

JULY 18, 1989

CIRCULAR POLARIZED DIRECTIONAL ANTENNA SYSTEM  
FOR RADIO STATIONS KPLU, KLSY, KMPS AND KRPM  
WITH TRANSMITTING AND ANTENNA FACILITIES  
LOCATED AT WEST TIGER MOUNTAIN, WASHINGTON

Electronics Research, Inc. is providing a custom fabricated directional antenna system that is specially designed to meet the F.C.C. requirements and the general needs of radio stations KPLU, KLSY, KMPS and KRPM.

The antenna is the 1082-4CP-DA type configuration. The circular polarized system consists of four 10' vertically spaced bays using 2 individually excited iris cells per bay. The antenna was tested on a full scale model of a section of a self supporting Magnum tower that exists at the West Tiger Mountain site. This is the structure planned to support the array. This model contained all ladders, transmission lines and other devices that will be in the aperture of the proposed antenna system. All tests were performed on frequencies of 88.5 MHz, 92.5 MHz, 94.1 Mhz and 106.1 MHz which are the centers of the FM broadcast channels assigned to the above stations. In anticipation of possible expanded use of the antenna additional pattern measurements were made on other FM channels which are allotted to the general Seattle-Tacoma area.

Pattern measurements were made on a fifty-acre antenna pattern range which is owned and operated by Electronics Research, Inc. The tests were performed under the direction of Thomas B. Silliman, President of Electronics Research, Inc. Mr. Silliman has both the Bachelor of Electrical Engineering and the Master of Electrical Engineering degrees from Cornell University, and is also a registered professional engineer in the states of Indiana, Maryland and Minnesota.

DESCRIPTION OF THE TEST PROCEDURE

The test antenna consisted of the complete four bay circular polarized system. The elements and brackets that were used in this test are the ones that will be installed at the West Tiger Mountain site.

The tower was erected vertically on a turntable mounted on a non-metallic building with the antenna centered vertically on the structure, making the center of radiation of the test approximately 30 feet above ground. The turntable is equipped with a motor drive and azimuth indicating mechanism, resolution of this azimuth measuring system is one-tenth of a degree.

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(Continued)

The antenna under test was operated in the transmitting mode and fed from a Wavetek Model 3000 signal generator. The frequency of the signal source was set at each of the carrier frequencies of the involved stations.

A broad-band horizontal and vertical dipole system, located approximately 628 feet from the test antenna, and mounted at the same height above terrain as the center of the antenna under test, was used to receive the emitted test signals. The signals received by the dipole system were fed to the test building by way of two buried Heliac cables to an Anritsu Model ML521B measuring receiver. This data was interfaced to a Hewlett-Packard Model 9872C plotter by means of a Hewlett-Packard Model 86 computer system. Relative field strength was plotted as a function of azimuth.

The measurements were performed by rotating the test antenna in a counter-clockwise direction and plotting the received signal on polar co-ordinated graph paper in a clockwise direction. Both horizontal and vertical components were recorded separately. The patterns furnished herewith are the averages of multiple separate measurements performed on each of the frequencies indicated.

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FIGURE # 1  
1082-4CP-0A ANTENNA  
TAPERED TOWER

# HORIZONTAL PLANE RELATIVE FIELD PATTERN

JULY 17, 1988  
STATION KPLU  
TACOMA WA  
88.5 MHz

ELECTRONICS RESEARCH, INC.  
108 MARKET STREET  
NEWBURGH, IN 47680

TRUE NORTH

1.00

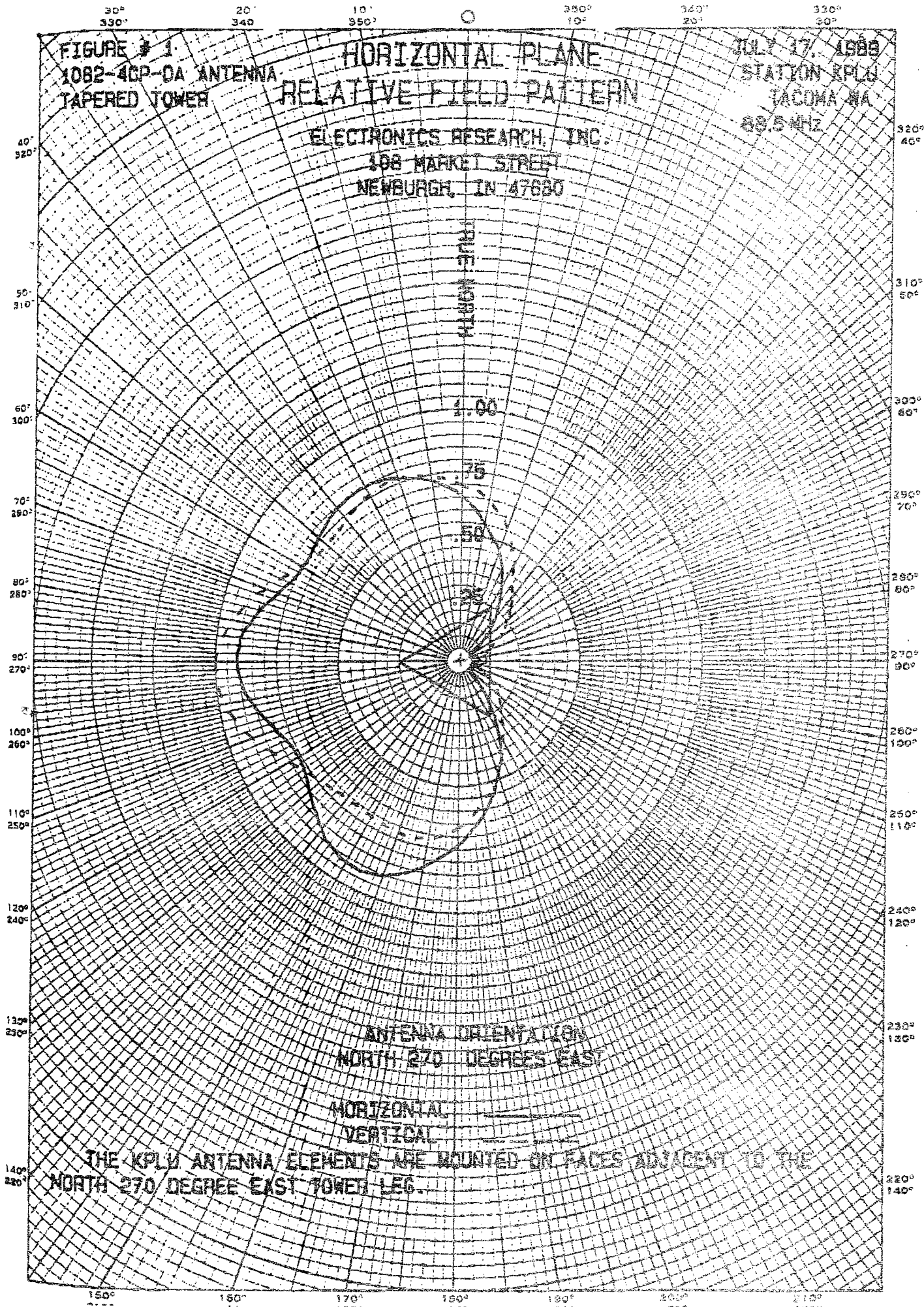
.75

.50

ANTENNA ORIENTATION  
NORTH 270 DEGREES EAST

HORIZONTAL  
VERTICAL


THE KPLU ANTENNA ELEMENTS ARE MOUNTED ON FACES ADJACENT TO THE  
NORTH 270 DEGREE EAST TOWER LEG.



ELI ELECTRONICS RESEARCH, INC.  
1108 MARKET STREET  
NEWBURGH, IN. 47630

# FEEL

6061 ALU



# VERTICAL PLANE RELATIVE HUMIDITY

TYPE 1082-40-DR FOUR (4) LEVEL ANTENNA  
120 INCH SPACING LEVEL-TO-LEVEL  
-1.85 DEGREE BEAM FULT  
0 PERCENT NULL FILL

