2002 Valley Highway PO Box 3 Acme WA 98220-0003
phone:888 226-3837 fax: 360 595-2722

FCC PART 101
TEST REPORT

DEVICE: TRANSMITTER

MODEL: CCU4

MANUFACTURER: ITRON, INC.

ADDRESS: 2818 NORTH SULLIVAN ROAD,
PO BOX 15288,
SPOKANE, WA 99215

WORK ORDER: 02-EMC-0613-0269

1. General

1.1 Document History

REVISION	DATE	COMMENTS
-	30 July 2002	Initial Release, Harry H. Hodes
A	20 August 2002	Addition of Substitution Method Radiated Spurious Emissions Test Data

Note: Acme Testing Co. hereby makes the following statements so as to conform with Chapter 10 (Test Reports) Requirement of ANSI C63.4:1992 "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

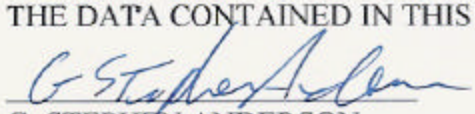
- The units described in this report were received at Acme Testing Co.'s facilities on 13 June 2002. Testing was performed on the units described in this report on 13, 28, 29 & 30 June 2002, and 19 August 2002.
- The Test Results reported herein apply only to the Units actually tested, and to substantially identical Units.
- This test report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government, or any other foreign government.

This document is the property of Acme Testing, Co., and shall not be reproduced, except in full, without prior written approval of Acme Testing Co. However, all ownership rights are hereby returned unconditionally to Itron, Inc., and approval is hereby granted to Itron, Inc. and its employees and agents to reproduce all or part of this report for any legitimate business purpose without further reference to Acme Testing Co.

1.2 Purpose

The purpose of this report is to demonstrate the compliance of the Transmitter, Model CCU4 to the FCC Rules (i.e. 47CFR Parts 2 & 101). This report references the applicable electromagnetic emissions requirements.

THE DATA CONTAINED IN THIS REPORT WAS COLLECTED AND COMPILED BY:



G. STEPHEN ANDERSON
EMC TECHNICIAN

1.3 Manufacturer

Company Name:	Itron, Inc.
Contact:	Dave Beliveau
Street Address:	2818 North Sullivan Road
Mailing Address:	PO Box 15288
City/State/Zip:	Spokane WA 99215-5288
Telephone:	509 924-9900
Fax:	509 891-3355
E-mail:	dave.beliveau@itron.com
Web:	www.itron.com

1.4 Test location

Laboratory:	Test Site #2
Street Address:	2002 Valley Highway
Mailing Address:	PO Box 3
City/State/Zip:	Acme WA 98220-0003
Telephone:	888 226-3837
Fax:	360 595-2722
E-mail:	acmetest@acmetesting.com
Web:	www.acmetesting.com

1.5 Accreditations and Listings

Acme Testing Co.'s test facilities are accredited by A2LA for a specific scope of accreditation which includes the tests detailed herein, under Certificate Numbers: 0829-01 (Acme, WA), and 0829-02 (Plummer, ID). Acme Testing Co.'s test facilities that are used to perform radiated and conducted emissions are currently registered with the Federal Communications Commission under registration numbers: 90420 (Acme, WA), and 96502 (Plummer, ID). In addition, Acme Testing Co.'s test facilities are also registered with the Industry Canada under registration numbers: IC3251 (Acme, WA), and IC3618 (Plummer, ID).

2. Test Results Summary

Summary of Test Results
Transmitter, Model CCU4

47 CFR Section No:	Test Criteria	Status
2.1046*	RF Power Output (Per 47CFR Part 101, Section 101.113)	Complied
2.1049	Occupied Bandwidth (Per 47 CFR Part 101, Section 101.111 (a) (5))	Complied
2.202 (c) (4)	Necessary Bandwidth (Per 47 CFR Part 101, Sections 101.109 & 101.147)	Complied
2.1051	Spurious Emission at Antenna Terminals (Per 47 CFR Part 101, Section 101.111 (a) (5) (iv))	Complied
2.1053	Field Strength of Spurious Radiation (Per 47 CFR part 101 Section 101.111 (a) (5) (iv))	Complied
2.1055	Frequency Stability (Per 47 CFR part 101 Section 101.107 (a))	Complied
1.1310	Radio Frequency Exposure (Per 47 CFR part 1 Section 1.1310)	Complied
15.107	AC Line Conducted Emissions (Per 47 CFR Part 15 Section 15.107)	Complied

The signed original of this report, supplied to the client, represents the only "official" copy. Retention of any additional copies (electronic or non-electronic media) is at Acme Testing Co.'s discretion to meet internal requirements only. The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.

Consistent with Industry practice, measurement and test equipment not directly involved in obtaining measurement results but having an impact on measurements (such as cable loss, antenna factors, etc.) is factored into the "Correction Factor" documented in certain test results. Instrumentation employed for testing meets tolerances consistent with known Industry Standards and Regulations.

The measurements contained in this report were made in accordance with the referenced standards. Acme Testing Co. assumes responsibility only for the accuracy and completeness of this data as it pertains to the sample tested.

REVIEWED AND APPROVED BY:

Harry H. Hodes
President/CEO
Principal EMC Engineer

20 AUGUST 2002
Date of Issuance

3. Description of Equipment and Peripherals

3.1 Equipment Under Test (EUT)

Device:	Non Broadcast "Wake Up" Transmitter
Model Number:	CCU4 (Cell Control Unit 4)
Serial Number:	6805-0011
FCC ID:	E09FNCCU4
Input Power:	120V/60 Hz (Internal Backup Battery: 16 VDC, 2.5 AH)
Grounding:	None
Size of EUT:	10.3 inches (26.2 cm) x 10.3 inches (26.2 cm) x 7.8 inches (19.8 cm)
Output Power (Nominal):	1.6 Watts (+32.1 dBM)
Antennas:	Omni-Directional Vertical Polarized, Base-fed dipole encased in a capped PVC Pipe, Type "N" connector at base, nominal gain 0dBd (2.14 dBi)
Transmit Frequency Range:	952 – 957 MHz
Receive Frequency Range:	908 – 924 MHz
Modulation:	1K58A1D

Usage: Automatic Interrogation, as follows:

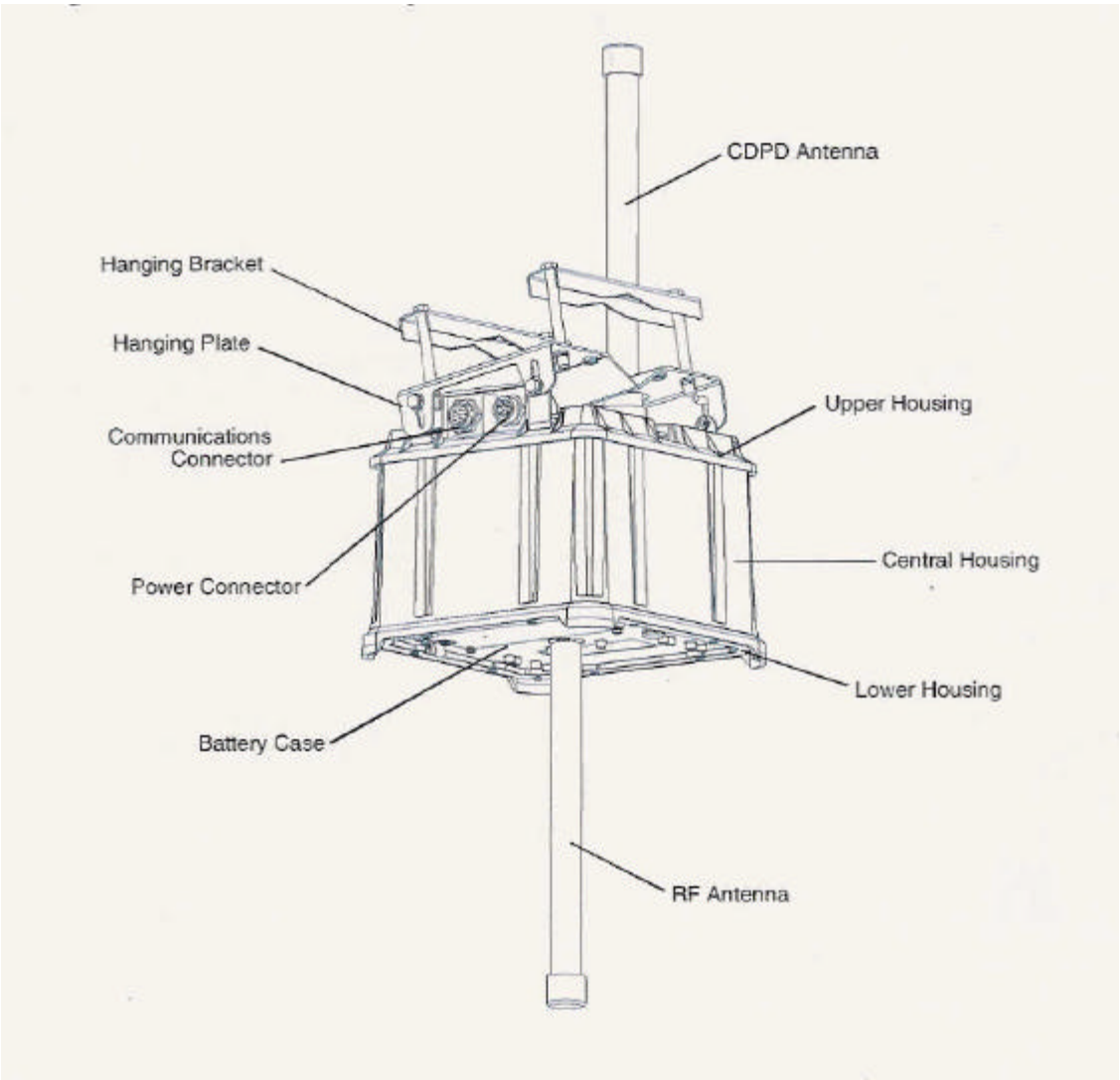
For Automatic Meter Reading (AMR), the CCU4 collects data directly from Itron ERT modules installed on meters. The CCU4 temporarily stores the metering-based data and forwards it to a host processor via the Wide Area Network (WAN). The CCU4 is designed with modularity in mind, allowing multiple types of WAN connections including Cellular Digital Packet Data (CDPD.

The CCU4 is typically mounted on a power pole or street light in a position that provides clear radio signals to both the meter modules and the WAN. The CCU4 gathers readings that are processed according to application parameters assigned at the head end. The CCU4 communicates with ERT meter modules via radio frequency in the 900 MHz band (952 – 957 MHz transmit, 908 – 924 MHz receive). The CCU4 collects data within its communications area continuously from ERTs that "bubble up" meter data on a pre-programmed interval, or on a scheduled basis for ERT modules that require a transmitted request-to-send or "wake-up" signal.

The CCU4 provides network operators with a high degree of flexibility. The rules and parameters for processing the data can be assigned to each individual ERT Module. The CCU4 manages the collection, processing, and storage of the ERT data from all ERT Modules. The data is stored in the CCU4 until the configurable prescheduled push time, or until a special request from the head end applications is received. Asynchronous events, such as outage alarms, are processed as they occur.

The CCU4 collector's modular design consists of a number of components fixed together to form a single weatherproof device. The rugged, adjustable mounting bracket secures the device in high winds and under heavy ice loads. Electrical components are designed into a plastic enclosure that provides double insulation and a high level of safety while handling the device. All electrical connections from the collector are fully isolated, meaning it does not require a connection to earth ground.

If data is transferred over a wireless cellular public network, the collector requires only a power connection. If data is transferred over a land-based public network, a telephone line or Ethernet connection is also required.



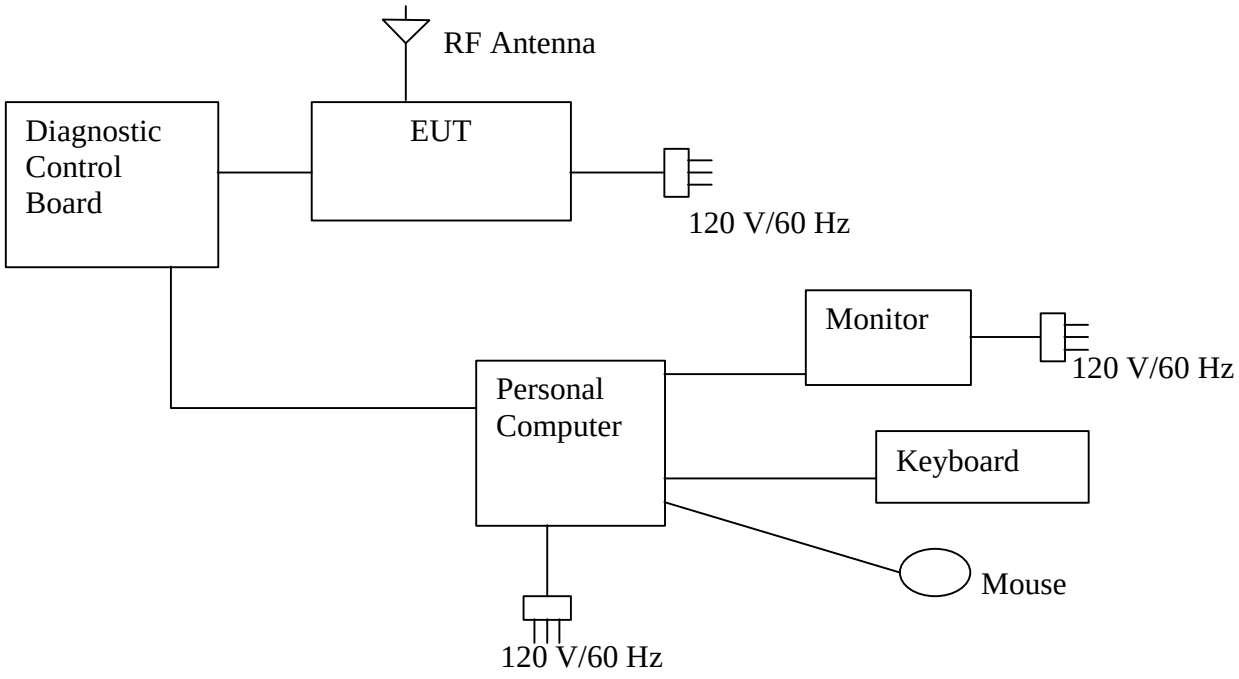
This test report (and the associated application for FCC Certification under Part 101) addresses the 952-956 MHz Transmitter (and the 910 – 920 MHz Receiver, which shares the RF antenna with the Transmitter) [see the figure above].

Note: The CDPD Modem Radio and its CDPD Antenna are already FCC Approved (FCC ID # N7NOEM2).

