

File No.

Call letters KWFT.....

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

APPLICATION FOR REGULAR BROADCAST STATION LICENSE

(Submit in duplicate to Federal Communications Commission, Washington, D. C. Swear to one copy)

To the Federal Communications Commission:

1. Name of applicant* WICHITA BROADCASTING COMPANY.....

2. Post-office address: State TEXAS..... City WICHITA FALLS.....

Street and number 800 EIGHTH STREET.....

3. Construction permit under which construction has been made:

File No. B3-P-2461..... Date JULY 5,....., 1940.....

4. Construction of station was commenced AUGUST 1, 1940..... and
was completed OCTOBER 29, 1940....., and is now in satisfactory operating
condition and ready for regular operation.

5. Description of transmitting apparatus which has been constructed pursuant to said construction permit:

(a) Make RCA MFG. COMPANY..... Type No. 5-DX..... Serial No. BC-1780.....

(b) Oscillator: Type of circuit PIEZO ELECTRIC..... Number, manufacturer's name, and
type of tubes ONE RCA 802.....

Actual plate current per tube 22 MA...... Plate voltage 350 VOLTS.....

(c) Last radio stage: Number, manufacturer's name, and type of tubes.....

ONE RCA 892-R.....

Actual night operation: Plate current per tube 0.365 AMP. Plate voltage 3700 VOLTS If greater
day power than night power is authorized, specify the following: Actual day operation: Plate
current per tube 0.810 AMP. Plate voltage 8300 VOLTS Describe fully the method and
procedure of reducing power at sunset REDUCE PLATE VOLTAGE TO MODULATED

AMPLIFIER AND ADJUST LOADING FOR PROPER EFFICIENCY.....

* Name must be identical with that used in construction permit.

(d) Modulator or last audio stage: Number, manufacturer's name, and type of tubes

Two RCA 891-R

Actual plate current per tube 0.05-0.50 AMP. Plate voltage 8300 VOLTS

(e) What maximum percentage of modulation was obtained on equipment tests under authorized operating conditions? 100%

(f) State name and type number of modulation monitor

RCA MODULATION MONITOR TYPE 66-A

(g) Give Federal Communications Commission approval number 1552

(h) Specify manufacturer's name, type number, and full scale reading of the following meters:

(1) In last radio stage:

Plate voltmeter WESTON TYPE 741 0-12 KV Serial No. 1156

Plate ammeter WESTON TYPE 741 0-1.5 AMP. Serial No. 1141

(2) Antenna ammeter SEE ATTACHED LIST Serial No.

(i) Antenna current for authorized operation:

Night SEE ATTACHED peres.

**SEE ATTACHED LIST OF
METERS AND READINGS**

Day SEE ATTACHED amperes.

(j) Maximum operating carrier power output of transmitter for satisfactory operation is 5000 watts.

(k) Maximum rated carrier power of transmitter as determined by orders of the Commission is 5000 watts.

(l) Description of frequency monitor.

(1) Manufacturer's name GENERAL RADIO Co. Type No. 475B/681A

(2) Serial No. 244/258 F. C. C. Approval No. 1452

(3) Date of original installation JULY 10, 1939

(4) Date of last reinstatement into service IN CONTINUOUS SERVICE

(5) Give the following data on the calibration of the monitor during the testing of the above equipment:

Date	. Time	Name of external checking agency	Frequency measured by external agency	Monitor reading, high or low
10/24/40	4:30 AM C.S.T.	COMMERCIAL RADIO EQUIPMENT COMPANY KANSAS CITY, MO.	620,000	ZERO

(m) By what method and how often will regular checks of the calibration of the frequency monitor be repeated INDEPENDENT FREQUENCY CHECK BY COMMERCIAL FREQUENCY CHECKING SERVICE - AT LEAST ONCE MONTHLY.

(n) Were all operating values specified above obtained and maintained on equipment tests? YES

If not, give full details EXCEPT DURING CALIBRATION AND ADJUSTMENT OF EQUIPMENT.

6. If application is for license for special broadcast station (on frequencies of 1530, 1550, or 1570 kc),

- (a) Attach complete final calculations on operating power, giving antenna input power, antenna resistance measurements, plate input power, efficiency, and other pertinent test data on the determination of the power.
- (b) Attach data and graphs taken on the modulating characteristics and capability of transmitter with complete description of method and apparatus employed. These data are required on each transmitter after installation and with operating constants as given in section 5 (b), (c), and (d).
- (c) Attach data and graphs taken on overall frequency transmitting characteristics of entire station with complete description of method and apparatus employed. These data are required on each transmitter after installation and with operating constants as given in section 5 (b), (c), and (d).
- (d) Attach sketch and dimensions of antenna system.
- (e) Attach any other pertinent test data on the operation of the station showing its condition of operation, such as radio frequency harmonics, effective field intensity, etc.

7. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit? NO CHANGES

8. Location of transmitter: State TEXAS County WICHITA COUNTY
City or town WICHITA FALLS Street and number APPROXIMATELY 2.5 MI. WNW AT RESETTLEMENT ROAD
N. Latitude: Degrees 33 Minutes 55 Seconds 07.42
W. Longitude: Degrees 98 Minutes 32 Seconds 37.21

9. Location of studio: State TEXAS County WICHITA
City or town WICHITA FALLS Street and number 800 EIGHTH STREET

10. The frequency, power, hours of operation, and call letters authorized, are as follows:

(a) Frequency 620,000 kilocycles.

(b) Power: (1) Night 1000 WATTS DA

(2) Day 5000 WATTS DA

(c) Hours of operation UNLIMITED

(d) Call letters KWFT

11. Applicant represents that all the terms, conditions, and obligations set forth in the above-described construction permit have been fully met, except as follows: NO EXCEPTIONS

12. Applicant reaffirms the truth, as of the date of this application, of all statements made in the application for construction permit pursuant to which said construction permit was granted.
13. Applicant waives any claim to the use of any particular frequency or of the ether as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise. and requests a station license in accordance with this application.

Dated this 29TH day of OCTOBER, 19 40

WICHITA BROADCASTING COMPANY
(Must correspond with item 1) *Applicant.*

By

(BE SURE ALL NECESSARY INFORMATION IS FURNISHED)

Official.

STATE OF TEXAS }
COUNTY OF DALLAS } ss:

JOE B. CARRIGAN, being first duly sworn upon his oath, affirmed according to law, deposes and says that he is the PRESIDENT OF THE WICHITA BROADCASTING COMPANY
(If applicant is not an individual, state relation of affiant to applicant)
above-named applicant, and that the facts stated in the foregoing application and all exhibits attached thereto are true of his own knowledge, except as to such statements as are therein stated on information and belief, and as to such statements he believes them to be true.

Subscribed and sworn to before me this 29TH day of OCTOBER, 19 40

[SEAL]

(Notary Public's seal must be affixed where law of jurisdiction requires, otherwise state that law does not require seal.)

Notary Public.

My commission expires _____

† Must be subscribed and verified by party applicant, by one of the parties if more than one, by an officer if applicant is a corporation, or by attorney of applicant only under the provisions of rule 105.34 which must be fully explained.

SUPPLEMENT TO F.C.C. 302 FORM

QUESTIONS 5(H) AND 5(1)

CURRENTS FOR AUTHORIZED OPERATION:

<u>LOCATION</u>	<u>DESCRIPTION</u>	<u>MAKE</u>	<u>MODEL</u>	<u>RANGE</u>	<u>SERIAL</u>	<u>READINGS</u>	
						<u>1000 WATTS</u>	<u>5000 WATTS</u>
PLANT BLDG.	PLATE CURRENT	WESTON	741	0-1.5 AMP.	1141	0.365	0.810
PLANT BLDG.	PLATE VOLTS	WESTON	741	0-12 KV	1156	3700	8300
NORTH TOWER	NORTH TOWER CURRENT	WESTON	743 ES	0-8 AMP.	433	2.60 255	5.80 5.60
SOUTH TOWER	SOUTH TOWER CURRENT	WESTON	269	0-15 AMP.	34448	-	10.35 11.3
SOUTH TOWER	SOUTH TOWER CURRENT	WESTON	425	0-8 AMP.	206887	4.58 4.6	-
PLANT BLDG.	NORTH LOOP CURRENT	WESTON	743 ES	0-8 AMP.	318	3.02	6.60
PLANT BLDG.	SOUTH LOOP CURRENT	WESTON	743 ES	0-15 AMP.	409	4.80	10.50
PLANT BLDG.	COMMON POINT CURRENT	WESTON	743 ES	0-6 AMP.	434	1.92	4.30
PLANT BLDG.	PHASE MONITOR	R.C.A.	300-A	0-360°	542	42°	42°

*NORTH TOWER LEADS SOUTH TOWER 38° - MONITOR INDICATION 42°

STATEMENT OF A. EARL CULLUM, JR. IN CONNECTION WITH THE APPLICATION OF RADIO STATION KWFT, WICHITA FALLS, TEXAS, FOR REGULAR BROADCAST STATION LICENSE FOR OPERATION ON 620 KILOCYCLES, 5000 WATTS DAYTIME, 1000 WATTS NIGHTTIME, USING A DIRECTIONAL ANTENNA BOTH DAY AND NIGHT.

I, A. EARL CULLUM, JR., AM A CONSULTING RADIO ENGINEER WITH OFFICES LOCATED IN DALLAS, TEXAS. I HAVE BEEN EMPLOYED BY THE WICHITA BROADCASTING COMPANY, LICENSEE OF RADIO STATION KWFT, TO ADJUST AND MAKE MEASUREMENTS ON THE DIRECTIONAL ANTENNA INSTALLED BY KWFT, AND TO MAKE A STUDY OF THE PERFORMANCE THEREOF.

THE CONSTRUCTION OF THE KWFT DIRECTIONAL ANTENNA WAS COMPLETED UNDER THE DIRECTION OF MR. JOE B. CARRIGAN, PRESIDENT OF THE WICHITA BROADCASTING COMPANY. A COMPLETE DESCRIPTION OF THE ANTENNA SYSTEM IS AS FOLLOWS:

- A. TWO ELEMENTS ARE USED.
- B. EACH ELEMENT IS A SERIES FED, SELF-SUPPORTING, SQUARE, TAPERED, STEEL TOWER MANUFACTURED BY THE LEHIGH STRUCTURAL STEEL COMPANY.
- C. NONE OF THE ELEMENTS IS TOP-LOADED.
- D. HEIGHT OF EACH ELEMENT IS 400 FEET ABOVE THE BASE INSULATORS.
- E. HEIGHT OF EACH ELEMENT IS 405 FEET ABOVE THE GROUND LEVEL.
- F. HEIGHT OF EACH ELEMENT IS 1405 FEET ABOVE THE MEAN SEA LEVEL.
- G. THE ELEMENTS ARE SPACED 1398 FEET OR APPROXIMATELY 317 ELECTRICAL DEGREES ON A LINE NORTH 155.5 DEGREES EAST. THE PHASE RATIOS AND THE CURRENT RATIOS ARE AS FOLLOWS:

	<u>CURRENT RATIO</u>	<u>PHASE RATIO</u>
NORTH	0.63	Plus 38°
SOUTH	1.00	00°

- H. ABOUT EACH ELEMENT A RADIAL GROUND SYSTEM HAS BEEN INSTALLED CONSISTING OF 120 RADIALS, EACH RADIAL 400 FEET LONG, AND 120 RADIALS, EACH 60 FEET LONG, EQUALLY SPACED ABOUT EACH TOWER. THE GROUND RADIALS ARE BURIED 6 TO 8 INCHES.
- I. THE RESISTANCE AT THE COMMON POINT OF INPUT IS 292 OHMS. NINETY-TWO AND FIVE TENTHS PER CENT OF 292 OHMS IS 270 OHMS. THE CURRENT AT THE COMMON POINT OF INPUT IS 1.92 AMPERES FOR 1000 WATTS AND 4.30 AMPERES FOR 5000 WATTS. ATTACHED WILL BE FOUND A TABULATION OF ALL METER READINGS.
- J. A SCHEMATIC SKETCH OF THE DIRECTIONAL ANTENNA SYSTEM IS ATTACHED HERETO.
- K. METHOD OF FEEDING THE ELEMENTS IS COMPLETELY DISCLOSED IN THE SCHEMATIC SKETCH OF SECTION J.
- L. THE ELEMENTS HAVE BEEN PAINTED AND LIGHTED IN EXACT ACCORD WITH THE SPECIFICATIONS ATTACHED TO THE CONSTRUCTION PERMIT. THESE SPECIFICATIONS ARE AS FOLLOWS:
- "EACH TOWER SHALL BE PAINTED THROUGHOUT ITS HEIGHT WITH ALTERNATE BANDS OF INTERNATIONAL ORANGE (ORANGE YELLOW No. 5 OF COLOR CARD SUPPLEMENT TO THE UNITED STATES ARMY QUARTERMASTER CORPS SPECIFICATIONS No. 3-1) AND WHITE, TERMINATING WITH INTERNATIONAL ORANGE BANDS AT BOTH TOP AND BOTTOM. THE WIDTH OF THE INTERNATIONAL ORANGE BANDS SHALL BE FROM 30 TO 40 FEET. THE WHITE BANDS SHALL BE ONE-HALF THE WIDTH OF THE INTERNATIONAL ORANGE BANDS.

L. CONTD.

"FOR NIGHT MARKING THERE SHALL BE INSTALLED AT THE TOP OF EACH TOWER A FLASHING RED HAZARD BEACON SIMILAR TO A 300 M/M ELECTRIC CODE BEACON OF THE DOUBLE FRESNEL LENS TYPE, EQUIPPED WITH TWO 500-WATT GENERAL LIGHTING SERVICE LAMPS, TYPE PS-40, CLEAR, MOGUL PREFOCUS BASE (BOTH LAMPS TO BURN SIMULTANEOUSLY), AND AVIATION RED COLOR SHADES. THE 300 M/M CODE BEACON TO BE EQUIPPED WITH A FLASHING MECHANISM PRODUCING 40 FLASHES PER MINUTE, HAVING A LUMINOUS PERIOD OF ONE SECOND AND A PERIOD OF DARKNESS OF ONE-HALF SECOND.

"AT BOTH THE ONE-THIRD AND TWO-THIRDS LEVELS OF EACH TOWER THERE SHALL BE INSTALLED 100-WATT LAMPS ARRANGED SO THAT ONE LAMP AT EACH LEVEL SHALL BE VISIBLE FROM ANY ANGLE OF APPROACH.

"ALL 100-WATT LAMPS TO BE TYPE A-21 CLEAR BULB TRAFFIC SIGNAL LAMPS (2000 HOURS).

"ALL LAMPS SHALL BE ENCLOSED IN AVIATION RED PRISMATIC OBSTRUCTION LIGHT GLOBES AND ALL LIGHTING SHALL BE EXHIBITED FROM DUSK TO DAWN."

M. SAMPLING LOOPS AND A RCA TYPE 300A PHASE MONITOR HAVE BEEN INSTALLED TO INDICATE THE RELATIVE FIELDS BEING RADIATED FROM EACH TOWER AND THE PHASE BETWEEN THESE FIELDS. BEFORE ADJUSTING THE DIRECTIONAL ANTENNA, EACH ELEMENT WAS OPERATED NON-DIRECTIONAL WITH THE OTHER ELEMENTS FLOATING. AFTER THE CURRENT AND PHASE RATIOS HAD BEEN PROPERLY ADJUSTED, THE INDICATIONS FROM THE MONITORING EQUIPMENT WERE AS FOLLOWS:

	<u>LOOP METER</u> <u>1000 WATTS</u>	<u>LOOP METER</u> <u>5000 WATTS</u>	<u>ACTUAL</u> <u>PHASE</u>	<u>INDICATED</u> <u>PHASE</u>
NORTH	3.02	6.60	PLUS 38°	PLUS 42°
SOUTH	4.80	10.50	00°	00°

RESULTS OF MEASUREMENTS

WITH THE ABOVE OPERATING CONDITIONS, FIELD INTENSITY MEASUREMENTS HAVE BEEN MADE ON THE KWFT DIRECTIONAL ANTENNA SYSTEM ALONG 12 RADIALS. A STUDY OF FIELD INTENSITY MEASUREMENTS SHOWS THE FOLLOWING UNATTENUATED FIELD TO BE

OBTAINED WHEN OPERATING AS SPECIFIED ABOVE:

<u>DIRECTION</u>	UNATTENUATED FIELD		<u>PROTECTING</u>
	1000 WATTS <u>DIRECTIONAL</u>	5000 WATTS <u>DIRECTIONAL</u>	
N 10.5 E	270	604	MILWAUKEE, WIS.
N 39.0 E	82	183	
N 72.4 E	290	649	
N 109.0 E	86	192	
N 130.0 E	165	369	TAMPA, FLORIDA
N 155.5 E	215	481	
N 181.0 E	155	347	
N 202.0 E	84	188	
N 238.6 E	300	671	PHOENIX, ARIZONA
N 272.0 E	80	179	
N 300.5 E	280	626	
N 335.5 E	295	660	

THE UNATTENUATED FIELDS FOR EACH DIRECTION HAVE BEEN PLOTTED ON POLAR GRAPH PAPER TO DETERMINE THE UNATTENUATED GROUND-WAVE PATTERNS. A STUDY OF THE GROUND-WAVE PATTERNS SHOWS THAT THE R.M.S. UNATTENUATED FIELD IS 214 MILLIVOLTS PER METER FOR THE 1000-WATT DIRECTIONAL OPERATION AND 478 MILLIVOLTS PER METER FOR THE 5000-WATT DIRECTIONAL OPERATION.

THE ATTENUATED 25 MILLIVOLT PER METER CONTOURS FOR BOTH 1000-WATT AND 5000-WATT OPERATIONS HAVE BEEN PLOTTED ON MAPS TO SHOW THE AREA COVERED IN THE VICINITY OF WICHITA FALLS, TEXAS BY THESE CONTOURS.

TO AID IN THE ANALYSIS OF THE MEASUREMENTS OF FIELD INTENSITY FROM THE DIRECTIONAL OPERATION, MEASUREMENTS WERE ALSO CARRIED OUT IN THE NULL DIRECTIONS OPERATING NON-DIRECTIVE WITH 1000 WATTS IN THE SOUTH ELEMENT. THE BASE RESISTANCE OF THE SOUTH ELEMENT WAS MEASURED IN ACCORDANCE WITH THE PROCEDURE SPECIFIED IN THE FEDERAL COMMUNICATIONS COMMISSION STANDARDS OF GOOD ENGINEERING PRACTICE, AND DETERMINED TO BE 36.1 OHMS.

DURING THESE NON-DIRECTIONAL MEASUREMENTS, THE CURRENT AT THE BASE OF THE SOUTH ELEMENT WAS MAINTAINED AT 5.26 AMPERES. THE NORTH ELEMENT WAS FLOATED ABOVE GROUND WHILE TAKING NON-DIRECTIONAL MEASUREMENTS. AN ANALYSIS OF THE ABOVE MEASUREMENTS INDICATES THE FOLLOWING:

<u>DIRECTION</u>	<u>UNATTENUATED FIELD 1000 WATTS NON-DIRECTIONAL</u>
N 39.0 E	195
N 109.0 E	195
N 202.0 E	195
N 272.0 E	195

THE FOLLOWING EXHIBITS WILL BE FOUND ATTACHED:

EXHIBIT 1 IS THE BASE IMPEDANCE AT THE SOUTH TOWER WHEN OPERATING NON-DIRECTIONAL WITH THE NORTH TOWER FLOATING.

EXHIBIT 2 IS A SCHEMATIC DIAGRAM OF THE KWFT DIRECTIONAL ANTENNA PHASING AND COUPLING EQUIPMENT.

EXHIBIT 3A IS A POLAR DIAGRAM OF THE UNATTENUATED FIELD IN THE HORIZONTAL PLANE ABOUT THE KWFT DIRECTIONAL ANTENNA FOR 1000-WATT OPERATION.

EXHIBIT 3B IS A POLAR DIAGRAM OF THE UNATTENUATED FIELD IN THE HORIZONTAL PLANE ABOUT THE KWFT DIRECTIONAL ANTENNA FOR 5000-WATT OPERATION.

ALL OF THE ADJUSTMENTS WERE CARRIED OUT BY ME. ALL OF THE FIELD INTENSITY MEASUREMENTS WERE MADE BY MR. C. M. DANIELL, ASSOCIATE ENGINEER. I AM FAMILIAR WITH THE OPERATION AND HAVE EXAMINED ALL OF THE EXHIBITS. IT IS MY BELIEF THAT

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THE DIRECTIONAL ANTENNA AS INSTALLED COMPLIES WITH ALL OF THE
TERMS AND CONDITIONS OF THE KWFT CONSTRUCTION PERMIT,
FILE #B3-P-2461.

A. EARL CULLUM, JR.

OCTOBER 29, 1940

BATONS
BERKSHIRE BOND
U.S.A.

STATE OF TEXAS)
) ss.
COUNTY OF DALLAS)

A. EARL CULLUM, JR., BEING DULY SWORN, UPON HIS OATH
DEPOSES AND SAYS THAT THE FACTS STATED IN THE FOREGOING,
TOGETHER WITH ALL EXHIBITS ATTACHED THERETO, ARE TRUE
OF HIS OWN KNOWLEDGE, EXCEPT AS TO SUCH STATEMENTS AS
THEREIN STATED TO BE ON INFORMATION AND BELIEF, AND AS TO
SUCH STATEMENTS HE BELIEVES THEM TO BE TRUE.

A. EARL CULLUM, JR.

SWORN TO AND SUBSCRIBED BEFORE ME THIS 29TH DAY OF OCTOBER,
1940.

NOTARY PUBLIC IN AND FOR
DALLAS COUNTY, TEXAS

MY COMMISSION EXPIRES JUNE 1, 1941.

