

E X H I B I T A

4. Particulars of Operation (see instruction below)

Frequency (state whether kHz or MHz)	POWER			EMISSION	MODULATING SIGNAL	NECESSARY BANDWIDTH (kHz)
(A)	(B)	(C)	(D)	(E)	(F)	(G)
FIXED ONLY						
2111.6	1KW	1KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
FIXED&MOB					(F) 2	
4851.6	1KW	1KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
5127.6	1KW	1KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
6991.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
7878.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
10397.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
11077.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
12950.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
14516.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
16403.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
18603.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
20971.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
26292.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
27377.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
27403.6	1KW	4KW	1KW	J3E, J2A, H3E	300-2.7KHz	2.7KHz
30.17	20W	20W	20W	F3E	(F) 3 7.5KHz	25KHz
39.15	20W	20W	20W	F3E	(F) 3±7.5KHz	25KHz
43.55	20W	20W	20W	F3E	(F) 3±7.5KHz	25KHz
47.525	20W	20W	20W	F3E	(F) 3±7.5KHz	25KHz
72.55	20W	20W	20W	F3E	(F) 3±7.5KHz	25KHz
75.975	20W	20W	20W	F3E	(F) 3±7.5KHz	25KHz

- (A) List each frequency or frequency band separately. (If more space is required, attach as EXHIBIT No. _____)
- (B) Insert maximum RF. output power at the transmitter terminals. Specify units.
- (C) Insert maximum effective radiated power from the antenna (if pulsed emission, specify peak power).
- (D) Insert "MEAN" or "PEAK" (See definitions in Part 5).
- (E) List each type of emission separately for each frequency. (See Section 2201 of FCC Rules)
- (F) Insert as appropriate for the type of modulation:
- (1) the maximum speed of keying in bauds;
 - (2) maximum audio modulating frequency;
 - (3) frequency deviation of carrier;
 - (4) pulse duration and repetition rate.
- For complex emissions, describe in detail in the space provided below.
- (G) Describe how the necessary bandwidth was determined in space provided below.
- 2.7KHz - STANDARD SSB BANDWIDTH
- 25KHz - STANDARD FM BANDWIDTH

Exact proposed area of operation will be within the area anchored by Bakersfield, CA, Las Vegas, NV, San Diego, CA and Tuscon, AZ. The center of the proposed area is Needles, CA.

