



M. Flom Associates, Inc.

International Compliance Testing Laboratory

3356 N. San Marcos Place, Suite 107
Chandler, AZ 85225

toll-free: (866) 311-3268
fax: (480) 926-3598

<http://www.mflom.com>
info@mflom.com

Transmitter Certification

of

Model: USB Dongle
FCC ID: R8KUGQUBE1US
to

Federal Communications Commission

Rule Part(s) 15.247

Date Of Report: September 12, 2005

On the Behalf of the Applicant:

Unigen Corporation

At the Request of:

Unigen Corporation
45388 Warm Springs Blvd.
Fremont, CA 94539

Attention of:

Mark Morrissey, Director of Business Development
(800) 826-0808; (510) 668-2088 ext 2087
Email: mmorrissey@unigen.com

Supervised By:

David E. Lee, Quality Assurance Manager

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

Applicant: Unigen Corporation

FCC ID: R8KUGQUBE1US

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
 - Block Diagram
 - Parts List
 - Active Devices
4. Draft Specification Information

By M.F.A. Inc.

- A. Testimonial & Statement of Certification

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.

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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: d0590044

d) Client: Unigen Corporation
45388 Warm Springs Blvd.
Fremont, CA 94539

e) Identification: USB Dongle
FCC ID: R8KUGQUBE1US
Description: 2.4GHz TX/RX

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

g) Report Date: September 12, 2005
EUT Received: September 2, 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:



David E. Lee, Quality Assurance 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 15.247

Sub-Part 2.1033

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

Unigen Corporation
45388 Warm Springs Blvd.
Fremont, CA 94539

Manufacturer:

Applicant

(c)(2): FCC ID:

R8KUGQUBE1US

Model Number:

USB Dongle

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

Please See Attached Exhibits

(c)(4): Type of Emission:

GFSK

(c)(5): FREQUENCY RANGE, MHz:

2402.00 to 2479.00

(c)(6): Power Rating:

☐ Switchable

☒ Variable

1 mW (0 dBm)

☐ N/A

(c)(7): Maximum Power Rating, W: [15.247(b)(3)]

1W

15.203: Antenna Requirement:

- ☒ 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, mA	=	70.0 (max), 8.0 (avg)
Collector Voltage, Vdc	=	5.0
Supply Voltage, Vdc	=	5.0

(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

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
_____	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)
X _____	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 ANSIC63.4-1992/2003, 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.

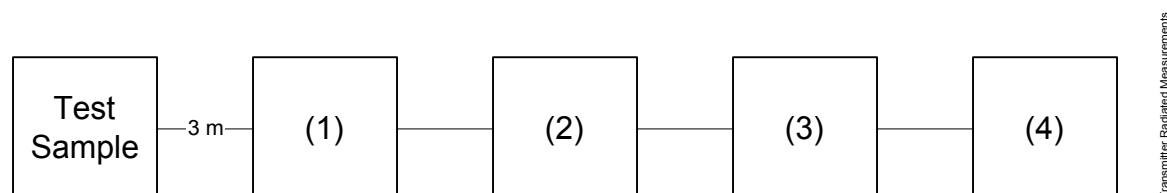
Measurement results, unless otherwise noted, are worst-case measurements.

 THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION ACCREDITED LABORATORY 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. Presented this 14th day of June 2004.  President For the Accreditation Council Certificate Number 2152-01 Valid to August 31, 2006 For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.	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
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Name of Test: EIRP Carrier Power (Radiated)

Specification: ANSI C63.4:2003

Radiated Test Setup



Test Equipment

Asset	Description	s/n	Cycle	Last Cal
(1) Transducer				
i00088	EMCO 3109-B 25MHz-300MHz	2336	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
(3) Amplifier				
X i00028	HP 8449A	2749A00121	12 mo.	May-05
(4) Spectrum Analyzer				
X i00029	HP 8563E	3213A00104	12 mo.	May-05
X i00033	HP 85462A	3625A00357	12 mo.	Sep-05

Measurement Results

g0590016: 2005-Sep-02 Fri 10:33:00

State: 2:High Power

Ambient Temperature: 30°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	Substitution Loss, dB	Calc, dBuV/m	EIRP, dBm	EIRP, Watts
2402.000000	2402.088000	77.00	32.59	+2.6	106.99		
2445.000000	2444.087500	76.72	32.70	+2.5	106.92	0.0	0.001
2479.000000	2479.102500	76.70	32.79	+2.6	106.89		



Performed by:

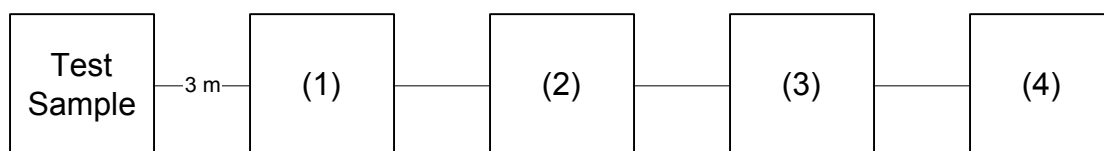
Fred Chastain, Test Technician

Name of Test: Spurious Radiation

Specification: 47 CFR 2.1053(a)

Guide: ANSI C63.4:2003

Radiated Test Setup



Transmitter Radiated Measurements

Test Equipment:

	Asset	Description	s/n	Cycle	Last Cal
		(as applicable)			Per ANSI C63.4-1992/2000 Draft, 10.1.4
(1) Transducer					
X	i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.	Sep-05
	i00065	EMCO 3301-B Active Monopole	2635	24 mo.	Sep-05
X	i00089	Apriel 2001 200MHz-1GHz	001500	24 mo.	Sep-05
X	i00103	EMCO 3115 1GHz-18GHz	9208-3925	24 mo.	Jan-04
(3) Amplifier					
X	i00028	HP 8449A	2749A00121	12 mo.	May-05
(4) Spectrum Analyzer					
X	i00029	HP 8563E	3213A00104	12 mo.	May-05
X	i00033	HP 85462A	3625A00357	12 mo.	Sep-05
	i00048	HP 8566B	2511AD1467	12 mo.	Jun-05

Name of Test: Field Strength of Spurious Radiation

State: 2:High Power g0590017: 2005-Sep-02 Fri 10:53:00

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV	CF, dB	V/H	uV/m @ 3m	ERP, dBm	Margin, dB
2479.000000	4958.314544	-0.33	39.25	H	88.31	-58.5	-15.1
2479.000000	4958.349352	-3.00	39.25	V	64.94	-61.1	-17.8
2479.000000	7437.370750	6.57	42.38	V	280.22	-48.4	-5.1
2479.000000	7437.467031	4.93	42.38	H	232.01	-50.1	-6.7
2479.000000	9916.463013	2.20	46.69	H	278.29	-48.5	-5.1
2479.000000	9916.466729	2.03	46.69	V	272.90	-48.7	-5.3
2479.000000	12395.614095	1.03	47.39	H	263.63	-49.0	-5.6
2479.000000	12395.618111	1.53	47.39	V	279.25	-48.5	-5.1
2479.000000	14874.309927	-1.83	50.47	H	270.40	-48.7	-5.4
2479.000000	14874.351278	-1.50	50.47	V	280.87	-48.4	-5.0

State: 2:High Power g0590018: 2005-Sep-02 Fri 11:10:00

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV	CF, dB	V/H	uV/m @ 3m	ERP, dBm	Margin, dB
2445.000000	4890.094500	6.35	39.27	V	190.99	-51.8	-8.4
2445.000000	4890.094500	6.39	39.27	H	191.87	-51.7	-8.3
2445.000000	7335.401027	-2.50	41.89	V	93.22	-58.0	-14.6
2445.000000	7335.408343	-3.00	41.89	H	88.00	-58.5	-15.1
2445.000000	9780.437509	-2.67	46.87	H	162.18	-53.2	-9.8
2445.000000	9780.449743	-1.17	46.87	V	192.75	-51.7	-8.3
2445.000000	12225.379043	-1.50	48.94	H	235.50	-49.9	-6.6
2445.000000	12225.383693	-2.83	48.94	V	202.07	-51.3	-7.9
2445.000000	14670.392843	-2.00	48.04	V	200.45	-51.3	-8.0
2445.000000	14670.413209	-3.00	48.04	H	178.65	-52.3	-9.0

