Topic	Subtopic	Comment Summary	EPA Response
Definitions	Signage Display	Two stakeholders asked about the definition of external data controller in regards to 1. A) 1. b) 5 and whether or not RJ45 connector qualifies to fulfill this condition to meet Signage Display criteria. Referring to 1. A) 1. b) 3, three stakeholders suggested the maximum pixel density be increased from 5,000 pixels/ sq.-inch to 7000 pixels/sq.-inch because of the trend toward higher resolution signage displays.	In order to provide greater specificity and in response to stakeholder feedback, EPA has revised the definition relating to external data controller and remote management to include signage displays that have a physical RJ45 or RS232 port. In the Final Draft, EPA has also revised the maximum pixel density limit to 7000 pixels/sq.-inch requirements per stakeholder comments to accommodate the trend towards higher resolution for signage displays.
Monitor TEC Requirements	Dataset	One stakeholder commented that since the dataset only contains ENERGY STAR qualified products, it does not represent an overall pass rate of 28% for ac-powered models on the market. It recommends that EPA issue a data request for non-ENERGY STAR qualified devices.	With the release of the Draft 1 specification in April 2018, EPA issued a public request for data including the publication of a data collection form. To date, EPA has not received data submitted via this form for non-ENERGY STAR certified models. During the EPA Draft 2 webinar on September 5, 2018, EPA presented data from the ENERGY STAR 2017 Unit Shipment Data report indicating monitors 2017 market penetration was 94%, meaning the ENERGY STAR dataset is reflective of the vast majority of the models on the market.
Monitor TEC Requirements	Size and Resolution in On Mode	Two stakeholders commented that the monitors Draft 2 E_TEC MAX equation was too stringent. One stakeholder argued that individual display panels of the same model have variations in maximum brightness due to the manufacturing process. This variation in brightness can affect the measured On Mode Power (W) at 200 nits by up to 20%. Therefore, the stakeholder recommended EPA account for these variations in its E_TEC MAX requirements. Three other stakeholders suggested EPA include a separate, less stringent E_TEC MAX equation for monitors greater than 300 square inches. The stakeholders noted that none of the models greater than 300 square inches with FHD resolution were able to meet the Draft 2 requirements.	In response to stakeholder comments and taking into consideration revised E_TEC MAX allowances, EPA is proposing revised E_TEC MAX requirements for monitors based on four size bins of Screen Area less than 190 square inches, 190 to 210 square inches, 210 to 315 square inches, and greater than or equal to 315 square inches. The revised Final Draft requirements for monitors including E_TEC MAX and the allowances results in dataset pass rates of 31% for models with diagonal screen size less than 26 inches and 30% for models equal to or greater than 26 inches. These revised criteria allow a wide range of resolutions, sizes, and features to meet ENERGY STAR. EPA has considered the stakeholder's comment regarding variations in maximum brightness of displays panels and resulting variations in display On Mode Power. In recognition, EPA has made numerous accomodations in this specification to ensure that models with a wide range of resolutions, sizes, and additional features are eligible. EPA's analysis shows that 31% of available models meet the final draft levels (a larger percent of among models introduced after 2017) and that many more models are close to meeting these levels. The ENERGY STAR program seeks to recognize top-performing models and EPA believes the final draft levels will reasonably accomplish this in spite of expected variation.
Allowances	Curved Monitors	Several stakeholders requested that EPA include a 30% allowance for curved displays because of decreased panel transmittance due to an additional required layer to correct for cross talk between pixels.	EPA has considered stakeholder feedback and revised the curved display allowance from 5% in Draft 2 to 15% in the Final Draft to account for and encourage the most energy efficient implementations of curved screen technology. Three out of the five curved monitors in the dataset are currently able to meet this proposal.