3.2 Support Equipment Used During Testing

Device	Manufacturer	Model Number	FCC ID	Serial Number
Personal Computer	Dell	D333	None	EVORP
Monitor	Gateway2000	500CS	BEJCS587W	15006A023726
Mouse	Microsoft Corp.	66915	C3KSMP3	00255258
Keyboard	Micron	RT5158TW	AQ6-8215	A08706Q3
Diagnostic Control Board	Itron	None	None	None

3.3 Test Setup Block Diagram



3.4 Description of Interface Cables Used During Testing

EUT/Diagnostic Control Board (Ribbon Cable)

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	Yes	No	0.33 m	No

Diagnostic Control Board/Computer (9 Pin Serial Cable)

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	No	Yes	8 m	No

Personal Computer/Keyboard

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	No	Yes	1.5 m	No

Personal Computer/Mouse

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	No	Yes	2 m	No

Personal Computer/Monitor

Shielded	Unshielded	Flat	Round	Length	Ferrite
Yes	No	No	Yes	1.8 m	Yes

EUT/AC Mains Input Power (120 V/60 Hz)

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	No	Yes	1.5 m	No

Personal Computer/AC Mains Input Power (120 V/60 Hz)

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	No	Yes	1.5 m	No

Monitor/AC Mains Input Power (120 V/60 Hz)

Shielded	Unshielded	Flat	Round	Length	Ferrite
No	Yes	No	Yes	1.5 m	No

Note: The RF Antenna mounts directly onto the CCU4 housing via weatherized type “N” connectors. No coaxial cable feedline is used.

ARRANGEMENT OF INTERFACE CABLES: All interface cables were positioned for worst-case maximum emissions with the normal operation conditions.

3.5 EUT Peripherals

None. The EUT was tested as a stand-alone device.

3.6 Modifications Required for Compliance

None.

4. Power in Final Stages

It is not possible to directly measure the transmitter final stage Current & Voltage setting. However, the transmitter uses a Continuously Operating Closed Loop Power Output Control System, whose setpoint is downloaded into the CCU Microcontroller firmware at the factory.

5. RF Power Output

Date of Test: 29 June 2002

5.1 Test Requirement

Sec. 2.1046 Measurements required: RF power output.

(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in Sec. 2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.

5.2 Test Technical Standard

Sec. 101.113 Transmitter power limitations.

(a) On any authorized frequency, the average power delivered to an antenna in this service must be the minimum amount of power necessary to carry out the communications desired. Application of this principle includes, but is not to be limited to, requiring a licensee who replaces one or more of its antennas with larger antennas to reduce its antenna input power by an amount appropriate to compensate for the increased primary lobe gain of the replacement antenna(s). In no event shall the average equivalent isotropically radiated power (EIRP), as referenced to an isotropic radiator, exceed the values specified below. In cases of harmful interference, the Commission may, after notice and opportunity for hearing, order a change in the effective radiated power of this station. Further, the output power of a transmitter on any authorized frequency in this service may not exceed the following:

Frequency Band (MHz)	Maximum allowable EIRP [1, 2]	
	Fixed	Mobile
	(dBW)	(dBW)
952.0 to 960.0 [2]	+40	-

1) Per polarization
2) For multiple address operations, see Sec. 101.147. Remote alarm units that are part of a multiple address central station protection system are authorized a maximum of 2 watts.

5.3 Test Procedure

TIA/EIA-603:1993 Section 2.2.1

5.4 Test equipment

⇒ Synthesized Signal Generator (100 kHz – 2.5 GHz): Hewlett Packard 8663A, Serial Number 2552A00775, Calibrated: 16 May 2002, Calibration Due Date: 16 May 2003

⇒ 10 W/20 dB (DC – 18 GHz) Attenuator: Pasternack PE 7015-20, Serial Number 121101, Calibrated: 08 November 2001, Calibration Due Date: 08 November 2002

⇒ Precision Attenuator (DC – 18 GHz): Weinschel AS-18/20 dB, Serial Number 665, Calibrated: 16 October 2001, Calibration Due Date: 16 October 2002

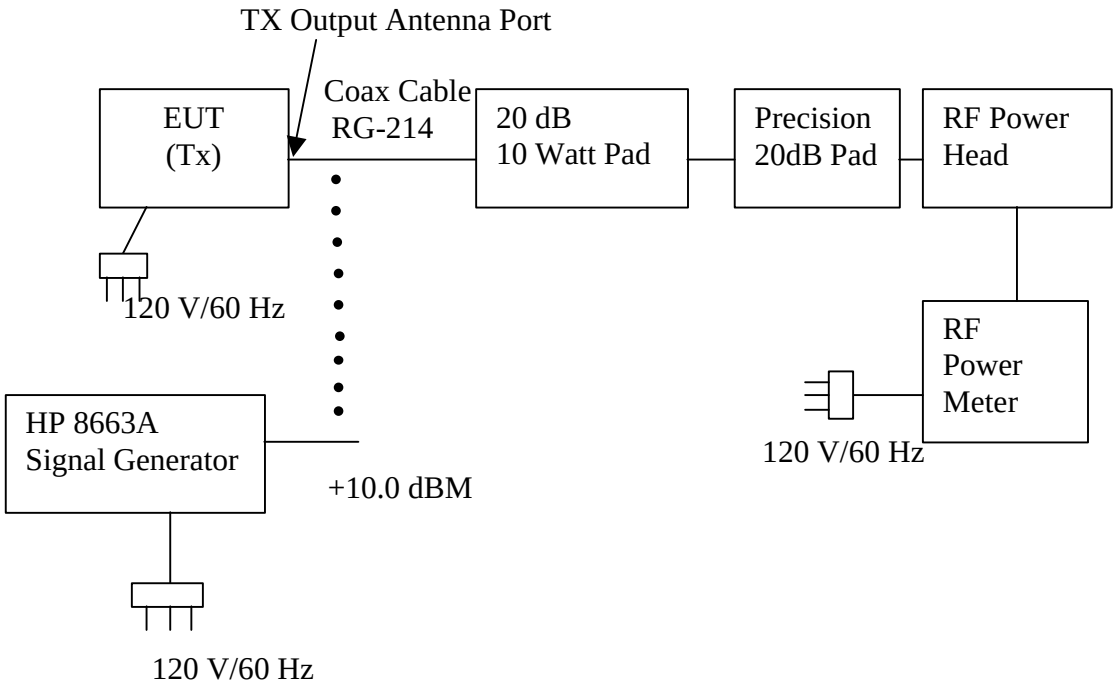
⇒ Peak Power Sensor: Rhode & Schwarz NRV-Z32/1031.6807.05, Serial Number 836019/023, Calibrated: 15 June 2000, Calibration Due Date: 15 June 2003

⇒ Power Meter Display Unit: Rhode & Schwarz NRVS/1020.1809.02, Serial Number 834432/074, Calibrated: 05 May 2000, Calibration Due Date: 05 March 2003

⇒ RF Power Head: Amplifier Research PH2000, Serial Number 301199, Calibrated: 19 June 2001, Calibration Due Date: 19 October 2002

⇒ RF Power Meter: Amplifier Research PM 2002, Serial Number 301552, Calibrated: 19 June 2001, Calibration Due Date: 19 October 2002

5.5 Test Setup Block Diagram

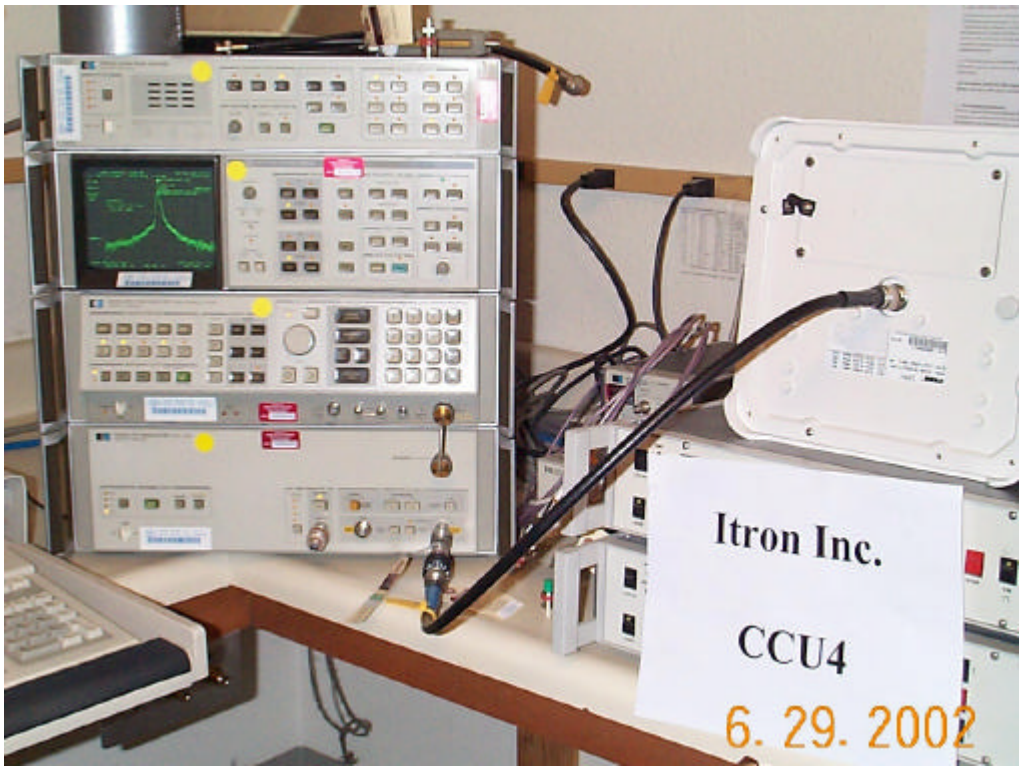


5.6 Test Results

1. Measured Power with TX Modulation "ON" through the above RF Connections was: -8.20 dBm
2. Measured Power with +10.0 dBm modulation signal out through the above RF Connections was: -30.27 dBm
3. Insertion Loss through the above RF Connections:
   +10.0 dBm – (-30.27 dBm) = + 40.27 dB Insertion Loss
4. Measured RF Power Output of Transmitter with TX Modulation "ON":
   -8.20 dBm + 40.27 dB = + 32.07 dBm = 1.611 Watts
5. EIRP:
   +32.07 dBm + 2.14 dBi = + 34.21 dBm = + 4.21 dBW

The EUT complied with the Transmitter Power Limitation requirement of 47 CFR Part 101 Section 101.113.

5.7 Test Setup Photographs



2002 Valley Highway PO Box 3 Acme WA 98220-0003
phone:888 226-3837 fax: 360 595-2722

6. Occupied Bandwidth

Date of Test: 29 June 2002

6.1 Test Requirement

Sec. 2.1049 Measurements required: Occupied bandwidth

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:

(h) Transmitters employing digital modulation techniques--when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at the discretion of the user.

6.2 Test Technical Standard

Sec. 101.111 (a) (5) Emission limitations

When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a 12.5 kHz bandwidth, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:

(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 2.5 kHz up to and including 6.25 kHz: At least 53 log (fd/2.5) decibels;

(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 6.25 kHz up to and including 9.5 kHz: At least 103 log (fd/3.9) decibels;

(iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in kHz) of more than 9.5 kHz up to and including 15 kHz: At least 157 log (fd/5.3) decibels; and

(iv) On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 kHz: At least 50 plus 10 log P or 70 decibels, whichever is the lesser attenuation.

6.3 Test Procedure

TIA/EIA-603:1993 Section 2.2.11

6.4 Test equipment

⇒ Spectrum Analyzer (yellow): Hewlett-Packard 8566B, Serial Number 2410A00139, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002

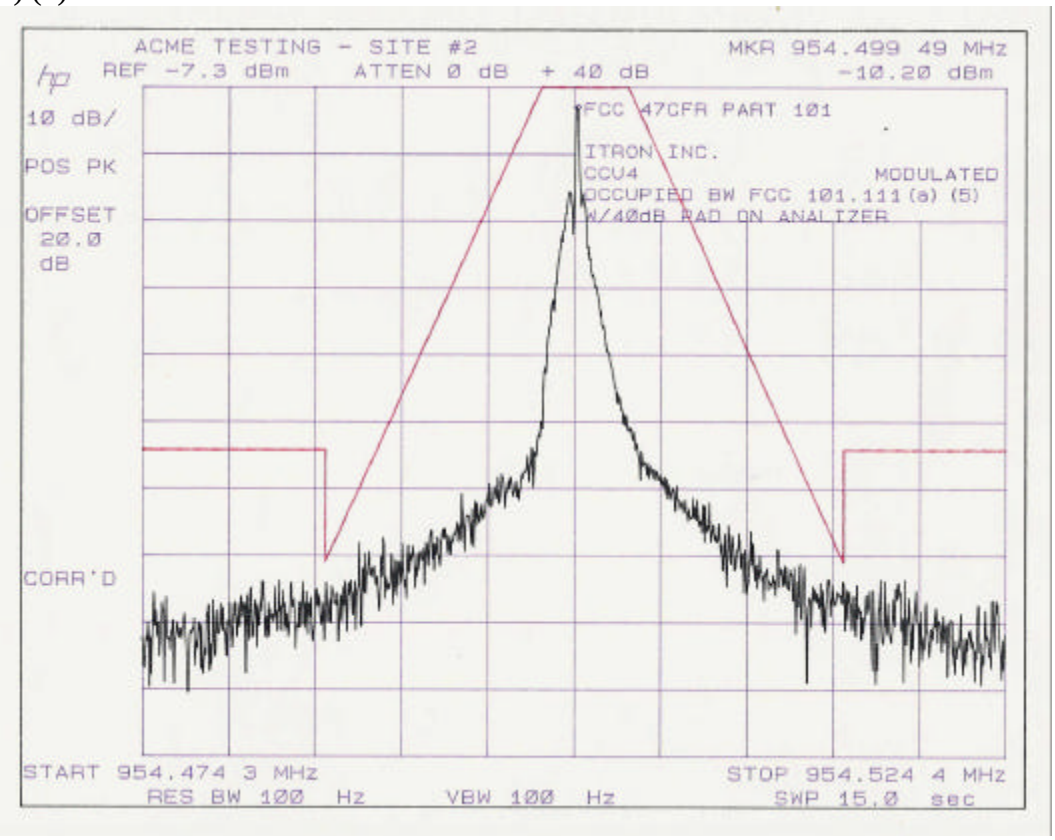
⇒ RF Preselector (yellow): Hewlett-Packard 85685A, Serial Number 2648A00392, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002

