dERL Example:
COM Commit Request 4p15_1

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IEEE 802.3 Channel Operating Margin (COM) Open Source Project Ad Hoc

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Purpose

- Illustrate an example of how to compute dERL using the COM Matlab code
- This is not intended to be complete package
- This is not a COM computation

Code updates: Commit Request 4p15_1

Branch: dERL_200G

Directory to be updated: release

- ❑ dERL_example_1p0.m – sample code
- ❑ dERL_example_1p0.zip – Example files
  - 2 measurement file (s2p)
    - Pkg_B_w_die_load_terminated_case2.s2p
    - Pkg_B_w_die_load_terminated_case1.s2p
  - 1 test fixture file
    - test_fixture_example_thru.s4p
  - dERL_example_1p0.m

Directory added to \src directory

- ❑ +dERL

src/ directory update to COM revision - not used for normal operation but corrections needed for dERL

- ❑ src/COM_FD_to_TD.m – correcting to use correct data for computing Vf
- ❑ src/OptFom_Create_Output.m – feature for debugging Vf (plotting PR used for Vf)
- ❑ src/get_TDR.m – fix bug if s parameters are totally uncoupled (needed for example)

+dERL working directory

- ❑ README.md
- ❑ dERL_example_.m
  - main program
  - handles dialog and executes TP0V_example
- ❑ TP0V_example.m
- ❑ file_dialog_and_control.m
- ❑ args_for_PR_wo_eq.m

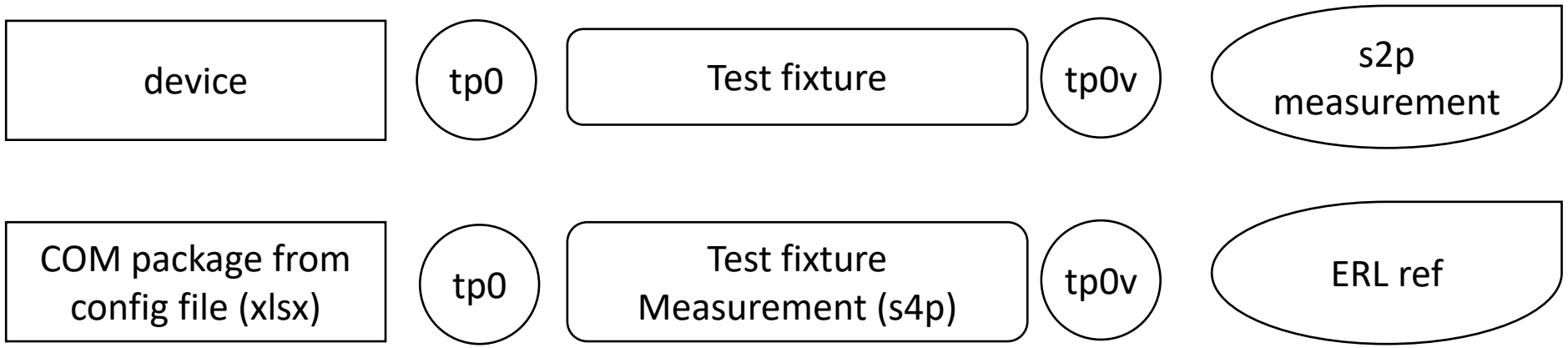
Example s-parameter filed

- ❑ test_fixture_example_thru.s4p
- ❑ Pkg_B_w_die_load_terminated_case1.s2p
- ❑ Pkg_B_w_die_load_terminated_case2.s2p

