1460-1470

Station	Main Studio	Freq	Power	Date
NEW	Medicine Hat, AB	1460	10 kW/DA-N	10/28/74
CJOY	Guelph, ON	1460	5/10 kW/DA-2	8/8/59
CJVB	Vancouver, BC	1460	10 kW/DA-2	9/72
CKRB	Ville St. George, QU	1460	5/10 kW/DA-N	7/8/59
KCDI	Kirkland, WA	1460	5 kW/DA-D	11/16/59
KDMA	Montevideo, MN	1460	1 kW/DA-1	6/20/58
KDON	Santa Cruz, CA	1460	5 kW/DA-1	3/16/49
KENO	Las Vegas, NV	1460	1/5 kW/DA-N	9/12/80
KENO	Las Vegas, NV	1460	1 kW/ND	11/13/50
KGAA	Kirkland, WA	1460	2.5/5 kW/DA-2	7/10/80
KILO	Kirkland, WA	1460	5 kW/DA-D	4/28/65
KIRL	St. Charles, MO	1460	0.5/5 kW/DA-2	9/12/80
KIRL	St. Charles, MO	1460	5 kW/DA-D	12/23/70
KLTC	Dickinson, ND	1460	5 kW/DA-N	7/26/78
KMWX	Yakima, WA	1460	5 kW/DA-N	3/1/54
KSO	Des Moines, IA	1460	5 kW/DA-N	3/24/77
KTYM	Inglewood, CA	1460	0.5/5 kW/DA-2	11/16/79
KTYM	Inglewood, CA	1460	5 kW/DA-D	3/23/59
KVRE	Santa Rosa, CA	1460	1 kW/DA-D	5/28/59
KYSN	Colorado Springs, CO	1460	0.5/1 kW/DA-N	4/5/57
KZOT	Marianna, AR	1460	0.5 kW/DA-D	10/2/59
WACO	Waco, TX	1460	1 kW/DA-N	9/22/76
WAIL	Baton Rouge, LA	1460	1 kW/DA-N	8/10/49
WAKS	Fuquay-Varina, NC	1460	5 kW/DA-D	5/25/77
WAXC	Rochester, NY	1460	5 kW/DA-N	10/15/45
WBCU	Union, SC	1460	1 kW/DA-N	12/2/48
WBET	Brockton, MA	1460	5/1 kW/DA-N	11/12/52

1460-1470

Station	Main Studio	Freq	Power	Date
WBNS	Columbus, OH	1460	1/5 kW/DA-N	1/21/49
WCID	Juncos, PR	1460	0.5 kW/DA-D	4/29/68
WCIS	Moss Point, MS	1460	1 kW/DA-D	6/22/62
WCMB	Harrisburg, PA	1460	5 kW/DA-N	1/11/56
WEMD	Easton, MD	1460	0.5/1 kW/DA-2	9/11/74
WEWO	Laurinburg, NC	1460	5 kW/DA-2	7/10/80
WFAB	Juncos, PR	1460	0.5 kW/DA-2	11/16/79
WFMH	Cullman, AL	1460	0.5/5 kW/DA-N	12/12/58
WIXN	Dixon, IL	1460	1 kW/DA-D	3/23/59
WJJZ	Holly, NJ	1460	5 kW/DA-D	12/29/65
WKAM	Goshen, IN	1460	0.5/1 kW/DA-N	3/30/63
WLPM	Suffolk, VA	1460	0.5/5 kW/DA-2	5/8/61
WMBA	Ambridge, PA	1460	0.5 kW/DA-D	6/11/54
WOKO	Albany, NY	1460	5 kW/DA-N	6/16/49
WPDQ	Jacksonville, FL	1460	5 kW/DA-N	9/17/48
WPNX	Phenix City, AL	1460	1 kW/DA-N	3/12/54
WPON	Pontiac, MI	1460	0.5/1 kW/DA-N	5/28/68
WPRW	Manassas, VA	1460	5 kW/DA-2	6/14/61
WPVL	Painesville, OH	1460	0.5/1 kW/DA-2	4/9/75
WRAD	Radford, VA	1460	0.5/5 kW/DA-N	11/28/55
WRTL	Rantoul, IL	1460	0.5 kW/DA-D	8/14/74
WXOK	Baton Rouge, LA	1460	1/5 kW/DA-N	5/27/69
NEW	Dickinson, ND	1460	5 kW/DA-N	3/16/77
NEW	New London, WI	1460	1 kW/DA-2	3/28/68
XELX	Zitacuaro, Michoacan	1460	10 kW/DA-N	6/13/52
NEW	Vancouver, BC	1470	10 kW/DA-2	11/29/69
CFOX	Pointe Claire, QU	1470	50 kW/DA-1	8/27/71

1460-1470

Station	Main Studio	Freq	Power	Date
CFRW	Winnipeg, MB	1470	5 kW/DA-1	8/28/68
CHOW	Welland, ON	1470	2.5/10 kW/DA-2	3/8/79
CHOW	Welland, ON	1470	5/10 kW/DA-2	6/29/78
CJVB	Vancouver, BC	1470	50 kW/DA-2	5/10/77
CJVB	Vancouver, BC	1470	10 kW/DA-2	5/12/76
KAPS	Mount Vernon, WA	1470	0.5 kW/DA-D	6/28/63
KARE	Atchison, KS	1470	1 kW/DA-1	2/28/69
KDHN	Dimmitt, TX	1470	0.5 kW/DA-D	3/30/64
KGHM	Brookfield, MO	1470	0.5 kW/DA-D	7/18/55
KLCL	Lake Charles, LA	1470	5 kW/DA-N	2/28/70
KNDE	Sacramento, CA	1470	1/5 kW/DA-2	6/29/70
KNDE	Sacramento, CA	1470	1 kW/DA-1	2/16/49
KRBC	Abilene, TX	1470	1/5 kW/DA-N	3/18/49
KSEM	Moses Lake, WA	1470	1/5 kW/DA-2	6/20/56
KSEM	Moses Lake, WA	1470	1 kW/DA-2	6/6/55
KVLH	Paula Valley, OK	1470	1 kW/DA-D	10/26/79
KWAY	Waverly, IA	1470	1 kW/DA-D	2/25/57
KWSL	Sioux City, IA	1470	5 kW/DA-2	7/19/57
WBIG	Greensboro, NC	1470	5 kW/DA-N	4/5/54
WBZE	Wheeling, WV	1470	0.5 kW/DA-D	6/28/63
WFAR	Farrell, PA	1470	0.5/1 kW/DA-N	1/29/60
WJDY	Salisbury, MD	1470	5 kW/DA-D	3/26/58
WKMF	Flint, MI	1470	1/5 kW/DA-2	8/22/69
WKMF	Flint, MI	1470	1 kW/DA-1	2/26/51
WLAM	Lewiston, ME	1470	5 kW/DA-1	7/30/75
WMBD	Peoria, IL	1470	5 kW/DA-2	8/16/49
WMPP	Chicago Heights, IL	1470	1 kW/DA-D	1/29/64

1460-1470

Station	Main Studio	Freq	Power	Date
WNAU	New Albany, MS	1470	0.5 kW/DA-N	9/27/60
WOHO	Toledo, OH	1470	1 kW/DA-2	12/12/49
WRBD	Pompano Beach, FL	1470	2.5/5 kW/DA-2	4/27/77
WRBD	Pompano Beach, FL	1470	5 kW/DA-D	1/28/70
WRBD	Pompano Beach, FL	1470	2.5/5 kW/DA-2	10/27/77
WRGA	Rome, GA	1470	5 kW/DA-N	9/8/48
WSAN	Allentown, PA	1470	5 kW/DA-N	1/28/66
WSRO	Marlborough, MA	1470	5 kW/DA-N	10/26/79
WSRO	Marlborough, MA	1470	1 kW/DA-D	6/16/59
WTKO	Ithaca, NY	1470	0.5/1 kW/DA-N	11/29/68
WVOL	Berry Hill, TN	1470	1/5 kW/DA-2	4/24/58
NEW	Orocovis, PR	1470	1 kW/DA-N	6/23/77
NEW	Coldwater, MI	1470	0.5 kW/DA-D	
NEW	Dimmitt, TX	1470	0.5 kW/DA-D	8/22/61
NEW	Wheeling, WV	1470	0.5 kW/DA-D	12/21/59
XEQF	Loma Bonita, Oax.	1470	5 kW/DA-N	2/77
XERL	Colima, Colima	1470	1 kW/DA-N	8/15/56

PROJECT #3607

DESCRIPTION SHEET - DIRECTIONAL ANTENNA

STATION: NEW

MAIN STUDIO: Medicine Hat, Alberta

FREQUENCY: 1460 kHz

POWER: 10 kW

NOTIFICATION LIST: No. 361

DATE: January 19, 1977

GEOGRAPHICAL LOCATION:

Latitude 49° 58' 35" North
Longitude 110° 36' 45" West

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-N
Number of Elements: 3 (Three)
Type of Elements: Guyed steel towers, uniform cross-section, base insulated for series feed

TOWER:	#1 (South)	#2 (Centre)	#3 (North)
Height above base insulator:	194'(103.6°)	194'(103.6°)	194'(103.6°)
Overall height	199'	199'	199'
Ratio:	1.0	1.21	.96
Phasing:	0°	-87.8°	-177°

GROUND SYSTEM: 120 equally spaced radials per tower of #10 B & S gauge bare soft copper wire, buried approximately 8 inches. Length of radials: 350' (0.52 wavelength) with the exception of those joined along the common chord.

SPACING AND ORIENTATION: Towers are equally spaced on a line bearing 360° True. Spacing between towers is 194' (103.6°).

PREDICTED EFFECTIVE FIELD:

DAY	NIGHT
616 mV/m at 1 mile for 10 kW	607 mV/m at 1 mile for 10 kW
195 mV/m at 1 mile for 1 kW	192 mV/m at 1 mile for 1 kW

October 28, 1974

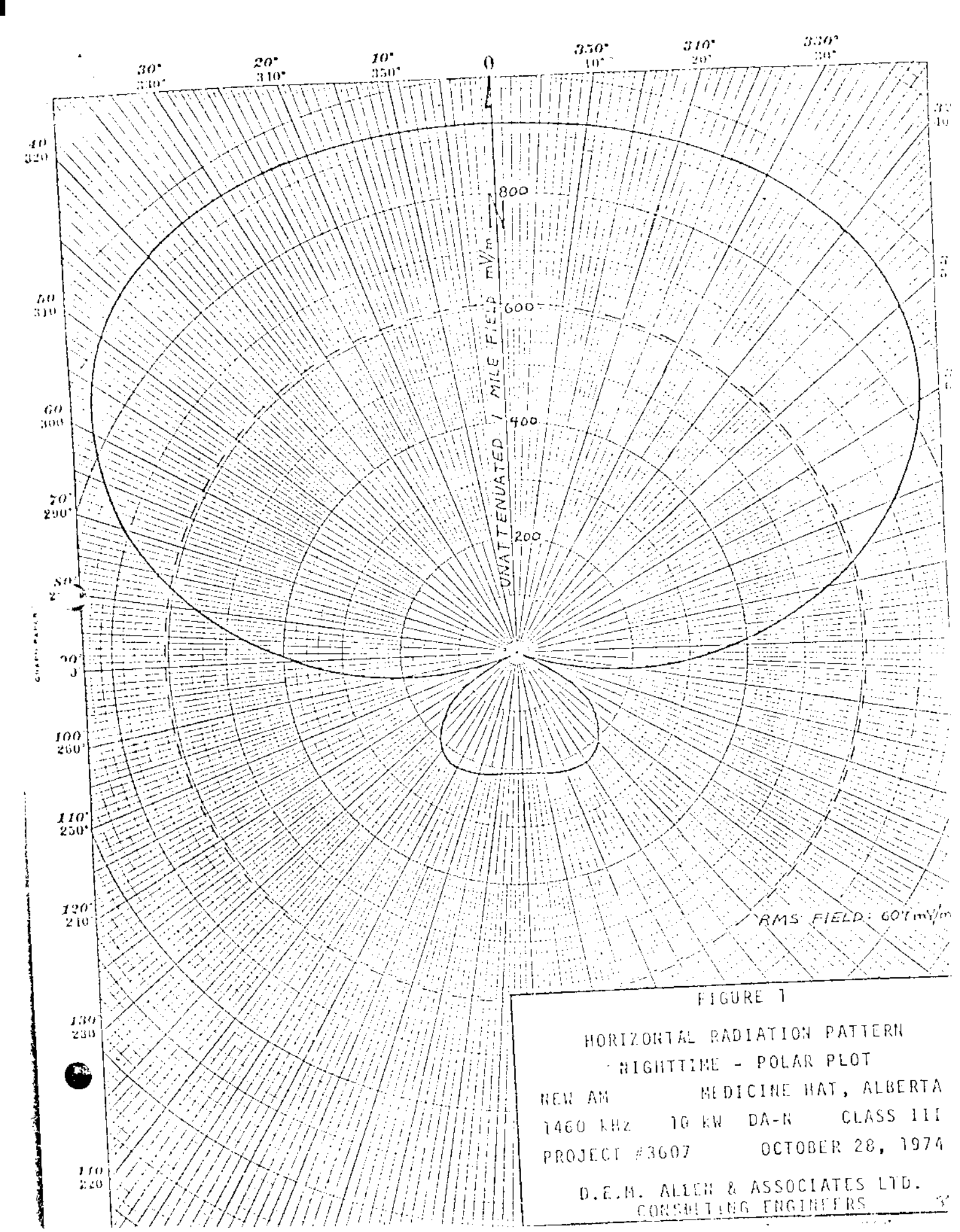


FIGURE 1

HORIZONTAL RADIATION PATTERN

NIGHTTIME - POLAR PLOT

NEW AM MEDICINE HAT, ALBERTA

1460 kHz 10 kW DA-N CLASS III

PROJECT #3607 OCTOBER 28, 1974

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

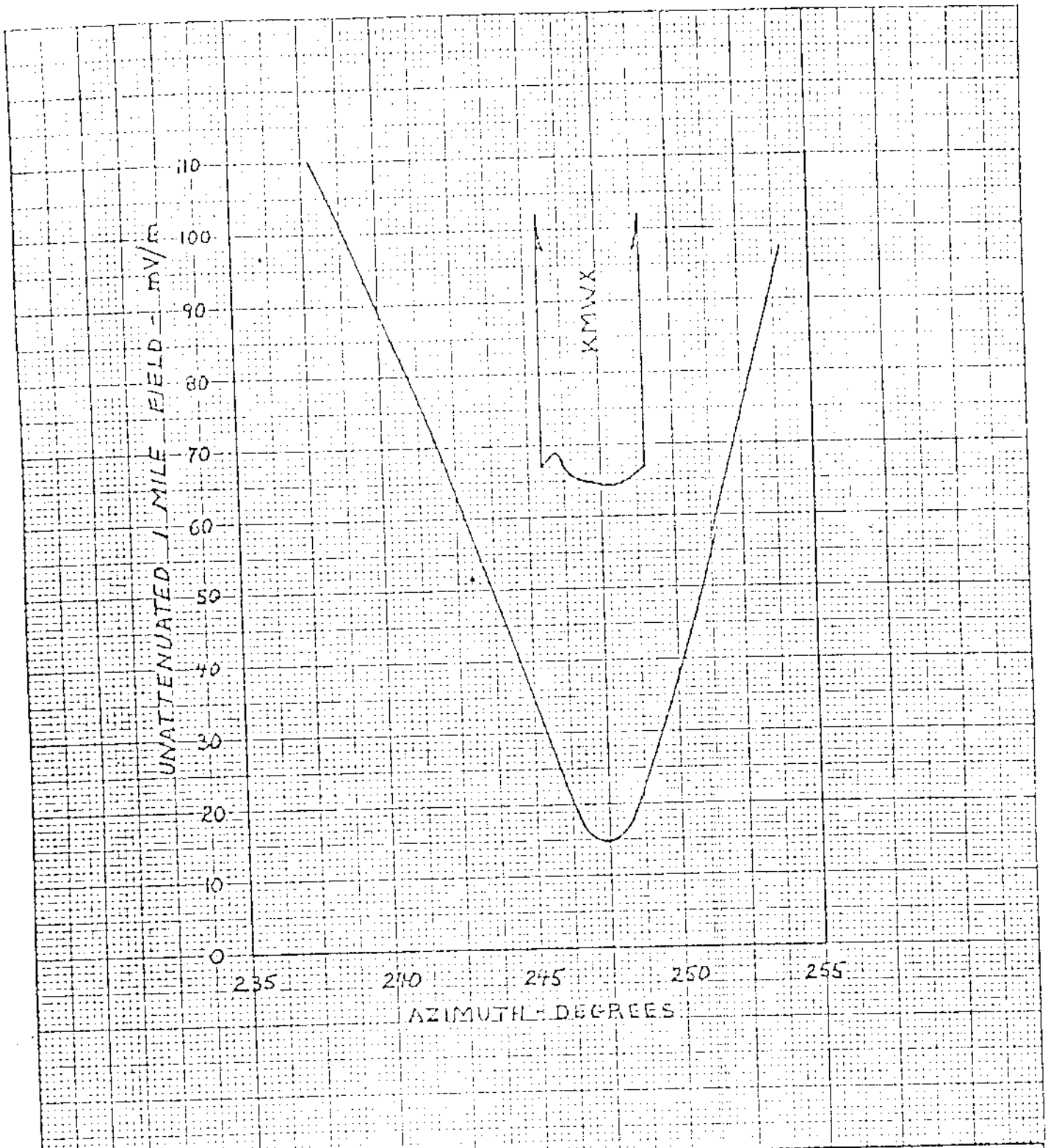
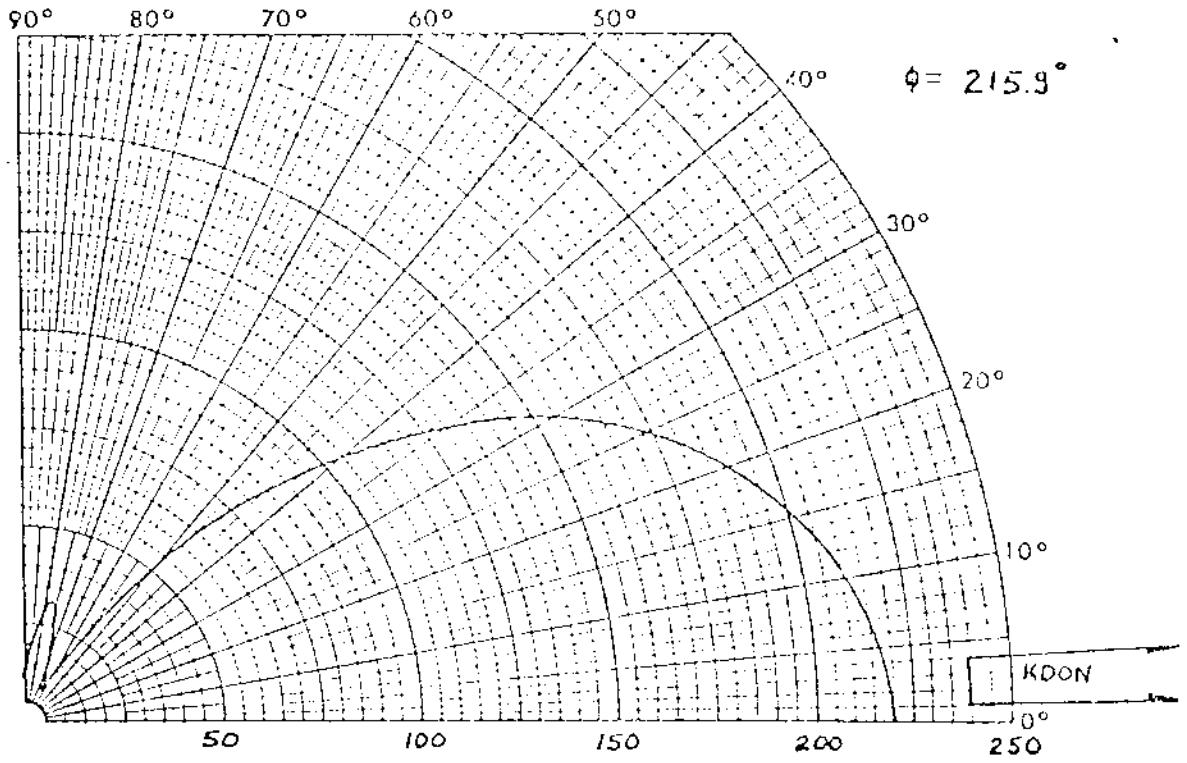


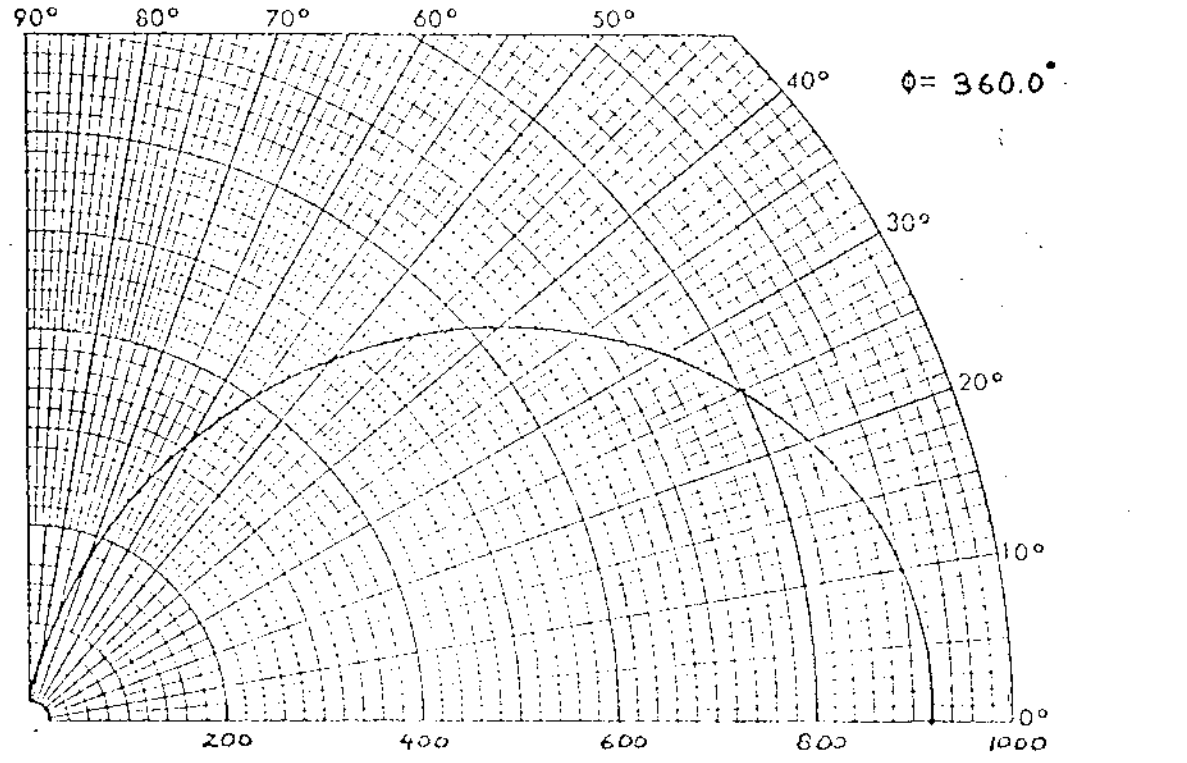
FIGURE 2

HORIZONTAL RADIATION PATTERN
NIGHTTIME - EXPANDED PLOT
NEW AM MEDICINE HAT, ALBERTA
1460 kHz 10 kW DA-N CLASS III
PROJECT #3607 OCTOBER 28, 1974

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS



UNATTENUATED (MV/M) 1 MILE FIELD



UNATTENUATED (MV/M) 1 MILE FIELD

VERTICAL RADIATION PATTERNS

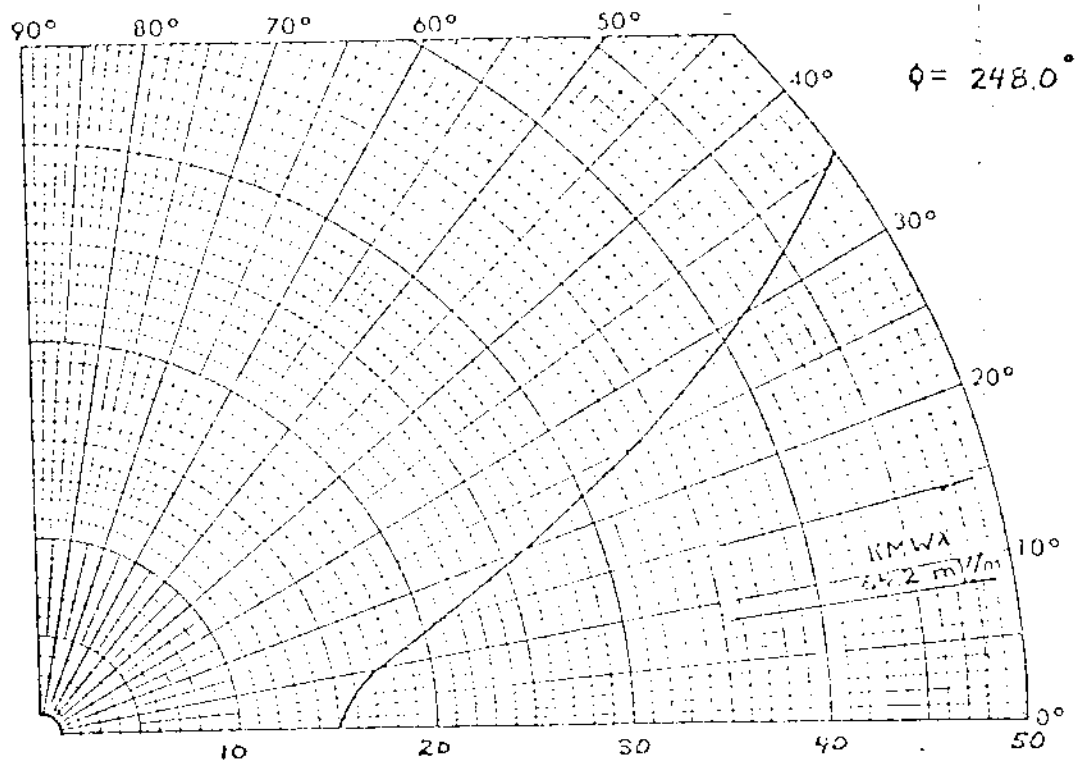
FIGURE 5

NEW AM BROADCASTING STATION — MEDICINE HAT, ALBERTA

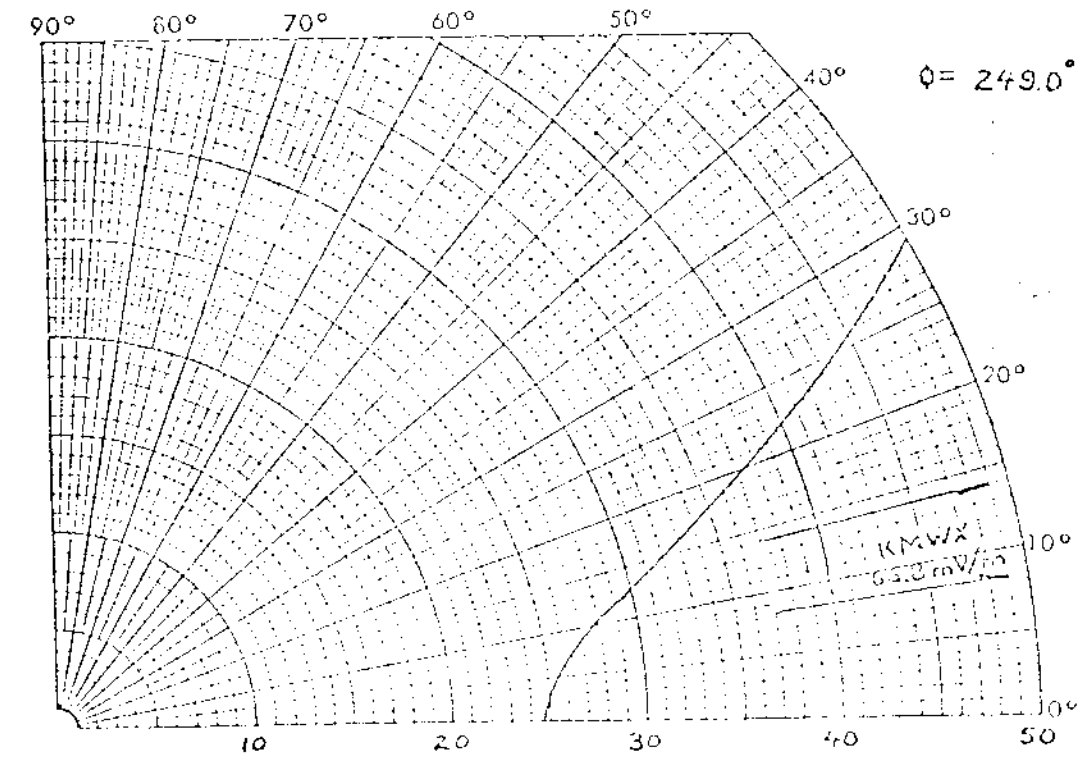
1460 kHz — 10 kW — DA-N — CLASS III

PROJECT #3607 — OCTOBER 28, 1974

D. E. M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS



UNATTENUATED (MVM) 1 MILE FIELD

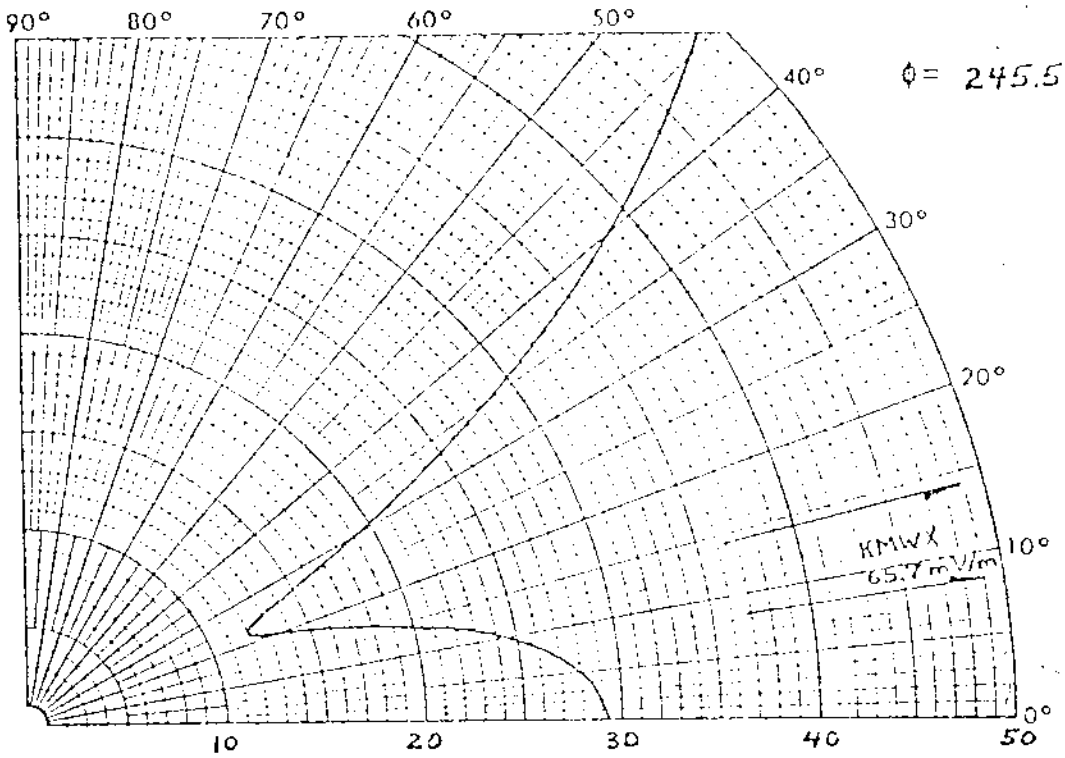


UNATTENUATED (MVM) 1 MILE FIELD

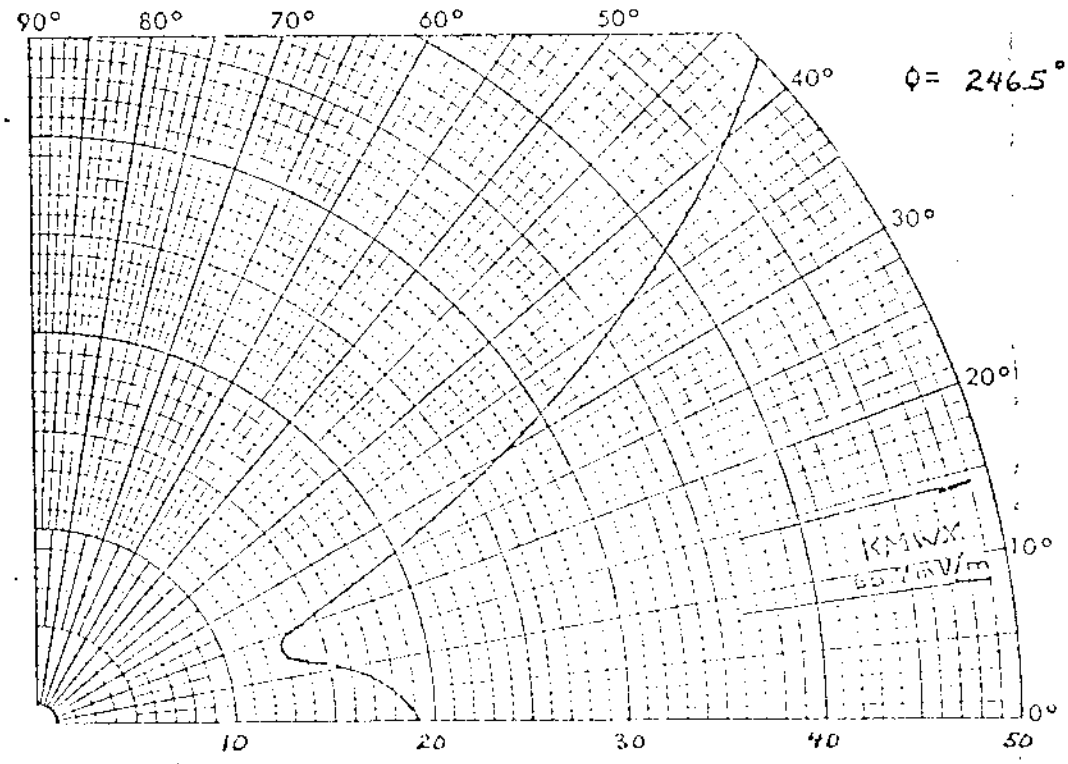
VERTICAL RADIATION PATTERNS

FIGURE 4

NEW AM BROADCASTING STATION MEDICINE HAT, ALBERTA
1460 kHz 10 kW DA-N CLASS III
PROJECT #3607 OCTOBER 28, 1974
D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS



UNATTENUATED (MV/M) 1 MILE FIELD



UNATTENUATED (MV/M) 1 MILE FIELD

VERTICAL RADIATION PATTERNS

FIGURE 3

NEW AM BROADCASTING STATION — MEDICINE HAT, ALBERTA
1460 kHz 10 kW — DA-N — CLASS III
PROJECT #3607 — OCTOBER 28, 1974
D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS

CJOY

#135

DESCRIPTION SHEET (8-8-59g) | Station CJOY Guelph, Ontario, Canada | 5kw, 10kw-LS, DA-2, U, Class III 1460 KC

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: CJOY — Main Studio: Guelph, Ont.

Frequency: 1460 Kc/s. — Power: 10 KW / 5 KW.

Notification List No. 135 — Date: June 12, 1959

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM: North Lat: 43° 29' 9"
West Long: 80° 14' 43"

ANTENNA CHARACTERISTICS

Mode of operation: DA-2
4 guyed elements, uniform cross-section, base insulated for series feed.

TOWER	#1	#2	#3	#4 (North)
Height above Insulators	160'(85.5°)	160'	160'	160'
Overall Height	164'	164'	164'	164'
Spacing	100°	100°	100°	
Phasing DAY	+98°	0°	-136°	not used
Phasing NIGHT	not used	+135°	0°	-135°
Field Ratio DAY	1.0	1.6	1.0	
Field Ratio NIGHT		1.0	1.715	1.0

Orientation: Towers #2, #3 and #4 are on a line bearing 0° of True North. Towers #2 and #1 are on a line bearing 165° of True North

Ground System: 120 radials per tower #10 AWG, bare, soft-drawn copper wire, uniformly spaced, depth 8" approx. 270' long (.4λ) except for shorter radials between towers (bonded at intersections).

Predicted effective Field:

DAY: 570 mv/m (180 mv/m for 1 KW. at one mile).

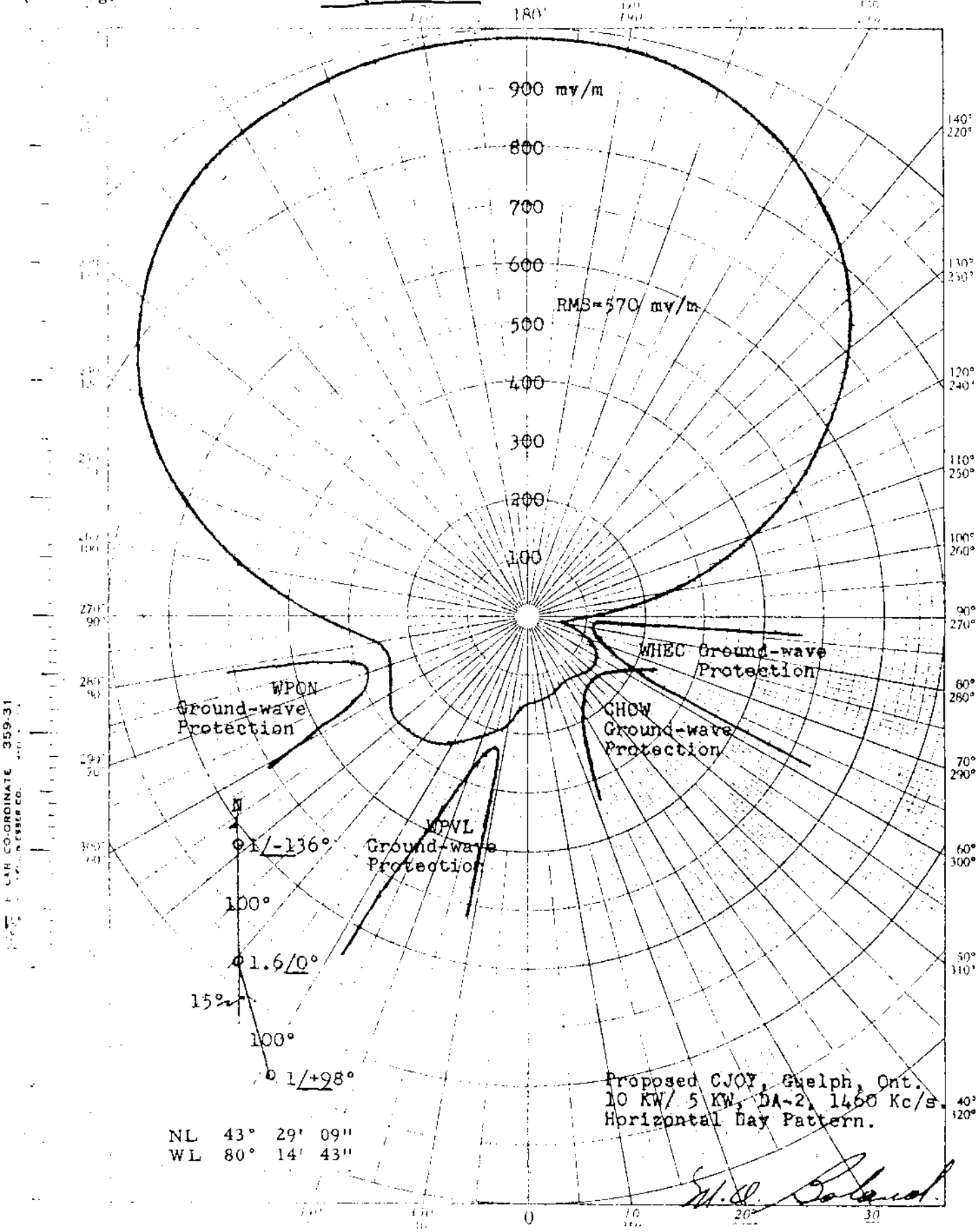
NIGHT: 403 mv/m (180 mv/m for 1 KW. at one mile).

#135

CJOY

PROPOSED DAY
(8-8-59g)

Station CJOY 5kw, 10kw-LS, DA-2, U, Class III
Guelph, Ontario, Canada 1460 KC



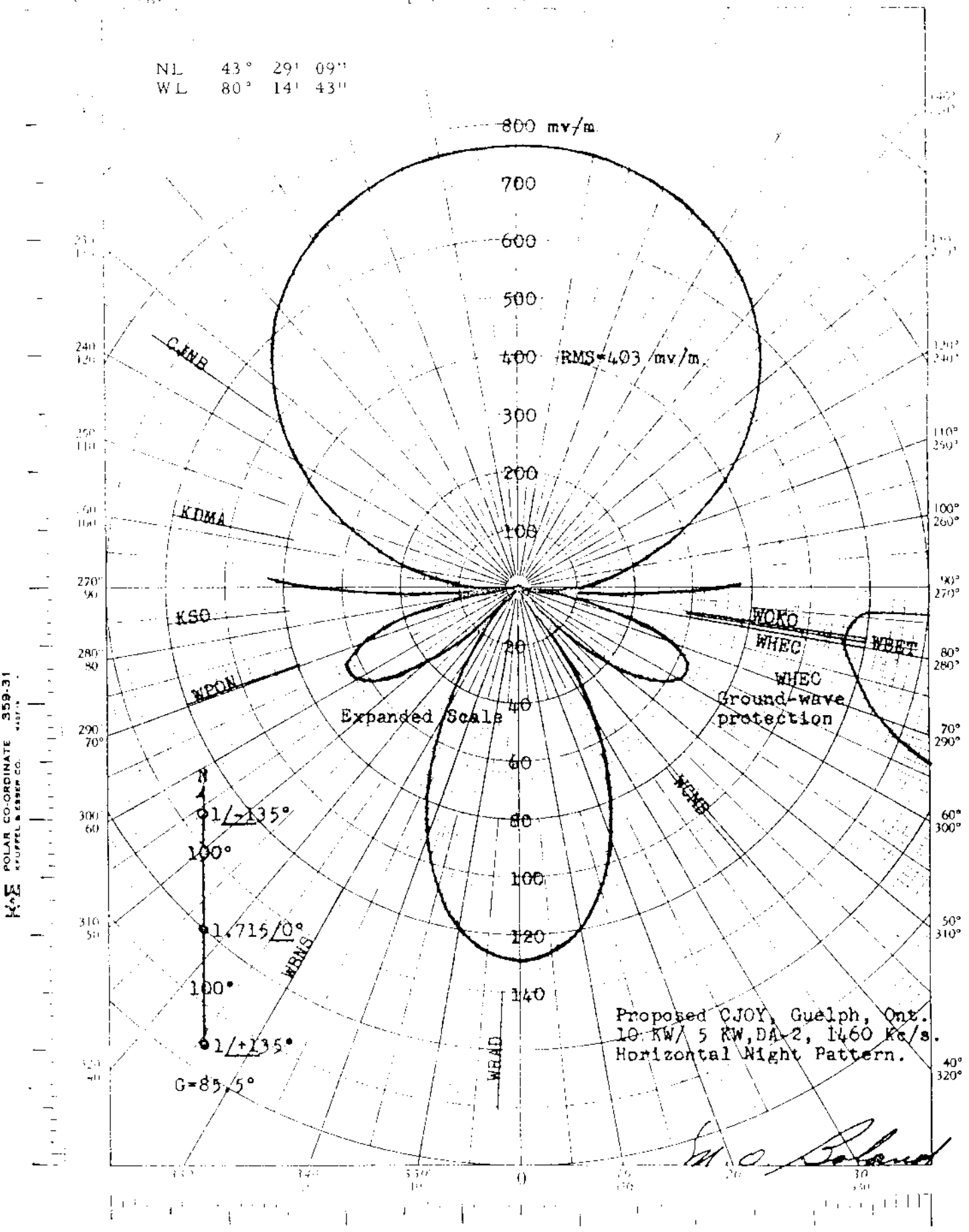
#135

CJOY

PROPOSED NIGHT
(8-8-59R)

Station CJOY 5kw, 10kw-LS, DA-2, U, Class III
Guelph, Ontario, Canada 1460 KC

NL 43° 29' 09"
WL 80° 14' 43"



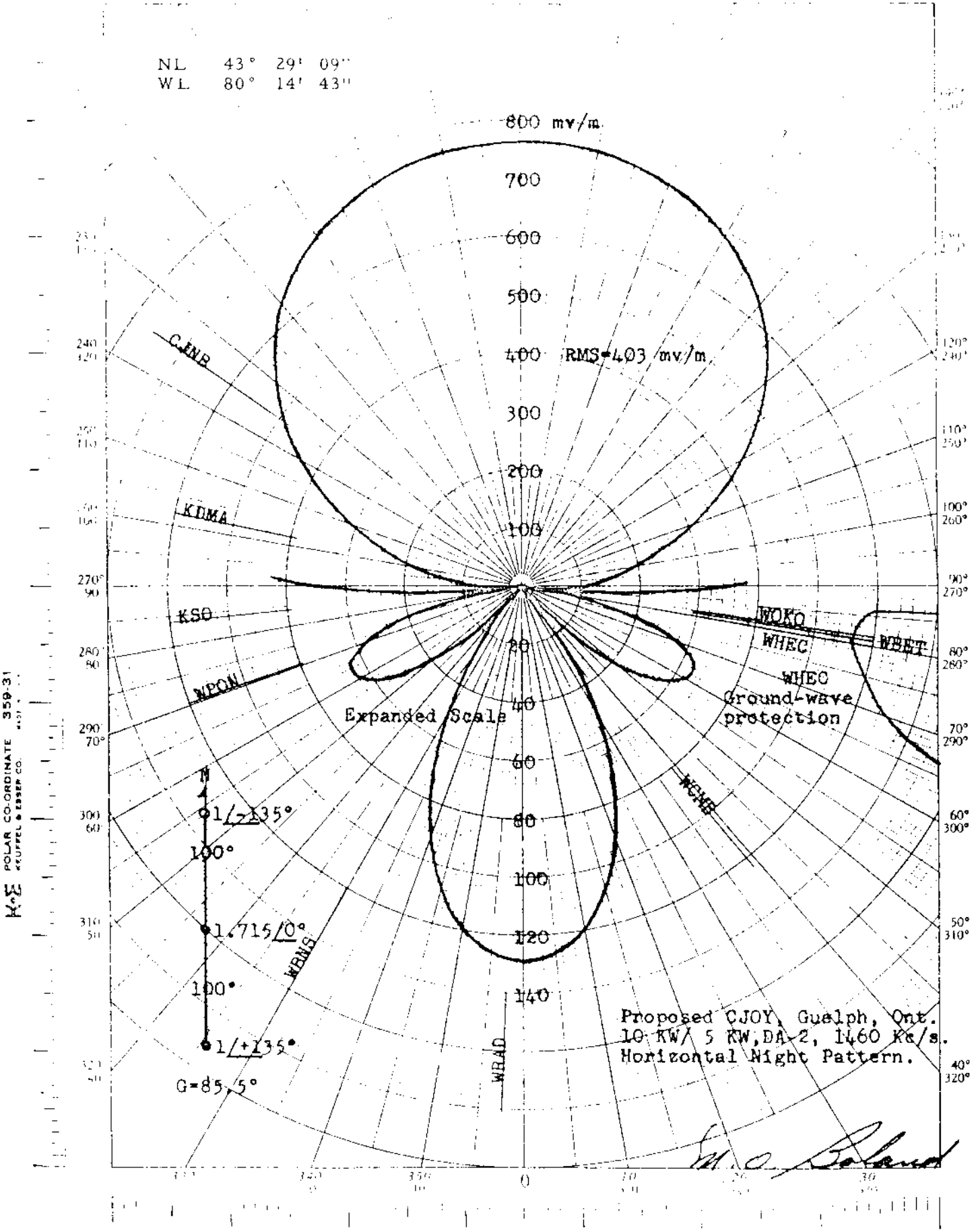
#135
D-12

CJOY

PROPOSED NIGHT
(8-8-59g)

Station CJOY 5kw, 10kw-LS, DA-2, U, Class III
Guelph, Ontario, Canada 1460 KC

NL 43° 29' 09"
WL 80° 14' 43"



CJOY

ANTENNA DESCRIPTION SHEET DIRECTIONAL DA-2

Station Call	C J O Y
Location	Guelph, Ontario.
Frequency	1460 khz
Power	10,000 watts
Class	III
Time	Unlimited
Notification Reference: 383	Date: March 28, 1979
Geographical Coordinates	Lat 43°29'09", Lon 80°14'43"
Array Characteristics	Four elements, guyed, uniform cross section, base insulated, series feed. No top loading.

