

RADIO ENGINEERING
MICROWAVE RADIO
ANTENNA SPECIFICATIONS
KS-20013 TEN-FOOT FOUR-PORT 6- AND 11-GHZ

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

1. GENERAL

1.01 The KS-20013 parabolic reflector antenna is a dual-frequency cross-polarized (four-port) antenna for use with short-haul, 6- and 11-GHz crossband diversity microwave radio systems such as TL/TM and TJ/TM.

2. TRANSMISSION CHARACTERISTICS

2.01 The frequency-gain characteristics are shown in Table A. Other transmission characteristics of the KS-20013 antenna are shown in Table B.

2.02 Horizontal-directivity curves are shown in Fig. 1 and 2. Figure 1 is the smoothed horizontal-directivity curve for the 6-GHz band for either the horizontal or vertical polarizations. Figure 2 is the smoothed horizontal-directivity curve for the 11-GHz band for either horizontal or vertical polarizations. These curves are drawn to cover all minor lobes that are likely to occur within the frequency band and are used as a worst case situation when making interference computations.

2.03 Figures 3 and 4 are polar graphs of the radiation patterns at 6.175 GHz for horizontally and vertically polarized signals. Figures 5 and 6 show the radiation patterns at 11.2 GHz. Figures 7

TABLE A
TRANSMISSION CHARACTERISTICS

| FREQUENCY (GHZ) | GAIN-MIN (DB) WITH RADOME |
|-----------------|------------------------------|
| 5.925 | 40.6 |
| 6.175 | 40.8 |
| 6.425 | 41.4 |
| 10.7 | 45.8 |
| 11.2 | 46.2 |
| 11.7 | 46.6 |

TABLE B
TRANSMISSION CHARACTERISTICS

| CHARACTERISTIC | FREQUENCY | |
|-----------------------------|---------------|-------------|
| | 6.175 GHZ | 11.2 GHZ |
| Half-power beam width | 1.1 degrees | 0.6 degrees |
| Major sidelobe suppression | 13 dB min | 13 dB min |
| Radome insertion loss | 0.3 dB max | 1.0 dB max |
| Return loss | 23 dB minimum | |
| Polarization discrimination | 20 dB minimum | |

and 8 illustrate the antenna response to a cross-polarized signal for the 6.175- and 11.2-GHz signals. The polar patterns show numerous minor lobes and are the result of actual measurement. The engineer should not attempt to rely upon this fine grain information for making interference computations,

SECTION 940-340-164

as they will differ considerably from antenna to antenna and from one specific frequency to another.

3. EQUIPMENT DESCRIPTION

3.01 The KS-20013 ten-foot parabolic antenna consists of a ten-foot diameter parabolic reflector equipped with a two element feed assembly for transmission in the 5.925 to 6.425 GHz and 10.7 to 11.7 GHz microwave frequency bands.

3.02 The reflector is a 10-foot parabolic dish of aluminum capable of being tower mounted as a direct radiator or horizontally mounted for periscope operation.

3.03 The complete assembly includes a mounting frame for attaching the reflector to the tower and is arranged for independent azimuth and elevation adjustments.

3.04 A weather-protecting low-loss radome fits over the reflector. The radome will be required on all installations to protect the feed assembly.

3.05 The two-element feed assembly is mounted in the center of the reflector. The assembly is fed by dominant mode rectangular waveguides. One WR159 rectangular waveguide with a gasketed flange is provided for each polarization of the 6-GHz frequency band and one WR90 rectangular waveguide with a gasketed flange is provided for each polarization of the 11-GHz frequency band. The 6-GHz rectangular waveguide is split into half-height waveguides which surround the 11-GHz feed and terminate at a square flared horn which directs the 6-GHz signals toward the subreflector for illuminating the reflector.

3.06 The 11-GHz vertically and horizontally polarized signals connect to a combining network which couples the energy from the rectangular waveguides to a circular polyrod feed to illuminate the subreflector with the two polarizations of both frequency bands.

3.07 The feed assembly, including the subreflector, is strut supported. Both the 6- and 11-GHz feeds can be rotated 360 degrees independently of each other. The entire assembly with mounting frame will withstand wind loading of 40 pounds per square foot without damage or misalignment.

3.08 Reflector or feed heaters are not provided with this antenna. The equipment information is shown in Table C. One of each List 1, 2, 3, and 4 is required for each installation.

TABLE C

EQUIPMENT INFORMATION

| | | |
|-----------------|--------|-----------------------------|
| KS-20013 | List 1 | 10-foot parabolic reflector |
| | List 2 | Feed assembly |
| | List 3 | Mounting frame |
| | List 4 | Radome |

3.09 On the used 6-GHz ports a KS-20148 filter is required to meet the isolation requirements. On unused ports a termination will be used. This equipment is not part of the antenna equipment and must be ordered separately.

