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An Electric Field Detector for high-performance measurements of the electric field in the ionosphere

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An Electric Field Detector (EFD) for space applications has been designed and built in the framework of the CSES (China Seismo-Electromagnetic Satellite) mission. The instrument has been conceived for space-borne measurements of electromagnetic phenomena such as seismo-electromagnetic perturbations and more in general to investigate lithosphere-atmosphere-ionosphere EM coupling. The EFD consists of four probes designed to be installed on booms deployed from a 3-axes stabilized satellite. It measures electric field in a wide band of frequencies extending from quasi-DC up to about 5 Mhz subdivided in four frequency bands by a signal processing unit, with a resolution of the order of $1\mu\text{V}/\text{m}$ with a wide dynamic range of 120 dB in the lower DC-ULF band. The resolution value is 40 times better than any other recent instrument of similar feature. With these characteristics, the described EFD represents the most performing and updated device so far developed for electric field measurements in near-space applications. The detector has been fully tested in laboratory both in a Faraday cage and in a Plasma Chamber that simulates the real ionospheric conditions. Topic of this talk is the technical description of the EFD, its main characteristics and the test results.

Collaboration

– not specified –

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