DOCKETED

Docket Number:	16-AAER-02
Project Title:	Appliance Efficiency Rulemaking for Computers, Computer Monitors, and Signage Displays
TN #:	214561
Document Title:	Addl Documents Relied Upon (15-day).
Description:	Addl Documents Relied Upon (15-day).
Filer:	Harinder Singh
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	11/23/2016 2:54:01 PM
Docketed Date:	11/23/2016

Additional Documents Relied Upon for the 15-Day Language:

Integral stakeholder input received after 45-day comment period

From:	Alexandria McBride
To:	Driskell, Kristen@Energy
Subject:	Gaming Adders
Date:	Wednesday, November 02, 2016 1:39:35 PM

Hi Kristen,

Thanks for taking time to speak today. As we discussed, the industry proposal is to reduce in the Tier 2 Adder value for Gaming Monitors with incremental hardware-based assistance from 35% to 30%.

Please let us know if there's anything else we can do to expedite the release of the revised 15-day language.

Thanks,
Alex
--
Alexandria McBride
Director, Environment and Sustainability
Information Technology Industry Council
[Contact information redacted]
www.itic.org

From: Alexandria McBride
To: Singh, Harinder@Energy
Cc: [E-mail addresses redacted]
Driskell, Kristen@Energy; Mohney, Leah@Energy; Rider, Ken@Energy;
Subject: ITI & CEC Displays - Follow up
Date: Wednesday, November 16, 2016 8:45:47 AM
Attachments: [IEC 62087-2015 test procedure omitted.]

Harinder,

As a follow up to yesterday's discussion, please see detail below on the IEC test methods. We'll discuss on today's call at 10:30am PT. Thanks.

_____

ES7.0 test methods, Rev "Sept 2015" is what the EPA is currently using, and what CEC references for us to use.

Examples:
Section 5.2.G:
62087:2011, section 11.6 shall be used for testing.

- **This section does not exist in 62087:2015**

Section 6.1.6:
Use 62087:2001 test signal, as specified in 5.2.G

Section 6.2.E.2.a:
Test per 62087:2011 section 11.5.5

- **This section does not exist in 62087:2015**

Section 6.3.B:
Power shall be measured per 62087:2011 section 11.6.1

- **This section does not exist in 62087:2015**

As stated by the EPA:

> *Thank you again for bringing this issue to my attention. Our team went back to review the differences between the 2011 and 2015 versions of the IEC standard and found that there are substantial changes to the 2015 IEC standard in terms of section numbers and organization. Consequently,* ***it would require several edits in the Test Method in order to adopt the new version of IEC.*** *I think it is something we can do the next time we revisit the Test Method, but it's* ***not as simple as just pointing people to the new version****. Since the 2011 IEC version is still accessible, we will stick to using that one until the next revision.*
>
> *Please let me know if you have additional questions and if you are experiencing difficulty in accessing the 2011 version.*

Best,
Verena

Verena Radulovic
Product Labeling, ENERGY STAR Consumer Electronics
U.S. Environmental Protection Agency

If CEC wants to leverage the EPA work and just reference the Test procedure the EPA uses on ES7.0, then the CEC has to use 82087:2011

If CEC is adamant in using the 2015 version, then the CEC needs to write a new test procedure for the test labs to follow…

Today, no one can test using the 2015 spec, a with the ES7.0 procedure.

USB ports, LAN ports…

If CEC wants to test like ES7.0 does, then they provide the same allowances as ES7.0

Else, they leave it the same as in 45 day language.

--
Alexandria McBride
Director, Environment and Sustainability
Information Technology Industry Council

[Contact information redacted]

www.itic.org

From: Sadowy, Donna
To: Singh, Harinder@Energy
Cc: Kerr, Scott; [contact redacted] Driskell, Kristen@Energy
Subject: Gaming Monitors
Date: Friday, October 21, 2016 12:39:12 PM
Attachments:

Hi Harinder,

To follow-up on our call yesterday on gaming monitors, here are our comments. I have copied [name removed] a Senior Fellow with our display team, and an expert on our Free Sync technology in case you have any questions.

Display Test Procedure

NRDC is stating that that the test method uses fixed refresh rate, not variable therefore there is no need for any extra allowance for gaming monitors (both FreeSync & Gsync).

Energy Star 7 display test procedure states that for fixed pixel displays (non-CRT):, *refresh rate shall be set to 60 Hz, unless a different default refresh rate is specified in the product manual, in which case the specified default refresh rate shall be used*.

We were not able to complete research on the Energy Star display test clip in one day. If I can find any additional information over the weekend I will provide it to you. We suggest discussing this issue further with [omitted specific names] OEMs who sell gaming monitors.

We would be concerned about any removal of the adder, since high-end gaming displays are a niche market, where we expect additional functionality will be added to displays going forward.

Treatment of FreeSync and G-Sync Using the Same Performance Standard

NRDC recommended that "Gsync: Hold to same standard (performance-based standards)" …as FreeSync.

We agree with the recommendation. Providing no adder or a smaller adder for FreeSync is not supported by the data from the IOUs/NRDC own study (below). [Proprietary information redacted.] We would be concerned if CA. gave preferential treatment to a proprietary technology, and we hope that the regulation will not create harm to uptake of FreeSync or any other new refresh rate technologies in the marketplace.

[Specific names omitted]

FreeSync and Power Consumption

NRDC states that FreeSync is purely software-based, all work in GPU, no extra power draw in monitor.

This understanding of FreeSync is not correct. FreeSync monitors use hardware located in the

monitor which is provided by other component manufacturers. MStar, Novatek and Realtek are examples of partner companies providing specialized scaler chips which work with FreeSync to synchronize display refresh rates and GPU framerates.

FreeSync scaler chips are not standardized monitor components. These chips enable features that are not available with other dynamic refresh rate technologies, including: picture scaling, on-screen display (OSD), HDMI®/DVI inputs for legacy users and DisplayPort™ High Bit Rate Audio.

