


SE Labs

INTELLIGENCE-LED TESTING

HOME ANTI- MALWARE PROTECTION

APR - JUN 2019





SE Labs tested a variety of anti-malware (aka 'anti-virus'; aka 'endpoint security') products from a range of well-known vendors in an effort to judge which were the most effective.

Each product was exposed to the same threats, which were a mixture of targeted attacks using well-established techniques and public email and web-based threats that were found to be live on the internet at the time of the test.

The results indicate how effectively the products were at detecting and/or protecting against those threats in real time.

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SE Labs is BS EN ISO 9001 : 2015 certified for
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SE Labs is a member of the Microsoft Virus Information
Alliance (VIA); the Anti-Malware Testing Standards
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INTRODUCTION

The best security tests keep it real

Why it's important not to try to be too clever

Realism is important in testing, otherwise you end up with results that are theoretical and not a useful report that closely represents what is going on in the real world. One issue facing security testing that involves malware is whether or not you connect the test network to the internet.

The argument against this approach is that computer viruses can spread automatically and a test could potentially infect the real world, making life worse for computer users globally. One counter argument goes that if the tester is helping improve products then a few dozen extra infected systems on the internet is, on balance, worth it considering there are already millions out there. The benefits outweigh the downside.

Another counter argument is that viruses such as we understand them from the 90s are not the same as they are today. There are far fewer self-replicating worms and more targeted attacks that do not generally spread automatically, so the risk is lower.

Connecting to the internet brings more than a few advantages to a test, too. Firstly, the internet is where most threats reside. It would be hard to test realistically with a synthetic internet.

Secondly, for at least 10 years most endpoint security products have made connections back to management or update servers to get the latest information about current threats. So-called 'cloud protection' or 'cloud updates' would be disabled without an internet connection, effectively reducing the products' protection abilities significantly. This then makes the test results much less accurate when running assessments.

There are cases in which turning off the internet is useful, though. Last year we ran a test to check whether or not artificial intelligence could predict future threats. We ran our Predictive Malware Response Test without an internet connection to see if a Cylance AI brain, which had been built and trained three years previously, could detect well-known threats that had come into existence since then. You can see the [full report here](#).

But that was a special case. When assessing any security product or service for real-world, practical purposes, a live and unfiltered internet connection is probably a useful and even necessary part of the setup. Naturally we have always used one in our testing, at one point even going as far as using consumer ADSL lines when testing home anti-malware products for extra realism. When reading security tests check that the tester has a live internet connection and allows the products to update themselves.

If you spot a detail in this report that you don't understand, or would like to discuss, please contact us via our Twitter or Facebook accounts.

SE Labs uses current threat intelligence to make our tests as realistic as possible. To learn more about how we test, how we define 'threat intelligence' and how we use it to improve our tests please visit our website and follow us on Twitter.

This test report was funded by post-test consultation services provided by SE Labs to security vendors. Vendors of all products included in this report were able to request early access to results and the ability to dispute details for free. SE Labs has submitted the testing process behind this report for compliance with the AMTSO Testing Protocol Standard v1.0. To verify its compliance please check the AMTSO reference link at the bottom of page three of this report or [here](#).

Executive Summary

Product Names

It is good practice to stay up to date with the latest version of your chosen endpoint security product. We made best efforts to ensure that each product tested was the very latest version running with the most recent updates to give the best possible outcome.

For specific build numbers, see **Appendix C: Product Versions** on page 17.

EXECUTIVE SUMMARY			
Products Tested	Protection Accuracy Rating (%)	Legitimate Accuracy Rating (%)	Total Accuracy Rating (%)
ESET Internet Security	98%	100%	100%
Kaspersky Internet Security	98%	100%	100%
Microsoft Windows Defender	98%	100%	100%
Symantec Norton Security	98%	100%	100%
McAfee Internet Security	96%	100%	99%
Avira Free Security Suite	95%	100%	99%
Sophos Home Premium	93%	100%	98%
Comodo Internet Security	89%	100%	97%
F-Secure Safe	97%	96%	97%
Avast Free Antivirus	88%	97%	95%
AVG Antivirus Free Edition	87%	97%	94%
Check Point ZoneAlarm	83%	100%	94%
G-Data Internet Security	79%	99%	93%
BullGuard Internet Security	64%	100%	88%
Trend Micro Internet Security	92%	85%	88%
eScan Internet Security Suite	87%	82%	85%

Products highlighted in green were the most accurate, scoring 85 per cent or more for Total Accuracy. Those in yellow scored less than 85 but 75 or more. Products shown in red scored less than 75 per cent.

For exact percentages, see **1. Total Accuracy Ratings** on page 6.

■ The security software products were generally effective at handling general threats from cyber criminals...

Most products were largely capable of handling public web-based threats such as those used by criminals to attack Windows PCs, tricking users into running malicious files or running scripts that download and run malicious files. BullGuard's product was notably weaker than the others.

■ ...and targeted attacks were prevented in many cases.

Many products were also competent at blocking more targeted, exploit-based attacks. However, while some did very well in this part of the test, others were very much weaker. Products from G-Data and BullGuard were notably weaker than the competition.

■ False positives were not an issue for most products

Most of the products were good at correctly classifying legitimate applications and websites. The vast majority allowed all of the legitimate websites and applications. eScan's and Trend Micro's were the least accurate in this part of the test.

■ Which products were the most effective?

Products from ESET, Kaspersky Lab, Microsoft and Symantec achieved extremely good results due to a combination of their ability to block malicious URLs, handle exploits and correctly classify legitimate applications and websites.

1. Total Accuracy Ratings

Judging the effectiveness of an endpoint security product is a subtle art, and many factors are at play when assessing how well it performs. To make things easier we've combined all the different results from this report into one easy-to-understand graph.

