

# TEST RESULT SUMMARY

## FCC Part 15 Subpart C Section 15.245

## Industry Canada RSS-210 Issue 6 Annex 7

### Emissions Requirements

MANUFACTURER	Vansco Electronics LP
NAME OF EQUIPMENT	True Ground Speed Sensor
MODEL NUMBER	740030A
MANUFACTURER'S ADDRESS	1305 Clarence Avenue R3T 1T4 Winnipeg, MB Canada
TEST REPORT NUMBER	WC505798.1
TEST DATES	12, 17, 23 November 2005

According to testing performed at TÜV America Inc, the above-mentioned unit is in compliance with the applicable electromagnetic compatibility (EMC) portions of the transmitter requirements defined in FCC Part 15 Subpart C Section 15.245 & IC RSS-210 Issue 6 Annex 7.

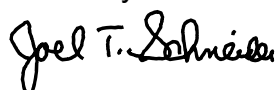
It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC transmitter requirements of FCC Part 15 subpart C section 15.245 "Operation within the bands 902–928 MHz, 2435–2465 MHz, 5785– 5815 MHz, 10500–10550 MHz, and 24075–24175 MHz" and IC RSS-210 Issue 6 Annex 7 "Field Disturbance Sensors Operating in the 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10.5-10.55 GHz and 24.075-24.175 GHz Bands".

Date: 22 December 2005

Tested By

Technical Writer



Joel Schneider



Greg Jakubowski

Not Transferable

# EMC Emission - TEST REPORT

Test Report File No. : **WC505798.1** Date of issue: 22 December 2005

Model / Serial Nos. : 740030A / eu-2005

Product Names : 740 True Ground Speed Sensor

Applicant : Vansco Electronics LP

Manufacturer : Vansco Electronics LP

Address : 1305 Clarence Avenue  
R3T 1T4  
Winnipeg, MB Canada

Test Result : ☒ **Positive** ☐ **Negative**

Test Project Number :  
Reference(s) : **WC505798.1**

Total pages including  
Appendices : 29

*TÜV America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV America Inc issued reports.*

*This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP, NIST, or any agency of the US government.*

*TÜV America Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI*

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### Sign Explanations:

- ☐ - not applicable
- ☒ - applicable

## EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

- |   |   |                                    |
|---|---|------------------------------------|
| <input type="checkbox"/> - EN 50081-1 / 1991                | <input type="checkbox"/> - Group 1                          | <input type="checkbox"/> - Group 2 |
| <input type="checkbox"/> - EN 55011 / 1991                  | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - EN 55013 / 1990                  | <input type="checkbox"/> - Household appliances and similar |                                    |
| <input type="checkbox"/> - EN 55014 / 1987                  | <input type="checkbox"/> - Portable tools                   |                                    |
|   | <input type="checkbox"/> - Semiconductor devices            |                                    |
| <input type="checkbox"/> - EN 55014 / A2:1990               | <input type="checkbox"/> - Household appliances and similar |                                    |
| <input type="checkbox"/> - EN 55014 / 1993                  | <input type="checkbox"/> - Portable tools                   |                                    |
|   | <input type="checkbox"/> - Semiconductor devices            |                                    |
| <input type="checkbox"/> - EN 55015 / 1987                  | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - EN 55015 / A1:1990               | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - EN 55015 / 1993                  |   |                                    |
| <input type="checkbox"/> - EN 55022 / 1987                  |   |                                    |
| <input type="checkbox"/> - EN 55022 / 1991                  |   |                                    |
| <input type="checkbox"/> - BS                               |   |                                    |
| <input type="checkbox"/> - VCCI                             | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - FCC Part 22 Subpart H            |   |                                    |
| <input type="checkbox"/> - FCC Part 15 Subpart B            | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input checked="" type="checkbox"/> - FCC Part 15 Subpart C |   |                                    |
| <input type="checkbox"/> - CISPR 11 (1990)                  | <input type="checkbox"/> - Group 1                          | <input type="checkbox"/> - Group 2 |
|   | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
| <input type="checkbox"/> - CISPR 22 (1993)                  | <input type="checkbox"/> - Class A                          | <input type="checkbox"/> - Class B |
|   |   |                                    |
| <input checked="" type="checkbox"/> - IC RSS-Gen Issue 1    |   |                                    |
| <input checked="" type="checkbox"/> - IC RSS-210 Issue 6    |   |                                    |

## Field strength (fundamental)

FCC 15.245(b), RSS-210 A7

### Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Minimum margin of compliance is 17.4 dB at 24.133 GHz

Fc = 110.5 dB $\mu$ V/m

Limit = 2500 mV/m = 127.9 dB $\mu$ V/m

### Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

☐ - Wild River Lab Small Test Site (Open Area Test Site)

### Test distance

☒ - 3 meters

☐ - 10 meters

### Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B
2847	12-18	Scientific Atlanta	Horn Antenna 18-26 GHz	80	Code Y
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06

Cal Code B = Calibration verification performed internally.

Cal Code Y = Calibration not required when used with other calibrated equipment.

