TEST REPORT

FCC Part 15 Subpart C Section 15.249
IC RSS-210 Issue 8 Annex 2 Section A2.9
IC RSS-Gen Issue 3

MANUFACTURER'S NAME	Motorguide 1016 N Monroe Street Lowell MI 49331
PRODUCT NAME	ASM-FT Pedal, INC, WRLS, Patch antenna
MODEL NUMBER(S) TESTED	001009291
SERIAL NUMBER(S) TESTED	NA
PRODUCT DESCRIPTION	Foot actuated remote to control fishing trolling motor
TEST REPORT NUMBER	NC1305643.2
TEST DATE(S)	14-19 August 2013

TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C Sections 15.249 “Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHZ, and 24.0-24.25 GHz” and IC RSS-210 “Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment” and IC RSS-Gen “General Requirements and Information for the Certification of Radiocommunication Equipment”.

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.

Date: 27 August 2013

Location: Taylors Falls MN
USA

Joel T Schneider
Senior EMC Engineer

Greg S Jakubowski
Senior EMC Technician

Not Transferable

EMC TEST REPORT

Test Report No.	**NC1305643.2**	Date of issue:	27 August 2013
Product Name	ASM-FT Pedal, INC, WRLS, Patch antenna		
Model(s) Tested	001009291		
Serial No(s) Tested	NA		
Product Description	Foot actuated remote to control fishing trolling motor		
Manufacturer	Motorguide 1016 N Monroe Street Lowell MI 49331		

Test Result ■ **Positive** ☐ **Negative**

TÜV SÜD 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 SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc issued reports.

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

REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	22	27 August 2013	Initial Release

DIRECTORY

Contents

EMC TEST REGULATIONS:
The tests were performed according to the following regulations:
FCC Part 15 Subpart C §15.249
IC RSS-210 Issue 8 Annex 2 Section A2.9
IC RSS-Gen Issue 3

ENVIRONMENTAL CONDITIONS IN THE LAB

	Actual
Temperature:	: 25°C
Atmospheric pressure	: 99kPa
Relative Humidity	: 50%

POWER SUPPLY UTILIZED
Power supply system : 3 VDC battery

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

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 ±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 ±4.8 dB. All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

SIGN EXPLANATIONS
☐ - not applicable
■ - applicable

Radiated Emissions 30 - 24835 MHz

FCC 15.249(a), (c), (d), IC RSS-210 Annex 2 Section A2.9

Test summary

The requirements are: ■ - MET ☐ - NOT MET
Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 8.3.
Maximum peak fundamental reading is 94.67 dBμV/m (54.1 mV/m) at 3 meters at 2.48 GHz.(limit 500 mV/m)
Maximum average fundamental reading is 93.12 dBμV/m (45.2 mV/m) at 3 meters at 2.48 GHz.(limit 50 mV/m)
Maximum peak harmonic reading is 58.03 dBμV/m (797 μV/m) at 3 meters at 7.44 GHz.(limit 5000 μV/m)
Maximum average harmonic reading is 48.98 dBμV/m (281 μV/m) at 3 meters at 7.44 GHz.(limit 500 μV/m)
No other spurious radiated emissions were detected other than harmonics.

Test location

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

Test distance

3 meters

Test Equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Due
WRLE03204	EM-6917B	Electro-Metrics	Biconicalog Periodic	102	30-May-14
WRLE03295	85662A	Hewlett-Packard	Analyzer Display	2349A06144	22-Apr-14
WRLE02689	8566B	Hewlett-Packard	Spectrum Analyzer	2416A00321	22-Apr-14
NBLE02683	85650A	Hewlett-Packard	Quasi-peak Adapter	2430A00495	30-May-14
WRLE02670	8447D	Hewlett-Packard	Preamplifier	2443A03954	Code B 11-Jan-14
WRLE10527	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0001	Code B 08-Jan-14
WRLE03229	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	2483	16-Aug-13

Cal Code B = Calibration verification performed internally.

Limit for transmitter

Fundamental Frequency (MHz)	Field strength of fundamental (mV/m)	Field strength of harmonics (μV/m)	Measurement distance (m)
2400-2483.5	50	500	3

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in § 15.209, whichever is the lesser attenuation.

