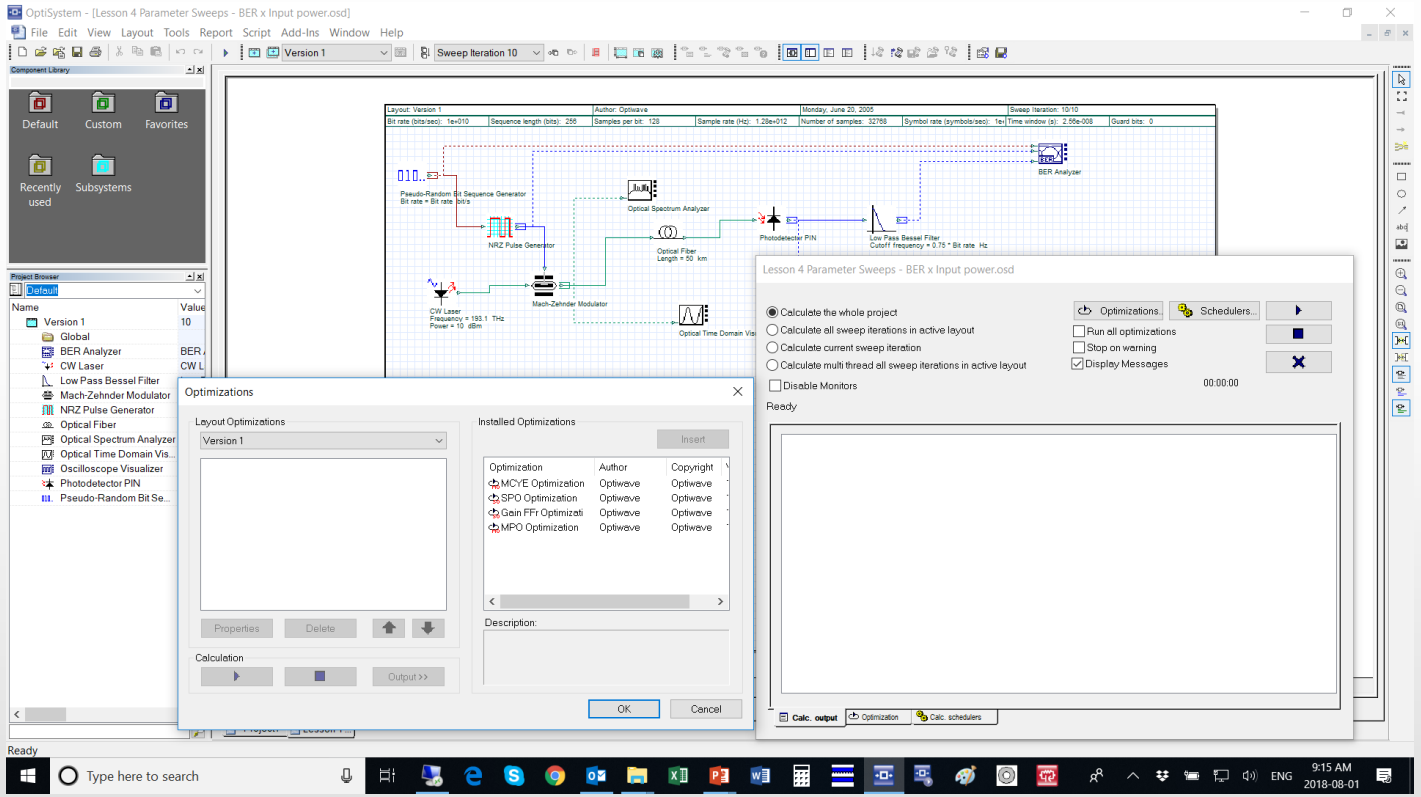
Parameters Optimization

7 Capella Court
Ottawa, ON, Canada
K2E 8A7

+1 (613) 224-4700
www.optiwave.com

Creating Optimization Process

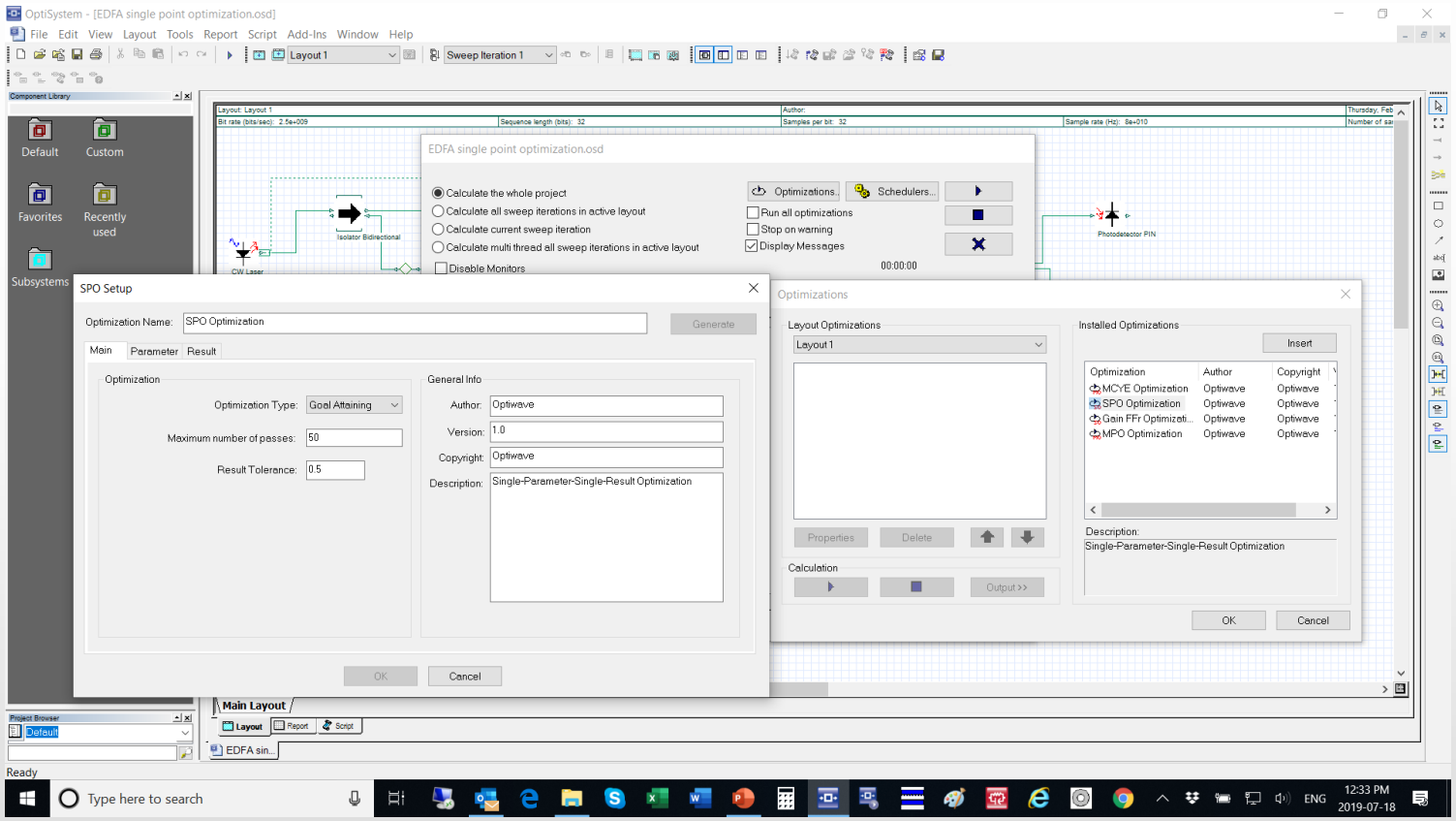
- After creating the project, select “Calculate” then choose “Optimizations..”
- There are four kinds of Optimization
  - Monte-Carlo Yield Estimation
  - Single parameter single result optimization
  - Gain FFr Optimization
  - Multi-parameter multi-result optimization
- Double click on required optimization type or highlight it and select “Insert”