### Test limit

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

### Test data

See pages A3 & A4

## Field strength (harmonics)

FCC 15.245(b)(1)(i), RSS-210 A7(1)

### Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Minimum margin of compliance is > 10 dB from 18 GHz to 110 GHz

No harmonic emissions were detected

Because of higher noise floors at higher frequencies, measurements were taken within 3 meters to prove compliance

### Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

☐ - Wild River Lab Small Test Site (Open Area Test Site)

### Test distances

☒ - 0.1 meters

☒ - 0.3 meters

☒ - 1 meter

☒ - 3 meters

### Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B
2847	12-18	Scientific Atlanta	Horn Antenna 18-26 GHz	80	Code Y
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
2661	11970A	Hewlett-Packard	Harm Mixer – 26.5-40 GHz	2332A01861	11-Jul-06
2919	11970U	Hewlett-Packard	Harm Mixer – 40-60 GHz	3003A01395	11-Jul-06
2920	11970V	Hewlett-Packard	Harm Mixer – 50-75 GHz	2521A01172	23-Oct-06
2922	11970W	Hewlett-Packard	Harm Mixer – 75-110 GHz	2521A01336	23-Oct-06
3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	01-Apr-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	24-Nov-05
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B

Cal Code B = Calibration verification performed internally, Cal Code Y = Calibration not required when used with other calibrated equipment

### Test limit

2nd & 3rd harmonics: 25 mV/m

Other harmonics (continuous operation): 500  $\mu$ V/m

### Test data

See page A3

## Spurious emissions (30 MHz – 110 GHz)

FCC 15.245(b)(3), RSS-210 A7(2)

### Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Minimum margin of compliance is > 10 dB from 30 MHz to 110 GHz

No spurious emissions were detected

Because of higher noise floors at higher frequencies, measurements were taken within 3 meters to prove compliance

### Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

☐ - Wild River Lab Small Test Site (Open Area Test Site)

### Test distances

☒ - 0.1 meters

☒ - 0.3 meters

☒ - 1 meter

☒ - 3 meters

### Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B
2847	12-18	Scientific Atlanta	Horn Antenna 18-26 GHz	80	Code Y
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
2661	11970A	Hewlett-Packard	Harm Mixer – 26.5-40 GHz	2332A01861	11-Jul-06
2919	11970U	Hewlett-Packard	Harm Mixer – 40-60 GHz	3003A01395	11-Jul-06
2920	11970V	Hewlett-Packard	Harm Mixer – 50-75 GHz	2521A01172	23-Oct-06
2922	11970W	Hewlett-Packard	Harm Mixer – 75-110 GHz	2521A01336	23-Oct-06
3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	106	01-Apr-06
3961	ZHL-1042J	Mini-Circuits	Preamplifier	D120403-1	Code B
2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 1-18 GHz	9001-3275	24-Nov-05
3958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B

### Test limits

500  $\mu$ V/m

### Test data

See page A3

## Band edge

FCC 15.245(b)(3), RSS-210 A7(3)

## Test summary

The requirements are: ☒ - MET ☐ - NOT MET

Fc is within the specified frequency band

## Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

☐ - Wild River Lab Small Test Site (Open Area Test Site)

## Test distances

☒ - 3 meters

☐ - 10 meters

## Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
8051	85662A	Hewlett-Packard	Analyzer Display	2112A02220	24-Mar-06
8052	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	24-Mar-06
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B
2847	12-18	Scientific Atlanta	Horn Antenna 18-26 GHz	80	Code Y
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
6717	3116	Emco	Dbl ridge guide horn ant.	2005	19-Sep-06
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	02-Sep-06
3010	6769B	Wiltron	Signal Generator	159003	28-May-06

Cal Code B = Calibration verification performed internally.

Cal Code Y = Calibration not required when used with other calibrated equipment.

## Test limits

24.075 – 24.175 GHz

## Test data

See page A6



## Occupied bandwidth

RSS-Gen 4.4.1

### Test summary

The requirements are: ☒ - MET ☐ - NOT MET

The 99% occupied bandwidth is < 108 kHz

### Test location

☒ - Wild River Lab Large Test Site (Open Area Test Site)

☐ - Wild River Lab Small Test Site (Open Area Test Site)

### Test distances

☒ - 3 meters

☐ - 10 meters

### Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
2127	11975A	Hewlett Packard	Amplifier 2- 8 GHz	2738A01200	Code B
2662	11970K	Hewlett-Packard	Harm Mixer – 18-26.5 GHz	2332A01170	11-Jul-06
3367	E4440A	Agilent	Spectrum Analyzer	MY43362222	02-Sep-06
6717	3116	Emco	Dbl ridge guide horn ant.	2005	19-Sep-06

Cal Code B = Calibration verification performed internally.

Cal Code Y = Calibration not required when used with other calibrated equipment.

### Test limits

24.075 – 24.175 GHz

### Test data

See page A7

**See Submittal Exhibits for Test Set-up**



See Submittal Exhibits for Test Set-up



## I Test Operation Mode

The device under test was operated under the following conditions during emissions testing:

- ☐ - Standby
- ☐ - Test program (H - Pattern)
- ☐ - Test program (color bar)
- ☐ - Test program (customer specific)
- ☐ - Practice operation
- ☒ - Normal operating mode – CW Doppler radar

### Configuration of the device under test

- ☒ - See Constructional Data Form in Appendix B

### RF Exposure statement

The transmitter complies with the RF exposure limits for humans as called out in FCC 2.1091 (mobile >20 cm) and RSS-102 Section 4.3. The transmitter uses Doppler radar to determine ground speed. It is exempt from RF evaluation based on its operating frequency band of 24.075 – 24.175 GHz, and ERP of 0.020 watts based on:

$$\text{ERP (dBk)} = E \text{ (dBuV/m)} - 106.92 + 20 \log D \text{ (km)} = 110.5 - 106.92 + (-50.46) = -46.88 \text{ dBk} = 0.020 \text{ watts.}$$

This would be less than the 1.5 watts requirement for a mobile device and the 0.200 watts requirement for a portable device operating at 24.075 – 24.175 GHz.

