



Test Report No.: RA190712D14	
Client	
Name :	VECOW CO., LTD.
Address :	3F., No.10, Jiankang Rd., Zhonghe Dist., New Taipei City 23586, Taiwan
Test Item :	High Performance Fanless Embedded System
Identification :	IVH-9204MX-ICY, IVH-9204MX-ICYXXXXXXXXXXXXXXXX("X" can be 0-9, A-Z or blank for marketing purpose)
Testing laboratory	
Name :	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Address :	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test specification	
Standard :	EN 50155: 2017
Test Result :	The test item passed.
Prepared By :	2019-11-08
	_____
Signature	Date
<u>Edward Chiueh</u>	
Technical Manager	
Approved By:	2019-11-08
	_____
Signature	Date
<u>Joseph Tsai</u>	
Manager	
This report should not be used by the client to claim product certification, approval, or endorsement by TAF, NVLAP, NIST or any government agencies.	
<p>This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification</p>	



TEST REPORT

EN 50155:2017

Railway application – Electronic equipment used on rolling stock

Report

Reference No.	RA190712D14
Compiled by (+ signature)	See cover sheet
Approved by (+ signature)	See cover sheet
Date of issue	2019-11-08
Total number of pages	22

Testing laboratory

Name	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Address	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Testing location	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Address	No. 19, Hwa Ya 2nd Rd, Kueishan Taoyuan, Taiwan, R.O.C.

Client

Name	VECOW CO., LTD.
Address	3F., No.10, Jiankang Rd., Zhonghe Dist., New Taipei City 23586, Taiwan

Test specification

Standard	EN 50155: 2017
Test procedure	CE
Non-standard test method	N/A.

Test Report Form/blank test report

Test Report Form No.	EN50155_1B
TRF originator.	BVCPS TAIWAN
Master TRF	Dated 2018-05

Test item

Description	High Performance Fanless Embedded System
Trademark	
Model and/or type reference	IVH-9204MX-ICY, IVH-9204MX-ICYXXXXXXXXXXXX("X" can be 0-9, A-Z or blank for marketing purpose)
Manufacturer	VECOW CO., LTD.
Rating(s)	110Vdc, 2.5A



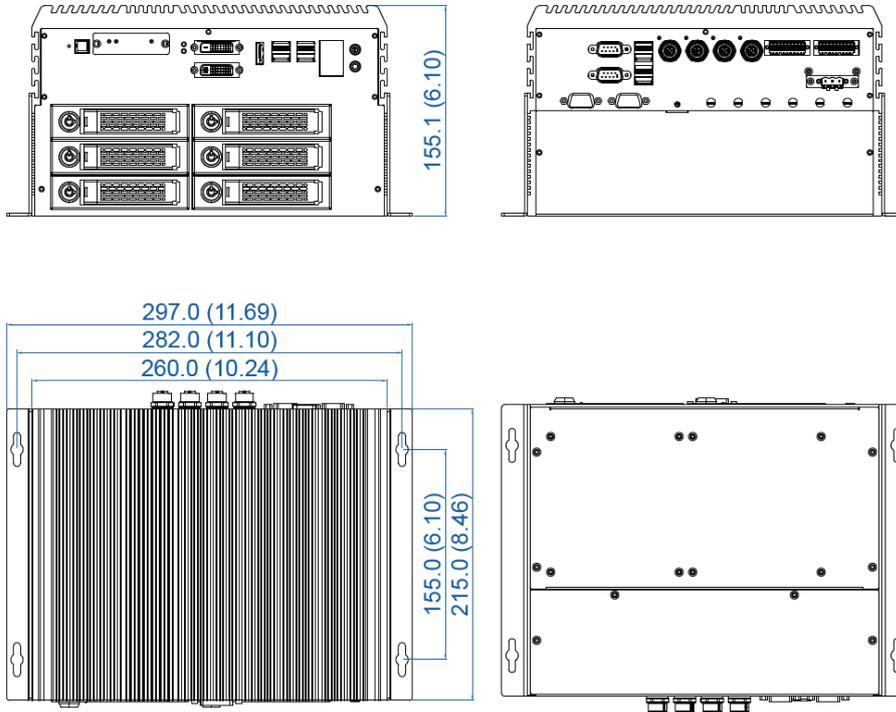
Copy of marking plate and summary of test results (information/comments):



