

VK3UM EME Performance Calculator

Two Station EME Receiver Performance

Tx A (Home Station) Default

1296 MHz 270,04 dB 8 °K 120 Hz 1,00 mm 3,8 mm -161,2 dBm 17,4 dB

Frequency Path Loss T Sky Rx BW Total Gnd 306 K Sky - Gnd → 8,5 dB

Rx T * K 21,9 °K = 0,32 dB Sys T * K 45,9 °K = 0,64 dB

6,8 K 14,4 K 0,1 dB -14,6 dB 3,4 % 0,09 dB

80 0,10 dB 0,21 dB 41,0 dB 12,0 dB 1,0 dB 10 °K 6 °K 18,0 dB

Solar Flux LNA Loss LNA NF LNA Gain Coax Loss Rx NF Spillover Feedthru Sun Y

Tx A Output Power Transmission Loss Power at Feed Moon Y

350 Watts 25,44 dBW 0,6 dB 305 Watts 24,84 dBW 1.132,253 Watts EIRP

Dx Station as received at Home Station ... 25,3 dB

Home Station as received at Dx Station ... 17,5 dB

Perigee Moon Apogee 356000 kms

Ground Temperature 290 K 17 °C

Tx B (Dx Station) on7un

1296 MHz 270,04 dB 8 °K 120 Hz 1,00 mm 12,7 mm -160,9 dBm 25,4 dB

Frequency Path Loss T Sky Rx BW Total Gnd 309 K Sky - Gnd → 8,3 dB

Rx T * K 21,9 °K = 0,32 dB Sys T * K 49,1 °K = 0,68 dB

6,8 dB 14,4 K 0,2 dB -13,5 dB 4,5 % 0,09 dB

80 0,10 dB 0,21 dB 41,0 dB 12,0 dB 1,0 dB 13 °K 6 °K 18,0 dB

Solar Flux LNA Loss LNA NF LNA Gain Coax Loss Rx NF Spillover Feedthru Sun Y

Tx B Output Power Transmission Loss Power at Feed Moon Y

2000 Watts 33,01 dBW 0,6 dB 1742 Watts 32,41 dBW 7.058,201 Watts EIRP

Frequency

50 MHz 432 MHz 2304 MHz 10 GHz 70 MHz

144 MHz 900 MHz 3456 MHz 24 GHz 406 MHz

220 MHz 1296 MHz 5760 MHz 47 GHz 1413 MHz

Yagi Array

Single Yagi Gain in dBi Number of Yagis E 23,80 °

16,80 dBi 1 23,80 °

Beam Width H 23,80 °

Rectangular Aperture Array Gain 14,65 dBd 16,80 dBi

Parabolic Reflector

Diameter Size Efficiency Beam Width Dish Gain Dish Gain

6,1 m Metric 0,55 2,68° 3714 33,55 dBd 35,70 dBi

Home Station ... Y Factor Calculator

Noise Source: Sagittarius, Cassiopeia, Cygnus, Taurus A, Virgo, Termination

Quiet Source: Termination, Aquarius, Leo, Taurus

Noise Flux 1740 °K Quiet Flux 8 °K System Tk 45,9 °K

Point Source Y Factor 0,85 dB

76 °K 101 °K 10 °K 111 °K

Aperture Source Y Factor 4,65 dB

Yagi Array

Single Yagi Gain in dBi Number of Yagis E 23,80 °

16,80 dBi 1 23,80 °

Beam Width H 23,80 °

Rectangular Aperture Array Gain 14,65 dBd 16,80 dBi

Parabolic Reflector

Diameter Size Efficiency Beam Width Dish Gain Dish Gain

6,1 m Metric 0,60 2,68° 4052 33,93 dBd 36,08 dBi

Additional Data ... (Home Station)

Effective Aperture 15,84 M² Beam Width Ratio 0,21 G/T Ratio 80,88 Moon Temp 230 °K

Object/BW Ratio 1,00 Moon Flux 10 -22 0,0884 Moon Angular Diam 00'.33.50" * Corrected sfu 49,20

Free Space Loss at 1.296 MHz 356000 kms 205,7 dB

Save Data Get Data Default Print Exit

VK3UM Ver 3.02

Simulation with 0,1 dB loss before LNA and 0,21 dB NF LNA, as measured with sun noise