RADIO STATION KWFT DIRECTIONAL ANTENNA SPECIFICATIONS

CONSTRUCTION PERMIT B3-P-2461 ISSUED TO THE WICHITA BROADCASTING COMPANY, WICHITA FALLS, TEXAS, INCLUDED THE FOLLOWING DIRECTIONAL ANTENNA SPECIFICATIONS:

"No. & TYPE OF ELEMENTS: 2, SELF-SUPPORTING, INSULATED.
HEIGHT: 400' (910) ABOVE INSULATORS, 405' OVERALL.
SPACING: 1398' (317⁰) BETWEEN TOWERS.
ORIENTATION: LINE OF TOWERS BEARING 155.5⁰ TRUE.
PHASING: NORTH TOWER 38⁰, SOUTH TOWER 0⁰.
CURRENT RATIO: NORTH TOWER 0.51, SOUTH TOWER 1.0.

THE INVERSE DISTANCE NIGHTTIME FIELD INTENSITY AT A DISTANCE OF ONE MILE FROM THE ANTENNA IN THE DIRECTIONS OF THE CITIES SPECIFIED SHALL NOT EXCEED THE FOLLOWING VALUES:

KWFT No. 1, DIRECTION OF PHOENIX, ARIZ. 88 mv/m
KWFT No. 2, DIRECTION OF MILWAUKEE, WISC. 88 mv/m
KWFT No. 3, DIRECTION OF TAMPA, FLA. 88 mv/m

A MONITORING POINT IN EACH OF THE ABOVE DIRECTIONS IN WHICH A FIELD INTENSITY IS SPECIFIED SHALL BE DESIGNATED WITH COMPLETE DETAIL INCLUDING A DESCRIPTION OF THE POINT, DIRECTIONS FOR PROCEEDING THERETO AND THE FIELD INTENSITY MEASURED AT THE POINT AFTER FINAL ADJUSTMENT OF THE ANTENNA SYSTEM, AND WHEN OPERATING IN EXACT ACCORDANCE WITH THE TERMS OF THIS AUTHORIZATION AND THE RULES AND REGULATIONS AND STANDARDS OF GOOD ENGINEERING PRACTICE GOVERNING STANDARD BROADCAST STATIONS. THE POINTS SHALL BE IN THE CLEAR SO AS TO PERMIT THE TAKING OF UNOBSTRUCTED FIELD INTENSITY MEASUREMENTS AND SHALL BE LOCATED NOT LESS THAN ONE MILE NOR MORE THAN FOUR MILES FROM THE ANTENNA IN THE DIRECTION SPECIFIED.

NO OPERATION SHALL OCCUR DURING THE REGULAR BROADCAST DAY UNTIL DATA HAS BEEN SUBMITTED SHOWING THAT OPERATION IS IN ACCORDANCE WITH THE ABOVE SPECIFICATIONS AND THAT THE FIELD INTENSITY IS IN SUBSTANTIAL AGREEMENT WITH THE THEORETICAL PATTERN SPECIFIED IN THE APPLICATION."

(E)

NON-DIRECTIVE ANTENNA BASE IMPEDANCE
 RADIO STATION KWFT, WICHITA FALLS, TEXAS
 A. EARL CULLUM, JR. CONSULTING ENGINEER
 SEPTEMBER 29, 1940

FREQUENCY KILOCYCLES	CAPACITANCE ONLY R_0	C_0	ANT. & CAP. SER. R_1	C_1	ANTENNA R	IMPEDANCE X
570	0.0	504	24.3	500	24.3	-05
580	0.0	504	26.3	505	26.3	+01
590	0.0	504	28.3	509	28.3	+05
600	0.0	504	30.7	513	30.7	+09
610	0.0	504	33.2	518	33.2	+14
620	0.0	504	36.1	522	36.1	+18
630	0.0	504	39.3	528	39.3	+23
640	0.0	504	42.8	532	42.8	+26
650	0.0	504	46.8	538	46.8	+31
660	0.0	504	51.2	545	51.2	+37
670	0.0	504	55.9	551	55.9	+41

MEASUREMENTS BY USE OF SERIES STANDARDS

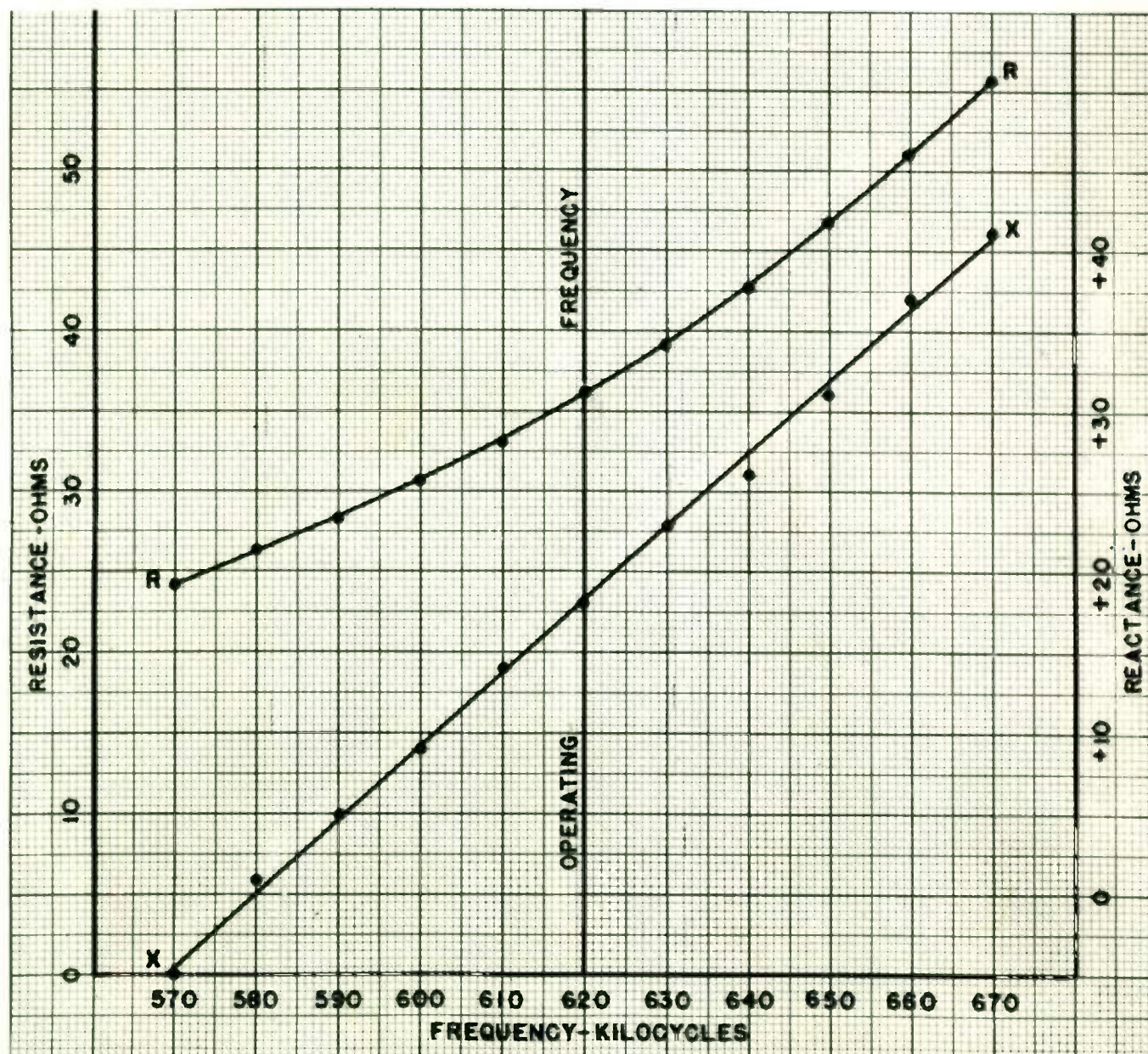
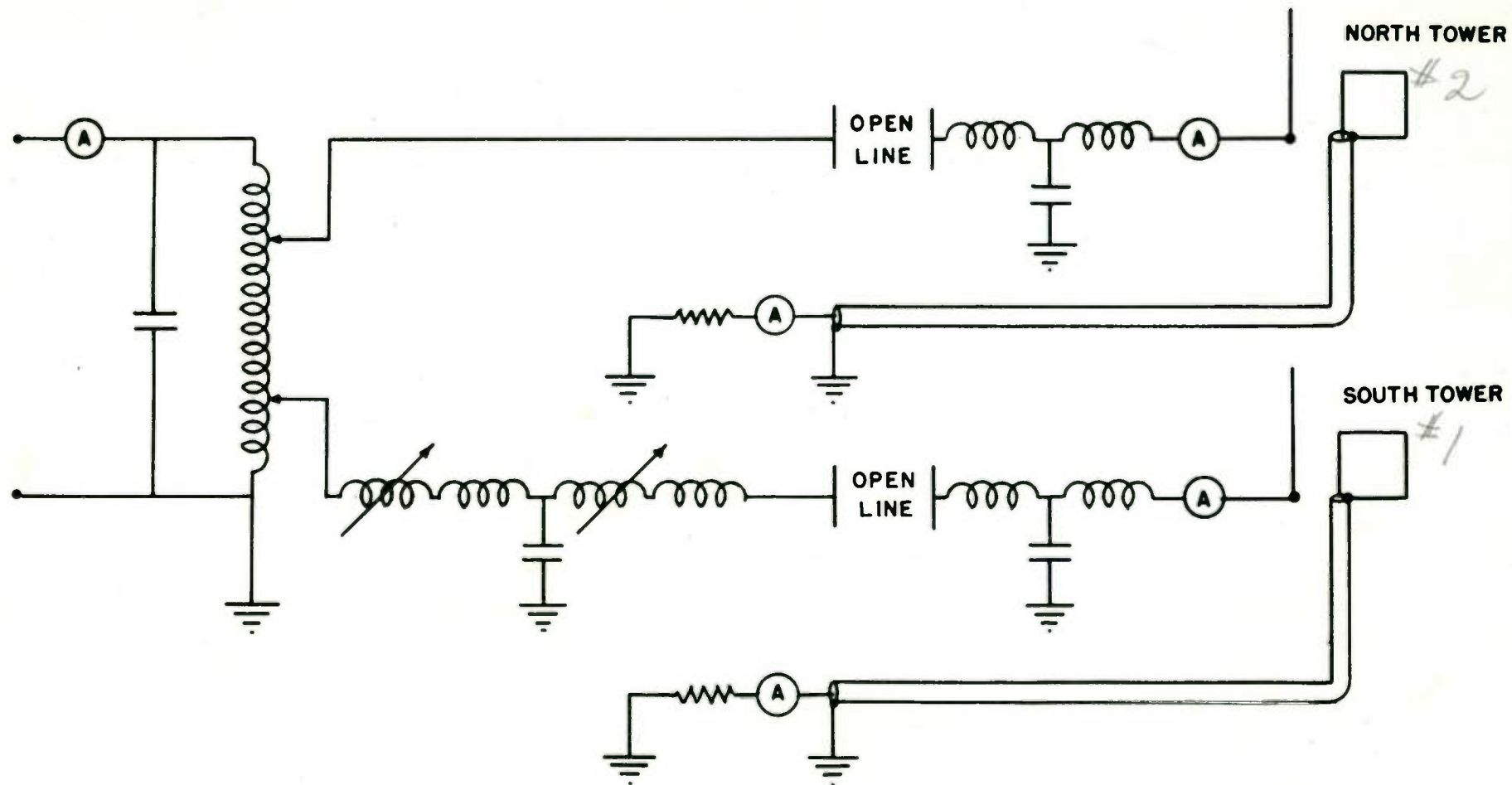
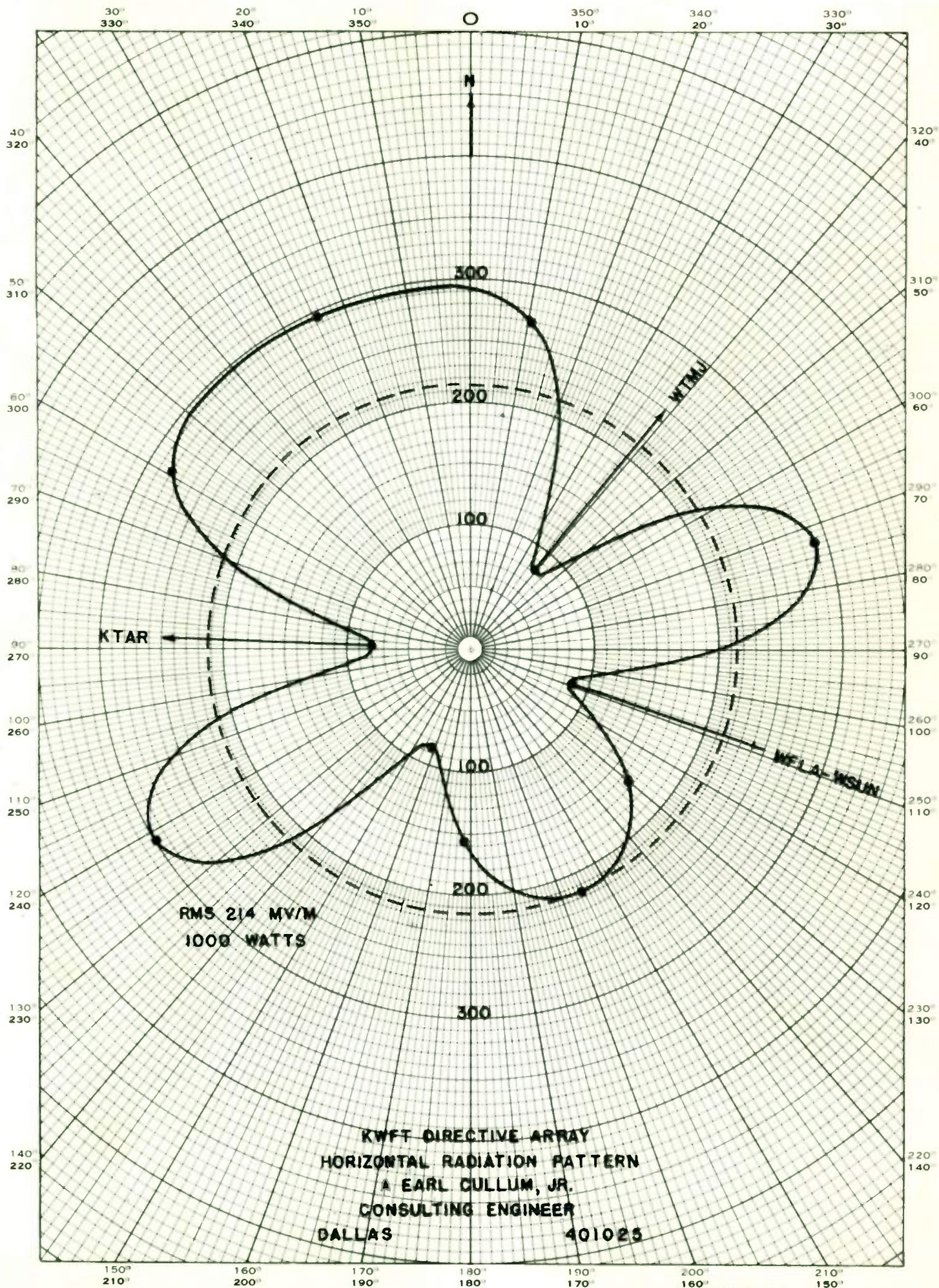
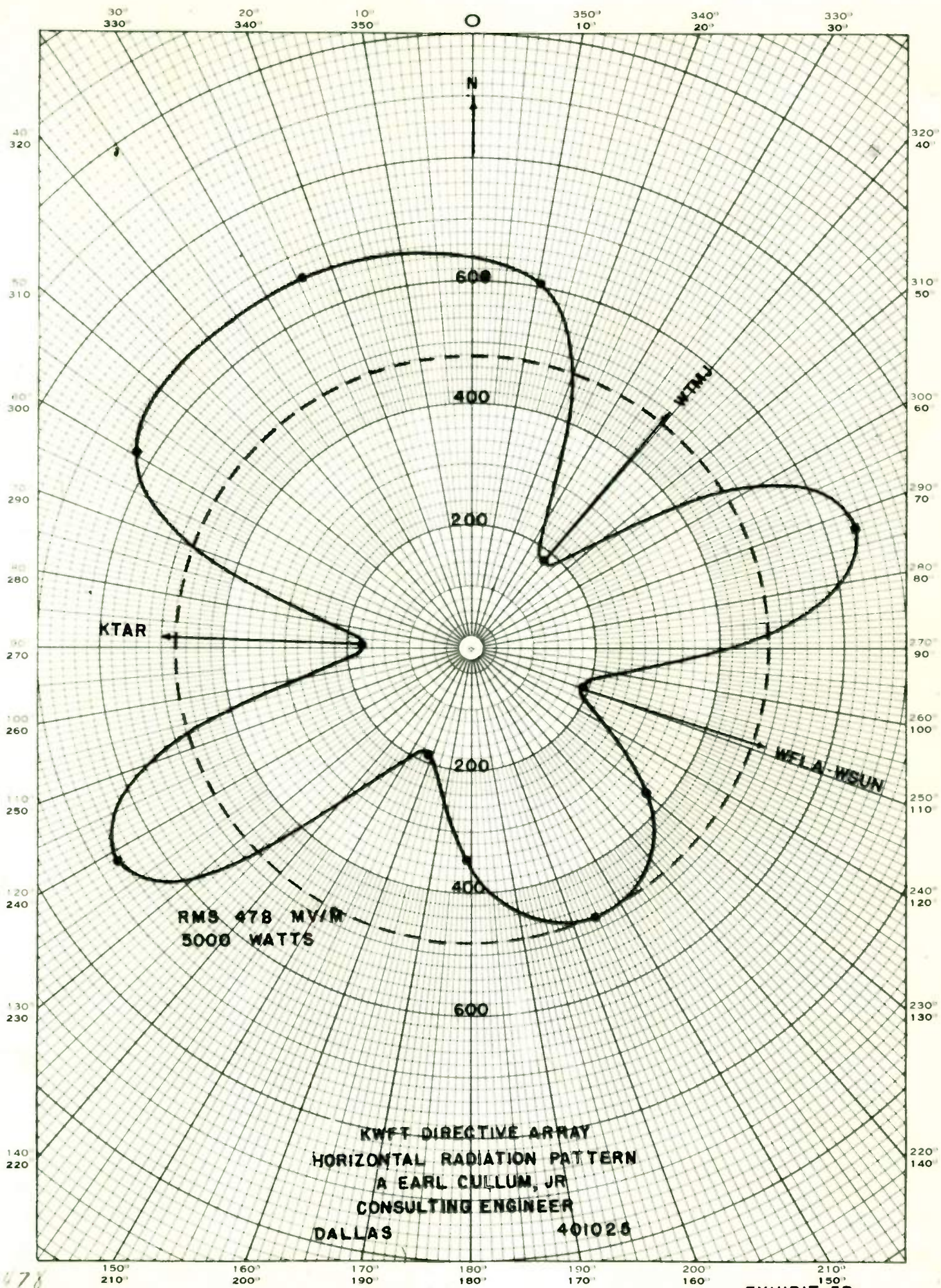


EXHIBIT I



KWFT ANTENNA SYSTEM-A. EARL CULLUM, JR., CONSULTING ENGINEER





AFFIDAVIT OF C. M. DANIELL, CONCERNING THE
MEASUREMENTS MADE TO DETERMINE THE PERFORMANCE
OF THE ANTENNA SYSTEM INSTALLED BY KWFT, WICHITA
FALLS, TEXAS, FOR OPERATION ON 620 KILOCYCLES,
5000 WATTS DAYTIME, 1000 WATTS NIGHTTIME, USING
A DIRECTIONAL ANTENNA BOTH DAY AND NIGHT.

I, C. M. DANIELL, AM A CONSULTING RADIO ENGINEER
ASSOCIATED WITH A. EARL CULLUM, JR. OF DALLAS, TEXAS. I HAVE
BEEN EMPLOYED TO MAKE FIELD INTENSITY MEASUREMENTS ON THE
DIRECTIVE ANTENNA SYSTEM AS INSTALLED BY KWFT, WICHITA FALLS,
TEXAS TO DETERMINE THE PERFORMANCE THEREOF. I HAVE ALSO BEEN
EMPLOYED TO MAKE FIELD INTENSITY MEASUREMENTS ON THE NON-
DIRECTIVE OPERATION OF KWFT PREVIOUS TO THE INSTALLATION OF
THE DIRECTIVE ANTENNA SYSTEM.

FIELD INTENSITY MEASUREMENTS HAVE BEEN MADE ON THE KWFT
DIRECTIVE ANTENNA ALONG 12 RADIALS. THE POINTS AT WHICH THE
FIELD INTENSITY MEASUREMENTS WERE MADE ARE SHOWN ON THE
ATTACHED POINT LOCATION MAPS. ALL OF THE FIELD INTENSITY
MEASUREMENTS WERE MADE WHEN OPERATING WITH 1000 WATTS TO THE
ANTENNA SYSTEM IN ACCORDANCE WITH THE FEDERAL COMMUNICATIONS
COMMISSION STANDARDS OF GOOD ENGINEERING PRACTICE, AND HAVE
BEEN TABULATED ON THE FOLLOWING ATTACHED EXHIBITS:

EXHIBITS 4A TO 4P ARE TABULATED DATA AND PLOTTED CURVES SHOWING
THE FOLLOWING:

1. DIRECTION FROM ANTENNA TO EACH POINT OF MEASUREMENT.
2. DATE ON WHICH EACH MEASUREMENT WAS MADE.
3. NUMBER GIVEN TO EACH POINT OF MEASUREMENT.
4. TIME AT WHICH EACH MEASUREMENT WAS MADE.
5. INTENSITY IN MILLIVOLTS PER METER AT EACH POINT OF
MEASUREMENT.

