

3M Optical Systems Division

## Toward a realistic and consistent standard for characterizing laptop battery life

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# Open Access to Energy



**Since the introduction of laptop computers, some manufacturers have tended to overestimate battery life, justifying their claims by using an unrealistically low setting for display brightness. Recently, a key standard-setting organization has codified a more realistic level of brightness, which allows consumers to make informed choices among competing devices. Consumers will benefit if all organizations adopt this higher benchmark for brightness.**

When consumers make a laptop purchase, they are usually excited about the new device's lighter weight, faster processor and other features. Frequently, though, they have been disappointed by one crucial measure of performance: too often, manufacturers' claims regarding battery life haven't matched consumers' real-world experience.

The difference between battery life claims and actual performance is the focus of at least one class-action suit; it has also been called the "most scandalous metric in the computer industry."<sup>1</sup> In fact, though, manufacturers' claims have been legitimate. Their laptops could reliably achieve the claimed run-times when screen brightness was set to the unrealistically low levels that were called for by some common benchmarks.

Until recently, the most common benchmark calculated battery life using a screen brightness of just 60 nits<sup>2</sup>, a level so low that it could cause eyestrain in many indoor situations and would be virtually useless in direct sunlight. Obviously, when the screen—which can account for more than 40 percent of the draw on the battery<sup>3</sup>—is set to such a low level of brightness, the laptop needs much less power and the battery lasts longer.

The technical legitimacy of the claims did little to alleviate consumer dissatisfaction. And those who understood the benchmarking rationale questioned why 60 nits was used when most modern laptops offered brightness capabilities that far exceeded that level, some by an order of magnitude or more. (Frequently, laptops will offer brightness settings of 300 or 400 nits. Many mass market devices promise 500 or 600 nits of brightness and some specialized laptops promise screens with up to 6,000 nits in direct sunlight.<sup>4</sup>)

Recently, the publisher of the most widely used benchmark revised its standards for calculating battery life, raising the brightness levels for those calculations from 60 to 150 nits.<sup>5</sup> The 150-nit level is also cited by the European standard-setting organization TCO as a minimum for preventing worker eyestrain in the office. The TCO recommendation has become the de facto European standard for brightness.

While these two influential groups have agreed on the 150-nit benchmark as a reflection of actual consumer use, some industry and government stakeholders continue to weigh other options. Currently, one influential group is drafting a new metric that could be below the 150-nit level. This would be a misstep that could have serious consequences for consumers and for the industry.

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<sup>1</sup> <http://semiaccurate.com/2009/06/29/battery-life-claims-become-class-action/>

<sup>2</sup> The "nit" is a measure of luminance equal to one candela per square meter.

<sup>3</sup> This estimate is from Microsoft's Windows 7 engineering blog: <http://blogs.msdn.com/b/e7/archive/2009/01/06/windows-7-energy-efficiency.aspx>

<sup>4</sup> For example, the Panasonic Toughbook 31 features an 1,200-nit screen ([ftp://ftp.panasonic.com/pub/Panasonic/toughbook/specsheets/TB-31\\_ss.pdf](ftp://ftp.panasonic.com/pub/Panasonic/toughbook/specsheets/TB-31_ss.pdf)); the Toughbook 19 offers a 1,000-nit screen with up to 6,000 nits in direct sunlight ([ftp://ftp.panasonic.com/pub/Panasonic/toughbook/specsheets/TB-19\\_ss.pdf](ftp://ftp.panasonic.com/pub/Panasonic/toughbook/specsheets/TB-19_ss.pdf)).

<sup>5</sup> [http://www.bapco.com/support/technical\\_documents/MobileMark2012-WhitePaper-1.00.pdf](http://www.bapco.com/support/technical_documents/MobileMark2012-WhitePaper-1.00.pdf)

## There are at least four reasons why all stakeholders should adopt the more realistic, 150-nit standard for benchmarking laptop battery life:

Estimating battery life with a dim screen misleads consumers. Under normal use, few if any consumers will achieve the battery life estimates claimed by some manufacturers. The fact that these mischaracterizations are longstanding, or that some variation stems from differences in use, does not justify product claims that rarely conform to consumers' real-world experience.

Laptop manufacturers who estimate battery life using an unrealistic benchmark give their products an unfair competitive advantage. Several manufacturers have already begun estimating battery life at the higher nit level. Other manufacturers are expected to make a similar change. (In fact, many industry observers anticipate that Intel will eventually publish a recommended performance benchmark for its new Ultrabook™ ultraportable device category of laptops that will stipulate a 5-hour battery life at 150 nits.<sup>6</sup>) The trend is clear, but without consistent industry-wide standards, some manufacturers will continue to tout unrealistic run-times for their laptops and consumers will find it difficult to compare competing devices.

Overstating battery life allows manufacturers to promote and sell energy-hungry devices. A laptop that requires frequent recharging is typically one that does not incorporate basic energy-saving components. Given that more than 25 million laptop<sup>7</sup> computers are sold annually in the United States, the impact on the environment—in terms of energy consumption and emissions—is meaningful. Comparable battery life estimates would allow consumers to make purchasing decisions that incorporate a consideration of energy efficiency.

Establishing a more realistic and consistent standard would promote the use of currently available energy-efficient system architectures and technologies, including high-efficiency batteries, LEDs, backlights (such as those using 3M light management films) and panels. It would also encourage investment in new technologies to reduce power consumption and extend battery life.

**Manufacturers should have the freedom to create a range of laptops, tablets and other mobile devices that address consumers' varied preferences for price and performance. But claims about battery life can and should be based on consistent and comparable benchmarks, and should better reflect consumers' real-world experience.**

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<sup>6</sup> Ultrabook is a trademark of Intel Corporation. Details on Ultrabook standards are forthcoming from Intel.

<sup>7</sup> DisplaySearch



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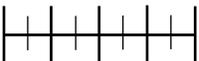


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