AVG Cleaner™ for Android®

Battery Life & Cleaning Whitepaper

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Contents

Chapter 1 | Introduction

This whitepaper documents the impact of AVG Cleaner for Android on various typical smartphones running Android. It shows both the effect of having the most popular apps installed as well as using the stock settings of the mobile OS.

1.1 Test Environment & Guidelines

1 The tested devices resided in an environment compliant with ECMA-383:

- Temperature: 23 degrees Celsius
- Relative humidity: 10 - 80 %
- Ambient light: 250 +/- 50 lux

2 The default power management settings were used

Chapter 1 | Introduction

1.2 What smartphones did we test? And why?

In this year's benchmarking roundup, we decided to test the effects of AVG Cleaner for Android on three different Android devices:

Samsung Galaxy S3® (2012)

Spec: Cortex A9 1.4GHz , 2 GB RAM
Super AMOLED display (720x1280)
2100 mAh battery (Li-Ion)

Motorola Moto G® (2013)

Spec: Cortex A7 1.2 GHz, 1 GB RAM
IPS LCD display (720x1280)
2070 mAh battery (Li-Ion)

Samsung Galaxy S5® (2015)

Spec: Snagdragon 2.5 GHz, 2 GB RAM
Super AMOLED display (1080x1920)
2800 mAh battery (Li-Ion)

Chapter 1 | Introduction

1.3 Preparing the smartphones

All smartphones were prepared using the same procedure: We've pre-installed the most-used apps according to our internal research as well as the top 100 apps of the Google Play™ store. Once installed, every single app was started and used for its main purpose. For example, testers signed up for Spotify™ and used the app to stream music over the course of several days. In some cases this required registering, using and playing for a certain amount of time. This is why we handed these devices to typical smartphone users. We wanted them to use the apps on a day-to-day basis.

Samsung Galaxy S3	We handed this device to a young person (Junior grade) for continuous usage over the course of several months. It was used about 3-5 hours per day for social media, gaming, researching and taking photos. We pre-installed the most-used apps according to our internal research as well as the top 100 apps of the Google Play store.
Motorola G	The Motorola G we picked was used for 3 months by a mid-30s sports fanatic who we'd asked to use it for all his activities, including running fitness apps, taking pictures, and researching his next cycling or mountain climbing trips. Since he stored a lot of photos, he had only about 150 MB of free space left and his phone was in dire need of a cleanup. As with the other phones, we pre-installed the most-used apps according to our internal research as well as the top 100 apps of the Google Play store.
Samsung Galaxy S5	After unboxing the brand-new phone, we began loading it with the top 100 apps and used it as a typical business phone over the course of several weeks to sync files to the cloud, work with Office applications, emails, remote management and more.

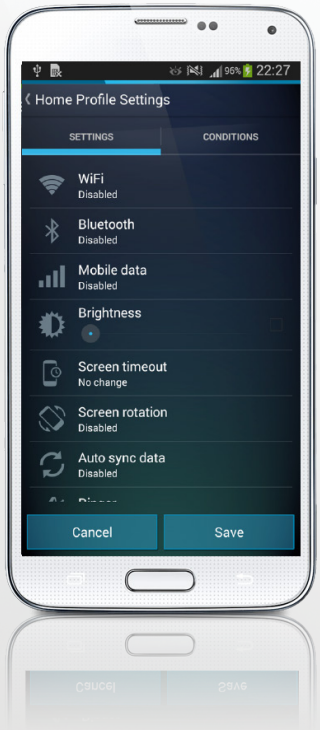
This procedure ensured that all the apps' background tasks, notification settings and general startup items were all activated. As mentioned, we left the stock Android settings intact as well. Both factors should help us understand how both battery life as well as general storage is impacted by the apps installed as well as the default settings of Android smartphones.

Chapter 2 | The Benchmarks in Detail

To provide accurate test results, testers had to perform several steps and follow a specific flow. Both an automated and a manual approach were used to get precise results.

