2. Stub matching using smith chart

Freq of operation : 300Mhz
Load (Z_L) Impedance : 100 + j156
Feedline : 50Ω, v_p = .89c, 50 ft to Antenna/stub

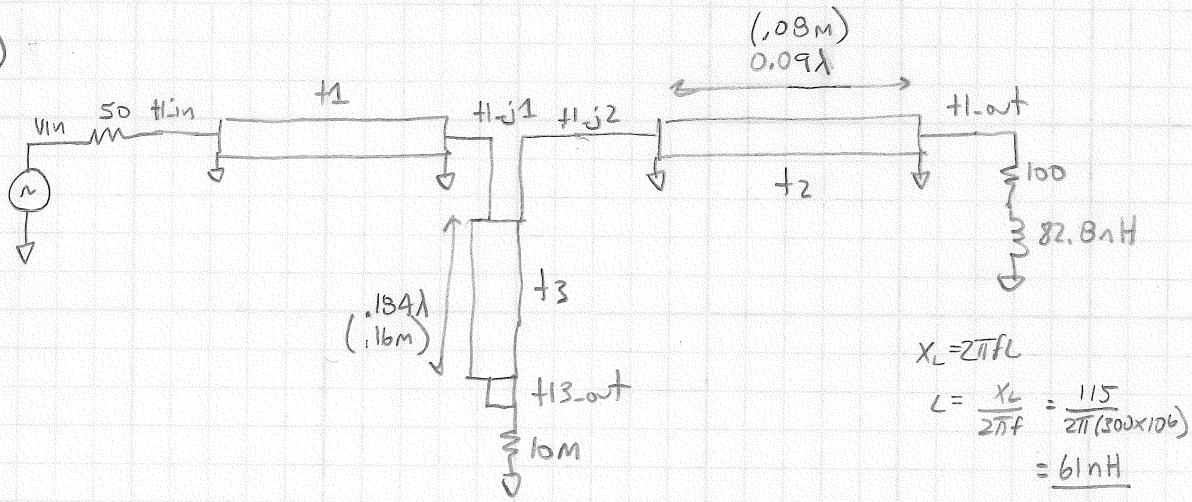
Normalized feedpoint $Z = 2 + j3.12$

λ @ 300Mhz $= \frac{0.89c}{300 \times 10^6} = 0.89$ meters

$\frac{50ft}{1} \frac{1meter}{3.28ft} = 15.24$ meters or 17.13λ

@300Mhz j156 = $L = \frac{156}{2\pi(300 \times 10^6)} = 82.8nH$ (for spice sim)

1a)



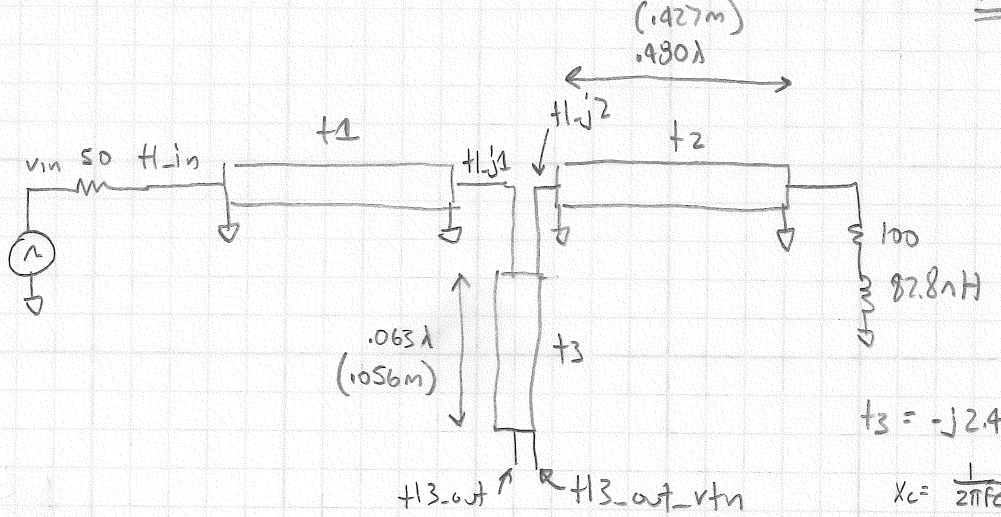
$X_L = 2\pi f L$

$L = \frac{X_L}{2\pi f} = \frac{115}{2\pi(300 \times 10^6)}$

$= 61nH$

$t3 \equiv 61nH$

1c)



