5. Conclusion

In this paper, we have demonstrated VLC using InGaN sources color-converted with AlInGaP NM assemblies. The NM geometry of the converter enables integration with optics and micro-LEDs by capillary bonding. We note that this format of color-conversion is consistent with semiconductor approaches developed by some LED manufacturers in order to extent the efficiency of blue LEDs to longer wavelengths, while at the same time offering faster response than phosphors for VLC. The extraction efficiency values reported are still relatively low but could be improved by further incorporating light extraction features to the NM assembly. The maximum data rate achieved for this hybrid configuration in this paper was 870 Mb/s using 4-PAM scheme with DFE. We also reported on a NM format for remote pumping by LD. In this configuration we have shown VLC up to 1.2 Gb/s using OFDM. This second configuration would be particularly suited for high power applications with the NM bonded to optics and heat spreaders. Finally, by designing other NM structures using AlGaInP or InGaN material systems it should be possible in principle to extend the wavelength coverage across the visible spectrum.

Acknowledgments

This research work was supported by the EPSRC Programme Grant “Ultra-parallel visible light communications (UP-VLC)” (EP/K00042X/1). The authors would like to acknowledge Dr. Enyuan Xie for the micro-LED fabrication.

#260251 Received 11 Mar 2016; revised 22 Apr 2016; accepted 23 Apr 2016; published 28 Apr 2016