Operation for COM Commit Request 4p15_1: dERL

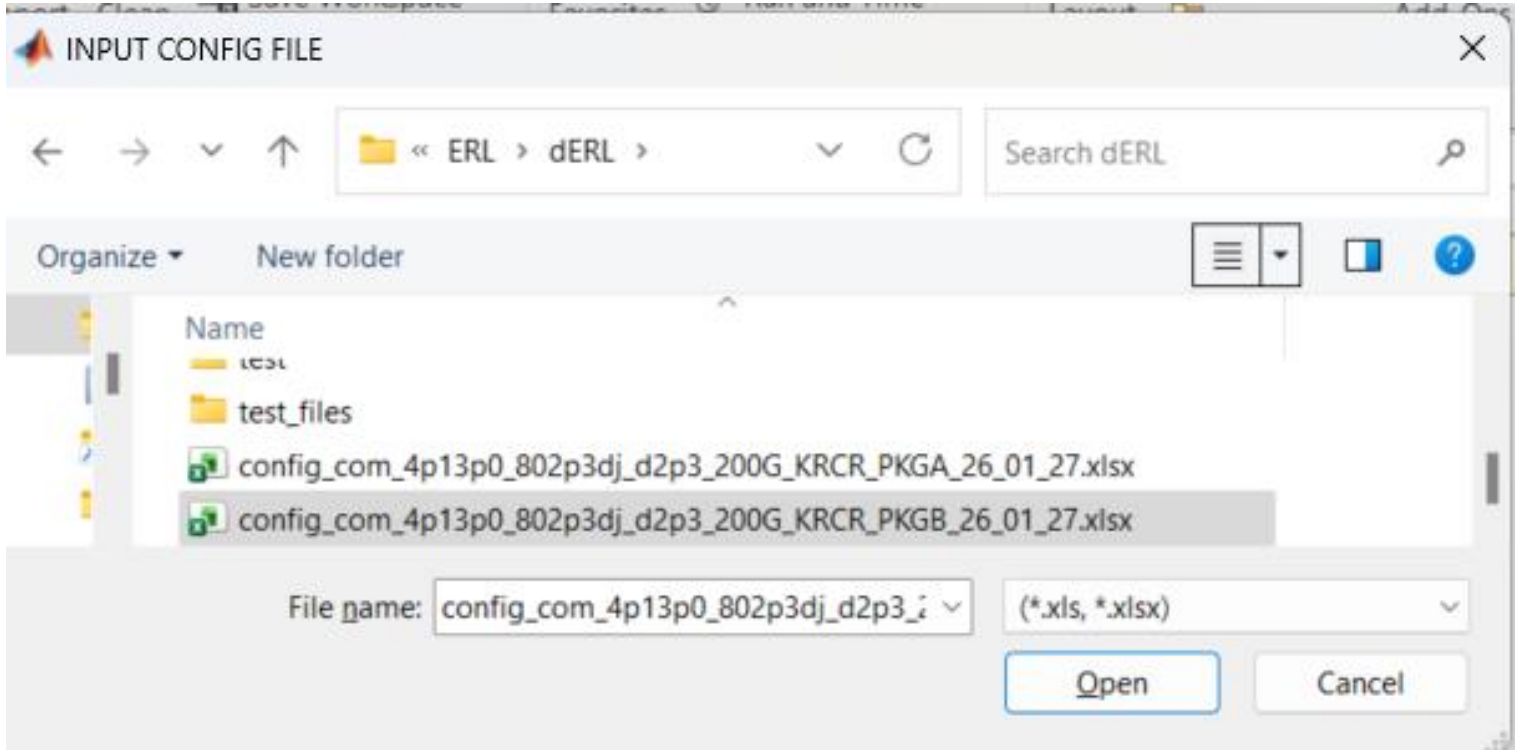
- A configuration file (xlsx) with packages required corresponding to the standard specifications.
- There is only one run per package selection.
  - Two for Package A and Two for Pack B
  - Typically, there will be 4 runs required.
  - Only the Tx package is used
- The interactive dialogue (dERL_example_1p0) asks

1. For a package length selection. The selection choose is the selection choices (1 to 4) in the config file.
2. Test fixture s4p between Tp0 to Tp0v (or Tp5 to Tp5v)
3. RL_{dd} measurement (s2p) at TP0v or TP5v