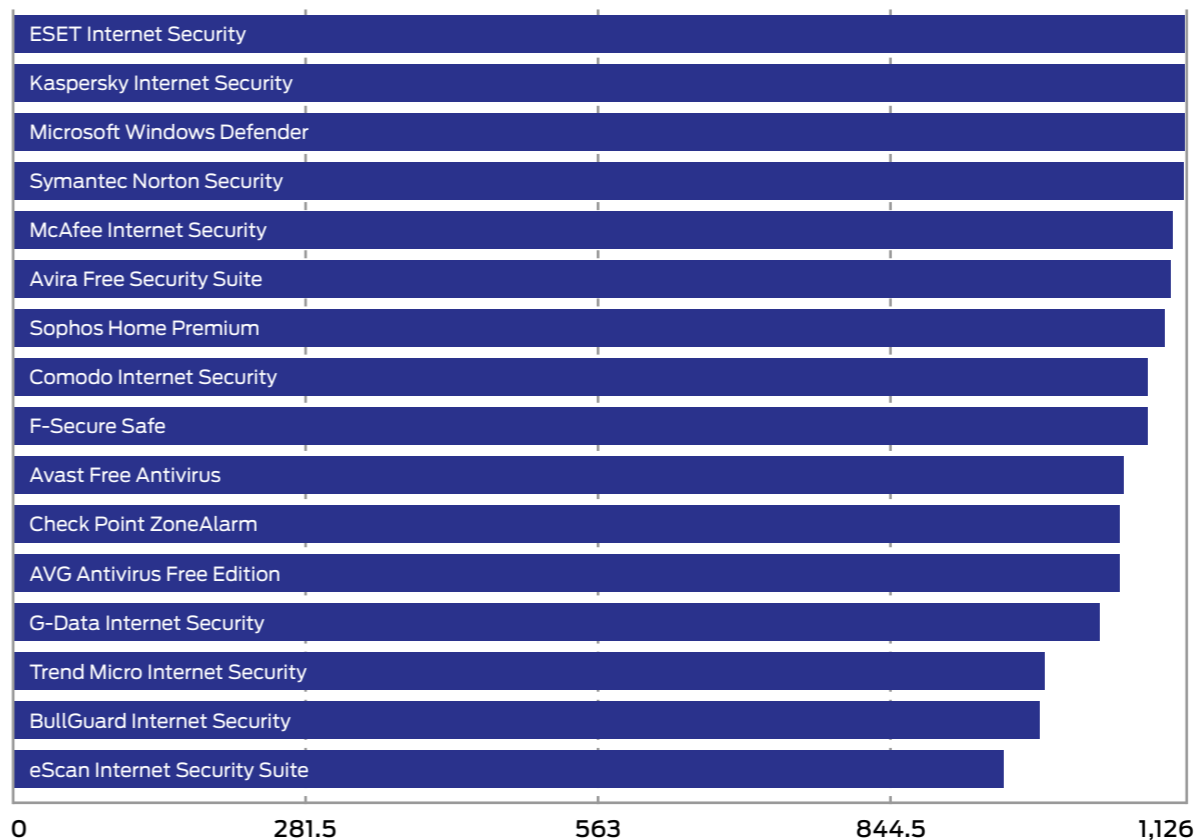
The graph below takes into account not only each product's ability to detect and protect against threats, but also its handling of non-malicious objects such as web addresses (URLs) and applications.

Not all protections, or detections for that matter, are equal. A product might completely block a URL, which stops the threat before it can even start its intended series of malicious events. Alternatively, the product might allow a web-based exploit to execute but prevent it from downloading any further code to the target. In another case malware might run on the target for a short while before its behaviour is detected and its code is deleted or moved to a safe 'quarantine' area for future analysis. We take these outcomes into account when attributing points that form final ratings.

For example, a product that completely blocks a threat is rated more highly than one that allows a threat to run for a while before eventually evicting it. Products that allow all malware infections, or that block popular legitimate applications, are penalised heavily.

Categorising how a product handles legitimate objects is complex, and you can find out how we do it in **5. Legitimate Software Ratings** on page 12.

TOTAL ACCURACY RATINGS			
Product	Total Accuracy Rating	Total Accuracy (%)	Award
ESET Internet Security	1,125	100%	AAA
Kaspersky Internet Security	1,125	100%	AAA
Microsoft Windows Defender	1,125	100%	AAA
Symantec Norton Security	1,124	100%	AAA
McAfee Internet Security	1,114	99%	AAA
Avira Free Security Suite	1,112	99%	AAA
Sophos Home Premium	1,106	98%	AAA
Comodo Internet Security	1,089	97%	AAA
F-Secure Safe	1,089	97%	AAA
Avast Free Antivirus	1,066	95%	AAA
Check Point ZoneAlarm	1,063	94%	AA
AVG Antivirus Free Edition	1,062	94%	AA
G-Data Internet Security	1,043	93%	AA
Trend Micro Internet Security	990	88%	A
BullGuard Internet Security	986	88%	A
eScan Internet Security Suite	951.5	85%	A



Total Accuracy Ratings combine protection and false positives.

Home Anti-Malware Protection Awards

The following products win SE Labs awards:

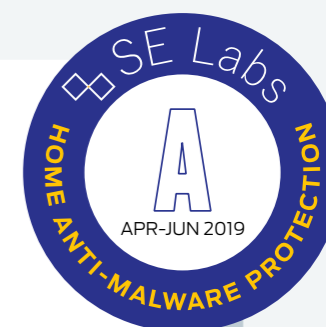
- **ESET** Internet Security
- **Kaspersky** Internet Security
- **Microsoft** Windows Defender
- **Symantec** Norton Security
- **McAfee** Internet Security
- **Avira** Free Security Suite
- **Sophos** Home Premium
- **Comodo** Internet Security
- **F-Secure** Safe
- **Avast** Free Antivirus



- **Check Point** ZoneAlarm
- **AVG** Antivirus Free Edition
- **G-Data** Internet Security



- **Trend Micro** Internet Security
- **BullGuard** Internet Security
- **eScan** Internet Security Suite



2. Protection Ratings

The results below indicate how effectively the products dealt with threats. Points are earned for detecting the threat and for either blocking or neutralising it.

■ Detected (+1)

If the product detects the threat with any degree of useful information, we award it one point.

■ Blocked (+2)

Threats that are disallowed from even starting their malicious activities are blocked. Blocking products score two points.

■ Neutralised (+1)

Products that kill all running malicious processes 'neutralise' the threat and win one point.

■ Complete Remediation (+1)

If, in addition to neutralising a threat, the product removes all significant traces of the attack, it gains an additional one point.

■ Persistent Neutralisation (-2)

This result occurs when a product continually blocks a persistent threat from achieving its aim, while not removing it from the system.

■ Compromised (-5)

If the threat compromises the system, the product loses five points. This loss may be reduced to four points if it manages to detect

the threat (see Detected, above), as this at least alerts the user, who may now take steps to secure the system.

Rating Calculations

We calculate the protection ratings using the following formula:

$$\begin{aligned} \text{Protection Rating} = & \\ & (1x \text{ number of Detected}) + \\ & (2x \text{ number of Blocked}) + \\ & (1x \text{ number of Neutralised}) + \\ & (1x \text{ number of Complete remediation}) + \\ & (-5x \text{ number of Compromised}) \end{aligned}$$

The 'Complete remediation' number relates to cases of neutralisation in which all significant traces of the attack were removed from the target. Such traces should not exist if the threat was 'Blocked' and so Blocked results imply Complete remediation.

These ratings are based on our opinion of how important these different outcomes are. You may have a different view on how seriously you treat a 'Compromise' or 'Neutralisation without complete remediation'. If you want to create your own rating system, you can use the raw data from [4. Protection Details](#) on page 11 to roll your own set of personalised ratings.

Targeted Attack Scoring

The following scores apply only to targeted attacks and are cumulative, ranging from -1 to -5.

■ Access (-1)

If any command that yields information about the target system is successful this score is applied. Examples of successful commands include listing current running processes, exploring the file system and so on. If the first command is attempted and the session is terminated by the product without the command being successful the score of Neutralised (see above) will be applied.

■ Action (-1)

If the attacker is able to exfiltrate a document from the target's Desktop of the currently logged in user then an 'action' has been successfully taken.

■ Escalation (-2)

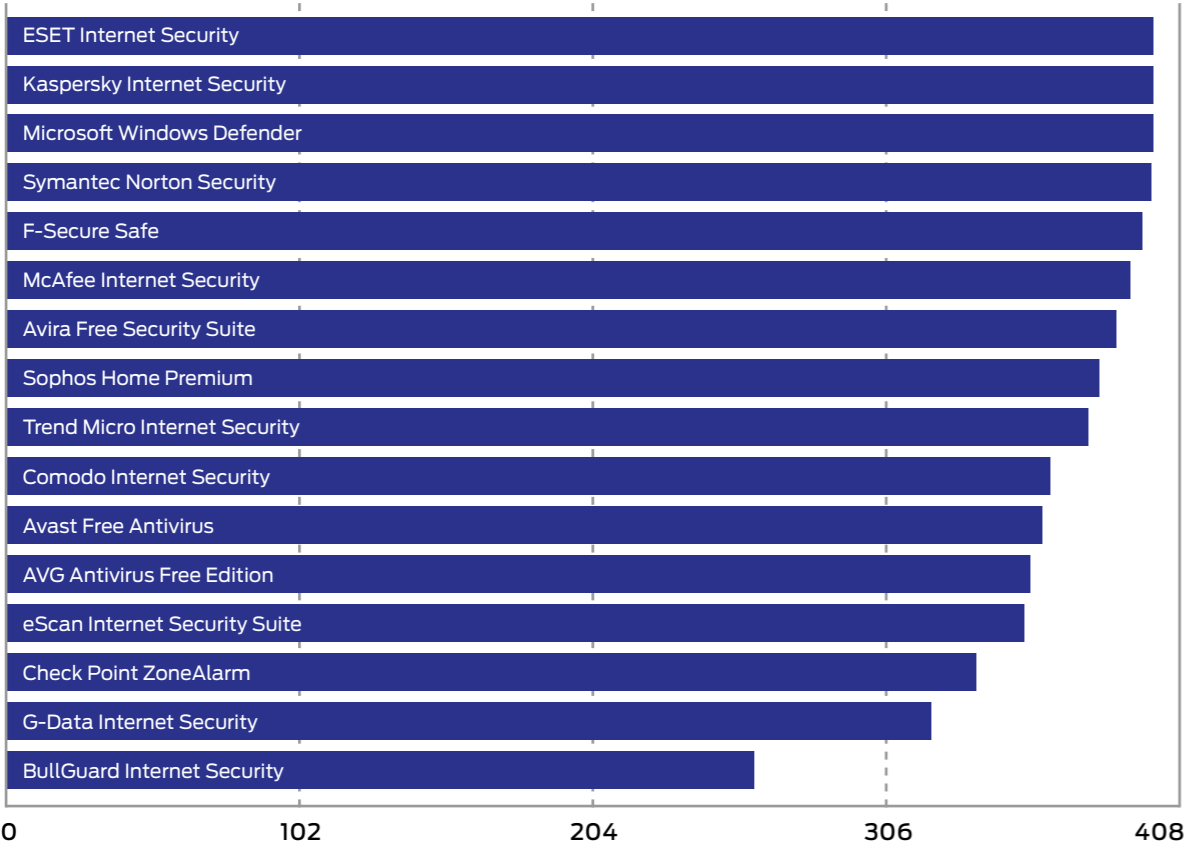
The attacker attempts to escalate privileges to NT Authority/System. If successful, an additional two points are deducted.