(e) As shown in § 15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

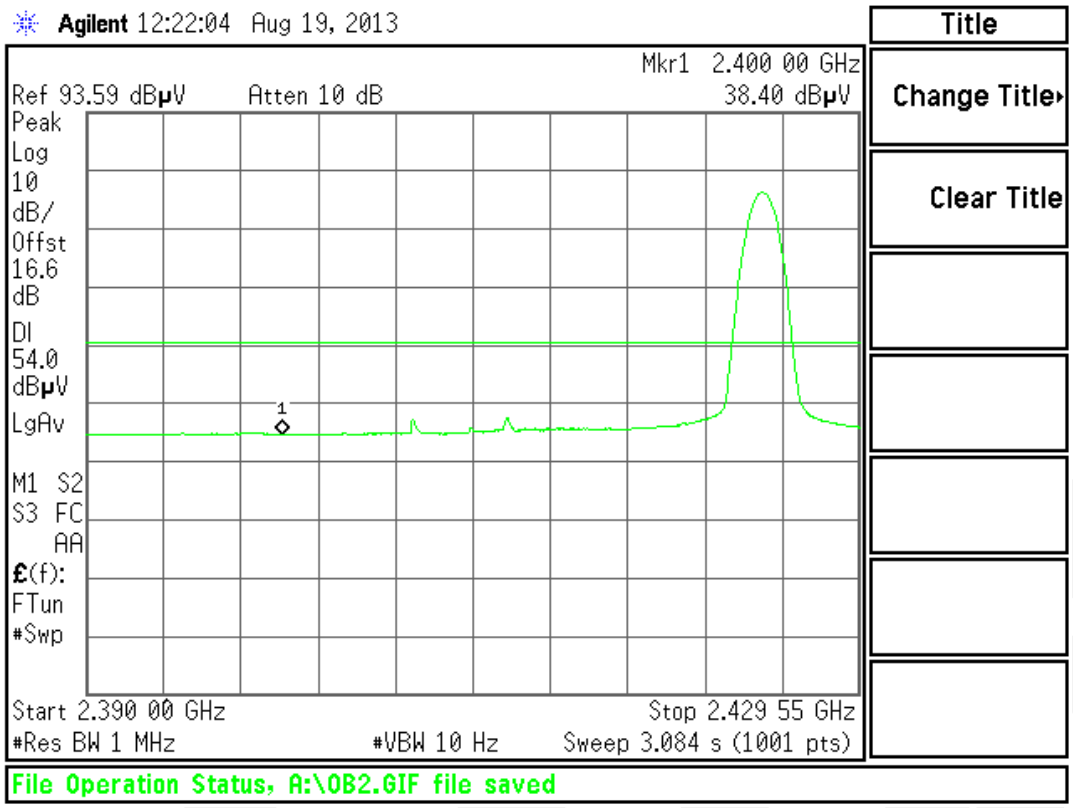
Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with a 120 kHz / 6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz RBW/VBW / 6 dB bandwidth and peak detection, 1 MHz RBW / 10 Hz VBW for average detection. Table top equipment is placed on a non-conductive support 80 cm above the ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT is rotated 360 degrees.

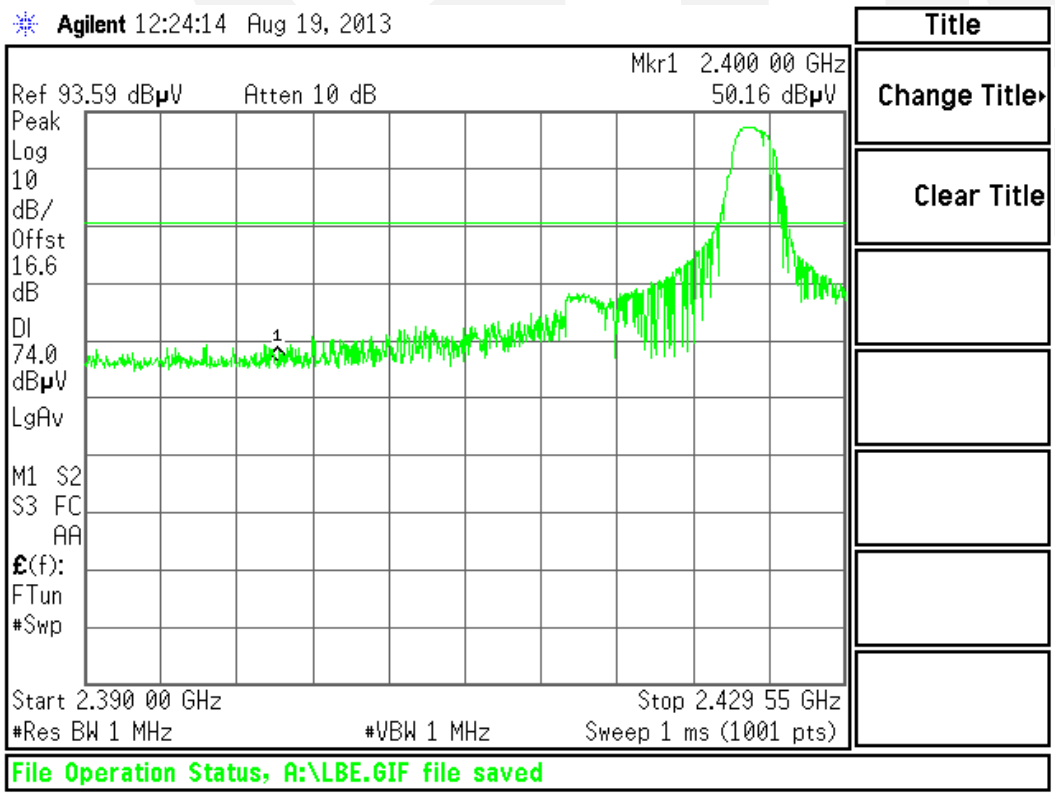
Test data

Measurement summary for limit1: FCC 15.249/RSS-210 <1GHz 3m (Qp)					
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	
no signals detected from 30-1000 MHz					

