



M. Flom Associates, Inc.

International Compliance Testing Laboratory

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Date of Report: July 1, 2005
Date of Submission: August 30, 2005

Federal Communications Commission
Via Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: HiTek Aqua Systems, LLC
Equipment: Aquavizor 1000
FCC ID: TFU-AQV1000
FCC Rules: 15.231(e)

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

Michael Schafer, General Manager

enclosure(s)
cc: Applicant
MS/del

List Of Exhibits
(FCC **Certification** (Transmitters) - Revised 9/28/98)

Applicant: HiTek Aqua Systems, LLC

FCC ID: TFU-AQV1000

By Applicant:

1. Letter Of Authorization
2. Identification Drawings
 - Label
 - Location of Label
 - Compliance Statement
 - Location of Compliance Statement
3. Documentation: 2.1033(B)
 - (3) User Manual
 - (4) Operational Description
 - (5) Block Diagram
 - (5) Schematic Diagram
 - (7) Photographs
 - Parts List
 - Active Devices
4. Draft Specification Information

By M.F.A. Inc.

- A. TESTIMONIAL & STATEMENT OF CERTIFICATION



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Transmitter Certification

of

FCC ID: TFU-AQV1000
Model: Aquavizor 1000

to

Federal Communications Commission

Rule Part: 15.231(e)

Date of report: July 1, 2005

On the Behalf of the Applicant:

HiTek Aqua Systems, LLC

At the Request of:

HiTek Aqua Systems, LLC
A Subsidiary of Aqualabz, LLC
940 South Park Lane, Suite 2
Tempe, AZ 85281

Attention of:

Mike Manasco
480-203-3685
mike.manasco@asm.com

Supervised by:

David E. Lee, Compliance Test Manager

The Applicant has been cautioned as to the following:

15.21 Information to User.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

Table Of Contents

Rule	Description	Page
	Test Report	1
2.1033(c)	General Information Required	2
	Standard Test Conditions and Engineering Practices	6
2.1053(a)	Field Strength of Spurious Radiation	8
2.1049(c)(1)	Emission Masks (Occupied Bandwidth)	13
2.202(g)	Necessary Bandwidth and Emission Bandwidth	20

Required information per ISO/IEC Guide 25-1990, paragraph 13.2:

a) **Test Report**

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0570003

d) Client: HiTek Aqua Systems, LLC
A Subsidiary of Aqualabz, LLC
940 South Park Lane, Suite 2
Tempe, AZ 85281

e) Identification: Aquavizor 1000
FCC ID: TFU-AQV1000
Description: Pool Monitor Transmitter

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: July 1, 2005
EUT Received: June 28, 2005

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:



Michael Findley, Laboratory Manager

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

List Of General Information Required For Certification

In Accordance With FCC Rules And Regulations,
Volume II, Part 2 and to 15.231(e)

Sub-part 2.1033

(c)(1): **Name and Address of Applicant:**

HiTek Aqua Systems, LLC
A Subsidiary of Aqualabz, LLC
940 South Park Lane, Suite 2
Tempe, AZ 85281

Manufacturer:

Applicant

(c)(2): **FCC ID:** TFU-AQV1000

Model Number: Aquavizor 1000

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type of Emission:** Pulsed, Coded

(c)(5): **Frequency Range, MHz:** 433.85MHz

(c)(6): **Power Rating:** 4,265uV/m
_____ Switchable _____ Variable X N/A

(c)(7): **Maximum Power Rating, W:** 4,384uv/m @ 3m @ 433MHz

15.203: **Antenna Requirement:**

- X The antenna is permanently attached to the EUT
- _____ The antenna uses a unique coupling
- _____ The EUT must be professionally installed
- _____ The antenna requirement does not apply

Subpart 2.1033 (continued)

(c)(8): Voltages & currents in all elements in final RF stage, including final transistor or solid state device:

Collector Current, A	=	< 10mA
Collector Voltage, Vdc	=	4.5
Supply Voltage, vdc	=	4.5

(c)(9): **Tune-Up Procedure:**

Please See Attached Exhibits

(c)(10): **Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please See Attached Exhibits

