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Report On

Radio Frequency Exposure Testing of the
Winland Electronics, Inc.
EnviroAlert Wireless Sensor

EN62311 January 2008
AS/NZS 2772.2:2011

Report No. CG72128596B

October 2017



REPORT ON	Radio Frequency Exposure Testing of the Winland Electronics, Inc. EnviroAlert EA-WTS, EA-WHS and EA-WMFS Wireless Sensor
TEST REPORT NUMBER	CG72128596B
PREPARED FOR	Winland Electronics, Inc. 1950 Excel Drive Mankato, MN 56001
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APPROVED BY	 Alex Chang Name Authorized Signatory Title: Commercial/Medical EMC Supervisor
DATED	October 28, 2017

Revision History

CG72128596B Winland Electronics, Inc. EA-WTS, EA-WHS and EA-WMFS EnviroAlert Wireless Sensor					
DATE	OLD REVISION	NEW REVISION	REASON	PAGES AFFECTED	APPROVED BY
10/28/2017	Initial Release				Alex Chang

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SECTION 1

REPORT SUMMARY

Radio Frequency Exposure Testing of the
Winland Electronics, Inc.
EA-WTS, EA-WHS and EA-WMFS Wireless Sensor

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Winland Electronics, Inc. Wireless Sensor to the requirements of EN62311 January 2008.

Objective	To verify compliance of the Equipment Under Test (EUT) with regards to radio frequency exposure hazard as defined under the test specification (EN62311 January 2008).
Manufacturer	Winland Electronics, Inc.
Model Number(s)	EA-WTS, EA-WHS and EA-WMFS
Serial Number(s)	01022-00025235489, 46249-00142125054, 01022-00025135489, 01022-00025135378 and 01022-00025135603 (See related radio test report for details)
Number of Samples Verified	N/A (Verification/calculations were based from the radio test reports submitted)
Test Specification/Issue/Date	EN62311 January 2008
Name of Engineer(s)	Ferdinand S. Custodio
Related Document(s)	<ul style="list-style-type: none">• EN62311 January 2008. Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz) (IEC 62311:2007, modified)• AS/NZS 2772.2:2011. Radiofrequency fields Part 2: Principles and methods of measurement and computation—3 kHz to 300 GHz• CG72112629-1215A EN 300 328 V1.9.1 (2015-02) Test Report (Issued by TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121-2912, March 2016)• ICNIRP Guidelines (Published in Health Physics 74 (4):494-522;1998) For Limiting Exposure To Time-Varying Electric, Magnetic And Electromagnetic Fields (Up To 300 Ghz)• Council Recommendation of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz)(1999/519/EC)

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out in accordance with EN62311 January 2008 is shown below. Principles and methods of measurement and computation used in this test report were also verified in accordance with AS/NZS 2772.2:2011.

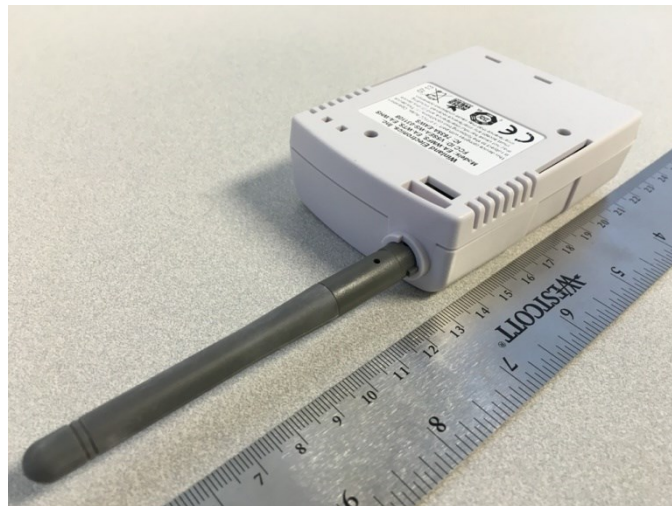
Section	Spec Clause	Test Description	Result	Comments/Base Standard
2.1	7.2	Generic Procedure for assessment of equipment	Compliant	
2.2	-	Exposure from sources with multiple frequencies	N/A	Council Recommendation of 12 July 1999 (1999/519/EC)

N/A EUT does not have co-located transmitter as verified.

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) were Winland Electronics, Inc. Wireless Sensors EA-WTS, EA-WHS and EA-WMFS as shown in the photograph below. EA-WTS, EA-WHS and EA-WMFS are parts of the Winland Critical-Environment Monitoring Solution. EA-WTS is the wireless temperature Accessory for EnviroAlert EA800-iP. EA-WHS is the Wireless Humidity Accessory for EnviroAlert EA800-iP. EA-WMFS is the Wireless Multi-Function Accessory for EnviroAlert EA800-iP. Three models are covered by this test report. The three models are identical except that they used different sensors.



1.3.2 EUT General Description

EUT Description	Wireless Sensor
Model Name	EnviroAlert
Model Number(s)	EA-WTS, EA-WHS and EA-WMFS
Rated Voltage	3.0V DC via battery
Mode Verified	2.4GHz Low-Rate Wireless PAN
Capability	2.4GHz Low-Rate Wireless PAN
Primary Unit (EUT)	<input type="checkbox"/> Production <input type="checkbox"/> Pre-Production <input checked="" type="checkbox"/> Engineering
Manufacturer Declared Temperature Range	0°C to 50°C
Antenna Type	Dipole
Manufacturer	Laird
Antenna Model	MAF94402
Antenna Gain	1.5 dBi

1.3.3 Maximum Output Power

Channel	EIRP (dBm)
2405.4 MHz	4.4*
2445.4 MHz	4.7*
2480.4 MHz	4.8*

**These levels are worst case values @ 0°C and not at ambient temperature.*



1.4 DEVIATIONS FROM THE STANDARD

All deviations made during verification from the applicable test standards or test plan if applicable are detailed under Section 1.2 of this test report.

1.5 TEST METHODOLOGY

All measurements and/or calculations contained in this report were conducted with EN62311 January 2008. Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz – 300 GHz) (IEC 62311:2007, modified).

1.6 TEST FACILITY LOCATION

1.6.1 TÜV SÜD America Inc. (Mira Mesa)

10040 Mesa Rim Road, San Diego, CA 92121-2912 (32.901268,-117.177681). Phone: 858 678 1400 Fax: 858 546 0364.

1.6.2 TÜV SÜD America Inc. (Rancho Bernardo)

Sony Electronics Inc., Building #8, 16530 Via Esprillo, San Diego, CA 92127-1708 (33.018644,-117.092409). Phone: 858 942 5542 Fax: 858 546 0364.

1.7 TEST FACILITY REGISTRATION

1.7.1 FCC – Designation No.: US1146

TUV SUD America Inc. (San Diego), is an accredited test facility with the site description report on file and has met all the requirements specified in §2.948 of the FCC rules. The acceptance letter from the FCC is maintained in our files and the Designation is US1146.

1.7.2 Innovation, Science and Economic Development Canada (ISED) Registration No.: 3067A-1 & 22806-1

The 10m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Rancho Bernardo) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada (ISED) for radio equipment testing with Registration No. 3067A-1.

The 3m Semi-anechoic chamber of TUV SUD America Inc. (San Diego Mira Mesa) has been registered by Certification and Engineering Bureau of Innovation, Science and Economic Development Canada (ISED) for radio equipment testing with Registration No. 22806-1

1.7.3 BSMI – Laboratory Code: SL2-IN-E-028R (US0102)

TUV Product Service Inc. (San Diego) is a recognized EMC testing laboratory by the BSMI under the MRA (Mutual Recognition Arrangement) with the United States. Accreditation includes CNS 13438 up to 6GHz.



1.7.4 VCCI – Registration No. A-0132

TUV SUD America Inc. (San Diego) is a VCCI registered measurement facility which includes radiated field strength measurement, radiated field strength measurement above 1GHz, mains port interference measurement and telecommunication port interference measurement.



