System Antenna Gains (Directivities): Alpha CubeSat 2016 February 05

Uplink Antenna System:

NOTE:

Ground Station:

Uplink Frequency: 7145 MHz Wavelength: 0.0420 meters

Operator Selects Option 1 to 4 Here

OPTION: 3 Parabolic Reflector Polarization: RHCP

1	Yagi	Boom Length (λ):	3.2	Optimum Elements (n):	12	per Plane	(in V and in H)		Maximum Gain:	16.3	dBiC	Beamwidth:	30.6	°	Antenna Length:	0.134	meters
2	Helix	Turns (n):	10.5	Turn Spacing (λ):	0.25	Circumference (λ):	1.0		Gain:	16.0	dBiC	Beamwidth:	32.2	°	Antenna Length:	0.110	meters
3	Parabolic Reflector	DSS-25		Diameter:	34.0 m	Aperture Efficiency:	56%		Gain:	94.7	dBiC	Beamwidth:	0.1	°			
4	User Defined	KLM (22x22 Element)	Yagi	(Example)					Gain:	18.5	dBiC	Beamwidth:	24.0	°	Antenna Length:	X.XX	meters

Spacecraft:

Uplink Frequency: 7145 MHz Wavelength: 0.0420 meters

Operator Selects Option 1 to 7 Here

OPTION: 7 Other (User Defined) Polarization: RHCP

1	Monopole		Gain:	2.15	dBiL	Beamwidth:	156.2	°	No Radiation in Back Hemisphere **AND** Null on Axis ("Tip Null")
2	Dipole		Gain:	2.15	dBiL	Beamwidth:	156.2	°	Null On Axis; Both Poles
3	Canted Turnstyle		Gain:	2.0	dBiC (typical)	Beamwidth:	180	°	Circular Pol. On Axis; RHCP one pole, LHCP Opposite Pole, Linear in Equatorial Plane
4	Quadrifilar Helix	Loop (λ): 1/2	Gain:	4.0	dBiC	Beamwidth:	150	°	No Radiation in Back Hemisphere; Excellent Axial Ratio Performance Off-Axis
5	Patch		Gain:	6.0	dBi (L or C)	Beamwidth:	90	°	Low Radiation in Back Hemisphere; High On-Axis Gain; Can be Maded Linear or Circularly Polarized
6	Parabolic Reflector		Gain:	49.5	dBi (L or C)	Beamwidth:	0.5	°	To Be Used if a High Gain Antenna is Required on S/C. Dish Diameter: 5.4 m Dish Aperture Efficiency: 55%
7	Other (User Defined)	reflectenna array	Gain:	8.0	dBi	Beamwidth:	4.8	°	Gain, Beamwidth and Roll-Off Equation To Be Provided By Link Model Operator

UPLINK ↑ ↓ **DOWNLINK**

Downlink Antenna System:

Spacecraft:

Downlink Frequency: 32000 MHz Wavelength: 0.0094 meters

Operator Selects Option 1 to 5 Here

7 Other (User Defined) Polarization: RHCP

OPTION:

1	Monopole			Gain:	2.15	dBiL		Beamwidth:	156.2	°	No Radiation in Back Hemisphere & Null on Axis ("Tip Null")	
2	Dipole			Gain:	2.15	dBiL		Beamwidth:	156.2	°	Null On Axis; Both Poles	
3	Canted Turnstyle			Gain:	2.0	dBiC	(typical)	Beamwidth:	180	°	Circular Pol. On Axis; RHCP one pole, LHCP Opposite Pole, Linear in Equatorial Plane	
4	Quadrifilar Helix	Loop (λ):	1/2	Gain:	4.0	dBiC		Beamwidth:	150	°	No Radiation in Back Hemisphere	
5	Other (User Defined)	Patch (Example)		Gain:	6.0	dBi (L or C)		Beamwidth:	90	°	No Radiation in Back Hemisphere	
6	Parabolic Reflector			Gain:	53.9	dBi (L or C)		Beamwidth:	0.3	°	To Be Used if a High Gain Antenna is Required on S/C.	Dish Diameter: 2.0 m; Dish Aperture Efficiency: 55%
7	Other (User Defined)	reflectenna array		Gain:	32.0	dBi		Beamwidth:	3	°	Gain, Beamwidth and Roll-Off Equation To Be Provided By Link Model Operator	

Ground Station:

Downlink Frequency: 32000 MHz Wavelength: 0.0094 meters

Operator Selects Option 1 to 4 Here

3 Parabolic Reflector Polarization: RHCP

OPTION:

1	Yagi	Boom Length (λ):	2.0	Optimum Elements (n):	8	per Plane	(in V and in H)	Maximum Gain:	14.1	dBiC	Beamwidth:	39.7	°	Antenna Length:	0.019	meters	
2	Helix	Turns (n):	10.5	Turn Spacing (λ):	0.25	Circumference (λ):	1.0	Gain:	16.0	dBiC	Beamwidth:	32.2	°	Antenna Length:	0.025	meters	
3	Parabolic Reflector	DSS-25		Diameter:	34.0 m	Aperture Efficiency:	56%	Gain:	79.0	dBiC	Beamwidth:	0.0	°				
4	User Defined	KLM (22x22 Element)	Yagi	(Example)				Gain:	18.5	dBiC	Beamwidth:	24.0	°	Antenna Length:	X.XX	meters	

Look-Up Table

Optimum Yagi Antenna Performance:

Boom Length (λ):	Optimum No. Elements (n):	Maximum Gain (dBi):
0.35	3	9.65
0.55	4	10.86
0.80	5	11.85
1.15	6	12.45
1.45	7	13.35
1.80	8	14.05
2.10	9	14.40

2.45	10	15.25
2.80	11	15.95
3.15	12	16.30
3.55	13	16.95
4.00	14	17.45
4.40	15	18.15
4.75	16	18.65
5.20	17	19.35
5.55	18	19.85
6.00	19	20.25
6.50	20	20.75
7.00	21	21.35
7.50	22	21.65

Data Taken from *ARRL Antenna Book*