MobileMark® 30

Revision 1.0 Initial release

About BAPCo

Business Applications Performance Corporation (BAPCo®) is a non-profit consortium with a charter to develop and distribute a set of objective performance benchmarks for personal computers based on popular computer applications and industry standard operating systems.

For more information about BAPCo® or a complete list of the current membership, see our website at http://www.bapco.com.

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1 Introduction

MobileMark® 30 is the latest version of the premier performance qualified battery life benchmark for mobile PCs. It features real world applications, updated workloads, and support for Microsoft Windows® 10 64-bit.

MobileMark 30 gives commercial and government IT decision makers, retailers, media, channel buyers, consultants, component designers, hardware designers, and manufacturers an objective, easy-to-use tool to evaluate the performance-qualified battery life of mobile PCs across the wide range of activities that a user may encounter.

MobileMark 30 is designed for those who want to:

- Evaluate and compare Windows x64-based mobile PC devices on performance-qualified battery life.
- Provide useful information to their audience(s) to assist in the evaluation and purchase of these devices.
- Evaluate mobile PC devices to better tune & optimize.

Unlike benchmarks that only measure battery life, MobileMark 30 measures battery life and performance simultaneously, showing how well a system design addresses the inherent tradeoffs between performance and power management.

Unlike synthetic benchmarks, which artificially drive components to peak capacity or attempt to deduce performance using a static simulation of application behavior, MobileMark 30 uses real applications, real user workloads, and real data sets to accurately measure how overall system performance impacts user experience.

MobileMark 30 builds upon BAPCo's 27-year history of building benchmarks to evaluate platform technologies. Benchmarks designed by BAPCo are the result of cooperative development between companies representing the breadth of the computing industry. They harness a consortium of knowledge to better reflect today's and tomorrow's emerging business trends.

This document describes the methodologies employed in the development of MobileMark 30. For detailed instructions on how to install and run MobileMark products, please refer to the documentation provided on the installation media and the BAPCo web site (www.bapco.com).

2 BAPCo Development Process

BAPCo creates benchmarks in accordance with the BAPCo Development Process, a set of milestones and checkpoints collaboratively developed and agreed upon by the BAPCo membership.

Early in the process, prevailing business mobile PC usage models are identified and grouped into scenarios according to their fit within a workflow. Applications are selected for each usage model based on market research and technical feasibility.

BAPCo members then join with expert application users in development sessions to collaboratively develop a workload specification for each scenario, defining each user/computer interaction which is to be simulated by the benchmark.

The goal of the development sessions is to produce representative business application workloads for the benchmark. Each application workload consists of three elements: the input data set, the tasks performed on the input data set, and the generated output. An example of generated output would be an image generated through an iterative process of steps to create a desired appearance. These three elements of the workload are chosen to represent the workflow of a user skilled in each given application.

After the workload specifications are created at the development sessions, BAPCo developers implement the workloads according to those specifications while satisfying benchmarking constraints to ensure the stability of the benchmark, the consistency of results, and the feasibility of implementation and distribution of the benchmark.

2.1 Milestone Overview

The BAPCo development process is divided into six major phases (Initialization, Design and Planning, Implementation, Validation, Characterization and Launch). Each phase consists of a series of milestones, some of which may be worked on concurrently.

The membership must vote to close each milestone. Once all the milestones within a phase are complete, the membership must vote to exit the current phase and enter the next phase. BAPCo members work in a collaborative process where decisions regarding products are sometimes made by majority vote rather than unanimously.

The following is the list of the development phases and the corresponding milestones. Some of these milestones are explained in greater detail in the following sections, as noted in this list.

1. Initialization Phase
    a. Milestone 1 – Committee kickoff
    b. Milestone 2 – Benchmark market and customer analysis
    c. Milestone 3 – Product positioning and customer value proposition
    d. Milestone 4 – Preliminary marketing requirements document
    e. Milestone 5 – Final marketing requirements document
2. Design and Planning Phase
    a. Milestone 6 – Preliminary engineering requirements document
    b. Milestone 7 – Usage model selection (see section 2.2)
    c. Milestone 8 – Application selection (see section 2.3)
    d. Milestone 9 – Define member resource commitments
    e. Milestone 10 – Define development infrastructure
    f. Milestone 11 – Define scoring methodology (see section 2.4)
    g. Milestone 12 – Define application/API licensing requirements
    h. Milestone 13 – Plan and execute workload development sessions (see section 2.5, 2.6)
    i. Milestone 14 – Define product release criteria
3. Implementation Phase

   a. Milestone 15 – Create implementation schedule
   b. Milestone 16 – Determine reference system (see section 2.7)
   c. Milestone 17 – Software engineering (see section 2.8)
4. Validation Phase
   a. Milestone 18 – Validation testing
   b. Milestone 19 – Define risk management plan
5. Characterization Phase
   a. Milestone 20 – Characterization testing
6. Launch Phase
   a. Milestone 21 – Product pricing
   b. Milestone 22 – Pre-launch materials
   c. Milestone 23 – Release to manufacture vote and sign-off
   d. Milestone 24 – Distribute early press evaluation
   e. Milestone 25 – Duplicate and distribute media
   f. Milestone 26 – Post-launch materials

2.2 Usage Model/Scenario Selection

In Milestone 6 of the BAPCo Development Process, usage models are chosen for inclusion in a benchmark. For MobileMark 30, BAPCo chose a wide variety of usage models in which the user experience is influenced by system performance.

BAPCo then groups related usage models into the following professional scenario group (for detailed descriptions of each scenario, please see section 2.6):

The scenario models for professional usage including word processing (mail merge, document comparison, and PDF conversion), spreadsheet data manipulation (payroll, stock analysis, financial forecasting), email creation/management, presentation editing, and photo editing/manipulation.

2.3 Application Selection

In milestone 7, after the usage models have been collected into scenarios, applications are chosen for the scenarios based on market research and technical feasibility.

Sufficient lead time is needed after the applications are selected for BAPCo to develop workloads, integrate the applications into the benchmark, and perform validation of the benchmark. Therefore, some of the application versions are not the newest available at the time of the launch of MobileMark 30.

The criteria that BAPCo uses for application selection includes, but is not limited to:

- Ability of the application to perform the needed task
- Applications with broad install base
- Minimum system requirements of the application
- Hardware support of the application
- Diversity of application vendors

For MobileMark 30, BAPCo has identified the following representative applications for the professional usage scenario.

2.3.1 Professional

- Corel WinZip 26.0 Enterprise
- Microsoft Excel® 2021 Professional Plus VL
- Microsoft Outlook® 2021 Professional Plus VL
- Microsoft PowerPoint® 2021 Professional Plus VL
- Microsoft Word® 2021 Professional Plus VL
- Adobe Photoshop® CC (25.0)

2.4 Scoring Methodology

In milestone 11, BAPCo decides the types of results that will be produced by a benchmark and the scoring methodology that determines how those results are calculated.

Importantly, BAPCo determines the scoring methodology before determining the content of the workloads, which helps ensure that a methodology is chosen for its ability to generate results that correspond to user experience, not for the results it produces on a pre-determined set of workloads.

For MobileMark 30, BAPCo evaluated the merits of a variety of scoring methodologies and chose a methodology on the basis of how it met the following criteria:

- The scoring methodology should give expected results:
    - The resulting score should differentiate between systems with different performance.
    - The resulting score should be repeatable and not have high variation.
    - The resulting score should not be affected by benchmark artifacts, such as the number of tasks within a scenario.
- The relative performance between any two systems should not be affected by the selection of the calibration system.
- The resulting score should reflect the performance of user initiated multitasking operations.
- The scoring methodology should be easy to understand.

MobileMark 30 measures system performance by measuring the response time of tasks on a PC using real applications and simulated user input while executing on DC (battery) power. In the MobileMark 30 scoring methodology, task response times are used to generate a DC performance rating that reflects the user experience. The faster a PC responds to the application workloads in MobileMark 30, the higher its MobileMark 30 DC performance rating will be.

MobileMark 30 produces three main scores at the conclusion of a successful run: MobileMark 30 Index score, Battery Life score, and the DC Performance score. The SUT must complete at least one iteration of the MobileMark 30 workload to report scores

2.4.1 Battery Life Rating

The battery life rating for MobileMark 30 is calculated by measuring the actual battery duration observed (from a fully charged state to a fully depleted state), in whole minutes, while running performance scenario in repetition. For readability, the battery life rating is displayed in hours and minutes in the PDF report and in the benchmark UI.

The MobileMark 30 battery life rating for a given machine may differ from the actual battery life real end users. Some reasons for this include but are not limited to:

- Different usage characteristics when using the system
- An old or degraded battery
- Additional OEM/IT software installed on the system
- Heavier network traffic
- Different power settings/optimizations
- Different screen brightness

2.4.2 DC Performance

The DC performance score is the relative performance rating of the SUT vs the MobileMark 30 reference system on DC (battery) power. The MobileMark 30 reference system scores 1000 for the DC performance rating, therefore a SUT with a 1500 DC performance rating is performing 50% faster than the reference system. For more information on how the DC Performance score is calculated refer to section section 2.4.

The Professional scenario rating is calculated by taking the sum of the response times of tasks in that scenario as performed on the test system and then comparing it with the sum of those same task response times as performed on the calibration system (see section 2.7). The calibration sum is divided by the measured sum on the test system and multiplied by 1000. The result is then rounded to the nearest integer.

The calibration scenario rating number is obtained by performing a complete MobileMark 30 rundown test on the calibration machine and for Professional scenario taking the median value of the sum of response times in the set of completed iterations for that scenario.