2.1 Battery Life

For our tests, we used the stock power management settings of each device and compared them to AVG Cleaner's power-saving settings. We wanted to understand the power saving potential of our app, which this year sports an additional set of power management capabilites, such as the ability to turn off background data synchronization, screen rotation, Bluetooth, Wi-Fi®, mobile data, and adjust screen brightness automatically using a pre-determined profile.



Chapter 2 | The Benchmarks in Detail

2.1 Battery Life cont ...

The following tests were then performed to determine the impact on battery life:

Movie Watching — This test involves the continuous playback of a typical TV episode in HD (1080p or 720p, depending on the device screen resolution) until the battery ran dry.

Gaming — For this test, we ran a demo loop of the popular Android game Asphalt® 8. This test puts a lot of stress on the devices as it involves the GPU and the CPU as well showing fast paced, bright scenes on the display.

Browsing — To evaluate battery life while browsing the web on the go we used Peacekeeper®, which sports a special loop test. Futuremark describes the test as follows: "*Peacekeeper measures your browser's performance by testing its JavaScript functionality. JavaScript is a widely used programming language used in the creation of modern websites to provide features such as animation, navigation, forms and other common requirements. By measuring a browser's ability to handle commonly used JavaScript functions Peacekeeper can evaluate its performance.*"

Chapter 2 | The Benchmarks in Detail

2.2 Storage tests

AVG Cleaner for Android identifies unnecessary app caches, log files, cookies, old downloads and other unwanted files on Android smartphones and tablets. In this test, we evaluated how much unneeded data was found on the test devices after the apps were installed and the devices were used continuously in real-life situations.

Background information: Most apps create "cache files" to temporarily store information. For example, a social media app may store wasteful thumbnails you looked at inside the cache folder. Getting rid of unnecessary content inside the cache folder is the job of each app. This is even recommended practice, according to the official development guidelines by Google®. AVG Cleaner gets rid of such cache files on a regular basis. In some cases, this cache folder can even become corrupt – causing crashes or even preventing the app from starting.

The same applies to history lists that get stored automatically on smartphones, such as:

Caller list	A list of all incoming, outgoing and missed calls.
Browser history	Cache files, cookies and other temporarily downloaded files from within your Android browser.
Clipboard	If you've copied and pasted text, images or other things from apps, they may be stored. Images, for example, can be quite large so it may be beneficial to erase the clipboard cache to free up storage space.
App history	A lot of apps also log your activity, such as the app pages you visit on the Google Play store or the items you searched for in the eBay app. If you sometimes share your tablet or phone with friends or family, you may not want them to see what you were doing on your phone. AVG Cleaner for Android also helps get rid of these lists.

Chapter 3 | The Results

This chapter contains all the results from our lab testing and should give readers an impression of the performance of both devices in their original state as well as after the optimization with AVG Cleaner for Android was complete.

3.1 Test Results Disclaimer

The following test results were performed under a highly controlled environment, in accordance with industry standards, and with professional measurement software and techniques. The tests were done with care and repeated several times. However, the testers cannot guarantee that these performance tests are absolutely accurate and can be reproduced on other smartphones.

While performance testing on "clean" smartphones is straightforward, the installation of several apps introduces factors that cannot be controlled – these include sudden interferences by update mechanisms or self-maintenance tasks that the installed programs perform after a certain time or when triggered.

