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Electromagnetic Emissions Test Report In Accordance With Industry Canada Radio Standards Specification 210 And FCC Part 15 Sections 15.245 on the SpeedInfo Model: Doppler Vehicle Speed Sensor

FCC ID:	SVL-DVSS100
GRANTEE:	SpeedInfo 19400 Stevens Creek Cupertino, CA 95014
TEST SITE:	Elliott Laboratories, Inc. 684 W. Maude Avenue Sunnyvale, CA 94086
REPORT DATE:	December 15, 2004
FINAL TEST DATE:	October 21 and November 3, 2004
AUTHORIZED SIGNATORY:	Juan Martinez Senior EMC Engineer

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TABLE OF CONTENTS

SCOPE

An electromagnetic emissions test has been performed on the SpeedInfo model Doppler Vehicle Speed Sensorpursuant to Subpart C of Part 15 of FCC Rules for intentional radiators and Industry Canada Radio Standards Specification RSS-210 for Low Power, License-Exempt Radio Communication Devices. Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in ANSI C63.4-1992 as outlined in Elliott Laboratories test procedures.

The transceiver above has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the SpeedInfo model Doppler Vehicle Speed Sensorand therefore apply only to the tested sample. The sample was selected and prepared by Jake Boyd of SpeedInfo

OBJECTIVE

The primary objective of the manufacturer is compliance with Subparts B and C of Part 15 of FCC Rules for the radiated and conducted emissions of intentional radiators and receivers. Certification of these devices is required as a prerequisite to marketing as defined in Part 2 the FCC Rules.

Certification is a procedure where the manufacturer or a contracted laboratory makes measurements and submits the test data and technical information to the FCC. The FCC issues a grant of equipment authorization upon successful completion of their review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

STATEMENT OF COMPLIANCE

The tested sample of Intellisense model DT-7360 complied with the requirements of Subpart C of Part 15 of the FCC Rules for low power intentional radiators and Industry Canada specification RSS 210 for Low Power Licence-Exempt Radiocommunication Devices (All Frequency Bands).

Maintenance of FCC compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

TEST RESULTS SUMMARY

15.209 / RSS 210 Table 3

FCC Part 15 Section	RSS 210 Section	Description	Comments	Result
15.207 / 15.107		AC Conducted Emissions, 0.15 – 30 MHz	Not applicable – the device is powered from a battery and is not intended to be powered, directly or indirectly, from an AC power source	N/A
	6.6 / 7.4	AC Conducted emissions 0.45 – 30 MHz		
15.245	6.2.2 (n)	Transmitter Fundamental Signal Emissions	117.7 dBuV/m (767,361uV/m) @ 24.15GHz (-10.3dB)	Complies
15.245	6.2.2 (n)	Transmitter Radiated Spurious Emissions, 30 MHz - 100 GHz	66.9dBuV/m (2213uV/m) @ 48.3 GHz (-27.8dB)	Complies
15.109	7.3	Receiver Spurious Emissions		N/A

MEASUREMENT UNCERTAINTIES

ISO Guide 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with NAMAS document NIS 81.

Measurement Type	Frequency Range (MHz)	Calculated Uncertainty (dB)
Conducted Emissions	0.15 to 30	± 2.4
Radiated Emissions	30 to 1000	± 3.6

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The SpeedInfo model Doppler Vehicle Speed Sensor is a Doppler radar which is designed to measure traffic speed. Although a single frequency device, the output frequency of the Doppler radar has a tolerance of 24.125 GHz +/- 50 MHz.

The EUT also contains a GPRS modem (FCC ID IHDT56DB1) which is used to send speed data to a centralized server.

The EUT would be pole-mounted during operation. For testing purposes it was mounted horizontally on a bracket, typical of end user applications. The device is battery powered and includes a solar panel for charging the battery packs.

The sample was received on October 21, 2004 and tested on October 21 and November 3, 2004. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number	FCC ID
SpeedInfo	DVSS-100	Doppler Radar	Beta 014	

OTHER EUT DETAILS

The 24GHz radar antenna is integral to the device. There is also an antenna for the GPRS modem which is removable. The unit will include an appropriate antenna/antennas whose gain will comply with the GPRS modems authorization which limits antenna gain to no more than +11 dBi and total system output must not exceed 1.5 W ERP (Cellular) / 3.0 W EIRP (PCS). The antenna for the GPRS modem is located more than 20cm from the antenna for the Doppler radar (field disturbance sensor), so there are no co-location issues.

ENCLOSURE

The EUT enclosure is primarily constructed of extruded aluminum. It is cylindrical with a diameter of approximately 4.23in and a length of 14.38in high.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with emissions specifications.

