MEASUREMENT/TECHNICAL REPORT

Company: General Sensors, Incorporated
FRN: 0006564041
Model
WIAS3
FCC ID: P72WIAS3

Description: This is a report to support a request for an original grant of equipment authorization.

Equipment Type: Low Power Communications Device Transmitter (DXX)

Report prepared for: General Sensors, Incorporated
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Report prepared by: Mairaj Hussain
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Introduction

This report is an application for Certification of a Transmitter operating pursuant to 47 CFR 15.231. The model number covered by this report is WIAS3. This report is designed to demonstrate the compliance of these devices with the requirements outlined in 47 CFR Part 15 using the methods outlined in 47 CFR Part 2.

EUT Configuration					
Work Order:	C0157				
Company:	General Sensors				
Company Address:	20 Baldwin Drive Branford, CT 06405				
Contact:	Don Hudson				
Person(s) Present:	None				
	MN		**SN**		
EUT:	WIAS3		-		
EUT Description:	Wireless freezing pipe sensor. The WIAS3 is a wireless sensor is designed to sense air and pipe temperatures in unheated areas of a building. In door use only.				
EUT Max Frequency:	418 MHz				
Attenuator values for Tx:	R22 = 910 ohm, C15 = 62 ohm				
Support Equipment:	**MN**		**SN**		
None					
EUT Cables:	**Qty**	**Shielded?**	**Length**	**Ferrites**	
None					
Unpopulated EUT Ports:	**Qty**	**Reason**			
None					

Statement of Conformity

The WIAS3 has been found to conform with the following parts of the 47 CFR as detailed below:

Applicable FCC part 15C section: **15.231 Periodic operation in the band 40.66 – 40.70 MHz and above 70 MHz.**

Part 2	Part 15	Comments
	15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
2.925	15.19	The label will be made from maylor and it will be attached with permanent adhesive. A sample label is shown in the label exhibit.
	15.21	Information to the user is shown in the instruction manual exhibit.
	15.27	No special accessories are required for compliance.
	15.207	The unit is DC powered without the capability of being operated from the AC mains.
	15.231 a(1)	See WIAS3 Operation Under Section 15.231
	15.231 a(2)	See WIAS3 Operation Under Section 15.231
	15.231 a(3)	See WIAS3 Operation Under Section 15.231
	15.231 a(4)	Not employed for radio controlled purposes. See WIAS3 Operation Under Section 15.231
	15.231 b(1)(2)(3)	See attached data tables.
	15. 231 c	See attached graphs of the bandwidth
	15.231 d	NA. Transmitter operates at 418 MHz.
	15.231 e	Satisfies paragraph b through d

Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). The testing was performed at an antenna to EUT distance of 3 or 1 meter(s) below 30MHz and a distance of 10m above 30MHz. The actual test distance used is noted in the test data sheets. The device's performance was investigated to 5 GHz. Since the device is installed in one orientation, the emissions were maximized around the vertical axis and the maximum reading was recorded. The integrated antenna cannot be maximized separately.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report.

Test Facility

Curtis-Straus LLC
All testing for the range 9kHz–5000MHz was performed at Curtis-Straus (A2LA Certificate Number 1627-01). The open area test site used to collect the radiated data is located at 527 Great Road, Littleton, MA 01460. Sites "T" was used.

Test Equipment Used

SPECTRUM ANALYZERS					
x	**Analyzer**	**Model No.**	**Company**	**Serial No.**	**Calibration Due**
x	**GREEN** 9kHz-26.5GHz	8593E	HP	3829A03618	04-OCT-2002

OPEN AREA TEST SITES (OATS)					
x	**Site**	**FCC Code**	**IC Code**	**VCCI Code**	**Calibration Due**
x	**"T"** Texas	93448	IC 2762-T	R-905/ C-480	09-SEP-2002

ANTENNAS					
x	**Antenna**	**Model No.**	**Company**	**Serial No.**	**Calibration Due**
x	**GREEN** Bilog: 30MHz-2GHz	CBL6112B	Chase	2742	26-JAN-2003
x	**ORANGE** Horn: 1-18GHz	3115	EMCO	0004-6123	27-MAY-2003

PREAMPLIFIERS					
x	**Preamplifier**	**Model No.**	**Company**	**Serial No.**	**Calibration Due**
x	**GREEN** 0.01-2000MHz	ZFL-1000-LN	MiniCircuits/ C-S	n/a	22-MAR-2003
x	**ORANGE-BLACK** 1-20GHz	SMC-12A	MITEQ	690639	06-AUG-2002

