



EAC Decision on Request for Interpretation 2015-04 (Visual Display Characteristics; Minimal display area)

VVSG 1.1 Volume I, Section 3.2.5 a (v.)

Date:

October 26, 2015

Questions:

What size display panel must a manufacturer use to meet the requirement for a minimum display area of 700 cm²? What is the nature of this requirement, and is it an absolute?

Section of Guidelines:

3.2.5 Visual display characteristics

The requirements of this section are designed to minimize perceptual difficulties for the voter. Some of these requirements are designed to assist voters with poor reading vision. These are voters who might have some difficulty in reading normal text, but are not typically classified as having a visual disability and thus might not be inclined to use the Acc-VS.

- a. If the voting system uses an electronic display screen as the primary visual interface for the voter, the display shall have the following characteristics:
 - i. Flicker frequency NOT between 2 Hz and 55 Hz.
 - ii. Minimum display brightness: 130 cd/m²
 - iii. Minimum display darkroom 7×7 checkerboard contrast: 150:1
 - iv. Minimum display pixel pitch: 85 pixels/inch (0.3 mm/pixel)
 - v. Minimum display area 700 cm²
 - vi. Antiglare screen surface that shows no distinct virtual image of a light source
 - vii. Minimum uniform diffuse ambient contrast ratio for 500 lx luminance: 10:1

Discussion:

At the time it was written (2006-2007) this requirement assumed a kiosk-based voting system and wanted to ensure that these products would use the minimum sized LCD monitors typically available at that time for legibility of the ballot and to permit enough information for the ballot displayed per screen. The requirement was intended to apply not just to electronic ballot displays, but also to the screen of precinct-based optical scanners that would provide feedback

to the voter before the scanned ballot was cast, to clearly indicate any overvotes, undervotes, and to provide an opportunity to verify the ballot before casting.

Display area is derived by multiplying the total pixel height and width. Therefore as an example, a 15" inch monitor with a 4:3 aspect ratio has a width of 30.48cm (1 inch = 2.54cm) and a height of 22.86cm, for a total area of 696.77cm² (rounded to 697cm²). Please note that for the purposes of this RFI, this area of 697cm² will be deemed to meet the 700cm² requirement. The attached table notes the display area of several common monitor sizes with both 4:3 and 5:4 aspect ratios.

Exceptions:

Although larger screens make the visual display easier to read and navigate, the 700cm² requirement is somewhat arbitrary, in that it is dependent on the context of use, and so there may be cases where a smaller display is currently used and is acceptable as noted below. However, the usability and accessibility requirements still apply. If the minimum display area is smaller than 700 cm², the burden of proof of the usability and accessibility of a smaller display is on the manufacturer. This implies that the product has undergone thorough usability testing and the submitted usability test reports demonstrate good usability and accessibility performance (in particular, works for low literacy, low vision, and dexterity). In these cases, EAC will have the reports evaluated by usability/human factors experts to confirm the findings in the manufacturer submitted usability test report(s).

Conclusion:

Current research indicates that it is both reasonable and desirable that a voting machine ballot display should meet the 700cm² display area requirement contained in Section 3.2.5 (a) (v) of the VVSG 1.1. This includes precinct count optical scanners as well as ballot marking devices and DRE (or DRE-like) machine displays. From a practical aspect, it is clear that smaller displays **may** also provide acceptable usability and accessibility while allowing current products using such smaller displays to remain in the market as a cost-savings to both election officials and voting system manufacturers. For this reason, previously EAC certified display screens not meeting the 700cm² requirement are grandfathered until further notice providing the manufacturer complies with the stipulation noted in the paragraph above and in the *Effective Date* notification of this document.

Effective Date:

Effective immediately for all new voting systems. Visual display screens of previously certified systems are grandfathered until further notice, but when submitted for modification testing with components not meeting this requirement, **must** submit the appropriate usability test reports at the time of application.

Diagonal (in)	Diagonal (cm)	5:4 Aspect Ratio Width (cm)	5:4 Aspect Ratio Height (cm)	5:4 Aspect Ratio Area (cm)	4:3 Aspect Ratio Width (cm)	4:3 Aspect Ratio Height (cm)	4:3 Aspect Ratio Area (cm)
11.6	29	23	18	423	24	18	417
13.3	34	26	21	557	27	20	548
14	36	28	22	617	28	21	607
15	38	30	24	708	30	23	697
15.4	39	31	24	746	31	23	734
17	43	34	27	910	35	26	895

Display Sizes of Select Monitors (width, height and area numbers rounded)