Frequency, Wavelength, Period and Photon Energy Converter

Wavelength, period, angular frequency, wavenumber and photon energy for a frequency, in vacuum or a medium with a given wave speed (light, radio or sound).

Method: Wave relations and SI constants

Input parameters

Unit system: SI

Parameter	Value	Unit
Frequency	2.4500	GHz
Wave speed in the medium	2.9979e+08	m/s

Calculated results

Parameter	Value	Unit
Wavelength	122.36	mm
Period	0.40816	ns
Angular frequency (rad/s)	1.5394e+10	
Wavenumber	8.1723	1/m
Photon energy hf	1.0132e-05	eV

Notes for this case

• λ = v/f, T = 1/f, ω = 2πf, wavenumber 1/λ. In vacuum v = c = 299,792,458 m/s exactly; in air about 0.03 % less for light and radio; sound in air at 20 °C about 343 m/s, in water about 1,480 m/s. Photon energy E = hf applies to electromagnetic waves only (1 eV ↔ 241.8 THz).

Formula and method

$$\lambda = \frac{v}{f}, \quad T = \frac{1}{f}, \quad \omega = 2\pi f, \quad E = hf$$

Variables

f	Frequency	1/s
v	Wave speed in the medium	m/s
λ	Wavelength	m
T	Period	s
ω	Angular frequency (rad/s)	-
$\widetilde{\nu}$	Wavenumber	1/m
E	Photon energy hf	J

Method and standards

Frequency and wavelength.

Assumptions and limits

- Non-dispersive medium at the given speed.

References

Wave relations and SI constants

Report details

Report reference	FCC-8PQ2-9ZJE (the same inputs always give the same reference)
Generated	23 November 2026, 17:50 UTC
Calculator	Frequency, Wavelength, Period and Photon Energy Converter
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/unit-conversions/frequency-wavelength-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.