EN 62311: 2008

TEST REPORT

For

AIS Class B Transponder

Brand Name: AMEC

Model: WideLink B600W, WideLink B600

Issued to

Alltek Marine Electronics Corp.
14F-2, No.237, Sec. 1, Datong Rd., Xizhi District, New Taipei City, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
No.11, Wugong 6th Rd., Wugu Dist.,
New Taipei City 24891, Taiwan. (R.O.C.)
http://www.ccsrf.com
service@ccsrf.com
Issued Date: November 18, 2016

Testing Laboratory
1309

Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	November 18, 2016	Initial Issue	ALL	Doris Chu

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1 Test Result Certification

Applicant:	Alltek Marine Electronics Corp. 14F-2, No.237, Sec. 1, Datong Rd., Xizhi District, New Taipei City, Taiwan, R.O.C.
Equipment Under Test:	AIS Class B Transponder
Brand Name:	AMEC
Model:	WideLink B600W, WideLink B600
Model Discrepancy:	WideLink B600 without Wi-Fi WideLink B600W with Wi-Fi

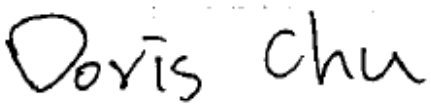
Applicable Standards
EN 62311: 2008
Limit
Electric Field: 61 V/m
Result
PASS

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in EN 62311. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Sam Chuang
Manager

Prepared by:



Doris Chu
Report coordinator

2 EUT Description

Frequency Range	2.4GHz WLAN: 2412 ~ 2472 (MHz) AIS: 156.025 (MHz) AIS: 162.025 (MHz)
Max Total Avg. Power in Watt (TP)	2.4GHz WLAN 16.31 dBm (0.043 W) 156.025 (MHz) 34.50 dBm (2.818 W) 162.025 (MHz) 34.50 dBm (2.818 W)
Antenna gain (G)	2.4GHz WLAN: Chip Ant. (ACA-5020-A2-MC-S) 1.00 dBi (Numeric gain: 1.26) Dipole Ant. (M-ANT-GY196HT695-001) 2.94 dBi (Numeric gain: 1.97) Total Gain = 5.09 dBi (Numeric gain: 3.23) Total Gain=10*LOG(((10^(Chip Ant./10)+10^(Dipole Ant./10)))) AIS VHF Ant.(ANT-11 / TENTA-11) 161 MHz: 2.86 dBi (Numeric gain: 1.93)

Remark:
1. For more details, please refer to the User's manual of the EUT.

3 Facilities and Accreditations

3.1. Facilities

All measurement facilities used to collect the measurement data are located at

☐ No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

☒ No.11, Wugong 6th Rd., Wugu Dist, New Taipei City 24891, Taiwan (R.O.C.)
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

☐ No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan, R.O.C.
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

3.2. Equipment

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with preselectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.

All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

3.3. Laboratory Accreditations and Listings

The test facilities used to perform radiated and conducted emissions tests are accredited by National Voluntary Laboratory Accreditation Program for the specific scope of accreditation under Lab Code: 200600-0 to perform Electromagnetic Interference tests according to FCC PART 15 AND CISPR 22 requirements. No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government. In addition, the test facilities are listed with Federal Communications Commission (registration no: 93105 and 90471).

4 EN 62311 Requirement

4.1. Limit

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the following limits.

Basic Restrictions Reference levels
Council Recommendation 99/519/EC
Basic restrictions for electric, magnetic and electromagnetic fields (0Hz to 300GHz)

Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)

Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density S_{eq} (W/m²)
0-1 Hz	—	$3,2 \times 10^4$	4×10^4	—
1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—
8-25 Hz	10 000	4 000/f	5 000/f	—
0,025-0,8 kHz	250/f	4/f	5/f	—
0,8-3 kHz	250/f	5	6,25	—
3-150 kHz	87	5	6,25	—
0,15-1 MHz	87	0,73/f	0,92/f	—
1-10 MHz	$87/f^{1/2}$	0,73/f	0,92/f	—
10-400 MHz	28	0,073	0,092	2
400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	f/200
2-300 GHz	61	0,16	0,20	10

Frequency range	Magnetic flux density (mT)	Current density (Ma/m2) (rms)	Whole body average SAR (W/kg)	Localised SAR (head and trunk) (W/kg)	Localised SAR (limbs) (W/kg)	Power density, S (W/m2)
0Hz	40	-	-	-	-	-
>0-1Hz	-	8	-	-	-	-
1-4Hz	-	8/f	-	-	-	-
4-1000Hz	-	2	-	-	-	-
1000Hz-100kHz	-	f/500	-	-	-	-
100kHz-10MHz	-	f/500	0.08	2	4	-
10MHz-10GHz	-	-	0.08	2	4	-
10-300GHz	-	-	-	-	-	10

For Frequency Range 10 MHz to 10 GHz

The basic restriction at frequencies between 10 MHz and 100 GHz is on localized SAR in the head. Any device with output power below 20 mW cannot produce an exposure exceeding this restriction under the most pessimistic exposure conditions.
The basic restriction is 2 W/kg so any unit which supplies less than 20 mW (=2/100W) from its antenna port, averaged over 6 minutes, will meet the basic restriction.

For Frequency Range 10 GHz to 300 GHz

The most conservative assumption is that all the transmitted power is absorbed within the specified area, therefore any device which supplies less than 20 mW will meet the basic restriction. The average time is equal to $68/f^{-1.05}$ minutes (where f is in GHz)
In the frequency range 10 GHz to 300 GHz, the basic restriction is 10 Wm^{-2} averaged over any 20 cm^2 of exposed area with a spatial maximum of 200 Wm^{-2} averaged over 1 cm^2

4.2. Human Exposure Assessment

Exposure evaluation	
Given $E = \frac{\sqrt{30 \times TP}}{D}$ $D = \frac{\sqrt{30 \times TP}}{E}$	Where: ● E: E field Strength ● TP: Transmitted power in watt ● D: distance from the transmitting antenna in meter

2.4GHz WLAN:

Ch.	Frq.(MHz)	TP (W)	Gain (num.)	D (m)	Electric Field(V/m)	Limit of Electric Field (V/m)	Result
3	2422	0.043	3.23	0.2	10.21	61	Pass

AIS

Frq.(MHz)	TP (W)	Gain (num.)	D (m)	Electric Field(V/m)	Limit of Electric Field (V/m)	Result
156.025	2.818	1.93	0.46	27.77	28	Pass
Frq.(MHz)	TP (W)	Gain (num.)	D (m)	Electric Field(V/m)	Limit of Electric Field (V/m)	Result
162.025	2.818	1.93	0.46	27.77	28	Pass

Conclusion:

For 2.4GHz WLAN

→E= 10.21V/m (max) is the E-Field strength when safety distance between the EUT and human body is 0.2m, which is below 61V/m as required in Annex II table 2 of EC Council Recommendation (99/519/EC).

For AIS

→E= 27.77V/m (max) is the E-Field strength when safety distance between the EUT and human body is 0.46m, which is below 28V/m as required in Annex II table 2 of EC Council Recommendation (99/519/EC).