

SEMI D73-1020

TEST METHOD FOR POSITIONAL ACCURACY OF CAPACITIVE TOUCHSCREEN PANEL

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1 Purpose

1.1 This measurement standard defines test methods for the positional accuracy of touchscreen panels. To help the communication between component/material/IC and panel manufactures, this Standard provides a testing method that reveals the response performance of touchscreen panels.

2 Scope

2.1 This Standard is a generic specification for positional accuracy test methods of touchscreen panel including the single point and the straight line.

2.2 Based on user experiences, the test sample is touchscreen panel incorporated with display.

2.3 The test methods are based on capacitive type of touchscreen panels.

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 ICDM Standard¹

Information Display Measurement Standard (IDMS v1.03)

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

4 Terminology

4.1 Abbreviations and Acronyms

4.1.1 *DUT* — device under test

4.1.2 *FPD* — flat panel display

4.2 Definitions

4.2.1 *display area* — the area which displays images of the test sample.

4.2.2 *line accuracy* — the maximum deviation of the draw line and the reported data. For calculation, line accuracy is the maximum orthogonal distance of reported coordinate to the drawing line.

4.2.3 *mechanical set position* — before applying positional accuracy test, the calibration between machine and panel coordinate should be executed. The mechanical set position is the calibrated original position that based on the panel coordinate.

4.2.4 *point accuracy* — the deviation of the touched point to the reported data, it means the distance between touched position and reported coordinate.

4.2.5 *stylus* — a device making touch actions to the DUT.

4.2.6 *test sample* — the test sample is a display with touchscreen panel.

¹ International Committee for Display Metrology, the ICDM is a Committee of SID (The Society for Information Display), part of the Definitions and Standards Committee.

5 Summary of Test Method

5.1 Environment Conditions

- Temperature: $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$
- Humidity: 25% to 75% RH
- Grounding: the stylus and DUT should be grounded to preventing electromagnetic interference.

5.2 Alignment and Calibration

5.2.1 Put the DUT on the stage of test machine, the test machine utilized fixture or camera to align the DUT. Therefore, the coordinate of test machine corresponds to the pixel coordinate of DUT.

5.2.2 The mechanical set position of test machine is set as the origin of DUT.

5.2.3 The report frequency should be recorded into the reporting table.

5.3 *Test for Point Accuracy* — Execute point test on 13 points of the test sample. The test points include corner and center; see Figure 1 following ¶ 7.2.2. Note that the coordinates of designated and reported should be recorded. The distance of the two coordinates is the point accuracy.

5.4 *Line Accuracy Test* — Drawing lines depicted in Figure 2 on the test sample. The reported coordinates and the drawing line equations are recorded. Eight lines are separately drawn on the test sample. Calculate the maximum distances between reported coordinates and the line.

6 Apparatus

6.1 *Stylus* — For capacitive type of touchscreen panel, the stylus shall be conductive. The conductive materials are copper or other conductive substances. The stylus is installed into automated machine with rounded tip for preventing damage the surface of DUT. Diameter of the rounded tip is less than 12 mm.

6.2 *Test Machine* — The equipment utilized for testing the positional accuracy on touchscreen panels. The trajectory of the stylus is recorded by the test machine. Basic requirements of the test machine are as follows:

- Automated xy-direction movement, the positional accuracy should less than 0.1 mm
- Exchangeable stylus
- Mechanism for coordinate calibration between test machine and DUT, the calibration error should less than 1 mm
- Mechanism for grounding
- Adjustable weight of stylus

6.3 *Device for Touched Coordinate Reporting* — There should be electronic device for transforming the DUT's reported data to the touched coordinate.

7 Testing Procedure

7.1 *Calibration* — The calibration procedure is in § 5.2, make sure that the stylus touching position can align with reported coordinate.

7.2 Point Accuracy

7.2.1 Setup the appropriate stylus to the test machine, adjust the touch force to an appropriate value.

7.2.2 Make the touch action automated executed by test machine (the test positions are depicted in Figure 1). Each position touch at least one time. Note that the edge of stylus at edge positions is just at the edge of display area. Therefore, the distances between test positions are not necessary the same.