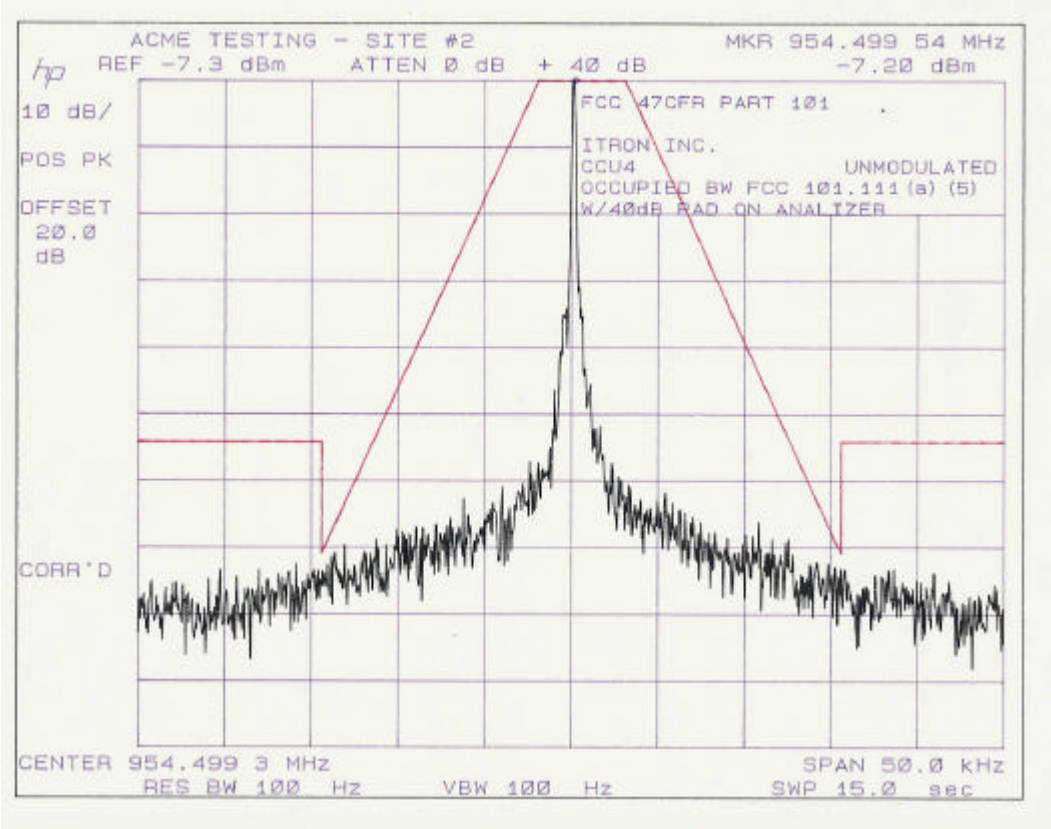
⇒ 10 W/20 dB (DC – 18 GHz) Attenuator: Pasternack PE 7015-20, Serial Number 121101, Calibrated: 08 November 2001, Calibration Due Date: 08 November 2002

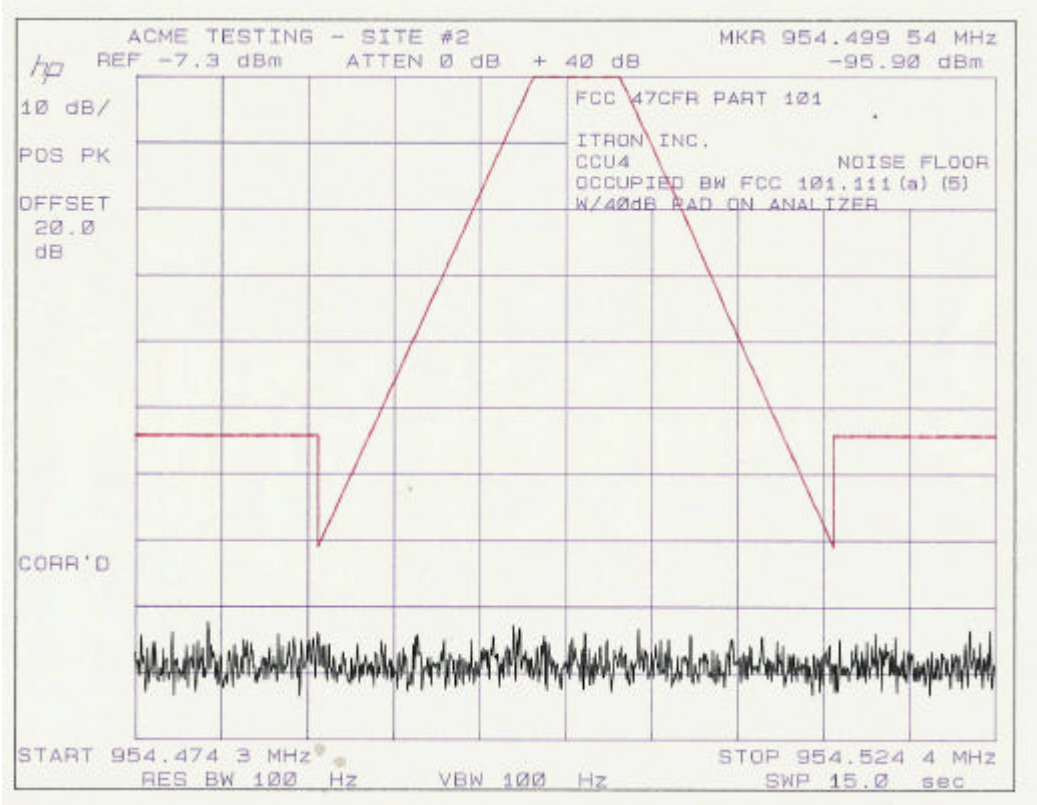
⇒ Precision Attenuator (DC – 18 GHz): Weinschel AS-18/20 dB, Serial Number 665, Calibrated: 16 October 2001, Calibration Due Date: 16 October 2002

6.5 Test Results

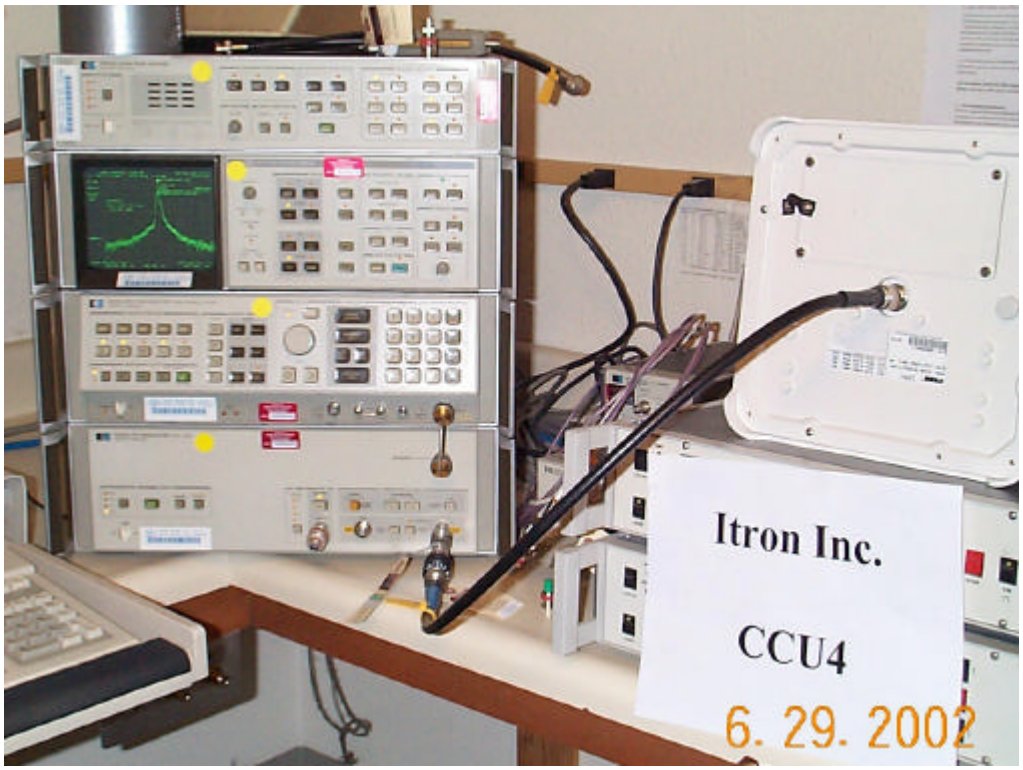
The EUT complied with the Emissions Mask requirements specified in 47CFR Part 101 Section 101.111 (a) (5).




ACME TESTING - SITE #2
MKR 954.499 54 MHz
REF -7.3 dBm
ATTEN 0 dB + 40 dB
-7.20 dBm
10 dB/
POS PK
OFFSET
20.0
dB
FCC 47CFR PART 101
ITRON INC.
CCU4
UNMODULATED
OCCUPIED BW FCC 101.111(a) (5)
W/40dB PAD ON ANALIZER
CORR'D
CENTER 954.499 3 MHz
SPAN 50.0 kHz
RES BW 100 Hz
VBW 100 Hz
SWP 15.0 sec


ACME TESTING - SITE #2
MKR 954.499 54 MHz
REF -7.3 dBm
ATTEN 0 dB + 40 dB
-95.90 dBm
10 dB/
POS PK
OFFSET
20.0
dB
FCC 47CFR PART 101
ITRON INC.
CCU4
NOISE FLOOR
OCCUPIED BW FCC 101.111(a) (5)
W/40dB PAD ON ANALIZER
CORR'D
START 954.474 3 MHz
STOP 954.524 4 MHz
RES BW 100 Hz
VBW 100 Hz
SWP 15.0 sec

6.6 Test Setup Photographs



7. Calculation or Measurement of Necessary Bandwidth

7.1 Test Requirement

It is not possible to calculate necessary bandwidth in accordance with 47CFR Part 2 Section 2.202 (c) (1), (2), or (3). Therefore, per Section 2.202 (c) (4) the actual 99 percent bandwidth was required to be measured.

7.2 Test Technical Standards

Section 101.109 Bandwidth (and Section 101.147 Frequency Assignments)

(a) Each authorization issued pursuant to these rules will show, as the emission designator, a symbol representing the class of emission which must be prefixed by a number specifying the necessary bandwidth. This figure does not necessarily indicate the bandwidth actually occupied by the emission at any instant. In those cases where part 2 of this chapter does not provide a formula for the computation of the necessary bandwidth, the occupied bandwidth may be used in the emission designator.

(b) Stations in this service will be authorized any type of emission, method of modulation, and transmission characteristic, consistent with efficient use of the spectrum and good engineering practice, except that Type B, damped-wave emission will not be authorized.

(c) The maximum bandwidth which will be authorized per frequency assigned is set out in the table that follows. Regardless of the maximum authorized bandwidth specified for each frequency band, the Commission reserves the right to issue a license for less than the maximum bandwidth if it appears that a lesser bandwidth would be sufficient to support an applicant's intended communications.

Frequency Band (MHz)	Maximum authorized bandwidth
952 to 960	200 kHz Footnotes 1,5,6

Footnotes:

1. The maximum bandwidth that will be authorized for each particular frequency in this band is detailed in the appropriate frequency table in Sec. 101.147. If contiguous channels are aggregated in the 928 – 928.85/952 – 952.85/956.25-956.45 MHz, the 928.85 – 929/959.85-960 MHz, or the 932 – 932.5/941-941.5 MHz bands, then the bandwidth may exceed that which is listed in the table.
5. A 12.5 kHz bandwidth applies only to frequencies listed in Sec. 101.147 (b) (1) through (4).
6. For frequencies listed in Section 101.147 (b) (1) through (4), consideration will be given on a case-by-case basis to authorizing bandwidths up to 50 kHz.

7.3 Test Procedure

TIA/EIA-603:1993 Section 2.2.11

7.4 Test equipment

⇒ Spectrum Analyzer (yellow): Hewlett-Packard 8566B, Serial Number 2410A00139, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002

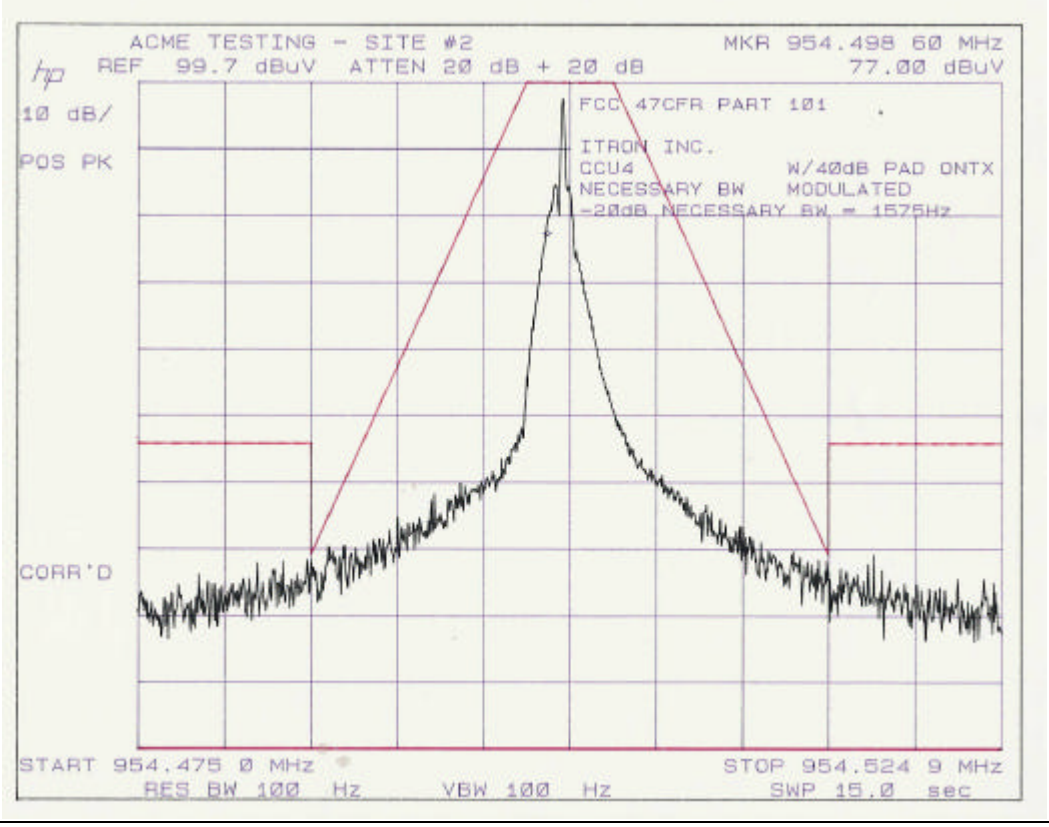
⇒ RF Preselector (yellow): Hewlett-Packard 85685A, Serial Number 2648A00392, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002

⇒ 10 W/20 dB (100 kHz to 22 GHz) Attenuator: Pasternack PE 7015-20, Serial Number 121101, Calibrated: 08 November 2001, Calibration Due Date: 08 November 2002

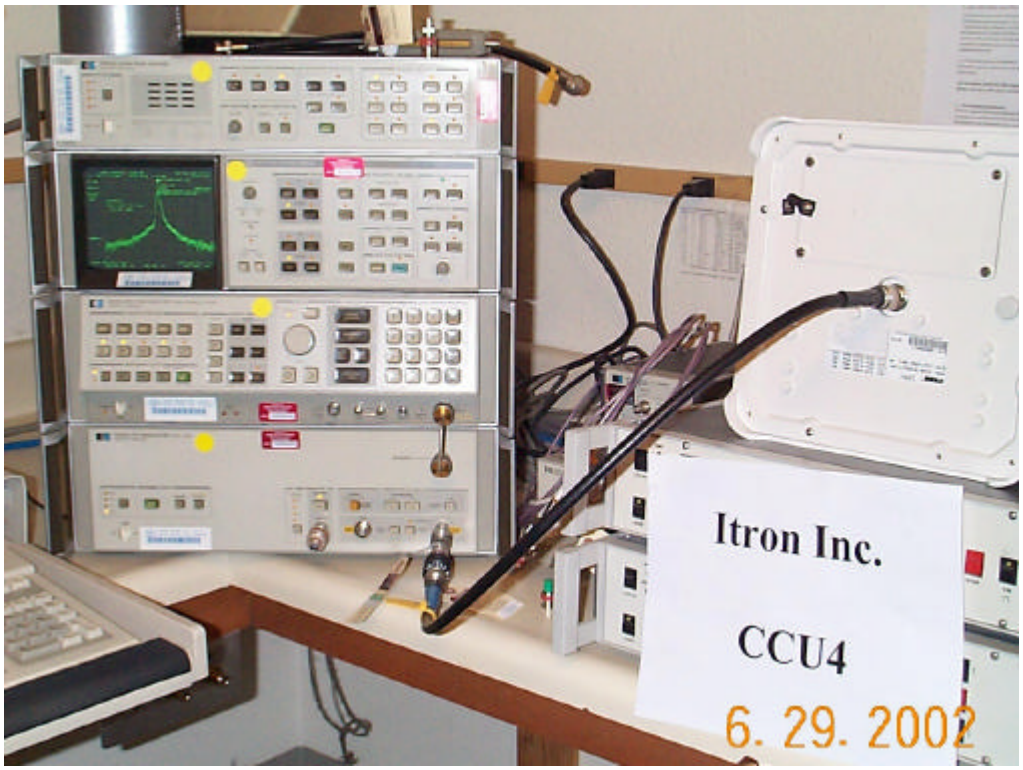
⇒ Precision Attenuator: Weinschel AS-18/20 dB, Serial Number 665, Calibrated: 16 October 2001, Calibration Due Date: 16 October 2002

7.5 Test Results

The measured 99% (-20 dB) Bandwidth was 1,575 Hz. The EUT complied with Necessary Bandwidth limitations in 47 CFR Part 101, Sections 101.109 and 101.147. (These limitations are 200 kHz and 12.5 kHz, respectively).



7.6 Test Setup Photographs



8. Spurious Emission At Antenna Terminals

8.1 Test Requirement

Sec. 2.1051 Measurements required: Spurious emissions at antenna terminals

The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in Sec. 2.1049 as appropriate. The magnitude of spurious emissions, which are attenuated more than 20 dB below the permissible value, need not be specified.

8.2 Test Technical Standard

Sec. 101.111 (a) (5) (iv) Emission limitations

On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 kHz: At least 50 plus 10 log P or 70 decibels, whichever is the lesser attenuation.

8.3 Test Procedure

TIA/EIA-603:1993 Section 2.2.13

8.4 Test equipment

⇒ Spectrum Analyzer (yellow): Hewlett-Packard 8566B, Serial Number 2410A00139, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002

⇒ RF Preselector (yellow): Hewlett-Packard 85685A, Serial Number 2648A00392, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002

⇒ 1 GHz to 26 GHz Preamplifier: Hewlett Packard HP8449B/H02, Serial Number 2933A00198, Calibrated: 03 May 2001, Calibration Due Date: 03 May 2003

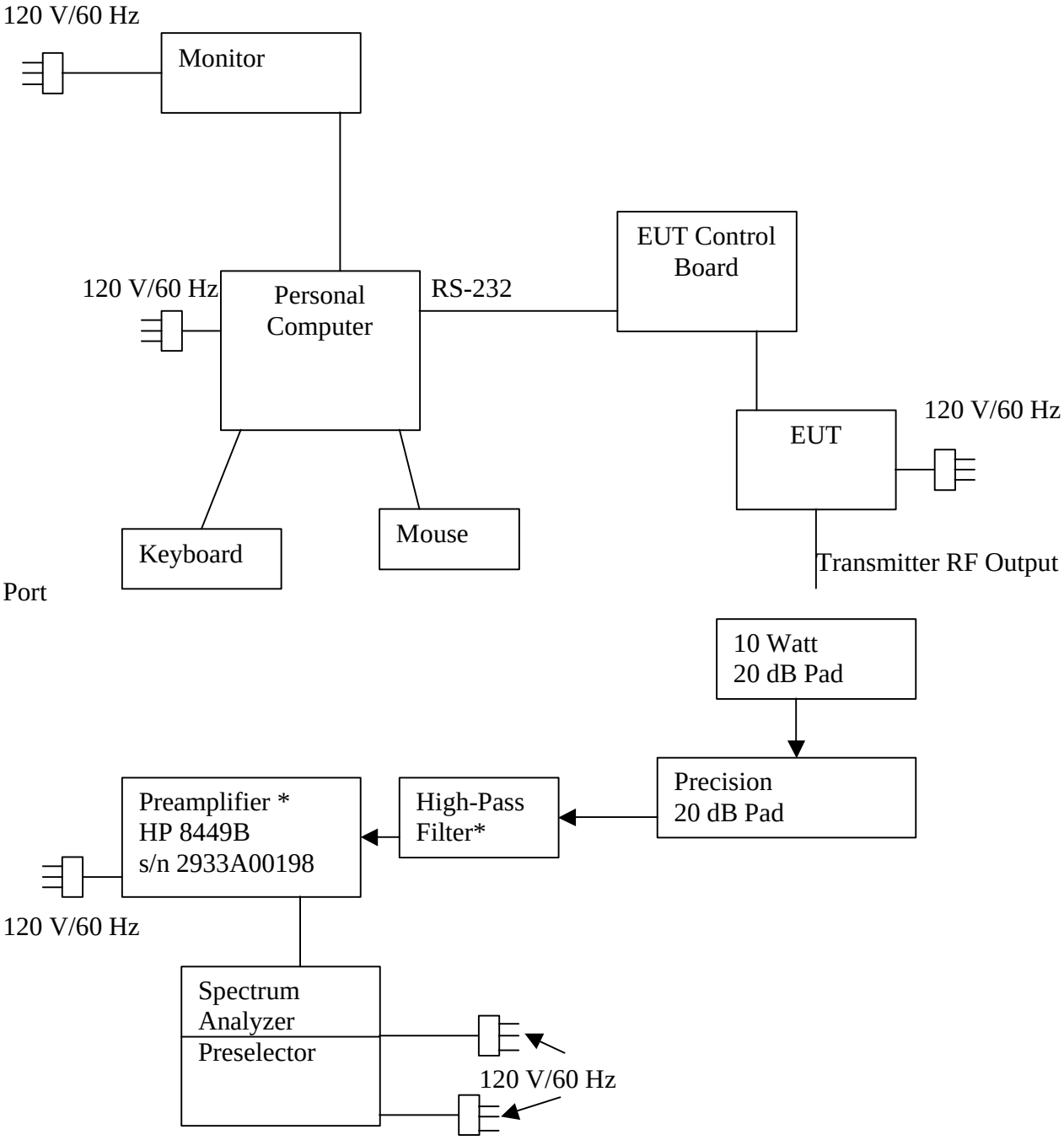
⇒ 10 W/20 dB (100 kHz to 22 GHz) Attenuator: Pasternack PE 7015-20, Serial Number 121101, Calibrated: 08 November 2001, Calibration Due Date: 08 November 2002

⇒ Precision Attenuator: Weinschel AS-18/20 dB, Serial Number 665, Calibrated: 16 October 2001, Calibration Due Date: 16 October 2002

⇒ 2 GHz High Pass Filter: Microphase Model # CR220 HIB, Serial Number: 1119, Calibrated: 22 October 2001, Calibration Due Date: 22 October 2002

⇒ 4 GHz High Pass Filter: Microphase Model # HB5000AB, Serial Number: 560, Calibrated: 22 October 2001, Calibration Due Date: 22 October 2002

8.5 Test Setup Block Diagram



* Used for f>2 GHz

Spectrum Analyzer Settings:
Reference Level = -30.0 dBm
Resolution Bandwidth = Video Bandwidth = 100 kHz
Span = 1.0 MHz (when examining a Spurious Emission)
Attenuator Settings: 0dB and 0dB (Mainframe and Preselector)
40 dB total Pad on EUT (Transmitter RF Output)

8.6 Test Results

Calculation of Limit

$10*\log_{10}(1.611 \text{ Watts}) - (50 + 10*\log_{10}(1.611 \text{ Watts})) = - 50 \text{ dBW or } -20 \text{ dBm}$

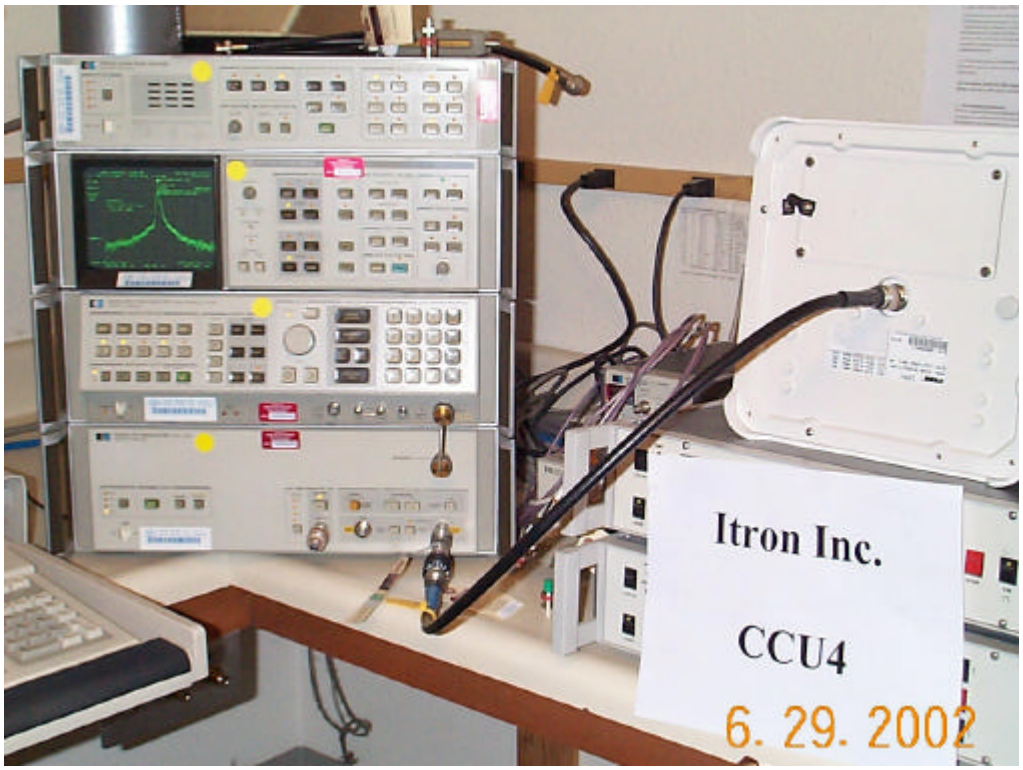
SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS

Frequency (MHz)	Raw Measured Signal (dBm)	Pads, Filters and Cable Losses (dB)	Corrected Measurement (dBm)	Limit of Spurious Emission (dBm)	Delta to Limit of Spurious Emissions (dB)
1908.983	-62.7	-26.6	-36.1	-20.0	-16.1
2863.5	-68.9	-7.07	-61.8	-20.0	-41.8
3818.006	-51.9	-9.14	-42.8	-20.0	-22.8
4772.5	-31.8	-9.6	-22.2	-20.0	-2.2
5727.0	-48.2	-10.73	-37.5	-20.0	-17.5
6681.5	-79.6*	-11.17	-68.4	-20.0	-48.4
7636.0	-37.4	-12.35	-25.0	-20.0	-5.0
8590.5	-56.1	-13.73	-42.4	-20.0	-22.4
9537.0	-76.1*	-14.0	-65.1	-20.0	-45.1

* Noise floor

The EUT complied with the Spurious Emissions at the antenna terminals limits specified in 47 CFR Part 101, Section 101.111 (a) (5) (iv).

8.7 Test Setup Photographs



9. Field Strength of Spurious Radiation

9.1 Test Requirement

Sec. 2.1053 Measurements required: Field strength of spurious radiation

(a) Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation. Curves or equivalent data shall be supplied showing the magnitude of each harmonic and other spurious emission. For this test, single sideband, independent sideband, and controlled carrier transmitters shall be modulated under the conditions specified in paragraph (c) of Sec. 2.1049, as appropriate. For equipment operating on frequencies below 890 MHz, an open field test is normally required, with the measuring instrument antenna located in the far-field at all test frequencies. In the event it is either impractical or impossible to make open field measurements (e.g. a broadcast transmitter installed in a building) measurements will be accepted of the equipment as installed. Such measurements must be accompanied by a description of the site where the measurements were made showing the location of any possible source of reflections which might distort the field strength measurements. Information submitted shall include the relative radiated power of each spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from halfwave dipole antennas.

(b) The measurements specified in paragraph (a) of this section shall be made for the following equipment:

(1) Those in which the spurious emissions are required to be 60 dB or more below the mean power of the transmitter.
(2) All equipment operating on frequencies higher than 25 MHz.
(3) All equipment where the antenna is an integral part of, and attached directly to the transmitter.
(4) Other types of equipment as required, when deemed necessary by the Commission.

9.2 Test Technical Standard

Sec. 101.111 (a) (5) (iv) Emission limitations

On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 kHz: At least 50 plus 10 log P or 70 decibels, whichever is the lesser attenuation.

9.3 Test Procedure

TIA/EIA-603:1993 Section 2.2.12

CALCULATION OF RADIATED POWER LIMIT

All emissions below 1000 MHz are expressed in terms of the equivalent power that would have to be fed into a dipole antenna in order to produce the same electric field strength. All emissions above 1000 MHz are expressed in terms of equivalent isotropic power. The equivalent power was determined by using the following formula: $P_t = E^2R^2/30\ G$

For the EUT, the output power of the transmitter was 1.611 Watts = 2.07 dBW.

The minimum attenuation is 50 + l0 Log 1.61 = 52.07 dBW, so the maximum power of any spurious emission must not exceed 2.07 dBW – 52.07 dBW = - 50 dBW = - 20 dBm = 0.01 mW

Using the above relation, we have E = $\sqrt{(30 * G * P)}$/R

For Spurious Emissions on frequencies which are less than or equal to 1000 MHz:
G =1.64 and E = $\sqrt{}$ (30 x 1.64 x 0.01 x 10^{-3}) / 3 = 7.4 mV/m
= 77.3 dBuV/m

Therefore, the electric field strength of Spurious Emissions on frequencies less than or equal to 1000 MHz must not exceed 77.3 dBuV/m at 3m.

Similarly, for Spurious Emissions which are on frequencies which are greater than 1000 MHz, G=1, and the field strength must not exceed 75.2 dBµV/m at 3 m.

