Background Statement for SEMI Draft Document 4765B

New Standard: TEST METHOD OF FPD-BASED STEREOSCOPIC DISPLAY WITH PASSIVE GLASSES

Note: This background statement is not part of the balloted item. It is provided solely to assist the recipient in reaching an informed decision based on the rationale of the activity that preceded the creation of this document.

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Background Statement:
With the ever growing popularity of FPD-based stereoscopic display with passive glasses, it is critical to develop a standard test method that addresses industry needs. Crosstalk is one of the key performances of 3D display measurement in addition to the 2D display. Therefore, this test method focuses on the test method for crosstalk and other related characteristics. This document describes the test method of stereoscopic display only with passive glasses.

Review and Adjudication Information

<table>
<thead>
<tr>
<th>Group:</th>
<th>Task Force Review</th>
<th>Committee Adjudication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date:</td>
<td>2013/10/15</td>
<td>2013/10/18</td>
</tr>
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<td>Time &amp; Timezone:</td>
<td>13:00-15:00</td>
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</tr>
<tr>
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</table>

This meeting’s details are subject to change, and additional review sessions may be scheduled if necessary. Contact Standards staff for confirmation.

Telephone and web information will be distributed to interested parties as the meeting date approaches. If you will not be able to attend these meetings in person but would like to participate by telephone/web, please contact Standards staff.
SEMI Draft Document 4765B

New Standard: TEST METHOD OF FPD-BASED STEREOSCOPIC DISPLAY WITH PASSIVE GLASSES

1 Purpose
1.1 This standard is provided specifically to help facilitate supply chain communication between supply channels as well as the communication between manufacturers and consumers.

2 Scope
2.1 This test method applies to FPD-based stereoscopic display with passive glasses. Test methods for the optical properties of 3D luminance, 3D luminance difference, 3D contrast ratio, system crosstalk, 3D chromaticity, 3D chromatic difference, 3D color-gamut, 3D angular luminance uniformity, 3D normal luminance uniformity, and 3D viewing angle are included in this document.

NOTE 1: The passive glasses are limited to linear or circular polarization glasses in this document.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards and Documents
3.1 SEMI Standards and Safety Guidelines
SEMI D59 — 3D Display Terminology

3.2 ISO/CIE Standards

3.3 VESA Standards
VESA FPDM 2.0 — Flat Panel Display Measurements Standard

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

4 Terminology
4.1 Abbreviations and Acronyms
4.1.1 FPD — Flat panel display
4.1.2 LMD — Light measurement device
4.1.3 P₀ — Measurement point at the location #i (i = 0~8) on the screen.
4.1.4 Lₓᵧᵧ (X, Y, Z) — “L” means luminance; the subscript “X” (where X = L or R) means left or right channel; the subscript “Y” means the location #i (where i = 0~8) of measurement point; the subscript “Z” means left or right channel; the subscript “W” means the white, or black pattern for the left channel ; the subscript “K” (where Z = W or K) means the white, or black pattern for the right channel.

4.1.5 Cₓᵧᵧ(u’, v’) — “C” means chromaticity; the subscript “X” (where X = L or R) means left or right channel; the subscript “Y” means the location #i (where i = 0~8) of measurement point; the subscript “Z” (where Z = W, K, R, or B) means the white, black, red, green, or blue pattern for the left channel; the subscript “W” (where Z = W, K, R,

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G or B) means the white, black, red, green, or blue pattern for the right channel. \((u', v')\) are the coordinates of color space adopted by the International Commission on Illumination (CIE) in 1976.

4.2 Definitions

4.2.1 Interlaced pattern — the pattern rendered by even rows and odd rows of the display panel. For example, the interlaced pattern of the left channel is even rows on the stereoscopic display while the other is the odd rows as shown in the Figure 1.

4.2.2 3D normal luminance uniformity — LMD is set along the normal line of the screen at measuring distance when the measure luminance of each selected points as shown in the Figure 2.

4.2.3 3D angular luminance uniformity — LMD is positioned along the normal line of the center of screen at measuring distance. Then focus on each selected points at corresponding angles, and take the luminance by LMD, as shown in the Figure 3. Configuration a is rotate LMD with passive glasses fixed as shown in the Figure 3(a), while configuration b is synchronized rotate LMD and passive glasses in the Figure 3(b).
4.2.4 3D color gamut — color range of monocular view for stereoscopic display.

5 Summary of Method

5.1 Environmental Conditions
- Temperature: 25°C ± 3°C
- Humidity: 25% to 75% RH
- Illumination of surrounding: dark room ≤ 1 lux.

6 Measurement Structure

6.1 The measurement structure for testing the stereoscopic display with passive glasses in horizontal and vertical directions are shown in the Figure 4 and Figure 5, respectively.
6.2 Measuring Points

6.2.1 The 9 points measurement is recommended. The measuring points are notated from P₀ to P₈ respectively as shown in Figure 6.

6.3 Measurement Setup

6.3.1 After warming up the stereoscopic display, apply the interlaced pattern to the left and right channels.

6.3.2 Put LMD along the normal line of the center of the screen at measuring distance. Then rotate the angle $\theta$ of stereoscopic display on the horizontal direction as shown in the Figure 4. Then tilt the angle $\phi$ of the stereoscopic display on the vertical direction shown in the Figure 5.

NOTE 2: Both of measuring distance and rotate angle are specified by mutual agreement between customer and manufacturer.
6.3.3 Set the lens of the passive glasses front and perpendicular to the optical axis of LMD, and make sure that the lens of the passive glasses shall cover the subtense angle ($\theta_{LMD}$) of LMD. Use a shade to block any stray light if necessary. It is recommended to set the distance between passive glasses and LMD as close as possible.

6.3.4 Measure at least 500 pixels or 10 % of the panel pixels (exceptions shall be verified and reported).

7 Apparatus

7.1 Luminance Measurement — Use a luminance meter or spectro-radiometer to measure the luminance.

7.2 Color Measurement — Use a spectro-radiometer or colorimeter to measure the chromaticity.

8 Test Pattern and Measuring Item

8.1 Send the interlaced pattern to the stereoscopic display. These patterns are full screen signals and the input signal levels are 100 % for White, Red, Green and Blue, while the input signal level is 0 % for Black, on left and right channels (see Table 1).

Table 1 Interlaced Pattern and Measuring Items

<table>
<thead>
<tr>
<th>Interlaced pattern</th>
<th>Measuring Item (Luminance)</th>
<th>Measuring Item (Chromaticity)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left channel</td>
<td>Right channel</td>
<td>Left View</td>
</tr>
<tr>
<td>Interlaced pattern</td>
<td>Interlaced pattern</td>
<td>Left View</td>
</tr>
<tr>
<td>White</td>
<td>Black</td>
<td>$L_{L1, WK}$</td>
</tr>
<tr>
<td>White</td>
<td>White</td>
<td>$L_{L1, WW}$</td>
</tr>
<tr>
<td>Black</td>
<td>Black</td>
<td>$L_{L1, KK}$</td>
</tr>
<tr>
<td>Black</td>
<td>White</td>
<td>$L_{L1, KW}$</td>
</tr>
<tr>
<td>Red</td>
<td>Red</td>
<td>$C_{L1, RR}(u', v')$</td>
</tr>
<tr>
<td>Green</td>
<td>Green</td>
<td>$C_{L1, GG}(u', v')$</td>
</tr>
<tr>
<td>Blue</td>
<td>Blue</td>
<td>$C_{L1, BB}(u', v')$</td>
</tr>
</tbody>
</table>
9 Preparation of Apparatus

9.1 Warm up the measuring equipment for a specified period of time and stabilize the display luminance output (according to the instruction manual of measuring equipment or follow VESA FPDM 2.0).

10 Calibration and Standardization

10.1 The LMD used for luminance and chromaticity measurements shall be calibrated and traced to the accredited laboratory.

