

A case study for Mobile Phone Antennas- Thesis work

Abstract

The antenna designs of the modern phones are predominantly of the built-in type. These antennas may be of “chassis mode” or PIFA type. The effect of chassis length and antenna size will be studied in depth.

Purpose

The student will in this thesis work investigate the performance two common type of antenna design with respect to different chassis length. Matching network for each configuration has to be developed. These investigation are done both with the help of simulation tools as well as real life measurements on prototypes. Investigations should be made both for passive and active solutions.

Description

The antenna types used within this thesis is of “chassis mode” or PIFA. For “chassis mode” reference see figure 2 in paper “A coupling element based Quad band antenna structure for mobile terminal” Helsinki University of Technology. Performance studies of antenna efficiency and matching for different chassis length and antenna sizes are investigated. Both passive and active matching principles for this antenna types will be studied.

Target matching values

	Frequency Range	Return Loss	Efficiency
Passive matching	824-960MHz	-5dB	-3dBi
	1710-2170MHz	-5dB	-3dBi
Active Matching	700-960MHz	-5dB	-3dBi
	1710-2700MHz	-5dB	-3dBi

Case studies

Chassis nominal dimensions are 42* 100mm.

Chassis length variation from 80-120mm in step of 5mm up to 100mm and above 100mm steps of 10mm.

Nominal antenna size is 11(height)*42(width)*7(thickness)

Antenna height variation 7 to 15 mm in step of 2mm

All chassis dimension studies shall be made with nominal sized antenna.

All antenna size studies shall be made with nominal chassis dimensions.

For each case study both a “chassis mode” and a PIFA antenna shall be developed

Use a simulator (Ansoft Designer) to perform the chassis and antenna studies.

A Mock-up shall be built with both active and passive matching for the nominal antenna and chassis size for the two antenna types “chassis mode” and PIFA.

For the mock-up a plastic chassis need to be developed for a small hand effect study on the antenna matching

Work

Literature study – learning of simulation tool(s) – simulations of designs – test of design – report and presentation.

Publication restrictions

Detailed descriptions of antenna matching layout and components values are not allowed in the report. The muck-up shall be returned to SEMC after thesis examination.

Supervisors

HIG: Prof. Cleas Beckman; for main supervision

Sony Ericsson, Kista: Michael Moser, michael.moser@sonyericsson.com, for mock-ups and general supervision

Kristina Gold, kristina.gold@sonyericsson.com, for general supervision

Additional information

Examiner: Prof. Cleas Beckman

Location: HIG

With additional meetings at Sony Ericsson

Competence: Applicant is interviewed at both HIG and Sony Ericsson. M. Sc. in engineering physics, electrical engineering or equivalent. Fluency in both written and spoken English and Swedish is desirable.

The student is compensated after finished project.