ELEMENT		ONE	TWO	THREE	FOUR
Height		400' 213.6°	160' 85.4°	160' 85.4°	160' 85.4°
Bearing		165°	ref.	000°	000°
Spacing		100° 187'	ref.	100° 187'	200° 374'
Day	R	1.00	1.75	1.00	
	ø	100°	00°	-134°	
Night	R		1.00	1.65	1.00
	ø		136°	00°	-136°

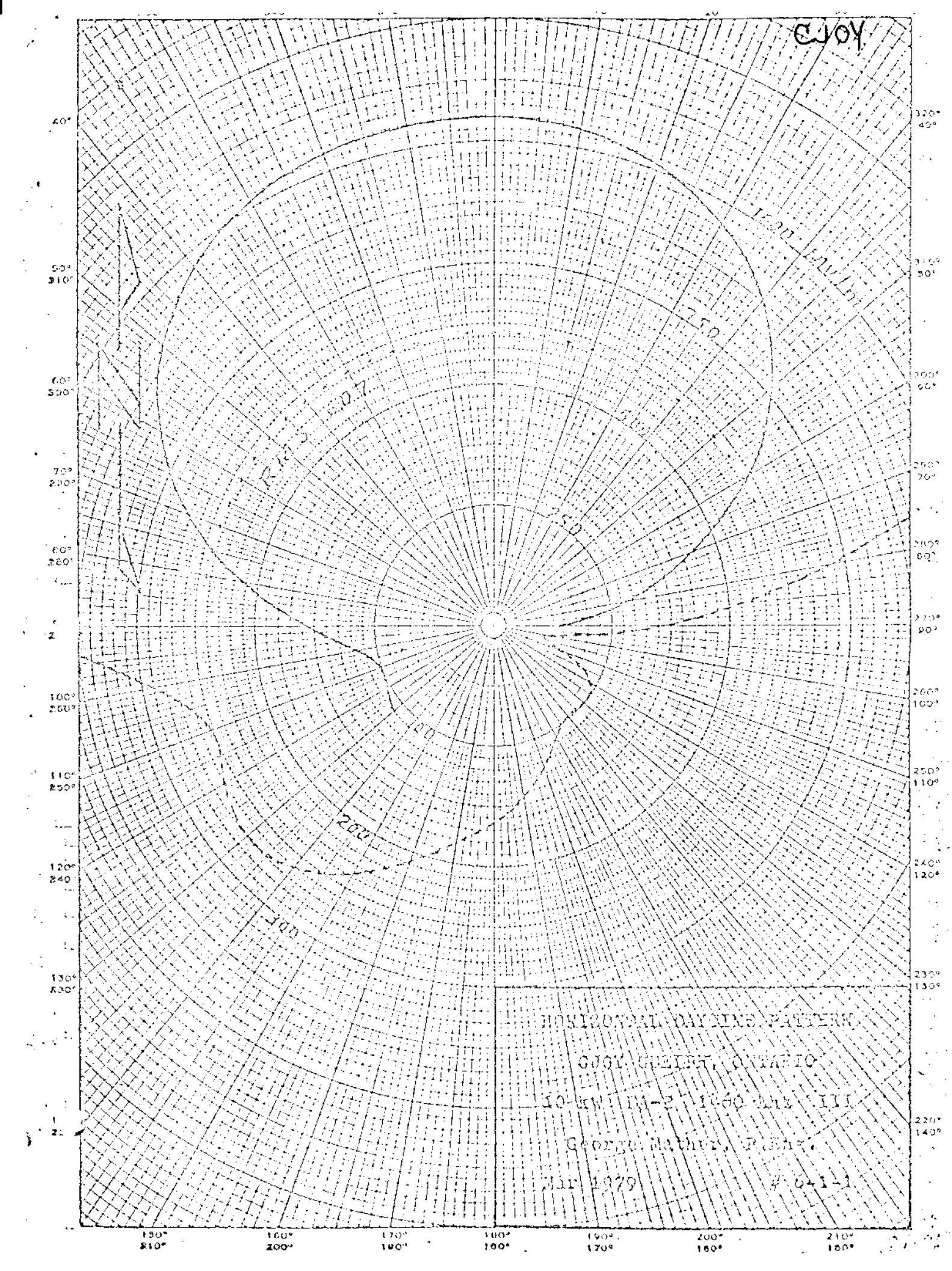
Ground System 120 radials per tower, #10 AWG bare, soft copper wire, spaced uniformly, depth of 8 inches approximately. Radials bonded along lines between towers and bonded to soft copper straps at tower bases. Maximum radial length 270 feet.

RMS Day 607.1 mv/m at 1 mile for 10 kw
192.0 mv/m at 1 mile for 1 kw

Night 563.5 mv/m at 1 mile for 10 kw
178.2 mv/m at 1 mile for 1 kw

Revised:
Mar 1979

5


HORIZONTAL PLANE PATTERN
GAIN 6.0 dB
10-kW FM-2 100-MHz III
George Harris, P.E.
Mar 1979
#6411

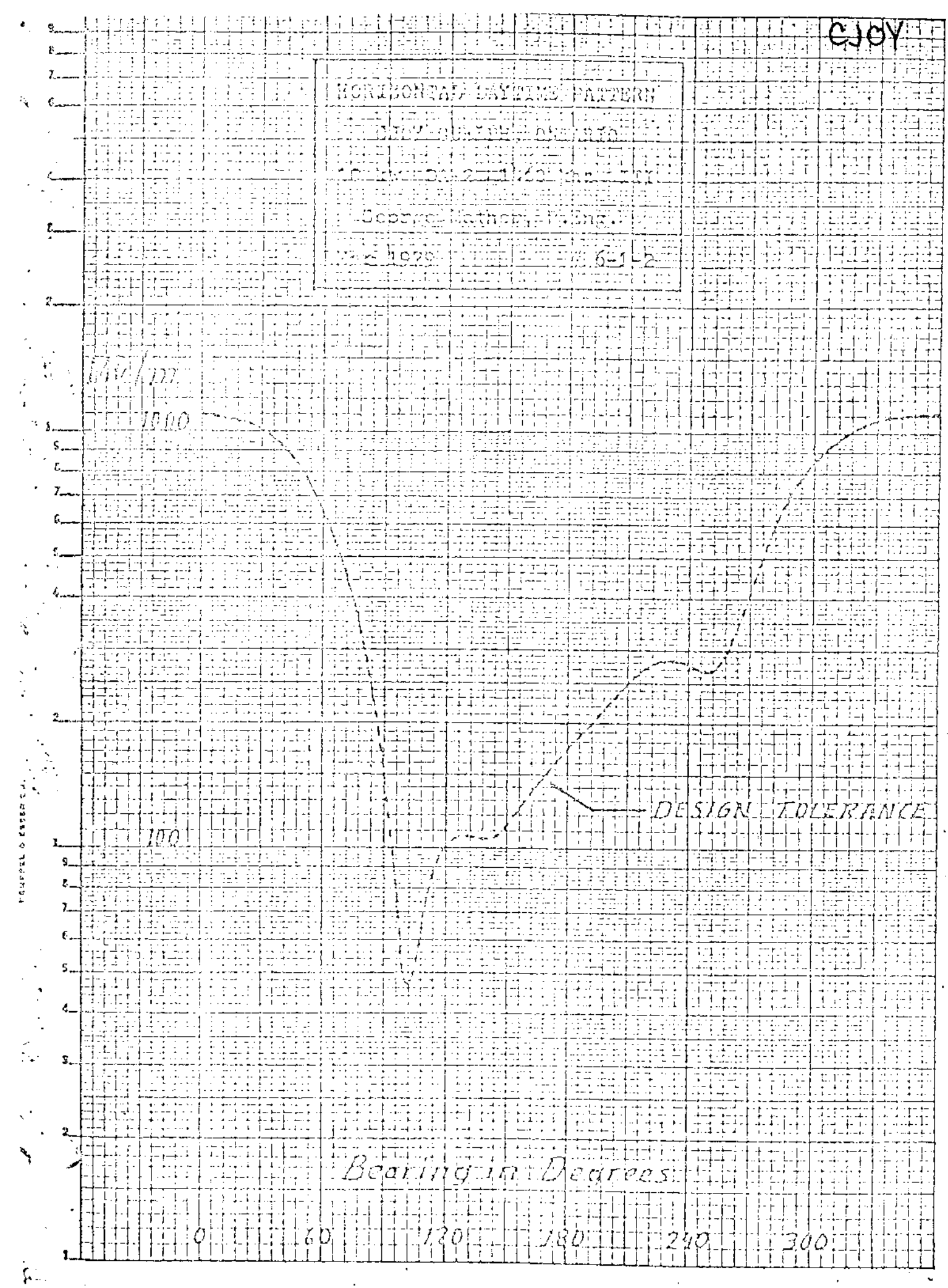
CJCY

HORIZONTAL BEARING PATTERN

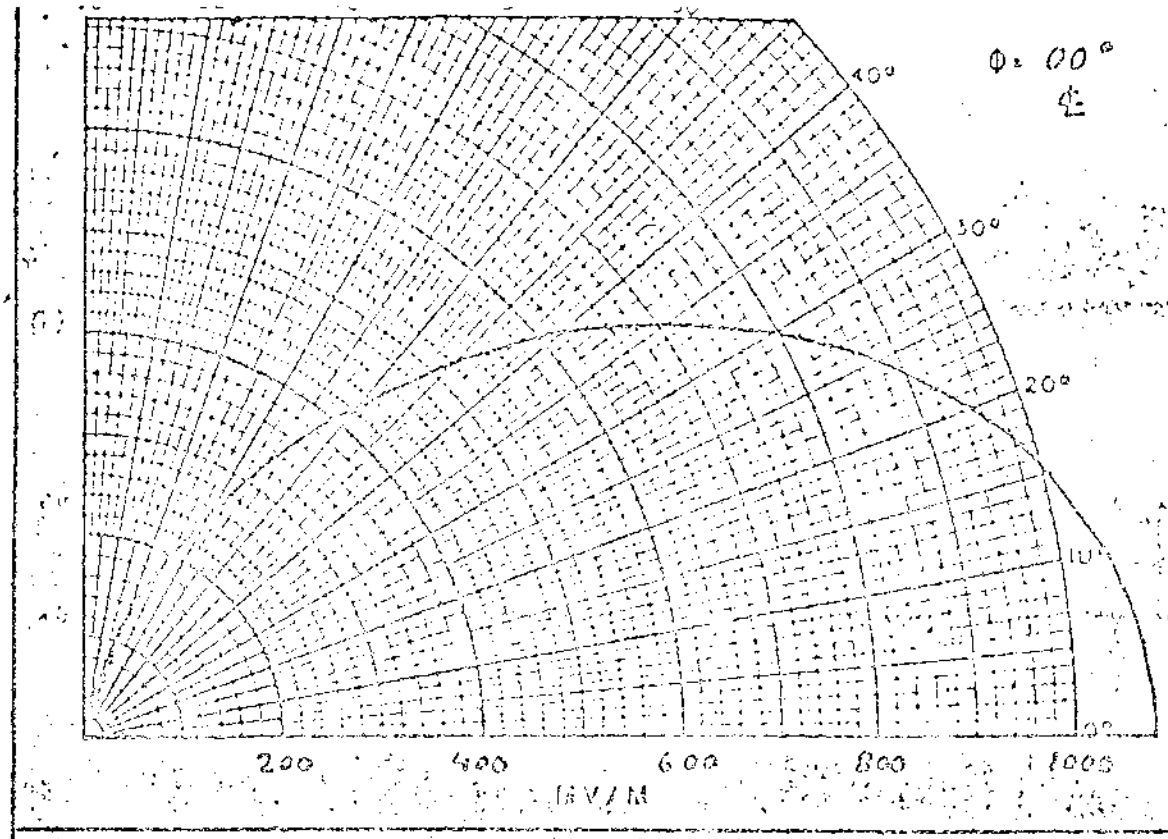
Scale 1:20

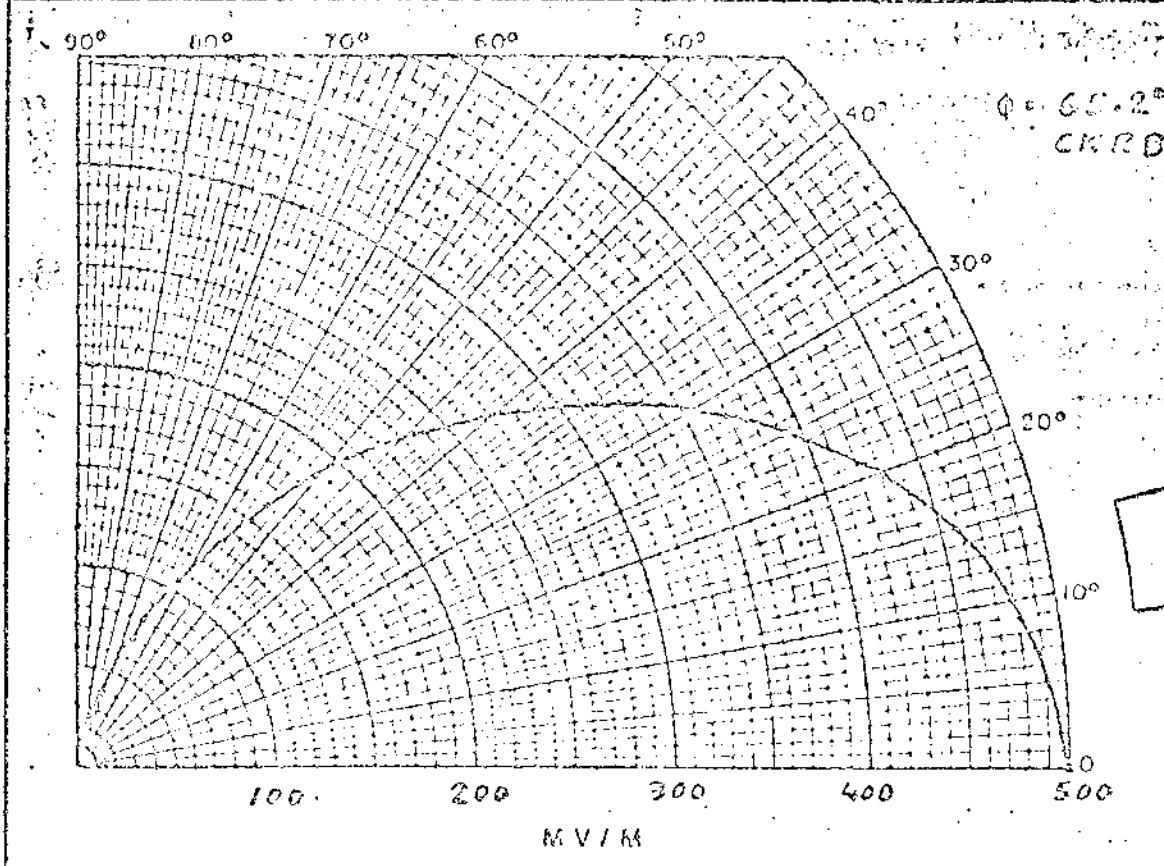
Joseph Kathrein, Prop.

Date 1929 6-12



CJOY



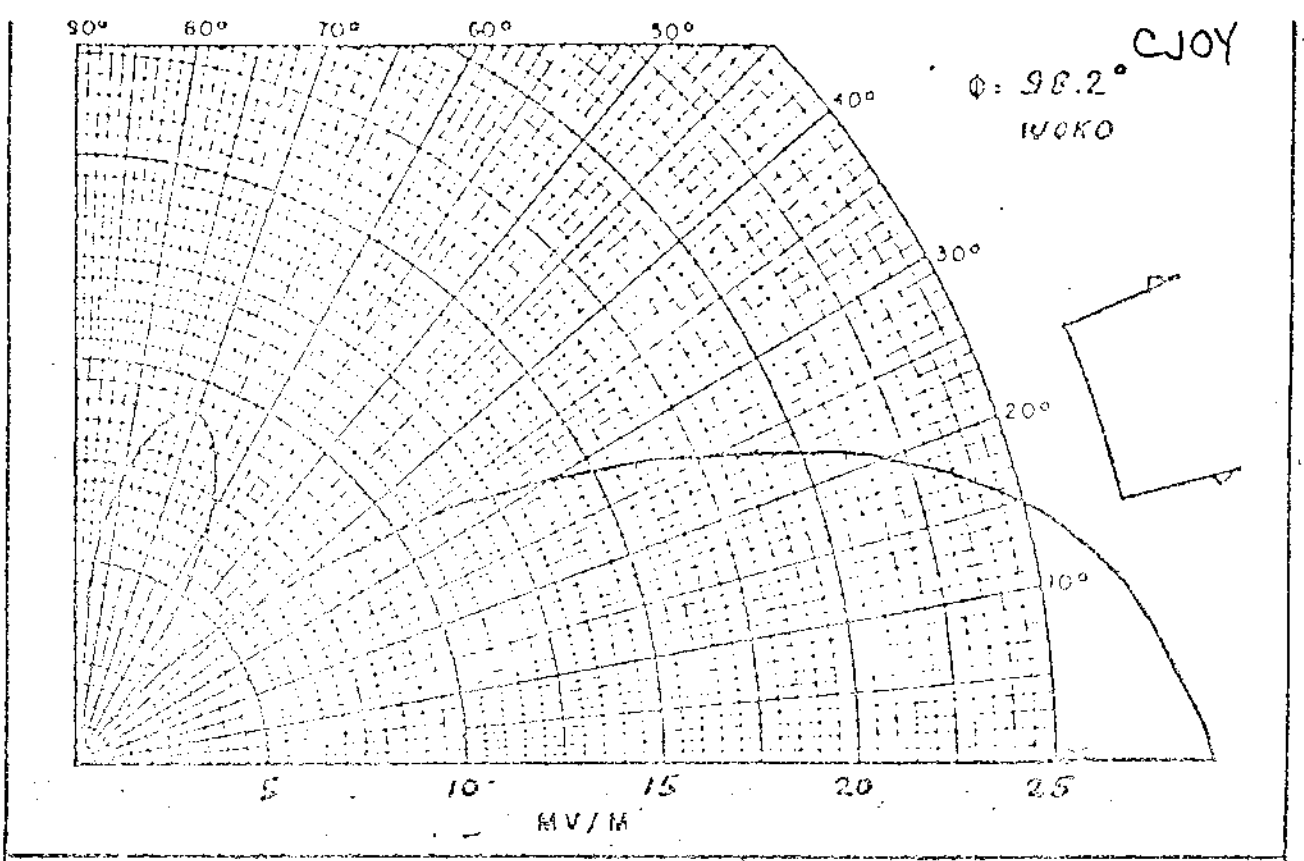


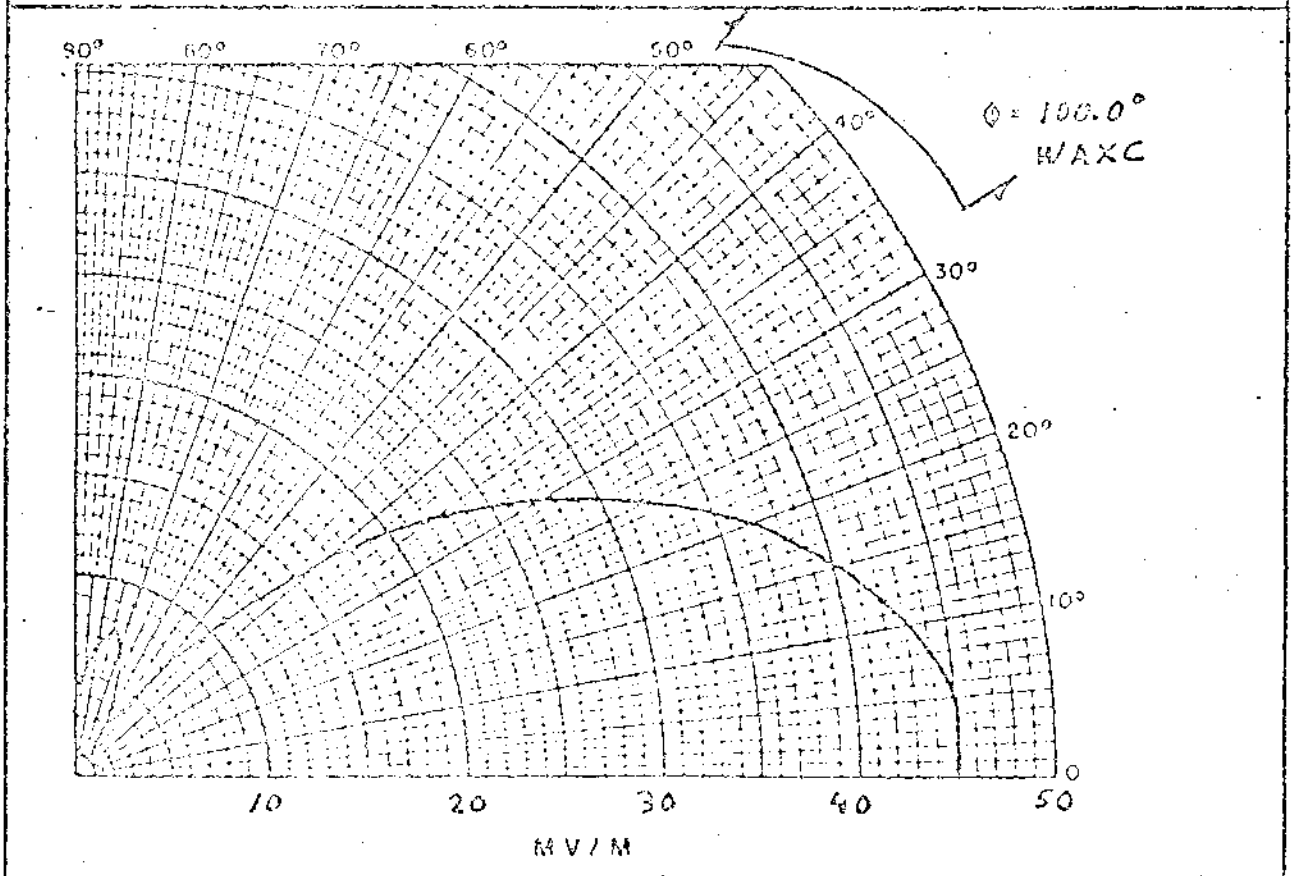
VERTICAL RADIATION PATTERNS

CJOY GUELPH, ONTARIO
10 kw DA-2 1460 khz
George Mather, P.Eng.

Aug 1970

7-1



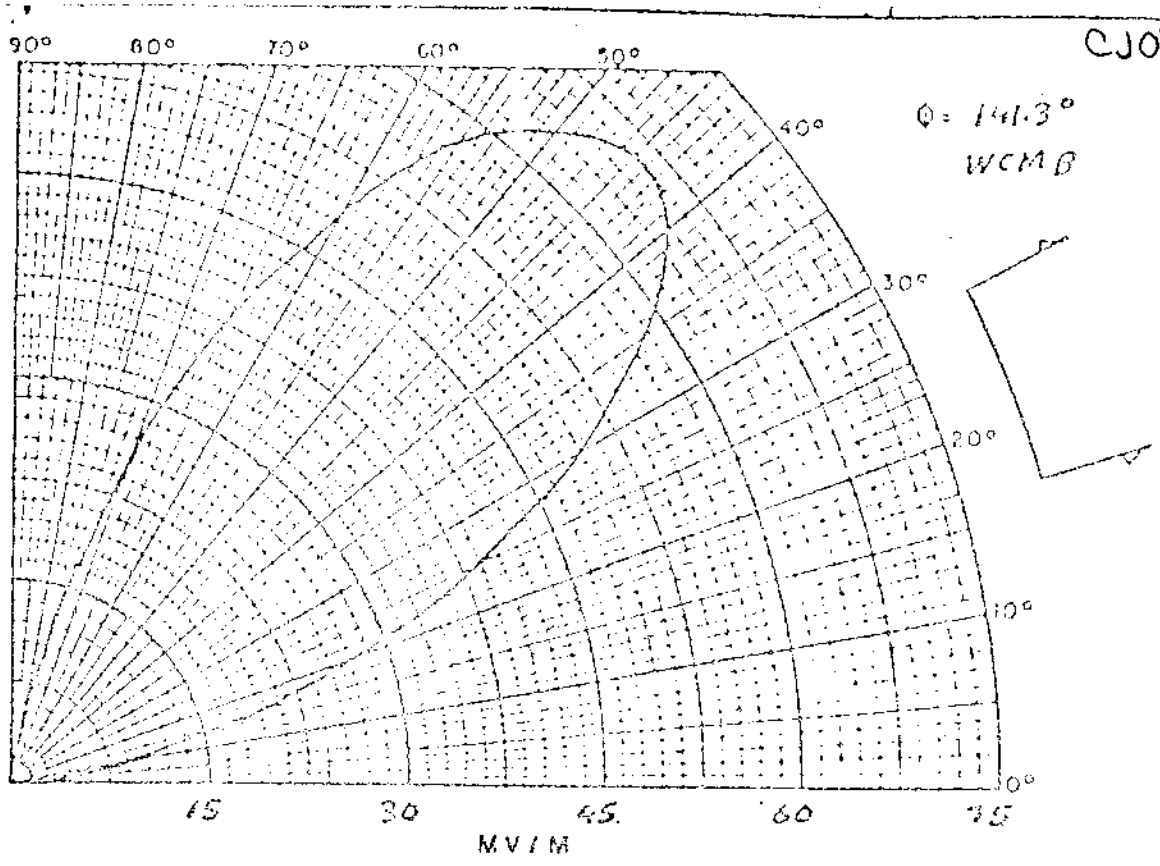


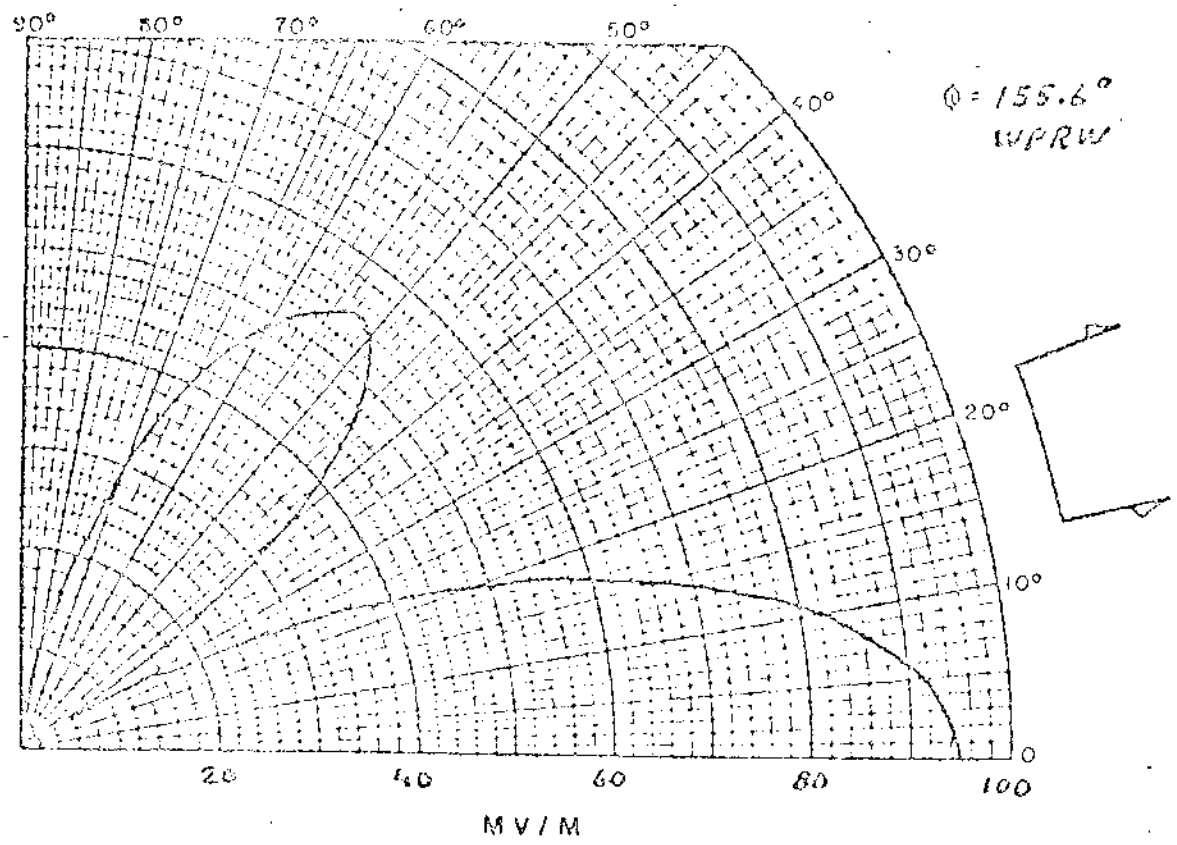
VERTICAL RADIATION PATTERNS

CJOY GUELPH, ONTARIO
10 kw DA-2 1460 khz
George Mather, P.Eng.

Aug 1976

CJOY



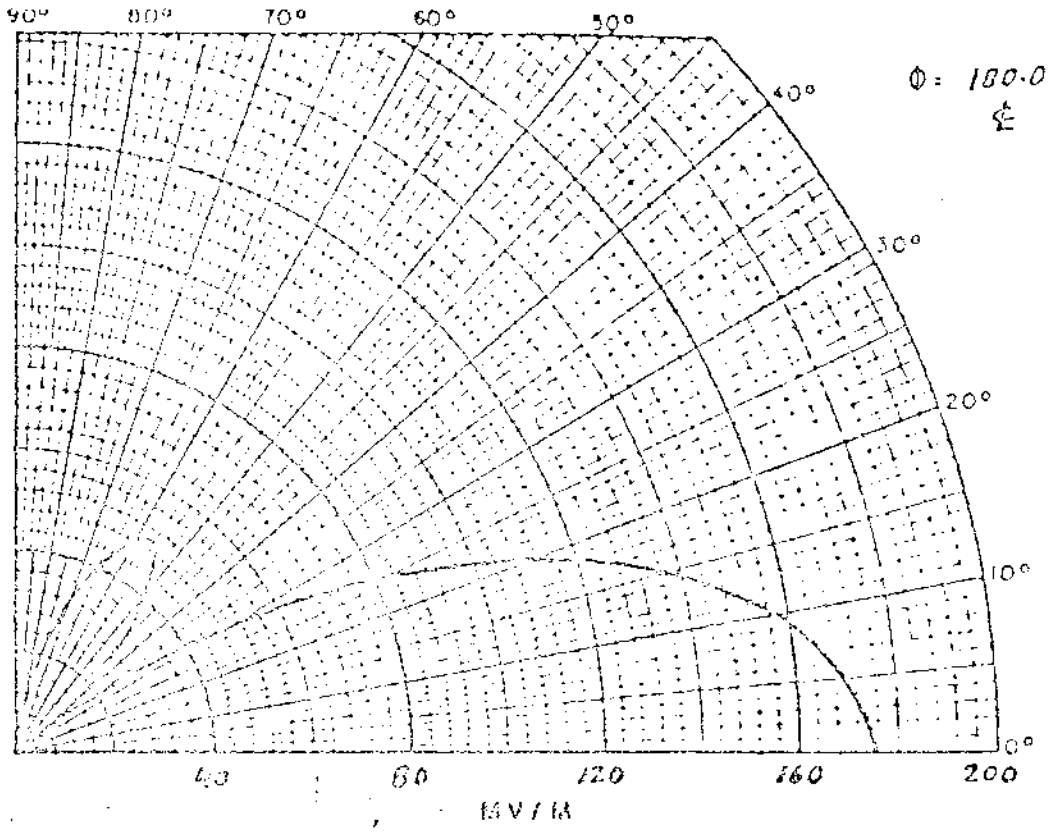


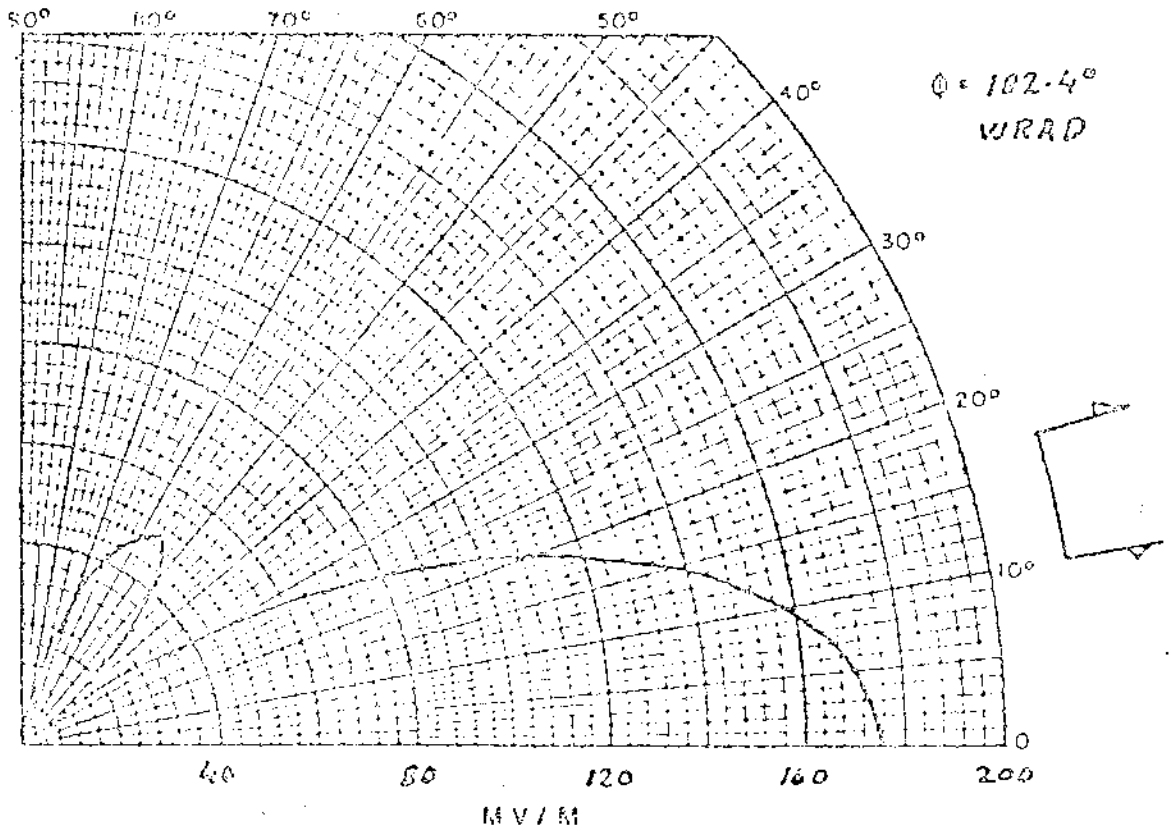
VERTICAL RADIATION PATTERNS

CJOY GUELPH, ONTARIO
10 kw DA-2 1460 khz
George Mather, P.Eng.

Aug 1976

CJOY



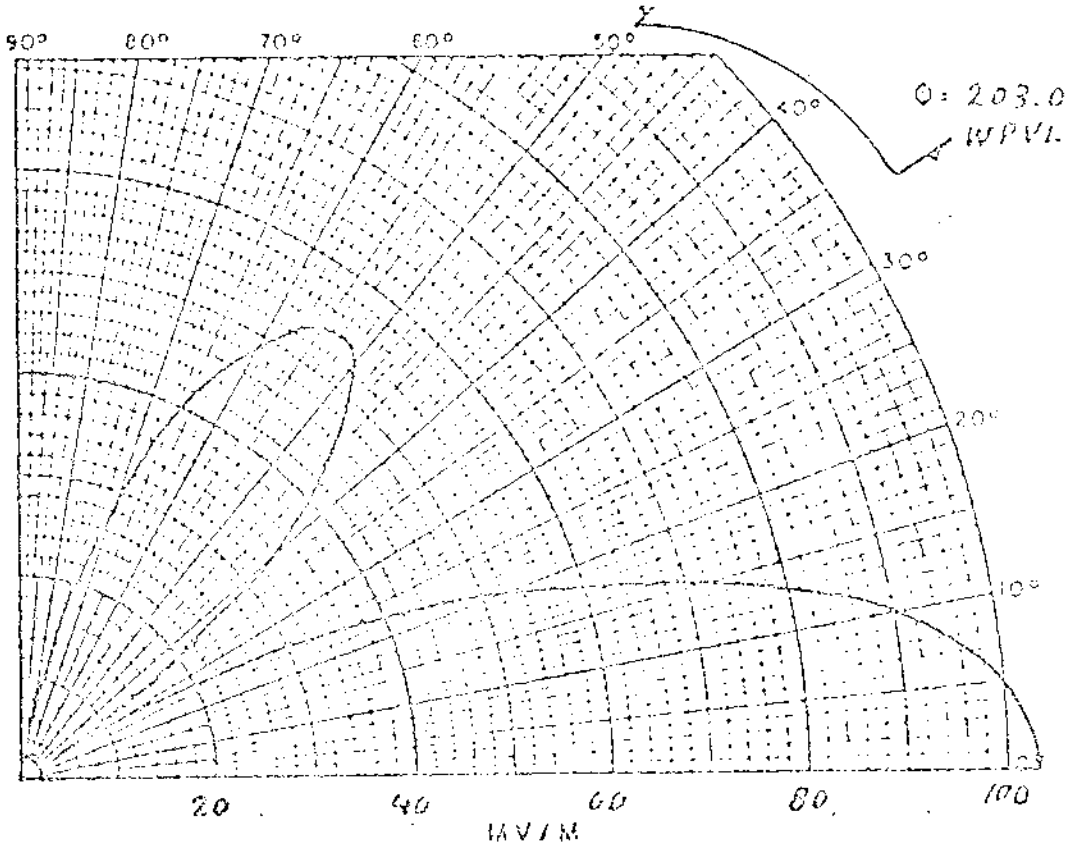


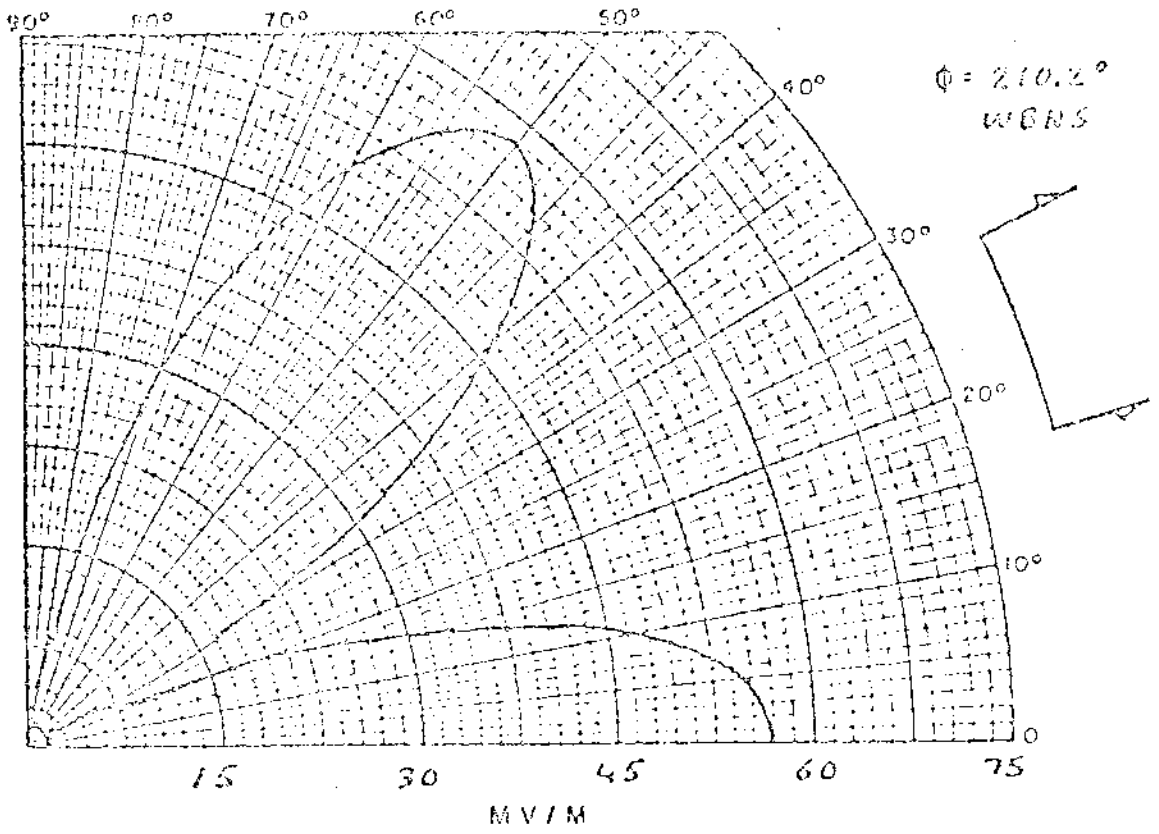
VERTICAL RADIATION PATTERNS

CJOY GUELPH, ONTARIO
10 kw DA-2 1460 Khz
George Mather, P.Eng.