Test item particulars	
Equipment mobility	<input checked="" type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input checked="" type="checkbox"/> stationary <input type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
Connection to the mains	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input checked="" type="checkbox"/> not directly connected to the mains
Operating condition	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
Access location	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location
Over voltage category (OVC)	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> other: DC supply
Mains supply tolerance (%) or absolute mains supply values	
Tested for IT power systems	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
IT testing, phase-phase voltage (V)	
Class of equipment	<input type="checkbox"/> Class I <input checked="" type="checkbox"/> Class II <input type="checkbox"/> Class III <input type="checkbox"/> Not classified
Considered current rating (A)	
Pollution degree (PD)	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
IP protection class	IPX0
Altitude during operation (m)	< 2000m
Altitude of test laboratory (m)	< 2000m
Mass of equipment (kg)	8.48 kg
Possible test case verdicts:	
- test case does not apply to the test object	N/A
- test object does meet the requirement	P (Pass)
- test object does not meet the requirement	F (Fail)
Testing	
Date of receipt of test item	2019-10-15
Date(s) of performance of tests	2019-10-17
	See attached reference reports for details.
General remarks:	
<p>The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.</p>	
<p>Throughout this report a point is used as the decimal separator.</p>	

General product information:

- 1) The equipment is a High Performance Fanless Embedded System, which is intended to be used as data processing, transferring and storage equipment covered by the scope of this standard.
- 2) The operating temperature classes is OT2, temperature range as -40°C - +55°C.
- 3) Dimension of EUT:



- 4) The power supply comes from 110Vdc DC sources.
- 5) This device is intended for indoor use only.
- 6) Performance test program provided by applicant.
- 7) The following test reports are attached with this report for detail information.
Report no. GO19070804-R1, LD190712D14, CE190712D14, XMIN190902365CCM.

Model difference:

N/A.

Test condition:

Temperature: 25°C

Relative humidity: 60%

Air pressure: 950 mbar

The test sample was a pre-production sample without serial number.



4	General requirements		P
4.1	Performance requirements	See below.	P
4.2	Performance criteria		P
4.3	Environment service conditions	See below	P
4.3.1	Altitude	< 2000m	P
	According to EN 50125-1, Table 1	Class A4	P
4.3.2	Operating temperature	OT2	P
4.3.3	Switch-on extended operating temperature	ST1	P
4.3.4	Rapid temperature variations	Not such equipment.	N/A
4.3.5	The equipment shall be able to withstand, without deterioration or malfunction, vibrations and shocks that occur in service.	See clause 13.4.11	P
	Unless otherwise specified, the requirements of EN 61373 category 1 class B apply.		P
4.3.6	Electromagnetic compatibility	See 13.4.8	P
4.3.7	Relative humidity	According to EN 50125-1.	P
4.4	Special service condition		N/A

5	Electrical service conditions		P
5.1	Power supply	See below.	P
5.1.1	DC Supply	See below.	P
5.1.1.1	General		P
	The nominal voltage of equipment (U_n) shall be selected from amongst the following values: 24 V, 28 V, 36 V, 48 V, 72 V, 96 V, 110 V	110Vdc	P
5.1.1.2	DC power supply range	See below.	P
	Minimum continuous voltage: $0.7 U_n$	77Vdc,	P
	Maximum continuous voltage: $1.25 U_n$	137.5Vdc	P
5.1.1.3	Temporary DC power supply fluctuation	See below.	P
	Minimum fluctuation voltage: $0.6 U_n$	66Vdc	P
	Maximum fluctuation voltage: $1.4 U_n$	154Vdc	P
	Temporary supply overvoltages lying between U_n and $1.4 U_n$ and not exceeding 0.1 s shall not cause deviation of function (performance criterion A).	See clause 13.4.3.2.	P
	Temporary supply overvoltages lying between $1.25 U_n$ and $1.4 U_n$ and not exceeding 1 s shall fulfil performance criterion B.	See clause 13.4.3.2.	P
	Temporary supply dips lying between U_n down to $0.6 U_n$ and not exceeding 0.1 s shall not cause deviation of function (performance criterion A).	See clause 13.4.3.2.	P
5.1.1.4	Interruptions of voltage supply (Input voltage may reduce to 0V for a short period)	See clause 13.4.3.4.	P



