

I. IDENTIFICATION DATA

| | |
|---------------------------------|--|
| Thesis name: | Indoor Channel Characterization at the Large and Small Scales |
| Author's name: | Tomáš Janák |
| Type of thesis : | bachelor |
| Faculty/Institute: | Faculty of Electrical Engineering (FEE) |
| Department: | Dept. of Electromagnetic Field |
| Thesis supervisor: | Jeff Frolik |
| Supervisor's department: | Dept. of Electromagnetic Field |

II. EVALUATION OF INDIVIDUAL CRITERIA

| | |
|--|--------------------|
| Assignment | challenging |
| <i>Evaluation of thesis difficulty of assignment.</i> | |
| This thesis focuses on collecting and analyzing measurement data related to wireless signal propagation in indoor environments. That work, in itself, is not particularly difficult but providing context to these results does require an understanding of fundamentals beyond that normally covered at the bachelor's level. The student demonstrates this understanding in Chapters 2, 3 and 4. | |

| | |
|--|------------------|
| Satisfaction of assignment | fulfilled |
| <i>Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.</i> | |
| The work presented in this thesis meets the set expectations. However, because omnidirectional antennas were not available for the measurements, the multipath noted was not as severe as would be seen in a "practical" application. The student extended the original test plan, taking additional data to illustrate that angular orientation has significant effect for the directional antennas used. | |

| | |
|--|-----------------------|
| Activity and independence when creating final thesis | A - excellent. |
| <i>Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.</i> | |
| The student was very dedicated to this effort. At our biweekly meetings he was always prepared both with both results and questions based on those results. Testing was conducted as scheduled and the results were analyzed promptly. As such, we were able to identify the results caused by using directional antennas and had time to conduct additional tests. The student demonstrated a high-level of independence in conducting this work. | |

| | |
|--|-----------------------|
| Technical level | B - very good. |
| <i>Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.</i> | |
| One area that could be improved would be to go further in depth on the analysis of the data using more current/advanced approaches than those cited. That would be expected for a graduate level thesis. However, as noted, the student has applied knowledge that is not typically covered at the bachelor's level and thus new expertise was gained and demonstrated in this work. | |

| | |
|---|-----------------------|
| Formal and language level, scope of thesis | B - very good. |
| <i>Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.</i> | |
| There are common language errors that occur throughout the writing. That being said, the overall structure of the thesis is good and the notation used is standard and thus the work is readily understood. | |

| | |
|--|-----------------------|
| Selection of sources, citation correctness | B - very good. |
| <i>Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own</i> | |

SUPERVISOR'S OPINION OF FINAL THESIS

results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.

The student's citing of prior work is in accordance to standards. For the uninitiated reader, an improvement would be to be more explicit in describing the concepts being leveraged from the cited works. The cited work includes a mixture of foundational texts, governmental reports, and journal papers. The project supervisors authored many of these sources. A stronger presentation would have a more diverse set of citations to illustrate that the student had pursued more detailed research on this topic.

Additional commentary and evaluation

Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.

The primary goal to investigate wireless propagation indoors was achieved. The work considered frequencies ranging from 5 to 40 GHz and thus are applicable to a wide range of systems that could be operating in these environments. The student demonstrated dexterity by conducting a variety of measurement and in analyzing the results.

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

In this work, the student demonstrated himself capable of conducting work independently and reliably. The scope of the work ranged from understanding theoretical foundations related to wireless propagation to conducting a variety of tests to implementing both large- and small-scale models. The work is logically presented and readily understood.

The work was hampered by not having omnidirectional antennas that covered the 5-40 GHz band. Questions for the defense could be related to how the results might have differed if these antennas were available. Also of interest would be what data the student considers to be the most interesting.

I evaluate handed thesis with classification grade **A - excellent**.

Date: **30.5.2017**