# PASSMARK® SOFTWARE

# Consumer Security Products Performance Benchmarks (Edition 1)

## Antivirus & Internet Security
## Windows 10

**September 2015**

# Table of Contents

# Revision History

| Rev | Revision History | Date |
|-----|------------------|------|
| Edition 1 | Initial version of this report. | 4 September 2015 |

# References

| Ref # | Document | Author | Date |
|-------|----------|--------|------|
| 1 | **What Really Slows Windows Down** (URL) | O. Warner, The PC Spy | 2001-2015 |

# Executive Summary

PassMark Software® conducted objective performance testing on Norton Security and on Windows Defender. This report presents our results and findings as a result of performance benchmark testing conducted on these two products.

For more details on which versions were tested, please see the section *"Products and Versions"*.

Testing included twenty-one (21) performance metrics. These performance metrics are as follows:

- Boot Time;
- Scan Time;
- User Interface Launch Time;
- Memory Usage during System Idle;
- Memory Usage during Initial Scan;
- Browse Time;
- Internet Explorer Launch Time;
- File Copy, Move and Delete;
- Installation of Third Party Applications;
- Network Throughput (previously named "Binary Download Test");
- File Format Conversion;
- File Compression and Decompression;
- PE Scan Time;
- File Copy Disk to Disk;
- File Copy Over Network;
- File Download;
- PCMark;
- Word Document Launch and Open Time;
- Run Excel Macro;
- Save Word Document as PDF; and
- USB 3.0 File Copy.

# Products and Versions

The names and versions of the two security products tested are as follows:

| Manufacturer | Product Name | Release Year | Product Version | Date Tested |
|---|---|---|---|---|
| Symantec Corporation | Norton Internet Security | 2015 | 22.5.2.15 | Aug 2015 |
| Microsoft Corporation | Windows Defender | 2015 | 4.8.10240.16384 | Aug 2015 |

# Performance Metrics Summary

We have selected a set of objective metrics which provide a comprehensive and realistic indication of the areas in which an antivirus may impact system performance for end users. Our metrics test the impact of the antivirus software on common tasks that end-users would perform on a daily basis.

All of PassMark Software's test methods can be replicated by third parties using the same environment to obtain similar benchmark results. Detailed descriptions of the methodologies used in our tests are available as "*Appendix 2 – Methodology Description*" of this report.

## Benchmark 1 – Boot Time

This metric measures the amount of time taken for the machine to boot into the operating system. Security software is generally launched at Windows startup, adding an additional amount of time and delaying the startup of the operating system. Shorter boot times indicate that the application has had less impact on the normal operation of the machine.

## Benchmark 2 – Scan Time

All antivirus solutions have functionality designed to detect viruses and various other forms of malware by scanning files on the system. This metric measured the amount of time required to scan a set of clean files. Our sample file set comprised a total file size of 982 MB and was made up of files that would typically be found on end-user machines, such as media files, system files and Microsoft Office documents.

## Benchmark 3 – User Interface Launch Time

This metric provides an objective indication as to how responsive a security product appears to the user, by measuring the amount of time it takes for the user interface of the antivirus software to launch from Windows. To allow for caching effects by the operating system, both the initial launch time and the subsequent launch times were measured. Our final result is an average of these two measurements.

## Benchmark 4 – Memory Usage during System Idle

This metric measures the amount of memory (RAM) used by the product while the machine and antivirus software are in an idle state. The total memory usage was calculated by identifying all antivirus software processes and the amount of memory used by each process.

The amount of memory used while the machine is idle provides a good indication of the amount of system resources being consumed by the antivirus software on a permanent basis. Better performing products occupy less memory while the machine is idle.

## Benchmark 5 – Memory Usage during Initial Scan

This metric measures the amount of memory (RAM) used by the product during an initial security scan. The total memory usage was calculated by identifying all security software processes and the amount of memory used by each process during the scan.

