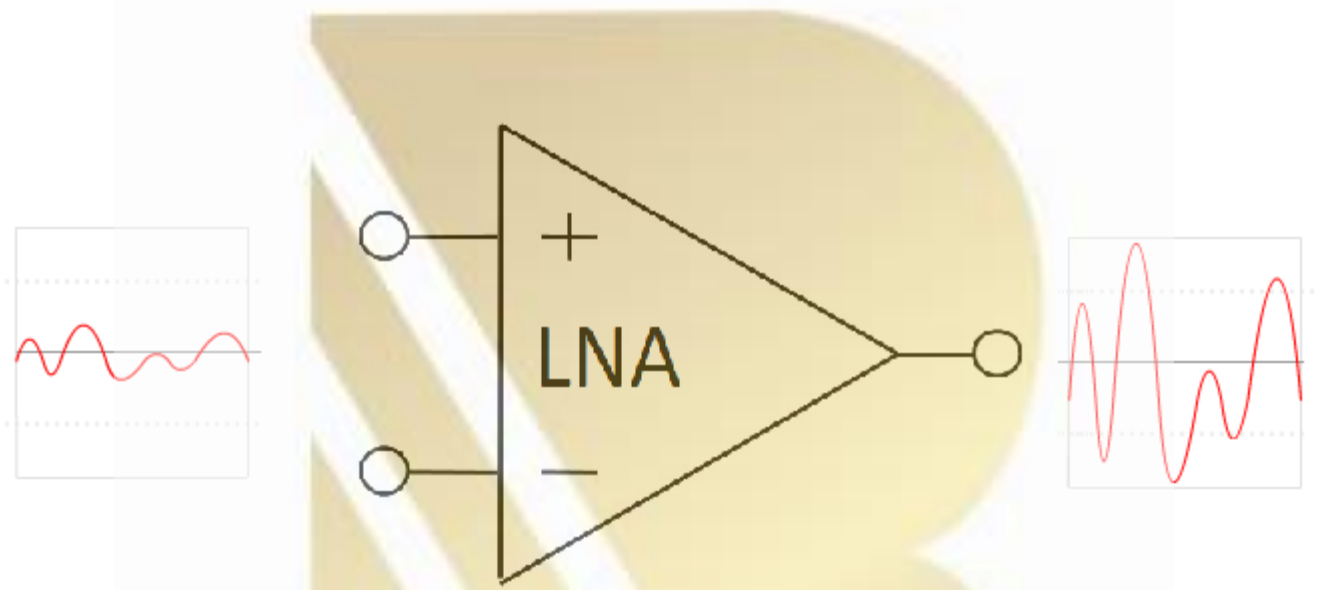


RF Components and Basic Concepts

1.8 - Low Noise Amplifier (LNA)

