



**Products Claims Testing  
Claims Test ADPC0028  
ITRenew – Phase 2 – Solid State Drives**

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University of South Wales**

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The content of this document is based on information shared to date and will be subject to change or modification as requirements are amended, clarified or additional requirements are indicated at a later stage. For this reason, this document should be viewed as a discussion document with further qualification and refinement required.

Whilst we make every endeavour to ensure the accuracy of the information provided here and that the recommendations are made to the best of our ability they may be subject to inaccuracies or change.

## REVISION HISTORY

16/04/2017	Revision 1.0 issued to Steve Mellings
24/04.2017	Revision 2.0 issued to Steve Mellings



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## Contents

1.0	Executive Summary .....	4
2.0	Test Level 1 Testing Solid State Drive .....	5
2.1	Simple Methodology. ....	5
3.0	Test Level 2 Testing Solid State Drive .....	6
3.1	Simple Methodology .....	6
4.0	Summary and Conclusions.....	7
Appendix A	Claims Test Application Form (copy) Form Number ADPC0028 .....	8

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## 1.0 Executive Summary

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This is the final report detailing the findings in relation to the execution of the ADISA Testing Methodology on Claims Test ADPC0028 submitted by ITRenew in December 2016. The claims test was carried out in accordance with ADISA Claims Testing (ACT) v1.0 and supporting document ADISA Testing Methodology v1.0, both of which are available from ADISA.

The claim made for the drive was:

*“The Teraware Digital Asset Disposition Platform version 3.0 can, using Teraware SAS/SATA SSD sanitisation method and by following instructions within Teraware User Guide v 1.0, forensically sanitise the solid state devices supplied within this claim, removing all user data such that it is unrecoverable using techniques aligned to ADISA Risk Levels 1 or 2 as outlined in section 3. Upon successful sanitisation, it produces a Certificate of Sanitisation to validate this.”*

Five devices were submitted as part of this test and these are listed below:

VENDOR	FAMILY	MODEL	CAPACITY	INTERFACE	RISK LEVEL	TEST LEVEL	CERT LISTING NAME
Intel	DC P3600 Series	SSDPEDME400G401	400GB	NVMe-SSD	1,2	1	Intel DC P3600 Series 400GB NVMe Adapter
Intel	540s Series	SSDSC2KW480H6X1	480GB	SATA-SSD	1,2	1	Intel 540s Series TLC 480GB SATA-SSD
EMC/STEC	EMC Enterprise Flash Drives	Z16IFE3B-200	200GB	FC-SSD	1,2,3,4	2	EMC Clariion EFD 200GB FC-SSD

Table 1 – Devices Tested

After testing it is confirmed that the ITRenew claim is true for the devices tested up to Test Level 1 results. Those devices are:

- Intel 540 Series – Model SSDSC2KW480H6X1
- Intel DC P3600 Series – Model SSDPEDME400G401

After testing it is confirmed that the ITRenew claim is true for the devices tested up to Test Level 2 results. Those devices are:

- EMC/STEC Enterprise Flash Drive – Model Z16IFE3B-200

## 2.0 Test Level 1 Testing Solid State Drive

### 2.1 Simple Methodology.

This test phase is designed to evaluate the claim made by recreating an attack by a threat adversary utilising standard COTS forensic tools and techniques.

For each computer hard drive (Seagate and Samsung) device the following methodology is performed:

1. The device is connected to a target PC and placed in a stable state.
2. Structured data, the string "ISRG", was written to every logical block address on the hard drive.
3. The device was then imaged using Access Data/FTK to create a base-line forensic image.
4. The device was then erased using the IT Renew Teraware Digital Asset Disposition Platform v3.0 in accordance with the manufacturer's instructions.
5. The device was then analysed using the following tools to create a second forensic image:
  - a. Standard commercial tools and techniques such as Access Data/FTK and ENCcase.
6. The two forensic images (Stage 3 and Stage 5) were then compared and contrasted to ensure that all structured data had been removed.
  - a. For this test there is no tolerance for remnant structured data and the result is a straight Pass or Fail.

### 2.2 Test Results.

#### Test Level 1 Summary Results

Test Level 1 replicated an attack on these devices being made by an aggressor with capabilities outlined below.