2.4.3 MobileMark 30 Index

The MobileMark 30 Index score combines the Battery life score (in minutes) and the overall DC performance score into a single metric, showing the balance between battery life and performance. A higher MobileMark 30 Index value is better. The formula for calculating the MobileMark 30 Index score is as follows:

$$MobileMark\ Index\ = \left(\frac{Battery\ Life\ in\ minutes * DC\ Performance}{1000}\right)$$

The chart below uses example scores to illustrate the how the battery life and DC Performance scores influence the MobileMark Index score:

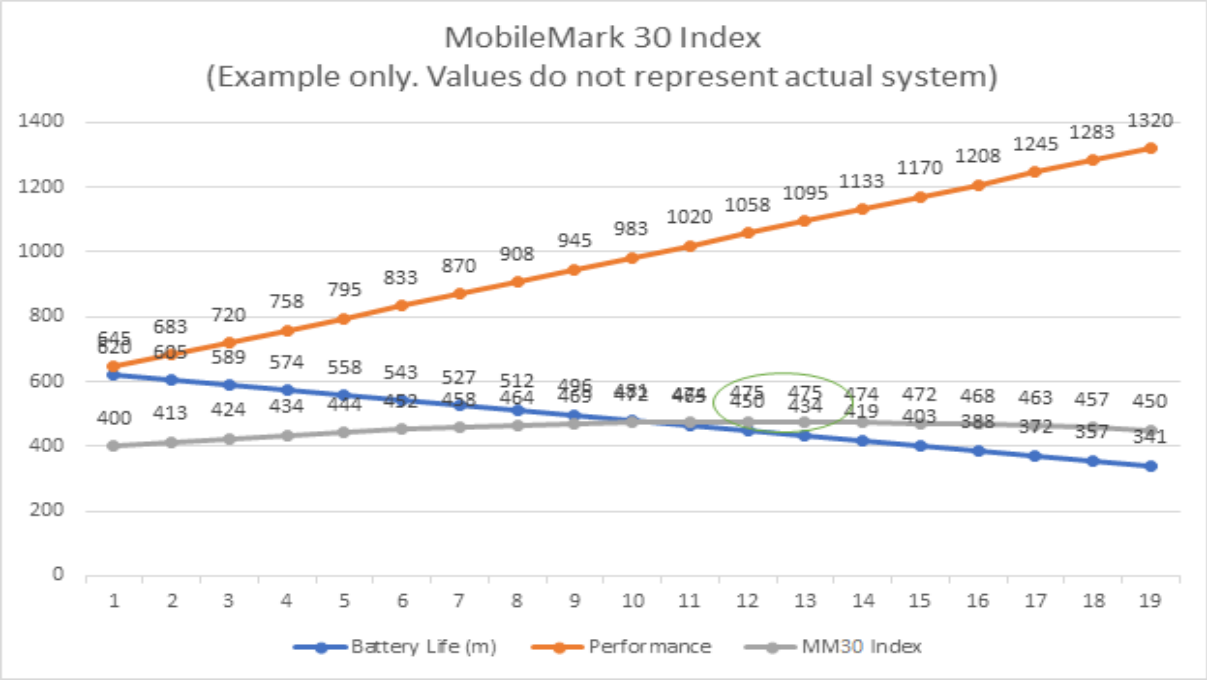


Figure 1: MobileMark 30 Index score, example data. Chart illustrates the optimal point for battery life and performance.

In general, battery life (represented by the blue line) and DC Performance scores (represented by the orange line) are inversely proportional. As the battery life score increases, the DC Performance score decreases, and conversely, as DC performance increases, battery life drops. Customers may value long battery life, but not at the cost of a poor user experience.

This is where the MobileMark 30 Index (represented by the grey line) offers guidance to PC OEMs in the design phase, and to customers in the purchasing phase. The MobileMark 30 Index shows the convergence point where a balance of battery life and DC Performance create the best overall user experience. For this illustration, we have circled the point (in green) on the chart where DC Performance is maximized while still providing a balanced battery life. Notebook manufacturers can use the MobileMark 30 Index score to target this balance when designing systems, and PC consumers can use the same information when making purchasing decisions.

2.4.4 Battery Life Estimation

During testing, once a scenario has completed, projected battery life ratings are calculated and displayed in the heads-up display. These values are rough estimates, reflecting the system behavior in the benchmark up to that point, and subject to the accuracy of the test system's battery level reporting mechanism.

The battery life rating estimate b_e is calculated using the following formula:

$$b_e = \frac{t(c_t)}{c_t - c_n}$$

Where:

t is the elapsed time since the test was started, in minutes.

c_t is the level of charge the battery reports having the capability to hold when fully charged, in any units as reported by the battery (typically amp-hours or watt-hours).

c_n is the level of charge reported by the battery presently, in the same units as c_t.

2.5 Workload Development Sessions

Once the usage models, scenarios, application models, and scoring methodology for the benchmark are decided, BAPCo members and application experts meet to create the application workloads that will be used in the benchmark.

For MobileMark 30, the workload development sessions consisted of one week of face-to-face meetings that included representatives from BAPCo member companies and expert application users who had professional experience with the applications chosen for the benchmark. The application experts included professionals in the fields of small business marketing, financial forecasting, graphic design, video editing, web development, and enterprise IT deployment.

In the workload development sessions, the experts take the lead, weaving the usage models supplied by BAPCo into a storyboard of user interactions with a series of application models. Each user interaction is written down in a workload specification, which is later used to automate the workloads.

At the end of the workload development sessions, BAPCo comes away with a detailed workload specification for each of the benchmark scenarios and all the input data sets needed to reproduce the workloads created at the sessions.

2.5.1 Additional Workload Considerations

The following additional factors were considered at the workload development sessions:

Input Data Set
Frequently in the sessions, the experts need raw digital content to serve as input data set for a workload. Examples of such content might include a video to transcode, an email to modify, or photos to manipulate. When experts need such content, care is taken to ensure that they use something that is functionally representative of content they might use or encounter professionally.

For instance, if pictures are needed in order to create a photo slideshow, an expert might walk outside and take pictures using the same equipment he/she uses professionally. If a song track is needed as the background music for creating a movie, an expert might purchase a stock track from his/her usual online resource. Like the user interactions, all of these source materials are captured at the development session and used later in the development of automated workloads.

2.6 Scenario Workload Descriptions

The scenario workloads created at the workload development sessions for MobileMark 30 are described below:

2.6.1 Professional

Read and manipulate notes from a notebook. Archive a diverse set of files into a single compressed file. Convert a PDF document into an editable word processing document. Perform a mail merge. View a complex presentation that includes multimedia and export it to PDF/video. Unpack a single compressed archive with a diverse set of files. Use a spreadsheet program to do data analysis. Perform financial analysis using a spreadsheet program. Apply various filters to a group of photos.

2.7 Calibration System

The calibration system is a system chosen in Milestone 16 as a reference point for all other MobileMark 30 results. BAPCo chose the configuration below for its wide availability and its representation of a typical mainstream notebook/2-in-1 computer at the time of release of MobileMark 30.

MobileMark 30 has been calibrated in such a way that a notebook/2-in-1 computer with performance equivalent to this calibration system for a given workload will have a scenario performance rating of 1000. A system twice as fast as the calibration system on a given workload (or, equivalently, that responds in half the time on average) will have a scenario performance rating of 2000. This is true for each of the scenario performance ratings.

MobileMark 30 DC performance scores are normalized using a reference system. The reference system scores '1000' for DC performance on each scenario and '1000' on the overall MobileMark 30 DC performance score. The MobileMark 30 Index score for the reference system is ~585. The battery life of the system under test is reported in hours and minutes.

Lenovo ThinkPad T14 Gen 4 calibration system configuration details

- **Operating System:** Windows 11 Professional 22H2 (10.0.22621.xxxx)
- **Processor:** Intel 13th Generation Intel Core i5-1345U vPro Processor (E-cores up to 3.5 GHz, P-cores up to 4.70 GHz)
- **Memory:** 32GB DDR5-5200Mhz (16 GB Soldered + 16 GB SODIMM)
- **Display:** 14" WUXGA (1920 x 1200), IPS, Anti-Glare, Non-Touch, 100% sRGB, 400 nits, 60Hz, Low Power, Low Blue Light
- **Storage:** 256 GB SSD M.2 2280 PCIe Gen4 TLC Opal
- **Graphics:** Intel Iris Xe Graphics
- **Camera:** 5MP RGB+IR with Microphone
- **Battery:** 4 Cell Li-Polymer 52.5 Wh
- **AC/DC OS Power Mode:** Balanced (for DC performance measurement purposes)
- **Wireless:** Intel® Wi-Fi 6E AX211 2×2 AX

A fresh operating system installation is performed on the system.
For more details about the configuration of the calibration system, please contact support@bapco.com.

2.8 Benchmark Implementation

Once the workload specifications have been created, BAPCo begins the work of translating the workload specifications into an automated benchmark in milestone 17.

MobileMark 30 is built upon scripts that do things in much the same way as a user would, using controls like buttons, text input boxes, and menus to navigate applications. See Appendix B for screenshots of the benchmark in action.

To ensure that MobileMark 30 has deterministic behavior, BAPCo uses a framework to install applications, collect system information, run the scenario scripts, record performance measurements, calculate performance ratings, and display test results. The framework is kept lightweight, consuming a minimal amount of memory and compute resources, in order to ensure that battery life and performance measurements reflect the workload behavior and do not include overhead from the framework.

The fundamental performance unit upon which the MobileMark 30 DC Performance Rating is based is *response time*. Response time is defined as the time it takes the computer to complete a task that has been initiated by the automated script. A task can be initiated by a mouse click or a keystroke. The duration of each task is measured by the framework. Examples of tasks include launching an application, finding text in a document, copying a file, encoding a video, and performing an image manipulation.

The framework has several methods of detecting task completion, depending upon the method the application uses to signal task completion to the user. For example, the framework may wait for the application to show a completion message in the form of a pop-up window, or it may wait for a progress dialog to disappear and for control of the application to be returned to the user.

3.0 Workload Characteristics

This section provides data illustrating the battery life and performance characteristics of MobileMark 30.

3.1 User Activity States

MobileMark 30 professional aims to model users' activity over a range of tasks which are grouped into a scenario. An iteration is defined as one complete run of each of a scenario. MobileMark 30 runs iterations continuously until the system battery charge is exhausted. Each iteration contains a portion of active time and idle time as detailed in the chart below.

