FCC Certification / Technical Report

FCC Test Specification	**:**	Certification for FCC Part 15, Subpart C §15.231
Manufacturer	**:**	Nuventions, Inc.
Equipment Under Test	**:**	Wireless Humidity Alarm Transmitter Model Cigar Sentry
Test Report No.	**:**	NUV-001D
Purchase Order No.	**:**	2007

Document History					
Revision	**Issue Date**	**Affected Pages**	**Description of Modifications**	**Revised By**	**Approved By**
N/C	11 December, 2000		Initial release		

FCC Certification / Technical Report
Document No. NUV-001D
From
G&M Compliance, Inc.
(Garwood Laboratories)

Test for
Nuventions, Inc.
Wireless Humidity Alarm Transmitter
Model Cigar Sentry

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Test Personnel	***Test Dates***
Arnie Tapia – EMC Engineer	27 October - 28 November, 2000

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TABLE OF CONTENTS (This document contains a total of 27 pages, excluding attachments)

MEASUREMENT / TECHNICAL REPORT SUMMARY

Manufacturer Company	Nuventions, Inc.
Address	2007 East Rock Wren Road
City, State, Zip	Phoenix, AZ 85048
Country	USA
Contact Name	Mr. Marco Mularoni
Phone	(480) 460-7390
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Type of Authorization	Certification for an Intentional Radiator
Applicable FCC Rules	Prepared in accordance with the requirements of FCC Rules and Regulations as listed in 47 CFR Ch.1 Parts 0 to 19 (10-1-98 Edition). The following subparts are applicable to the results in this test report: Part 15, Subpart C – Intentional Radiators § 15.231 Periodic Operation in the band 40.66-40.70 MHz and above 70 MHz § 15.203 Antenna requirements § 15.207 Conducted limits (N/A) § 15.209 Radiated emission limits; general requirements Part 2, Subpart J – Equipment Authorization Procedures Certification sections
Equipment Under Test	Wireless Humidity Alarm Transmitter Model Cigar Sentry
Summary of Data	The EUT complied with all the applicable FCC rules as listed above.

EMC Test Laboratory	G&M Compliance, Inc. (Garwood Laboratories)
Facility	World Compliance Division
Address	565 Porter Way
City, State, Zip Code	Placentia, CA 92870
Country	USA

1. GENERAL INFORMATION

1.1 Product Description

Equipment Under Test	Wireless Humidity Alarm Transmitter
Model Number	Cigar Sentry
Description	The equipment under test (EUT) is a wireless humidity alarm transmitter for monitoring humidity levels in a cigar storage container. The transmitter is powered by 2 AA batteries. The microprocessor-controlled sensor monitors the humidity level and transmits up to 50 feet its status to the receiver (Plug-in unit, which already complies to FCC part 15B).
Transmitting Frequency	315.0 MHz

1.2 Related Submittal(s)/ Grant(s)

N/A

1.3 Tested System Description

The Tested System was configured with all typical peripherals (or terminations) and operated to generate the maximum emissions during the test. Refer to Section 3.5 and Section 3.6 for the configuration of the EUT during testing, support/peripheral equipment used during testing and cabling information.

1.4 Test Methodology

The test for unwanted emissions was performed according to the general provisions of ANSI C63.4-1992 (American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz).

The EUT was setup on a non-conductive table, 1.0 x 1.5m, in the Open Area Test Site. The test for unwanted emissions was performed at an EUT to receiving antenna distance of 3 meters. The radiated emissions were maximized by rotating the turntable 360 degrees and varying the antenna height from 1 to 4 meters. The field strength of the fundamental frequency and harmonics, up to the 10^{th} harmonic, were measured utilizing a BiLog and Double Ridge Guide Horn antenna. Measurements were made in both, vertical and horizontal antenna polarizations.

1.5 Test Facility

The Open Area Test Site (OATS) and measurement facilities used to collect the test data are located in Placentia, CA. This facility has been fully described in a report submitted to the FCC and accepted in a letter dated 28 January 2000 (31040/SIT 1300F2) registration #90681.

