$$\frac{8 \times 10^6}{10^4} = 8 \times 10^2$$
$$= 800$$

1024 ; 10 MHz

10 MHz ÷ 1024 = 9765.63 Hz

1.25 MHz ÷ 9765.63 Hz
= 127.99
≃ 128

2.4 GHz
6dB antenna gain.

0 dB gain
Sens -64 dBm

Cannot receive below -64 dBm

Signal is 20 dB + 6 dB = 26 dB

26 - -64 dB = 90 dB

At 90 dB

free space path loss

$$PL = 20\log(d) + 20\log(f) - 147.55$$
$$20\log(d) = PL - 20\log(f) + 147.55$$
$$\log_{10}(d) = \frac{PL}{20} - \log_{10}(f) + 7.3775$$
$$10^{\log_{10}(d)} = 10^{\left(\frac{PL}{20} - \log_{10}(f) + 7.3775\right)}$$
$$d = 10^{\left(PL/20 - \log_{10}(f) + 7.3775\right)}$$

logarithmic

for linear max distance

$$d = \frac{c}{4\pi f}\sqrt{\frac{P_T}{P_R}}$$

to use logarithmically

$$d = \frac{c}{4\pi f}\sqrt{10^{\frac{dB}{10}}}$$

$$d = \frac{c}{4\pi f}\sqrt{10^{90/10}}$$
$$= \frac{c}{4\pi f}\sqrt{10^9}$$

315m

2.4 GHz router.
6dB gain.

Power at 100mW
↗
20dBm

laptop. 0dB gain.

Sens. −60 dBm.

Max signal loss 20+6 − −60
= 86.

At 150m, signal loss is 83.57dB

✓