



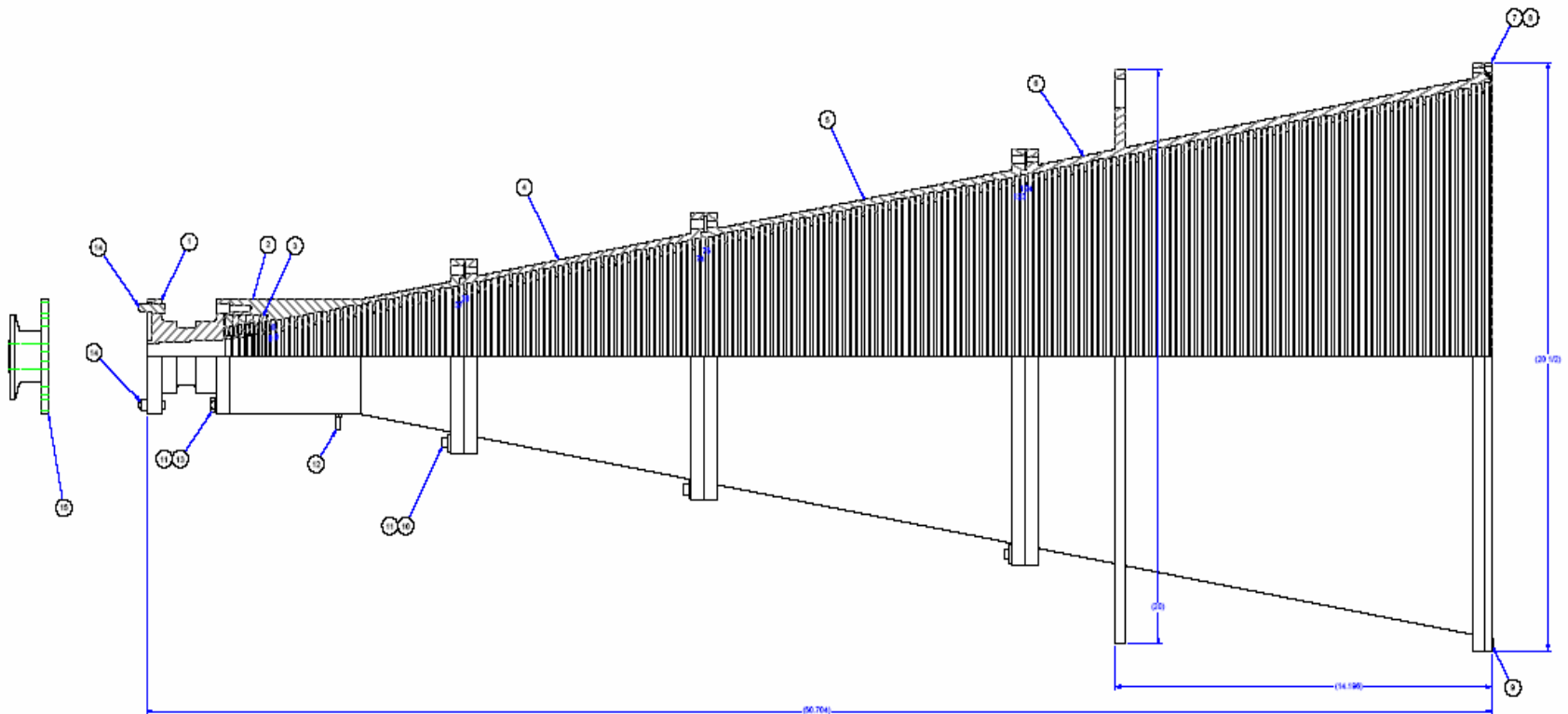
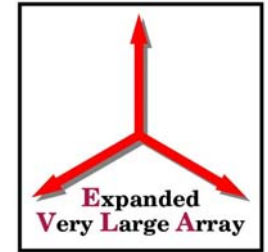
X-, Ku-, S-Band Feed Design

S. Srikanth
NRAO/Charlottesville



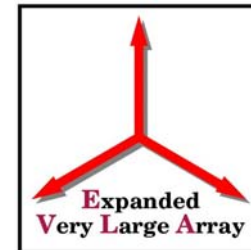
X-Band Sectional View

(OD = 20.5; Length = 50.7)





