



# *BatteryXPRT* *for Android*

## BatteryXPRT for Android 2014 (Community Preview)

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### User manual

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## Introduction

The purpose of the BatteryXPRT for Android\* benchmark is to reliably evaluate the battery life of Android-based devices based on real-world usage scenarios. The benchmark provides an intuitive user interface, a runtime allowing it to be completed within one work day, and easy-to-understand results.

## About the benchmark

The BatteryXPRT for Android workload is based on the tests included in MobileXPRT 2013. In addition, the workload also contains activities such as audio and video playback that are not part of MobileXPRT, and some of the tests have been altered to make them better suited to a battery-life test.

BatteryXPRT for Android is capable of running in two modes: network mode and airplane mode. We briefly explain each mode below.

- **Network mode.** Network mode requires the device to be connected to the Internet via a Wi-Fi or cellular data connection. In network mode, the benchmark accesses an externally-hosted Web site to obtain content for the Web browsing and video playback tests. In addition, intermittent background activity during the test simulates the power draw required by common data sync tasks for email clients and resident applications.
- **Airplane mode.** Airplane mode requires the user to turn on airplane mode in the device settings menu. During the Web browsing and video playback portions of the benchmark, the benchmark accesses locally stored content included during the initial installation.

In both modes, the benchmark will run a 45-minute workload seven times (default), and estimate the battery life. However, BatteryXPRT for Android also allows the user to increase the number of times it runs the workload. You may also set the test to run until the battery is exhausted. A rundown test requires more iterations of the workload to run the battery down than the standard seven-iteration test, but in all other respects is the same as the standard test.

Figure 1 compares workloads across the two modes. For readability, Figure 1 does not show simulated sync activity.

	Network mode sub-test	Airplane mode sub-test
List Scroll	Scroll a list for 1 minute.	
Video Playback	Stream a 2-minute 720p H.264 video clip from the Internet.	Play a 2-minute 1,080p H.264 video clip from local storage.
Stand by	Device goes to standby for 1 minute.	
Zoom n Pinch	Zoom and Pinch an image (40 seconds).	
Apply Photo Effects	Apply four different Photo Effects to 20, 8MP photos and save them to JPEG/WebP format.	
Stand by	Device goes to standby for 1 minute.	
Gallery Scroll	Swipe through a photo gallery (90 seconds).	
Stand by	Device goes to standby for 1 minute.	
Detect Faces	Organize a photo album based on whether it has faces or not.	
Audio	Play an audio clip for 3 minutes.	
Browser Scroll	Browse Web pages from remote location (2 minutes).	Browse local (cached) Web pages (2 minutes).
Video Playback	Stream a 2-minute 720p H.264 video clip from Internet.	Play a 2-minute 1,080p H.264 video clip from local storage.
Create Photo Collages	Create five photo collages from 20, 8MP photos.	
Stand by	Device goes to standby for 1 minute.	
Encrypt Personal Content	Encrypt and decrypt photos, video, and an audio clip (~2 minutes)	
Audio	Play an audio clip for 3 minutes.	
Create Slideshow	Create a video slideshow (720p; H.264; 20 seconds) using 20 images with different transitions and effects.	
Stand by	Device goes to standby for 1 minute.	
Grid Scroll	Scroll the list of apps on the device (90 seconds).	
Stand by	Device goes to standby for the rest of the 45-minute cycle.	

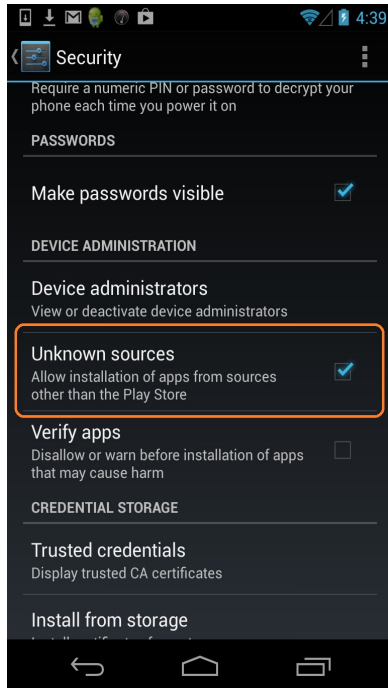
**Figure 1: Comparison of network mode and airplane mode.**

After completing a test run, the benchmark displays a results page. Details include the estimated battery life with a 95 percent confidence interval and the performance score. The detailed results information also includes the test's actual test duration. For a rundown test, users can also compare expected battery life to the test's actual elapsed time. Results of the complete rundown test and the seven-iteration test should be similar. However, because rundown test uses a larger number of iterations, the results will generally have a smaller confidence interval. Our testing shows that the benchmark's estimated battery life is very close to the battery life

recorded during a full rundown test. For details about how the results are calculated, see the [BatteryXPRT for Android design document](#).