■ Post-Escalation Action (-1)

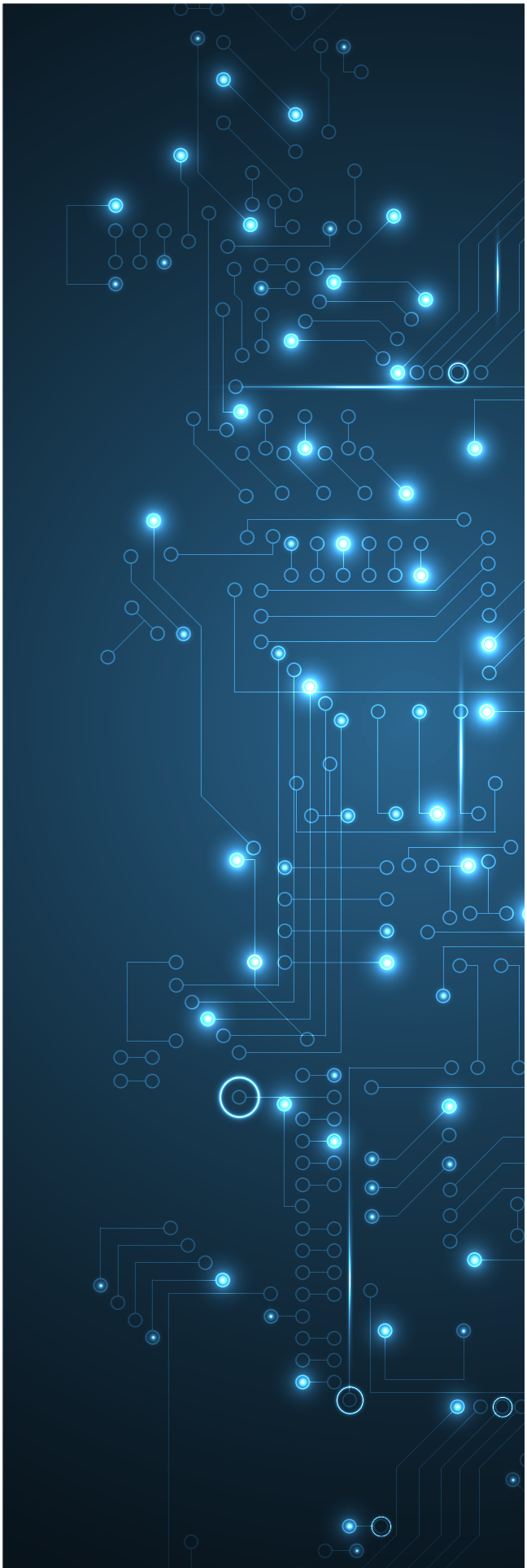
After escalation the attacker attempts actions that rely on escalated privileges. These include attempting to steal credentials, modifying the file system and recording keystrokes. If any of these actions are successful then a further penalty of one point deduction is applied.

PROTECTION RATINGS		
Product	Protection Rating	Protection Rating (%)
ESET Internet Security	399	98%
Kaspersky Internet Security	399	98%
Microsoft Windows Defender	399	98%
Symantec Norton Security	398	98%
F-Secure Safe	395	97%
McAfee Internet Security	391	96%
Avira Free Security Suite	386	95%
Sophos Home Premium	380	93%
Trend Micro Internet Security	376	92%
Comodo Internet Security	363	89%
Avast Free Antivirus	360	88%
AVG Antivirus Free Edition	356	87%
eScan Internet Security Suite	354	87%
Check Point ZoneAlarm	337	83%
G-Data Internet Security	321	79%
BullGuard Internet Security	260	64%

Average 90%



Protection Ratings are weighted to show that how products handle threats can be subtler than just 'win' or 'lose'.