## DEVIATIONS FROM STANDARD:

None.

## GENERAL REMARKS:

Modifications required to pass:

- ☒ None
- ☐ As indicated on the data sheet(s)

Test Specification Deviations: Additions to or Exclusions from:

- ☒ None
- ☐ As indicated in the Test Plan

## SUMMARY:

The requirements according to the technical regulations are

- ☒ - met
- ☐ - **not** met.

The device under test does

- ☒ - fulfill the general approval requirements mentioned on page 3.
- ☐ - **not** fulfill the general approval requirements mentioned on page 3.

EUT Received Date (TÜV): 12 November 2005

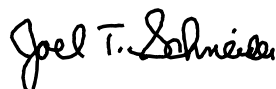
Condition of EUT: Normal

Testing Start Date (TÜV): 12 November 2005

Testing End Date: (ADC) 23 November 2005

- TÜV AMERICA INC -

Tested By:



Joel T. Schneider

Reviewed By:



G. S. Jakubowski

## Appendix A

### Test Data



# RADIATED EMISSIONS



Test Report #: WC505798 Run 1 Test Area: LTS – 3m  
EUT Model #: 740030A Date: 11/17/2005  
EUT Serial #: eu-2005 EUT Power: 13.5VDC Temperature: 20.0 °C  
Test Method: FCC - IC Air Pressure: 98.0 kPa  
Customer: VANSCO Rel. Humidity: 40.0 %

EUT Description: TRUE GROUND SPEED SENSOR

Notes: 80cm EUT HEIGHT

Data File Name: \_\_\_\_\_ Page: 1 of 1

## List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
NO EMISSIONS DETECTED WITH V OR H POLARIZATIONS AT ALL AZIMUTHS 1 - 4 METERS						
END OF SCAN 30 - 18000MHz.						

Tested by: RM Johnson

Printed

Signature

Reviewed by: Greg Jakubowski

Printed

Signature

# RADIATED EMISSIONS



Test Report #: WC505798 Run 1a Test Area: LTS – 3m  
EUT Model #: 740030A Date: 11/12/2005  
EUT Serial #: eu-2005 EUT Power: 13.5VDC Temperature: 20.0 °C  
Test Method: FCC / IC Air Pressure: 98.0 kPa  
Customer: VANSCO Rel. Humidity: 40.0 %

EUT Description: TRUE GROUND SPEED SENSOR

Notes: 80cm EUT HEIGHT

Data File Name: \_\_\_\_\_ Page: 1 of 5

## List of measurements for run #: 1a

FREQ (GHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	Limit (dBμV/m)	Delta (dB)
Maximized fundamental						
24.133	64.7	0 / 45.8 / 0 / 0	110.5	H / 1.5 / 0	127.9	-17.4

No harmonic or spurious emissions detected from 18 GHz to 100 GHz  
0.1 to 3 meter measurement distances

