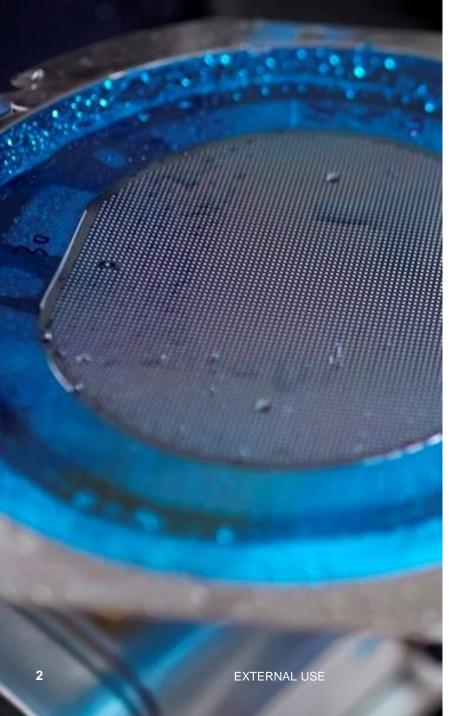
MATLAB for Verifying the Hardware Implementation of Automotive Radar Signal Processing

Sainath Karlapalem Shashank Venugopal





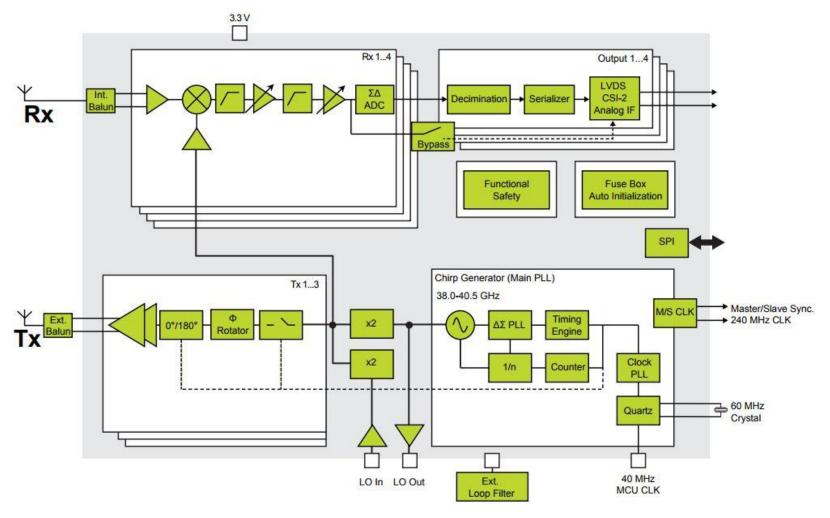


Agenda

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

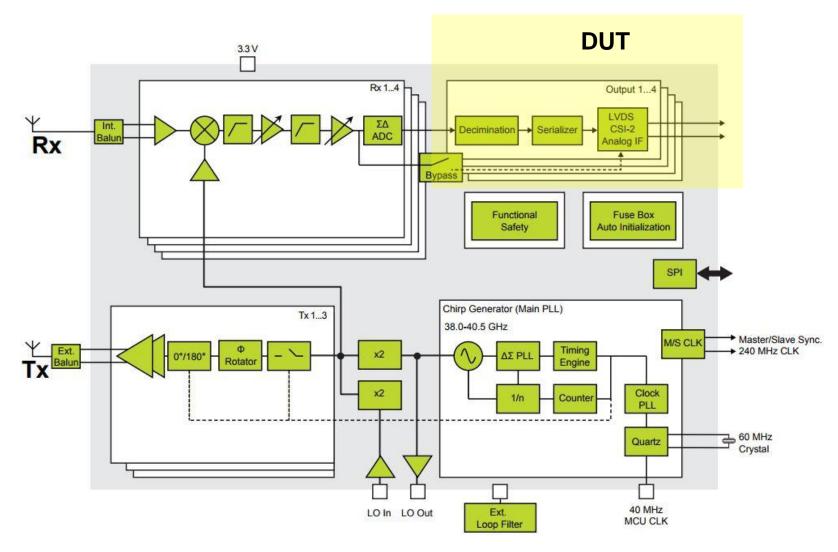


Automotive RADAR Architecture





Automotive RADAR Architecture





Verification Challenges

Mixed Signal Design

- DSP centric
- Functional and performance parameters

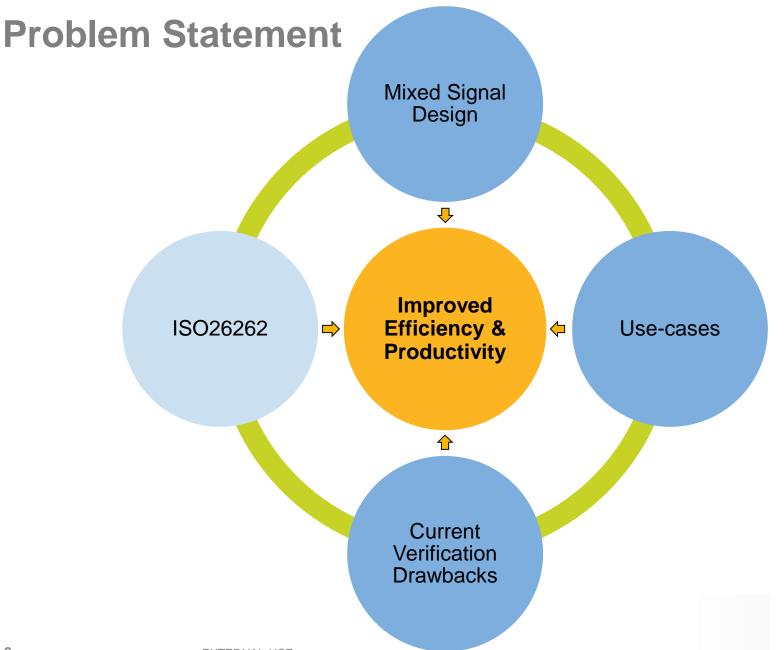
Conventional Verification Flow

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

Test-bench implementation

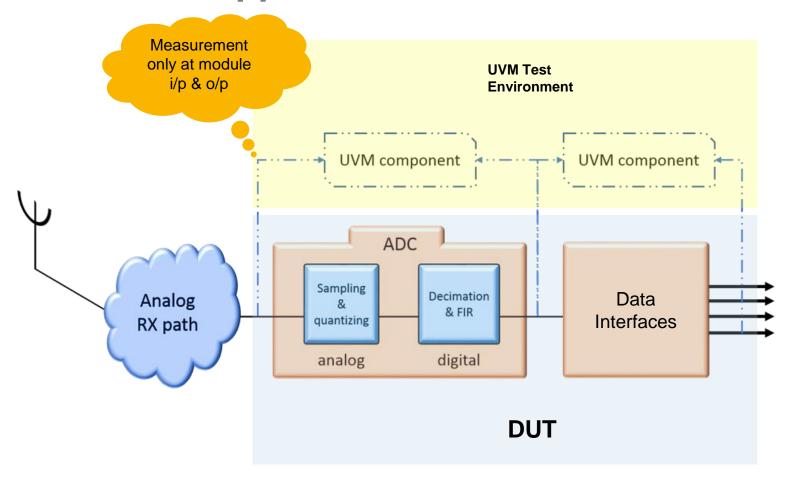
- Need for golden reference DUT models
- High effort in terms of manpower and time





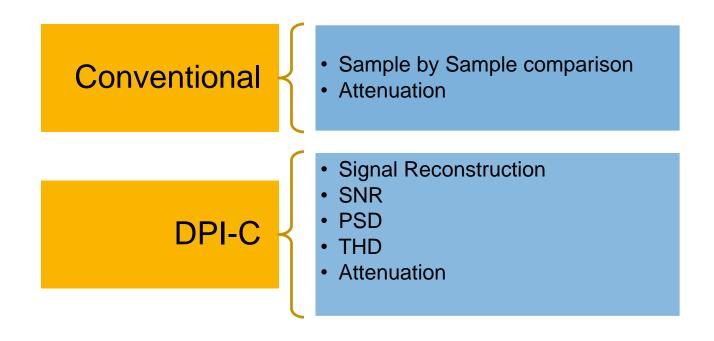


Conventional Approach





Verification Metrics





DPI-C Approach

Functions written in MATLAB to measure functional & performance parameters

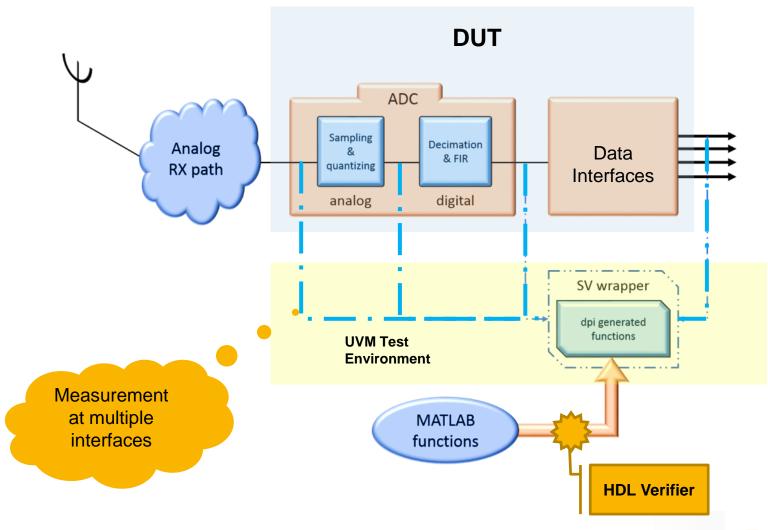
Using MATLAB Coder, shared object library is generated UVM Components replaced with dpi generated "shared object"

Scoreboard compares the measurement with spec Functions report all functional & performance parameters to scoreboard

UVM Scoreboard collects sample data and passes it to DPI-C functions generated in MATLAB

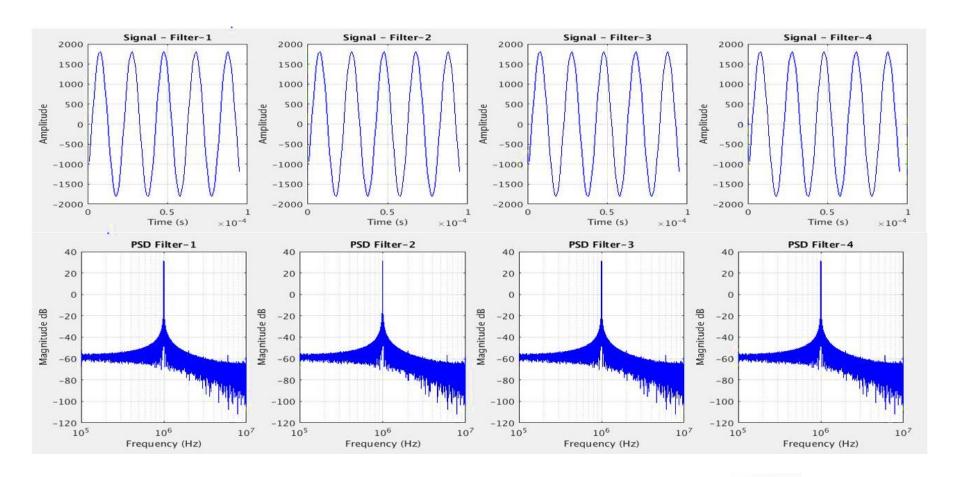


DPI-C Approach (contd..)





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





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