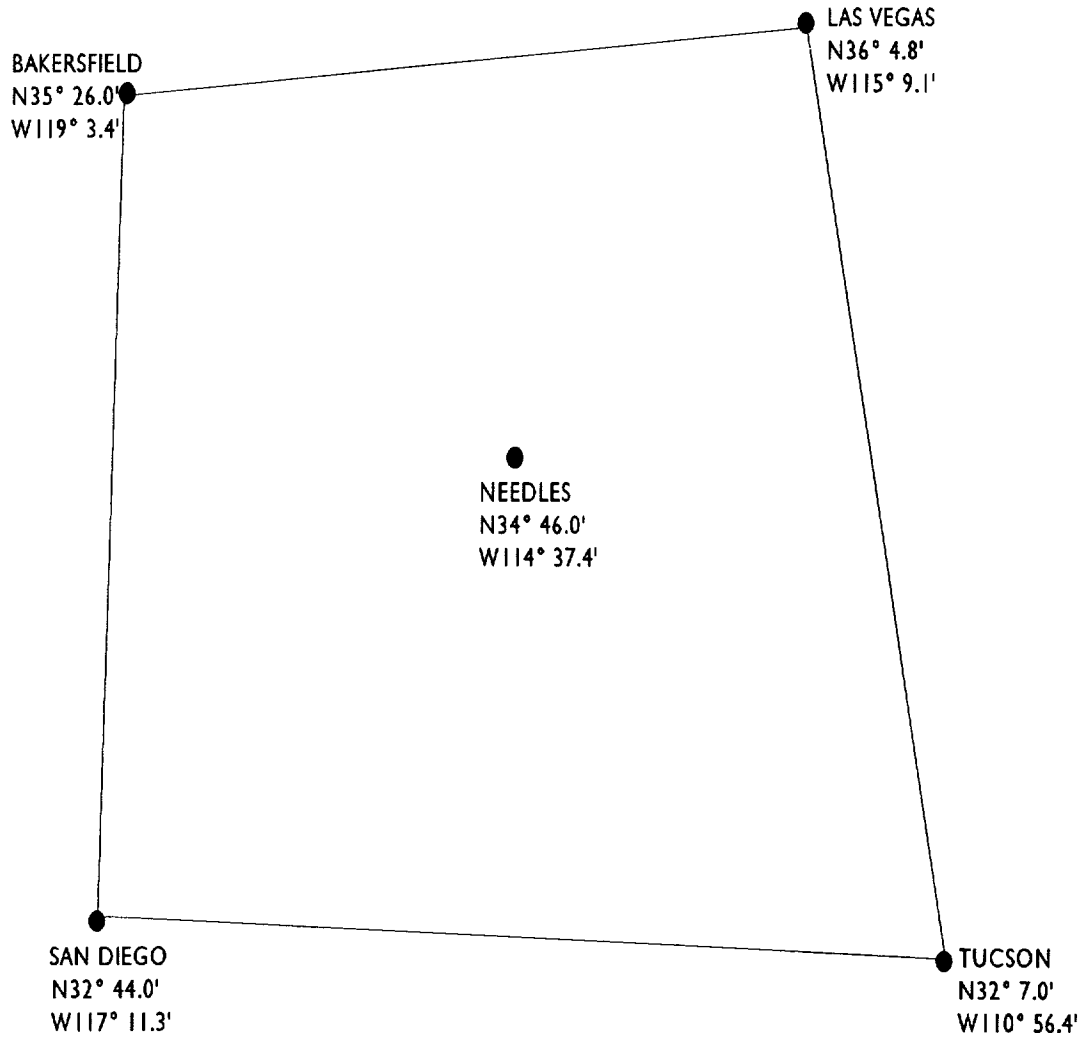
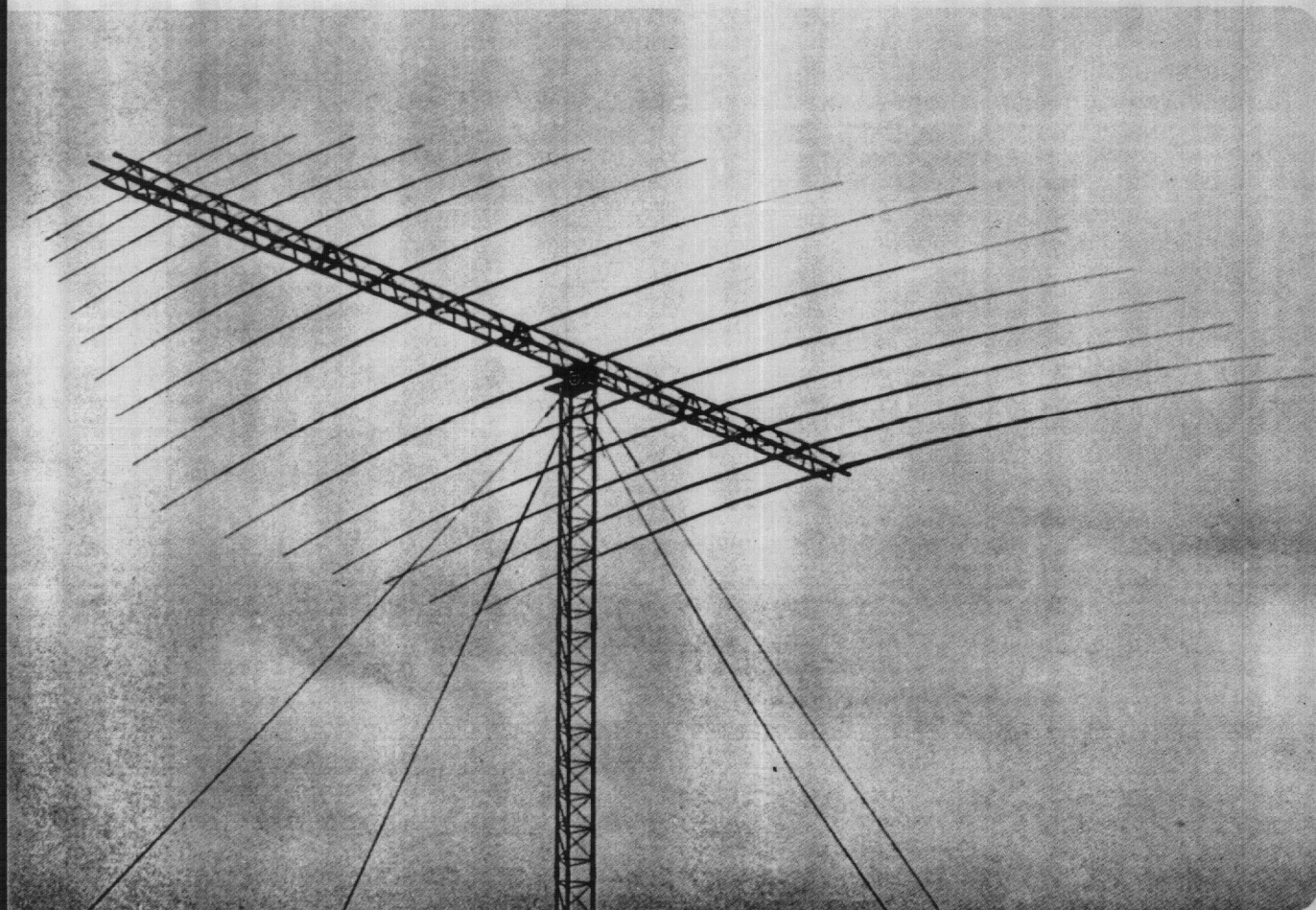


