

ServerDOM-V

3IE3 Series

Customer: _____

Customer

Part

Number: _____

Innodisk

Part

Number: _____

Innodisk

Model Name: _____

Date: _____

Innodisk Approver	Customer Approver

Total Solution For
Industrial Flash Storage

Table of contents

LIST OF FIGURES	5
1. PRODUCT OVERVIEW	6
1.1 INTRODUCTION OF INNODISK SERVERDOM-V 3IE3	6
1.2 PRODUCT VIEW AND MODELS	6
1.3 SATA INTERFACE.....	6
2. PRODUCT SPECIFICATIONS	7
2.1 CAPACITY AND DEVICE PARAMETERS.....	7
2.2 PERFORMANCE	7
2.3 ELECTRICAL SPECIFICATIONS	7
2.3.1 Power Requirement.....	7
2.3.2 Power Consumption	8
2.4 ENVIRONMENTAL SPECIFICATIONS	8
2.4.1 Temperature Ranges	8
2.4.2 Humidity.....	8
2.4.3 Shock and Vibration	8
2.4.4 Mean Time between Failures (MTBF)	8
2.5 CE AND FCC COMPATIBILITY	9
2.6 RoHS COMPLIANCE	9
2.7 RELIABILITY	9
2.8 TRANSFER MODE	9
2.9 PIN ASSIGNMENT	10
2.10 MECHANICAL DIMENSIONS.....	10
2.11 ASSEMBLY WEIGHT	10
2.12 SEEK TIME	11
2.13 HOT PLUG.....	11
2.14 NAND FLASH MEMORY.....	11
3. THEORY OF OPERATION	11
3.1 OVERVIEW.....	11
3.2 SATA III CONTROLLER	12
3.3 ERROR DETECTION AND CORRECTION.....	12
3.4 WEAR-LEVELING	12
3.5 BAD BLOCKS MANAGEMENT	12
3.6 POWER CYCLING	12
3.7 GARBAGE COLLECTION.....	13
4. INSTALLATION REQUIREMENTS	13
4.1 ELECTRICAL CONNECTIONS FOR SERVERDOM-V 3IE3.....	13

4.2 DEVICE DRIVE 13

4.3 POWER CABLE 13

5. PART NUMBER RULE 14

REVISION HISTORY

Revision	Description	Date
Rev 1.0	First Released	NOV, 2016

List of Tables

TABLE 1: DEVICE PARAMETERS	7
TABLE 2: PERFORMANCE	7
TABLE 3: INNODISK SERVERDOM-V 3IE3 POWER REQUIREMENT	7
TABLE 4: POWER CONSUMPTION	8
TABLE 5: TEMPERATURE RANGE FOR SERVERDOM-V 3IE3	8
TABLE 6: SHOCK/VIBRATION TESTING FOR SERVERDOM-V 3IE3	8
TABLE 7: SERVERDOM-V 3IE3 MTBF	9
TABLE 8: INNODISK SERVERDOM-V 3IE3 PIN ASSIGNMENT	10

List of Figures

FIGURE 1: INNODISK SERVERDOM-V 3IE3	6
FIGURE 2: INNODISK SERVERDOM-V 3IE3 BLOCK DIAGRAM	11

1. Product Overview

1.1 Introduction of Innodisk ServerDOM-V 3IE3

Innodisk ServerDOM is dedicated to the further of server design. By using ServerDOM as a boot drive, there is more space for the hot-swappable data storage devices.

Innodisk ServerDOM supports SATA III standard (6.0Gb/s) interface with excellent performance. Besides, the booting time for operation and the power consumption is less than hard disk drive (HDD), and can work under harsh environment compile with ATA protocol, no additional drives are required, and the SSD can be configured as a boot device.