## Benchmark 6 – Browse Time

It is common behavior for security products to scan data for malware as it is downloaded from the internet or intranet. This behavior may negatively impact browsing speed as products scan web content for malware. This metric measures the time taken to browse a set of popular internet sites to consecutively load from a local server in a user's browser window.

## Benchmark 7 – Internet Explorer Launch Time

This metric is one of many methods to objectively measure how much a security product impacts on the responsiveness of the system. This metric measures the amount of time it takes to launch the user interface of Internet Explorer 10. To allow for caching effects by the operating system, both the initial launch time and the subsequent launch times were measured. Our final result is an average of these two measurements.

## Benchmark 8 – File Copy, Move and Delete

This metric measures the amount of time taken to move, copy and delete a sample set of files. The sample file set contains several types of file formats that a Windows user would encounter in daily use. These formats include documents (e.g. Microsoft Office documents, Adobe PDF, Zip files, etc), media formats (e.g. images, movies and music) and system files (e.g. executables, libraries, etc).

## Benchmark 9 – Installing Third Party Applications

This metric measures the amount of time taken to install and uninstall third party programs. The installation speed of third party applications may be impacted by antivirus behavior such as heuristics or real time malware scanning.

## Benchmark x10 – Network Throughput

The metric measures the amount of time taken to download a variety of files from a local server using the HyperText Transfer Protocol (HTTP), which is the main protocol used on the web for browsing, linking and data transfer. Files used in this test include file formats that users would typically download from the web, such as images, archives, music files and movie files.

## Benchmark 11 – File Format Conversion

This test measures the amount of time taken to convert an MP3 file to a WAV and subsequently, convert the same MP3 file to a WMA format.

## Benchmark 12 – File Compression and Decompression

This metric measures the amount of time taken to compress and decompress different types of files. Files formats used in this test included documents, movies and images.

## Benchmark 13 – File Download

This test measures the amount of time taken to download a set of setup files from a local server using the HyperText Transfer Protocol (HTTP). The data set comprised a total file size of 290MB, and the formats used include executables and Microsoft installation packages.

## Benchmark 14 – PE Scan Time

All antivirus solutions have functionality designed to detect viruses and various other forms of malware by scanning files on the system. This metric measured the amount of time required to scan a set of PE (Portable Executable) files. Our sample file set comprised a total file size of 2.03GB and consisted of .exe (329MB), .dll (920MB) and .sys files (827MB).

## Benchmark 15 – File Copy Disk To Disk

This test measures the amount of time taken to copy files between two local drives. The data set comprised a total file size of 5.44GB, and the formats used included documents, movies, images and executables.

## Benchmark 16 – File Copy Over Network

This test measures the amount of time taken to copy files from a local drive to a local server. The data set comprised a total file size of 5.44GB, and the formats used included documents, movies, images and executables.

## Benchmark 17 – PCMark

This test measures the overall performance as an overall score over a range of areas, including memory, video, gaming, music, communications, productivity and HDD performance.

## Benchmark 18 – Word Document Launch and Open Time

This metric measures how much security software impacts on the responsiveness and performance of the system. This metric measures the amount of time it takes to open a large, mixed media document with Microsoft Word. To allow for caching effects by the operating system, both the initial launch time and the subsequent launch times were measured. Our final result is an average of these two measurements.

## Benchmark 19 – Run Excel Macro

This test measures the amount of time taken to open an Excel document and run a macro to perform a range of operations. The test is run five times with a reboot in between each run. Our final result is taken as an average of these five measurements.

## Benchmark 20 – Save Word Document as PDF

This test measures the amount of time taken to open a large Word  document and save it in PDF format. The test is run five times with a reboot in between each run. Our final result is taken as an average of these five measurements.

## Benchmark 21 – USB 3.0 File Copy

This test measures the amount of time taken to copy files from a USB 3.0 drive to a local disk. The data set comprised a total file size of 6.06GB, and the formats used included documents, movies, system files and executables.

# Internet Security Software – Test Results

In the following charts, we have highlighted the results we obtained for Norton Internet Security in yellow. The average has also been highlighted in blue for ease of comparison.