EXHIBIT B



**SABRE COMMUNICATIONS
CORPORATION**

TECHNICAL DATA REPORT



HF ROTATABLE LOG PERIODIC ANTENNA SYSTEM

6-2-30 MHz

MODEL SERIES 504

The Sabre Model 504 Series of antenna systems provides continuous unidirectional coverage of the 6.2-30 MHz frequency band. Each system consists of a Log-Periodic Antenna (Model 600), Rotator with remote control (Model APA-3) and tower with all guys and hardware (ST Series) for a total communications system.

Power handling capabilities from 1 KW AVG/2 KW PEP (Standard) to 4 KW AVG/8 KW PEP are available. The 504 Series has towers varying in height from 20 to 100 feet.

APPLICATION

The Sabre Model Series 504 antenna systems are specifically designed for government and commercial applications such as maritime, embassy, MARS and industrial long haul HF communication circuits. Full band 6.2-30 MHz frequency coverage is designed for economical high quality installations where power requirements do not exceed 4 KW AVG/8 KW PEP. The 504 system has available towers for 20-100 feet in either roof or ground mounted applications.

DESIGN

All Sabre antenna systems are designed with the highest quality materials to provide long life reliability in the severest environments. Antenna heads are constructed of high strength aluminum alloy triangular booms and tapered elements utilizing stainless steel hardware to prevent corrosion. Towers are hot dipped galvanized steel shipped in a knocked down configuration with all required hardware for a complete installation.

Incorporation of the optional AEK erection kits eliminates the requirement for cranes or lifting gin poles by utilizing a simple hinge under/flip over erection procedure shown in the accompanying illustrations.

SPECIFICATIONS

Electrical:

Frequency Coverage	6.2 thru 30 MHz continuous
Polarization	Horizontal
VSWR	2.5 to 1 maximum
Forward Gain	9 db at 6.2 MHz increasing to 13 db at 12 MHz
Front to Back Ratio	12 db average
Power Handling	1 KW average 2 KW PEP (Standard)
Input Impedance	50 Ohms
Input Connector	Type N

