Welcome to AntennaSelect™ Volume 30 – February 2017

Welcome to Volume 30 of our newsletter, AntennaSelect™. Every two months we will be giving you an "under the radome" look at antenna and RF Technology behind it. If there are subjects you would like to see covered, please let us know what you would like to see by emailing us at: info@micronetixx.com

In this issue:

New DV Series of VHF High Band Slot Antennas

We are introducing our newest repack ready antenna for high band VHF, the **DV Series**. **DV** Series Antennas are side-mounted and come in two or three-bay models. There are two azimuth patterns to choose from, an Omnioid and a Broad Cardioid.

The **DV-2000** has a 3-1/8" EIA 50 Ohm input and has a Power Rating of 25 kW. The **DV-3000** has an input Power Rating of 40 kW, using a 4-1/16" EIA input; while the **DV-4000** has a 50 kW input Power Rating using a 6-1/8" EIA input. All **DV** VHF Antennas are end-fed.

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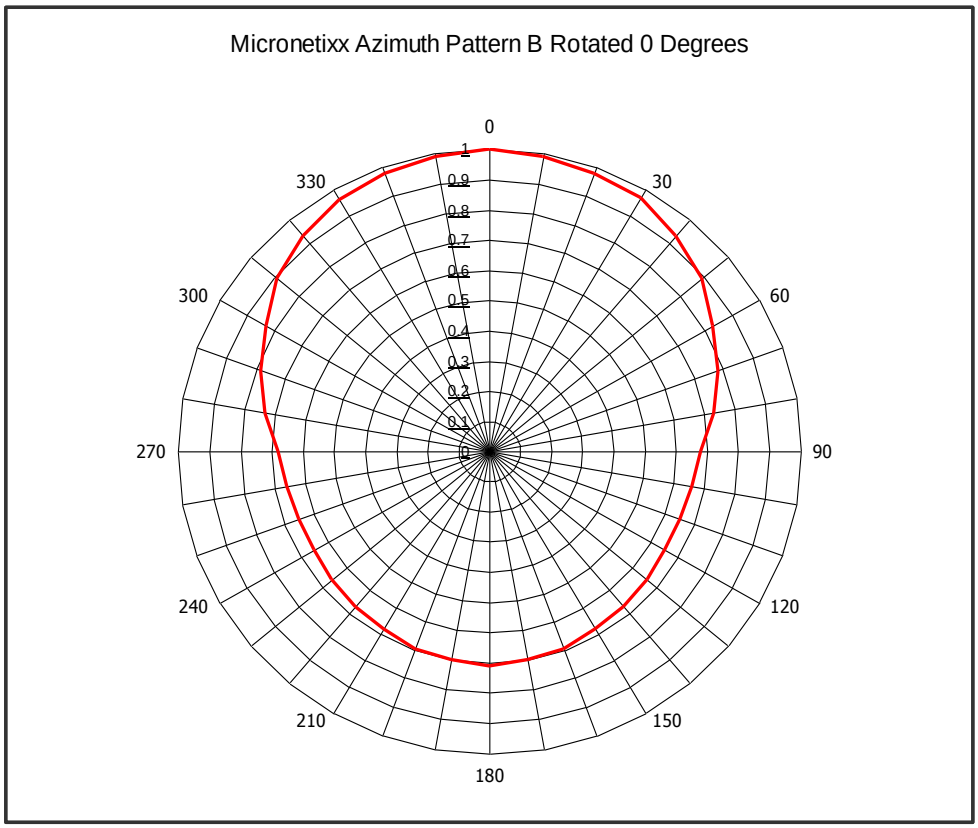
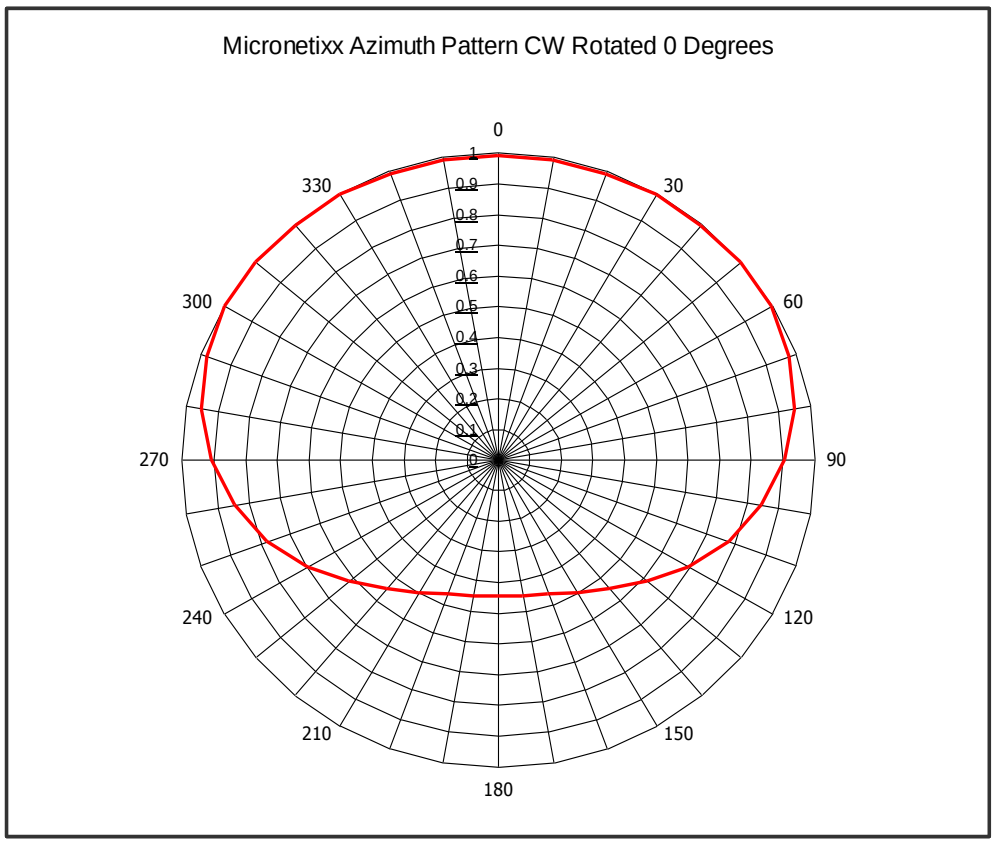
DV Antenna Azimuth Patterns



B – Omnioid – azimuth gain 1.70 (2.30 dB)



CW – Wide Cardioid – azimuth gain 1.50 (1.76 dB)

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The two bay **DV** antennas have a beam tilt of -1.75 degrees, while the three bay models have a -1.50 degree beam tilt.

Omnioid Model #	Max Input Power	2 Bay B Gain	Maximum ERP	3 Bay B Gain	Maximum ERP
DV-2000-B	25 kW	4.40 (6.43 dB)	110 kW (20.41 dBk)	6.45 (8.10 dB)	161 kW (22.07 dBk)
DV-3000-B	40 kW	4.40 (6.43 dB)	176 kW (22.45 dBk)	6.45 (8.10 dB)	258 kW (24.11 dBk)
DV-4000-B	50 kW	4.40 (6.43 dB)	220 kW (23.42 dBk)	6.45 (8.10 dB)	322 kW (25.07 dBk)
Wide Cardioid Model #	**Max Input Power**	**2 Bay CW Gain**	**Maximum ERP**	**3 Bay CW Gain**	**Maximum ERP**
DV-2000-CW	25 kW	3.90 (5.90 dB)	97 kW (19.86 dBk)	5.70 (7.55 dB)	142 kW (21.51 dBk)
DV-3000-CW	40 kW	3.90 (5.90 dB)	156 kW (21.93 dBk)	5.70 (7.55 dB)	228 kW (23.58 dBk)
DV-4000-CW	50 kW	3.90 (5.90 dB)	195 kW (22.90 dBk)	5.70 (7.55 dB)	285 kW (24.54 dBk)

The gains shown above are for Horizontal Polarization. As an option the **DV** Series are available with Elliptical Polarization with a 70/30 power split. (To calculate elevation gain with Elliptical Polarization, multiply the gain in the Table above by 0.70.)

