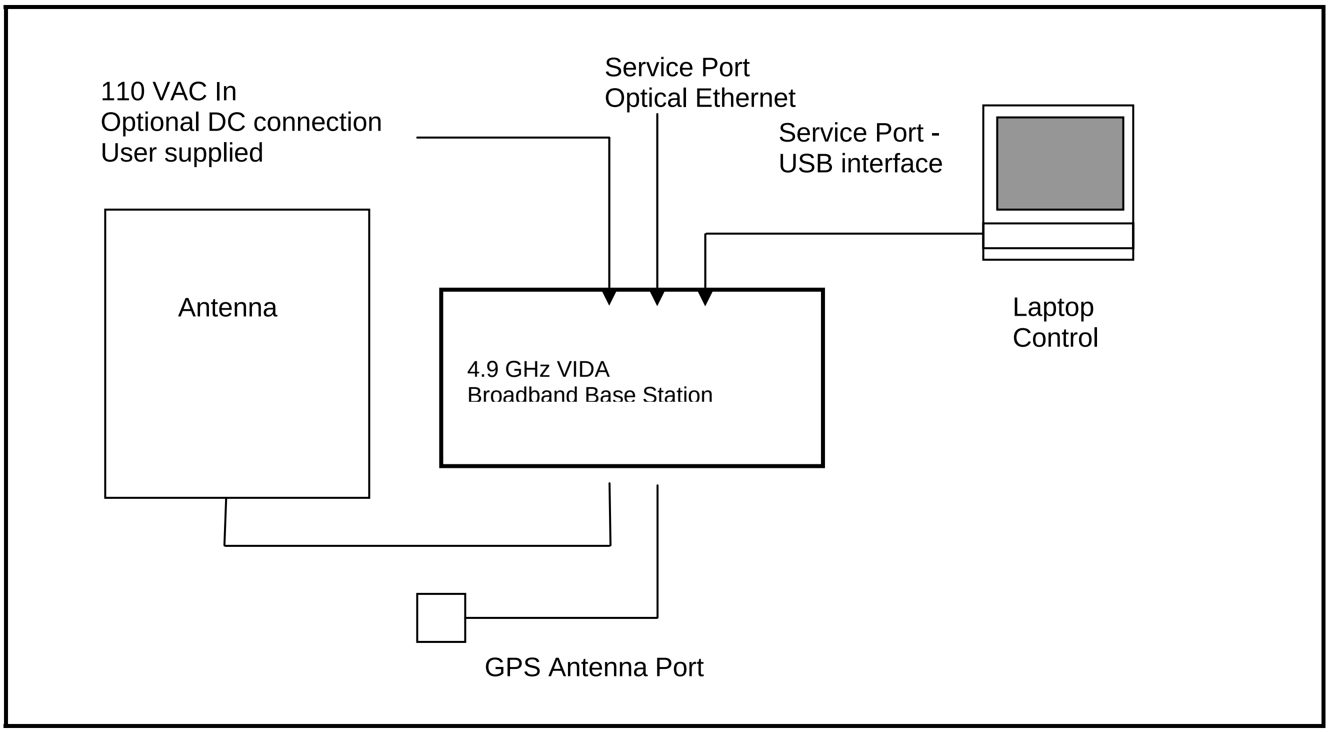
Table 2-2: Ports and Cabling (EUT)

Port	Cable Type	Quantity	Length (feet)	Shield
AC Power Port	3-pin industrial Conxall	1	6	No
DC Power Port	2-pin industrial Conxall	1	6	No
RJ-45 Gigabit Ethernet Port	RJ-45	2	6	No
Remote Antenna Mount Port	N type female	1	6	Yes
Service Port	RJ-45	1	N/A	No
GPS Port	SMA female	1	>6	Yes

Table 2-3: Support Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Notebook Computer	Dell	Latitude	N/A	N/A	17545
RJ-45 Cable	N/A	N/A	N/A	N/A	N/A

Figure 2-1: Configuration of Tested System



3 FCC Rules and Regulations Part 2 §2.1033(c)(8): Voltages and Currents Through The Final Amplifying Stage

Nominal DC Voltage: 10 VDC
Current: 1.2 AMPS

4 FCC Rules and Regulations Part 90 §90.1215(a) & Part 2 §2.1046(a): Peak Output Power; RSS-111 Section 4.3: 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

High power devices are also limited to a peak power spectral density of 21 dBm per 1 MHz. High power devices using channel bandwidths other than those listed above are permitted, however they are limited to a peak power spectral density of 21 dBm MHz. If the transmitting antennas of directional gain greater than 9 dBi are used, both the peak transmit power and the peak power spectral density should be reduced by the amount in decibels that the directional gain of the antenna exceeds 9 dBi. However, high power point-to-point or point-to-multipoint operation (both fixed and temporary-fixed rapid deployment) may employ transmitting antennas with a directional gain up to 26 dBi without any corresponding reduction in the transmitter power or the spectral density. Corresponding reduction in the peak transmit power and peak power spectral density should be the amount in decibels that the directional gain of the antenna exceeds 26 dBi.

4.1 Test Procedure

The EUT transmitter output was connected through an appropriate 50 ohm attenuator to a spectrum analyzer. The resolution bandwidth was set to a value greater than the signal bandwidth. The video bandwidth was set to a value greater than the resolution bandwidth (preferred value is video bandwidth at least three times greater than the resolution bandwidth). Peak power was taken with trace in max hold and no averaging.

4.2 Test Data

The EUT complies with 47CFR2.1046 and 90.1215(a). The EUT does not exceed 27 dBm at carrier frequency.

Table 4-1: RF Power Output: Carrier Output Power

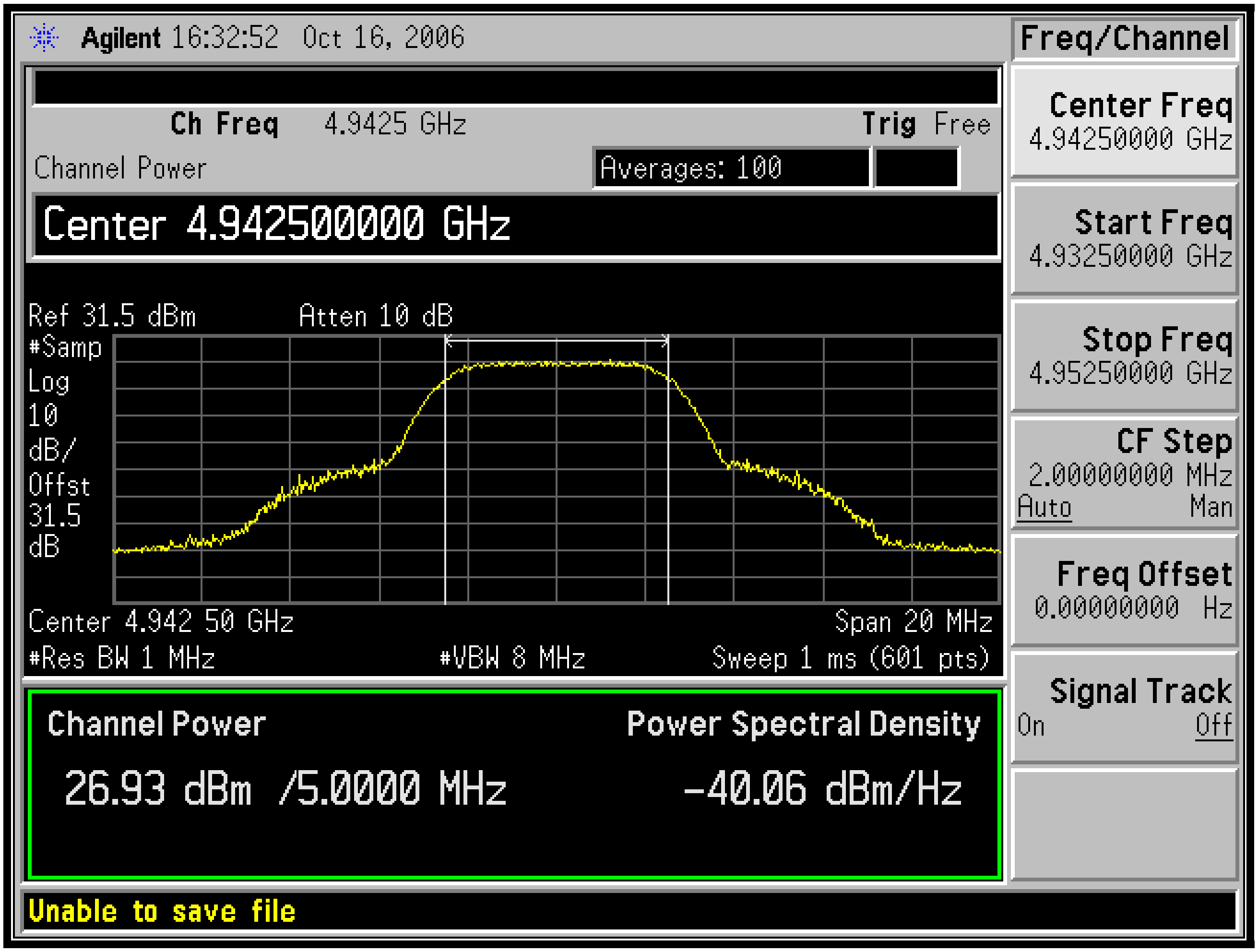
Channel	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)
3	4942.5	26.93	27
6	4947.5	26.89	27
7	4952.5	26.93	27
8	4957.5	26.91	27
9	4962.5	26.90	27
10	4967.5	26.74	27
11	4972.5	26.83	27
12	4977.5	26.91	27
13	4982.5	26.94	27
16	4987.5	26.93	27

*Measurement accuracy: +/-.3 dB

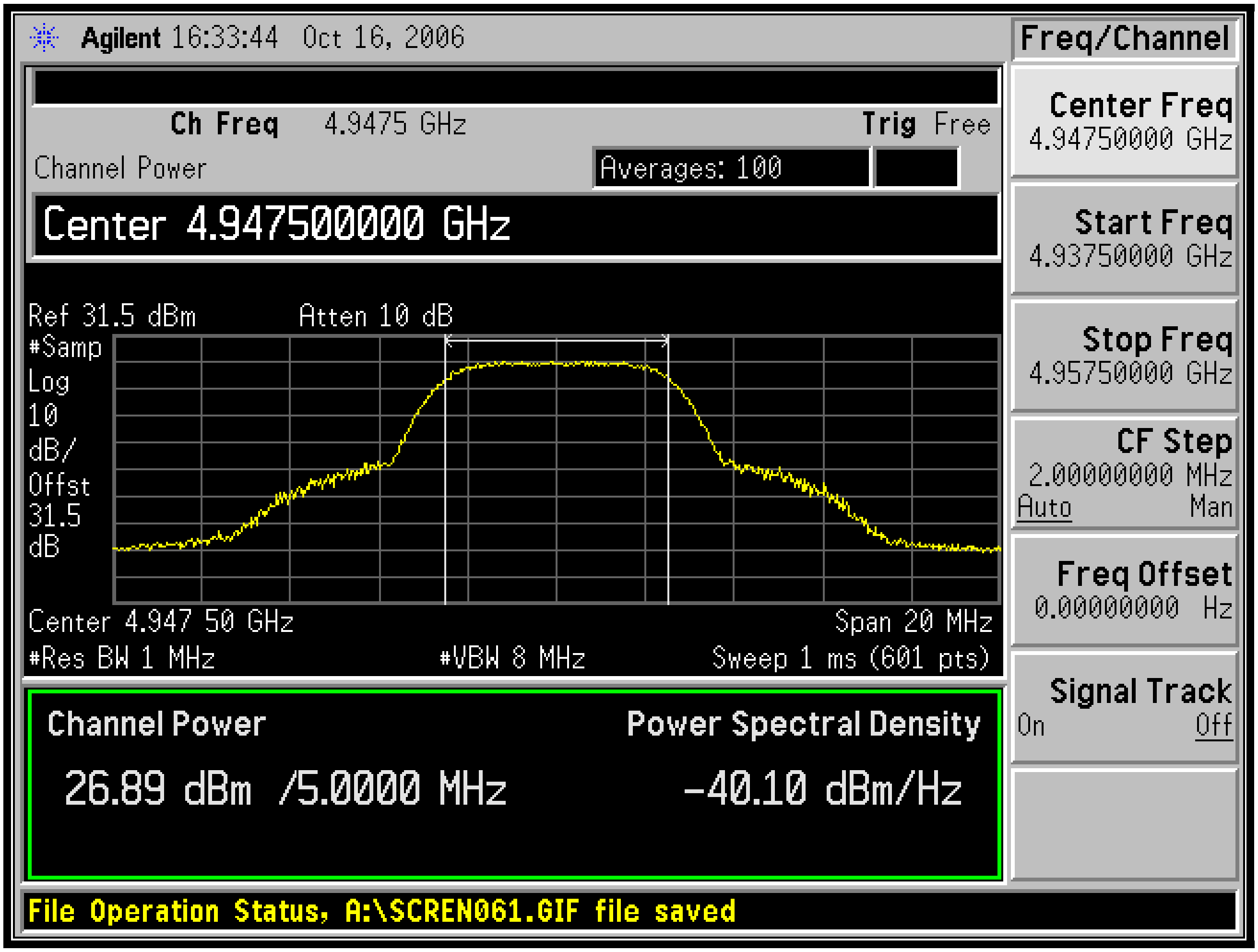
Table 4-2: RF Power Output (Rated Power)

