



Test Report

Prepared for: ViaSat

Model: VSC100

Description: Velocity Sensing Controller 100 - True Ground Speed/Direction with Single Speed Trigger for deploying aerodynamic features on trailers

FCC ID: 2ABLP-VSC100

To

FCC Part 15.249

Date of Issue: December 19, 2013

On the behalf of the applicant:

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Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	December 19, 2013	Alex Macon	Original Document
2.0	May 1, 2014	Alex Macon	Added detail to band edge plots, added specification 15.215(c) to the test summary table, and added specification 15.203



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The tests results contained within this test report all fall within our scope of accreditation, unless noted below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



FCC Site Reg. #349717

IC Site Reg. #2044A-2

Non-accredited tests contained in this report:

N/A



The applicant has been cautioned as to the following

15.21: Information to User

The user's manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a): Special Accessories

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without an additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.



Standard Test Conditions Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing.

In accordance with ANSI C63.10-2009 and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104°F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Measurement results, unless otherwise noted, are worst-case measurements.

Environmental Conditions		
Temperature (°C)	Humidity (%)	Pressure (mbar)
19.9 - 20.3	30.5 – 31.8	971.5 - 975.3

EUT Description

Model: VSC100

Description: Velocity Sensing Controller 100 - True Ground Speed/Direction with Single Speed Trigger for deploying aerodynamic features on trailers

Additional Information:

The EUT is a 24GHz Satcom Road Speed Detector used on commercial vehicles.

EUT Operation during Tests

EUT was placed in normal operation with the final cable harness

15.203: Antenna Requirement:

- The antenna is permanently attached to the EUT
- The antenna uses a unique coupling
- The EUT must be professionally installed
- The antenna requirement does not apply



Accessories:

Qty	Description	Mfg	Model	S/N
2	Latch	SouthCo	J-R4-EM-21-161	N/A
1	4-LED assembly	N/A	N/A	N/A

Cables:

Qty	Description	Length (M)	Shielding Y/N	Shielded Hood Y/N	Termination
1	DC power cable	>3m	Y	N	EUT to power supply

Modifications: None



Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.249(a)	Fundamental Field Strength	Pass	
15.249(d) 15.215(c)	Out of Band Spurious Emissions	Pass	
RSS-210	99% Occupied Bandwidth	Pass	



Fundamental Field Strength

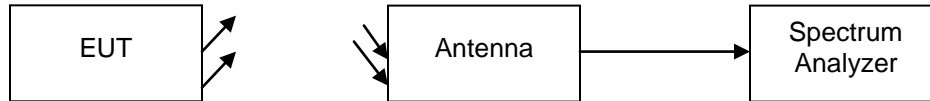
Name of Test: Fundamental Field Strength
Test Equipment Utilized: i00273, i00379, i00409

Engineer: Alex Macon
Test Date: 12/16/13

Test Procedure

The EUT was tested in a semi-anechoic chamber at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Fundamental Field Strength.

Test Setup



Spectrum Analyzer Settings

Detector Settings	RBW	VBW	Span
Peak	1 MHz	1 MHz	As Necessary
Average	1 MHz	3 Mhz	As Necessary

Sample Calculations:

Correction Factors include Antenna and cable insertion loss.

Measured Level includes correction factors that were entered into the spectrum analyzer before recording test data.



Fundamental Field Strength

Tuned Frequency (GHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Result
24.1588	84.72	128.0	Pass

Tuned Frequency (GHz)	Avg. Measured Level (dBuV/m)	Avg. Limit (dBuV/m)	Result
24.1588	83.28	108.0	Pass

No other emissions were detectable. All emissions were more than -20 dBc.



Radiated Spurious Emissions

Name of Test:

Radiated Spurious Emissions

Engineer: Alex Macon

Test Equipment Utilized:

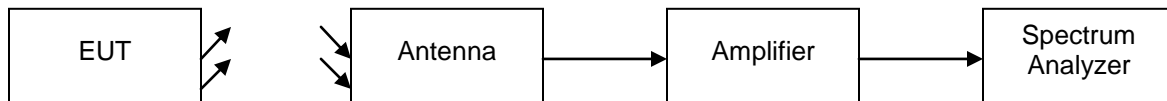
i00267, i00273, i00379, i00409

Test Date: 12/16/13

Test Procedure

The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the limits for Radiated Spurious Emissions. The antenna, band reject filter, amplifier and cable correction factors were input into the spectrum analyzer before recording data. The spectrum for each tuned frequency was examined to the 10th harmonic.