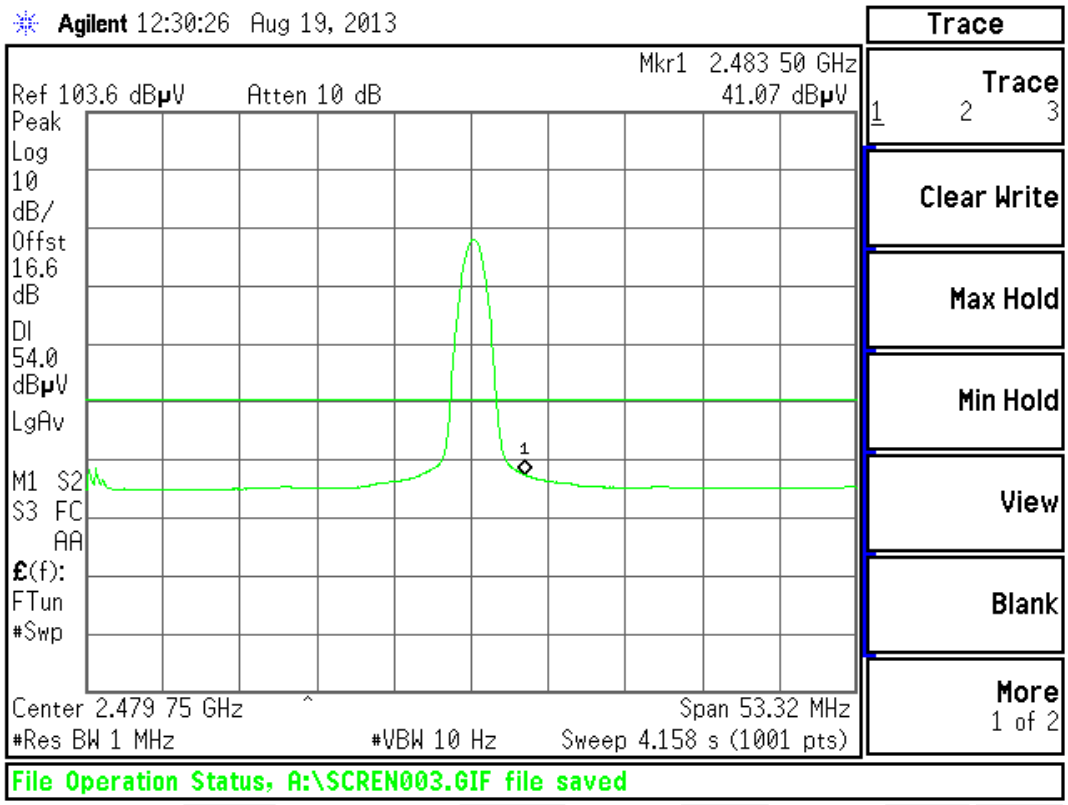
List of measurements for run #: 5						
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV/m)	POL / HGT / AZ (m)(DEG)	15.249 limit (dBuV/m)	DELTA2
eut bottom up						
eut standing on its side – worst case						
with absorbers down						
2.425 GHz	101.61 Av	4.55 / 28.39 / 43.3 / 0.0	91.25	H / 1.10 / 290		
2.425 GHz	103.6 Pk	4.55 / 28.39 / 43.3 / 0.0	93.24	H / 1.10 / 290		
2.45 GHz	102.66 Av	4.59 / 28.47 / 43.33 / 0.0	92.4	H / 1.10 / 290		
2.45 GHz	104.6 Pk	4.59 / 28.47 / 43.33 / 0.0	94.34	H / 1.10 / 290		
2.48 GHz	103.25 Av	4.65 / 28.58 / 43.36 / 0.0	93.12	H / 1.10 / 290	94	
2.48 GHz	104.8 Pk	4.65 / 28.58 / 43.36 / 0.0	94.67	H / 1.10 / 290	114	
no signals detected within 20 dB of the limit from 30-1000 MHz						
fundamental meets 15.249 limit of 94 dBuV/m by 0.9 dB						
absorbers removed						
added 4-8 GHz bandpass filter in front of preamp - with absorbers down						
4.899 GHz	40.12 Av	7.89 / 33.0 / 43.59 / 0.46	37.88	H / 1.00 / 110		
4.899 GHz	49.7 Pk	7.89 / 33.0 / 43.59 / 0.46	47.46	H / 1.00 / 110		
4.899 GHz	42.68 Av	7.89 / 33.0 / 43.59 / 0.46	40.44	H / 1.00 / 110	54	
4.899 GHz	51.4 Pk	7.89 / 33.0 / 43.59 / 0.46	49.16	H / 1.00 / 110	74	
4.96 GHz	41.87 Av	7.97 / 33.12 / 43.52 / 0.47	39.91	V / 1.00 / 210	54	
4.96 GHz	50.5 Pk	7.97 / 33.12 / 43.52 / 0.47	48.54	V / 1.00 / 210	74	
4.849 GHz	45.12 Av	7.82 / 32.93 / 43.64 / 0.44	42.67	H / 1.20 / 110	54	
4.849 GHz	53.1 Pk	7.82 / 32.93 / 43.64 / 0.44	50.65	H / 1.20 / 110	74	
removed absorbers						
4.899 GHz	48.82 Av	7.89 / 33.0 / 43.59 / 0.46	46.58	H / 1.40 / 90		
4.899 GHz	54.9 Pk	7.89 / 33.0 / 43.59 / 0.46	52.66	H / 1.40 / 90		
