LAMPIRAN 1

Perhitungan impedansi input pada antenna mikrostrip segitiga :

$$Z = R + jX = -j\omega\mu_0 \sum_{n=0}^{\infty} \sum_{m=n}^{\infty} \frac{4\sqrt{3}tC''_{mn}}{27a^2} \left[\cos\left(\frac{2\pi ld}{\sqrt{3}a}\right) j\left(\frac{\pi l 2w}{\sqrt{3}a}\right) + \right.$$

$$\left. \cos\left(\frac{2\pi md}{\sqrt{3}a}\right) j\left(\frac{\pi m 2w}{\sqrt{3}a}\right) + \cos\left(\frac{2\pi nd}{\sqrt{3}a}\right) j\left(\frac{\pi n 2w}{\sqrt{3}a}\right) \right]^2 x \left[\frac{\left(\omega^2 - \omega^2{}_{mn}\right)\mu_0\varepsilon + j\delta_{eff}k^2}{\left(\omega^2 - \omega^2{}_{mn}\right)^2 \mu^2{}_0\varepsilon^2 + j\delta^2{}_{eff}k^4} \right]$$

Dimana :

$$k_{mn} = \frac{4\pi}{3a}\left(m^2 + mn + n^2\right)^{1/2}$$

$$k_{mn} = \frac{4.3.14}{3.32}\left(1^2 + 1.0 + 0^2\right)^{1/2}$$

dan C”$_{mn}$= 6

$$Z = R + jX = -j\omega\mu_0 \sum_{n=0}^{\infty} \sum_{m=n}^{\infty} \frac{4\sqrt{3}tC''_{mn}}{27a^2} \left[\cos\left(\frac{2\pi ld}{\sqrt{3}a}\right) j\left(\frac{\pi l 2w}{\sqrt{3}a}\right) + \right.$$

$$\left. \cos\left(\frac{2\pi md}{\sqrt{3}a}\right) j\left(\frac{\pi m 2w}{\sqrt{3}a}\right) + \cos\left(\frac{2\pi nd}{\sqrt{3}a}\right) j\left(\frac{\pi n 2w}{\sqrt{3}a}\right) \right]^2 x \left[\frac{\left(\omega^2 - \omega^2{}_{mn}\right)\mu_0\varepsilon + j\delta_{eff}k^2}{\left(\omega^2 - \omega^2{}_{mn}\right)^2 \mu^2{}_0\varepsilon^2 + \delta^2{}_{eff}k^4} \right]$$

$$Z = R + jX = (-j.2.\pi.1{,}9.10^{9}.4.\pi.10^{-7}) \left(\frac{4\sqrt{3.0{,}0025}.6}{27.(0{,}032)^2} \right) x$$

$$\left[\cos\left(\frac{2\pi.0{,}045.2.0{,}016}{\sqrt{3}.0{,}032}\right) j\left(\frac{\pi.0{,}045.2.0{,}005}{\sqrt{3}.0{,}032}\right) + \cos\left(\frac{2\pi.1.0{,}016}{\sqrt{3}.0{,}032}\right) j\left(\frac{\pi.1.2.0{,}005}{\sqrt{3}.0{,}032}\right) + \right.$$

$$\left. \cos\left(\frac{2\pi.0.0{,}016}{\sqrt{3}.0{,}032}\right) j\left(\frac{\pi.0{,}045.2.0{,}005}{\sqrt{3}.0{,}032}\right) \right] x$$

$$\left[\frac{j.0{,}0023.(130{,}8)^2}{0{,}0023.(130{,}8)^4} \right]$$

= (-j,15.10^3) x (3,758) x (0,028) x (j.0,0254) = 40,5 Ω

Perhitungan impedansi input pada antenna mikrostrip kotak :

PATCHD.V50 02-05-2008 20:40:27

SUBSTRATE HEIGHT = 0.25 cm
SUBSTRATE RELATIVE DIELECTRIC CONSTANT = 10.2
SUBSTRATE LOSS TANGENT = 0.0023
CONDUCTOR RELATIVE CONDUCTIVITY = 1.000
PATCH LENGTH = 2.398 cm
PATCH WIDTH = 3.300 cm
FREQUENCY = 1.900 GHz

