Display Materials and Systems Division
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January 12, 2015

Ms. Verena Radulovic
United States Environmental Protection Agency
Office of Air and Radiation
Washington, D.C. 20460

Dear Ms. Radulovic,

In response to your memo dated November 18, 2014, 3M is providing input on the ENERGY STAR Program Requirements Product Specification for Displays (the Specification). We appreciate the opportunity to provide comments, and we continue to support the EPA's efforts to improve energy efficiency in display devices. These comments will pertain to both Draft 1 of the Eligibility Requirements and Draft 2 of the Test Method.

Our recommendations primarily relate to adjustments in the criteria to meet the trends in color. This year's CES show highlighted the trend in displays towards more realistic colors and wider color gamuts, and we believe it is important that the Specification address this market trend.

General Recommendations:

First, we would recommend clarifying the color data to direct that the gamut be reported in the CIE 1976 color space (u'v'). This color space is more uniform than the CIE 1931 space, and better reflects the current practice in color science. Much of the color information in the data set is in terms of the NTSC gamut designed for analog television, and the color space is not consistently noted. This could be improved by reporting in terms of percentage of sRGB coverage in the CIE 1976 color space.

Next, we would recommend the addition of a factor in the On-Mode Power calculation (Equation 1) to account for the impact of color gamut on display efficiency. This would enable partners to use color gamut to differentiate their products and maximize efficiency.

Finally, the color gamut requirement for enhanced performance designation should be expanded to the AdobeRGB target. In reviewing the data set, approximately 72% of all models reported at least a sRGB gamut area. This data set represents significant market adoption, not a performance differentiator. Seventeen of the enhanced performance models already report color gamuts that would be consistent with the AdobeRGB target. There are other models in the data set that can qualify for enhanced performance, but are not listing that designation.

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Specific Comments and Recommendations, by Specification Section Reference

Eligibility Criteria, Section 2.2.2

3M is supportive of including signage displays larger than 61 inches, and we agree with the simplified exclusion for TV tuners.

Eligibility Criteria, Section 3.3.1

With the addition of a factor to account for color gamut, we are supportive of the proposed On-Mode Power calculation for monitors. Considering that the data set extends back to 2011, technology advancement should continue to enable efficiency improvements over the current reported levels. Area and resolution are significant drivers of the display power, and as suggested above, color gamut is emerging as an important factor as well. Better reporting of display color gamuts should enable the impact of color gamut on display power to be determined if the correlation is not clear from the current data set.

For signage, calculating the On-Mode Power based on as-shipped luminance as is currently proposed in Table 1 of the Specification will have the unintended consequence of driving default luminances higher and therefore higher As-Shipped power. Instead, 3M believes a more meaningful evaluation criteria is absolute signage efficiency. To evaluate absolute signage efficiency, 3M recommends power testing at a fixed luminance as is done for monitors. The signage test method could be harmonized with the monitor test at a fixed luminance of 200 cd/m^2.

We appreciate that signage is installed in a great variety of environments that may require a range of luminances. No one can be sure how the signs will ultimately be set for the environment. By rewarding efficiency, the EPA can guarantee that signage will be using the lowest amount of power possible for whatever picture setting is suitable for the environment. 3M believes that the most effective way to ensure low power consumption is to evaluate and reward signs that have high efficiency (ratio of performance to power consumption).

By testing at a fixed luminance, all signs are evaluated on a level playing field, and power measurements become measurements of efficiency. Manufacturers would be free to set the default luminance for the intended market rather than for compliance to the ENERGY STAR targets.

Eligibility Criteria, Section 3.3.3

As recommended above, the enhanced performance criteria for color gamut should be expanded to AdobeRGB to account for the current trend in premium monitors, and the CIE 1976 color space is better suited for comparing and defining large color gamuts.

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Additional differentiation in the space is warranted since an additional 14 models could qualify as enhanced performance but did not declare meeting the definition.

Test Method, Section 6.3

We are supportive of continuing to include a fixed luminance for On-Mode Power measurements as required in section 6.3.A.2 in the draft 2 Test method. This setting allows ENERGY STAR to drive improved operating efficiency of monitors. Without specifying the measurement luminance there would not be a meaningful power comparison between units of the same area and resolution. Further, 200 cd/m^2 represents a useful luminance level for monitors as indicated by TCO Development's TCO Certified Displays criteria.

As noted previously, this fixed luminance should be adopted for signage displays. As the criteria now stands, the power allowance is calculated with one luminance and power is measured at a different luminance. This makes it difficult to compare display efficiencies between models.

TEC Approach

The TEC approach adds complexity and makes the requirements less intuitive. Consumers and manufacturers are familiar with power and have a sense of scale for the numbers. While everyone can also relate to annual energy consumption, the multipliers and adders require additional explanation and study to determine the impact of design changes. We request more time to evaluate this proposal before inclusion into the test method.

Thank you for your consideration of these comments. We look forward to cooperating with the EPA during this process. As questions arise around these comments, please contact us for further discussion.

Sincerely,

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