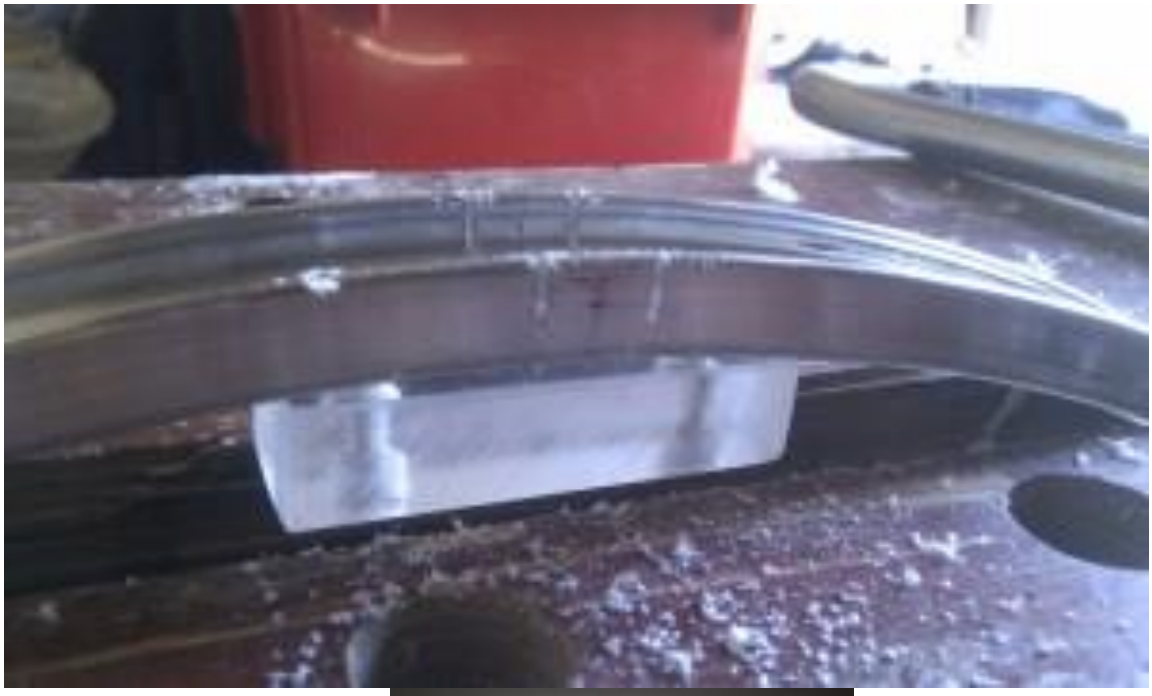
24″ Bicycle Rim Mag Loop Update
By G4HSK

My first tests using the 24″ aluminium bicycle rim did not work out well. This was, as you may have already read elsewhere, due to problems with the Faraday coupling loop that I was using at the time.

Having had extremely encouraging results using the LDF4-50 based loop I decided to try the bicycle rim again but this time I simply used the working coupling loop from the LDF4-50 loop.

So here's a photo of the 24″ loop:

I made two cuts in the rim opposite the hole that was left by the inner tube valve to form a small 1/2″ (12.5mm) wide gap. A small section of Perspex was then used to bridge this gap to maintain shape and rigidity. The same method of tuning was adopted as used on the larger loop i.e. a large split-stator capacitor for the coarse tuning plus a small butterfly capacitor in parallel for fine tuning. The coupling loop was a very simple single turn of copper micro-capillary tubing as used on boiler thermocouples; this was formed into a 5″ (125mm) diameter loop.



To tune the loop, I normally set the small (butterfly) capacitor so it's half in mesh and then adjust the large capacitor to peak the received signal, then using a very low output (typically 1W) I adjust the small capacitor for minimum VSWR on transmit.

This loop tunes approximately 20 – 35MHz and is used mainly on the bottom end of 10M for digi-mode contacts and experiments (WSPR, QRSS etc)

The results with this size loop, setup on a stand, indoors, have been very encouraging, running WSPR tests with less than 2W output have produced the following results:

This map shows the results running WSPR on 10M.

