Compact Optical Steganography Based on Amplified Spontaneous Emission Noise

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Abstract: We experimentally demonstrate a compact optical steganography method using chirped fiber Bragg gratings. The stealth signals are carried by wide band amplified spontaneous emission noise, which has strong dispersion effect for pulse stretching.

1. Introduction

Optical stealth transmission carried by amplified spontaneous emission (ASE) has been proved to be an effective way to hide the signal in both the time domain and the spectral domain [1]. Since ASE noises widely exist in the fiber optics networks, adding the stealth channel to the network does not introduce extra power consumption. The spectrum of the stealth channel is ex-1(h)-2(a(o)-1.521.521.521t1-Oh.5(i)2(e)-1207 0 82(t)1(o)-3( )-84 T68s)8(p)8Tj33( )]TJ 5(i)2

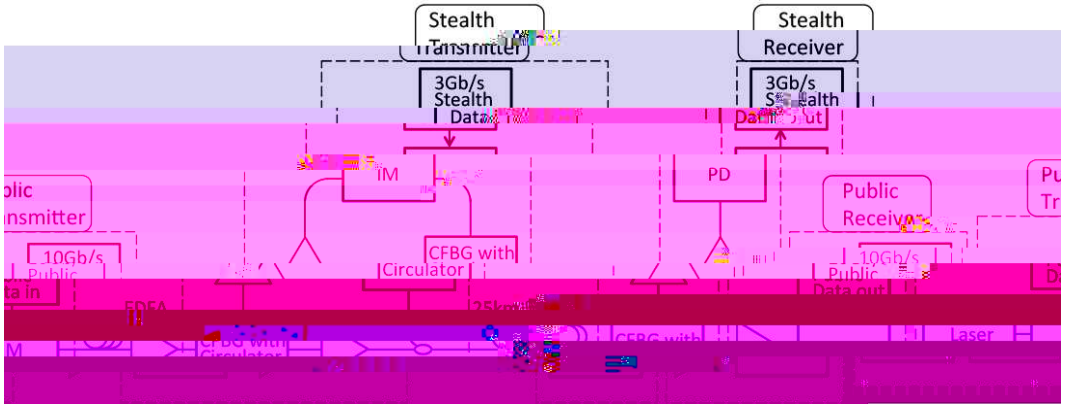

Fig. 1. Experimental Setup (IM: Intensity Modulator; EDFA: erbium-doped fiber amplifier; CFBG: chirped fiber Bragg grating; SSMF: standard single mode fiber; DCF: dispersion compensating fiber; PD: photo diode).

3. Results and analysis

Fig. 2 shows the measured eye diagrams with and without the dispersion matched. The measurement shows that when the dispersion is matched, the stealth channel has a clear eye diagram (Fig. 2(a)) and when the dispersion is not matched with 2034ps/nm extra dispersion, the stealth channel is pure noise and even the period of the stealth