X-, Ku-Band Feed Details

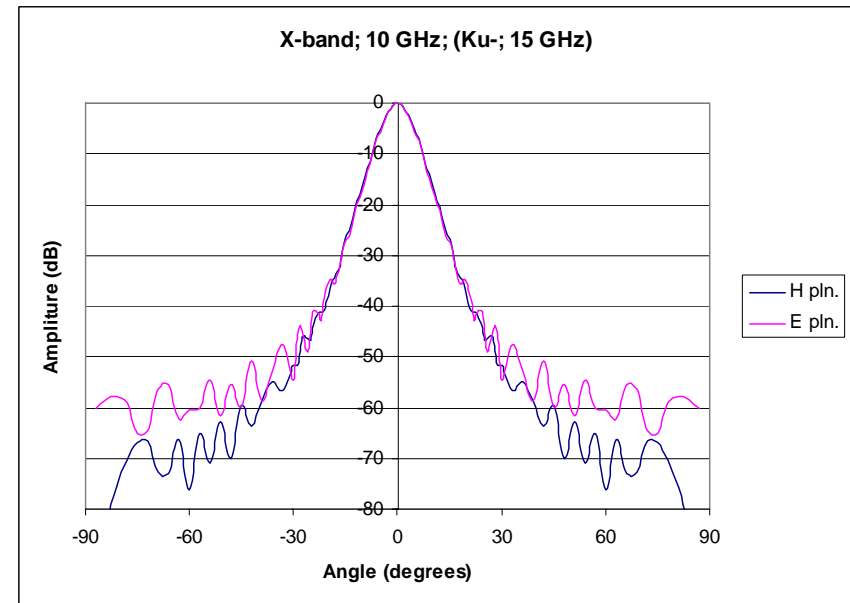
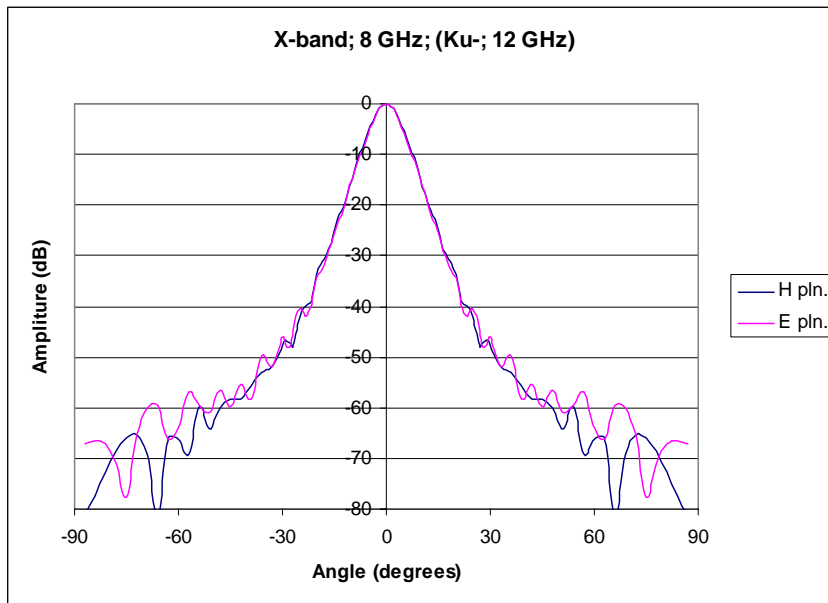
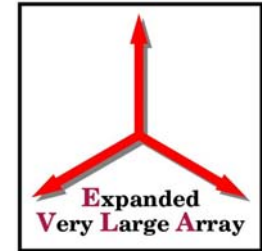


	X	Ku	λ
Aperture ID	18.491	12.344	15.7
Aperture OD	20.5	14.2	
Length	50.7	32.8	43
Input Dia	0.920	0.798	
Θ input	8°	8°	
Θ feed	10.38°	10.38°	

Corrugations		
	X	Ku
Total	194	194
Ring-loaded	5	5
Pitch	0.246	0.164
Flange width	0.078	0.052
Corrug. width	0.168	0.112
No. per λ	4.8	4.8

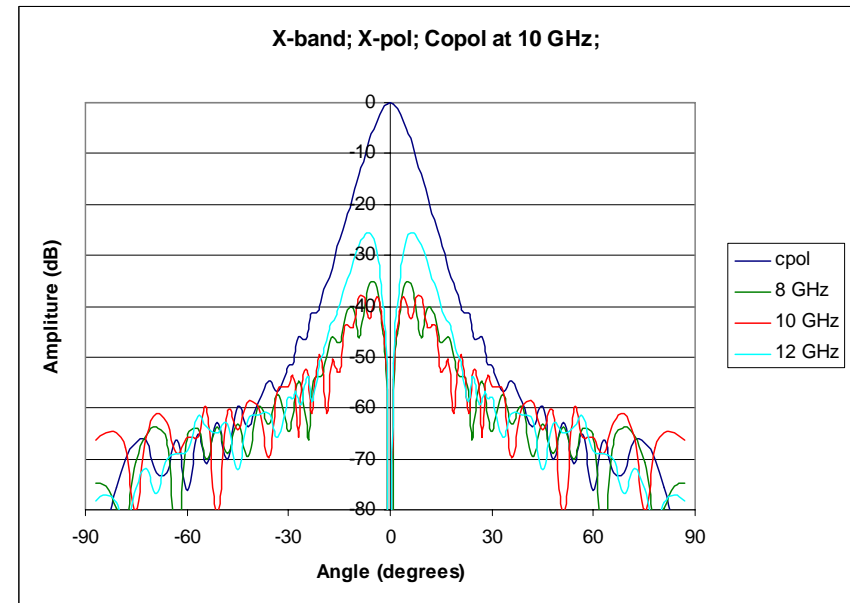
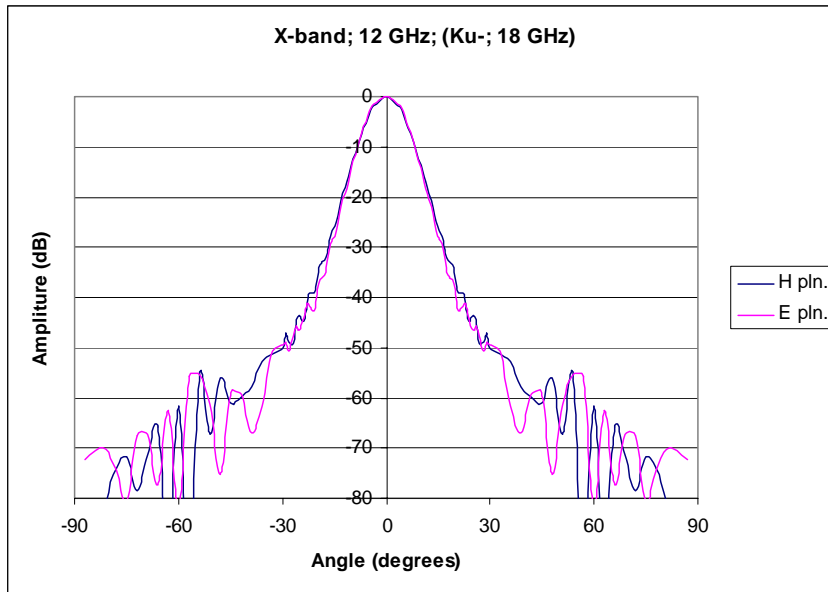
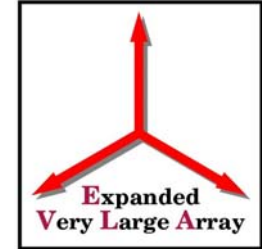


