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1. a. $Z_A = 0,25 Z_0$

a. 1.
$$\Gamma_A = \frac{Z_A - Z_0}{Z_A + Z_0} = \frac{0,25 Z_0 - Z_0}{0,25 Z_0 + Z_0}$$
$$= \frac{0,75}{1,25} = 0,6 + j0$$

$$|\Gamma_A| = 0,6$$

$$\theta = \tan^{-1} \left(\frac{0}{0,6} \right) = 0^\circ$$

$$SWR = \frac{1 + |\Gamma_A|}{1 - |\Gamma_A|} = \frac{1 + 0,6}{1 - 0,6} = 4$$

$$RL = 20 \log |\Gamma_A| = 20 \log 0,6 = -4,44 \text{ dB}$$

a. 2. 25 dBm

$$P = 10^{\frac{25}{10}} = 316 \text{ mW} = 0,316 \text{ W}$$

$$|\Gamma_A| = \frac{V^-}{V^+}$$

$$V^- = |\Gamma_A| V^+ = 0,6 \cdot 0,316 = 0,1896$$

$$V^{2+} = V^+ - V^- = 0,316 - 0,1896 = 0,1264 \text{ W}$$

$$a.3. \quad d = 0,375 \lambda$$

$$\beta = \frac{2\pi}{\lambda}$$

$$Z(d) = Z_0 \cdot \frac{Z_A + j Z_0 \tan(\beta d)}{Z_0 + j Z_A \tan(\beta d)}$$

$$= Z_0 \cdot \frac{0,25 Z_0 + j Z_0 \tan\left(\frac{2\pi}{\lambda} \cdot 0,375 \lambda\right)}{Z_0 + j 0,25 Z_0 \tan\left(\frac{2\pi}{\lambda} \cdot 0,375 \lambda\right)}$$

$$= Z_0 \cdot \frac{0,25 - j}{1 - j 0,25}$$

$$= 0,47 Z_0 + j 0,88 Z_0$$

$$|\Gamma_A| = \frac{Z(d) - Z_0}{Z(d) + Z_0} = \frac{0,47 Z_0 + j 0,88 Z_0 - Z_0}{0,47 Z_0 + j 0,88 Z_0 + Z_0}$$

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