

RF Emissions Test Report To Determine Compliance With: FCC, Part 15 Rules and Regulations

Model number: SD200
December 13, 2001

Manufacturer: coaXmedia
1220 Oak Industrial Lane
Suite B
Cumming, GA 30041

EMC Testing Laboratories, Inc. authorizes the above company to reproduce
this report provided it is reproduced in its entirety

<u>Contents</u>	<u>Section</u>
General Information	1
Test Summary.....	2
Standard Reference	3
Test Method	4
Radiated Emissions Measurements	5
Conducted Emissions Measurements	6
Test Configuration	7

Section 1

General Information

Manufacturer:	coaXmedia 1220 Oak Industrial Lane Suite B Cumming, GA 30041
Manufacturer representative:	Mr. Dave Collins
Equipment covered by this report:	Model no. SD200
Options covered by this report:	None
Equipment serial no.	Prototype
Test specifications:	To determine compliance with: FCC, Part 15, Subpart B Rules and Regulations, Class B
Test report number:	01-239A
Test commenced:	November 27, 2001
Test completed:	November 29, 2001
Test engineer:	Kent Stewart
Test Facility:	The test facility used to perform these tests is on file with the FCC under file 31040/SIT, 1300F2 and located at:

EMC Testing Laboratories, Inc.
2420 Oak Street West
Cumming, GA. 30041-6456

Section 2

Test report summary sheet 1 of 4

Summary:

Tests	Results
FCC, Part 15, Class B, Radiated emissions:	Pass
FCC, Part 15, Class B, Conducted emissions:	Pass

- 1- The product(s) covered by this report was found to comply with the Class B limits of the FCC, Part 15, Subpart B Rules and Regulations.
- 2- The minimum margin of compliance was -5.0 dB μ v/m at 386.1 Mhz followed by -5.7 dB μ v/m at 225.6 Mhz for configuration 1 and -2.0 dB μ v/m at 17.7 Mhz followed by -3.0 dB μ v/m at 18.2 Mhz for configuration 2.
- 3- The test results apply only to the products identified on the test report.

Product description:

The product(s) covered by this report consisted of a model SD200, is an Internet access appliance (modem) allowing high speed Internet connectivity over existing building coaxial distribution systems. The EUT connects to a personal computer via USB or Ethernet connection.

The enclosure is constructed of plastic, (shaped as shown) with overall dimensions measuring 18.2cm wide by 4cm high by 20.3cm deep and houses the following components judged as critical:

1. A printed wiring board, manufactured by coaXmedia, part no. 311004-001, Rev. B.

NOTE: During testing the unit's plastic enclosure was not utilized.

Test configuration:

The equipment under test (EUT) was set-up and configured as specified by the manufacturer as follows. To test both the Ethernet and USB communication circuits, two configurations were tested. Additionally, two AC to DC adapters one manufactured by

Test report summary sheet 2 of 4

Ventronics Ins., part number R48W051000-14/1 and the other manufactured by Globtek Inc., part number WR1A1000LCP-N were tested for both configurations during conducted emissions testing.

1- The EUT was connected to the following support peripherals:

- A)** A mouse, manufactured by Logitech, model no. M-S34-6MD, serial number LZA60347350, FCC ID: DZL210472.
- B)** A printer, manufactured by Hewlett Packard, model 660C, serial number SG5BE1C151, FCC ID: B94C2164X.
- C)** A laptop computer, manufactured by Toshiba, part no. PS171U-11K93H, serial no. Y024923CU, FCC DOC marked. (NOTE: The laptop computer has no means for connecting a serial device other than the mouse noted above.)

NOTE: The following peripheral equipment was positioned away from the EUT:

- D)** A Broadband Gateway, manufactured by coaXmedia, model no. BG-200, serial no. 014.
- E)** A laptop computer, manufactured by Toshiba, part no. PRS408U-T2CW8, serial no. 59668335A, FCC DOC marked.

2- The EUT utilized the following cables and were connected as indicated below:

- A)** A shielded cable, (integral to the mouse) was connected to the computer's mouse port.
- B)** A shielded printer cable was connected from the computer's parallel printer port to the printer.
- C)** A 75 ohm coaxial cable with a 40 ohm attenuator was connected from the EUT's RF port to the IN port of a typical 2-way splitter, manufactured by Signal Vision Inc., part no. SV-2G. The OUT ports of the splitter were connected to the Broadband Gateway's RFI and RFO ports by two 75 ohm coaxial cables.