Aug 1978

CJOY



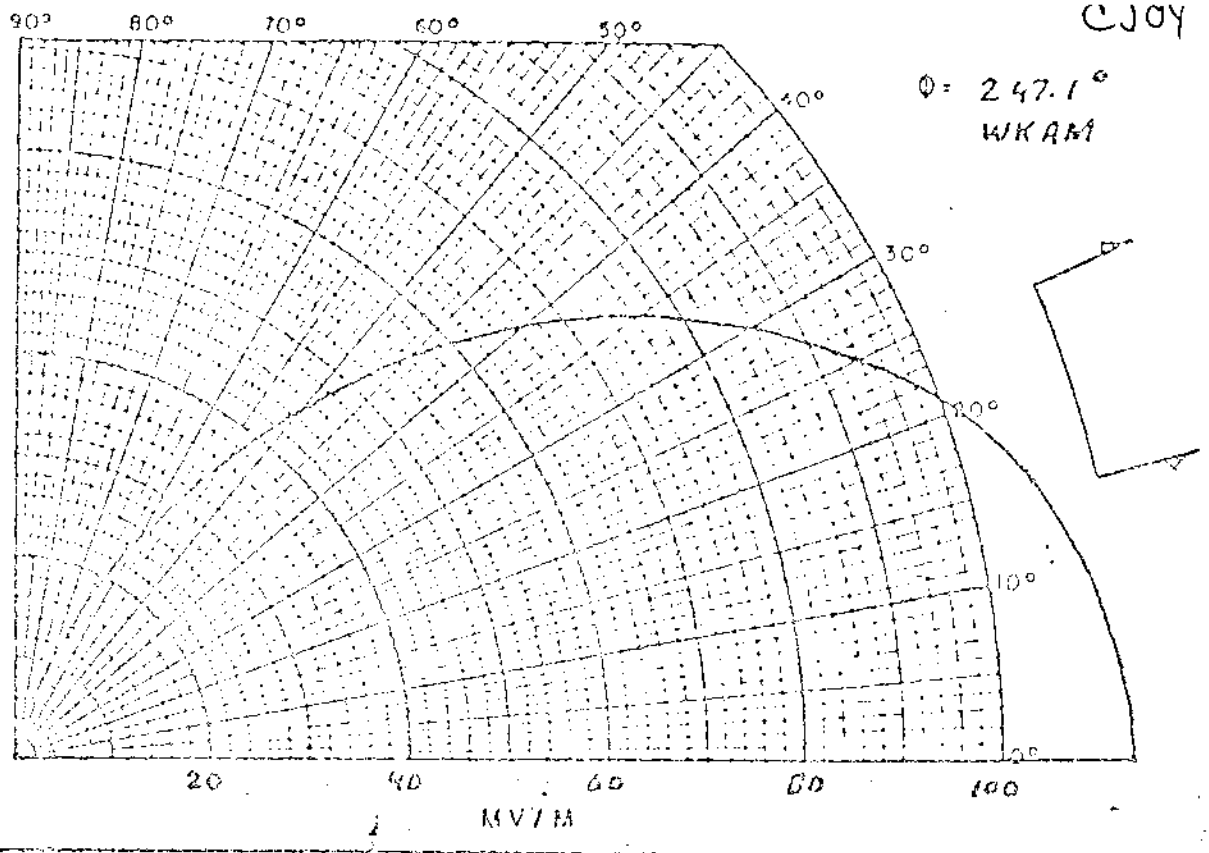


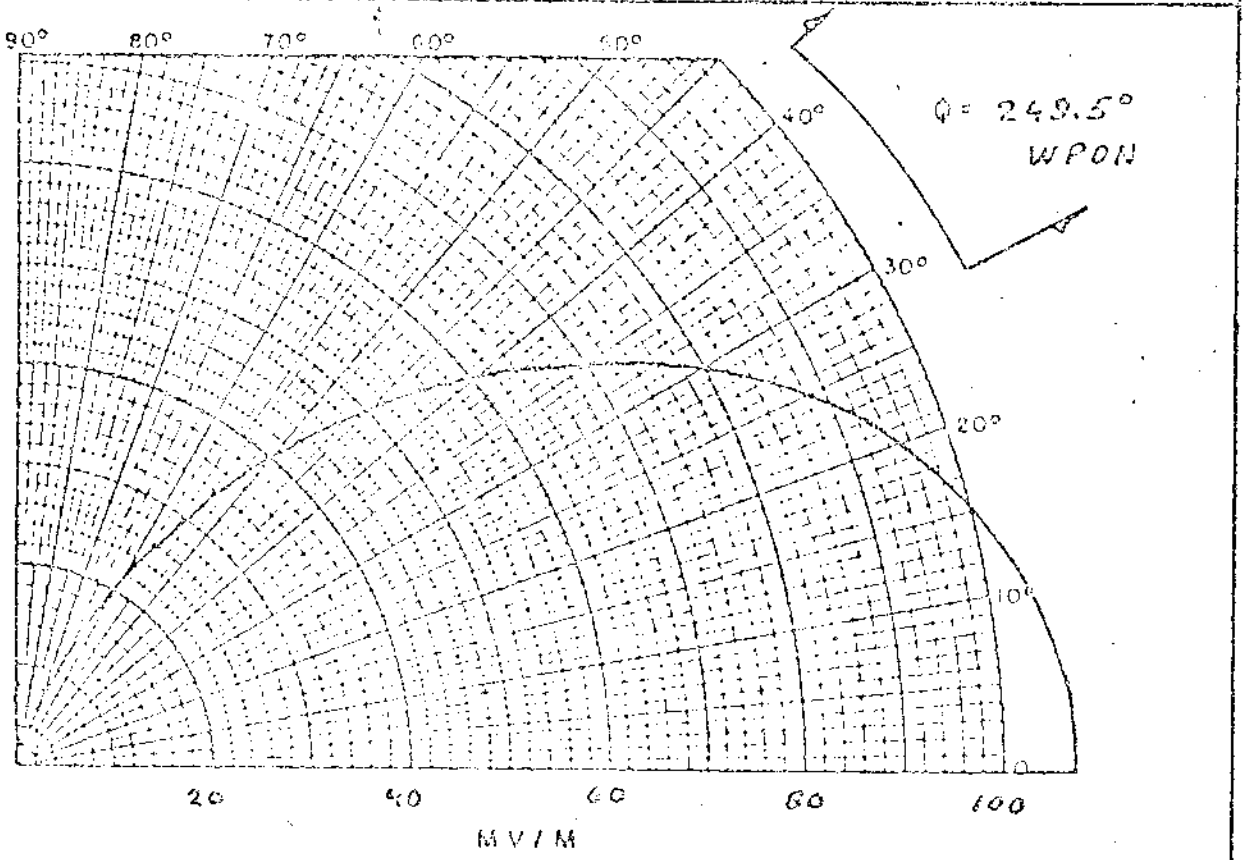
VERTICAL RADIATION PATTERNS

CJOY GUELPH, ONTARIO
10 kw DA-2 1460 Khz
George Mather, P.Eng.

Aug 1978

CJOY



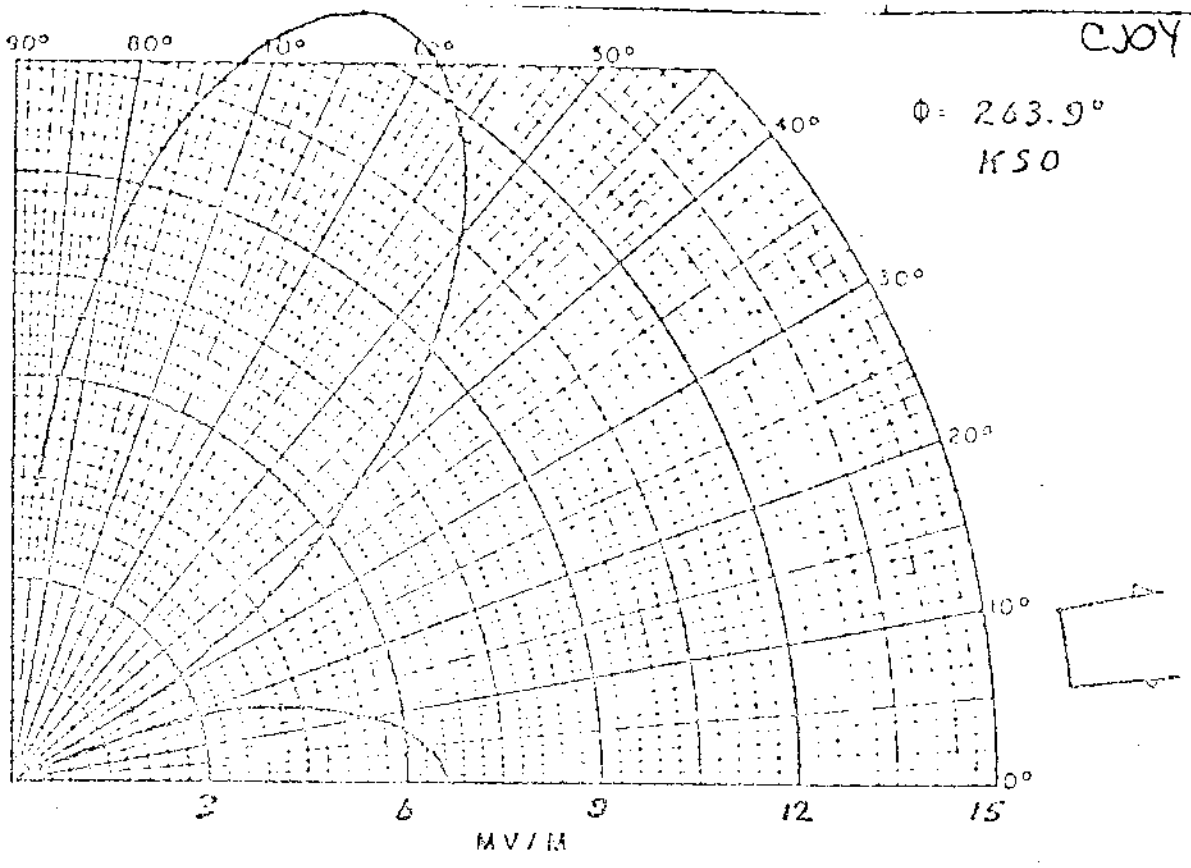


VERTICAL RADIATION PATTERNS

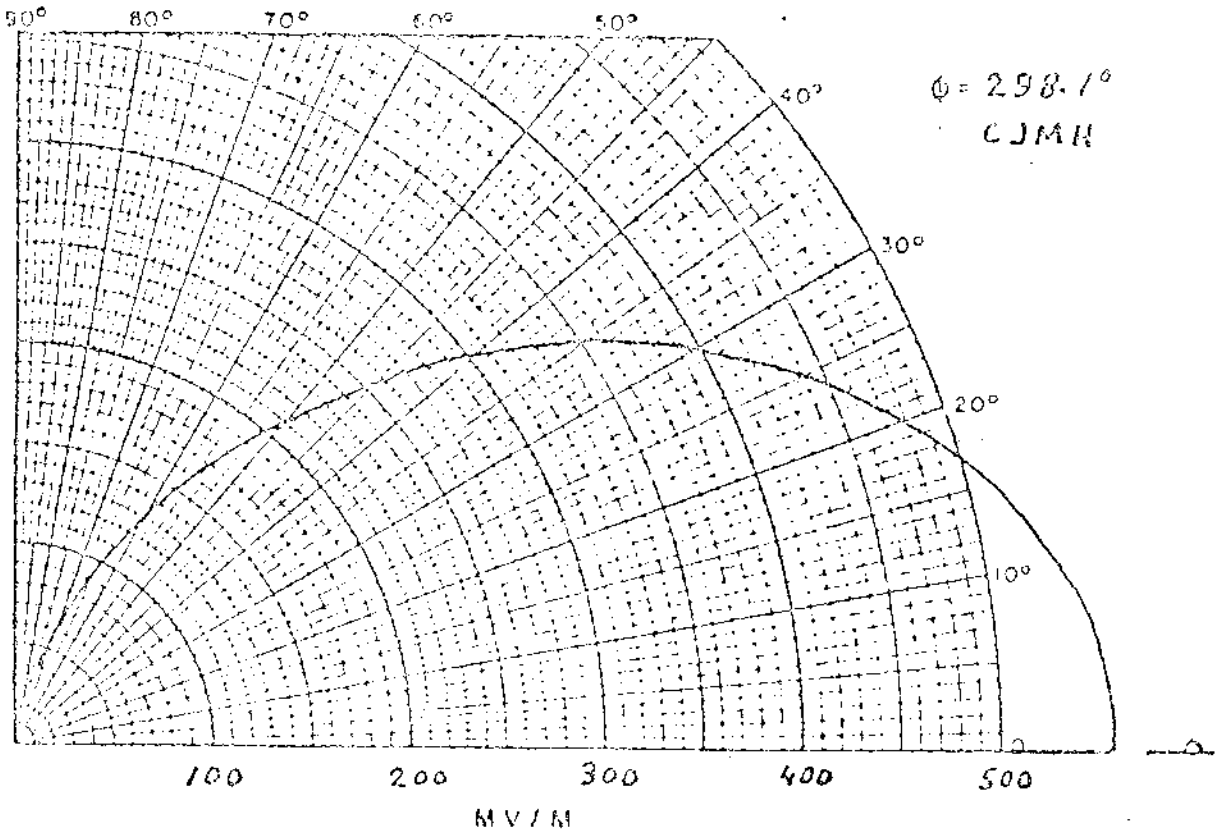
CJOY GUELPH, ONTARIO
10 kw DA-2 1460 khz
George Kather, P.Eng.

Aug 1978

CJOY



Φ = 263.9°
KSO



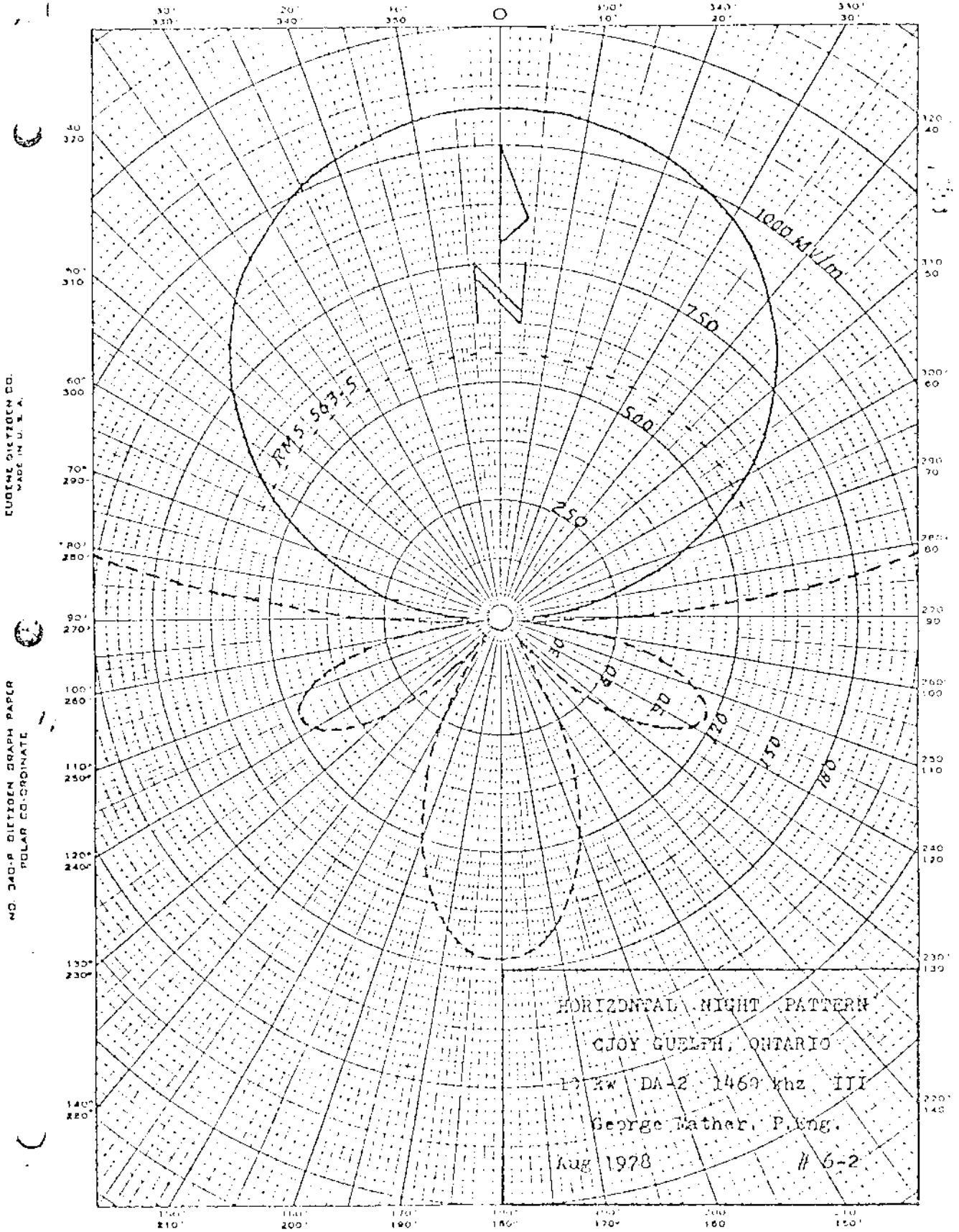
Φ = 298.1°
CJMR

VERTICAL RADIATION PATTERNS

CJOY GUELPH, ONTARIO
10 kw DA-2 1460 khz
George Mather, P.Eng.

Aug 1978

CJOY


1000 mV/m
750
500
250
RMS 563-5
50
40
30
20
10
HORIZONTAL NIGHT PATTERN
CJOY GUELPH, ONTARIO
1 kw DA-2 1460 khz III
George Lather, P.Eng.
Aug 1978
6-2
EUGENE DIETZGEN CO.
MADE IN U.S.A.
NO. 340-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE

CJVB

ANTENNA DESCRIPTION SHEET

DIRECTIONAL DA-2

STATION CALL:	C J V B
MAIN STUDIO:	Vancouver, B. C.
FREQUENCY:	1470 kc/s
POWER:	10,000 watts
CLASS:	III
TIME:	Unlimited

NOTIFICATION REFERENCE:

GEOGRAPHICAL LOCATION: Lat 49°11'36", Lon 123°00'39"

ARRAY CHARACTERISTICS: Three elements, guyed, uniform cross section, base insulated, series feed. Height 167 feet or 90 degrees.

TOWER		ONE	TWO	THREE
spacing		ref	120° 223.2'	240° 446.4'
bearing		ref	340°	340°
Day	R	1000	1000	
	ø	00°	-61°	
Night	R	1000	1880	1000
	ø	+68°	00°	-68°

Ground System: 120 radials per tower, #10 AWG bare, soft copper wire, spaced uniformly, buried approximately 8 inches. Radials bonded along line between towers and bonded to soft copper straps at tower base. Maximum radial length 268 feet.

Pattern RMS:

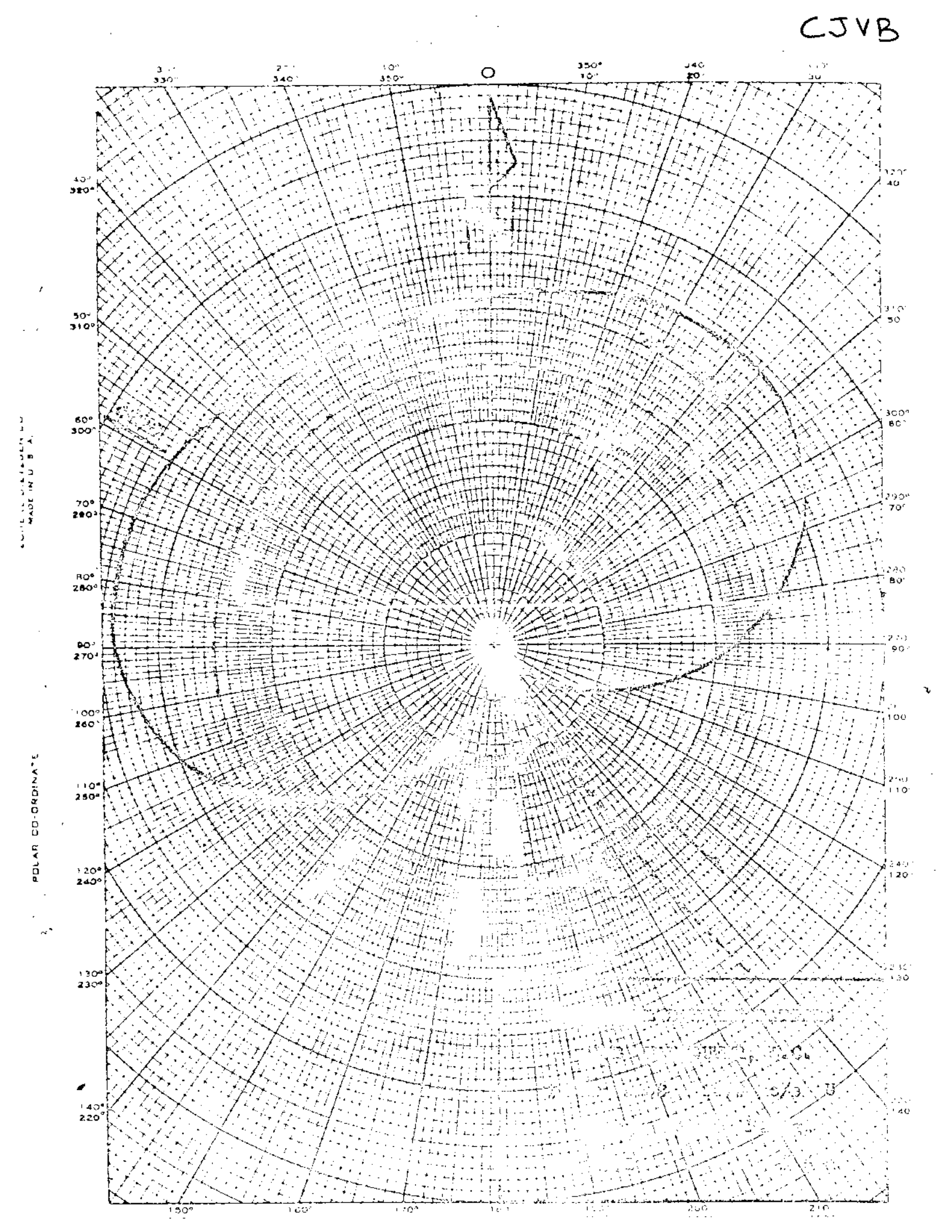
Day: 630 mv/m at 1 mi for 10 kw
200 mv/m at 1 mi for 1 kw

Night: 601 mv/m at 1 mi for 10 kw
190 mv/m at 1 mi for 1 kw

Spt 1972

5

CJVB



#13A

DESCRIPTION SHEET (7-8-59g) Station CKRB 5kw, 10kw-LS, DA N, U, Class III
Ville St. Georges, Quebec, Canada 1460 KC

STATION: CKRB MAIN STUDIO: VILLE ST. GEORGES, QUE.

FREQUENCY: 1460 KC POWER: 10KW D/5KW N CLASS: III

NOTIFICATION LIST NO. 13A DATE: June 5, 1959

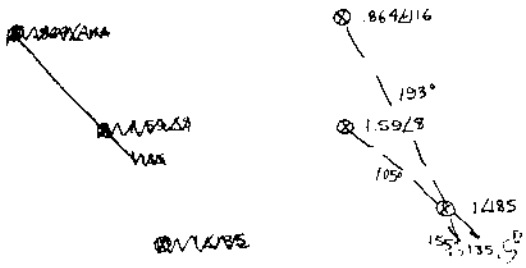
GEOGRAPHICAL LOCATION OF ANTENNA SYSTEM:
North Latitude 46° 09' 03"
West Longitude 70° 42' 36"

ANTENNA CHARACTERISTICS

Mode of Operation: Non-directional day, directional nighttime (DA-N)
Number of element: Three (3)
Type of elements: Uniform cross section guyed steel towers, base insulated for series feed.

	#1 (S)	#2 (C)	#3 (N)
TOWER:			
HEIGHT ABOVE INSULATORS:	200' (107°)	200' (107°)	200' (107°)
OVERALL HEIGHT:	210'	210'	210'
SPACING:	196.8' (105°)	196.8' (101°)	
PHASING:	+185°	+8°	-116°
FIELD RATIO:	1.0	1.59	0.864
ORIENTATION:	See below		

GROUND SYSTEM:



120' equiangularly spaced radials extend from the base of the south and centre tower to a distance of 315' (.47 wavelength) with the exception of those joined along the common chord. The north tower has 120' equiangularly spaced radials extending from the base of the tower to the boundary of the property with the exception of those joined along the common chord. The shortest radials are greater than 168' (0.25 wavelength). The total ground system area is equivalent to that of a system consisting of radials 269' (0.4 wavelength).

ORIENTATION: The Centre and South towers are spaced 196.8' (105°) apart on a line bearing 135.5° East of True North. The North and South towers are spaced 361' (193°) on a line bearing 155.5° East of True North.

PREDICTED EFFECTIVE FIELD: Nighttime 1.72 MV/M at 1 mile (.312 MV/M for 1 KW)

Daytime 616 MV/M at 1 mile for 10 KW (195 MV/M for 1KW)

Revised May 19/59

#134

CKRB

PROPOSED NIGHT
(7-8-59g)

Station CKRB
Ville St. Georges, Quebec, Canada

5kw, 10kw-LS, DA-N, U, Class III
1460 KC

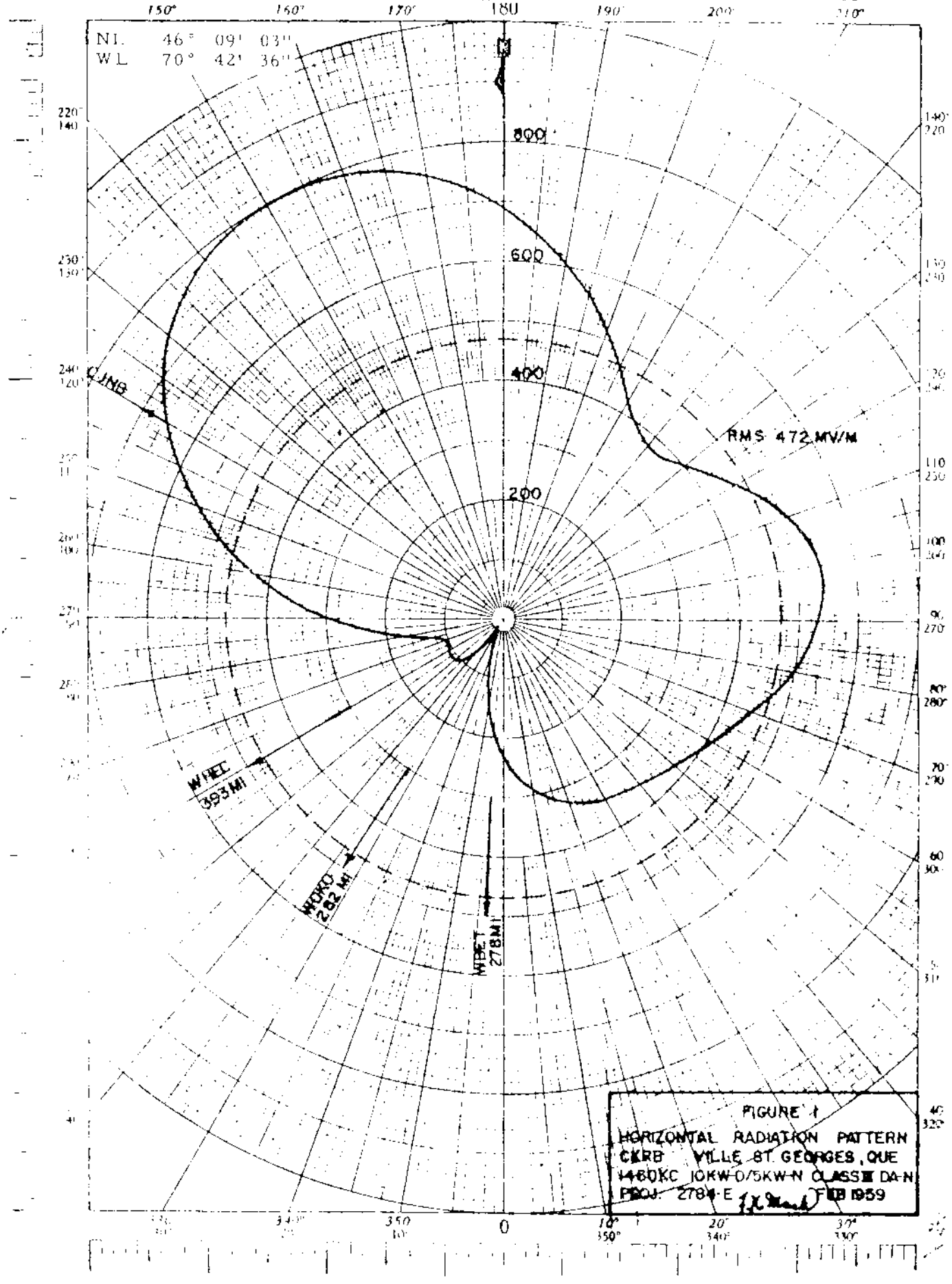


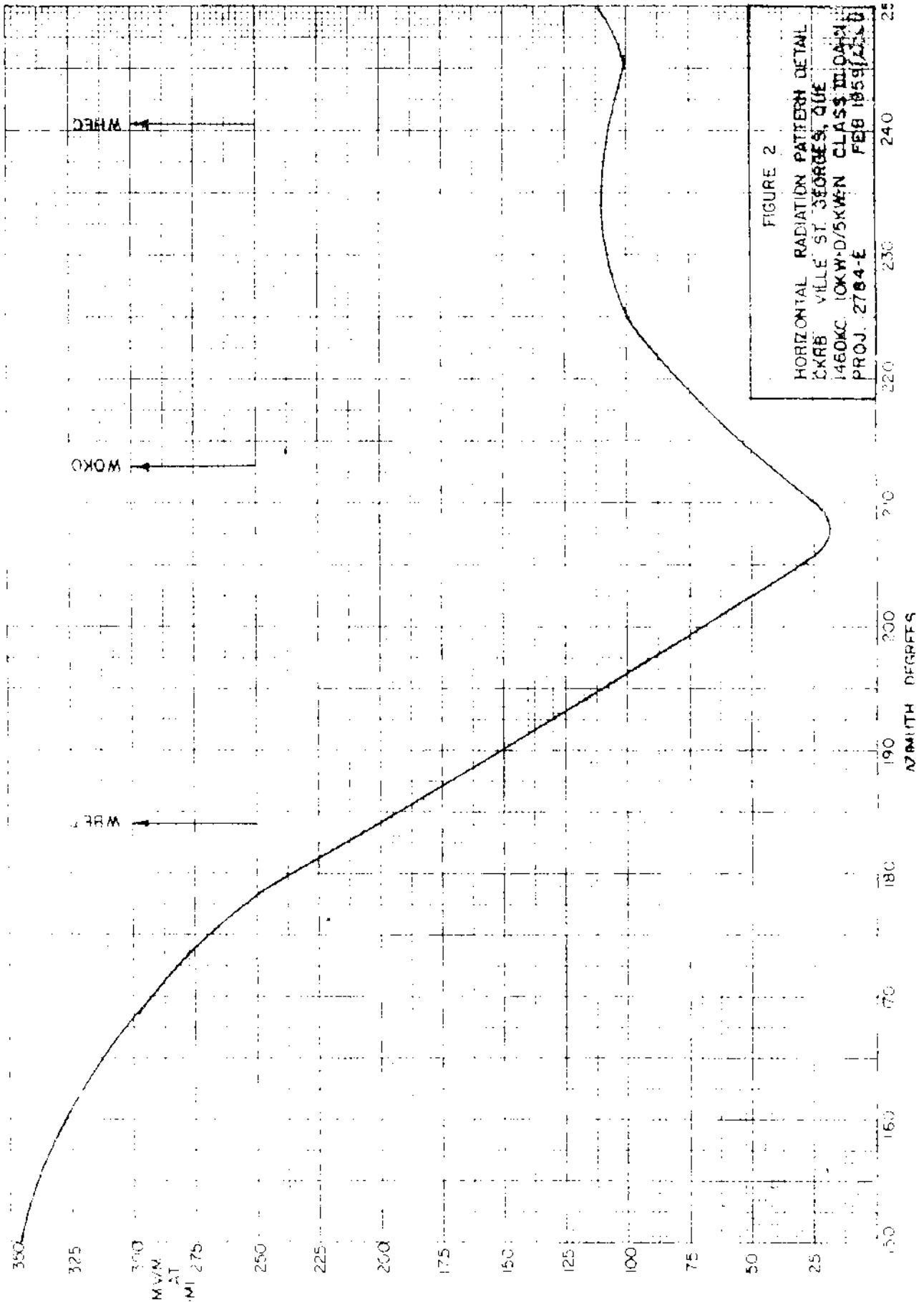
FIGURE 1
HORIZONTAL RADIATION PATTERN
CKRB VILLE ST. GEORGES, QUE
1460KC 10KW-D/5KW-N CLASS III DA-N
PROJ. 2784-E FEB 1959

#13A

PROPOSED NIGHT NULLS (7-8-59g)

Station CKRB Ville St. Georges, Quebec, Canada

5kw, 10kw-LS, DA-N, U, Class III 1460 KC



KCDI

Kirkland, Washington

PROPOSED DAY
(11-16-59g)

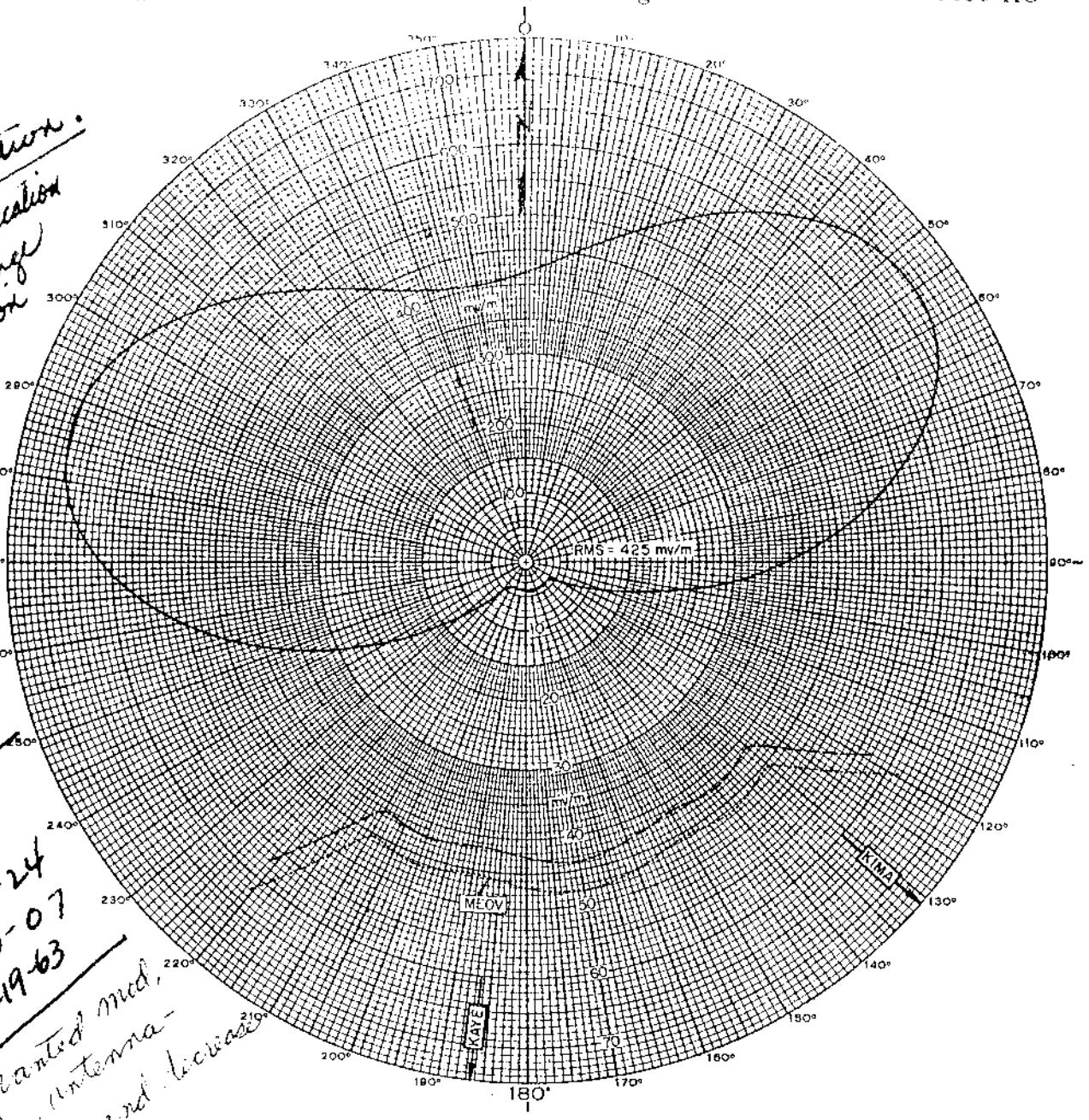
New; Carl-Dek, Inc.
Kirkland, Washington

5kw, DA-D,D
1460 KC

1-4-61
granted CP
for new station.
BMP 9604 - application
to modify CP to change
Y-X mile location
to 47-39-10
NL
WL 122-11-20
#163
Copper Front

MEOV requested
for
NL 47-40-24
WL 122-10-07
#183-CT (3-19-63

3-29-63 granted mod.
of CP to change antenna-
transmitter location and license
antenna height.



N 47° 38' 39"
W 122° 11' 54"

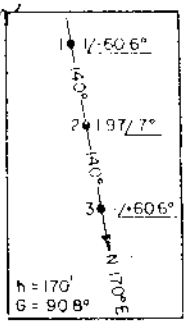


FIGURE 7

CALCULATED DAYTIME

HORIZONTAL PLANE PATTERN

CARL-DEK INC.

KIRKLAND, WASHINGTON

1460 KC 5 KW D. DA-D

AUGUST 1959

PAGE, CREUTZ, STEEL & WALDBOHMITT
Consulting Engineers
1616 K STREET, NORTHWEST
WASHINGTON 6, D. C.

FCC File No. BP-13491
Accepted 10-9-59

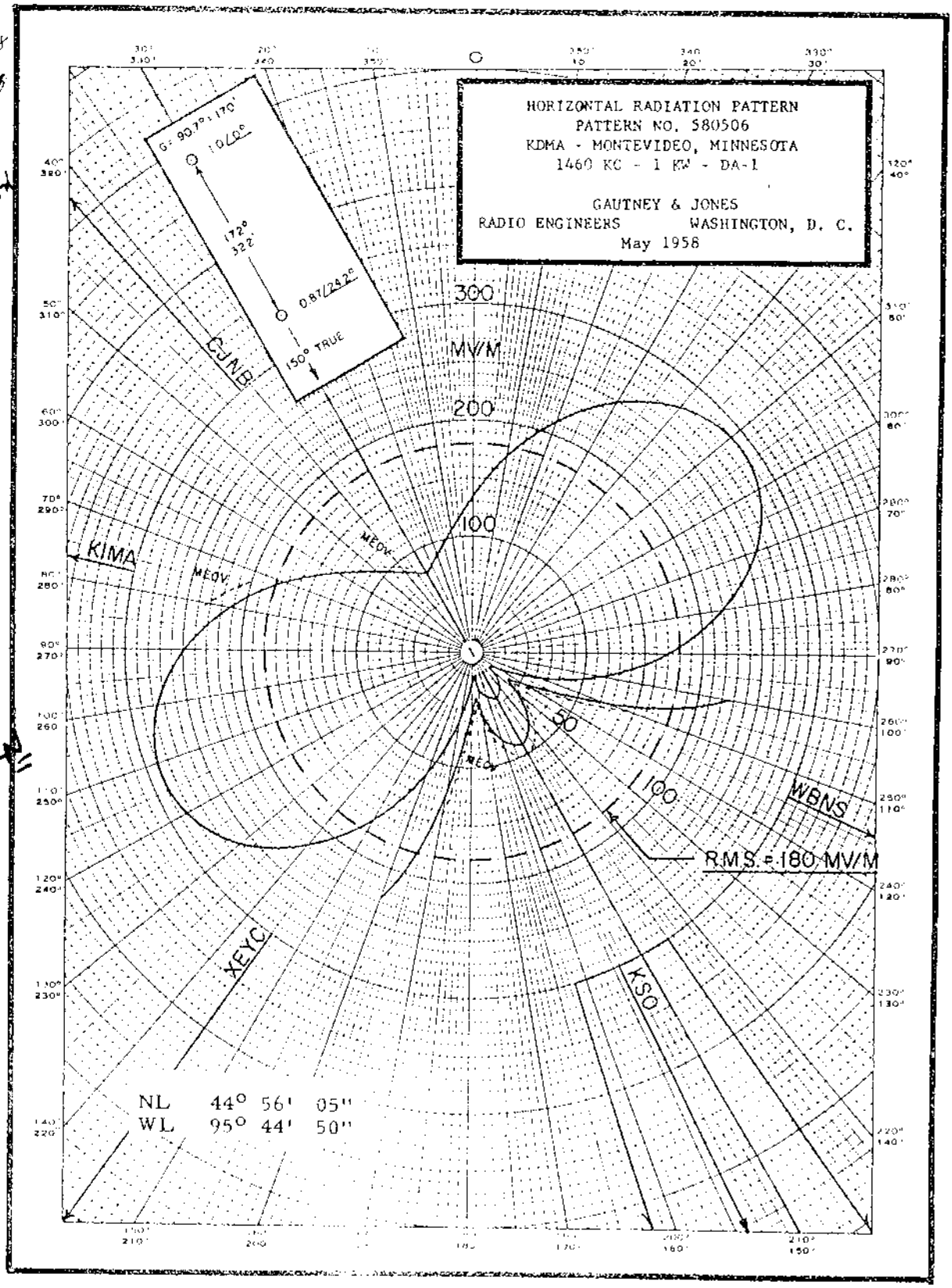
Carl - Dek, Incorporated
Kirkland, Washington 1460 KC

KDMA

PROPOSED DAY & NIGHT (6-20-58g) | Station KDMA Montevideo, Minnesota | 1kw, DA-1,U 1460 KC

Granted CP 4/12/58 for change in freq & install of DA system

3 towers
DA-N operation
9-7-61

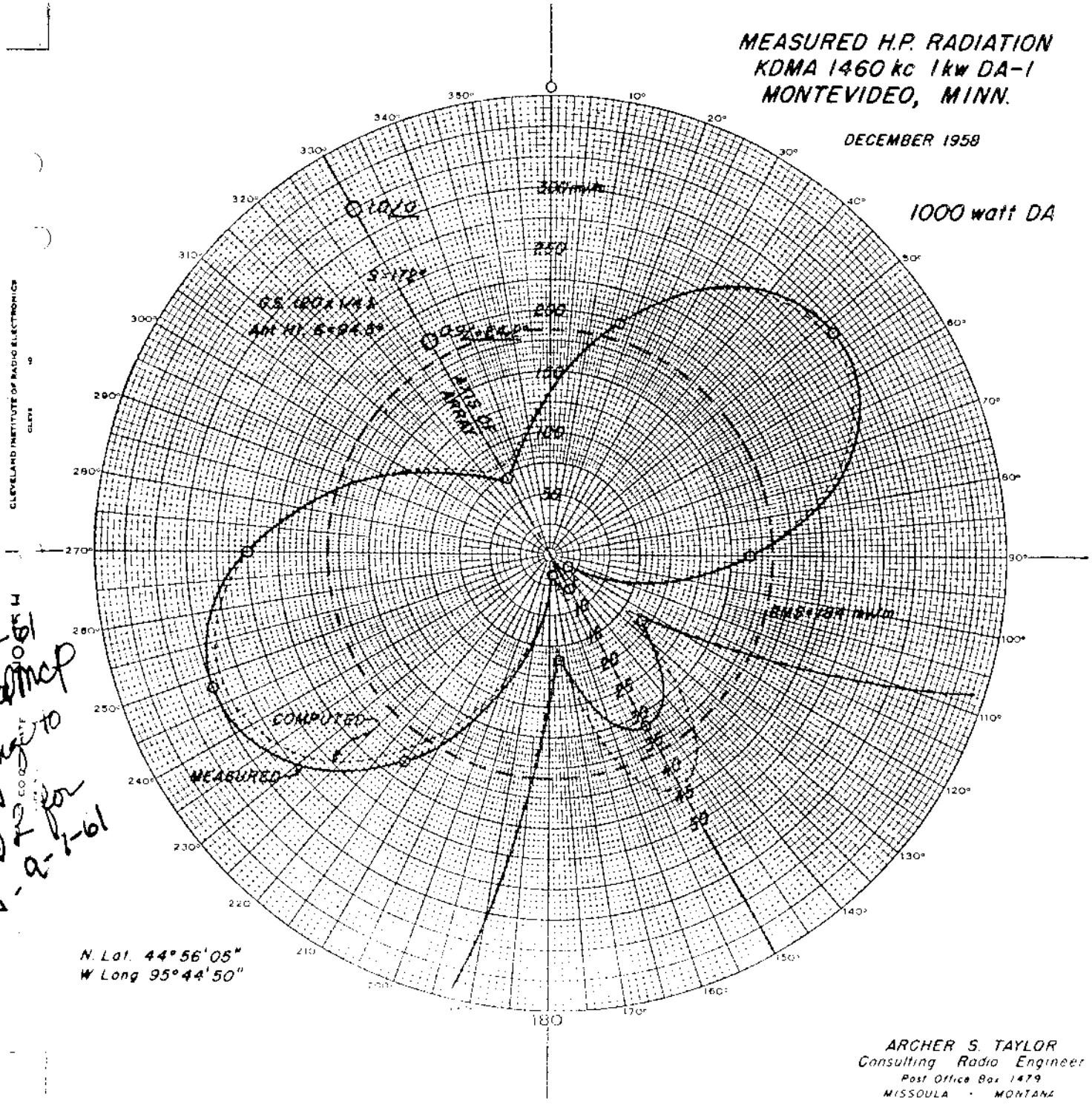


2-23-61 granted MCP & changed to DA-N

FCC File No. BP-11,304 Accepted 5-26-58 (Amended) | KDMA Montevideo, Minnesota | 1460 KC

