January 16, 2015

Ms. Verena Radulovic
United States Environmental Protection Agency
Office of Air and Radiation
1200 Pennsylvania Ave NW
Washington, DC 20460

Subject: Comments regarding Draft 1 Version 7 Displays Specification

Dear Ms. Radulovic,

On behalf of the Natural Resources Defense Council (NRDC) and the Appliance Standards Awareness Project (ASAP), we respectfully submit the following comments in regards to the ENERGY STAR Draft 1 Version 7.0 Displays specification issued November 18, 2014. On behalf of its more than 1.2 million members and online activists, the NRDC is working to help the world achieve decisive reductions in electricity and natural gas needs from buildings and appliances, in order to safeguard the Earth, its people, animals and plants, and the natural systems on which all life depends. ASAP is a coalition project which includes consumer, environmental and efficiency groups, utilities and state government representatives working together to advance efficiency through improved standards and other policies.

Electronic Displays, including computer monitors, professional displays and digital picture frames constitute a substantial portion of electricity end use in US homes and businesses: computer monitors are increasingly used not just with desktop computers but also with commercial notebooks in docking stations and as second screens. The power consumption of the most common size computer displays (21-24 inch diagonal) ranges from 12 W to 25 W in on mode. This corresponds to roughly 35-75 kWh electricity per year, equivalent to the ENERGY STAR base allowance for entry level

desktop computers, and 2 to 5 times the ENERGY STAR base allowance for notebook computers. In addition, there has been a rapid growth in the use of signage displays in public locations and commercial buildings. These displays tend to be larger, more brightly lit, and on longer hours than computer displays, resulting in high energy use. This makes the energy efficiency of both computer monitors and signage displays an important opportunity and priority for the reduction of carbon emissions associated with buildings in the United States and worldwide.

Modern displays use similar technology as LCD TVs. The rapid reduction in on mode power in the TV market suggest similar efficiency opportunities in electronic displays.

We commend EPA for initiating the revision of the Display specification in rapid reaction to the high market share of ENERGY STAR-qualified displays, and we generally support EPA's Draft 1 proposal. Our comments are meant to improve the draft specification and answer some of the questions posed by EPA in the 12/11/2014 webinar. Our comments cover the following points:

1. **Total Energy Consumption (TEC):** EPA's TEC proposal risks reducing energy savings from the ENERGY STAR v7 Display specification by allowing manufacturers to unnecessarily relax sleep mode efficiency. We support a TEC calculation for illustrative purposes however not as a qualification criterion;
2. **On mode power limits** - To better achieve its objective of 25 percent qualification rate at effective date, and to help the specification remain effective until the next revision, EPA should consider including two tiers in version 7, with the first tier on mode limits set at between 10 to 15 percent maximum of the ENERGY STAR dataset, and a more stringent second tier ready to be triggered when Tier 1 reaches 50 percent market share.
3. **Sleep mode allowances** – We support EPA's proposal and suggest a clarification on which sleep mode allowances can be cumulated;
4. **Signage displays power factor** – We recommend EPA includes power factor requirements of 0.9 for signage displays.

Here are our detailed comments:

1. EPA's total energy consumption (TEC) proposal risks reducing energy savings from the ENERGY STAR v7 Display specification by allowing manufacturers to unnecessarily relax sleep mode efficiency. We support a TEC calculation for illustrative purposes however not as a qualification criterion.

EPA requested feedback on the potential adoption of a Total Energy Consumption (TEC) approach instead of limits by mode for monitors. We appreciate EPA's objectives to increase flexibility for manufacturers and reduce the criticality of small allowances in

sleep mode. However we are concerned that this approach could have unintended consequences and result in higher energy consumption by qualified displays.

Display technology is evolving rapidly, we expect that on mode power will continue to decrease naturally per current market trends. Over the effective life of the specification, more displays will be able to easily meet on mode requirements. In a TEC framework, manufacturers would be able to use this cushion to relax sleep mode efficiency, resulting in higher energy consumption than in a scenario where sleep mode limits would still be in effect. In addition to reducing savings from the specification, it could also set the industry back on innovation for better efficiency in sleep mode.

We agree that sleep mode limits could prevent some displays with efficient on modes from qualifying, but we believe that EPA's sleep mode requirements already provide some margin for innovation. The large number of small allowances can add up to a significant overall sleep mode allowance. This provides some flexibility within the overall sleep mode allowance. And if new sleep mode features arrived in the market that couldn't work within the specification's sleep mode allowance and couldn't wait until the next major revision, EPA has the ability to do a minor interim revision to account for new sleep mode features.

