

Chapter 6

Conclusion

Here, LabVIEW programming for instrument control is employed to develop a software solution for metrological applications. Considering the common microwave measurements, examples are explained for understanding the LabVIEW programming techniques. The process for uncertainty evaluation is also given in detail to analyze the measured results. The observations made during the study and implementation can be summarized as follows:

- (i) For instrument control, GPIB devices can be automated easily using LabVIEW message-based programming
- (ii) Complete calibration suite for microwave measurements can possible provide faster tests with minimum human interference
- (iii) Automated uncertainty evaluation can be implemented using LabVIEW Mathematics functions
- (iv) The metrology software should in no case compromise with the integrity of the measurement results
- (v) Automated report generation can be implemented using LabVIEW.

In a typical automated RF calibration process, the operator must frequently intervene to change test setups, thus limiting the benefits that can be realized by the automaton. However, the presented system of attenuation measurement is developed such that it only needs measurement points to be passed by the user just one time before the execution, thus increasing the calibration system capabilities in terms of time and efficiency. The measurement results along with the corresponding uncertainties show the proper implementation and execution of automation. The metrological software is validated with assured quality by following the guidelines available in the literature. It was finally found that the quality of the measured results is not affected by the automation since proper considerations were made during the design process. The LabVIEW application is also capable for measurement technique validation with the help of normalized error analysis. We hope this exercise will be useful for implementing automated attenuation measurement system in the measurement laboratories.