KDMA

MEASURED DAY & NIGHT (4-22-59g) | Station KDMA, Montevideo, Minnesota | 1kw, DA-1,U, 1460 KC



granted license

2-23-61 Granted MCP to change to DA-N Granted 2 for DA-N-2-7-61

FCC File No. BL-7386 | KDMA | Accepted 3-26-59 | Montevideo, Minnesota | 1460 KC

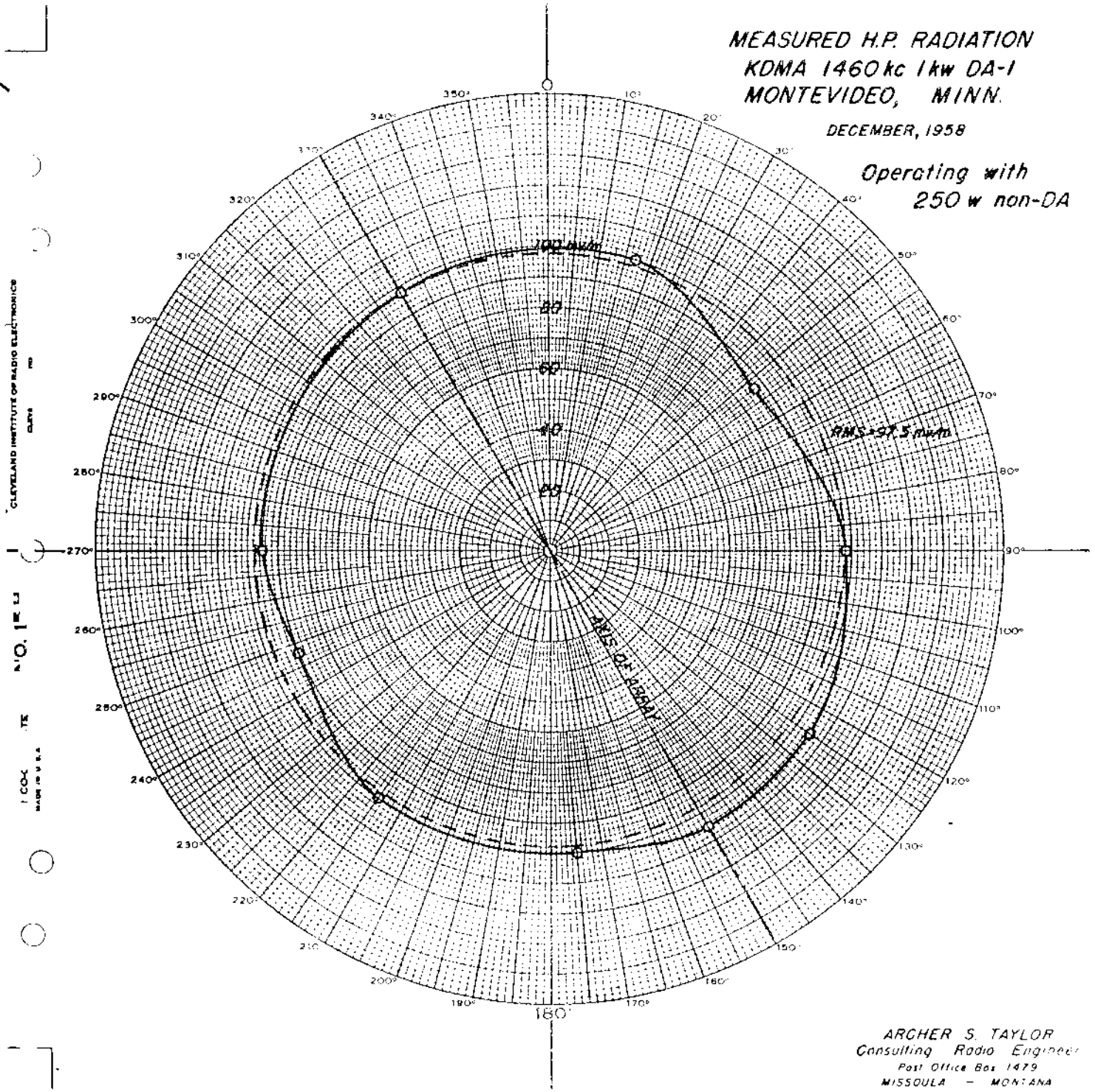
KDMA

MEASURED NON-DA
(4-22-59g)

Station KDMA
Montevideo, Minnesota

1kw, DA-1,U
1460 KC

Granted item 7-17-59



FCC File No. BL-7386
Accepted 3-26-59

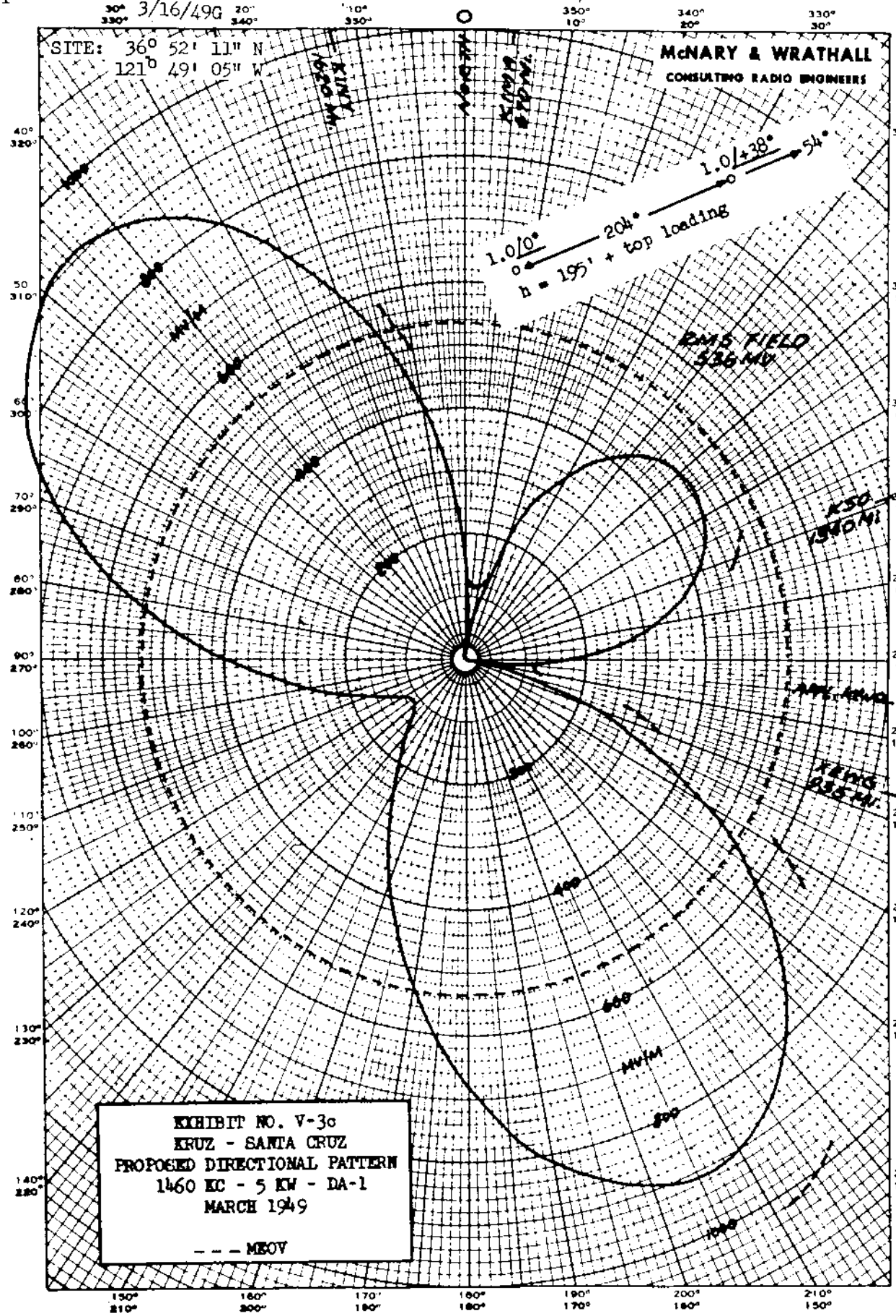
KDMA
Montevideo, Minnesota

1460 KC

KDON

PROPOSED NIGHT&DAY

KRUZ, SANTA CRUZ, CAL. 3-14-49 BP-7148 5kw, DA1 1460kc



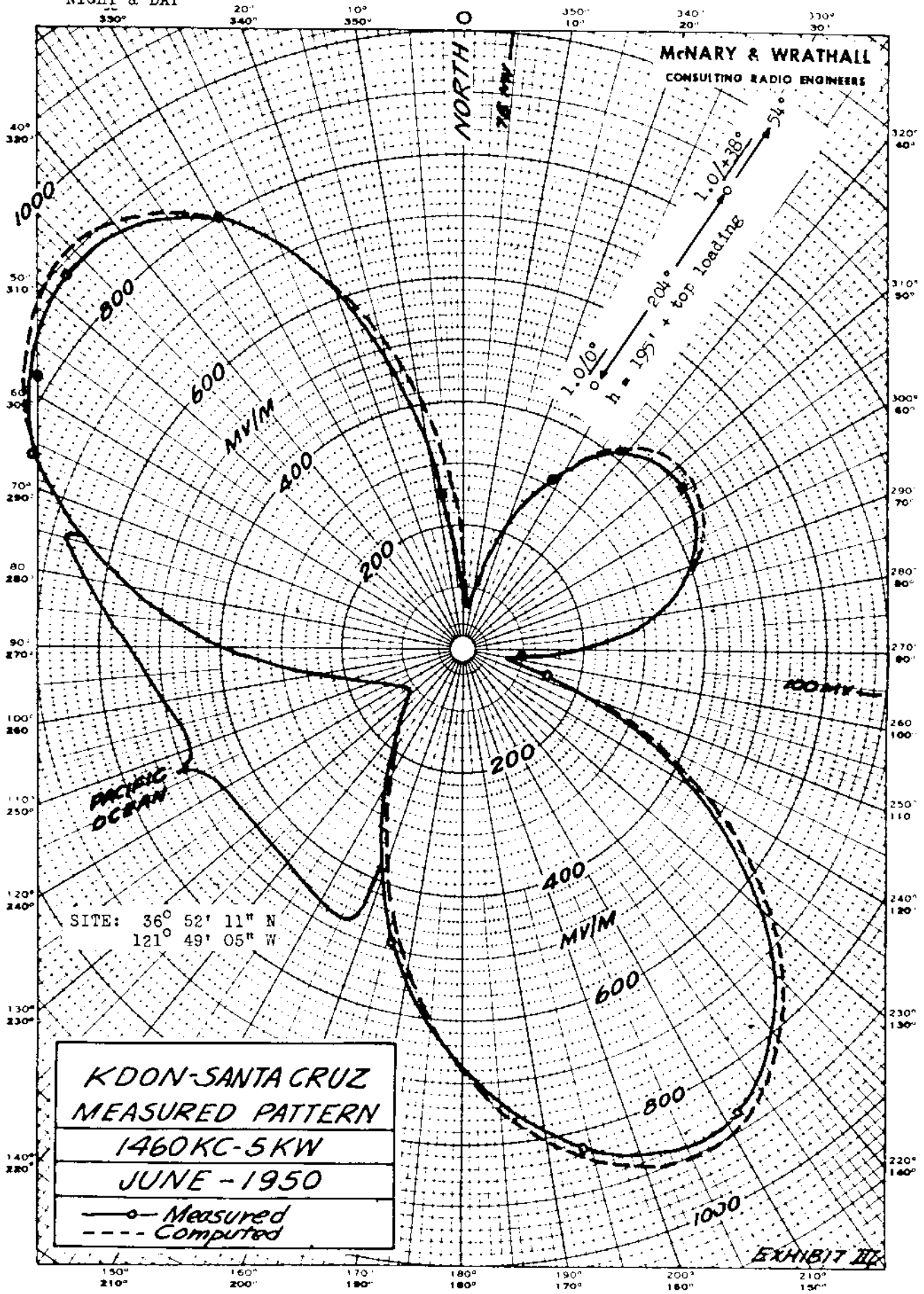
KRUZ, Santa Cruz, Cal. 1460 kc

KDON

MEASURED
NIGHT & DAY

KDON, SANTA CRUZ, CALIF.

5kw, DA-1-U 1460 kc



KDON, Santa Cruz, Calif. 1460 kc

KENO
1460 kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KENO — Main Studio: Las Vegas, Nevada

Frequency: 1460 kHz — Power: 1kw Night 5kw Day

Notification List No. 1789 — Date: September 12, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 36° 06' 17"
West Longitude: 115° 12' 03"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation (DA-N)
Number of elements: 3
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	C(#1)	W(#2)	E(#3)
HEIGHT ABOVE INSULATORS:	176'	176'	176' (94°)
NIGHT PHASING:	0°	+55°	-30°
NIGHT FIELD RATIO:	1.0	0.60	0.75

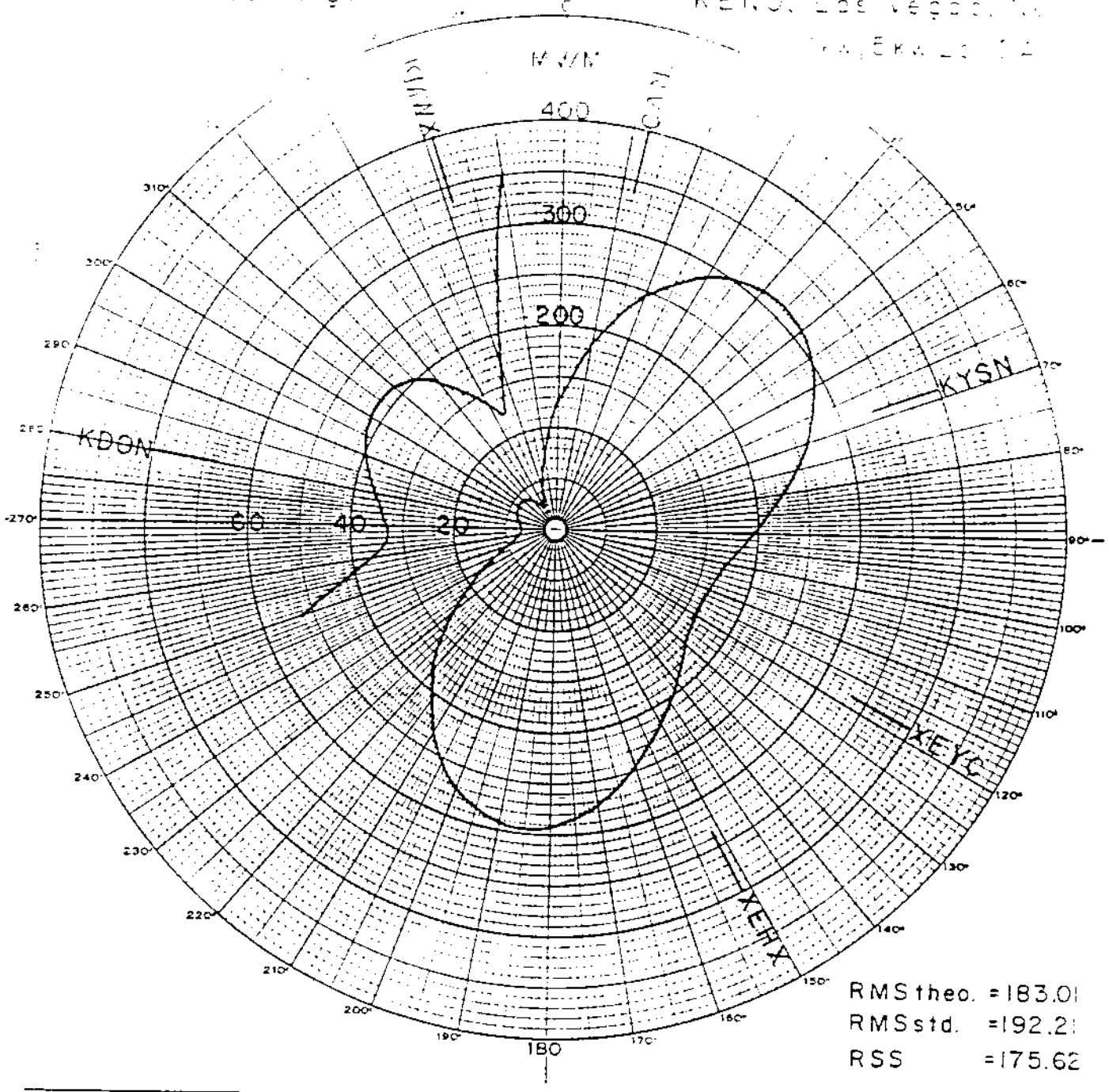
SPACING AND ORIENTATION: With Tower #1 as reference, Tower #2 is spaced 103.4° on a line bearing 281.27° true and Tower #3 is spaced 141° on a line bearing 123.2° true.

GROUND SYSTEM: 120 - 168' to equally spaced copper radials plus 120 - 50' interspaced radials about each tower. Radials are shortened and bonded to transverse straps midway between adjacent towers

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Night	183.01 mv/m	175.62 mv/m	192.21 mv/m

KENO
1460 KHz



RMS theo. = 183.01
RMS std. = 192.2
RSS = 175.62

HORIZONTAL RADIATION PATTERN—FIGURE No. 10A

Antenna Parameters

281.27° No. 2
0.6 ∠ 55
103.4° No. 1
1.0 ∠ 0
141° No. 3
0.75 ∠ -30
123.2°

G = 94°

Floyd Hall
Registered Engineer

Applicant: KENO
Location: Las Vegas, Nev.
Freq: 1460 kc. — 1.0 kw
Lat: 36° 06' 17" — 115° 12' 02.7"
Time of operation: Night
Type of operation: DA-N
RMS used: 192.26 std.
Pattern No: 800416

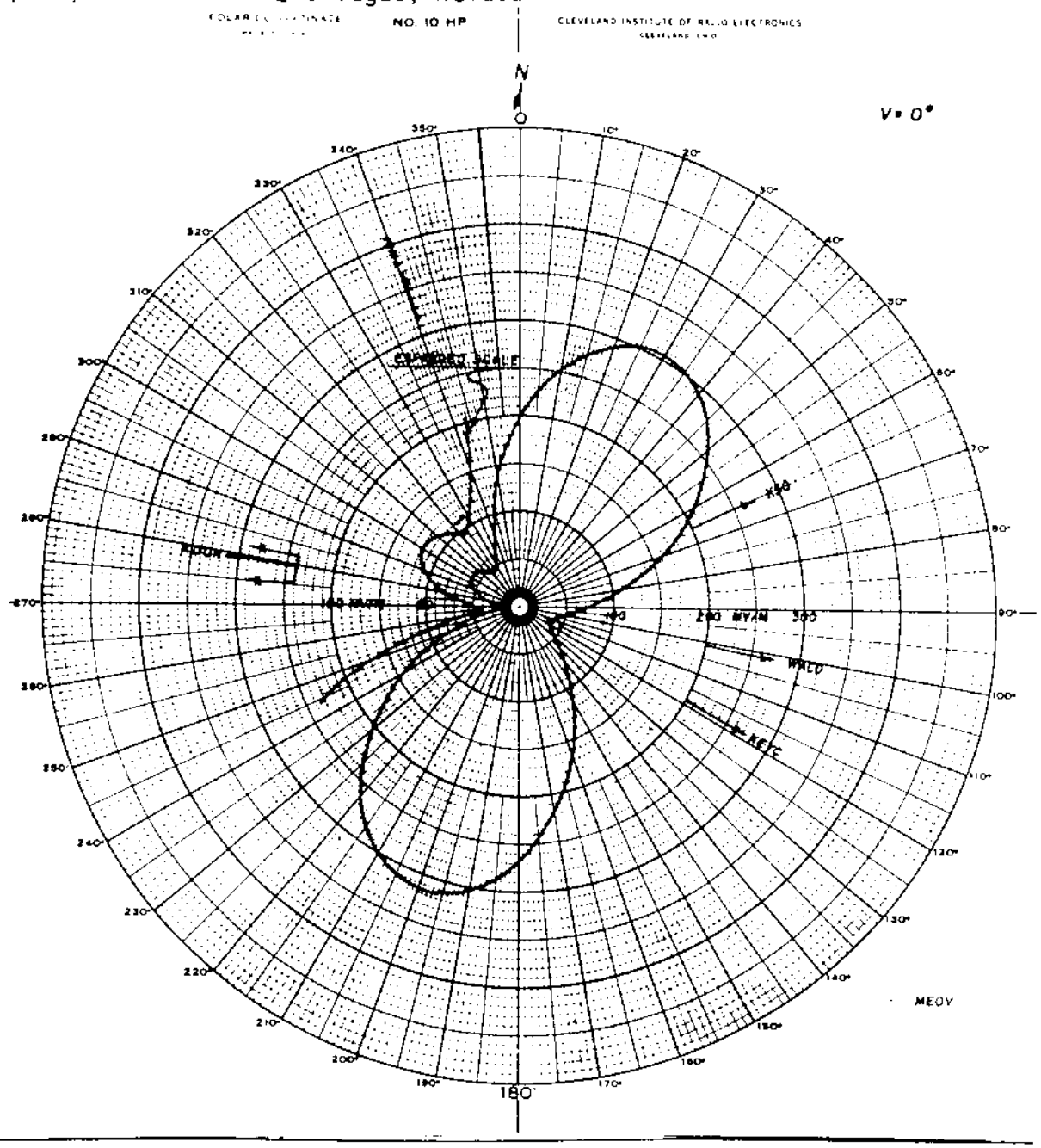
Date: 4-16-80 O.H.

KENO

Proposed Night
(12-23-70ct)

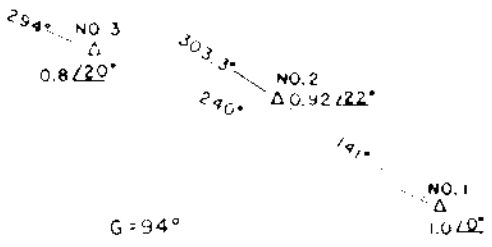
Station KENO
Las Vegas, Nevada

1kw, 5kw-LS, DA-N, U
1460 kc



HORIZONTAL RADIATION PATTERN—FIGURE No. 1—Revised

Antenna Parameters



Floyd Hall
Radio Engineering
Consultant

Applicant Lotus Broadcasting Corp.
Location Las Vegas, Nevada
Freq 1460 kc Power 5.00/1.0N
Lat 36° 06' 16" Long 115° 12' 16"
Type of pattern Night
Type of system D.A.-N
Res. Field 179.8 mv/m
Proposed %
10-24-70

FCC file No. BP-18930
Accepted 11-30-70

Station KENO
Las Vegas, Nevada

1460 kc

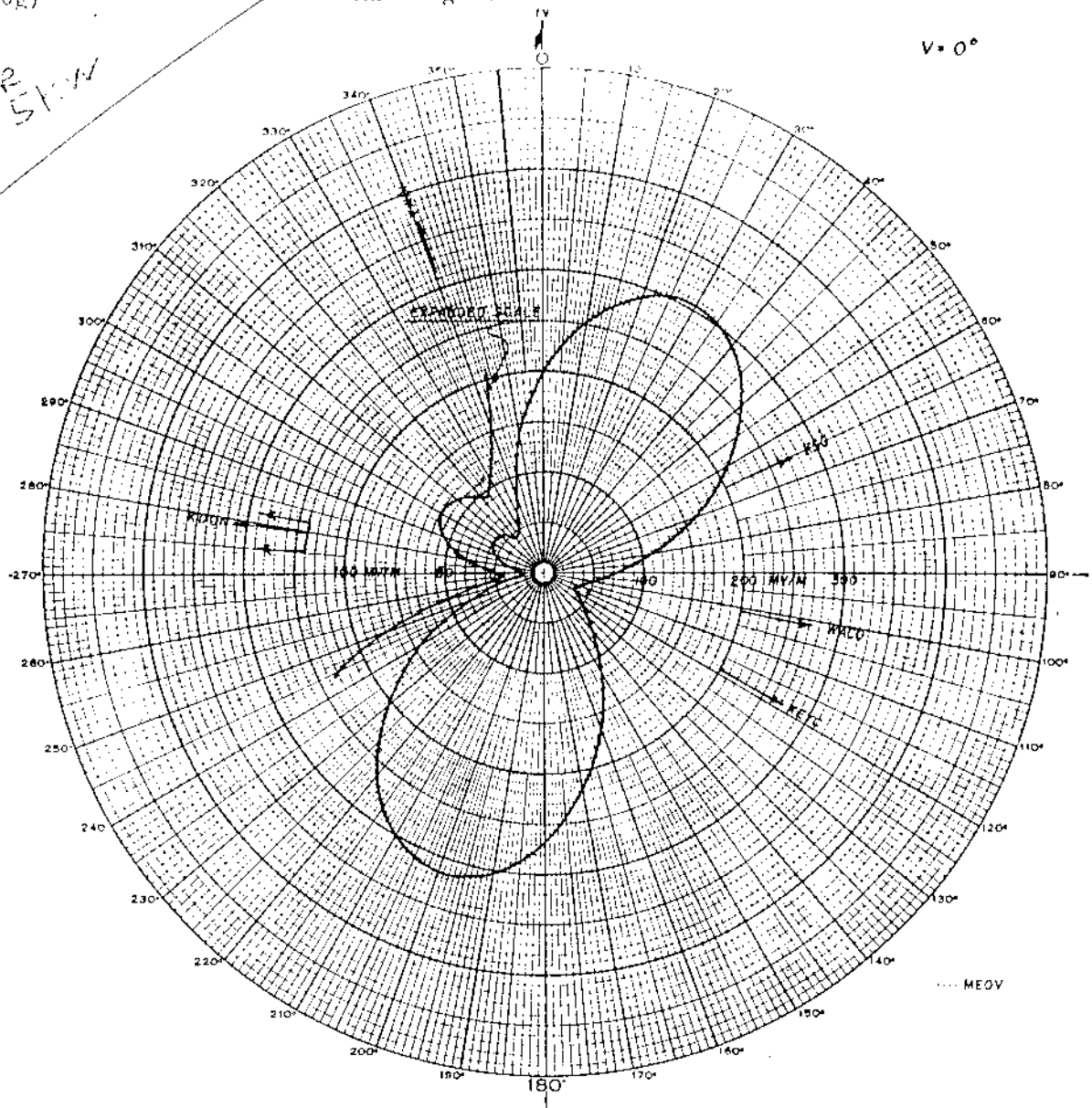
KENO

PROPOSED NIGHT
(5-27-60g)

Station KENO
Las Vegas, Nevada

1kw, DA-N,U
1460 KC

10-18-67
GRANTED C-P
INCREASE POWER
FROM 1 KW TO 5 KW



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS								STATION DATA
	TOWER No.	ELECTRICAL HEIGHT θ°	TRUE TOWER ORIENTATION ϑ°	SPACING s°	PHASING ψ°	HORIZONTAL FIELD mV/m E	FIELD RATIO f	ELEV ANGLE θ°	ELEVATION RMS FIELD mV/m E_θ	CALL KENO
	1	99	0	0	0	116.6	1.0	0	179.8	FREQUENCY 1460 kc
	2	99	303.3	141	22		0.92	10		POWER 1.0 KW kw
	3	99	294	240	20		0.8	20		TIME OF OPERATION UNLIMITED
	4							30		TYPE OF OPERATION DA-N
	5							40		DAYTIME TOWERS 1
	6							50		NIGHTTIME TOWERS 3
	7							60		NO RADIALS PER TOWER 120
	8							70		LENGTH OF RADIALS 90° 168 ft
	9							80		GROUND SCREEN DIMENSION 24' SQ
	10									LAT 36° 06' 58"
	DAYTIME OPERATION [ ]			NIGHTTIME OPERATION [X]				E_1 = mV/m		LONG 115° 09' 03.5"
								P_1 = kw		SUPERSEDES
										PATTERN No

294° NO.3 303.3° NO.2 240° 141' N NO.1
141° 264'
240° 450'

EXHIBIT NO. 1-A

RADIO STATION KENO
LAS VEGAS, NEVADA

APRIL 1960

5-23-60 Granted CP to make changes in DA system

FCC File No. BP-14097
Accepted 5-4-60

KENO
Las Vegas, Nevada

1460 KC

KENO

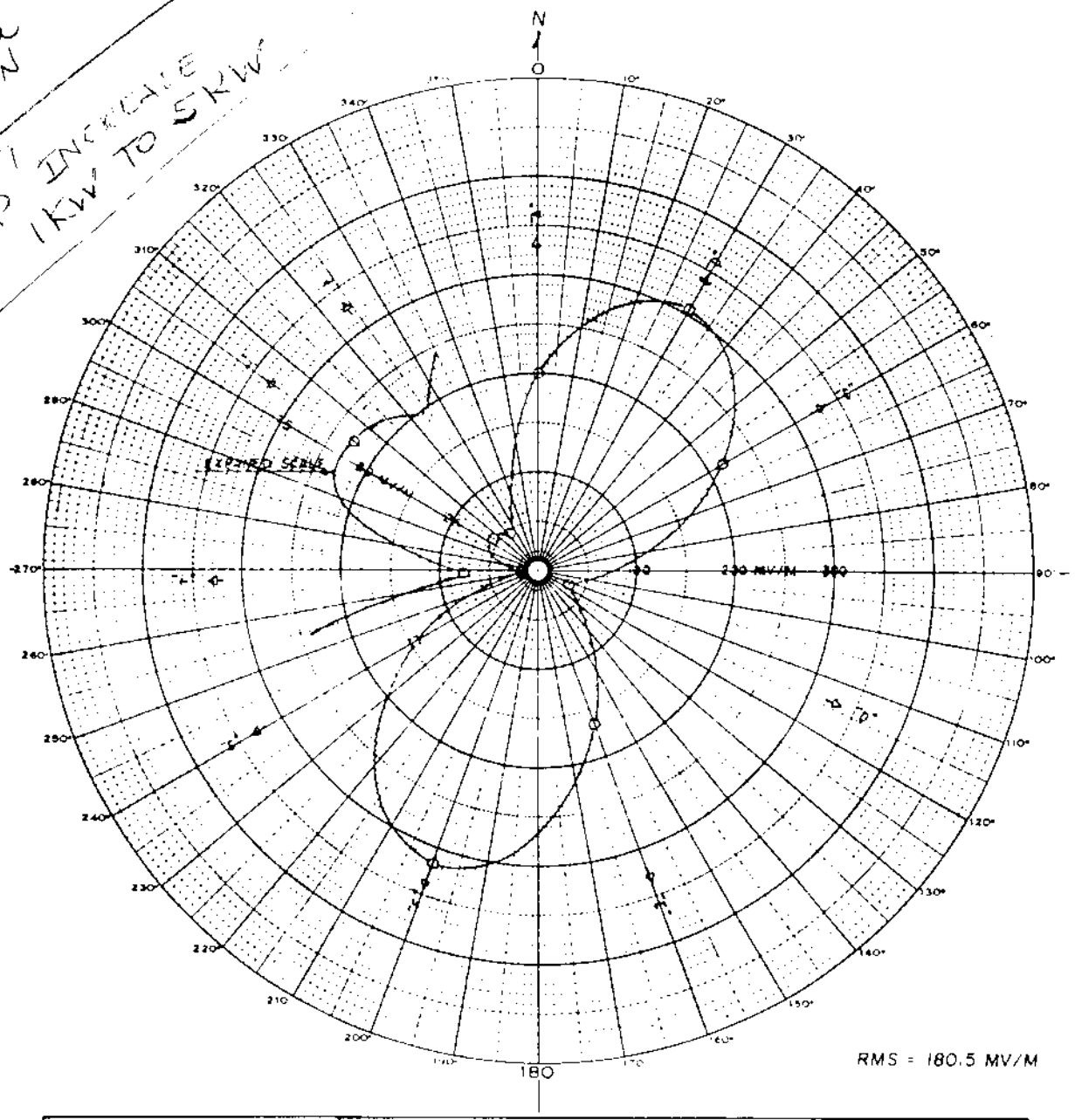
MEASURED NIGHT
(9-20-61ct)

Station KENO
Las Vegas, Nevada

1kw, DA-N, U
1460 kc

5-4-62
granted ~ covering
change in 4 units &
and changes in DA-N

10-18-67 C.P. INCREASE
GRANTED POWER FROM 1 KW TO 5 KW



RMS = 180.5 MV/M

TOWER PLACEMENT SKETCH

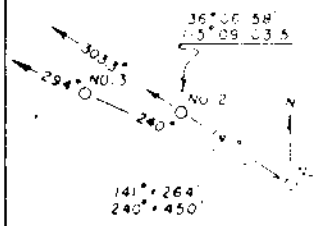


FIGURE NO. 13

NIGHT TIME DIRECTIONAL RADIATION PATTERN

BASED ON FIELD INTENSITY MEASUREMENTS

STATION KENO — LAS VEGAS, NEVADA

1460 K KW DA-N

JUNE

FCC File No. BL-8637
Accepted 8-23-61

Station KENO
Las Vegas, Nevada

1460 kc

KENO

MEASURED NON-DA
(9-20-61ct)

Station-KENO
Las Vegas, Nevada

1kw, DA-N, U
1460 kc

10-18-61
GRANTED C.P.
INCREASE POWER
FROM 1 KW TO 5 KW

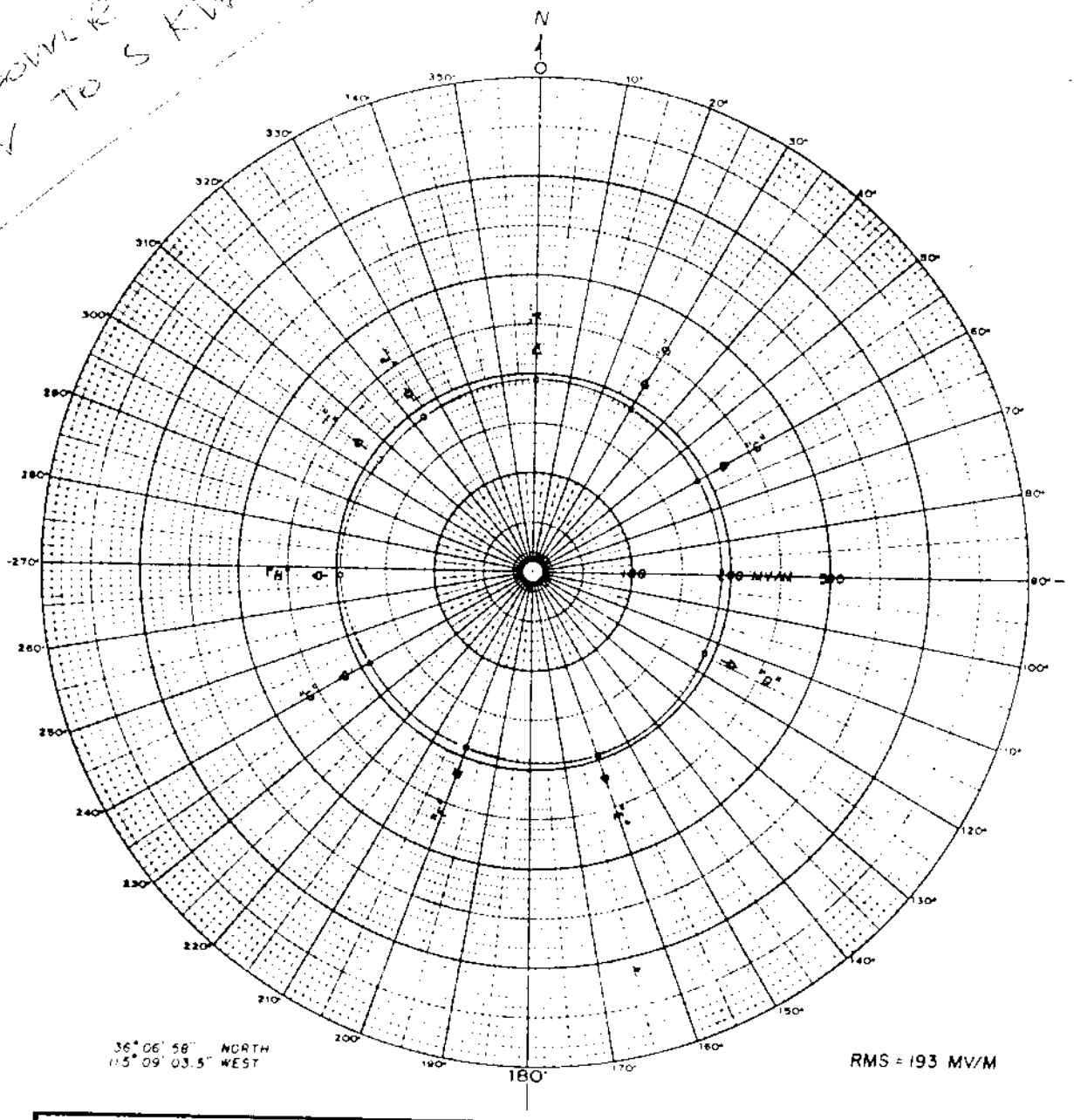


FIGURE NO. 12

NON-DIRECTIONAL RADIATION PATTERN
BASED ON FIELD INTENSITY MEASUREMENTS

1460 KC 1 KW DA-N

STATION KENO — LAS VEGAS, NEVADA

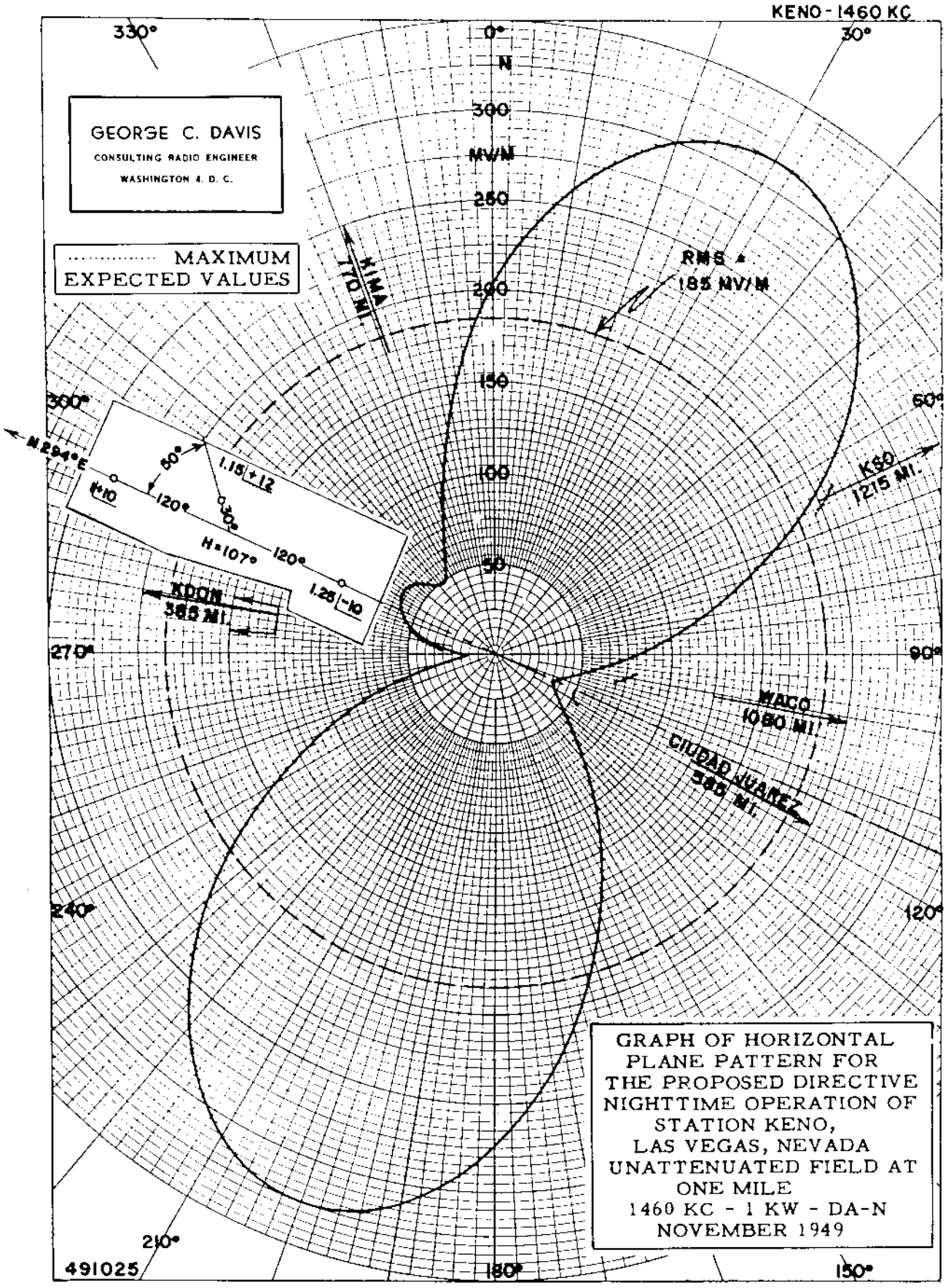
JUNE 1961

FCC File No. BL-8637
Accepted 8-23-61

Station KENO
Las Vegas, Nevada

1460 kc

KENO


KENO - 1460 KC
GEORGE C. DAVIS
CONSULTING RADIO ENGINEER
WASHINGTON 4, D. C.
MAXIMUM EXPECTED VALUES
0° N
30°
60°
90°
120°
150°
180°
210°
240°
270°
300°
330°
300
250
200
150
100
50
MV/M
RMS = 185 MV/M
KWKW 170 MI.
N 294° E
K=10
60°
120°
1.15/+12
30°
K=107°
120°
1.25/-10
KDON 385 MI.
KSO 1215 MI.
WACO 1080 MI.
CIUDAD JUAREZ 586 MI.
GRAPH OF HORIZONTAL PLANE PATTERN FOR THE PROPOSED DIRECTIVE NIGHTTIME OPERATION OF STATION KENO, LAS VEGAS, NEVADA UNATTENUATED FIELD AT ONE MILE 1460 KC - 1 KW - DA-N NOVEMBER 1949
491025

KENO

MEASURED NIGHT KENO, LAS VEGAS, NEV. 1kw, DA-N 1460 kc

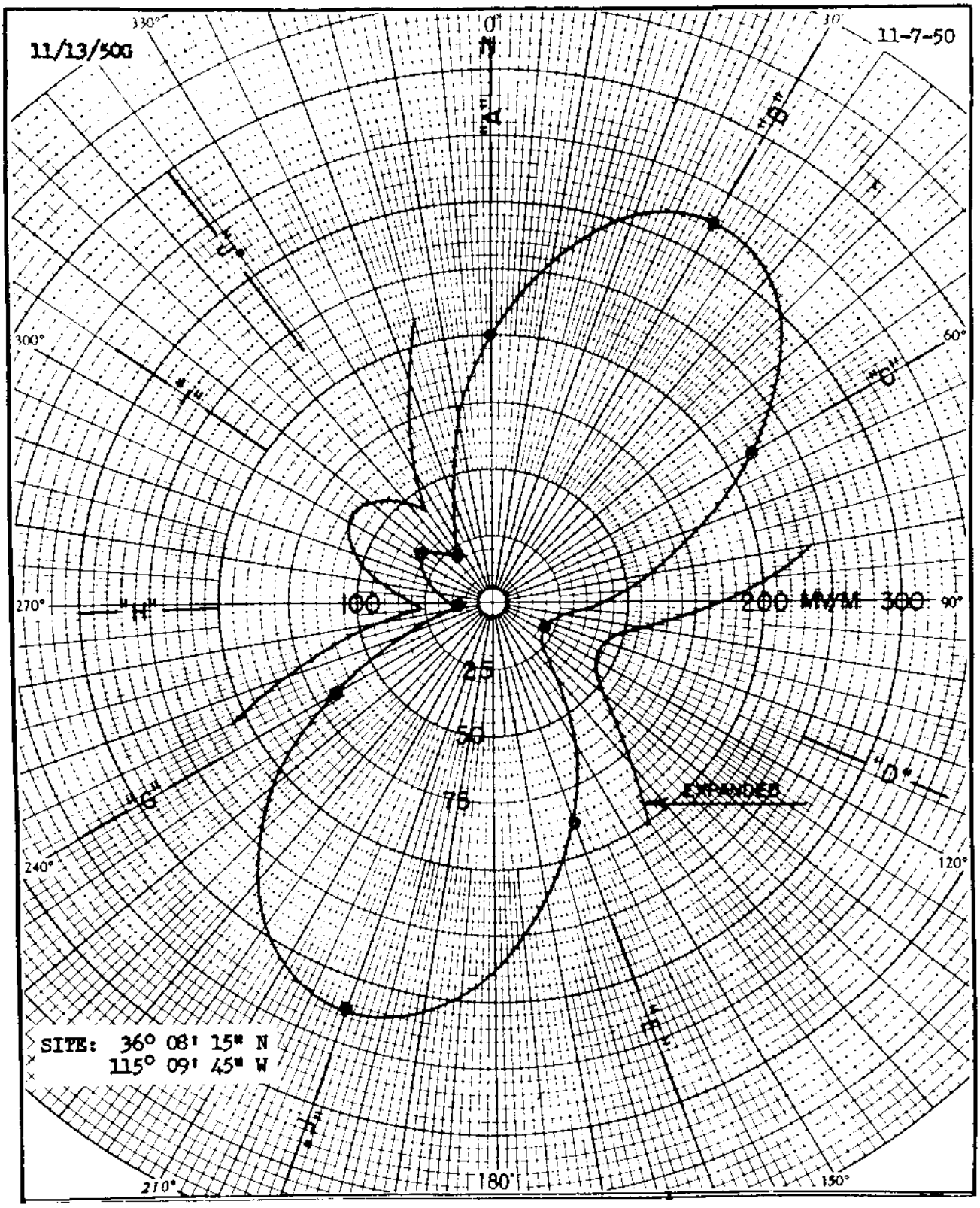


FIGURE NO. 9-A

Horizontal Radiation Pattern
Antenna Operation: DA: Night

Radio Station KENO Las Vegas, Nevada
1,000 Watts 1460 KC
Determined RMS Field at One Mile 188.5 MV/M
October-1950

KENO, Las Vegas, Nevada 1460 kc

MEASURED
DAY (NON-DA)

KENO, LAS VEGAS, NEV.