	- Class S1: no performance criterion is requested.		N/A
	- Class S2: 10 ms interruptions	See clause 13.4.3.4.	P
	- Class S3: 20 ms interruptions		N/A
5.1.1.5	Variations of voltage supplies for rolling stock powered by combustion engines	Not such equipment.	N/A
5.1.1.6	D.C. ripple factor	No such parts.	N/A
	A peak to peak ripple voltage that gives a DC ripple factor no greater than 5 %		N/A
5.1.2	Supply by a specified source other than the main power source	The power supply from 110Vdc.	N/A
	Characteristics (e.g. range, fluctuation, ripple factor) of the output voltage of the stabilized supply and input voltage of the equipment shall fit together.	See clause 13.4.3.4.	N/A
	The specification shall be agreed between the involved parties	This clause is not evaluated, due to no agreed specification between the involved parts is provided.	N/A
5.1.3	Supply change over	See below.	P
	- Class C1: at 0,6 U_n during 100ms (without interruptions), Performance criterion A	See clause 13.4.3.5	P
	- Class C2: during a supply break of 30ms, Performance criterion B		N/A
	Unless otherwise specified, the requirements of class C1 apply.		P
5.1.4	Supply with overhead line or third rail	The supply from a power converter or batteries.	N/A
5.2	Installation requirements	See below.	P
5.2.1	Power supply	An inrush current protect circuit is provided to prevent unit damage from inrush current.	P
5.2.2	Thermal compatibility	See 11.5	P
5.2.3	Electromagnetic compatibility	See 13.4.8	P
5.2.4	Cabling	This is evaluated during installation.	N/A
5.2.5	Installation instruction		P
5.2.6	Insulation	See 13.4.9.3	P

6	Reliability, maintainability and expected useful life		P
6.1	Equipment reliability	According to manufacturer's declaration, the MTBF is: > 357705 hours (25°C) > 184470 hours (50°C)	P
6.2	Useful life	See below.	P



	Unless otherwise specified, the life class L4 applies.	LX The manufacturer declare that the product lifecycle at least 7 years.	P
6.3	Maintainability	The manufacturer declare that no any maintenance is required.	P
6.4	Built-in diagnostics	No such function.	N/A
6.5	Automatic test equipment	Not such equipment.	N/A
6.6	Purpose built test equipment and special tools	No such function.	N/A

7	Design		P
7.1	General		P
7.1.1	Equipment	The manufacturer declare that the procedure of design, development, manufacturing and quality control comply to the criteria of ISO9001.	P
7.1.2	Quality management	The manufacturer declare that the procedure of design, development, manufacturing and quality control comply to the criteria of ISO9001.	P
7.1.3	System life-cycle	See above.	P
7.2	Detailed practices - Hardware	See clause 13.4.8 for EMC; see clause 11.5 for personnel safety. Maximum inrush current: 15.4A	P
7.3	Detailed practices - Software	No evaluation.	N/A
7.4	Features of software controlled equipment	This product is a computer.	P
7.4.1	General	The function of the product is designed according to product specification.	P
7.4.2	Self-test		P
7.4.3	Watchdog	The function is described in the manual.	P
7.4.4	Failure indication	LED	P
7.4.5	Recovery		P

8	Non-railway designed electronic equipment		P
	In some special cases (e.g. passenger entertainment, new technologies), it might be necessary to use equipment that is not fully compliant with the requirements of this standard.	This product is a High Performance Fanless Embedded System can be multiple function used.	P

9	Components		P
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9.1	General		P
9.2	Procurement	The manufacturer declare that the procedure of design, development, manufacturing and quality control comply to the criteria of ISO9001.	P
9.3	Application	The safety critical parts list see Clause 11.5.	P

10	Construction		P
10.1	Equipment construction	See clause 11.5.	P
10.2	Component mounting	See clause 11.5.	P
10.3	Electrical connections	See clause 11.5.	P
10.4	Internal flexible wiring (electrical and optical)	See clause 11.5.	P
10.5	Flexible printed wiring	See clause 11.5.	P
10.6	Printed boards – flexible and rigid	See clause 11.5.	P
10.7	Protective coating for printed board assemblies	PC1. No protective coatings.	P
10.8	Identification		P
10.9	Mounting	See clause 11.5.	P
10.10	Cooling and ventilation	See clause 11.5.	P
10.11	Materials and finishes	See clause 11.5.	P
10.12	Reworking, modification and repair of electronic assemblies	The manufacturer declare that the procedure of design, development, manufacturing and quality control comply to the criteria of ISO9001.	P

