CERTIFICATION TEST REPORT

FOR THE

WIRELESS CABLE MODEM TRANSCEIVER, 520004-1

FCC PART 2 AND PART 21
COMPLIANCE

DATE OF ISSUE: JANUARY 20, 2000

PREPARED FOR:

California Amplifier, Inc.
460 Calle San Pablo
Camarillo, CA 93012

P.O. No: 20574
W.O. No: 72297

PREPARED BY:

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Mariposa, CA 95338

Date of test: December 15-17, 1999

Report No: FC00-003

DOCUMENTATION CONTROL:

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APPROVED BY:

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Director of Laboratories
CKC Laboratories, Inc.

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Part 2 & 21 CERTIFICATION TEST REPORT

ADMINISTRATIVE INFORMATION

DATE OF TEST:	December 15, 1999
PURPOSE OF TEST:	To demonstrate the compliance of the Wireless Cable Modem Transceiver, 520004-1, with the requirements for FCC Part 21 devices.
MANUFACTURER:	California Amplifier, Inc. 460 Calle San Pablo Camarillo, CA 93012
REPRESENTATIVE:	Carlos Briceno
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest, Mariposa, CA 95338
TEST PERSONNEL:	Skip Doyle
TEST METHOD:	FCC Part 2 and 21
FREQUENCY RANGE TESTED:	500 kHz - 22 GHz
EQUIPMENT UNDER TEST:	**Wireless Cable Modem Transceiver** Manuf: California Amplifier Model: 520004-1 Serial: 9510000121 FCC ID: J26520004-1 (Pending)

SUMMARY OF RESULTS

The California Amplifier, Inc. Wireless Cable Modem Transceiver, 520004-1, was tested in accordance with FCC Part 21 devices. As received, the above equipment was found to be fully compliant with the limits of FCC Part 21 devices. The results in this report apply only to the items tested, as identified herein.

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

Up/Down converter working in conjunction with a cable modem.

MEASUREMENT UNCERTAINTY

Associated with data in this report is a ±4dB measurement uncertainty.

EUT OPERATING FREQUENCY

The EUT was operating at 2150-2162 MHz.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

PERIPHERAL DEVICES

The EUT was tested with the following peripheral devices:

Mouse
Manuf: Compaq
Model: P/N:141189-401
Serial: N/A
FCC ID: DZL211029

Keyboard
Manuf: Compaq
Model: M/N
Serial: B23N0A39E874G
FCC ID: AQ6MTN4XZ15

PC
Manuf: Compaq
Model: Deskpro
Serial: 6647HVS3Q701
FCC ID: DoC

Monitor
Manuf: ViewSonic
Model: V641-1M
Serial: 2A71303961
FCC ID: GSS14002

Modem
Manuf: Hybrid Networks
Model: N231
Serial: 82AAP001759
FCC ID: DoC

Power Supply 22 VDC/750mA
Manuf: Unknown
Model: 71441
Serial:
FCC ID: DoC

2.1033(c)(5) – Frequency Range

2150-2162 MHz.

2.1033(c)(7) – Maximum Power Rating

Maximum power rating as defined in the operating part(s) of the rules.

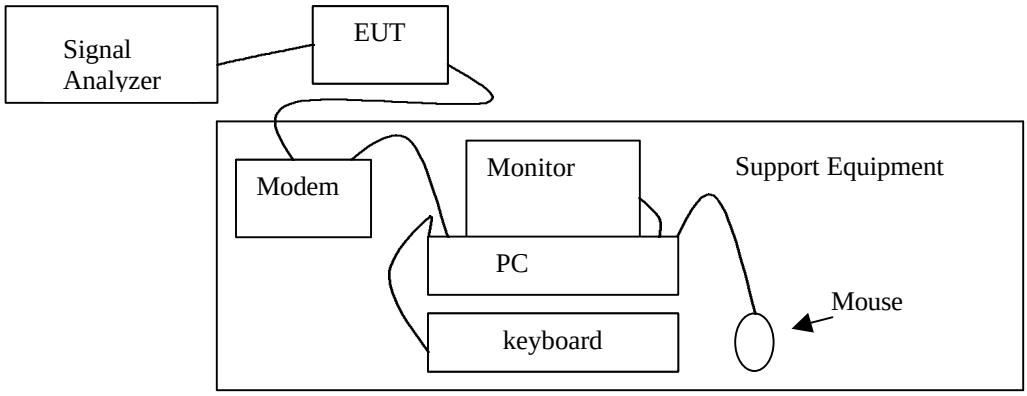
741 mW

2.1033(c)(14)/2.1046/21.107/21.904(b) - RF POWER OUTPUT

Test Conditions: EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from the modem via RG58 cable. Power through the cable is provided through the Power Inserter. EUT is continuously sending packets via command from the PC. EUT is operating on Low Channel (2153MHz) and High Channel (2159MHz) for each reading.

The emission designator is 5M00M1D.

DIAGRAM OF TEST SETUP USED FOR TEST:



TEST EQUIPMENT USED:

1. Spectrum Analyzer, Hewlett Packard, Model No. 8566B, S/N 2209A01404. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
2. Display, Hewlett Packard, Model No. 8566B, S/N 2403A08241. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
3. QP Adapter, Hewlett Packard, Model No. 85650A, S/N 1532A03198. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
4. 10-Meter GHz Hardline Cable, includes GHz cables #1, 2 & 3.

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
2152MHz – 2159MHz	1MHz

TEST DATA: (ERP or EIRP)

Channel 2153

Power Output = InvLog(dBuV-107)/10
InvLog(135.7dBuV-107)/10
InvLog(2.87)

Power Output = **741.3102413mWatts or 135.7dBuV**

Channel 2159

Power Output = InvLog(dBuV-107)/10
InvLog(135.2dBuV-107)/10
InvLog(2.82)

Power Output = **660.693448mWatts or 135.2dBuV**

Spec Limit Per 21.107/21.904(b)

EIRP Spec Limit = 33dBW+10Log(360/Beamwidth)
= 33dBW+10Log(360/12.5)
= 33dBW+14.59

In accordance with 21.904(b) where 10Log(360/beamwidth)<=6, since 14.59 is greater than 6 the following spec was used:

EIRP Spec Limit = 33dBW+6
= 39dBW or 176dBuV

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	GHz Cable dB	dB	dB	dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	2153.121M	132.9	+2.8				+0.0	135.7	176.0	-40.3	None
2	2159.080M	132.4	+2.8				+0.0	135.2	176.0	-40.8	None

2.1033(c)(14)/2.1047(a)MODULATION CHARACTERISTICS – Audio Frequency Response

Not applicable to this unit.

2.1033(c)(14)/2.1047(b)MODULATION CHARACTERISTICS – Modulation Limiting Response

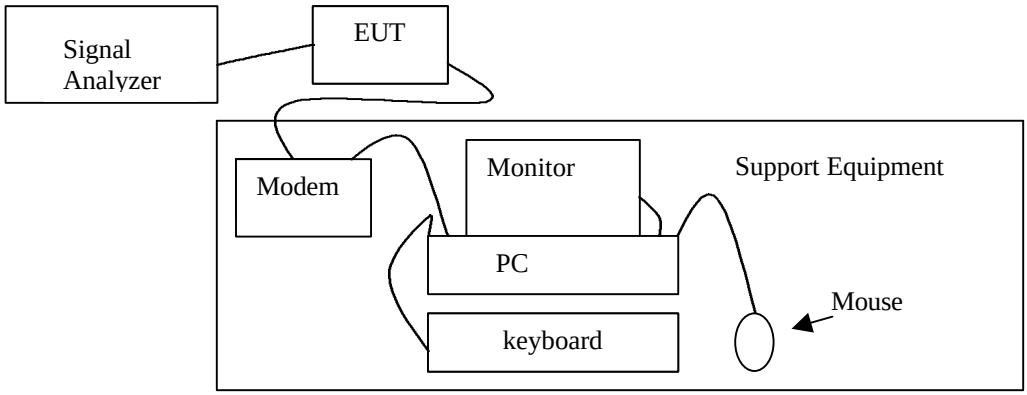
Not applicable to this unit.

2.1033(c)(14)/2.1049(i)/26.106(a)(2)/21.908(b) - OCCUPIED BANDWIDTH

DESCRIBE: The EUT was connected directly to the signal analyzer. Since the EUT only produced a modulated signal, plots showing the modulated signal were taken. EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from the modem via RG58 cable. Power through the cable is provided through the Power Inserter. EUT is continuously sending packets via command from the PC. EUT is operating on Low Channel (2153MHz) and High Channel (2159MHz) for each reading.

The emission designator is 5M00M1D.

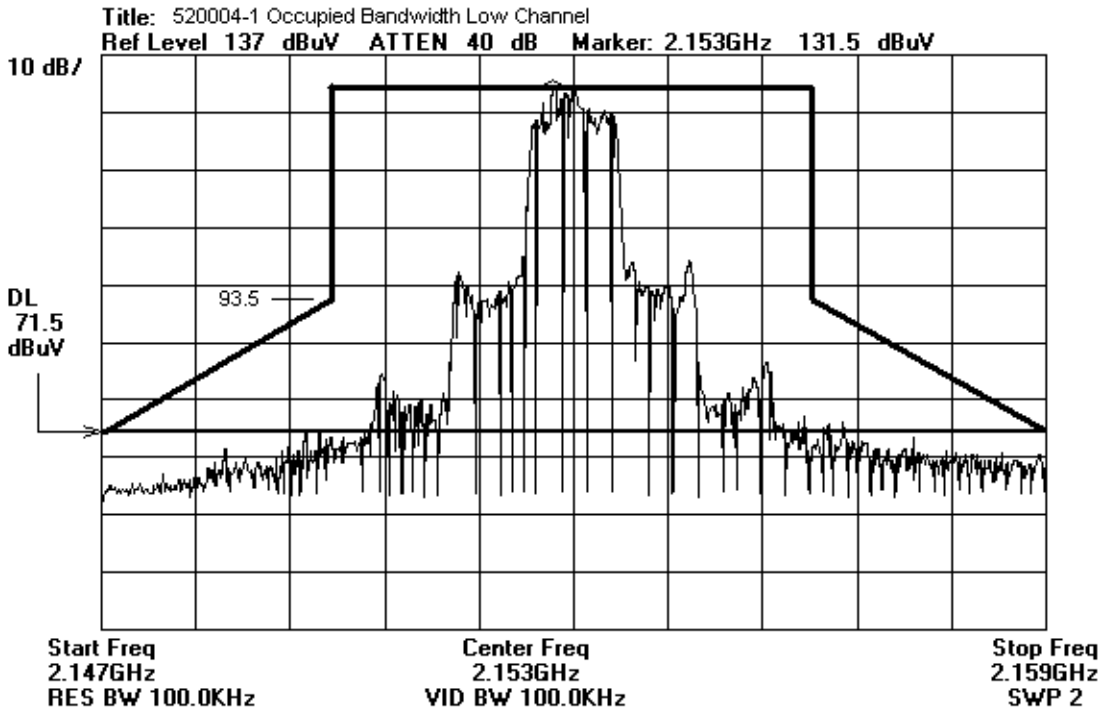
DIAGRAM OF TEST SETUP USED FOR TEST:



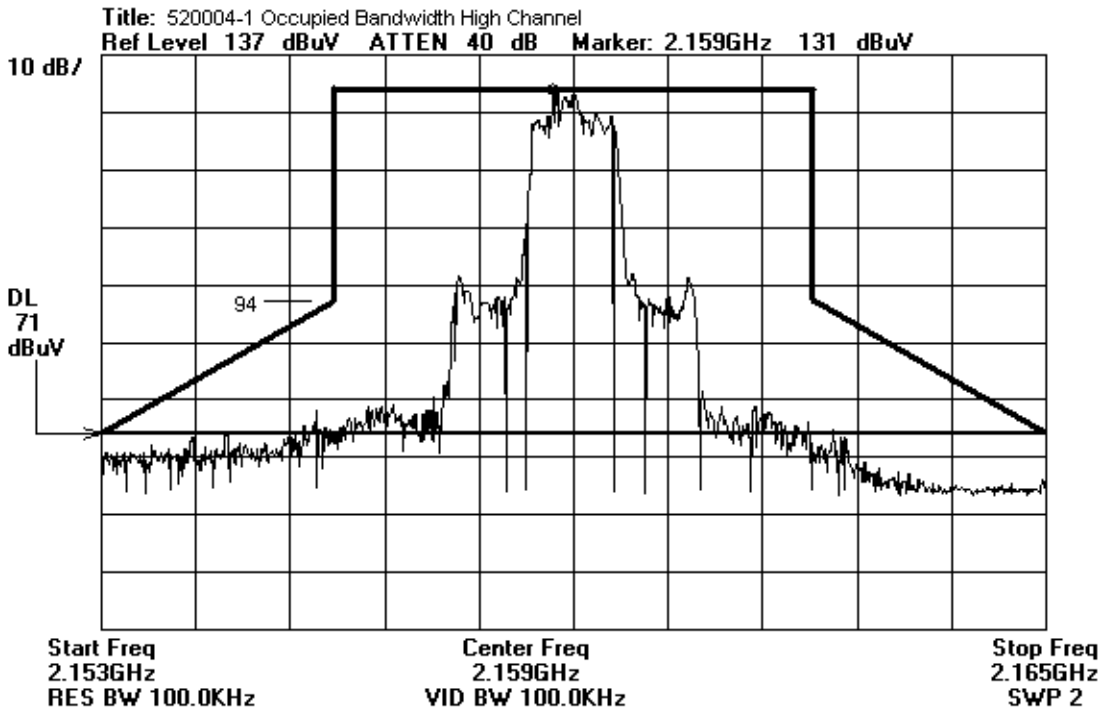
TEST EQUIPMENT USED:

1. Spectrum Analyzer, Hewlett Packard, Model No. 8566B, S/N 2209A01404. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
2. Display, Hewlett Packard, Model No. 8566B, S/N 2403A08241. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
3. QP Adapter, Hewlett Packard, Model No. 85650A, S/N 1532A03198. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.