Test Setup



Analyzer Settings

Detector Settings	RBW	VBW	Span
Peak	1 MHz	3 MHz	As Necessary
Average	1 MHz	3 MHz	As Necessary

Sample Calculations:

Correction Factors include Antenna and cable insertion loss correction factors.

Measured Level includes correction factors that were input to the spectrum analyzer before recording test data

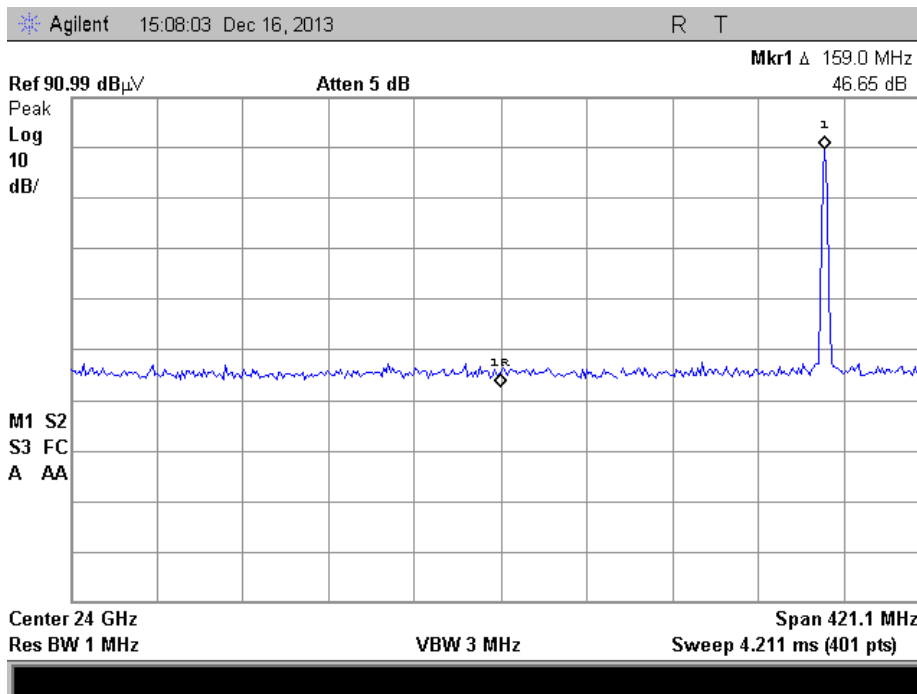
Radiated Spurious Emissions

Tuned Frequency (GHz)	Emission Frequency (GHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
24.1588	25.752	51.6	74.0	-22.4
24.1588	25.699	47.79	74.0	-26.2

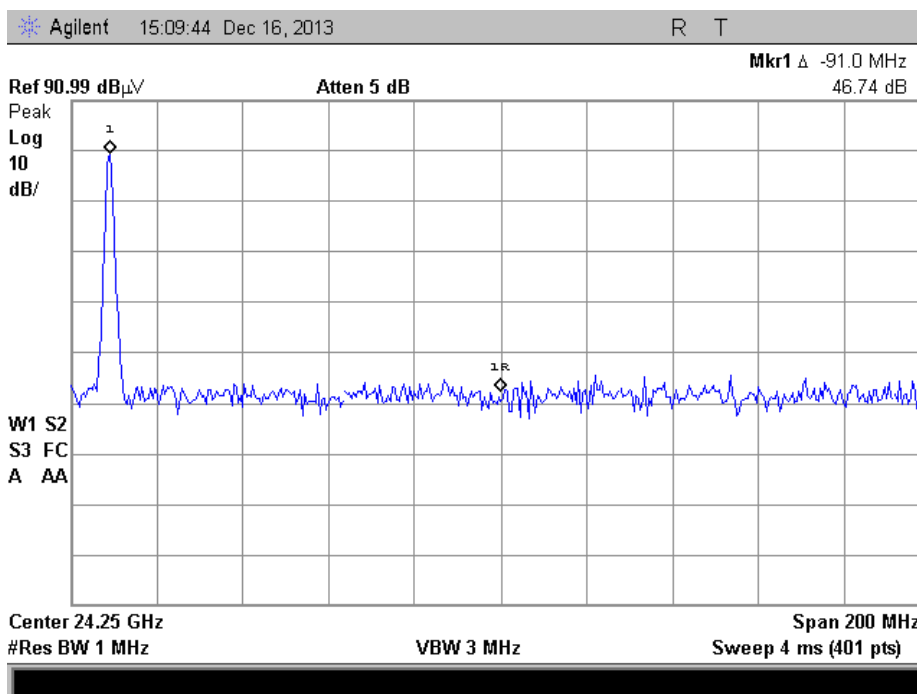
Tuned Frequency (GHz)	Emission Frequency (GHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)
24.1588	25.752	50.16	54.0	-3.84
24.1588	25.699	46.78	54.0	-7.22



Lower Band Edge Plot 15.249(d)



Upper Band Edge Plot 15.249(d)





99% Occupied Bandwidth

Name of Test:

99% Occupied Bandwidth

Engineer: Alex Macon

Test Equipment Utilized:

i00273, i00379, i00409

Test Date: 12/23/13

Test Procedure

The EUT was tested in a semi-anechoic chamber at a distance of 3 meter from the receiving antenna. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span. The analyzer was set to max hold while the 99% bandwidth was measured.

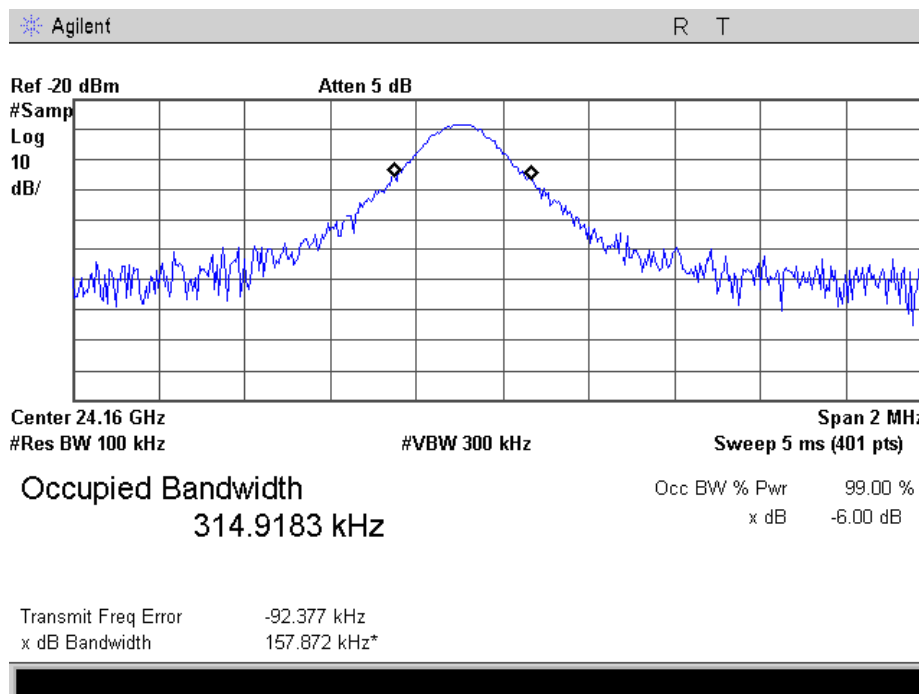
Test Setup



Occupied Bandwidth Summary

Frequency MHz	Recorded Measurement	Result
24.13	314.92 kHz	Pass

99% Bandwidth





Test Equipment Utilized

Description	Manufacturer	Model #	CT Asset #	Last Cal Date	Cal Due Date
Bilog Antenna	Schaffner	CBL6111C	i00267	12/19/11	12/19/13
Amplified Horn Antenna	ARA	MWH-1826/B	i00273	4/19/12	4/19/14
*Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	12/4/12	12/4/13
*EMI Analyzer	Agilent	E7405A	i00379	11/21/12	11/21/13
Labview Software	National Instruments	FCC_PART15AB_R2	i00395	Compiled on: 06/11	
DC Power Supply	Yitua	PS-3010	i00409	Verified on: 12/13/13	

*Note: Equipment is under 60 day calibration extension per Lab Manager's discretion

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.