Additional information is available here:
http://ir.amd.com/phoenix.zhtml?c=74093&p=irol-newsArticle&ID=1969277

Power consumption FreeSync vs. Gsync Monitors

NRDC States that 73% of GSync, 57% of FreeSync monitors on market today already comply with no adder.

NRDC's own data shows that fewer FreeSync monitors are able to comply with the power limits, compared to the competing technology.

In addition to the scaler component described above, FreeSync allows monitor manufacturers to make their own customizations which can result in additional power consumption. One example of gaming monitor customization is "Smart Insight" technology provided by a company called Eizo. This technology adjusts monitor brightness in real time so that gamers have better visibility in light and dark areas. This technology is enabled by a customized chip [. . .]
http://gaming.eizo.com/news/eizo-brings-competitive-advantage-to-gamers-with-23-foris-fs2333-led-backlit-monitor/

[Paragraph omitted]

Please let us know if you have any questions.

Best Regards,
Donna

DONNA SADOWY
Senior Manager Global Regulatory Affairs| Public Affairs
[Contact Information Omitted]

From:	Fossati, Humberto (Strategist - Displays & Access)
To:	Singh, Harinder@Energy; Driskell, Kristen@Energy
Subject:	Industry commentary for CEC
Date:	Friday, October 21, 2016 1:01:53 PM
Attachments:	[logo omitted]

Kristen, Harinder,

Industry wants to make sure you do not view the below estimates as a projected minimum. These estimates can increase or decrease depending on many factors that can be outside of Industry's control.

Thus, this communication contains forward-looking statements, which reflect Industry's current expectations. A number of factors could cause actual results to differ materially from the results we anticipate.

Regarding CEC's Request for Information for market share projections of the various products that include allowances or exemptions,
Here is the Industry estimate of market share **thru 2022**:

- The very high-performance (>8.3MPix, 3840*2160) Monitors (<1% of the market)
- KVM/KMM type Monitors (<1% of the market)
- Medical (DICOM compliant, FDA certified) Monitors (<1% of the market)
- Touch Monitors (~2% of the market)
- OLED Monitors (~2% of the market)
- The EPD (99% or better of AdobeRGB) Monitors (~3% of the market)
- Gaming Monitors (~5% of the market)
- Curved Monitors (~6% of the market)
- The EPD (99% or better of sRGB) Monitors (~8% of the market)

[Paragraphs related to petitions for rulemaking omitted]

Regarding OLED monitors, the Industry needs to highlight that it does **not** recommend a change in the ON power allowance for OLED monitors manufactured after Jan 1,2021.
As stated by both the Advocates and Industry, the main levers that we can employ on monitors to improve power efficiency are:

- Improvement in the LED efficiency of the back-light
- Improvement in the Optical Film Stack on the panel (DBEF films and the like)
- Improvement in the efficiency of the power supply

For OLED monitors, the first two are non-applicable, and currently we are using EPA approved Class-VI EPS (87%+ efficiencies already)
For this emerging technology, we currently do not have "line of sight" to any "new" power efficiency improvement opportunities.

The current risk of reducing the allowance by Jan 1, 2021, is that we can have a situation where the Industry introduces product, which by 2021 needs to be removed because it no longer meets CEC's max ON power limit.

Regarding market sales data from the Industry.
The Industry recommends that CEC do not request market sales data for the different product offerings discussed above for the following reasons:

- Not really feasible for the Industry to provide "California Specific" sales data; we do not have it.
- Consumer monitors: example: bulk deliveries to a centralized hub operation for Best Buy for example, would not include information of how much of that volume Best Buy would plan to ship to its CA stores for sale there (same for other major retailers)
- Commercial/business monitors: example: bulk deliveries to a centralized hub operation for BM or Citibank for example, would not include information of how much of that volume they would plan to deploy/allocate to their CA offices for use there (same for other major corporations)
- All the "Internet" based sales… no idea how much volume eBay, Amazon, CDW, and many other companies like these get products shipped to CA.

Thus, Industry will not be able to provide market share data for CA, for any of the specific products discussed.

[Remainder of e-mail redacted]

Regards,

Humberto M. Fossati (漢寶多)
Strategist, Engineering P.M.
Display & Accessories B.U.
[Contact information redacted]

From:	Pasha, Soheila@Energy
To:	Driskell, Kristen@Energy
Subject:	FW: high-end graphic memory capacity
Date:	Tuesday, November 22, 2016 2:30:03 PM

From: Luc Bisson [e-mail address redacted]
Sent: Thursday, November 17, 2016 3:19 PM
To: Rider, Ken@Energy; Ned Finkle; Sadowy, Donna
Cc: Pasha, Soheila@Energy
Subject: RE: high-end graphic memory capacity

Hi Ken,

Yes this is consistent with my understanding of the market.

Best regards,

-Luc.

From: Rider, Ken@Energy [mailto:Ken.Rider@energy.ca.gov]
Sent: Thursday, November 17, 2016 3:03 PM
To: Ned Finkle; Luc Bisson; Sadowy, Donna
Cc: Pasha, Soheila@Energy
Subject: high-end graphic memory capacity

I have reviewed the high end graphics products available and found the large majority of them to have an 8 GB GDDR5 capacity (both in GeForce and Radeon cards). Does this sound consistent with your understanding of the market? This number (8 GB) would be used to substitute the 50% memory requirement for integrated graphics seeking high expandability exemption.
-Ken

From:	Luc Bisson
To:	Driskell, Kristen@Energy; Pasha, Soheila@Energy; Rider, Ken@Energy
Subject:	Graphics related proposed text
Date:	Wednesday, November 16, 2016 11:51:24 AM
Attachments:	GRAPHICS SPECIFIC 15-Day Language Express Terms Computers Computer Monitors and Signage Displays.docx

Hi Kristen, Soheila, and Ken,

Per yesterday's call I am sending you the Industry proposed graphics related text ( ).