7.349 GHz	52.1 Pk	9.95 / 36.27 / 42.73 / 1.22	56.81	H / 1.70 / 110		
7.349 GHz	43.81 Av	9.95 / 36.27 / 42.73 / 1.22	48.52	V / 1.10 / 240		
7.349 GHz	51.9 Pk	9.95 / 36.27 / 42.73 / 1.22	56.61	V / 1.10 / 240		
4.899 GHz	47.37 Av	7.89 / 33.0 / 43.59 / 0.46	45.13	V / 1.00 / 210		
4.899 GHz	53.5 Pk	7.89 / 33.0 / 43.59 / 0.46	51.26	V / 1.00 / 210		
4.96 GHz	48.01 Av	7.97 / 33.12 / 43.52 / 0.47	46.05	V / 1.00 / 210		
4.96 GHz	54.0 Pk	7.97 / 33.12 / 43.52 / 0.47	52.04	V / 1.00 / 210		
7.44 GHz	42.79 Av	10.0 / 36.38 / 42.83 / 1.27	47.62	V / 1.10 / 240		
7.44 GHz	51.1 Pk	10.0 / 36.38 / 42.83 / 1.27	55.93	V / 1.10 / 240		
4.96 GHz	47.2 Av	7.97 / 33.12 / 43.52 / 0.47	45.24	H / 1.30 / 90		
4.96 GHz	53.4 Pk	7.97 / 33.12 / 43.52 / 0.47	51.44	H / 1.30 / 90		
7.44 GHz	52.9 Pk	10.0 / 36.38 / 42.83 / 1.27	57.73	H / 1.70 / 110		
7.274 GHz	44.43 Av	9.91 / 36.08 / 42.66 / 1.19	48.95	H / 1.20 / 110		
7.274 GHz	52.3 Pk	9.91 / 36.08 / 42.66 / 1.19	56.82	H / 1.20 / 110		
4.849 GHz	51.26 Av	7.82 / 32.93 / 43.64 / 0.44	48.81	H / 1.40 / 90		
4.849 GHz	56.6 Pk	7.82 / 32.93 / 43.64 / 0.44	54.15	H / 1.40 / 90		
4.849 GHz	47.41 Av	7.82 / 32.93 / 43.64 / 0.44	44.96	V / 1.00 / 210		
4.849 GHz	53.9 Pk	7.82 / 32.93 / 43.64 / 0.44	51.45	V / 1.00 / 210		
7.274 GHz	42.84 Av	9.91 / 36.08 / 42.66 / 1.19	47.36	V / 1.10 / 240		
7.274 GHz	51.0 Pk	9.91 / 36.08 / 42.66 / 1.19	55.52	V / 1.10 / 240		
with absorbers down						
7.44 GHz	44.15 Av	10.0 / 36.38 / 42.83 / 1.27	48.98	H / 1.40 / 120	54	
7.44 GHz	53.2 Pk	10.0 / 36.38 / 42.83 / 1.27	58.03	H / 1.40 / 120	74	
Checked fundamental – same level w/without preamp						

