



# Radiated Composite Gain Data

# Appendix A

Θ(15°)	-6.27/6.49	6.75/7.03	-7.46/8.21	-8.96/9.57	-9.85/10.16	-10.91/12.23	-13.97/15.88	-17.31/17.32	-16.25/14.51	-12.56/10.75	-9.09/8.05	-7.81/7.91	-7.72/6.48	-5.41/5.05	-5.45/6.45	-7.57/8.43	-9.31/10.69	-12.95/16.64	-17.69/18.33	-18.71/18.12	-16.61/14.43	-12.57/11.46	-10.72/9.64	-8.65/8.17
Θ(20°)	-4.99/5.16	5.35/5.67	-6.47/8.71	-8.93/11.91	-12.35/11.46	-11.06/11.53	-13.11/16.72	-17.88/17.79	-14.04/10.51	-8.01/6.66	-5.13/4	-3.87/4.45	-5.2/5.59	-5.25/4.62	-4.63/5.25	-6.23/7.24	-8.55/10.21	-12.72/15.98	-16/14.17	-13.6/14.12	-14.54/14.16	-12.84/11.59	-10.39/9.06	-7.99/6.88
Θ(25°)	-5.01/4.74	-4.77/4.85	-5.46/6.38	-9.11/14.56	-17.56/13.48	-11.77/12.46	-12.75/17.99	-12.75/17.99	-4.96/3.65	-3.28/3.34	-3.36/4.48	-5.17/6.45	-5.44/4.67	-4.12/3.77	-3.74/4.19	-5.53/7.5	-11.6/10.25	-10.12/12.19	-11.6/10.25	-9.6/9.55	-10.06/11.43	-12.68/12.67	-11.6/10.14	-8.92/8.25
Θ(30°)	-5.87/5.47	-6/6.7	-7.33/8.29	-11.07/16.22	-14.93/11.61	-10.81/11.64	-12.09/9.1	-5.38/2.86	-1.77/1.93	-2.92/3.62	-2.84/2.48	-3.08/3.89	-4.56/5.25	-5.94/5.36	-5.05/3.86	-3/3.06	-4.34/6.35	-8.49/8.76	-8.02/7.69	-7.27/6.73	-6.79/7.94	-9.93/11.69	-11.92/11.52	-10.74/9.45
Θ(45°)	-4.63/4.41	-5.74/8.23	-10.8/11.47	-10.84/9.96	-8.75/8.47	-9.1/9.29	-7.43/4.65	-2.38/1.08	-0.95/2.04	-3.43/3.12	-2.12/1.92	-2.3/2.48	-2.46/2.63	-3.01/3.39	-3.75/3.5	-2.77/4.25	-3.13/4.77	-6.43/5.65	-5.06/5.85	-5.89/4.91	-4.5/4.9	-5.98/7.3	-8.06/8.6	-8.43/7.11
Θ(52.5°)	-4.21/3.99	-5.53/8.19	-8.78/7.3	-6.4/6.12	-5.89/6.67	-8.31/8.02	-4.77/2.31	-1.17/0.95	-1.72/3.75	-4.12/2.28	-2.02/2.8	2.912/3.7	1.450/8.4	0.470/0.9	-0.16/0.3	-0.64/1.71	-3.2/2.64	-4.01/3.35	-3.29/3.55	-4.11/5.06	-5.56/5.48	-5.3/4.4		
Θ(60°)	-3.2/2.94	-4.13/5.15	-4.07/3.09	-3.59/5.21	-5.83/5.85	-6.08/5.19	-2.66/1.24	-1.86/3	-3.85/5.87	-6.7/3.79	-1.88/1.08	0.472/0.2	2.15/1.1	-0.16/0.26	0.6/1.15	1.010/0.8	0.80/3	-0.29/0.34	-0.12/0.95	-1.41/1.67	-2.54/3.33	-3.72/4.57	-4.88/3.92	-3.09/2.29
Θ(67.5°)	-2.26/1.95	-2.45/2.96	-2.47/2.14	-2.91/6.41	-4.95/3.62	-2.57/2.4	-1.86/2.05	-4.6/5.22	-4.69/6.81	-7.71/7.72	-6.85/6.4	-4.44/3.51	-4.08/5.87	-8.47/8.03	-4.06/1.88	-1.69/1.91	-0.69/0.5	0.25/0.16	-0.20/0.37	0.21/0.87	-2.4/4.34	-4.8/4.76	-5.15/3.96	-2.48/1.74
Θ(75°)	-2.85/2.56	-2.36/2.86	-3.99/3.3	-2.14/1.9	-2.48/1.9	-0.67/1.24	-2.44/3.13	-3.83/2.66	-3.2/6.84	-7.69/6.24	-5.24/3.75	-3.53/4.13	-4.49/6.68	-5.65/9.18	-18.73/12.35	-10.44/10.6	-7.07/3.11	-1.4/1.55	-2.35/0.46	-2.55/5.93	-6.71/4.19	-4.79/4.29	-2.46/1.9	
Θ(82.5°)	2.89/3	-2.5/2.85	4.21/3.69	-1.13/0.23	-1.98/2.2	-0.19/0.49	-1.88/1.64	0.95/0.93	3.22/3.79	-1.82/1.83	2.26/3.41	4.05/2.65	-1.93/1.64	-1.43/2.58	5.67/7.8	8.36/10.13	-11.93/9.29	4.68/3.29	5.95/3.81	2.1/3.01	3.26/6.9	7.83/3.96	4.77/4.75	2.43/1.67
Θ(90°)	-2.68/3.47	-3.26/3.25	-4.85/6.02	-3.09/1.31	-3.41/2.32	0.6/1.1	-2.09/0.42	0.82/0.34	1.1/1.84	0.15/0.74	-2.32/1.81	-2.76/0.78	0.23/0.07	0.09/0.71	-2.06/2.66	-3.51/5.49	-6.83/8.96	-9.51/5.7	-7.68/11.15	-8.7/8.23	5.44/6.91	-7.74/5.2	5.51/6.05	-3.66/2.24
Θ(97.5°)	-4.27/6.35	-7/7.11	-9.38/13.01	-5.8/2.58	-4.66/2.86	-0.1/1.34	-2.23/0.33	0.97/1.47	-5.3/1.55	-0.68/2.86	-3.93/8.48	-17.48/8.24	-5.17/3.26	-2.36/2.76	-2.76/2.56	-4.32/7.1	-7.71/8.56	9.86/6.48	6.77/10.44	-13.91/19.12	-10.47/8.38	-7.9/5.63	-4.55/4.15	-2.94/2.22
Θ(105°)	2.67/4.86	-7.77/11.68	18.34/17.11	-7.51/4.92	-9.02/5.03	-1.14/1.73	-2.49/1.52	-1.84/4.53	8.21/4.58	-3.21/5.21	-5.99/5.71	-11.49/14.64	-7.75/7.63	8.1/10.18	-6.82/5.46	-7.91/13	-14.26/12.46	-12.39/9.35	-7.89/8.65	8.91/11.15	-16.3/14.81	-12.51/9.11	5.08/2.49	-1.15/1.02
Θ(112.5°)	6.41/7.7	-9.47/13.38	-18.73/14.42	-9.58/9.25	-10.95/4.16	-1.67/3.1	6.05/7.49	-8.58/10	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83	-11.11/7.83
Θ(120°)	-12.95/10.86	-11.1/13.81	-17.81/12.52	-8.31/7.64	-8.11/6.61	-6.64/10.09	-16.81/18.21	-19.37/18.66	-17.42/11.09	-6.81/6.22	-9.74/10.01	-9.53/12.04	-12.37/8.12	-5.52/5.02	-6.95/9.74	-12.88/10.09	-10.27/11.41	-11.69/9.19	-18.88/10.34	-7.57/7.05	9.06/14.46	-14.78/12.52	-13.93/18.32	-19.03/14.61
Θ(127.5°)	-6.54/10.78	-17.31/19.43	-17.26/10.68	-6.93/6.89	-10.44/16.09	-17.93/19.17	-18.69/13.9	-10.42/9.73	-8.87/7.84	-7.42/10.31	-16.88/8.08	-4.58/3.13	-1.84/0.37	0.25/0.33	-2.07/4.71	-7.86/10.7	-10.69/7.59	-6.56/9.27	-18.32/16.43	-11.15/8.4	-7.33/7.1	-6.36/5.67	-5.33/5	-4.42/4.27
Θ(135°)	-2.1/4.85	-8.11/9.43	-10.69/11.78	-11.93/14.58	-17.46/12.19	-10.18/10.75	-10.81/9.12	-7.71/6.95	-5.44/4.24	-4.8/8.48	-1.47/6.07	1.77/2.39	2.10/9.7	-0.63/2.57	-4.99/8.65	-10.14/7.24	-6.68/8.9	-10.19/9.21	-7.57/7.66	6.97/9.59	-4.73/3.48	-2.47/1.48	-0.73/0.85	
Θ(142.5°)	5.31/7.74	-8.79/8.5	9.71/11.29	-9.69/6.9	-5.09/4.77	-6.09/8.48	-10.15/11.09	-10.73/7.7	4.38/2.75	2.96/5.59	8.69/5.74	2.54/1.03	0.81/1.26	2.22/3.67	5.04/5.89	6.67/7.38	7.24/6.91	8.29/11.6	10.57/6.57	4.64/3.98	3.57/3.43	-3.87/4.62	4.85/4.02	3.03/2.98
Θ(150°)	-11.2/8.66	-5.8/4.28	-3.8/3.23	-3.38/3.23	-3.76/5.58	-9.78/18.09	-18.05/12.97	-10.04/7.29	5.11/4.01	-4.01/5.15	-7.55/7.52	-4.81/3.84	-4.74/7.69	9.21/11.55	-11.65/9.85	-7.64/6.2	-5.58/4.17	-8.06/11.58	-15.39/11.39	-7.38/5.19	-3.82/2.97	-2.83/3.4	-4.62/6.14	-7.34/7.87
Θ(157.5°)	-9.51/8.17	-6.76/6.11	-6.38/7.02	-7.51/8.32	-10.43/15.42	-17.86/15.35	-11.08/9.52	-8.94/8.56	-8.68/9.5	-10.37/10.74	-11.16/11.62	-11.79/12.6	-14.18/13.57	-11.82/10.82	-10.08/9.1	-7.89/7.06	-7.11/8.07	9.86/11.61	-13.23/14.44	-14.19/12.75	-11.2/9.51	-8.02/6.96	-6.47/6.85	-7.91/8.63
Θ(165°)	-13.53/15.72	-17.94/17.8	-18.27/17.78	-15.84/15.33	-15.3/14.44	-13.1/11.9	-11.41/11.74	-12.75/13.93	-15.38/17.42	-18.66/19.06	-17.73/18.45	-19.01/18.4	-19.25/17.35	-19.06/17.8	-18.77/18.13	-18.41/19.16	-15.79/14.76	-13.65/12.25	-10.87/9.87	9.36/9.52	-10.19/11.47	-13.12/14.94	-16.35/16.63	-13.97/12.54
Θ(172.5°)	-5.93/5.92	-6.04/6.23	-6.67/7.3	-7.92/8.91	-10.08/11.37	-12.7/13.68	-14.3/14.67	-14.88/15.84	-14.57/14.09	-13.92/13.8	-13.1/9.81	-9.31/9.29	9.46/9.69	9.96/10.57	-11.32/12.82	-13.94/16.66	-15.11/14.64	-14.4/12.1	-10.5/9.05	7.88/7.08	6.49/6.2	6.32/6.64	-7.03/7.02	-6.66/6.42
Θ(180°)	-5.52/4.42	-5.71/6.3	-7.26/8.48	-10.11/11.29	-14.96/18.76	-18.95/18.62	-16.77/14.61	-13.26/12.17	-10.02/9.72	-8.27/7.22	-7.04/7.44	-7.66/7.32	-6.77/6.15	-6.22/6.56	-7.29/8.32	-9.91/11.43	-13.87/17.44	-19.54/17.3	-14.52/12.48	-10.95/9.89	-8.98/8.16	-7.48/6.87	-6.7/5.8	-5.29/4.72
Gain	Φ(0°)/Φ(7.5°)	Φ(15°)/Φ(22.5°)	Φ(30°)/Φ(37.5°)	Φ(45°)/Φ(52.5°)	Φ(60°)/Φ(67.5°)	Φ(75°)/Φ(82.5°)	Φ(90°)/Φ(97.5°)	Φ(105°)/Φ(112.5°)	Φ(120°)/Φ(127.5°)	Φ(135°)/Φ(142.5°)	Φ(150°)/Φ(157.5°)	Φ(165°)/Φ(172.5°)	Φ(180°)/Φ(187.5°)	Φ(195°)/Φ(202.5°)	Φ(210°)/Φ(217.5°)	Φ(225°)/Φ(232.5°)	Φ(240°)/Φ(247.5°)	Φ(255°)/Φ(262.5°)	Φ(270°)/Φ(277.5°)	Φ(285°)/Φ(292.5°)	Φ(300°)/Φ(307.5°)	Φ(315°)/Φ(322.5°)	Φ(330°)/Φ(337.5°)	Φ(345°)/Φ(352.5°)
Gain	1.88/1.85	1.70/6/13	1.69/13/52	1.27/8/15.7	1.16/11.73	1.12/13.74	1.47/14.19	1.45/15.72	1.58/4.191	1.84/1.744	1.87/4.185	1.85/18.79	1.805/18.76	1.885/18.65	1.855/18.69	1.84/18.47	1.842/12.51	1.199/12.13	1.11/31.11	1.11/31.11	1.184/13.02	1.375/14.87	1.78/18.49	1.86/18.33
Θ(7.5°)	-18.26/17.36	-18.37/18.77	-18.89/19.56	-15.73/13.98	-12.36/12.14	-12.44/11.19	-12.01/13.03	-13.72/14.64	-13.13/14.69	-18.6/18.27	-18.62/18.88	-18.95/15.77	-14.21/15.68	-15.77/14.29	-13.69/13.81	-12.8/13.7	-15.8/17.83	-18.25/17.87	-17.99/19.14	-17.92/17.93	-18.5/18.53	-19.19/19.14	-17.58/18.13	
Θ(11.25°)	-18.8/18.2	-19.11/18.62	-18.97/18.93	-17.24/13.17	-12.74/11.73	-10.66/10.18	-11.21/12.52	-13.97/14.11	-15.55/15.63	-17.56/17.56	-18.72/16.56	-18.84/18.86	-18.27/18.1	-19.21/18.23	-18.41/19.17	-18.66/18.38	-16.49/19.19	-17.42/17.65	-12.36/10.91	-11.29/12.17	-15.81/17.49	-18.64/19.41	-19.14/17.75	-18.99/18.95
Θ(22.5°)	-17.77/18.63	-19.11/17.53	-17.99/17.36	-18.97/16.91	-18.8/18.9	-12.95/11.75	-14.56/18.47	-16.35/12.96	-13.04/16.23	-18.93/18.26	-18.36/18.15	-18.89/18.82	-17.98/18.22	-18.87/17.88	-18.69/18.92	-18.01/18.47	-17.49/18.56	-17.83/18.45	-15.16/13.53	-15.48/13.83	-18.64/17.24	-16.48/16.73	-18.75/18.68	-18.25/18.8
Θ(37.5°)	-17.73/18.21	-17.45/14.24	-18.52/18.66	-15.38/17.43	-18.07/18.4	-17.42/16.22	-15.8/18.68	-18.81/18.43	-18.37/18.88	-19.1/18.25	-18.3/18.97	-18.92/17.58	-18.53/19.32	-18.21/19.1	-18.26/17.05	-19.17/18.29	-17.45/17.7	-18.73/18.14	-18.03/17.86	-19.33/18.98	-13.88/12.77	-13.18/15.06	-18.83/18.08	-19.17/15.2
Θ(45°)	-18.01/18.71	-17.88/18.38	-15.79/19.28	-18.31/18.84	-18.4/19.04	-18.02/18.84	-18.22/18.53	-18.52/19.03	-18.1/18.3	-18.23/17.81	-18.24/15.13	-19.15/18.3	-17.84/18.23	-19.23/18.75	-19.29/18.41	-19.05/17.56	-17.87/17.03	-19.2/17.79	-18.76/18	-18.11/17.36	-16.34/17.52	-18.62/18.17	-18.92/18.61	-18.73/19.22
Θ(52.5°)	-19.24/18.48	-13.3/17.95	-18.07/19.1	-18.75/18.63	-18.91/18.34	-17.56/15.67	-14.48/13.44	-14.38/19.23	-19.12/18.04	-16.19/14.11	-18.45/19.02	-19.38/19.52	-15.99/13.43	-19.05/12.44	-12.23/19.94	-18.45/18.77	-18.41/17.56	-19.05/17.04	-19.24/17.8	-18.26/19.24	-17.31/17.09	-18.66/17.27	-18.71/15.2	
Θ(60°)	-18.75/17.42	-13.92/17.5	-18.36/18.56	-18.08/15.77	-18.41/14.56	-13.08/17.77	-11.09/11.02	-18.95/19.04	-10.63/8.42	-14.48/13.38	-17.55/17.7	-17.82/18.83	-12.11/18.52	-15.88/15.36	-18.04/12.52	-13.1/18.23	-19.33/18.4	-18.54/19.37	-14.59/19.26	-18.21/17.78	-17.34/16.34	-17.16/17.89	-18.77/18.09	-18.21/18.93
Θ(67.5°)	-18.48/17.38	-14.06/19.31	-17.42/15.52	-18.98/17.36	-18.89/11.27	-19.1/13.77	-13.17/18.83	-13.21/13.66	-12.12/14.09	-13.47/9.56	-14.36/18.39	-15.85/17.05	-12.51/13.89	-15.6/17.04	-18.41/18.94	-16.58/14.7	-18/18.38	-18.93/17.4	-17.89/					



