Multi-Input Radiofrequency Power Amplifier Architectures

Background and challenges

- Conventional single-ended PAs **unable to achieve high efficiency** for wideband telecommunications signals.
- SISO Doherty PAs **lack the versatility** to fully exploit highly-efficient, linear and broadband operation.

**Main Challenge:** Optimally design MISO PAs to achieve the **highest efficiency, linearity** and instantaneous bandwidth.

Description and main innovation

**Objectives and innovation:**
- **Identify, describe and model** the load modulation and instantaneous bandwidth degradation mechanisms.
- Devise a **systematic design procedure** to achieve optimal efficiency and linearity for multi-band operation.

**Main Tasks:**
- Study the efficiency, linearity and power relationship to **extract the optimal load modulation**.
- **Identify and model the degradation mechanisms** that limit the instantaneous bandwidth in load modulated PAs.
- Devise the **output combiner topology** and respective digital processing algorithms.
- Build and test a prototype PA to validate the developed **MISO systematic design**.

Achievements

Up to this stage, this work led to the following contributions:
1. Journal Publication (TMTT)
2. Conference Paper (IMS 2018)
3. International RF Power Amplifier Student Design Competition - 1st Place (EuMC 2018)