



Antenna Development Group  
Engineering Test Report

**Skyware 69cm**  
**FCC Ka Data Submission**  
**(HNS Jupiter Feed Assembly)**

27/1/2012

REVISIONS				
MF	REV	DESCRIPTION	DATE	APPROVED
	ORIG	Initial	20/1/12	
CM	A	Rx Patterns Added	25/1/12	
CM	B	OMT/Polariser Insertion Loss added to Gains	25/1/12	
CM	C	Proprietary statement removed, photographs added	27/1/12	
CM	D	New photographs added	13/2/12	

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## 1 Introduction

This report details the Transmit radiation patterns and gain performance of the Skyware Ka-band 69cm antenna. The data is presented in accordance with FCC regulation 25.138 ('Blanket licensing of GSO FCC Earth Stations' ... at Ka-band) and is with respect to the FCC masks outlined in regulation 25.209 ('Antenna Performance Standards'). The measurements were carried out in Skyware Globals Compact Antenna Test Range in Garner, North Carolina using a full production antenna system.

### 1.1 Antenna Configuration

The antenna comprises a 69cm elliptical reflector (Dimensions 780mm x 620mm) with a Ka-band feed horn, polariser and Orthogonal Mode Transducer (OMT). Measurements are referenced to the waveguide transition at the OMT.

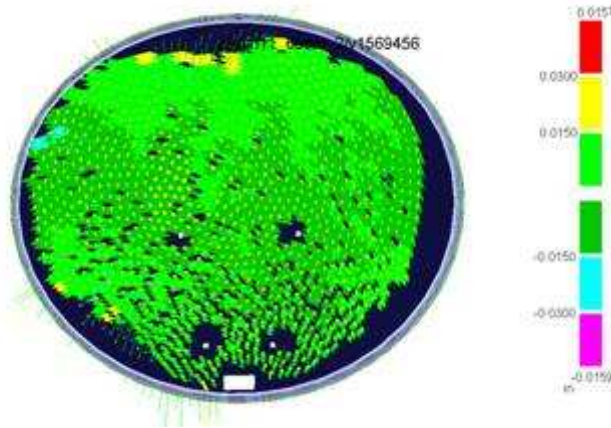
### 1.2 Frequency List

The antenna system had both co-polar and cross-polar radiation components taken in the azimuth and elevation planes for both Left Hand Circular Polarisation (LHCP) and Right Hand Circular Polarisation (RHCP) polarisations at 29.25, 29.5, 29.75 and 30GHz for the transmit band and at 18.3, 18.55, 18.8, 19.7, 19.95 and 20.2GHz for the receive band. Each pattern is presented separately and is plotted along with the applicable FCC mask.

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## 2 Reflector Scan

Below is the reflector profile scan using the Leica scanner in Smithfield, North Carolina. The focal length and CAD rms are within specification.

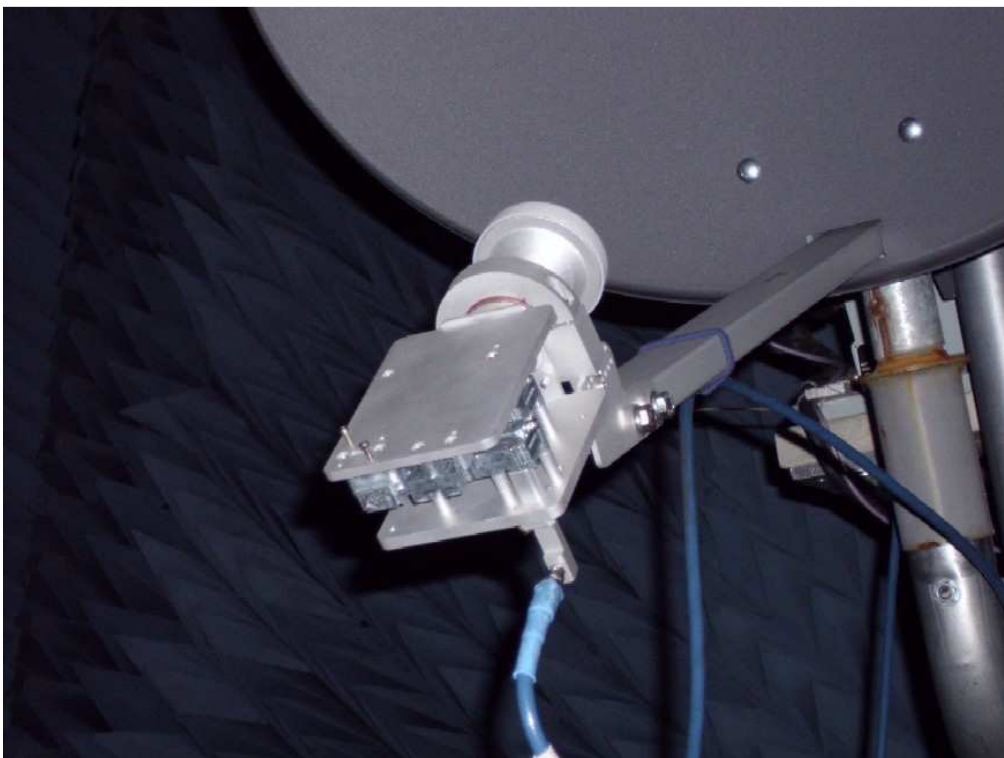


CAD RMS =  
0.0058

FL= 21.5252

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### 3 Photographs





## 4 Pattern Set

### 4.1 Transmit Pattern List

29.25GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
29.5GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
29.75GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
30GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
29.25GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
29.5GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
29.75GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
30GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
29.25GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
29.5GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
29.75GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
30GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
29.25GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
29.5GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
29.75GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
30GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
29.25GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
29.5GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
29.75GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
30GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut

29.25GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
29.5GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
29.75GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
30GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
29.25GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
29.5GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
29.75GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
30GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
29.25GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
29.5GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
29.75GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
30GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
29.25GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
29.5GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
29.75GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
30GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
29.25GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
29.5GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
29.75GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
30GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut



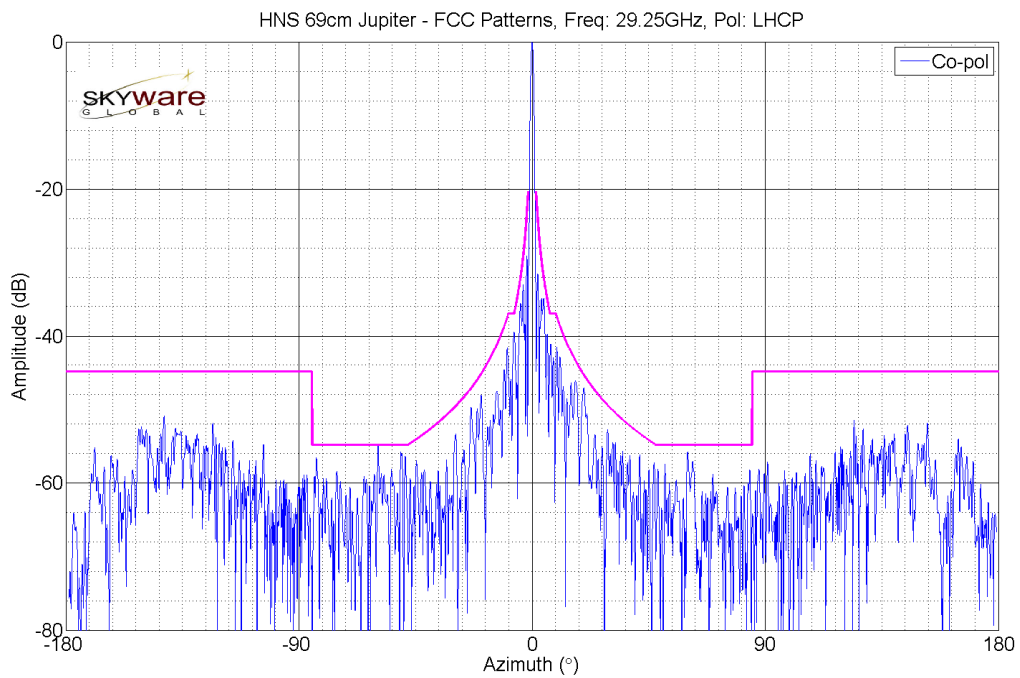
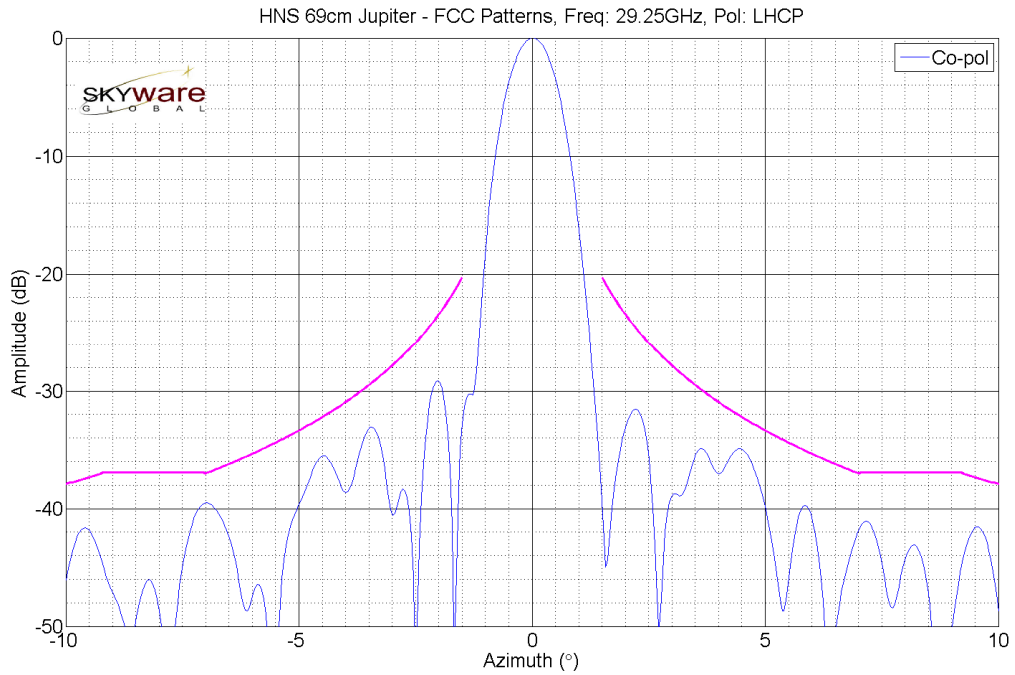
## 4.2 Receive Pattern List

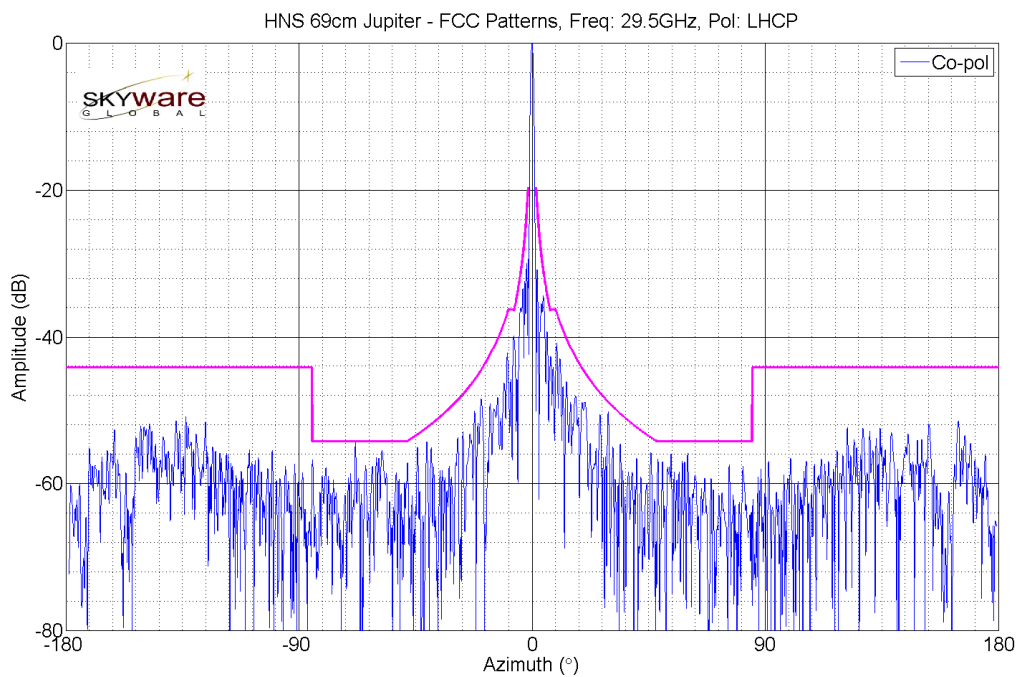
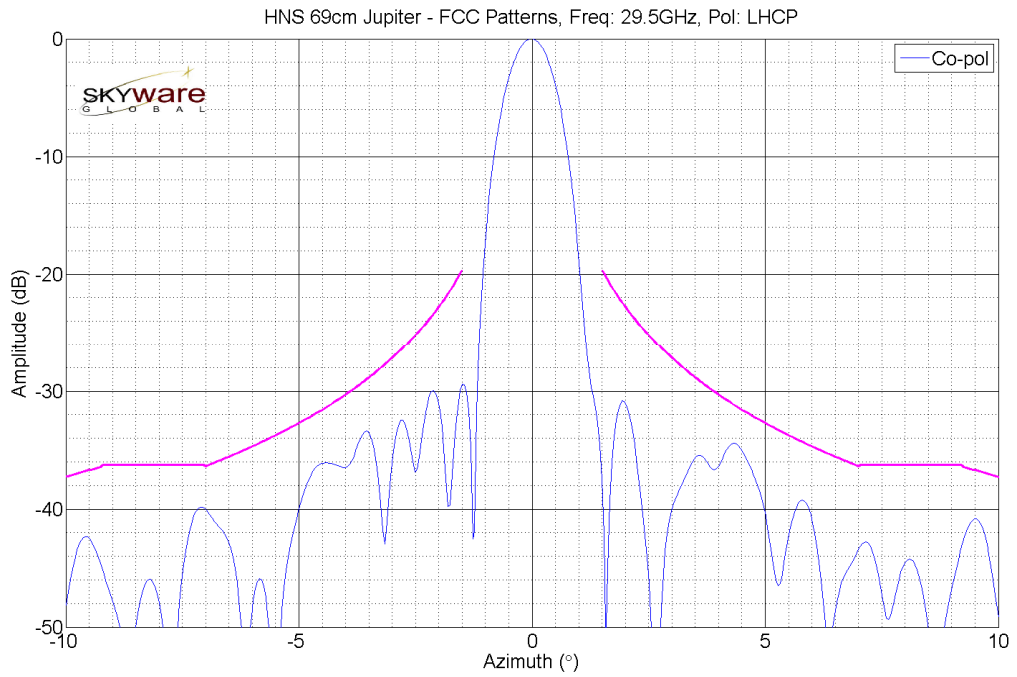
18.3GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
18.55GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
18.8GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
19.7GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
19.95GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
20.2GHz	Co-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
18.3GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
18.55GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
18.8GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
19.7GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
19.95GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
20.2GHz	Co-polar	$\pm 180^\circ$	LHCP	Azimuth Cut
18.3GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
18.55GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
18.8GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
19.7GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
19.95GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
20.2GHz	X-polar	$\pm 10^\circ$	LHCP	Azimuth Cut
18.3GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
18.55GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
18.8GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
19.7GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
19.95GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
20.2GHz	Co-polar	$0^\circ$ to $+30^\circ$	LHCP	Elevation Cut
18.3GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
18.55GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
18.8GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
19.7GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
19.95GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut
20.2GHz	X-polar	$\pm 10^\circ$	LHCP	Elevation Cut

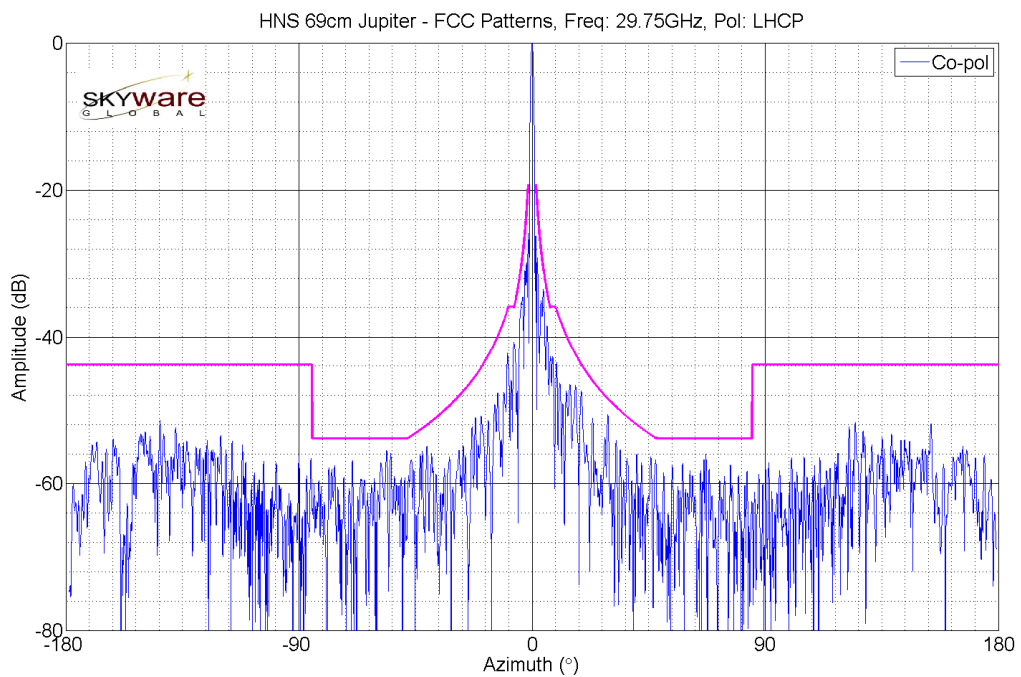
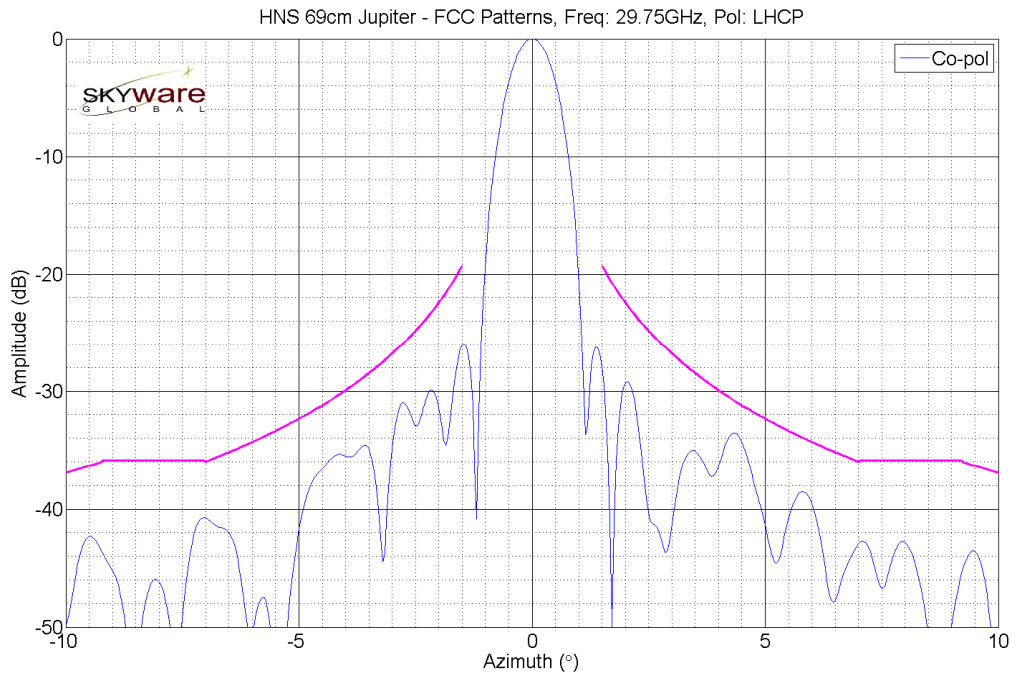
18.3GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
18.55GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
18.8GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
19.7GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
19.95GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
20.2GHz	Co-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
18.3GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
18.55GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
18.8GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
19.7GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
19.95GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
20.2GHz	Co-polar	$\pm 180^\circ$	RHCP	Azimuth Cut
18.3GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
18.55GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
18.8GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
19.7GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
19.95GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
20.2GHz	X-polar	$\pm 10^\circ$	RHCP	Azimuth Cut
18.3GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
18.55GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
18.8GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
19.7GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
19.95GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
20.2GHz	Co-polar	$0^\circ$ to $+30^\circ$	RHCP	Elevation Cut
18.3GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
18.55GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
18.8GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
19.7GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
19.95GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut
20.2GHz	X-polar	$\pm 10^\circ$	RHCP	Elevation Cut

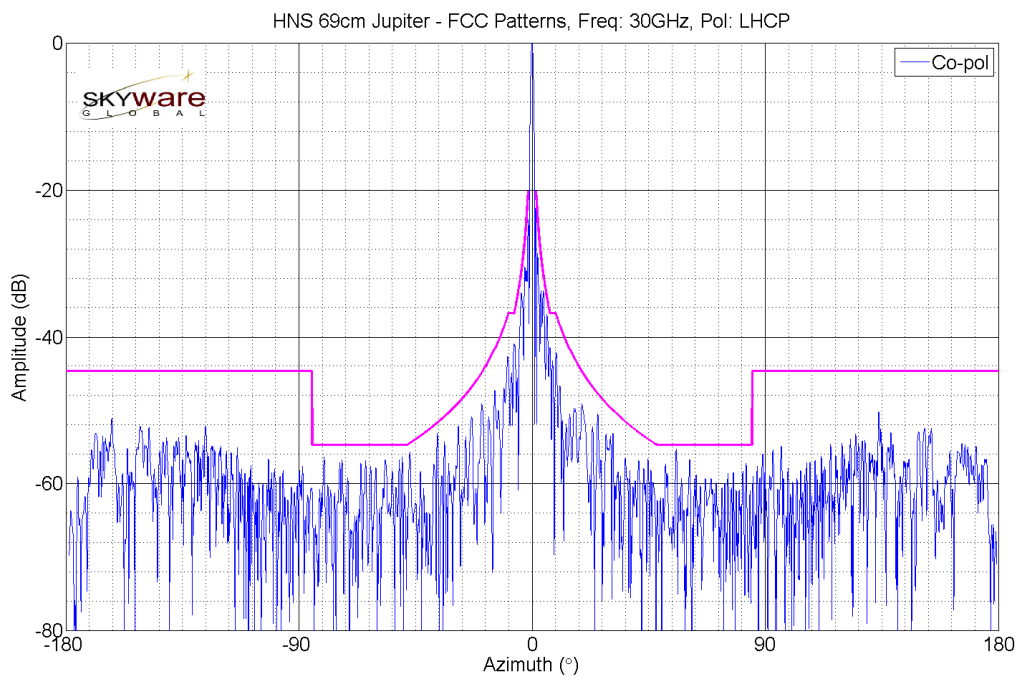
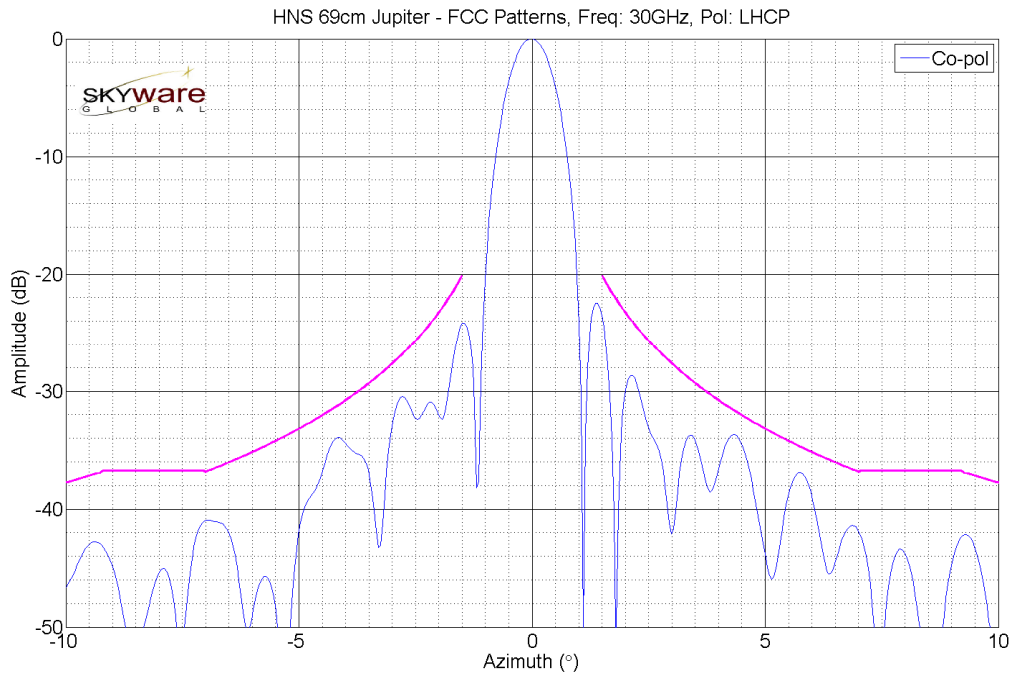
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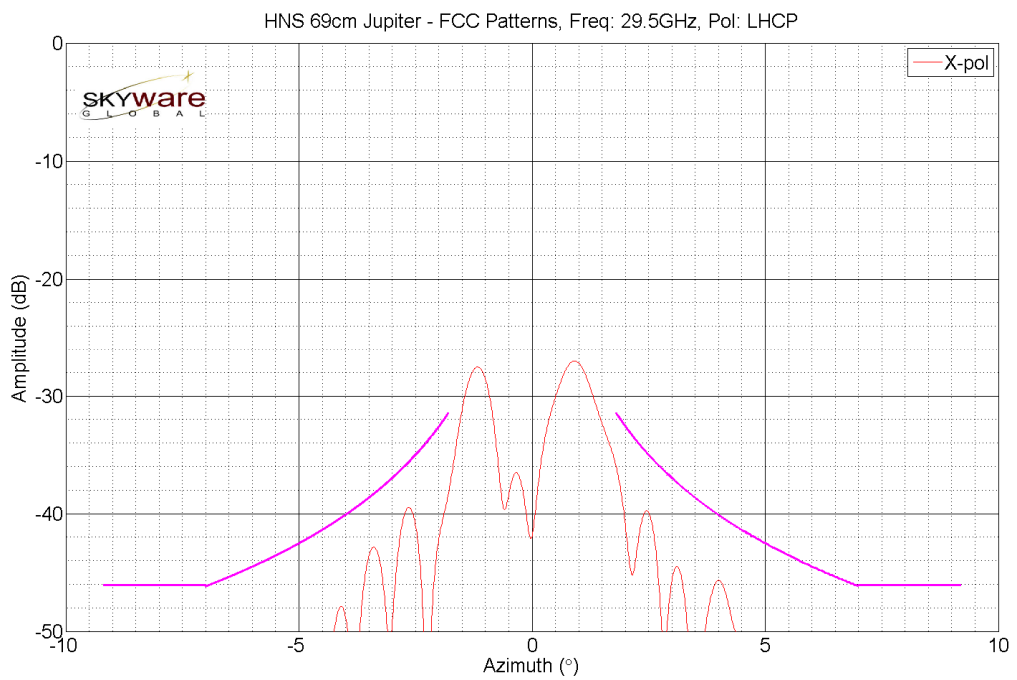
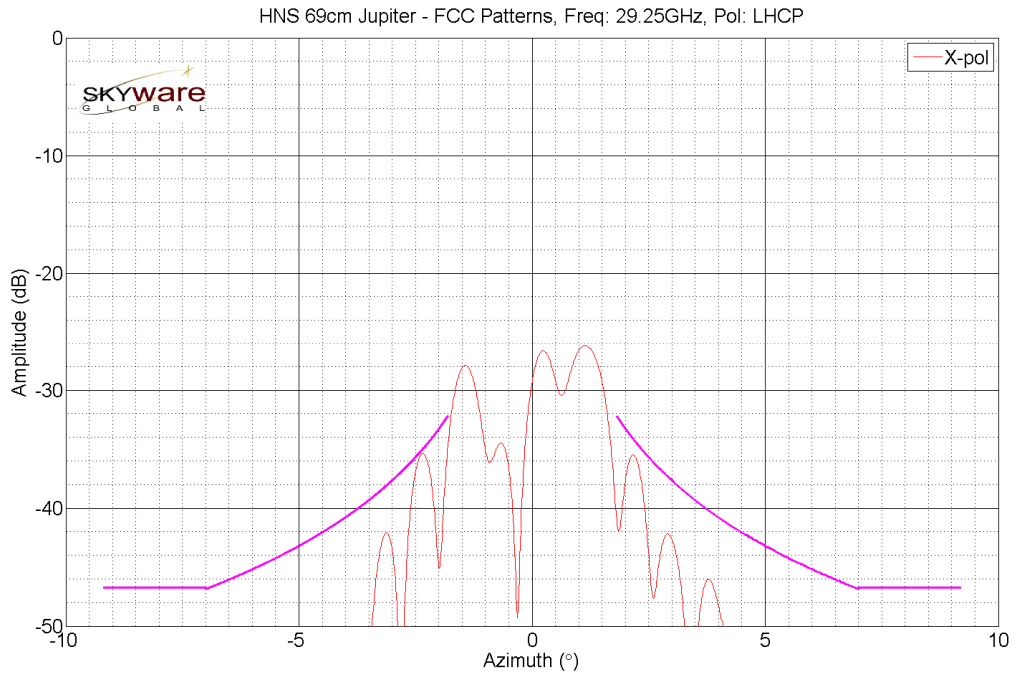
### 5.1 Tx LHCP Azimuth Radiation Patterns