# Radiated Composite Gain Data

# Appendix A

Theta	3.33/2.99	-2.56/5.9	-4.71/4.24	4.49/4.12	-0.79/5.91	-3.2/5.3	5.74/5.6	-1.91/6.49	-4.43/3.73	-2.06/2.13	-2.91/1.35	1.43/1.93	3.04/2.5	0.11/0.45	0.43/1.24	-0.71/5.24	-6.15/5.64	6.19/2.42	-3.56/6.17	-4.72/5.97	-7.61/2.83	-4.75/3.76	-4.63/5.27	-4.98/3.79	
Theta(6.75)	-3.6/2.6	-4.8/18.25	-7.4/13.84	2.94/1.17	-2.99/4.89	-4.53/6.32	4.36/6.76	-4.3/3.47	-2.66/2.02	-0.32/3.09	-1.66/2.8	-1.3/3.7	-6.07/5.26	4.07/6.47	-3.9/5.2	-6.33/6.69	-6.16/15.69	-7.61/8.69	-3.51/6.07	-3.12/4.81	-5.75/4.71	-5.17/2.07	-2.15/3.26	4.8/4.31	
Theta(7.5)	-1.75/15.03	-2.29/3.7	-1.09/0.8	0.95/2.21	-3.83/3.34	-5.01/3.45	4.35/6.12	-1.97/4.39	-6.08/2.1	-5.12/2.45	-4.27/6.51	-1.27/1.88	-1.88/2.53	0.95/3.29	-3.24/3.52	-6.61/4.58	-7.47/6.21	-6.92/5.36	-4.98/5.31	5.03/4.33	4.93/2.73	2.29/2.15	-1.99/1.69	-1.68/3.78	
Theta(8.25)	0.43087	-1.22/1.27	1.37/0.19	1.54/5.74	-3.4/3.12	-1.45/4.84	-3/0.76	-8.15/2.34	-2.64/0.84	-1.52/1.1	-1.98/1.88	-2.29/0.17	0.48/0.11	-1.43/1.54	-8.9/2.04	-4.1/3.63	-1.9/6.62	-2.52/4.25	-3.75/2.4	-6.46/6	3.44/1.11	-1.9/5.6	0.1/2.02	0.96/0.42	
Theta(9.0)	0.74/1.15	-1.34/1.37	0.15/6.08	-1.96/5.81	-4.19/3.67	-1.43/8.45	-2.87/2.6	-6.74/2.89	3.11/2.22	-1.41/0.09	-1.09/0.22	0.29/1.94	4.23/2.59	-2.04/2.58	-7.2/3.02	-3.33/2.07	-3.01/5.67	-2.05/4.53	-3.49/3.04	9.99/2.42	4.26/1.71	-2.69/0.04	-0.45/3.42	-4.77/0.03	
Theta(9.75)	1.39/1.31	-0.88/1.69	0.43/5.43	-1.73/3.57	-5.67/5.57	-3.55/4.89	-6.57/5.73	-2.18/6.68	-4/0.63	-12.49/4.08	-8.52/12.07	-5.96/7.2	-5.91/5.53	-2.51/6.12	-12.3/8.23	-6.75/5.98	-6.97/9	-6.21/5.16	-3.56/5.87	-14.18/3.99	-6.24/0.18	-0.80/0.79	-0.69/4.15	-4.39/0.89	
Theta(10.5)	1.66/1.04	-1.22/1.13	2.08/0.93	-0.82/8.13	-2.95/5.25	-3.55/4.37	-4.31/4.95	-3.6/5.46	-6.91/6.83	-5.84/1.62	-4.11/4.82	-4.53/9.09	-4.1/4.86	-7.07/7.07	-11.8/8.15	-3.04/8.95	-17.86/11.09	-6.98/6.55	-6.46/6.35	-7.63/6.3	-5.85/3.28	0.07/1.1	-1.21/5.57	-0.67/1.24	
Theta(11.25)	-2.43/7.5	2.28/4.12	0.55/1.25	-2.79/7	-6.9/5.34	4.74/3.7	6.7/5.63	-4.58/8.57	-8.18/4.58	5.31/2.22	-4.6/4.6	-5.15/6.55	3.63/6.35	-6.67/6	9.29/12.32	-4.92/12.92	-11.15/8.87	-7.02/5.41	-9.67/6.36	9.79/3.7	5.03/5.93	-3.55/3.88	-3.66/4.08	0.99/1.35	
Theta(12.0)	6.36/6.78	-10.82/8.35	-3.5/1.2	-8.1/11.7	-13.84/6.38	-10.61/10.7	-8.58/9.28	-8.36/8.28	-7.09/6.5	-8.27/7.58	-8.75/7.38	-8.24/14.48	-16.81/12.93	-12.96/11.6	-9.67/8.88	-4.23/13.25	-14.55/6.97	-10.38/11.75	-13.54/13.64	-14.38/7.63	4.95/8.7	9.68/7	7.32/10.11	-8.33/4.93	
Theta(12.75)	-7.03/8.74	-10.36/12.01	-16.1/10.88	-8.97/7.62	-12.3/14.31	-14.76/11.23	-16.5/13.77	-12.66/18.09	-14.83/11.96	-17.72/12.04	-9.56/5.2	-4.85/5.83	-5.11/6.53	-6.6/9.57	-17.3/8.72	-18.84/10.25	-17.94/12.82	-10.56/12.41	-18.61/14	-18.2/8.27	5.18/10.48	-14.87/7.97	-10.49/6.81	-8.14/9.78	
Theta(13.5)	-11.92/13.35	-13.09/10.39	7.68/8.81	-5.36/8.03	-10.33/11.74	-12.94/13.95	-12.77/11.94	-8.24/11.71	-17.91/9.41	-11.08/14.36	-12.84/13.83	-11.35/12.05	-13.93/12.94	-17.75/14.39	-12.13/11.8	-11.97/18.17	-15.23/19.49	-13.77/17.13	-11.77/18.18	-10.94/12.69	-4.83/4.67	-7.26/13.39	-13.28/14.91	-13.82/14.91	
Theta(14.25)	-2.63/3.21	-4.55/5.4	-7.2/10.3	-13.1/12.16	-18.97/9.26	-7.59/13.72	-10.5/3.65	-4.44/10.89	-13.95/11.37	-8.56/14.9	-17.68/18.37	-11.93/10	-15.16/18.9	-14.77/19.12	-6.93/11.2	-16.21/12.67	-18.29/16.24	-13.06/9.02	-7.61/10.42	-18.21/15.38	-7.68/13.71	-8.89/5.34	-4.97/5.79	-3.92/3.69	
Theta(15.0)	7.11/8.06	6.47/5.82	5.27/6.2	-9.18/7.51	-7.42/9.49	-7.44/6.35	-7.99/9.47	-9.95/7.27	-7.16/13.81	-15.14/17.23	-18.53/18.02	-18.98/18.72	-16/15.89	-17.15/18.15	-13.88/18.57	-19.06/18.77	-11.57/6.43	-5.69/6.6	-9.62/13.83	-12.29/14.96	-18.18/12.02	-9.72/7.73	-4.32/4.37	-5.57/5.59	
Theta(15.75)	-9.46/7.73	9.35/9.75	9.27/7.52	5.16/6.57	-12.25/10.3	-8.4/14.19	-11.94/6.39	-4.66/3.03	-12.77/11.94	-11.94/6.39	-4.66/3.03	-12.77/11.94	-11.94/6.39	-4.66/3.03	-12.77/11.94	-11.94/6.39	-4.66/3.03	-12.77/11.94	-11.94/6.39	-4.66/3.03	-12.77/11.94	-11.94/6.39	-4.66/3.03	-12.77/11.94	-11.94/6.39
Theta(16.5)	-7.18/2.1	-8.26/9.16	-10.2/10.8	-11.54/9.21	-6.9/8.02	-9.09/7.97	-6.29/7.04	-8.34/10.9	-14.31/9.67	-8.28/9.03	-9.97/11.09	-11.76/10.73	-9.34/8.06	-8.16/10.89	-15.37/14.78	-12.33/12.99	-12.41/13.96	-14.85/14.57	-11.42/12.16	-12.71/15.38	-11.42/12.16	-12.71/15.38	-11.42/12.16	-12.71/15.38	
Theta(17.25)	9.62/9.01	8.09/7.48	-7.51/7.99	-8.39/10.37	-15.24/18.18	-12.18/9.23	-8.69/9.61	-12.46/16.12	-19.37/18.28	-14.14/11.3	-11.18/12.76	-12.75/14.07	-11.78/9.02	-8.61/8.33	-8.27/10.31	-12.3/13.99	-15.98/17.44	-19.2/18.41	-16.78/13.56	-10.44/9	9.04/8.96	-9.12/10.6	-10.93/10.51	-10.73/11.47	
Theta(18.0)	-11.92/19.05	-17.97/18.23	-18.13/18.94	-19.35/15.53	-12.53/14.94	-10.97/11.45	-13.05/15.23	-15.03/12.78	-12.73/14.99	-18.49/18.42	-17.16/18.96	-19.06/18.86	-18.66/17.79	-17.66/18.95	-18.6/17.06	-16.69/18.83	-19.04/18.12	-17.92/15.67	-14.46/13.9	-12.6/11.36	-11.77/12.95	-12.97/13.83	-15.04/16.54	-16.22/15.23	
Theta(18.75)	5.63/6.01	Phi/Ant 3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
Gain	Phi(0)/Phi(7.5)	Phi(15)/Phi(22.5)	Phi(30)/Phi(37.5)	Phi(45)/Phi(52.5)	Phi(60)/Phi(67.5)	Phi(75)/Phi(82.5)	Phi(90)/Phi(97.5)	Phi(105)/Phi(112.5)	Phi(120)/Phi(127.5)	Phi(135)/Phi(142.5)	Phi(150)/Phi(157.5)	Phi(165)/Phi(172.5)	Phi(180)/Phi(187.5)	Phi(195)/Phi(202.5)	Phi(210)/Phi(217.5)	Phi(225)/Phi(232.5)	Phi(240)/Phi(247.5)	Phi(255)/Phi(262.5)	Phi(270)/Phi(277.5)	Phi(285)/Phi(292.5)	Phi(300)/Phi(307.5)	Phi(315)/Phi(322.5)	Phi(330)/Phi(337.5)	Phi(345)/Phi(352.5)	
Theta(0)	-17.83/18.42	-17.43/18.54	-19.19/19	-18.58/18.35	-17.93/17.49	-18.92/16.57	-15.21/13.9	-14.12/14.74	-17.72/18.97	-17.48/17.29	-18.39/17.92	-17.82/18.33	-18.58/18.44	-16.66/18.1	-18.98/17.84	-17.88/17.44	-16.64/16.34	-18.57/18.51	-18.06/18.52	-19.4/18.36	-18.58/18.07	-18.51/18.06	-19.3/19.08	-18.96/18.91	
Theta(7.5)	-18.96/18.76	-19.17/17.18	-17.41/17.69	-18.83/17.15	-18.87/15.15	-14.46/18.36	-18.34/19.63	-16.76/15.65	-17.99/18.19	-18.89/18.09	-19.73/18.42	-17.74/19.13	-16.74/16.52	-18.26/18.83	-16.21/12.67	-18.29/16.24	-16.48/15.18	-14.29/12.93	-12.28/13.62	-14.53/14.75	-14.71/13.91	-14.89/17.17	-18.67/18.01	-18.67/18.01	
Theta(15)	-18.9/18.3	-18.28/18.74	-19.36/18.15	-15.18/12.06	-14.06/15.43	-14.94/18.54	-18.25/14.68	-11.94/12.99	-15.93/17.8	-16.01/13.33	-15.34/18.49	-17.36/17.62	-18.19/18.21	-18.22/18.15	-17.59/18.06	-18.31/8.72	-13.58/12.96	-11.78/10.92	-12.45/15.21	-19.37/18.63	-17.75/16.9	-17.4/18.17	-17.94/17.49	-18.16/17.96	
Theta(22.5)	-18.72/19.14	-16.53/17.67	-17.8/19.51	-15.34/13.71	-11.22/11.31	-13.66/14.71	-15.84/11.14	-16.07/15.92	-18.18/17.97	-16.88/17.46	-17.74/17.71	-18.04/18.74	-18.22/18.47	-18.09/18.59	-17.43/18.97	-12.99/19.33	-13.36/19.18	-12.89/9.96	-11.75/19.09	-13.87/14.21	-16.89/18.42	-18.71/17.72	-18.84/18.47	-18.84/18.47	
Theta(30)	-17.19/18.31	-18.4/18.54	-17.95/16.71	-15.58/13.83	-17.21/12.5	-14.22/18.52	-13.21/17.3	-16.24/18.12	-14.18/19.17	-17.83/16.17	-12.1/11.63	-15.57/19.27	-18.38/18.09	-17.19/19.15	-14.63/16.08	-16.51/15.26	-18.9/13.66	-12.47/16.55	-12.57/10.64	-11.89/17.97	-18.83/17.53	-17.56/17.18	-18.68/18.01	-18.68/18.01	
Theta(37.5)	-18.83/16.35	-14.37/14.08	-19.17/18.35	-17.69/17.84	-18.59/12.87	-17.87/15.01	-12.3/17.61	-18.92/18.4	-17.24/16.93	-18.17/17.29	-16.73/19.2	-17.53/18.89	-18.4/18.16	-17.52/18.7	-12.71/14.88	-17.17/17.95	-18.73/19	-17.6/18.35	-17.99/17.65	-11.33/12.23	-18.08/17.91	-13.23/12.57	-18.87/17.66	-18.77/17.52	
Theta(45)	-19.37/18.83	-18.12/13.32	-12.43/18.68	-14.87/16.76	-19.04/13.81	-13.66/19.08	-17.17/19.04	-17.85/19.1	-17.46/19.21	-19.44/17.14	-17.51/15.13	-18.89/18	-17.95/18.87	-18.2/18.25	-13.85/17.72	-16.17/17.18	-18.73/17.06	-18.99/17.78	-18.62/18.29	-17/19.11	-19.17/15.25	-17.29/18.5	-17.96/17.98	-18.18/18.61	
Theta(52.5)	-18.4/18.47	-18.77/18.99	-14.37/18.51	-18.93/18.03	-12.78/19.34	-10.66/16.14	-14.33/18.94	-17.26/17.12	-17.23/18.37	-17.98/18.2	-17.17/18.49	-12.71/14.16	-18.66/18.3	-18.48/18.64	-17.52/17.61	-18.46/18.69	-18.67/19.08	-18.67/19.08	-18.67/19.08	-18.67/19.08	-18.67/19.08	-18.67/19.08	-18.67/19.08	-18.67/19.08	-18.67/19.08
Theta(60)	-13.74/15.29	-18.27/17.53	-15.82/17.22	-18.96/16.98	-12.7/17.99	9.19/18.23	-18.86/11.17	-13.53/18.32	-16.61/8.69	-11.8/10.35	-11.03/10.34	-12.31/19.01	-16.75/14.71	-16.29/15.66	-17.94/15.53	-18.16/18.09	-17.82/18.84	-14.5/16.79	-12.47/11.3	-18.02/13.81	-18.08/18.82	-17.72/12.92	-14.92/19.04	-17.75/17.15	
Theta(67.5)	-18.9/19.07	-19.06/18.96	-18.71/17.5	-18.91/18.38	-19.38/12.09	-12.73/14.61	-10.87/12.34	-10.3/8.95	-10.91/9.44	-16.35/13.33	-11.59/11.97	-11.91/14.76	-16.51/15.66	-18.19/16.66	-13.51/17.59	-11.58/18.28	-18.34/19.18	-18.63/18.12	-13.67/10.68	-17.86/15.72	-18.93/16.43	-15.1/12.03	-13.05/16.28	-17.7/19.4	
Theta(75)	-18.1/16.82	-14.95/18.29	-15.18/15.77	-14.47/13.92	-18.64/18.82	-15.27/18.18	-18.15/15.13	-14.11/16.88	-18.58/18.16	-18.83/17.38	-16.71/5.8	-16.78/16.27	-13.24/18.79	-16.35/17.9	-15.18/16.36	-18.92/19.36	-17.49/17.55	-14.4/12.73	-18.15/15.6	-15.99/16.01	-19.12/15.61	-17.09/16.81	-18.84/18.15	-18.84/18.15	
Theta(82.5)	-18.31/15.31	-17.47/18.67	-13.52/19.23	-18.46/17.52	-17.95/19.28	-12.4/16.62	-15.25/17.85	-11.17/12.02	-12.16/18.91	-14.66/13.15	-13.27/12.08	-9.95/17.75	-18.7/17.35	-10.13/15.97	-17.91/17.73	-17.69/18.21	-18.31/17.52	-16.29/18.22							