## Benchmark 1 – Boot Time (seconds)

The following chart compares the average time taken for the system to boot (from a sample of five boots) for each Internet Security product tested. Products with lower boot times are considered better performing products in this category.
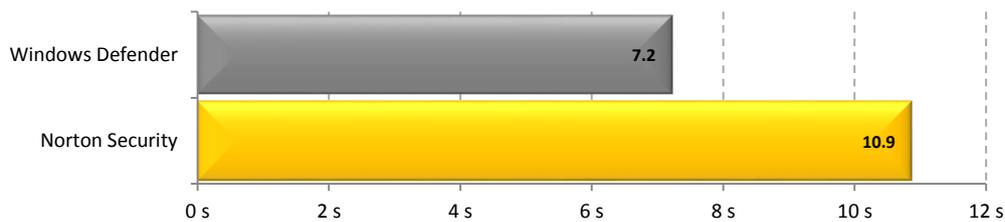


## Benchmark 2 – Scan Time (seconds)

The following chart compares the average time taken to scan a set of 6159 files (totaling 982 MB) for each Internet Security product tested. This time is calculated by averaging the initial (Run 1) and subsequent (Runs 2-5) scan times. Products with lower scan times are considered better performing products in this category.
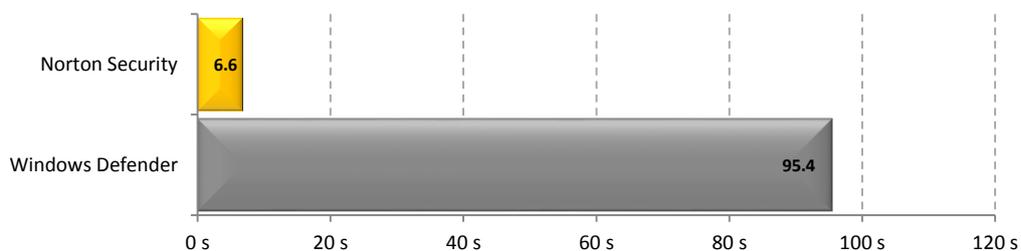


## Benchmark 3 – User Interface Launch Time (milliseconds)

The following chart compares the average time taken to launch a product's user interface. Products with lower launch times are considered better performing products in this category.
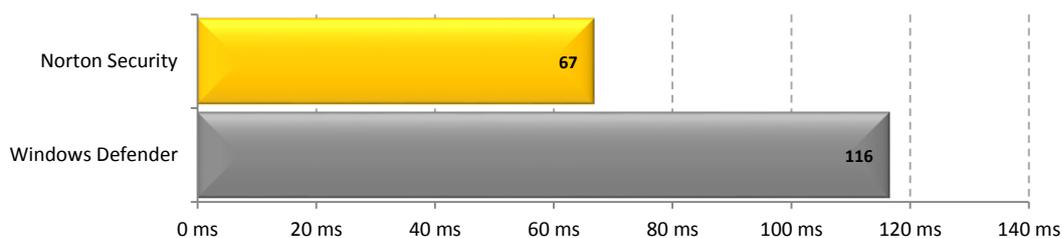
## Benchmark 4 – Memory Usage during System Idle (megabytes)

The following chart compares the average amount of RAM in use by an Internet Security product during a period of system idle. This average is taken from a sample of ten memory snapshots taken at roughly 60 seconds apart after reboot. Products with lower idle RAM usage are considered better performing products in this category.
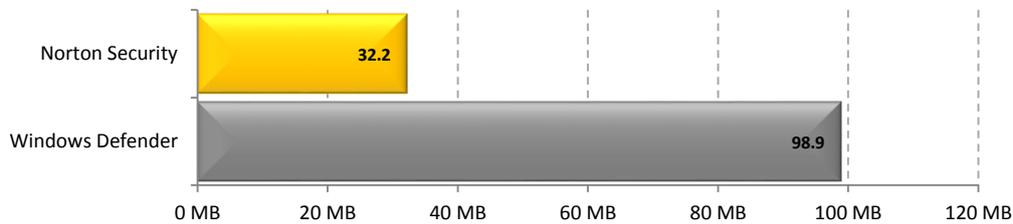


