Coupled-line sections are well-known and broadly used components in microwave electronics. Their advantages are wide operational bandwidth and small size and both are important with respect to the constant development of communication systems and devices, which incorporate many communication standards in a single device. The size reduction is not only justified by the desire to offer communication devices as handheld and pocket-size, but it strictly affects the cost of circuit production. Within the project a methodology for design of components for realization of radio-communication circuits will be developed with respect to coupled-line directional couplers, and networks consisting of coupled-line directional couplers. The project focuses on chip-scale design, and all the components consisting of coupled-lines will be designed in the selected integrated circuit fabrication technologies.

Typically in the design of microwave circuits as directional couplers branch-line devices are utilized, but their main disadvantages are narrow operational bandwidth and large size. The operational bandwidth of such devices can be enhanced by designing multisection couplers but the size of such devices is even larger. The advantage of branch-line couplers is their very easy topology, thus can be easily designed and fabricated. On the other hand the coupled-line directional couplers feature much reduced size but the design of such devices is more complex, and form the fabrication point of view they are more demanding. In particular to design tight-coupled directional couplers it is required to utilize at least two different metallization layers with a thin dielectric separation. The challenge is to fit these components into the fabrication technologies without compromising their performance. Further functional blocks for communication systems with the use of the developed couplers will be designed as a proof of concept.