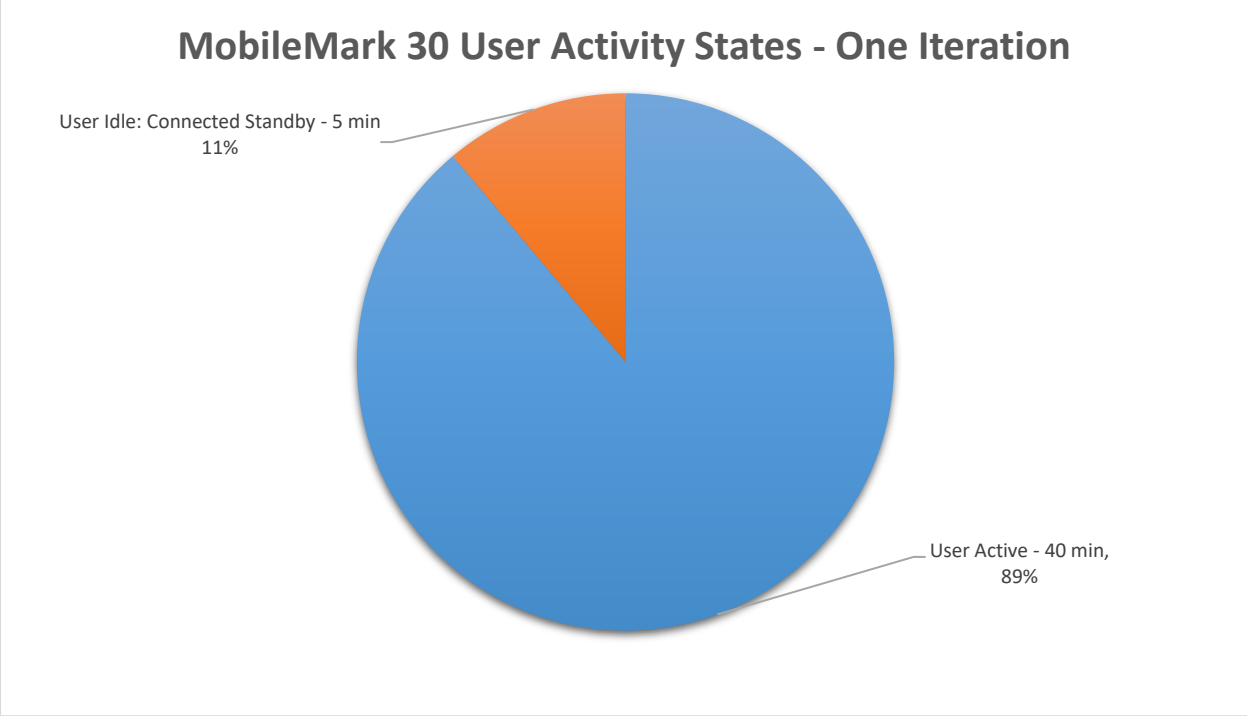


Figure 2: MobileMark 30 User activity states for one iteration

3.2 Sensitivity Analysis

The series of tables below shows the sensitivity of MobileMark 30 performance scores to different system characteristics, including the amount of system memory (RAM), number of CPU cores, type of storage device, and display resolution. The study was conducted using a desktop system to allow better control of the system components being evaluated. Another thing worth mentioning is that the effect of component sensitivity on battery life is not included in this study.

Within each configuration only one system component (e.g. memory) is varied. All the other system components are held constant. To best illustrate the sensitivity, one configuration is chosen as a baseline and the ratings for the other configurations are shown as the percentage difference relative to the baseline.

Sensitivity study system configuration information

- CPU: Intel Core i9-12900k, E-Cores, Turbo and HT disabled
- RAM: 2x32gb DDR5 5200 (64gb dual channel)
- Storage: Samsung 980 Pro 500gb
- GPU: Intel UHD 750
- Resolution: 1920x1080
- OS: Windows 11 Pro version 10.0.22000.282

For the tables below, the following components are varied as noted:

- System Memory:
    - 1x8gb
    - 2x4gb
    - 1x16gb
    - 2x8gb
    - 2x16gb

- CPU - Cores adjusted in OS settings
    - 2 PCores
    - 4 PCores
    - 6 PCores
    - 8 PCores

- Storage
    - Seagate 500GB ST500LT012 @ 5400rpm
    - Western Digital 1TB WD1003FZEX @ 7200rpm

- Intel 545s SSD SATA 3.0 256 GB
- Intel Optane 660p NVME 512GB
- Samsung 980 Pro NVME 500GB
- Intel Optane 900p PCIE 260GB

- Graphics
  - Intel UHD 750
  - NVIDIA GTX 1650
  - NVIDIA RTX 2060
  - NVIDIA RTX 3080
- Resolution
  - 1280x800 @ 60Hz
  - 1366 x 768 @ 60Hz
  - 1920 x 1080 @ 60Hz
  - 2560 x 1600 @ 60Hz
  - 3840 x 2160 @ 60Hz

3.2.1 Sensitivity to System Memory

The total system memory for single channel are 4 GB and 16 GB. For dual channel the 4 GB and 16 GB. E-Cores, Turbo and HyperThreading were disabled for this study.

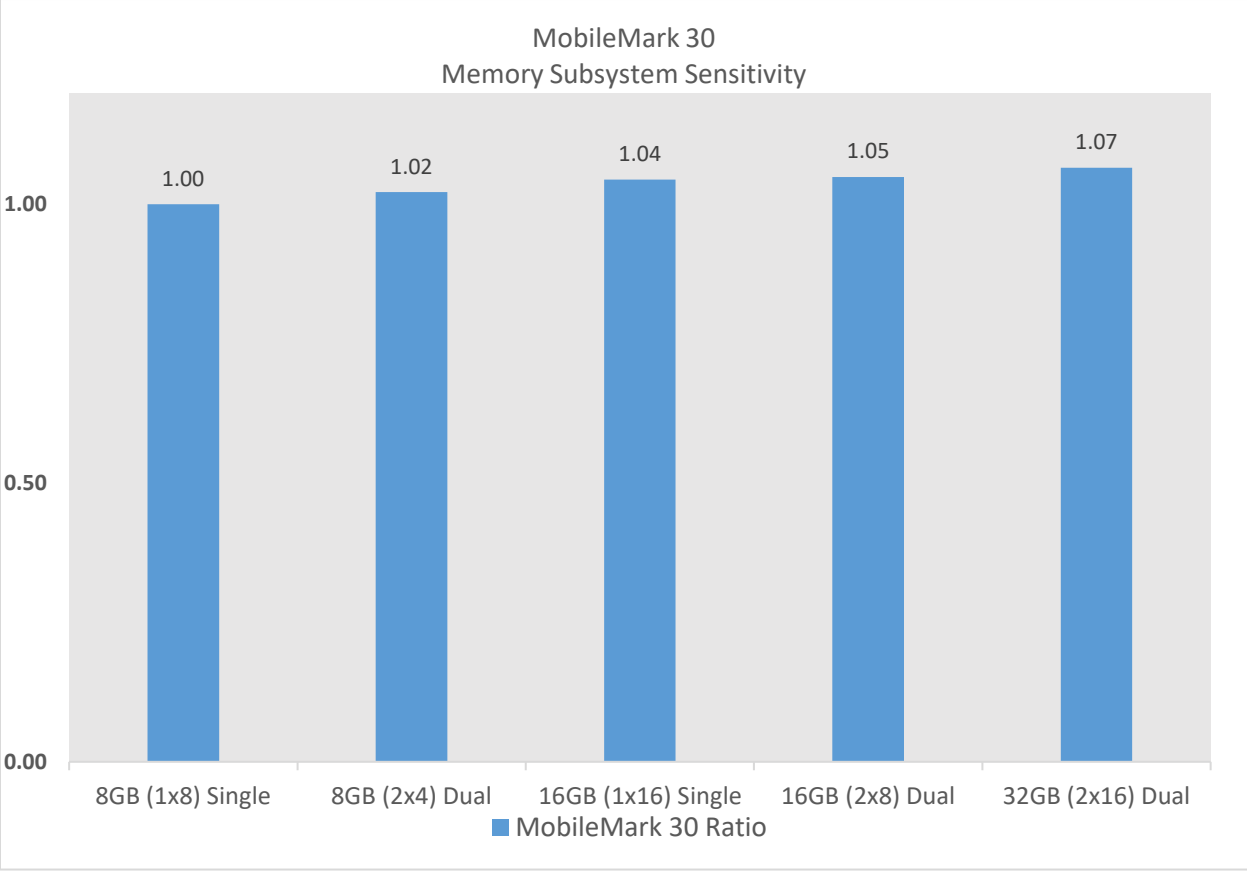


Chart 1: System Memory Sensitivity

3.2.2 Sensitivity to CPU Cores

Cores and threads available to the system were limited using Windows OS settings. E-Cores, Turbo and Hyper-Threading were turned off for all configs.

