innodisk

Total Solution For Embedded Peripherals

EMPL-G103

mPCIe to single GbE LAN Module

Customer: _____

Customer Part Number: _____

Innodisk Part Number: _____

Innodisk Model Name: _____

Date: _____

Innodisk Approver	Customer Approver

Table of Contents

REVISION HISTORY

Revision	Description	Date
1.0	First Released	May, 2019
1.1	mPCIe Pin Define 3.3V => 3.3V AUX	Mar, 2020
1.2	Add CE/FCC Report	May, 2020
1.3	Add MTBF value	Apr, 2024

List of Tables

List of Figures

1. Product Introduction

1.1. Overview

Innodisk EMPL-G103 is designed with standard Mini PCI Express form factor, EMPL-G103 supports PCIe Gen 2.1 with a single lane to single independent GbE LAN, optimized for higher performance and lower power. EMPL-103 is designed with on-board transformer which brings you a flexible cable design for small form factor or embedded systems.

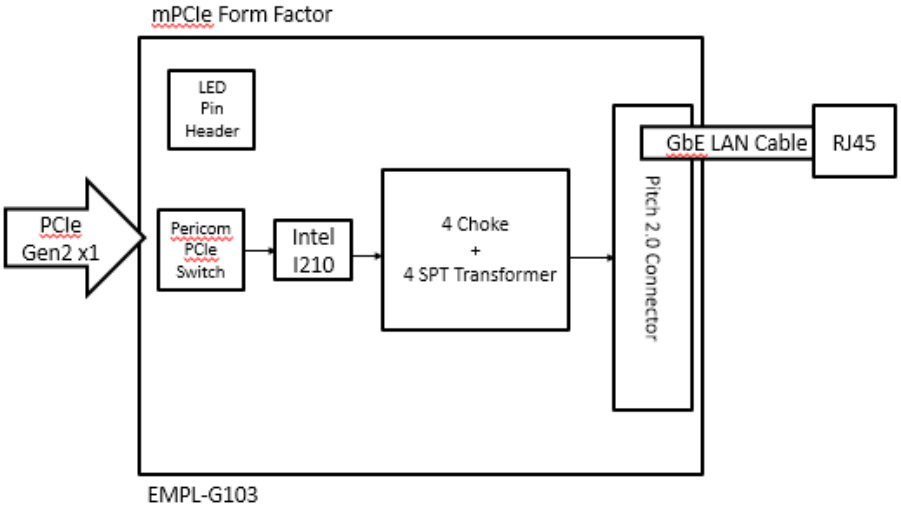


Figure 1: Block Diagram

1.2. Features

- Single GbE LAN ports
- Complies with EN61000-4-2 (ESD) Air-15kV, Contact-8kV
- Transformer on PCB for flexible cable design
- External LED indicator pin for speed 10/100/1000
- Optional Industrial Temperature (-40°C to +85°C) support

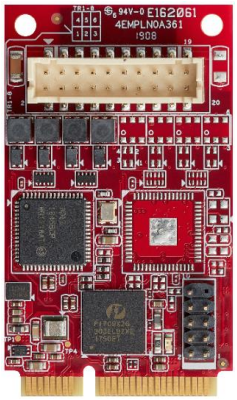


Figure 2: mPCIe Board Picture

Figure 3: 20pin Pitch 2.0 Connector to 1 RJ45 Cable

2. Product Specifications

2.1. Device Parameters

Table 1: Device Parameters

Form Factor	mPCIe
Input I/F	PCI Express 2.1 x 1
Output I/F	GbE LAN x 1
Output Connector	20 Pin Pitch 2.0 Connector
Dimension (WxLxH)	mPCIe Board: 29.8 x 50.8 x 9.3 mm

2.2. Electrical Specifications

2.2.1. Power Requirement

Table 2: Power Requirement

Item	Connector	Rating
Input voltage	mPCIe Golden Finger	+3.3 DC +-5%

2.2.2. Power Consumption

Table 3: Power Consumption

Full Load (mA)	Voltage (V)
405	3.3

2.3. Environmental Specifications

2.3.1. Temperature Ranges

Table 4: Temperature Ranges

Temperature	Range
Operating	Standard Grade: 0°C to +70°C Industrial Grade: -40°C to +85°
Storage	-55°C to +95°

2.3.2. Humidity

Relative Humidity: 10-95%, non-condensing

2.3.3. Shock and Vibration

Table 5: Shock and Vibration

Reliability	Test Conditions	Reference Standards
Vibration	7 Hz to 2K Hz, 20G, 3 axes	IEC 68-2-6
Mechanical Shock	Duration: 0.5ms, 1500 G, 3 axes	IEC 68-2-27

2.3.4. Mean Time between Failure (MTBF)

Reliability prediction methodology provides the basis for reliability evaluation and analysis. The purpose of the prediction is to predict the life time of the product in units of failure rate and MTBF.