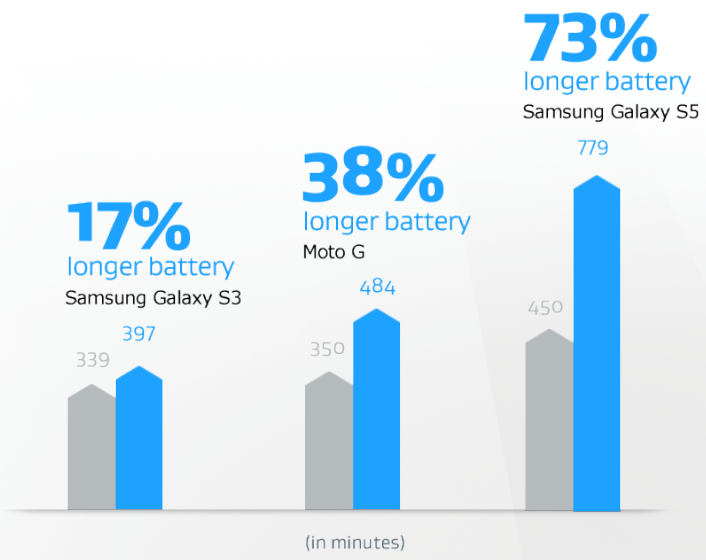
These variances were reduced to a minimum by several reboots of the Android devices and days of uptime – however, they cannot be eliminated. It is possible that the results were impacted due to the high load that was put on the system.

Still, the results represent a close to real representation of smartphones under high load and how an optimization product is capable of solving these problems.

Chapter 3 | The Results

3.2 Battery Life While Watching an HD movie

First, we ran a 1080p (Full HD) movie in constant loop on all three devices to experience the benefits.



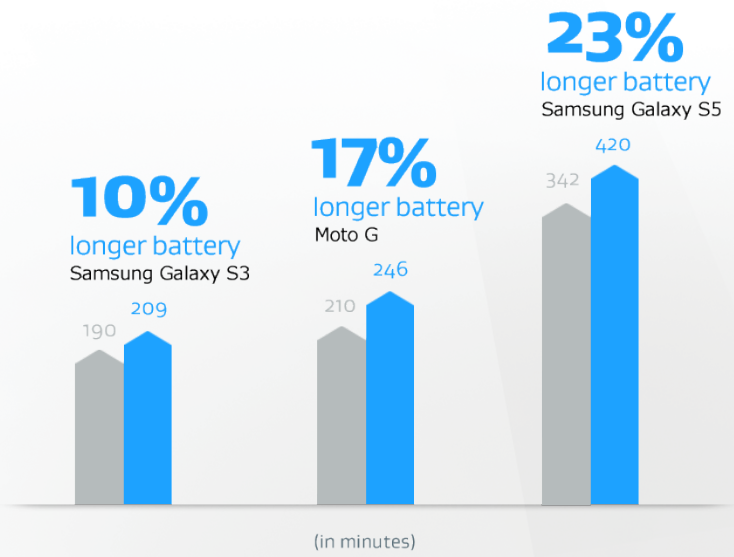
Results

The Samsung Galaxy S5 benefitted the most from our power-saving functionality, mainly because we used it to automatically turn off all non-essential features and reduced screen brightness to 25%. With the movie running, the S5 lasted roughly 13 hours instead of just 7 hours and 30 minutes.

Chapter 3 | The Results

3.3 Battery Life While Playing a 3D Game

We used one of the most graphically intense games on the Google Play store, Asphalt 8, to measure how long it took until our devices' batteries ran dry – with and without AVG Cleaner!



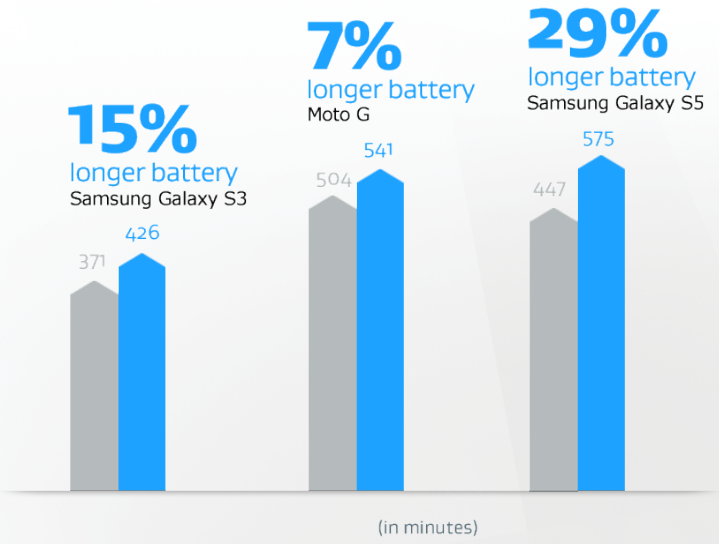
Results

Due to the heavy workload performed by the graphics chip, the battery on all three devices ran dry rather quickly. On the Galaxy S5, we saw the biggest improvement, once we activated all power-saving features of AVG Cleaner: It ran the game for **exactly 7 hours**, compared to 6 hours without our app.