Tested by: Joel Schneider

Printed

Signature

Reviewed  
by: Greg Jakubowski

Printed

Signature



# RADIATED EMISSIONS

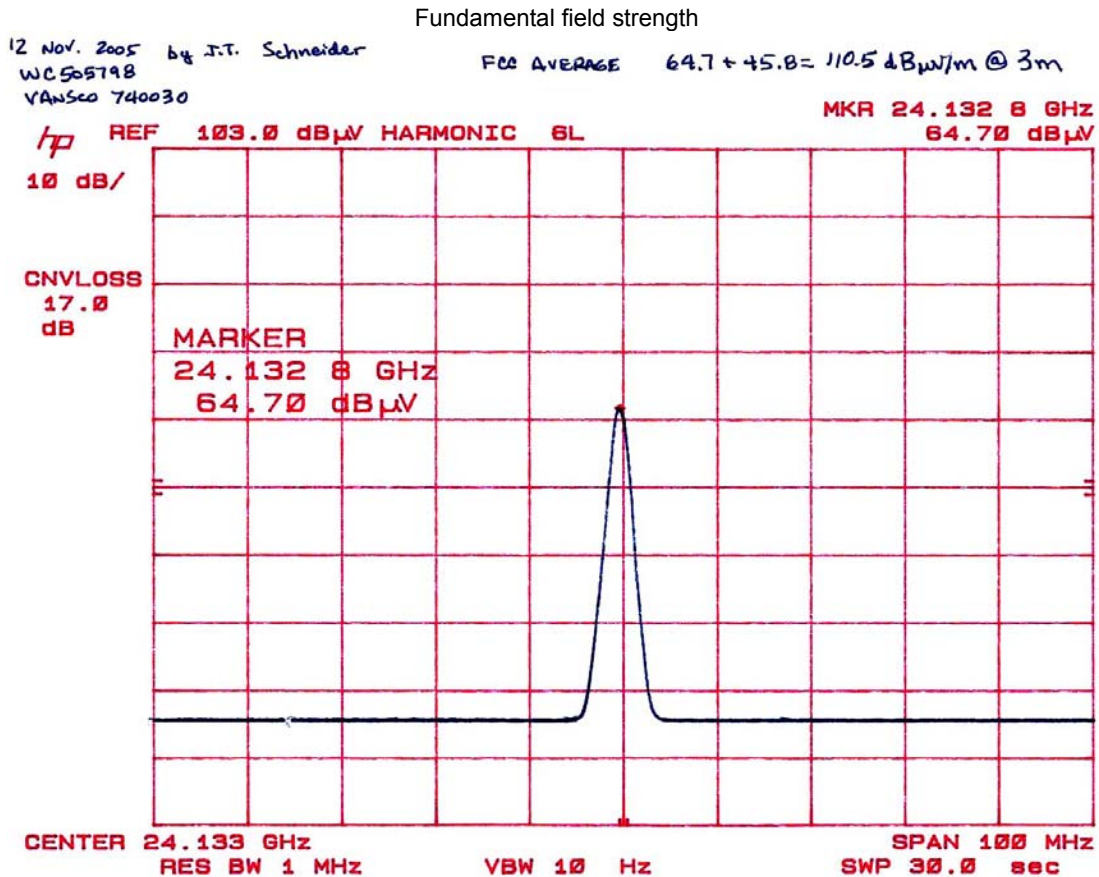


Test Report #: WC505798 Run 1a Test Area: LTS – 3m  
EUT Model #: 740030A Date: 11/12/2005  
EUT Serial #: eu-2005 EUT Power: 13.5VDC Temperature: 20.0 °C  
Test Method: FCC / IC Air Pressure: 98.0 kPa  
Customer: VANSCO Rel. Humidity: 40.0 %

EUT Description: TRUE GROUND SPEED SENSOR

Notes: 80cm EUT HEIGHT

Data File Name: \_\_\_\_\_ Page: 2 of 5



Tested by: Joel Schneider

Printed

*Joel T. Schneider*

Signature

Reviewed by: Greg Jakubowski

Printed

*Greg Jakubowski*

Signature

# RADIATED EMISSIONS



Test Report #: WC505798 Run 1a Test Area: LTS – 3m

EUT Model #: 740030A Date: 11/12/2005

EUT Serial #: eu-2005 EUT Power: 13.5VDC Temperature: 20.0 °C

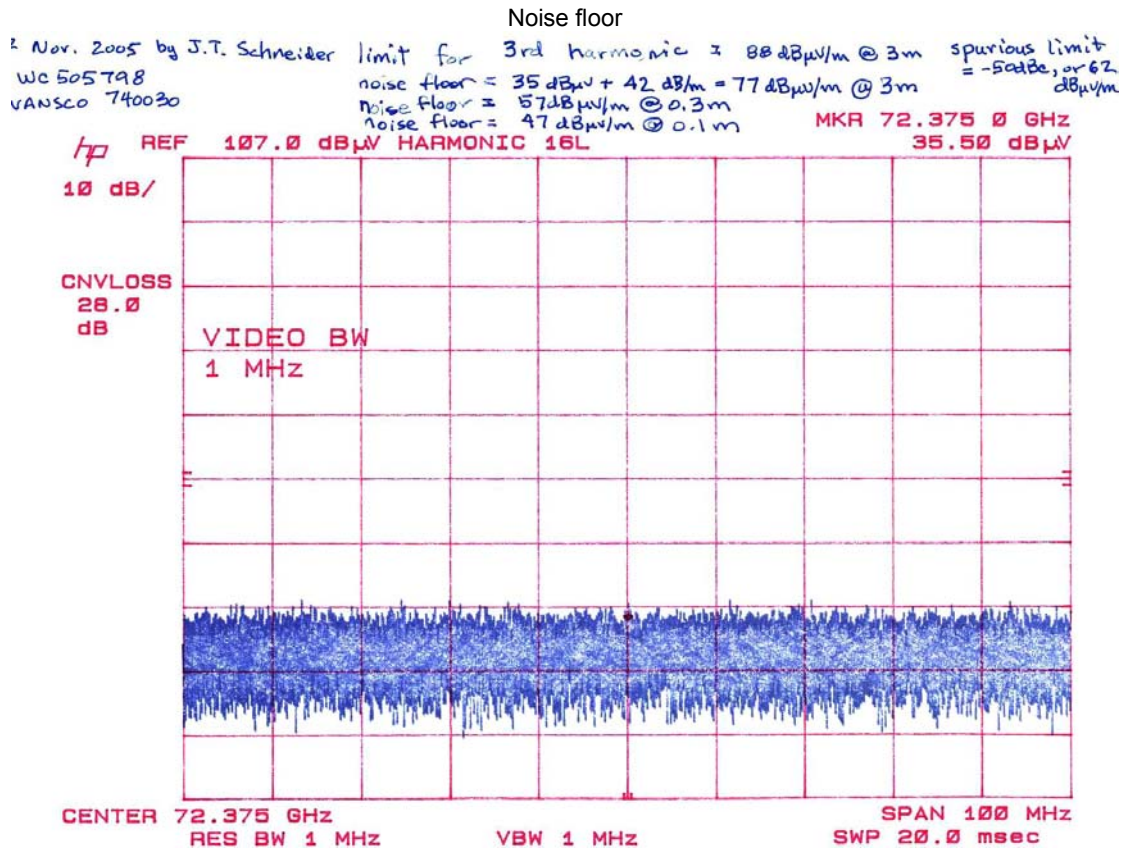
Test Method: FCC / IC Air Pressure: 98.0 kPa

