

Exhibit 6A

Test Report Part 15

The NextNet Wireless 2.4 GHz Customer Premise Equipment (CPE) (model RSU-2400-AV) has been tested for compliance to the FCC rules contained in 47CFR part 15.247 as of 20 August 2004.

FCC Rule Part	Description	Response
15.31(m)	Number of measurement frequencies	3 (low, middle, high)
15.247	Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.	2400-2483.5 MHz
15.247(a)(2)	Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.	Pass See pages 4-8
15.247(b)(3)	The maximum peak output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.	Pass See pages 9-14
15.247(b)(4)(i)	Except as shown in paragraphs (b)(3) (i), (ii) and (iii) of this section, if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi. Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.	Pass See page 9
15.247(b)(4)(iii)	Fixed, point-to-point operation, as used in paragraphs (b)(3)(i) and (b)(3)(ii) of this section, excludes the use of point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this	Pass See “Exhibit 11 RF Exposure”

	responsibility.	
15.247(b)(5)	Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.	Pass See “Exhibit 11 RF Exposure Information”.
15.247(c) RF Conducted	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required.	Pass See pages 15-61
15.247(c) Radiated Emissions	In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).	Pass See pages 68-79
15.247(d)	For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.	Pass See pages 62-67
15.247(e)	[Reserved]	Not Applicable
15.247(f)hybrid systems.....	Not Applicable
15.247(g)	Frequency hopping spread spectrum systems.....	Not Applicable
15.247(h)	The incorporation of intelligence within a frequency hopping spread spectrum system.....	Not Applicable

6dB Bandwidth

Rule Part Number: 15.247(a)(2)
The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Procedure: The RF output is applied to a spectrum analyzer through a self calibrated coax and attenuator(s). The spectrum analyzer is adjusted as follows:
Fo = desired channel frequency
RF span = 7 MHz
Resolution bandwidth = 100 kHz
Video bandwidth = 300 kHz.
Sweep time = auto
Detector = peak
The peak signal is found. Markers are then adjusted to the -6dB point on either side of the peak signal level. The -6 dB bandwidth is then determined by adding the magnitude of the -6 dB frequency points.
The external attenuation is included in the spectrum analyzer offset level. Measurements are performed for each of the modulation formats available, 4-QAM, 16-QAM, and 64-QAM. The Tx -6dB BW is measured at the RF connector on the PCB.

Test Conditions: Frequency = 2404, 2440, 2476 MHz
Temperature = 25 °C
Supply Voltage = 12, 15, 19.5 Vdc

Test Results:

-6dB BW (MHz)

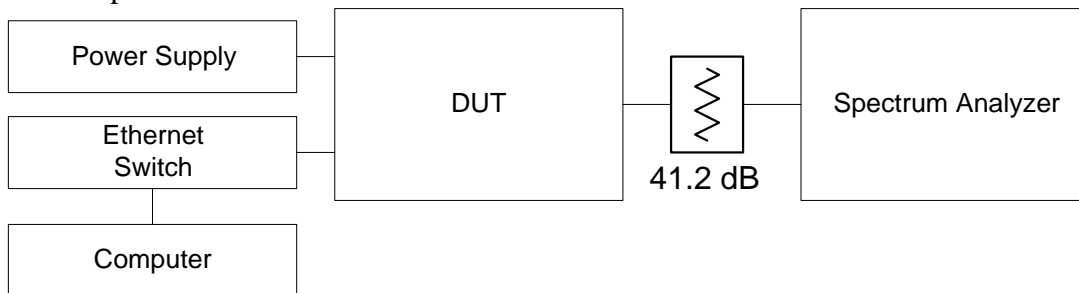
Measured with Globtek 19.5 Vdc power supply			
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	5.544	5.558	5.530
2440	5.558	5.558	5.558
2476	5.544	5.558	5.558
Measured with Globtek 15 Vdc power supply			
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	5.572	5.558	5.530
2440	5.558	5.544	5.530
2476	5.544	5.572	5.558
Measured with HP Power Supply (12 Vdc)			
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	5.544	5.558	5.558
2440	5.544	5.558	5.558
2476	5.558	5.558	5.558

6dB Bandwidth

Test Equipment:

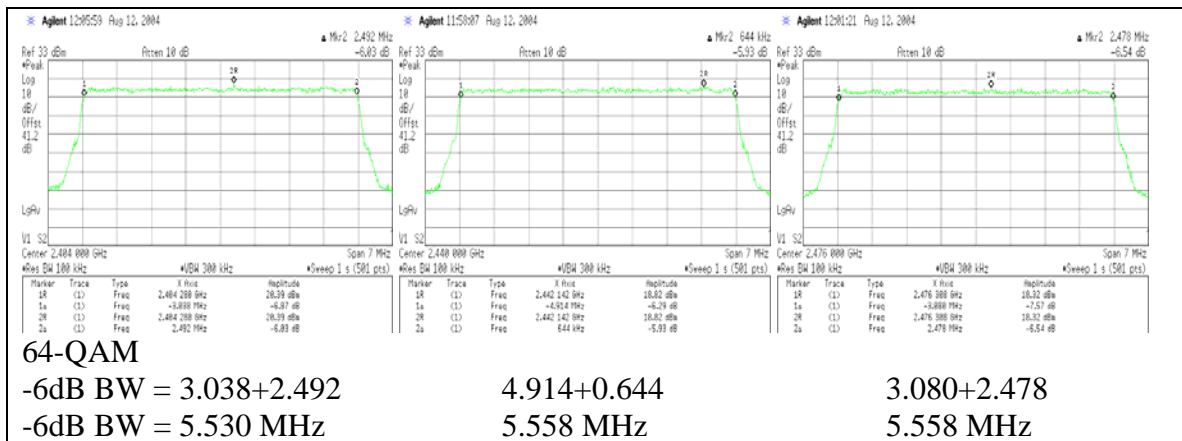
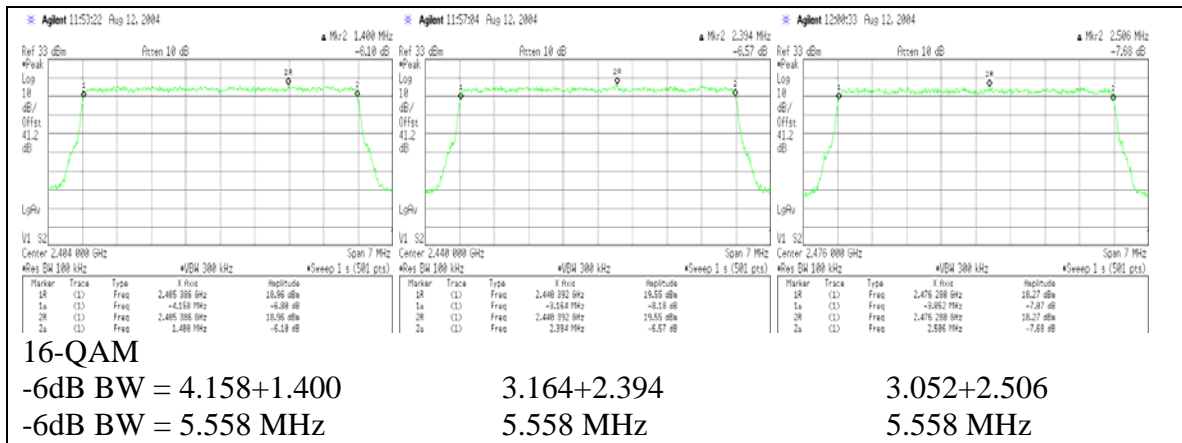
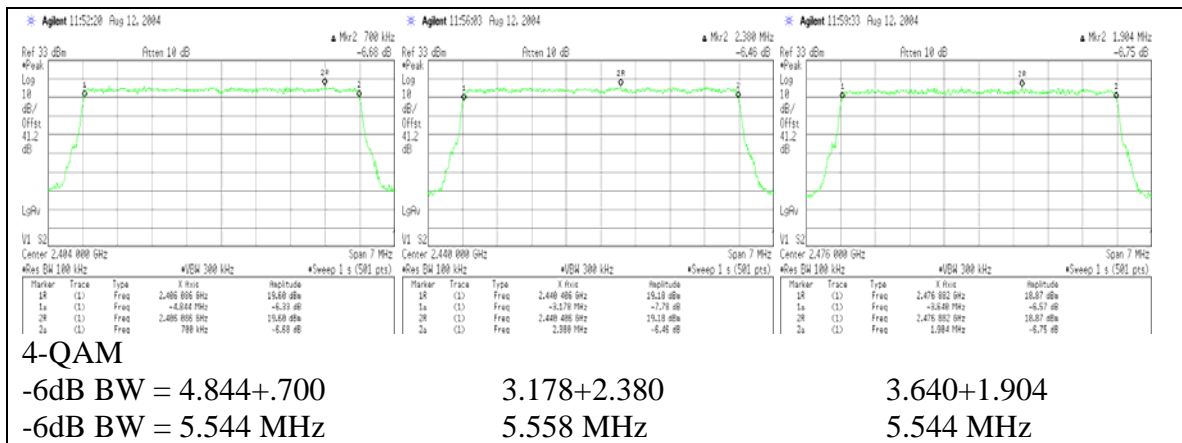
DUT	NextNet Wireless CPE (RSU-2400-AV) # 2008687
Spectrum Analyzer	Agilent E4440A S/N: MY44022791 Calibrated on: 05/30/2004 Cal due: 05/30/2006
Attenuator 2 x 20 dB	Pasternak Corporation Model: PE7005-20 (20 dB) Calibrated by user
Computer	Dell Inspiron 5000 Model: PPM S/N: 000832RM-12961-04R-0441
Ethernet Switch	D-Link Model: DSS-5+ 5 port 10/100Mbps S/N: B205335003175
Power Supply 1	Globetek Model: GT-21148-3015-T3 15 Vdc / 1.6A Limited Power Source S/N: 00430704
Power Supply 2	Globetek Model: GT-21097-5020-0.5 19.5 Vdc / 2.5 A Limited Power Source S/N: 003808 09/03
Power Supply 3	Agilent E3615A 0-20 Vdc / 0-3 A S/N: KR01508861

Test Set-Up:



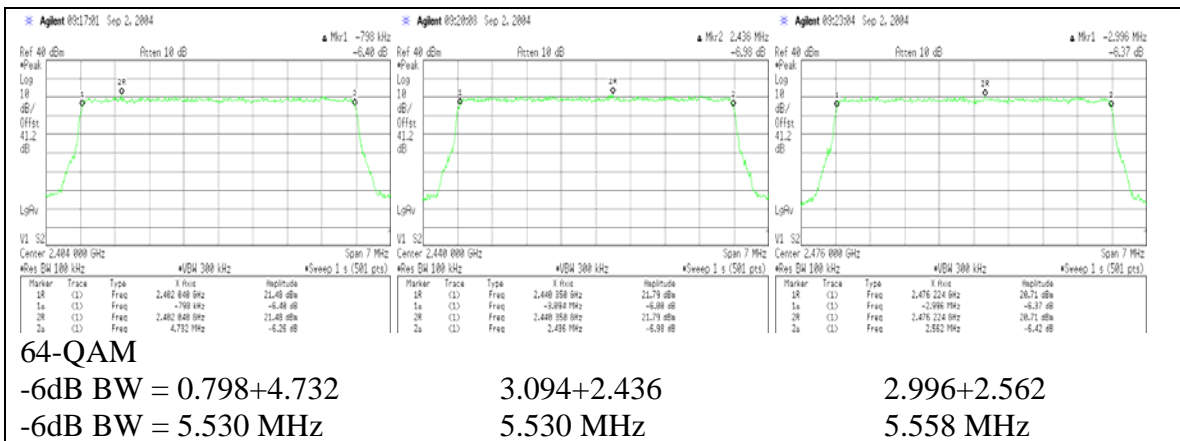
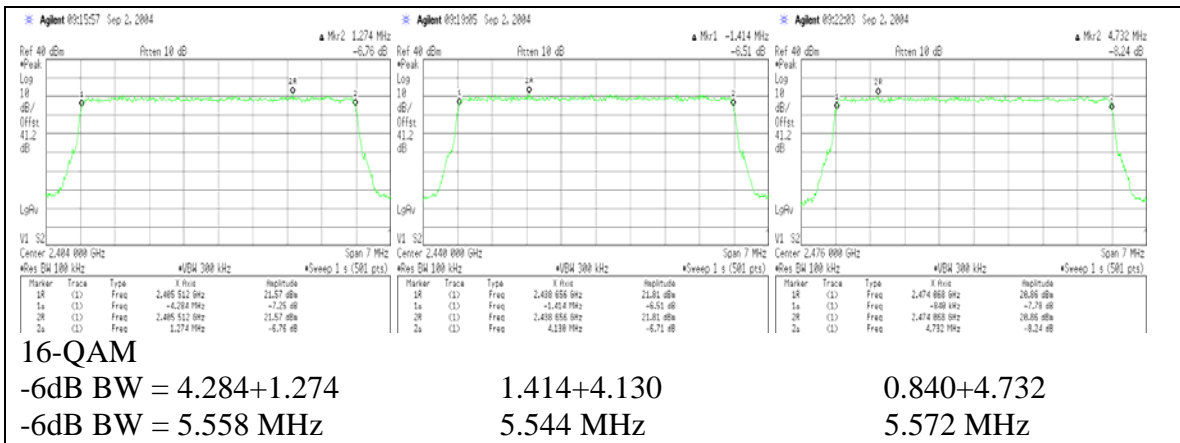
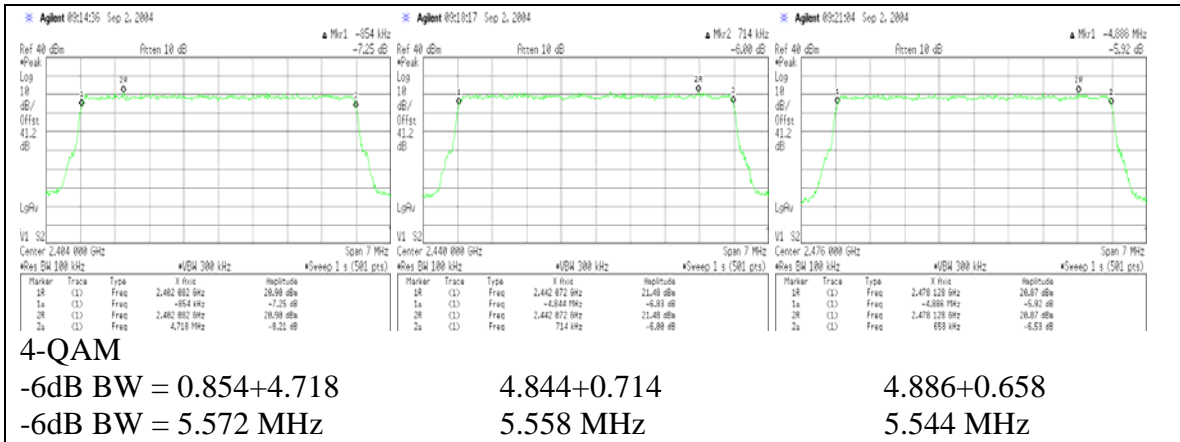
6dB Bandwidth

Measured with Globtek 19.5 Vdc power supply



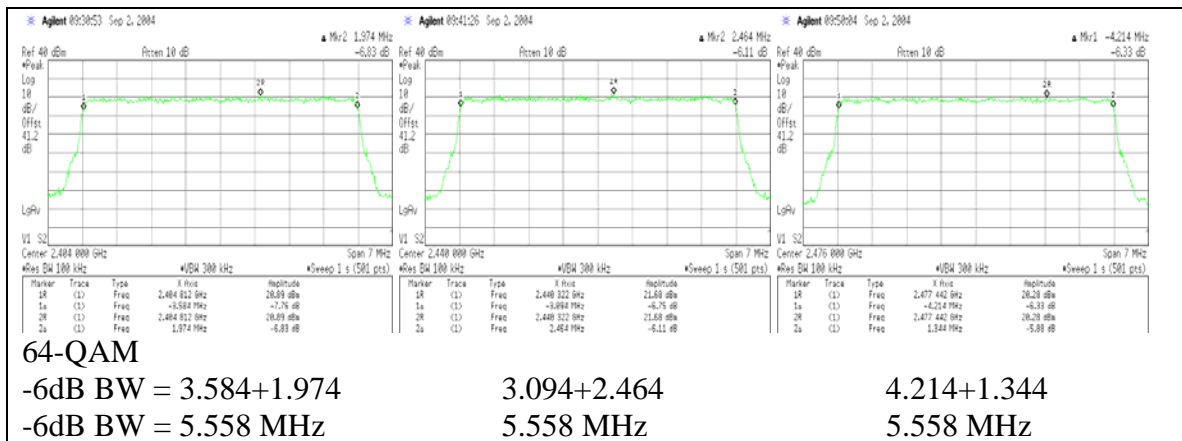
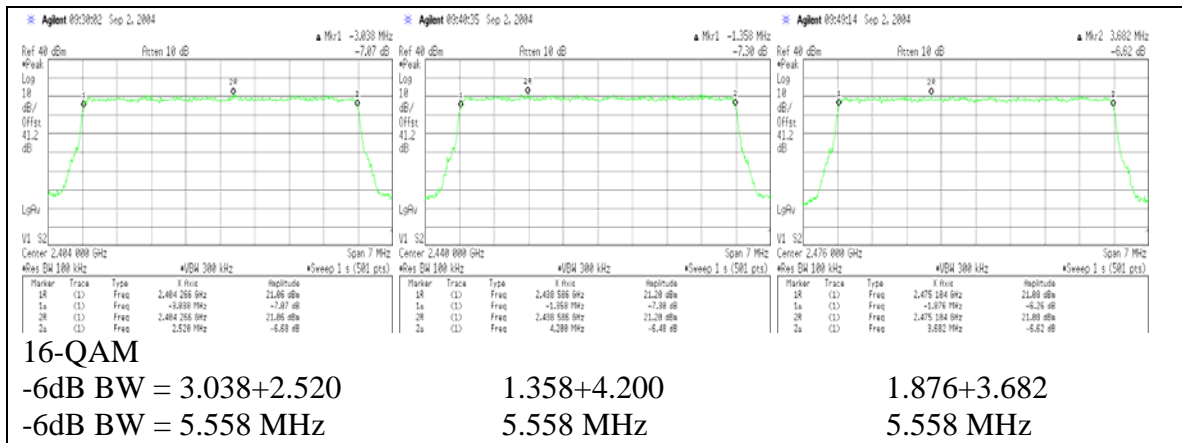
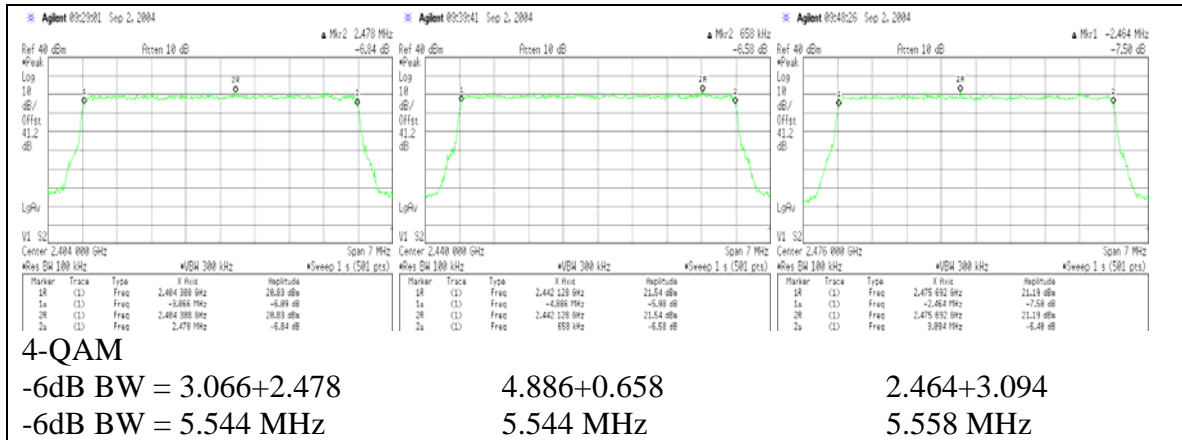
6dB Bandwidth

Measured with Globtek 15 Vdc power supply



6dB Bandwidth

Measured with HP Power Supply (12 Vdc)



Maximum Peak Power Output

Rule Part Number: 15.247(b)(3), 15.247(b)(4)(i)
1 Watt, power reduced to 0.562 watts for 13.5 dBi antenna
(13.5 dBi – 6 dBi = 7.5 dBi above 6 dBi)
Max power = $30 \text{ dBm} - (7.5/3) = 30 - 2.5 = 27.5 \text{ dBm} = 0.562 \text{ Watts}$

Test Procedure: The RF output is applied to a spectrum analyzer through a self calibrated coax and attenuator(s). The maximum power output is measured per method #2 as described in Public Notice DA-02-2138 from the FCC. The spectrum analyzer is adjusted as follows:
Fo = desired channel frequency
RF span = 0 MHz
Resolution bandwidth = 8 MHz
Video bandwidth = 50 MHz.
Sweep time = 165 usec
Detector = sample
Trigger = Video
Trace average = 100
Peak power is defined as the peak of the resulting waveform

. The external attenuation is included in the spectrum analyzer offset level. Measurements are performed for each of the modulation formats available, 4-QAM, 16-QAM, and 64-QAM. The Tx power for the 0.562 watt setting is measured at the RF connector on the PCB.

Test Conditions: Frequency = 2404, 2440, 2476 MHz
Temperature = 25 °C
Supply Voltage = 12, 15, 19.5 Vdc

Maximum Peak Power Output

Test Results:

Maximum Peak Power (dBm)

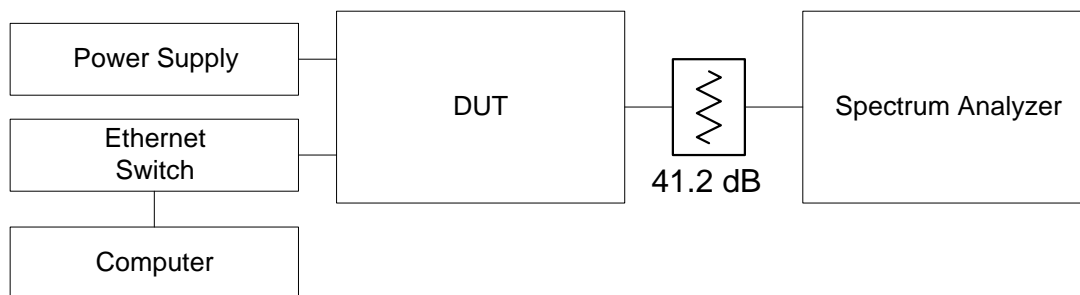
	Measured with Globtek 19.5 Vdc power supply		
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	26.711	26.388	27.310
2440	27.192	27.323	27.368
2476	27.482	27.301	27.045
	Measured with Globtek 15 Vdc power supply		
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	26.550	26.552	26.562
2440	26.663	26.897	27.073
2476	26.134	26.399	26.103
	Measured with HP Power Supply (12 Vdc)		
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	27.326	27.036	27.062
2440	27.414	27.326	27.012
2476	26.925	26.667	27.313

Maximum Peak Power Output

Test Equipment:

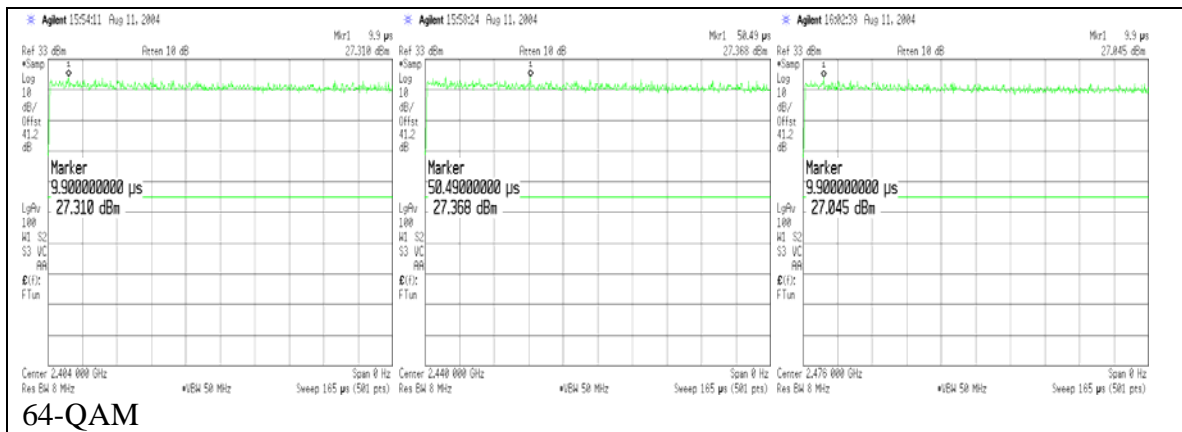
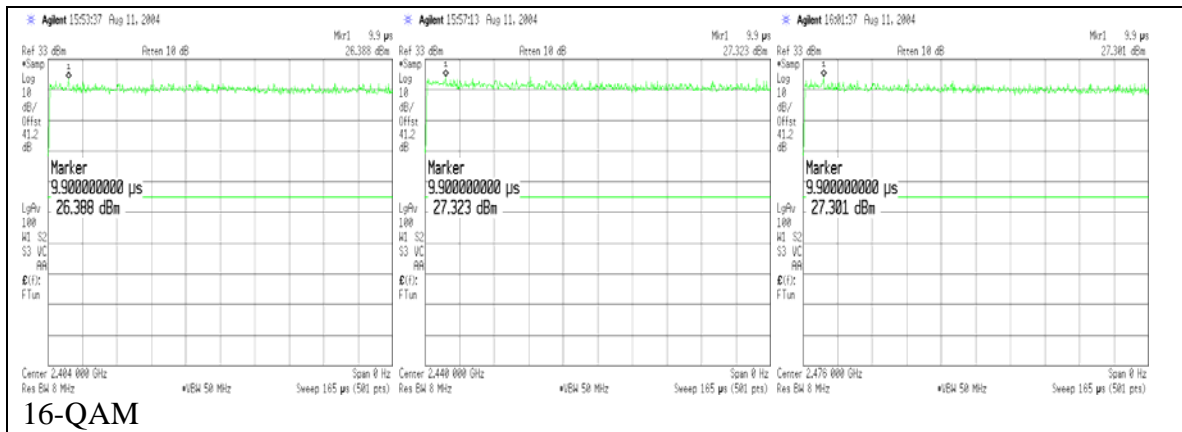
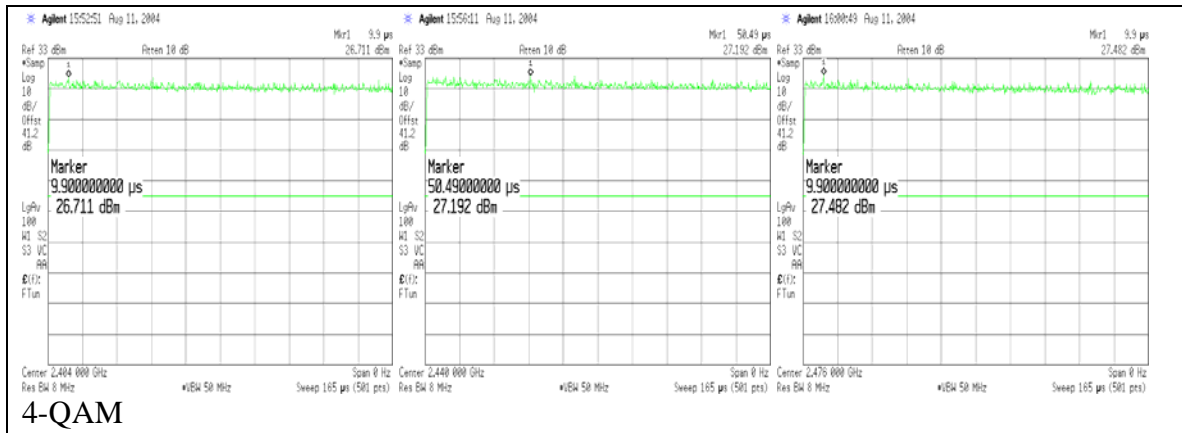
DUT	NextNet Wireless CPE (RSU-2400-AV) # 2008687
Spectrum Analyzer	Agilent E4440A S/N: MY44022791 Calibrated on: 05/30/2004 Cal due: 05/30/2006
Attenuator(s) 2 x 20 dB	Pasternak Corporation Model: PE7005-20 (20 dB) Calibrated by user
Computer	Dell Inspiron 5000 Model: PPM S/N: 000832RM-12961-04R-0441
Ethernet Switch	D-Link Model: DSS-5+ 5 port 10/100Mbps S/N: B205335003175
Power Supply 1	Globetek Model: GT-21148-3015-T3 15 Vdc / 1.6A Limited Power Source S/N: 00430704
Power Supply 2	Globetek Model: GT-21097-5020-0.5 19.5 Vdc / 2.5 A Limited Power Source S/N: 003808 09/03
Power Supply 3	Agilent E3615A 0-20 Vdc / 0-3 A S/N: KR01508861
Multimeter	HP 34401A Multimeter Cal Date: 08-03-2004 Cal Due: 08-03-06 S/N: 3146A58949

Test Set-Up:



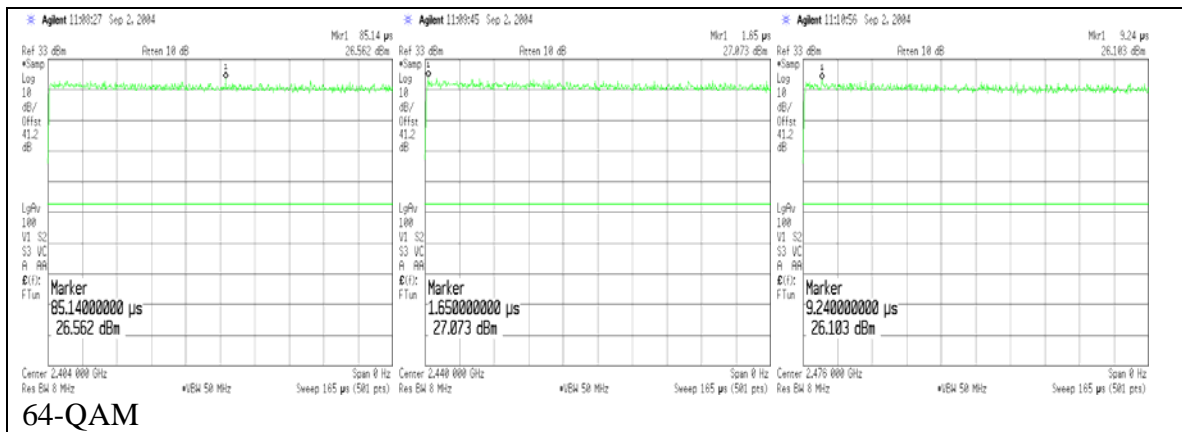
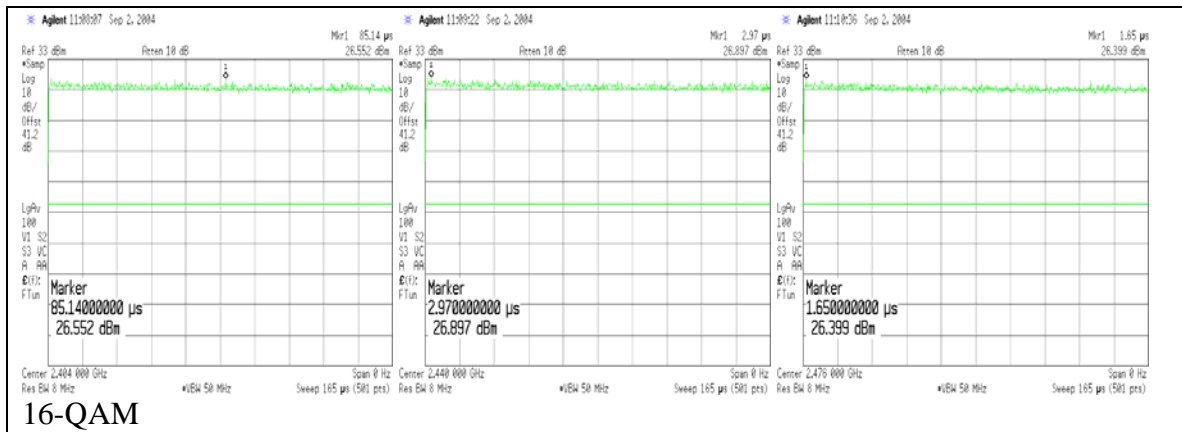
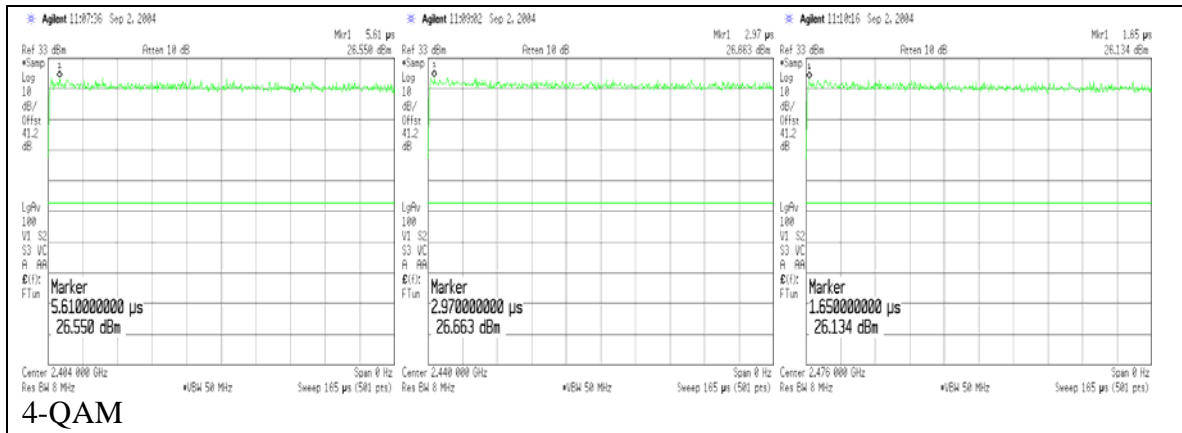
Maximum Peak Power Output

