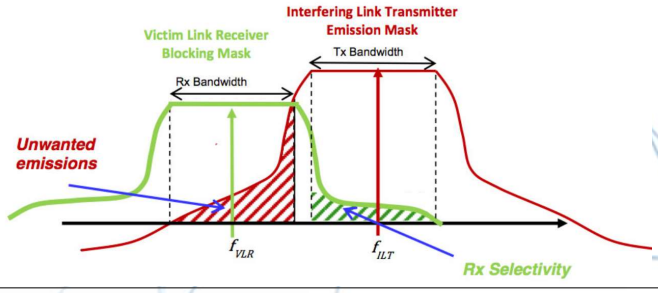
High Dynamic Range Low-Noise Amplifiers

Sarmad Ozan, M. Nair, T. Cappello, M. Beach

Aim: Design of a low noise amplifier (LNA) to be resilient to the adjacent channel interferers or blockers by having a high signal selectivity within the amplification bandwidth.

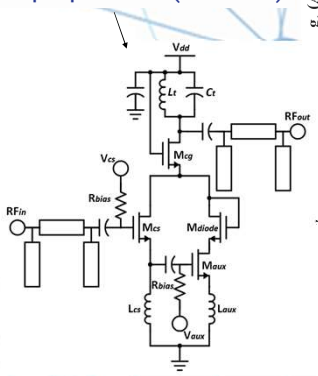
Introduction

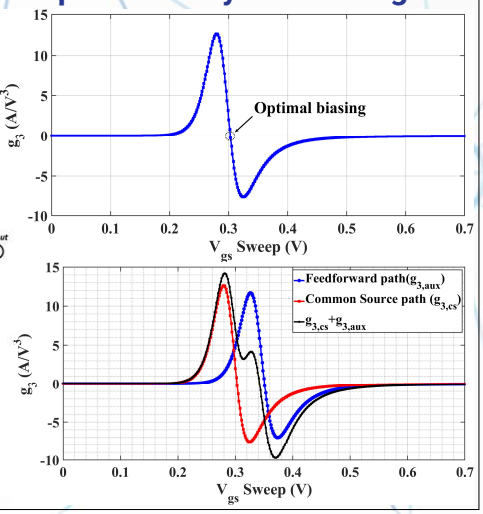
- LNAs set the performance of the overall receiver both in terms of noise and linearity.
- Goal: design a LNA with a high dynamic range to avoid saturation with signal interferers.
- The technique can be used in jammer avoidance in congested electromagnetic environment.



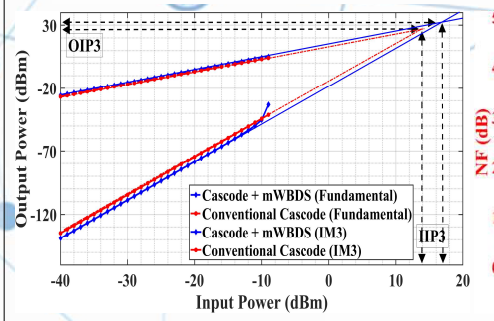
Hardware Solution to Improve the Dynamic Range

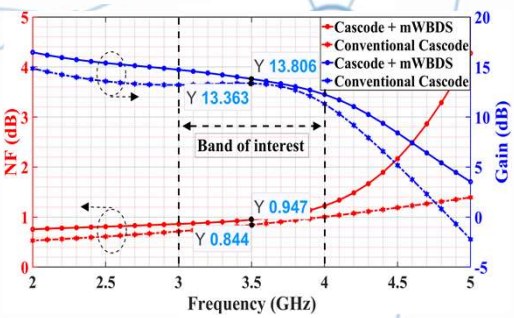
Schematic for modified Wideband derivative superposition (mWBDS)

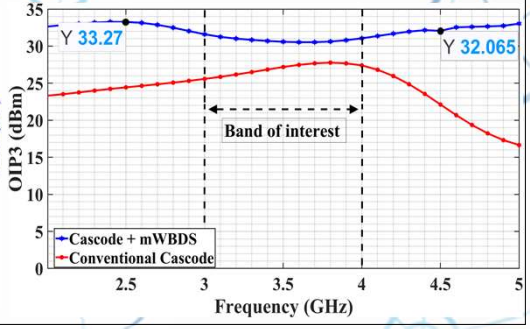




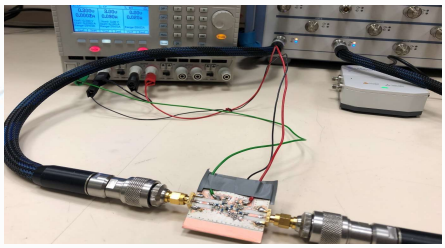
Expected Performance of the mWBDS LNA

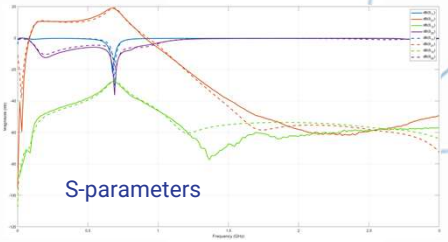


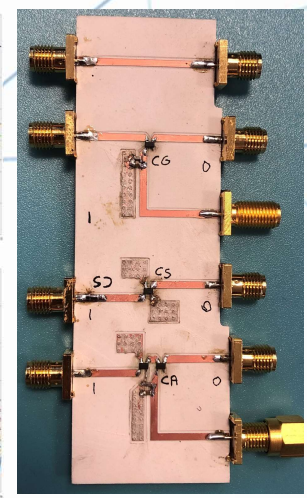


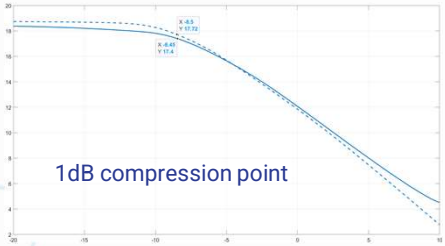


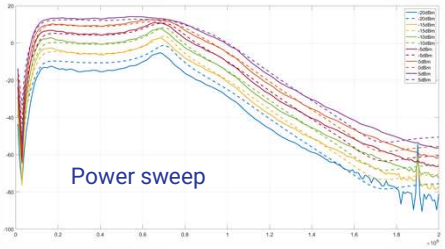
Ongoing work











References

[1] S Ozan, M Nair, T Cappello, MA Beach, "Low-Noise Amplifier with Wideband Feedforward Linearisation for Mid-Band 5G Receivers," IEEE APCCAS, 2020.

[2] http://apps.cept.org/eccnews/July2016/an_introduction_to_seamcat.html

[3] S. Ganesan, E. Sanchez-Sinencio, and J. Silva-Martinez, "A highly linear low-noise amplifier," IEEE TMTT, 2006.

This research was supported through the UKRI/EPSRC Prosperity Partnership in Secure Wireless Agile Networks (EP/T005572/1).

Communication Systems & Networks Research Group, Smart Internet Lab, Merchant Venturers Building, Woodland Road, Bristol, BS8 1TR

@PartnershipSWAN

https://www.swan-partnership.ac.uk/

linkedin.com/company/swan-prosperity-partnership

swan-programme@bristol.ac.uk