

Measurement probe for a 45-kV-UWB-pulse generator

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The investigations in high power electromagnetic (HPEM) applications are accompanied with the development of high power and high voltage pulse generators. In many HPEM applications high power microwave (HPM) generators are used. These generators produce signals with a very high output power but only with a narrow frequency bandwidth. In contrast to HPM generators the so-called ultra wideband (UWB) pulse generators produce output pulses with an extremely broad frequency range. Combined with a high voltage amplitude of the UWB-signal and a high repetition rate high power-densities can be produced in nearly all frequencies at the same time.

At the moment there are UWB-pulse generators available which produce double exponential time signals with a rise time of about 150 ps, a pulse width of 2 ns and a voltage amplitude of up to 45 kV. The validation of the 45-kV-UWB-signal is currently done with special attenuators. The disadvantage of these attenuators is the frequency depending attenuation factor especially in the upper frequency range. To get the real time output signal of the attenuator the transfer function of the attenuator has to be used. This could be led to unstable calculations and to wrong time signals. This paper presents a measurement probe which provides exact measurements of high voltage signals with amplitudes up to 45 kV combined with an extremely broad frequency bandwidth. The probe will be characterized in time as well as in frequency domain and the measurement results will be compared to the measurements of the offered attenuator.