Simultaneous Transmit and Receive (STAR) communication is being developed as a means of improving spectral efficiency in wireless communication systems. If the obstacle of self-interference can be sufficiently overcome, it is possible to double the spectral efficiency of an equivalent time or frequency division dupplexed system. Spread spectrum techniques can reduce self-interference by using orthogonal or pseudo-orthogonal codes to encode the transmit signal and decode the receive signal.

Hardware correlator filters are developed for use with STAR radio systems using orthogonal frequency coded (OFC) surface acoustic wave (SAW) devices. OFC is a type of spread spectrum communication that can be implemented using SAW transducers to create a correlator filter, also known as a matched filter. OFC allows code division multiple access and processing gain, similar to other spread spectrum techniques, but is more well-suited to low loss inline SAW design due to the use of multiple orthogonal carriers.

The development of low loss fixed code OFC SAW correlator filters is documented, including design criteria and multiple approaches that progressively reduced loss. Using the results from the progressive designs, a pair of correlator filters with matched codes are presented with 6dB insertion loss at 950 MHz.

A second development focusing on OFC SAW correlator filters with programmable codes using RF switches is also described. The programmable correlators use a fixed OFC code with programmable binary phase shift keying (BPSK), and demonstrate positive results. The programmable correlators presented require less than 1 mW of DC power.