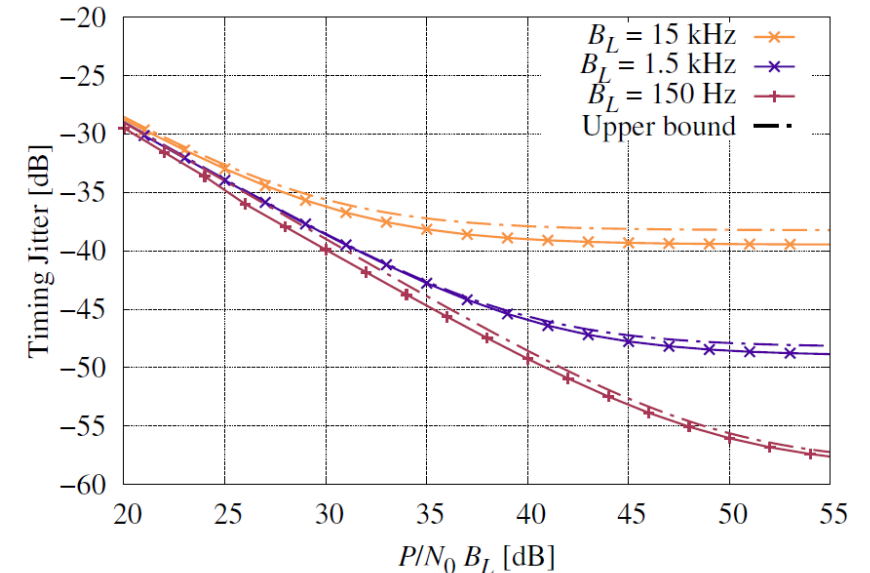
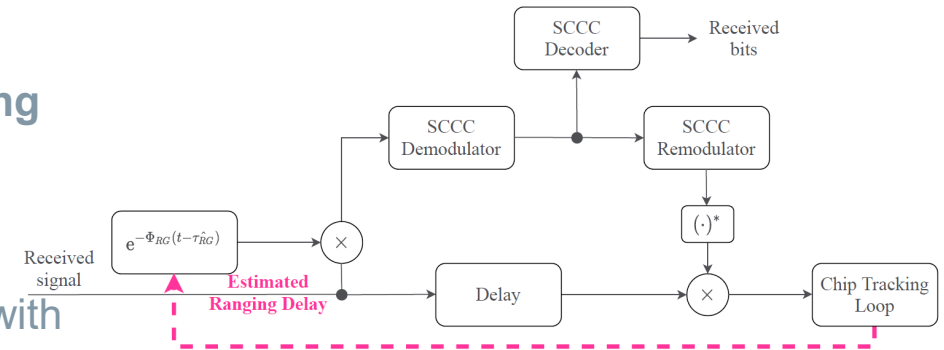


BB for simultaneous transmission of HoM and PN ranging - test results

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- During Toulouse 2022, ESA presented for information (SLS-RFM_22-11) the **results of a simulation study concerning the simultaneous transmission of filtered high-order modulations (HoM) and PN ranging**
- The **main outcomes** of the study were:
 - Filtered PSK/APSK can be transmitted/received simultaneously with PN ranging as done for GMSK with a receiver as in figure (although sub-optimal)
 - The main advantage of higher spectral efficiency is at the price of a floor in the ranging jitter (due to the non-constant envelope)
 - The jitter can be estimated in closed form (an estimation was found in [R1]): the PN jitter floor can be decreased by using lower loop bandwidths



[R1] B. Ripani, A. Modenini, G. Montorsi, "On the Use of PN Ranging With High-Rate Spectrally-Efficient Modulations in Satellite Payload Telemetry Links"

- Since then, ESA conducted an activity with IngeniArs concerning the **development of a HW prototype**, namely, a breadboard (BB) of a transmitter and a receiver of SCCC with PN ranging
- The **objective of this presentation is to present the results** of the breadboard and discuss the way forward

See presentation of IngeniArs in Annex 1

- BB results were presented, showing the technology as promising
- As such, **ESA is interested in pursuing standardization for HoM with PN ranging**. In this respect, ESA proposes the following options, to be discussed in the WG:
 - **Option 1:** to do an Orange Book
 - **Option 2:** (preferred by ESA): update in parallel both
 - the Green Book 414.0-B, for simultaneous GMSK and PN ranging (changing title to High-rate)
 - the Blue Book 401.0-B, recommendation 2.4.22A, concerning high-rate modulations with PN ranging, for Category A 8.45-8.50 GHz Band