Risk Level	Threat Actor and Compromise Methods	Test Level
1 (Very Low)	Casual or opportunistic threat actor only able to mount high-level non-invasive and non-destructive software attacks utilising freeware, OS tools and COTS products.	1
2 (Low)	Commercial data recovery organisation able to mount non-invasive and non-destructive software attacks and hardware attacks.	1

#### The Results of Test Level 1

Hard Drive/Model	Result
Intel 540 Series – Model SSDSC2KW480H6X1	PASS
Intel DC P3600 Series – Model SSDPEDME400G401	PASS
EMC/STEC Enterprise FD – Model Z16IFE3B-200	PASS

Pass means that Teraware Digital Asset Disposition Platform version 3.0 can, using Teraware SAS/SATA SSD sanitisation method and by following instructions within Teraware User Guide v 1.0 mitigate the threat posed by the Threat Actors holding the capabilities outlined by Test Level 1 on the tested devices and the claim made can be confirmed.

## 3.0 Test Level 2 Testing Solid State Drive

### 3.1 Simple Methodology.

This test phase is designed to evaluate the claim made by recreating an attack by a threat adversary utilising standard intrusive/destructive testing tools designed to read data directly off the device at the platter/chip level.

For each computer hard drive (Seagate and Samsung) device the following methodology is performed:

1. The device is connected to a target PC and place in a stable state.
2. Structured data, the string "ISRG", was written to every logical block address on the hard drive.
3. The device was then imaged using Access Data/FTK to create a base-line forensic image.
4. The device was then erased using the IT Renew Teraware Digital Asset Disposition Platform v3.0 in accordance with the manufacturer's instructions.
5. The device was then analysed use the following tools and techniques to create a series of forensic images that are compared and contrasted with the base-line forensic image to ensure that all structured data has been removed. For this test there is no tolerance for remnant structured data and the result is a straight Pass or Fail.
  - a. Software based forensic tools/techniques such as:
    - i. Standard commercial tools and techniques such as Access Data/FTK and ENCcase;
    - ii. State of the art data recovery tools such as PC3000 SSD;
    - iii. Customer designed data recovery software.
  - b. Hardware/Chip based forensic tools/techniques such as:
    - i. Flash/NAND TSOP/BGA chip readers;
    - ii. State of the art data recovery tools such as PC3000 FLASH and Rusolut;
    - iii. Customer designed data recovery software/hardware.

### 3.2 Test Results.

#### Test Level 2 Summary Results

Test Level 2 replicated an attack on these devices being made by an aggressor with capabilities outlined below.

Risk Level	Threat Actor and Compromise Methods	Test Level
3 (Medium)	Commercial computer forensics organisation able to mount both non-invasive/non-destructive and invasive/non-destructive software and hardware attack, utilising COTS products.	2
4 (High)	Commercial data recovery and computer forensics organisation able to mount both non-invasive/non-destructive and invasive/ non-destructive software and hardware attack, utilising both COTS and bespoke utilities.	2

#### The Results of Test Level 2.

Hard Drive/Model	Result
EMC/STEC Enterprise FD – Model Z16IFE3B-200	PASS

A Pass means that Teraware Digital Asset Disposition Platform version 3.0 can, using Teraware SAS/SATA SSD sanitisation method and by following instructions within Teraware User Guide v 1.0 mitigate the threat posed by the Threat Actors holding the capabilities outlined by Test Level 2 on the tested devices and the claim made can be confirmed.

## 4.0 Summary and Conclusions

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**Claims Test Result:** Pass on all devices tested against the test level 1 submitted.

**Claims Test Result:** Pass on the one tested against the test level 2 submitted.

Claims Test Carried Out By: Professor Andrew Blyth, PhD.

Test Facility: University of South Wales

Signature:

A handwritten signature in black ink, appearing to read 'A Blyth', with a large, stylized flourish at the end.

Date: 15<sup>th</sup> April 2017

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# Appendix A Claims Test Application Form (copy)



ASSET DISPOSAL & INFORMATION  
SECURITY ALLIANCE

## Claims Testing Application Form Form Number ADPC0028

### Section 1 – Applicant Information

Company Name: ITRenew Inc.  
Address: 8356 Central Avenue, Newark, CA 9560  
General Contact  
Name: Matt Mickelson  
Phone: 001 408 799 4118  
Mobile: 001 408 799 4118  
E-Mail: [matt.mickelson@itrenew.com](mailto:matt.mickelson@itrenew.com)

### Section 2 – Applicant Software Information

Manufacturer: ITRenew Inc.  
Version of software: Teraware v3.00

#### Technical / physical architecture of claims test applicant software.

The Teraware platform discovers the target device and capabilities to formulate a multi-step, forensic-level, sanitization protocol for a solid state device.