## Benchmark 5 – Memory Usage during Initial Scan

The following chart compares the average amount of RAM in use by an Internet Security product during a scan. This average is taken from a sample of ten memory snapshots taken at roughly 12 seconds apart. Products with lower idle RAM usage are considered better performing products in this category.
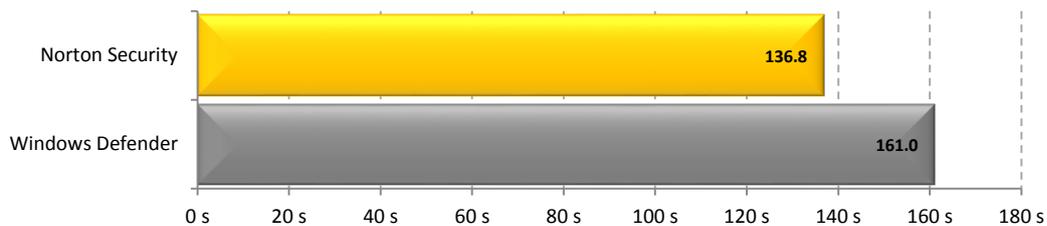


## Benchmark 6 – Browse Time (seconds)

The following chart compares the average time taken for Internet Explorer to successively load a set of popular websites through the local area network from a local server machine. Products with lower browse times are considered better performing products in this category.
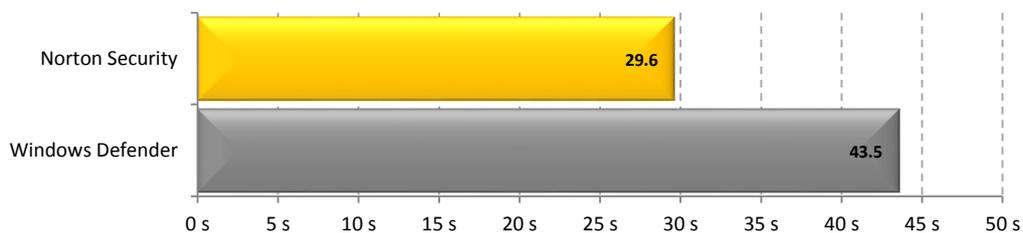
## Benchmark 7 – Internet Explorer Launch Time (milliseconds)

The following chart compares the average launch times of Internet Explorer after rebooting the machine for each Internet Security product we tested. Products with lower launch times are considered better performing products in this category.
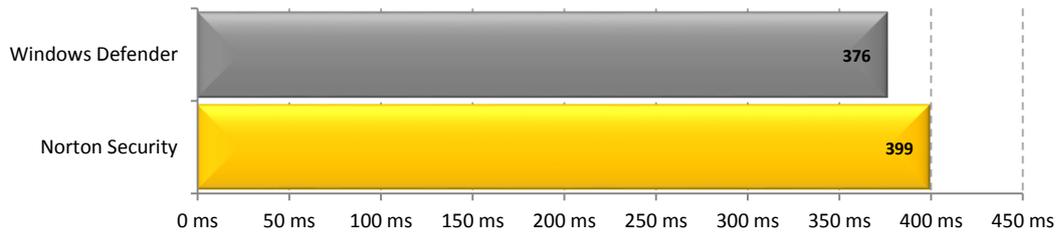