3.10 The weight of the reflector and feed assembly is approximately 650 pounds. The mounting frame weighs approximately 330 pounds, and the radome weighs approximately 90 pounds.

4. REFERENCES

SD-3C041-01 Parabolic Reflector Antennas-Passive Reflectors and Outdoor Waveguide Systems.

940-340-131* Microwave Radio, Waveguide Systems, Design Consideration

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

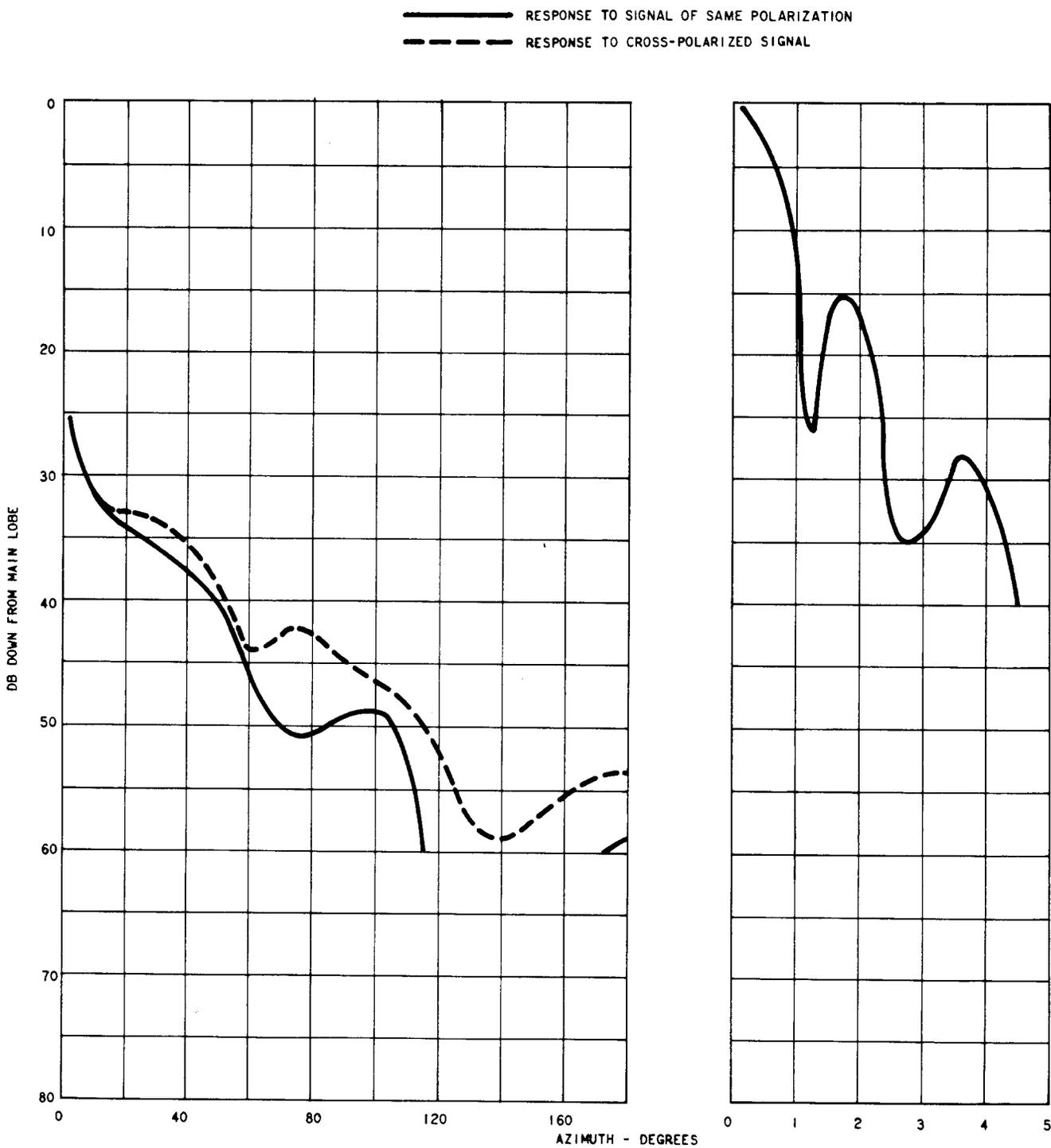


Fig. 1—Smoothed Horizontal Directivity—6 GHz

— RESPONSE TO SIGNAL OF SAME POLARIZATION
- - - RESPONSE TO CROSS-POLARIZED SIGNAL

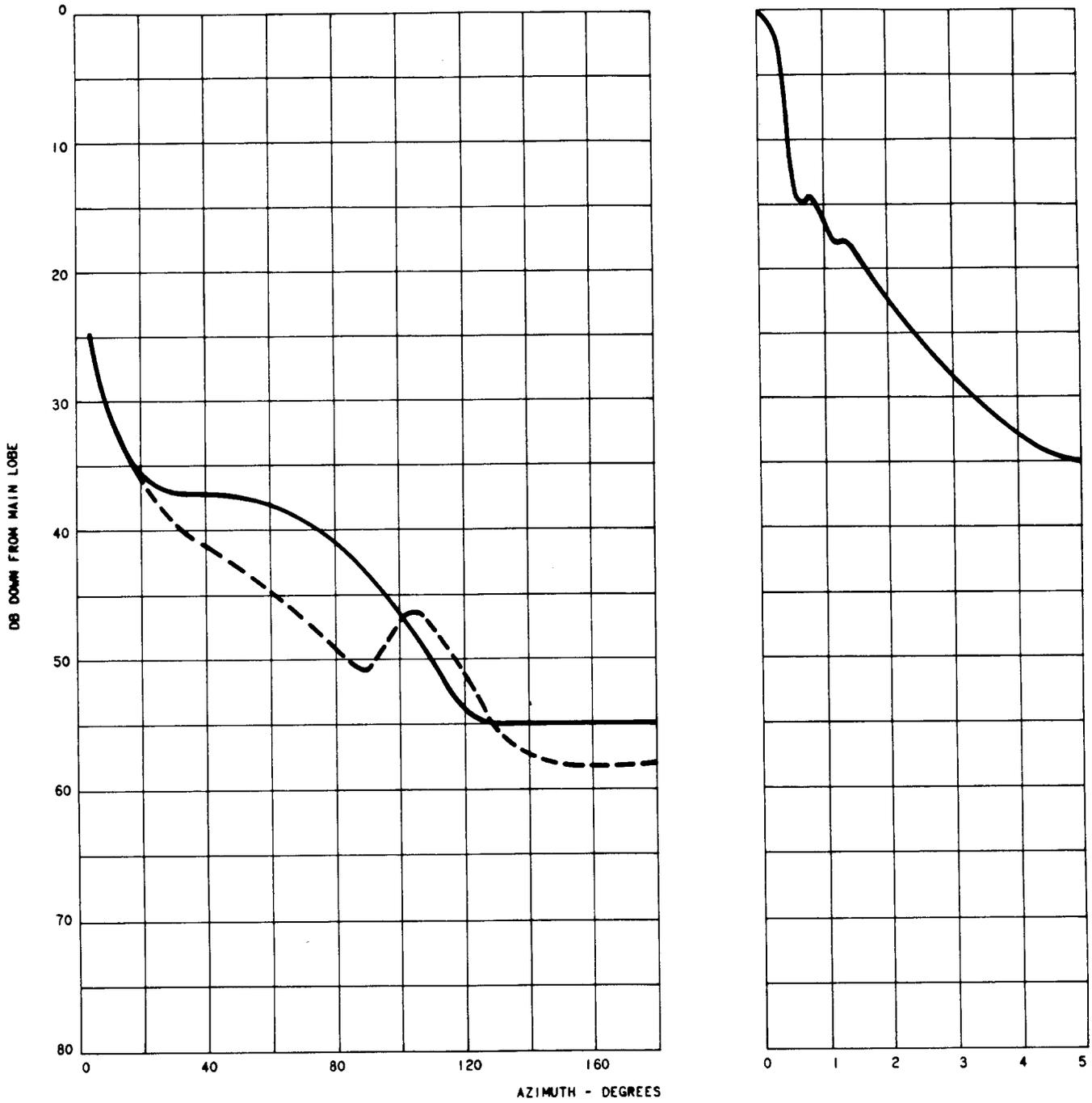


Fig. 2—Smoothed Horizontal Directivity—11 GHz

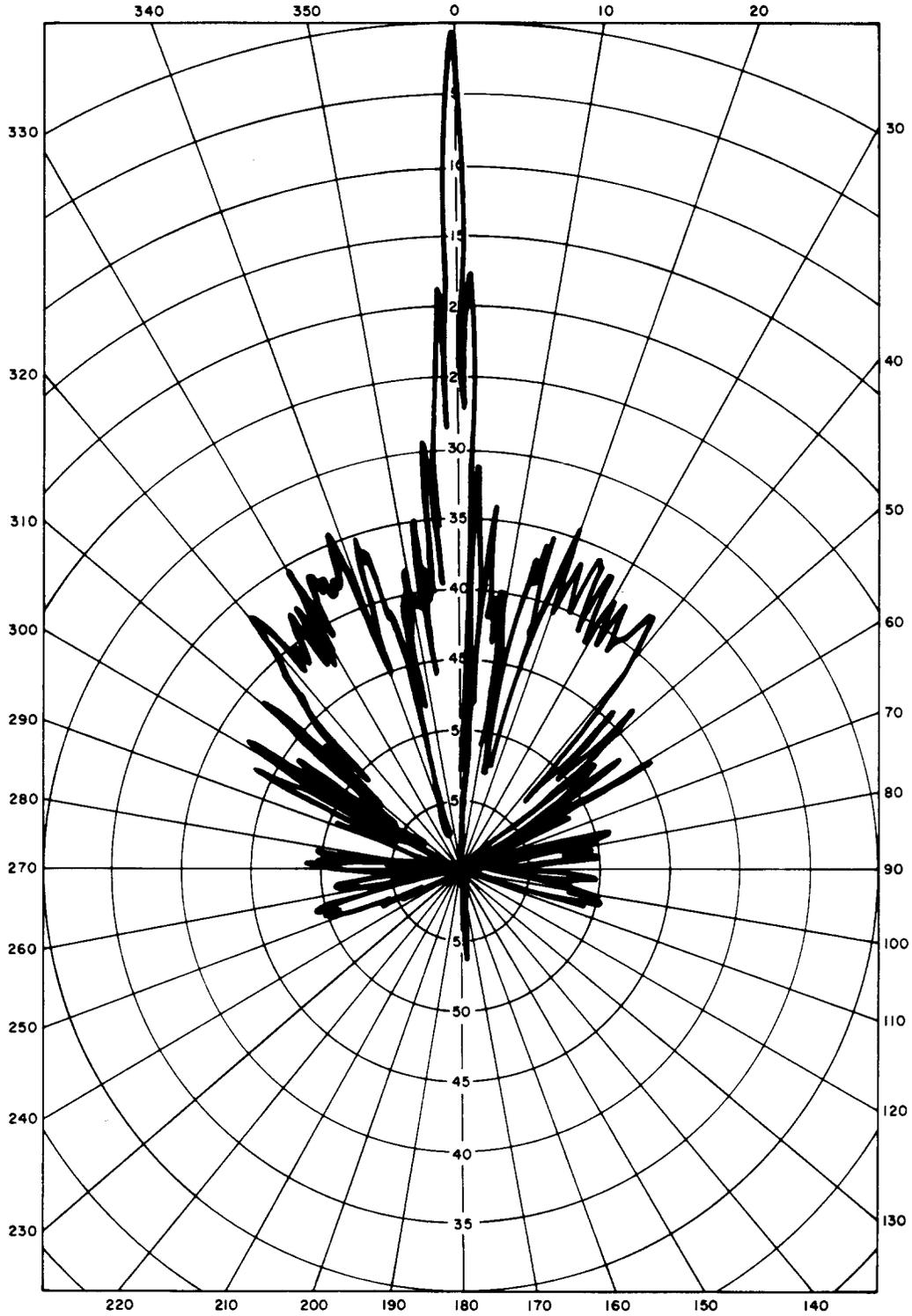


Fig. 3—Radiation Pattern for