III. CONCLUSION

An intelligent energy measurement device (iDev) has been aimed to design in order to measure the electrical energy consumption of the devices real-timely. Energy saving has been provided by using embedded systems and wireless network protocol for measuring, monitoring, and controlling of electrical energy. Then, by comparing the current consumption with past consumptions, a consumption pattern has been determined for each measured device.

By the iDev design, electrical energy consumption of the devices has been measured by the electric plug and delivered to the server software program. In order to determine how much electrical energy is consumed by which device, it is adequate to connect power supply of the device to the designed iDev. Values such as current, voltage, temperature, humidity, cos φ, and frequency have been measured and saved by sensors on iDev with respect to the specified sampling period. The amount of consumed power and energy of the device has been calculated with respect to the values. A software program operating on the server and all data received from the iDev have been stored in database files. Peak times and maximum energy consumption values in a day can be determined by analysis of the data in the database. Measurement results of the developed iDev have been tested by a calibrated device which measures more precisely. After test results, the error of the developed iDev has been confirmed as maximum between 2% and 3%. In the software, maximum and minimum levels of measured values have been identified parametrically and in case of a violation of these threshold values, an interruption in energy has been provided. Owing to this feature, the risk of electric shock has been kept at a minimum.

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