

Filter integrated Low Noise Amplifier to suppress out of band Radio Frequency Inference

Radio Telescope Operating at Low Frequency suffer from various commercial transmission outside the observing band. Low Noise Amplifier being the first device to receive the Radio signals easily get saturated due to the out of band transmission and become impossible to carry out useful Radio Astronomical observation. In addition to saturation the out of band Interfering signals produce in band Intermodulation product. Placing a band pass filter after the LNA do not reduce these products and prevent from saturation of LNA. Similarly placing the band pass filter before the LNA will degrade the Receiver performance. The paper present a LNA design with Low Pass Filter integrated between the amplification stages of the LNA without degrading the Noise Figure of LNA. The LPF cuts off the out of band RFI and prevent early saturation of the LNA and reduce the intermodulation product in the band. The designed LNA for frequency 120-245 MHz have a gain of 35 dB and Noise temperature of 40 K with a 80 dB rejection for the Interfering mobile signal.

Reference:

1. Swarup, G. et al., The Giant Metrewave Radio Telescope. Curr. Sci., 1991, 60, 95–105.
2. Yashwant Gupta, et al., The upgraded GMRT: Opening new windows on the radio Universe. Curr. Sci., 113(4):707-714 • January 2017.