Lab Code: 200167-0

FCC PART 15.245

TEST AND MEASUREMENT REPORT

For

SpeedInfo, LLC

Suite 590, 100 Park Center Plaza

San Jose, CA 95113, USA

FCC ID: SVL-DVSS101
Model: DVSS-101

Report Type:	**Product Type:**
Original Report	Traffic Speed Sensor

Test Engineer:	Victor Zhang
Report Number:	R0810021-245
Report Date:	2008-11-03
Reviewed By:	Boni Baniqued Sr. RF Engineer
Prepared By: (66)	Bay Area Compliance Laboratories Corp.(**BACL**) 1274 Anvilwood Ave Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.
* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*".

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R0810021-245	Original	2008-11-03

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

This BACL measurement and test report has been complied on behalf of *SpeedInfo, LLC,* and their product, model: DVSS-101 or the "EUT" as referred to in this report. The EUT is a Doppler radar which is design to measure traffic speed. Although a single frequency device, the output frequency of the Doppler radar has a tolerance of 24.125GHz ± 50MHz. The EUT would be pole-mounted during operation. The device is battery powered.

1.2 EUT Photo

Additional photos in exhibit C

1.3 EUT Mechanical Description

The EUT measures approximately 360mm Length and 100mm in diameter, weight approximately 5.9 kg.

** The test data gathered are from production samples provided by the manufacturer, serial numbers: 737.*

1.4 Objective

This type approval report is prepared on behalf of *SpeedInfo, LLC.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B, and C.

1.5 Related Submittal(s)/Grant(s)

N/A

1.6 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.4-2003.

1.7 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from $\pm$2.0 for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

1.8 Test Facility

The semi-anechoic chambers used by BACL to collect radiated and conducted emissions measurement data is located in the building at it's facility in Sunnyvale, California, USA.

BACL's test sites have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

2.2 Special Accessories

There were no special accessories were required, included, or intended for use with EUT during these tests.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Power Supply

N/A

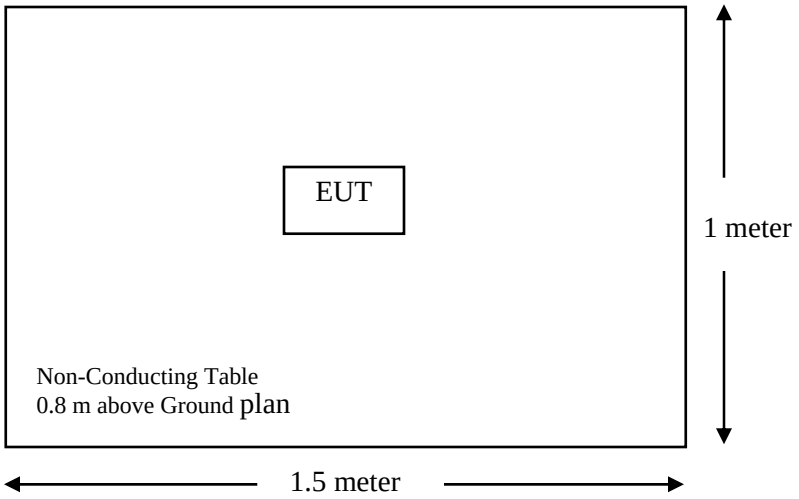
2.5 Interface Ports and Cabling

N/A

2.6 Local Support Equipment

N/A

2.7 Test Setup Block Diagram



3 SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.207	Conducted Emissions	N/A *
§15.245 (b)	Field Strength of Fundamental	Compliant
§15.245 (b)(1)(i)	Field Strength of Harmonics	Compliant
§15.245 (b)(3)	Radiated Emissions: Out of Band Emission	Compliant

Note: Battery operation.

4 FCC §15.207– CONDUCTED EMISSIONS

Battery operation.

N/A

5 FCC §15.245 (b) – FIELD STRENGTH OF FUNDAMENTAL

5.1 Applicable standards

Per FCC §15.245 Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz.

