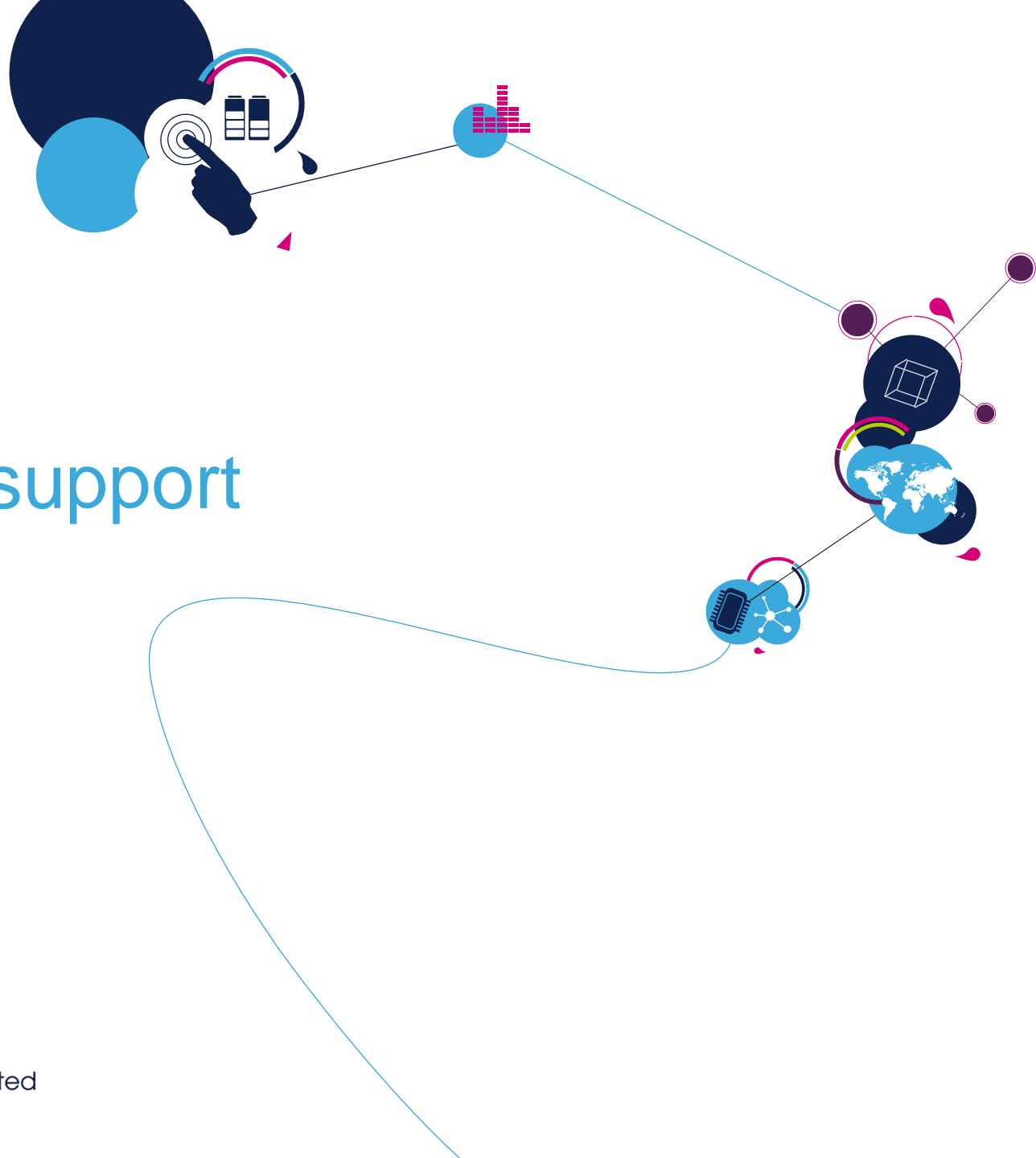


Voltus-FI support

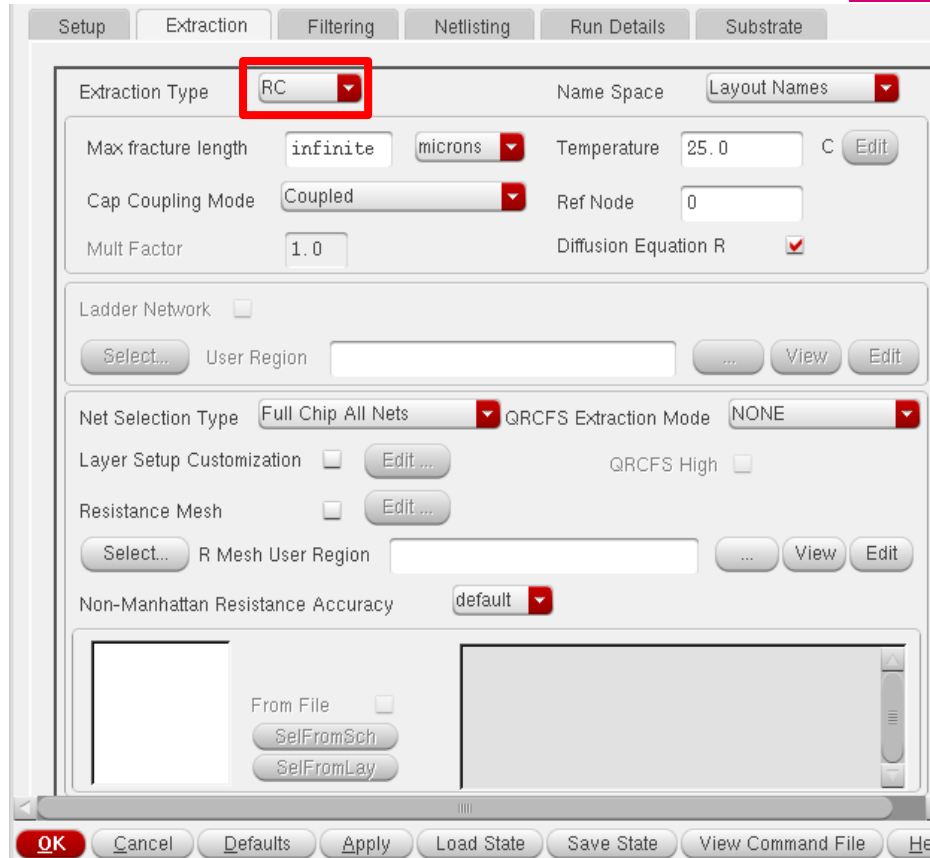
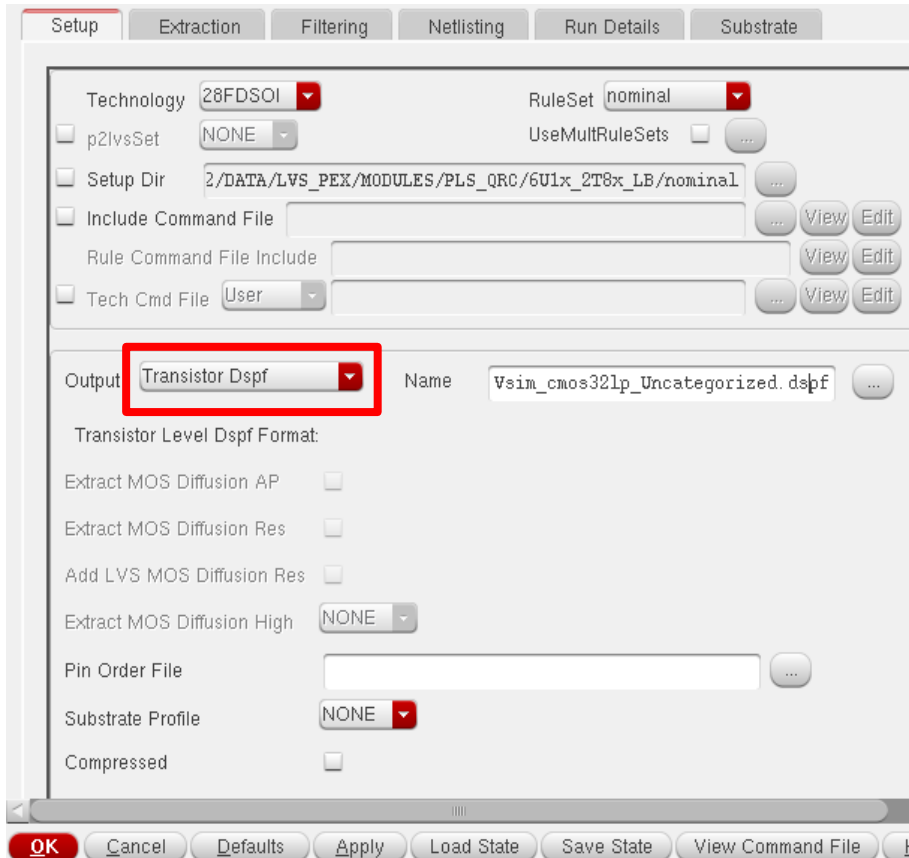


Agenda

- **QRC configuration**
- Format needed for the DSPF
- Step by step quick kick off using Voltus-Fi

QRC setup for voltus

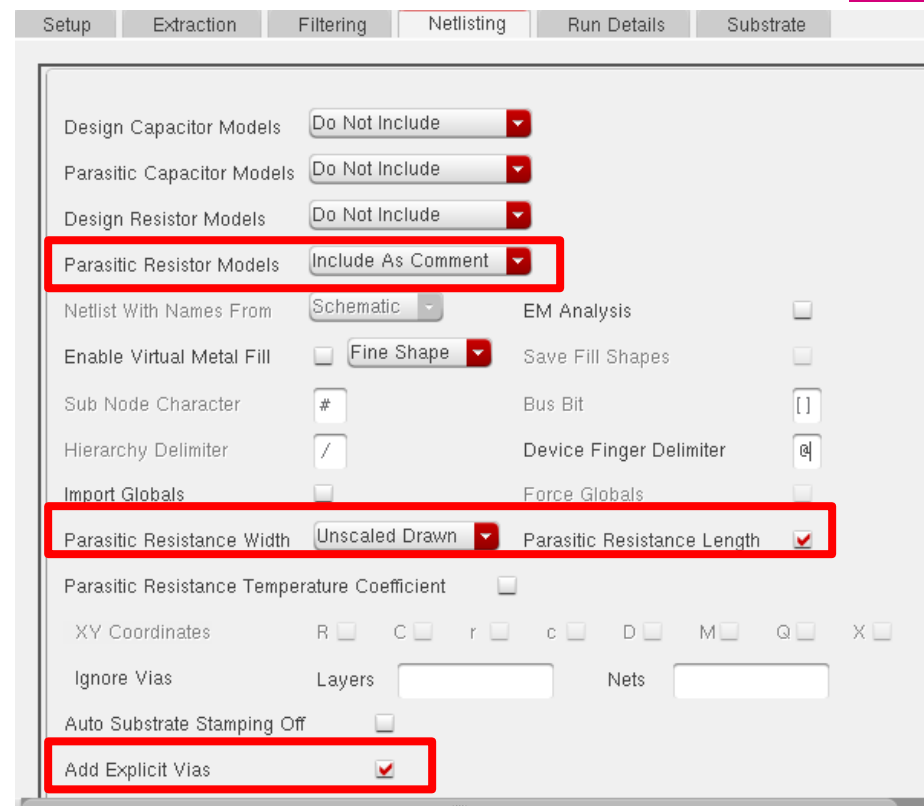
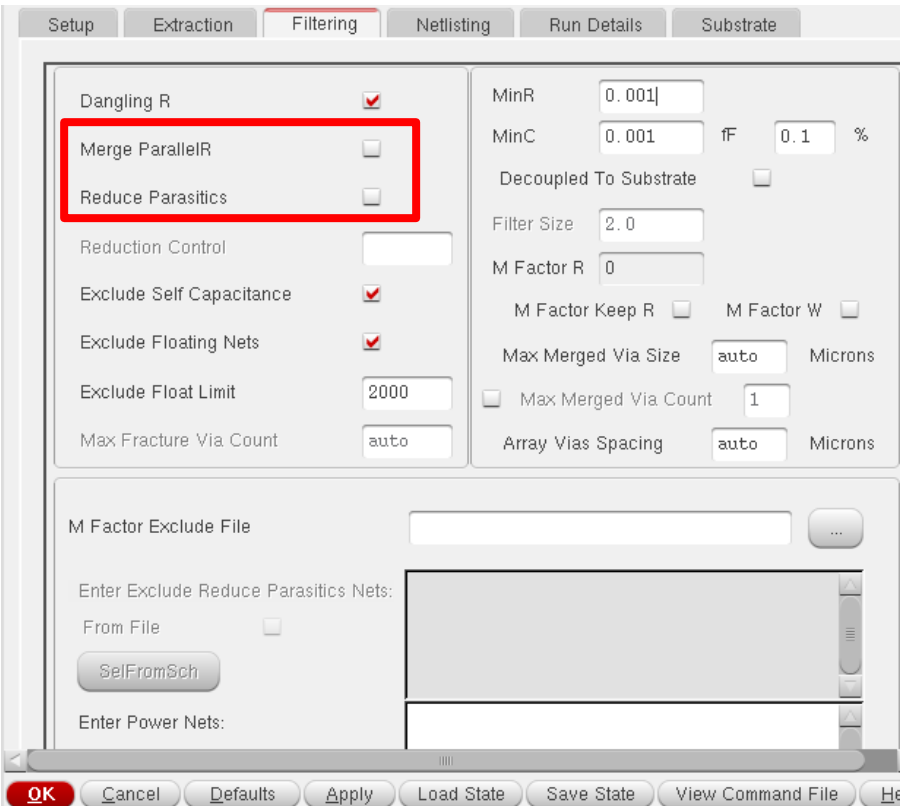
3



