

# 8K Video Data Transmission through Optical Phased Array Packaged by Direct Optical Wire Bonding

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**Abstract**—We have proposed and demonstrated high-speed optical wireless transmission system using 2D beam steerable optical phased array (OPA), achieving 8K video data transmission through free-space range of 3m for the first time. OPA was designed based on transmission power budget from the proposed system, having 64 phase tunable channels and  $2\mu\text{m}$  pitch grating radiators array with n-i-n heater at each radiator for 2D beam steering. The manufactured OPA had beam divergence angle of  $0.7^\circ/0.9^\circ$  and beam steering range of  $46.0^\circ/10.2^\circ$  each in transversal/longitudinal direction. Eye-diagram for 32Gbps data transmission was measured for several receiving points with different phases and radiator heating power, each showing identical shape. We also managed to send 8K video data using OPA, verifying the potential for OPA uses in commercialized optical wireless communication (OWC) systems. For integrating OPA into a module, direct optical wire (DOW) bonding was applied for optical packaging.

**Keyword**—Optical phased array (OPA), Optical wireless communication (OWC), Direct optical wire (DOW), Optical packaging, Silicon photonics



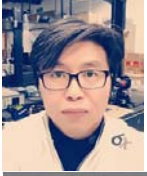
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