

# EMPL-G201

mPCIe to dual isolated

**GbE LAN Module**

**Customer:** \_\_\_\_\_

**Customer** \_\_\_\_\_

**Part Number:** \_\_\_\_\_

**Innodisk** \_\_\_\_\_

**Part Number:** \_\_\_\_\_

**Innodisk** \_\_\_\_\_

**Model Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

Innodisk Approver	Customer Approver

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## REVISION HISTORY

Revision	Description	Date
1.0	First Released	Sep, 2018
1.1	mPCIe Pin Define 3.3V => 3.3V AUX	Mar, 2020

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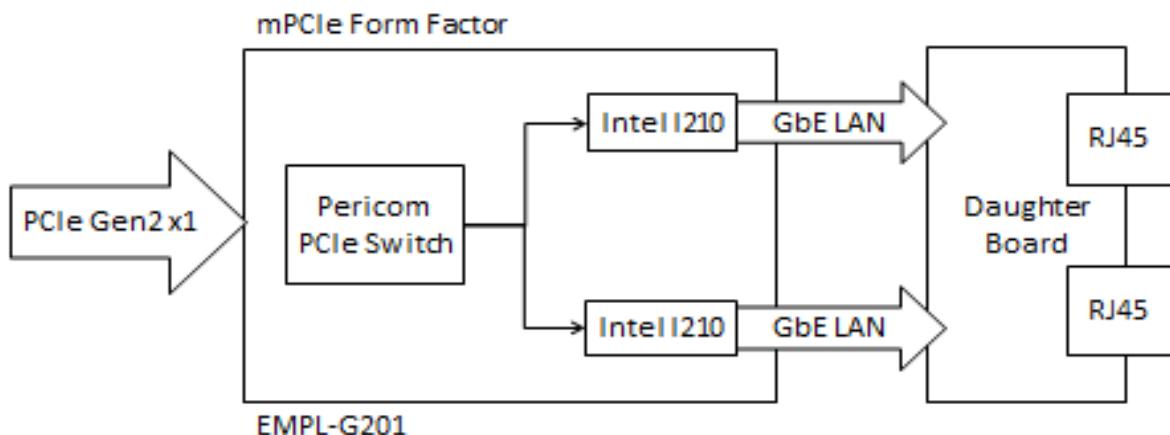
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# 1. Product Introduction

## 1.1. Overview

Innodisk EMPL-G201 is designed with standard Mini PCI Express form factor, EMPL-G201 supports PCIe Gen 2.1 with a single lane to dual independent isolated GbE LAN, optimized for higher performance and lower power, which brings you a flexible expansion solution for embedded systems.



**Figure 1: Block Diagram**

## 1.2. Features

- Dual isolated GbE LAN ports
- Complies with EN61000-4-5 1kV Surge protection
- Complies with IEC 60950-1:2005 + A1: 2009 + A2:2013 2kV HiPOT protection
- Complies with EN61000-4-2 (ESD) Air-15kV, Contact-8kV
- Flexible daughter board with cable to fit into different system
- Optional terminal mounting hole or bracket for daughter board



**Figure 2: mPCIe Board Picture**



**Figure 3: Mounting Hole Daughter Board Picture (EMPL-G201-C1/W1)**



**Figure 4: Bracket Daughter Board Picture (EMPL-G201-C2/W2)**

## 2. Product Specifications

### 2.1. Device Parameters

**Table 1: Device Parameters**

<b>Form Factor</b>	mPCIe
<b>Input I/F</b>	PCI Express 2.1 x 1
<b>Output I/F</b>	GbE LAN x 2
<b>Output Connector</b>	RJ45 x 2
<b>Dimension (WxLxH)</b>	mPCIe Board: 30 x 50.9 x 7.6 mm Daughter Board: 30 x 59.95 x 19.37

### 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)
450	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-G201	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	3,566,007

### 2.4. CE and FCC Compatibility

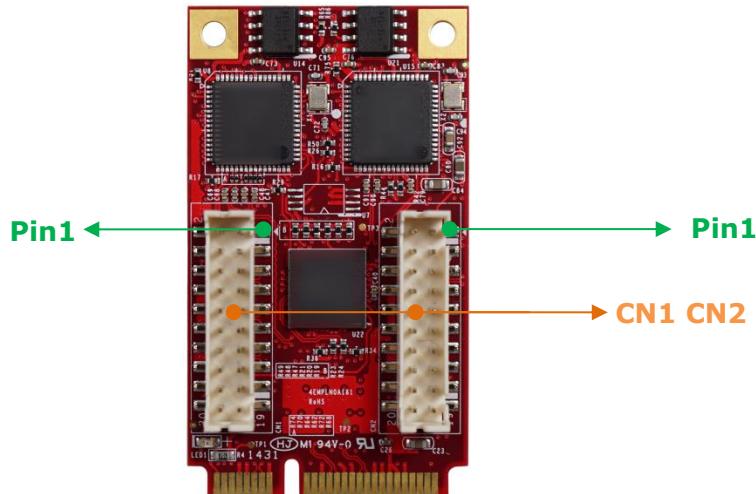
EMPL-G201 conforms to CE and FCC requirements.

### 2.5. RoHS Compliance

EMPL-G201 is fully compliant with RoHS directive.

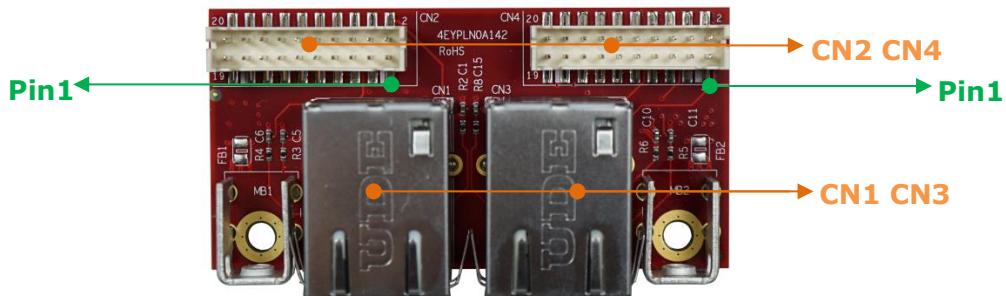
## 2.6. Hardware

### 2.6.1. Layout



**Table 7: mPCIe PCB Layout Legend**

Label	Connector Type	Function
<b>CN1</b>	Wire to board SMD 2*10P 180° P:2.00mm H:4.0mm	GbE LAN Signal 10/100/1000 LED Signal
<b>CN2</b>	Wire to board SMD 2*10P 180° P:2.00mm H:4.0mm	GbE LAN Signal 10/100/1000 LED Signal



**Table 8: Daughter Board PCB Layout Legend**

Label	Connector Type	Function
<b>CN1</b>	10/100/1000 Base-T RJ45 DIP 10P8C 90° LED: Green-Orange/Green	GbE LAN Port 10/100/1000 LED Indicator

<b>CN2</b>	Wire to board SMD 2*10P 180° P:2.00mm H:4.0mm	GbE LAN Signal 10/100/1000 LED Signal
<b>CN3</b>	10/100/1000 Base-T RJ45 DIP 10P8C 90° LED: Green-Orange/Green	GbE LAN Port 10/100/1000 LED Indicator
<b>CN4</b>	Wire to board SMD 2*10P 180° P:2.00mm H:4.0mm	GbE LAN Signal 10/100/1000 LED Signal

## 2.6.2. Pin Define

**Table 9: mPCIe Pin Define**

Signal Name	Pin #	Pin #	Signal Name
NC	<b>51</b>	<b>52</b>	3.3V AUX
NC	<b>49</b>	<b>50</b>	GND
NC	<b>47</b>	<b>48</b>	NC
NC	<b>45</b>	<b>46</b>	NC
GND	<b>43</b>	<b>44</b>	NC
3.3V AUX	<b>41</b>	<b>42</b>	NC
3.3V AUX	<b>39</b>	<b>40</b>	GND
GND	<b>37</b>	<b>38</b>	NC
GND	<b>35</b>	<b>36</b>	NC
RX+	<b>33</b>	<b>34</b>	GND
RX-	<b>31</b>	<b>32</b>	SMBDATA
GND	<b>29</b>	<b>30</b>	SMBCLK
GND	<b>27</b>	<b>28</b>	NC
TX+	<b>25</b>	<b>26</b>	GND
TX-	<b>23</b>	<b>24</b>	3.3V AUX
GND	<b>21</b>	<b>22</b>	PERST#
NC	<b>19</b>	<b>20</b>	NC
NC	<b>17</b>	<b>18</b>	GND
GND	<b>15</b>	<b>16</b>	NC
CLK+	<b>13</b>	<b>14</b>	NC
CLK-	<b>11</b>	<b>12</b>	NC

GND	<b>9</b>	<b>10</b>	NC	
GND	<b>7</b>	<b>8</b>	NC	
NC	<b>5</b>	<b>6</b>	NC	
NC	<b>3</b>	<b>4</b>	GND	
PE_WAKE_N	<b>1</b>	<b>2</b>	3.3V AUX	

