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## Prevention of OLED display damage due to charge accumulation

Qi Qi

Yi Tao

Chang Ju Kang

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## **Prevention of OLED display damage due to charge accumulation**

### **ABSTRACT**

The disclosure describes techniques to protect an organic light emitting diode (OLED) display by discharging excess charge that gets accumulated on a display module. A conductive coating material is applied from the backside of a cover glass to a metal layer on the backside of the display. With the addition of the conductive coating material, excess charge is discharged through the system ground to avoid damage to the display panel.

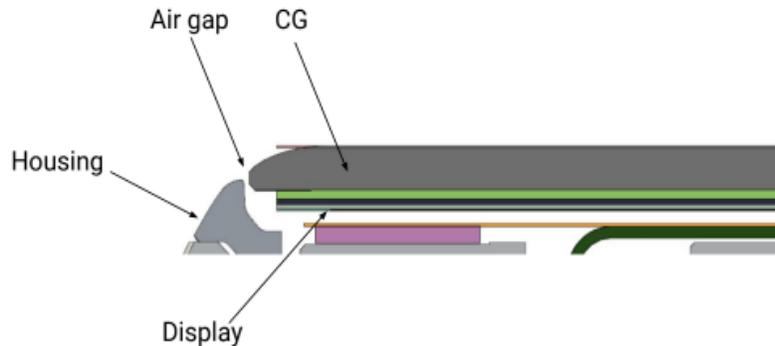
### **KEYWORDS**

- Organic light emitting diode display (OLED)
- Charge accumulation
- Electrostatic discharge
- Touch screen display
- Smartphone
- Green spot
- Green flash

### **BACKGROUND**

Protecting a display from damage due to electrical charge accumulation is important for organic light emitting diode (OLED) display modules. Charge accumulation can result in green spot, green flash, or green display on OLED displays leading to recoverable, temporary damage or non-recoverable, permanent damage of the device display. For example, electrical charge can be accumulated when a user rubs their device with a cloth material to clean the device display. The electrical charge can cause abnormal OLED function and may revert to normal function

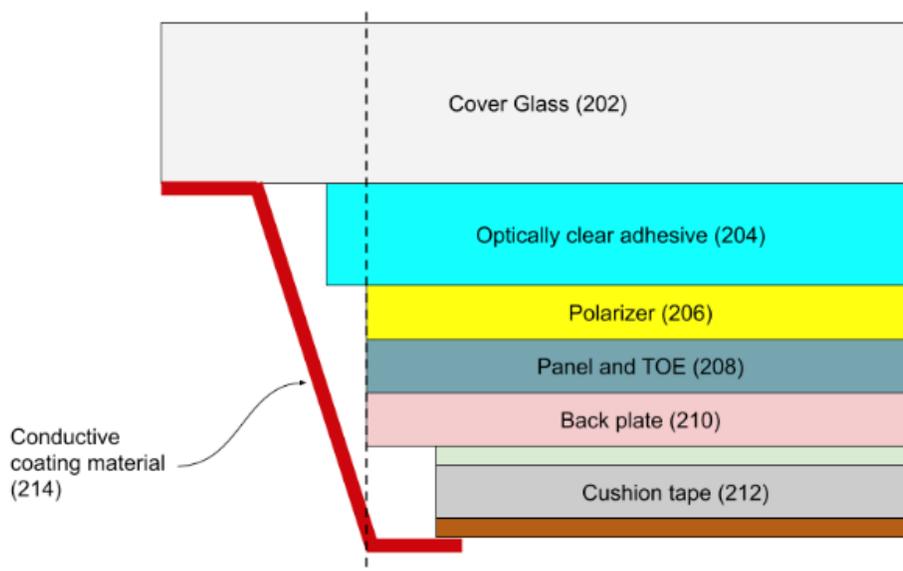
when the charge is released. In some instances, even the touch of a human finger with the display cover glass can lead to such problems.



**Fig. 1: Example device with air gap**

An example consumer electronics device with open design is illustrated in Fig. 1. Such design can help realize narrow bezels, e.g., for a smartphone, or other device. In such devices, an air gap may exist between the cover glass (CG) and the housing. The air gap allows for possible charge accumulation to move onto the display, e.g., at the display edges that are close to the gap.

DESCRIPTION



**Fig. 2: Anti charge accumulation for OLED display**

Fig. 2 illustrates an example OLED display in which a conductive coating material provides a path to discharge accumulated excess electrical charge from the cover glass to a metal layer on the backside of a display panel. The display module is constructed with a cover glass (202) and an optically clear adhesive (204) to attach the polarizer (206), panel and TOE (208), and back plate (210) to the cover glass. A cushion tape (212) is placed under the backplate. A layer of conductive coating material (214) is applied over the backside of the cover glass to the metal layer of the display module.

The metal layer of the display is grounded for electrostatic discharge protection. With the added conductive coating material, accumulated excess charge on the cover glass is discharged, thus avoiding damage to the display panel. Discharging the accumulated excess charge can extend the lifetime of the display and reduce green display failure rate.

## CONCLUSION

The disclosure describes techniques to protect an organic light emitting diode (OLED) display by discharging excess charge that gets accumulated on a display module. A conductive coating material is applied from the backside of a cover glass to a metal layer on the backside of the display. With the addition of the conductive coating material, excess charge is discharged through the system ground to avoid damage to the display panel.