calculatoratoz.com

unitsconverters.com

Antenna Theory Parameters Formulas

Calculators! Examples! Conversions!

Bookmark **calculatoratoz.com**, **unitsconverters.com**

Widest Coverage of Calculators and Growing - **30,000+ Calculators!**
Calculate With a Different Unit for Each Variable - **In built Unit Conversion!**
Widest Collection of Measurements and Units - **250+ Measurements!**

Feel free to SHARE this document with your friends!

Please leave your feedback here...

© calculatoratoz.com. A softusvista inc. venture!

List of 24 Antenna Theory Parameters Formulas

Antenna Theory Parameters

1) Antenna Current

Open Calculator

fx $$I_a = \frac{E_{gnd} \cdot \lambda \cdot D}{120 \cdot \pi \cdot h_t \cdot h_r}$$

ex $$2246.893\text{A} = \frac{400\text{V/m} \cdot 90\text{m} \cdot 1200\text{m}}{120 \cdot \pi \cdot 10.2\text{m} \cdot 5\text{m}}$$

2) Antenna Efficiency

Open Calculator

fx $$E_t = \frac{P_{rad}}{P_i}$$

ex $$0.012297 = \frac{34\text{W}}{2765\text{W}}$$

3) Antenna Gain

Open Calculator

fx $$G = \frac{U}{U_o}$$

ex $$300 = \frac{27\text{W/sr}}{0.09\text{W/sr}}$$

© calculatoratoz.com. A softusvista inc. venture!

4) Average Radiation Intensity

Open Calculator

fx $$R_{avg} = \frac{U}{D_a}$$

ex $$337.5\text{W/sr} = \frac{27\text{W/sr}}{0.08}$$

5) Directivity of Antenna

Open Calculator

fx $$D_a = \frac{U}{R_{avg}}$$

ex $$8.653846 = \frac{27\text{W/sr}}{3.12\text{W/sr}}$$

6) Distance between Transmitting and Receiving Point

Open Calculator

fx $$D = \frac{I_a \cdot 120 \cdot \pi \cdot h_t \cdot h_r}{E_{gnd} \cdot \lambda}$$

ex $$1199.998\text{m} = \frac{2246.89\text{A} \cdot 120 \cdot \pi \cdot 10.2\text{m} \cdot 5\text{m}}{400\text{V/m} \cdot 90\text{m}}$$

7) Duct Height

Open Calculator

fx $$d = \left(\frac{\lambda_{max}}{0.014}\right)^{\frac{2}{3}}$$

ex $$9m = \left(\frac{0.378m}{0.014}\right)^{\frac{2}{3}}$$

8) Effective Area of Antenna

Open Calculator

fx $$A_e = \frac{k \cdot \Delta T}{S}$$

ex $$2.895455m^2 = \frac{12.25K/W \cdot 13K}{55W/m^3}$$

9) Friis Formula

Open Calculator

fx $$P_r = P_t \cdot G_r \cdot G_t \cdot \frac{\lambda^2}{(4 \cdot 3.14 \cdot D)^2}$$

ex $$111.6245W = 1570W \cdot 6.31dB \cdot 316dB \cdot \frac{(90m)^2}{(4 \cdot 3.14 \cdot 1200m)^2}$$

© calculatoratoz.com. A softusvista inc. venture!

10) Height of Receiving Antenna

Open Calculator

$$h_r = \frac{E_{gnd} \cdot \lambda \cdot D}{120 \cdot \pi \cdot h_t \cdot I_a}$$

$$5.000007\text{m} = \frac{400\text{V/m} \cdot 90\text{m} \cdot 1200\text{m}}{120 \cdot \pi \cdot 10.2\text{m} \cdot 2246.89\text{A}}$$

11) Height of Transmitting Antenna

Open Calculator

$$h_t = \frac{E_{gnd} \cdot \lambda \cdot D}{120 \cdot \pi \cdot I_a \cdot h_r}$$

$$10.20002\text{m} = \frac{400\text{V/m} \cdot 90\text{m} \cdot 1200\text{m}}{120 \cdot \pi \cdot 2246.89\text{A} \cdot 5\text{m}}$$

12) Isotropic Radiation Intensity

Open Calculator

$$U_o = \frac{P_{rad}}{4 \cdot \pi}$$

$$2.705634\text{W/sr} = \frac{34\text{W}}{4 \cdot \pi}$$

13) Length of Binomial Array

Open Calculator

$$L = (n - 1) \cdot \frac{\lambda}{2}$$

$$225\text{m} = (6 - 1) \cdot \frac{90\text{m}}{2}$$

© calculatoratoz.com. A softusvista inc. venture!

14) Maximum Duct Wavelength

Open Calculator

$$\lambda_{max} = 0.014 \cdot d^{\frac{3}{2}}$$

$$0.378\text{m} = 0.014 \cdot (9\text{m})^{\frac{3}{2}}$$

15) Noise Temperature of Antenna

Open Calculator

$$T_a = \frac{S}{k \cdot B_a}$$

$$17.26845\text{K} = \frac{55\text{W/m}^3}{12.25\text{K/W} \cdot 0.26\text{Hz}}$$

16) Ohmic Resistance

Open Calculator

$$R_{ohm} = R_t - R_{rad}$$

$$2.5\Omega = 4.75\Omega - 2.25\Omega$$

17) Power Density of Antenna

Open Calculator

$$S = \frac{P_i \cdot G}{4 \cdot \pi \cdot D}$$

$$55.00793\text{W/m}^3 = \frac{2765\text{W} \cdot 300}{4 \cdot \pi \cdot 1200\text{m}}$$

