

COM Commit Request 4p11_2: Modal ERL

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

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Purpose for Commit Request

- ❑ Follow on to D2.1 Comments 253, 254, 255, 256, 257, 258, 259, 261, 262, 264, 265, 266, 267, and 268 to produce Modal ERL data
- ❑ Also see
https://www.ieee802.org/3/dj/public/adhoc/electrical/25_0828/mellitz_3dj_adhoc_01a_250828.pdf
- ❑ Branch: Modal ERL based on Re-normalization branch
- ❑ Example code: (will be removed upon merge complete)
 - [https://opensource.ieee.org/richard.mellitz/com_code/-/raw/Modal ERL/release/com_ieee8023_4p12p0 Modal ERL.m?ref_type=heads&inline=false](https://opensource.ieee.org/richard.mellitz/com_code/-/raw/Modal%20ERL/release/com_ieee8023_4p12p0 Modal%20ERL.m?ref_type=heads&inline=false)

Navigate to Richard_Mellitz/com_code

First step to review changes of a branch to the last release

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C Richard Mellitz / com_code 🌐 Owner
Workspace for Rich's COM development

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com_code

Checking changes of a branch to the last release

IEEE SA OPEN

Richard Mellitz / com_code / Repository / Branches

Overview Active Stale All

Filter by branch name View branch rules New branch

Active branches

Modal_ERL
387468b7 · Removing an extra end statements · 2 days ago

Re-normalization
cd8871cd · Correcting adding the resistance die termination with

Replace_SDDii_w_ERL_spec
3f019e31 · Merge branch com_code:main into Replace_SDDii_w_ERL_spec · 5 days ago

Modal_VTF
d09c4781 · Merge branch com_code:main into Modal_VTF · 5 days ago

CC
892fbd1e · Merge branch com_code:main into CC · 5 days ago

Show more active branches

Use drop down in the 3 dots pulldown for Modal_ERL and select compare. Selecting bring up the compare screen

0 21 802-co... New Download

0 6 802-co... New Download

0 4 New New Download

0 4 New New Download

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Code updates

❑ 13 .m files changed from branch Re-normalization

1. src/SL.m
2. src/TDR_ERL_Processing.m
3. src/add_pkg_with_die.m
4. src/end_display_control.m
5. src/get_TDR.m
6. src/plot_modal.m
7. src/process_sxp.m
8. src/read_Nport_touchstone.m
9. src/read_ParamConfigFile.m
10. src/read_p2_s2params.m
11. src/read_p4_s4params.m
12. src/read_s4p_files.m
13. src/s21_pkg.m

Summary of code changes page 1

File	Change description
src/SL.m	Add R_0 to call SL instead of using 100 ohms for differential impedance. SL adds series or parallel resistance to adjust die terminations. Only used with TDR_W_TXPKG keyword
src/TDR_ERL_Processing.m	Added outputs for modal ERL
src/add_pkg_with_die.m	Only used with TDR_W_TXPKG keyword. Attempt to add common mode die termination. R_0 and Z_t need to be the same.
src/end_display_control.m	Add ERL modal data to print terminal output
src/get_TDR.m	Pass Z_t in. Changed RL parameter from sdd to S. This means ERL maybe computed for any pass RL include the modal ones.
src/plot_modal.m	New m file. Modal S-parameter of victim file plotted
src/process_sxp.m	Package is only added to a DD mode RL. Model ERL return NAN if R_0 not the same as Z_t. Call added to get_TDR for each model and return modal ERL's. TDR and ERL plot now use the TIME_AXIS keyword;
src/read_Nport_touchstone.m	Warning for impedance re-normalization changed to an INFO for terminal output.

Summary of code changes page 2

File	Change description
src/read_ParamConfigFile.m	Allows keyword flim to be specified in GHz
src/read_p2_s2params.m	Added SCC output to function
src/read_p4_s4params.m	Added SCC output to function. Pass through to add param.Z0 to read to read_Nport_touchstone function call
src/read_s4p_files.m	Pass through to add param.Z0 to read to read_Nport_touchstone function call: Change terminal output from warning to INFO when stop frequency is < Fb and Zero_pad is not set. If zero_pad is set no output is generated.
src/s21_pkg.m	Adjust for channel impedance R_0 (param.Z0)