The first 3 pages show all the new changes (additions in green, deletions in red) and the last 3 pages show the text with all the modifications accepted (may be easier to read ☺).

Since GPU is used more often in the overall document and GPU is well defined I am proposing that we get rid of discrete graphics and integrated graphics and only use discrete GPU and integrated GPU. The only remaining graphics mention is hybrid graphics and this is fine since it is about a functionality and not a component.

Please look at this and let me know what you think.

Thanks and best regards,

-Luc.

~~"Discrete Graphics" or~~ "Discrete ~~Graphics~~ GPU" means a ~~graphics processing unit (GPU) discrete hardware component containing one or more graphics processing units (GPU)~~ GPU with a local memory controller interface and local graphics-specific memory. Discrete GPUs are not packaged on the same die or substrate as the CPU.

"First Discrete GPU" means the computer's discrete GPU that has the highest frame buffer bandwidth measured in gigabytes per second (GB/s).

"Frame buffer bandwidth" means the amount of data that is processed per second by a discrete GPU~~each GPUs on a discrete or a hybrid graphics, the rate at which data can be read from or stored within discrete, integrated, or hybrid graphics,~~ expressed in gigabytes per second (GB/s). It is calculated based on Ecma International Standard ECMA-383 (December 2010).

"Graphics processing unit (GPU)" means an integrated circuit~~, separate from the CPU,~~ designed to accelerate the rendering of two-dimensional or three-dimensional content to displays. A GPU may be either integrated with the CPU or discrete.

"High expandability computer" means a computer with any of the following:

(1) An expandability score of more than 690;

(2) If the computer is manufactured before January 1, 2020, a power supply of 600 watts or greater and either:

(i) a first discrete GPU ~~discrete or integrated graphics~~ with a frame buffer bandwidth of 400 gigabytes per second (GB/s) or greater; or

(ii) a system memory with more than 50 percent of its capacity (in gigabytes) with a bandwidth of 432 GB/s or more and an integrated GPU~~ graphics~~.

(3) If the computer is manufactured on or after January 1, 2020, a power supply of 600 watts or greater and either:

(i) a first discrete GPU ~~discrete or integrated graphics~~ with a frame buffer bandwidth of 600 gigabytes per second (GB/s) or greater; or

(ii) a system memory with more than 50 percent of its capacity (in gigabytes) with a bandwidth of 632 GB/s or more and an integrated GPU~~ graphics~~.

"Hybrid graphics" means a functionality that ~~allows~~ automatically places the system's first~~primary~~ ~~D~~discrete ~~G~~graphicsGPU ~~to enter~~ in a low-power state when not required in favor of an~~+~~integrated ~~G~~graphicsGPU. This functionality allows graphics rendering by lower power and lower capability integrated GPUs while on battery or when the output graphics are not overly complex while then allowing the more power consumptive but more capable discrete GPU to provide rendering capability when the system requires it.

~~"Integrated graphics" or~~ "Integrated GPU" means a graphics solution that does not contain ~~discrete graphics or~~a discrete GPU~~s~~.

"Mobile gaming system" means a computer that is primarily used for gaming and that is designed specifically for portability and to be operated for extended periods both with and without a direct connection to an AC mains power source. A mobile gaming system is sold with an integrated display and a physical keyboard, and has all of the following criteria:

1) First discrete GPU~~Discrete video card~~ with frame buffer bandwidth of 128 gigabytes per second or greater;

2) System memory of 16 gigabytes or more;

3) AC adaptor size of 150 watts or greater; and

4) Total battery capacity of 90 watt-hours or greater.

"Mobile workstation" means a high-performance, single-user computer primarily used for graphics, computer-aided design (CAD), software development, financial, or scientific applications, among other computation intensive tasks, excluding game play, and that is designed specifically for portability and to be operated for extended periods of time either with or without a direct connection to an external power source. Mobile workstations utilize an integrated display and are capable of operation on an integrated battery. A mobile workstation may use an external power supply and have an integrated keyboard and pointing device. In addition, a mobile workstation must meet all of the following criteria:

(1) Has a mean time between failures (MTBF) of at least 13,000 hours;

(2) Has qualified or is currently being reviewed for qualification by two or more independent software vendor (ISV) product certifications;

(3) Has at least one ~~integrated or~~ discrete GPU~~graphics processing unit~~ with frame buffer bandwidth of 96~~124~~ gigabytes per second or greater, or at least one integrated GPU~~graphics processing unit~~ and a system memory with more than 50 percent of its capacity (in gigabytes) with a bandwidth of 134 gigabytes per second or greater;

(4) Supports the inclusion of three or more internal storage devices; and

(5) Supports at least 32 gigabytes of system memory.

"Workstation" means a computer used for graphics, computer-aided design (CAD), software development, financial, or scientific applications, among other computation intensive tasks. A workstation covered by this specification must meet the following criteria:

(1) Product as shipped does not support altering frequency or voltage beyond the computer processing unit and GPU manufacturers' operating specifications;

(2) Has system hardware that supports error-correcting code (ECC) that detects and corrects errors with dedicated circuitry on and across the CPU, interconnect, and system memory; and

(3) Meets two or more of the following criteria:

A) Supports one or more discrete graphic or discrete compute accelerators.

B) ~~Supports~~ Includes four or more lanes of PCI-express, other than discrete GPU~~graphics~~, connected to accessory expansion slots or ports where each lane has a bandwidth of 8 gigabits~~ytes~~ per second (Gb~~B~~/s) or more.