SECTION 2

TEST DETAILS

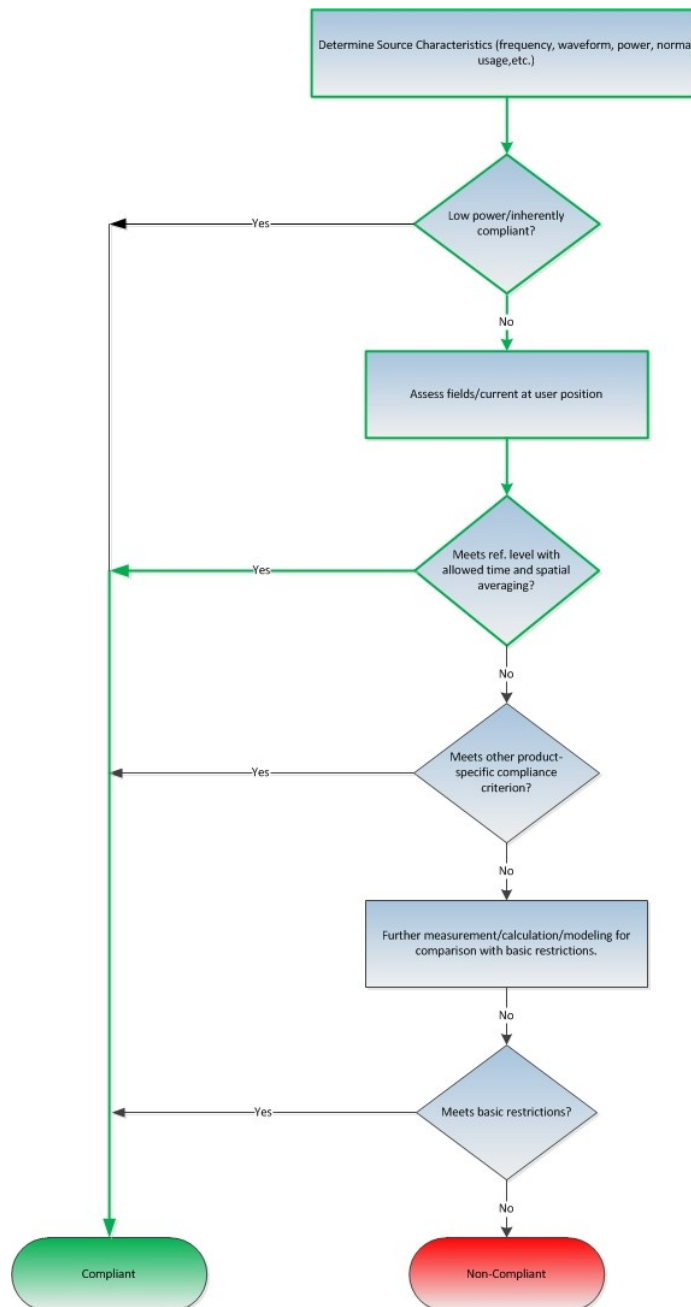
Radio Testing of the
Winland Electronics, Inc.
Wireless Sensor

2.1 GENERIC PROCEDURE FOR ASSESSMENT OF EQUIPMENT

2.1.1 Specification Reference

Section 7.2 of EN62311 January 2008

2.1.2 Assessment Flowchart



2.1.3 Assessment Method

E and *H* measurement. Near or far field. Direct measurement for comparison with reference levels or as input for more detailed assessment. See Annex F of EN62311 January 2008 for reference.

2.1.4 Assessment Procedure

Verification is based from power levels and declared antenna gains (for multi co-located transmitters type EUT) detailed in this test report and were taken from the following RF module test report(s):

Test Report	Radio Standard	Issued by:
CG72112629-1215A	ETSI EN 300 328 V1.9.1	TÜV SÜD America Inc., 10040 Mesa Rim Road, San Diego, CA 92121-2912 (March 2016)

Equation for predicting RF field is then used to determine the minimum distance that will comply with the requirements. The equation is from Section 8.3.2 of EN50383:2002. The model where the formula was derived is applicable in the far-field region and over-estimates in the radiating near-field region:

$$S = \frac{PG}{4\pi r^2}$$

Where: S=the power flux
P=input power of the antenna
G=antenna gain relative to an isotropic antenna
r=distance from the antenna to the point of investigation

2.1.5 Limits

Limits used is from Table 7 of ICNIRP Guidelines (Published in Health Physics 74 (4):494-522;1998):

Frequency Range	E-field strength (V/m)	H-field strength (A/m)	B-Field (μT)	Equivalent plane wave power density S_{eq} (W/m ²)
2 GHz-300 GHz	61	0.16	0.2	10

Only the relevant frequency range presented.

2.1.6 Equipment Under Test and Modification State

Serial No: 01022-00025235489, 46249-00142125054, 01022-00025135489, 01022-00025135378 and 01022-00025135603 / See radio test report for details (see Section 2.1.4 for info)

2.1.7 Date of Test/Initial of test personnel who performed the test

See radio test report for details (see Section 2.1.4 for details)

2.1.8 Test Equipment Used

See radio test report for details (see Section 2.1.4 for details).

2.1.9 Environmental Conditions

See radio test report for details (see Section 2.1.4 for details).

2.1.10 Measurement Uncertainty

See radio test report for details (see Section 2.1.4 for details).

2.1.11 Test Results @ 20 cm distance

User separation with the EUT antenna is restricted @ 20 cm as stated in the product manual.

Maximum peak output power at antenna input terminal:	3.30	(dBm)
Maximum peak output power at antenna input terminal:	2.14	(mW)
Antenna gain (typical):	1.5	(dBi)
Maximum antenna gain:	1.413	(numeric)
Prediction distance:	20	(cm)
Source Based Time Average Duty Cycle:	100	(%)
Prediction frequency:	2445.4	(MHz)
MPE limit for uncontrolled exposure at prediction frequency:	0.1000	(mW/cm ²)
Power density at prediction frequency:	0.00060	(mW/cm ²)
Power density at prediction frequency:	0.006	(W/m ²)
Margin of Compliance:	-22.21	(dB)

2.1.12 Test Results Verdict

Complies.



SECTION 3

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

3.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT

TÜV SÜD America Inc.'s reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. 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.'s issued reports.

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