- Setup tab: Select 'transistor DSPF' output
- Extraction tab: Extraction must be performed at least on 'R' network.

QRC setup for voltus

4



- Filtering tab: Remove 'Merge parallel R' and 'Reduce parasitics' options
- Netlisting tab:
 - 'Parasitic resistor model' must be included as comment.
 - Parasitic resistance length must be extracted
 - parasitic resistance width must be extracted as 'unscaled drawn'
 - Add explicit vias.

Agenda

- QRC configuration
- **Format needed for the DSPF**
- Step by step quick kick off using Voltus-Fi

DSPF format

- Previous QRC options will extract a correct DSPF file for voltus
- You can check that the DSPF includes for each parasitic elements:
 - Layer names (as comment)
 - Width (or Area for vias)
 - Length
 - Add explicit via

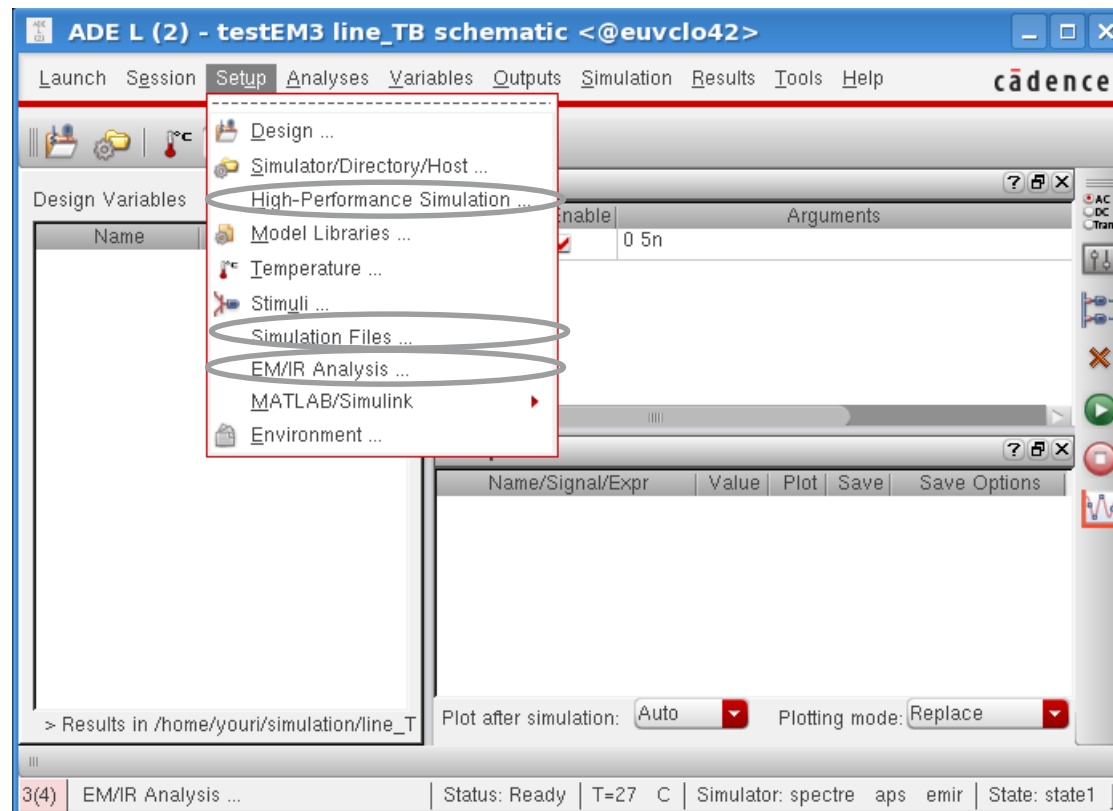
```
*[NET VPLUS_EGOSC 1.04551e-13
*[P (VPLUS_EGOSC X 0 -16.34000 558.95000)
*[I (X1_ummached#neg X1_ummached neg X 0 0.07500 575.28000)
*[I (X4_ummached#neg X4_ummached neg X 0 13.07500 575.28000)
*[I (X6_ummached#neg X6_ummached neg X 0 26.07500 575.28000)
[*]S (VPLUS_EGOSC#4 -2.29000 573.00000)
[*]S (VPLUS_EGOSC#17 23.71000 573.00000)
[*]S (VPLUS_EGOSC#19 23.71000 572.90000)
C981 VPLUS_EGOSC#48 NET5_EGOSC#24 4.09496e-18
C982 VPLUS_EGOSC#44 XTP3_EGOSC#d 3.70976e-16
C983 VPLUS_EGOSC#41 NET3_EGOSC#37 9.88762e-18
C984 VPLUS_EGOSC#41 NET4_EGOSC#38 1.21792e-17
C985 VPLUS_EGOSC#48 NET4_EGOSC#28 4.09496e-18
C986 VPLUS_EGOSC#48 XTP1_EGOSC#d 4.09496e-18
C987 VPLUS_EGOSC#45 XTP2_EGOSC#d 3.70976e-16
C988 VPLUS_EGOSC#43 NET4_EGOSC#28 3.70976e-16
C989 VPLUS_EGOSC#41 NET1_EGOSC#34 9.88762e-18
C990 VPLUS_EGOSC#48 XTP0_EGOSC#d 4.09496e-18
C991 VPLUS_EGOSC#41 NET3_EGOSC#34 9.88762e-18
C992 VPLUS_EGOSC#42 NET5_EGOSC#30 3.45305e-16
C993 VPLUS_EGOSC#41 NET2_EGOSC#37 9.88762e-18
C994 VPLUS_EGOSC#46 XTP1_EGOSC#d 3.70976e-16
Rk259 VPLUS_EGOSC#5 VPLUS_EGOSC#9 2.023950 $M1 $L=16.737749 $W=1.8
Rk260 VPLUS_EGOSC#5 VPLUS_EGOSC#7 0.010883 $M1 $L=0.09 $W=1.8
Rk261 VPLUS_EGOSC#11 VPLUS_EGOSC#15 2.023950 $M1 $L=16.737749 $W=1.8
Rk262 VPLUS_EGOSC#11 VPLUS_EGOSC#13 0.010883 $M1 $L=0.09 $W=1.8
Rk263 VPLUS_EGOSC#17 VPLUS_EGOSC#21 2.023950 $M1 $L=16.737749 $W=1.8
Rk264 VPLUS_EGOSC#17 VPLUS_EGOSC#19 0.010883 $M1 $L=0.09 $W=1.8
Rk265 VPLUS_EGOSC#23 VPLUS_EGOSC#27 2.023950 $M1 $L=16.737749 $W=1.8
Rk266 VPLUS_EGOSC#23 VPLUS_EGOSC#25 0.010883 $M1 $L=0.09 $W=1.8
Rk267 VPLUS_EGOSC#29 VPLUS_EGOSC#33 2.023950 $M1 $L=16.737749 $W=1.8
Rk268 VPLUS_EGOSC#29 VPLUS_EGOSC#31 0.010883 $M1 $L=0.09 $W=1.8
Rk269 VPLUS_EGOSC#35 VPLUS_EGOSC#39 2.023950 $M1 $L=16.737749 $W=1.8
Rk270 VPLUS_EGOSC#35 VPLUS_EGOSC#37 0.010883 $M1 $L=0.09 $W=1.8
Rk271 VPLUS_EGOSC#41 VPLUS_EGOSC 0.020748 $M1 $L=1.79991 $W=83.160004
Rk272 VPLUS_EGOSC#40 VPLUS_EGOSC#41 1.645555 $M1 $L=27.594 $W=3.6
Rj273 VPLUS_EGOSC#42 VPLUS_EGOSC#43 0.547880 $M2 $L=9 $W=3.6
Rj274 VPLUS_EGOSC#43 VPLUS_EGOSC#44 0.712244 $M2 $L=11.7 $W=3.6
Rj275 VPLUS_EGOSC#44 VPLUS_EGOSC#45 0.712244 $M2 $L=11.7 $W=3.6
Rj276 VPLUS_EGOSC#45 VPLUS_EGOSC#46 0.712244 $M2 $L=11.7 $W=3.6
Rj277 VPLUS_EGOSC#47 VPLUS_EGOSC#48 0.767032 $M2 $L=12.6 $W=3.6
Rj278 VPLUS_EGOSC#46 VPLUS_EGOSC#47 0.712244 $M2 $L=11.7 $W=3.6
Rm279 VPLUS_EGOSC#40 VPLUS_EGOSC#48 9.990000 $V1 viaDG $A=0.002025
Rm280 VPLUS_EGOSC#39 VPLUS_EGOSC#42 9.990000 $V1 viaDG $A=0.002025
Rm281 VPLUS_EGOSC#33 VPLUS_EGOSC#43 9.990000 $V1 viaDG $A=0.002025
Rm282 VPLUS_EGOSC#27 VPLUS_EGOSC#44 9.990000 $V1 viaDG $A=0.002025
```

Agenda

- QRC configuration
- Format needed for the DSPF
- **Step by step quick kick off using Voltus-Fi**