$t3 = -j2.4$

$X_C = \frac{1}{2\pi f C}$

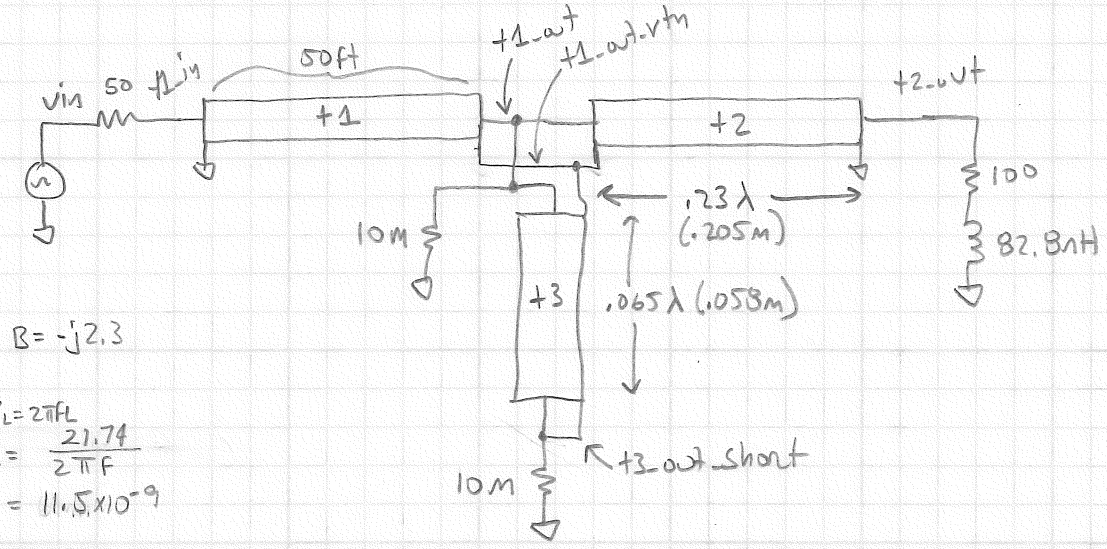
$C = \frac{1}{X_C 2\pi f} = \frac{1}{120(2\pi)(300 \times 10^6)}$

$C = 4pF$

$t3 \equiv 4pF$

smith_match1

1b)



