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High-Power RF Source for the Pulsed Fields Excitation in the Ground

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High-power electromagnetic fields and currents in the excitation and propagation in the ground is of a significant interest for numerous applied problems. A pulsed electromagnetic field source has been developed for the related purposes. The source is designed as a dipole (vibrator) antenna, excited by the high-current pulsed discharges.

The usage of a dipole with a high input capacitance and a low input impedance is a distinctive feature of this source dipole antenna. The dipole antenna impedance being low improves antenna matching with the spark-gap, being the source of exciter signal. This approach is used to increase the source efficiency. The electromagnetic fields source length is 1.63 m while its diameter is 0.5 m. The source can operate either in single-burst or repetitive mode.

The output source radiation parameters have been experimentally measured in the far field zone. The generated waveform is close to a sine-wave impulse with the central frequency of 60 MHz, E*R product of 450 kV and a peak pulsed power of greater than 2.5 GW with a burst length of 200 ns. Excellent coupling of this source signals through the soil has been shown experimentally.

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