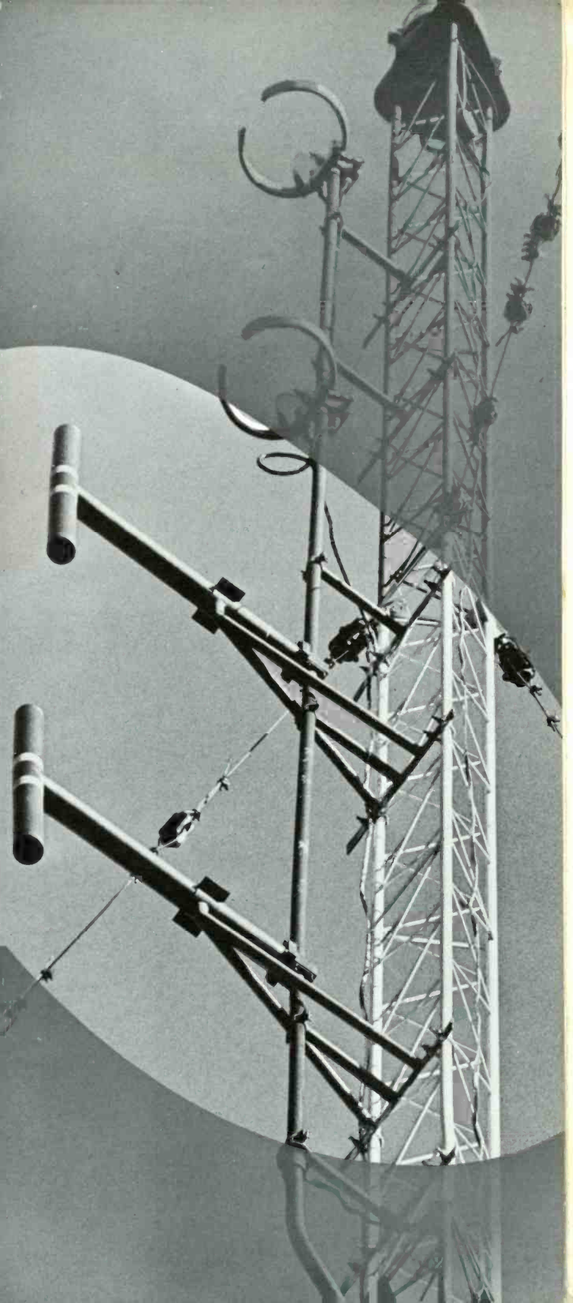


Specifications

ELECTRICAL

FREQUENCY RANGE	Factory tuned to specified frequency in 88-108 mc band.
POWER GAIN	Approximately equal to number of dipoles. (See table.)
POLARIZATION	Vertical.
HORIZONTAL LINEARITY	Dipole circular ±1 db in free space.
VSWR	Tuned to 1.1:1 or less; less than 1.5:1 mounted on customer's tower.
INPUT IMPEDANCE	50 ohms on 1⅝" or 3⅛" coax.
POWER INPUT RATING	3 Kw per dipole.

MECHANICAL

WINDLOAD	60 psf on flat surfaces, 40 psf on cylindrical surfaces (123 mph actual wind velocity).
DIMENSIONS	Length of dipole—3.75 ft. From center of transmission line to center of dipole—2.83 ft.
WEIGHT	1⅝" dipole—26.5 lbs. 3⅛" dipole—34.0 lbs. Typical mounting bracket—22.0 lbs.
EQUIPMENT FURNISHED	Antenna dipoles. Custom mounting brackets. Interconnecting rigid coax, 1⅝" or 3⅛" as specified. Standard EIA flange, 1⅝" or 3⅛".
DEICERS	Not required.