t_3: $B = -j2.3$

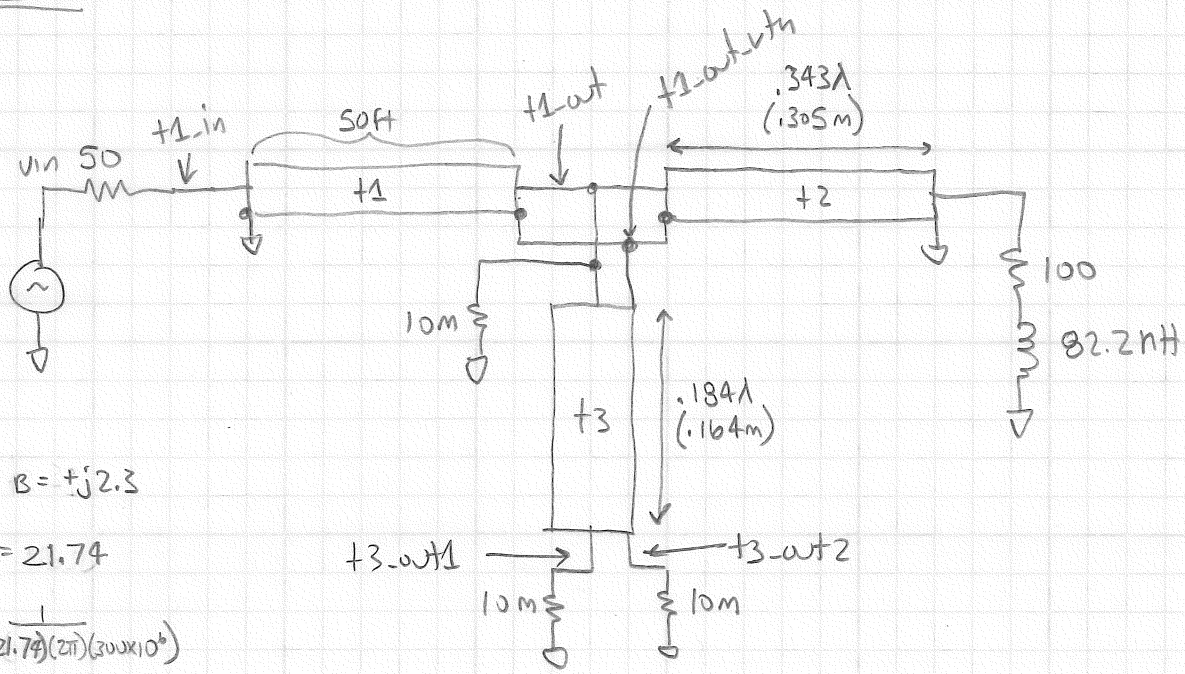
$X_L = 2\pi fL$

$L = \frac{21.74}{2\pi F}$

$= 11.5 \times 10^{-9}$

$t_3 \equiv 11.5nH$

1d)