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

WIAS3 Operation Under Section 15.231

- Manual operation of the unit occurs when the unit is initially installed and tested. Pushing the test button activates the transmission for 453ms and transmission is terminated automatically.
- Automatic transmission occurs every 9 hours when unit "checks-in" with its status. The duration of automatic transmissions is 453ms.
- Periodic Operation, the unit is part of a safety/security system and transmits supervisory signals to insure system integrity. Periodic rate of transmission does not exceed one second per hour for each transmissions.
- Transmissions during alarm conditions. The Tx time limits are waived as indicated in section 15.231. The duration of transmission is 1.4s and it is repeated once every 15 minutes until cleared.

Measurement Results

Operating Frequency

This device operates at 418MHz.

Electric Field Strength Radiation Measurements

Limit calculation at fundamental and spurious:

Limit at 418 MHz from table in 15.231 b = 80.1 dbuV/m
Averaging factor was calculated as:

Max numbers of bits in 100 ms	= 23
no of high in 100 ms	= 12
Averaging factor	= 20 log (23/12)
	= 5.6 db
Adjusted Limit at fundamental	= 5.6 + 80.1 = 85.7 dbuV/m
Limit used for harmonics	= 60.1 + 5.6 = 65.7 dbuV/m
Limit used for other spurious frequencies:	= 60.1 dbuV/m

Radiated Emissions Table

Curtis-Straus LLC

Date: 05-Mar-02 **Company:** General Sensors **Table** 1
Engineer: EG & MH **EUT Desc:** WIAS3 **Work Order:** C0157

Frequency Range: 30-2000MHz **Measurement Distance:** 3 m
Notes: fundamental, harmonics,and spurious **EUT Max Freq:** 418MHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Avg Factor (dB)	Adjusted Reading (dBµV/m)	Adjusted Margin (dB)	Adjusted Result (Pass/Fail)	FCC Part 15 Sec. 231 Limit (dBµV/m)	FCC Part 15 Sec. 231 Margin (dB)	FCC Part 15 Sec. 231 Result (Pass/Fail)
Vpk (no preamp)	418.0	64.6	0.0	16.8	2.4	5.6	78.2			80.1	-1.9	Pass
Vpk	836.0	38.4	21.3	21.1	3.9	5.6	36.5			60.1	-23.6	Pass
Vpk	1254.0	25.7	21.3	23.0	5.1	5.6	26.9			60.1	-33.2	Pass
Vpk	1672.0	26.0	18.7	25.7	6.2	5.6	33.6			60.1	-26.5	Pass
Vpk	36.2	45.9	21.9	16.1	0.4	0.0	40.5			60.1	-19.6	Pass
Vpk	485.2	37.5	21.4	17.8	2.7	0.0	36.6			60.1	-23.5	Pass

Table Result: Pass by -1.9 dB ***Worst Freq:*** 418.0 MHz

Test Site: "T" **Pre-Amp:** Green **Cable:** 65 ft RG8A/U **Analyzer:** Green **Antenna:** Green

Radiated Emissions Table

Curtis-Straus LLC

Date: 05-Mar-02 **Company:** General Sensors **Table** 2
Engineer: EG & MH **EUT Desc:** WIAS3 **Work Order:** C0157

