

**G/T SIMULATIONS OF A 4 BAY ARRAY OF
YAGI ANTENNAS ON 2 METERS ON 144.1 MHz**

TYPE OF	L	GAIN	E	H	Ga	Tlos	Ta	G/T
ANTENNA	(WL)	(dBd)	(m)	(m)	(dBd)	(°K)	(°K)	(dB)
W1JR 8 MOD	1.80	11.17	3.09	2.76	17.15	3.04	266.57	-4.96
DJ9BV 1.8	1.81	11.38	3.16	2.80	17.31	3.16	267.12	-4.81
BQH8B	1.88	11.66	3.29	2.98	17.67	4.96	263.60	-4.39
IOJXX 8	2.04	12.16	3.46	3.17	18.18	11.33	267.91	-3.95
DK7ZB 8	2.09	12.15	3.41	3.12	18.08	4.34	260.41	-3.93
M2 9	2.12	12.08	3.34	3.04	18.08	8.77	254.38	-3.83
DJ9BV 2.1	2.14	11.92	3.33	3.04	17.92	4.66	260.72	-4.10
*OZ5HF 9	2.16	11.75	2.70	2.50	17.21	2.95	264.46	-4.87
OZ5HF 9	2.16	11.75	3.25	2.96	17.71	2.99	262.13	-4.33
YU7EF 9	2.16	11.86	3.18	2.87	17.79	3.23	243.83	-3.94
F9FT 11	2.17	11.71	3.27	2.97	17.70	5.21	262.64	-4.35
*CC 13B2	2.17	11.83	2.90	2.79	17.67	4.40	256.63	-4.28
CC 13B2	2.17	11.83	3.33	3.04	17.83	4.46	263.15	-4.23
*CC 215WB	2.19	11.86	3.05	3.05	17.80	4.34	286.14	-4.62
CC 215WB	2.19	11.86	3.48	3.19	17.87	4.40	287.83	-4.58
RA3AQ-9	2.35	12.34	3.40	3.11	18.30	4.45	238.76	-3.33
#RA3AQ-9	2.35	12.34	3.26	3.26	18.37	4.44	240.91	-3.30
Eagle 10	2.38	12.28	3.44	3.15	18.29	6.07	249.46	-3.54
DK7ZB 9	2.39	12.49	3.62	3.35	18.53	4.93	262.30	-3.51
*Flexa 224	2.49	11.90	3.50	3.30	18.01	8.29	264.66	-4.07
Flexa 224	2.48	11.90	3.30	3.31	17.87	8.32	257.77	-4.10
K5GW 10	2.49	12.57	3.45	3.16	18.53	5.72	241.20	-3.15
#K5GW 10	2.49	12.57	3.30	3.30	18.58	5.76	242.35	-3.12
K1FO 12	2.53	12.49	3.46	3.18	18.44	3.51	245.43	-3.31
YU7EF 10	2.54	12.53	3.43	3.14	18.49	3.14	237.12	-3.11
IOJXX 12	2.68	12.69	3.59	3.32	18.68	4.45	247.49	-3.11
BQH 12J	2.80	12.82	3.66	3.40	18.85	3.09	252.88	-3.03
#BQH 12J	2.80	12.82	3.53	3.53	18.88	3.06	252.93	-3.06
*M2 12	2.84	12.79	3.05	3.05	18.59	5.19	237.40	-3.02
M2 12	2.84	12.79	3.48	3.21	18.71	5.15	237.98	-2.91
BQH 10	2.86	13.07	3.70	3.44	19.05	6.59	240.48	-2.62
#BQH 10	2.86	13.07	3.57	3.57	19.11	6.56	242.58	-2.59
DK7ZB 10	2.87	13.19	3.89	3.65	19.20	5.94	259.91	-2.80
WB9UWA 12	2.90	12.82	3.45	3.17	18.73	6.93	227.71	-2.70
BQH 13	2.92	13.09	3.69	3.44	19.07	3.92	241.77	-2.62
#BQH 13	2.92	13.09	3.57	3.57	19.11	3.95	243.09	-2.60
*M2 20 XPOL	2.97	13.19	3.65	3.65	19.20	6.74	252.79	-2.68
#M2 20 XPOL	2.97	13.19	3.65	3.65	19.20	6.74	252.79	-2.68
M2 20 XPOL	2.97	13.19	3.77	3.52	19.16	6.77	251.00	-2.69
*BVO-3WL	3.00	13.50	3.90	3.70	19.48	5.35	264.59	-2.60
BVO-3WL	3.00	13.50	4.01	3.77	19.49	5.38	266.39	-2.62
#BVO-3WL	3.00	13.50	3.89	3.89	19.52	5.45	265.97	-2.58
YU7EF 11	3.04	13.07	3.56	3.30	18.99	3.32	226.79	-2.42
*CD15LQD	3.11	12.87	4.00	3.80	18.96	4.57	261.85	-3.08
CD15LQD	3.11	12.87	3.68	3.42	18.86	4.49	259.53	-3.14
CD15LQD MOD	3.11	13.24	3.83	3.58	19.24	3.73	253.86	-2.66

MBI FT17	3.12	13.34	3.84	3.59	19.31	6.02	246.36	-2.46
*CC3219	3.14	12.66	4.27	3.66	18.64	4.62	349.69	-4.65
CC3219	3.14	12.66	4.05	3.80	18.65	4.65	354.61	-4.70
CC3219 MOD	3.14	13.32	3.91	3.67	19.32	3.74	258.52	-2.66
*F9FT 17	3.15	12.87	3.68	3.50	18.92	5.74	243.96	-2.81
F9FT 17	3.15	12.87	3.57	3.30	18.84	5.74	240.69	-2.83
DJ9BV 3.2	3.22	13.36	3.85	3.58	19.34	3.99	246.42	-2.42
K1FO 14	3.25	13.36	3.78	3.54	19.30	4.26	243.48	-2.42
MBI 3.4	3.41	13.69	3.88	3.63	19.63	7.68	235.12	-1.94
YU7EF 12	3.49	13.67	3.83	3.58	19.60	4.40	224.97	-1.78
*SM5BSZ 11	3.51	13.86	3.50	3.50	19.71	3.16	232.02	-1.80
SM5BSZ 11	3.51	13.86	3.96	3.72	19.79	3.13	238.58	-1.84
*SM5BSZ 11A	3.52	13.97	4.00	4.00	19.96	3.13	244.17	-1.77
SM5BSZ 11A	3.52	13.97	4.05	3.81	19.91	3.07	244.00	-1.82
17LQD EKM	3.59	13.37	3.83	3.59	19.35	4.57	252.49	-2.53
17LQDE BQH	3.59	13.79	4.04	3.81	19.77	3.95	248.40	-2.04
DJ9BV 3.6	3.61	13.73	4.00	3.77	19.64	4.25	258.21	-2.33
K1FO 15	3.65	13.78	3.94	3.70	19.70	3.33	238.55	-1.93
DK7ZB 12	3.83	14.25	4.30	4.08	20.26	5.69	250.62	-1.64
YU7EF 13	3.92	14.09	4.01	3.77	20.03	5.13	222.70	-1.30
DJ9BV OPT	3.99	14.22	4.29	4.08	20.18	4.99	248.48	-1.63
#DJ9BV OPT	3.99	14.22	4.19	4.19	20.21	5.03	247.16	-1.57
#SV 2SA13	4.01	14.46	4.20	4.20	20.44	4.67	246.84	-1.34
SV 2SA13	4.01	14.46	4.37	4.16	20.43	4.67	247.35	-1.36
DJ9BV 4.0	4.02	14.07	4.15	3.92	19.98	5.67	255.50	-1.95
HG215DX	4.02	14.20	4.25	4.03	20.14	6.44	258.47	-1.84
CC3219 MOD	4.05	14.20	4.34	4.13	20.17	4.28	256.17	-1.77
*CC4218XL	4.15	14.14	4.08	3.85	20.03	7.25	265.93	-2.07
CC4218XL	4.15	14.14	4.45	4.23	20.11	7.17	266.22	-2.00
WB9UWA 15	4.18	13.62	3.69	3.43	19.48	8.00	214.69	-1.69
CC4218 MOD	4.18	14.29	4.24	4.02	20.24	5.25	244.97	-1.51
YU7EF 14	4.37	14.58	4.23	4.00	20.51	4.63	223.20	-0.83
K1FO 17	4.41	14.44	4.22	4.00	20.35	4.34	234.51	-1.21
DJ9BV 4.4	4.42	14.36	4.28	4.06	20.25	6.19	256.51	-1.70
SHARK 20	4.46	14.39	4.32	4.10	20.26	2.90	264.04	-1.81
IOJXX 16	4.47	14.39	4.17	3.94	20.32	6.09	223.60	-1.03
#IOJXX 16	4.47	14.39	4.06	4.06	20.35	6.11	223.23	-0.99
*CC17B2	4.51	14.53	3.66	3.51	20.22	4.83	233.29	-1.31
CC17B2	4.51	14.53	4.28	4.06	20.47	4.99	234.82	-1.08
DK7ZB 14	4.71	15.04	4.73	4.54	21.02	6.90	245.10	-0.73
K1FO 18	4.77	14.72	4.35	4.14	20.63	4.54	234.66	-0.93
*M2 28 XPOL	4.80	15.22	4.50	4.50	21.14	17.04	258.67	-0.84
#M2 28 XPOL	4.80	15.22	4.76	4.76	21.22	17.15	257.77	-0.76
M2 28 XPOL	4.80	15.22	4.86	4.66	21.19	17.11	257.51	-0.77
HG217DX	4.82	14.81	4.63	4.43	20.78	8.14	256.05	-1.16
DJ9BV 4.8	4.83	14.65	4.40	4.18	20.57	5.85	255.84	-1.37
*M2 5WL	4.83	14.80	4.15	3.84	20.56	8.49	254.92	-1.36
M2 5WL	4.83	14.80	4.56	4.35	20.74	8.70	251.18	-1.11
YU7EF 15	4.84	14.98	4.44	4.23	20.92	4.89	221.29	-0.38
*SM5BSZ 14A	4.89	15.14	4.00	4.00	20.93	4.33	232.02	-0.58
SM5BSZ 14A	4.89	15.14	4.54	4.33	21.03	4.43	238.02	-0.59
RA3AQ-15	4.92	15.14	4.67	4.48	21.10	4.42	239.26	-0.54

#RA3AQ-15	4.92	15.14	4.56	4.56	21.12	4.43	239.19	-0.52
*SM5BSZ 14	4.95	15.29	5.20	5.20	21.37	3.13	246.72	-0.41
SM5BSZ 14	4.95	15.29	4.72	4.51	21.19	3.02	233.77	-0.68
SM2CEW 19	4.98	14.91	4.47	4.26	20.84	9.38	233.77	-0.70
#SM2CEW 19	4.98	14.91	4.37	4.37	20.87	9.00	232.88	-0.66
*BVO-5WL	5.02	15.05	4.58	4.40	20.99	5.21	243.42	-0.73
#BVO-5WL	5.02	15.05	4.59	4.59	21.04	5.24	242.36	-0.66
BVO-5WL	5.02	15.05	4.69	4.49	21.01	5.23	242.70	-0.70
K5GW 17	5.06	14.99	4.64	4.44	20.96	6.16	244.55	-0.78
K1FO 19	5.18	15.01	4.47	4.27	20.92	4.04	232.19	-0.59
#RU1AA 15	5.27	15.55	4.85	4.85	21.55	6.02	235.76	-0.03
RU1AA 15	5.27	15.55	4.85	4.65	21.50	5.99	236.28	-0.09
*M2 18XXX	5.32	15.07	4.27	3.96	20.85	7.90	243.30	-0.87
M2 18XXX	5.32	15.07	4.55	4.35	21.01	7.95	240.56	-0.66
M2 32 XPOL	5.62	15.70	5.23	5.04	21.69	15.02	250.74	-0.16
#M2 32 XPOL	5.62	15.70	5.13	5.13	21.71	15.04	251.20	-0.15
*M2 19XXX	5.73	15.41	4.27	4.04	21.15	8.75	238.80	-0.49
M2 19XXX	5.73	15.41	4.70	4.51	21.36	8.75	235.52	-0.22
#M2 32 XPOL	5.73	15.88	5.07	5.07	21.87	16.03	248.46	0.06
M2 32 XPOL	5.73	15.88	4.98	5.16	21.84	16.03	248.11	0.04
DK7ZB 17	5.81	15.69	5.16	4.98	21.68	6.16	234.46	0.12
YU7EF 17	5.87	15.79	4.84	4.64	21.68	4.98	229.47	0.22
BVO-6WL	6.00	15.69	4.75	4.93	21.63	5.12	231.63	0.13
#BVO-6WL	6.00	15.69	4.84	4.84	21.66	5.13	231.84	0.15
AF9Y 22	6.15	15.75	5.04	4.86	21.72	10.04	230.73	0.23
RA3AQ-18	6.28	16.11	5.13	4.96	22.05	4.97	227.80	0.62
*RA3AQ-18	6.28	16.11	5.30	5.30	22.13	4.99	227.28	0.71
#RA3AQ-18	6.28	16.11	5.05	5.05	22.08	4.98	227.31	0.64
MBI 6.6	6.60	16.14	5.46	5.29	22.14	13.09	238.73	0.51
#MBI 6.6	6.60	16.14	5.38	5.38	22.17	13.07	239.28	0.53
BQH 25	7.29	16.31	5.22	5.04	22.25	9.83	224.18	0.89
#BQH 25	7.29	16.31	5.13	5.13	22.28	9.86	224.61	0.91
K2GAL 21	7.65	16.80	5.75	5.59	22.75	19.58	245.81	0.99
M2 8WL(old)	7.71	16.55	5.28	5.10	22.40	9.52	231.46	0.90
M2 8WL(new)	8.05	17.05	5.82	5.67	23.01	11.53	237.20	1.40

Legend:	
L	Length in Wavelengths
Gain	Gain in dBd of a single antenna
E	E plane (Horizontal) stacking in Meters
H	H plane (Vertical) stacking in Meters
Ga	Gain in dBd of a 4 bay array
Tios	The internal resistance of the antenna in degrees Kelvin
Ta	The total temperature of the antenna or array in degrees Kelvin. This includes all the side lobes, rear lobes and internal resistance of the antenna or array.
G/T	Figure of merit used to determine the receive capability of the antenna or array = $(Ga + 2.15) - (10 \cdot \log Ta)$. The more positive figure the better.
Notes:	
1. The Program used to calculate E/H Stacking, G, Ga and G/T is YAGI ANALYSIS 3.54 by Goran Stenberg, SM2IEV	
2. Temperatures used: Tsky = 200 degrees K; Tearth = 1000 degrees K	

3. All dipoles have been adjusted to give a J of under +/- .5
4. No stacking harness losses or H frame effects are included in the gain figures.
5. All stacking dimensions EXCEPT those marked with a "*" and "#" are calculated from the DL6WU stacking formula
6. Antennas marked with a "*" have stacking dimensions recommended by the manufacturer or designer
7. Antennas marked with a "#" have stacking dimensions for XPOL antennas by VE7BQH
8. Antennas marked with a "@" have some or all 10mm elements. All others are 4mm to 6mm
9. Manufacturer / Designer Legend:

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9. Manufacturer / Designer Legend:

AF9Y	= AF9Y	I0JXX	= I0JXX
BVO	= Eagle / DJ9BV	K1FO	= K1FO
BQH	= VE7BQH	K2GAL	= K2GAL
CC	= Cushcraft	K5GW	= Texas Towers / K5GW
CC MOD	= VE7BQH	M2	= M^2
CD	= CUE DEE	MBI	= F/G8MBI
CD MOD	= VE7BQH	OZ5HF	= Vargarda
DJ9BV	= DJ9BV	RA3AQ	= RA3AQ
DJ9BV OPT	= DJ9BV	RU1AA	= RU1AA
DK7ZB	= DK7ZB	SHARK	= Shark (Italy)
EKM MOD	= SM2EKM	SM2CEW	= SM2CEW / VE7BQH
F9FT	= F9FT	SV	= Svenska Antennspecialisten AB
HG	= HyGain	W1JR	= VE7BQH (Mininec error)
FLEXA	= Flexa Yagi	WB9UWA	= WB9UWA
		YU7EF	= YU7EF

Issue 51: Add YU7EF Antennas

Issue 52: Update all DK7ZB antennas to latest published data. add DK7ZB 8

Issue 53: Replace BQH8A with BQH8B a 50 ohm antenna

LIONEL H. EDWARDS - VE7BQH

Issue 53 - June 17, 2006