(A) A computer monitor used in the testing of desktop computers shall have a native resolution of at least 1920x1080 pixels and use progressive scanning. The computer operating system shall be set to operate at a

minimum of 1920x1080 pixels and progressive scanning. If multiple display connections are available on the computer, choose the correct connection using the following criteria:

1. If hybrid graphics isare available, choose the port that enables hybrid graphics.

Table X Continued - Data Submittal Requirements

		~~Integrated Graphics Frame Buffer Bandwidth (rounded to nearest gigabyte per second)~~	
		Discrete GPU~~graphics processing unit(s)~~ present in system	True~~/~~, False
		First Discrete GPU~~Graphics~~ Frame Buffer Bandwidth (rounded to nearest gigabyte per second)	
		Total Number of Discrete GPUs~~Graphics Processing Units~~	

TEXT WITH ALL MODIFICATIONS ACCEPTED

"Discrete GPU" means a GPU with a local memory controller interface and local graphics-specific memory. Discrete GPUs are not packaged on the same die or substrate as the CPU.

"First Discrete GPU" means the computer's discrete GPU that has the highest frame buffer bandwidth measured in gigabytes per second (GB/s).

"Frame buffer bandwidth" means the amount of data that is processed per second by a discrete GPU, expressed in gigabytes per second (GB/s). It is calculated based on Ecma International Standard ECMA-383 (December 2010).

"Graphics processing unit (GPU)" means an integrated circuit designed to accelerate the rendering of two-dimensional or three-dimensional content to displays. A GPU may be either integrated with the CPU or discrete.

"High expandability computer" means a computer with any of the following:

(4) An expandability score of more than 690;

(5) If the computer is manufactured before January 1, 2020, a power supply of 600 watts or greater and either:

(i) a first discrete GPU with a frame buffer bandwidth of 400 gigabytes per second (GB/s) or greater; or

(ii) a system memory with more than 50 percent of its capacity (in gigabytes) with a bandwidth of 432 GB/s or more and an integrated GPU.

(6) If the computer is manufactured on or after January 1, 2020, a power supply of 600 watts or greater and either:

(i) a first discrete GPU with a frame buffer bandwidth of 600 gigabytes per second (GB/s) or greater; or

(ii) a system memory with more than 50 percent of its capacity (in gigabytes) with a bandwidth of 632 GB/s or more and an integrated GPU.

"Hybrid graphics" means a functionality that automatically places the system's first discrete GPU in a low-power state when not required in favor of an integrated GPU. This functionality allows graphics rendering by lower power and lower capability integrated GPUs while on battery or when the output graphics are not overly complex while then allowing the more power consumptive but more capable discrete GPU to provide rendering capability when the system requires it.

"Integrated GPU" means a graphics solution that does not contain a discrete GPU.

"Mobile gaming system" means a computer that is primarily used for gaming and that is designed specifically for portability and to be operated for extended periods both with and without a direct connection to an AC mains power source. A mobile gaming system is sold with an integrated display and a physical keyboard, and has all of the following criteria:

5) First discrete GPU with frame buffer bandwidth of 128 gigabytes per second or greater;

6) System memory of 16 gigabytes or more;

7) AC adaptor size of 150 watts or greater; and

8) Total battery capacity of 90 watt-hours or greater.

"Mobile workstation" means a high-performance, single-user computer primarily used for graphics, computer-aided design (CAD), software development, financial, or scientific applications, among other computation intensive tasks, excluding game play, and that is designed specifically for portability and to be operated for extended periods of time either with or without a direct connection to an external power source. Mobile workstations utilize an integrated display and are capable of operation on an integrated battery. A mobile workstation may use an external power supply and have an integrated keyboard and pointing device. In addition, a mobile workstation must meet all of the following criteria:

(1) Has a mean time between failures (MTBF) of at least 13,000 hours;

(2) Has qualified or is currently being reviewed for qualification by two or more independent software vendor (ISV) product certifications;

(3) Has at least one discrete GPU with frame buffer bandwidth of 96 gigabytes per second or greater, or at least one integrated GPU and a system memory with more than 50 percent of its capacity (in gigabytes) with a bandwidth of 134 gigabytes per second or greater;

(4) Supports the inclusion of three or more internal storage devices; and

(5) Supports at least 32 gigabytes of system memory.

"Workstation" means a computer used for graphics, computer-aided design (CAD), software development, financial, or scientific applications, among other computation intensive tasks. A workstation covered by this specification must meet the following criteria:

(1) Product as shipped does not support altering frequency or voltage beyond the computer processing unit and GPU manufacturers' operating specifications;

(2) Has system hardware that supports error-correcting code (ECC) that detects and corrects errors with dedicated circuitry on and across the CPU, interconnect, and system memory; and

(3) Meets two or more of the following criteria:

A) Supports one or more discrete graphic or discrete compute accelerators.

B) Supports four or more lanes of PCI-express, other than discrete GPU, connected to accessory expansion slots or ports where each lane has a bandwidth of 8 gigabits~~ytes~~ per second (Gb/s) or more.

(B) A computer monitor used in the testing of desktop computers shall have a native resolution of at least 1920x1080 pixels and use progressive scanning. The computer operating system shall be set to operate at a minimum of 1920x1080 pixels and progressive scanning. If multiple display connections are available on the computer, choose the correct connection using the following criteria:

1. If hybrid graphics is available, choose the port that enables hybrid graphics.

Table X Continued - Data Submittal Requirements

		Discrete GPU present in system	True, False
		First Discrete GPU Frame Buffer Bandwidth (rounded to nearest gigabyte per second)	
		Total Number of Discrete GPUs	

From:	Pasha, Soheila@Energy
To:	Driskell, Kristen@Energy
Subject:	FW: PC rulemaking - exclusion of handheld game consoles
Date:	Tuesday, November 22, 2016 2:29:27 PM

From: Michael Warnecke [e-mail redacted]
Sent: Friday, November 11, 2016 3:11 PM
To: Pasha, Soheila@Energy
Subject: PC rulemaking - exclusion of handheld game consoles

Hi Soheila,

I wanted to follow-up on ESA's October 24th letter with respect to the treatment of handheld game consoles in the PC rulemaking.