Optimization Process Parameters

Main tab

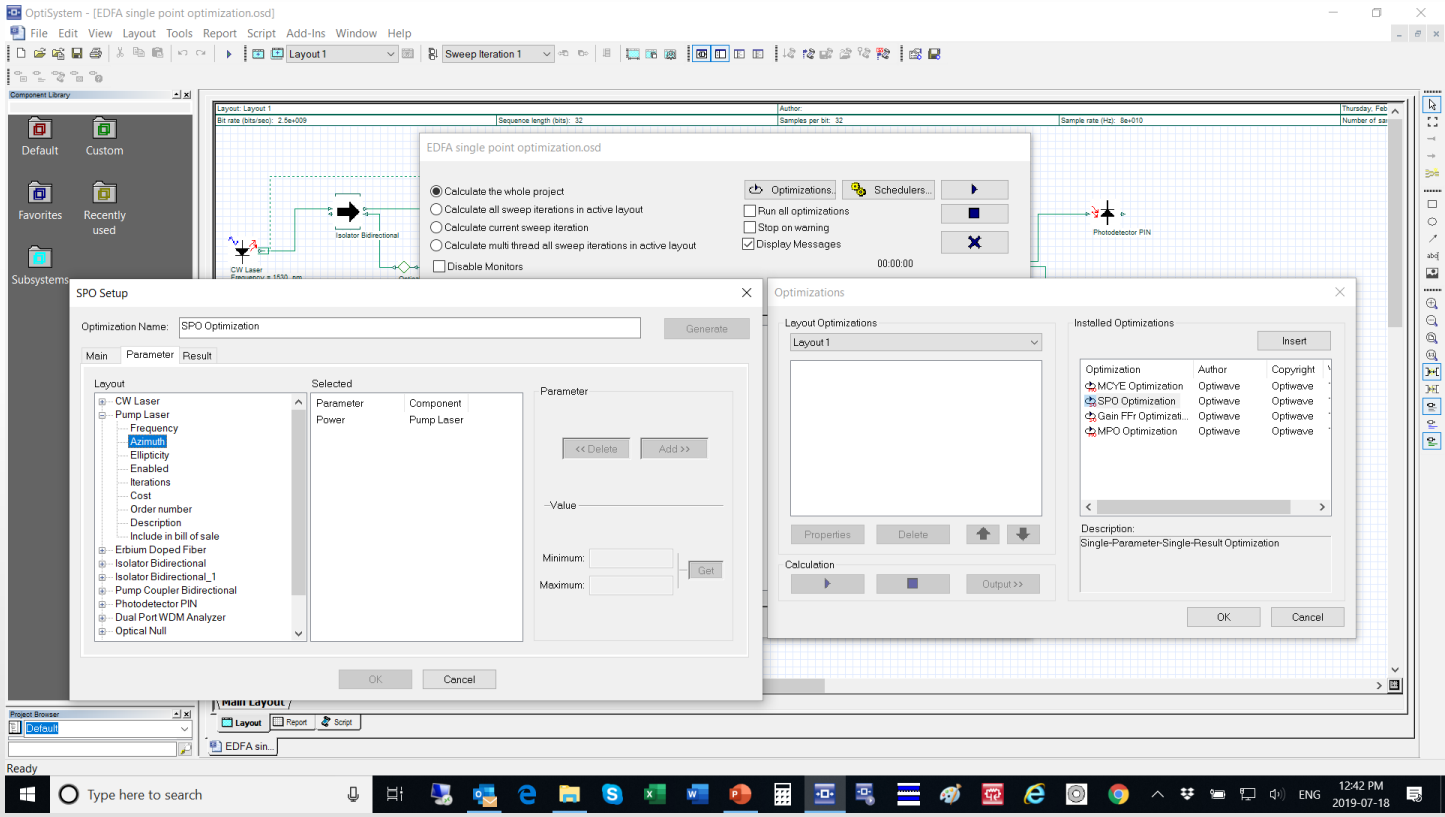
- Choose Optimization type:
  - **Minimize**
  - **Maximize**
  - **Goal Attaining**
- Choose the Maximum number of passes
- Choose Result Tolerance



Optimization Parameters - I

Parameter tab

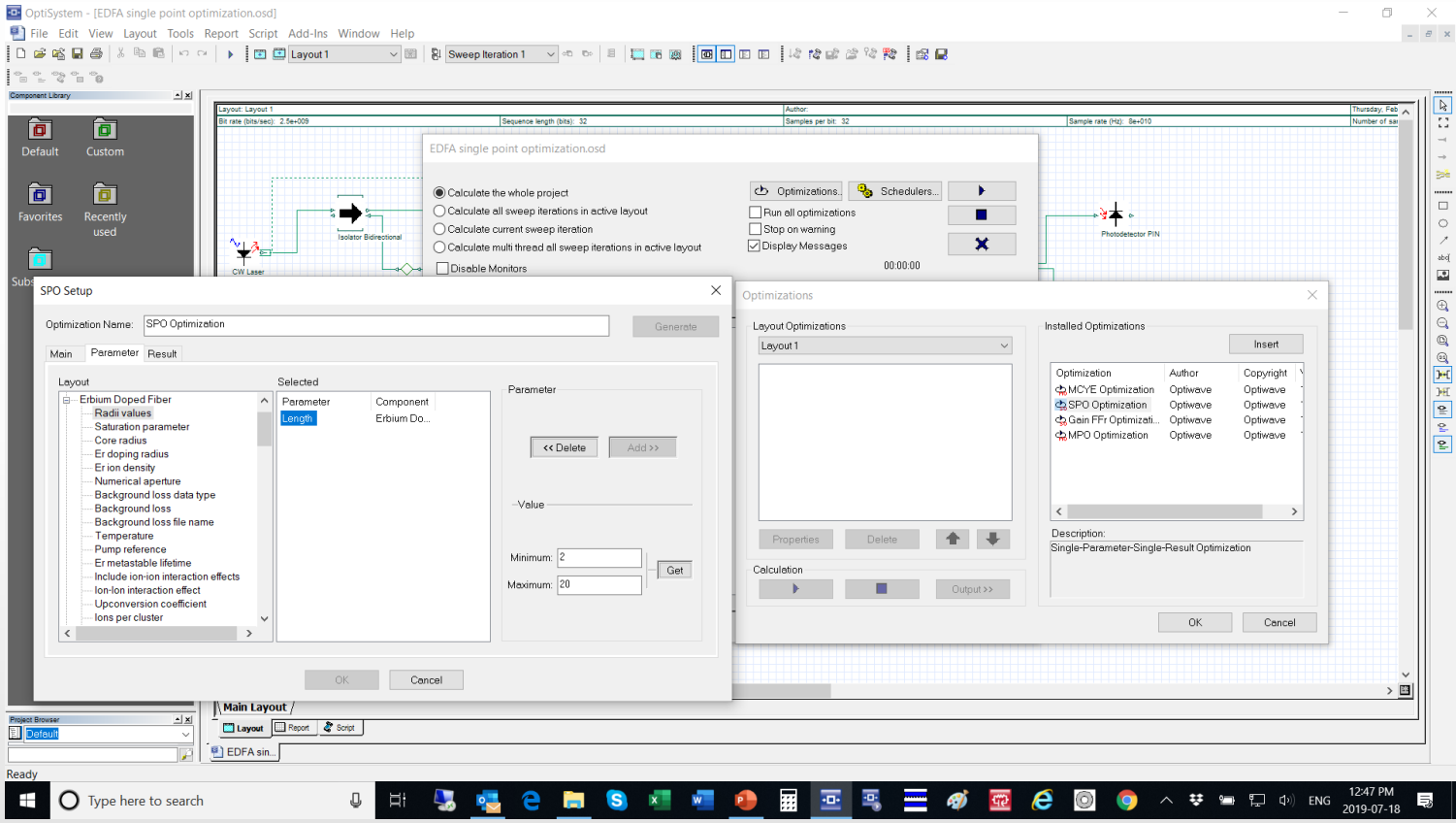
- All components in the Project Layout are listed
- Use [+] and [–] to maximize or minimize the list of parameters of each component in the layout
- Select the parameter(s) to optimize by double click on it or highlighted then choose Add>> to add it to the “Selected” list. An added parameter will be taken out from the “Layout” side