(a) Operation under the provisions of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902–928	500	1.6
2435–2465	500	1.6
5785–5815	500	1.6
10500–10550	2500	25.0
24075–24175	2500	25.0

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209.

5.2 Test Setup

The radiated emissions tests were performed in the 3-meter semi-anechoic chamber test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

5.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Dates
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19
WiseWave	18 – 26.5 GHz Antenna	ARH-4223-02	10555-02	2008-05-12
WiseWave	18 – 26.5 GHz Antenna	ARH-4223-02	10555-01	2008-05-12
HP	Amplifier, Pre, Microwave	8449B	3147A00400	2007-11-02
HP	Generator, Signal	83650B	3614A00276	2008-05-28

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

5.4 Environmental Conditions

Temperature:	24 ºC
Relative Humidity:	45 %
ATM Pressure:	102.1 kPa

**Testing was performed by Victor Zhang on 2008-10-08*

5.5 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

5.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

5.7 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.245 standard's radiated emissions limits for class B devices, and had the worst margin of:

-15.13 dB @ 24110 MHz in the **Vertical** polarization at **Carrier Frequency**

The provisions in §15.35 for limiting peak emissions apply:

Please refer to the following tables for full test results

5.8 Radiated Emissions Test Result Data: RF Carrier Frequency

Fundamental Frequency = 24110 MHz (Measured at 3 meter)

Freq. (MHz)	S.A. Reading (dBuV)	Azimuth (Degrees)	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comments
			Height (m)	Polar (H / V)	Factor (dB/m)						
24110	108.48	0	1	V	34.3	11.66	41.57	112.87	128	-15.13	Ave
24110	109.63	0	1	V	34.3	11.66	41.57	114.02	148	-33.98	Peak
24110	82.70	325	1.05	H	34.3	11.66	41.57	87.09	128	-40.91	Ave
24110	86.40	325	1.05	H	34.3	11.66	41.57	90.79	148	-57.21	Peak

6 FCC §15.245 (B) (1) (I), (B) (3) – FIELD STRENGTH OF HARMONICS & OUT OF BAND EMISSIONS

6.1 Applicable Standards

Per § 15.245 Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785–5815 MHz, 10500–10550 MHz, and 24075–24175 MHz

(a) Operation under the provisions of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.

(b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency (MHz)	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (millivolts/meter)
902–928	500	1.6
2435–2465	500	1.6
5785–5815	500	1.6
10500–10550	2500	25.0
24075–24175	2500	25.0

(1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209.

Per §15.205 Restricted bands of operation

(a) Except as shown in 15.205 paragraphs (d), only spurious emissions are permitted in any of the frequency bands listed below:

(MHz)	(MHz)	(MHz)	(MHz)	(MHz)	(GHz)	(GHz)
0.090 – 0.110	8.291 – 8.294	16.69475 – 16.69525	156.7 – 156.9	1435 – 1626.5	3.332 – 3.339	10.6 – 12.7
0.495 – 0.505	8.362 – 8.366	25.5 – 25.67	162.0125 –167.17	1645.5 – 1646.5	3.3458 – 3.358	13.25 – 13.4
2.1735 – 2.1905	8.37625 – 8.38675	37.5 – 38.25	167.72 – 173.2	1660 – 1710	3.600 – 4.400	14.47 – 14.5
4.125 – 4.128	8.41425 – 8.41475	73 – 74.6	240 – 285	1718.8 – 1722.2	4.5 – 5.15	15.35 – 16.2
4.17725 – 4.17775	12.29 – 12.293	74.8 – 75.2	322 – 335.4	2200 – 2300	5.35 – 5.46	17.7 – 21.4
4.20725 – 4.20775	12.51975 – 12.52025	108 – 121.94	399.9 – 410	2310 – 2390	7.25 – 7.75	22.01 – 23.12
6.215 – 6.218	12.57675 – 12.57725	123 – 138	608 – 614	2483.5 – 2500	8.025 – 8.5	23.6 – 24.0
6.26775 – 6.26825	13.36 – 13.41	149.9 – 150.05	960 – 1240	2690 – 2900	9.0 – 9.2	31.2 – 31.8
6.31175 – 6.31225	16.42 – 16.423	156.52475 – 156.52525	1300 – 1427	3260 – 3267	9.3 – 9.5	36.43 – 36.5
						Above 38.6

