KEYSIGHT MMWAVE DEMO PDK FOR INTEROPERABILITY

Version 1.0

PDK User Guide

Revision 1.0

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Preface

Scope

This User's Guide describes the installation, structure and usage of Keysight mmWave Demo PDK for Interoperability. This user guide also consists the device library and devices details.User may find this guide in the package inside *<PDK ROOT Directory>/docs* directory.

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Contents

1. Introduction

Keysight mmWave Demo PDK for interoperability is similar to native ADS mmWave DemoKit from the PDK's technology perspective. This PDK offers interoperability support between Keysight ADS and Synopsys Custom Compiler. The mm-Wave demo kit's technology is based on GaN-HEMT MMIC technology.

Following are the specifications of this PDK:

- Devices have been modeled to work for the frequency range up to 50 GHz.
- There are two FETs present in the kit based on ASM HEMT and Angelov-GaN HEMT models.
- There are 3 metal levels present. These are met1, met2, and met3. met3 is an air-bridge metal and used only for Inductors and pads.
- All interconnects except demo_mmWave_Tline are provided with 2 types *met1* only and *met1+met2* (thick metal). For demo_mmWave_Tline, there is an extra type *met2* available.

1.1. Application

This PDK can be used to design interoperable designs for millimeter frequency range applications. This PDK can be used as a demo vehicle to demonstrate the Keysight tools like RFPro and GoldenGate in the Synopsys Custom Compiler environment.

1.2. Location

The native mmWave Demo Kit is available inside the ADS installation and can be found at the following location:

$HPEESOF_DIR/examples/DesignKit/DemoKit_mmWave

The Interoperable PDK is available at Keysight Knowledge Centre(KC) and can be downloaded from the link given below

ADS Downloads - Keysight Knowledge Center

Note: Please register yourself to Keysight Knowledge Center (KC) , if not done already

2. PDK and Tools Details

2.1. PDK Details

PDK Name	Keysight mmWave Demo PDK for Interoperability
PDK Version	1.0
Package Name	mmw_demo_ipdk_v1p0.tar
PDK Library Name	DemoKit_mmWave