6. DISTANCE IN MILES FROM ANTENNA TO EACH POINT OF MEASUREMENT.
7. PRODUCT OF INTENSITY TIMES DISTANCE TO EACH POINT OF MEASUREMENT.
8. TYPE OF OPERATION - DIRECTIVE OR NON-DIRECTIVE.

EXHIBIT 5 IS A FAMILY OF ED CURVES PLOTTED FOR 620 KILOCYCLES FOR SOIL CONDUCTIVITIES VARYING FROM 40 TIMES 10 TO THE MINUS 14TH TO 10 TIMES 10 TO THE MINUS 14TH. ALSO SHOWN IS THE INVERSE DISTANCE CURVE FOR NO ATTENUATION.

EXHIBIT 6 IS A DESCRIPTION OF THE KWFT MONITORING POINTS. AFTER THE 12 RADIALS HAD BEEN COMPLETED, THE DATA ANALYZED, AND FOUND TO PROVIDE THE FOLLOWING PATTERN, MONITORING POINTS WERE ESTABLISHED IN THE DIRECTION OF MILWAUKEE, WISCONSIN, TAMPA, FLORIDA, AND PHOENIX, ARIZONA.

EXHIBIT 7 IS A POINT LOCATION MAP SHOWING THE POINTS AT WHICH MEASUREMENTS OF FIELD INTENSITY WERE MADE BETWEEN 0.10 MILE AND 2.50 MILES. MEASUREMENTS WERE MADE AT THESE POINTS ONLY ON THE NON-DIRECTIONAL OPERATION.

EXHIBIT 8 IS A POINT LOCATION MAP SHOWING THE POINTS AT WHICH MEASUREMENTS OF FIELD INTENSITY WERE MADE BETWEEN 2.50 MILES AND 20 MILES.

EXHIBIT 9A IS A MAP OF WICHITA FALLS AND VICINITY SHOWING THE AREA INCLUDED WITHIN THE 25 MILLIVOLTS PER METER CONTOUR FOR 1000-WATT DIRECTIONAL OPERATION.

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EXHIBIT 9B IS A MAP OF WICHITA FALLS AND VICINITY SHOWING THE AREA INCLUDED WITHIN THE 25 MILLIVOLTS PER METER CONTOUR FOR 5000-WATT DIRECTIONAL OPERATION.

ALL OF THE FIELD INTENSITY MEASUREMENTS WERE MADE BY ME. I USED RCA FIELD INTENSITY METER, TYPE TMV75B, SERIAL 575, LAST CALIBRATED BY THE RCA MANUFACTURING COMPANY ON AUGUST 19, 1940.

THE MEASUREMENTS ON KWFT WERE TAKEN AT THE BEST AVAILABLE POINTS. I PREPARED THE GRAPHICAL ANALYSIS OF THE MEASUREMENTS, AND IT IS MY BELIEF THAT THESE ANALYSES INDICATE THE EXISTING OPERATING CONDITIONS OF THE KWFT ANTENNA SYSTEM.

C. M. DANIELL

OCTOBER 29, 1940

STATE OF TEXAS)
) ss.
COUNTY OF DALLAS)

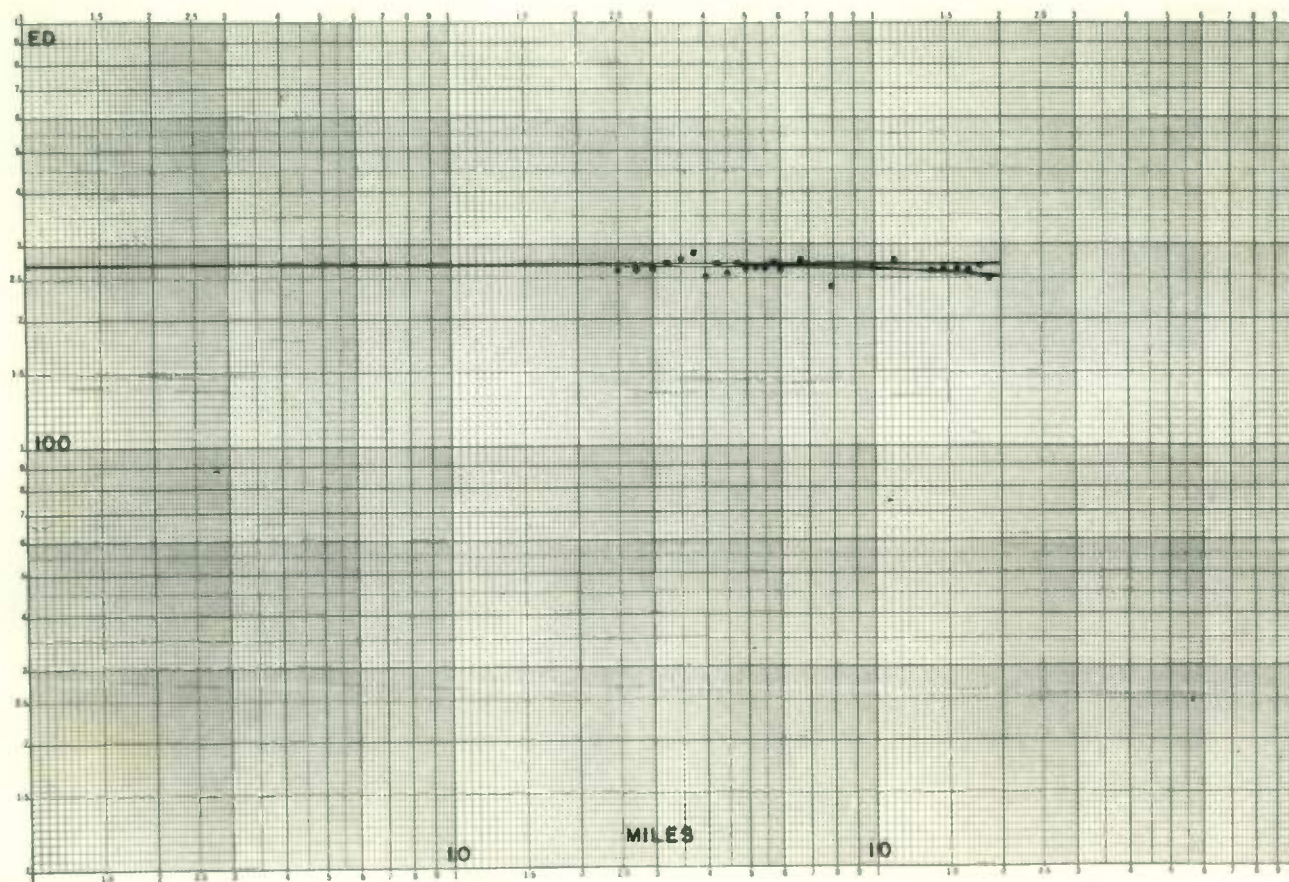
C. M. DANIELL, BEING DULY SWORN, UPON HIS OATH DEPOSES AND
SAYS THAT THE FACTS STATED IN THE FOREGOING, TOGETHER WITH
ALL EXHIBITS ATTACHED THERETO, ARE TRUE OF HIS OWN KNOWLEDGE,
EXCEPT AS TO SUCH STATEMENTS AS THEREIN STATED TO BE ON
INFORMATION AND BELIEF, AND AS TO SUCH STATEMENTS HE BELIEVES
THEM TO BE TRUE.

C. M. DANIELL

SWORN TO AND SUBSCRIBED BEFORE ME THIS 29TH DAY OF OCTOBER,
1940.

NOTARY PUBLIC IN AND FOR
DALLAS COUNTY, TEXAS

MY COMMISSION EXPIRES JUNE 1, 1941.

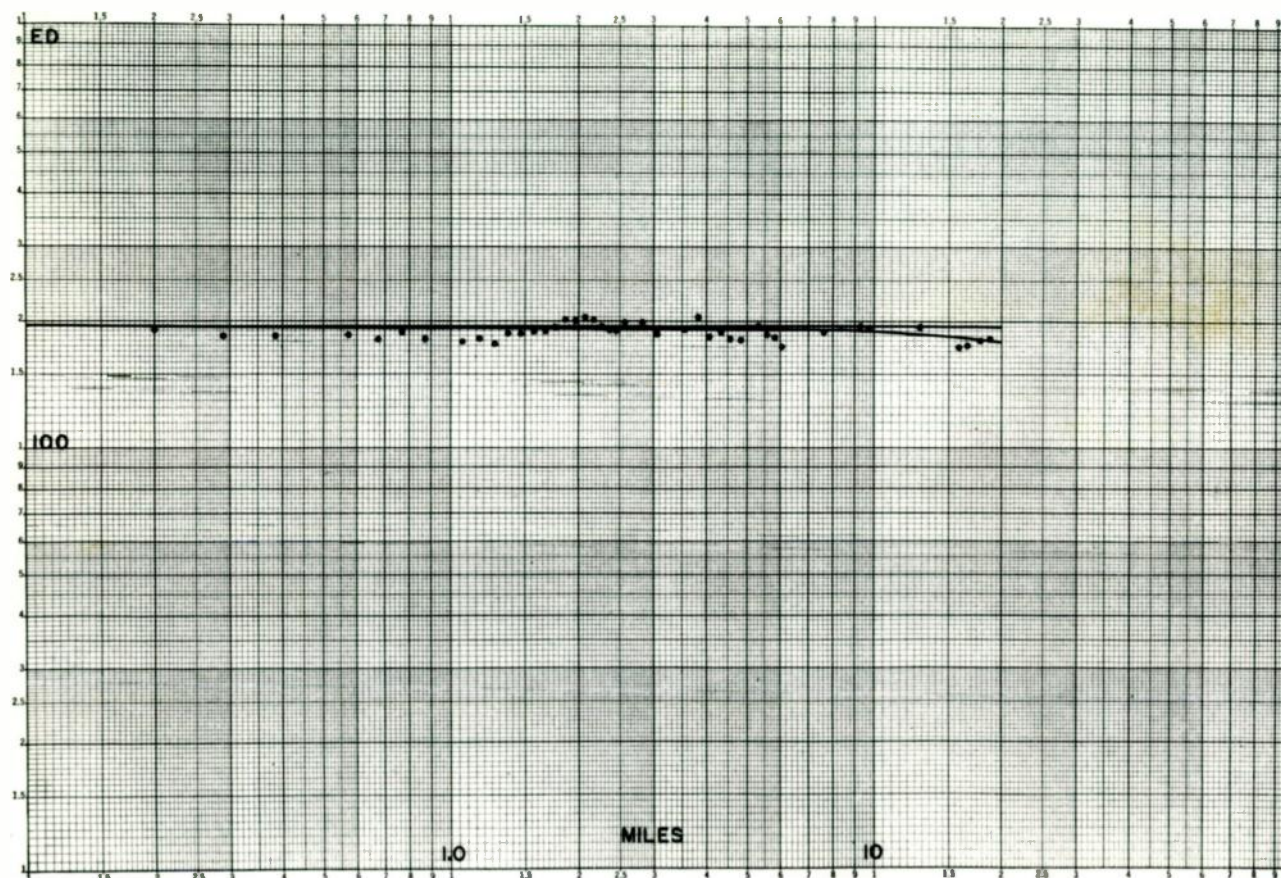


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KFTY
600 KC - 1000 WATTS-DA
RADIAL NORTH 10.5 DEGREES EAST
OCTOBER 13 AND 14, 1940

P	TIME	E	D	ED	COMMENTS
25A	9:50 AM	104.0	2.50	260	
26A	9:50 AM	94.0	2.75	261	
27A	9:50 AM	37.4	3.50	262	
28A	9:50 AM	33.8	3.50	272	
29A	10:00 AM	78.3	3.50	276	
30A	10:00 AM	76.3	3.75	280	
31A	10:00 AM	62.4	4.00	280	
32A	10:00 AM	63.4	4.25	270	
33A	10:00 AM	54.7	4.50	255	
34A	11:00 AM	54.7	4.75	270	
35A	11:00 AM	52.3	5.00	262	
36A	11:15 AM	50.1	5.25	263	
37A	11:00 AM	47.5	5.50	266	
38A	11:00 AM	47.5	5.75	275	
39A	11:35 AM	44.2	6.00	261	
40A	2:00 PM	41.2	6.75	276	
41A	2:00 PM	20.8	7.00	238	
42A	2:00 PM	26.3	7.50	264	
43A	2:30 PM	24.5	11.00	274	RED RIVER
44A	2:14 PM	10.8	13.75	258	RED RIVER
45A	2:30 PM	18.5	14.75	272	
46A	1:35 PM	16.7	15.75	263	
47A	1:41 PM	14.0	16.75	250	
48A	1:44 PM	14.0	17.00	268	
49A	1:50 PM	13.3	18.75	249	

EXHIBIT 4A

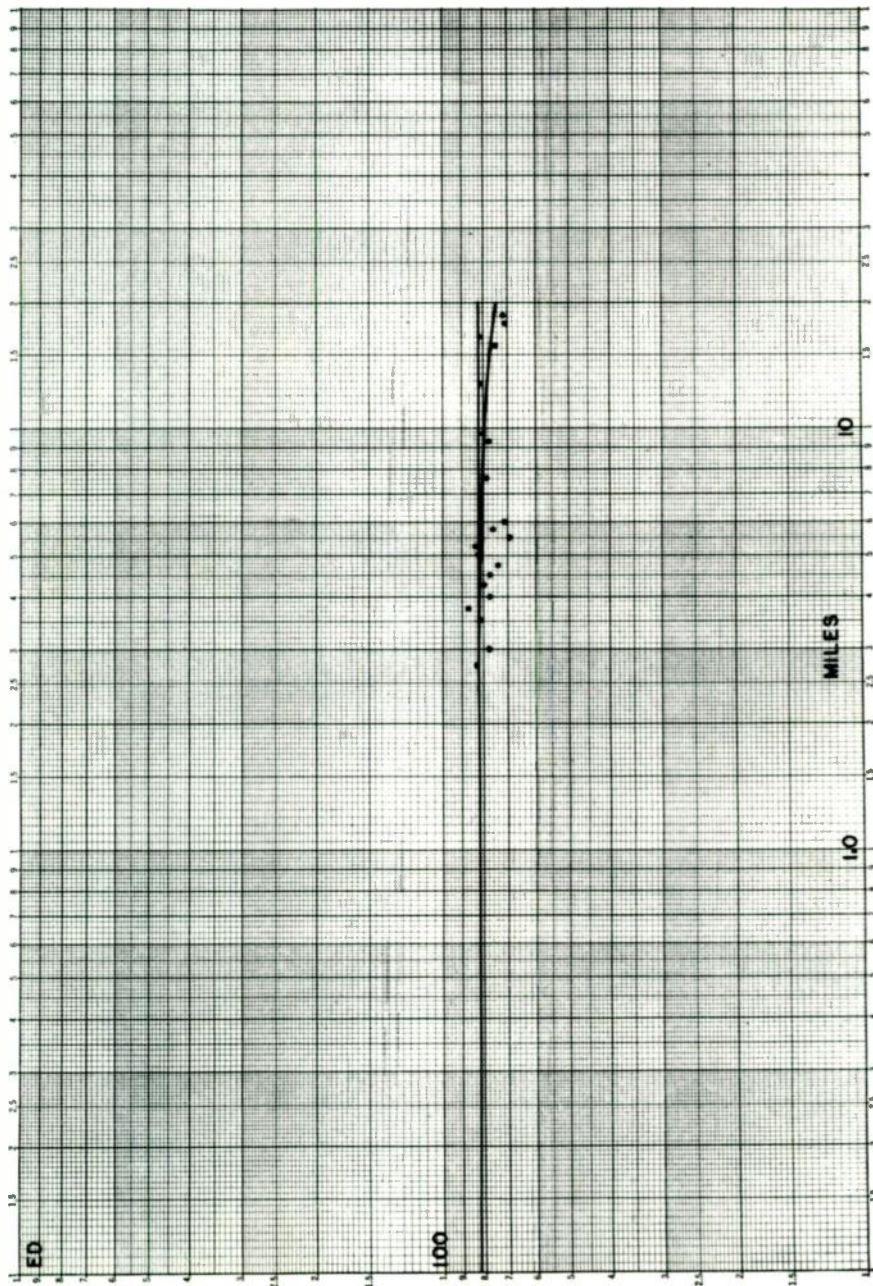


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KNFT
620 KC - 1000 WATTS-NOM-DA
RADIAL NORTH 39.0 DEGREES EAST
SEPTEMBER 26, 28*, AND 30*, 1940

P	TIME	E	D	ED	COMMENTS
18	9:23 AM	956	0.200	191	
28	9:30 AM	638	0.290	185	
38	9:36 AM	478	0.385	184	
48	x	x	0.480	x	UNLOCATED
58	9:45 AM	322	0.577	186	
68	9:55 AM	270	0.675	182	
78	10:04 AM	245	0.773	189	
88	10:15 AM	208	0.870	181	
98	x	x	0.970	x	LIVES
108	10:27 AM	166	1.070	178	
118	10:34 AM	156	1.170	181	
128	10:40 AM	140	1.265	177	
138	10:47 AM	136	1.365	186	
148	10:51 AM	127	1.465	186	
158	10:59 AM	121	1.565	189	
168	11:02 AM	114	1.660	186	CREEK
178	11:15 AM	110	1.760	194	
188	11:20 AM	108	1.860	201	POINTS NUMBERS
198	11:24 AM	102	1.960	200	188 TO 258 ON
208	11:27 AM	99	2.060	204	GENERALLY RISING
218	11:32 AM	93.5	2.160	202	ELEVATION
228	11:39 AM	86.1	2.260	195	
238	11:42 AM	80.6	2.360	190	
248	11:47 AM	77.2	2.460	190	
258	11:51 AM	77.6	2.560	199	
268	2:16 PM**	70.9	2.81	189	BEHIND HILL
278	2:40 PM**	60.9	3.06	186	BEHIND HILL
288	x	x	3.31	x	LIVES
298	3:00 PM**	53.5	3.56	190	
308	3:11 PM**	50.9	3.81	205	
318	3:21 PM**	45.4	4.06	184	
328	3:42 PM**	43.6	4.31	188	
338	3:59 PM**	39.4	4.56	180	
348	4:37 PM**	37.4	4.81	180	
358	4:49 PM**	35.2	5.06	180	
368	5:00 PM**	36.8	5.31	185	
378	5:15 PM**	33.4	5.56	186	
388	5:27 PM**	31.7	5.81	184	CREEK BOTTOMS
398	5:42 PM**	28.7	6.06	174	BETWEEN 38 & 39
408	9:59 AM*	24.8	7.60	188	
418	10:08 AM*	20.8	9.30	194	
428	10:13 AM*	19.8	9.75	188	
438	10:27 AM*	15.1	12.83	194	
448	10:53 AM*	11.0	15.85	175	RED RIVER SAND
458	11:02 AM*	10.6	16.60	176	RED RIVER SAND
468	11:14 AM*	10.1	17.20	180	RED RIVER SAND
478	11:19 AM*	9.79	18.65	182	RED RIVER SAND

EXHIBIT 48

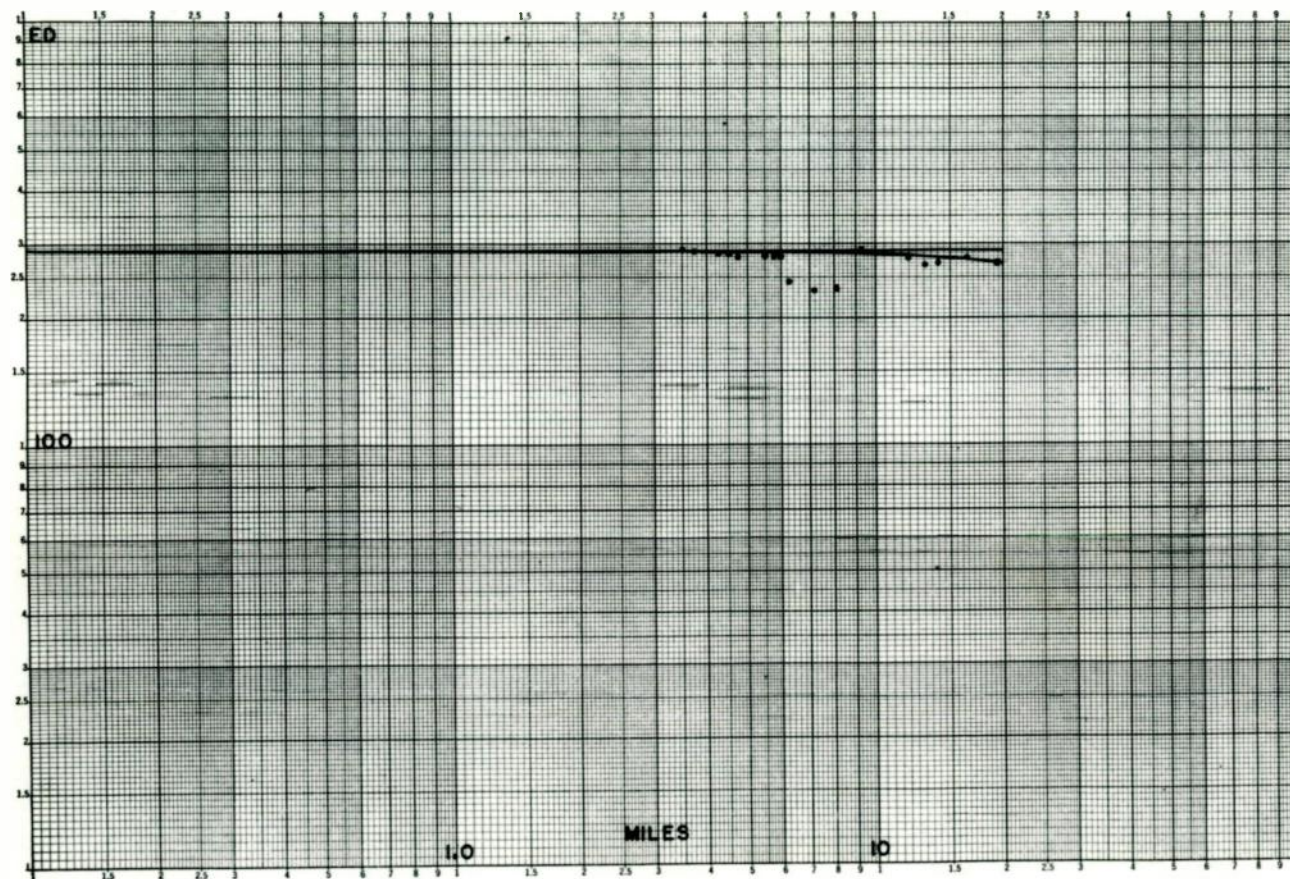


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION WFT
620 KC - 1000 WATTS-DA
RADIAL NORTH 39.0 DEGREES EAST
OCTOBER 9 AND 11, 1940