18) Power Per Unit Bandwidth

Open Calculator

fx $P_u = k \cdot T_R$

ex $150.0012\text{W} = 12.25\text{K/W} \cdot 12.245\text{K}$

19) Radiation Intensity

Open Calculator

fx $U = U_o \cdot D_a$

ex $0.0072\text{W/sr} = 0.09\text{W/sr} \cdot 0.08$

20) Radiation Resistance

Open Calculator

fx $R_{rad} = R_t - R_{ohm}$

ex $2.25\Omega = 4.75\Omega - 2.5\Omega$

21) Strength of Ground Wave

Open Calculator

fx $E_{gnd} = \dfrac{120 \cdot \pi \cdot h_t \cdot h_r \cdot I_a}{\lambda \cdot D}$

ex $399.9994\text{V/m} = \dfrac{120 \cdot \pi \cdot 10.2\text{m} \cdot 5\text{m} \cdot 2246.89\text{A}}{90\text{m} \cdot 1200\text{m}}$

22) Total Antenna Resistance

Open Calculator

fx $R_t = R_{ohm} + R_{rad}$

ex $4.75\Omega = 2.5\Omega + 2.25\Omega$

© calculatoratoz.com. A softusvista inc. venture!

23) Total Input Power

Open Calculator

fx $$P_i = \frac{P_{rad}}{E_t}$$

ex $$4250W = \frac{34W}{0.008}$$

24) Total Power of Antenna

Open Calculator

fx $$P_a = k \cdot T_a \cdot B_a$$

ex $$54.99858W = 12.25K/W \cdot 17.268K \cdot 0.26Hz$$

© calculatoratoz.com. A softusvista inc. venture!

Variables Used

- A_e Effective Area Antenna *(Square Meter)*
- B_a Bandwidth *(Hertz)*
- d Duct Height *(Meter)*
- D Transmitter Receiver Distance *(Meter)*
- D_a Directivity of Antenna
- E_{gnd} Strength of Ground Wave Propagation *(Volt per Meter)*
- E_t Antenna Efficiency
- G Antenna Gain
- G_r Gain of Receiving Antenna *(Decibel)*
- G_t Gain of Transmitting Antenna *(Decibel)*
- h_r Height of Receiver *(Meter)*
- h_t Height of Transmitter *(Meter)*
- I_a Antenna Current *(Ampere)*
- k Thermal Resistance *(Kelvin per Watt)*
- L Length of Binomial Array *(Meter)*
- n No of Element
- P_a Total Power of Antenna *(Watt)*
- P_i Total Input Power *(Watt)*
- P_r Power at Receiving Antenna *(Watt)*
- P_{rad} Radiated Power *(Watt)*
- P_t Transmitting Power *(Watt)*

© calculatoratoz.com. A softusvista inc. venture!

- P_u Power per Unit *(Watt)*
- R_{avg} Average Radiation Intensity *(Watt per Steradian)*
- R_{ohm} Ohmic Resistance *(Ohm)*
- R_{rad} Radiation Resistance *(Ohm)*
- R_t Total Antenna Resistance *(Ohm)*
- S Power Density of Antenna *(Watt Per Cubic Meter)*
- T_a Antenna Temperature *(Kelvin)*
- T_R Resistor Absolute Temperature *(Kelvin)*
- U Radiation Intensity *(Watt per Steradian)*
- U_o Isotropic Radiation Intensity *(Watt per Steradian)*
- ΔT Incremental Temperature *(Kelvin)*
- λ Wavelength *(Meter)*
- λ_{max} Maximum Duct Wavelength *(Meter)*

© calculatoratoz.com. A softusvista inc. venture!

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Electric Current** in Ampere (A)
  Electric Current Unit Conversion
- Measurement: **Temperature** in Kelvin (K)
  Temperature Unit Conversion
- Measurement: **Area** in Square Meter (m²)
  Area Unit Conversion
- Measurement: **Power** in Watt (W)
  Power Unit Conversion
- Measurement: **Frequency** in Hertz (Hz)
  Frequency Unit Conversion
- Measurement: **Electric Resistance** in Ohm (Ω)
  Electric Resistance Unit Conversion
- Measurement: **Wavelength** in Meter (m)
  Wavelength Unit Conversion
- Measurement: **Electric Field Strength** in Volt per Meter (V/m)
  Electric Field Strength Unit Conversion
- Measurement: **Thermal Resistance** in Kelvin per Watt (K/W)
  Thermal Resistance Unit Conversion
- Measurement: **Sound** in Decibel (dB)
  Sound Unit Conversion
- Measurement: **Power Density** in Watt Per Cubic Meter (W/m³)
  Power Density Unit Conversion

© calculatoratoz.com. A softusvista inc. venture!

- Measurement: **Radiant Intensity** in Watt per Steradian (W/sr)
  Radiant Intensity Unit Conversion

© calculatoratoz.com. A softusvista inc. venture!

Check other formula lists

- **Antenna Theory Parameters Formulas**
- **Special Antennas Formulas**
- **Wave Propagation Formulas**

Feel free to SHARE this document with your friends!

PDF Available in

English Spanish French German Russian Italian Portuguese Polish Dutch

12/17/2023 | 2:13:49 PM UTC *Please leave your feedback here...*

© calculatoratoz.com. A softusvista inc. venture!