# PEDF

## **EDF POWER NETWORKS LAB**

## ELECTROMAGNETIC COMPATIBILITY TESTS

## Test electromagnetic behaviour in an environment

Electromagnetic Compatibility (EMC) is an electrotechnical discipline aimed at ensuring the ability of an electronic or electrical system to operate properly in its environment without producing electromagnetic interferences (EMI) that are intolerable to other devices in its environment.

The EMC laboratory has test facilities to simulate generic EM environments (electrostatic discharges, lightning magnetic fields, fast transients, electric fields such as radio / radar / DECT / GSM / 3G / 4G / WiFi / Bluetooth, etc.) in order to qualify the robustness of the equipment and to verify the compatibility of emitted EM radiation in a nuclear site deployment.



Our EMC laboratory has several test facilities able at its disposal to characterize the electromagnetic behavior of a device with its environment. Among them, two stand out :

#### • Reverberation chamber with Modes stirred

The Mode-Stirred Reverberation Chamber (MSRC) is a parallelepipedic cavity with conductive walls (Faraday cage). One of its main roles is to subject electronic equipments to high levels of electromagnetic field, in order to characterize its robustness according to procedures standardized by the IEC (International Electronical Commission).

#### Semi-Anechoic Chamber

The semi-anechoic chamber is a Faraday cage that isolates the contents of the cavity from external emissions. Unlike the MSRC, the internal walls of this cavity are covered with absorbent materials.

This test equipment is intended to carry out immunity tests to electromagnetic fields at radio frequencies in accordance with IEC 61000-4-3 on industrial automation equipments. The objective is to absorb all emissions between an antenna and an object under test except for the direct path.

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EMC TEST AND MEASUREMENT EQUIPMENT	FEATURES AND CHARACTERISTICS
SEMI-ANECHOIC CHAMBER	<ul> <li>Size of the Faraday cage : 7 m x 2,8 m x 3 m</li> <li>Turntable, antenna mast and shielded camera controlled by optical fibers</li> <li>Immunity testing capacity: up to 30 V/m from 80 MHz to 6 GHz in 61000-4-3</li> <li>Emission test capacity: IN84 &amp; CISPR 22 measurements from 80 MHz to 18 GHz</li> </ul>
REVERBERATION CHAMBER WITH MODES BREWING	<ul> <li>Size of the Faraday cage : 4.9 m x 3.7 m x 3.1 m</li> <li>Immunity testing capacity: up to 200 V/m from 250 MHz to 6 GHz in 61000-4-21</li> <li>Emission test capacity: total radiated power measurements</li> </ul>
DRIVEN IMMUNITY TEST BENCHES	<ul> <li>Electrostatic discharge test bench (IEC 61000-4-2),</li> <li>Fast burst transient generator (IEC 61000-4-4),</li> <li>Shock wave generator (IEC 61000-4-5),</li> <li>Damped sinusoidal wave generator (IEC 61000-4-12),</li> <li>Damped oscillatory wave generator (IEC 61000-4-18)</li> </ul>
RECEIVERS AND MEASURING EQUIPMENT	<ul> <li>Spectrum Analysers (9 kHz to 30 GHz) / EMI Receiver (9 kHz to 26 GHz)</li> <li>Vector network analyzers LF and HF (10 Hz to 6 GHz)</li> <li>Antennas: Whip, Tuned dipole, Biconic, Log Periodic, Bi-Log, Horn</li> <li>Magnetic and electric field meters (human exposure)</li> </ul>





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