P	TIME	E	D	ED	COMMENTS
268	0112 AM	20.2	1.75	83.0	Behind Hill
278	0121 AM	20.0	1.75	78.0	Behind Hill
288	0130 AM	20.0	1.75	78.0	Behind Hill
298	0140 AM	20.2	1.75	81.2	Behind Hill
308	0145 AM	20.2	1.75	87.0	Behind Hill
318	0150 AM	19.4	1.75	77.6	Behind Hill
328	0155 AM	18.8	1.75	80.0	Behind Hill
338	0200 AM	17.1	1.75	77.0	Behind Hill
348	0205 AM	15.6	1.75	74.0	Behind Hill
358	0210 AM	15.0	1.75	74.0	Behind Hill
368	0215 AM	15.8	1.75	84.0	Behind Hill
378	0220 AM	12.5	1.75	68.8	Behind Hill
388	0225 AM	13.2	1.75	76.0	Behind Hill
398	0230 AM	11.7	1.75	70.3	Behind Hill
408	0235 AM	10.3	1.75	78.3	Behind Hill
418	0240 AM	8.40	1.75	78.1	Behind Hill
428	0245 AM	8.08	1.75	78.1	Behind Hill
438	0250 AM	8.08	1.75	78.1	Behind Hill
448	0255 AM	4.70	1.75	70.5	Behind Hill
458	0300 AM	4.92	1.75	81.0	Behind Hill
468	0305 PM	3.87	1.75	70.9	Behind Hill
478	0310 PM	3.81	1.75	71.1	Behind Hill

EXHIBIT 4C



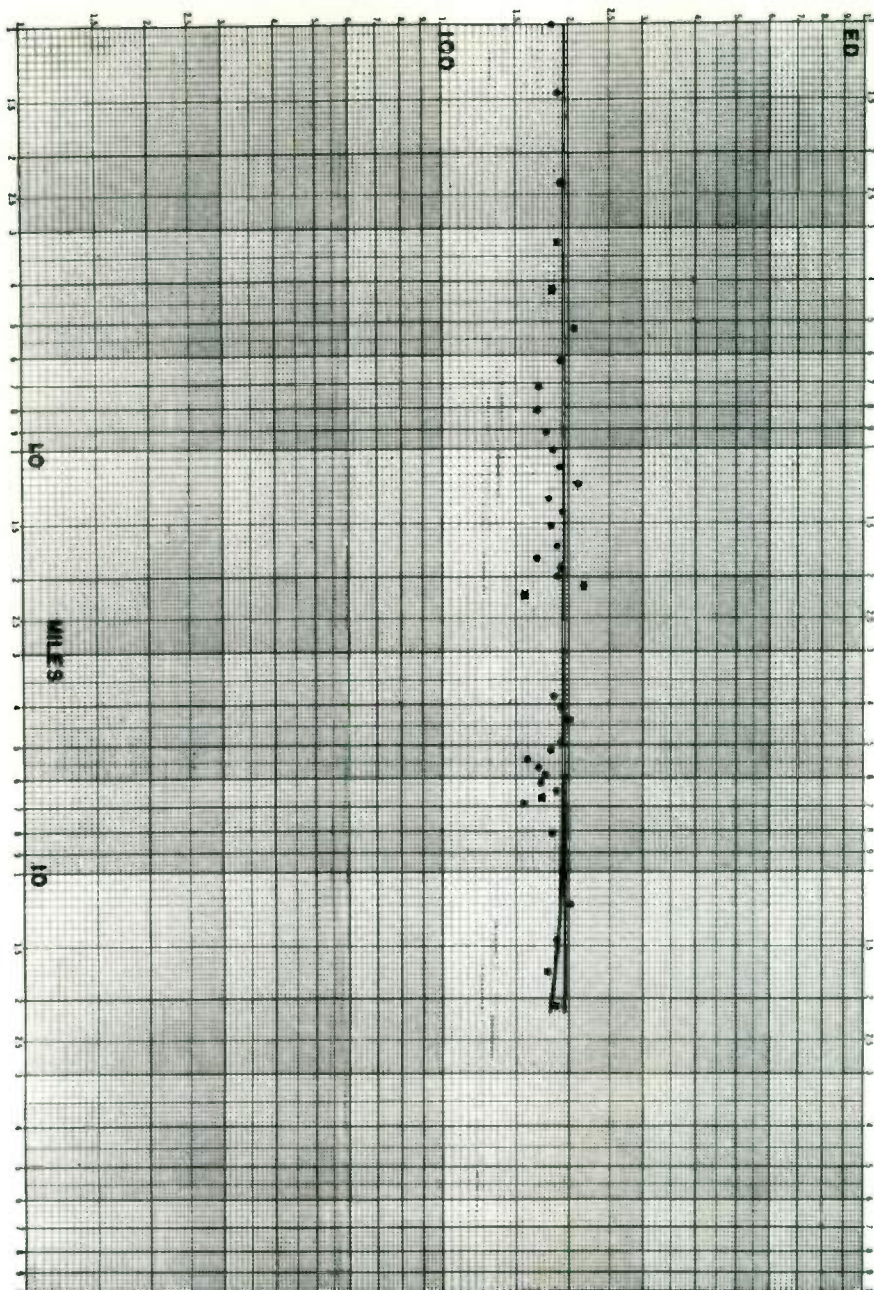
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER

HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KNFT
650 KC - 1000 WATTS-DA
RADIAL NORTH 72.4 DEGREES EAST
OCTOBER 13 AND 16, 1940

P	TIME	E	D	ED	COMMENTS
260	2:35 PM	83.0	3.50	290	
270	2:43 PM	76.7	3.75	285	
280	"	"	4.00	"	LINES
290	2:50 PM	67.0	4.25	285	
300	3:05 PM	63.0	4.50	284	
310	3:11 PM	59.0	4.75	280	
320	3:20 PM	56.4	5.00	282	
330	"	"	5.25	"	LINES
340	3:32 PM	51.0	5.50	280	
350	3:45 PM	48.8	5.75	280	
360	4:00 PM	47.0	6.00	282	
370	3:35 PM	36.0	6.25	244	WICHITA RIVER
380	3:50 PM	35.6	7.15	233	WICHITA RIVER
390	4:08 PM	30.3	8.08	236	WICHITA RIVER
400	4:46 PM	31.6	9.40	231	
410	4:30 PM	23.2	11.35	278	
420	5:10 PM	20.5	13.05	268	
430	5:18 PM	19.4	14.00	272	
440	5:27 PM	17.1	16.30	278	
450	5:39 PM	13.8	19.40	268	

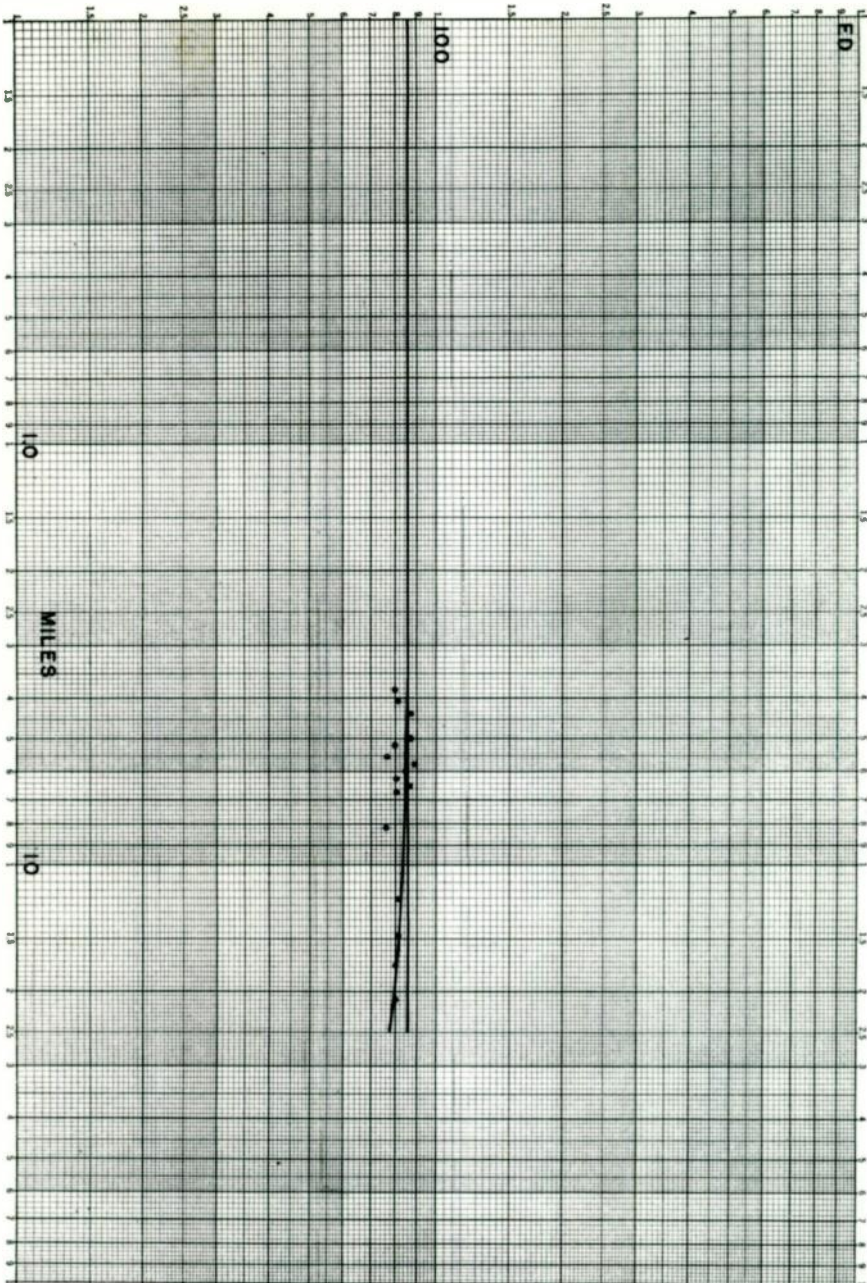
EXHIBIT 4D



P	TIME	E	D	ED	COMMENTS
1D	1:40 PM	1340.	0.100	184	
2D	1:50 PM	1310.	0.145	190	
3D	1:57 PM	814.	0.235	191	
4D	1:44 PM	578.	0.325	188	
5D	1:55 PM	437.	0.420	184	
6D	2:01 PM	396.	0.520	206	
7D	2:07 PM	308.	0.620	191	
8D	2:12 PM	209.	0.720	190	
9D	2:19 PM	209.	0.810	160	
10D	2:24 PM	195.	0.910	177	
11D	2:28 PM	182.	1.010	184	
12D	2:34 PM	169.	1.110	186	
13D	2:40 PM	173.	1.210	210	
14D	2:42 PM	138.	1.305	180	
15D	2:46 PM	125.	1.405	184	
16D	2:52 PM	125.	1.505	182	
17D	3:02 PM	111.	1.605	189	
18D	3:05 PM	111.	1.700	189	
19D	3:41 PM	93.5	1.800	168	
20D	3:46 PM	101.0	1.900	182	
21D	3:51 PM	94.5	2.00	189	
22D	4:01 PM	104.0	2.10	218	
23D	4:10 PM	77.2	2.20	157	
24D	4:10 PM	77.2	2.30	157	
25D	4:10 PM	77.2	2.40	185	
26D	2:04 PM	48.4	3.82	185	
27D	2:08 PM	47.1	4.06	192	
28D	2:15 PM	46.2	4.37	202	
29D	2:15 PM	46.2	4.40	202	
30D	2:15 PM	46.2	4.40	202	
31D	1:51 PM	38.0	4.55	181	
32D	2:02 PM	36.1	5.15	181	
33D	2:19 PM	29.7	5.40	180	
34D	2:27 PM	31.9	5.65	180	
35D	2:38 PM	30.0	5.90	177	
36D	2:53 PM	27.9	6.15	172	
37D	2:53 PM	28.1	6.40	186	
38D	3:08 PM	28.2	6.90	174	
39D	3:08 PM	28.2	6.90	183	
40D	2:50 PM	22.4	8.15	183	
41D	3:07 PM	16.9	12.00	203	
42D	3:19 PM	12.7	14.70	187	
43D	3:06 PM	10.3	17.30	178	
44D	3:53 PM	8.89	20.30	186	

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS
RADIO STATION KNFT
650 KC - 1000 WATTS-NON-DA
RADIAL NORTH 109.0 DEGREES EAST
SEPT. 27, 28, AND OCT. 1, 1940

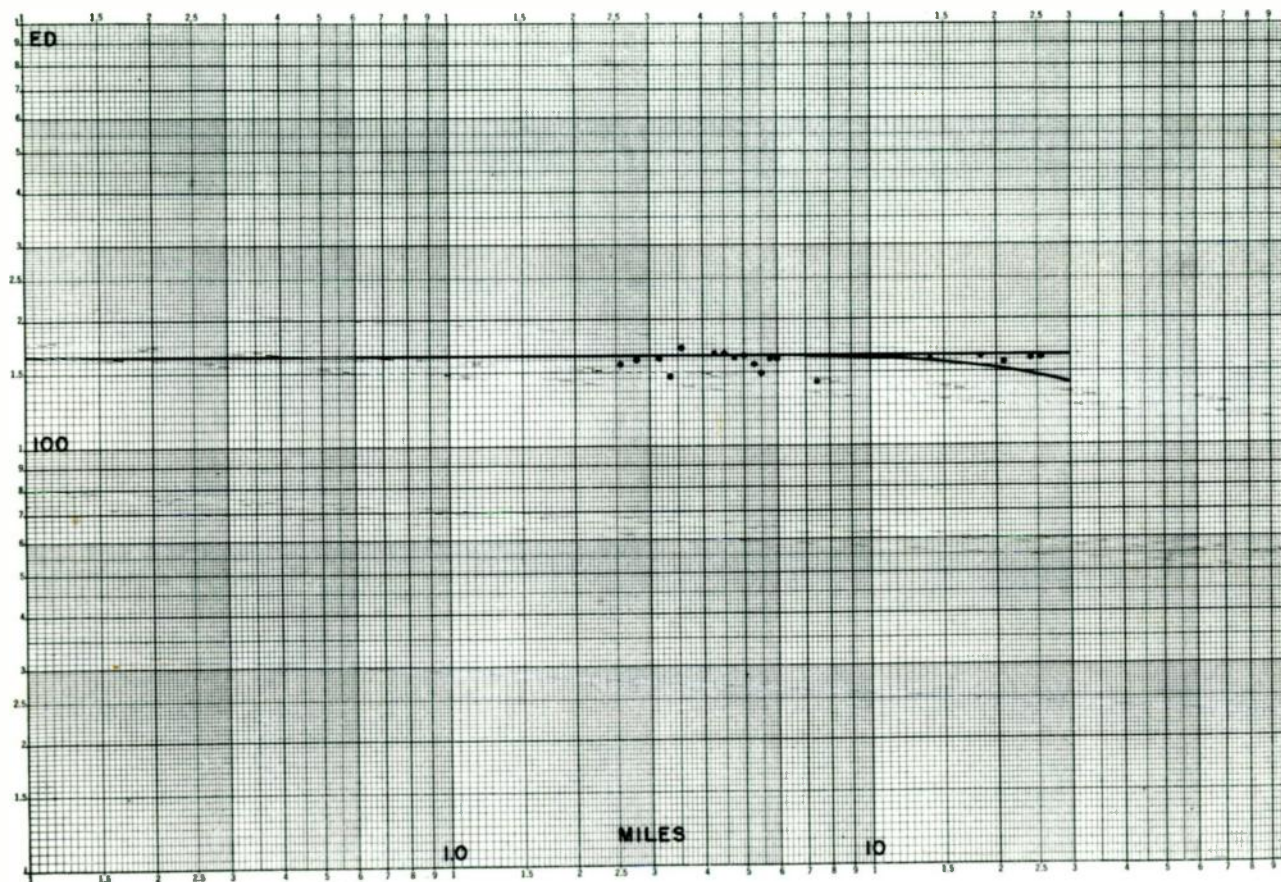
EXHIBIT 4E



P	TIME	E	D	ED	COMMENTS
26D	1:40 PM	51.2	3.82	80.5	1st CITY
27D	1:53 PM	50.0	4.06	81.5	1st CITY
28D	1:58 PM	50.0	4.37	87.5	1st CITY
29D	2:00 PM	51.2	4.50	87.5	Lines
30D	2:01 PM	51.2	4.75	87.5	Lines
31D	2:02 PM	51.2	5.00	87.0	Lines
32D	2:03 PM	51.2	5.25	79.8	Lines
33D	2:04 PM	51.2	5.50	79.5	Lines
34D	2:05 PM	51.2	5.75	85.0	Lines
35D	2:06 PM	51.2	6.00	85.0	Lines
36D	2:07 PM	51.2	6.25	80.0	Lines
37D	2:08 PM	51.2	6.50	87.1	Lines
38D	2:09 PM	51.2	6.75	80.7	Lines
39D	2:10 PM	51.2	7.00	80.7	Lines
40D	2:11 PM	51.2	7.25	80.7	Lines
41D	2:12 PM	51.2	7.50	80.7	Lines
42D	2:13 PM	51.2	7.75	80.7	Lines
43D	2:14 PM	51.2	8.00	80.7	Lines
44D	2:15 PM	51.2	8.25	80.7	Lines

A. EARL CULUM, JR.
 CONSULTING ENGINEER
 HIRSHLAND PARK VILLAGE
 DALLAS, TEXAS
 RADIO STATION KEFT
 684 N. C. - 1000 WATTS-DM
 RADIAL NORTH 100 DEGREES EAST
 OCTOBER 5 AND 11, 1940

Points 36 & 37 Along
 U.K.T. RR. No Lines.
 Good Nulls

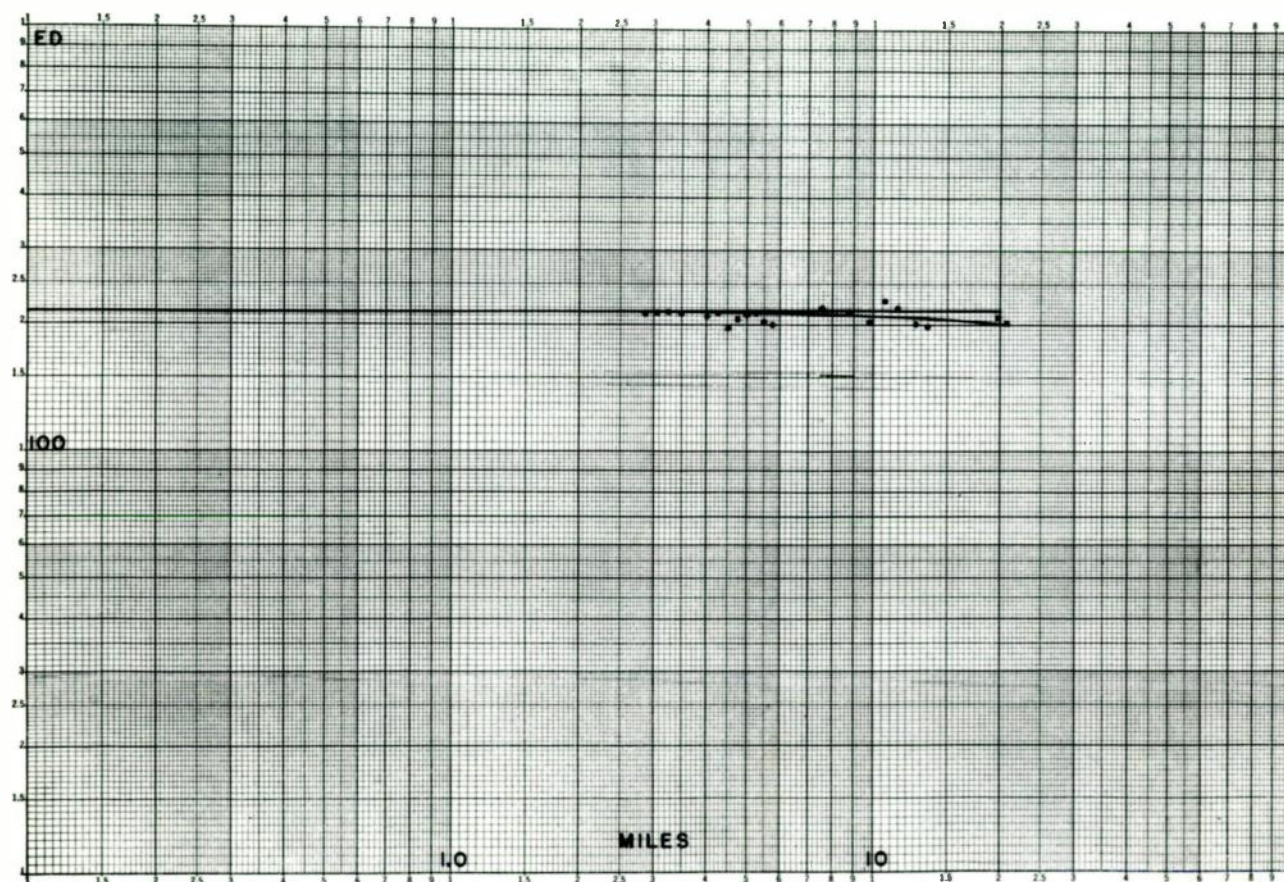


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KWFT
650 KC - 1000 WATTS-DA
RADIAL NORTH 130.0 DEGREES EAST
OCTOBER 14 AND 17, 1940

