

Third Laureate Research & Development



- ◆ **Project title:** Tuner IC for Stationary and Hand-held Digital TV (DVB-T/H)
- ◆ **Representative:** Seyed Mojtaba Atarodi (Ph.D.)

Abstract:

This product is an integrated circuit tuner for digital video, in the VHF and UHF bands, based on the DVB-T/H standard. The tuner, connected to the antenna, is the first stage in the DVB receiving system. It converts the RF input signal to the base-band for signal processing. To address the need for low cost and low power, direct conversion (Zero-IF) architecture, with minimum external components, is selected for the tuner. It is implemented in a $0.18\ \mu\text{m}$ CMOS process with QFN48 package. In the tuner, the RF input signal from antenna is connected to a programmable-gain low noise amplifier with $75\ \Omega$ input impedance. After amplification, the signal is directly down-converted to zero-IF frequency by quadrature mixers. Quadrature LO signals for the mixers are generated by an integrated frequency synthesizer, covering UHF and VHF bands. Baseband section which consists of variable gain amplifiers, DC offset cancellation blocks and a low-pass filter, provides appropriate output signal levels for data processing in a demodulator. The variable gain in the RF front-end and base-band section helps to get optimum signal quality in case of large interfering signals at the tuner input.

This product is the first analog/RF and mixed-mode integrated circuit which is designed in Iran and verified by the customer (IRIB).

Three ISI journal papers, three international conference papers, one Ph.D. dissertation and four M.Sc. theses are the results of this research work.

Acknowledgements

The research group would like to acknowledge IRIB and Iran Ministry of Science, Research, and Technology for financial support.