1.2 Product View and Models

Innodisk ServerDOM-V 3IE3 is available in follow capacities~

ServerDOM-V 3IE3 16GB, 32GB, 64GB



Figure 1: Innodisk ServerDOM-V 3IE3

1.3 SATA Interface

Innodisk ServerDOM-V 3IE3 supports SATA III interface, and compliant with SATA I and SATA II. SATA III interface can work with Serial Attached SCSI (SAS) host system, which is used in server computer. Innodisk ServerDOM-V 3IE3 is compliant with Serial ATA Gen 1, Gen 2 and Gen 3 specification (Gen 3 supports 1.5Gbps /3.0Gbps/6.0Gbps data rate). SATA connector uses a standard 7-pin signal segment.

2. Product Specifications

2.1 Capacity and Device Parameters

ServerDOM-V 3IE3 device parameters are shown in Table 1.

Table 1: Device parameters

LBA	Capacity	Cylinder	Heads	Sectors	User Capacity(MB)
31277232	16GB	16383	16	63	15272
62533296	32GB	16383	16	63	30533
125045424	64GB	16383	16	63	61057

2.2 Performance

Burst Transfer Rate: 6.0Gbps

Table 2: Performance

Capacity	16GB	32GB	64GB
Sequential* Read (max.)	210 MB/s	400 MB/s	440 MB/s
Sequential* Write (max.)	100 MB/s	170 MB/s	260 MB/s
4KB Random* Read (QD32)	7,200 IOPS	10,000 IOPS	10,500 IOPS
4KB Random* Write (QD32)	18,000 IOPS	28,000 IOPS	30,000 IOPS

Note: the information is based on CrystalDiskMark 3.03 with file size 1000MB test patent

2.3 Electrical Specifications

2.3.1 Power Requirement

Table 3: Innodisk ServerDOM-V 3IE3 Power Requirement

Item	Symbol	Rating	Unit
Input voltage	V _{IN}	+5 DC +- 5%	V

2.3.2 Power Consumption

Table 4: Power Consumption

Mode	Power Consumption
Read	420 mA (Max.)
Write	450 mA (Max.)
Idle	220 mA (Max.)

2.4 Environmental Specifications

2.4.1 Temperature Ranges

Table 5: Temperature range for ServerDOM-V 3IE3

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

2.4.2 Humidity

Relative Humidity: 10-95%, non-condensing

2.4.3 Shock and Vibration

Table 6: Shock/Vibration Testing for ServerDOM-V 3IE3

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

2.4.4 Mean Time between Failures (MTBF)

Table 7 summarizes the MTBF prediction results for various ServerDOM-V 3IE3 configurations. The analysis was performed using a RAM Commander™ failure rate prediction.

- **Failure Rate:** The total number of failures within an item population, divided by the total number of life units expended by that population, during a particular measurement interval under stated condition.
- **Mean Time between Failures (MTBF):** A basic measure of reliability for repairable items: The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Table 7: ServerDOM-V 3IE3 MTBF

Product	Condition	MTBF (Hours)
Innodisk ServerDOM-V 3IE3	Telcordia SR-332 GB, 25°C	>3,000,000

2.5 CE and FCC Compatibility

ServerDOM-V 3IE3 conforms to CE and FCC requirements.

2.6 RoHS Compliance

ServerDOM-V 3IE3 is fully compliant with RoHS directive.

2.7 Reliability

Parameter	Value
Read Cycles	Unlimited Read Cycles
Wear-Leveling Algorithm	Support
BadBlocks Management	Support
Error Correct Code	Support
TBW* (Total Bytes Written)	Unit:TB
16GB	31.25
32GB	62.5
64GB	125
* Total bytes written is based on JEDEC 218 (Solid-State Drive Requirements and Endurance Test Method). ** Lifespan is calculated by device written per day.	

