Exhibit F

Antenna Patterns

Reflector Design

Designed for Low Sidelobes

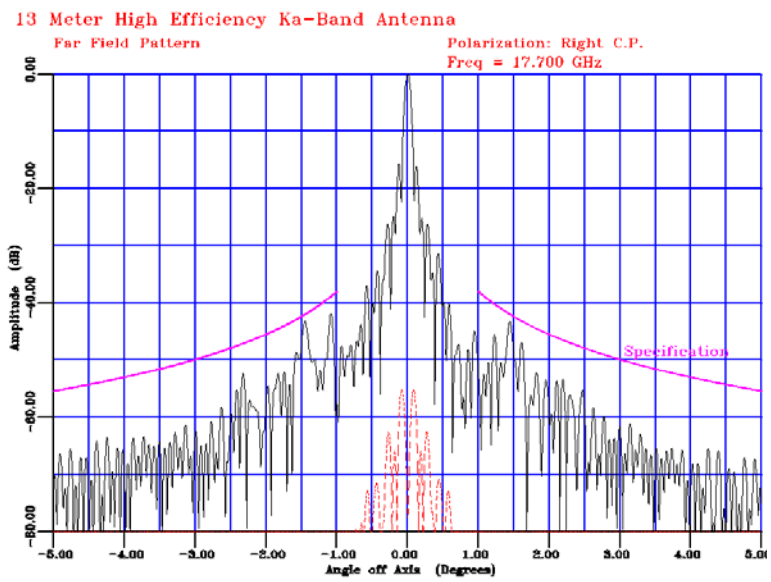
- ITU Recommendation S-580-5
  - 29-25 log(θ) $1.0^o < \theta < 20.0^o$
  - -3.5 dBi $20.0^o < \theta < 26.3^o$
  - 32-25 log(θ) $26.3^o < \theta < 48.0^o$
  - -10 dBi $48.0^o < \theta < 180.0^o$
- ALSO FCC CFR-47 §25.209

