

**Title:** A 5GHz1.8V Low Power CMOS Low-Noise Amplifier

**Author(s):** Azevedo, Fernando <sup>[1]</sup>; Mendes, Luis; Fialho, Vitor <sup>[1]</sup>; Vaz, Joao C.; Fortes, Fernando <sup>[1]</sup>; Rosario, Maria J.

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**Abstract:** Wireless local-area networks (WLANs) have been deployed as office and home communications infrastructures worldwide. The diversification of the standards, such as IEEE 802.11 series demands the design of RF front-ends. Low power consumption is one of the most important design concerns in the application of those technologies. To maintain competitive hardware costs, CMOS has been used since it is the best solution for low cost and high integration processing, allowing analog circuits to be mixed with digital ones.

In the receiver chain, the low noise amplifier (LNA) is one of the most critical blocks in a transceiver design. The sensitivity is mainly determined by the LNA noise figure and gain. It interfaces with the pre-select filter and the mixer. Furthermore, since it is the first gain stage, care must be taken to provide accurate input match, low-noise figure, good linearity and a sufficient gain over a wide band of operation.

Several CMOS LNAs have been reported during the last decade, showing that the most research has been done at 802.11/b and GSM standards (900-2400MHz spectrum) and more recently at 802.11/a (5GHz band). One of the more significant disadvantages of 802.11/b is that the frequency band is crowded and subject to interference from other technologies, as is 2.4GHz cordless phones and Bluetooth. As the demand for radio-frequency integrated circuits, operating at higher frequency bands, increases, the IEEE 802.11/a standard becomes a very attractive option to wireless communication system developers.

This paper presents the design and implementation of a low power, low noise amplifier aimed at IEEE 802.11a for WLAN applications. It was designed to be integrated with an active balun and mixer, representing the first step toward a fully integrated monolithic WLAN receiver. All the required circuits are integrated at the same die and are powered by 1.8V supply source. Preliminary experimental results (S-parameters) are shown and promise excellent results.

The LNA circuit design details are illustrated in Section 2. Spectre simulation results focused at gain, noise figure (NF) and input/output matching are presented in Section 3. Finally, conclusions and comparison with other recently reported LNAs are made in Section 4, followed by future work.

**KeyWords Plus:** 5GHz1.8V; CMOS; Low-Noise Amplifier

**Reprint Address:** Azevedo, F (reprint author) - Inst Super Engn Lisboa, Lisbon, Portugal.

**Addresses:**

[1] Inst Super Engn Lisboa, Lisbon, Portugal

**E-mail Addresses:** fazevedo@deetc.isel.pt; ffortes@deetc.isel.pt; mrosario@alfa.ist.utl.pt

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