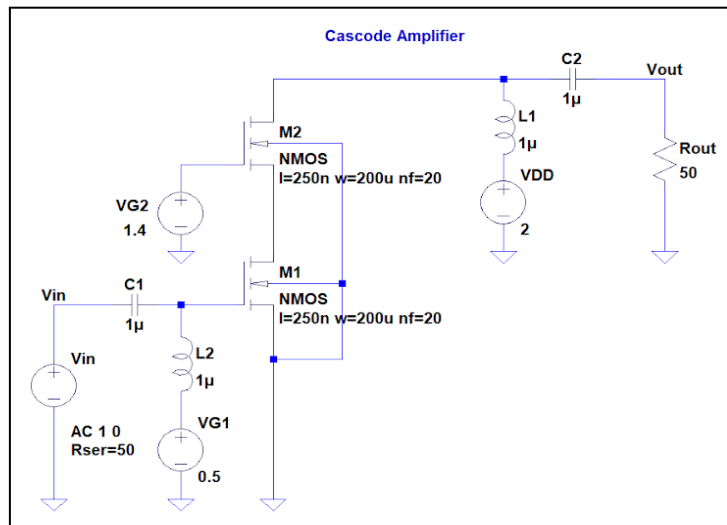


Cascode Amplifier Circuit:



Components:

Name	Components	LTspice Library	Value
M1, M2	MOSFET	nmos4	L=250nm, W=200μm, nf=20
L1, L2	Inductor	ind	1μH
C1, C2	Capacitor	cap	1μF
Rout	Resistor	res	50Ω
VG1	DC Voltage Source	voltage	0.5V
VG2	DC Voltage Source	voltage	1.4V
VDD	DC Voltage Source	voltage	2V
Vin	AC Voltage Source	voltage	Small Signal amplitude 1 and phase 0 and res 50Ω

