

Partial Discharge Detection and Location in Transformer Using RF Antenna

A.Nimer, R.Mourtada, M.Hirzallah
American University of Sharjah
Ahmad Nimer email : aanimer@gmail.com

Abstract

The objective of our project is to design an RF antenna-based system that would be installed inside the transformer tank to detect the partial discharge; this system should neither interfere with the operation of the transformer, nor harm the equipment. Moreover, this system should be able to locate the source of the partial discharge inside the tank. This system is a part of the self healing process for Power system components which would be playing an important role in the future of smart grid. Smart grid is a new concept being developed to make the existing power system smart in a sense that it will be green and environment friendly. In this project, we have studied the properties of several RF antenna designs such as the dipole, axial helix and circular loop, and implemented the simulated RF antennas in order to obtain the best optimum results for both detection and localization of the partial discharge. The **circular loop antenna** has shown the best capability and accuracy of detecting the partial discharge with respect to the lowest inception voltage needed to induce the partial discharge. In addition, the **relation** of the **electric field's peak value** of the PD signal with respect to the **distance to the antenna** is used to approximately locate the region where the induced PD lies in. According to our results, we were able to estimate the section of the tank where the partial discharge was generated by comparing the peak voltages of the acquired signals.

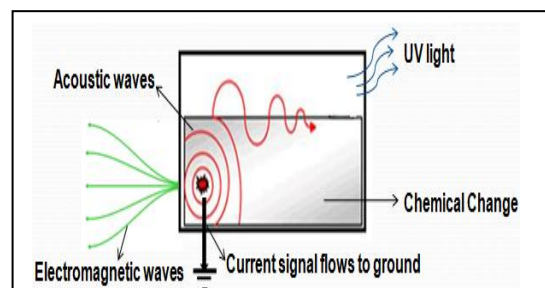


Figure 1 : the legend of Figure 1 can be on more than one line if needed. The only limit is the overall size of the external frame.