Allowances	Enhanced Performance Displays	In response to the Draft 2 enhanced performance displays allowance proposal, stakeholders commented that it was too stringent overall and failed to take into account power demand for color gamut as it relates to screen area. Generally speaking, several stakeholders suggested that allowances equivalent to 10% of TEC Max for models meeting 32.9% CIE and up to 50% of TEC Max for models meeting 38.4% CIE are appropriate to account for relative decreases in panel transmittance and LED efficiency. One stakeholder suggested an equation based on color gamut for the enhanced performance display allowance and asked that it vary by screen area. Several stakeholders additionally argued that the enhanced performance display allowance should apply to models with resolution at 2.3 total megapixels or higher rather than 3.6 total megapixels or higher because FHD resolution (MP=2.07) is classified as mainstream segment where WUXGA (MP=2.3) is classified as premium segment. FInally, stakeholders requested that EPA clarify whether an allowance function of color gamut is based on a variable expressed as a decimal from 0 to 1 or as percentage from 0 to 100.	In response to Draft 2, stakeholders suggested that the EPD allowance, in addition to being a continuous function of Color Gamut, should be implemented as a percentage of the Maximum TEC requirement so as to also account for the impact of screen size on power demand. EPA is thus proposing an EPD allowance that computes a percentage of Maximum TEC by a linear function of the Color Gamut. This function was determined such that the percentage of enhanced performance displays meeting the Final Draft Version 8.0 requirements was comparable to the overall percentage of displays in the dataset meeting the requirements. For enhanced performance models meeting the mininum color coverage of 32.9% of CIE, the allowance as function of color gamut equates to 4% of TEC Max. For models with the highest color coverage, including those surpassing 99% of Adobe, the allowance as a function of color gamut is equivalent to 33% of TEC Max. Per closer review of the data, EPA agrees that WUXGA (MP=2.3) resolution is still a premium segment of the market and indicates need for the EPD allowance. Therefore, EPA has reverted to the original resolution requirement that models have a minimum of 2.3 MP down from 3.6 MP proposed in Draft 2 for the EPD allowance.
Allowances	HDR	One stakeholder encouraged EPA to review and consider high dynamic range (HDR) in the Version 9 specification development as stated in Draft 2.	In response to stakeholder requests for an allowance for monitors with High Dynamic Range (HDR) capability, EPA is proposing respective allowances of 5% of TEC Max and 10% of TEC Max for models meeting the DisplayHDR 600 and 1000 tier white luminance performance requirements outlined in VESA's DisplayHDR CTS v1.0 specification, section 5.1. These allowances account for the higher peak brightness of models supporting HDR as compared to a standard model. No changes to the TEC calculation will be made at this time. EPA continues to encourage energy-efficient implementation of HDR as tested per the existing ENERGY STAR test method and will continue to current development of HDR test procedures led by other organizations including CLASP and consider a possible future revision to the ENERGY STAR test method.
Allowances	USB-C	One stakeholder suggested that EPA provide a TEC allowance for monitor with USB-C ports equivalent to 2W additional power demand in On Mode.	EPA reviewed the latest ENERGY STAR certified model data and identified 56 monitors with USB-C ports. Without an allowance the pass rate for models with USB-C is nearly 23%, slightly lower than the overall dataset pass rate of 31%. Therefore, EPA Is proposing a modest allowance of 0.7 kWh to TEC Max for models with USB-C to account for additional background power demand of USB-C yet encourage energy-efficient implementations of USB-C when the port is not fully being utilized.
Allowances	Gaming Monitors	One stakeholder suggested that models with high refresh rate (≥ 100 Hz) are used for gaming and premier audio-markets. The stakeholder argued that these models require more power, therefore, should be treated as a separate category and an allowance should be provided.	To date, EPA has not received a proposed definition or data for "gaming" monitors to assess whether increased power is required in the default mode using the standard test clip. Further, EPA has identified six models in the ENERGY STAR dataset that market gaming applications on brand websites. As three of these six models are able to meet the proposed Final Draft criteria, EPA does not see a need for an additional allowance.

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Signage Displays	Computation Allowance	One stakeholder requested EPA to provide an allowance for compute power if the signage display has Plug-in Module or Embedded Module. The stakeholder suggested EPA look to the ENERGY STAR Computers specification for benchmarks.	In response to the stakeholder's request, EPA analyzed the ENERGY STAR televisions dataset. "Smart TVs" or Television with Thin Client Capability, the ability of the TV to receive, decrypt, and display encrypted content provided by a Multichannel Video Programming Distributor (MVPD) over the Local Area Network, are similar in function to signage displays with embedded processors and computation capability. EPA regressed On Mode power data against size and presence of the Thin Client for UHD TVs in the ENERGY STAR dataset. On average, UHD TVs with a thin client draw 2.7 W more in On Mode than UHD TVs without Thin Client controlling for screen area. Based on these data, EPA is proposing an adder of 2.5W in On Mode for signage displays manufactured with Embedded Modules to encourage to adoption of the most energy-efficient designs and hardware. EPA is not proposing to apply this allowance to signage displays shipped and tested with Plug-In Modules as these types of signage displays have been eligible for ENERGY STAR Version 7 and there is thus far no data or examples of models demanding higher power.