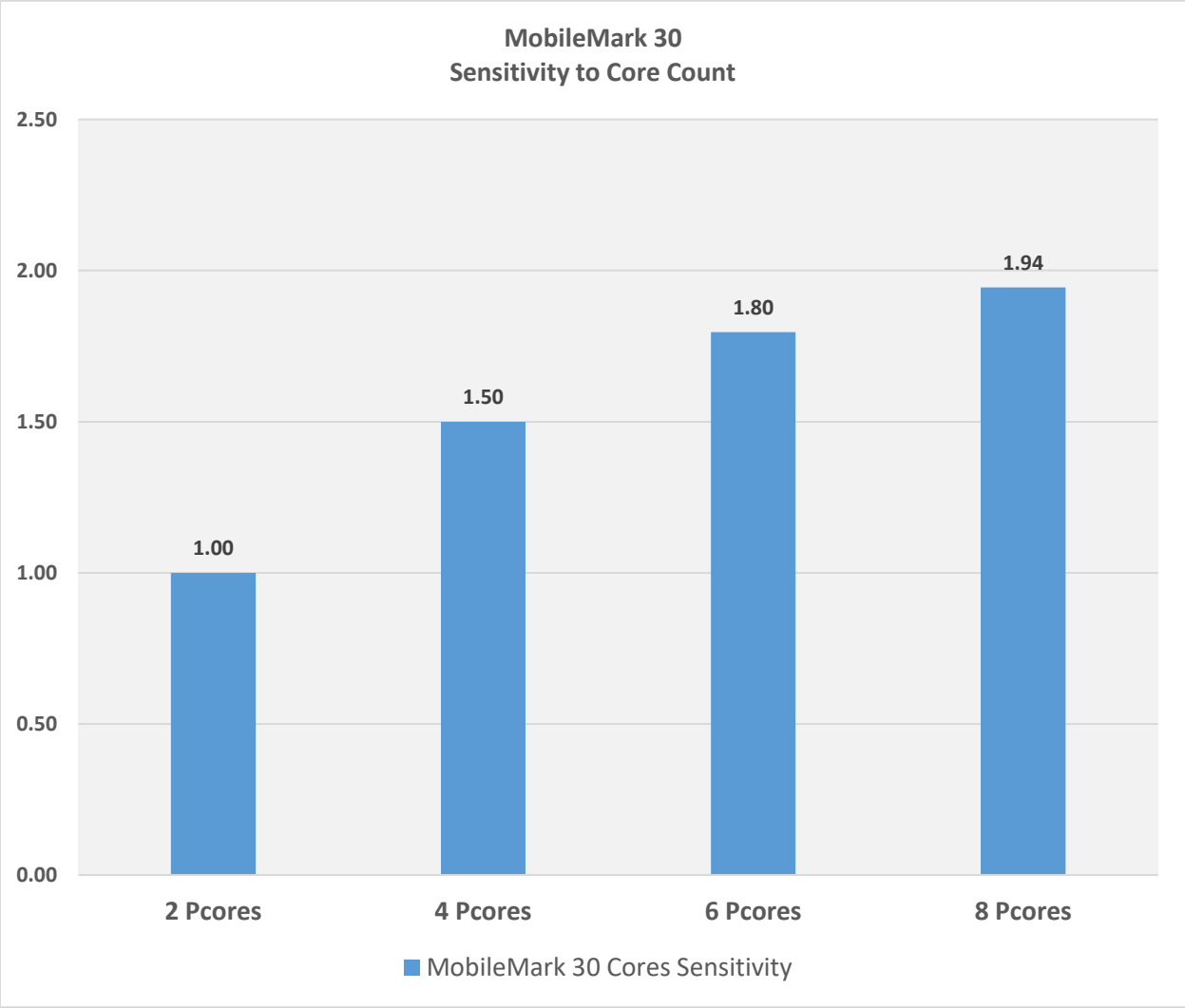


Chart 2: CPU Core Sensitivity

3.2.3 Sensitivity to I/O Subsystem

The primary storage device is changed from a 5400 RPM hard disk drive to a 7200 RPM hard disk drive to a 240 GB Sata SSD.

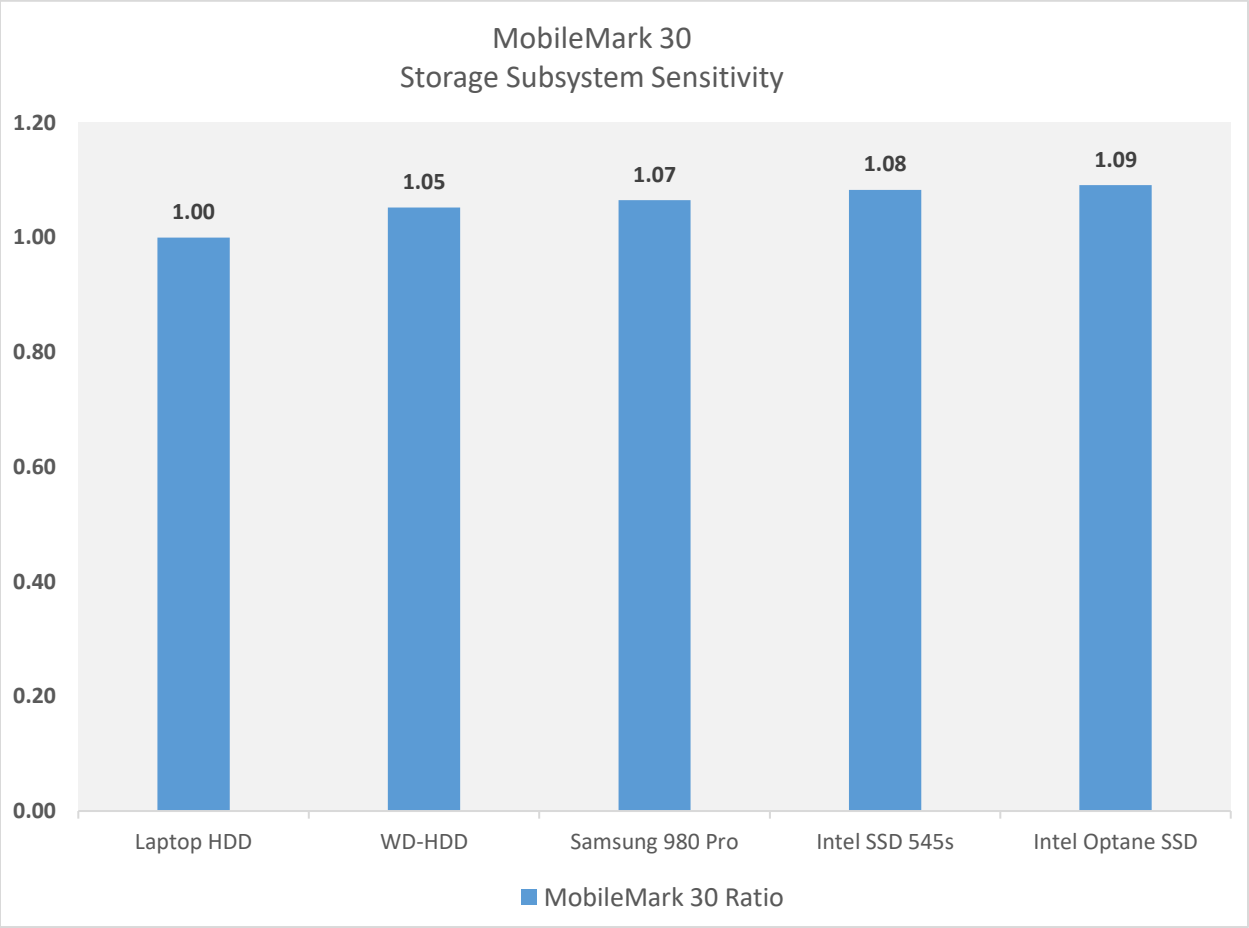


Chart 3: I/O Subsystem Sensitivity

3.2.4 Sensitivity to Graphics Card

The system graphics controller is changed from the Integrated GFX to various models of discrete graphics cards.

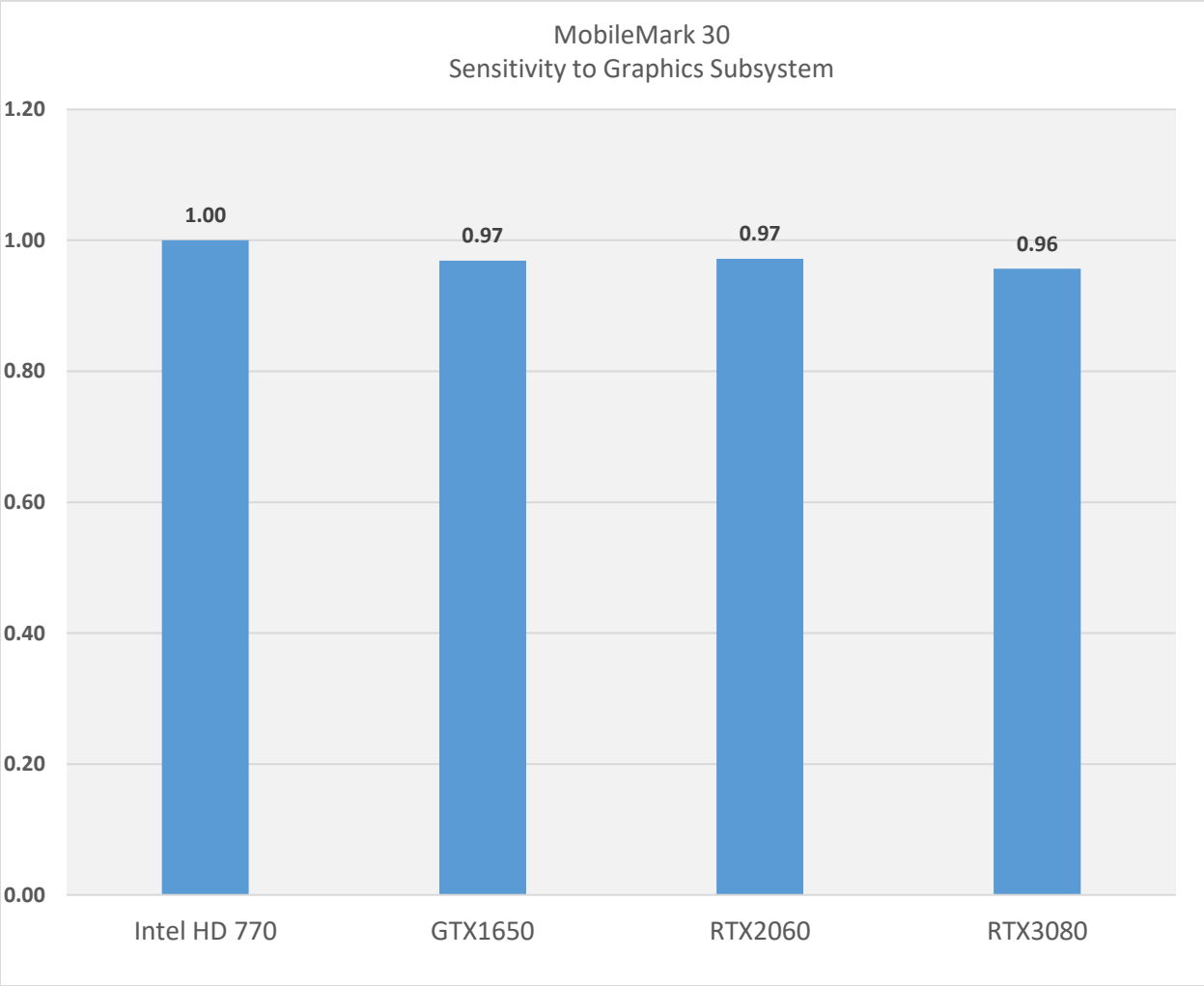


Chart 4: Display Resolution Sensitivity

3.2.5 Sensitivity to Display Resolution

The system display resolution is changed, from 1366 x 768 to 1920 x 1080 to 2560 x 1440 to 3840 x 2160.

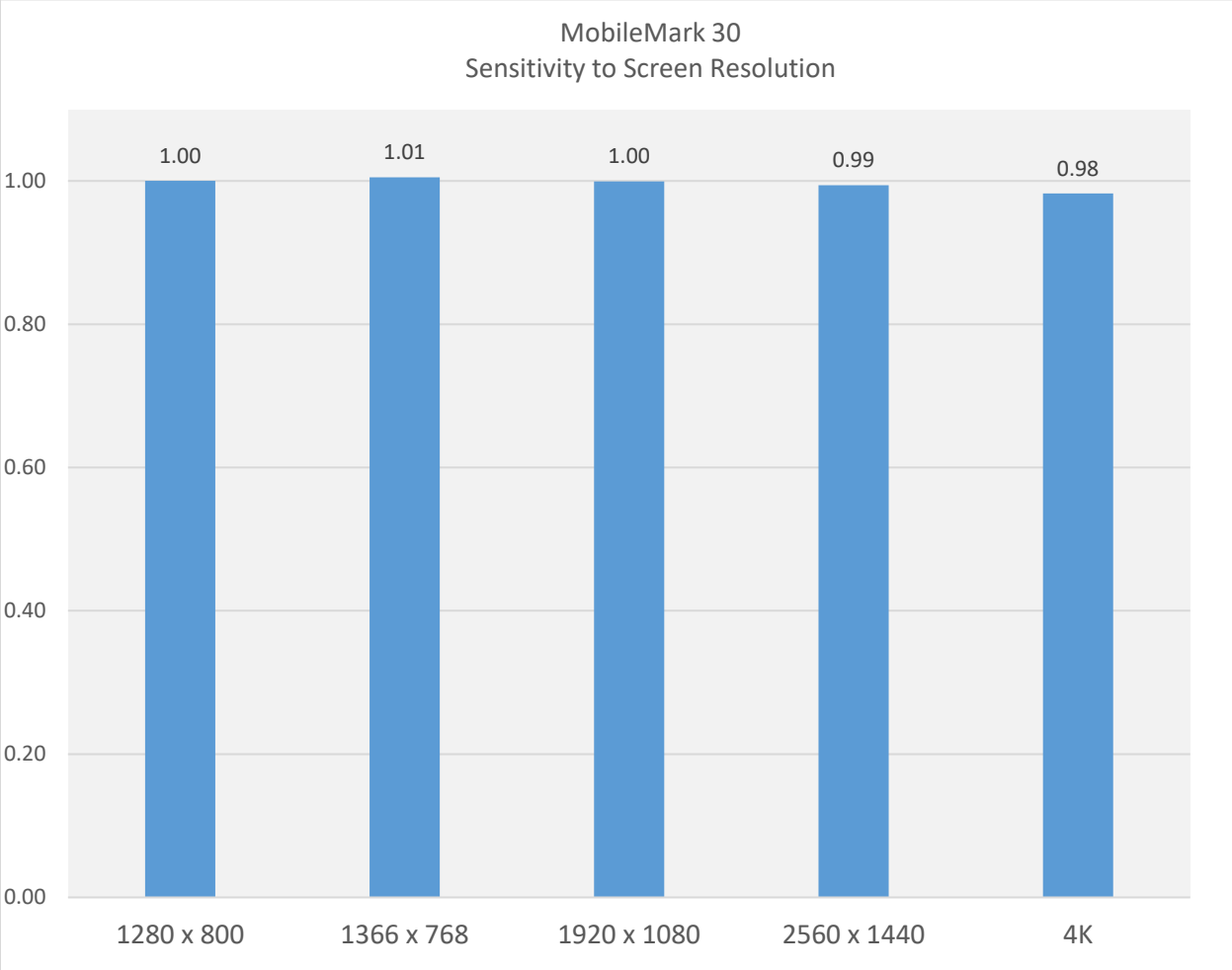


Chart 5: Display Resolution Sensitivity

3.3 Iteration User Activity Analysis

The following chart shows the order each activity is run in and its relative time in an iteration for the professional scenario.

Due to system implementation differences, this chart is accurate for the calibration system only. These contributions will vary from one system to the next.

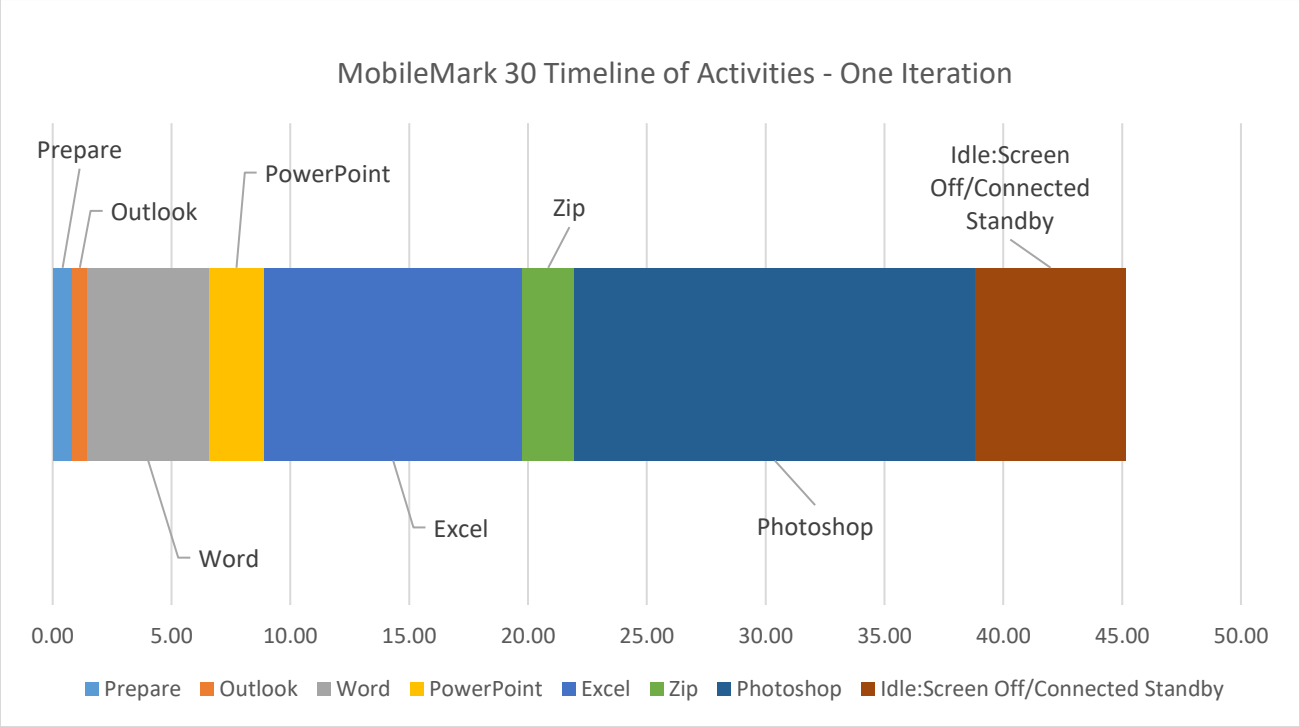


Figure 3:: MobileMark 30 timeline of activities for one iteration on the Calibration System (See Section 2.8 for system details).30

3.4 DC Performance Rating Analysis

The following charts shows the approximate contribution of each application to the MobileMark 30 DC Performance Rating on the calibration system.

Due to system implementation differences, this chart is accurate for the calibration system only. These contributions will vary from one system to the next.

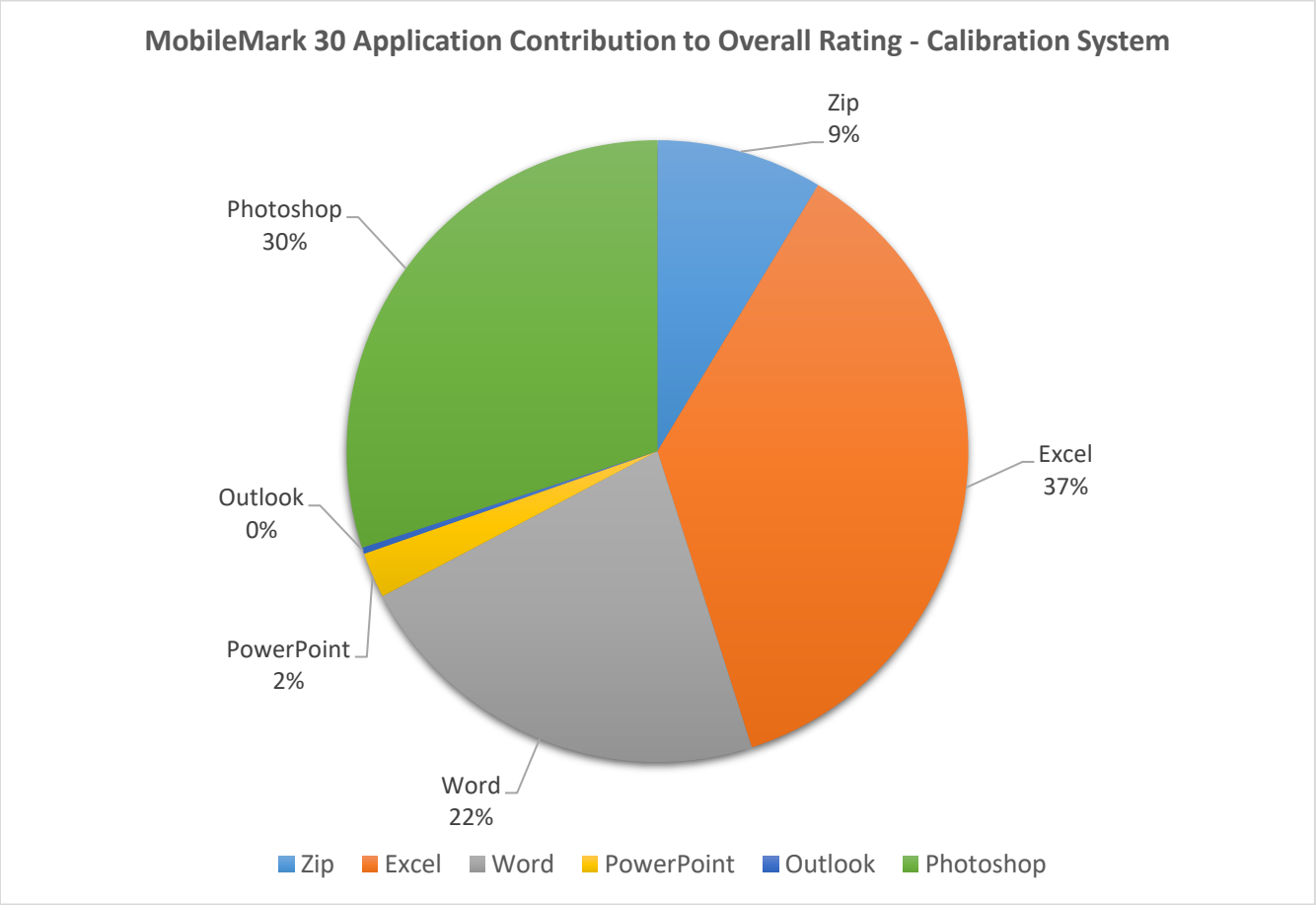


Figure 4: MobileMark 30 timeline of activities for one iteration on the Calibration System (See Section 2.8 for system details).30