SUPPORT EQUIPMENT

No support equipment was used during emissions testing. The EUT is fully self contained and is not designed to connect to any other devices.

EUT INTERFACE PORTS

The I/O cabling configuration during emissions testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Antenna	GPRS antenna	Direct connection	N/A	N/A
Solar Panel Connector	Solar Panel	Two Wire	Unshielded	1.5

Note: The Umbilical port was not connected as the manufacturer stated that this port is not currently supported and will be implemented for future applications. Digital device testing will be repeated at that time.

EUT OPERATION

The EUT was receiving down load of the operating software. It was exercising processor and modem activities (GPRS modem was active, sending intermittent transmissions) and with the radar operating in pulsed mode for digital device tests and operating continuously for transmitter-related tests.

ANTENNA REQUIREMENTS

The antenna for the Doppler radar disturbance sensor is integral to the device.

TEST SITE

GENERAL INFORMATION

Final test measurements were taken on October 21 and November 3, 2004at the Elliott Laboratories Open Area Test Site # 1 & 2 located at 684 West Maude Avenue, Sunnyvale, California. The test site contains separate areas for radiated and conducted emissions testing. Pursuant to section 2.948 of the Rules, construction, calibration, and equipment data has been filed with the Commission.

The FCC recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement with the exception of predictable local TV, radio, and mobile communications traffic. The test site contains separate areas for radiated and conducted emissions testing. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent FCC requirements.

RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment. The test site is maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines.

MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer run automated data collection programs which control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

TEST PROCEDURES

EUT AND CABLE PLACEMENT

The FCC requires that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst-case orientation is used for final measurements.

RADIATED EMISSIONS

Radiated emissions measurements are performed in two phases as well. A preliminary scan of emissions is conducted in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed from 30 MHz up to the frequency required by the regulation specified on page 1. One or more of these is with the antenna polarized vertically while the one or more of these is with the antenna polarized horizontally. During the preliminary scans, the EUT is rotated through 360°, the antenna height is varied and cable positions are varied to determine the highest emission relative to the limit.

A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters. The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain. Emissions, which have values close to the specification limit may also be measured with a tuned dipole antenna to determine compliance.

SPECIFICATION LIMITS AND SAMPLE CALCULATIONS

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

FUNDAMENTAL AND HARMONIC LIMITS 15.245

The table below shows the limits for both the Fundamental and Harmonic emissions (that do not fall in restricted bands) for each frequency band of operation detailed in Section 15.245.

Operating Frequency (MHz)	Field strength (millivolts/m)	Harmonics (millivolts/m)
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

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.209

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
0.009-0.490	$2400/F_{KHz}$ @ 300m	$67.6-20*\log_{10}(F_{KHz})$ @ 300m
0.490-1.705	$24000/F_{KHz}$ @ 30m	$87.6-20*\log_{10}(F_{KHz})$ @ 30m
1.705 to 30	30 @ 30m	29.5 @ 30m
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

RADIATED EMISSIONS SPECIFICATION LIMITS, SECTION 15.109(a) (RECEIVER)

The table below shows the limits for emissions from the receiver.

Frequency Range (MHz)	Limit (uV/m @ 3m)	Limit (dBuV/m @ 3m)
30 to 88	100	40
88 to 216	150	43.5
216 to 960	200	46.0
Above 960	500	54.0

SAMPLE CALCULATIONS - RADIATED EMISSIONS

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements. A distance factor, when used for electric field measurements, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:

F_d = Distance Factor in dB

D_m = Measurement Distance in meters

D_s = Specification Distance in meters

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:

R_r = Receiver Reading in dBuV/m

F_d = Distance Factor in dB

R_c = Corrected Reading in dBuV/m

L_s = Specification Limit in dBuV/m

M = Margin in dB Relative to Spec

EXHIBIT 1: Test Equipment Calibration Data

1 Page

Radiated Emissions, 30 - 2,000 MHz, 21-Oct-04
Engineer: Vishal Narayan

Manufacturer	Description	Model #	Asset #	Cal Due
EMCO	Horn Antenna, D. Ridge 1-18GHz	3115	487	13-May-06
Hewlett Packard	EMC Spectrum Analyzer 9kHz - 6.5GHz	8595EM	780	26-Feb-05
Hewlett Packard	Microwave Preamplifier, 1-26.5GHz	8449B	870	12-Jan-05
Filtek	High Pass Filter, 1GHz	HP12/1000-5BA	955	12-Apr-05
Rohde & Schwarz	Test Receiver, 0.009-2750 MHz	ESN	1332	12-May-05
EMCO	Log Periodic Antenna, 0.2-2 GHz	3148	1404	17-Nov-04
EMCO	Biconical Antenna, 30-300 MHz	3110B	1498	15-Jan-05

