FCC PART 15, SUBPART B and C
TEST REPORT

for

WIRELESS REMOTE SENSOR

MODEL: ACC0414RF

Prepared for

VENSTAR, INC.
9250 OWENSMOUTH AVENUE
CHATSWORTH, CALIFORNIA 91311

Prepared by:_____

KYLE FUJIMOTO

Approved by:_____

MICHAEL CHRISTENSEN

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DATE: MAY 12, 2008

	REPORT BODY	APPENDICES					TOTAL
		A	***B***	***C***	***D***	***E***	
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GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

This report must not be used to claim product endorsement by NVLAP, NIST or any other agency of the U.S. Government.

Device Tested:	Wireless Remote Sensor Model: ACC0414RF S/N: E001
Product Description:	See Expository Statement
Modifications:	The EUT was not modified in order to meet the specifications.
Customer:	Venstar, Inc. 9250 Owensmouth Avenue Chatsworth, California 91311
Test Dates:	April 27 and 28, 2008
Test Specifications:	EMI requirements CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205, 15.209 and 15.231(e)
Test Procedure:	ANSI C63.4
Test Deviations:	The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz – 30 MHz	This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions, 10 kHz – 4400 MHz (Transmitter Portion)	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.205, 15.209, and 15.231(e).
3	Radiated RF Emissions, 10 kHz – 4400 MHz (Digital Portion)	Complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B.
4	-20 dB Bandwidth	Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231(c).

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Wireless Remote Sensor, Model: ACC0414RF. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class B** specification limits defined by CFR Title 47, Part 15, Subpart B for the digital portion; and the limits defined in Subpart C, sections 15.205, 15.207, 15.209, and 15.231(e) for the transmitter portion.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

Venstar, Inc.

Corey McTigue Engineering Manager

Compatible Electronics, Inc.

Kyle Fujimoto Test Engineer
Michael Christensen Lab Manager

2.4 Date Test Sample was Received

The test sample was received on April 27, 2008.

2.5 Disposition of the Test Sample

The sample has not been returned to Venstar, Inc. as of May 12, 2008.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4 2003	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

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description Of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT and Peripherals Tested

Stand Alone Mode: The Wireless Remote Sensor, Model: ACC0414RF (EUT) was tested as a stand alone unit. The EUT was placed at the center of the non-conductive table. The EUT was transmitting on a continuous basis. The EUT's antenna is a PCB style antenna and is on the PCB itself.

After the EUT is activated by pressing the button, the transmission will cease operation once the button is released.

The final radiated data was taken in the mode above. Please see Appendix E for the data sheets.

4.1.1 Cable Construction and Termination

There were no external cables connected to the EUT.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
WIRELESS REMOTE SENSOR (EUT)	VENSTAR, INC.	ACC0414RF	E001	**MUHRSTX2**

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS					
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
EMI Receiver	Rohde & Schwarz	ESIB40	100172	November 27, 2006	Nov. 27, 2008
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
RF RADIATED EMISSIONS TEST EQUIPMENT					
Preamplifier	Com-Power	PA-102	1017	January 11, 2008	Jan. 11, 2009
Biconical Antenna	Com Power	AB-900	15226	February 28, 2008	February 28, 2009
Log Periodic Antenna	Com-Power	AL-100	16060	July 9, 2007	July 9, 2008
Loop Antenna	Com-Power	AL-130	17089	September 24, 2007	Sept. 24, 2008
Double Ridge Horn Antenna	Com-Power	AH-118	10073	July 17, 2006	July 17, 2008
Microwave Preamplifier	Com-Power	PA-122	181921	March 3, 2008	March 3, 2009
Antenna Mast	Com-Power	AM-100	N/A	N/A	N/A

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 Conducted Emissions Test

The spectrum analyzer was used as a measuring meter. The data was collected with the spectrum analyzer in the peak detect mode with the "Max Hold" feature activated. The quasi-peak was used only where indicated in the data sheets. A transient limiter was used for the protection of the spectrum analyzer input stage, and the offset was adjusted accordingly to read the actual data measured. The LISN output was measured using the spectrum analyzer. The output of the second LISN was terminated by a 50 ohm termination. The effective measurement bandwidth used for this test was 9 kHz.

Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The EUT was powered through the LISN, which was bonded to the ground plane. The LISN power was filtered and the filter was bonded to the ground plane. The EUT was set up with the minimum distances from any conductive surfaces as specified in ANSI C63.4. The excess power cord was wrapped in a figure eight pattern to form a bundle not exceeding 0.4 meters in length.

The conducted emissions from the EUT were maximized for operating mode as well as cable placement. The final data was collected under program control by the Compatible Electronics software in several overlapping sweeps by running the spectrum analyzer at a minimum scan rate of 10 seconds per octave. The final qualification data is located in Appendix E.

Test Results:

This test was not performed because the EUT operates on battery power only and cannot be plugged into the AC public mains.

7.2 Radiated Emissions (Spurious and Harmonics) Test

The EMI Receiver was used as a measuring meter along with the quasi-peak adapter. Amplifiers were used to increase the sensitivity of the instrument. The Com-Power Preamplifier Model: PA-102 was used for frequencies from 30 MHz to 1 GHz, and the Com-Power Microwave Preamplifier Model: PA-122 was used for frequencies above 1 GHz. The EMI Receiver was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer or EMI Receiver records the highest measured reading over all the sweeps.

The readings were averaged by a “duty cycle correction factor”, derived from 20 log (dwell time / one pulse train with blanking interval).

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna
1 GHz to 4.4 GHz	1 MHz	Horn Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The gunsight method was used when measuring with the horn antenna in order to ensure accurate results. The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

7.3 Radiated Emissions (Spurious and Harmonics) Test (Continued)

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 3 meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E.

Test Results:

The EUT complies with the **Class B** limits of CFR Title 47, Part 15, Subpart B; and CFR Title 47, Part 15, Subpart C, sections 15.205, 15.209, and 15.231(e).

7.4 Bandwidth of the Fundamental

The -20 dB bandwidth was checked to see that it was within 0.25% of the fundamental frequency for the EUT. Plots of the -20 dB bandwidth are located in Appendix E.

Test Results:

Complies with the limits of CFR Title 47, Part 15, Subpart C, section 15.231(c).

8. CONCLUSIONS

The Wireless Remote Sensor, Model: ACC0414RF meets all of the **Class B** specification limits defined in CFR Title 47, Part 15, Subpart B for the digital portion; and the limits defined in Subpart C, sections 15.205, 15.207, 15.209, and 15.231(e) for the transmitter portion.

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.231(e) or FCC Class B specifications.

All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

No modifications were made to the EUT.