Table 6: Mean Time between Failure (MTBF)

Product	Condition	MTBF (Hours)
EMPL-G103-C1	The analysis is at 25°C ambient temperature by Telcordia SR-332, Issues 4, Method I, Case 3 under Ground Benign, Controlled environment, 50% operation stress	16,575,110 hours
EMPL-G103-W1	The analysis is at 25°C ambient temperature by Telcordia SR-332, Issues 4, Method I, Case 3 under Ground Benign, Controlled environment, 50% operation stress	19,492,466 hours

2.4. CE and FCC Compatibility

EMPL-G103 conforms to CE and FCC requirements.

2.5. RoHS Compliance

EMPL-G103 is fully compliant with RoHS directive.

2.6. Hardware

2.6.1. Layout

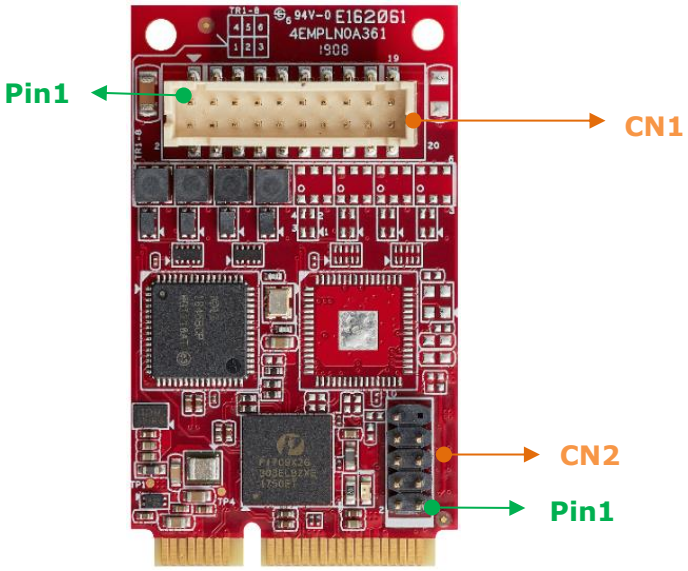


Table 7: mPCIe PCB Layout Legend

Label	Connector Type	Function
CN1	Wire to board SMD 2*10P 180° P:2.0mm H:4.0mm	GbE LAN Signal
CN2	2x5 Pin Header (cut 9pin) P:2.0mm	10/100/1000 LED Signal

2.6.2. Pin Define

Table 8: mPCIe Pin Define

Signal Name	Pin #	Pin #	Signal Name
NC	**51**	**52**	3.3V AUX
NC	**49**	**50**	GND
NC	**47**	**48**	NC
NC	**45**	**46**	NC
GND	**43**	**44**	NC
3.3V AUX	**41**	**42**	NC
3.3V AUX	**39**	**40**	GND
GND	**37**	**38**	NC
GND	**35**	**36**	NC
RX+	**33**	**34**	GND
RX-	**31**	**32**	SMBDATA
GND	**29**	**30**	SMBCLK
GND	**27**	**28**	NC
TX+	**25**	**26**	GND
TX-	**23**	**24**	3.3V AUX
GND	**21**	**22**	PERST#
NC	**19**	**20**	NC
NC	**17**	**18**	GND
GND	**15**	**16**	NC
CLK+	**13**	**14**	NC
CLK-	**11**	**12**	NC
GND	**9**	**10**	NC
GND	**7**	**8**	NC
NC	**5**	**6**	NC
NC	**3**	**4**	GND
PE_WAKE_N	**1**	**2**	3.3V AUX

