MICROWAVE ANTENNAS
KS-5708 LIST 1 PERFORATED PARABOLIC ANTENNA
DESCRIPTION

CONTENTS

1. GENERAL

1.01 This section pertains to the 57" parabolic reflector antenna (KS-5708). Circuit and equipment data are included, as well as transmission characteristics. Related photographs and drawings are also included.

1.02 Parabolic reflector antennas are suitable for use as transmitting or receiving antennas for line-of-sight broad band microwave radio systems of the portable pick-up variety. In general, parabolic reflector antennas have good forward gain and fair side and back lobe suppression. Hence they lend themselves to use on paths of moderate length where the highest degree of directivity is not required to avoid interference.

1.03 The practical working range of the design described in this section is from 3890 to 4200 megacycles; however, parabolic reflector antennas may readily be built for other microwave frequencies.

2. CIRCUIT DESCRIPTION

(A) 57" Parabolic Reflector Antenna

2.01 The layout of this antenna is shown in Figure 1, page 4. It has a wave guide feed at the focal point of the parabolic reflector and sprays the electromagnetic energy at it in the form of spherical waves. The waves in turn are reflected outward as essentially plane waves as a result of the contour. The narrowness of beam depends upon the diameter of the reflector, which in this case is 57 inches. This develops a beam width of about 3.5 degrees between 3 db points as shown in the directivity pattern in Figure 2, page 5. The gain of the antenna at 4100 mc is 31 db over a half-wave dipole; the gain vs. frequency characteristic is shown in Figure 3, page 6. The back-to-back pickup by a like antenna is about 75 db down.

3. EQUIPMENT FEATURES

(A) 57" Parabolic Reflector Antenna

3.01 The parabolic dish is a perforated aluminum sheet 57-1/4" in diameter with a steel supporting ring on the extreme circumference and a supporting ring casting of aluminum toward the center. An isometric drawing of the assembly is shown in Figure 1. The focal distance of the parabolic dish is 19 inches. The feed is a tapered 2-inch by 1-inch brass wave guide with a flange for connection to 2-inch by 1-inch wave guide. The midband frequency of this antenna is approximately 4050 megacycles. The center of the beam is adjustable to either 60" or 35" above the floor line.

3.02 The parabolic dish and casting are supported on a floor frame which when partially fastened permits antenna adjustments of ±5 degrees in elevation and ±3 degrees traverse. The weight of the parabolic dish, casting and antenna feed is 55 lbs. and the floor support weighs 45 lbs.

4. TRANSMISSION CHARACTERISTICS

(A) 57" Parabolic Reflector Antenna

4.01 Transmission characteristics for the 57" parabolic reflector antenna are as follows:

(a) Gain in forward direction	31 db over half-wave dipole at 4100 MC
(b) Beam width (horizontal)	3.5 degrees (between 3 db points)
(c) Back-to-back ratio (to like antenna)	About 75 db