						Power		Reported		Distance	
Date	Call	Frequency	SNR	Drift	Grid	dBm	W	by	loc	km	mi
2013-10-20 17:46	G4HSK	28.126070	-24	0	JO01fs	+33	1.995	KC2LWD	FM29iw	5738	3565
2013-10-20 17:34	G4HSK	28.126149	-4	0	JO01fs	+33	1.995	N0UR	EN33	6575	4086
2013-10-20 16:44	G4HSK	28.126179	-26	0	JO01fs	+33	1.995	VE3SW8	FN06ge	5567	3459
2013-10-20 16:24	G4HSK	28.126121	-13	-1	JO01fs	+33	1.995	WB1FIG	FN42ia	5332	3313
2013-10-20 16:24	G4HSK	28.126156	-21	0	JO01fs	+33	1.995	KB9AMG	EN52tx	6337	3938
2013-10-20 16:14	G4HSK	28.126145	-18	-2	JO01fs	+33	1.995	N2OTO	EL96wi	7109	4417
2013-10-20 16:14	G4HSK	28.126148	-12	0	JO01fs	+33	1.995	KZ3X	FN10wh	5766	3583
2013-10-20 16:14	G4HSK	28.126150	-21	0	JO01fs	+33	1.995	K4BYN	FM05qu	6258	3889
2013-10-20 15:44	G4HSK	28.126142	-19	0	JO01fs	+33	1.995	W3CSW	FM19kd	5915	3675
2013-10-20 15:36	G4HSK	28.126142	-25	0	JO01fs	+33	1.995	4X1RF	KM72ls	3486	2166
2013-10-20 14:42	G4HSK	28.126145	-28	0	JO01fs	+33	1.995	N2NOM	FN22bg	5611	3487
2013-10-20 14:42	G4HSK	28.126162	-21	0	JO01fs	+33	1.995	NONCO	EN35ki	6436	3999
2013-10-20 14:42	G4HSK	28.126151	-24	0	JO01fs	+33	1.995	KZ8C	EM88pm	6321	3928
2013-10-20 14:42	G4HSK	28.126186	-21	0	JO01fs	+33	1.995	ND6M	EM55se	6946	4316
2013-10-20 14:42	G4HSK	28.126168	-24	0	JO01fs	+33	1.995	NU3E	FN20pb	5691	3536
2013-10-20 13:46	G4HSK	28.126142	-21	0	JO01fs	+33	1.995	K9AN	EN50wc	6540	4064
2013-10-20 12:48	G4HSK	28.126175	-22	0	JO01fs	+33	1.995	KM4LK	EM72ip	6945	4315
2013-10-20 09:52	G4HSK	28.126137	-24	0	JO01fs	+33	1.995	IT9CLU	JM76iw	1993	1238
2013-10-20 08:42	G4HSK	28.126181	-18	-1	JO01fs	+33	1.995	OH8GKP	KP24rt	2033	1263
2013-10-20 08:10	G4HSK	28.126154	-12	0	JO01fs	+33	1.995	OH3NE	KP11ul	1769	1099
2013-10-19 17:04	G4HSK	28.126154	-26	0	JO01fs	+33	1.995	N2GYI	FN41aa	5444	3383
2013-10-19 16:48	G4HSK	28.126173	-25	0	JO01fs	+33	1.995	EA1KV	IN52og	1266	787
2013-10-19 16:48	G4HSK	28.126140	-22	0	JO01fs	+33	1.995	W1QG	CM87xg	8652	5376
2013-10-19 16:36	G4HSK	28.126145	-26	0	JO01fs	+33	1.995	KE5HPY	EL29	7832	4867
2013-10-19 16:36	G4HSK	28.126142	-12	0	JO01fs	+33	1.995	VE3LC	FN25fk	5375	3340
2013-10-19 10:24	G4HSK	28.126129	-18	0	JO01fs	+33	1.995	LZ1OI	KN22id	2114	1314
2013-10-19 09:24	G4HSK	28.126148	-17	0	JO01fs	+33	1.995	RA3UDF	LO17ck	2715	1687
2013-10-19 09:24	G4HSK	28.126141	-7	0	JO01fs	+33	1.995	UR/SWL56	KN56jk	2268	1409
2013-10-19 09:24	G4HSK	28.126144	-16	0	JO01fs	+33	1.995	LA9JO	JP99gb	2145	1333
2013-10-18 17:34	G4HSK	28.126178	-25	0	JO01fs	+33	1.995	KC2GMM	FN21uc	5590	3473

This shows the results on transmit on 10M.

