



**TELEDISTRIBUTION**  
**E Q U I P M E N T**  
**MATV/CATV**



## GEMINI G80 Satellite Antenna

### PERFORMANCE CHARACTERISTICS

Reflector Type	Offset elliptical, cross formatted
Gain @ 12.5 GHz, typical	39.5 dBi
Cross Polarisation	- 30 dB
Off Axis Sidelobe Levels	complies with $29 - 25\log(q)$ if correctly illuminated.
G/T @ 12.5 GHz, 45° elevation	19.3 dB/°K
Offset Angle	18.2°
Elevation Adjustment	10° to 80°
Reflector Overall Dimensions	900mm wide x 806mm high
Wind Load @ 41 m/s	0.86 kN
Mast Diameter	38mm to 52mm
Reflector Material	Zinc Coated Steel G3NS Z275
Fasteners	Metric Hexagon and Combination Recess Head, Zinc plated and chromate passivated to AS1897-1976 and AS1791-1986
Surface Coating	Electrostatic Polyester Dark Grey to BS3900
Service Life	Reflector tested to 700 hours salt spray exposure to ASTM B117-94 in accordance with AS3715-1989 Appendix 13.

**Notes:**

RF Gain performance values are derived from range testing by Hills Industries and others. Reflector gain has been calculated from the E and H plane patterns using the ANSI/ EIA-411-A-1986 formula:

$$G = 10 * \log_{10} [ (31000/(\theta_{3E} * \theta_{3H}) + 91000/(\theta_{10E} * \theta_{10H})) / 2 ]$$

where  $\theta$  is the beamwidth at -3dB and -10dB in the E and H planes.

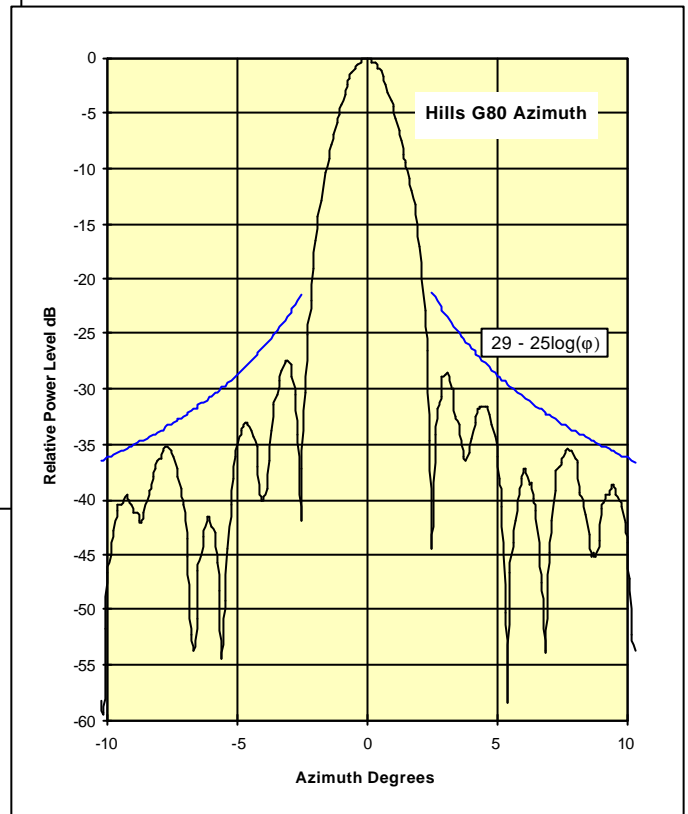
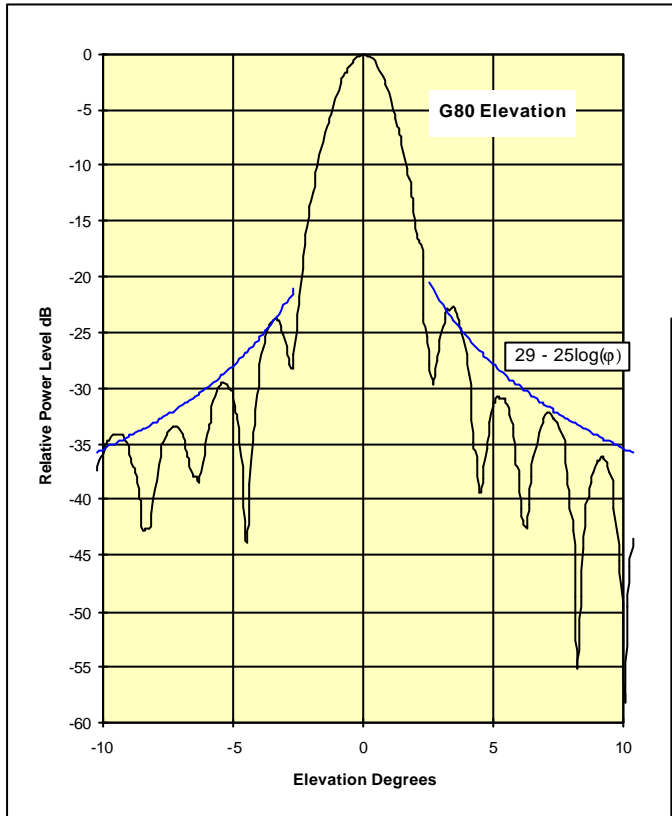
Table values apply at 12.5 GHz and will vary with respect to received signal frequency. Gain related performance values are typical and are subject to production tolerances of  $\pm 0.3$  dB

