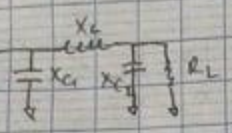
a, $f = 1 + 0,05 \cdot 91 = 5,55$ GHz

$V_{CC} = 10 + 0,5 \times 1 = 10,5$ V

b, $\eta_{max} = 70\% \Rightarrow 2\theta_c = 121°$

c, 

$P_0 = 3 \cdot 0,7 = 2,1$ W

$V_0 = V_{DC} = 10,5$ V

$\Rightarrow R = 26,25\ \Omega$

- $X_{C_1} = \frac{R}{Q} = 1,3125\ \Omega$

$\Rightarrow C_1 = 42$ pF

- $X_{C_2} = 1,81\ \Omega$

$\Rightarrow C_2 = 87$ pF

- $X_L = 3,2\ \Omega$

$\Rightarrow L = 486 \text{ nH} = 4,9 \cdot 10^{-10}$ H

d, $V_M = 2 V_{dc} = 21$, $\eta_{max} = 70\% \Rightarrow$ Class AB $\Rightarrow G_p = 0,125$

e, d, $V_0 = V_{DC} \Rightarrow V_{max} = 21$ V

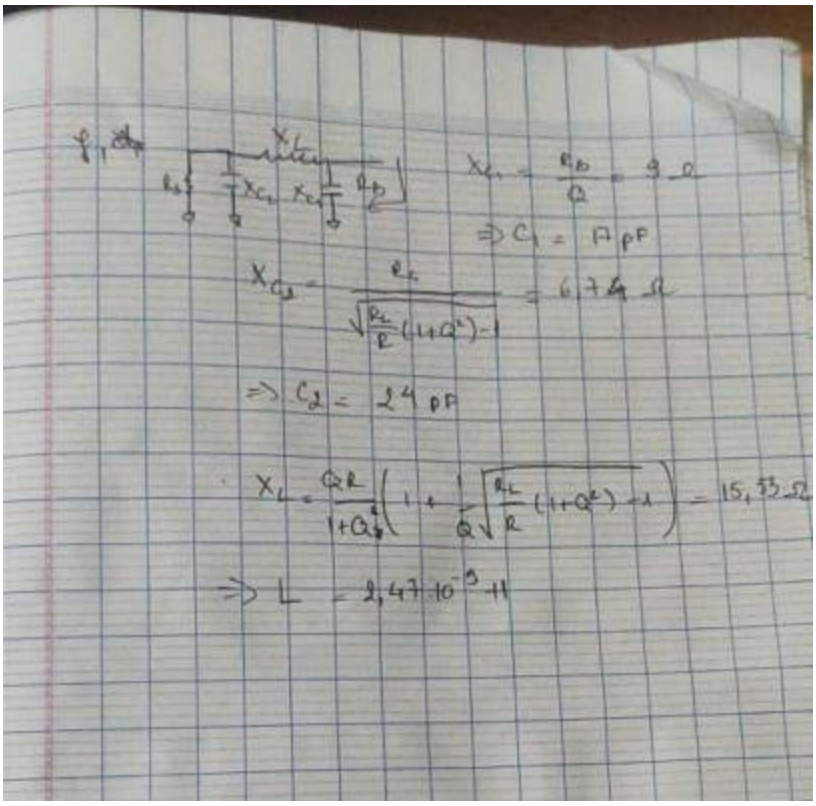
$I_0 = \frac{V_{DC}}{R} = 0,4$ A

$I_M = \frac{I_0}{\alpha_1(\theta_c)} = 0,77$ A

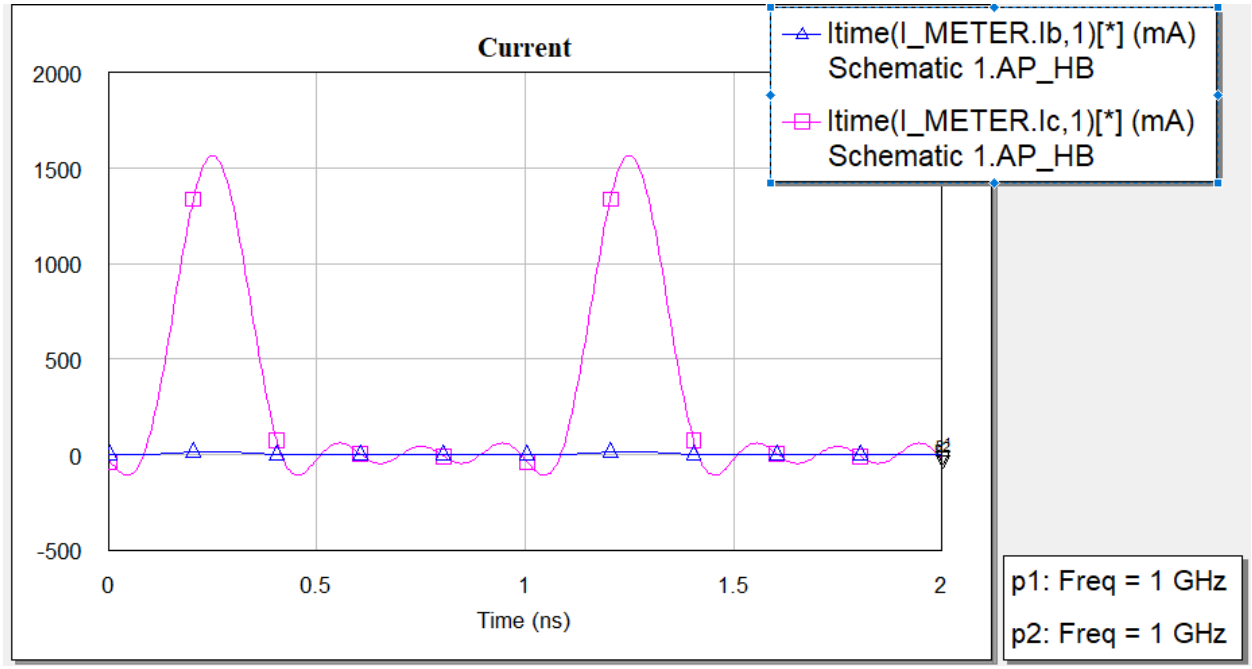
$I_b = \frac{I_0}{\beta \gamma_1(\theta_c)} = 0,006$ A