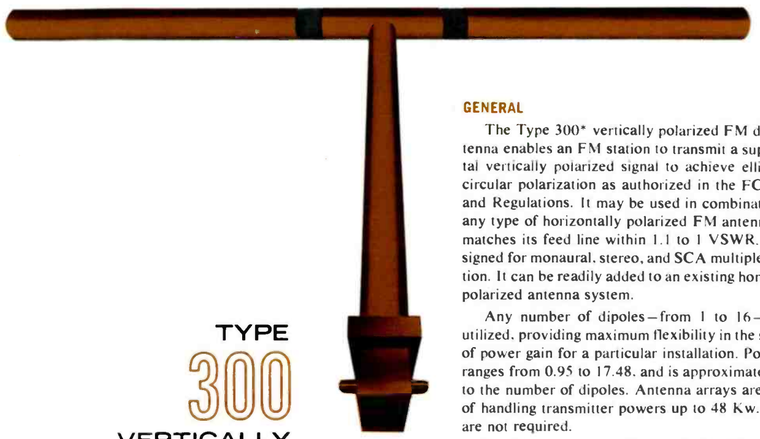
MANUFACTURED BY

Electronics Research, Inc.
P. O. Box 327
Evansville, Indiana 47704

DISTRIBUTED BY

640601-4M

TYPE 300 VERTICALLY POLARIZED FM DIPOLE ANTENNA



TYPE 300 VERTICALLY POLARIZED FM DIPOLE ANTENNA

FEATURES

More signal in auto receivers

May be used with existing horizontal antennas

Easy installation—minimum maintenance

Custom brackets supplied

Sturdy construction

High gain—low VSWR

Designed for monaural, stereo and SCA

Light weight—low windload

Proven field performance

GENERAL

The Type 300* vertically polarized FM dipole antenna enables an FM station to transmit a supplemental vertically polarized signal to achieve elliptical or circular polarization as authorized in the FCC Rules and Regulations. It may be used in combination with any type of horizontally polarized FM antenna which matches its feed line within 1.1 to 1 VSWR. It is designed for monaural, stereo, and SCA multiplex operation. It can be readily added to an existing horizontally polarized antenna system.

Any number of dipoles—from 1 to 16—may be utilized, providing maximum flexibility in the selection of power gain for a particular installation. Power gain ranges from 0.95 to 17.48, and is approximately equal to the number of dipoles. Antenna arrays are capable of handling transmitter powers up to 48 Kw. Deicers are not required.

Special antennas can be provided with null fill or beam tilt for unusual applications.

**U. S. Patent Pending*

DESCRIPTION

The antenna consists of two basic parts: (1) radiating dipoles and (2) interconnecting transmission line sections. The dipoles in any array are all identical electrically and mechanically. Each antenna is furnished with suitable power division, phasing, and impedance matching networks between horizontally and vertically polarized elements to produce circular or elliptical polarization and omnidirectional horizontal radiation.

The Type 300 dipole is a product of straight-forward electrical and mechanical design. It has low Q which results in a broad-band antenna that minimizes cross-coupling between main and subcarrier channels. Although rugged, it is light-weight and presents a low windload, thus reducing the cost of supporting structures. It is mainly fabricated of copper tubing which is durable, weather-resistant, and has excellent electrical properties.

Antenna elements are normally spaced one wavelength apart with interconnecting transmission line sections, and fed through a common system input terminating in a 50 ohm EIA flange. A typical antenna might consist of several dipoles fed through a power divider to apportion the transmitter power between separate horizontally and vertically polarized antennas. Alternatively, the vertical dipoles can be interspersed between horizontally polarized elements on a common feed line to form a single antenna which is both horizontally and vertically polarized.

MOUNTING

The antenna is mounted on its supporting structure as a unit using brackets specially fabricated to match the tower and mounting arrangement specified by the purchaser. Antennas are usually side mounted on either guyed or self-supporting towers. Pole or top mounting is available on special order.

If there are guy wires in close proximity to the antenna, it is recommended that they be insulated from the tower and broken by insulators every 3 ft. for a minimum of 15 ft. from the tower to avoid detuning or distortion of the radiation pattern.

Antennas of 9 bays or less are fed at the base through a 6 ft. transmission line section. Ten or more elements are usually center fed through a 6 ft. transmission line section and coaxial "T" connector. In the case of a large supporting structure, several Type 300 dipoles may be mounted around the periphery to obtain coverage 360° in azimuth. These dipoles would be fed in parallel by individual equal-length feed lines from a power divider.

CIRCULARITY

Good horizontal linearity depends largely on the inherent circularity of the antenna element. The horizontal radiation pattern of the Type 300 dipole is omnidirectional within ±1 db in free space. When side mounted, the antenna pattern will be somewhat affected by the supporting structure. The extent of deviation from a circular pattern will vary with the type and size of the supporting structure.

BANDWIDTH & VSWR

The voltage standing wave ratio of the Type 300 antenna can be maintained at better than 1.1 to 1. Substantial bandwidth virtually eliminates detuning effects caused by changes in atmospheric conditions. Antennas are carefully tuned to the customer's operating frequency before they are shipped, thus assuring the most efficient installation. Normally no field adjustment is required.

Type	No. of Sections	Gain[1] Field	Gain[1] Power Kw	Gain[1] Power Db	Power Rating 1⅝" Line Kw	1⅝" Line Dbk	3⅛" Line Kw	3⅛" Line Dbk	Freq. Mc.	Length (Ft) (A)	Distance (Ft From Top To Radiation Center (B)	Distance (Ft) From Top To Feed Point (C)	Weight (lbs) Dipoles & Coax Lines 1⅝"	Weight (lbs) Dipoles & Coax Lines 3⅛"	Wind Load[2] In Direction Toward Tower 1⅝"	Wind Load[2] In Direction Toward Tower 3⅛"	Wind Load[2] In Direction Across Tower 1⅝"	Wind Load[2] In Direction Across Tower 3⅛"
300-1	1[3]	.97	.95	−.22	3	4.8	3	4.8	88 98 108	0 0 0	0 0 0	0 0 0	49 49 49	57 57 57	107 107 107	107 107 107	89 89 89	92 92 92
300-2	2	1.40	1.97	2.94	6	7.8	6	7.8	88 98 108	11.1 10.0 9.1	5.6 5.0 4.5	17.1 16.0 15.1	120 119 118	164 161 158	306 299 294	390 378 368	269 263 258	422 411 401
300-3	3	1.79	3.12	4.94	9	9.5	9	9.5	88 98 108	22.3 20.0 18.1	11.1 10.0 9.1	28.3 26.0 24.1	183 180 178	251 246 241	471 458 449	609 586 566	416 404 394	689 666 647
300-4	4	2.05	4.20	6.23	10	10.0	12	10.8	88 98 108	33.4 30.0 27.2	16.7 15.0 13.6	39.4 36.0 33.2	246 242 239	339 331 323	637 617 603	829 794 764	564 544 530	957 922 892
300-5	5	2.30	5.31	7.25	10	10.0	15	11.8	88 98 108	44.5 40.0 36.3	22.3 20.0 18.1	50.5 46.0 42.3	309 303 299	427 416 406	802 776 757	1048 1002 962	711 685 666	1224 1178 1138
300-6	6	2.53	6.39	8.06	10	10.0	18	12.6	88 98 108	55.7 50.0 45.4	27.8 25.0 22.7	61.7 56.0 51.4	372 365 360	515 501 489	967 953 911	1268 1210 1161	858 826 802	1491 1433 1384
300-7	7	2.74	7.50	8.75	10	10.0	21	13.2	88 98 108	66.8 60.0 54.4	33.4 30.0 27.2	72.8 66.0 60.4	435 427 420	603 586 571	1133 1095 1066	1487 1417 1359	1005 967 938	1758 1689 1630
300-8	8	2.93	8.57	9.33	10	10.0	24	13.8	88 98 108	77.9 70.0 63.5	39.0 35.0 31.7	83.9 76.0 69.5	497 488 481	691 671 654	1298 1254 1220	1707 1625 1557	1153 1108 1074	2026 1944 1876
300-9	9	3.12	9.76	9.89	10	10.0	27	14.3	88 98 108	89.0 80.0 72.6	44.5 40.0 36.3	95.0 86.0 78.6	560 550 541	779 756 737	1464 1413 1374	1926 1833 1755	1300 1249 1210	2293 2200 2122
300-10*	10	3.31	10.96	10.40	20	13.0	30	14.8	88 98 108	100.2 90.0 81.6	50.1 45.0 40.8	56.1 51.0 46.8	649 636 625	927 897 873	1632 1574 1531	2151 2046 1958	1458 1400 1357	2519 2415 2326
300-11*	11	3.45	11.87	10.74	20	13.0	33	15.2	88 98 108	111.3 100.0 90.7	55.7 50.0 45.4	67.2 61.0 55.9	712 697 686	1015 982 956	1797 1733 1685	2370 2254 2156	1605 1541 1493	2786 2670 2572
300-12*	12	3.63	13.20	11.20	20	13.0	36	15.6	88 98 108	122.4 110.0 99.8	61.2 55.0 49.9	67.2 61.0 55.9	775 759 746	1102 1067 1039	1963 1892 1839	2590 2462 2354	1753 1682 1629	3053 2926 2818
300-13*	13	3.75	14.03	11.47	20	13.0	39	15.9	88 98 108	133.6 120.0 108.8	66.8 60.0 54.4	78.3 71.0 65.0	838 821 807	1190 1152 1121	2128 2051 1994	2809 2670 2552	1900 1823 1765	3321 3182 3064
300-14*	14	3.91	15.29	11.84	20	13.0	42	16.2	88 98 108	144.8 130.0 117.9	72.3 65.0 59.0	78.3 71.0 65.0	901 882 867	1278 1238 1204	2294 2210 2148	3029 2878 2750	2047 1964 1901	3588 3437 3310
300-15*	15	4.04	16.30	12.12	20	13.0	45	16.5	88 98 108	155.9 140.0 127.0	77.9 70.0 63.5	89.5 81.0 74.0	964 944 928	1366 1323 1286	2459 2369 2302	3248 3086 2948	2194 2105 2037	3855 3693 3556
300-16*	16	4.18	17.48	12.43	20	13.0	48	16.8	88 98 108	167.0 150.0 136.1	83.5 75.0 68.0	89.5 81.0 74.0	1027 1005 988	1454 1408 1369	2624 2528 2456	3468 3294 3147	2342 2246 2174	4122 3948 3801

NOTES:

[1] *Referred to half-wave dipole in free space, assuming antenna radiates 95% of its input power.*

[2] *60 psf wind pressure on flat surfaces, 40 psf on cylindrical surfaces (123 mph actual wind velocity).*

[3] *6 ft. transmission line section not furnished with 1-section antenna.*

* *Antennas of 10 bays and over are normally center fed if an even number of bays, or at a point one-half bay below center if an odd number of bays.*

VOLTAGE STANDING WAVE RATIO VS. FREQUENCY
Measured VSWR of Type 300-6 Antenna