DC Simulation: Operating Point

Simulation result:

```

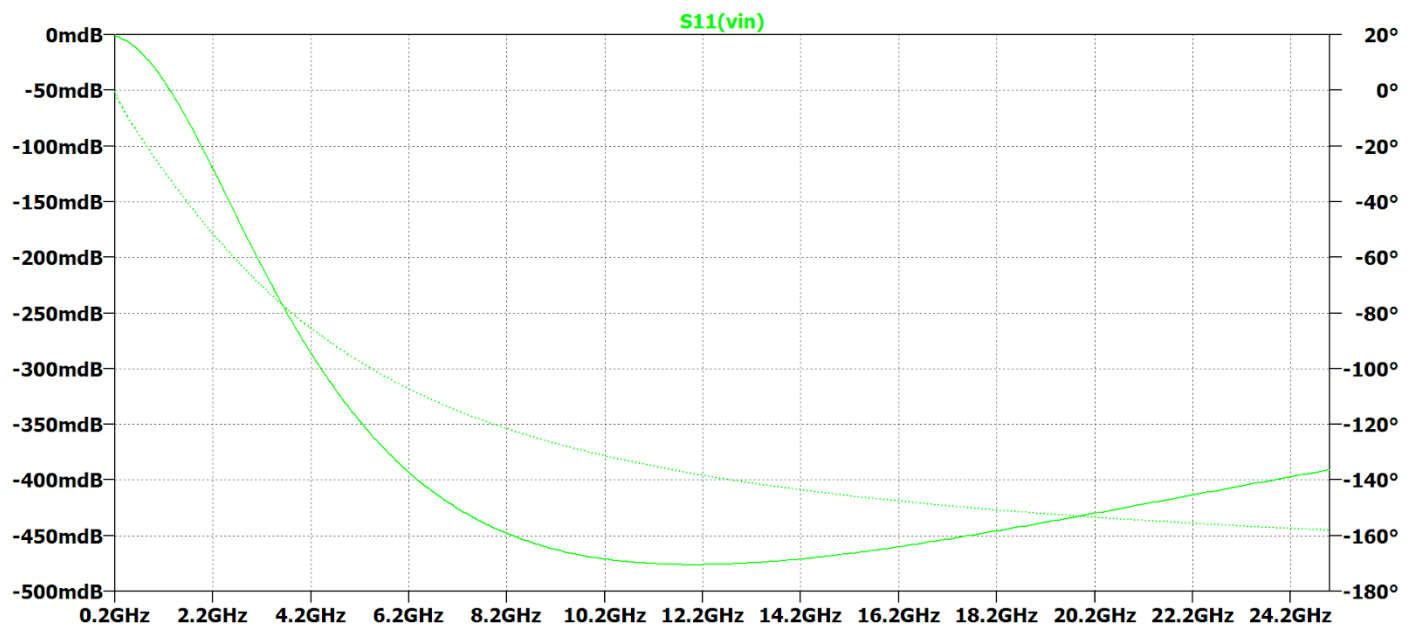
--- Operating Point ---

V(n004):      0.750063      voltage
V(n005):      0.5          voltage
V(n001):      1.99999      voltage
V(n002):      1.4          voltage
V(n003):      2            voltage
V(n006):      0.5          voltage
V(vout):      9.99996e-17  voltage
V(vin):       2.5e-17      voltage
V(m1#dbody):  1.28955e-11  voltage
V(m1#sbody):  7.19498e-12  voltage
V(m2#dbody):  1.27228e-08  voltage
V(m2#sbody):  1.27135e-08  voltage
Id(M1):       0.00742683   device_current
Ig(M1):       4.44241e-09   device_current
Ib(M1):       -4.21736e-12  device_current
Is(M1):       -0.00742683   device_current
Id(M2):       0.00742681   device_current
Ig(M2):       2.0838e-08    device_current
Ib(M2):       -6.77884e-09  device_current
Is(M2):       -0.00742683   device_current
I(C2):        -1.99999e-18  device_current
I(C1):        5e-19         device_current
I(L1):        -0.00742681   device_current
I(L2):        -4.44239e-09  device_current
I(Rout):      1.99999e-18    device_current
I(Vg1):       -4.44237e-09  device_current
I(Vdd):       -0.00742681   device_current
I(Vin):       5e-19         device_current
I(Vg2):       -2.0838e-08   device_current

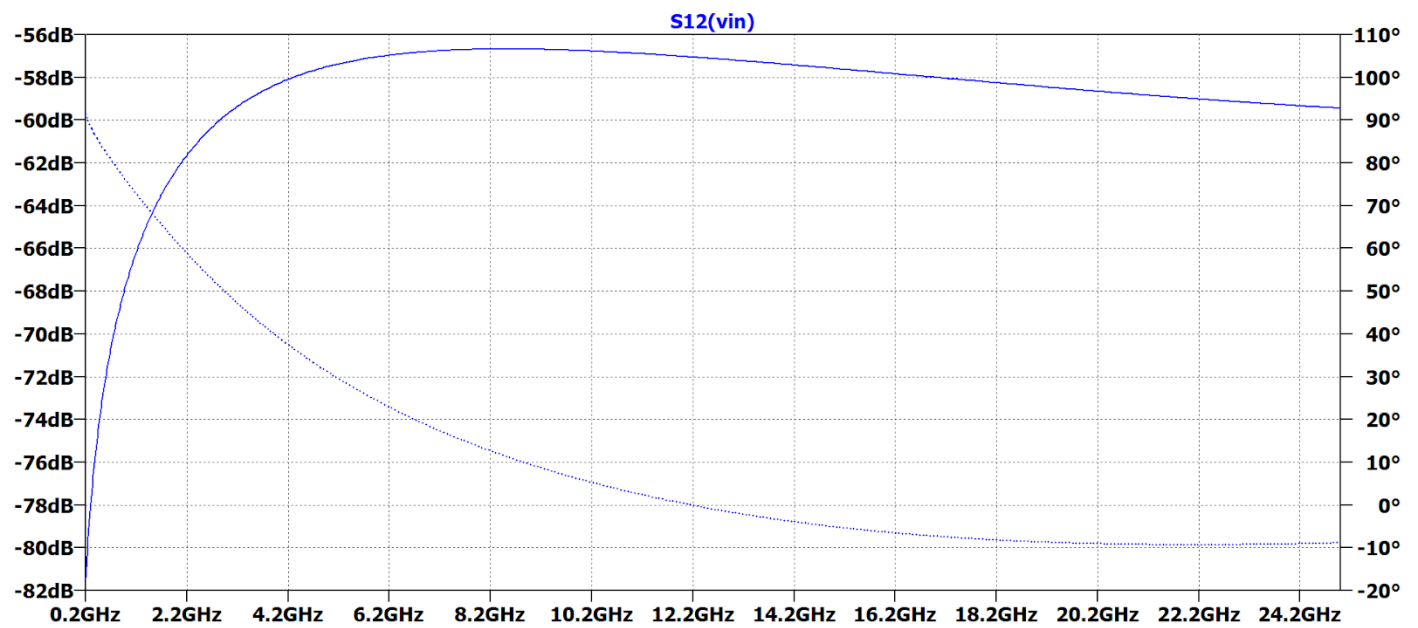
```

