# Radio Frequency (RF) Front End Channelizer for Low Power, Wide Bandwidth Applications (20120150, Dr. Ramesh Harjani)

**IP Status:** Issued US Patent; **Application #:** 13/859,476

## Front-End Channelizer for Software Defined Radios or Cognitive Radios

A switched capacitor based radio frequency (RF) front-end channelizer for software defined radios (SDR) and/or cognitive radios (CR) offers lower power, higher bandwidth channelization capabilities that may reduce the sample rate and dynamic range requirements for wide-band digitization in SDRs. The technology, based on Charge Reuse Analog Fourier Transform (CRAFT) design, offers longer battery life of mobile SDRs and/or CRs, resulting in faster, lower power operation in 5G or other wide spectrum RF communication networks. Furthermore, CMOS compatibility makes this technology a cost effective solution, and its significantly lower power requirements extends battery life and increases the potential for use in a handheld device.

**Technology ID**
20120150

**Category**
Engineering & Physical Sciences/Semiconductor

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## Low Power and Wide Bandwidth Applications

Current SDRs strive to digitize the RF signal and perform spectrum sensing in the digital domain, but operating in wide band or ultra-wide band applications (e.g., 5 GHz) increases costs and reduces battery life, which has prevented SDR from reaching the mobile radio market. In this new scalable technology, initial processing is done in analog circuits prior to digitization, allowing the switched capacitor based RF front end channelizer to operate over large bandwidth with low power and large dynamic range.

**BENEFITS AND FEATURES OF CHANNELIZER:**

- Larger bandwidth, lower power, larger dynamic range, amenable to scaling
- Applications in SDR, CR, cellular communication, high-speed ADC, RF filters, multipath filters or polyphase filters
- Low power channelizing for 5G devices over wider spectrum range
- Cost effective implementation using CMOS compatible technology
- Potential high resolution, low power image/video processing for drone image data
- Increased utilization efficiency of available communication spectrum

**Other Technologies based on CRAFT:**

[Pseudo True Time Delay for Wideband Phased Array](#)

**Phase of Development** Prototype dev

**Researchers**

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[External Link](#) (ece.umn.edu)