State: 2:High Power g0590019: 2005-Sep-02 Fri 11:21:00

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV	CF, dB	V/H	uV/m @ 3m	ERP, dBm	Margin, dB
2402.000000	4804.090000	5.97	39.30	V	183.44	-52.1	-8.7
2402.000000	4804.090000	6.06	39.30	H	185.35	-52.0	-8.6
2402.000000	7206.319444	-2.33	41.27	V	88.51	-58.4	-15.1
2402.000000	7206.370778	-2.50	41.27	H	86.80	-58.6	-15.2
2402.000000	9608.324444	-2.67	47.11	V	166.72	-52.9	-9.6
2402.000000	9608.346344	-0.33	47.11	H	218.27	-50.6	-7.2
2402.000000	12010.340744	-3.00	50.95	V	249.75	-49.4	-6.1
2402.000000	12010.361627	-1.83	50.95	H	285.76	-48.3	-4.9
2402.000000	14412.292161	-3.00	46.57	V	150.83	-53.8	-10.4
2402.000000	14412.316427	-1.67	46.57	H	175.79	-52.5	-9.1



Performed by:

Fred Chastain, Test Technician

Name of Test: Radiated Spurious Emissions (Non-Harmonic)

Guide: ANSI C63.4:2003

Test Equipment: As per previous page

15.249(c): Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emissions limits in § 15.209, whichever is the lesser attenuation.

Measurement Results: Radiated Spurious Emissions (Non-Harmonic)
 Frequency of Carrier, MHz = 2445.000000
 Spectrum Searched = 0 to 10 x F_C

Name Of Test: Radiated Spurious Emissions
 g0590020: 2005-Sep-02 Fri 11:38:00

Frequency Emission, MHz	Meter, dBuV	@ m	C.F., dB	Limit, uV/m	uV/m	@ m
35.035000	25.02	3	11.38	100.0	66.07	3
45.580000	19.55	3	12.36	100.0	39.40	3
55.730000	12.78	3	10.81	100.0	15.12	3
115.040000	14.87	3	10.88	150.0	19.39	3
135.310000	11.87	3	11.85	150.0	15.35	3
146.510000	10.68	3	12.14	150.0	13.84	3
176.510000	9.16	3	12.20	150.0	11.69	3
176.860000	13.40	3	12.24	150.0	19.14	3
214.110000	12.60	3	14.72	150.0	23.23	3
216.860000	9.40	3	14.89	200.0	16.39	3
235.860000	16.11	3	15.91	200.0	39.90	3
248.310000	15.86	3	16.57	200.0	41.83	3
265.860000	12.35	3	19.78	200.0	40.41	3
266.580000	9.55	3	19.92	200.0	29.75	3
283.230000	12.40	3	22.96	200.0	58.61	3
293.880000	12.27	3	24.85	200.0	71.78	3
295.510000	12.58	3	25.14	200.0	76.91	3
303.050000	14.22	3	15.35	200.0	30.10	3
330.350000	8.69	3	15.95	200.0	17.06	3
354.350000	10.01	3	16.52	200.0	21.21	3
388.950000	14.65	3	17.26	200.0	39.40	3
390.200000	13.15	3	17.30	200.0	33.30	3
434.130000	14.34	3	18.07	200.0	41.73	3



Performed by: Fred Chastain, Test Technician

Name Of Test: Radiated Spurious Emissions (Cont)

g0590020: 2005-Sep-02 Fri 11:38:00

Frequency Emission, MHz	Meter, dBuV	@ m	C.F., dB	Limit, uV/m	uV/m	@ m
440.200000	12.13	3	18.17	200.0	32.73	3
441.750000	13.47	3	18.19	200.0	38.28	3
500.200000	14.38	3	18.99	200.0	46.61	3
612.850000	10.61	3	25.01	200.0	60.39	3
665.050000	10.21	3	25.81	200.0	63.24	3
672.850000	10.84	3	25.94	200.0	69.02	3
714.000000	12.09	3	26.23	200.0	82.41	3
744.130000	13.81	3	25.85	200.0	96.16	3
761.200000	11.58	3	25.63	200.0	72.53	3
762.500000	12.63	3	25.61	200.0	81.66	3
780.130000	13.28	3	25.37	200.0	85.61	3
803.000000	12.05	3	25.14	200.0	72.36	3
833.630000	11.50	3	25.46	200.0	70.47	3
902.380000	15.92	3	26.22	200.0	127.94	3
906.130000	16.11	3	26.35	200.0	132.74	3

All other emissions in the required measurement range were more that 20 dB below the required limits.



Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11
Test Equipment: As per previous page

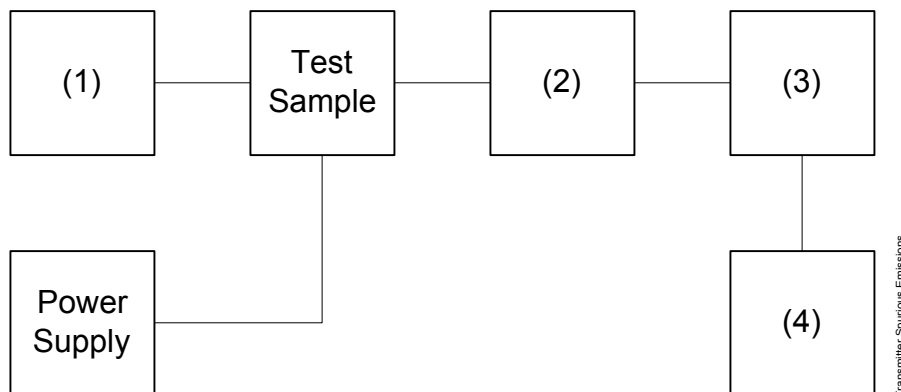
Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ± 2.5 kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. Measurement Results: Attached

Transmitter Spurious Emission

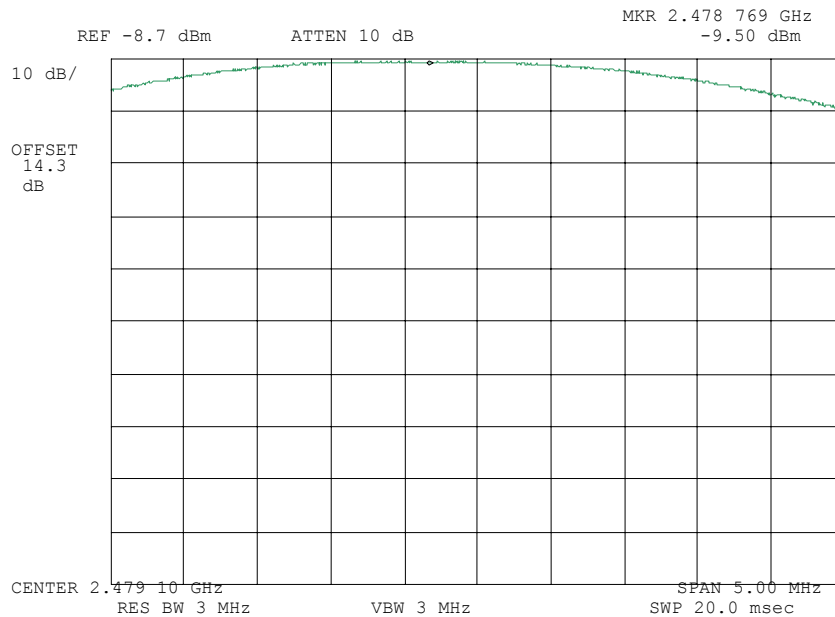
Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious



Asset (as applicable)	Description	s/n	Cycle	Last Cal
(1) Audio Oscillator/Generator				
X i00017	HP 8903A Modulation Meter	2216A01753	12 mo.	Apr-05
(2) Coaxial Attenuator				
X i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
i00123	NARDA 766 (10 dB)	7802A	NCR	
(3) Interface				
X i00021	HP 8954A Transceiver Interface	2146A00159	NCR	
(4) Spectrum Analyzer				
X i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Jul-05
i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo.	May-05

Name of Test: Emission Masks (Occupied Bandwidth)
g0590025: 2005-Sep-12 Mon 09:05:00
State: 0:General



Power:
Modulation:

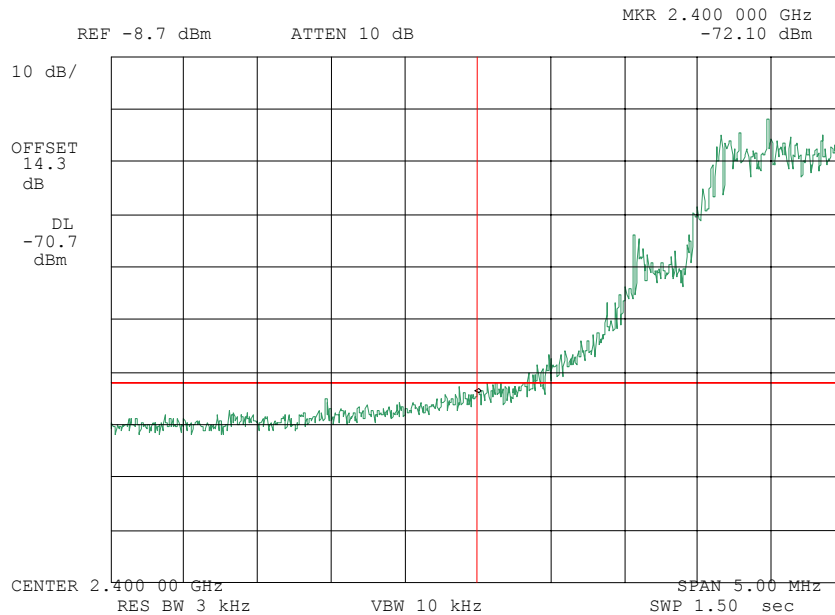
LOOSE COUPLED
MAX BW POWER

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g0590026: 2005-Sep-12 Mon 09:12:00
State: 0:General