Theory H- & E-Planes



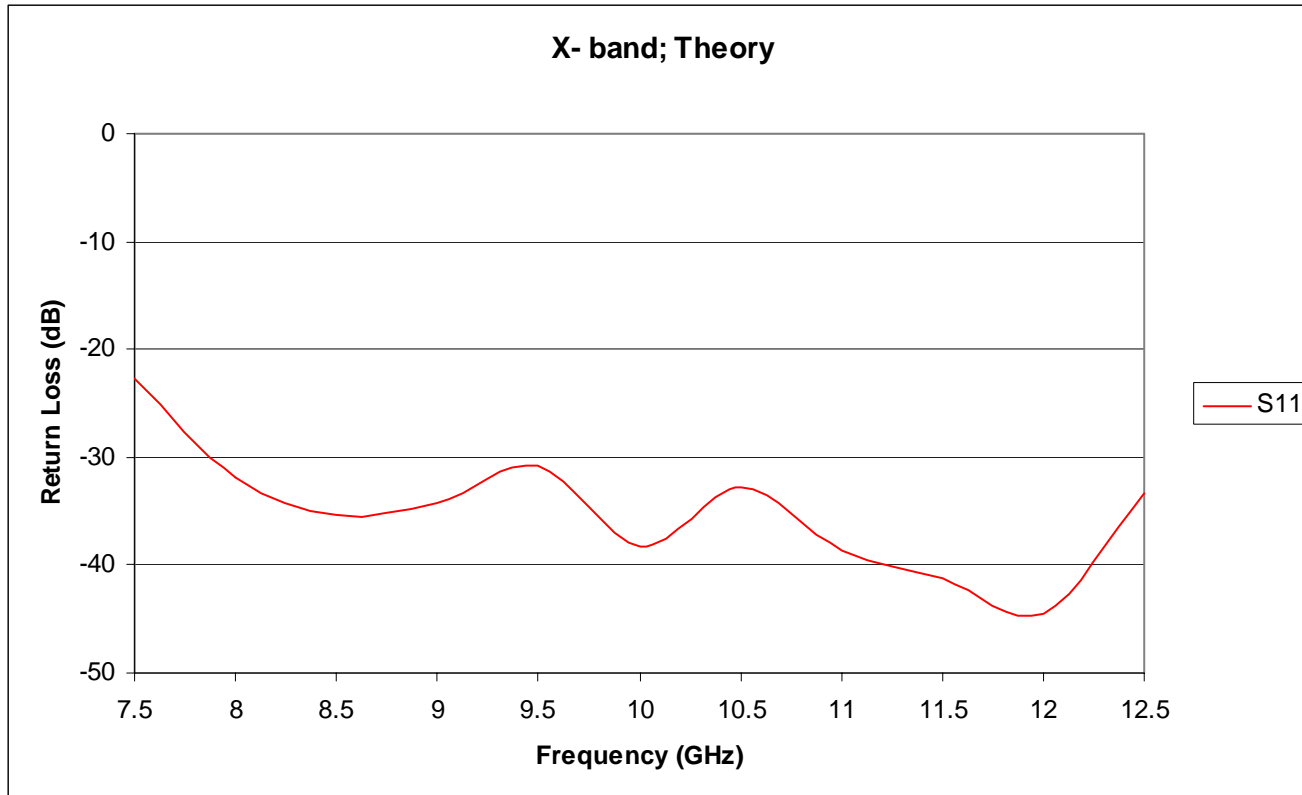


Theory H- & E- Copol; 45-Xpol



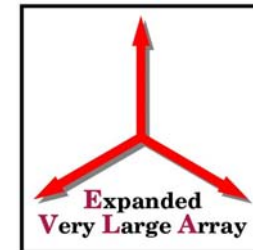


Return Loss; Theory





X- (Ku-) Band Feed Summary (Theory)



Freq. (GHz)	H	E	X-pol
8.0 (12.0)	-13.4	-13.5	-35.1
8.5 (12.75)	-13.7	-13.6	-35.2
9.0 (13.5)	-14.1	-14.0	-35.8
9.5 (14.25)	-14.4	-14.6	-38.8
10.0 (15.0)	-14.6	-15.4	-38.1
10.5 (15.75)	-14.5	-15.9	-32.5
11.0 (16.5)	-14.7	-14.4	-33.1
11.5 (17.25)	-14.0	-13.2	-31.3
12.0 (18)	-12.0	-12.4	-25.6

S-Band Feed Details

Aperture ID = 44.236 (11.2λ)

Aperture OD = 48.0

Length = 130.0 (33λ)