2.6.3. I/O Connector Mechanical Drawing & Pin Defines

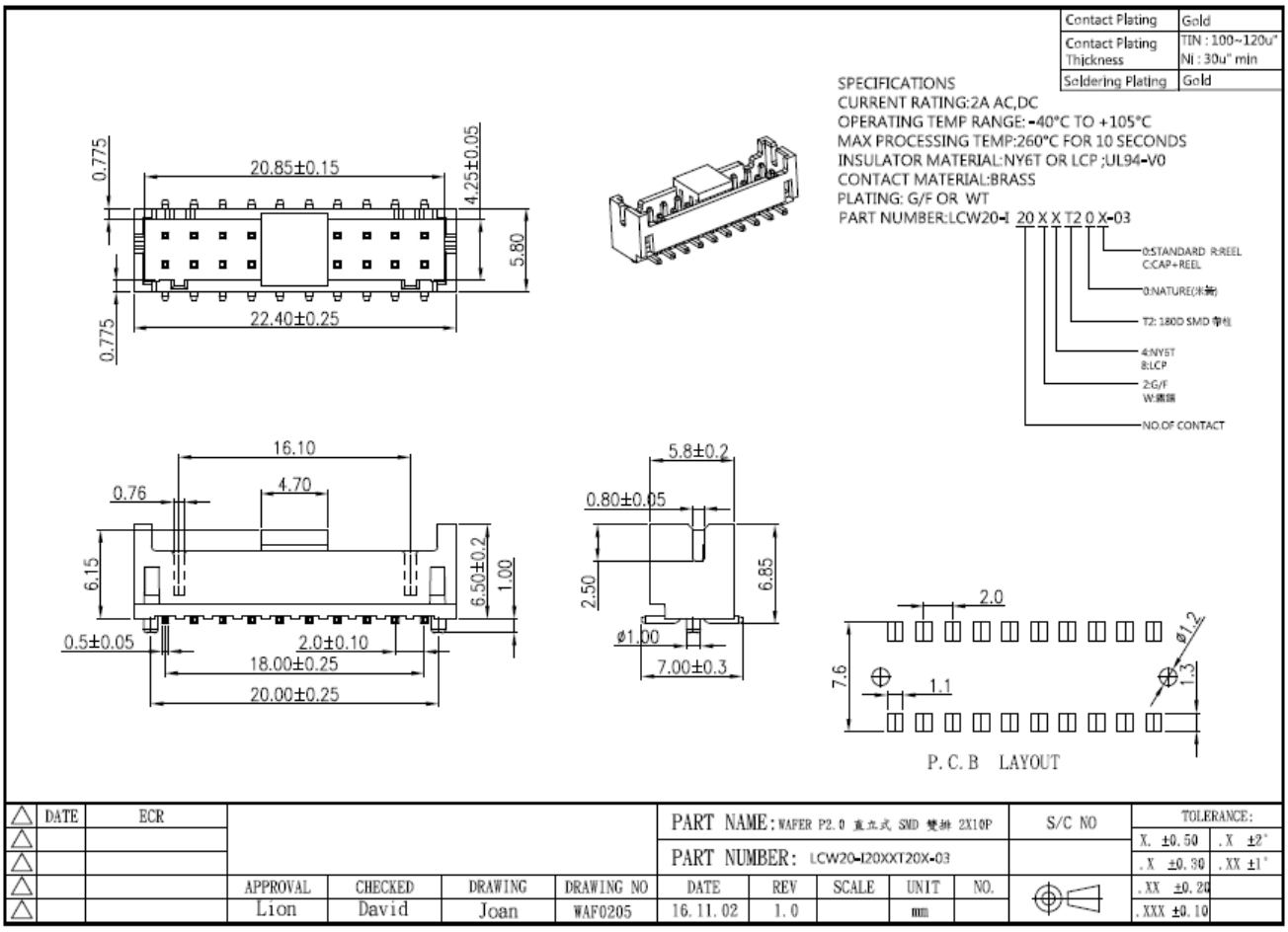


Figure 4: Wire to Board SMD 2*10P Connector Drawing

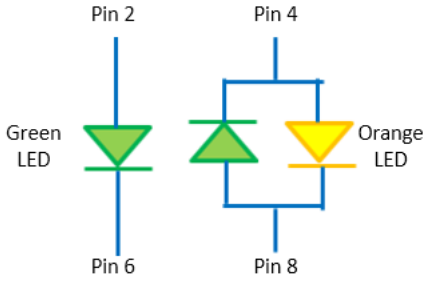
Table 9: Wire to Board SMD 2*10P Connector (CN1) Pin Define