(c)(11): **Label Information:**

Please See Attached Exhibits

(c)(12): **Photographs:**

Please See Attached Exhibits

(c)(13): **Digital Modulation Description:**

☐	ATTACHED EXHIBITS
☒	N/A

(c)(14): **Test and Measurement Data:**

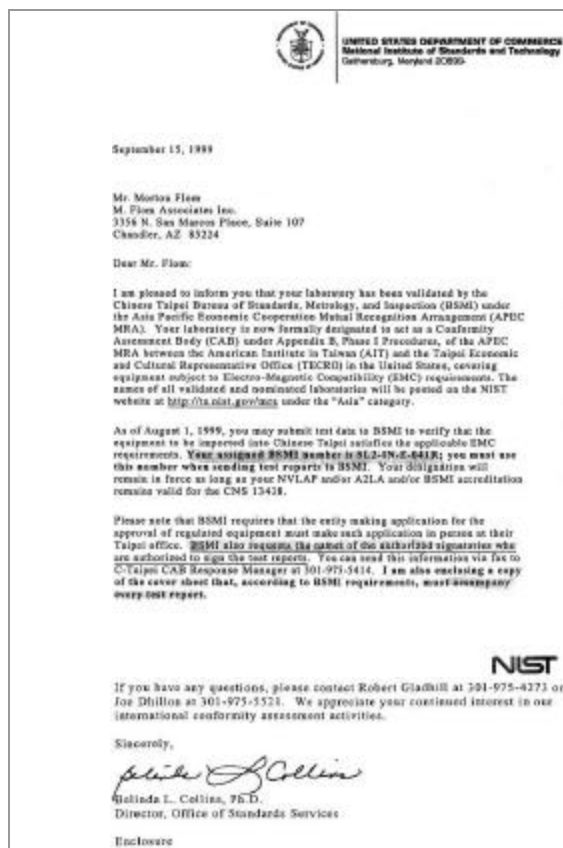
Follows



A2LA

"A2LA has accredited M. Flom Associates, Inc. Chandler, AZ 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."

Certificate Number: **2152-01**



NIST

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Your laboratory is now formally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at <http://ts.nist.gov/mra> under the 'Asia' category."

BSMI Number: **SL2-IN-E-041R**

Sub-part
2.1033(b):

Test And Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

_____	15.209	Radiated emission limits; general requirements
_____	15.211	Tunnel radio systems
_____	15.213	Cable locating equipment
_____	15.214	Cordless telephones
_____	15.217	Operation in the band 160-190 kHz
_____	15.219	Operation in the band 510-1705 kHz
_____	15.221	Operation in the band 525-1705 kHz (leaky coax)
_____	15.223	Operation in the band 1.705-10 MHz
_____	15.225	Operation in the band 13.553-13.567 MHz
_____	15.227	Operation in the band 26-27.28 MHz (remote control)
_____	15.229	Operation in the band 40.66-40.70 MHz
X _____	15.231	Periodic operation in the band 40.66-40.70 MHz and above 70 MHz
_____	15.233	Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz
_____	15.235	Operation within the band 49.82-49.90 MHz
_____	15.237	Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance)
_____	15.239	Operation in band 88-108 MHz
_____	15.241	Operation in the band 174-216 MHz (biomedical)
_____	15.243	Operation in the band 890-940 MHz (materials)
_____	15.245	Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors)
_____	15.247	Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum)
_____	15.249	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0- 24.25 GHz
_____	15.251	Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358- 3.6 GHz (vehicle identification systems)
_____	15.321	Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390- 2400 MHz bands (Unlicensed PCS)
_____	15.323	Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS)

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2000, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

Name of Test: Signaling Restriction

Specification: 47 CFR 15.231(a)

Provisions

To Paragraph 15.231

(a) Types of momentary signals

- ☐ The EUT only transmits a control signal.
- ☒ The EUT meets the requirements provided in (e).

(a)(1) Manually operated transmitters

- ☒ The EUT can not be manually activated.
- ☐ The EUT ceases transmission within 5 seconds or deactivation.
- ☐ The EUT is employed during emergencies.