Rated Power
0.5 W

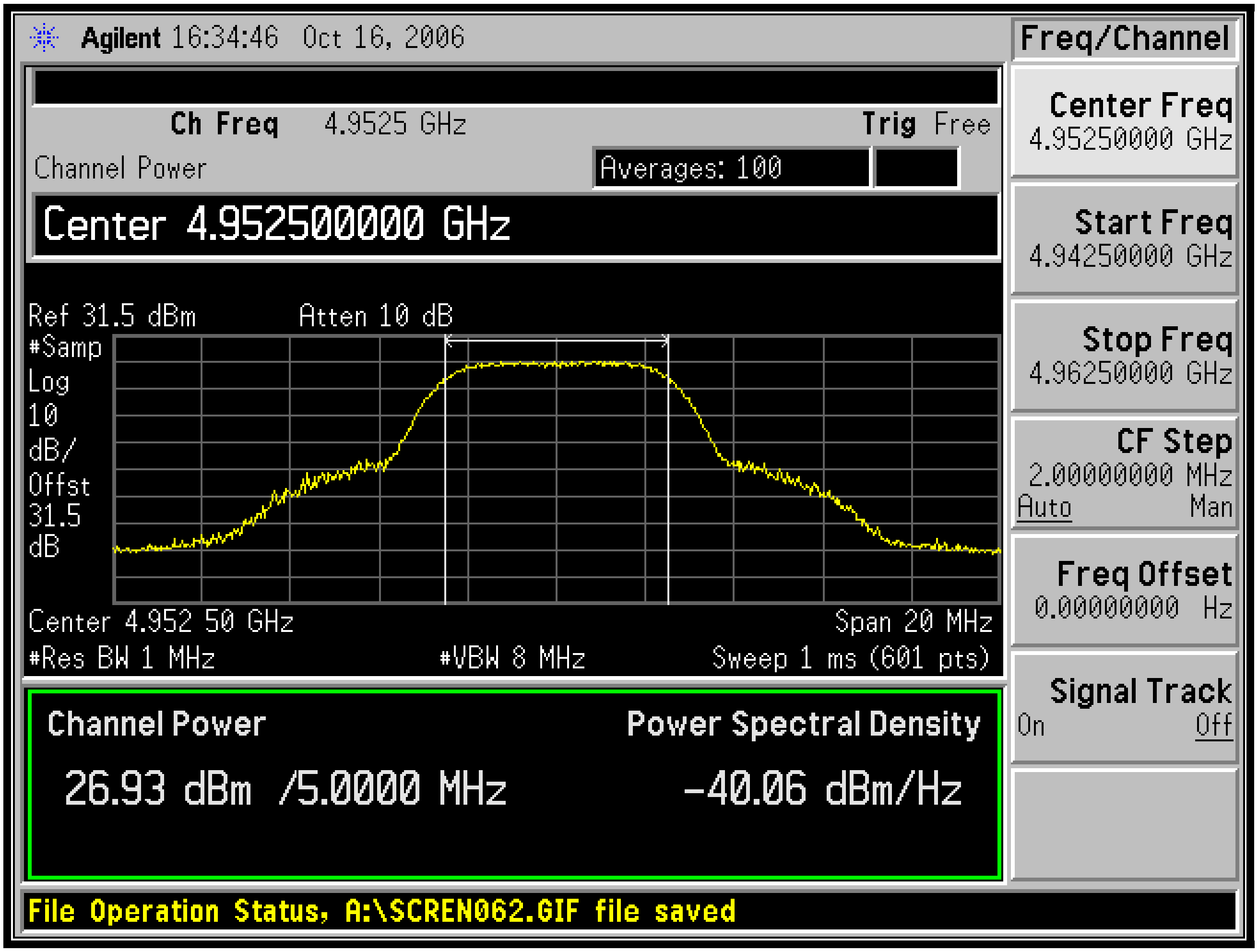
Plot 4-1: Channel Power Output; Channel 3 - 4942.5 MHz



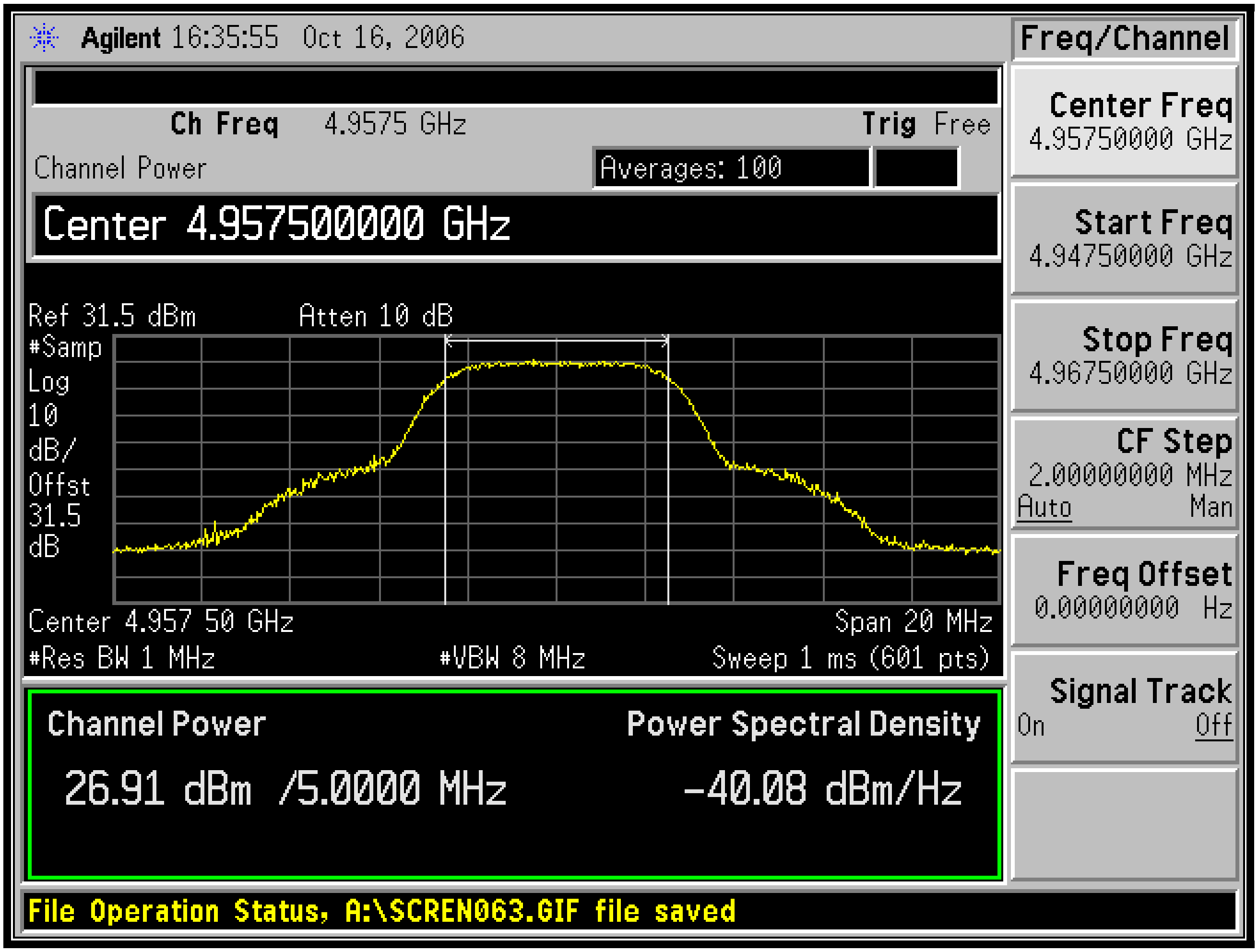
Plot 4-2: Channel Power Output; Channel 6 - 4947.5 MHz



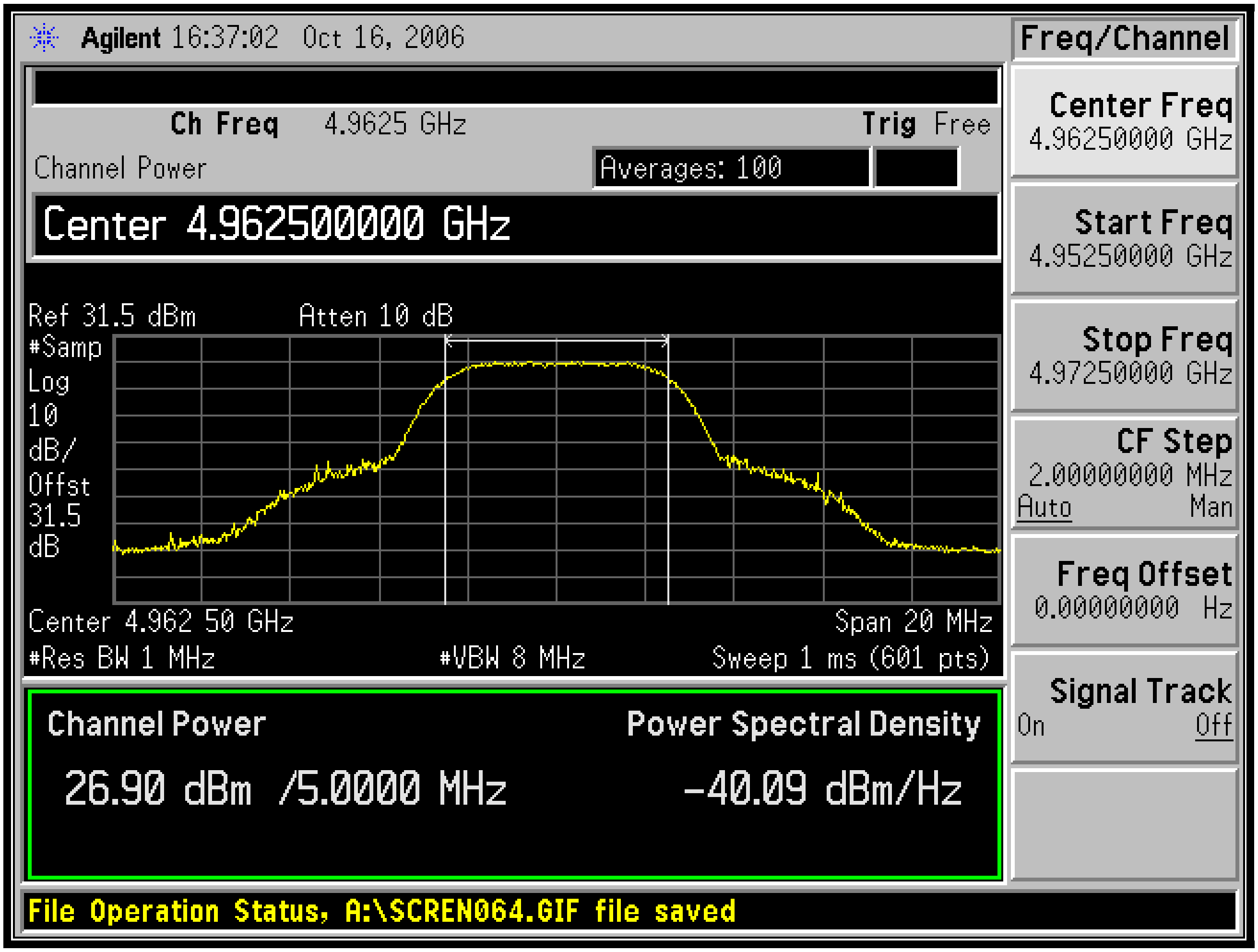
Plot 4-3: Channel Power Output; Channel 7 - 4952.5 MHz



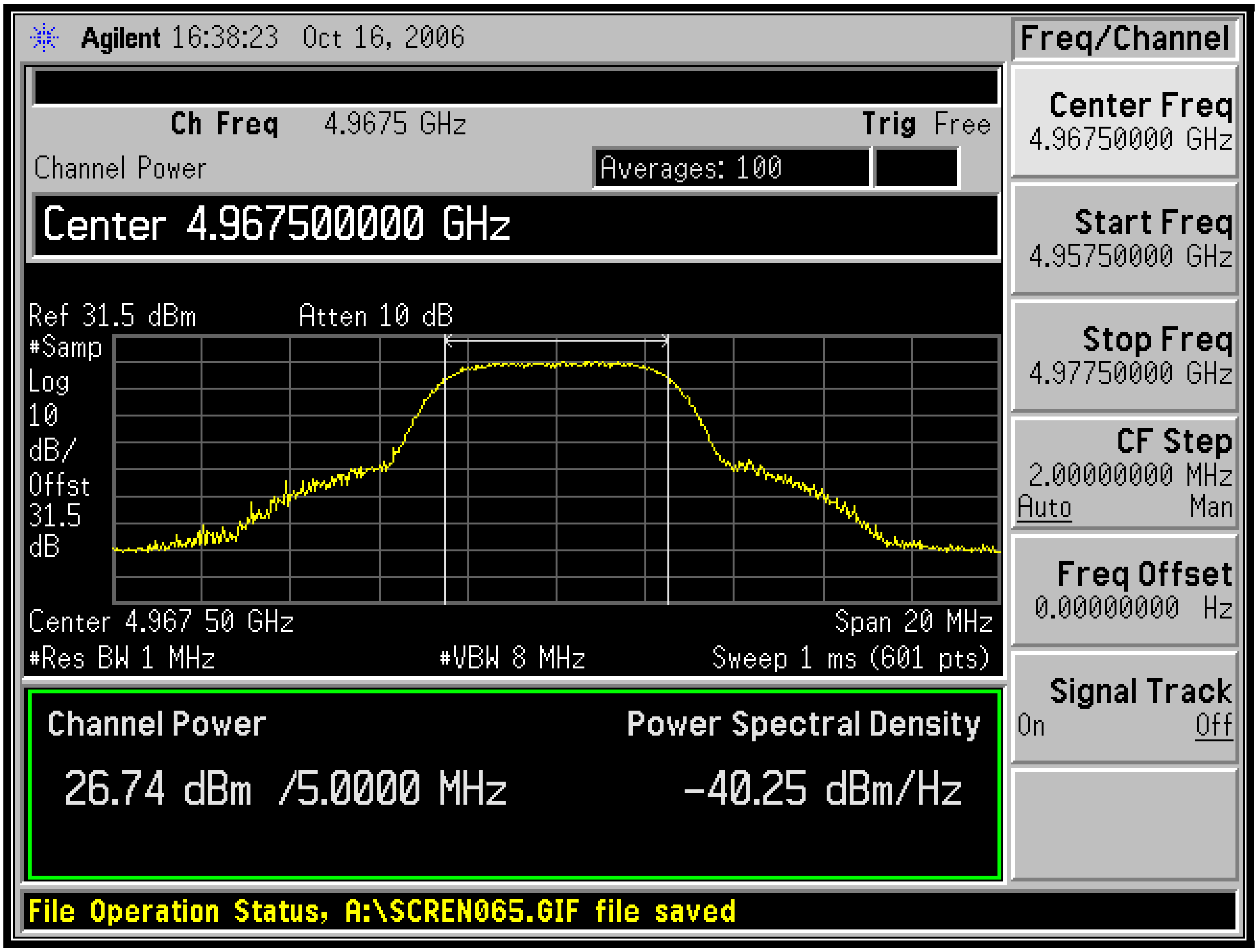
Plot 4-4: Channel Power Output; Channel 8 - 4957.5 MHz



