5-11 Analysis of Crossed Dipole in Circular Cavity

Summary of Results

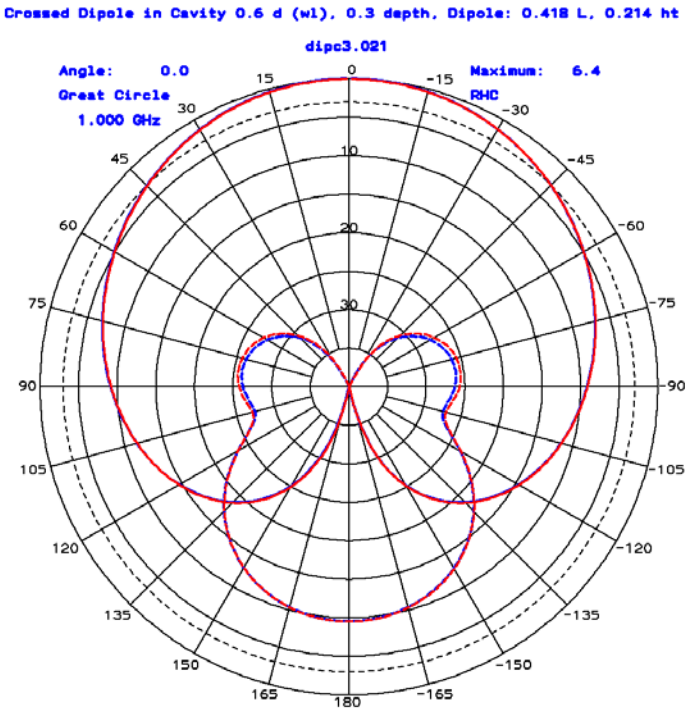
Aperture (λ)	Base (λ)	Depth (λ)	Gain dB	Beam-Width	Opt. *f/D*	Illum. Losses	Phase Ctr. (λ)	Band-Width	10 dB Beam
0.6	0.6	0.3	6.4	85.6	0.32	1.70	0.332	22%	182.5
0.6	0.6	0.5	7.2	82.1	0.36	1.94	0.503	15.%	171.3
0.7	0.7	0.3	7.4	79.0	0.36	1.66	0.334	28%	162
0.7	0.7	0.5	8.0	73.4	0.40	1.73	0.486	20%	147.3
0.8	0.8	0.5	8.7	68.6	0.44	1.57	0.478	37%	133
0.88	0.57	0.44	9.1	65.2	0.48	1.48	0.415	21%	123.3
0.9	0.9	0.3	9.0	65.6	0.44	1.44	0.303	27%	128.4
0.9	0.9	0.4	9.2	63.9	0.44	1.49	0.393	28%	123.6
0.9	0.9	0.5	9.3	63.5	0.48	1.48	0.474	32%	121.6
0.9	0.9	0.6	9.3	64.7	0.48	1.47	0.566	44%	120.6
1.0	1.0	0.3	9.7	61.1	0.48	1.43	0.291	23%	118.0
1.0	1.0	0.3	9.6	61.5	0.48	1.44	0.287	27%	119.0
1.0	1.0	0.4	9.8	59.9	0.52	1.51	0.393	26%	115.1
1.0	1.0	0.5	10.0	58.7	0.48	1.44	0.480	29%	111.3
1.0	1.0	0.6	10.0	59.2	0.56	1.59	0.580	28%	111.0
1.0	0.65	0.5	9.8	61.1	0.48	1.43	0.455	25%	114.8
1.1	1.1	0.4	10.5	55.4	0.56	1.94	0.289	20%	105.5
1.1	1.1	0.5	10.7	54.1	0.56	1.47	0.491	20%	101.9
1.1	1.1	0.6	10.8	54.1	0.60	1.76	0.583	28%	100.8
1.2	0.65	0.5	10.7	54.2	0.52	1.36	0.395	33%	102.9
1.3	0.65	0.5	11.2	51.0	0.56	1.37	0.364	28.5%	97.3
1.4	0.65	0.5	11.5	49.1	0.60	1.58	0.249	29%	95.4
1.5	0.65	0.5	11.7	47.7	0.56	1.60	0.208	24%	94.3
1.6	0.65	0.44	11.3	47.9	0.56	1.52	0.132	23%	96.4
1.7	0.65	0.44	11.1	47.3	0.52	1.54	0.102	26.5%	96.9
1.7	0.80	0.44	11.6	45.2	0.60	1.61	0.050	26%	90.7
1.7	0.90	0.44	12.1	43.3	0.68	1.65	0.037	24.5%	85.7
1.7	1.0	0.44	12.5	41.4	0.68	1.79	-0.035	22.5%	81.8
1.7	1.1	0.44	12.6	39.4	0.64	2.10	-0.164	21%	83.6
1.8	1.0	0.44	12.6	39.7	0.56	2.02	-0.160	23%	84.8

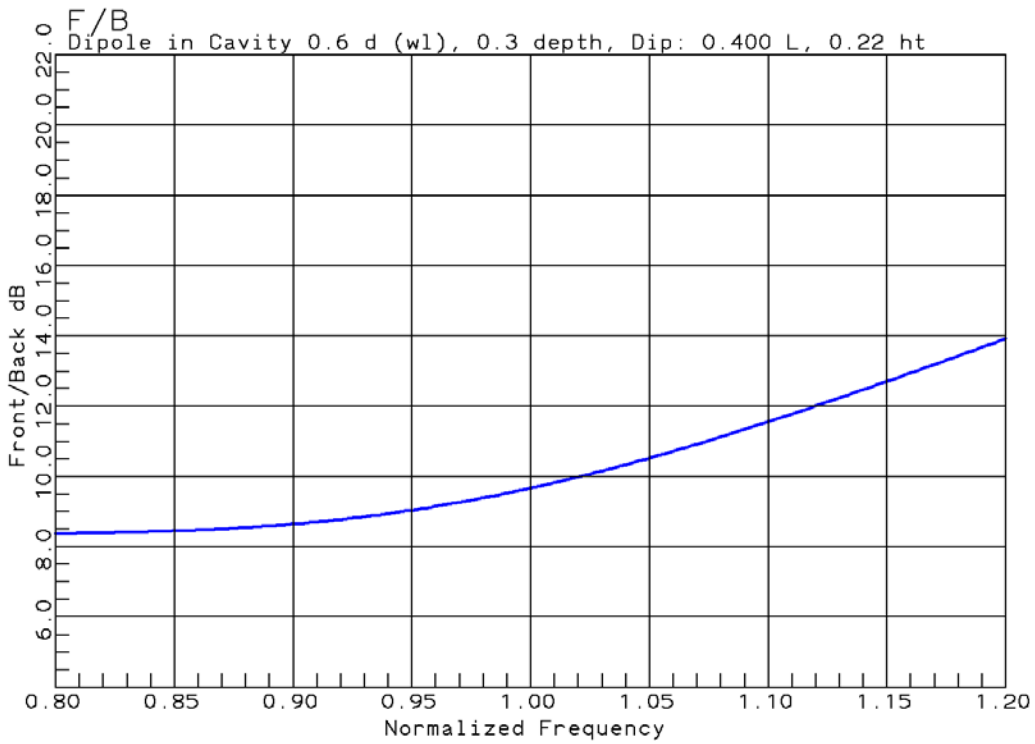
Aperture (λ)	Base (λ)	Depth (λ)	Dipole Length	Dipole Height	F/B Center	F/B Avg.
0.6	0.6	0.3	0.400	0.22	9.7	10.2
0.6	0.6	0.5	0.377	0.27	13.3	12.9
0.7	0.7	0.3	0.410	0.20	12.5	12.8
0.7	0.7	0.5	0.410	0.21	19.5	16.7
0.8	0.8	0.5	0.430	0.20	26.7	21.0
0.88	0.57	0.44	0.458	0.25	19.9	19.0
0.9	0.9	0.3	0.440	0.25	17.2	16.1
0.9	0.9	0.4	0.440	0.20	24.1	23.0
0.9	0.9	0.5	0.440	0.20	27.4	23.7
0.9	0.9	0.6	0.440	0.20	16.6	17.4
1.0	1.0	0.3	0.440	0.20	17.7	16.4
1.0	1.0	0.3	0.440	0.23	17.8	16.8
1.0	1.0	0.4	0.440	0.23	23.9	21.7
1.0	1.0	0.5	0.440	0.23	30.4	28.7
1.0	1.0	0.6	0.458	0.21	17.6	18.9
1.0	0.65	0.5	0.458	0.25	22.8	20.8
1.1	1.1	0.4	0.458	0.24	21.6	19.3
1.1	1.1	0.5	0.440	0.25	33.6	27.8
1.1	1.1	0.6	0.458	0.25	17.2	16.1
1.2	0.65	0.5	0.458	0.25	27.3	23.3
1.3	0.65	0.5	0.458	0.23	25.3	22.4
1.4	0.65	0.5	0.432	0.23	22.4	21.4
1.5	0.65	0.5	0.440	0.22	19.4	20.4
1.6	0.65	0.44	0.440	0.22	21.4	23.1
1.7	0.65	0.44	0.440	0.25	21.1	23.5
1.7	0.80	0.44	0.440	0.25	21.8	25.8
1.7	0.90	0.44	0.449	0.26	24.9	28.1
1.7	1.0	0.44	0.454	0.28	29.8	28.7
1.7	1.1	0.44	0.454	0.30	31.2	26.4
1.8	1.0	0.44	0.454	0.30	29.8	28.6

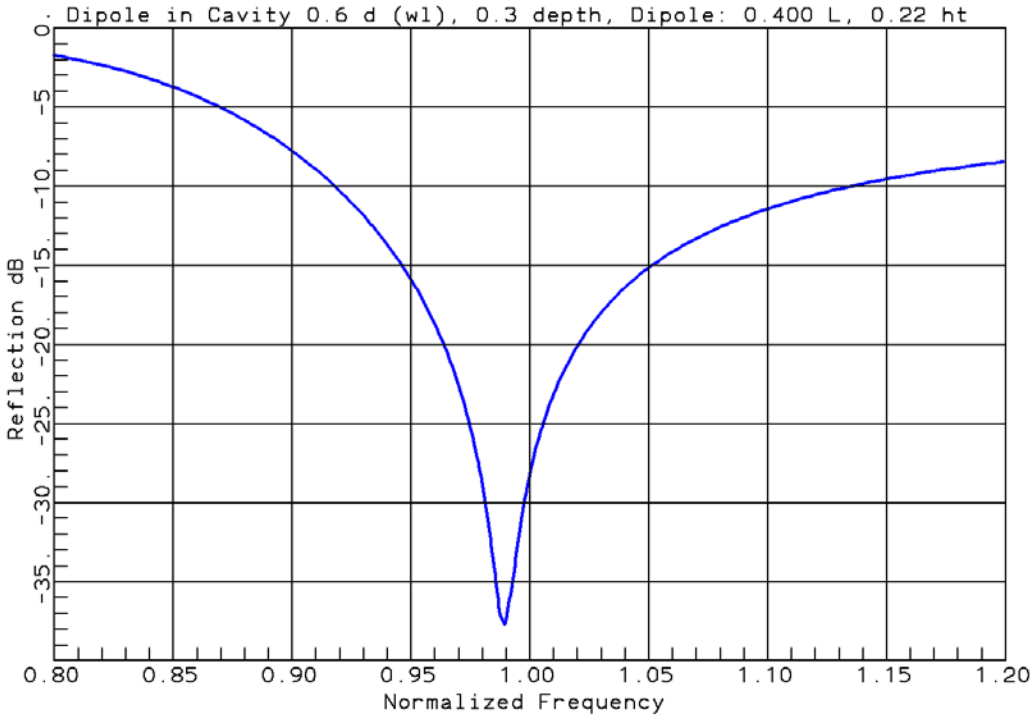
Straight wall designs

Cavity: 0.6λ Diameter Aperture, 0.3λ Depth, Dipole: 0.418λ, Height: 0.214λ

Circular Polarization Blue: φ = 0, Red: φ = 45

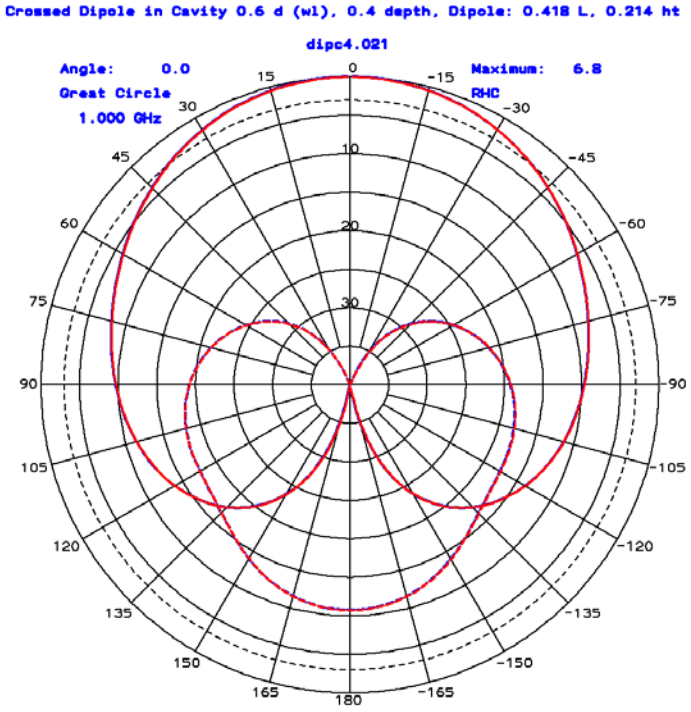


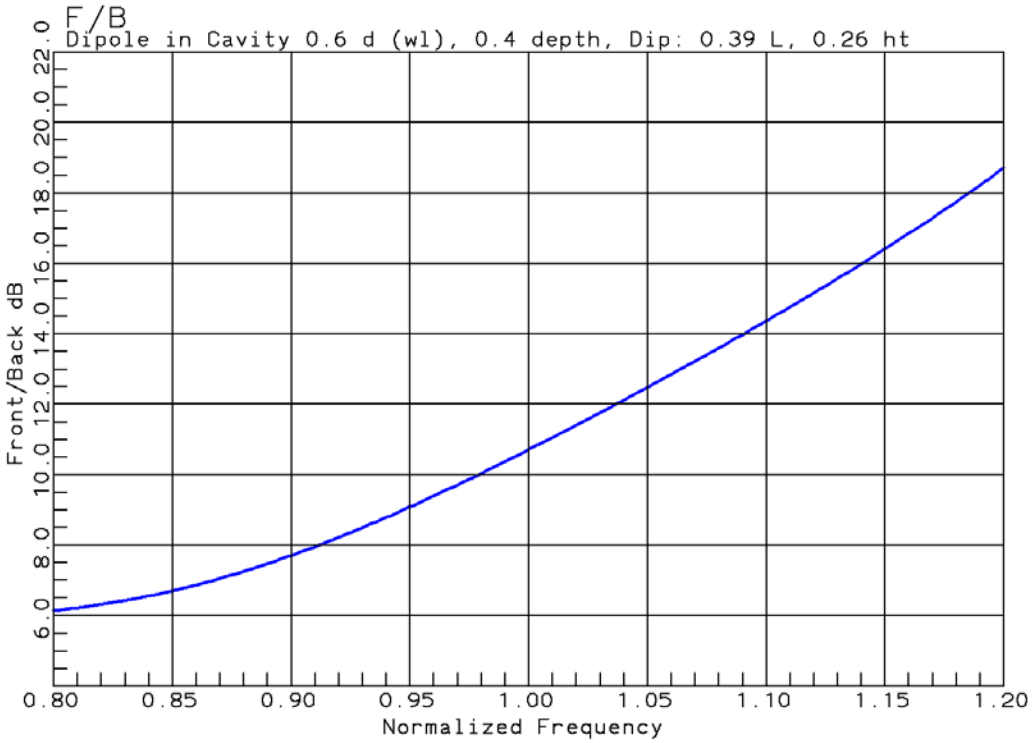

F/B
Dipole in Cavity 0.6 d (wl), 0.3 depth, Dip: 0.400 L, 0.22 ht
Front/Back dB
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

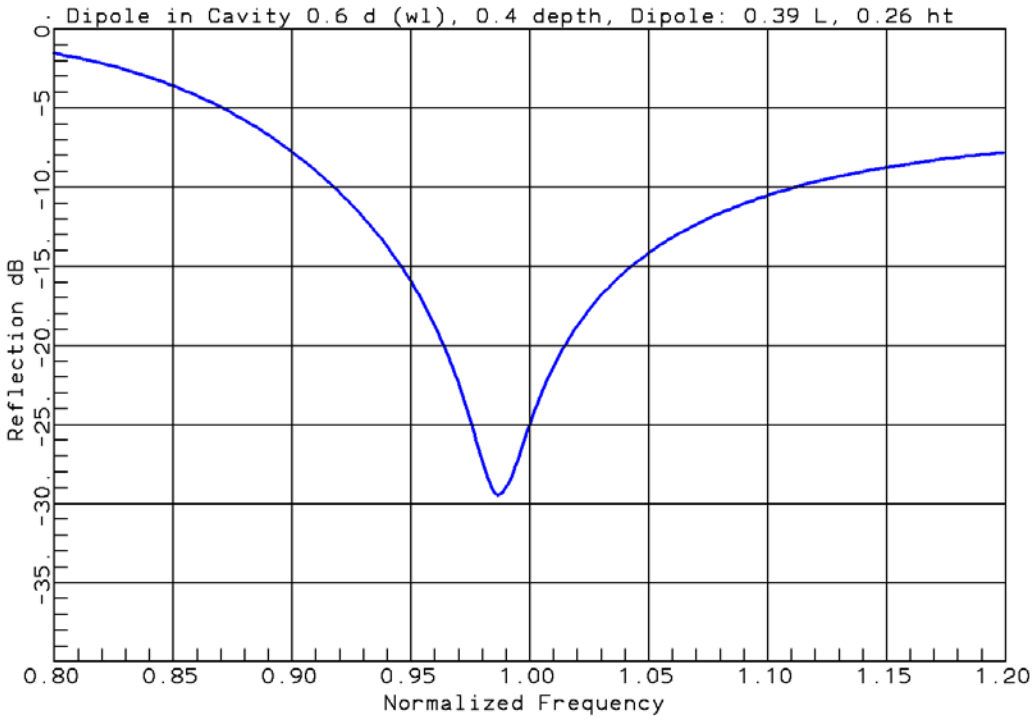

Dipole in Cavity 0.6 d (wl), 0.3 depth, Dipole: 0.400 L, 0.22 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.6λ Diameter Aperture, 0.4λ Depth, Dipole: 0.418λ, Height: 0.214λ

Circular Polarization Blue: φ = 0, Red: φ = 45

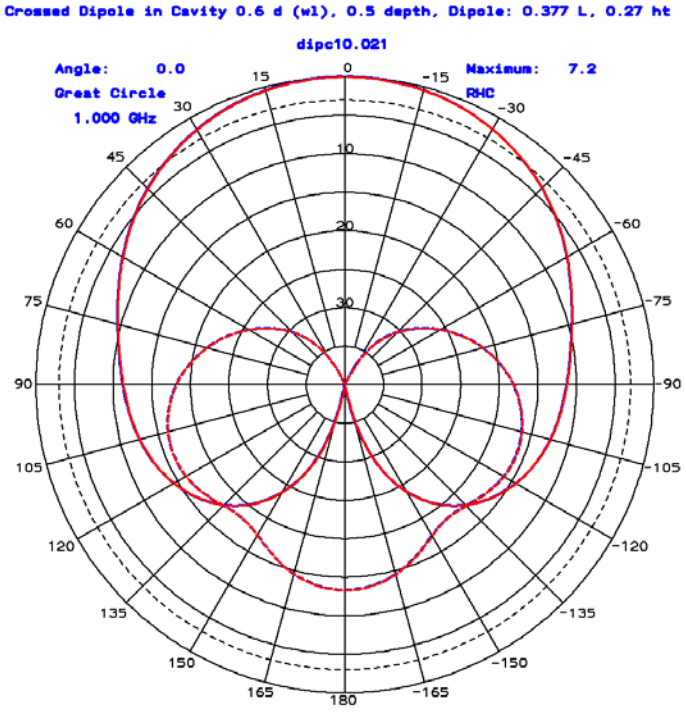


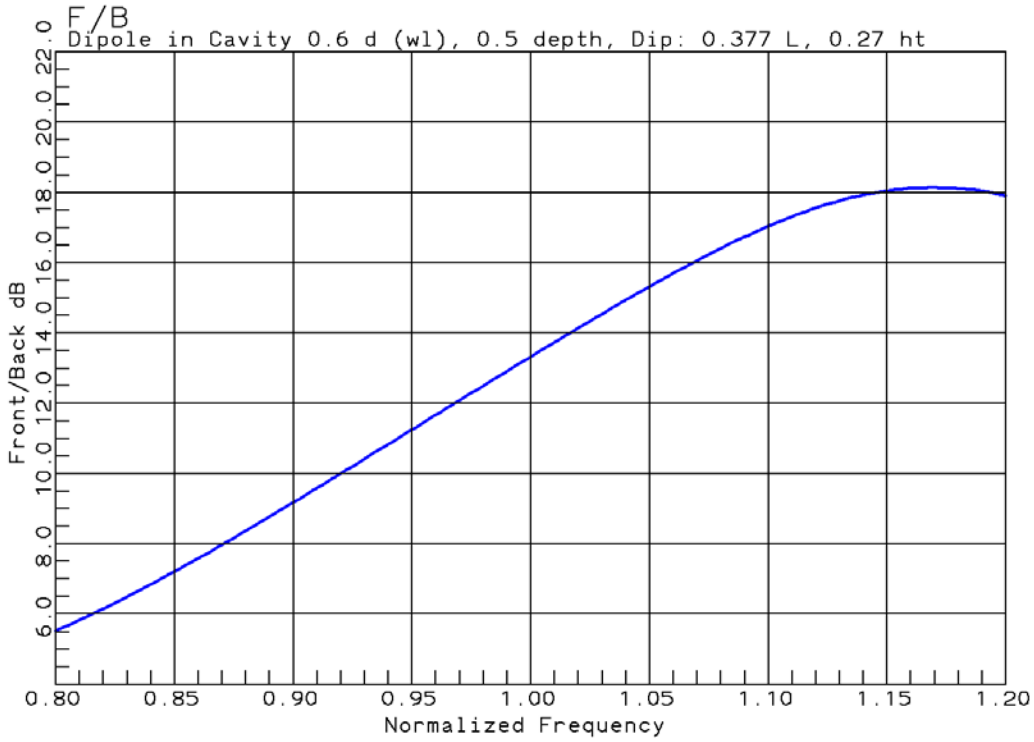


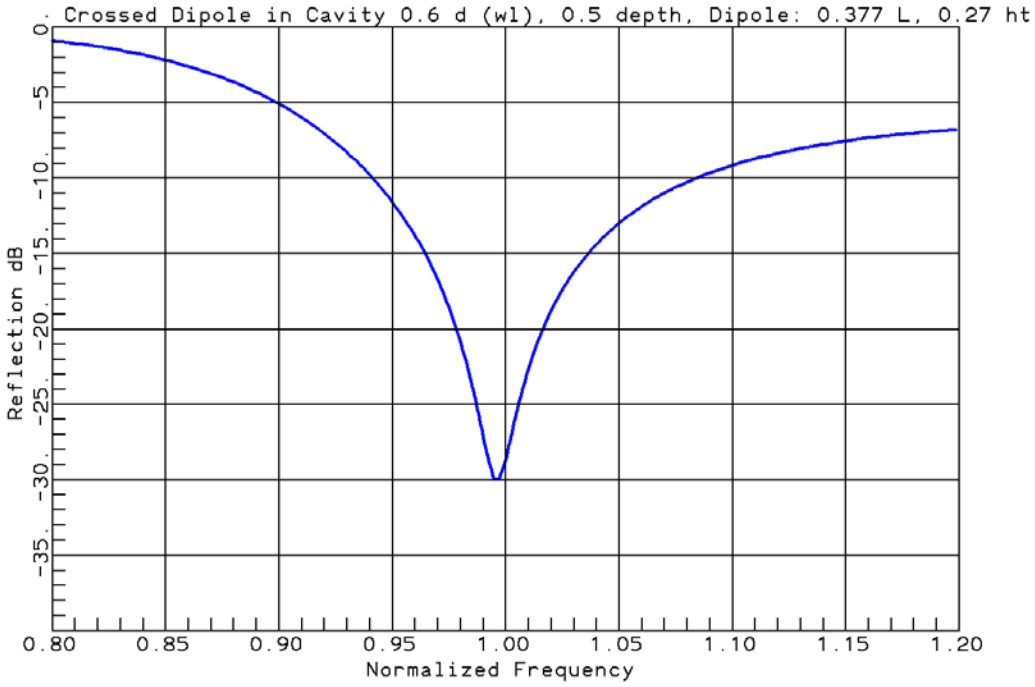

Dipole in Cavity 0.6 d (wl), 0.4 depth, Dipole: 0.39 L, 0.26 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.6λ Diameter Aperture, 0.5λ Depth, Dipole: 0.377λ, Height: 0.270λ

Circular Polarization Blue: φ = 0, Red: φ = 45

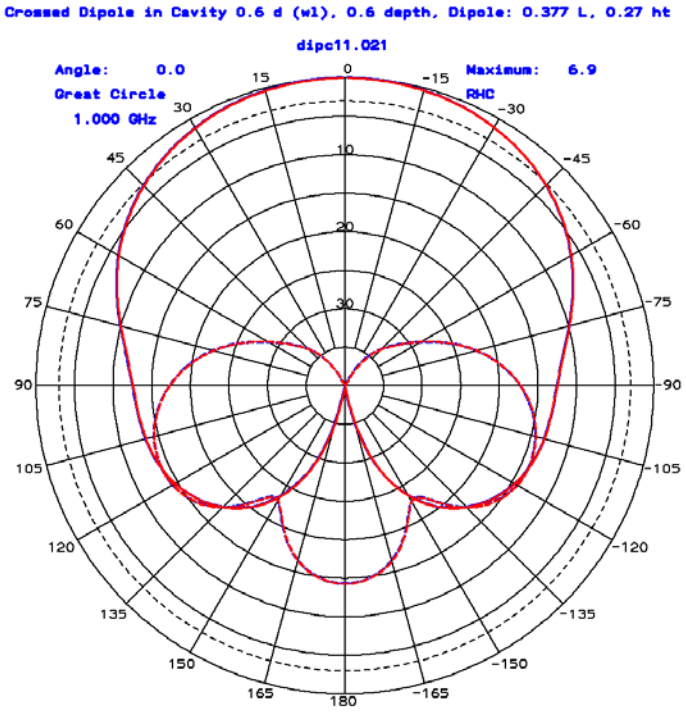


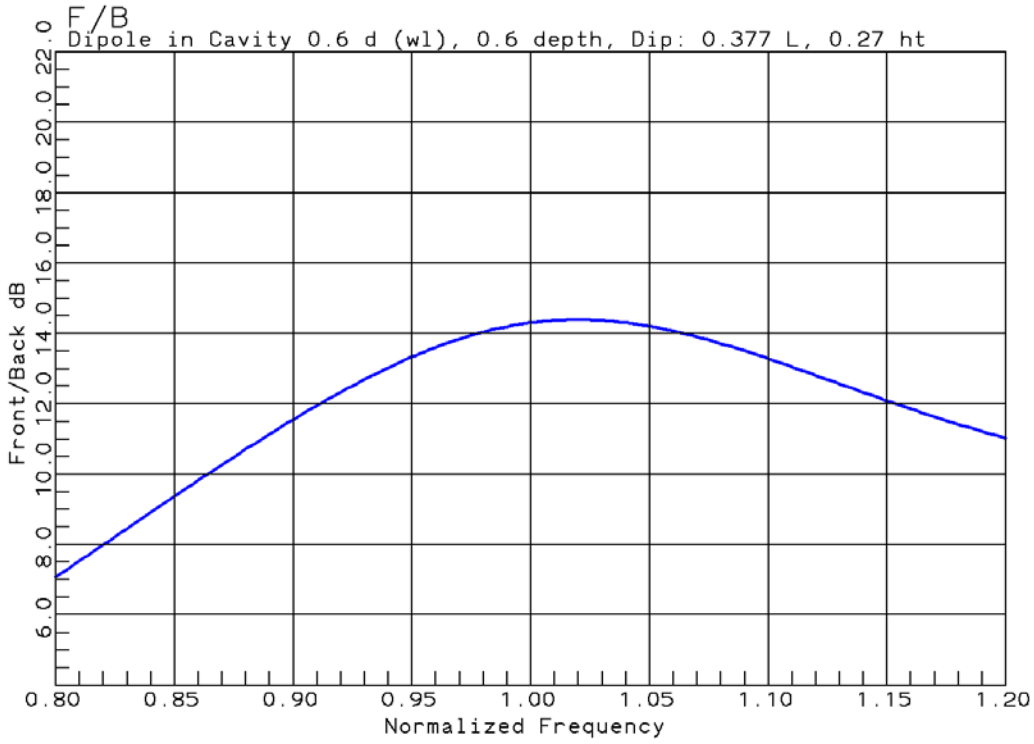


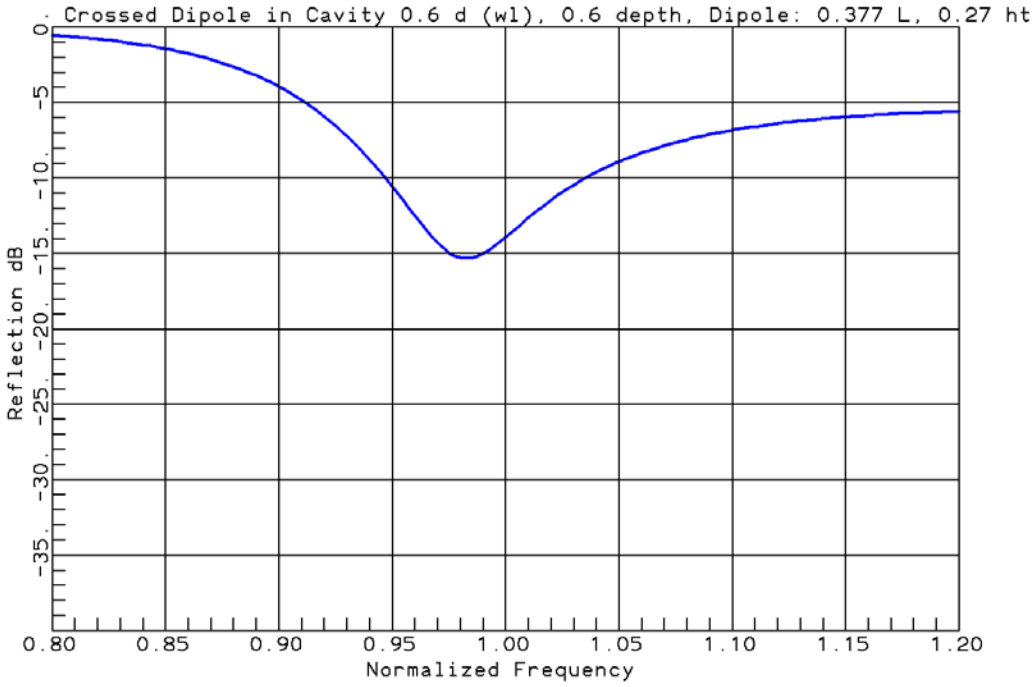

Crossed Dipole in Cavity 0.6 d (wl), 0.5 depth, Dipole: 0.377 L, 0.27 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.6λ Diameter Aperture, 0.6λ Depth, Dipole: 0.377λ, Height: 0.270λ

Circular Polarization Blue: φ = 0, Red: φ = 45

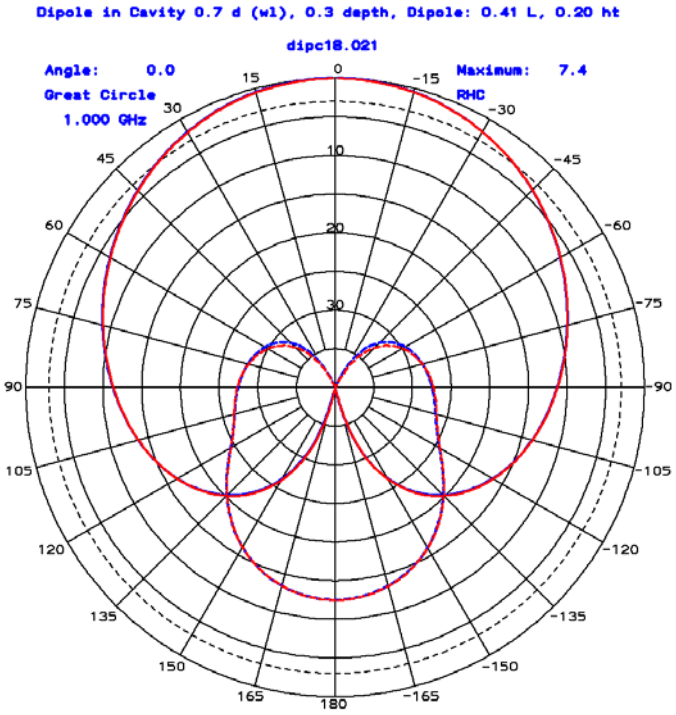




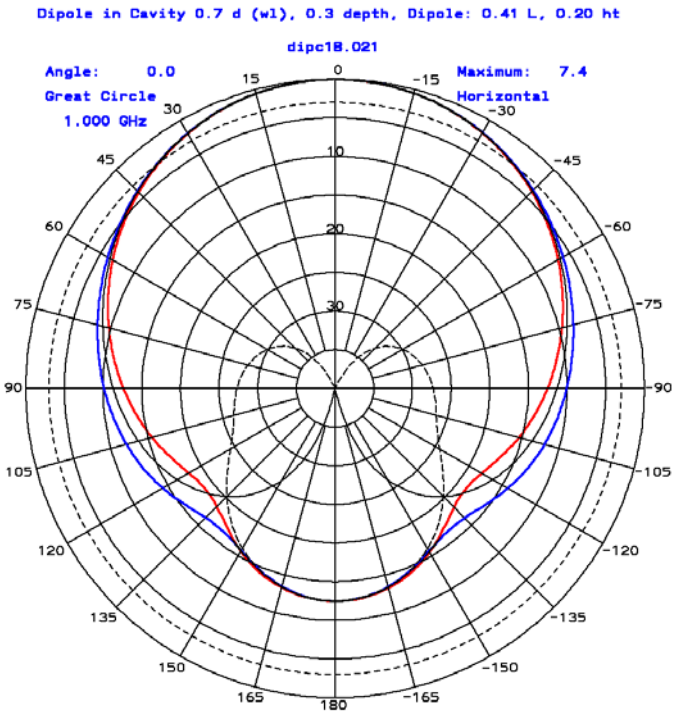

Crossed Dipole in Cavity 0.6 d (wl), 0.6 depth, Dipole: 0.377 L, 0.27 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

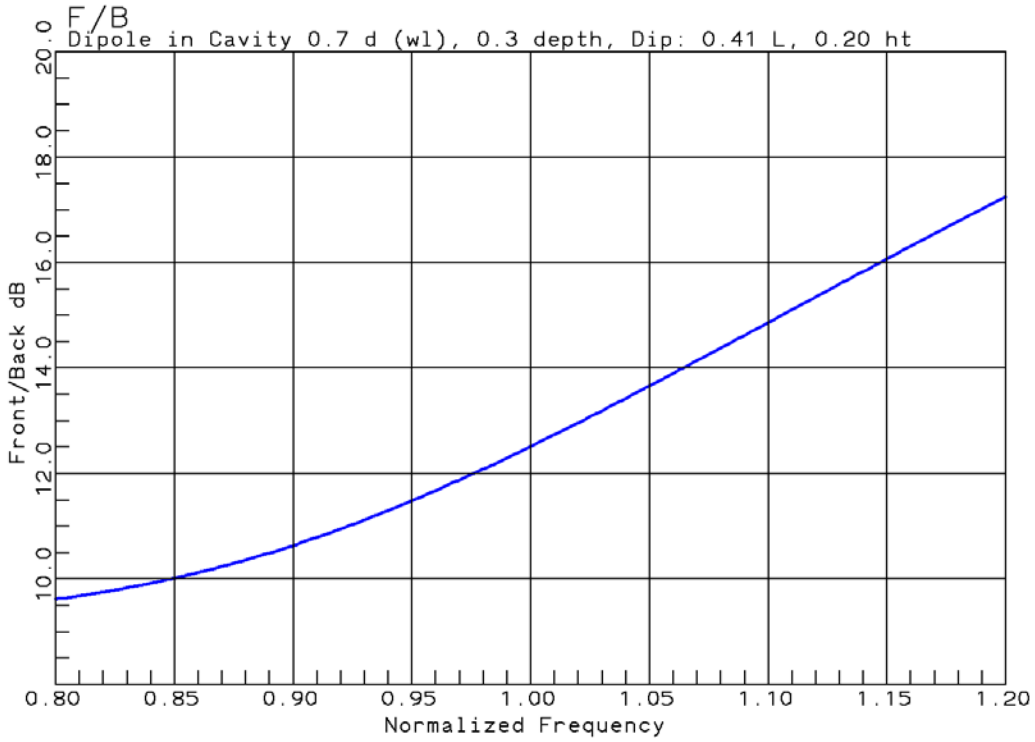
Cavity: 0.7λ Diameter Aperture, 0.3λ Depth, Dipole: 0.410λ, Height: 0.20λ