Chapter 3 | The Results

3.4 Battery Life While Browsing the Web

Next, we used Peacekeeper's web browsing benchmark on a continuous loop until the battery ran dry. Peacekeeper simulates loading a variety of different websites, videos and dynamic elements.

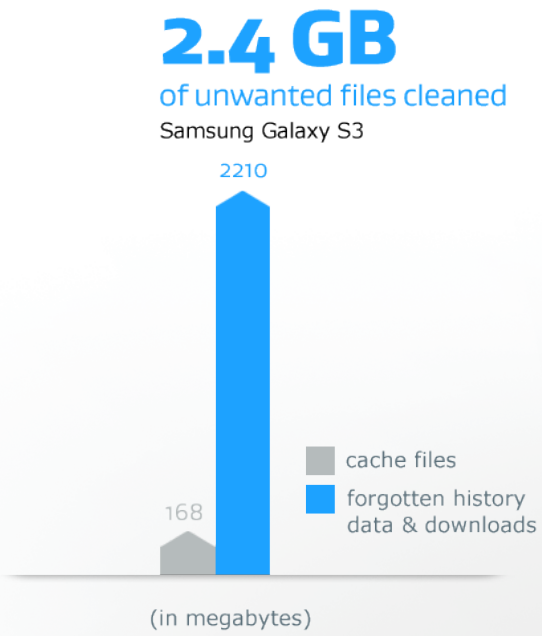


Results

As you can see, we were able to surf between 7% and 15% longer on the S3 and the Moto G. However, the S5 benefited the most, as its battery lasted 9 hours 35 minutes instead of 7 hours 27 minutes while browsing.