Radiated Emissions, 1,000 - 40,000 MHz, 03-Nov-04
Engineer: Mark Briggs

Manufacturer	Description	Model #	Asset #	Cal Due
Hewlett Packard	EMC Spectrum Analyzer 30Hz - 40 GHz, Sunnyvale	8564E (84125C)	1148	09-Jun-05
Hewlett Packard	Harmonic Mixer 40 - 60 GHz	11970U	M1165	17-Jul-05
Hewlett Packard	Harmonic Mixer 50 - 75 GHz	11970V	M1166	17-Jul-05
Hewlett Packard	Harmonic Mixer 75 - 110 GHz	11970W	M1167	17-Jul-05
Dorado	Standard Gain Horn, 40 - 60 GHz	GH-19-20	A1197	17-Jul-05
Dorado	Standard Gain Horn, 60 - 90 GHz	12-GH-12-20	A1242	17-Jul-05
Dorado	Standard Gain Horn, 75 - 110 GHz	GH-10-25	A1245	17-Jul-05

EXHIBIT 2: Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T57483 5 Pages

Elliott

EMC Test Data

Client:	SpeedInfo	Job Number:	J57340
Model:	DVSS-100	T-Log Number:	T57483
		Account Manager:	-
Contact:	Jake Boyd		
Emissions Spec:	FCC 15 Parts B and C	Class:	B
Immunity Spec:	N/A	Environment:	-

EMC Test Data

For The

SpeedInfo

Model

DVSS-100

Date of Last Test: 11/3/2004

Client:	SpeedInfo	Job Number:	J57340
Model:	DVSS-100	T-Log Number:	T57483
		Account Manager:	-
Contact:	Jake Boyd		
Emissions Spec:	FCC 15 Parts B and C	Class:	B
Immunity Spec:	N/A	Environment:	-

EUT INFORMATION

General Description

The EUT is a doppler radar which is designed to measure traffic speed. Although a single frequency device, the output frequency of the doppler radar has a tolerance of ***24.125, +/-50MHz.***
The EUT also contains a GPRS modem (FCC ID **IHDT56DB1**) which is used to send speed data to a centralized server.
The EUT would be pole-mounted during operation. For testing purposes it was mounted horizontally on a bracket, typical of end user applications. The device is battery powerd and includes a solar panel for charging the battery packs.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Speed Info	DVSS-100	Doppler radar	Beta 014	

Other EUT Details

The 24GHz radar antenna is integral to the device. There is also an antenna for the GPRS modem which is removable. The unit will include an appropriate antenna/antennas whose gain will comply with the GPRS modems authorization which limits antenna gain to no more than +11 dBi and total system ouput must not exceed 1.5 W ERP (Cellular) / 3.0 W EIRP (PCS).

EUT Enclosure

The EUT enclosure is primarily constructed of extruded aluminum. It is cylindrical with a diameter of approximately 4.23in and a length of 14.38in high.

Modification History

Mod. #	Test	Date	Modification
1	-	-	None

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.

Client:	SpeedInfo	Job Number:	J57340
Model:	DVSS-100	T-Log Number:	T57483
		Account Manager:	-
Contact:	Jake Boyd		
Emissions Spec:	FCC 15 Parts B and C	Class:	B
Immunity Spec:	N/A	Environment:	-

Test Configuration #1

Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
None				

Interface Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Antenna	Dipole Antenna	Dipole Antenna	Unshielded	0.09
Solar Panel Connector	Solar Panel	Two Wire	Unshielded	1.5

Note: The Umbilical port was not connected as the manufacturer stated that this port is not currently supported and will be implemented for future applications. Digital device testing will be repeated at that time.

EUT Operation During Emissions

The EUT was receiving down load of the operating software. It was exercising processor and modem activities (GPRS modem was active, sending intermittent transmissions) and with the radar operating in pulsed mode for digital device tests and operating continuously for transmitter-related tests.

Client:	SpeedInfo	Job Number:	J57340
Model:	DVSS-100	T-Log Number:	T57483
		Account Manager:	-
Contact:	Jake Boyd		
Spec:	FCC 15 Parts B and C	Class:	B

Radiated Emissions - Transmitter (15.245/15.209)

Test Specifics

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 11/3/2004
Test Engineer: Mark Briggs
Test Location: SVOATS #1
Config. Used: #1
Config Change: N/A
EUT Voltage: Internal Battery Pack

General Test Configuration

The EUT was located on the turntable for radiated emissions testing. The EUT was placed in its mounting bracket and attached to a vertical pole, mounted on top of the 0.8m high wooden table.