5. PHOTOGRAPH AND FIGURES

(A) Photographs

(B) Figures

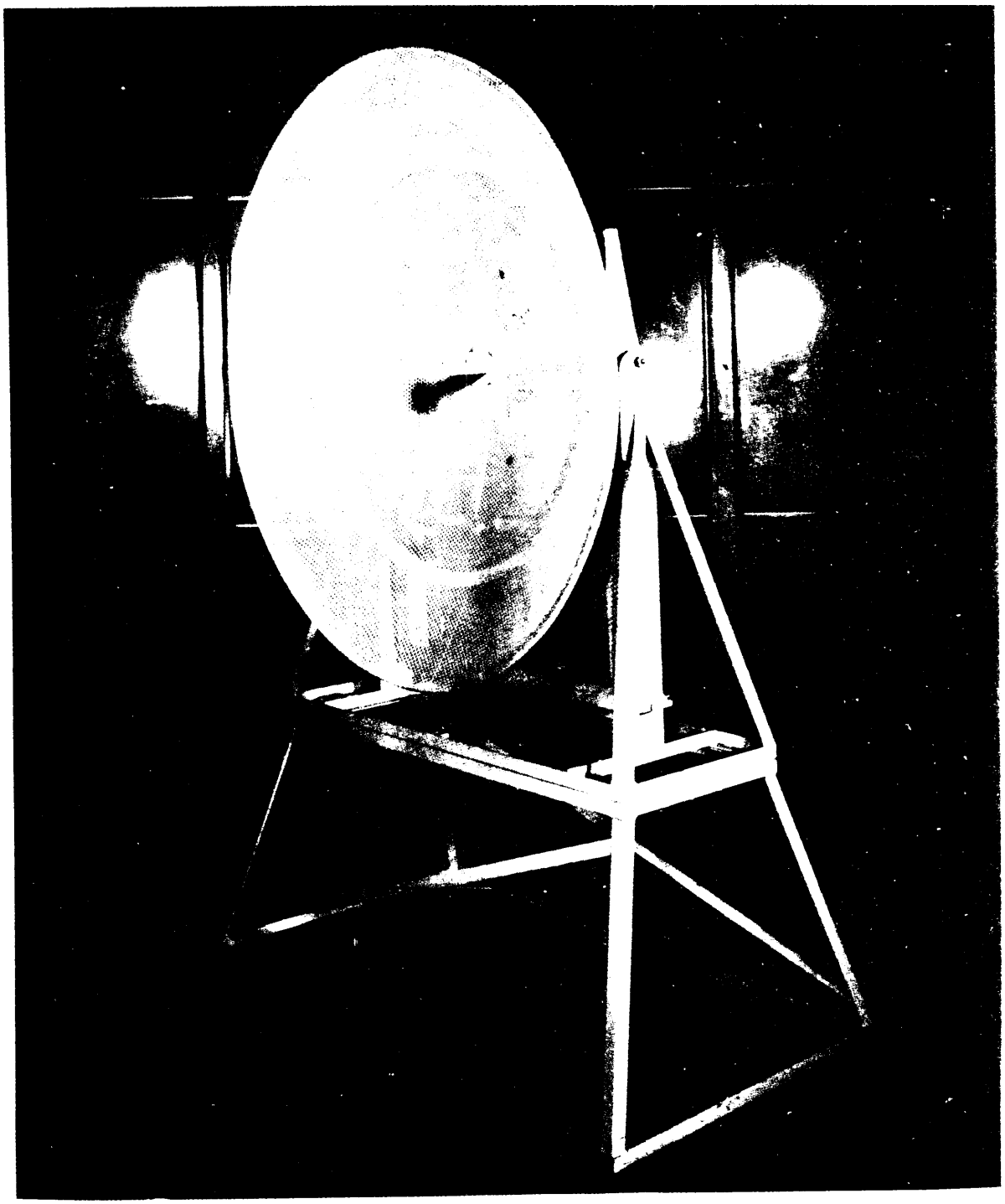


Photo A – Parabolic Reflector Antenna Assembly
Reflector Diameter-57" (Wave Guide
Feed Oriented for Vertical Polarization)