Power:
Modulation:

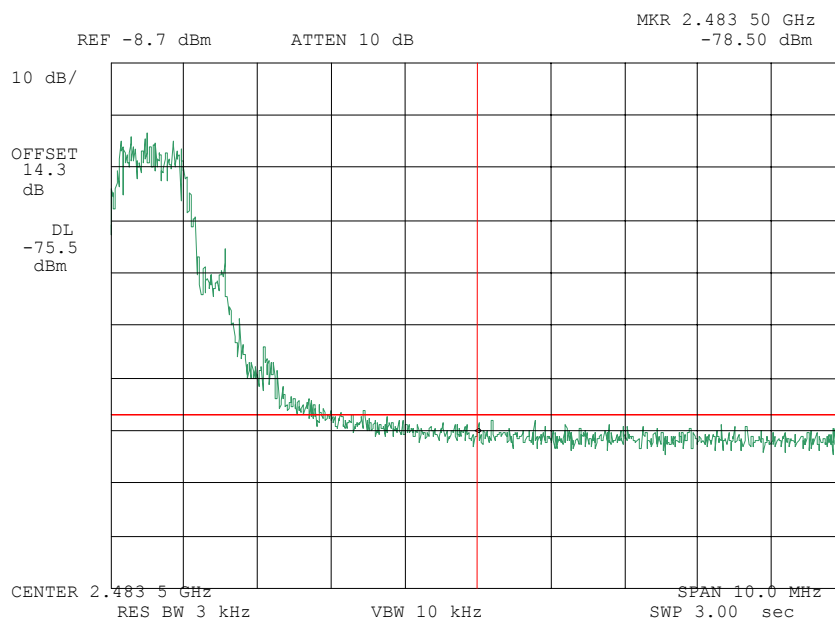
LOOSE COUPLED
LOW BAND EDGE (-70.7dBc below 2400.0MHz)
Limit -50dBc or 15.209

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g0590027: 2005-Sep-12 Mon 09:14:00
State: 0:General



Power:
Modulation:

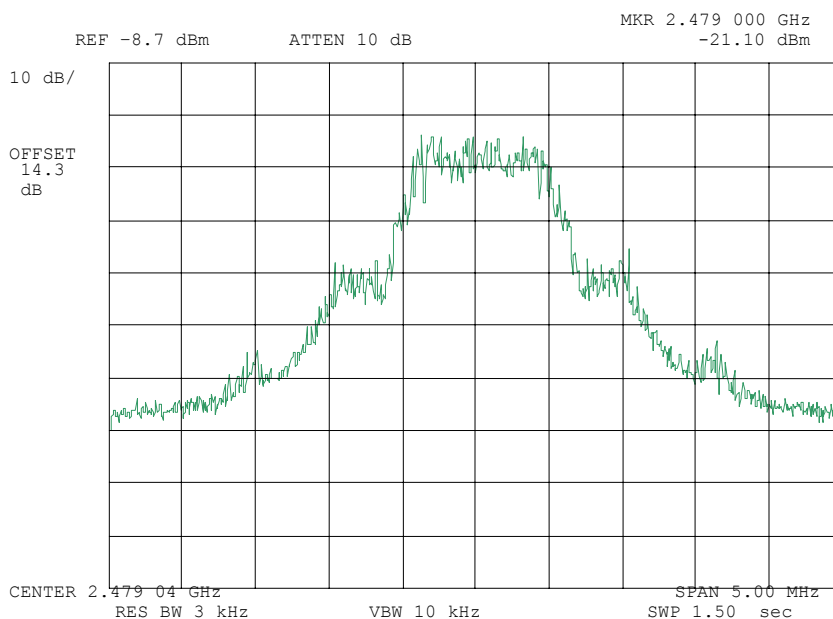
LOOSE COUPLED
HI BAND EDGE (-75.5dBc above 2483.5MHz)
Limit -50dBc or 15.209