Unless otherwise specified, the measurement antenna was located 3m from the EUT.

Note, for testing above 1 GHz, the FCC specifies the limit as an average measurement. In addition, the FCC states that the peak reading of any emission above 1 GHz, can not exceed the average limit by more than 20 dB.

Ambient Conditions:

Temperature: 20 °C
Rel. Humidity: 45 %

Summary of Results

Run #	Test Performed	Limit	Result	Margin
2	Radiated emissions - fundamental	15.245	Pass	117.7 dBuV/m (767,361uV/m) @ 24.15GHz (-10.3dB)
1 and 2	Radiated emissions - spurious	15.245 / 15.209	Pass	66.9dBuV/m (2213uV/m) @ 48.3 GHz (-27.8dB)

Measurements were made with GPRS modem active. No inter-modulation effects observed. The separation distance between GPRS and radar antennas is > 20cm so they are not considered co-located.

Modifications Made During Testing:

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client:	SpeedInfo	Job Number:	J57340
Model:	DVSS-100	T-Log Number:	T57483
		Account Manager:	-
Contact:	Jake Boyd		
Spec:	FCC 15 Parts B and C	Class:	B

Run #1: Radiated Emissions, Field Distrubance Intentional Radiator

Antenna factor calculation:

F (GHz)	G (dBi)	AF
48.2940	20.0	43.898
72.4410	20.0	47.42
96.5880	25.0	44.918

Unit Beta 17

Fundamental signal

Frequency	Level	AF	Level	Distance	Extrapolated	FCC 15.209/15.245		Detector	Comments
MHz	dBuV	dBm^{-1}	dBuV/m	m	Level	Limit	Margin	Pk/QP/Avg	
24150.00	71.3	52.4	123.7	1.5	117.7	128.0	-10.3	Pk	

117.7dBuV/m is approximately **23dBm** (200mW) eirp.

52.4 dBm^{-1} AF includes cable loss of 13dB.

Maximum signal level with measurement antenna vertical. Cross polar repsonse > -10dB.

Spurious signals 40 - 100GHz

Frequency	Level	AF	Level	Distance	Extrapolated	FCC 15.209/15.245		Detector	Comments
MHz	dBuV	dBm^{-1}	dBuV/m	m	Level	Limit	Margin	Pk/QP/Avg	
48300.00	45.8	43.9	89.7	0.1	60.2	88.0	-27.8	Pk	
48300.00	32.5	43.9	76.4	1.0	66.9	88.0	-21.1	Pk	Below 3m limit

Note 1:	Limit is 2500mV/m for the fundamental signal (128dBuV/m). 2nd and 3rd harmonics have a limit of 25mV/m (88dBuV/m), 4th harmonic limit is 7.5mV/m (77.5dBuV/m). All others are limited by 15.209 or -50dBc, 15.209 for emissions in restricted bands. No spurious signals can exceed the fundamental signal level.
Note 2:	Average limit, peak measurement. No duty cycle correction applied as, in normal use, the device transmits in busrts of ~250ms duration.
Note 3:	Measurements above 40GHz: The dBuV level include conversion loss of external mixer used. They are maximized for antenna polarization and height and for EUT azimuth. All signals were coming striaght out of the front of the EUT, vertically polarized. The measurement distance is noted in the 5th column and the extrapolated level uses 20log(measurement distance/ 3) to extrapolate the measurement to 3m.
Note 4:	No spurious emissions, other than 2nd harmonic, observed from the field disturbance sensor rf circuits. Digital device emissions to be covered from 30MHz - 2 GHz against FCC Subpart B, Class B limits. GPRS modem is covered by its grant.
Note 5:	The EN 300 440-2 limit for spurious emissions is 1uW (-30dBm, ~65.3dBuV/m @ 3m)

EXHIBIT 3: Test Configuration Photographs

Uploaded as A Separate Attachment

EXHIBIT 4: Theory of Operation
SpeedInfo Model Doppler Vehicle Speed Sensor

Uploaded as A Separate Attachment

EXHIBIT 5: Proposed FCC ID Label & Label Location

Uploaded as A Separate Attachment

EXHIBIT 6: Detailed Photographs
SpeedInfo Model Doppler Vehicle Speed Sensor

Uploaded as A Separate Attachment

EXHIBIT 7: Installation Guide
SpeedInfo Model Doppler Vehicle Speed Sensor

Uploaded as A Separate Attachment

EXHIBIT 8: Block Diagram
SpeedInfo Model Doppler Vehicle Speed Sensor

Uploaded as A Separate Attachment

EXHIBIT 9: Schematic Diagrams
SpeedInfo Model Doppler Vehicle Speed Sensor

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