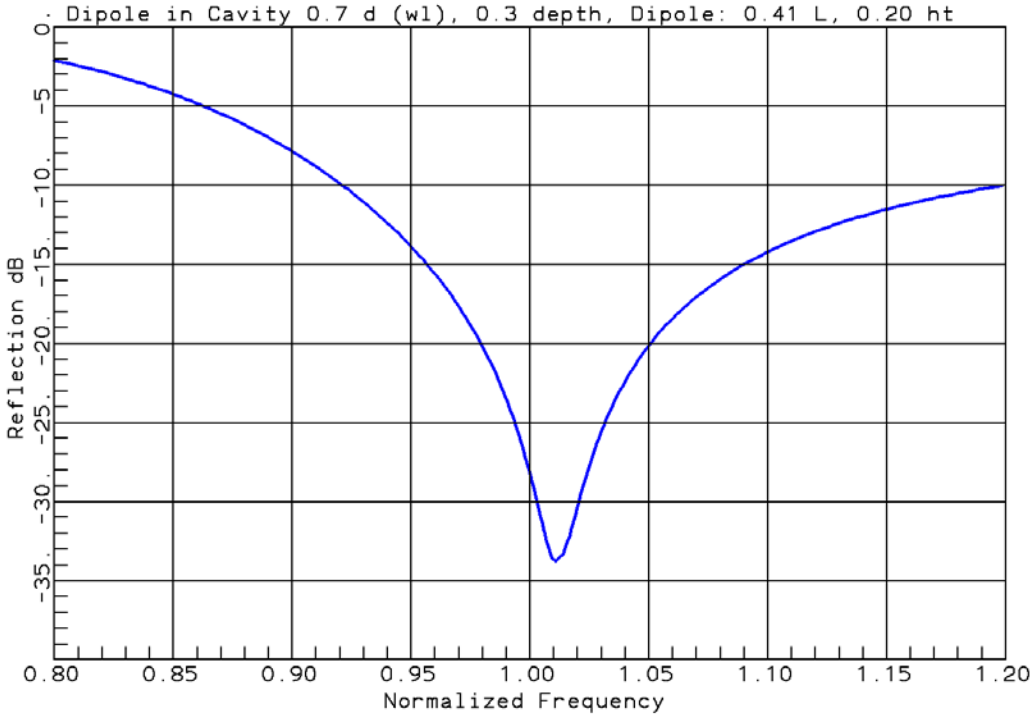
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

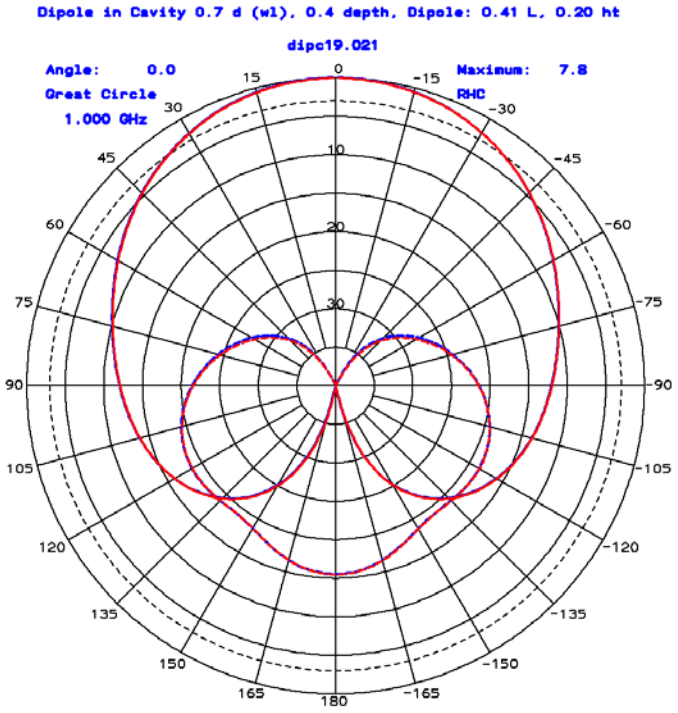


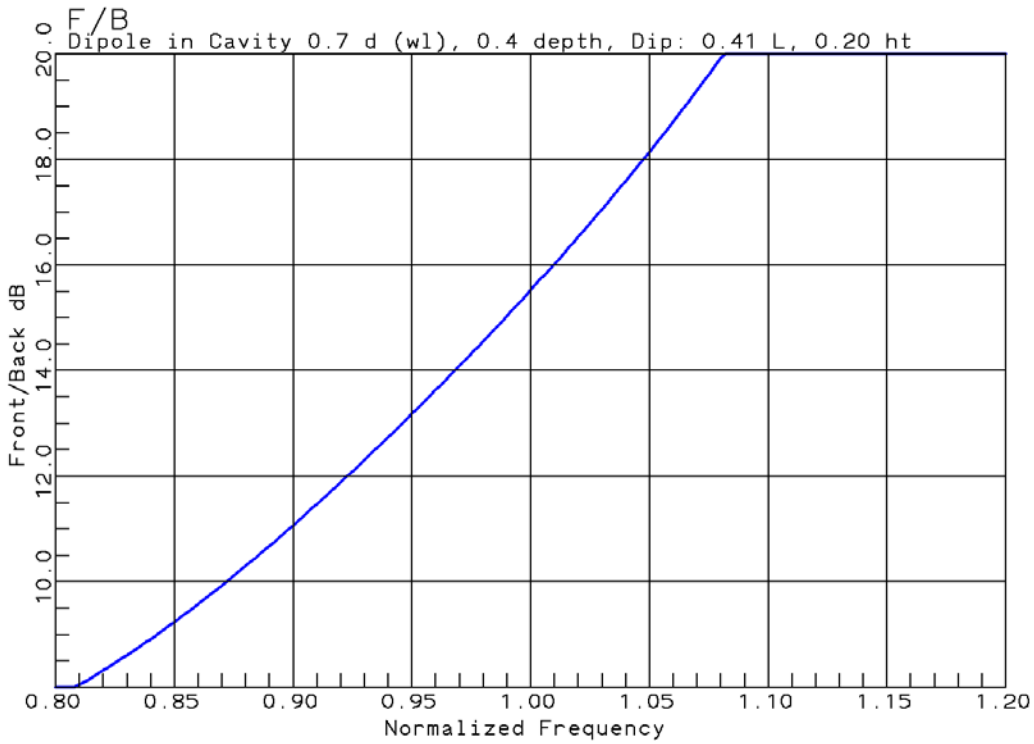

F/B
Dipole in Cavity 0.7 d (wl), 0.3 depth, Dip: 0.41 L, 0.20 ht
Front/Back dB
10.0
12.0
14.0
16.0
18.0
20.0
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

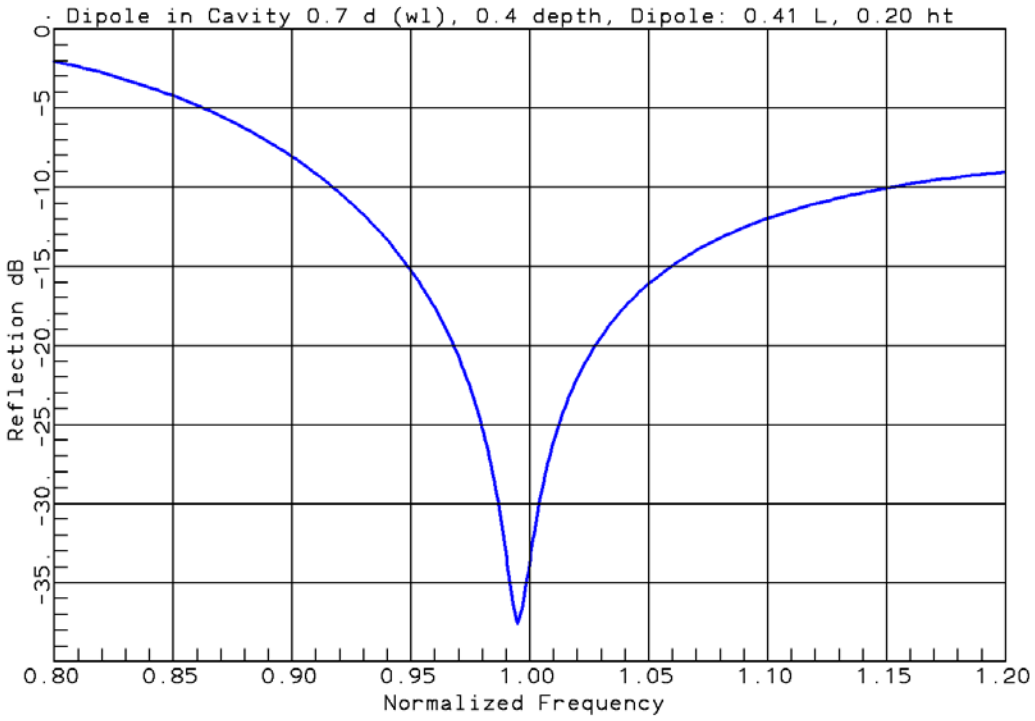

Dipole in Cavity 0.7 d (wl), 0.3 depth, Dipole: 0.41 L, 0.20 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.7λ Diameter Aperture, 0.4λ Depth, Dipole: 0.410λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

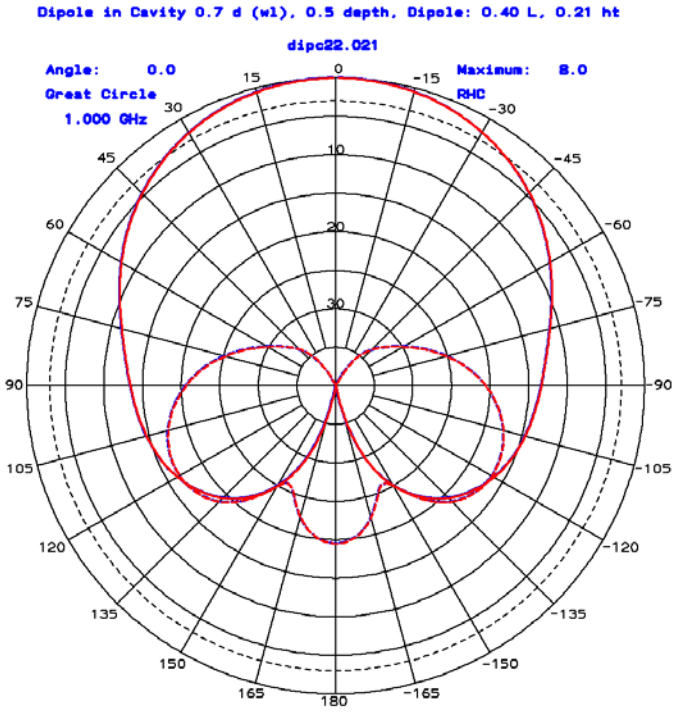




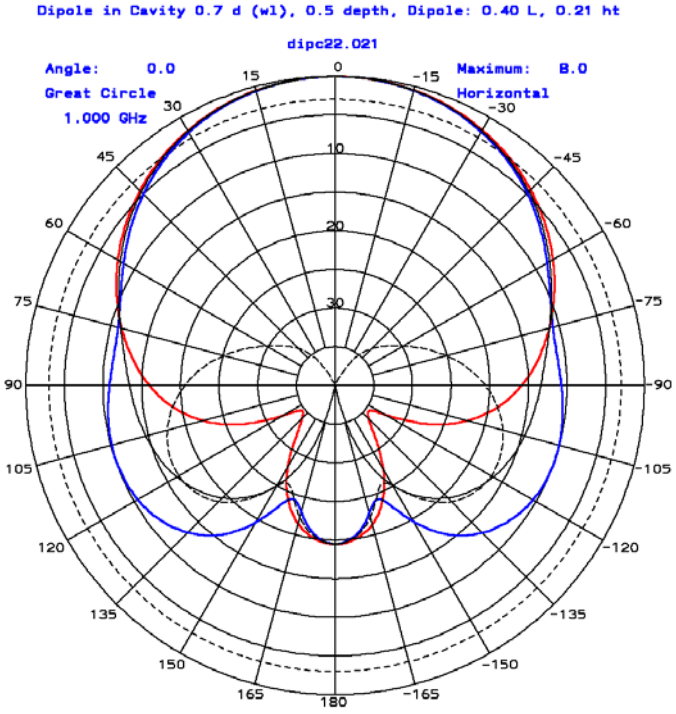

Dipole in Cavity 0.7 d (wl), 0.4 depth, Dipole: 0.41 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

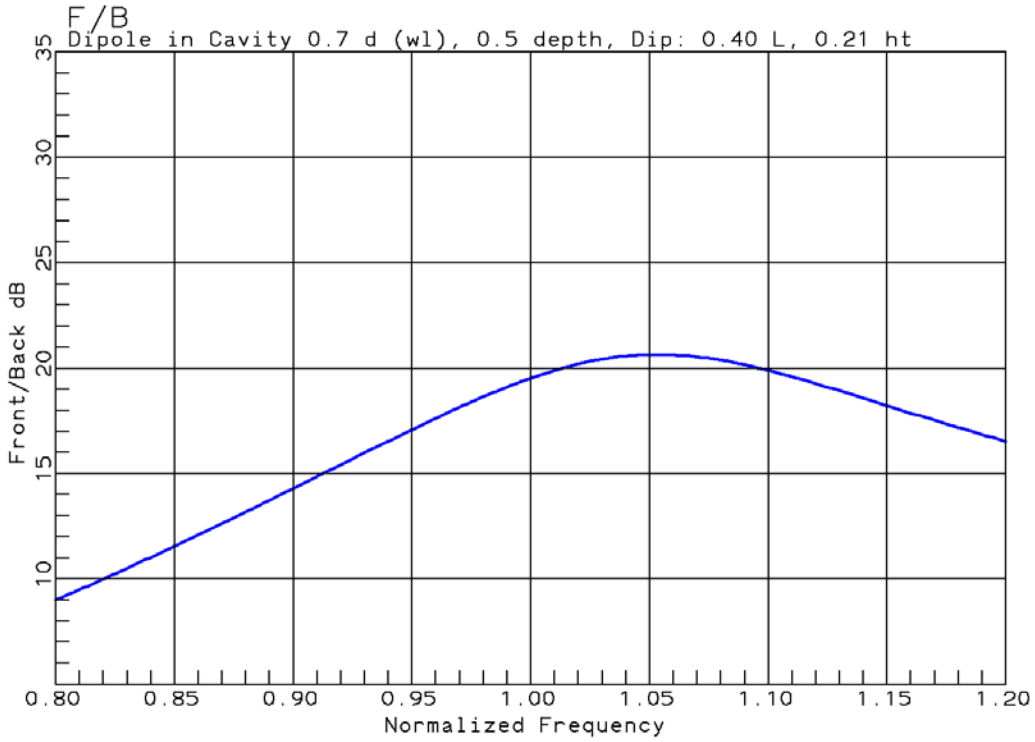
Cavity: 0.7λ Diameter Aperture, 0.5λ Depth, Dipole: 0.40λ, Height: 0.21λ

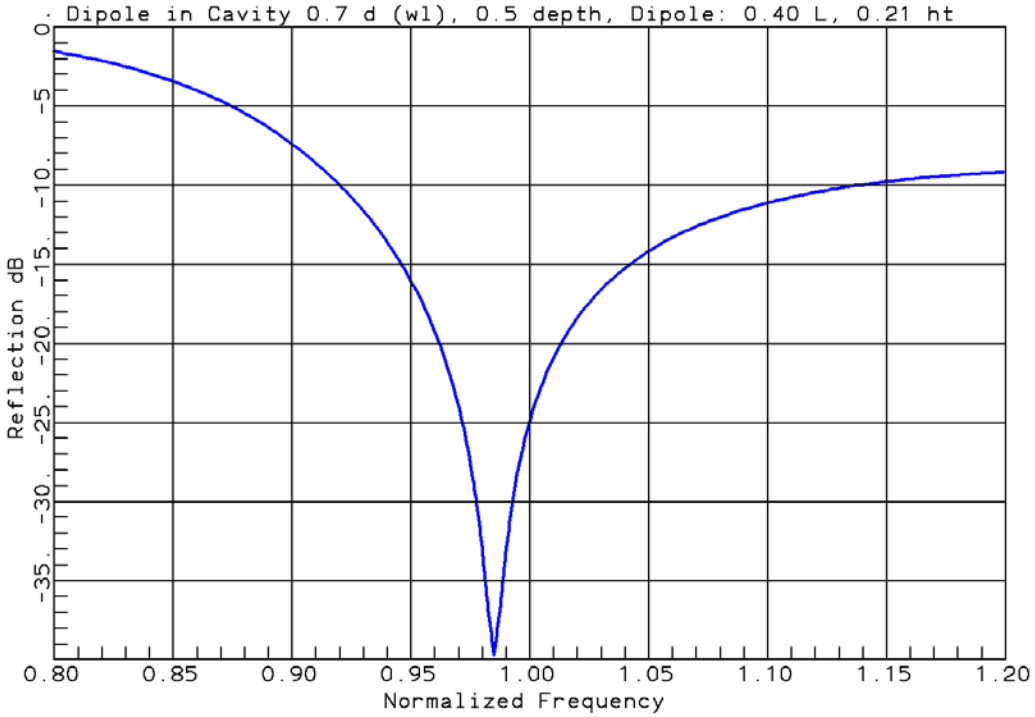
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

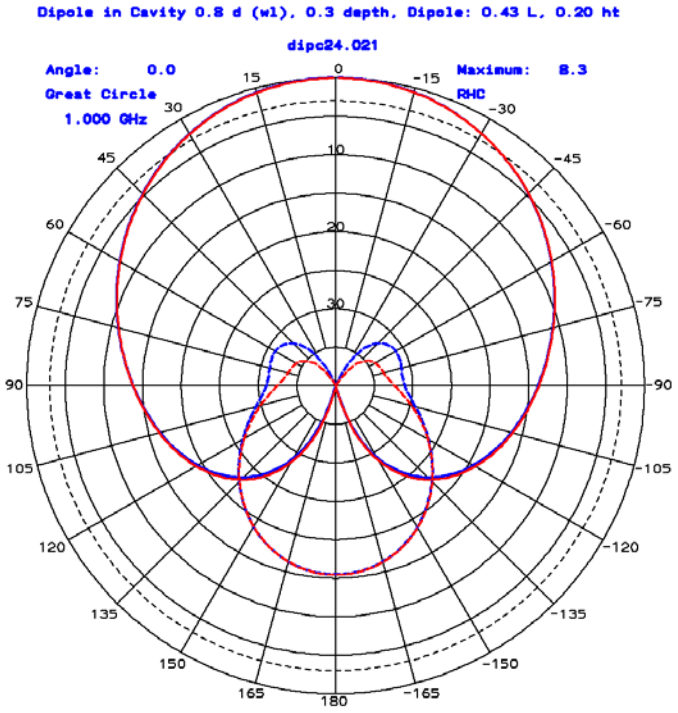


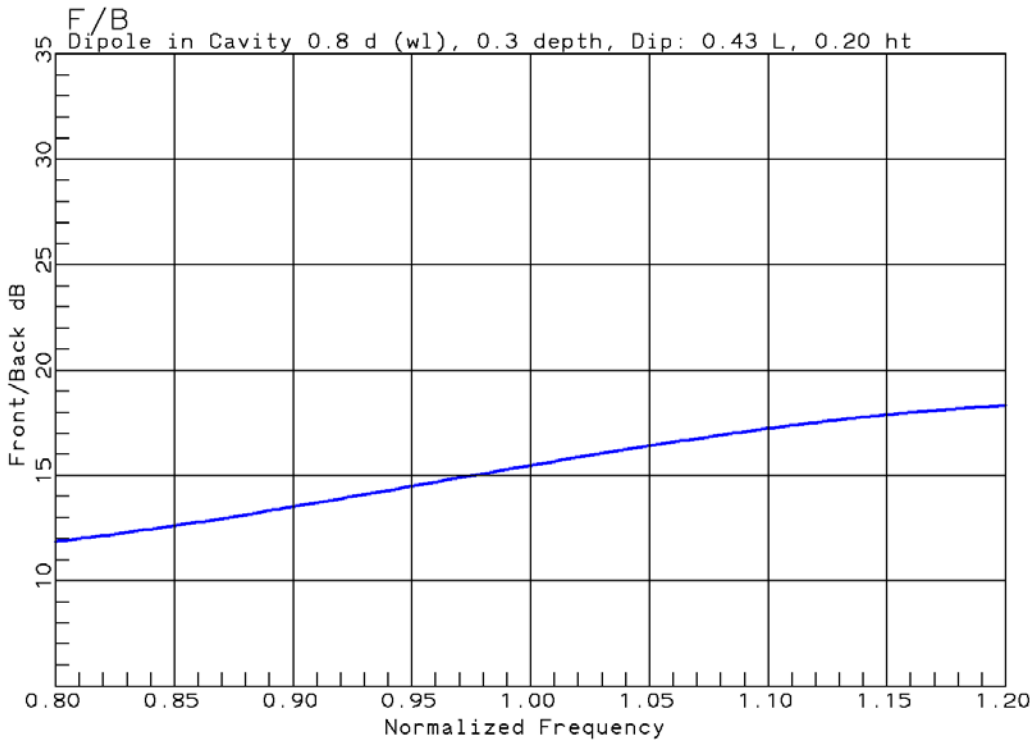

F/B
Dipole in Cavity 0.7 d (wl), 0.5 depth, Dip: 0.40 L, 0.21 ht
Front/Back dB
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

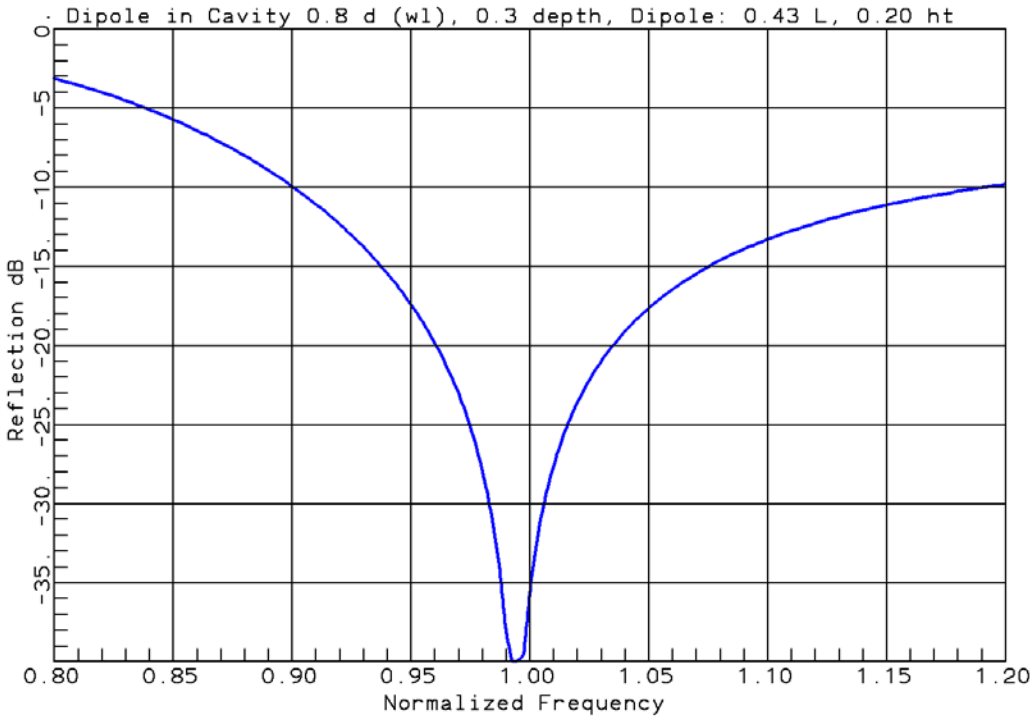

Dipole in Cavity 0.7 d (wl), 0.5 depth, Dipole: 0.40 L, 0.21 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.8λ Diameter Aperture, 0.3λ Depth, Dipole: 0.43λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

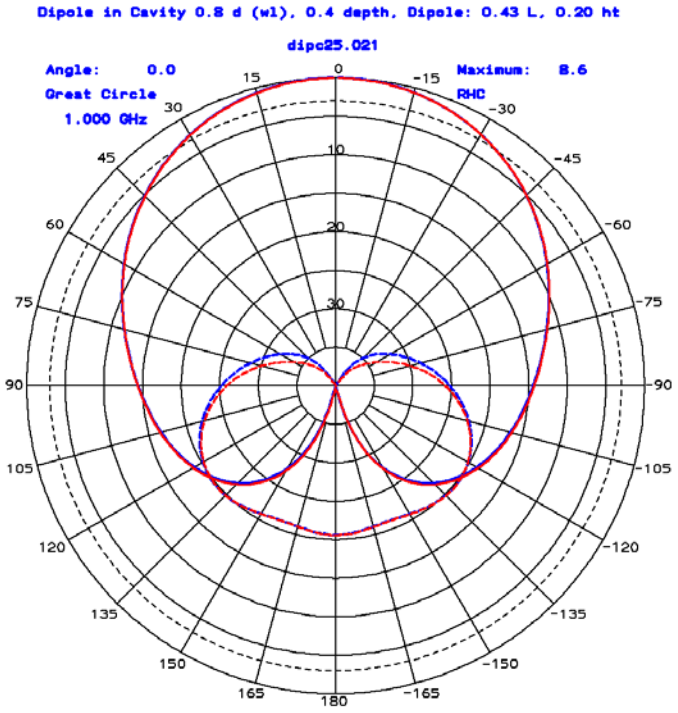


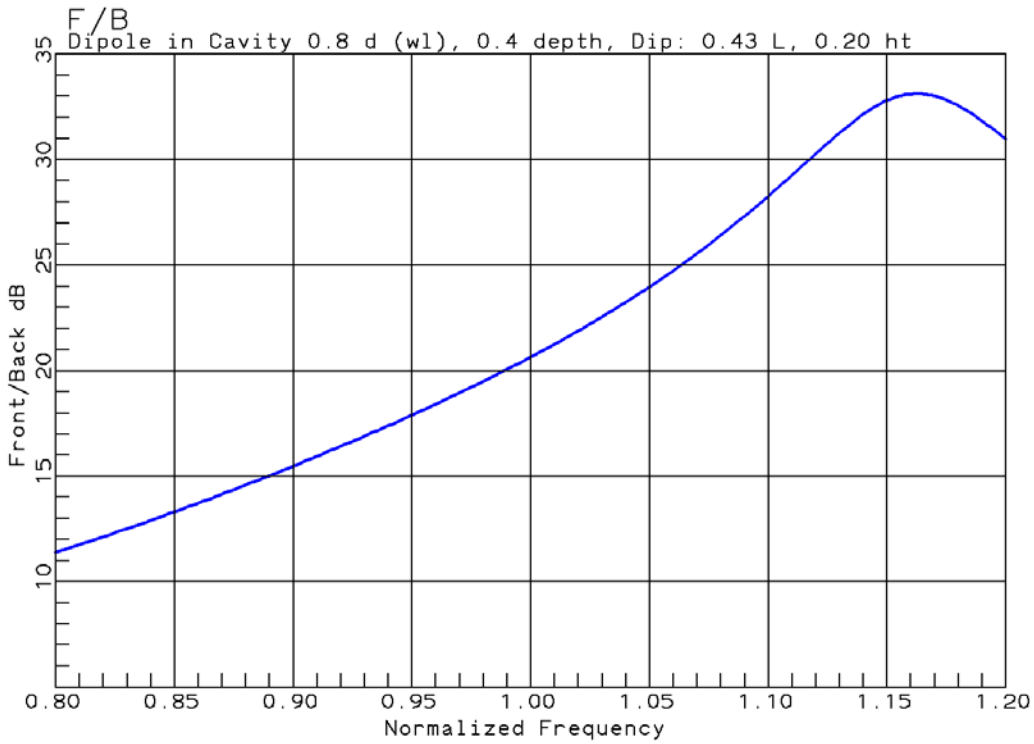


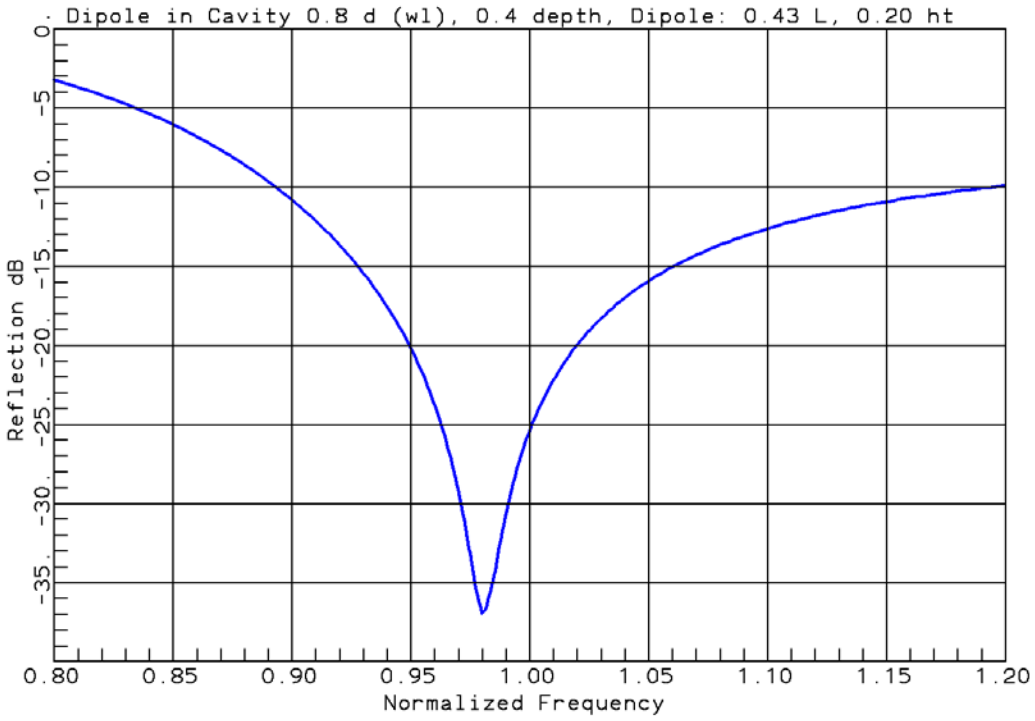

Dipole in Cavity 0.8 d (wl), 0.3 depth, Dipole: 0.43 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.8λ Diameter Aperture, 0.4λ Depth, Dipole: 0.43λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

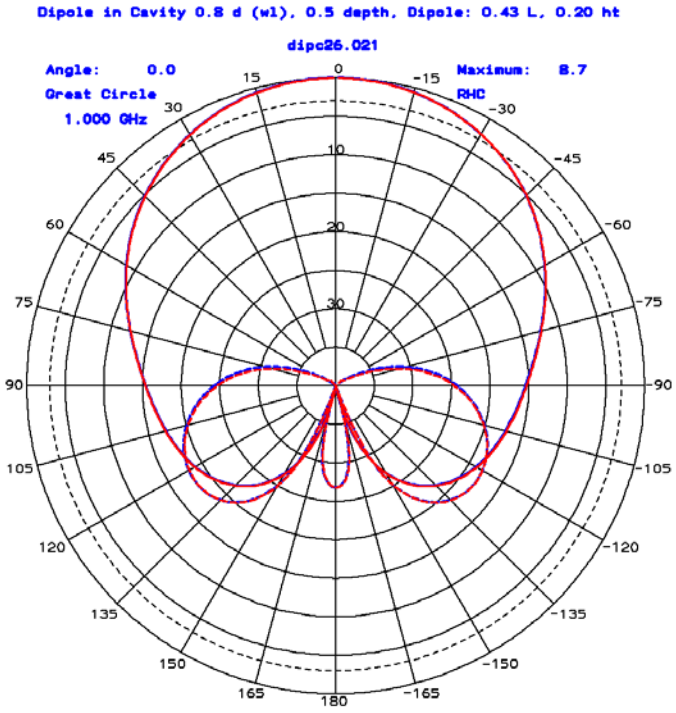




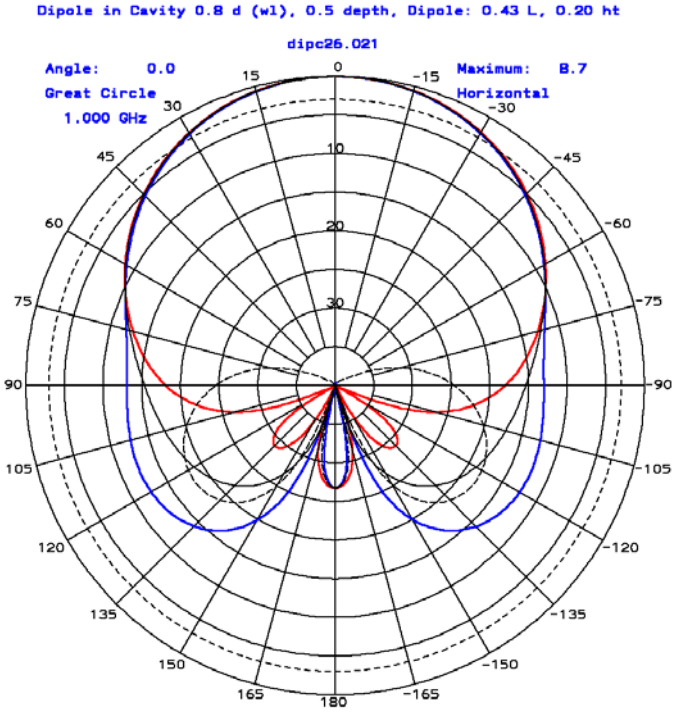

Dipole in Cavity 0.8 d (wl), 0.4 depth, Dipole: 0.43 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

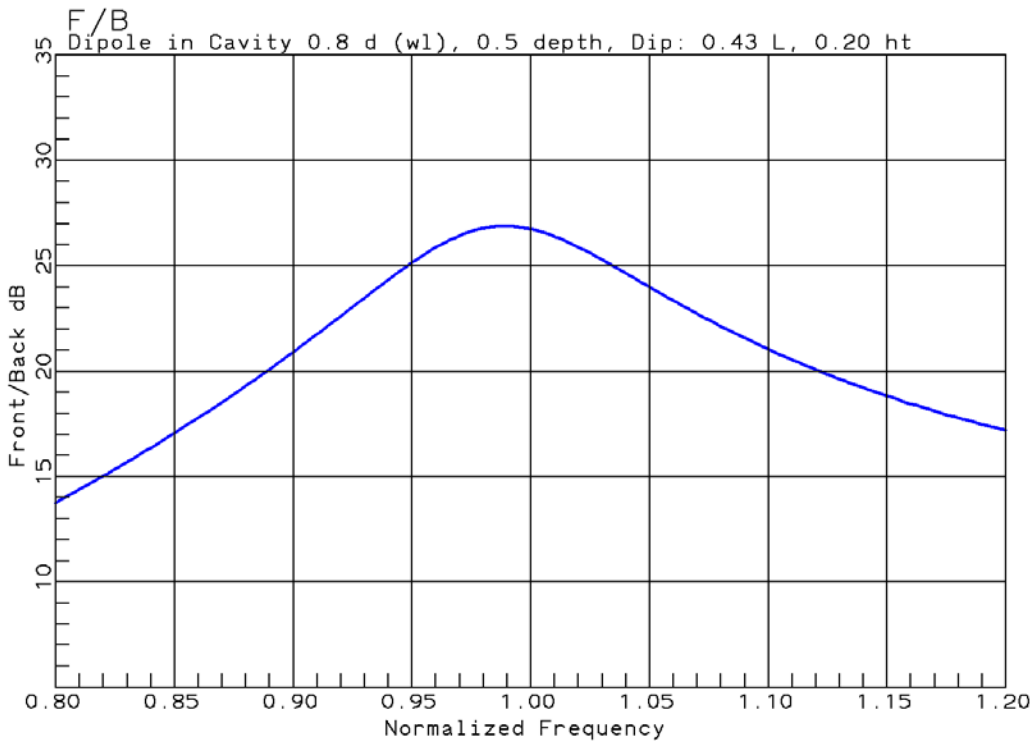
Cavity: 0.8λ Diameter Aperture, 0.5λ Depth, Dipole: 0.43λ, Height: 0.20λ

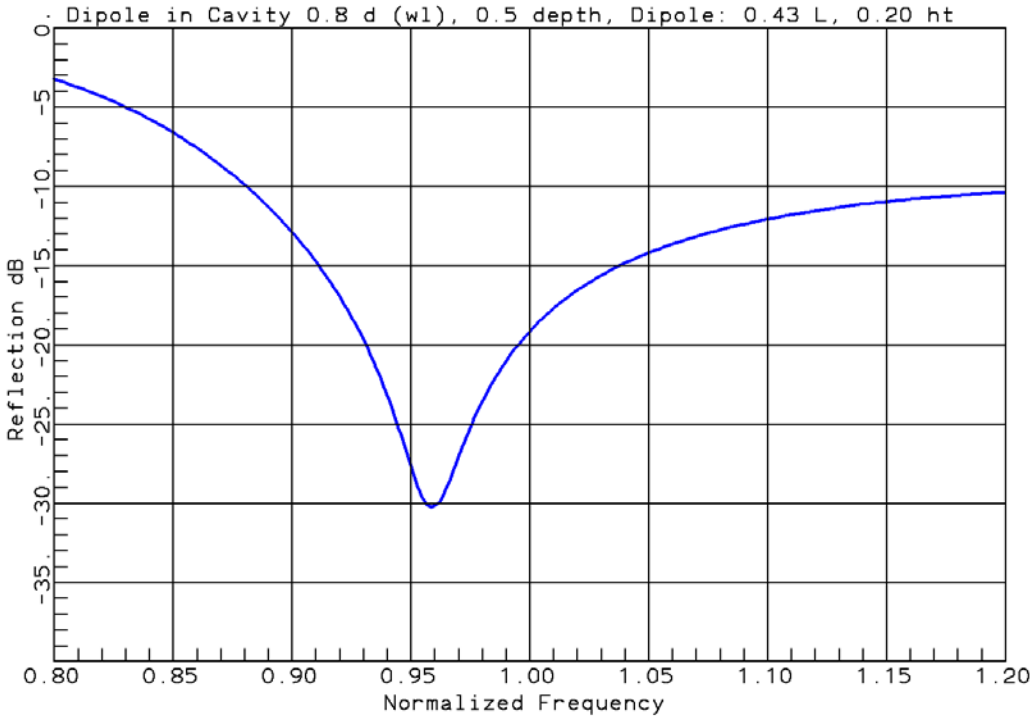
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

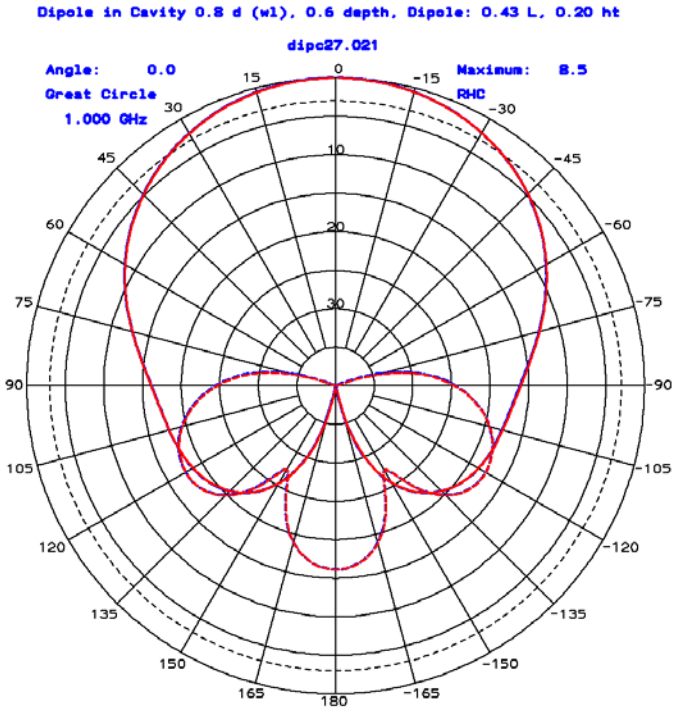


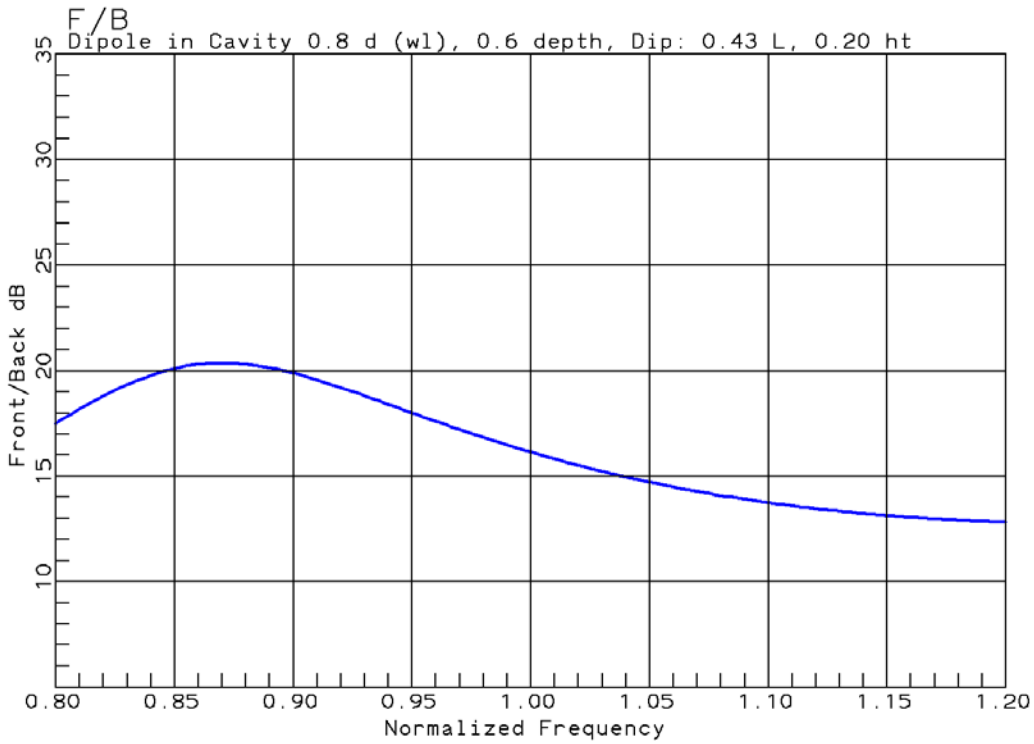

F/B
Dipole in Cavity 0.8 d (wl), 0.5 depth, Dip: 0.43 L, 0.20 ht
Front/Back dB
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

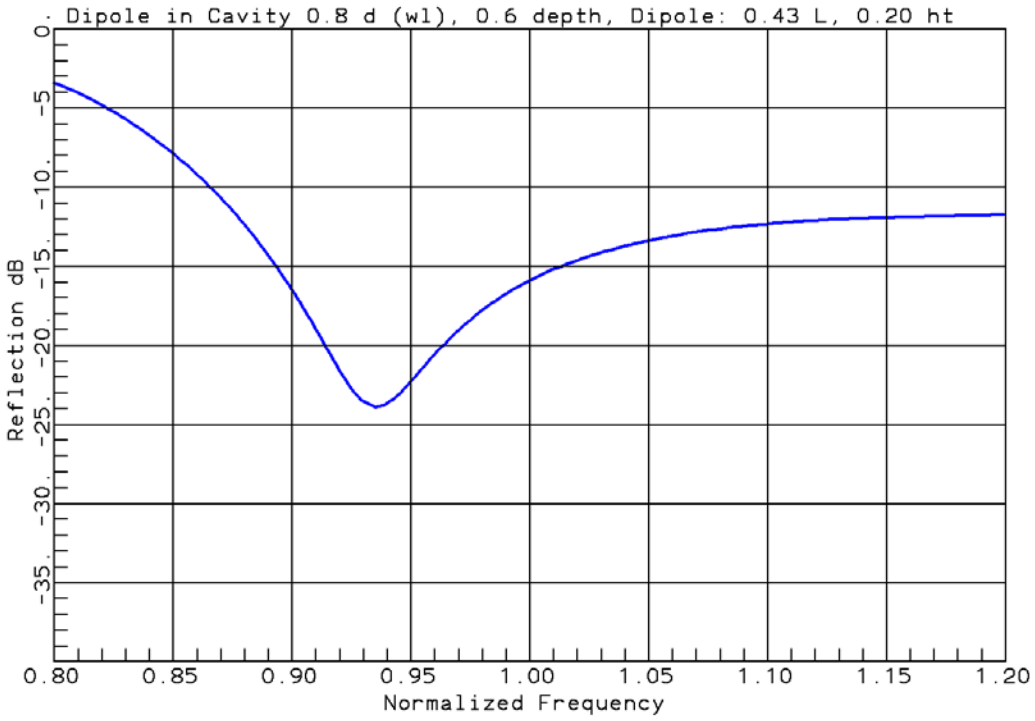

Dipole in Cavity 0.8 d (wl), 0.5 depth, Dipole: 0.43 L, 0.20 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.8λ Diameter Aperture, 0.6λ Depth, Dipole: 0.43λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

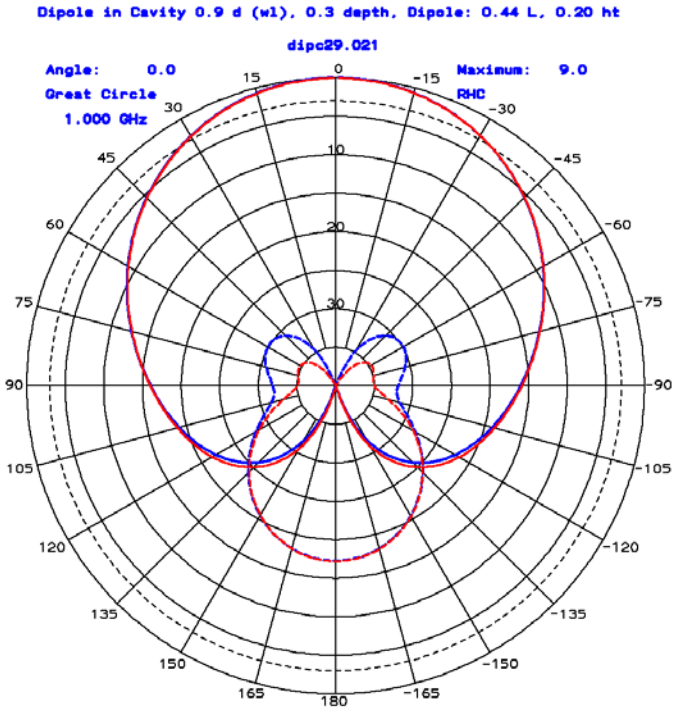


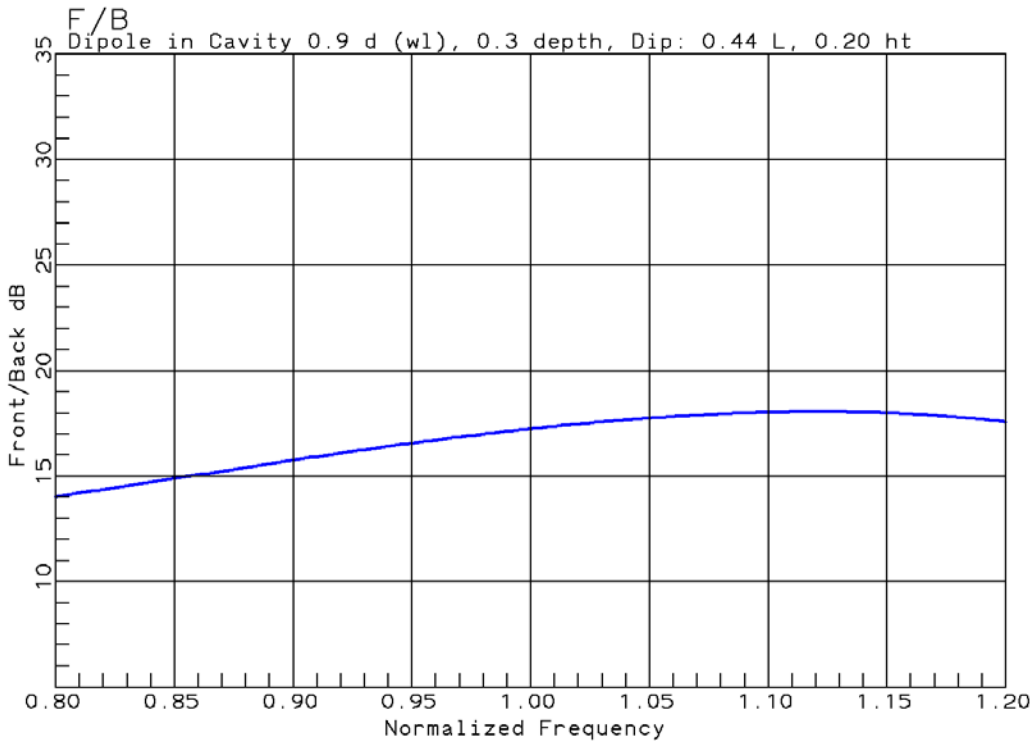


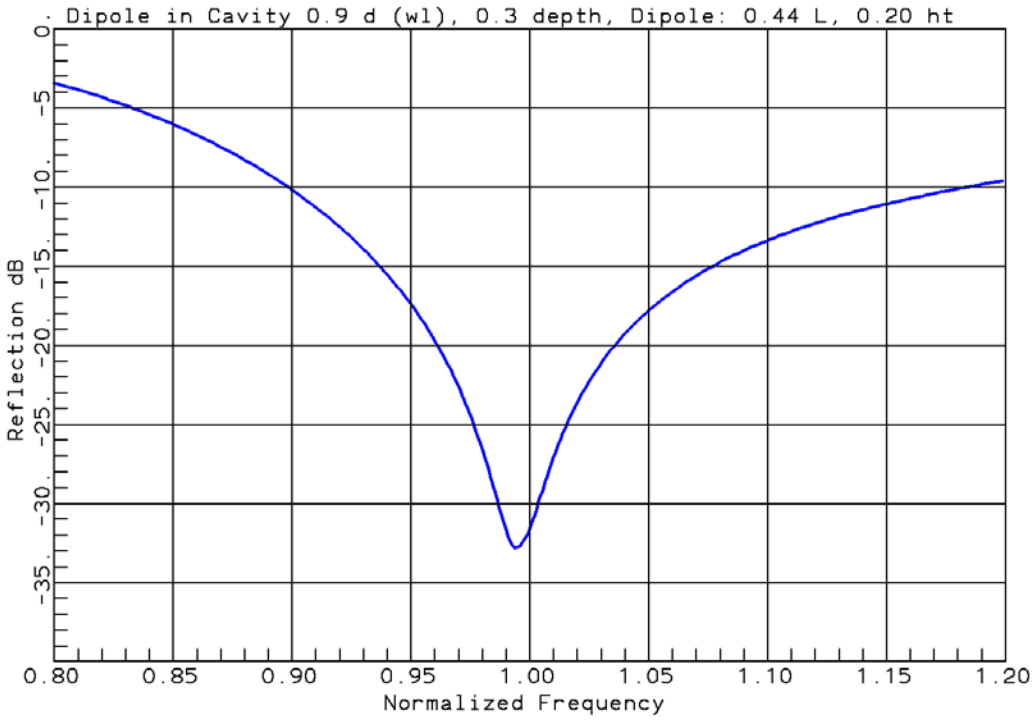

Dipole in Cavity 0.8 d (wl), 0.6 depth, Dipole: 0.43 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.9λ Diameter Aperture, 0.3λ Depth, Dipole: 0.44λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

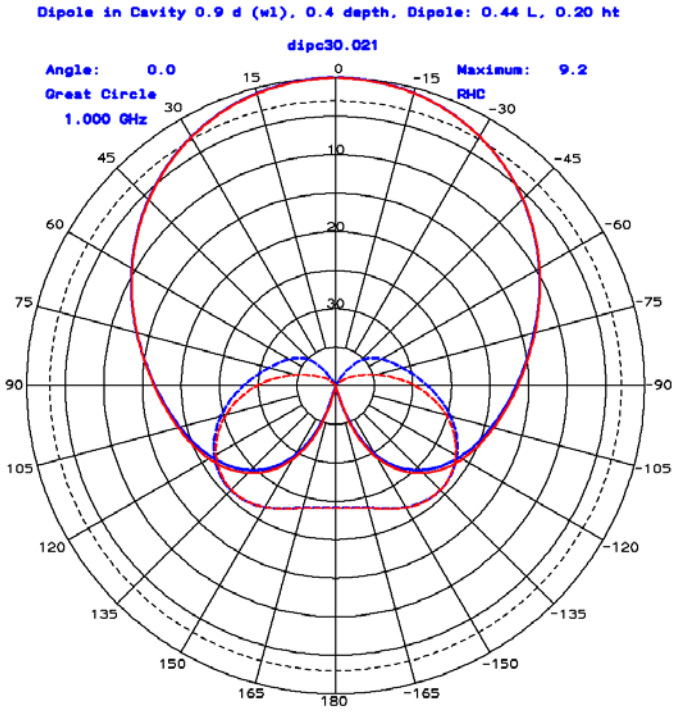


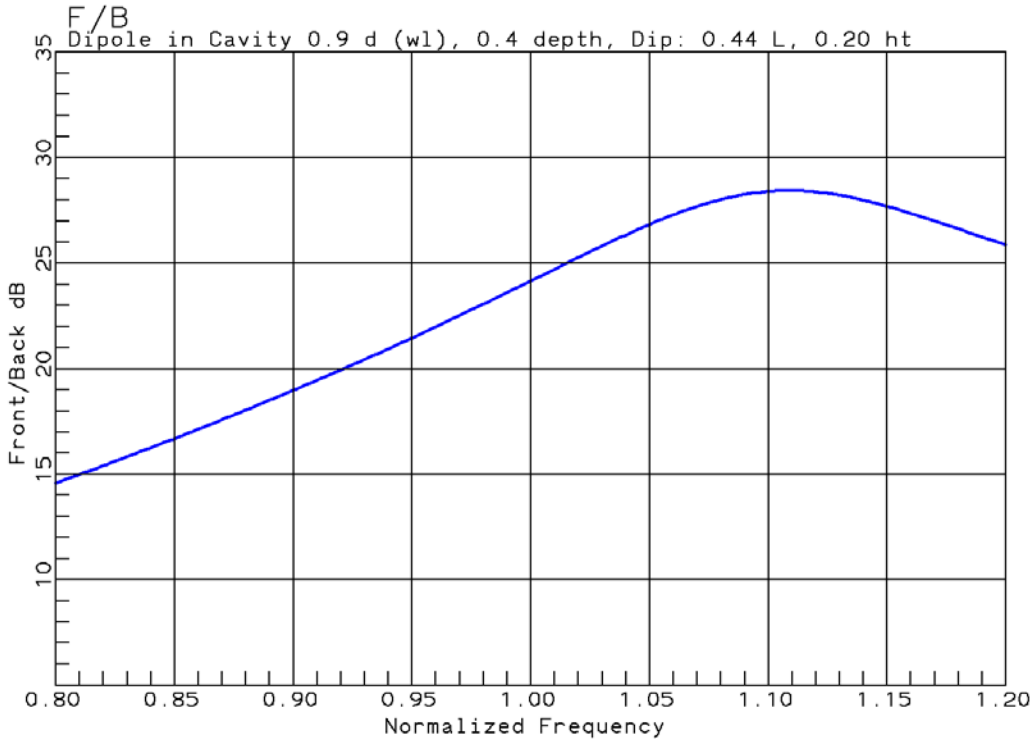


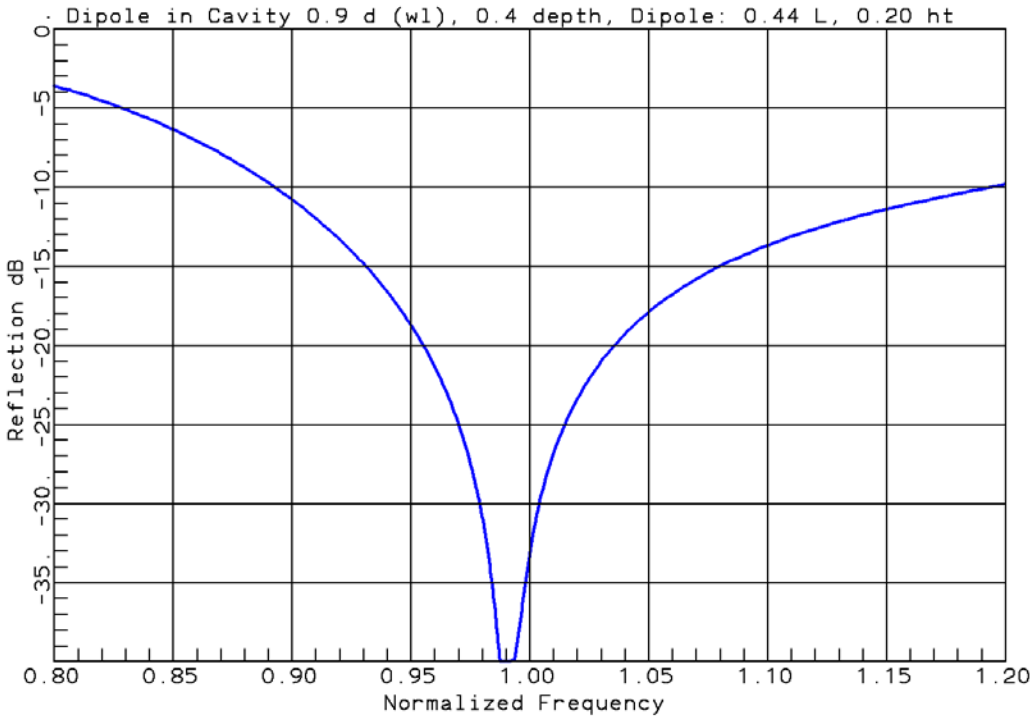

Dipole in Cavity 0.9 d (wl), 0.3 depth, Dipole: 0.44 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.9λ Diameter Aperture, 0.4λ Depth, Dipole: 0.44λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

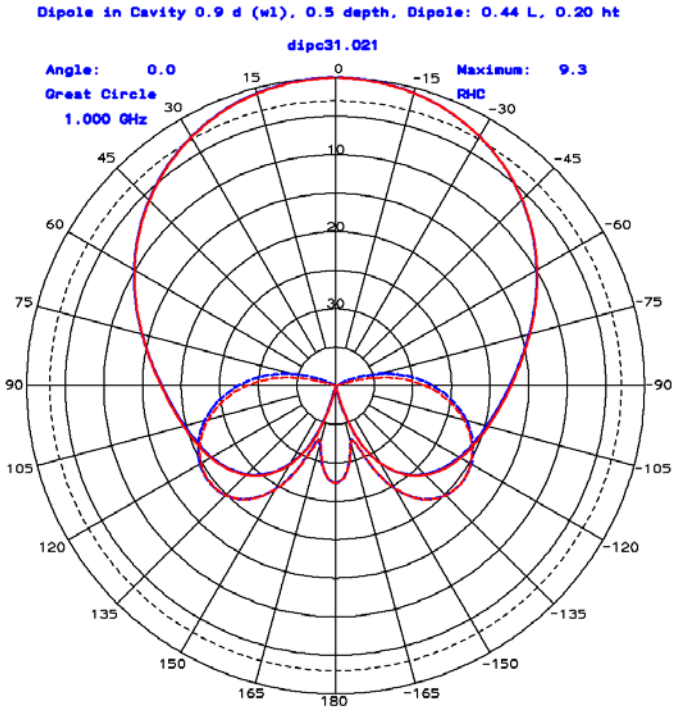




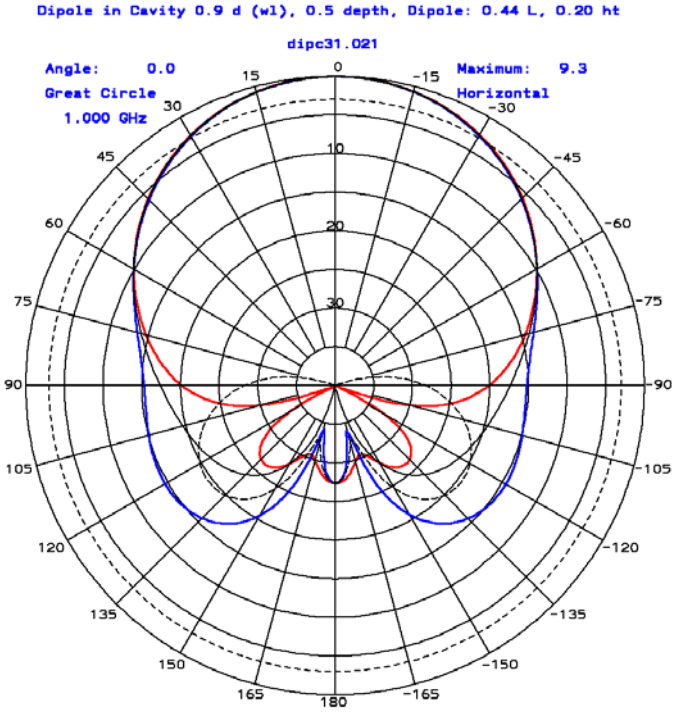

Dipole in Cavity 0.9 d (wl), 0.4 depth, Dipole: 0.44 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

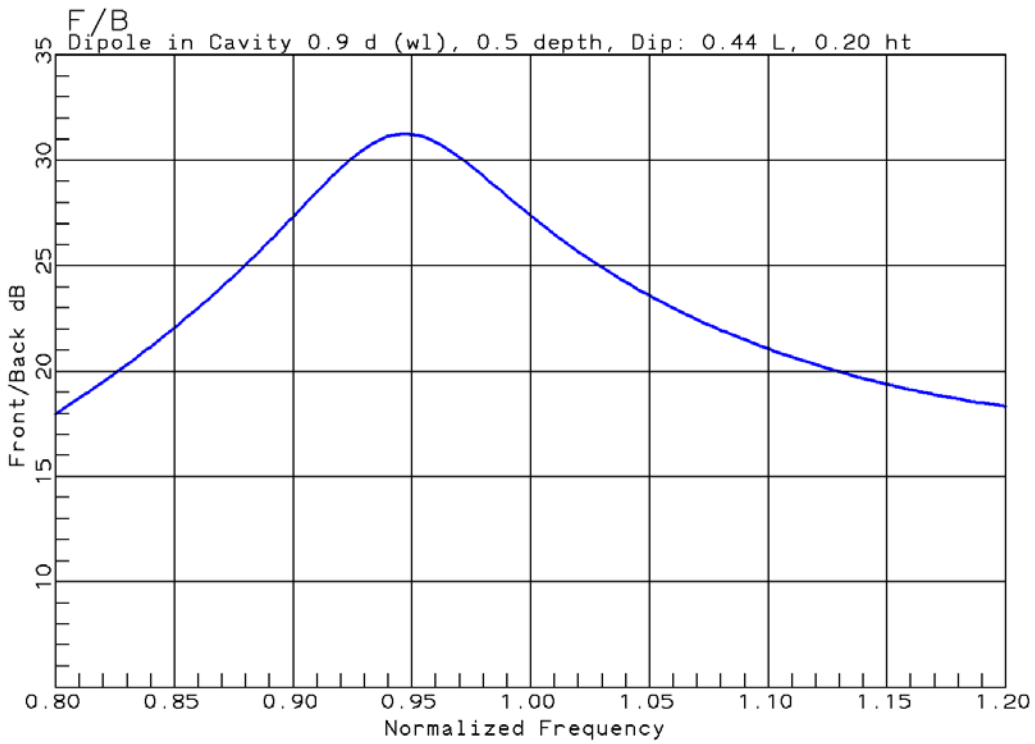
Cavity: 0.9λ Diameter Aperture, 0.5λ Depth, Dipole: 0.44λ, Height: 0.20λ

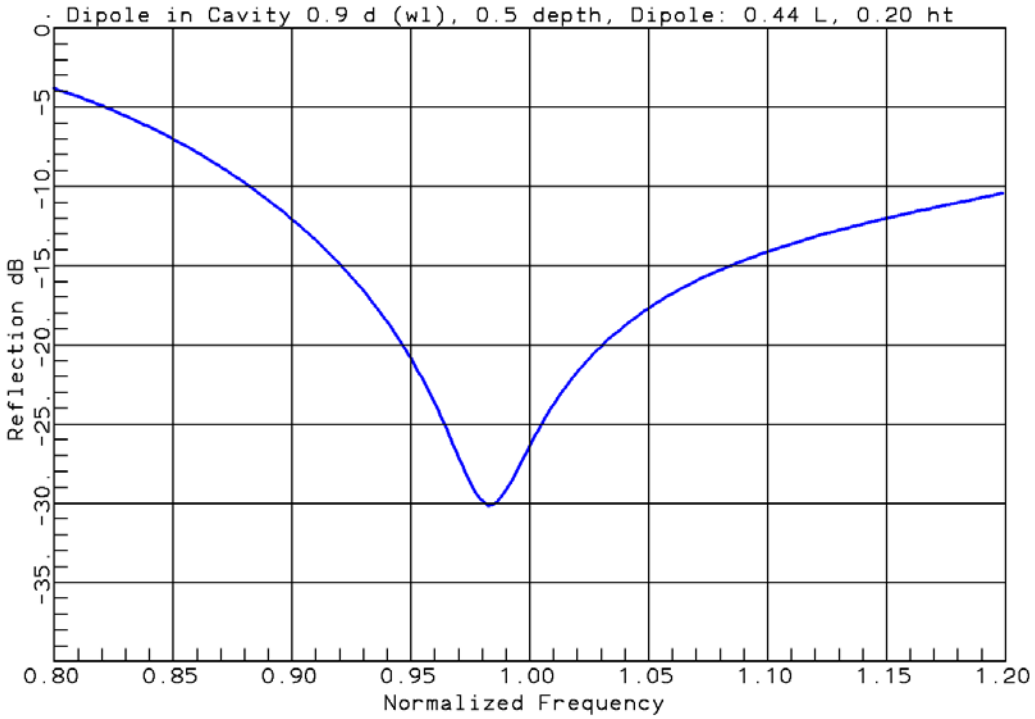
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

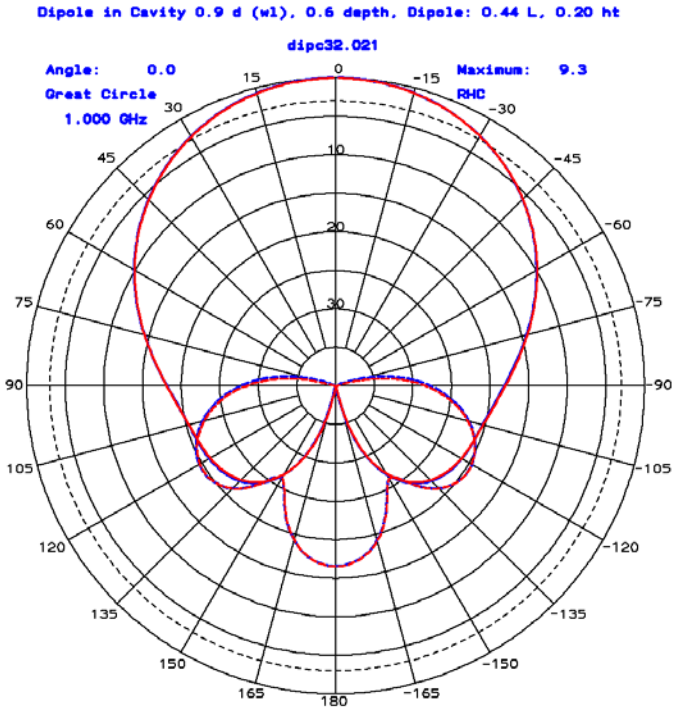


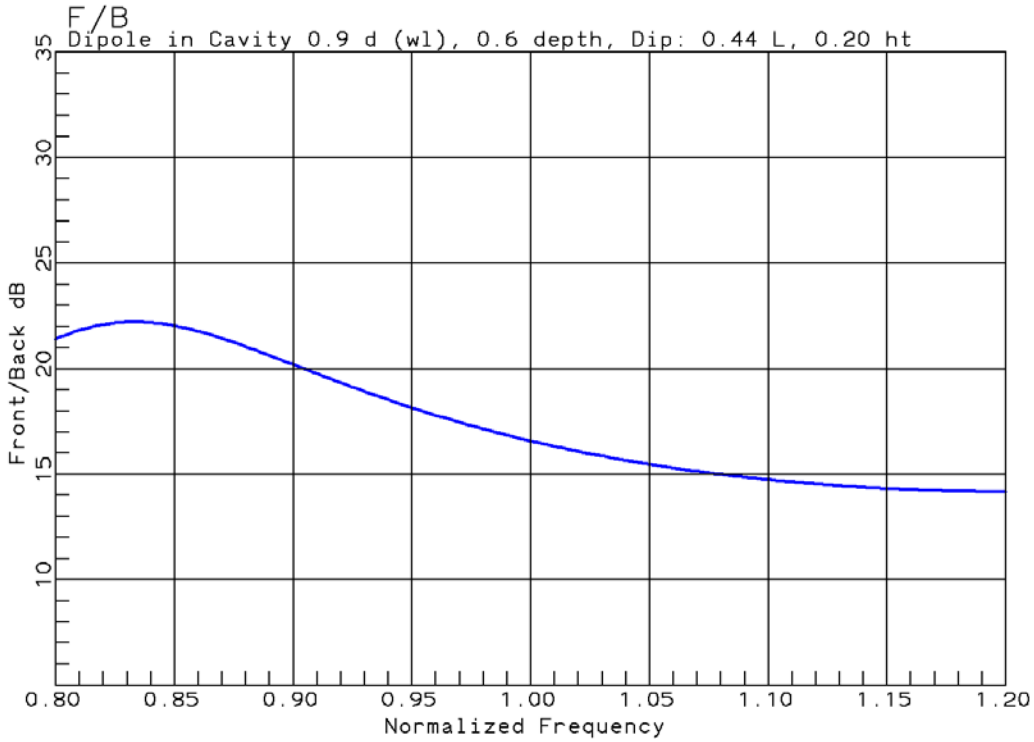

F/B
Dipole in Cavity 0.9 d (wl), 0.5 depth, Dip: 0.44 L, 0.20 ht
Front/Back dB
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

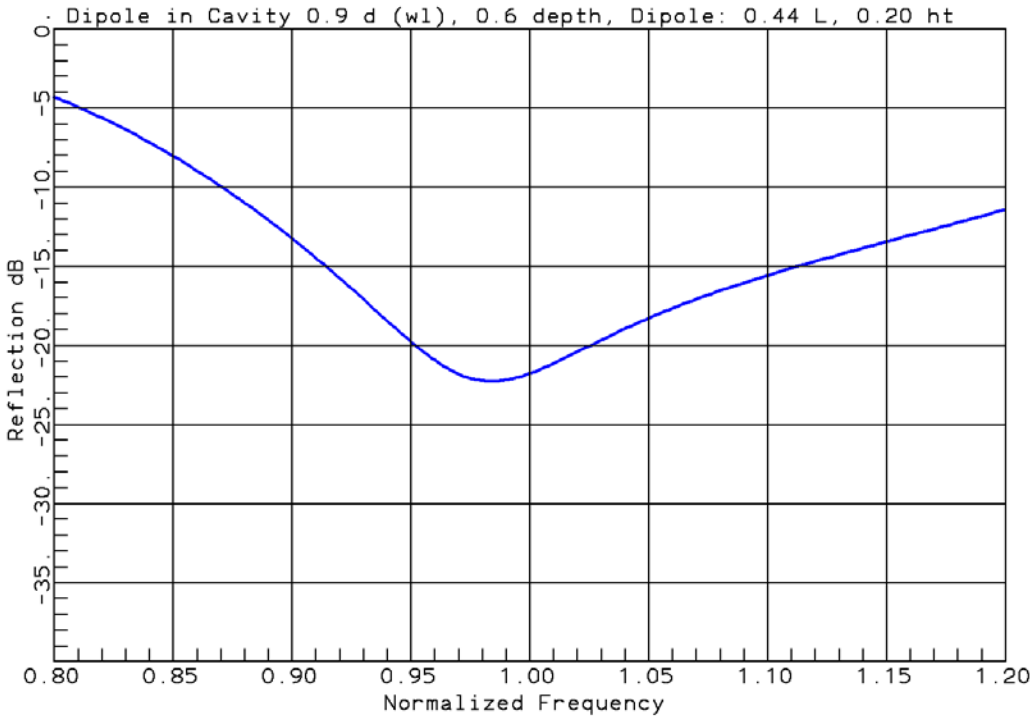

Dipole in Cavity 0.9 d (wl), 0.5 depth, Dipole: 0.44 L, 0.20 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 0.9λ Diameter Aperture, 0.6λ Depth, Dipole: 0.44λ, Height: 0.20λ

Circular Polarization Blue: φ = 0, Red: φ = 45

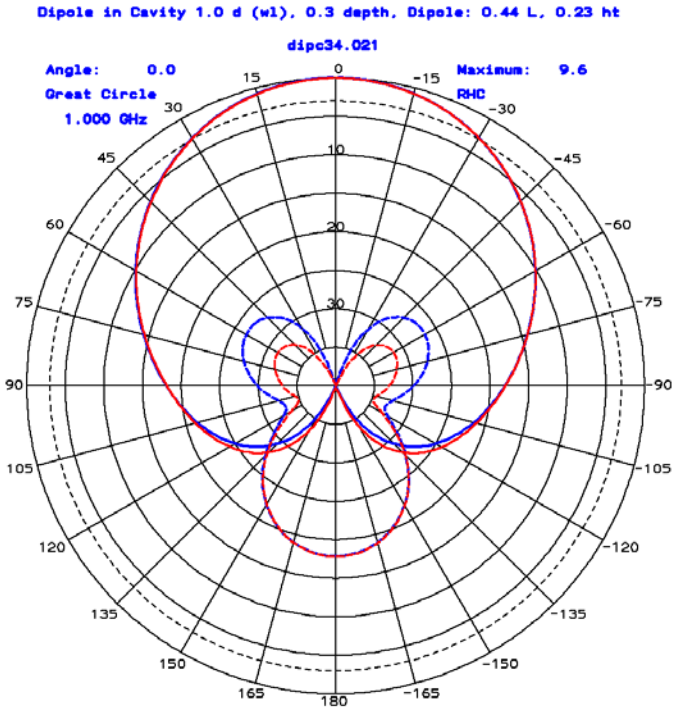


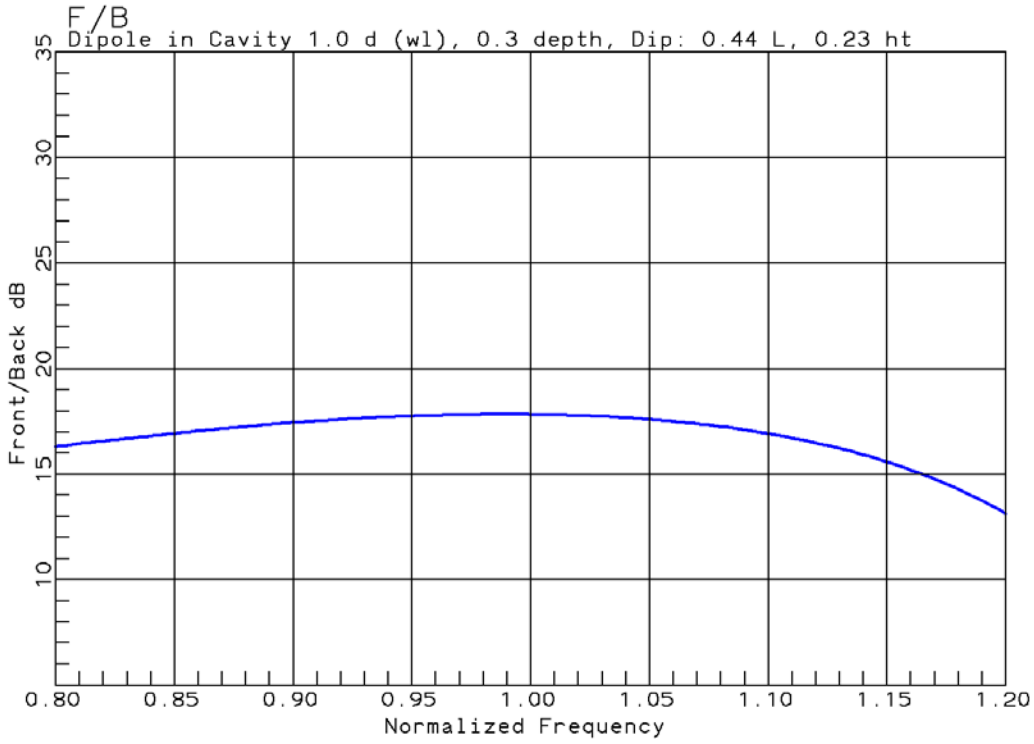


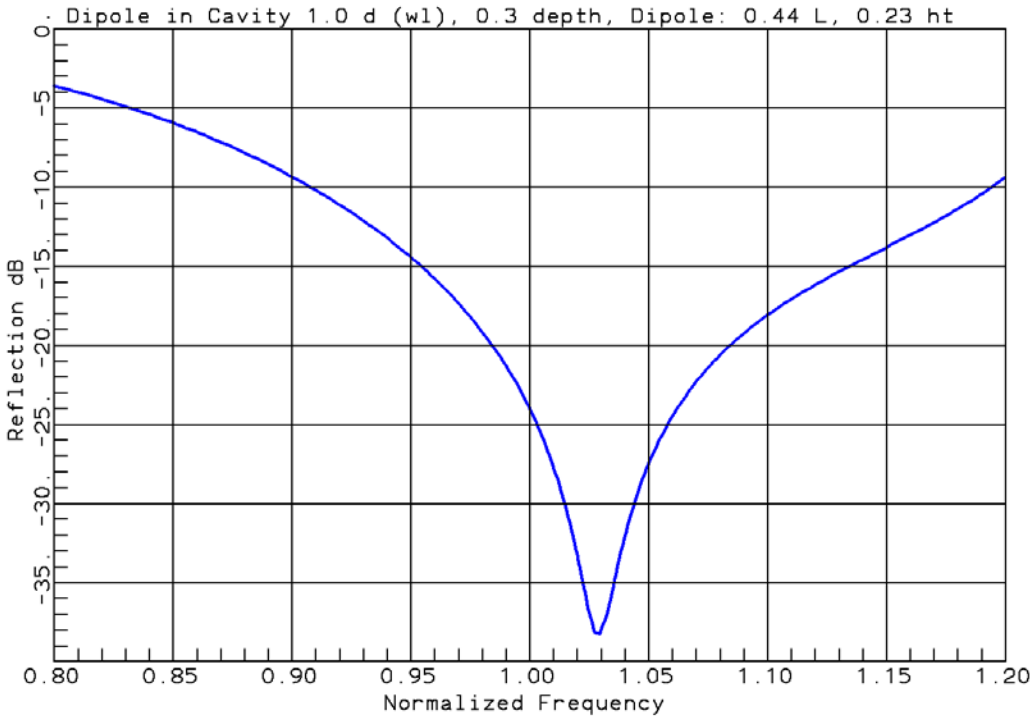

Dipole in Cavity 0.9 d (wl), 0.6 depth, Dipole: 0.44 L, 0.20 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.0λ Diameter Aperture, 0.3λ Depth, Dipole: 0.44λ, Height: 0.23λ

Circular Polarization Blue: φ = 0, Red: φ = 45

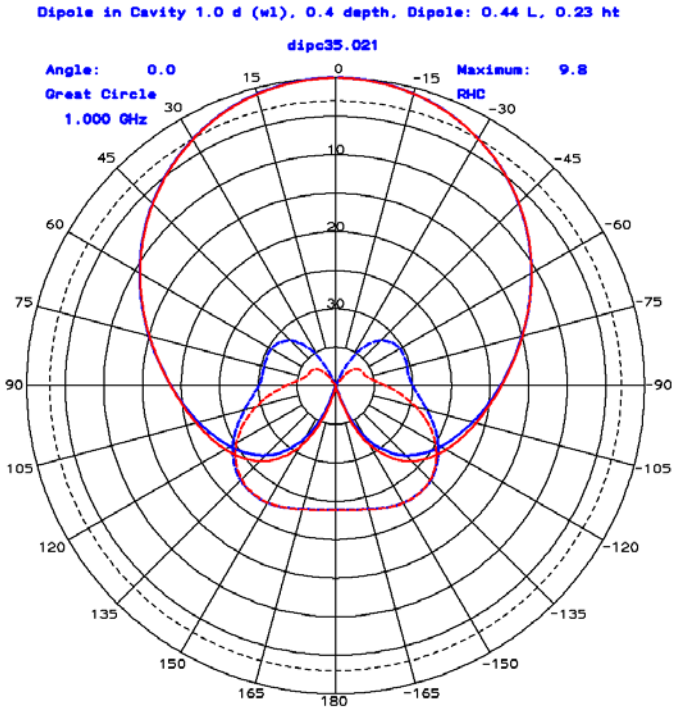


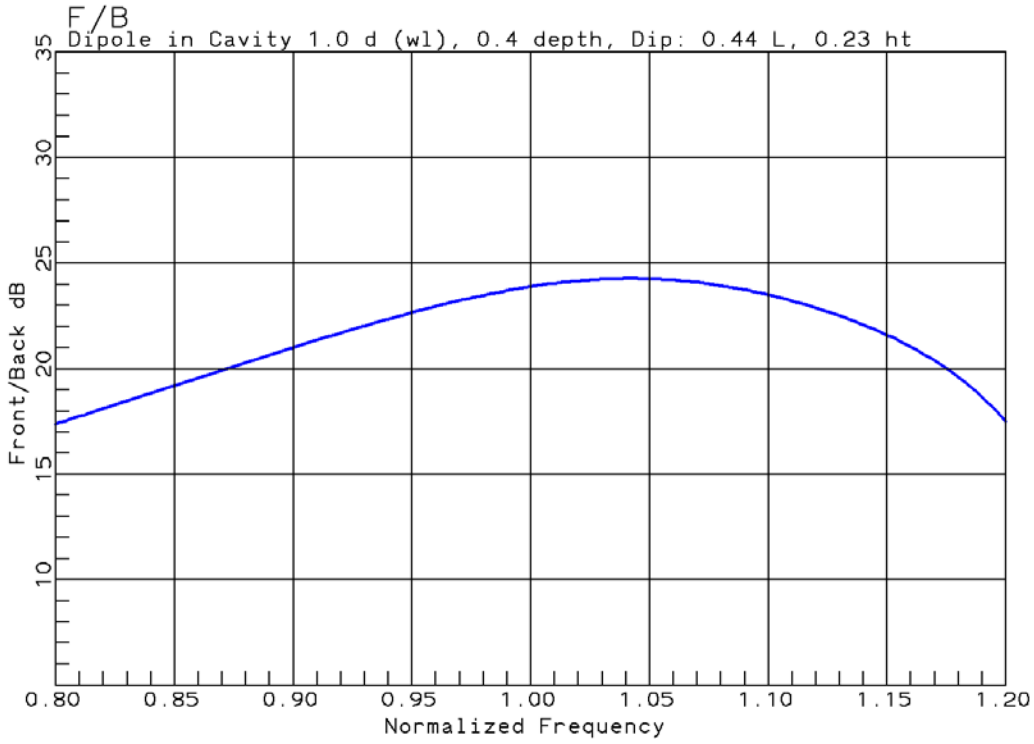


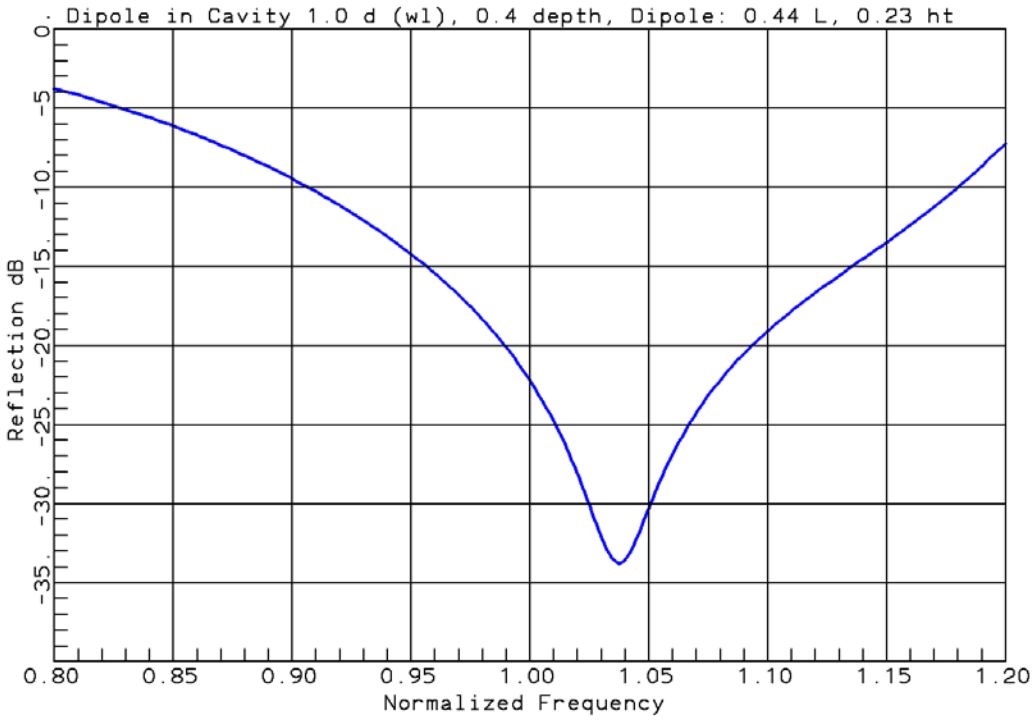

Dipole in Cavity 1.0 d (wl), 0.3 depth, Dipole: 0.44 L, 0.23 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.0λ Diameter Aperture, 0.4λ Depth, Dipole: 0.44λ, Height: 0.23λ

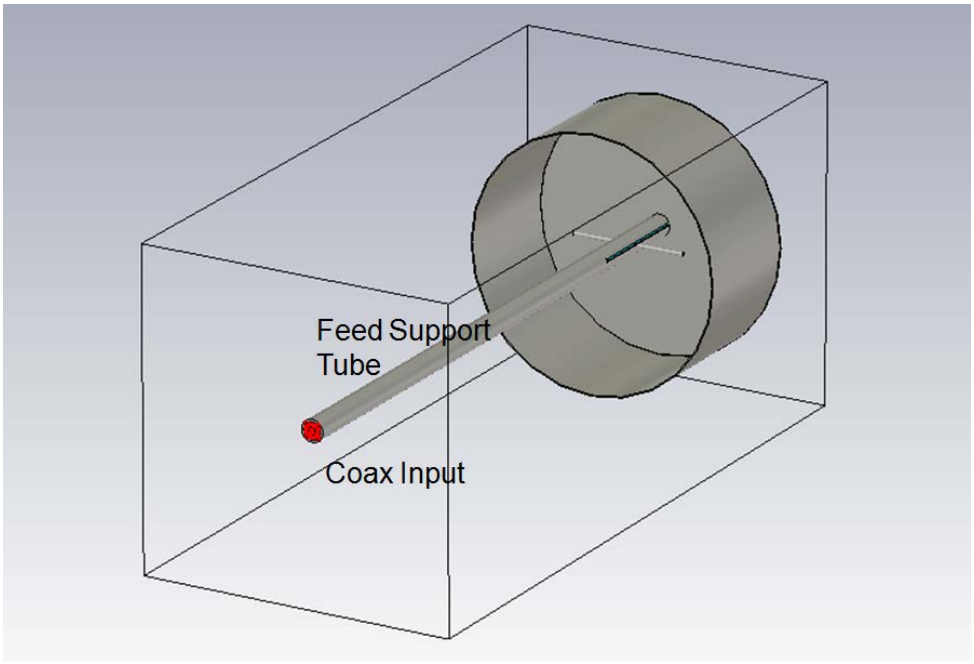
Circular Polarization Blue: φ = 0, Red: φ = 45

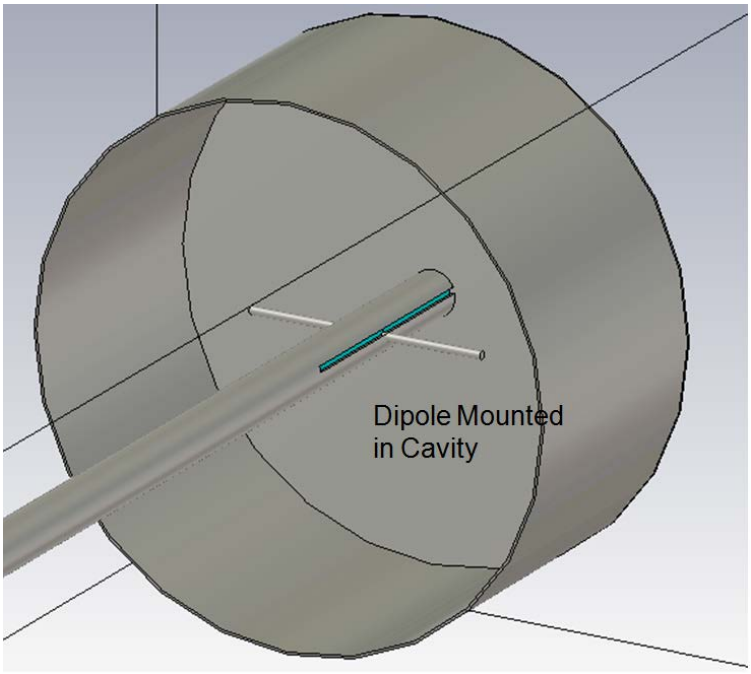




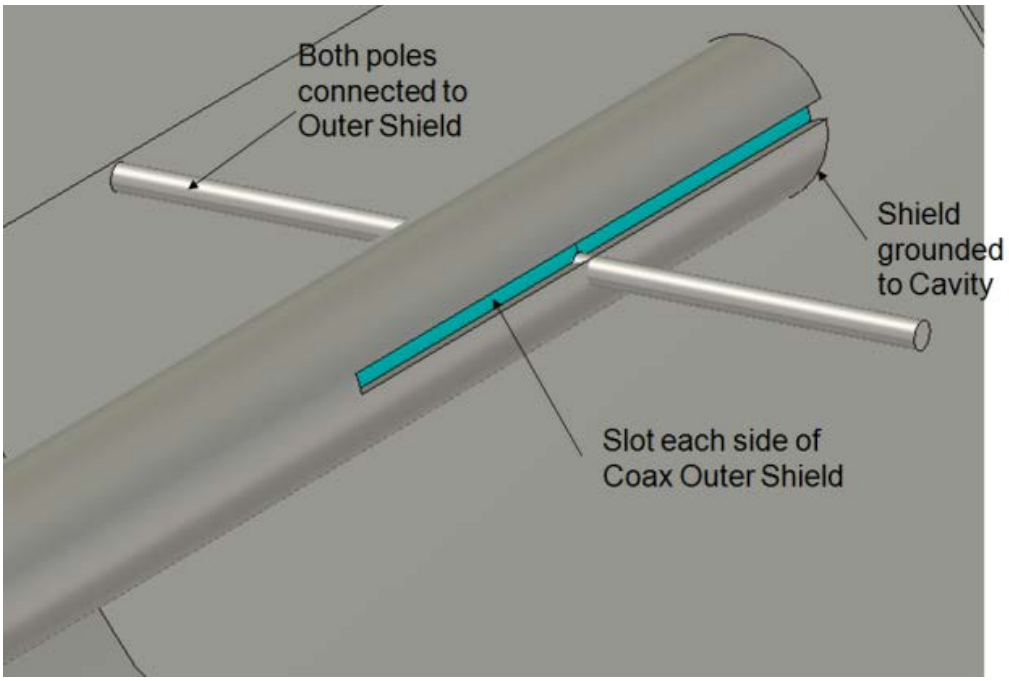

Dipole in Cavity 1.0 d (wl), 0.4 depth, Dipole: 0.44 L, 0.23 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

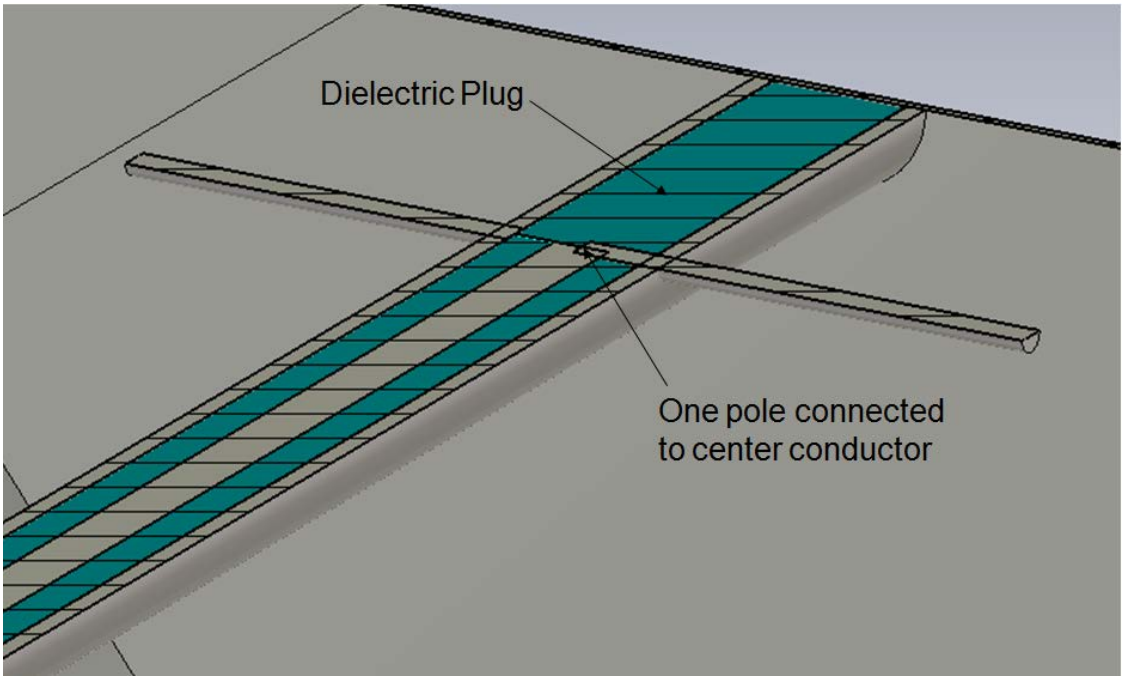
CST time domain model with Cavity: 1.0λ Diameter Aperture, 0.4λ Depth, Dipole: 0.44λ, Height: 0.23λ





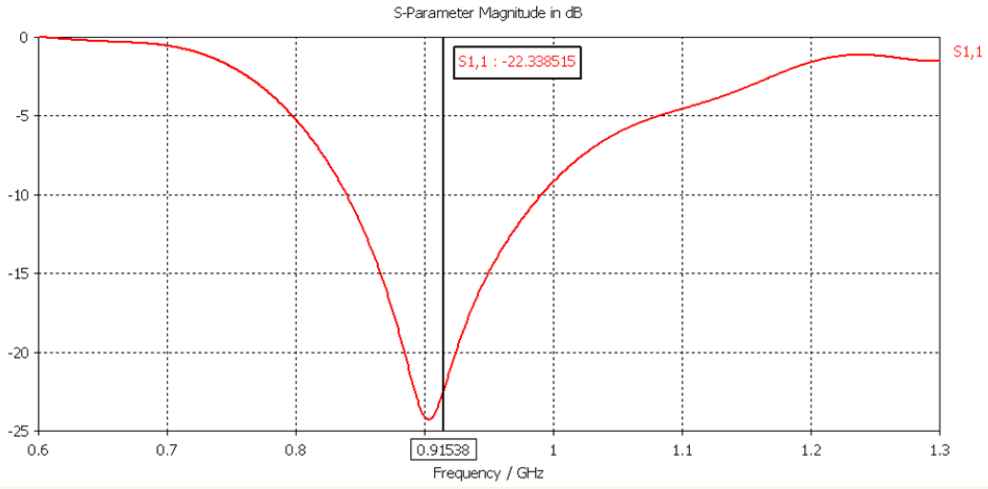
The model has a one-wavelength long slotted tube balun with the dipole mounted in the center.



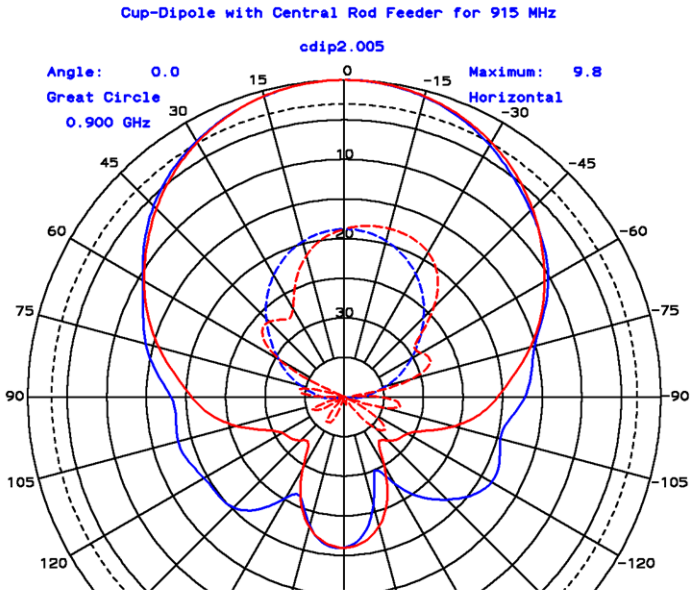


Cross-section of the coaxial feed illustrating the center conductor to shield short provided by one pole of the dipole. Both poles are shorted to the outer shield.

Analytical Model S_{11}



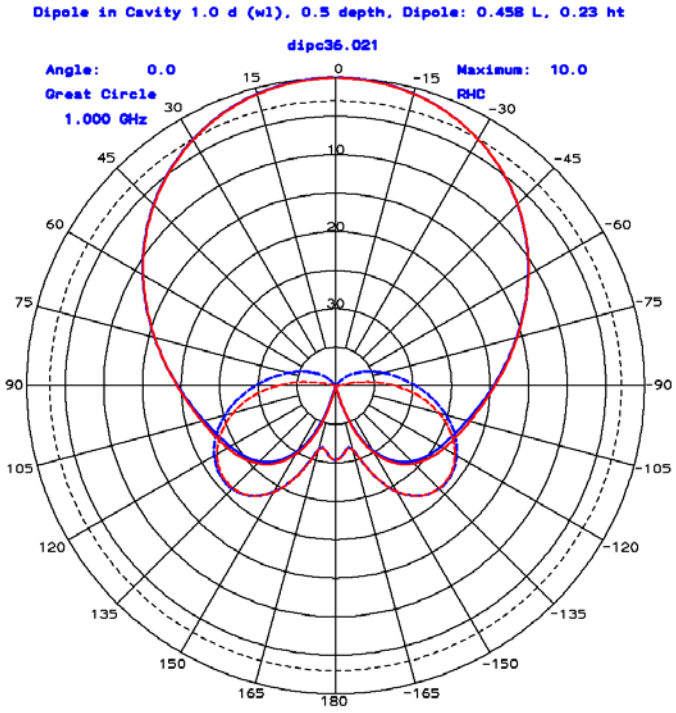
CST predicted reflection coefficient (dB) at the feed coaxial port



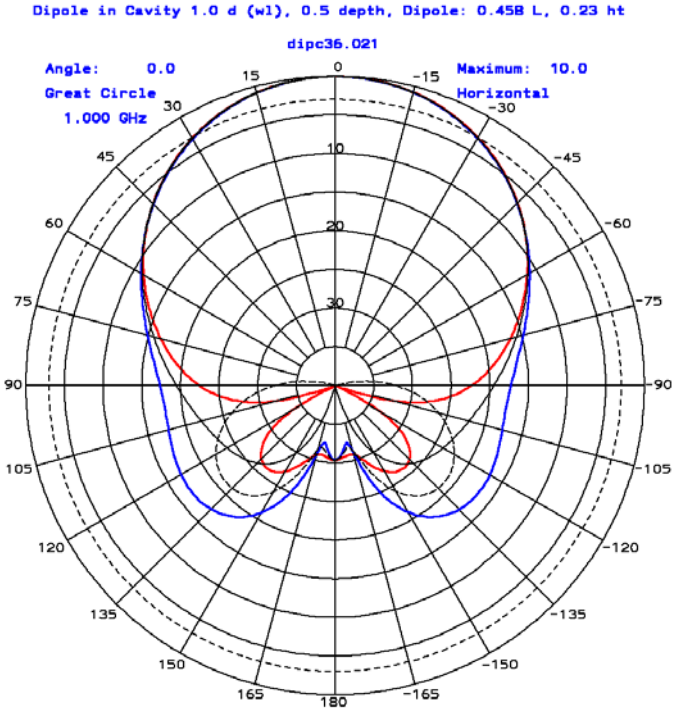
CST prediction closely matches MoM analysis given above

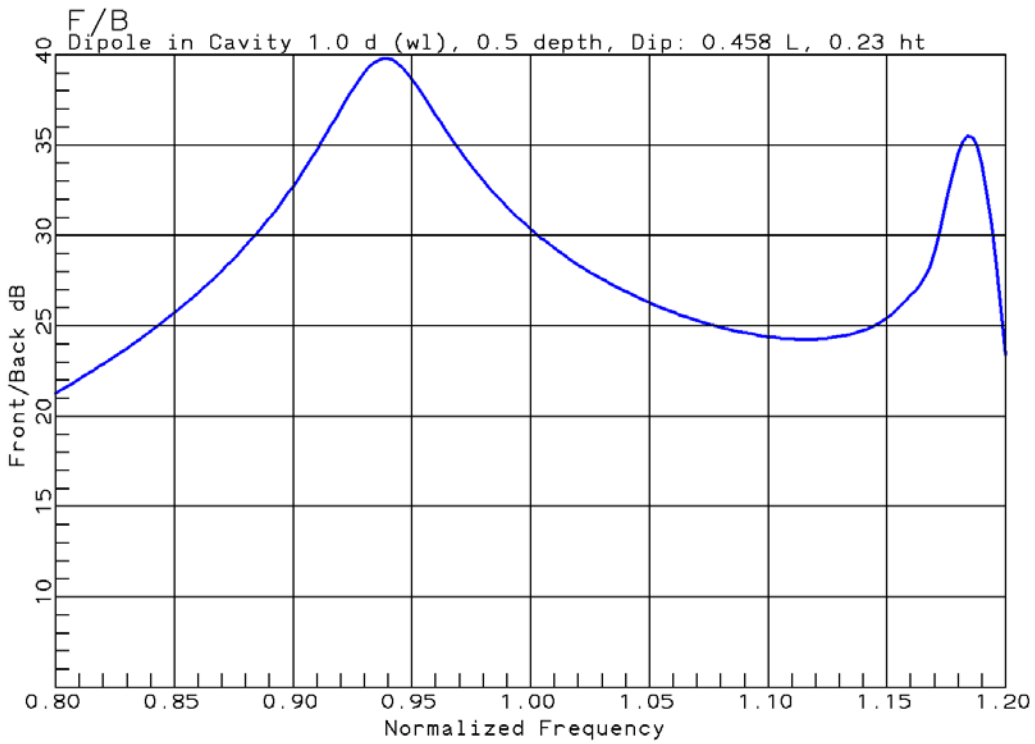
Cavity: 1.0λ Diameter Aperture, 0.5λ Depth, Dipole: 0.458λ, Height: 0.23λ

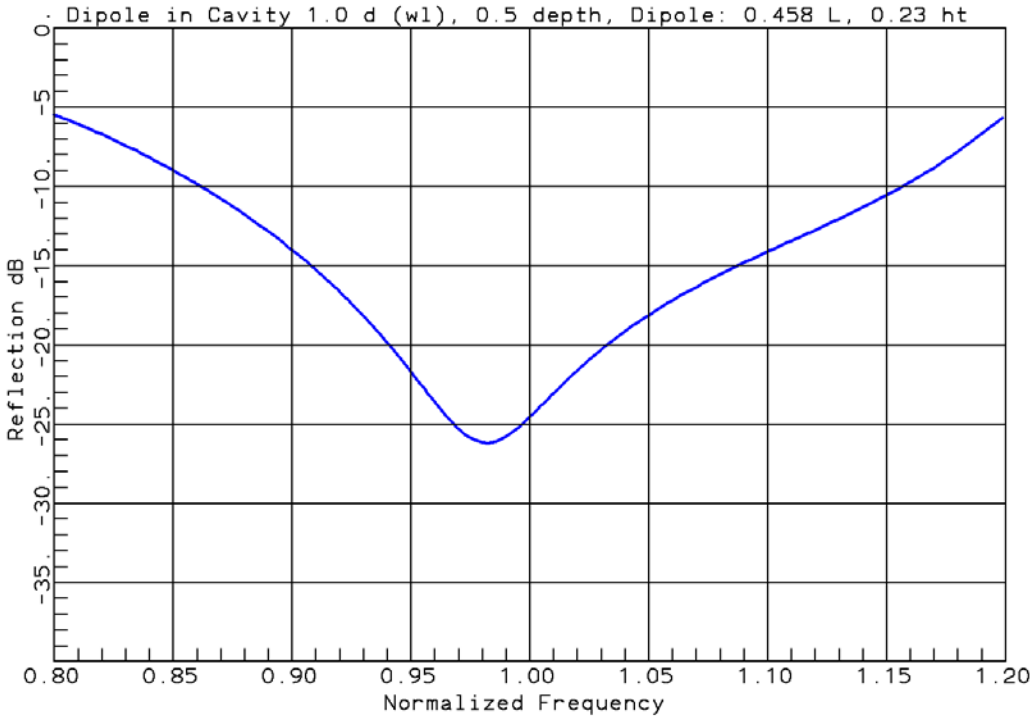
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

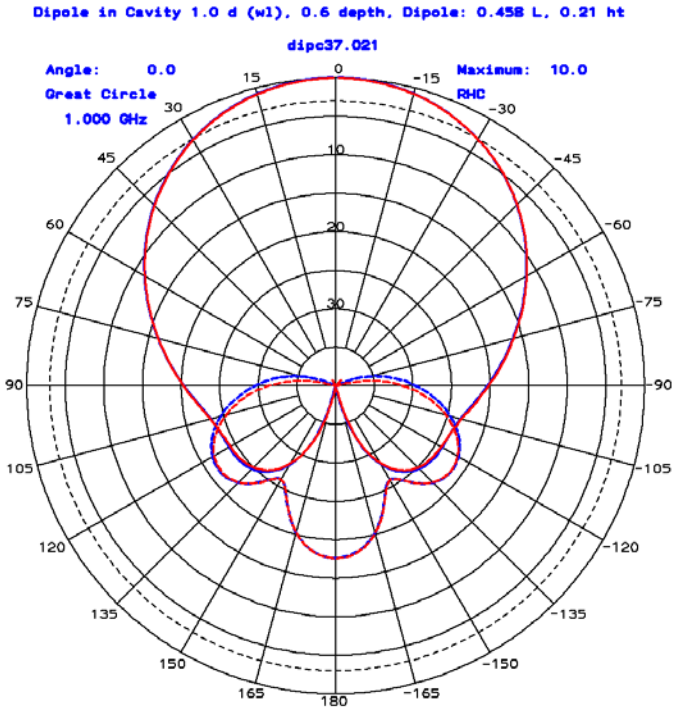


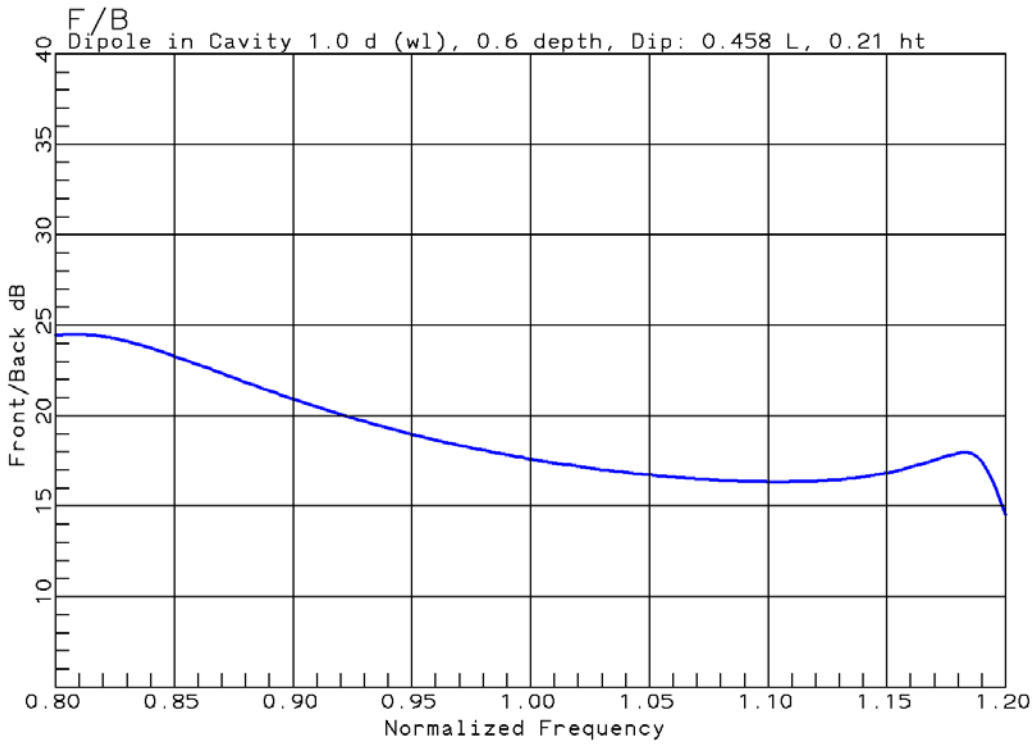

F/B
Dipole in Cavity 1.0 d (wl), 0.5 depth, Dip: 0.458 L, 0.23 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

