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# Conducted and radiated noise distribution on Pt rod power network for CMS Tracker upgrade.

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The next generation of CMS tracker system will have all DC-DC converters located inside the tracker volume.They will be connected together in each rod via common power network, which propagates this noise along the rod.This paper presents several conducted and radiated test results on a prototype of the Pt power network.Test results will show the implication of the DC-DC converter position and grounding topology on noise emission along the rod.The goal of this study is to gain insight into the noise distribution along the rod power bus to increase the immunity of FEE.

## Summary

The characterization of electromagnetic noise emissions of DC-DC converters is a critical issue that has been analyzed during the first stage of the "EMC studies for Tracker upgrade"project (CMS 9.04). Several simulation analyses showed important effects on conducted emissions of DC-DC converters due to port impedance variations. These simulations have been confirmed with several tests on real prototypes of DC-DC. However, the noise level inside the tracker volume will not depend only on the noise emission of each DC-DC converter but also the power distribution network and electronics layout inside each rod. They will play an important role in the noise distribution and this aspect will contribute to decrease the performance of FEE. The power bus that connects all DC-DC converter together, DC-DC converter positions along the rod and grounding topology will have an important effect on noise level inside tracker volume.
For that purpose, a prototype of the Tracker Pt power network has been designed and developed with 4 DC-DC converters and Pt rod structures. Several conducted and radiated tests have been planned and performed to characterize the noise distribution along the rod on a real prototype of the Pt layer power network. Conducted and radiated (near and far field) emission of the power network has been measured. Special attention has been paid on DC-DC converters layout along Pt rod structure and grounding configuration of the rod.
These studies provide important recommendations and criteria to be applied in order to design the power network and electronics layout across the rod. This design plans to present high robustness against EMI noise.

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