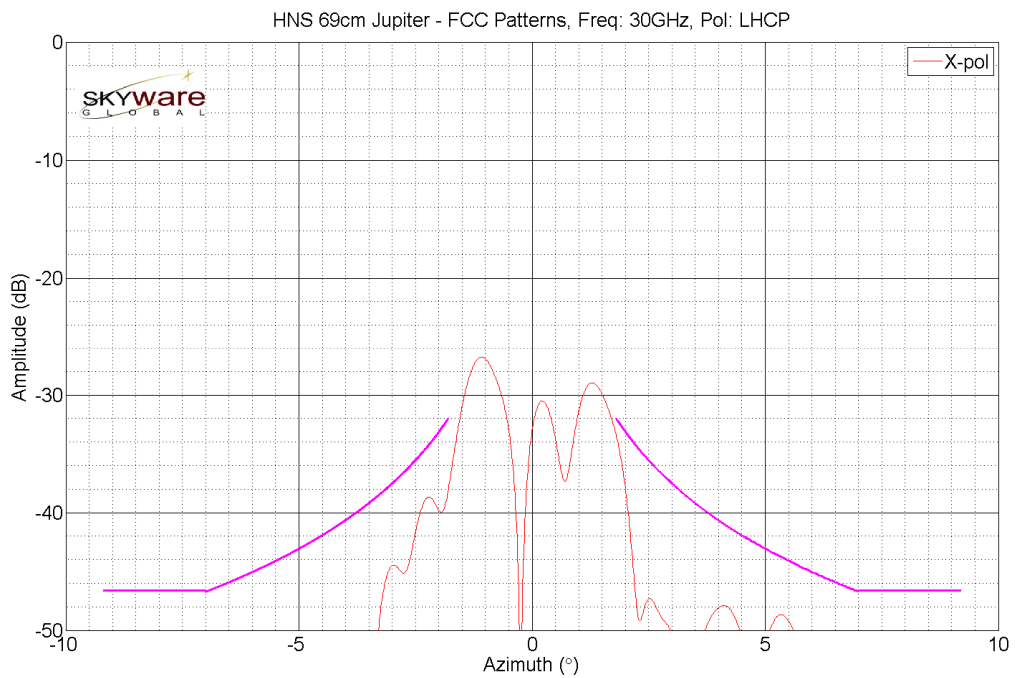
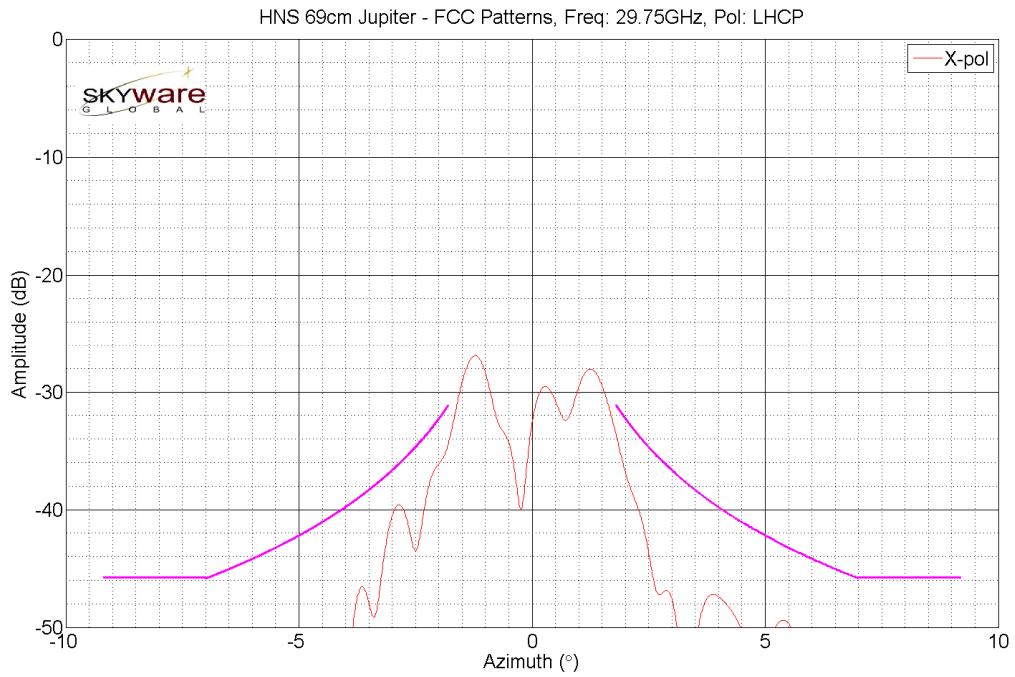






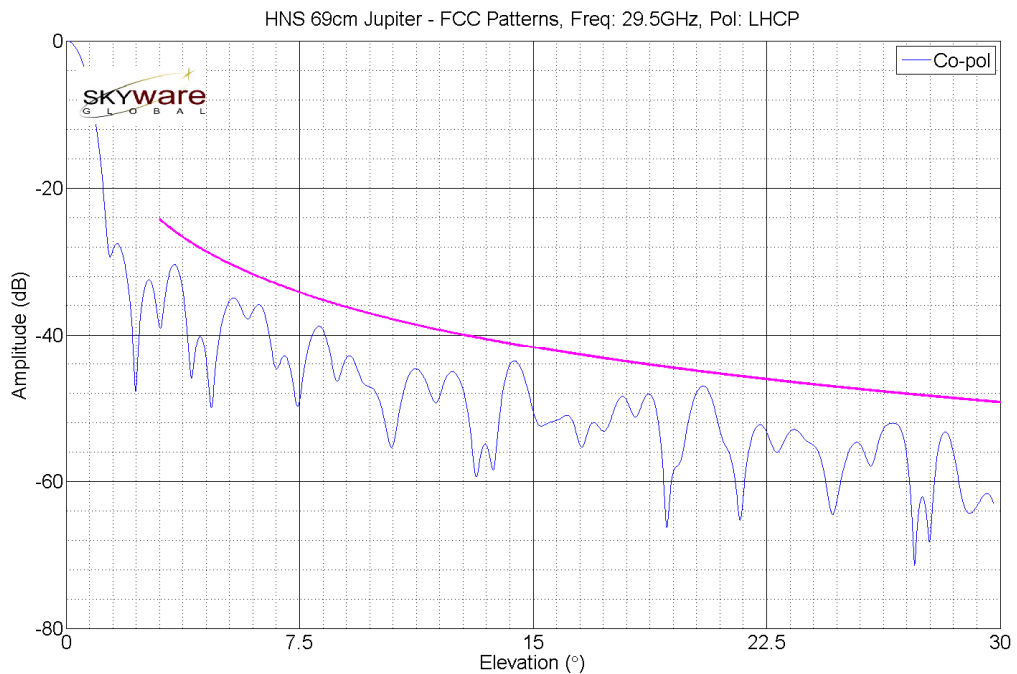
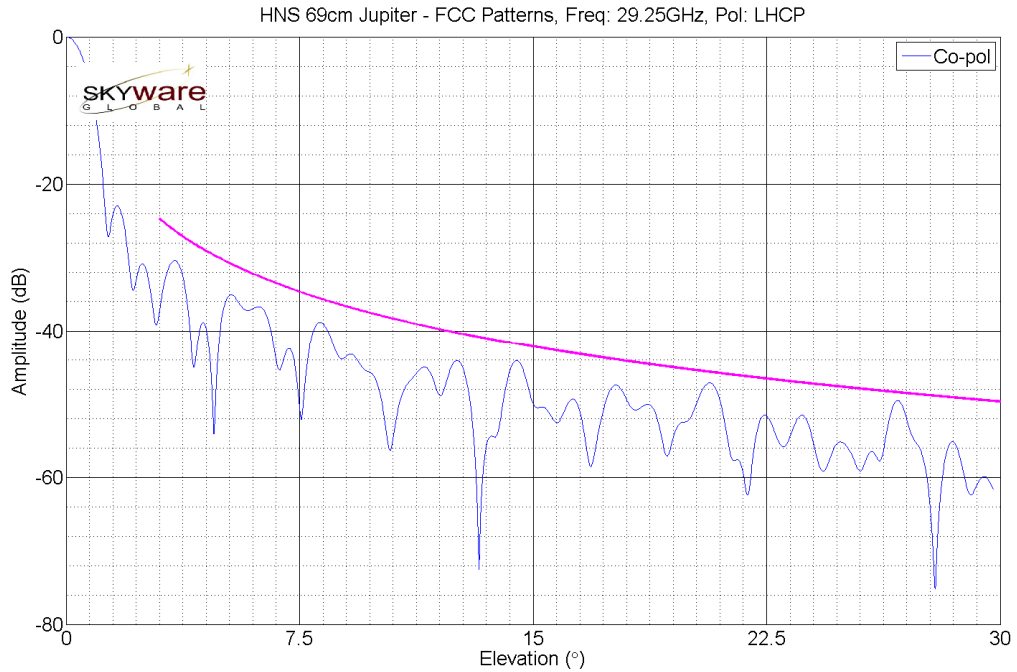


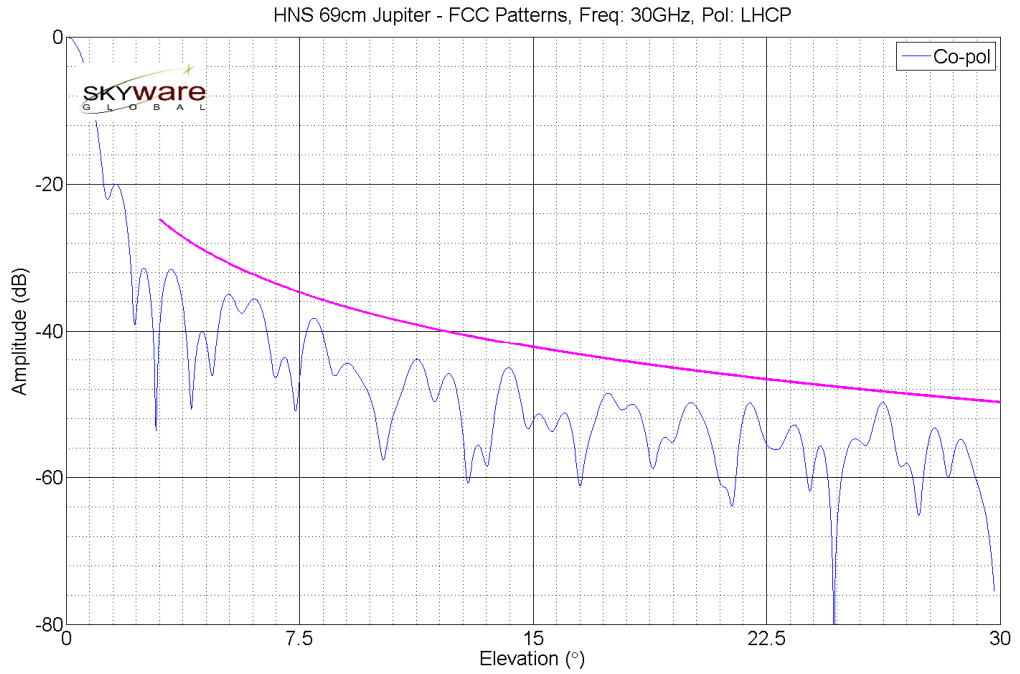
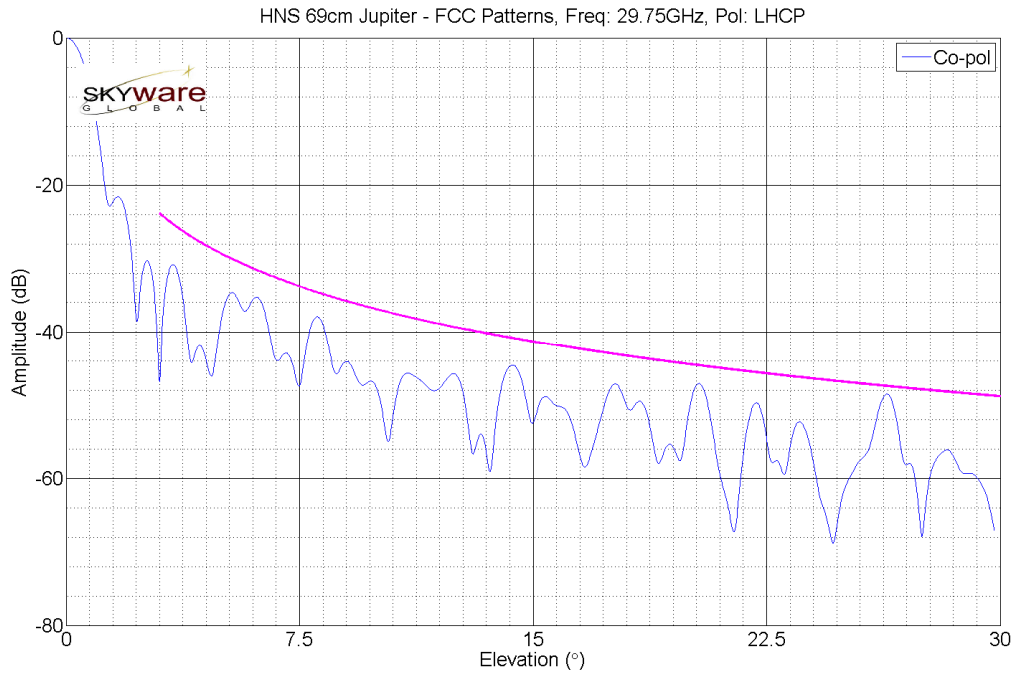


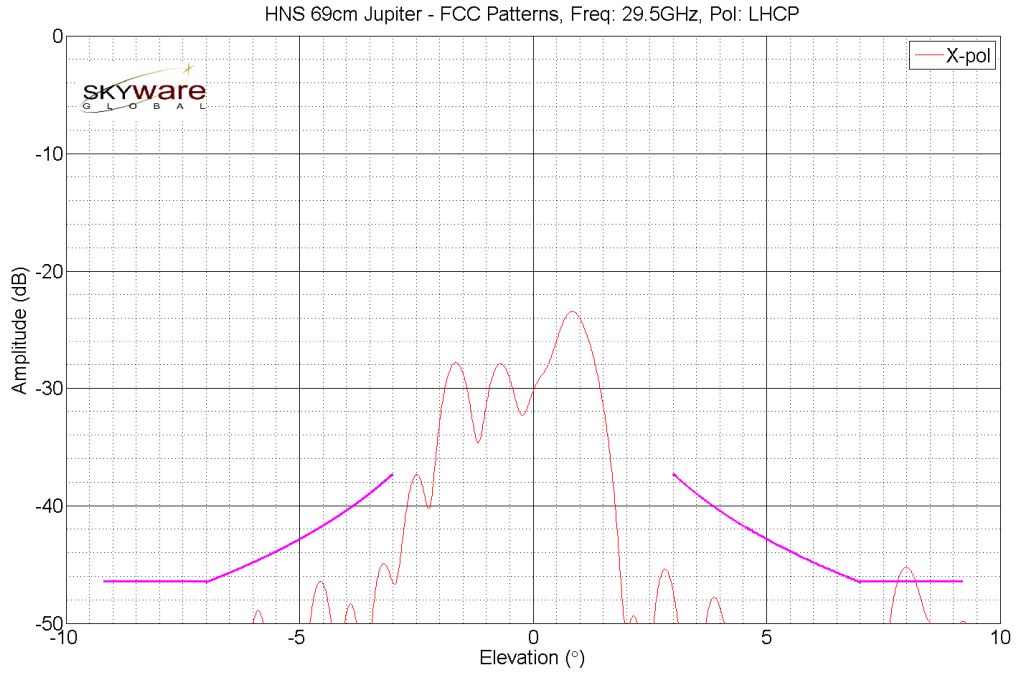
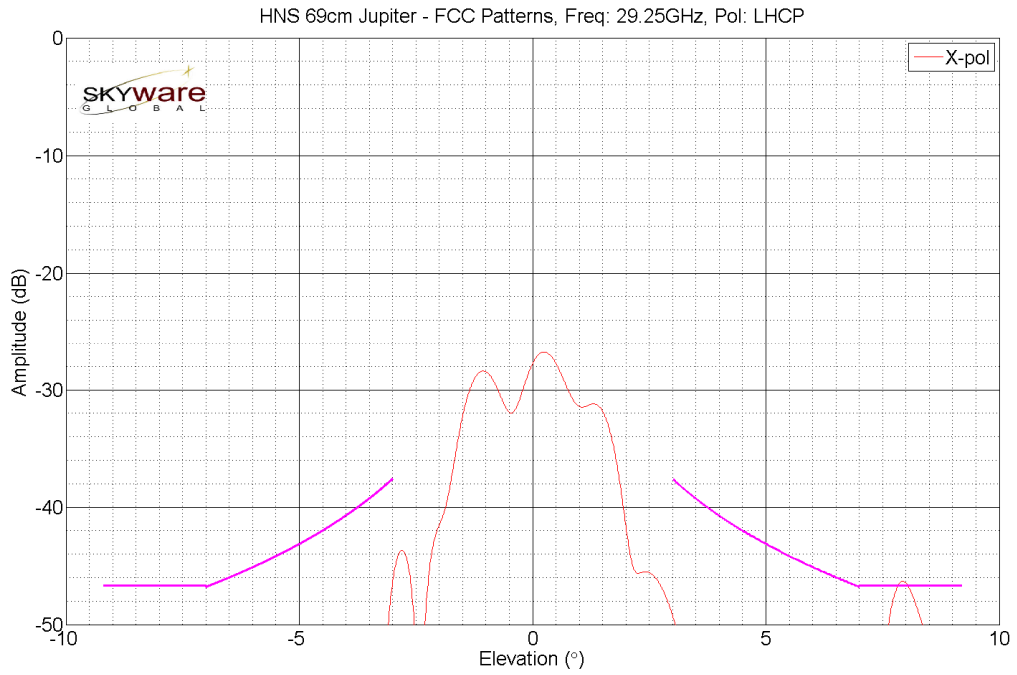


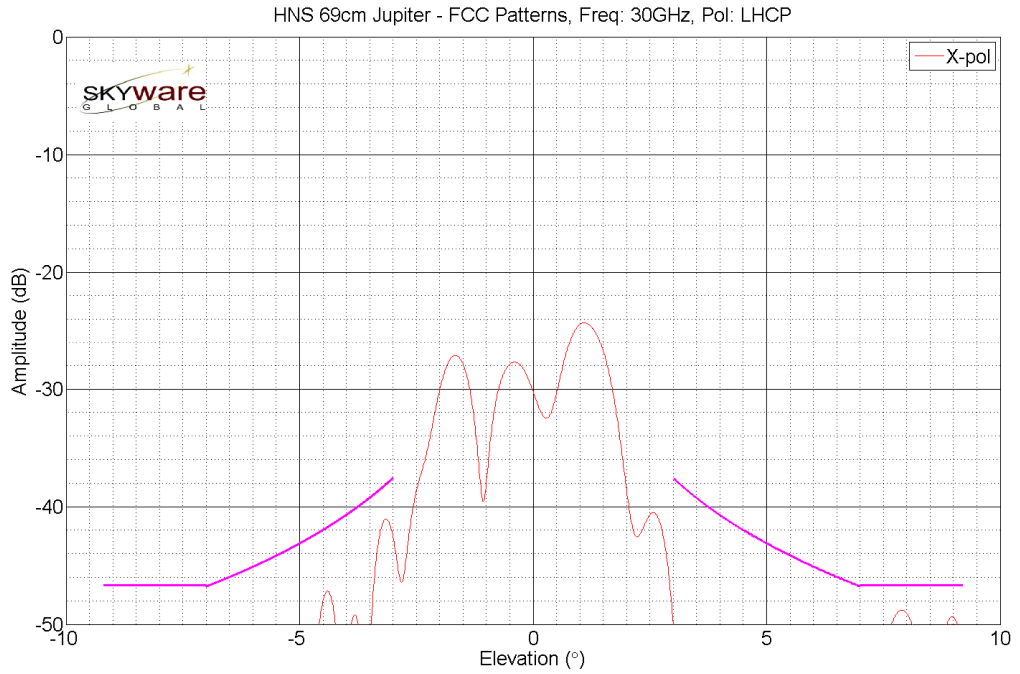
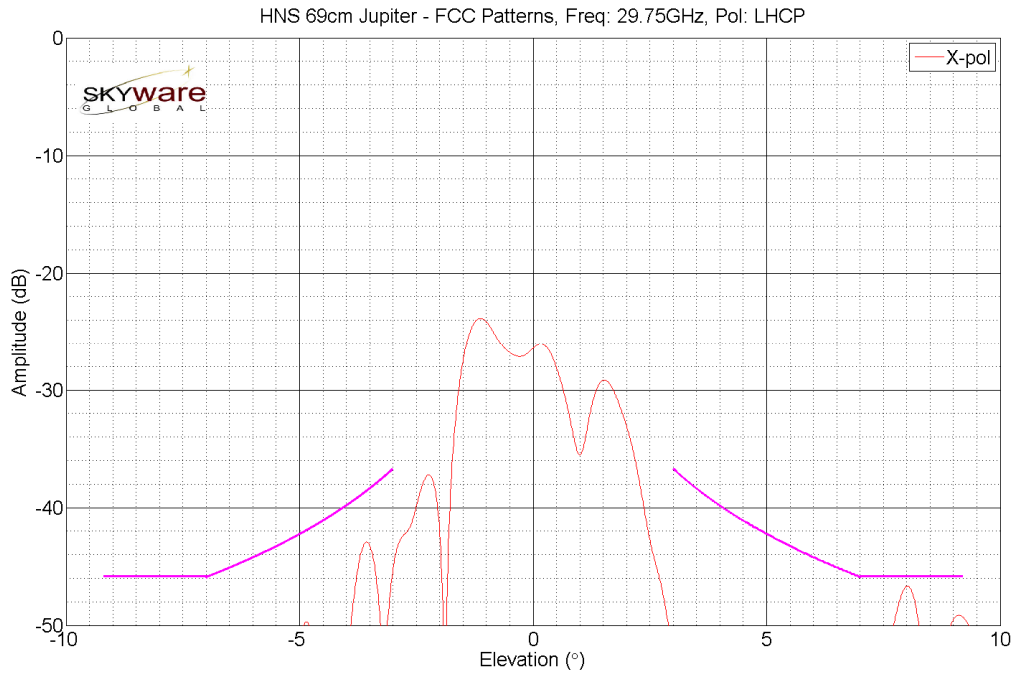


## 5.2 Tx LHCP Elevation Radiation Patterns

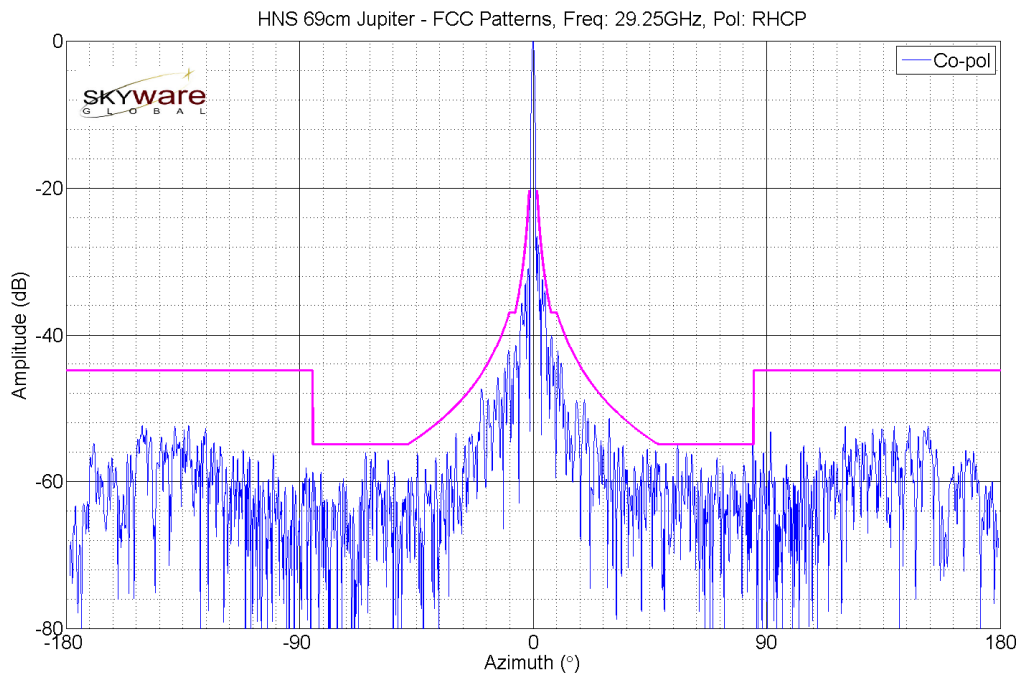
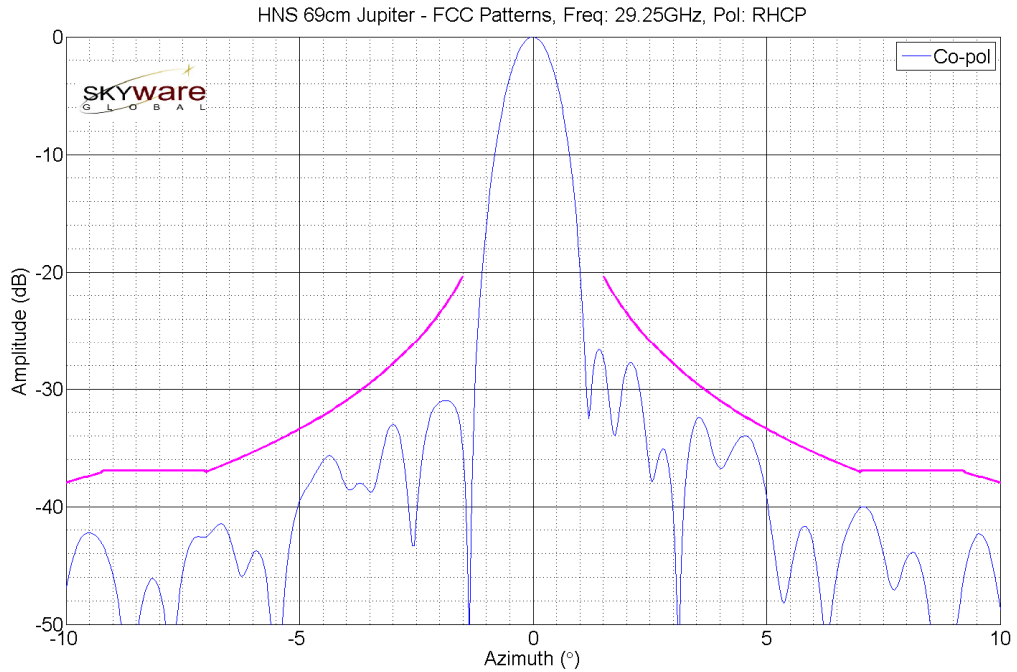