Test report summary sheet 3 of 4

- D) An unshielded category 5 cable was connected from the EUT's Ethernet port to the laptop (Toshiba, part no. PS171U-11K93H, serial no. Y024923CU) computer's Ethernet port.
- E) An unshielded category 5 cable was connected from the laptop (Toshiba, part no. PRS408U-T2CW8, serial no. 59668335A) computer's Ethernet port to the Broadband Gateway Ethernet port.

Test configuration 2 is identical to test configuration 1 except that the Ethernet cable (item D above) is removed and the following cable is used:

- A) A shielded USB cable was connected from the EUT's USB port to the laptop (Toshiba, part no. PRS408U-T2CW8, serial no. 59668335A) computer's USB port.

Test operation:

For all measurements, the equipment under test was caused to function in a continuous mode of operation for maximum electrical activity as specified by the manufacturer. Specifically, during test configuration 1, the EUT was made to continuously send and receive a ping signal between the two laptop computers. Additionally, the laptop computer directly connected to the EUT was made to continuously send a scrolling "H" character to the display.

During test configuration 2, the EUT was continuously being polled by the Broadband Gateway for data to which the EUT continuously responded while the laptop computer directly connected to the EUT established a continuous data flow via the USB connection. Additionally, the laptop computer directly connected to the EUT was made to continuously send a scrolling "H" character to the display.

Modifications:

The following modifications were required to comply with the indicated limits:

- 1- None

Test report summary sheet 4 of 4

Engineering Statement:

All measurement data, of this test report, was taken in accordance with the FCC, Part 15, Subpart B Rules and Regulations and ANSI C63.4-1992 by EMC Testing Laboratories, Inc., located in Cumming, Georgia. Although this data is taken under stringent laboratory conditions and to the best of our knowledge, represents accurate data, it must be recognized that emissions from or immunity to this type equipment may be greatly affected by the final installation of the equipment. Therefore, EMC Testing Laboratories, Inc., while supporting the accuracy of the data in this report, takes no responsibility for use of equipment based on these tests. The manufacturer of this equipment must take full responsibility for any field problems which may arise, and agrees that EMC Testing Laboratories, Inc., in performing its functions in accordance with its objectives and purposes, does not assume or undertake to discharge any responsibility of the manufacturer to any other party or parties.

Conclusion:

With the above indicated modifications, the product(s) covered by this report has been tested and found to comply with the limits for a Class B device in accordance with the FCC, Part 15, Subpart B Rules and Regulations.

Tested by:

Reviewed by:

Kent Stewart
Laboratory Manager

Gene J. Bailey
Engineering Manager
EMC Testing Laboratories, Inc.
December 13, 2001

Section 2 cont...

This page intentionally left blank.

(Reserved for future use)

Section 3

STANDARD REFERENCE

The following primary standards were used for this test:

- 1) **ANSI C63.4-1992:** Method of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the 9 Khz to 40 Ghz.
- 2) **US Code of Federal Regulations (CFR) (1998):** Title 47, Part 15, Radio Frequency Devices, Subpart B, Unintentional Radiators.

Section 4

TEST METHOD

INTRODUCTION:

The product(s) covered by this report were subjected to electromagnetic interference emissions measurements to determine compliance with the FCC, Part 15 requirements.

Radiated and conducted emissions were measured in accordance with Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 Ghz, ANSI C63.4.

MEASUREMENT CALCULATIONS:

Radiated Emissions:

For radiated emissions measurements, the signal attenuation due to impedance losses in the antenna and signal cable was significant and was added to the spectrum analyzer reading to give corrected signal strength reading. If a preamplifier was used, the signal gain was subtracted from the signal strength reading. Radiated emissions data was specified as decibels above 1 microvolt per meter (dB μ V/m) of radiated field strength.

$$\text{Radiated emissions (dB}\mu\text{V)} = \text{Analyzer reading (dB}\mu\text{V)} \text{ plus} \\ \text{antenna factor (dB) plus cable factor (dB) minus Amplifier gain (dB)}$$