## Benchmark 8 – File Copy, Move and Delete (seconds)

The following chart compares the average time taken to copy, move and delete several sets of sample files for each Internet Security product tested. Products with lower times are considered better performing products in this category.
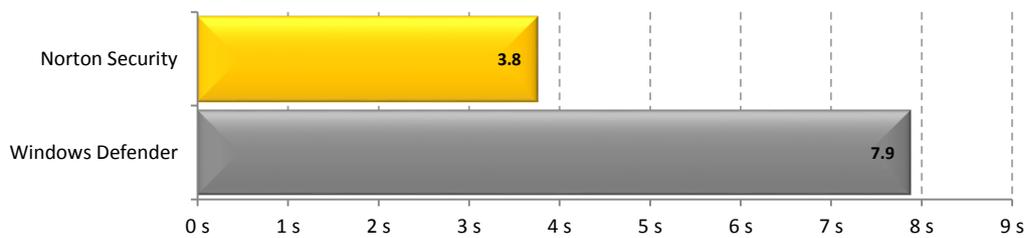


## Benchmark 9 – Installation of Third Party Applications (seconds)

The following chart compares the average time taken to install 3 different third party applications for each Internet Security product tested. Products with lower times are considered better performing products in this category.
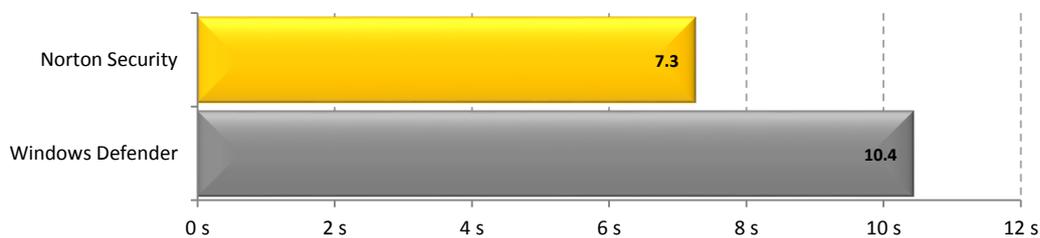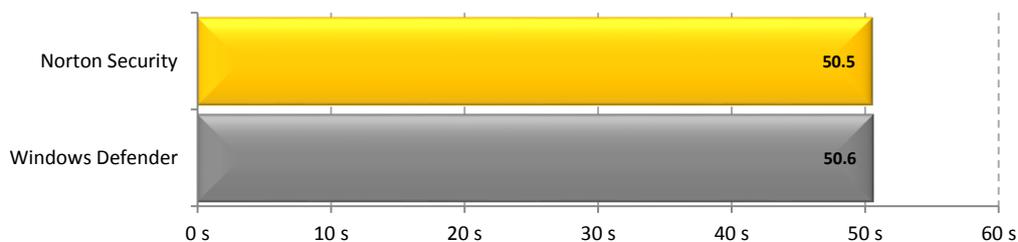
## Benchmark 10 – Network Throughput (seconds)

The following chart compares the average time to download a sample set of common file types for each Internet Security product tested. Products with lower times are considered better performing products in this category.
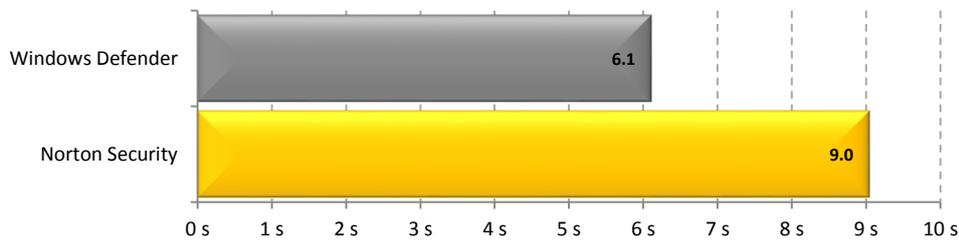


## Benchmark 11 – File Format Conversion (seconds)

The following chart compares the average time it takes for five sample files to be converted from one file format to another (MP3 ↔ WMA, MP3 ↔ WAV) for each Internet Security product tested. Products with lower times are considered better performing products in this category.