Measured with Globtek 19.5 Vdc power supply

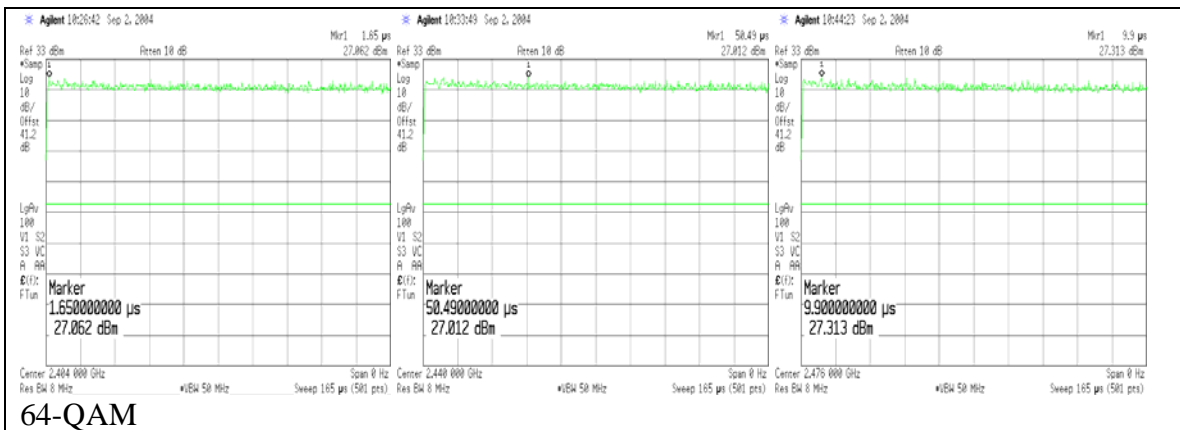
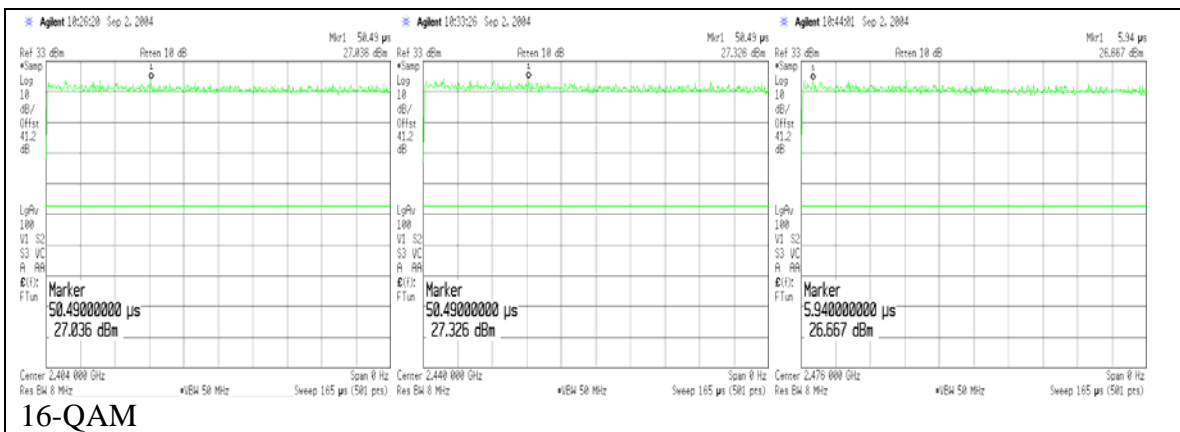
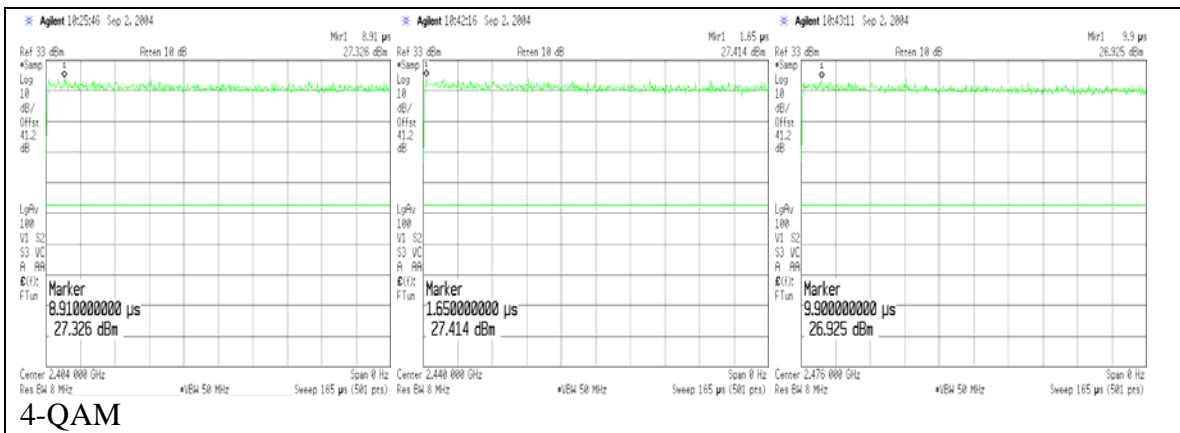


Maximum Peak Power Output

Measured with Globtek 15 Vdc power supply



Measured with HP Power Supply (12 Vdc)



Spurious emissions at antenna terminals

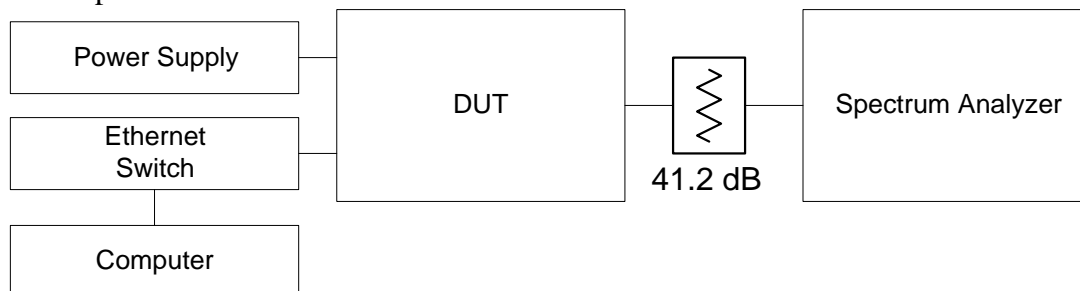
- Rule Part Number: 15.247(c)
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
- Test Procedure: The RF output is applied to a spectrum analyzer through a self calibrated coax and attenuator(s). The spurious emissions at the antenna terminal are measured as per the guidelines found in “Guidance on Measurements for Digital Transmission Systems Section 15.247” found on the FCC web site. The spectrum analyzer is adjusted as follows:
Fo = desired channel frequency
RF span = varies MHz
Resolution bandwidth = 100 kHz
Video bandwidth = 300 kHz.
Sweep time = varies
Detector = peak below 1 GHz / average above 1 GHz
Trigger = Free run (100% TX duty cycle)
The external attenuation is included in the spectrum analyzer offset level. Measurements are performed with 4-QAM modulation for each of the three test frequencies and test voltages. The Tx spurious for the 0.562 watt setting is measured at the RF connector on the PCB.
- Test Conditions: Frequency = 2404, 2440, 2476 MHz
Temperature = 25 °C
Supply Voltage = 12, 15, 19.5 Vdc

Spurious emissions at antenna terminals

Test Equipment:

DUT	NextNet Wireless CPE (RSU-2400-AV) # 2008687
Spectrum Analyzer	Agilent E4440A S/N: MY44022791 Calibrated on: 05/30/2004 Cal due: 05/30/2006
Attenuator(s) 2 x 20 dB	Pasternak Corporation Model: PE7005-20 (20 dB) Calibrated by user
Computer	Dell Inspiron 5000 Model: PPM S/N: 000832RM-12961-04R-0441
Ethernet Switch	D-Link Model: DSS-5+ 5 port 10/100Mbps S/N: B205335003175
Power Supply 1	Globetek Model: GT-21148-3015-T3 15 Vdc / 1.6A Limited Power Source S/N: 00430704
Power Supply 2	Globetek Model: GT-21097-5020-0.5 19.5 Vdc / 2.5 A Limited Power Source S/N: 003808 09/03
Power Supply 3	Agilent E3615A 0-20 Vdc / 0-3 A S/N: KR01508861
Multimeter	HP 34401A Multimeter Cal Date: 08-03-2004 Cal Due: 08-03-06 S/N: 3146A58949

Test Setup

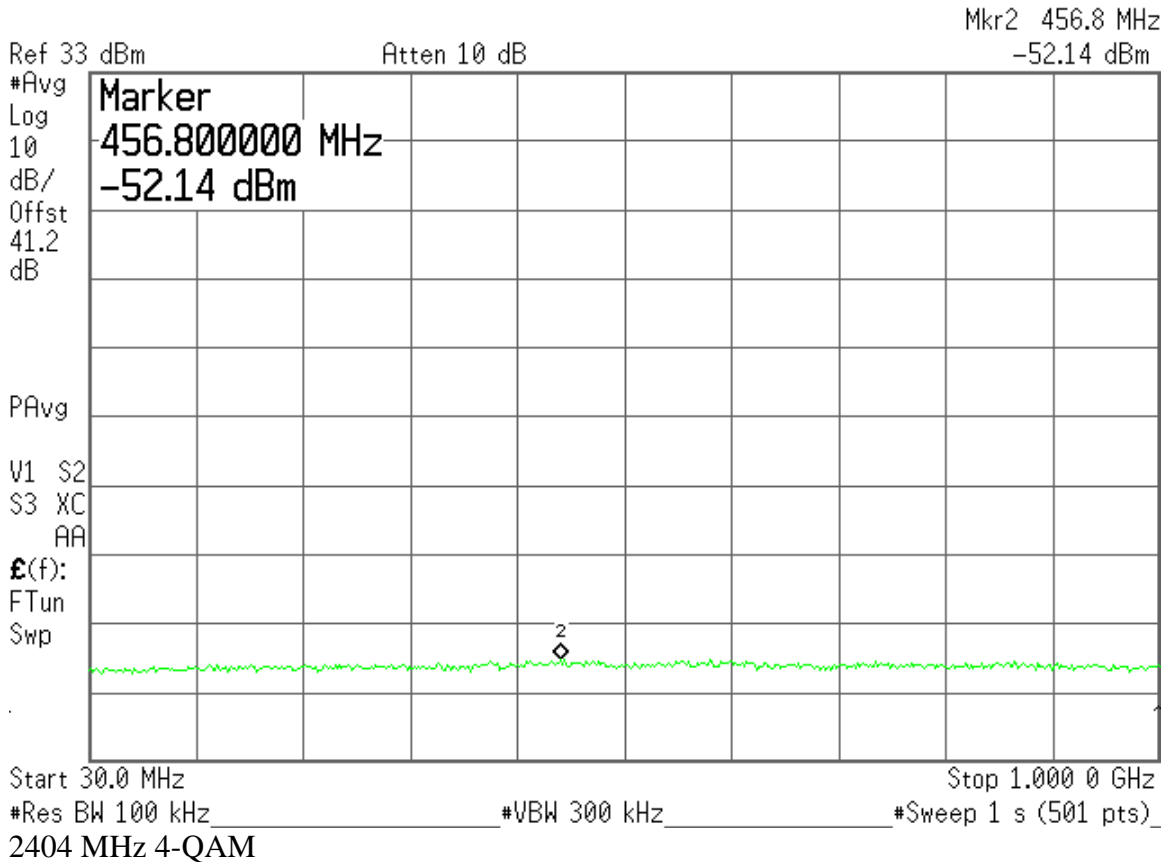


Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with Globtek 19.5 Vdc power supply

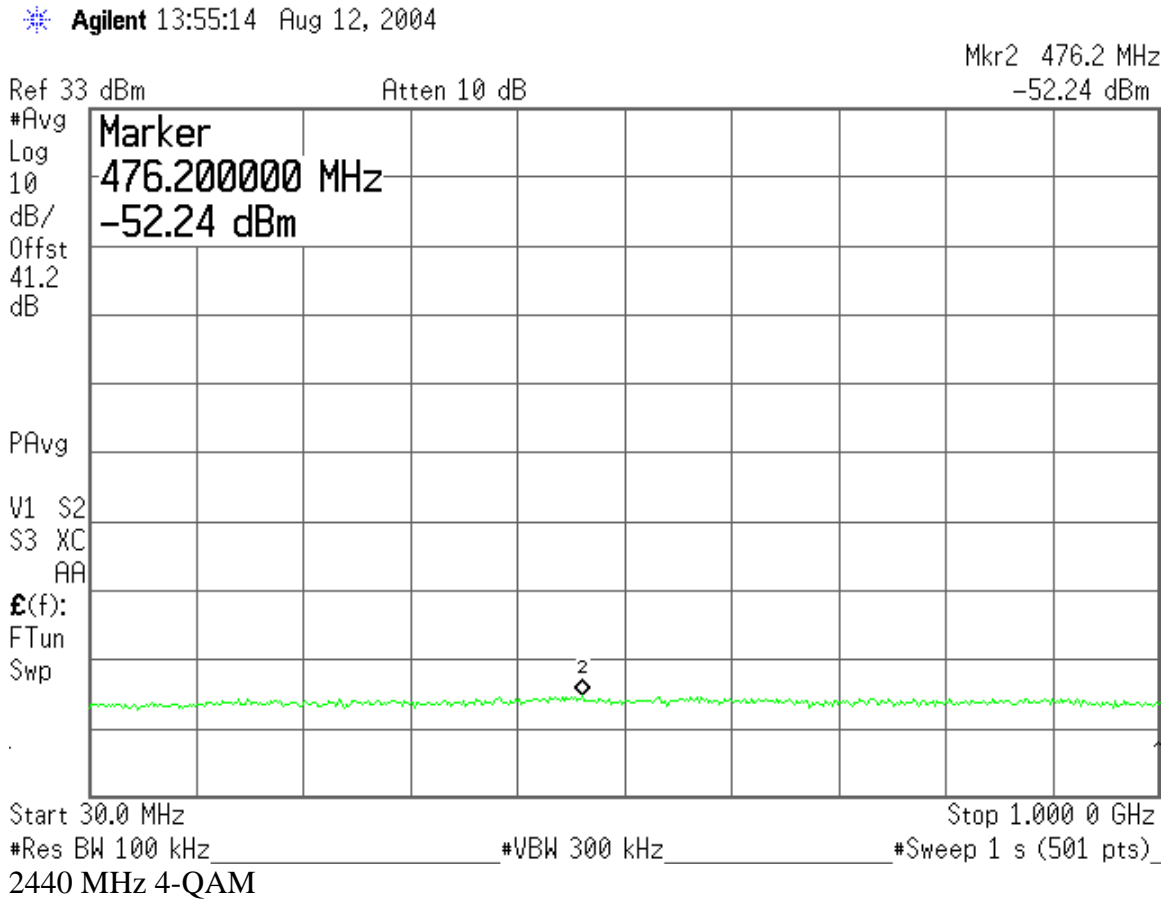
✱ Agilent 13:45:43 Aug 12, 2004



Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with Globtek 19.5 Vdc power supply

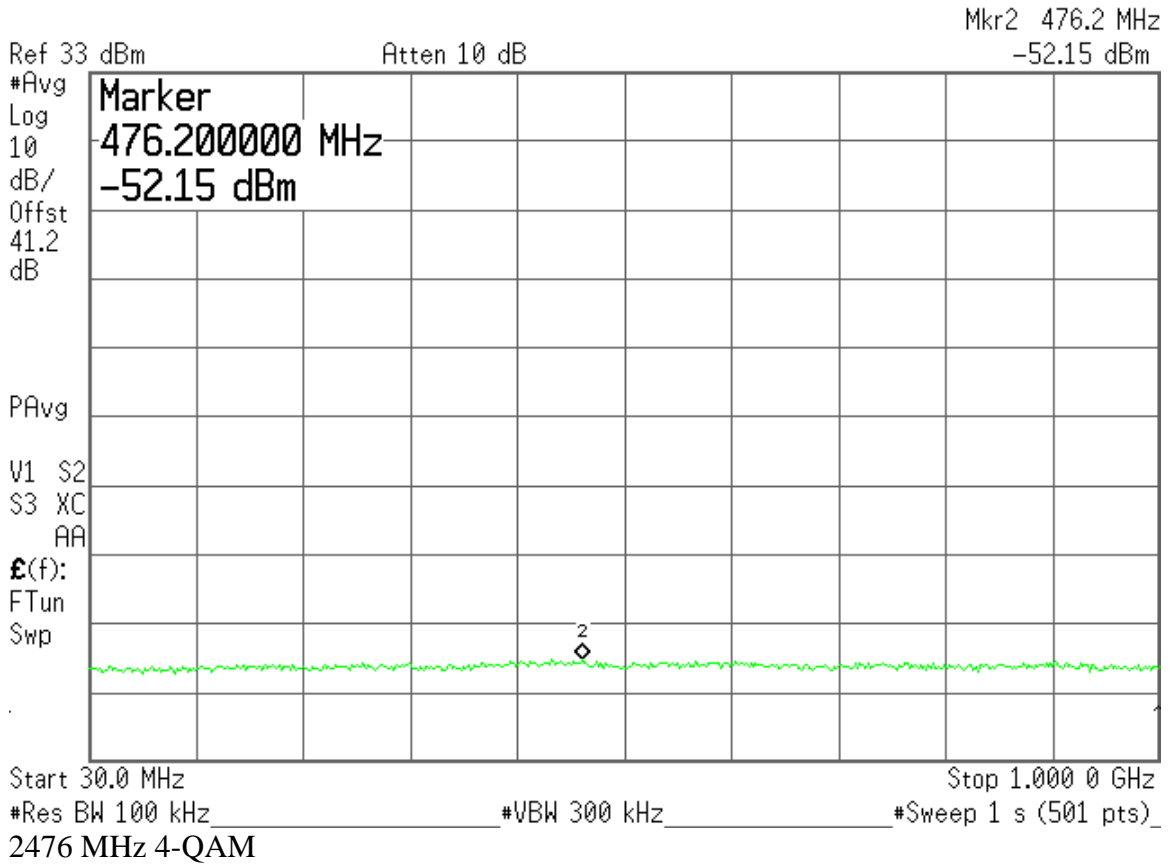


Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with Globtek 19.5 Vdc power supply

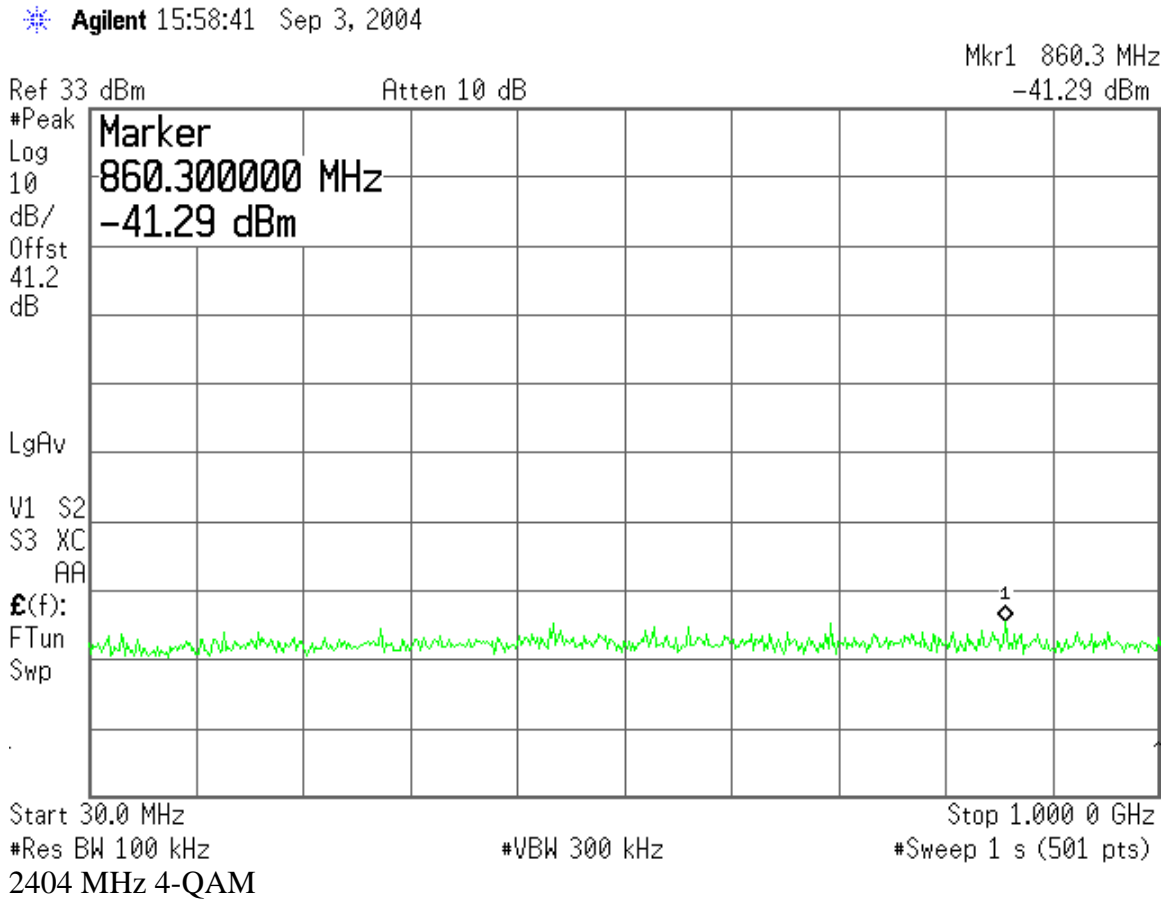
✱ Agilent 13:56:51 Aug 12, 2004



Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with Globtek 15 Vdc power supply

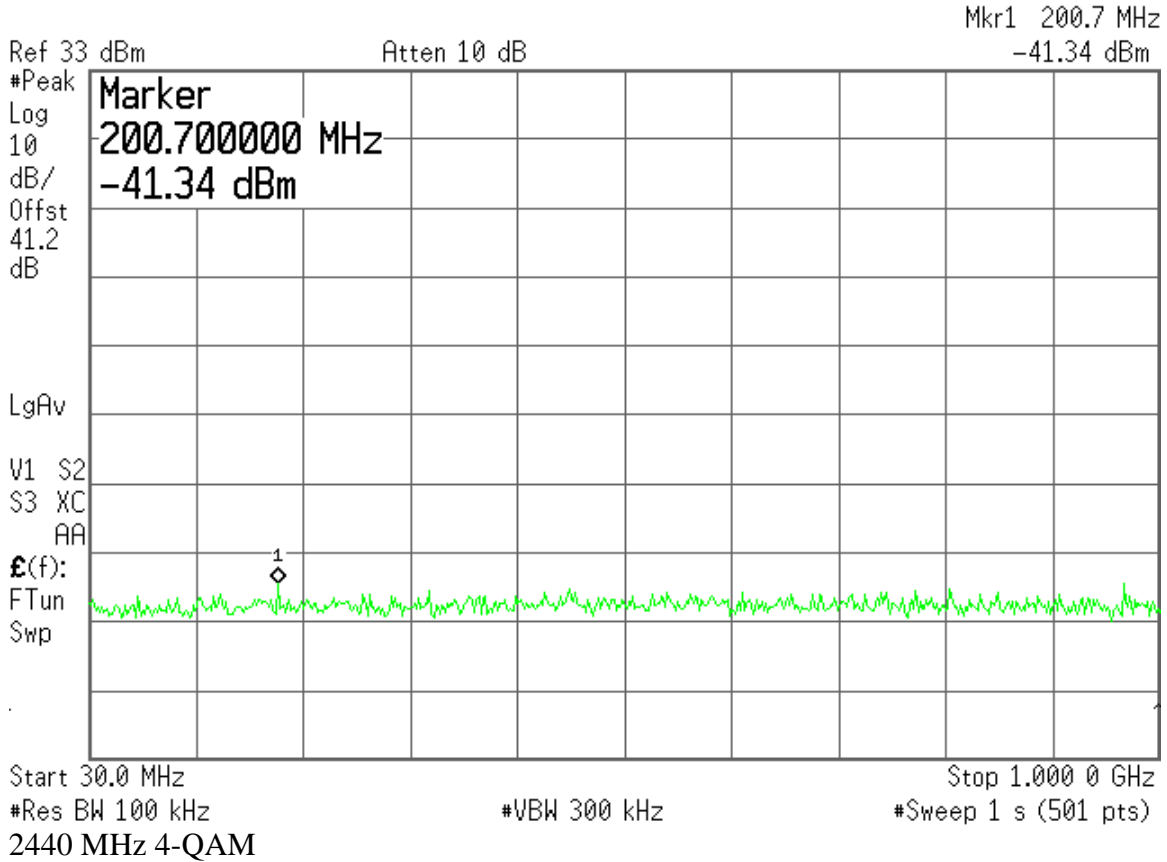


Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with Globtek 15 Vdc power supply

Agilent 15:59:14 Sep 3, 2004

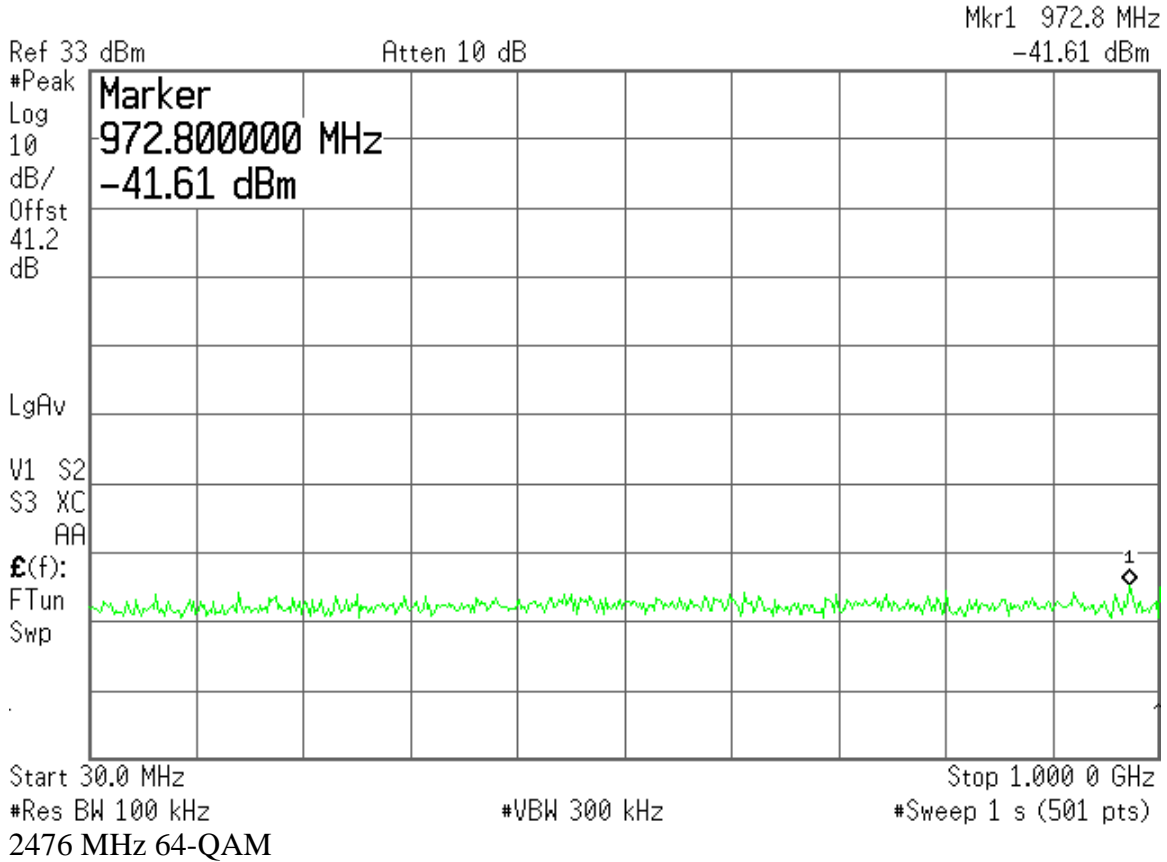


Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with Globtek 15 Vdc power supply

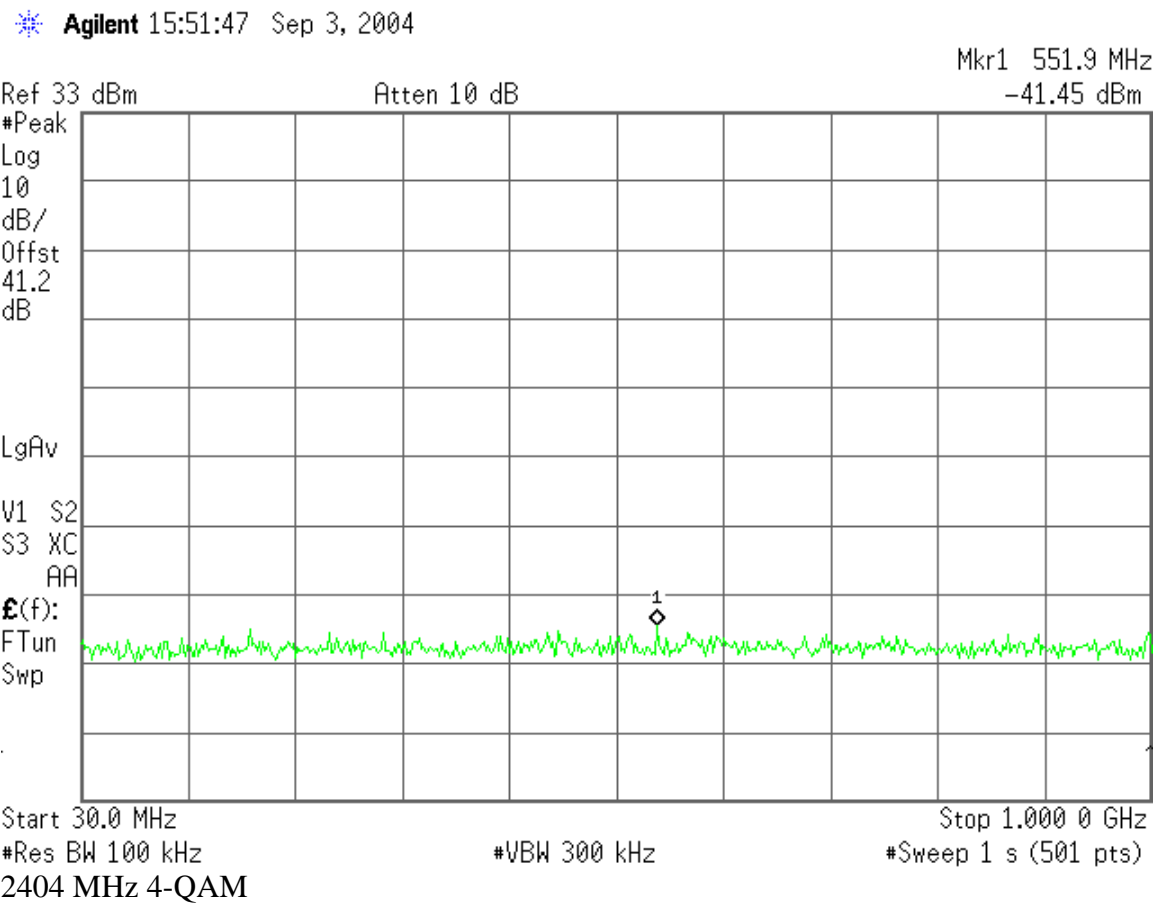
Agilent 15:59:45 Sep 3, 2004



Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with HP Power Supply (12 Vdc)

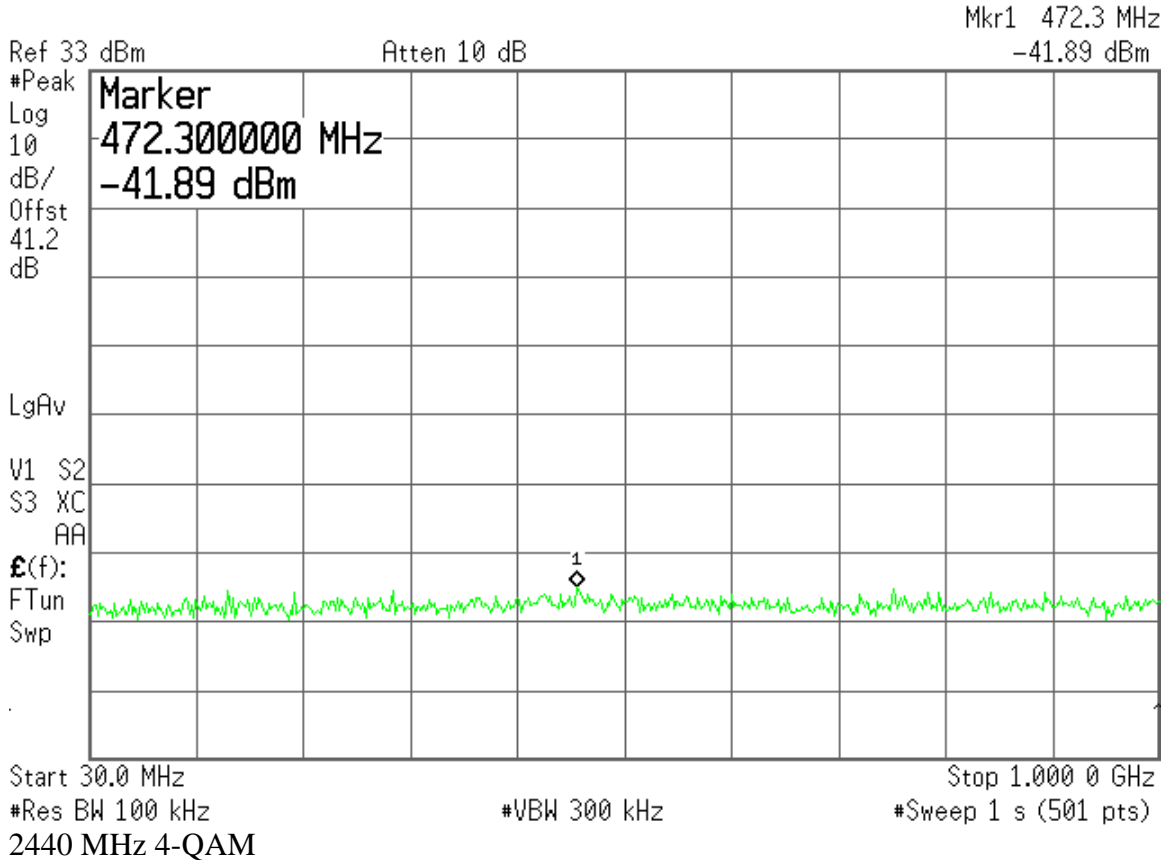


Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 15:52:25 Sep 3, 2004

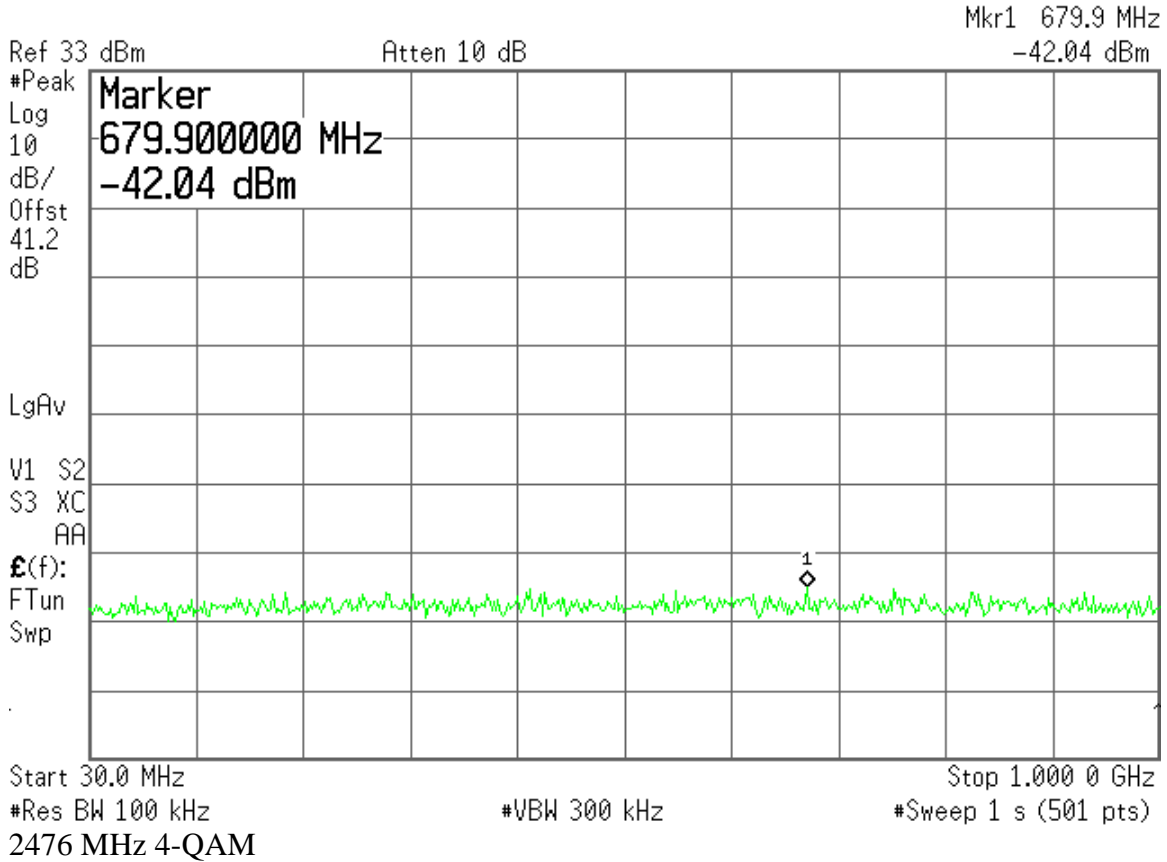


Spurious emissions at antenna terminals

30 MHz – 1 GHz

Measured with HP Power Supply (12 Vdc)

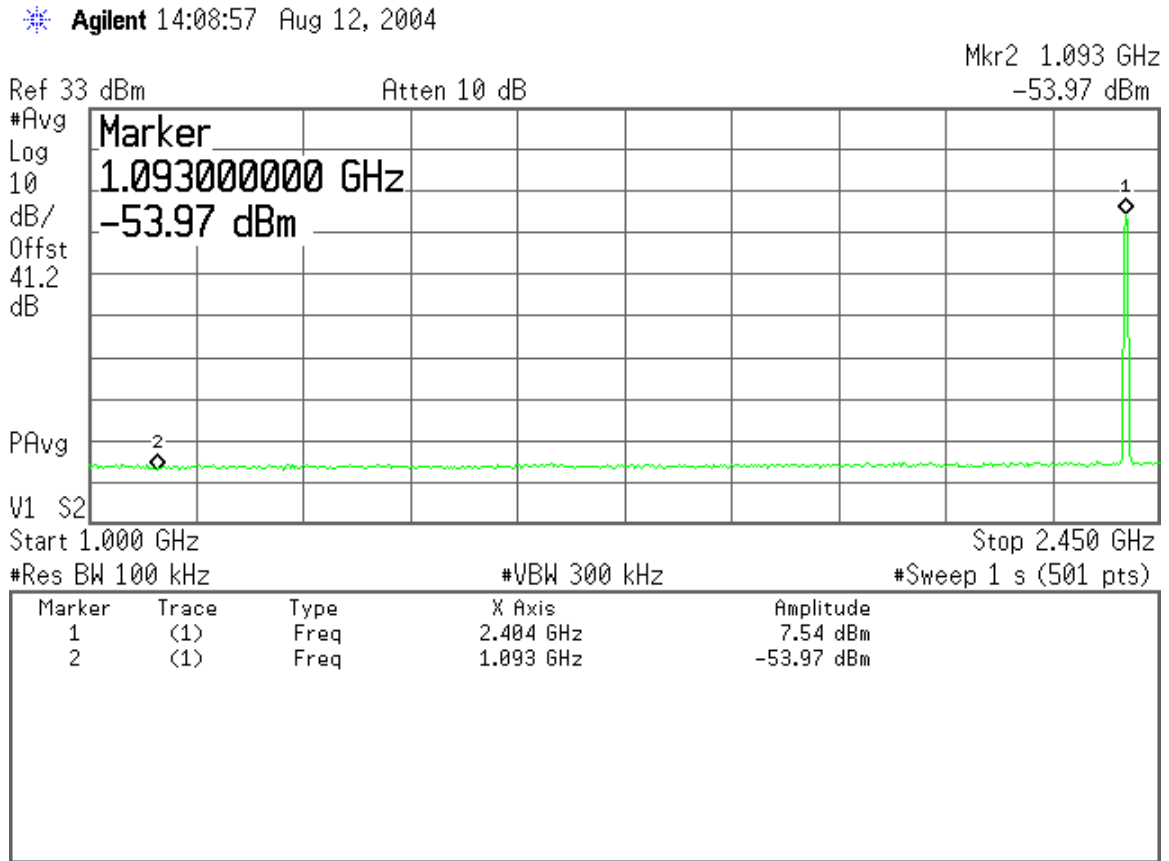
Agilent 15:52:54 Sep 3, 2004



Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with Globtek 19.5 Vdc power supply



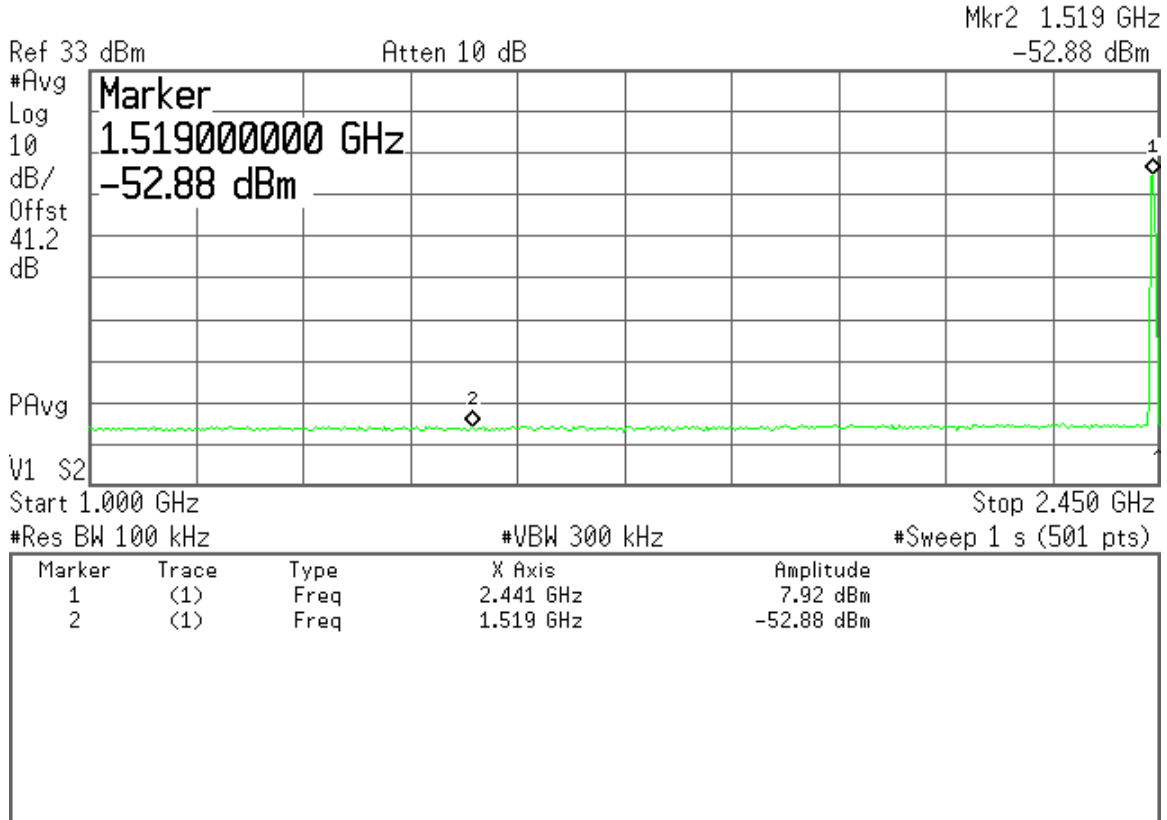
2404 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 14:11:50 Aug 12, 2004



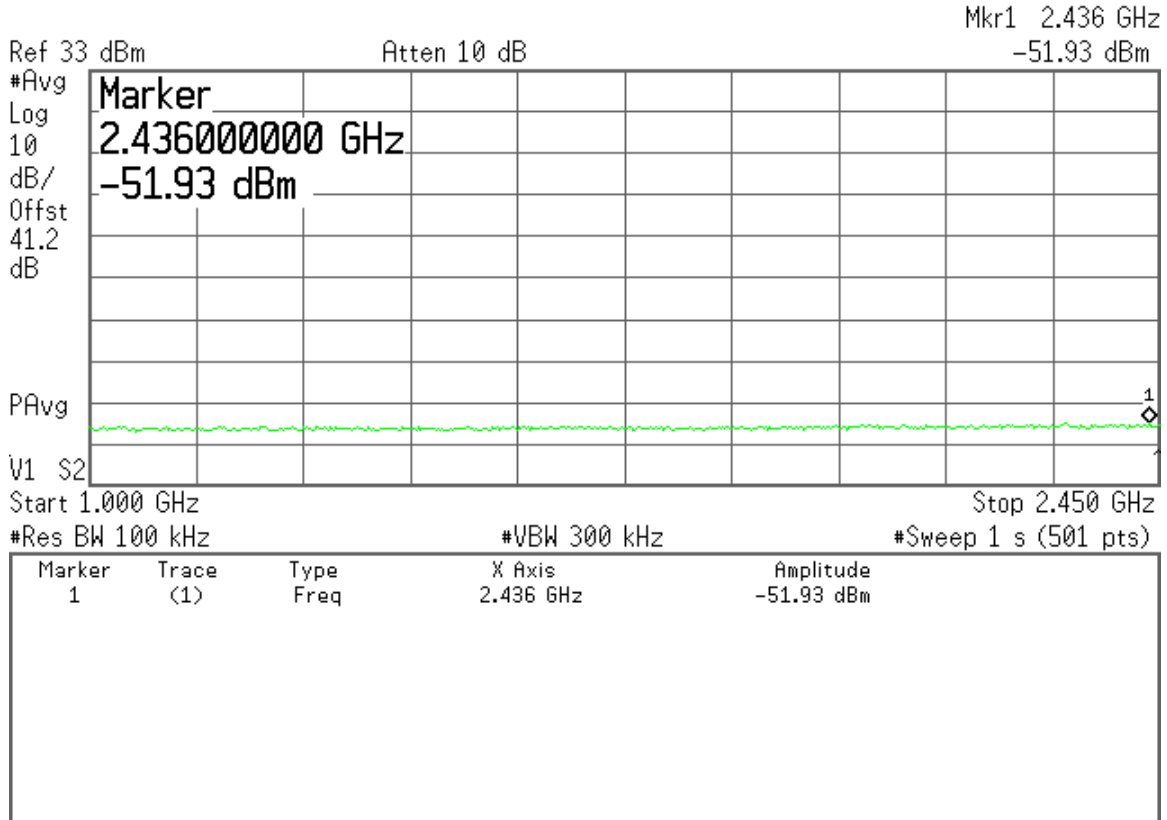
2440 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 14:14:31 Aug 12, 2004



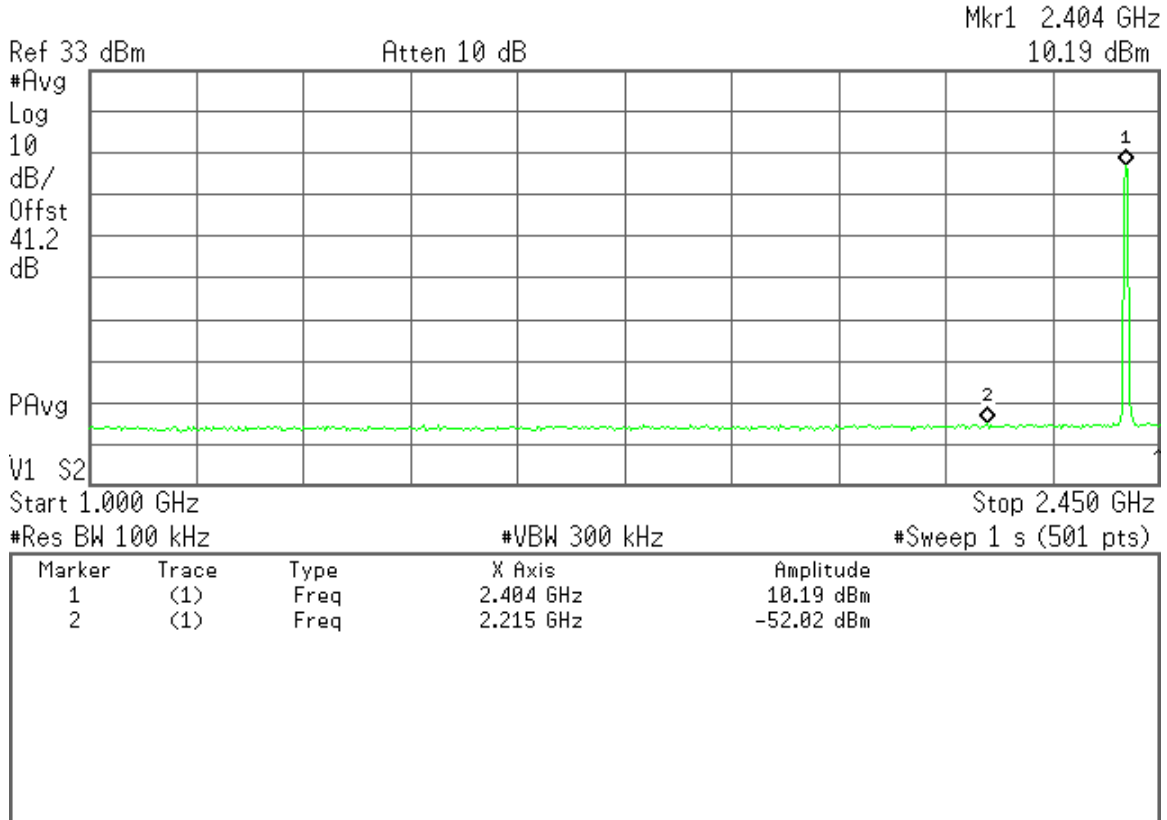
2476 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with Globtek 15 Vdc power supply

Agilent 16:07:50 Sep 3, 2004

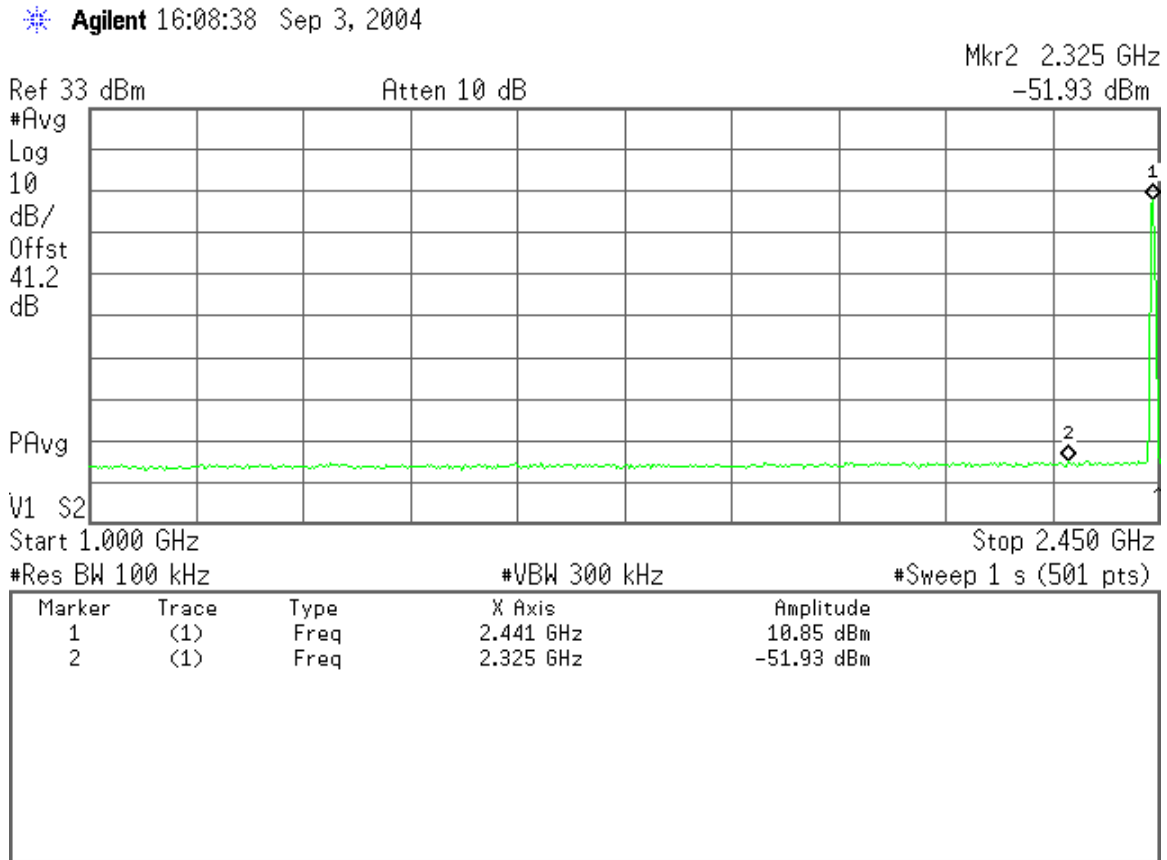


2404 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with Globtek 15 Vdc power supply



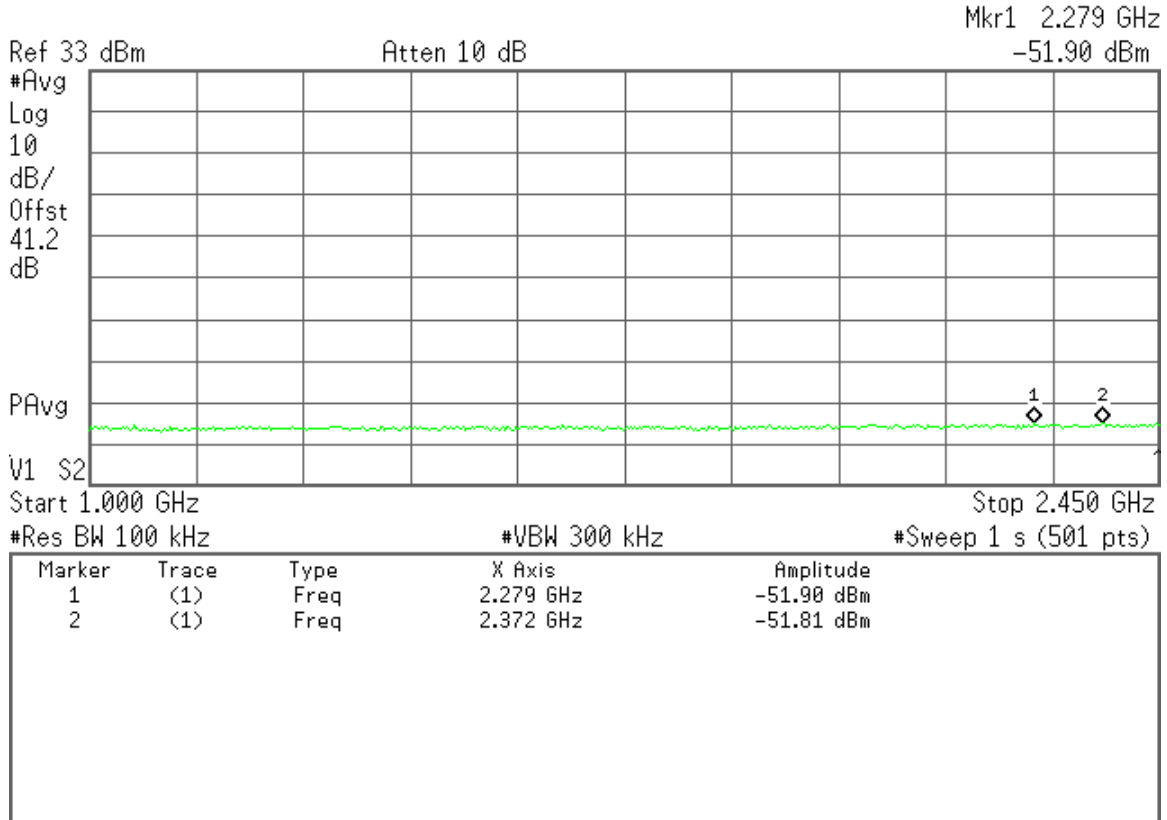
2440 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with Globtek 15 Vdc power supply

Agilent 16:09:24 Sep 3, 2004



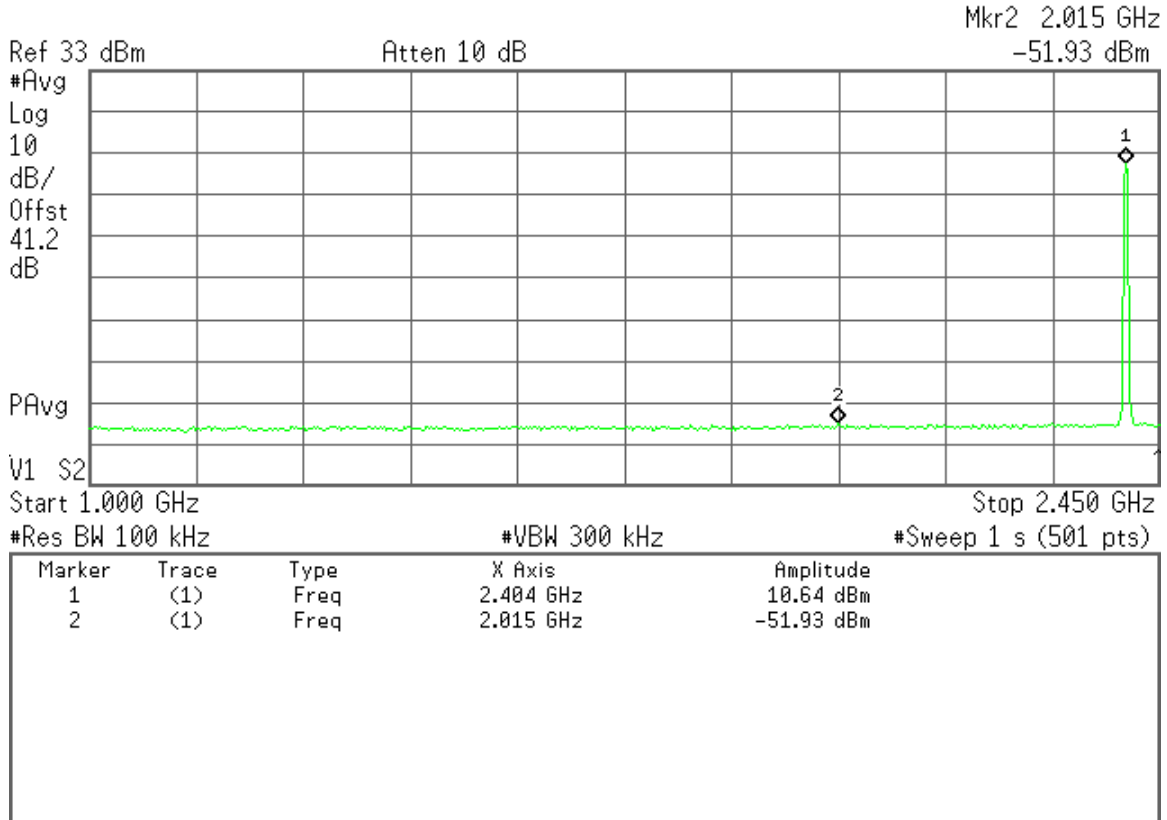
2476 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 16:14:16 Sep 3, 2004



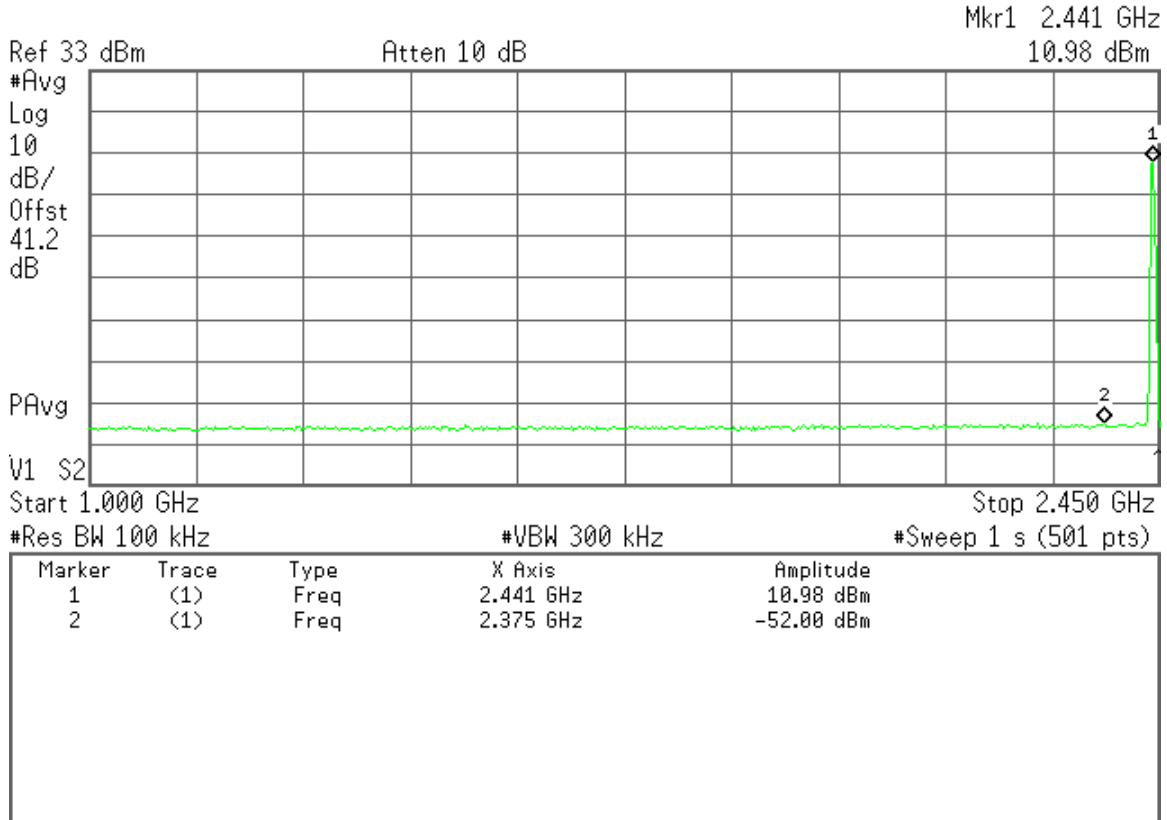
2404 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 16:15:03 Sep 3, 2004