S-parameter Simulation:

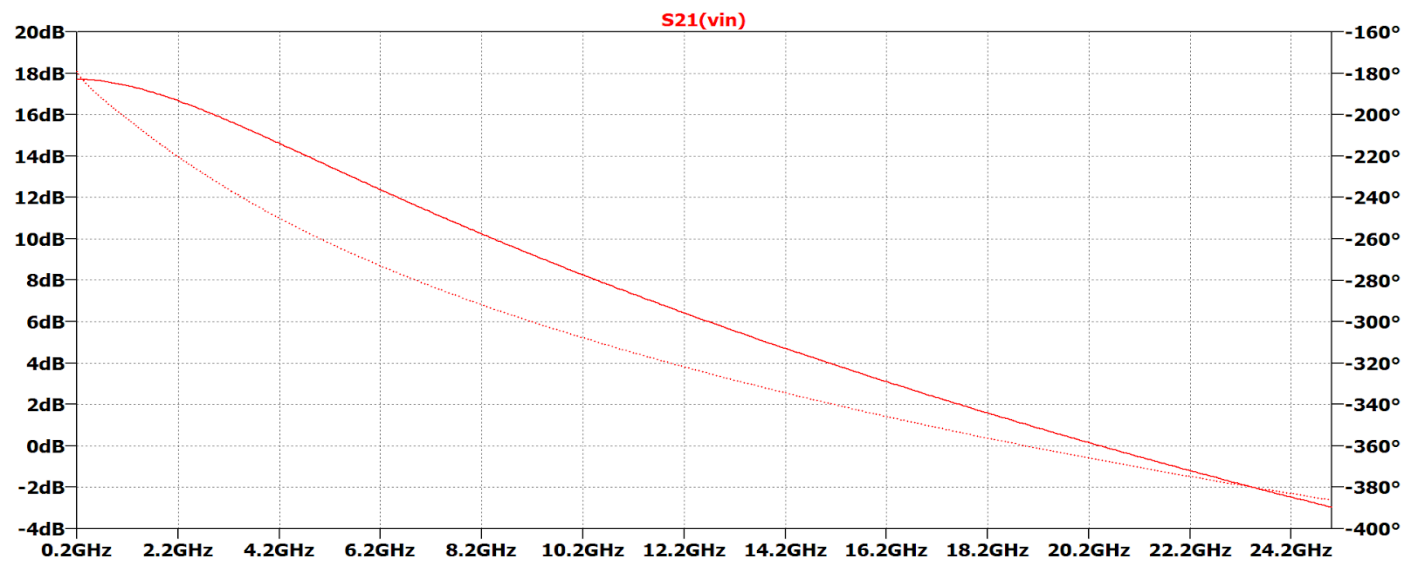
S11 plot:



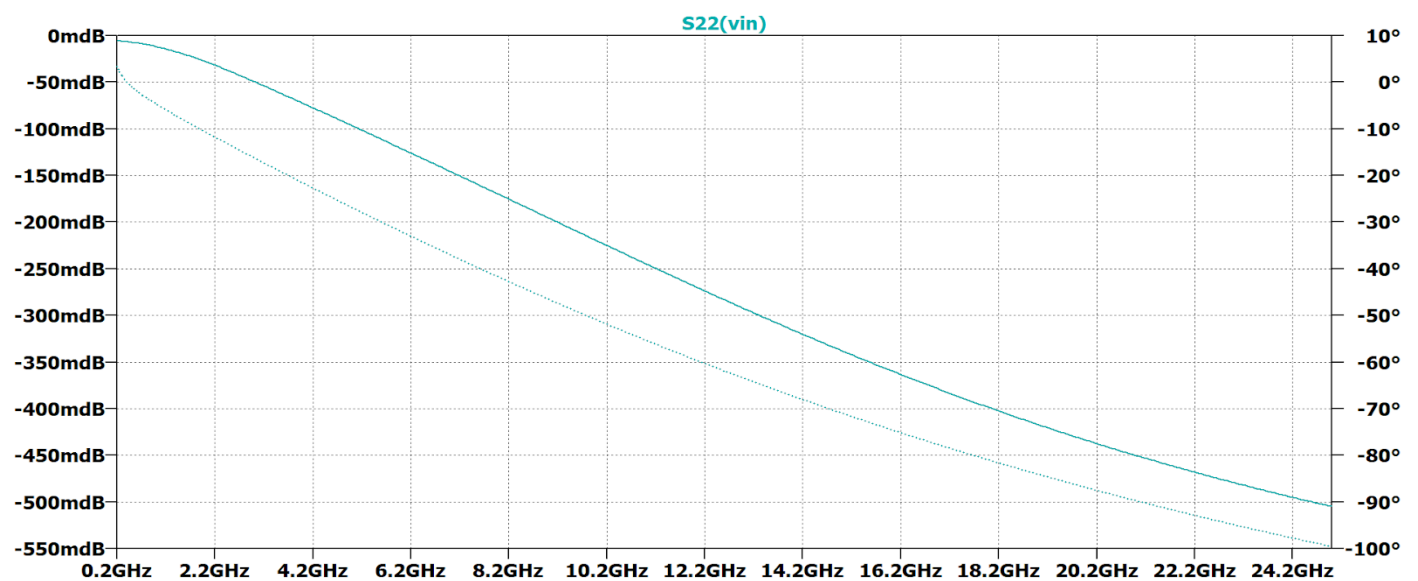
S12 plot:



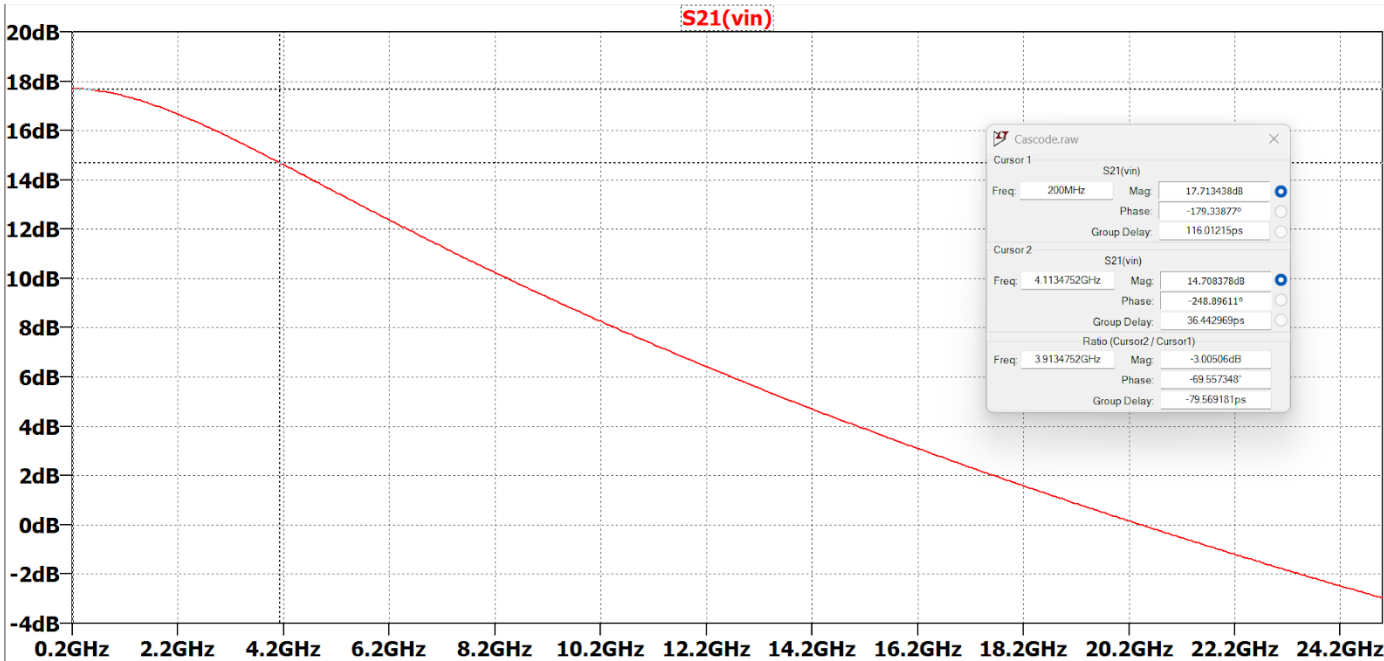
S21 plot:



S22 plot:

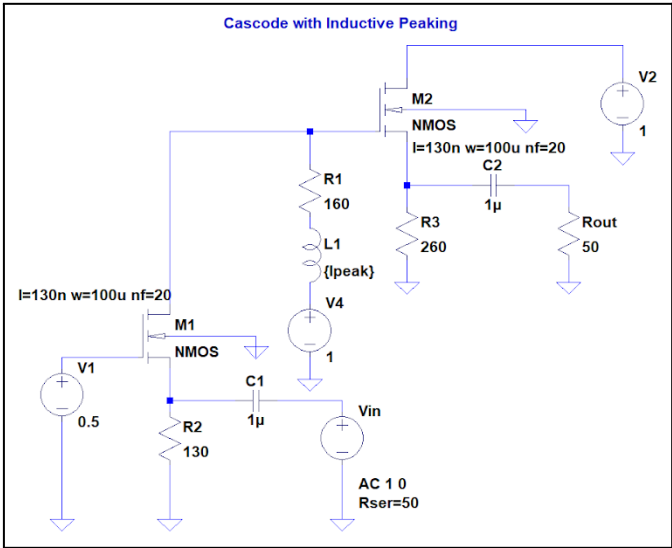


Gain-Bandwidth Product = $14.708\text{dB} \times 4.113\text{GHz} = 22.364\text{GHz}$



Cascode with Inductive Peaking:

Circuit:



Components:

Name	Components	LTspice Library	Value
M1, M2	MOSFET	nmos4	L=130nm, W=100μm, nf=20
L1	Inductor	ind	0nH, 0.5nH, 1nH, 3nH and 5nH
C1, C2	Capacitor	cap	1μF

Rout	Resistor	res	50Ω
R1	Resistor	res	160Ω
R2	Resistor	res	130Ω
R3	Resistor	res	260Ω
V1	DC Voltage Source	voltage	0.5V
V2	DC Voltage Source	voltage	1V
V4	DC Voltage Source	voltage	1V
Vin	AC Voltage Source	voltage	Small Signal amplitude 1 and phase 0 and res 50Ω

S-parameter Simulation:

S21 plot:

