

## **Abstract**

The smart home IoT market is characterised by a rapid increase in areas of application and the associated use of these devices by consumers. However, a large number of communication standards are currently used in this area, resulting in interoperability problems. In addition, the established standards have security gaps which, in the event of inappropriate implementation, lead to opportunities for hackers to attack. To meet these challenges, the Matter communication standard was developed, which is intended to eliminate interoperability problems, simplify the development of new devices by manufacturers and at the same time promises a high level of security for consumers. Matter builds on the already existing Wi-Fi, Bluetooth and Thread standards. However, since there are known vulnerabilities in these standards, it is necessary to question how secure Matter is. To investigate this, the research question is asked: Does Matter overcome security issues of implemented communication standards? To answer the research question, experiments were carried out which investigate known attack possibilities with regard to the Wi-Fi and Bluetooth standards used in Matter. In a quantitative investigation, hacking tests against Matter as well as alternative networks have been carried out to allow comparisons between Matter and the corresponding network standard used by Matter. The results obtained show that Matter is able to meaningfully meet the required standards according to their respective strengths. Furthermore, some security features such as the comparison of certificates and measures related to data integrity could be determined. However, it was also possible to find vulnerabilities with regard to de-authentication attacks in the WPA2 security protocol used under Wi-Fi. From this it can be concluded that Matter is not adequately protected using security protocols older than WPA3, which increases the threat of downgrading attacks, in which attacker deliberately exploit vulnerabilities of older security standards.