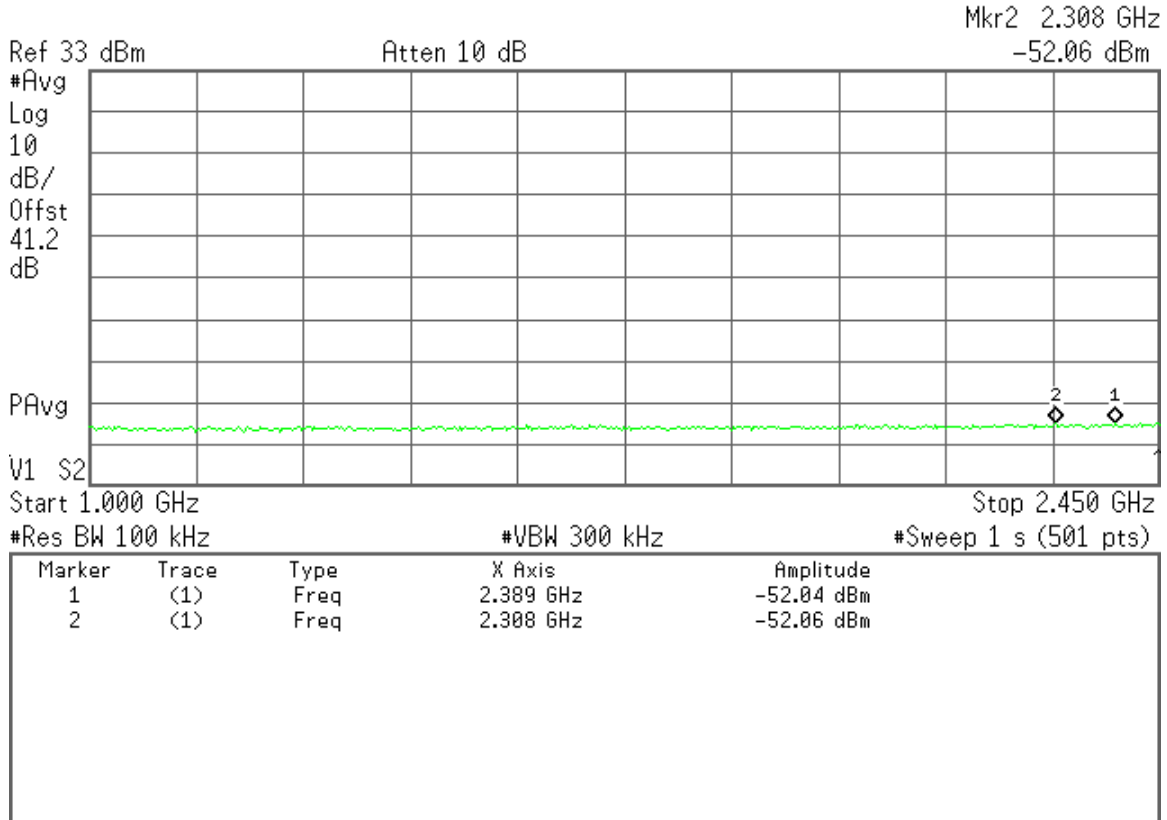
2440 MHz 4-QAM

Spurious emissions at antenna terminals

1 GHz – 2.450 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 16:16:02 Sep 3, 2004



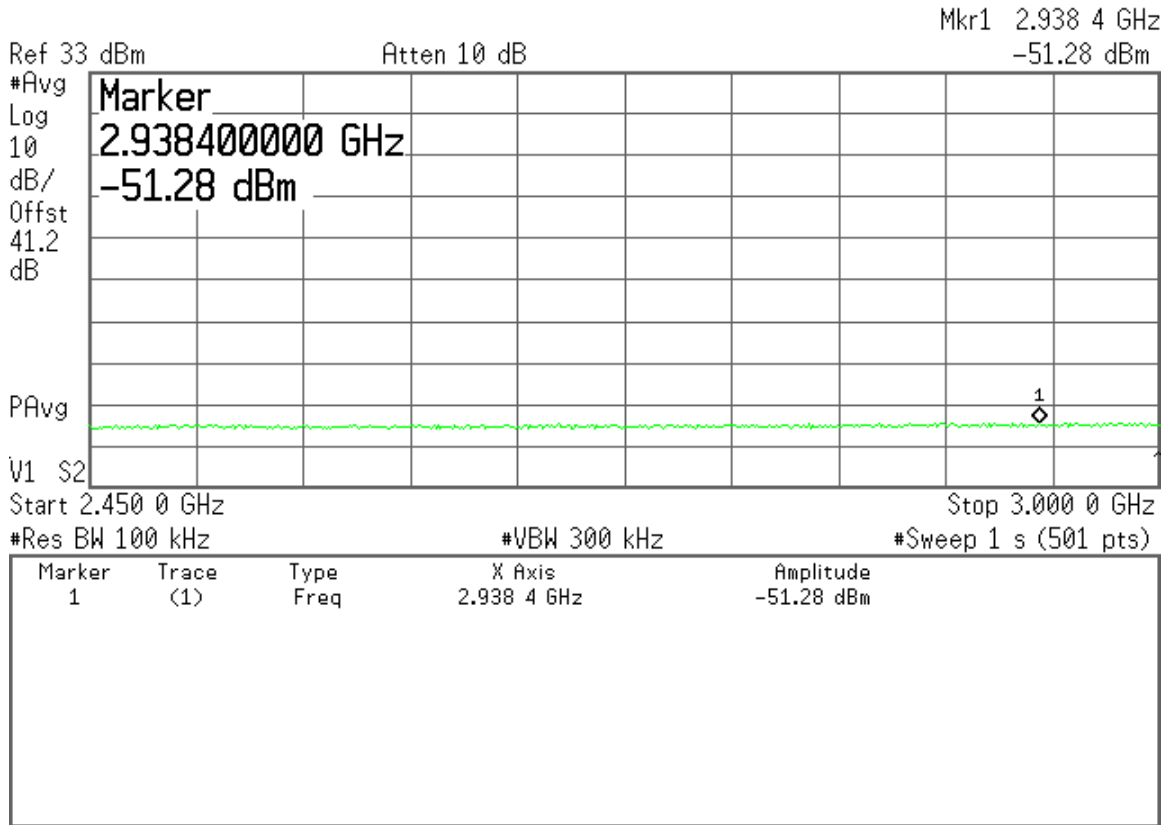
2476 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with Globtek 19.5 Vdc power supply

✱ Agilent 14:17:27 Aug 12, 2004



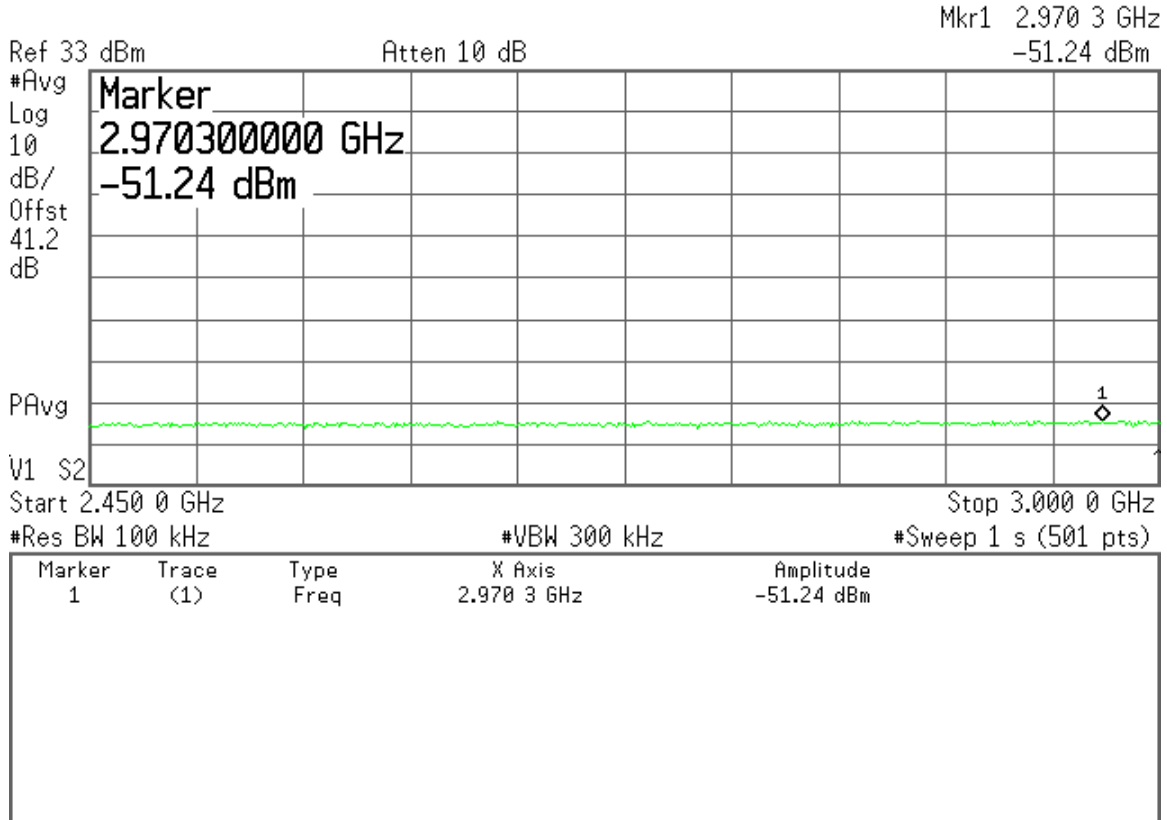
2404 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 14:19:07 Aug 12, 2004



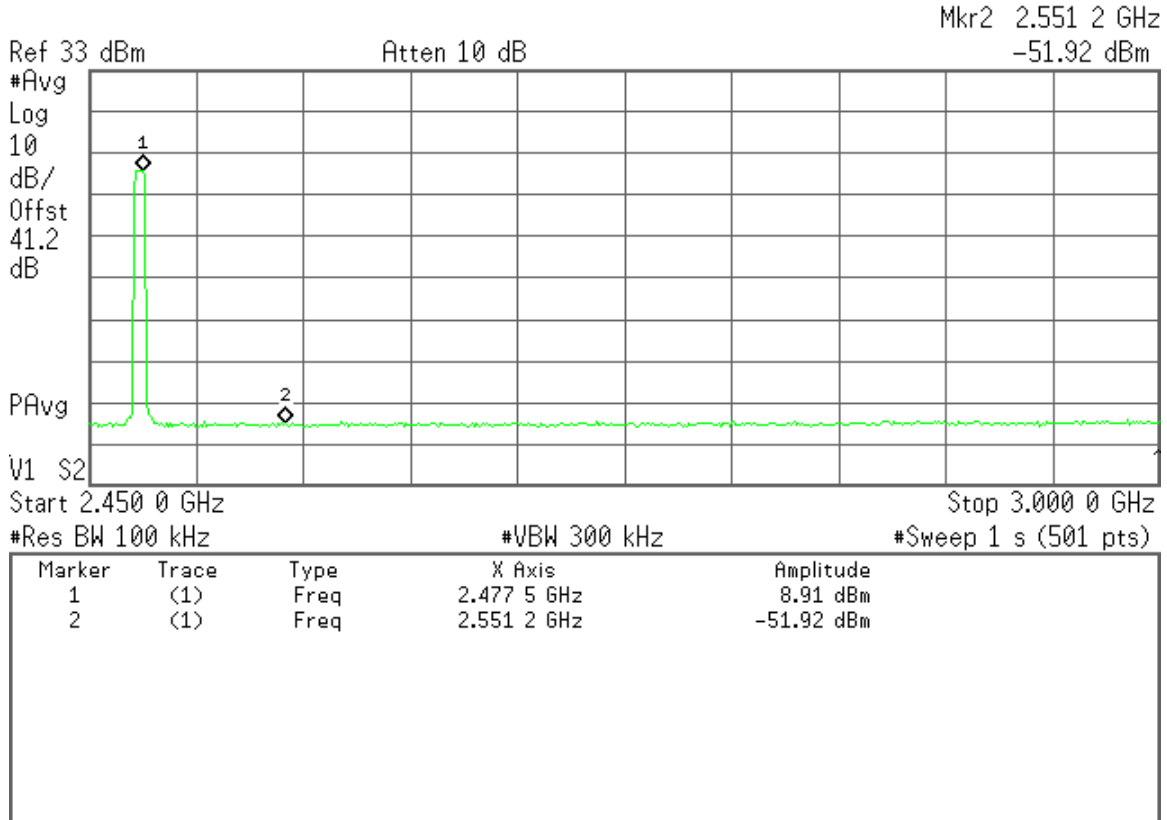
2440 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 14:29:22 Aug 12, 2004



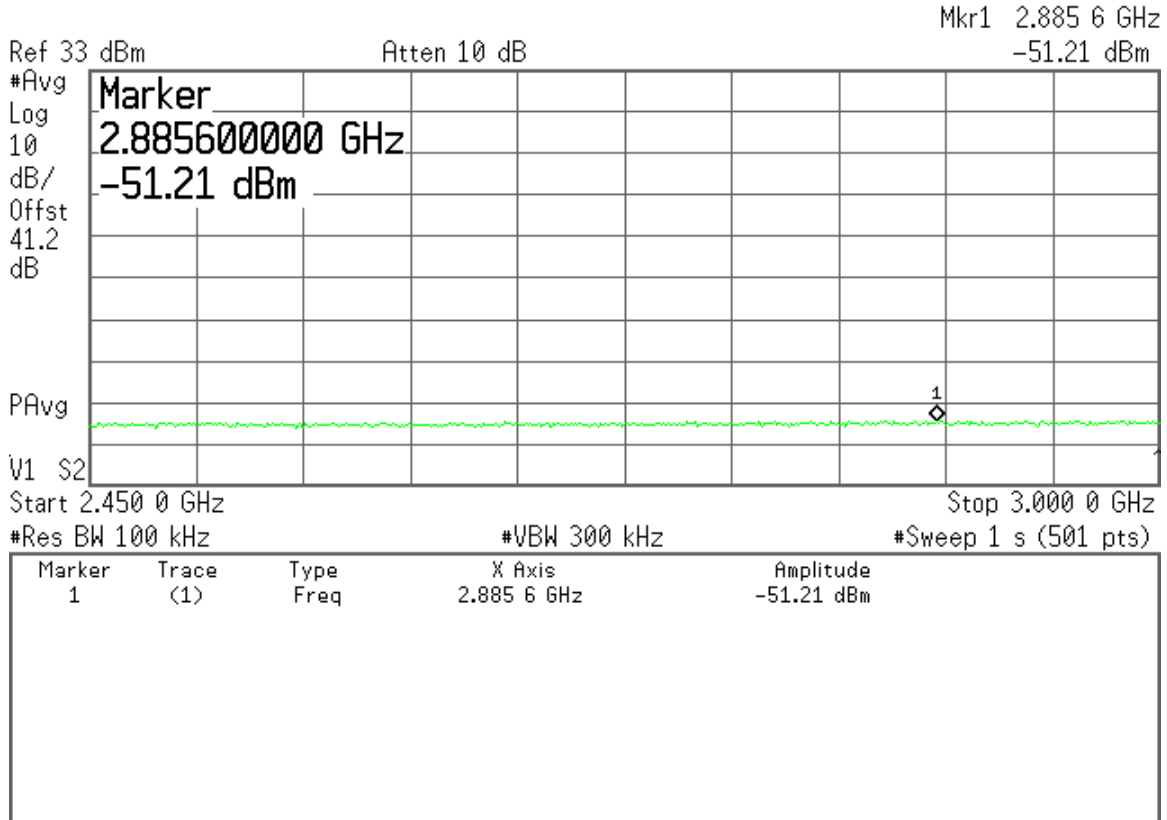
2476 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with Globtek 15 Vdc power supply

Agilent 08:43:27 Sep 7, 2004



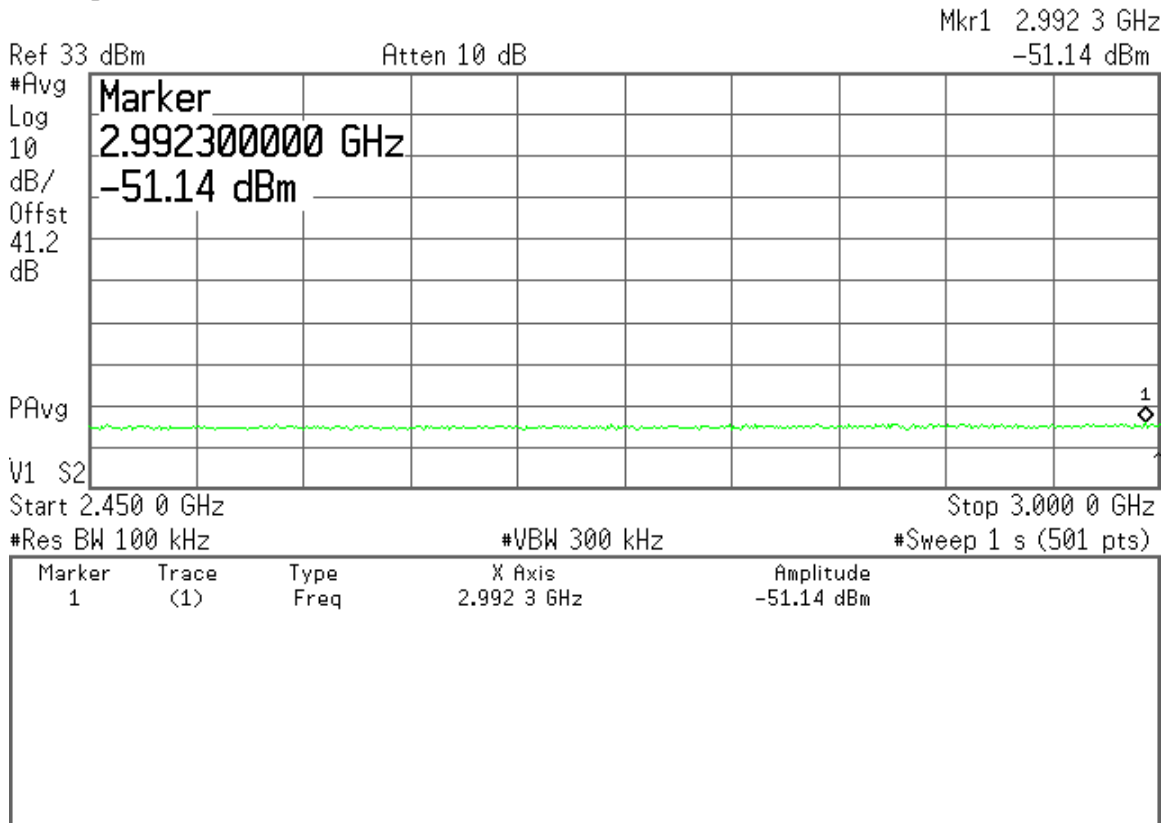
2404 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with Globtek 15 Vdc power supply

✱ Agilent 08:44:05 Sep 7, 2004



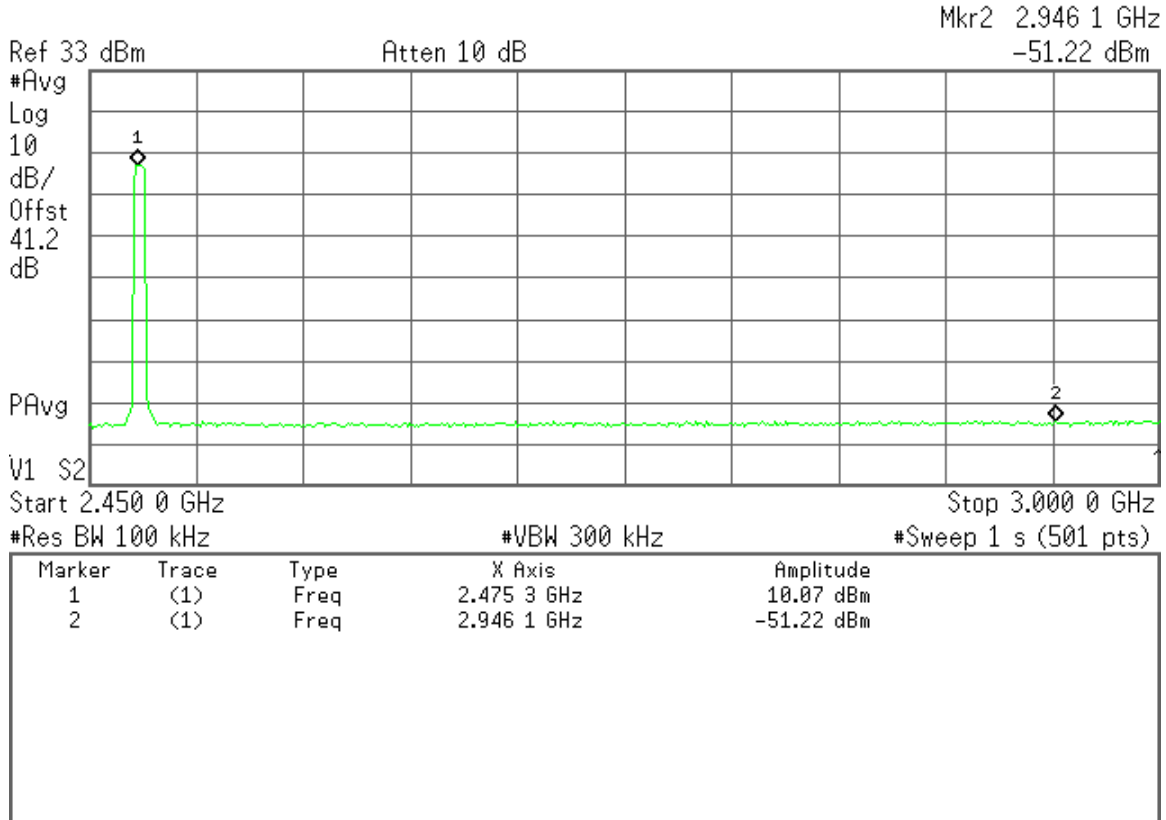
2440 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with Globtek 15 Vdc power supply

Agilent 08:44:57 Sep 7, 2004



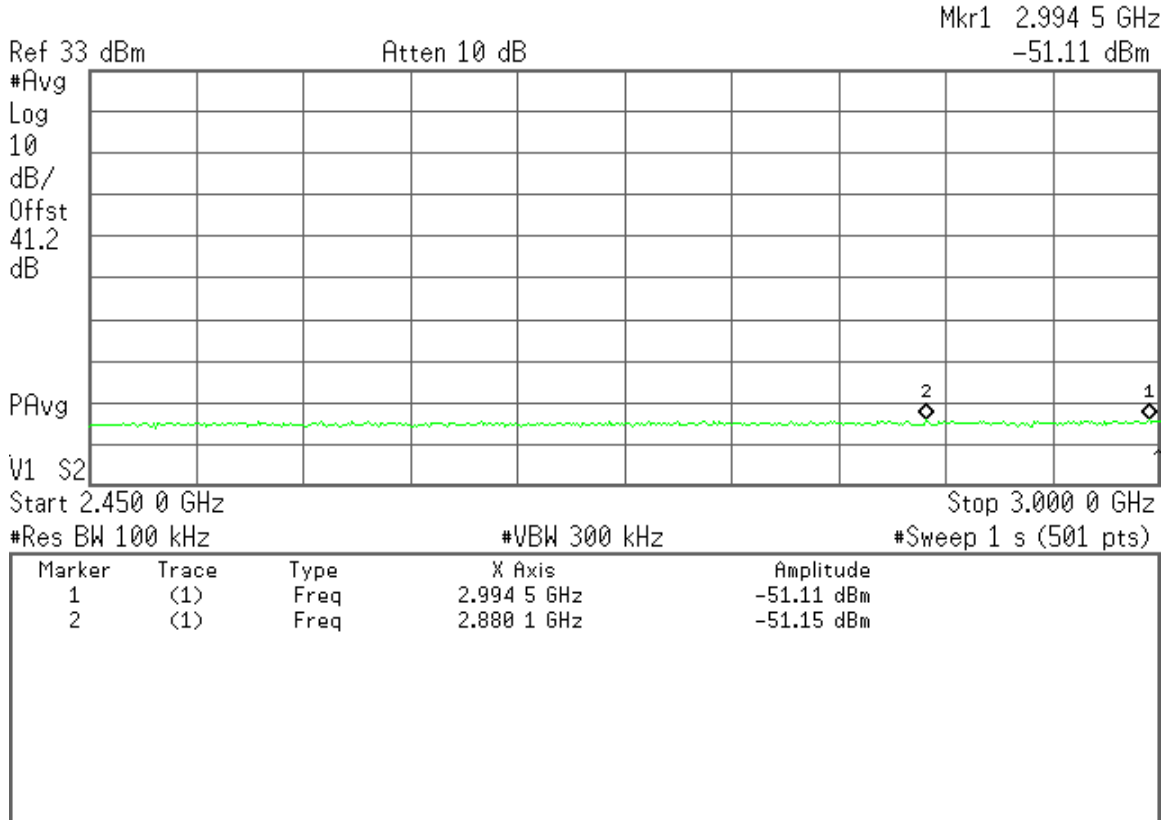
2476 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 16:26:10 Sep 3, 2004



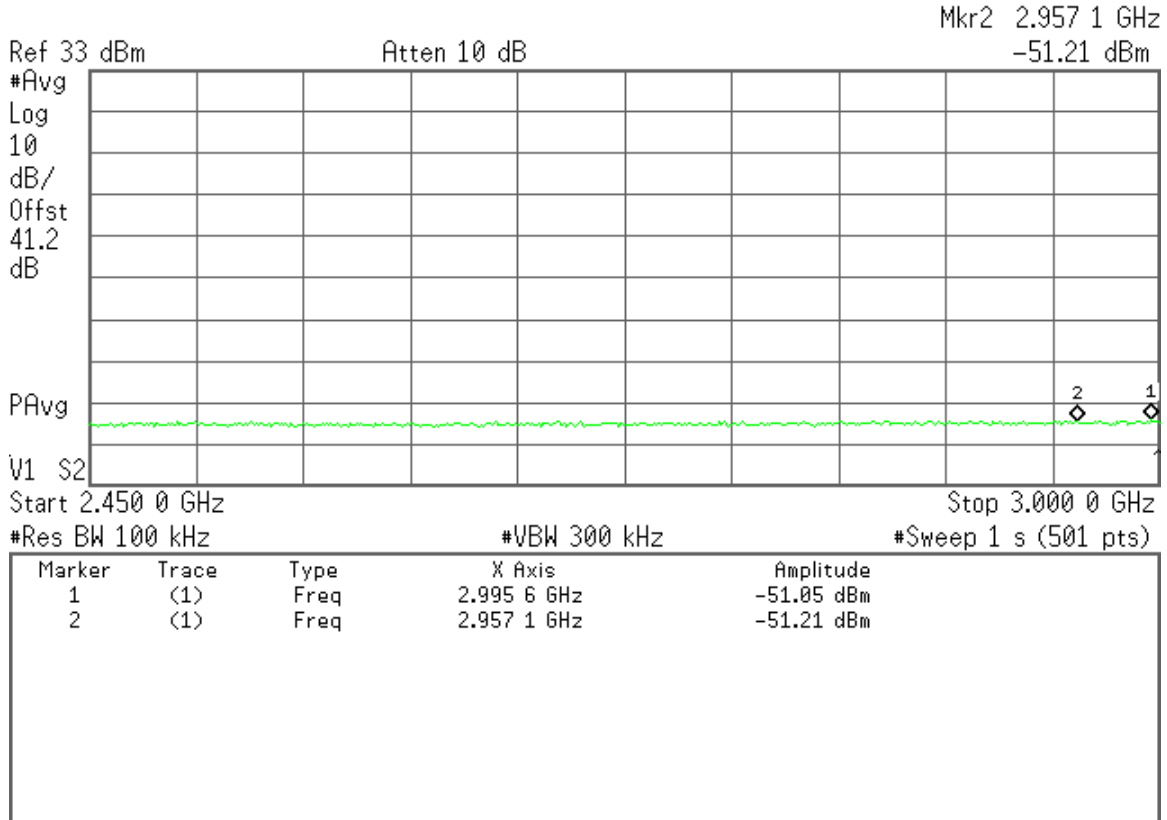
2404 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 16:26:43 Sep 3, 2004



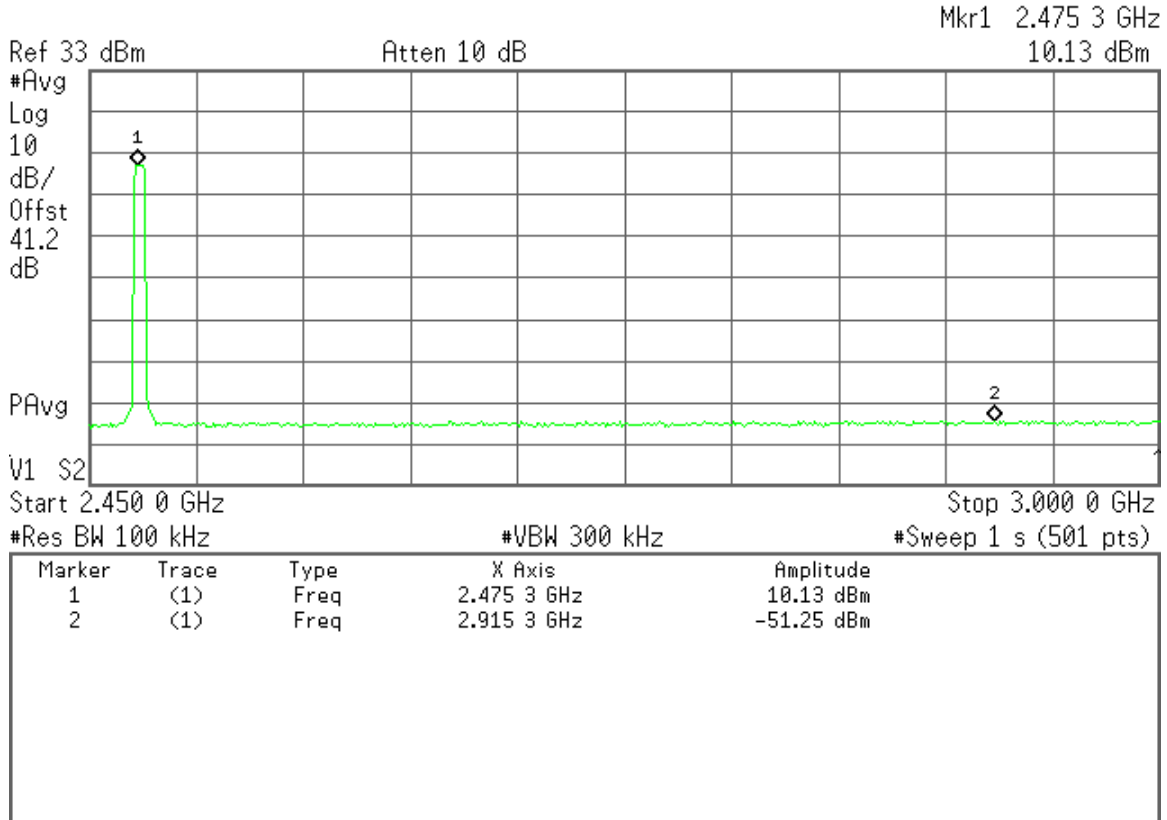
2440 MHz 4-QAM

Spurious emissions at antenna terminals

2.450 GHz – 3.0 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 16:27:22 Sep 3, 2004



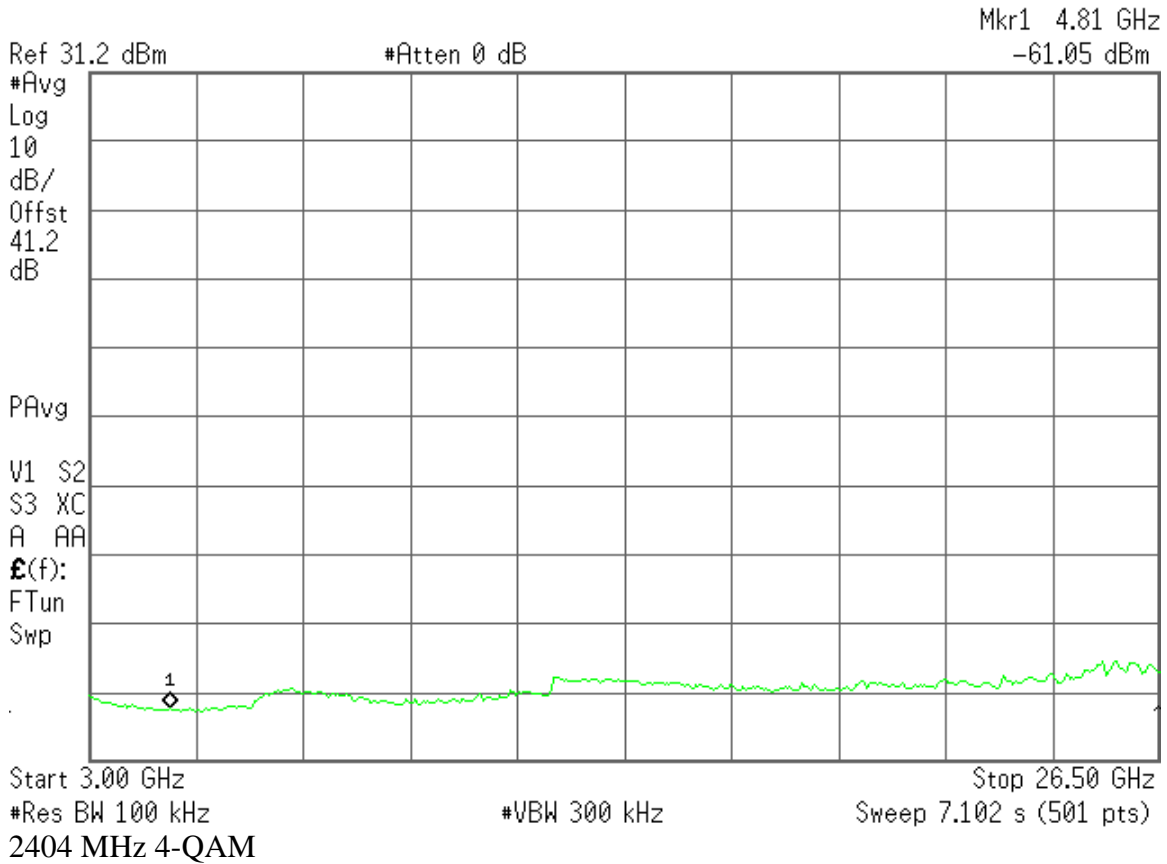
2476 MHz 4-QAM

Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with Globtek 19.5 Vdc power supply

✱ Agilent 15:36:43 Sep 24, 2004

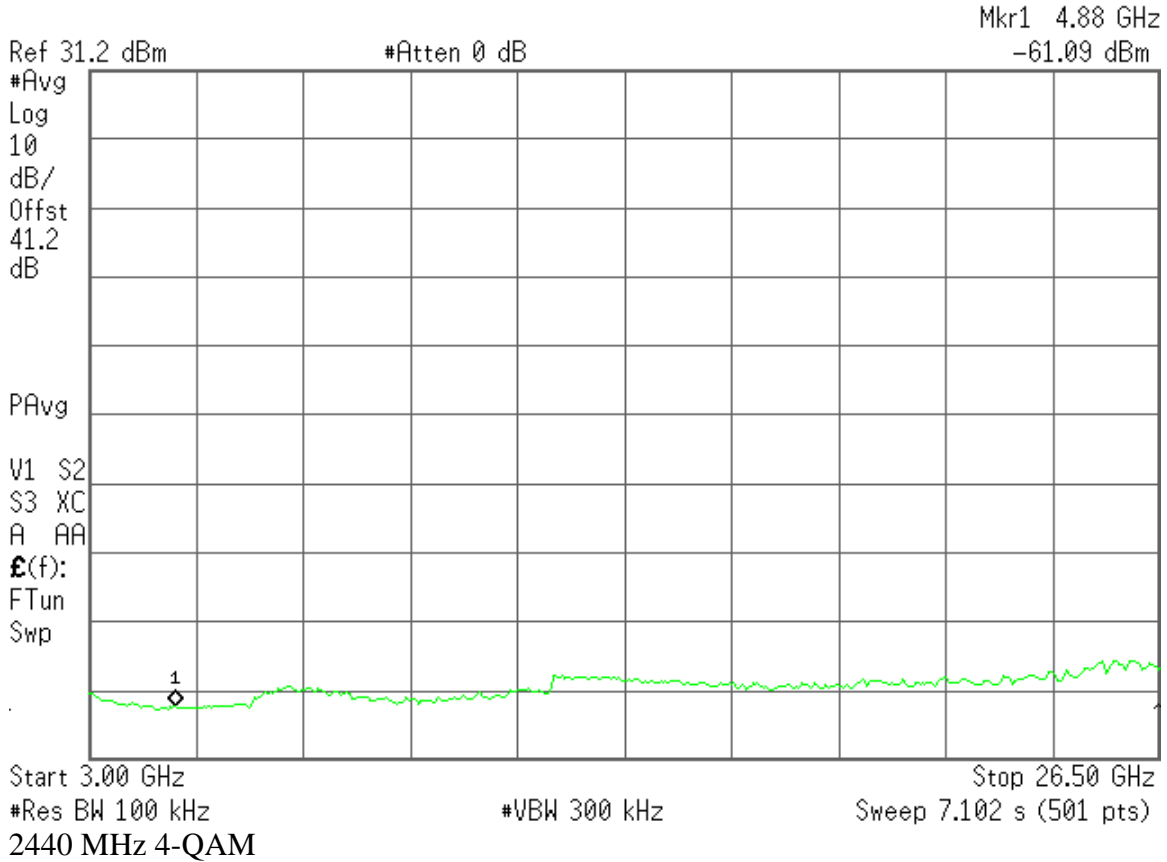


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 15:40:39 Sep 24, 2004

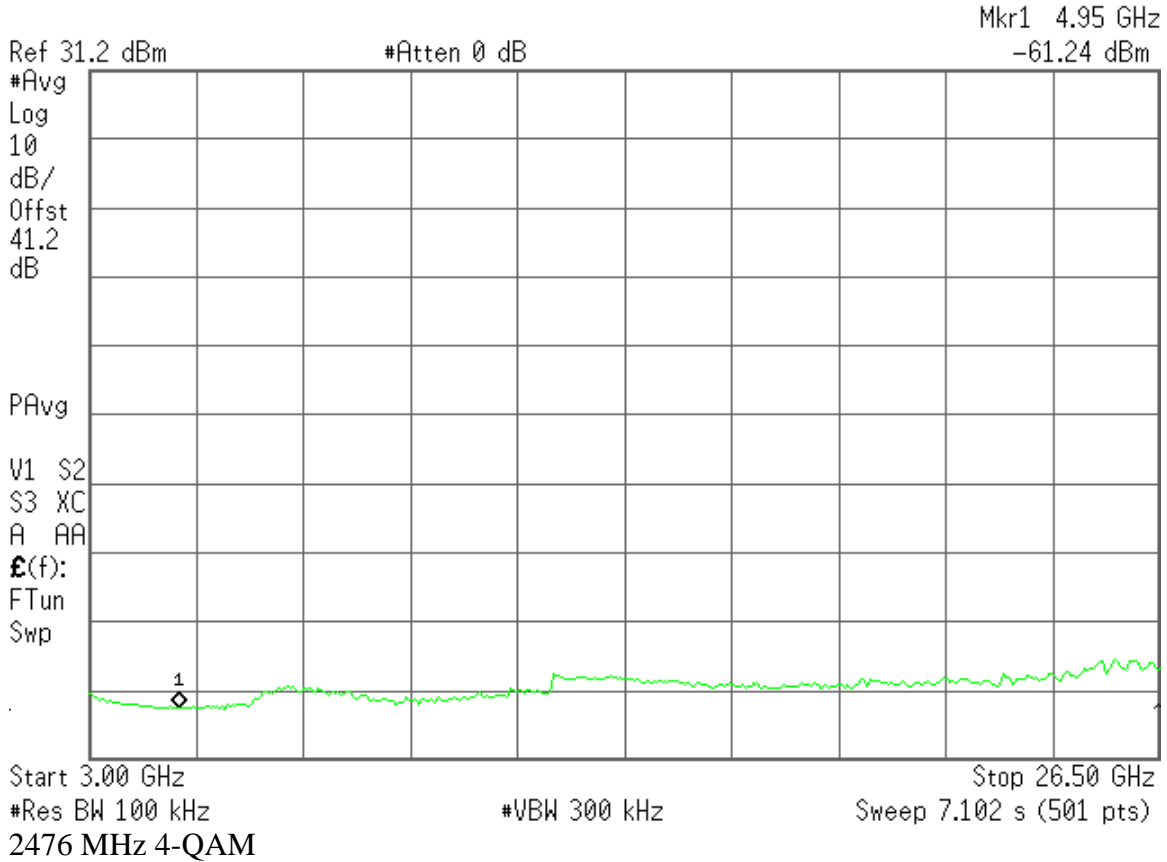


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 15:43:12 Sep 24, 2004

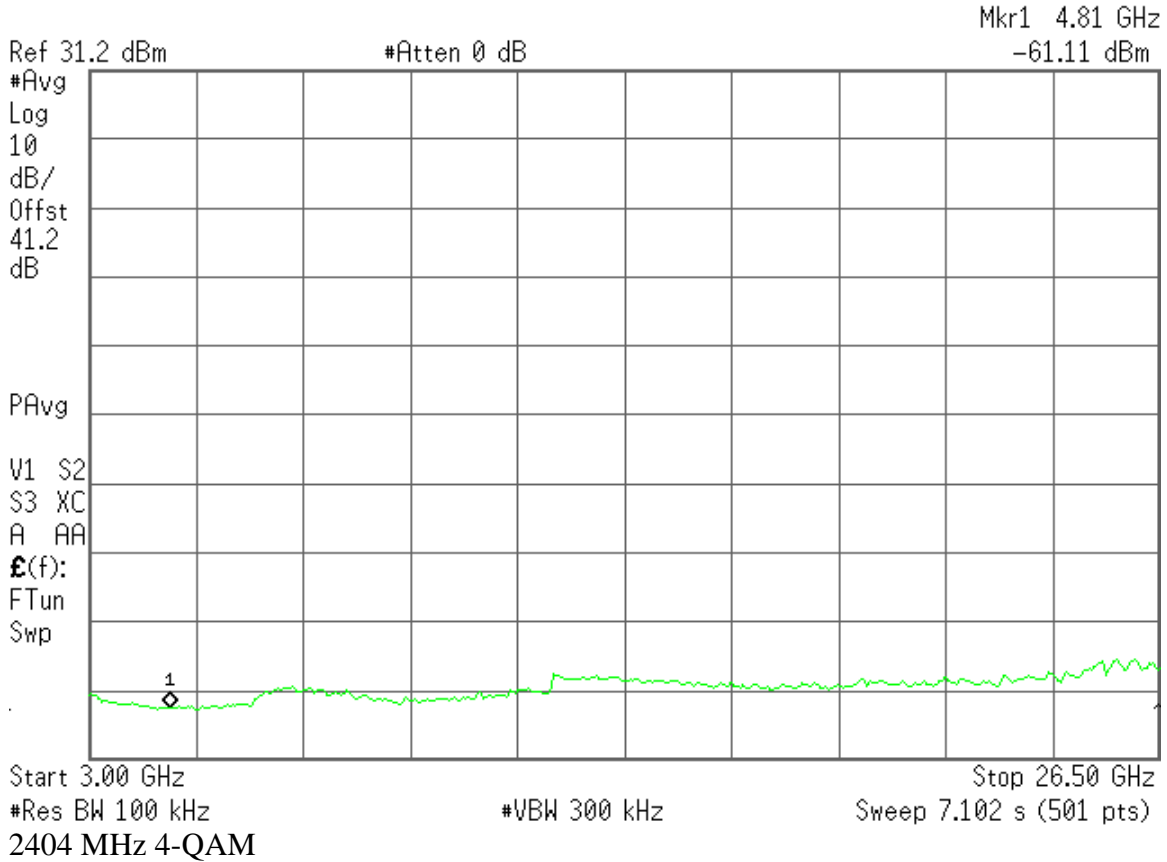


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with Globtek 15 Vdc power supply

Agilent 15:19:20 Sep 24, 2004

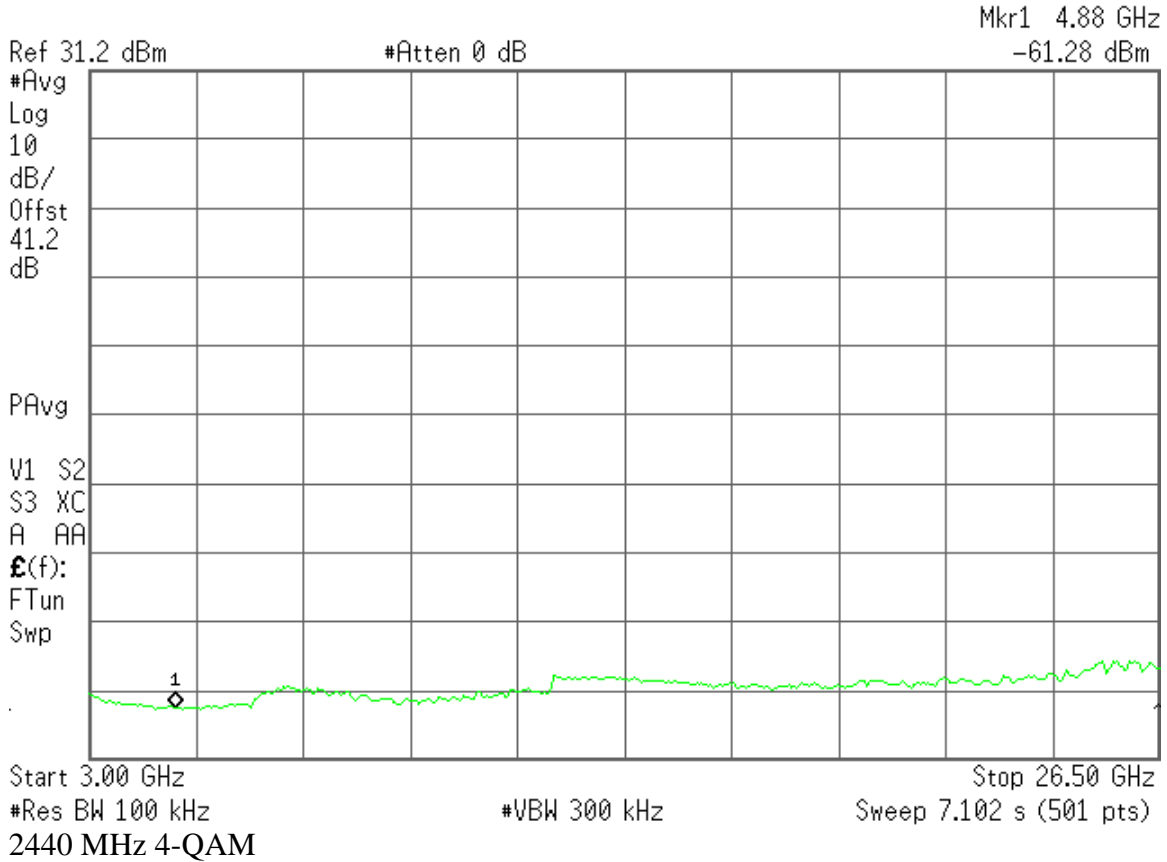


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with Globtek 15 Vdc power supply

Agilent 15:22:50 Sep 24, 2004

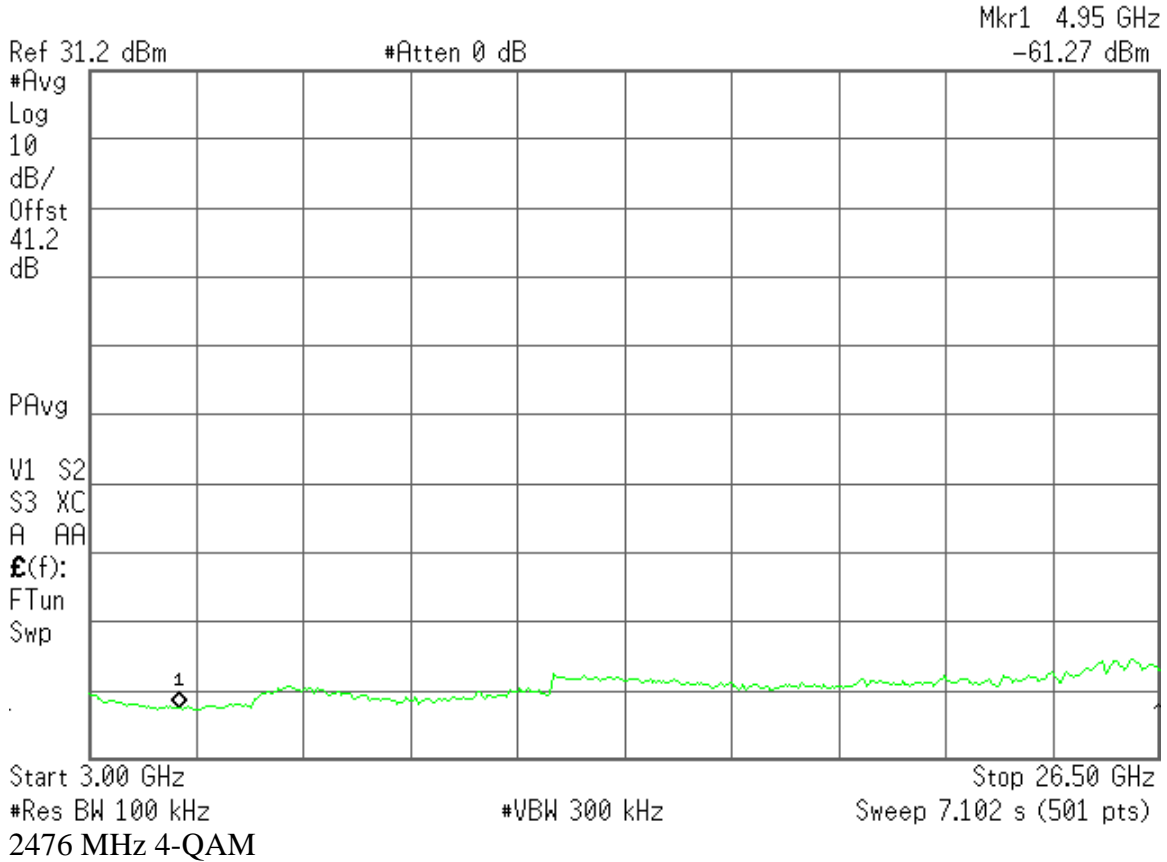


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with Globtek 15 Vdc power supply

Agilent 15:25:42 Sep 24, 2004

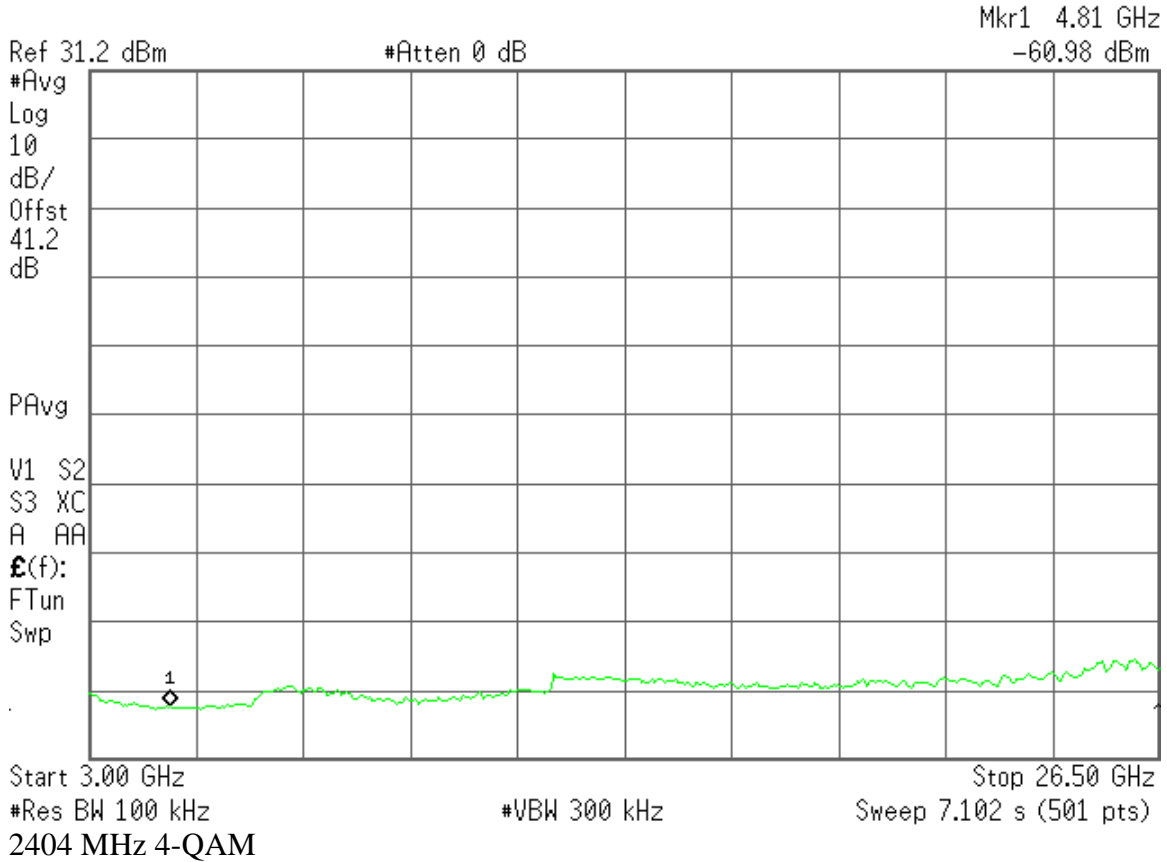


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 15:49:07 Sep 24, 2004

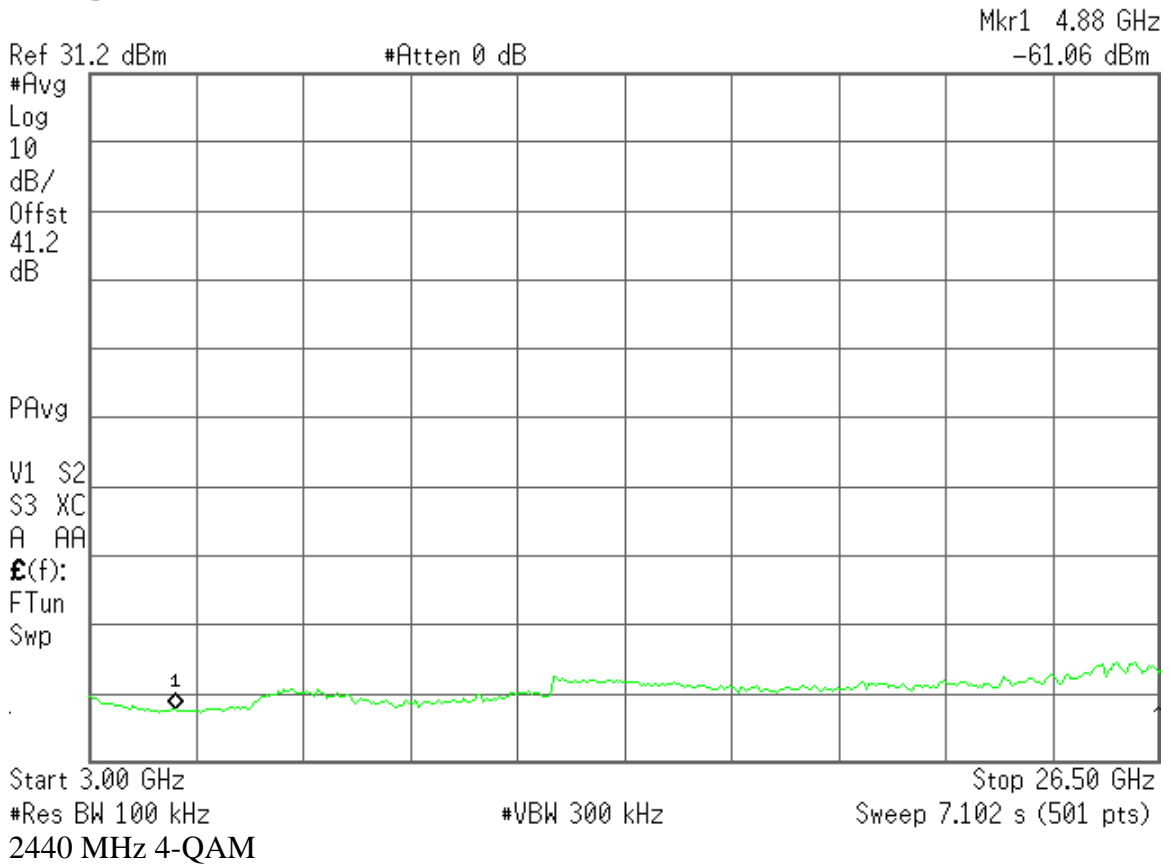


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 15:52:32 Sep 24, 2004

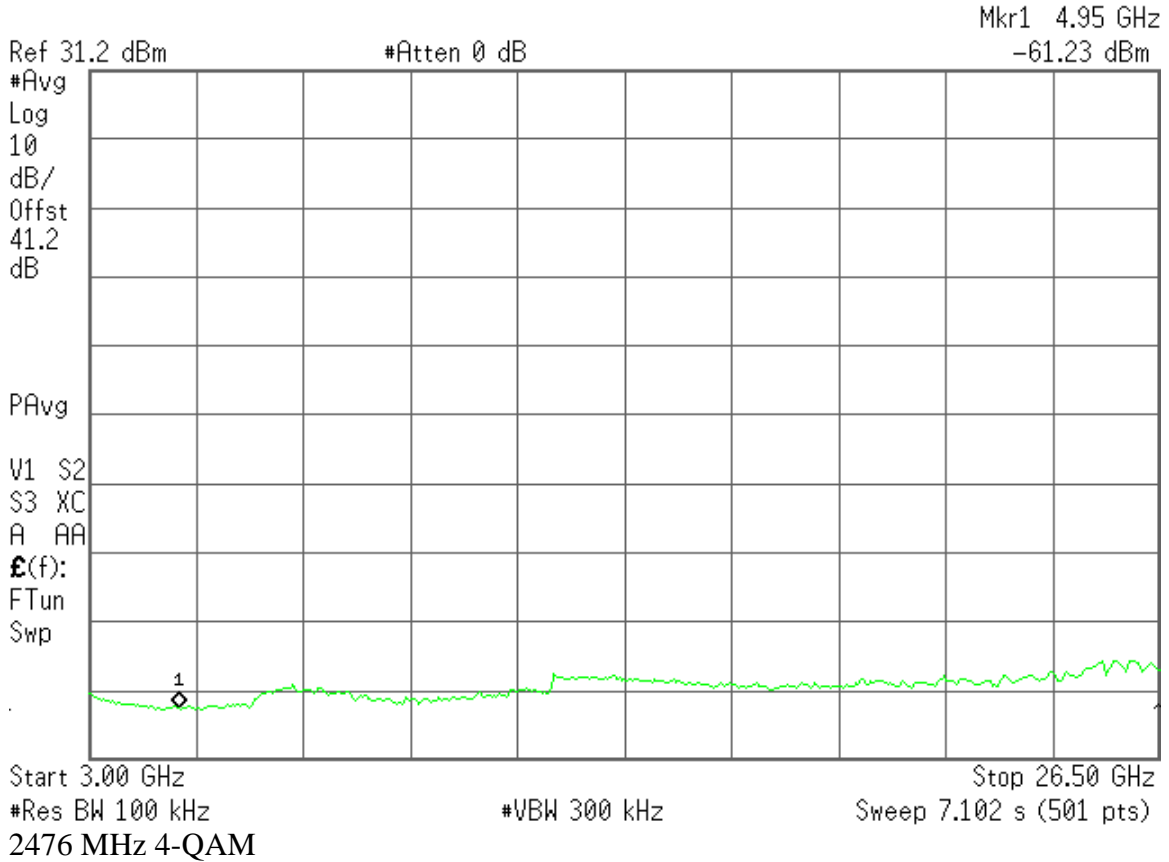


Spurious emissions at antenna terminals

3.0 GHz – 26.50 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 15:54:19 Sep 24, 2004

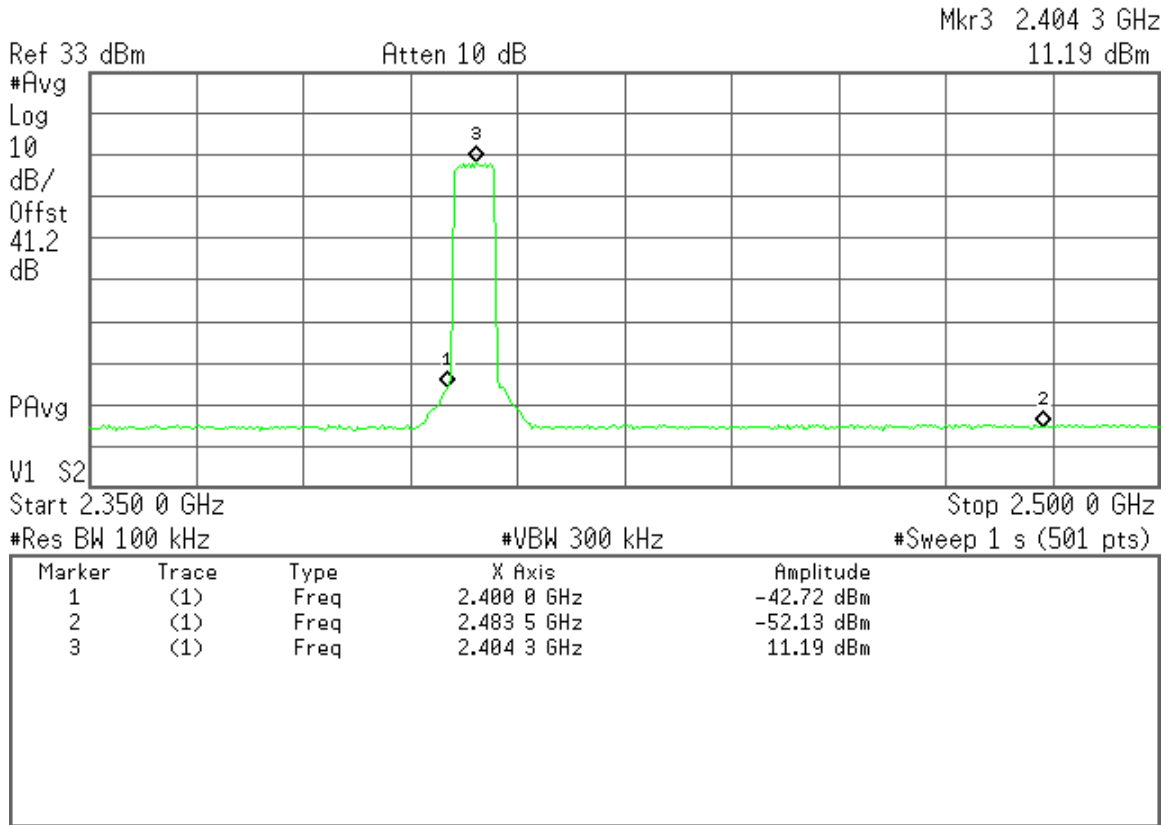


Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with Globtek 19.5 Vdc power supply

✱ Agilent 08:37:05 Sep 7, 2004



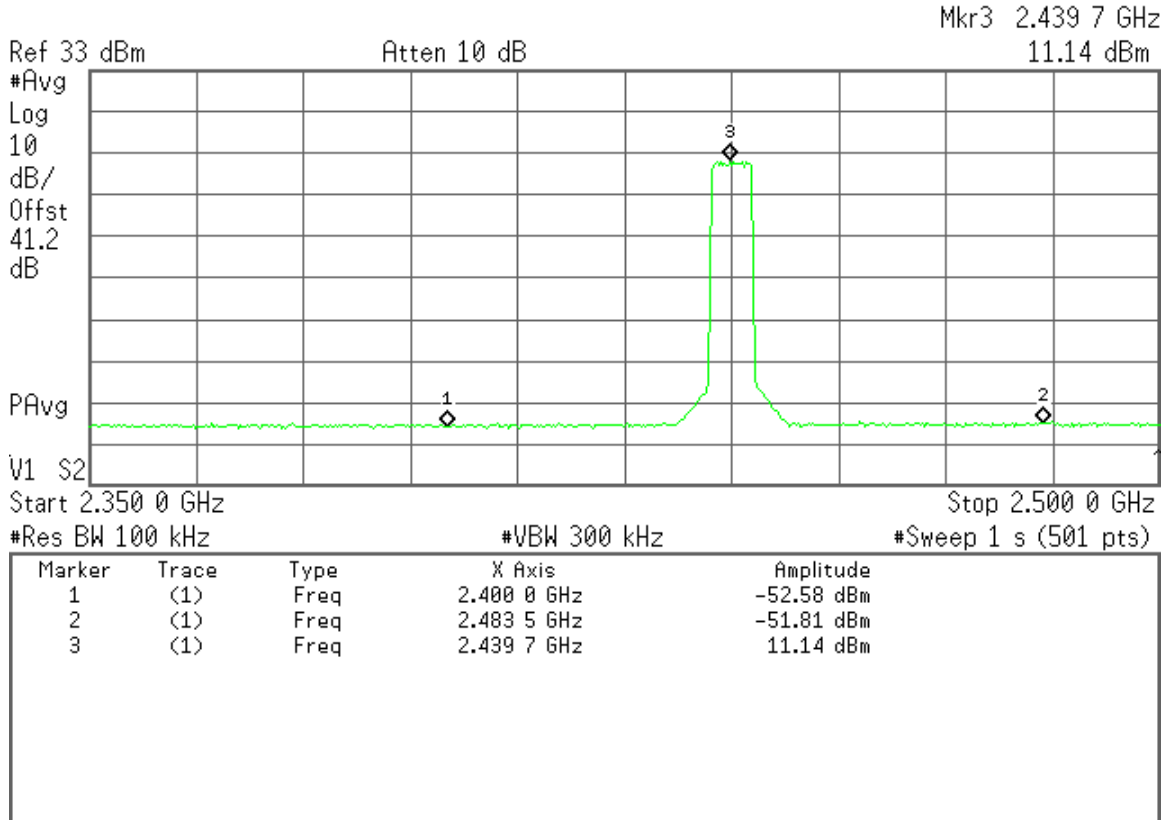
2404 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 08:37:42 Sep 7, 2004