Optimization Parameters - II

Parameter tab

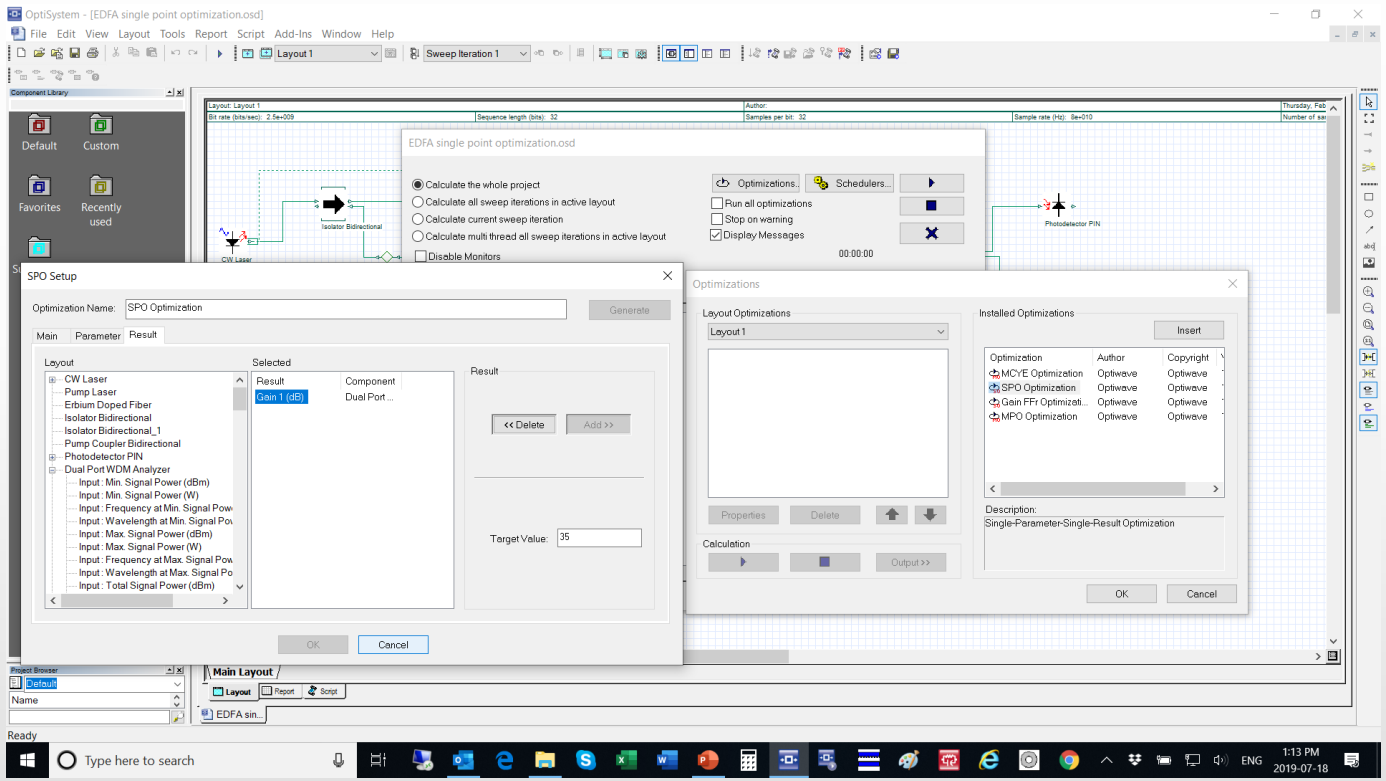
- Highlighting a parameter selected for optimization to enter the Minimum and Maximum value of the optimization range



Optimization Results

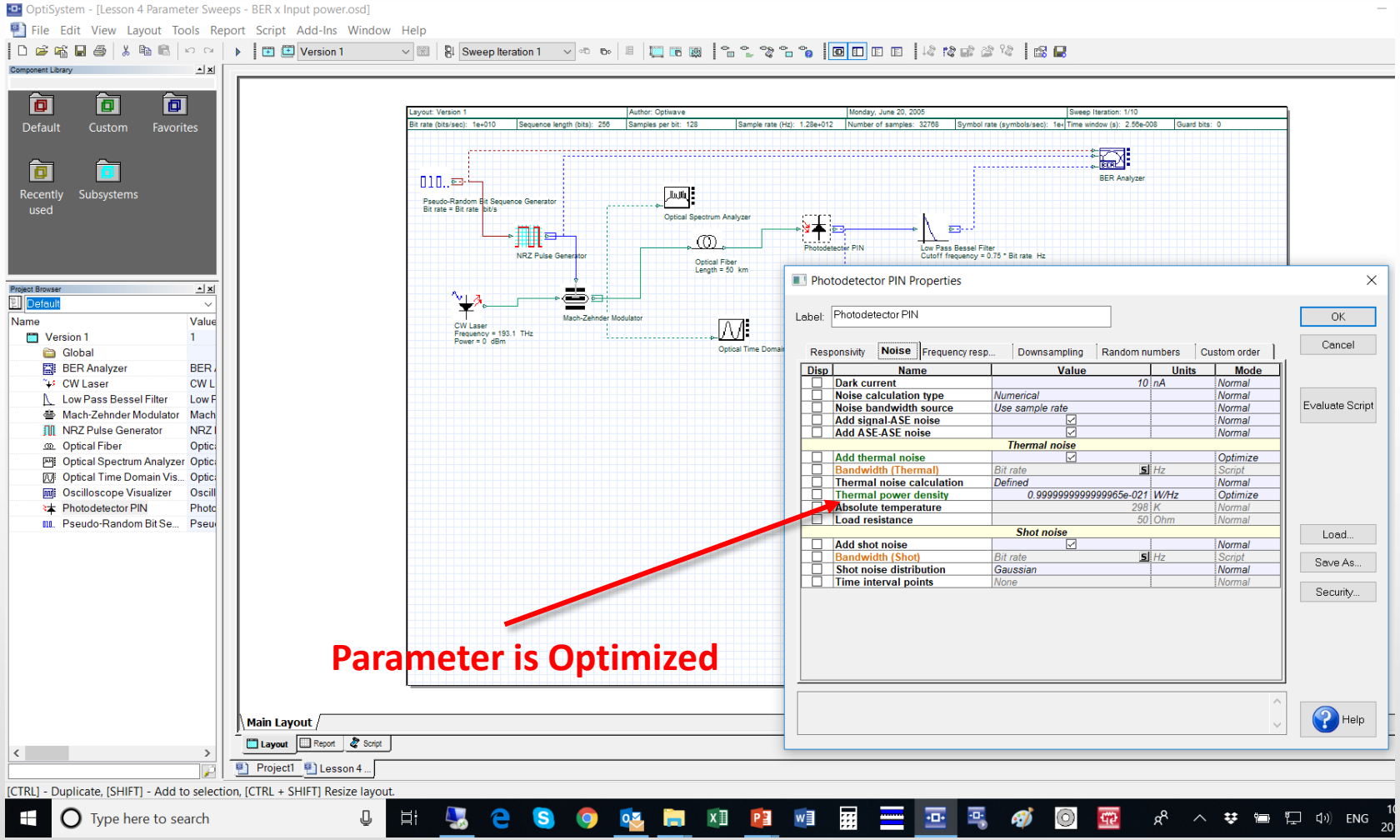
Result tab

- OptiSystem components designed to have results after calculation will have [+] symbol to show the list of available results
- Select the desired result(s) for the optimization process by double clicking on it or highlight it then choose Add>>
- Highlight the selected result to enter the “Target Value:” when the “Optimization Type:” is “Goal Attaining”.



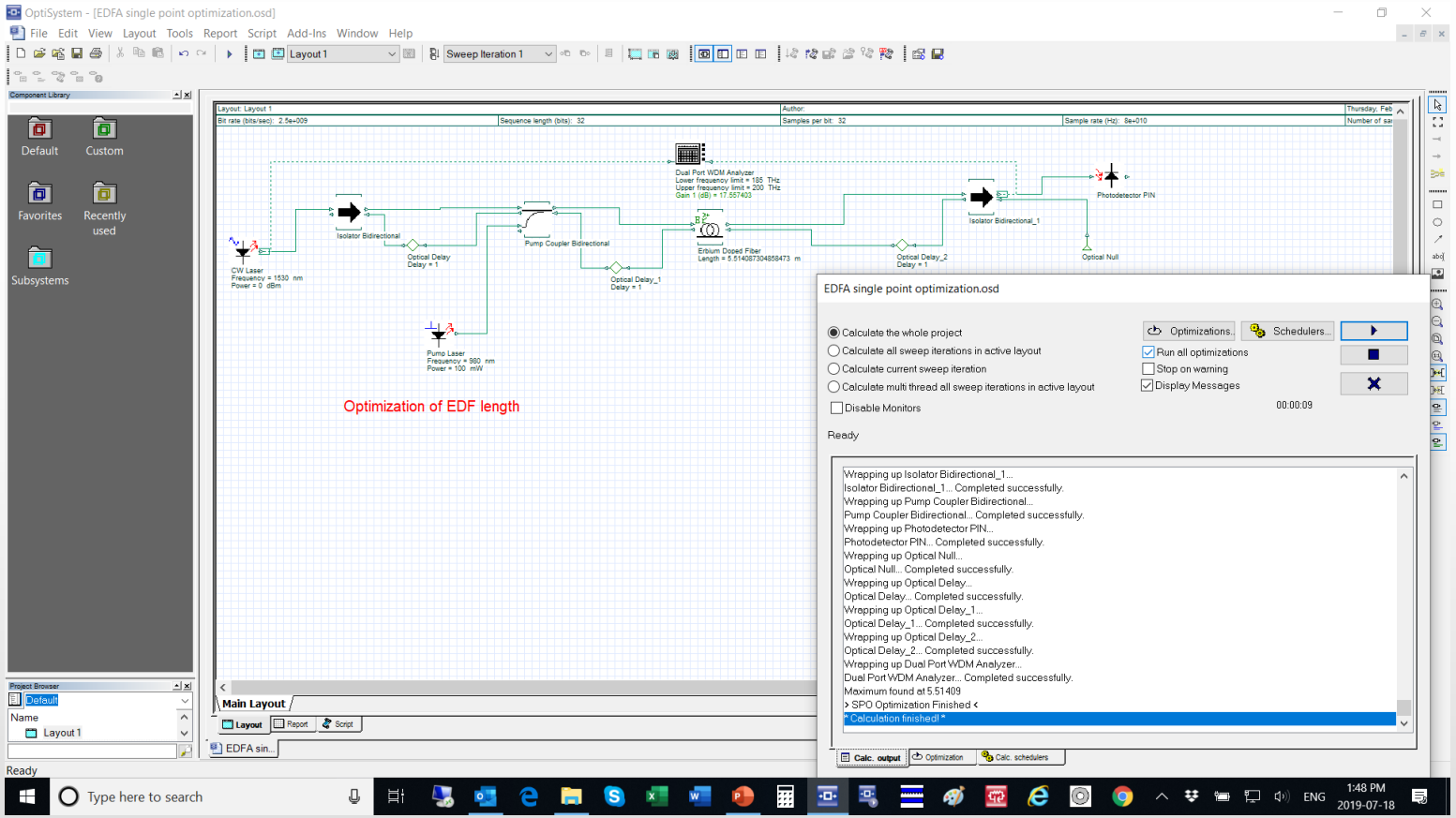
Optimized Parameter(s)