Mechanical Information

3 Bay Models

Omnioid Model #	Channel 7			Channel 10			Channel 13		
	Length	Weight	Wind Load	Length	Weight	Wind Load	Length	Weight	Wind Load
DV-2000-B-3	21 feet	500 lbs.	37.6 ft^2	19-1/2 feet	410 lbs.	35.1 ft^2	18 feet	385 lbs.	32.4 ft^2
DV-3000-B-3	21 feet	515 lbs.	37.6 ft^2	19-1/2 feet	415 lbs.	35.1 ft^2	18 feet	390 lbs.	32.4 ft^2
DV-4000-B-3	21 feet	530 lbs.	37.6 ft^2	19-1/2 feet	430 lbs.	35.1 ft^2	18 feet	410 lbs.	32.4 ft^2
				3 Bay Models					
Wide Cardioid Model #	**Channel 7**			**Channel 10**			**Channel 13**		
	Length	**Weight**	**Wind Load**	**Length**	**Weight**	**Wind Load**	**Length**	**Weight**	**Wind Load**
DV-2000-CW-3	21 feet	545 lbs.	46.0 ft^2	19-1/2 feet	450 lbs.	42.9 ft^2	18 feet	420 lbs.	39.6 ft^2
DV-3000-CW-3	21 feet	560 lbs.	46.0 ft^2	19-1/2 feet	455 lbs.	42.9 ft^2	18 feet	425 lbs.	39.6 ft^2
DV-4000-CW-3	21 feet	575 lbs.	46.0 ft^2	19-1/2 feet	470 lbs.	42.9 ft^2	18 feet	440 lbs.	39.6 ft^2

The **DV** Series of antennas are built with rugged passivated aluminum pylons. A partial radome system covers the front half of the antenna. The **DV** antennas come with rugged stainless steel mounts that can be attached to a tower leg or outrigged pole. We have designed the **DV** (and their UHF cousin – the **DX** Series antennas) to have most of the upfront engineering done. This decreases delivery time during the busy Re-Pack period. The higher power input levels of the **DV** Antennas will let stations run much higher ERP's than many competitors' VHF options. Call us for your **DV** Antenna.

DTV ERP Changes When Switching UHF Channels

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For UHF channels that are at 38 and above, a new channel number will be assigned. Some stations that are currently on channel 36 or below will also be moving. Stations moving to a lower channel assignment will also have a lower ERP to match their coverage area. The FCC uses a simple formula to calculate the lower ERP.

$$41-(20*LOG_{10}(615\ MHz/F))$$

Where F is the frequency of the new channel assignment

New Repacked Channel		Percentage of ERP from Pre-Packed channel to new repack channel													
		Pre-Pack channel number													
		38	39	40	41	42	43	44	45	46	47	48	49	50	51
	MHz	617	623	629	635	641	647	653	659	665	671	677	683	689	695
14	473	77	76	75	74	74	73	72	72	71	70	70	69	69	68
15	479	78	77	76	75	75	74	73	73	72	71	71	70	70	69
16	485	79	78	77	76	76	75	74	74	73	72	72	71	70	70
17	491	80	79	78	77	77	76	75	75	74	73	73	72	71	71
18	497	81	80	79	78	78	77	76	75	75	74	73	73	72	72
19	503	82	81	80	79	78	78	77	76	76	75	74	74	73	72
20	509	82	82	81	80	79	79	78	77	77	76	75	75	74	73
21	515	83	83	82	81	80	80	79	78	77	77	76	75	75	74
22	521	84	84	83	82	81	81	80	79	78	78	77	76	76	75
23	527	85	85	84	83	82	81	81	80	79	79	78	77	76	76
24	533	86	86	85	84	83	82	82	81	80	79	79	78	77	77
25	539	87	87	86	85	84	83	83	82	81	80	80	79	78	78
26	545	88	87	87	86	85	84	83	83	82	81	81	80	79	78
27	551	89	88	88	87	86	85	84	84	83	82	81	81	80	79
28	557	90	89	89	88	87	86	85	85	84	83	82	82	81	80
29	563	91	90	90	89	88	87	86	85	85	84	83	82	82	81
30	569	92	91	90	90	89	88	87	86	86	85	84	83	83	82
31	575	93	92	91	91	90	89	88	87	86	86	85	84	83	83
32	581	94	93	92	91	91	90	89	88	87	87	86	85	84	84
33	587	95	94	93	92	92	91	90	89	88	87	87	86	85	84
34	593	96	95	94	93	93	92	91	90	89	88	88	87	86	85
35	599	97	96	95	94	93	93	92	91	90	89	88	88	87	86
36	605	98	97	96	95	94	94	93	92	91	90	89	89	88	87

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Stations moving to a lower frequency will see an ERP reduction of between 2 and 32 percent. The worst case is a station on channel 51 moving to channel 14. For example, If they were running a full 1000 kW ERP, the new ERP would be 680 kW, which should produce the same coverage contours.