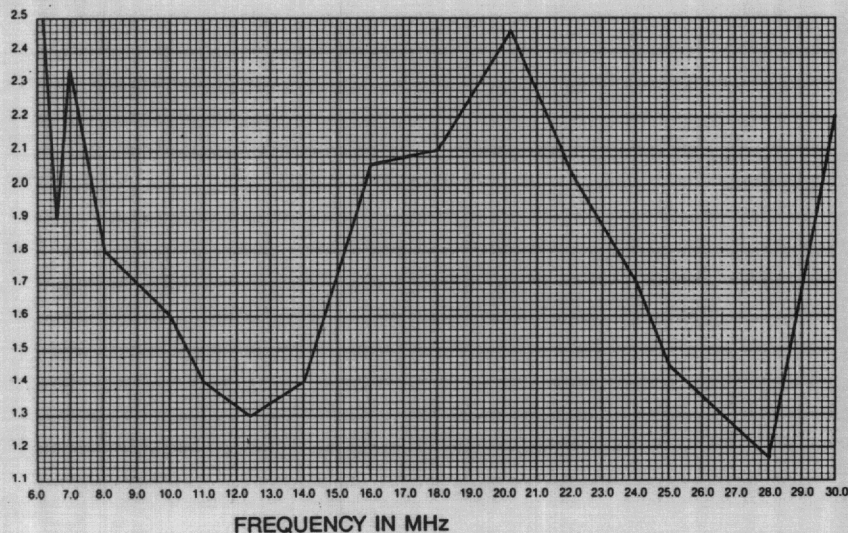
Mechanical:

Boom Length	40 feet
Longest Element	48 feet
Turning Radius	29 feet
Construction	High-strength aluminum elements and boom with stainless steel hardware

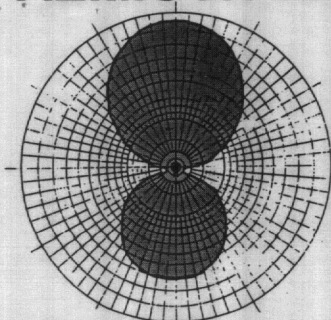
Tower:

Heights available	20, 40, 60, 80, 100 ft.
Mounting	Roof or Ground
Construction	Knock-down, hot dip galvanized steel and hardware. Basic tower is 3000 Series.
System	Wind survival 100 MPH