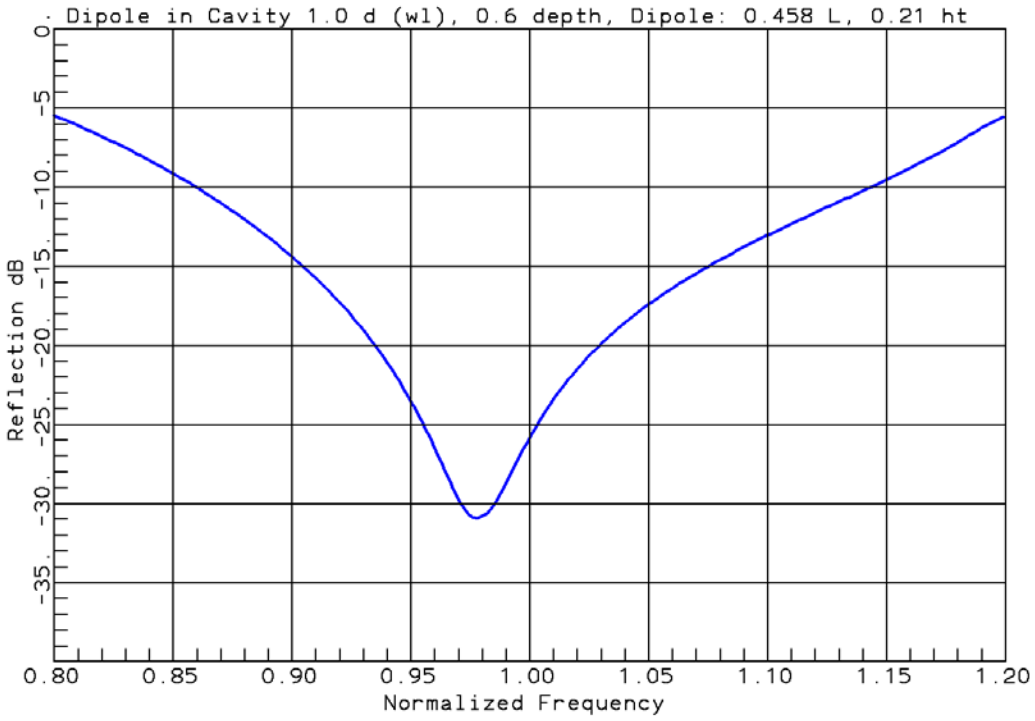

Dipole in Cavity 1.0 d (wl), 0.5 depth, Dipole: 0.458 L, 0.23 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.0λ Diameter Aperture, 0.6λ Depth, Dipole: 0.458λ, Height: 0.21λ

Circular Polarization Blue: φ = 0, Red: φ = 45

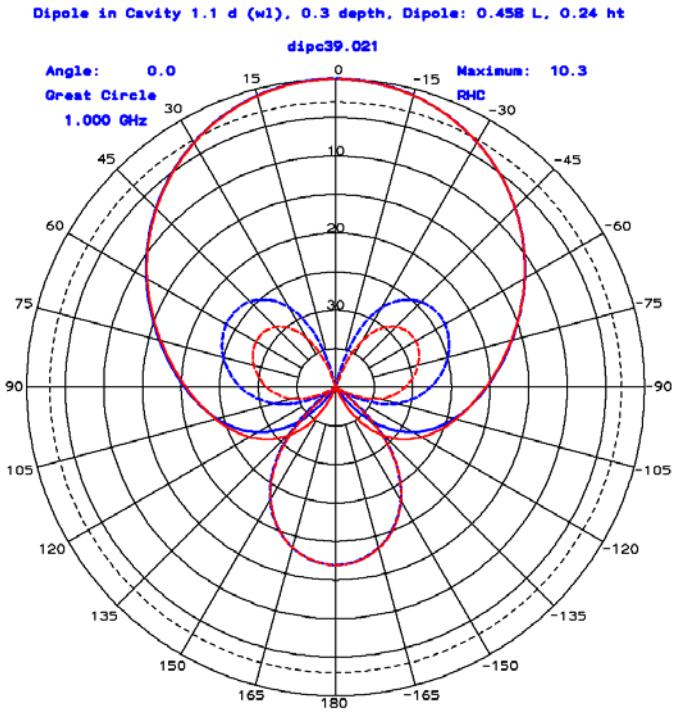


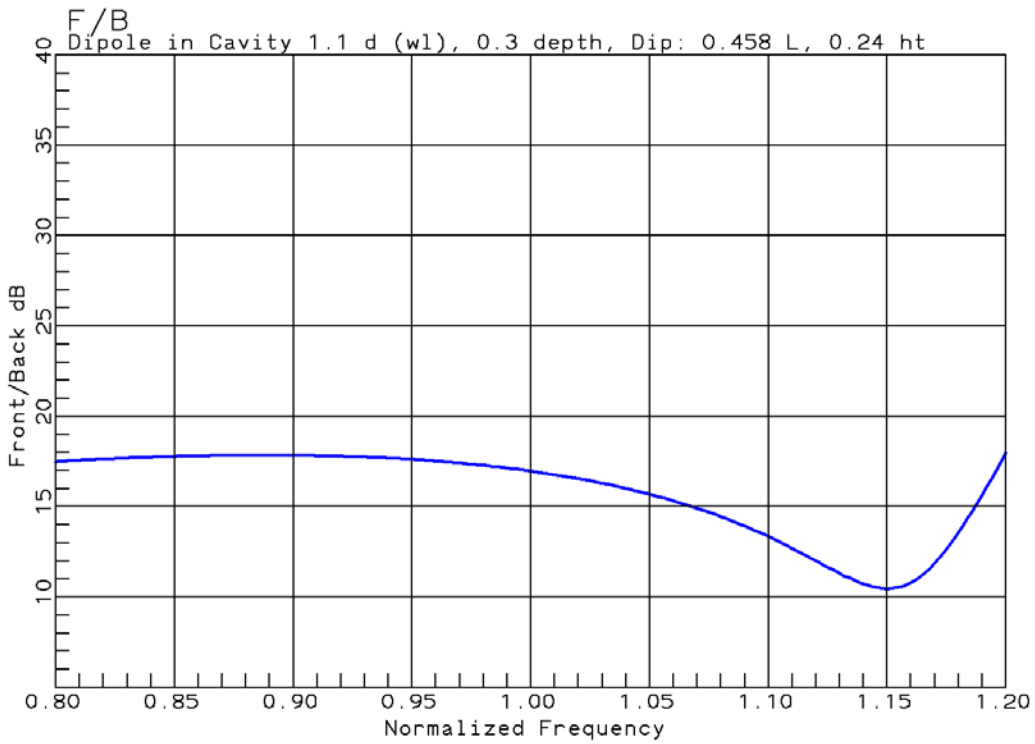


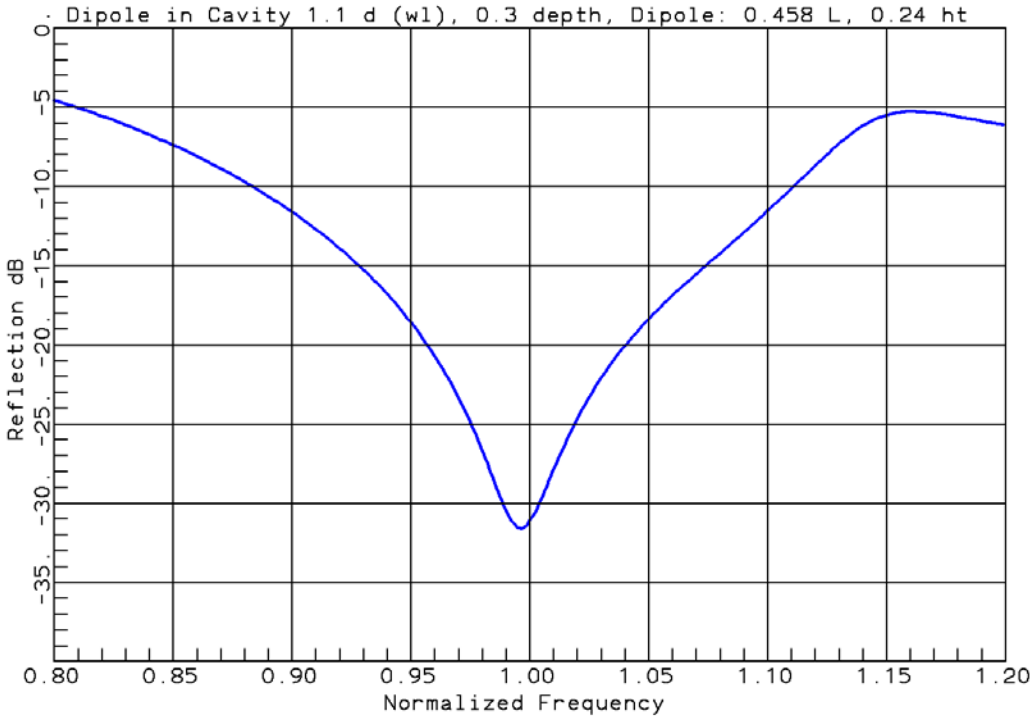

Dipole in Cavity 1.0 d (wl), 0.6 depth, Dipole: 0.458 L, 0.21 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.1λ Diameter Aperture, 0.3λ Depth, Dipole: 0.458λ, Height: 0.24λ

Circular Polarization Blue: φ = 0, Red: φ = 45

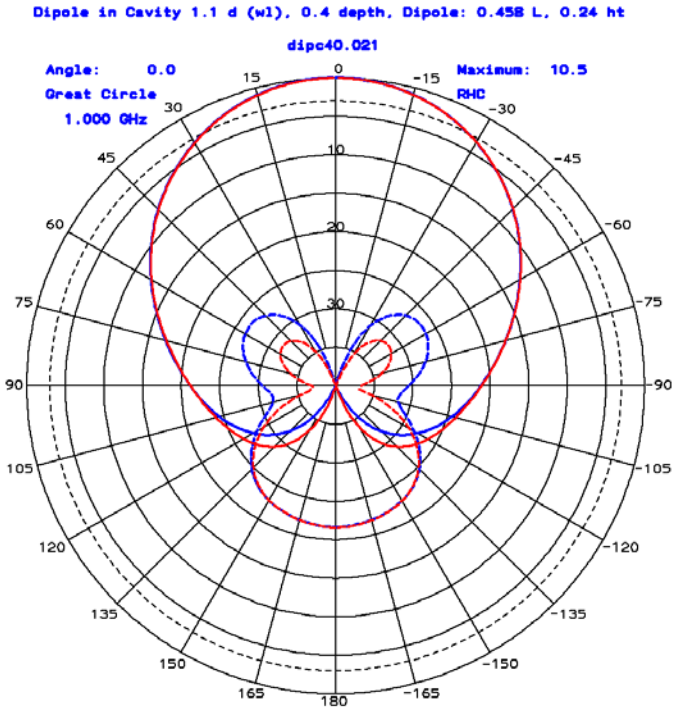


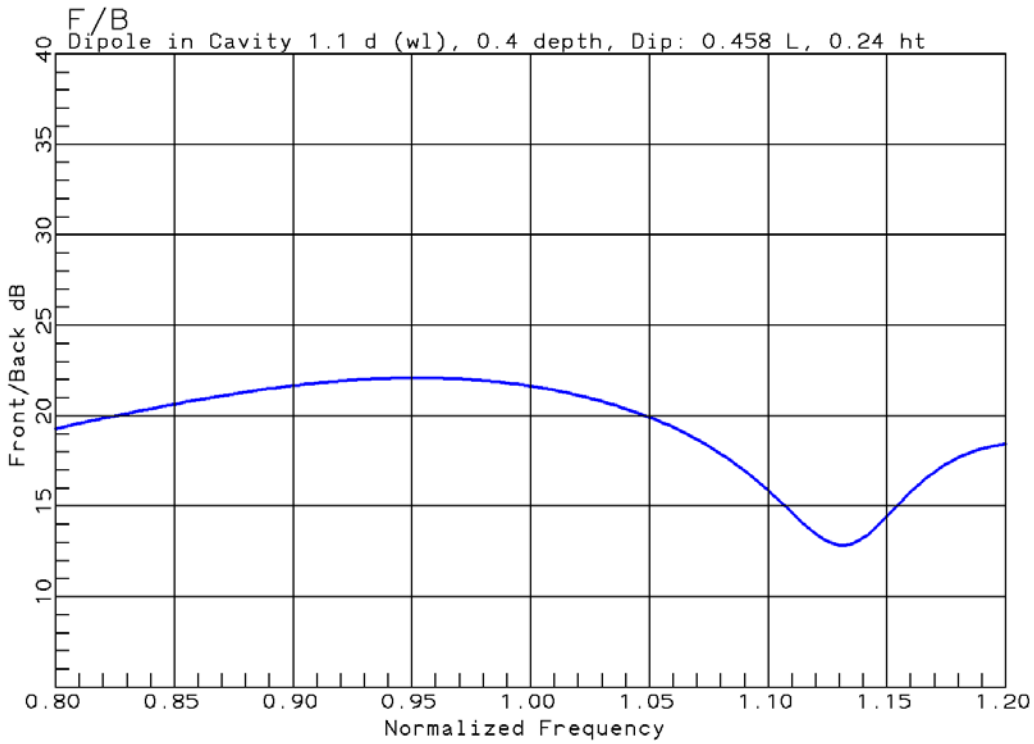

F/B
Dipole in Cavity 1.1 d (wl), 0.3 depth, Dip: 0.458 L, 0.24 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

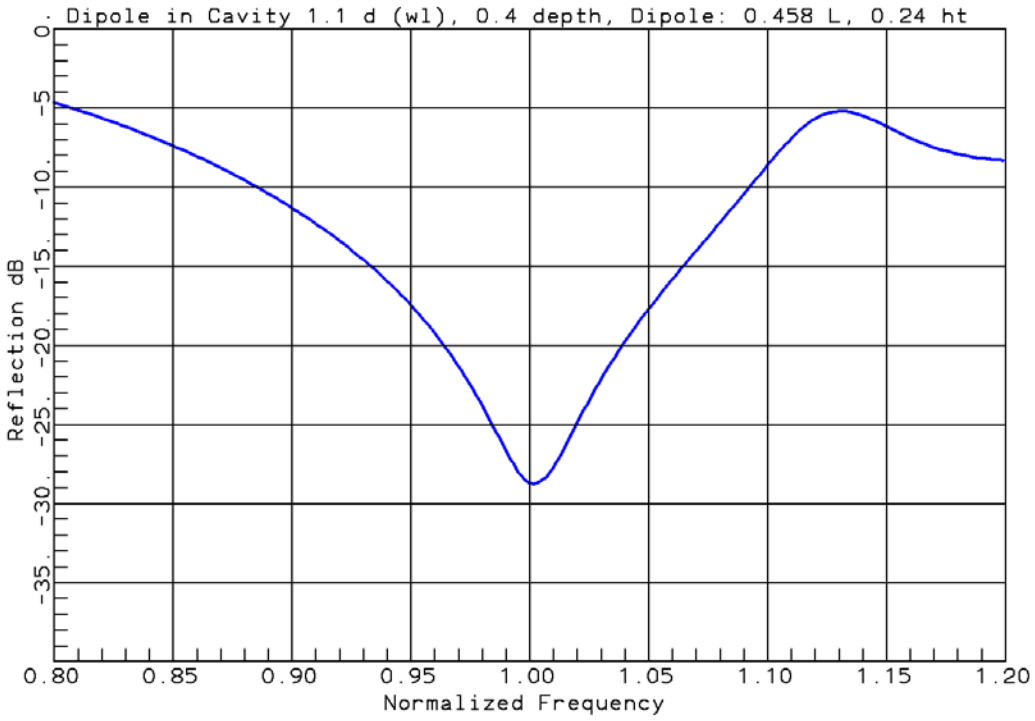

Dipole in Cavity 1.1 d (wl), 0.3 depth, Dipole: 0.458 L, 0.24 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.1λ Diameter Aperture, 0.4λ Depth, Dipole: 0.458λ, Height: 0.24λ

Circular Polarization Blue: φ = 0, Red: φ = 45

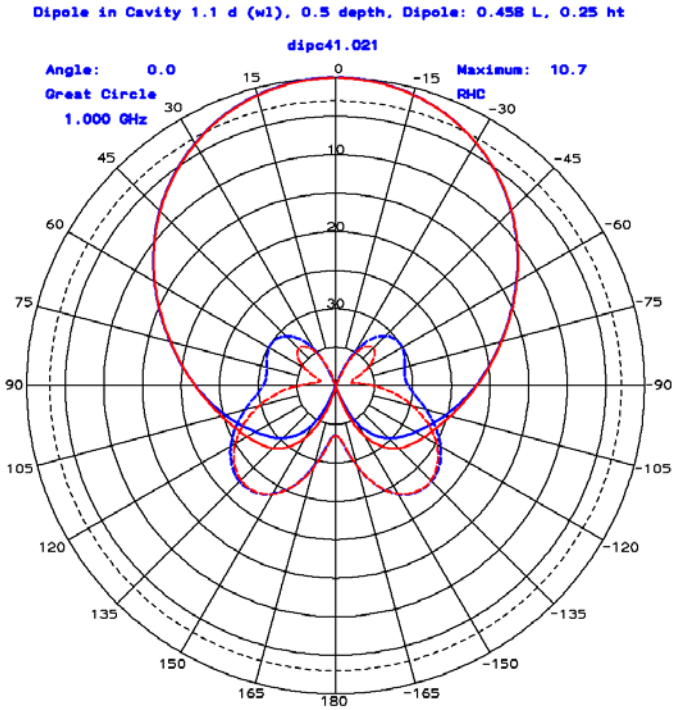




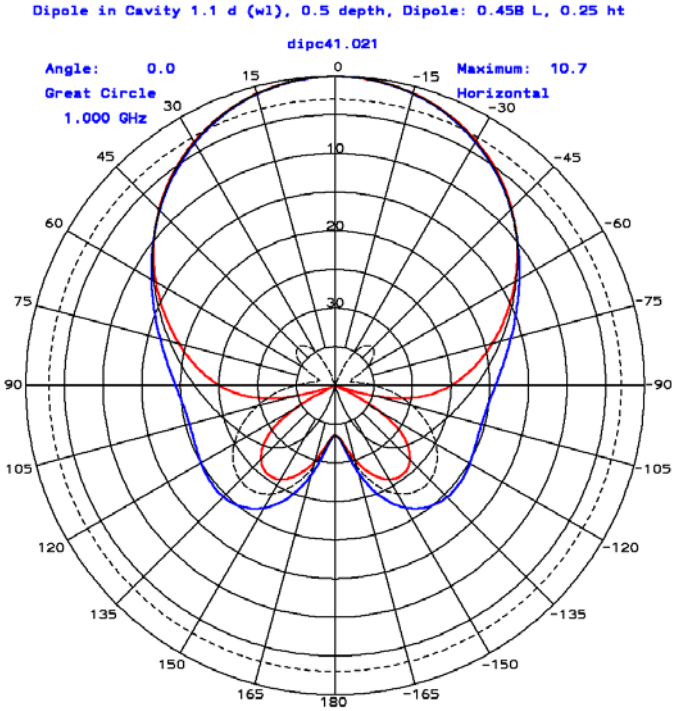

Dipole in Cavity 1.1 d (wl), 0.4 depth, Dipole: 0.458 L, 0.24 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

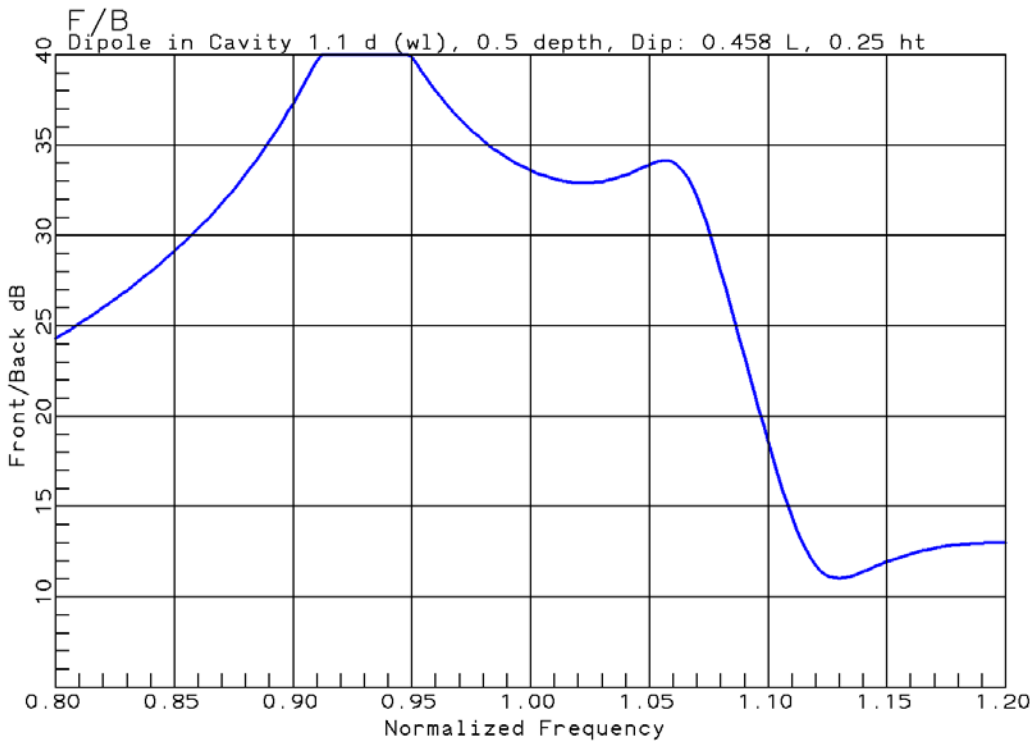
Cavity: 1.1λ Diameter Aperture, 0.5λ Depth, Dipole: 0.458λ, Height: 0.25λ

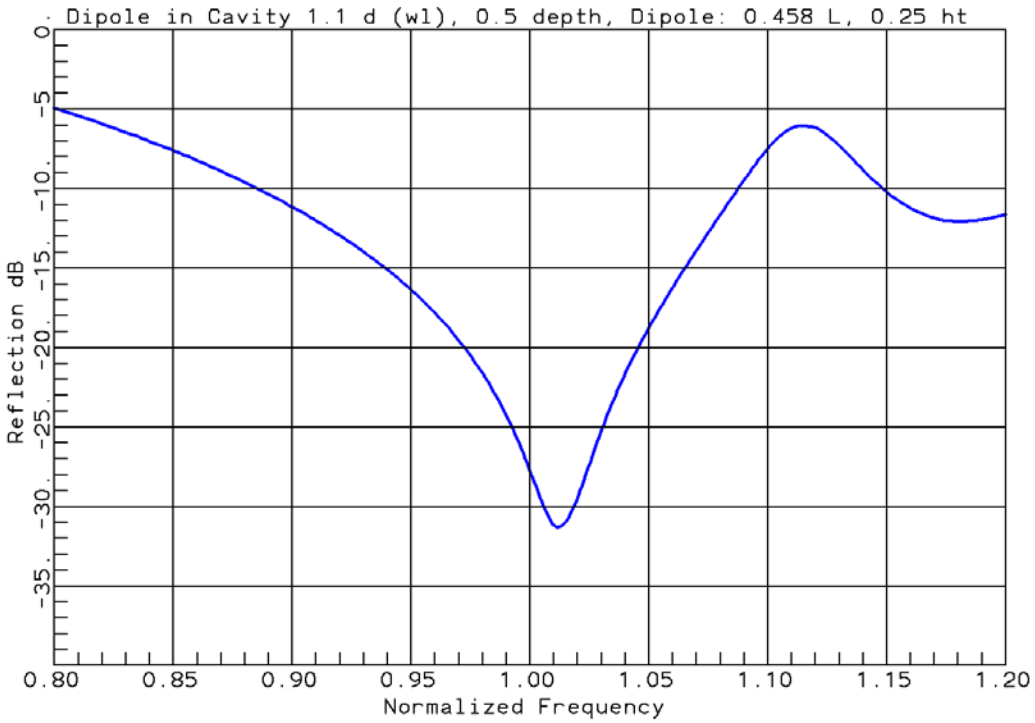
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

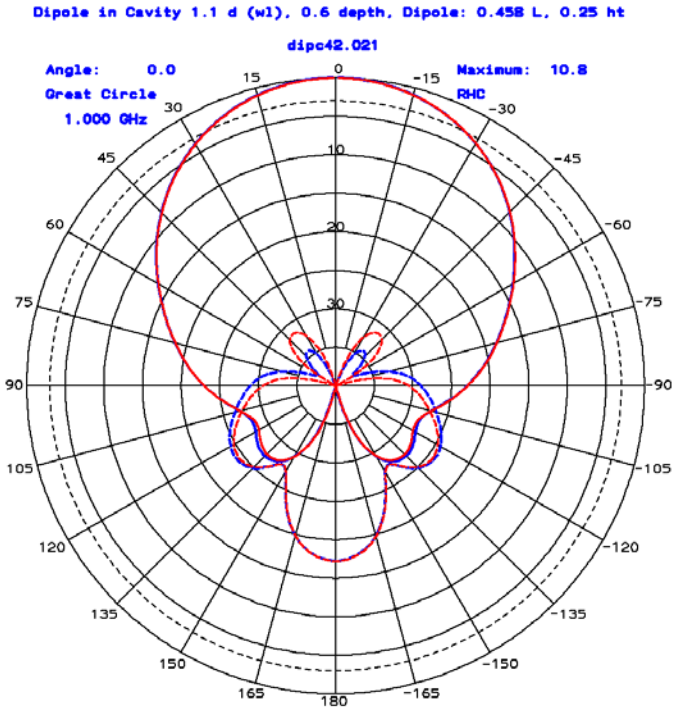


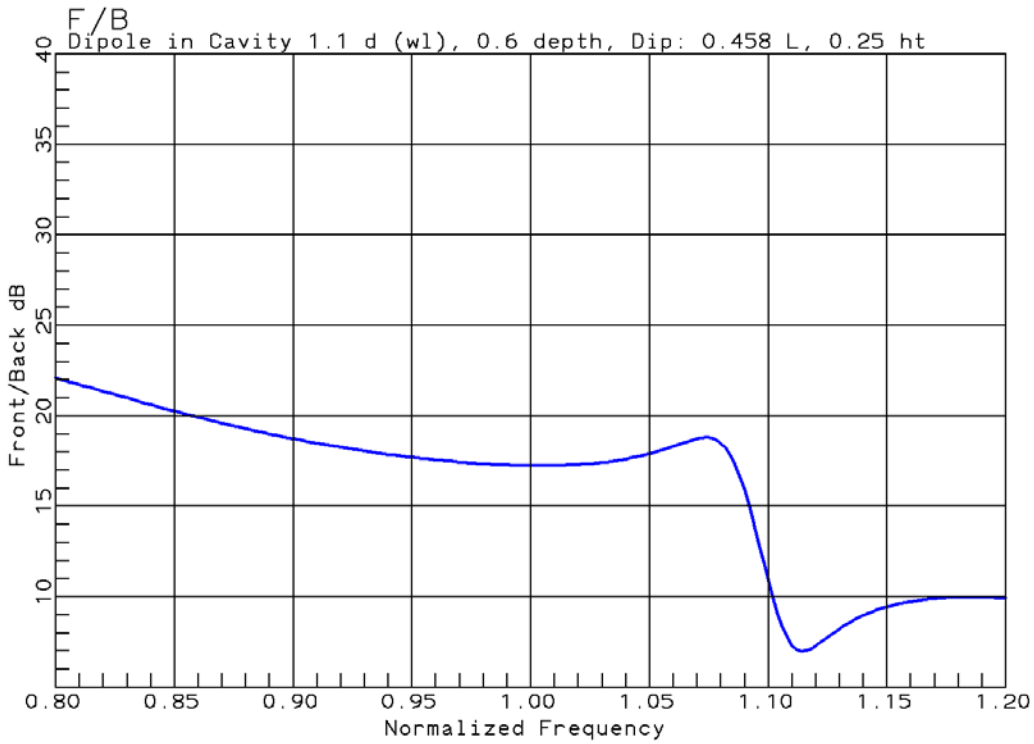

F/B
Dipole in Cavity 1.1 d (wl), 0.5 depth, Dip: 0.458 L, 0.25 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

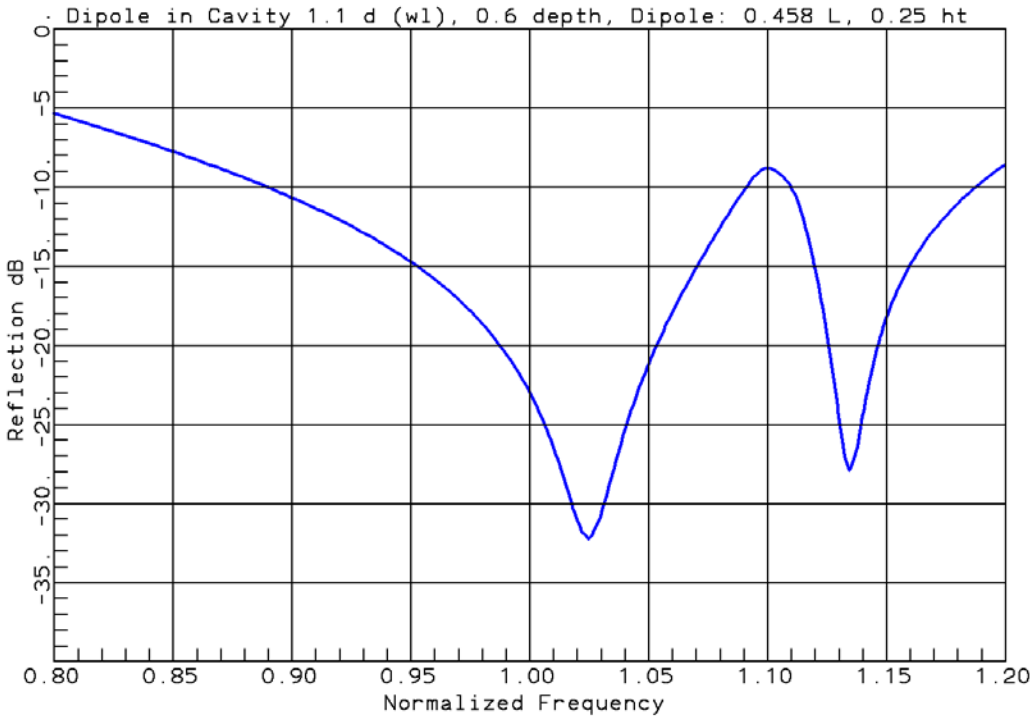

Dipole in Cavity 1.1 d (wl), 0.5 depth, Dipole: 0.458 L, 0.25 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.1λ Diameter Aperture, 0.6λ Depth, Dipole: 0.458λ, Height: 0.25λ

Circular Polarization Blue: φ = 0, Red: φ = 45

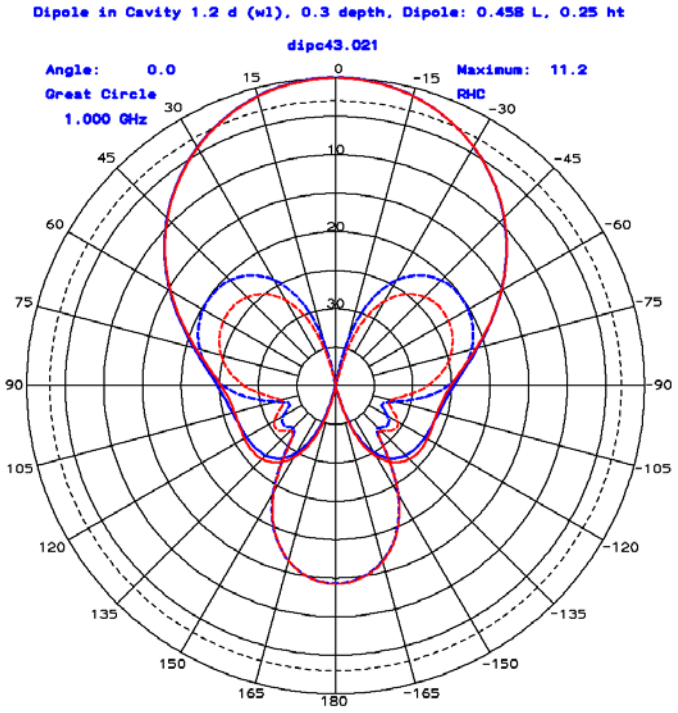


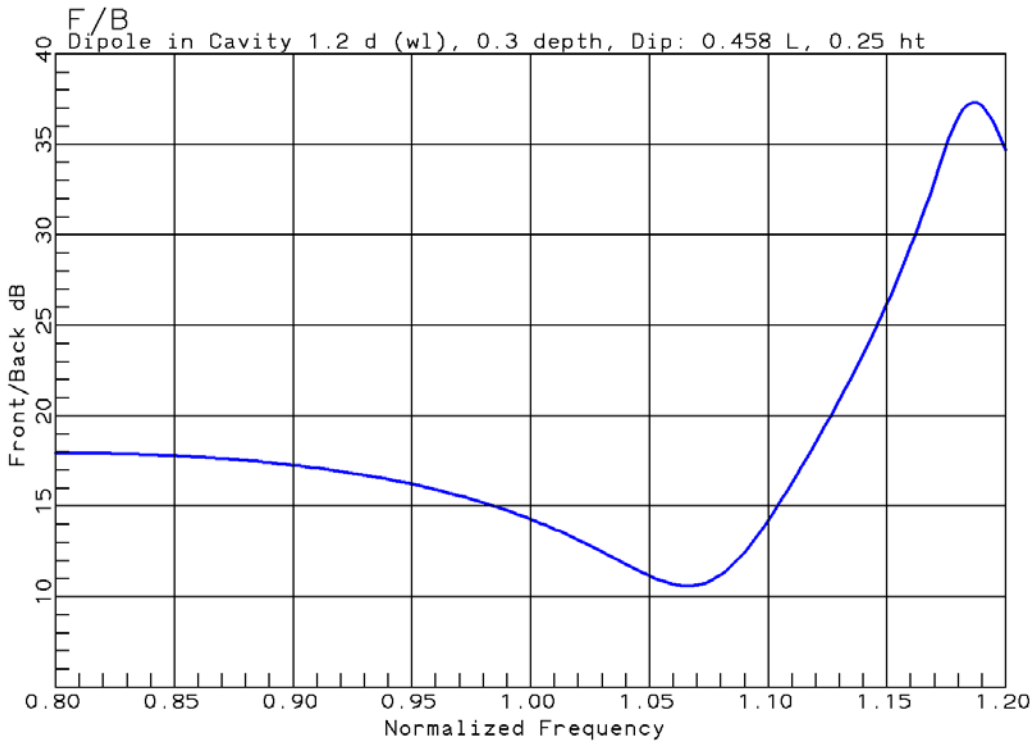


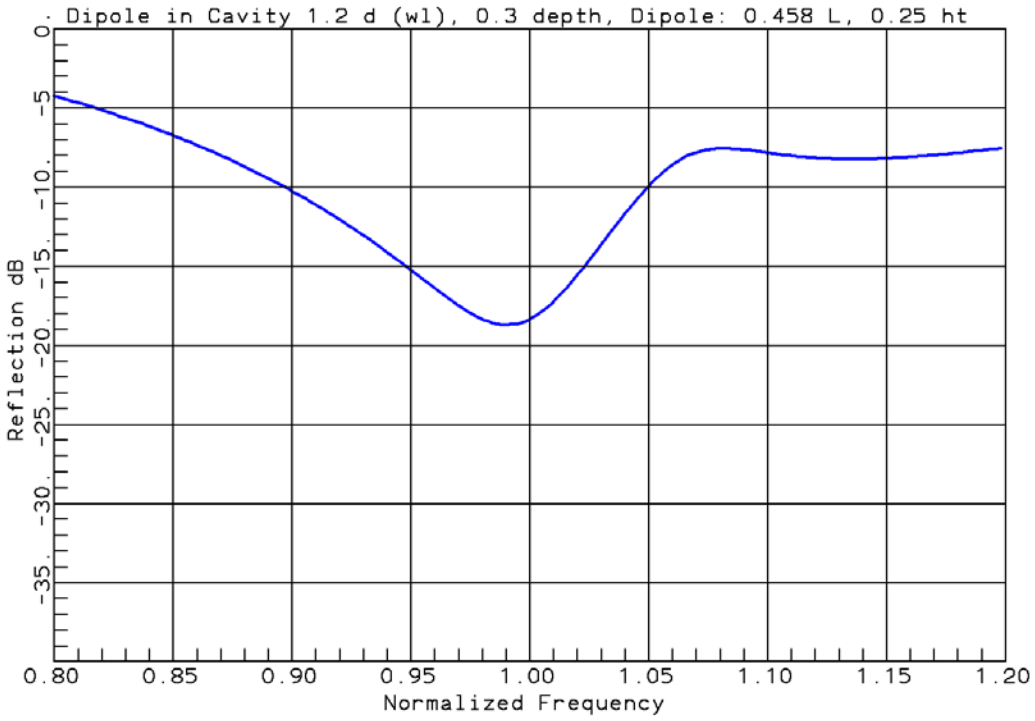

Dipole in Cavity 1.1 d (wl), 0.6 depth, Dipole: 0.458 L, 0.25 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.2λ Diameter Aperture, 0.3λ Depth, Dipole: 0.458λ, Height: 0.25λ