t_3: $B = +j2.3$

$B_{T3} = 21.74$

$C = \frac{1}{(21.74)(2\pi)(300 \times 10^6)}$

$= 24.4pF$

$t_3 \equiv 24.4pF$

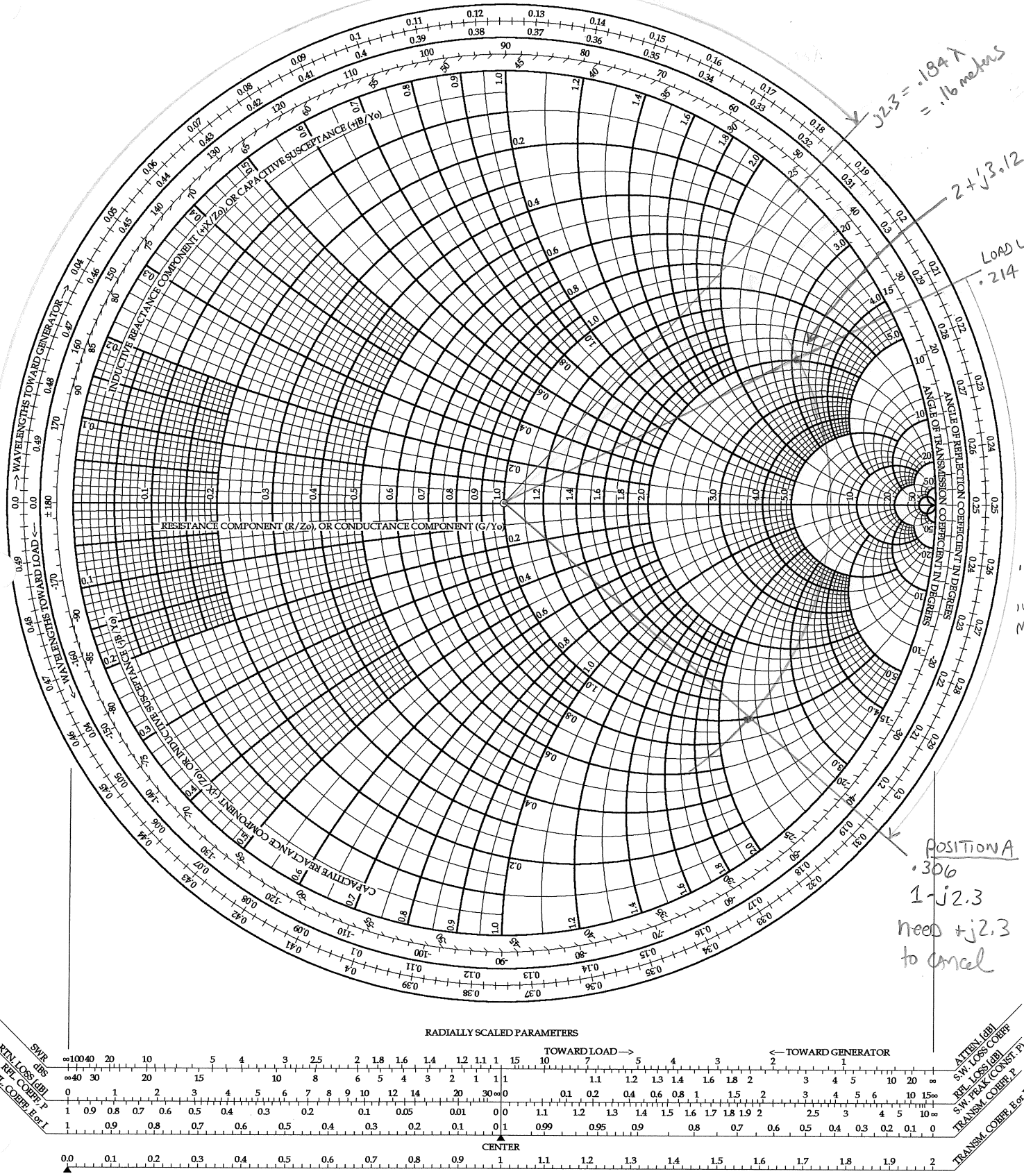
"A" network - series connected, short circuit stub at nearest position