P	TIME	E	D	ED	COMMENTS
26E	8:47 AM	61.2	2.56	157	IN CITY
27E	9:05 AM	57.2	2.78	159	IN CITY
28E	9:11 AM	51.0	3.17	162	IN CITY
29E	9:20 AM	46.5	3.35	146	IN CITY
30E	9:34 AM	47.6	3.58	171	IN CITY
31E	10:30 AM	39.0	4.28	166	
32E	10:40 AM	36.9	4.50	166	
33E	10:47 AM	34.2	4.75	162	
34E	11:15 AM	32.8	5.44	164	
35E	11:25 AM	26.9	5.45	157	
36E	11:30 AM	27.0	5.50	148	CREEK
37E	11:44 AM	28.1	5.75	161	
38E	11:55 AM	27.0	6.00	162	
39E	9:34 AM	10.4	7.35	141	
40E	10:00 AM	11.6	13.80	160	
41E	10:50 AM	8.86	18.48	103	
42E	11:07 AM	7.33	20.70	136	
43E	11:18 AM	6.65	24.00	160	
44E	11:28 AM	6.39	25.40	162	

EXHIBIT 40

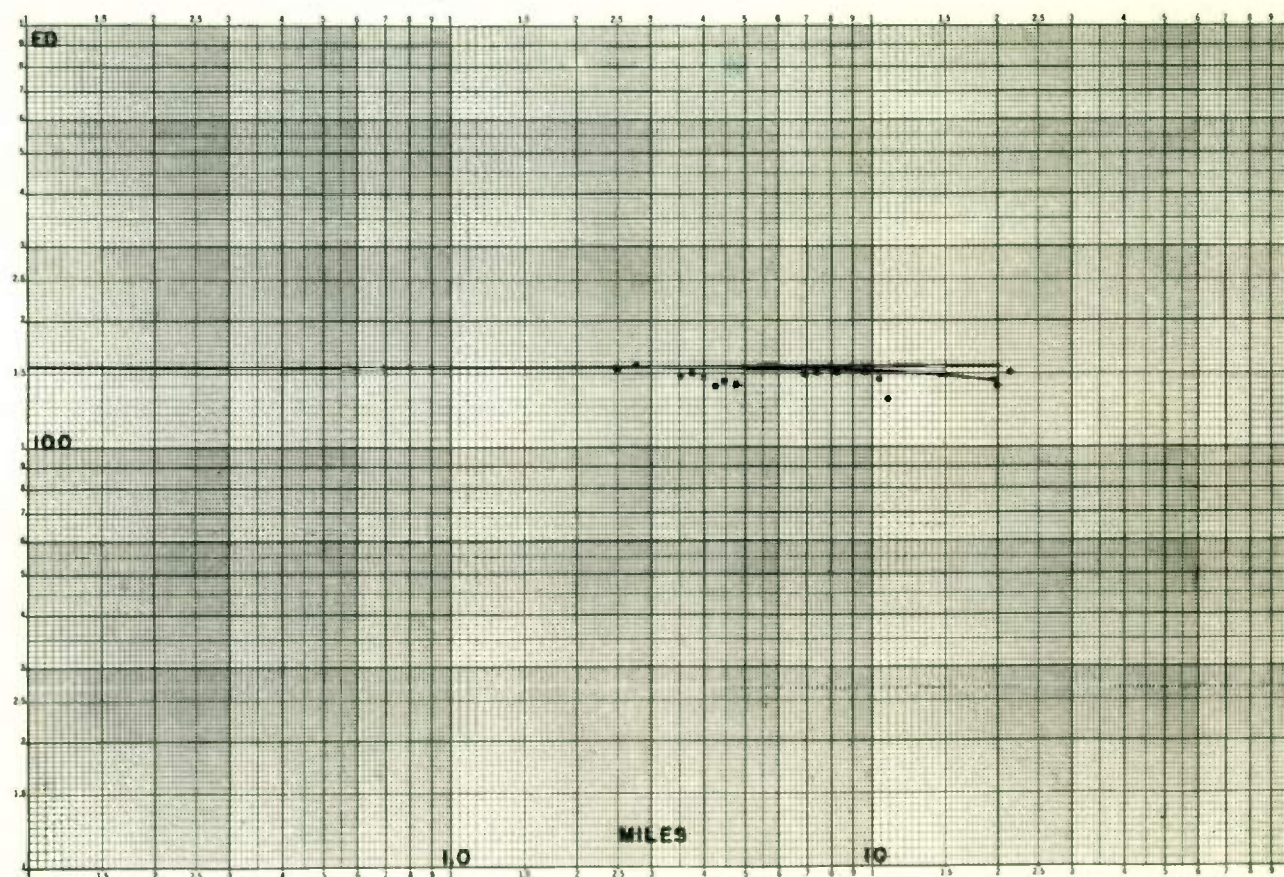


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KFTT
600 KC - 1000 WATTS-DA
RADIAL NORTH 155.5 DEGREES EAST
OCTOBER 14 AND 17, 1940

P	TIME	E	D	ED	COMMENTS
20F	1:30 PM	74.0	2.86	212	
27F	1:40 PM	70.5	3.05	215	
28F	1:50 PM	66.1	3.25	215	
29F	1:56 PM	60.8	3.50	213	
30F	1:58 PM	55.4	3.75	210	LINES CREEK
31F	2:10 PM	55.4	4.00	210	
32F	2:16 PM	55.4	4.15	210	
33F	2:44 PM	40.5	4.50	196	
34F	2:50 PM	40.7	4.75	207	
35F	3:40 PM	41.4	5.00	212	
36F	3:46 PM	41.0	5.25	215	
37F	3:57 PM	37.2	5.50	204	
38F	3:59 PM	34.6	5.75	200	
39F	4:00 PM	34.6	6.00	200	LINES
40F	1:00 PM	22.2	7.50	210	
41F	1:12 PM	24.4	8.75	214	
42F	1:40 PM	26.8	9.30	204	
43F	1:50 PM	21.6	10.60	229	
44F	2:00 PM	19.2	11.45	220	
45F	2:30 PM	15.8	12.70	200	
46F	2:42 PM	14.7	13.45	198	
47F	3:08 PM	10.5	19.05	210	
48F	3:14 PM	9.75	20.70	202	HIGH ELEVATION

EXHIBIT 4M

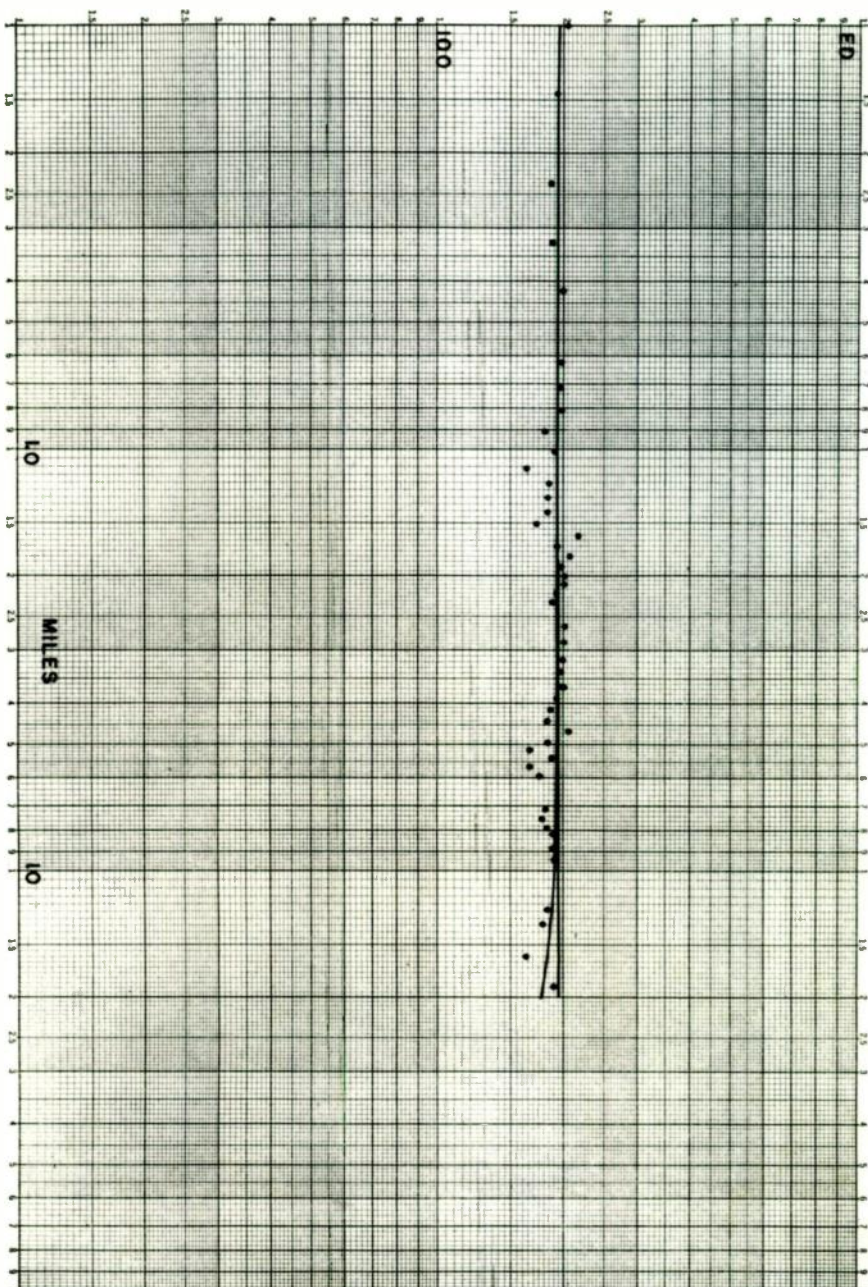


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KWFT
650 KC - 1000 WATTS-DM
RADIAL NORTH 161.0 DEGREES EAST
OCTOBER 14 AND 15, 1940

P	TIME	E	D	ED	COMMENTS
25G	9:15 AM	61.2	2.00	153	
26G	9:22 AM	50.7	1.75	156	
27G	9:30 AM	46.1	3.80	147	
28G	10:00 AM	39.9	5.75	150	
29G	10:10 AM	36.8	4.00	147	
30G	10:20 AM	31.5	4.75	138	
31G	10:30 AM	31.4	4.50	143	
32G	10:40 AM	22.0	4.75	141	LAKE WICHITA
33G	9:40 PM	21.0	6.00	140	LAKE WICHITA
34G	9:45 PM	20.4	7.40	151	
35G	9:27 PM	18.3	8.00	150	
36G	9:18 PM	17.7	8.70	144	
37G	9:00 PM	15.5	7.00	150	
38G	4:53 PM	14.1	10.00	145	
39G	4:45 PM	11.2	10.95	130	AT THE WICHITA RIVER
40G	4:00 PM	6.98	25.00	140	AND VERY ROUGH AREA
41G	3:57 PM	6.00	11.00	151	BETWEEN 30 & 40

EXHIBIT 41

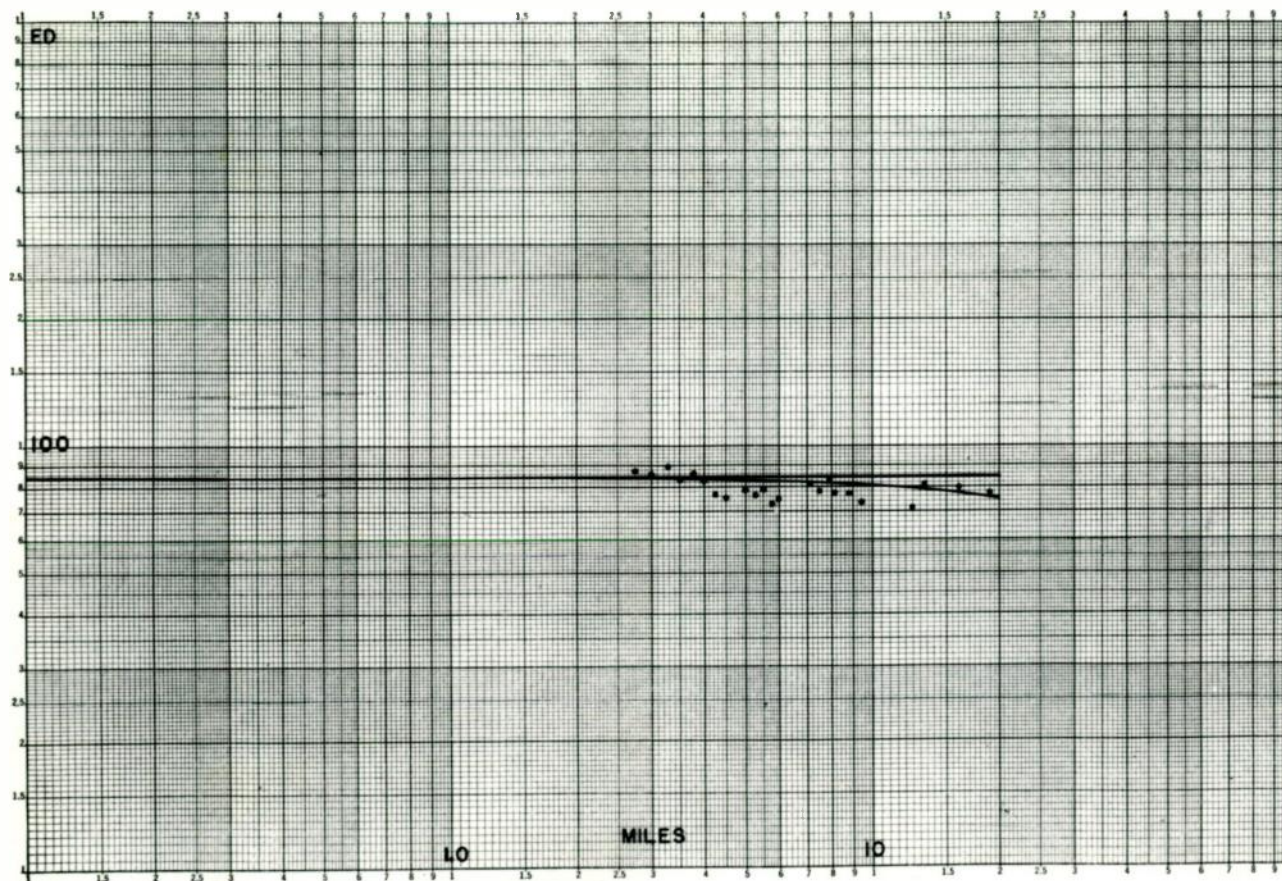


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
MEMPHIS PARK VILLAGE
DALLAS, TEXAS

RADIO STATION NFMT
620 KC - 1000 WATTS-NOM-DA
RADIAL NORTH 202.0 DEGREES EAST
SEPT. 27, 28, 29 & OCT. 1, 1940

P	TIME	E	D	ED	COMMENTS
1H	8:30 AM	2066.	0.100	206	
2H	8:33 AM	1743.	0.145	186	
3H	8:44 AM	794.	0.235	186	
4H	8:49 AM	583.	0.325	189	
5H	8:57 AM	476.	0.420	200	
6H	9:00 AM	476.	0.420	200	
7H	9:32 AM	276.	0.715	197	Missouri River
8H	9:35 AM	244.	0.810	186	
9H	9:47 AM	189.	1.010	181	
10H	9:52 AM	148.	1.110	164	
11H	9:58 AM	148.	1.210	185	
12H	10:08 AM	141.	1.305	184	
13H	10:13 AM	130.	1.405	173	
14H	10:28 AM	115.	1.505	168	
15H	10:35 AM	106.	1.600	199	
16H	10:42 AM	106.	1.800	202	
17H	10:50 AM	101.	2.00	202	
18H	10:55 AM	96.0	2.10	193	
19H	11:00 AM	82.2	2.30	189	
20H	11:07 AM	82.2	2.30	189	
21H	11:11 AM	76.4	2.45	202	
22H	8:30 AM	69.2	2.80	201	
23H	8:40 AM	63.2	3.15	199	
24H	8:41 AM	58.5	3.40	200	
25H	8:51 AM	54.7	3.55	194	
26H	9:01 AM	49.7	3.90	184	
27H	9:11 AM	44.3	4.10	184	
28H	9:21 AM	41.7	4.40	206	
29H	9:31 AM	44.3	4.65	183	
30H	9:41 AM	37.4	4.90	166	
31H	9:51 AM	32.3	5.15	188	
32H	10:01 AM	34.8	5.40	167	
33H	10:11 AM	29.6	5.65	176	
34H	10:21 AM	29.6	5.90	176	
35H	10:31 AM	23.7	7.15	179	
36H	10:41 AM	23.3	7.50	184	
37H	10:51 AM	23.1	8.15	190	
38H	11:01 AM	21.2	8.45	188	
39H	11:11 AM	20.2	8.85	184	
40H	11:21 AM	19.8	9.40	184	
41H	11:31 AM	14.8	12.50	183	
42H	11:41 AM	11.8	16.00	183	
43H	11:51 AM	10.1	18.85	190	
44H	12:01 PM	10.1	18.85	190	
45H	12:11 PM	10.1	18.85	190	
46H	12:21 PM	10.1	18.85	190	
47H	12:31 PM	10.1	18.85	190	
48H	12:41 PM	10.1	18.85	190	
49H	12:51 PM	10.1	18.85	190	
50H	1:01 PM	10.1	18.85	190	

LITTLE MISSOURI RIVER
EMIRIT 40

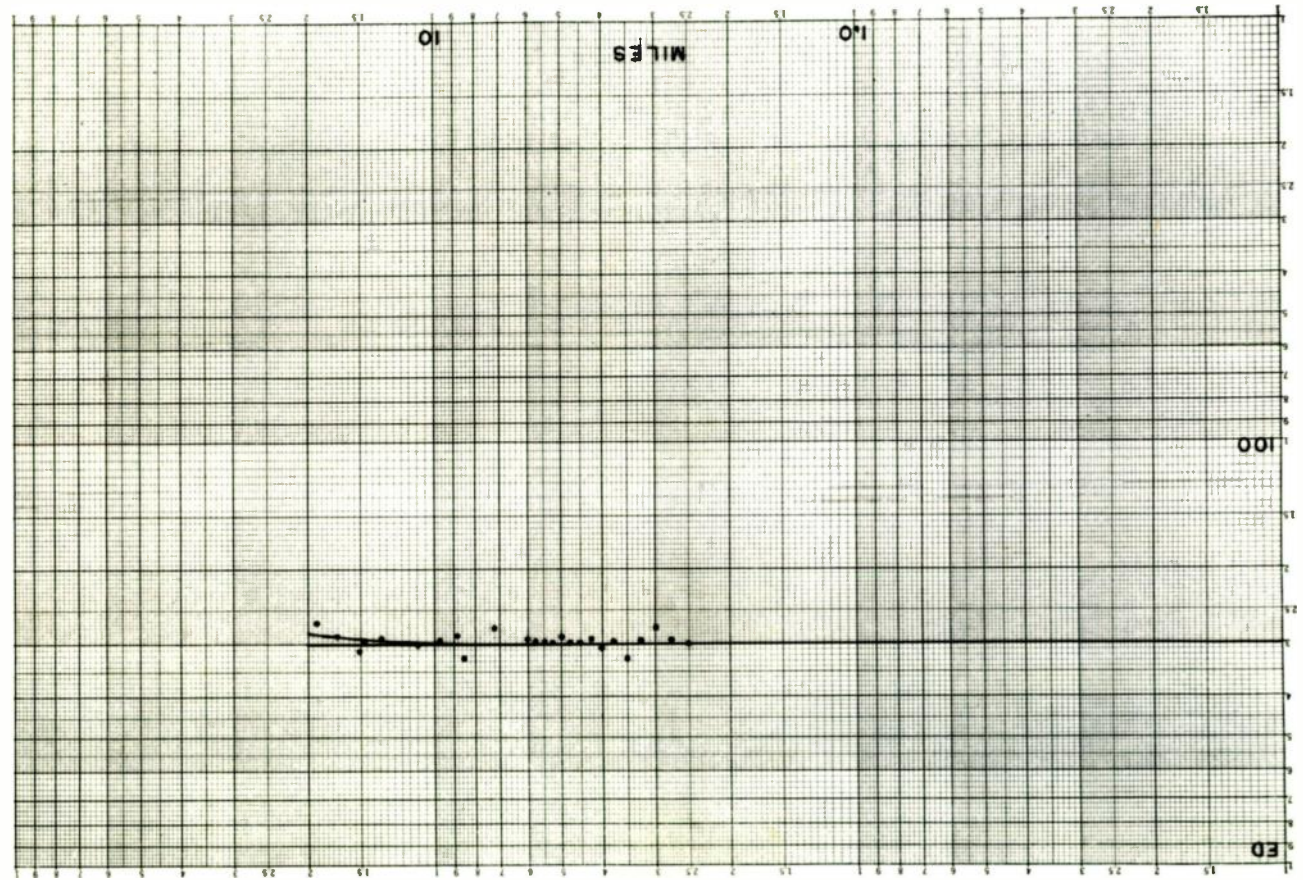


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION W0FT
CLO KC - 1000 WATTS-DC
RADIAL NORTH 202 DEGREES EAST
OCTOBER 9th, 10th AND 12, 1940