9.4 Test equipment

⇒ Spectrum Analyzer (yellow): Hewlett-Packard 8566B, Serial Number 2410A00139, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002
⇒ RF Preselector (yellow): Hewlett-Packard 85685A, Serial Number 2648A00392, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002
⇒ Quasi Peak Adapter (yellow): Hewlett-Packard 85650A, Serial Number 2521A00689, Calibrated: 05 September 2001, Calibration Due Date: 05 September 2002
⇒ Preamplifier (1 – 26 GHz): Hewlett-Packard HP 8449B Opt H02, Serial Number: 2933A00198, Calibrated: 05 March 2002, Calibration Due Date: 05 March 2003
⇒ Biconical Antenna (red) (20 MHz to 200 MHz): EMCO 3110, Serial Number 9001-1115, Calibrated: 11 June 2001, Calibration Due Date: 11 August 2002
⇒ Log Periodic Antenna (red) (200 MHz to 1000 MHz): EMCO 3146, Serial Number 9008-2853, Calibrated: 11 June 2001, Calibration Due Date: 11 August 2002
⇒ Double Ridge Guide Horn Antenna: EMCO 3115, Serial Number 9807-5534, Calibrated: 5 September 2001, Calibration Due Date: 05 September 2002
⇒ EUT Turntable Position Controller: EMCO 1061-3M, Serial Number 9003-1441, No Calibration Required
⇒ Antenna Mast with Controller: EMCO 1051, Serial Number 9002-1457, No Calibration Required
⇒ Log Periodic Antenna (1 – 18 GHz): A.H. Systems SAS-200/518, Serial Number 252, No Calibration Required
⇒ Precision Attenuators (6 dB & 10 dB): Weinchel 44, Serial Number 665 (SET), Calibrated: 16 October 2001, Calibration Due Date: 16 October 2002
⇒ High Pass Filter (2 GHz): Microphase CR220HIB, Serial Number 1119, Calibrated: 22 October 2001, Calibration Due Date: 22 October 2002
⇒ Signal Generator (100 kHz – 2.56 GHz): Hewlett Packard 8663A, Serial Number 2552A00775, Calibrated: 16 May 2002, Calibration Due Date: 16 May 2003
⇒ Signal Generator (2.0 – 26.0 GHz): Hewlett Packard 8673B, Serial Number: 2527A00738, Calibrated: 30 April 2001: Calibration Due Date: 30 October 2002

9.5 Test Results

RADIATED EMISSIONS:
FUNDAMENTAL AND SPURIOUS EMISSIONS
FROM CCU4 TRANSMITTER (with Modulation "ON")

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS ABS	dLIM dB	MODE	POL	SITE HGT cm	AZM deg	CORR FACTOR dB
1	954.572	129.5	112.0	-17.4	QP	H	107	360	30.5 (fundamental)
2	954.575	129.5	112.0	-17.4	QP	V	107	360	30.5 (fundamental)
3	1909.02	75.2	58.6	-16.6	PK	V	134	225	17.8
4	2863.48	75.2	25.2	-50.1	PK	V	104	335	-2.2
5	3818.02	75.2	29.2	-46.0	PK	V	104	335	1.9
6	4772.51	75.2	37.5	-37.7	PK	V	101	108	3.1
7	5727.02	75.2	37.3	-37.9	PK	V	104	265	5.5
8	6681.49	75.2	39.4	-35.8	PK	V	112	308	6.4
9	7635.98	75.2	41.8	-33.4	PK	V	147	250	7.8
10	8590.51	75.2	41.5	-33.7	PK	V	101	149	9.0
11	9544.95	75.2	48.1	-27.1	PK	V	104	335	9.6

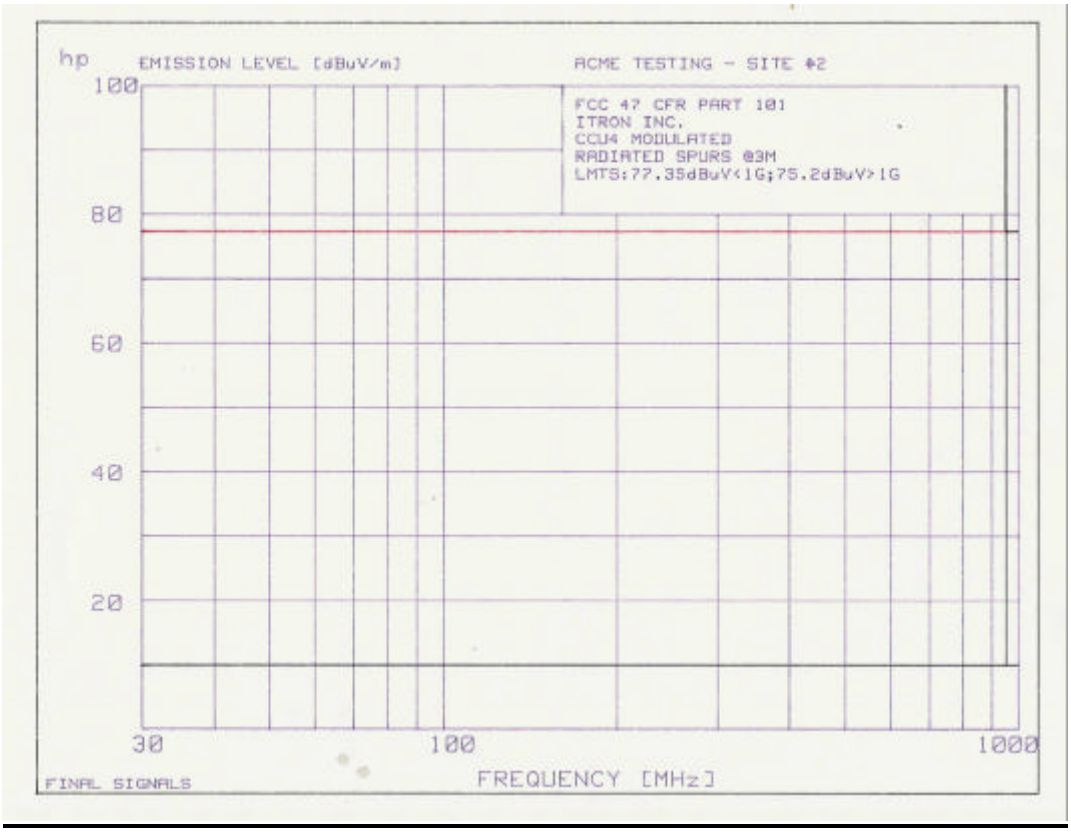
Only the 11 (eleven) highest amplitude radiated emissions are listed above.

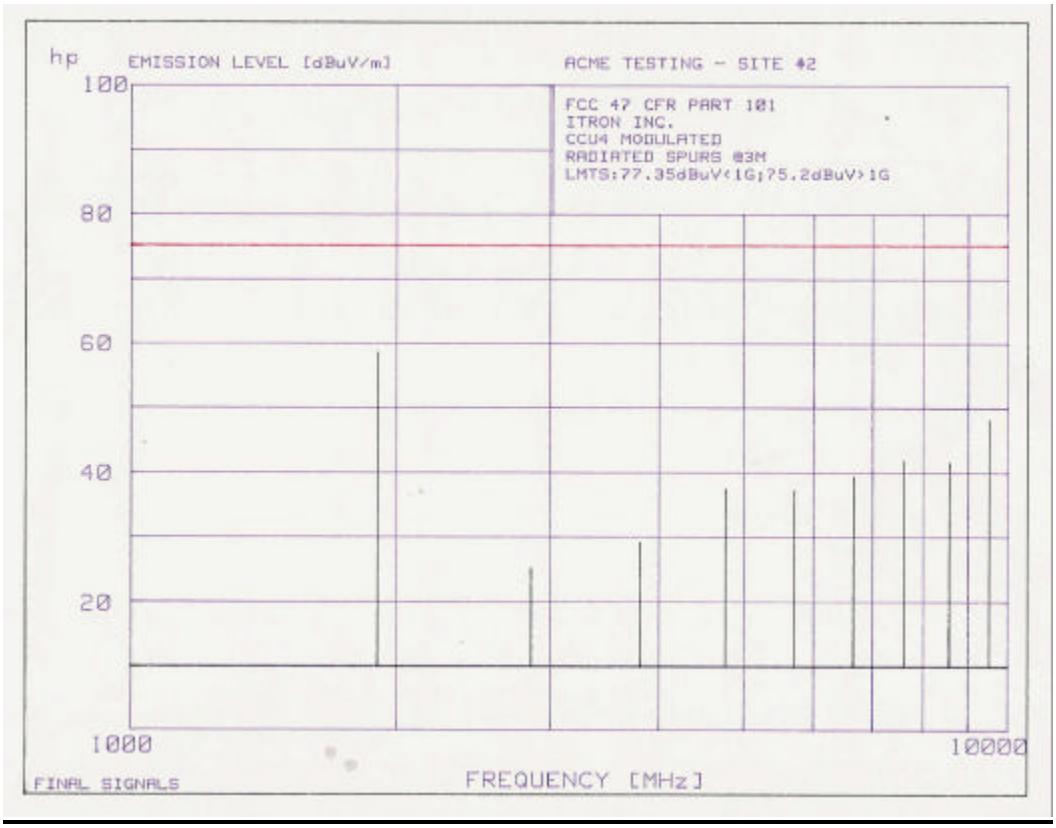
MEASURED EFFECTIVE RADIATED POWER OF SPURIOUS EMISSIONS
FROM CCU4 TRANSMITTER

Frequency of Spurious Emissions MHz	Polarization (H/V)	Received Signal Field Strength (dBµv/m@3m)	[L] Loss from Cables, Impedance Matching Pad, & High Pass Filters (dB)	[G_t] Gain of TX Antenna (dBi)	[P_t] Sig Gen Power Output Setting to Give Field Strength (dBm)	EIRP (dBm)	Effective Radiated Power (ERP) Limit (dBm)	Delta to Limit (dB)
1909.02	V	58.6	19.1	+3.9	-5.0	-20.2	-20.0	-0.2
2863.48	V	25.2	19.8	+5.6	-37.0	-51.2	-20.0	-31.2
3818.02	V	29.2	20.4	+4.3	-55.0	-71.1	-20.0	-51.1
4772.51	V	37.5	21.1	+4.0	-27.0	-44.0	-20.0	-24.0
5727.02	V	37.3	21.7	+4.6	-16.5	-33.6	-20.0	-16.6
6681.49	V	39.4	21.8	+8.0	-27.5	-41.3	-20.0	-21.3
7635.98	V	41.8	22.5	+3.5	-14.0	-33.0	-20.0	-13.0
8590.51	V	41.5	22.7	+3.7	-9.5	-28.5	-20.0	-8.5
9544.95	V	48.1	23.0	+2.2	-11.2	-32.0	-20.0	-12.0

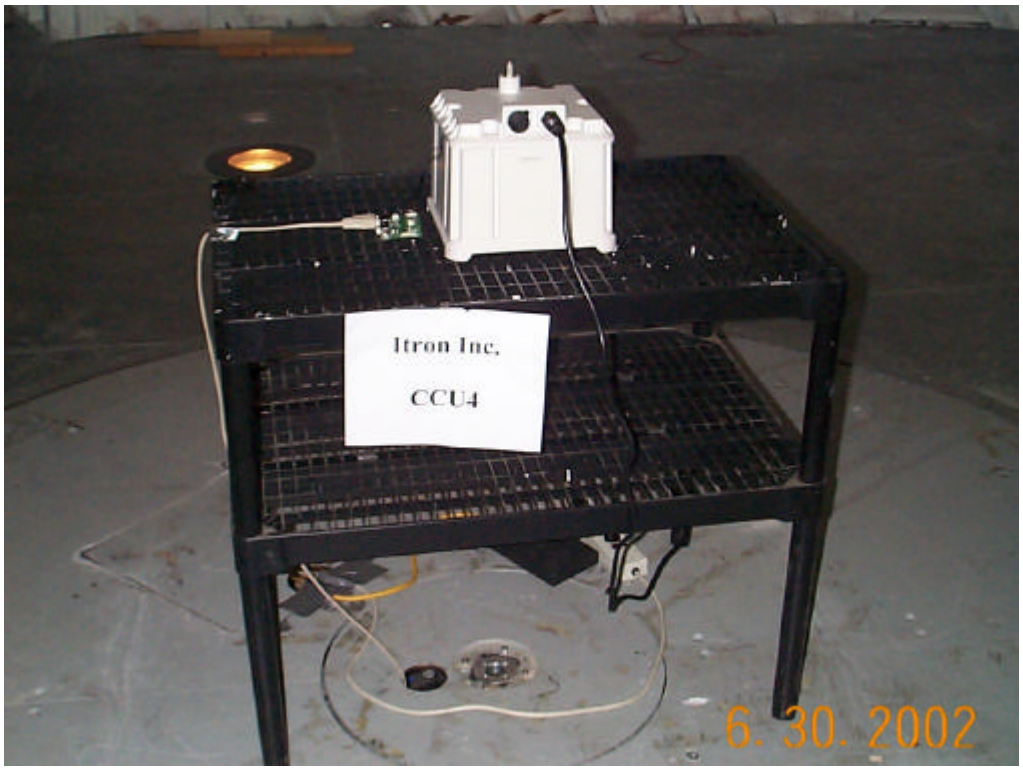
Note: $EIRP = P_t + G_t - L$

Conclusion: The EUT complied with Radiated Spurious Emissions Limits (when measuring the Substitution Method) given in 47CFR Part 101 Section 101.111(a)(5)(iv).


hp
EMISSION LEVEL [dBuV/m]
ACME TESTING - SITE #2
FCC 47 CFR PART 101
ITRON INC.
CCU4 MODULATED
RADIATED SPURS @3M
LMTS:77.35dBuV<1G;75.2dBuV>1G
100
80
60
40
20
30
100
1000
FINAL SIGNALS
FREQUENCY [MHz]


hp
EMISSION LEVEL [dBuV/m]
ACME TESTING - SITE #2
FCC 47 CFR PART 101
ITRON INC.
CCU4 MODULATED
RADIATED SPURS @3M
LMTS:77.35dBuV<1G;75.2dBuV>1G
100
80
60
40
20
1000
10000
FINAL SIGNALS
FREQUENCY [MHz]

9.6 Test Setup Photographs



10. Frequency Stability

10.1 Test Requirement

Sec. 2.1055 Measurements required: Frequency stability.

(a) The frequency stability shall be measured with variation of ambient temperature as follows: (1) From -30 deg. to +50 deg. centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10 deg. centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.

(d) The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery-operating end point, which shall be specified by the manufacturer.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

10.2 Test Technical Standard

Sec. 101.107 (a) Frequency tolerance.

The carrier frequency of each transmitter authorized in these services must be maintained within the percentage of the reference frequency except as otherwise provided in paragraph (b) of this section or in the applicable subpart of this part (unless otherwise specified in the instrument of station authorization the reference frequency will be deemed to be the assigned frequency).

For private operational fixed point-to-point microwave systems, with a channel greater than or equal to 50 kHz bandwidth, ±0.00015%; for multiple address master stations, regardless of bandwidth, ±0.00015%; for multiple address remote stations with 12.5 kHz bandwidths, ±0.00015%; for multiple address remote stations with channels greater than 12.5 kHz bandwidth, ±0.00015%.

Limit = ±0.00015% * 954,499,989 Hz = +/-1431.7 Hz.

