

A Study of an Integrated 4 x 3 SWO Box System as a HPEM Resonant Source

Mae AlMansoori*, Moza Mohamed, Edrees AlMansoori, Luciano Prado de Oliveira, Ernesto Niera, Abdul Rouf Baba, Felix Vega, and Chaouki Kasmi

(1) Directed Energy Research Center, Technology Innovation Institute, Abu Dhabi, UAE; e-mail: mae.almansoori@tii.ae

This paper presents the concept of a Switched Oscillator Box Array (SOBA), a HPEM source designed for susceptibility and vulnerability testing, meeting IEC 61000-4-36 standards. The 3x4 transmitter system consists of multiple resonating transmitters integrated into a single rack. Each transmitter comprises an antenna, a switched oscillator, a high-voltage source, and a pneumatic system in SF₆.

An initial transmitter operating at 330 MHz, was studied and validated in [1]. Based on the reported results, the concept of SOBA, shown in Figure 1, has been developed combining 12 of the designed boxes. The system is designed to have a peak electric field of 90 kV/m at 1 m when the 12 SWO boxes radiate in phase. Moreover, this system has advantages over other systems with similar E-field ranges due to its low cost and easy maintenance. The manufactured final prototype is shown in Fig. 1.

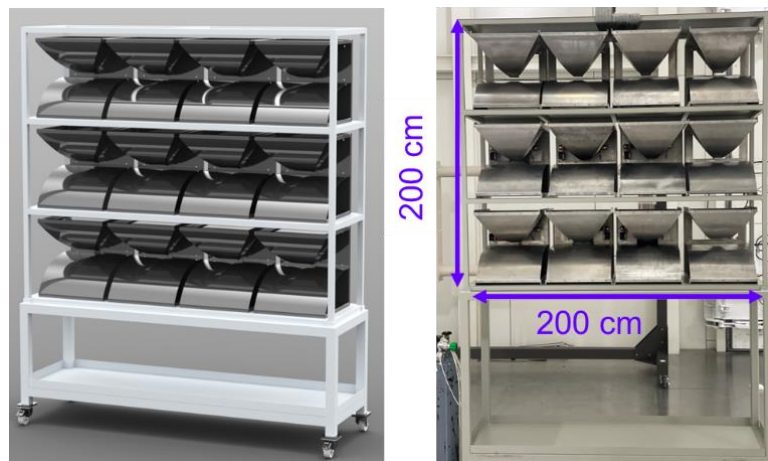


Figure 1. 3D model of the SOBA system (left) and the manufactured prototype (right).

The system was experimentally tested in a semi-anechoic chamber in order to verify the influence of adjacent antennas on the individual radiating patterns. Further steps are under way in order to create a synchronization mechanism using a laser triggering system.

References

- [1] F. Vega et al., "The SWO Box, a Portable Resonant Source for High-Power Electromagnetic Applications," 2022 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (AP-S/URSI), Denver, CO, USA, 2022, pp. 627-628.
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