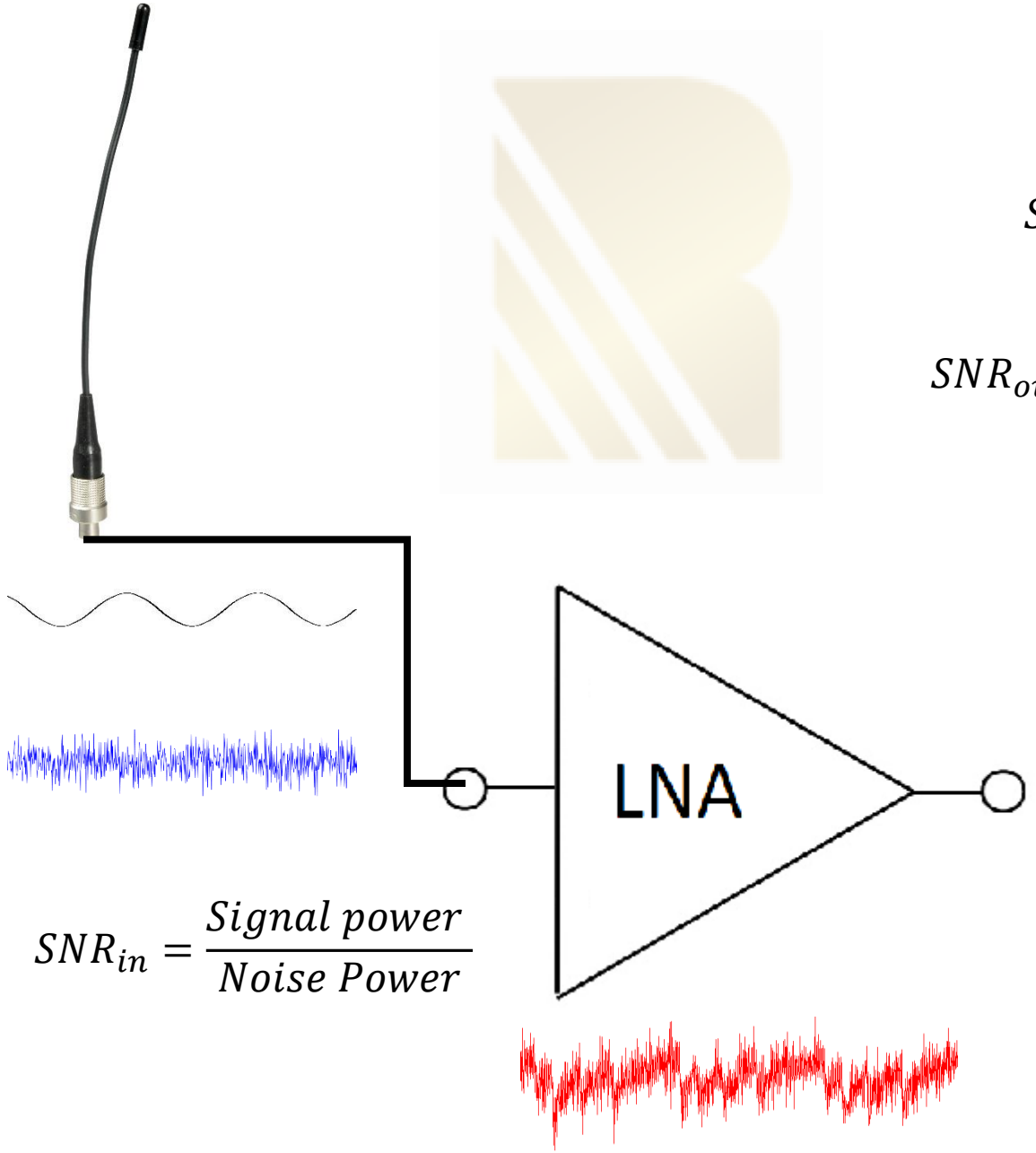
LNA

- A **low**-**noise amplifier** (**LNA**) is an electronic **amplifier** that amplifies a very **low**-power signal without significantly degrading its **signal-to-noise** ratio.

- An **amplifier** increases the power of both the signal and the **noise** present at its input.

Tx

Rx

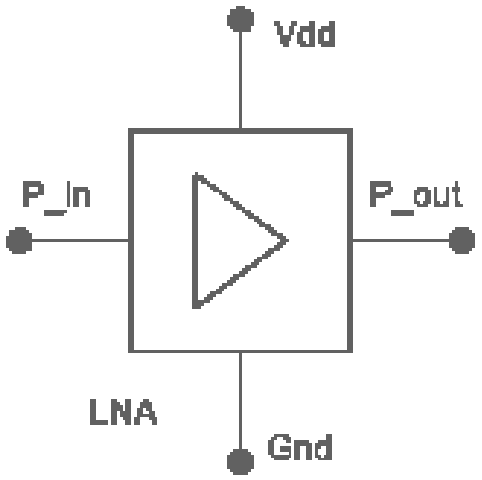


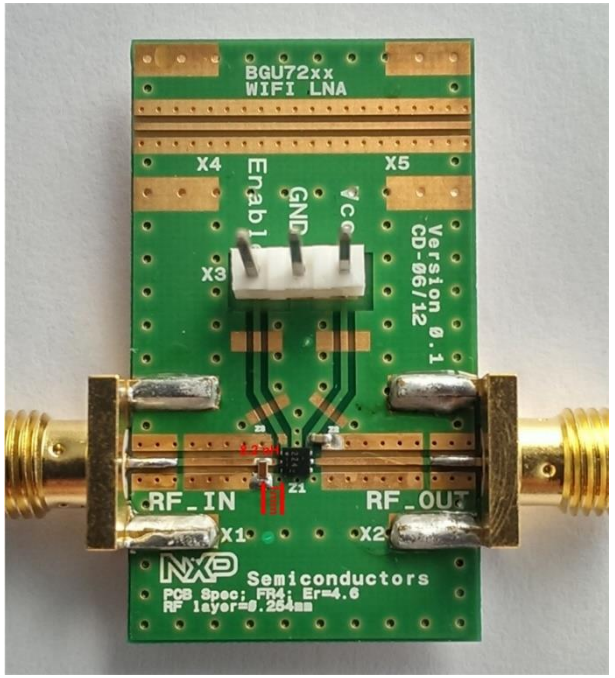
$$SNR_{in} = \frac{Signal\ power}{Noise\ Power}$$

$$SNR_{out} = \frac{Gain \times Signal\ Power}{Gain\ \times Noise\ Power} = \mathrm{SNR_{in}}$$

$$SNR_{out} = \frac{Gain \times Signal\ Power}{Gain\ \times Noise\ Power + Amplifier\ Noise}$$

OM7869: BGU7224 WLAN LNA evaluation board





What are the requirements for LNA ?

- Low Noise Coming From Device (low Noise figure -> will be discussed)
- Linearity (Better IIP3 -> Will be discussed)
- Low Power Consumption (Specially for hand held application)
- Low Area Consumption
- Gain (S21 -> Will be discussed)
- Matched to the antenna or filter (Matching ? -> Will be discussed)