1kw, DA-N

1460 kc

KEN

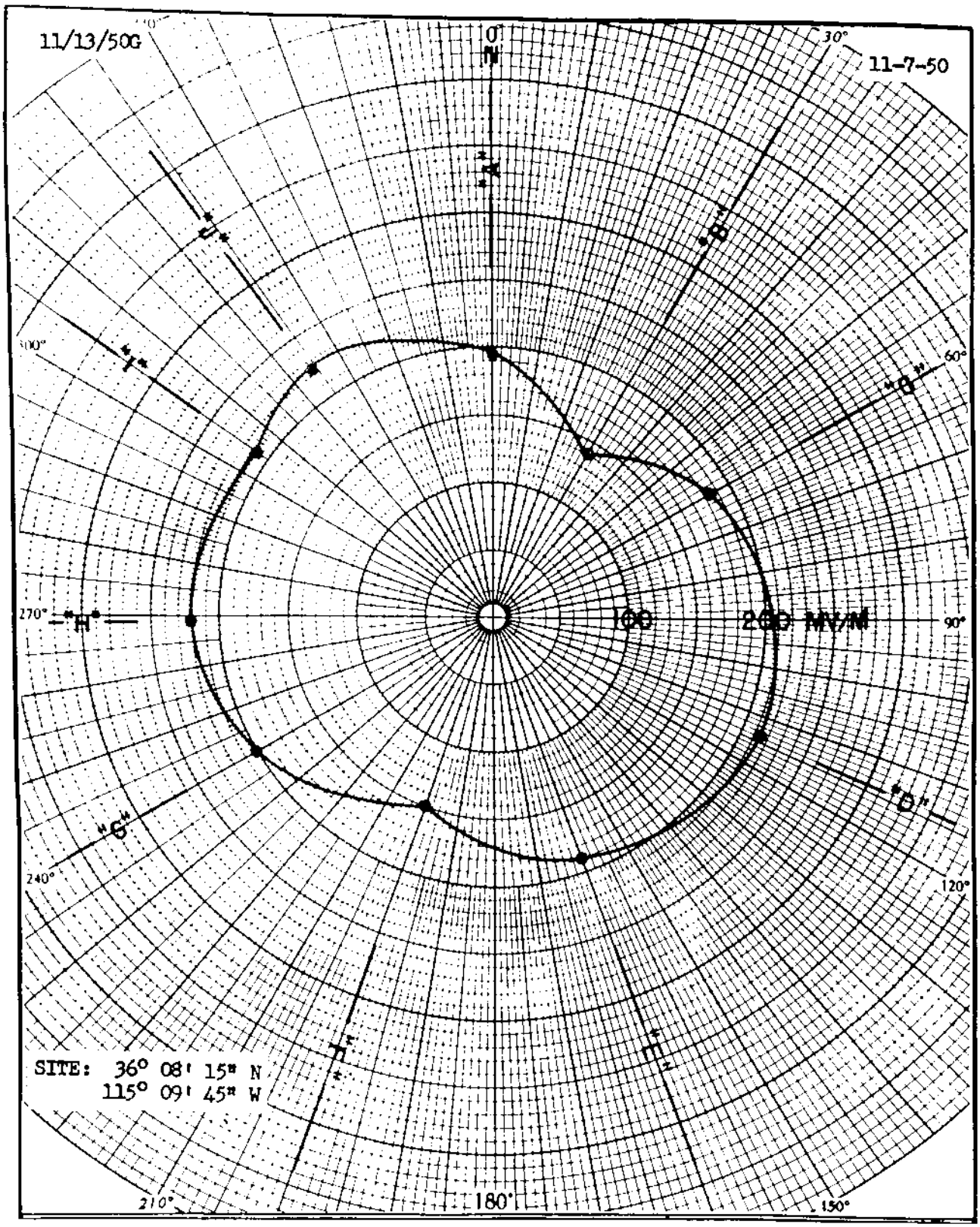


FIGURE NO. 8-A

Horizontal Radiation Pattern
Antenna Operation: ND (Day)

Radio Station KENO Las Vegas, Nevada
1,000 Watts 1460 KC
Determined RMS Field at One Mile 197.5 MV/M
October-1950

KENO, Las Vegas, Nevada 1460 kc

KGAA
1460 kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KGAA

Main Studio: Kirkland, Washington

Frequency: 1460 kHz

Power: 2.5kw Night 5kw Day

Notification List No. 1787

Date: July 10, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 47° 40' 24"
West Longitude: 122° 10' 07"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 5
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers. *Includes top loading.

TOWER:	C(#1)	EC(#2)	SE(#3)	N(#4)	S(#5)
HEIGHT ABOVE INSULATORS:	150'	150'	150'	150'	150' (90°)*
NIGHT PHASING:	0°	+116°	+217.5°	---	---
NIGHT FIELD RATIO:	1.0	1.9	1.05	---	---
DAY PHASING:	+16	---	---	-43	+43
DAY FIELD RATIO:	2.0	---	---	1.0	1.0

SPACING AND ORIENTATION: With tower #1 as reference tower #2 is spaced 168.42' (90°) on a line bearing 137.65° true. Tower #3 is spaced 200.33' (107°) on a line bearing 137.65° true; Tower #4 is spaced 262' (140°) on a line bearing 350° true, and Tower #5 is spaced 262' (140°)on a line bearing 170° true.

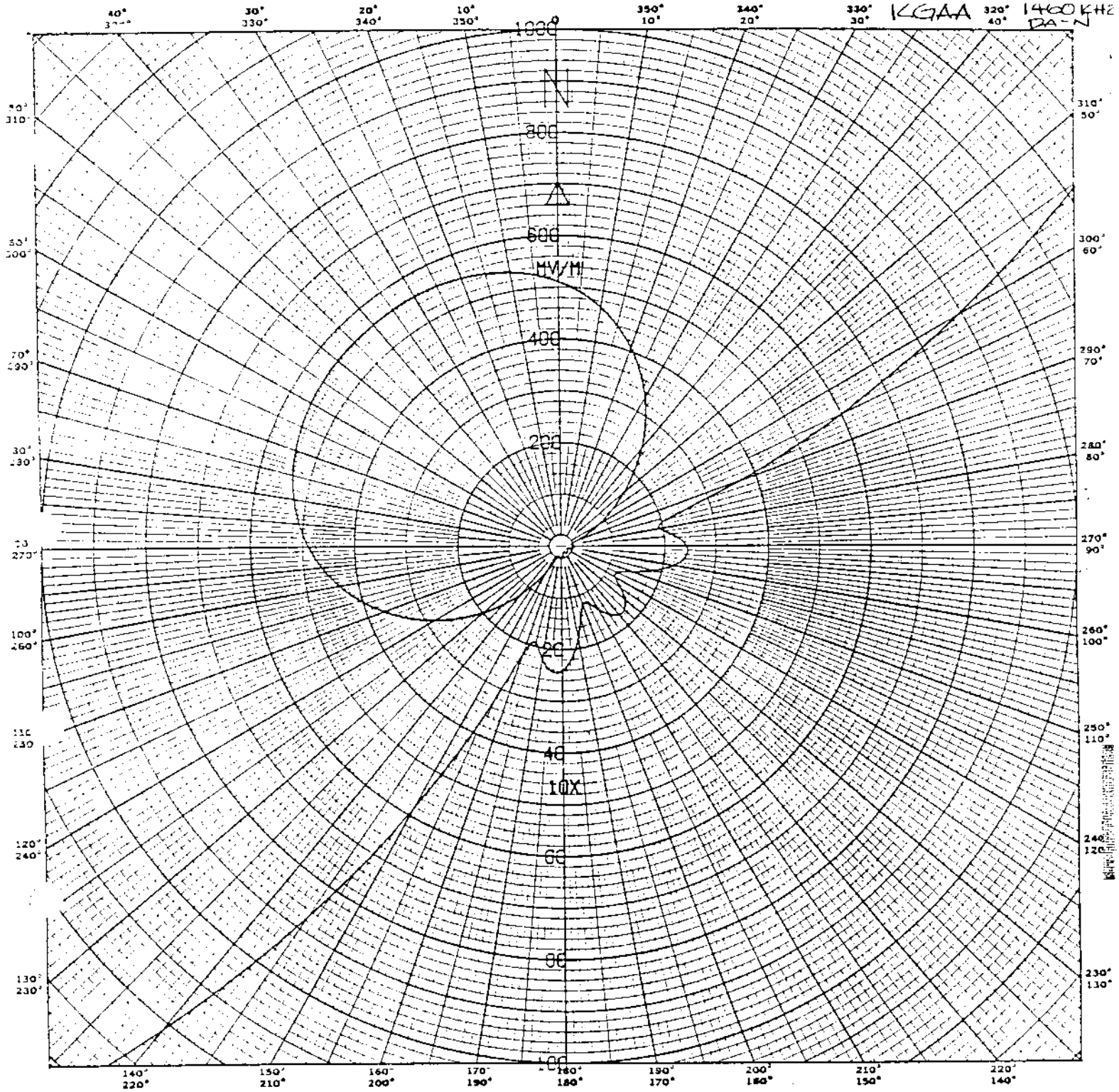
GROUND SYSTEM: 120 - 20' to 150' equally spaced copper radials about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	RSS	STANDARD RMS
Day	425 mv/m		
Night	315.356 mv/m	327.247 mv/m	331.27 mv/m

KGAA
1460kHz

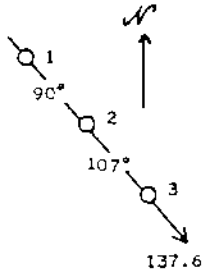
NOTE: Please retain the Daytime directional antenna radiation pattern notified for Station KYAC in United States Change List Number 1104 dated March 24, 1965, and attach to this Revised Description Sheet and Nighttime pattern. This notification concerns only a change in the Nighttime operation of the station with Daytime operation continued as previously notified.



HATFIELD & DAWSON
CONSULTING ELECTRICAL ENGINEERS
3525 STONE WAY N.
SEATTLE, WASHINGTON 98103

RADIO STATION KGAA
KIRKLAND, WASHINGTON USA

8/79



SITE: 47° 40' 24'' NL X
122° 10' 07'' WL

PROPOSED NIGHTIME DIRECTIONAL ANTENNA 1460 KHZ
2.5 KW DA-N HORIZONTAL PLANE STANDARD PATTERN
RMS THEO 315.3562 MV/M RMS STD 331.2739 MV/M
RSS 327.2478 MV/M K = 136.919 MV/M

#	F	Ø	S	Ø	G
1	1.0	0	0	0	90*
2	1.9	116	90	137.65	90*
3	1.05	217.5	197	137.65	90*

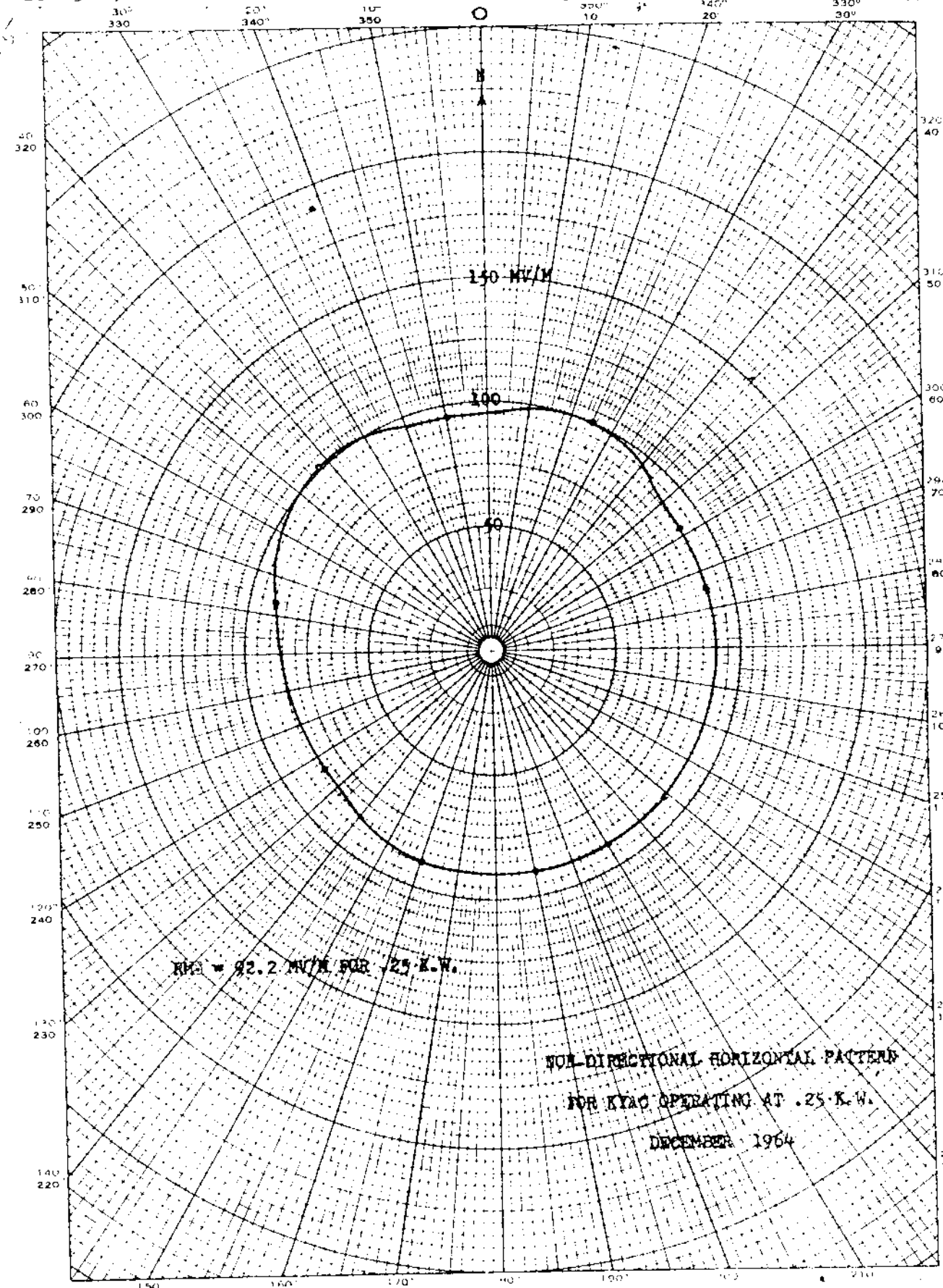
* PHYSICAL HEIGHT OF TOWERS 80.1°
WITH 9.9° GUY WIRE TOPLOADING

KILO

Measured Non-DA
(4-28-65ct)

Station KYAC
Kirkland, Washington

5kw, DA-D, D
1460 kc



FCC File No. BL-10849
Accepted 4-7-65

Station KYAC
Kirkland, Washington

1460 kc

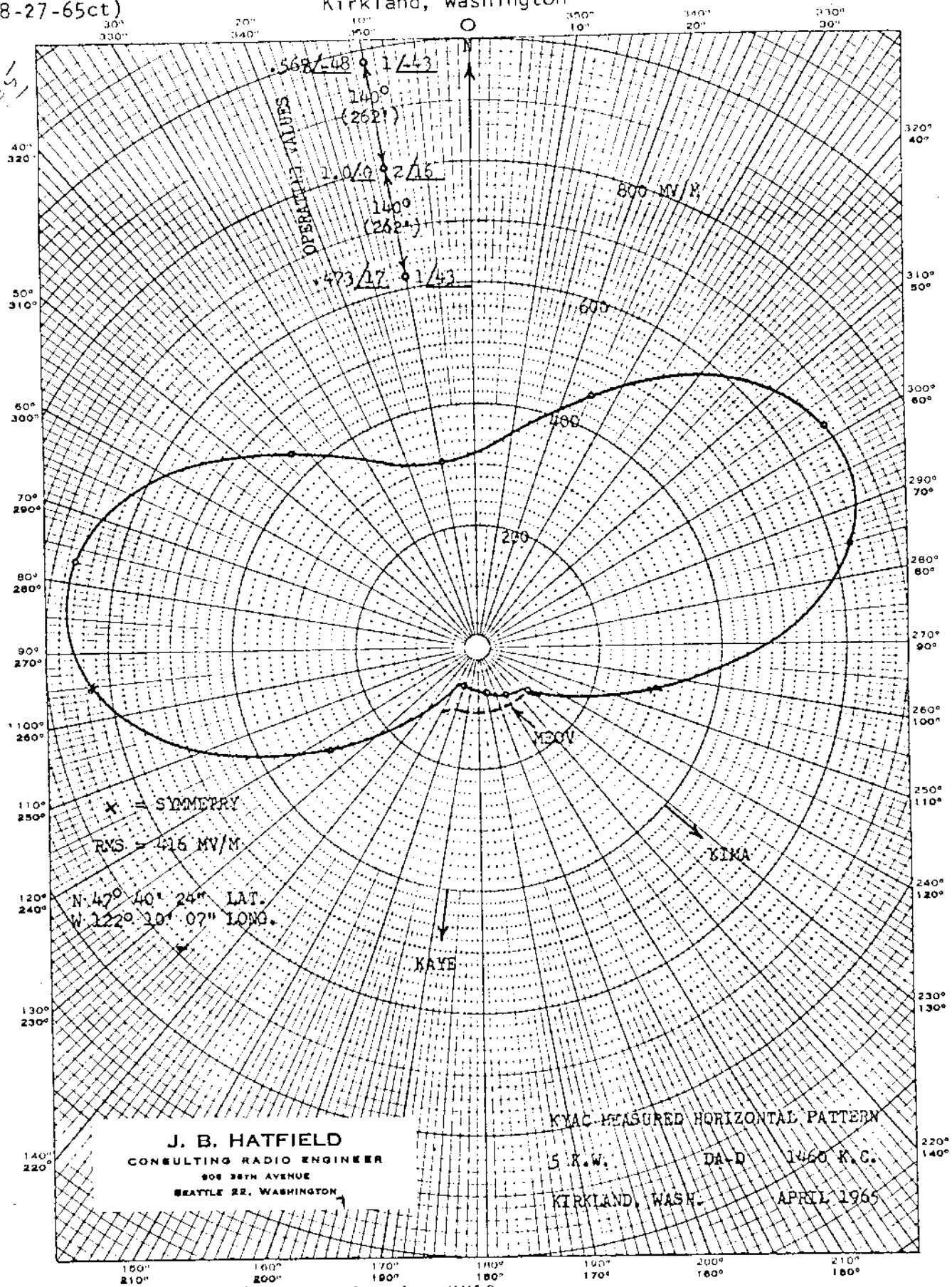
Measured Day
(8-27-65ct)

Station KYAC
Kirkland, Washington

5kw, [

KILO

IC 10-28-65



EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 340-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE

FCC File No. BL-10962
Accepted 7-26-65

Station KYAC
Kirkland, Washington

1460 kc

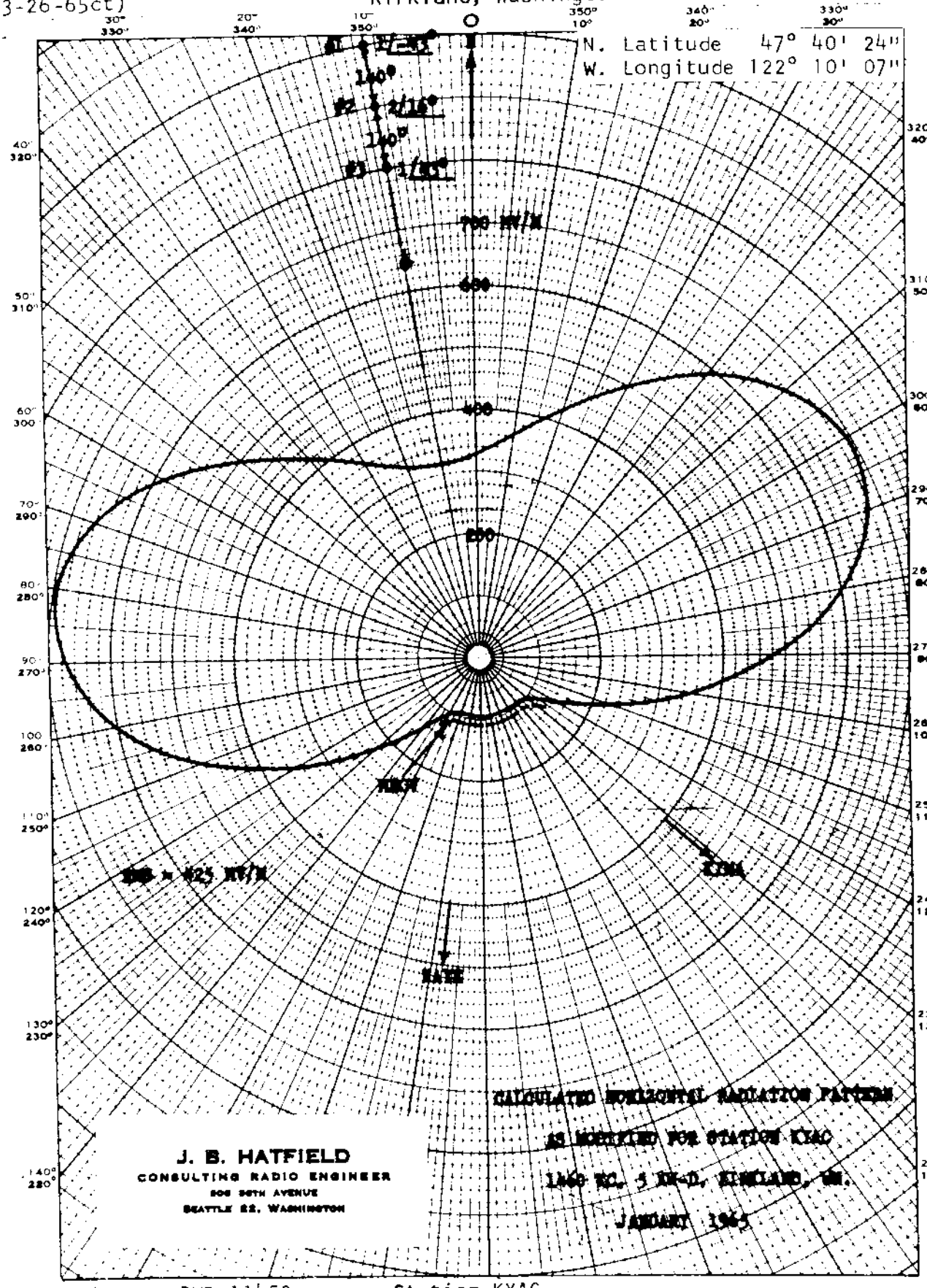
KILO

Proposed Day
(3-26-65ct)

Station KYAC
Kirkland, Washington

5kw, DA-D, D
1460 kc

BMP-11453
3-19-65 MCP
CHG. DA.



FCC File No. BMP-11453
Accepted 3-9-65

Station KYAC
Kirkland, Washington

1460 kc

KIRL
1460KHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KIRL — Main Studio: St. Charles, Missouri

Frequency: 1460 kHz — Power: 0.5kw Night 5kw Day

Notification List No. 1789 — Date: September 12, 1980 — Class: III

GEOGRAPHICAL LOCATION OF THE CENTERS OF THE DAY AND NIGHT ANTENNA SYSTEMS:

DAYTIME		NIGHTTIME	
North Latitude:	38° 50' 05"	North Latitude:	38° 48' 21"
West Longitude:	90° 28' 12"	West Longitude:	90° 24' 23"

NIGHTTIME ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation (DA-2)
Number of elements: 4
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	NW(#1)	SE(#2)	NNW(#3)	ESE(#4)
HEIGHT ABOVE INSULATORS:	168.5'	168.5'	168.5'	168.5' (90°)
NIGHT PHASING:	0°	+73.5°	+150°	+223.5°
NIGHT FIELD RATIO:	1.0	0.95	0.46	0.44

SPACING AND ORIENTATION: The towers are located at the vertices of a parallelogram the long sides of which are 515.7' (275.5°) in length on a line bearing 135.5° true. The short sides are 84.2' (45°) in length on a line bearing 95.5° true.

GROUND SYSTEM: 120 - 169' equally spaced copper radials plus 120 - 60' interspaced radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers.

KIRL
1460KHz

DAYTIME ANTENNA CHARACTERISTICS

Number of elements: 3
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	SW(#2)	NC(#3)	NE(#4)
HEIGHT ABOVE INSULATORS:	168.5'	168.5'	168.5' (90°)
DAY PHASING:	-123.5°	0°	+140°
DAY FIELD RATIO:	0.51	1	0.68

SPACING AND ORIENTATION: Adjacent towers #1 and #2 are spaced 337' (180°) on a line bearing 212° true. From the midpoint between towers #1 and #2, Tower #3 is spaced 37.5' (20°) on a line bearing 357° true.

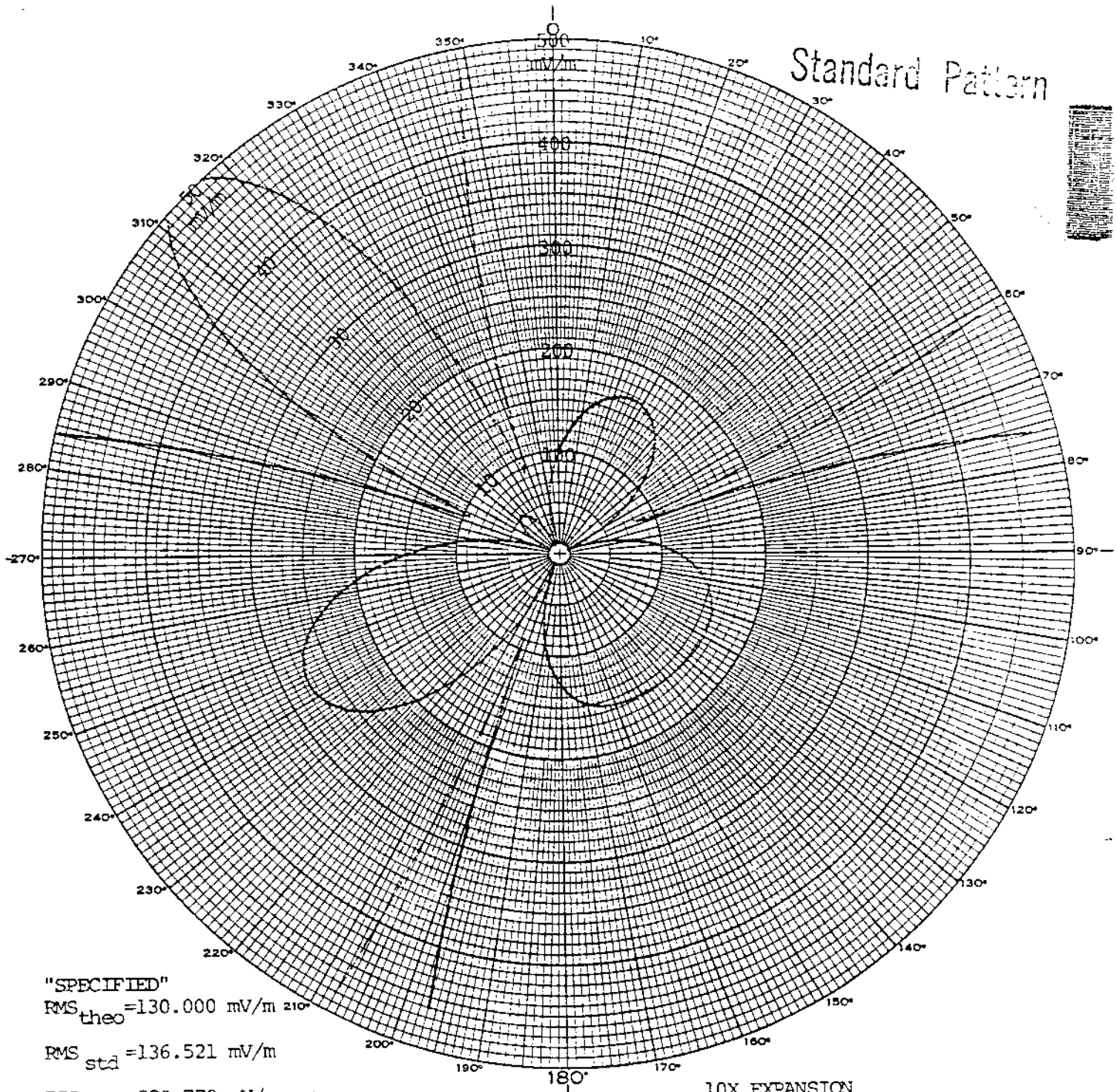
GROUND SYSTEM: 120 - 169' equally spaced copper radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	411 mv/m		
Night	130 mv/m	220.779 mv/m	136.521 mv/m

Note: Please retain the Daytime directional antenna radiation pattern notified for Station KIRL in United States Change List Number 1377 dated June 17, 1970 and attach to this Revised Description Sheet and Nighttime patterns. This notification concerns only a change in the Nighttime operation of the station with Daytime operation continued as previously notified.

KIRL
1460KHz



"SPECIFIED"

RMS_{theo}=130.000 mV/m

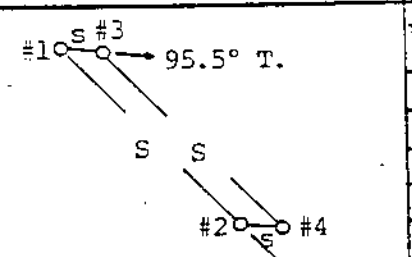
RMS_{std}=136.521 mV/m

RSS_{theo}=220.779 mV/m

10X EXPANSION

COORDINATES SHOWN ARE NIGHTTIME SITE ONLY

TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	FIGURE 2	STATION DATA



S = 275.5°
s = 45°

TOWER No.	ELECTRICAL HEIGHT θ°	SPACING s°	PHASING Ψ°	FIELD RATIO F
1	90°		0°	1.00
2	90°		73.5°	0.95
3	90°		150°	0.46
4	90°		223.5°	0.44
5				
6				

DAYTIME OPERATION ☐ NIGHTTIME OPERATION ☒

PROPOSED NIGHTTIME HORIZONTAL PLANE STANDARD PATTERN

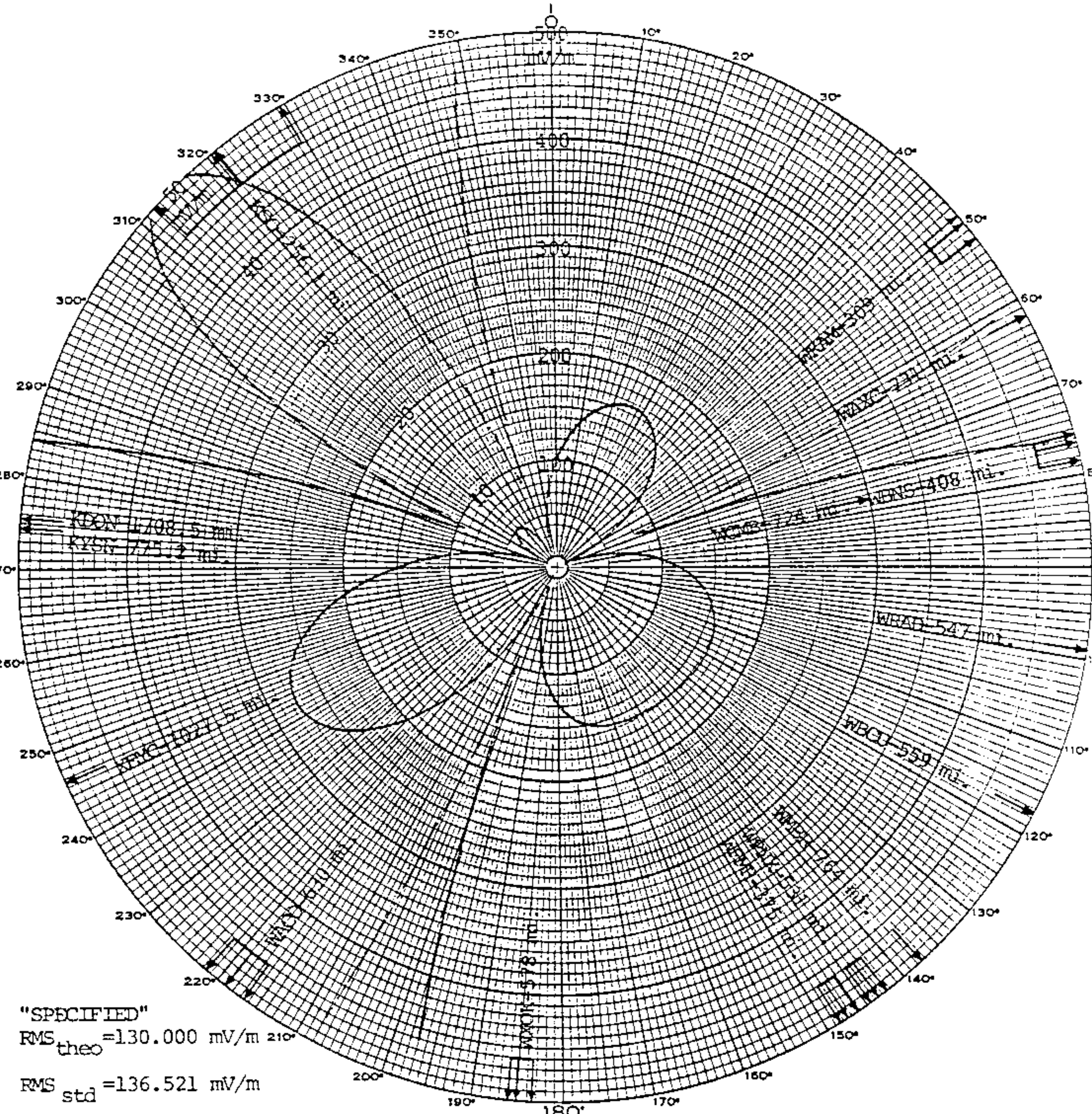
ST. CHARLES, MO.

θ° = 0

CALL	KIRL
FREQ	1460 kHz
POWER	0.5 kW
TYPE	DA-2
TIME	UNLIMITED
LAT.	N 38°48'21"
LONG.	W 90°24'23"

E. HAROLD MUNN, JR. & ASSOCIATES, INC.
COLDWATER, MICH.

KIRL
1460KHz



"SPECIFIED"

RMS_{theo}=130.000 mV/m

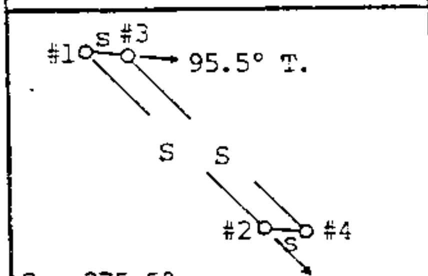
RMS_{std}=136.521 mV/m

RSS_{theo}=220.779 mV/m

10X EXPANSION

COORDINATES SHOWN ARE NIGHTTIME SITE ONLY

TOWER PLACEMENT SKETCH



S = 275.5°
s = 45°

PATTERN PARAMETERS

TOWER No	ELECTRICAL HEIGHT G°	SPACING S°	PHASING ψ°	FIELD RATIO F
1	90°		0°	1.00
2	90°		73.5°	0.95
3	90°		150°	0.46
4	90°		223.5°	0.44
5				
6				

DAYTIME OPERATION ☐ NIGHTTIME OPERATION ☒

FIGURE 2A

PROPOSED
NIGHTTIME
HORIZONTAL
PLANE
STANDARD
PATTERN

ST. CHARLES, MO.

Θ° = 0

STATION DATA

CALL	KIRL
FREQ	1460 kHz
POWER	0.5 kW
TYPE	DA-2
TIME	UNLIMITED
LAT.	N 38°48'21"
LONG.	W 90°24'23"

E. HAROLD MUNN, JR. & ASSOCIATES, INC.
COLDWATER, MICH.

KIRL

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KIRL — Main Studio: St. Charles, Missouri

Frequency: 1460 kHz — Power: 0.5 kW Night 5 kW Day

Notification List No. 1725 — Date: March 16, 1977 — Class: III

GEOGRAPHICAL LOCATION OF THE CENTERS OF THE DAY AND NIGHT ANTENNA SYSTEM:

Daytime				NIGHTTIME			
North Latitude:	38°	50'	05"	North Latitude:	38°	48'	21"
West Longitude:	90°	28'	12"	West Longitude:	90	24'	23"

Authorized for Daytime and Nighttime operation (DA-2).

NIGHTTIME ANTENNA CHARACTERISTICS

Number of elements: 4

Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers. Tower #5 is top loaded by upper sections of guy wires to an effective electrical height of 185° (*).

TOWER:	NW(#5)	SW(#2)	NE(#3)	SE(#4)
HEIGHT ABOVE INSULATORS:	269'(*)	168.5'	168.5'	168.5' (90.10°)
PHASING:	0°	+84.43°	+95.42°	-172.99°
FIELD RATIO:	1.000	0.888	0.8410	0.6250

SPACING AND ORIENTATION: From reference tower #5, tower #2 is spaced 500' (267.0°) on a line bearing 140.00° true, tower #3 is spaced 96.32' (51.47°) in length on a line bearing 87.84° true, and tower #4 is spaced 650.96' (347.86°) on a line bearing 132.58° true.

NIGHTTIME GROUND SYSTEM: 120-120' to 180' equally spaced copper radials plus 120-60' interspaced radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers. Centers of system are bonded together.

DAYTIME ANTENNA CHARACTERISTICS

Number of elements: 3

Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

(Cont'd)

TOWER:	SW(#2)	NC(#3)	NE(#1)
HEIGHT ABOVE INSULATORS:	168.5'	168.5'	168.5' (90°)
PHASING:	-123.5°	0°	+140°
FIELD RATIO:	0.51	1	0.68

SPACING AND ORIENTATION: Adjacent elements #1 and #2 are spaced 337' (180°) on a line bearing 212° true. From the midpoint between towers #1 and #2, tower #3 is spaced 37.5' (20°) on a line bearing 357° true.

DAYTIME GROUND SYSTEM: 120-169' equally spaced copper radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers. Centers of system are bonded together.

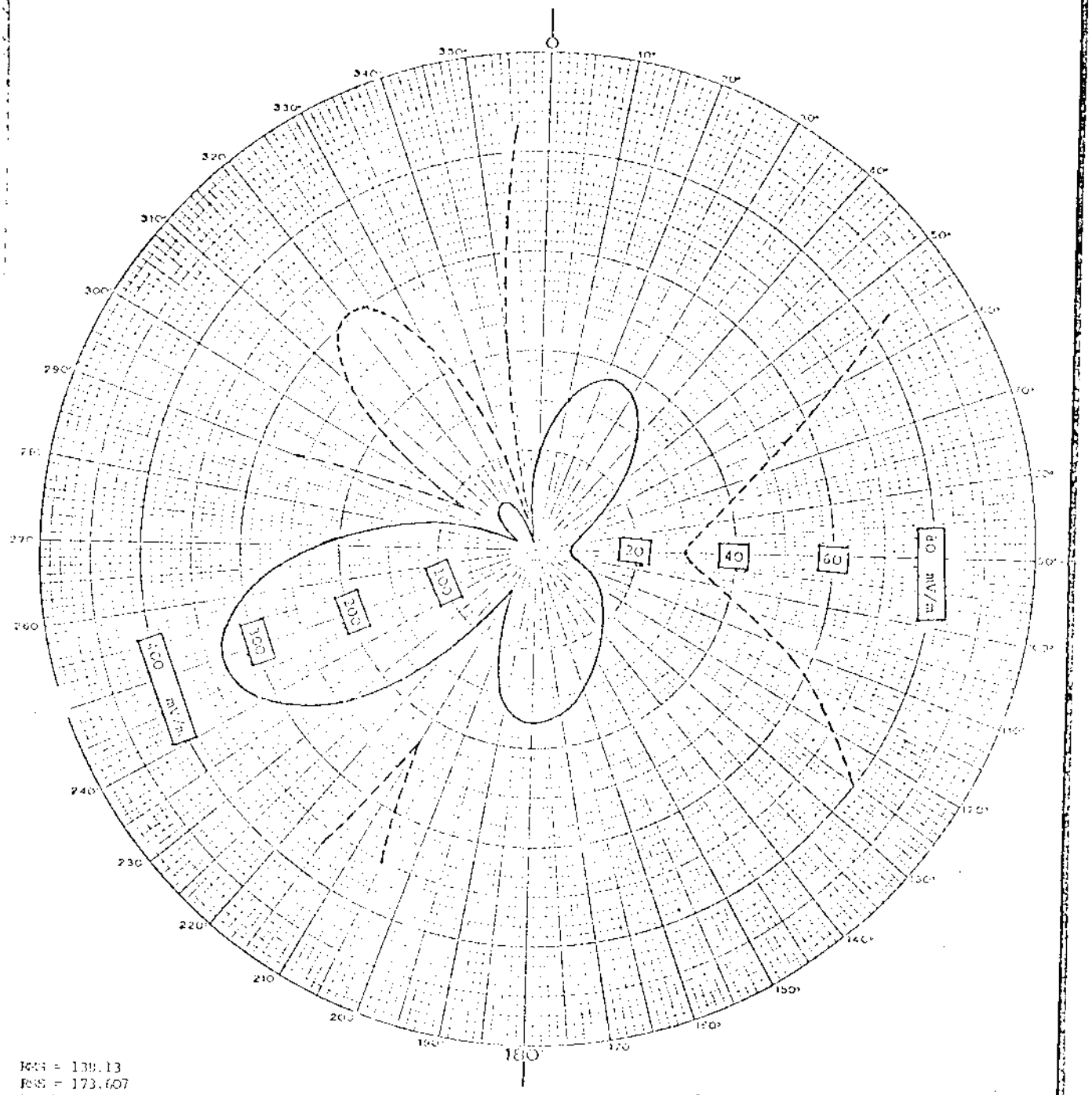
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL		STANDARD
	RMS	RSS	RMS
Day	411 mv/m	- mv/m	- mv/m
Night	138.13 mv/m	173.607 mv/m	145.173 mv/m

Note: Please retain the Daytime directional antenna radiation pattern notified for Station KIRL in United States Change List Number 1377 dated June 17, 1970 and attach to this Revised Description Sheet and Nighttime pattern. This notification concerns only a change to add new Nighttime operation with Daytime operation continued as previously notified.

CTR NO 31146A3

KIRL.



STD
N

RSS = 138.13
RSS = 173.607
RSS/RSS Ratio = 1.2568
RSS (Averaged) = 145.171

JANUARY, 1977

Standard Pattern

LATITUDE:	38° 48' 21"
LONGITUDE:	90° 24' 23"

GURTCOIS, & ASSOCIATES

ANTENNA PARAMETERS

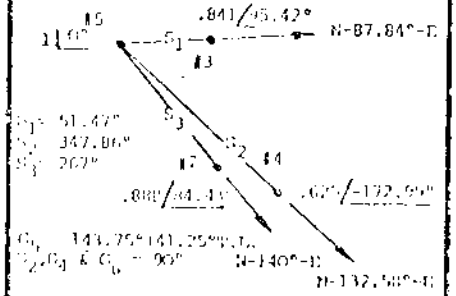


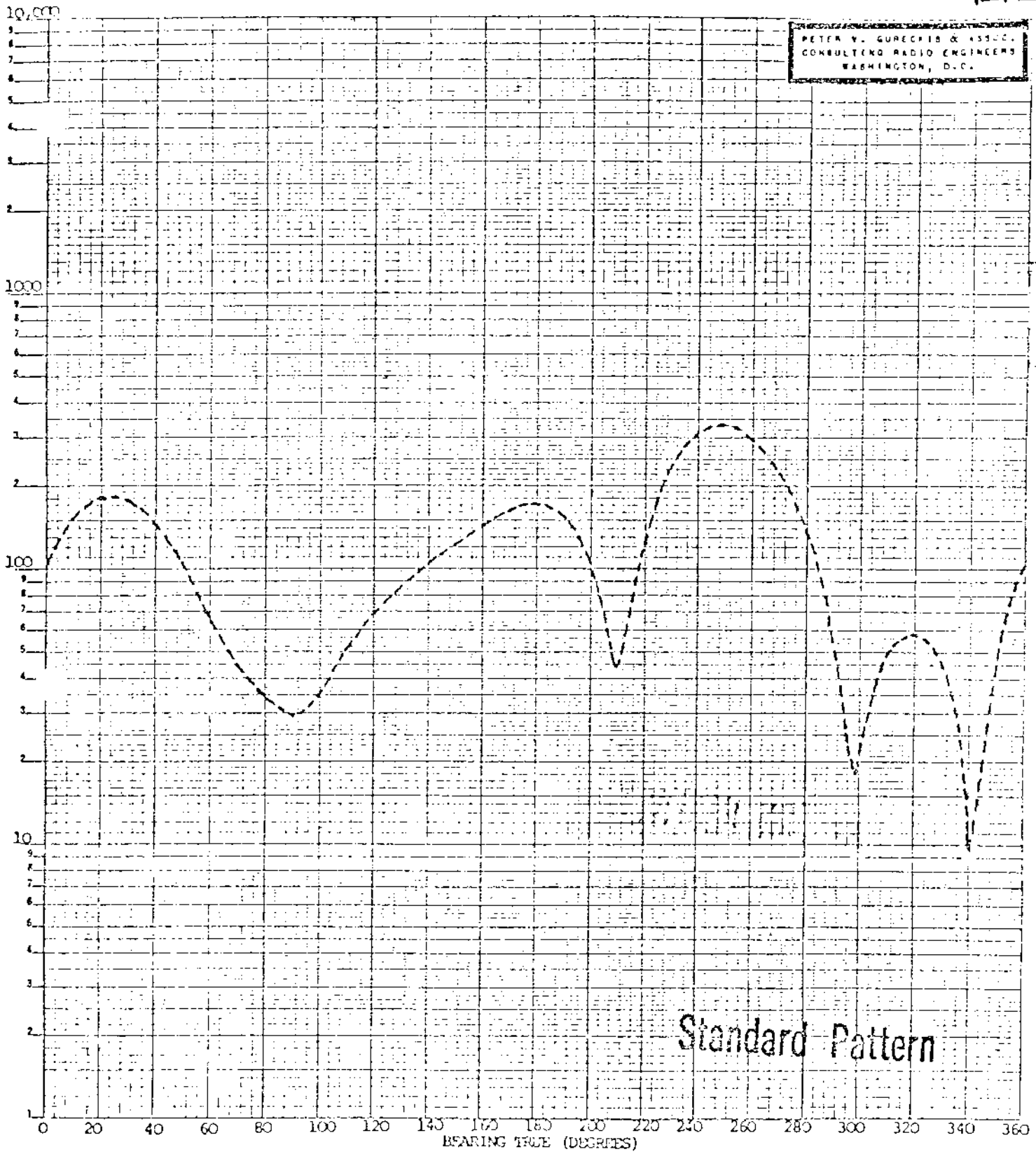
FIGURE 3

PROPOSED DIRECTIONAL NIGHTTIME PATTERN

RADIO STATION KIRL
ST.CHARLES, MISSOURI

1460 Khz 0.5/5Kw-LS,DA-2,U

KIRL.