P	TIME	E	D	ED	COMMENTS
26H	9:00 AM	31.9	1.75	87.7	
27H	9:07 AM	28.8	3.00	86.6	
28H	9:10 AM	27.6	3.25	80.7	
29H	9:32 AM	23.7	3.60	83.0	
30H	9:35 AM	23.0	3.75	86.3	
31H	9:44 AM	10.7	4.00	82.8	
32H	10:02 AM	18.0	4.25	76.5	
33H	10:15 AM	16.8	4.50	75.6	
34H	10:25 AM	17.7	4.75	84.0	
35H	10:30 AM	15.7	5.00	78.5	
36H	10:35 AM	14.6	5.25	76.6	
37H	10:40 AM	14.2	5.50	78.8	
38H	10:47 AM	12.6	5.75	72.5	
39H	11:00 AM	12.5	6.00	75.0	
40H	4:45 PM	11.4	7.15	81.5	LARE WICHITA
41H	4:51 PM	10.5	7.55	79.2	LARE WICHITA
42H	4:53 PM	10.0	7.50	83.8	CREEK BOTTOM
43H	5:07 PM	9.50	8.15	77.8	
44H	5:15 PM	8.70	8.35	77.0	
45H	10:30 AM	7.88	9.40	74.0	
46H	10:42 AM	5.73	12.40	71.0	
47H	10:51 AM	6.11	13.30	81.4	
48H	11:07 AM	4.06	16.00	73.5	
49H	11:30 AM	4.08	18.85	76.0	LITTLE WICHITA RIVER

EXHIBIT 4K



A. EARL CULUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS
RADIO STATION KMTF
650 MC - 1000 WATTS-DA
RADIAL MATHS - 6 DE REES EAST
OCTOBER 19, 190 AND 1900, 1960

1111 3 2 C 33

151	11.40	120.0	1.50	300
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307	305	300	•	10	107
373	300	310	•	121	173
377	377	301	•	113	127

[illegible][illegible]

321	5135	68.3	4.25	252
331	9140	66.5	4.50	627
341	6150	69.8	4.25	609

341	0150	At 00	62.0	4.75	2.18
351	9157	At 00	57.6	5.02	2.28
361	1000	At 00	56.6	5.15	2.38

303	52.5	4.17	11.00	16.17	1.81
377	5.50	0.95	0.00	16.05	3.71
378	5.45	0.95	0.00	10.05	3.61

307	3.12	3.87	10.35	10.7
303	2.00	4.85	10.38	10.71
302	8.75	11.4	10.75	10.81

9838	AL	38.9	7.20	334	2.70
9839	AL	37.2	8.60	334	2.70
9840	AL	37.2	8.60	334	2.70

387	1.1	3.7	16.8	144
295	2.70	36.4	10.05	401
282	2.25	32.4	9.05	171

306	11.00	2.72	10.81	1.57
307	10.45	1.17	10.00	1.57
308	10.14	1.17	9.91	1.57

421	10:30 AM	20:2	14.10	23.8
471	10:41 AM	20.4	15.40	30.7
10:51 AM	20.5	15.50	30.8	

077	20.31	7.74	11.50	11.05	1.21
080	19.05	14.2	17.0	10.53	1.71

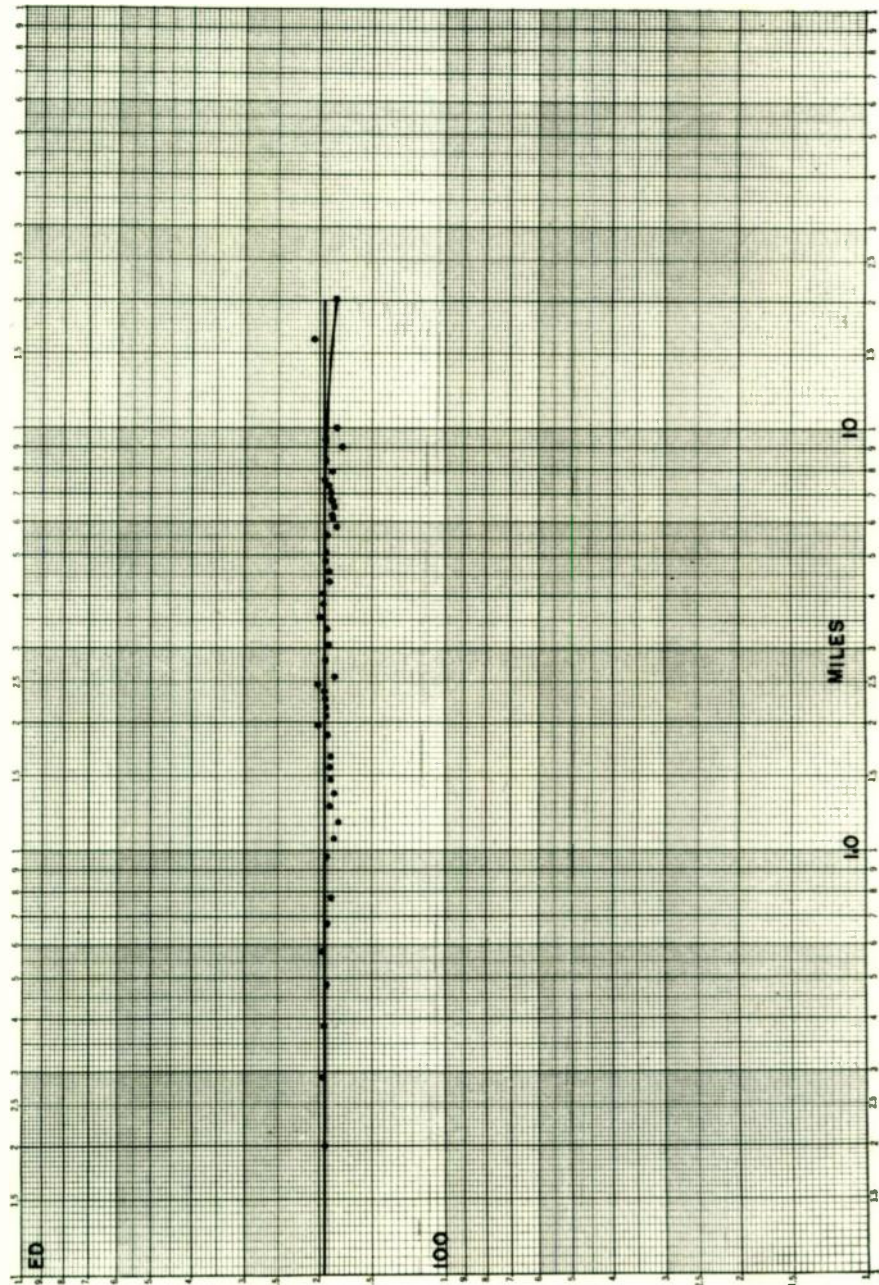
ВНХЗ

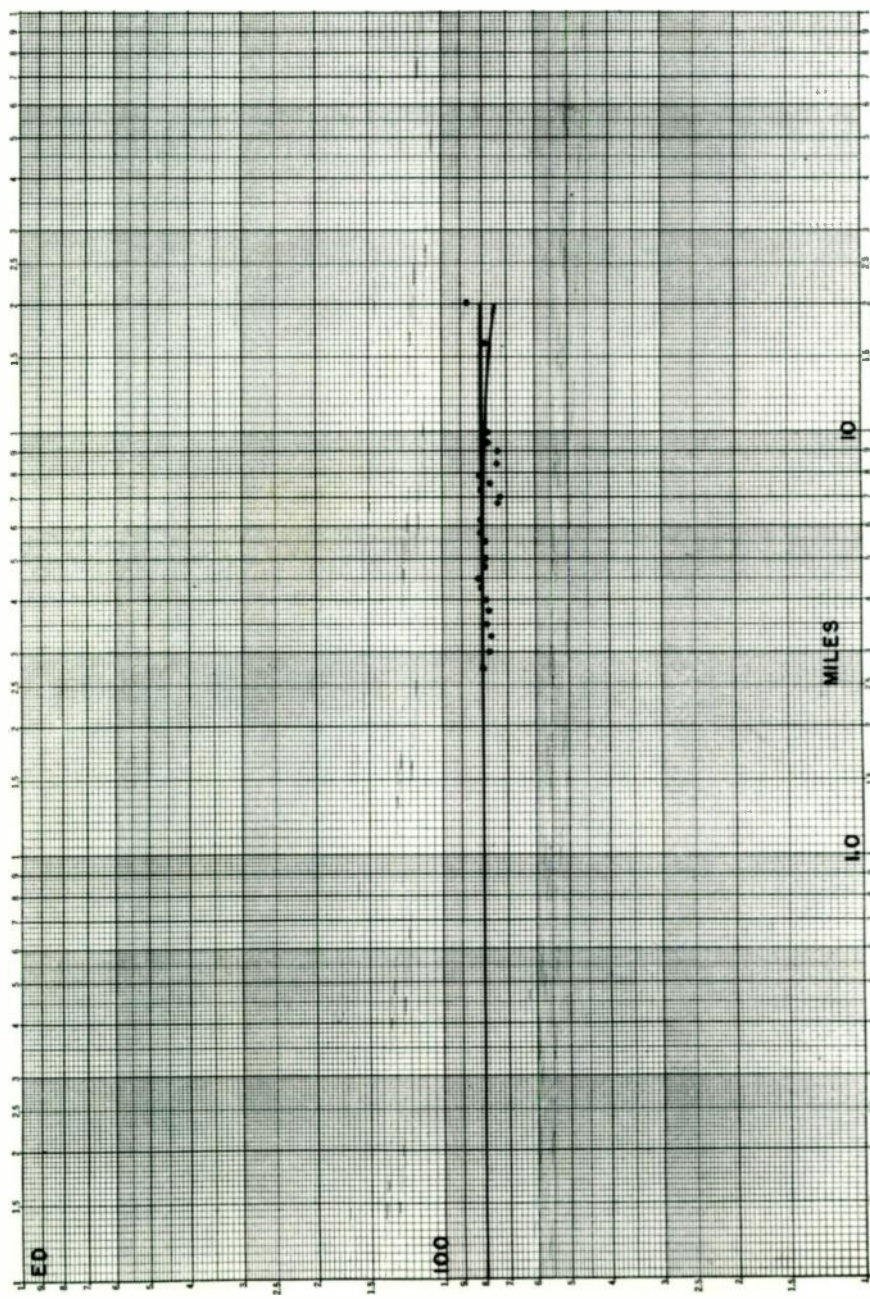
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KFTT
650 KC - 1000 WATTS-NON-PA
RADIAL NORTH 272.0 DEGREES EAST
SEPTEMBER 26, 28*, AND 30*, 1940

P	TIME	E	D	ED	COMMENTS
1J	1:58 PM	970.	0.200	194	
2J	2:10 PM	676.	0.200	196	On Bluff
3J	2:18 PM	506.	0.385	196	
4J	2:29 PM	400.	0.480	192	Bottoms
5J	2:39 PM	342.	0.577	197	Swamp
6J	2:45 PM	285.	0.575	192	
7J	2:50 PM	242.	0.773	187	On Bluff
8J	3:05 PM	197.	0.870	181	Inaccessible
9J	3:20 PM	173.	0.870	185	On Bluff
10J	3:29 PM	168.	1.070	185	Points 10J to 40J
11J	3:33 PM	149.	1.170	185	on high level plains.
12J	3:40 PM	135.	1.265	184	
13J	3:44 PM	127.	1.465	186	
14J	3:47 PM	120.	1.565	188	
15J	3:52 PM	113.	1.660	188	
16J	4:10 PM	103.	1.760	191	
17J	4:15 PM	103.	1.960	202	
18J	4:20 PM	93.5	2.060	193	
19J	4:25 PM	89.8	2.160	189	
20J	4:30 PM	85.5	2.260	190	
21J	4:40 PM	82.7	2.360	195	
22J	4:45 PM	82.3	2.460	202	
23J	4:50 PM	72.0	2.560	184	
24J	5:00 PM	62.2	2.660	194	
25J	5:10 PM	62.2	2.760	190	
26J	5:13 AM**	57.9	3.31	188	
27J	10:20 AM**	56.1	3.66	200	
28J	10:28 AM**	51.1	3.81	195	
29J	10:38 AM**	48.1	4.06	196	
30J	10:50 AM**	43.8	4.31	189	
31J	11:08 AM**	41.7	4.56	190	
32J	11:16 AM**	38.0	4.81	194	
33J	11:25 AM**	36.0	5.06	196	
34J	12:47 PM**	34.5	5.31	192	
35J	12:58 PM**	31.1	5.56	186	
36J	1:12 PM**	30.5	6.06	181	
37J	1:25 PM**	30.1	6.31	185	
38J	1:27 AM**	29.4	6.56	185	
39J	1:36 AM**	27.8	6.81	185	
40J	1:41 AM**	26.6	7.06	188	
41J	10:20 AM**	26.0	7.31	190	
42J	10:26 AM**	26.6	7.56	196	
43J	10:40 AM**	23.6	7.81	186	
44J	10:53 AM**	22.9	8.06	193	
45J	10:58 AM**	19.6	8.40	176	
46J	11:08 AM**	20.6	8.66	183	
47J	11:23 AM**	18.1	10.0	181	Points 51, 52 & 53
48J	11:23 AM**	18.1	10.0	206	in badly eroded area
49J	11:23 AM**	18.1	10.0	194	
50J	12:16 PM**	5.18	20.1		

EXHIBIT 4M





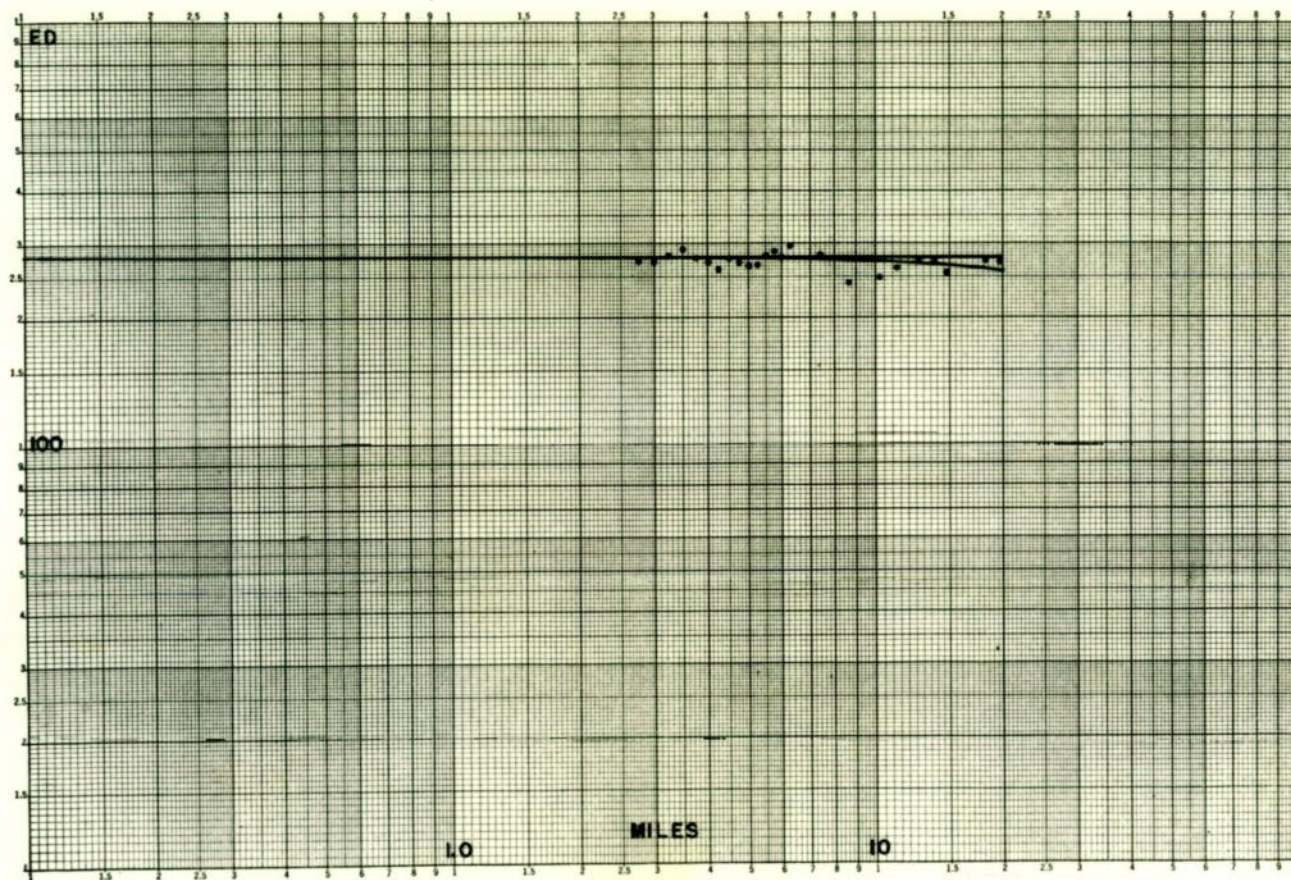
A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KNFT
620 KC - 1000 WATTS-2A
RADIAL NORTH 272 DEGREES EAST
OCTOBER 10, 12 AND 15-1940

P	TIME	E	D	ED	COMMENTS
50J	1:05 PM	29.8	2.75	80.2	
50J	2:05 PM	23.6	2.05	70.5	
50J	2:06 PM	23.6	2.05	70.5	
50J	2:15 PM	22.5	2.50	78.8	
50J	2:25 PM	10.8	3.75	78.0	
50J	2:31 PM	19.8	4.00	79.3	
50J	2:46 PM	19.1	4.25	81.2	
50J	2:57 PM	18.4	4.50	86.8	
50J	3:03 PM	16.8	4.75	79.8	
50J	3:15 PM	16.8	5.00	79.1	
50J	3:23 PM	14.4	5.50	79.3	
50J	3:35 PM	14.2	5.75	81.6	
50J	3:45 PM	13.1	6.00	75.2	
50J	1:45 PM	15.0	6.20	80.6	
41J	1:1	11	6.50	11	
42J	1:1	11	6.70	11	
43J	2:57 PM	10.8	6.80	70.5	
43J	2:58 PM	10.8	7.05	82.7	
43J	2:59 PM	10.8	7.25	82.7	
43J	2:59 PM	10.1	7.55	76.3	
43J	2:40 PM	10.3	7.60	81.5	
43J	2:45 PM	8.75	8.40	79.5	
43J	2:55 PM	8.20	9.00	75.8	
50J	12:08 PM	8.08	9.35	75.5	
51J	12:04 PM	7.75	10.0	77.5	
50J	11:53 AM	4.57	10.1	78.5	
50J	11:50 AM	4.52	20.1	80.8	