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g0590028: 2005-Sep-12 Mon 09:16:00
State: 0:General



Power:
Modulation:

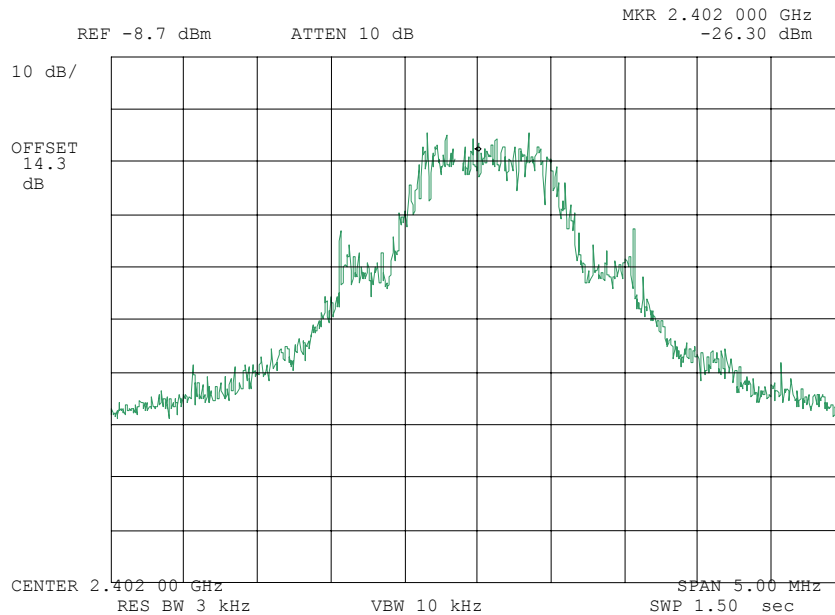
LOOSE COUPLED
HI CHANNEL

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g0590029: 2005-Sep-12 Mon 09:17:00
State: 0:General



Power:
Modulation:

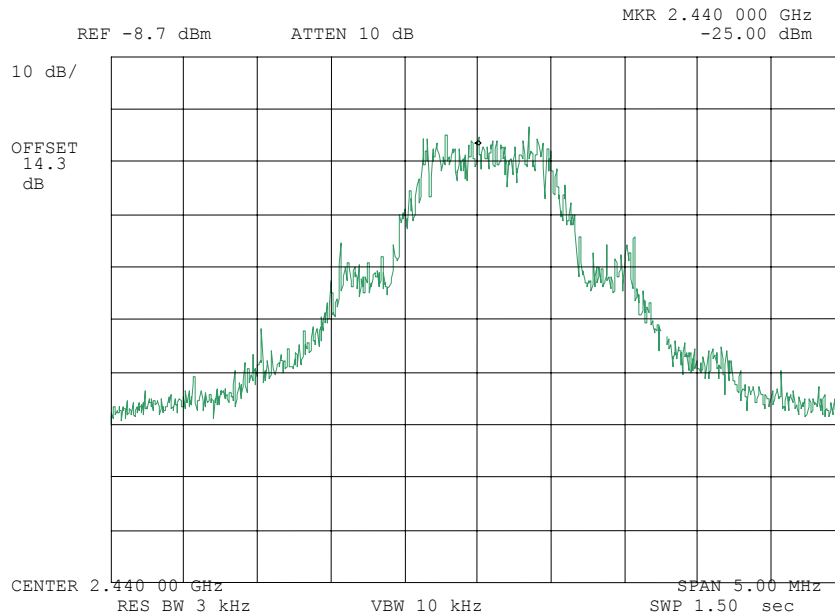
LOOSE COUPLED
LO CHANNEL

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g0590030: 2005-Sep-12 Mon 09:19:00
State: 0:General



Power:
Modulation:

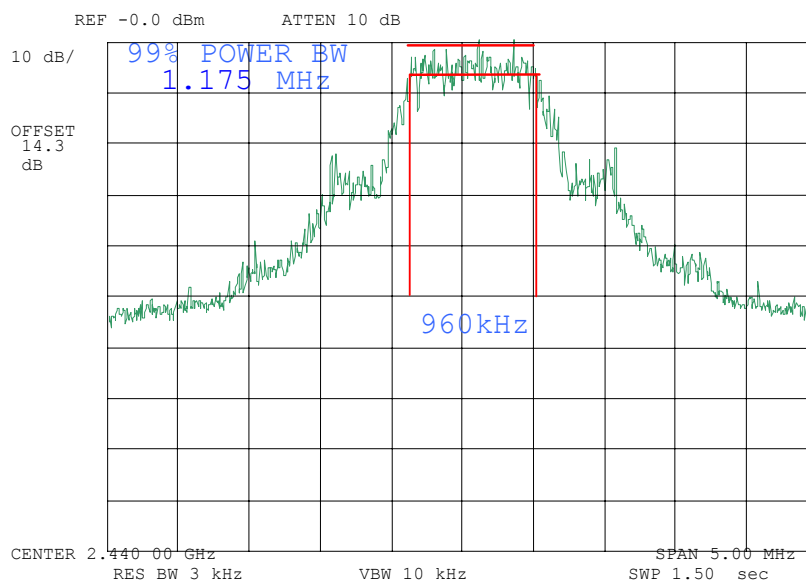
LOOSE COUPLED
MID CHANNEL

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g0590031: 2005-Sep-12 Mon 09:20:00
State: 0:General



Power:
Modulation:

LOOSE COUPLED
MID CHANNEL
6dB BW 960kHz (Marker Delta Method)
99% Power BW 1.175MHz

Fred Chastain

Performed by:

Fred Chastain, Test Technician

Name of Test: Spread Spectrum Technology
Direct Sequence Systems

15.247(d) Transmitter Power Density

Limit: The transmitter power density peak over any 1 second interval shall not be greater than 8dBm in any 3 kHz Bandwidth within these bands.

Results:

Frequency	Measured dBm @ 1Hz	Calculated dBm @ 3kHz	Margin dBm
2402.000	-32.90	1.90	-6.10
2440.000	-32.10	2.70	-5.30
2479.000	-31.75	3.05	-4.95

Power Spectral Density per 3-kHz bandwidth = Power Spectral Density per 1-Hz bandwidth + Bandwidth Correction Factor.
Bandwidth Correction Factor = $10 \cdot \log(3 \text{ kHz} / 1 \text{ Hz}) = 34.8 \text{ dB}$

15.247(e) Processing Gain

Limit: The processing gain shall be $\geq 10 \text{ dB}$

Results: See Applicant's statement



Performed by:

Fred Chastain, Test Technician

Name of Test: A/C Powerline Conducted Emissions

Specification: FCC: 47 CFR 15.27

Guide: IEEE Standard 213

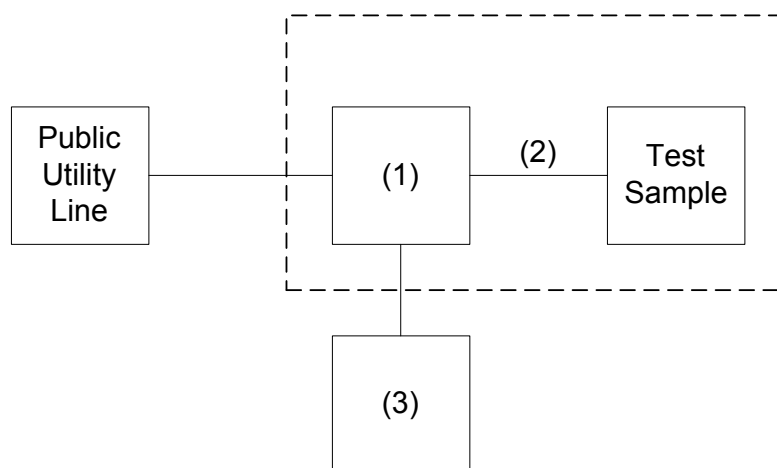
Test Conditions: S. T. & H.

Test Equipment: As per attached page

Measurement Procedure

1. A test sample was connected to the Public Utility lines through a LISN (50 μ H).
2. A reference level of 250 μ V was set on the Spectrum Analyzer. The spectrum was searched over the range of 150 kHz to 30 MHz.
3. All other emissions were 20 dB or more below limit.
4. ☐ The test sample used a charger.
☒ The test sample does not use a charger.