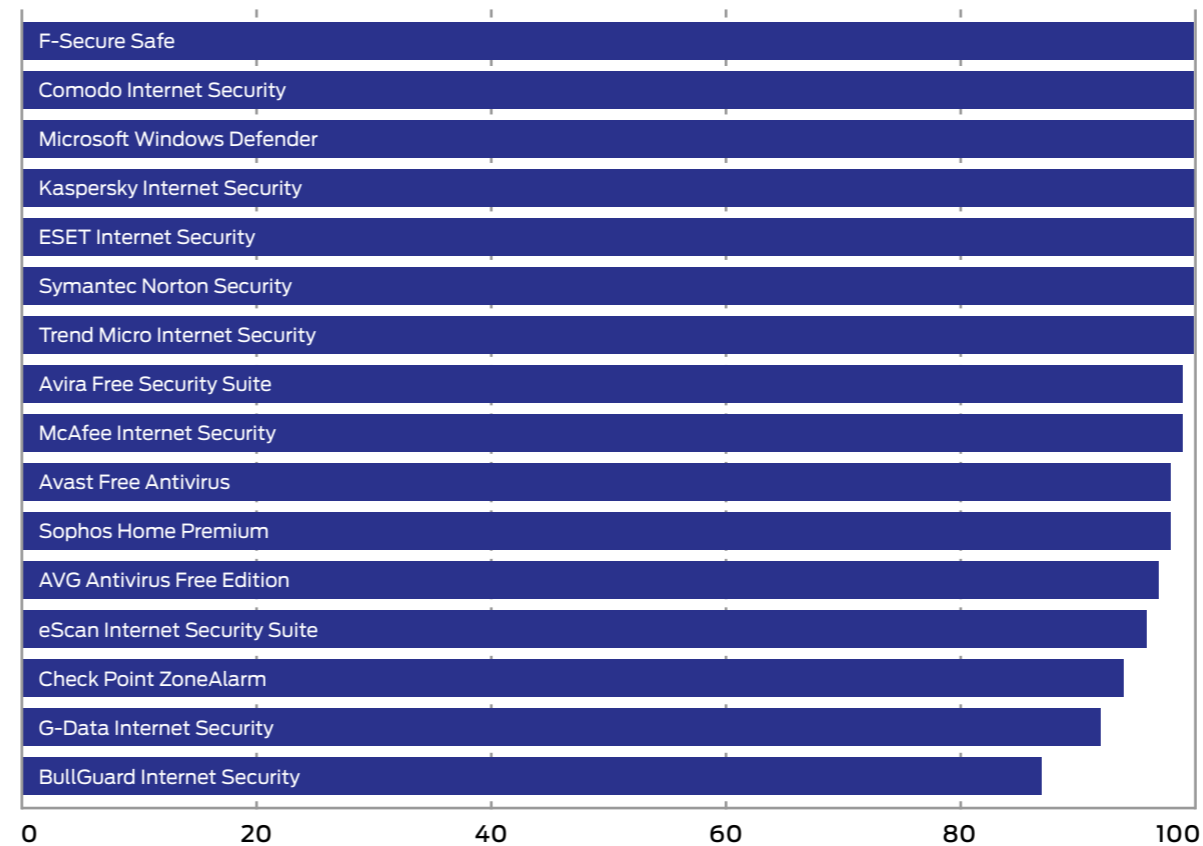


3. Protection Scores

This graph shows the overall level of protection, making no distinction between neutralised and blocked incidents.

For each product we add Blocked and Neutralised cases together to make one simple tally.

PROTECTION SCORES	
Product	Protection Score
F-Secure Safe	100
Comodo Internet Security	100
Microsoft Windows Defender	100
Kaspersky Internet Security	100
ESET Internet Security	100
Symantec Norton Security	100
Trend Micro Internet Security	100
Avira Free Security Suite	99
McAfee Internet Security	99
Avast Free Antivirus	98
Sophos Home Premium	98
AVG Antivirus Free Edition	97
eScan Internet Security Suite	96
Check Point ZoneAlarm	94
G-Data Internet Security	92
BullGuard Internet Security	87



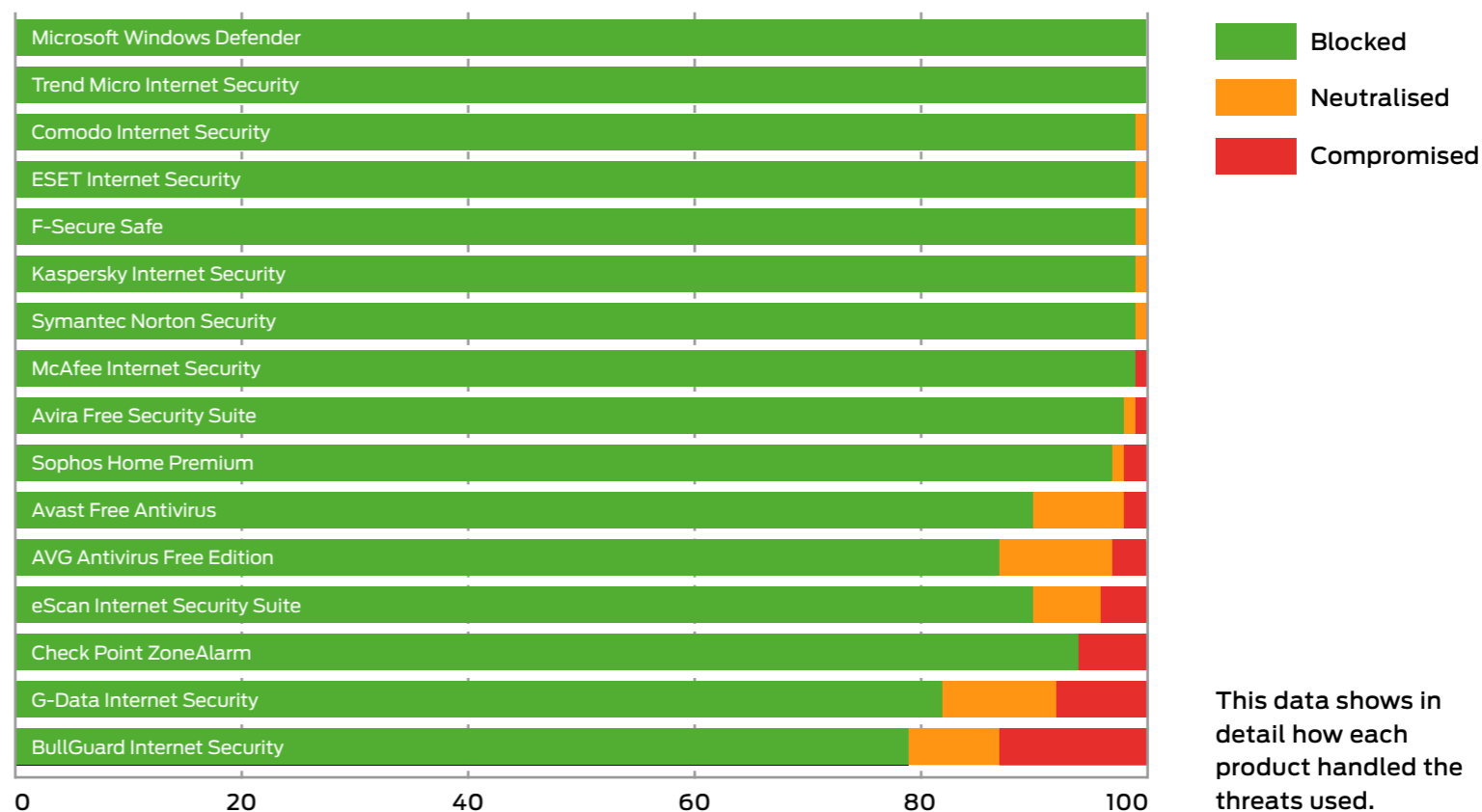
Protection Scores are a simple count of how many times a product protected the system.