Test data: Low Channel 2.153GHz



Test data: High Channel 2.159GHz



2.1033(c)(14)/2.1051/21.106(a)(i)&(ii) - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

DESCRIBE: The EUT was connected directly to the signal analyzer. The EUT is a Wireless Cable Modem operating at 2150-2162MHz. The EUT receives power from the modem via a RG58 cable. The power to the cable is provided through the Power Inserter. The EUT is continually sending packets via command from the PC. The EUT was operating on the Low Channel (2153MHz) and than again on the High Channel (2159MHz).

The emission designator is 5M00M1D.

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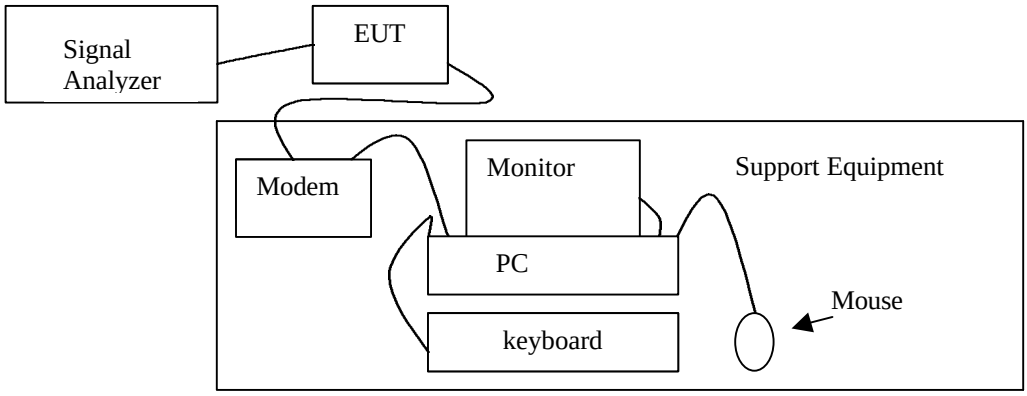
VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
9kHz – 150kHz	3kHz
150kHz - 30MHz	100kHz
30MHz – 1MHz	1MHz
1GHz – 22GHz	1MHz

DIAGRAM OF TEST SETUP USED FOR TEST:



TEST EQUIPMENT USED:

1. Spectrum Analyzer, Hewlett Packard, Model No. 8566B, S/N 2209A01404. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
2. Display, Hewlett Packard, Model No. 8566B, S/N 2403A08241. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
3. QP Adapter, Hewlett Packard, Model No. 85650A, S/N 1532A03198. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
4. 10-Meter GHz Hardline Cable, includes GHz cables #1, 2 & 3.

TEST DATA: Low Channel 2153MHz

Customer:	**California Amplifier**		
Specification:	**FCC 21.106(i)(ii)2153**		
Work Order #:	**72297**	Date:	12/16/1999
Test Type:	**Antenna Terminal Emissions**	Time:	10:56:21
Equipment:	**Wireless Cable Modem Transceiver Model 520004-1**	Sequence#:	6
Manufacturer:	California Amplifier	Tested By:	Skip Doyle
Model:	520004-1		
S/N:	951000021		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Cable Modem	California Amplifier	520004-1	9510000121

Support Devices:

Function	Manufacturer	Model #	S/N
Modem	Hybrid Networks	N231	82AAP001759
Mouse	Compaq	P/N:141189-401	N/A
Keyboard	Compaq	M/N	B23N0A39E874G
PC	Compaq	Deskpro	6647HVS3Q701
Monitor	ViewSonic	V641-1M	2A71303961
Power Supply 22VDC 750mA	Unknown	71441	

Test Conditions / Notes:

EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from the modem via RG58 cable. Power to the cable is provided through the Power Inserter. EUT is continuously sending packets via command from the PC. EUT is operating on Low Channel (2153MHz). Direct connection from EUT antenna output to analyzer.