After giving the issue further thought, we think that the exclusion and definition for "small computer device" as set forth in the Proposed Regulatory Language: Express Terms released 9/9 by the CEC should be sufficient for excluding handheld game consoles. Accordingly, we've decided that a separate, explicit exception for handhelds is not necessary.

Please let me know if you have any questions or need further information.

Thanks,

Mike

Michael Warnecke
Chief Counsel, Tech Policy
Entertainment Software Association
[contact information redacted]

From: Delforge, Pierre
To: Pasha, Soheila@Energy
Cc: Driskell, Kristen@Energy
Subject: RE: Primary storage
Date: Tuesday, November 22, 2016 7:37:23 PM

Hi Soheila,

The problem with defining the primary/secondary disk based on where the OS is installed is that the base allowance already includes an HDD adder (which is why a single-disk system doesn't get a storage allowance). For systems that have both an SSD and an HDD, and where the OS is installed on the SSD (which is increasingly common for performance reasons), then the HDD would get the adder twice: once because the HDD adder is already included in the base allowance, and once because the HDD doesn't have the OS. This double-dipping would result in a large unwarranted allowance of 26 kWh.

Please note that the approach I proposed was actually different from the one in the 45-day language. The approach I suggested when we met was to give the adder **only from the second 3.5-inch HDD in the system**. This would ensure that systems that only have one 3.5-inch HDD don't get the adder, whether it is the primary or secondary. This is right because this adder is already included in the base allowance. This would avoid having to define a primary and secondary HDD. For example, if a system uses both an SSD and an HDD, it wouldn't get the HDD adder, whether the OS is installed on the SSD or HDD, and whichever disk has the largest capacity. It already gets one HDD adder as part of the base allowance.

But I am fine with either CEC's or my approach, just not the one which defines primary/secondary based on the OS as that approach would lose most of the savings for an increasingly common configuration.

Best,
Pierre

PIERRE DELFORGE
NATURAL RESOURCES DEFENSE COUNCIL
111 SUTTER ST., 21ST FLOOR, SAN FRANCISCO, CA 94104
[contact information redacted]
BLOG: HTTP://SWITCHBOARD.NRDC.ORG/BLOGS/PDELFORGE/

From: Pasha, Soheila@Energy [mailto:Soheila.Pasha@energy.ca.gov]
Sent: Friday, November 18, 2016 2:48 PM
To: Delforge, Pierre
Subject: Primary storage

Good afternoon Pierre,

I am looking for some information that you shared with us a while back regarding the "primary

storage" issue. If you recall, the definition of the "primary storage" was the storage that had operating system installed on. We changed it to the storage with the largest capacity (in GB) per NRDC's request. I am looking for the justification that you presented to us to make this change. Could you please send that to me?

Thank you,

-Soheila

From:	Pasha, Soheila@Energy
To:	Driskell, Kristen@Energy
Subject:	FW: 15 Day Reporting
Date:	Tuesday, November 22, 2016 2:33:40 PM
Attachments:	15-Day Language Express Terms Computers Computer Monitors and Signage Displays (rw).docx

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From: Singh, Harinder@Energy
Sent: Friday, November 18, 2016 11:13 AM
To: Pasha, Soheila@Energy
Subject: FW: 15 Day Reporting

Comments from Robert

From: [Robert White - email address redacted]
Sent: Friday, November 18, 2016 8:57 AM
To: Singh, Harinder@Energy
Subject: RE: 15 Day Reporting

Dell - Internal Use - Confidential

Hi Harinder,

Please see attached and let me know if you have any additional questions.

Thanks,

Robert White
Regulatory Senior Engineer
Dell | Global Product Compliance & Environmental Affairs
[contact information redacted]

From: Singh, Harinder@Energy [mailto:Harinder.Singh@energy.ca.gov]
Sent: Friday, November 18, 2016 10:34 AM
To: White, Robert [e-mail address redacted]
Subject: RE: 15 Day Reporting

From: Pasha, Soheila@Energy
Sent: Thursday, November 17, 2016 11:29 AM
To: Singh, Harinder@Energy
Cc: Driskell, Kristen@Energy
Subject: FW: 15 Day Reporting

Hi Harinder,
Could you reply to the comments for the monitors?

Thanks,
-Soheila

From: [Robert White - e-mail address redacted]
Sent: Wednesday, November 16, 2016 11:19 AM
To: Pasha, Soheila@Energy; Rider, Ken@Energy; Driskell, Kristen@Energy
Subject: 15 Day Reporting

Dell - Internal Use - Confidential

A couple of sections need additional options to select or clarification:

1606. Filing by Manufacturers; Listing of Appliances in Database.

Table X Data Submittal Requirements

	Appliance	*Required Information*	*Permissible Answers*
-	All Appliances	* Manufacturer's Name	
		* Brand Name	
		* Model Number	
		Date model to be displayed	What does this mean? Is this the date the model will be available to purchase in California? If so, what about that are on the market prior to the effective date? Would we put the effective date here?
		Regulatory Status	Federally-regulated consumer product, federally-regulated commercial and industrial equipment, non-federally-regulated

&

V	*Appliance*	*Required Information*	*Permissible Answers*	Additional Answer Needed or Question
	Computer Monitors	Color Gamut	>32.9% of CIELUV ~~or greater,~~ (99% or more of defined sRGB colors), >38.4% of CIELUV ~~or greater~~ (99% or more of defined Adobe RGB colors). ~~Less than~~ <32.9% of CIELUV	N/A or False Because this is cut and pasted into the "Computers" section.
	Computers	Color Gamut (if computer has integrated display)	>32.9% of CIELUV ~~or greater,~~ (99% or more of defined sRGB colors), >38.4% of CIELUV ~~or greater~~ (99% or	

			more of defined Adobe RGB colors), ~~Less than~~ ≤32.9% of CIELUV	
	Computers	AC Adapter Size (watts) (notebook computers and mobile gaming systems only)		This should not be limited to notebooks and/or mobile gaming systems. Desktops, Thin Clients, All-In-Ones (integrated computers) and possibly Workstations use AC Adapters.
	Computers	Power supply model number		Computers ship with multiple power supplies (internal & external). Power Supplies are never single sourced. Do you just want the power supply that was used for testing/certification purposes to be listed? Will this be an issue during an audit of the power supply tested is not the power supply listed in the database?