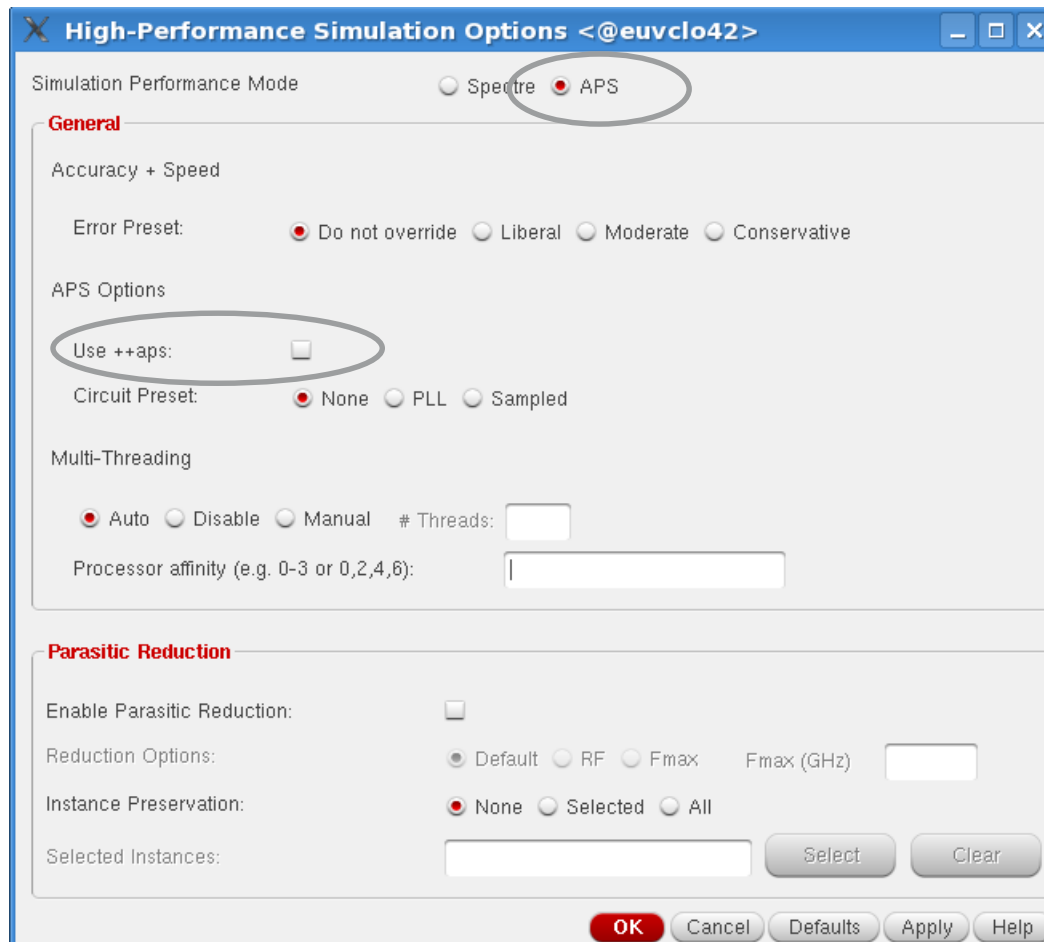
Simulation Settings

- Set APS to have Spectre faster
- Add DSPF file
- Set EMIR configuration



High Performance simulation

- Set APS



The image shows a screenshot of the 'High-Performance Simulation Options' dialog box for a project named '@euvclo42'. The dialog is divided into two main sections: 'General' and 'Parasitic Reduction'. In the 'General' section, the 'Simulation Performance Mode' is set to 'APS' (selected with a red dot) instead of 'Spectre'. Under 'Accuracy + Speed', the 'Error Preset' is 'Do not override'. In the 'APS Options' section, the 'Use ++aps:' checkbox is checked. The 'Circuit Preset' is set to 'None'. Under 'Multi-Threading', 'Auto' is selected for the threading mode, and the '# Threads' field is empty. The 'Processor affinity' field is also empty. In the 'Parasitic Reduction' section, 'Enable Parasitic Reduction' is unchecked. The 'Reduction Options' are set to 'Default'. The 'Instance Preservation' is set to 'None'. The 'Selected Instances' field is empty, with 'Select' and 'Clear' buttons next to it. At the bottom of the dialog are buttons for 'OK', 'Cancel', 'Defaults', 'Apply', and 'Help'.

High-Performance Simulation Options <@euvclo42>

Simulation Performance Mode: ☐ Spectre ☒ APS

General

Accuracy + Speed

Error Preset: ☒ Do not override ☐ Liberal ☐ Moderate ☐ Conservative

APS Options

Use ++aps: ☒

Circuit Preset: ☒ None ☐ PLL ☐ Sampled

Multi-Threading

☒ Auto ☐ Disable ☐ Manual # Threads:

Processor affinity (e.g. 0-3 or 0,2,4,6):

Parasitic Reduction

Enable Parasitic Reduction: ☐

Reduction Options: ☒ Default ☐ RF ☐ Fmax Fmax (GHz)

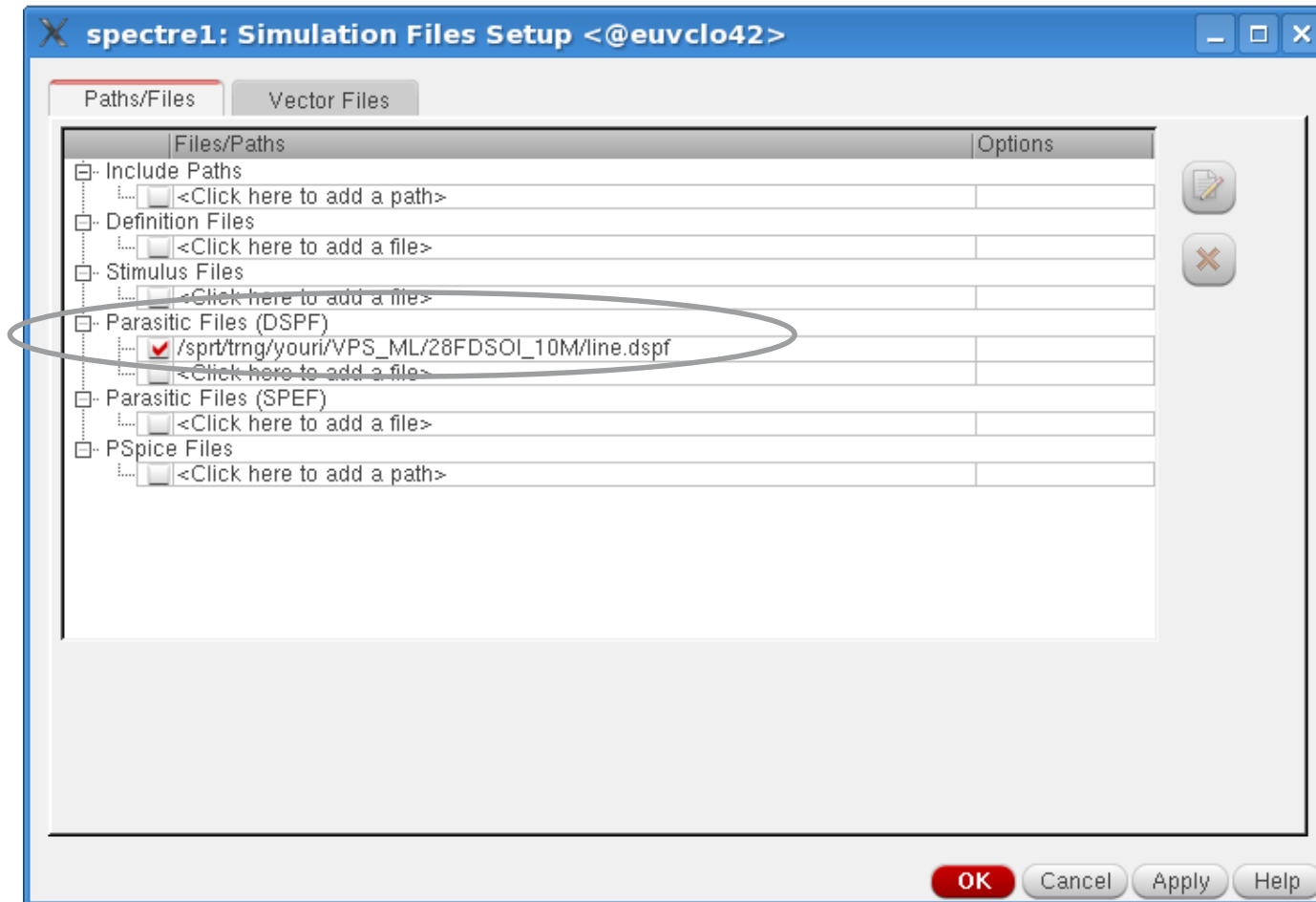
Instance Preservation: ☒ None ☐ Selected ☐ All

Selected Instances:

Company Confidential

Simulation Files setup

- Add DSPF parasitic file



EMIR Analysis setup

spectre0: EM/IR Analysis Setup <@euvclo37>

Analysis Solver Options

Type ☒ Dynamic ☐ Static

Net Selection

Net Name: Select Clear

IR Drop Analysis: ☐ max ☐ avg EM Current Analysis: ☐ max ☐ avg ☐ avgabs ☐ rms

Advanced IR Drop Analysis: ☐ Signal Net IR Drop ☐ Power Gate Add

Emirutil Setup

EM Tech File ...

Layer Map File ...

Summary Information

Options	Value
---------	-------

Import Export Delete Clear

☐ Enable EMIR Analysis in Transient or DC Simulation

OK Cancel Apply Help

- Settings to have the EMIR computation

EMIR setup Analysis tab (1)

spectre0: EM/IR Analysis Setup <@euvclo37>

Analysis Solver Options

Type ☒ Dynamic ☐ Static

Net Selection

Net Name: Select Clear

IR Drop Analysis: ☒ max ☒ avg EM Current Analysis: ☒ max ☒ avg ☐ avgabs ☐ rms

Advanced IR Drop Analysis: ☐ Signal Net IR Drop ☐ Power Gate Add

Emirutil Setup

EM Tech File ...

Layer Map File ...

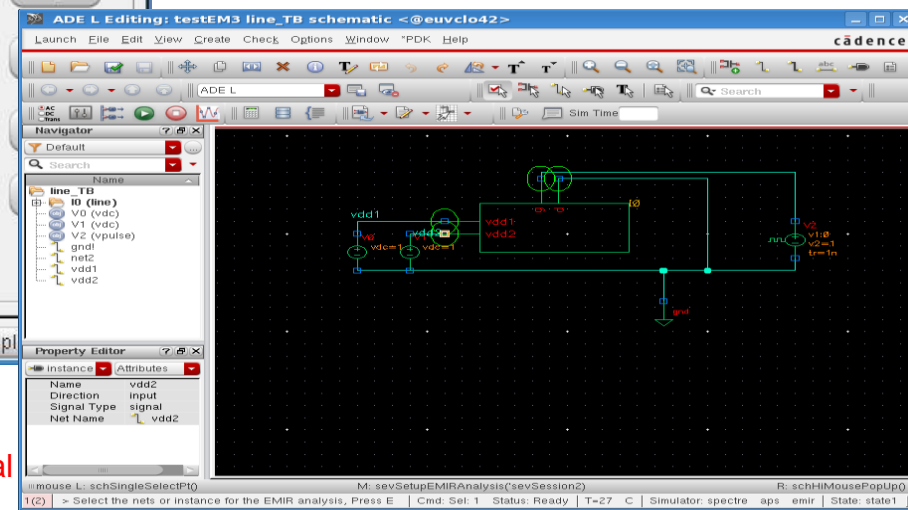
Summary Information

Options	Value
net	name=[I0.vdd2 I0.vdd1] analysis=[vmax vavg lmax lavg]

☒ Enable EMIR Analysis in Transient or DC Simulation

OK Cancel Apply

- Select the nets on which you want computation of EMIR
- Type or "Select" on the schematic (Select the node of the symbol)
- Select the type analysis (lxxx for EM analysis; Vxxx for Irdrop analysis)
- Add the selection, it appears in the Summary information section



EMIR setup Analysis tab (2)

- Select the EM rules file, either from EMdataFile, either qrcTechfile with EM rules)
- Select the Layer Map File (mapping between layer name in DSPF and layer name in ICT)
- Add to the setup by Apply

spectre0: EM/IR Analysis Setup <@euvclo37>

Analysis Solver Options

Type ☒ Dynamic ☐ Static

Net Selection

Net Name: I0.vdd2 I0.vdd1 Select Clear

IR Drop Analysis: ☒ max ☒ avg EM Current Analysis: ☒ max ☒ avg ☒ avgabs ☒ rms

Advanced IR Drop Analysis: ☐ Signal Net IR Drop ☐ Power Gate Add

Emirutil Setup

EM Tech File les/28lp_6U1x_2U2x_2T8x_LB_FDSOI_nominal_detailed_EM_ict ...