## Benchmark 12 – File Compression and Decompression (seconds)

The following chart compares the average time it takes for sample files to be compressed and decompressed for each Internet Security product tested. Products with lower times are considered better performing products in this category.
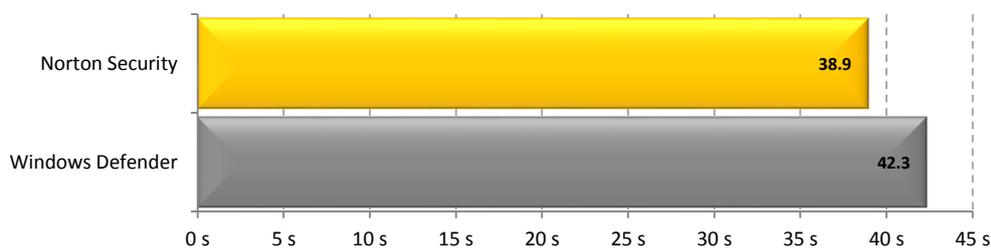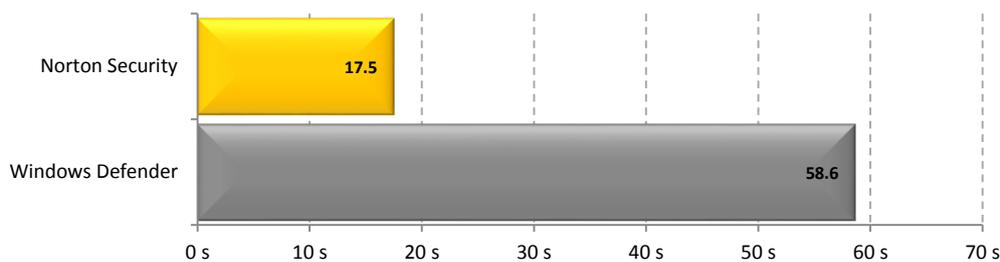
## Benchmark 13 – File Download (seconds)

The following chart compares the average time taken to download a set of setup files from a local server. The test was performed 5 times, and the average of all 5 runs was taken as the result. Products with lower times are considered better performing products in this category.*
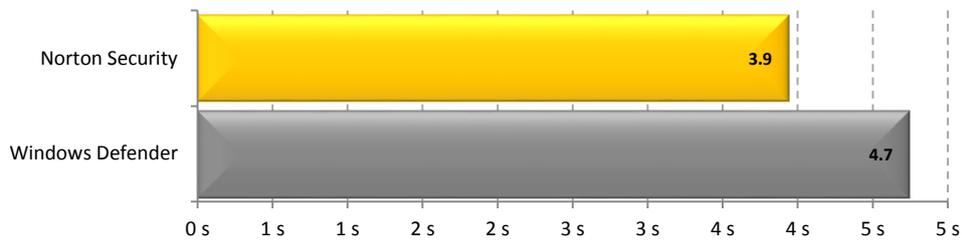


## Benchmark 14 – PE Scan Time (seconds)

The following chart compares the average time taken to scan a set of 6351 portable executable files (totaling 2076 MB) for each Internet Security product tested. This time is calculated by averaging the initial (Run 1) and subsequent (Runs 2-5) scan times.  Products with lower scan times are considered better performing products in this category.



## Benchmark 15 – File Copy Disk to Disk (seconds)

The following chart compares the average time taken to copy a total of 8,501 files, with a total file size of 5.44GB files, from one local drive to another local drive for each Internet Security product tested. The test was performed 5 times, and the average of all 5 runs was taken as the result. Products with lower times are considered better performing products in this category.
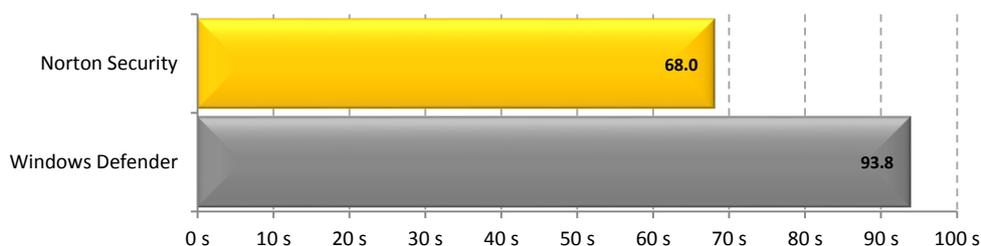
## Benchmark 16 – File Copy Over Network (seconds)