(a)(2) Automatically activated transmitters

- ☒ The EUT can not be automatically activated.
- ☐ The EUT does not transmit for more than 5 seconds.
- ☐ The EUT only operates during an alarm condition.

(a)(3) Automatically activated transmitters

- ☐ The EUT does not transmit at regular predetermined intervals.
- ☒ The EUT meets the requirements provided in (e).
- ☐ The EUT does not transmit more than one, one second per hour.

(a)(4) Emergency transmitters

- ☒ The EUT is not an emergency transmitter.
- ☐ The EUT only operates during an alarm condition.

Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

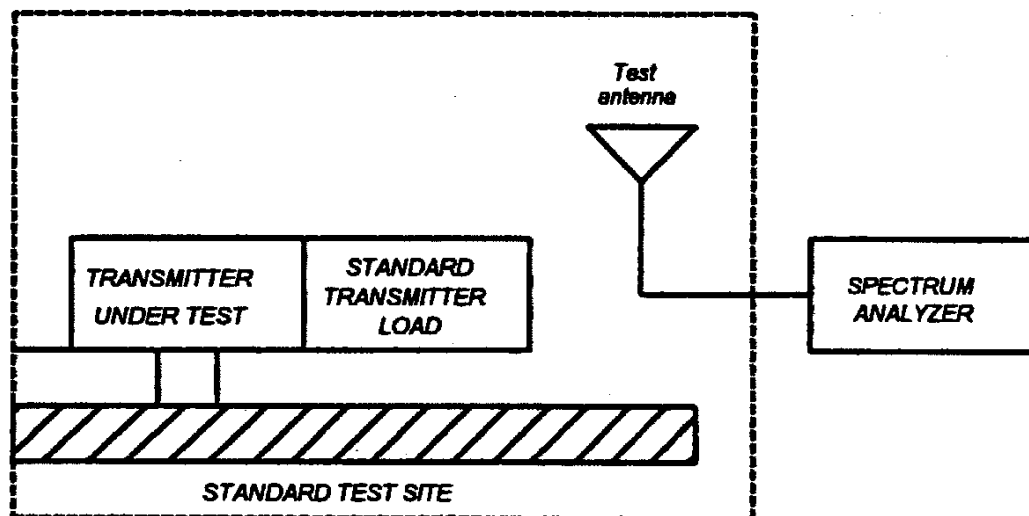
Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

Measurement Procedure

1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

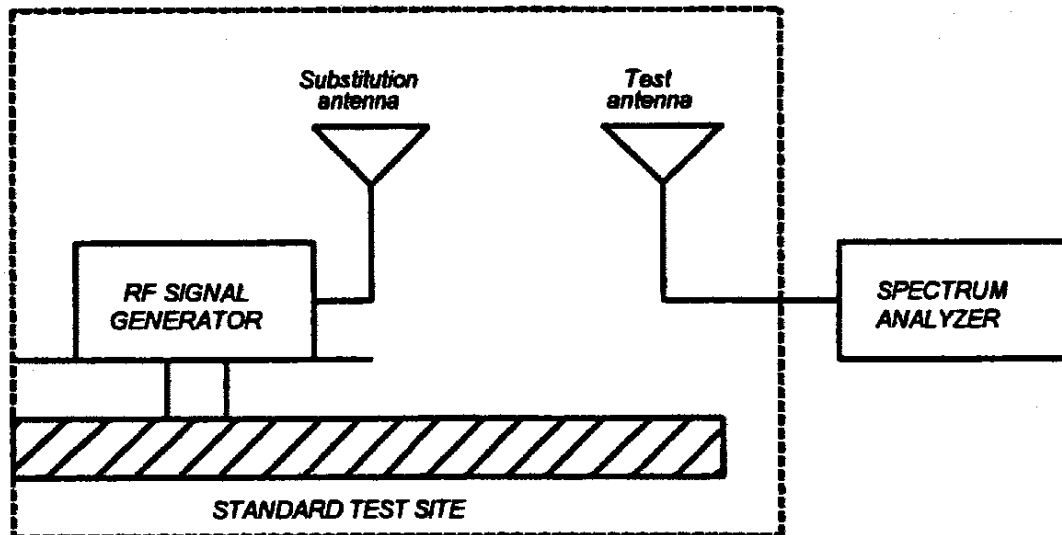
1.2.12.2 Method of Measurement

- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth = 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed ≤ 2000 Hz/second
 - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.