# Radiated Composite Gain Data

# Appendix A

Theta (°)	Phi (°)	Phi(7.5°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)	
Theta(120°)	2.82/2.88	-2.92/1.65	-1.13/3.11	5.38/6.39	-2.29/1.84	-7.47/5.21	-3.39/1.92	-0.59/15.64	-10.65/6.59	-3.6/2.56	-2.11/6.49	-9.33/10.48	-7.18/4.22	-4.02/5.47	-7.57/12.74	9.86/10.2	-19.31/11.2	9.53/4.45	8.45/17.36	9.79/5.14	-3.93/2.48	-1/2.25	-3.04/3.41	-1.92/0.55		
Gain	Phi(0°)	Phi(15°)	Phi(30°)	Phi(45°)	Phi(60°)	Phi(75°)	Phi(90°)	Phi(105°)	Phi(120°)	Phi(135°)	Phi(150°)	Phi(165°)	Phi(180°)	Phi(195°)	Phi(210°)	Phi(225°)	Phi(240°)	Phi(255°)	Phi(270°)	Phi(285°)	Phi(300°)	Phi(315°)	Phi(330°)	Phi(345°)		
Theta(0°)	-13.57/15.18	-16.77/14.97	12.37/11.16	-10.98/11.23	-11.77/12.03	-12.66/12.56	-12.68/13.01	-14.45/17.82	-18.32/17.64	-17.47/17.89	-17.78/16.18	-15.66/14.86	-13.59/12.8	-12.25/11.96	-12.1/12.61	-13.24/13.96	-14.2/13.98	-13.77/14.28	-15.53/16.84	-18.57/18.36	-17.09/18.82	-15.44/14.74	-16.37/17.54	-15.01/13.46		



# Radiated Composite Gain Data

# Appendix A

Theta	150°	157.5°	165°	172.5°	180°	Freq(Hz)	Gain	Phi(0°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
Theta	150°	157.5°	165°	172.5°	180°	Freq(Hz)	Gain	Phi(0°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
Theta	150°	157.5°	165°	172.5°	180°	Freq(Hz)	Gain	Phi(0°)	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)