Circular Polarization Blue: φ = 0, Red: φ = 45

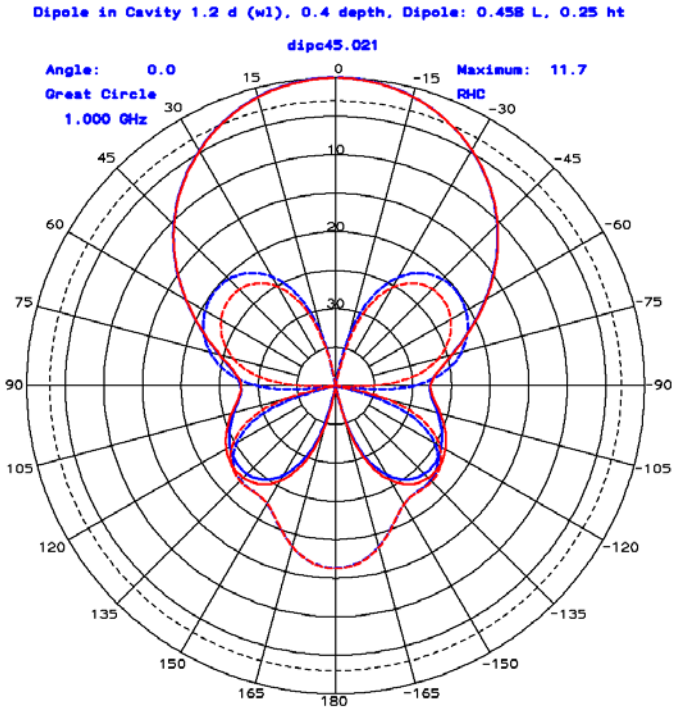


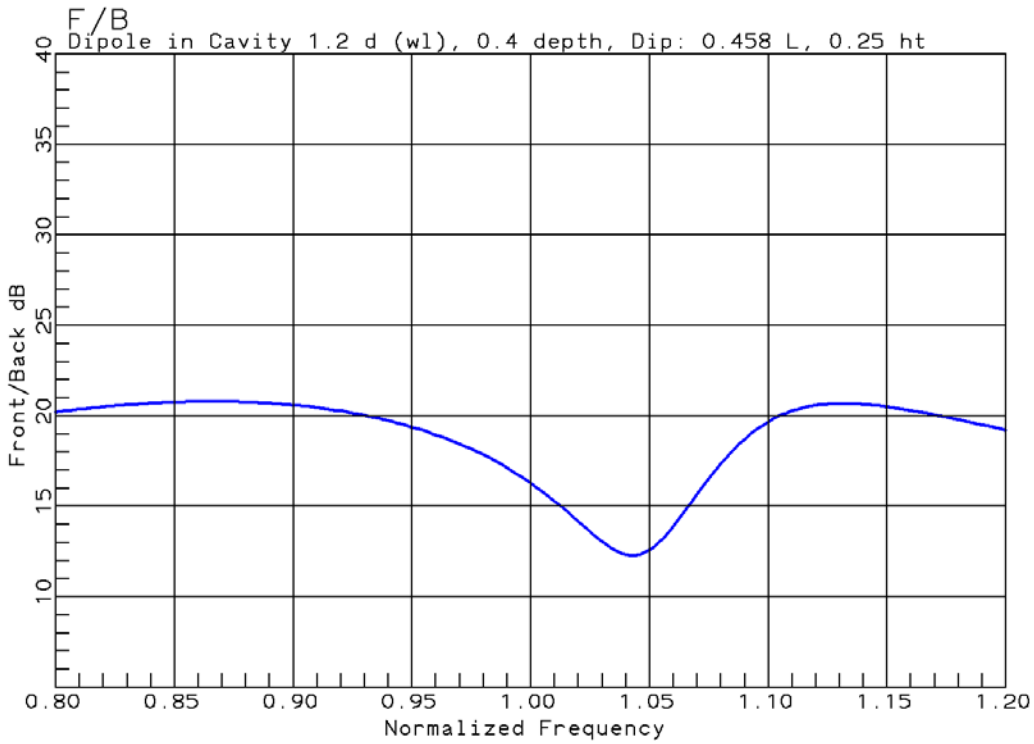


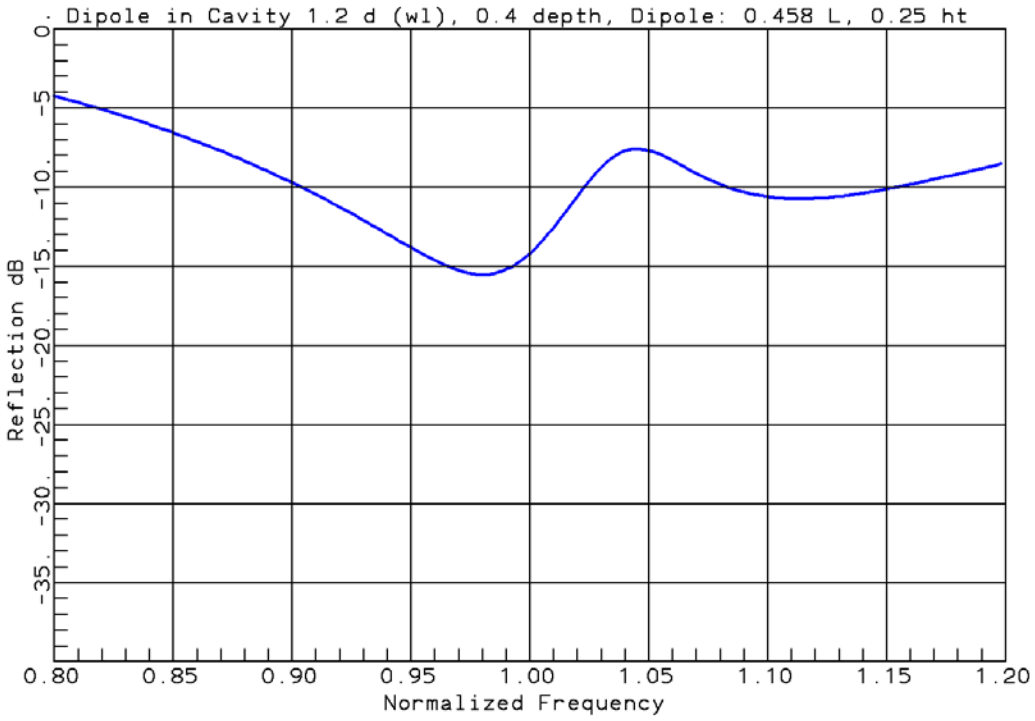

Dipole in Cavity 1.2 d (wl), 0.3 depth, Dipole: 0.458 L, 0.25 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.2λ Diameter Aperture, 0.4λ Depth, Dipole: 0.458λ, Height: 0.25λ

Circular Polarization Blue: φ = 0, Red: φ = 45

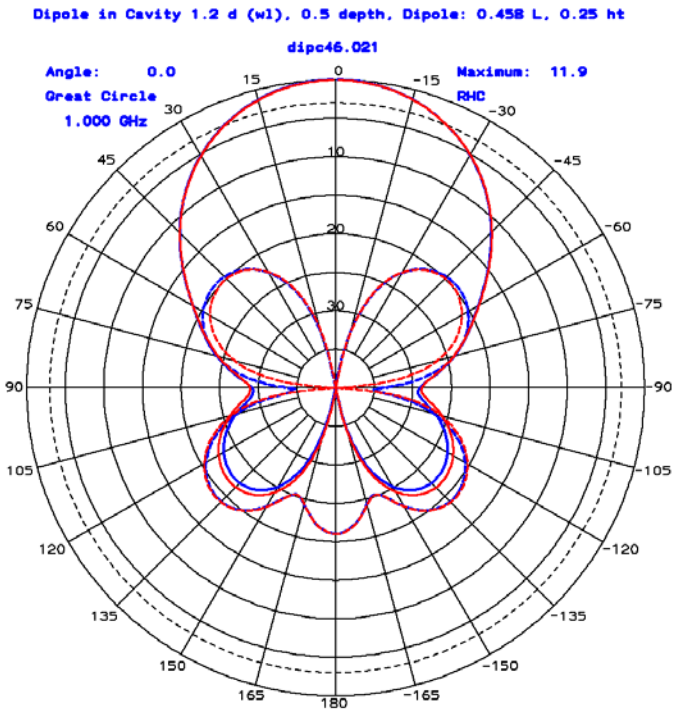


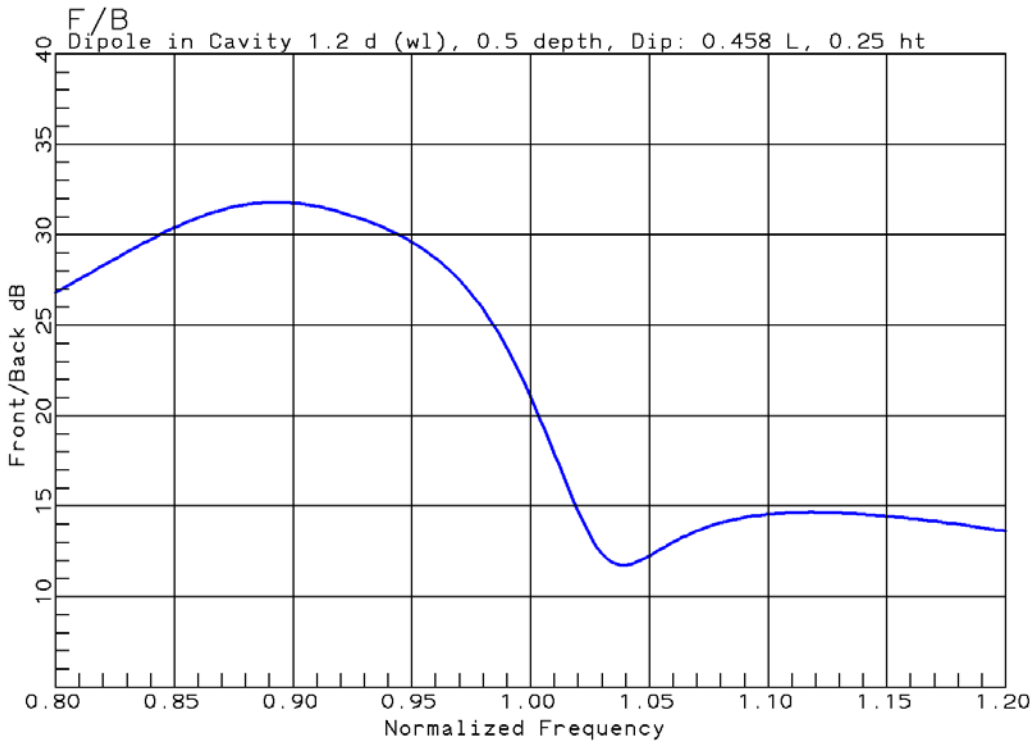


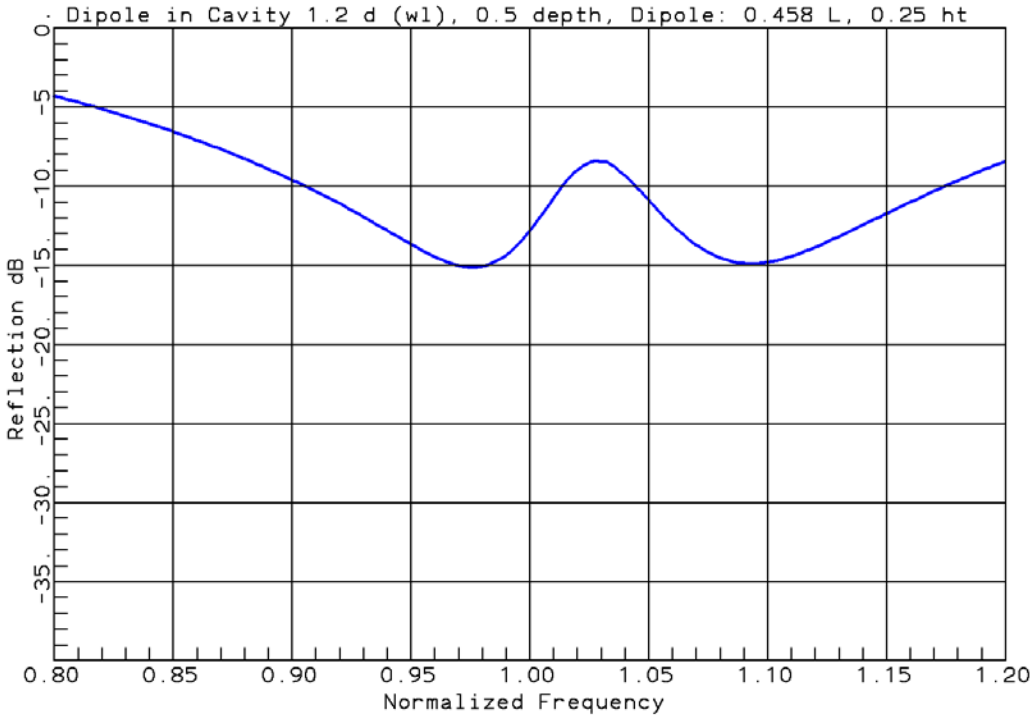

Dipole in Cavity 1.2 d (wl), 0.4 depth, Dipole: 0.458 L, 0.25 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Cavity: 1.2λ Diameter Aperture, 0.5λ Depth, Dipole: 0.458λ, Height: 0.25λ

Circular Polarization Blue: φ = 0, Red: φ = 45



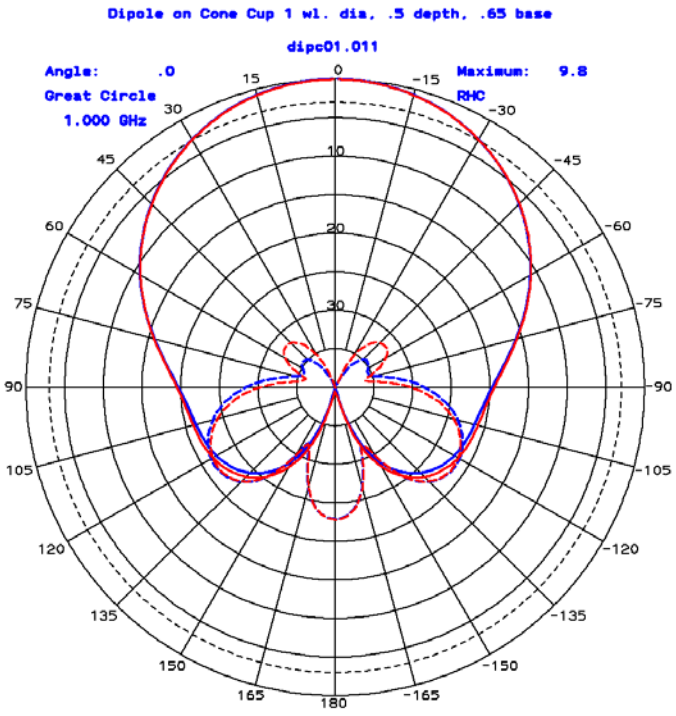



Dipole in Cavity 1.2 d (wl), 0.5 depth, Dipole: 0.458 L, 0.25 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

Tapered Cavity Designs

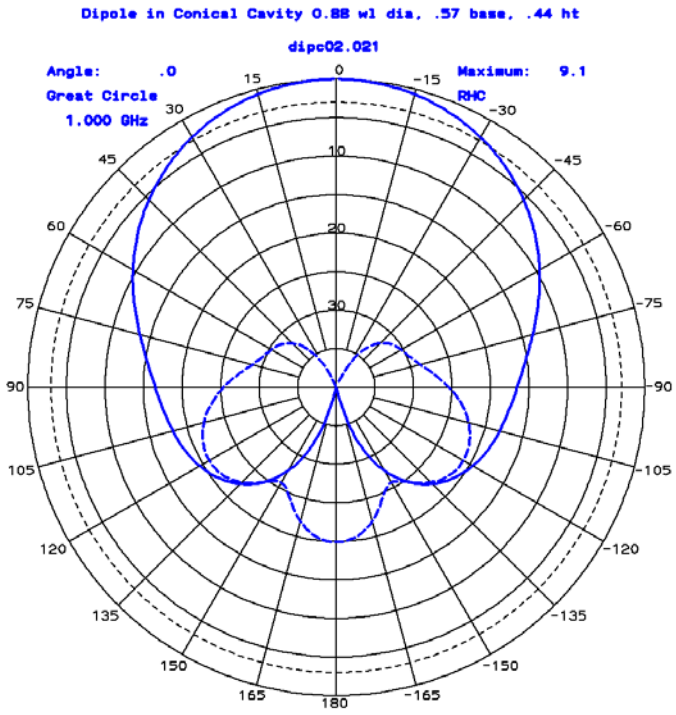
Cavity: 1.0λ Diameter Aperture, 0.5λ Depth, 0.65λ Diameter Base, Dipole: 0.458λ, Height: 0.25λ

Circular Polarization Blue: φ = 0, Red: φ = 45



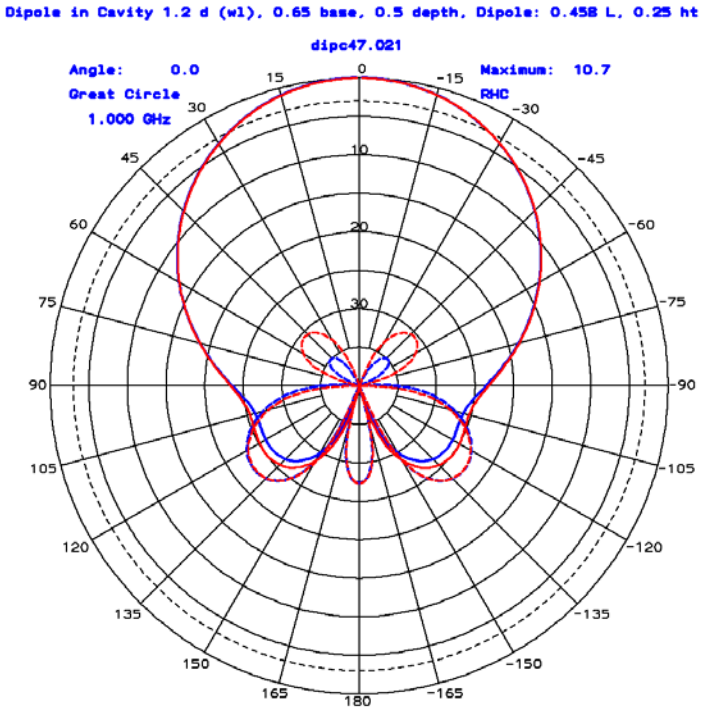
Cavity: 0.88λ Diameter Aperture, 0.44λ Depth, 0.57λ Diameter Base, Dipole: 0.458λ, Height: 0.25λ

Circular Polarization Blue: φ = 0, Red: φ = 45

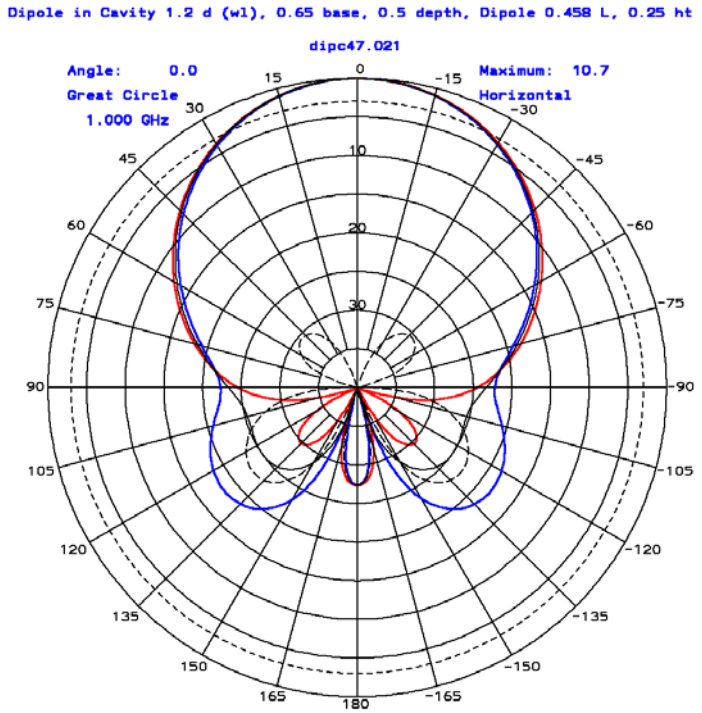


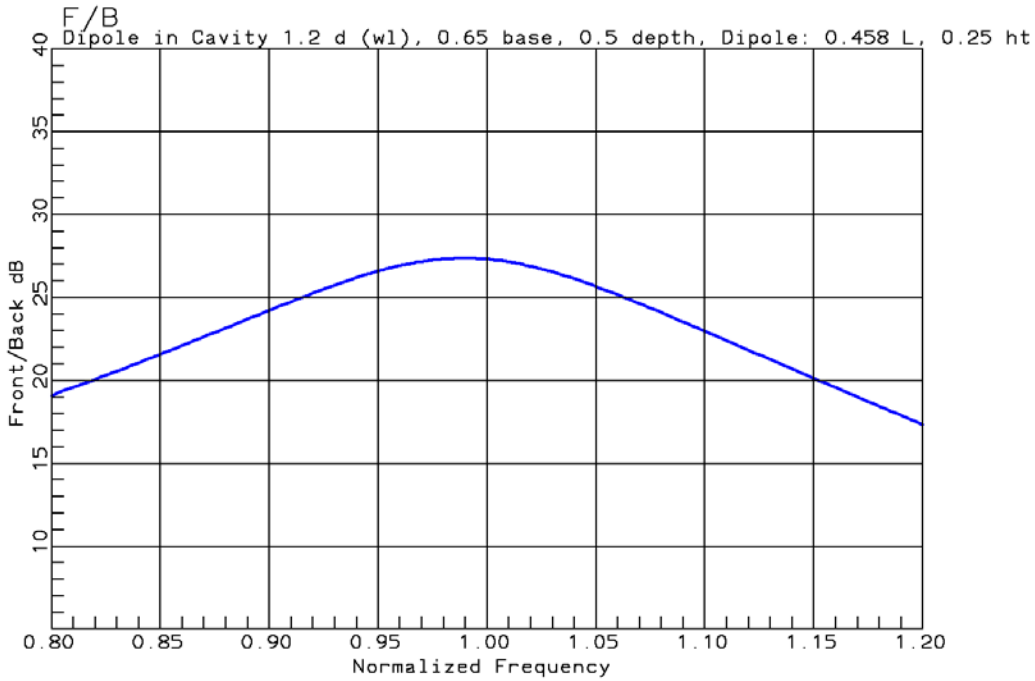
Cavity: 1.2λ Diameter Aperture, 0.5λ Depth, 0.65λ Diameter Base, Dipole: 0.458λ, Height: 0.25λ

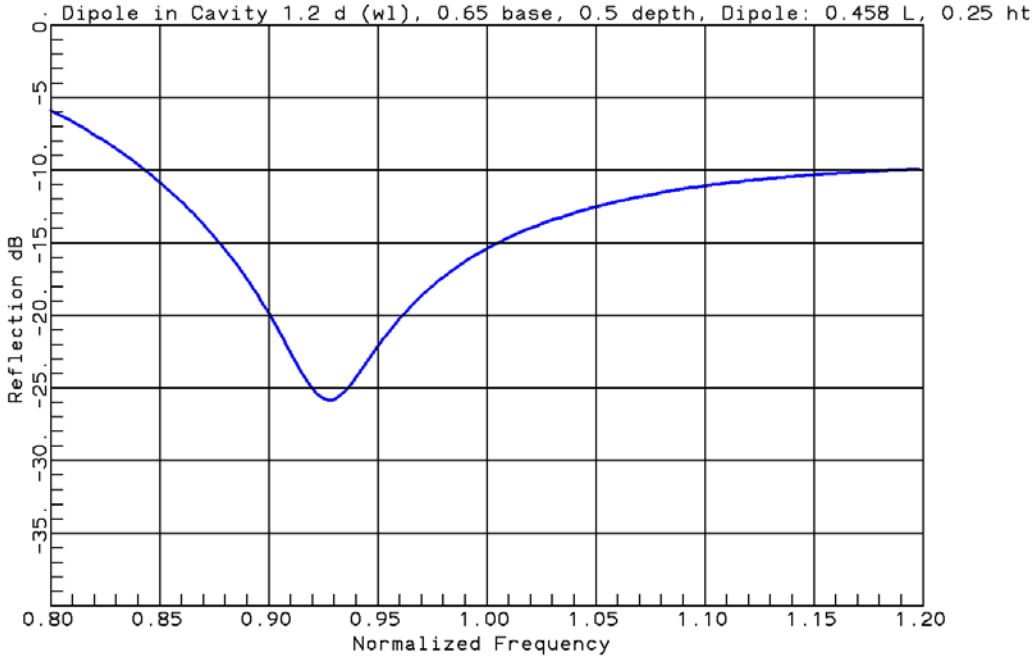
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

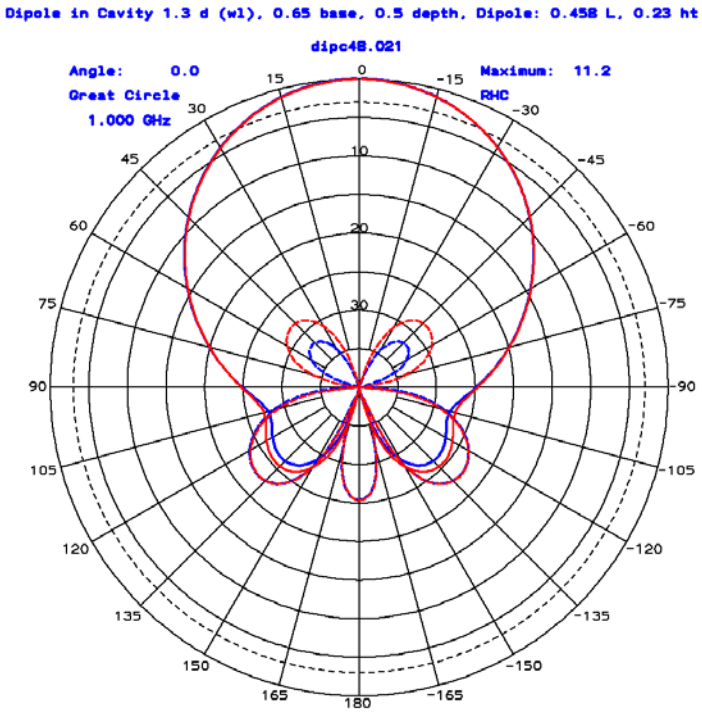



F/B
Dipole in Cavity 1.2 d (wl), 0.65 base, 0.5 depth, Dipole: 0.458 L, 0.25 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

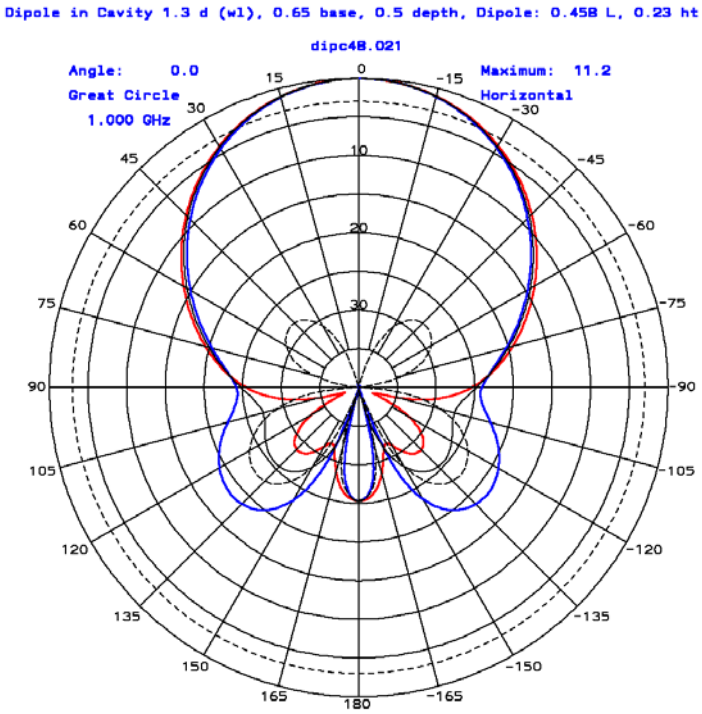

Dipole in Cavity 1.2 d (wl), 0.65 base, 0.5 depth, Dipole: 0.458 L, 0.25 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

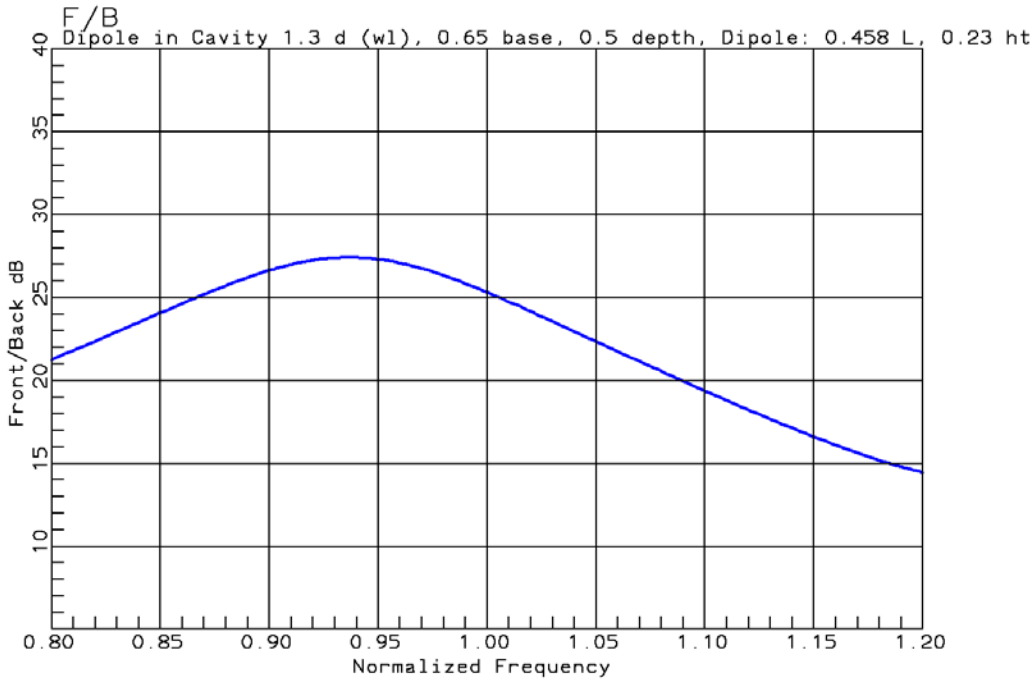
Cavity: 1.3λ Diameter Aperture, 0.5λ Depth, 0.65λ Diameter Base, Dipole: 0.458λ, Height: 0.23λ

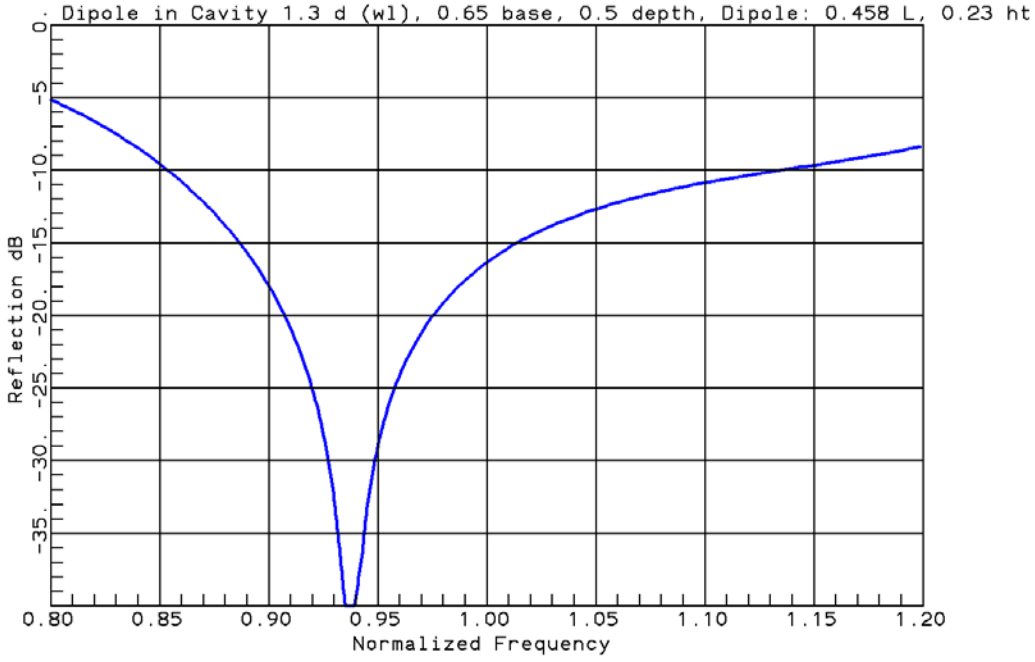
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