11	Safety		P
11.1	General	See below.	P
11.2	Requirements	See 11.5 and 13.4.9	P
11.3	Fire behavior requirements	The PCB is tested according to EN 45545-2, Table 2, EL9, R25 and complies with the requirements. Details see test reports no. XMIN190902365CCM.	P
11.4	Functional safety	The product is a High Performance Fanless Embedded System. The function does not related to safety of rolling stock.	N/A
11.5	Personnel safety	See LVD Test Report. (Report no. LD190712D14)	P

12	Documentation		P
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12.1	General	The manufacturer declare that the procedure of design, development, manufacturing and quality control comply to the criteria of ISO9001.	P
12.2	Supply and storage of documentation	The manual is provided by manufacturer. For additional documentation, due to no agreement between manufacturer and user, the details are not evaluated.	N/A
12.3	Datasheet	Some of the relative information are provided in the manual. Due to no agreement between manufacturer and user, the details of RAMS are not evaluated.	N/A
12.4	User manual	The manual is provided.	P
12.5	Equipment integration/installation documentation	The installation instruction is provided in the manual.	P
12.6	Commissioning documentation	See 12.4	P
12.7	Design documentation	Due to without the contractual agreement between involved parties, the requirement need be reviewed after the agreement is issued.	N/A

13	Testing		P
13.1	General		P
13.2	Categories of tests	See below	P
13.2.1	General		P
13.2.2	- type tests;		P
13.2.3	- routine tests;	The manufacturer declare that the procedure of design, development, manufacturing and quality control comply to the criteria of ISO9001.	P
13.2.4	- investigation tests.	Due to no agreement between manufacturer and user, this clause is not evualuated.	N/A
13.3	Tests summary	All mandatory test are tested.	P
13.4	Test specification	See below.	P
13.4.1	Visual inspection		P
13.4.2	Performance test		P
13.4.3	Power supply test	See below.	P
13.4.3.1	General		P
13.4.3.2	Supply variations		P



	Tests shall be performed to prove correct functioning at nominal supply voltage and at the specified upper and lower limits (see 5.1.1.2).	Follow the requirement of clause 5.1.1.2. The details see test report no. GO19070804-R1.	P
	DC power supply range: Tests shall be performed to prove correct functioning for the voltage range (see 5.1.1.3)	Meet the requirement of clause 5.1.1.3. Details see test report no. GO19070804-R1.	P
	Temporary supply overvoltages up to $1,4 U_n$ lasting no more than 0,1 s shall not cause deviation of function (performance criterion A).	Performance criterial A. Details see test report no. GO19070804-R1.	P
	For temporary supply overvoltages up to $1,4 U_n$ lasting no more than 1 s the equipment shall fulfil performance criterion B .	Performance criterial A. Details see test report no. GO19070804-R1.	P
13.4.3.3	Temporary supply dips		P
	Temporary supply dips down to $0,6 U_n$ not exceeding 0,1 s shall not cause deviation of function (performance criterion A).	Performance criterial A. Details see test report no. GO19070804-R1.	P
13.4.3.4	Interruptions of voltage supply		P
	- Class S1: No performance criterion is requested but the equipment shall continue to operate as specified after the voltage interruption.	See below.	P
	- Class S2: The equipment shall behave according performance criterion A.	The test results complies performance criterion A. Details see test report no. GO19070804-R1.	P
	- Class S3: The equipment shall behave according performance criterion A.	The test results comply performance criterion A. Details see test report no. GO19070804-R1.	P
13.4.3.5	Supply change-over		P
	- Class C1: at $0,6 U_n$ during 100 ms (without interruptions). Performance criterion A ;	The test result complies performance criterion A. Details see test report no. GO19070804-R1.	P
	- Class C2: during a supply break of 30 ms starting at U_n Performance criterion B .		NA
	Unless otherwise specified, the requirements of class C1 apply to power supply only.	C1 compliance.	P
13.4.4	Low temperature start-up test		P
	EN 60068-2-1, test Ad, 2h		P
	Equipment shall be tested according to its operating temperature class; low operating temperature (T_{TEST}) shall be taken from Table 1 of this standard.	$-40^{\circ}C$ for 2hrs	P
	Test acceptance requirements:		P