The following chart compares the average time taken to transfer a total of 8,501 files over the local network, with a total file size of 5.44GB files, from a local drive on the test machine to a local server. The test was performed 5 times, and the average of all 5 runs was taken as the result. Products with lower times are considered better performing products in this category.
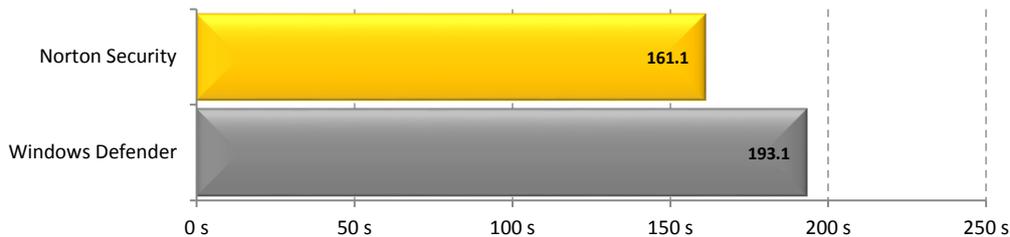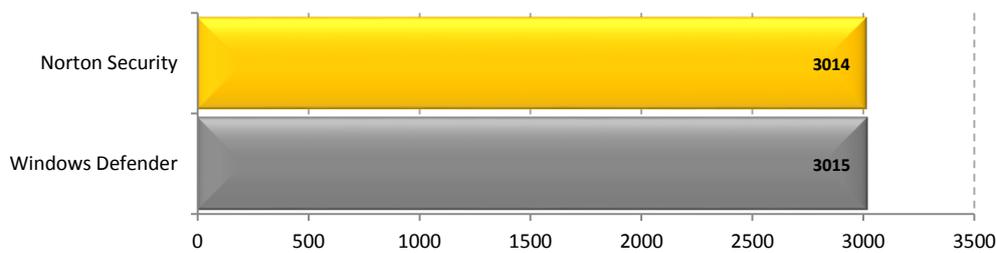


## Benchmark 17 – PCMark

The following chart compares the average PCMark score for each Internet Security product tested. The test was performed 2 times, and the average of both runs was taken as the result. Products with higher scores are considered better performing products in this category.
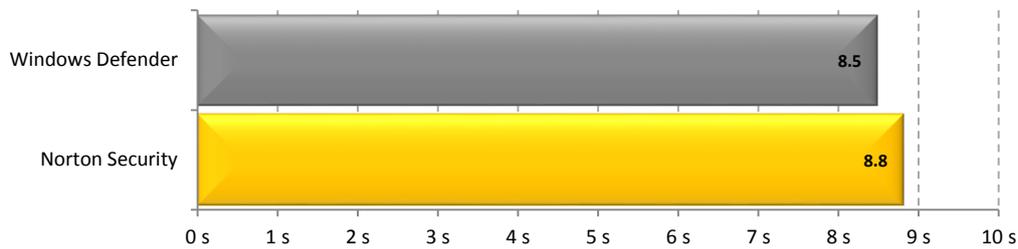