2.8 Transfer Mode

ServerDOM-V 3IE3 support following transfer mode:

Serial ATA III 6.0Gbps

Serial ATA II 3.0Gbps

Serial ATA I 1.5Gbps

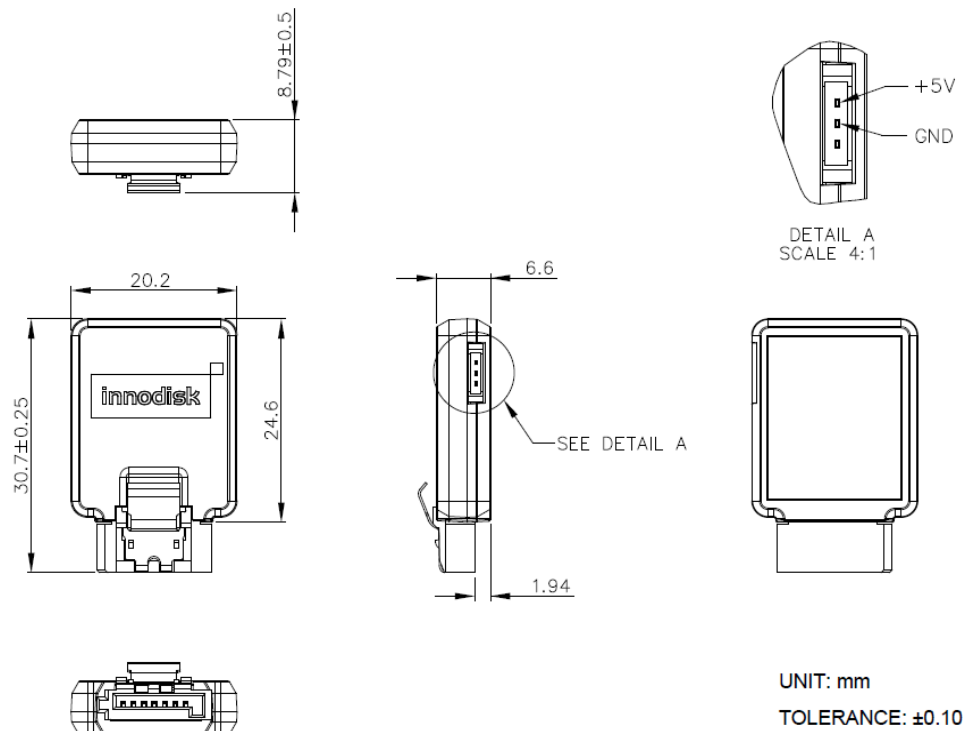
2.9 Pin Assignment

Innodisk ServerDOM-V 3IE3 uses a standard SATA pin-out. See Table 8 for ServerDOM-V 3IE3 pin assignment.

Table 8: Innodisk ServerDOM-V 3IE3 Pin Assignment

Name	Type	Description
Pin 0	GND	Shielding
Pin 1	GND	Shielding
Pin 2	A+	Differential signal to A
Pin 3	A-	Differential signal to A-
Pin 4	GND	Shielding
Pin 5	B-	Differential signal to B-
Pin 6	B+	Differential signal to B
Pin 7	GND	Shielding

2.10 Mechanical Dimensions



2.11 Assembly Weight

An Innodisk ServerDOM-V 3IE3 within flash ICs, 64GB's weight is 8 grams approximately.

2.12 Seek Time

Innodisk ServerDOM-V 3IE3 is not a magnetic rotating design. There is no seek or rotational latency required.

2.13 Hot Plug

The SSD support hot plug function and can be removed or plugged-in during operation. User has to avoid hot plugging the SSD which is configured as boot device and installed operation system.

Surprise hot plug : The insertion of a SATA device into a backplane (combine signal and power) that has power present. The device powers up and initiates an OOB sequence.

Surprise hot removal: The removal of a SATA device from a powered backplane, without first being placed in a quiescent state.

2.14 NAND Flash Memory

Innodisk ServerDOM-V 3IE3 uses Multi Level Cell (MLC) NAND flash memory, which is non-volatility, high reliability and high speed memory storage.

3. Theory of Operation

3.1 Overview

Figure 2 shows the operation of Innodisk ServerDOM-V 3IE3 from the system level, including the major hardware blocks.

