

## I. TEST METHOD SETUP

#Key	Comment Summary	Response
1	<p>In general, Panasonic supports the clarification details presented in the Test Method Sections 5 F) UUT Alignment and 5 G) Light Source.</p> <p>Panasonic has some display models which guide the light from the ABC sensor window (located in the product's enclosure) to the actual location of the ABC sensor. In some cases, the ABC sensor may be at a 90 degree angle to this window.</p> <p>In order to account for this situation, we would suggest that the wording "ABC sensor" be replaced by "ABC sensor window" in the Test Method Sections 5 G) 2) c) and 5 G) 2) d) as follows:</p> <p>c) The center of the lamp shall be aligned at a horizontal angle of 0° with respect to the center of the UUT's ABC sensor window.</p> <p>d) The center of the lamp shall be aligned at a height equal to the center of the UUT's ABC sensor window with respect to the floor (i.e. the light source shall be placed at a vertical angle of 0° with respect to the center of the UUT's ABC sensor window).</p>	<p>DOE appreciates the comments provided by Panasonic on alignment of the light source with the ABC sensor present on the UUT.</p> <p>DOE understands that depending on the design of the product the ABC sensor may be embedded deeper into the product's enclosure/bezel, or may be covered by light integrating surfaces and ABC sensor windows. DOE believes that the word "ABC Sensor" is the most commonly and widely used terminology by manufacturers, testing laboratories, certification bodies, and consumers to denote the part of the ABC sensor which is visible on the bezel/enclosure of the product.</p> <p>DOE believes that specifying the "ABC Sensor" by any other name would give rise to confusion among the manufacturers, tests labs, and certification bodies. Therefore, DOE has retained the "ABC Sensor" language in the ENERGY STAR Displays Version 6.0 Final Draft Test Method (Rev June-2012).</p>

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In general, the light sensor cannot receive the total amount of light in the room, because it is installed in the bezel that comes to block part of light as shown in Figure 1. The ABC function is adjusted optimally under this real environment, and if the light source is aimed directly toward the light sensor, the brightness of the product would be raised too high.

Therefore, we would like to suggest any of the following test conditions.

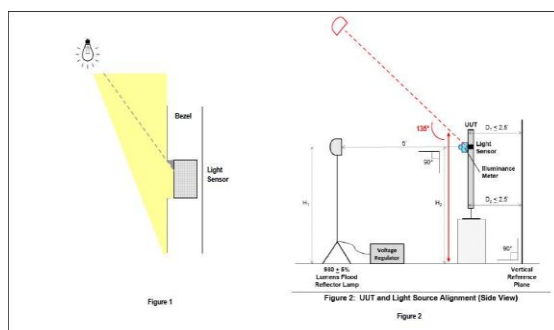
[Condition 1]

Instead of shining light directly into the sensor, it is illuminated obliquely downward as shown by red-colored description in Figure 2, considering real environment.

[Condition 2]

If light shines directly into the sensor, the level of the ambient light sensor should be re-evaluated considering the room lighting as real environment.

For example, 5lux, 50lux, 150lux and 250lux rather than 10lux, 100lux, 300lux and 500lux.



DOE believes that the alignment and the positioning of the light sensor in the bezel varies for different products. In addition, in the investigative testing performed, DOE observed most repeatable and consistent results with the center of the light source aligned at a horizontal angle of 0° and a vertical angle of 0° with respect to the center of the light sensor. DOE also observed that measuring at a vertical angle greater than 0° will not completely stress the ABC sensor.

DOE does not agree with re-evaluating room illuminance levels for testing, as both DOE and EPA believe that the lighting levels of 10 lux, 100 lux, 300 lux, and 500 lux provide power consumption values for very low to very high room illuminance values. As such, DOE has retained these lux levels in the Final Draft of the Test Method (Rev June-2012).