Name of Test: Field Strength of Spurious Radiation (Cont.)

- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to $\pm$ the test bandwidth (see section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

Name of Test: Field Strength of Spurious Radiation (Cont.)

- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

$$\text{Radiated spurious emissions dB} = 10 \log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$$

Note: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

Asset (as applicable)	Description	s/n	Cycle	Last Cal
Transducer				
i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.	Sep-03
i00065	EMCO 3301-B Active Monopole	2635	24 mo.	Sep-03
X i00089	Apriel 2001 200MHz-1GHz	001500	24 mo.	Sep-03
X i00103	EMCO 3115 1GHz-18GHz	9208-3925	24 mo.	Jan-04
Amplifier				
i00028	HP 8449A	2749A00121	12 mo.	Mar-05
Spectrum Analyzer				
i00029	HP 8563E	3213A00104	12 mo.	May-05
X i00033	HP 85462A	3625A00357	12 mo.	Sep-04
i00048	HP 8566B	2511AD1467	12 mo.	Aug-04

Test Setup: Radiated Emissions

State:



State:



Name of Test: Field Strength of Spurious Radiation

State:

g0560314: 2005-Jun-28 Tue 08:51:00

State: 2:High Power

Ambient Temperature: 29°C ± 3°C

Vertical

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
434.000000	44.370000	21.30	12.40	-63.7	
434.000000	72.773000	30.30	7.53	-59.5	
434.000000	84.705000	26.13	7.58	-63.7	
434.000000	134.150000	24.66	11.81	-60.9	
434.000000	144.470000	25.29	12.09	-60.0	
434.000000	164.630000	24.94	12.12	-60.3	
434.000000	187.300000	24.68	12.98	-59.7	
434.000000	254.000000	20.48	28.93	-48.0	15.8pW max (295.0uV/m)
434.000000	258.130000	19.97	28.95	-48.5	
434.000000	262.380000	14.98	28.96	-53.4	
434.000000	327.880000	17.85	15.90	-63.6	
434.000000	356.500000	19.88	16.58	-60.9	
434.000000	525.530000	14.40	20.47	-62.5	
434.000000	578.458000	17.45	23.56	-56.4	

g0560315: 2005-Jun-28 Tue 10:02:00

State: 2:High Power

Ambient Temperature: 33°C ± 3°C

Horizontal

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	
434.000000	33.160000	22.52	11.90	-63.0	
434.000000	51.050000	20.33	11.64	-65.4	
434.000000	56.010000	23.75	10.77	-62.9	
434.000000	114.790000	24.75	10.87	-61.8	
434.000000	133.710000	20.57	11.80	-65.0	
434.000000	327.687500	24.86	15.90	-56.6	
434.000000	335.875000	19.81	16.09	-61.5	
434.000000	339.973800	19.99	16.18	-61.2	
434.000000	344.063800	23.68	16.29	-57.4	2.19pW max (97.0uV/m)
434.000000	348.160000	22.63	16.38	-58.4	
434.000000	352.260000	20.09	16.48	-60.8	
434.000000	360.440000	19.20	16.66	-61.5	
434.000000	364.540000	21.41	16.75	-59.2	
434.000000	376.835000	17.78	17.01	-62.6	
434.000000	450.120000	18.97	18.33	-60.1	
434.000000	500.728000	14.47	19.02	-63.9	
434.000000	811.400000	12.11	25.22	-60.0	



Performed By:

David E. Lee, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)
Specification: 47 CFR 2.1049(c)(1)
Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11
Test Equipment: As per attached page