Input Dia. = 3.750

Θ input = 8°

Θ max = 12°

(all dimensions = inches)

Corrugations

Total = 132

Ring-loaded = 7

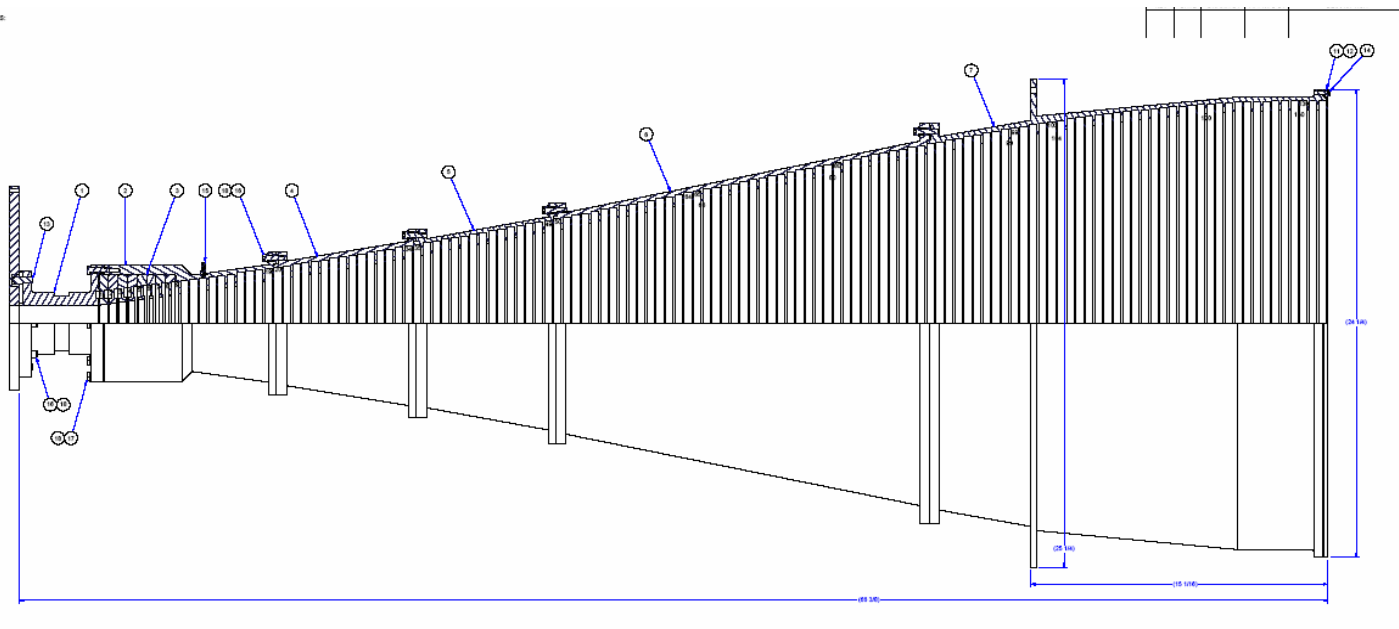
Pitch = 1.126

Flange width = 0.090

Corrug. width = 1.036

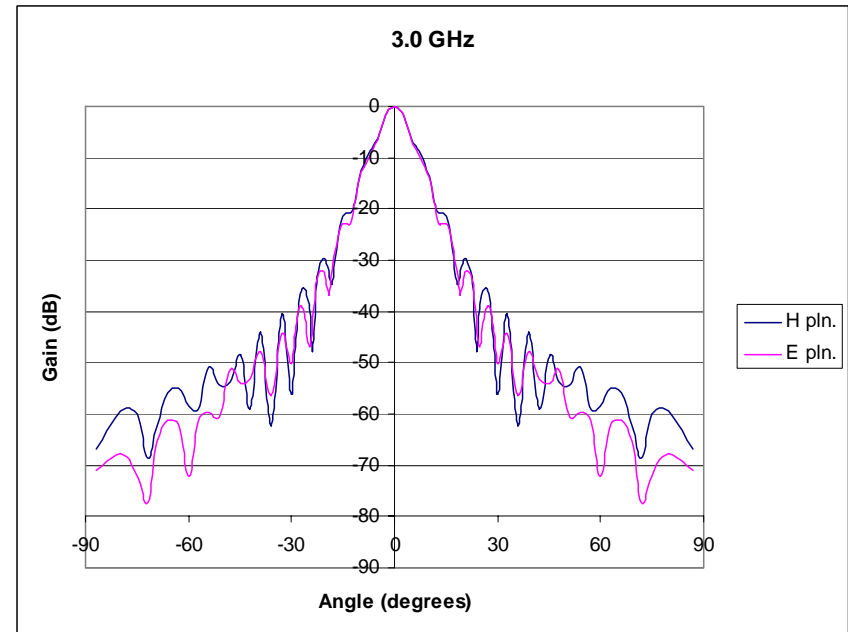
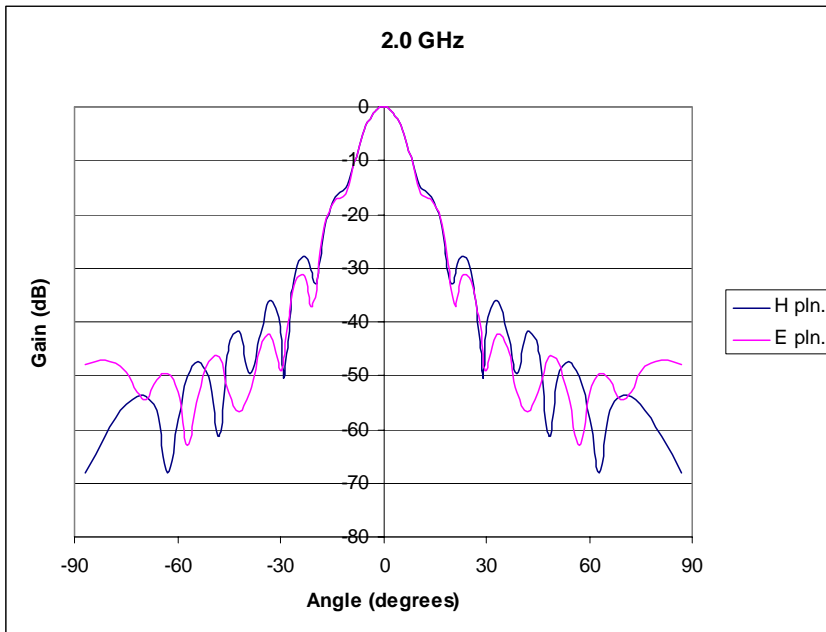
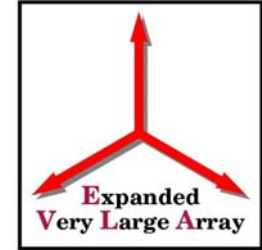
No. per λ = 3.5

