

Review of Bachelor Thesis

Thesis title: **Collinear Slot Antennas with High Directivity**

Thesis author: **David Buchtel**

Supervisor: **Doc. Ing. Pavel Hazdra, Ph.D.**

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The thesis deals with design of several variants of collinear antenna (Franklin array). The antennas are simulated in EM field simulator as well as manufactured and measured. The thesis is structured as follows: Introduction gives brief recommended literature review, Chapter 1 lists used antenna characteristics. Chapter 2 reviews common basic antenna elements (dipole, slot, antenna array, Franklin antenna), Chapter 4 analyses 3, 5, 7 and 9 element Franklin slot antennas. Chapter 5 Analyses effect of substrate, feeding and reflectors. 4 variants of the antenna are also chosen in Chapter 5 to be realized. Measurement results are compared with simulated in Chapter 6.

The work described in the thesis is quite extensive. The author explores variants of the antenna namely, number of elements, slot orientation (up/down), slot width, electric plane width and length, substrate permittivity, coaxial cable dimensions, reflector distance, size and shape. 4 prototypes have been manufactured and measured. The author obtained very nice comparison of simulation and measurement at 1 of the prototypes (see fig. 6.7).

The thesis is written in a good English, I did not find major grammatical mistakes, the text is clear. Graphically the thesis is very nice, especially graphs are in vector format, they have same clear style and size, which simplifies reader's orientation. Small details which I noticed:

- Equation 1.3 – typical notation is that S-parameters are complex values not just amplitude
- Equation 1.8 – term Realized Gain is used more often than “Absolute Gain”
- Equation 2.10 – the formula is only approximate, I would use \approx instead of =

Based on the submitted thesis, the author clearly shows ability to individually work on a given engineering problem, analyze results and make conclusions of them.

I recommend the thesis to be classified as A – výborně.

Questions for defense:

1. Can we just scale all antenna dimensions of the 2.5 GHz to get 10 GHz antenna? Explain why.
2. Where was the (calibration) reference plane of the VNA for the figures 6.7, 6.8, 6.9? How do you explain the wavy behavior of measured $S_{1,1}$?
3. Figure 5.1 shows a big difference if gap is present in FR4 while Fig 5.3 shows negligible influence of substrate permittivity. To me it seems that these 2 graphs are contradicting. Do you have an explanation?
4. Why did you choose permittivity range 2 to 10 in graph 5.3?

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