11 Procedure

11.1 3D Luminance

11.1.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.

11.1.2 Apply the White/White test pattern to the stereoscopic display, measure and record the luminance at center point of the screen.

11.1.3 Set the right lens in front of the LMD.

11.1.4 Apply the White/White test pattern to the stereoscopic display, measure and record the luminance at center point of the screen.

11.2 3D Contrast Ratio

11.2.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.

11.2.2 Apply the White/White and Black/Black test patterns to the stereoscopic display, measure and record the luminance at center point of the screen.

11.2.3 Set the right lens in front of the LMD.

11.2.4 Apply the White/White and Black/Black test patterns to the stereoscopic display, measure and record the luminance at center point of the screen.

11.3 3D Color Performance

11.3.1 3D Chromaticity

11.3.1.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.

11.3.1.2 Apply the White/White test pattern to the stereoscopic display, measure and record the chromaticity at center point of the screen.

11.3.1.3 Set the right lens in front of the LMD.

11.3.1.4 Apply the White/White test pattern to the stereoscopic display, measure and record the chromaticity at center point of the screen.

11.3.2 3D Color Gamut

11.3.2.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.

11.3.2.2 Apply the Red/Red, Green/Green and Blue/Blue test patterns to the stereoscopic display, measure and record the chromaticity at center point of the screen.

11.3.2.3 Set the right lens in front of the LMD.

11.3.2.4 Apply the Red/Red, Green/Green and Blue/Blue test patterns to the stereoscopic display, measure and record the chromaticity at center point of the screen.

11.4 System Crosstalk

11.4.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.

11.4.2 Apply the White/Black, Black/White and Black/Black test patterns to the stereoscopic display, measure and record the luminance at center point of the screen.
11.4.3 Set the right lens in front of the LMD.
11.4.4 Apply the White/Black, Black/White and Black/Black test patterns to the stereoscopic display, measure and record the luminance at center point of the screen.

11.5 3D Luminance Uniformity Measurement

11.5.1 3D Normal Luminance Uniformity
11.5.1.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.
11.5.1.2 Apply the White/White pattern to the stereoscopic display, measure and record the luminance along the normal line of each selected point as shown in the Figure 2.
11.5.1.3 Set the LMD at the measuring distance, and set the right lens in front of the LMD.
11.5.1.4 Apply the White/White pattern to the stereoscopic display, measure and record the luminance along the normal line of each selected point as shown in the Figure 2.

11.5.2 3D Angular Luminance Uniformity
11.5.2.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.
11.5.2.2 Apply the White/White pattern to the stereoscopic display, measure and record the luminance of each selected points at corresponding angles as shown in the Figure 3.
11.5.2.3 Set the LMD at the measuring distance, and set the right lens in front of the LMD.
11.5.2.4 Apply the White/White pattern to the stereoscopic display, measure and record the luminance of each selected points at corresponding angles as shown in the Figure 3.

11.6 3D Viewing Angle
11.6.1 Set the LMD at the measuring distance, and set the left lens in front of the LMD.
11.6.2 Apply the Black/White, White/Black and Black/Black patterns to the stereoscopic display, measure and record the luminance angular profile in the vertical and horizontal directions as shown in Figure 4(b) and Figure 5(b), respectively.
11.6.3 Set the LMD at the measuring distance, and set the right lens in front of the LMD.
11.6.4 Apply the Black/White, White/Black and Black/Black pattern to the stereoscopic display, measure and record the luminance angular profile in the vertical and horizontal directions as shown in Figure 4(b) and Figure 5(b), respectively.

12 Calculations

12.1 3D Luminance and 3D Luminance Difference
12.1.1 3D luminance is separately reported as left channel luminance \( L_{L0,WW} \) and right channel luminance \( L_{R0,WW} \) at center point of the screen.