NOTES:



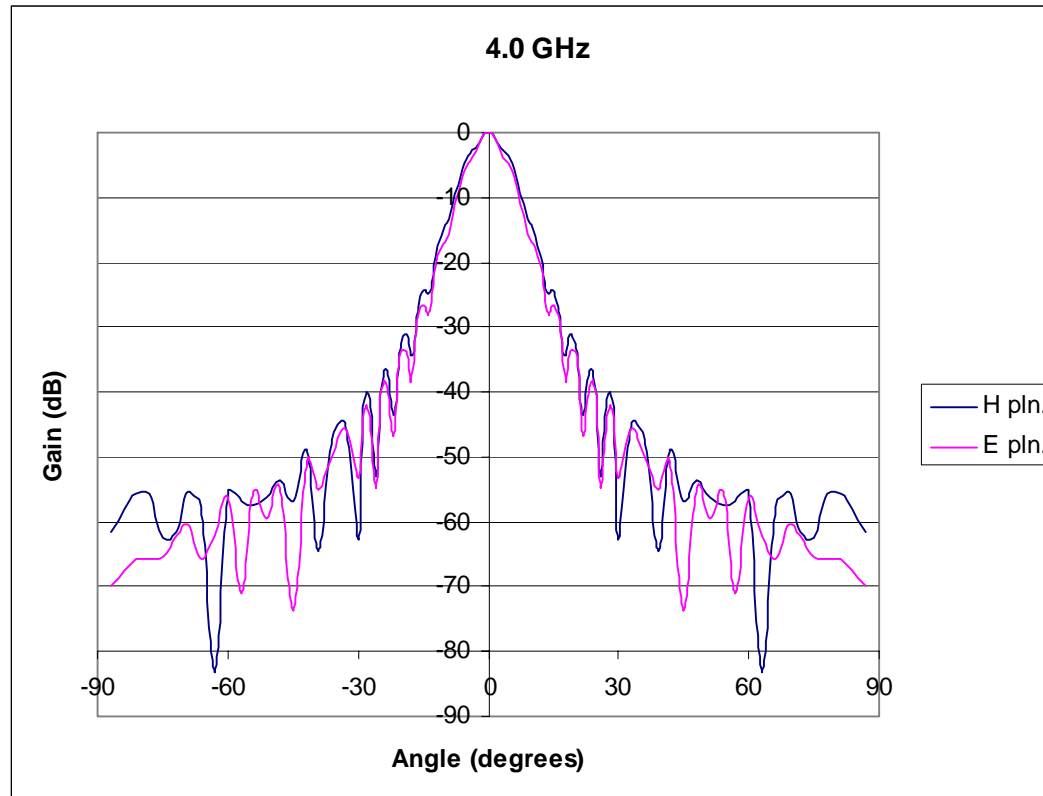
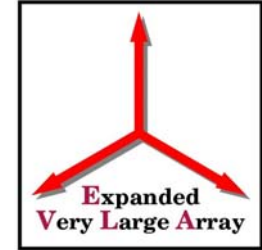


