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## FCC PART 80 AND IC RSS-182 TEST REPORT

<b>APPLICANT</b>	VERTEX STANDARD CO., LTD.
	4-8-8 NAKAMEGURO, MEGURO-KU TOKYO 153-8644 JAPAN
<b>FCC ID</b>	K6630493X20
<b>IC CERTIFICATION</b>	511B-30493X20
<b>MODEL NUMBER</b>	HX300
<b>PRODUCT DESCRIPTION</b>	HANDHELD MARINE TRANSCEIVER WITH WX
<b>DATE SAMPLE RECEIVED</b>	12/28/2011
<b>DATE TESTED</b>	1/6/2012
<b>TESTED BY</b>	Joe Scoglio
<b>APPROVED BY</b>	Mario R. de Aranzeta
<b>TIMCO REPORT NO.</b>	3088AUT11TestReport REV 1.doc
<b>TEST RESULTS</b>	<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.





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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:** 1/28/2012

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## GENERAL INFORMATION

### DUT Specification

<b>DUT Description</b>	HANDHELD MARINE TRANSCEIVER WITH WX
<b>FCC ID</b>	K6630493X20
<b>IC Certification</b>	511B-30493X20
<b>Model Number</b>	HX300
<b>Operating Frequency</b>	156.025-157.425 MHz
<b>Test Frequencies</b>	156.0 MHz, 157.4 MHz
<b>Type of Emission</b>	16K0G3E
<b>Modulation</b>	FM
<b>DUT Power Source</b>	<input type="checkbox"/> 110-120Vac/50- 60Hz
	<input type="checkbox"/> DC Power 12V
	<input checked="" type="checkbox"/> Battery Operated Exclusively
<b>Test Item</b>	<input type="checkbox"/> Prototype
	<input checked="" type="checkbox"/> Pre-Production
	<input type="checkbox"/> Production
<b>Type of Equipment</b>	<input type="checkbox"/> Fixed
	<input type="checkbox"/> Mobile
	<input checked="" type="checkbox"/> Portable
<b>Test Conditions</b>	The temperature was 26°C Relative humidity of 50%.
<b>Modification to the DUT</b>	None
<b>Test Exercise</b>	The DUT was placed in continuous transmit mode.
<b>Applicable Standards</b>	ANSI/TIA 603-C:2004, FCC CFR 47 Part 80, IC RSS-182 and RSS-GEN
<b>Test Facility</b>	Timco Engineering Inc. at 849 NW State Road 45 Newberry, FL 32669 USA.

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## TEST PROCEDURES

**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 10<sup>th</sup> 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 C63.4-2004 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 micro volt at the output of the antenna.

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## TECHNICAL DATA

80.203 (b) **External Controls:** The transmitter is capable of changing frequency between 156.05 – 157.425 MHz by external control. The available channels are shown in the User Manual description Channel List. These channels are preprogrammed by the manufacturer and change of frequency is inaccessible to the station operator.

80.203 (c) Five minutes continuous transmission test. The antenna was connected to a dummy load and the radio was locked in a transmit PTT mode. An external timer digital clock was used to observe the duration of the un-modulated transmission. The transmitter turned off and the radio went to receive mode at 4 minutes, 58 seconds as displayed by the external digital clock.

80.873; 80.956 Transmitter G3E emission capability:

80.911 (a) 80.956 G3E Transmissions: This radio is capable of G3E emission on 156.300 and 156.800 MHz

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## SPURIOUS EMISSIONS AT ANTENNA TERMINALS (CONDUCTED)

**Rule Part No.:** FCC Part 2.1051(a), 80.211, RSS-182

**Requirements:** Emissions must be  $43+10\log(PO)$  dB below the mean power output of the transmitter.

$$\text{High Power} - 43+10\log(5) = 50$$

$$\text{Low Power} - 43+10\log(1) = 43$$

**Method of Measurement:** The carrier was modulated 100% using a 2500 Hz tone. The spectrum was scanned from 0.4 to at least the 10th harmonic of the fundamental. The measurements were made in accordance with standard ANSI/TIA 603-C: 2004.