Signal Name	Pin #	Pin #	Signal Name
NC	**2**	**1**	GND
P1_MDI0P_CN	**4**	**3**	P1_MDI1P_CN
P1_MDI0N_CN	**6**	**5**	P1_MDI1N_CN
P1_MDI2P_CN	**8**	**7**	P1_MDI3P_CN
P1_MDI2N_CN	**10**	**9**	P1_MDI3N_CN
NC	**12**	**11**	NC
NC	**14**	**13**	NC
NC	**16**	**15**	NC
NC	**18**	**17**	NC
NC	**20**	**19**	GND

Table 10: 2X5 Pin Header (CN2) Pin Define

Signal Name	Pin #	Pin #	Signal Name
NC	**1**	**2**	3.3_LANA
NC	**3**	**4**	LANA_LINK_100_N
NC	**5**	**6**	LANA_LINK_ACT_N
NC	**7**	**8**	LANA_LINK_1000_N
		10	GND

Table 11: LAN LED Table



Speed	Orange/Green (Status)	Green (Active/Link)
10M	OFF	Flash
100M	ON (Green)	Flash
1G	ON (Orange)	Flash

2.6.4. EMPL-G103 Mechanical Drawing

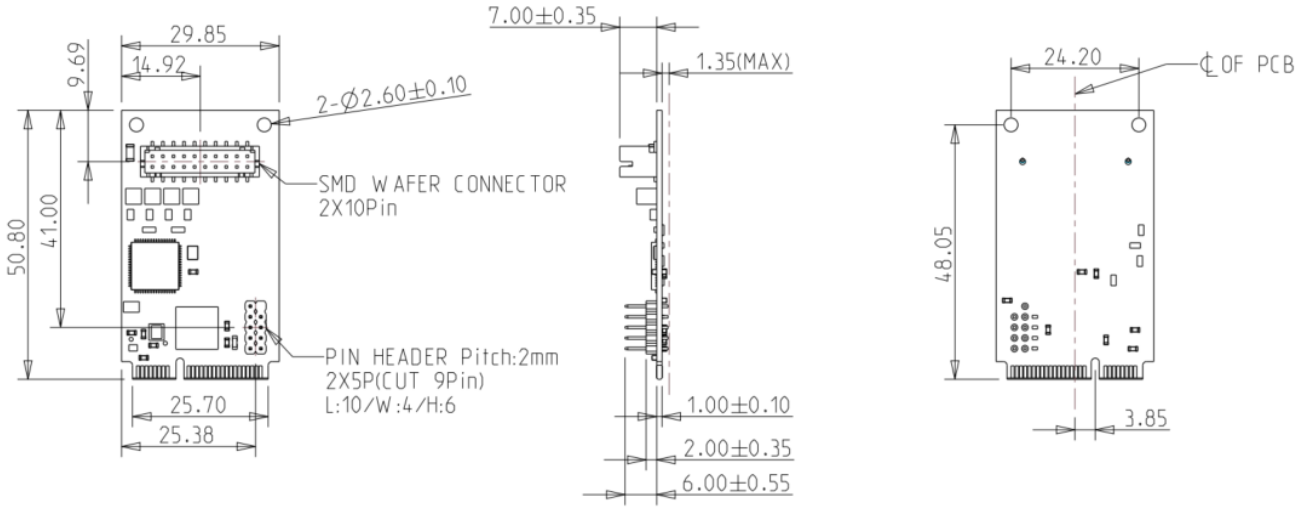


Figure 5: EMPL-G103 mPCIe Board Drawing

2.6.5. Cable Mechanical Drawing

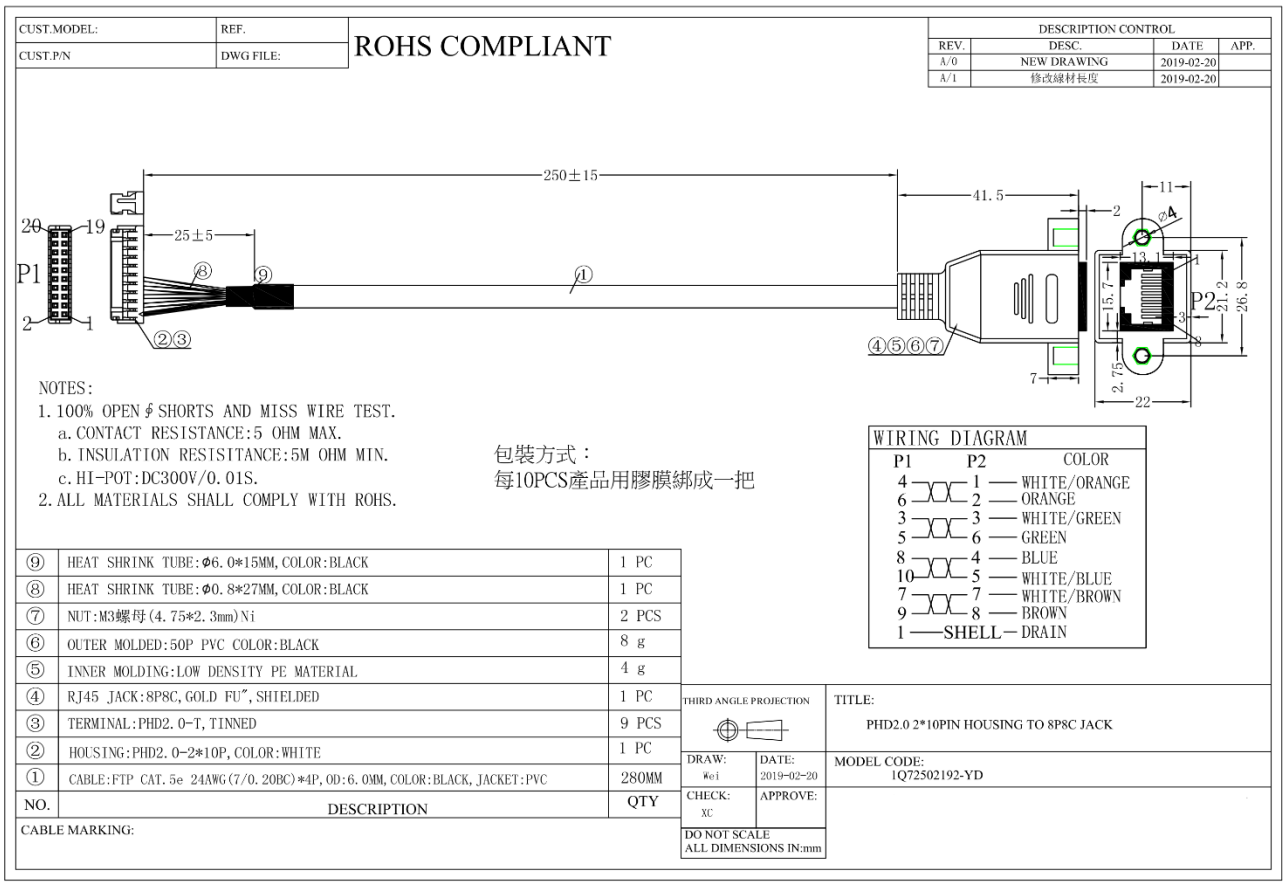


Figure 6: 20pin Pitch 2.0 Connector to 1 RJ45 Cable Drawing

2.6.6. Packing List

- EMPL-G103 mPCIe Board x 1
- 20pin Pitch 2.0 Connector to 1 RJ45 Cable x 1

2.7. Software Support

- Windows: XP(32bit), 7(32/64bit), 8/8.1(32/64 bit), 10(32/64bit)
- Linux: Kernel 2.4 above.

3. Installation Guide

Please download driver from Myinnodisk web site.
https://myinnodisk.innodisk.com/myinnodisk/Login.aspx

Or you can download intel i210 chip driver from intel official web site directly.
https://downloadcenter.intel.com/product/64399/Intel-Ethernet-Controller-I210-Series

4. Appedix

innodisk

宜鼎國際股份有限公司
Innodisk Corporation
REACH Declaration

Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: http://www.innodisk.com/

We hereby confirm that the product(s) delivered to

Innodisk P/N	Description
All Innodisk EP Products	

☐ contain(s) **no** hazardous substances or constituents exceeding the defined threshold 0.1 % by weight in homogenous material if not otherwise specified, as described in the candidate list table currently including 197 substances and shown on the ECHA website (http://echa.europa.eu/de/candidate-list-table).

☑ contain(s) one or more hazardous substances or constituents exceeding 0.1 % by weight in homogenous material if not otherwise specified in candidate list table. Where the threshold value is exceeded, the substances in question are to be declared in accompanying Appendix A & B.