APPENDIX A: System Requirements

MobileMark 30 has the following minimum system requirements:

- **CPU:** 2015 or newer x86 processor (Intel 6th Generation Core or newer, AMD A6/A8/A10-7000 series APU or newer), 2GHz or higher, dual core or higher
    - **NOTE**: OS Power modes may reduce performance below minimum hardware requirement levels. CPU must be capable of 2GHz or higher during the entirety of the test.
- **RAM:** 16 GB
- **Storage (primary boot drive):** 30GB of free space.
- **Operating System:** Microsoft® Windows® 11 64-bit 22H2 (10.0.22621.xxxx)
- **Minimum Display Resolution:** 1366×768
- **Graphics:** DirectX 12 compatible, 2GB of VRAM
- **Supported Languages:** English (US)
    - Additional languages to be added in future update: Brazilian Portuguese, Simplified Chinese, French, German, Italian, Japanese, Polish, Spanish (SP)

APPENDIX B: Screenshots

The screenshots below illustrate the user interface and workloads included in the current version of MobileMark 30. These screenshots may not depict future releases of MobileMark 30.

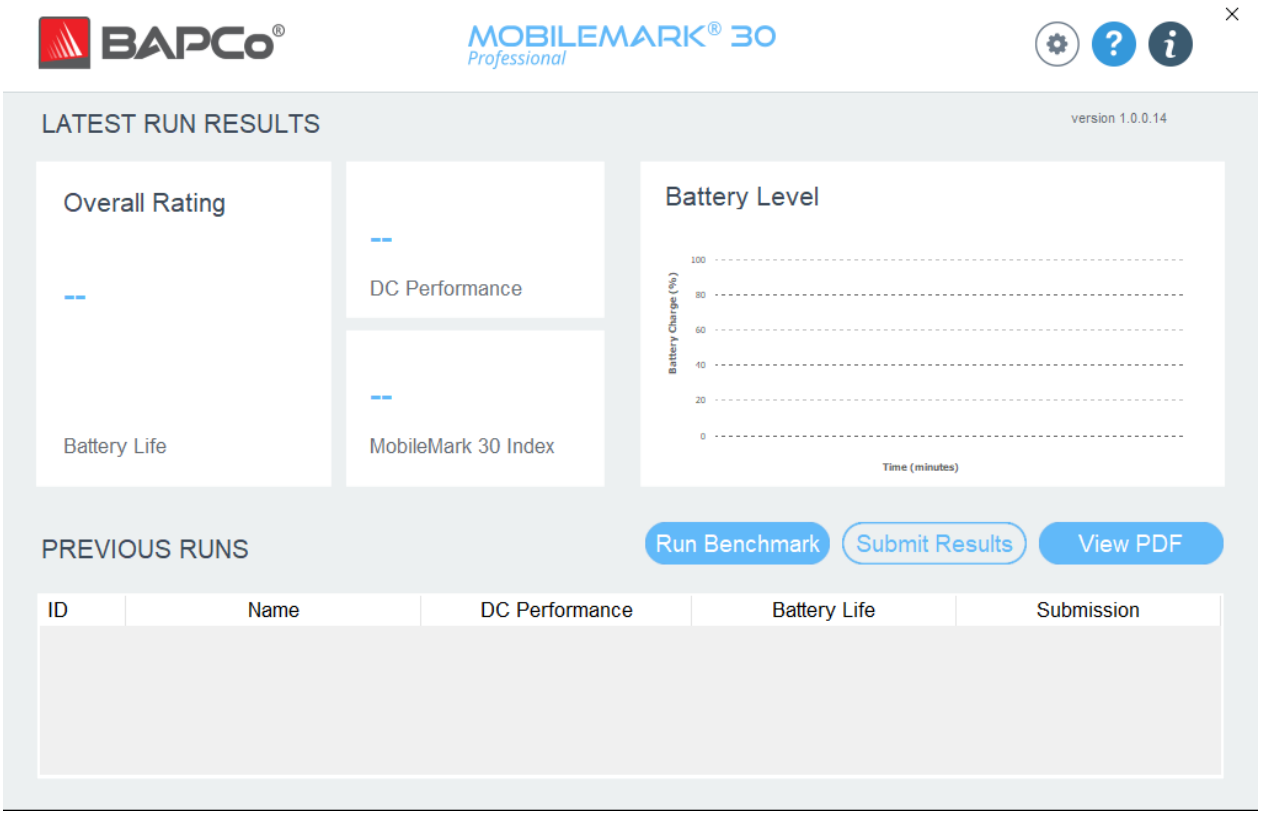


Figure 5: MobileMark 30 launch screen

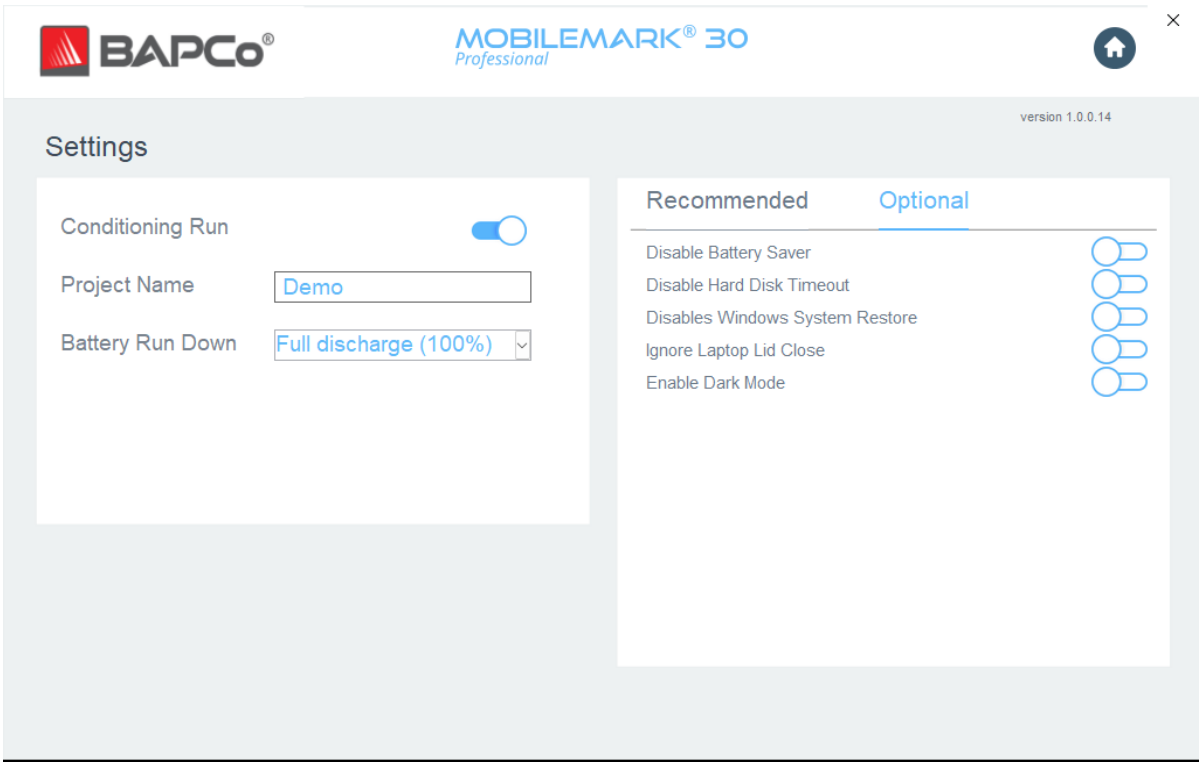


Figure 6: MobileMark 30 Config Tool settings

Figure 7: MobileMark 30 Heads Up Display

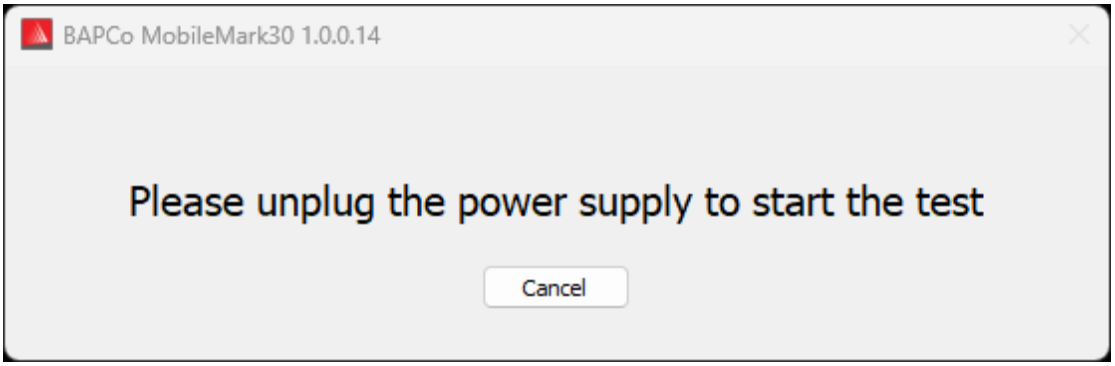


Figure 8: MobileMark 30 prompt to unplug

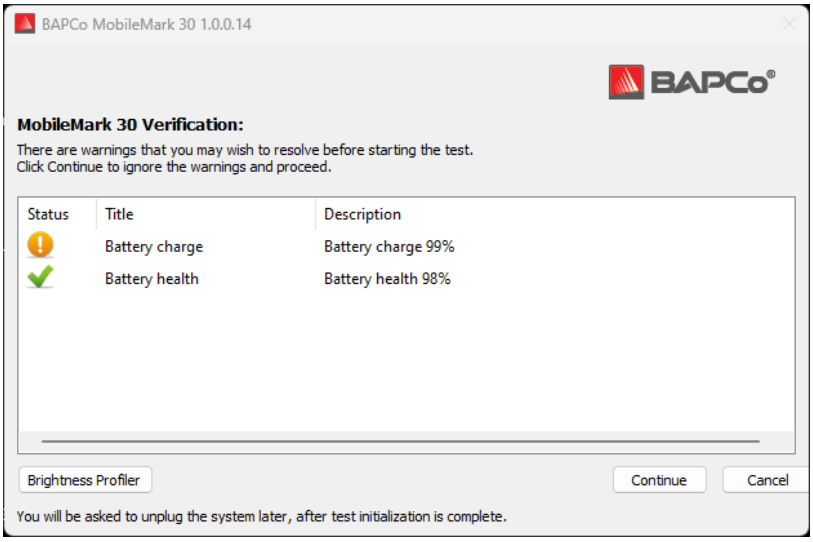


Figure 9: MobileMark 30 verification screen

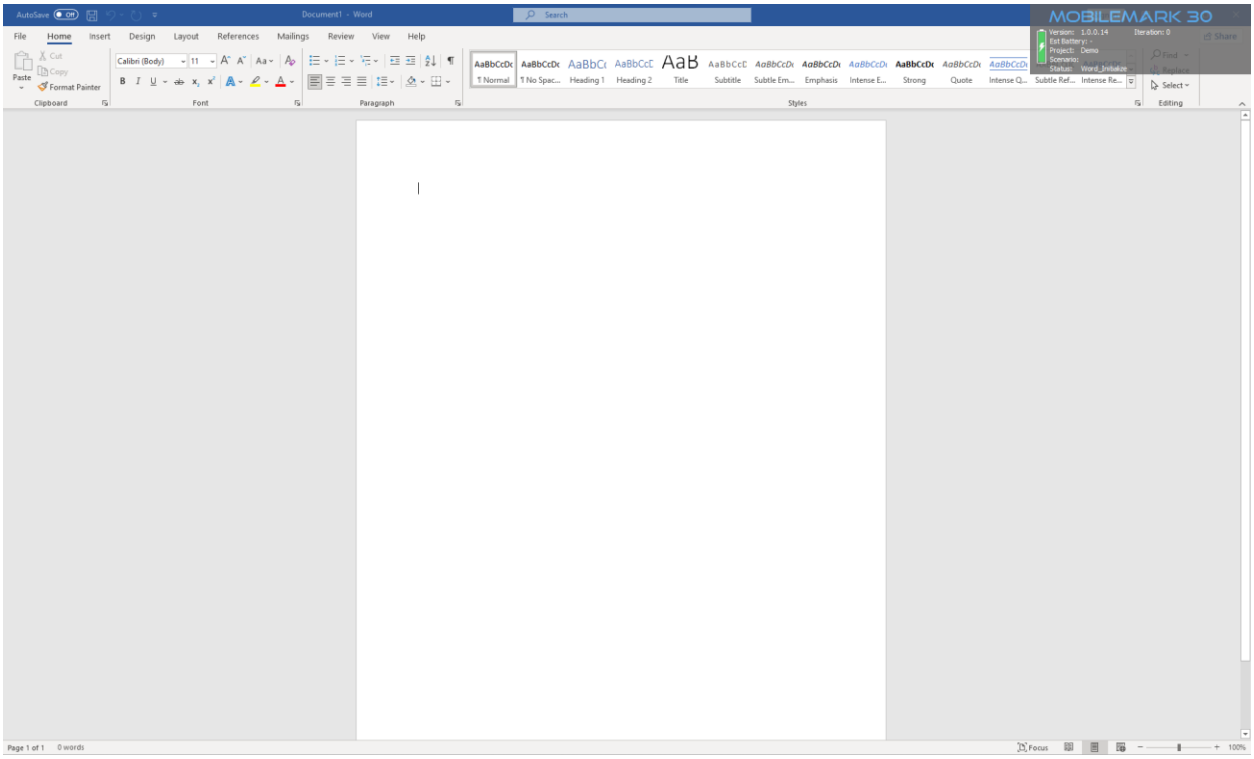


Figure 10: MS Word, part of the MobileMark 30 Professional scenario

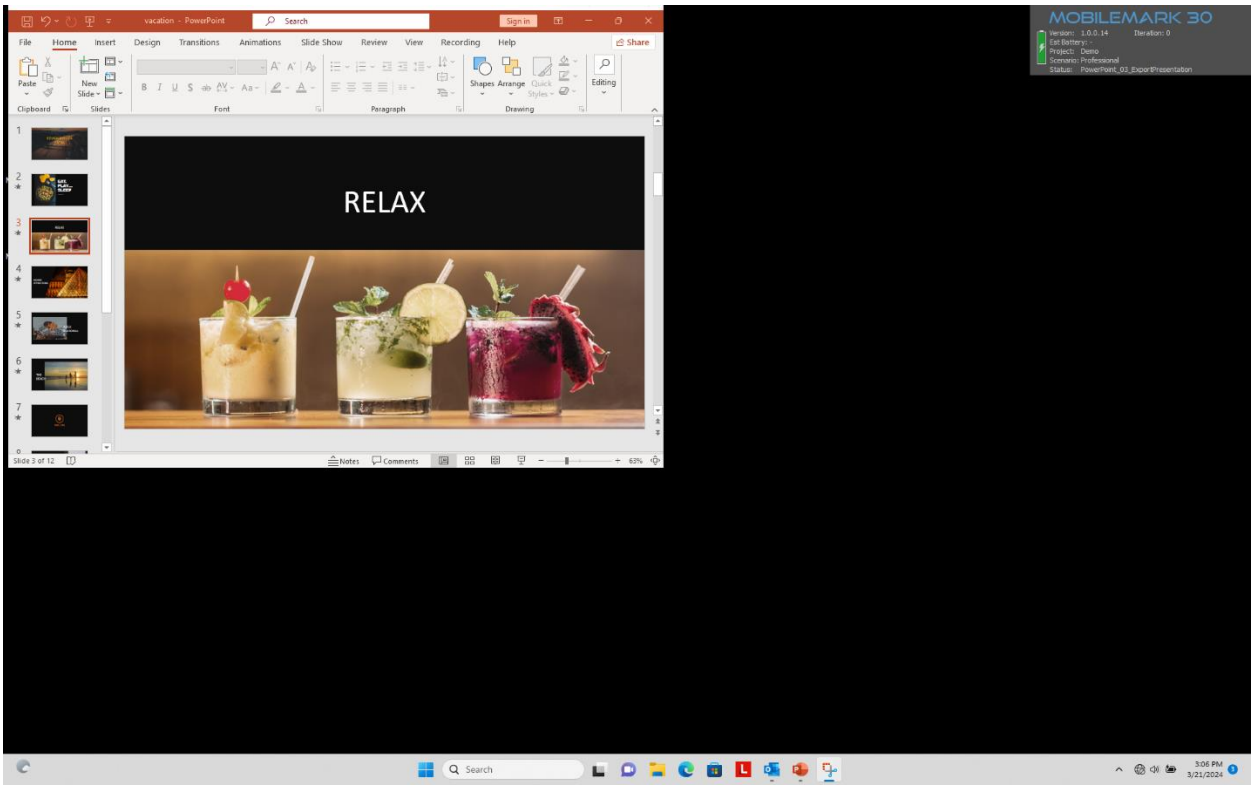


Figure 11: MS PowerPoint, part of the MobileMark 30 Professional scenario

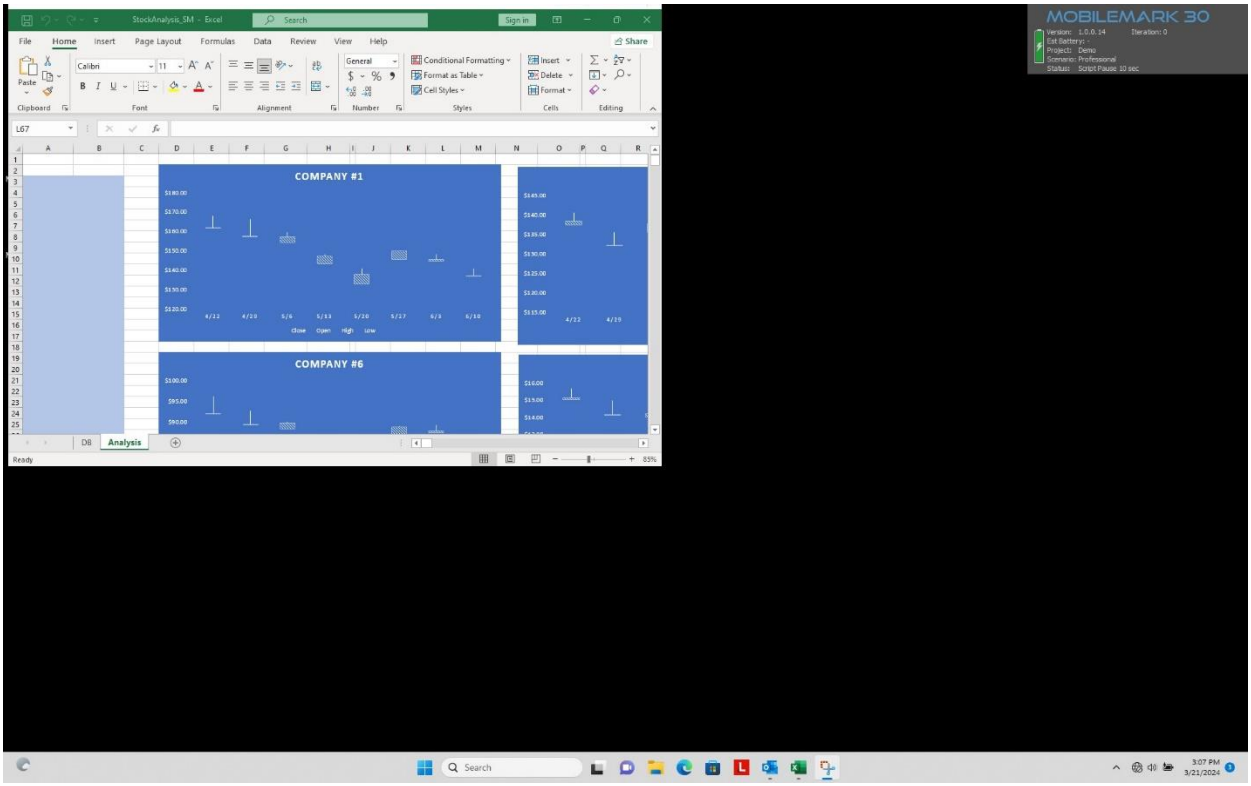


Figure 12: MS Excel, part of the MobileMark 30 Professional workload

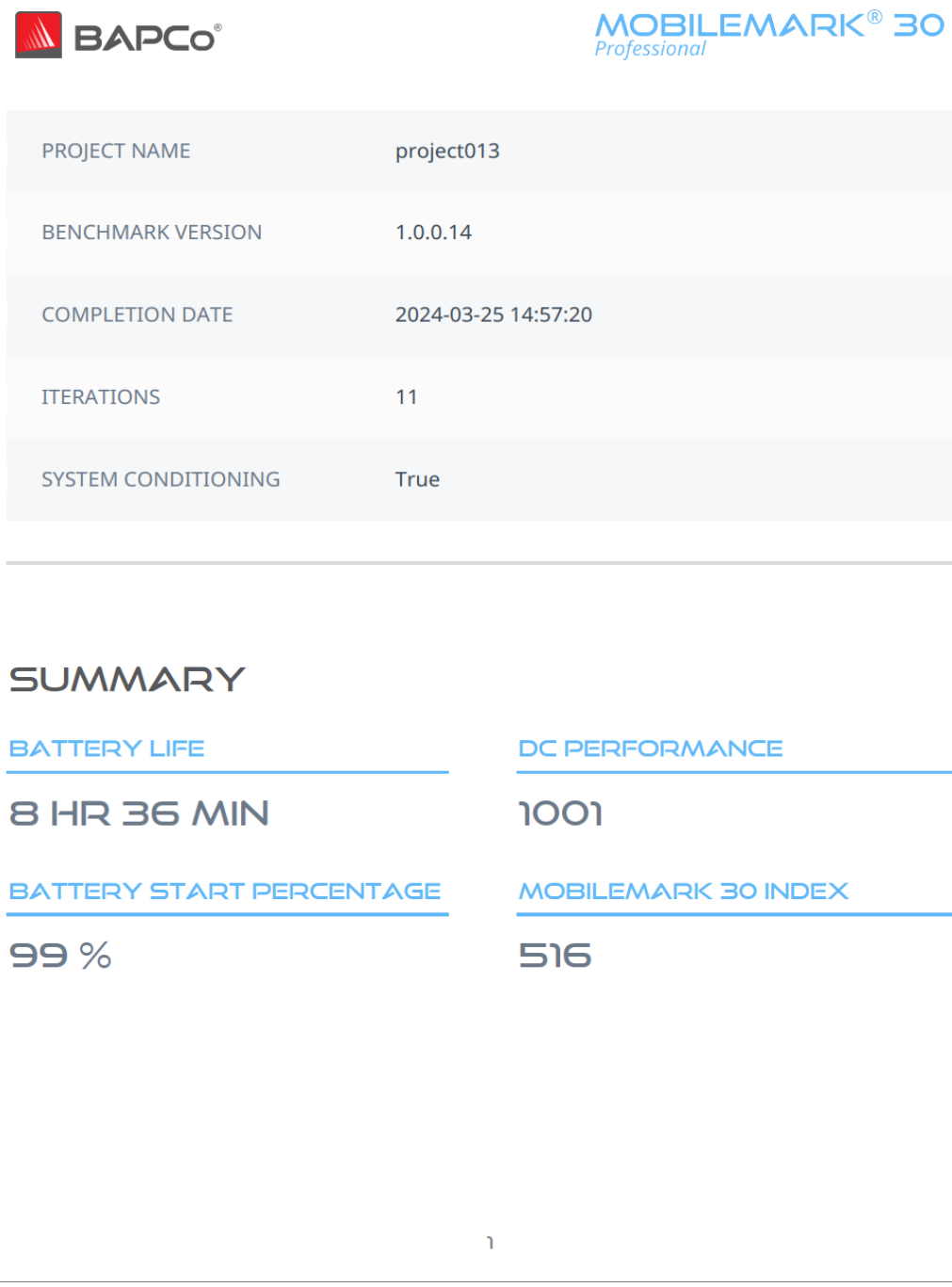
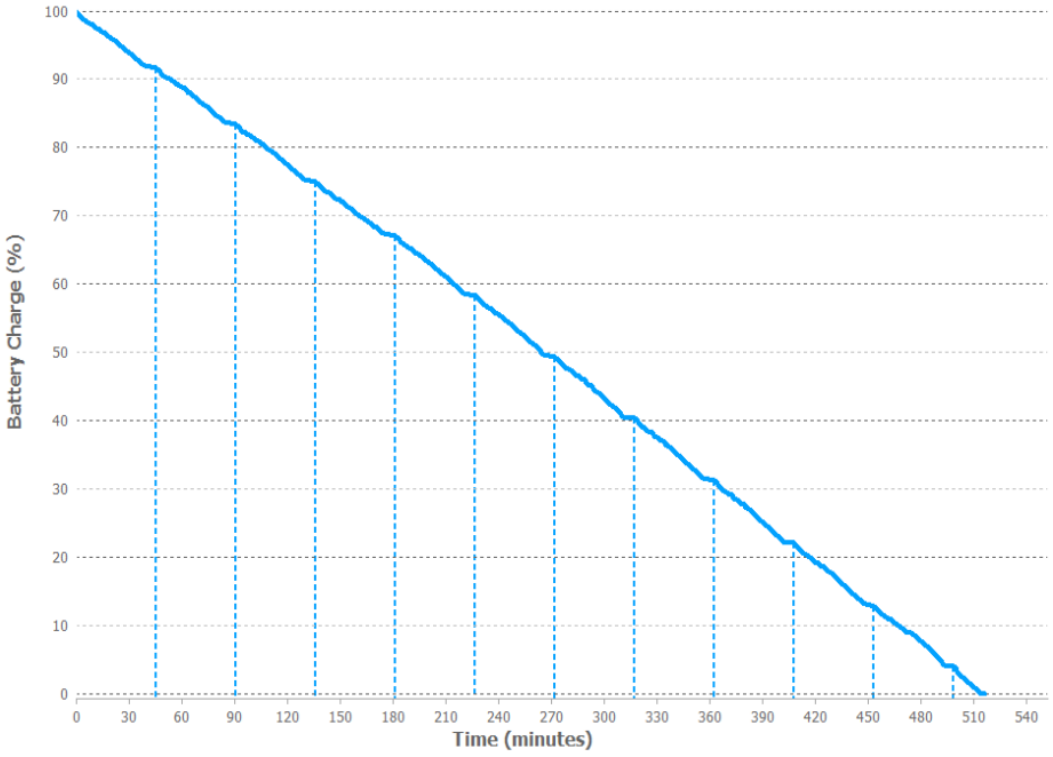


Figure 13: MobileMark 30 results PDF page 1

BATTERY LEVEL



PROFESSIONAL PERFORMANCE

ITERATIONS	ITER 1	ITER 2	ITER 3	ITER 4	ITER 5	ITER 6	ITER 7	ITER 8	ITER 9	ITER 10
SCORES	1012	1018	1011	1022	1011	998	1013	1003	1025	900

Figure 14: MobileMark 30 results PDF page 2

BAPCo®

MOBILEMARK® 30
Professional

SYSTEM INFORMATION COMPARISON TABLE

System Info	This System	Calibration System
BIOS	LENOVO N3QET39W (1.39) 10/23/2023	LENOVO N3QET38W (1.38) 9/15/2023
Core + Memory		
Motherboard type	21HDCTO1WW	21HDCTO1WW
CPU	13th Gen Intel(R) Core(TM) i5-1345U, 1600 MHz, 10 Cores(s), 12 Logical Processor(s)	13th Gen Intel(R) Core(TM) i5-1345U, 1600 MHz, 10 Cores(s), 12 Logical Processor(s)
Memory Size	32.00 GB, 2 Channel, 5200 MHz	32.00 GB, 2 Channel, 5200 MHz
Virtual Memory	36.41 GB Total, 31.14 GB Free	36.41 GB Total, 31.32 GB Free
Virtualization	Enabled in hardware	Enabled in hardware
Secure Boot	Secure Boot State:On	Secure Boot State:On
Video		
Resolution	1920 x 1200 x 60 hertz	1920 x 1200 x 60 Hertz
Brightness	95%	95%
Brightness Profiler	False	False
GPU 0	Intel(R) Iris(R) Xe Graphics (version: 31.0.101.4502)	Intel(R) Iris(R) Xe Graphics (version: 31.0.101.4502)
Storage		
Drive 0	238.00 GB (256052966400 bytes) WD PC SN740 SDDQNQD-256G-1201	238.00 GB (256052966400 bytes) WD PC SN740 SDDQNQD - 256G - 1201
Policies	Write caching: Default; Power protected: Default	Write caching: Default; Power protected: Default
Battery		
Battery 0	SMP 5B10W51864 1992SMP5B10W51864	SMP 5B10W51864 1992SMP5B10W51864

Figure19: MobileMark 30 results PDF page 4

Design Capacity	52500 mWh	52500 mWh
Full Capacity	51300 mWh	52500 mWh
Battery Health	98%	100%
Cycle Count	51	25

Operating System

OS Type	Microsoft Windows 11 Pro	Microsoft Windows 11 Pro
OS Version	10.0.22621.2428	10.0.22621.2428
Bitlocker	Volume C: Protection Off	Volume C: Protection Off
Tamper Protection	Enabled	Enabled
Windows Defender Antivirus	Enabled	Enabled
Windows Security Center	Enabled	Enabled
Power Policy	BAPCo MobileMark 30	BAPCo MobileMark30
Power Mode	Balanced	Balanced
Power Source	DC	DC
Dark Mode (MobileMark/OS)	Disabled/Disabled	Disabled/Disabled
Virtualization-based Security	Enabled	Enabled
Memory Integrity	Disabled	Enabled

Figure20: MobileMark 30 results PDF page 5