

Kathleen Vokes
Katharine Kaplan
U.S. Environmental Protection Agency
Climate Protection Partnerships Division
April 30, 2010

Dear Ms Vokes and Ms Kaplan,

EMC appreciates the opportunity to provide the ENERGY STAR Program with our comments and recommendations concerning the ENERGY STAR Products Enhanced Testing and Verification proposal announced on March 26, 2010. We hope this set of observations and proposed options help further the ENERGY STAR Program's approach in this area. This opportunity for the industry to collaborate with the ENERGY STAR program in the development Qualification and Verification procedures that ensure the integrity of the ENERGY STAR brand while ensuring that the IT industry continues to provide timely innovations and enhancements in energy efficiency and other areas, benefitting other industries in improving their own energy efficiency as well.

In particular, we address two subjects in the attached document:

- The particular challenges associated with the use of independent laboratories to provide the necessary Qualification testing in a timely and effective manner
- The opportunity for the IT industry to provide a more flexible alternative that will continue to preserve the brand integrity of the ENERGY STAR Program

We are looking forward to continuing our participation in the development ENERGY STAR specification and procedures. Should you have any questions about anything in this submission, please let us know if we can be of any additional assistance.

Sincerely,

Rona Newmark
Sr. Vice President
Corporate Strategy
EMC Corporation

1 Introduction

As the world's leading developer and provider of information infrastructure technologies, services, and solutions that enable people and organizations to transform the way they create value from their information, EMC Corporation appreciates the opportunity to respond to the ENERGY STAR Enhanced Qualification and Verification proposal, issued March 26, 2010. The development of appropriate and cost-effective methods to qualify and audit ENERGY STAR products in ways that enhance the reputation of the ENERGY STAR brand are important to us as a partner in the upcoming Data Center Storage specification.

The span of storage products expected to be included in the ENERGY STAR specification for Data Center Storage ranges in price from roughly \$7,000 to over \$500,000. As a result, these systems will be among the most expensive test subjects when compared to the vast majority of Consumer Electronics or even IT equipment intended for personal or small office use. In its March 26 and March 31 presentations, the EPA acknowledged that products at extremely high cost points may need to be handled differently from the rest of the sector, and EMC welcomes the opportunity to work with the EPA and the industry to develop appropriate qualification and verification protocols for storage products fitting this description. In developing this approach, we seek to ensure it accounts for the multiple degrees of configuration complexity prevalent in storage products, including, but not limited to, media type, speeds of operation of different media, capacity variability within each class of media, overall system capacity and client connectivity modes.

2 Recommendations Regarding Product Qualification

A cornerstone of the EPA proposal is the use of certified, independent laboratories to perform all official qualification for products to be listed on the ENERGY STAR web site, and officially recognized by the program. While this approach reflects the current methodology for qualification/certification of products in many industries, EMC believes that it presents several particular challenges for all parties concerned when applied to Data Center IT products, and especially so when applied to Data Center Storage Products. We are confident that the underlying requirement that the Qualification process be performed within tight statistical controls and under the supervision or audit of an independent authority can be achieved in a simpler way. This approach also allows the ENERGY STAR program to meet its goals of increasing availability of energy efficient products in the market and of minimizing the incremental costs customers must pay for these more efficient products.

2.1 Challenges Raised by Independent Test Labs

In today's market there are few, if any, independent labs certified to the EPA's desired standard that also possess the skill sets to perform testing on data center products. The necessary skills will include not only use of the test harness and familiarity with the products under test, but also complex software and hardware configurations and provisioning. These are the test circumstances that will have to be met for such labs to provide test data that will most likely be required by the current versions of IT specs under development. Mandatory use of these labs for qualification of IT products will require:

1. A significant increase in the number of these labs and in their capacity.
2. The training of adequate staff to properly operate the IT equipment under test as well as to supervise and/or administer the appropriate test protocols.
3. Measureable impact on manufacturers seeking to obtain qualification and listing approval

These themes are further explored below.

Typical Data Center Storage products have multiple degrees of freedom, and each customer orders a system built to his particular needs with respect to capacity, media type, client connectivity, etc. Given this, the complexity of configuring a data center storage system for test is significant, and requires substantial

training and experience as well as system management equipment. The test rigs for achieving the proposed dynamic energy measurements are likewise complex and require expertise in set up and tuning of the workloads and the storage. A typical test harness will consist of power meters, large numbers of servers, and specialized test software in addition to the product under test. As a result, storage manufacturers will need to send personnel and equipment to any independent facility to assemble and configure the storage systems, as well as to set up and tune the test environments to ensure the official Qualification testing replicates the preliminary results achieved by the vendor. The test cycles for each system configuration, once the gear has been assembled, last roughly 1 week, so a full family test could easily consume a calendar month in the independent lab. This is in addition to the identical testing that the manufacturer performed in in-house labs prior to this new test cycle.