4. Protection Details

These results break down how each product handled threats into some detail. You can see how many detected a threat and the levels of protection provided.

Products sometimes detect more threats than they protect against. This can happen when they recognise an element of the threat but aren't equipped to stop it. Products can also provide protection even if they don't detect certain threats. Some threats abort on detecting specific endpoint protection software.

PROTECTION DETAILS					
Product	Detected	Blocked	Neutralised	Compromised	Protected
Microsoft Windows Defender	100	100	0	0	100
Trend Micro Internet Security	100	100	0	0	100
Comodo Internet Security	100	99	1	0	100
ESET Internet Security	100	99	1	0	100
F-Secure Safe	100	99	1	0	100
Kaspersky Internet Security	100	99	1	0	100
Symantec Norton Security	100	99	1	0	100
McAfee Internet Security	100	99	0	1	99
Avira Free Security Suite	99	98	1	1	99
Sophos Home Premium	98	97	1	2	98
Avast Free Antivirus	94	90	8	2	98
AVG Antivirus Free Edition	99	87	10	3	97
eScan Internet Security Suite	97	90	6	4	96
Check Point ZoneAlarm	99	81	13	6	94
G-Data Internet Security	99	82	10	8	92
BullGuard Internet Security	92	79	8	13	87



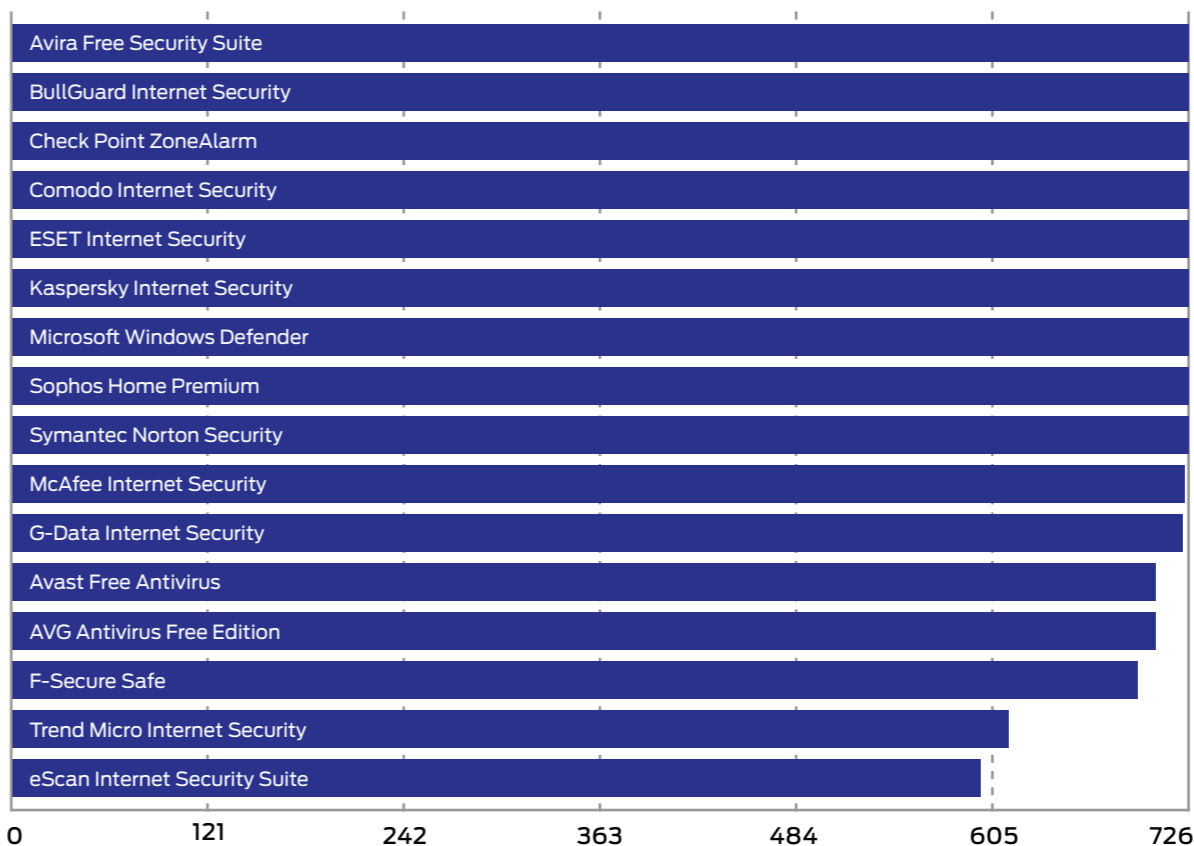
5. Legitimate Software Ratings

These ratings indicate how accurately the products classify legitimate applications and URLs, while also taking into account the interactions that each product has with the user. Ideally a product will either not classify a legitimate object or will classify it as safe. In neither case should it bother the user.

We also take into account the prevalence (popularity) of the applications and websites used in this part of the test, applying stricter penalties for when products misclassify very popular software and sites.

To understand how we calculate these ratings, see [5.3 Accuracy Ratings](#) on page 14.

LEGITIMATE SOFTWARE RATINGS		
Product	Legitimate Accuracy Rating	Legitimate Accuracy (%)
Avira Free Security Suite	726	100%
BullGuard Internet Security	726	100%
Check Point ZoneAlarm	726	100%
Comodo Internet Security	726	100%
ESET Internet Security	726	100%
Kaspersky Internet Security	726	100%
Microsoft Windows Defender	726	100%
Sophos Home Premium	726	100%
Symantec Norton Security	726	100%
McAfee Internet Security	723	100%
G-Data Internet Security	722	99%
Avast Free Antivirus	706	97%
AVG Antivirus Free Edition	706	97%
F-Secure Safe	694	96%
Trend Micro Internet Security	614	85%
eScan Internet Security Suite	597.5	82%



Legitimate Software Ratings can indicate how well a vendor has tuned its detection engine.