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	GHz Cable dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1174.000M	76.8	+2.0				+0.0	78.8	94.0	-15.2	None
2	4554.000M	70.5	+3.7				+0.0	74.2	94.0	-19.8	None
3	1.010M	69.7	+0.0				+0.0	69.7	94.0	-24.3	None
4	500.000k	69.2	+0.0				+0.0	69.2	94.0	-24.8	None
5	2278.000M	63.8	+2.9				+0.0	66.7	94.0	-27.3	None
6	977.600M	61.0	+0.0				+0.0	61.0	94.0	-33.0	None
7	15948.000M	49.6	+8.4				+0.0	58.0	94.0	-36.0	None
8	116.800M	56.1	+0.0				+0.0	56.1	94.0	-37.9	None

9	212.000M	52.7	+0.0	+0.0	52.7	94.0	-41.3	None
10	195.400M	47.3	+0.0	+0.0	47.3	94.0	-46.7	None
11	279.600M	47.0	+0.0	+0.0	47.0	94.0	-47.0	None
12	318.200M	43.6	+0.0	+0.0	43.6	94.0	-50.4	None
13	3.725M	40.7	+0.0	+0.0	40.7	94.0	-53.3	None

TEST DATA: High Channel 2159MHz

Customer:	**California Amplifier**		
Specification:	**FCC 21.106(i)(ii)2159**		
Work Order #:	**72297**	Date:	12/16/1999
Test Type:	**Antenna Terminal Emissions**	Time:	11:34:00
Equipment:	**Wireless Cable Modem Transceiver Model 520004-1**	Sequence#:	7
Manufacturer:	California Amplifier	Tested By:	Skip Doyle
Model:	520004-1		
S/N:	951000021		

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Wireless Cable Modem	California Amplifier	520004-1	9510000121

Support Devices:

Function	Manufacturer	Model #	S/N
Modem	Hybrid Networks	N231	82AAP001759
Mouse	Compaq	P/N:141189-401	N/A
Keyboard	Compaq	M/N	B23N0A39E874G
PC	Compaq	Deskpro	6647HVS3Q701
Monitor	ViewSonic	V641-1M	2A71303961
Power Supply 22VDC 750mA	Unknown	71441	

Test Conditions / Notes:

EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from the modem via RG58 cable. Power to the cable is provided through the Power Inserter. EUT is continuously sending packets via command from the PC. EUT is operating on High Channel (2159MHz). Direct connection from EUT antenna output to analyzer.

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	GHz Cable dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1428.000M	89.5	+2.2				+0.0	91.7	94.0	-2.3	None
2	673.600M	73.1	+0.0				+0.0	73.1	94.0	-20.9	None
3	348.400M	70.9	+0.0				+0.0	70.9	94.0	-23.1	None
4	6476.000M	62.1	+8.2				+0.0	70.3	94.0	-23.7	None
5	989.200M	61.3	+0.0				+0.0	61.3	94.0	-32.7	None
6	724.000M	60.8	+0.0				+0.0	60.8	94.0	-33.2	None
7	614.000k	60.3	+0.0				+0.0	60.3	94.0	-33.7	None
8	5.450M	58.7	+0.0				+0.0	58.7	94.0	-35.3	None
9	1062.000M	56.5	+1.9				+0.0	58.4	94.0	-35.6	None
10	4556.000M	54.0	+3.7				+0.0	57.7	94.0	-36.3	None
11	125.600M	55.7	+0.0				+0.0	55.7	94.0	-38.3	None
12	209.600M	55.4	+0.0				+0.0	55.4	94.0	-38.6	None
13	15944.000M	45.8	+8.4				+0.0	54.2	94.0	-39.8	None
14	98.000M	53.0	+0.0				+0.0	53.0	94.0	-41.0	None
15	2280.000M	47.0	+2.9				+0.0	49.9	94.0	-44.1	None
16	29.000M	45.5	+0.0				+0.0	45.5	94.0	-48.5	None
17	18.120M	42.2	+0.0				+0.0	42.2	94.0	-51.8	None

18	11392.000M	34.5	+7.2		+0.0	41.7	94.0	-52.3	None

2.1033(c)(14)/2.1053/21.106(i) - FIELD STRENGTH OF SPURIOUS RADIATION

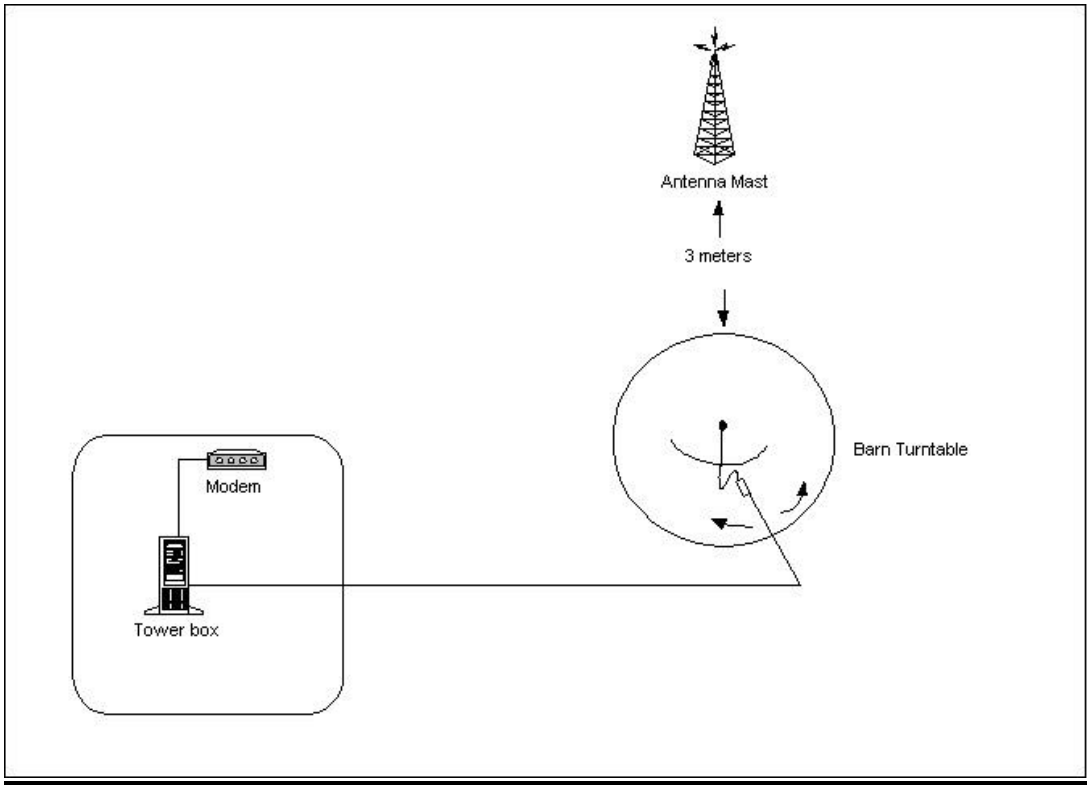
TEST METHOD AND PROCEDURE:

All harmonics and sub-harmonics of the carrier frequency were investigated. Measurements were also made to detect any spurious emissions that were directly radiated from the EUT under normal conditions of installation and operation. All spurious emissions which were attenuated more than 20 dB below the permissible value were not reported. The information submitted includes the relative radiated power of each spurious and harmonic emissions with reference to the rated power output of the transmitter (assuming all emissions are radiated from half-wave dipole antennas).

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
9kHz – 150kHz	3kHz
150kHz - 30MHz	100kHz
30MHz – 1MHz	1MHz
1GHz – 22GHz	1MHz

DIAGRAM OF TEST SETUP USED FOR TEST:



TEST EQUIPMENT USED:

1. Spectrum Analyzer, Hewlett Packard, Model No. 8566B, S/N 2209A01404. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
2. Display, Hewlett Packard, Model No. 8566B, S/N 2403A08241. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
3. QP Adapter, Hewlett Packard, Model No. 85650A, S/N 1532A03198. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
4. Preamplifier, Hewlett Packard, Model No. 8447D, S/N 1937A02604. Calibration date: April 28, 1999. Calibration due date: April 28, 2000.
5. Preamplifier, Hewlett Packard, Model No. 8449B, S/N 300A00301. Calibration date: April 27, 1999. Calibration due date: April 27, 2000.
6. Biconical Antenna, A & H Systems, Model No. SAS-200/542, S/N 156. Calibration date: May 20, 1999. Calibration due date: May 20, 2000.
7. Log Periodic Antenna, A & H Systems, Model No. SAS-200/512, S/N 154. Calibration date: May 20, 1999. Calibration due date: May 20, 2000.
8. Horn Antenna, EMCO, Model No. 3115, S/N 4085. Calibration date. February 15, 1999. Calibration due date: February 15, 2000.
9. High Pass Filter, K & L, Model 91H31-300, S/N 00001. Calibration date. August 9, 1999. Calibration due date: August 9, 2000.
10. 10-Meter GHz Hardline Cable, includes GHz cables #1, 2 & 3.
11. 10-Meter Hardline Cable.

TEST CONDITIONS:

EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from modem via RG58 cable. Power to the cable is provided through the Power Inserter. EUT is continually sending packets via command from the PC. EUT is operating on Low Channel (2153MHz). Test was than redone in the same manner as stated above, except the EUT was operating at the High Channel (2159MHz).

PHOTOGRAPH OF TEST SETUP USED FOR TEST:

Front View

Back View

TEST DATA:

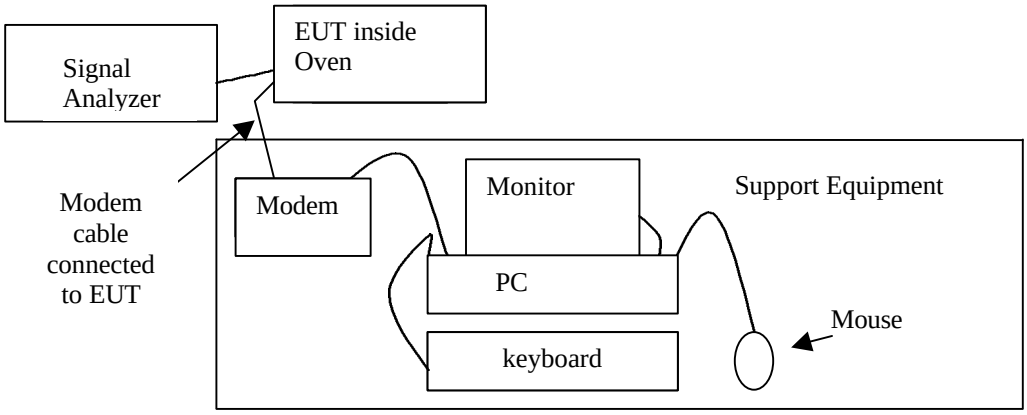
FCC Part 2.1053/21.106(2)(a)(i)(ii)21.908(a) Measurements required: Field strength of spurious radiation											
Low Channel - 2153MHz											
Polarity	**Freq(MHz)**	**Reading in dBuV/m**	**PreAmp Factor**	**Cable Factor**	**Horn Antenna**	**High Pass Filter**	**Corrected E (dBuV/M)**	**V/M**	**ERP (Watts)**	**Spec Limit Watts**	**Pass or Fail**
Vertical	16260.00	36.80	-34.00	29.10	38.60	11.7	82.20	0.012882496	0.000030358	0.000741000	Pass
Horizontal	1420.00	86.40	-35.70	5.30	25.30	0.0	81.30	0.011614486	0.000024676	0.000741000	Pass
Vertical	1422.00	86.00	-35.70	5.30	25.30	0.0	80.90	0.011091748	0.000022505	0.000741000	Pass
Vertical	12864.00	37.90	-33.60	25.60	38.70	3.1	71.70	0.003845918	0.000002706	0.000741000	Pass
Horizontal	12888.00	37.50	-33.50	25.60	38.70	3.1	71.40	0.003715352	0.000002525	0.000741000	Pass
Horizontal	10492.00	35.50	-33.90	24.60	38.20	2.3	66.70	0.002162719	0.00000856	0.000741000	Pass
Notes: Frequency range investigated was from 500kHz to 22GHz. All spurious and harmonic emissions were investigated. All emissions detected that were less than 20dB below the permissible value were reported. **Rated Power output of transmitter at 2153.121MHz = 0.741 Watts.** EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from the modem via RG58 cable. Power through the cable is provided through the Power Inserter. EUT is continuously sending packets via command from the PC. EUT is operating on Low Channel (2153MHz). Antenna gain is 24dBi. OATS testing.											
High Channel - 2159MHz											
Polarity	**Freq(MHz)**	**Reading in dBuV/m**	**PreAmp Factor**	**Cable Factor**	**Horn Antenna**	**High Pass Filter**	**Corrected E (dBuV/M)**	**V/M**	**ERP (Watts)**	**Spec Limit Watts**	**Pass or Fail**
Horizontal	15418.00	41.2	-30.8	27.7	37.1	6.4	81.6	0.012022644	0.000026441	0.000661000	Pass
Vertical	2916.00	53.4	-32.1	10.3	31.7	15.0	78.3	0.008222426	0.000012367	0.000661000	Pass
Horizontal	13782.00	40.7	-32.2	25.8	40.1	2.1	76.5	0.006683439	0.000008171	0.000661000	Pass
Vertical	14976.00	37.4	-32.1	27.7	38.9	3.7	75.6	0.006025596	0.000006642	0.000661000	Pass
Vertical	14910.00	36.0	-32.4	27.6	39.0	3.5	73.7	0.004841724	0.000004288	0.000661000	Pass
Vertical	4560.00	55.4	-32.7	14.4	32.8	0.6	70.5	0.003349654	0.000002052	0.00066100	Pass
Notes: Frequency range investigated was from 500kHz to 22GHz. All spurious and harmonic emissions were investigated. All emissions detected that were less than 20dB below the permissible value were reported. **Rated Power output of transmitter at 2159MHz = 0.661 Watts**. EUT is a Wireless Cable Modem operating at 2150-2162MHz. EUT receives power from the modem via RG58 cable. Power through the cable is provided through the Power Inserter. EUT is continuously sending packets via command from the PC. EUT is operating on High Channel (2159MHz). Antenna gain is 24dBi. OATS testing.											