Theory H- & E-Planes



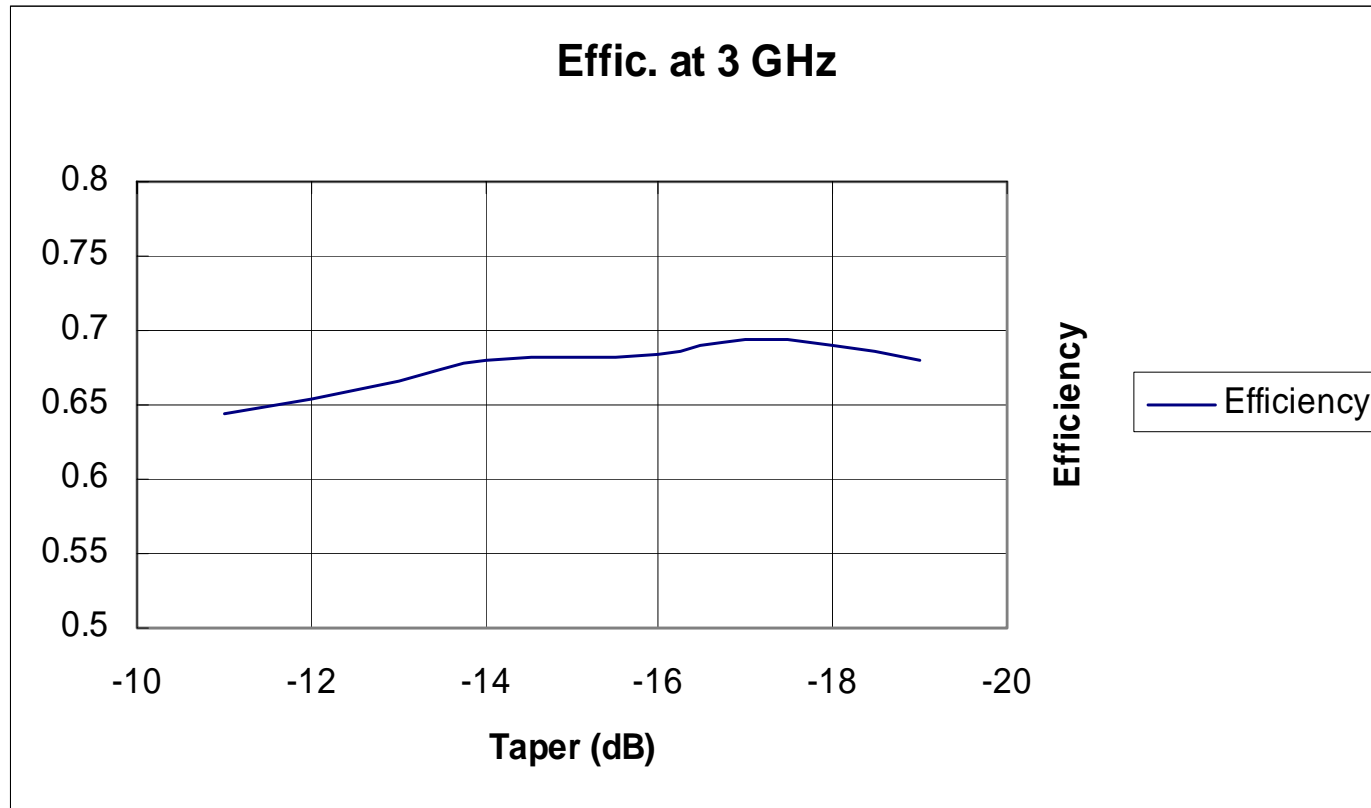
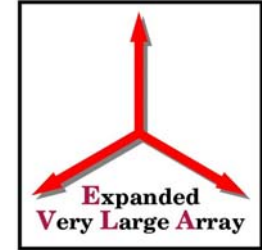


Theory H- & E-Planes



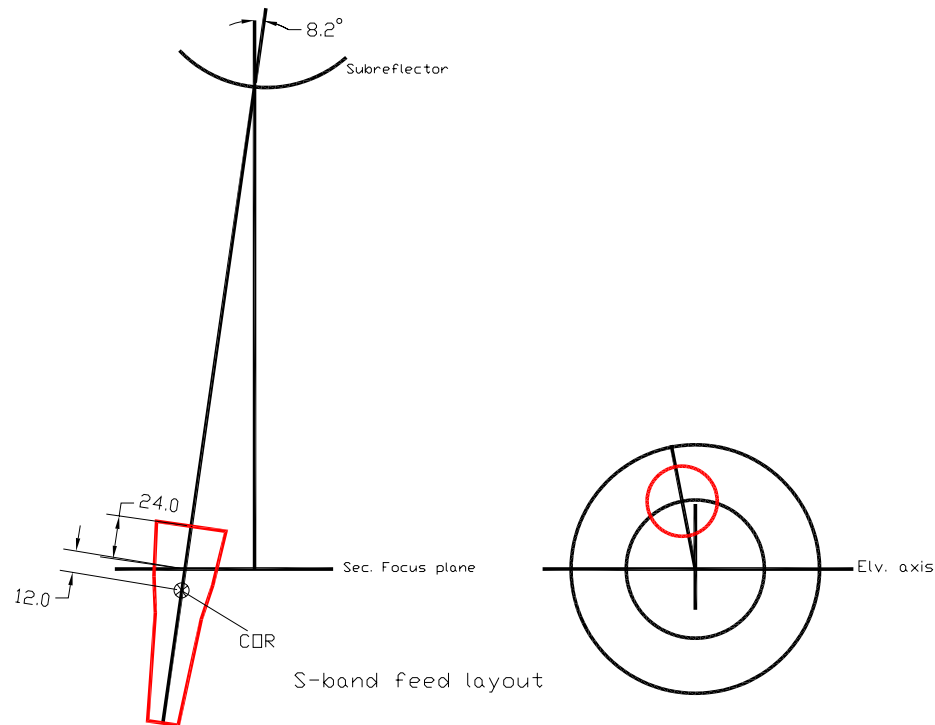
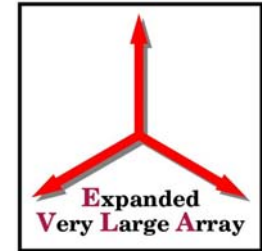


