

# **Air-coupled Ultrasonic Inspection on Glass Substrates**

**Wonjae Choi<sup>1</sup>, Bonggyu Ji<sup>2</sup>**

<sup>1</sup>Center for Safety Measurement, KRISS, Republic of Korea, <sup>1</sup>Intelligent Wave Engineering, KRISS, Republic of Korea

In the OLED display manufacturing process, It is more efficient to produce large quantities by inserting a large OLED glass substrates than by using multiple smaller, so the size of the OLED glass substrates is gradually increasing. As the size of the glass substrate increases, the incidence of cracks also increases. Cracks in glass substrates are responsible for breakage in high temperatures sputtering process( $\geq 500$  °C). Debris caused by the breakage causes not only failure of sputtering equipment, but also huge economic loss as it stops the process. The method using the existing optical camera, which is difficult to detect cracks due to malfunction caused by reflected light from the surroundings, has a limited operating environment. This study presents an air-coupled ultrasonic inspection method for detecting cracks in OLED glass substrates based on guided waves. The pitch-catch configuration of transducers can transmit/receive guided waves by incident oblique waves. The transmission coefficient spectrum of the analytic model is used to physically describe the guided waves with mode and frequency selection. The frequency dependence of identifying crack sizes in samples was investigated below 1 MHz. Scanned images obtained experimentally can identify the size and location of the specimen. The proposed method can be a new alternative to the existing limited method.