CALCULATIONS
Note: The data taken is relative to the radiated power of each spurious emission with reference to the rated 10 log (741mW/1mW) = 28.6dBm 28.6dBm - 60dBc = - 31.3 Inv Log (-31.3 dBm/10) = 0.000741W **Spec Limit = 0.000741 Watts for Low Channel (2153MHz)** 10 log (661mW/1mW) = 28.2 dBm 28.2dBm - 60dBc = -31.79dBm Inv Log (-31.79dBm/10) = 0.000661W **Spec Limit = 0.000661 Watts for High Channel (2159MHz)**
ERP = $(Ed)^2/30(G)$ E = V/m d= distance G = Gain of Antenna (numerical gain of half wave dipole antenna 1.64)
Conversion of dBuV/m to V/m **[invlog(Reading in dBuV/m/20)]*.000001 = V/m**

2.1033(c)(14)/2.1055/21.101 - FREQUENCY STABILITY

TEST CONDITIONS: The EUT was connected directly to the signal analyzer. The EUT is a Wireless Cable Modem operating at 2150-2162MHz. The EUT receives power from the modem via a RG58 cable. The power to the cable is provided through the Power Inserter. The EUT is continually sending packets via command from the PC.

DIAGRAM AND PHOTOGRAPH OF TEST SETUP USED FOR TEST:



TEST EQUIPMENT USED:

1. Spectrum Analyzer, Hewlett Packard, Model No. 8566B, S/N 2209A01404. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
2. Display, Hewlett Packard, Model No. 8566B, S/N 2403A08241. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
3. QP Adapter, Hewlett Packard, Model No. 85650A, S/N 1532A03198. Calibration date: July 7, 1999. Calibration due date: July 7, 2000.
4. Temperature Chamber Thermotron Corp S-1.2 Mini Max 11899. Calibration date: March 29, 1999. Calibration Due: March 29, 2000.

VIDEO BANDWIDTH AND RESOLUTION BANDWIDTH SETTINGS:

Frequency Range	Signal Analyzer VBW & RBW Setting
2152MHz – 2159MHz	1MHz

TEST DATA:

LO 2278.000MHz, Counter is reading the LO. Unable to check Low and High channels, EUT unable to produce unmodulated signal at those frequencies and the counter will not read the modulated signal of the fundamental.

FCC Part 21.101 - Frequency Specification is +/-1kHz. We would like to request a frequency tolerance of +/- 10kHz. The +/- 10kHz is stated in the manufacturers specification. As reference, a previous grant was issued to FCC ID: J26520001-2.

Measured Reading	Frequency Error(Hz)	LIMIT (**Hz**)
-20°C LIMIT		
f +V = 2.278006200 GHz	6200	1000
V = 2.278005800 GHz	5800	1000
-V = 2.278006100 GHz	6100	1000
-10°C		
f +V = 2.278006500 GHz	6500	1000
V = 2.278006500 GHz	6500	1000
-V = 2.278006600 GHz	6600	1000
0°C		
f +V = 2.278005600 GHz	5600	1000
V = 2.278005500 GHz	5500	1000
-V = 2.278005400 GHz	5400	1000
+10°C		
f +V = 2.278003500 GHz	3500	1000
V = 2.278003700 GHz	3700	1000
-V = 2.278003900 GHz	3900	1000
+20°C		
f +V = 2.278001500 GHz	1500	1000
V = 2.278001700 GHz	1700	1000
-V = 2.278001800 GHz	1800	1000
+30°C		
f +V = 2.278000400 GHz	400	1000
V = 2.278000500 GHz	500	1000
-V = 2.278000600 GHz	600	1000
+40°C		
f +V = 2.278000400 GHz	400	1000
V = 2.278000400 GHz	400	1000
-V = 2.278000200 GHz	200	1000
+50°C		
f +V = 2.278002100 GHz	2100	1000
V = 2.278002000 GHz	2000	1000
-V = 2.278001400 GHz	1400	1000