# Radiated Composite Gain Data

# Appendix A

$\Theta$ (°)	$\Phi$ (°)	$\Phi$ (7.5°)	$\Phi$ (15°)	$\Phi$ (22.5°)	$\Phi$ (30°)	$\Phi$ (37.5°)	$\Phi$ (45°)	$\Phi$ (52.5°)	$\Phi$ (60°)	$\Phi$ (67.5°)	$\Phi$ (75°)	$\Phi$ (82.5°)	$\Phi$ (90°)	$\Phi$ (97.5°)	$\Phi$ (105°)	$\Phi$ (112.5°)	$\Phi$ (120°)	$\Phi$ (127.5°)	$\Phi$ (135°)	$\Phi$ (142.5°)	$\Phi$ (150°)	$\Phi$ (157.5°)	$\Phi$ (165°)	$\Phi$ (172.5°)	$\Phi$ (180°)	$\Phi$ (187.5°)	$\Phi$ (195°)	$\Phi$ (202.5°)	$\Phi$ (210°)	$\Phi$ (217.5°)	$\Phi$ (225°)	$\Phi$ (232.5°)	$\Phi$ (240°)	$\Phi$ (247.5°)	$\Phi$ (255°)	$\Phi$ (262.5°)	$\Phi$ (270°)	$\Phi$ (277.5°)	$\Phi$ (285°)	$\Phi$ (292.5°)	$\Phi$ (300°)	$\Phi$ (307.5°)	$\Phi$ (315°)	$\Phi$ (322.5°)	$\Phi$ (330°)	$\Phi$ (337.5°)	$\Phi$ (345°)	$\Phi$ (352.5°)
0	0	-17.61/18.78	-17.41/18.42	-18.61/17.07	-17.84/18.48	-18.35/17.9	-19.08/19.27	-18.81/18.9	-18.31/17.39	-18.35/19.21	-17.47/18.43	-19.52/18.18	-18.45/18.61	-19.08/18.85	-18.63/18.8	-18.02/18.77	-17.43/17.2	-19.2/18.78	-18.96/19.22	-19.33/18.58	-17.48/17.97	-18.88/18.53	-19.47/18.16	-18.15/19.32	-17.13/17.13																							
0	7.5	-19.08/18.32	-18.47/18.8	-18.76/18.86	-18.39/19.26	-18.03/16.94	-17.81/18.57	-17.5/18.31	-19.26/17.89	-19.07/18.27	-18.54/19.27	-18.07/18.99	-17.8/18	-18.81/19.04	-18.21/18.46	-18.02/17.43	-18.86/17.78	-18.22/17.84	-18.86/19.36	-18.68/18.06	-18.42/19.07	-18.52/17.65	-18.18/18.79	-18.29/18.86	-19.32/17.63																							
0	15	-19.26/17.78	-18.09/18.42	-18.77/18.49	-18.64/18.59	-18.55/18.91	-19.07/17.77	-17.55/18.79	-18.9/17.66	-15.83/14.3	-14.91/13.99	-15.65/18.61	-18.54/18.65	-18.36/18.66	-17.57/17.93	-19.07/18.99	-19.05/17.9	-17.57/18.08	-18.12/18.48	-18.38/18.15	-16.02/18.85	-19.1/17.63	-18.32/18.98	-18.63/17.93	-18.47/18.36																							
0	22.5	-18.41/17.76	-19.14/18.7	-18.74/17.77	-15.79/17.87	-18.26/18.83	-17.82/16.62	-16.89/17.08	-15.1/14.61	-15.59/17.88	-18.62/17.81	-18.9/15.86	-18.93/17.2	-18.19/17.72	-18.81/15.7	-18.19/19.02	-17.64/18	-18.25/18.58	-18.83/17.84	-18.27/18.46	-17.36/18.86	-18.72/18.13	-19.3/17.09	-18.44/18.9	-18.22/17.32																							
0	30	-17.63/18.78	-18.36/17.84	-18.74/17.53	-18.34/18.74	-18.16/18.99	-17.48/15.5	-16.49/16.58	-14.51/18.8	-17.53/15.55	-14.85/14.83	-17.82/19.02	-18.73/17.04	-17.83/18.43	-18/13.06	-16.2/15.79	-18.36/18.49	-18.72/17.59	-18.8/19.1	-18.8/19.1	-18.93/17.93	-18.57/18.68	-19.01/18.44	-17.56/17.99	-18.31/18.48																							
0	37.5	-18.33/18.76	-19.06/18.13	-19.17/19.96	-17.85/17.67	-18.29/18.93	-18.79/18.07	-19.39/17.75	-18.72/18.14	-13.9/10.78	-12.53/10.68	-11.19/16.78	-18.5/17.67	-17.71/19.16	-17.8/19.1	-18.48/19.33	-18.7/17.56	-15.35/16.58	-18.87/19.63	-18.32/18.36	-19.24/17.8	-18.06/17.29	-18.47/17.84	-18.46/19.44	-18.89/18.41																							
0	45	-19.1/18.09	-19.07/13.84	-13.97/17.48	-18.56/17.97	-19.08/18.59	-18.83/18.27	-15.92/16.82	-17.12/15.72	-11.71/16.7	-16.07/13.62	-16.87/15.79	-19.21/19.06	-19.15/18.25	-18.68/17.54	-17.66/18.8	-15.81/10.44	-13.01/13.87	-18.33/17.61	-16.36/17.51	-17.53/18.66	-13/12.51	-12.82/18.8	-17.42/17.71	-18.66/17.68																							
0	52.5	-17.23/15.38	-15.17/18.12	-18.63/18.46	-18.61/18.6	-14.3/16.85	-18.07/18.29	-18.5/19.25	-18.22/16.07	-13.16/13.75	-16.36/18.99	-17.34/19.01	-18.71/17.88	-18.93/13.76	-18.31/17.76	-18.32/12.48	-15.44/16.93	-18.72/17.86	-18.99/17.87	-18.62/18.53	-16.81/19.06	-14.85/14.41	-12.39/14.19	-15.51/16.94	-16/18.17																							
0	60	-18.47/18.15	-18.07/17.27	-15.91/14.98	-12.4/16.26	-17.5/18.39	-17.32/17.54	-18.14/17.54	-13.9/17.7	-19.33/17.19	-12.86/12.15	-13.23/11.17	-15.33/19.26	-17.78/17.26	-19/18.89	-16.04/13.18	-18.44/18.26	-15.57/18.54	-18.88/18.77	-18.22/18.43	-17.72/17	-19.38/18.1	-17.8/17.28	-15.42/15.76	-18.9/18.92																							
0	67.5	-17.67/15.61	-14.12/17.48	-15.55/17	-18.85/18	-18.92/19.19	-17.32/18.68	-19.03/19.05	-19.05/19.37	-16.83/13.77	-10.79/8.57	-14.38/16.63	-13.43/12.14	-17.92/18.39	-17.67/14.6	-18.81/14.06	-17.54/14.6	-18.88/19.02	-19.29/18.23	-18.86/18.66	-17.28/16.39	-18.03/17.99	-18.51/16.07	-18.44/18.06	-19.1/17.59																							
0	75	-17.72/18.89	-17.1/17.68	-19.01/18.82	-17.03/12.04	-16.55/11.56	-8.81/18.34	-14.8/18.25	-17.09/15.61	-18.56/17.26	-18.5/18.59	-17.14/18.88	-16.68/18.19	-17.95/15.86	-18.34/15.67	-10.56/11.62	-18.94/10.56	-14.71/18.84	-17.53/16.19	-17.26/17.04	-17.68/17.99	-17.78/18.26	-18.04/18.58	-13.63/15.22	-18.01/15.18																							
0	82.5	-19.01/16.36	-19.43/18	-18.57/15.12	-13.04/9.82	-14.33/12.72	-13.35/18.39	-13.92/19.23	-11.12/18.04	-18.07/15	-17.8/17.57	-13.63/17.95	-17.97/19.11	-15.27/18.09	-18.12/14.25	-12.09/9.82	-18.25/15.18	-16.86/19.04	-17.3/10.94	-15.91/15.57	-19.19/15.74	-18.06/18.37	-13.87/18.58	-14.02/18.92	-13.11/12.05																							
0	90	-16.39/17.92	-16.88/16.34	-14.42/19.27	-16.49/12.47	-18.6/18.5	-12.76/17.82	-11.25/14.99	-10.61/18	-18.98/16.81	-16.41/11.07	-9.92/12.68	-18.7/11.52	-17.79/17.83	-16.85/17.13	-13.68/16.86	-16.27/18.12	-17.51/17.85	-16.92/12.03	-16.66/18.45	-18.24/18.5	-18.56/17.02	-18.19/12.66	-12.86/18.73	-18.13/17.52																							
0	97.5	-17.47/18.78	-18.22/17.96	-19.03/18.84	-17.91/15.85	-16.26/19.5	-13.65/17.71	-13.2/17.4	-17.44/17.24	-17.61/14.45	-17.08/17.71	-17.68/18.13	-18.21/15.39	-19.01/17.52	-17.34/16.49	-18.16/14.12	-18.36/18.22	-17.78/17.91	-15.3/16.25	-17.58/18.11	-19.23/18.57	-18.53/14.43	-13.16/14.71	-12.3/16.43	-17.89/15.05																							
0	105	-19.01/16.36	-19.43/18	-18.57/15.12	-13.04/9.82	-14.33/12.72	-13.35/18.39	-13.92/19.23	-11.12/18.04	-18.07/15	-17.8/17.57	-13.63/17.95	-17.97/19.11	-15.27/18.09	-18.12/14.25	-12.09/9.82	-18.25/15.18	-16.86/19.04	-17.3/10.94	-15.91/15.57	-19.19/15.74	-18.06/18.37	-13.87/18.58	-14.02/18.92	-13.11/12.05																							
0	112.5	-17.47/18.78	-18.22/17.96	-19.03/18.84	-17.91/15.85	-16.26/19.5	-13.65/17.71	-13.2/17.4	-17.44/17.24	-17.61/14.45	-17.08/17.71	-17.68/18.13	-18.21/15.39	-19.01/17.52	-17.34/16.49	-18.16/14.12	-18.36/18.22	-17.78/17.91	-15.3/16.25	-17.58/18.11	-19.23/18.57	-18.53/14.43	-13.16/14.71	-12.3/16.43	-17.89/15.05																							
0	120	-15.78/16.81	-17.97/15.21	-11.87/17.4	-17.49/12.63	-14.85/18.48	-15.98/15.8	-18.26/18.3	-16.36/14.4	-15.01/9.42	-8.6/12.72	-18.91/14.61	-11.54/18.75	-18.23/18.71	-18.22/13.74	-14.35/13.37	-13.56/10.64	-14.04/18.61	-18.93/17.96	-15.38/18.17	-15.57/18.48	-17.6/15.01	-18.12/17.56	-18.6/18.2	-17.51/13.74																							
0	135	-18.42/18.55	-19.07/17.32	-18.51/18.86	-14.5/18.87	-10.19/11.9	-13.18/9.98	-12.18/14.39	-18.12/10.61	-10.3/14.71	-10.03/10.07	-18.77/17.47	-16.05/12.23	-17.09/18.41	-18.89/13.76	-10.97/10.78	-10.47/12.46	-10.47/12.46	-19.94/18.27	-16.5/15.24	-17.28/17.5	-17.5/9.68	-13.49/14.03	-17.61/17.95	-16.03/11.97																							
0	142.5	-18.93/18.97	-17.92/18.51	-19.26/18.58	-16.19/11.78	-10.29/18.58	-13.11/13.62	-18.14/18.16	-17.81/11.7	-9.76/13.93	-18.54/16.66	-14.21/13	-18.22/11.84	-13.64/17.49	-15.23/9.95	-10.35/14.98	-10.86/13	-13.64/18.55	-18.5/17.92	-18.82/14.91	-10.64/10.1	-15.39/14.58	-11.11/9.46	-13.87/15.57	-15.82/15.3																							
0	150	-18.24/18.81	-18.11/18.45	-19.26/16.69	-17.12/18.36	-18.9/17.34	-17.23/18.28	-18.21/16.6	-18.02/18	-14.89/17.84	-18.8/16.38	-15.06/17.79	-18.72/18.46	-18.74/17.43	-18.29/16.38	-14.45/13.04	-18.18/17.06	-17.22/14.3	-12.74/14.58	-17.87/19.1	-15.44/12.73	-8.41/6.5	-9.41/10.98	-11.75/12.47	-16.27/18.71																							
0	157.5	-17.23/15.38	-15.17/18.12	-18.63/18.46	-18.61/18.6	-14.3/16.85	-18.07/18.29	-18.5/19.25	-18.22/16.07	-13.16/13.75	-16.36/18.99	-17.34/19.01	-18.71/17.88	-18.93/13.76	-18.31/17.76	-18.32/12.48	-15.44/16.93	-18.72/17.86	-18.99/17.87	-18.62/18.53	-16.81/19.06	-14.85/14.41	-12.39/14.19	-15.51/16.94	-16/18.17																							
0	165	-8.89/9.75	-10.77/11.55	-9.17/9.81	-12.5/16.59	-18.42/17.39	-18.08/18.28	-17.82/18.6	-18.78/19	-19.71/19.2	-12.28/10.59	-9.81/9.52	-11.51/12.1	-16.35/16.21	-17.47/14.87	-14.36/18.22	-18.31/15.55	-13.6/11.68	-11.28/11.1	-14.07/16.31	-14.08/11.78	-8.8/7.93	-7.21/6.21	-6.7/6.7	-8.98/8.31																							
0	172.5	-16.64/18.21	-17.6/18.16	-16.33/14.9	-15.85/17.31	-19.5/18.97	-17.09/18.5	-19.16/18.33	-18.35/18.62	-19.02/13.88	-13.18/13.08	-12.27/13.2	-13.62/15.68	-17.84/17.93	-18.16/17.56	-16.85/18.83	-11.61/10.75	-10.26/11.25	-12.81/12.76	-12.97/11.04	-10.36/10.9	-10.1/10.28	-13.75/17.19	-16.88/17.01																								
0	180	-13.08/12.92	-17.29/18.15	-18.73/18.82	-18.1/19.27	-18.02/17.57	-16.76/15.01	-11.41/10.24	-10.15/8.67	-8.63/11.79	-11.11/13.13	-14.23/14.77	-16.85/16.19	-19.19/19.24	-17.32/16.18	-14.03/12.56	-10.77/9.19	-8.63/8.07	-8.05/7.59	-8.28/7.96	-8.05/8.59	-9.16/9.57	-9.21/10.8	-8.98/10.23	-11.73/13.51																							
Freq(Hz)	5.785GHz																																															
Theta(Ant. 4)																																																
Gain	$\Phi$ (0°)	$\Phi$ (7.5°)	$\Phi$ (15°)	$\Phi$ (22.5°)	$\Phi$ (30°)	$\Phi$ (37.5°)	$\Phi$ (45°)	$\Phi$ (52.5°)	$\Phi$ (60°)	$\Phi$ (67.5°)	$\Phi$ (75°)	$\Phi$ (82.5°)	$\Phi$ (90°)	$\Phi$ (97.5°)	$\Phi$ (105°)	$\Phi$ (112.5°)	$\Phi$ (120°)	$\Phi$ (127.5°)	$\Phi$ (135°)	$\Phi$ (142.5°)	$\Phi$ (150°)	$\Phi$ (157.5°)	$\Phi$ (165°)	$\Phi$ (172.5°)	$\Phi$ (180°)	$\Phi$ (187.5°)	$\Phi$ (195°)	$\Phi$ (202.5°)	$\Phi$ (210°)	$\Phi$ (217.5°)	$\Phi$ (225°)	$\Phi$ (232.5°)	$\Phi$ (240°)	$\Phi$ (247.5°)	$\Phi$ (255°)	$\Phi$ (262.5°)	$\Phi$ (270°)	$\Phi$ (277.5°)	$\Phi$ (285°)	$\Phi$ (292.5°)	$\Phi$ (300°)	$\Phi$ (307.5°)	$\Phi$ (315°)	$\Phi$ (322.5°)	$\Phi$ (330°)	$\Phi$ (337.5°)	$\Phi$ (345°)	$\Phi$ (352.5°)
0	-18.12/19.17	-18.22/17.74	-18.22/18.49	-18.87/19.06	-18.57/19.09	-18.43/18.53	-19/18.5	-18.17/17.85	-18.09/17.37	-17.14/18.68	-17.61/18.77	-18.52/18.08	-18.45/18.58	-17.38/17.59	-19.15/17.91	-18.55/19.34	-18.16/18.32	-18.87/18.65	-18.73/17.97	-17.69/18.1	-17.16/18.95	-																										



# Antenna Pattern

# Appendix B

## Total Gain Data

Freq(Hz)	2.45GPol.	TotalAnt. 1	θ	φ	φ(30°)φ(37.5°)	φ(45°)φ(52.5°)	φ(60°)φ(67.5°)	φ(75°)φ(82.5°)	φ(90°)φ(97.5°)	φ(105°)φ(112.5°)	φ(120°)φ(127.5°)	φ(135°)φ(142.5°)	φ(150°)φ(157.5°)	φ(165°)φ(172.5°)	φ(180°)φ(187.5°)	φ(195°)φ(202.5°)	φ(210°)φ(217.5°)	φ(225°)φ(232.5°)	φ(240°)φ(247.5°)	φ(255°)φ(262.5°)	φ(270°)φ(277.5°)	φ(285°)φ(292.5°)	φ(300°)φ(307.5°)	φ(315°)φ(322.5°)	φ(330°)φ(337.5°)	φ(345°)φ(352.5°)
Gain	φ(0°)φ(7.5°)	φ(15°)φ(22.5°)	φ(30°)φ(37.5°)	φ(45°)φ(52.5°)	φ(60°)φ(67.5°)	φ(75°)φ(82.5°)	φ(90°)φ(97.5°)	φ(105°)φ(112.5°)	φ(120°)φ(127.5°)	φ(135°)φ(142.5°)	φ(150°)φ(157.5°)	φ(165°)φ(172.5°)	φ(180°)φ(187.5°)	φ(195°)φ(202.5°)	φ(210°)φ(217.5°)	φ(225°)φ(232.5°)	φ(240°)φ(247.5°)	φ(255°)φ(262.5°)	φ(270°)φ(277.5°)	φ(285°)φ(292.5°)	φ(300°)φ(307.5°)	φ(315°)φ(322.5°)	φ(330°)φ(337.5°)	φ(345°)φ(352.5°)		
φ(0°)	-15.99/16.01	-15.02/15.27	-15.49/15.44	-15.23/15.39	-15.54/15.53	-15.94/15.35	-14.89/15.46	-14.64/15.08	-15.38/15.94	-15.33/15.92	-15.50/15.50	-14.77/14.57	-15.08/15.17	-14.61/15.38	-15.23/15.31	-15.52/15.11	-15.14/15.22	-15.53/15.70	-15.14/15.72	-15.53/15.70	-15.04/15.69	-15.28/15.17	-15.08/14.78	-14.95/15.96		
φ(7.5°)	-15.89/14.57	-15.80/15.32	-16.18/15.35	-15.05/15.24	-15.14/14.46	-14.39/14.57	-15.12/15.39	-14.47/15.20	-15.14/15.07	-15.56/15.81	-14.50/15.45	-15.28/15.78	-15.31/15.49	-15.67/15.60	-15.07/15.22	-15.19/16.25	-15.26/14.67	-15.25/14.64	-15.10/15.34	-15.31/15.83	-15.34/15.42	-15.27/14.56	-15.68/15.81	-15.48/15.49		
φ(15°)	-11.46/11.61	-12.04/12.90	-12.75/12.34	-11.74/11.04	-10.80/10.23	-10.07/9.95	-10.86/11.02	-10.83/11.95	-15.01/14.78	-13.69/13.31	-15.83/14.83	-13.61/13.49	-15.21/14.72	-15.16/15.45	-15.56/15.52	-14.81/14.12	-13.20/13.97	-15.34/16.08	-12.72/11.70	-11.34/12.60	-11.91/11.49	-12.23/11.92	-11.17/11.20	-11.68/11.88		
φ(22.5°)	-7.54/7.81	-7.86/8.99	-8.69/9.53	-9.92/9.85	-9.48/8.45	-8.20/8.66	-9.28/9.60	-9.85/10.70	-12.53/13.19	-14.23/14.37	-14.66/15.41	-13.27/13.18	-14.89/15.75	-15.49/14.91	-13.46/13.07	-13.38/14.94	-15.72/15.18	-12.48/9.69	-7.81/7.00	-7.06/7.57	-7.52/8.09	-8.01/7.80	-7.63/7.56			
φ(30°)	-5.78/5.66	-5.44/5.30	-5.82/7.34	-8.96/10.35	-8.99/7.02	-6.81/7.55	-8.50/8.78	-8.00/6.94	-6.48/6.98	-8.67/10.42	-10.70/11.02	-13.42/14.22	-12.63/11.30	-11.37/12.06	-11.29/11.48	-11.74/10.78	-9.61/8.38	-6.62/5.50	-5.22/5.40	-5.69/6.09	-5.64/5.26	-5.72/6.06	-5.91/5.32	-4.83/5.05		
φ(37.5°)	-4.52/6.03	-5.01/3.53	-2.60/4.10	-7.58/9.55	-7.16/5.31	-5.19/5.93	-6.46/6.11	-5.20/4.44	-4.50/5.41	-6.88/8.88	-8.51/7.36	-7.86/8.98	-8.39/7.25	-7.26/8.13	-8.98/8.40	-6.88/6.19	-6.84/7.80	-7.82/7.59	-8.07/9.24	-11.35/14.59	-15.26/13.31	-10.80/9.05	-7.77/6.13	-4.46/3.84		
φ(45°)	-4.29/7.13	-6.78/3.74	-2.28/3.18	-4.90/6.91	-4.75/3.50	-4.06/4.75	-5.68/4.70	-3.80/3.76	-4.36/5.22	-6.26/8.73	-8.43/5.21	-4.34/6.29	-6.71/4.52	-3.44/4.35	-6.28/7.00	-6.51/7.77	-11.31/15.43	-15.74/14.19	-9.93/7.84	-6.71/5.74	-5.98/7.38	-7.78/6.73	-6.21/6.66	-5.83/4.59		
φ(52.5°)	-6.14/7.76	-8.14/5.09	-3.14/2.11	-2.63/3.82	-3.18/2.57	-3.64/5.12	-5.44/4.32	-3.75/4.31	-5.13/5.10	-4.95/6.41	-6.93/3.59	-2.22/4.23	-5.02/2.04	-1.12/2.89	-6.96/8.45	-8.16/10.17	-10.01/7.57	-5.29/3.56	-2.98/1.26	-0.82/0.58	-1.13/2.51	-3.93/4.85	-5.36/6.22	-6.58/6.39		
φ(60°)	-7.30/9.88	-8.53/6.26	-4.31/2.03	-1.24/2.15	-2.29/2.13	-2.97/3.62	-3.74/3.32	-3.73/4.79	-5.14/4.40	-3.71/4.83	-5.30/2.19	-0.95/1.98	-2.30/1.64	-1.98/3.86	-7.21/4.68	-2.57/3.23	-3.05/1.94	-1.10/4.08	0.100/9.1	1.751/7.5	0.811/0.85	-2.11/2.51	-3.21/4.42	-5.08/5.05		
φ(67.5°)	-2.45/5.62	-10.02/6.89	-5.19/2.75	-1.22/1.85	-1.97/0.74	-0.91/1.79	-1.88/2.17	-3.56/4.52	-4.95/4.14	-4.01/4.66	-4.14/0.71	-0.14/1.00	-0.84/4.23	-3.36/2.41	-3.49/0.97	-2.09/2.12	-0.62/0.06	-0.06/0.69	0.007/0.9	1.471/5.3	0.980/4.7	-1.21/1.95	-1.21/1.68	-2.45/1.66		
φ(75°)	-0.47/1.50	-5.09/6.55	-6.08/3.80	-1.91/1.70	-1.71/0.21	0.06/0.24	0.18/0.74	-2.74/4.65	-5.00/4.58	-3.74/2.96	-2.28/0.90	-0.22/0.11	-1.61/5.37	-1.02/0.74	-2.47/0.67	-1.95/3.37	-0.77/1.29	-1.16/0.56	0.790/7.3	1.301/5.3	1.330/8.4	-0.40/1.54	0.90/0.67	-1.63/1.32		
φ(82.5°)	-0.39/0.62	-2.01/3.18	-4.79/4.81	-3.41/2.58	-1.85/0.11	0.44/0.03	0.10/0.67	-3.23/2.52	-5.83/4.13	-2.14/2.83	-3.71/1.42	0.04/0.72	-1.38/2.86	0.10/1.12	-2.06/2.00	-5.35/3.57	-3.04/6.16	-4.33/2.66	-3.20/2.58	-0.41/0.02	0.79/1.15	-1.51/2.40	-2.15/1.51	-1.82/1.52		
φ(90°)	-1.04/0.94	-1.92/2.13	-2.74/2.35	-3.21/4.74	-3.84/0.58	0.21/0.95	-0.80/1.93	-0.55/5.73	-4.83/2.80	-2.65/4.62	-2.49/0.27	1.18/2.04	-1.12/2.76	0.59/0.67	-3.09/5.24	-1.69/1.48	-6.38/7.35	-4.63/3.49	-4.43/4.32	-3.10/2.32	-3.31/3.37	-3.95/3.56	-4.32/3.93	-5.97/5.97		
φ(97.5°)	-2.72/1.96	-2.27/2.45	-3.06/2.25	-1.73/3.78	-4.81/2.50	-1.57/1.57	-1.60/1.60	-1.87/1.74	-1.33/1.31	-2.12/2.03	-0.90/0.00	2.16/1.57	-2.54/0.62	0.27/2.02	-5.35/4.65	-3.50/4.67	-4.59/1.97	-0.27/1.27	-2.82/2.50	-2.15/3.86	-6.80/7.18	-6.50/5.50	-4.28/4.46	-5.19/4.58		
φ(105°)	-3.47/2.82	-3.47/3.10	-4.33/2.78	-2.22/3.01	-3.78/1.96	-0.81/0.88	0.05/0.25	-0.65/1.60	-2.28/1.89	-0.93/1.27	-2.01/0.23	1.57/0.95	-2.73/0.69	-1.27/4.33	-8.03/3.28	-1.91/2.32	-2.02/2.14	-1.20/4.13	-2.73/3.03	-2.61/2.85	-3.43/3.78	-4.30/4.75	-3.18/3.22	-5.47/5.31		
φ(112.5°)	-4.15/3.85	-3.78/4.17	-6.24/4.54	-2.94/4.15	-3.54/2.40	-1.55/1.09	-0.36/0.46	-1.53/3.12	-3.10/1.85	-1.98/4.62	-5.26/2.25	-2.47/3.79	-2.63/2.66	-5.93/8.27	-4.87/1.10	-1.69/1.18	-6.38/7.35	-4.63/3.49	-4.43/4.32	-3.10/2.32	-3.31/3.37	-3.95/3.56	-4.32/3.93	-5.97/5.97		
φ(120°)	-5.65/7.27	-5.96/4.75	-6.85/6.37	-5.57/8.40	-8.12/5.38	-4.09/4.23	-4.18/4.13	-5.06/5.46	-6.29/6.13	-7.70/9.44	-6.69/5.43	-7.19/6.69	-6.12/8.35	-7.44/6.32	-4.82/3.77	-6.20/10.24	-12.62/12.13	-8.42/7.45	-11.08/13.17	-7.94/6.28	-6.42/5.98	-6.19/8.31	-8.55/8.76	-9.39/6.14		
φ(127.5°)	-9.83/13.31	-9.84/6.37	-8.05/6.65	-7.61/8.52	-9.18/8.00	-7.78/9.37	-10.35/9.71	-8.21/7.43	-8.32/10.80	-15.76/14.70	-10.67/10.01	-7.45/5.84	-7.01/7.34	-6.77/8.08	-7.92/8.41	-10.21/12.50	-13.64/11.72	-8.29/7.72	-9.51/11.79	-10.24/10.36	-11.45/10.59	-9.62/10.33	-10.76/12.27	-14.17/13.03		
φ(135°)	-11.72/13.58	-15.40/13.04	-12.35/11.67	-12.14/13.97	-14.25/13.01	-10.31/8.41	-7.42/6.24	-5.83/5.83	-5.63/6.01	-4.94/4.77	-5.83/7.17	-6.96/8.20	-9.92/7.52	-6.39/7.15	-7.92/9.37	-11.36/12.51	-10.67/8.67	-6.75/6.36	-6.15/6.01	-6.73/8.73	-12.64/14.94	-14.66/13.31	-11.73/10.28	-10.71/11.64		
φ(142.5°)	-8.78/8.53	-12.56/13.06	-15.97/15.07	-15.51/14.86	-15.31/14.77	-11.36/8.78	-9.45/5.56	-5.08/5.75	-6.68/6.23	-6.30/8.82	-12.20/9.24	-6.22/5.84	-5.49/5.34	-6.31/8.18	-9.68/11.16	-10.80/10.15	-9.36/7.80	-7.00/7.12	-6.69/5.93	-6.11/7.57	-10.86/13.72	-13.63/13.76	-14.33/12.53	-11.23/10.09		
φ(150°)	-10.95/8.80	-7.87/7.61	-6.82/6.72	-7.23/8.87	-11.49/10.80	-7.28/7.54	-5.91/6.51	-7.18/7.99	-8.56/7.41	-7.05/8.23	-7.25/6.64	-3.84/5.35	-8.05/3.88	-9.04/8.84	-9.37/9.69	-9.18/8.64	-8.86/9.67	-10.36/10.72	-11.65/13.86	-14.68/13.35	-12.00/12.77	-14.21/13.41	-13.83/13.09			
φ(157.5°)	-12.81/10.99	-8.95/7.40	-6.16/5.39	-4.88/4.72	-5.42/6.12	-5.61/5.29	-5.56/6.24	-6.91/6.10	-4.87/4.53	-5.52/6.57	-6.17/6.16	-8.33/13.07	-14.19/9.91	-7.78/7.21	-7.83/8.69	-9.54/9.92	-10.43/11.70	-12.97/12.09	-11.51/12.19	-13.88/15.12	-13.86/11.39	-11.31/13.02	-15.45/15.28	-14.33/13.44		
φ(165°)	-13.12/13.23	-12.89/11.83	-11.65/9.98	-8.77/7.66	-7.23/7.40	-7.38/7.06	-6.78/6.60	-7.10/7.11	-7.36/7.87	-8.77/9.59	-10.84/12.99	-13.47/13.05	-10.73/11.88	-7.15/7.42	-8.46/10.16	-12.77/13.41	-14.96/14.30	-12.45/11.58	-11.77/11.55	-11.87/12.16	-11.43/10.66	-11.11/11.73	-12.25/12.18	-11.84/11.99		
φ(172.5°)	-13.54/13.57	-14.21/14.25	-14.61/14.44	-14.67/15.06	-15.34/14.56	-15.51/15.78	-14.67/13.88	-13.05/13.91	-14.74/13.49	-13.17/13.47	-13.78/12.39	-11.43/10.34	-10.11/9.70	-9.71/9.90	-10.86/11.91	-13.50/13.91	-13.82/12.92	-11.63/10.57	-10.27/10.65	-11.29/11.43	-10.48/10.50	-11.07/11.06	-11.12/11.28	-11.85/12.34		
φ(180°)	-14.15/15.08	-14.90/15.26	-14.26/12.77	-12.41/12.63	-13.24/13.86	-13.66/12.91	-12.26/12.26	-13.19/12.80	-13.37/13.03	-12.37/11.01	-10.99/10.99	-10.61/10.27	-10.20/10.53	-11.64/13.04	-13.87/14.29	-14.47/13.72	-12.44/11.53	-11.74/13.63	-16.04/14.97	-14.27/15.40	-14.92/13.70	-12.90/12.97	-13.43/14.17			
5.2GPol.	TotalAnt. 1	θ	φ	φ(30°)φ(37.5°)	φ(45°)φ(52.5°)	φ(60°)φ(67.5°)	φ(75°)φ(82.5°)	φ(90°)φ(97.5°)	φ(105°)φ(112.5°)	φ(120°)φ(127.5°)	φ(135°)φ(142.5°)	φ(150°)φ(157.5°)	φ(165°)φ(172.5°)	φ(180°)φ(187.5°)	φ(195°)φ(202.5°)	φ(210°)φ(217.5°)	φ(225°)φ(232.5°)	φ(240°)φ(247.5°)	φ(255°)φ(262.5°)	φ(270°)φ(277.5°)	φ(285°)φ(292.5°)	φ(300°)φ(307.5°)	φ(315°)φ(322.5°)	φ(330°)φ(337.5°)	φ(345°)φ(352.5°)	
Gain	φ(0°)φ(7.5°)	φ(15°)φ(22.5°)	φ(30°)φ(37.5°)	φ(45°)φ(52.5°)	φ(60°)φ(67.5°)	φ(75°)φ(82.5°)	φ(90°)φ(97.5°)	φ(105°)φ(112.5°)	φ(120°)φ(127.5°)	φ(135°)φ(142.5°)	φ(150°)φ(157.5°)	φ(165°)φ(172.5°)	φ(180°)φ(187.5°)	φ(195°)φ(202.5°)	φ(210°)φ(217.5°)	φ(225°)φ(232.5°)	φ(240°)φ(247.5°)	φ(255°)φ(262.5°)	φ(270°)φ(277.5°)	φ(285°)φ(292.5°)	φ(300°)φ(307.5°)	φ(315°)φ(322.5°)	φ(330°)φ(337.5°)	φ(345°)φ(352.5°)		
φ(0°)	-12.01/13.17	-13.24/13.24	-13.16/13.34	-12.44/11.86	-11.74/11.66	-11.53/12.03	-12.64/12.65	-12.72/12.28	-12.14/12.40	-11.91/12.86	-12.20/12.57	-11.53/11.68	-12.49/13.09	-13.59/12.83	-12.24/12.35	-14.61/13.14	-11.54/11.61	-14.09/12.51	-13.94/13.20							



# Antenna Pattern

# Appendix B

Theta	Phi	11.39/10.21	8.63/9.12	9.41/9.98	9.53/8.44	9.71/9.70	9.49/8.95	8.88/8.62	8.85/10.63	9.99/11.46	11.87/11.14	13.07/13.18	13.15/12.31	12.60/15.98	14.65/11.90	10.11/9.46	8.56/9.58	8.98/8.38	10.48/10.83	11.41/11.72	11.73/12.83	12.89/12.56	11.55/10.15	10.36/10.04	9.91/11.07																						
Theta(20°)	Phi(7.5°)	9.62/8.05	6.83/6.74	7.39/7.98	6.06/5.97	7.21/7.53	5.67/4.36	5.53/5.53	5.58/7.32	7.79/8.23	9.27/11.66	11.80/13.05	10.57/8.02	8.31/14.09	10.89/10.13	11.62/11.06	11.68/14.87	15.60/15.81	15.77/15.53	13.63/12.65	11.19/12.66	10.15/11.76	10.64/10.79	10.04/9.38	10.59/9.46																						
Theta(30°)	Phi(7.5°)	6.91/6.50	6.05/5.68	5.99/6.93	5.59/5.19	4.94/3.89	4.22/3.40	3.81/3.48	4.29/5.40	5.26/6.23	7.74/8.49	7.66/9.36	7.83/5.85	7.87/9.95	11.71/11.84	8.72/6.53	5.97/6.80	6.64/6.19	6.24/6.44	5.24/5.17	5.02/3.82	3.59/3.78	3.85/4.25	5.33/8.15	4.82/8.07																						
Theta(37.5°)	Phi(7.5°)	7.29/7.52	5.48/5.56	7.41/6.29	8.03/5.60	4.60/4.06	4.28/4.44	3.88/3.80	3.78/4.17	5.00/6.21	8.25/8.09	8.10/5.90	5.83/4.68	8.57/5.56	8.02/3.66	2.82/4.32	3.34/2.44	0.85/1.07	0.68/1.56	1.94/1.30	1.08/0.79	3.18/3.53	5.04/3.59	4.08/3.72	7.60/6.73																						
Theta(45°)	Phi(7.5°)	4.31/5.57	5.65/5.34	6.48/7.40	8.69/8.15	6.21/6.91	3.90/6.62	7.96/6.33	7.22/7.70	7.92/7.45	6.50/5.59	7.35/5.54	5.06/9.88	4.91/8.05	3.14/6.50	6.25/7.97	1.15/0.53	4.71/5.86	7.88/9.79	10.85/9.53	7.80/4.97	3.98/5.89	6.84/9.41	6.05/6.77	6.89/5.43																						
Theta(52.5°)	Phi(7.5°)	8.40/7.79	3.46/3.16	4.17/3.87	5.99/4.37	3.57/5.22	7.36/8.45	9.60/7.01	6.87/5.18	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74	3.64/4.74																						
Theta(60°)	Phi(7.5°)	3.70/3.36	8.06/5.07	3.28/2.03	5.11/2.64	2.02/1.15	1.42/3.29	3.61/1.87	1.02/0.91	0.34/1.13	1.92/4.59	2.23/3.33	1.89/5.76	0.46/3.14	0.37/3.53	1.70/0.98	0.62/0.59	1.21/0.74	0.38/0.18	0.84/0.84	1.68/2.81	3.42/3.76	4.53/3.94	6.23/4.03	2.54/2.32																						
Theta(67.5°)	Phi(7.5°)	3.64/3.29	3.30/7.48	5.29/4.98	4.23/2.66	4.85/0.95	0.52/1.64	0.32/0.13	0.04/0.79	0.50/2.19	3.70/3.29	3.25/2.96	4.33/2.71	4.98/2.74	3.26/2.68	2.43/1.40	2.86/1.33	0.01/0.68	0.15/1.57	1.23/1.19	0.19/0.56	0.07/1.89	3.46/4.54	5.18/6.64	6.17/4.94																						
Theta(75°)	Phi(7.5°)	6.62/4.40	3.85/4.66	3.29/3.07	2.70/2.92	2.14/5.20	2.38/1.92	0.93/1.04	1.39/1.24	3.01/4.28	1.88/2.61	1.81/3.76	1.04/3.95	2.58/0.97	1.33/2.17	1.56/3.62	1.02/2.89	3.82/5.82	5.20/2.16	3.05/9.48	8.31/3.00	3.65/3.33	4.13/5.82	5.35/2.30	4.52/6.86																						
Theta(82.5°)	Phi(7.5°)	5.24/3.33	4.56/6.92	3.50/2.17	0.57/0.83	0.41/1.86	2.19/2.98	4.57/3.71	1.05/0.68	0.090/48	0.97/0.91	3.30/0.93	0.03/3.50	2.37/1.96	1.72/2.28	0.94/0.19	0.39/0.70	0.46/1.27	0.42/0.33	0.91/1.20	2.91/1.01	1.70/7.89	4.30/3.38	4.87/4.57	1.44/5.09																						
Theta(90°)	Phi(7.5°)	7.83/7.34	7.40/4.81	5.24/4.86	3.71/3.24	2.13/2.15	2.26/1.01	0.63/0.36	0.49/0.14	1.05/1.31	3.34/1.52	4.53/3.06	2.79/5.83	5.77/2.21	1.88/4.54	2.51/3.80	4.09/1.19	6.11/2.30	0.030/29	0.24/1.82	1.34/6.91	6.17/7.70	1.98/6.94	4.19/7.87																							
Theta(97.5°)	Phi(7.5°)	4.50/7.14	6.64/9.12	5.43/3.45	3.48/2.30	2.61/3.50	4.91/1.24	0.48/0.05	2.08/1.69	1.43/1.48	3.32/0.18	4.50/7.01	0.58/4.61	2.77/1.05	5.18/5.44	2.48/2.43	1.520/35	2.79/4.72	12.83/3.67	1.56/2.73	5.61/6.44	2.89/9.09	11.35/10.23	8.33/9.84	6.83/7.66																						
Theta(105°)	Phi(7.5°)	8.55/6.24	5.05/11.03	11.39/4.85	1.70/0.53	2.48/3.37	3.32/3.06	2.81/3.99	3.11/1.38	3.42/0.56	3.77/1.06	5.86/9.53	1.40/4.28	7.41/5.34	4.32/9.29	4.70/3.59	7.64/6.16	8.59/6.20	7.37/7.36	8.47/6.89	5.81/15.15	7.79/12.54	14.52/8.97	8.96/10.62	10.20/8.87																						
Theta(112.5°)	Phi(7.5°)	13.28/15.32	8.62/12.22	11.69/6.38	5.73/6.45	4.89/7.44	4.57/1.95	2.26/5.18	6.86/3.95	7.31/6.05	9.67/9.39	10.21/11.47	6.79/4.77	7.23/12.38	10.35/13.43	8.13/6.79	7.05/10.74	15.36/13.42	6.72/12.77	15.08/11.69	13.31/12.45	13.09/12.56	13.60/15.05	14.12/14.56																							
Theta(120°)	Phi(7.5°)	10.26/11.52	15.78/13.91	8.65/9.92	2.86/4.03	4.15/4.39	4.93/8.03	6.74/6.06	7.24/8.65	3.35/4.11	3.73/0.07	5.41/13.88	8.11/6.44	4.92/5.32	8.21/7.90	6.61/6.16	4.17/5.50	6.80/6.66	2.80/1.84	3.64/7.75	12.92/14.92	12.29/12.67	10.56/10.27	16.07/14.26	10.64/13.23																						
Theta(127.5°)	Phi(7.5°)	7.00/5.82	9.95/8.45	14.64/6.87	3.52/2.91	2.92/3.05	3.23/2.92	3.00/5.80	5.66/5.69	5.45/3.90	4.10/5.56	7.96/7.46	6.67/5.44	10.85/9.83	11.29/11.53	6.97/7.50	5.43/7.07	6.33/5.30	6.32/13.01	12.80/9.26	9.05/9.72	13.00/14.59	12.53/14.34	12.36/15.76	14.11/9.70																						
Theta(135°)	Phi(7.5°)	12.38/7.14	5.72/8.40	10.91/11.50	13.02/8.85	6.95/6.44	9.00/8.46	7.88/8.76	10.61/11.47	10.59/9.06	8.34/4.44	10.63/9.68	10.44/14.25	14.54/15.44	10.81/12.18	12.48/10.50	9.69/8.39	8.55/11.45	14.42/13.80	7.81/11.45	11.15/10.93	15.53/15.70	12.68/12.69	11.78/14.52	10.57/13.32																						
Theta(142.5°)	Phi(7.5°)	11.88/10.94	13.84/12.89	13.81/10.11	8.24/5.79	5.51/6.46	9.18/13.47	13.55/12.03	9.97/10.04	10.67/9.80	7.92/8.01	11.76/10.20	11.13/12.34	7.77/6.74	6.18/8.06	9.76/13.68	10.98/9.59	7.46/11.64	15.34/14.17	15.64/15.39	11.22/10.12	12.13/12.66	14.69/9.99																								
Theta(150°)	Phi(7.5°)	4.30/4.54	7.60/10.00	14.60/7.84	7.07/8.14	4.58/3.36	3.83/5.44	7.53/4.94	5.25/5.10	4.64/4.85	4.09/4.66	7.41/7.62	8.62/8.40	9.49/10.53	5.44/2.97	4.95/5.72	8.81/8.66	8.87/8.55	6.90/8.10	6.90/7.63	11.96/13.24	12.43/10.30	12.57/7.77	9.32/9.63	6.39/8.84																						
Theta(157.5°)	Phi(7.5°)	3.08/2.65	3.88/6.07	7.71/6.98	5.64/3.16	2.92/4.26	5.79/4.91	4.44/4.33	5.41/4.77	4.52/4.25	3.80/4.59	5.33/7.83	6.01/5.56	6.20/3.40	2.67/5.93	9.67/5.36	4.97/5.83	7.13/7.73	7.99/9.94	14.11/14.43	12.84/8.35	7.52/5.25	6.98/8.59	1.47/1.50	5.07/4.78																						
Theta(165°)	Phi(7.5°)	4.67/3.69	3.66/3.35	3.83/5.00	5.22/5.79	4.72/4.38	4.21/5.08	4.87/5.23	4.63/4.71	4.85/5.18	6.12/5.77	5.16/5.69	7.21/6.31	4.57/6.09	9.41/8.09	6.51/7.28	8.38/8.00	8.10/10.05	13.80/14.12	9.37/6.98	5.67/6.21	7.56/8.01	8.77/7.17	5.92/5.50	5.17/4.60																						
Theta(172.5°)	Phi(7.5°)	5.18/4.54	4.84/4.66	4.46/4.26	4.28/4.64	4.91/4.16	3.90/3.21	3.16/3.52	4.04/4.13	4.48/4.72	5.33/5.84	8.50/8.72	7.87/9.11	9.07/10.76	13.63/14.52	12.02/10.62	10.52/14.43	9.04/7.75	9.63/10.66	9.31/8.94	7.48/7.46	6.24/6.16	6.10/5.23																								
Theta(180°)	Phi(7.5°)	7.20/7.34	7.17/7.14	6.97/6.55	7.05/7.54	7.15/7.64	8.22/8.98	9.02/9.26	7.99/7.87	8.25/8.63	8.26/8.55	7.30/6.18	6.92/7.96	12.11/15.10	14.49/12.22	11.92/8.93	7.80/7.69	9.76/13.59	9.15/12.73	7.91/9.06	9.02/8.21	8.13/8.43	9.03/8.26	8.61/8.48	8.05/7.79																						
Freq(Hz)	5.2GPol	TotalAnt	2	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+																						
Gain	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)	Phi(352.5°)
Theta(0°)	Phi(7.5°)	9.25/9.20	9.73/9.86	9.92/9.17	9.19/9.24	9.29/8.32	7.70/7.66	8.52/8.54	7.47/7.27	8.89/10.89	9.67/9.49	5.62/5.14	5.19/5.26	5.26/5.22	5.25/5.14	5.17/5.15	5.10/5.10	5.05/5.41	5.79/5.69	5.32/5.11	5.46/6.08	6.39/5.05	5.39/5.08	5.31/6.13	6.86/7.19																						
Theta(15°)	Phi(7.5°)	7.39/7.48	8.10/8.57	8.22/7.65	7.35/7.15	6.79/6.29	5.81/5.64	5.94/5.78	5.18/5.08	5.94/7.46	8.05/6.90	5.69/5.39	5.84/6.40	6.64/6.43	5.79/4.38	3.76/3.44	3.53/3.77	4.03/4.45	4.99/5.48	5.32/4.69	4.44/4.72	5.25/5.39	4.89/4.30	4.20/4.74	5.53/6.04																						
Theta(22.5°)	Phi(7.5°)	6.58/6.41	6.61/7.01	7.32/7.69	8.16/8.80	7.11/5.91	5.03/4.82	5.26/5.13	4.63/4.43	4.90/5.41	5.23/4.33	3.35/2.80	2.94/3.36	3.69/3.59	3.33/2.78	2.36/2.30	2.66/3.18	3.75/4.40	5.18/6.14	6.19/5.45	4.73/5.44	4.97/5.48	5.53/4.99	4.44/4.49	5.08/5.79																						
Theta(30°)	Phi(7.5°)	6.81/6.53	6.22/6.58	7.61/9.52	11.92/11.96	8.78/6.02	4.29/3.84	4.51/5.41	6.06/6.41	7.48/8.66	8.24/5.76	4.14/3.63	4.08/5.07	5.89/5.85	4.75/3.04	2.31/2.12	2.43/2.91	3.48/3.77	3.95/4.10	3.76/3.34	3.03/2.92	3.17/3.57	4.08/4.29	3.85/3.63	4.08/5.28																						
Theta(37.5°)	Phi(7.5°)	5.26/6.05	6.72/7.50	8.32/10.05	11.84/11.27	7.50/5.45	4.40/4.18	4.49/4.96	5.61/5.92	7.57/11.09	14.12/8.82	5.67/4.86	5.26/5.20	4.83/4.94	4.42/3.10	2.43/2.88	4.29/6.18	7.51/7.26	6.28/5.41	4.56/3.98	3.61/3.04	2.32/1.63	1.59/2.19	2.74/2.94	3.13/3.70																						
Theta(45°)	Phi(7.5°)	4.36/5.52	7.55/8.40	7.51/8.44	12.60/12.77	7.71/5.81	5.24/4.66	3.74/3.00	3.38/4.64	6.94/10.12	12.51/10.94	7.56/6.85	7.27/4.97	3.29/4.13	5.74/4.29	2.89/3.14	4.34/4.82	4.20/3.00	2.10/1.71	1.46/1.52	2.23/2.78	1.91/0.52	0.17/0.07	0.74/1.45	2.29/3.02																						
Theta(52.5°)	Phi(7.5°)	4.41/5.65	7.83/7.24	5.31/6.07	10.22/10.49	7.19/6.45	5.48/3.79	2.30/1.57	2.28/4.94	10.13/9.24	6.96/6.37	5.07/3.63	3.41/2.55	1.41/2.36	4.65/3.16	0.92/0.21	0.140/08	0.76/1.47	1.85/1.88	1.92/1.72	2.76/2.42	1.33/0.50	0.05/0.27	1.62/2.79																							
Theta(60°)	Phi(7.5°)	2.93/3.76	5.47/5.39	4.51/5.07	6.85/5.59	4.63/5.13	4.18/1.90	0.78/0.84	2.17/5.18	11.03/8.04	4.28/3.87	3.65/2.04	1.89/2.56	1.99/1.93	2.90/2.45	1.05/0.50	0.30/0.32	0.180/34	0.710/75	0.901/10	0.571/84	2.32/3.78	4.87/3.69	1.78/0.79	1.16/1.99																						
Theta(67.5°)	Phi(7.5°)	1.40/1.24	2.13/3.53	3.95/4.50	3.61/2.41	2.81/3.53	2.1																																								







# Antenna Pattern

# Appendix B

Theta (°)	Phi (°)	Phi (7.5°)	Phi (15°)	Phi (22.5°)	Phi (30°)	Phi (37.5°)	Phi (45°)	Phi (52.5°)	Phi (60°)	Phi (67.5°)	Phi (75°)	Phi (82.5°)	Phi (90°)	Phi (97.5°)	Phi (105°)	Phi (112.5°)	Phi (120°)	Phi (127.5°)	Phi (135°)	Phi (142.5°)	Phi (150°)	Phi (157.5°)	Phi (165°)	Phi (172.5°)	Phi (180°)	Phi (187.5°)	Phi (195°)	Phi (202.5°)	Phi (210°)	Phi (217.5°)	Phi (225°)	Phi (232.5°)	Phi (240°)	Phi (247.5°)	Phi (255°)	Phi (262.5°)	Phi (270°)	Phi (277.5°)	Phi (285°)	Phi (292.5°)	Phi (300°)	Phi (307.5°)	Phi (315°)	Phi (322.5°)	Phi (330°)	Phi (337.5°)	Phi (345°)	Phi (352.5°)			
Theta (105°)	1.71/0.96	-1.13/1.23	2.12/0.58	-0.73/8.84	-2.79/5.04	-3.43/4.01	-4.12/4.24	-3.10/5.27	-6.46/12.04	-5.59/1.35	-3.15/4.25	-3.74/7.34	-3.84/4.61	-6.79/6.77	9.87/7.06	-2.91/8.57	-14.79/10.29	6.68/6.32	-6.01/6.01	6.89/6.05	-5.62/3.31	0.12/1.14	-1.12/3.31	-0.55/1.28																											
Theta (112.5°)	-2.32/5.52	-2.11/3.83	-0.49/1.08	-2.68/6.34	-6.04/5.15	-4.43/3.55	-6.47/3.97	-3.98/7.17	-7.50/4.41	-5.11/1.84	-3.50/3.35	-4.21/6.09	-3.49/6.14	-6.28/5.27	7.84/11.36	-4.72/9.23	-9.81/8.50	6.68/5.19	-8.77/6.09	8.89/7.78	-4.80/5.64	-3.40/3.63	-3.53/3.94	-0.93/1.26																											
Theta (120°)	-6.05/6.48	-9.33/6.00	-3.02/4.14	-6.75/9.61	-11.25/9.92	-6.99/9.34	-7.97/7.78	-7.91/7.80	-6.70/6.49	-7.89/7.28	-6.94/4.55	-9.79/8.68	-11.63/11.97	-11.85/10.08	9.22/8.30	-4.04/10.50	-8.84/10.55	-9.84/10.55	-11.28/12.56	-8.29/7.54	-4.74/7.78	-9.07/6.65	-6.95/9.55	-7.42/4.75																											
Theta (127.5°)	-6.73/7.92	-9.65/9.53	-14.01/10.27	-7.38/7.19	-11.30/13.13	-9.86/10.50	-14.49/10.70	-10.48/15.50	-11.92/8.81	-13.67/11.17	-8.59/9.31	-3.72/5.56	-4.94/6.26	-6.32/9.02	-15.08/8.14	-15.10/8.96	-15.39/11.82	9.31/11.37	-15.52/12.06	-14.06/7.83	-4.50/8.45	-11.68/7.56	-9.78/6.56	-7.73/9.18																											
Theta (135°)	-11.06/12.31	-11.77/9.64	-7.36/8.37	-5.17/7.69	-9.45/11.05	-11.82/12.35	-11.57/9.03	-6.71/10.37	-11.72/6.00	-8.19/12.35	-10.10/10.13	-8.65/10.37	-12.67/11.96	-15.03/12.86	9.01/8.27	-11.00/12.11	-13.23/12.27	-11.87/6.74	8.80/10.04	-8.66/11.99	-10.10/11.71	4.54/4.46	-6.93/12.17	-12.05/12.58																											
Theta (142.5°)	-2.47/2.99	-4.12/5.10	-6.80/9.72	-11.93/11.17	-7.27/8.64	-7.20/12.36	-8.27/2.47	-7.17/10.29	-12.61/9.50	-5.94/8.58	-12.82/14.15	-8.39/9.46	-12.48/14.76	-13.05/8.67	5.94/9.30	-12.21/11.40	-15.76/12.44	-12.01/8.52	-7.15/9.54	-13.31/11.50	-7.14/7.00	-4.79/5.12	-4.76/5.57	-3.79/3.28																											
Theta (150°)	-6.15/7.36	-5.96/5.51	-4.97/5.77	-8.66/7.21	-7.11/8.98	-7.15/6.04	-7.63/8.72	-9.18/6.33	-6.37/12.55	-9.29/8.88	-11.33/13.45	-12.09/13.41	-13.99/13.95	-14.12/13.90	-11.74/14.24	-13.42/15.68	-10.76/6.22	-5.47/6.30	-9.11/12.62	-10.57/11.16	-12.93/10.20	-8.46/6.99	-4.03/4.04	-5.04/4.79																											
Theta (157.5°)	-8.87/7.43	-8.73/9.24	-8.73/7.21	-4.92/6.24	-11.24/9.54	-7.95/11.58	9.20/4.97	3.46/3.60	5.52/12.15	-16.12/8.55	6.88/7.80	9.13/8.02	8.07/8.53	-10.40/10.69	-11.60/11.76	-11.70/13.44	-10.67/7.41	5.73/6.30	-8.07/9.86	-9.68/10.45	-12.29/11.41	-8.24/7.54	-9.48/8.91	8.55/10.92																											
Theta (165°)	-6.11/6.74	-5.07/8.34	-9.37/9.53	-10.27/8.69	-6.36/7.07	-7.67/6.95	-5.70/6.59	-8.73/12.04	-14.10/12.94	-9.95/7.27	6.85/8.06	9.20/10.42	-10.49/9.43	-8.57/7.59	-7.73/10.29	-13.72/13.28	-11.55/10.96	-10.54/11.25	-10.88/10.53	9.43/2.00	9.60/9.77	-8.77/6.53	-5.01/5.20	-5.22/4.71																											
Theta (172.5°)	-8.89/8.49	-7.70/7.16	-7.10/7.65	-7.58/8.72	-10.83/11.21	-8.86/7.24	-7.07/7.54	-8.30/8.68	-9.59/9.67	-8.62/7.40	-7.47/8.57	-8.54/9.59	9.32/7.85	8.06/7.95	-7.92/9.70	-11.34/12.70	-13.65/14.71	-13.81/11.80	-10.25/9.47	8.47/7.86	8.13/8.11	-8.23/8.67	9.11/9.25	9.08/9.74																											
Theta (180°)	-15.11/15.87	-15.44/15.32	-15.03/13.81	-12.77/12.86	-11.39/9.87	-10.09/7.10	-11.96/13.20	-12.57/11.25	-11.74/13.44	-15.14/15.31	-14.43/14.96	-13.91/13.64	-12.58/12.89	-12.80/12.09	-13.08/12.87	-12.33/13.51	-13.95/12.76	-11.64/9.61	-9.03/8.94	8.60/8.47	-9.17/10.61	-11.44/12.64	-13.62/14.06	-14.18/13.30																											
Freq (Hz)	5.65GHz	TotalAnt. 3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Gain	Phi (7.5°)	Phi (15°)	Phi (22.5°)	Phi (30°)	Phi (37.5°)	Phi (45°)	Phi (52.5°)	Phi (60°)	Phi (67.5°)	Phi (75°)	Phi (82.5°)	Phi (90°)	Phi (97.5°)	Phi (105°)	Phi (112.5°)	Phi (120°)	Phi (127.5°)	Phi (135°)	Phi (142.5°)	Phi (150°)	Phi (157.5°)	Phi (165°)	Phi (172.5°)	Phi (180°)	Phi (187.5°)	Phi (195°)	Phi (202.5°)	Phi (210°)	Phi (217.5°)	Phi (225°)	Phi (232.5°)	Phi (240°)	Phi (247.5°)	Phi (255°)	Phi (262.5°)	Phi (270°)	Phi (277.5°)	Phi (285°)	Phi (292.5°)	Phi (300°)	Phi (307.5°)	Phi (315°)	Phi (322.5°)	Phi (330°)	Phi (337.5°)	Phi (345°)	Phi (352.5°)				
Theta (0°)	-15.53/15.37	-15.13/15.82	-15.96/16.73	-15.60/15.18	-15.32/14.53	-15.59/14.14	-13.53/12.72	-12.97/13.16	-15.22/15.28	-14.56/14.92	-13.90/13.65	-13.42/13.34	-14.31/13.28	-13.49/15.75	-15.61/15.39	-15.57/15.05	-14.29/14.10	-15.82/15.64	-15.00/15.79	-15.59/15.47	-15.81/15.56	-15.78/15.31	-16.26/15.90	-15.66/15.94																											
Theta (7.5°)	-9.96/10.01	-11.08/11.09	-11.88/12.79	-11.40/11.43	-13.44/12.48	-12.77/13.69	-15.01/16.11	-14.19/13.81	-15.19/15.06	-15.44/15.04	-16.06/14.97	-13.72/13.63	-12.34/13.13	-14.61/12.86	-14.22/15.89	-14.31/15.42	-15.67/15.13	-14.25/13.35	-12.96/11.63	-11.26/11.86	-11.06/11.00	-9.74/10.36	-9.63/10.02																												
Theta (15°)	-10.80/10.34	-10.65/9.95	-8.12/8.12	-7.28/6.32	-8.26/11.11	-9.93/9.39	-9.67/10.34	-9.83/9.08	-7.90/7.16	-6.88/7.92	-10.31/11.80	-10.67/10.91	-10.26/9.78	-10.50/9.70	-9.35/11.05	-10.77/10.74	-9.60/9.49	-9.43/9.26	-10.32/10.56	-12.31/12.03	-11.12/10.26	-8.40/8.35	-9.84/10.74	-10.77/11.20																											
Theta (22.5°)	-6.29/5.03	-4.54/6.86	-8.65/8.48	5.83/4.71	5.27/7.21	-8.69/10.81	-9.78/3.33	4.06/5.40	-8.29/8.54	-8.12/7.29	-7.16/9.74	-11.38/9.80	-8.98/8.40	-7.87/7.50	-9.56/10.81	-8.01/6.62	6.55/7.14	-8.69/9.33	-8.74/8.38	-8.16/7.56	-8.78/10.76	-9.81/9.16	-8.62/7.70																												
Theta (30°)	-7.46/5.13	-5.07/5.02	-5.52/7.20	-4.59/6.38	-6.09/8.74	-7.86/4.37	-6.26/7.95	-6.33/5.41	-5.96/7.42	-6.03/6.84	-6.26/7.72	-10.09/8.05	-6.90/6.98	-5.75/8.22	-7.62/9.46	-7.16/8.92	-7.16/8.92	-7.13/7.94	-5.70/4.07	-4.49/4.43	-5.97/5.20	-9.24/9.94																													
Theta (37.5°)	-10.44/8.65	-6.85/6.43	-7.13/4.69	-1.61/4.79	-9.90/3.36	-5.99/6.22	6.49/6.42	-6.98/6.79	-11.11/6.56	-5.22/3.72	4.41/2.44	-1.40/6.67	0.96/2.52	-2.80/3.54	-3.61/3.03	-4.72/7.08	-7.79/6.65	6.46/10.40	-5.95/8.54	-6.18/7.57	8.01/8.06	-5.38/4.50	-5.51/5.51	-5.98/7.12																											
Theta (45°)	-6.43/5.26	-4.62/4.93	5.58/4.05	4.32/5.65	-3.65/3.63	-6.65/6.33	-5.59/7.38	-8.21/3.45	-3.18/0.53	-4.29/3.68	-3.80/3.04	-6.12/7.98	-4.23/2.57	-3.96/6.02	-4.81/6.51	-4.01/4.38	-4.68/6.50	5.25/4.79	-10.56/5.16	-8.85/6.10	-3.26/6.60	-3.87/5.76	-3.52/2.26	-3.89/4.67																											
Theta (52.5°)	-3.57/2.52	-3.61/4.05	-4.04/4.86	-5.39/3.59	-2.59/4.43	-2.31/3.15	-5.82/3.11	-1.91/4.60	-4.76/2.96	-5.44/1.43	-6.55/8.24	-5.67/4.91	-7.18/6.74	-7.98/9.38	-4.43/4.01	-5.97/4.37	-4.70/4.27	-6.75/5.33	-7.57/6.76	-5.06/4.88	-4.43/8.94	-3.60/3.68	-2.69/2.27	-5.63/5.02																											
Theta (60°)	-2.63/1.31	-1.80/3.68	-1.12/3.46	-1.82/3.00	-4.49/0.28	-3.10/2.40	-3.34/3.11	5.89/2.40	-2.40/6.05	-0.55/0.82	-1.58/0.32	0.94/1.36	1.87/2.45	1.83/0.56	0.21/0.73	1.65/6.25	-3.06/6.56	4.43/4.67	6.01/4.32	-6.11/5.52	5.33/5.23	-1.82/1.65	-2.10/1.02	-2.64/1.37																											
Theta (67.5°)	-0.67/1.67	-0.53/2.06	-0.39/3.69	-0.94/5.99	-1.65/0.33	-4.58/1.58	6.11/2.79	-1.88/3.25	-1.70/1.71	0.16/2.49	0.48/1.32	-2.15/1.81	-3.14/6.38	-4.80/3.33	-2.96/7.77	-5.65/4.45	-7.95/8.01	-5.62/4.39	-3.25/2.91	6.31/4.44	-7.92/9.42	-1.77/0.66	-5.47/1.19																												
Theta (75°)	-1.14/1.80	-1.87/2.47	-2.37/2.80	-0.20/6.57	-1.20/4.71	-2.45/8.20	-4.36/1.71	-6.11/5.09	-3.24/2.97	-0.06/4.21	-0.07/2.08	1.03/1.08	-1.32/0.91	2.42/3.05	-1.47/5.42	-4.10/5.19	-9.23/5.07	-8.94/4.66	-5.22/4.05	-3.56/2.89	-6.34/2.24	-2.76/0.67	-0.33/0.47	-3.62/0.82																											
Theta (82.5°)	-0.37/1.04	-1.89/1.29	-1.62/0.78	-0.70/0.30	-2.33/1.28	-2.90/1.88	-3.89/2.94	-2.30/5.95	-1.12/3.21	2.23/0.86	-4.08/6.31	-3.30/4.10	0.96/2.90	0.56/8.89	-2.75/0.64	-5.53/1.47	-6.85/1.59	-4.10/2.70	-3.06/4.41	2.79/2.47	-5.00/1.34	0.02/1.21	-0.35/0.80	-1.00/0.15																											
Theta (90°)	0.67/0.28	-0.20/1.44	<b>0.97/2.52</b>	-1.99/0.18	-2.01/1.46	4.54/0.04	8.39/0.08	-2.10/5.35	0.02/1.45	-0.00/0.05	-1.04/0.23	0.93/1.43	-3.81/3.14	-1.82/1.74	-6.97/9.21	-1.06/1.31	-4.97/3.04	3.17/2.02	-2.23/2.78	-3.57/4.46	-4.76/2.32	-0.90/1.79	-0.31/1.18	0.66/0.11																											
Theta (97.5°)	-1.75/1.52	-1.63/0.10	-4.17/0.65	-5.11/3.25	-1.27/0.82	-4.03/4.74	-5.63/4.25	-1.53/3.66	-4.40/1.90	-4.90/4.51	-1.80/4.01	-1.56/5.06	5.08/3.07	-6.22/3.46	-4.93/6.17	-4.58/6.02	-3.27/3.46	-7.81/3.32	-4.02/9.87	5.99/4.65	-2.53/9.25	-1.73/2.46	2.22/3.21	-1.50/0.47																											
Theta (105°)	-2.59/2.44	-3.56/0.80	-2.31/1.41	-2.40/1.87	-6.06/0.08	-7.24/3.78	-8.36/4.56	0.03/7.89	-7.21/6.79	-13.23/6.14	-4.32/6.01	-3.11/8.18	-11.02/4.99	-6.35/8.08	-6.69/7.74	-5.45/11.02	-12.58/10.49	-13.20/7.98	-3.05/10.34	-9.81/4.35	-3.09/2.40	1.13/0.02	-0.51/2.29	-1.02/3.36																											
Theta (112.5°)	0.02/3.47	0.14/0.49	-1.25/5.57	-3.03/1.28	-4.35/1.47	-5.22/3.15	9.11/2.84	-2.07/3.58	-6.85/9.09	-3.70/4.13	5.03/5.55	-4.52/6.94	-6.94/6.57	-3.29/4.80	-5.26/12.49	-7.48/15.13	-10.72/6.42	-6.12/11.69	-7.52/5.14	-3.99/4.84	-0.46/7.17	-1.61/5.41	-0.35/1.46																												
Theta (120°)	-5.75/10.55	-6.51/8.82	-5.09/5.70	-8.22/7.61	-7.28/8.41	-4.35/7.15	-9.16/6.68	-9.99/5.62	-5.05/8.14	-4.56/8.11	-7.96/7.32	-4.72/7.47	-11.59/13.01	-11.22/10.46	-6.95/9.83	-11.15/6.42	-12.49/7.75	-10.57/12.11	-11.22/8.28	-6.86/10.04	-6.47/8.36	-7.39/8.25	-5.10/4.73																												
Theta (127.5°)	-8.83/8.23	-10.59/13.29	-8.65/8.34	-15.40/11.00	-11.11/12.24	-10.87/14.84	-13.05/9.87	-6.91/10.26	-15.08/12.71	-16.09/11.98	9.02/4.60	-2.01/3.19	-3.32/5.43	-6.58/8.43	-15.56/7.71	-15.30/13.32	-8.54/9.46	-12.52/13.90	-15.11/13.06	-11.42/8.81	-12.96/12.12	-11.78/8.78	-8.70/9.37	-12.98/9.86																											
Theta (135°)	-8.74/9.53	-7.87/8.28	-10.09/9.33	-10.57/8.12	-10.43/8.02	-10.57/11.78	-9.77/9.31	-6.88/6.57	-13.88/11.58	-5.70/9.90	-12.17/10.06	-6.76/6.35	-11.40/13.79	-12.81/10.09	-9.15/8.58	-10.17/10.93	-13.29																																		