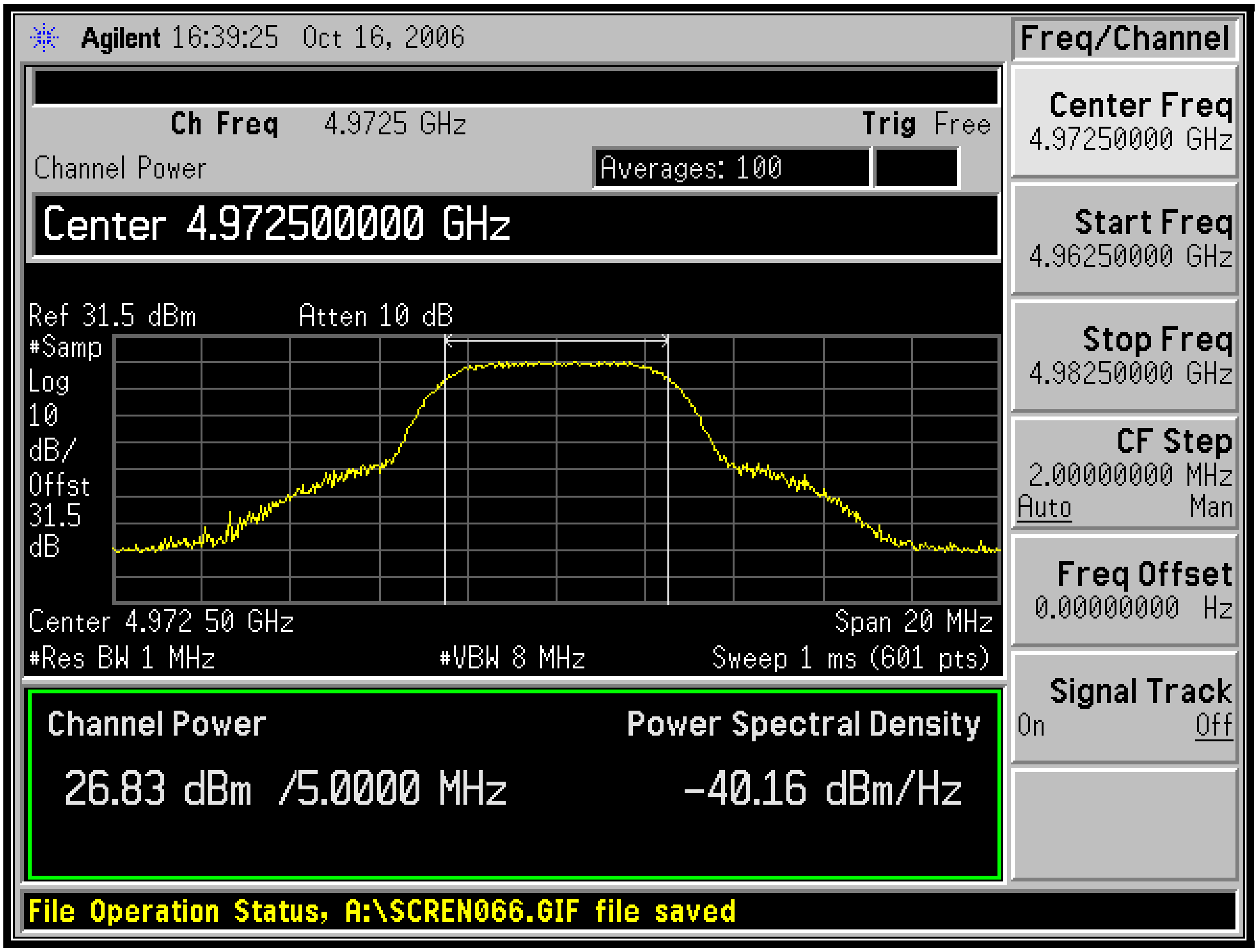
Plot 4-5: Channel Power Output; Channel 9 - 4962.5 MHz



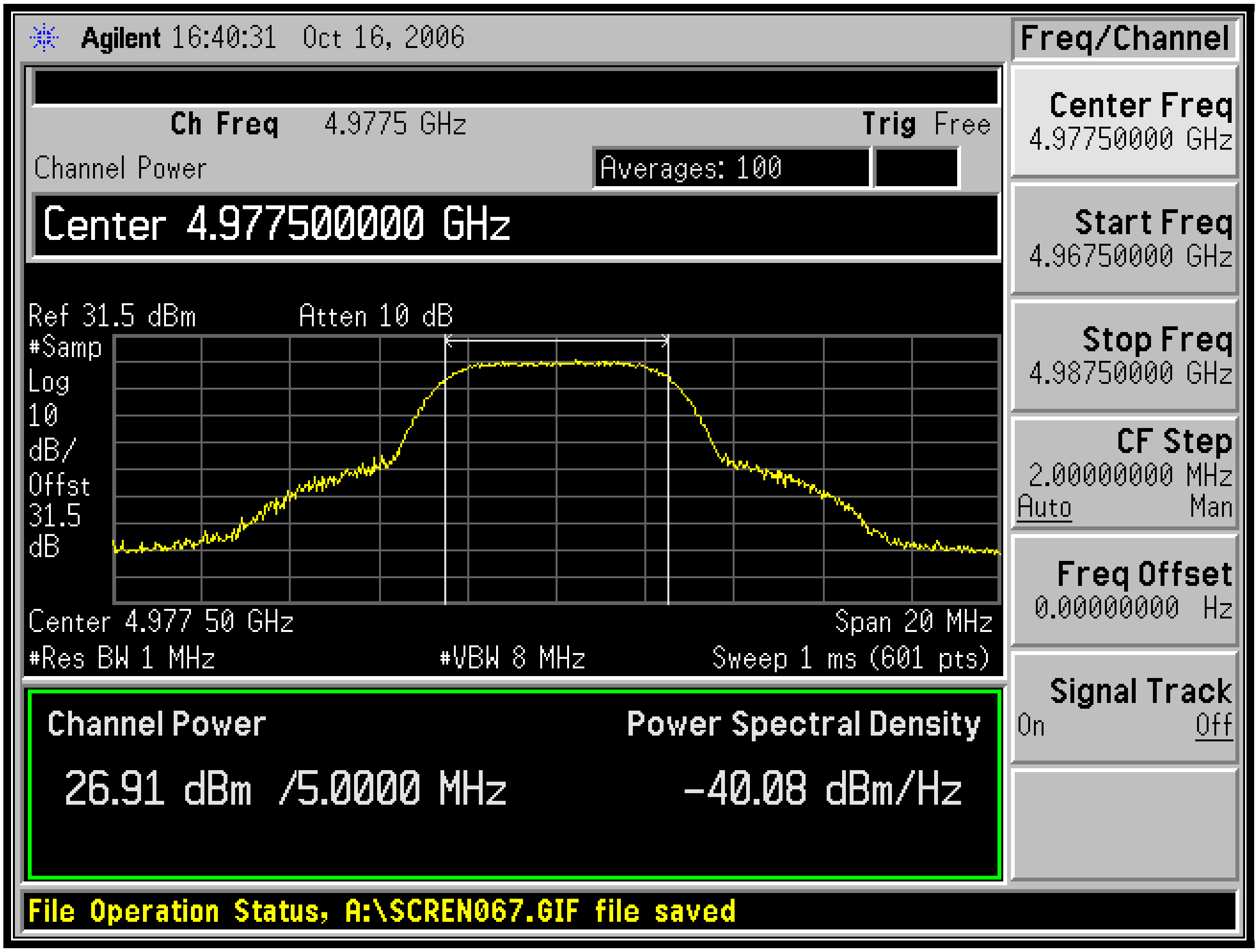
Plot 4-6: Channel Power Output; Channel 10 - 4967.5 MHz



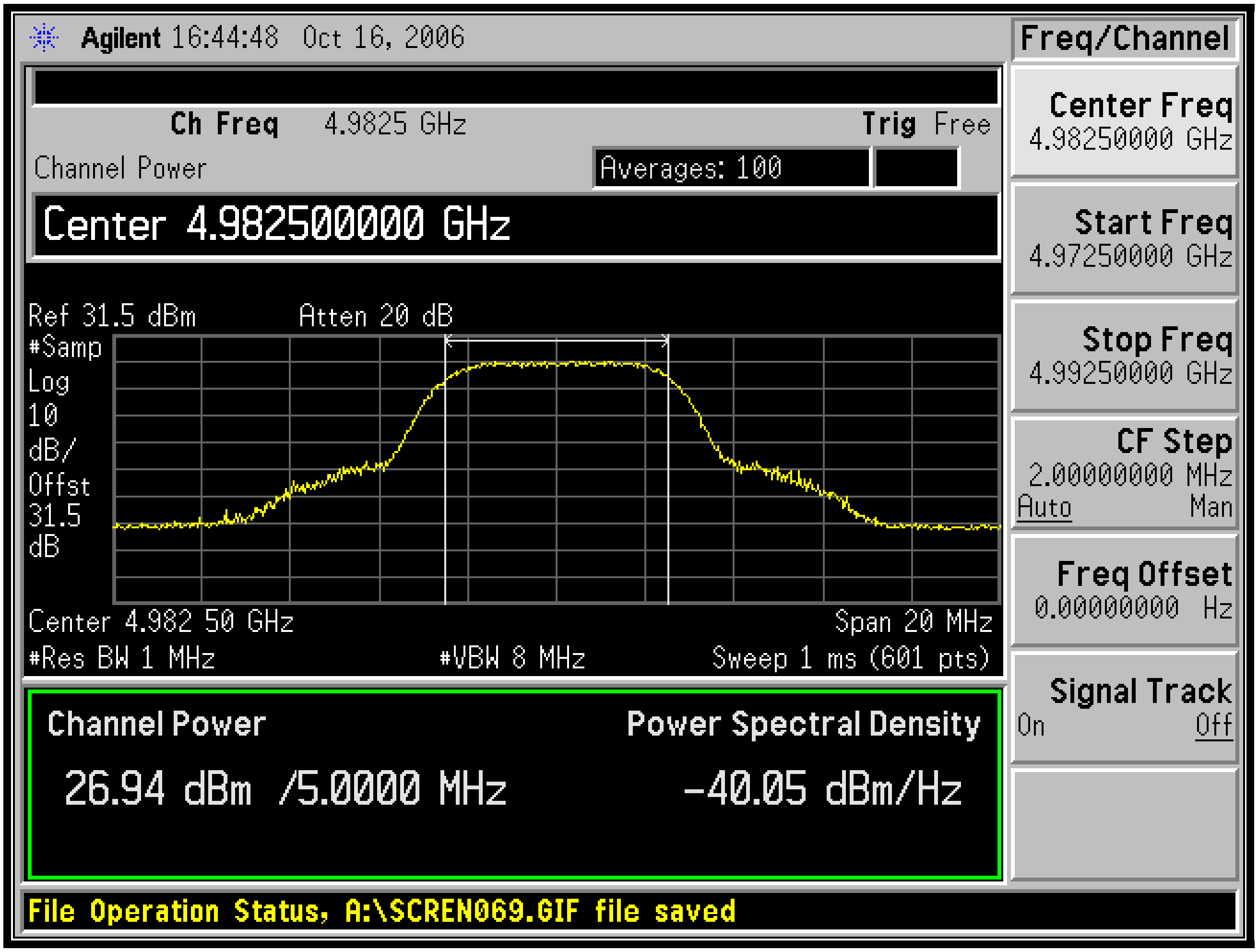
Plot 4-7: Channel Power Output; Channel 11 - 4972.5 MHz



Plot 4-8: Channel Power Output; Channel 12 - 4977.5 MHz



Plot 4-9: Channel Power Output; Channel 13 - 4982.5 MHz



Plot 4-10: Channel Power Output; Channel 16 - 4987.5 MHz

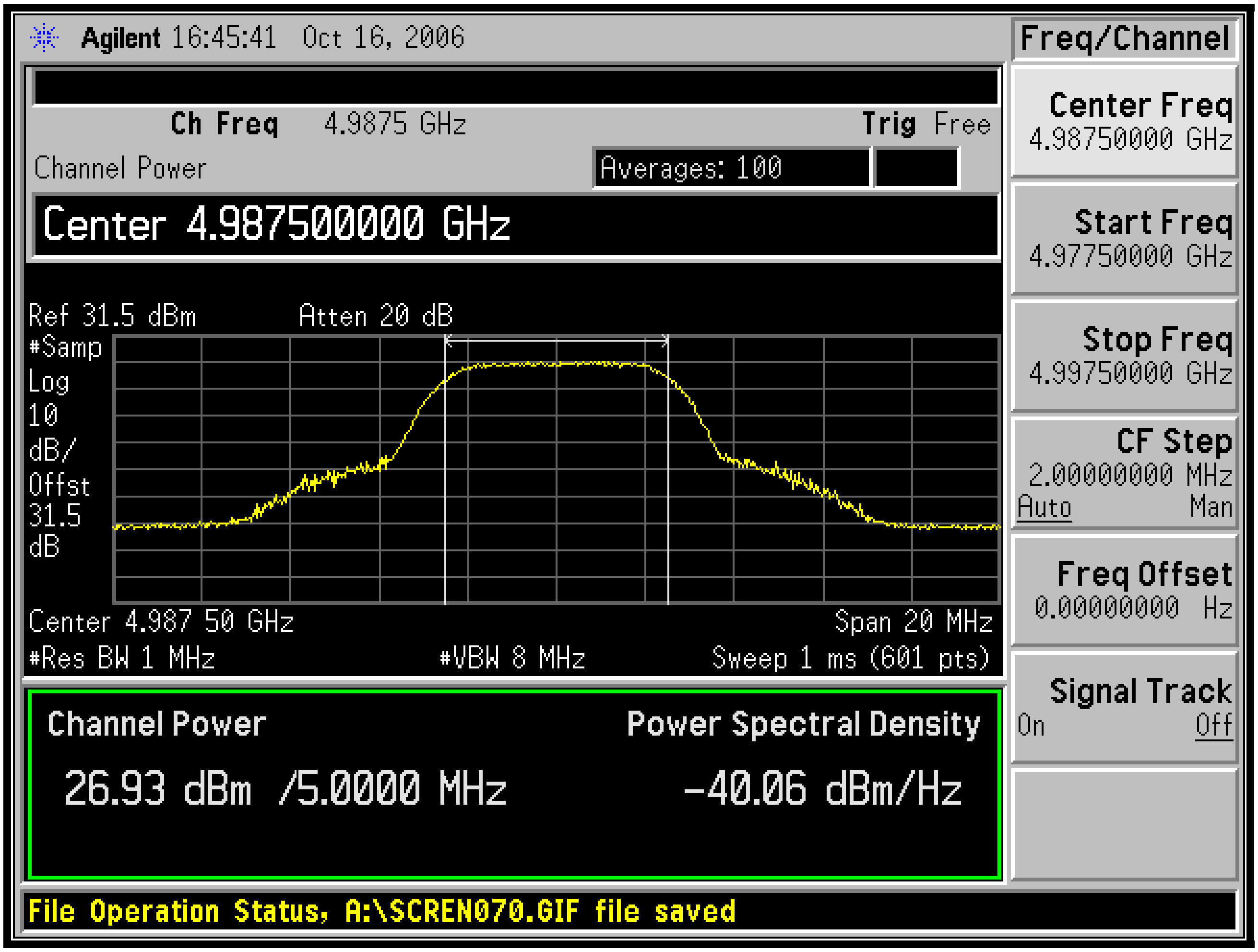


Table 4-3: Test Equipment for Testing RF Power Output - Conducted

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901413	Agilent	E4448	Spectrum Analyzer	US44020346	11/2/06
901138	MCE Weinschel	48-20-34	Attenuator, 20 dB, DC-18 GHz, 100 W	BK5859	12/9/08
900948	MCE Weinschel	47-10-43	Attenuator, 10 dB, DC-18 GHz, 50 W	BH1487	12/2/08

Test Personnel:

Daniel Biggs		October 16, 2006
Test Engineer	Signature	Date Of Tests

5 FCC Rules and Regulations Part 90 §90.1215(a): Peak Power Spectral Density; RSS-111 Section 4.3: Transmitter Output Power and Channel Bandwidth

(a) High power devices are also limited to a peak power spectral density of 21 dBm per 1 MHz. High power devices using channel bandwidths other than those listed above are permitted, however they are limited to a peak power spectral density of 21 dBm MHz. If the transmitting antennas of directional gain greater than 9 dBi are used, both the peak transmit power and the peak power spectral density should be reduced by the amount in decibels that the directional gain of the antenna exceeds 9 dBi. However, high power point-to-point or point-to-multipoint operation (both fixed and temporary-fixed rapid deployment) may employ transmitting antennas with a directional gain up to 26 dBi without any corresponding reduction in the transmitter power or the spectral density. The corresponding reduction in the peak transmit power and peak power spectral density should be the amount in decibels that the directional gain of the antenna exceeds 26 dBi.