5.1 Interaction Ratings

It's crucial that anti-malware endpoint products not only stop – or at least detect – threats, but that they allow legitimate applications to install and run without misclassifying them as malware. Such an error is known as a 'false positive' (FP).

In reality, genuine FPs are quite rare in testing. In our experience it is unusual for a legitimate application to be classified as 'malware'. More often it will be classified as 'unknown', 'suspicious' or 'unwanted' (or terms that mean much the same thing).

We use a subtle system of rating an endpoint's approach to legitimate objects, which takes into account how it classifies the application and how it presents that information to the user. Sometimes the endpoint software will pass the buck and demand that the user decide if the application is safe or not. In such cases the product may make a recommendation to allow or block. In other cases, the product will make no recommendation, which is possibly even less helpful.

If a product allows an application to install and run with no user interaction, or with simply a brief notification that the application is likely to be safe, it has achieved an optimum result. Anything else is a Non-Optimal Classification/Action (NOCA). We think that measuring NOCAs is more useful than counting the rarer FPs.

	None (Allowed)	Click to Allow (Default Allow)	Click to Allow/Block (No Recommendation)	Click to Block (Default Block)	None (Blocked)	
Object is Safe	2	1.5	1			A
Object is Unknown	2	1	0.5	0	-0.5	B
Object is not Classified	2	0.5	0	-0.5	-1	C
Object is Suspicious	0.5	0	-0.5	-1	-1.5	D
Object is Unwanted	0	-0.5	-1	-1.5	-2	E
Object is Malicious				-2	-2	F
	1	2	3	4	5	

Products that do not bother users and classify most applications correctly earn more points than those that ask questions and condemn legitimate applications.

INTERACTION RATINGS			
Product	None (Allowed)	Click to Allow (Default Allow)	Click to Block (Default Block)
Avira Free Security Suite	100	0	0
BullGuard Internet Security	100	0	0
Check Point ZoneAlarm	100	0	0
Comodo Internet Security	100	0	0
ESET Internet Security	100	0	0
Kaspersky Internet Security	100	0	0
Microsoft Windows Defender	100	0	0
Sophos Home Premium	100	0	0
Symantec Norton Security	100	0	0
Avast Free Antivirus	99	0	1
AVG Antivirus Free Edition	99	0	1
G-Data Internet Security	99	0	1
McAfee Internet Security	99	0	1
F-Secure Safe	97	1	2
Trend Micro Internet Security	93	0	7
eScan Internet Security Suite	90	0	10

5.2 Prevalence Ratings

There is a significant difference between an endpoint product blocking a popular application such as the latest version of Microsoft Word and condemning a rare Iranian dating toolbar for Internet Explorer 6. One is very popular all over the world and its detection as malware (or something less serious but still suspicious) is a big deal. Conversely, the outdated toolbar won't have had a comparably large user base even when it was new. Detecting this application as malware may be wrong, but it is less impactful in the overall scheme of things.

With this in mind, we collected applications of varying popularity and sorted them into five separate categories, as follows:

1. **Very High Impact**
2. **High Impact**
3. **Medium Impact**
4. **Low Impact**
5. **Very Low Impact**

Incorrectly handling any legitimate application will invoke penalties, but classifying Microsoft Word as malware and blocking it without any way for the user to override this will bring far greater penalties than doing the same for an ancient niche toolbar. In order to calculate these relative penalties, we assigned each impact category with a rating modifier, as shown in the table above.

LEGITIMATE SOFTWARE PREVALENCE RATING MODIFIERS	
Impact Category	Rating Modifier
Very High Impact	5
High Impact	4
Medium Impact	3
Low Impact	2
Very Low Impact	1

Applications were downloaded and installed during the test, but third-party download sites were avoided and original developers' URLs were used where possible. Download sites will sometimes bundle additional components into applications' install files, which may correctly cause anti-malware products to flag adware. We remove adware from the test set because it is often unclear how desirable this type of code is.

The prevalence for each application and URL is estimated using metrics such as third-party download sites and the data from Alexa.com's global traffic ranking system.

5.3 Accuracy Ratings

We calculate legitimate software accuracy ratings by multiplying together the interaction and prevalence ratings for each download and installation:

Accuracy rating = Interaction rating x Prevalence rating

If a product allowed one legitimate, Medium impact application to install with zero interaction with the user, then its Accuracy rating would be calculated like this:

Accuracy rating = 2 x 3 = 6

This same calculation is made for each legitimate application/site in the test and the results are summed and used to populate the graph and table shown under **5. Legitimate Software Ratings** on page 12.

5.4 Distribution of Impact Categories

Endpoint products that were most accurate in handling legitimate objects achieved the highest ratings. If all objects were of the highest prevalence, the maximum possible rating would be 1,000 (100 incidents x (2 interaction rating x 5 prevalence rating)).

In this test there was a range of applications with different levels of prevalence. The table below shows the frequency:

LEGITIMATE SOFTWARE CATEGORY FREQUENCY	
Prevalence Rating	Frequency
Very high impact	26
High impact	39
Medium impact	16
Low impact	10
Very low impact	9
TOTAL	100

6. Conclusions

Attacks in this test included threats that affect the wider public and more closely-targeted individuals and organisations. You could say that we tested the products with ‘public’ malware and full-on hacking attacks. We introduced the threats in a realistic way such that threats seen in the wild on websites were downloaded from those same websites, while threats caught spreading through email were delivered to our target systems as emails.

All of the products tested are well-known and should do well in this test. While we do ‘create’ threats by using publicly available free hacking tools, we don’t write unique malware so there is no technical reason why any vendor being tested should do poorly.