The value for G/T includes amplifier noise for an LNB with a noise figure of 1.0 dB

Wind Loads are worst case values for W41 situations and are calculated in accordance with AS1170.2-1989.

## Gain Measurement:

Reflector #R 7/9/99	Azimuth	Elevation
3 dB Beamwidth	1.62	1.81
10 dB Beamwidth	3.13	3.38
Calculated Gain/ plane:	40.23 dB	39.41 dB
Calculated Gain @ 12.5GHz:	39.82 dB	



## Gain Efficiency:

Reflector Size: 868 x 774

Offset Angle: 18.2°

Measured Gain: 39.5 dBi

Aperture Area Normal to Boresight:  $A_e = \pi/4 * 868 * 774 * \cos(18.2) = 0.5013 \text{ m}^2$

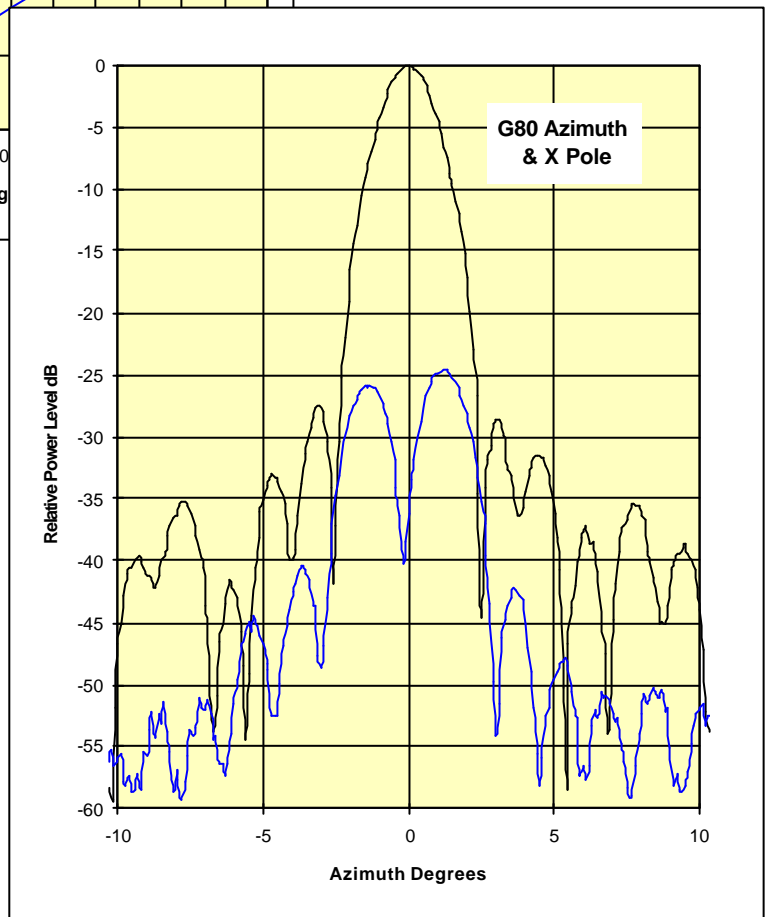
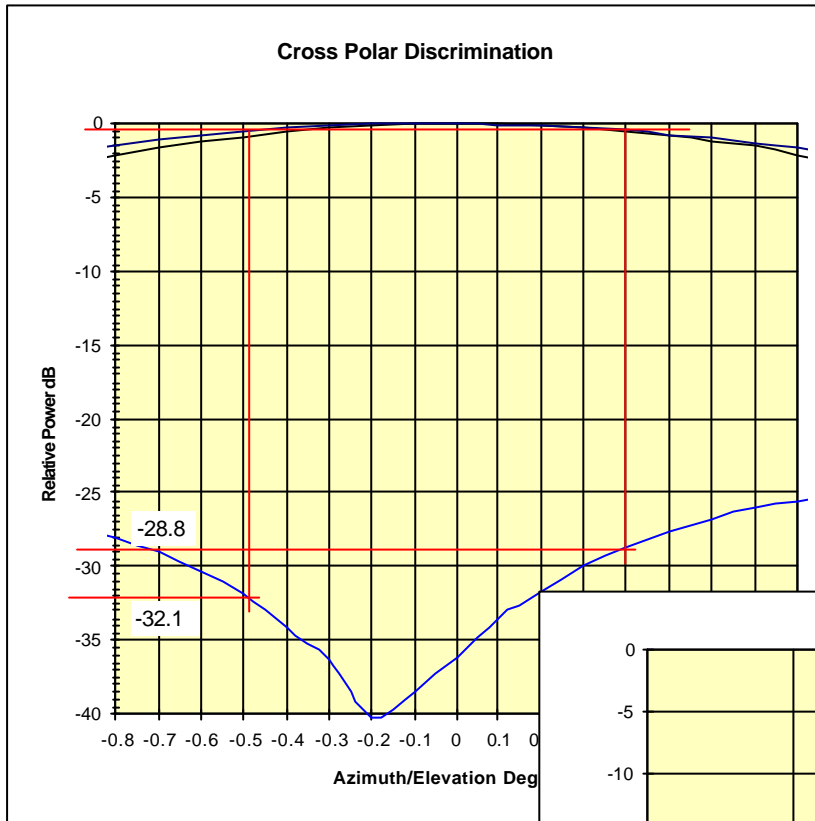
Wavelength at 12.5 GHz:  $\lambda = 0.3 / 12.5 = 0.024\text{m}$