Layer Map File /trng/yourri/VPS_ML/28FDSOI_10M/EM_techfiles/layerMapfile ...

Summary Information

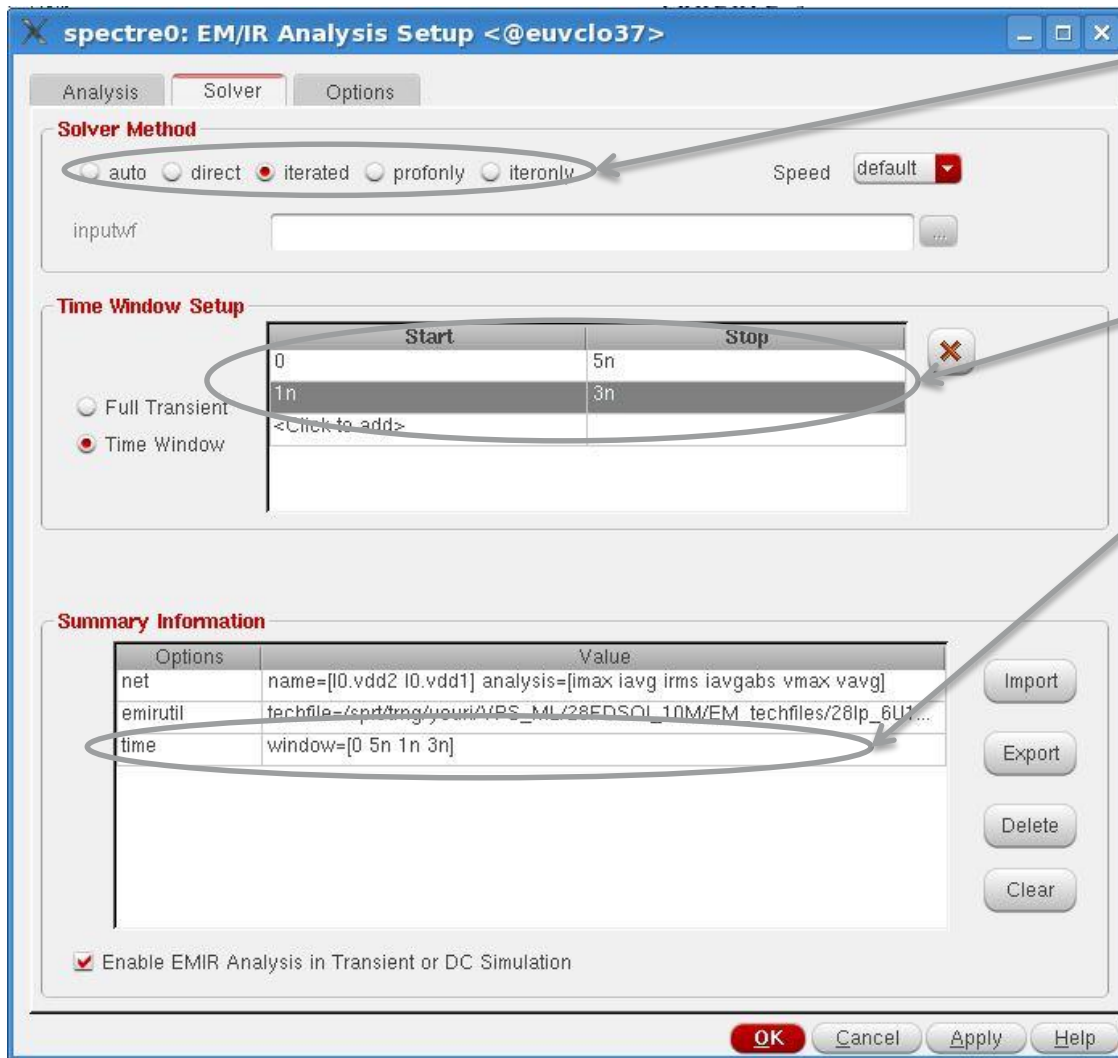
Options	Value
net	name=[I0.vdd2 I0.vdd1] analysis=[imax iavg irms iavgabs vmax vavg]
emirutil	layermapfile=/sprt/trng/yourri/VPS_ML/28FDSOI_10M/EM_techfiles/layer...
emirutil	techfile=/sprt/trng/yourri/VPS_ML/28FDSOI_10M/EM_techfiles/28lp_6U1...

☒ Enable EMIR Analysis in Transient or DC Simulation

Import Export Delete Clear

OK Cancel Apply Help

EMIR setup Solver tab



- Select the Method of Solving, Direct or Iterated (all in one resolution or resolution in 2 steps)
- Select the time window of analysis calculation (default is the Full transient window)
- Add to the setup

EMIR setup Options tab

spectre0: EM/IR Analysis Setup <@euvclo37>

Analysis Solver **Options**

Options

Advanced Option: report ☒ html ☒ text

Additional Option: Additional Value: Add

DSPF File Checking

DSPF File: /sprt/trng/your/VPS_ML/28FDSOI_10M/line.dspf ...

Options: Run

Summary Information

Options	Value
net	name=[I0.vdd2 I0.vdd1] analysis=[imax iavg irms iavgabs vmax vavg]
emirutil	techfile=/sprt/trng/your/VPS_ML/28FDSOI_10M/EM_techfiles/28lp_6U1...
time	window=[0.5n 1n 3n]
spf	aliasterm = "egnfet 1=d 2=g 3=s"

Import Export Delete Clear

☒ Enable EMIR Analysis in Transient or DC Simulation

OK Cancel Apply Help

- Several options are available here such as the type of report created
- The DSPF checker, checks the validity of the DSPF syntax respect to EMIR analysis. Indeed for EMIR computation, parasitics must contains layer, length and width definition.
- This checks also the pin order of devices in the dspf

EMIR setup Options tab (2)

- DSPF checker output log

```

/sprt/trng/your/VPS_ML/28FDSOI_10M/line.dspf.chklog <@euvclo42>
File Edit View Help
cadence

*****
*
*  spfchecker  version 13.1.0 64bit 01/19/2014 10:33 (sjfnl843)
*  sub-version 13.1.0.144
*  MMSIM Standard Parasitic Format Checker
*  Copyright(C) 2006-2013, Cadence Design Systems, Inc.
*
*****

Current Working Dir: /sprt/trng/your/VPS_ML/28FDSOI_10M
Command Line Input: /sprt/sw/linux86/mmsim13i_isr4_17-01-2014/tools/emir/bin/64bit/spfchecker /sprt/trng/your/

SPFCheker started at: Fri Mar 21 10:30:51 2014

Connecting to License Server ... Done.
Successful checkout of Virtuoso_Spectre license with total wait time of 0 sec.

Check File: /sprt/trng/your/VPS_ML/28FDSOI_10M/line.dspf

Reading /sprt/trng/your/VPS_ML/28FDSOI_10M/line.dspf ...
(line 15) .SUBCKT line
0 : g
1 : d
2 : vdd2
3 : vdd1

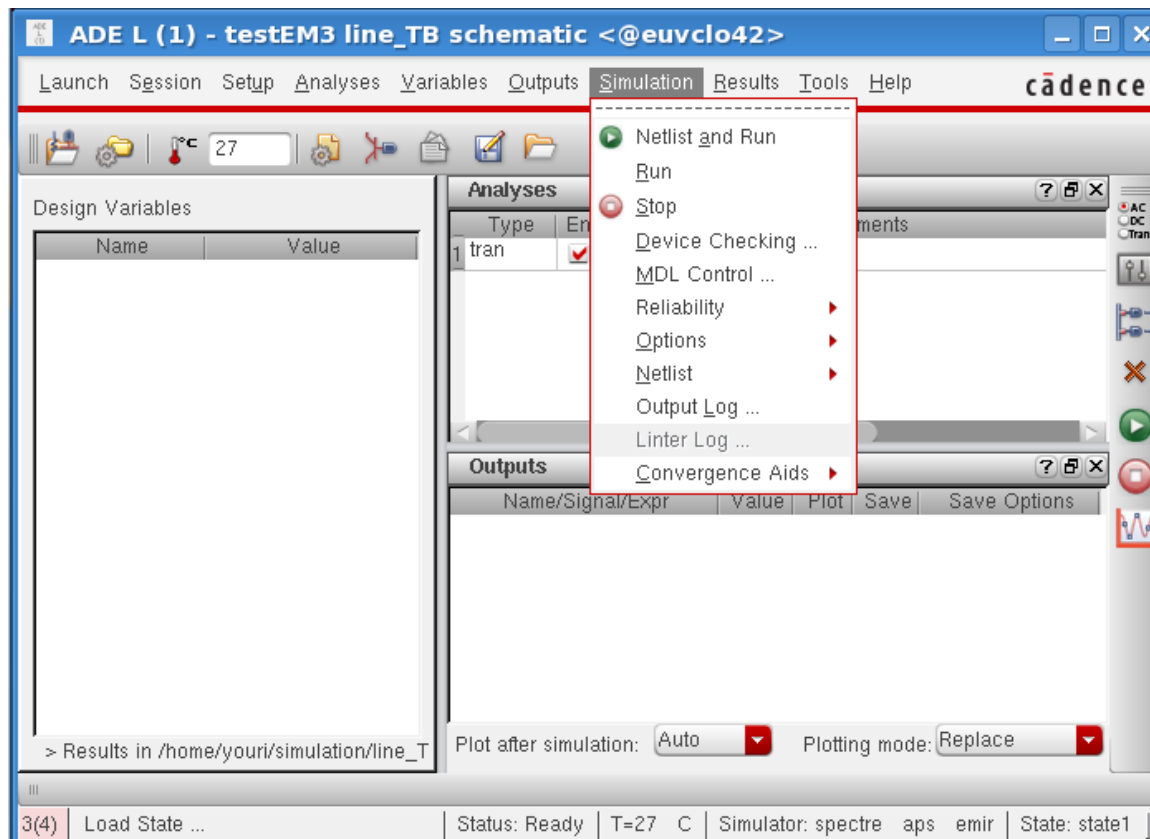
*** In NET "g"(line 21) ***:
Line 28: rn_1_1 g#1 XX65/M0#g 5.409109 : missing length/width.
Line 29: rn_1_2 XX65/M0#g g#3 5.409109 : missing length/width.
Line 30: rn_1_3 g#4 XX64/M0#g 5.409109 : missing length/width.
Line 31: rn4 g#1 g 0.633320 : missing length/width.
Line 32: rn5 g#3 g#4 5316.566406 : missing length/width.
NET Inventory:
Element      :      Number      Min Value      Max Value
Resistor     :              5      0.63332      5316.6
Capacitor    :              0
CCap         :              0
Subnode      :              5
---
SPF-0011(line 21): In NET "g" 5 resistor(s) have incomplete physical information ($l=... $w=... $lvl=...).

*** In NET "d"(line 34) ***:
Line 80: ro6 XX65/M0#d d#7 7.032816 : missing length/width.
Line 81: ro7 XX65/M0#d d#8 7.032816 : missing length/width.
Line 82: ro8 XX65/M0#d d#10 7.032816 : missing length/width.
Line 83: ro9 XX65/M0#d d#9 7.032816 : missing length/width.
Line 84: ro10 XX65/M0#d d#6 7.032816 : missing length/width.
Line 85: ro11 XX65/M0#d d#2 7.032816 : missing length/width.
Line 86: ro12 XX65/M0#d d#1 7.032816 : missing length/width.
Line 87: ro13 XX65/M0#d d#3 7.032816 : missing length/width.
Line 88: ro14 XX65/M0#d d#5 7.032816 : missing length/width.
Line 89: ro15 XX65/M0#d d#4 7.032816 : missing length/width.
Line 90: ro16 XX64/M0#d d#18 7.032816 : missing length/width.
Line 91: ro17 XX64/M0#d d#19 7.032816 : missing length/width.
Line 92: ro18 XX64/M0#d d#21 7.032816 : missing length/width.
Line 93: ro19 XX64/M0#d d#20 7.032816 : missing length/width.
Line 94: ro20 XX64/M0#d d#17 7.032816 : missing length/width.
Line 95: ro21 XX64/M0#d d#13 7.032816 : missing length/width.
Line 96: ro22 XX64/M0#d d#12 7.032816 : missing length/width.