### 2.6.3. I/O Connector Mechanical Drawing & Pin Defines

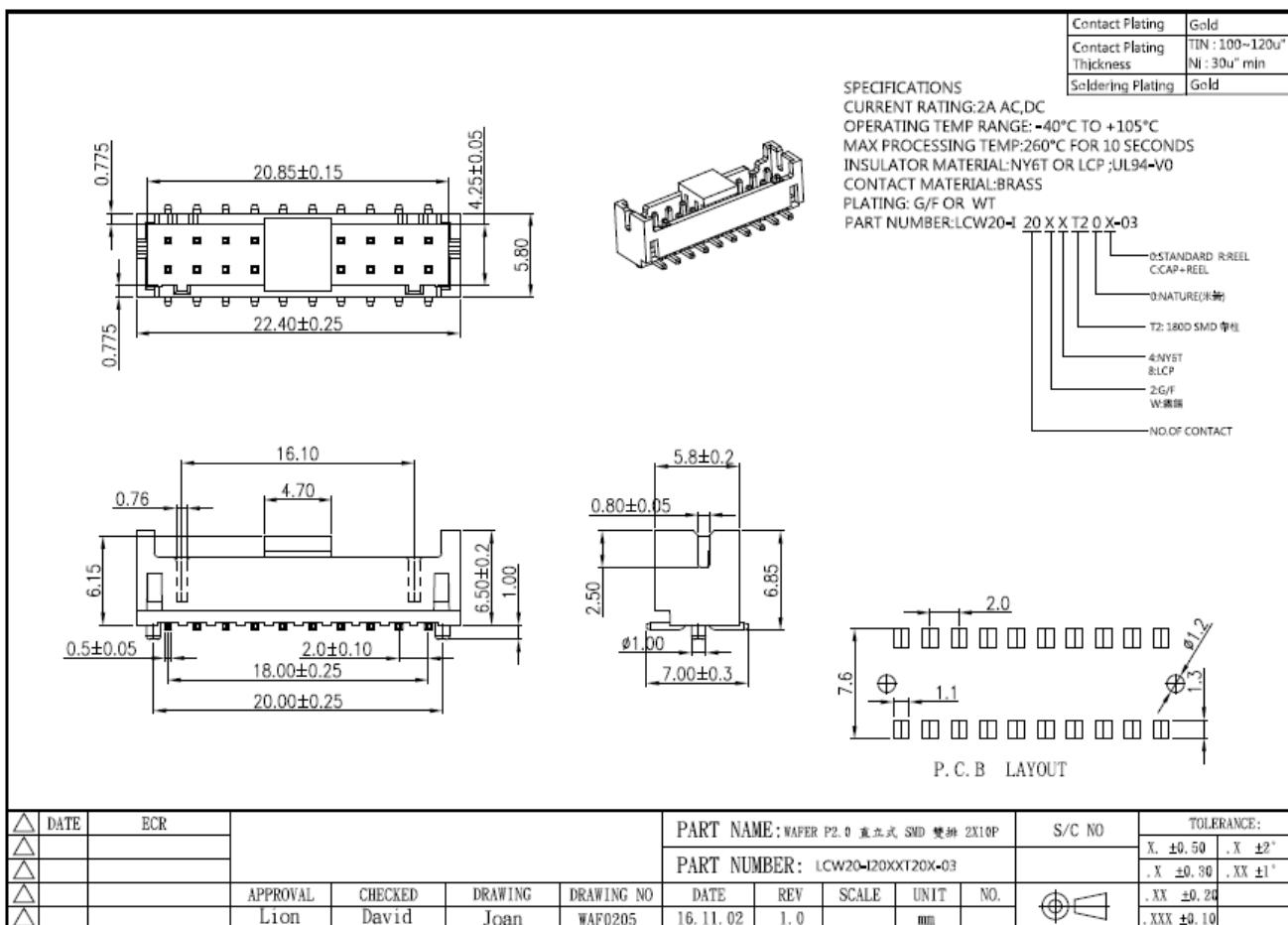
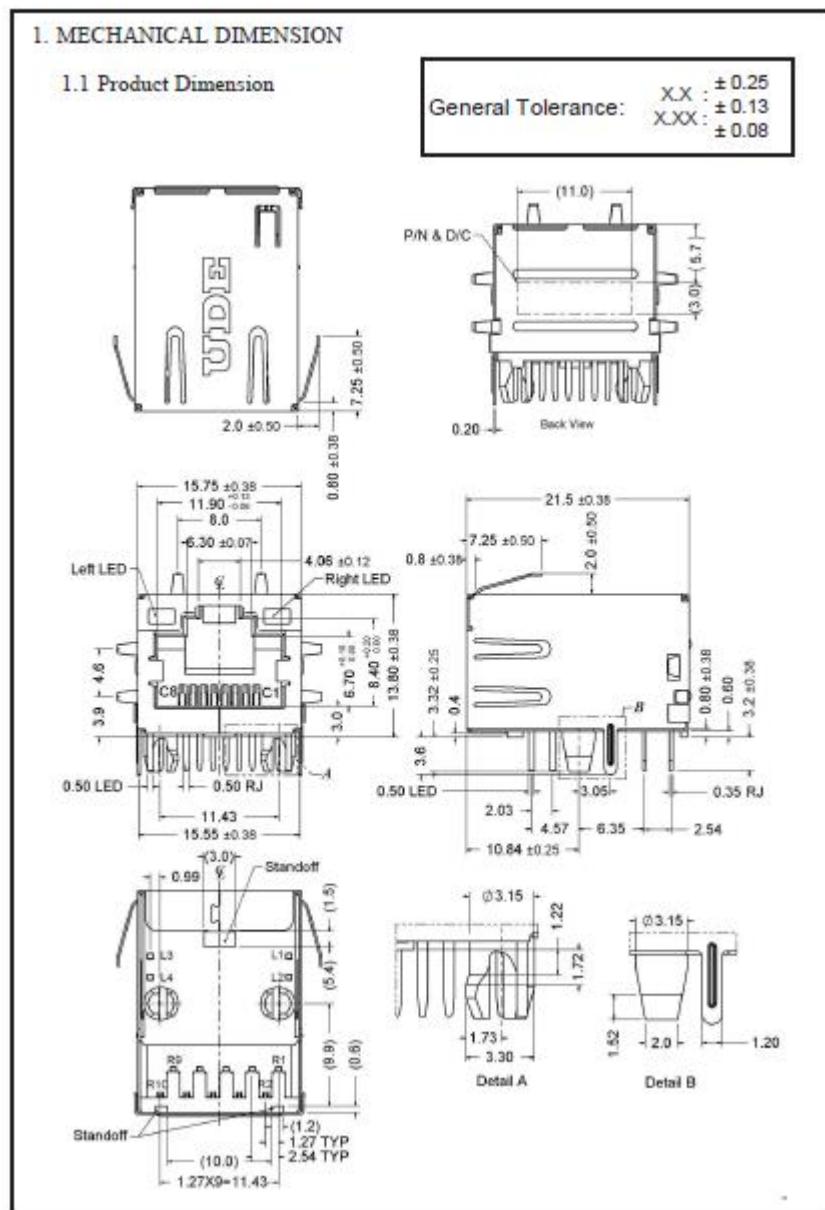


Figure 5: Wire to Board SMD 2\*10P Connector Drawing

Table 10: Wire to Board SMD 2\*10P Connector Pin Define

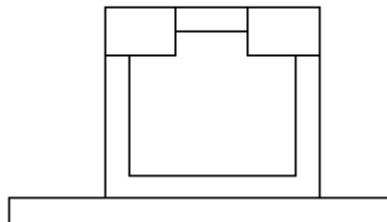
Signal Name	Pin #	Pin #	Signal Name
LINK_100_N	<b>2</b>	<b>1</b>	MDIOP_IC
LINK_ACT_N	<b>4</b>	<b>3</b>	MDION_IC
LINK_1000_N	<b>6</b>	<b>5</b>	MDI1P_IC

GND	<b>8</b>	<b>7</b>	MDI1N_IC
GND	<b>10</b>	<b>9</b>	MDI2P_IC
GND	<b>12</b>	<b>11</b>	MDI2N_IC
3.3V	<b>14</b>	<b>13</b>	MDI3P_IC
3.3V	<b>16</b>	<b>15</b>	MDI3N_IC
NC	<b>18</b>	<b>17</b>	NC
NC	<b>20</b>	<b>19</b>	NC

**Figure 6: RJ45 Connector Drawing**

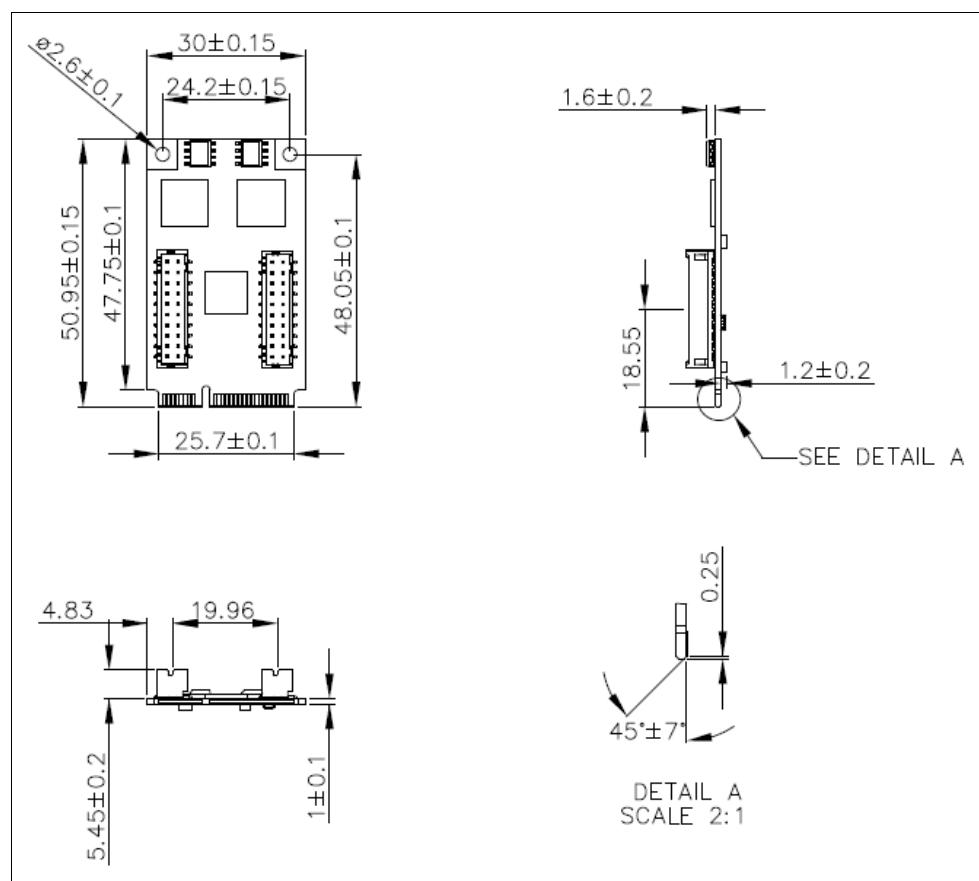
**Table 11: RJ45 LAN LED Table**

Orange  
/Green      Green

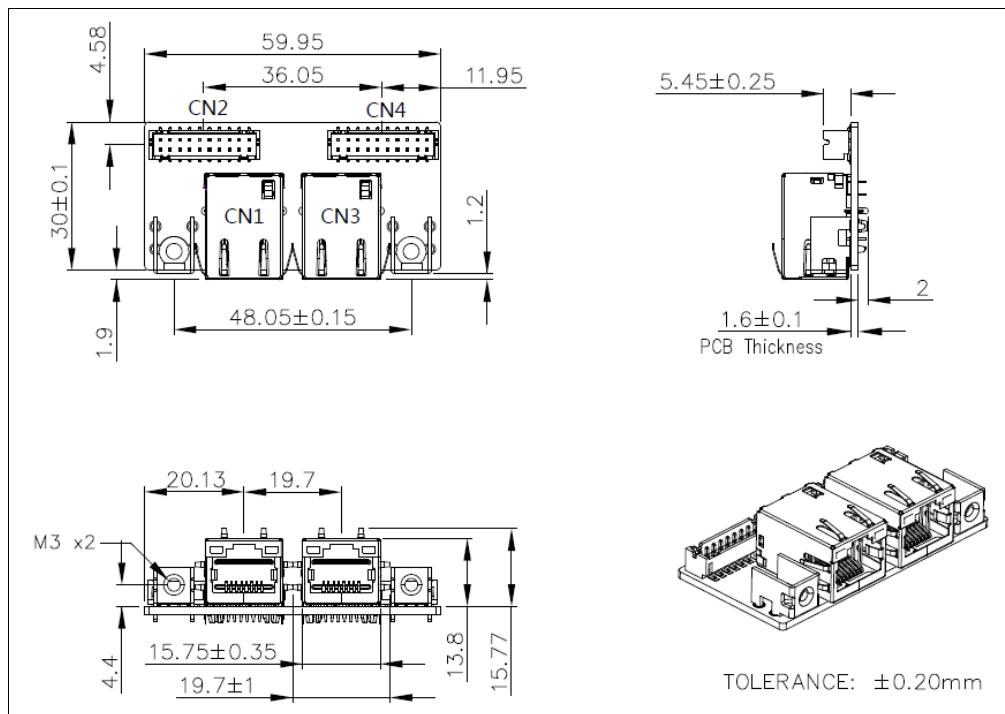


Speed	Orange/Green (Status)	Green (Active/Link)
<b>10M</b>	OFF	Flash
<b>100M</b>	ON (Green)	Flash
<b>1G</b>	ON (Orange)	Flash