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

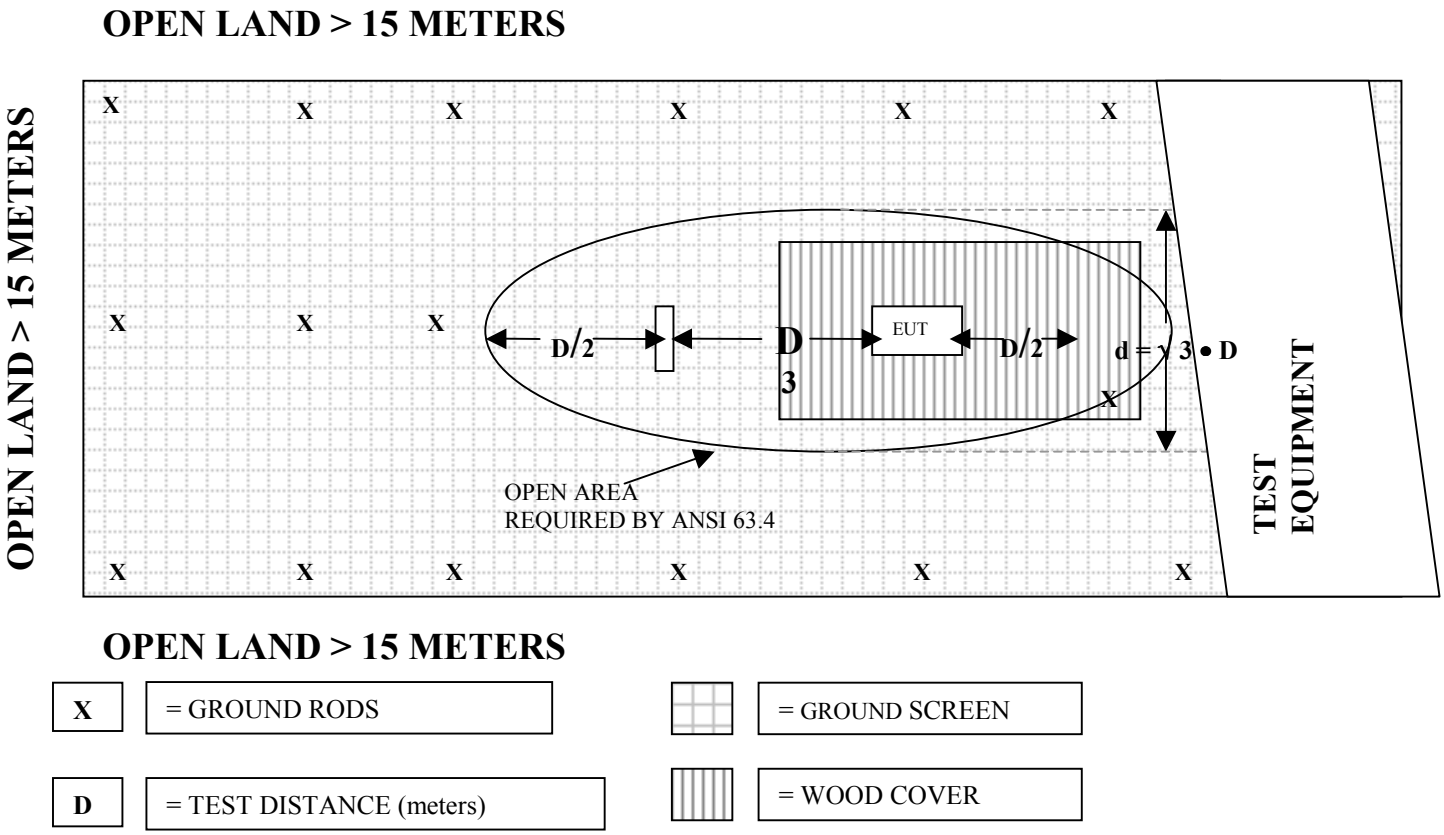
Wireless Remote Sensor
Model: ACC0414RF
S/N: E001

There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: PLOT MAP AND LAYOUT OF 3 METER RADIATED SITE



COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15226

CALIBRATION DATE: FEBRUARY 28, 2008

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	12.1	100	10.7
35	12.2	120	13.6
40	11.7	140	12.1
45	9.9	160	12.2
50	11.3	180	15.2
60	9.4	200	16.5
70	7.6	250	16.5
80	6.0	275	18.1
90	6.8	300	21.5

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16060

CALIBRATION DATE: JULY 9, 2007

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	13.5	700	20.5
400	15.8	800	21.6
500	17.0	900	21.3
600	19.2	1000	22.2

COM-POWER PA-102

PREAMPLIFIER

S/N: 1017

CALIBRATION DATE: JANUARY 11, 2008

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.2	300	38.0
40	38.0	350	38.3
50	38.3	400	38.0
60	38.6	450	37.5
70	38.4	500	37.9
80	38.4	550	37.9
90	38.3	600	37.8
100	38.1	650	37.5
125	38.5	700	38.0
150	38.2	750	37.7
175	38.1	800	37.1
200	38.4	850	37.1
225	38.2	900	37.1
250	38.2	950	37.0
275	38.2	1000	36.5