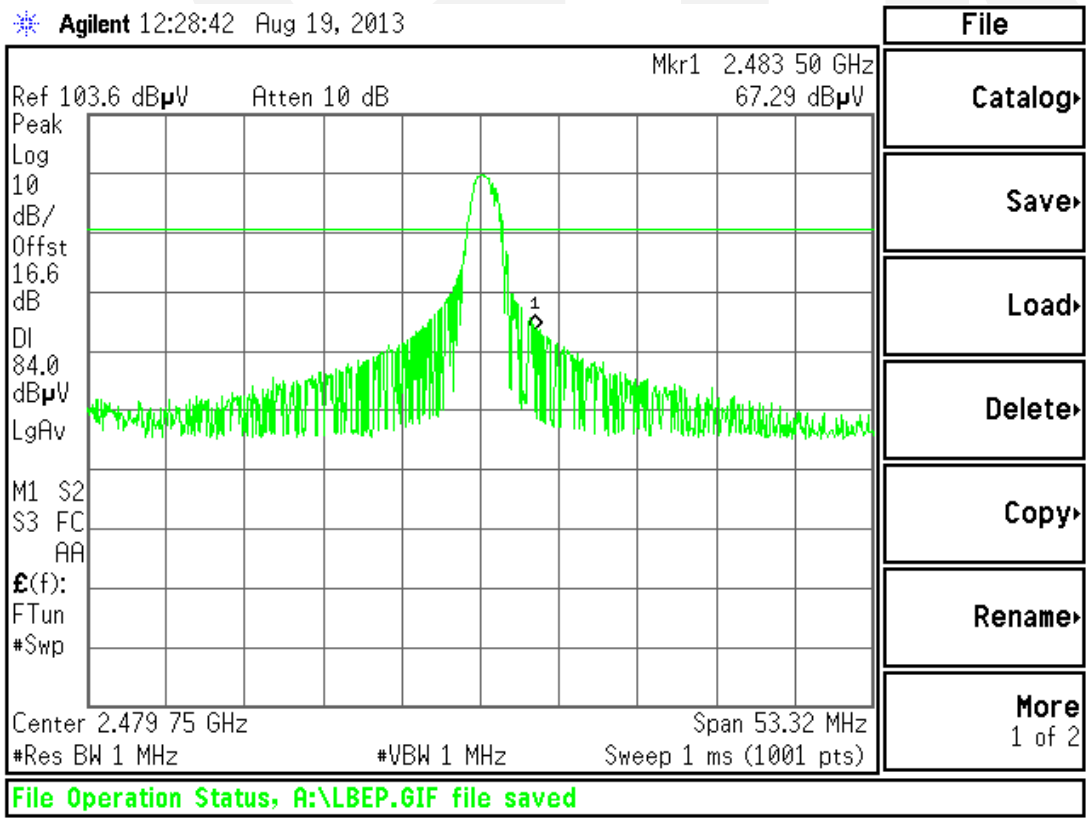
Lower band edge





Upper band edge





Occupied bandwidth
RSS-Gen 4.6.1

Test summary
The requirements are: ■ - MET ☐ - NOT MET
Test was performed in accordance with the article “The Measurement of Occupied Bandwidth” by Industry Canada’s certification bureau.
Occupied bandwidth = 1.07 MHz

