INDIAN INSTITUTE OF INFORMATION TECHNOLOGY,
DESIGN AND MANUFACTURING,
KANCHEEPURAM

RFMCD CIRCUIT DESIGN PRACTICE

RAT RACE HYBRID COUPLER DESIGN

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ESD19I008

Aim:

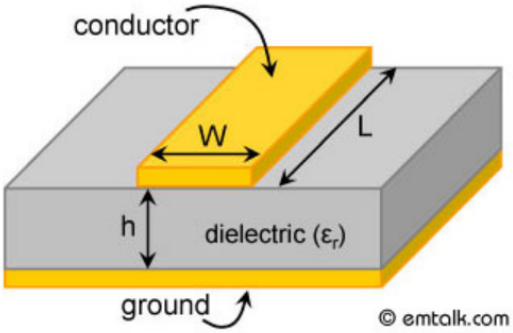
To design and analyze a rat race hybrid coupler.

Apparatus required:

ANSYS Electromagnetics Desktop

Dimensions and specifications:

Microstrip Line Calculator

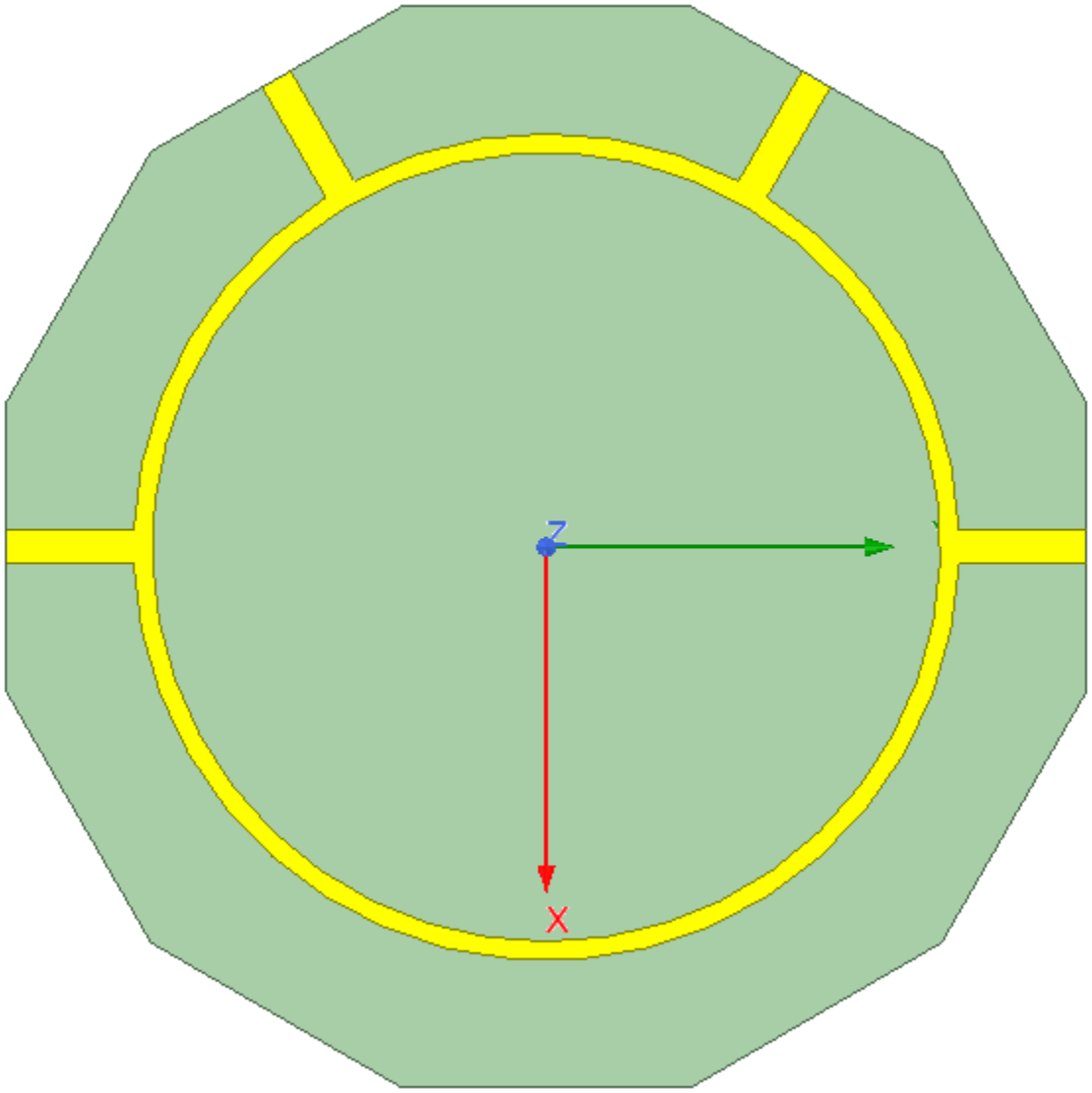


Substrate Parameters

Dielectric Constant (ε_r):	2.33	
Dielectric Height (h):	0.8	mm
Frequency:	1.8	GHz