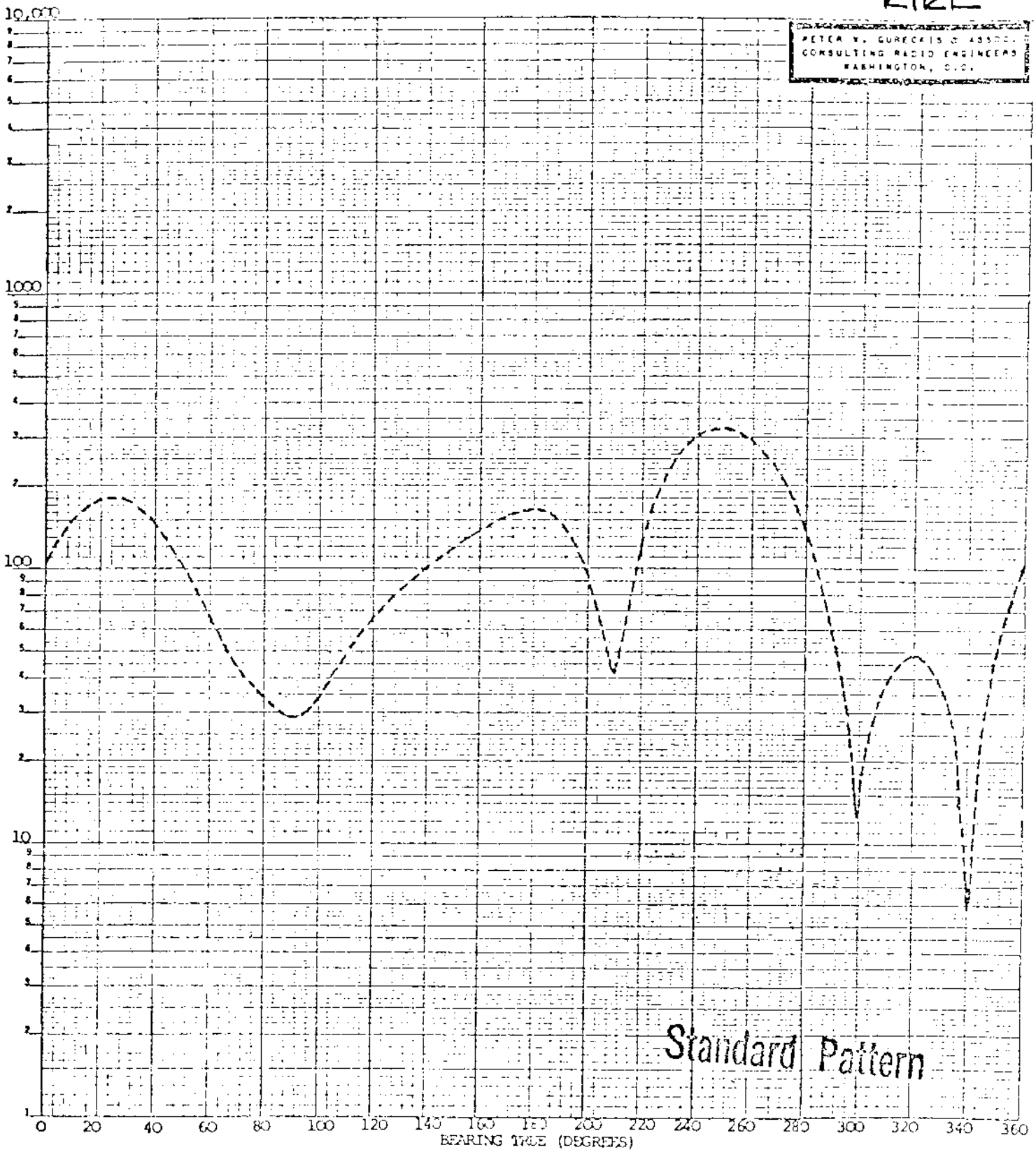


VERTICAL ANGLE = 5°

FIGURE 4

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

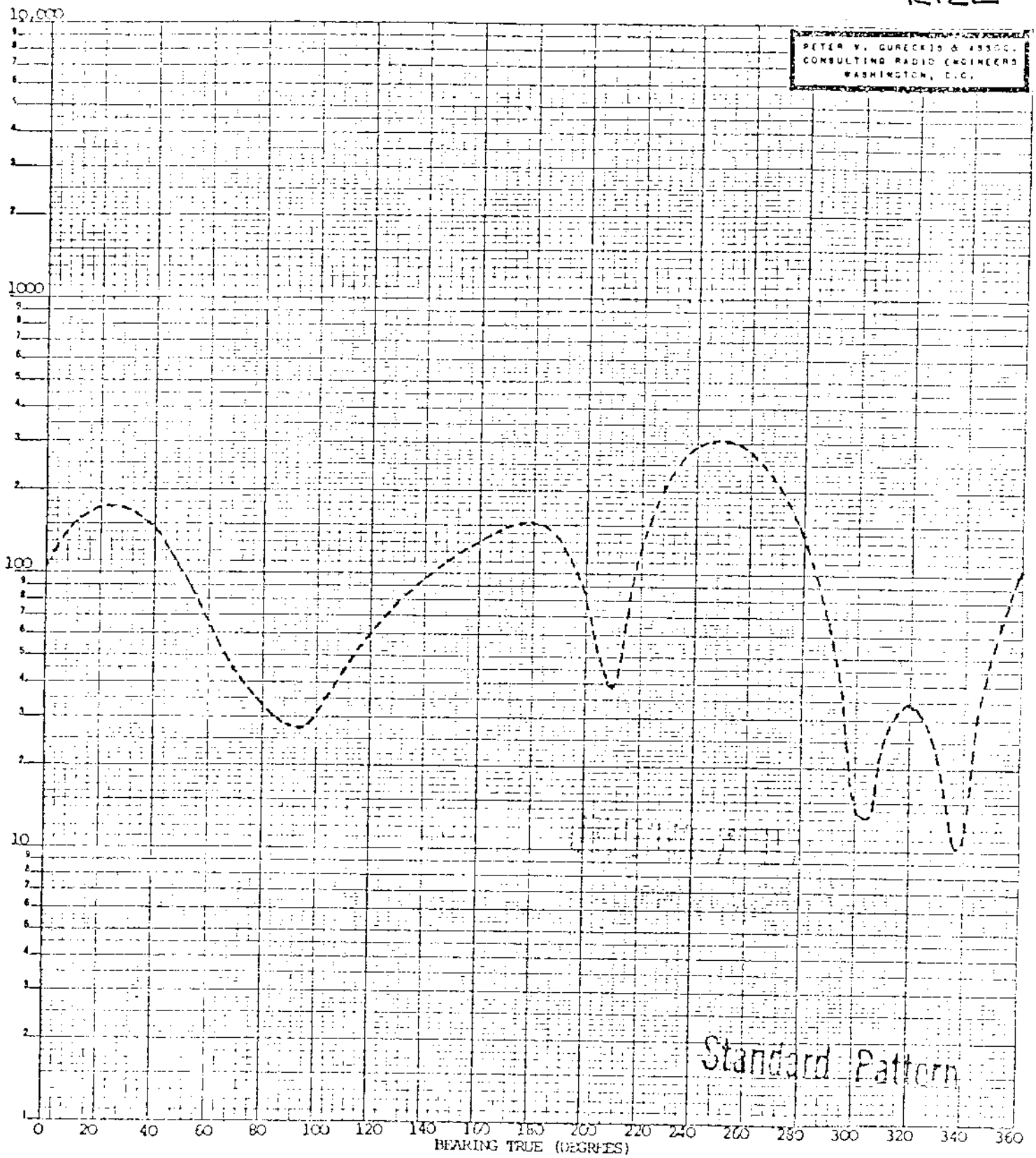


VERTICAL ANGLE = 10°

FIGURE 5

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

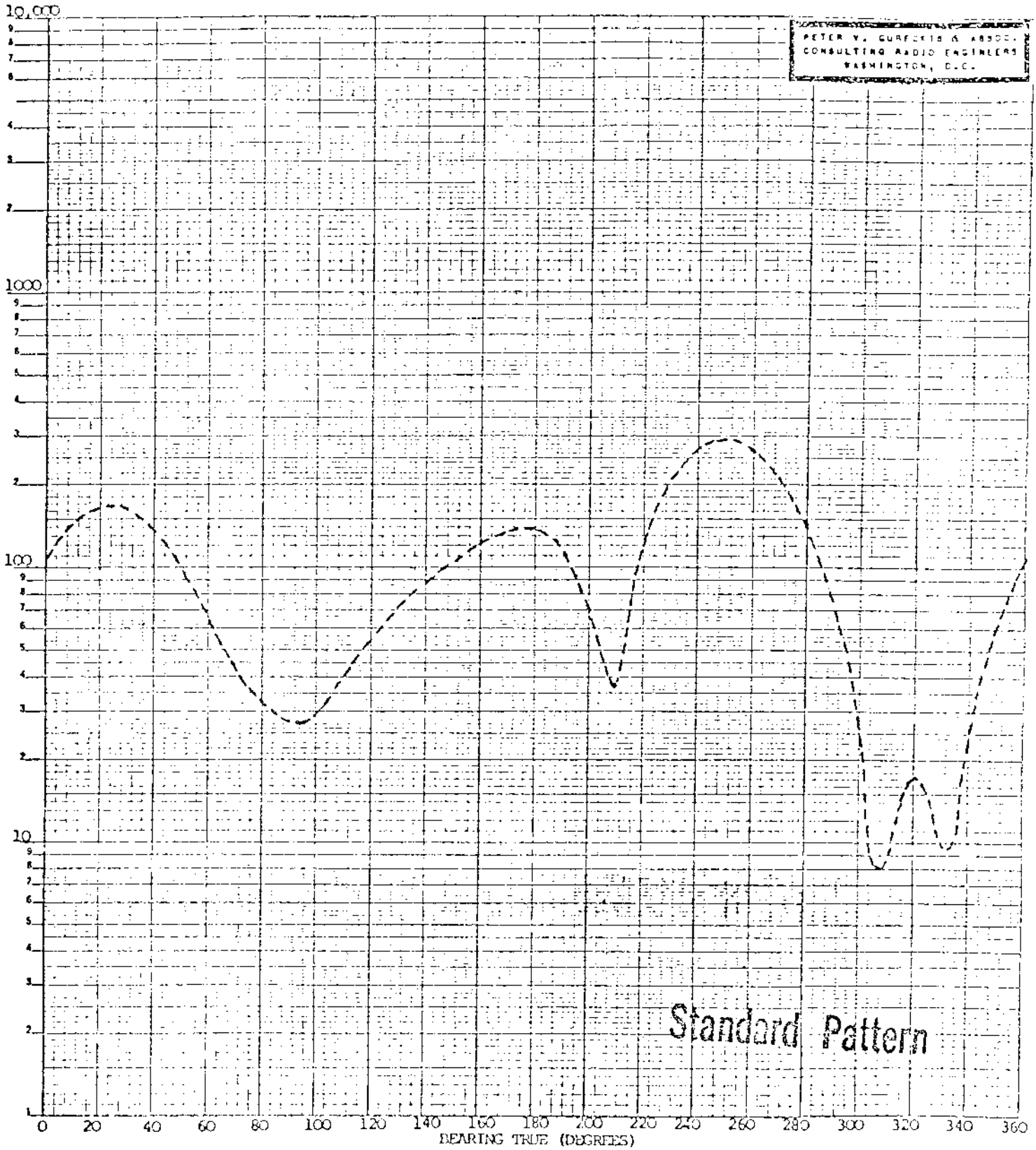


VERTICAL ANGLE = 15°

FIGURE 6

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

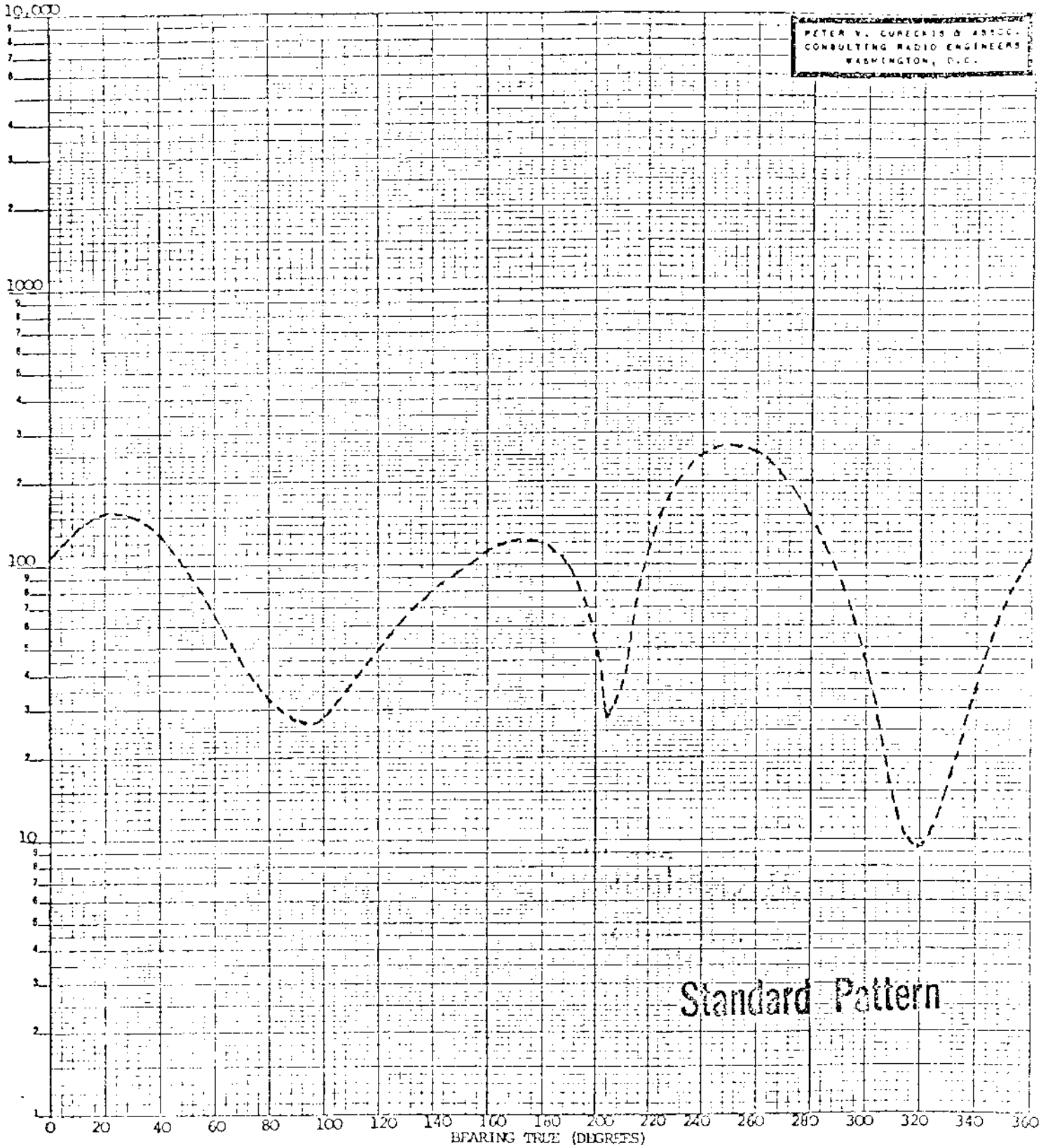


VERTICAL ANGLE = 20°

FIGURE 7

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

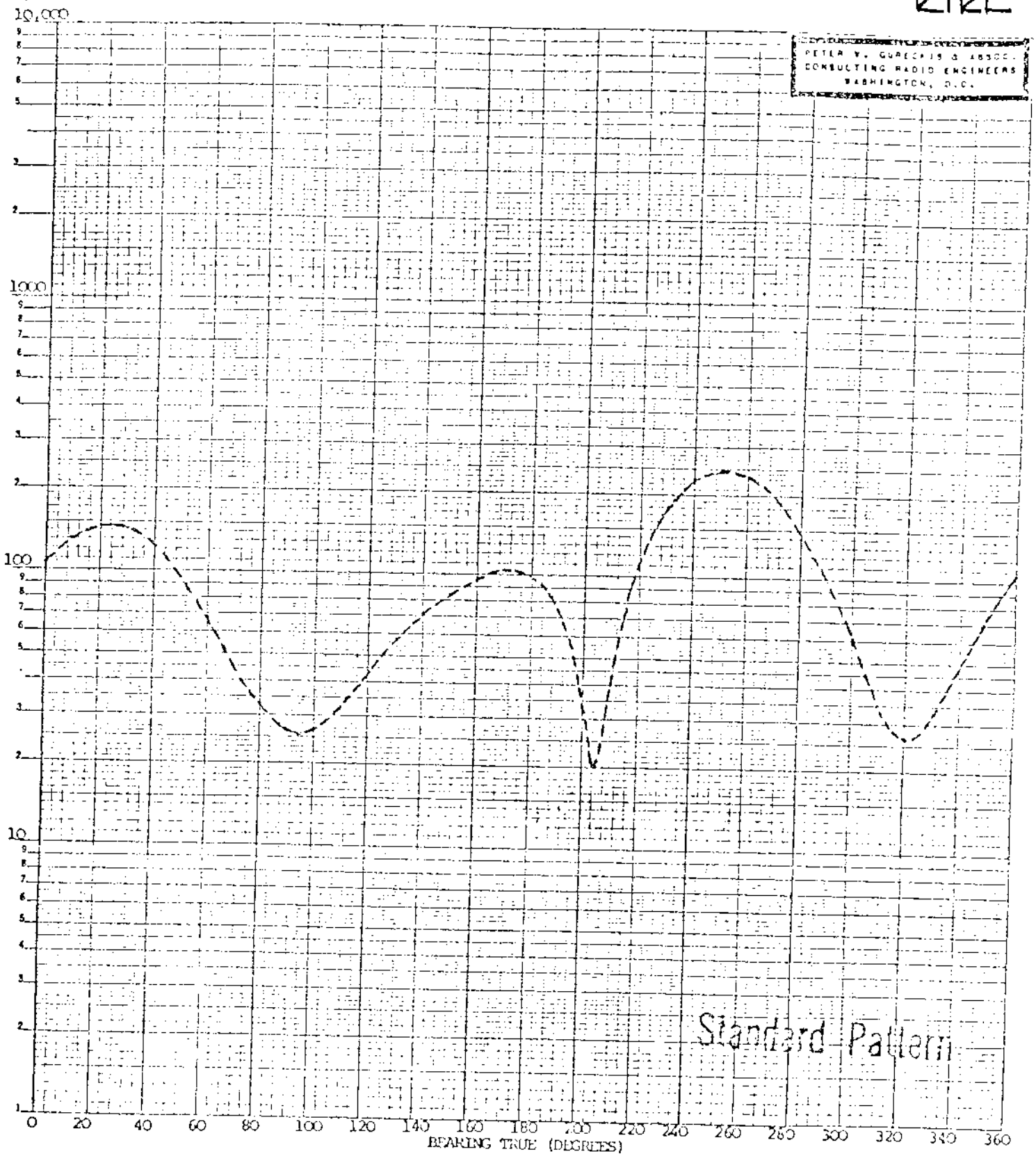


VERTICAL ANGLE = 25°

FIGURE 8

RADIO STATION KIRL
1460 Khz 5000-DA-N

KIRL

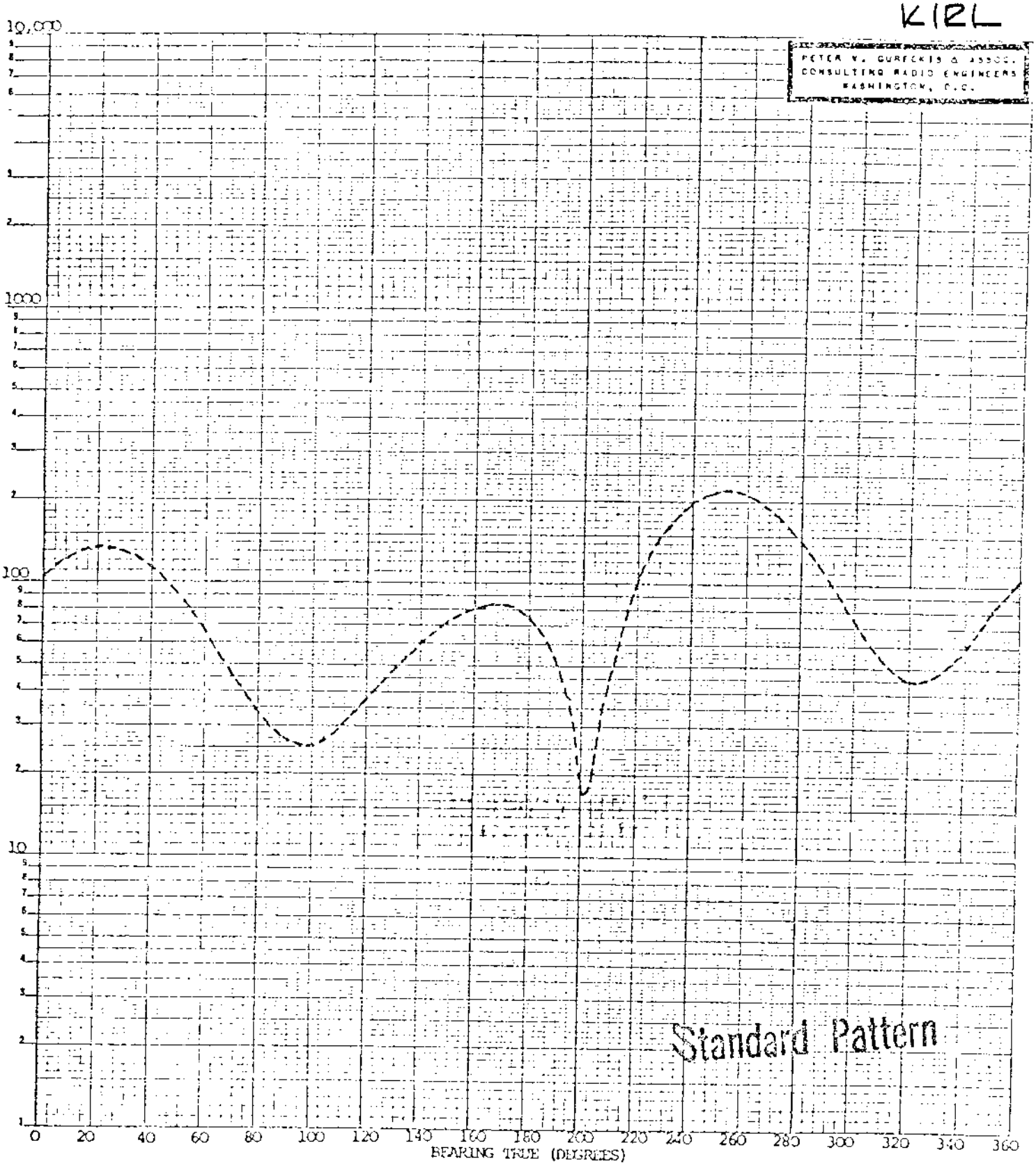


VERTICAL ANGLE = 30°

FIGURE 9

RADIO STATION KIRL
1460 Khz 500W-D-N

KIRL

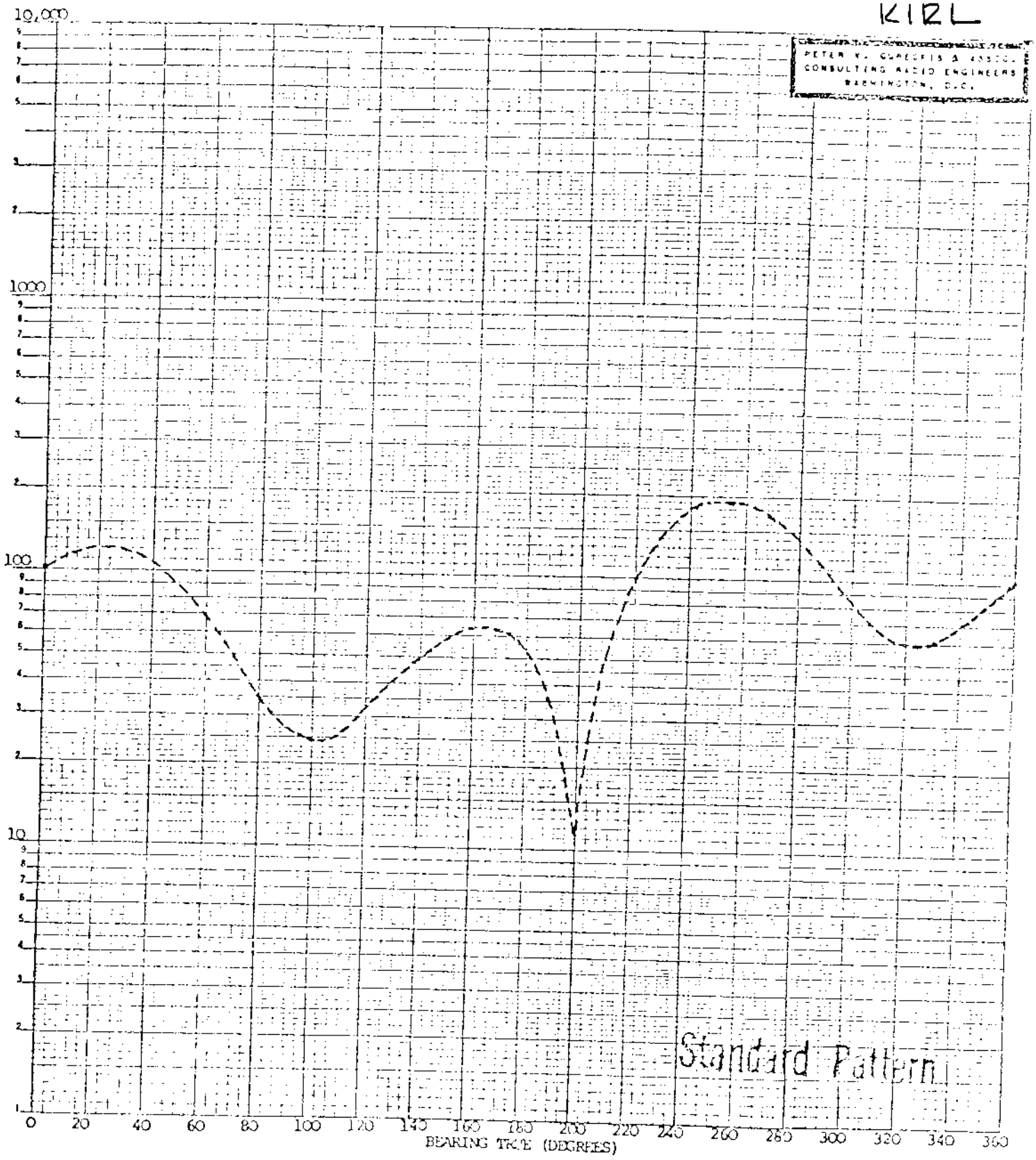


VERTICAL ANGLE = 35°

FIGURE 10

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

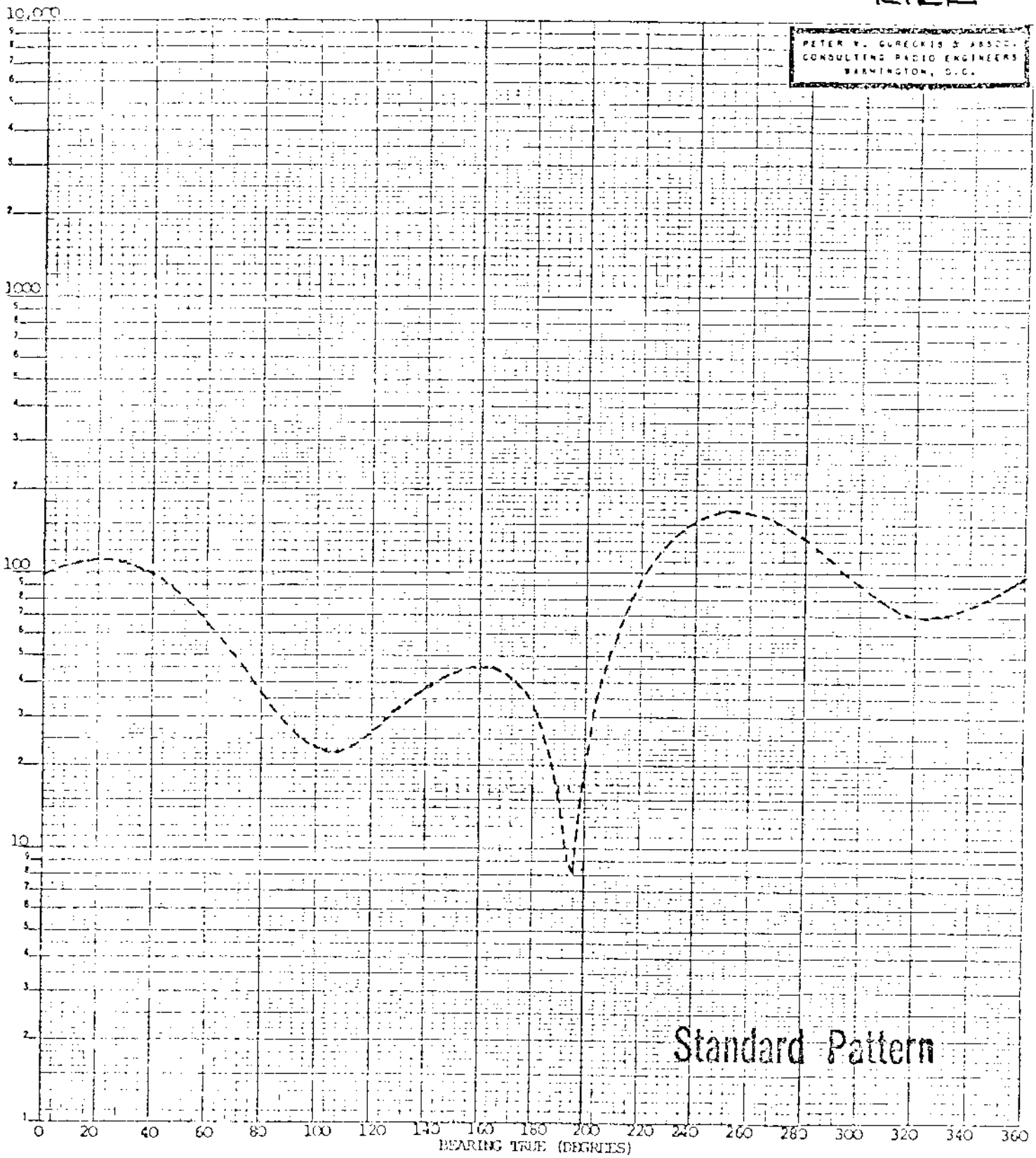


VERTICAL ANGLE = 40°

FIGURE 11

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

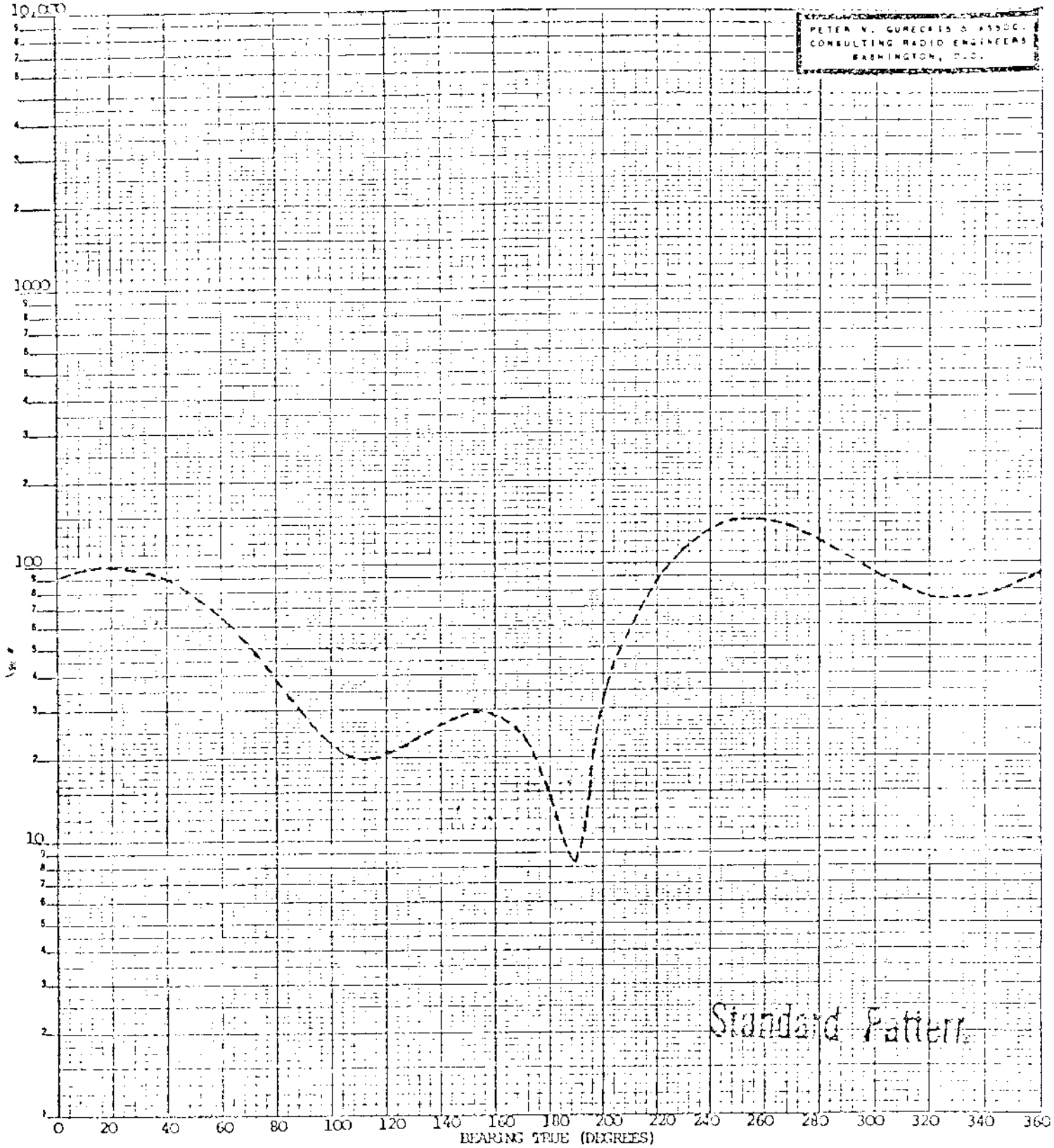


VERTICAL ANGLE 45°

FIGURE 12

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

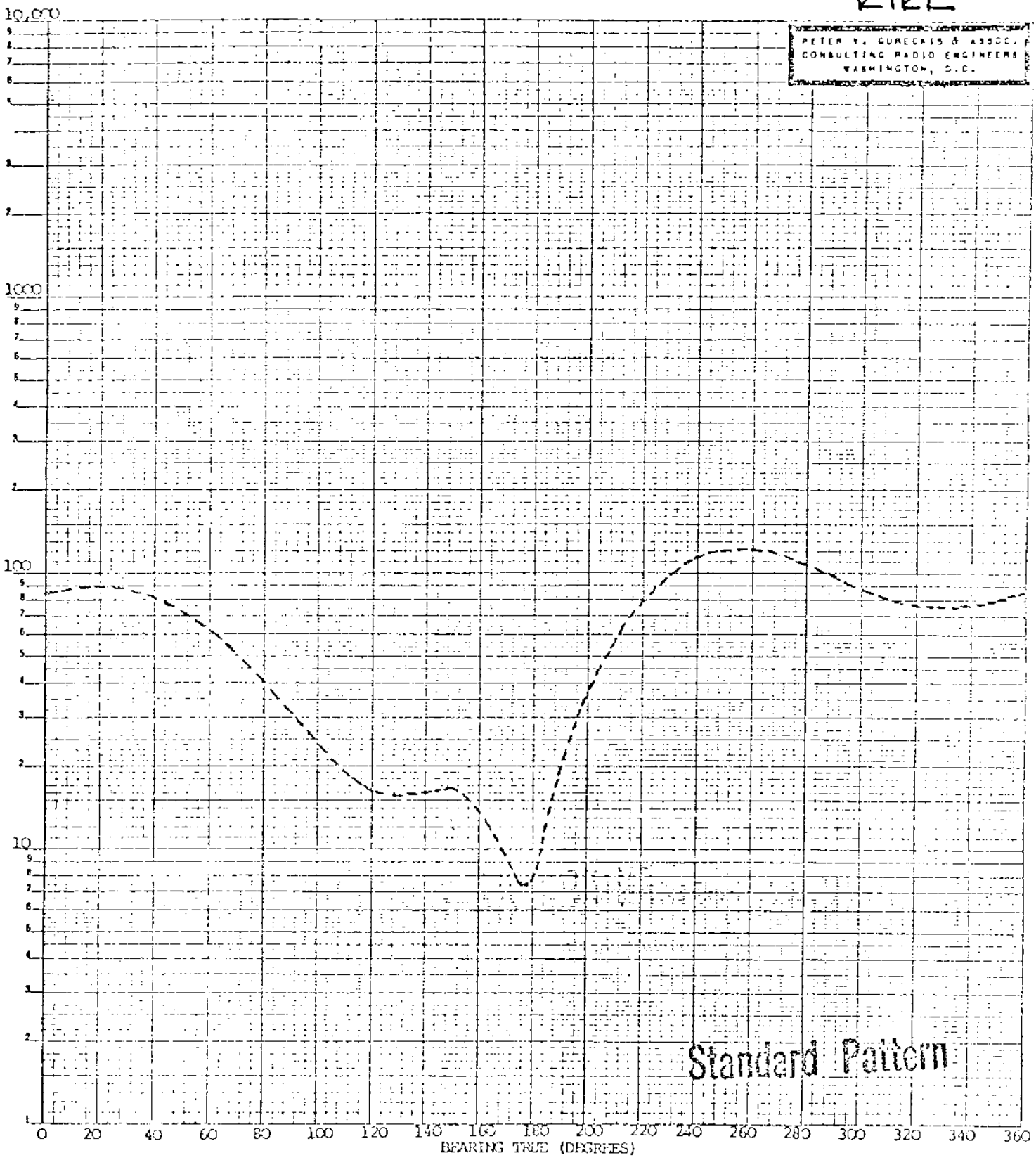


VERTICAL ANGLE = 50° .

FIGURE 13

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL

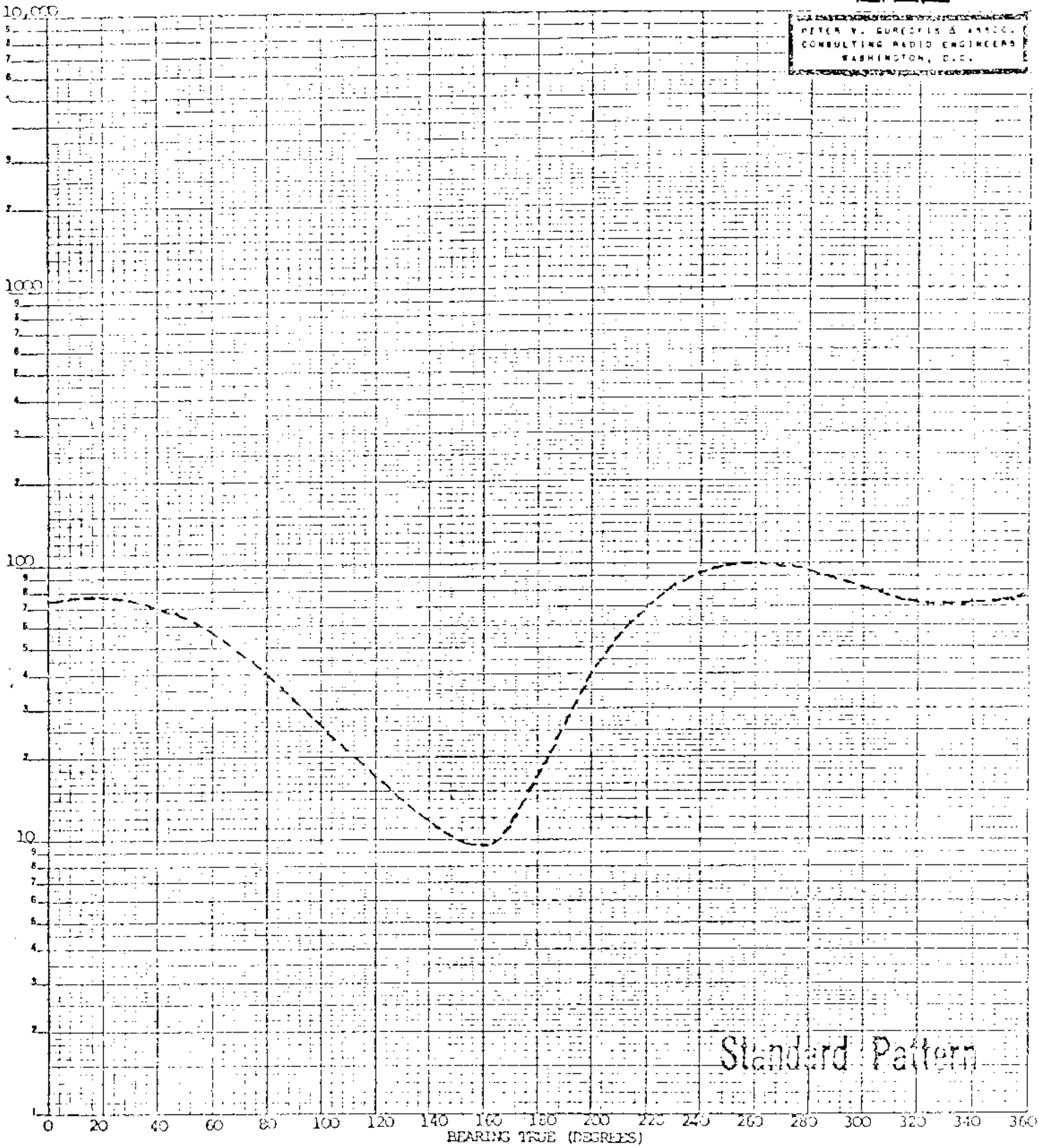


VERTICAL ANGLE =55°

FIGURE 14

RADIO STATION KIRL
1460 Khz 500W-DA-N

KIRL



VERTICAL ANGLE = 60°

FIGURE 15

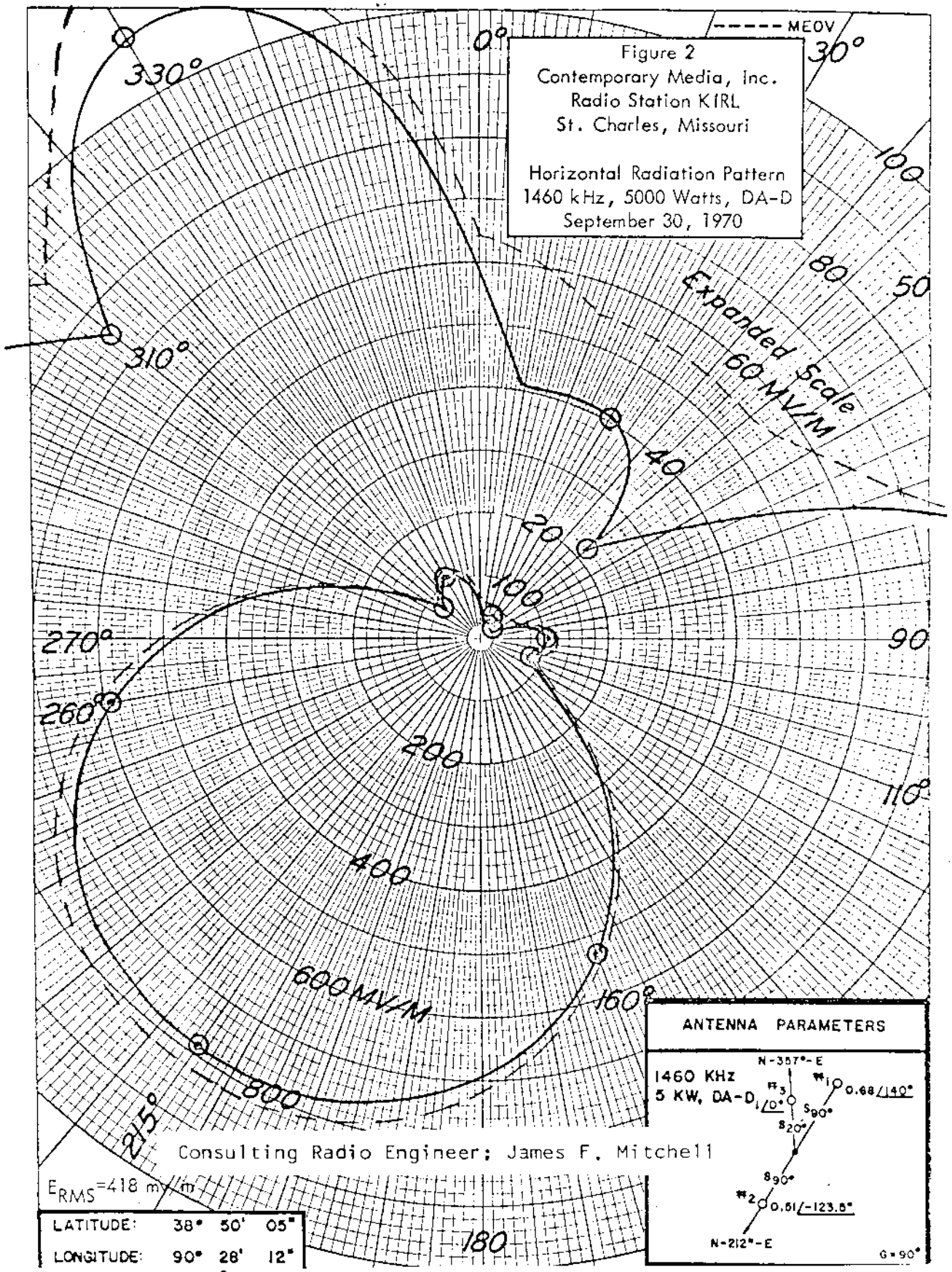
RADD STATION KIRL
1460 Khz 500W-DA-N

KIRL

Measured Day
(12-23-70ct)