Customer: VANSCO Rel. Humidity: 40.0 %

EUT Description: TRUE GROUND SPEED SENSOR

Notes: 80cm EUT HEIGHT

Data File Name: \_\_\_\_\_ Page: 3 of 5



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Printed

*Joel T. Schneider*

Signature

Reviewed by: Greg Jakubowski

Printed

*Greg Jakubowski*

Signature

# RADIATED EMISSIONS



Test Report #: WC505798 Run 1a Test Area: LTS – 3m

EUT Model #: 740030A Date: 11/12/2005

EUT Serial #: eu-2005 EUT Power: 13.5VDC Temperature: 20.0 °C

Test Method: FCC / IC Air Pressure: 98.0 kPa

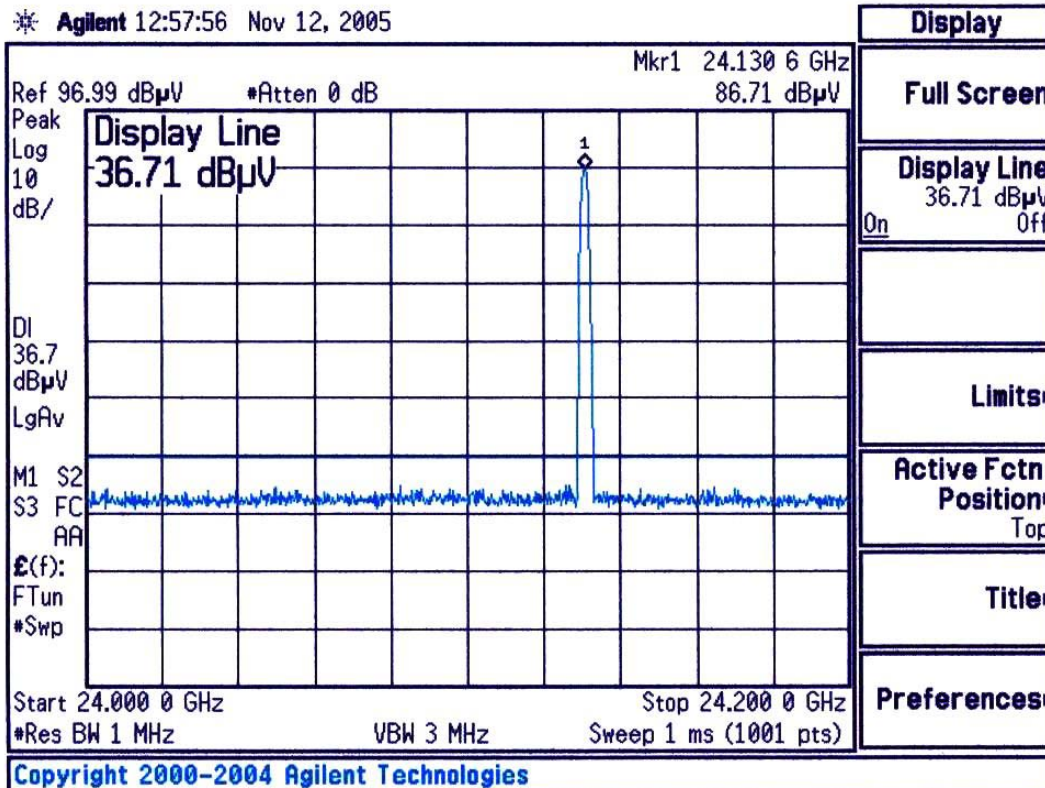
Customer: VANSCO Rel. Humidity: 40.0 %

EUT Description: TRUE GROUND SPEED SENSOR

Notes: 80cm EUT HEIGHT

Data File Name: \_\_\_\_\_ Page: 4 of 5

Band edge



Tested by: Joel Schneider

Printed

*Joel T. Schneider*

Signature

Reviewed by: Greg Jakubowski

Printed

*G. Jakubowski*

Signature

# RADIATED EMISSIONS



Test Report #: WC505798 Run 1a Test Area: LTS – 3m