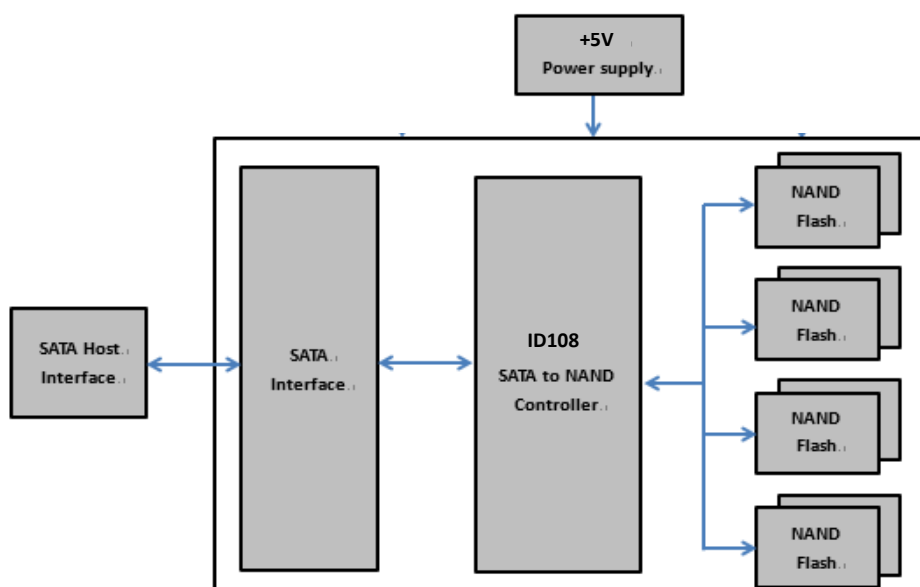


Figure 2: Innodisk ServerDOM-V 3IE3 Block Diagram

Innodisk ServerDOM-V 3IE3 integrates a SATA III controller and NAND flash memories. Communication with the host occurs through the host interface, using the standard ATA protocol. Communication with the flash device(s) occurs through the flash interface.

3.2 SATA III Controller

Innodisk ServerDOM-V 3IE3 is designed with ID 108, a SATA III 6.0Gbps (Gen. 3) controller. The Serial ATA physical, link and transport layers are compliant with Serial ATA Gen 1, Gen 2 and Gen 3 specification (Gen 3 supports 1.5Gbps/3.0Gbps/6.0Gbps data rate). The controller has 2 channels for flash interface.

3.3 Error Detection and Correction

Highly sophisticated Error Correction Code algorithms are implemented. The ECC unit consists of the Parity Unit (parity-byte generation) and the Syndrome Unit (syndrome-byte computation). This unit implements an algorithm that can correct 40 bits per 1024 bytes in an ECC block. Code-byte generation during write operations, as well as error detection during read operation, is implemented on the fly without any speed penalties.

3.4 Wear-Leveling

Flash memory can be erased within a limited number of times. This number is called the **erase cycle limit** or **write endurance limit** and is defined by the flash array vendor. The erase cycle limit applies to each individual erase block in the flash device.

Innodisk ServerDOM-V 3IE3 uses a static wear-leveling algorithm to ensure that consecutive writes of a specific sector are not written physically to the same page/block in the flash. This spreads flash media usage evenly across all pages, thereby extending flash lifetime.

3.5 Bad Blocks Management

Bad Blocks are blocks that contain one or more invalid bits whose reliability are not guaranteed. The Bad Blocks may be presented while the SSD is shipped, or may develop during the life time of the SSD. When the Bad Blocks is detected, it will be flagged, and not be used anymore. The SSD implement Bad Blocks management, Bad Blocks replacement, Error Correct Code to avoid data error occurred. The functions will be enabled automatically to transfer data from Bad Blocks to spare blocks, and correct error bit.