10.3 Test Procedure

TIA/EIA-603:1993 Section 2.2.1

10.4 Test equipment

⇒ Thermocouple-Equipped Data Acquisition/Switch Unit with Thermocouple Board: Agilent Technologies 34970A, Serial Number US37033006, Calibrated: 28 January 2002, Calibration Due Date: 28 January 2003

⇒ Frequency Counter (20 Hz to 24 GHz): Systron-Donner 6054B, Serial Number 26010-0, Calibrated: 01 April 2002, Calibration Due Date: 01 April 2003

⇒ 10 W/20 dB (100 kHz to 22 GHz) Attenuator: Pasternack PE 7015-20, Serial Number 121101, Calibrated: 08 November 2001, Calibration Due Date: 08 November 2002

⇒ Digital Multimeter: Fluke 189, Serial Number 78120 092, Calibrated: 01 April 2002, Calibration Due Date: 01 April 2003

⇒ Variable Autotransformer: Staco 3PN1010B, Serial Number: 120V/10A, Conditional Use Only

⇒ Temperature Chamber: Ransco 925D-1-4, Serial Number: 4341, Conditional Use Only

⇒ Power Strip: Manufacturer Unknown, Serial Number: Unknown, No Calibration Required

10.5 Test Setup Block Diagrams

Figure 10.5 a: Frequency Stability with Temperature Test Setup

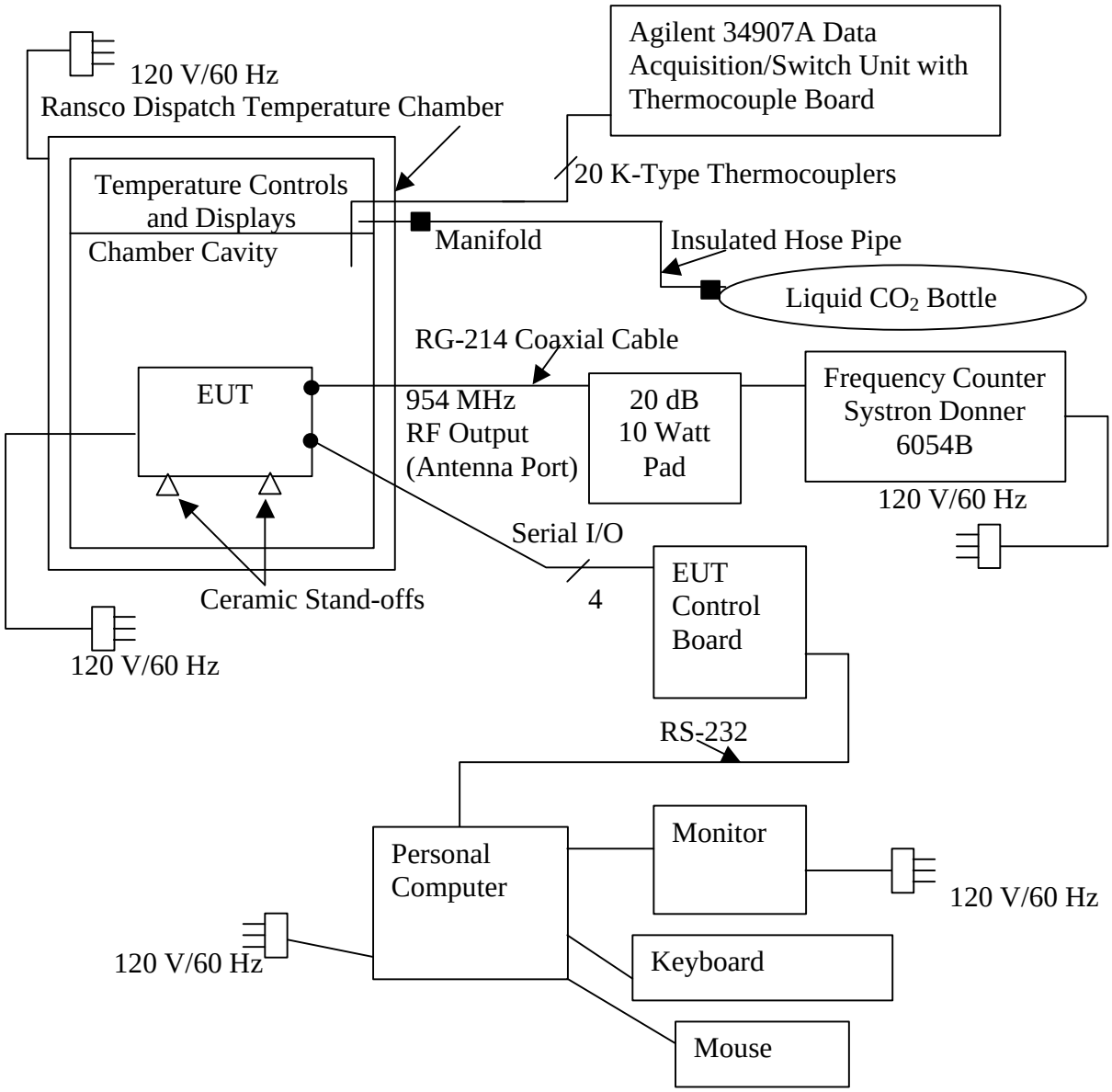
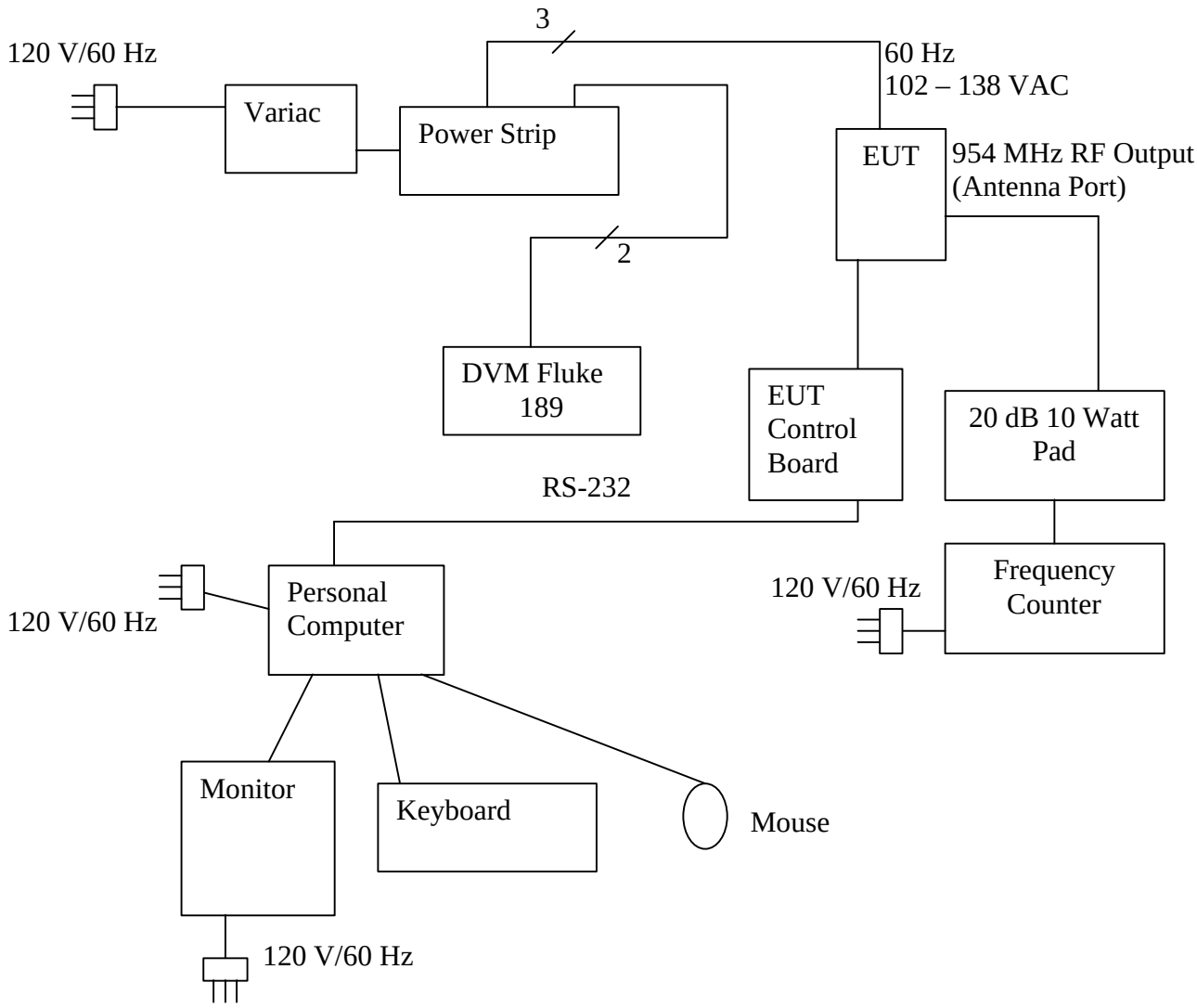


Figure 10.5 b: Frequency Stability with Voltage Test Setup



10.6 Test Results

10.6.1 Frequency Stability with Temperature

Test Setup Parameters:
VAC Input to EUT: 120.8 VAC/60 Hz
$T_{AMBIENT}$ = 22.0 ºC
RH = 56.5 %
Barometric Pressure = 1023.0 mBAR
Temperature Soak Time (To Thermal Equilibrium): 15 minutes
EUT State: Core CPU Board Powered "ON" continuously, transmitter turned "OFF" during Temperature Ramp and Temperature Soak periods.

Temperature 0º C	Fundamental (MHz)	Delta of Relative to Reference (Hz)	Notes
+22.0 ºC	954.499989 ± 2 Hz	0	Reference
-30.0 ºC	954.499976 ± 5 Hz	-13 Hz ±5.3 Hz	
-20.0 ºC	954.500070 ± 2 Hz	+81 Hz ± 2.0 Hz	
-10.1 ºC	954.500083 ± 5 Hz	+ 94 Hz ± 5.3 Hz	
-0.2 ºC	954.500070 ± 8 Hz	+81 Hz ± 8.2 Hz	
+10.1 ºC	954.500150 ± 2 Hz	+161 Hz ± 2.0 Hz	
+20.0 ºC	954.500150 ± 6 Hz	+161 Hz ± 6.3 Hz	
+30.2 ºC	954.499948 ± 2 Hz	-41 Hz ± 2.0 Hz	
+40.0 ºC	954.499885 ± 5 Hz	-104 Hz ± 5.3 Hz	
+50.1 ºC	954.499919 ± 35 Hz	-70 Hz ± 35.1 Hz	

Worst Deviations from Reference: –104 Hz to +161 Hz
Limit = ± 1431.2 Hz
Conclusion: the EUT complied with the frequency stability with temperature requirement of 47CFR Part 101.107 (a).

10.6.2 Frequency Stability with Input AC Voltage

Test Setup Parameters:

$T_{AMBIENT}$ = 20.8 ºC
RH = 56.5 %
Barometric Pressure = 1023.0 mBAR
Test Date & Time = 30 June 2002 0950 Hours

VAC Input (Volts)	$f_{Fundamental}$ (MHz)	Delta from Reference Frequency (Hz)	Notes
$V_{NOMINAL}$ = 120.33 VAC/60 Hz	954.499950 ± 5 Hz	0	Reference
0.85 x $V_{NOMINAL}$ = 102.29 VAC/60 Hz	954.499950 ± 7 Hz	0	
1.15 x $V_{NOMINAL}$ = 138.35 VAC/60 Hz	954.499950 ± 8 Hz	0	

Conclusion: the EUT complied with the Frequency Stability with Voltage Requirements specified in 47 CFR Part 2 Section 2.1055 (d) (1).

10.7 Test Setup Photographs

Frequency Stability with AC-Line Input Voltage

Frequency Stability with Temperature

Frequency Stability with Temperature

11. Conducted Emissions Tests

Test Requirement: 47 CFR Part 15 Section 15.107

Test Procedure: ANSI C63.4 - 1992

Date of Test: 13 June 2002

Laboratory: Test Site #2 (Acme, WA)

11.1 Test Equipment

⇒ Spectrum Analyzer (blue): Hewlett-Packard 8566B, Serial Number 2410A00168, Calibrated: 04 April 2001, Calibration Due Date: 04 April 2002

⇒ RF Preselector (blue): Hewlett-Packard 85685A, Serial Number 2648A00519, Calibrated: 04 April 2001, Calibration Due Date: 04 April 2002

⇒ Quasi Peak Adapter (blue): Hewlett-Packard 85650A, Serial Number 2043A00327, Calibrated: 04 April 2001, Calibration Due Date: 04 April 2002

⇒ Line Impedance Stabilization Networks: Fisher FCC-LISN-50-25-2-08, Serial Numbers 2040 and 2041, Calibrated: 25 October 2001, Calibration Due Date: 25 October 2002

⇒ Transient Limiter: Hewlett-Packard 11947A, Serial Number 3107A01879, Calibrated: 27 April 2001, Calibration Due Date: 27 April 2002

⇒ Line Conduction Test Site: Acme Testing Co., Test Site Number 2, Calibrated: 24 June 2001, Calibration Due Date: 24 June 2002

11.2 Purpose

The purpose of this test was to evaluate the level of conducted noise the EUT imposed on the AC Mains.

11.3 Test Procedures

The EUT was placed on a 1 meter long by 1.5 meters wide and 0.8-meter high nonconductive table that was placed directly on a flush-mounted turntable. The EUT was connected to its associated support equipment, with any excess I/O cabling bundled to approximately 1 meter. The EUT was connected to a dedicated LISN and all support equipment was connected to a second separate LISN circuit. The LISNs were bonded to the ground plane.

Final conducted measurements were taken on the EUT on each current carrying conductor with respect to ground.

Conducted Emissions Test Characteristics	
Frequency range	0.15 MHz - 30.0 MHz
Test instrumentation resolution bandwidth	9 kHz
Lines Tested	Line 1/Line 2

11.4 Test Results

TRANSMIT MODE

PEAK

LINE 1 "HOT"

A summary of the 7 (seven) highest amplitude conducted emissions is listed below.

PEAK #	FREQ. (MHz)	AMPL (dBµV)
1	2.745	41.2
2	2.985	42.8
3	3.729	42.8
4	10.47	41.2
5	13.41	41.1
6	13.69	42.7

LINE 2 "NEUTRAL"

A summary of the 24 (twenty-four) highest amplitude conducted emissions is listed below.

PEAK #	FREQ. (MHz)	AMPL (dBµV)
1	0.4894	48.3
2	0.5574	46.8
3	0.5692	48.0
4	0.5861	47.0
5	0.5961	48.3
6	0.6062	49.4
7	0.619	49.6
8	0.6295	49.9
9	0.6401	48.6
10	0.651	48.8
11	0.662	49.0
12	0.6789	49.1
13	0.6932	47.9
14	0.7109	47.9
15	0.726	47.8
16	0.7445	47.7
17	0.7603	47.0
18	0.7764	46.7
19	0.7929	46.8
20	0.8097	46.4
21	0.8268	46.1
22	0.8408	45.6
23	0.8586	45.1
24	13.13	45.5

The EUT complied with the Conducted Emissions Limits specified in 47CFR Part 15 Section 15.107.