~~Position A or B~~

Smith_match 1

Smith Chart

stub length =



j2.3 = .184 λ = .16 meters

2 + j3.12

LOAD LINE .214

.091 λ = .08 meters

POSITION A

.306

1 - j2.3

need +j2.3 to cancel

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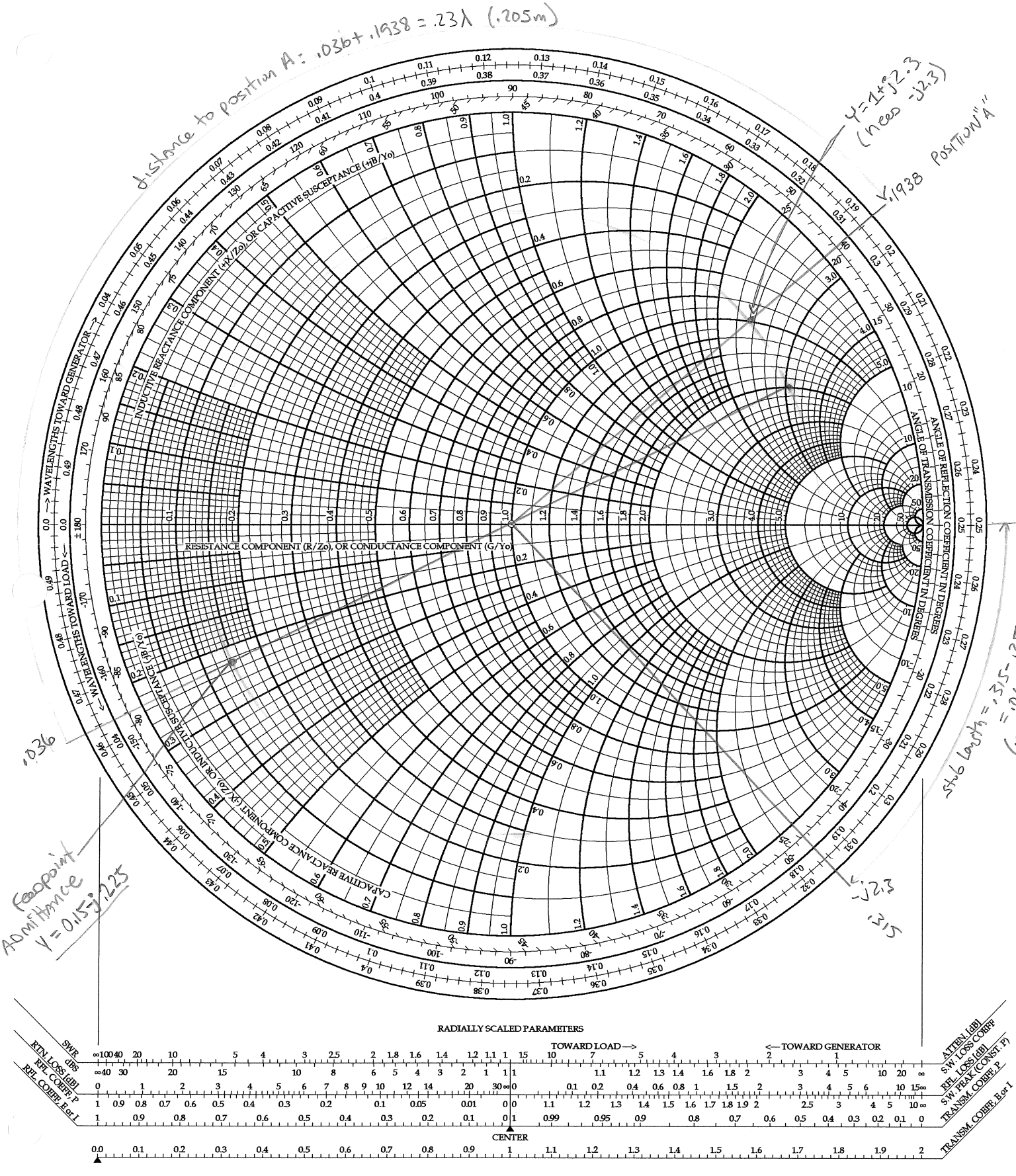
"B" network - shunt connected, short circuit stub at first position