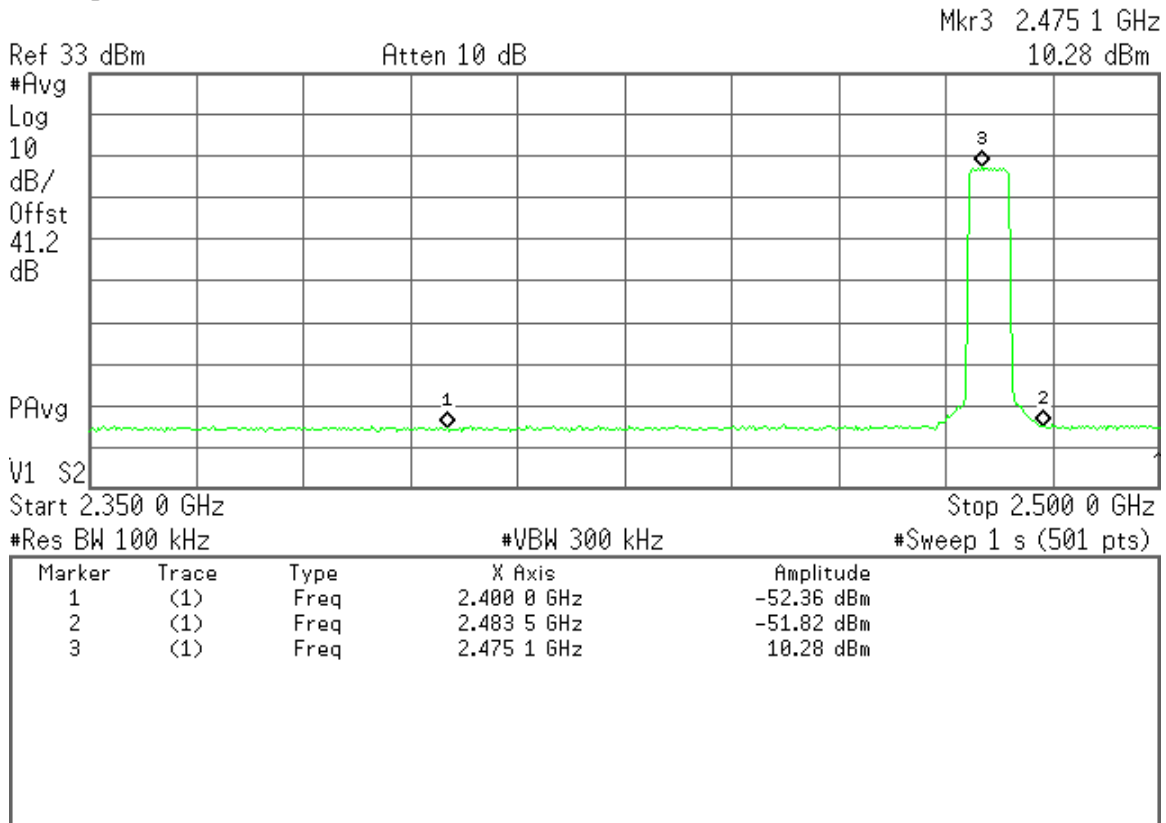
2440 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with Globtek 19.5 Vdc power supply

Agilent 08:38:19 Sep 7, 2004



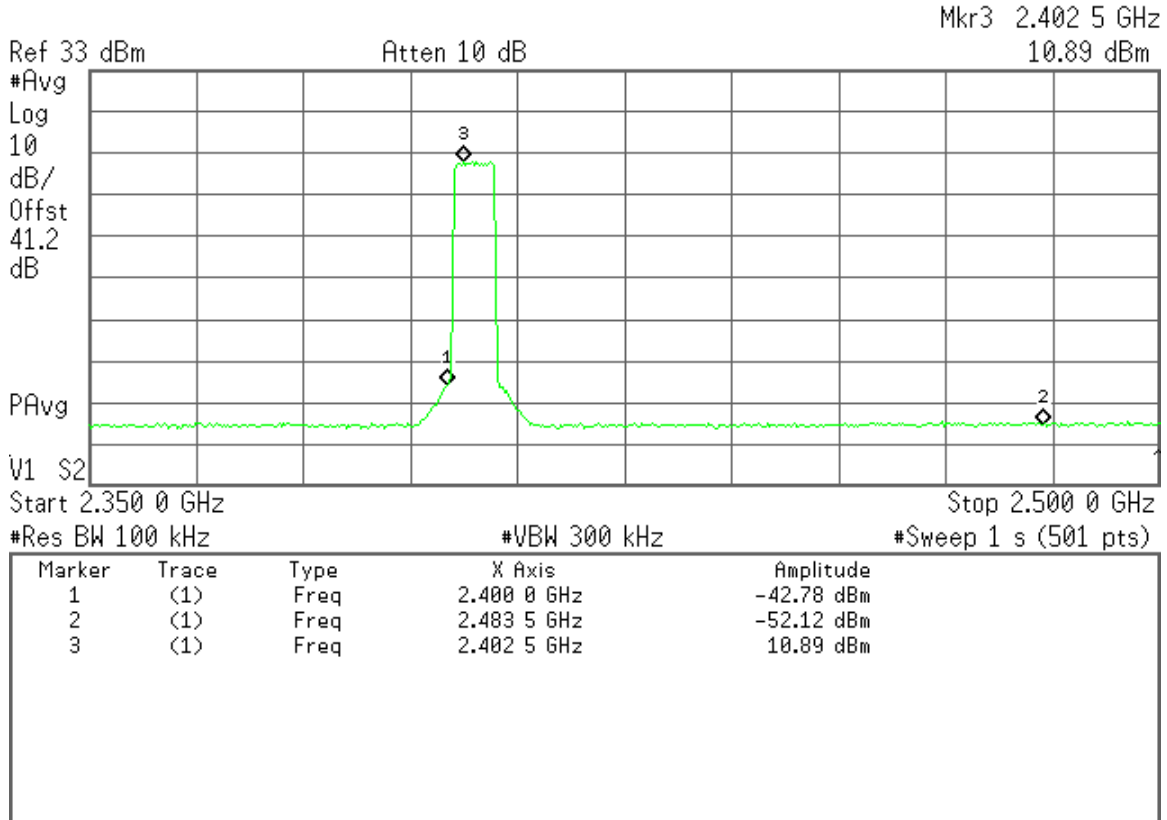
2476 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with Globtek 15 Vdc power supply

Agilent 08:40:23 Sep 7, 2004



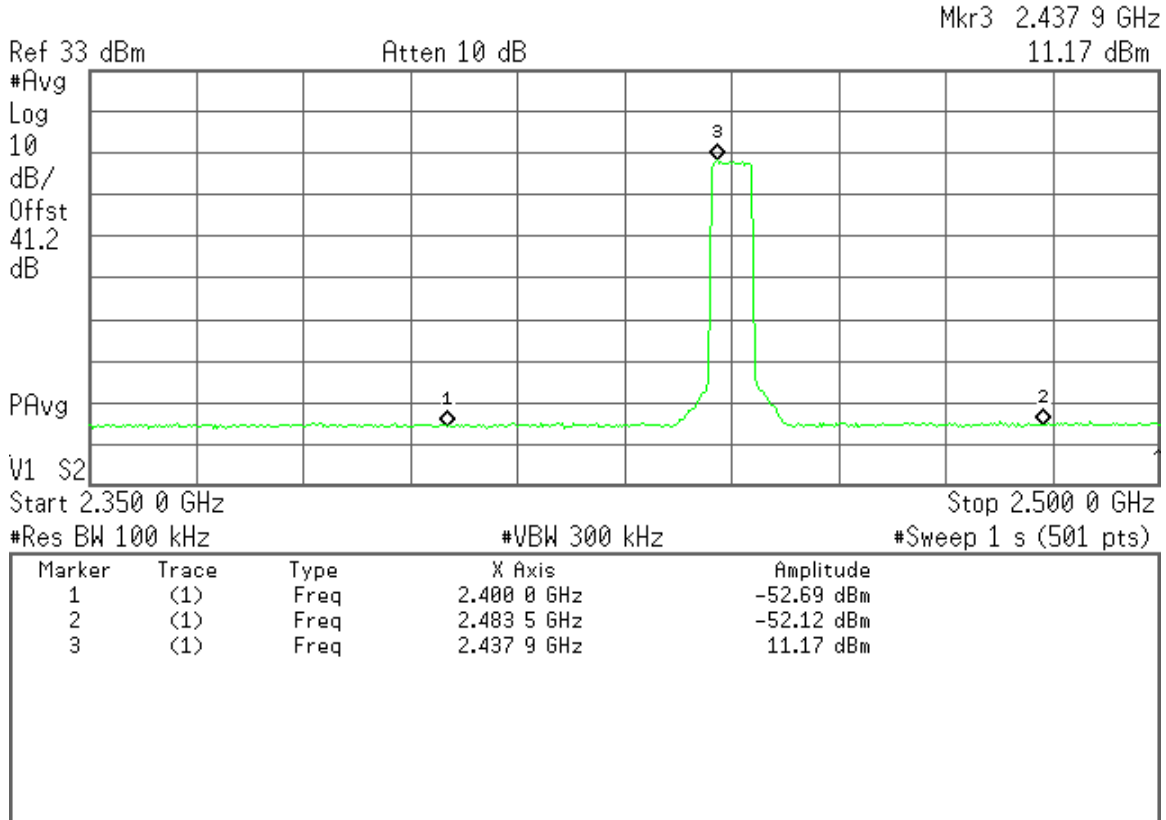
2404 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with Globtek 15 Vdc power supply

Agilent 08:40:55 Sep 7, 2004



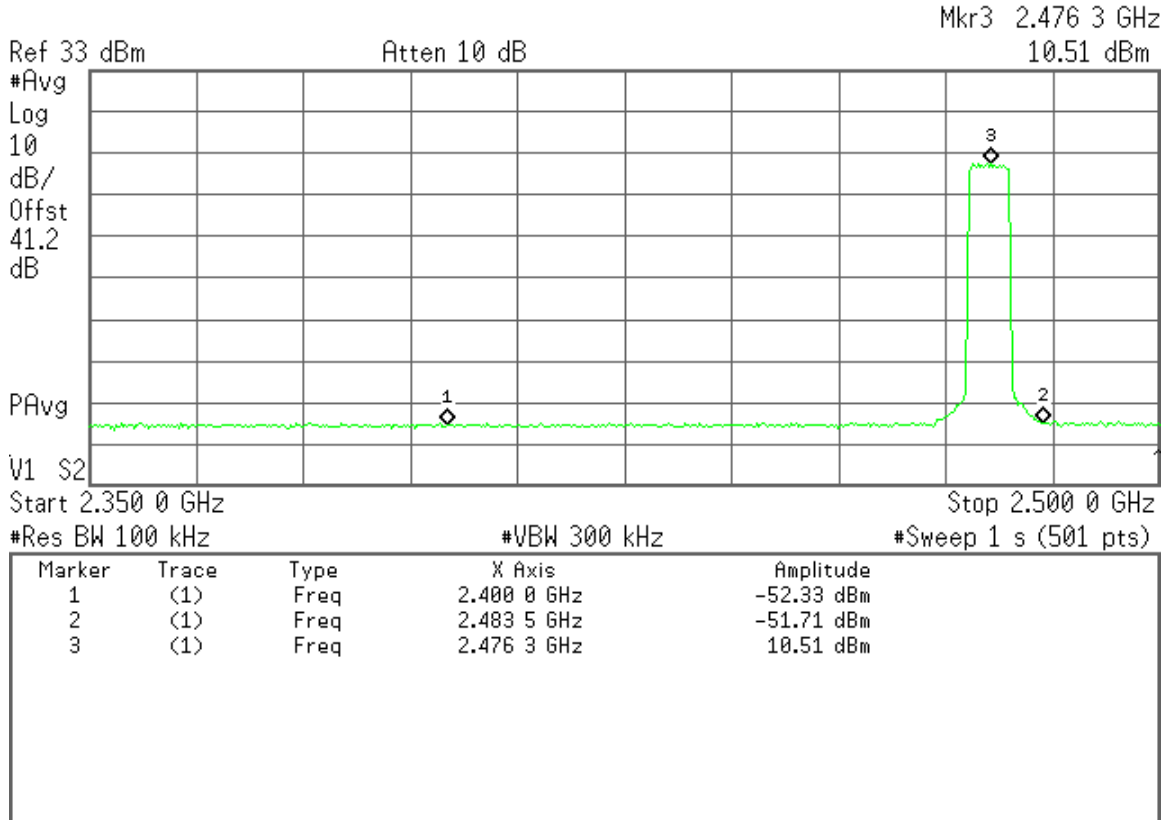
2440 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with Globtek 15 Vdc power supply

Agilent 08:41:25 Sep 7, 2004



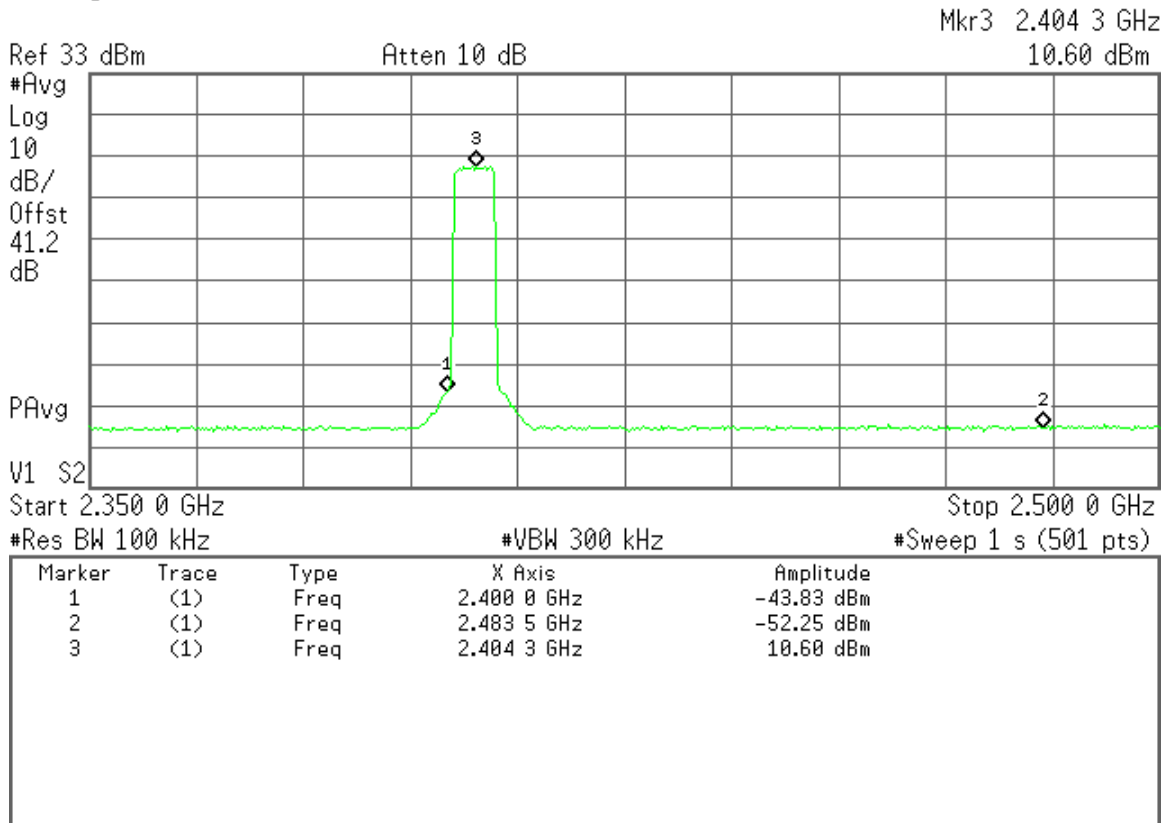
2476 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 08:54:33 Sep 7, 2004



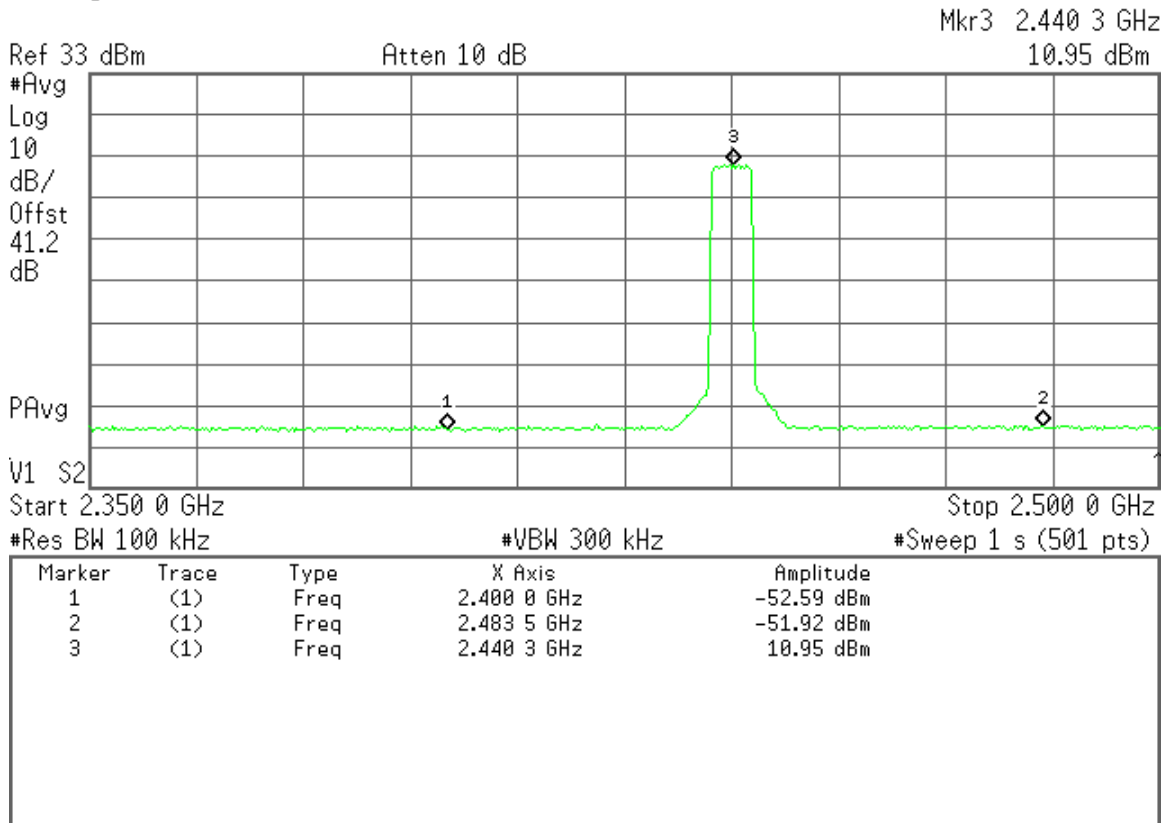
2404 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 08:55:06 Sep 7, 2004



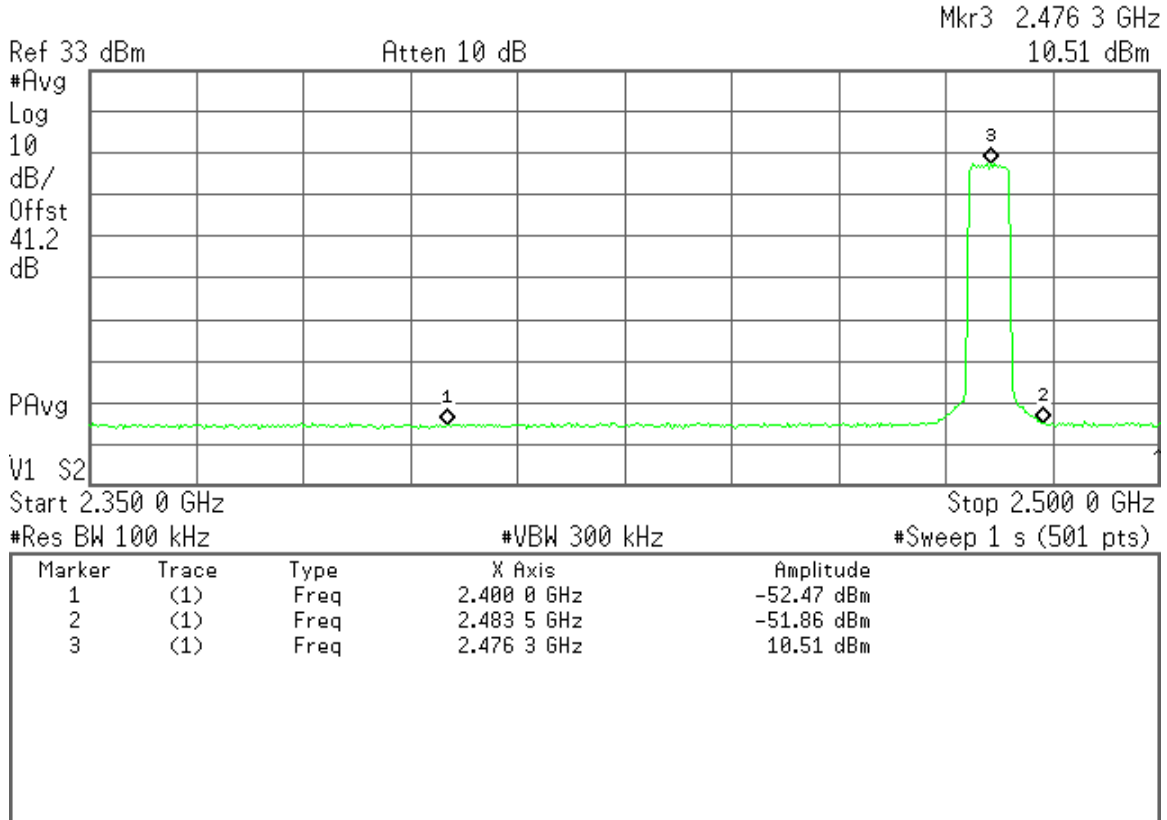
2440 MHz 4-QAM

Spurious emissions at antenna terminals

2.350 GHz – 2.500 GHz

Measured with HP Power Supply (12 Vdc)

Agilent 08:55:37 Sep 7, 2004



2476 MHz 4-QAM

Peak Power Spectral Density

Rule Part Number: 15.247(d)
For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Test Procedure: The RF output is applied to a spectrum analyzer through a self calibrated coax and attenuator(s). The peak power spectral density at the antenna terminal is measured as per the guidelines found in "Guidance on Measurements for Digital Transmission Systems Section 15.247" found on the FCC web site.

The spectrum analyzer is adjusted as follows:
Fo = desired channel frequency
RF span = 6 MHz
Resolution bandwidth = 3 kHz
Video bandwidth = 30 kHz.
Sweep time = 2000 seconds
Detector = peak
The external attenuation is included in the spectrum analyzer offset level. Measurements are performed for each of the modulation formats available, 4-QAM, 16-QAM, and 64-QAM. The peak power spectral density for the 0.562 watt setting is measured at the RF connector on the PCB.

Test Conditions: Frequency = 2404, 2440, 2476 MHz
Temperature = 25 °C
Supply Voltage = 12, 15, 19.5 Vdc

Peak Power Spectral Density

Test Results:

Peak Power Spectral Density (dBm)

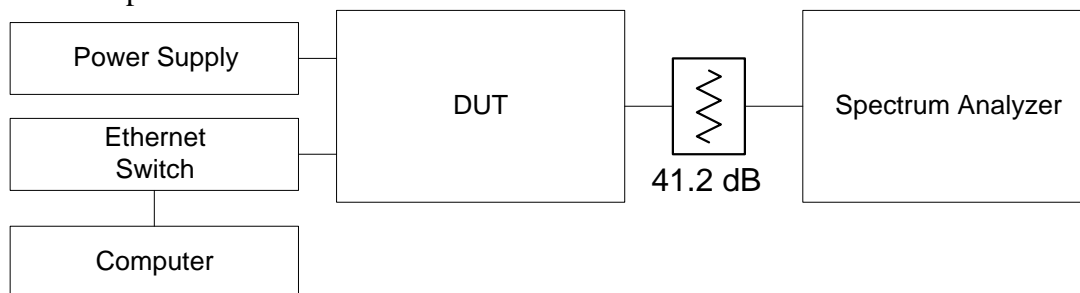
	Measured with Globtek 19.5 Vdc power supply		
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	1.87	1.83	2.41
2440	2.36	2.58	2.65
2476	1.83	1.58	2.14
	Measured with Globtek 15 Vdc power supply		
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	2.01	2.10	2.06
2440	2.11	2.69	2.16
2476	1.76	1.74	2.15
	Measured with HP Power Supply (12 Vdc)		
Freq (MHz)	4-QAM	16-QAM	64-QAM
2404	2.21	2.02	2.18
2440	2.62	2.27	2.60
2476	1.94	1.76	1.99

Peak Power Spectral Density

Test Equipment:

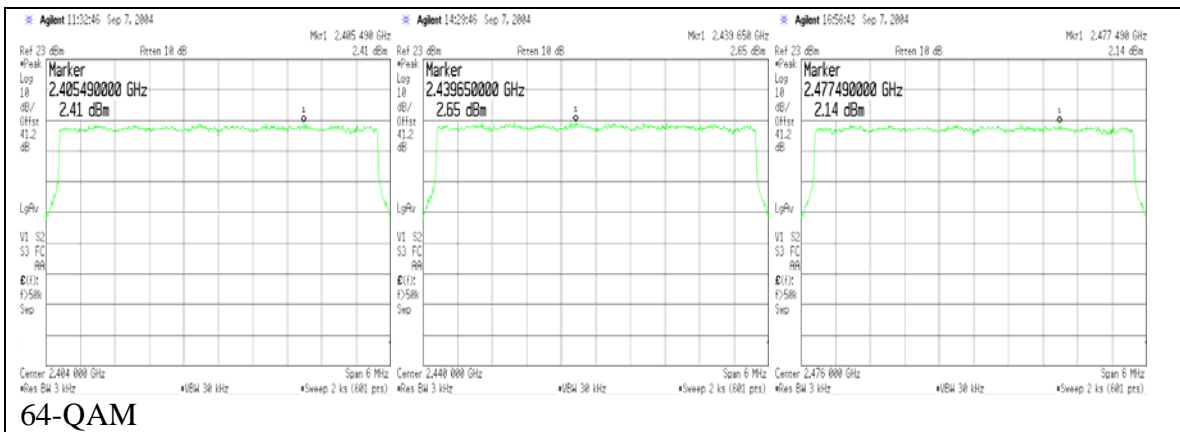
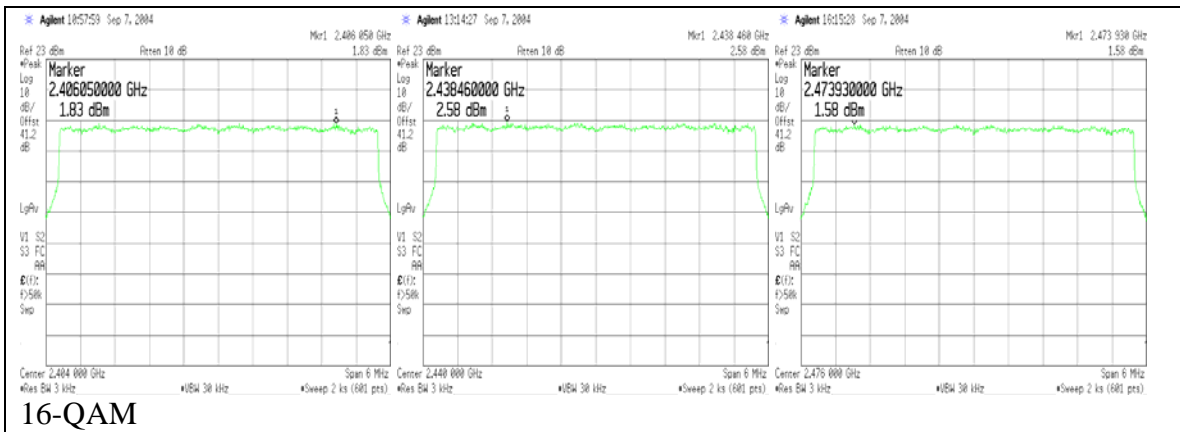
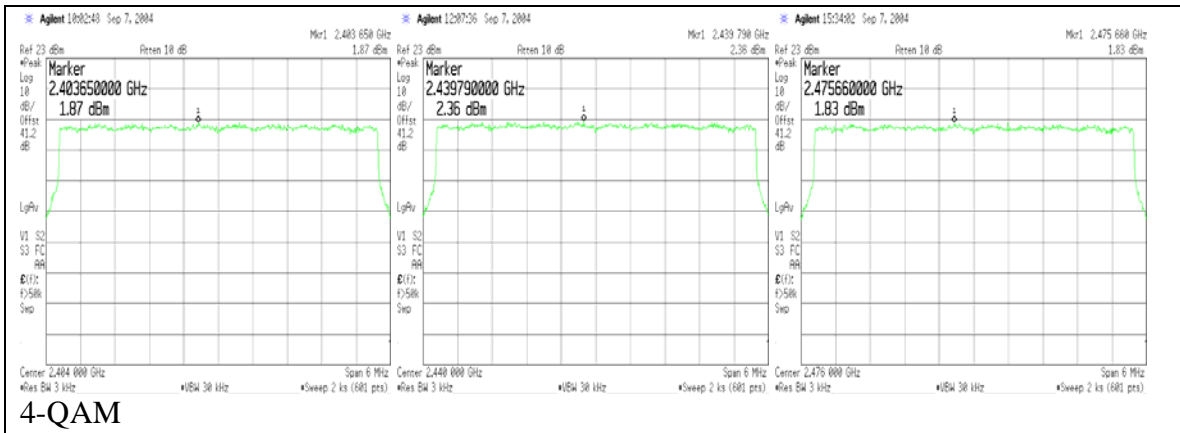
DUT	NextNet Wireless CPE (RSU-2400-AV) # 2008687
Spectrum Analyzer	Agilent E4440A S/N: MY44022791 Calibrated on: 05/30/2004 Cal due: 05/30/2006
Attenuator(s) 2 x 20 dB	Pasternak Corporation Model: PE7005-20 (20 dB) Calibrated by user
Computer	Dell Inspiron 5000 Model: PPM S/N: 000832RM-12961-04R-0441
Ethernet Switch	D-Link Model: DSS-5+ 5 port 10/100Mbps S/N: B205335003175
Power Supply 1	Globetek Model: GT-21148-3015-T3 15 Vdc / 1.6A Limited Power Source S/N: 00430704
Power Supply 2	Globetek Model: GT-21097-5020-0.5 19.5 Vdc / 2.5 A Limited Power Source S/N: 003808 09/03
Power Supply 3	Agilent E3615A 0-20 Vdc / 0-3 A S/N: KR01508861
Multimeter	HP 34401A Multimeter Cal Date: 08-03-2004 Cal Due: 08-03-06 S/N: 3146A58949

Test Setup:



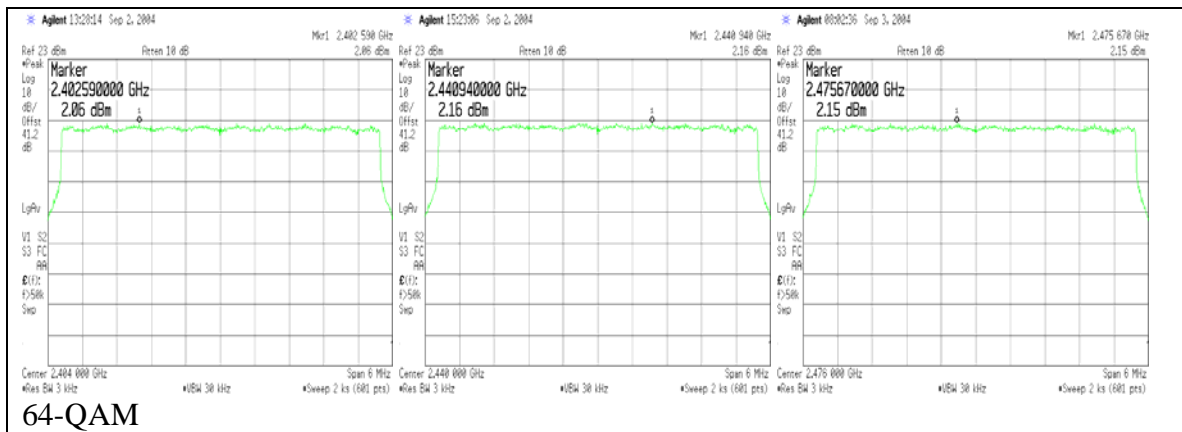
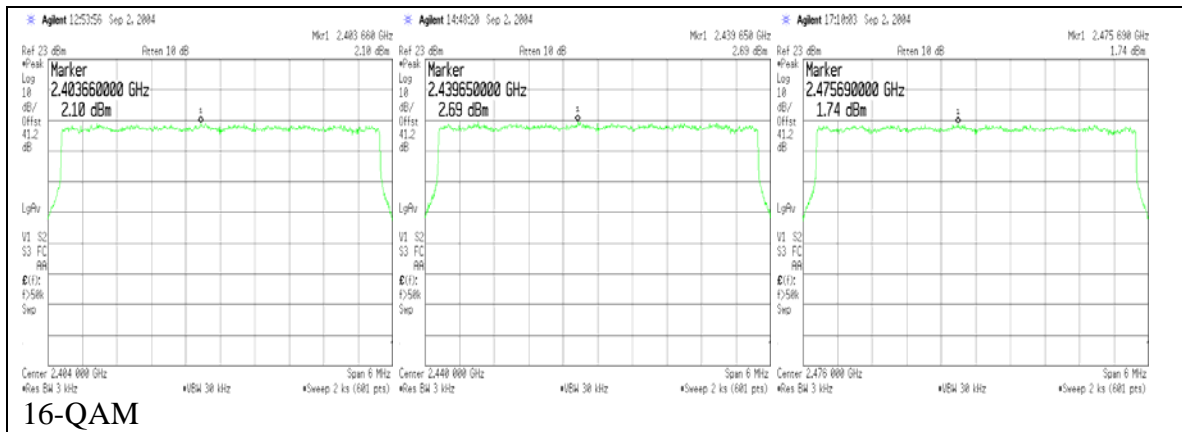
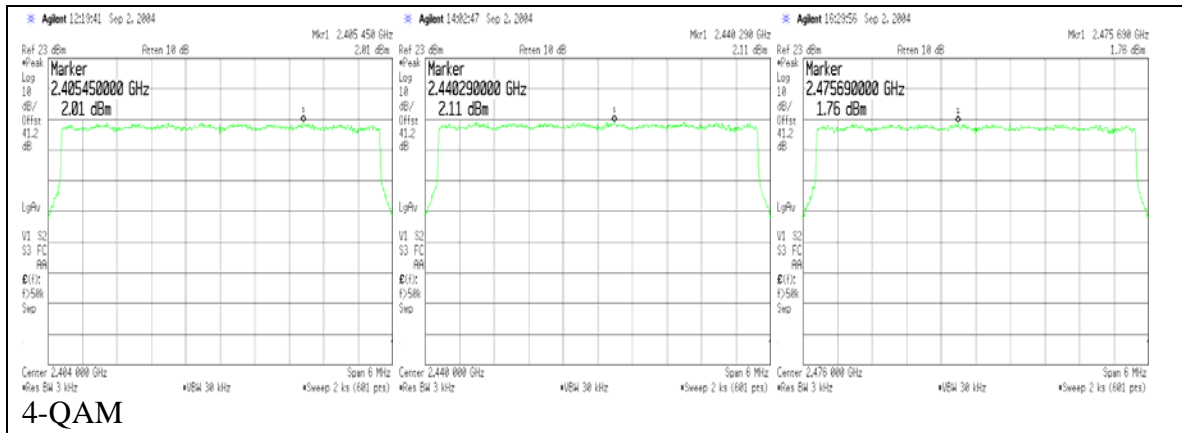
Peak Power Spectral Density

