

Base Station Antennas for 5G

Abstract

This short course gives the participants an overview of the application, implementation, and design of base station antennas for 5G. The course explains underlying theoretical and practical implementation aspects of base station antennas in mobile communication networks of today and in 5G.

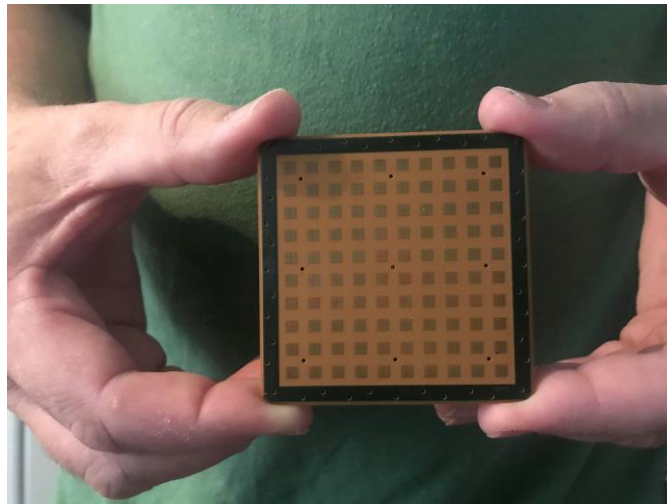
In the first parts of the course fundamental parameters of a base station antenna are discussed in the context of radio network design. In particular we discuss parameters such as gain, radiation patterns, and frequency bands, and put them in the context of cell planning, propagation and capacity.

In the second part, an overview of 5G Systems, scenarios and frequency bands are given followed by a overview of the implementation of MIMO (multiplexing) and massive MIMO (beamforming) in 5G.

In the next parts of the course we discuss Advanced Antenna Systems (AAS) in general and in particular mmWave antennas for Fixed Wireless Access.

Finally, we give an overview of OTA verification, RF parameters to be verified and the various techniques used for the measurements.

Graphical abstract



Recommended prerequisites

The course requires a basic knowledge on antennas, cellular networks, propagation and RF measurements

Learning objectives

After the course the participant will be able to understand the various types of BTS antennas that are used for 5G in different environments and for different frequency bands. They will also know the basic concepts of MIMO, massive MIMO and OTA

Course outline

- i. Fundamentals of Base station antennas
- ii. Beam Shaping for Cellular Networks
- iii. 5G Systems, scenarios and frequency bands
- iv. MIMO and massive MIMO antennas in 5G
- v. Advanced antenna systems AAS
- vi. Fixed Wireless Access and mmWave antennas
- vii. OTA, Over the air verification

Course is given in a Class room format. Participants do not need to bring laptops. Hardware will be demonstrated

Instructor 1 – Biography



Claes Beckman is an antenna systems engineering professor, technical expert and certified board member with more than 30 years of experience from industry and academia.

He has worked as a design engineer for both Ericsson and Allgon where his work resulted in numerous products, patents and papers.

He is the founding director of KTH Center for Wireless Systems, Wireless@kth and was KTH's Principal Investigator in the EU funded 5G project METIS. He is currently a Senior Researcher and an Antenna systems professor in the Radio Systems lab at KTH. In parallel he is a part time technical expert for Icomera AB while serving as a board member of Medfield AB and H&E Solutions AB. He is also a technical board member of InCoax AB and Allgon AB.