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Circuitos RF
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Fundamentals of Microwave and RF Design

1) $\lambda = c/f = \frac{3 \cdot 10^8}{4{,}5 \cdot 10^9} = 6{,}67 \cdot 10^{-2}\ m$
$= 6{,}67\ cm$

7) $B_w = 100\ kHz$ $\quad r = 1\ km \Rightarrow P_r = 100\ nW$
$P \propto 1/r^2$
$\Rightarrow \frac{P_r(1\ km)}{P_r(r)} = \frac{100\ nW}{100\ pW} = 10^3$
$\Rightarrow \frac{r^2}{(10^3)^2} = 10^3 \Rightarrow r = \sqrt{10^9}$
$r \approx 31.622\ m$

15) $R = 50\ \Omega$
$v(t) = 0{,}1 \cos(\omega t)$
a) $P = \frac{V_{RMS}^2}{R} = \frac{(0{,}1/\sqrt{2})^2}{50} = 0{,}1\ mW$

b) $P_{dBm} = 10 \log(0{,}1) = -10\ dBm$

26) Power : $1\mu W$
Noise : $1nW$

$\Rightarrow SNR_{dB} = 10\log\left(\frac{10^{-6}}{10^{-9}}\right)$

$= 30dB$

34) $Z_{IN} = 50\Omega$
$Z_{LOAD} = 50\Omega$

$\Rightarrow$ Considerando $Z_{OUT} = 0$

$\Rightarrow G_{PdB} = 10\log\left(\frac{V_o^2/Z_{LOAD}}{V_i^2/Z_{IN}}\right)$

$= 10\log\left(\left(\frac{V_o}{V_i}\right)^2 \cdot \frac{Z_{IN}}{Z_{LOAD}}\right)$

$= 20\log(100^2) = 40dB$