Horizontally Polarized 6.175 GHz Signal

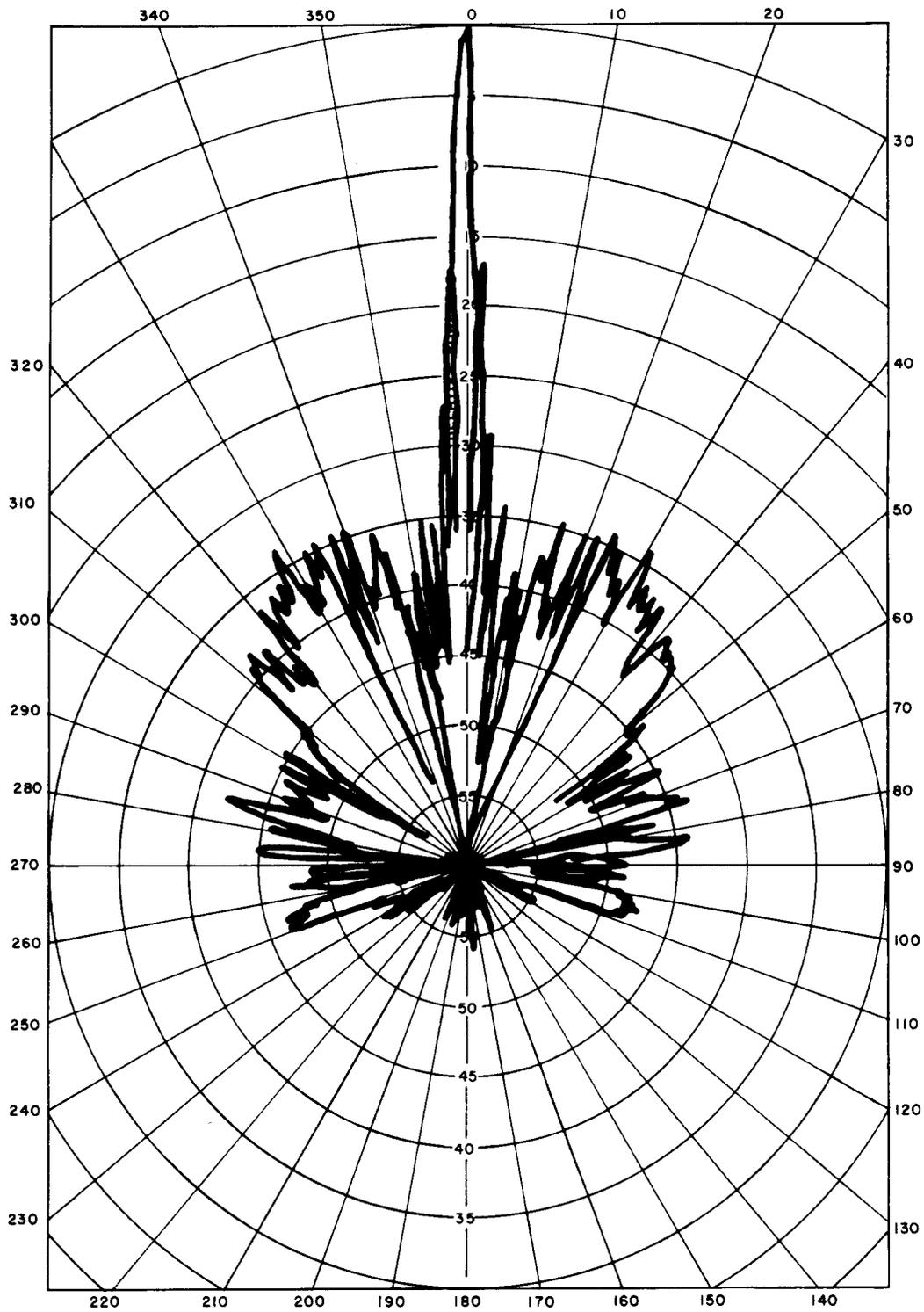


Fig. 4—Radiation Pattern for Vertically Polarized 6.175 GHz Signal

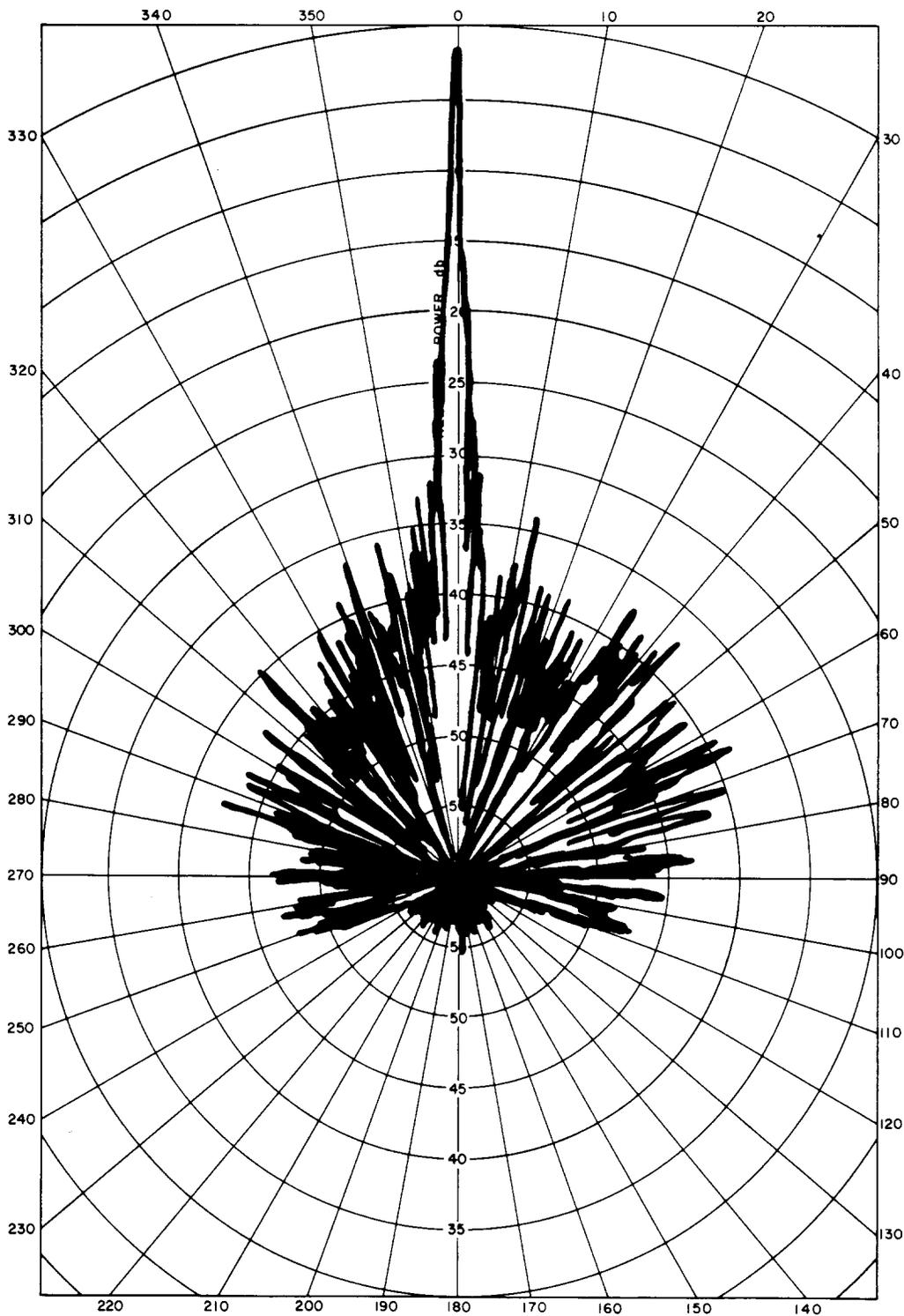


