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Title:10 Gb/s optical carrier distributed network with W-band (0.1 THz) short-reach wireless communication system
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Abstract:Millimeter-wave (mm-wave) operated in W-band (75 GHz-0.11 THz) is of particular interests, since this frequency band can carry signals at much higher data rates. We demonstrate a 10 Gb/s optical carrier-distributed network with the wireless communication system. The mm-wave signal at carrier frequency of 0.1 THz is generated by a high speed near-ballistic uni-traveling carrier photodiode (NBUTC-PD) based transmitter (Tx), which is optically excited by optical short pulses. The optical pulse source is produced from a self-developed photonic mm-wave waveform generator (PMWG), which allows spectral line-by-line pulse shaping. Hence these optical pulses have high tolerance to fiber chromatic dispersion. The W-band 10 Gb/s wireless data is transmitted and received via a pair of horn antennas. The received 10 Gb/s data is envelope-detected and then used to drive an optical modulator at the remote antenna unit (RAU) to produce the upstream signal sending back to the central office (CO). 20 km single mode fiber (SMF) error free transmission is achieved. Analysis about the optimum repetition rate of the optical pulse source and the transmission performance of the upstream signal are also performed and discussed. © 2012 Elsevier B.V. All rights reserved.
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