VK3UM EME Performance Calculator

Two Station EME Receiver Performance

Tx A (Home Station) Default

1296 MHz 270,04 dB 8 °K 120 Hz 1,00 mm 3,8 mm -161,2 dBm 17,4 dB

Frequency Path Loss T Sky Rx BW -16,7 dB Total Gnd 306 °K Sky - Gnd -> 8,5 dB

Rx T °K 21,9 °K = 0,32 dB Sys T °K 45,9 °K = 0,64 dB

0,0 °K 21,5 °K 0,1 dB -14,6 dB 3,4 % 0,09 dB

80 0,00 dB 0,31 dB 41,0 dB 12,0 dB 1,0 dB 10 °K 6 °K 18,0 dB

Solar Flux LNA Loss LNA NF LNA Gain Coax Loss Rx NF Spillover Feedthru Sun Y

Tx A Output Power Transmission Loss Power at Feed Moon Y

350 Watts 25,44 dBW 0,6 dB 305 Watts 24,84 dBW 1.132.253 Watts EIRP

Dx Station as received at Home Station ... 25,3 dB

Perigee Moon Apogee 356000 kms

Ground Temperature 290 °K 17 °C

Tx B (Dx Station) on7un

1296 MHz 270,04 dB 8 °K 120 Hz 1,00 mm 12,7 mm -160,9 dBm 25,4 dB

Frequency Path Loss T Sky Rx BW -16,7 dB Total Gnd 309 °K Sky - Gnd -> 8,3 dB

Rx T °K 21,9 °K = 0,32 dB Sys T °K 49,1 °K = 0,68 dB

6,8 dB 14,4 °K 0,2 dB -13,5 dB 4,5 % 0,09 dB

80 0,10 dB 0,21 dB 41,0 dB 12,0 dB 1,0 dB 13 °K 6 °K 18,0 dB

Solar Flux LNA Loss LNA NF LNA Gain Coax Loss Rx NF Spillover Feedthru Sun Y

Tx B Output Power Transmission Loss Power at Feed Moon Y

2000 Watts 33,01 dBW 0,6 dB 1742 Watts 32,41 dBW 7.058.201 Watts EIRP

Frequency

50 MHz 432 MHz 2304 MHz 10 GHz 70 MHz

144 MHz 900 MHz 3456 MHz 24 GHz 406 MHz

220 MHz 1296 MHz 5760 MHz 47 GHz 1413 MHz

Yagi Array

Single Yagi Gain in dBi Number of Yagis E 23,80 °

16,80 dBi 1 Beam Width H 23,80 °

Rectangular Aperture Array Gain 14,65 dBd 16,80 dBi

Parabolic Reflector

Diameter Size Efficiency Beam Width Dish Gain Dish Gain

6,1 m Metric 0,55 2,68° 3714 33,55 dBd 35,70 dBi

Home Station ... Y Factor Calculator

Noise Source: Sagittarius, Cassiopeia, Cygnus, Taurus A, Virgo, Termination

Quiet Source: Termination, Aquarius, Leo, Taurus

Noise Flux 1740 °K Quiet Flux 8 °K System Tk 45,9 °K

Point Source Y Factor 0,85 dB

76 °K 101 °K 10 °K 111 °K

Aperture Source Y Factor 4,65 dB

Yagi Array

Single Yagi Gain in dBi Number of Yagis E 23,80 °

16,80 dBi 1 Beam Width H 23,80 °

Rectangular Aperture Array Gain 14,65 dBd 16,80 dBi

Parabolic Reflector

Diameter Size Efficiency Beam Width Dish Gain Dish Gain

6,1 m Metric 0,60 2,68° 4052 33,93 dBd 36,08 dBi

Additional Data ... (Home Station)

Effective Apature 15,84 M² Beam Width Ratio 0,21 G/T Ratio 80,90 Moon Temp 230 °K

Object/BW Ratio 1,00 Moon Flux 10 -22 0,0884 Moon Angular Diam 00'.33.50" * Corrected sfu 49,20

Free Space Loss at 1.296 MHz 356000 kms 205,7 dB

Save Data Get Data Default Print Exit

VK3UM Ver 3.02

Simulation with 0 dB loss before preamp, but NF 0,32 dB of LNA as measured on the noise figure meter including relay and adaptors.