Fig. 5—Radiation Pattern for Horizontally Polarized 11.2 GHz Signal

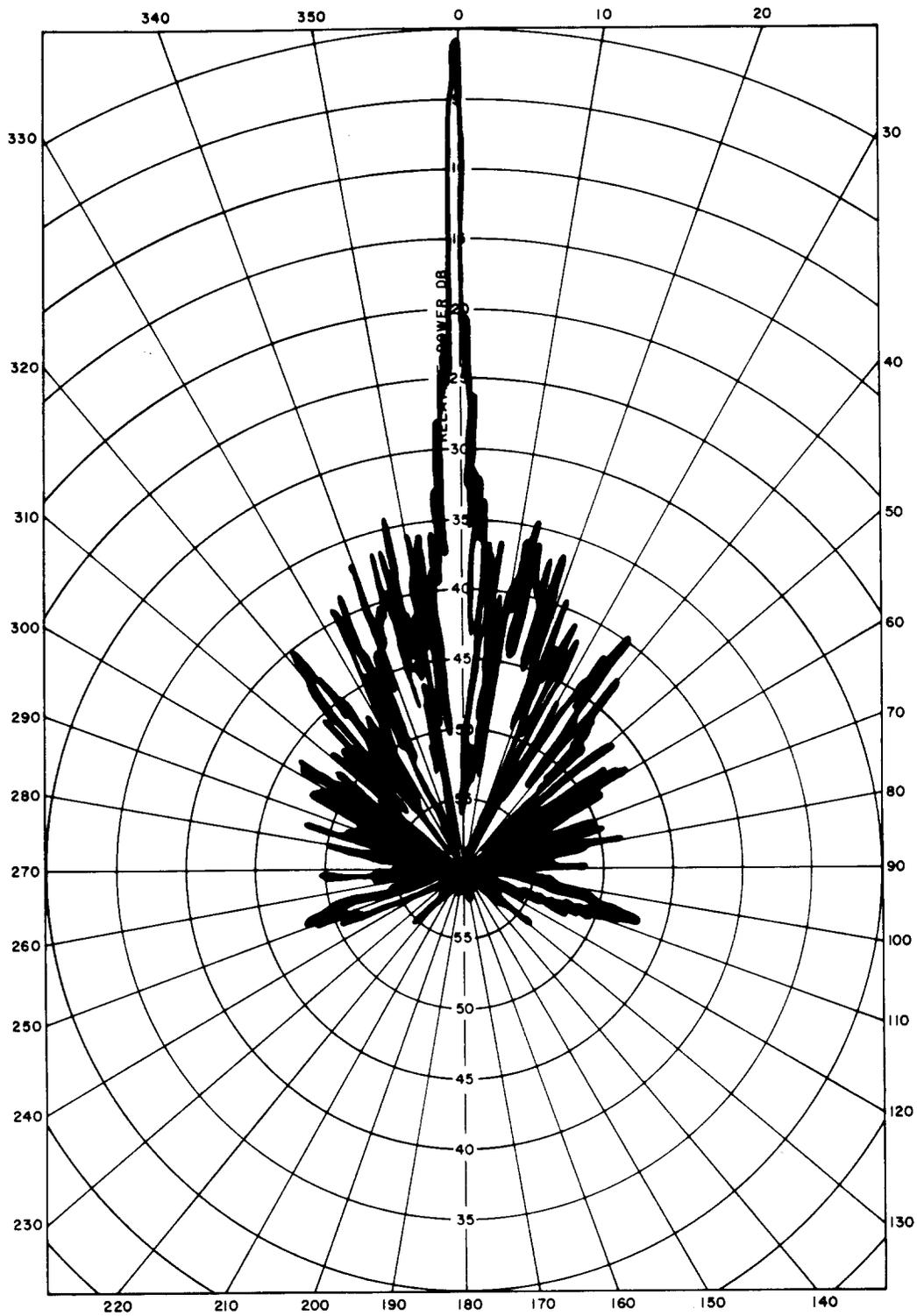


Fig. 6—Radiation Pattern for Vertically Polarized 11.2 GHz Signal