- Optimized parameter(s) name appears green in the Component Properties popup window
- The parameter “Mode” become “Optimize”
- Parameter value is the minimum value of the optimization range



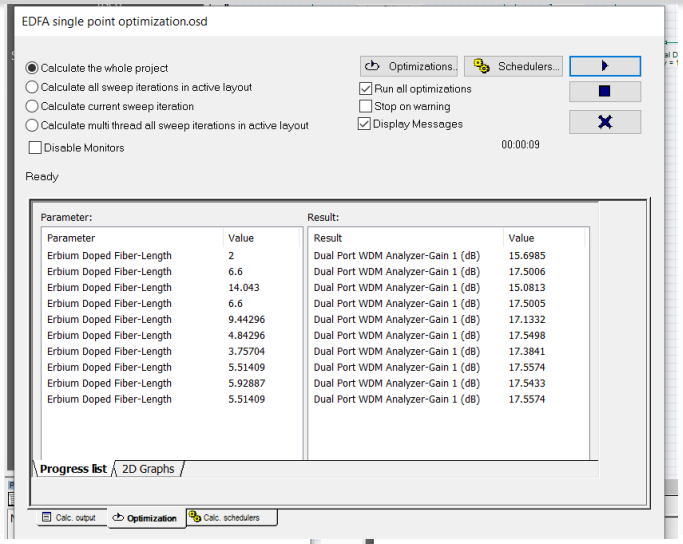
Calculate Project with Optimization

- Select Calculate in OptiSystem GUI
- Select “Run all optimization”
- Select “Calculate the whole project”
- Select Run symbol 

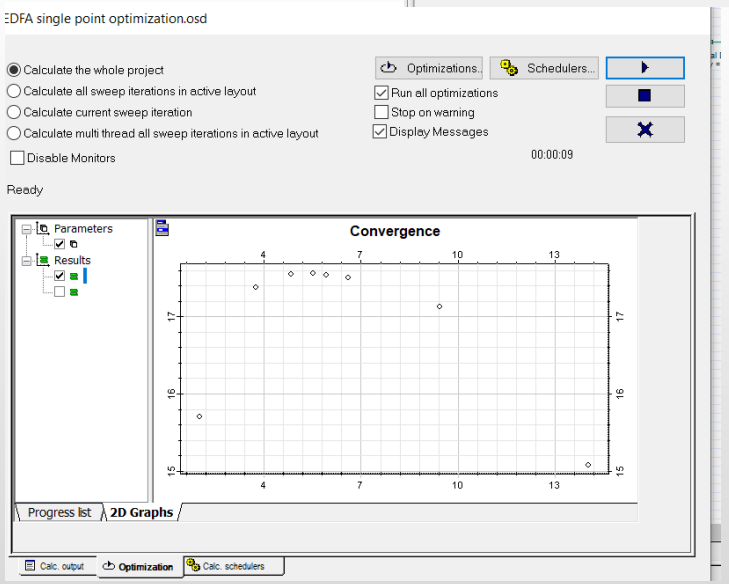


Monitoring Optimization Process

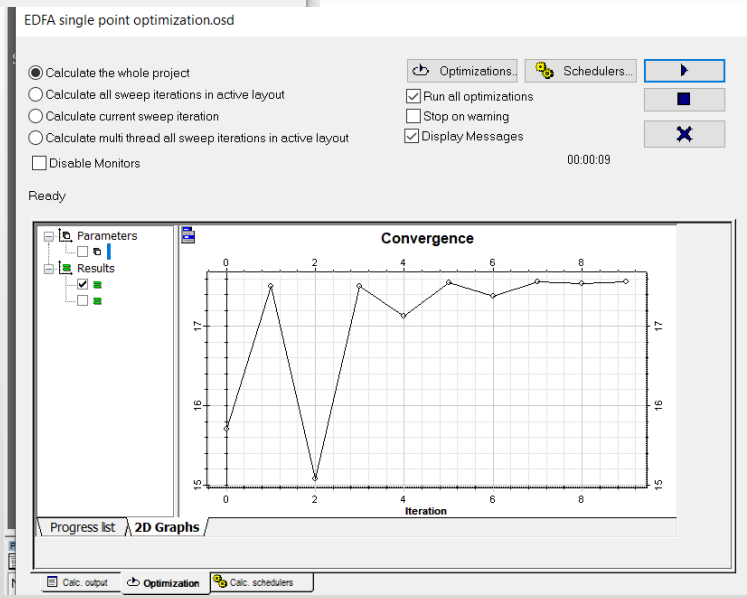
- Users can view optimization progress by selecting “Optimization” tab at the bottom of the calculation window
- Select “Progress list” to view the progress of “Parameter” Value and the “Result:” Value during the calculation
- Select “2D Graphs” to view different displays of the Parameter(s) and Results of the optimization process