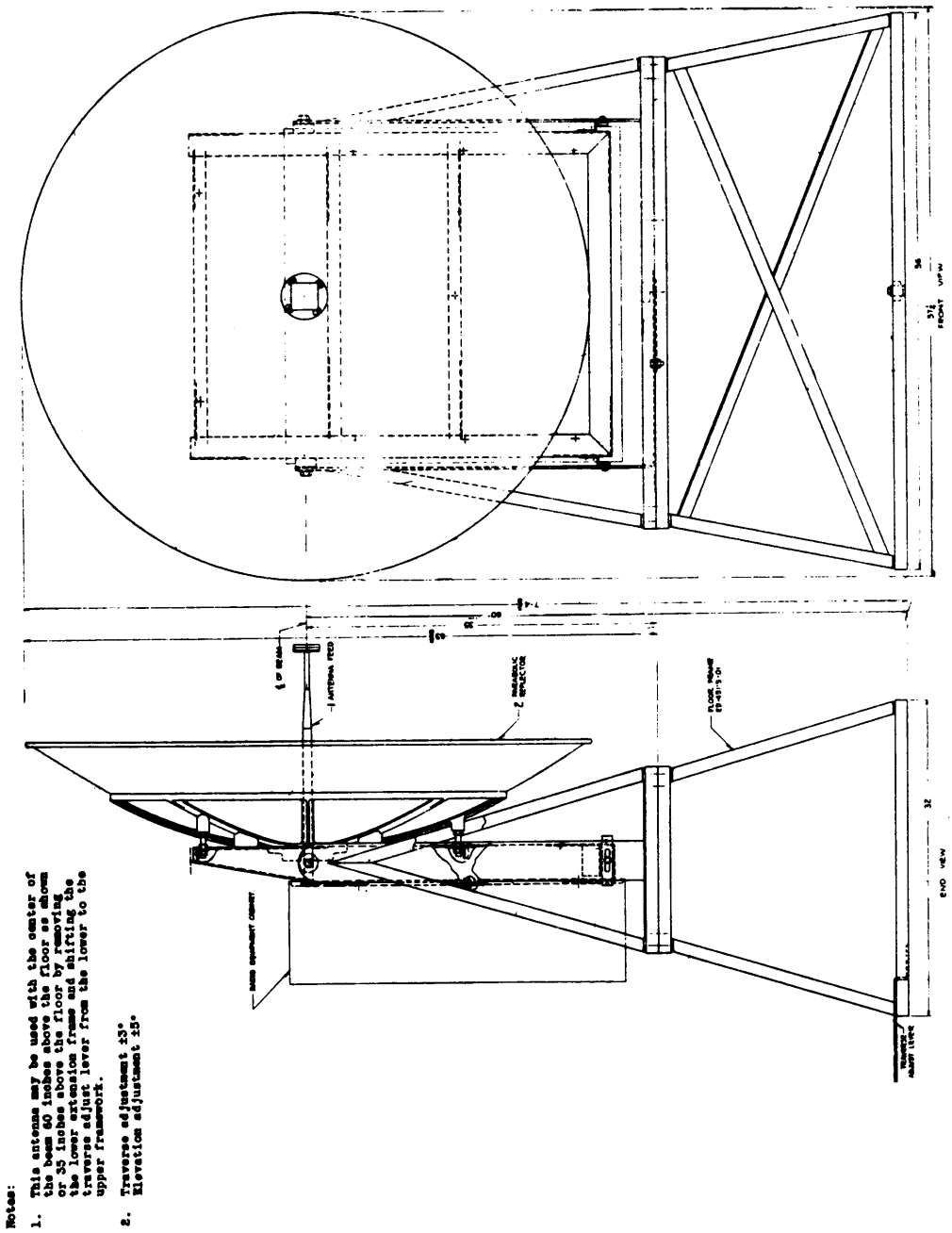
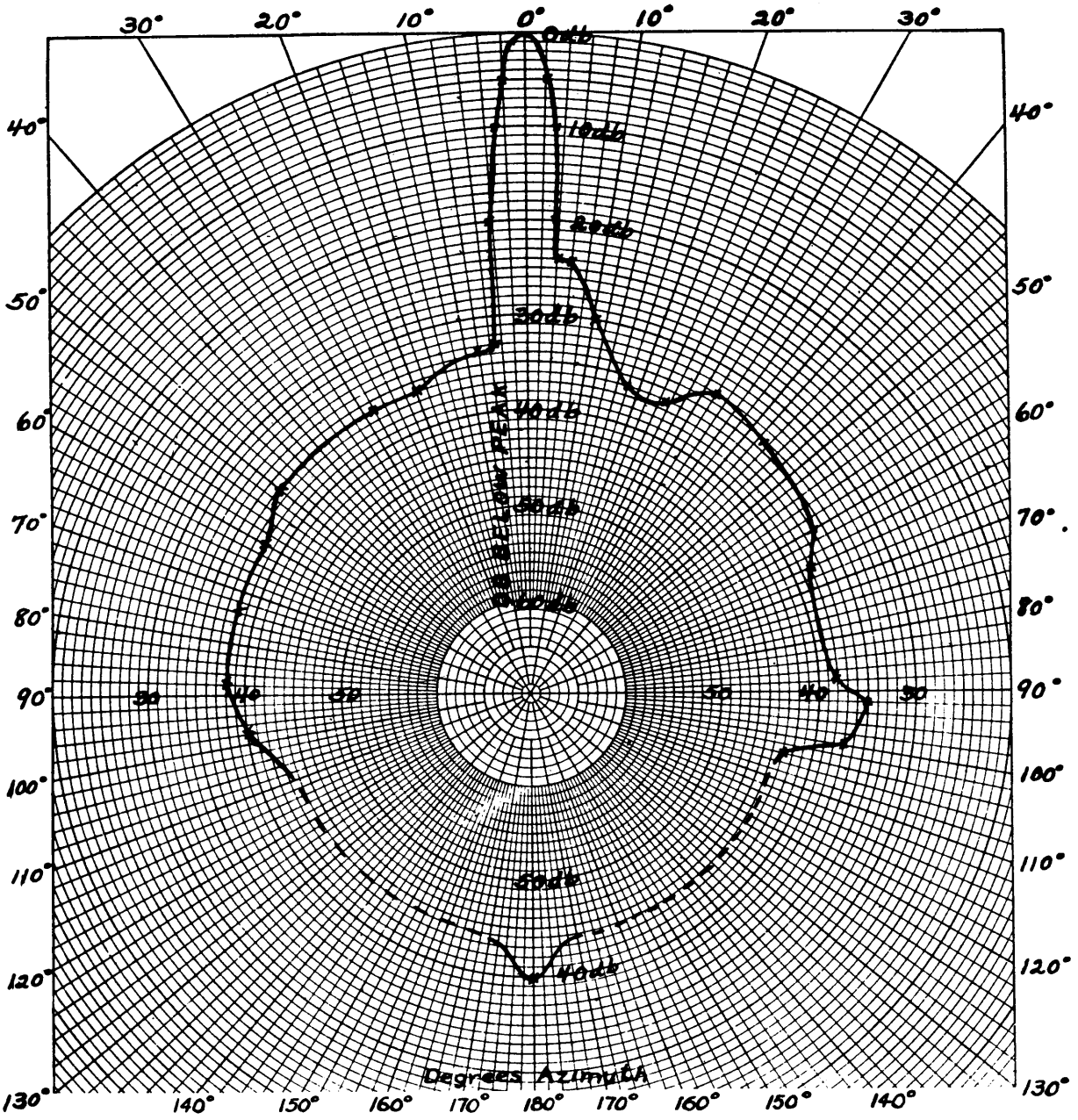


