

RADIO ENGINEERING
MICROWAVE RADIO
ANTENNA SPECIFICATIONS
KS-15970, 5-FOOT, 11-GHz

	CONTENTS	PAGE
1. GENERAL	1
2. TRANSMISSION CHARACTERISTICS	1
3. EQUIPMENT DESCRIPTION	1
4. REFERENCES	2

1. GENERAL

- 1.01** The KS-15970 antenna is a 5-foot parabolic dish antenna for use on short-haul 11-GHz radio routes, such as TJ and TL microwave radio systems.
- 1.02** The 2-port construction of the feed assembly provides the capability of operation with both vertical and horizontal polarizations.

2. TRANSMISSION CHARACTERISTICS

- 2.01** The gain-frequency characteristics are shown in Table A. Other transmission characteristics are shown in Table B.
- 2.02** The minimum return loss of 22 dB corresponds to a voltage standing wave ratio of 1.17 to 1.
- 2.03** Smoothed, horizontal-plane (azimuthal) directivity characteristics are given in Table C and illustrated in Fig. 1 and 2. Table C lists the radiation discrimination of the antenna in dB per degree (azimuth) to signals of the same polarization for which the antenna is arranged and also to cross-polarized signals. Azimuthal angles are given between 0 and 180 degrees. The first letter of the four columns designated VV, HV, HH, and VH denotes **V**ertical or **H**orizontal polarization of the signal. The second letter of the four columns, V

or H, denotes the polarization for which the antenna is arranged. Figures 1 and 2 are graphical presentations of the information given in Table C. The curves envelop the minor lobes that are likely to occur within the 11-GHz frequency band, and may be used as a worse-case situation when making interference computations.

3. EQUIPMENT DESCRIPTION

- 3.01** The KS-15970 antenna consists of a 5-foot spun-aluminum dish, a broadband feed assembly, a radome, and a mounting frame for attaching the reflector to standard towers or other structures.
- 3.02** A low-loss radome fits over the front face of the reflector and is required for the antenna to meet the design wind load requirements, and to protect the feed assembly. Dish and feed heaters are not available.
- 3.03** The feed assembly consists of a length of circular waveguide with a focal length of 21.1 inches. The rotatable flange matches WC-75 gasketed waveguide. A 1405A network is required to separate the vertical and horizontal polarizations. If single polarization is desired, a 4A transducer may be used. The network and transducer match WR-90 waveguides. The assembly is arranged to be inserted or removed through the rear of the reflector.
- 3.04** The mounting frame provides for independent azimuth and elevation adjustments. A fine adjustment of ± 10.5 degrees on azimuth and ± 3.5 degrees on elevation is possible with the mounting frame design: additional adjustment range may be obtained by lengthening the pipe sections of the adjusting turn buckle.
- 3.05** The weight of the reflector and feed assembly is approximately 130 pounds. The mounting

SECTION 940-340-159

frame weighs about 75 pounds, and the radome about 20 pounds. The antenna and its mounting frame are designed for a wind load of 40 pounds per square foot.

3.06 The equipment information is shown in Table D.

4. REFERENCES

SD-3C041-01 Short-Haul Radio—Parabolic Reflector Antennas, Passive Reflectors, and Outdoor Waveguide Systems

402-433-200

940-340-131*

AA266.091

KS-15970 Parabolic Antenna—Assembly and Installation

Microwave Radio—Waveguide Systems—Design Considerations

Antennas, Passive Reflectors, and Radomes for Microwave Communication Systems—Toll Systems

*This section may not be issued. Consult the latest numerical index.

TABLE A

GAIN-FREQUENCY CHARACTERISTICS

FREQUENCY (GHz)	GAIN (dB)
10.7	41.6
11.2	42.1
11.7	42.4

TABLE B

TRANSMISSION CHARACTERISTICS

CHARACTERISTIC	POLARIZATION	
	VERTICAL	HORIZONTAL
Half-Power Beam Width (11.2 GHz)	1.2 degrees	1.3 degrees
Major Sidelobe Suppression (11.2 GHz)	15.5 dB MIN	13.0 dB MIN
Return Loss	22 dB MIN	
Polarization Discriminator	20 dB MIN	
Radome Insertion Loss	0.7 dB MAX	

TABLE C
DISCRIMINATION OF TYPE KS-15970 ANTENNA

ANGLE (DEGREES)	DISCRIMINATION (DECIBELS)			
	VV	HV	HH	VH
0	0.0	20.0	0.0	20.0
1	13.4	35.7	9.7	35.7
2	20.8	38.2	14.5	38.2
3	25.0	42.7	27.7	42.7
4	29.3	44.7	31.3	44.7
5	31.6	46.5	33.7	46.5
6	32.1	48.1	34.5	48.1
7	32.4	49.6	35.0	49.6
8	32.7	51.0	35.4	51.0
9	33.0	52.5	35.9	52.5
10	34.5	53.3	37.0	53.3
11	36.0	54.0	38.1	54.0
12	36.0	53.3	38.2	53.3
13	36.0	52.5	38.3	52.5
14	36.0	51.8	38.4	51.8
15	36.0	51.1	38.5	51.1
16	36.2	50.0	38.4	50.0
17	36.4	49.0	38.3	49.0
18	36.5	47.9	38.2	47.9
19	36.7	46.8	38.1	46.8
20	36.9	45.8	38.0	45.8
21	37.1	44.7	37.9	44.7
22	36.9	43.7	37.9	43.7
23	36.7	42.8	37.8	42.8
24	36.5	41.8	37.8	41.8
25	36.4	40.9	37.8	40.9
26	36.2	39.9	37.7	39.9
27	36.0	39.0	37.7	39.0
28	35.7	39.0	37.6	39.0
29	35.4	39.0	37.6	39.0
30	35.3	40.0	37.7	40.0
31	35.1	41.0	37.9	41.0
32	35.0	42.0	38.0	42.0
33	35.9	42.9	38.6	42.9
34	36.9	43.9	39.1	43.9
35	37.8	44.8	39.7	44.8

TABLE C (Cont)

ANGLE (DEGREES)	DISCRIMINATION (DECIBELS)			
	VV	HV	HH	VH
36	38.8	45.8	40.2	45.8
37	39.7	46.7	40.8	46.7
38	40.7	47.6	41.4	47.6
39	41.6	48.6	41.9	48.6
40	42.6	49.5	42.5	49.5
41	42.9	49.9	42.6	49.9
42	43.2	50.3	42.6	50.3
43	43.5	50.7	42.7	50.7
44	43.8	51.0	42.8	51.0
45	44.1	51.4	42.8	51.4
46	44.4	51.8	42.9	51.8
47	44.7	52.2	42.9	52.2
48	45.0	52.6	43.0	52.6
49	45.0	53.0	43.4	53.0
50	45.1	53.3	43.8	53.3
51	45.1	53.7	44.2	53.7
52	45.2	54.1	44.7	54.1
53	45.2	54.4	45.1	54.4
54	45.3	54.8	45.5	54.8
55	45.3	55.2	45.9	55.2
56	45.4	55.5	46.3	55.5
57	45.4	55.9	46.7	55.9
58	45.5	56.3	47.2	56.3
59	45.5	56.6	47.6	56.6
60	45.6	57.0	48.0	57.0
61	45.6	56.6	47.8	56.6
62	45.6	56.2	47.6	56.2
63	45.6	55.8	47.4	55.8
64	45.6	55.5	47.2	55.5
65	45.6	55.1	47.0	55.1
66	45.5	54.7	46.8	54.7
67	45.5	54.3	46.7	54.3
68	45.5	53.9	46.5	53.9
69	45.5	53.5	46.3	53.5
70	45.5	53.2	46.1	53.2
71	45.5	52.8	45.9	52.8
72	45.5	52.4	45.7	52.4
73	44.8	51.8	45.8	51.8
74	44.2	51.2	46.0	51.2
75	43.5	50.6	46.1	50.6

TABLE C (Cont)

ANGLE (DEGREES)	DISCRIMINATION (DECIBELS)			
	VV	HV	HH	VH
76	42.8	49.9	46.3	49.9
77	42.2	49.3	46.4	49.3
78	41.5	48.7	46.6	48.7
79	40.9	48.1	46.7	48.1
80	40.2	47.5	46.9	47.5
81	40.2	47.5	47.2	47.5
82	40.2	47.5	47.6	47.5
83	40.2	47.5	47.9	47.5
84	40.2	47.5	48.3	47.5
85	40.2	47.5	48.6	47.5
86	41.0	48.8	48.9	48.8
87	41.7	50.2	49.2	50.2
88	42.5	51.5	49.6	51.5
89	43.2	52.9	49.9	52.9
90	44.0	54.2	50.2	54.2
91	44.2	54.7	50.3	54.7
92	44.4	55.2	50.4	55.2
93	44.6	55.8	50.5	55.8
94	44.7	56.3	50.6	56.3
95	44.9	56.8	50.7	56.8
96	45.1	57.3	50.8	57.3
97	45.3	57.8	50.9	57.8
98	45.5	58.4	51.1	58.4
99	45.7	58.9	51.2	58.9
100	45.9	59.4	51.3	59.4
101	46.1	59.9	51.4	59.9
102	46.2	60.4	51.5	60.4
103	46.4	61.0	51.6	61.0
104	46.6	61.5	51.7	61.5
105	46.8	62.0	51.8	62.0
106	47.6	62.3	52.1	62.3
107	48.4	62.5	52.4	62.5
108	49.2	62.8	52.8	62.8
109	50.0	63.1	53.1	63.1
110	50.8	63.4	53.4	63.4
111	51.7	63.6	53.7	63.6
112	52.5	63.9	54.1	63.9
113	53.3	64.2	54.4	64.2
114	54.1	64.5	54.7	64.5
115	54.9	64.7	55.0	64.7

TABLE C (Cont)

ANGLE (DEGREES)	DISCRIMINATION (DECIBELS)			
	VV	HV	HH	VH
116	55.7	65.0	55.4	65.0
117	56.5	65.3	55.7	65.3
118	57.3	65.6	56.0	65.6
119	58.1	65.8	56.3	65.8
120	58.9	66.1	56.7	66.1
121	59.8	66.4	57.0	66.4
122	60.6	66.7	57.3	66.7
123	61.4	66.9	57.6	66.9
124	62.2	67.2	58.0	67.2
125	63.0	67.5	58.3	67.5
126	63.2	67.5	58.4	67.5
127	63.3	67.6	58.5	67.6
128	63.5	67.6	58.6	67.6
129	63.7	67.7	58.7	67.7
130	63.9	67.7	58.8	67.7
131	64.0	67.8	58.9	67.8
132	64.2	67.8	59.0	67.8
133	64.4	67.9	59.1	67.9
134	64.5	67.9	59.2	67.9
135	64.7	67.9	59.4	67.9
136	64.9	68.0	59.5	68.0
137	65.1	68.0	59.6	68.0
138	65.2	68.1	59.7	68.1
139	65.4	68.1	59.8	68.1
140	65.6	68.2	59.9	68.2
141	65.8	68.2	60.0	68.2
142	65.9	68.3	60.1	68.3
143	66.1	68.3	60.2	68.3
144	66.1	68.3	60.0	68.3
145	66.1	68.2	59.7	68.2
146	66.1	68.2	59.5	68.2
147	66.1	68.2	59.2	68.2
148	66.1	68.1	59.0	68.1
149	66.1	68.1	58.7	68.1
150	66.1	68.1	58.5	68.1
151	66.1	68.0	58.2	68.0
152	66.1	68.0	58.0	68.0
153	66.3	67.9	57.9	67.9
154	66.5	67.7	57.9	67.7
155	66.7	67.6	57.8	67.6

TABLE C (Cont)