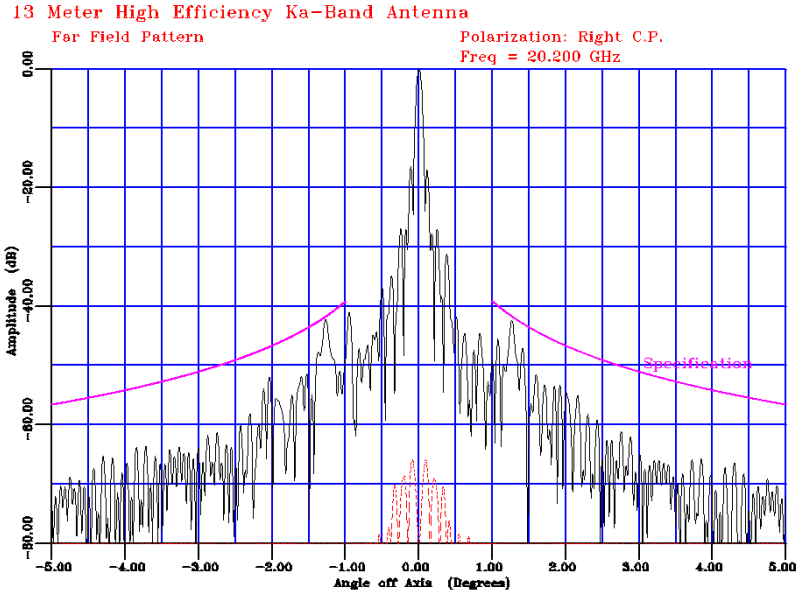
Designed for Ka-Band Operation

Designed for Maximum Gain

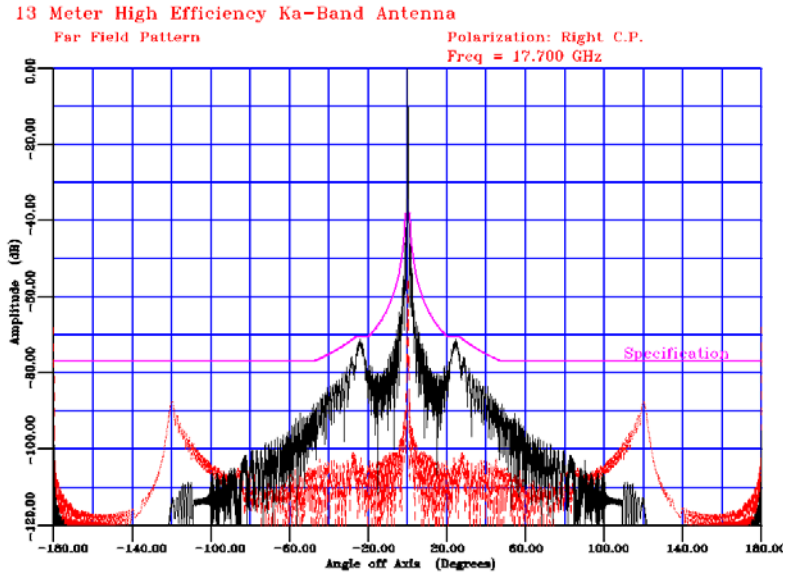
Designed for Low Noise Temperature

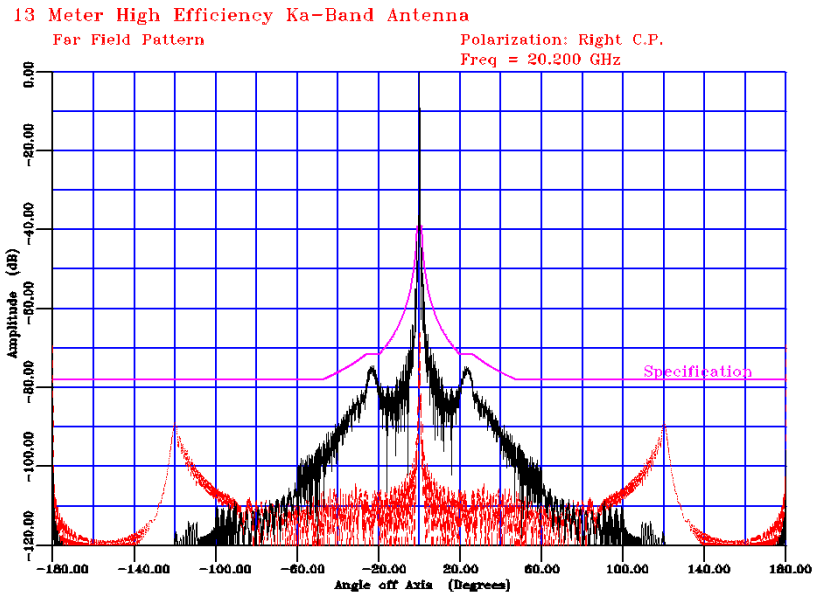
Ka-Band Receive Main Beam Pattern



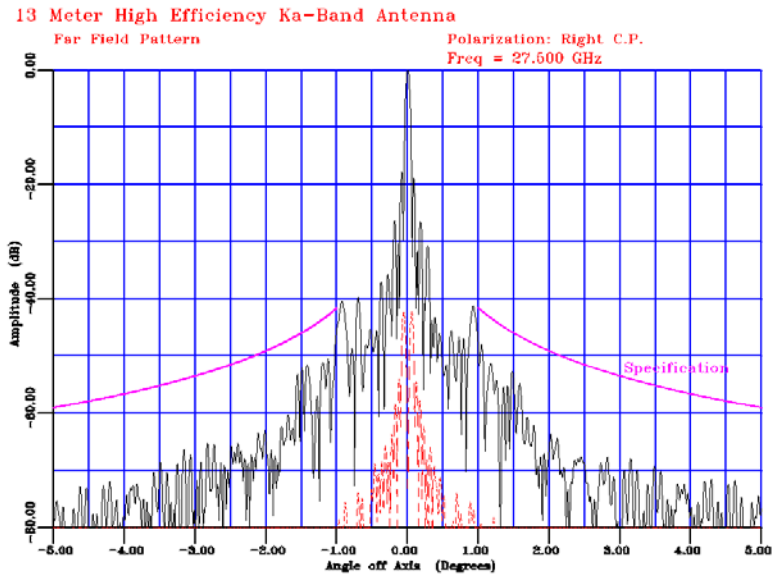


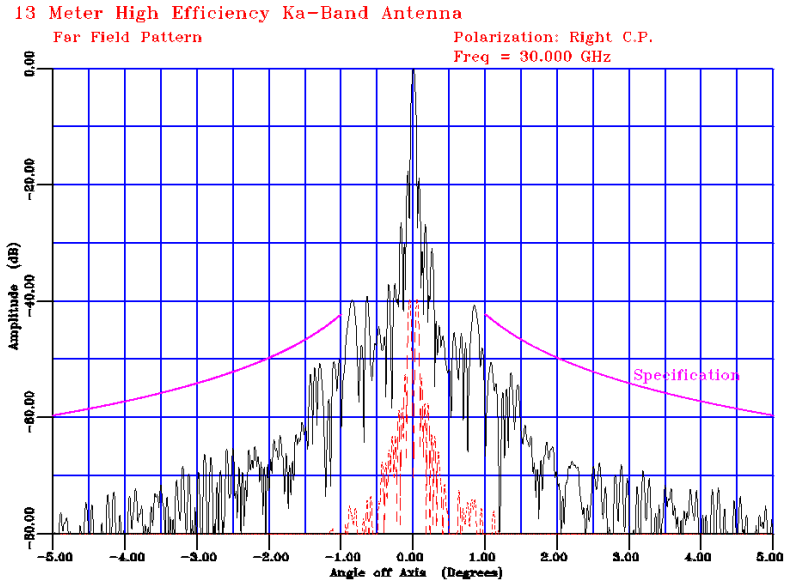
Ka-Band Receive
Wide Angle Sidelobes



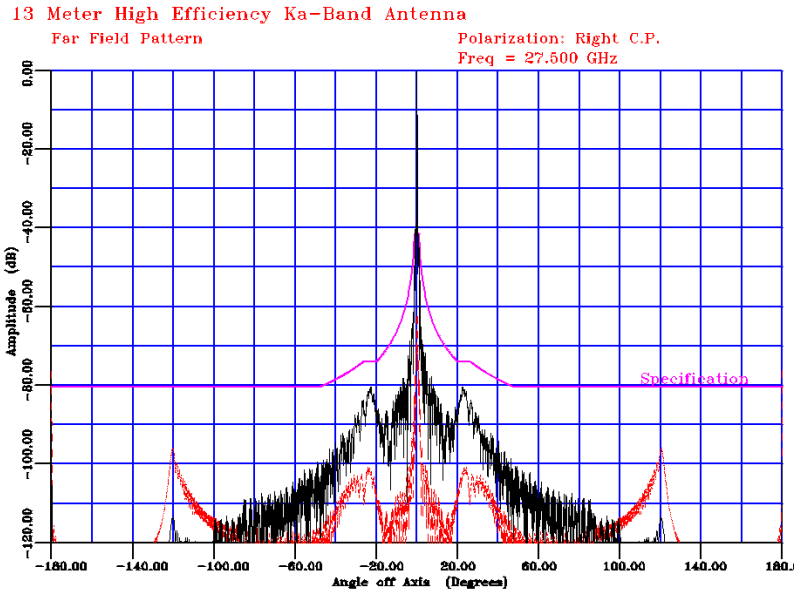


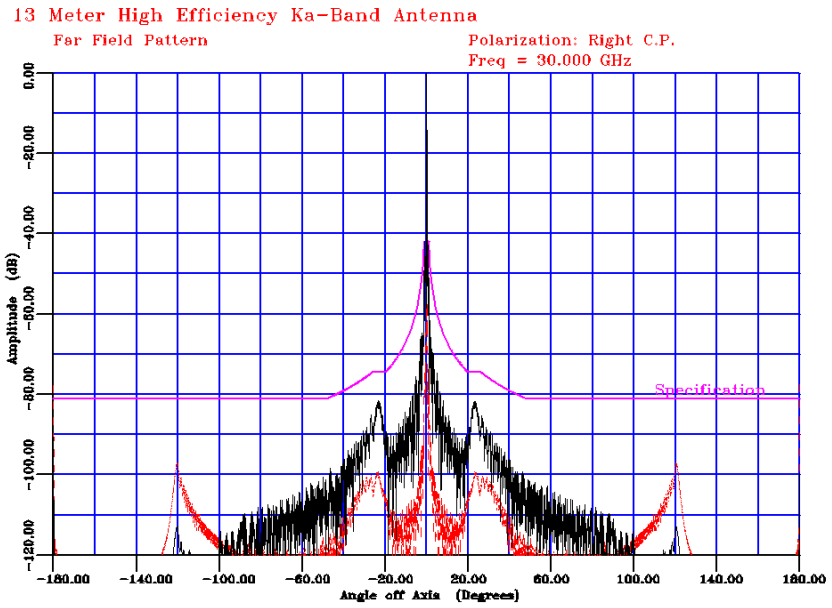
Ka-Band Transmit Main Beam Pattern



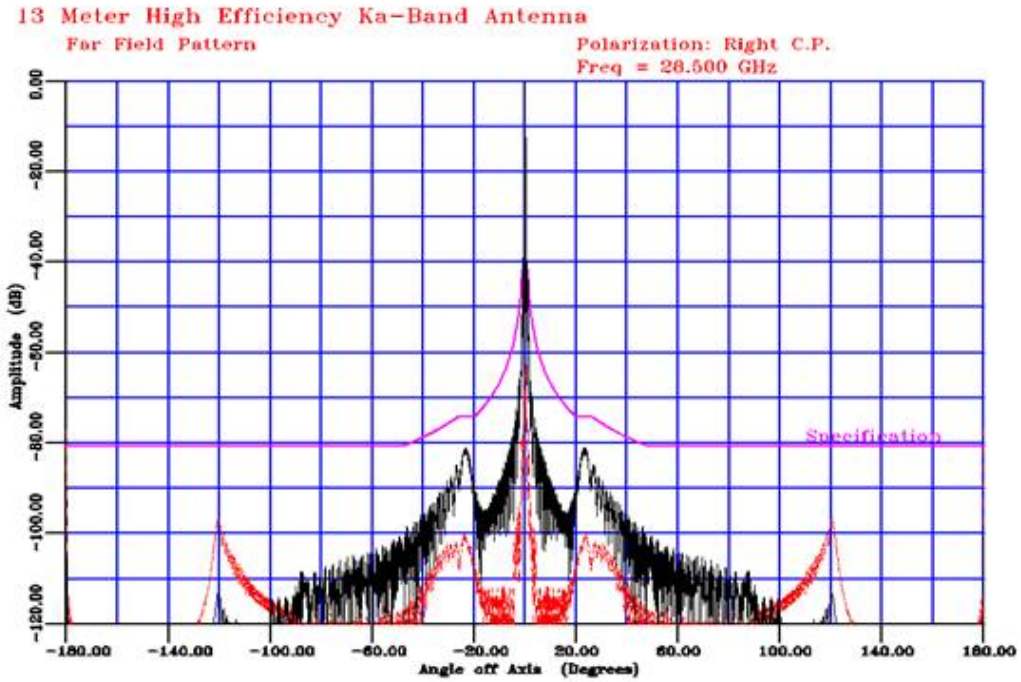


Ka-Band Transmit
Wide Angle Sidelobes





Ka-Band Transmit
Wide Angle Sidelobes Mid Band



Ka-Band Receive G/T Calculation

Main Reflector RMS = 0.012 Subreflector RMS = 0.003	Frequency					