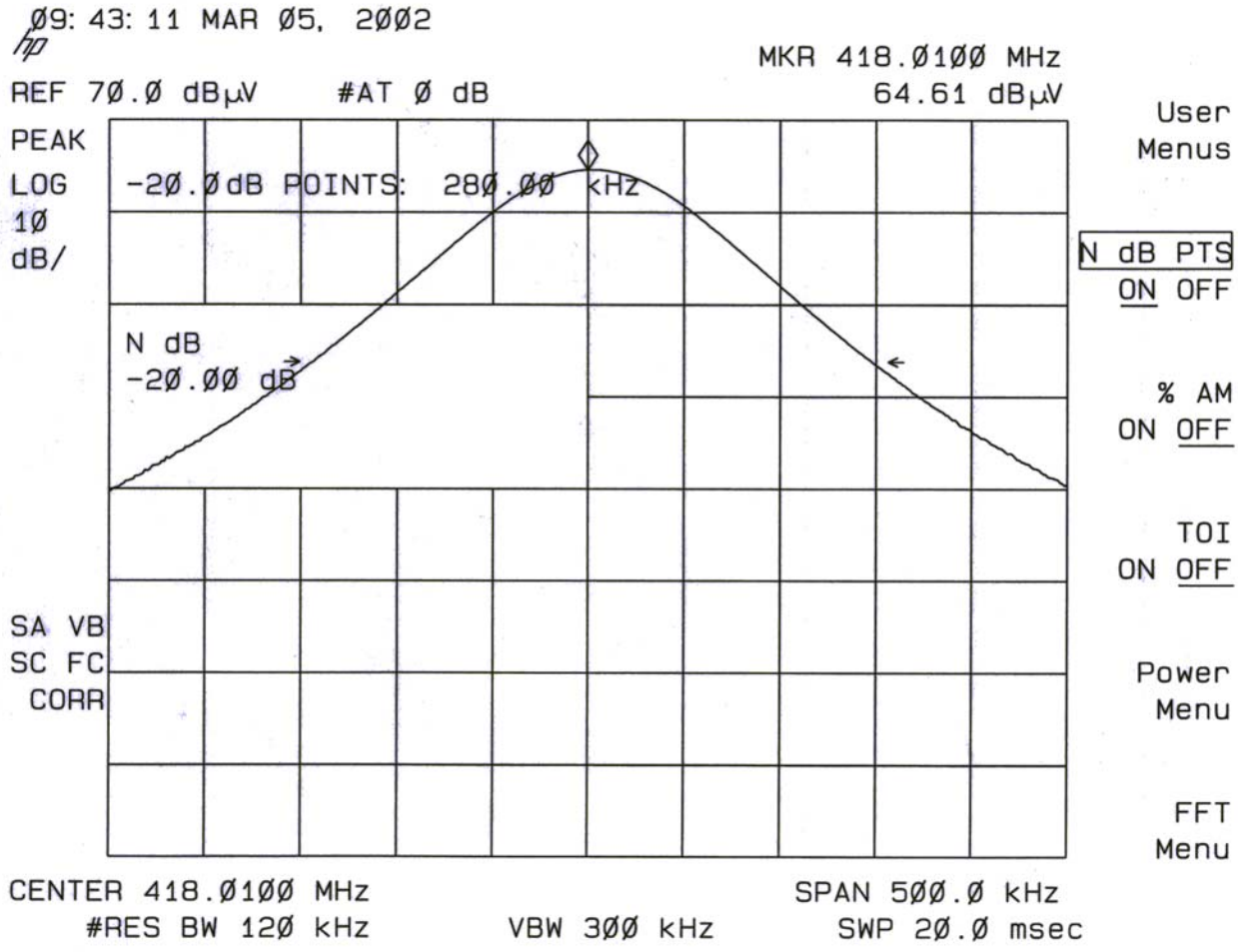
Frequency Range: 2-5GHz **Measurement Distance:** 3 m
Notes: harmonics and spurious **EUT Max Freq:** 418MHz

Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Avg Factor (dBµV/m)	Adjusted Reading (dBµV/m)	Adjusted		FCC Part 15 Sec. 231 Limit (dBµV/m)	FCC Part 15 Sec. 231 Margin (dB)	FCC Part 15 Sec. 231 Result (Pass/Fail)
nf	2090.0	28.6	24.5	29.4	2.1	5.6	30.0			60.1	-30.1	Pass
nf	2508.0	29.0	24.4	30.6	2.4	5.6	32.0			60.1	-28.1	Pass
nf	2926.0	26.7	24.4	31.2	2.6	5.6	30.5			60.1	-29.6	Pass
nf	3344.0	28.2	24.3	32.3	3.0	5.6	33.6			60.1	-26.5	Pass
nf	3762.0	27.6	24.2	33.6	3.4	5.6	34.8			60.1	-25.3	Pass
nf	4180.0	27.0	24.2	34.2	3.6	5.6	35.0			60.1	-25.1	Pass

Table Result: Pass by -25.2 dB ***Worst Freq:*** 4180.0 MHz

Test Site: "T" **Pre-Amp:** Or-Blk **Cable:** 3m Microflex **Analyzer:** Green **Antenna:** Orange Horn

Emissions Plots



Fundamental

20db Bandwidth = 280 KHz
Limit = 418 MHz * 0.0025 = 1,045 KHz