9) 3m — 60dB SIL

15m ⟶ ?

$60dB = 10 \times \log_{10}\left(\frac{I}{I_{ref}}\right)$

$1\ \mu W/m^2 = I$ at 3m.

$1\ \mu W \longrightarrow \frac{1}{9}$

$? \longrightarrow \frac{1}{(15)^2}$

$$\frac{1 \times 10^{-6} \times \frac{1}{(15)^2}}{\frac{1}{9}}$$

$1 \times 10^{-6} \times \frac{9}{(15)^2}$

0.04

0.00000004

40 nW/m²

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10 (alternative)

(a) ~~I_0~~ / ~~$4\pi(9)$~~ / ~~I_0~~ / ~~$4\pi(15)^2$~~

$\frac{(15)^2}{9} = \frac{I_1}{I_2}$

$25 I_2 = I_1$

I_1 is 25 times higher at 3m.

$\Rightarrow$ I_2 in dB is 25 time lower

13.97 dB

$46.0205\ dB = 10 \log_{10}\left(\frac{I}{1pW}\right)$

40nW/m²