Conducted Emissions:

For conducted emissions, the signal attenuation due to impedance losses in the LISN and signal cables were negligible and assumed to be 0dB. The conducted emissions were directly equal to the spectrum analyzer reading. Conducted emissions data was specified as decibels above 1 microvolt (dB μ V) of conducted line voltage.

$$\text{Conducted emissions (dB}\mu\text{V)} = \text{Analyzer reading (dB}\mu\text{V)}$$

RADIATED EMISSIONS MEASUREMENT:

Radiated emissions measurements were performed at an open field test site. The receiving antenna was positioned 3 or 10 meters from the equipment under test as indicated below, along the center axis of the test site. Measurements were made with broadband antennas and if necessary, detected emissions were verified with dipole antennas. The dipole antenna was manually tuned to the signal frequency by adjusting the length of the antenna elements. The radiated emissions were measured for both the horizontal and vertical signal planes by rotating the antennas. Additionally, the EUT was rotated by the turntable and the antenna height was raised and lowered 1 to 4 meters to locate the maximum emission strength at each frequency.

Emission measurements made from 30 Mhz to 1000 Mhz were made at an antenna to EUT distance of 10 meters.

Emission measurements made from 1000 Mhz to 10 Ghz were made at an antenna to EUT distance of 3 meters.

The following antennas were used to measure the radiated emissions within the specified frequency spans.

<u>Antenna</u>	<u>Frequency Span</u>
Biconical	20 - 200 Mhz
Log Periodic	200 - 1000 Mhz
Dipoles	20 - 1000 Mhz
Horn	1-18 Ghz

CONDUCTED EMISSIONS MEASUREMENT:

Conducted emissions measurements were performed on a ground plane that was electrically bonded to earth ground. The equipment under test was positioned 0.8 meter above the ground plane and 0.8 meter minimum from the LISN that was positioned on the ground plane. The LISN housings were electrically bonded to the ground plane. The conducted emissions for both the ungrounded supply conductor (L1) and the grounded conductor (L2) of the power supply cord were measured. The conducted emissions were measured over the frequency span of 0.45 to 30 Mhz. The measurements were conducted in the quasi-peak and average detector modes.

INSTRUMENTATION:

Radiated and conducted signal strength measurements were taken with a spectrum analyzer. Radiated emissions were measured with broadband and tuned dipole antennas. Conducted emissions were measured with a 50 UH line impedance stabilization network (LISN). The test equipment consists of the following:

<u>Test Equipment</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Cal. Due</u>
Spectrum Analyzer	HP 8591A	2919A00171	06-19-02
Spectrum Analyzer	8592L	3649A00744	02-12-02
LISN	94641-1	0145/0146	06-01-02
Biconical Antenna	3110B	1708	09-14-02
Biconical Antenna	BIA-25	2451	09-14-02
Log Periodic	LPA25	1112	09-14-02
Dipole Antenna	DM-105A-T1	31402-110	06-01-02
Dipole Antenna	DM-105A-T2	31402-105	06-01-02
Dipole Antenna	DM-105A-T3	31402-109	06-01-02
Horn Antenna	3115	9405-4264	09-14-02
R.F. Amplifier	QB-820	11602	09-14-02
Preamplifier	8449B	3008A00914	09-14-02

DETECTOR FUNCTION:

All measurements were taken using a peak hold signal detector function. In this mode, the spectrum analyzer makes continuous scans across the frequency band and stores the highest emission value detected at each frequency for all scans. The peak hold integration will detect transient or low duty cycle emissions peak which might be missed on single scan measurement. The emission value at each frequency was a true value.

SPECTRUM ANALYZER SETTING:

For all measurements, the spectrum analyzer was set for a 10 dB input attenuation. 10 dB/Division vertical scale and 90 or 100 dB μ V reference level. The resolution bandwidth was set at 9 KHz for the 0.45 - 30 Mhz span, 120 KHz for 30 - 1000 Mhz span and 1 Mhz for measurement above 1000 Mhz. The video bandwidth and sweep rate were automatically coupled by the analyzer.