New or changed keywords

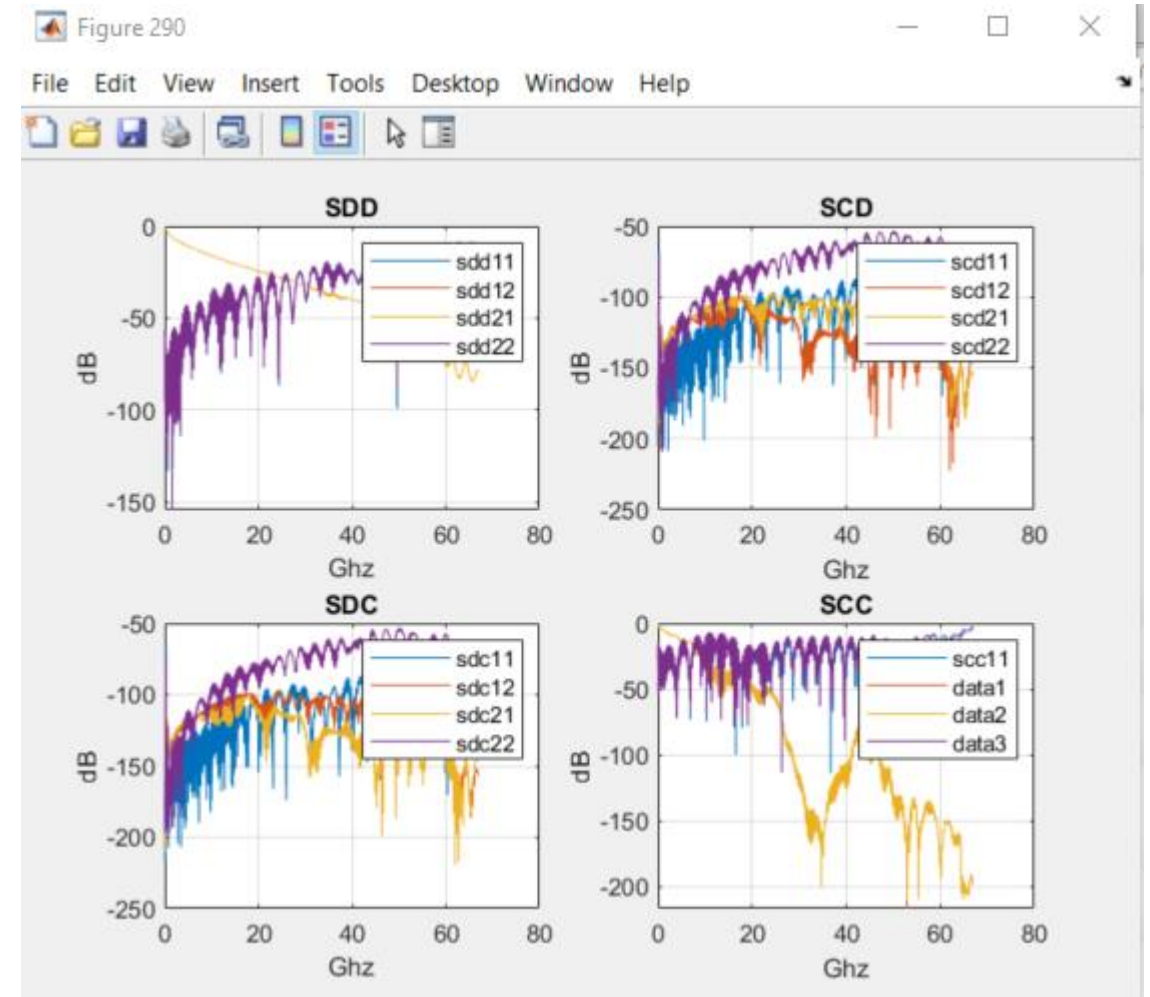
- ❑ Flim may be specified in GHz
- ❑ Time_Axis ('ns" or "ui") keyword is used for TDR plots.

Modified Outputs

- ❑ Modal S-parameter of victim file plotted
new m file: plot_modal.m

- ❑ 6 new outputs

ERL11		12.7654
ERL11_CD		46.7448
ERL11_DC		46.7448
ERL11_CC		4.2863
ERL22		12.7466
ERL22_CD		33.7649
ERL22_DC		33.7649
ERL22_CC		4.1158



Modified Terminal Report

❑ Modal ERL's added to terminal output

```
WC All cases PASS ... COM = 4.233 dB
```

```
WC All cases DER = 3.137e-04 at COM threshold
```

```
WC All cases: PASS ... ERL = 12.747 dB (12.765 dB, 12.747 dB)
```

```
ERL11 CD DC CC = [46.74 46.74 4.286] dB    ERL22 CD DC CC = [33.76 33.76 4.116] dB
```

```
redo string is: eval(['My_var_0 = ' getappdata(0,'cmd_str')])
```

Summary

- ❑ Modal ERLs computed and reported
- ❑ It is recommended to make R_0 and Z_t the same.

Thank You!