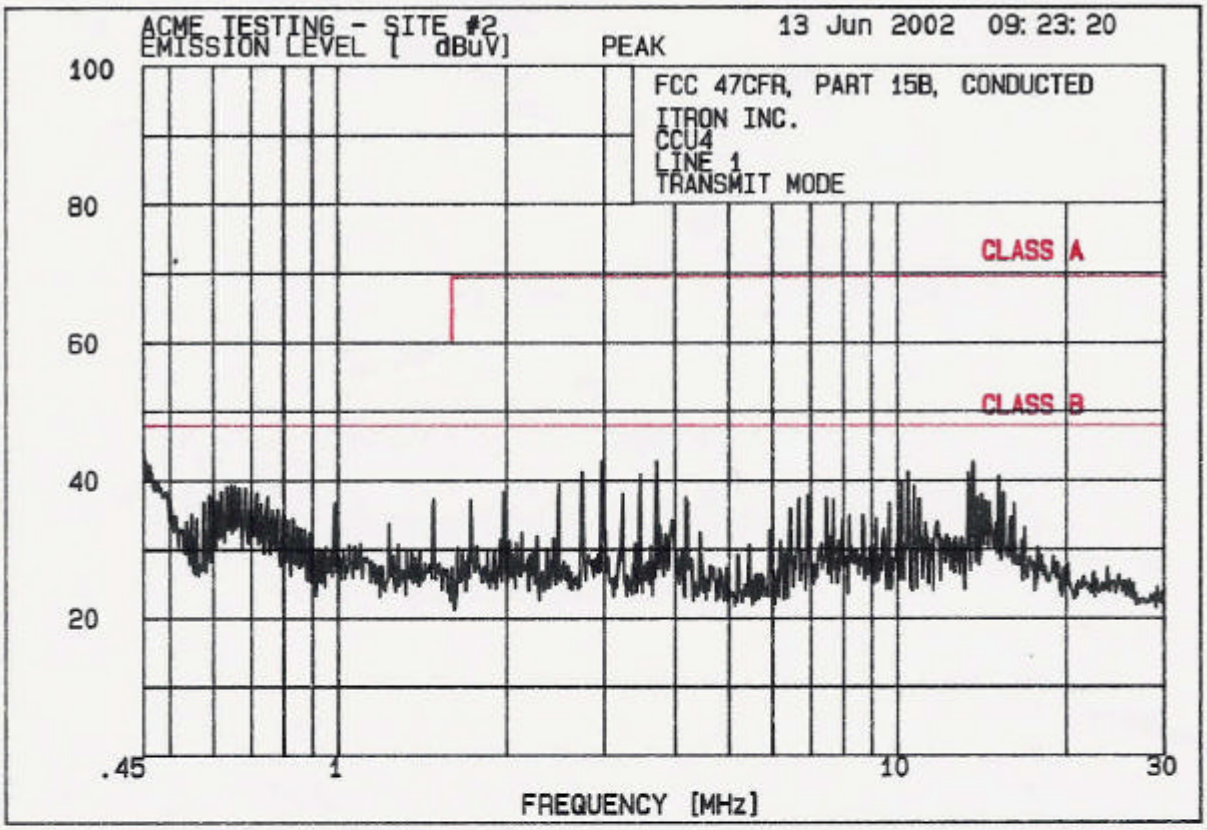
2002 Valley Highway PO Box 3 Acme WA 98220-0003
phone:888 226-3837 fax: 360 595-2722

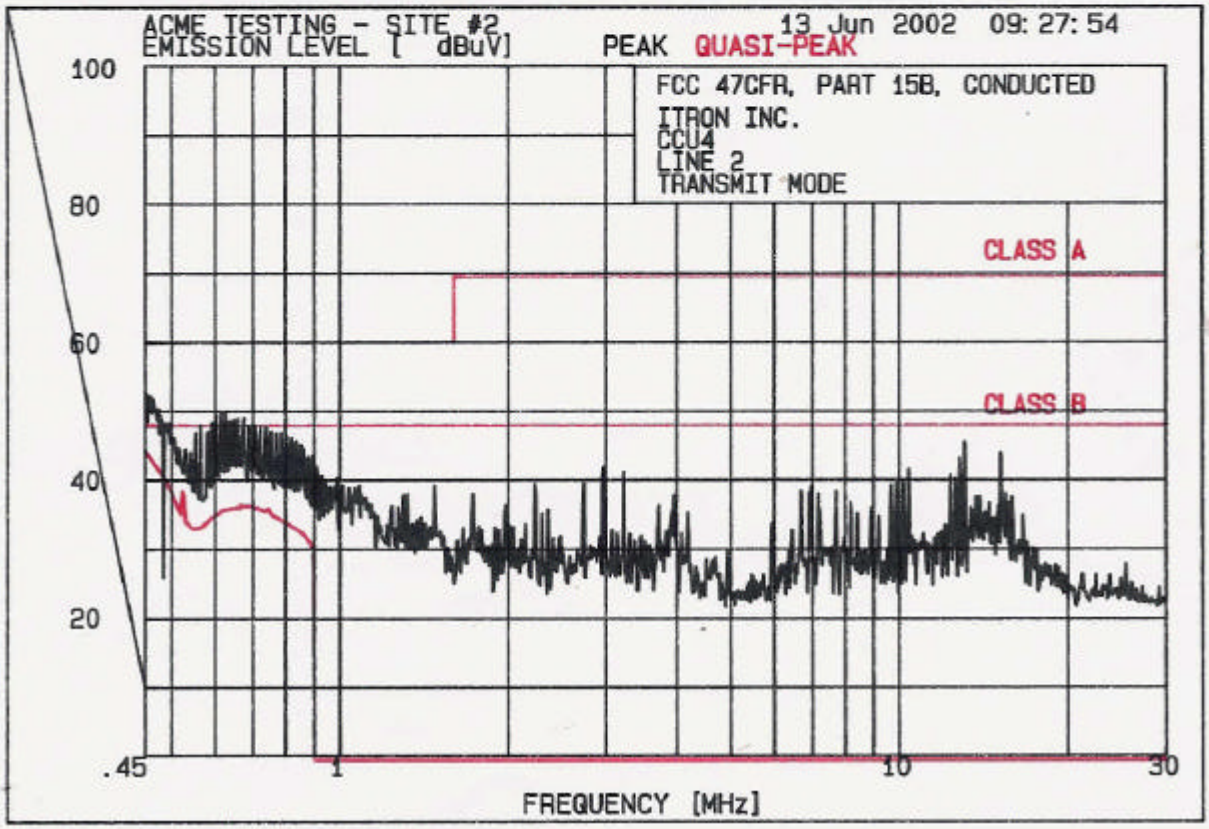
QUASI-PEAK

LINE 2 “NEUTRAL”

PEAK #	FREQ. (MHz)	AMPL (dBµV)
1	0.5278	38.4
2	0.6704	36.4
3	0.7508	35.9

The EUT complied with the Conducted Emissions Limits specified in 47CFR Part 15 Section 15.107.


ACME TESTING - SITE #2
EMISSION LEVEL [dBuV]
PEAK
13 Jun 2002 09: 23: 20
FCC 47CFR, PART 15B, CONDUCTED
ITRON INC.
CCU4
LINE 1
TRANSMIT MODE
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]


ACME TESTING - SITE #2
EMISSION LEVEL [dBuV]
PEAK QUASI-PEAK
13 Jun 2002 09: 27: 54
FCC 47CFR, PART 15B, CONDUCTED
ITRON INC.
CCU4
LINE 2
TRANSMIT MODE
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

RECEIVE MODE

PEAK

LINE 1 "HOT"

A summary of the 6 (six) highest amplitude conducted emissions is listed below.

PEAK #	FREQ. (MHz)	AMPL (dBµV)
1	0.6903	33.2
2	2.985	35.4
3	3.971	35.9
4	12.17	32.5
5	15.14	32.5
6	15.53	35.2

LINE 2 "NEUTRAL"

A summary of the 7 (seven) highest amplitude conducted emissions is listed below.

PEAK #	FREQ. (MHz)	AMPL (dBµV)
1	0.4615	50.8
2	0.4732	49.5
3	0.4873	48.0
4	0.662	41.8
5	0.6962	41.7
6	0.7508	41.2
7	15.53	41.2

The EUT complied with the Conducted Emissions Limits specified in 47CFR Part 15 Section 15.107.

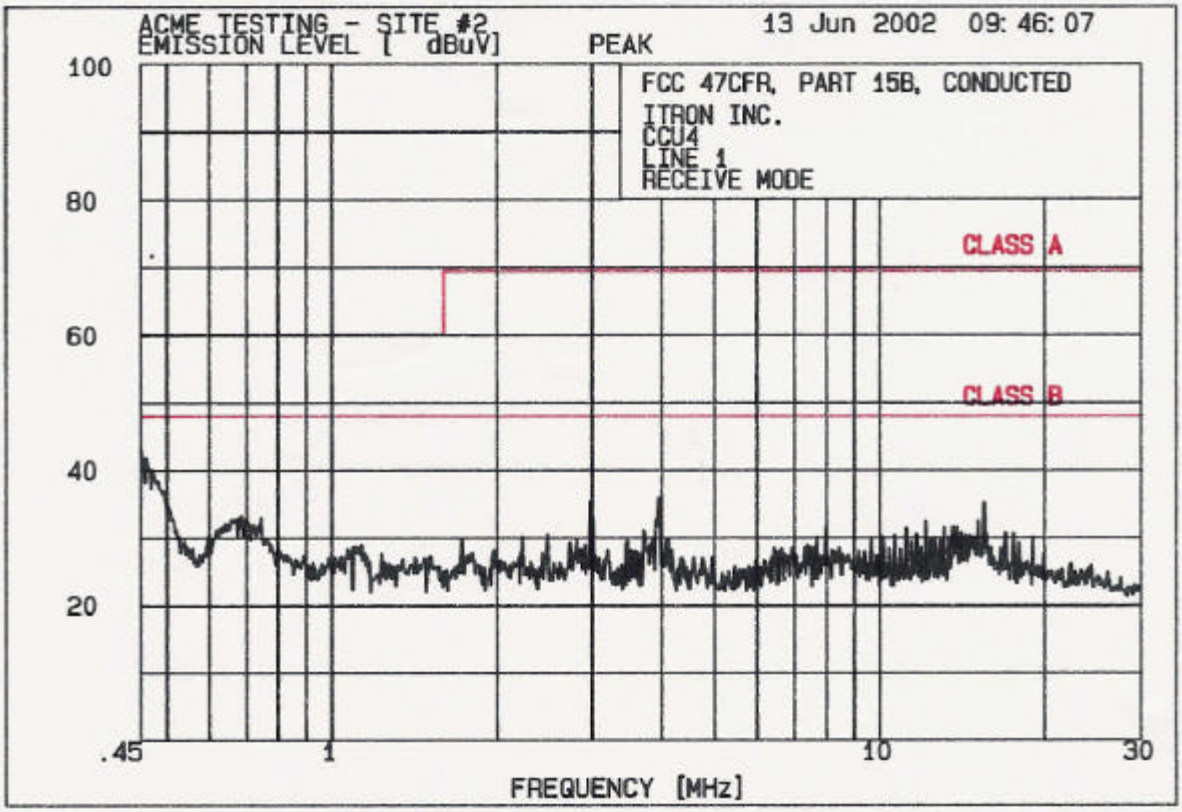
QUASI-PEAK

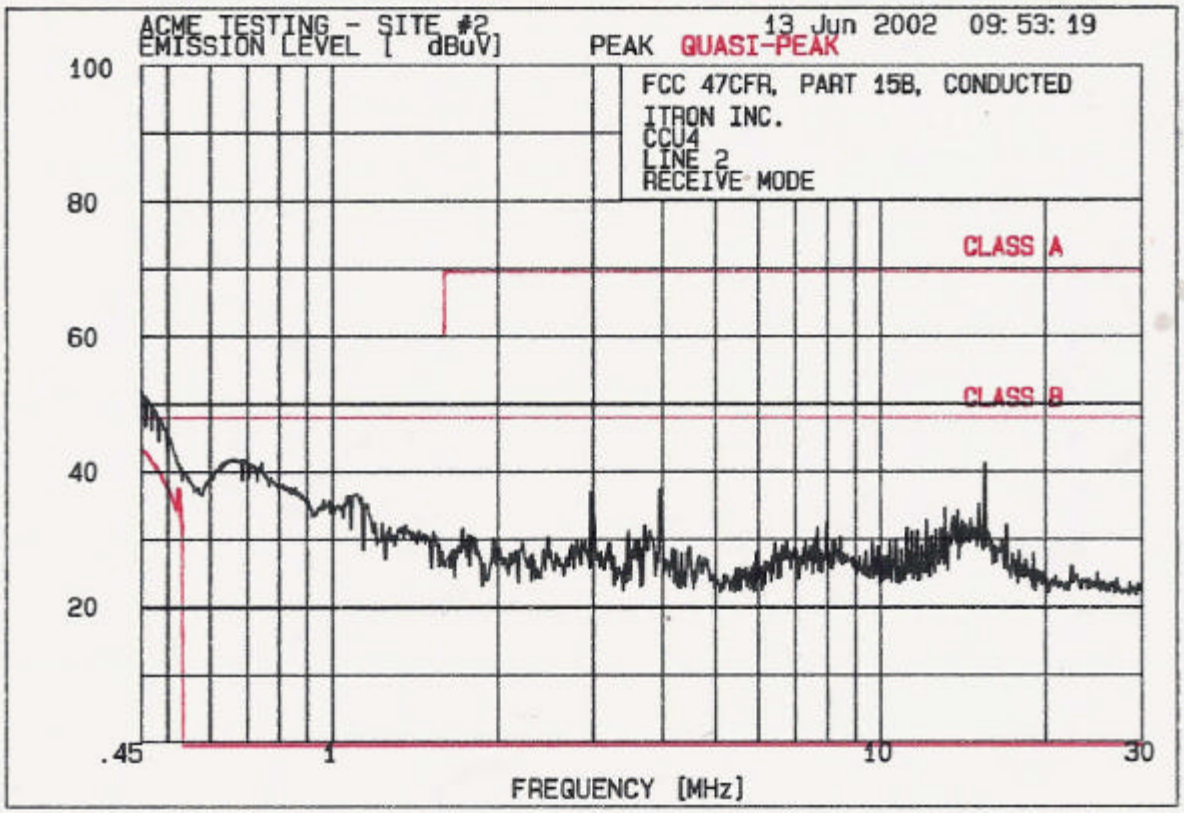
LINE 2 "NEUTRAL"

A summary of the highest amplitude conducted emission is listed below.