(b) The peak power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the EUT. 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 EUT, 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

5.1 Test Procedure

The EUT transmitter output was connected through the appropriate 50 ohm attenuator to a spectrum analyzer. Per FCC 90.1215(b), the resolution bandwidth was set to 1 MHz and the video bandwidth was set to a value greater than the resolution bandwidth (8 MHz). Peak search was used to find peak spectral density within 1 MHz of the signal bandwidth.

A combined 10 dB and a 20 dB attenuator was used between the EUT and Spectrum analyzer for PSD measurement. No cable was used; the attenuators were directly connected from EUT to Analyzer.

Path loss calculated as follows (this was checked across the frequency band of interest):

The system loss was measured by using a signal generator and reference cable. The attenuation was measured first with the reference cable, and then with the reference cable and attenuators.

Loss (reference cable/attenuators) – Loss (reference cable) = System loss

31.2 dB - 0.8 dB = 30.5 dB total system loss (relative offset entered into analyzer)

5.2 Test Data

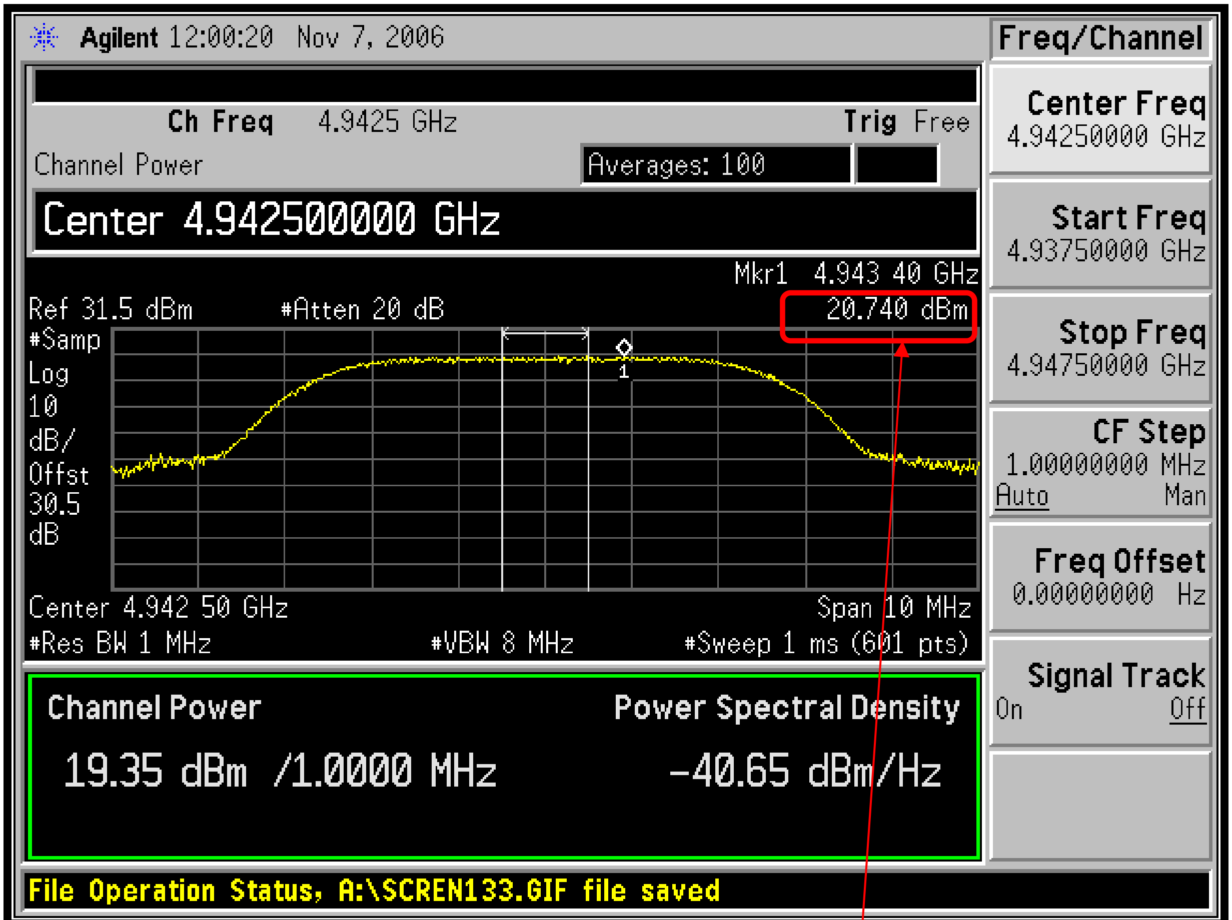
The EUT complies with 47CFR2.1046 and 90.1215(a). The EUT does not exceed 21 dBm at carrier frequency.

Table 5-1: 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)
3	4942.5	5	20.74	21
6	4947.5	5	20.79	21
7	4952.5	5	20.66	21
8	4957.5	5	20.29	21
9	4962.5	5	20.69	21
10	4967.5	5	20.61	21
11	4972.5	5	20.70	21
12	4977.5	5	20.70	21
13	4982.5	5	20.53	21
16	4987.5	5	20.78	21

* Measurement accuracy: +/-.3 dB

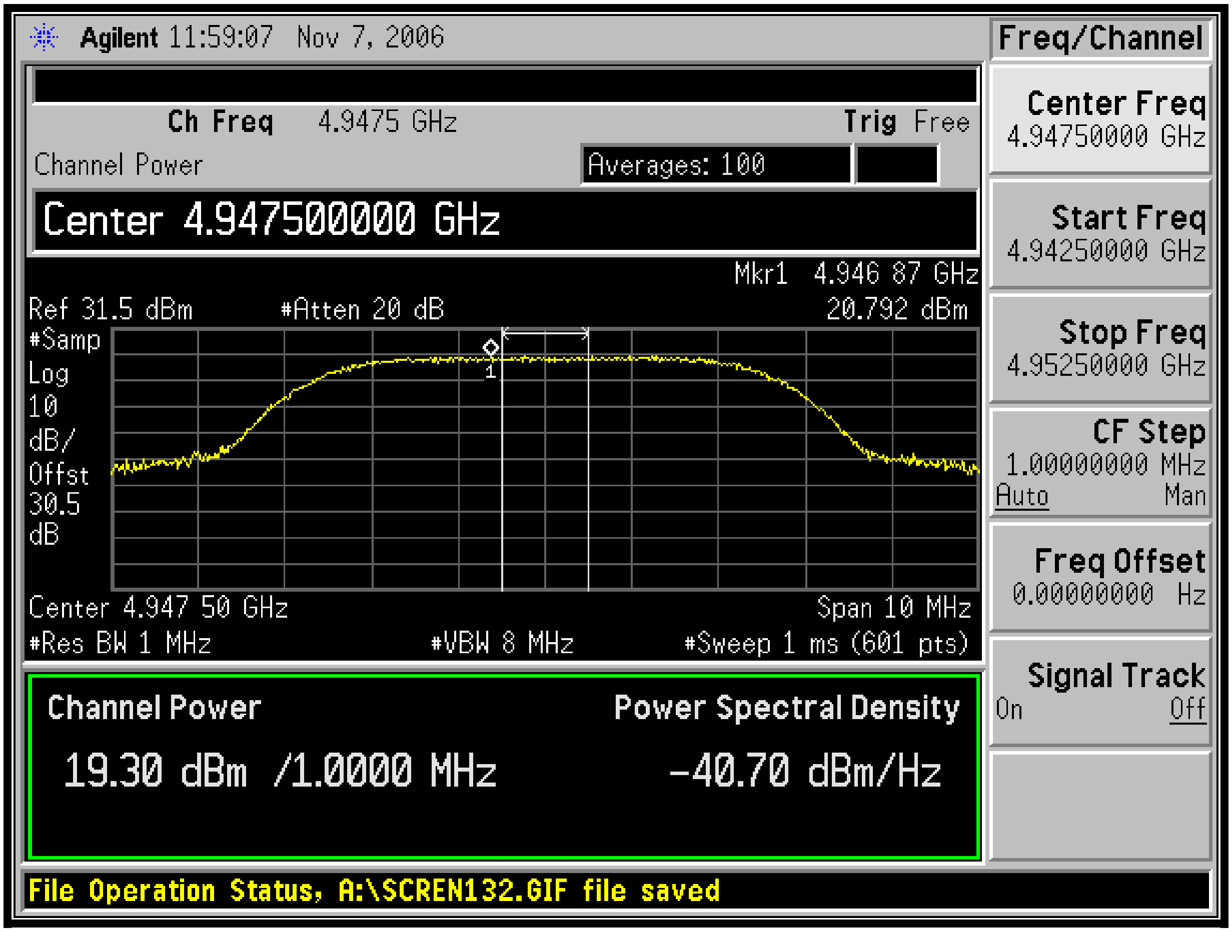
Plot 5-1: Peak Power Spectral Density; Channel 3 - 4942.5 MHz



Result: Peak power spectral density = 20.74 dBm per one MHz

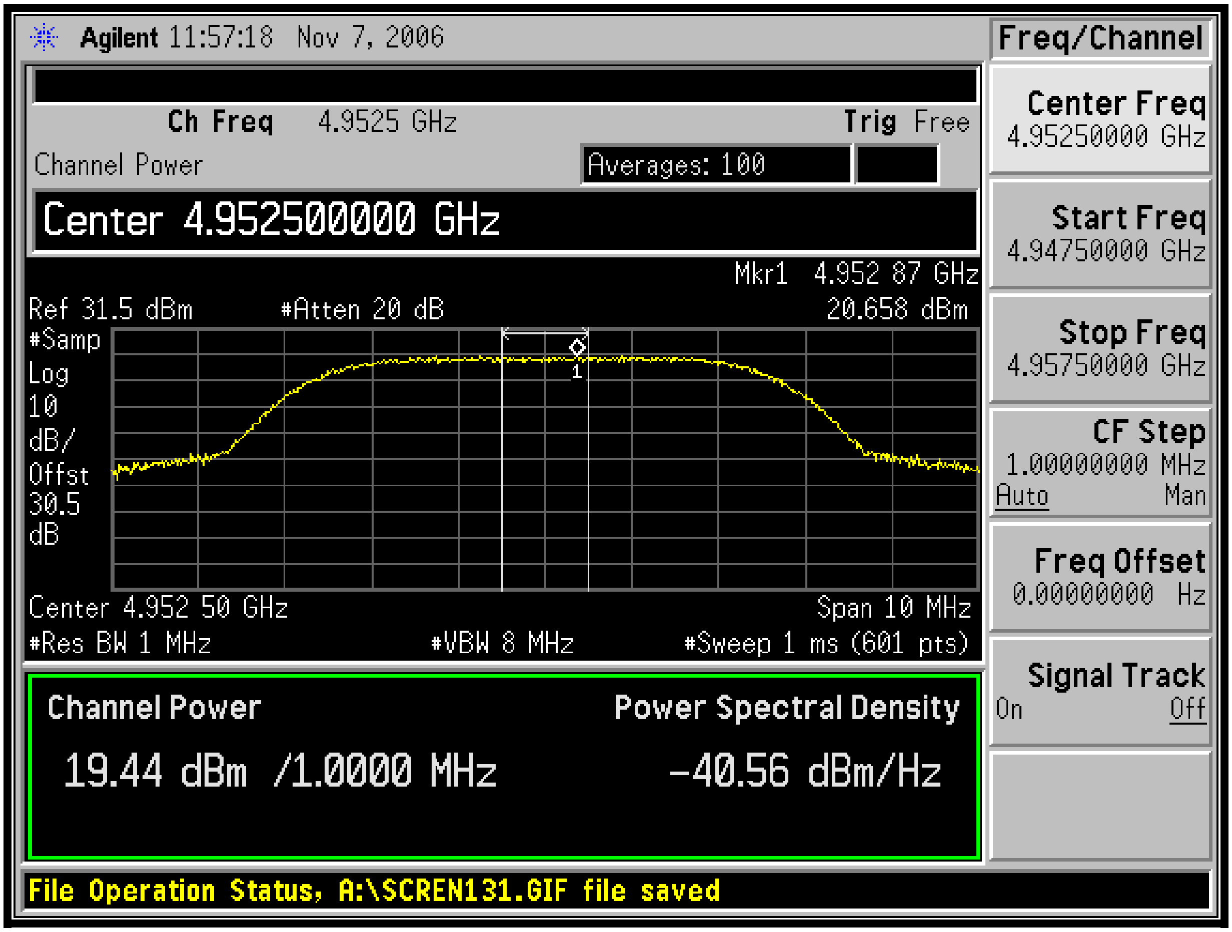
Note: PPSD is circled red in plot and is indicated by peak marker.