### Test Data:

TF <b>HIGH POWER</b>	EF	dB below carrier		TF <b>LOW POWER</b>	EF	dB below carrier
156	156	0		156	156	0
	312.1	77.9			312.1	73
	468.1	97.9			468.1	88.9
	624.2	105.5			624.2	99.3
	780.2	97.3			780.2	96.5
	936.3	98.4			936.3	96.9
	1092.3	106			1092.3	100.4
	1248.4	108.6			1248.4	100.2
	1404.5	105.7			1404.5	101.4
	1560.5	101.2			1560.5	98.6

TF <b>HIGH POWER</b>	EF	dB below carrier		TF <b>LOW POWER</b>	EF	dB below carrier
<b>157.4</b>	157.4	0		<b>157.4</b>	157.4	0
	314.8	79.2			314.8	71.7
	472.2	94.8			472.2	88.2
	629.6	94.4			629.6	96.7
	787.1	96.5			787.1	95.4
	944.5	100.1			944.5	96.1
	1102	100.3			1102	100.2
	1259.4	101.1			1259.4	101.2
	1416.8	100.5			1416.8	102.3
	1574.4	98.9			1574.4	96.4

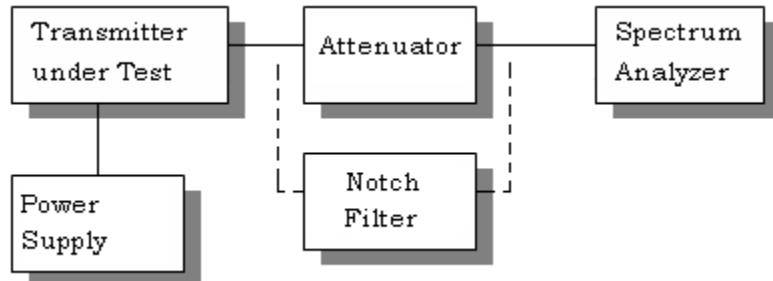
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### **Method of Measuring Conducted Spurious Emissions**



**METHOD OF MEASUREMENT:** The procedure used was ANSI/TIA 603-C:2004 without any exceptions. The measurements were made at TIMCO ENGINEERING INC. 849 N.W. State Road 45, Newberry, Florida 32669.

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## FIELD STRENGTH OF SPURIOUS EMISSIONS

**Rule Parts. No.:** FCC Part 2.1053, RSS-182

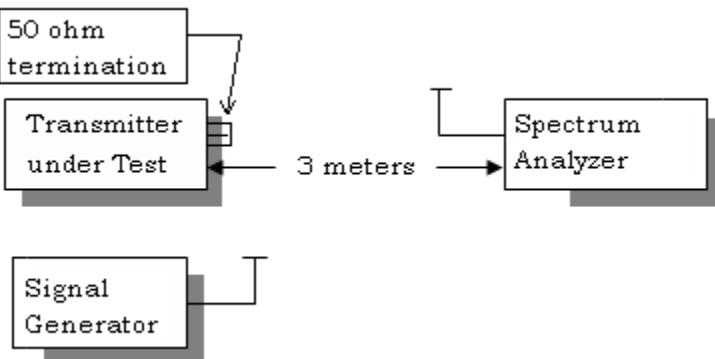
**Requirements:** Emissions must be  $43+10\log(PO)$  dB below the mean power output of the transmitter.

$$\text{High Power} - 43+10\log(5) = 50$$

$$\text{Low Power} - 43+10\log(1) = 43$$

**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. This test was conducted per ANSI/TIA 603-C: 2004 using the substitution method. Measurements were made at the test site of TIMCO ENGINEERING, INC. located at 849 NW State Road 45, Newberry, FL 32669.