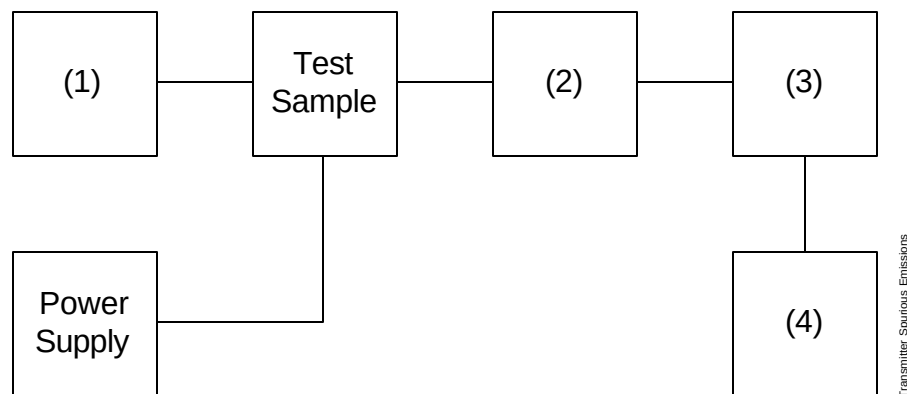
Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer loosely coupled.
2. The transmit function was enabled.
3. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
4. Measurement Results: Attached

Transmitter Spurious Emission

Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious



	Asset	Description	s/n	Cycle	Last Cal.
(1)	Audio Oscillator/Generator				
_____	i00017	HP 8903A	2216A01753	12 mo.	Apr-05
(2)	Coaxial Attenuator				
_____	i00122	Narda 766-10	7802		
_____	i00123	Narda 766-10	7802A		
_____	i00069	Bird 8329 (30 dB)	1006		
_____	i00113	Sierra 661A-3D	1059		
(3)	Filters; Notch, HP, LP, BP				
_____	i00126	Eagle TNF-1	100-250		
_____	i00125	Eagle TNF-1	50-60		
_____	i00124	Eagle TNF-1	250-850		
(4)	Spectrum Analyzer				
X	i00048	HP 8566B	2511A01467	12 mo.	Oct-04
_____	i00029	HP 8563E	3213A00104	12 mo.	May-05

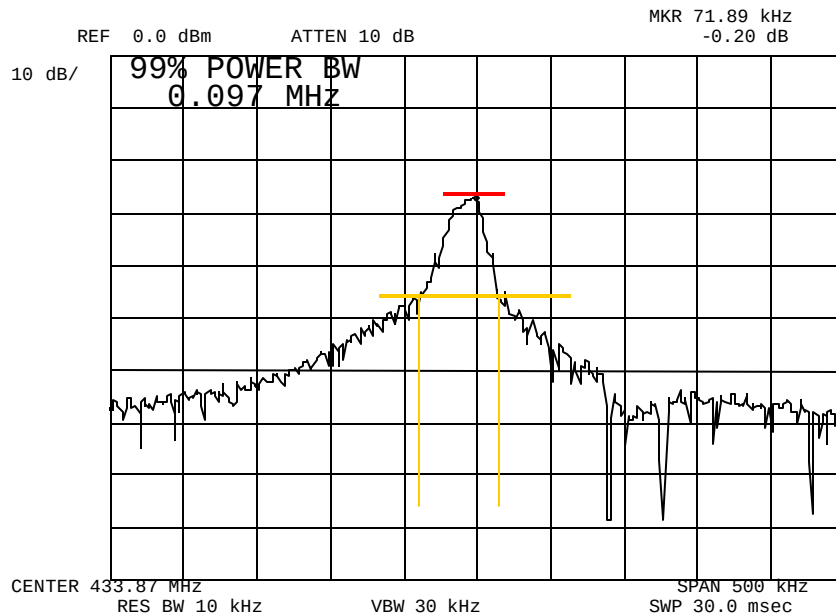
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0570014: 2005-Jul-08 Fri 12:28:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
PULSED
(99% POWER BANDWIDTH) = 97kHz
20dB Bandwidth = 72kHz