```

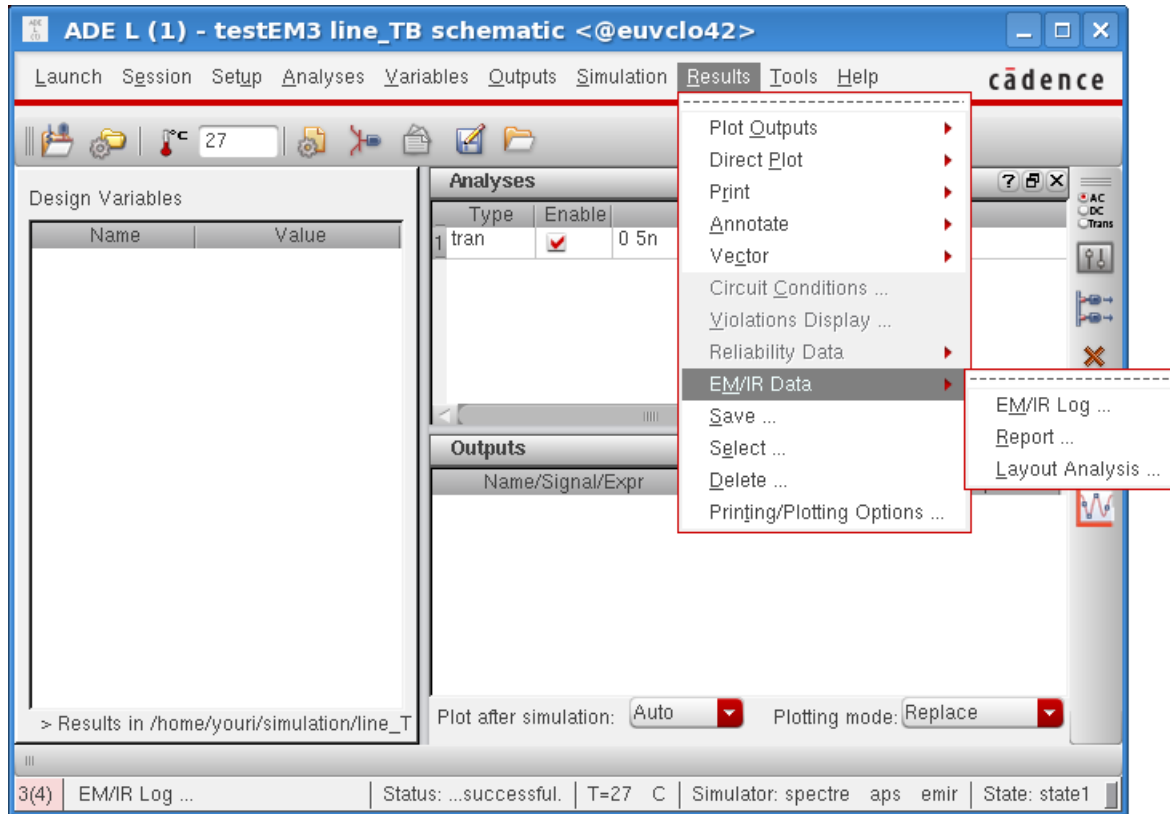

Simulation

- Netlist and Run
- Check logs



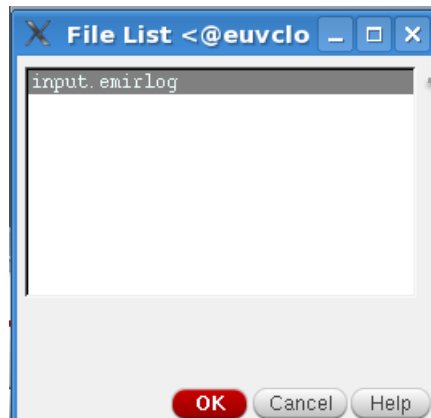
EMIR results

- In Results menu, EMIR Data shows several sub-menu



EMIR results (1)

- EMIR run log
- This log report the EMIR computation and gives information about what wrong or not during computation



```
/home/your/simulation/line_TB/spectre/schematic/psf/input.emirtap.emirlog <@euvclo42>
File Edit View Help
cadence

*WARN:EMIR-5*:cannot find via resistance for via layer: v2_viadg. EMIR analysis: all EM analyses are skipped for rcc218.
Pin current report /home/your/simulation/line_TB/spectre/schematic/netlist/./psf/input.emirtap.rpt_pin created.
Pin current HTML report /home/your/simulation/line_TB/spectre/schematic/netlist/./psf/input.emirtap.rpt_pin.html created.

Completed processing EM/IR data up to:60 %

Completed processing EM/IR data up to:70 %

Completed processing EM/IR data up to:80 %

Completed processing EM/IR data up to:90 %

*WARN:EMIR-5*:cannot find via resistance for via layer: v1_viadg. EMIR analysis: all EM analyses are skipped for rpb295.
*WARN:EMIR-5*:cannot find via resistance for via layer: v1_viadg. EMIR analysis: all EM analyses are skipped for rpb296.
*WARN:EMIR-5*:cannot find via resistance for via layer: v1_viadg. EMIR analysis: all EM analyses are skipped for rpb297.
*WARN:EMIR-5*:cannot find via resistance for via layer: v1_viadg. EMIR analysis: all EM analyses are skipped for rpb298.
*WARN:EMIR-5*:cannot find via resistance for via layer: v2_viadg. EMIR analysis: all EM analyses are skipped for rkb299.
*WARN:EMIR-5*:cannot find via resistance for via layer: v2_viadg. EMIR analysis: all EM analyses are skipped for rfb301.
*WARN:EMIR-5*:cannot find via resistance for via layer: v3_viadg. EMIR analysis: all EM analyses are skipped for rfb302.
*WARN:EMIR-5*:cannot find via resistance for via layer: v3_viadg. EMIR analysis: all EM analyses are skipped for rfb303.
*WARN:EMIR-5*:cannot find via resistance for via layer: v3_viadg. EMIR analysis: all EM analyses are skipped for rfb304.
*WARN:EMIR-5*:cannot find via resistance for via layer: v4_viadg. EMIR analysis: all EM analyses are skipped for rab305.
*WARN:EMIR-5*:cannot find via resistance for via layer: v4_viadg. EMIR analysis: all EM analyses are skipped for rab306.
*WARN:EMIR-5*:cannot find via resistance for via layer: v5_viadg. EMIR analysis: all EM analyses are skipped for roc307.
*WARN:EMIR-5*:cannot find via resistance for via layer: v5_viadg. EMIR analysis: all EM analyses are skipped for roc308.
*WARN:EMIR-5*:cannot find via resistance for via layer: v5_viadg. EMIR analysis: all EM analyses are skipped for roc309.
*WARN:EMIR-5*:cannot find via resistance for via layer: v5_viadg. EMIR analysis: all EM analyses are skipped for roc310.
*WARN:EMIR-5*:cannot find via resistance for via layer: vv_viadg. EMIR analysis: all EM analyses are skipped for rr311.
*WARN:EMIR-5*:cannot find via resistance for via layer: vv_viadg. EMIR analysis: all EM analyses are skipped for rr312.

Note: the same type of warning message, EMIR-5, will no longer be printed. To see more warnings, please change warning limit

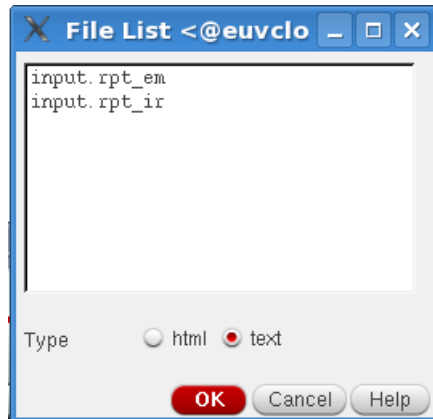
Completed processing EM/IR data up to:100 %

text IR report successfully generated.
text EM report successfully generated.
text PIN current report successfully generated.
HTML IR report successfully generated.
HTML EM report successfully generated.
HTML PIN current report successfully generated.

Note, found 339 warning messages, and 151 warnings printed.
```

EMIR results (2)

- EMIR reports IRdrop



The main window is a Cadence EMIR results viewer. It displays "VOLTAGE DROP RESULTS" for a simulation. The window title is "/home/your/simulation/line_TB/spectre/schematic/psf/input.rpt_ir <@euvclo". The menu bar includes File, Edit, View, and Help. The status bar at the bottom shows "11" and "L1 C1".

Metadata:

```
VOLTAGE DROP RESULTS
VERSION = 1
BINARY FILE = /home/your/simulation/line_TB/spectre/schematic/netlist/./psf/input.emir
RESULTS FILE CREATED = Fri Mar 21 10:54:29 2014
USER SUPPLIED VALUES:
  RESULTS TYPE = TRANSIENT
  TRANSIENT START = 0
  TRANSIENT STOP = 5e-09
  SIM TEMPERATURE = 27 C
  AVERAGE = t
  PEAK = t
  SIGVMAX = nil
  SIGVAVG = nil
```

----- "vdd2" NET: Vref = 1V -----

max

VOLTAGE-DROP (V)	NETNAME	TIME (s)	LAYER	X (um)	Y (um)
25.482m	XX64/M0#s	1.359n	rx	334.623	-15.843
25.462m	vdd2#82	1.359n	rx	334.561	-15.393
25.462m	vdd2#81	1.359n	rx	334.561	-15.493
25.461m	vdd2#79	1.359n	rx	334.561	-15.593
25.461m	vdd2#80	1.359n	rx	334.561	-15.693
25.461m	vdd2#83	1.359n	rx	334.561	-15.793
25.460m	vdd2#87	1.359n	rx	334.561	-15.893
25.460m	vdd2#85	1.359n	rx	334.561	-16.293
25.460m	vdd2#84	1.359n	rx	334.561	-16.193
25.460m	vdd2#86	1.359n	rx	334.561	-16.093
25.460m	vdd2#88	1.359n	rx	334.561	-15.993
25.173m	vdd2#89	1.359n	m1	334.561	-15.393
25.172m	vdd2#90	1.359n	m1	334.561	-15.493
25.170m	vdd2#91	1.359n	m1	334.561	-15.593
25.166m	vdd2#92	1.359n	m1	334.561	-15.693
25.162m	vdd2#93	1.359n	m1	334.561	-15.793
25.156m	vdd2#94	1.359n	m1	334.561	-15.893
25.155m	vdd2#100	1.359n	m1	334.561	-16.293
25.154m	vdd2#99	1.359n	m1	334.561	-16.193
25.152m	vdd2#98	1.359n	m1	334.561	-16.093
25.147m	vdd2#95	1.359n	m1	334.561	-15.993
24.842m	vdd2#96	1.359n	m1	331.560	-16.000
24.839m	vdd2#97	1.359n	m1	331.535	-16.000
24.539m	vdd2#101	1.359n	m2	331.535	-16.000
24.536m	vdd2#102	1.359n	m2	331.510	-16.000
24.217m	vdd2#103	1.359n	m2	328.510	-16.000

EMIR results (3)