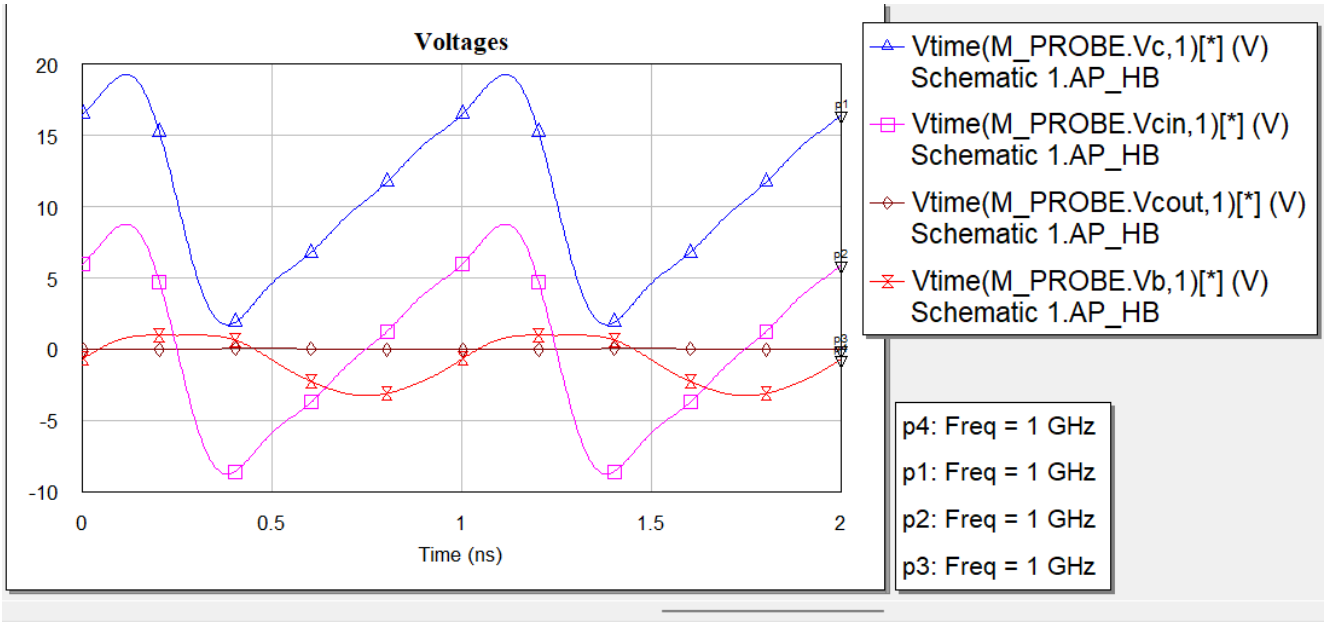
$V_b = I_b R_b = 4,6 \cdot 0,54$

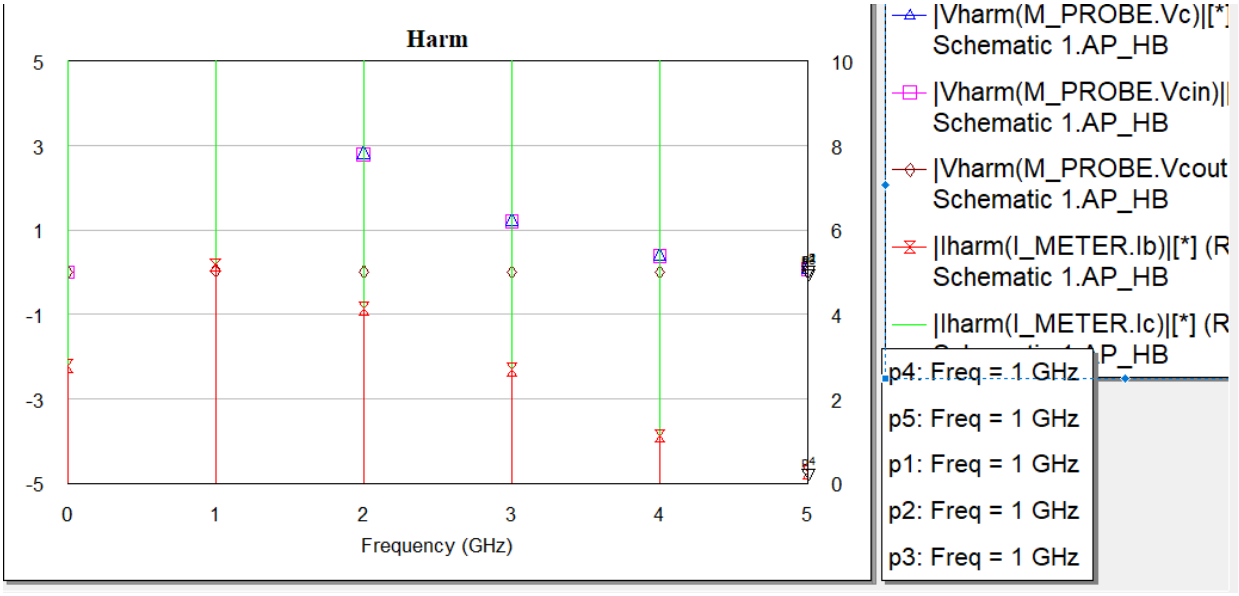
$V_{BB} = V_{BE(on)} - V_b \cos\theta_c = 0,89$ V



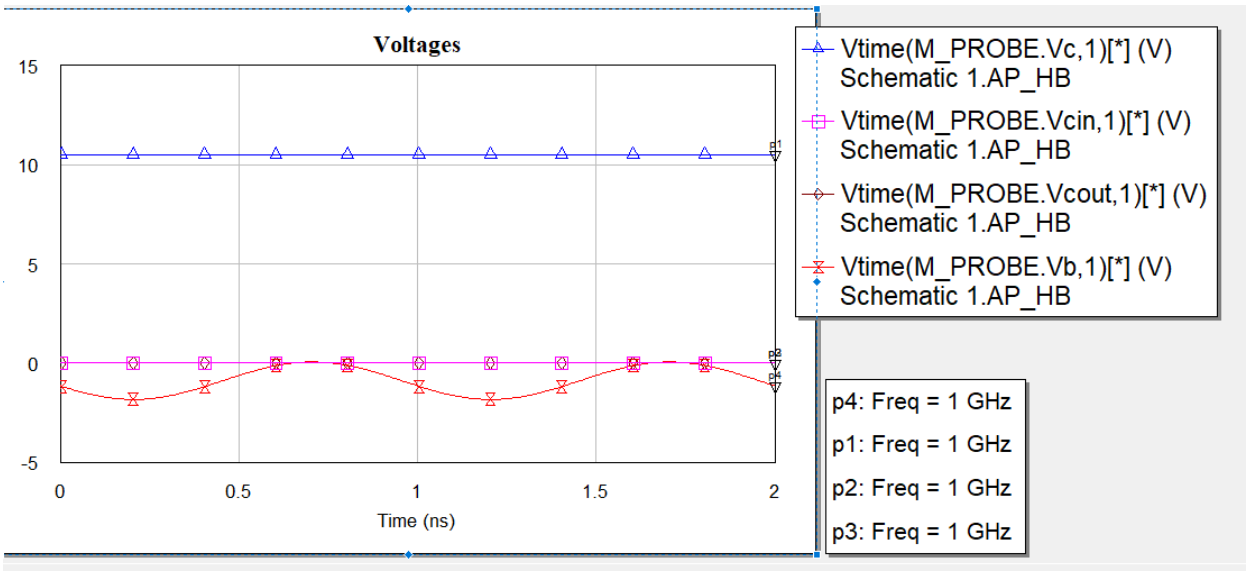
h,

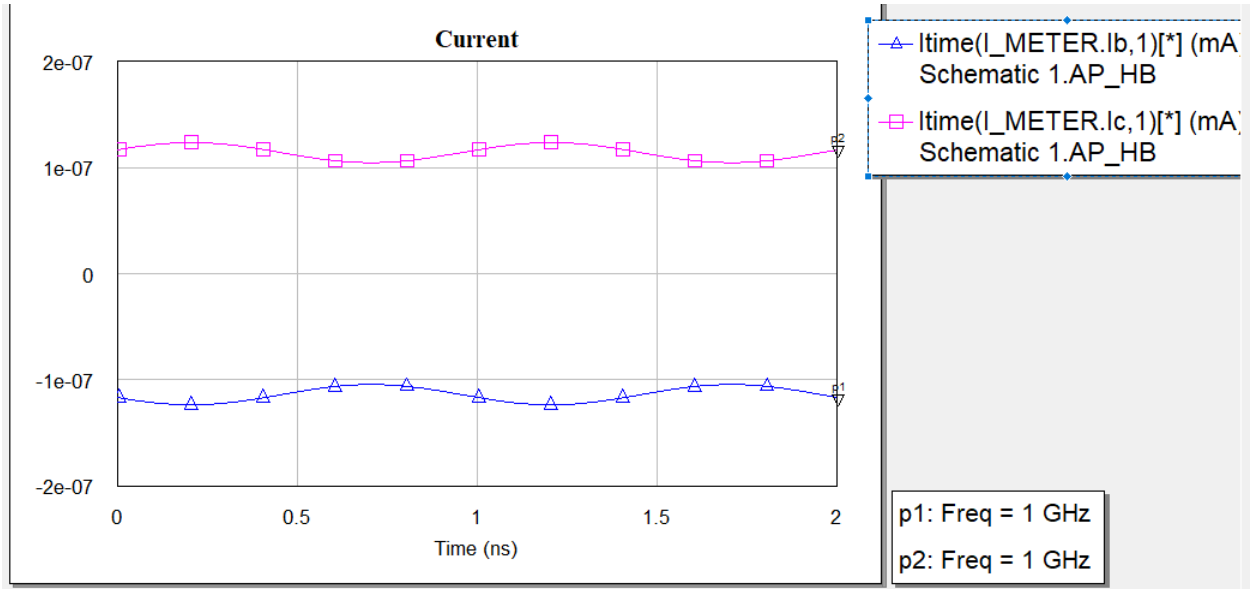

Current
Itime(I_METER.Ib,1)[*] (mA)
Schematic 1.AP_HB
Itime(I_METER.Ic,1)[*] (mA)
Schematic 1.AP_HB
2000
1500
1000
500
0
-500
0
0.5
1
1.5
2
Time (ns)
p1: Freq = 1 GHz
p2: Freq = 1 GHz