## Benchmark 18 – Word Document Launch and Open Time (milliseconds)

The following chart compares the average time taken to launch Microsoft Word and open a 10MB document. Products with lower launch times are considered better performing products in this category.
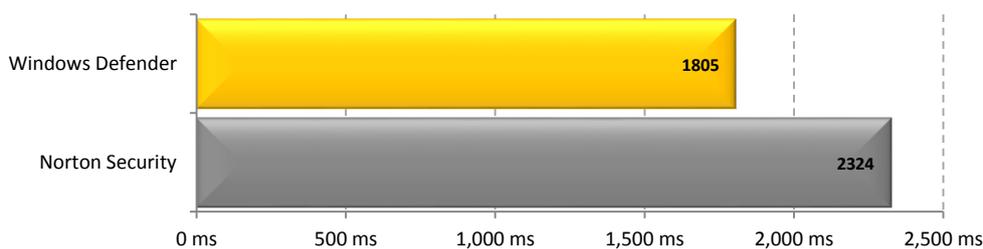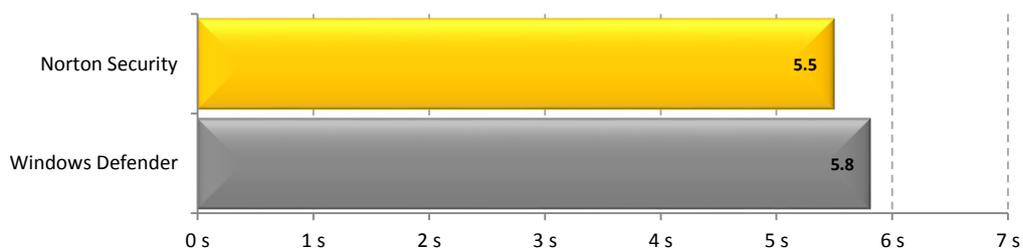
## Benchmark 19 – Run Excel Macro (seconds)

The following chart compares the average time taken to launch Microsoft Excel and run a macro. Products with lower times are considered better performing products in this category.



## Benchmark 20 – Save Word Document to PDF (seconds)

The following chart compares the average time taken to launch Microsoft Word and open a 10MB document and save it as a PDF. Products with lower times are considered better performing products in this category.



## Benchmark 21– USB 3.0 File Copy (seconds)

The following chart compares the average time taken to copy a set of files from an external USB 3.0 drive to a local disk. Products with lower times are considered better performing products in this category.
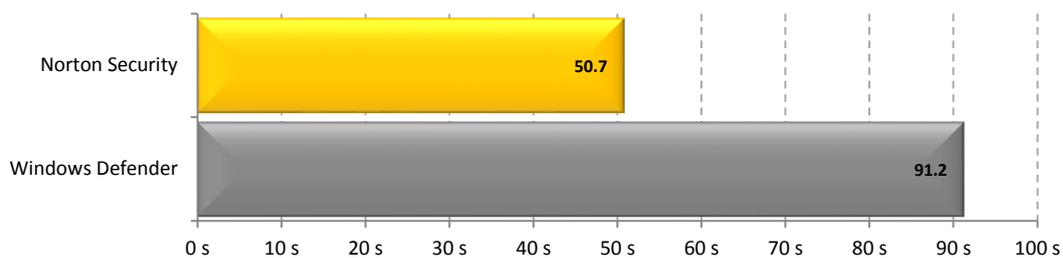
# Disclaimer and Disclosure

This report only covers the versions that are listed in the "Products and Versions" section of this report.

## Disclaimer of Liability

While every effort has been made to ensure that the information presented in this report is accurate, PassMark Software Pty Ltd assumes no responsibility for errors, omissions, or out-of-date information and shall not be liable in any manner whatsoever for direct, indirect, incidental, consequential, or punitive damages resulting from the availability of, use of, access of, or inability to use this information.

## Disclosure

Symantec Corporation funded the production of this report, selected the test metrics and list of products to include in this report, and supplied some of the test scripts used for the tests.

## Trademarks

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# Appendix 1 – Test Environment

For our testing, PassMark Software used a test environment running Windows 10 Home (64-bit) with the following hardware specifications:

## Windows 10 Home (64-bit) System

| | |
|---|---|
| **Model:** | Lenovo H50W-50 i5 |
| **CPU:** | Intel Core i5-4460 CPU @ 3.20GHz 3.20 GHz |
| **Video Card:** | NVIDIA GeForce GT 705 |
| **RAM:** | 8GB DDR3 RAM |
| **SSD (Main Boot Drive):** | Intel SSD 730 Series 240GB |
| **Network:** | Gigabit (1GB/s) switch |