(b) Except as provided in 15.205 paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission

limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e), regardless of the field strength limits specified elsewhere in this Subpart, the provisions of this Section apply to emissions from any intentional radiator.

Per FCC §15.209 Radiated emission limits, general requirements.

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

*** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

(b) In the emission table above, the tighter limit applies at the band edges.

6.2 Test Setup

The radiated emissions tests were performed in the 3-meter semi-anechoic chamber test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Dates
HP	Amplifier, Pre (100 KHz – 1.3 GHz)	8447D	2944A10198	2007-12-19
Sunol Science Corp.	Broadband Antenna (30 – 3000 MHz)	JB3 Antenna	A020106-3	2008-03-24
HP	Pre, Amplifier (1 ~ 26.5 GHz)	8449B	3147A00400	2007-11-02
A. R.A	Antenna, Horn, DRG	DRG-118/A	1132	2008-08-07
OML	WR-19 Harmonic Mixer with Horn Antenna	ARH-1923-02	11648-01	2008-01-23
OML	Diplexer for Agilent Spectrum Analyzer	DPL26	N/A	N/A
HP	Generator, Signal	83650B	3614A00276	2008-05-28
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

6.4 Environmental Conditions

Temperature:	24 ºC
Relative Humidity:	45 %
ATM Pressure:	102.1 kPa

**Testing was performed by Victor Zhang on 2008-10-08*

6.5 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

6.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

6.7 Summary of Test Results

Fundamental Frequency = 24110 MHz

Worst case reading as follows measured at 3 meters:

30 MHz to 1 GHz: -23.93 dB at 920.498 MHz in the Vertical polarization

1GHz – 18 GHz: @Emissions are at noise floor level

Band Edge: -11.70 dB at 24175 MHz in the Vertical polarization

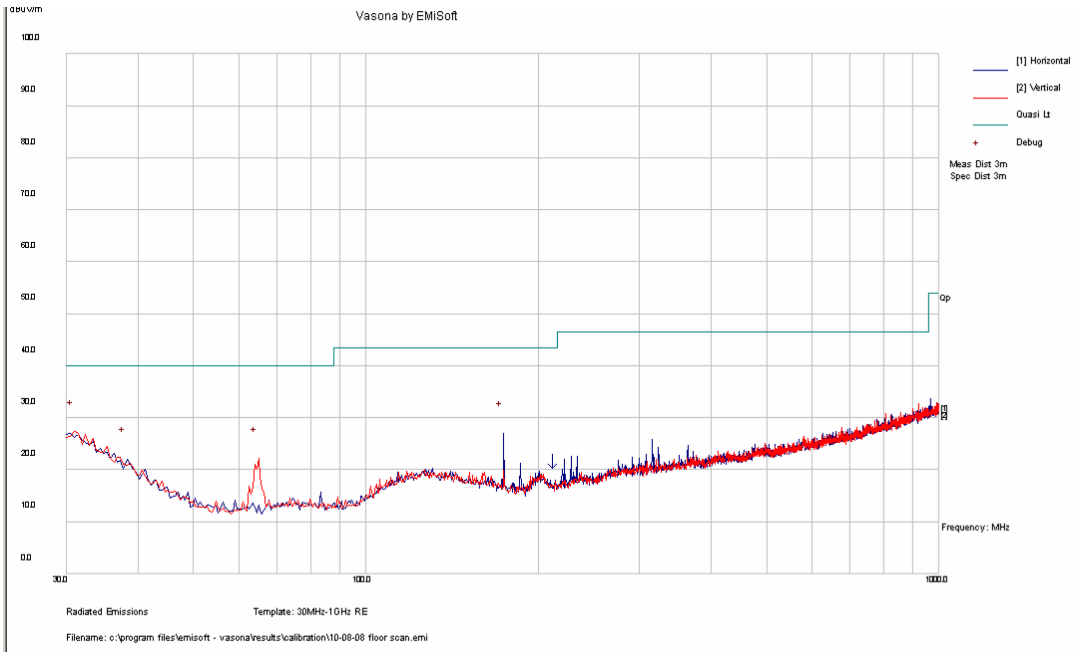
Harmonics: @Emissions are at noise floor level