Convergence in 10 iterations



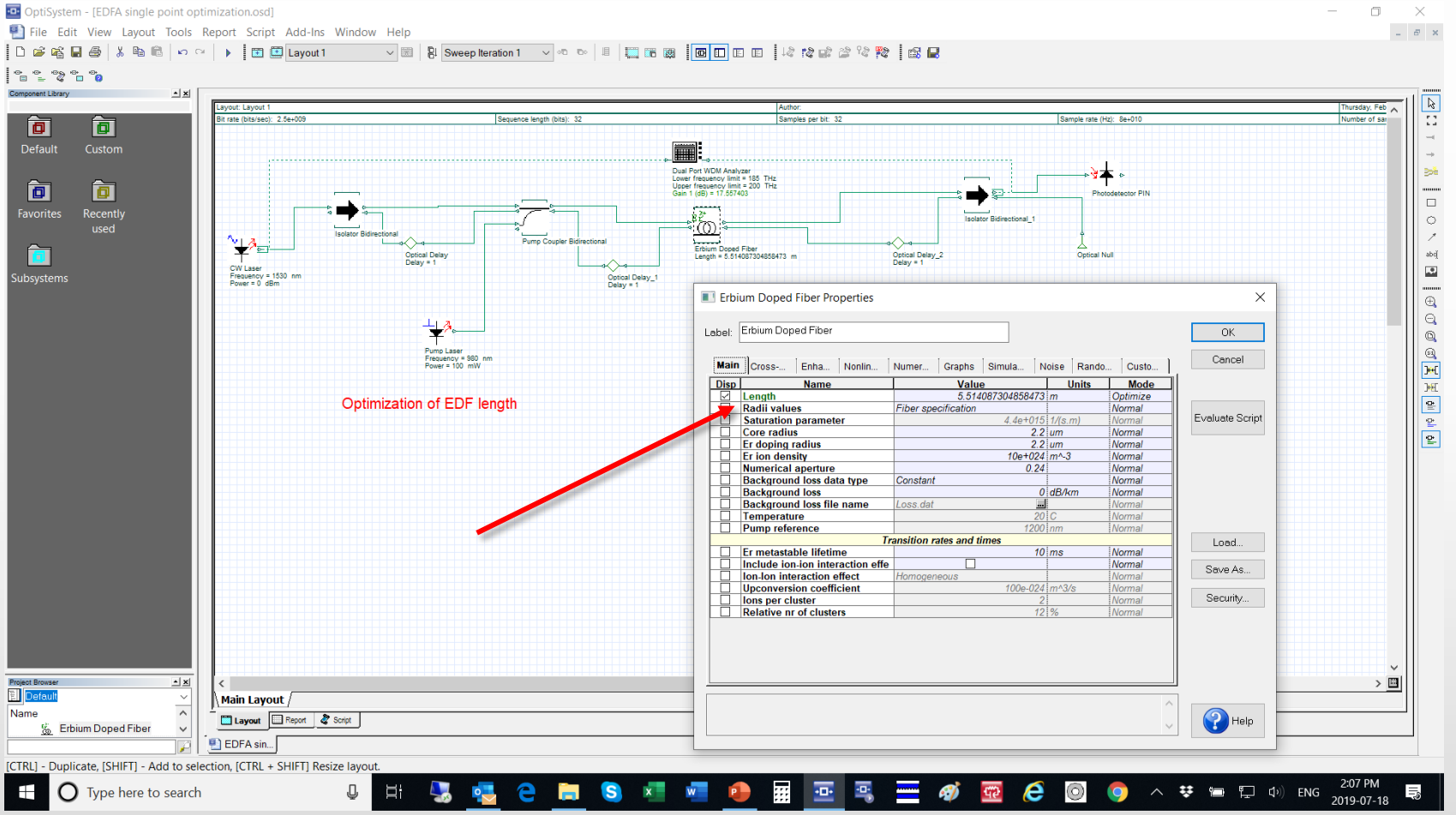
Results versus Parameter



Results versus Iteration

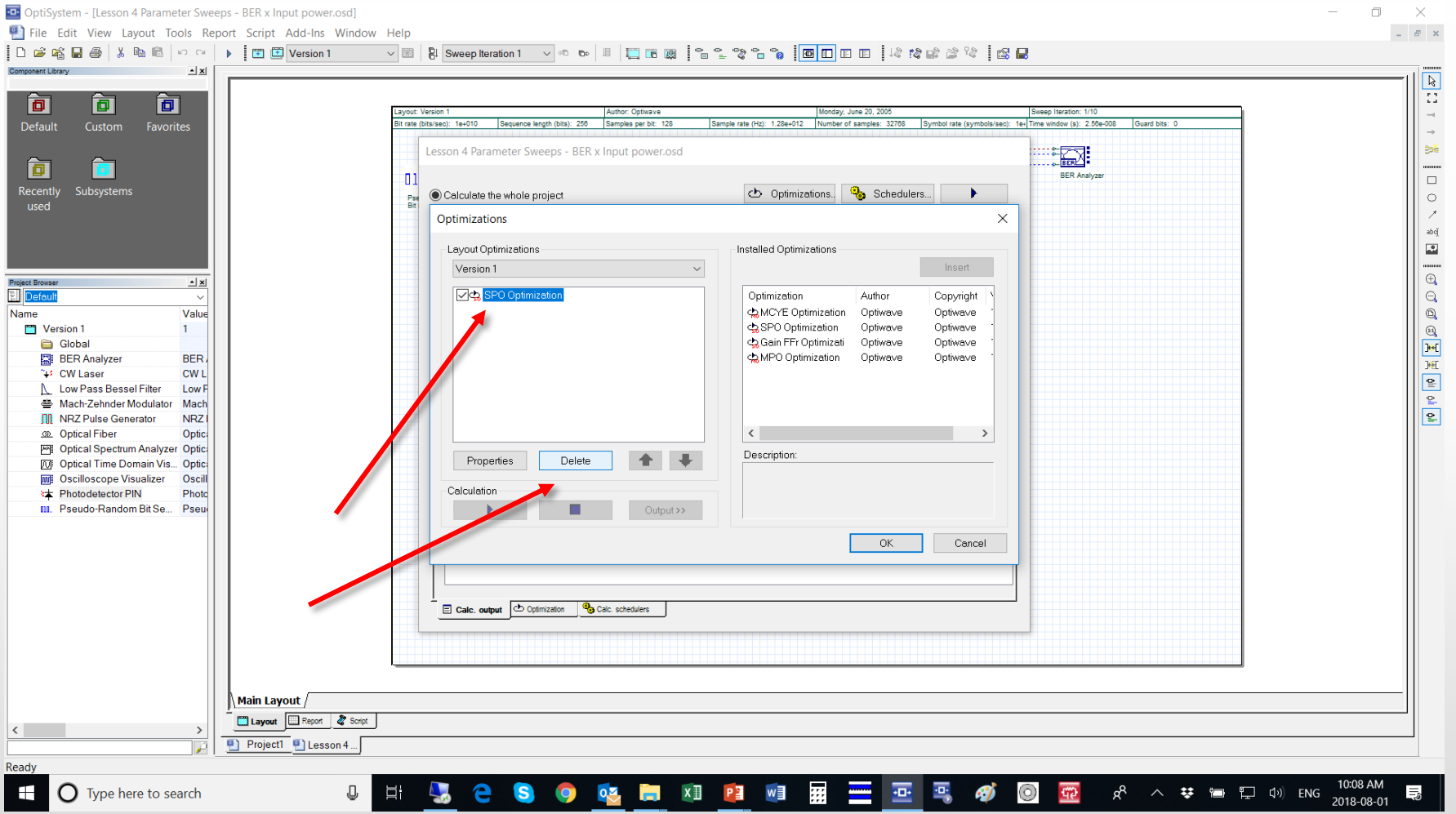
Optimization Results

- Optimal values of Optimized parameter(s) and desired Result(s) are displayed in the “Component Properties…” and “Component Results…” popup windows after the calculation ends

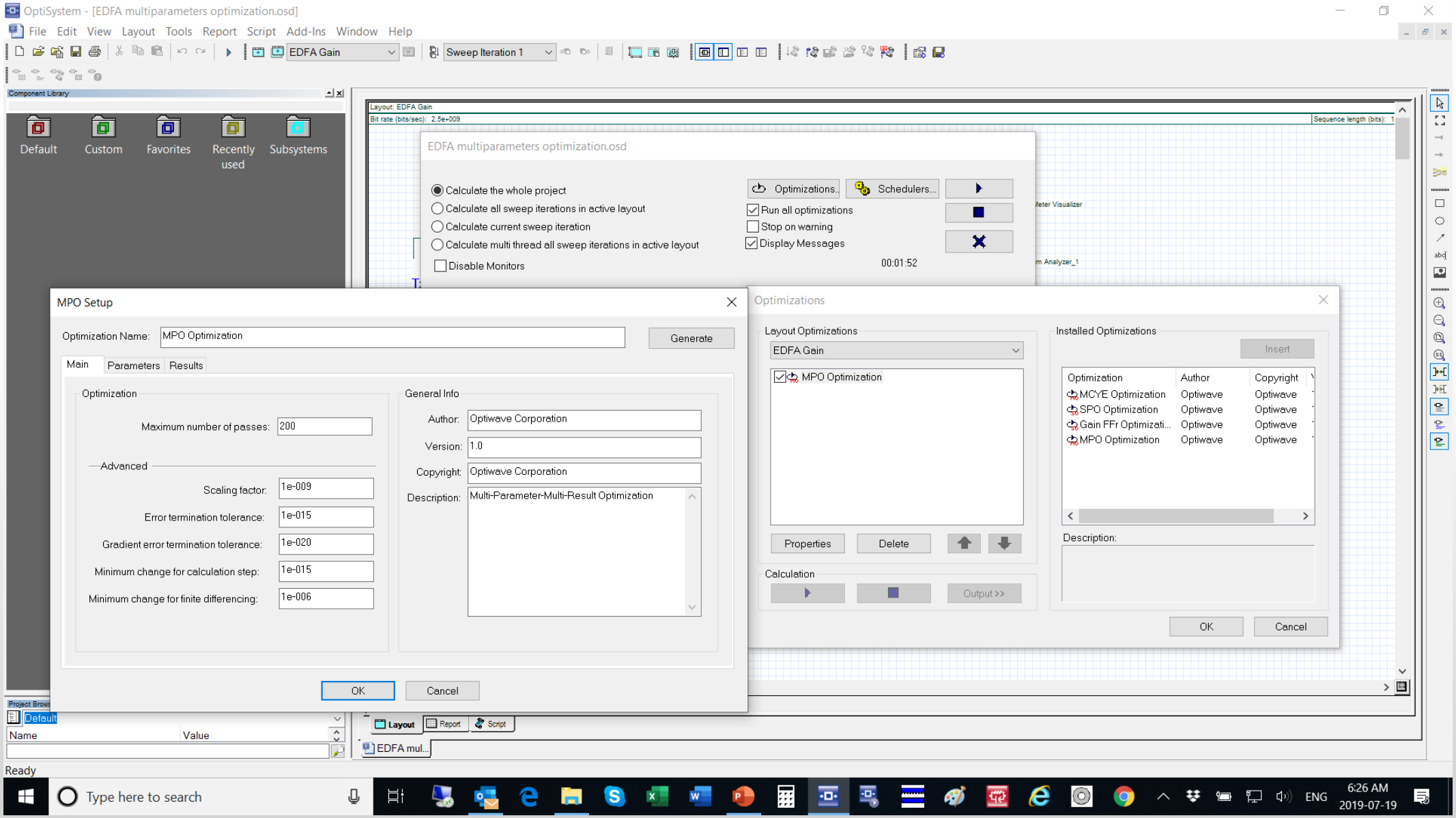


Delete Project Optimization

- Select Calculate and select Optimization, then select the optimization process and delete it
- Parameter is no more optimize in Component Properties (it is Normal)