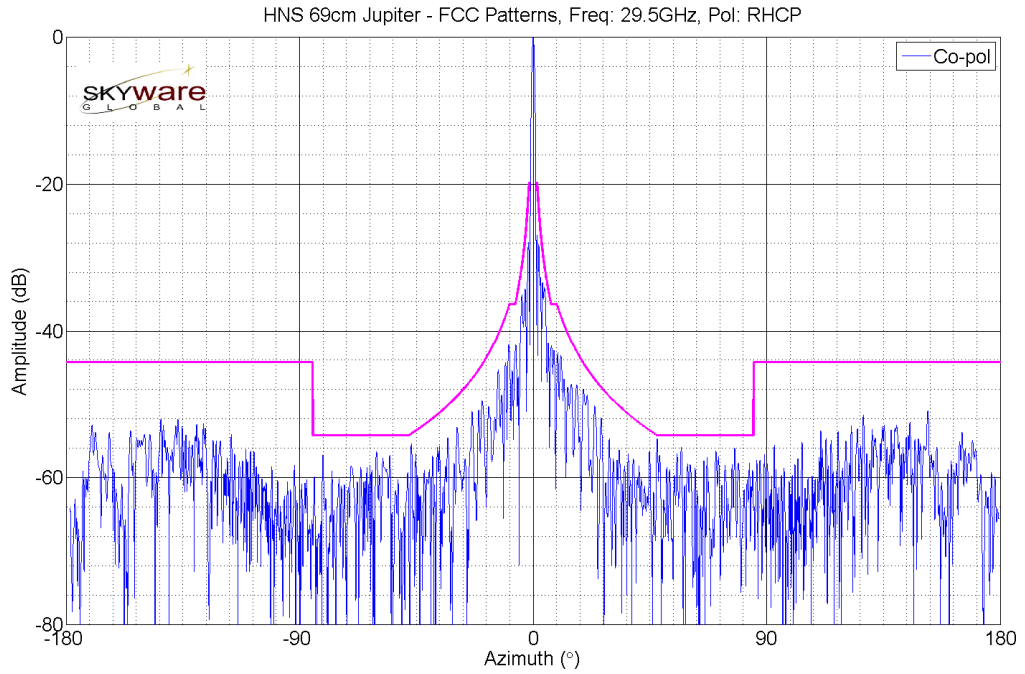
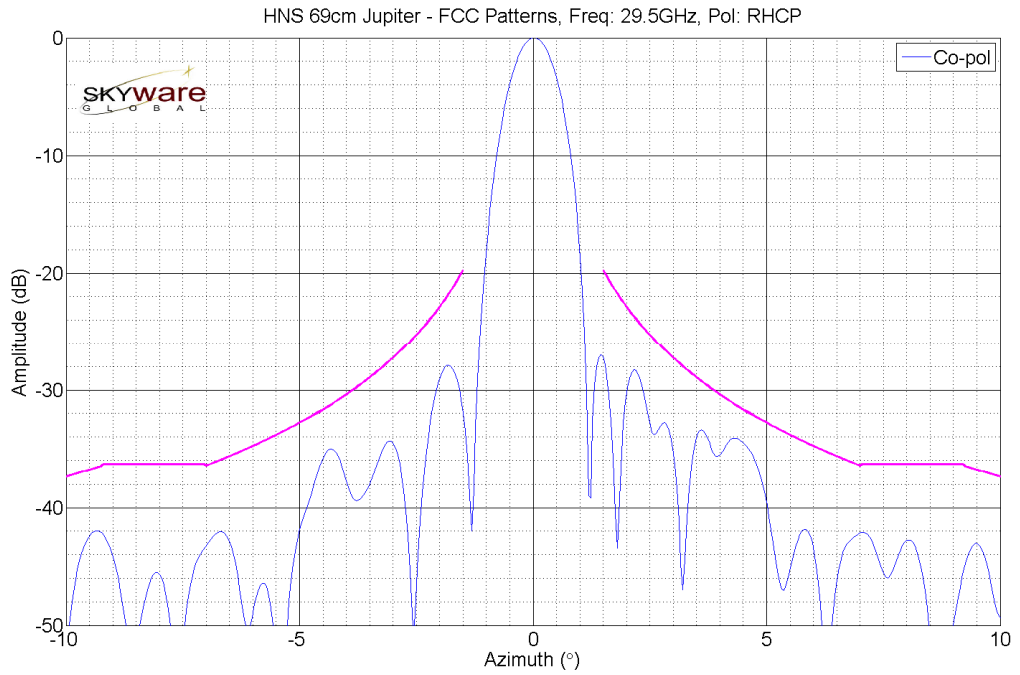


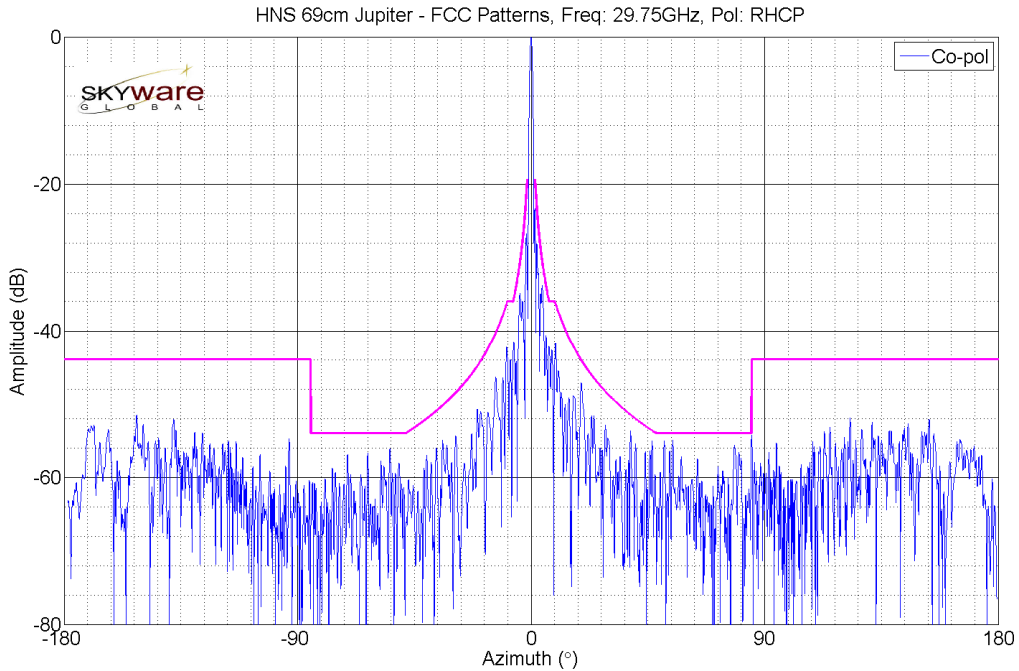
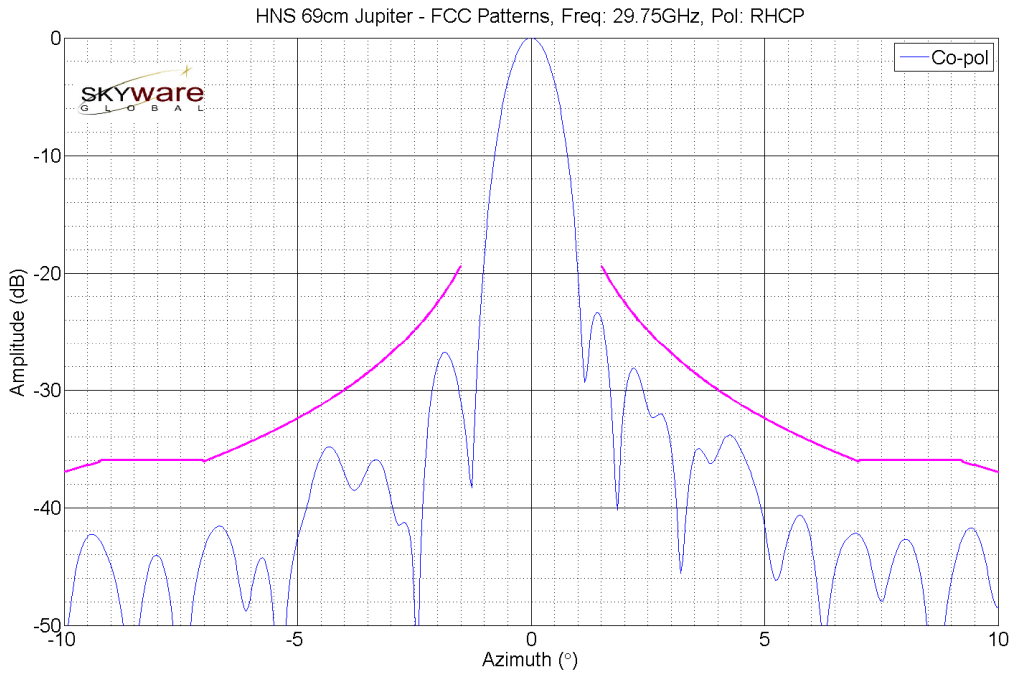


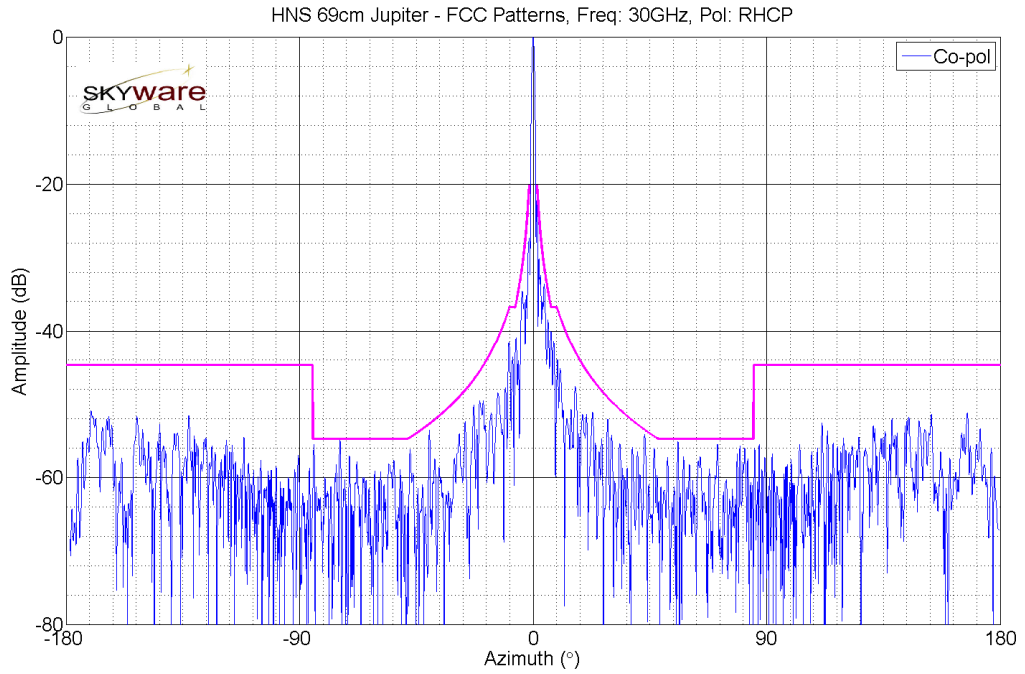
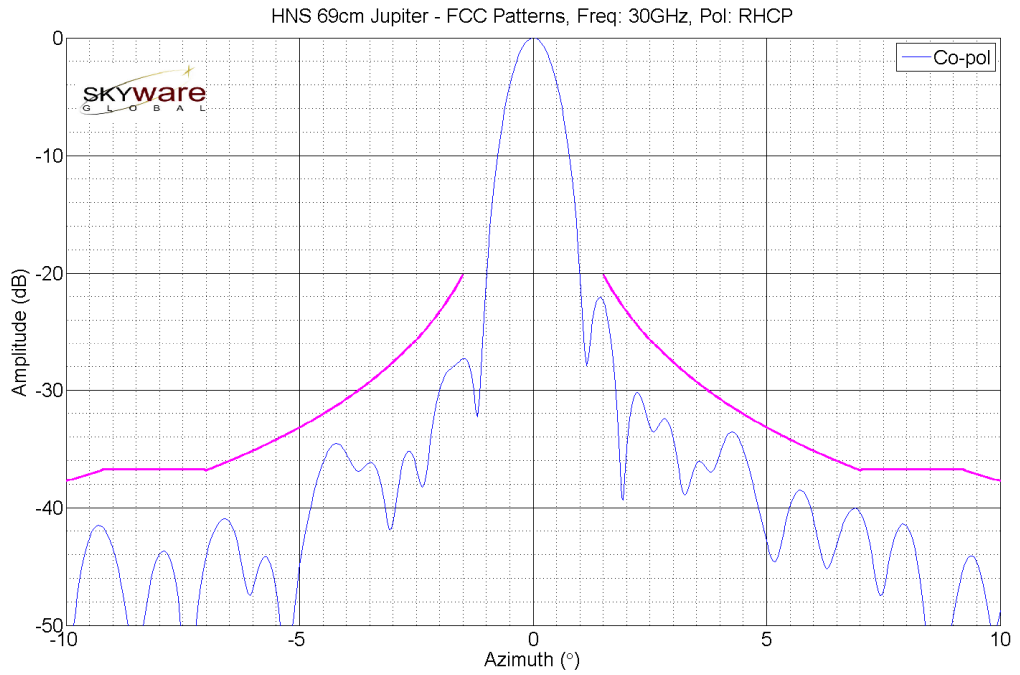


## 5.3 Tx RHCP Azimuth Radiation Patterns

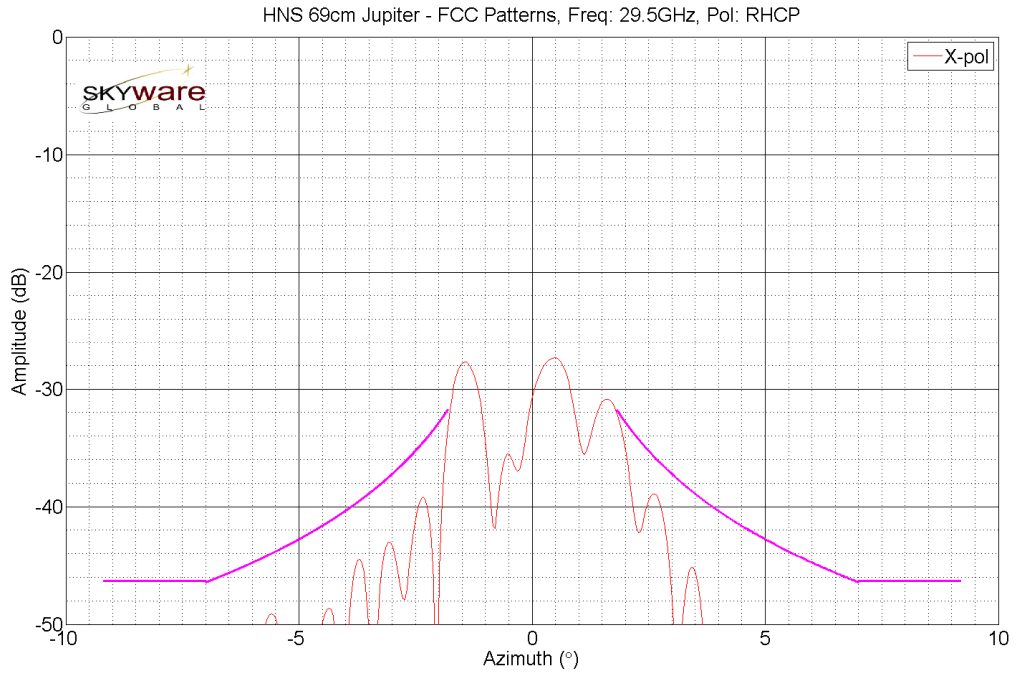
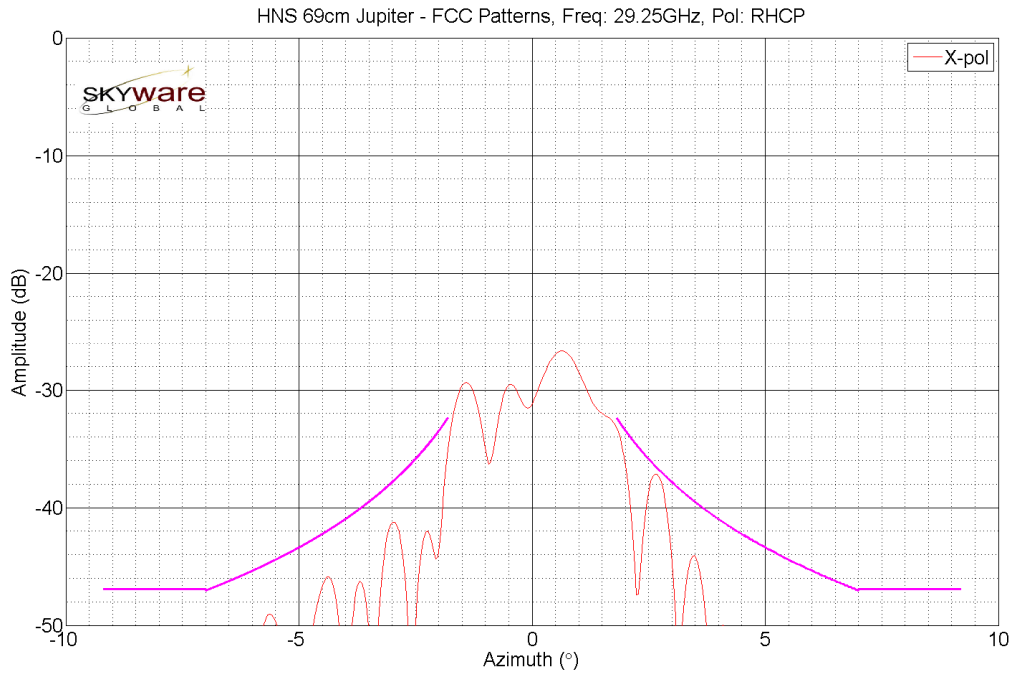


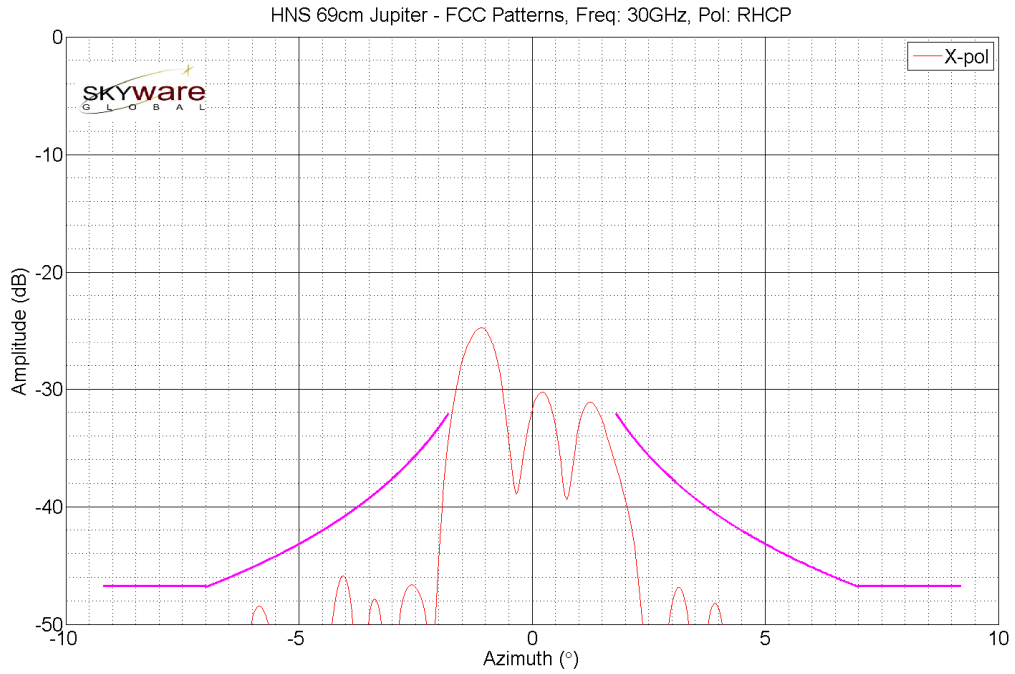
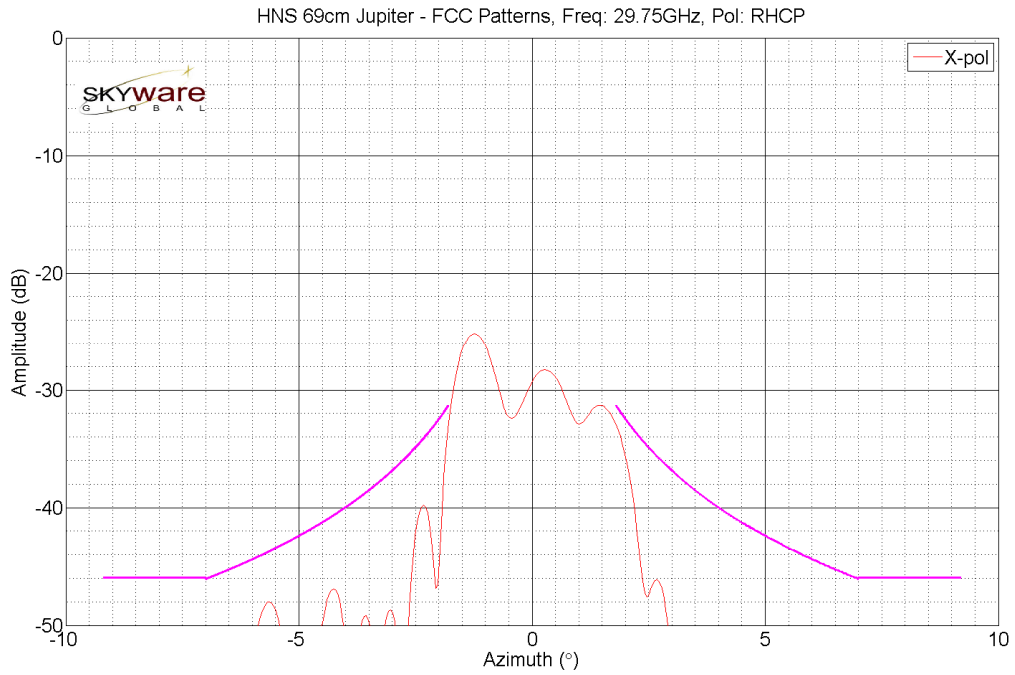




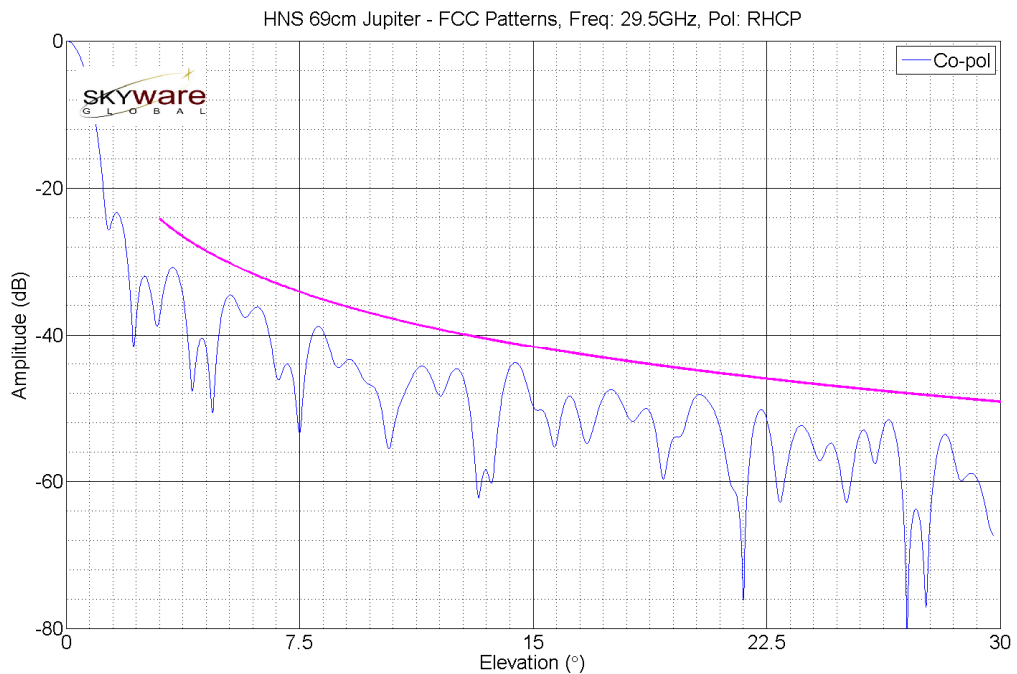
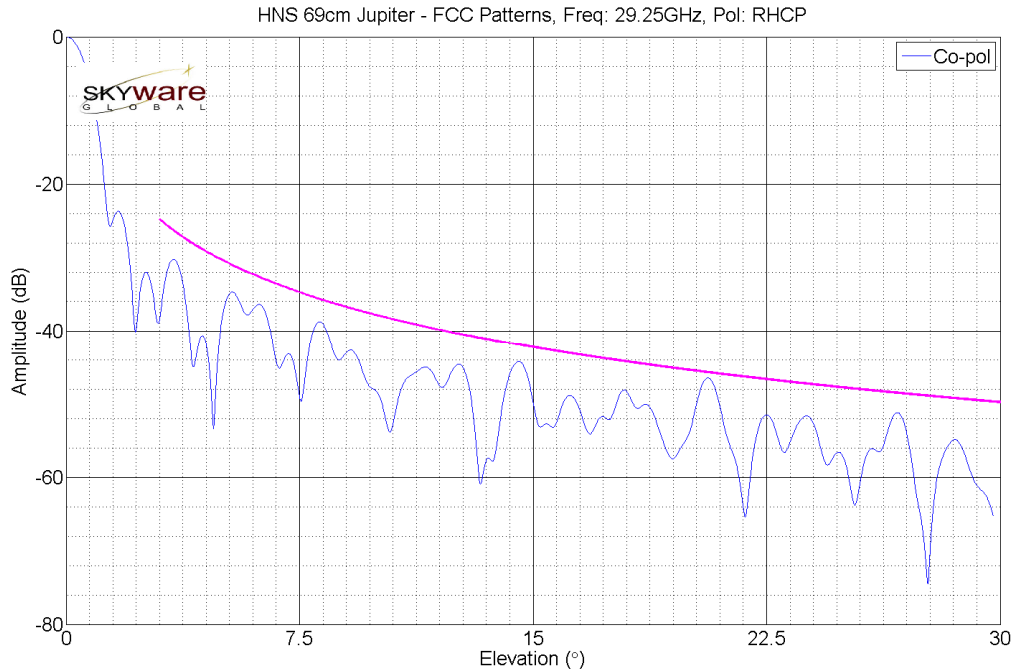