Plot 5-2: Peak Power Spectral Density; Channel 6 - 4947.5 MHz



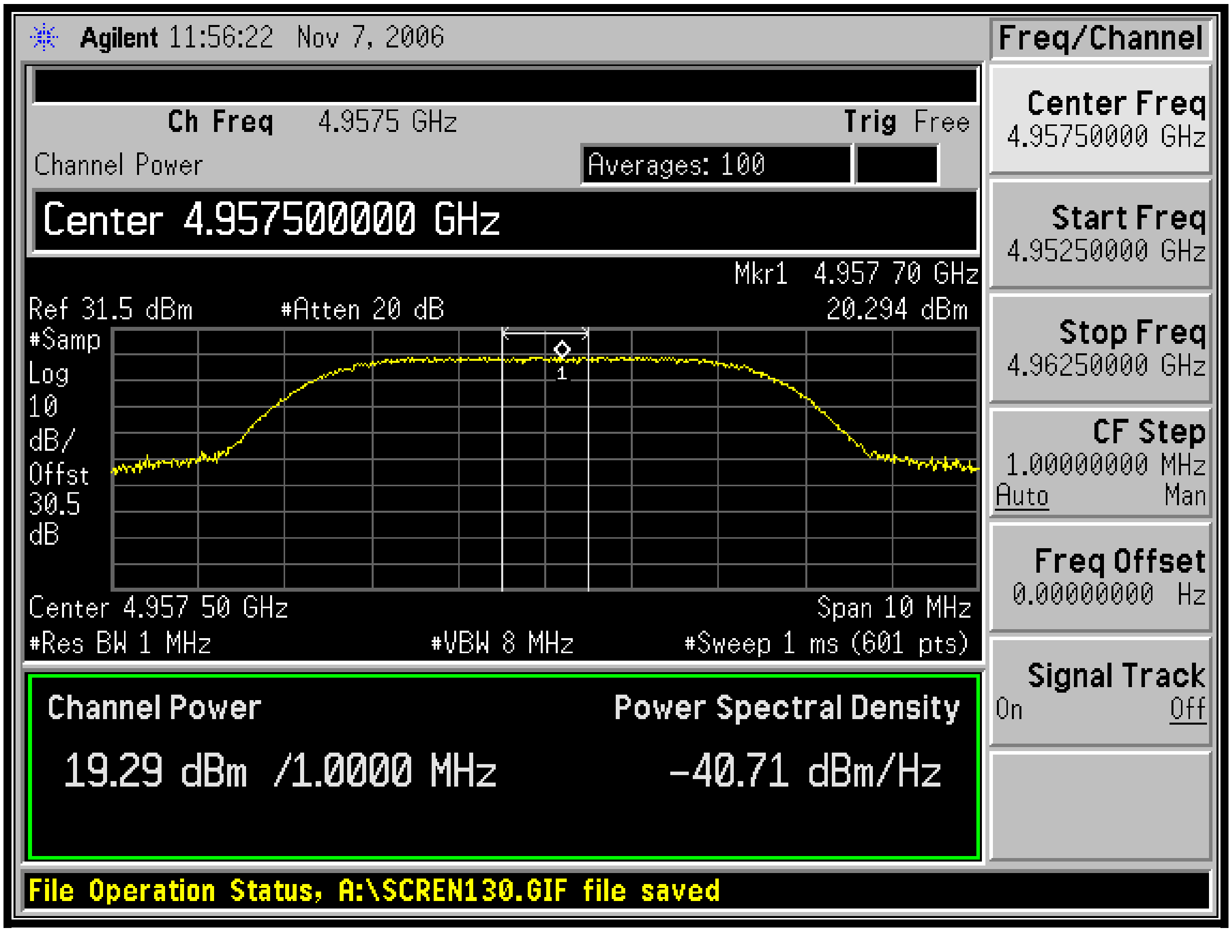
Result: Peak power spectral density = 20.79 dBm per one MHz

Plot 5-3: Peak Power Spectral Density; Channel 7 - 4952.5 MHz



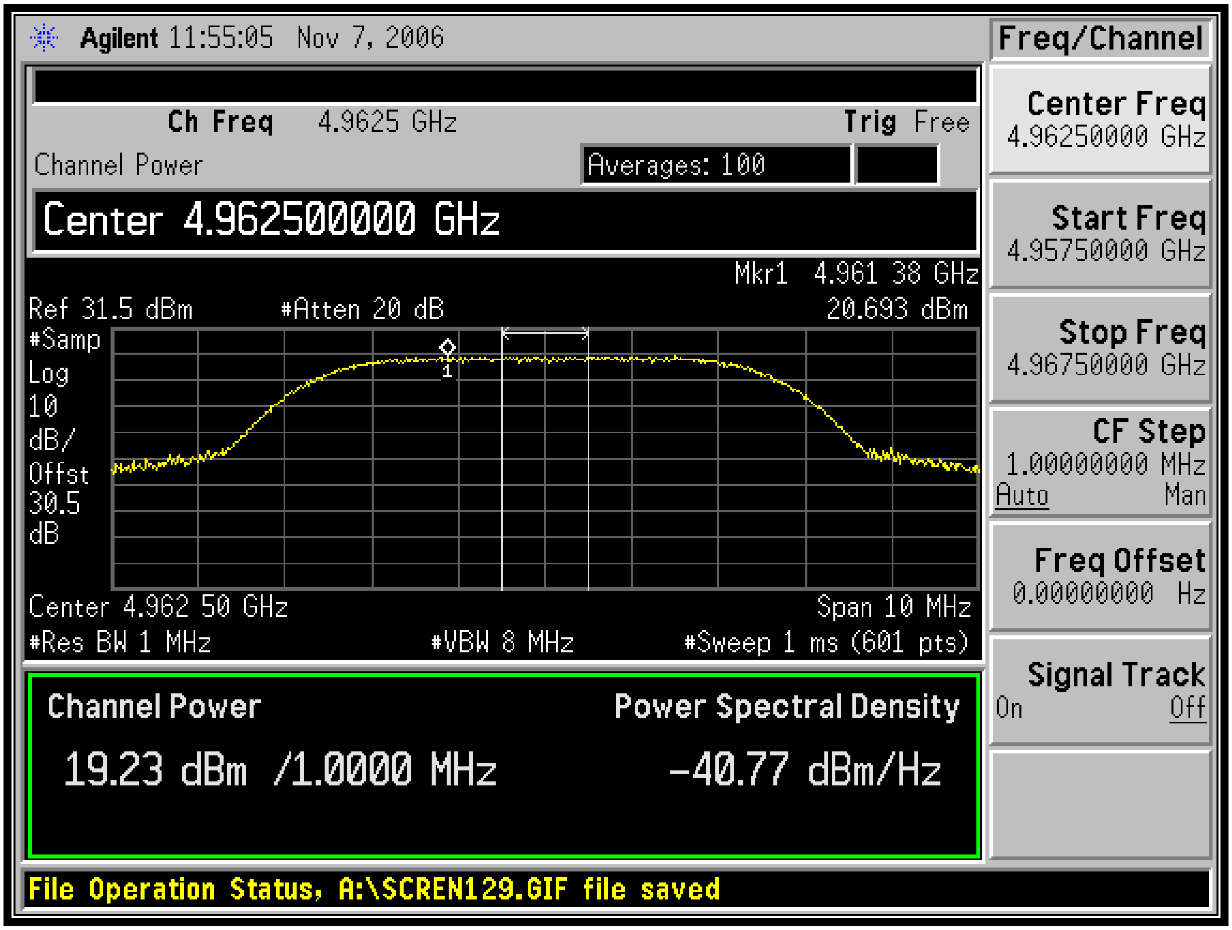
Result: Peak power spectral density = 20.66 dBm per one MHz

Plot 5-4: Peak Power Spectral Density; Channel 8 - 4957.5 MHz



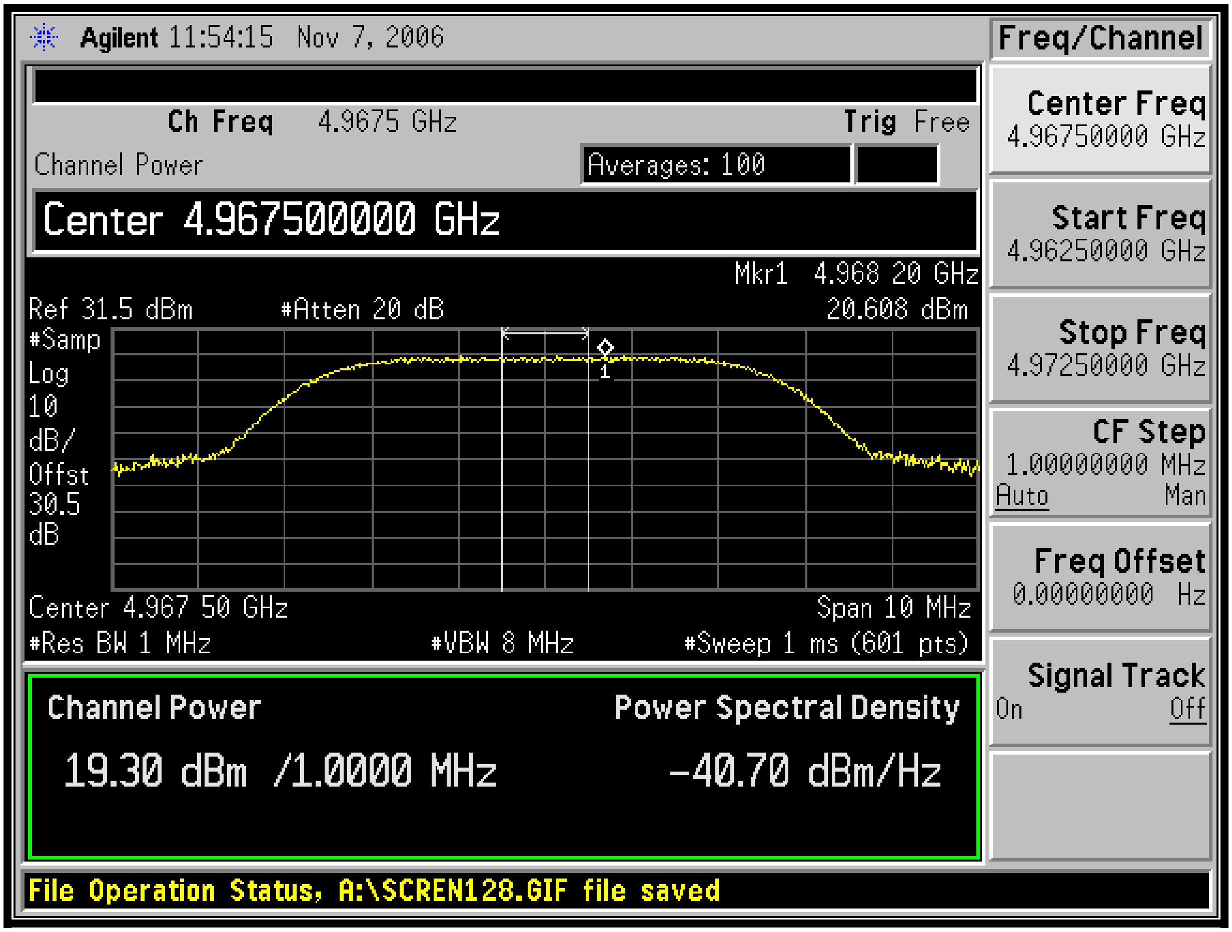
Result: Peak power spectral density = 20.29 dBm per one MHz

Plot 5-5: Peak Power Spectral Density; Channel 9 - 4962.5 MHz



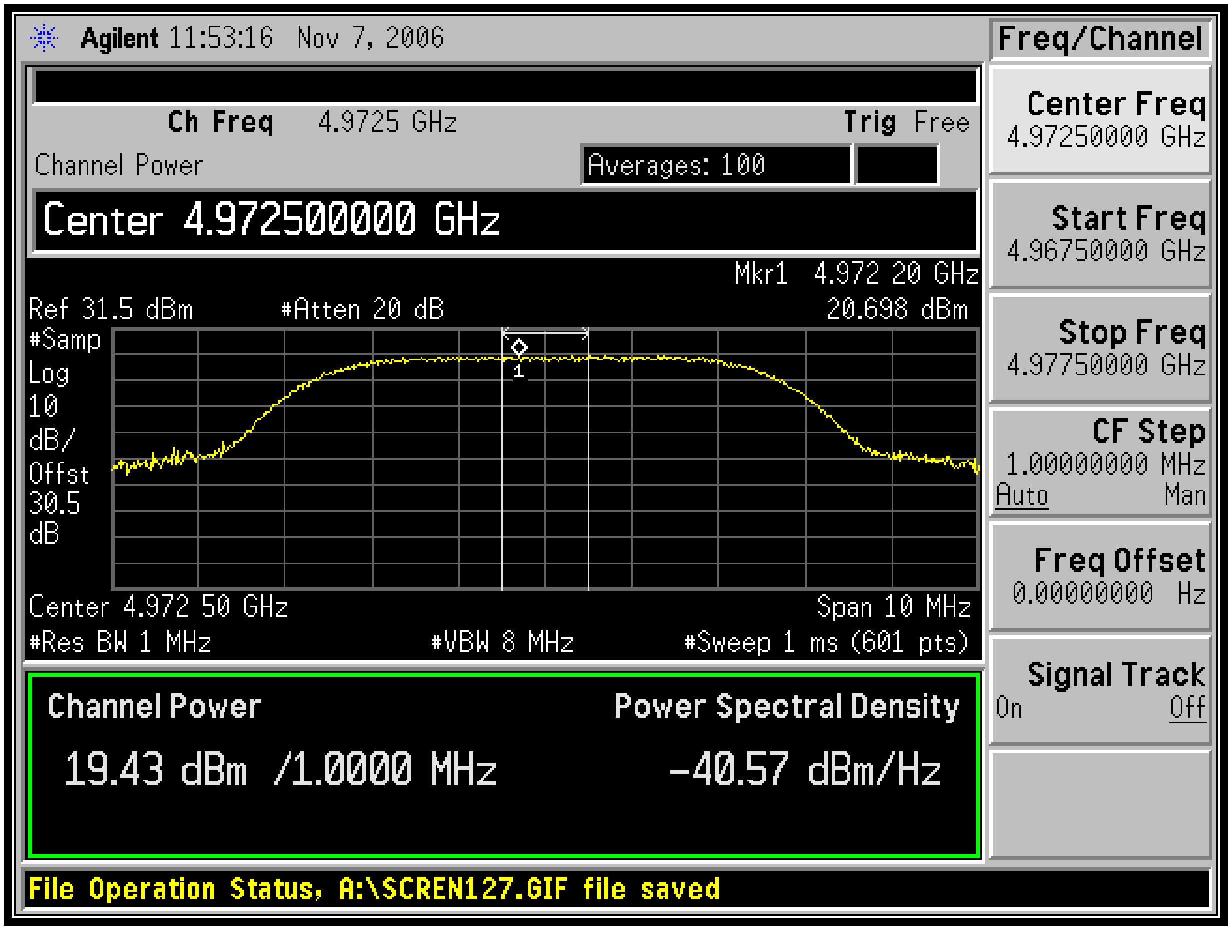
Result: Peak power spectral density = 20.69 dBm per one MHz