Multi-Parameter Optimization

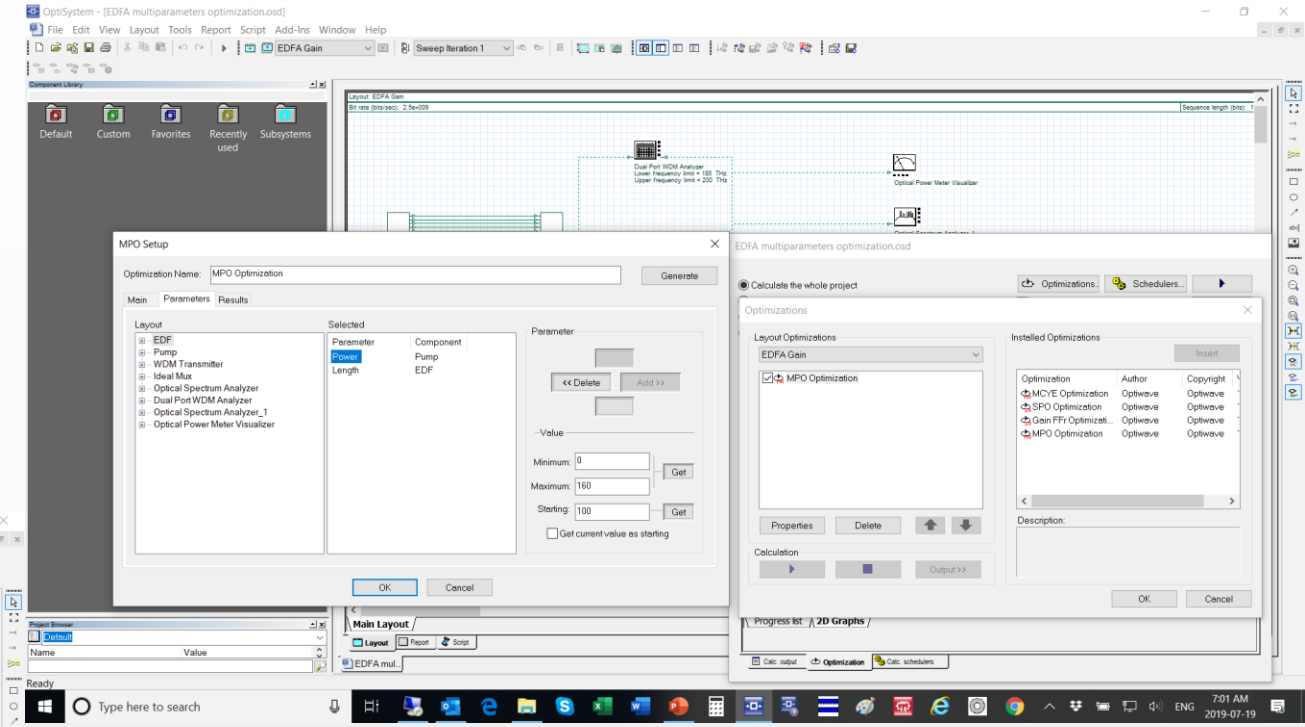


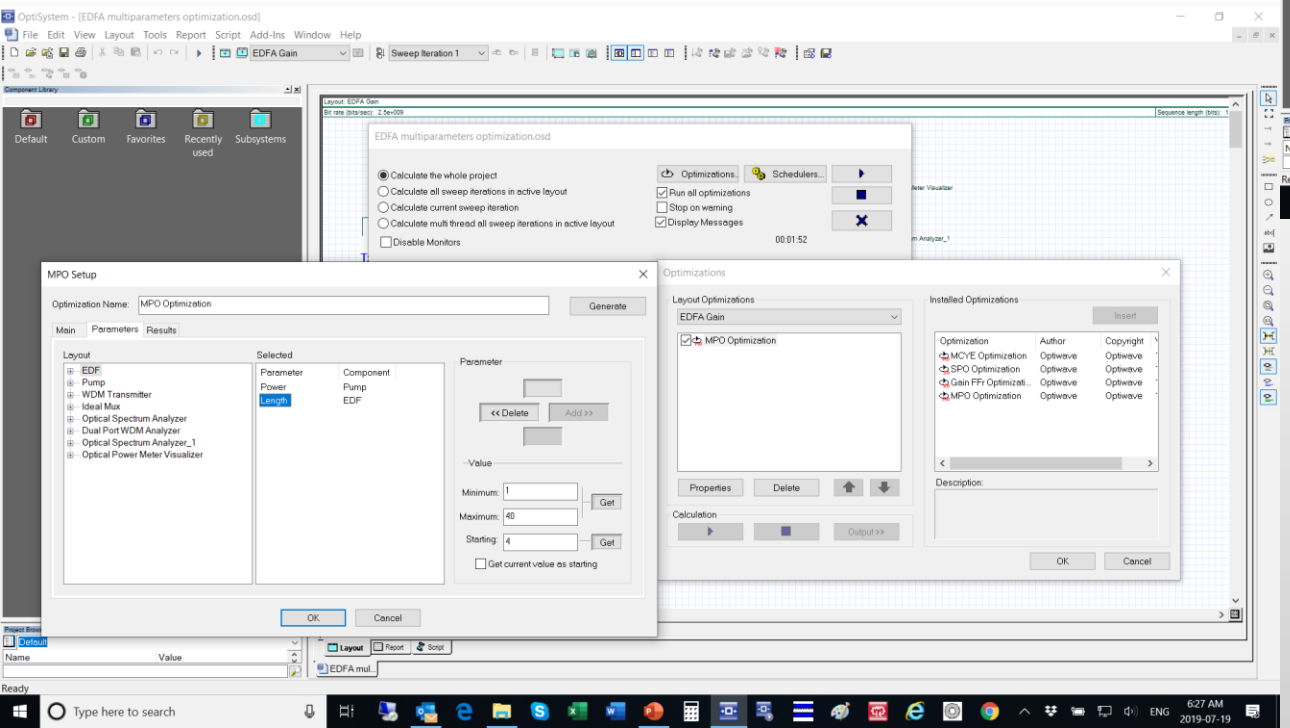
Simulation Parameters Description

Main

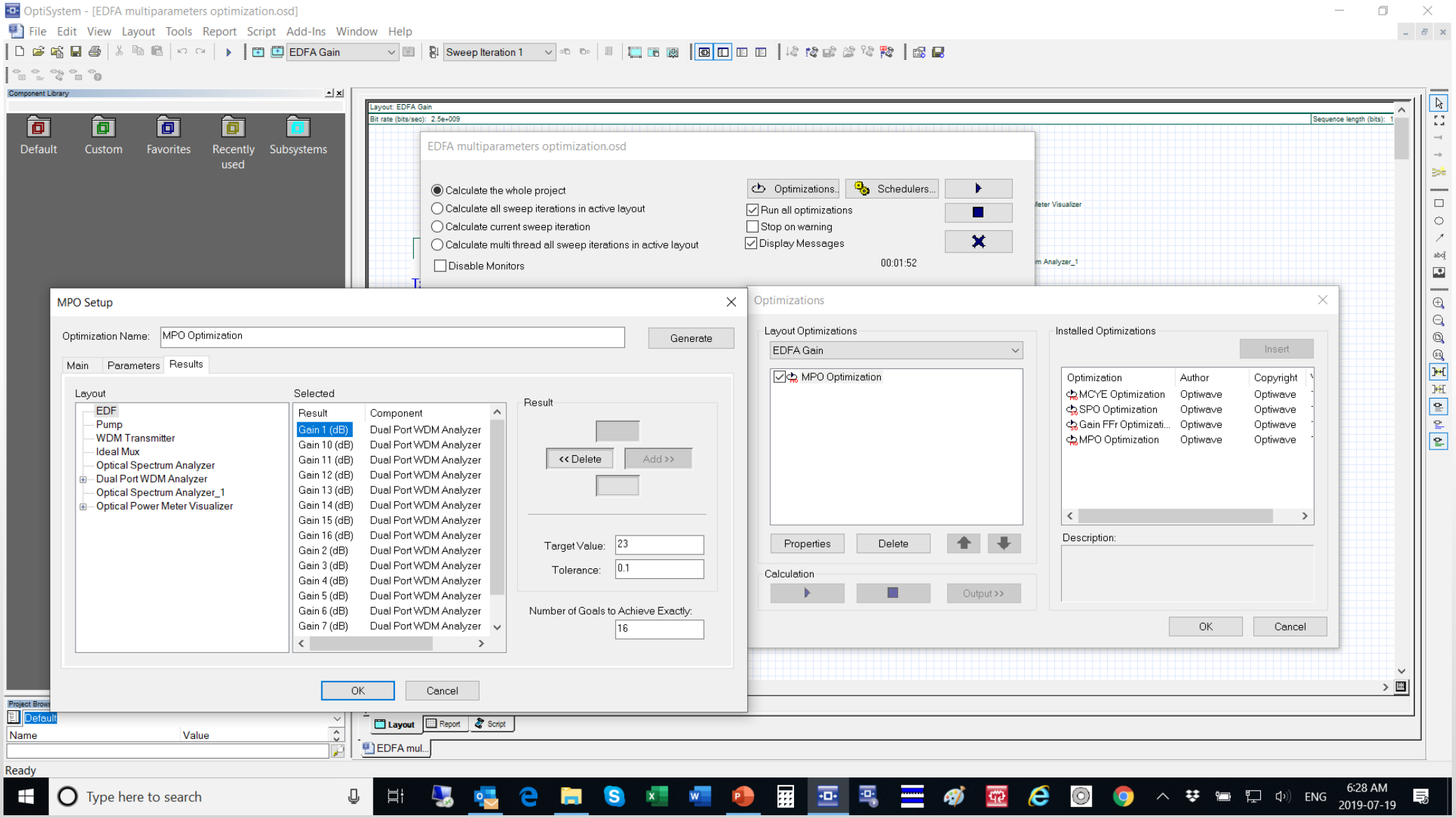
Name/Description	Default value	Value range
Maximum number of passes Maximum number of iterations allowed.	50	[1, INF]
Scaling factor Scale that minimizes the error estimate.	1e-009	[0, INF]
Error termination tolerance Termination tolerance on the result values.	1e-015	[0, INF]
Gradient error termination tolerance Termination tolerance on the conjugate gradient iteration.	1e-020	[0, INF]
Minimum change for calculation step Minimum change in variables for calculation.	1e-015	[0, INF]
Minimum change for finite differencing Minimum change in variables for finite differencing.	1e-006	[0, INF]

