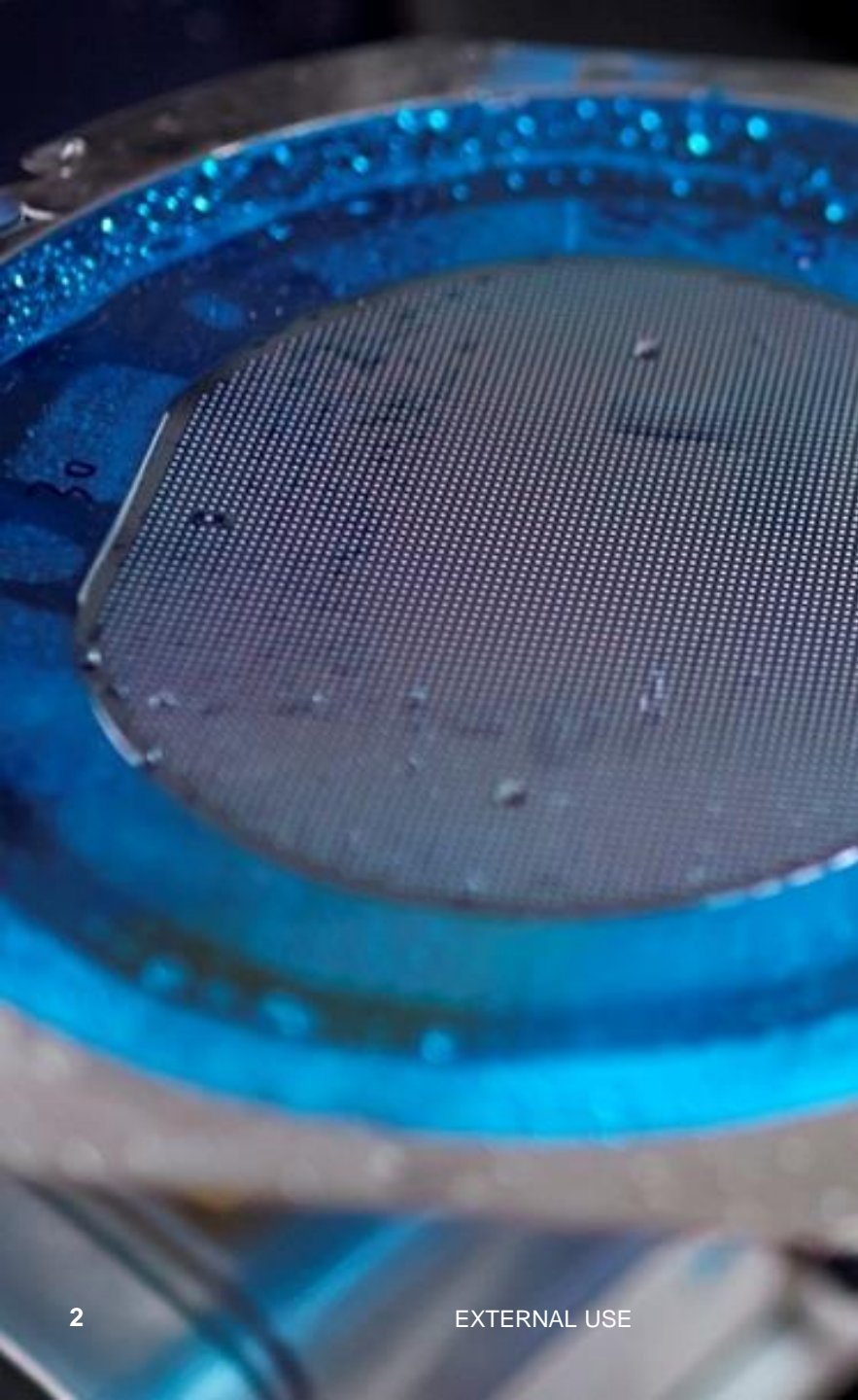


MATLAB for Verifying the Hardware Implementation of Automotive Radar Signal Processing

Sainath Karlapalem
Shashank Venugopal



SECURE CONNECTIONS
FOR A SMARTER WORLD

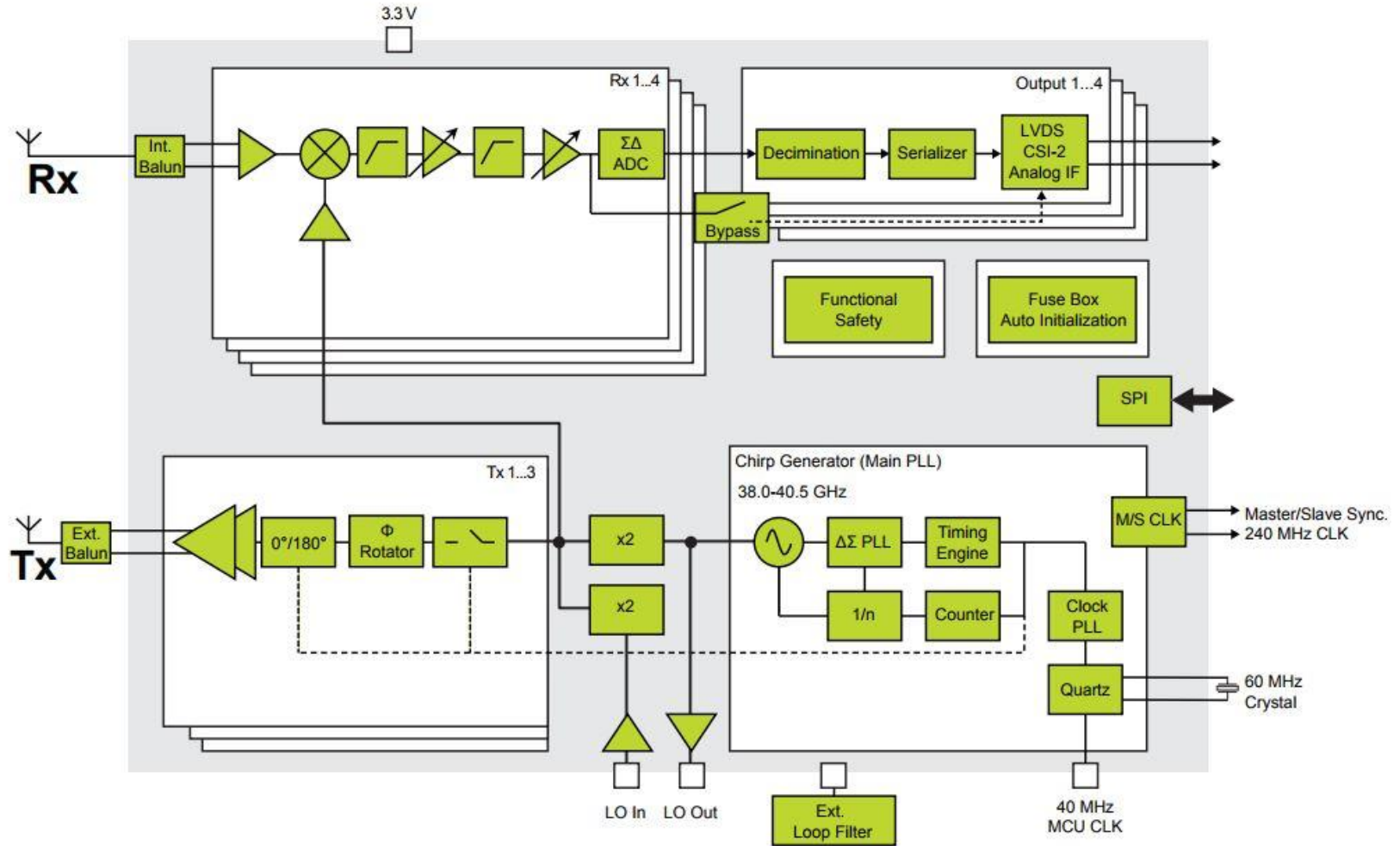


Agenda

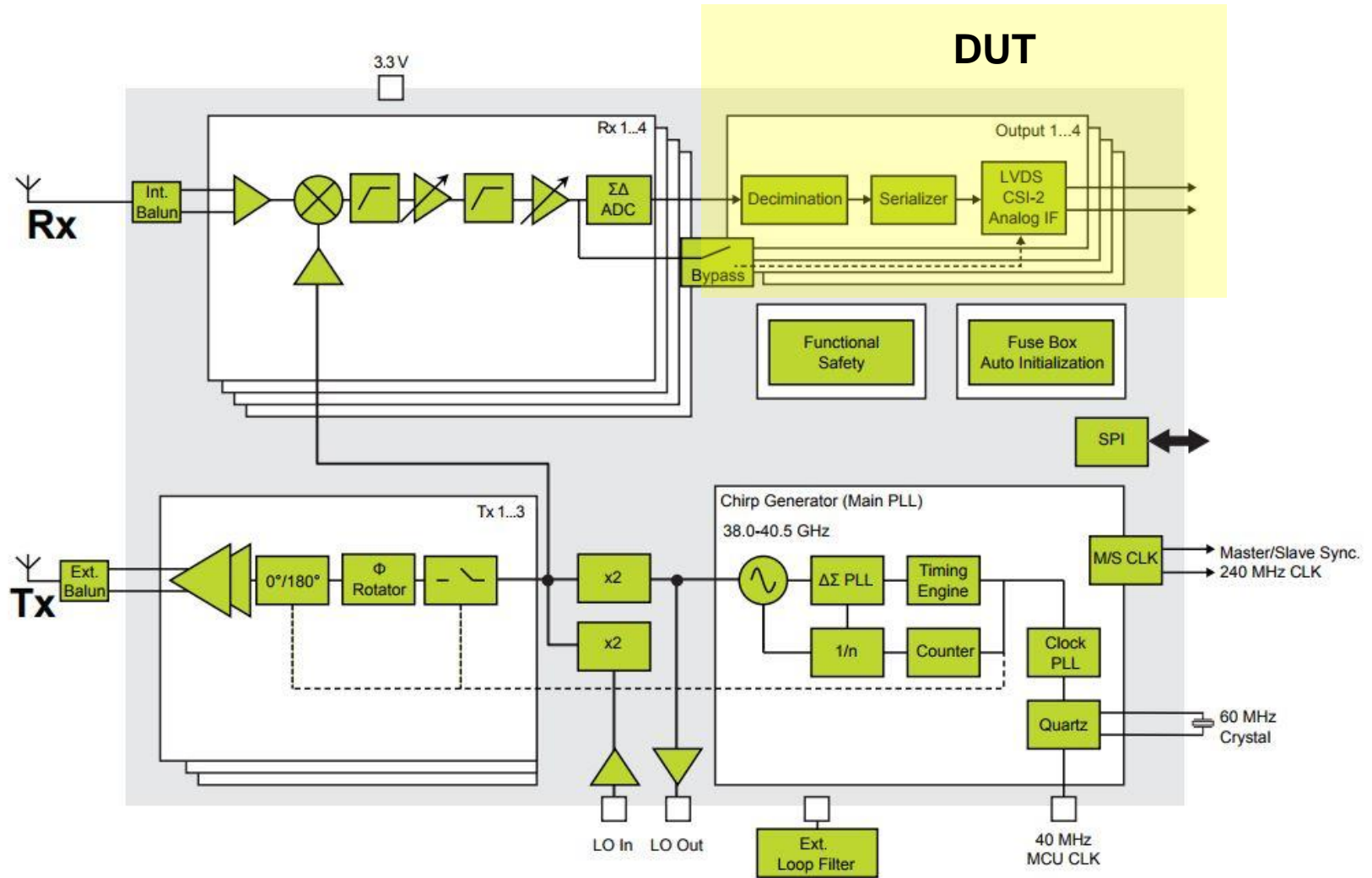
- Automotive RADAR Architecture
- Verification Challenges
- Problem Statement
- Conventional Approach
- DPI-C Approach
- Tools Used
- Benefits



Automotive RADAR Architecture



Automotive RADAR Architecture



Verification Challenges

Mixed Signal Design

- DSP centric
- Functional and performance parameters

Conventional Verification Flow

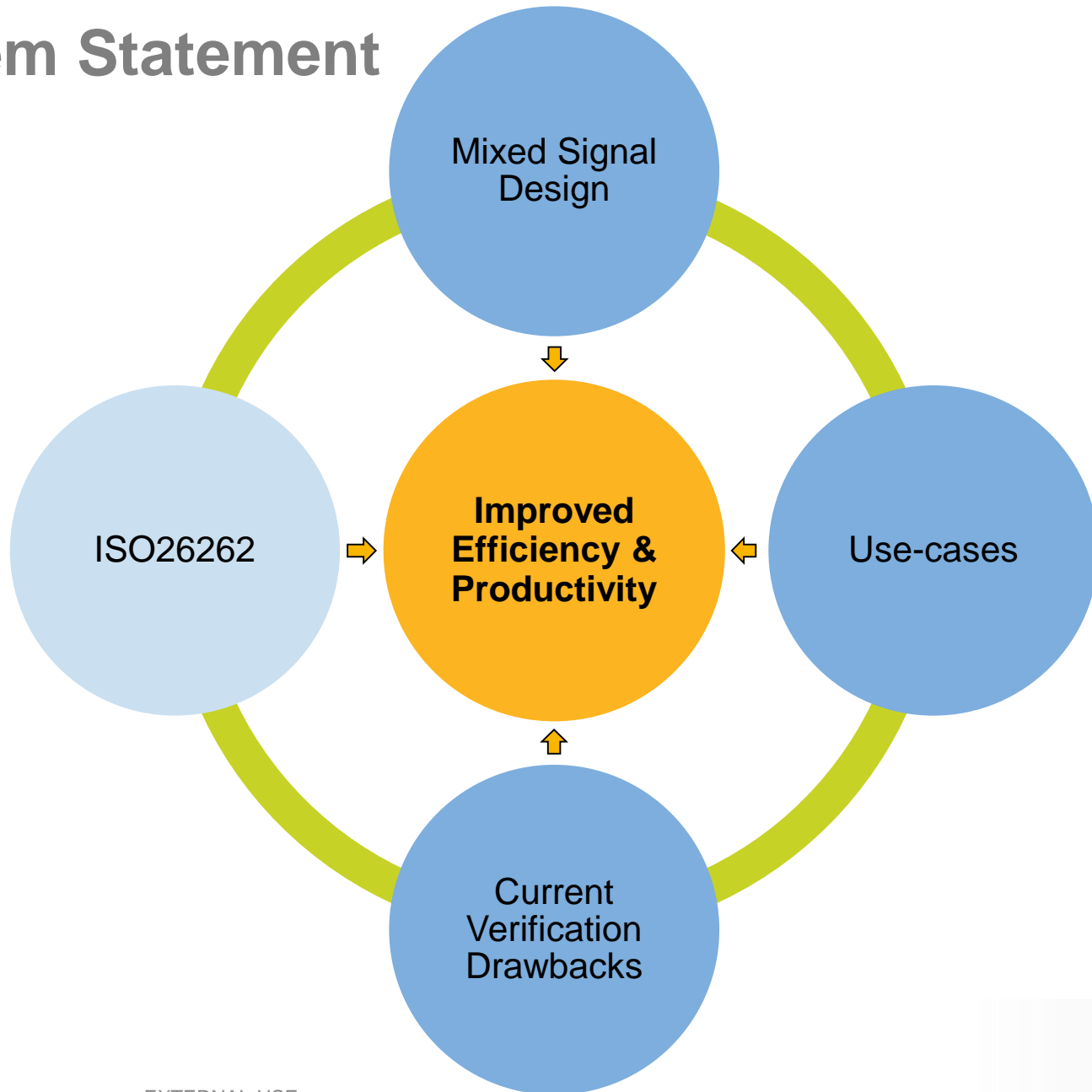
- Based on Constrained Randomization
- Highly inefficient
- Involves its own verification cycle

Test-bench implementation

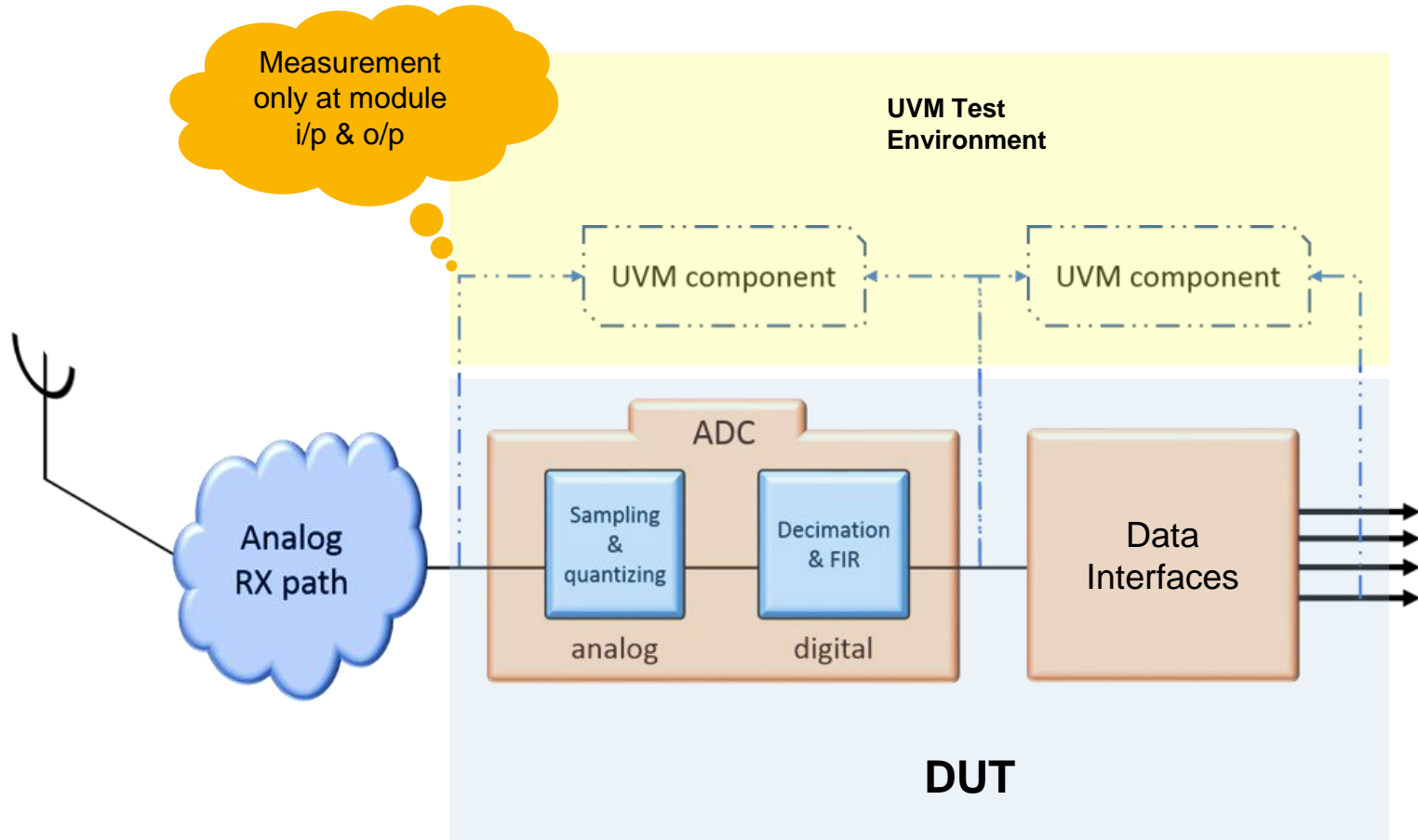
- Need for golden reference DUT models
- High effort in terms of manpower and time



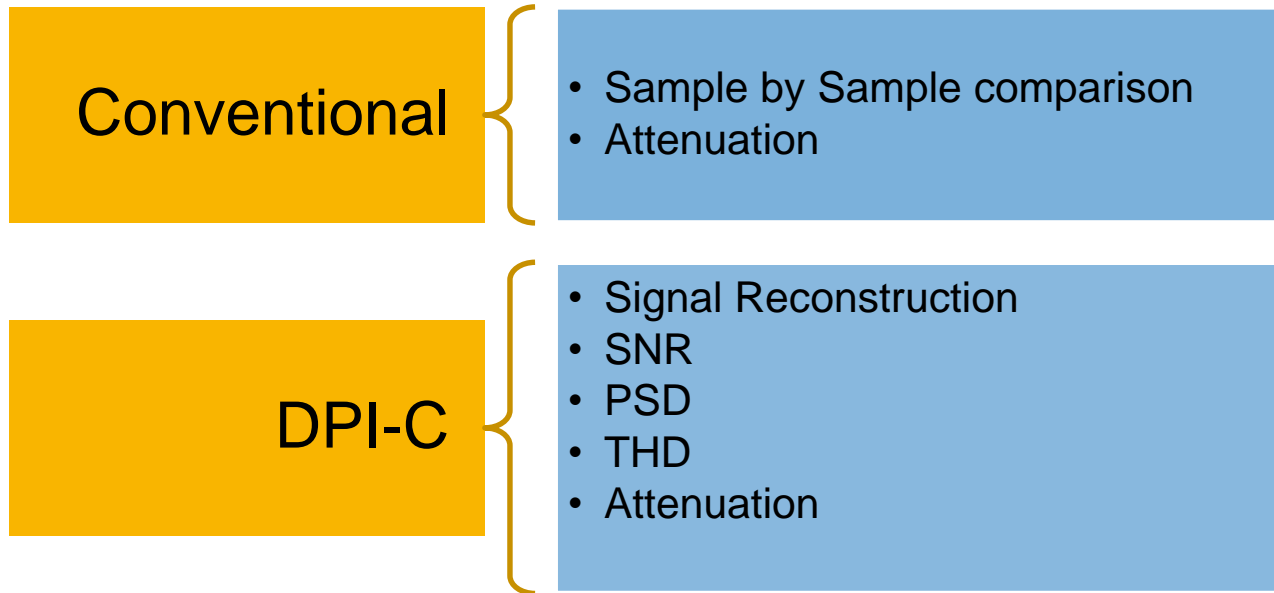
Problem Statement



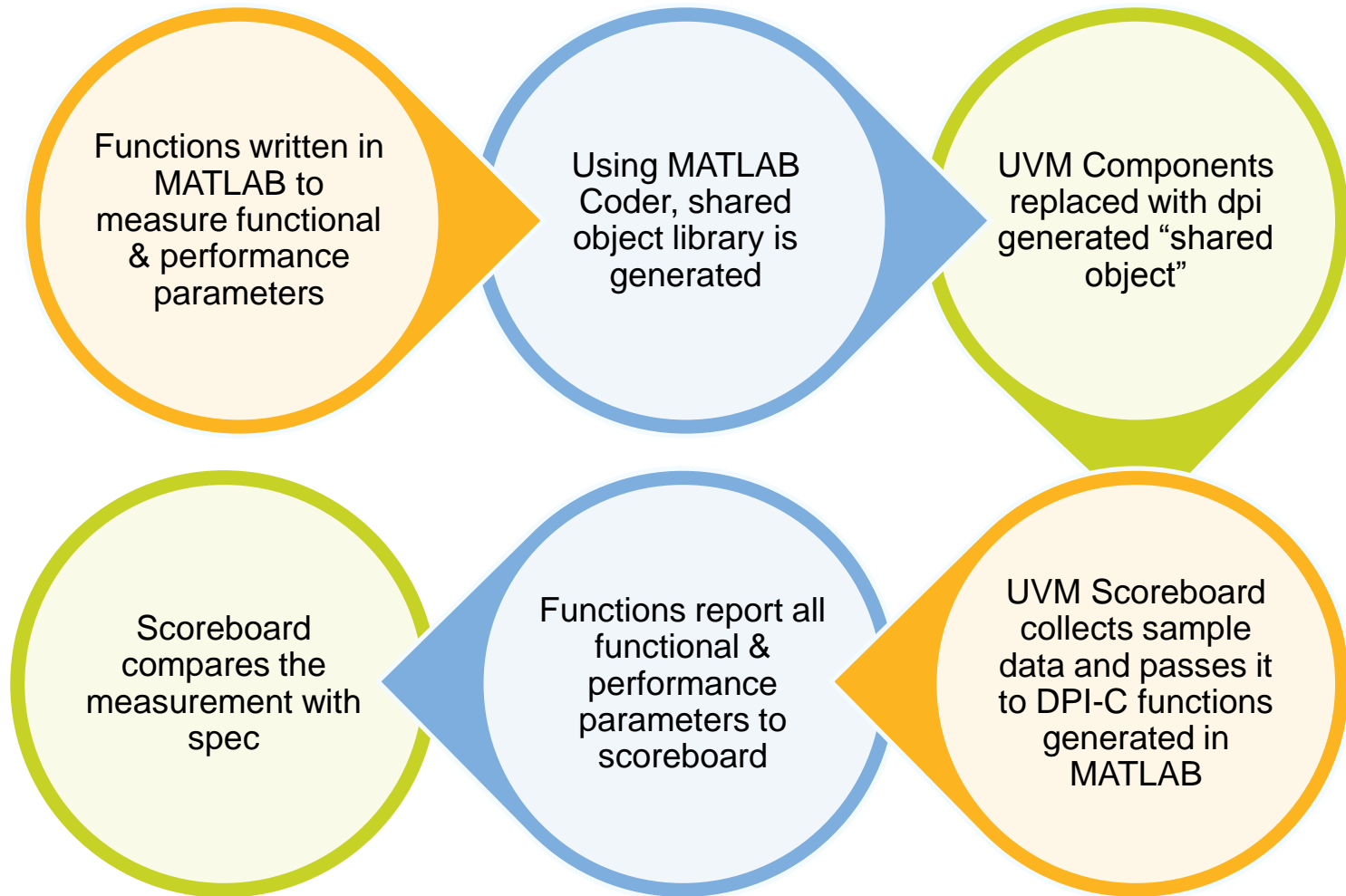
Conventional Approach



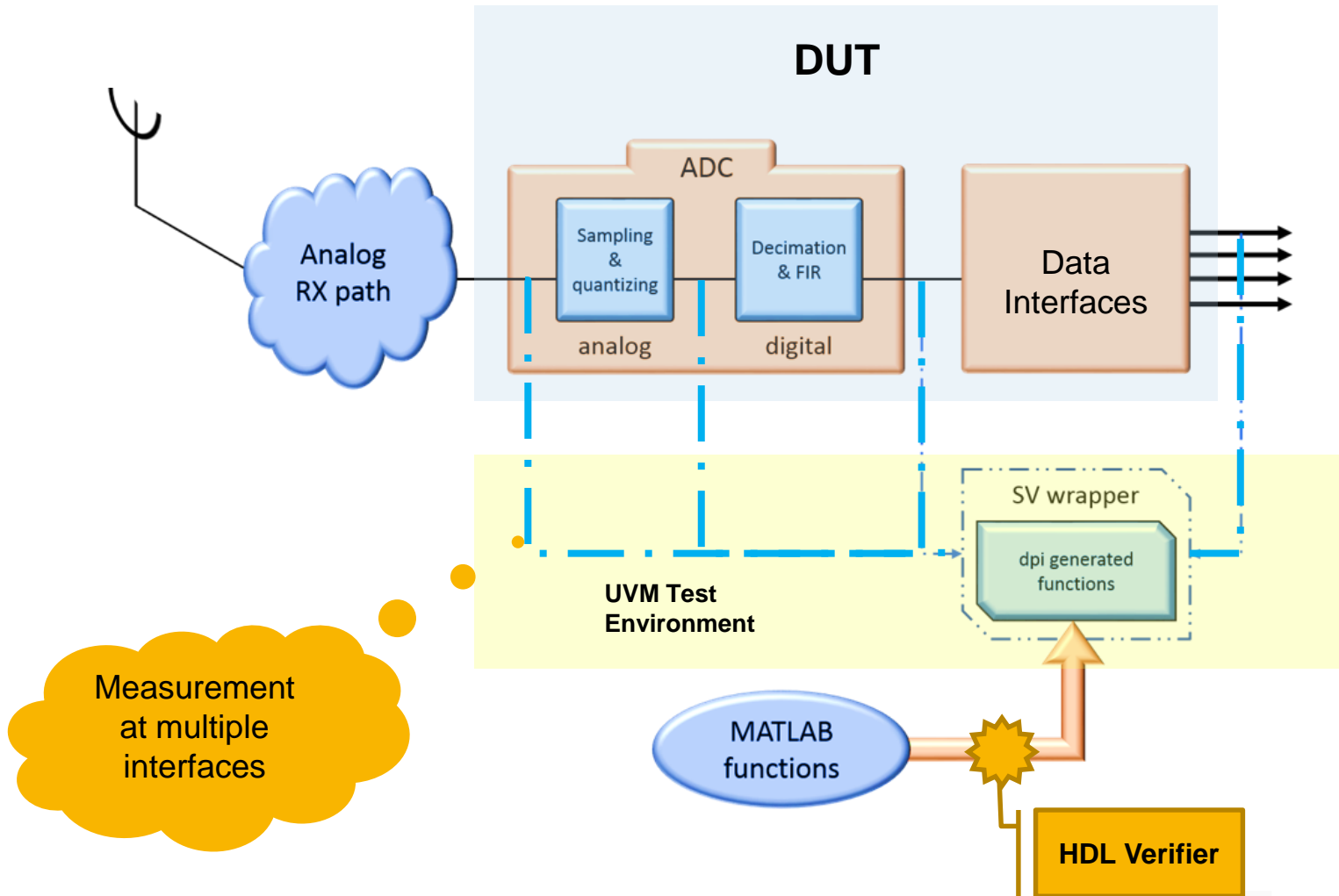
Verification Metrics



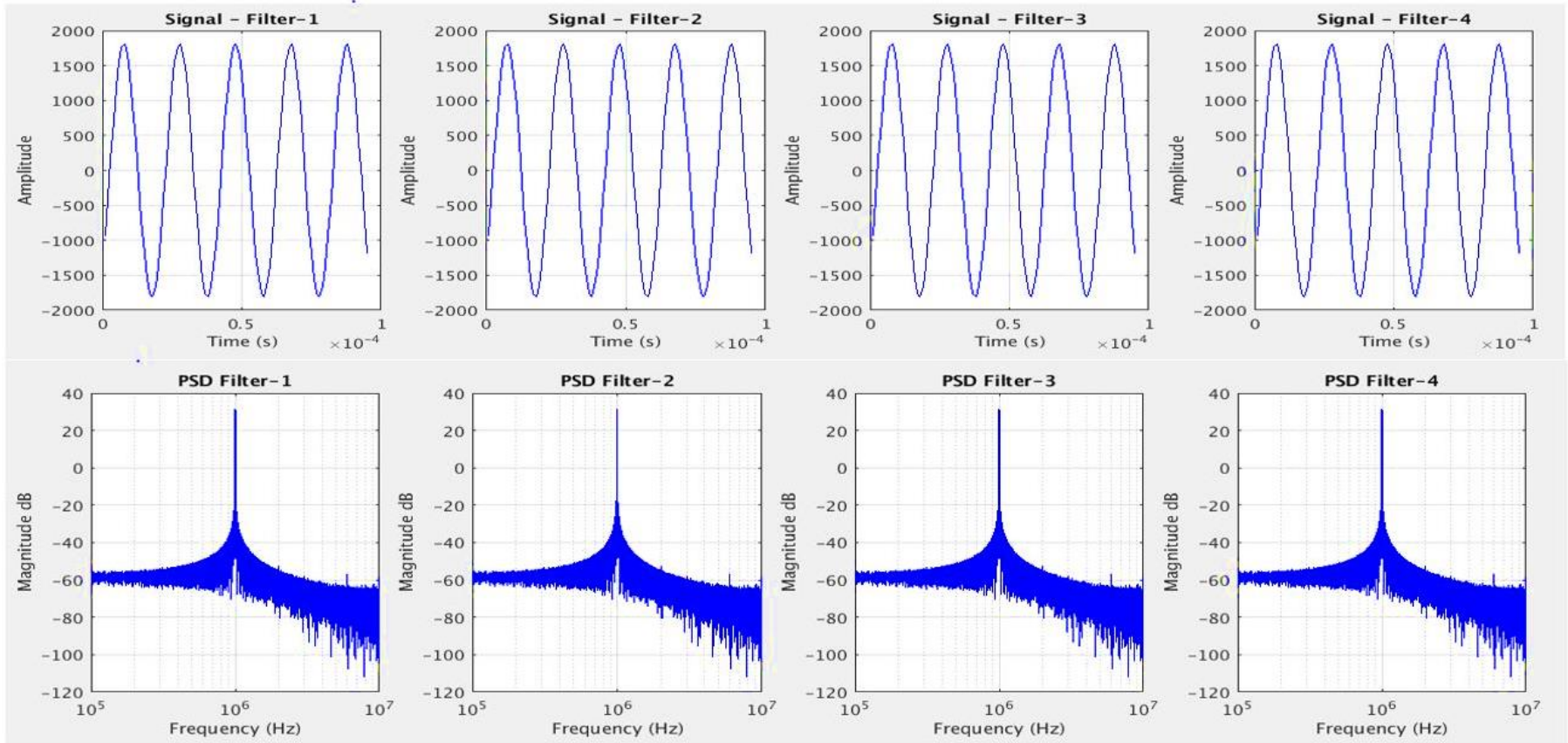
DPI-C Approach



DPI-C Approach (contd..)



DPI-C Approach (contd..)



Tools Used

MATLAB

Signal Processing Toolbox

MATLAB Coder

Embedded Coder

HDL Verifier

Benefits

- Reduced verification Effort
- Performed verification at higher level of abstraction → more inline with customer
- Enables signal analysis during regression runs
- Allows metrics measurements at multiple interfaces
- Eliminated human prone errors in modelling by transferring effort to machine
- Testcases reused for post- silicon validation
- Allows for functional & performance parameter measurements at multiple interfaces



SECURE CONNECTIONS
FOR A SMARTER WORLD