

Background:

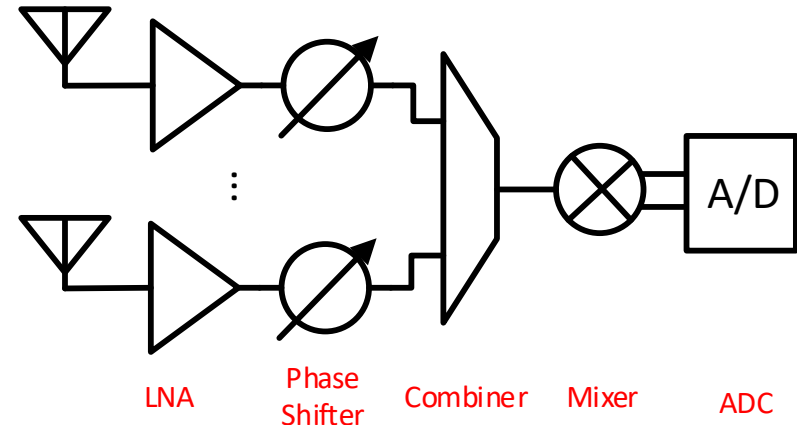
The mobile communication industry has experienced tremendous growth in the recent years, and the mobile internet traffic is rapidly increasing. With the increasing user base and the advent of new features in smart phones demanding higher data rates, the cellular bands in the lower RF range are already overcrowded. Hence, the use of mm-Waves for the next generation mobile communication system, unofficially dubbed “5G”, is actively pursued by many in order to alleviate the overcrowding. Beamforming and massive MIMO have drawn attention as a key configuration for envisioned 5G applications. Key issues turn out to be small size, low power-consumption and accurate phase control over a wide-band frequency range. In fact, this poses significant challenges for the RF front end of a 5G compliant receiver.

Tasks:

For this work, the particular tasks can be separated as follows:

- ❖ Evaluation of general requirements of a 5G communication system like potential frequency bands, modulation schemes, data rate etc.
- ❖ A detailed analysis of required receiver component specifications like linearity, noise figure, gain, bandwidth power consumption etc.
- ❖ System level design of a 5G compliant RX front end

The student will gain experience in working with industrial simulation tools like Cadence, ADS or MATLAB. Furthermore, he/she will get an insight in the design of high frequency systems.



General block diagram of a beamsteering RX front end for 5G communication systems

Further information on this and other topics could be delivered by email, telephone or discussion.

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