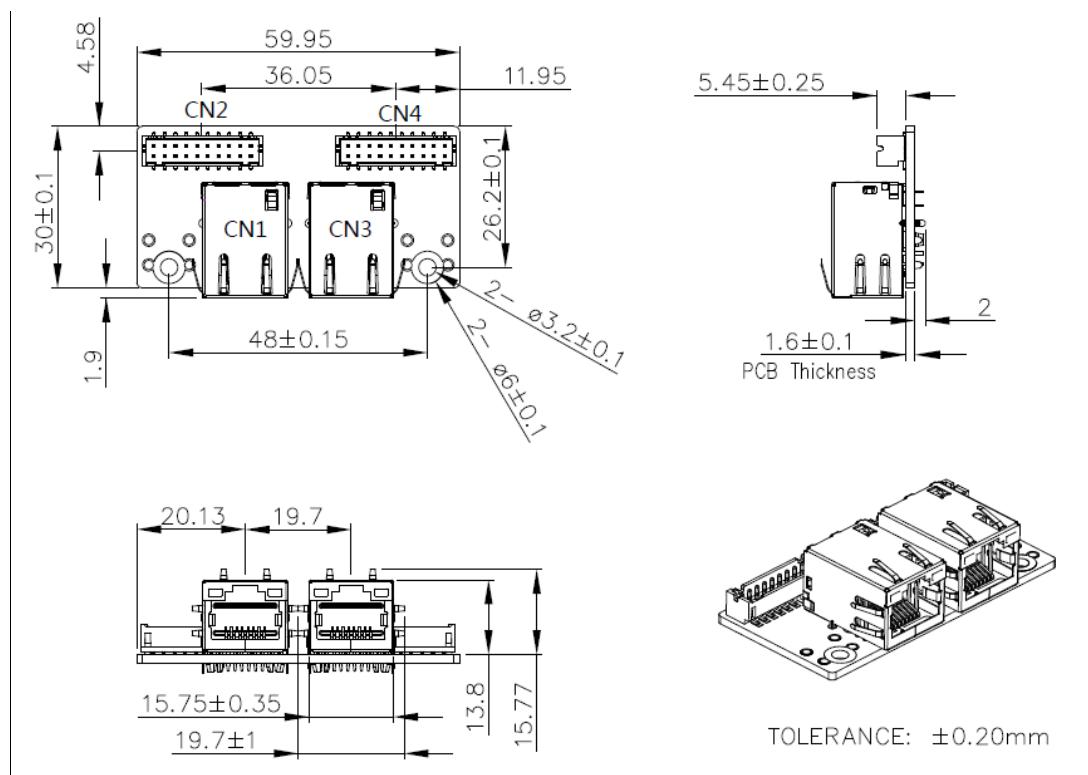
## 2.6.4. EMPL-G201 Mechanical Drawing



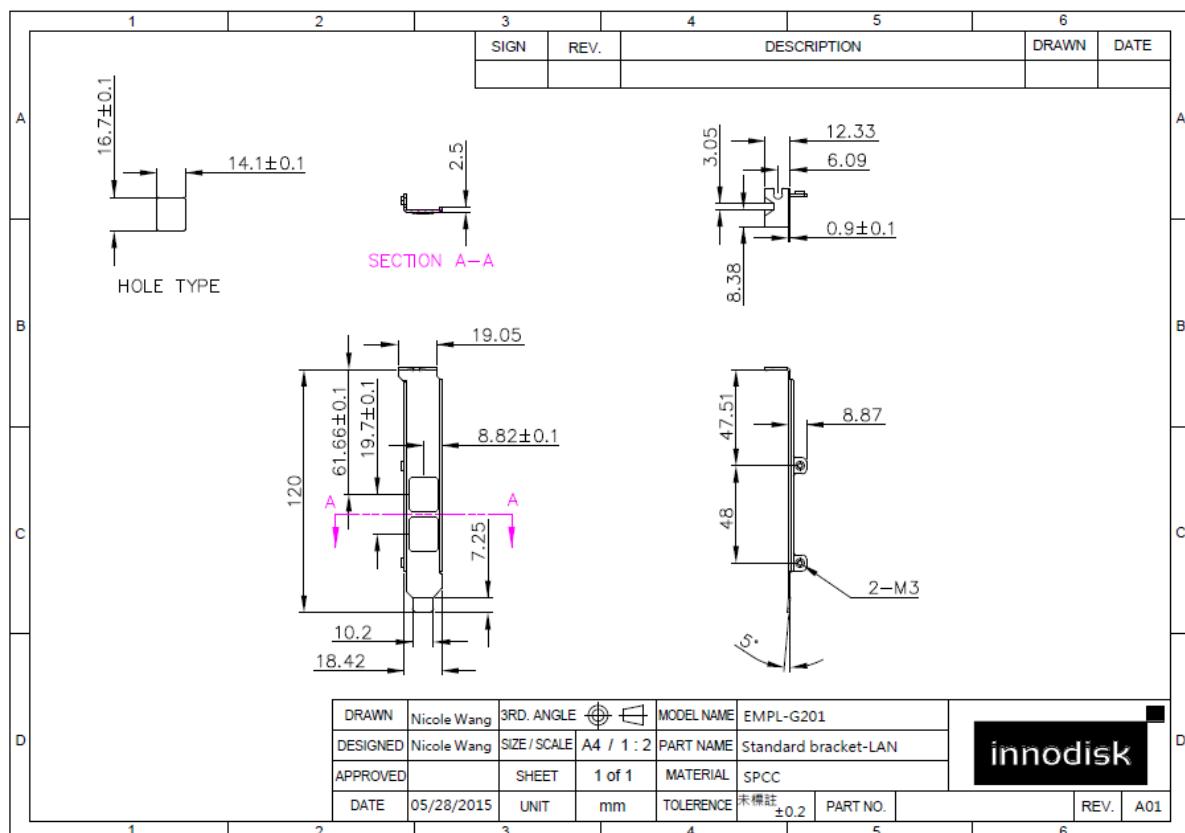
**Figure 7: EMPL-G201 mPCIe Board Drawing**