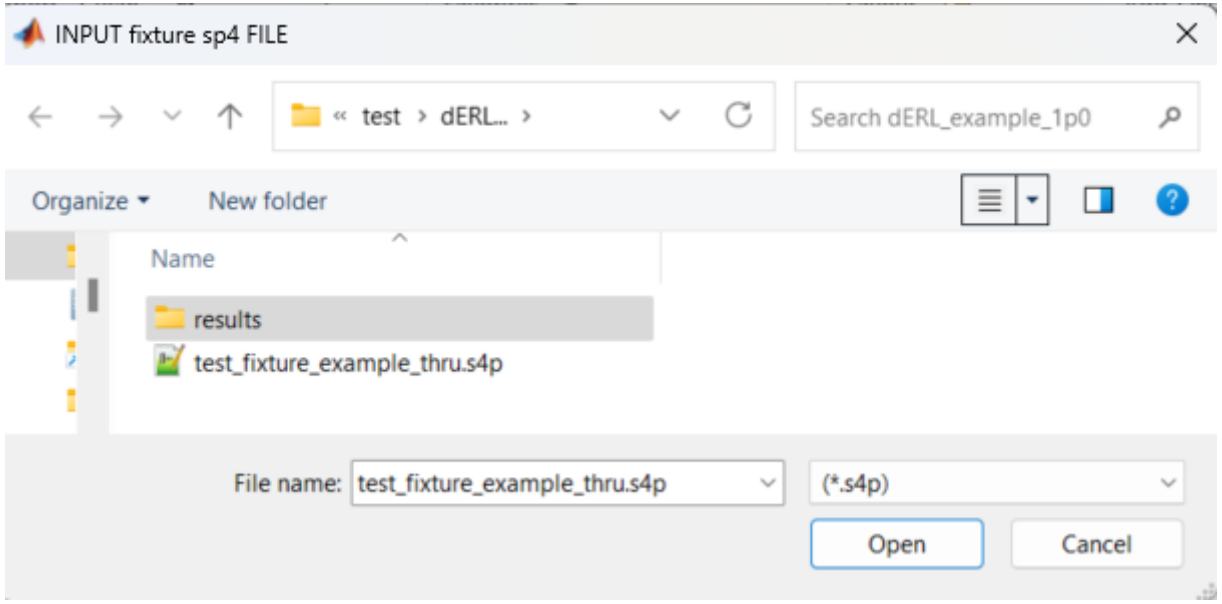
The config file is provided by the user

>> dERL_example_1p0
Enter config XLS file (Enter opens dialog):



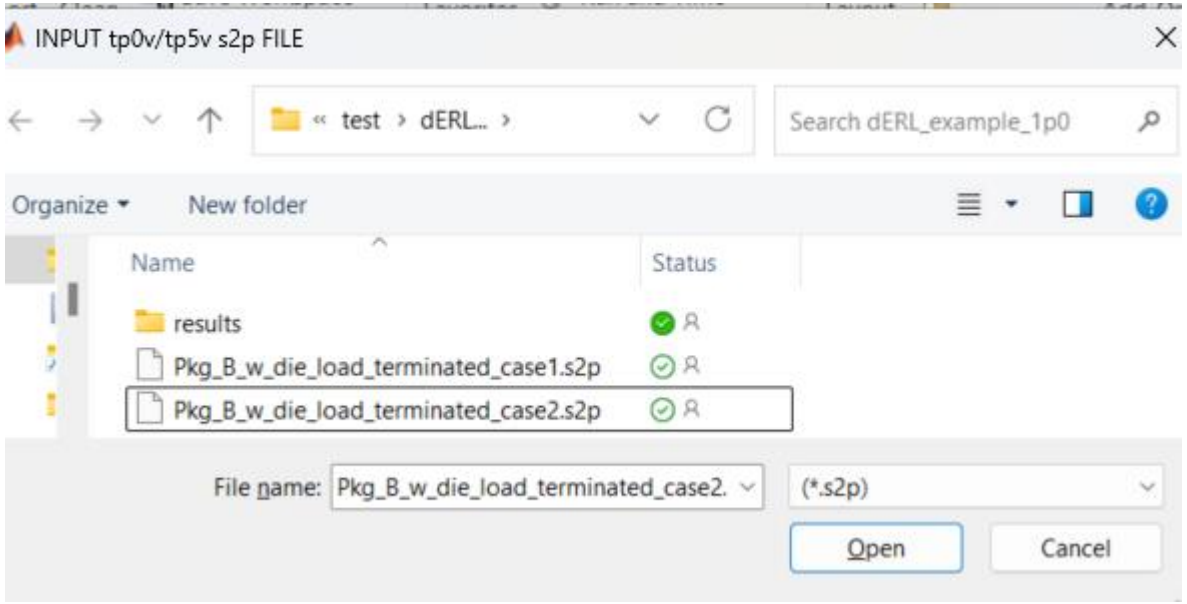
The dialog asks for a test fixture measurement