Smith-match 1

Smith Chart



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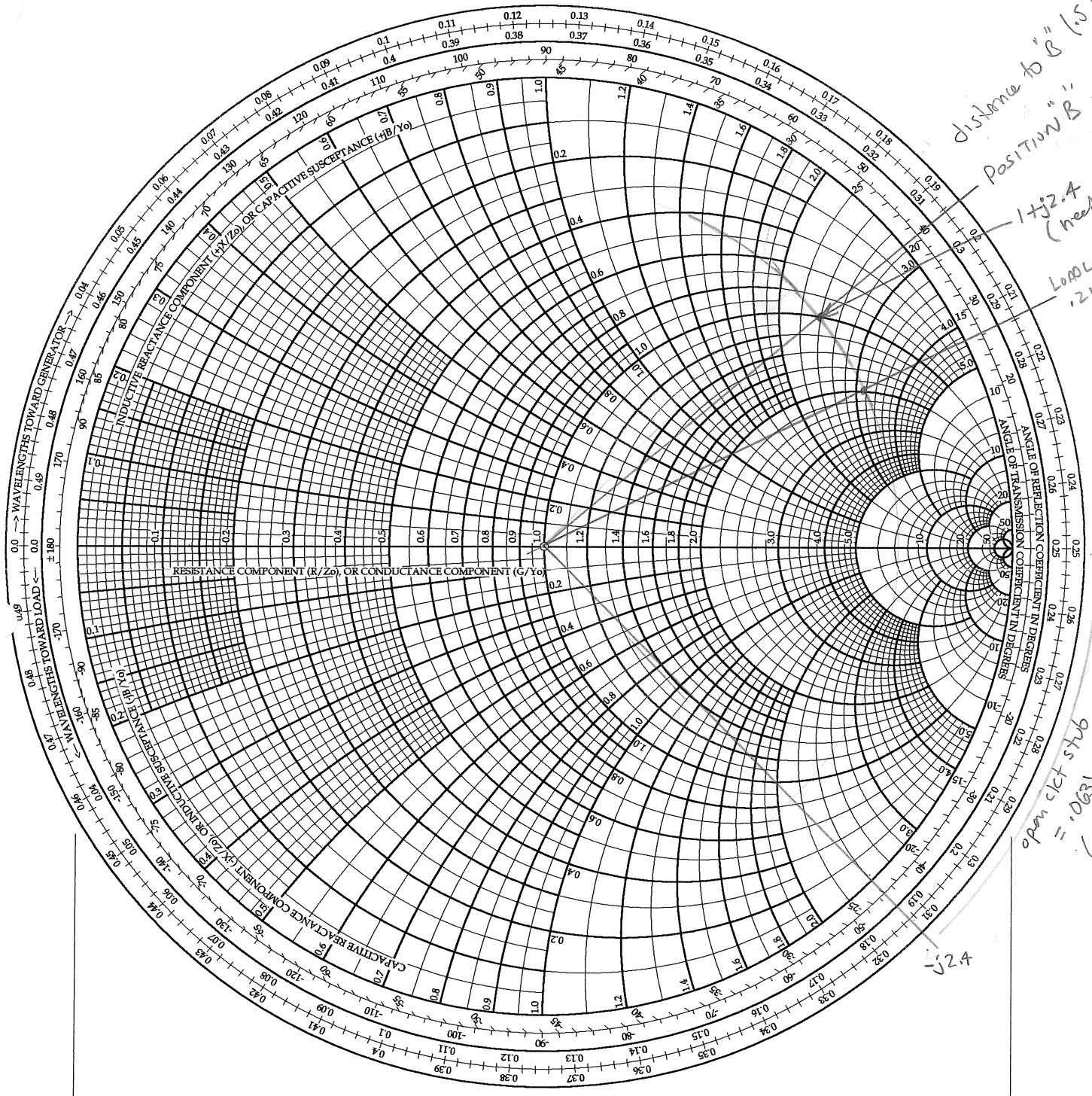
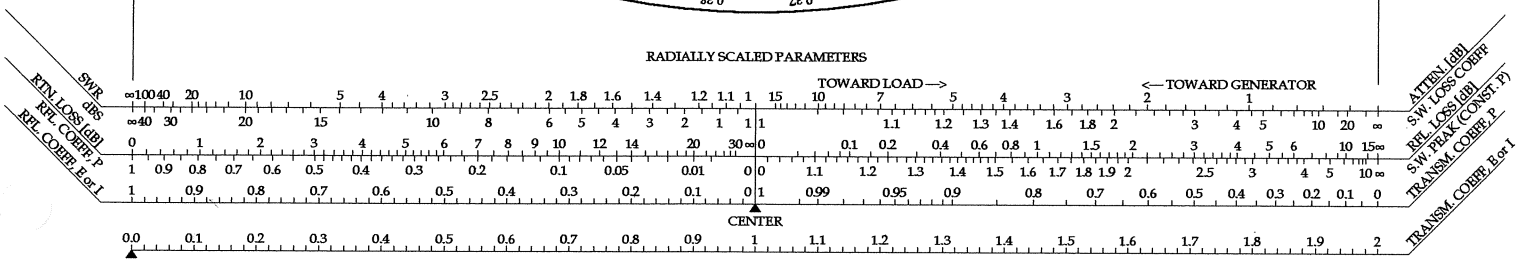
"C" Network - series connected, open circuit stub @ 2nd nearest position