STEP 1: CRYPTOGRAPHIC ERASE – Teraware designates the first step in the process to address the devices that support the means to delete the cryptographic key between the flash controller and the NAND flash. This step uses one of several possible commands best suited to address the cryptographic key erasure.

STEP 2: PRNG OVERWRITE – Teraware applies a pseudorandom pre-deterministic data pattern to the device that covers all user block address.

STEP 3: BLOCK ERASE – Teraware will issue a firmware based command that will trigger a back-end block erase command to the NAND flash that will eliminate all data from the user provisioned data areas and also the reserved blocks of the NAND. This step uses one of several possible commands best suited to address the block erase command.

STEP 4: OVERWRITE ERASE – Teraware performs another overwrite step that is designed to prepare the device for re-use by remapping the poor performing NAND blocks and re-write the bad block table. To execute this process, Teraware may issue a firmware based technique that will perform a full medium overwrite of the drive. If the device does not offer a means of self-overwrite, Teraware shall issue a host overwrite method.

STEP 5: MEDIA VERIFICATION – Teraware performs a full verification of all user provisioned blocks of the device to confirm the absence of any user data or unstructured data patterns.

#### Best practice usage guide for usage of software being tested. (Please enclose any manuals)

*Teraware\_User\_Guide\_v1.0.pdf*

#### Host Information for claims test applicant software to run on. To be shipped by test claimant.

1x Teraware Appliance (contains the application and deployment system)  
1x Dell CS24-TY server w/LSI 4Gb FC HBA (processing station)  
1x EMC DAE Disk Enclosure  
Teraware User Guide



### Section 3 – Test Hardware Information

VENDER	FAMILY	MODEL	CAPACITY	INTERFACE	RISK LEVEL	TEST LEVEL	CERT LISTING NAME
Intel	DC P3600 Series	SSDPEDME400G401	400GB	NVMe-SSD	1,2	1	Intel DC P3600 Series 400GB NVMe Adapter
Intel	540s Series	SSDSC2KW480H6X1	480GB	SATA-SSD	1,2	1	Intel 540s Series TLC 480GB SATA-SSD
EMC/STEC	EMC Enterprise Flash Drives	Z16IFE3B-200	200GB	FC-SSD	1,2,3,4	2	EMC Clariion EFD 200GB FC-SSD

#### ADISA Threat Matrix

Risk Level	Threat Actor and Compromise Methods	Test Level
1 (Very Low)	Casual or opportunistic threat actor only able to mount high-level non-invasive and non-destructive software attacks utilising freeware, OS tools and COTS products.	1
2 (Low)	Commercial data recovery organisation able to mount non-invasive and non-destructive software attacks and hardware attacks.	1
3 (Medium)	Commercial computer forensics organisation able to mount both non-invasive/non-destructive and invasive/ non-destructive software and hardware attack, utilising COTS products.	2
4 (High)	Commercial data recovery and computer forensics organisation able to mount both non-invasive/non-destructive and invasive/ non-destructive software and hardware attack, utilising both COTS and bespoke utilities.	2
5 (Very High)	Government-sponsored organisations or an organisation with unlimited resources and unlimited time capable of using advanced techniques to mount all types of software and hardware attacks to recover sanitised data.	3

## Section 4 – The Claim

The Teraware Digital Asset Disposition Platform version 3.0 can, using Teraware SAS/SATA SSD sanitization method and by following instructions within Teraware User Guide v 1.0, forensically sanitise the solid state devices supplied within this claim removing all user data such that it is unrecoverable using techniques aligned to ADISA Risk Levels 1 or 2 as outlined in section 3. Upon successful sanitisation, it produces a Certificate of Sanitisation to validate this.

Claim Technical Contact at applicant.

Name: Matt Mickelson

Phone: 408-799-4118

Mobile: 408-799-4118

E-mail: [matt.mickelson@itrenew.com](mailto:matt.mickelson@itrenew.com)

## Acceptance

**I, Matt Mickelson of ITRenew confirm that the information outlined in this document is an accurate and true reflection of the claims made by our product wishing to undergo the ADISA testing method.**

Signed on behalf of ITRenew

SIGNED:

NAME: Matt Mickelson

TITLE: Director, Product Management

DATE: 12/09/2016

Claim Accepted by:

Signed on behalf of University of South Wales

SIGNED:

NAME: Andrew Blyth

TITLE: Professor

DATE:

Signed on behalf of ADISA

SIGNED:

NAME: Steve Mellings

TITLE: Director

DATE: