

**AbstractID: 3583 Title: Impact of Room Illuminance on Black Level Luminance and Contrast Detection for Off-axis Viewing on High Resolution Normal and High-Bright Flat Panel Displays**

**Purpose:**

Flat panel display image quality is known to be highly dependent on viewing angle. The contribution of room illuminance to black level luminance is well understood for CRTs, but, is not clearly understood for flat panel displays. We have investigated the effect of room illuminance and off axis viewing on displayed image quality. Two high resolution 9.2 megapixel flat panels were evaluated under various room illuminance levels and viewing angles – a standard IBM T221.

**Method and Materials:**

Black level luminance was measured at 0,  $\pm 15$ ,  $\pm 30$  and  $\pm 45$  degrees with room illuminance levels of 0, 2, 5, 10 and 50 lux. Luminance was measured with a Minolta LA-100a spot meter and illuminance levels were measured with an International Light Luminance Meter IL 1400a. The luminance target (3% of total display area) was centered on the display. Reader studies using a computer generated contrast detail phantom were conducted at each viewing angle and room illuminance level. Five readers read the target images. Specular reflections were minimized for all measurements and reader observations.

**Results:**

Minimization of specular reflections in the viewing room minimized the change in measured black level luminance. As room illuminance levels increased and viewing angles became more acute black level luminance increased. Reader results are presented as k-values and a correlation with room illuminance and black level luminance is demonstrated. The optimal viewing condition was shown to be 0 degrees with a room illuminance of 2 lux. Substantial degradation of measured k-value and black level luminance occurred at other viewing conditions.

**Conclusion:**

Visual perception of small targets is substantially impacted by both viewing angle and room illuminance. The results of these measurements help to explain the observed variations in 5 and 50 lux data presented at the Pittsburgh AAPM meeting.

**Conflict of Interest (only if applicable):**