- EMIR reports ElectroMigration

```

/home/your/simulation/line_TB/spectre/schematic/psf/input.rpt_em <@euvclo42>
File Edit View Help
cadence

ELECTROMIGRATION ANALYSIS RESULTS

VERSION = 1
BINARY FILE      = /home/your/simulation/line_TB/spectre/schematic/netlist/./psf/input.emir0_bin
RESULTS FILE CREATED = Fri Mar 21 10:54:29 2014
USER SUPPLIED VALUES:
  RESULTS TYPE      = TRANSIENT
  TRANSIENT START    = 0
  TRANSIENT STOP     = 5e-09
  SIM TEMPERATURE    = 27 C
  AVERAGE           = t
  AVERAGE ABS       = t
  AVERAGE POS       = nil
  ACPEAK            = nil
  CUSTOM            = nil
  RMS               = t
  PEAK              = t

----- NET "vdd2" -----
max

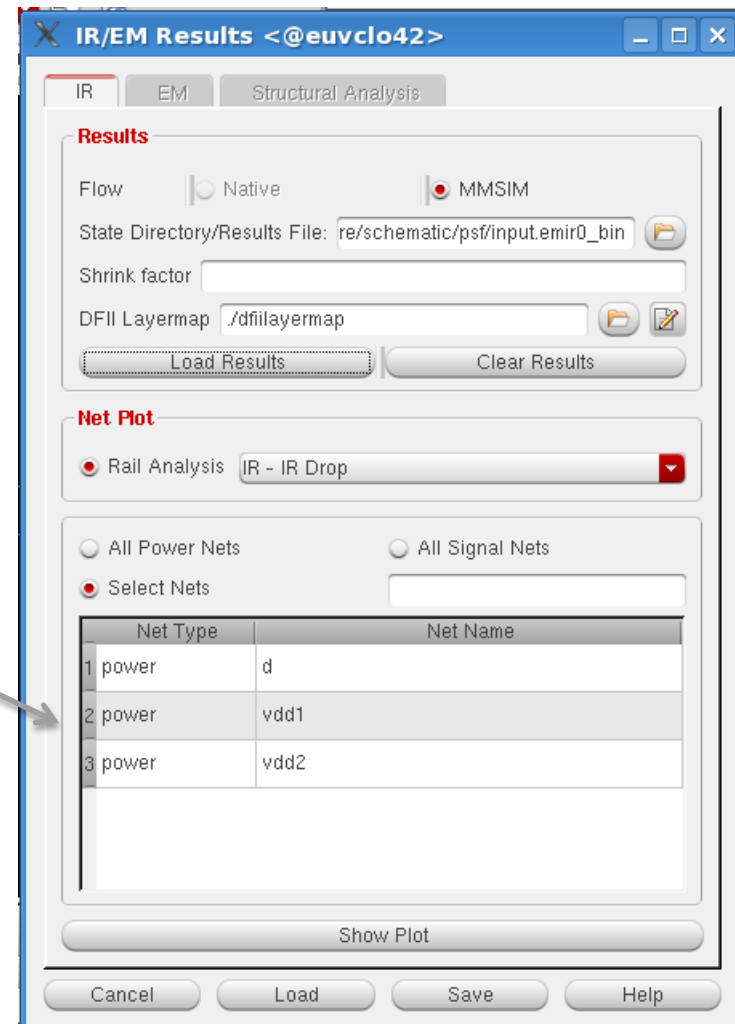
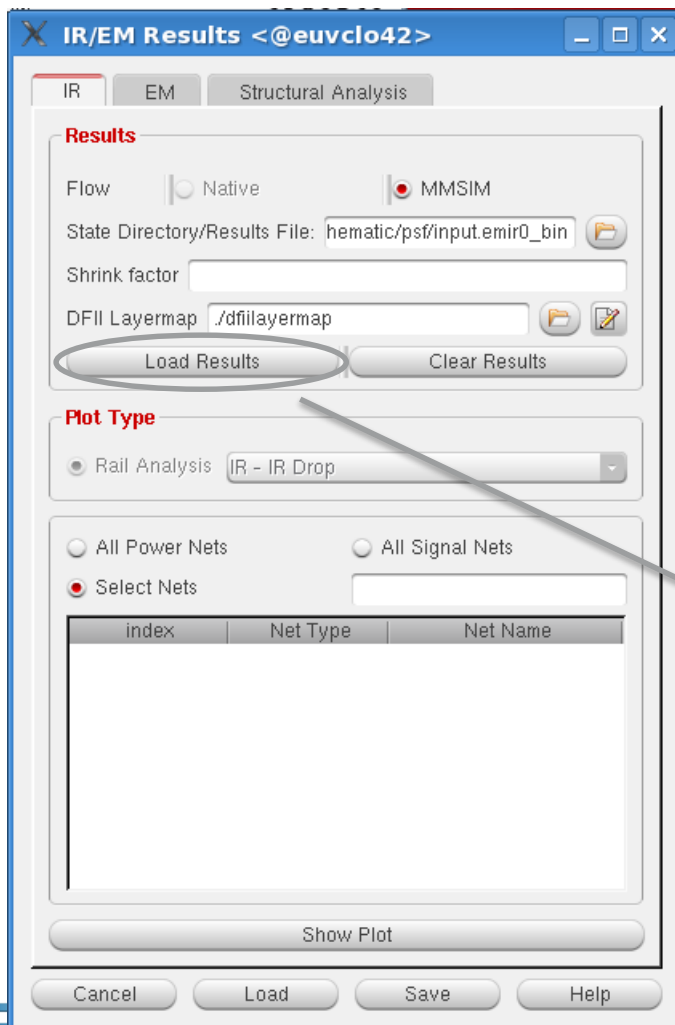
There is no resistor whose current density exceeds the limit.

%failed    resistor layer    current    width    pathLength    density    limit    needed width/#vias    X1    Y1    X2    Y2    resistance
              (A)          (um)        (um)        (A/um, A/via) (A/um, A/via) (um/#)
pass-97.96%  rm93      m1      30.004u    0.067      3.533      447.819u    22.000m    0.001      331.560 -16.000 331.535 -16.000 0.103
pass-97.96%  rm85      m1      30.004u    0.067      18.045      447.819u    22.000m    0.001      12.100 -16.000 12.075 -16.000 0.103
pass-97.96%  rm83      m1      30.004u    0.067      18.045      447.819u    22.000m    0.001      32.125 -16.000 32.100 -16.000 0.103
pass-97.96%  rm81      m1      30.004u    0.067      5.422       447.819u    22.000m    0.001      6.025  -16.000 6.000  -16.000 0.103
pass-98.25%  rm92      m1      30.004u    0.078      3.533      384.665u    22.000m    0.001      334.561 -15.993 331.560 -16.000 10.171
pass-98.25%  rm84      m1      30.004u    0.078      18.045      384.665u    22.000m    0.001      32.100 -16.000 12.100 -16.000 67.779
pass-98.25%  rm82      m1      30.004u    0.078      5.422       384.665u    22.000m    0.001      6.000  -16.000 0  -16.000 20.359
pass-98.26%  rh138     m6      30.004u    0.069      2.745       434.839u    25.000m    0.001      319.335 -16.000 319.310 -16.000 0.107
pass-98.26%  rh137     m6      30.004u    0.069      18.067      434.839u    25.000m    0.001      136.550 -16.000 136.525 -16.000 0.107
pass-98.26%  rh135     m6      30.004u    0.069      5.445       434.839u    25.000m    0.001      110.450 -16.000 110.425 -16.000 0.107
pass-98.26%  rh133     m6      30.004u    0.069      5.445       434.839u    25.000m    0.001      116.475 -16.000 116.450 -16.000 0.107
pass-98.26%  ri132     m5      30.004u    0.069      2.745       434.839u    25.000m    0.001      319.360 -16.000 319.335 -16.000 0.107
pass-98.26%  ri130     m5      30.004u    0.069      2.745       434.839u    25.000m    0.001      322.385 -16.000 322.360 -16.000 0.107
pass-98.26%  ri129     m5      30.004u    0.069      18.045      434.839u    25.000m    0.001      116.500 -16.000 116.475 -16.000 0.107
pass-98.26%  ri127     m5      30.004u    0.069      18.045      434.839u    25.000m    0.001      136.525 -16.000 136.500 -16.000 0.107
pass-98.26%  ri126     m5      30.004u    0.069      5.445       434.839u    25.000m    0.001      104.400 -16.000 104.375 -16.000 0.107
pass-98.26%  ri124     m5      30.004u    0.069      5.445       434.839u    25.000m    0.001      110.425 -16.000 110.400 -16.000 0.107
pass-98.26%  rj123     m4      30.004u    0.069      2.745       434.839u    25.000m    0.001      322.410 -16.000 322.385 -16.000 0.107
pass-98.26%  rj121     m4      30.004u    0.069      2.745       434.839u    25.000m    0.001      325.435 -16.000 325.410 -16.000 0.107
pass-98.26%  rj120     m4      30.004u    0.069      18.045      434.839u    25.000m    0.001      84.350  -16.000 84.325  -16.000 0.107

```

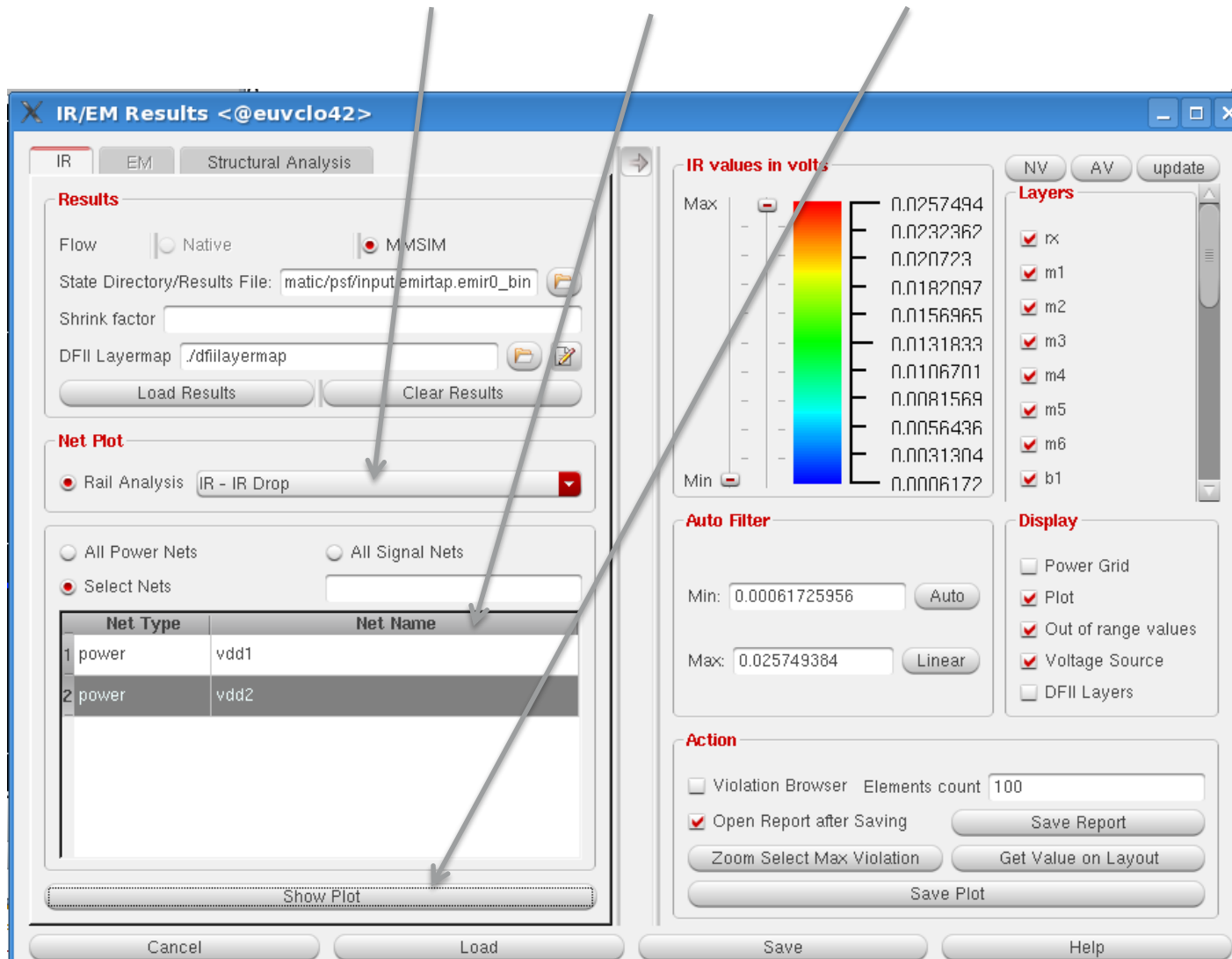
IR results (4)

