

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	Phantom of Muscular Tissue Based on Agar
<b>Author's name:</b>	Michaela Kantová
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Electrical Engineering (FEE)
<b>Department:</b>	Department of Electromagnetic Field
<b>Thesis reviewer:</b>	Ing. Jan Herza, Ph.D.
<b>Reviewer's department:</b>	Equa bank a.s.

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>How demanding was the assigned project?</i>	
<p><b>I see the difficulty of the thesis mainly in choosing appropriate ingredients for phantom material composition, and then in finding their correct ratio. In this case, simultaneous optimization of multiple variables was needed.</b></p>	

<b>Fulfilment of assignment</b>	<b>fulfilled</b>
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
<p><b>All particular tasks mentioned in the master's thesis assignment have been solved.</b></p>	

<b>Methodology</b>	<b>correct</b>
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
<p><b>I found the methods, fabrication procedures and calculations appropriate to the master's thesis assignment. Thesis is based on previously accepted researches and their methodology was held.</b></p>	

**Technical level****A - excellent.**

*Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?*

**The author showed her expert knowledge during the design of the phantom and further calculation of the Cole-Cole model parameters.**

**The results of this master's thesis also show the skills and ability to fabricate real muscle tissue phantom, as well as expertise needed for measurement of phantom parameters (complex permittivity).**

**Formal and language level, scope of thesis****B - very good.**

*Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?*

**The thesis is well articulated and chapters are not hard to understand.**

**Selection of sources, citation correctness****A - excellent.**

*Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?*

**There are many sources mentioned in the master's thesis. In case of usage earlier work results (i.e. measurement results, phantom ingredients concentration), the citations were always correctly formed.**

### III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

*I would like to ask a few questions:*

*During the measuring dependency of complex permittivity on temperature and frequency, in Chapter 6, both phantom samples (for temperature measurement and for complex permittivity respectively) were identical. Does it mean they were made of one material? If not, would these differences affect the measurement results?*

*The 0.1M saline solution was used for coaxial probe calibration (mentioned in the same chapter). What is the meaning of "0.1M saline solution" (some specific concentration...)?*

*Figures 7.5 and 7.6 show 4 curves of temperature dependency of the dielectric properties on the frequency. Why just the "fitted model V4" at temperature 30°C is used for this comparison, when both "Lay" and "Meas V4" curves are shown at 35°C?*

*Figure 5.8 shows the frequency dependency of conductivity for various sodium chloride concentrations in phantom material. All curves intersect at frequency of approximately 1.5 GHz. Do you have an explanation why just on this particular point the curves meet (or is it only circumstance)?*

*I appreciate the extensive research of the sources and the large number (25) of fabricated phantoms, which shows the author's diligence.*

*Then I accentuate large number of measurements performed to increase the accuracy of investigated dependency of the complex permittivity on temperature and frequency (10 measurements for each temperature and frequency).*

*Furthermore, I found chapter 8 very useful because it contains very detailed description of the agar phantom fabrication. It also enables reproducing of the phantom for further studies and research.*

*I recommend continuing further study and research of discussed issues and improvement of phantom design during the doctoral study, or in other master's theses.*

The grade that I award for the thesis is **B - very good**.

Date: **19.1.2020**

Signature: