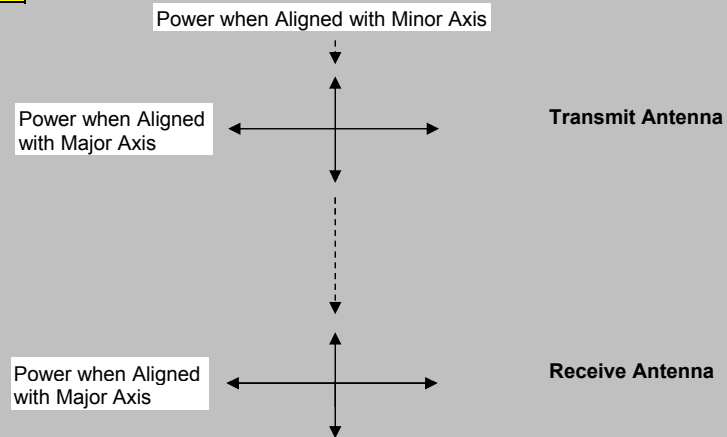


$$\text{Axial Ratio} \equiv 10 \cdot \text{LOG}$$

Power Emitted (or Received) with Antenna Aligned with Major Axis
Power Emitted (or Received) with Antenna Aligned with Minor Axis

NOTE:

Circular
Right Hand or Left Hand

Axial Ratio =
1.0 =
0.0 dB

Elliptical
Right Hand or Left Hand

Axial Ratio =
2.0 =
3.0 dB

Linear
Vertical or Horizontal

Axial Ratio = ∞

Axial Ratio =
1.0 =
0.0 dB

Axial Ratio =
2.0 =
3.0 dB

Axial Ratio = ∞

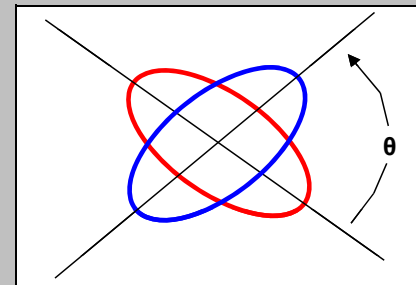
NOTE:**UPLINK:** Operator selects uplink antenna characteristics in blue boxes.**Polarization Loss Calculation:****Co-Polarization Loss:**

Axial ratio of Tx Antenna (Ant. #1) in dB = 1.00 [dB]
 Axial ratio (Ant. #1) = 1.26 []
 Axial ratio of Rx Antenna (Ant. #2) in dB = 1.00 [dB]
 Axial ratio (Ant. #2) = 1.26 []
 Polarization Angle θ between antennas = 5.0 [degrees]
 Polarization Angle θ between antennas = 0.087266 [Radians]

Polarization Loss = 0.99961 []
 Polarization Loss = 0.00 [dB]

Cross Polarization Coupling/Isolation:

Cross Pol. Power Fraction = 0.00039
 Cross Pol. Power Fraction = -34.10 [dB]
 Cross Polarization Isolation = 34.10 [dB]



Polarization Angle (θ) \equiv
Angle between transmit and receive
major axes.

Polarization Loss Equation:

$$PL = 0.5 \cdot (1 + ((1 - r_1^2) \cdot (1 - r_2^2) \cdot \cos(2\theta) + 4 \cdot r_1 \cdot r_2) / ((1 + r_1^2) \cdot (1 + r_2^2)))$$

DOWNLINK: Operator selects downlink antenna characteristics in blue boxes.**Polarization Loss Calculation:****Co-Polarization Loss:**

Axial ratio of Tx Antenna (Ant. #1) in dB = 1.00 [dB]
 Axial ratio (Ant. #1) = 1.26 []
 Axial ratio of Rx Antenna (Ant. #2) in dB = 1.00 [dB]
 Axial ratio (Ant. #2) = 1.26 []
 Polarization Angle θ between antennas = 5.0 [degrees]
 Polarization Angle θ between antennas = 0.087266 [Radians]
 Polarization Loss = 0.99961 []
 Polarization Loss = 0.00 [dB]

Cross Polarization Coupling/Isolation:

Cross Pol. Power Fraction = 0.00039
 Cross Pol. Power Fraction = -34.10 [dB]
 Cross Polarization Isolation = 34.10 [dB]

Example Calculations:

	Tx Ant. A.R. #1: (dB)	Rx Ant. A.R. #2: (dB)	θ (degrees)	Pol. Loss (dB)
<i>Tx Circular,</i>	0.0	0.0	90.0	0.0
<i>Rx Variable:</i>	0.0	1.0	90.0	-0.1
	0.0	2.0	90.0	-0.2
	0.0	3.0	90.0	-0.5
	0.0	6.0	90.0	-1.3
	0.0	10.0	90.0	-2.2
	0.0	30.0	90.0	-3.0
	0.0	30.0	0.0	-3.0
<i>Tx & Rx Elliptical:</i>	3.0	3.0	0.0	0.0
	3.0	3.0	45.0	-0.9
	3.0	3.0	90.0	-1.9
<i>Tx & Rx Linear:</i>	30.0	30.0	0.0	0.0
	30.0	30.0	30.0	-1.3
	30.0	30.0	45.0	-3.0
	30.0	30.0	60.0	-6.0
	30.0	30.0	90.0	-54.0
<i>Tx Elliptical,</i>	2.0	30.0	0.0	-1.5
<i>Rx Linear</i>	2.0	30.0	45.0	-3.0
	2.0	30.0	90.0	-4.0

NOTE: A linearly polarized antenna may be represented by an Axial Ratio value of 30 dB.

NOTE: This is a typical small satellite case.

NOTE: This is also a typical small satellite case.