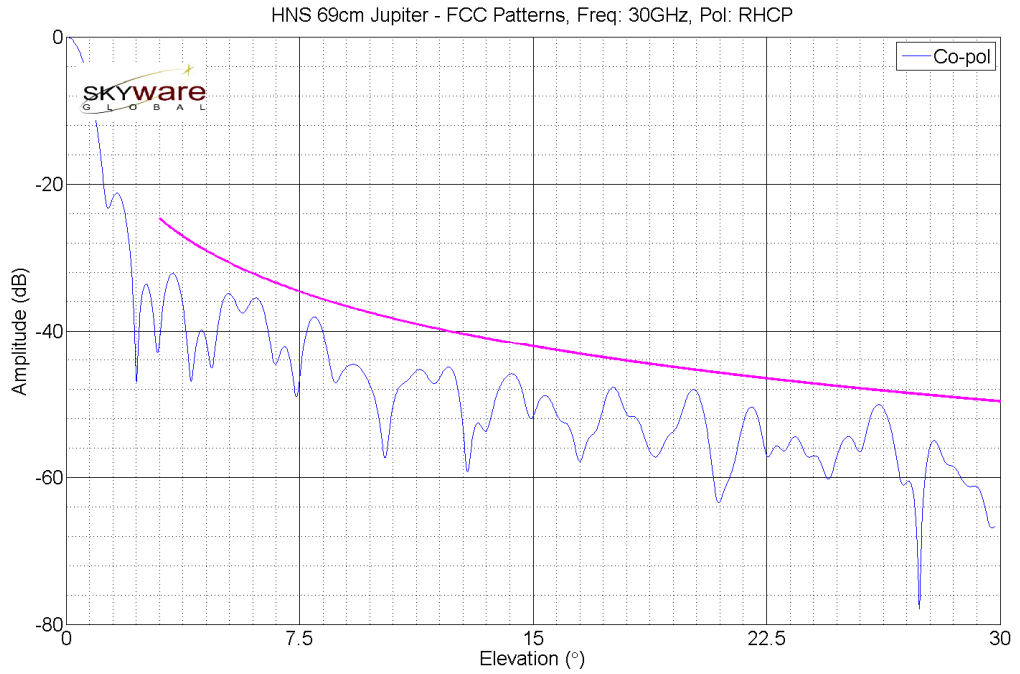
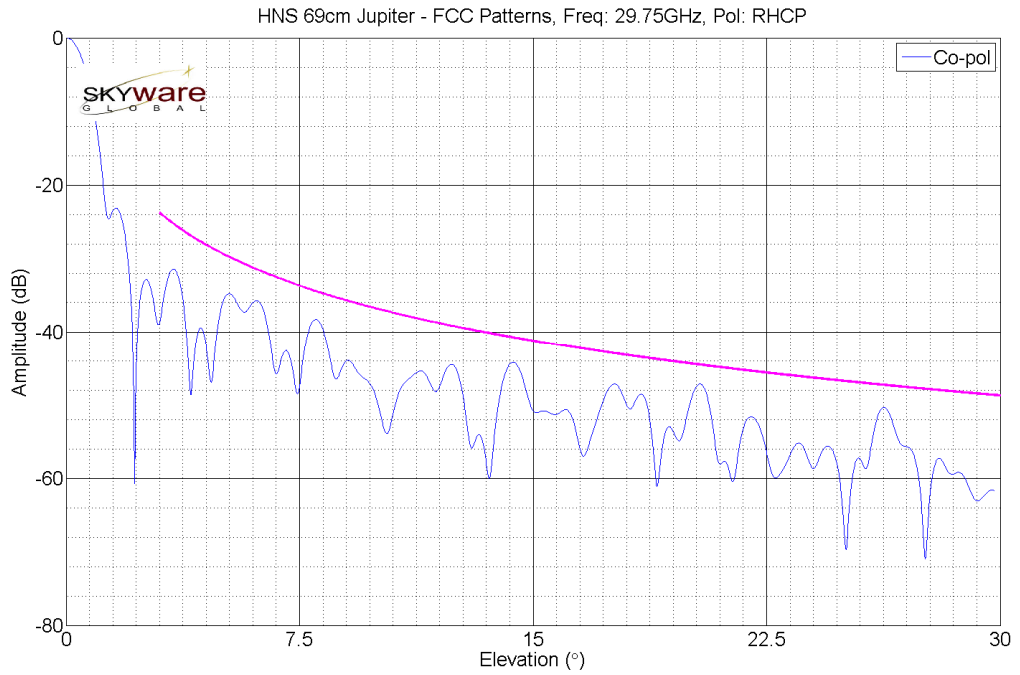


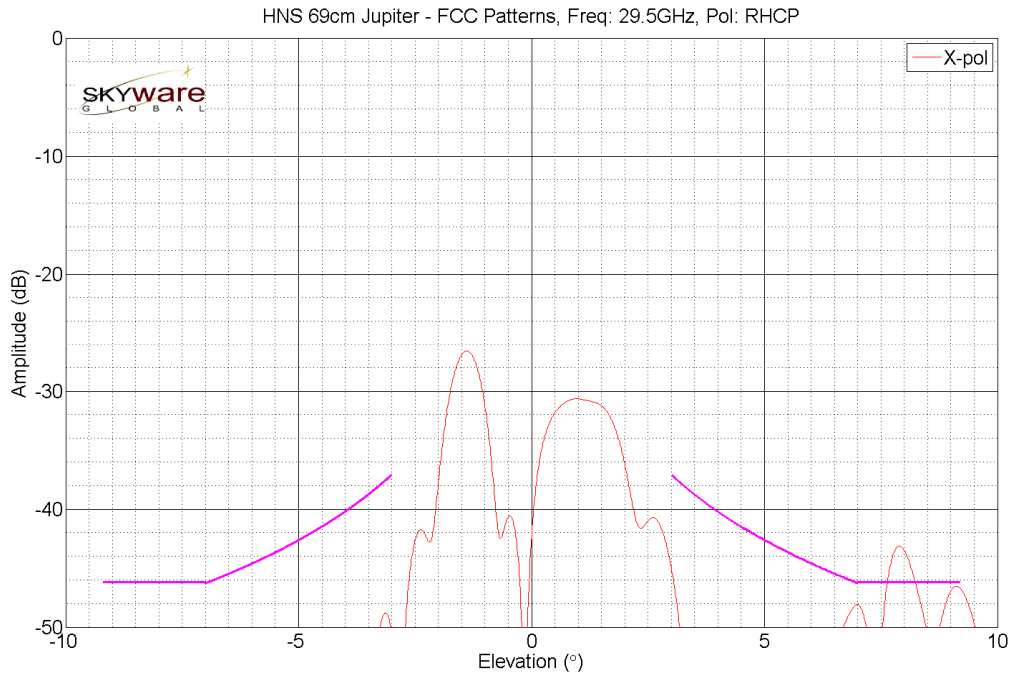
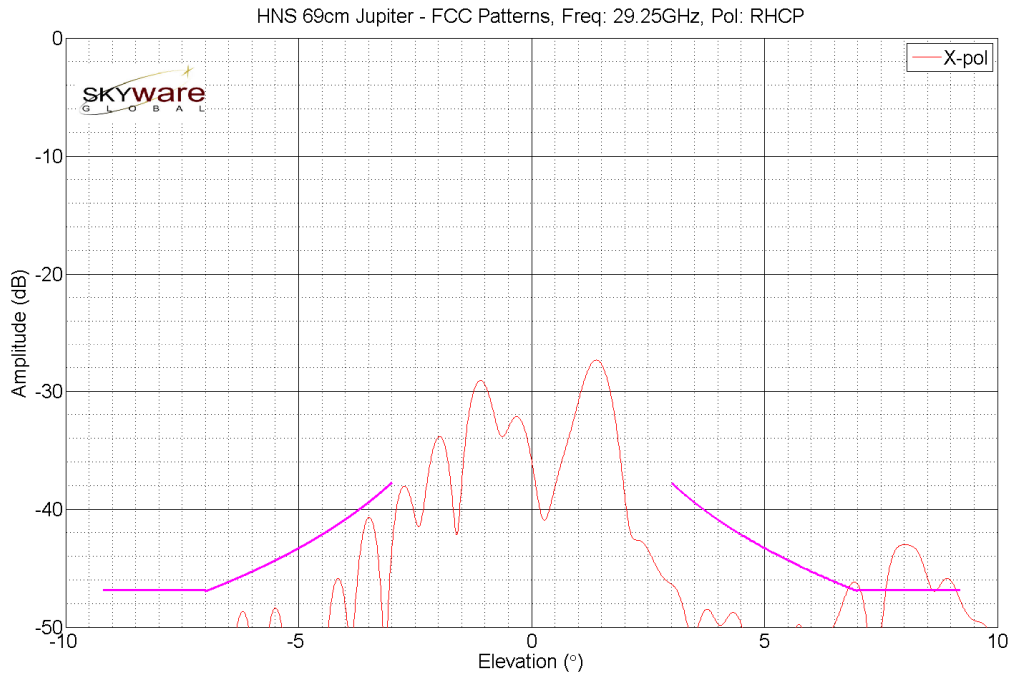


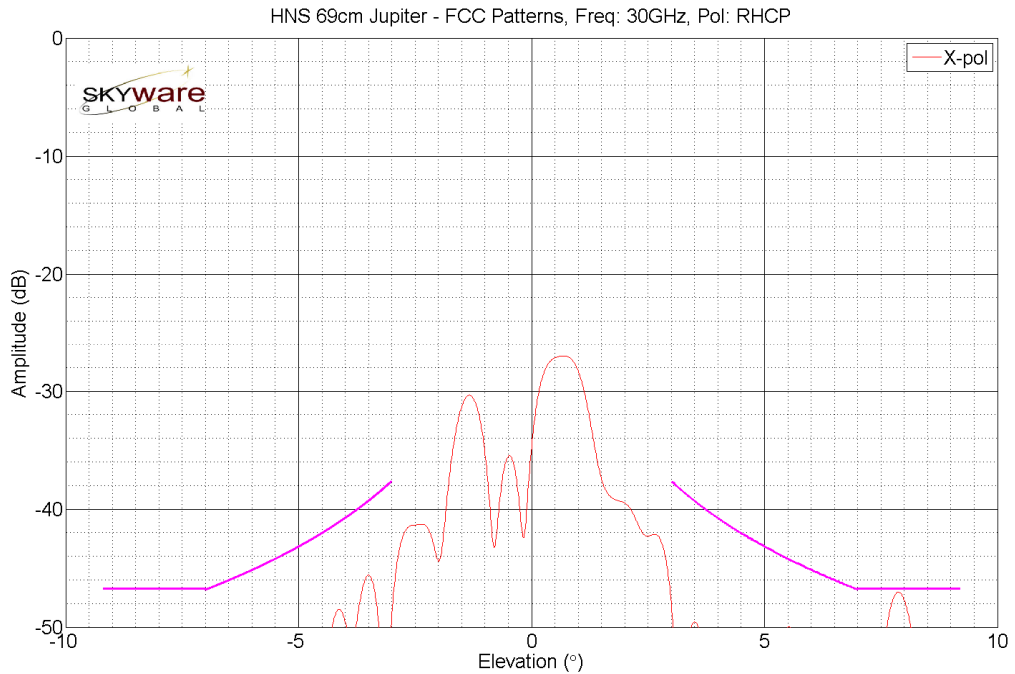
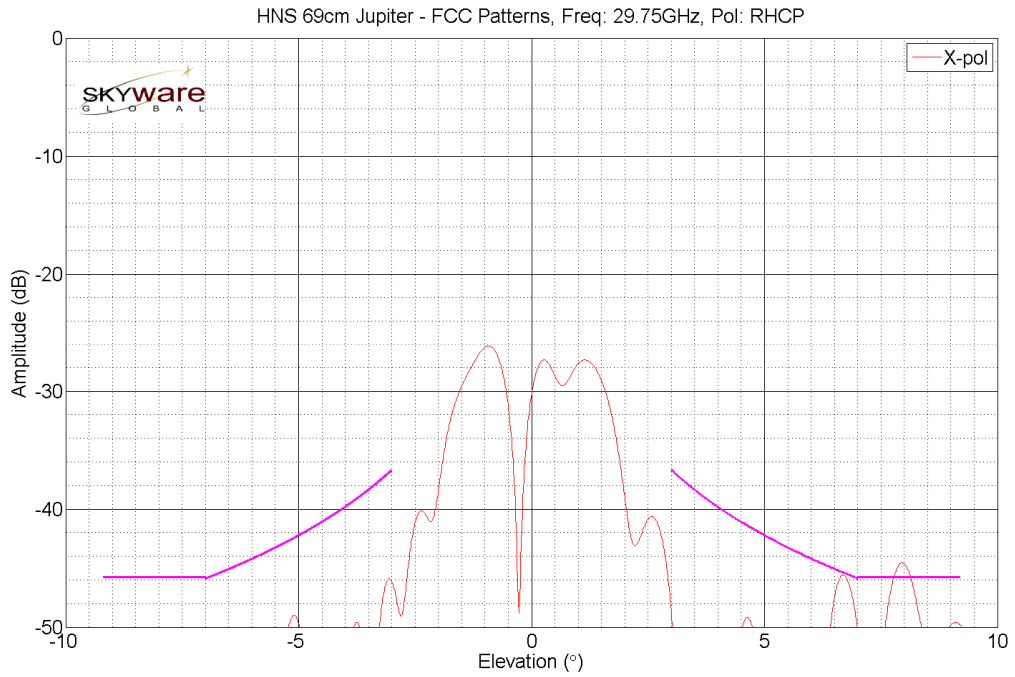


## 5.4 Tx RHCP Elevation Radiation Patterns

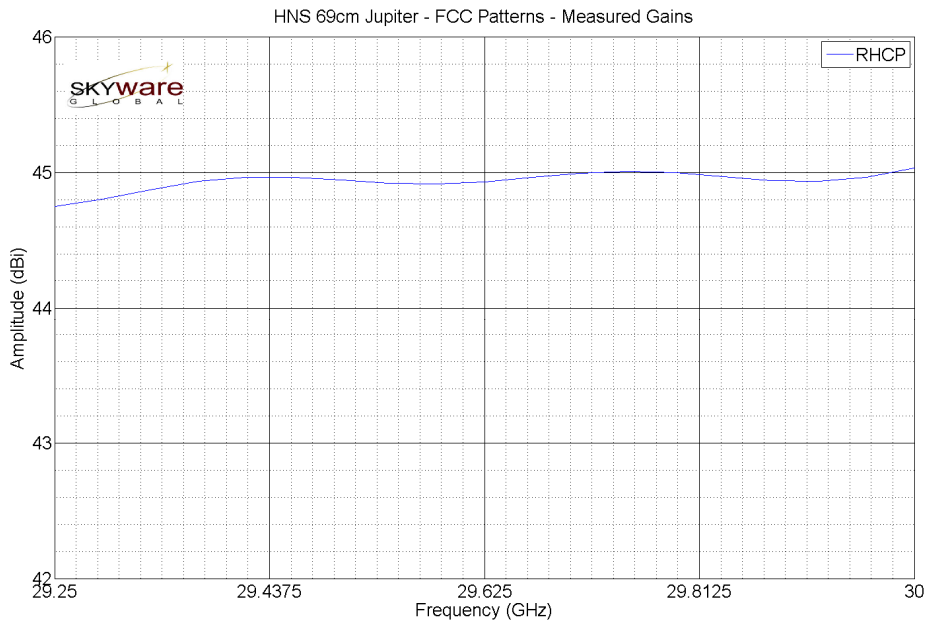
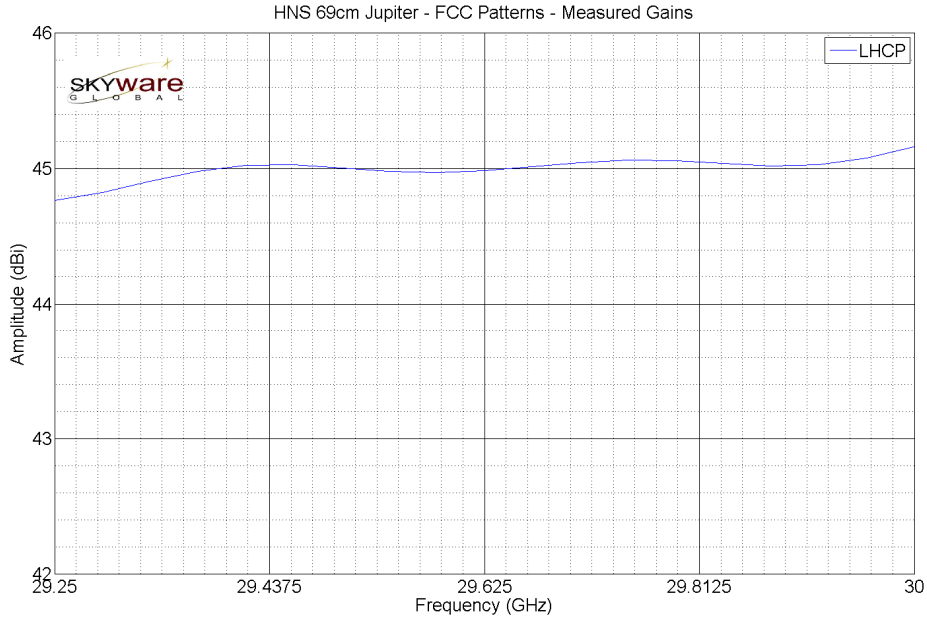




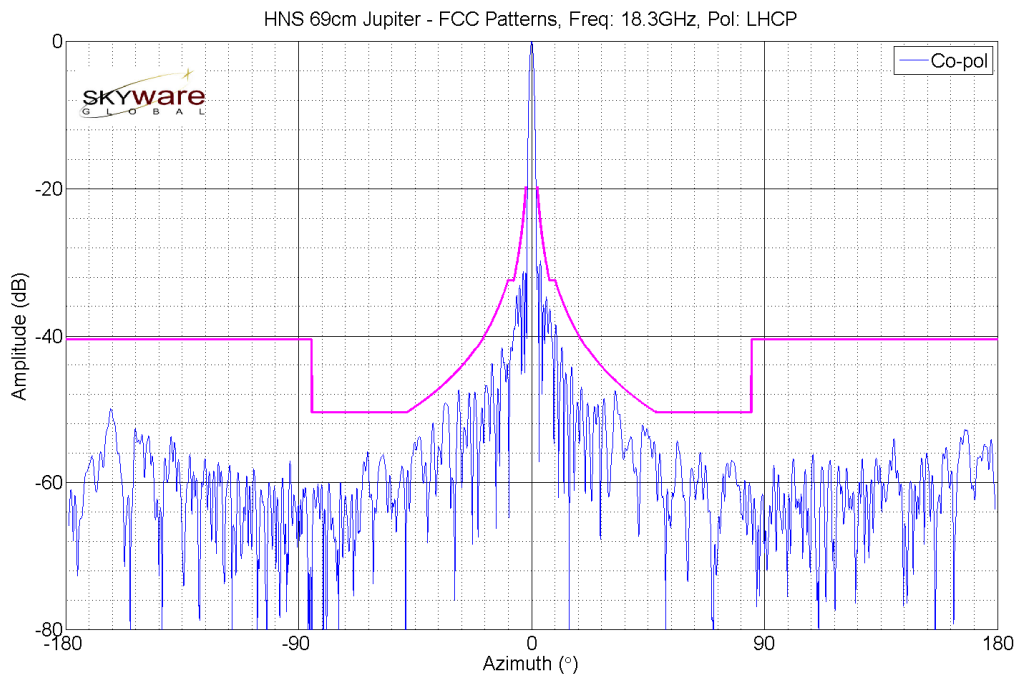
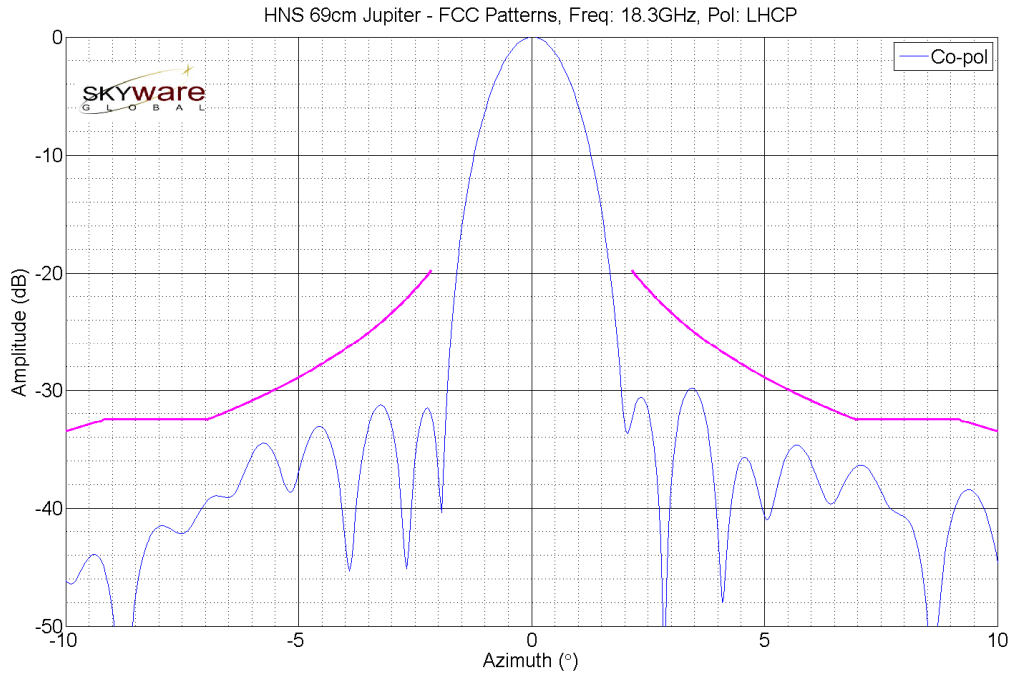




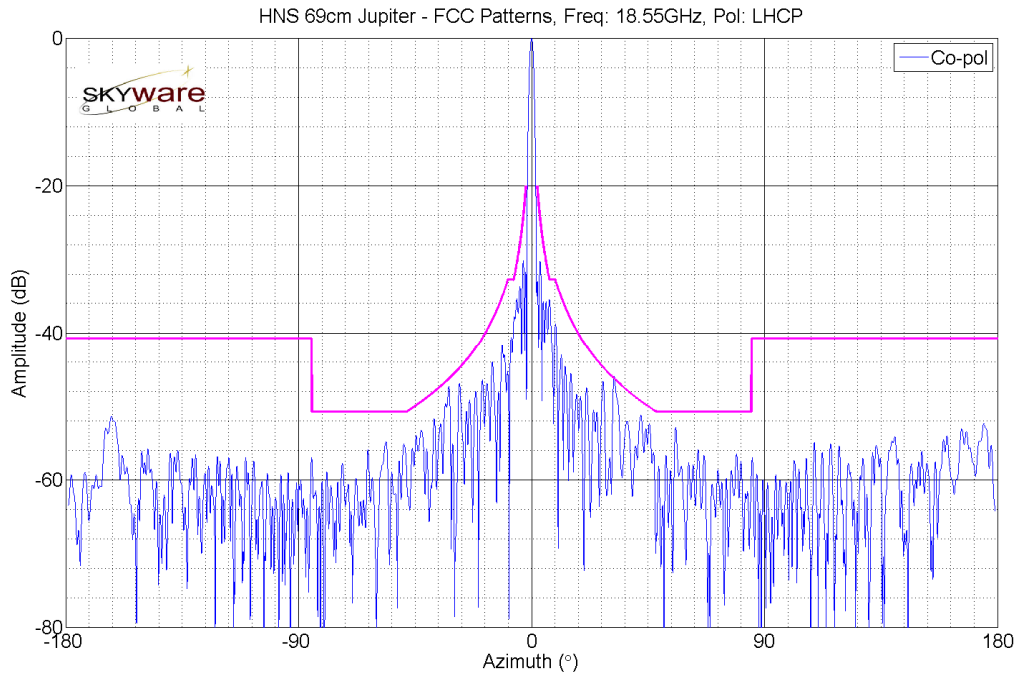
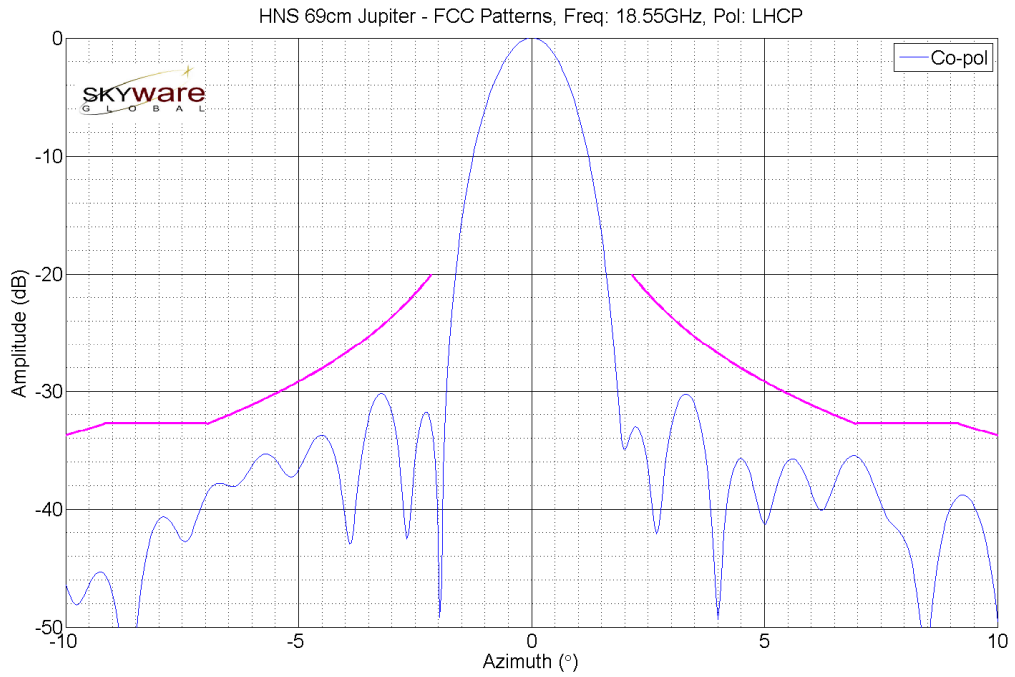
## 5.5 Tx Gains

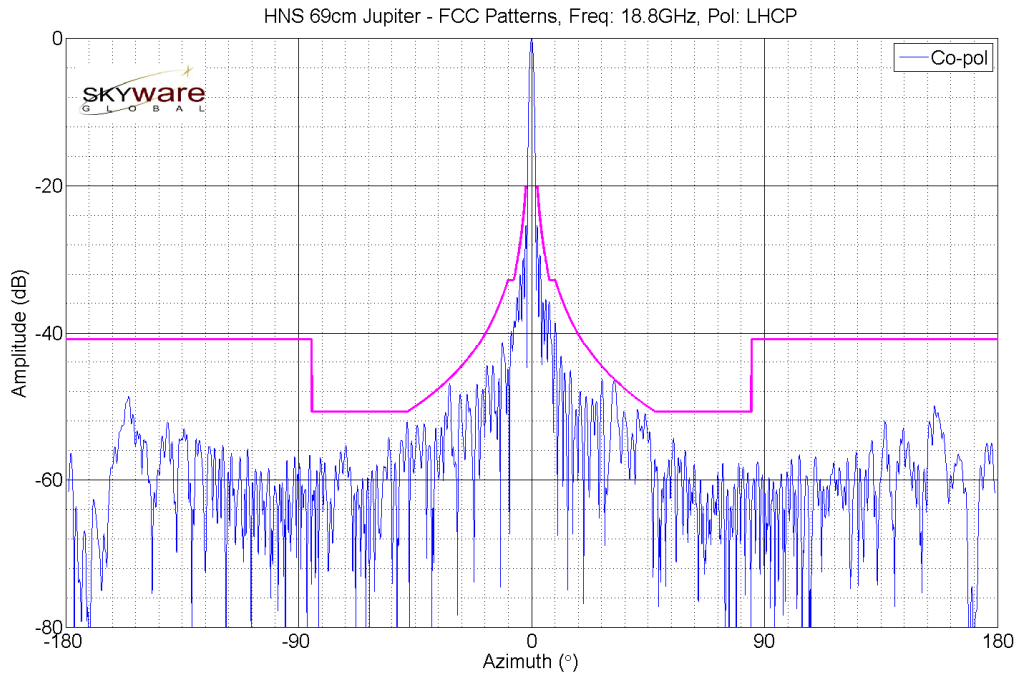
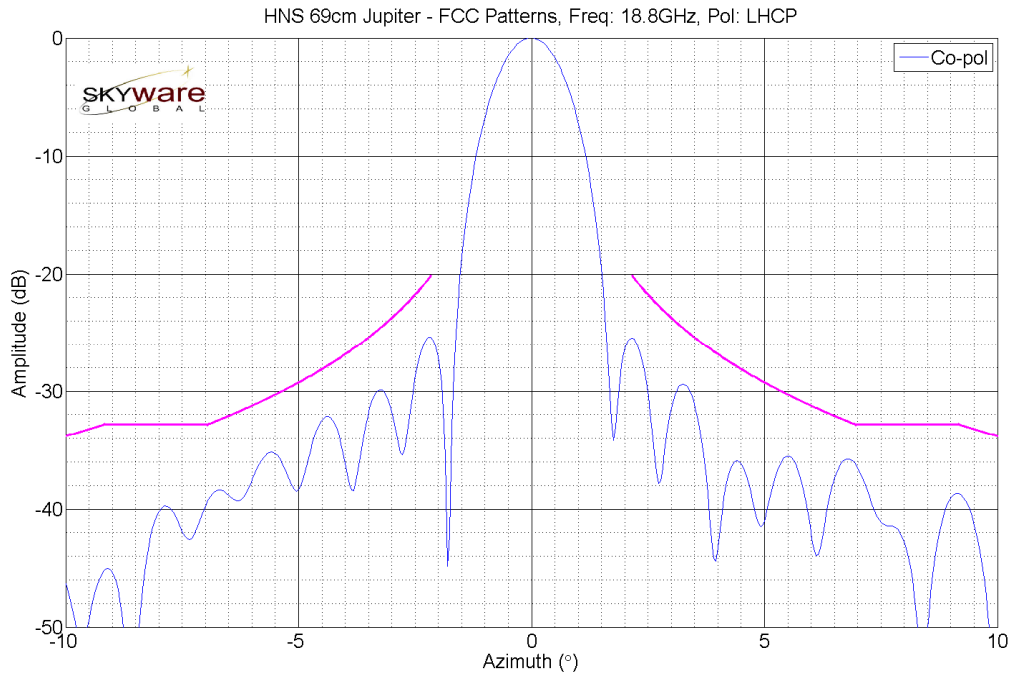


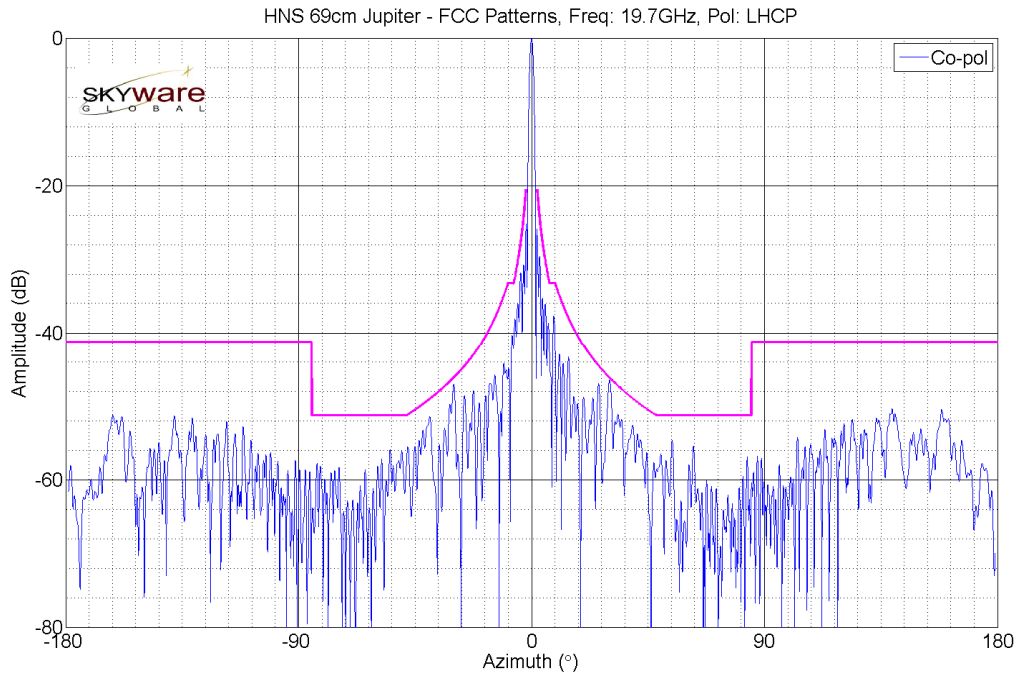
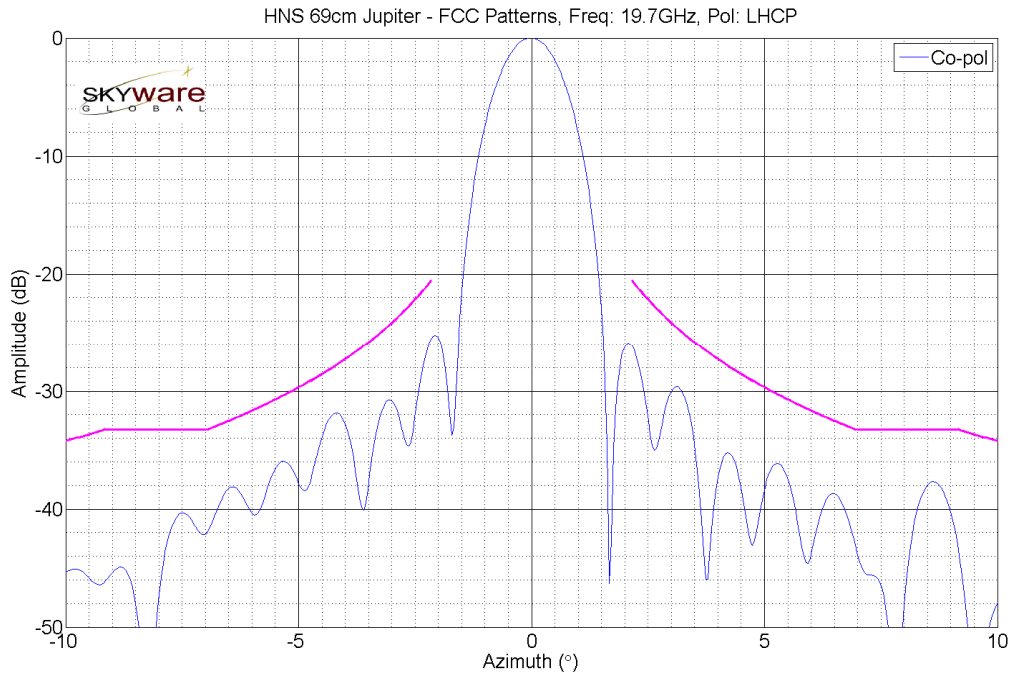
## 5.6 Rx LHCP Azimuth Radiation Patterns

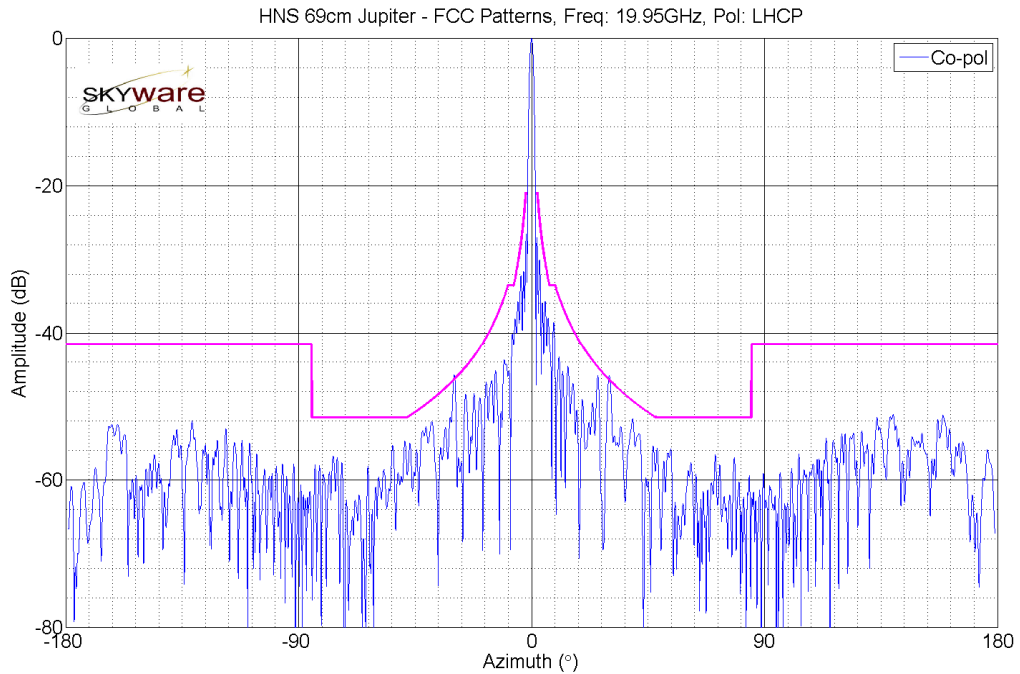
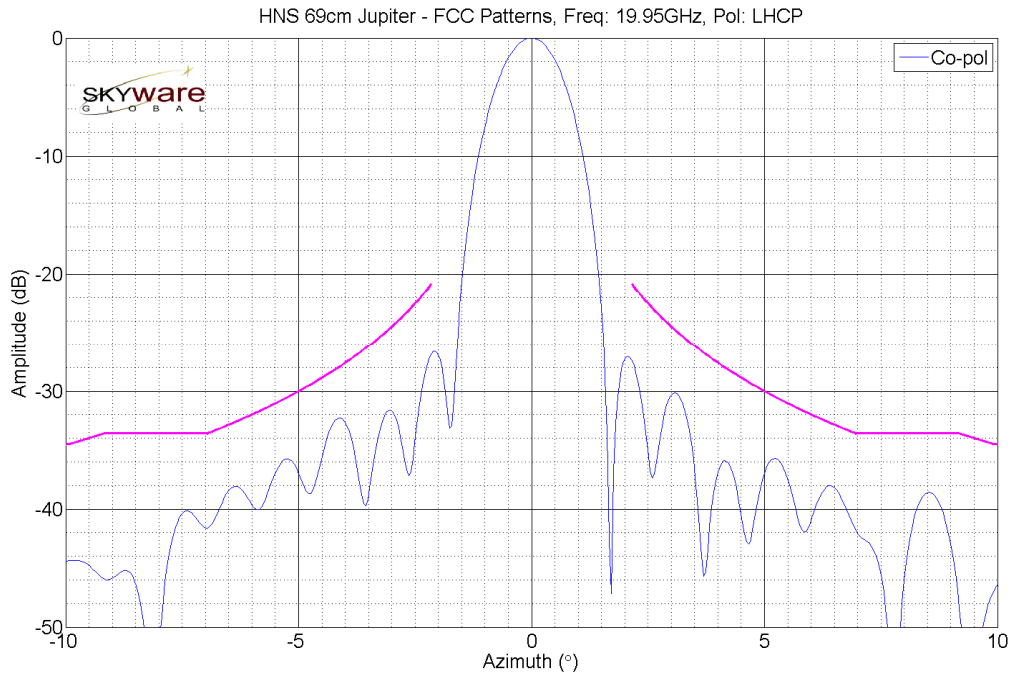


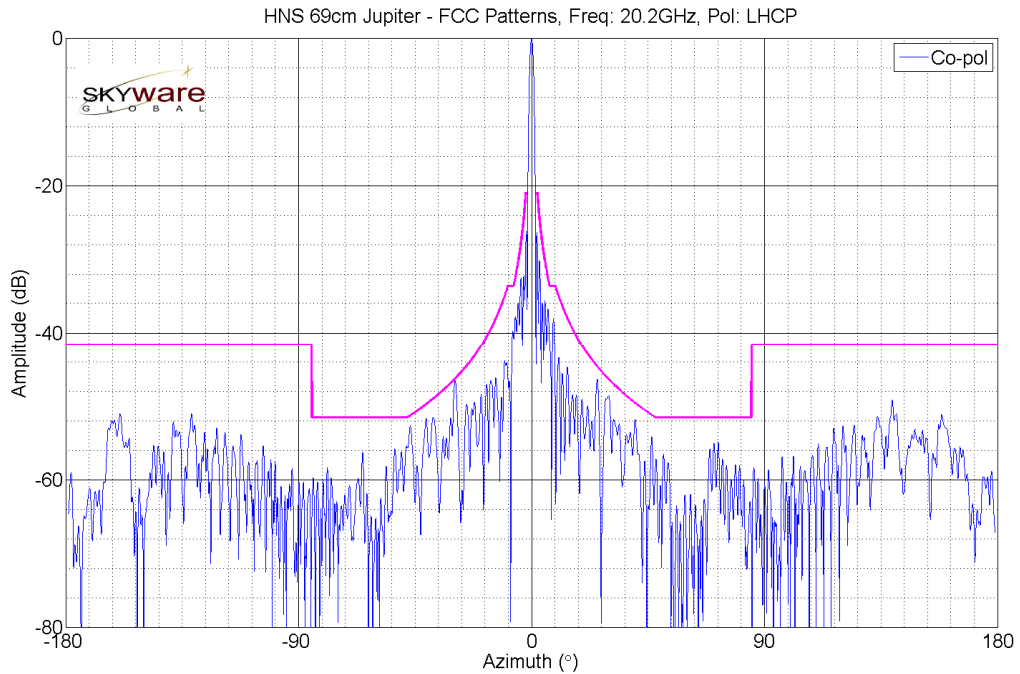
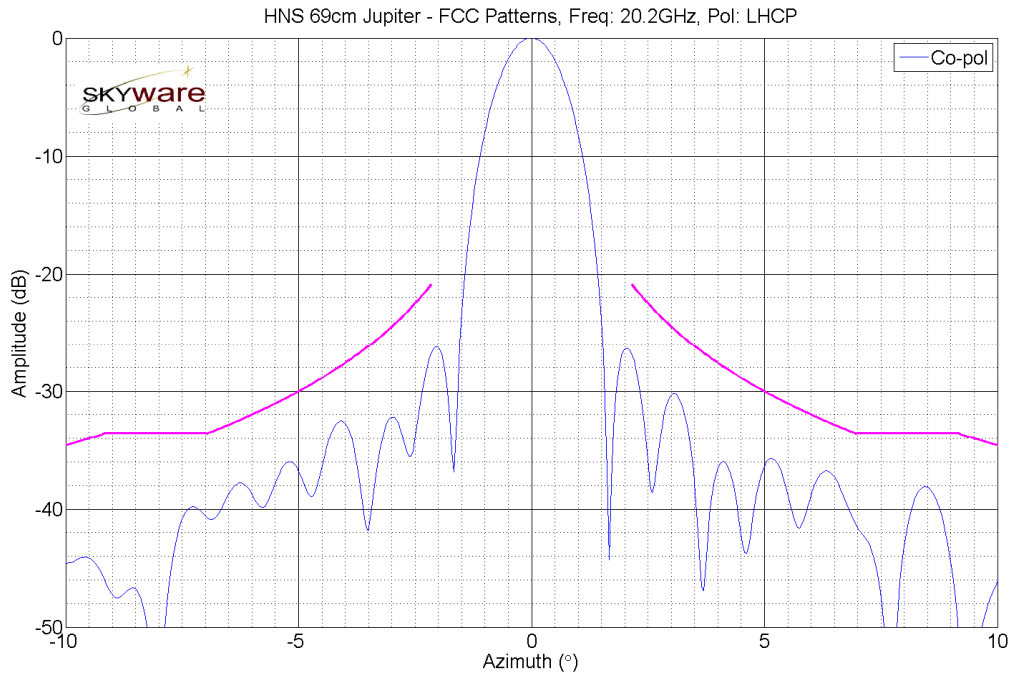


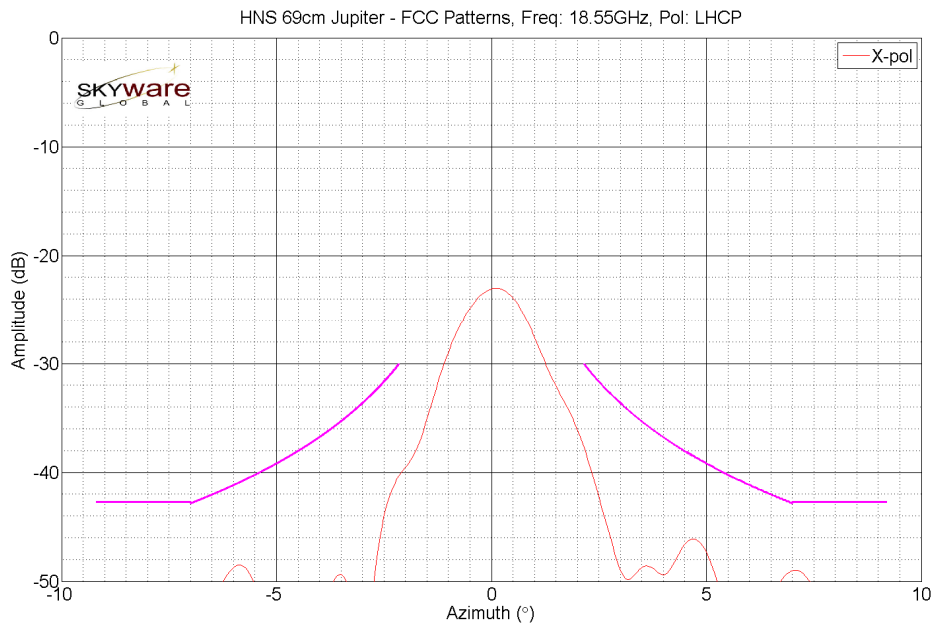
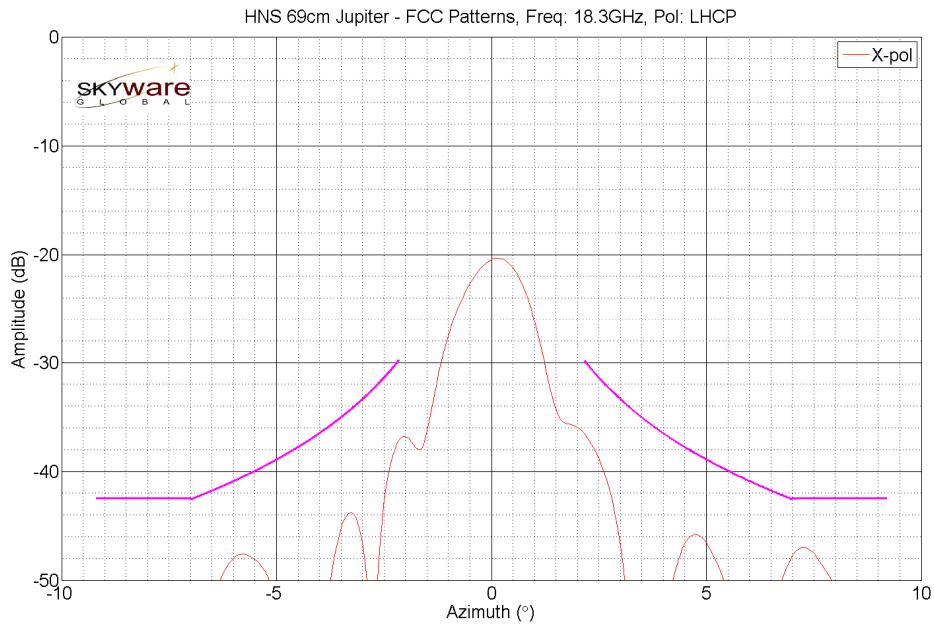


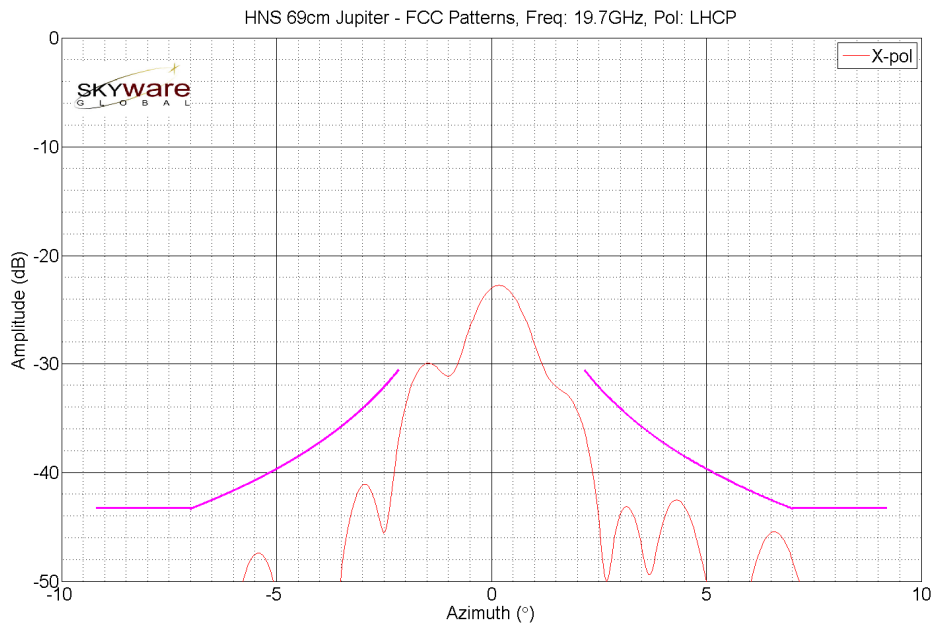
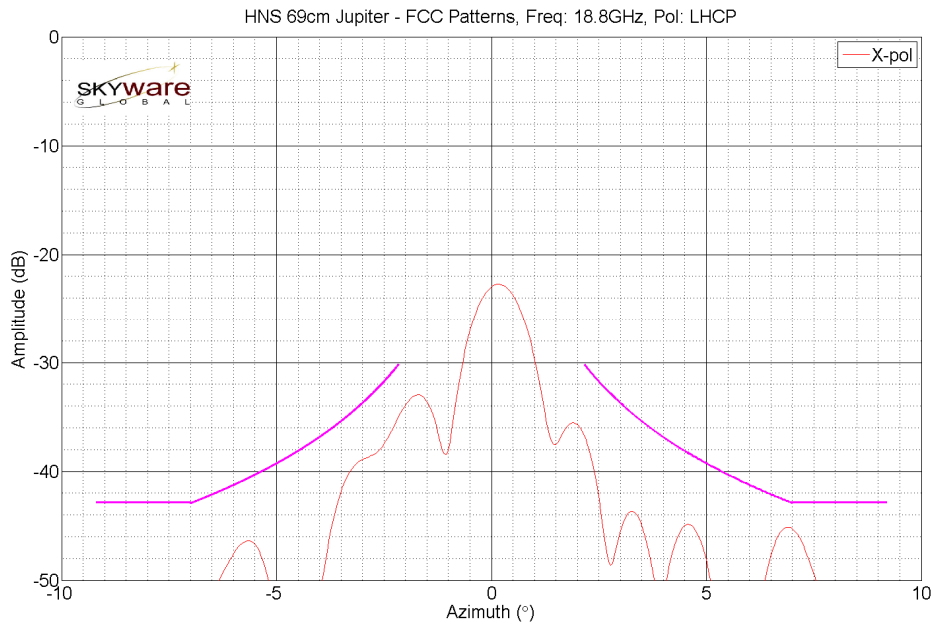


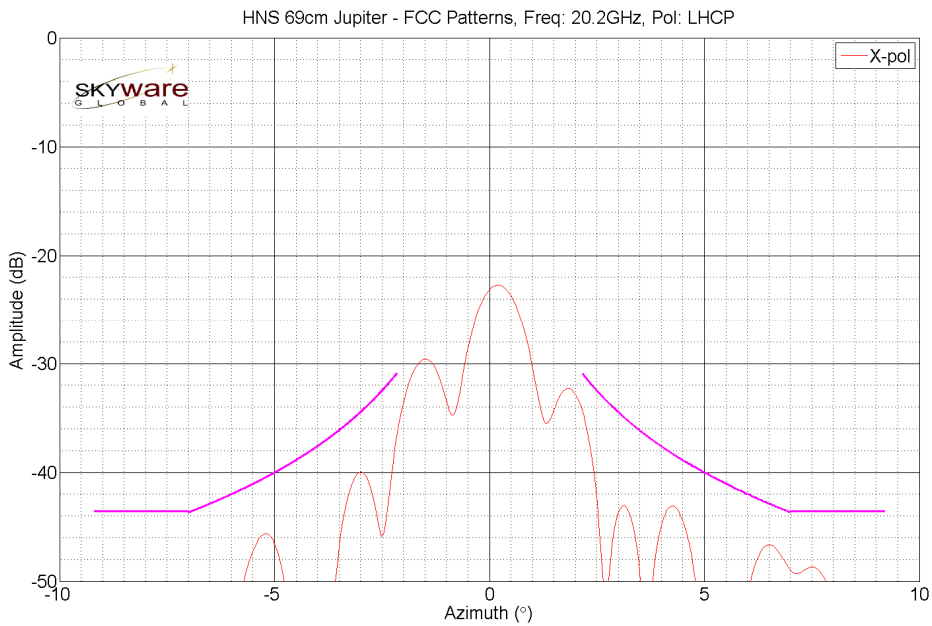
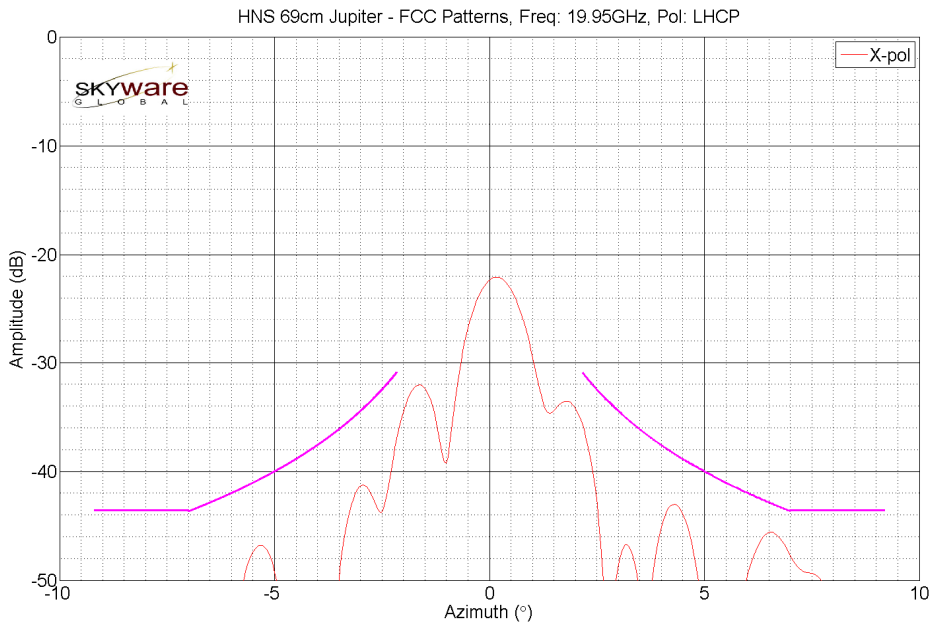






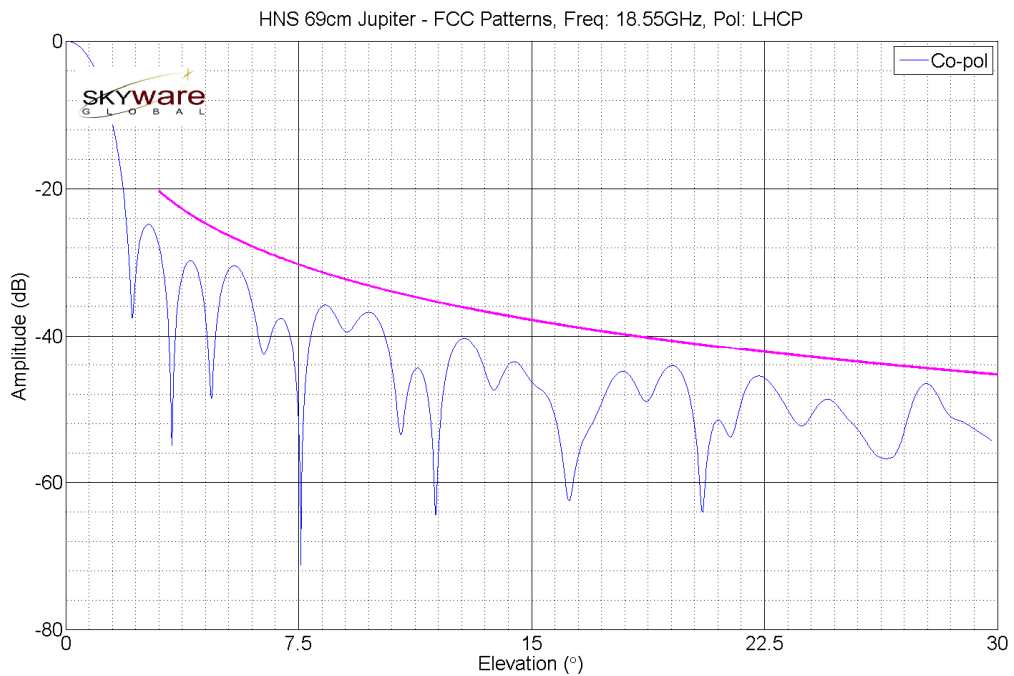
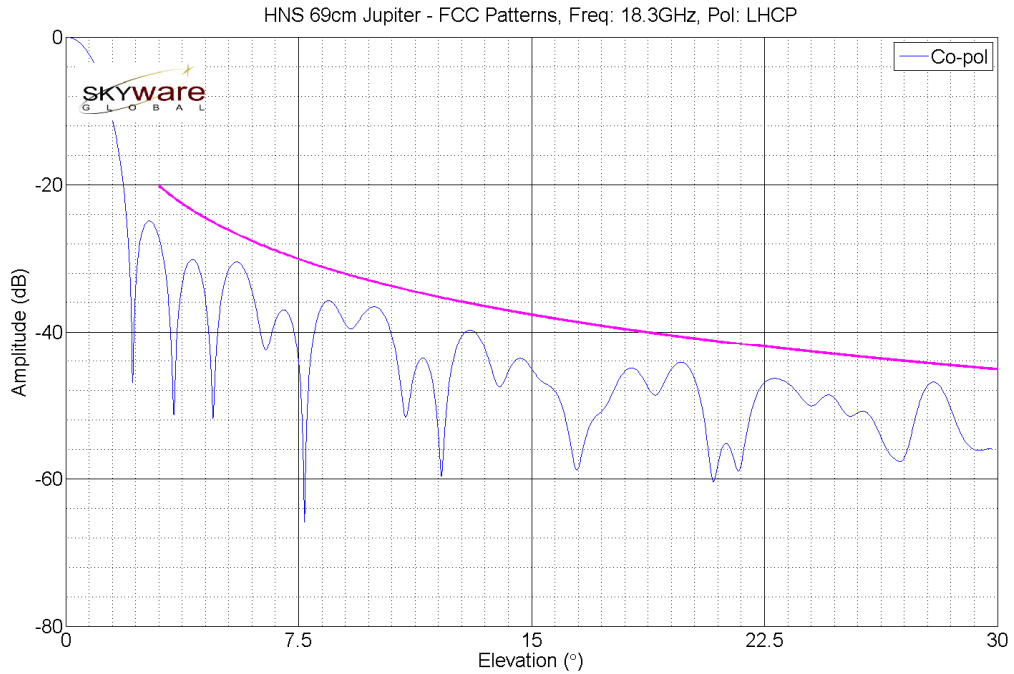


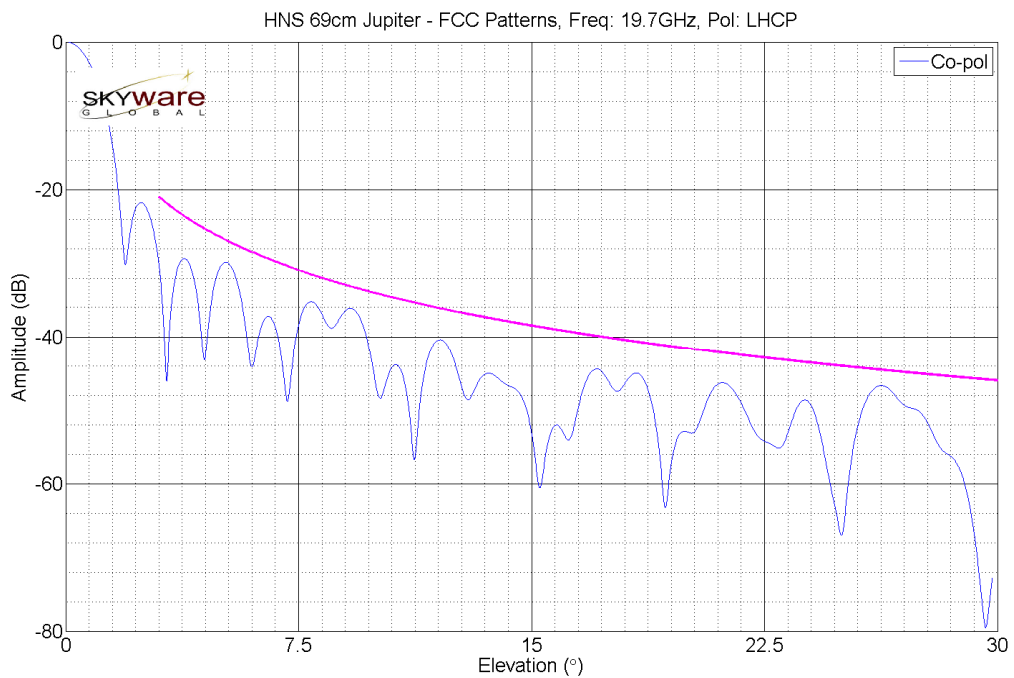
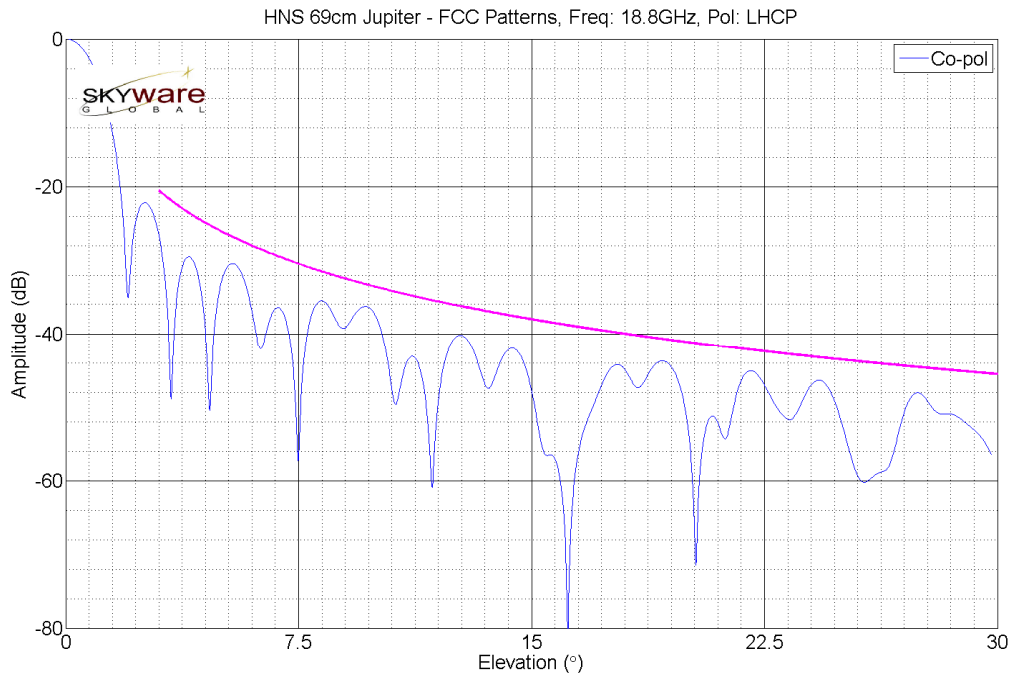


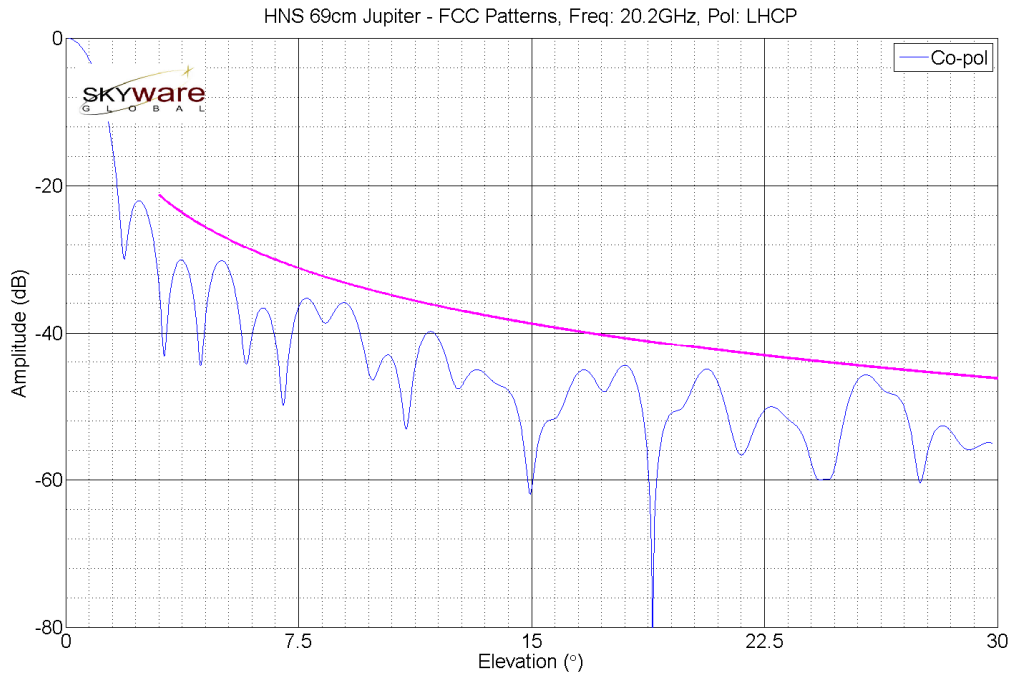
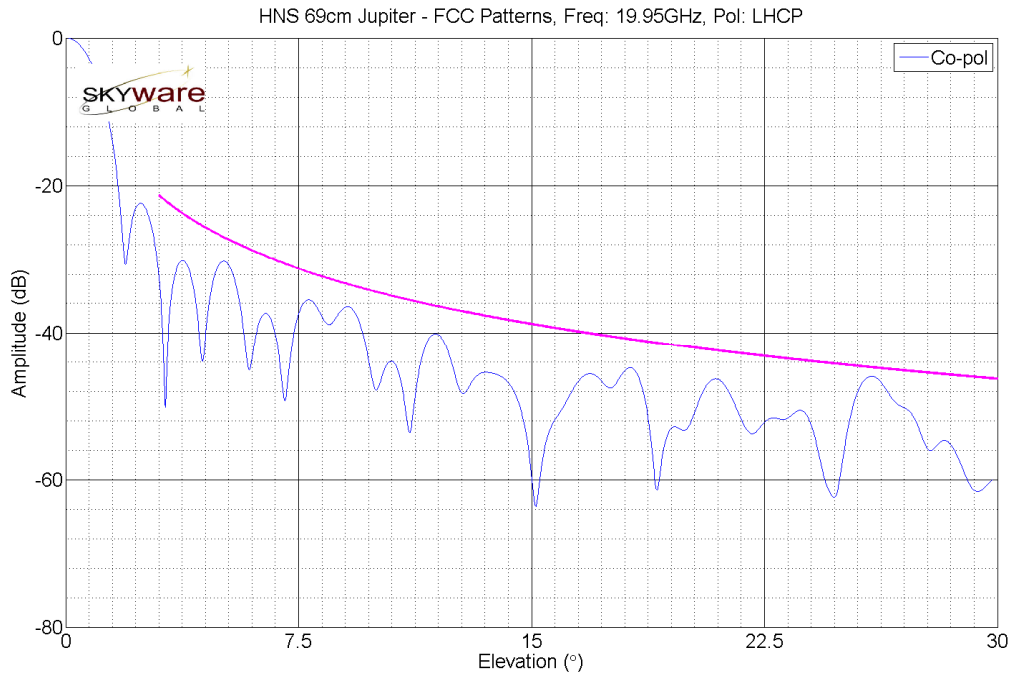


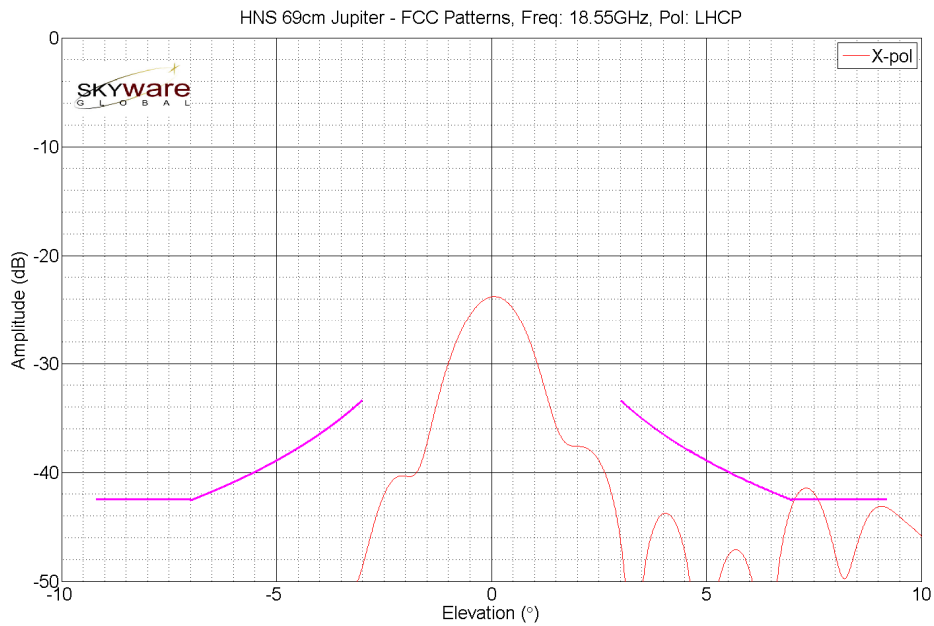
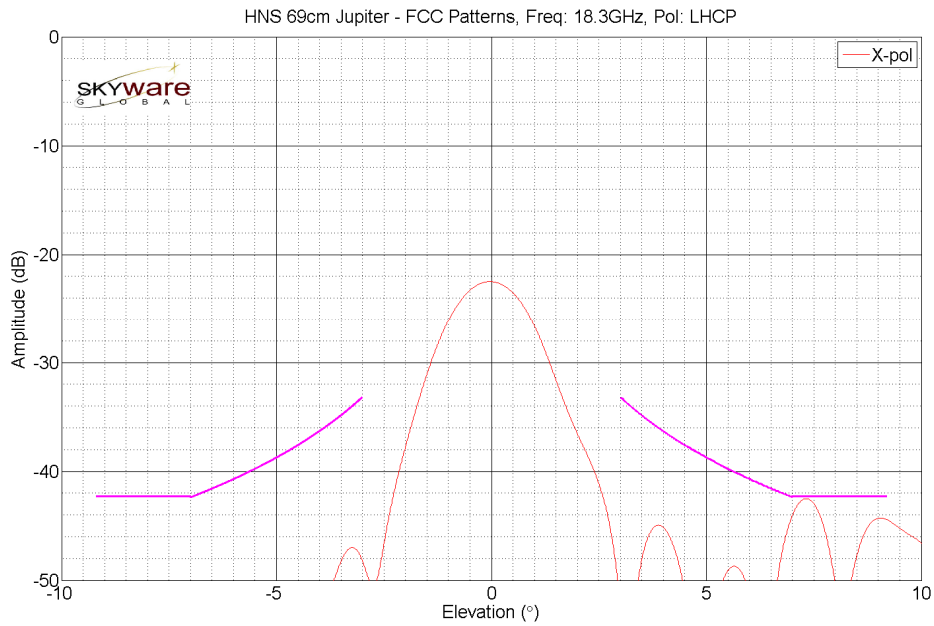


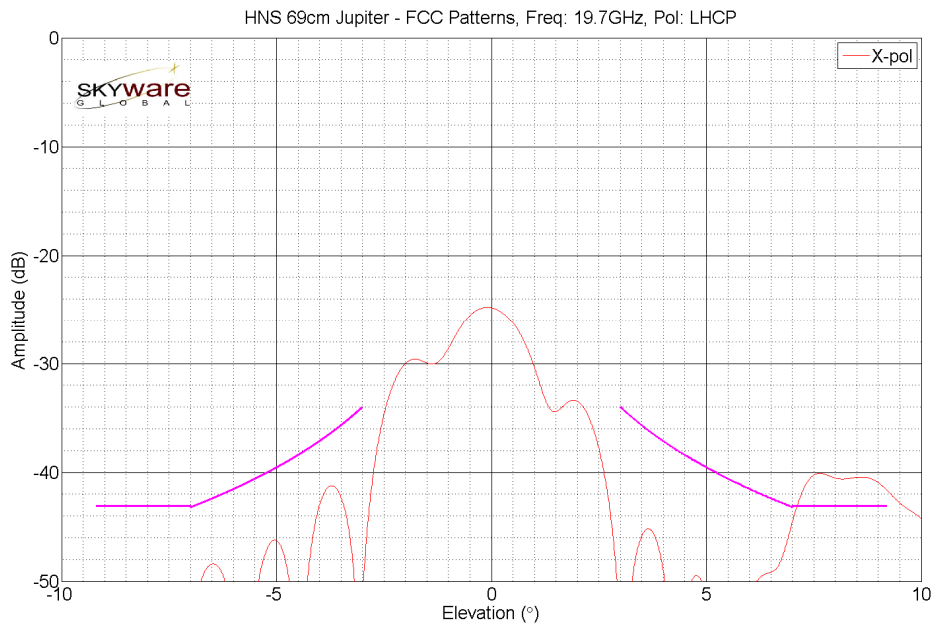
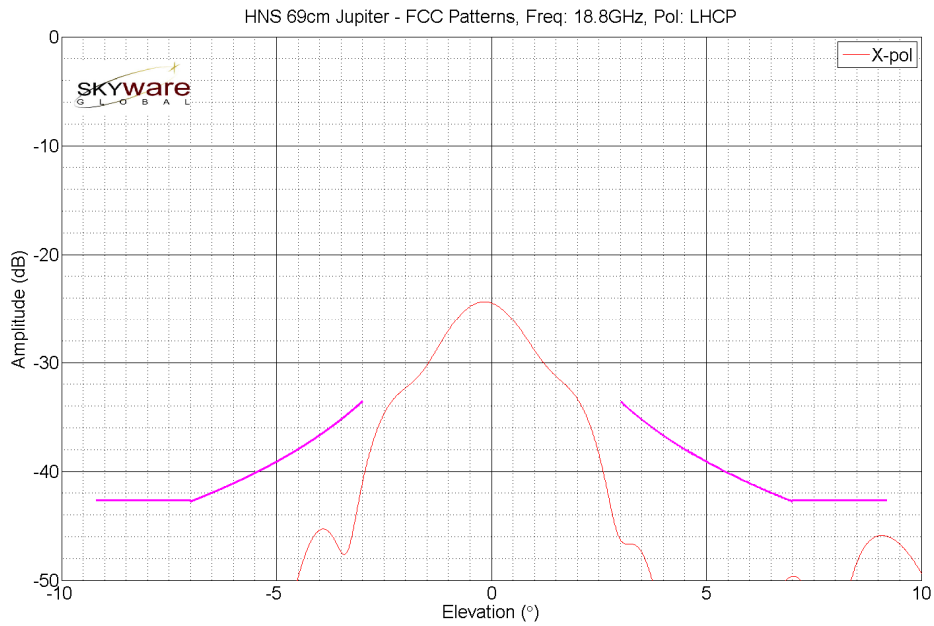
## 5.7 Rx LHCP Elevation Radiation Patterns

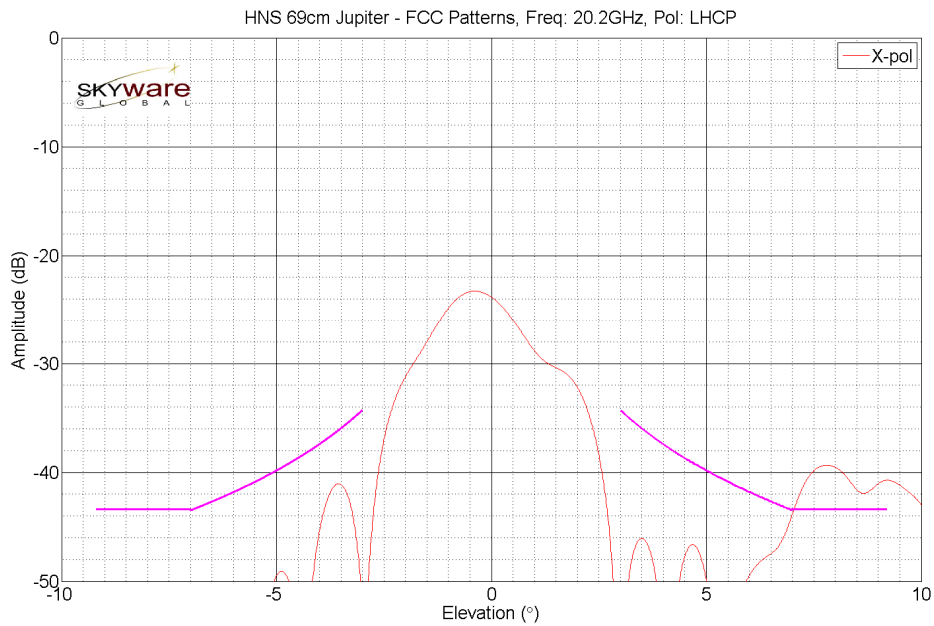
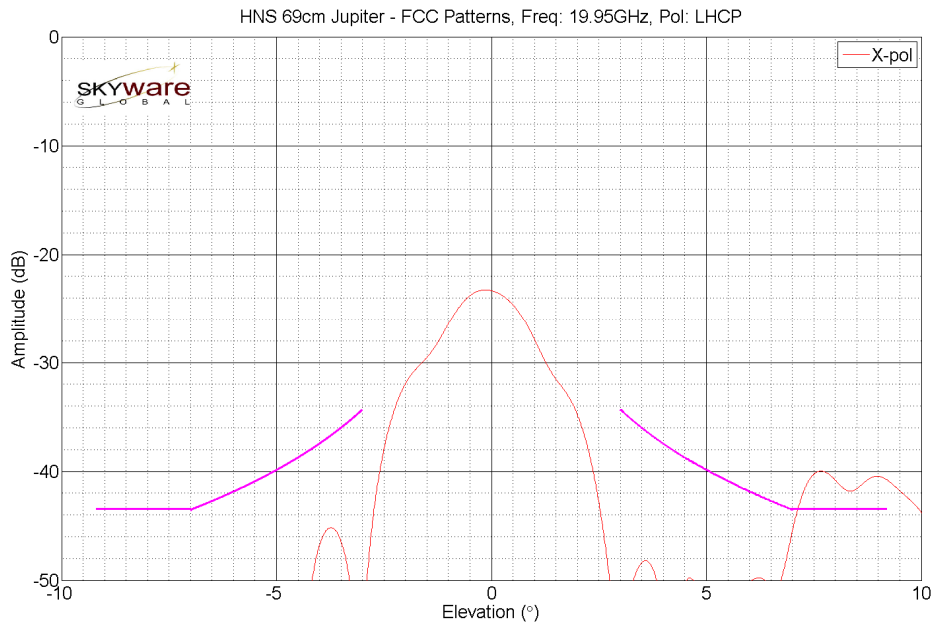




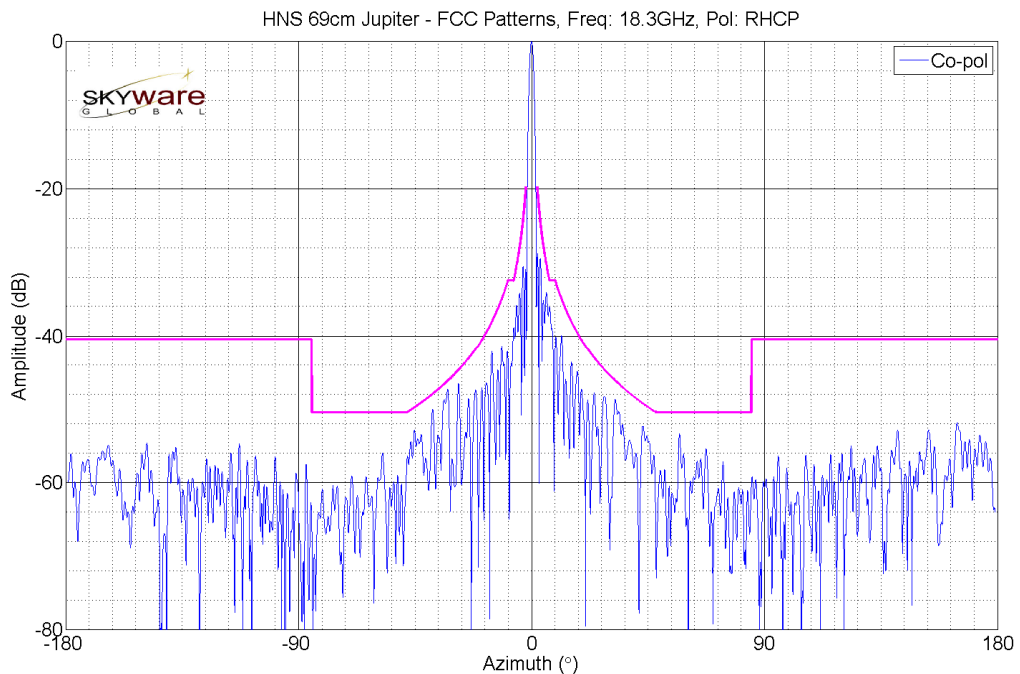
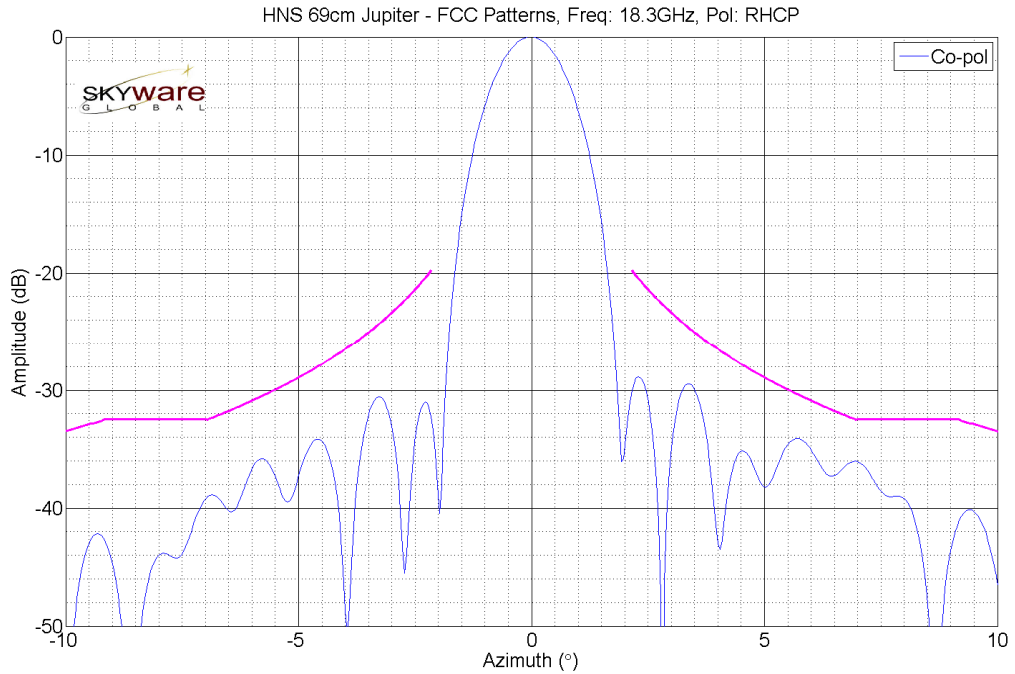