## Installing the benchmark

1. Configure the test device to allow installation of apps from local storage.

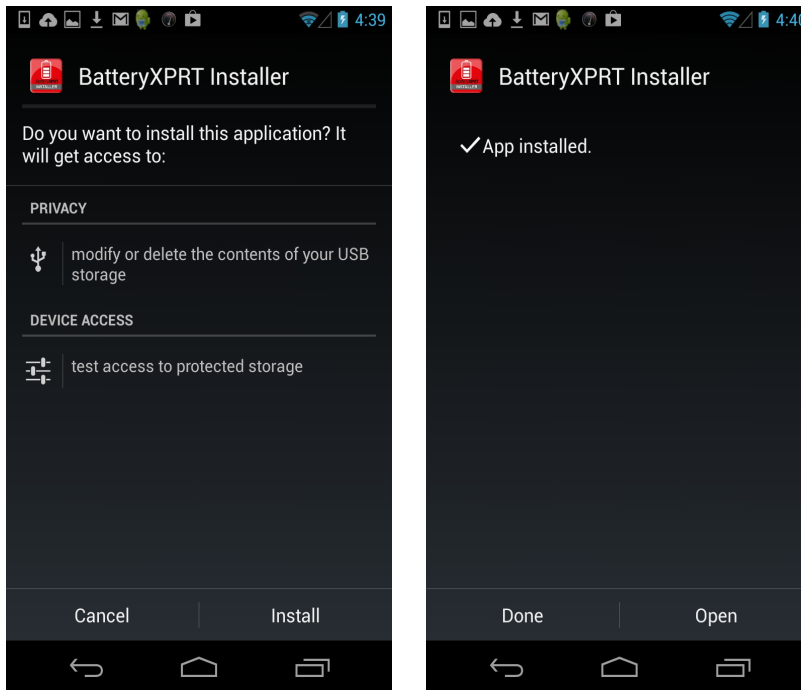


2. Go to [BatteryXPRT tab in the members](#) area to download the BatteryXPRT installer.
3. Copy the installer APK file to /phone or /sdcard on the Android device.
4. Click on the APK to launch the installer.  
Note: If the test device does not have a default file explorer, you may need to install a file explorer application.

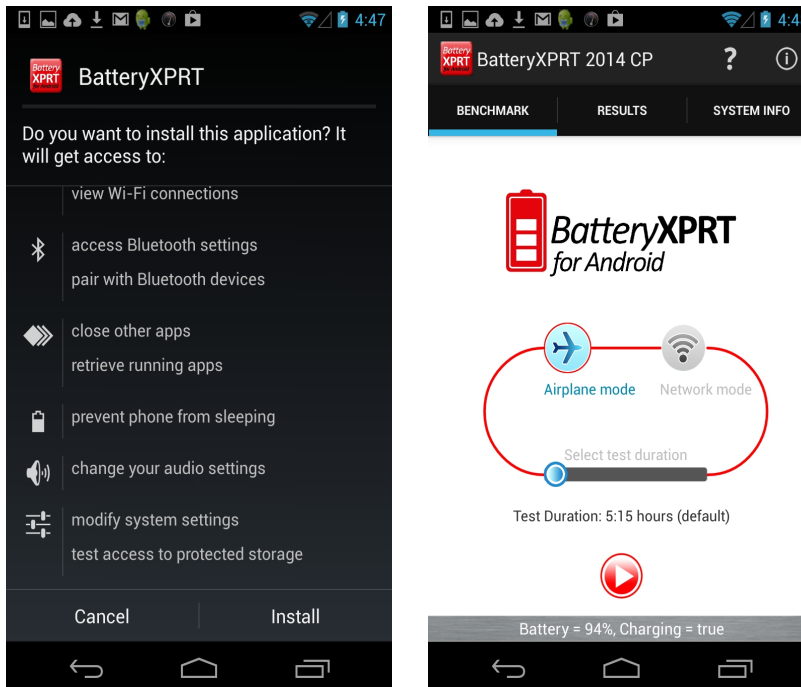


5. Click Install to start installing the BatteryXPRT Installer and other components that are required for the benchmark to run.
6. After the installation completes, click Open to start the installation of required components. The screen will show a “Copying content...” notice during the installation.

7. Click Install to start installing the Android BL Tests. After the app is installed, click Done to close the app.



8. Click Install to start installing the Android BL test app. After completing the installation, click Open to start the BatteryXPRT for Android app. BatteryXPRT installation is complete.



## Configuring the test device

The following test device configuration steps are recommended for reliable results using BatteryXPRT:

- Set the display brightness to 200 nits.
- Connect a set of ear-fitting headphones (with sensitivity of ~100 dB/1mW) to the audio port and set the noise level to 75 dB.
- Charge the battery of the device to 100 percent.
- Go to Settings | Display | Daydream, and turn Daydream OFF (Android 4.4 KITKAT only).
- Make sure any system or app update messages are addressed or dismissed completely (update notices may interrupt the benchmark run).
- Make sure to close all running apps. To do this, click on the recent apps menu item and remove all apps from the list.
- Disconnect the device power adapter.
- Configure the test device's network configuration:
  - Network mode
    - ***Note the connection type (WiFi, 3G, or 4G), signal strength, and interference will impact your BatteryXPRT test results.***
    - Connect to Wi-Fi or Cellular network.
    - Ensure the device is not searching for a network and the connected network signal strength is high and reliable.
    - If using Wi-Fi, connect to a wireless access point that is less than 10 feet from the test device.
    - Disable Bluetooth and NFC connectivity to reduce interference.
    - Test the network connection by connecting to a known Web site using an Internet browser.
  - Airplane mode
    - Turn on Airplane mode.
    - Disable Bluetooth, Wi-Fi, and NFC.

