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FCC PART 80 TEST REPORT

APPLICANT	GUIDANCE NAVIGATION
	4 DOMINUS WAY MERIDAN BUSINESS PARK
	LEICESTER, LE19 1RP UK
FCC ID	VYMRADASCAN
MODEL NUMBER	RADASCAN
PRODUCT DESCRIPTION	NAVIGATION RADAR
DATE SAMPLE RECEIVED	1/04/2008
DATE TESTED	1/16/2008
TESTED BY	NAM NGUYEN
APPROVED BY	MARIO DE ARANZETA
TIMCO REPORT NO.	26UT8TestReport.doc
TEST RESULTS	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL

**THE ATTACHED REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL
WITHOUT THE WRITTEN APPROVAL OF TIMCO ENGINEERING, INC.**



Test Certificate # 0955-01

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GENERAL REMARKS

The attached report shall not be reproduced except in full without the written permission of Timco Engineering Inc.

The test results relate only to the items tested.

Summary

The device under test does:

- ☒ fulfill the general approval requirements as identified in this test report
☐ not fulfill the general approval requirements as identified in this test report

Attestations

This equipment has been tested in accordance with the standards identified in this test report. To the best of my knowledge and belief, these tests were performed using the measurement procedures described in this report.

All instrumentation and accessories used to test products for compliance to the indicated standards are calibrated regularly in accordance with ISO 17025 requirements.



Testing Certificate # 0955-01

I attest that the necessary measurements were made, under my supervision, at:

Timco Engineering Inc.
849 NW State Road 45
Newberry, Fl 32669



Authorized Signatory Name:

Mario de Aranzeta C.E.T.
Compliance Engineer/ Lab. Supervisor

Date: 2/7/08

GENERAL INFORMATION

DUT Specification

DUT Description	NAVIGATION RADAR
FCC ID	VYMRADASCAN
Model Number	RADASCAN
Serial Number	N/A
Operating Frequency	9.2-9.3 GHz
No. of Channels	Single
Type of Emission	Swept CW
Modulation	FM
DUT Power Source	<input type="checkbox"/> 110-120Vac/50- 60Hz
	<input checked="" type="checkbox"/> DC Power (24 Vdc)
	<input type="checkbox"/> Battery Operated Exclusively
Test Item	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
Type of Equipment	<input checked="" type="checkbox"/> Fixed
	<input type="checkbox"/> Mobile
	<input type="checkbox"/> Portable
Antenna	narrow beamwidth parabolic reflector 28 dBi gain
Antenna Connector	SMA

Test facility	Timco Engineering, Inc. 849 NW State Road 45, Newberry, FL 32669
Test Condition	The DUT was tested in the laboratory in an environment with normal temperature and humidity. The temperature was 26°C with a relative humidity of 50%.
Modifications	None
Test Exercise	The DUT was placed in continuous transmit mode of operation
Applicable Standards	ANSI/TIA 603-C;2004 , FCC CFR 47 Part 90

EQUIPMENT LIST

Device	Manufacturer	Model	Serial Number	Cal/Char Date	Due Date
3/10-Meter OATS	TEI	N/A	N/A	Listed 3/20/07	3/19/10
3-Meter OATS	TEI	N/A	N/A	Listed 1/11/06	1/10/09
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	Listed 5/11/07	5/10/10
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	CAL 11/30/07	11/30/09
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	CAL 11/30/07	11/30/09
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	CAL 11/30/07	11/30/09
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	CAL 11/30/07	11/30/09
Antenna: Biconnical	Electro-Metrics	BIA-25	1171	CAL 7/18/07	7/18/09
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	CAL 12/1/06	12/1/08
Antenna: Double-Ridged Horn	Electro-Metrics	RGA-180	2319	CAL 7/18/07	7/18/09
LISN	Electro-Metrics	ANS-25/2	2604	CAL 10/5/06	10/5/08
Termaline Wattmeter	Bird Electronic Corporation	611	16405	CAL 3/15/07	3/15/09

TEST PROCEDURE

Power Line Conducted Interference: The procedure used was ANSI/TIA 603-C:2004 using a 50uH LISN. Both lines were observed with the UUT transmitting. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

Bandwidth 20 dB: The measurements were made with the spectrum analyzer's resolution bandwidth (RBW) = 1 MHz and the video bandwidth (VBW) = 3 MHz and the span set as shown on plot.