- Irdrop analysis form empty and loaded



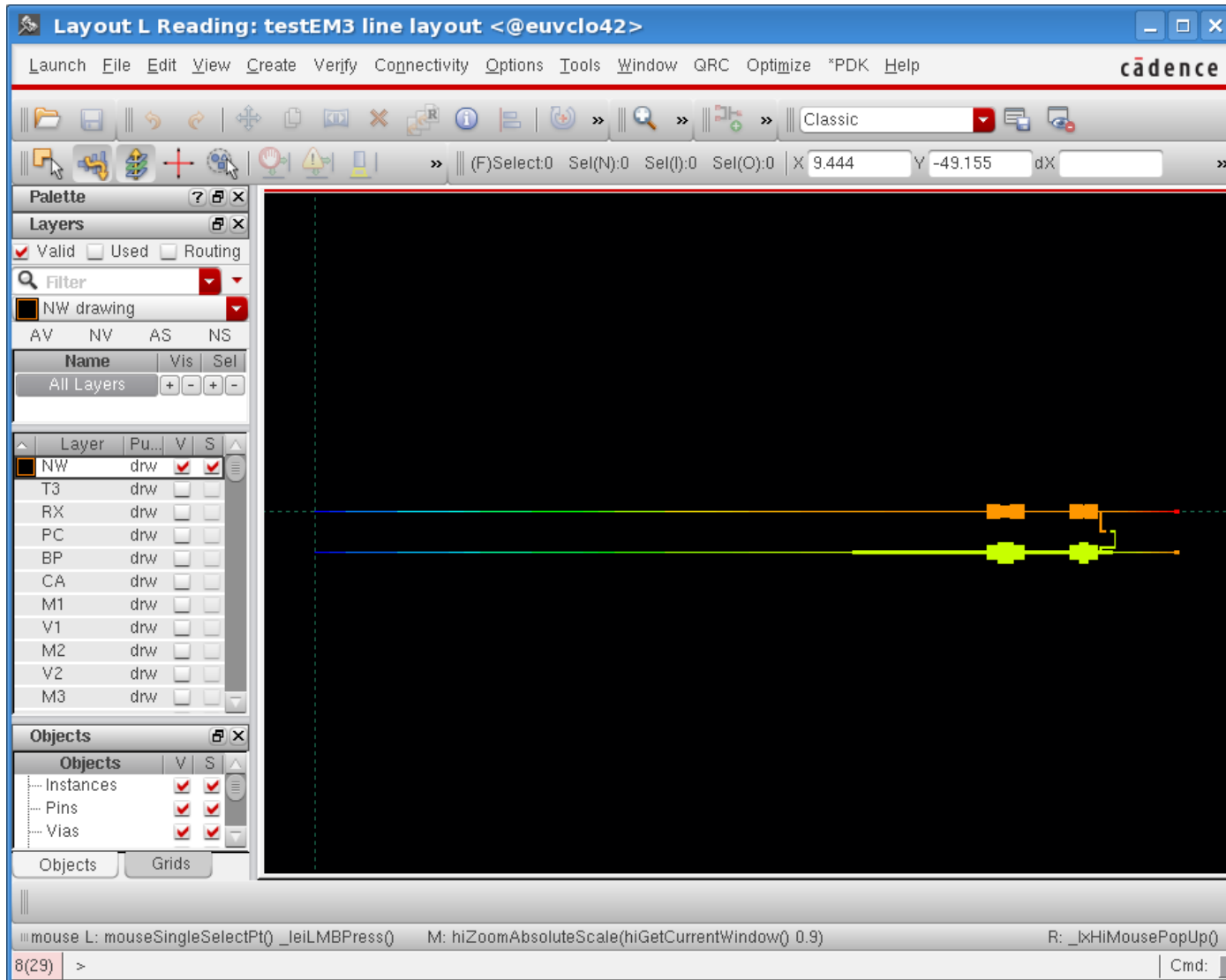
IR results (5)

- Select analysis type, net(s) and Show plot =>extended form appears



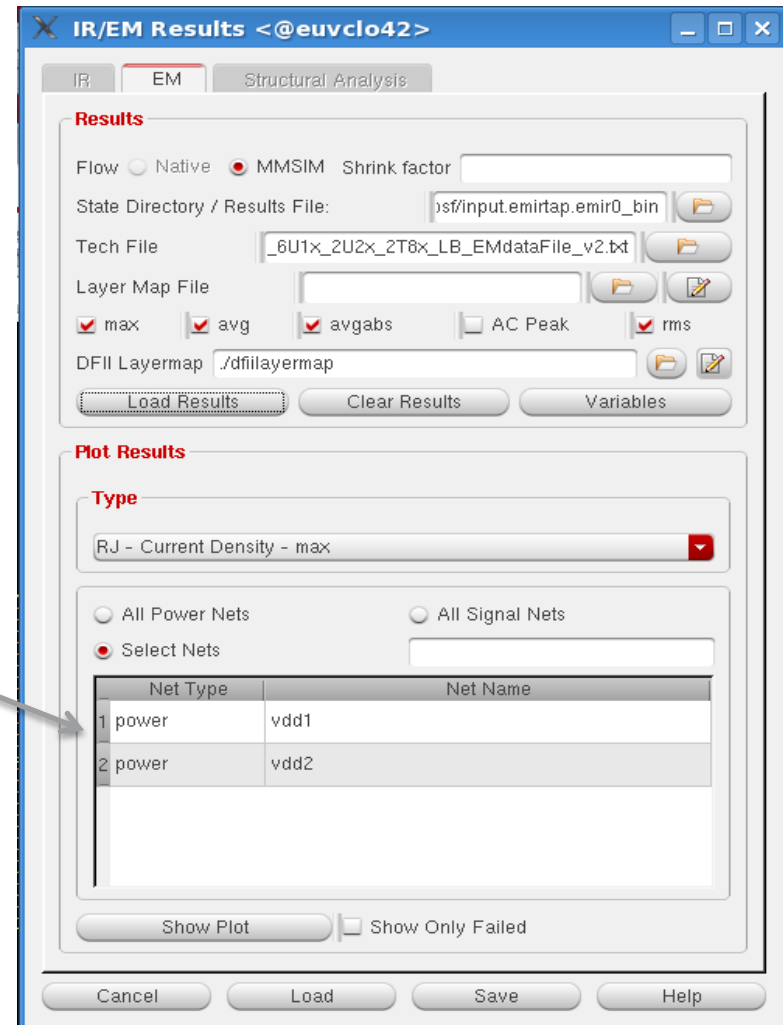
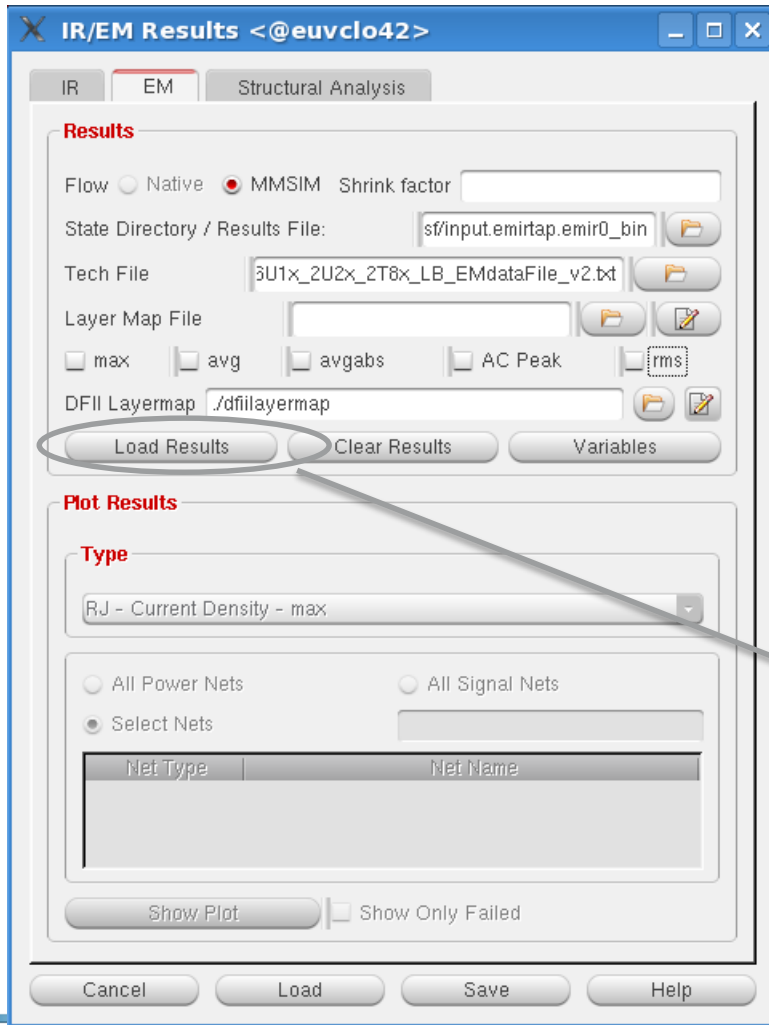
IR results (5b)

- IRdrop on 2 Power nets



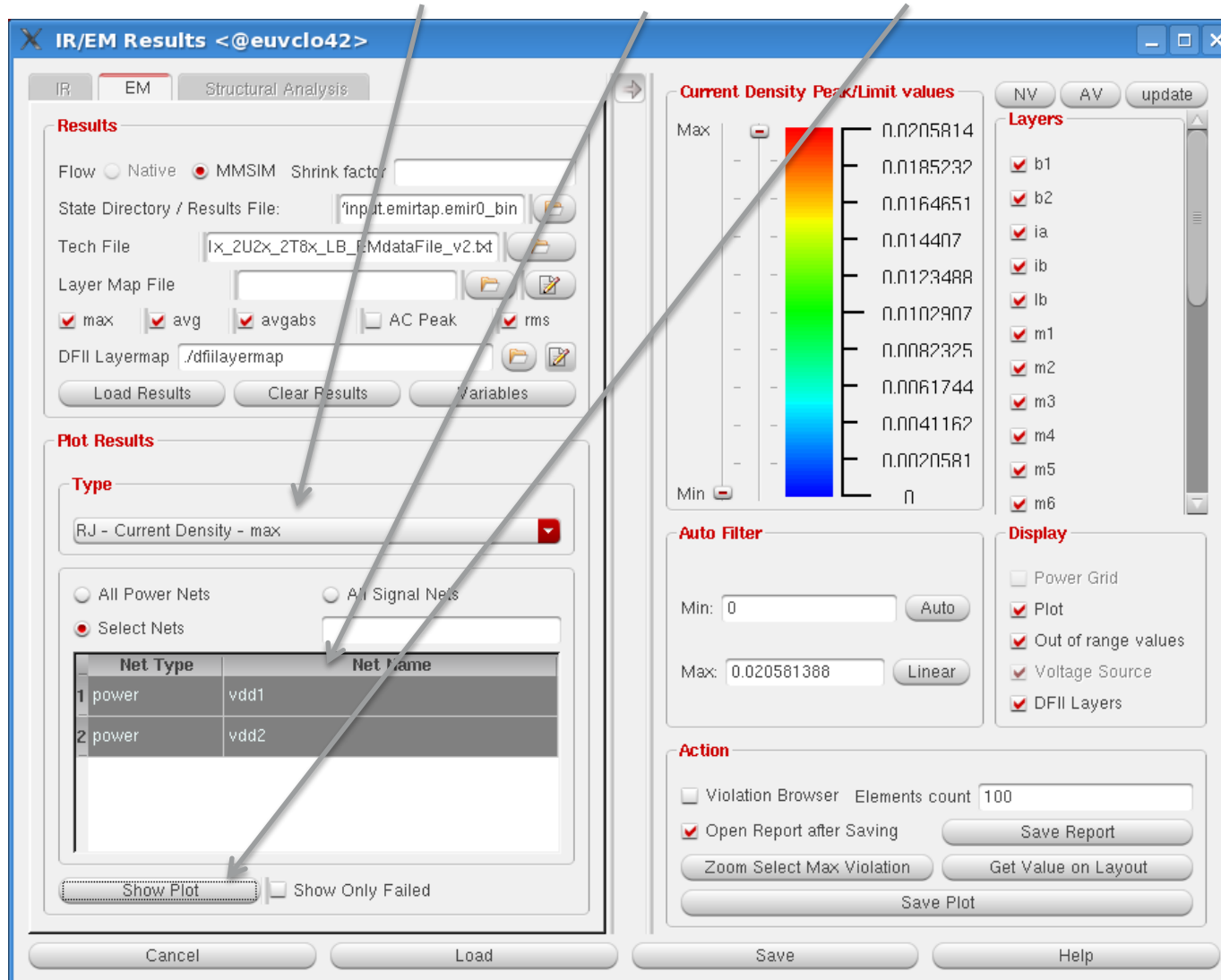
EM results (6)