12.1.2 3D luminance difference is the difference of luminance between the left channel and the right channel at center point of the screen.

\[
\Delta L = \left| L_{L0,WW} - L_{R0,WW} \right| \tag{1}
\]

Where,

- \( \Delta L \) is the 3D luminance difference (inter-ocular luminance difference) in the place of the center of the screen.
- \( L_{L0,WW} \) is the luminance of White/White pattern of the left channel at center point of the screen.
- \( L_{R0,WW} \) is the luminance of White/White pattern of the right channel at center point of the screen.
12.2 3D Contrast Ratio

3D contrast ratio is separately calculated as the left channel contrast ratio \(\text{CR}_L\) and the right channel contrast ratio \(\text{CR}_R\) at center point of the screen.

\[
\text{CR}_L = \frac{L_{L0,WW}}{L_{L0,KK}}
\]

\[
\text{CR}_R = \frac{L_{R0,WW}}{L_{R0,KK}}
\]

Where,

\(\text{CR}_L\) is the left channel contrast ratio in the place of the center of the screen.

\(L_{L0,WW}\) is the luminance of White/White pattern of the left channel at center point of the screen.

\(L_{L0,KK}\) is the luminance of Black/Black pattern of the left channel at center point of the screen.

\(\text{CR}_R\) is the right channel contrast ratio in the place of the center of the screen.

\(L_{R0,WW}\) is the luminance of White/White pattern of the right channel at center point of the screen.

\(L_{R0,KK}\) is the luminance of Black/Black pattern of the right channel at center point of the screen.

12.3 3D Color Performance

12.3.1 3D Chromaticity and 3D Chromatic Difference

12.3.1.1 3D Chromaticity

12.3.1.1.1 \(C_{L0,WW}(u',v'), C_{R0,RR}(u',v'), C_{L0,GG}(u',v')\) and \(C_{R0,BB}(u',v')\) are the CIE 1976 UCS chromaticity coordinates with White/White, Red/Red, Green/Green and Blue/Blue patterns that measured from the left channel respectively at the centre point of the screen. And, \(C_{R0,WW}(u',v'), C_{R0,RR}(u',v'), C_{R0,GG}(u',v'), C_{R0,BB}(u',v')\) are the CIE 1976 UCS chromaticity coordinates with White/White, Red/Red, Green/Green and Blue/Blue patterns that measured from the right channel respectively at center point of the screen.

12.3.1.2 3D Chromatic Difference

12.3.1.2.1 3D chromatic difference (inter-ocular chromatic difference) is the chromaticity difference between the left channel \(C_{L0,WW}(u',v')\) and the right channel \(C_{R0,WW}(u',v')\) in the place of the center of the screen. 3D chromatic difference is calculated as following equation (4)

\[
\Delta u'v'_{\text{inter-ocular}} = \sqrt{(u'_{R0,WW} - u'_{L0,WW})^2 + (v'_{R0,WW} - v'_{L0,WW})^2}
\]

Where,

\(\Delta u'v'_{\text{inter-ocular}}\) is the 3D chromatic difference at center point of the screen.

\(u'_{R0,WW}, v'_{R0,WW}\) are the coordinates of \(C_{R0,WW}(u',v')\) for the right channel.

\(u'_{L0,WW}, v'_{L0,WW}\) are the coordinates of \(C_{L0,WW}(u',v')\) for the left channel.
12.4 3D Color Gamut

12.4.1 3D color gamut is calculated by the percentage of the triangle area of measuring RGB colors to the triangle area of primary RGB colors for the right channel and the left channel in the place of the center of the screen as shown in equation (5) and equation (6), respectively. The area of the primary RGB triangle in (u’, v’) space is 0.0744 (see Table 2).

\[
\text{Gamut}_{R0} = \frac{0.5[(u'_{R0,RR} - u'_{R0,BB})(v'_{R0,GG} - v'_{R0,BB}) - (u'_{R0,GG} - u'_{R0,BB})(v'_{R0,RR} - v'_{R0,BB})]}{0.0744} \times 100\% \quad (5)
\]

\[
\text{Gamut}_{L0} = \frac{0.5[(u'_{L0,RR} - u'_{L0,BB})(v'_{L0,GG} - v'_{L0,BB}) - (u'_{L0,GG} - u'_{L0,BB})(v'_{L0,RR} - v'_{L0,BB})]}{0.0744} \times 100\% \quad (6)
\]