EUT Model #: 740030A Date: 11/12/2005

EUT Serial #: eu-2005 EUT Power: 13.5VDC Temperature: 20.0 °C

Test Method: FCC / IC Air Pressure: 98.0 kPa

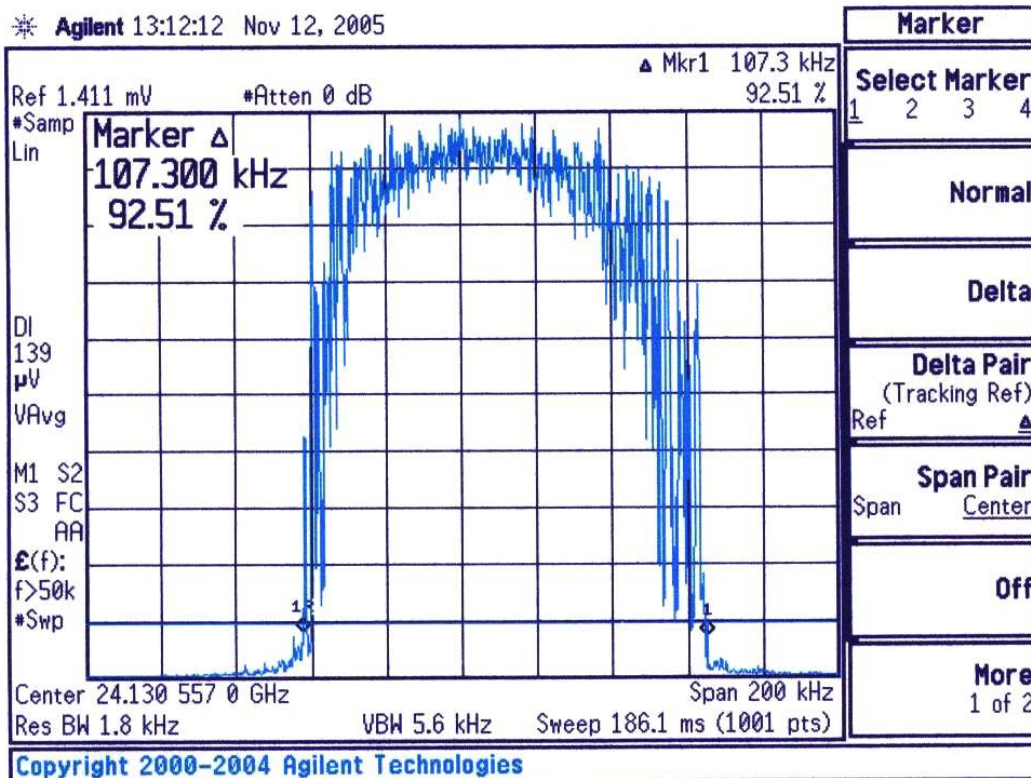
Customer: VANSCO Rel. Humidity: 40.0 %

EUT Description: TRUE GROUND SPEED SENSOR

Notes: 80cm EUT HEIGHT

Data File Name: \_\_\_\_\_ Page: 5 of 5

Occupied bandwidth



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Signature

Reviewed by: Greg Jakubowski

Printed

*G. Jakubowski*

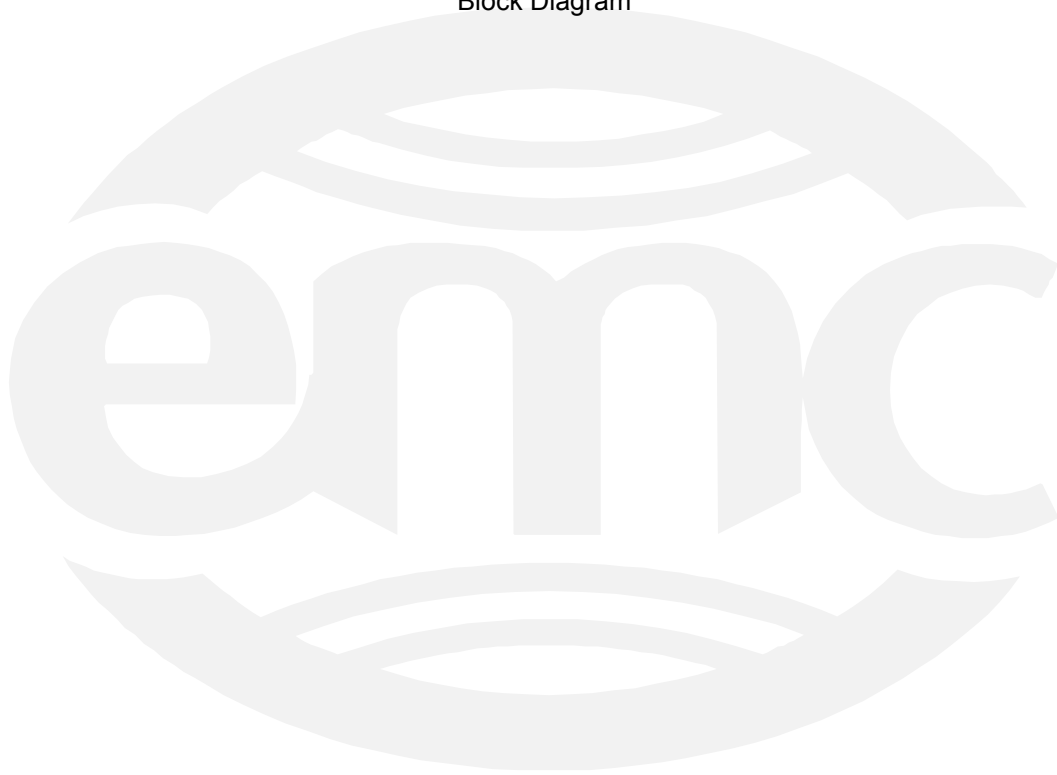
Signature

## Appendix B

Constructional Data Form

and

Block Diagram







## EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.  
**NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.**

Company: Vansco Electronics LP  
 Address: 1305 Clarence Avenue  
R3T 1T4  
Winnipeg, MB Canada  
 Contact: Ron Richert Position: Technical Lead  
 Phone: 204-453-3339 x240 Fax: 204 452-7156  
 E-mail Address: rrichert@vansco.ca