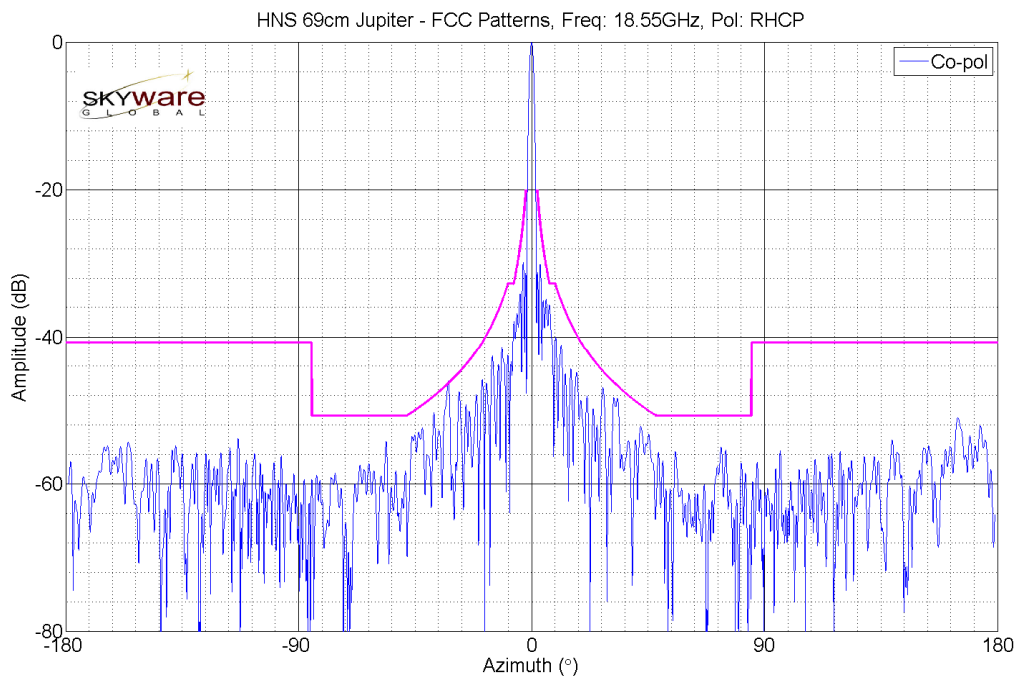
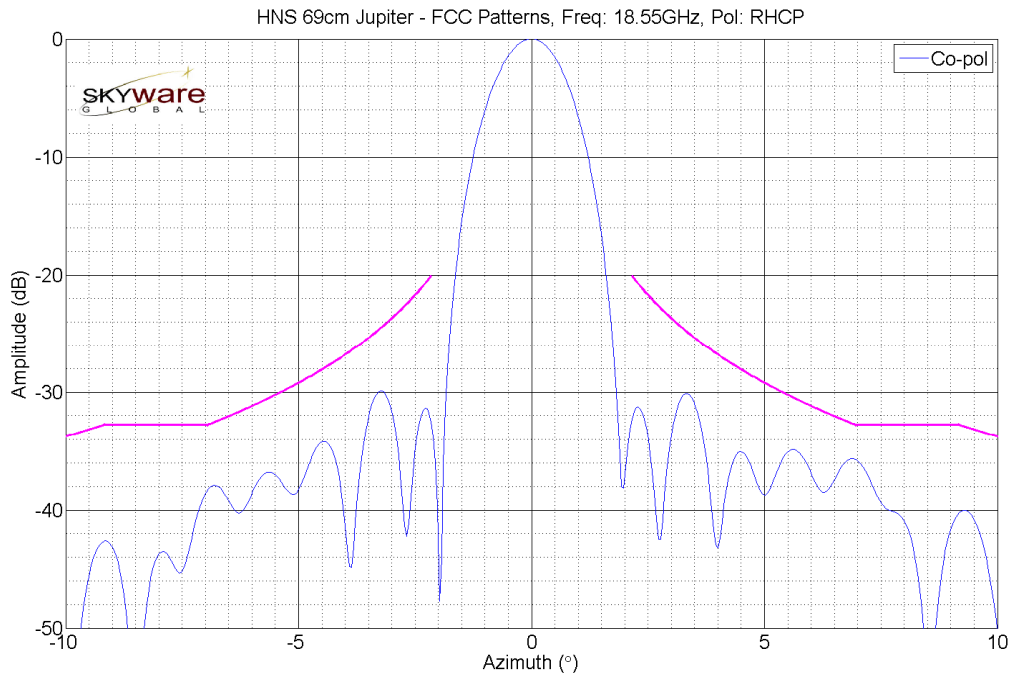




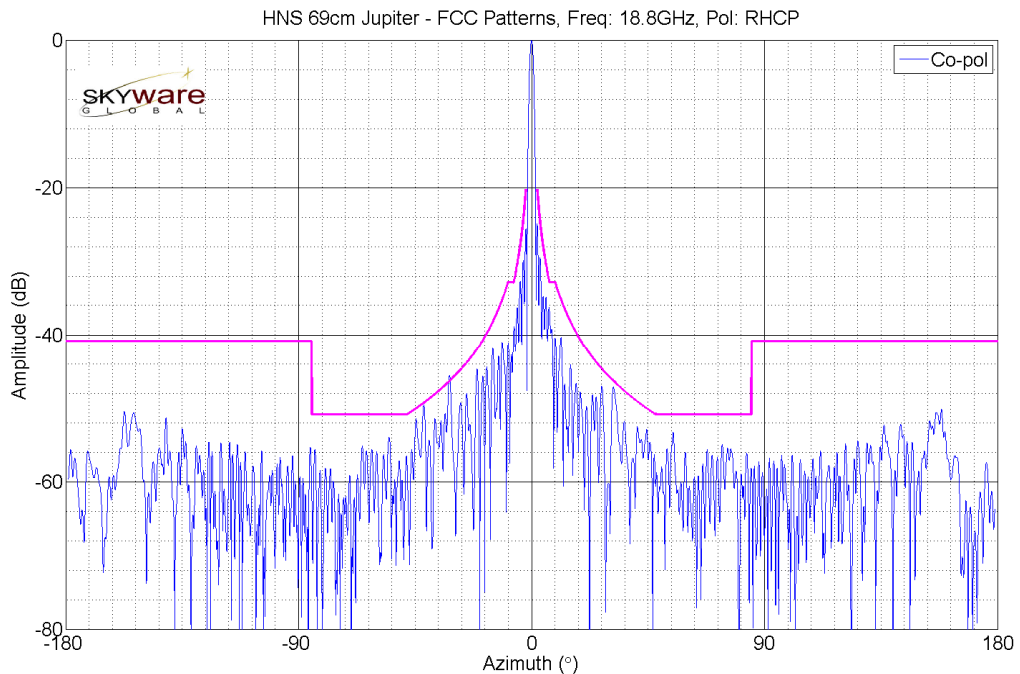
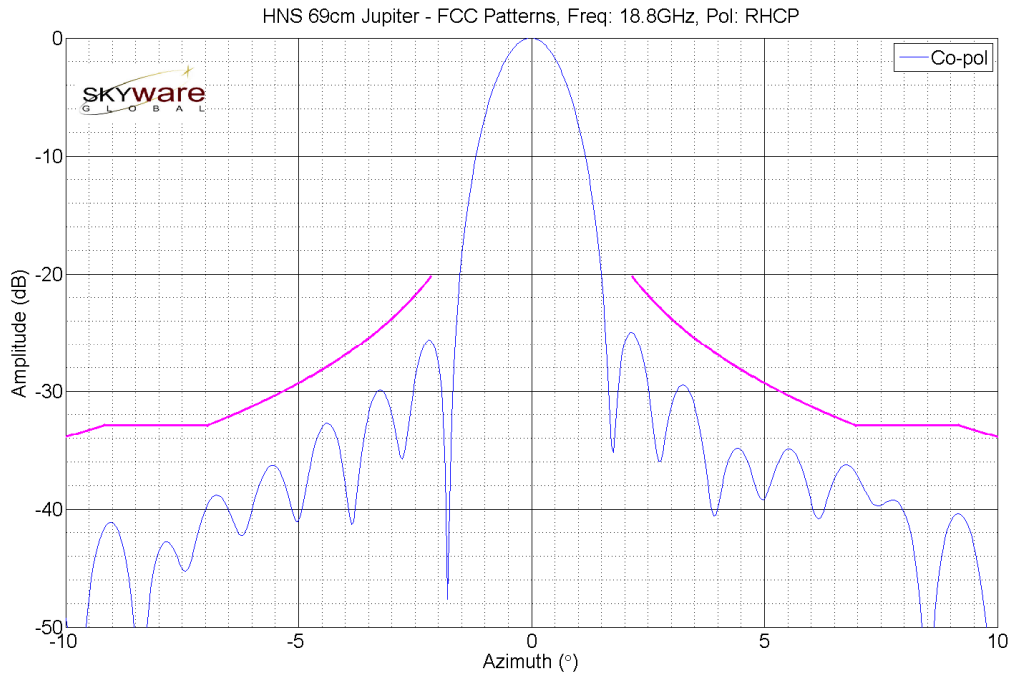


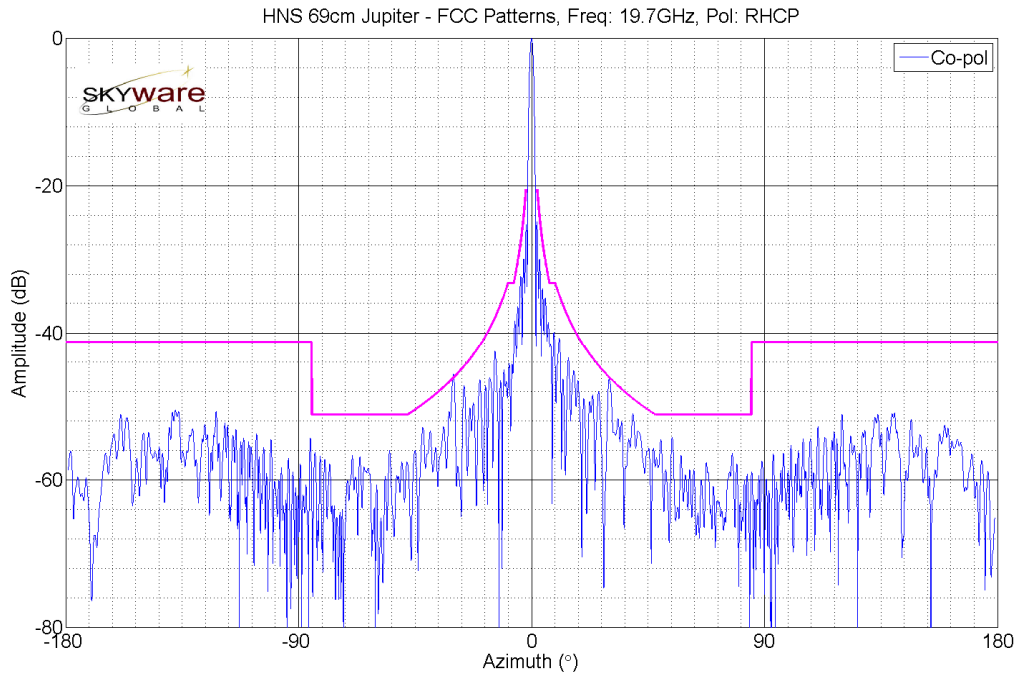
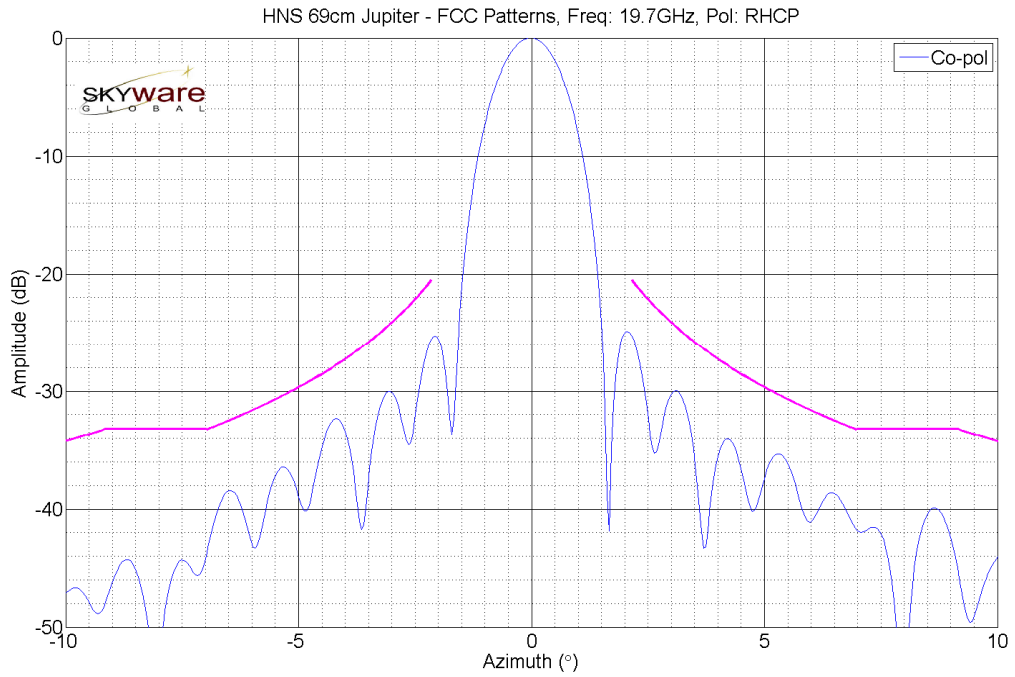
## 5.8 Rx RHCP Azimuth Radiation Patterns

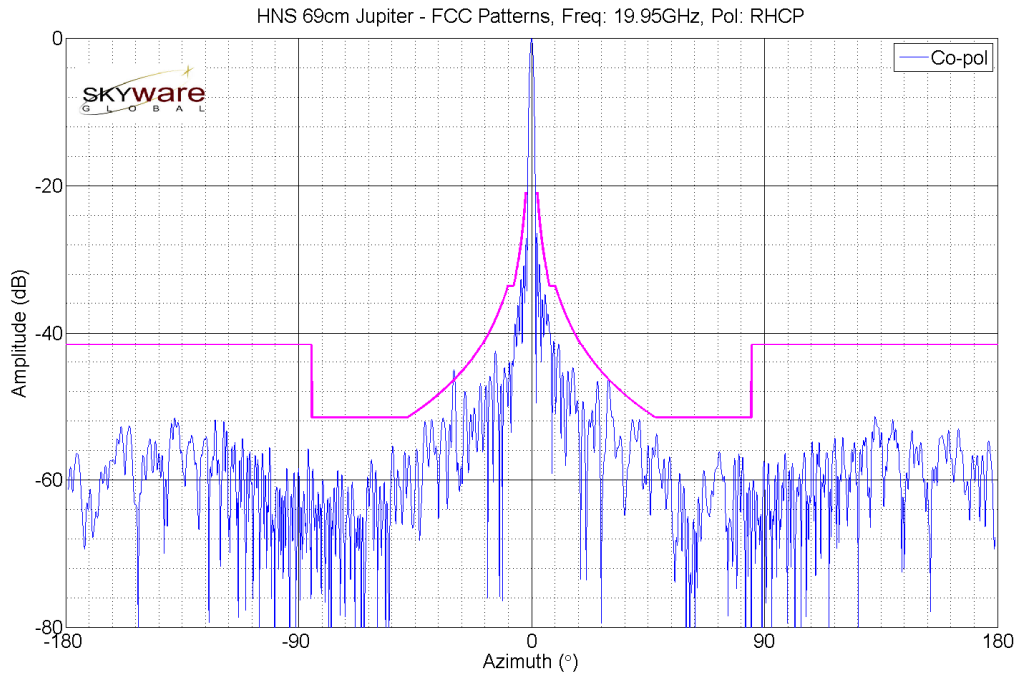
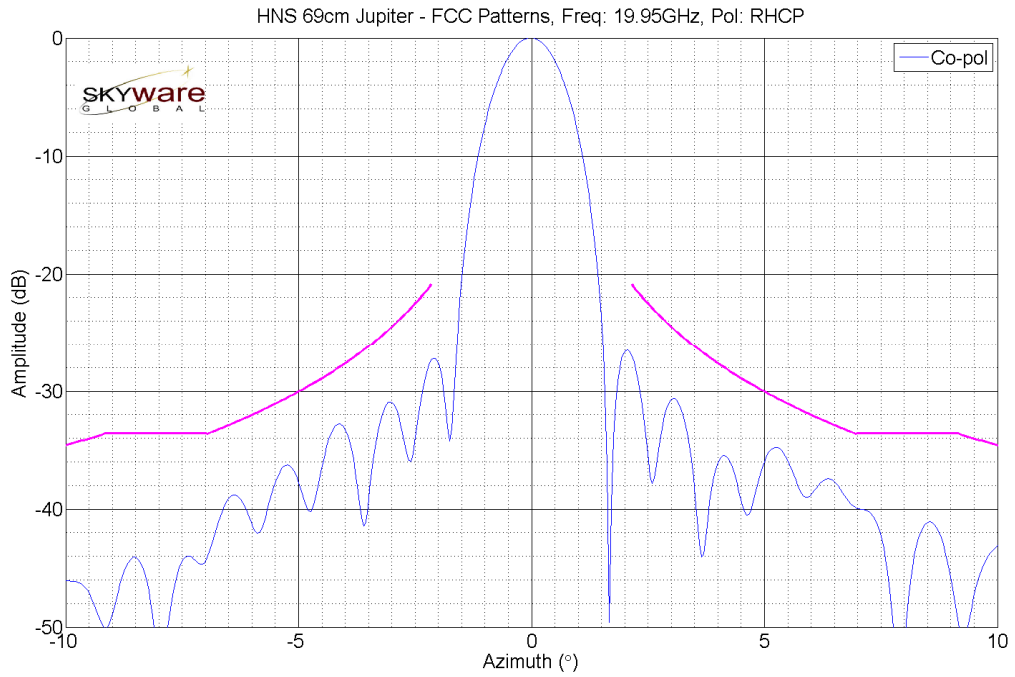


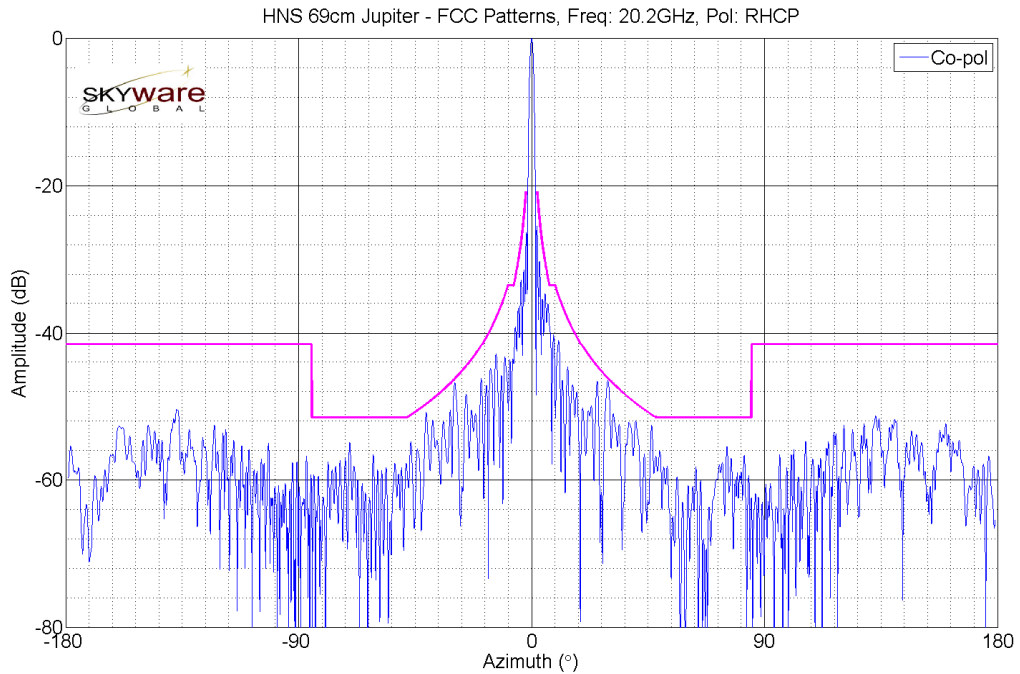
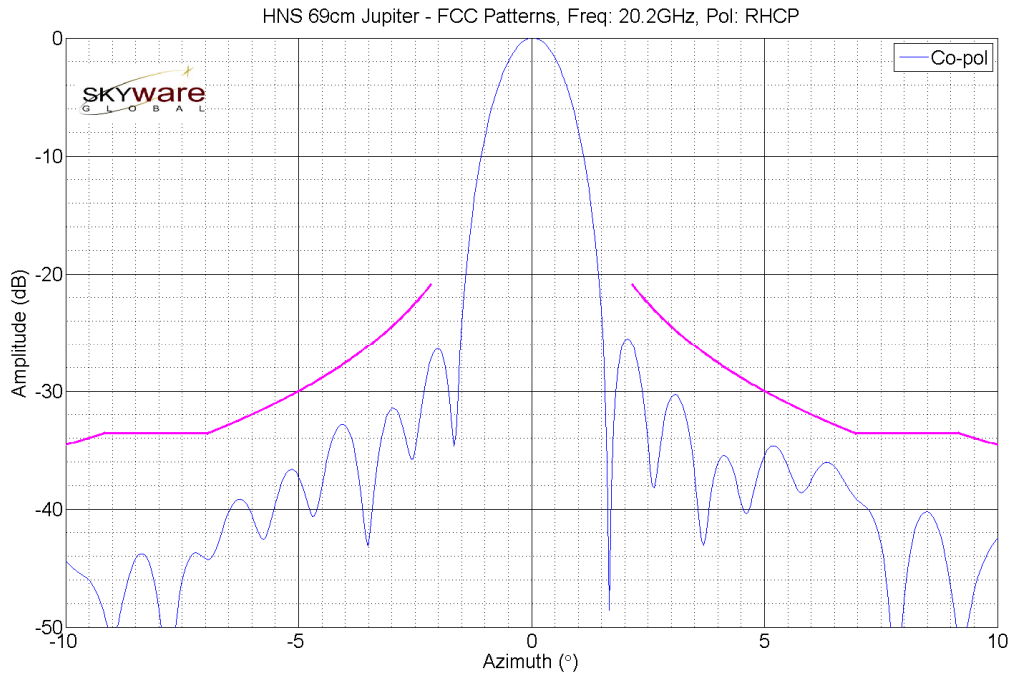


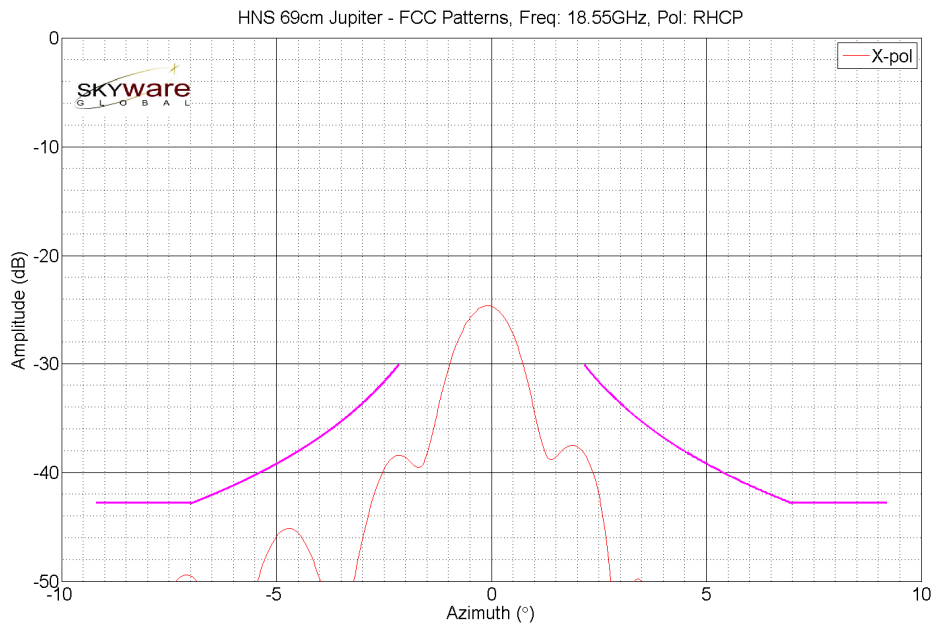
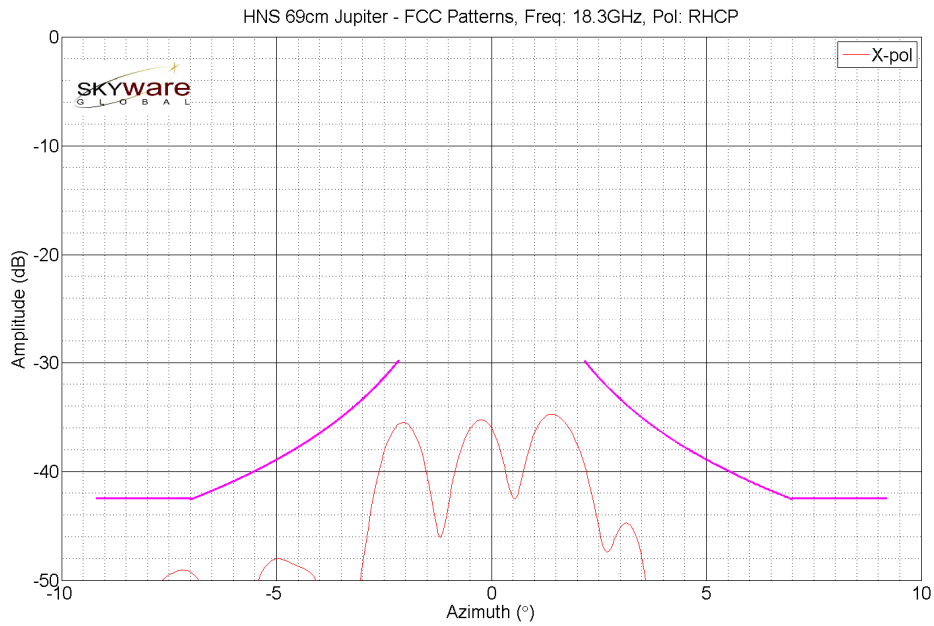