### Table 2 Standard Triangle Chromaticity Coordinates of Primary RGB

<table>
<thead>
<tr>
<th>Original NTSC Colorimetry (1953)</th>
<th>CIE 1931 x</th>
<th>CIE 1931 y</th>
<th>CIE 1976 u'</th>
<th>CIE 1976 v'</th>
</tr>
</thead>
<tbody>
<tr>
<td>primary red</td>
<td>0.67</td>
<td>0.33</td>
<td>0.4769</td>
<td>0.5285</td>
</tr>
<tr>
<td>primary green</td>
<td>0.21</td>
<td>0.71</td>
<td>0.0757</td>
<td>0.5757</td>
</tr>
<tr>
<td>primary blue</td>
<td>0.14</td>
<td>0.08</td>
<td>0.1466</td>
<td>0.3353</td>
</tr>
<tr>
<td>Gamut (%)</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>white point (CIE Standard illuminant C)</td>
<td>0.310</td>
<td>0.316</td>
<td>0.2009</td>
<td>0.4608</td>
</tr>
</tbody>
</table>

#1 The Chromaticity Coordinates (u’, v’) are calculated from the CIE 1931 chromaticity coordinates (x, y).

12.4.2 3D color gamut is calculated separately by the percentage of triangle area of measuring RGB colors to the area of the spectrum locus in (u’, v’) space for the right channel and the left channel at center point of the screen as shown in equation (7) and equation (8). The area of the spectrum locus in (u’, v’) space is 0.1952.

\[
\text{Gamut}_{R0} = \frac{0.5[(u'_{R0,RR} - u'_{R0,BB})(v'_{R0,GG} - v'_{R0,BB}) - (u'_{R0,GG} - u'_{R0,BB})(v'_{R0,RR} - v'_{R0,BB})]}{0.1952} \times 100\% \quad (7)
\]

\[
\text{Gamut}_{L0} = \frac{0.5[(u'_{L0,RR} - u'_{L0,BB})(v'_{L0,GG} - v'_{L0,BB}) - (u'_{L0,GG} - u'_{L0,BB})(v'_{L0,RR} - v'_{L0,BB})]}{0.1952} \times 100\% \quad (8)
\]

Where,

\[u'_{R0,RR}, v'_{R0,RR}\] are the coordinates of \(C_{R0,RR}(u', v')\) for the right channel.

\[u'_{R0,GG}, v'_{R0,GG}\] are the coordinates of \(C_{R0,GG}(u', v')\) for the right channel.

\[u'_{R0,BB}, v'_{R0,BB}\] are the coordinates of \(C_{R0,BB}(u', v')\) for the right channel.

\[u'_{L0,RR}, v'_{L0,RR}\] are the coordinates of \(C_{L0,RR}(u', v')\) for the left channel.

\[u'_{L0,GG}, v'_{L0,GG}\] are the coordinates of \(C_{L0,GG}(u', v')\) for the left channel.

\[u'_{L0,BB}, v'_{L0,BB}\] are the coordinates of \(C_{L0,BB}(u', v')\) for the left channel.
12.5 System Crosstalk

12.5.1 System crosstalk (SC) is separately calculated as shown in equations (9) and (10) at center point of the screen for the left and right channels.

\[
SC_L = \frac{L_{L0,KW} - L_{L0,KK}}{L_{L0,WK} - L_{L0,KK}} \times 100\% \quad (9)
\]

\[
SC_R = \frac{L_{R0,KW} - L_{R0,KK}}{L_{R0,WK} - L_{R0,KK}} \times 100\% \quad (10)
\]