Aperture Gain:  $= 10 * \text{LOG}_{10}(4 * \pi * A_e / \lambda^2) = 40.39 \text{ dBi}$

Gain Efficiency:  $k = \lambda^2 * 10^{(39.5/10)} / (4 * \pi * A_e) = 0.815 \approx 80\%$

### Cross Polar Discrimination:

A value for cross pole is calculated from the average gain of the cross pole pattern at  $\pm 0.5$  dB off reflector boresight.  $(28.8 + 32.1)/2 = 30.4$  dB



### Gain /Noise Temperature:

Measured Gain at 12.5GHz:  $G = 39.5$  dBi

Estimated reflector spillover noise at  $45^\circ$  elevation:  $20^\circ$

Estimated value for sky noise:  $10^\circ$  K

Equivalent noise temperature of LNB at 1dB Noise Figure at  $290^\circ$  K :  $75^\circ$  K

Total System Noise without amplifier,  $T_A = 20 + 10 = 30^\circ$  K

$G/T_A = 10 * \text{Log}_{10}(10^{G/10} / T_A) = 24.7$  dB/ $^\circ$  K

Total System Noise  $T = 20 + 10 + 75 = 105^\circ$  K

$G/T = 10 * \text{Log}_{10}(10^{G/10} / T) = 19.3$  dB/ $^\circ$  K

### Wind Loading:

Wind forces on parabolic reflectors are based on Jet Propulsion Laboratory Publication 78-16 entitled "Compilation of Wind Tunnel Coefficients for Parabolic Reflectors". For a wind direction normal to the plane of the reflector, a drag coefficient of  $C_d = 1.5$  is applicable.

Referring to AS 4055-1992 "Wind loads for housing", the rationalised wind speed W41 (classifications N3 & C1) is frequently encountered.

The force due to the wind on the reflector in these conditions is given by:

$$F = C_d * A * 0.6 * V^2 / 1000$$

$$= 1.5 * \pi/4 * 0.900 * 0.806 * 0.6 * 41^2 / 1000 = 0.86 \text{ kN}$$