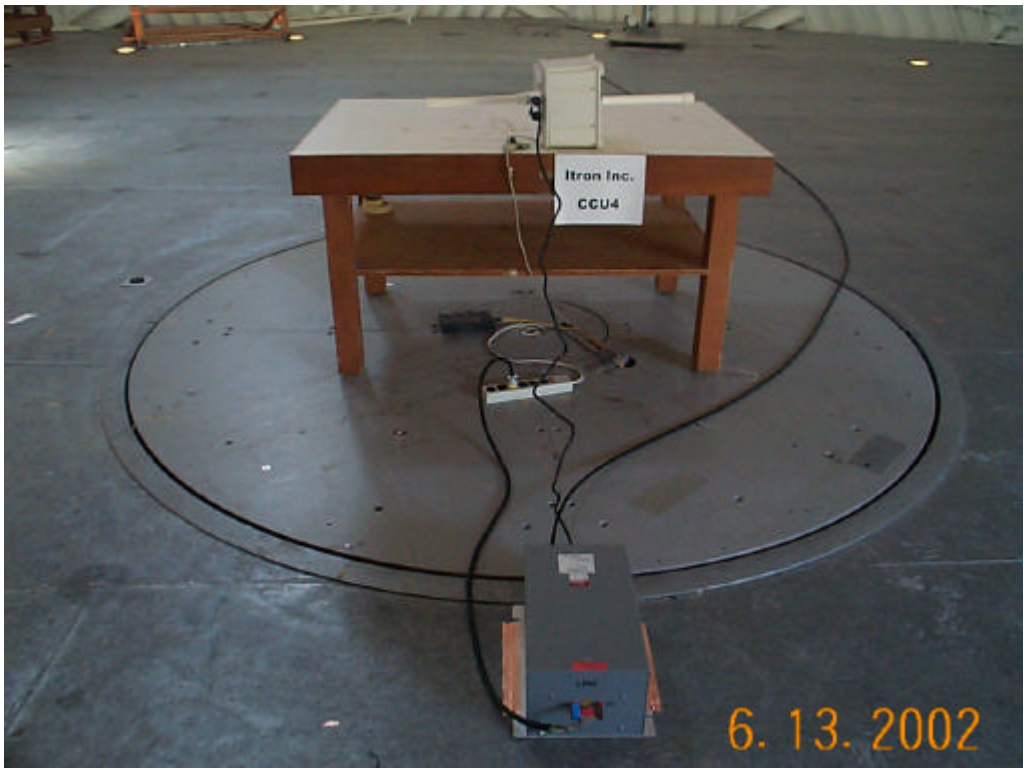
PEAK #	FREQ. (MHz)	AMPL (dBµV)
1	0.5278	37.5

The EUT complied with the Conducted Emissions Limits specified in 47CFR Part 15 Section 15.107.


ACME TESTING - SITE #2
EMISSION LEVEL [dBuV]
PEAK
13 Jun 2002 09: 46: 07
FCC 47CFR, PART 15B, CONDUCTED
ITRON INC.
CCU4
LINE 1
RECEIVE MODE
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]


ACME TESTING - SITE #2
EMISSION LEVEL [dBuV]
PEAK QUASI-PEAK
13 Jun 2002 09: 53: 19
FCC 47CFR, PART 15B, CONDUCTED
ITRON INC.
CCU4
LINE 2
RECEIVE MODE
CLASS A
CLASS B
100
80
60
40
20
.45
1
10
30
FREQUENCY [MHz]

11.5 Test Setup Photographs



12. Radio Frequency Exposure

12.1 Regulation

Section 1.1310 Radio-Frequency Radiation Exposure Limits, Table 1 (B). *See* also §1.1307(b)(1) of the FCC Rules.

12.2 Classification

According to Section 1.1307b(1), the EUT does not require an environmental evaluation.

1. This equipment classification is not listed within Table 1 of Section 1.1307 and is not listed in Section 1.1307b(2).
2. The EUT is a fixed transmitter and is thus categorically exempt from routine environmental evaluation per Section 2.1093.

Included in the following section of this Test Report are calculations that determine that minimum distance from the transmitter antenna that will ensure an exposure limit at or below the guidelines given in Table 1 of Section 1.1310 for the general population. The formula for these calculations are taken from OET Bulletin 65, edition 97-01, August 1997; "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields".

12.3 Calculations

The EUT is intended to be permanently mounted on a light pole or a utility (telephone) pole (i.e. is intended for fixed installation use.)

Per Table 1 of Section 1.1310, the limit for General Population/Uncontrolled Exposure at 952 - 957 MHz is 0.64 mW/cm^2.

Per OET Bulletin 65, Edition 97-01, the formula for calculating power density is: $S=P*G/4ÐR^2$ with:

Power = +32.07 dBm = 1.611 mW

Gain of ¼ Wave Whip Antenna = 2.14 dBi or a numeric gain of 1.637

Therefore, solving for R gives a minimum safe distance of: 1.75 cm.

The FCC specified maximum safe distance for fixed installation EUTs is 2 meters.

12.4 Conclusion

The EUT complies with the requirements of Table (B) limits for Maximum Permissible Exposure [MPE] for the general population uncontrolled exposure of Section 1.1310 of the FCC Regulations. The manufacturer has specified 2 m as the minimum safe distance in the EUT's User Manual.

13. Miscellaneous Comments and Notes

1. None.

14. Informative Information

American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999

ACME TESTING CO.
Site # 1 and Site # 2
P.O. Box 3,
2002 Valley Highway
Acme, WA 98220-0003
Harry H. Hodes Phone: 360 595 2785

ELECTRICAL (EMC)

Valid to: November 30, 2003 Certificate Number: 0829-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC) tests:

Test Technology	Test Method(s)
Basic Test Method Standards (Emissions):	
Conducted & Radiated:	ANSI C63.4-1992 & ANSI C63.4-2000; EIA/TIA-603:1993 & TIA/EIA-603:2001; FCC OET MP-5:1986; CISPR 11:1991 & EN 55011:1992; CISPR 11:1997 + A1:1999 & EN 55011:1998 + A1:1999; CISPR 13:1996 + A1:1998; CISPR 13:2001 & EN 55013:2001 & EN 55013:1990 + A12:1994 + A13:1996 + A14:1999 CISPR 14-1:1993 + A1:1996 + A2:1998 & EN 55014-1:1993 + A1:1997 + A2:1999; CISPR 14-1:2000 + A1:2001 & EN 55014-1:2000 + A1:2001 CISPR 22:1993 + A1:1995 + A2:1996 & EN 55022:1994 + A1:1995 + A2:1997; CISPR 22:1997 + A1:2000 & EN 55022:1998 + A1:2000;
Harmonic Current:	IEC 61000-3-2:1995+A1:1997+A2:1998 & IEC 61000-3-2:2000 & EN 61000-3-2:1995+A1,A2:1998+A14:2000; IEC 61000-3-2:2000 & EN 61000-3-2:2000
Voltage Fluctuations & Flicker	IEC 61000-3-3:1994+ A1:2001 & EN 61000-3-3:1995+A1:2001
Basic Test Method Standards (Immunity):	
Audio Frequency Common Mode	IEC 61000-2-1:1990; IEC 61000-2-2:2002
Electrostatic Discharge (ESD):	IEC 801-2:1991; IEC 1000-4-2:1995; IEC 61000-4-2:1995 + A1:1998 + A2:2001; EN 61000-4-2:1995 + A1:1998 + A2:2001;
Radiated RF Fields:	IEC 801-3:1984; ENV 50140:1994; IEC 1000-4-3:1995 & IEC 61000-4-3:1995; EN 61000-4-3:1996 + A1:1998; ENV 50204:1995;
Electrical Fast Transient/Burst:	IEC 801-4:1998; IEC 1000-4-4:1995; IEC 61000-4-4:1995; EN 61000-4-4:1995;

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5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

Test Technology	Test Method(s)
Surge:	IEC 801-5(D):1992 (*single phase only, and excluding 10/700 surge testing*); ENV 50142:1994 (*single phase only, and excluding 10/700 surge testing*); IEC 1000-4-5:1995 (*single phase only,and excluding 10/700 surge testing*); IEC 61000-4-5:1995 (*single phase only, and excluding 10/700 surge testing*); EN 61000-4-5:1995 (*single phase only, and excluding 10/700 surge testing*);
RF Common Mode (Conducted):	ENV 50141:1994; IEC 1000-4-6:1996; IEC 61000-4-6:1996; EN 61000-4-6:1996;
Power Frequency Magnetic Fields:	IEC 1000-4-8:1994; IEC 61000-4-8:1994; EN 61000-4-8:1994; IEC 61000-4-8:2001
Voltage Dips, Short Interruptions, & Variations:	IEC 1000-4-11:1994; IEC 61000-4-11:1994; EN 61000-4-11:1994;

Generic & Product Family Standards:

47 U.S. Code of Federal Regulations (47 CFR) FCC Methods, as follows:
Part 15 (using ANSI C63.4-1992 & ANSI C63.4-2000); &
Part 18 (using FCC OET MP-5:1986);

ICES-003 Issue 2 Revision 1;

CNS 13438:1997; CNS 13439:1994;

Bellcore [Telcordia] GR-1089-CORE Issue 2 Revision 1:1999
(*Sections 2, 3, 4.5.9, 4.5.10 [1st level surge only],9.10.5, & 9.10.6 Only*);

AS/NZS 2064:1997; AS/NZS 3548:1995;
AS/NZS 4251.1:1994; AS/NZS 4252.1:1994;
AS/NZS 4268.2:1995

EN 50081-1:1992; EN 50081-2:1993; EN 50082-1:1997; EN 50082-2:1995;
IEC 61000-6-1:1997 & EN 61000-6-1:2001
IEC 61000-6-2:1999 & EN 61000-6-2:1999 & EN 61000-6-2:2001
IEC 61000-6-3:1996 & EN 61000-6-3:2001
IEC 61000-6-4:1997 & EN 61000-6-4:2001

EN 50083-2:1995 + A1:1997; EN 50091-2:1995;
EN 50130-4:1995 + A1:1998, EN 50199:1995; EN 50270:1999;
EN 50293:2000;

CISPR 11:1991 & EN 55011:1992;
CISPR 11:1997 + A1:1998 & EN 55011:1998 + A1:1999;
CISPR 13:1996 + A1:1998
& EN 55013:1990 + A12:1994 + A13:1996 + A14:1999
CISPR 13:2001 & EN 55013:2001;
CISPR 14-1:1993 + A1:1996 + A2:1998
& EN 55014-1:1993 + A1:1997 + A2:1999;
CISPR 14-1:2000 + A1:2001 & EN 55014-1:2000 + A1:2001
CISPR 14-2:1997 & EN 55014-2:1997

(A2LA Cert. No. 829.01) 05/08/02

Test Technology	Test Method(s)
Generic & Product Family Standards:	
	CISPR 22:1993 + A1:1995 + A2:1996
	& EN 55022:1994 + A1:1995 + A2:1997;
	CISPR 22:1997 + A1:2000 & EN 55022:1998 + A1:2000;
	CISPR 24: 1997 + A1:2001 & EN 55024:1998 + A1:2001
	EN 55103-1:1996; EN 55103-2:1996;
	IEC 60521:1988 & EN 60521:1995;
	IEC 60555-2:1991 & EN 60555-2:1993;
	IEC 60555-3:1990 & EN 60555-3:1991;
	EN 60601-1-2:1984 *(EMC Requirements Only)*;
	IEC 60601-1-2:2001 (2nd Edition) *(EMC Requirements Only)*
	& EN 60601-1-2:2001 (2nd Edition) *(EMC Requirements Only)*
	IEC 60687:1992 & EN 60687:1992;
	IEC 60870-2-1:1995 & EN 60870-2-1:1996
	IEC 60945:1996 (*Clauses 9, 10, 11.2, 12.2, & 12.3 Only*),
	& EN 60945:1996 (*Clauses 9, 10, 11.2, 12.2, & 12.3 Only*);
	IEC 61000-3-2:1995+A1:1997+A2:1998
	& EN 61000-3-2:1995+A1,A2:1998+A14:2000;
	IEC 61000-3-2:2000 & EN 61000-3-2:2000;
	IEC 61000-3-3:1994 + A1:2001 & EN 61000-3-3:1995 + A1:2001;
	IEC 61036:1996 + A1:2000 & EN 61036:1996 + A1:2000;
	IEC 61131-2:1992 & EN 61131-2:1994 + A11:1996 + A12:2000;
	IEC 61204-3:2000 & IEC 61204-3:2000;
	IEC 61268:1995 & EN 61268:1996;
	IEC 61326:1997 + A1:1998 + A2:2000
	& EN 61326:1997 + A1:1998 + A2:2000;
	IEC 61800-3:1996 & EN 61800-3:1996 + A11:2000;
	EN 300 339:1998
	EN 300 386 V1.3.1(09-2001),
	EN 301 489-01 (09-2001)
	ETS 300 683:1997
	EN 301 489-03 (11-2001)
	EN 300 385:1999
	EN 301 489-04 (07-2000)
	EN 300 279:1999
	EN 301 489-05 (07-2000)
	EN 301 489-09 (09-2000)
	ETS 300 684:1997
	EN 301 489-15 (09-2000)
	EN 301 489-22 (11-2000)

Peter Rhoyer

2002 Valley Highway PO Box 3 Acme WA 98220-0003
phone:888 226-3837 fax: 360 595-2722

Radio Test Standards:

47 U.S. Code of Federal Regulations (47 CFR) FCC Methods, as follows:
Part 15 (using ANSI C63.4-1992 & ANSI C63.4-2000), &
Part 90 (using ANSI C63.4-1992, ANSI C63.4-2000, & TIA/EIA-603);

Industry Canada, as follows:
RSS-119 Issue 6: March 2000;
RSS-125 Issue 2: August 1996;
RSS-210 Issue 4: December 2000;

European Union [EU] & European Economic Area [EEA], as follows:
EN 300 086-1 V.1.2.1 (2001-03) & EN 300 086-2 V.1.2.1 (2001-02);
EN 300 113-1 V1.3.1 (2001-03) & EN 300 113-2 V1.3.1 (2001-03);
EN 300 219-1 V1.2.1 (2001-03) & EN 300 219-2 V1.2.1 (2001-03);
EN 300 220-1 V1.3.1 (2000-09) & EN 300 220-2 V1.3.1 (2000-09)
& EN 300 220-3 V1.1.1 (2000-03);
EN 300 296-1 V1.1.1 (2001-03) & EN 300 296-2 V1.1.1 (2001-02);
EN 300 330-1 V1.3.1 (2001-06) & EN 300 330-2 V1.1.1 (2001-06);
EN 300 422-1 V1.2.1 (2000-08) & EN 300 422-2 V1.1.1 (2000-08);
EN 300 440-1 V1.3.1 (2001-09) & EN 300 440-2 V1.1.1 (2001-09);
EN 301 751 V1.2.1 (2000-12);
EN 301 753 V1.1.1 (2001-03);
EN 301 783-1 V1.1.1 (2000-09) & EN 301 783-2 V1.1.1 (2000-07)

On the following materials and products:
Electrical and electronic equipment for: information technology; industrial, scientific, and medical applications; residential service; receivers; licensed and unlicensed transmitters/transceivers; UPS systems; alarm/security systems; heavy industrial equipment; marine equipment; professional audio/video equipment; arc welders; PLC controllers; and scientific and laboratory apparatus.

Peter Mayer

(A2LA Cert. No. 829.01) 05/08/02

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THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

ACME TESTING CO.
Acme, WA

for technical competence in the field of

Electrical Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 30th day of April, 2002.

SEAL

President
For the Accreditation Council
Certificate Number 829.01
Valid to November 30, 2003

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation

Laboratory Division
7435 Oakland Mills Road
Columbia, MD. 21046

November 22, 1999

Registration Number: 90420

Acme Testing Company
P.O. Box 3
2002 Valley Highway
Acme, WA 98220-0003

Attention: Paul Slavens

Re: Measurement facility located at Acme, Sites 1 & 2
3, 10 & 30 meter sites
Date of Listing: November 22, 1999

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.

If requested, the above mentioned facility has been added to our list of those who perform these measurement services for the public on a fee basis. An up-to-date list of such public test facilities is available on the Internet on the FCC Website at WWW.FCC.GOV, E-Filing, OET Equipment Authorization Electronic Filing.

Sincerely,

Thomas W Phillips
Electronics Engineer