	During and after the test, the equipment shall work as intended and within its specified limits (performance criterion A).	No failure and damaged. Complies with performance criterion A. Details see test report no. GO19070804-R1.	P
13.4.5	Dry heat test		P
	EN 60068-2-2, test Be, 6h	Test cycle B	P
	The temperature value for this test is dependent of the temperature class and the switch-on extended operating temperature class of equipment under test (see Table 1 and Table 2 for details).	55 °C, 6hrs and additional 10min for 70 °C	P
	Test acceptance requirements:		P
	During and after the test, the equipment shall work as intended and within its specified limits (performance criterion A).	No failure and damaged. Complies with performance criterion A. Details see test report no. GO19070804-R1.	P
13.4.6	Low temperature storage test		N/A
	EN 60068-2-1, test Ab		N/A
	Temperature: -40°C; Duration: 16h min		N/A
	Test acceptance requirements:		N/A
	After recovery, the equipment shall work as intended and within its specified limits (performance criterion A).		N/A
13.4.7	Cyclic damp heat test		P
	EN 60068-2-30, test Db variant 2		P
	Temperature: +55°C and +25°C		P
	Number of cycles: 2 (breathing effect)		P
	Time: 2 x 24 h		P
	Test acceptance requirements:		P
	The results of all insulation and performance test (results after the first and second cycles) shall be within the specified tolerances and operation performance respectively.	The insulation and performance test complies with the requirements.	P
	Before and after the test (initial and final voltage withstand and insulation), the equipment shall work as intended and within its specified limits (performance criterion A).	No failure and damaged. Complies with performance criterion A. Details see test report no. GO19070804-R1.	P
13.4.8	Electromagnetic compatibility test	Details see EMC report. (Report no. CE190712D14)	P
13.4.9	Insulation test		P
13.4.9.1	General	See below.	P
13.4.9.2	Insulation measurement test (500Vdc)		P
	Test acceptance requirements:		P



	The minimum value of the insulation resistance after the withstand test shall be higher than 20 MΩ. The equipment shall work as intended and within its specified limits after the insulation test.	Input port to metal enclosure: >1000 MΩ Input port to I/O ports: >1000 MΩ Details see test report no. GO19070804-R1.	P
13.4.9.2	Voltage withstand test		P
	500 VAC or 750 VDC: nominal battery voltages and/or I/O voltage < 72 VDC or 50 VAC rms		N/A
	1000 VAC or 1500 VDC: nominal battery voltages and/or I/O voltage 72 VDC ≤ VDC ≤ 125Vdc or from 50 to 90 VAC rms	Input port to metal enclosure: 1000 Vac Input port to I/O ports: 1000 Vac Details see test report no. GO19070804-R1.	P
	1500 VAC or 2200 VDC: nominal battery voltages and/or I/O voltage 125 VDC ≤ VDC ≤ 315Vdc or from 90 to 225 VAC rms		N/A
	Test acceptance requirements:		P
	Neither disruptive discharge nor flashover shall occur. After the withstand test, the equipment shall work as intended and within its specified limits.	Neither disruptive discharge nor flashover occurred.	P
13.4.10	Salt mist test		N/A
	EN 60068-2-11, test Ka, 48h		N/A
	Test acceptance requirements:		N/A
	visual inspection		N/A
	an operational check shall not show any failure or damage. The equipment shall work as intended and within its specified limit. major damage shall occur.		N/A
13.4.11	Vibration and shock test		P
13.4.11.1	General	See below.	P
13.4.11.2	Simulated long life testing		P
	EN 61373: 2010, Clause 9		P
	Test acceptance requirements		P
	no damage shall be visible after the test,	No damage.	P
	after the test, the equipment shall work as intended and within its specified limits.	The equipment work as intended and within its specification. Details see test report no. GO19070804-R1.	P
13.4.11.3	Shock testing		P
	EN 61373: 2010, Clause 10		P
	Test acceptance requirements		P
	no damage shall occur during the test,	No damage.	P



	during the test, the equipment is monitored and shall work as intended within its specified limits.	The equipment work as intended and within its specification. Details see test report no. GO19070804-R1.	P
13.4.11.4	Functional random vibration test		P
	EN 61373: 2010, Clause 8		P
	Test acceptance requirements		P
	no damage shall occur during the test,	No damage.	P
	during the test, the equipment is monitored and shall work as intended within its specified limits.	The equipment work as intended and within its specification. Details see test report no. GO19070804-R1.	P
13.4.12	Enclosure protection test (IP test)		N/A
13.4.13	Stress screening test		N/A
	The process may include:		N/A
	- operation at elevated temperature;		N/A
	- thermal cycling;		N/A
	- vibration.		N/A
13.4.14	Rapid temperature variation test		N/A
	The test specification and the test procedure shall be agreed between the involved parties.		N/A

Appendix A

Photos