>> dERL_example_1p0
Enter config XLS file (Enter opens dialog):
Enter measured fixture s4p file (Enter opens dialog):



The dialog asks for a s2p (RL_{dd}) measurement

>> dERL_example_1p0
Enter config XLS file (Enter opens dialog):
Enter measured fixture s4p file (Enter opens dialog):
Enter tp0v/tp5v s2pfile (Enter opens dialog, 0 to skip):



Enter package selection in the config xlsx file

Not the package length

```
>> dERL_example_1p0
Enter config XLS file (Enter opens dialog):
Enter measured fixture s4p file (Enter opens dialog):
Enter tp0v/tp5v s2pfile (Enter opens dialog, 0 to skip):
Enter z_p_select (usually 1,2,3 or 4): 4
```

COM code will run twice

First run determines Tfx, ERL_ref, Vf_ref, and Pmax_by_Vf (rPeak_ref)

```
Vref_rpeak_Tfx__MEAS dERL_example_1p0--test_fixture_example_thru    Causality correction = -33.6 dB (not applied)
Vref_rpeak_Tfx__MEAS dERL_example_1p0--test_fixture_example_thru    Truncation ratio = -Inf dB
FOM:               -7.3 dB
TXFFE coefficients: 1
SNR ISI:              3.4 dB
CTLE DC gain:       0 dB
CTF peaking gain:  -8.1e-06 dB
Symbol Available signal:   0.03191
SCMR_CH =  Inf dB
 Die to die loss = 23.9159 dB
run time = 0.480498 min
SCMR_CH =  Inf dB
WC All cases  PASS ... COM = -16.659 dB
WC All cases DER = 3.280e-142 at COM threshold
WC All cases:  PASS ... ERL = 20.256 dB (NaN dB, 20.256 dB)
ERL11 CD DC CC = [Inf Inf 13.07] dB    ERL22 CD DC CC = [Inf Inf 36.14] dB
 redo string is: eval(['My_var_0 = ' getappdata(0,'cmd_str')])
 IGNORE COM and ERL pass/fail results

tfx_str =

    '1.0882352941e-09'
```

2nd COM run used to determine dERL

ERL of measurement and computed and a report is generated

```
run time = 0.0875022 min
WC All cases:  PASS ... ERL = 20.202 dB (20.202 dB, NaN dB)
ERL11 CD DC CC = [Inf Inf 20.25] dB    ERL22 CD DC CC = [  ] dB
 redo string is: eval(['My_var_0 = ' getappdata(0,'cmd_str')])
 IGNORE COM and ERL pass/fail results

  Results ...
     passing dERL = -0.0535
     V_f Ref mV  = 389.7
     Vpeak/Vf Ref= 0.246

ans =

  struct with fields:

          ERL_s2p: 20.2021
             dERL: -0.0535
          ERL_ref: 20.2556
           Vf_ref: 389.7209
    Pmax_by_Vf_ref: 0.2456 (r_peak_ref)
```

Note that dVf and dr_peak are not computed here and are performed outside of this example.

Summary

- The Matlab code “dERL_example_1p0” reports dERL, V_f_ref, and r_{peak}_ref for one package case in a specified configuration file.
- Changes made to the COM code to correctly compute V_f and r_{peak}

Thank You!