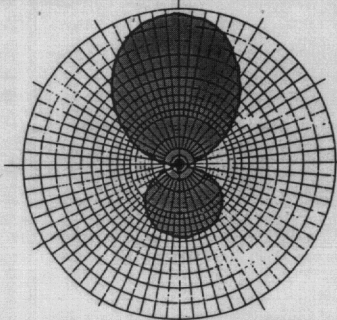
VSWR GRAPH



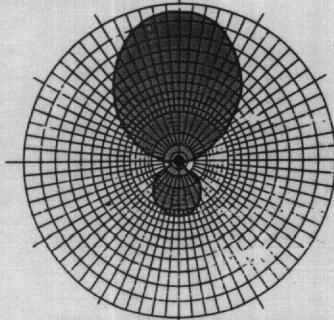
AZIMUTH RADIATION PATTERNS



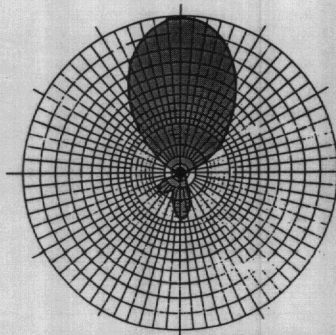
Frequency 6.2 MHz
84° HP Beam Width



Frequency 12.5 MHz
70° HP Beam Width



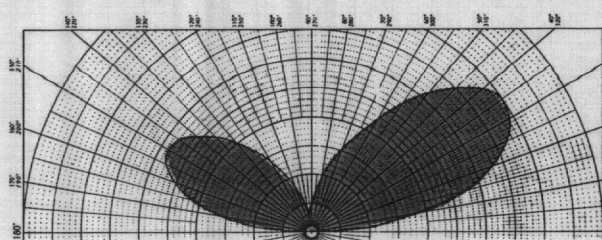
Frequency 22.5 MHz
60° HP Beam Width



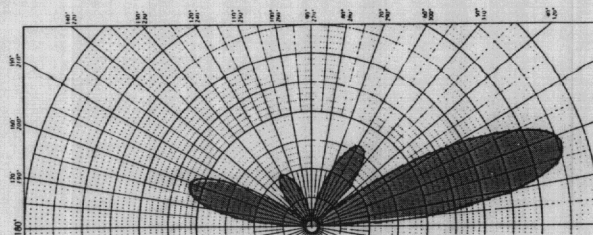
Frequency 30.0 MHz
60° HP Beam Width

VERTICAL PATTERNS

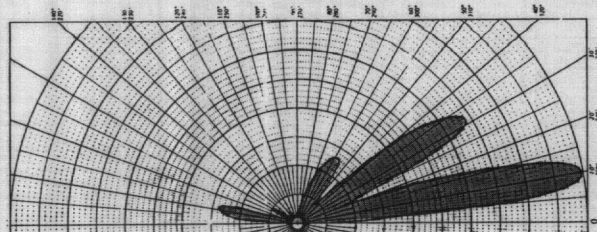
OVER AVERAGE SOIL
ANTENNA 80 FEET ABOVE GROUND



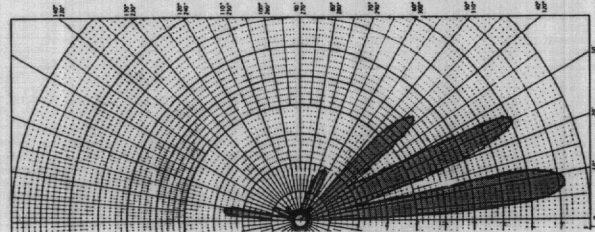
Frequency 6.2 MHz



Frequency 12.5 MHz



Frequency 22.5 MHz



Frequency 30.0 MHz

TAKE-OFF ANGLES AT VARIOUS HEIGHTS ABOVE GROUND AND FREQUENCIES FOR THE MLP-1 LOG-PERIODIC ANTENNA

Height Above Ground	Frequency				
	6.2 MHz	10 MHz	15 MHz	25 MHz	30 MHz
20'	90°	90°	55°	29°	24°
40'	80°	38°	24°	14°	12°
60'	42°	24°	16°	9.5°	8°
100'	25°	20°	12°	5°	3°

SYSTEM COMPONENTS

The Series 504 system consists of the Model 600 (MLP-1) antenna head, Model APA-3 rotator and remote control and tower heights from 20 to 100 feet in both roof and ground mounting configurations. Separate data sheets are available on each of these basic Model 504 Series components. Ground mounted configuration standard.

MODEL	ANTENNA HEAD	ROTATOR	TOWER
504-20	600 (MLP-1)	APA-3	ST-20 (20 ft. K.D.)
504-40	600 (MLP-1)	APA-3	ST-40 (40 ft. K.D.)
504-60	600 (MLP-1)	APA-3	ST-60 (60 ft. K.D.)
504-80	600 (MLP-1)	APA-3	ST-80 (80 ft. K.D.)
504-100	600 (MLP-1)	APA-3	ST-100 (100 ft. K.D.)

AVAILABLE OPTIONS

Model APA-3 Rotator Complete With Remote Control
Control Cable for APA-3 Rotator
Model ST-20 KD, 20 Ft. Tower*
Model ST-40 KD, 40 Ft. Tower*
Model ST-60 KD, 60 Ft. Tower*

Model ST-80 KD, 80 Ft. Tower*
Model ST-100 KD, 100 Ft. Tower*
AEK-1 Erection Kit**
AEK-2 Erection Kit†
HB-1 Hinged Base Assembly

Note: Standard MLP-1 includes 160 ft. of RG 8/u
coaxial cable, 2 KW P.E.P. Balun and type "N"
Connector.

