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EPEAT Clarification #6-1
Modular design

This Clarification applies to the following IEEE Standards and criteria:

Applicable Standards:	Applicable Criteria
☒ IEEE 1680.1 – Computers and Displays	4.4.2.2
☐ IEEE 1680.2 – Imaging Equipment	
☐ IEEE 1680.3 – Televisions	

PVC Determination:
The criterion requires that the processor must be changeable independent of other components such as the circuit board to which it is attached.

Background:
The following was received from two subscribers and a supplier. Their names have been replaced with X, Y and Z.:

X, Y and Z formally request an interpretation and clarification of the IEEE 1680 standard for criteria 4.4.2.2 – Optional criteria for modular design by the EPEAT Product Verification Committee. This is a follow up to the request made by X in May 2009.

The modular design 4.4.2.2 product optional criteria states: Product shall have a modular design; for example, major components and processor can be changed.

Specifically, the EPEAT conformity assessment protocols guidance document (page 4.4-9) states that processors cannot be soldered to the motherboard as shown in the table below.

Evaluation Guidance	*Modularity means that major components must be easily removable, have standard connectors, and are readily replaceable. Processor cannot be soldered to motherboard. Note that criterion does not require that modules must be changeable by user and may be limited to designated service entities or the manufacturer. However, stating "take item to service entity" does not fulfill the "description of the module change method", which must be provided for the service entity.*

At this time no interpretations or clarifications for modular design have been issued since the EPEAT criteria were developed in 2004 and 2005 and finalized as the IEEE 1680 standard in mid-2006. As you know, electronics technology is advancing rapidly with entirely new generations of technology and products introduced every 12 – 18 months. The latest processor technology often uses processors that are soldered to motherboards or cards to enable slimmer, lighter form factors that reduce the weight and materials used in both notebook and desktop

computers. The latest products are also lower voltage with significantly improved energy efficiency.

X, Y and Z believe the original intent of the modular design criteria was to allow for the processor to be replaced as a singular component as it is provided as an example. The standard, however, does not explicitly state that the processor must be singularly replaceable. Allowing motherboards with soldered processors to be replaced as an upgrade option to meet the modular design criteria is desirable for the following reasons:

- *Processors and motherboards work as a single subassembly or component. In product repair or upgrade situations the entire board is normally replaced rather than single components.*
- *Today's technologies increasingly use processors soldered to boards that help enable slimmer, lighter form factors that reduce materials use. For example new ultra portable notebooks and netbooks weigh about 3 pounds, while the previous generations of notebooks weigh 5 pounds or more. Weight examples for various models are available on the web sites for X and Y.*
- *The new lighter models also are lower voltage and more energy efficient. The new smaller form factor systems are in the 30 watt range and older models about 100 watts.*
- *Note that these new, lower cost products help enable access to technology and the internet for more consumers globally. As EPEAT becomes more active in retail situations this criteria will become more important to clarify.*

The requested interpretation would not require a modification of the standard itself. However, the language noted above in the Conformity Assessment Protocols on the EPEAT.net website should be considered for modification to allow replacing entire motherboards (or similar module) with soldered processors as a valid upgrade option to meet the modular design optional criteria 4.4.2.2.

Staff is, of course, unwilling to change the protocols until the PVC provides direction. A literal reading of the criterion states that the processor must be changeable, and that is the provision in the Protocols.

However, there are two factors to be considered:

1. The case is made by the supplicants that, in essence, the intent can be met by considering the entire motherboard as the module, and allowing the replacement of the motherboard to be equivalent to "processor can be changed".
2. The reference to the processor is an example. The criterion reads "for example", it does not read "including". Does referencing an example mean that the example must be included, or may be included?

Clearly, this criterion will be subject to revision when the 1680.1 standard is reopened this coming year. However, for at least a year this optional criterion will not be available to

subscribers that use certain popular processors that are designed to be, and apparently are only available, soldered to the motherboard.

The PVC determination is based on the following logic:

- The intent of the standard developers was to assure that the processor alone could be changed, and therefore it is not appropriate for the PVC to allow that the entire motherboard must be changed in order to change the processor.
- While non-removable processors are supported by current design and recycling practices, EPEAT is intended to drive environmentally preferable change, not to adapt to industry practice. It's not clear that removable processors are not technologically feasible. Rather, it is current industry practice. Couldn't EPEAT drive a change in this practice if left as is?
- LCAs show that the manufacture of electronic components (and upstream processes) contribute substantially to the environmental impact of computer products. If the PVC allows that the entire motherboard must be replaced in order to change the processor, we are significantly reducing the environmental benefit of this criterion.
- Changing out the motherboard which has other functions integrated on the board defeats the purpose of extending the life of a product and reducing the environmental impact.
- Finally, this is an optional criteria. If the intent is changed, the standard will be giving away a point, rather than creating an incentive towards a stretch goal.

Change History:
Created: January 2010