Allowing displays with efficient on modes to qualify should not be a tradeoff with efficiency in sleep mode. We support a TEC calculation for illustrative purposes, to make it easier for stakeholders to evaluate the annual energy consumption of displays, however not as a qualification criterion.

2. **On mode power limits - To better achieve its objective of 25 percent qualification rate at effective date, and to help the specification remain effective until the next revision, EPA should consider including two tiers in version 7, with the first tier on mode limits set at between 10 to 15 percent maximum of the ENERGY STAR dataset, and a more stringent second tier ready to be triggered when Tier 1 reaches 50 percent market share.**

We are concerned that setting requirements at the top 20 percent of monitors in the ENERGY STAR dataset will result in much higher qualification rate than EPA's objective of 25 percent at the effective date of the new specification, as was the case with the version 6 specification. According to EPA's own analysis shows that by the end of 2014, only 18 months after Version 6 took effect, 80 to 90% of all monitors available met the Version 6 specification.[1] The new specification won't go into effect until Q2 2016, which means that for 18 months or longer, the ENERGY STAR label was not effectively helping customers differentiate the most energy efficient products in the market.

[1] ENERGY STAR Program Requirements for Displays – Draft Eligibility Criteria

To address prevent this issue from reoccurring with version 7, we recommend a two-prong approach:

A. Set on mode limits between 10 to 15 percent maximum of the ENERGY STAR dataset. We support EPA's objective that a new specification represents the top 25 percent most efficient products in the market at the date it goes into effect. EPA's proposed requirements reflect the performance of the top 20 percent of monitors in the ENERGY STAR dataset. The dataset includes models introduced in 2012, and possibly even earlier. In a rapidly evolving market, these models no longer represent the overall market. In addition, the v7 specification is expected to go into effect in Q2 2016, more than a year from today, and 4 years or more from the oldest models in the dataset. This will likely result in qualification rate significantly higher than 25 percent at effective date, and the specification may rapidly represent the majority of the market, reducing its effectiveness in helping customers identify and purchase high-efficiency models.

To better achieve its objective of a 25 percent qualification rate at effective date, EPA should set on mode limits between 10 to 15 percent maximum of the ENERGY STAR dataset.

This is particularly important for monitors in the 21-24 inch diagonal screen size category, which represent the majority of the market and where EPA proposed levels appear to correspond to relatively high qualification rates per the CA IOUs comments.

B. Shorten the time to revise the specification should market share increase rapidly. One approach would be for EPA to define two tiers in the version 7 specification, and trigger Tier 2 as soon as Tier 1 market share reaches 50 percent, without a lengthy specification revision process. This would ensure that the specification remains effective until a version 8 goes into effect.

3. Sleep mode allowances – We support EPA's proposal and suggest a clarification on which ones can be cumulated

We support EPA's proposal for sleep mode allowances for network connectivity, touch technology and occupancy sensor features . We recommend EPA clarifies in the specification which allowances can be cumulated and which ones are mutually exclusive.

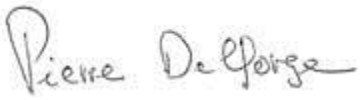
4. Signage displays power factor – We recommend EPA includes power factor requirements of 0.9 for signage displays

Power factor (PF) is a measure of current quality. Most efficient power supplies use switch mode designs that draw current in short spikes which often bear no relation to the voltage waveform, resulting in a low power factor if uncorrected[2]. Devices with low power factor have proportionately higher AC current draw, which increases the resistive losses in the building wiring, and increase the amount of electricity generation required for a given load. A device with a power factor of 0.4 draws 2.5 times the current compared to an ideal load with a PF of 1, which means that building wiring losses could be 6.25 times higher than the ideal case. The customer impacts are relatively higher in commercial buildings, where signage displays are used, than in residential buildings with shorter wiring.

Power factor losses increase exponentially with current. While the impact of power factor losses are relatively minor for low-power devices such as phone chargers, they become significant as power increases. For this reason, we recommend that EPA at a minimum requires a power factor of 0.9 or greater for signage displays, which typically have power levels that approach or exceed 50 watts, and if possible for computer monitors as well, many of which are used in commercial settings where power factor correction yields even more significant energy savings than in residential buildings.

Thank you for the opportunity to participate in this specification development process and for your consideration of our comments.

Sincerely,



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[2] IEA: Power Factor Correction: An Energy Efficiency Perspective, http://standby.iea-4e.org/files/otherfiles/0000/0041/AGO_G3A_PowerFactorCorrection_FINAL_2011_0617-M.pdf

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