INPUT RESISTANCE = 29.97 Ohms
PATCH TOTAL Q = 69.994
EFFICIENCY = 82.82%
OVERALL EFFICIENCY = 65.97%

Perhitungan impedansi input pada antenna mikrostrip Lingkaran :

PATCHD.V50 05-06-2008 10:20:12

SUBSTRATE HEIGHT = 0.2500 cm
SUBSTRATE RELATIVE DIELECTRIC CONSTANT = 10.20
SUBSTRATE LOSS TANGENT = 0.0023
CONDUCTOR RELATIVE CONDUCTIVITY = 1.000
PATCH RADIUS = 1.418 cm
FREQUENCY = 1.8981 GHz

INPUT RESISTANCE = 75.15 Ohms
PATCH TOTAL Q = 82.171
EFFICIENCY = 82.82%
OVERALL EFFICIENCY = 63.04%

LAMPIRAN 2

Langkah perhitungan pengambilan magnitude pada penurunan rumus Theta :

$$\Gamma = \frac{Z_L - Z_1}{Z_L + Z_1 + jt\,2\sqrt{Z_1 Z_L}}$$

$$\frac{Z_L - Z_1}{(Z_L+Z_1) + j(t2\sqrt{Z_1 Z_L})} X \frac{(Z_L+Z_1) - j(t2\sqrt{Z_1 Z_L})}{(Z_L+Z_1) - j(t2\sqrt{Z_1 Z_L})}$$

$$\frac{(Z_L - Z_1)[(Z_L+Z_1) - j(t2\sqrt{Z_1 Z_L})]}{(Z_L+Z_1)^2 + [j(t2\sqrt{Z_1 Z_L})]^2}$$

$$\frac{[(Z_L - Z_1)x(Z_L+Z_1)] - [(Z_L - Z_1)xj(t2\sqrt{Z_1 Z_L})]}{(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L}$$

$$\frac{[(Z_L - Z_1)x(Z_L+Z_1)]}{(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L} - \frac{j(t2\sqrt{Z_1 Z_L})x(Z_L - Z_1)}{(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L}$$

$$\sqrt{\left(\frac{[(Z_L - Z_1)x(Z_L+Z_1)]}{(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L}\right)^2 + \left(\frac{(t2\sqrt{Z_1 Z_L})x(Z_L - Z_1)}{(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L}\right)^2}$$

$$\sqrt{\left(\frac{\left[(Z_L - Z_1)^2 (Z_L+Z_1)^2\right] x \left[(t2\sqrt{Z_1 Z_L})x(Z_L - Z_1)\right]^2}{\left[(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L\right]^2}\right)}$$

$$\sqrt{\left(\frac{\left[(Z_L - Z_1)^2 (Z_L+Z_1)^2\right] x \left[(4t^2 Z_1 Z_L)x(Z_L - Z_1)^2\right]}{\left[(Z_L+Z_1)^2 + 4t^2 Z_1 Z_L\right]^2}\right)}$$

$$\sqrt{\left(\frac{(Z_L - Z_1)^2 \left[(Z_L + Z_1)^2 (4t^2 Z_1 Z_L) \right]}{\left[(Z_L + Z_1)^2 + 4t^2 Z_1 Z_L \right]^2} \right)}$$

$$\frac{\left((Z_L - Z_1)^2 \left[(Z_L + Z_1)^2 (4t^2 Z_1 Z_L) \right] \right)^{1/2}}{\left(\left[(Z_L + Z_1)^2 + 4t^2 Z_1 Z_L \right]^2 \right)^{1/2}}$$

$$\frac{(Z_L - Z_1) x \left[(Z_L + Z_1)^2 (4t^2 Z_1 Z_L) \right]^{1/2}}{\left[(Z_L + Z_1)^2 + 4t^2 Z_1 Z_L \right]}$$

$$(Z_L - Z_1) x \left[(Z_L + Z_1)^2 (4t^2 Z_1 Z_L) \right]^{1/2-1}$$

$$(Z_L - Z_1) x \left[(Z_L + Z_1)^2 (4t^2 Z_1 Z_L) \right]^{-1/2}$$

$$\rho = \frac{(Z_L - Z_1)}{\left[(Z_L + Z_1)^2 (4t^2 Z_1 Z_L) \right]^{1/2}}$$