Thanks,

Robert White
Regulatory Senior Engineer
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[contact information redacted]

1606. Filing by Manufacturers; Listing of Appliances in Database.

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Table X Data Submittal Requirements

	Appliance	*Required Information*	*Permissible Answers*
	All Appliances	* Manufacturer's Name	
		* Brand Name	
		* Model Number	
		Date model to be displayed	
		Regulatory Status	Federally-regulated consumer product, federally-regulated commercial and industrial equipment, non-federally-regulated

. . .

	Appliance	*Required Information*	*Permissible Answers*
V	Computer Monitors	~~Technology~~Backlight Type	CCCFL, LED, OLED, Quantum Dots
		~~Monitor Type~~	~~Computer Monitor, EPD sRGB, EPD Adobe RGB, OLED, Gaming Monitor w/ Incremental Hardware, Gaming Monitor w/o Incremental hardware, "Keyboard, Video, Mouse," "Keyboard, Mouse, Monitor," Very High Performance~~
		EPD sRGB,	True, False
		EPD Adobe RGB,	True, False
		OLED,	True, False
		Gaming Monitor w/ Incremental Hardware,	True, False
		Gaming Monitor w/o Incremental hardware,	True, False
		"Keyboard, Video, Mouse,"	True, False
		"Keyboard, Mouse, Monitor,",	True, False
		Very High Performance	True, False
		Curved Monitor.	True, False
		Viewable Screen area (square inches)	
		Screen size (diagonal inches)	
		Automatic Brightness Control	True~~/~~, False
		Automatic Brightness Control Enabled when Shipped	True~~/~~, False
		Screen Luminance (Candelas Per Square Meter)	
		Native Resolution (megapixels)	
		Power Consumed in Computer Monitor On Mode (watts)	
		Power Consumed in Computer Monitor Sleep Mode (watts)	

		Power Consumed in Computer Monitor Off Mode (watts)	
		Touch Screen Capability	True~~/~~, False
		Touch Screen Enabled	True~~/~~, False
		Color Gamut	≥32.9% of CIELUV ~~or greater,~~ (99% or more of defined sRGB colors), ≥38.4% of CIELUV ~~or greater~~ (99% or more of defined Adobe RGB colors), ~~Less than~~ ≤32.9% of CIELUV

	Appliance	*Required Information*	*Permissible Answers*
V	Medical Computer Monitor	* Manufacturer's Name	
		* Brand Name	
		* Model Number	
		Date model to be displayed	

Table X Continued - Data Submittal Requirements

	Appliance	*Required Information*	*Permissible Answers*
V	Computers	Computer Type	Desktop, Notebook, Small-Scale Server, Workstation, Thin Client, Portable All-In-One, Mobile Gaming System, Mobile Workstation, High Expandability Computer
		Operating System Type	None, Limited Capability Operating System, Other
		Operating System (Provide the operating system used during testing to calculate energy consumption.)	
		Core Speed (gigahertz)	
		Number of CPU Cores	
		CPU support for 4 or more channels of memory or a 256 bit or greater memory interface	True, False
		Number of 3.5" hard-disk drives and Others (other than primary storage)	
		Number of 2.5" hard-disk drives (other than primary storage)	
		Number of solid-state drives (other than primary storage)	
		Number of hybrid solid-state drives (other than primary storage)	
		AC Adapter Size (watts) (notebook computers and mobile gaming systems only) 1. Remove reference to computer type 2. Move to the section (bottom) where information on power supply is listed	
		Total Battery Capacity (watt-hours) (notebook computers, portable all-in-one, and mobile gaming systems only)	
		Integrated Graphics Frame Buffer Bandwidth	

		(rounded to nearest gigabyte per second)	
		Discrete graphics processing unit(s) present in system	True~~/~~, False
		First Discrete Graphics Frame Buffer Bandwidth (rounded to nearest gigabyte per second)	
		Total Number of Discrete Graphics Processing Units	
		Integrated Display	True~~/~~, False
		Color Gamut (if computer has integrated display)	≥32.9% of CIELUV ~~or greater.~~ (99% or more of defined sRGB colors), ≥38.4% of CIELUV ~~or greater~~ (99% or more of defined Adobe RGB colors), ~~Less than~~ <32.9% of CIELUV
		Diagonal screen size (inches) (if computer has integrated display)	
		Viewable screen area (square inches) (if computer has integrated display)	
		Resolution (megapixels) (if computer has integrated display)	
		Enhanced Performance (if computer has integrated display)	True~~/~~, False
		Length of time of user inactivity before computer entering sleep (minutes). Do not report a number if the model does not enter sleep.	
		Length of time of user inactivity before placing display into sleep (minutes). Do not report a number if the model does not enter sleep.	
		Energy Efficient Ethernet Capability	True~~/~~, False
		Total Number of Add-in Cards	
		Video Surveillance Card	True~~/~~, False
		Wired Ethernet or Fiber Card with a transmit rate of 10 GB/s or greater	True~~/~~, False
		Total System Memory (gigabytes)	
		Highest system ~~System~~ memory bandwidth (gigabytes/second)	
		System memory with bandwidth higher than 632 GB/s (gigabytes)	
		System memory with bandwidth higher than 432 GB/s (gigabytes)	
		System memory with bandwidth higher than 146 GB/s (gigabytes)	
		System memory with bandwidth higher than 134 GB/s (gigabytes)	
		~~Sleep~~ Computer sleep mode type	ACPI S3, Other
		Computer ~~O~~off mode power (watts)	
		~~Sleep~~Computer sleep mode power (watts)	
		Long-idle power (watts)	
		Short-idle power (watts)	
		Expandability Score	
		Meets full capability mode weighting criteria	True~~/~~, False
		Meets remote wake mode weighting criteria	True, False
		Total Annual Energy Consumption (kilowatt	