Measured with Globtek 19.5 Vdc power supply



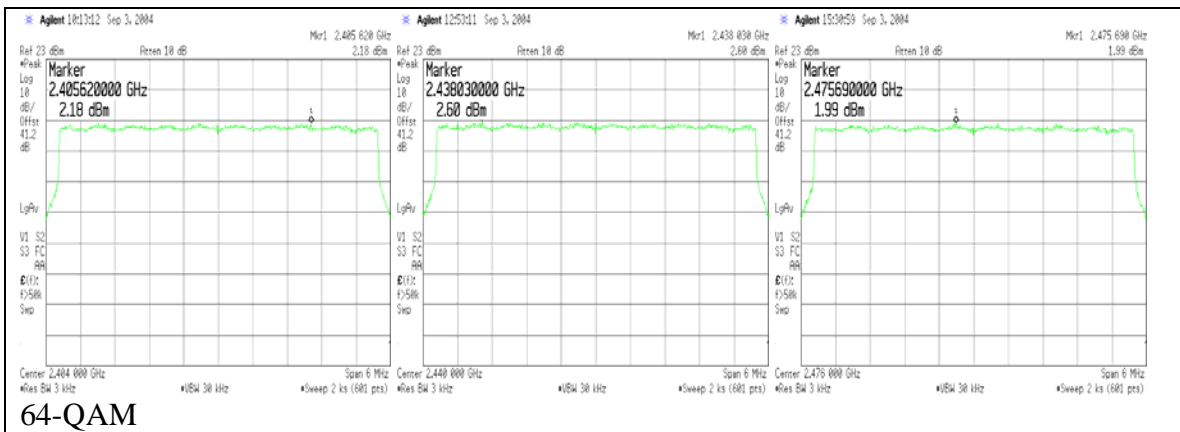
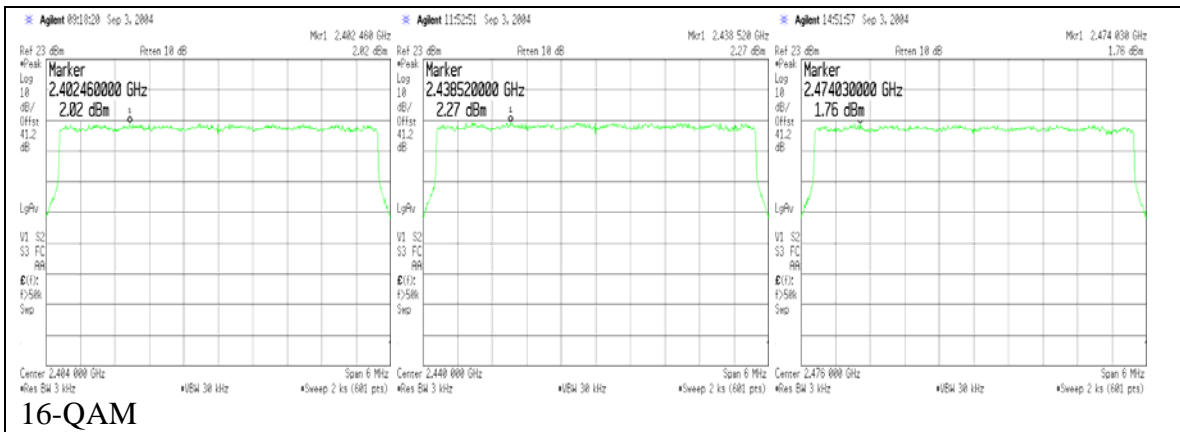
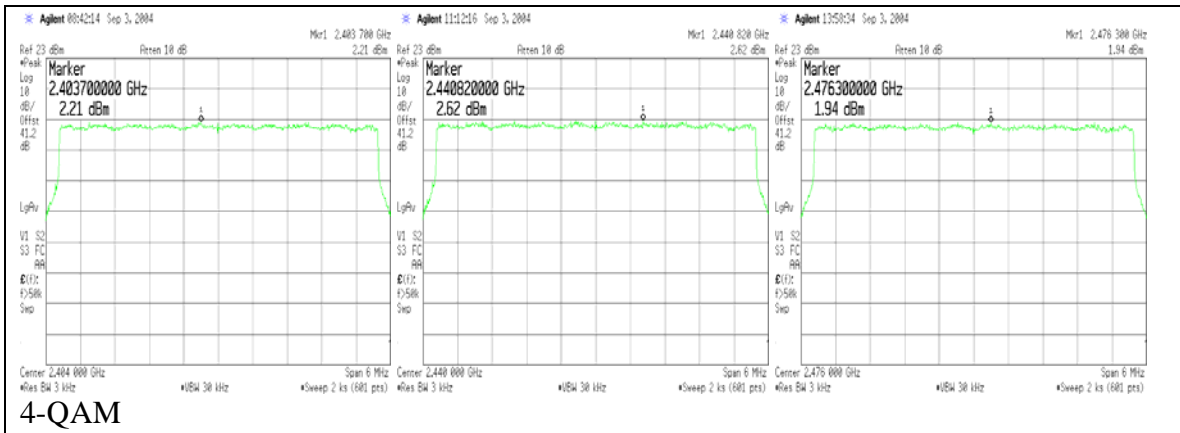
Peak Power Spectral Density

Measured with Globtek 15 Vdc power supply



Peak Power Spectral Density

Measured with HP Power Supply (12 Vdc)



Field strength of spurious radiation

Rule Part Number: 15.33(a), 15.247(c)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Frequency Range = 30 MHz to 26.5 GHz

Measurement Frequency (MHz)	Field Strength (microvolts/meter)	Distance (meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Procedure:

The field strength of spurious radiation was measured at an open area test site with applicable measurement antennas, low noise amplifiers, and spectrum analyzers. Measurements were performed by TUV Product Service Inc – Taylors Falls on August 5th and 6th, 2004. Spurious signals were maximized for peak level by rotation of the test unit and elevation of the measurement antenna. Identified spurious signals between 30 MHz and 1000 MHz are measured with a 120 kHz/6 dB bandwidth and quasi-peak detection. Spurious signals above 1000 MHz are measured with a 1 MHz / 6 dB bandwidth and peak detection.

Field strength of spurious radiation

Test Conditions: Frequency: 2404, 2440, 2476 MHz
 Tx power set to maximum level
 Temperature = 23 °C
 Supply Voltage = 120 Vac / 60 Hz (19.5 VDC to RSU-2400-AV)

Test Equipment: NextNet Wireless, Inc.

DUT	NextNet Wireless CPE (RSU-2400-AV) # 2008687
Attenuator(s) 2 x 20 dB	Pasternak Corporation Model: PE7005-20 (20 dB) Calibrated by user
Computer	Dell Inspiron 5000 Model: PPM S/N: 000832RM-12961-04R-0441
Ethernet Switch	D-Link Model: DSS-5+ 5 port 10/100Mbps S/N: B205335003175
Power Supply	Globetek Model: GT-21097-5024-4.5 19.5 Vdc / 2.56A Limited Power Source S/N: 008968 23/04

Conducted Limits

Rule Part Number: 15.33(a), 15.207(a)

Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range = 150 kHz to 30 MHz

Conducted limit (dBmV)		
Frequency of emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Test Procedure: The radio frequency voltage that is conducted back into the AC power mains was measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Measurements were performed by TUV Product Service Inc – Taylors Falls on August 5th and 6th, 2004 for transmit and receive modes.

Test Equipment: NextNet Wireless, Inc.

DUT	NextNet Wireless CPE (RSU-2400-AV) # 2008687
Computer	Dell Inspiron 5000 Model: PPM S/N: 000832RM-12961-04R-0441
Ethernet Switch	D-Link Model: DSS-5+ 5 port 10/100Mbps S/N: B205335003175
Power Supply	Globetek Model: GT-21097-5024-4.5 19.5 Vdc / 2.56A Limited Power Source S/N: 008968 23/04

Field strength of spurious radiation



TEST RESULT SUMMARY

FCC PART 15 SUBPART C

Section 15.247 Spurious radiated emissions (electric field, restricted bands)

FCC PART 15 SUBPART C

Section 15.207 Conducted Emission Requirements

MANUFACTURER'S NAME	NextNet Wireless, Inc.
NAME OF EQUIPMENT	Expedience
TYPE OF EQUIPMENT	ISM/MMDS Indoor Customer Premise Equipment
MODEL NUMBER	900-0041-1XXX
MANUFACTURER'S ADDRESS	9555 James Avenue South, Suite 270 Bloomington, MN 55431
TEST REPORT NUMBER	WC403349.3
TEST DATE	05 August 2004

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 15 Subpart C Section 15.207 and with the spurious radiated emissions requirements of FCC Part 15 Subpart C Section 15.247.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 15 Subpart C Section 15.207 and the spurious radiated emissions requirements of FCC Part 15 Subpart C Section 15.247.

Date: 09 September 2004

J. C. Sausen *Thomas K. Swanson*

Location: Taylors Falls MN
USA

J. C. Sausen
Tested By

T. K. Swanson
Reviewed By

Not Transferable

Field strength of spurious radiation



EMC EMISSION - TEST REPORT

Test Report File No. : **WC403349.3** Date of issue: 09 September 2004

Model No. : 900-0041-1XXX

Product Name : Expedience

Product Type : ISM/MMDS Indoor Customer Premise Equipment

Applicant : NextNet Wireless, Inc.

Manufacturer : NextNet Wireless, Inc.

License holder : NextNet Wireless, Inc.

Address : 9555 James Avenue South, Suite 270
: Bloomington, MN 55431

Test Result : ☒ Positive ☐ Negative

Test Project Number : WC403349.3

Reference(s)

Total pages including Appendices : 38

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV Product Service Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

File No. WC403349.3, Page 1 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

NextNet Wireless, Inc
9555 James Ave. South Suite 270
Bloomington, MN 55431

09/27/2004

Field strength of spurious radiation



D I R E C T O R Y - E M I S S I O N S		
		Page(s)
A) Documentation		
Test report		1 - 10
Directory		2
Test Regulations		3
Deviations from standard / Summary		11
Test-setups (Photos)		12 - 14
Test-setup (drawing)		Appendix A
B) Test data		
6 dB Bandwidth [15.247 (a)(2)]		9
Peak Power Out [15.247 (b)]		9
Antenna Directional Gain [15.247 (b)(3)(i)]		9
Peak Power Spectral Density [15.247 (d)]		9
FCC 15.207 - Conducted emissions	150 kHz – 30 MHz	5, 10
Spurious radiated emissions (electric field) (restricted bands)	30 MHz – 25.0 GHz	5, 6, 10
Spurious conducted emissions	30 MHz – 25.0 GHz	10
C) Appendix A		
Test Data Sheets and Test Setup Drawing(s)		A1 – A14
D) Appendix B		
Constructional Data Form(s) and/or Product Information Form(s)		B1 – B8
E) Appendix C		
Measurement Protocol		C1 - C2

File No. WC403349.3, Page 2 of 14

TUV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

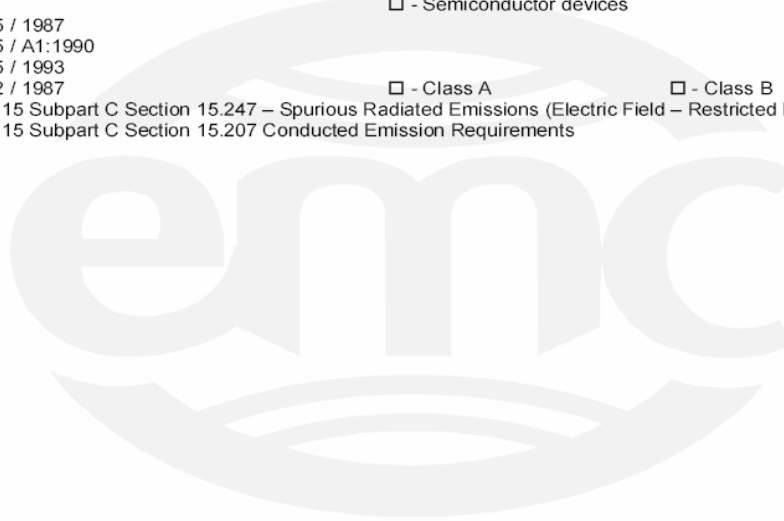
Field strength of spurious radiation



EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- ☐ - EN 50081-1 / 1991
- ☐ - EN 55011 / 1998
 - w/Amendment A1:1999
- ☐ - EN 55013 / 1990
- ☐ - EN 55014 / 1987
- ☐ - EN 55014 / A2:1990
- ☐ - EN 55014 / 1993
- ☐ - EN 55015 / 1987
- ☐ - EN 55015 / A1:1990
- ☐ - EN 55015 / 1993
- ☐ - EN 55022 / 1987
- ☒ - FCC Part 15 Subpart C Section 15.247 – Spurious Radiated Emissions (Electric Field – Restricted Bands)
- ☒ - FCC Part 15 Subpart C Section 15.207 Conducted Emission Requirements
- ☐ - Group 1
- ☐ - Class A
- ☐ - Group 2
- ☐ - Class B
- ☐ - Household appliances and similar
- ☐ - Portable tools
- ☐ - Semiconductor devices
- ☐ - Household appliances and similar
- ☐ - Portable tools
- ☐ - Semiconductor devices
- ☐ - Class A
- ☐ - Class B



File No. WC403349.3, Page 3 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Environmental conditions in the lab:

	<u>Actual</u>
Temperature	: 23 °C
Relative Humidity	: 65 %
Atmospheric pressure	: 99.0 kPa
Power supply system	: 60 Hz – 115 VAC – 1 Phase

Sign Explanations:

- ☐ - not applicable
- ☒ - applicable



File No. WC403349.3, Page 4 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Conducted Limits



Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ - Test not applicable

- ☒ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)
- ☐ - Wild River Lab Screen Room
- ☐ - New Brighton Lab Shielded Room

Test equipment used:

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ - 2416	3825/2	Electro-Mechanics (EMCO)	50 Ω LISN	8812-1437	Code B
■ - 2534	ESHS-20	Rhode & Schwarz	EMI Receiver	837055/003	14-Jan-05

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

☒ - Test not applicable

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

- ☐ - 3 meters
- ☐ - 30 meters

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TUV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location:

☐ - Test not applicable

- ☒ - Wild River Lab Large Test Site (Open Area Test Site) – NSA measurements made 2-03, due 2-05.
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

- ☒ - 3 meters
- ☐ - 10 meters
- ☐ - 30 meters

Test equipment used:

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ - 3204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	24-Oct-04
■ - 8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115a00853	17-Oct-04
■ - 8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	17-Oct-04
■ - 2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	23-Feb-05
■ - 2668	8447D	Electro-Mechanics (EMCO)	Preamplifier	1937A02209	Code B

Cal Code B = Calibration verification performed internally. Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

☒ - Test not applicable

- ☐ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)
- ☐ - Wild River Lab Screen Room
- ☐ - New Brighton Lab Shielded Room

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TUV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz – 12.5 GHz were performed in a horizontal and vertical polarization at the following test location:

☐ - Test not applicable

- ☒ - Wild River Lab Large Test Site (Open Area Test Site)
- ☐ - Wild River Lab Small Test Site (Open Area Test Site)
- ☐ - Oakwood Lab (Open Area Test Site)
- ☐ - Wild River Lab Screen Room

at a test distance of:

- ☐ - 1 meters
- ☒ - 3 meters
- ☐ - 10 meters

Test equipment used:

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115a00853	17-Oct-04
■ -	8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	17-Oct-04
■	2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	23-Feb-05
■ -	3957	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B
■ -	2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	19-Nov-04

Cal Code B = Calibration verification performed internally.

Cal Code Y = Calibration not required when used with other calibrated equipment.

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

File No. WC403349.3, Page 7 of 14

TUV PRODUCT SERVICE INC

19333 Wild Mountain Road

Taylors Falls MN 55084-1758

Tel: 651 638 0297

Fax: 651 638 0298

Rev.No 1.0

Field strength of spurious radiation



Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☐ - Test program (color bar)
- ☐ - Test program (customer specific)
- ☐ - Practice operation
- ☐ - Normal Operating Mode
- ☒ - Base site transmit. FCC Part 15C
Base site receive. FCC Part 15B

Configuration of the device under test:

- ☐ - See Constructional Data Form in Appendix B - Page B2
- ☒ - See Product Information Form in Appendix B - beginning on Page B3

The following peripheral devices and interface cables were connected during the measurement:

- | | |
|--|----------------|
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input type="checkbox"/> - _____ | Type : _____ |
| <input checked="" type="checkbox"/> - unshielded power cable | |
| <input checked="" type="checkbox"/> - unshielded cables | |
| <input type="checkbox"/> - shielded cables | MPS.No.: _____ |
| <input type="checkbox"/> - customer specific cables | |
| <input type="checkbox"/> - _____ | |

File No. WC403349.3, Page 8 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Emission Test Results:

6 dB Bandwidth [15.247 (a)(2)]

The requirements are

☐ - MET

☐ - NOT MET

The minimum 6 dB bandwidth shall be at least 500 kHz.

Remarks: Test not performed at this time.

Peak Power Out [15.247 (b)]

The requirements are

☐ - MET

☐ - NOT MET

Maximum peak power output shall be 1 watt.

Remarks: Test not performed at this time.

Antenna Directional Gain [15.247 (b)(3)(i)]

The requirements are

☐ - MET

☐ - NOT MET

The antenna directional gain is less than 6 dBi. For antennas with directional gain greater than 6 dBi the maximum peak output power is reduced by 1 dB for every 3 dB that the directional gain is over 6 dBi.

Remarks: Test not performed at this time.

Peak Power Spectral Density – [15.247 (d)]

The requirements are

☐ - MET

☐ - NOT MET

Peak power spectral density shall not be greater than 8 dBm in any 3 kHz band.

Remarks: Test not performed at this time.

File No. WC403349.3, Page 9 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0



Field strength of spurious radiation



DEVIATIONS FROM STANDARD:

None

GENERAL REMARKS:

During radiated emissions testing the following modifications were made in order for compliance:

1. Added 36pF caps to ethernet lines:
2. Changed to NextNet Wireless P/S Model: GT-21097-5024-4.5.

SUMMARY:

The requirements according to the technical regulations are

☒ - met

☐ - not met.

The device under test does

☒ - fulfill the general approval requirements mentioned on page 3.

☐ - not fulfill the general approval requirements mentioned on page 3.

Testing Start Date: 05 August 2004

Testing End Date: 05 August 2004

- TÜV PRODUCT SERVICE INC -

Thomas K. Swanson

T. K. Swanson
Technical Writer

J. C. Sausen

Tested By:
J. C. Sausen

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TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Conducted Limits



Test-setup photo(s):
Conducted emission 10/150 kHz - 30 MHz



File No. WC403349.3, Page 12 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Test-setup photo(s):
Radiated emission 30 MHz - 12500 MHz



File No. WC403349.3, Page 13 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Test-setup photo(s):
Radiated emission 30 MHz - 12500 MHz



File No. WC403349.3, Page 14 of 14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation



Appendix A

Test Data Sheets
and
Test Setup Drawing(s)



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TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation

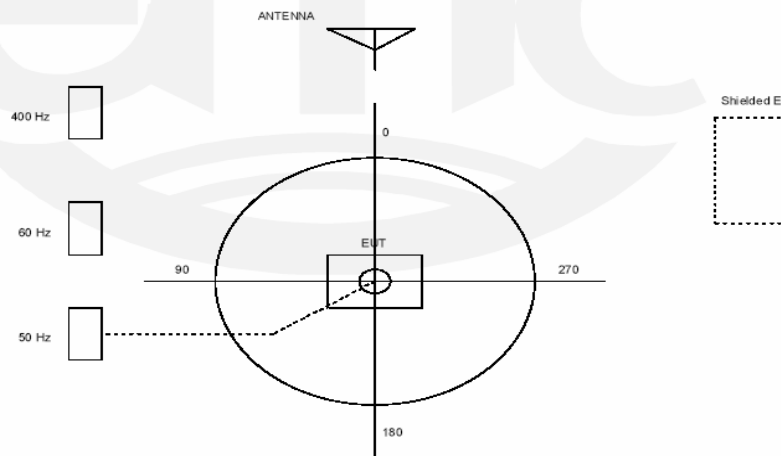


TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Large Test Site

Notes:

1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz, 60 Hz, and 400 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3, 10 or 30 meters from the center of the turntable.
4. The circle is a 6.7 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



File No. WC403349.3, Page A2 of A14

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Conducted Limits

CONDUCTED EMISSIONS



Test Report #: WC403349 Run 10 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/2004
EUT Serial #: EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: With P/S Model # GT-21097-5024-4.5

Data File Name: 3349.dat

Page: 1 of 4

List of measurements for run #: 10						
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN 55022 B AVE	DELTA2
Transmit Mode:						
450.0 kHz	16.17 Qp	0.0 / 0.75 / 0.0 / 0.0	16.92	L1	-29.96	n/a
989.51 kHz	17.81 Qp	0.0 / 0.05 / 0.0 / 0.0	17.86	L1	-28.14	n/a
4.098 MHz	19.9 Qp	0.1 / 0.05 / 0.0 / 0.0	20.05	L1	-25.95	n/a
5.964 MHz	11.38 Qp	0.1 / 0.05 / 0.0 / 0.0	11.53	L1	-38.47	n/a
10.703 MHz	21.74 Qp	0.2 / 0.05 / 0.0 / 0.0	21.99	L1	-28.01	n/a
18.916 MHz	32.24 Qp	0.3 / 0.09 / 0.0 / 0.0	32.63	L1	-17.37	n/a
30.0 MHz	20.25 Qp	0.5 / 0.1 / 0.0 / 0.0	20.85	L1	-29.15	n/a
450.0 kHz	15.62 Qp	0.0 / 0.75 / 0.0 / 0.0	16.37	N	-30.51	n/a
989.51 kHz	20.78 Qp	0.0 / 0.05 / 0.0 / 0.0	20.83	N	-25.17	n/a
4.098 MHz	21.58 Qp	0.1 / 0.05 / 0.0 / 0.0	21.73	N	-24.27	n/a
5.964 MHz	13.11 Qp	0.1 / 0.05 / 0.0 / 0.0	13.26	N	-36.74	n/a
10.703 MHz	12.2 Qp	0.2 / 0.05 / 0.0 / 0.0	12.45	N	-37.55	n/a
18.916 MHz	30.9 Qp	0.3 / 0.09 / 0.0 / 0.0	31.29	N	-18.71	n/a
30.0 MHz	12.23 Qp	0.5 / 0.1 / 0.0 / 0.0	12.83	N	-37.17	n/a
Receive Mode:						
450.0 kHz	15.79 Qp	0.0 / 0.75 / 0.0 / 0.0	16.54	N	-30.34	n/a
472.57 kHz	17.66 Qp	0.0 / 0.64 / 0.0 / 0.0	18.3	N	-28.17	n/a
4.579 MHz	23.58 Qp	0.1 / 0.05 / 0.0 / 0.0	23.73	N	-22.27	n/a
13.798 MHz	17.97 Qp	0.3 / 0.07 / 0.0 / 0.0	18.34	N	-31.66	n/a
18.915 MHz	30.96 Qp	0.3 / 0.09 / 0.0 / 0.0	31.35	N	-18.65	n/a
28.686 MHz	25.23 Qp	0.49 / 0.1 / 0.0 / 0.0	25.82	N	-24.18	n/a
450.0 kHz	16.27 Qp	0.0 / 0.75 / 0.0 / 0.0	17.02	L1	-29.86	n/a
472.57 kHz	17.53 Qp	0.0 / 0.64 / 0.0 / 0.0	18.17	L1	-28.3	n/a
989.51 kHz	11.54 Qp	0.0 / 0.05 / 0.0 / 0.0	11.59	L1	-34.41	n/a

Tested by: J. C. Sausen

Printed

Signature

Reviewed by: TKS

Printed

Signature

File No. WC403349.3, Page A3 of A14

Conducted Limits

CONDUCTED EMISSIONS



Test Report #: WC403349 Run 10 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/2004
EUT Serial #: _____ EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: With P/S Model # GT-21097-5024-4.5

Data File Name: 3349.dat

Page: 2 of 4

List of measurements for run #: 10

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN 55022 B AVE	DELTA2
4.098 MHz	6.49 Qp	0.1 / 0.05 / 0.0 / 0.0	6.64	L1	-39.36	n/a
4.579 MHz	23.45 Qp	0.1 / 0.05 / 0.0 / 0.0	23.6	L1	-22.4	n/a
5.964 MHz	9.82 Qp	0.1 / 0.05 / 0.0 / 0.0	9.97	L1	-40.03	n/a
10.703 MHz	8.98 Qp	0.2 / 0.05 / 0.0 / 0.0	9.23	L1	-40.77	n/a
13.798 MHz	15.5 Qp	0.3 / 0.07 / 0.0 / 0.0	15.87	L1	-34.13	n/a
18.916 MHz	31.01 Qp	0.3 / 0.09 / 0.0 / 0.0	31.4	L1	-18.6	n/a
28.686 MHz	25.25 Qp	0.49 / 0.1 / 0.0 / 0.0	25.84	L1	-24.16	n/a
30.0 MHz	12.39 Qp	0.5 / 0.1 / 0.0 / 0.0	12.99	L1	-37.01	n/a

End of conducted data:

Tested by: J. C. Sausen

Printed

Signature

Reviewed
by: TKS

Printed

Signature

File No. WC403349.3, Page A4 of A14

Conducted Limits

CONDUCTED EMISSIONS



Test Report #: WC403349 Run 10 Test Area: LTS

EUT Model #: RSU-2400A Date: 8/5/2004

EUT Serial #: _____ EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C

Test Method: FCC B Air Pressure: 99.0 kPa

Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: With P/S Model # GT-21097-5024-4.5

Data File Name: 3349.dat Page: 3 of 4

Measurement summary for limit1: EN 55022 B AVE (Qp)					
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	EUT Lead	DELTA1 EN 55022 B AVE
18.916 MHz	32.24 Qp	0.3 / 0.09 / 0.0 / 0.0	32.63	L1	-17.37
4.579 MHz	23.58 Qp	0.1 / 0.05 / 0.0 / 0.0	23.73	N	-22.27
28.686 MHz	25.25 Qp	0.49 / 0.1 / 0.0 / 0.0	25.84	L1	-24.16
4.098 MHz	21.58 Qp	0.1 / 0.05 / 0.0 / 0.0	21.73	N	-24.27
989.51 kHz	20.78 Qp	0.0 / 0.05 / 0.0 / 0.0	20.83	N	-25.17
10.703 MHz	21.74 Qp	0.2 / 0.05 / 0.0 / 0.0	21.99	L1	-28.01
472.57 kHz	17.66 Qp	0.0 / 0.64 / 0.0 / 0.0	18.3	N	-28.17
30.0 MHz	20.25 Qp	0.5 / 0.1 / 0.0 / 0.0	20.85	L1	-29.15
450.0 kHz	16.27 Qp	0.0 / 0.75 / 0.0 / 0.0	17.02	L1	-29.86
13.798 MHz	17.97 Qp	0.3 / 0.07 / 0.0 / 0.0	18.34	N	-31.66
5.964 MHz	13.11 Qp	0.1 / 0.05 / 0.0 / 0.0	13.26	N	-36.74

Tested by: J. C. Sausen
Printed

Signature

Reviewed by: TKS
Printed

Signature

File No. WC403349.3, Page A5 of A14

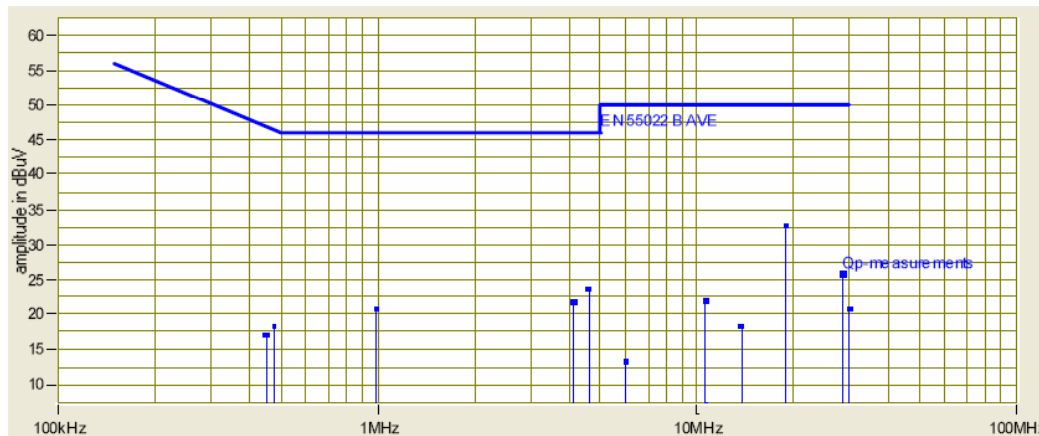
Conducted Limits

CONDUCTED EMISSIONS



Test Report #:	WC403349 Run 10	Test Area:	LTS
EUT Model #:	RSU-2400A	Date:	8/5/2004
EUT Serial #:		EUT Power:	60 Hz / 110 VAC
Test Method:	FCC B	Temperature:	23.0 °C
Customer:	Next Net	Air Pressure:	99.0 kPa
		Rel. Humidity:	65.0 %
EUT Description:	2.4 GHz TRx & Rcvr Residential Subscriber Unit		
Notes:	With P/S Model # GT-21097-5024.4.5		
Data File Name:	3349.dat	Page:	4 of 4

Graph:



Tested by:	J. C. Sausen	
	Printed	Signature
Reviewed by:	TKS	
	Printed	Signature

File No. WC403349.3, Page A6 of A14

Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #: WC403349 Run 9 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/04
EUT Serial #: EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: Note P/S change on data line #119.