						Power		Reported		Distance	
Date	Call	Frequency	SNR	Drift	Grid	dBm	W	by	loc	km	mi
2013-10-20 17:44	NU3E	28.126038	-22	0	FN20pb	+37	5.012	G4HSK	JO01fs	5691	3536
2013-10-20 17:36	N0UR	28.126076	-22	0	EN33iu	+30	1.000	G4HSK	JO01fs	6560	4076
2013-10-20 17:10	K2TL	28.126077	-19	1	FN20vd	+37	5.012	G4HSK	JO01fs	5653	3513
2013-10-20 17:06	KC2LWD	28.126183	-24	-1	FM29iw	+33	1.995	G4HSK	JO01fs	5738	3565
2013-10-20 16:20	WB1FIG	28.126122	-25	-1	FN42ia	+37	5.012	G4HSK	JO01fs	5332	3313
2013-10-20 15:40	W3CSW	28.126171	-22	0	FM19kd	+33	1.995	G4HSK	JO01fs	5915	3675
2013-10-20 15:16	K4RCG	28.126074	-20	0	FM08xl	+37	5.012	G4HSK	JO01fs	6024	3743
2013-10-20 14:56	N0NCO	28.126056	-20	0	EN35ki	+37	5.012	G4HSK	JO01fs	6436	3999
2013-10-20 13:50	W3PM	28.126106	-26	0	EM64or	+37	5.012	G4HSK	JO01fs	6876	4273
2013-10-20 13:40	KZ3X	28.126126	-28	0	FN10wh	+37	5.012	G4HSK	JO01fs	5766	3583
2013-10-20 12:34	ND6M	28.126060	-10	0	EM55se	+10	0.010	G4HSK	JO01fs	6946	4316
2013-10-20 09:20	R0TA	28.126103	-13	0	NO85xw	+40	10.000	G4HSK	JO01fs	5864	3644
2013-10-20 07:30	JH1GYE	28.126132	-29	0	PM96mi	+37	5.012	G4HSK	JO01fs	9421	5854
2013-10-19 17:10	K3GRN	28.126048	-26	0	FM19ke	+37	5.012	G4HSK	JO01fs	5912	3674
2013-10-19 17:08	KB1VXY	28.126098	-18	0	FN42fe	+37	5.012	G4HSK	JO01fs	5337	3316
2013-10-19 16:50	VE3LC	28.126150	-27	0	FN25fk	+37	5.012	G4HSK	JO01fs	5375	3340
2013-10-19 16:46	W6II	28.126038	-24	-1	CN85nm	+47	50.119	G4HSK	JO01fs	7917	4919
2013-10-19 16:46	W1QG	28.126186	-26	0	CM87xg	+37	5.012	G4HSK	JO01fs	8652	5376
2013-10-19 16:34	NR5O	28.126069	-24	0	DM33vp	+37	5.012	G4HSK	JO01fs	8485	5272
2013-10-19 16:18	VE3SWS	28.126088	-12	-2	FN06qe	+37	5.012	G4HSK	JO01fs	5567	3459
2013-10-19 16:18	N2NHT	28.126063	-17	0	FN21	+40	10.000	G4HSK	JO01fs	5613	3488
2013-10-19 16:18	K9AN	28.126174	-18	0	EN50wc	+37	5.012	G4HSK	JO01fs	6540	4064
2013-10-19 16:16	K3NAL	28.126160	-19	1	FM18	+37	5.012	G4HSK	JO01fs	5958	3702
2013-10-19 10:42	LZ1OI	28.126032	-16	-1	KN22id	+37	5.012	G4HSK	JO01fs	2114	1314
2013-10-19 10:40	RA3UDF	28.126168	-18	0	LO17ck	+33	1.995	G4HSK	JO01fs	2715	1687
2013-10-19 09:12	EX1UN	28.126153	-26	0	MN72hu	+33	1.995	G4HSK	JO01fs	5432	3375
2013-10-18 18:28	KC2GMM	28.126066	-23	-1	FN21uc	+37	5.012	G4HSK	JO01fs	5590	3473
2013-10-18 17:56	N2NOM	28.126123	-29	-1	FN22bg	+33	1.995	G4HSK	JO01fs	5611	3487

This shows how well the loop received on 10M

WARNING: Because of the very high Q, some capacitors can arc over at power levels as low as 10 watts. Remember also that even with only a few watts of RF power,magnetic loop antennas produce very high voltages across the capacitor(s) and can cause nasty RF burns if touched while transmitting.