Plot 5-6: Peak Power Spectral Density; Channel 10 - 4967.5 MHz



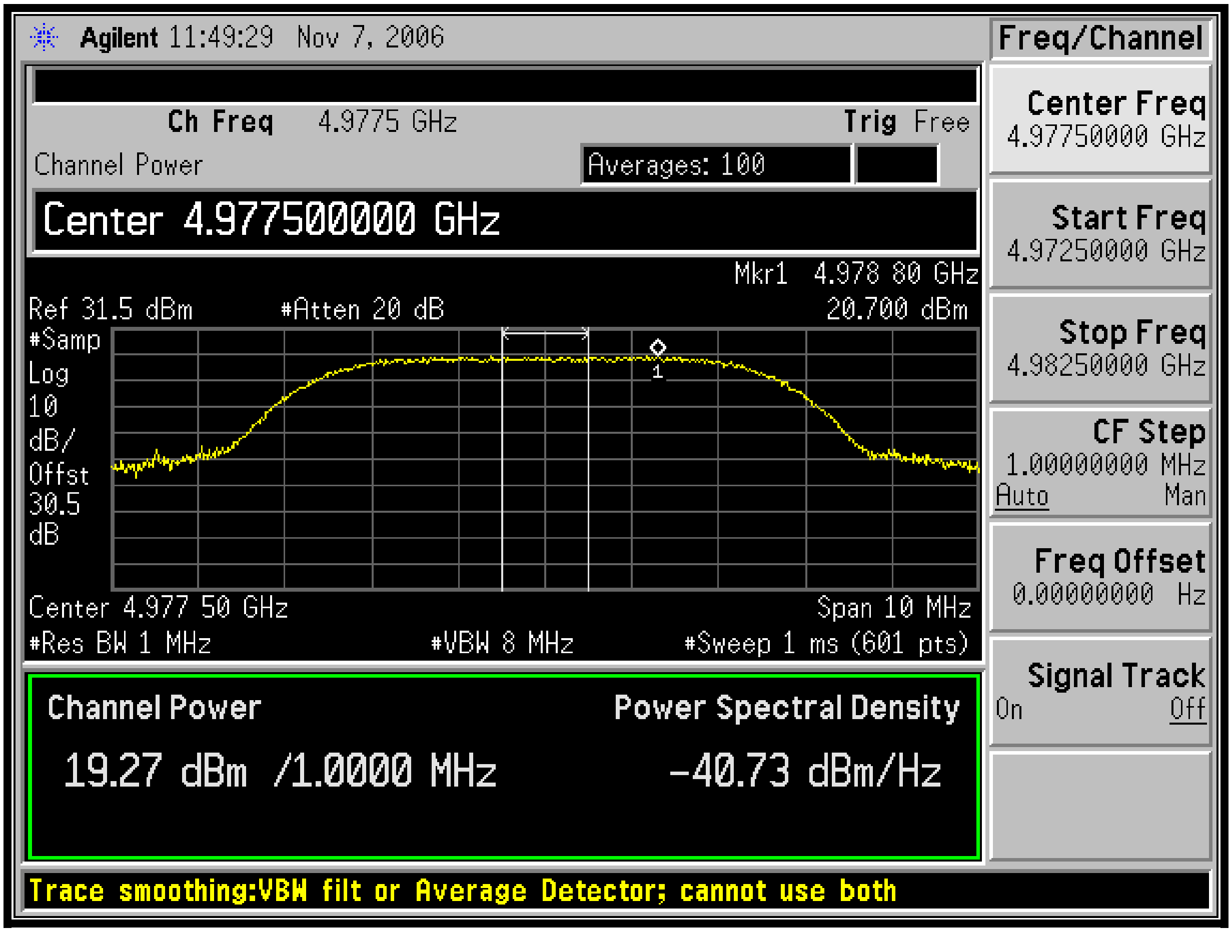
Result: Peak power spectral density = 20.61 dBm per one MHz

Plot 5-7: Peak Power Spectral Density; Channel 11 - 4972.5 MHz



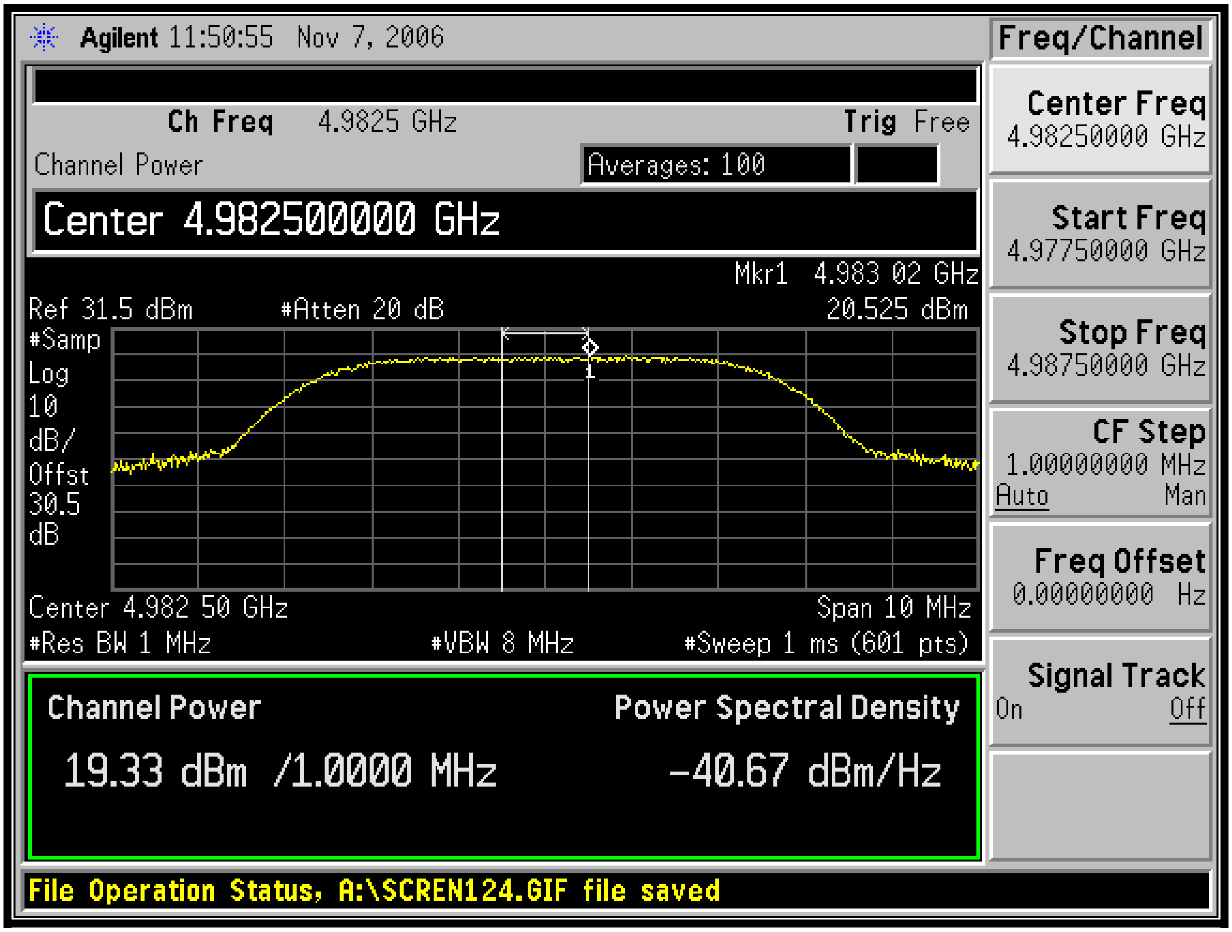
Result: Peak power spectral density = 20.7 dBm per one MHz

Plot 5-8: Peak Power Spectral Density; Channel 12 - 4977.5 MHz



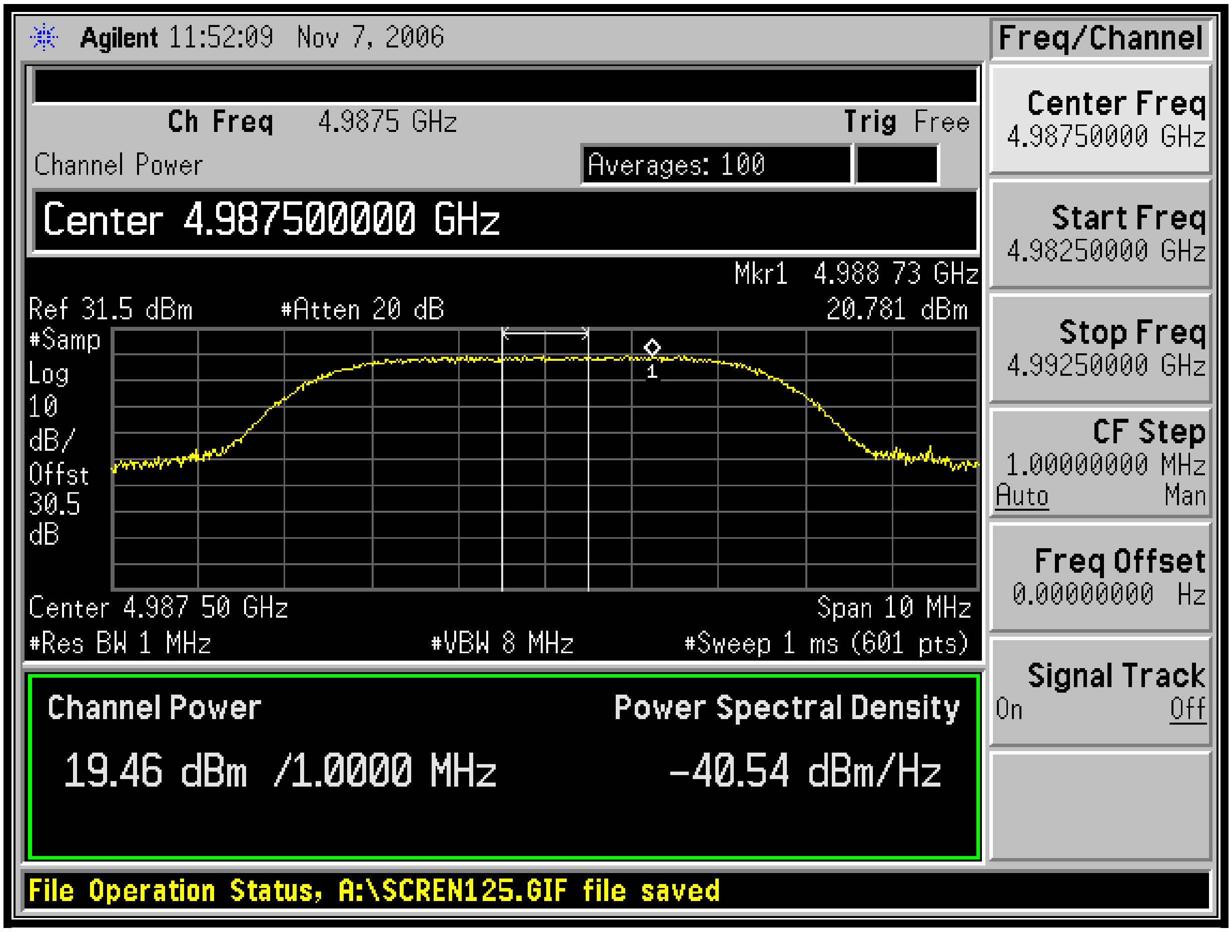
Result: Peak power spectral density = 20.7 dBm per one MHz

Plot 5-9: Peak Power Spectral Density; Channel 13 - 4982.5 MHz



Result: Peak power spectral density = 20.53 dBm per one MHz

Plot 5-10: Peak Power Spectral Density; Channel 16 - 4987.5 MHz



Result: Peak power spectral density = 20.78 dBm per one MHz

Table 5-2: Test Equipment for Testing Peak Power Spectral Density - Conducted

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901413	Agilent	E4448	Spectrum Analyzer	US44020346	11/2/06
901138	MCE Weinschel	48-20-34	Attenuator, 20 dB, DC-18 GHz, 100 W	BK5859	12/9/08
900948	MCE Weinschel	47-10-43	Attenuator, 10 dB, DC-18 GHz, 50 W	BH1487	12/2/08

Test Personnel:

Daniel Biggs		October 16 & November 7, 2006
Test Engineer	Signature	Dates Of Tests

6 FCC Rules and Regulations Part 90 §90.210(m) & Part 2 §2.1049: Occupied Bandwidth (Emissions Masks) and Conducted Spurious Emissions; RSS-111 Section 4.4: 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 between 100 – 150% of the authorized bandwidth: 50 or 55+ 10 log (P) dB, whichever is the lesser attenuation.
(7) 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. Emissions levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least 1% of the occupied bandwidth.

Additionally, 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 fundamental emission to determine the reference level, and a minimum RBW of 1% of the fundamental to determine the mask skirts. The mask should be developed using the same resolution bandwidth throughout, for the reference level and the mask skirts. This interpretation was coordinated with the Wireless Bureau; the inquiry asked whether the same RBW should be used, or if different RBW's could be used, provided each was greater than 1% of the fundamental.

6.1 Test Procedure

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 (240 kHz for this test) and a VBW of 30 kHz. The mask was then taken using the same RBW of 240 kHz per the latest FCC interpretation.