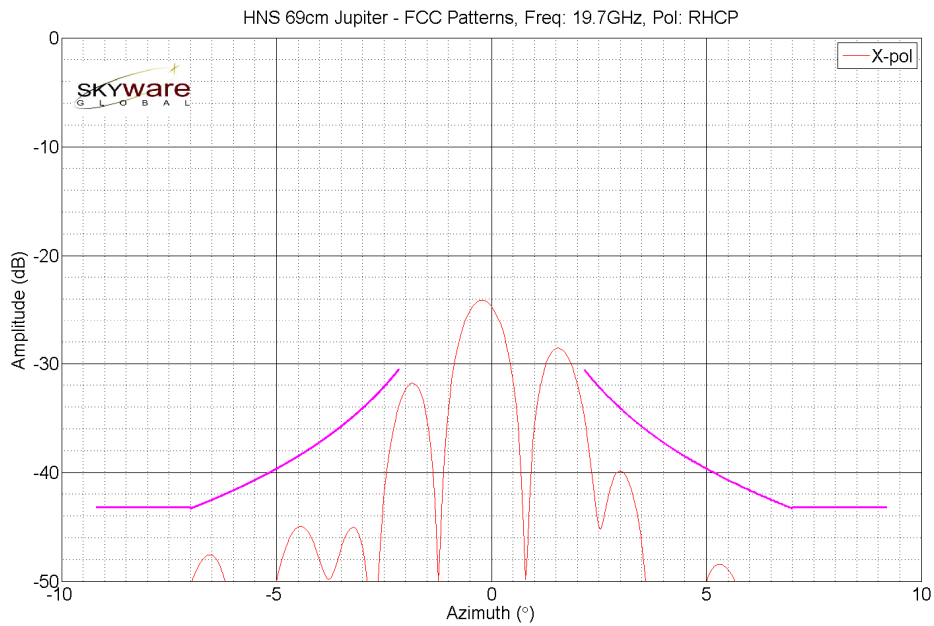
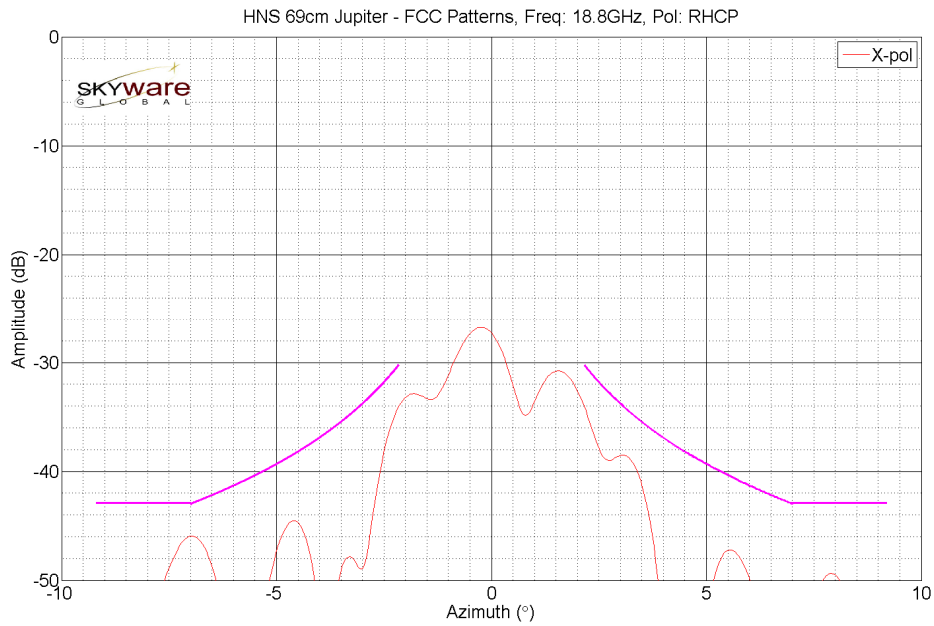


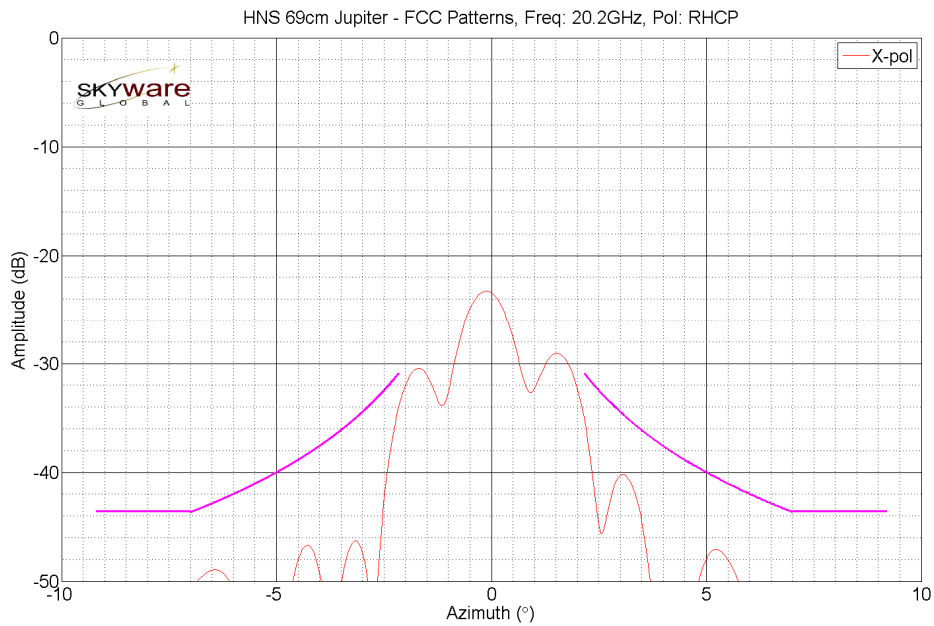
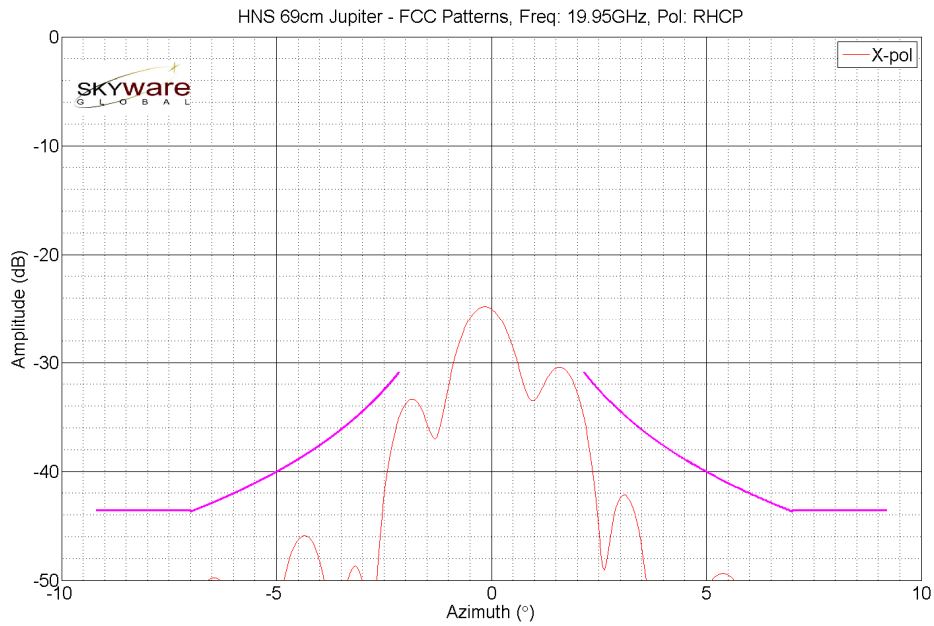




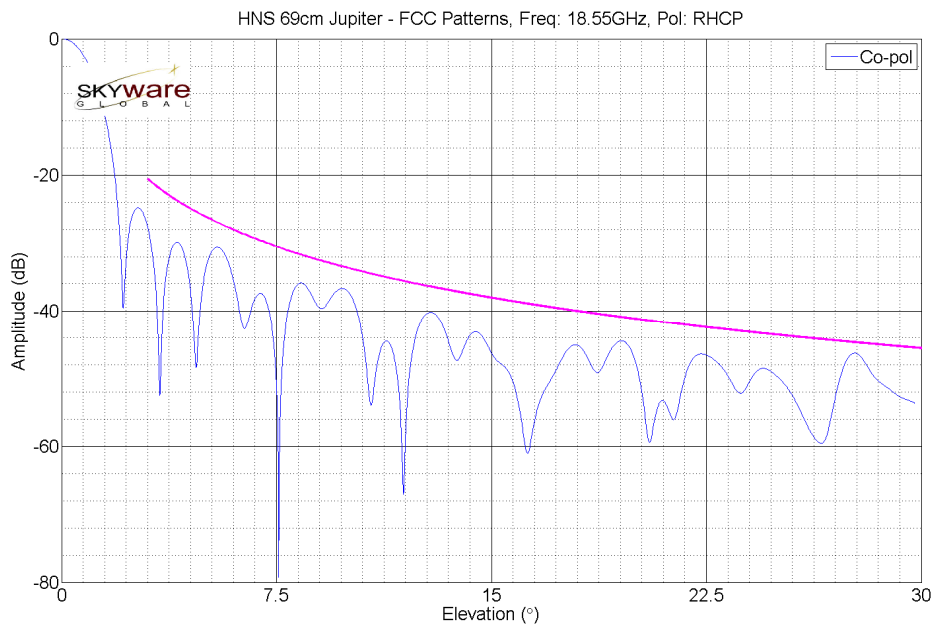
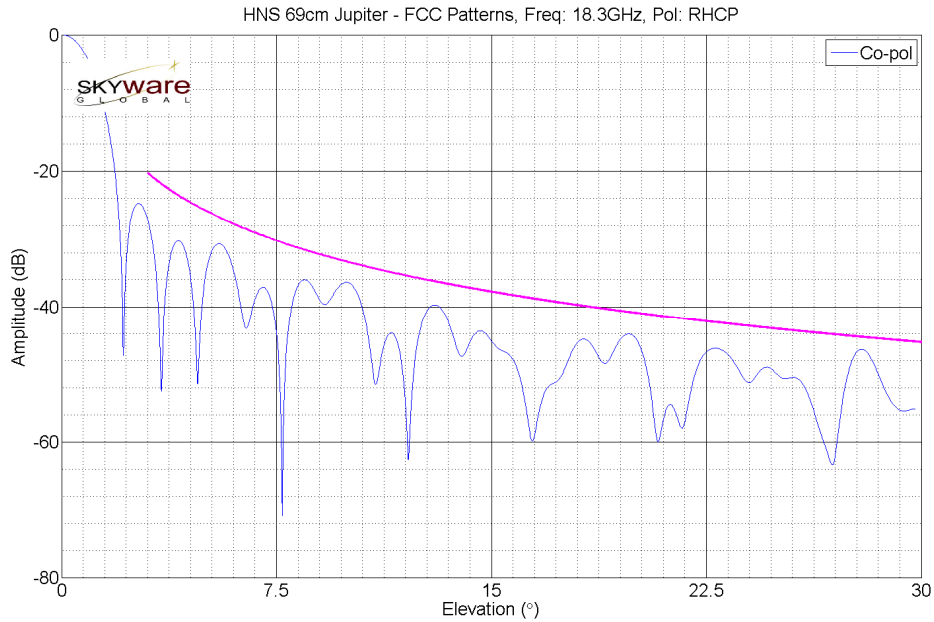




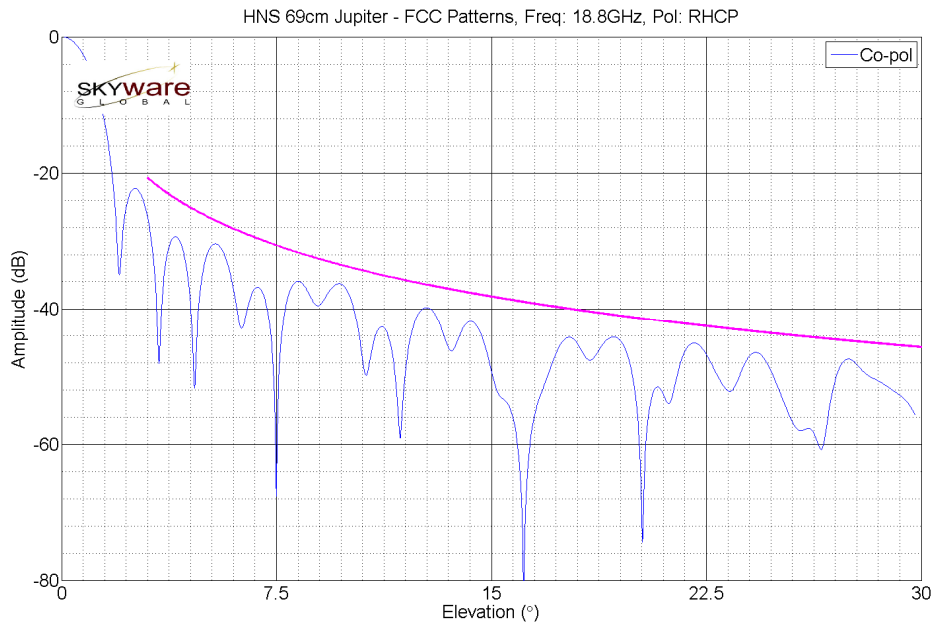


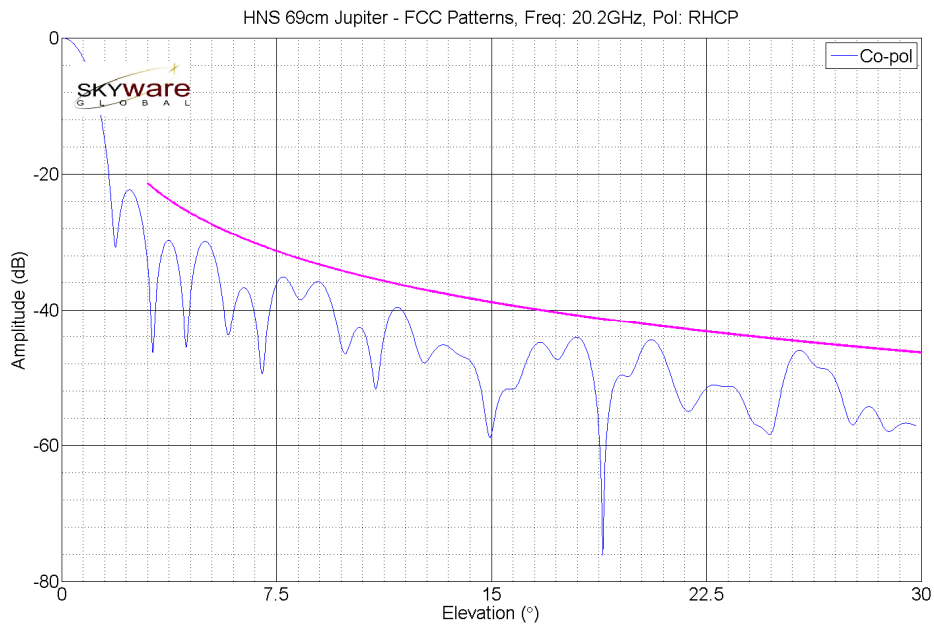
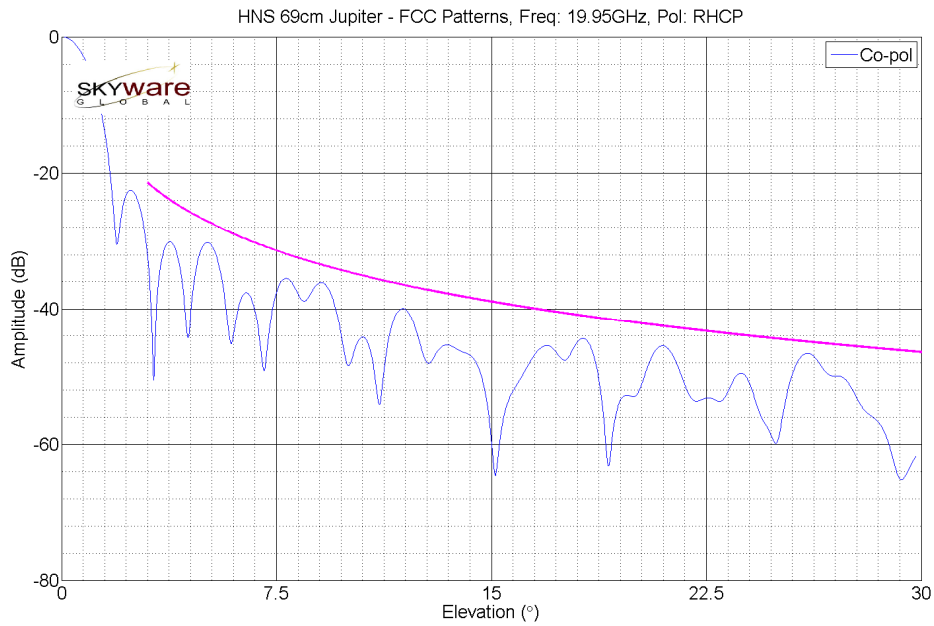


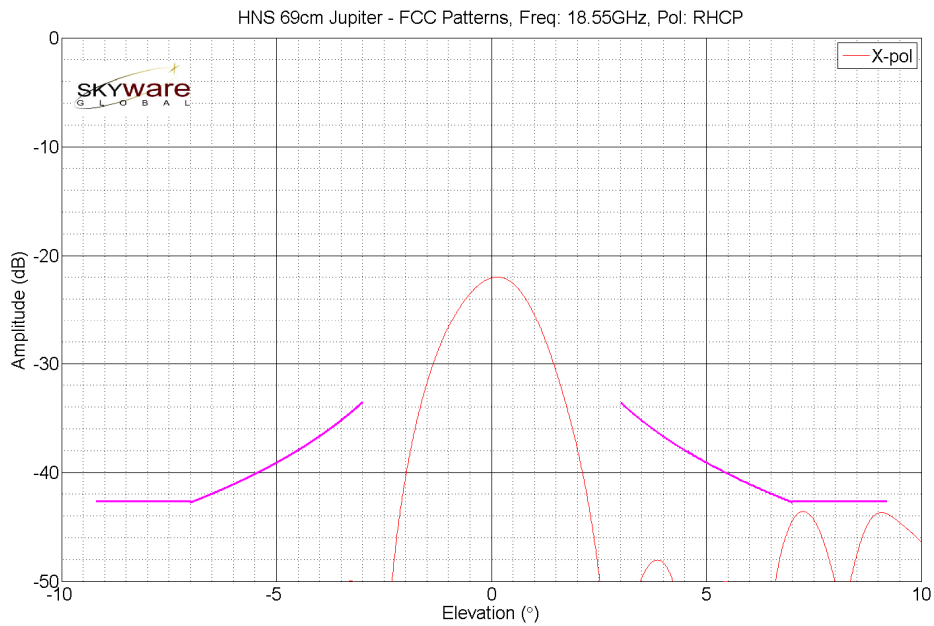
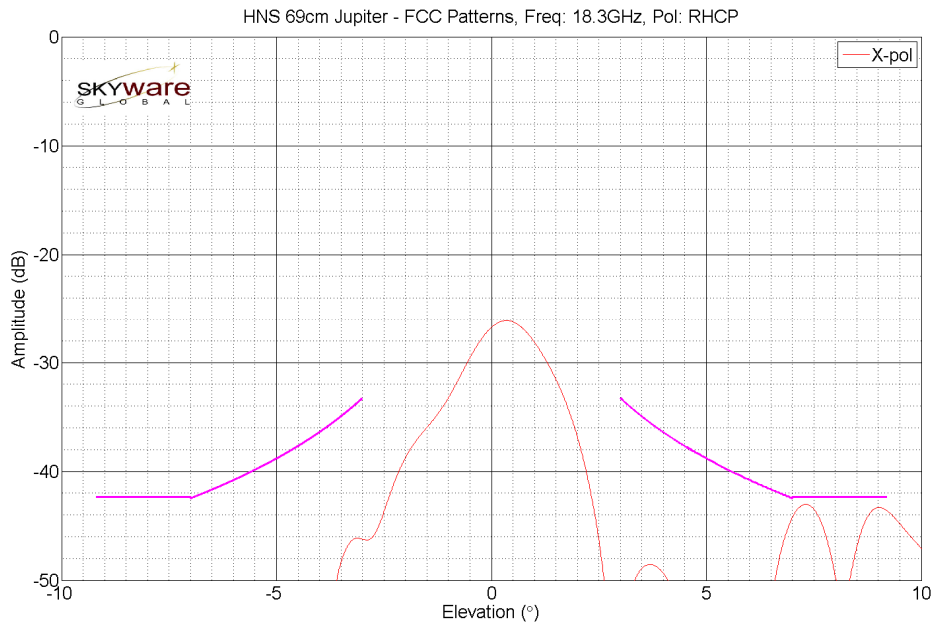
## 5.9 Rx RHCP Elevation Radiation Patterns

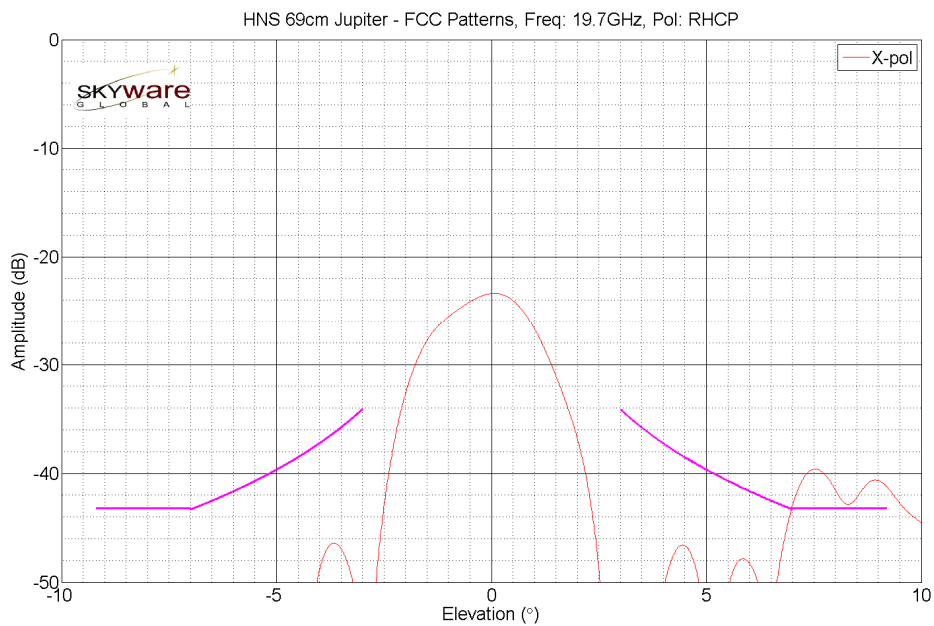
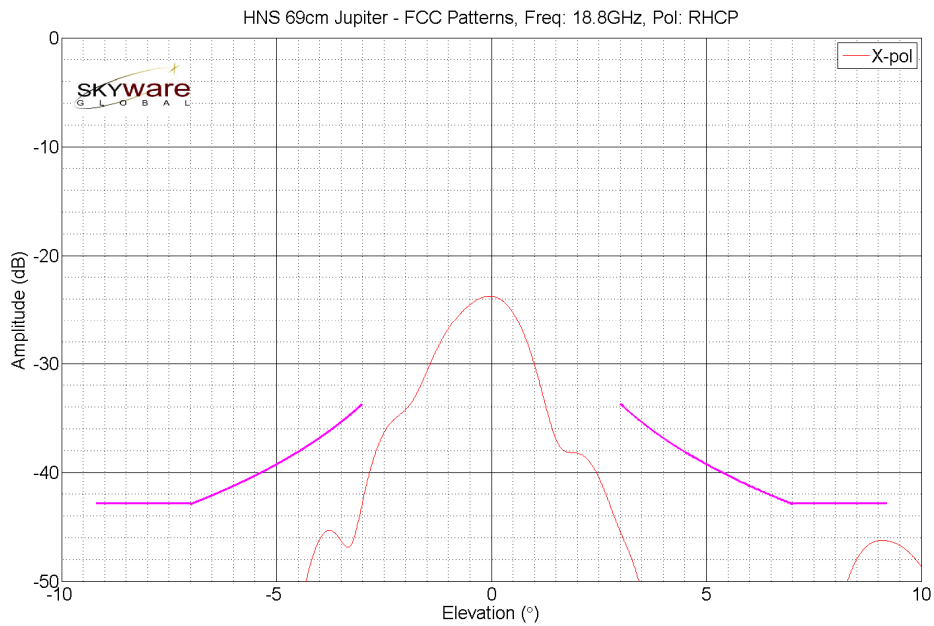


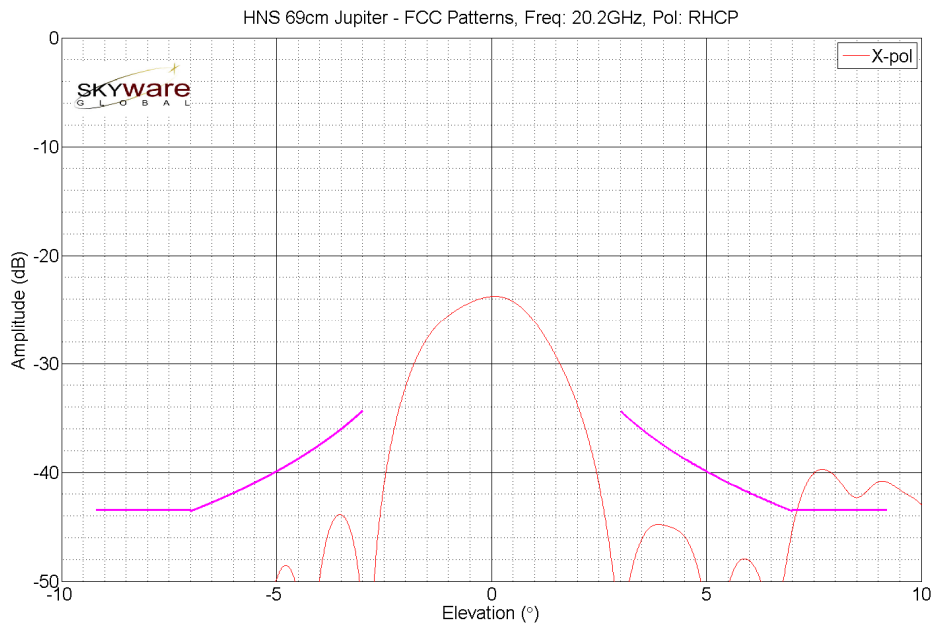
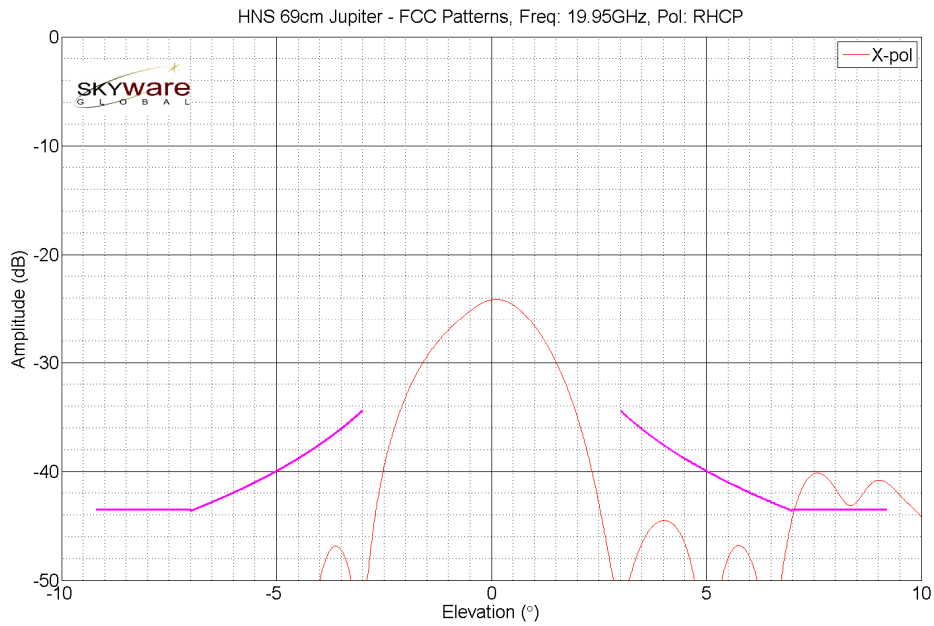












## 5.10Rx Gains