Where,

- \(SC_L\) is the system crosstalk in the place of the left channel at center point of the screen.
- \(L_{L0,KW}\) is the luminance of Black/White pattern of the left channel at center point of the screen.
- \(L_{L0,WK}\) is the luminance of White/Black pattern of the left channel at center point of the screen.
- \(L_{L0,KK}\) is the luminance of Black/Black pattern of the left channel at center point of the screen.
- \(SC_R\) is the system crosstalk of the right channel at center point of the screen.
- \(L_{R0,KW}\) is the luminance of Black/White pattern of the right channel at center point of the screen.
- \(L_{R0,WK}\) is the luminance of White/Black pattern of the right channel at center point of the screen.
- \(L_{R0,KK}\) is the luminance of Black/Black pattern of the right channel at center point of the screen.

12.6 3D Luminance Uniformity

12.6.1 3D Normal Luminance Uniformity

12.6.1.1 3D normal luminance uniformity (Un) is calculated separately as shown in equations (11) and (12) for the left and right channels.

\[
Un_L = \frac{(L_{L_i,WW})_{\text{Min}}}{(L_{L_i,WW})_{\text{Max}}} \times 100\% \quad (11)
\]

\[
Un_R = \frac{(L_{R_i,WW})_{\text{Min}}}{(L_{R_i,WW})_{\text{Max}}} \times 100\% \quad (12)
\]

Where,

- \(Un_L\) is the normal luminance uniformity for the left channel.
- \(L_{L_i,WW}\) is the luminance of White/White pattern at each selected point \(Pi\) (i=0 ~ 8) for the left channel.
- \(Un_R\) is the normal luminance uniformity for the right channel.
- \(L_{R_i,WW}\) is the luminance of White/White pattern at each selected point \(Pi\) (i=0 ~ 8) for the right channel.
12.6.2 3D Angular Luminance Uniformity

12.6.2.1 3D angular luminance uniformity (Ua) is calculated separately as shown in equations (13) and (14) for the left and right channels.

\[
Ua_L = \frac{(L_{Li,WW})_{Min}}{(L_{Li,WW})_{Max}} \times 100\% \tag{13}
\]

\[
Ua_R = \frac{(L_{Ri,WW})_{Min}}{(L_{Ri,WW})_{Max}} \times 100\% \tag{14}
\]

Where,

\(Ua_L\) is the angular luminance uniformity of the left channel at center point of the screen.

\(L_{Li,WW}\) is the luminance of White/White pattern at each selected point \(Pi\) (where \(i=0 \sim 8\)) for the left channel.

\(Ua_R\) is the angular luminance uniformity of the right channel at center point of the screen.

\(L_{Ri,WW}\) is the luminance of White/White pattern at each selected point \(Pi\) (where \(i=0 \sim 8\)) for the right channel.

12.7 3D Viewing Angle

12.7.1 3D viewing angle of stereoscopic display is measured by taking the center measurement of the full screen at off-normal viewing angle. This is calculated separately for the left and right channels. 3D viewing angles are determined by the profile of the system crosstalk versus the angle in horizontal and vertical directions for the left and right channels.

12.7.2 After the acceptable values of the system crosstalk are decided in horizontal and vertical directions, 3D viewing angles are calculated separately as shown in equations (15), (16), (17), and (18) for the left and right channels.

\[
\Delta \theta_{L,H} = |\theta^{(1)}_{L,H} - \theta^{(2)}_{L,H}| \tag{15}
\]

\[
\Delta \phi_{L,V} = |\phi^{(1)}_{L,V} - \phi^{(2)}_{L,V}| \tag{16}
\]

And

\[
\Delta \theta_{R,H} = |\theta^{(1)}_{R,H} - \theta^{(2)}_{R,H}| \tag{17}
\]

\[
\Delta \phi_{R,V} = |\phi^{(1)}_{R,V} - \phi^{(2)}_{R,V}| \tag{18}
\]

Where

\(\theta^{(1)}_{L,H}, \phi^{(1)}_{L,V}\) are the positive rotation and tilt angles at acceptable values of the system crosstalk for the left channel at center point of the screen.

