README.DOC for Adaptive DPD Workflow

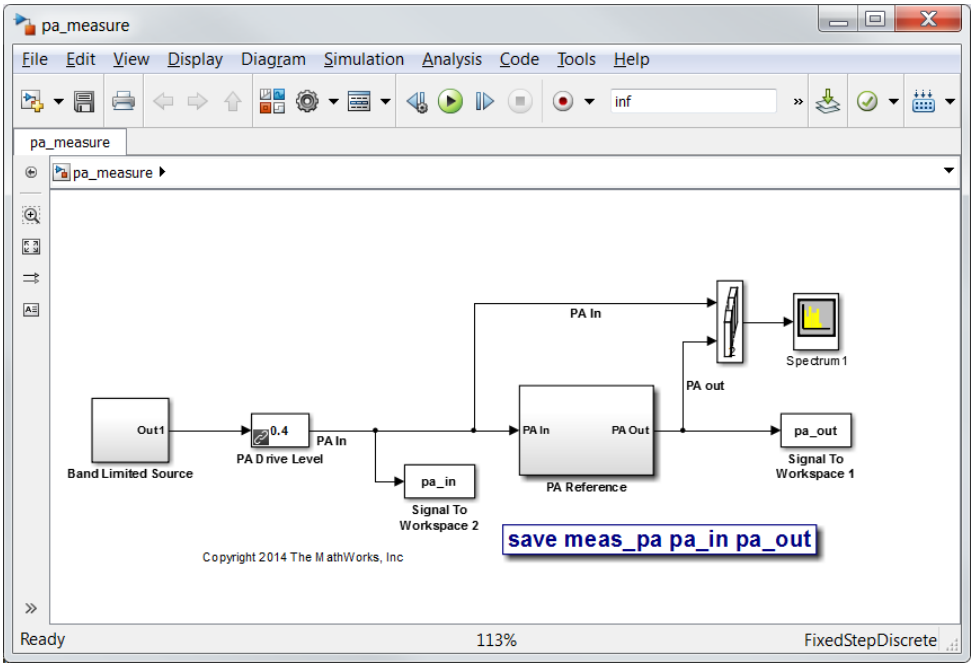
Contents

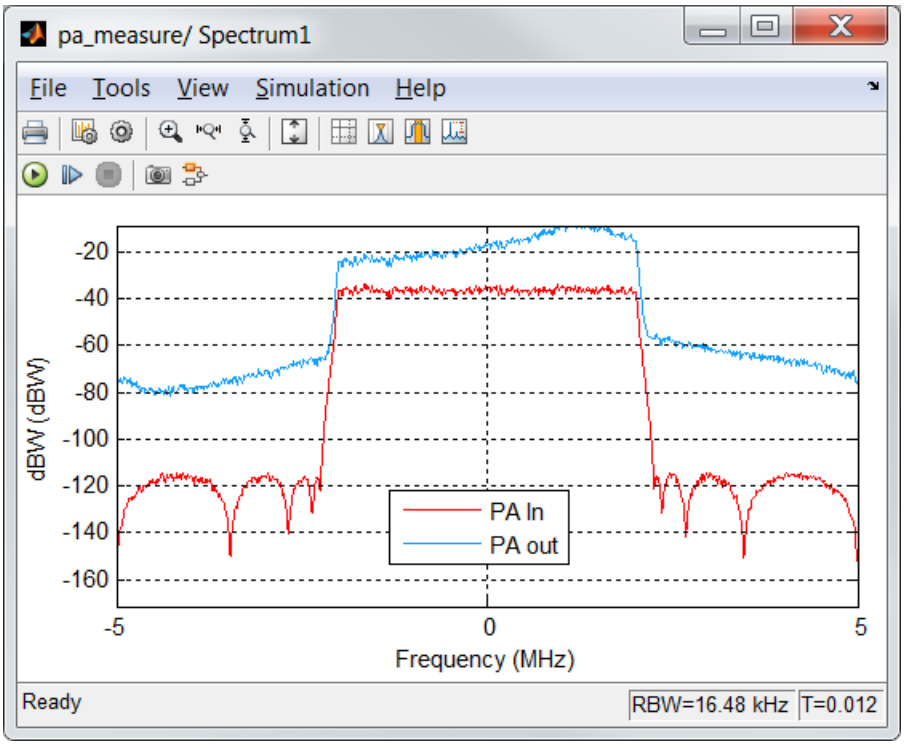
The DPD.zip file contains the following files.

1. pa_measure.slx – Run this model first.
2. dpd_static_verify.slx – Run this model second.
3. dpd_adapt_verify.slx – Run this model last.
4. ILA_CONFIG.slx – A configurable subsystem used by model 3.
5. DPD_analysis.m – A script used by model 2 to derive DPD coefficients. Used as a model callback.
6. DPD.pdf – technical paper providing background on modeling and simulation.

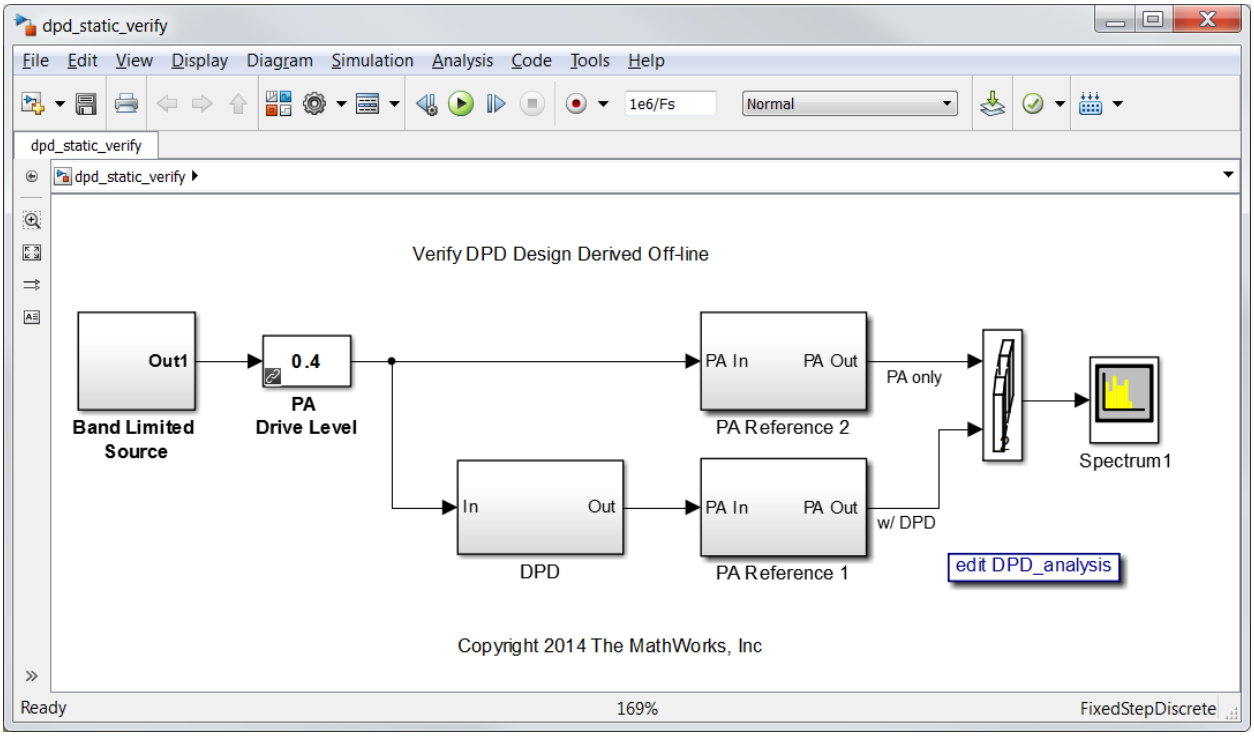
How to Use the Examples

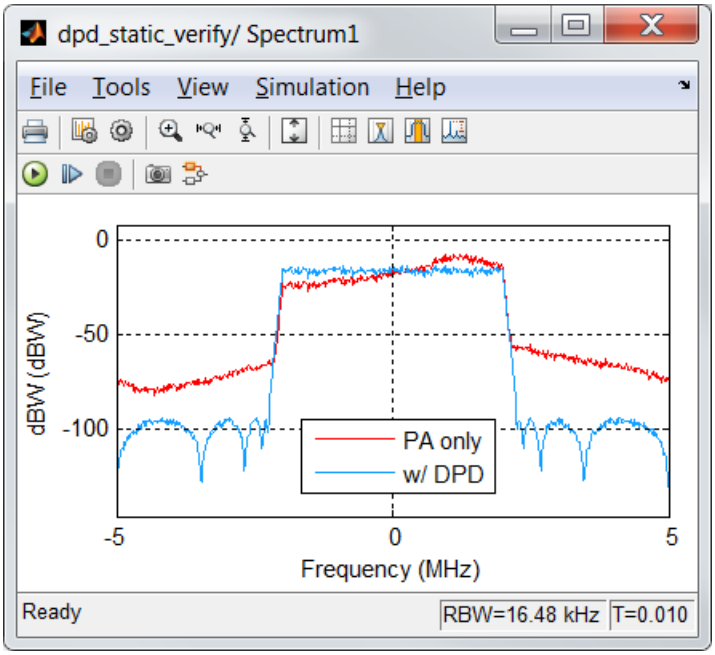
1. Start by opening and running the model, **pa_measure.slx**. This model excites and takes measurements on the power amplifier (PA). The PA input and output are logged to the MATLAB workspace. At the end of the simulation, you can optionally save the workspace to a file. There is an annotation callback for saving to the file **meas_pa.mat**.



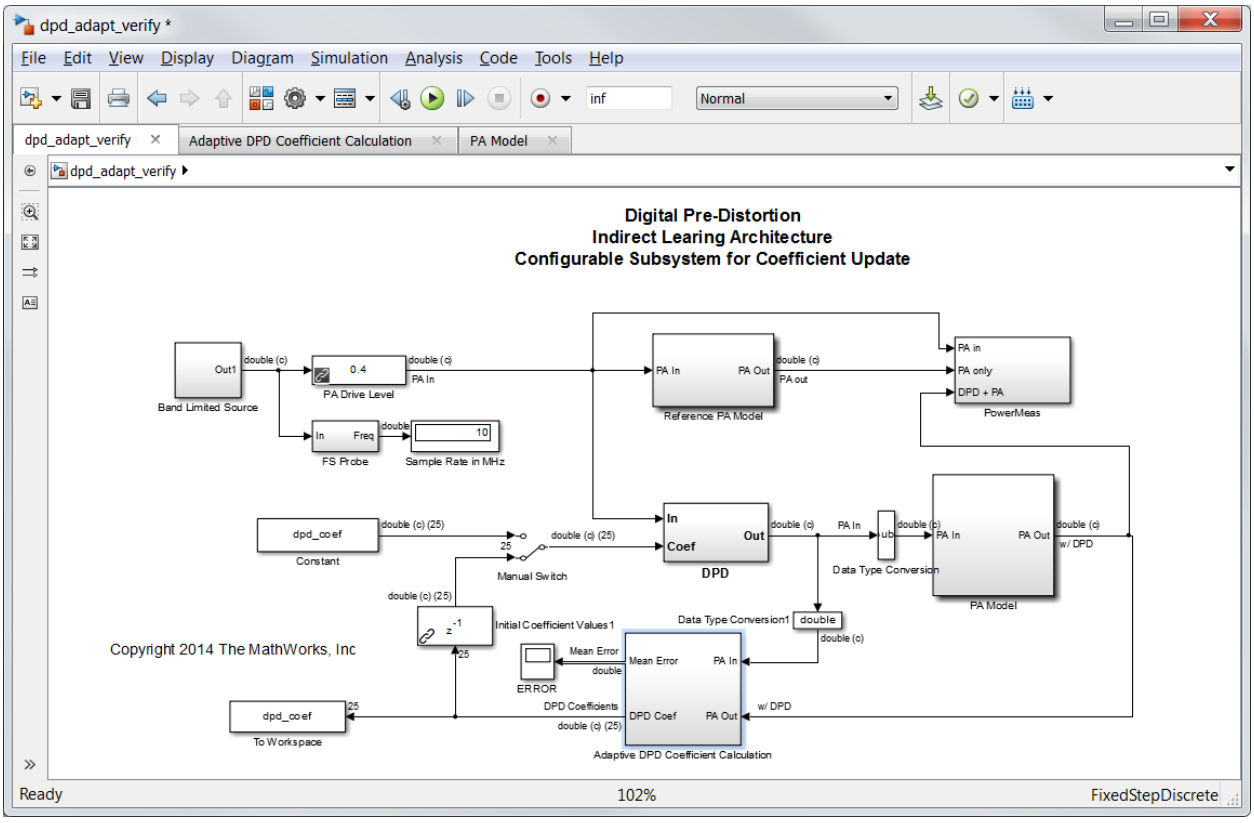


2. Next run the model **dpd_static_verify.slx**. This model calls **DPD_analysis.m** before loading. It loads the measurements saved to the file **meas_pa.mat** and derives a set of DPD coefficients. See the **DPD.pdf** for the details of this derivation. After DPD_analysis completes and the model is loaded, you are ready to run the model. Press play and confirm that spectral regrowth has been significantly reduced compared to using the PA without DPD.





3. Run the model **dpd_adapt_verify.slx**. This is the adaptive DPD implementation. There are two implementations of the **Coef_Calc** subsystem. One is based on the **LMS** algorithm and the second is based on the **RPEM** algorithm. You can switch between implementations before each run by right clicking on the **Coef_Calc** block and selecting **Block Choice**. Coef_Calc is a configurable system and its parent is in the file **ILA_CONFIGSS.slx**.


dpd_adapt_verify *
File Edit View Display Diagram Simulation Analysis Code Tools Help
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Normal
dpd_adapt_verify
Adaptive DPD Coefficient Calculation
PA Model
Digital Pre-Distortion
Indirect Learing Architecture
Configurable Subsystem for Coefficient Update
Band Limited Source
PA Drive Level
FS Probe
Sample Rate in MHz
Reference PA Model
PowerMeas
Constant
Manual Switch
DPD
Data Type Conversion
PA Model
Initial Coefficient Values1
Data Type Conversion1
ERROR
Mean Error
Adaptive DPD Coefficient Calculation
To Workspace
Copyright 2014 The MathWorks, Inc
Ready
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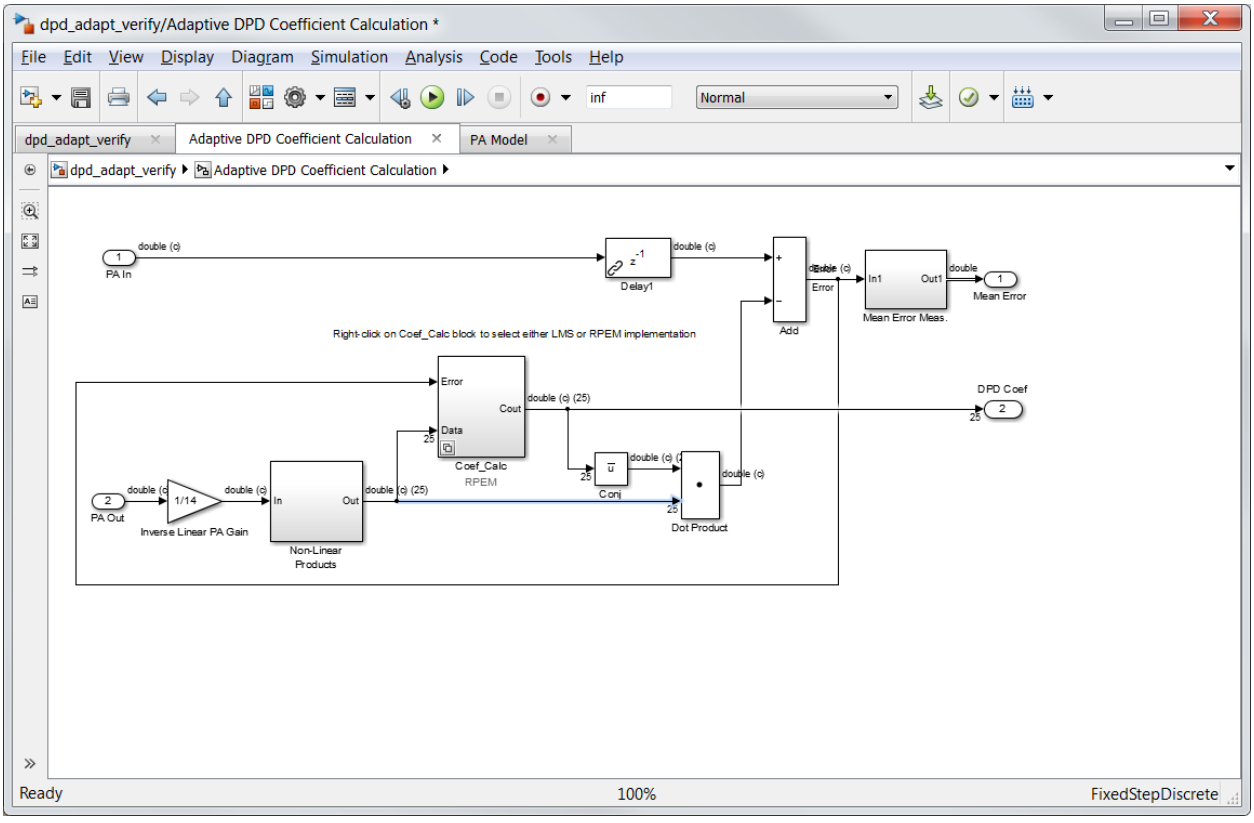
FixedStepDiscrete


dpd_adapt_verify/Adaptive DPD Coefficient Calculation *
File Edit View Display Diagram Simulation Analysis Code Tools Help
inf
Normal
dpd_adapt_verify
Adaptive DPD Coefficient Calculation
PA Model
PA In
Delay1
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Mean Error Meas.
Mean Error
Right-click on Coef_Calc block to select either LMS or RPEM implementation
Coef_Calc
RPEM
DPD Coef
Conj
Dot Product
PA Out
Inverse Linear PA Gain
Non-Linear
Products
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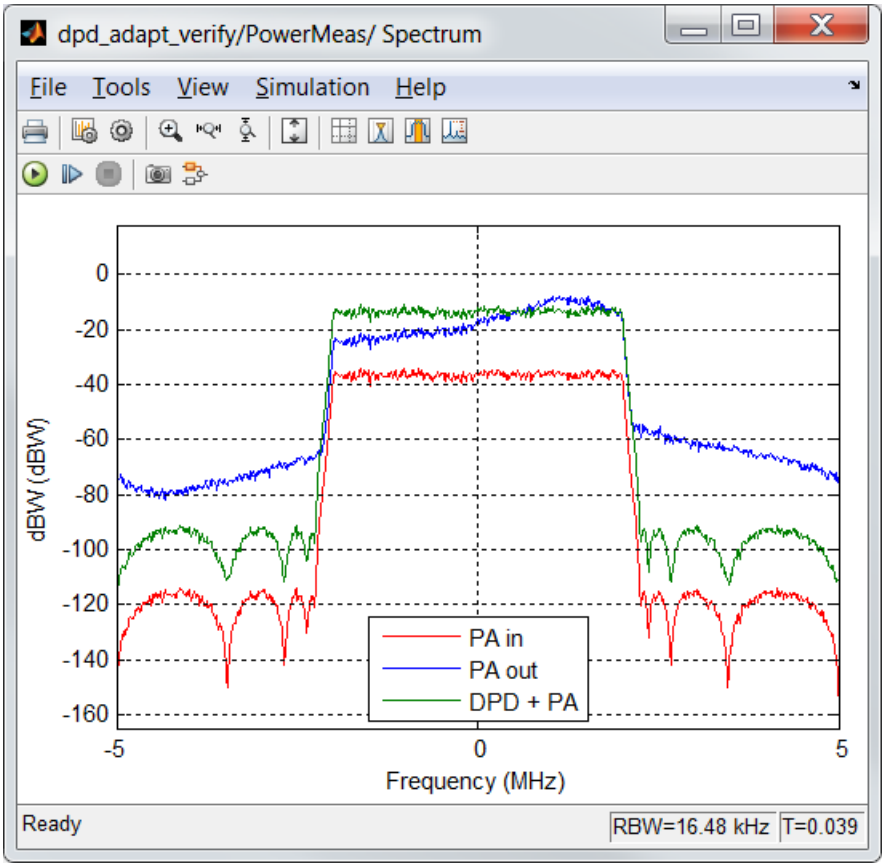
FixedStepDiscrete


dpd_adapt_verify/PowerMeas/ Spectrum
File Tools View Simulation Help
0
-20
-40
-60
-80
-100
-120
-140
-160
dBW (dBW)
-5
0
5
Frequency (MHz)
PA in
PA out
DPD + PA
Ready
RBW=16.48 kHz
T=0.039