**Figure 8: Mounting Hole Daughter Board Drawing (EMPL-G201-C1/W1)**



**Figure 9: Bracket Daughter Board Drawing (EMPL-G201-C2/W2)**



**Figure 10: Bracket Drawing**

## 2.6.5. Cable Mechanical Drawing

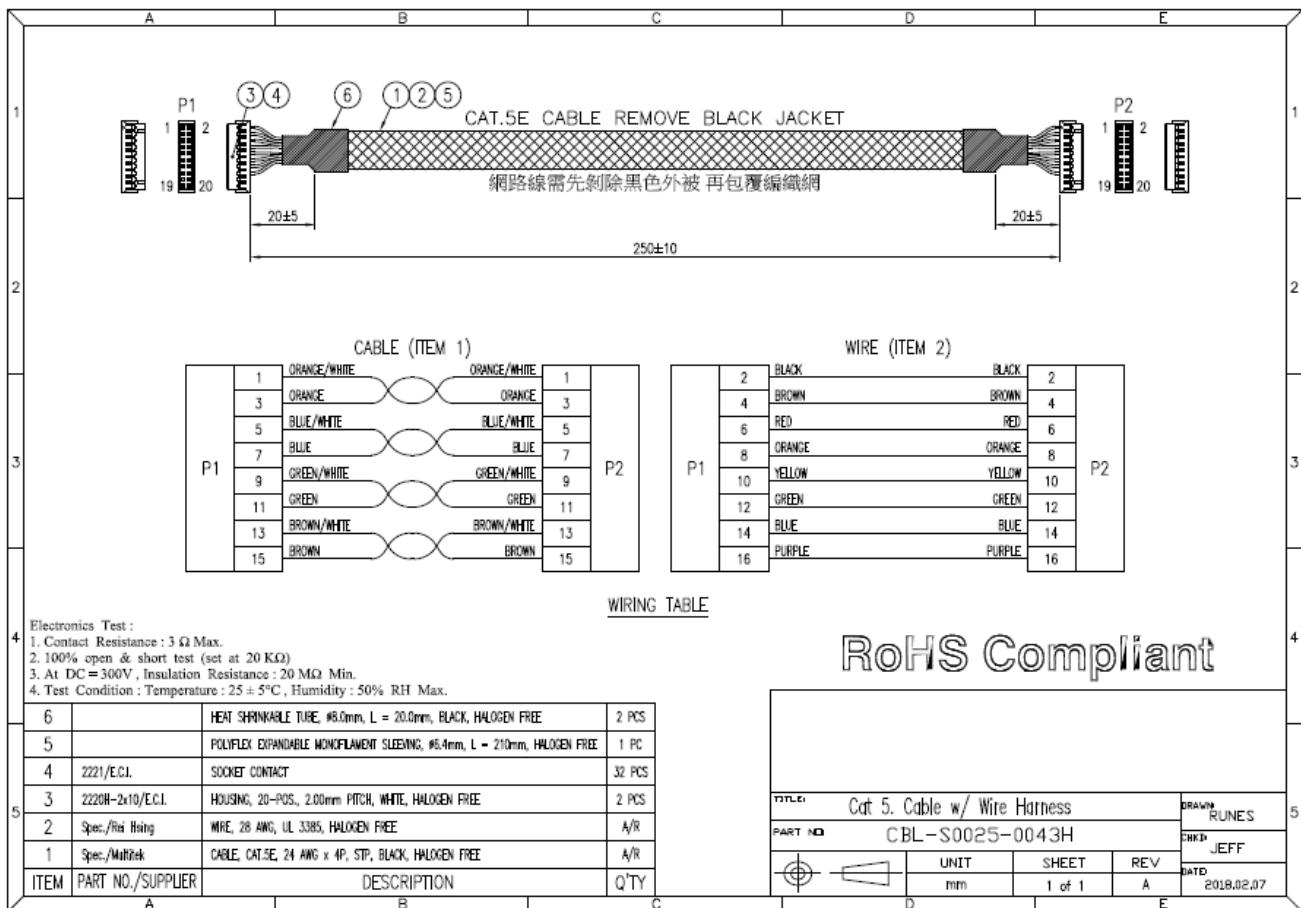


Figure 11: Board to Board LAN Cable Drawing

## 2.6.6. Packing List

- EMPL-G201 mPCIe Board x 1
- EMPL-G201 Daughter Board x 1
- Board to Board LAN Cable x 2
- Bracket x 1 (EMPL-G201-C2/W2 only)
- Screw M3\*5 Silver x 2 (EMPL-G201 C2/W2 only)