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

Test equipment

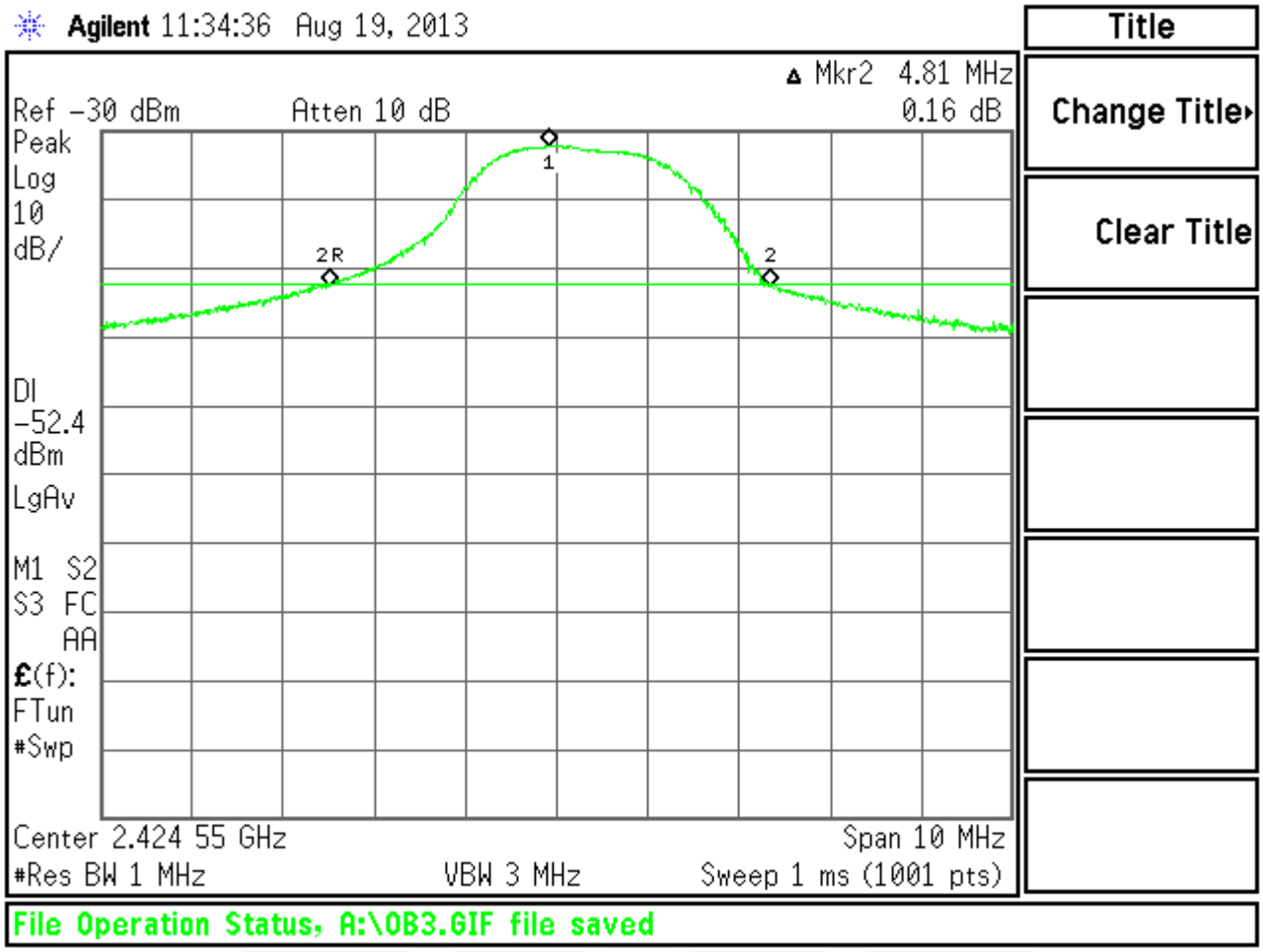
TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
WRLE03371	E4440A	Agilent	Spectrum Analyzer	MY43362222	06-Nov-13

