A practical solution is presented for the design of a non-isolated DC/DC power converter with very low output ripple voltage and very fast output voltage step response. The converter is intended for use as an envelope tracking power supply for an RFPA (Radio Frequency Power Amplifier) in a Tetra2 base station. A simple and effective fixed-frequency hysteretic control scheme for the converter (buck with 4th order output filter) is developed and analyzed. The proposed approach is verified experimentally by a 500W output prototype, capable of delivering any voltage in the range of 10-30V within 10μs with 10mVpp of output ripple and efficiencies in the 88-95% range.