Gain/ T_{sys} Analysis



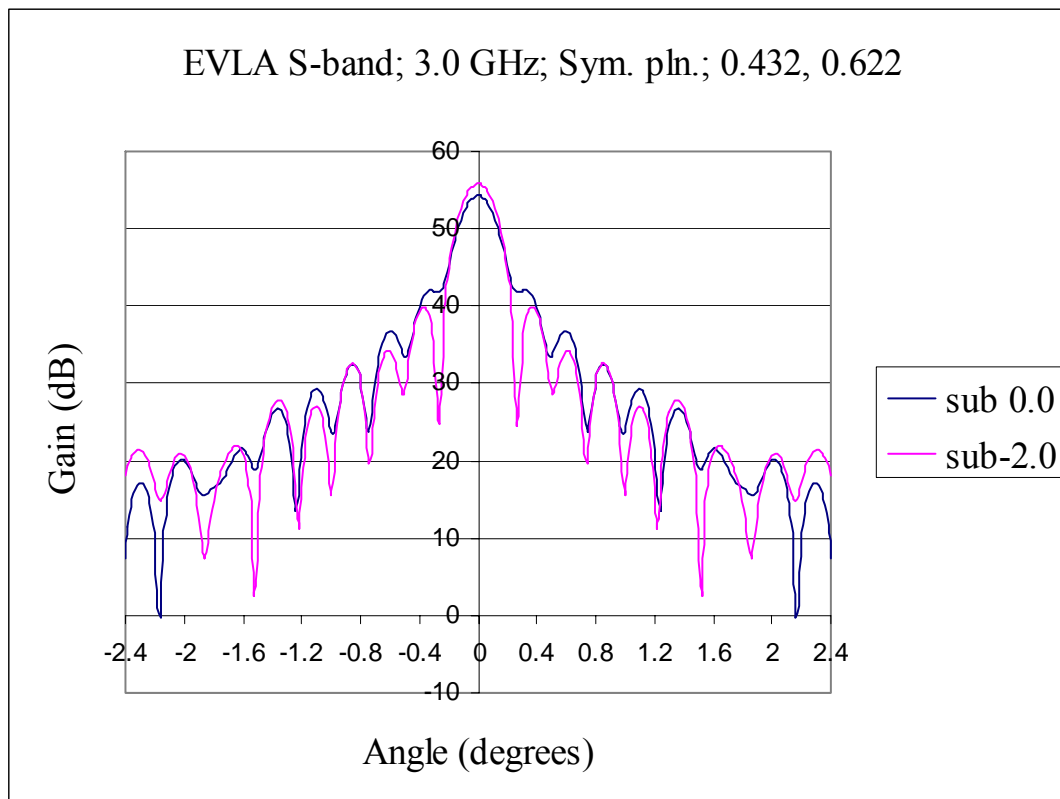
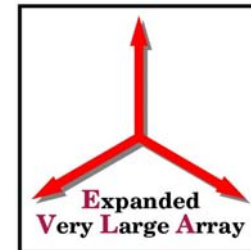


Feed As Installed On the Antenna



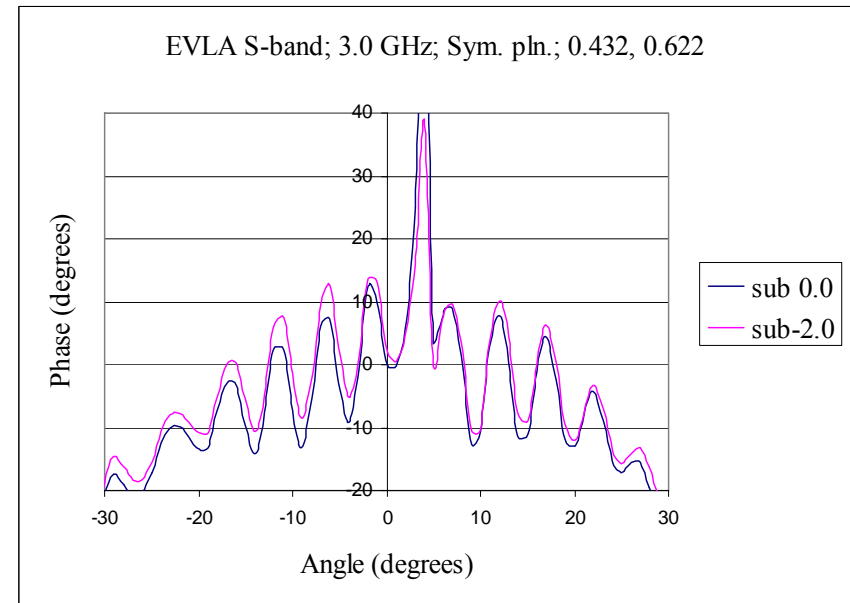
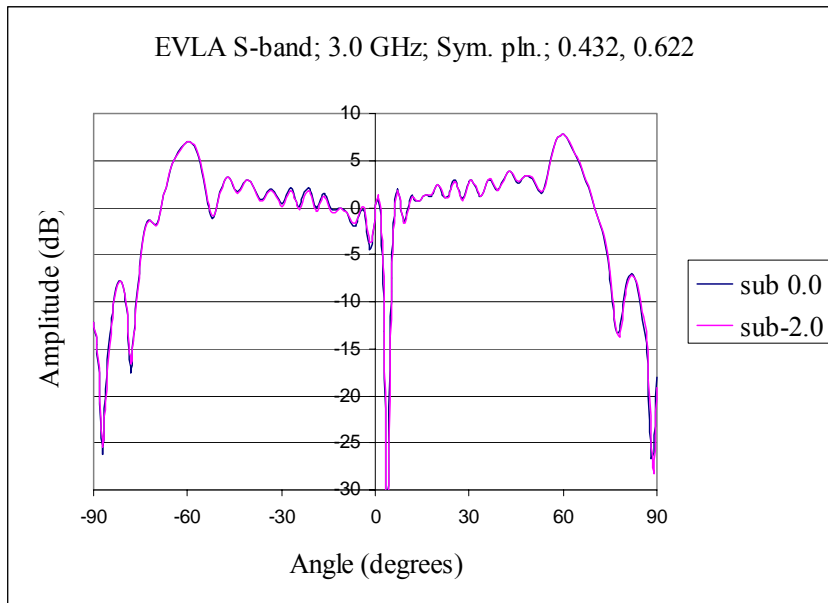
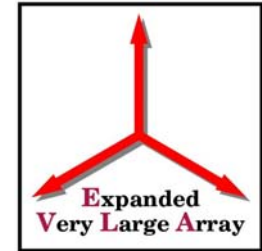