Stub length
Smith_match1

Smith Chart





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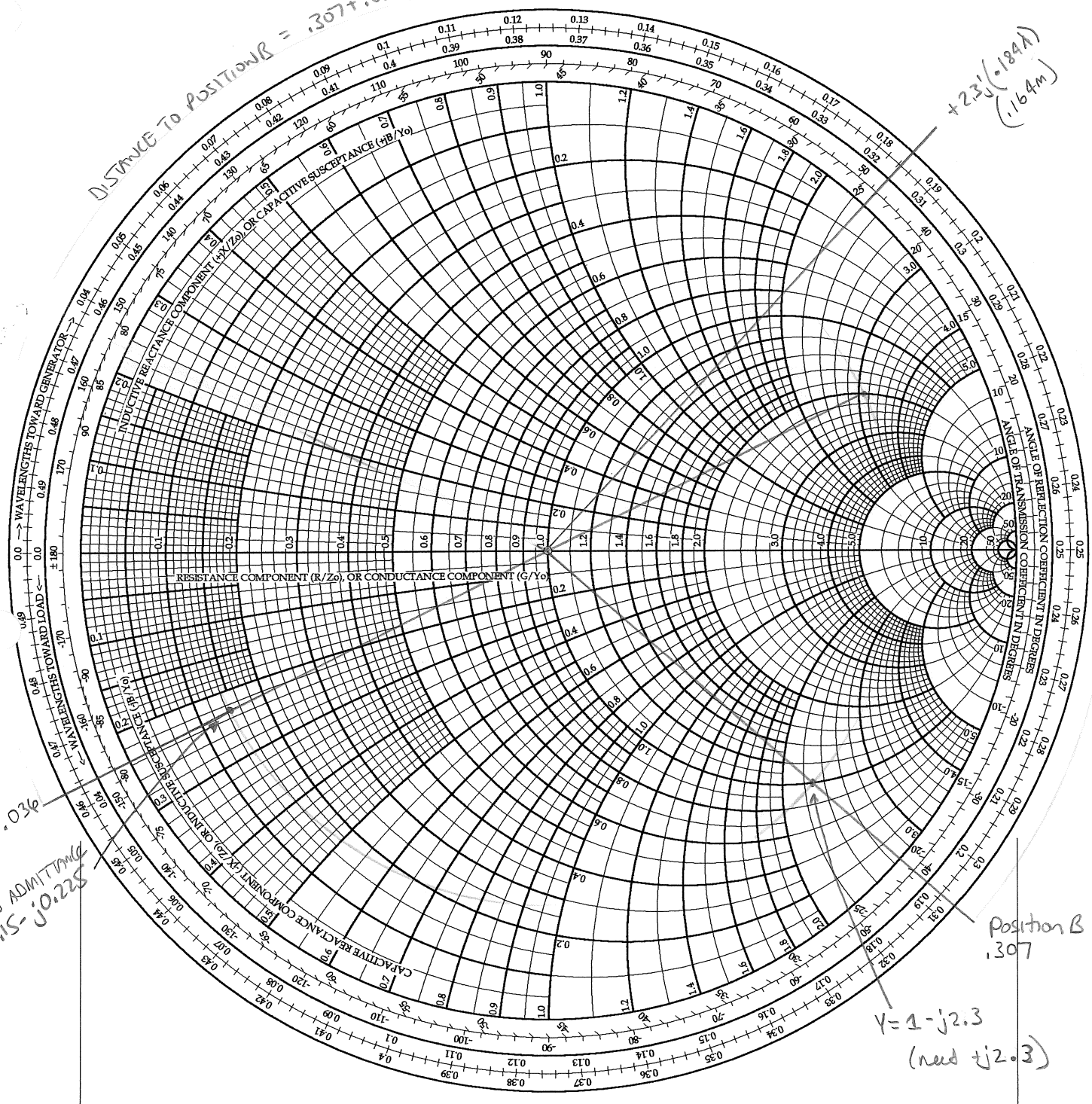
"D" Network shunt connection, open ckt stub to 2nd nearest position.

smitch_match1

Smith Chart



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