Consequently, it’s not a shock to see most of the products handle the public threats very effectively, although BullGuard’s product struggled a little. Targeted attacks were also handled well by most but caused some significant problems for the products from BullGuard and G-Data.

The Comodo, ESET, F-Secure, Kaspersky Lab, Microsoft, Symantec and Trend Micro products blocked all of the public and targeted attacks. Those same products, excepting those from F-Secure and Trend Micro, also handled all of the legitimate applications correctly.

Products from McAfee and Avira follow up close behind. McAfee Internet Security missed one targeted threat while Avira Free Security Suite missed one public threat.

G-Data Internet Security stopped all of the public threats but only 17 of the 25 targeted attacks, while BullGuard Internet Security missed six public attacks and seven targeted attacks.

The leading products from ESET, Kaspersky Labs, Microsoft, Symantec (Norton), McAfee, Avira, Sophos, Comodo, F-Secure and Avast all win AAA awards.

Appendices

APPENDIX A: Terms Used

TERM	MEANING
Compromised	The attack succeeded, resulting in malware running unhindered on the target. In the case of a targeted attack, the attacker was able to take remote control of the system and carry out a variety of tasks without hindrance.
Blocked	The attack was prevented from making any changes to the target.
False positive	When a security product misclassifies a legitimate application or website as being malicious, it generates a 'false positive'.
Neutralised	The exploit or malware payload ran on the target but was subsequently removed.
Complete Remediation	If a security product removes all significant traces of an attack, it has achieved complete remediation.
Target	The test system that is protected by a security product.
Threat	A program or sequence of interactions with the target that is designed to take some level of unauthorised control of that target.
Update	Security vendors provide information to their products in an effort to keep abreast of the latest threats. These updates may be downloaded in bulk as one or more files, or requested individually and live over the internet.

APPENDIX B: FAQs

A **full methodology** for this test is available from our website.

- The products chosen for this test were selected by SE Labs.
- The test was unsponsored.
- The test was conducted between 25th March to 3rd June 2019.
- All products were configured according to each vendor's recommendations, when such recommendations were provided.
- Malicious URLs and legitimate applications and URLs were independently located and verified by SE Labs.
- Targeted attacks were selected and verified by SE Labs.
- Malicious and legitimate data was provided to partner organisations once the test was complete.
- SE Labs conducted this endpoint security testing on physical PCs, not virtual machines.
- The web browser used in this test was Google Chrome. When testing Microsoft products Chrome was equipped with the Windows Defender Browser Protection browser extension (<https://browserprotection.microsoft.com>).

Q What is a partner organisation? Can I become one to gain access to the threat data used in your tests?

A Partner organisations benefit from our consultancy services after a test has been run. Partners may gain access to low-level data that can be useful in product improvement initiatives and have permission to use award logos, where appropriate, for marketing purposes. We do not share data on one partner with other partners. We do not partner with organisations that do not engage in our testing.

Q I am a security vendor and you tested my product without permission. May I access the threat data to verify that your results are accurate?

A We are willing to share a certain level of test data with non-partner participants for free. The intention is to provide sufficient data to demonstrate that the results are accurate. For more in-depth data suitable for product improvement purposes we recommend becoming a partner.

APPENDIX C: Product Versions

The table below shows the service's name as it was being marketed at the time of the test.

PRODUCT VERSIONS			
Provider	Product Name	Build Version (start)	Build Version (end)
Avast	Free Antivirus	19.3.2369 (build 19.3.4241.439)	19.5.2378 (build 19.5.4444.497)
AVG	Antivirus Free Edition	19.3.3084 (build 19.3.4241.405)	19.5.3093 (build 19.5.4444.501)
Avira	Free Security Suite	15.0.55.143	15.0.1905.1271
BullGuard	Internet Security	19.0.364.2	19.0.366.3
Check Point	ZoneAlarm	Antivirus+Firewall: 15.4.260.17960, Antivirus engine: 8.8.1.110	Antivirus+Firewall: 15.4.260.17960, Antivirus engine: 8.8.1.110
Comodo	Internet Security	11.0.0.6802	12.0.0.6818
eScan	Internet Security Suite	14.0.1400.2117	14.0.1400.2175
ESET	Internet Security	12.1.31.0	12.1.34.0
F-Secure	Safe	17.5	17.6
G-Data	Internet Security	25.5.27	25.5.2.7
Kaspersky Lab	Internet Security	19.0.0.1088(d)	19.0.0.1088 (d)
McAfee	Internet Security	Version 16.0 , Security Centre Version 17.8.131, VirusScan 22.3.140	Version 16.0 , Security Centre Version 17.8.131, VirusScan 22.3.140
Microsoft	Windows Defender	Threat definition version: 1.291.301.0	Antimalware Client Version (4.18.1904) Engine Version (1.1.15900.4) Antivirus Version (1.293.2614.0) Anti-spyware Version (1.293.2614.0)
Sophos	Home Premium	2.1.1	2.1.3
Symantec	Norton Security	22.17.0.183	22.17.2.46
Trend Micro	Internet Security	15.0.1212	15.0.1231

APPENDIX D: Attack Types

The table below shows how each product protected against the different types of attacks used in the test.

ATTACK TYPES			
Product	Web-Download	Targeted Attack	Protected
Comodo Internet Security	75	25	100
ESET Internet Security	75	25	100
F-Secure Safe	75	25	100
Kaspersky Internet Security	75	25	100
Microsoft Windows Defender	75	25	100
Symantec Norton Security	75	25	100
Trend Micro Internet Security	75	25	100
Avira Free Security Suite	74	25	99
McAfee Internet Security	75	24	99
Avast Free Antivirus	73	25	98
Sophos Home Premium	73	25	98
AVG Antivirus Free Edition	72	25	97
eScan Internet Security Suite	73	23	96
ZoneAlarm	73	21	94
G-Data Internet Security	75	17	92
BullGuard Internet Security	69	18	87

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