For stations that are on the lower portion of the UHF band on channel 36 and below, and are moving, they may also see a lower ERP if moving down in frequency. Moving to a higher channel however would allow a higher ERP to a point. If a station were at 1000 kW on a lower channel and moved to a higher channel, they would still be limited to 1000 kW ERP – a decrease in coverage. The worst case scenario would be a station going from channel 14 to 36 that is at 1000 kW on channel 14 They could still do 1000 kW at channel 36, however they are losing 22% of frequency adjusted ERP. So far the stations that are reporting a channel change will only be moved less than 5 channels – less than a 6% ERP difference up or down.

Pre-Repack Channel		Percentage of ERP from prepack channel Repacked Channel Number																							
		14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	MHz	473	479	485	491	497	503	509	515	521	527	533	539	545	551	557	563	569	575	581	587	593	599	605
14	473		101	103	104	105	106	108	109	110	111	113	114	115	116	118	119	120	122	123	124	124	127	128
15	479	99		101	103	104	105	106	108	109	110	112	113	114	115	116	118	119	120	121	123	124	125	126
16	485	98	99		101	102	104	105	106	107	109	110	111	112	114	115	116	118	119	120	121	122	124	125
17	491	96	98	99		101	102	104	105	106	107	109	110	111	112	113	115	116	117	118	120	121	122	123
18	497	95	96	98	99		101	102	104	105	106	107	108	110	111	112	113	114	116	117	118	119	121	122
19	503	94	95	96	98	99		101	102	104	105	106	107	108	110	110	112	113	114	115	117	118	119	120
20	509	93	94	95	96	98	99		101	102	104	105	106	107	108	109	111	112	113	114	115	117	118	119
21	515	92	93	94	95	96	98	99		101	102	103	105	106	107	108	109	110	112	113	114	115	116	117
22	521	91	92	93	94	95	97	98	99		101	102	103	105	106	107	108	109	110	112	113	114	115	116
23	527	90	91	92	93	94	95	97	98	99		101	102	103	105	106	107	108	109	110	111	113	114	115
24	533	89	90	91	92	93	94	95	97	98	99		101	102	103	105	106	107	108	109	110	111	112	114
25	539	88	89	90	91	92	93	94	96	97	98	99		101	102	103	104	106	107	108	108	110	111	112
26	545	87	88	89	90	91	92	93	94	96	97	98	99		101	102	103	104	106	107	108	109	110	111
27	551	86	87	88	89	90	91	92	93	95	96	97	98	99		101	102	103	104	105	107	108	109	110
28	557	85	86	87	88	89	90	91	92	93	95	96	97	98	99		101	102	103	104	106	107	108	109
29	563	84	85	86	87	88	89	90	91	93	94	95	96	97	98	99		101	102	104	104	105	106	107
30	569	83	84	85	86	87	88	89	91	92	93	94	95	96	97	98	99		101	102	103	104	105	106
31	575	82	83	84	85	86	87	91	90	91	92	93	94	95	96	96	98	99		101	102	103	104	105
32	581	81	82	83	85	85	87	88	89	89	91	92	93	94	94	94	97	98	99		101	102	103	104
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35	599	79	80	81	82	83	84	85	86	87	88	88	88	91	92	93	94	95	96	97	98	99		101
36	605	78	79	80	81	82	83	84	85	86	86	86	89	90	91	92	93	94	95	96	97	98	99	

Stacking LPFM Antennas

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As an example, consider two LPFM stations who wish to share vertical space – stacking one antenna above the other. Can they? For the most part yes. For single channel antennas, one bay antennas should be 15 to 20 feet apart vertically – add another 10 feet if the two stations are close on the dial. With a single bay LPFM antenna there is a lot of energy at high depression angles.

For stations that are closer together, a two-bay half-wave spaced antenna is ideal. At a depression angle of -60 degrees the two bay half wave spaced antenna has a field value of 3% of peak field, while a single bay still has a 50% field value. For practical purposes the two half wave antennas do not see each other. Spacing? 10 to 15 feet apart is fine.

One final tip. The transmission line from the top antenna is going to run through the aperture of the lower antenna. There is a lot of energy to excite the outer conductor. To minimize this excitation ground each antenna's transmission line at the input tee. Wrapping the transmission line around the outrigged pole helps to minimize excitation. Also ground the outer conductor of the transmission line from the top antenna as it passes by the lower antenna's aperture.

Be on the lookout for the next volume of AntennaSelect™ coming out in April

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