- EM analysis form empty and loaded



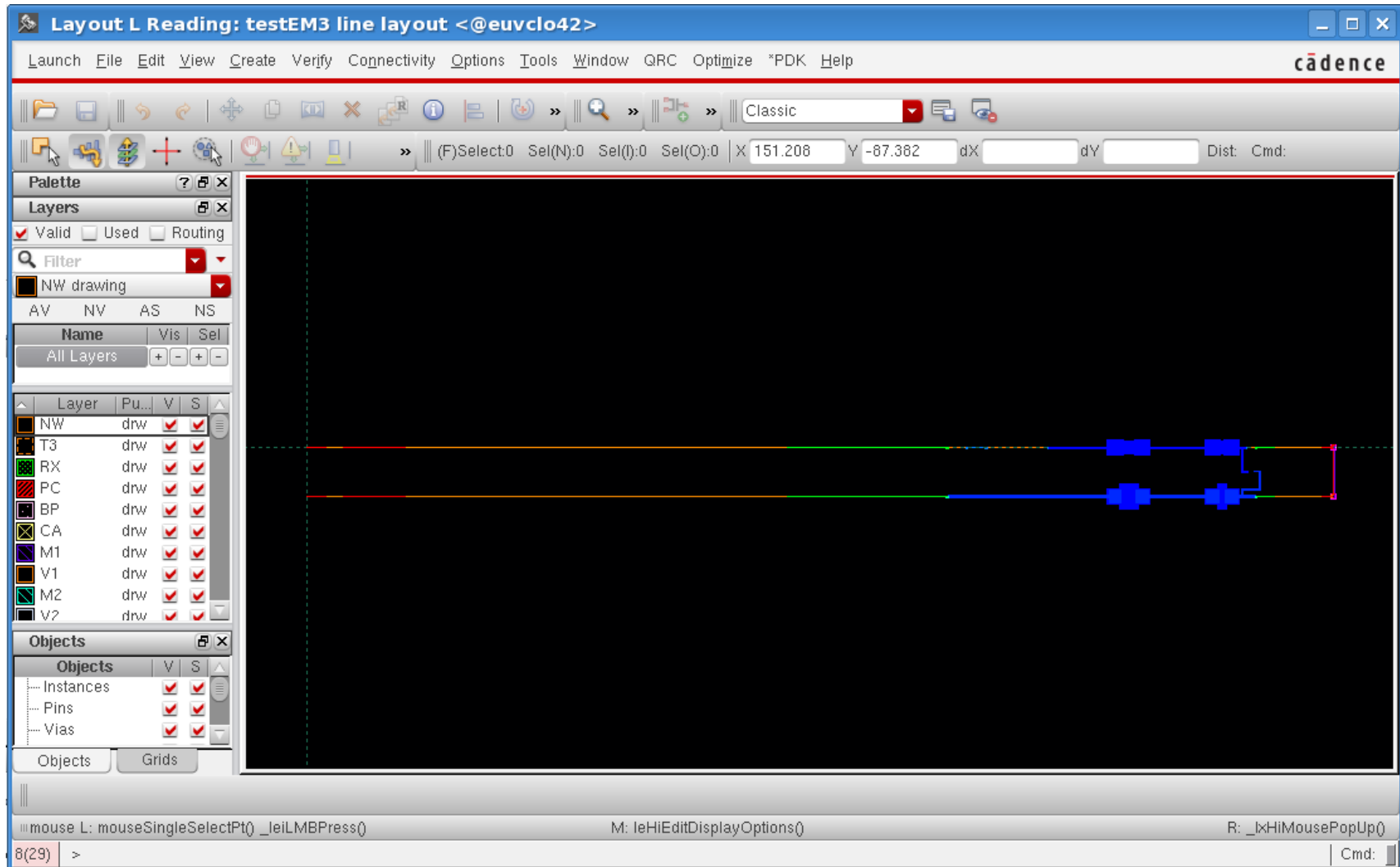
EM results (7)

- Select analysis type, net(s) and Show plot =>extended form appears



EM results (7b)

- EM on 2 Power nets



EM results (8)

- Getting Value on Layout

The screenshot shows the 'IR/EM Results' window for project '@euvclo42'. The 'EM' tab is active. The 'Results' section shows 'Flow' set to 'MMSIM' and 'Shrink factor' as an empty field. The 'State Directory / Results File' is 'input.emirtap.emir0_bin'. The 'Tech File' is 'lx_2U2x_2T8x_LB_EMdataFile_v2.txt'. The 'Layer Map File' is empty. The 'DFII Layermap' is 'dfiilayermap'. The 'Plot Results' section shows 'Type' as 'JAVG - Current Density - avg'. The 'Net Type' is 'power' and 'Net Name' is 'vdd1'. The 'Action' panel at the bottom right has the 'Get Value on Layout' button circled. The 'Current Density Avg/Limit values' section shows a color map with values ranging from 0.0205193 to 0.205193. The 'Layers' section shows a list of layers: b1, b2, ia, ib, lb, m1, m2, m3, m4. The 'Display' section shows 'Power Grid' unchecked, 'Plot' checked, 'Out of range values' checked, 'Voltage Source' checked, and 'DFII Layers' checked. The 'Auto Filter' section shows 'Min: 0' and 'Max: 0.20519268'. The 'Save Plot' button is also visible in the Action panel.

Current Density Avg/Limit values

Value
0.205193
0.184673
0.164154
0.143635
0.123116
0.102596
0.0820771
0.0615578
0.0410385
0.0205193
0

Layers

Layer
b1
b2
ia
ib
lb
m1
m2
m3
m4

Net Type

Net Type	Net Name
1 power	vdd1
2 power	vdd2

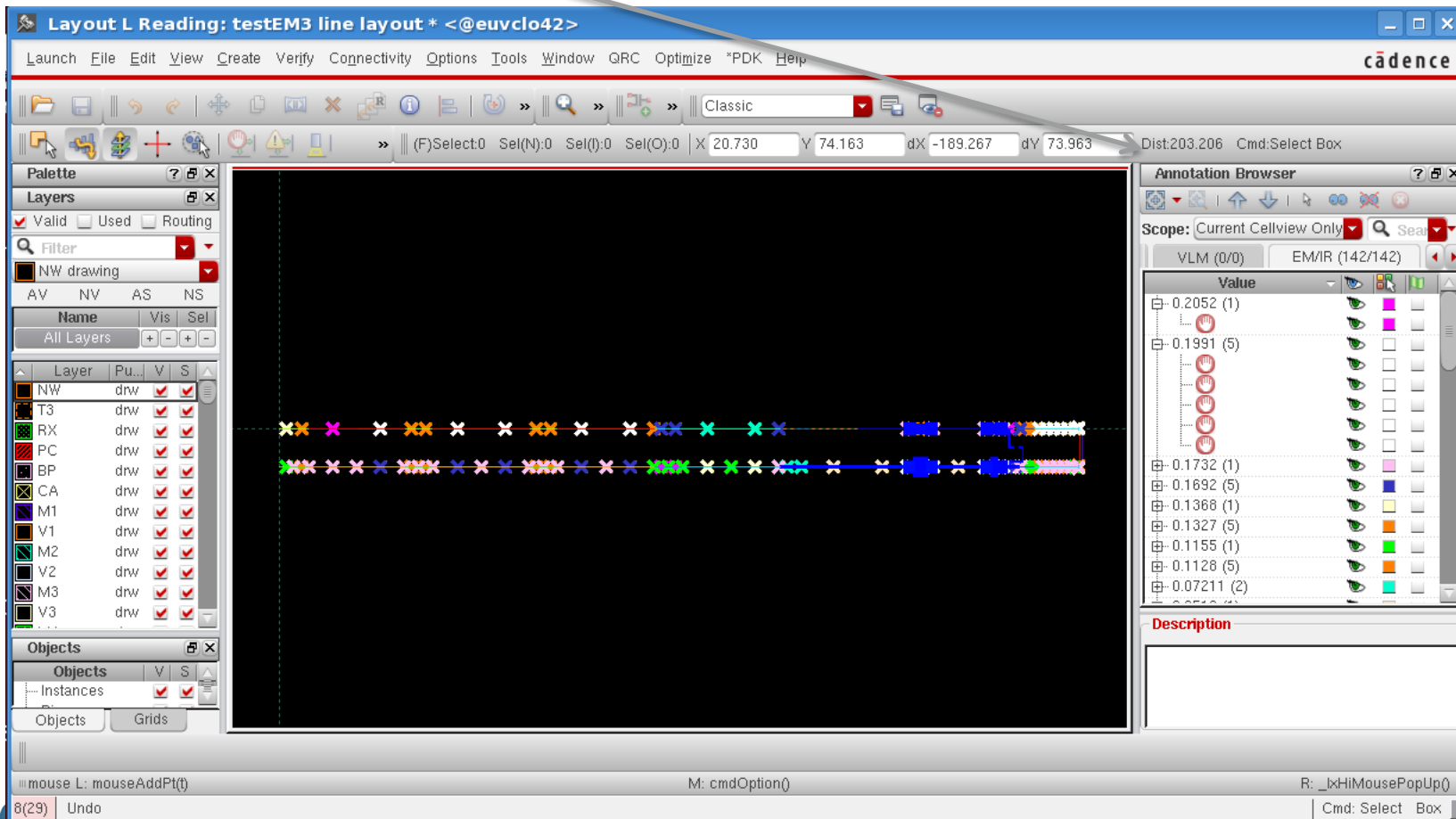
Action

- ☒ Violation Browser Elements count 1000
- ☒ Open Report after Saving
- Zoom Select Max Violation
- Save Plot

- Click on “Get Value”
- Select a region on the layout to get the value in the colormap and selection in the “Annotation browser”

EM results (8b)

- Getting in annotation browser
 - Click on “Get Value”
 - The “Annotation browser” opens in the layout view, you can select value and zoom on it



conclusion

- For full details, you can read the documentation `voltusFIXL.pdf` in the IC doc directory under `voltusFIXL/` dir.
- Voltus FI interface and engine are changing with each new mmsim or IC releases
- That's why it is recommended to use them or sooner ones to get
 - all GUI features
 - the best accuracy with a good runtime execution and less convergence issues.
- The snapshots were extracted from IC 06.16.090 and mmsim 14.10.138.