Friis transmission formula

$$S = \frac{P_{out} * G}{4 * \pi * R},$$

Where

S = Power density in $mW/cm^2$

$P_{out}$ = Output power to antenna in mW

G = Power Gain of the antenna

R = Separation distance between radiator and human body (cm)

## Limits for General Population / Uncontrolled Exposure

| **Frequency Range** (MHz) | **Electric Field Strength** (E) (V/m) | **Magnetic field Strength** (H) (A/m) | **Power Density** (S) ($mW/cm^2$) |
|---|---|---|---|
| 0.3 – 1.34 | 614 | 1.63 | 100 |
| 1.34 – 30 | 824/f | 2.16/f | 180/f2 |
| 30 - 300 | 27.5 | 0.073 | 0.2 |
| **300 – 1500** | **-** | **-** | **f/1500** |
| 1500 – 100,000 | - | - | 1.0 |

Device parameters:

Frequency: 902.3 – 914.9 MHz

Output power to antenna: 10.92 – 11.13 dBm or 12.36 – 12.97 mW

Antenna gain 2.2 dBi

Distance 20 cm

## Results

| **Frequency** (MHz) | **Maximum peak output power** (dBm) | **Antenna Gain** (dbi) | **Total Power** (mW) | **Distance** (cm) | **Limit Power Density** ($mW/cm^2$) | **Power Density** (mW/cm^2) | **Verdict** |
|---|---|---|---|---|---|---|---|
| 914.9 | 11.13 | 2.2 | 12.97 | 20 | 0.610 | 0.1135 | PASS |