COM-POWER PA-122

PREAMPLIFIER

S/N: 181921

CALIBRATION DATE: MARCH 3, 2008

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	36.32	10.0	35.47
1.5	35.40	10.5	35.05
2.0	34.77	11.0	34.16
2.5	35.07	11.5	33.75
3.0	34.86	12.0	34.65
3.5	34.48	12.5	34.41
4.0	34.30	13.0	35.36
4.5	33.96	13.5	35.30
5.0	34.06	14.0	35.87
5.5	34.54	14.5	36.44
6.0	35.90	15.0	36.24
6.5	36.85	15.5	35.92
7.0	36.55	16.0	35.53
7.5	35.31	16.5	35.29
8.0	33.57	17.0	34.96
8.5	33.36	17.5	34.02
9.0	35.01	18.0	33.39
9.5	35.97	18.5	32.70

COM-POWER AH-118

DOUBLE RIDGE HORN ANTENNA

S/N: 10073

CALIBRATION DATE: JULY 17, 2006

FREQUENCY (GHz)	FACTOR (dB)	FREQUENCY (GHz)	FACTOR (dB)
1.0	25.331	10.0	42.391
1.5	27.507	10.5	39.194
2.0	31.581	11.0	38.504
2.5	30.906	11.5	40.724
3.0	30.276	12.0	41.079
3.5	30.396	12.5	41.014
4.0	30.881	13.0	41.201
4.5	32.77	13.5	42.335
5.0	34.067	14.0	43.248
5.5	33.914	14.5	45.639
6.0	34.028	15.0	43.197
6.5	35.779	15.5	41.751
7.0	38.347	16.0	42.462
7.5	39.096	16.5	41.908
8.0	39.377	17.0	40.277
8.5	38.646	17.5	48.117
9.0	37.438	18.0	54.113
9.5	38.403		

COM-POWER AL-130

LOOP ANTENNA

S/N: 17089

CALIBRATION DATE: SEPTEMBER 24, 2007

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-41.27	10.23
0.01	-41.96	9.54
0.02	-41.73	9.77
0.05	-42.0	9.5
0.07	-41.5	10.0
0.1	-41.43	10.07
0.2	-43.9	7.9
0.3	-41.43	10.07
0.5	-41.40	10.1
0.7	-41.13	10.37
1	-40.83	10.67
2	-40.30	11.20
3	-40.60	10.90
4	-41.00	10.50
5	-40.20	11.30
10	-40.40	11.10
15	-41.67	9.83
20	-41.10	10.40
25	-42.80	8.70
30	-42.80	8.70

FRONT VIEW

VENSTAR, INC.
WIRELESS REMOTE SENSOR
MODEL: ACC0414RF
FCC SUBPART B AND C – RADIATED EMISSIONS – LAB D – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

VENSTAR, INC.
WIRELESS REMOTE SENSOR
MODEL: ACC0414RF
FCC SUBPART B AND C – RADIATED EMISSIONS – LAB D – BELOW 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

VENSTAR, INC.
WIRELESS REMOTE SENSOR
MODEL: ACC0414RF
FCC SUBPART B AND C – RADIATED EMISSIONS – LAB D – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

