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Diplomarbeit / Masterarbeit

Aufgabe der Abschlussarbeit im
ISE Bachelor/Masterstudiengang

für: Herrn Saeed Arafat

gestellt von: Prof. Dr.-Ing. K. Solbach
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Thema: **Development of a broadband circular polarised antenna for Over-The-Air Performance test applications**

Description of Problem:

OTA -Over The Air Performance- is the new measurement method to characterize the air interface of a mobile device. Within the measurement procedure a bidirectional link between the base station simulator and the device under test (DUT) has to be established while the DUT is rotating on the 3D positioner inside the anechoic chamber. In order to maintain the connection to the mobile device and to reduce the measurement errors the power level for the communication path has to be nearly constant. Therefore, a circularly polarised antenna is used for the communication link which reduces the problems of polarisation mismatch between the DUT and the antenna.

Thesis Task:

Within this thesis a broadband ($0.8 < f/\text{GHz} < 6$) RHCP (right-handed circular polarised) antenna for the communication link in OTA measurements is to be designed. Based on literature survey fundamental concepts shall be investigated using numerical simulations and simplified lab tests. Such concepts should include the cavity-backed planar spiral antenna, the cone-spiral and the crossed log-periodic antenna. Methods for suppressing unwanted modes (in the cavity) and of the back radiation shall also be investigated as well as the required feeding networks, i.e. balanced-unbalanced transformers and hybrid power dividers.

As an optional point the antenna functionality for measurements of higher harmonics up to 12.4 GHz should be evaluated.

A prototype of the antenna according to the most promising concept is to be realised and characterised by standard antenna measurement techniques.

At the end of the thesis work, a public presentation is to be given of the results.