# Antenna Pattern

# Appendix B

Theta (°)	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°																					
Gain	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)		
5.36dBi	-13.17/13.96	-14.49/14.79	-15.21/14.35	-14.57/15.38	-13.95/14.29	-15.08/15.18	-15.96/14.79	-12.97/13.20	-15.11/12.66	-14.52/14.96	-14.75/16.28	-15.87/15.11	-14.38/14.05	-14.01/14.70	-14.04/13.48	-13.14/13.25	-14.76/14.74	-15.00/14.38	-14.96/14.42	-14.39/13.87	-16.24/15.87	-14.06/14.70	-14.84/14.63	-13.27/14.21	-13.90/15.23	-14.76/15.87	-14.81/13.34	-13.87/15.11	-15.57/15.71	-15.82/16.21	-15.39/15.00	-13.61/13.99	-15.20/15.29	-14.95/15.75	-15.52/15.02	-15.29/15.25	-15.26/14.57	-13.92/15.13	-14.83/13.74	-14.20/14.59	-14.77/13.63	-13.88/14.01	-15.64/15.14	-15.70/14.97	-15.34/15.86	-15.99/15.04	-15.31/14.93	-14.84/15.60
Theta (°)	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°																					
Gain	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)		
5.36dBi	-14.75/14.96	-13.08/12.54	-13.50/12.18	-13.55/15.08	-15.39/15.40	-14.53/14.42	-12.74/10.93	-11.03/12.55	-14.87/14.77	-15.82/16.64	-15.13/13.78	-13.36/13.60	-13.81/12.80	-12.42/12.03	-10.54/10.23	-12.40/15.68	-15.08/14.05	-11.43/10.85	-10.84/12.63	-14.52/15.28	-14.78/14.24	-15.13/14.16	-13.94/15.13	-13.03/14.51	-15.17/15.48	-15.09/15.09	-15.72/15.47	-14.30/12.64	-12.61/14.38	-14.37/16.00	-15.22/15.23	-15.83/11.34	-9.79/10.84	-11.32/10.49	-12.48/13.17	-12.03/12.86	-12.13/11.49	-12.79/12.05	-11.64/12.08	-11.86/12.18	-13.35/13.78	-13.17/13.60	-13.36/14.24	-15.09/15.40	-14.00/13.79	-13.15/13.96	-14.08/13.81	-15.17/14.84
Theta (°)	150°	157.5°	165°	172.5°	180°	187.5°	195°	202.5°	210°	217.5°	225°	232.5°	240°	247.5°	255°	262.5°	270°	277.5°	285°	292.5°	300°	307.5°	315°	322.5°	330°	337.5°	345°																					
Gain	Phi(7.5°)	Phi(15°)	Phi(22.5°)	Phi(30°)	Phi(37.5°)	Phi(45°)	Phi(52.5°)	Phi(60°)	Phi(67.5°)	Phi(75°)	Phi(82.5°)	Phi(90°)	Phi(97.5°)	Phi(105°)	Phi(112.5°)	Phi(120°)	Phi(127.5°)	Phi(135°)	Phi(142.5°)	Phi(150°)	Phi(157.5°)	Phi(165°)	Phi(172.5°)	Phi(180°)	Phi(187.5°)	Phi(195°)	Phi(202.5°)	Phi(210°)	Phi(217.5°)	Phi(225°)	Phi(232.5°)	Phi(240°)	Phi(247.5°)	Phi(255°)	Phi(262.5°)	Phi(270°)	Phi(277.5°)	Phi(285°)	Phi(292.5°)	Phi(300°)	Phi(307.5°)	Phi(315°)	Phi(322.5°)	Phi(330°)	Phi(337.5°)	Phi(345°)		
5.36dBi	-14.75/14.96	-13.08/12.54	-13.50/12.18	-13.55/15.08	-15.39/15.40	-14.53/14.42	-12.74/10.93	-11.03/12.55	-14.87/14.77	-15.82/16.64	-15.13/13.78	-13.36/13.60	-13.81/12.80	-12.42/12.03	-10.54/10.23	-12.40/15.68	-15.08/14.05	-11.43/10.85	-10.84/12.63	-14.52/15.28	-14.78/14.24	-15.13/14.16	-13.94/15.13	-13.03/14.51	-15.17/15.48	-15.09/15.09	-15.72/15.47	-14.30/12.64	-12.61/14.38	-14.37/16.00	-15.22/15.23	-15.83/11.34	-9.79/10.84	-11.32/10.49	-12.48/13.17	-12.03/12.86	-12.13/11.49	-12.79/12.05	-11.64/12.08	-11.86/12.18	-13.35/13.78	-13.17/13.60	-13.36/14.24	-15.09/15.40	-14.00/13.79	-13.15/13.96	-14.08/13.81	-15.17/14.84

E1(XY plane) –  $\Theta(90)\Phi(0-360)$   
 E2(XZ plane) –  $\Theta(0-180)\Phi(0)$  and  $\Theta(0-180)\Phi(180)$   
 E3(YZ plane) –  $\Theta(0-180)\Phi(90)$  and  $\Theta(0-180)\Phi(270)$