Section 5

RADIATED EMISSIONS MEASUREMENTS

RADIATED EMISSIONS MEASUREMENTS

Test Configuration 1 – Ethernet

Model number: SD200

Test date: 11/27/01

Frequency Mhz	Measurement Reading dB μ V/m	Corrected Reading dB μ V/m	FCC Limit dB μ V/m	Minimum Margin dB μ V/m
Vertical				
150.0	32.3	25.2	33.0	-7.8
225.6	38.4	29.8	35.5	-5.7
252.2	33.7	26.4	35.5	-9.1
*321.0	33.9	28.9	35.5	-6.6
Horizontal				
150.0	30.5	22.9	33.0	-10.1
225.7	38.5	29.6	35.5	-5.9
*240.1	36.7	28.5	35.5	-7.0
250.1	37.4	29.6	35.5	-5.9
386.1	34.7	30.5	35.5	-5.0

* - Indicates Quasi-Peak Measurement

Radiated Emissions Measurements cont...

Test Configuration 2 – USB

Model number: SD200

Test date: 11/29/01

Frequency Mhz	Measurement Reading dB μ V/m	Corrected Reading dB μ V/m	FCC Limit dB μ V/m	Minimum Margin dB μ V/m
Vertical				
150.0	33.7	26.6	33.0	-6.4
175.0	28.6	22.2	33.0	-10.8
250.0	33.5	26.1	35.5	-9.4
*265.8	38.7	32.0	35.5	-3.5
297.1	32.8	28.1	35.5	-7.4
416.1	35.5	32.3	35.5	-3.2
1095.0	54.2	42.6	54.0	-11.4
1200.0	49.0	37.8	54.0	-16.2
1488.8	52.5	42.4	54.0	-11.6

* - Indicates Quasi-Peak Measurement

Radiated Emissions Measurements cont...

Test Configuration 2 – USB**Model number:** SD200**Test date:** 11/29/01

Frequency Mhz	Measurement Reading dBμV/m	Corrected Reading dBμV/m	FCC Limit dBμV/m	Minimum Margin dBμV/m
Horizontal				
150.0	30.3	22.7	33.0	-10.3
208.7	31.5	22.9	33.0	-10.1
250.1	34.4	26.6	35.5	-8.9
*265.7	38.0	31.1	35.5	-4.4
*273.9	35.2	28.7	35.5	-6.8
1201.3	55.3	45.3	54.0	-8.7
1487.5	57.5	48.6	54.0	-5.4
1685.0	52.2	44.6	54.0	-9.4

* - Indicates Quasi-Peak Measurement

Section 6

CONDUCTED EMISSIONS MEASUREMENTS

CONDUCTED EMISSIONS MEASUREMENTS

Test Configuration 1 – Ethernet

Ventronics Ins. – Part no. R48W051000-14/1

Model number: SD200

Test voltage: 120V 60Hz

Test date: 11/27/01

Frequency Mhz	Reading dBuV, L1	Frequency Mhz	Reading dBuV, L2	FCC Limit, dBuV	Margin dBuV
0.46	40.7	0.46	40.1	48.0	-7.3
0.47	40.1	0.47	40.0	48.0	-7.9
0.49	40.0	0.48	39.8	48.0	-8.0
15.2	32.2	12.0	27.7	48.0	-15.8
17.3	26.6	17.2	27.3	48.0	-20.7
25.2	36.6	25.2	39.0	48.0	-9.0

Globtek Inc. – Part No. WR1A1000LCP-N

Test voltage: 120V 60Hz

Test date: 11/27/01

Frequency Mhz	Reading dBuV, L1	Frequency Mhz	Reading dBuV, L2	FCC Limit, dBuV	Margin dBuV
0.45	35.4	0.45	36.6	48.0	-11.4
0.47	34.9	0.47	35.9	48.0	-12.1
0.48	34.1	0.51	33.8	48.0	-13.9
0.50	32.8	3.0	30.3	48.0	-15.2
19.4	25.8	15.5	30.0	48.0	-18.0
25.1	33.8	25.2	35.5	48.0	-12.5

Conducted Emissions Measurements cont...

