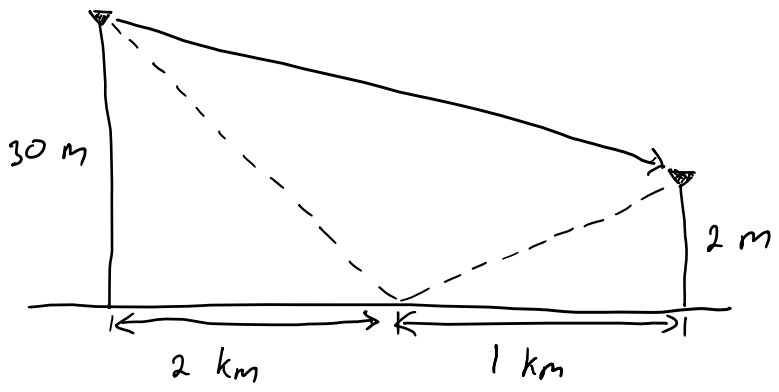
M. Hasyim Abdillah P. 1101191095 TT-43-11



1. Diketahui : $T_x = 30\ dBm$ body loss = 2 dB
$G_R = 0\ dBi$

a. Ditanya : W_{R_x} = ... ? (one-ray)

$W_{R_x} = W_{T_x} \cdot G_T \cdot G_R$
$= T_x + G_T + G_R$ − body loss
$= 30\ dBm + 0 + 0 - 2dB$
$= 28\ dBm$

b. Ditanya : P_R = ... ? (two-ray)

$P_R = P_0 \left(\frac{h_1 h_2}{d^2} \right)^2$

$= 30\ dBm \left(\frac{30 \cdot 2}{3000^2} \right)^2$

$= 1 \cdot \left(\frac{60}{9 \times 10^6} \right)^2 = 4,44 \times 10^{-11}\ W = 4,44 \times 10^{-8}\ mW$

$= -73,522\ dBm$

$d = 1 + 2 = 3\ km = 3.000\ m$

$P_0 = 30\ dBm = 1\ Watt$

2. a. P_{R_x} = ... ? (Okumura - Hata)

Asumsi f_c = 900 MHz

$$a(h_R) = (1,1 \cdot \log f_c - 0,7) h_R - (1,56 \cdot \log f_c - 0,8) \text{ dB}$$

$$= (1,1 \cdot \log(900) - 0,7) \cdot 2 - (1,56 \cdot \log(900) - 0,8) \text{ dB}$$

$$= (3,25 - 0,7) \cdot 2 - 4,61 - 0,8$$

$$= 1,29 \text{ dB}$$

$$L_u = 69,55 + 26,16 \log f_c - 13,83 \log h_T - a(h_R) + [44,9 - 6,55 \log h_T] \log d$$

$$= 69,55 + 26,16 \log(900) - 13,83 \log(30) - 1,29 + [44,9 - 6,55 \log(30)] \log(3)$$

$$= 69,55 + 77,28 - 20,43 - 1,29 + 16,8$$

$$= 141,91 \text{ dB}$$

$$P_{R_x} = P_{T_x} + G_{T_x} + G_{R_x} - L_u - \text{body loss}$$

$$= 30 \text{ dB}_m + 0 + 0 - 141,91 - 2$$

$$= -113,91 \text{ dB}_m$$

b. CDF = 84 % $\quad\quad$ σ = 7 dB

$p = 0,84$

$Z(p) = 0,994$

Fading margin = $7 \cdot 0,994 = 6,958$ dB