Manufacturers typically plan to achieve ENERGY STAR qualification for products prior to the public announcement and release of new systems. Shipping unreleased products to an independent lab will require all regulatory releases to have been received, which could significantly delay the start of ENERGY STAR qualification until less than 30 days prior to intended product release. This would result in unpredictable delays to product release plans, since the precise timing of test slots is improbable. These delays will have an adverse impact on a manufacturer's sales plans, limiting his window of opportunity with respect to competitors, leading to either lower sales or sales at lower price points, and thus lowering profits.

In many cases, independent test facilities will be testing more than one vendor's unannounced or unreleased products simultaneously. These facilities would need to provide the industry a demonstration of isolation of each vendor's products from the others, and also assure that there was no cross-contamination of personnel, so that information on unreleased products would not accidentally be transferred to the support team of another vendor. This is as true for software features as for hardware features. These measures are not unusual in the IT industry, and they do result in increased staffing levels to maintain the necessary firewalls between teams working with competitors' products.

Typically, each independent lab will have a maximum test capacity devoted to ENERGY STAR qualification testing. In addition, there will be a limited number of these facilities available. As such, a manufacturer may find that at any point in time, the qualification testing needed for a new product will not be possible without an adverse impact on the release schedule. This impact will either take the form of 1) delaying release of the product until ENERGY STAR qualification is complete, 2) shortening the marketable life of a product, or 3) shipping the product without ENERGY STAR qualification. All of these scenarios result in adverse economic impact for the manufacturer through reduced sales or reduced price points, as noted above.

In addition to the concerns outlined above, the use of independent laboratories and the funding of products and associated test gear shipped to these facilities, will result in higher costs that must be borne by the IT manufacturers. These costs will be incurred not simply on the introduction of new hardware models, but also on the introduction of new software features. This is particularly true in the Data Center Storage space, where the software has a significant impact on many of the variables being measured by the ENERGY STAR test protocols. Manufacturers could require multiple test cycles per product per year. The costs associated with this recurring testing will, in general, be passed along to customers, making the ROI for energy efficient Data Center products less appealing.

EMC is also concerned about the environmental cost of off-site testing and qualification of large-scale equipment. The lifecycle impacts of the manufacture of extra equipment for testing, and additional servers

and network equipment for testing, transportation and shipment of this equipment, and facilities space would be significant and should be considered in evaluating the optimum verification framework.

2.2 EMC Recommendations

One of the goals of ENERGY STAR is to increase the quantity of energy efficient products available for purchase by increasing the number of options available. At the same time, another goal is to provide these more efficient products at the most attractive pricing possible. The current proposal is designed to strengthen ENERGY STAR's brand integrity, yet it may have a negative impact on these other goals. EMC believes that the following approach would actually provide the ENERGY STAR program appropriate assurance of test integrity, without increasing costs or time to market.

Most manufacturers have in-house labs that meet standard certification requirements such as ISO 17025 or other equivalent independent certification such as NVLAP. The maintenance of these certifications to obtain regulatory approvals is a long-standing demonstration of the industry's commitment to producing auditable and reproducible test results. Allowing the use of these test facilities, with on-site observation from independent third parties when appropriate, would provide each manufacturer with the flexibility to bring products to market on their own schedules, with the ENERGY STAR listing at product introduction, while maintaining the integrity of the ENERGY STAR brand, which all parties desire. Smaller manufacturers who are currently working with third party labs that have this level of accreditation should be able to recommend that these facilities receive the EPA's endorsement to perform the ENERGY STAR testing, allowing a consolidation of their work with that same vendor.

3 Recommendations Regarding Product Verification

As previously noted, Data Center storage systems are not purchased in standard configurations and are not available from retail outlets. This means that subsequent verification testing cannot be accomplished through purchases from stock inventory at a third party. Instead the selection manager will need to work with the manufacturer to obtain a specifically configured test system from standard production. EMC endorses The Green Grid's and SNIA's recommendations to conduct Verification testing at qualified in-house labs or other sites, using a system chosen from a list of the top models/configurations shipped to customers over the past year. This would provide a representative product instance for verification.