Fig. 1 – Parabolic Reflector Antenna Assembly 57" Diameter



Note: This curve indicates the values of the envelope of the radiation pattern measured at a given location. The dotted portion indicates levels less than 43 db which could not be measured.

Fig. 2 – Directivity Pattern for 57" Parabolic Reflector Antenna at 4300 MC

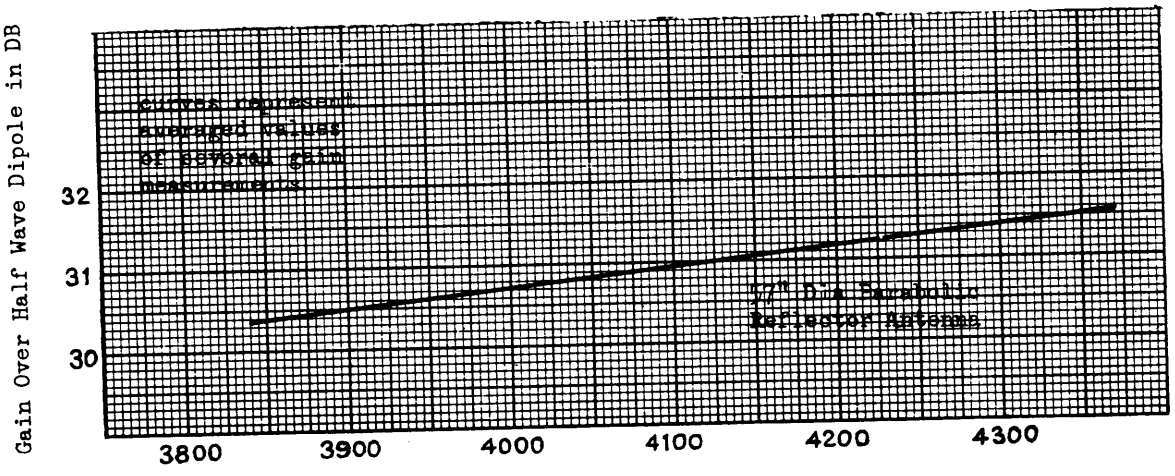


Fig. 3 – Gain-Frequency Characteristic of 57" Parabolic Reflector Antenna