The test facility is also recognized and accredited from following accreditation organizations:

NVLAP

The lab is recognized under the National Voluntary Laboratory Accreditation Program (*NVLAP/NIST*) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Code: 200119-0, Effective through December 31, 2000.

FCC

This site has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Reference : 31040/SIT 1300F2, Registration #90681, January 28, 2000. With the above and NVLAP, the lab is an authorized test laboratory for the DoC process.

Technology International (I²T)

The lab has been assessed in accordance with ISO Guide *25* and with ITI's assessment criteria. Based upon this assessment, Technology International (Europe), Ltd. Has granted approval for specifications implementing the EU Directive on EMC (89/336/EEC). The scope of the approval was provided on a Schedule of Assessment supplied with a certificate and is available upon request. Certificate #99-051, Dated: May 5, 1999.

ACA

The lab can also perform testing for the Australian C-Tick mark as a result of our NVLAP accreditation and the MRA (Mutual Recognition Agreement) between the US and Australia.

VCCI

The lab has been accepted as a member to the VCCI. Our conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures. Registration C574, C575, C576, R561 Effective through February 4, 2000 (Renewal Pending).

Industry Canada

The lab is registered by Industry Canada for performance of measurements and complies with RSP 100. Reference IC 3298, Dated: March 11, 1999.

BSMI (Formerly known as BCIQ)

The lab can perform testing for Taiwan to the CNS requirements. This is as a result of our NVLAP accreditation and the MRA (Mutual Recognition Agreement) between the US and Taiwan.

2. PRODUCT LABELING

2.1 FCC ID Label

All devices authorized under the certification procedures are required to display an identification label showing the FCC Identifier (FCC ID) under which they are authorized.
Example:

FCC ID: XXX123

XXX = Indicates manufacturer's Grantee Code
123 = Indicates manufacturer's Equipment Product Code

In addition, the manufacturer (or importer) is responsible for having the compliance label produced, and for having it affixed to each unit that is marketed or imported.

FCC Compliance Label:

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference including interference that may cause undesired operation.

2.2 Location of Label on EUT

As stated in §15.19, the label shall be located in a conspicuous location on the device. When the device is so small or for such use that it is not practicable to place the compliance label on it, the information required should be placed in a prominent location in the instruction manual or pamphlet supplied to the user. Alternatively, the compliance label can be placed on the container in which the device is marketed. However, the FCC identifier must be displayed on the device.

2.3 Information to the user

The users manual or instruction manual for an intentional or unintentional 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.

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT was used in a system configured for testing in a typical fashion, as a customer would normally use it.

3.2 EUT Exercise Software/Equipment

The following operating mode was used during testing to exercise the functions of the EUT.

Upon power up, all the functions of the EUT were enabled. The reset button on the transmitter was pressed and released. This allowed the EUT to transmit a test signal.

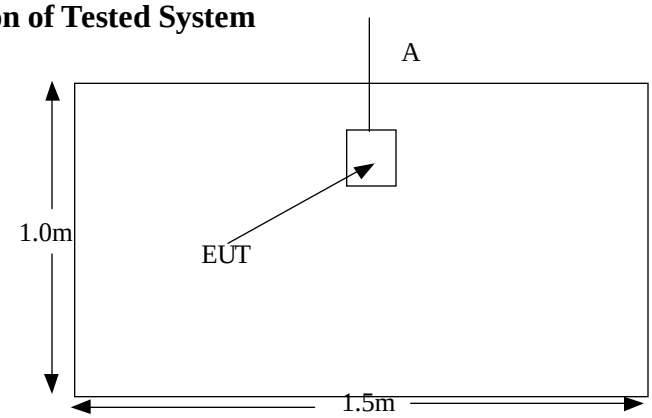
3.3 Special Accessories

The EUT requires no special accessories to comply with the limits.

3.4 Equipment Modifications

No modifications were made to achieve the required specification limit.

3.5 Configuration of Tested System



The Cigar Sentry Alarm Transmitter was tested as a stand-alone system

3.6 Details of Tested System

The following table lists the accessory/peripheral equipment used during testing of the EUT. FCC ID numbers are included if available for a tested system component.

Accessory/Peripheral Equipment			
Item No.	***Manufacturer***	***Description***	***Identification Numbers***
1	None	None	Model No: Not applicable Serial No.: Not applicable

The EUT was tested as a stand-alone system. No accessory/peripheral equipment was used during testing.

The following table lists all of the cabling details for the tested system.

Cabling of The Tested System					
Item No.	***Description***	***Length (m)***	***Type Shielded-S Unshielded-US***	***Connected From***	***Connected To***
	N/A				

4. BLOCK DIAGRAM(S) OF EUT

Please refer to the Attachment Section of this report for a Block Diagram of the EUT.

5. Test Measurement and EUT Photos

Photo: Radiated Emissions (Front View)

Photo: Radiated Emissions (Rear View)

EUT (Top View)

EUT (Back View)

EUT (Side View 1)

EUT (Side View 2)

EUT (top cover removed)

EUT (bottom cover removed)

6. TEST DATA

6.1 General Radiated Emissions Requirements

Emissions that are radiated outside of the specified frequency bands, except for harmonics, should be attenuated by at least 50 dB below the level of the fundamental or to the general radiated limits in §15.209, whichever is the lesser attenuation.

6.2 General Radiated Emissions Results

The following data lists the significant emission frequencies, measured levels, correction factor (includes cable, preamplifier and antenna corrections), the corrected reading, plus the limit.

Worst-Case Radiated Emissions from 30 – 1000MHz				
	Frequency (MHz)	***Detection Mode***	***Corrected Reading (dBµV/m)***	***Delta to the 10m Quasi-Peak Limit(dB)***
1.	NDS	-	-	-

- All readings are peak with specified CISPR bandwidth unless stated otherwise.

NDS: There were no detectable signals from the EUT from 30 – 1000MHz.

6.3 Field Strength of Emissions Requirement

FCC Part 15, Subpart C, § 15.231		
Fundamental Frequency (MHz)	Field Strength of Fundamental (µV/m)	Field Strength of Spurious Emissions (µV/m)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750*	125 to 375*
174-260	3,750	375
260-470	3,750 to 12,500*	375 to 1,250*
Above 470	12,500	1,250

*Linear Interpolations. The following formula was used to calculate the limit:

(125/3) x f (MHz) – (21250/3) µV/m = Limit, for a test distance of 3 meters, where f (MHz) is the EUT's fundamental frequency.

The fundamental frequency of the EUT is 315.0 MHz. The applicable limits for the EUT are those listed for the fundamental frequency falling within the frequency band of 260-470 MHz.

6.4 Summary Table for Highest Field Strength Levels

The following table lists the fundamental and harmonic emission frequencies, spectrum analyzer measured levels, correction factor (includes cable loss, preamplifier gain and antenna factor), the corrected reading, and the specification limit.

Test Results:
Company Name: Cigar Sentry
EUT Name: Wireless Humidity Alarm (Sensor/transmitter)
Operating Frequency: 315.0 MHz
Field Strength of Emissions from an Intentional Radiator (Reference: FCC Pt.15 Subpart C, §15.231(b))
FCC Average Limit for the Fundamental: (125/3) x f (MHz) – (21250/3) µV/m @3meters = 6041.67 µV/m
FCC Average Limit for the Harmonics: 604.17µV/m