3.6 Power Cycling

Innodisk's iDataGuard is a comprehensive data protection mechanism that functions before and

after a sudden power outage to SSD. Low-power detection terminates data writing before an abnormal power-off, while table-remapping after power-on deletes corrupt data and maintains data integrity. Innodisk's iDataGuard provides effective power cycling management, preventing data stored in flash from degrading with use.

3.7 Garbage Collection

Garbage collection is used to maintain data consistency and perform continual data cleansing on SSDs. It runs as a background process, freeing up valuable controller resources while sorting good data into available blocks, and deleting bad blocks. It also significantly reduces write operations to the drive, thereby increasing the SSD's speed and lifespan.

4. Installation Requirements

4.1 Electrical Connections for ServerDOM-V 3IE3

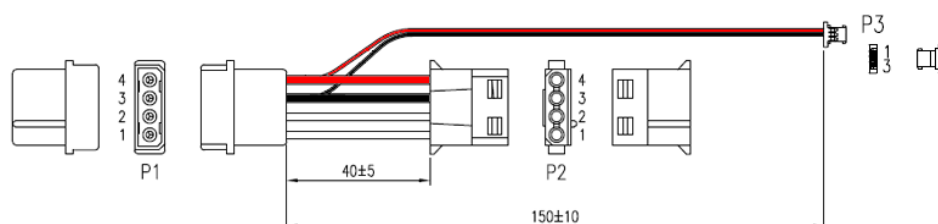
A Serial ATA device may be either directly connected to a host or connected to a host through a cable. For connection via cable, the cable should be no longer than 1meter. The SATA interface has a separate connector for the power supply. Please refer to the pin description for further details.

4.2 Device Drive

No additional device drives are required. The Innodisk ServerDOM-V 3IE3 can be configured as a boot device.

4.3 Power cable

A power cable is shipped with each SATADOM product, which has standard 4pins power connector and special 3 pins power connector for SATADOM. The male and female power connector of SATADOM have foolproof design to avoid misconnection, please check it before power on.



5. Part Number Rule

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	D	H	S	N	V	-	3	2	G	D	0	8	B	C	A	Q	C	-	X	X	X
Description	Disk	ServerDOM					Capacity			Controller			Flash Mode	Operation Temp.	Internal Control	CH.	Flash Type	-	Customized Code		
Definition																					
Code 1 st (Disk)													Code 14th (Operation Temperature)								
D : Disk													C: Standard Grade (0℃~ +70℃)								
Code 2 nd (Feature set)													W: Industrial Grade (-40℃~ +85℃)								
H : iSLC Series													Code 15th (Internal control)								
Code 3 rd ~5 th (Form factor)													A~Z: PCB version.								
SNV: ServerDOM-V													Code 16th (Channel of data transfer)								
Code 7th ~9th (Capacity)													S: Single Channel								
16G: 16GB, 32G: 32GB 64G: 64GB													D: Dual Channels								
													Q: Quad Channels								
													Code 17th (Flash Type)								
													Internal control								
Code 10th ~12th (Controller)													Code 18th~21st (Customize code)								
D08: ID108																					
Code 13th (Flash mode)																					
Internal control																					

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 EM Flash and Dram 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 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) 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

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： 2016 / 08 / 04



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 EM Flash and Dram 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: 20/06/2016)。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: 20/06/2016).

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：2016 / 06 / 23





VERIFICATION OF COMPLIANCE

This Verification of Compliance is hereby issued to the below named company. The test results of this report relate only to the tested sample identified in this report.

**Technical Standard: EMC DIRECTIVE 2014/30/EU
(EN55022 / EN55024)**

General Information

Applicant: Innodisk Corporation
5F., No. 237, Sec. 1, Datong Rd., Xizhi Dist.,
New Taipei City 22161, Taiwan (R.O.C)

Product Description

EUT Description: ServerDOM-V
Brand Name: Innodisk
Model Number: ServerDOM-V 3S*W-&
S:Flash type: (S:SLC, LiSLC, M:MLC, T:3D TLC)
*:Product line: (E:Embedded, G:EverGreen, R:InnoRobust)
#:Product Generation: (empty, 0-9)
&:Product line: (empty, P:Plus)

Measurement Standard

EN 55022: 2010 / AC: 2011
EN 61000-3-2: 2014
EN 61000-3-3: 2013
EN 55024: 2010 + A1: 2015
(IEC 61000-4-2: 2008; IEC 61000-4-3: 2006 + A1: 2007 + A2: 2010; IEC 61000-4-4: 2012;
IEC 61000-4-5: 2014; IEC 61000-4-6: 2013; IEC 61000-4-8: 2009; IEC 61000-4-11: 2004)

Measurement Facilities

Xindian Lab.: Compliance Certification Services Inc.
No.163-1, Zhongsheng Rd., Xindian Dist., New Taipei City, 23151 Taiwan.
Tel: +886-2-22170894 / Fax: +886-2-22171029

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: T161004D11-E

Sam Hu / Assistant Manager

Date: October 11, 2016

CCSRF

程颢科技股份有限公司
Compliance Certification Services Inc.



VERIFICATION OF COMPLIANCE

This Verification of Compliance is hereby issued to the below named company. The test results of this report relate only to the tested sample identified in this report.

**Technical Standard: EMC DIRECTIVE 2014/30/EU
(EN55032)**

General Information

Applicant: Innodisk Corporation
5F., No. 237, Sec. 1, Datong Rd., Xizhi Dist.,
New Taipei City 22161, Taiwan (R.O.C)

Product Description

EUT Description: ServerDOM-V
Brand Name: Innodisk
Model Number: ServerDOM-V 3S*W-&
\$-Flash type: (S:SLC, L:SLC, M:MLC, T:3D TLC)
*-Product line: (E:Embedded, G:EverGreen, R:InnoRobust)
#-Product Generation: (empty, 0~9)
&-Product line: (empty, P:Plus)

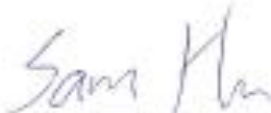
Measurement Standard

EN 55032: 2012 / AC: 2013
CISPR 32: 2012

Measurement Facilities

Xindian Lab.: Compliance Certification Services Inc.
No.163-1, Zhongsheng Rd., Nindian Dist., New Taipei City, 23151 Taiwan.
Tel: +886-2-22170894 / Fax: +886-2-22171029

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: T161004D11-E


Sam Hu / Assistant Manager
Date: October 11, 2016

CCSRF
恆智科技股份有限公司
Compliance Certification Services Inc.



VERIFICATION OF COMPLIANCE

This Verification of Compliance is hereby issued to the below named company. The test results of this report relate only to the tested sample identified in this report.

**Technical Standard: FCC Part 15 Class B
IC ICES-003**

General Information

Applicant: Innodisk Corporation
5F., No. 237, Sec. 1, Datong Rd., Xizhi Dist.,
New Taipei City 22161, Taiwan (R.O.C)

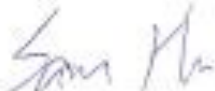
Product Description

EUT Description: ServerDOM-V
Brand Name: Innodisk
Model Number: ServerDOM-V 3S*#-&
S:Flash type: (S:SLC, L:SLC, M:MLC, T:3D TLC)
*:Product line: (E:Embedded, G:EverGreen, R:InnoRobust)
#:Product Generation: (empty, 0-9)
&:Product line: (empty, P:Plus)

Measurement Facilities

Xindian Lab.: Compliance Certification Services Inc.
No.163-1, Zhongsheng Rd., Xindian Dist., New Taipei City, 23151 Taiwan.
Tel: +886-2-22170894 / Fax: +886-2-22171029

This device has been shown to be in compliance with and was tested in accordance with the measurement procedures specified in the Standards & Specifications listed above and as indicated in the measurement report number: T161004D11-D


Sam Hu / Assistant Manager
Date: October 11, 2016

CCSRF
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