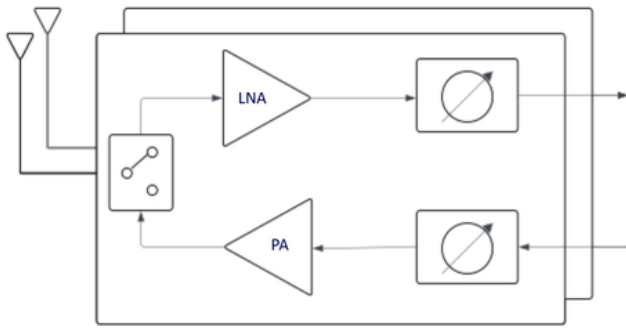


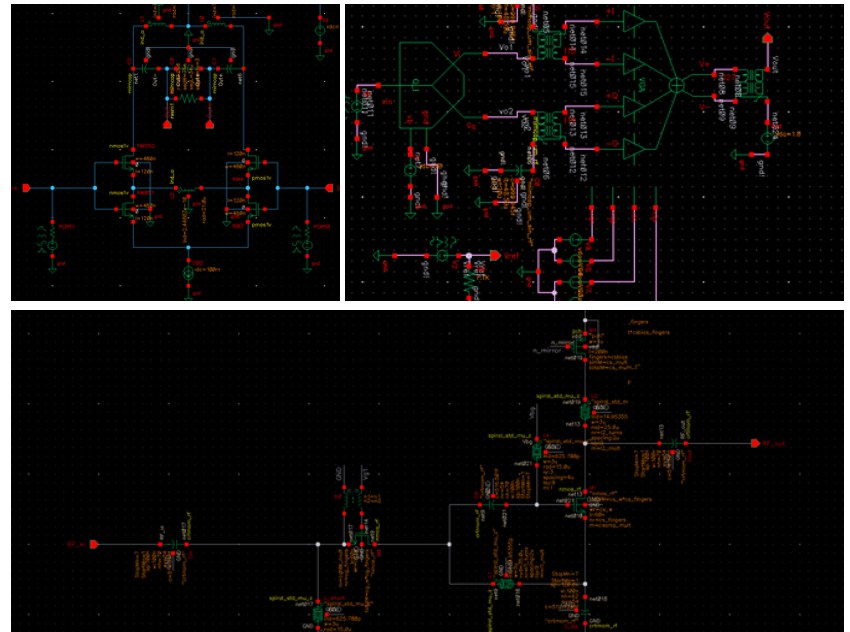
ARCHITECTURAL DESIGN



RX: Align and recombine received signal from phased-antenna array.

TX: Finely control phase of propagated signal to directionally transmit signals.

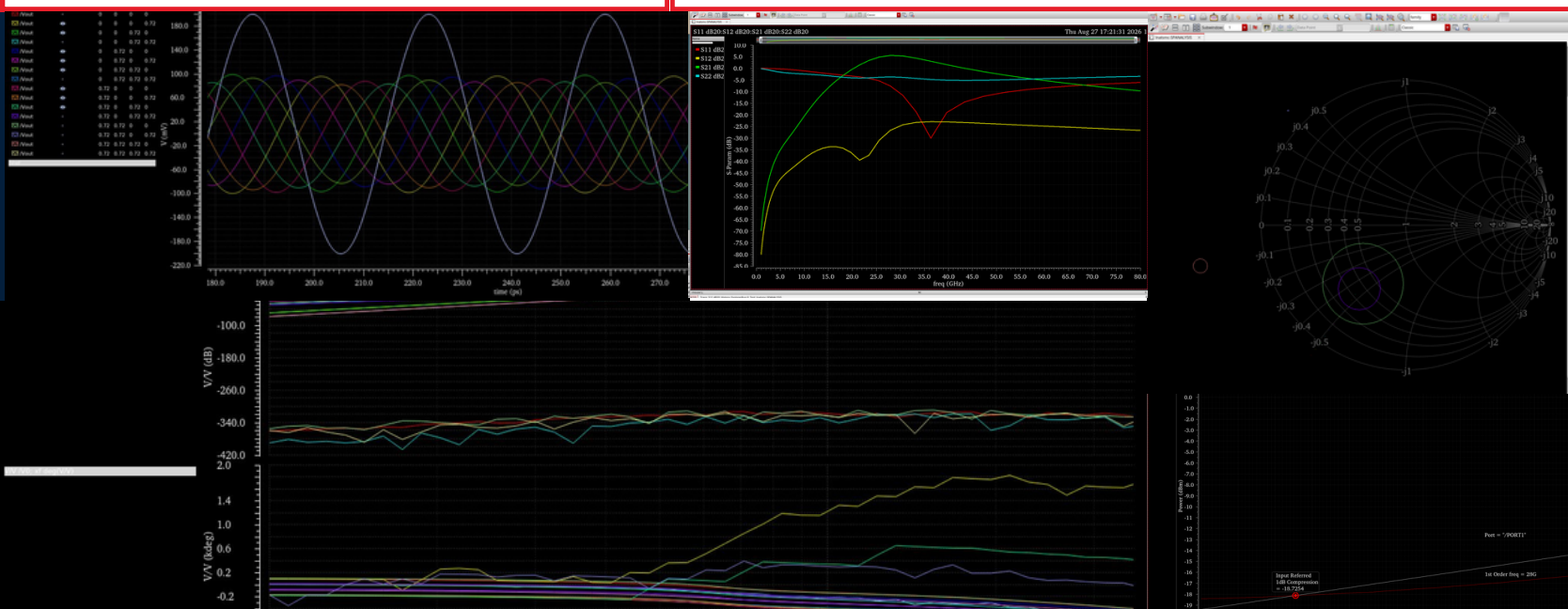
SCHEMATIC DESIGN



BACKGROUND AND MOTIVATION

- The relentless pursuit towards fifth-generation technology and higher frequency bands demands more complex designs from analog designers.
- Signal propagation in high-frequencies suffers from large signal attenuation, interference as well as noise contribution from multiple sources.
- An Analog Front-end with high EIRP and SNR is a crucial step to ensure high-quality communications.

LNA Param.	Result	PS Param.	Result	PA Param.	Result
Gain (dB)	10dB	Gain (dB)	-5.5 dB	Gain (dB)	11dB
NF	5dB	RMS Gain Error	0.695 dB	BW	2 GHz
IP3	-18dB	RMS Phase Error	3.3°	PAE	21%



CONCLUSION

- Completed schematic design for full 5G AFE IC in TSMC65N node, achieved competitive specs to existing designs.
- Gained deep insight into sub-micron analog design and RF mmWave effects.
- Proposed future improvements for LNA and PS for future academic inspection and research.