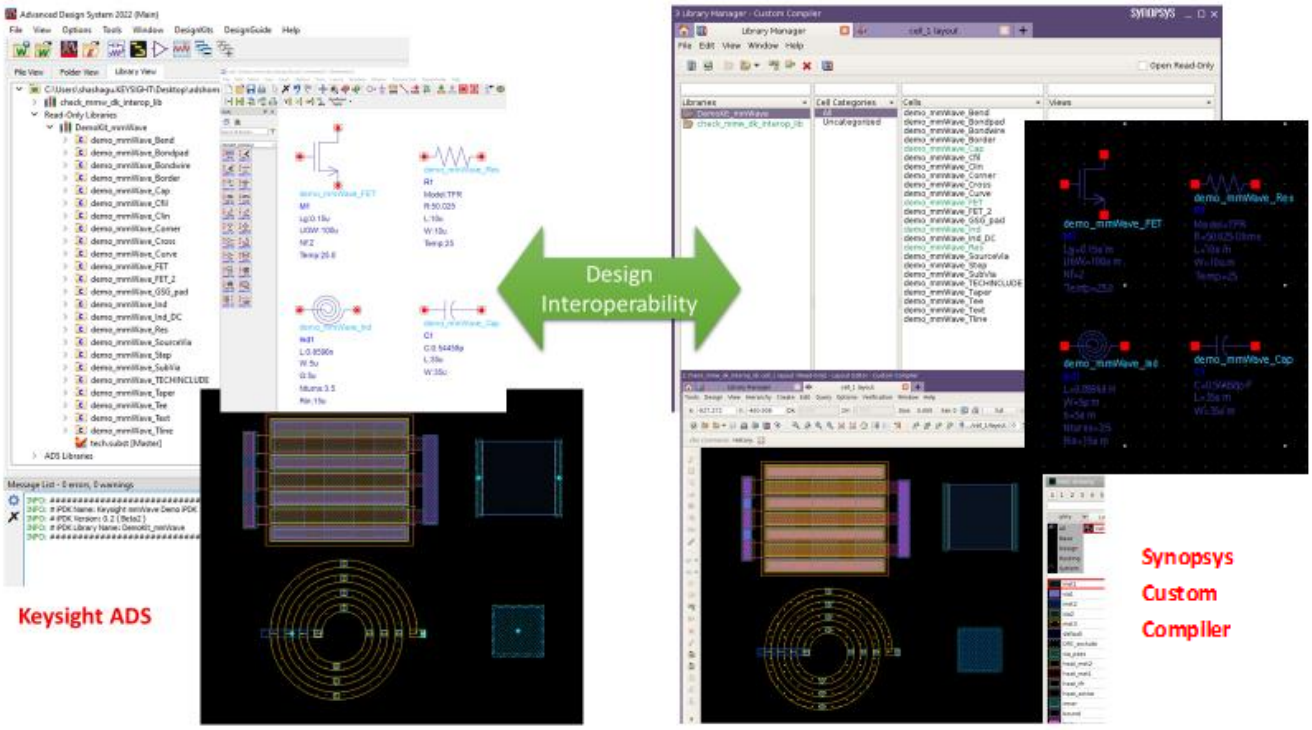
2.2. Supported Tools

Tool Name	Tool Version
Keysight Advanced Design System (ADS)	2023 and above
Synopsys Custom Compiler (SNPS CC)	2019 and above
Operating System (OS)	
Red Hat Linux (RHEL)	7
Microsoft Windows	10

3. PDK Features

Following are the features of the mmWave Demo PDK for interoperability

- ✓ PDK Library with technology, display resource, and components
- ✓ EM stack and material definitions supporting PDK's technology
- ✓ Components with component definitions (CDF) and parameter callbacks written in OA-TCL
- ✓ Artwork pCell macros written in OA-TCL
- ✓ EM/Circuit Partitioning rule
- ✓ Device models and data files for Keysight ADS, Keysight GoldenGate, and Synopsys HSPICE simulator
- ✓ DRC rules and batch DRC configuration for Keysight ADS DRC
- ✓ LVS rules and batch LVS configuration for Keysight ADS LVS
- ✓ Thermal stack for Keysight Electrothermal Simulation
- ✓ Component help docs
- ✓ Interoperability with Synopsys Custom Compiler



4. Library Components

List of library components present in the PDK

Category	Components	Description
Actives	demo_mmWave_FET	FET (Angelov Model)
	demo_mmWave_FET_2	FET (ASM-HEMT Model)
Passives	demo_mmWave_Res	Epitaxial and Thin-film resistor
	demo_mmWave_Cap	MIM Capacitor
	demo_mmWave_Ind	Circular Spiral Inductor
	demo_mmWave_Ind_DC	DC Feed Inductor (Rectnagular & Circular)
Interconnects and Discontinuities	demo_mmWave_Tline	Microstrip Transmission Line
	demo_mmWave_Bend	Microstrip Bend
	demo_mmWave_Corner	Microstrip Corner
	demo_mmWave_Curve	Microstrip Curve
	demo_mmWave_Taper	Microstrip Taper
	demo_mmWave_Cflil	Microstrip Coupled Line Filter
	demo_mmWave_Clin	Mircostrip Coupled Line
	demo_mmWave_Tee	Microstrip Tee
	demo_mmWave_Cross	Microstrip Cross
	demo_mmWave_Step	Microstrip Step
Pads	demo_mmWave_Bondpad	Bondpad
	demo_mmWave_GSG_Pad	GSG Pad
Vias	demo_mmWave_SubVia	Substrate Via
	demo_mmWave_SourceVia	Substrate Via (for FETs)
Misc	demo_mmWave_Border	Border
	demo_mmWave_Bondwire	Bond wire
	demo_mmWave_Text	Text component supporting lift-off process
Process Include	demo_mmWave_TECHINCLUDE	Process Include Component (to be used in ADS only)