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

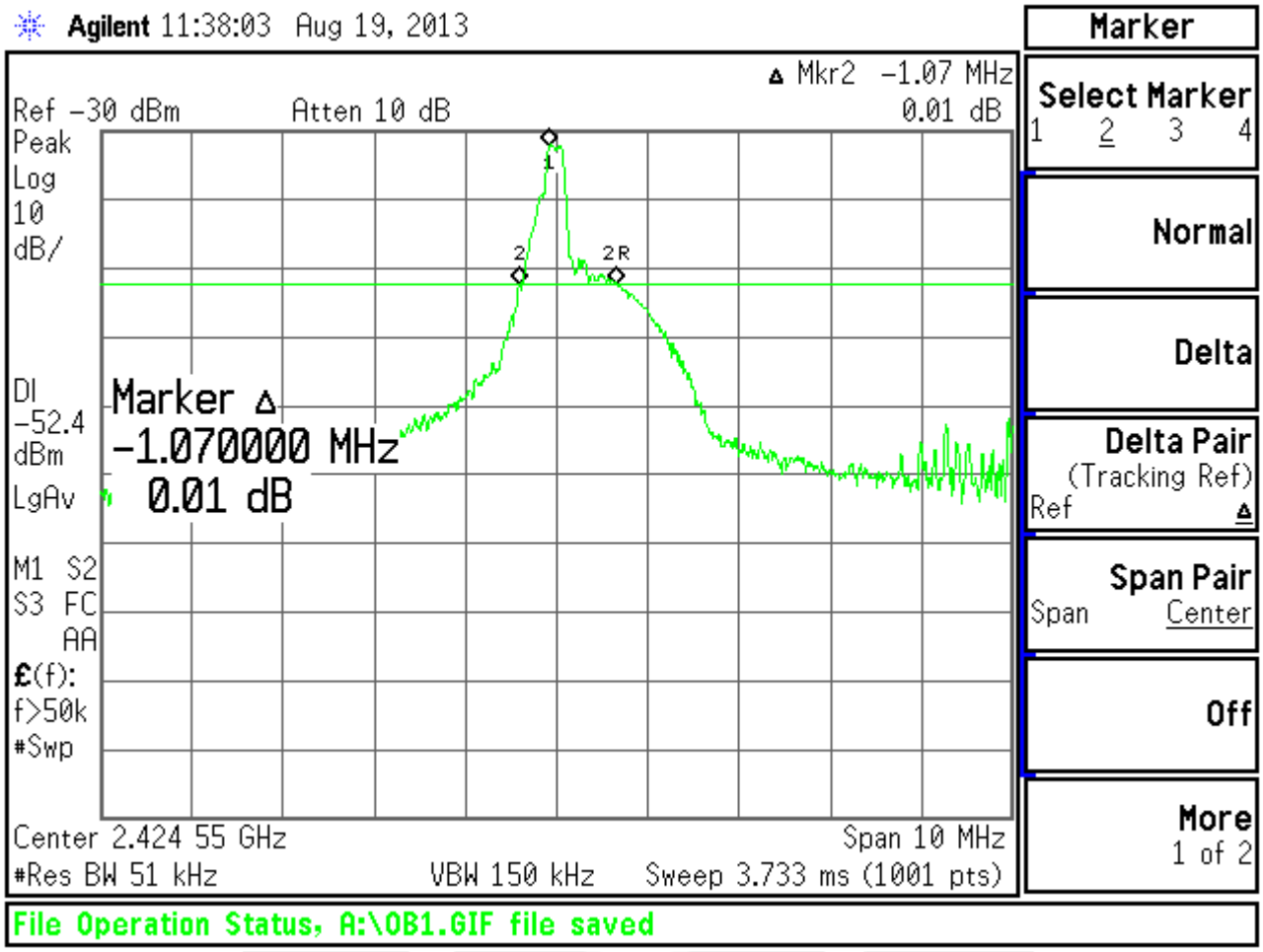
Test limit
Not specified

Test data
See following pages

99% Occupied bandwidth
1 of 2

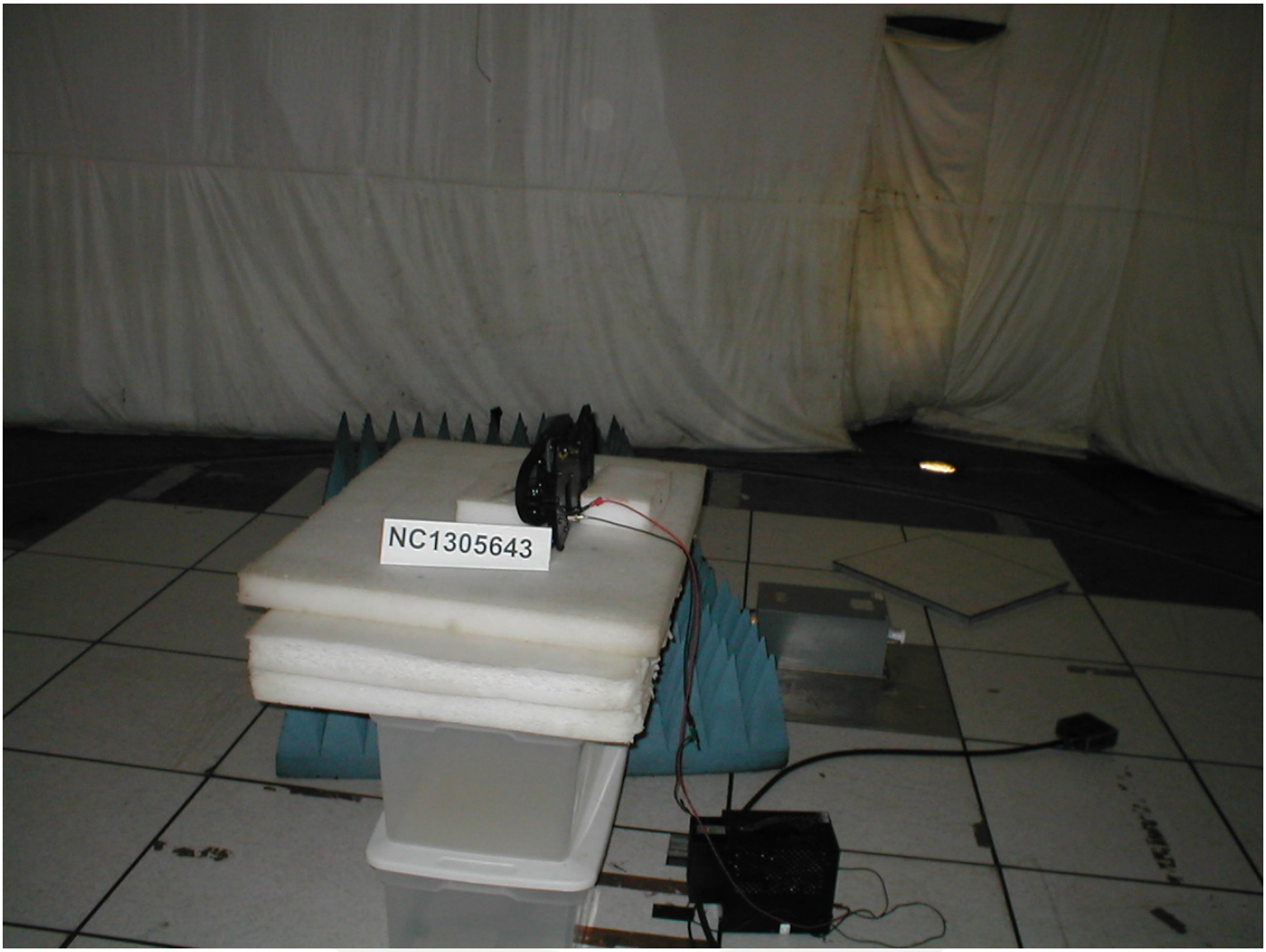


99% Occupied bandwidth
2 of 2



Test-setup photo(s): below 1 GHz

Test-setup photo(s): above 1 GHz



Equipment Under Test (EUT) Test Operation Mode:

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

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

■ - Normal operating mode

Configuration of the device under test:

■ - See Appendix A and test setup photos

☐ - See Product Information Form(s) in Appendix B

DEVIATIONS FROM STANDARD:
None.

GENERAL REMARKS:
None

Modifications required to pass:

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 and the device under test does fulfill the general approval requirements.
☐ - **not** met and the device under test does **not** fulfill the general approval requirements..

EUT Received Date:	14 August 2013
Condition of EUT:	Normal
Testing Start Date:	14 August 2013
Testing End Date:	19 August 2013

TÜV SÜD AMERICA INC

Tested by:

Joel T Schneider
Senior EMC Engineer

Approved by:

Greg S Jakubowski
Senior EMC Technician

Appendix A

Constructional Data Form

Form

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:	Attwood Corporation		
Address:	1016 N Monroe St		
	Lowell, MI		
	49331		
Contact:	Peter Duesing	Position:	Test Engineer
Phone:	616-897-2334	Fax:	616-897-2337
E-mail Address:	peter.duesing@attwoodmarine.com		

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

EUT Description	Foot acuated remote to control fishing trolling motor		
EUT Name	ASM-FT PEDAL,INC,WRLS		
Model No.:	001009291	Serial No.:	NA
Product Options:	NA		
Configurations to be tested:	Normal		

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:	NA
Modifications made during test:	NA

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

- ☒ EMC Directive 2004/108/EC (EMC) Std:
- ☐ Machinery Directive 89/392/EEC (EMC) Std:
- ☐ Medical Device Directive 93/42/EEC (EMC) Std:
- ☐ Vehicle Directive - 2004/104/EC (EMC)
  - ☐ Other Vehicle Std:
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☒ FCC: Class ☒ A ☐ B Part 15bc
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B (Separate Report)
- ☒ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☒ Other: RTTE
- ☐ Ag Directive *2009/64/EC (EMC)

Form

EMC Test Plan and Constructional Data Form

Third Party Certification (contact TÜV for quote), if applicable (*Signature on last page required).	
☐ Attestation of Compliance (AoC)*	☐ EMC Certification (used with Octagon Mark)*
☐ Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed	
Protection Class (Req'd for AoC, SoC, EMC Cert. N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III (Press **F1** when field is selected to show additional information on Protection Class.)	
☒ FCC / TCB Certification	☐ Taiwan Certification
☒ Industry Canada / FCB Certification	☐ Korean Certification
☐ e-Mark 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 SÜD 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: 12" Width: 8" Height: 3" Weight: 5 lb

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: 2x 1.5V AA Battery (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: _____

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
Personal Watercraft (fishing boat)

Form

EMC Test Plan and Constructional Data Form

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): ____________
☐ Shielded OR ☐ Unshielded
☒ Not Applicable

EUT Interface Ports and Cables

Type	Analog	Digital	During Test: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐

Form

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables

Type	Analog	Digital	During Test: Active	During Test: Passive	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
	☐	☐	☐	☐		☐	☐						☐	☐

EUT Software.

Revision Level: REV 1.51

Description: Production Revision

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 - just pressing the buttons to initiate signals sent to the trolling motor.

2.

3.

Form

EMC Test Plan and Constructional Data Form

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 #**

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.			
Description	***Model #***	***Serial #***	***FCC ID #***
XI5-105FW 54" 36V FP	940800130		

Oscillator Frequencies

Manufacturer	*Frequency*	*Derived Frequency*	*Component # / Location*	*Description of Use*
Linx	26MHz		wireless controller	
Ayshire	10MHz		Main controller	

Form

EMC Test Plan and Constructional Data Form

Power Supply			
Manufacturer	***Model #***	***Serial #***	***Type***
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters		
Manufacturer	***Model #***	***Location in EUT***

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	***Manufacturer***	***Part # or Value***	***Qty***	***Component # / Location***

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

PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

Authorization (Signature Required if a Third Party Certification is checked on pg 1)

Peter Duesing	6/18/13
Customer authorization to perform tests according to this test plan.	Date
Peter Duesing	6/18/13
Test Plan/CDF Prepared By (please print)	Date