

### **ABSTRACT OF THE DISCLOSURE**

Embodiments of the present disclosure generally relate to augmented reality waveguide combiners. The waveguides includes a waveguide substrate, having a substrate refractive index (RI)  $n_{\text{sub}}$ , a slab waveguide layer disposed over the waveguide substrate, the slab waveguide layer having a slab RI  $n_{\text{swg}}$  and a slab depth  $d_{\text{swg}}$ , the slab depth  $d_{\text{swg}}$  from a lower surface to an upper surface of the slab waveguide layer, at least one grating defined by a plurality of grating structures, the grating structures are disposed in, on, or over the slab waveguide layer, and a superstrate between and over the grating structures, the superstrate having a superstrate RI  $n_{\text{superstrate}}$  and an interface with the slab waveguide layer. The slab RI  $n_{\text{swg}}$  is greater than the substrate RI  $n_{\text{sub}}$  and the slab RI  $n_{\text{swg}}$  is greater than the superstrate RI  $n_{\text{superstrate}}$ .

[Figure 2]