Power Output: The RF power output was measured at the antenna feed point using a peak power meter.

Antenna Conducted Emissions: The RBW = 100 kHz, VBW = 300 kHz and the span set to 10.0 MHz and the spectrum was scanned from 30 MHz to the 10th Harmonic of the fundamental. Above 1 GHz the resolution bandwidth was 1 MHz and the VBW = 3 MHz and the span to 50 MHz.

Radiation Interference: The test procedure used was ANSI/TIA 603-C:2004 using an Agilent spectrum receiver with pre-selector. The bandwidth (RBW) of the spectrum receiver was 100 kHz up to 1 GHz and 1 MHz above 1 GHz with an appropriate sweep speed. The VBW above 1 GHz was 3 MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the UUT was 76°F with a humidity of 55%.

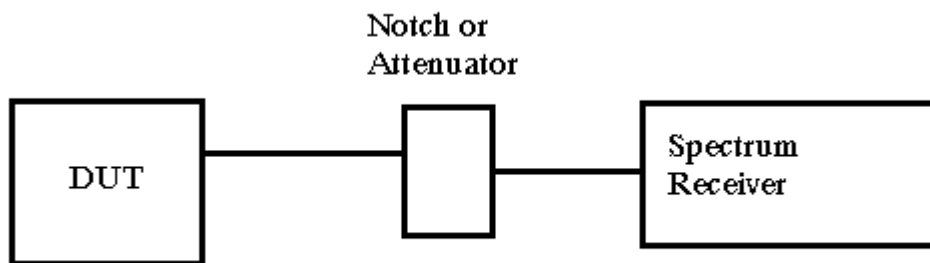
RF POWER OUTPUT

Rule Part No.: Part 2.1046(a), Part 80

Test Requirements:

Method of Measurement: RF power is measured by connecting a 50-ohm, resistive wattmeter to the RF output connector. With a nominal voltage, and the transmitter properly adjusted the RF output measures:

Test Setup Diagram:



Test Data:

OUTPUT POWER: 1.62 Watts

OUTPUT POWER (radiated): 1022 Watts EIRP

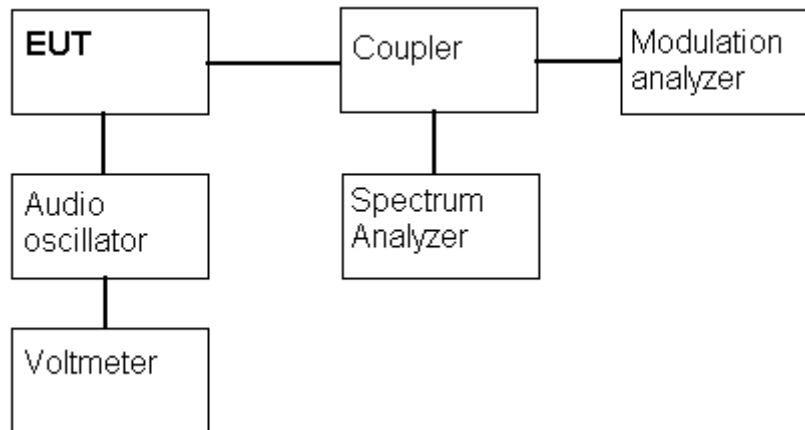
Part 2.1033 (C)(8) DC Input into the final amplifier