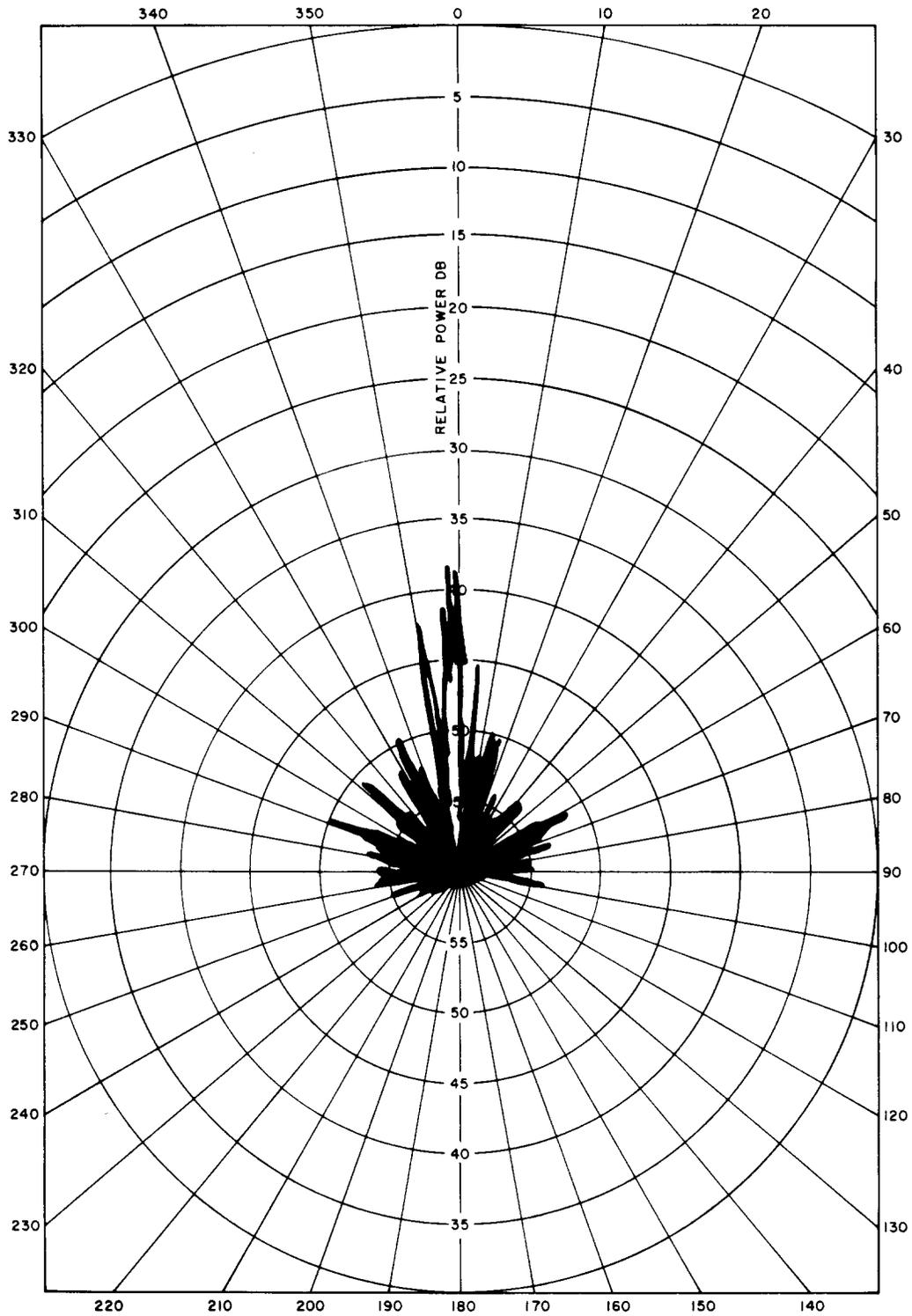


Fig. 7—Response to Cross-Polarized 6.175 GHz Signal

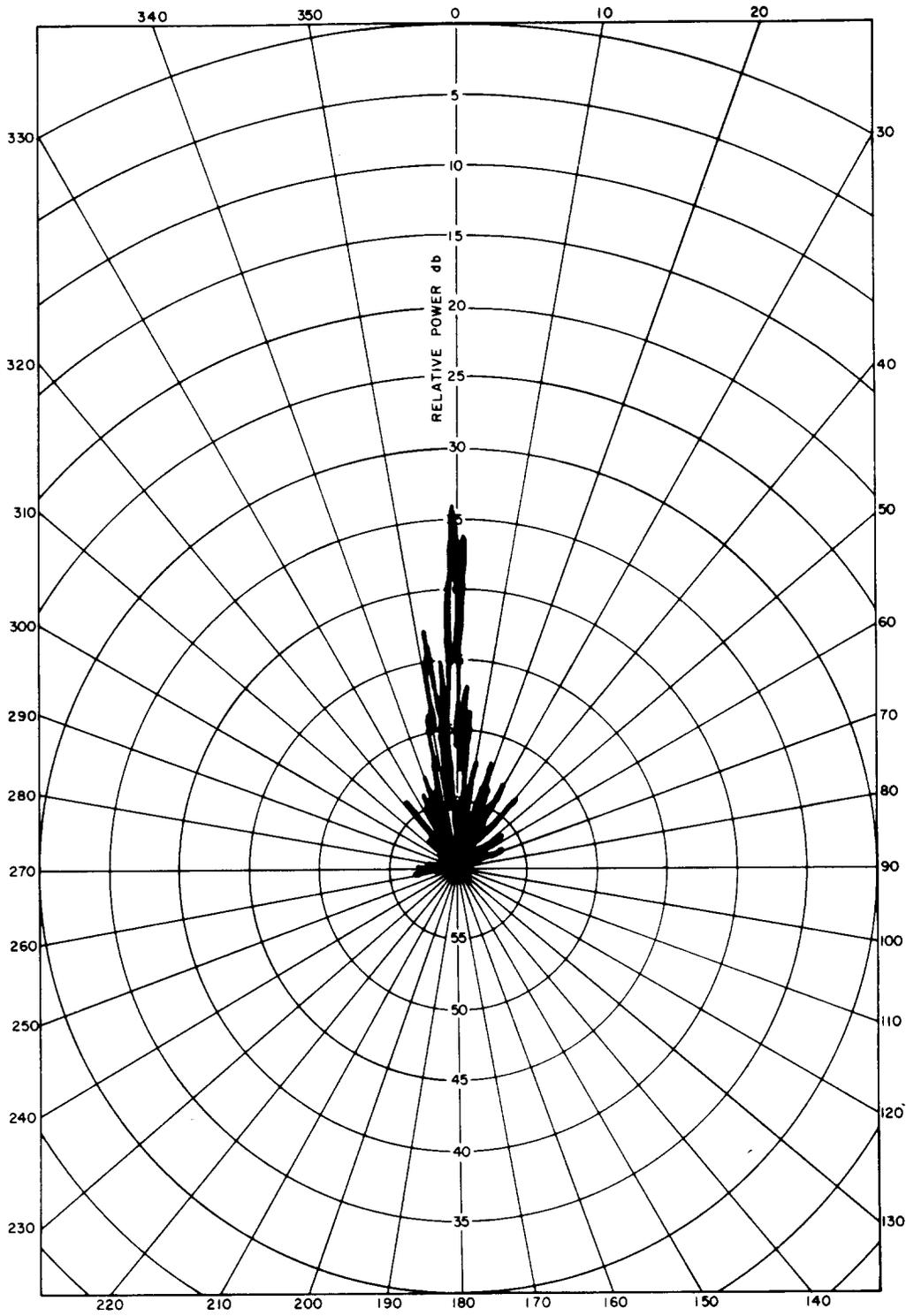


Fig. 8—Response to a Cross-Polarized 11.2 GHz Signal