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3	<p>The tests were very interesting and it was attempted to create diffuse lighting as well as direct lighting. While direct lighting depends heavily on the positioning (any luminous intensity distribution of certain lamps / luminaires will show how much that would be), I was a bit surprised by the way the diffuse lighting was created.</p> <p>Ideally, you would want a Lambertian source (i.e. a source that has a constant Luminance independent on the viewing angle. The best way to reproducibly generate this would be by using an Ulbricht Sphere (integrating sphere) with an outlet. This is how it is usually done in lighting. Once you have such a setup, the desired illuminance can be obtained by varying the distance. A Lambertian source has a much more predictable luminous intensity distribution and as far as I know is also less “vulnerable” with respect to angular positioning. This concept is used in many photometric methods in order to test materials, daylighting systems or even test equipment.</p>	<p>DOE understands that a Lambertian source (Ulbricht Sphere) is the most ideal form of generating diffused lighting. However, building and procuring such a light source is expensive and will add burden to manufacturers, testing laboratories and certification bodies.</p> <p>In addition, DOE observed variation in the power consumed by the product when tested with different light diffusing set-ups, as shown in the published results <a href="#">here</a>. As such, DOE has retained a direct light setup for determining brightness of ABC-enabled displays in the Final Draft Test Method (Rev June-2012).</p>
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## II. TEST MEASUREMENTS AND TEST BURDEN

#Key	Comment Summary	Response
4	<p>Even if the occupancy sensor is disabled by default setting, does the power of Sleep Mode (Psleep) have to be measured in enabled mode as well?</p>	<p>DOE recommends in section 6.1.A) of the Draft 4 Test Method (Rev Apr-2012) that power measurements shall be performed with the product in its as-shipped condition for the duration of the Sleep Mode and On Mode testing, with all user configurable values set to factory default, except as otherwise specified by the test method. If the occupancy sensor is disabled by default, the power of the Sleep Mode shall be measured only with the sensor disabled.</p>

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5	<p>The Test Method Draft 4 Section 6.2 G) True Power Factor has added, "The reported power factor shall be averaged over the entire duration of the On Mode testing." Panasonic appreciates the effort to make this measurement more defined and repeatable. However, we find a number of issues with this method:</p> <ol style="list-style-type: none"><li>1) The number of measurements or time interval between measurements is not specified.</li><li>2) The resulting average will not be repeatable for verification purposes since it is highly unlikely that the measurements will be taken during the same scenes in the Dynamic Broadcast-Content Signal, which change at a high rate. As the Average Picture Level (APL) of the scenes change, the power and power factor will also vary.</li><li>3) The time required to perform multiple power factor measurements is overly burdensome.</li></ol> <p>Panasonic suggests that these issues can be corrected by adopting the same method employed by the Canadian Standards Association C382 Energy Performance of Televisions (TVs) and Displays. Section 4.4.5 Power Factor specifies that the measurement shall be made using the three-bar video signal provided in IEC 62087 Ed.2, Section 11.5.5. It also specifies that the ABC feature is disabled during the measurement. If the ABC cannot be disabled, the measurement is to be made with light entering directly into the ABC sensor at 300 lux or greater.</p> <p>Panasonic recommends this approach because it is both very repeatable and easy to perform. It should be noted that these same conditions are required during the ENERGY STAR Displays Version 6.0 Draft 4 Test Method Section 7.2 Luminance Testing (except that 500 lux is substituted for 300 lux). It would be efficient to perform the power factor measurement immediately after the UUT luminance is set to the On Mode luminance value LON as per Section 7.2.</p>	<p>DOE agrees with comment 1), and as such DOE has specified a time interval (measuring frequency) of greater than or equal to 1 reading per second at which both power and the power factor values shall be recorded.</p> <p>2) DOE recommends that the power factor values be recorded at the same time interval (recording frequency) as the power values. Doing so will maintain consistency in the measurement of power factor values. Language has been added to the Final Draft Test Method specifying the logging frequency of both the power and power factor readings.</p> <p>3) DOE is aware of power meters capable of logging power factor values in addition to the power values at the same reading frequency. As such, DOE does not believe that power factor measurements as specified in the test method would add testing burden. The requirement for power factor measurements remains in the Final Draft Test Method (Rev June-2012).</p>
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