VENSTAR, INC.
WIRELESS REMOTE SENSOR
MODEL: ACC0414RF
FCC SUBPART B AND C – RADIATED EMISSIONS – LAB D – ABOVE 1 GHz

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

FCC 15.231 (e)
Venstar, Inc.
Wireless Remote Sensor
Model: ACC0414RF

Date: 04/27/08
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode
Duty Cycle = 33.31%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	77.8	V	72.3	5.5	Peak	1.5	180	With 430
418	68.26	V	72.3	-4.04	Avg	1.5	180	Ohm Resistor
836	54.83	V	52.3	2.53	Peak	2	180	With 430
836	45.29	V	52.3	-7.01	Avg	2	180	Ohm Resistor
1254	61.39	V	54	7.39	Peak	1	225	With 430
1254	51.85	V	54	-2.15	Avg	1	225	Ohm Resistor
1672	62.32	V	54	8.32	Peak	1.5	180	With 430
1672	52.78	V	54	-1.22	Avg	1.5	180	Ohm Resistor
2090	49.34	V	54	-4.66	Peak	1.75	225	With 430
2090	39.8	V	54	-14.2	Avg	1.75	225	Ohm Resistor
2508	50.85	V	54	-3.15	Peak	1.75	135	With 430
2508	41.31	V	54	-12.69	Avg	1.75	135	Ohm Resistor
2926	47.15	V	54	-6.85	Peak	1.25	135	With 430
2926	37.61	V	54	-16.39	Avg	1.25	135	Ohm Resistor
3344	44.27	V	54	-9.73	Peak	1.35	150	With 430
3344	34.73	V	54	-19.27	Avg	1.35	150	Ohm Resistor
3762	41.86	V	54	-12.14	Peak	1.22	175	With 430
3762	32.32	V	54	-21.68	Avg	1.22	175	Ohm Resistor
4180	41.31	V	54	-12.69	Peak	1.25	90	With 430
4180	31.77	V	54	-22.23	Avg	1.25	90	Ohm Resistor

FCC 15.231 (e)
Venstar, Inc.
Wireless Remote Sensor
Model: ACC0414RF

Date: 04/27/08
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode
Duty Cycle = 33.31%

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
418	79.84	H	72.3	7.54	Peak	1.5	180	With 430
418	70.3	H	72.3	-2	Avg	1.5	180	Ohm Resistor
836	40.25	H	52.3	-12.05	Peak	1	225	With 430
836	30.71	H	52.3	-21.59	Avg	1	225	Ohm Resistor
1254	51.65	H	54	-2.35	Peak	1.25	135	With 430
1254	42.11	H	54	-11.89	Avg	1.25	135	Ohm Resistor
1672	54.93	H	54	0.93	Peak	1.25	135	With 430
1672	45.39	H	54	-8.61	Avg	1.25	135	Ohm Resistor
2090	49.12	H	54	-4.88	Peak	1.25	150	With 430
2090	39.58	H	54	-14.42	Avg	1.25	150	Ohm Resistor
2508	43.52	H	54	-10.48	Peak	1.25	150	With 430
2508	33.98	H	54	-20.02	Avg	1.25	150	Ohm Resistor
2926	44.85	H	54	-9.15	Peak	1.35	175	With 430
2926	35.31	H	54	-18.69	Avg	1.35	175	Ohm Resistor
3344	43.38	H	54	-10.62	Peak	1.45	200	With 430
3344	33.84	H	54	-20.16	Avg	1.45	200	Ohm Resistor
3762	40.21	H	54	-13.79	Peak	1.45	225	With 430
3762	30.67	H	54	-23.33	Avg	1.45	225	Ohm Resistor
4180	42.72	H	54	-11.28	Peak	1.55	135	With 430
4180	33.18	H	54	-20.82	Avg	1.55	135	Ohm Resistor

FCC Class B and FCC 15.231 (e)