Supervised By:

David E. Lee, Test Engineer

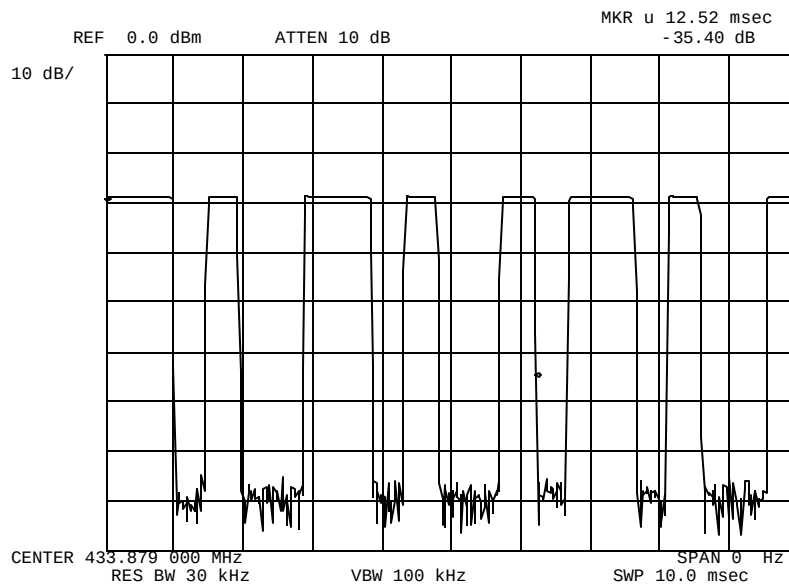
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0570014: 2005-Jul-08 Fri 12:28:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
PULSED
CODING (Average 50%)



Supervised By:

David E. Lee, Test Engineer

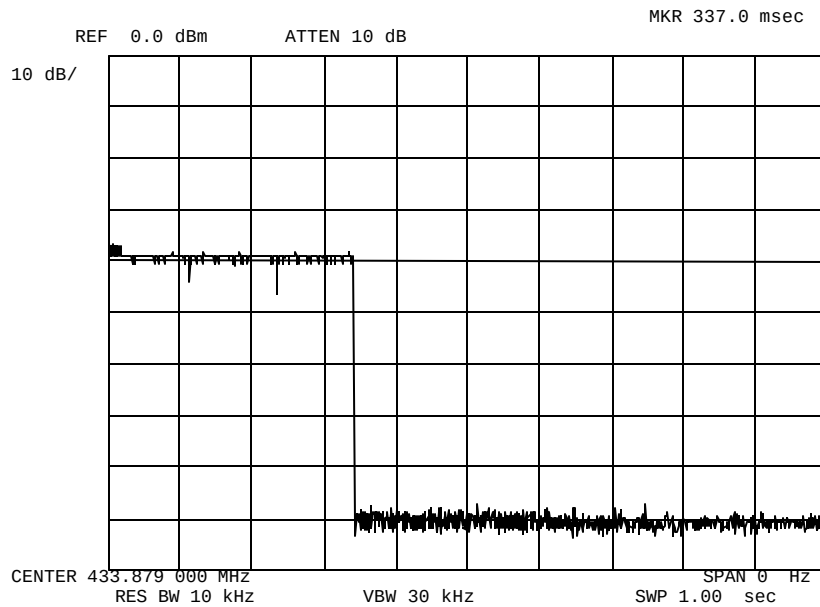
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0570014: 2005-Jul-08 Fri 12:28:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:
Modulation:

HIGH
PULSED
TX DURATION = 337 msec



Supervised By:

David E. Lee, Test Engineer

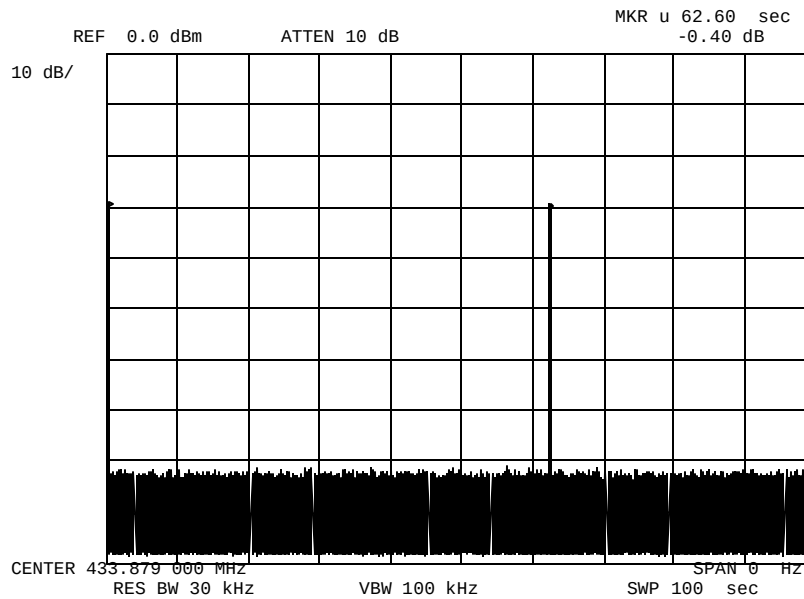
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0570014: 2005-Jul-08 Fri 12:28:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

PULSED

TX INTERVAL = 62.6 secs

Per 15.231(e)

Transmitter repetition interval is:

- (a) longer than 10 sec and
- (b) more than 30 times the transmission duration (30 * 0.337 sec)



Supervised By:

David E. Lee, Test Engineer

Name of Test: Pulsed Operation Calculations

Specification: 47 CFR 15.37(c)

Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown with the Spectrum Analyzer connected.
2. The pulse train and pulse repetition was measured with the Spectrum Analyzer controls set as shown on the test results.

Measured Results

g0560314: 2005-Jun-28 Tue 08:51:00

State: 2:High Power

Ambient Temperature: 33°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	Calc, dBuV/m	Calc, uV/m
433.000000	433.898880	60.53	18.07	78.6	8,511

3. Calculations:

Pulse Train = 337msec (Greater than 0.1 sec per 15.35)

Peak Voltage during Pulse Train = 78.6 dBuV/m = 8,511 uV/m

Peak to Blanking Ratio from Coding = 50% = 6dB

Average Voltage during Pulse Train = 72.6 dBuV/m = 4,265 uV/m

Limit is 4,384 uV/m @433MHz

The device **PASSES**

Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = Pulsed Code

Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz

72kHz (Measured at 20dB points)



Supervised By:

David E. Lee, Test Engineer

Radiated Measurements For Part 15 Transmitters W/ Integral Antennas

Radiated Measurements

Range Of Measurement	Specification	Resolution B/W	Video B/A
30 to 1000 MHz	CISPR	≥ 100 kHz	≥ 100 kHz
>1000 MHz	FCC, 15.37(b)	1 MHz	≥ 1 MHz
(if averaging)	FCC, 15.37(b)	1 MHz	10 Hz

Measuring Equipment

a. Antennas:

EMCO 3109	20 - 300 MHz
APREL AALP2001	200 - 1000 MHz
APREL AAB20200	20 - 200 MHz
APREL AAH118	1 - 18 GHz

b. Instruments:

HP8566B	Spectrum Analyzer
HP85685A	Preselector, w/ preamp below 2 GHz
HP85650A	Quasi Peak Adapter
HP8449	Preamp, above 2 GHz

Occupied Bandwidth

Occupied Bandwidth is measured as a radiated signal without attenuators and/or filter. RBW, VBW and scan settings as shown were set to produce a meaningful result in accordance with ANSI C63.4, Section 13.1.7.

Part 15.21, Information to User

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly avoided by the party responsible for compliance could void the user's authority to operate the equipment.

§ 15.205 Restricted Bands of Operation

(a) Except as shown in paragraph (b) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69625	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-339.4	3600-4400	
13.36-13.41			

**Testimonial
And
Statement Of Certification**

This is to certify that:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

Certifying Engineer:



Michael Findley, Laboratory Manager