

# **Impact of Powerline Communication Radiation on Human Health**

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## **Abstract.**

The advent of smart grids has created the need for a reliable communication system within conventional power-grids. Communication using PLC (Power-Line Communication) technology is by far the best choice for operators of these smart-grids, because it uses the power lines already in place as a communication medium.

Unfortunately, since the electrical network was not designed for the transport of high-frequency signals, in PLC mode (100kHz-30Mhz) the electrical lines behave like antennas and emit electromagnetic radiation into the environment.

This work is a contribution in the evaluation of the harmfulness of electromagnetic radiation from an electrical distribution line traversed by a PLC signal (Outdoor-PLC) on human health. To do this, interaction between the radiation of an Outdoor-PLC line and a human head have been analyze base of analytical and numerical methods.

This analyze has demonstrate the harmless of long term ( $\Delta t > 12$ hours) exposure to Outdoor-PLC line radiation as the SAR(specific absorption rate) still under  $1\text{nW/Kg}$  and the raise of tissue temperature( $\Delta T$ ) less than  $10^{-5} \text{ }^\circ\text{C}$ . It has also give a simplified expression of PLC-line electromagnetic radiation SAR base on Biot-&-Savart law.

**Keywords:** Smart-grids, Power Line Communication, Communication medium, Electromagnetic radiation, SAR