		hours per year)	
		Power Supply Meets Table V-9 or Level VI	True/, False
		Small Volume Manufacturer	True/, False
		Motherboard model number	
		Power supply size (watts) 1. Please Specify Internal	
		AC Adapter Size (watts) 1. Remove reference to computer type	
		Power supply's power factor at full load 1. Please Specify Internal	
		Power supply's median power factor during long idle measurements 1. Please Specify Internal	
		Power supply model number 1. Recommend this include both internal and external (AC adapter)	

…

(e) Modified and Discontinued Appliances.

…

(3) If a manufacturer of a computer fails to obtain two ISV certifications within 60 days of certifying a computer model or loses ISV certifications such that the computer model no longer meets the definition of a workstation or mobile workstation, that manufacturer shall either file to remove the appliance from the database as described in Section 1606(e)(2) or shall modify the model certification as described in Section 1606(e)(1) to comply as a different computer type.

…

(k) Small Volume Manufacturers.

(1) Entities seeking to be designated as a "small volume manufacturer" for purposes of Section 1605.3(v)(7) shall certify and retain records to demonstrate the following information:

(A) Gross revenues from the 12-month period preceding the certification, from all of the entity's operations, including operations of any other person or business entity that controls, is controlled by, or is under common control of the entity, is $2,000,000 or less; and

(B) The manufacturer assembles and sells the computers at the same location.

(2) If a small volume manufacturer no longer meets one of the requirements to be a small volume manufacturer, the entity shall file to remove itself from the database as a small volume manufacturer within 90 days.

…

Note: Authority cited: Sections 25213, 25218(e), 25402(a)-25402(c) and 25960, Public Resources Code; and sections 16, 26 and 30, Governor's Exec. Order No. B-29-15 (April 1, 2015). Reference: Sections 25216.5(d), 25402(a)-

25402(c), 25402.5.4 and 25960, Public Resources Code; and section 16, Governor's Exec. Order No. B-29-15 (April 1, 2015).

From: Robert.White@dell.com
To: Pasha, Soheila@Energy; Rider, Ken@Energy; Driskell, Kristen@Energy
Subject: TEC Equations/Formulas
Date: Tuesday, November 15, 2016 7:14:04 PM
Attachments: [Logos & ENERGY STAR v.6.1 omitted]

[Label omitted]

All,

After today's call, thought I would send you proposals from ENERGY STAR version 6.1 to collect all of the power modes for Small-scale servers, Workstations, Mobile Workstations, and High Expandability Score computers.
This would allow ODM's that are already testing models for ENERGY STAR to align, for the most part.
https://www.energystar.gov/sites/default/files/specs//Version%206%201%20Computers%20Final%20Program%20Requirements.pdf

Small-Scale Servers & **High Expandability Score**: Desktop Conventional
Table 3 page 11

Table 3: Mode Weightings for Desktop, Thin Clients, and Integrated Desktop Computers

Mode Weighting	Conventional	Full Network Connectivity			
		Base Capability	Remote Wake	Service Discovery/ Name Services	Full Capability
T_{OFF}	45%	40%	30%	25%	20%
T_{SLEEP}	5%	15%	28%	36%	45%
$T_{LONG\ IDLE}$	15%	12%	10%	8%	5%
T_{SHORT_IDLE}	35%	33%	32%	31%	30%

Mobile Workstations: Follow Notebook Conventional, since this is the only option for notebooks and models not meeting definition would be required to qualify as notebooks anyway.
Table 4 page 12

Table 4: Mode Weightings for Notebook Computers

Mode Weighting	Conventional	Full Network Connectivity			
		Base Capability	Remote Wake	Service Discovery / Name Services	Full Capability
T_{OFF}	25%	25%	25%	25%	25%
T_{SLEEP}	35%	39%	41%	43%	45%
T_{LONG_IDLE}	10%	8%	7%	6%	5%
$T_{SHORT\ IDLE}$	30%	28%	27%	26%	25%

Workstations: Table 8 page 15

Table 8: Mode Weightings for Workstations

T_{OFF}	T_{SLEEP}	$T_{LONG\ IDLE}$	$T_{SHORT\ IDLE}$
35%	10%	15%	40%

Thanks,
Robert White
Regulatory Senior Engineer
Dell | Global Product Compliance & Environmental Affairs
[contact information redacted]

From: Sheikh, Shahid A
To: [[Contact information redacted]]

Subject: Add-in card, Mobile WS FB_BW and PCIe slots material
Date: Friday, November 18, 2016 3:41:20 PM
Attachments: Mb WS Gaming NB data3 Mb WS call out.pptx
PCIe Power.pptx

Hi Ken/Soheila: As promised please see attached data for mobile WS Framebuffer bandwidth – the systems highlighted meet the WS definition. The rest are mobile gaming systems or high-end notebooks.

Also attached is justification for use of PCIe mechanical slots vs. electrical lanes for expandability score.

Please see below proposed change to add-in card definition after today's discussion. Added 2 sentences to address CEC's concerns.

ITI 15 day proposal:

"Add-in card" means a removable device that can be installed in a computer peripheral component interconnect (PCI) or other slot. Add-in card does not include hard-disks, system memory, riser cards, ~~or~~ removable devices that are intended to operate outside of a computer chassis, or other components that are listed in Table V-8. It also does not include cards that split, or physically extend~~, or convert a slot type~~ a motherboard slot. Add-in card adder is applied only once per slot. The adder is only applicable when an add-in card does not claim an expandability score.