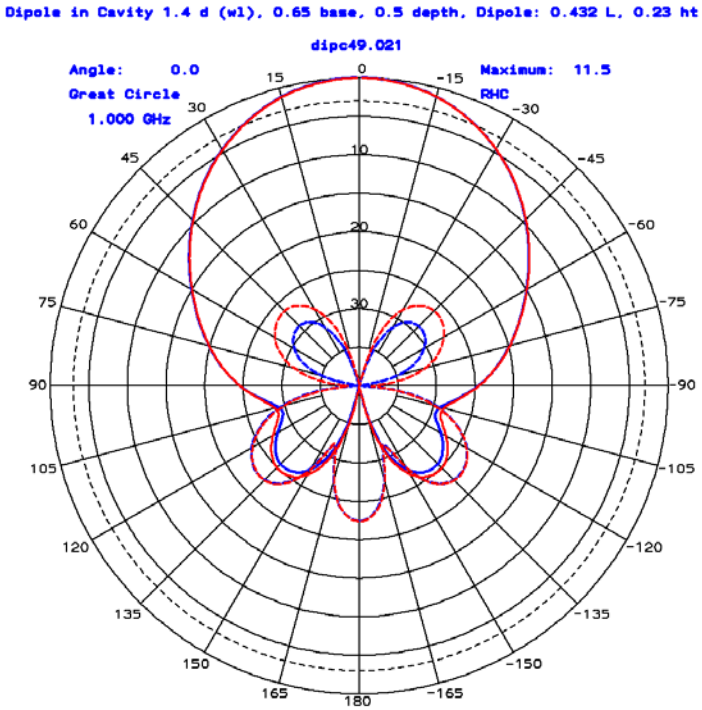



F/B
Dipole in Cavity 1.3 d (wl), 0.65 base, 0.5 depth, Dipole: 0.458 L, 0.23 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

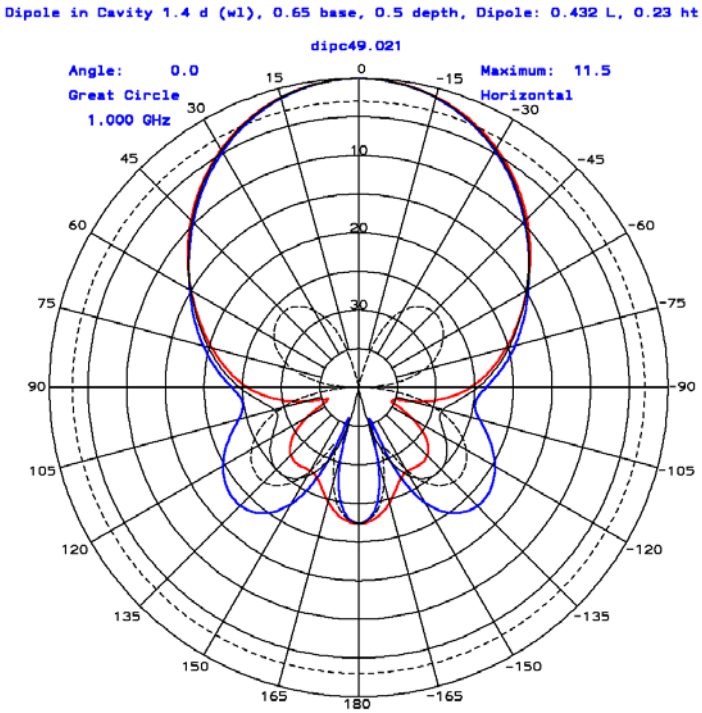

Dipole in Cavity 1.3 d (wl), 0.65 base, 0.5 depth, Dipole: 0.458 L, 0.23 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

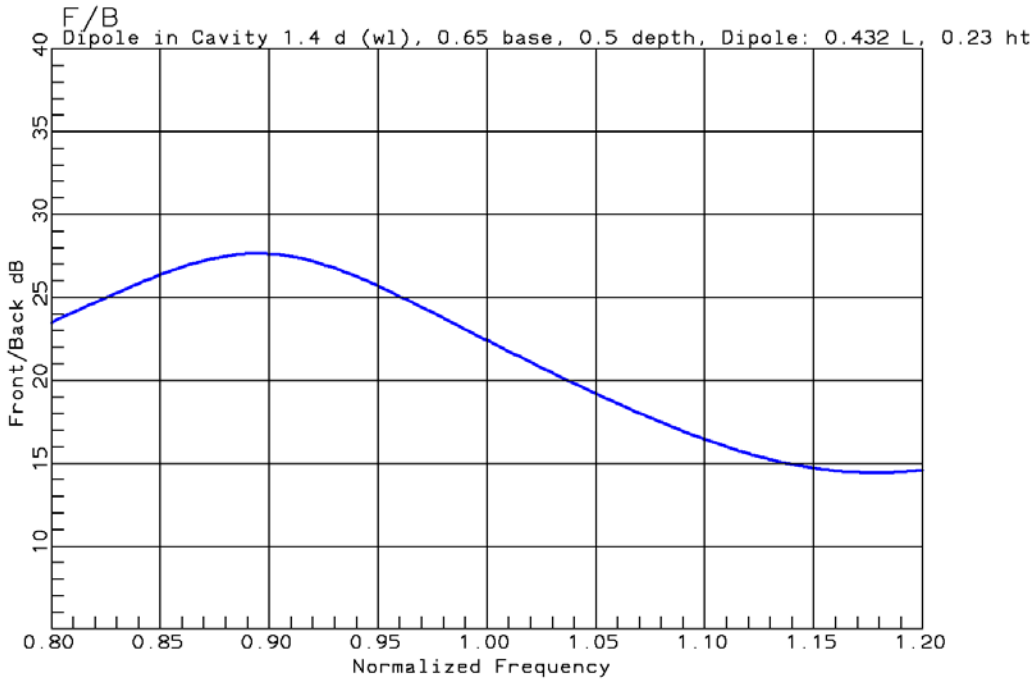
Cavity: 1.4λ Diameter Aperture, 0.5λ Depth, 0.65λ Diameter Base, Dipole: 0.432λ, Height: 0.23λ

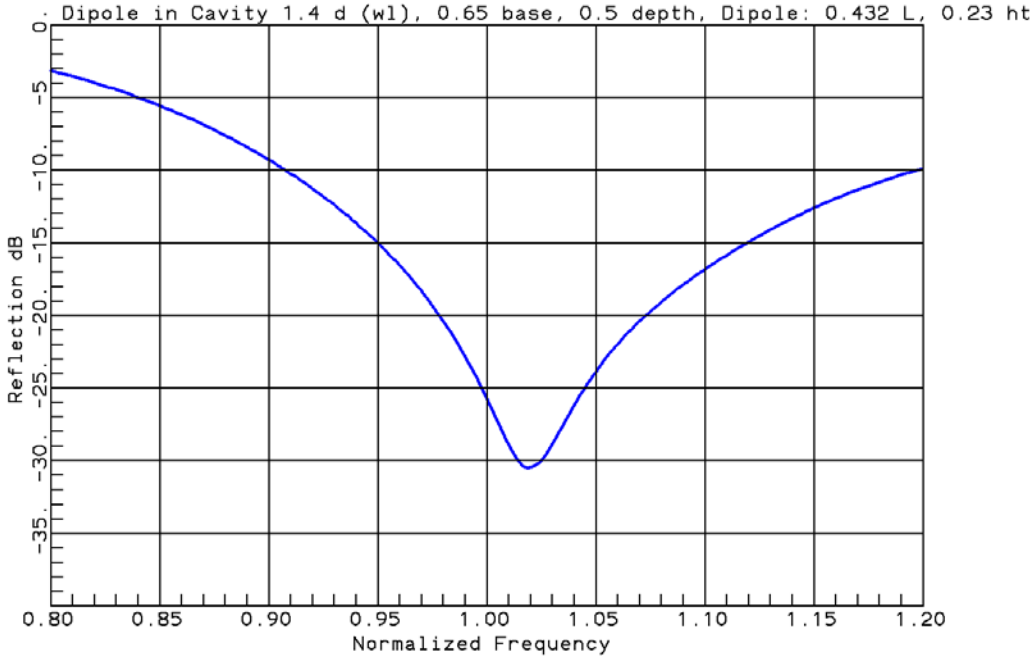
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

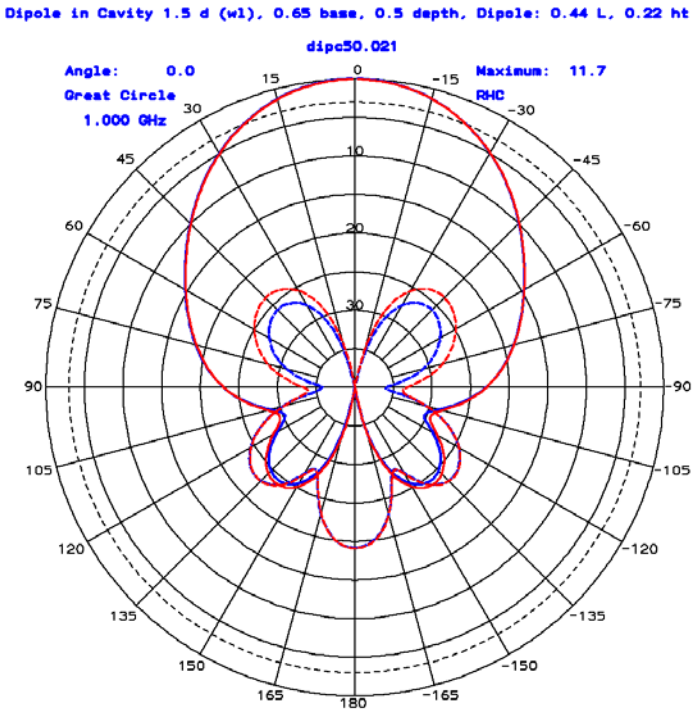



F/B
Dipole in Cavity 1.4 d (wl), 0.65 base, 0.5 depth, Dipole: 0.432 L, 0.23 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

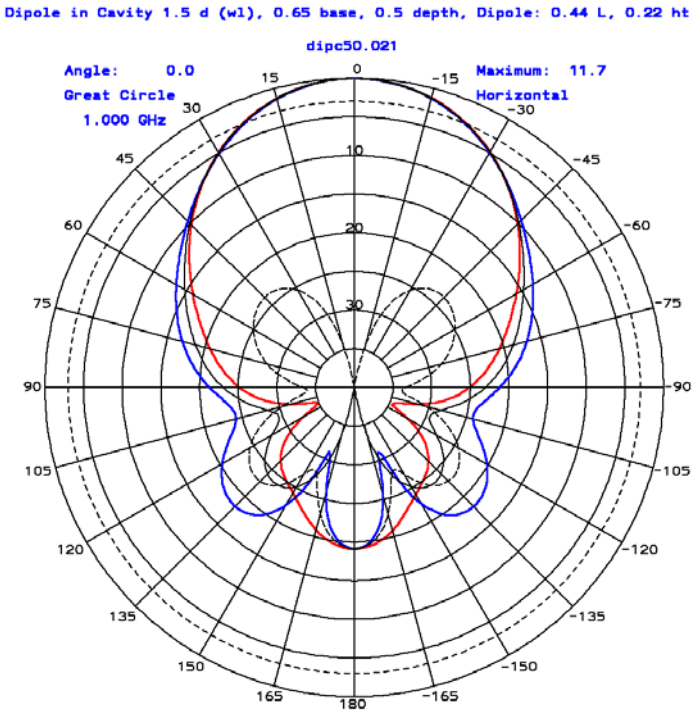

Dipole in Cavity 1.4 d (wl), 0.65 base, 0.5 depth, Dipole: 0.432 L, 0.23 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

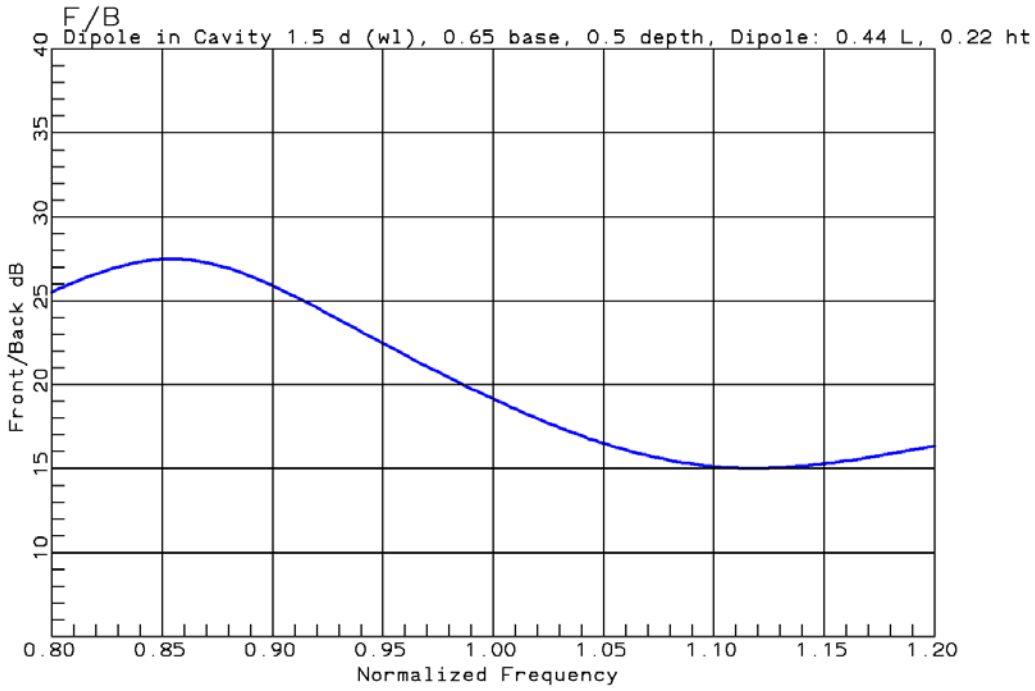
Cavity: 1.5λ Diameter Aperture, 0.5λ Depth, 0.65λ Diameter Base, Dipole: 0.44λ, Height: 0.22λ

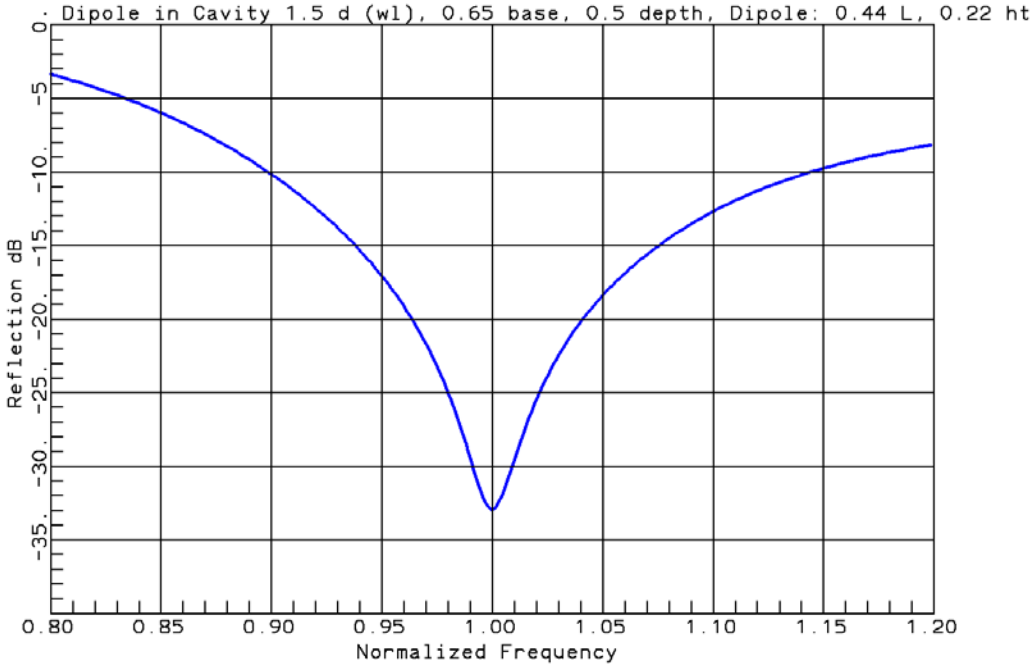
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

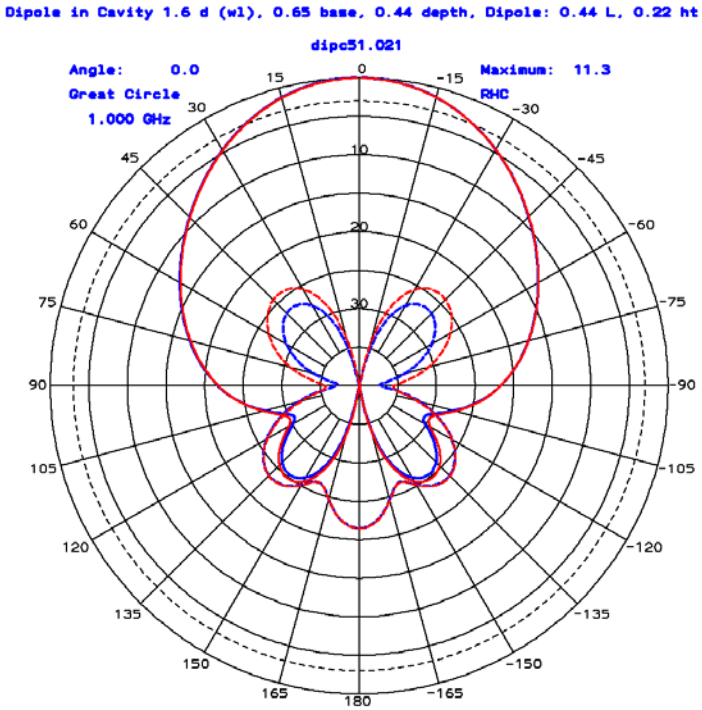



F/B
Dipole in Cavity 1.5 d (wl), 0.65 base, 0.5 depth, Dipole: 0.44 L, 0.22 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

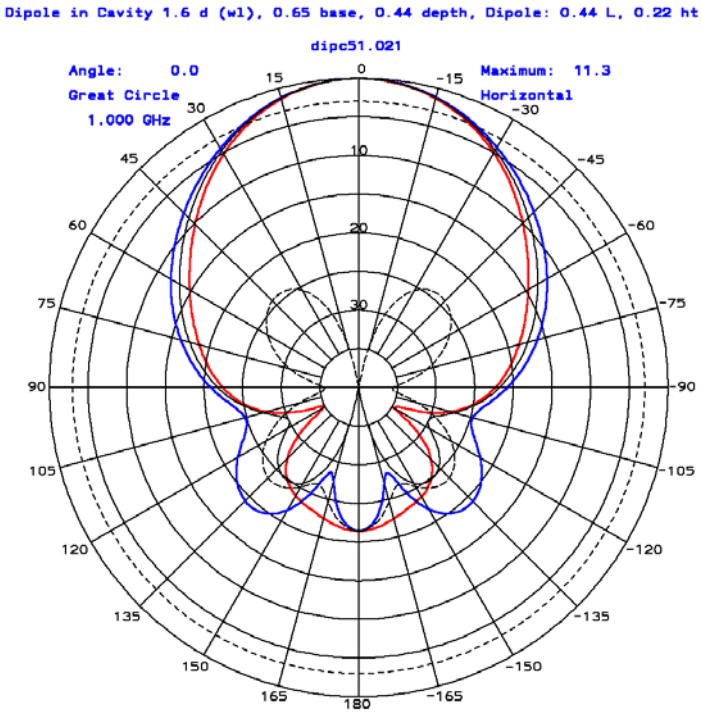

Dipole in Cavity 1.5 d (wl), 0.65 base, 0.5 depth, Dipole: 0.44 L, 0.22 ht
Reflection dB
0
-5
-10
-15
-20
-25
-30
-35
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

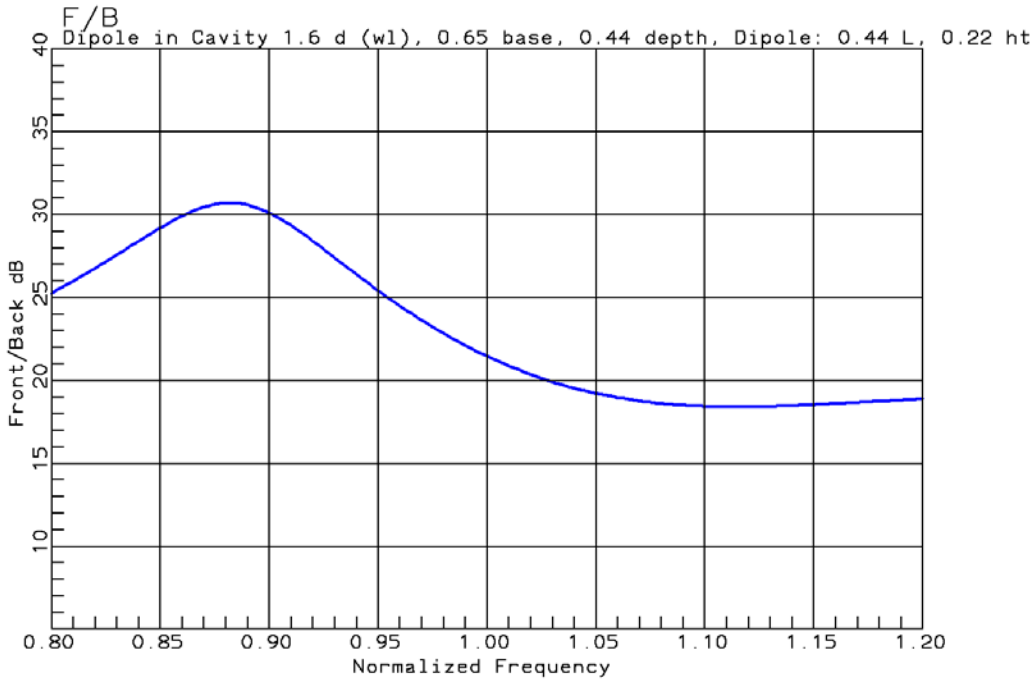
Cavity: 1.6λ Diameter Aperture, 0.44λ Depth, 0.65λ Diameter Base, Dipole: 0.44λ, Height: 0.22λ

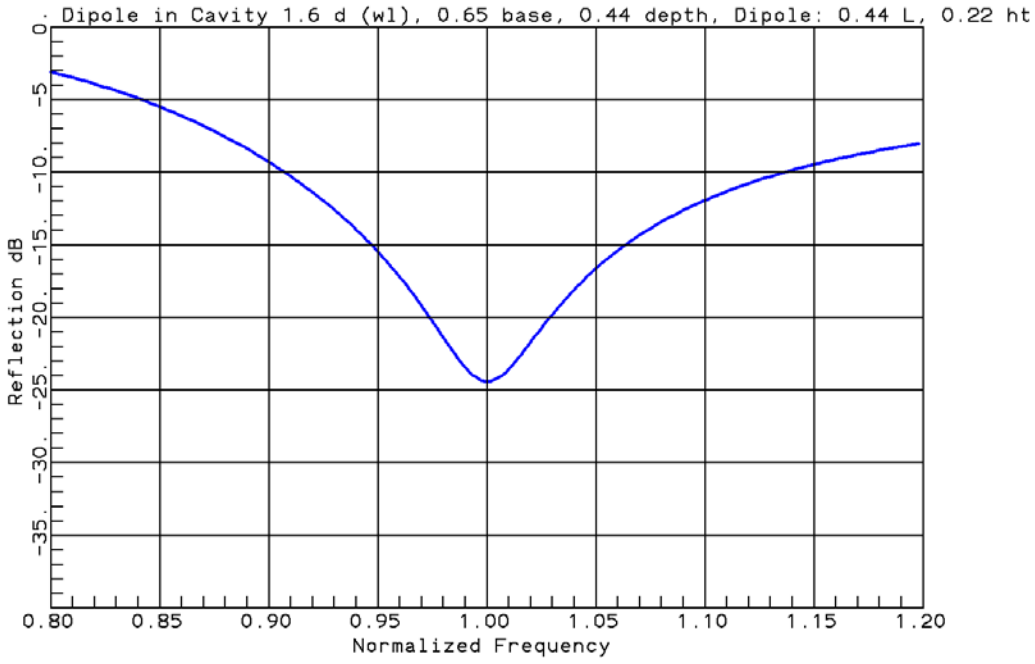
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

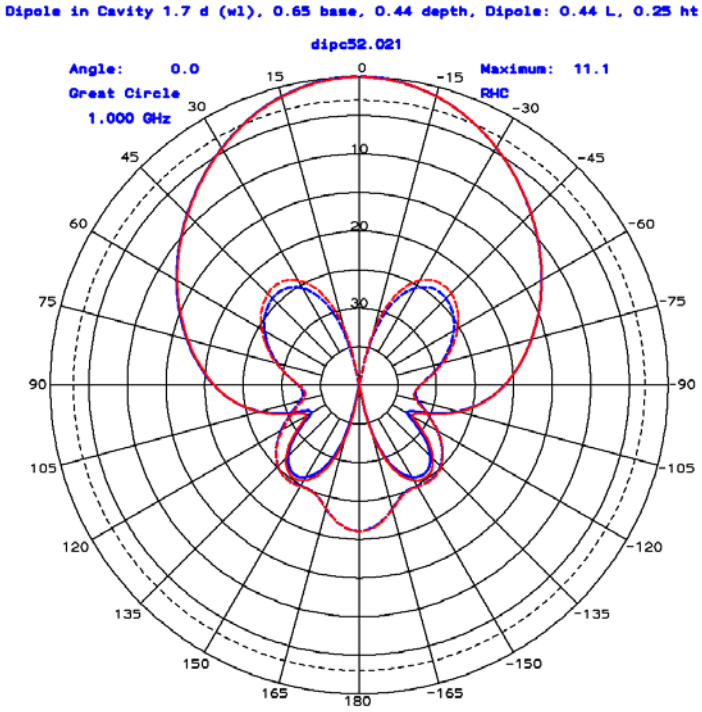



F/B
Dipole in Cavity 1.6 d (wl), 0.65 base, 0.44 depth, Dipole: 0.44 L, 0.22 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

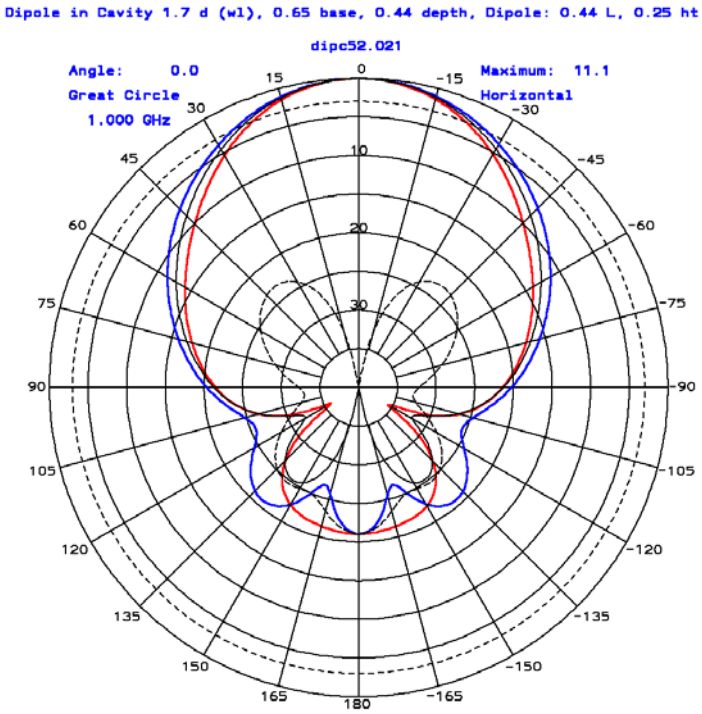

Dipole in Cavity 1.6 d (wl), 0.65 base, 0.44 depth, Dipole: 0.44 L, 0.22 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

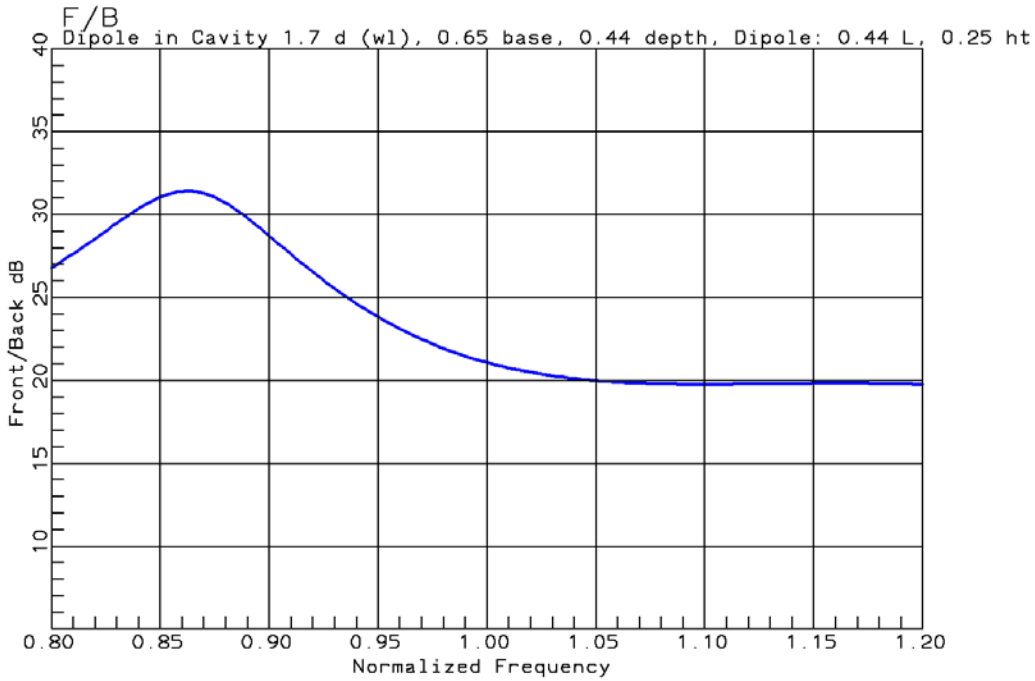
Cavity: 1.7λ Diameter Aperture, 0.44λ Depth, 0.65λ Diameter Base, Dipole: 0.44λ, Height: 0.25λ

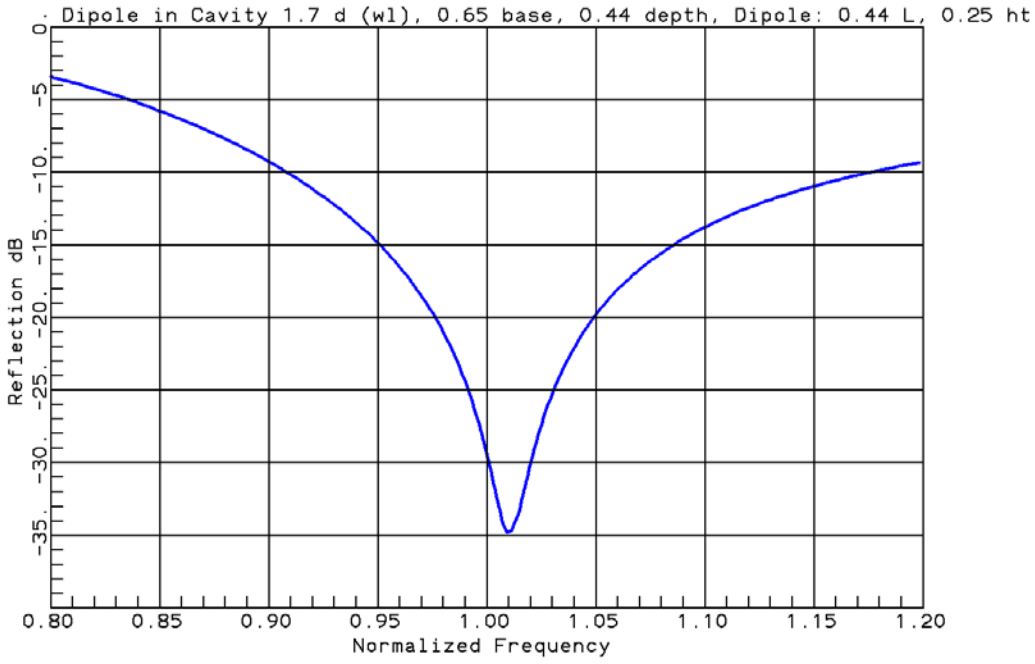
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

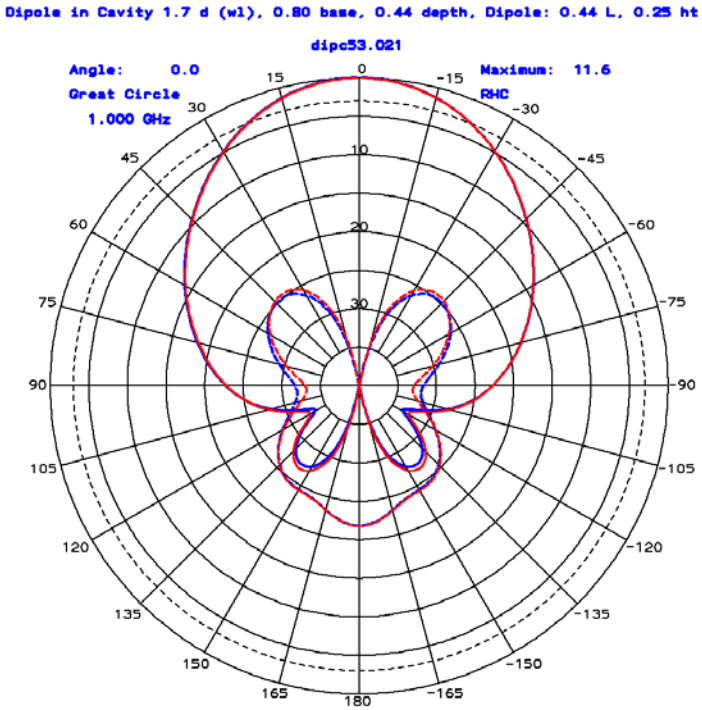



F/B
Dipole in Cavity 1.7 d (wl), 0.65 base, 0.44 depth, Dipole: 0.44 L, 0.25 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

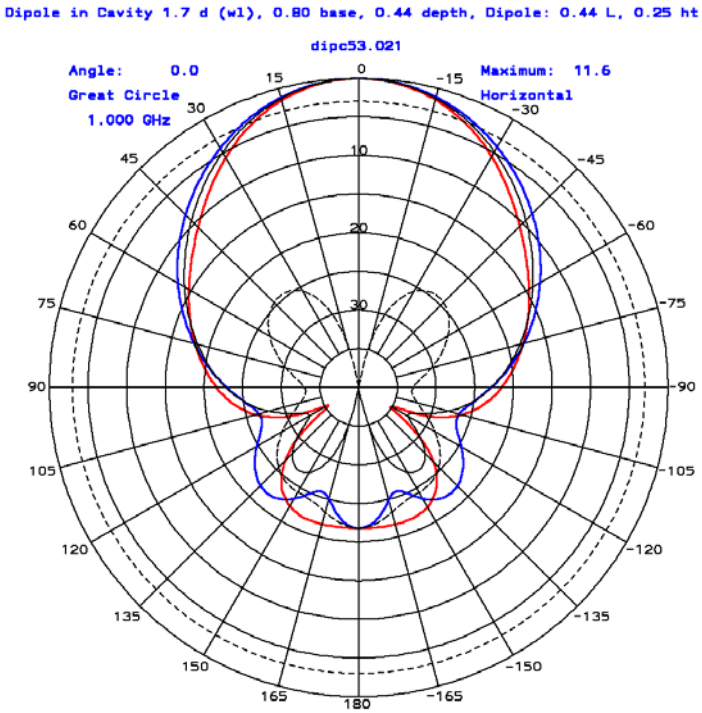

Dipole in Cavity 1.7 d (wl), 0.65 base, 0.44 depth, Dipole: 0.44 L, 0.25 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

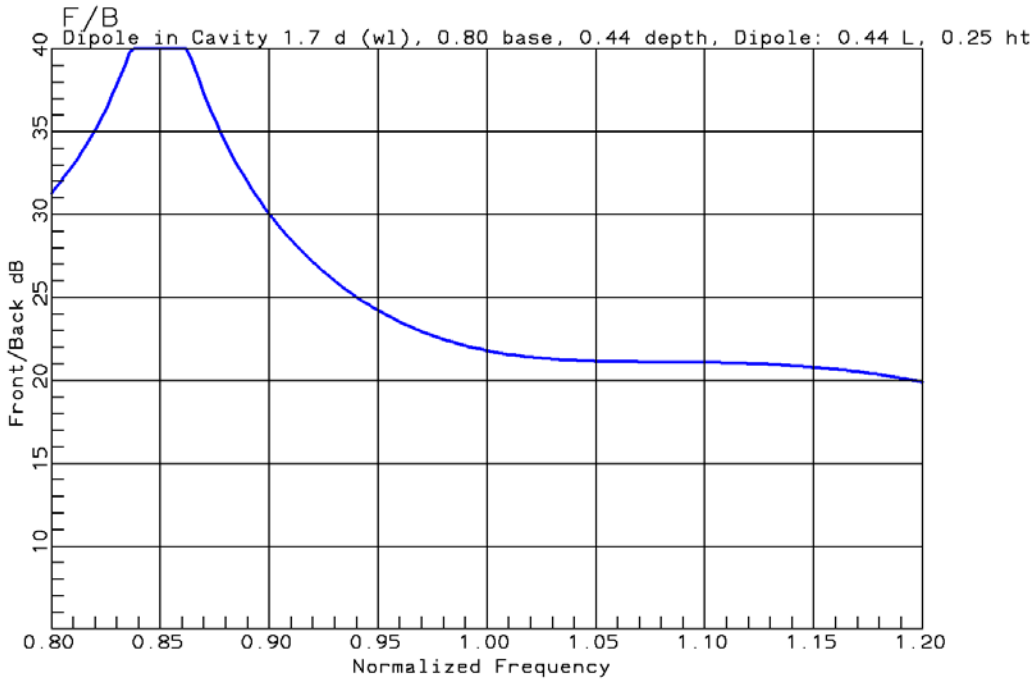
Cavity: 1.7λ Diameter Aperture, 0.44λ Depth, 0.80λ Diameter Base, Dipole: 0.44λ, Height: 0.25λ