POINTS 51, 52, &
53 IN SLEAVY ERODED
AREA

EXHIBIT 4M

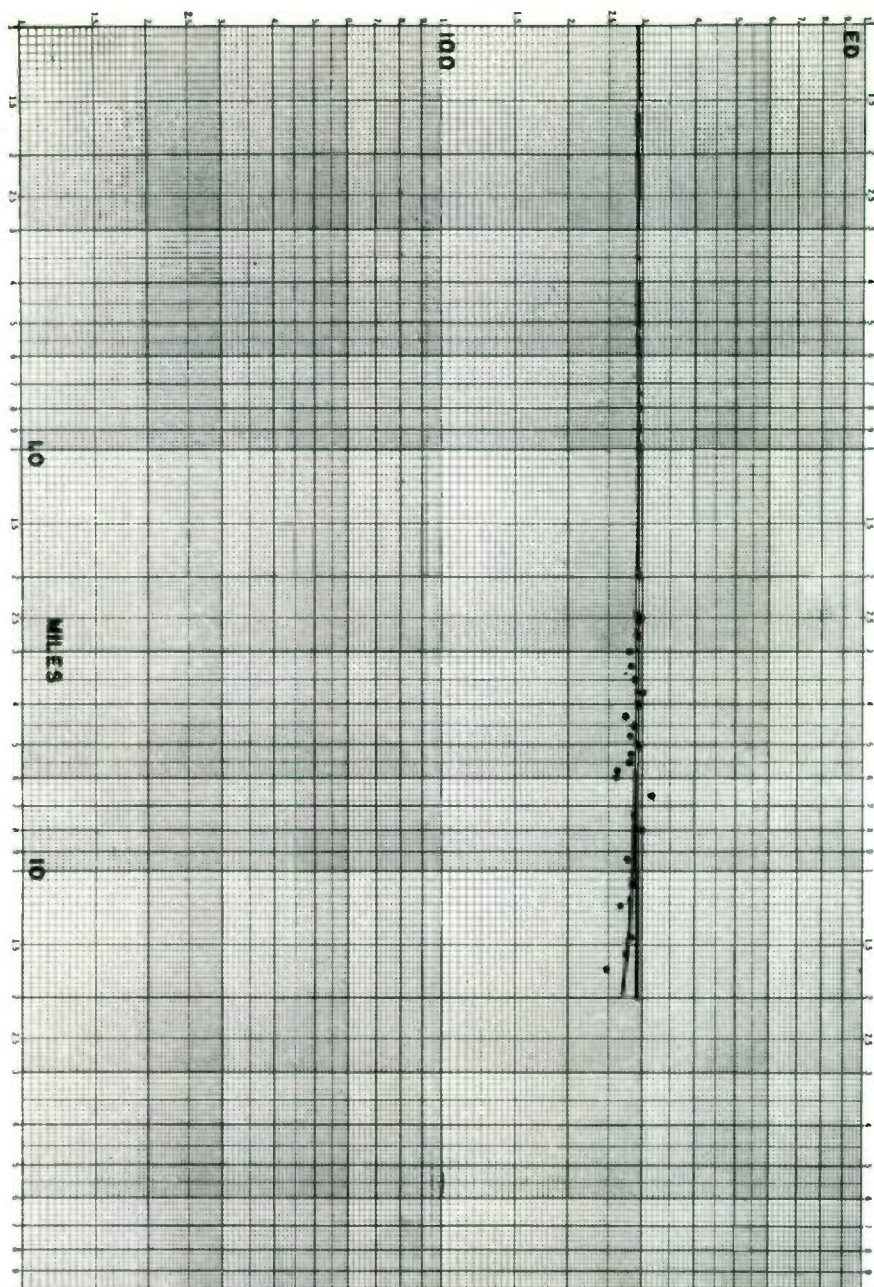


A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

RADIO STATION KNFT
620 KC - 1000 WATTS-DM
RADIAL NORTH 300.5 DEGREES EAST
OCTOBER 18, 19th AND 20th, 1940

P	TIME	E	D	ED	COMMENTS
26K	2:55 PM	98.0	2.75	272	CREEK BOTTOM
27K	3:20 PM	90.5	3.00	272	
28K	3:29 PM	86.0	3.25	280	
29K	3:35 PM	82.5	3.50	289	HIGH ELEVATION
30K	3:48 PM	79.5	3.75	276	
31K	4:10 PM	67.4	4.00	270	
32K	4:36 PM	61.2	4.25	260	CREEK BOTTOM
33K	4:44 PM	61.2	4.50	276	
34K	4:59 PM	56.7	4.75	270	
35K	5:27 PM	55.8	5.00	264	
36K	5:32 PM	50.6	5.25	266	
37K	9:10 AM	51.0	5.50	280	
38K	9:15 AM	49.7	5.75	286	HIGH ELEVATION
39K	9:20 AM	45.7	6.00	274	HIGH ELEVATION
40K	1:37 PM	47.0	6.25	294	
41K	1:46 PM	38.1	7.36	280	
42K	1:56 PM	59.2	8.60	242	
43K	2:05 PM	24.6	10.15	250	
44K	2:10 PM	20.2	11.30	262	
45K	2:36 PM	22.0	12.60	277	
46K	2:47 PM	19.7	13.70	270	
47K	4:15 PM	17.1	14.80	253	
48K	4:27 PM	15.0	18.20	273	
49K	4:36 PM	13.9	19.70	274	

EXHIBIT 40



P	TIME	E	D	ED	COMMENTS
25L	9:57 AM	119.0	5.00	158	Low Elevation
26L	9:51 AM	107.0	5.75	134	High Elevation
27L	10:06 AM	96.6	5.00	278	High Elevation
28L	10:10 AM	86.5	3.25	282	
29L	10:51 AM	80.5	3.50	302	
30L	10:27 AM	73.5	3.75	302	
31L	10:43 AM	61.6	4.00	306	
32L	10:16 PM	53.6	4.25	274	
33L	11:43 PM	50.6	4.50	266	
34L	11:43 PM	48.6	4.75	266	
35L	11:46 PM	36.9	5.00	295	
36L	11:41 PM	54.1	5.25	294	
37L	11:46 PM	51.0	5.50	280	
38L	11:52 PM	45.6	5.75	262	
39L	2:00 PM	43.4	6.00	261	
40L	11:52 AM	38.4	6.25	319	
41L	11:59 AM	30.9	7.00	288	
42L	11:59 AM	26.7	7.25	275	
43L	10:00 AM	26.8	8.00	286	
44L	10:19 AM	23.8	10.65	286	
45L	10:17 AM	21.9	11.80	281	
46L	10:12 AM	19.6	12.20	283	
47L	10:40 AM	17.5	14.45	276	
48L	10:40 AM	16.00	15.00	276	
49L	10:50 AM	14.5	17.00	246	

RADIO STATION KEPT
GEO. KC - 1000 WATTS-DA
RADIAL NORTH 326.5 DEGREES EAST
OCTOBER 19 AND 20, 1940

A. EARL CULLUM, JR.
CONSULTING RADIO ENGINEER
HIGHLAND PARK VILLAGE
DALLAS, TEXAS

High Elevation
High Elevation
Creek
Creek
High Elevation
High Elevation

Red River - Behind
Bluff

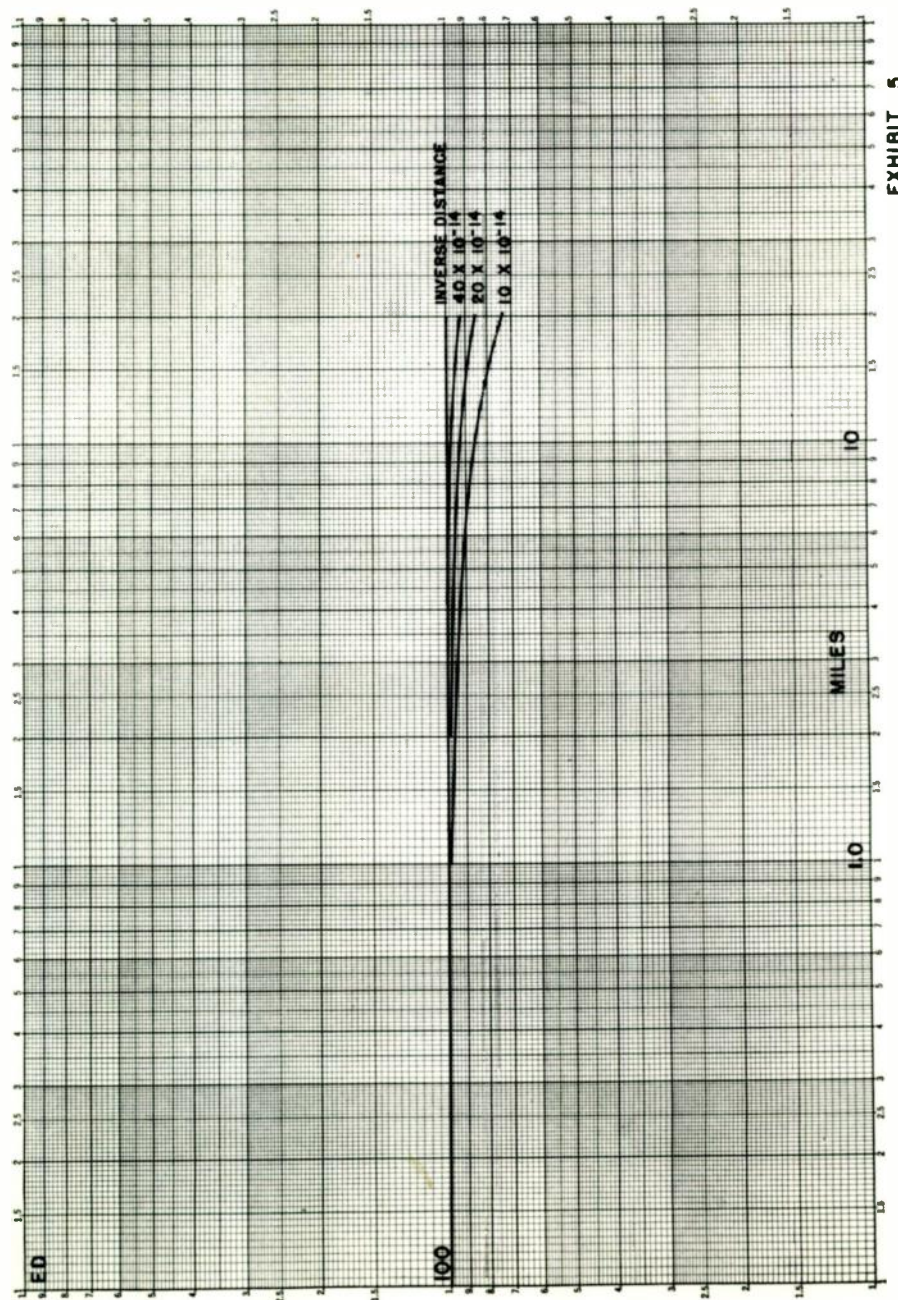


EXHIBIT 5

DESCRIPTION OF KWFT MONITORING POINTS

MILWAUKEE, WISCONSIN KWFT 29.4 MILLIVOLTS PER METER

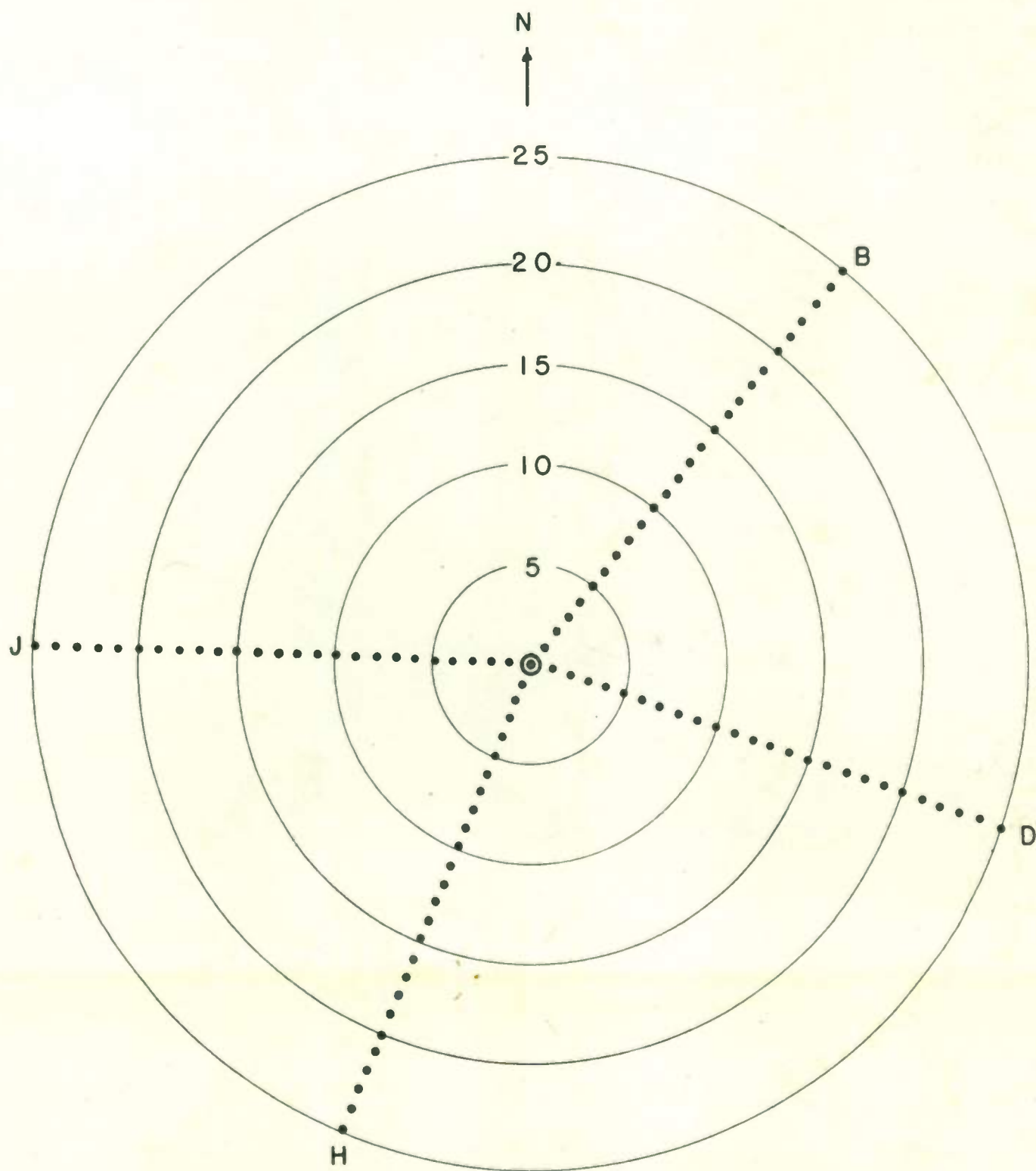
THIS POINT IS LOCATED 2.60 MILES IN THE DIRECTION NORTH 39.0 DEGREES EAST FROM THE MID POINT BETWEEN THE KWFT TOWERS. TO REACH THIS POINT PROCEED FROM THE WICHITA FALLS CITY LIMITS NORTHWEST ON U. S. HIGHWAY 70; 1.50 MILES TO JUNCTURE WITH GRAVEL ROAD RUNNING SOUTH; GO SOUTH 0.50 MILES TO JUNCTURE WITH GRAVEL ROAD TO THE WEST; TURN WEST ACROSS THE MISSOURI-KANSAS-TEXAS RAILROAD TRACKS, AND CONTINUE 0.40 MILES WEST FROM THE TRACKS TO THE MONITOR POINT.

TAMPA, FLORIDA WFLA-WSUN 19.7 MILLIVOLTS PER METER

THIS POINT IS LOCATED 4.25 MILES IN THE DIRECTION NORTH 109.0 DEGREES EAST FROM THE MID POINT BETWEEN THE KWFT TOWERS. TO REACH THIS POINT PROCEED 0.05 MILES EAST FROM THE WICHITA FALLS CITY LIMITS AND HOLLIDAY CREEK ON U. S. HIGHWAY 82; THE MONITOR POINT IS ON THE SOUTH SIDE OF THE HIGHWAY RIGHT-OF-WAY.

PHOENIX, ARIZONA KTAR 29.1 MILLIVOLTS PER METER

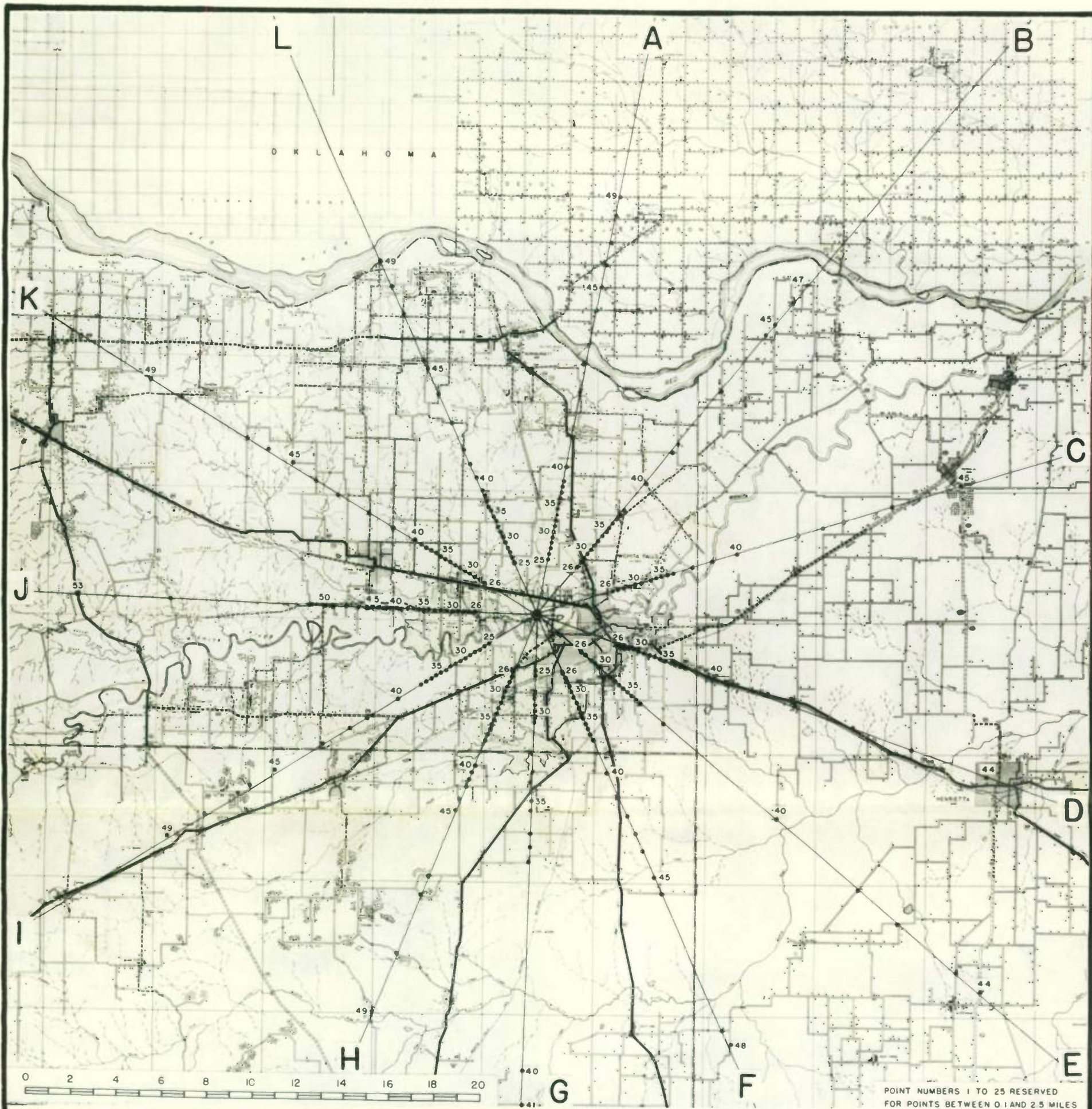
THIS POINT IS LOCATED 2.75 MILES IN THE DIRECTION NORTH 272.0 DEGREES EAST FROM THE MID POINT BETWEEN THE KWFT TOWERS. TO REACH THIS POINT PROCEED FROM THE KWFT PLANT APPROXIMATELY 3 MILES WEST ON THE INDIAN HEIGHTS ROAD TO CHASTE ROAD; TURN NORTH 0.40 MILES TO PRIVATE ENTRANCE TO FARM HOUSE ON THE WEST SIDE OF CHASTE ROAD; TURN WEST INTO FARM YARD AND PROCEED 0.20 MILES DUE WEST TO MONITOR POINT, WHICH IS LOCATED BY IRRIGATION CANAL.



NUMBER ASSIGNED TO EACH POINT INDICATES DISTANCE FROM ANTENNAE TO POINT MEASURED IN TENTH MILES

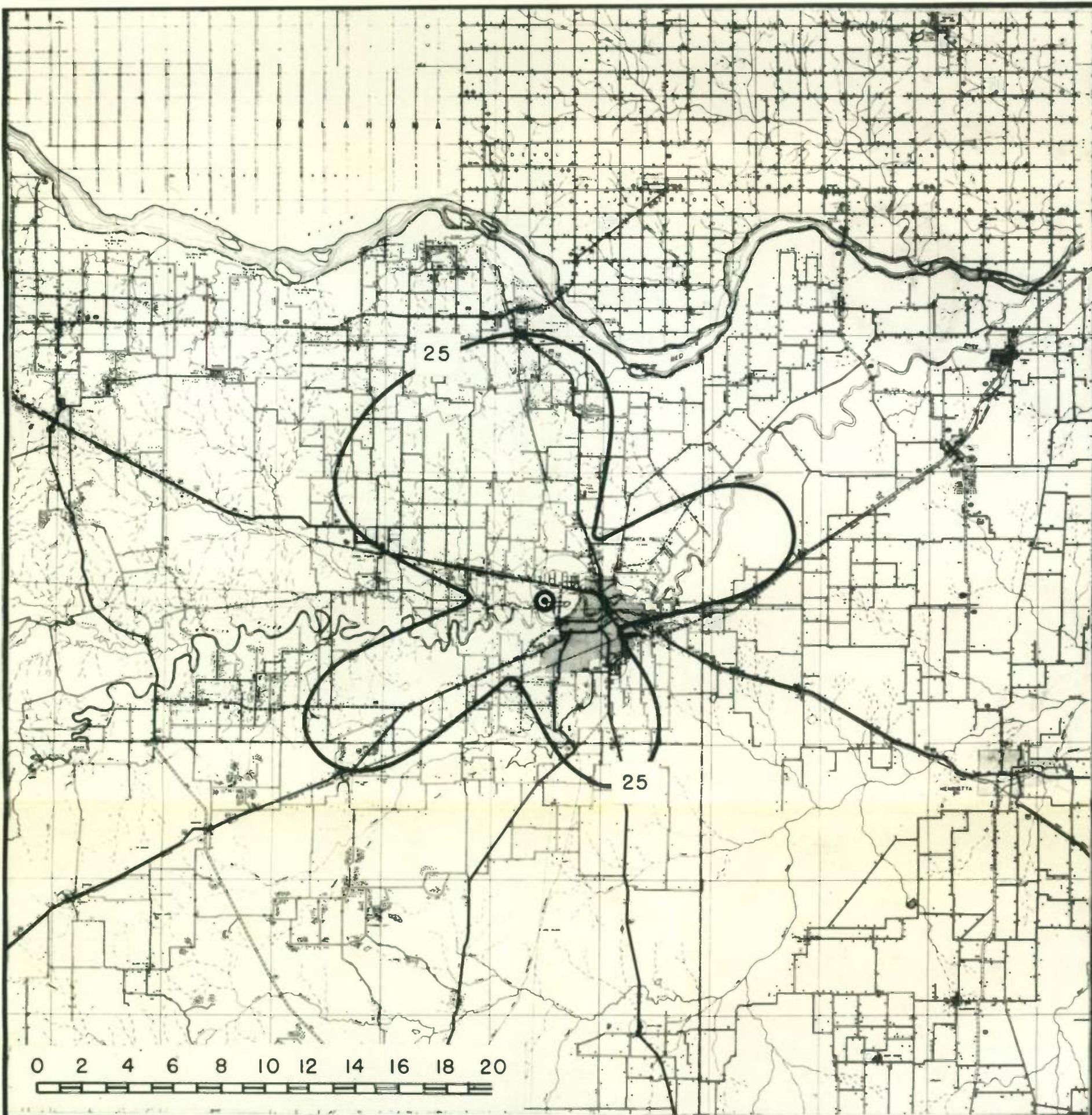
AREA IMMEDIATELY
SURROUNDING THE ANTENNA
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
620 KC. 5000-1000 WATTS-DA.
POINT LOCATION MAP
EXHIBIT NUMBER 7



