IBM COMMENTS:
EPA ENERGY STAR® TESTING AND VERFICATION PROPOSAL

IBM appreciates the opportunity to provide a response to the testing and verification proposals that EPA presented in the file "ENERGY STAR® Products, Enhanced Testing and Verification, Consumer Electronics and IT Products" at its webinar on March 31, 2010. The qualification and verification criteria and process are an important aspect of the ENERGY STAR® program, as they provide the data and assurance necessary to maintain the integrity of the ENERGY STAR® program. Equally important is the need to insure that the qualification and verification process utilizes a simple, direct approach wherever possible. The process should not become too difficult or costly to the point where it discourages companies from participating or fails to intelligently leverage in-house capabilities in dealing with large and/or complex products. It is encouraging that in its presentation, EPA appears willing to work with industry partners to fashion a workable, effective qualification and verification program.

The ENERGY STAR® server requirements have been in place for less than 12 months, and verification work for the qualified products is just getting underway. As such, it is important that EPA not rush into a solution for the verification process for servers since servers are just beginning to enter into that portion of the ENERGY STAR® process. IBM is interested in working with EPA to design a correct approach to a qualification and verification system which takes into account the cost of servers, the multitude of potential configurations that can be created for a single product family and the complexities and expense involved with setting up and executing a test on a server system. Server, storage (in the future), and network (in the future) products are significantly more complex than most of the products EPA deals with in the ENERGY STAR® program and unlike consumer electronics, these products are not available "off-the-shelf" at a retail store.

ENTERPRISE IT EQUIPMENT IS EXPENSIVE AND COMPLEX

1. Products are configured and ordered by the user. A single product family can have hundreds of possible configurations with different numbers and speeds of processors, storage disks, Ethernet connections, and other components. The products are "built to" the order.
2. Enterprise IT products can be very expensive. IBM has qualified three product families to the ENERGY STAR® server requirements. The Power 750 Express has configuration with one to four processor sockets populated that can range in price from $50,000 to $300,000. The base x3650 M2 system, a two processor socket system, can range in price from $1,775 to $7,500 for a base configuration, to over $50,000 for a maximum configuration. A fully populated 14 blade chassis ranges in price from $250,000 to $750,000, depending on how the servers and chassis are configured. Because of the cost of these systems, EPA should consider innovative methodologies for sampling, procuring and testing products to protect the value of the products and to make the cost of the program reasonable.
3. The complexity of the hardware and software involved requires that two engineers accompany a product to an external testing lab. A Software Engineer is needed because the Initial Program Load (IPL) typically takes a server to a

standby mode where logical partitions need to be configured and started.   A Hardware Engineer is needed because the physical hardware configuration needs to be changed for minimum, typical, and maximum tests. If a witness is needed at the test, it would be more efficient to have that witness be a third party.

4. If systems are shipped to a third party lab, remote tuning will be required for performance measurements. Benchmarks need to be installed and configured to match the processor and memory configurations.

5. For qualification testing, hardware is typically very limited and companies want to protect their competitive advantage and not release systems to third parties prior to any planned announcement. Shipping servers to non-IBM locations typically requires third party agency approvals which can be in flux until approximately one month prior to the announcement of the product. This would not leave enough time to incorporate notice of ENERGY STAR® qualification into any announcement literature. Finally, there are concerns about details of unannounced products being released from a third party laboratory.

PRODUCT TESTING

IBM recommends that EPA allow the qualification and verification program for Enterprise IT equipment to be performed at the manufacturer's in-house laboratories -- as is currently done for certain product safety requirements. Key considerations for such a program would include:

1. Require the in-house laboratories to acquire some type of third party certification. There are laboratory certification standards that could be used to establish a lab's credentials:
    a. **System Manufacturing Test Qualified Laboratory** (Product Safety) - UL, TUV, etc. have programs in place that audit the laboratory to the ISO/IEC 17025 standard. This standard includes requirements for equipment calibration, test environments, training, test processes, test procedures, etc. In the end, the test data is accepted by the agencies for inclusion in a CB report that is used in the Declaration of Conformity for the CE mark.
    b. **NVLAP (National Voluntary Laboratory Accreditation Program)** - NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific tests or calibrations. This certification is used for EMC testing on our products.
2. Require, or establish the option for, third party witnessing of the testing process by the qualification and verification program manager or their designee.
3. Include the submittal of quality control documentation as part of the submittal of any qualification or verification data.

In-house testing offers several benefits:
1. Testing takes an extensive amount of time. IBM utilized 24 days of testing time to qualify the Power 750 Express system. Performing this at an in-house lab would be expensive. Having the work done at a third party facility as well

as having IBM resources at the lab for the configuration and set-up of the equipment would be prohibitively expensive.

2. It is difficult to procure and transport systems, particularly large configurations. There are opportunities to manage this efficiently in-house that are not available if testing is performed by a third party.

3. Manufacturers routinely test their equipment for various product safety and benchmark requirements. They are familiar with set-up requirements for both the hardware and the supporting software. Particularly on more complex servers, there is a significant amount of work involved in properly setting up and configuring the system. The servers need to be connected to a hardware management console (HMC) which manages the server and validates change management to ensure the server meets the configuration rules.

PRODUCT SELECTION

An equally important consideration is the selection of products for testing. Because products are not "off-the-shelf" the chosen product has to be built to order. IBM makes the following proposals to simplify this process:

Manufacturers provide information to EPA on the number and configuration of the ENERGY STAR® servers that are shipped each year to customers. The EPA should consider selecting configurations for testing from the top 5 or 10 configurations by volume shipped to customers. This would insure that products are selected which match what customers are purchasing and it would make it easier for the manufacturer to resell the equipment after it is tested. This approach helps limit the number of products considered for testing and focuses on those products valued by the marketplace.

IBM also requests that EPA consider allowing manufacturers to make arrangements to test ENERGY STAR® products at an internal data center or development lab or a large customer facility. The manufacturer could provide the EPA third party administrator a list of ENERGY STAR® products that will be shipped to a customer facility (either an internal or external customer) and the schedule for the shipments and the EPA could select products for verification from that list. This would offer several advantages to the manufacturers:

1. The verification testing could be run as part of the product set-up and installation, utilizing technical resources already in place at the facility. The testing work would delay equipment availability to the customer by only two or three days, and would greatly simplify the testing process.

2. The test would be performed in actual data center conditions.

3. The product would not have to be sold as "refurbished."

There will be significant hurdles to establish this type of process for verification, but it is an approach that could significantly reduce the cost and impact of the testing process. EPA should consider this approach as an alternative means for sampling and verifying server equipment.

In closing, the complexity and cost of enterprise IT equipment makes in-house testing the best option for both qualification and verification testing. Testing in a third party external lab introduces unneeded costs, scheduling and logistical difficulties and reduces the value of an expensive product.

The IBM team is available to discuss its technical concerns in more detail and to offer a tour of a testing lab facility to assist EPA in understanding the complexities involved in testing server equipment. Jay Dietrich (jdietric@us.ibm.com) is the IBM interface to the ENERGY STAR® program and would be happy to answer any questions you have or schedule a meeting with our technical team.

Thank you for considering our comments.