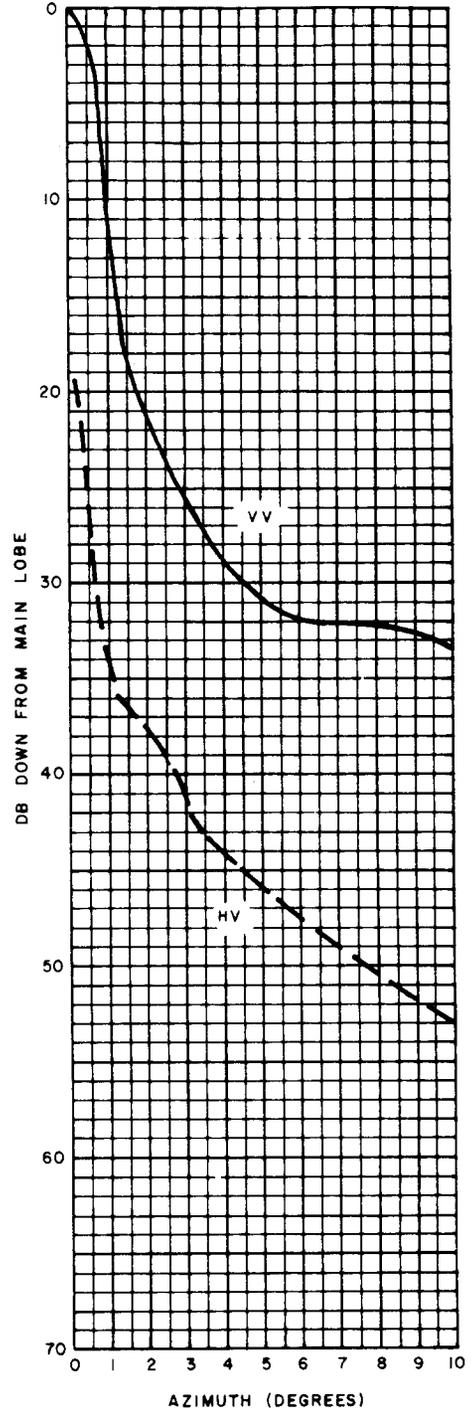
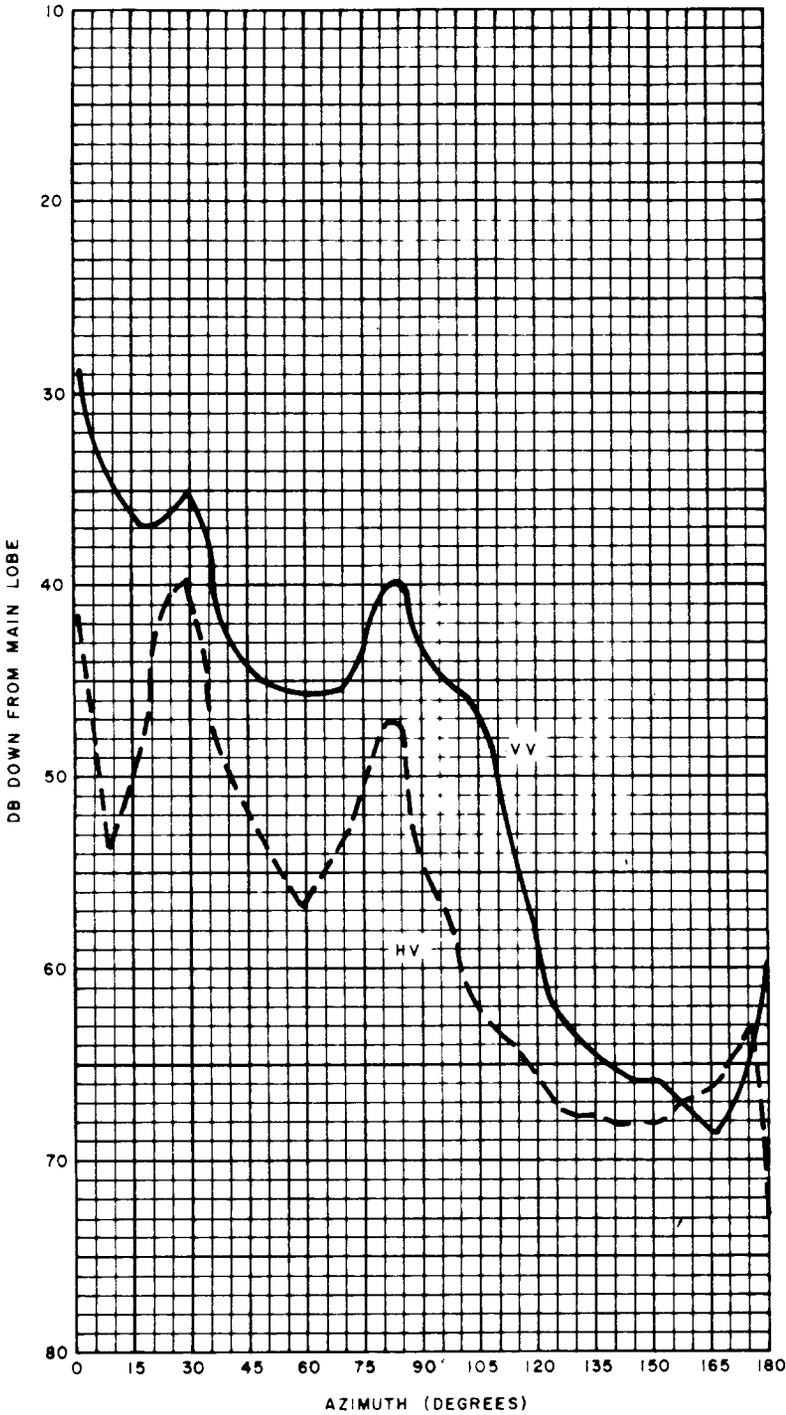
ANGLE (DEGREES)	DISCRIMINATION (DECIBELS)			
	VV	HV	HH	VH
156	66.9	67.4	57.7	67.4
157	67.1	67.3	57.6	67.3
158	67.3	67.1	57.6	67.1
159	67.5	67.0	57.5	67.0
160	67.8	66.9	57.4	66.9
161	68.0	66.7	57.4	66.7
162	68.2	66.6	57.3	66.6
163	68.4	66.4	57.2	66.4
164	68.6	66.3	57.1	66.3
165	68.8	66.1	57.1	66.1
166	69.0	66.0	57.0	66.0
167	68.5	65.8	57.1	65.7
168	68.0	65.6	57.2	65.4
169	67.5	65.4	57.3	65.0
170	67.0	65.2	57.4	64.7
171	66.5	65.0	57.5	64.4
172	66.0	64.8	57.6	64.1
173	65.5	64.6	57.7	63.8
174	65.0	64.4	57.8	63.4
175	64.5	64.2	57.9	63.1
176	64.0	64.0	58.0	62.8
177	62.3	68.0	59.6	67.1
178	60.5	72.0	61.1	71.4
179	58.8	76.0	62.7	75.7
180	57.1	80.0	64.3	80.0

TABLE D

EQUIPMENT INFORMATION — KS-15970

List 1	5-foot diameter, spun-aluminum paraboloidal reflector
List 2	Mounting frame assembly
List 3	Broadband antenna feed assembly
List 4	Radome

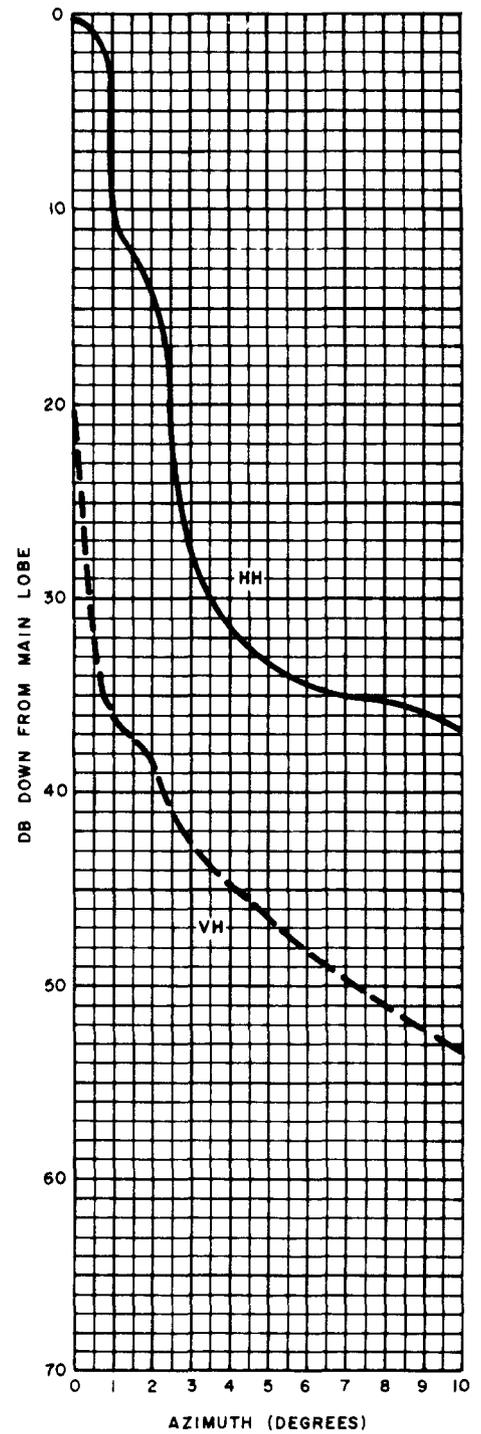
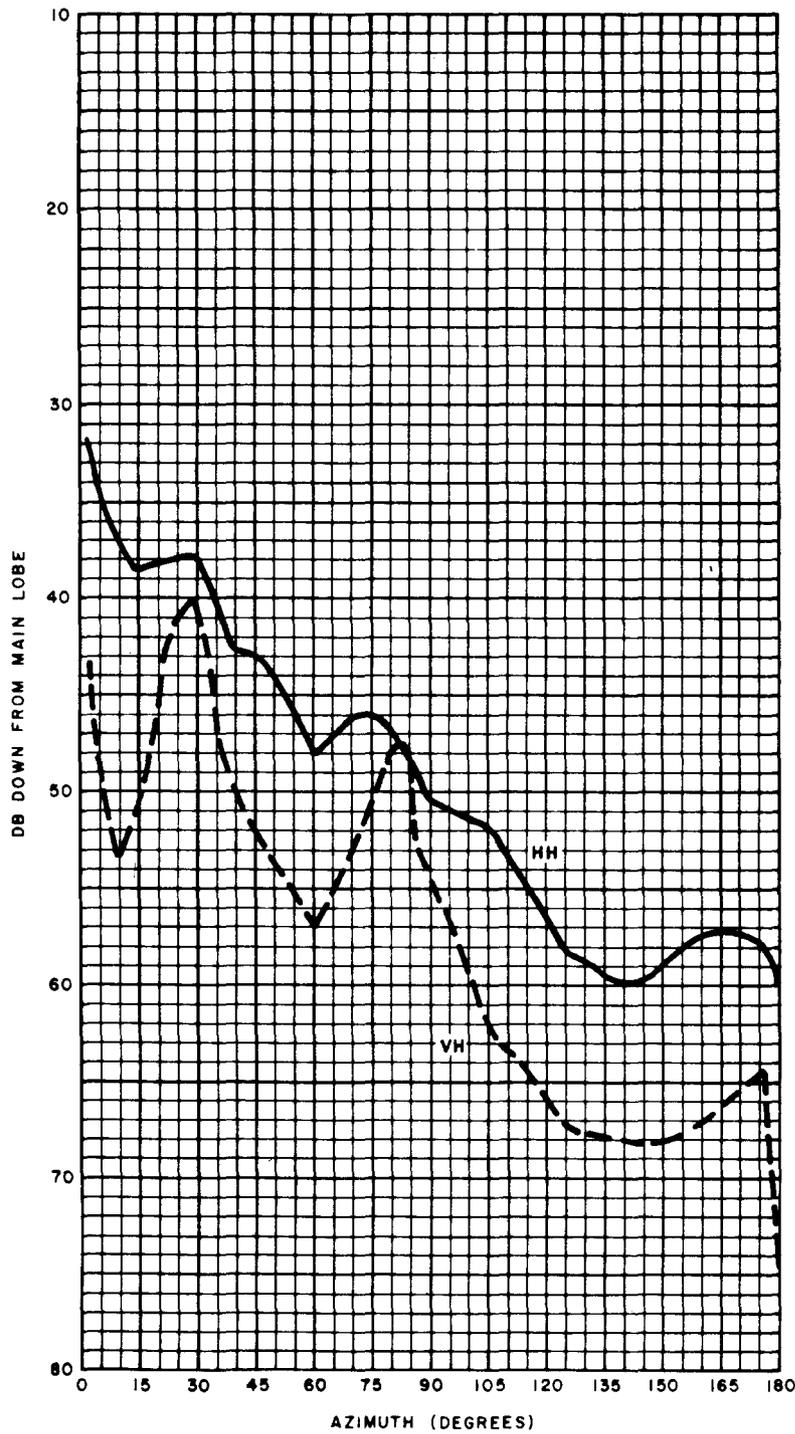
— RESPONSE TO SIGNAL OF SAME POLARIZATION (VV)
 - - - RESPONSE TO CROSS-POLARIZED SIGNAL (HV)



TPA 559135

Fig. 1—Discrimination Characteristics of Antenna KS-15970 Arranged for Vertical Polarization—Horizontal-Plane (Azimuthal) Directivity

— RESPONSE TO SIGNAL OF SAME POLARIZATION (HH)
 - - - RESPONSE TO CROSS-POLARIZED SIGNAL (VH)



TPA 559136

Fig. 2—Discrimination Characteristics of Antenna KS-15970 Arranged for Horizontal Polarization—Horizontal-Plane (Azimuthal) Directivity