### General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description TRUE GROUND SPEED SENSOR  
 EUT Name 740 TRUE GROUND SPEED SENSOR  
 Model No.: 740030 Serial No.: eu-2005  
 Product Options: Radar present line tied to battery or gnd  
 Configurations to be tested: Radar present line tied to battery

### Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)

Modifications since last test: \_\_\_\_\_  
 Modifications made during test: \_\_\_\_\_

### Test Objective(s): Please indicate the tests to be performed, entering the applicable standard(s) where noted.

- |   |   |
|---|---|
| <input type="checkbox"/> EMC Directive 89/336/EEC (EMC)<br>Std: _____           | <input type="checkbox"/> FCC: Class <input type="checkbox"/> A <input type="checkbox"/> B Part _____                      |
| <input type="checkbox"/> Machinery Directive 89/392/EEC (EMC)<br>Std: _____     | <input type="checkbox"/> VCCI: Class <input type="checkbox"/> A <input type="checkbox"/> B                                |
| <input type="checkbox"/> Medical Device Directive 93/42/EEC (EMC)<br>Std: _____ | <input type="checkbox"/> BSMI: Class <input type="checkbox"/> A <input type="checkbox"/> B                                |
|   | <input type="checkbox"/> Canada: Class <input type="checkbox"/> A <input type="checkbox"/> B                              |
|   | <input type="checkbox"/> Australia: Class <input type="checkbox"/> A <input type="checkbox"/> B                           |
|   | <input checked="" type="checkbox"/> Other: EN 300 440:2000<br>FCC part 15, subpart C, title 47<br>Industry Canada:RSS-210 |
- ☐ Vehicle Directive 72/245/EEC (EMC)  
Std: \_\_\_\_\_
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

### Third Party Certification, if applicable (\*Signature on Page 6 Required)

- |   |   |
|---|---|
| <input type="checkbox"/> Attestation of Conformity (AoC)* | <input type="checkbox"/> EMC Certification (used with Octagon Mark)*                                  |
| <input type="checkbox"/> Certificate of Conformity (CoC)* | <input type="checkbox"/> Compliance Document*   |
| Protection Class (N/A for vehicles)                       | <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III |
- (Press F1 when field is selected to show additional information on Protection Class.)

**EMC Test Plan and Constructional Data Form**

America

- ☒ FCC / TCB Certification  
☐ E-Mark Certification

- ☒ Industry Canada / FCB Certification  
☐ Taiwan Certification

**Attendance**

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

**Failure - Complete this section if testing will not be attended by the customer.**

If a failure occurs, TÜV America should:

- ☒ Call contact listed above, if not available then stop testing. (After hrs phone): \_\_\_\_\_  
☐ Continue testing to complete test series.  
☐ Continue testing to define corrective action.  
☐ Stop testing.

**EUT Specifications and Requirements**

Length: 3.60" Width: 3.89" Height: 3.88" Weight: 460 grams

**Power Requirements**

*Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)*

Voltage: 12 Volts (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: N/A

Current (Amps/phase(max)): 120 mA Current (Amps/phase(nominal)): 100 mA

Other N/A

**Other Special Requirements**

N/A

**Typical Installation and/or Operating Environment**

(ie. Hospital, Small Business, Industrial/Factory, etc.)  
AGRICULTURAL EQUIPMENT

**EUT Power Cable**

- ☒ Permanent OR ☐ Removable Length (in meters): \_\_\_\_\_  
☐ Shielded OR ☐ Unshielded  
☐ Not Applicable



## EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables														
Type	Analog	Digital	During Test		Qty	Shielding		Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent	
			Active	Passive		Yes	No							Type
<b>EXAMPLE:</b>														
RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
POWER AND SPEED OUTPUT	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	18 AWG, 4/C SJOOW	N/A	F0B-14A	N/A		<input type="checkbox"/>	<input checked="" type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>



America

**Description:** The firmware samples an input frequency from the radar antenna. The frequency is directly proportional to the ground speed measured. It uses histogram - based filtering to remove artifacts such as noise and signal dropout. It generates an output frequency based on this filtered data.

**Equipment Under Test (EUT) Operating Modes to be Tested** -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Normal operating mode
- 2.
- 3.

**Equipment Under Test (EUT) System Components** -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #
TGSS	740030	EU-2005	740030A



## EMC Test Plan and Constructional Data Form

**Support Equipment** -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)  
This information is required for FCC & Taiwan testing.

<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
N/A			

### Oscillator Frequencies

<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
7.3728MHz	N/A	Y1	Micro operation

### Power Supply

<i>Manufacturer</i>	<i>Model #</i>	<i>Serial #</i>	<i>Type</i>
N/A			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____
			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____

### Power Line Filters

<i>Manufacturer</i>	<i>Model #</i>	<i>Location in EUT</i>
Murata	NFM61RH20T332T1	At the input of +12V



## EMC Test Plan and Constructional Data Form

### Critical EMI Components (Capacitors, ferrites, etc.)

<i>Description</i>	<i>Manufacturer</i>	<i>Part # or Value</i>	<i>Qty</i>	<i>Component # / Location</i>
Filter capacitor	N/A	X71U16V125C 10%1206	5	C15,C8,C1,C2
Filter capacitor	N/A	X7R.1U50V 125C 10%0805	6	C5,C6,C17,C18,C27,C28
Filter capacitor		X7R .1U 25V 125C 10% 0603		C3,C9

### EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

All longer traces sandwiched between two ground plane layers.