Optimized Parameters

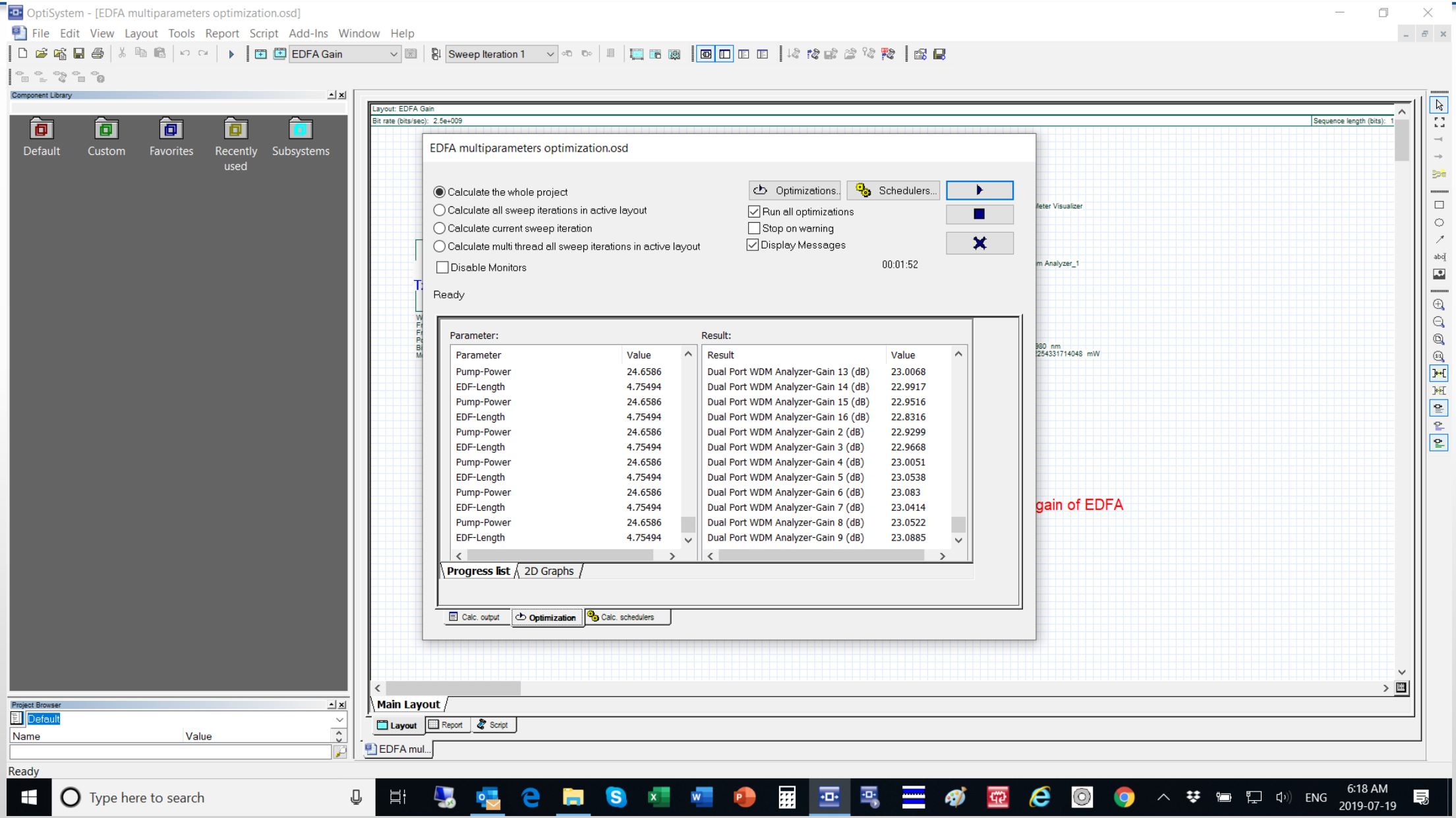




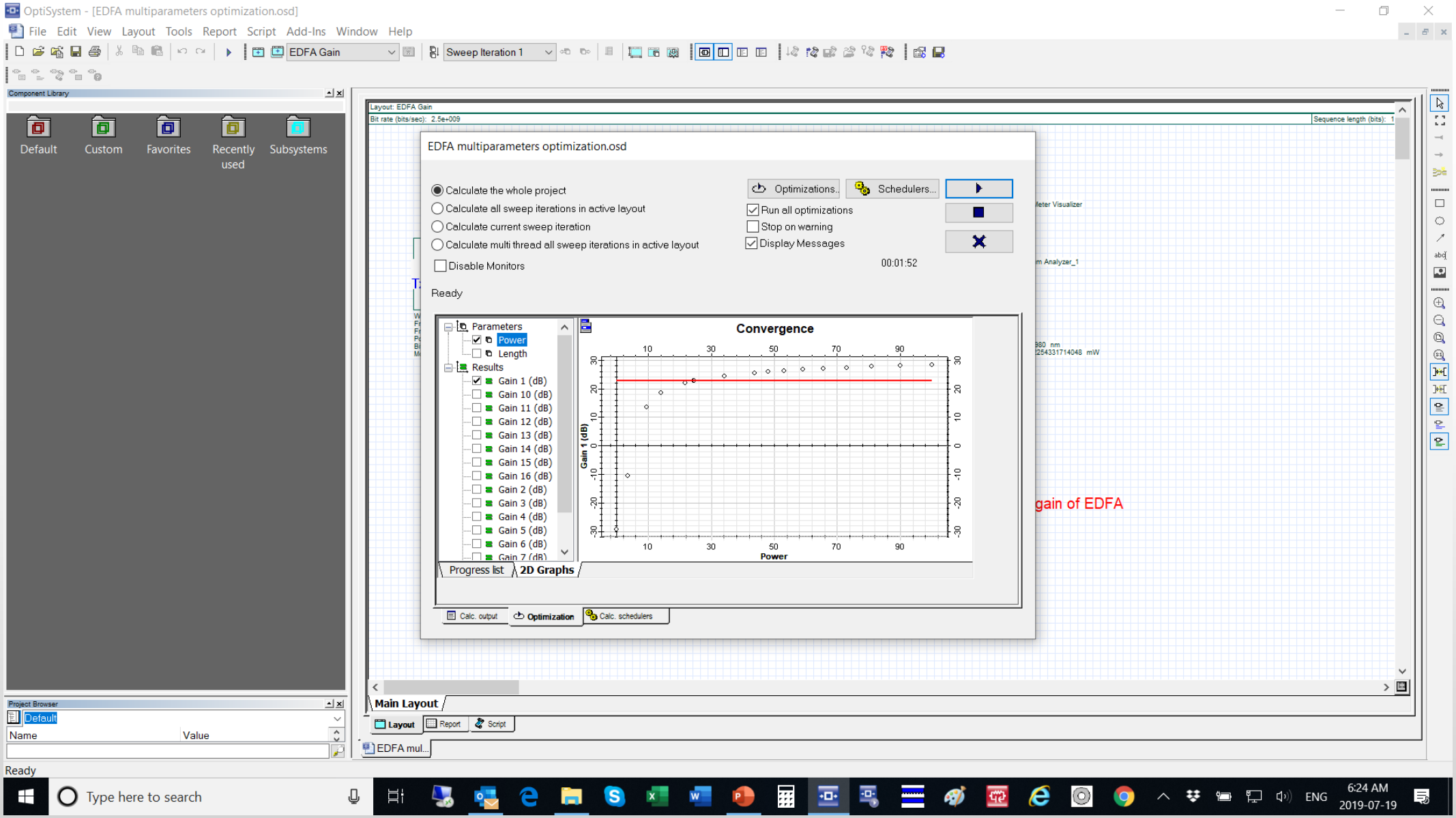
Optimization Result



MPO Optimization Progress

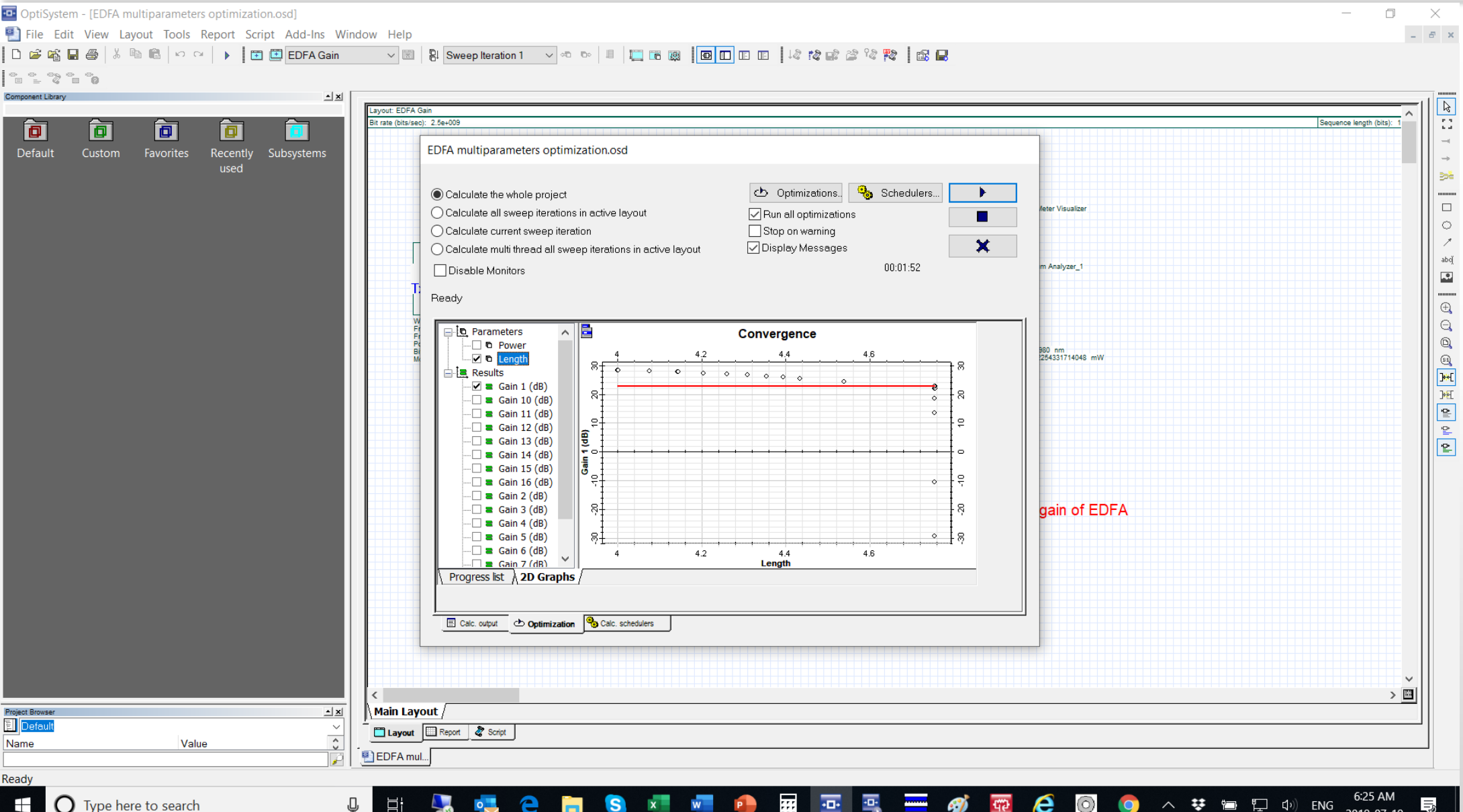


Pump Power Optimization Convergence



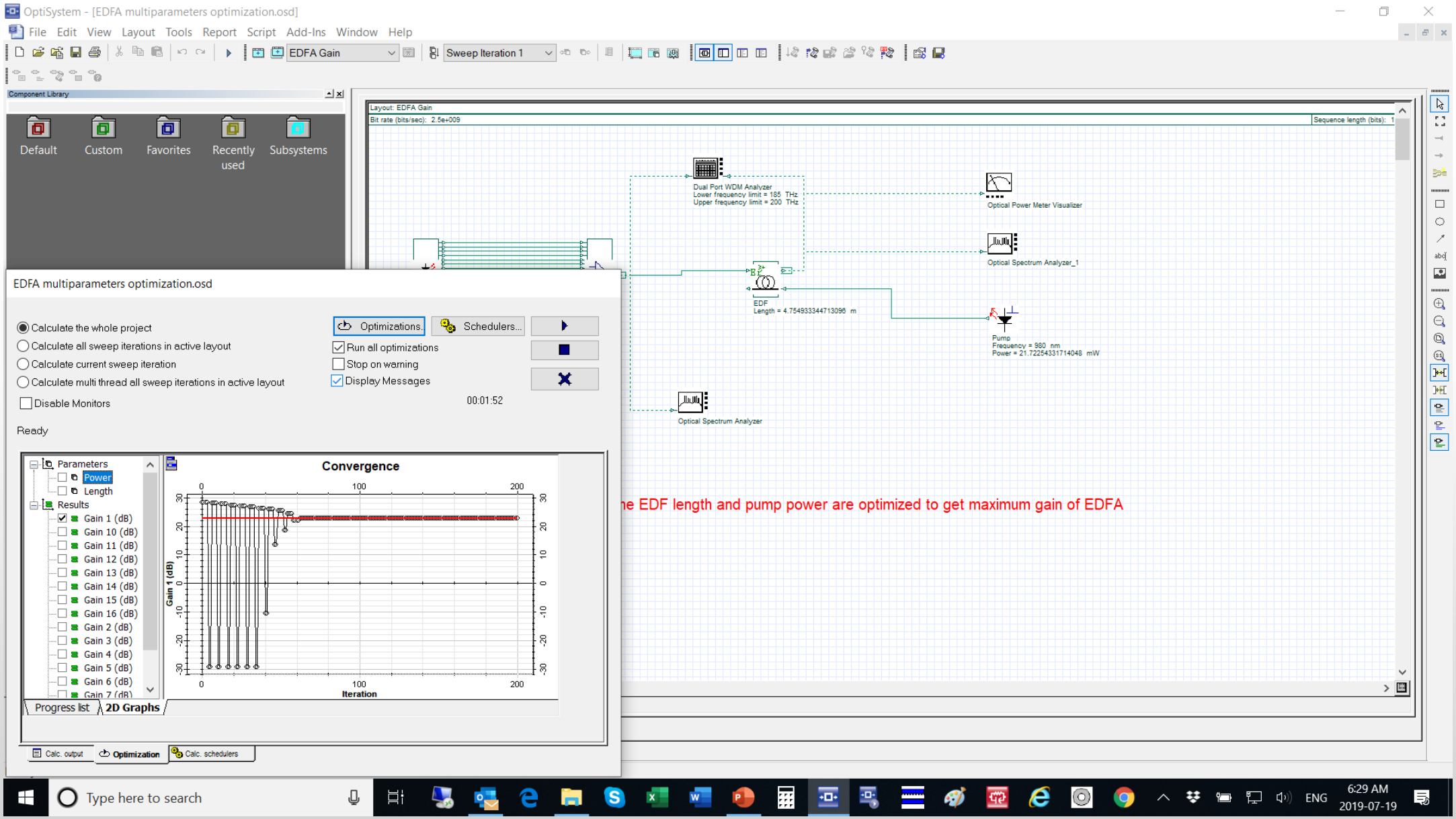
Pump power is optimized to achieve specific gain

EDF Length Optimization Convergence



EDF Length is optimized to achieve specific gain

No. of Passes Effect on Optimization Convergence



Optiwave
DESIGN SOFTWARE

Questions

support@optiwave.com

Reference

OptiSystem_User_Reference.pdf