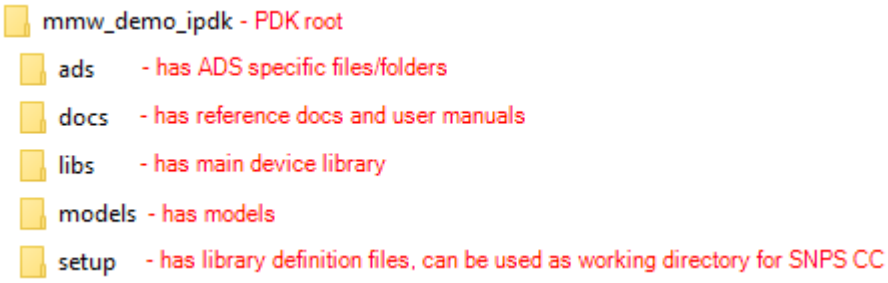
5. PDK Installation

5.1. Download the PDK package from Keysight Knowledge Center by clicking the link below

ADS Downloads - Keysight Knowledge Center

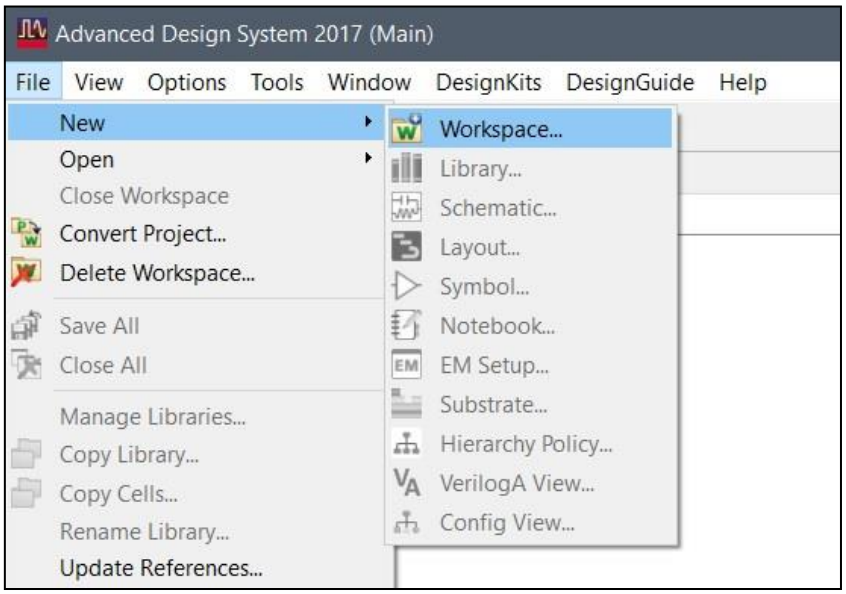
Note: Please register yourself to Keysight Knowledge Center (KC) , if not done already

5.2. Create a directory to unarchive the Interoperable PDK package and unarchive

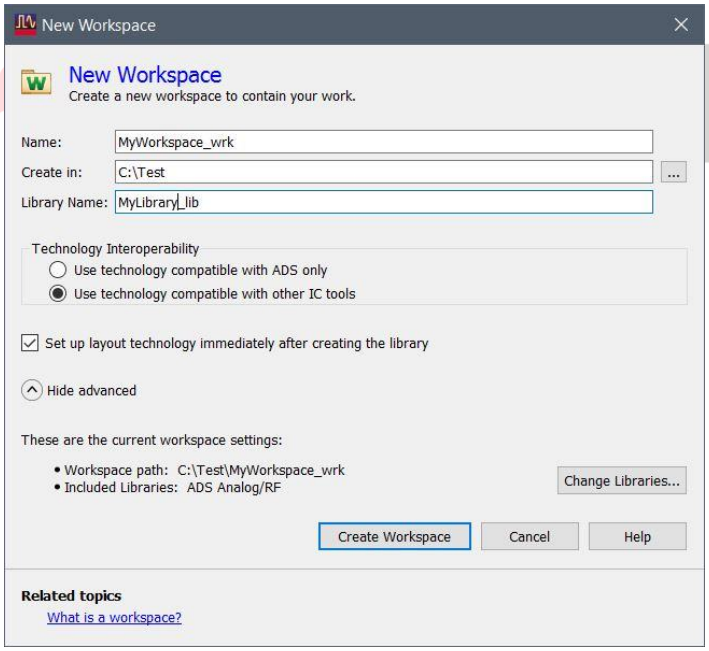


6. Using PDK in Keysight ADS

a) Create a new workspace by selecting “File -> New -> Workspace”



b) In the “New Workspace” GUI, follow the steps mentioned below



1. Provide the name of the workspace, library, and destination.
2. Select the “Technology Interoperability” option as shown in the screenshot.
3. Tick the checkbox for setting up “layout technology”.
4. Click on the “Change Libraries” button. To add the PDK into the workspace, click on “**Add User Favorite Library/PDK**” and browse for the *lib.defs* file present inside the *<PDK_Installation_Directory>*/mmw_demo_Interoperable PDK/setup/ directory.

7. Using PDK in Synopsys Custom Compiler

Provided that environment setup is already done for Synopsys Custom Compiler (SNPS CC)

1. Change the current working directory to the directory having library definition file lib.defs i.e. *<PDK_Installation_Directory>/mmw_demo_Interoperable PDK/setup*
2. Launch SNPS CC
3. Create a new library and attach the PDK's technology to it.
4. Create cell and cell view and start designing using PDK's component.