Gary Chow will send you information on memory capacity w.r.t. proposed system memory bandwidth.

Exempt Notebooks –
Mobile Workstations & Gaming Notebooks

6/15/2016

High End Notebook Data

# of CPU cores	Mem (GB)	GPU FB_BW	Screen size	PSU Size	Short Idle	Measured TEC	Base TEC*
4	16	80	15.4	135	12.88	44.66	30.2
4	32	256	17.3	240	24.5	87.56	33.0
4	16	80	13.3	130	22.61	70.63	36.6
4	16	160	15.6	180	25.44	81.35	39.6
4	16	160	17.3	180	25.24	82.51	39.4
4	32	72	17.3	240	24.5	87.56	42.3
4	64	80	17.3	200	24.06	87.35	47.4
4	32	120	17.3	90	26.1	93.64	50.1
4	16	120.3	15.6	230	28.1	98.11	53.4
4	32	160.4	17.3	230	34.7	123.76	76.3
4	64	120	17.3	230	36.8	134.47	90.9
4	16	160 (2x)	18.4	330	39.5	148.3	94.3
4	32	160	18.4	240	48.26	164.04	114.7

Mobile WS systems in orange box

*Base TEC using these Adders: D2 Memory, D2 EEE, D2 HDD, ITI Tier 1 dGFx, IOU May Display Adder

PCI Express – Mechanical Slots and power

11/18/2016

PCI Express

- Expandability Score needs to follow the Mechanical size of the slot and not the Electrical lanes for the slot.
- For Example a Mechanical x16 slot has to support the power of a x16 card (usually graphics card) plugged into that slot
- The following pages provides technical justification

PCI spec – Power for Cards

- Document "PCI Express® Card Electromechanical Specification Revision 3.0" (July 21, 2013) – https://pcisig.com/specifications?field_revision_value%5B%5D=3&field_document_type_value%5B%5D=specification&speclib= (document is not publicly free)
  - Section 4.2: Power Consumption
    - This section talks about Multiple Card Sizes and the power consumption of a **card**.
    - Table 4-2 is from the public Rev 1.1 spec - these details have not changed. http://read.pudn.com/downloads166/ebook/758109/PCI_Express_CEM_1.1.pdf

4.2. Power Consumption

This specification provides various sizes of cards for system implementation. Each card size provides support for a certain number of PCI Express lanes, and a corresponding difference in specified power consumption as shown in Table 4-2.

Table 4-2: Add-in Card Power Dissipation

	X1		x4/x8	x16	
Standard height	10 W[1] (max)	25 W[1] (max)	25 W (max)	25 W[2] (max)	75 W[2, 4] (max)
Low profile card[3]	10 W (max)		25 W (max)	25 W (max)	

Notes:

PCI Spec – Power to Slots

- Document "PCI Express® Card Electromechanical Specification Revision 3.0" (July 21, 2013) – https://pcisig.com/specifications?field_revision_value%5B%5D=3&field_document_type_value%5B%5D=specification&speclib= (document is not publicly free)
  - Section 4.1 Power Supply Requirements – There is no mention of slot size, just power delivery (Table 4-1 shown below)
  - System level designs have to assume for PSU sizing that any mechanical x16 slot can consume 75 watts through the board

Table 4-1: Power Supply Rail Requirements

Power Rail	10 W Slot	25 W Slot	150W-ATX Power Connector	75 W Slot
+3.3V				
Voltage tolerance	± 9% (max)	± 9% (max)	N/A	± 9% (max)
Supply Current	3.0 A (max)	3.0 A (max)		3.0 A (max)
Capacitive Load	1000 µF (max)	1000 µF (max)		1000 µF (max)
+12V				
Voltage tolerance	± 8%	± 8%	+5% / -8% (max)	± 8%
Supply Current	0.5 A (max)	2.1 A (max)		5.5 A (max)
Capacitive Load	300 µF (max)	1000 µF (max)	6.25 A (max)	2000 µF (max)
+3.3Vaux			N/A	
Voltage tolerance	± 9% (max)	± 9% (max)		± 9% (max)
Supply Current				
Wakeup Enabled	375 mA (max)	375 mA (max)		375 mA (max)
Non-wakeup Enabled	20 mA (max)	20 mA (max)		20 mA (max)
Capacitive Load	150 µF (max)	150 µF (max)		150 µF (max)

From: Sheikh, Shahid A
To: [Contact information redacted]
RE: Add-in card, Mobile WS FB_BW and PCIe slots material
Monday, November 21, 2016 2:02:08 PM

Subject:
Date:

Hi Ken/Soheila: Further refinement to add-in card definition is attached. Thanks Shahid

"Add-in card" means a removable device that can be installed in a computer peripheral component interconnect (PCI) or other slot. Add-in card does not include hard-disks, system memory, graphics cards~~, riser cards,~~ ~~or~~ removable devices that are intended to operate outside of a computer chassis, or other components that are listed in Table V-8. It also does not include cards that split, or physically extend~~, or convert a slot type~~ a motherboard slot which is usually called a Riser Card. Add-in card adder is applied only once per slot (or final device). The add-in card TEC adder is only applicable when an add-in card does not claim an expandability score.

From: Sheikh, Shahid A
Sent: Friday, November 18, 2016 3:41 PM
To: [Contact information redacted]

Subject: Add-in card, Mobile WS FB_BW and PCIe slots material

Hi Ken/Soheila: As promised please see attached data for mobile WS Framebuffer bandwidth – the systems highlighted meet the WS definition. The rest are mobile gaming systems or high-end notebooks.

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Gary Chow will send you information on memory capacity w.r.t. proposed system memory bandwidth.

<< File: Mb WS Gaming NB data3 Mb WS call out.pptx >> << File: PCIe Power.pptx >>