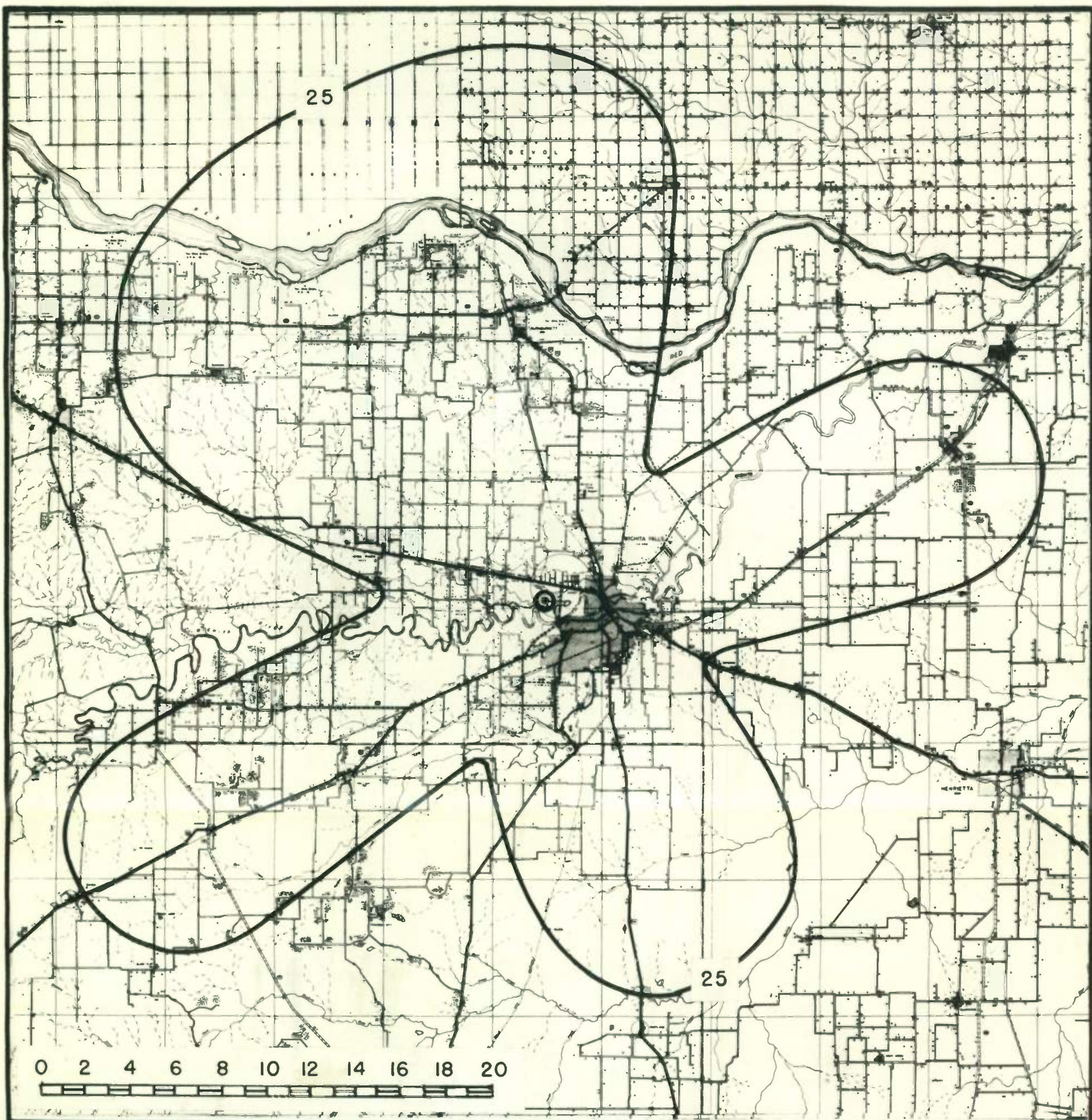
WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM, JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
620 KC 5000-1000 WATTS-DA
POINT LOCATION MAP
EXHIBIT NUMBER 8



WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
620 KC. 1000 WATTS-DA
MEASURED CONTOUR
EXHIBIT NUMBER 9A



WICHITA FALLS, TEXAS
AND SURROUNDING TERRITORY
A. EARL CULLUM JR.
RADIO ENGINEERING CONSULTANT

RADIO STATION KWFT
620 KC. 5000 WATTS-DA
MEASURED CONTOUR
EXHIBIT NUMBER 9B

File No.

Call letters KWFT

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

APPLICATION TO DETERMINE OPERATING POWER OF BROADCASTING STATION
BY DIRECT MEASUREMENT OF ANTENNA POWER

(Submit in duplicate to Federal Communications Commission, Washington, D.C. Swear to one copy)

To the Federal Communications Commission:

1. Name of applicant* : WICHITA BROADCASTING COMPANY
2. Post office address: State TEXAS City WICHITA FALLS
Street and number 800 EIGHTH STREET
3. Existing license or construction permit authorizes the use of the following:
 - (a) Call letters KWFT (b) Frequency 620 KC
 - (c) Power: Night 1000 DA watts; Day 5000 DA watts.
4. Description of antenna system: DIRECTIONAL ANTENNA FOR DAY AND NIGHT
 - (a) Type 2 ELEMENT DIRECTIONAL Height of vertical lead 400 feet.
Length of flat top NONE feet. Height of top of antenna above ground level 405 feet. If not fully described above, give further details and dimensions:
LINE OF TOWER N 155.5 E, NORTH TOWER CURRENT 0.63 PHASED PLUS 38 DEGREES, SOUTH TOWER CURRENT 1.00 PHASED 00 DEGREES.
 - (b) Is counterpoise used? NO If so, state: Type XXX
Length XXX feet. Breadth XXX feet.
Height above ground (earth) or roof XXX feet.
 - (c) Is ground used? YES If so, describe fully giving details and dimensions 120 RADIALS EACH 400 FEET LONG AND 120 RADIALS EACH 60 FEET LONG EQUALLY SPACED ABOUT EACH TOWER BURIED 6 TO 8 INCHES.
 - (d) Towers: Type and description LEHIGH SELF-SUPPORTING, SQUARE, TAPERED, SERIES FED STEEL TOWERS Height 400 feet.
1398
Distance apart 1398 feet. Operated grounded or insulated? INSULATED

* Name must be identical with that used in existing license or construction permit.

5. Antenna Ammeter: Manufacturer's name WESTON MANUFACTURING CO.
Type No. 743 ES Rated accuracy ONE (1) per cent.
Full scale reading 0-6 amperes. Where connected in circuit AT POINT OF

MEASUREMENT - BETWEEN TRANSMITTER AND POWER DIVIDING -
PHASING NETWORK.

6. Antenna resistance measurement.

Applicant represents that all the information specified below under this section is appended herewith and specifically made a part hereof.

- Qualifications of engineers taking measurements.
- Full description of method used to make measurements.
- Manufacturer's name of each calibrated instrument used and manufacturer's rated accuracy.
- Date, accuracy, and by whom each instrument was last calibrated.
- Table of complete data taken.
- The graph drawn of 10 to 12 readings in a band 50 to 60 kilocycles wide with the operating frequency near the center.

(Commission form 3043, containing data and methods of measurement of resistance of a broadcasting station antenna, is recommended for reference.)

7. Operating constants:

- COMMON POINT
XXXXXX Antenna current for night power 1.92 amperes.
- COMMON POINT
XXXXXX Antenna current for day power 4.30 amperes.
- COMMON POINT
XXXXXX Antenna resistance at operating frequency 292 ohms.
- 92.5% of 292 ohms is 270 OHMS
(d) Last radio stage: Night, total plate current 0.365 AMP. Plate voltage 3700 Volts
Day, total plate current 0.810 AMP. Plate voltage 3300 Volts
- (e) What system of modulation is employed (high level, low level, grid bias in last radio stage, etc.)? High level
- (f) Maximum percentage of modulation obtained 100%

Dated this 29TH day of OCTOBER, 19 40

WICHITA BROADCASTING COMPANY
Applicant. (Must correspond with item 1)

By: [Signature]

Agent.

(Be sure all necessary information is furnished)

STATE OF TEXAS } ss:
COUNTY OF DALLAS

JOE B. CARRIGAN, being first duly { sworn upon his oath,
deposes and says that he is the PRESIDENT OF THE WICHITA BROADCASTING COMPANY
(If applicant is not an individual, state relation of affiant to applicant)
above-named applicant, and that the facts stated in the foregoing application and all exhibits attached thereto
are true of his own knowledge, except as to such statements as are therein stated on information and belief,
and as to such statements he believes them to be true.

Subscribed and sworn to before me this 29TH day of OCTOBER, 19 40

[SEAL]

(Notary Public's seal must be affixed where law of jurisdiction requires, otherwise state that law does not require seal)

Notary Public.

My commission expires _____

STATE OF TEXAS)
) ss.
COUNTY OF DALLAS)

A. EARL CULLUM, JR., BEING DULY SWORN, DEPOSES AND SAYS THAT HE IS A QUALIFIED AND EXPERIENCED RADIO ENGINEER WITH OFFICES LOCATED IN DALLAS, TEXAS, AND THAT HE HAS BEEN ENGAGED BY THE LICENSEE OF RADIO STATION KWFT, THE WICHITA BROADCASTING COMPANY, WICHITA FALLS, TEXAS, TO TAKE MEASUREMENTS ON THE KWFT DIRECTIONAL ANTENNA SYSTEM TO BE FILED WITH AND MADE A PART OF AN APPLICATION TO DETERMINE THE OPERATING POWER OF THE KWFT DIRECTIONAL ANTENNA BY DIRECT MEASUREMENT OF POWER. THE ASSIGNMENT OF KWFT IS 620 KILOCYCLES, 5000 WATTS DAYTIME, 1000 WATTS NIGHTTIME, USING A DIRECTIONAL ANTENNA BOTH DAY AND NIGHT.

DEPONENT CERTIFIES THAT THE ENGINEERING DATA HEREWITH SUBMITTED, TOGETHER WITH ATTACHED EXHIBITS, WAS PREPARED BY HIM, AND THAT THE FACTS AND DATA CONTAINED HEREIN ARE TRUE AND ACCURATE TO THE BEST OF HIS KNOWLEDGE AND BELIEF.

A. EARL CULLUM, JR.

SUBSCRIBED AND SWORN TO BEFORE ME THIS 29TH DAY OF OCTOBER, 1940.

NOTARY PUBLIC IN AND FOR
DALLAS COUNTY, TEXAS

MY COMMISSION EXPIRES JUNE 1, 1941.

(A) QUALIFICATIONS OF ENGINEERS TAKING THESE MEASUREMENTS

MR. A. EARL CULLUM, JR., ENGINEER TAKING THESE MEASUREMENTS IS A CONSULTING ENGINEER WITH OFFICES IN HIGHLAND PARK VILLAGE, DALLAS, TEXAS. HE GRADUATED FROM THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY IN 1931, RECEIVING A BACHELOR OF SCIENCE DEGREE IN COMMUNICATION ENGINEERING. MR. CULLUM HAS BEEN EMPLOYED ALMOST CONTINUOUSLY AS A MEMBER OF BROADCAST STATION ENGINEERING STAFFS SINCE 1922. SINCE JULY, 1936, HE HAS MAINTAINED AN OFFICE AS A CONSULTING ENGINEER. LABORATORY AND FIELD WORK HAS REQUIRED THAT HE BE QUALIFIED TO TAKE RADIO FREQUENCY MEASUREMENTS.

(B) FULL DESCRIPTION OF METHOD USED TO MAKE MEASUREMENTS

THE DIRECTIVE ANTENNA POWER DIVIDING AND PHASING NETWORK, WHEN LOADED WITH THE DIRECTIVE ANTENNA, WAS MEASURED WITH A RADIO FREQUENCY BRIDGE USING THE PARALLEL STANDARDS METHOD IN THE FOLLOWING MANNER: A SIGNAL GENERATOR PRODUCING EACH DESIRED FREQUENCY WAS CONNECTED ACROSS THE "GENERATOR" TERMINALS OF THE BRIDGE. THE FREQUENCY OF THE SIGNAL GENERATOR WAS ADJUSTED BY BEATING THE GENERATOR AGAINST AN ACCURATELY CALIBRATED OSCILLATOR. THE CALIBRATION OF THE OSCILLATOR WAS CHECKED AGAINST KNOWN BROADCAST STATION CARRIER FREQUENCIES. A RADIO RECEIVER WAS USED AS A NULL-INDICATOR ACROSS THE "DETECTOR" TERMINALS OF THE BRIDGE. THE CALIBRATION OF THE BRIDGE WAS FIRST CHECKED BY PLACING KNOWN STANDARDS IN PARALLEL ACROSS THE "UNKNOWN" TERMINALS OF THE BRIDGE. THE NETWORK WAS THEN CONNECTED IN PARALLEL WITH SUITABLE KNOWN STANDARDS ACROSS THE "UNKNOWN" TERMINALS OF THE BRIDGE. THE BRIDGE READINGS WERE RECORDED FOR EACH CONDITION OF BALANCE. THE ACTUAL VALUE OF THE NETWORK IMPEDANCE AT EACH FREQUENCY WAS THEN CALCULATED FROM THE DATA RECORDED.

(C) MANUFACTURER'S NAME AND RATED ACCURACY OF EACH CALIBRATED INSTRUMENT.

<u>INSTRUMENT</u>	<u>MANUFACTURER</u>	<u>RATED ACCURACY</u>
RADIO FREQUENCY BRIDGE TYPE 516C SERIAL 342	GENERAL RADIO Co.	2%
RADIO FREQUENCY GENERATOR	A. E. CULLUM, JR.	0.05%
RADIO RECEIVER TYPE HRO	NATIONAL COMPANY	NULL INDICATOR

(D) DATE, ACCURACY, AND BY WHOM EACH INSTRUMENT WAS LAST CALIBRATED.

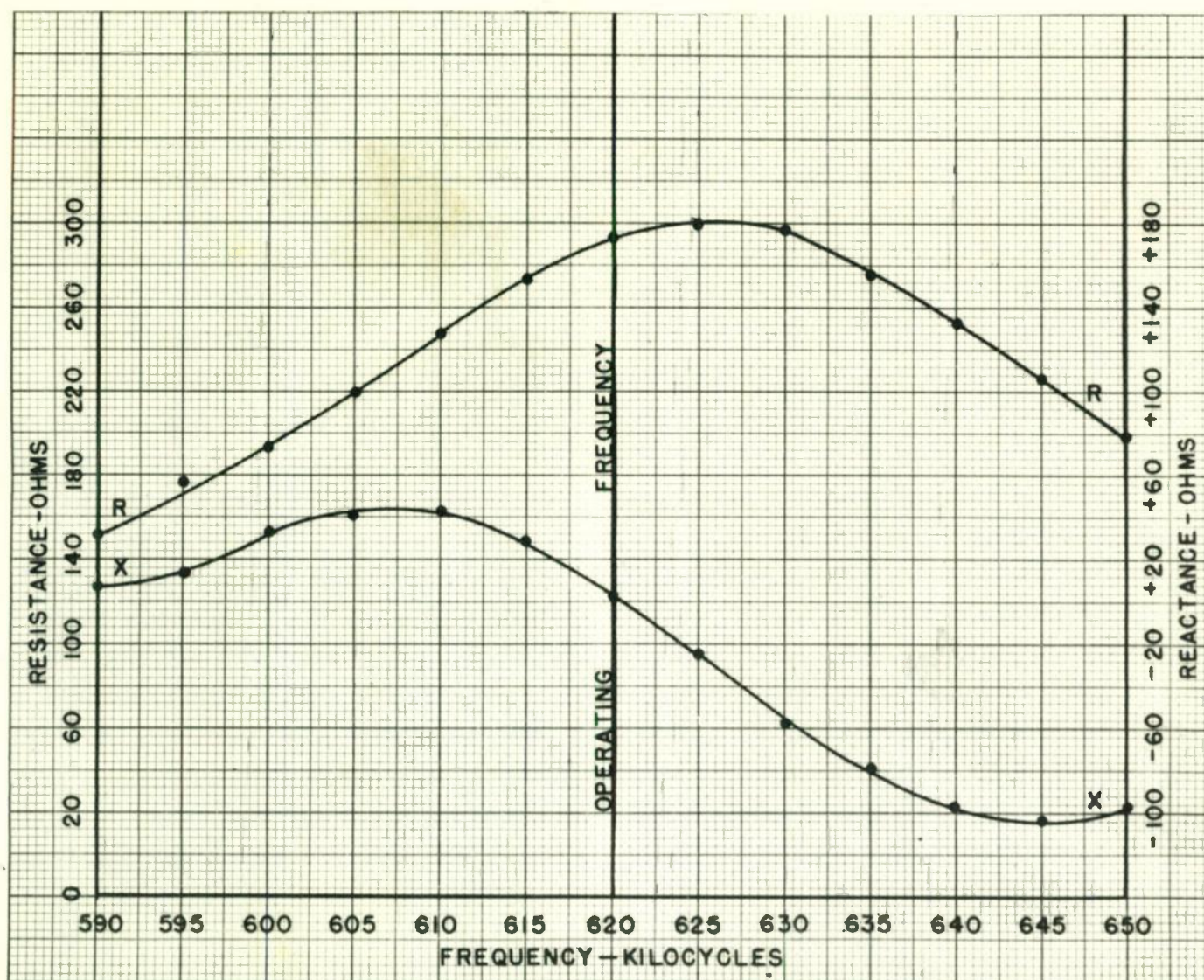
<u>INSTRUMENT CALIBRATED</u>	<u>DATE</u>	<u>ACCURACY</u>	<u>BY WHOM</u>
RADIO FREQUENCY BRIDGE TYPE 516C SERIAL 342	OCT. 11, 1940	2%	A.E. CULLUM, JR.
RADIO FREQUENCY GENERATOR	OCT. 11, 1940	0.05%	A.E..CULLUM, JR.

(E)

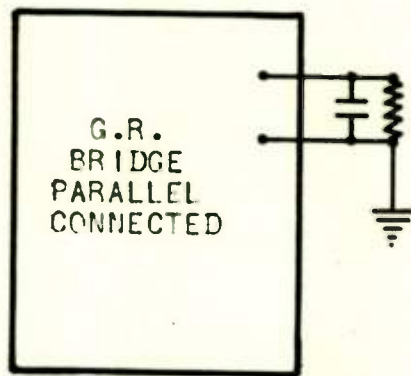
DIRECTIVE ANTENNA COMMON POINT IMPEDANCE
 RADIO STATION KWFT, WICHITA FALLS, TEXAS
 A. EARL CULLUM, JR. CONSULTING ENGINEER
 OCTOBER 11, 1940

FREQUENCY KILOCYCLES	PARALLEL R_1	STDS. C_1	STDS. & NET. R_2	PAR. C_2	NETWORK R	IMPEDANCE X
590	100.2	448	60.1	526	151	+6.9
595	100.2	448	62.9	330	167	+13.0
600	100.2	448	66.5	229	193	+32.8
605	100.2	447	69.6	233	218	+41.0
610	100.2	448	72.0	275	248	+42.5
615	100.2	447	73.8	352	273	+28.2
620	100.2	447	74.8	438	292	+3.0
625	100.2	447	75.5	514	299	-24.2
630	100.2	447	75.6	609	296	-58.3
635	100.3	448	75.4	696	276	-79.5
640	100.3	448	74.5	787	253	-96.8
645	100.3	448	73.1	880	226	-104.0
650	100.3	448	71.2	964	198	-98.5

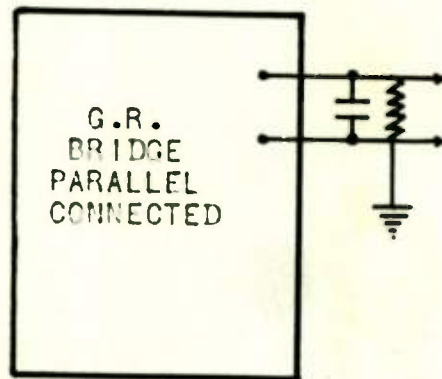
MEASUREMENTS BY USE OF PARALLEL STANDARDS



(1) COMMON POINT IMPEDANCE MEASUREMENTS



AT ALL FREQUENCIES
READ R_1 AND C_1



COMMON
POINT

AT ALL FREQUENCIES
READ R_2 AND C_2

COMMON POINT IMPEDANCE:

$$R = \frac{G_x}{G_x^2 + B_x^2}$$

$$X = \frac{-B_x}{G_x^2 + B_x^2}$$

WHERE

$$G_x = \frac{1}{R_2} - \frac{1}{R_1}$$

$$B_x = \omega(C_2 - C_1)$$

AUDIO FIDELITY CURVE

± 75 KC SWING

GR FM MONITOR 1170-A

---- Standard 75 μ sec Pre Emphasis Curve

— Overall Equipment Response Curve

DECIBELS

+ 18

+ 16

+ 14

+ 12

+ 10

+ 8

+ 6

+ 4

+ 2

+ 0

- 2

50

100

400

1000

5000

10000

15000

CYCLES PER SECOND

World Radio History

