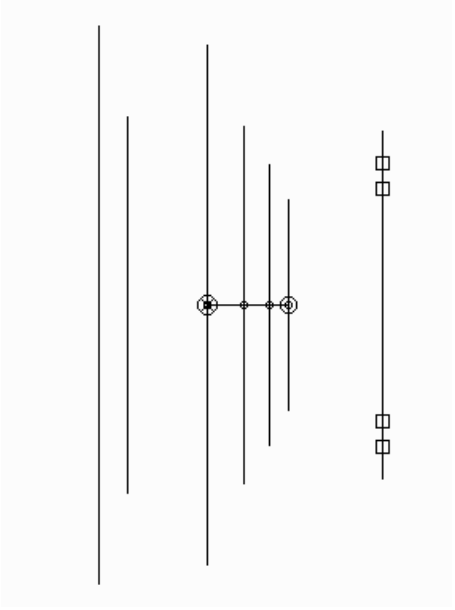
CUSHCRAFT X7 TRIBAND ANTENNA

Written by Danny Horvat, T93M
Monday, 20 March 2006

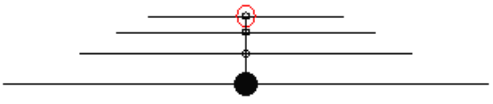
Cushcraft X7 antenna design is based on Log periodic-Yagi and has real advantage over conventional multiband trapped tribanders. Core of X7 antenna is 4 element log-periodic driven cell. Parasitic reflectors for 20/15m and trapped director for 20/15/10m complete this antenna into great compromise on 18' boom.

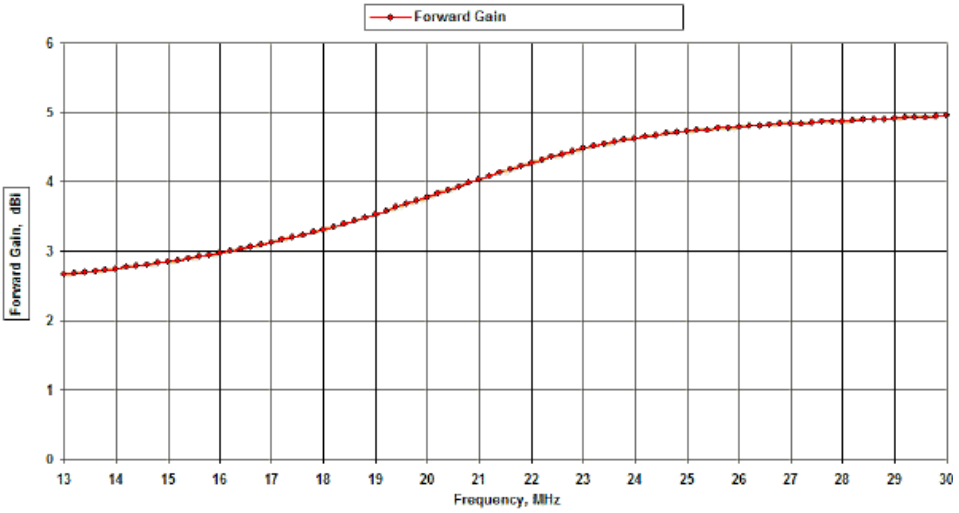
Advantage of it's Log periodic cell over full size dipole (in free space) is 0.45 dBD on 20m, 1.93 dBD on 15m and 2.57 dBD on 10m as modeled by EZNEC. Aside gain, cell has added another great characteristic to this antenna which is low VSWR on all three bands.



Log-Cell

Shown bellow is the driven Log-cell of X7 antennas as well as gain graph of cell itself.

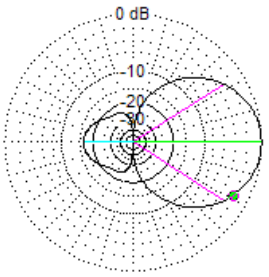




Radiation Patterns

Shown bellow are Azimuth radiation patterns in free space for 10/15/20 meters as well as for 12/17 meters. Antenna is designed primarily for 10/15/20 m but shows a good performances on WARC bands.

10m AZ pattern



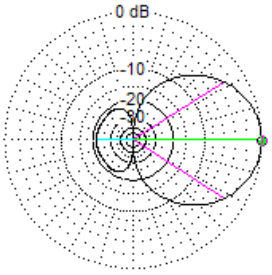
EZNEC

28.5 MHz

Azimuth Plot		Cursor Az	332.0 deg.
Elevation Angle	0.0 deg.	Gain	5.26 dBi
Outer Ring	7.44dBi		-2.18 dBmax

Slice Max Gain	7.44 dBi @ Az Angle = 0.0 deg.
Front/Back	16.28
Beamwidth	65.4 deg.; -3dB @ 327.3, 32.7 deg.
Sidelobe Gain	-8.83 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe	16.28 dB

15m AZ pattern



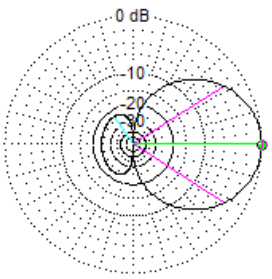
EZNEC

21.2 MHz

Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	0.0 deg.	Gain	7.4 dBi
Outer Ring	7.4dBi		0.0 dBmax

Slice Max Gain	7.4 dBi @ Az Angle = 0.0 deg.
Front/Back	21.32
Beamwidth	66.0 deg.; -3dB @ 327.0, 33.0 deg.
Sidelobe Gain	-13.92 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe	21.32 dB

20m AZ pattern

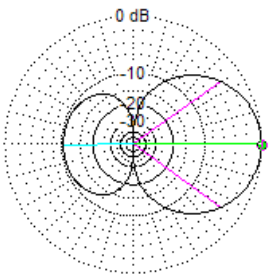


Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	0.0 deg.	Gain	7.36 dBi
Outer Ring	7.36dBi		0.0 dBmax

Slice Max Gain	7.36 dBi @ Az Angle = 0.0 deg.
Front/Back	23.96
Beamwidth	65.8 deg.; -3dB @ 327.1, 32.9 deg.
Sidelobe Gain	-15.51 dBi @ Az Angle = 125.0 deg.
Front/Sidelobe	22.87 dB

WARC performance

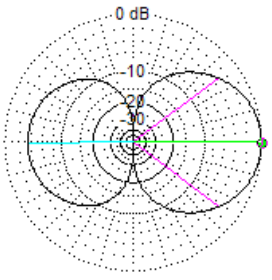
12m AZ pattern



Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	0.0 deg.	Gain	5.48 dBi
Outer Ring	5.48dBi		0.0 dBmax

Slice Max Gain	5.48 dBi @ Az Angle = 0.0 deg.
Front/Back	10.45
Beamwidth	71.2 deg.; -3dB @ 324.4, 35.6 deg.
Sidelobe Gain	-4.97 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe	10.45 dB

17m AZ pattern



Azimuth Plot		Cursor Az	0.0 deg.
Elevation Angle	0.0 deg.	Gain	3.74 dBi
Outer Ring	3.74dBi		0.0 dBmax

Slice Max Gain	3.74 dBi @ Az Angle = 0.0 deg.
Front/Back	3.36
Beamwidth	72.8 deg.; -3dB @ 323.6, 36.4 deg.
Sidelobe Gain	0.39 dBi @ Az Angle = 180.0 deg.
Front/Sidelobe	3.36 dB

Last Updated (Monday, 20 March 2006)