

Development of AC High Voltage Measurement System with Digital Technique at NIMT

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This paper describes how to develop, test and evaluation of an AC High Voltage Measurement System 70 kV with digital technique at NIMT. The purpose of the development is to make national standard more reliable for quality assurance. The AC HV Measurement System consists of a Capacitive-High Voltage divider, Measuring cable and high precision Digital Multi-Meter. Its nominal scale factor is 10000:1. A 100 pF compressed gas capacitor is series-connected with a 1 micro-F low voltage standard capacitor to form the Capacitive-High Voltage divider. The measuring cable conducts a voltage signal from low voltage standard capacitor to a high precision Digital Multi-Meter. The high precision Digital Multi-Meter operates in digitizing mode to sample a voltage signal. The homemade program is designed to control the high precision Digital Multi-Meter to sample a voltage signal at the sampling rate greater than Nyquist rate from an output of the Capacitive-High Voltage divider, and calculate the values of sampled signal.

The high precision Digital Multi-Meter with program is verified by a traceable ac voltage source. The results show that the measured value agrees within 70 ppm. After that, the high precision Digital Multi-Meter with program is connected to the Capacitive-High Voltage divider via a measuring cable. The AC High Voltage Measurement System is evaluated according to IEC 60060 by a well-calibrated national standard. The result shows the agreement within 0.2 %.

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