(PLEASE INSERT "ELECTRONIC SIGNATURE" BELOW IF POSSIBLE)

### Authorization Signatures (Signature Required for Certifications checked on pg 1)

Paulo Rodrigues

December, 05 2005

Customer authorization to perform tests  
according to this test plan.

Date

Danica Pantner/Paulo Rodrigues

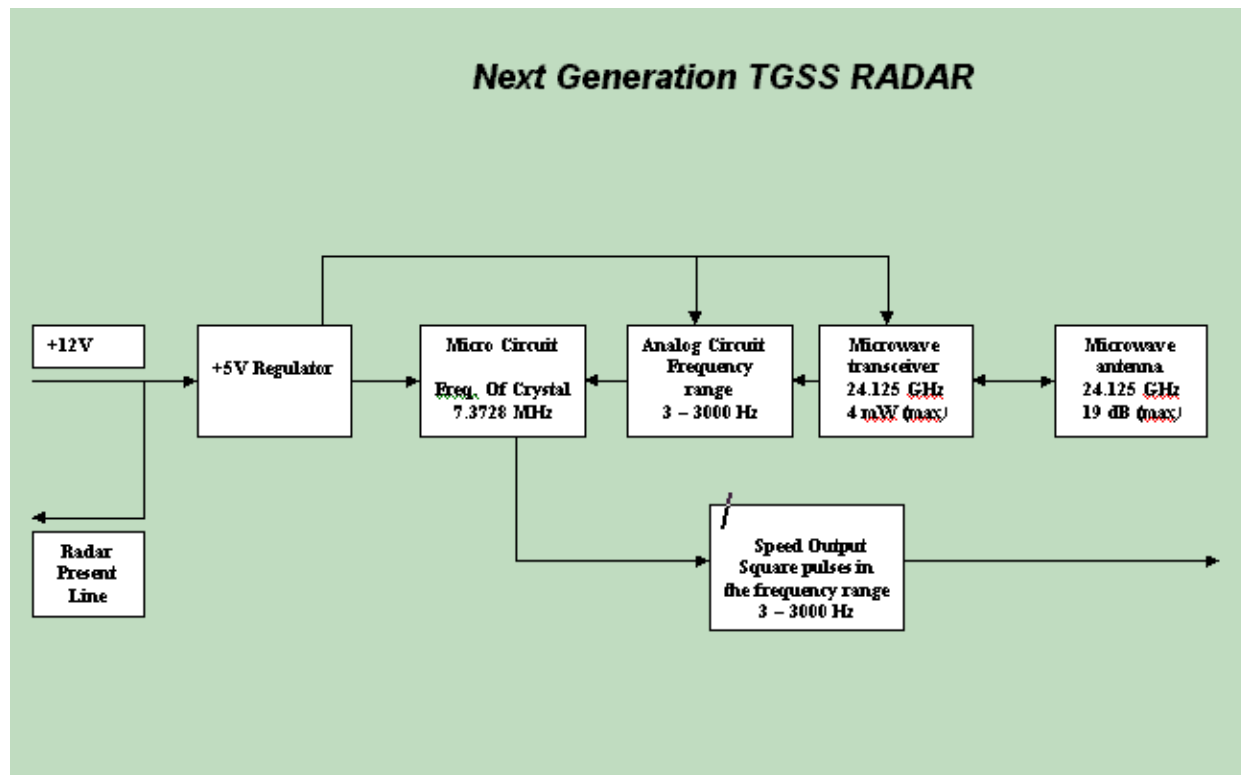
December,06 2005

Test Plan/CDF Prepared By (please print)

Date

## EMC Block Diagram Form

**System Configuration Block Diagram** -- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables, power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



## Authorization Signatures

Customer authorization to perform tests  
according to this test plan.

Date

Test Plan/CDF Prepared By (please print)

Date

## Appendix C

### Measurement Protocol



# MEASUREMENT PROTOCOL

## GENERAL INFORMATION

### Environmental conditions in the lab,

Temperature: 20 °C

Relative Humidity: 40 %

Atmospheric pressure: 98.0 kPa

Power supply system: 13.5 VDC

### Test Methodology

Emissions testing is performed according to the procedures in ANSI C63.4-2003.

### Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of  $\pm 1.8$  dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of  $\pm 4.8$  dB. The equipment comprising the test systems is calibrated on an annual basis.

### Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into its characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

### Radiated Emissions

The final level, in dB $\mu$ V/m, equals the reading from the spectrum analyzer (Level dB $\mu$ V), adding the antenna correction factor and cable loss factor (Factor dB) to it, and subtracting the preamp gain (and duty cycle correction factor, if applicable). This result then has the limit subtracted from it to provide the Delta, which gives the tabular data as shown in the data sheets in Attachment A.

Example:

FREQ (MHz)	LEVEL (dB $\mu$ V)	CABLE/ANT/PREAMP (dB) (dB/m) (dB)	FINAL (dB $\mu$ V/m)	POL/HGT/AZ (m) (deg)	DELTA1
60.80	42.5Qp +	1.2 + 10.9 - 25.5 =	29.1	V 1.0 0.0	-10.9

### Test Equipment

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.