

## PhD Oral Defense

**Date:** 5 August 2021 (Thursday)

**Time:** 2:30pm

### Thesis Title

**Design of high-performance planar antenna arrays for millimetre-wave applications**



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### Abstract

This thesis presents a series of high-performance planar antenna arrays for millimeter-wave applications. High-gain antenna arrays are popular in millimetre-wave wireless communications since it can compensate for the high propagation attenuation in millimeter-wave frequencies. It is a challenge to design high-gain antenna arrays with a wide operating bandwidth, high radiation efficiency, stable unidirectional pattern, and a simple structure. In this thesis, novel feed networks and antenna elements are developed and combined together to contribute to high-performance arrays. Several elements that contribute to a wide band and high gain, such as the combination of patches and a magneto-electric (ME) dipole, a C-shaped open slot, and an 11-element microstrip patch subarray, are proposed to develop the antenna arrays for the first time. The pillbox-distributed network and full-corporate feed networks are used to excite these elements. The overall performance of the proposed arrays was significantly improved by introducing these novel antenna elements and feed networks. The arrays proposed in this thesis have potential applications in long-range millimeter-wave wireless communications.