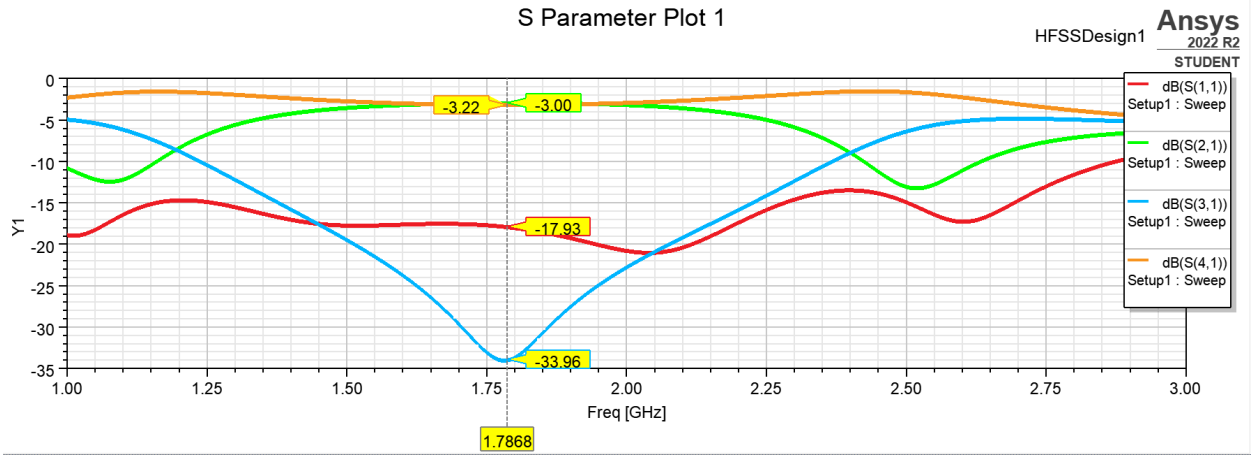
Electrical Parameters				Physical Parameters		
Zo:	70.7	Ω	Synthesize	Width (W):	1.3563643382131	mm
Elec. Length:	540	deg	Analyze	Length (L):	181.41782055754	mm

Design:



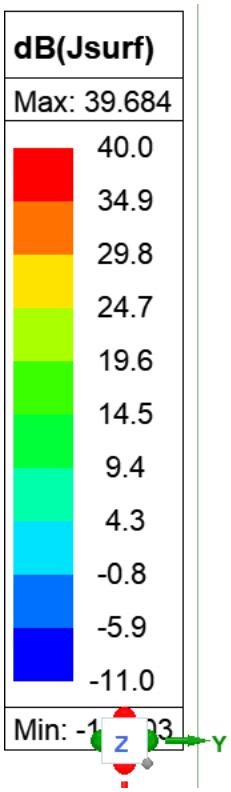
ACTIVITY 1:

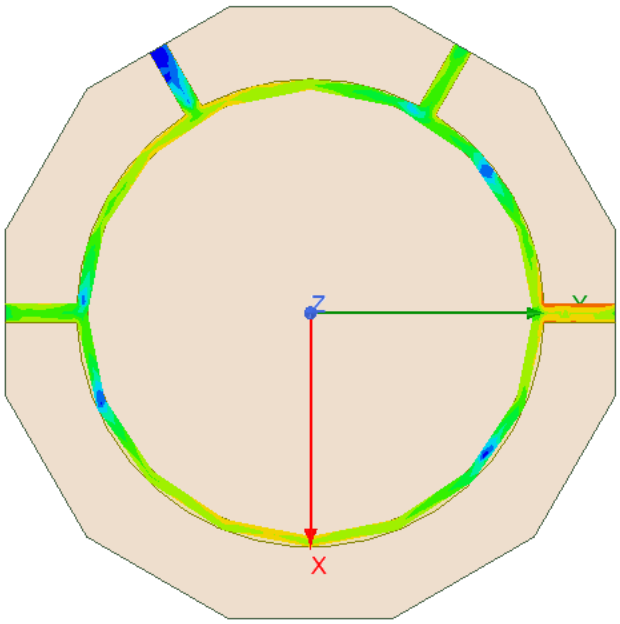
S parameter plot:



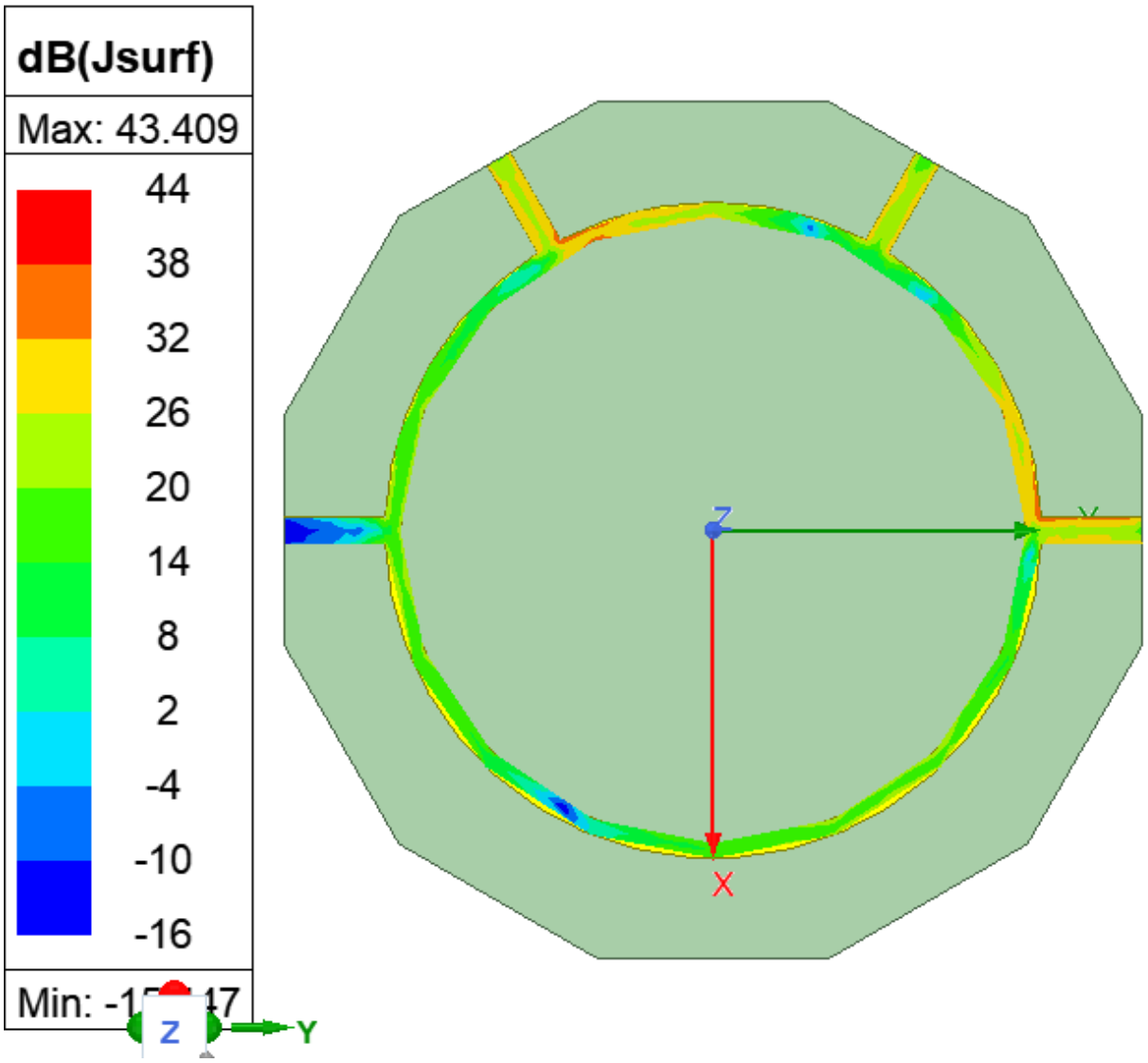
ACTIVITY 2:

Port 1 is excited:





Port 1 and Port 3 are excited:



Inference:

- When port 1 is excited, port 3 is isolated, power is equally distributed between port 2 and port 4.

- When port 1 and port 3 are excited, port 2 receives the sum of power and port 4 receives the difference of power.

Result:

Designed and analyzed rat race coupler.