Global and China Mobile Phone Display Industry Report, 2009

With the decreasing prices of mobile phone baseband and memory, mobile phone displays have become the most expensive component for mobile phones. Research on mobile phone display is very necessary. Mobile phone display industry experienced industrial upgrading within the period 2006 to 2007; monochrome and colorful STN-LCD markets shrunk dramatically, much less than 10% in 2004. TFT-LCD accounted for over 70%. Manufacturers without TFT-LCD production lines were in hardship, so they had to buy second-hand TFT-LCD production lines or independently built TFT-LCD production lines, including Truly, Wintek, Giantplus, Tianma and Varitronix.

From the end of 2007, in the field of mobile phone display, especially small and medium-size display, some changes have occurred. Some large-size TFT-LCD manufacturers have begun to increase investment in medium and small display. Chimei, LG Display, Brilliant Crystal, CPT, Innolux and AUO gained increasing income from this field. The shipment of Chimei, LG Display, Brilliant Crystal and CPT was conducted by CELL instead of module. At present, the size of mobile phone (particularly smart phone and illegal mobile phone) displays is often above 3.5 inches, and they are usually packaged by COF with the cooperation of flex-board vendors. The demand for displays focus on various appearances, not on quantity, while large-size display manufacturers always pay attention to the demand for quantity. Innolux is subject to Foxconn Electronics Inc., while AUO is concerned about the key customers and digital camera field; both of them focus on the shipment by module. Their large-size TFT-LCD production lines are mostly 3, 4 and 4.5-generation lines, which have already been depreciated, so the cost is quite low. These large-size TFT-LCD manufacturers do not impact on traditional mobile phone display manufacturers, they conduct shipment by CELL and rely on the latter to complete module process for them, so Wistron, EIO, Aeneas and other small manufacturers gain benefits hereby.

Another hotspot of mobile phone display is AM OLED. PM OLED is the same with STN-LCD in color and resolution, but its price is far higher. AM OLED is the focus in market.

OLED’s disadvantage is that antioxidant capacity of its light-emitting materials is rather poor after being electrified, so it needs vacuum glass seal to prevent oxidation, which is the same with TFT-LCD. OLED is a current-mode device which requires high current drive, so LTPS TFT substrate is essential. Now, all of small-size AM OLEDs are LTPS TFT substrates. The carrier transfer rate of LTPS TFT substrates is 100 times faster than that of traditional A-SI substrates. The manufacturing process of LTPS substrate is very complicated, requiring more mask and laser annealing processes, which leads to low throughput. If there are crystal defects on the surface of LTPS, Mura will arise easily, which is a barrier for the application of LTPS substrate. Due to the perfect process of a-Si substrate, it is easy to carry mass-production. A-Si substrate production is seen as another large-scale solution, but a-Si substrate has disadvantages in initial voltage offset and mobility.

LTPS determines the high cost of OLED. The investment in OLED production line is not lower than that of traditional TFT-LCD. At this stage, OLED is sold at a loss; even in mass production, its cost is still higher than that of traditional TFT-LCD. Most TFT-LCD panel plants have completed amortization of some old production lines, and obtained considerable output as well as good effects. LTPS TFT technology is only mastered by a few big TFT-LCD manufacturers, and their attitude towards OLED is very important, unless they completely grasp OLED manufacturing know-how, they will not invest in OLED. Therefore, OLED is in the charge of a few manufacturers now, such as Samsung. Samsung has overwhelming advantages in AM OLED, which is very unfavorable for the industrial development.

Income Ranking of 18 Small and Medium-size Panel Manufacturers in the World, 2007-2008

Manufacturer	Sales Income,2007(US$: million)	Sales Income,2008(US$: million)
Sharp	4772	4276
TMDisplay	2485	2182
EPSON	1915	1452
Hitachi Display	1581	1523
AUO	1264	1383
Samsung SDI	1220	866
TPO	1115	917
Wintek	998	405
Truly	908	563
Samsung	1280	1479
Giantplus	397	165
LG Display	458	410
Tianma	242	198
CPT	556	515
Chimei	372	453
Sony	——	933
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