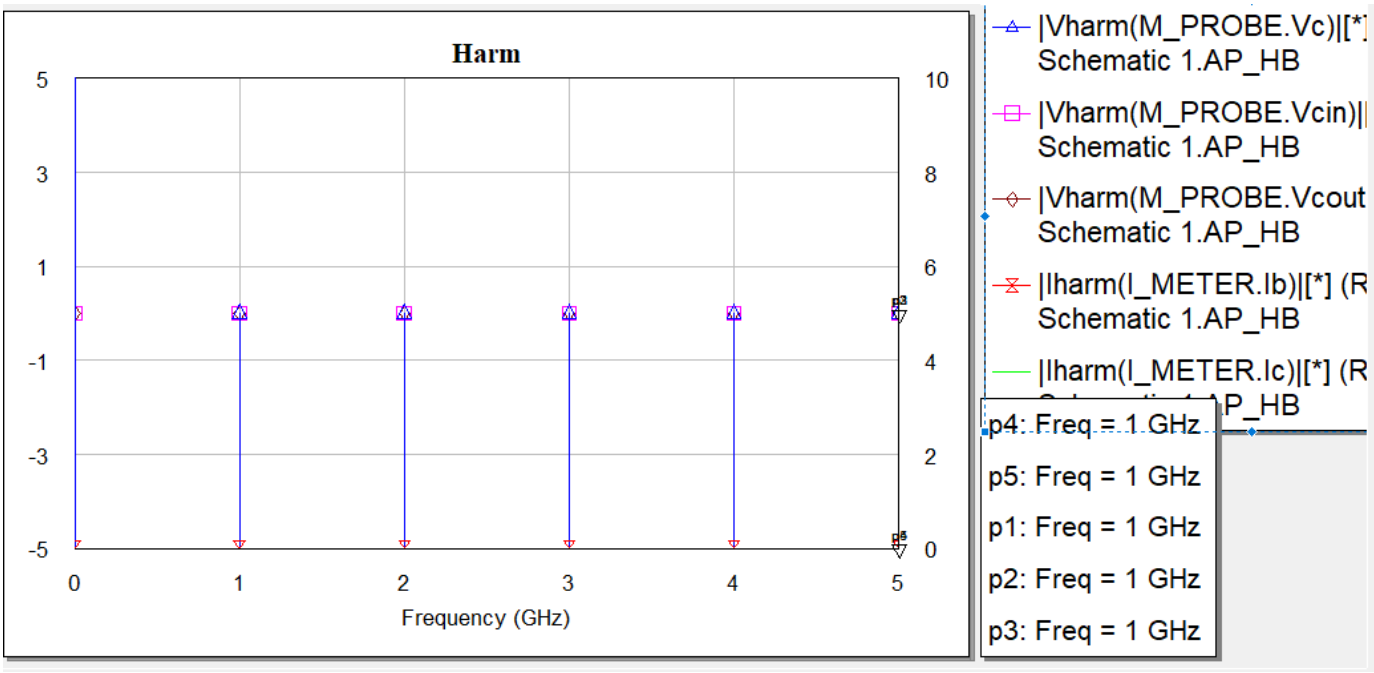

Voltages
20
15
10
5
0
-5
-10
0
0.5
1
1.5
2
Time (ns)
Vtime(M_PROBE.Vc,1)[*] (V)
Schematic 1.AP_HB
Vtime(M_PROBE.Vcin,1)[*] (V)
Schematic 1.AP_HB
Vtime(M_PROBE.Vcout,1)[*] (V)
Schematic 1.AP_HB
Vtime(M_PROBE.Vb,1)[*] (V)
Schematic 1.AP_HB
p4: Freq = 1 GHz
p1: Freq = 1 GHz
p2: Freq = 1 GHz
p3: Freq = 1 GHz


Harm
5
3
1
-1
-3
-5
10
8
6
4
2
0
0
1
2
3
4
5
Frequency (GHz)
|Vharm(M_PROBE.Vc)|[*]
Schematic 1.AP_HB
|Vharm(M_PROBE.Vcin)|
Schematic 1.AP_HB
|Vharm(M_PROBE.Vcout
Schematic 1.AP_HB
|Iharm(I_METER.Ib)|[*] (R
Schematic 1.AP_HB
|Iharm(I_METER.Ic)|[*] (R
p4: Freq = 1 GHz
p5: Freq = 1 GHz
p1: Freq = 1 GHz
p2: Freq = 1 GHz
p3: Freq = 1 GHz

i,


Voltages
15
10
5
0
-5
0
0.5
1
1.5
2
Time (ns)
Vtime(M_PROBE.Vc,1)[*] (V)
Schematic 1.AP_HB
Vtime(M_PROBE.Vcin,1)[*] (V)
Schematic 1.AP_HB
Vtime(M_PROBE.Vcout,1)[*] (V)
Schematic 1.AP_HB
Vtime(M_PROBE.Vb,1)[*] (V)
Schematic 1.AP_HB
p4: Freq = 1 GHz
p1: Freq = 1 GHz
p2: Freq = 1 GHz
p3: Freq = 1 GHz


Current
2e-07
1e-07
0
-1e-07
-2e-07
0
0.5
1
1.5
2
Time (ns)
Itime(I_METER.Ib,1)[*] (mA
Schematic 1.AP_HB
Itime(I_METER.Ic,1)[*] (mA
Schematic 1.AP_HB
p1: Freq = 1 GHz
p2: Freq = 1 GHz



j,

Các kết quả đo và so sánh trùng khớp với nhau