Guarantor

Company name 公司名稱：Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人：Randy Chien 簡川勝

Company Representative Title 公司代表人職稱：Chairman 董事長

Date 日期：2019 / 01 / 31

1

宜鼎國際股份有限公司
Innodisk Corporation
Tel:(02)7703-3000 Fax:(02) 7703-3555 Internet: http://www.innodisk.com/

RoHS 自我宣告書(RoHS Declaration of Conformity)

Manufacturer Product: All Innodisk EP products

一、 宜鼎國際股份有限公司（以下稱本公司）特此保證售予貴公司之所有產品，皆符合歐盟 2011/65/EU 及(EU) 2015/863 關於 RoHS 之規範要求。
Innodisk Corporation declares that all products sold to the company, are complied with European Union RoHS Directive (2011/65/EU) and (EU) 2015/863 requirement.

二、 本公司同意因本保證書或與本保證書相關事宜有所爭議時，雙方宜友好協商，達成協議。
Innodisk Corporation agrees that both parties shall settle any dispute arising from or in connection with this Declaration of Conformity by friendly negotiations.

三、 本公司聲明我們的產品符合 RoHS 指令的附件中(7a)、(7c-I)允許豁免。
We declare, our products permitted by the following exemptions specified in the Annex of the RoHS directive.
※ (7a) Lead in high melting temperature type solders(i.e. lead-based alloys containing 85% by weight or more lead).
※ (7C-I) Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound.

Name of hazardous substance	Limited of RoHS ppm（mg/kg）
鉛（Pb）	< 1000 ppm
汞（Hg）	< 1000 ppm
鎘（Cd）	< 100 ppm
六價鉻（Cr 6+）	< 1000 ppm
多溴聯苯（PBBs）	< 1000 ppm
多溴二苯醚（PBDEs）	< 1000 ppm
鄰苯二甲酸二(2-乙基己基)酯（DEHP）	< 1000 ppm
鄰苯二甲酸丁酯苯甲酯（BBP）	< 1000 ppm
鄰苯二甲酸二丁酯（DBP）	< 1000 ppm
鄰苯二甲酸二異丁酯（DIBP）	< 1000 ppm

立 保 證 書 人 (Guarantor)

Company name 公司名稱： Innodisk Corporation 宜鼎國際股份有限公司

Company Representative 公司代表人： Randy Chien 簡川勝

CERTIFICATE OF CONFORMITY

Product	:	mPCIe to dual GbE LAN single board module
Brand	:	Innodisk
Test Model	:	E%PL-G&03
Series Model	:	E%PL-G&03 <%: Form factor: (2: 2.5"SSD,3:DDR3 DIMM, D:Dongle,G:NGFF_M.2,H:mPCIe Half,L:PCIe Low profile,M:mPCIe,S:PCIe Standard,X:Multi,Z:Others) &: Output items: (1:1Port, 2:2Ports, 3:3Ports, 4:4Ports, A~Z:TBD, X:Multi)>
Applicant	:	Innodisk Corporation
Report No.	:	CE190426D11

We, **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards, in accordance with the Directive 2014/30/EU. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

EN 55032:2015 +AC:2016, Class B
EN 61000-3-2:2014 (Not applicable)
EN 61000-3-3:2013 (Not applicable)
EN 55035:2017
EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0
EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2
EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0
EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0
EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0
EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0
EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0 (Not applicable)
Broadband impulse noise disturbances (Not applicable)

NOTE: The above IEC basic standards are applied with latest version if customer has no special requirement.

Kenny Meng / Assistant Manager
May 10, 2019

No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
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http://www.bureauveritas-adt.com E-Mail: service.adt@tw.bureauveritas.com

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Product	:	mPCIe to dual GbE LAN single board module
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Test Model	:	E%PL-G&03
Series Model	:	E%PL-G&03 <%: Form factor: (2: 2.5"SSD,3:DDR3 DIMM,D:Dongle,G:NGFF_M.2,H:mPCIe Half,L:PCIe Low profile,M:mPCIe,S:PCIe Standard,X:Multi,Z:Others) &: Output items: (1:1Port, 2:2Ports, 3:3Ports, 4:4Ports, A~Z:TBD, X:Multi)>
Applicant	:	Innodisk Corporation
Report No.	:	FD190426D11

We, **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, declare that the equipment above has been tested in our facility and found compliance with the requirement limits of applicable standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate under the standards herein specified.

47 CFR FCC Part 15, Subpart B, Class B

ICES-003:2016 Issue 6, Class B

ANSI C63.4:2014

Jim Hsiang / Associate Technical Manager

May 10, 2019

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April 25, 2024