Polarity (V &H)	Frequency (MHz)	S.A. Reading Peak (dBµV)	Correction Factor (dB)	Peak Field Strength at 3 meters (dBµV/m)	Peak Field Strength at 3 meters (µV/m)	Average Field Strength at 3 meters (µV/m)	FCC Limit at 3 meters (µV/m)
V	315	81.8	-6.5	75.3	5,821.03	-	6,041.67
H	315	94.2	-6.5	87.7	24,266.10	2,426.61	6,041.67
V	630	52.6	1.9	54.5	530.88	-	604.17
H	630	62.3	1.9	64.2	1,621.81	162.18	604.17
V	945	30.5	7.0	37.5	74.99	-	604.17
H	945	37.0	7.0	41.0	112.20	-	604.17
V	1260	47.50	-4.09	43.41	148.08	-	604.17
H	1260	55.80	-4.09	51.71	385.03	-	604.17
V	1575	40.20	-1.26	38.94	88.51	-	604.17
H	1575	48.40	-1.26	47.14	227.51	-	604.17
V	1890	NDS	1.58	NDS	NDS	NDS	604.17
H	1890	NDS	1.58	NDS	NDS	NDS	604.17
V	2205	NDS	3.73	NDS	NDS	NDS	604.17
H	2205	34.10	3.73	37.83	77.89	-	604.17
V	2520	NDS	5.46	NDS	NDS	NDS	604.17
H	2520	NDS	5.46	NDS	NDS	NDS	604.17
V	2835	NDS	6.61	NDS	NDS	NDS	604.17
H	2835	NDS	6.61	NDS	NDS	NDS	604.17
V	3150	NDS	8.15	NDS	NDS	NDS	604.17
H	3150	NDS	8.15	NDS	NDS	NDS	604.17

Average emission measurements were employed and the provisions in §15.35 for averaging pulsed emissions and for limiting peak emissions were followed.

NDS (No Detectable Signal)

6.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG

Where: FS = Field strength
RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier gain

Example:

Assume a receiver reading of 52.5 dBµV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBµV/m.

FS = 52.5 + 7.4 + 1.1 - 29 = 32 dBµV/m

6.6 Occupied Bandwidth

Requirement:
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900MHz. The bandwidth is determined at the points 20 dB down from the modulated carrier.

Occupied Requirement for the EUT:

315 MHz x 0.0025 = 787.5 kHz (Should not exceed 787.5 kHz)

Test Result:

The EUT complied with the occupied bandwidth requirement.

APPENDIX A - TEST EQUIPMENT USED

The absolute performance calibration of equipment requiring calibration is performed on an as needed basis in accordance with MIL-STD 45662A. However, calibration periods do not exceed one (1) year. The test equipment is capable of making measurements within tolerances of at least +/- 2dB amplitude and +/- 2% frequency deviation. Equipment certifications showing traceability to NIST (National Institute of Standards and Technology) are maintained on file at the test facility. All equipment is checked and verified for proper operation before and after each series of tests.

A.1 Specific Equipment Used

Test	*Instrument*	*MFG / Model No.*	*Asset No.*	*CAL. Due Date*
Conducted Emission Test				
	EMI Receiver System	Hewlett Packard	System 1	02/25/01
	RF Coax Cable	Pasternack / RG 223	20170	03/05/01
	Line Impedance Stabilization Network	FCC / LISN-50-25-2	20073	06/10/01
Radiated Emission Test				
	EMI Receiver System	Hewlett Packard	System 3	02/05/01
	RF Coax Cable	Times Microwave / LMR 600	20180	03/05/01
	BiLog Antenna	Chase / CBL6111A	20062	07/09/01
	Pre-Amplifier	ISCI / RFPA/Z FL-2000	20007	03/05/01
	Spectrum Analyzer	Hewlett Packard / 8566B	20257	02/24/01
	Preamplifier (Above 1000MHz)	Hewlett Packard / 8449B	20003	10/14/01
	Double Ridge Guide Horn Antenna	Emco / 3115	20056	01/13/01

APPENDIX B – SUPPLEMENTAL TEST DATA

Test Type	*Basic Standard*	*Details*	*Data Format*	*Page No.*
Duty Cycle Calculation	FCC Pt.15 §15.35	Provisions in §15.35 for averaging pulsed emissions and limiting peak emissions were followed. Total on time of the EUT is 5.9ms	Plotted	D1

D1

ATTACHMENTS

INDEX OF ATTACHMENTS