RF track – project assignment

(October 2025)

Assignment A

Goal: Design a X1X2 Ohm 3dB 90◦ branch line coupler with center band (X1*X2+1 or X1X2) GHz using one of the technologies indicated in the file: EE4C05_RFTrack_poster_GeneralInfo.pdf.

Q1): Motivate the technology/substrate choice.

Q2): Use an impedance transformation (using lumped LC or Tlines) at each of the ports to convert it to 50 Ohm (if for your group X1X2 is equal to 50Ohm then transform to 75Ohm)

Q3): Present a realistic layout implementation of the branch line coupler

Q4): compare EM results with the ADS ones, and motivate differences.

To present on the poster presentation day:

To describe on the poster (please use two slide of A3 paper), sketch of the component structure, schematic view, clear use of the technology used, performance results

Schematics and ADS simulation results (such as S11-matching , S12 and S13 insertion loss, relative BW, port isolations and phase in-balance, operation of the matching network, etc.).

Remember each of the member of the group will have to answer to questions related to the project.

Student1 number=NNNNNNNX1
Student2 number=NNNNNNNX2

RF track – project assignment

(October 2025)

Assignment B

Goal: Design a X1X2 Ohm Wilkinson 3 dB power divider at (X1*X2+1 or X1X2) GHz using one of the technologies indicated in the file: EE4C05_RFTrack_poster_GeneralInfo.pdf.

Q1): Motivate the technology/substrate choice.

Q2): Choose the technology that according to you will minimize losses, and motivate this choice by comparing the performance of the Tline with at least another technology (use as comparison parameters both insertion loss and area).

Q3): Present a way to reduce the length of the line using a lumped equivalent line. You do not need to design the entire Wilkinson divider with it, only the line section.

Q4): Present a realistic layout implementation of the Wilkinson divider (account for dimension of the SMD component).

(Optional): compare EM results with the ADS ones, and motivate differences.

To present on the poster presentation day:

To describe on the poster (please use two slide of A3 paper), sketch of the component structure, schematic view, clear use of the technology used, performance results

Schematics and ADS simulation results (such as S11-matching , S12 and S13 insertion loss, relative BW, port isolations and phase in-balance, operation of the matching network, etc.).

Remember each of the member of the group will have to answer to questions related to the project.

Student1 number=NNNNNNNX1
Student2 number=NNNNNNNX2

RF track – project assignment

(October 2025)

Assignment C

Goal: Design a X1X2 Ohm 180◦ rat race at (X1*X2+1 or X1X2) GHz using one of the technologies indicated in the file: EE4C05_RFTrack_poster_GeneralInfo.pdf.

Q1): Motivate the technology/substrate choice.

Q2): Use an impedance transformation (using lumped LC or Tlines) at each of the ports to convert it to 50 Ohm (if for your group X1X2 is equal to 50Ohm then transform to 75Ohm)

Q3): Present a realistic layout

Q4): show comparison between momentum and schematic simulations.

To present on the poster presentation day:

To describe on the poster (please use two slide of A3 paper), sketch of the component structure, schematic view, clear use of the technology used, performance results

Schematics and ADS simulation results (such as S11-matching , S12 and S13 insertion loss, relative BW, port isolations and phase in-balance, operation of the matching network, etc.).

Remember each of the member of the group will have to answer to questions related to the project.

Student1 number=NNNNNNNX1
Student2 number=NNNNNNNX2

RF track – project assignment

(October 2025)

Assignment D

Goal) Design a X1X2 Ohm 16dB coupled line coupler (edge coupled) with center band (X1*X2+1 or X1X2) GHz using one of the technologies indicated in the file: EE4C05_RFTrack_poster_GeneralInfo.pdf.

Q1) Motivate the technology/substrate choice.

Q2): Use an impedance transformation (using lumped LC or Tlines) at each of the ports to convert it to 50 Ohm (if for your group X1X2 is equal to 50Ohm then transform to 75Ohm)

Q3) Present a realistic layout implementation of the branch line coupler

Q4): compare EM results with the ADS ones, and motivate differences.

To present on the poster presentation day:

To describe on the poster (please use two slide of A3 paper), sketch of the component structure, schematic view, clear use of the technology used, performance results

Schematics and ADS simulation results (such as S11-matching , S12 and S13 insertion loss, relative BW, port isolations and phase in-balance, operation of the matching network, etc.).

Remember each of the member of the group will have to answer to questions related to the project.

Student1 number=NNNNNNNX1
Student2 number=NNNNNNNX2