\(\theta^{(2)}_{L,H}, \phi^{(2)}_{L,V}\) are the negative rotation and tilt angles at acceptable values of the system crosstalk for the left channel at center point of the screen.

\(\theta^{(1)}_{R,H}, \phi^{(1)}_{R,V}\) are the rotation and tilt angles at acceptable values of the system crosstalk for the right channel at center point of the screen.

\(\theta^{(2)}_{R,H}, \phi^{(2)}_{R,V}\) are the rotation and tilt angle at acceptable values of the system crosstalk.
for the right channel at center point of the screen.

\[ \Delta \theta_{L,H}, \Delta \phi_{L,V} \] are the 3D viewing angle in horizontal and vertical directions for the left channel at center point of the screen.

\[ \Delta \theta_{R,H}, \Delta \phi_{R,V} \] are the 3D viewing angle in horizontal and vertical directions for the right channel at center point of the screen.

NOTE 3: The acceptable value of system crosstalk is determined by mutual agreement between customer and manufacturer. For example, the acceptable value of system crosstalk is 7% on horizontal direction as shown in the Figure 7.

![Figure 7: System Crosstalk on Horizontal Viewing Angle](image)

### 13 Reporting Results

#### 13.1 3D Luminance and 3D Luminance Difference

**Table 3 3D Luminance and 3D Luminance Difference Report Form**

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Interlaced Pattern</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Channel</td>
<td>Right Channel</td>
</tr>
<tr>
<td>( P_0 )</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td></td>
<td>3D luminance difference (cd/m²)</td>
<td></td>
</tr>
</tbody>
</table>
### 13.2 3D Contrast Ratio

**Table 4 3D Contrast Ratio Report Form**

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Measuring Pattern</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Channel</td>
<td>Right Channel</td>
</tr>
<tr>
<td>P₀</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₀</td>
<td>Black</td>
<td>Black</td>
</tr>
</tbody>
</table>

3D contrast ratio

### 13.3 3D Color Performances

**Table 5 3D Color Performances Report Form**

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Measuring Pattern</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Channel</td>
<td>Right Channel</td>
</tr>
<tr>
<td>P₀</td>
<td>White</td>
<td>White</td>
</tr>
</tbody>
</table>

3D chromatic difference

| P₀ | Red | Red |
| P₀ | Green | Green |
| P₀ | Blue | Blue |

Color gamut (%)

### 13.4 System Crosstalk

**Table 6 System Crosstalk Report Form**

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Measuring Pattern</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Channel</td>
<td>Right Channel</td>
</tr>
<tr>
<td>P₀</td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>P₀</td>
<td>Black</td>
<td>White</td>
</tr>
<tr>
<td>P₀</td>
<td>Black</td>
<td>Black</td>
</tr>
</tbody>
</table>

System crosstalk (%)
13.5 3D Luminance Uniformity

Table 7 3D Luminance Uniformity Report Form

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Measuring Pattern</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Channel</td>
<td>Right Channel</td>
</tr>
<tr>
<td>P₀</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₁</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₂</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₃</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₄</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₅</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₆</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₇</td>
<td>White</td>
<td>White</td>
</tr>
<tr>
<td>P₈</td>
<td>White</td>
<td>White</td>
</tr>
</tbody>
</table>

3D luminance uniformity (%)

13.6 3D Viewing Angle

Table 8 3D Viewing Angle Report Form

<table>
<thead>
<tr>
<th>Measuring Point</th>
<th>Angle (degree)</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left Channel (Horizontal)</td>
<td>Right Channel (Horizontal)</td>
</tr>
<tr>
<td>P₀</td>
<td>θ₁</td>
<td></td>
</tr>
<tr>
<td>P₀</td>
<td>θ₂</td>
<td></td>
</tr>
</tbody>
</table>

Acceptable value of system crosstalk (%)

3D viewing angle (degree)

14 Related Documents

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