FOR POWER SETTING INPUT POWER: $(24.0V)(1.20A) = 28.8$ Watts

MODULATION CHARACTERISTICS

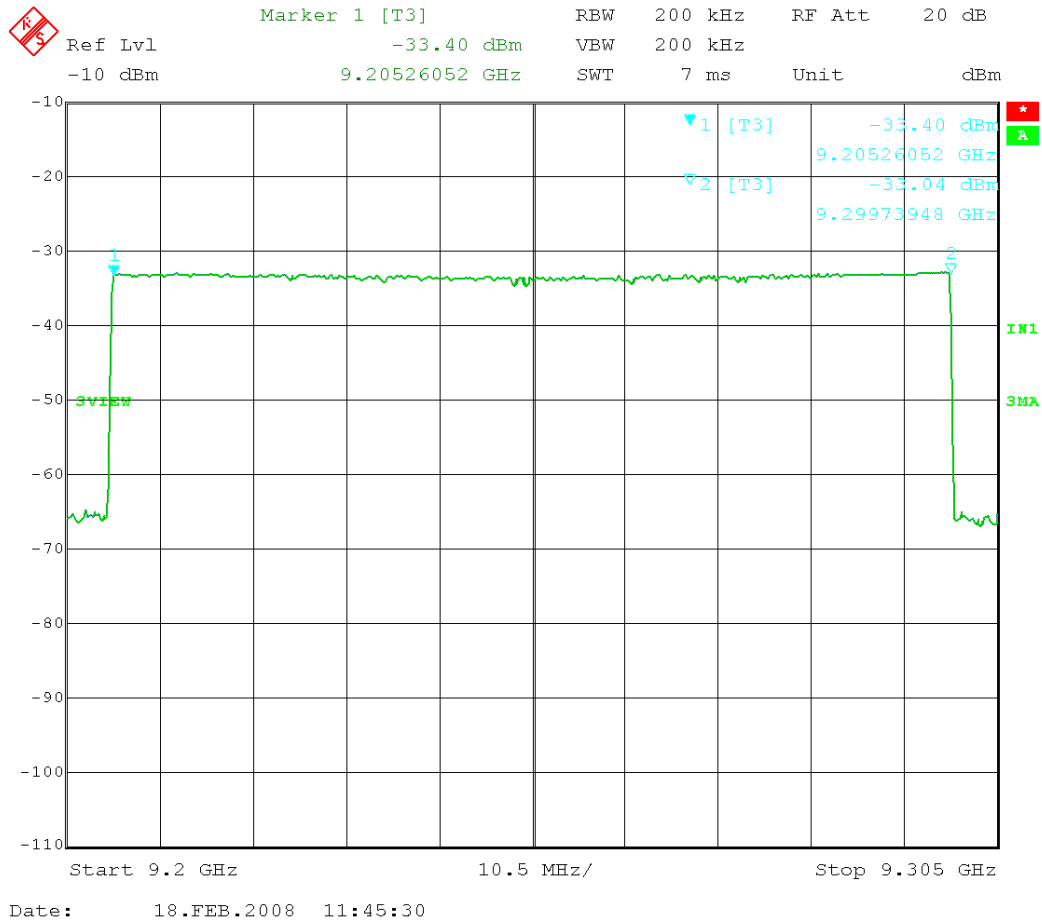
Method of Measurement: ANSI/TIA 603-C:2004

Test Setup Diagram:



The modulation consists of a rampwave changing the carrier frequency continuously from 9200-9300 MHz. The emission designator will be F0N.

OCCUPIED BANDWIDTH PLOT

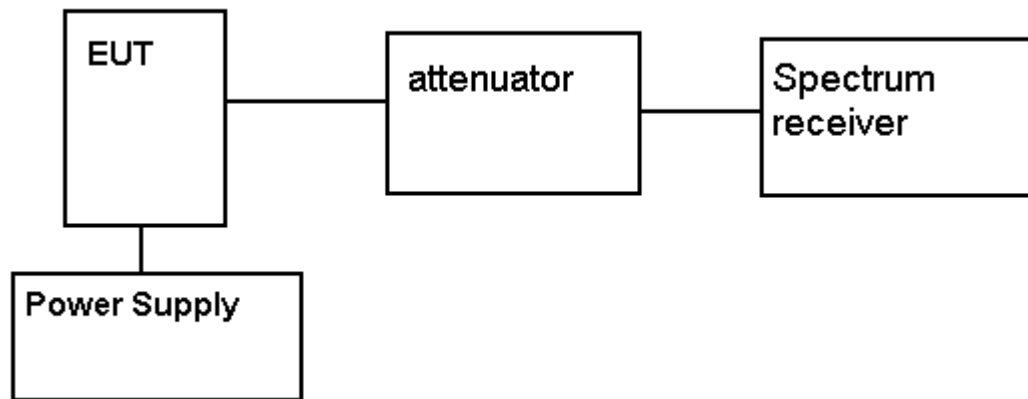


The emission mask for this device requires that the emission only need stay in the band.

SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)**Rule Part No.:** Part 2.1051(a)**Requirements:** $43 + 10\log(\text{mean power})$
 $43 + 10\log(1.62) = 45.10 \text{ dB}$ **Method of Measurement:** The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental or 40 GHz. The measurements were made in accordance with standard ANSI/TIA 603-C:2004.**Test Data:**

Tuned Freq. (MHz)	Emission Freq. MHz	dB below carrier
9301.70	18603.40	61.73
	27905.10	72.75
	37206.80	70.63

Method of Measuring Conducted Spurious Emissions



METHOD OF MEASUREMENT: The procedure used was TIA/EIA-603-C:2004

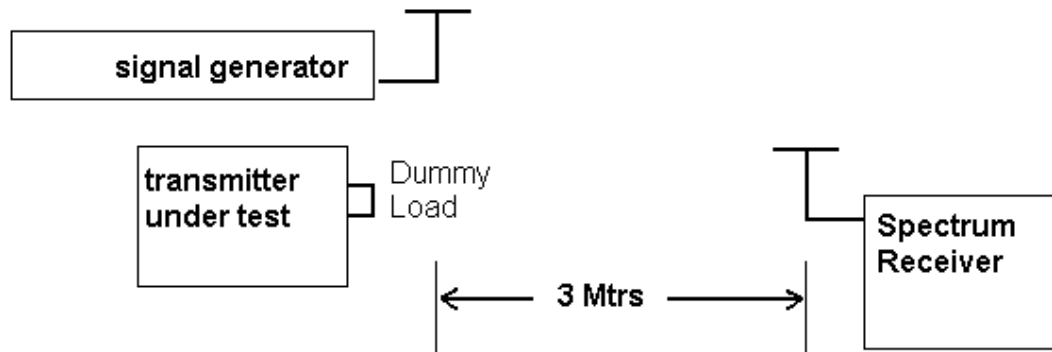
FIELD STRENGTH OF SPURIOUS EMISSIONS

Rule Parts. No.: Part 2.1053

Requirements: The FCC limits for radiated emissions are the same as previously stated for the conducted emissions.

METHOD OF MEASUREMENT: The tabulated data shows the results of the radiated field strength emissions test. The spectrum was scanned from 30 MHz to at least the tenth harmonic of the fundamental or 40 GHz. This test was conducted per ANSI/TIA 603-C:2004 using the substitution method.

Test Setup Diagram:



Test Data:

Emission Frequency MHz	Ant. Polarity	dB below Carrier (dBc)
9302.25	0	0
18603.40	V	48.95
27905.10	H/V	NE
37206.80	H/V	NE

FREQUENCY STABILITY

Rule Parts. No.: Part 2.1055, Part 80

Requirements: Emission need only remain in the band.

Method of Measurements: ANSI/TIA 603-C:2004

Test Data:

Assigned Frequency (Ref. Frequency) (MHz)		9301.905436
Temperature (°C)	Frequency (MHz)	Frequency Stability (PPM)
-30	9296.345513	-597.7
-20	9297.112613	-515.2
-10	9299.534708	-254.8
0	9301.088535	-87.8
+10	9301.728611	-19.0
+20	9301.905436	0.0
+30	9301.384092	-56.0
+40	9300.119386	-192.0
+50	9298.561111	-359.5

Assigned Frequency (Ref. Frequency) (MHz)		
% Battery	Frequency (MHz)	Frequency Stability (PPM)
-15%	9301.902565	-0.31
0	9301.905436	0
+15%	9301.932013	2.86

The temperature stability of this device was measured without the temperature stabilization circuitry in the radome operating. This was required to be able to obtain reading from the device below 5 °C. In normal operation the lowest temperature obtainable would be 5 °C.