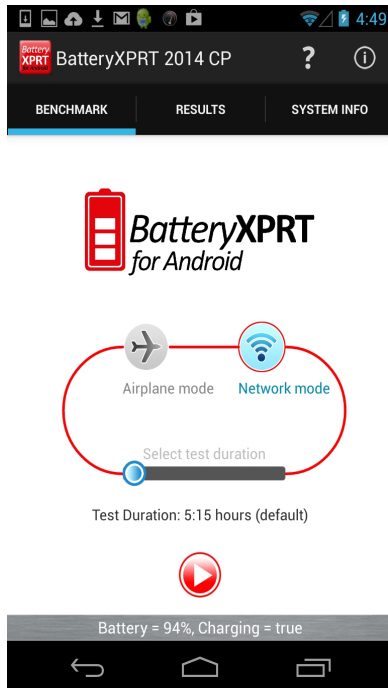
## Testing instructions

Before starting the test, please make sure the device is prepared according to the steps listed in the Test Device Configuration section. These steps are necessary in order to produce reliable numbers comparable to results from other devices.

After launching the BatteryXPRT app, perform the following steps:

1. Select Airplane mode or Network mode, according to the test you wish to run.
2. Disconnect the device from its power adapter.

3. Verify that the current battery capacity is at least 95 percent.
4. Click the red Start button to begin the test. For the default seven-iteration test, it takes approximately 5 hours and 15 minutes to complete the run and present the results.

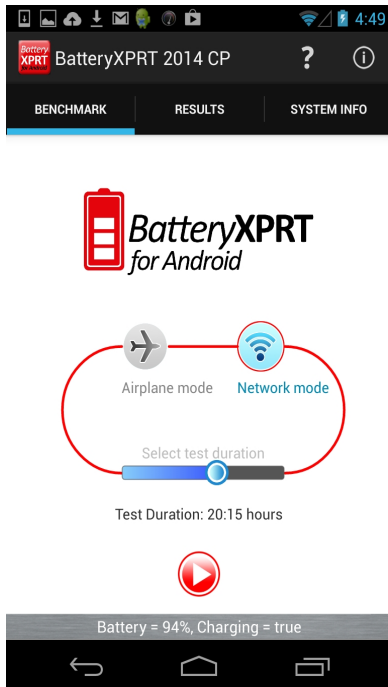


After a successful run, the test shows a results screen.

## Running with more than seven iterations

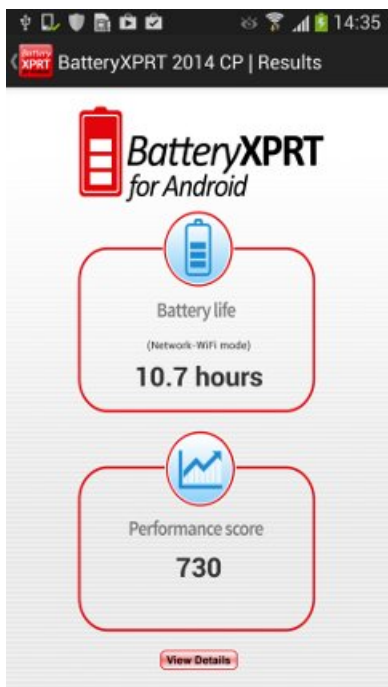
BatteryXPRT for Android provides the ability to run the test for more than seven iterations. Using this approach, a user can choose to set the test duration to a time longer than the expected battery life for the device. Currently, rundown mode allows users to select up to 30 hours of run time.

To run the test longer than the default seven iterations (5:15 hours), use the slide bar to set the duration of the run. When set to the maximum allowed duration, the benchmark will run the test until the desired duration is reached or the device runs out of battery power – whichever comes first.



## Results

At the end of a successful test, results are automatically displayed. The results show the performance-qualified battery life.





Results for all successful previous tests are archived on the test device, and can be accessed by clicking the Results tab on the main screen.

## Uninstall

BatteryXPRT can be uninstalled from the device Application Manager. The BatteryXPRT Tests component must be uninstalled separately from the Application Manager.

## OS versions

BatteryXPRT is designed to run on devices with Android 4.2 and above.

## Known Issues

1. On some devices (example: Lenovo\* K900), BatteryXPRT does not exit standby mode, and test runs will not complete successfully.

Workaround: Adjust the following settings to allow the device to exit standby when necessary:

- a. Go to Settings | Feature Settings.
- b. Select the System wake-up control option.
- c. Choose the BatteryXPRT and BatteryXPRT Tests apps.

## Technical Support

Contact us at [BenchmarkXPRTsupport@principledtechnologies.com](mailto:BenchmarkXPRTsupport@principledtechnologies.com) for technical support.