Venstar, Inc.
Wireless Remote Sensor
Model: ACC0414RF

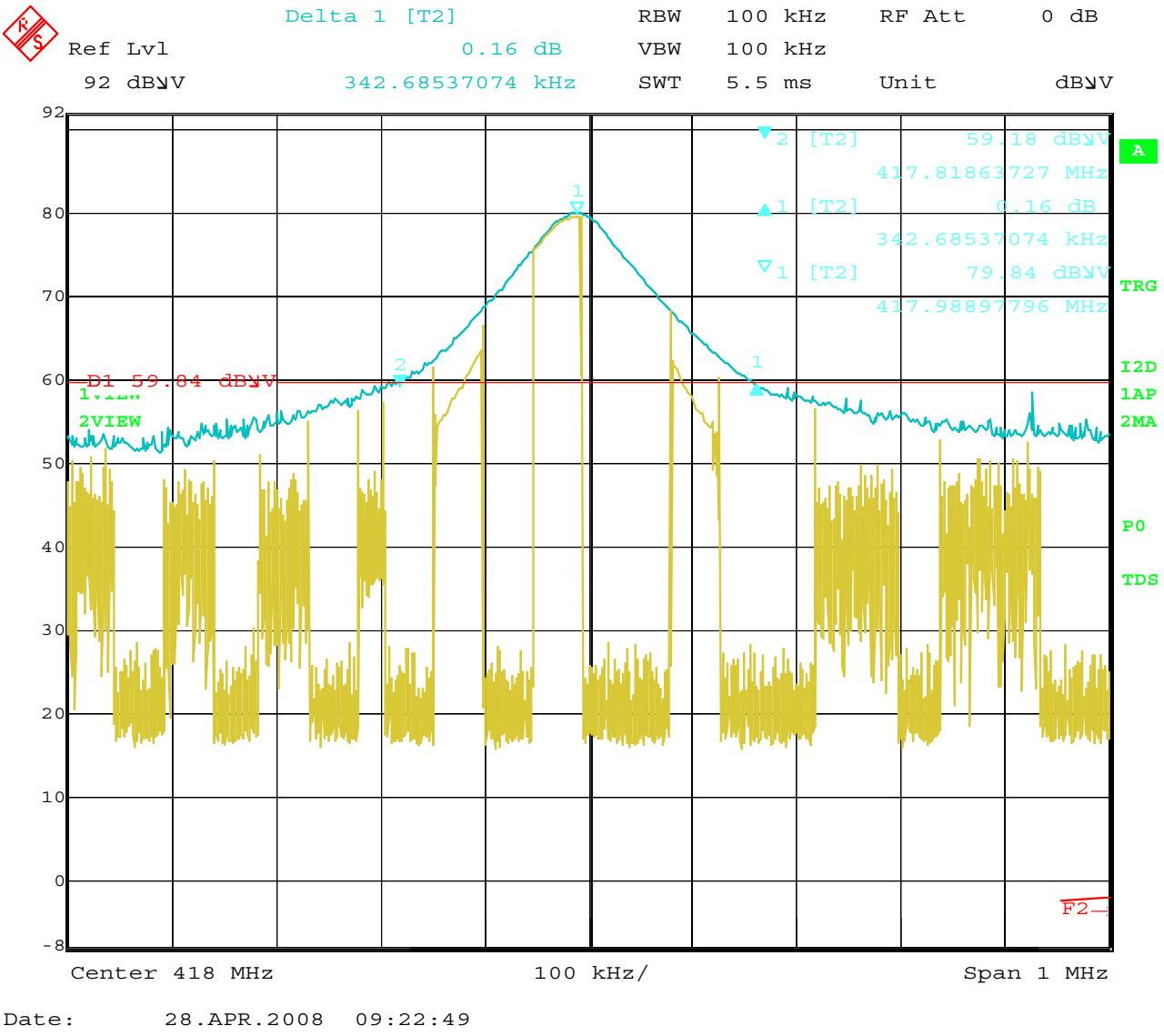
Date: 04/27/08
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode
Digital Portion and Non-Harmonic Emissions from the Tx
10 kHz to 4180 MHz - Vertical and Horizontal Polarization

Freq. (MHz)	Level (dBuV)	Pol (v/h)	Limit	Margin	Peak / QP / Avg	Ant. Height (m)	Table Angle (deg)	Comments
								No Emissions Detected from the Digital Portion from 10 kHz to 4180 MHz
								No Emissions Detected from the Non Harmonic Emissions from the Tx from 10 kHz to 4180 MHz

-20 dB BANDWIDTH

DATA SHEET



-20 dB Bandwidth of the Fundamental