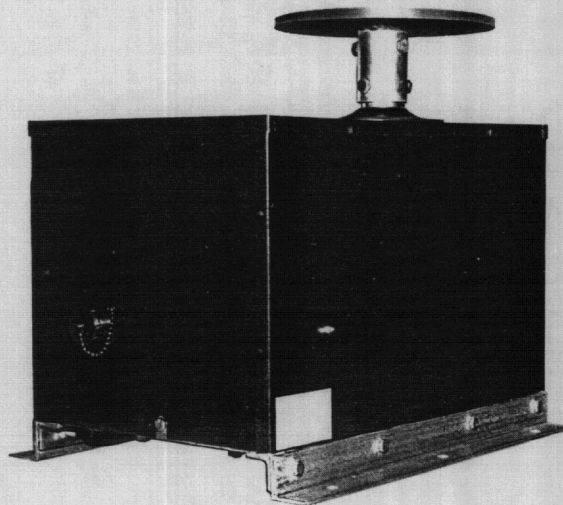
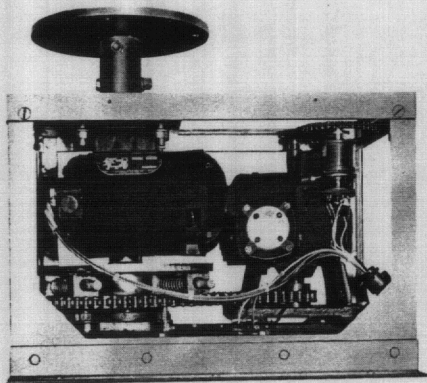
*All Towers Furnished Complete with Guys and Mounting Hardware.

**For use with Towers up to 40 feet.

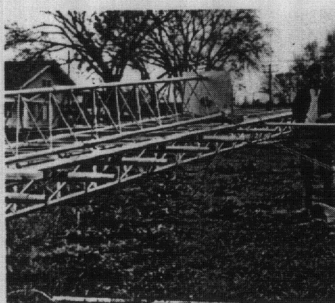
†For use with Towers 60 feet and 80 feet.

Self Support Towers

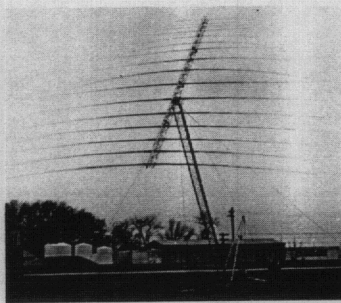
APA-3 ROTATOR



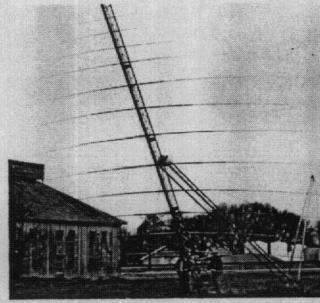
ERECTION



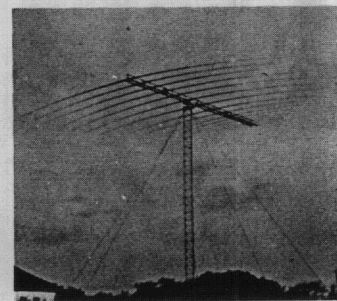
ASSEMBLE ON GROUND



RAISE TO 45°



ROTATE/SECURE ANTENNA



COMPLETE INSTALLATION



SABRE COMMUNICATIONS CORPORATION

3400 HWY. 75 NORTH • P.O. BOX 536 • SIOUX CITY, IOWA 51102

• (712) 258-6690 • FAX (712) 258-8250

EXHIBIT C

6. The directional antenna used by Transworld is a Sabre Communications Model 504 HF Rotatable log periodic. A Technical data sheet is attached.



EXHIBIT D

9. Transworld Communications, along with a number of other manufacturers of HF radio equipment, has been engaged in an ongoing program of on-the-air testing in the support of Federal Standard 1045, MIL-STD-188-110A, and their off-shoots. This project, conducted with the authorization of the National Telecommunications and Information Administration (NTIA) in Boulder, Colorado, requires the use of long range HF radio equipment. The purpose of the project is to develop standards for the design of Adaptive HF radio equipment in the areas of interoperability, networking, connectivity, and encryption.

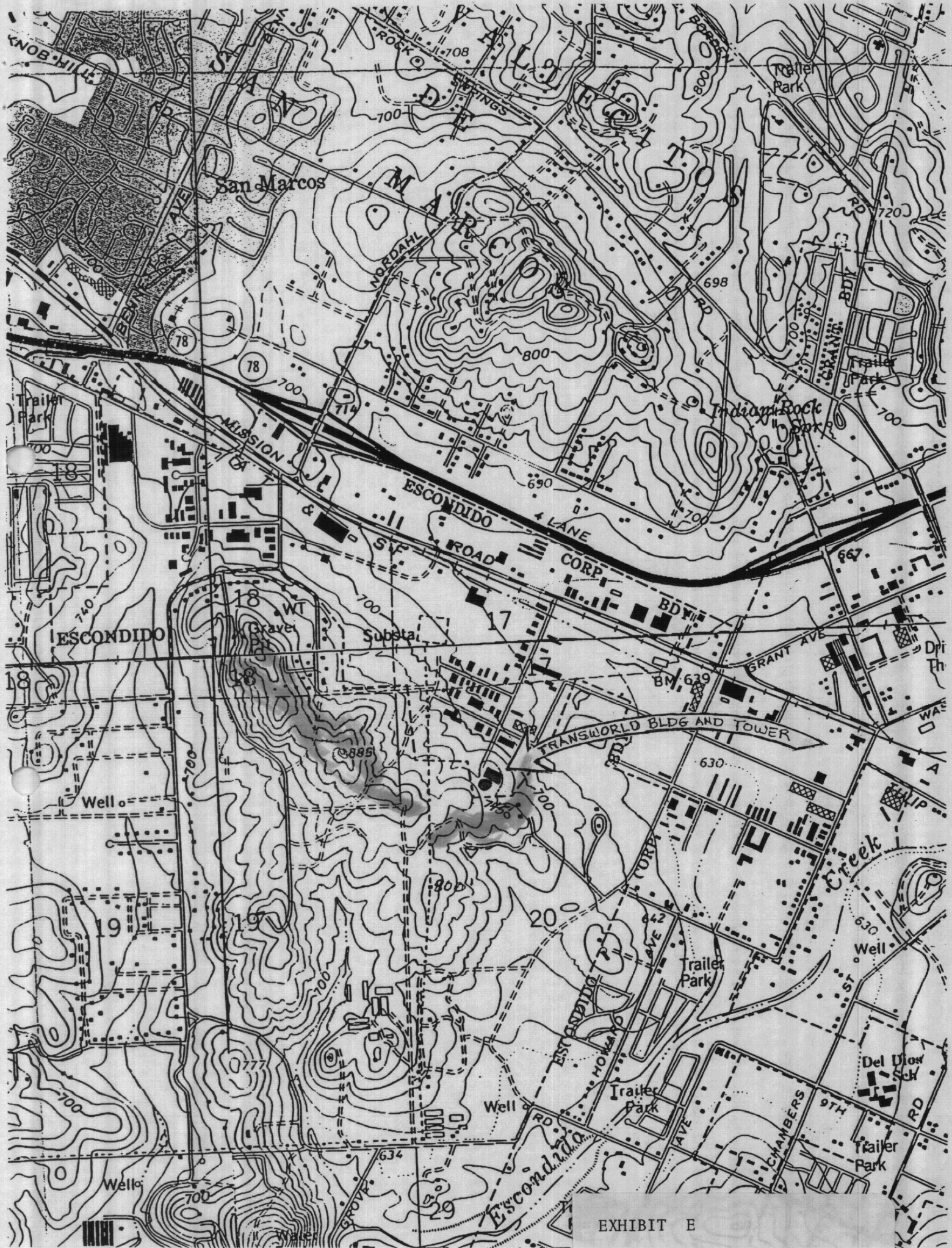


EXHIBIT E

EXHIBIT F

PREVIOUS PERMIT AND LICENSE

1. Trans World Communications held an FCC Experimental Permit and License during the period July 11, 1989 to October 1, 1991.
2. FCC file number is 0972-EX-PL-89.
3. Call sign assigned was KA2XZD.
4. Tower and antenna, the same as described in Paragraph 6, were erected in connection with previous permit and license.
5. Copy of PL and authorized frequencies is attached.