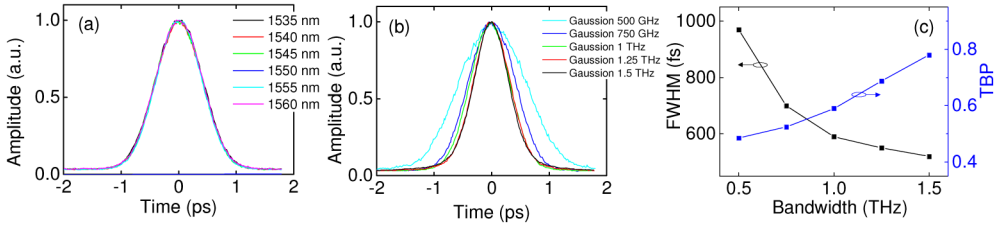

Fig. 7. (a) Autocorrelation traces of the 10 GHz data pulse at different wavelengths; (b) Autocorrelation traces of the 10 GHz data pulse with different 3-dB bandwidth (500 GHz, 750 GHz, 1 THz, 1.25 THz and 1.5 THz); (c) the FWHM and time bandwidth product (TBP) for different bandwidths.

0.485 is achieved at the minimum bandwidth of 500 GHz. The transform limited TBP (0.441 for Gaussian pulses) is not achieved because nonlinear chirp is generated at the edge of the broadened spectrum at the output of the DF-HNLF 2 and this cannot be compensated by dispersive elements. The TBP increases with the filter bandwidth since more uncompensated nonlinear chirp passes the filter when the bandwidth of the filter is larger. In principle, a transform limited TBP could be obtained if the spectrum was broadened enough and only a small portion in the center of the spectrum where only linear chirp is generated was filtered out.

5. Conclusions

We have demonstrated a 10 GHz pulse source for a 640 Gbit/s OTDM transmitter and receiver based on $LiNbO_3$ phase modulator followed by a polarization-independent 2-stage non-linear pulse compressor. Both stages are based on self-phase modulation (SPM) in dispersion-flattened highly non-linear fibers. Error-free performance for the OTDM multiplexing and demultiplexing is achieved, which confirms the high pulse quality. The pulse source can also be tuned from 1535 nm to 1560 nm, emitting a 680 fs Gaussian pulse with negligible pedestal at all wavelengths. Different pulse widths can be obtained by adjusting the bandwidth of the subsequent Gaussian filter.

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