Calculated Antenna Beam at 3.0 GHz



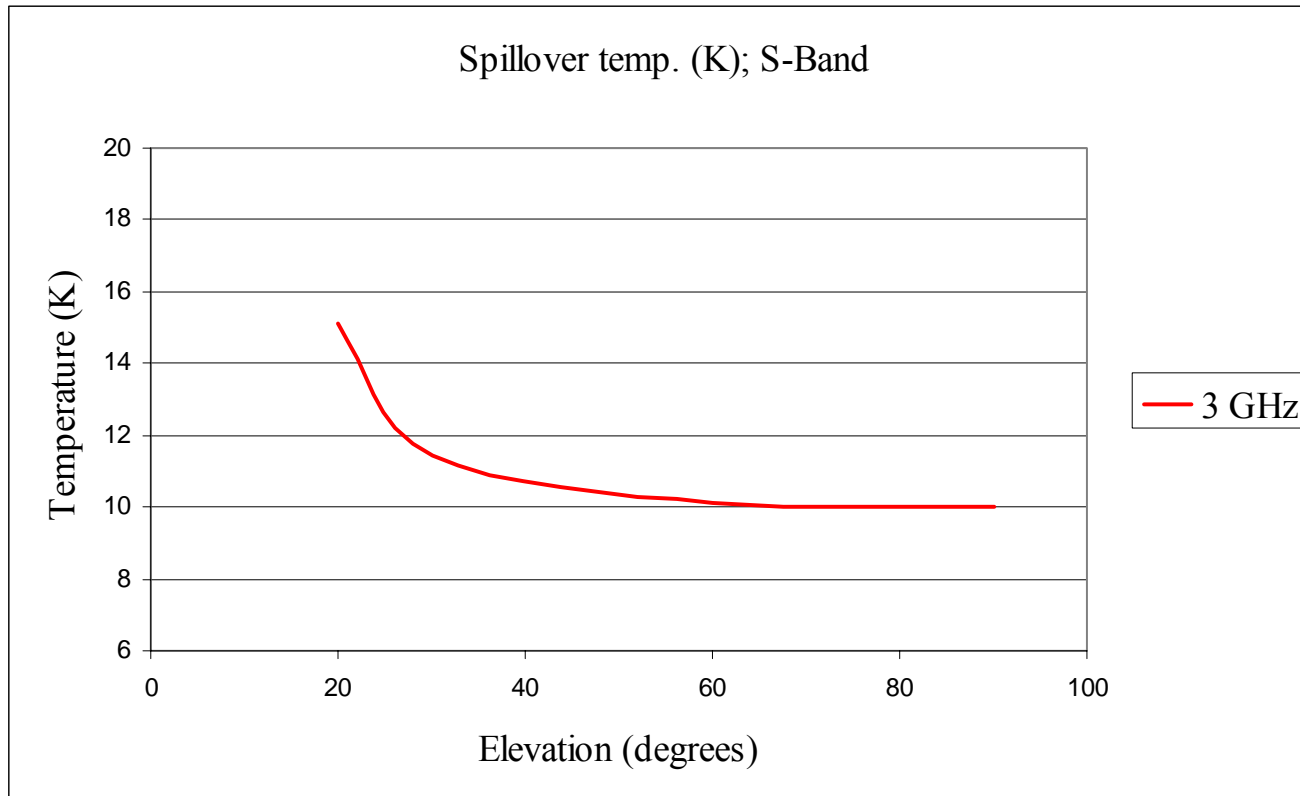
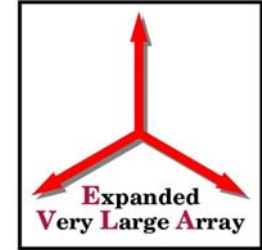


Calculated Subreflector Beam at 3.0 GHz



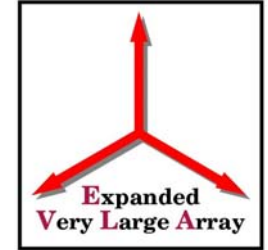


Spillover at S-Band





S-Band Feed Summary



Freq. (GHz)	Taper at 9.3°			PC
	H	E	X-pol	
2.0	-11.9	-12.3	-34.1	14.2
2.2	-12.2	-12.0	-31.5	
2.4	-11.2	-11.8	-31.5	
2.6	-12.4	-11.8	-32.2	28.8
2.8	-11.6	-11.4	-36.7	
3.0	-13.0	-13.2	-39.2	42.6
3.2	-13.3	-11.9	-32.8	
3.4	-12.5	-13.5	-25.8	
3.6	-16.2	-15.9	-31.0	
3.8	-12.0	-12.0	-25.0	
4.0	-11.8	-10.2	-24.0	