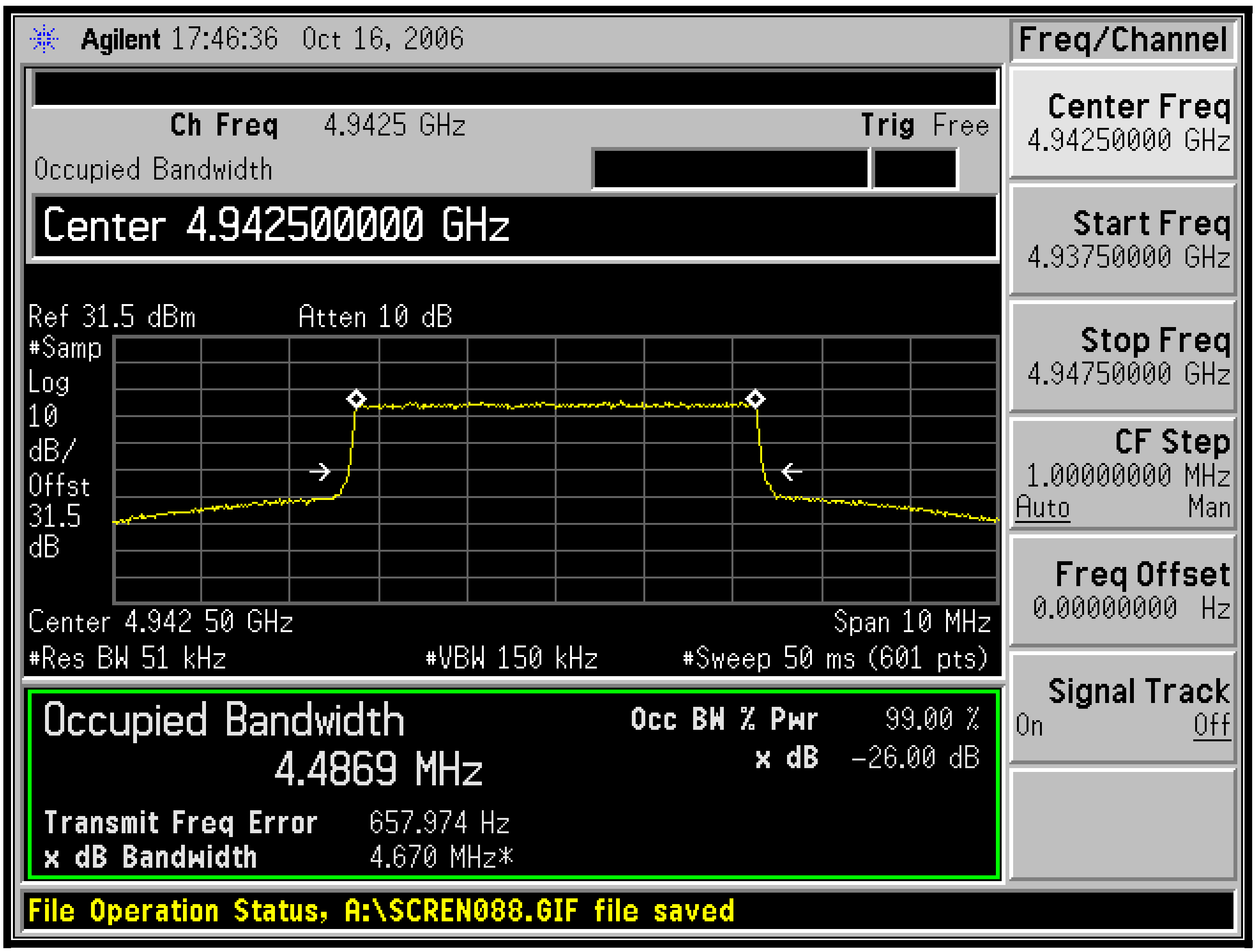
6.2 Reference Level Measurements

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

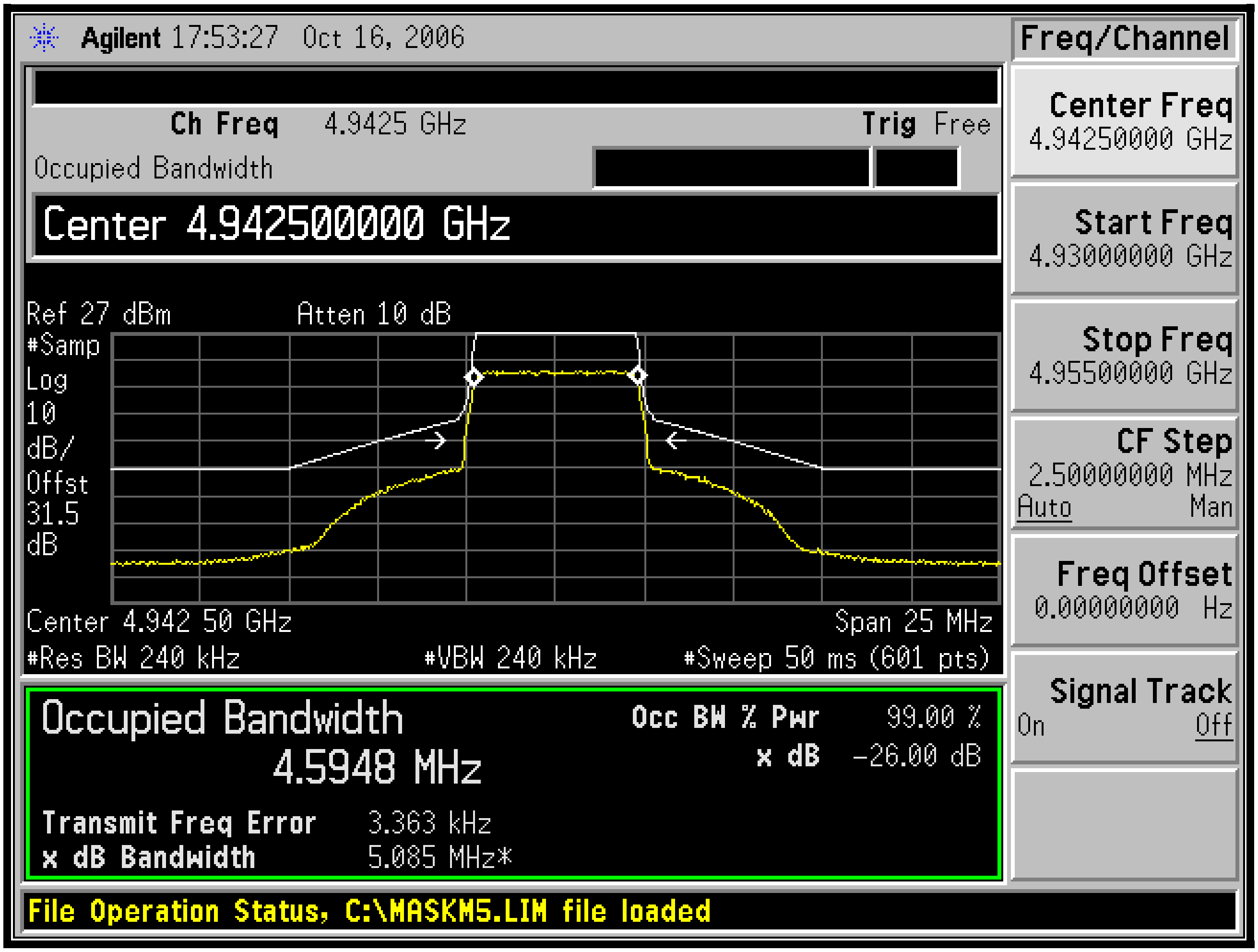
Channel	RBW (kHz)	VBW (kHz)	Level (dBm)
3	240	30	24.6
16	240	30	24.6

6.3 In Band Spurious Test Data

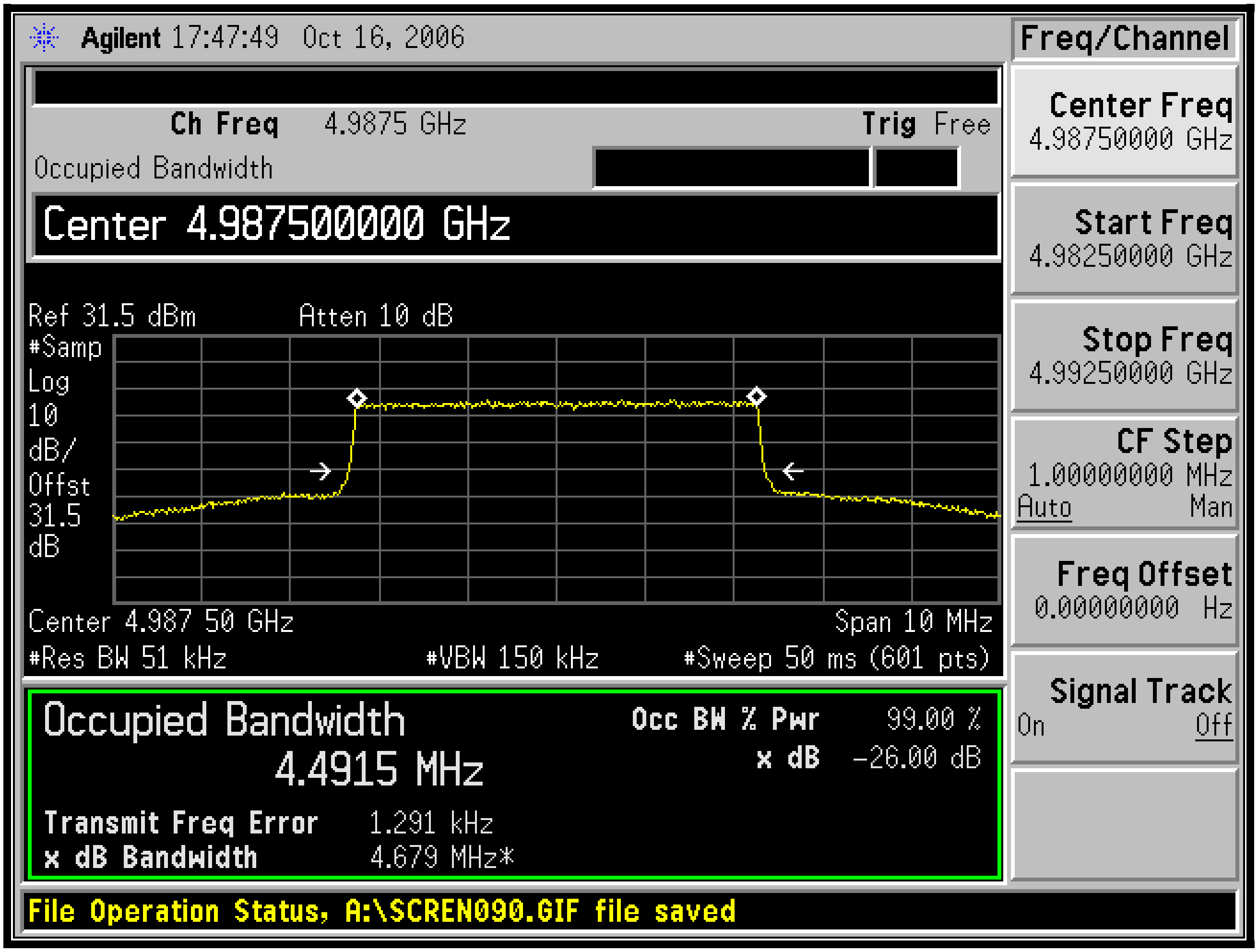
Plot 6-1: Occupied Bandwidth; Channel 3 - 4942.5 MHz



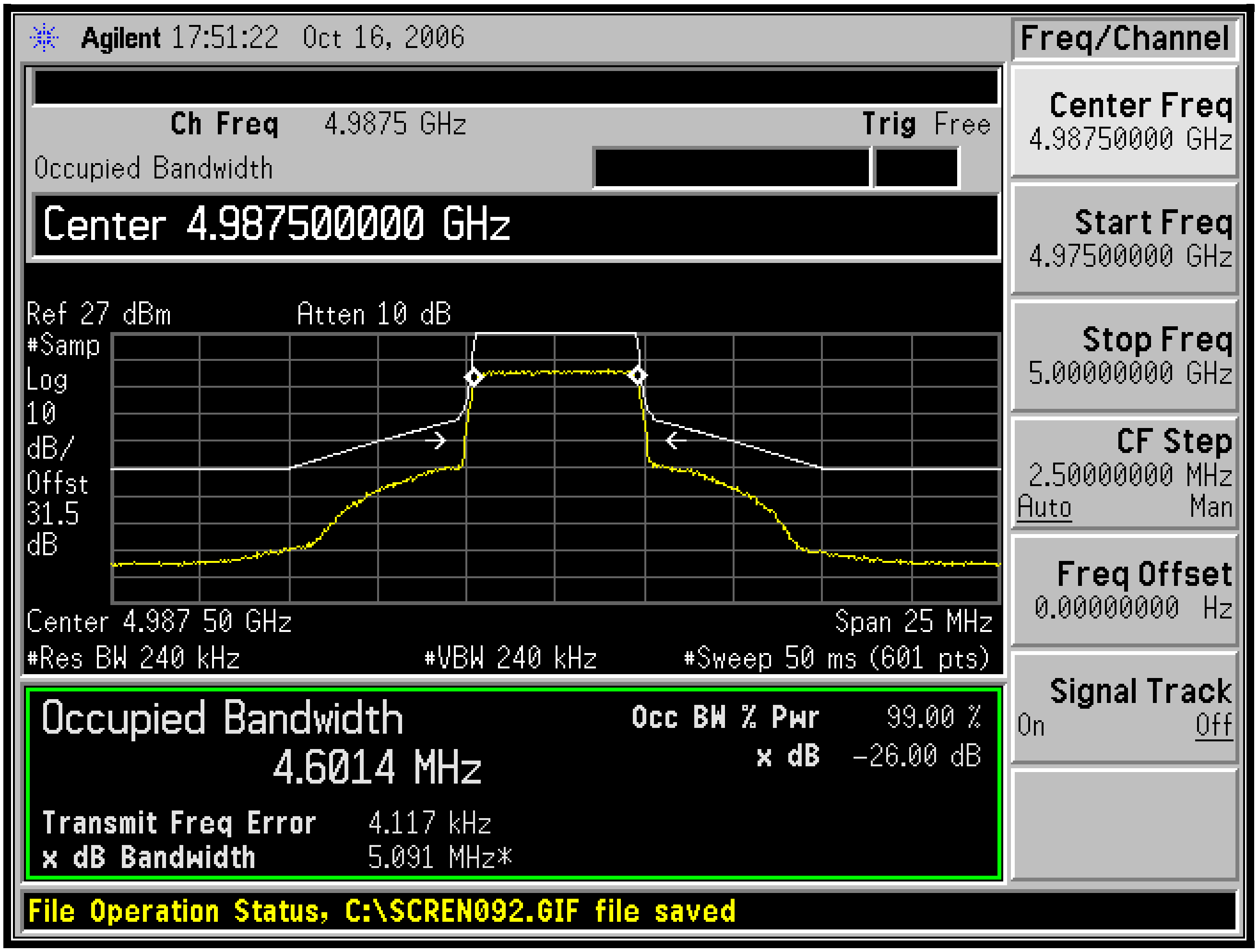
Plot 6-2: Emissions Mask M; Channel 3 - 4942.5 MHz