Please refer to the following tables for full test results

6.8 Radiated Spurious Emission

30 MHz to 1 GHz:

(Measured at 3 meter)



Frequency (MHz)	Meter Reading (dBuV)	Detector (QP/AV)	Azimuth (Degree)	Antenna		Antenna Factor – Amp. Gain (dB)	Cable Loss (dB)	Cord. Amp. (dBµV/m)	Part 15.245/15.209	
				Height (cm)	Polar. (H/V)				Limit (dBuV/m)	Margin (dB)
920.498	16.98	QP	155	258	V	-6.53	12.12	22.57	46.5	-23.93
364.380	15.45	QP	247	175	H	-13.82	11.19	12.81	46.5	-33.69
316.185	15.47	QP	245	289	H	-14.81	11.01	11.66	46.5	-34.84
174.122	15.40	QP	24	110	H	-18.24	10.8	7.96	43.5	-35.54
64.922	15.67	QP	285	130	V	-21.80	10.5	4.36	40.0	-35.64
227.725	15.17	QP	129	389	H	-17.45	10.88	8.60	46.5	-37.90

1 GHz to 18 GHz:

(Measured at 3 meter)

Frequency (MHz)	Meter Reading (dBuV)	Detector (PK/AV)	Azimuth (Degree)	Antenna		Antenna Factor & Amp. Gain (dB)	Cable Loss (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	Part 15.245	
				Height (m)	Polar (H/V)					Limit (dBuV/m)	Margin (dB)
-	-	-	-	-	-	-	-	-	-	-	-

* Emissions are at noise floor level

Above 18 GHz:

(Measured at 1 meter)

Frequency (MHz)	Meter Reading (dBuV)	Detector (PK/AV)	Azimuth (Degree)	Antenna		Antenna Factor & Amp. Gain (dB)	Cable Loss (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	Part 15.245	
				Height (m)	Polar (H/V)					Limit (dBuV/m)	Margin (dB)
-	-	-	-	-	-	-	-	-	-	-	-

* Emissions are at noise floor level

Band Edge (24075 -24175 MHz):

(Measured at 3 meter)

Frequency (MHz)	Reading (dBuV)	Azimuth (Degree)	Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBuV/m)	15.209		Comments
			Height (m)	Polar (H/V)	Factor (dB)				Limit (dBuV/m)	Margin (dB)	
24175	37.69	0	1.0	V	34.3	11.71	41.4	42.30	54	-11.70	Ave
24075	34.67	0	1.0	V	34.2	11.66	41.57	38.96	54	-15.04	Ave
24075	31.33	17	1.0	H	34.2	11.66	41.57	35.62	54	-18.38	Ave
24175	30.05	21	1.1	H	34.3	11.71	41.4	34.66	54	-19.34	Ave
24175	45.29	0	1.0	V	34.3	11.71	41.4	49.90	74	-24.10	Peak
24075	43.98	0	1.0	V	34.2	11.66	41.57	48.27	74	-25.73	Peak
24075	36.29	17	1.0	H	34.2	11.66	41.57	40.58	74	-33.42	Peak
24175	34.37	21	1.1	H	34.3	11.71	41.4	38.98	74	-35.02	Peak