

Photodiode Based Up-conversion Technique for UWB-over-Fiber Systems

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Abstract – This paper investigates all-optical frequency conversion of UWB signals for UWB-over-fiber systems. A low cost and efficiency up-conversion system is achieved by using the receiving photodiode as frequency mixer. Principle and experimental validation of this optical microwave mixing technique are presented using continuous waves. Then, optical up-conversion of a 3.4 GHz bandwidth UWB monocycle is successfully demonstrated in the 10 GHz band showing good performances in terms of conversion loss and available bandwidth. Interest of this up-conversion technique for millimeter wave UWB is discussed relatively to electrical RF mixers.