AC Powerline Conducted Measurements



Asset	Description	s/n	Cycle	Last Cal
(1) Line Impedance Stabilization Network				
X i00244	Fischer 50-20-2-01	2047	NCR	
(2) Screen Room				
X i00170	Lindgren LG170	4999	NCR	
(3) Spectrum Analyzer				
X i00033	HP 85462A	3625A00357	12 mo.	Sep-05
i00048	HP 8566B	2511AD1467	12 mo.	May-05

Results:

A/C Powerline Conducted Emissions

g0590021: 2005-Sep-07 Wed 14:41:00

State: 0:General

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	C.F., dB	$\mu\text{V/m}$
0.000000	0.151800	52.55	-8.17	165.58
0.000000	0.203400	50.90	-8.57	130.77
0.000000	0.274300	47.63	-8.81	87.30
0.000000	0.344300	43.46	-8.90	53.46
0.000000	0.409900	43.18	-8.90	51.76
0.000000	0.481600	38.99	-8.88	32.03
0.000000	0.546300	38.18	-8.89	29.14
0.000000	0.615000	39.21	-8.90	32.77
0.000000	0.683800	41.14	-8.90	40.93
0.000000	0.752500	41.14	-8.91	40.88
0.000000	0.822500	38.85	-8.91	31.41
0.000000	0.893800	39.35	-8.92	33.23
0.000000	0.965000	37.11	-8.91	25.70
0.000000	1.300000	42.03	-8.91	45.29
0.000000	1.920000	42.80	-8.91	49.49
0.000000	2.480000	43.09	-8.90	51.23
0.000000	3.160000	42.52	-8.88	48.08
0.000000	3.990000	41.71	-8.86	43.90
0.000000	4.620000	41.31	-8.82	42.12
0.000000	5.450000	43.53	-8.78	54.64
0.000000	8.450000	36.38	-8.63	24.41
0.000000	10.050000	36.83	-8.57	25.88
0.000000	10.880000	32.05	-8.53	15.00
0.000000	12.950000	33.28	-8.42	17.50
0.000000	14.780000	37.82	-8.33	29.82
0.000000	15.640000	39.17	-8.30	34.95
0.000000	18.190000	34.44	-7.90	21.23
0.000000	21.600000	29.65	-7.71	12.50
0.000000	23.960000	27.08	-7.92	9.08
0.000000	25.880000	23.33	-7.89	5.92
0.000000	28.010000	21.80	-7.84	4.99
0.000000	29.510000	17.86	-7.81	3.18



Performed by:

Fred Chastain, Test Technician

Results:

A/C Powerline Conducted Emissions

g0590022: 2005-Sep-07 Wed 14:57:00

State: 0:General

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	C.F., dB	$\mu\text{V/m}$
0.000000	0.151800	53.46	-8.14	184.50
0.000000	0.204300	51.26	-8.55	136.62
0.000000	0.274300	46.74	-8.78	79.07
0.000000	0.343400	39.99	-8.90	35.85
0.000000	0.413400	40.98	-8.90	40.18
0.000000	0.481600	40.32	-8.90	37.24
0.000000	0.548800	35.66	-8.91	21.75
0.000000	0.616300	37.93	-8.93	28.18
0.000000	0.686300	34.79	-8.94	19.61
0.000000	0.755000	33.70	-8.96	17.26
0.000000	0.825000	33.12	-8.96	16.14
0.000000	0.893800	31.86	-8.97	13.95
0.000000	0.962500	31.86	-8.97	13.95
0.000000	1.230000	35.02	-8.99	20.02
0.000000	1.780000	37.70	-8.99	27.26
0.000000	2.200000	39.58	-8.97	33.92
0.000000	2.760000	40.77	-8.93	39.08
0.000000	3.660000	43.65	-8.87	54.83
0.000000	4.140000	44.06	-8.83	57.74
0.000000	4.550000	43.21	-8.81	52.48
0.000000	5.180000	41.83	-8.77	44.98
0.000000	6.500000	39.93	-8.68	36.52
0.000000	9.300000	33.52	-8.55	17.72
0.000000	11.850000	31.42	-8.43	14.11
0.000000	13.580000	34.68	-8.35	20.73
0.000000	14.050000	36.16	-8.33	24.63
0.000000	15.340000	39.40	-8.21	36.27
0.000000	18.080000	36.10	-7.90	25.70
0.000000	21.710000	33.42	-7.73	19.25
0.000000	25.350000	24.45	-7.72	6.86
0.000000	27.640000	25.32	-7.61	7.68
0.000000	29.440000	18.28	-7.53	3.45



Performed by:

Fred Chastain, Test Technician

Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = GFSK

Necessary Bandwidth Calculation:

99% Power Bandwidth

1.175MHz



Performed by:

Fred Chastain, Test Technician

Radiated Measurements For Part 15 Transmitters with 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:

David E. Lee, Quality Assurance Manager