Test Configuration 2 – USB

Ventronics Ins. – Part no. R48W051000-14/1

Model number: SD200

Test voltage: 120V 60Hz

Test date: 11/29/01

Frequency Mhz	Reading dBuV, L1	Frequency Mhz	Reading dBuV, L2	FCC Limit, dBuV	Margin dBuV
0.45	41.8	0.46	42.2	48.0	-5.8
0.48	41.0	0.48	42.1	48.0	-5.9
0.50	40.8	0.51	40.8	48.0	-7.2
0.58	38.5	0.57	39.3	48.0	-8.7
17.5	38.3	18.2	44.1	48.0	-3.9
25.1	43.0	25.1	43.0	48.0	-5.0

Globtek Inc. – Part No. WR1A1000LCP-N

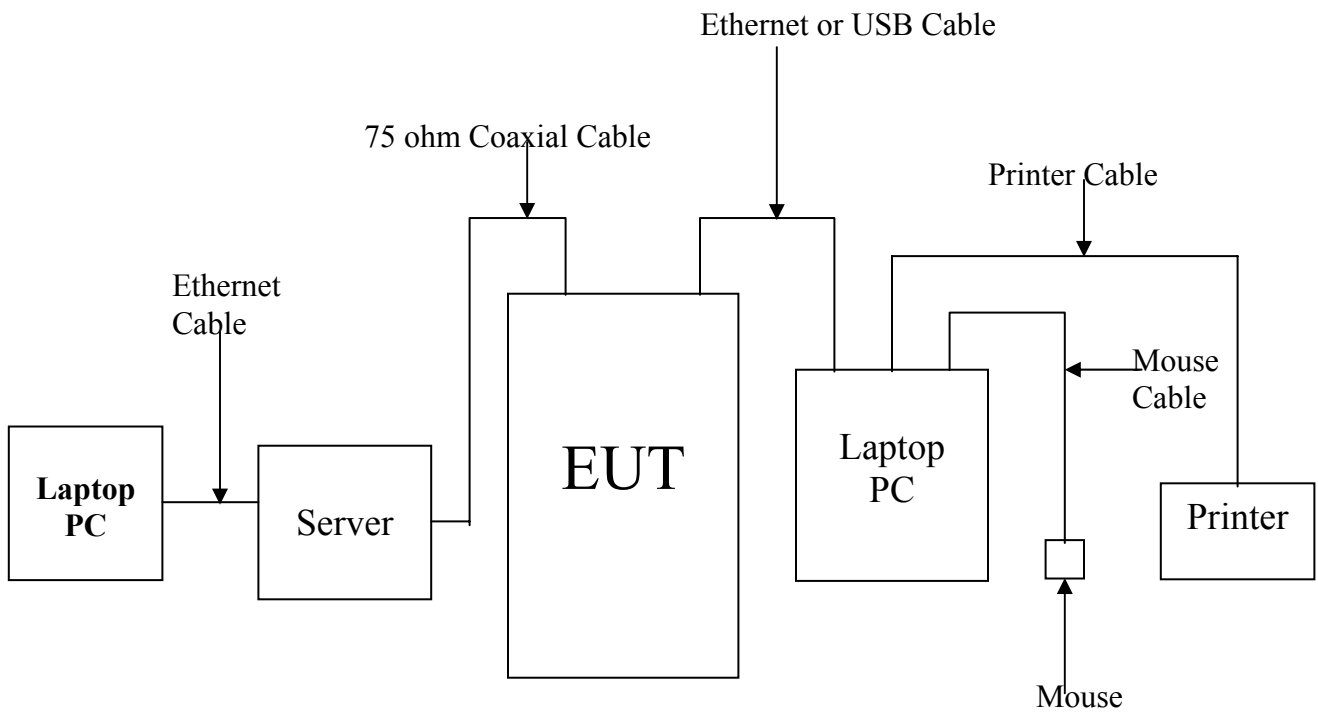
Test voltage: 120V 60Hz

Test date: 11/29/01

Frequency Mhz	Reading dBuV, L1	Frequency Mhz	Reading dBuV, L2	FCC Limit, dBuV	Margin dBuV
0.45	37.0	0.45	36.6	48.0	-11.0
0.49	36.6	0.49	35.4	48.0	-11.4
16.2	41.5	16.2	38.0	48.0	-6.5
17.7	46.0	17.7	39.7	48.0	-2.0
18.2	45.0	18.2	37.0	48.0	-3.0
25.1	35.8	25.1	37.6	48.0	-10.4

Section 7

Test Configuration



LAST PAGE ...