Data File Name: 3349-9.dat

Page: 1 of 8

List of measurements for run #: 9

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
Each measurement maxed:						
2.404 GHz	97.2 Pk	4.31 / 30.49 / 43.66 / 0.0	88.33	H / 1.00 / 0	n/a	34.33*
2.405 GHz	40.39 Av	4.31 / 30.49 / 43.67 / 0.0	31.52	H / 1.00 / 0	n/a	-22.48
2.404 GHz	39.97 Av	4.31 / 30.49 / 43.66 / 0.0	31.1	H / 1.00 / 0	n/a	-22.9
2.44 GHz	41.49 Av	4.33 / 30.57 / 43.69 / 0.0	32.7	H / 1.00 / 0	n/a	-21.3
2.44 GHz	92.0 Pk	4.33 / 30.57 / 43.69 / 0.0	83.21	H / 1.00 / 0	n/a	29.21*
2.476 GHz	98.3 Pk	4.35 / 30.65 / 43.7 / 0.0	89.6	H / 1.00 / 0	n/a	35.6*
2.476 GHz	41.87 Av	4.35 / 30.65 / 43.7 / 0.0	33.17	H / 1.00 / 0	n/a	-20.83
2.476 GHz	104.2 Pk	4.35 / 30.65 / 43.7 / 0.0	95.5	V / 1.00 / 0	n/a	41.5*
2.476 GHz	41.42 Av	4.35 / 30.65 / 43.7 / 0.0	32.72	V / 1.00 / 0	n/a	-21.28
2.593 GHz	113.3 Pk	4.42 / 30.89 / 43.7 / 0.0	104.9	V / 1.00 / 0	n/a	50.9*
2.593 GHz	39.71 Av	4.42 / 30.89 / 43.7 / 0.0	31.31	V / 1.00 / 0	n/a	-22.69
2.593 GHz	100.8 Pk	4.42 / 30.89 / 43.7 / 0.0	92.4	H / 1.00 / 0	n/a	38.4*
2.593 GHz	39.5 Av	4.42 / 30.89 / 43.7 / 0.0	31.1	H / 1.00 / 0	n/a	-22.9
2.44 GHz	99.9 Pk	4.33 / 30.57 / 43.69 / 0.0	91.11	V / 1.00 / 0	n/a	37.11*
2.44 GHz	41.44 Av	4.33 / 30.57 / 43.69 / 0.0	32.65	V / 1.00 / 0	n/a	-21.35
2.404 GHz	101.05 Pk	4.31 / 30.49 / 43.66 / 0.0	92.18	V / 1.00 / 0	n/a	38.18*
2.404 GHz	41.1 Av	4.31 / 30.49 / 43.66 / 0.0	32.23	V / 1.00 / 0	n/a	-21.77
All above measurements are of the fundamental and will not be included in the measurement summary – Measurement summary Includes spurious emissions only.						
2.404 GHz spurious:						
4.808 GHz	37.62 Av	6.33 / 34.56 / 44.11 / 0.0	34.4	V / 1.00 / 0	n/a	-19.6
4.808 GHz	37.88 Av	6.33 / 34.56 / 44.11 / 0.0	34.66	H / 1.00 / 0	n/a	-19.34
7.212 GHz	45.7 Av	8.1 / 37.22 / 44.1 / 0.0	46.92	H / 1.00 / 0	n/a	-7.08
7.212 GHz	42.61 Av	8.1 / 37.22 / 44.1 / 0.0	43.83	V / 1.00 / 0	n/a	-10.17

Tested by: J. C. Sausen

Printed

J C Sausen

Signature

Reviewed by: TKS

Printed

Thomas K. Swanson

Signature

File No. WC403349.3, Page A7 of A14

Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #: WC403349 Run 9 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/04
EUT Serial #: EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: Note P/S change on data line #119.

Data File Name: 3349-9.dat

Page: 2 of 8

List of measurements for run #: 9

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
1.17 GHz	39.61 Av	2.97 / 26.5 / 40.1 / 0.0	28.98	V / 1.00 / 0	n/a	-25.02
2.440 GHz spurious:						
4.88 GHz	37.89 Av	6.39 / 34.76 / 44.04 / 0.0	35.01	V / 1.00 / 0	n/a	-18.99
4.88 GHz	38.36 Av	6.39 / 34.76 / 44.04 / 0.0	35.48	H / 1.00 / 0	n/a	-18.52
7.32 GHz	44.48 Av	8.1 / 37.44 / 44.06 / 0.0	45.96	V / 1.00 / 0	n/a	-8.04
7.32 GHz	44.65 Av	8.1 / 37.44 / 44.06 / 0.0	46.13	H / 1.00 / 0	n/a	-7.87
2.476 GHz spurious:						
1.17 GHz	38.79 Av	2.97 / 26.5 / 40.1 / 0.0	28.16	V / 1.00 / 0	n/a	-25.84
4.952 GHz	35.29 Av	6.46 / 34.97 / 44.0 / 0.0	32.71	V / 1.00 / 0	n/a	-21.29
4.952 GHz	37.65 Av	6.46 / 34.97 / 44.0 / 0.0	35.07	H / 1.00 / 0	n/a	-18.93
7.428 GHz	41.52 Av	8.12 / 37.66 / 44.01 / 0.0	43.28	H / 1.00 / 0	n/a	-10.72
7.428 GHz	38.97 Av	8.12 / 37.66 / 44.01 / 0.0	40.73	V / 1.00 / 0	n/a	-13.27
2.593 GHz spurious:						
5.186 GHz	35.76 Av	6.61 / 35.4 / 44.0 / 0.0	33.77	V / 1.00 / 0	n/a	-20.23
5.186 GHz	34.92 Av	6.61 / 35.4 / 44.0 / 0.0	32.93	H / 1.00 / 0	n/a	-21.07
7.779 GHz	47.68 Av	8.25 / 37.63 / 43.71 / 0.0	49.85	H / 1.00 / 0	n/a	-4.15
7.779 GHz	42.62 Av	8.25 / 37.63 / 43.71 / 0.0	44.79	V / 1.00 / 0	n/a	-9.21
1.908 GHz	38.08 Av	3.88 / 29.07 / 42.69 / 0.0	28.33	V / 1.00 / 0	n/a	-25.67
1.908 GHz	38.21 Av	3.88 / 29.07 / 42.69 / 0.0	28.46	H / 1.00 / 0	n/a	-25.54
2.079 GHz	40.8 Av	3.9 / 29.77 / 43.27 / 0.0	31.21	V / 1.00 / 0	n/a	-22.79
2.476 GHz spurious:						
1.904 GHz	40.59 Av	3.87 / 29.04 / 42.68 / 0.0	30.82	V / 1.00 / 0	n/a	-23.18

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File No. WC403349.3, Page A8 of A14

Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #: WC403349 Run 9 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/04
EUT Serial #: _____ EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: Note P/S change on data line #119.

Data File Name: 3349-9.dat

Page: 3 of 8

List of measurements for run #: 9

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
2.44 GHz spurious:						
1.849 GHz	41.56 Av	3.83 / 28.73 / 42.55 / 0.0	31.57	V / 1.00 / 0	n/a	-22.43
2.404 GHz spurious:						
1.796 GHz	40.65 Av	3.78 / 28.41 / 42.37 / 0.0	30.47	V / 1.00 / 0	n/a	-23.53
NOTE! THE FOLLOWING MEASUREMENTS ARE NOT MAXED UNLESS NOTED.						
2.404 GHz TRANSMIT MODE:						
32.93 MHz	27.25 Qp	0.45 / 19.5 / 25.9 / 0.0	21.3	H / 1.00 / 0	-18.7	n/a
87.711 MHz	37.1 Qp	0.8 / 7.5 / 25.81 / 0.0	19.59	H / 1.00 / 0	-20.41	n/a
115.011 MHz	48.95 Qp	0.9 / 9.6 / 25.9 / 0.0	33.55	H / 1.00 / 0	-9.95	n/a
179.391 MHz	37.25 Qp	1.1 / 9.43 / 26.14 / 0.0	21.64	H / 1.00 / 0	-21.86	n/a
195.994 MHz	40.85 Qp	1.19 / 11.33 / 26.27 / 0.0	27.1	H / 1.00 / 0	-16.4	n/a
223.989 MHz	38.6 Qp	1.28 / 11.1 / 26.3 / 0.0	24.68	H / 1.00 / 0	-21.32	n/a
224.265 MHz	38.8 Qp	1.29 / 11.1 / 26.3 / 0.0	24.89	H / 1.00 / 0	-21.11	n/a
240.0 MHz	40.65 Qp	1.3 / 11.76 / 26.3 / 0.0	27.41	H / 1.00 / 0	-18.59	n/a
265.2 MHz	37.0 Qp	1.43 / 12.58 / 26.41 / 0.0	24.6	H / 1.00 / 0	-21.4	n/a
251.988 MHz	46.1 Qp	1.35 / 12.16 / 26.33 / 0.0	33.28	H / 1.00 / 0	-12.72	n/a
260.0 MHz	41.25 Qp	1.4 / 12.7 / 26.38 / 0.0	28.97	H / 1.00 / 0	-17.03	n/a
280.0 MHz	46.15 Qp	1.5 / 12.66 / 26.48 / 0.0	33.83	H / 1.00 / 0	-12.17	n/a
300.0 MHz	38.6 Qp	1.5 / 13.73 / 26.58 / 0.0	27.25	H / 1.00 / 0	-18.75	n/a
420.0 MHz	33.0 Qp	1.7 / 16.84 / 26.77 / 0.0	24.77	H / 1.00 / 0	-21.23	n/a
336.0 MHz	48.2 Qp	1.57 / 14.27 / 26.7 / 0.0	37.34	H / 1.00 / 0	-8.66	n/a
336.0 MHz	40.35 Qp	1.57 / 14.27 / 26.7 / 0.0	29.49	V / 1.00 / 0	-16.51	n/a
336 MHz maxed:						
336.0 MHz	61.6 Qp	1.57 / 14.27 / 26.7 / 0.0	50.74	V / 1.10 / 167	4.74	n/a

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File No. WC403349.3, Page A9 of A14

Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #: WC403349 Run 9 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/04
EUT Serial #: _____ EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: Note P/S change on data line #119.

Data File Name: 3349-9.dat

Page: 4 of 8

List of measurements for run #: 9

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
Added 36pF caps to ethernet lines:						
336.0 MHz	41.27 Qp	1.57 / 14.27 / 26.7 / 0.0	30.41	V / 1.10 / 167	-15.59	n/a
336.0 MHz	41.75 Qp	1.57 / 14.27 / 26.7 / 0.0	30.89	V / 1.40 / 226	-15.11	n/a
223.989 MHz	47.9 Qp	1.28 / 11.1 / 26.3 / 0.0	33.98	V / 1.10 / 180	-12.02	n/a
87.711 MHz	50.4 Qp	0.8 / 7.5 / 25.81 / 0.0	32.89	V / 1.10 / 180	-7.11	n/a
115.011 MHz	54.7 Qp	0.9 / 9.6 / 25.9 / 0.0	39.3	V / 1.00 / 195	-4.2	n/a
195.994 MHz	41.95 Qp	1.19 / 11.33 / 26.27 / 0.0	28.2	V / 1.00 / 195	-15.3	n/a
223.989 MHz	49.7 Qp	1.28 / 11.1 / 26.3 / 0.0	35.78	V / 1.00 / 195	-10.22	n/a
265.2 MHz	40.5 Qp	1.43 / 12.58 / 26.41 / 0.0	28.1	V / 1.00 / 195	-17.9	n/a
300.0 MHz	38.4 Qp	1.5 / 13.73 / 26.58 / 0.0	27.05	V / 1.00 / 195	-18.95	n/a
420.0 MHz	38.6 Qp	1.7 / 16.84 / 26.77 / 0.0	30.37	V / 1.00 / 195	-15.63	n/a
32.93 MHz	37.85 Qp	0.45 / 19.5 / 25.9 / 0.0	31.9	V / 1.00 / 195	-8.1	n/a
DISCONNECTED ETHERNET CONNECTION AT LAPTOP IN SCREEN ROOM.						
EUT FULLY OPERATIONAL.						
115.011 MHz	57.53 Qp	0.9 / 9.6 / 25.9 / 0.0	42.13	V / 1.00 / 195	-1.37	n/a
2.44 GHz MODE:						
115.011 MHz	57.44 Qp	0.9 / 9.6 / 25.9 / 0.0	42.04	V / 1.00 / 195	-1.46	n/a
2.476 GHz MODE:						
115.011 MHz	57.33 Qp	0.9 / 9.6 / 25.9 / 0.0	41.93	V / 1.00 / 195	-1.57	n/a
2.593 GHz MODE:						
115.011 MHz	57.69 Qp	0.9 / 9.6 / 25.9 / 0.0	42.29	V / 1.00 / 195	-1.21	n/a

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File No. WC403349.3, Page A10 of A14

Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #: WC403349 Run 9 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/04
EUT Serial #: _____ EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: Note P/S change on data line #119.

Data File Name: 3349-9.dat

Page: 5 of 8

List of measurements for run #: 9

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
NOTE!!! THE ABOVE MEASUREMENTS AT 115 MHZ SHOW THAT THE LOW FREQUENCY EMISSIONS DO NOT CHANGE WITH TRANSMIT FREQUENCY CHANGES.						
32.93 MHz	39.6 Qp	0.45 / 19.5 / 25.9 / 0.0	33.65	V / 1.00 / 195	-6.35	n/a
195.994 MHz	42.0 Qp	1.19 / 11.33 / 26.27 / 0.0	28.25	V / 1.00 / 195	-15.25	n/a
223.989 MHz	49.4 Qp	1.28 / 11.1 / 26.3 / 0.0	35.48	V / 1.00 / 195	-10.52	n/a
265.2 MHz	40.7 Qp	1.43 / 12.58 / 26.41 / 0.0	28.3	V / 1.00 / 195	-17.7	n/a
87.711 MHz	57.05 Qp	0.8 / 7.5 / 25.81 / 0.0	39.54	V / 1.00 / 270	-0.46	n/a
87 MHz MAXED:						
87.711 MHz	57.28 Qp	0.8 / 7.5 / 25.81 / 0.0	39.77	V / 1.00 / 5	-0.23	n/a
MOVED CABLE TO MAXIMIZE EMISSION LEVEL AT 87.7 MHz:						
ADDED STEWARD FERRITE #25A0393-0A0 TO RSU END OF DC POWER CORD.						
87.711 MHz	57.55 Qp	0.8 / 7.5 / 25.81 / 0.0	40.04	V / 1.00 / 5	0.04	n/a
99.801 MHz	65.12 Qp	0.88 / 9.04 / 25.9 / 0.0	49.15	V / 1.00 / 5	5.65	n/a
REMOVED ALL FERRITES.						
CHANGED TO: NEXTNET WIRELESS P/S MODEL: GT-21097-5024-4.5.						
87.711 MHz	39.65 Qp	0.8 / 7.5 / 25.81 / 0.0	22.14	V / 1.00 / 5	-17.86	n/a
99.801 MHz	42.95 Qp	0.88 / 9.04 / 25.9 / 0.0	26.98	V / 1.00 / 5	-16.52	n/a
78.531 MHz	44.2 Qp	0.77 / 7.69 / 25.8 / 0.0	26.87	V / 1.00 / 5	-13.13	n/a
118.731 MHz	42.3 Qp	0.9 / 9.6 / 25.95 / 0.0	26.85	V / 1.00 / 5	-16.65	n/a
134.589 MHz	40.6 Qp	1.0 / 8.55 / 26.07 / 0.0	24.08	V / 1.00 / 5	-19.42	n/a
140.002 MHz	49.8 Qp	1.0 / 9.27 / 26.01 / 0.0	34.05	V / 1.00 / 5	-9.45	n/a
32.93 MHz	33.05 Qp	0.45 / 19.5 / 25.9 / 0.0	27.1	V / 1.00 / 5	-12.9	n/a
33.164 MHz	33.0 Qp	0.45 / 19.43 / 25.9 / 0.0	26.97	V / 1.00 / 5	-13.03	n/a
115.011 MHz	40.05 Qp	0.9 / 9.6 / 25.9 / 0.0	24.65	V / 1.00 / 5	-18.85	n/a

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Reviewed by: TKS

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Thomas K. Swanson

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File No. WC403349.3, Page A11 of A14

Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #: WC403349 Run 9 Test Area: LTS
EUT Model #: RSU-2400A Date: 8/5/04
EUT Serial #: _____ EUT Power: 60 Hz / 110 VAC Temperature: 23.0 °C
Test Method: FCC B Air Pressure: 99.0 kPa
Customer: Next Net Rel. Humidity: 65.0 %

EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit

Notes: Note P/S change on data line #119.

Data File Name: 3349-9.dat

Page: 6 of 8

List of measurements for run #: 9

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m	DELTA2 FCC B >1GHz 3m
195.994 MHz	45.05 Qp	1.19 / 11.33 / 26.27 / 0.0	31.3	V / 1.00 / 5	-12.2	n/a
223.989 MHz	54.7 Qp	1.28 / 11.1 / 26.3 / 0.0	40.78	V / 1.00 / 5	-5.22	n/a
218.589 MHz	54.1 Qp	1.25 / 11.0 / 26.3 / 0.0	40.05	V / 1.00 / 5	-5.95	n/a
240.0 MHz	41.85 Qp	1.3 / 11.76 / 26.3 / 0.0	28.61	V / 1.00 / 5	-17.39	n/a
251.988 MHz	44.65 Qp	1.35 / 12.16 / 26.33 / 0.0	31.83	V / 1.00 / 5	-14.17	n/a
260.0 MHz	36.55 Qp	1.4 / 12.7 / 26.38 / 0.0	24.27	V / 1.00 / 5	-21.73	n/a
265.2 MHz	30.7 Qp	1.43 / 12.58 / 26.41 / 0.0	18.3	V / 1.00 / 5	-27.7	n/a
280.0 MHz	44.7 Qp	1.5 / 12.66 / 26.48 / 0.0	32.38	V / 1.00 / 5	-13.62	n/a
300.0 MHz	35.45 Qp	1.5 / 13.73 / 26.58 / 0.0	24.1	V / 1.00 / 5	-21.9	n/a
336.0 MHz	33.05 Qp	1.57 / 14.27 / 26.7 / 0.0	22.19	V / 1.00 / 5	-23.81	n/a
420.0 MHz	31.95 Qp	1.7 / 16.84 / 26.77 / 0.0	23.72	V / 1.00 / 5	-22.28	n/a
223.9 MHz MAXED:						
223.989 MHz	53.65 Qp	1.28 / 11.1 / 26.3 / 0.0	39.73	V / 1.00 / 259	-6.27	n/a
87.711 MHz	35.8 Qp	0.8 / 7.5 / 25.81 / 0.0	18.29	V / 1.00 / 5	-21.71	n/a
99.801 MHz	42.45 Qp	0.88 / 9.04 / 25.9 / 0.0	26.48	V / 1.00 / 5	-17.02	n/a
179.391 MHz	38.45 Qp	1.1 / 9.43 / 26.14 / 0.0	22.84	V / 1.00 / 5	-20.66	n/a
218.589 MHz	52.55 Qp	1.25 / 11.0 / 26.3 / 0.0	38.5	V / 1.00 / 5	-7.5	n/a
224.265 MHz	50.4 Qp	1.29 / 11.1 / 26.3 / 0.0	36.49	V / 1.00 / 5	-9.51	n/a
No further significant EUT emissions detected 30 MHz to 12.5 GHz, vert and hor ant.						

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File No. WC403349.3, Page A12 of A14


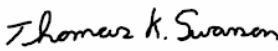
Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #:	WC403349 Run 9	Test Area:	LTS
EUT Model #:	RSU-2400A	Date:	8/5/04
EUT Serial #:		EUT Power:	60 Hz / 110 VAC
Test Method:	FCC B	Temperature:	23.0 °C
Customer:	Next Net	Air Pressure:	99.0 kPa
		Rel. Humidity:	65.0 %
EUT Description: 2.4 GHz TRx & Rcvr Residential Subscriber Unit			
Notes: Note P/S change on data line #119.			
Data File Name:	3349-9.dat	Page:	7 of 8

Measurement summary for limit1: FCC-B <1GHz 3m (Qp)					
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC-B <1GHz 3m
223.989 MHz	54.7 Qp	1.28 / 11.1 / 26.3 / 0.0	40.78	V / 1.00 / 5	-5.22
218.589 MHz	54.1 Qp	1.25 / 11.0 / 26.3 / 0.0	40.05	V / 1.00 / 5	-5.95
32.93 MHz	39.6 Qp	0.45 / 19.5 / 25.9 / 0.0	33.65	V / 1.00 / 195	-6.35
336.0 MHz	48.2 Qp	1.57 / 14.27 / 26.7 / 0.0	37.34	H / 1.00 / 0	-8.66
140.002 MHz	49.8 Qp	1.0 / 9.27 / 26.01 / 0.0	34.05	V / 1.00 / 5	-9.45
224.265 MHz	50.4 Qp	1.29 / 11.1 / 26.3 / 0.0	36.49	V / 1.00 / 5	-9.51
280.0 MHz	46.15 Qp	1.5 / 12.66 / 26.48 / 0.0	33.83	H / 1.00 / 0	-12.17
195.994 MHz	45.05 Qp	1.19 / 11.33 / 26.27 / 0.0	31.3	V / 1.00 / 5	-12.2
251.988 MHz	46.1 Qp	1.35 / 12.16 / 26.33 / 0.0	33.28	H / 1.00 / 0	-12.72
33.164 MHz	33.0 Qp	0.45 / 19.43 / 25.9 / 0.0	26.97	V / 1.00 / 5	-13.03
78.531 MHz	44.2 Qp	0.77 / 7.69 / 25.8 / 0.0	26.87	V / 1.00 / 5	-13.13
420.0 MHz	38.6 Qp	1.7 / 16.84 / 26.77 / 0.0	30.37	V / 1.00 / 195	-15.63
99.801 MHz	42.95 Qp	0.88 / 9.04 / 25.9 / 0.0	26.98	V / 1.00 / 5	-16.52
118.731 MHz	42.3 Qp	0.9 / 9.6 / 25.95 / 0.0	26.85	V / 1.00 / 5	-16.65
260.0 MHz	41.25 Qp	1.4 / 12.7 / 26.38 / 0.0	28.97	H / 1.00 / 0	-17.03
240.0 MHz	41.85 Qp	1.3 / 11.76 / 26.3 / 0.0	28.61	V / 1.00 / 5	-17.39
265.2 MHz	40.7 Qp	1.43 / 12.58 / 26.41 / 0.0	28.3	V / 1.00 / 195	-17.7
87.711 MHz	39.65 Qp	0.8 / 7.5 / 25.81 / 0.0	22.14	V / 1.00 / 5	-17.86
300.0 MHz	38.6 Qp	1.5 / 13.73 / 26.58 / 0.0	27.25	H / 1.00 / 0	-18.75
115.011 MHz	40.05 Qp	0.9 / 9.6 / 25.9 / 0.0	24.65	V / 1.00 / 5	-18.85
134.589 MHz	40.6 Qp	1.0 / 8.55 / 26.07 / 0.0	24.08	V / 1.00 / 5	-19.42
179.391 MHz	38.45 Qp	1.1 / 9.43 / 26.14 / 0.0	22.84	V / 1.00 / 5	-20.66

Tested by:	J. C. Sausen	
	Printed	Signature
Reviewed by:	TKS	
	Printed	Signature

File No. WC403349.3, Page A13 of A14


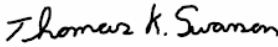
Field strength of spurious radiation

RADIATED EMISSIONS



Test Report #:	WC403349 Run 9	Test Area:	LTS
EUT Model #:	RSU-2400A	Date:	8/5/04
EUT Serial #:		EUT Power:	60 Hz / 110 VAC
		Temperature:	23.0 °C
Test Method:	FCC B	Air Pressure:	99.0 kPa
Customer:	Next Net	Rel. Humidity:	65.0 %
EUT Description:	2.4 GHz TRx & Rcvr Residential Subscriber Unit		
Notes:	Note P/S change on data line #119.		
Data File Name:	3349-9.dat	Page:	8 of 8

Measurement summary for limit2: FCC B >1GHz 3m (Av)					
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC B >1GHz 3m
7.779 GHz	47.68 Av	8.25 / 37.63 / 43.71 / 0.0	49.85	H / 1.00 / 0	-4.15
7.212 GHz	45.7 Av	8.1 / 37.22 / 44.1 / 0.0	46.92	H / 1.00 / 0	-7.08
7.32 GHz	44.65 Av	8.1 / 37.44 / 44.06 / 0.0	46.13	H / 1.00 / 0	-7.87
7.428 GHz	41.52 Av	8.12 / 37.66 / 44.01 / 0.0	43.28	H / 1.00 / 0	-10.72
4.88 GHz	38.36 Av	6.39 / 34.76 / 44.04 / 0.0	35.48	H / 1.00 / 0	-18.52
4.952 GHz	37.65 Av	6.46 / 34.97 / 44.0 / 0.0	35.07	H / 1.00 / 0	-18.93
4.808 GHz	37.88 Av	6.33 / 34.56 / 44.11 / 0.0	34.66	H / 1.00 / 0	-19.34
5.186 GHz	35.76 Av	6.61 / 35.4 / 44.0 / 0.0	33.77	V / 1.00 / 0	-20.23
1.849 GHz	41.56 Av	3.83 / 28.73 / 42.55 / 0.0	31.57	V / 1.00 / 0	-22.43
2.079 GHz	40.8 Av	3.9 / 29.77 / 43.27 / 0.0	31.21	V / 1.00 / 0	-22.79
1.904 GHz	40.59 Av	3.87 / 29.04 / 42.68 / 0.0	30.82	V / 1.00 / 0	-23.18
1.796 GHz	40.65 Av	3.78 / 28.41 / 42.37 / 0.0	30.47	V / 1.00 / 0	-23.53
1.17 GHz	39.61 Av	2.97 / 26.5 / 40.1 / 0.0	28.98	V / 1.00 / 0	-25.02
1.908 GHz	38.21 Av	3.88 / 29.07 / 42.69 / 0.0	28.46	H / 1.00 / 0	-25.54

Tested by:	J. C. Sausen	
	Printed	Signature
Reviewed by:	TKS	
	Printed	Signature

File No. WC403349.3, Page A14 of A14

Field strength of spurious radiation

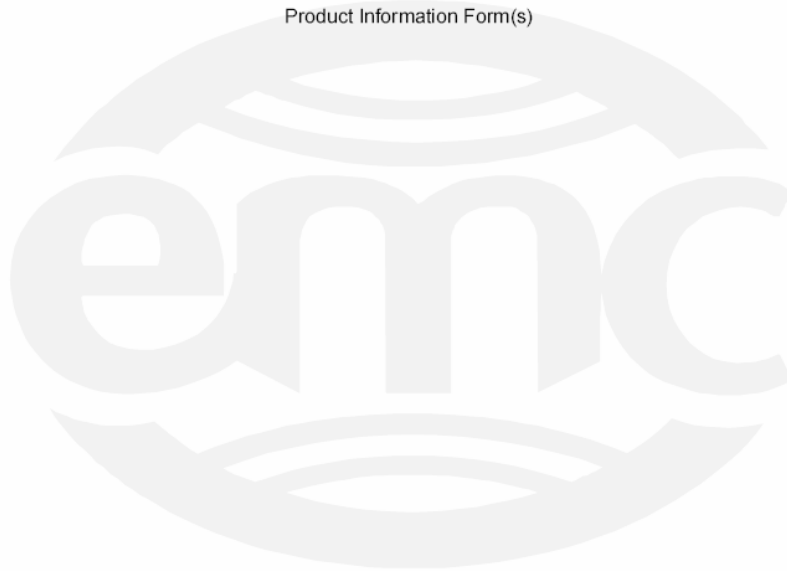


Appendix B

Constructional Data Form(s)

and/or

Product Information Form(s)



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TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Field strength of spurious radiation

Form

EMC Test Plan and Constructional Data Form



PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- NOTE: This information will be input into your test report as shown below.
Press the F1 key at any time to get HELP for the current field selected.

Company: NextNet Wireless, Inc.
Address: 9555 James Avenue South
Suite 270
Bloomington, MN 55431
Contact: Tim Blom Position: Principal Engineer
Phone: 507-837-1057 x212 Fax: 507-837-1059
E-mail Address: blomt@nextnetwireless.com

General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description: ISM/MMDS Indoor Customer Premise Equipment
EUT Name: Expedience
Model No.: 900-0041-1XXX Serial No.: board # 2008687
Product Options: none
Configurations to be tested: standard

Test Objective

- ☐ EMC Directive 89/336/EEC (EMC) ☒ FCC: Class ☐ A ☒ B Part 15
Std: ☐ VCCI: Class ☐ A ☐ B
☐ Machinery Directive 89/392/EEC (EMC) ☐ BCIQ: Class ☐ A ☐ B
Std: ☐ Canada: Class ☐ A ☐ B
☐ Medical Device Directive 93/42/EEC (EMC) ☐ Australia: Class ☐ A ☐ B
Std: ☒ Other: FCC Parts 2, 15B/C, 21, 74
☐ Vehicle Directive 72/245/EEC (EMC)
Std: _____
☐ FDA Reviewers Guidance for Premarket
Notification Submissions (EMC)

TÜV Product Service Certification Requested

- ☐ Attestation of Conformity (AoC) ☐ International EMC Mark (IEM)
☐ Certificate of Conformity (CoC) ☐ Compliance Document
Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III

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NextNet Wireless, Inc
9555 James Ave. South Suite 270
Bloomington, MN 55431

09/27/2004

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(Press **F1** when field is selected to show additional information on Protection Class.)

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Failure - Complete this section if testing will not be attended by the customer.

If a failure occurs, TÜV Product Service should:

- ☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____
☐ Continue testing to complete test series.
☐ Continue testing to define corrective action.
☐ Stop testing.

EUT Specifications and Requirements

Length: 6.25" Width: 1.125" Height: 9.25" Weight: 1.5Lb
: _____

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 120 (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: 1

Current (Amps/phase(max)): 1 Current (Amps/phase(nominal)): .5

Other ---

Other Special Requirements

N/A

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
Home or small business

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 2
☐ Shielded OR ☐ Unshielded
☐ Not Applicable

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EUT Interface Ports and Cables												
Interface			Shielding									
Type	Analog	Digital	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE:												
RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15DC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	twin pair		Circular	DC	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Ethernet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	CAT-5		RJ-45	100 ohm	15	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>

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EUT Software

Revision Level: 2.2

Description: Expedience software

EUT Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Customer Premise Equipment transmitter. FCC Parts 2, 15C, 21, and 74.
2. Customer Premise Equipment receive. FCC Part 15B
- 3.

EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)

Description	Model #	Serial #	FCC ID #
CPE transmitter / receiver	900-0041-1XXX	Board # 2008687	PHX-RSU2400A

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Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)			
Description	Model #	Serial #	FCC ID #
Dell laptop computer	Inspiron 5000	000832RM-12961-04R-0441	N/A
D-Link switch	DSS-5+	B20533503175	N/A

Oscillator Frequencies			
Frequency	Derived Frequency	Component # / Location	Description of Use
20.000MHz	N	Y902	TCXO for main stability
1100k/200k /70k	N	U1, U5, U6	power supply switchers

Power Supply			
Manufacturer	Model #	Serial #	Type
Group West International	BUT-15-1660	n/a	<input checked="" type="checkbox"/> Switched-mode: (Frequency) 100 kHz <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____
			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____

Power Line Filters		
Manufacturer	Model #	Location in EUT
N/A		

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Critical EMI Components (Capacitors, ferrites, etc.)

Description	Manufacturer	Part# or Value	Qty	Component # / Location

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

N/A

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

Authorization Signatures

/s/ Tim Blom

8/2/2004

Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

Reviewed by TÜV Product Service Associate

Date

Field strength of spurious radiation

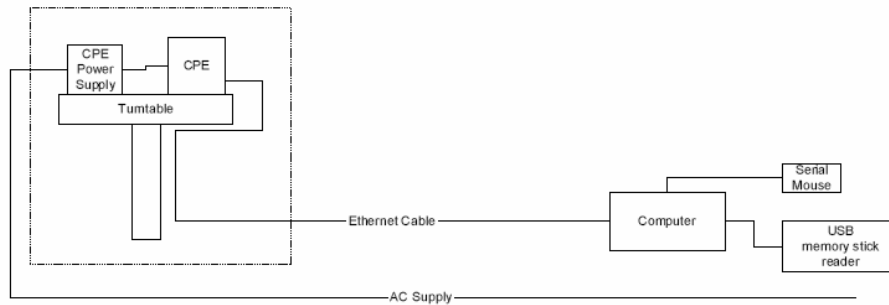
Form

EMC Block Diagram Form



System Configuration Block Diagram -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.

-Part 15B/C test setup for ISM/MMDS Customer Premise Equipment (CPE) for DOC compliance.
Parts 2, 15B/C, 21, and 74 test setup for ISM/MMDS Customer Premise Equipment (CPE).



Authorization Signatures

/s/ Tim Blom

8/2/2004

Customer authorization to perform tests
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

Reviewed by TÜV Product Service Associate

Date

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Appendix C

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Test Methodology

Conducted and radiated emission testing is performed according to the procedures in International Special Committee on Radio Interference (CISPR) Publication 22 (1993), European Standard EN 55022 and Australian Standard AS 3548 (which are based on CISPR 22).

The Japanese standard, "Voluntary Control Council for Interference (VCCI) by Data Processing Equipment and Electronic Office Machines, Technical Requirements" is technically equivalent to CISPR 22 (1993). For official compliance, a conformance report must be sent to and accepted by the VCCI.

In compliance with FCC Docket 92-152, "Harmonization of Rules for Digital Devices Incorporate International Standards", testing for FCC compliance may be done following the ANSI C63.4-1992 procedures and using the CISPR 22 Limits.

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ± 4.8 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the CISPR limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

RADIATED EMISSIONS

The final level, expressed in dB μ V/m, is arrived at by taking the reading from the spectrum analyzer (Level dB μ V), adding the antenna correction factor and cable loss factor (Factor dB) to it, then subtracting the preamp gain. This result then has the CISPR limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment A.

Example:

FREQ (MHz)	LEVEL (dB μ V)		CABLE/ANT/PREAMP (dB) (dB/m) (dB)			FINAL (dB μ V/m)	POL/HGT/AZ (m) (deg)			DELTA1 EN 55022 A
60.80	42.5Qp	+	1.2	+	10.9	- 25.5 = 29.1	V	1.0	0.0	-10.9

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DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω /50 μ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 12500 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The transmitter is rotated through 3 orthogonal axes in order to determine the maximum emission levels.

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