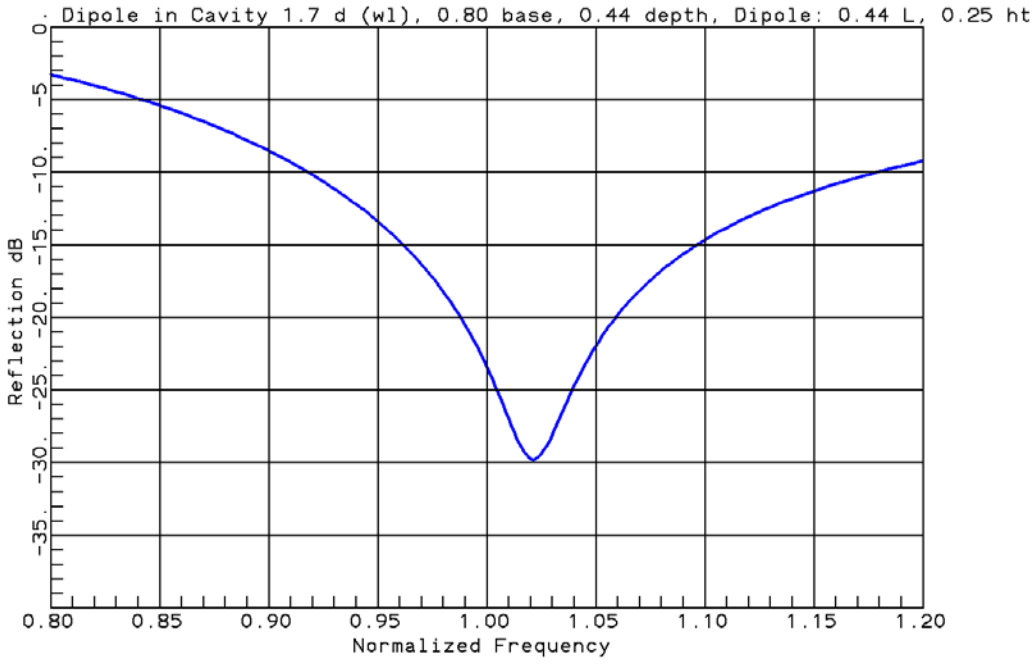
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

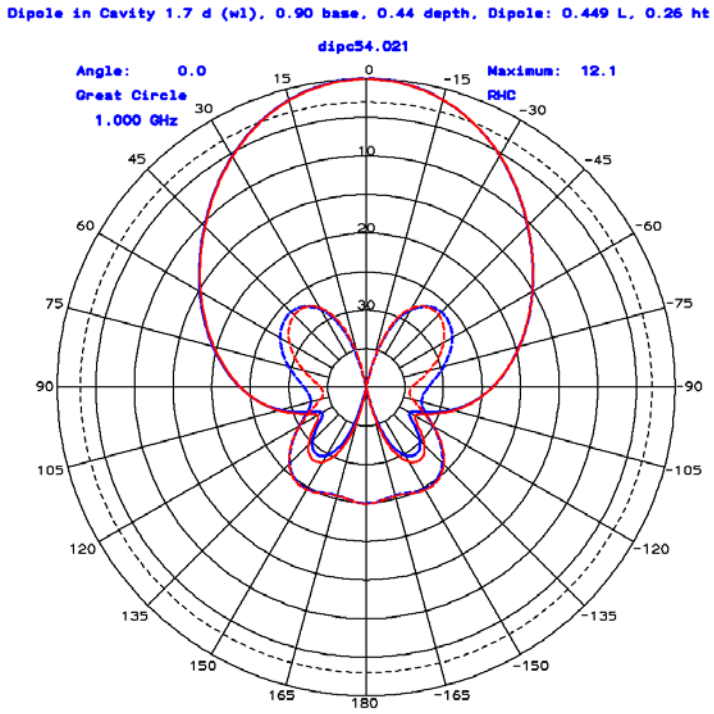



F/B
Dipole in Cavity 1.7 d (wl), 0.80 base, 0.44 depth, Dipole: 0.44 L, 0.25 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

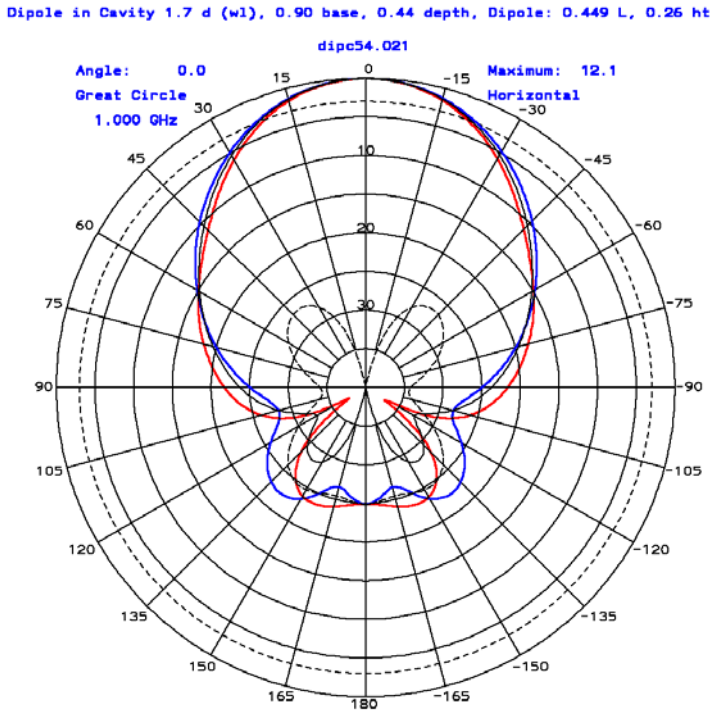

Dipole in Cavity 1.7 d (wl), 0.80 base, 0.44 depth, Dipole: 0.44 L, 0.25 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

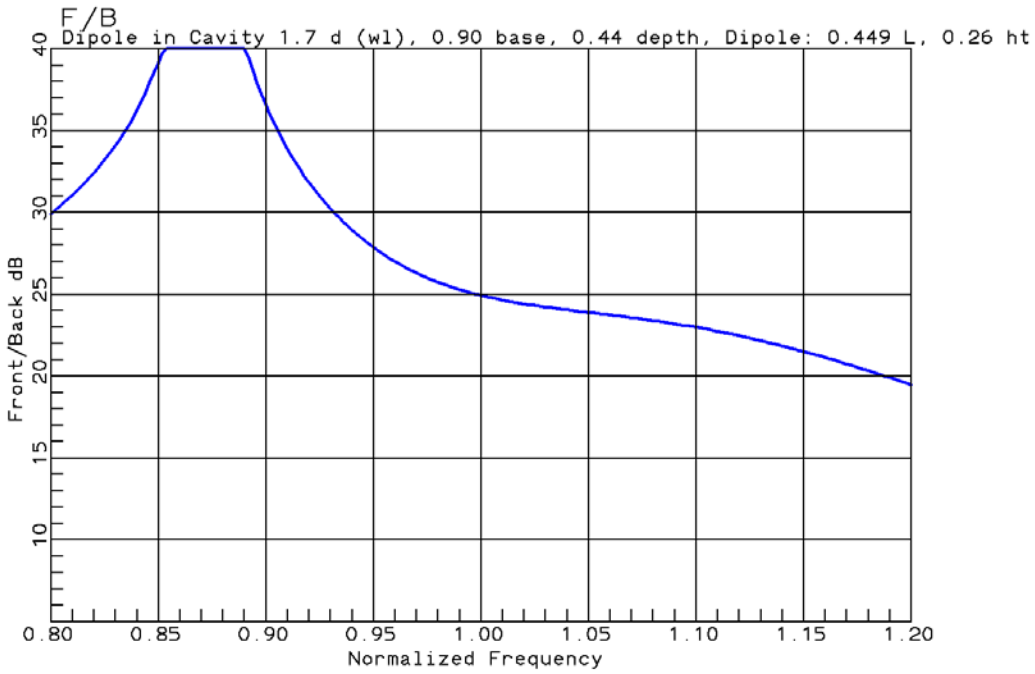
Cavity: 1.7λ Diameter Aperture, 0.44λ Depth, 0.90λ Diameter Base, Dipole: 0.449λ, Height: 0.26λ

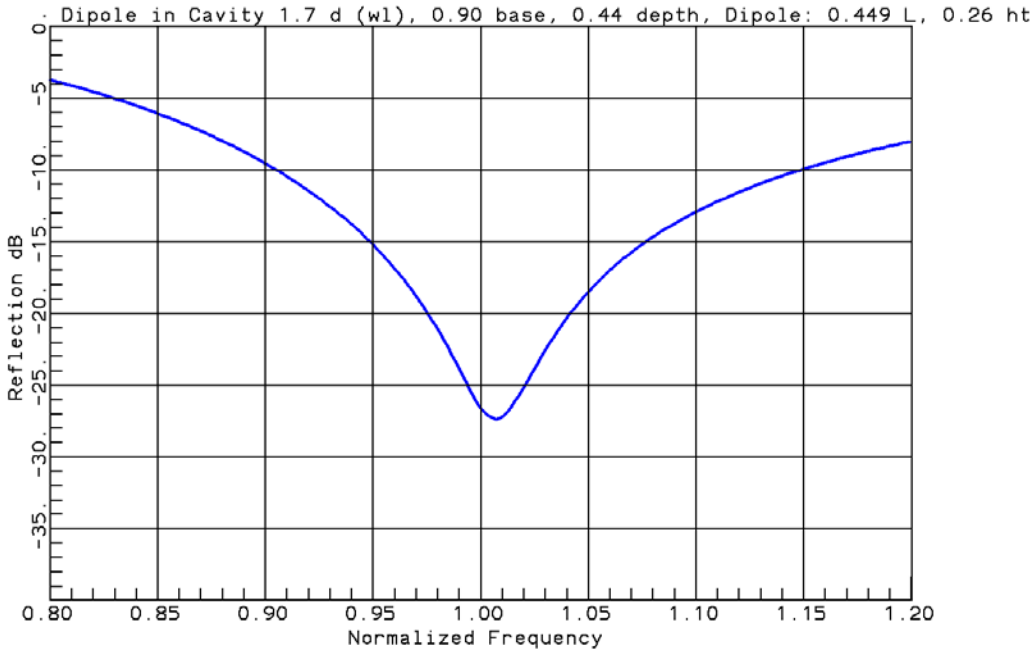
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

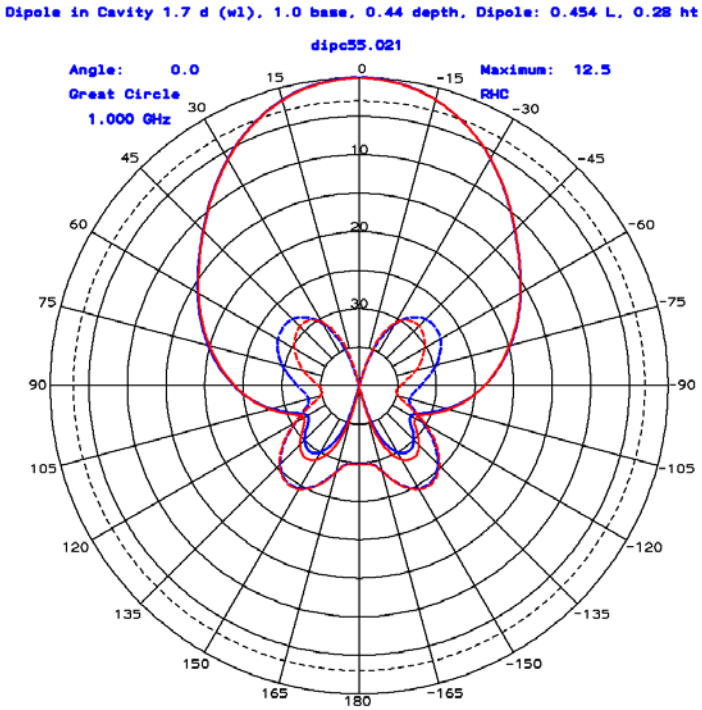



F/B
Dipole in Cavity 1.7 d (wl), 0.90 base, 0.44 depth, Dipole: 0.449 L, 0.26 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

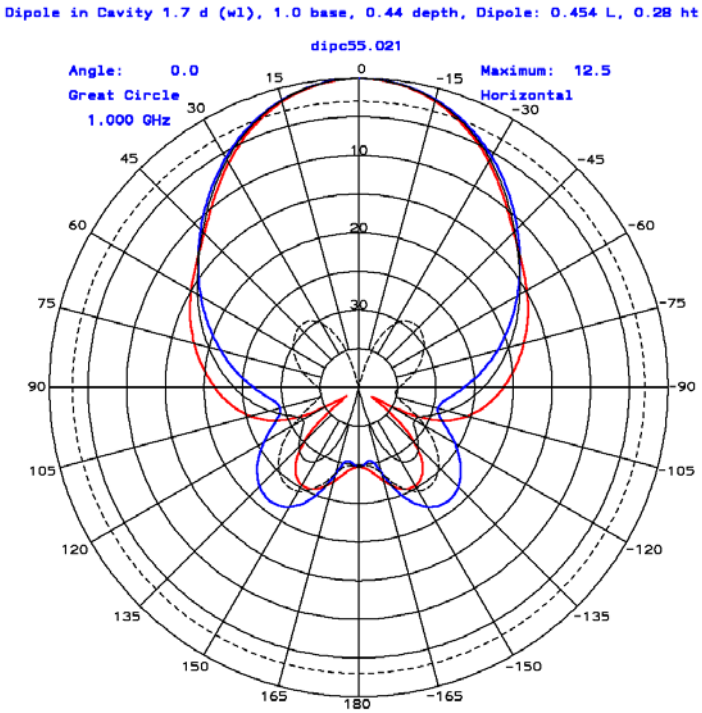

Dipole in Cavity 1.7 d (wl), 0.90 base, 0.44 depth, Dipole: 0.449 L, 0.26 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

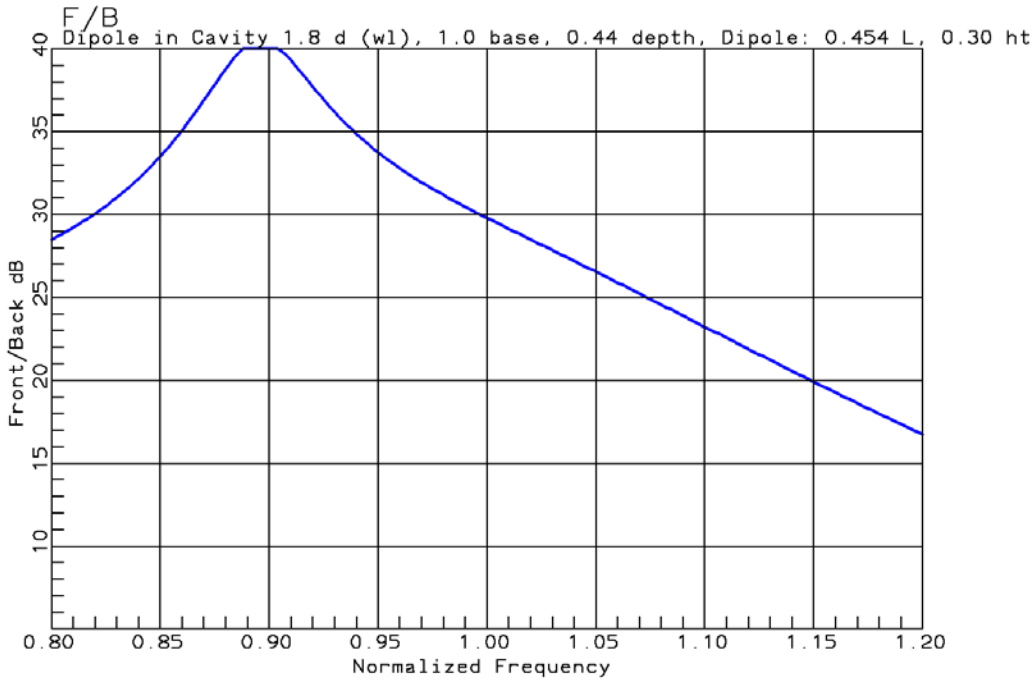
Cavity: 1.7λ Diameter Aperture, 0.44λ Depth, 1.0λ Diameter Base, Dipole: 0.454λ, Height: 0.28λ

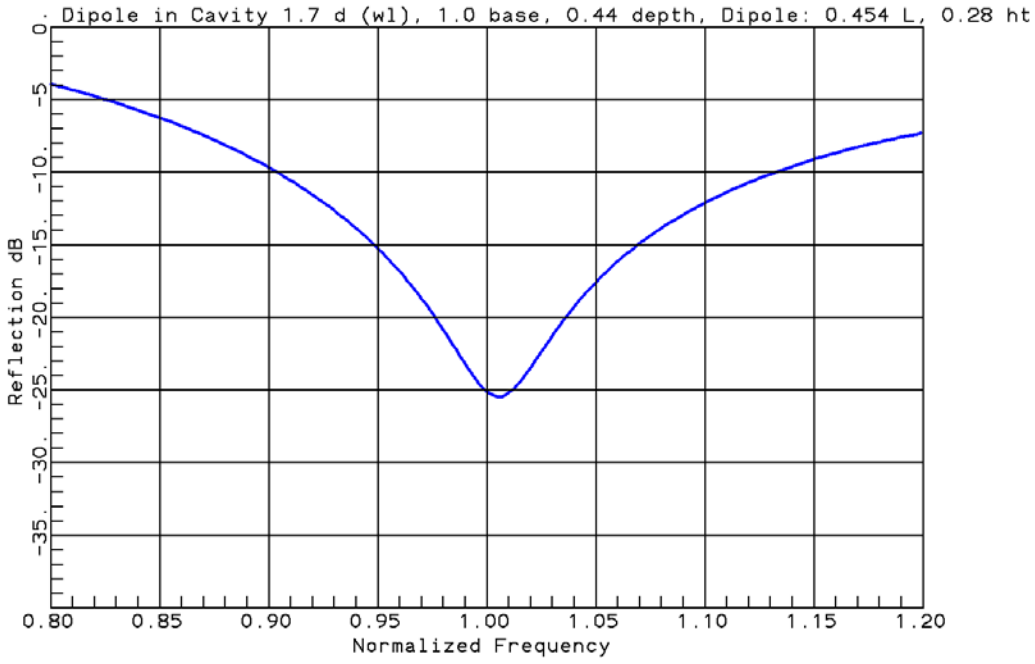
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

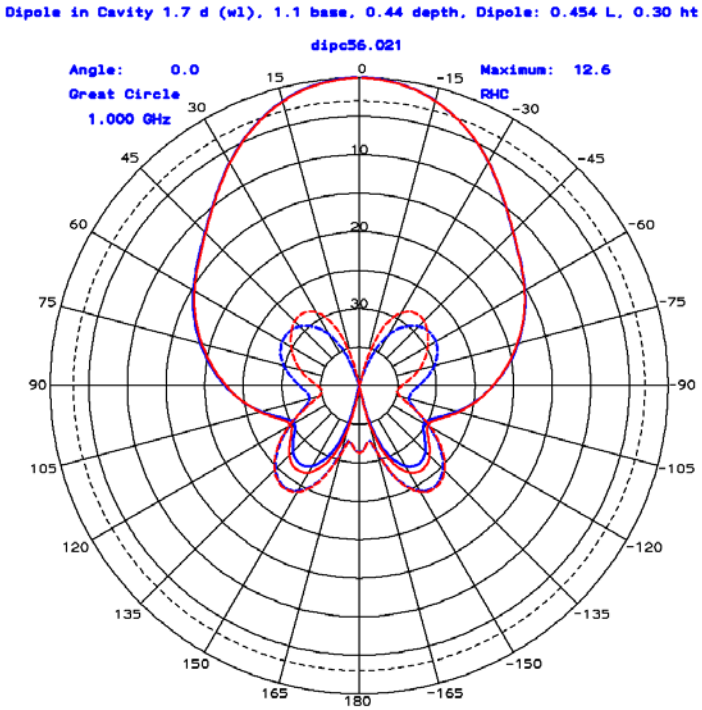



F/B
Dipole in Cavity 1.8 d (wl), 1.0 base, 0.44 depth, Dipole: 0.454 L, 0.30 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

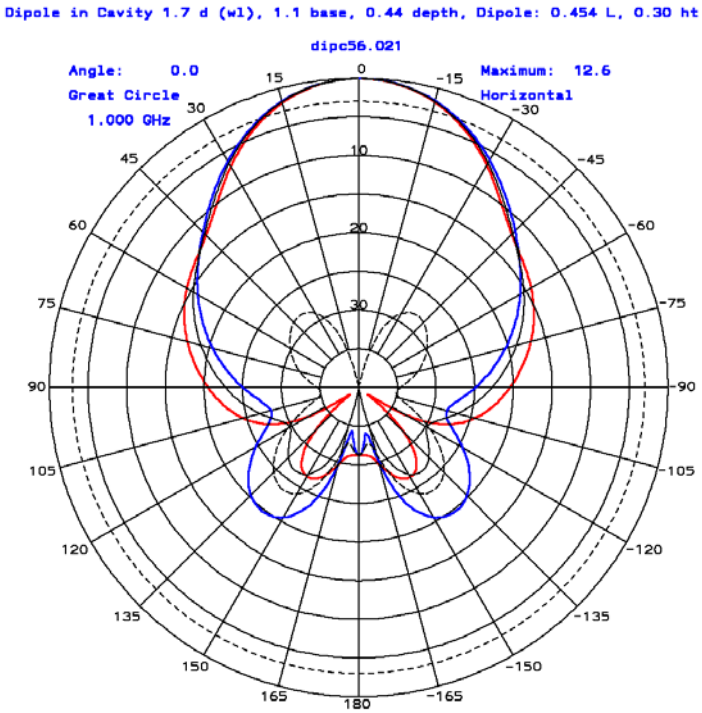

Dipole in Cavity 1.7 d (wl), 1.0 base, 0.44 depth, Dipole: 0.454 L, 0.28 ht
Reflection dB
0.
-5.
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

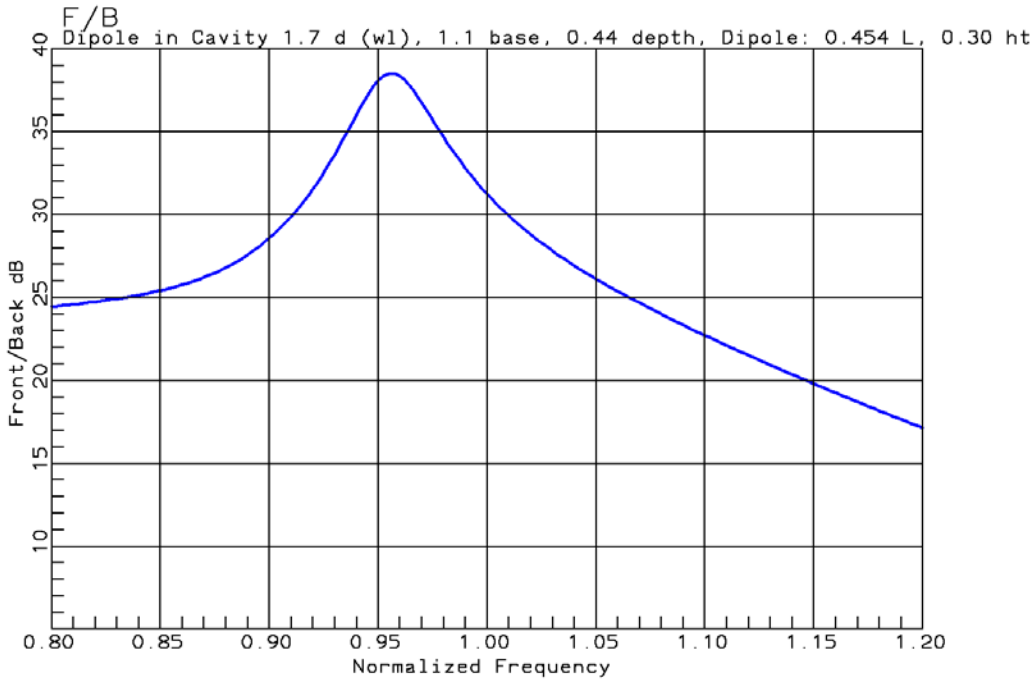
Cavity: 1.7λ Diameter Aperture, 0.44λ Depth, 1.1λ Diameter Base, Dipole: 0.454λ, Height: 0.30λ

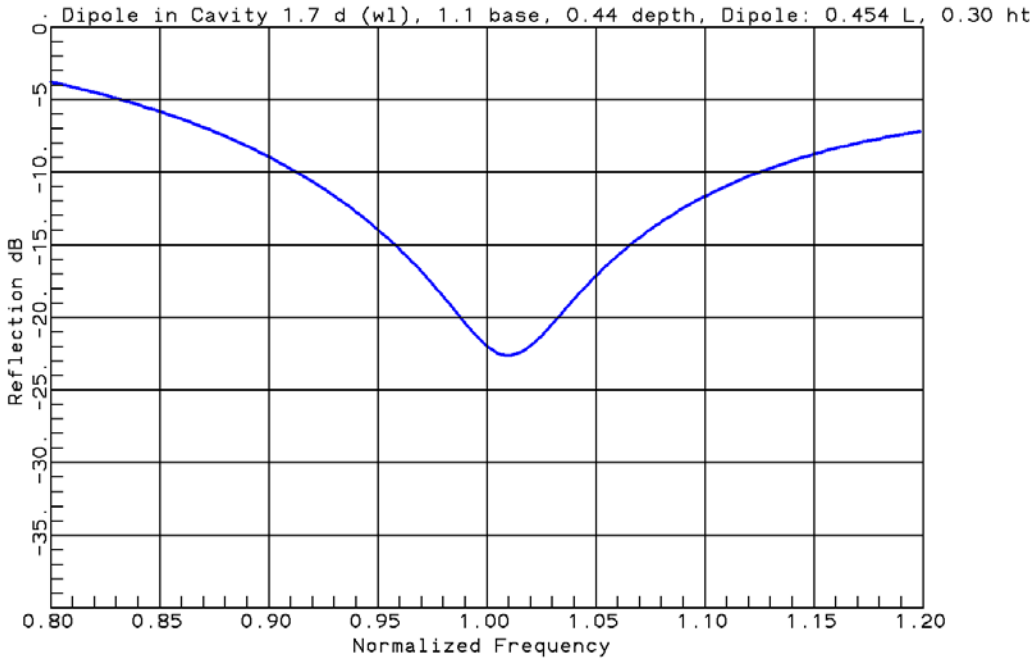
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45

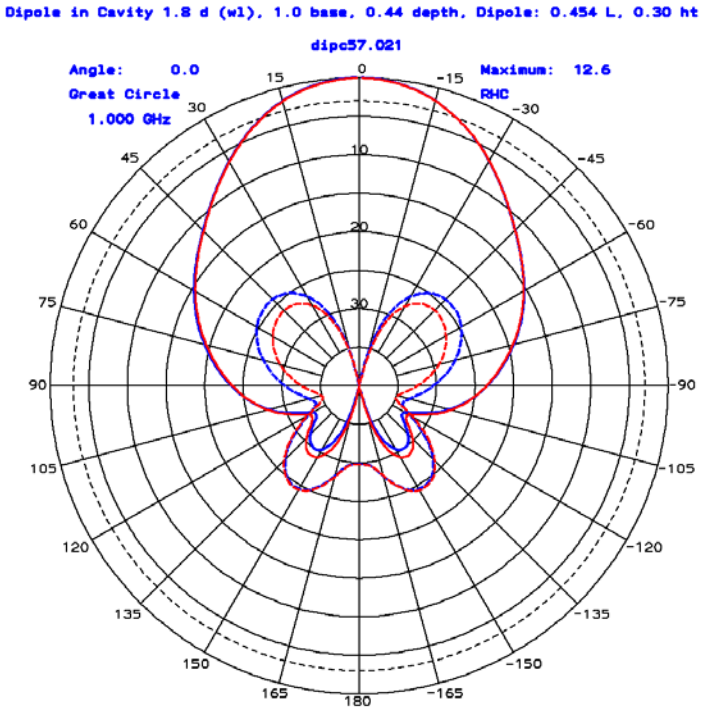



F/B
Dipole in Cavity 1.7 d (wl), 1.1 base, 0.44 depth, Dipole: 0.454 L, 0.30 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

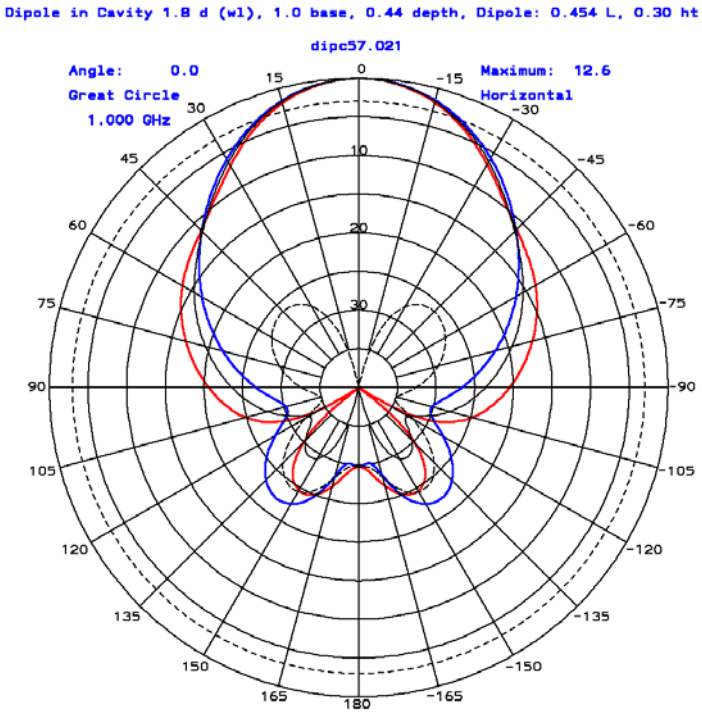

Dipole in Cavity 1.7 d (wl), 1.1 base, 0.44 depth, Dipole: 0.454 L, 0.30 ht
Reflection dB
0.
-5
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency

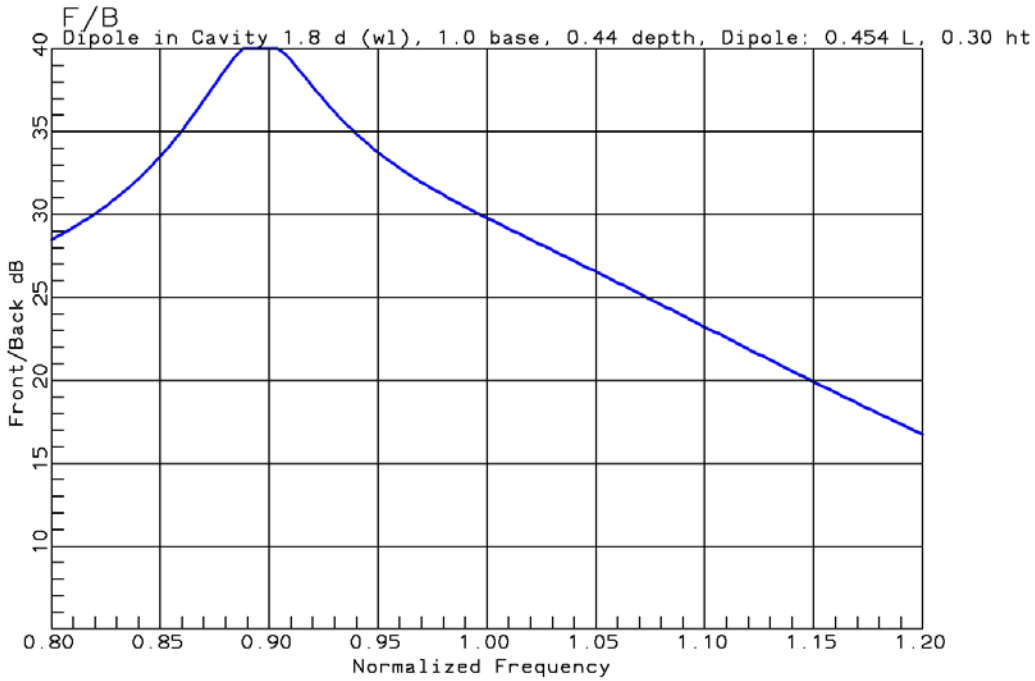
Cavity: 1.8λ Diameter Aperture, 0.44λ Depth, 1.0λ Diameter Base, Dipole: 0.454λ, Height: 0.30λ

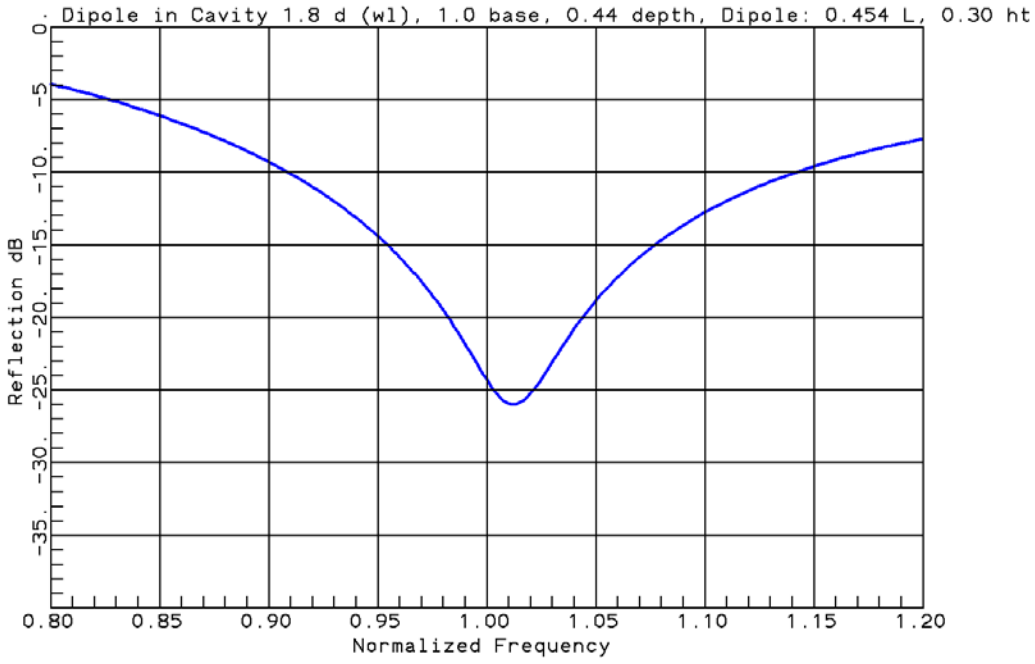
Circular Polarization Blue: φ = 0, Red: φ = 45



Linear Polarization Blue: φ = 0, Red: φ = 90, Black: φ = 45




F/B
Dipole in Cavity 1.8 d (wl), 1.0 base, 0.44 depth, Dipole: 0.454 L, 0.30 ht
Front/Back dB
40
35
30
25
20
15
10
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency


Dipole in Cavity 1.8 d (wl), 1.0 base, 0.44 depth, Dipole: 0.454 L, 0.30 ht
Reflection dB
0.
-5
-10.
-15.
-20.
-25.
-30.
-35.
0.80
0.85
0.90
0.95
1.00
1.05
1.10
1.15
1.20
Normalized Frequency