Plot 6-3: Occupied Bandwidth; Channel 16 - 4987.5 MHz

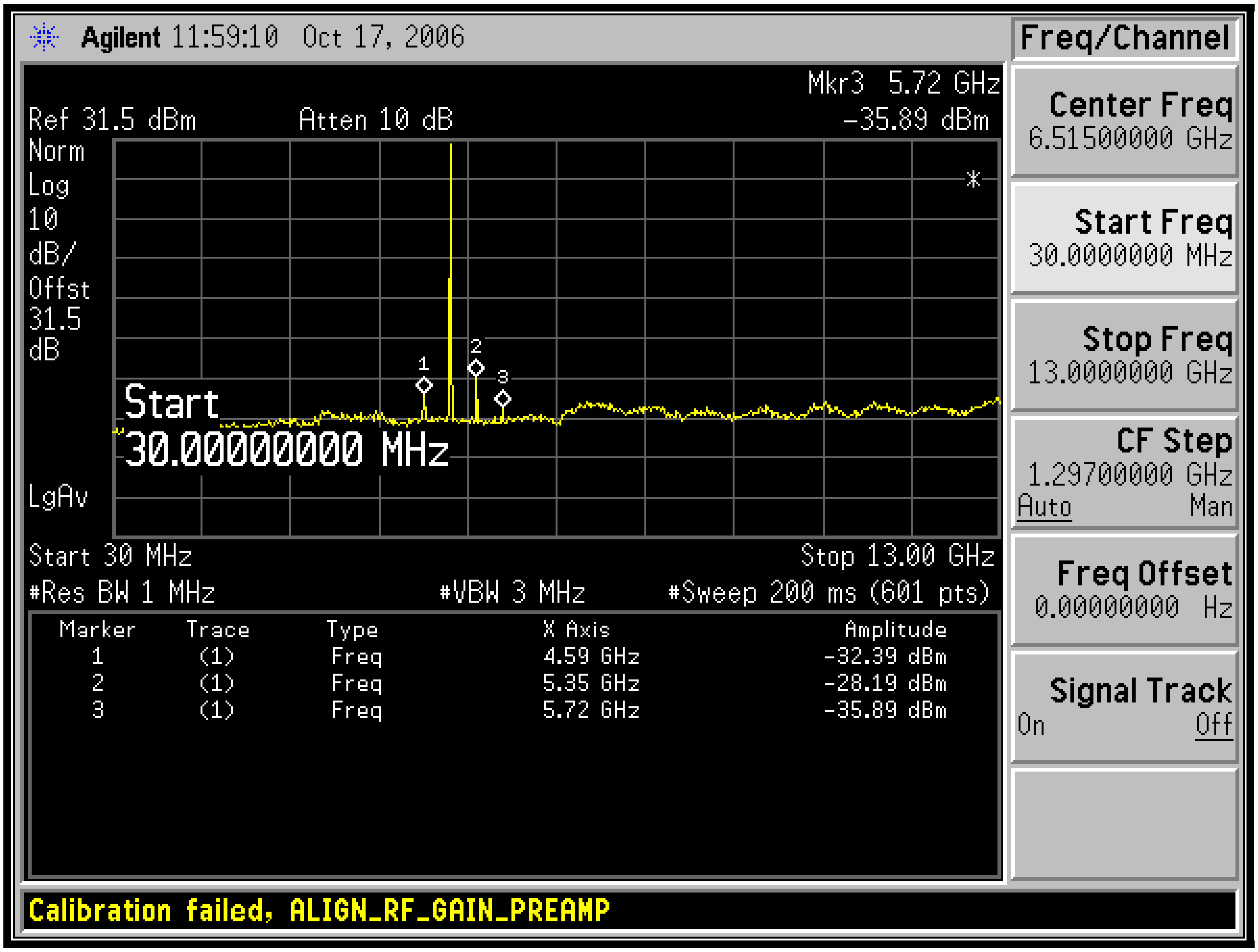


Plot 6-4: Emissions Mask M; Channel 16 - 4987.5 MHz



6.4 Out of Band Spurious Test Data

Plot 6-5: Conducted Spurious Emissions; Channel 9 – 4962.5 MHz; 30 MHz – 13 GHz



Plot 6-6: Conducted Spurious Emissions; Channel 9 – 4962.5 MHz; 13 GHz – 50 GHz

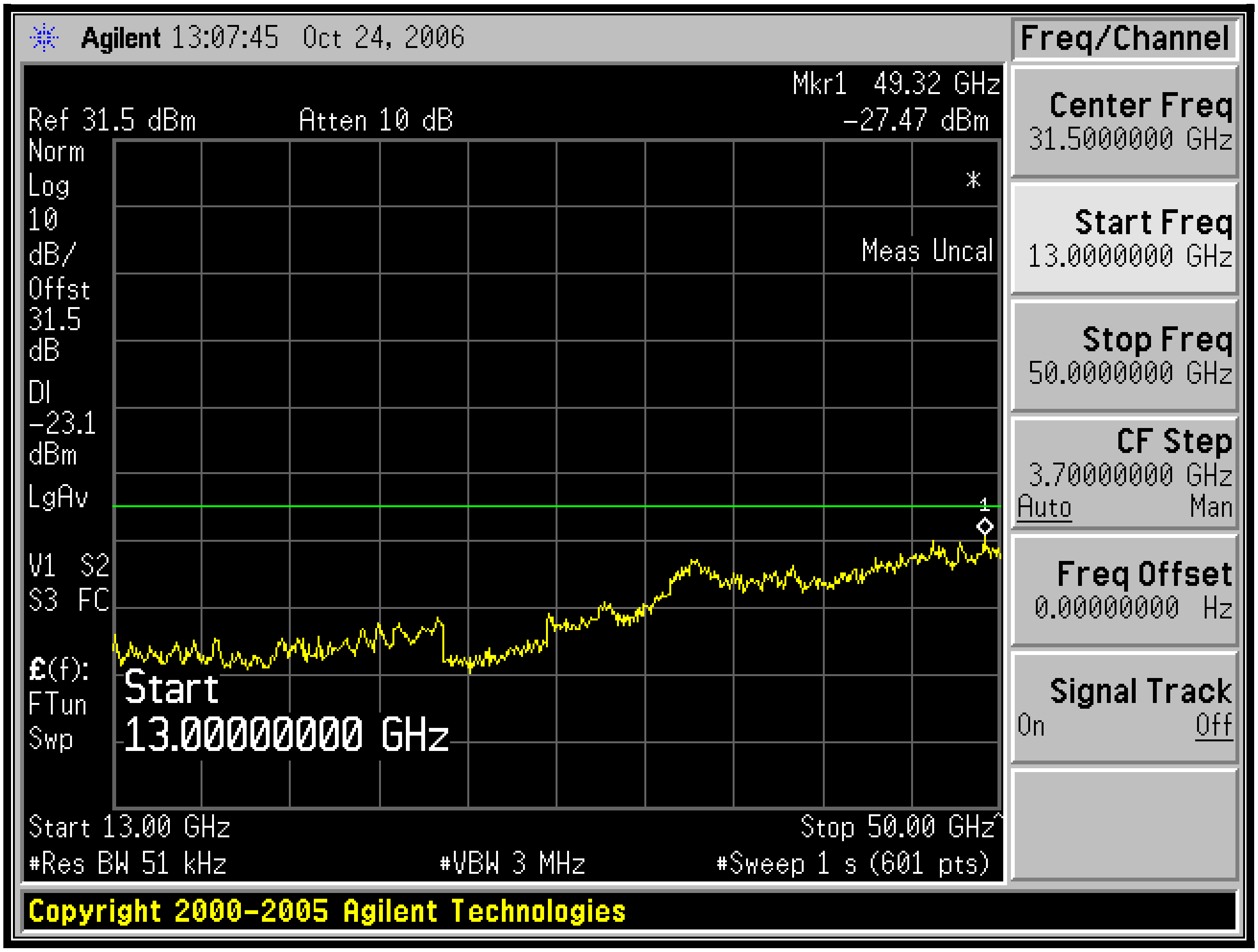
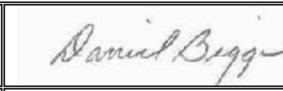


Table 6-1: Test Equipment for Testing Occupied Bandwidth/Conducted Spurious Emissions

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901413	Agilent	E4448	Spectrum Analyzer	US44020346	11/2/06
901138	MCE Weinschel	48-20-34	Attenuator, 20 dB, DC-18 GHz, 100 W	BK5859	12/9/08
900948	MCE Weinschel	47-10-43	Attenuator, 10 dB, DC-18 GHz, 50 W	BH1487	12/2/08

Test Personnel:

Daniel Biggs		October 16-17 & 24, 2006
Test Engineer	Signature	Dates Of Tests

7 FCC Rules and Regulations Part 90 §90.210(l) & Part 2 §2.1053(a): Field Strength of Spurious Radiation; RSS-111 Section 3.3: 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: 40 dB

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. Emissions levels are also based on the use of measurement instrumentation employing a resolution bandwidth of at least 1% of the occupied bandwidth.

7.1 Test Procedure

ANSI/TIA-603-B-2002, 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 GHz to 10^{th} harmonic of fundamental. The spectrum analyzer resolution bandwidth is set to 1 MHz, and the video bandwidth is set to 1 MHz.

The spurious radiated emission limit is calculated as follows:

Average output power: 26.9 dBm (channel 9)

Spurious limit = 26.9 dBm – 50 db = -23.1 dBm

7.2 Test Data

7.2.1 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.

Table 7-1: Field Strength of Spurious Radiation: Channel 9 – 4962.5 MHz (High Power)

Limit = 50 dBc or -23.1 dBm
Conducted Power (Avg) = 26.9 dBm = 0.49W

Frequency (MHz)	Polarization (H/V)	Spectrum Analyzer Level (dBuV)	Signal Generator Level (dBm)	Cable Loss* (dB)	Antenna Gain (dBd)	EIRP (dBm)	Limit	Margin (dB)
9925.0	H	41.4	-43.4	7.5	8.4	-42.5	-23.1	-19.4
9925.0	V	42.6	-42.7	7.5	8.6	-41.6	-23.1	-18.5
14887.5	-	SNF	-	-	-	-	-23.1	-
19850.0	-	SNF	-	-	-	-	-23.1	-
24812.5	-	SNF	-	-	-	-	-23.1	-
29775.0	-	SNF	-	-	-	-	-23.1	-
34737.5	-	SNF	-	-	-	-	-23.1	-
39700.0	-	SNF	-	-	-	-	-23.1	-
44662.5	-	SNF	-	-	-	-	-23.1	-
49625.0	-	SNF	-	-	-	-	-23.1	-

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

Note: SNF = Spectrum analyzer noise floor

Table 7-2: Test Equipment for Testing Field Strength of Spurious Radiation

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901053	Schaffner-Chase	CBL6112	Antenna (25 MHz – 2 GHz)	2648	11/1/06
901413	Agilent	E4448	Spectrum Analyzer	US44020346	11/2/06
901138	MCE Weinschel	48-20-34	Attenuator, 20 dB, DC-18 GHz, 100 W	BK5859	12/9/08
900948	MCE Weinschel	47-10-43	Attenuator, 10 dB, DC-18 GHz, 50 W	BH1487	12/2/08
900928	Hewlett Packard	HP 83752A	Synthesized Sweeper (.01 – 20 GHz)	3610A00866	11/10/06
900321	EMCO	3161-03	Horn Antennas (4 – 8 GHz)	9508-1020	5/20/07
900323	EMCO	3160-07	Horn Antennas (8.2 – 12 GHz)	9605-1054	7/31/09
900356	EMCO	3160-08	Horn Antennas (12.4 – 18 GHz)	9607-1044	5/20/07
900392	Hewlett Packard	1197OK	Harmonic mixer (18 – 26.5 GHz)	3525A00159	11/27/07
900126	Hewlett Packard	11970A	Horn Antennas (26.5 – 40 GHz)	2332A01199	10/29/09
901262	ETS	3115	Double ridge horn (1 – 26 GHz)	6748	4/19/08
901422	Insulated Wire, Inc.	KPS-1503-2400-KPS	RF cable, 20'	NA	12/12/06
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	NA	12/12/06

Test Personnel:

Daniel Biggs		October 24, 2006
Test Engineer	Signature	Date Of Test

8 FCC Rules and Regulation Part 90 §90.213(a) & Part 2 §2.1055: Frequency Stability; RSS-111 Section 4.2: 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.

8.1 Test Procedure

ANSI/TIA-603-B-2002, 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 input voltage.

The worst-case test data are shown below in Table 8-1 and Table 8-2.

8.2 Frequency Stability Test Data

8.2.1 Frequency Stability/Temperature Variation

Table 8-1: Frequency Stability/Temperature Variation – Channel 9 - 4962.5 MHz

Temperature (°C)	Channel Frequency (MHz)	Measured Frequency (MHz)	Delta Freq (MHz)	ppm
-30	4962.5	4962.493259	-0.006741	-1.36
-20	4962.5	4962.494766	-0.005234	-1.05
-10	4962.5	4962.496900	-0.003100	-0.62
0	4962.5	4962.496200	-0.003800	-0.77
10	4962.5	4962.493000	-0.007000	-1.41
20	4962.5	4962.496500	-0.003500	-0.71
30	4962.5	4962.500250	0.000250	0.05
40	4962.5	4962.501025	0.001025	0.21
50	4962.5	4962.500490	0.000490	0.10
60	4962.5	4962.500175	0.000175	0.04

8.2.2 Frequency Stability/Voltage Variation

Table 8-2: Frequency Stability/Voltage Variation – Channel 9 - 4962.5 MHz

Voltage (VAC)	Channel Frequency (MHz)	Measured Frequency (MHz)	Delta Freq (MHz)	ppm
93.5	4962.5	4962.501320	0.001320	0.27
110	4962.5	4962.501420	0.001420	0.29
126.5	4962.5	4962.501035	0.001035	0.21

Table 8-3: Test Equipment for Testing Frequency Stability

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
900946	Tenney Engineering, Inc.	TH65	Temperature Chamber with Humidity	11380	02/04/06
901413	Agilent	E4448	Spectrum Analyzer	US44020346	11/2/06
900948	MCE Weinschel	47-10-43	Attenuator, 10 dB, DC-18 GHz, 50 W	BH1487	12/2/08
901424	Insulated Wire Inc.	KPS-1503-360-KPS	RF cable 36"	NA	12/12/06
901354	Meterman	37XR	Digital Multimeter	N/A	8/31/06

Test Personnel:

Daniel Biggs	Daniel Biggs	October 18, 2006
Test Engineer	Signature	Date Of Tests

9 Conclusion

The data in this measurement report shows that the **M/A-COM, Inc**. **4.9 GHz VIDA Broadband Base Station, FCC ID: BV8VIDA-BB, IC: 3670A-VIDABB,** complies with all the applicable requirements of FCC Parts 90, 15 and 2, and Industry Canada RSS-111. This includes both the AC powered version and DC powered version.