Chapter 3 | The Results

3.5 Cleaning test on Samsung Galaxy S3

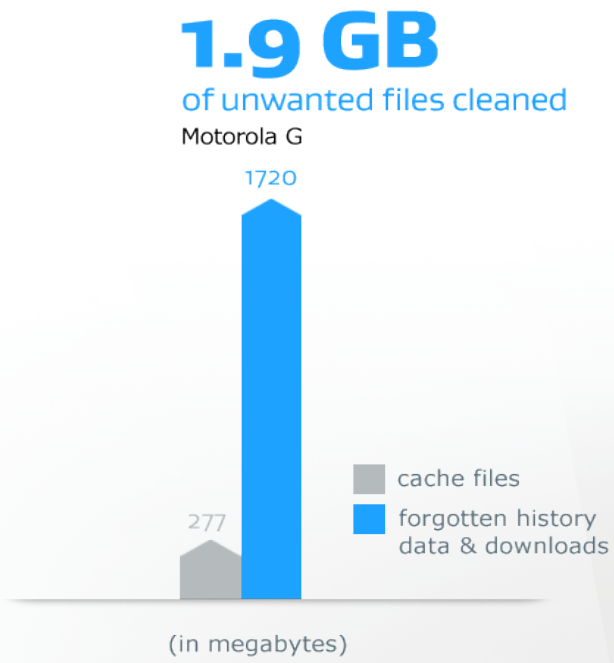


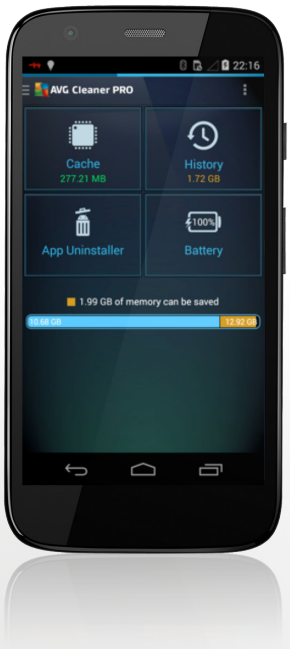
Results

Of an available 11.35 GB, over 2.4 GB of unnecessary cache files and downloads (mostly old photos, videos, and apps sitting in the "Downloads" folder) were found and deleted. Another side effect: Once we returned the phone to the teenager, she noted that two of her favorite games were running again – probably due to some corrupt cache files that we had cleaned and which got recreated as a result.

Chapter 3 | The Results

3.6 Cleaning test on Motorola G

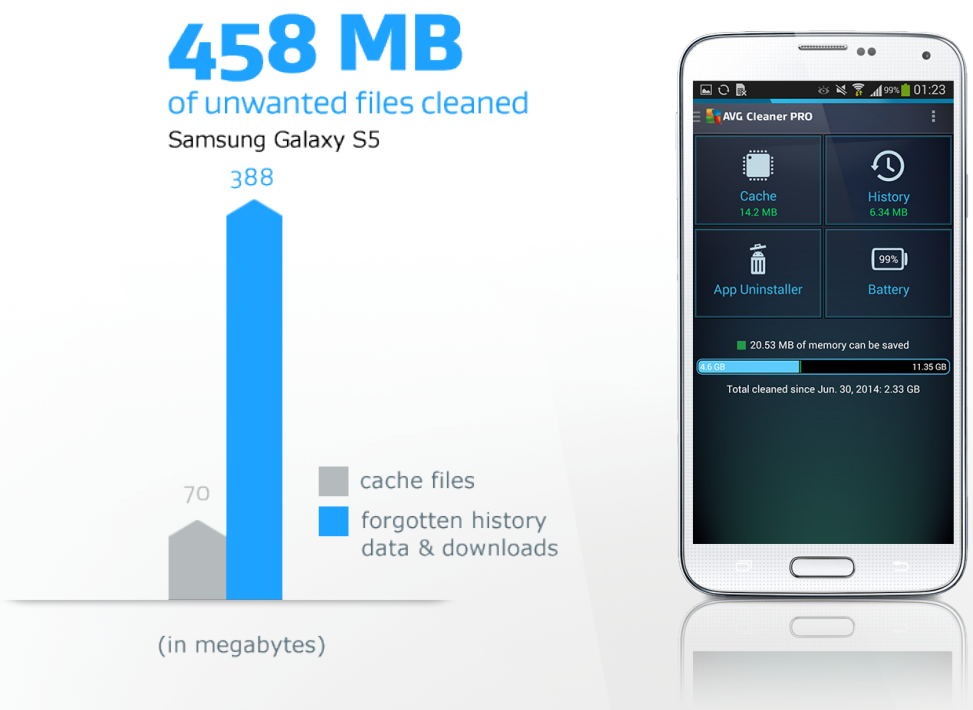




Results Of an available 12.9 GB, over **1.9 GB** of unnecessary files were found and removed. In this case, we found many downloaded PDFs, map packages, and forgotten sports videos. Finally, the phone was able to breathe again.

Chapter 3 | The Results

3.7 Cleaning test on Samsung Galaxy S5



Results

Even though we had only run these apps a few times on a brand-new device, they created 70 MB of cache and almost 388 MB of history data. Given that the S5 has only 16 GB of storage by default, saving roughly half a Gigabyte after only 4 weeks of usage is a very nice result.

Chapter 3 | The Results

3.8 Bottom Line

Overall, Cleaner for Android helped improve both battery life as well as free up space on all devices. It should be noted that while some of the power management improvements can be achieved manually, the app performs the various steps automatically depending on the location which results in less hassle for the user.

Chapter 4 | Contact Information

The contact information below is provided in case you are working with particular individuals or agencies on this review. If you have any questions around AVG Cleaner for Android, please contact:

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