## 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



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/>

### REACH Declaration of Conformity

#### Manufacturer Product:All Innodisk EP products

1. 宜鼎國際股份有限公司（以下稱本公司）特此保證此售予貴公司之產品，皆符合歐盟化學品法案(Registration , Evaluation and Authorization of Chemicals ; REACH)之規定

(<http://www.echa.europa.eu/de/candidate-list-table> last updated: 15/01/2018)。所提供之產品包含：(1) 產品或產品所使用到的所有原物料；(2)包裝材料；(3)設計、生產及重工過程中所使用到的所有原物料。

We Innodisk Corporation hereby declare that our products are in compliance with the requirements according to the REACH Regulation

(<http://www.echa.europa.eu/de/candidate-list-table> last updated: 15/01/2018).

Products include : 1) Product and raw material used by the product ; 2) Packaging material ; 3) Raw material used in the process of design, production and rework

2. 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.

#### 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

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

Date 日期 : 2018 / 02 / 08



**宜鼎國際股份有限公司  
Innodisk Corporation**

Page 1/1

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.

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

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

Date 日期 : 2018 / 02 / 08



# Certificate

Issue Date: January 16, 2015  
 Ref. Report No. ISL-15LE019CE

Product Name : LAN Module  
 Model(s) : E%PL-G\*01-\*1 (% : 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) \* : Series (1~9, A~Z))  
 Responsible Party : Innodisk Corporation  
 Address : 5F.No.237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221,  
               Taiwan (R.O.C.)

We, International Standards Laboratory, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in European Council Directive- EMC Directive 2004/108/EC. The device was passed the test performed according to :



**Standards:**

EN 55022: 2010+AC2011 and CISPR 22: 2008 (modified)  
 EN 61000-3-2: 2006+A1:2009 +A2:2009 and IEC 61000-3-2: 2005+A1:2008 +A2:2009  
 EN 61000-3-3: 2013 and IEC 61000-3-3: 2013  
 EN 55024: 2010 and CISPR 24: 2010  
 EN 61000-4-2: 2009 and IEC 61000-4-2: 2008  
 EN 61000-4-3: 2006+A1: 2008 +A2: 2010 and  
 IEC 61000-4-3:2006+A1: 2007+A2: 2010  
 EN 61000-4-4:2012 and IEC 61000-4-4:2012

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standards Laboratory

Jim Chu / Director

**Hsi-Chih LAB:**

No. 65, Gu Dai Keng Street, Hsi-Chih Dist.,  
 New Taipei City 221, Taiwan  
 Tel: 886-2-2646-2550; Fax: 886-2-2646-4641



**Lung-Tan LAB:**

No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.,  
 Lung-Tan Hsiang, Tao Yuan County 325, Taiwan  
 Tel: 886-3-407-1718; Fax: 886-3407-1738



# Certificate

Issue Date: January 16, 2015  
 Ref. Report No. ISL-15LE019FB

Product Name : LAN Module  
 Model(s) : E%PL-G\*01-\*1 (% : 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) \* : Series (1~9, A~Z))  
 Applicant : Innodisk Corporation  
 Address : 5F.No.237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (R.O.C.)

We, International Standards Laboratory, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified. (refer to Test Report if any modifications were made for compliance).

Standards:



FCC CFR Title 47 Part 15 Subpart B: 2012- Section 15.107 and 15.109

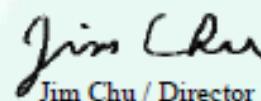
ANSI C63.4-2009

Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 5: 2012

Class B

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standards Laboratory

  
 Jim Chu / Director

**Hsi-Chih LAB:**

No. 65, Gu Dai Keng Street, Hsi-Chih Dist.,  
 New Taipei City 221, Taiwan  
 Tel: 886-2-2646-2550; Fax: 886-2-2646-4641



**Lung-Tan LAB:**

No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd.,  
 Lung-Tan Hsiang, Tao Yuan County 325, Taiwan  
 Tel: 886-3-407-1718; Fax: 886-3407-1738



# Contact us

## Headquarters (Taiwan)

5F., No. 237, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

Tel: +886-2-77033000

Email: sales@innodisk.com

## Branch Offices:

### USA

usasales@innodisk.com

+1-510-770-9421

### Europe

eusales@innodisk.com

+31-40-3045-400

### Japan

jpsales@innodisk.com

+81-3-6667-0161

### China

sales\_cn@innodisk.com

+86-755-2167-3689

[www.innodisk.com](http://www.innodisk.com)

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May 28, 2020