### Test Setup Diagram:



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**Test Data:**

HIGH POWER			LOW POWER		
Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
156.00	V	0	156.00	V	0
312.10	V	72.4	312.10	V	76.1
468.10	V	85.4	468.10	H	81.2
624.20	V	69.1	624.20	V	78.6
780.20	V	80.9	780.20	V	73.6
936.30	V	73.2	936.30	V	71.7
1092.30	V	76.3	1092.30	V	69.9
1248.40	V	78.8	1248.40	V	72.7
1404.50	V	75.9	1404.50	V	72.6
4627.20	V	78.9			

HIGH POWER			LOW POWER		
Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)	Emission Frequency MHz	Ant. Polarity	dB Below Carrier (dBc)
157.40	V	0	157.40	V	0
314.80	V	73.1	314.80	V	79.1
472.20	H	89.4	472.20	H	86.8
629.60	V	71.1	629.60	V	78.0
787.10	V	80.6	787.10	V	85.2
944.50	V	80.4	944.50	V	82.2
1102.00	V	76.1	1102.00	V	74.2
1259.40	V	74.7	1574.40	V	71.8
1416.80	V	74.6			
1574.40	V	73.7			

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## RECEIVER RADIATED SPURIOUS EMISSIONS

**Rule Parts. No.:** FCC Part 15.109, RSS-GEN 4.10, 6

### Requirements:

Frequency MHz	Limits
30 – 88	40.0 dB $\mu$ V/m measured @ 3 meters
80 – 216	43.5 dB $\mu$ V/m measured @ 3 meters
216 – 960	46.0 dB $\mu$ V/m measured @ 3 meters
Above 960	54.0 dB $\mu$ V/m measured @ 3 meters

### TEST DATA:

Tuned Frequency MHz	Emission Frequency MHz	Meter Reading dB $\mu$ V	Ant. Pol	Coax Loss dB	Correction Factor dB/m	Field Strength dB $\mu$ V/m	Margin dB
156.0	134.30	3.2	H	0.68	13.90	17.78	25.72
156.0	134.30	10.6	V	0.68	13.90	25.18	18.32
157.4	135.70	3.8	H	0.69	14.24	18.73	24.77
157.4	135.70	12.4	V	0.69	14.24	27.33	16.17
161.6	139.90	5.3	H	0.69	15.08	21.07	22.43
161.6	139.90	11.9	V	0.69	15.08	27.67	15.83
163.2	141.50	5.4	H	0.69	15.28	21.37	22.13
163.2	141.50	12.0	V	0.69	15.28	27.97	15.53

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**EMC EQUIPMENT LIST**

<b>Device</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal/Char Date</b>	<b>Due Date</b>
Analyzer Tan Tower Spectrum Analyzer	HP	8566B Opt 462	3138A07786 3144A20661	11/24/09	10/28/13
Analyzer Tan Tower Preamplifier	HP	8449B-H02	3008A00372	11/21/09	10/28/13
Antenna: Biconnical	Electro-Metrics	94455-1BIA-25	1096	05/04/2011	05/04/2013
Antenna: Biconnical	Eaton	94455-1	1096	05/04/11	05/04/13
Antenna: Log-Periodic	Electro-Metrics	LPA-25	1122	05/04/11	05/04/13
Frequency Counter	HP	5352B	2632A00165	06/22/11	06/22/13
Frequency Counter	HP	5385A	2730A03025	08/17/11	08/17/13
Signal Generator	HP	8648C	3623A02898	09/9/11	09/9/13
Hygro-Thermometer	Extech	445703	0602	06/15/11	06/15/13
Digital Multimeter	Fluke	77	35053830	09/09/11	09/09/13
Analyzer Tan Tower RF Preselector	HP	85685A	3221A01400	11/21/09	10/28/13
Antenna: Passive Loop	EMC Test Systems	EMCO 6512	9706-1211	06/02/09	06/02/12
Modulation Analyzer	HP	8901A	3435A06868	07/18/11	07/18/13
Analyzer Tan Tower Quasi-Peak Adapter	HP	85650A	3303A01690	11/22/09	10/28/13
Temperature Chamber	Tenney Engineering	TTRC	11717-7	06/18/10	06/18/12
Frequency Counter	HP	5385A	3242A07460	06/22/11	06/22/13
3-Meter OATS	TEI	N/A	N/A	02/05/09	02/05/12
3-Meter Semi-Anechoic Chamber	Panashield	N/A	N/A	05/10/10	05/10/12

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