	17.700 GHz		**18.950 GHz**		**20.200 GHz**	
Ideal Gain		67.78 dBi		68.38		68.93
	%		%		%	
Cross Polarization	0.998	-0.01 dB	0.998	-0.01 dB	0.998	-0.01 dB
Spillover	0.993	-0.03 dB	0.994	-0.03 dB	0.995	-0.02 dB
Diffraction	0.998	-0.01 dB	0.998	-0.01 dB	0.998	-0.01 dB
Aperture Illumination	0.965	-0.15 dB	0.962	-0.17 dB	0.957	-0.19 dB
Phase Error	0.941	-0.26 dB	0.953	-0.21 dB	0.961	-0.17 dB
Surface Error	0.947	-0.24 dB	0.940	-0.27 dB	0.932	-0.31 dB
Blockage	0.930	-0.32 dB	0.930	-0.32 dB	0.930	-0.32 dB
Overall Efficiency	0.791		0.793		0.790	
Calculated Gain at Feed Aperture		66.76 dBi		67.37 dBi		67.91 dBi
Feed Loss		-1.15 dB		-1.15 dB		-1.15 dB
Feed VSWR Loss 1.45:1		-0.15 dB		-0.15 dB		-0.15 dB
Calculated Antenna Gain (Feed Output)		65.47 dBi		66.07 dBi		66.61 dBi
Specified Antenna Gain (Feed Output)		64.97 dBi		65.57 dBi		66.11 dBi
Margin		0.50 dB		0.50 dB		0.50 dB
Antenna Temperature (20 deg. el.)		24.60 K		34.90 K		51.40 K
Net Antenna Temperature		93.21 K		100.85 K		113.08 K
LNA System Noise Temperature		160.47 K		160.47 K		160.47 K
Calculated Antenna G/T		41.42 dBi/K		41.90 dBi/K		42.24 dBi/K
Specified Antenna G/T		40.92 dBi/K		41.40 dBi/K		41.74 dBi/K
Margin		0.50 dBi/K		0.50 dBi/K		0.50 dBi/K

Ka-Band Transmit Gain Calculation

Main Reflector RMS = 0.012 Subreflector RMS = 0.003	Frequency					
	27.500 GHz		**28.750 GHz**		**30.000 GHz**	
Ideal Gain		71.61 dBi		72.00		72.37
	%		%		%	
Cross Polarization	0.998	-0.01 dB	0.998	-0.01 dB	0.998	-0.01 dB
Spillover	0.998	-0.01 dB	0.998	-0.01 dB	0.998	-0.01 dB
Diffraction	0.998	-0.01 dB	0.998	-0.01 dB	0.998	-0.01 dB
Aperture Illumination	0.917	-0.38 dB	0.913	-0.40 dB	0.909	-0.41 dB
Phase Error	0.995	-0.02 dB	0.992	-0.03 dB	0.987	-0.06 dB
Surface Error	0.877	-0.57 dB	0.866	-0.62 dB	0.855	-0.68 dB
Blockage	0.930	-0.32 dB	0.930	-0.32 dB	0.930	-0.32 dB
Overall Efficiency	0.740		0.725		0.710	
Gain at Feed Aperture		70.30 dBi		70.60 dBi		70.88 dBi
Feed Loss		-1.30 dB		-1.30 dB		-1.30 dB
Feed VSWR Loss 1.45:1		-0.15 dB		-0.15 dB		-0.15 dB
Calculated Antenna Gain (Feed Output)		68.85 dBi		69.15 dBi		69.42 dBi
Specified Antenna Gain (Feed Output)		68.35 dBi		68.65 dBi		68.92 dBi
Margin		0.50 dB		0.50 dB		0.50 dB