Station KIRL
St. Charles, Missouri

5kw, DA-D, D
1460 kc



FCC File No. BL-12798
Accepted 11-27-70

Station KIRL
St. Charles, Missouri

1460 kc

KIRL

Measured Non-DA
(12-23-70ct)

Station KIRL
St. Charles, Missouri

5kw, DA-D, D
1460 kc

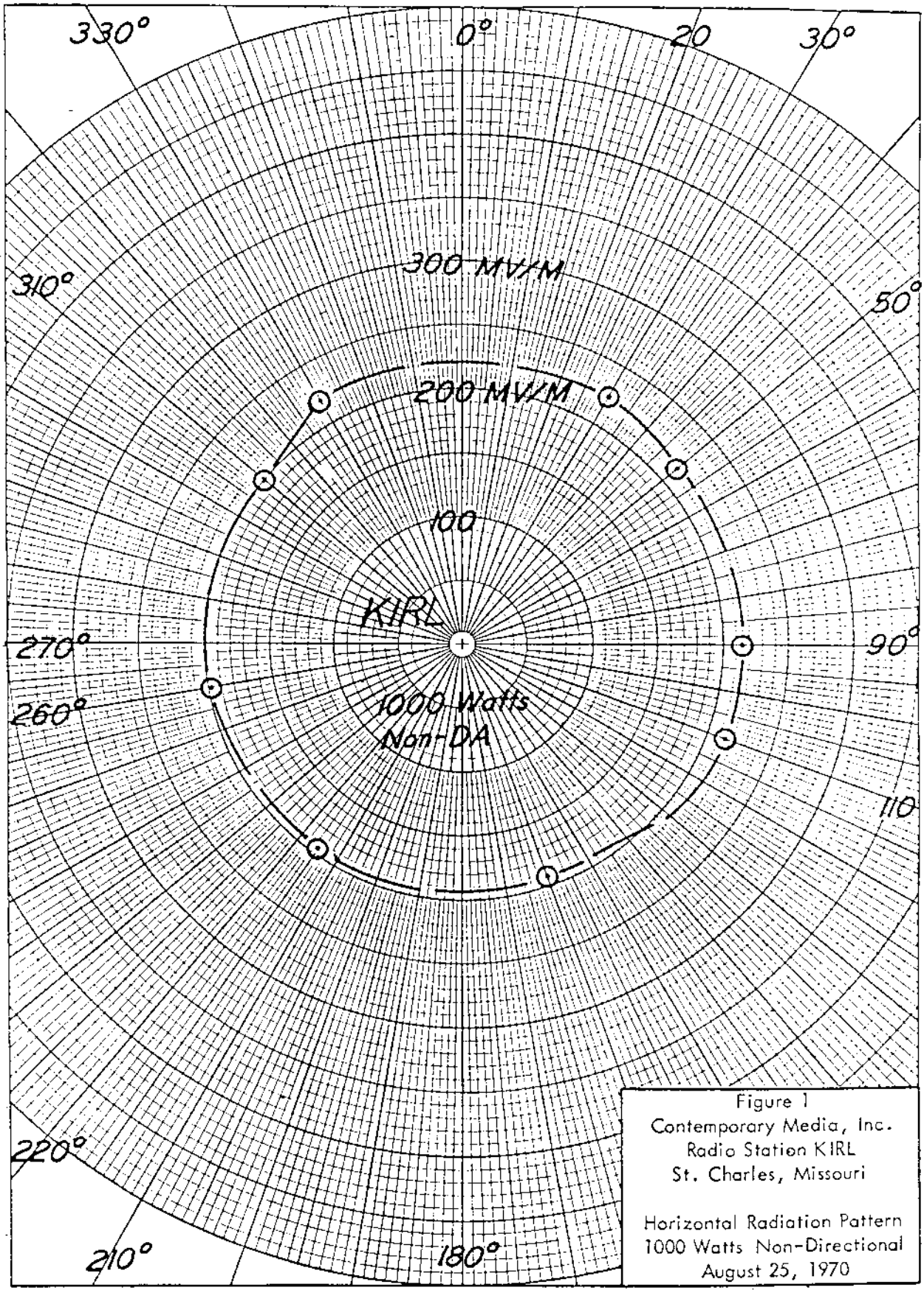


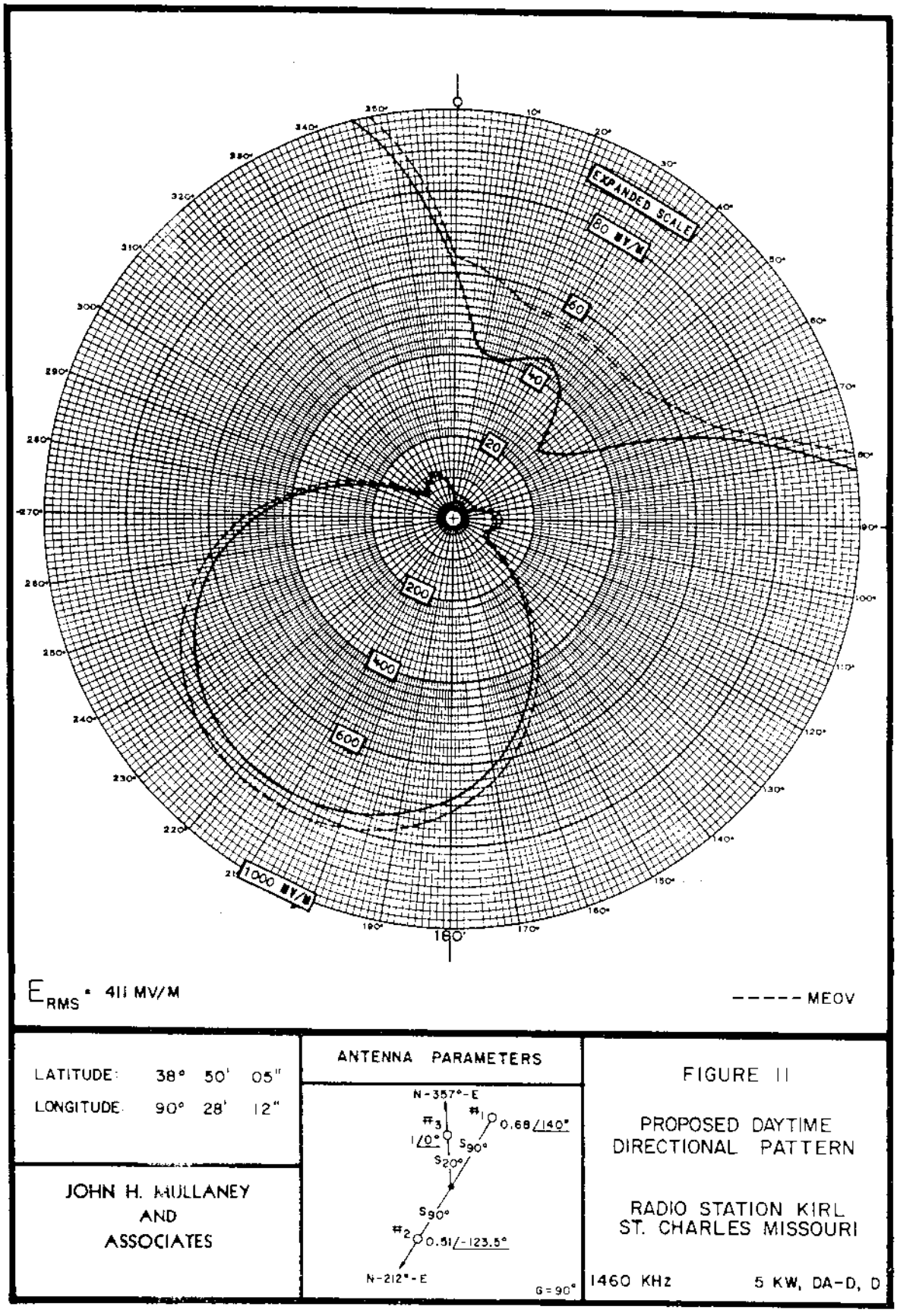
Figure 1
Contemporary Media, Inc.
Radio Station KIRL
St. Charles, Missouri

Horizontal Radiation Pattern
1000 Watts Non-Directional
August 25, 1970

FCC File No. BL-12798
Accepted 11-27-70

Station KIRL
St. Charles, Missouri

1460 kc



E_{RMS} = 411 MV/M

----- MEOV

LATITUDE: 38° 50' 05" LONGITUDE: 90° 28' 12"	ANTENNA PARAMETERS	FIGURE II PROPOSED DAYTIME DIRECTIONAL PATTERN RADIO STATION KIRL ST. CHARLES MISSOURI
JOHN H. MULLANEY AND ASSOCIATES	N-357°-E #3 170° #1 0.68/140° S90° S20° S90° #2 0.51/-123.5° N-212°-E G=90°	1460 KHz 5 KW, DA-D, D

KLTC

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KLTC — Main Studio: Dickinson, North Dakota

Frequency: 1460 KHz — Power: 5 Kw Night 5 Kw Day

Notification: 1777 — Date: July 26, 1978 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 46° 50' 56"
West Longitude: 102° 49' 41"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 4
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER	:	S (#1)	SC (#2)	NC (#3)	N (#4)	
HEIGHT ABOVE INSULATORS	:	170'	300' (160.3°)		170'	170' (90.8°)
PHASING	:	0°	202°	54.6°	-88.2°	
FIELD RATIO	:	1.000	1.760	.9942	.180	

SPACING AND ORIENTATION : Towers in a row are spaced 169' (90.3°) on a line bearing 35° true.

GROUND SYSTEM: 120 - 169' equally spaced copper radials plus 120 - 50' interspaced radials tower. Radials are shortened and bonded to transverse straps along intersections between towers.

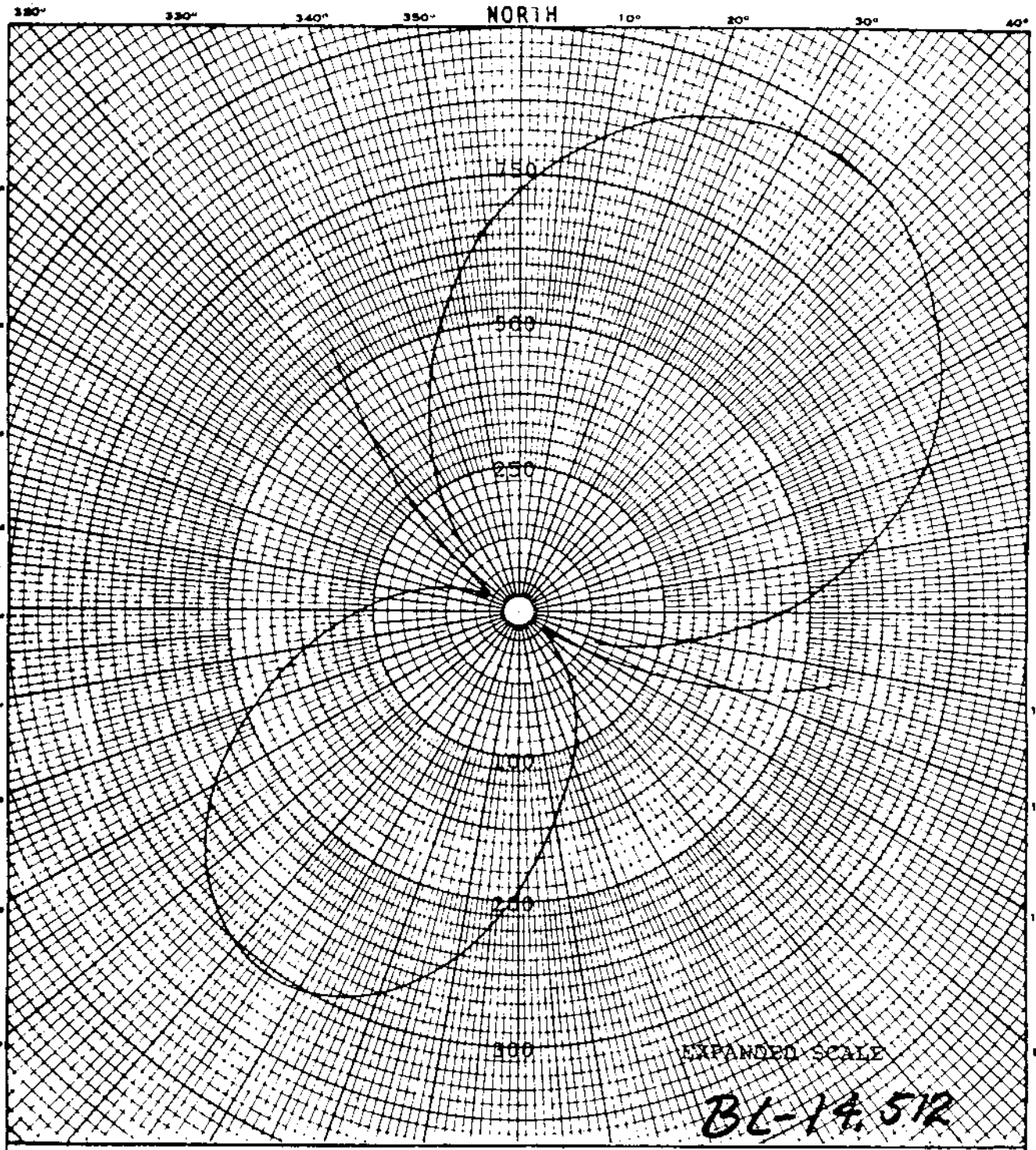
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL		STANDARD
	RMS	RSS	RMS
(omnidirectional)			
Day 1/	497 mV/m		
Night 1/	445 mV/m	821.99 mV/m	465.2 mV/m

1/ By adjustment of input power.

Note: This notification concerns only a change in the Nighttime operation of the station with Daytime operation continued as previously notified.

KLTC



R.M.S. (THEO) 445.0 MV/M R.M.S. (STND) 465.2 MV/M R.S.S. 821.9 MV/M

PATTERN PARAMETERS

35° True

4. .18/-88.2°

3. .9942/54.6° S = 90°

2. 1.760/202° $G_1=G_3=G_4=90°$ $G_2=160°$

1. 1.00/ 0°

RADIO STATION KLTC

☐ MEASURED ☒ PROPOSED

FREQ 1460 (KHZ) POWER 5.0 (KW) ☐ DA-D

N. LAT. 46 ° 50 ' 56 " ☒ DA-N

W. LONG 102 ° 49 ' 41 " ☐ N-D

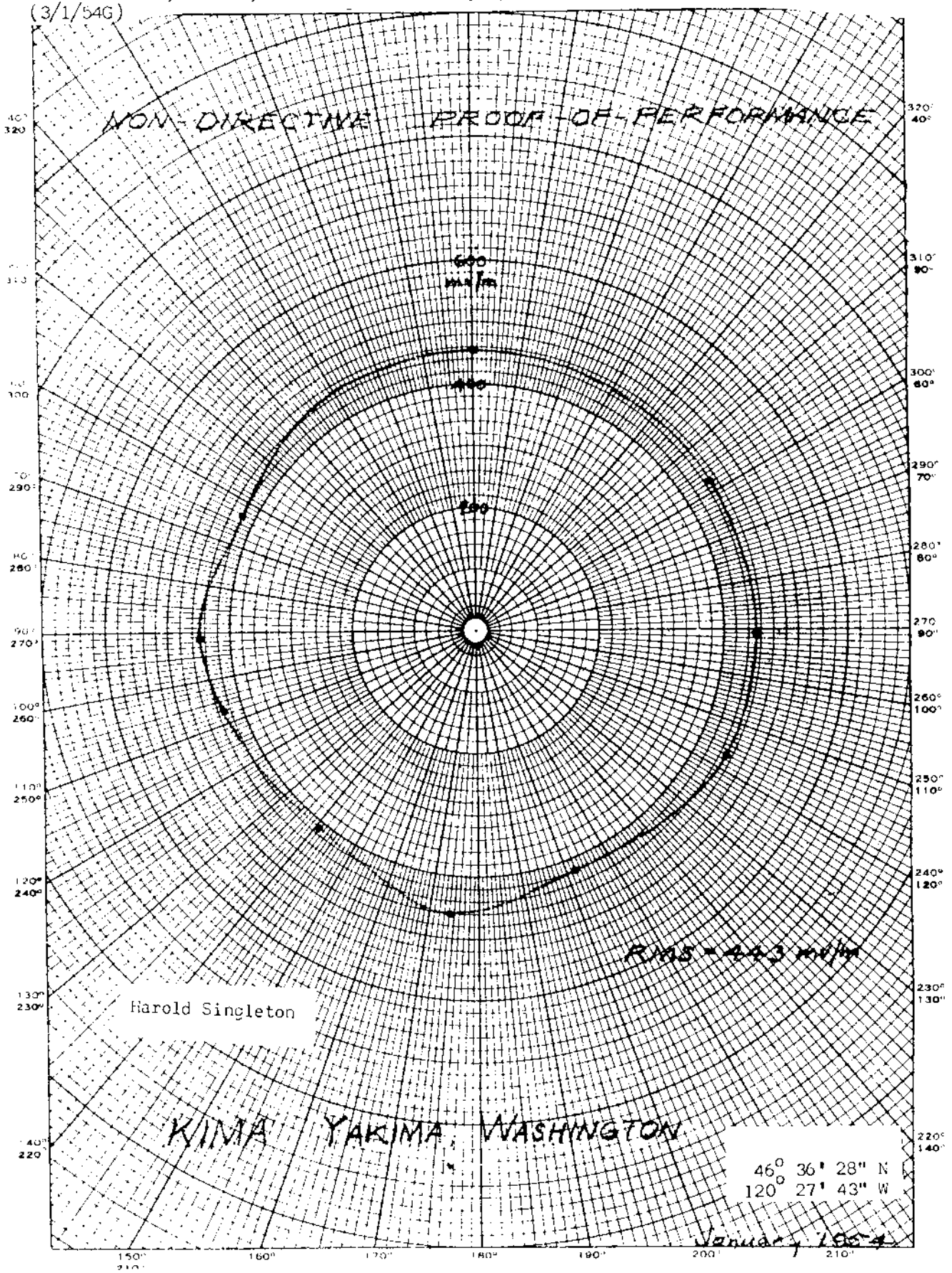
LOCATION: Dickinson, North Dakota

DATE: March 1978

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

KMWX

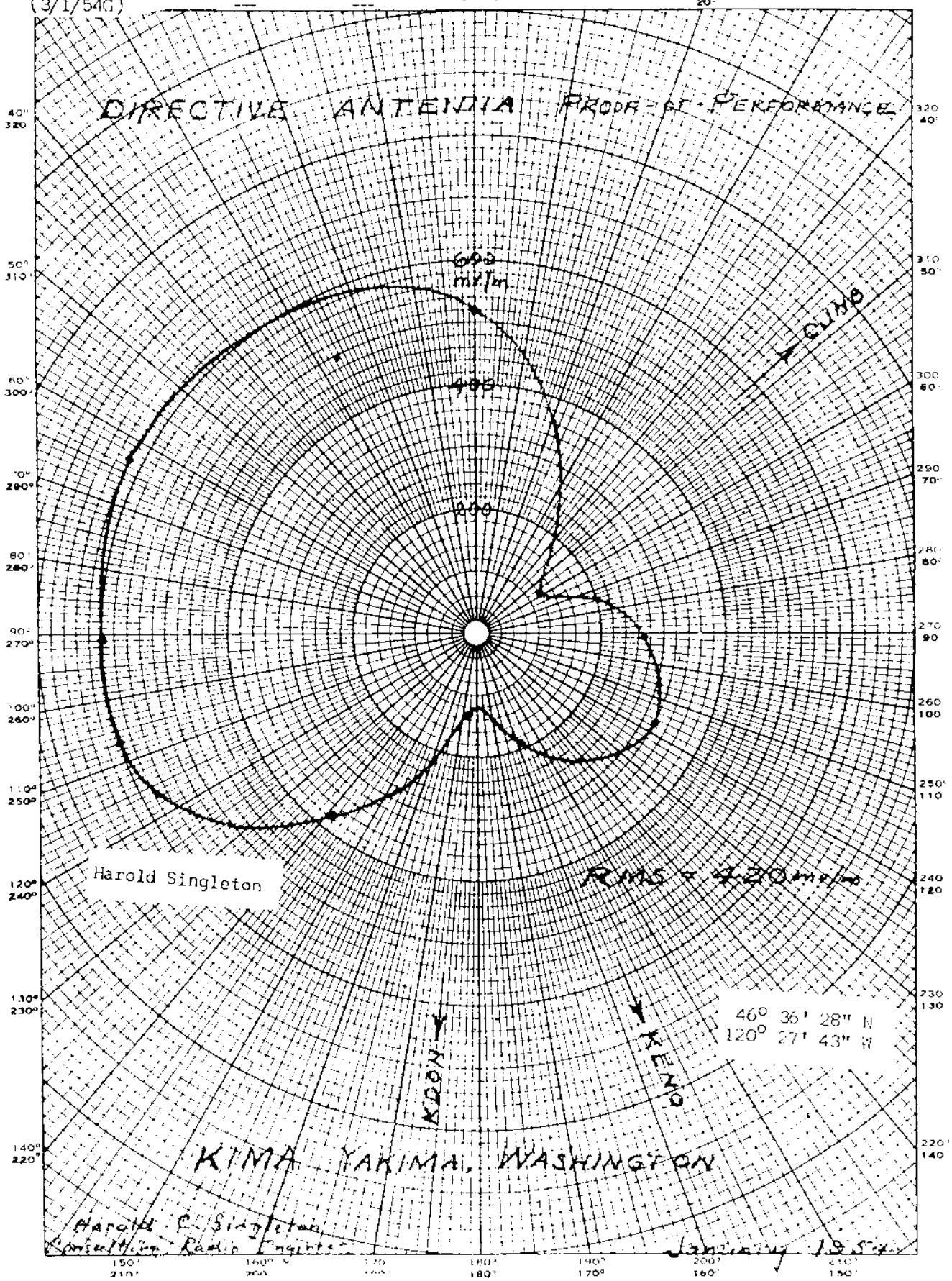
MEASURED NON-DA (3/1/54G) KIMA, YAKIMA, WASINGTON 5KW, U, DA-N 1460 kc



FCC File No. BL-5222 Accepted 2/19/54 KIMA, Yakima, Washington 1460 kc

KMWX

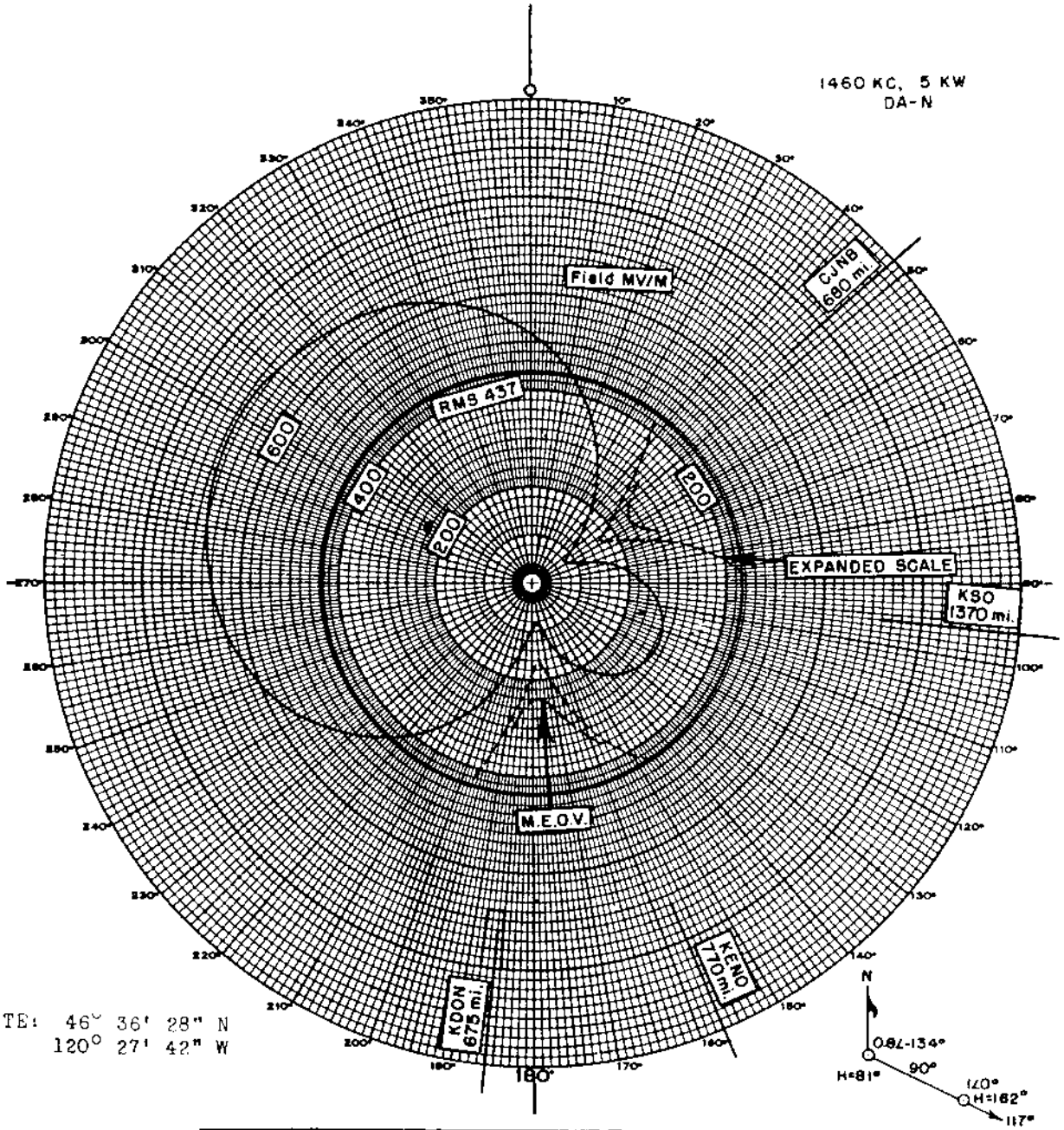
MEASURED NIGHT (3/1/54G) KIMA, YAKIMA, WASHINGTON 5KW, U, DA-N 1460 kc



FCC File No. BL-5222 Accepted 2/19/54 KIMA, YAKIMA, WASHINGTON 1460 kc

KMWX

PROPOSED NIGHT (5/27/53G) KIMA, YAKIMA, WASHINGTON 5kw, U, DA-N 1460 kc



SITE: 46° 36' 28" N
120° 27' 42" W

CASCADE BROADCASTING CO., INC. YAKIMA, WASHINGTON	Figure 1 AMENDED 1460 KC 5 KW, DA-N
DIRECTIONAL ANTENNA PATTERN	McINTOSH & INGLIS Consulting Radio Engineers Wyatt Building Washington, D. C.

FCC FILE NO. BP-8704 Amended Accepted 5/8/53 KIMA, Yakima, Wash. 1460 kc

KSO

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KSO

Main Studio: Des Moines, Iowa

Frequency: 1460 kHz

Power: 5 kW

Notification List No. 1726

Date: March 24, 1977

Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 41° 38' 45"
West Longitude: 93° 32' 12"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 2
Type of elements: Both towers are series excited, vertical steel, tower #1 is uniform cross-section, guyed, tower #2 is self supporting, tapered.

	NW(#1)	SE(#2)
TOWER:		
HEIGHT ABOVE INSULATORS:	355' (190°)	200' (107°)
PHASING:	0°	+25°
FIELD RATIO:	1.0	0.75

SPACING AND ORIENTATION: Towers are spaced 327' (175°) on a line bearing 135° true.

GROUND SYSTEM: 120-270' equally spaced copper radials plus a 50' square ground screen about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

THEORETICAL

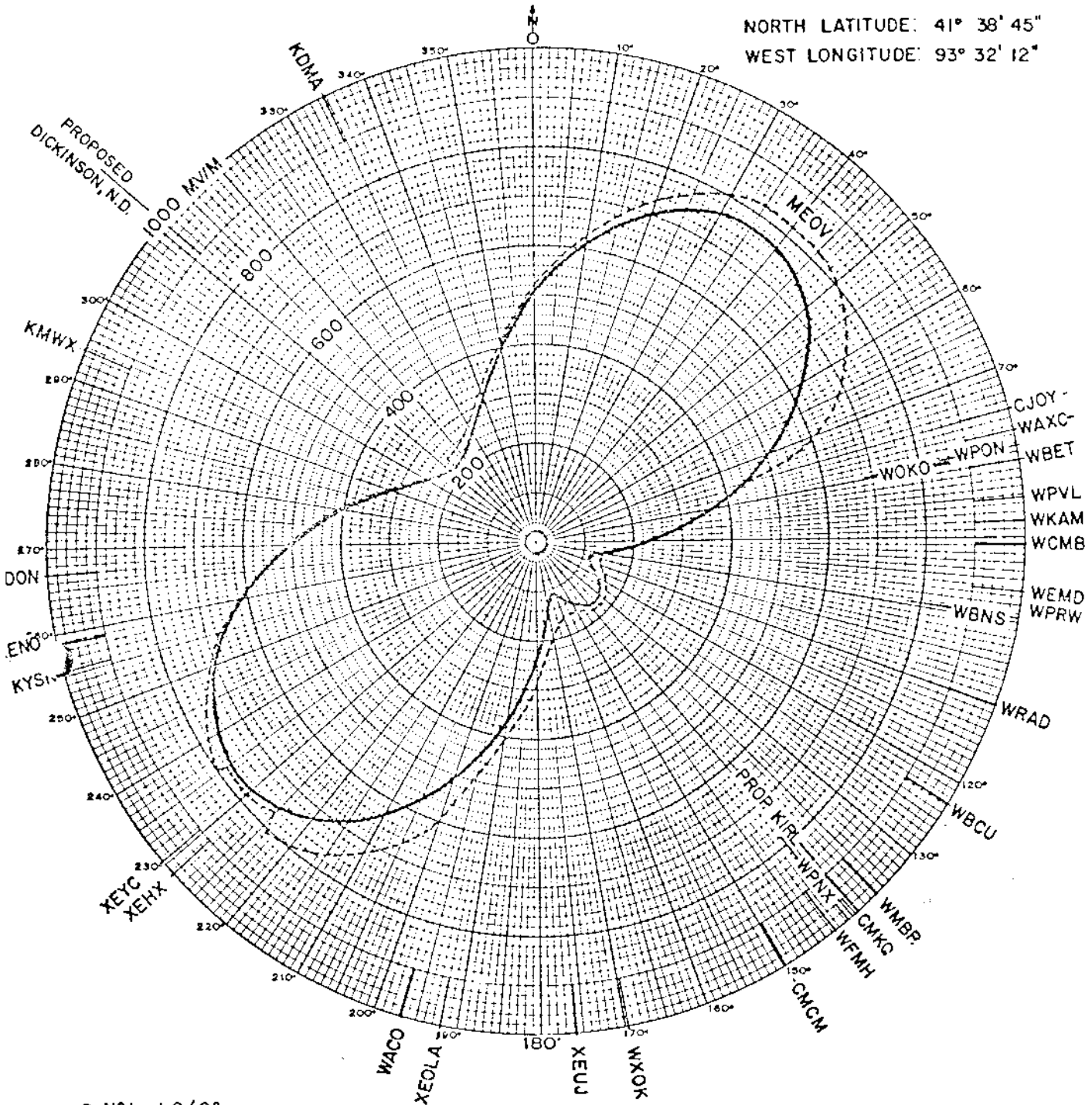
	RMS	RSS
Day 1/	550. mv/m	- mv/m
Night	479.27 mv/m	550.4 mv/m

1/ Tower #1

Note: This notification concerns only a change in the Nighttime operation of the station with Daytime operation continued as previously notified.

CTR NO 31160A4

KSO



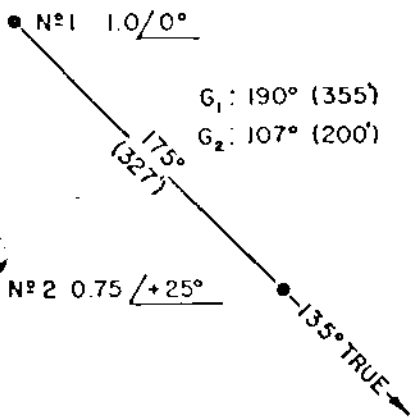


EXHIBIT D-1

HORIZONTAL RADIATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

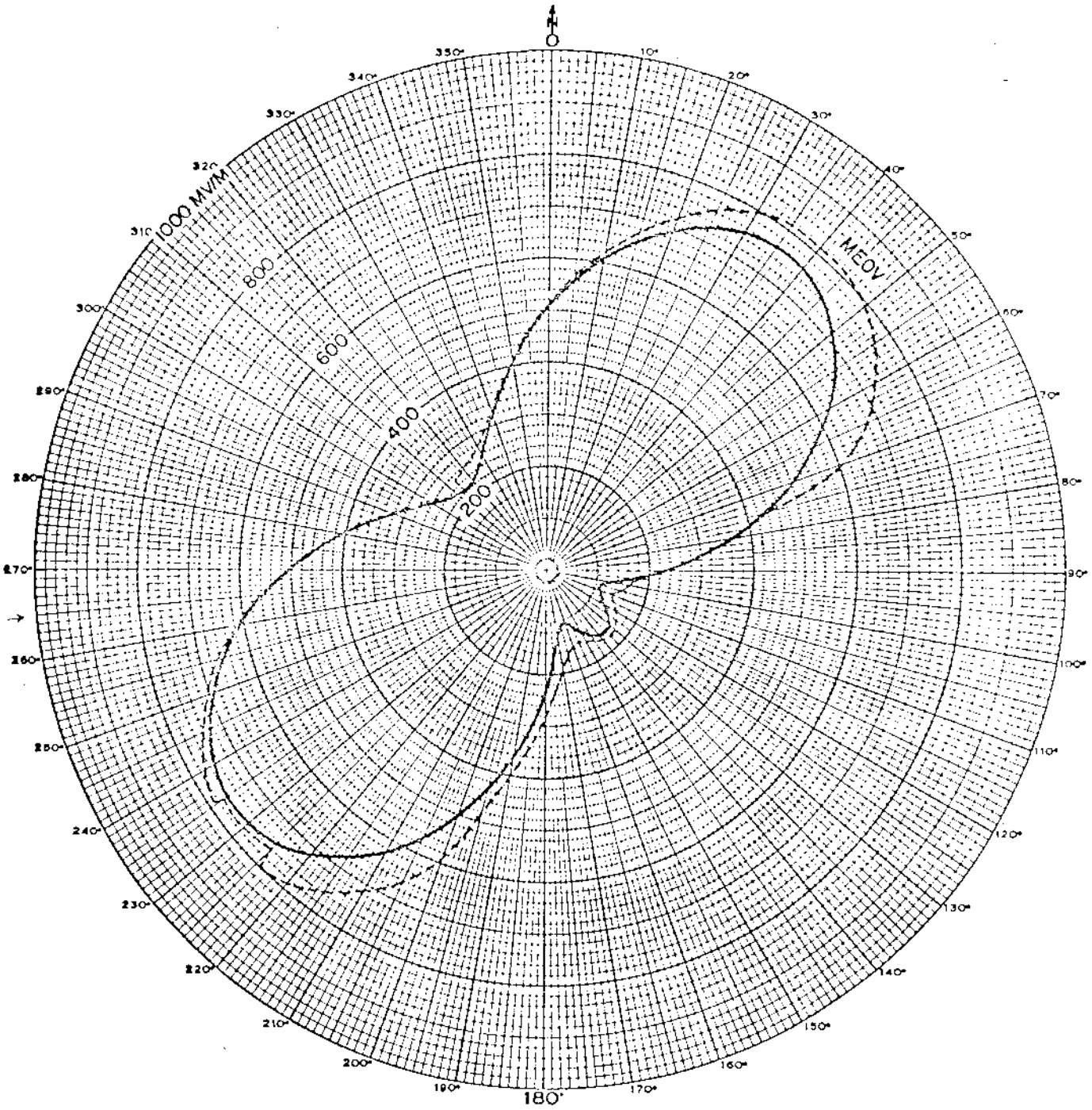


EXHIBIT D-2

5° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

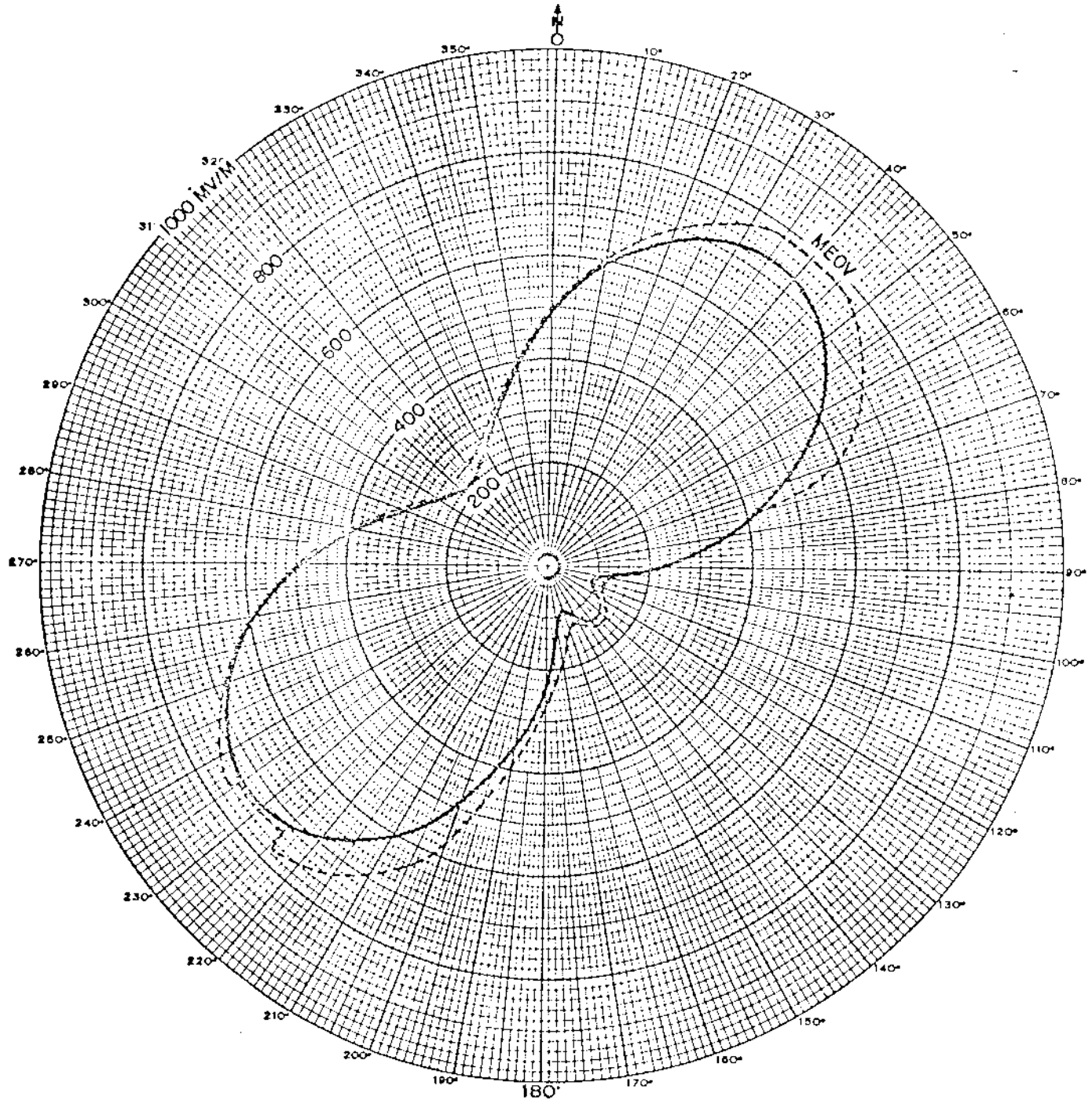


EXHIBIT D-3

10° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

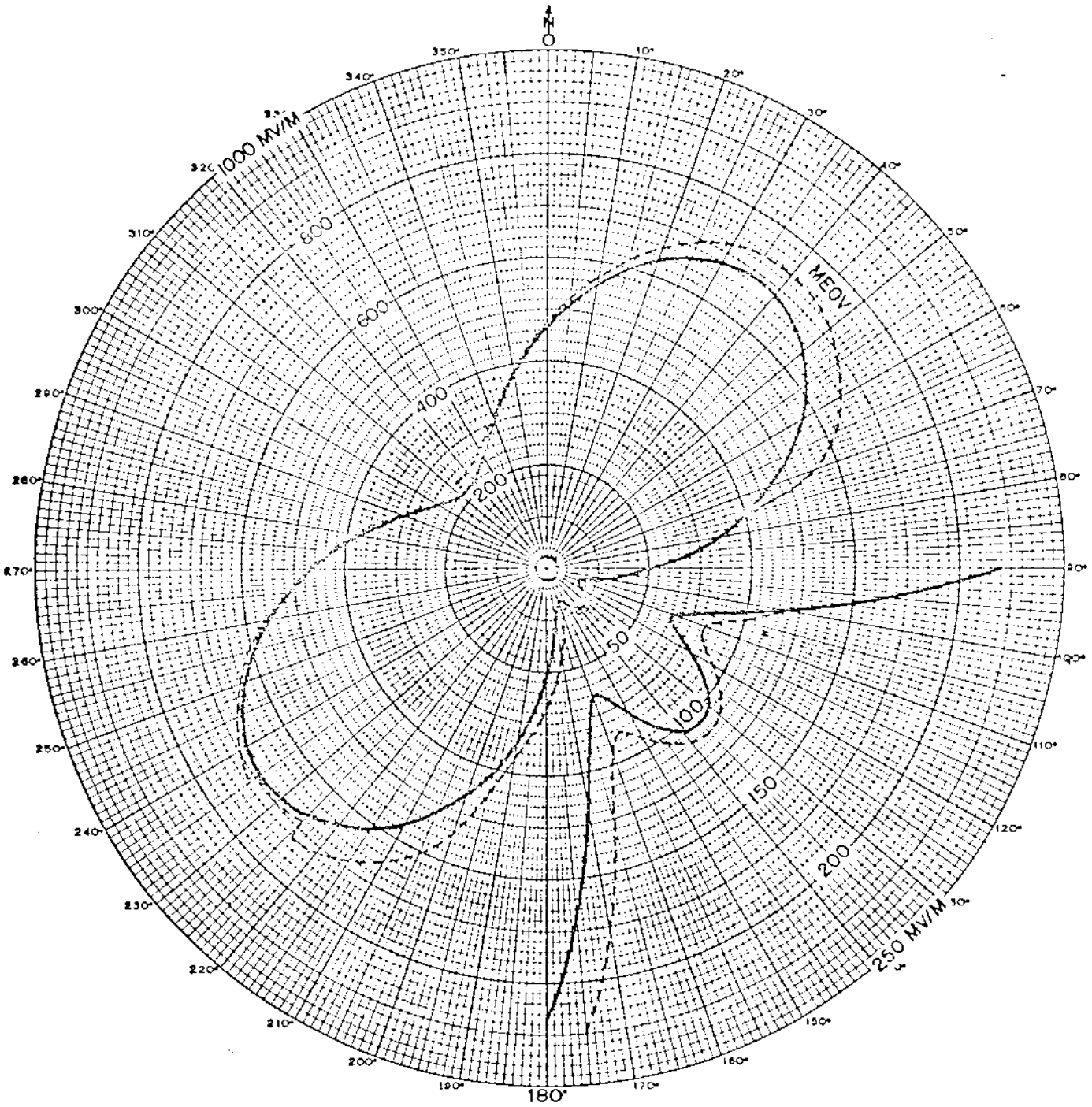


EXHIBIT D-4

15° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

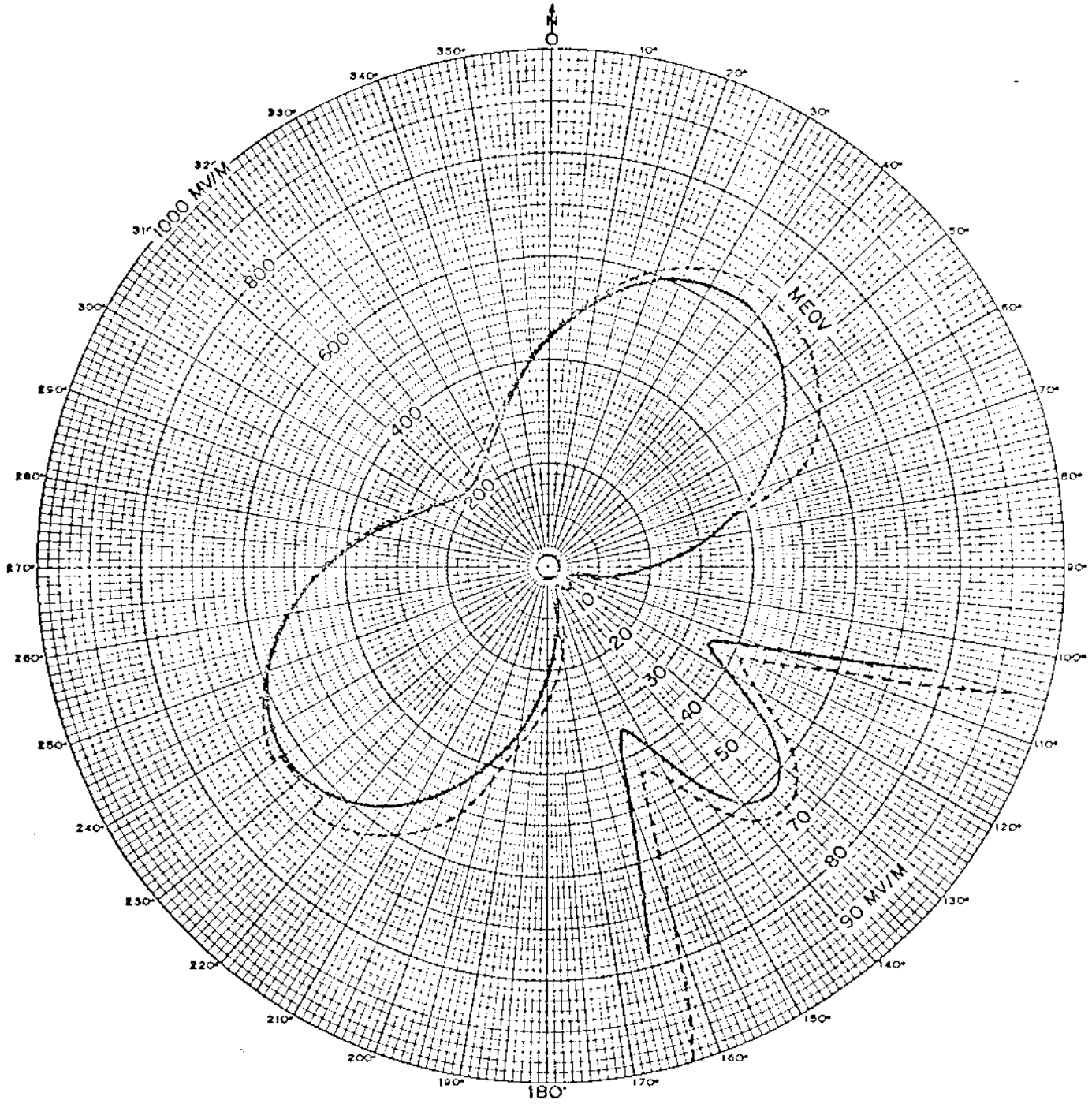


EXHIBIT D-5

20° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

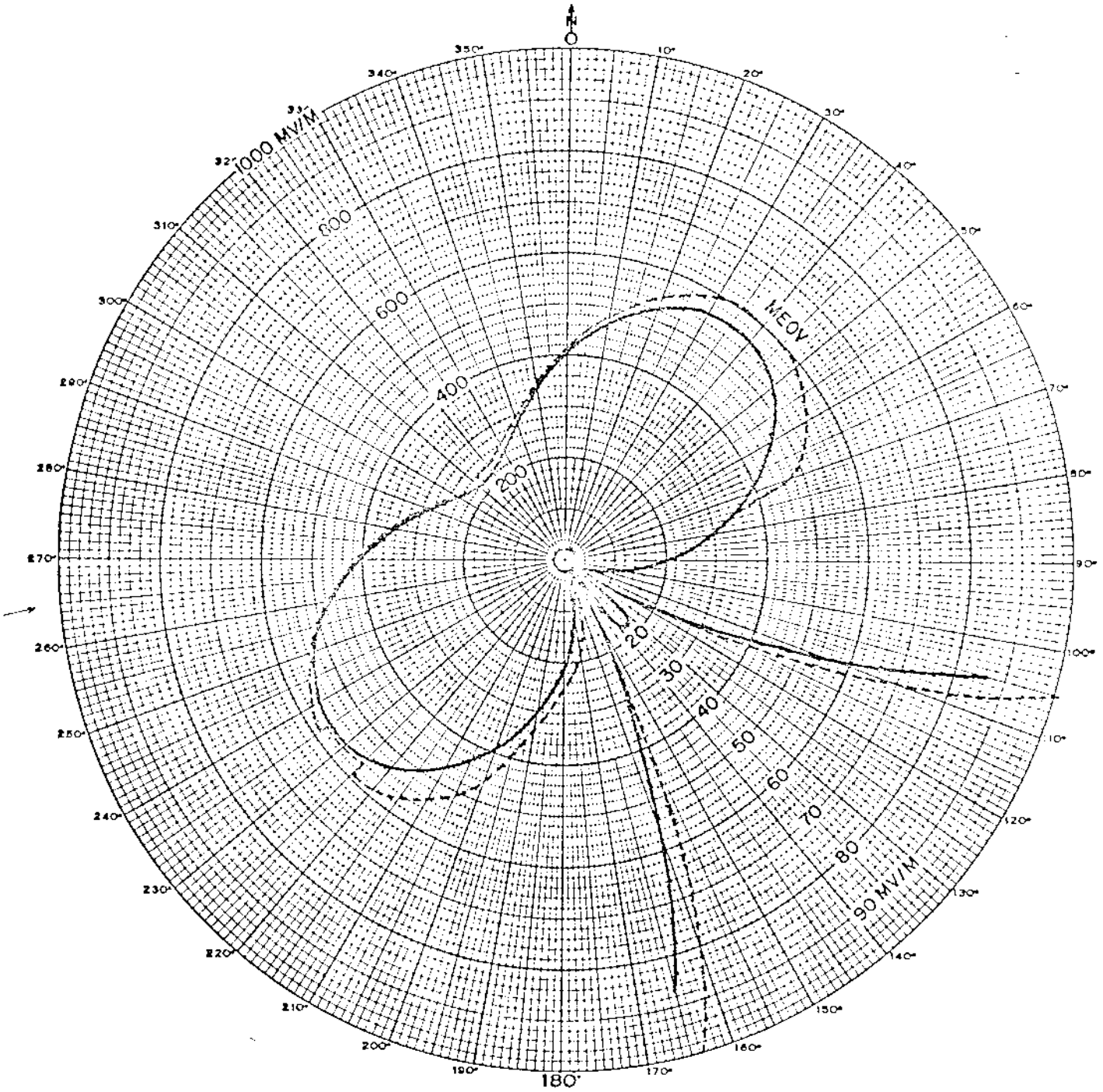


EXHIBIT D-6

25° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

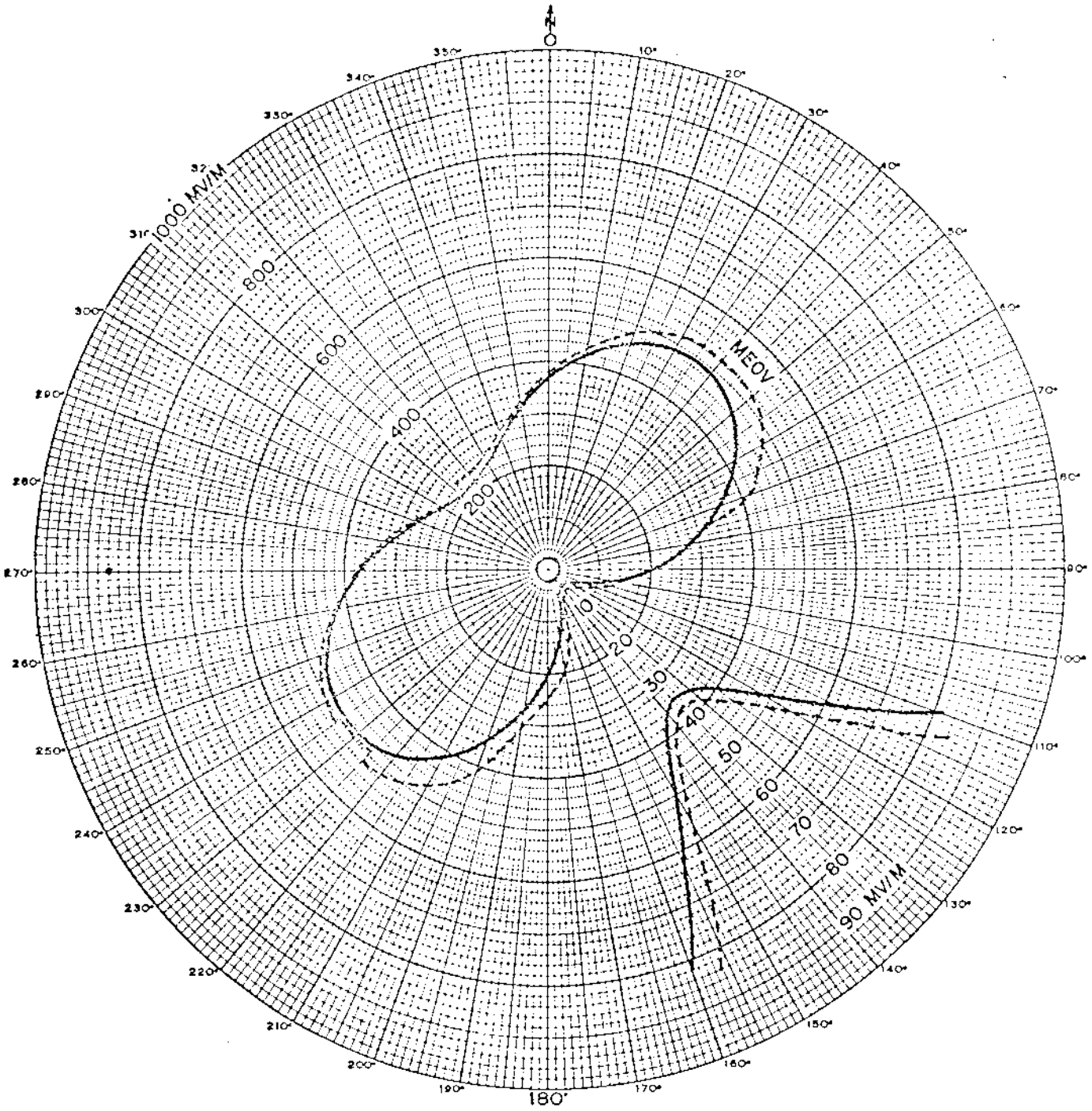


EXHIBIT D-7

30° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

KSO

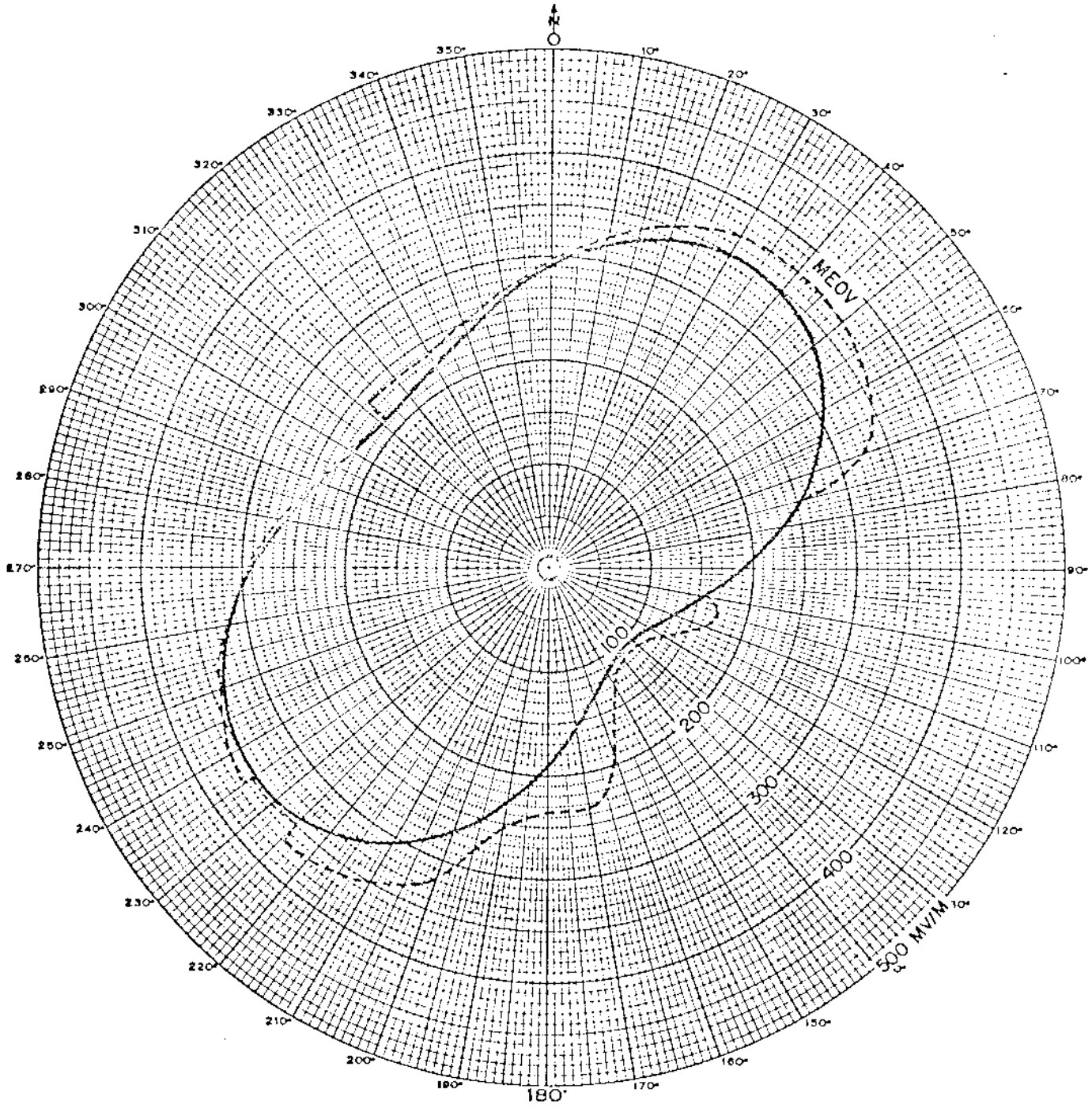


EXHIBIT D-9

40° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

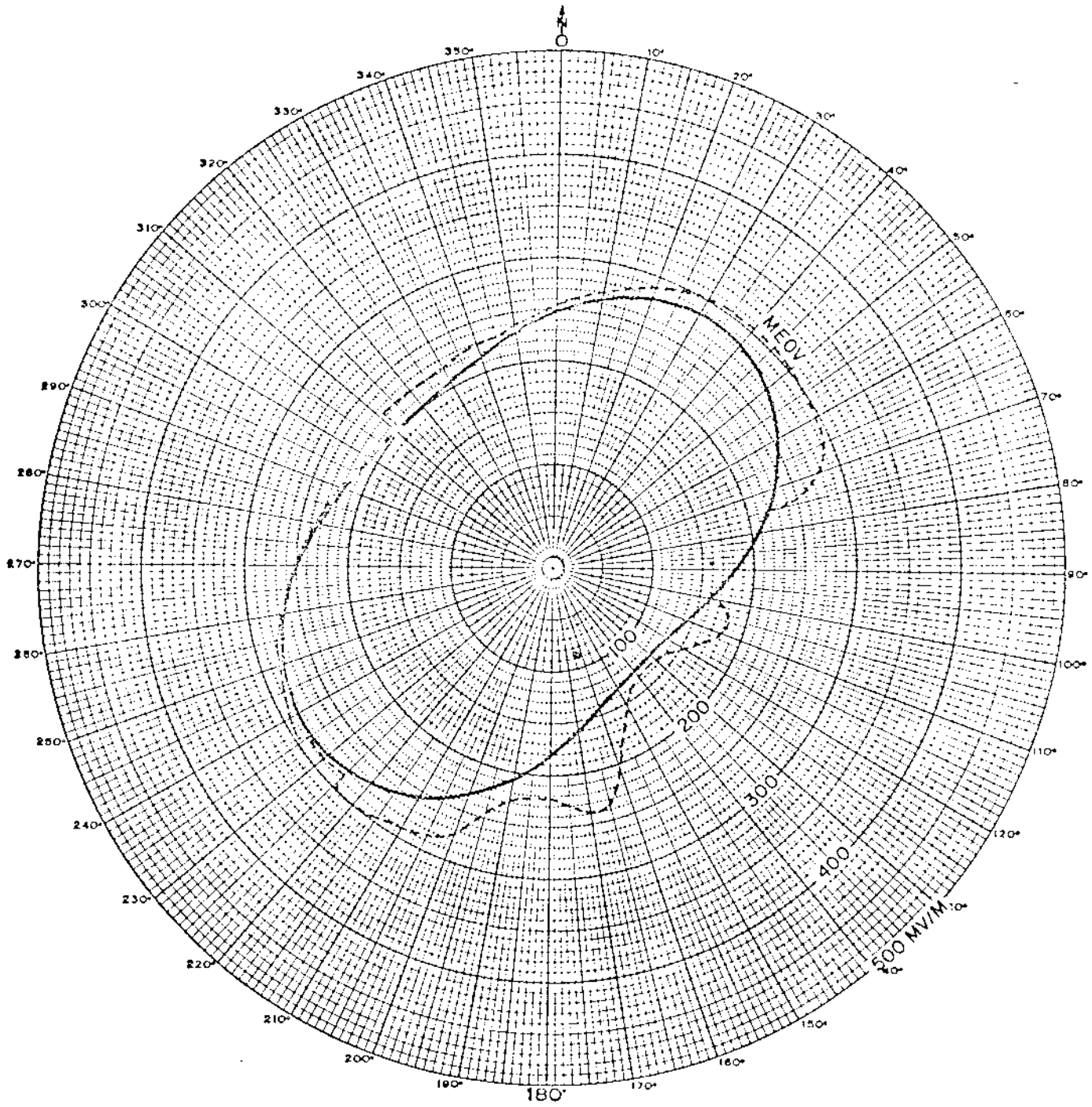
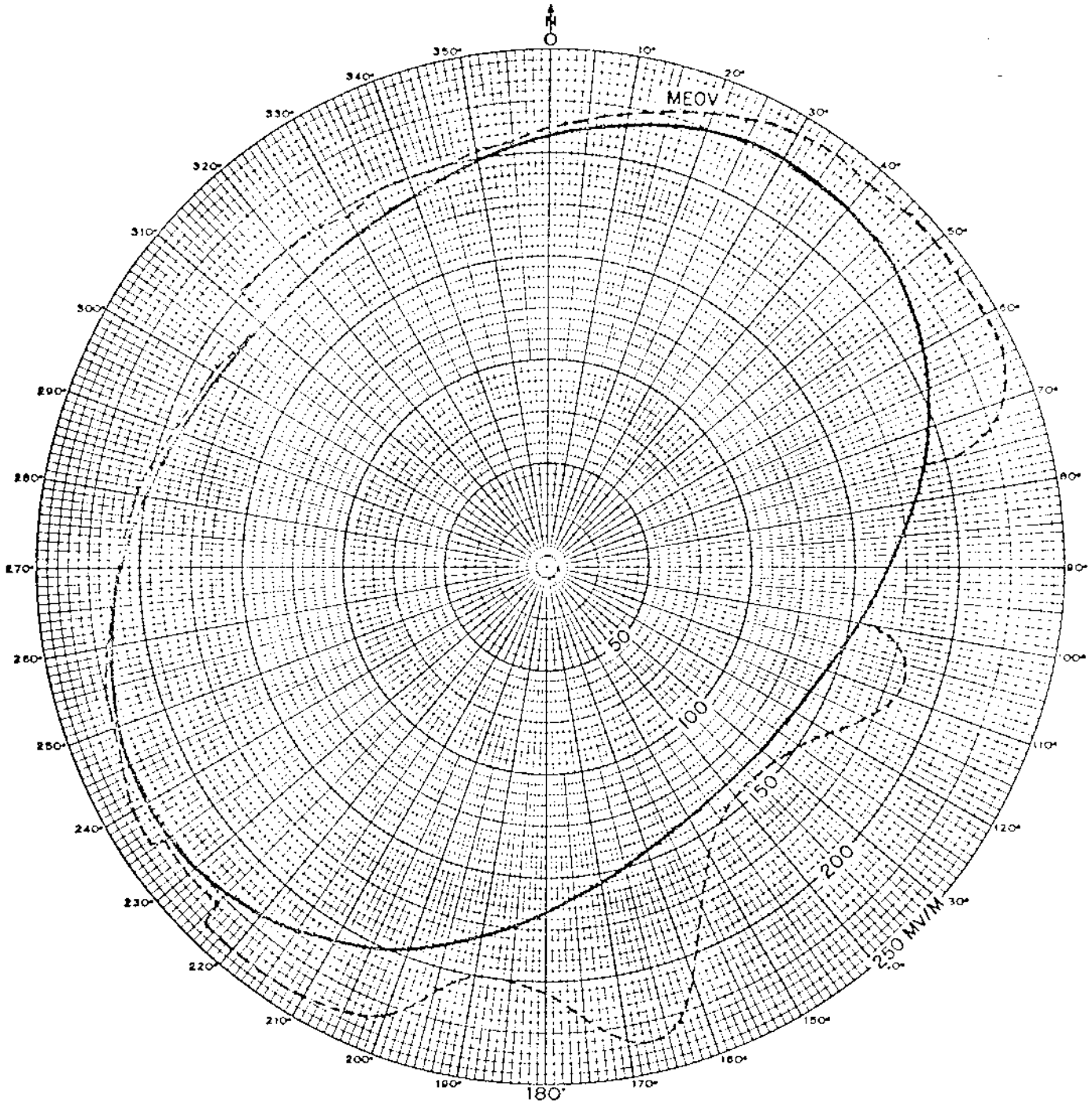


EXHIBIT D-10

45° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA



NOTE SCALE CHANGE

EXHIBIT D-11

50° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

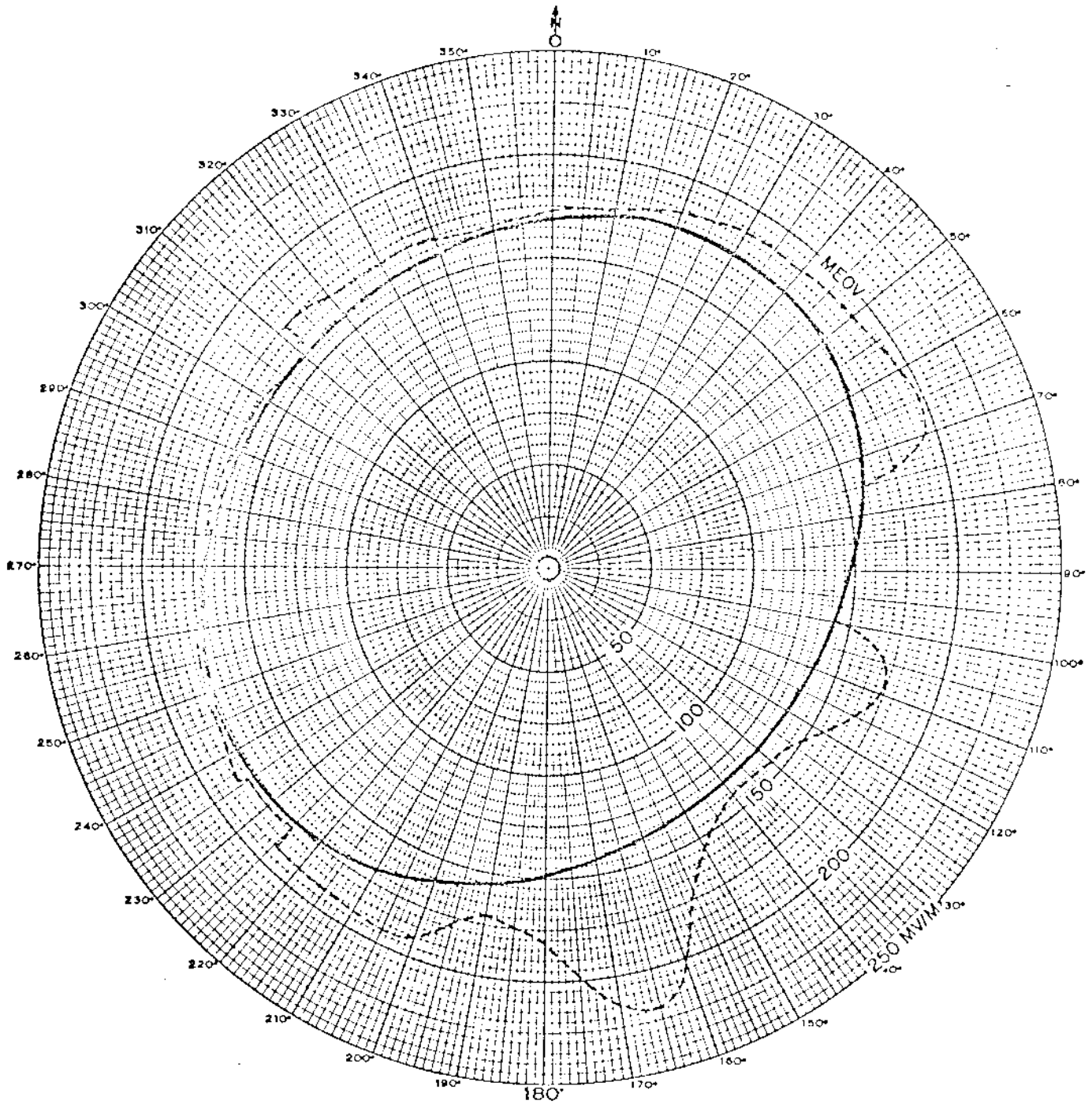


EXHIBIT D-12

55° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

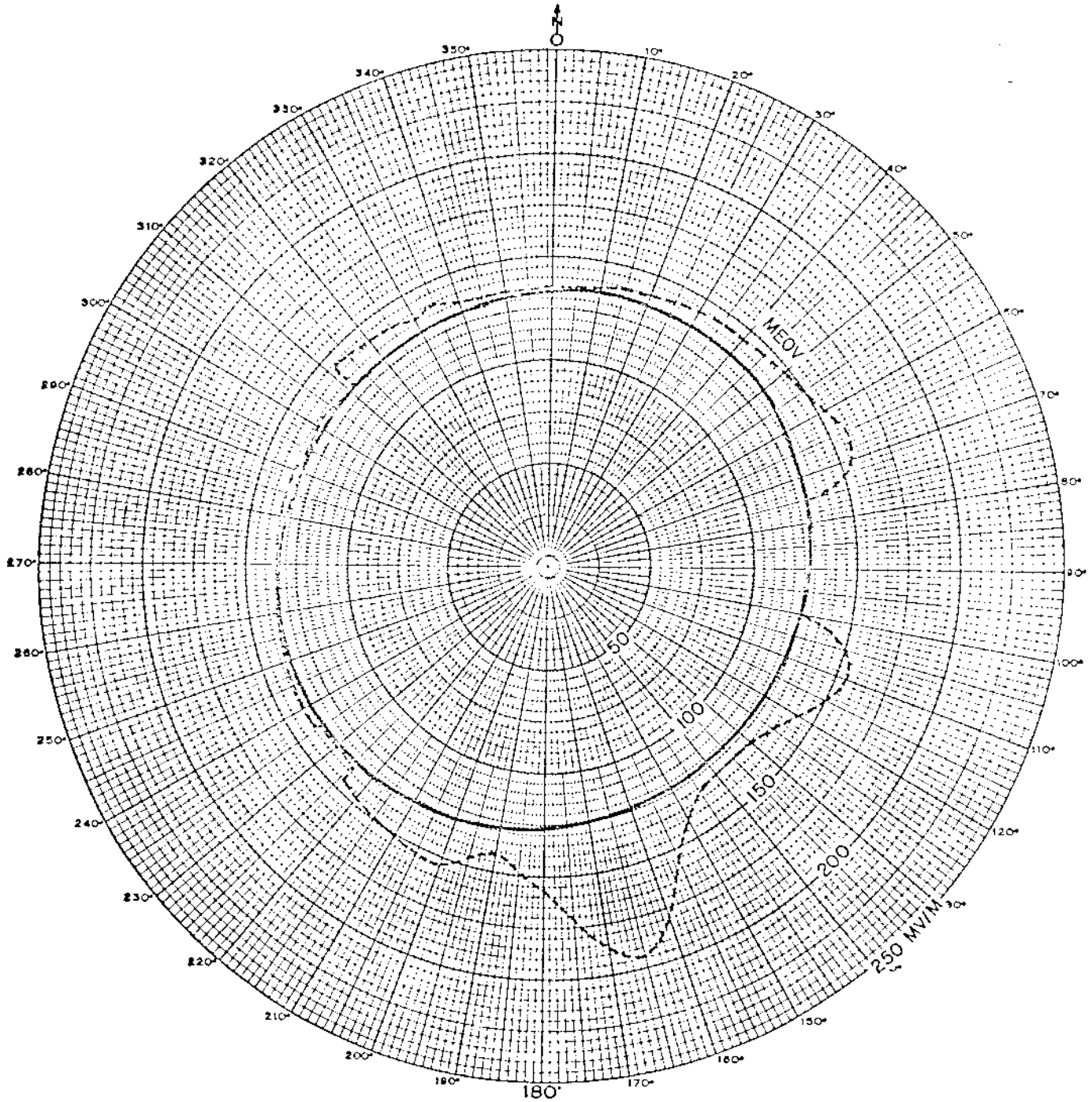


EXHIBIT D-13

60° ELEVATION PATTERN
KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

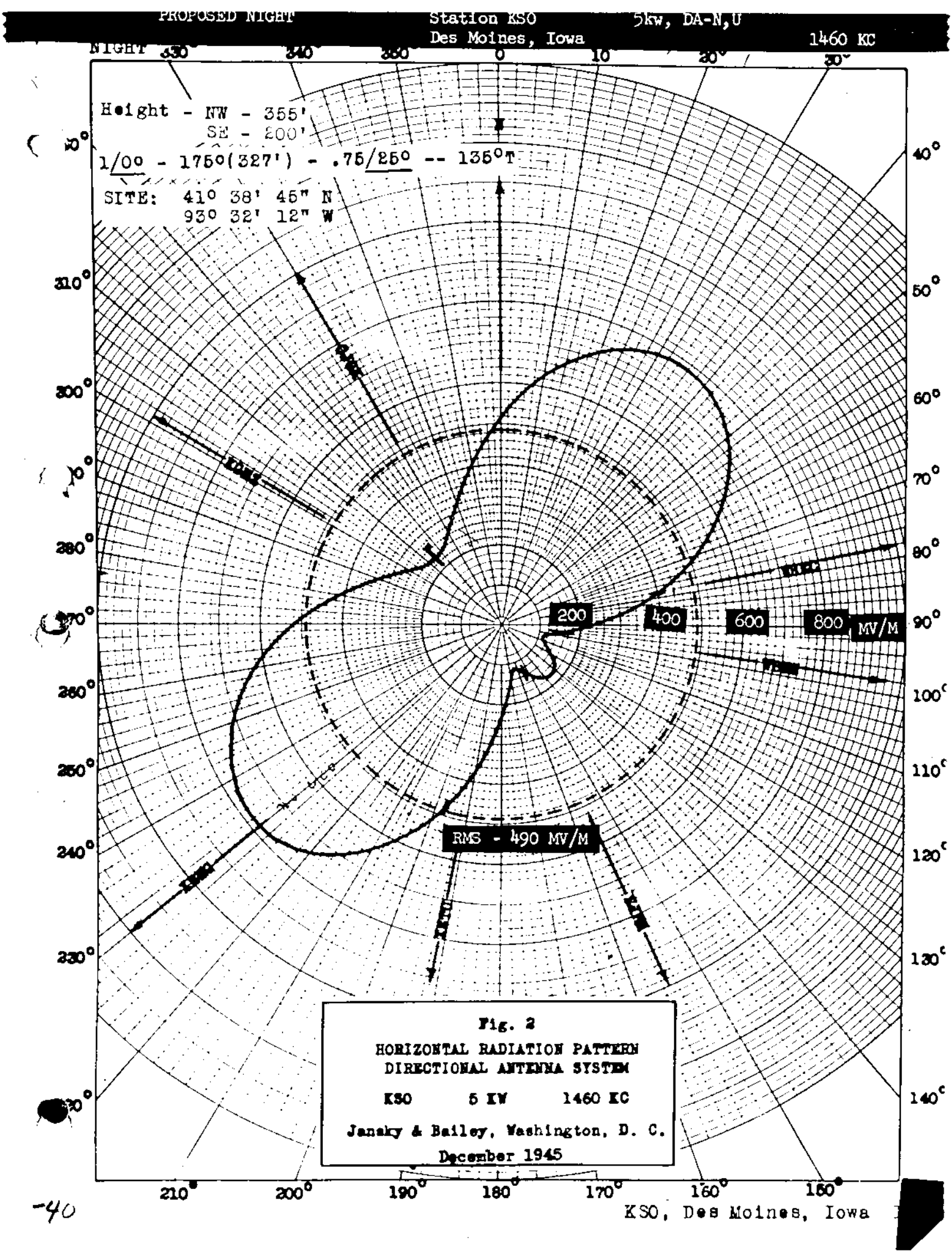


Fig. 2

HORIZONTAL RADIATION PATTERN
DIRECTIONAL ANTENNA SYSTEM

KSO 5 KW 1460 KC

Jansky & Bailey, Washington, D. C.

December 1945

KSO, Des Moines, Iowa

Prop nite – superseded by Dec 1945 but retained for clarity

T20 – 1460 KC

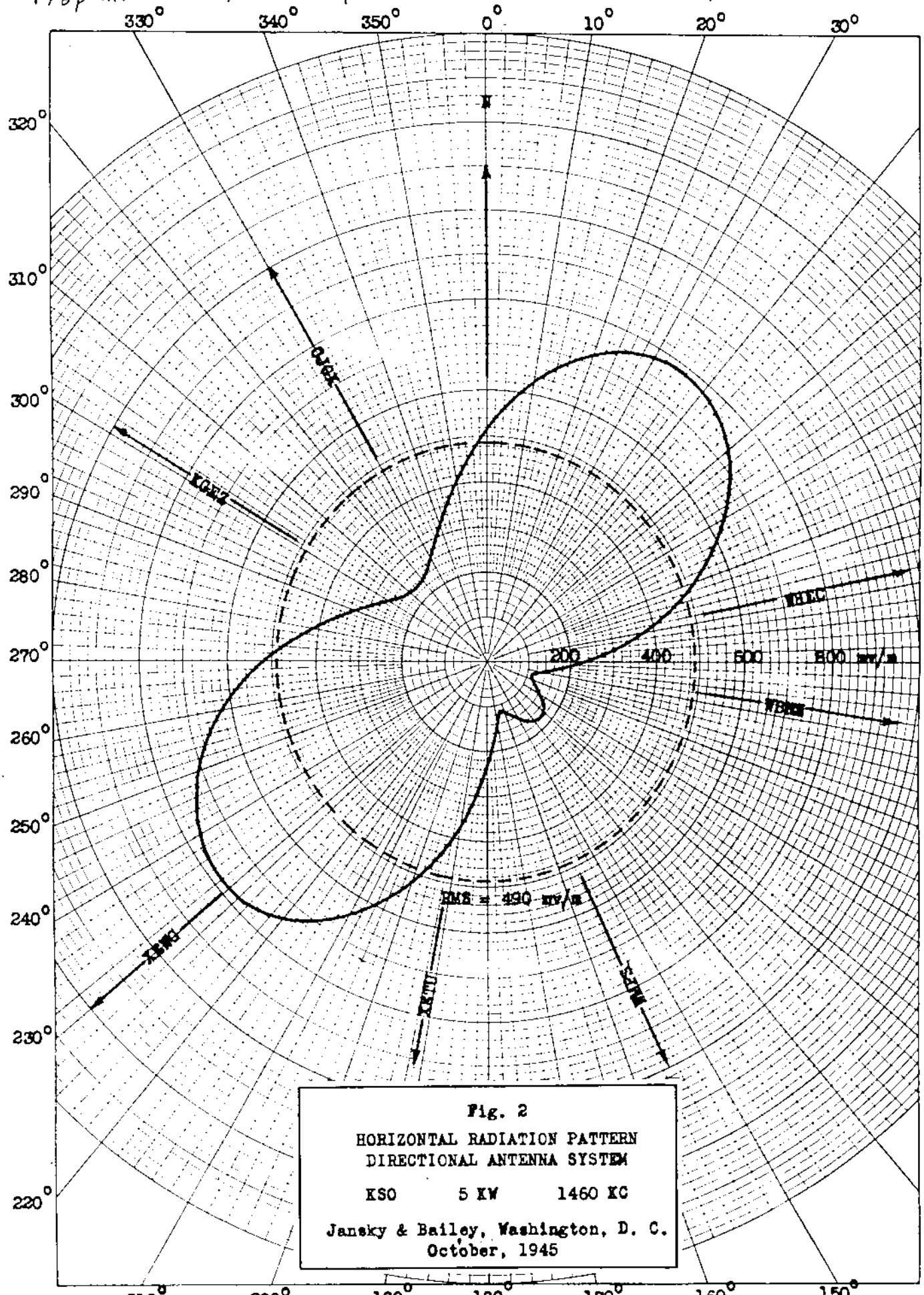


Fig. 2

HORIZONTAL RADIATION PATTERN
DIRECTIONAL ANTENNA SYSTEM

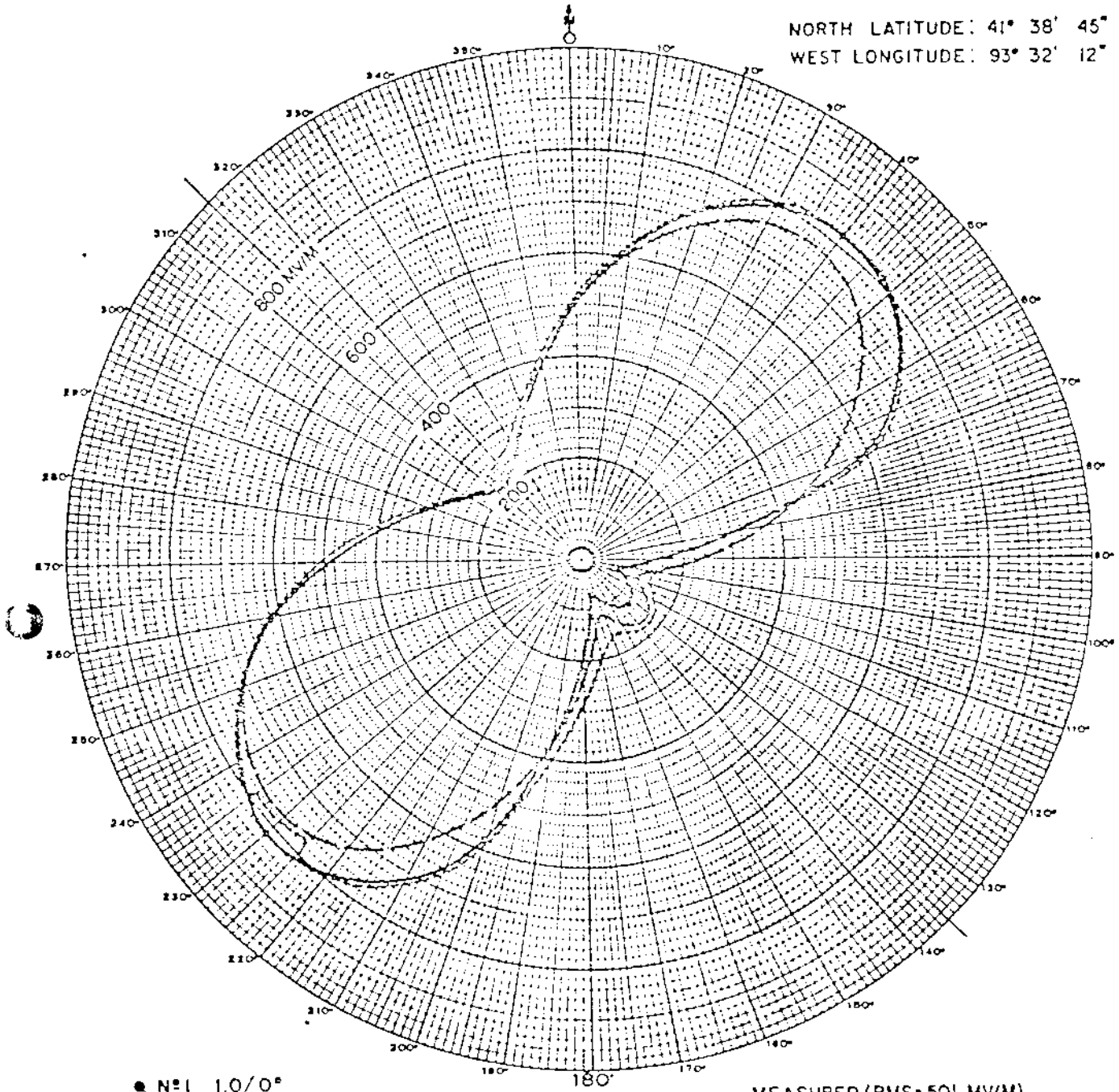
KSO 5 KW 1460 KC

Jansky & Bailey, Washington, D. C.
October, 1945

KEUFFEL & ESSER CO., N. Y. NO 343A
POLAR CO-ORDINATE
MADE IN U. S. A.

78

KSO



BC-14,398

BC-14,398

EXHIBIT I

MEASURED
DIRECTIONAL RADIATION PATTERN

KSO
1460 KHZ, 5 KW, DA-N
DES MOINES, IOWA

KTYM
1460 kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: KTYM — Main Studio: Inglewood, California

Frequency: 1460 kHz — Power: 0.5kw Night 5kw Day

Notification List No. 1785 — Date: November 16, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 34° 00' 24"
West Longitude: 118° 21' 52"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 2
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWERS:	N(#1)	S(#2)
HEIGHT ABOVE INSULATORS:	180'	180' (96°)
NIGHT PHASING:	0°	-123.5°
NIGHT FIELD RATIO:	1.0	0.843
DAY PHASING:	0°	118.8°
DAY FIELD RATIO:	1.0	0.583

SPACING AND ORIENTATION: Adjacent towers are spaced 149.7' (80°) on a line bearing 175° true.

GROUND SYSTEM: 120 - 168.5' equally spaced copper radials plus a 48' square ground screen about each tower. Radials are shortened and bonded to a transverse strap along intersection sbetween towers.

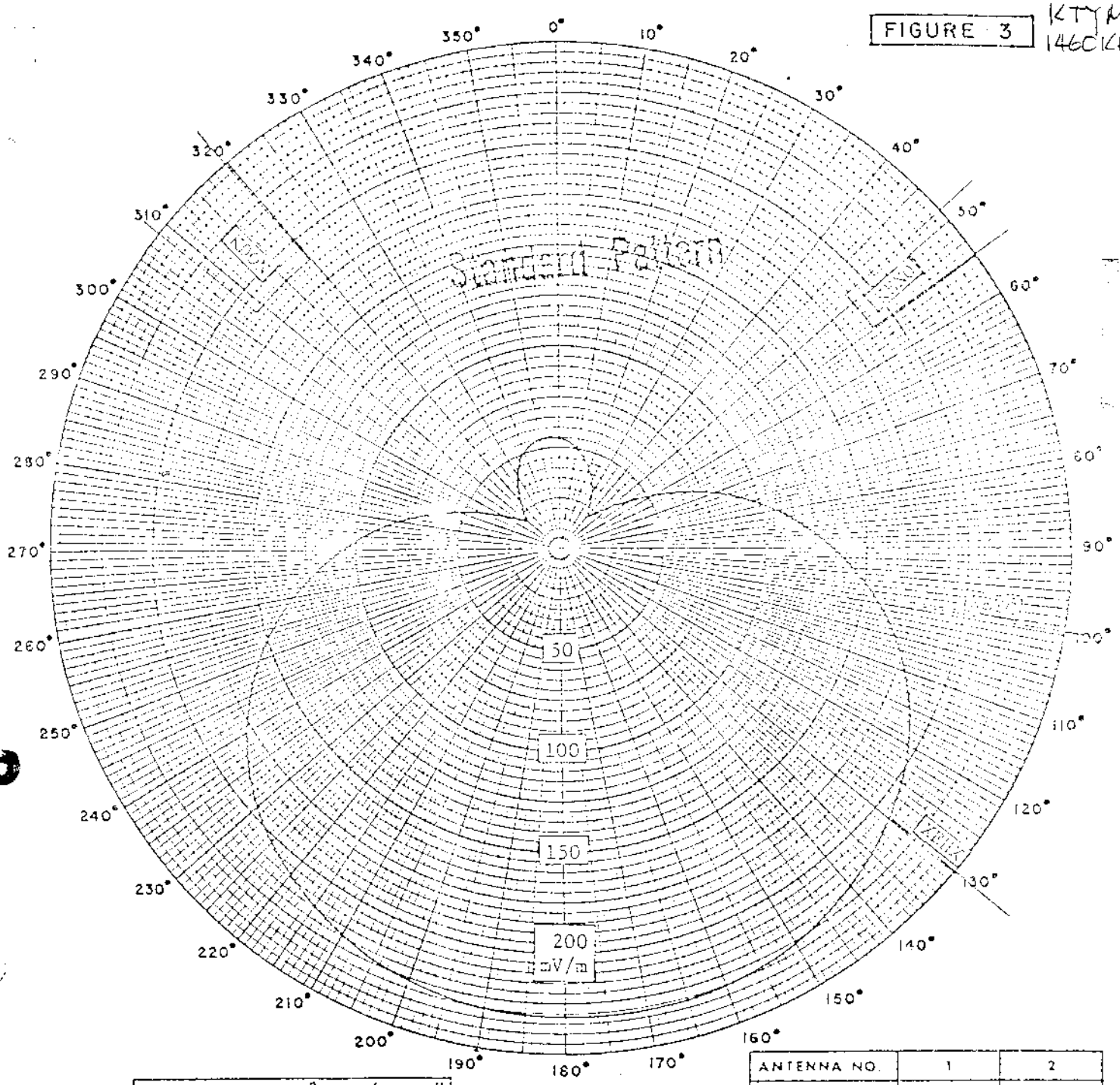
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	436 mv/m		
Night	140.276 mv/m	168.806 mv/m	147.424 mv/m

NOTE: Please retain the Daytime directional antenna radiation pattern notified for Station KTYM in United States Change List Number 927 dated October 4, 1961 and attach to this Revised Description Sheet and Nighttime pattern. This notification concerns only a change in the Nighttime operation of the station with Daytime operation continued as previously notified.

FIGURE 3

KTYM
1460 KHz



N. LAT.	34 °	00 '	24 "
W. LONG.	118 °	21 '	52 "
RMS STD.	147.424	mv/m	
RMS Th.	140.276	mv/m	
RSS Th	168.806		

ANTENNA NO.	1	2
FIELD	1.0	0.843
PHASE	0°	-123.5°
SPACING	0°	80°
ORIENTATION	0°	175°
HEIGHT	96°	96°

Standard Pattern

NIGHTTIME STANDARD HORIZONTAL PATTERN
KTYM - INGLEWOOD, CALIFORNIA
1460 kHz - 0.5 kW-N/5 kW-D - DA-2

AUGUST, 1977

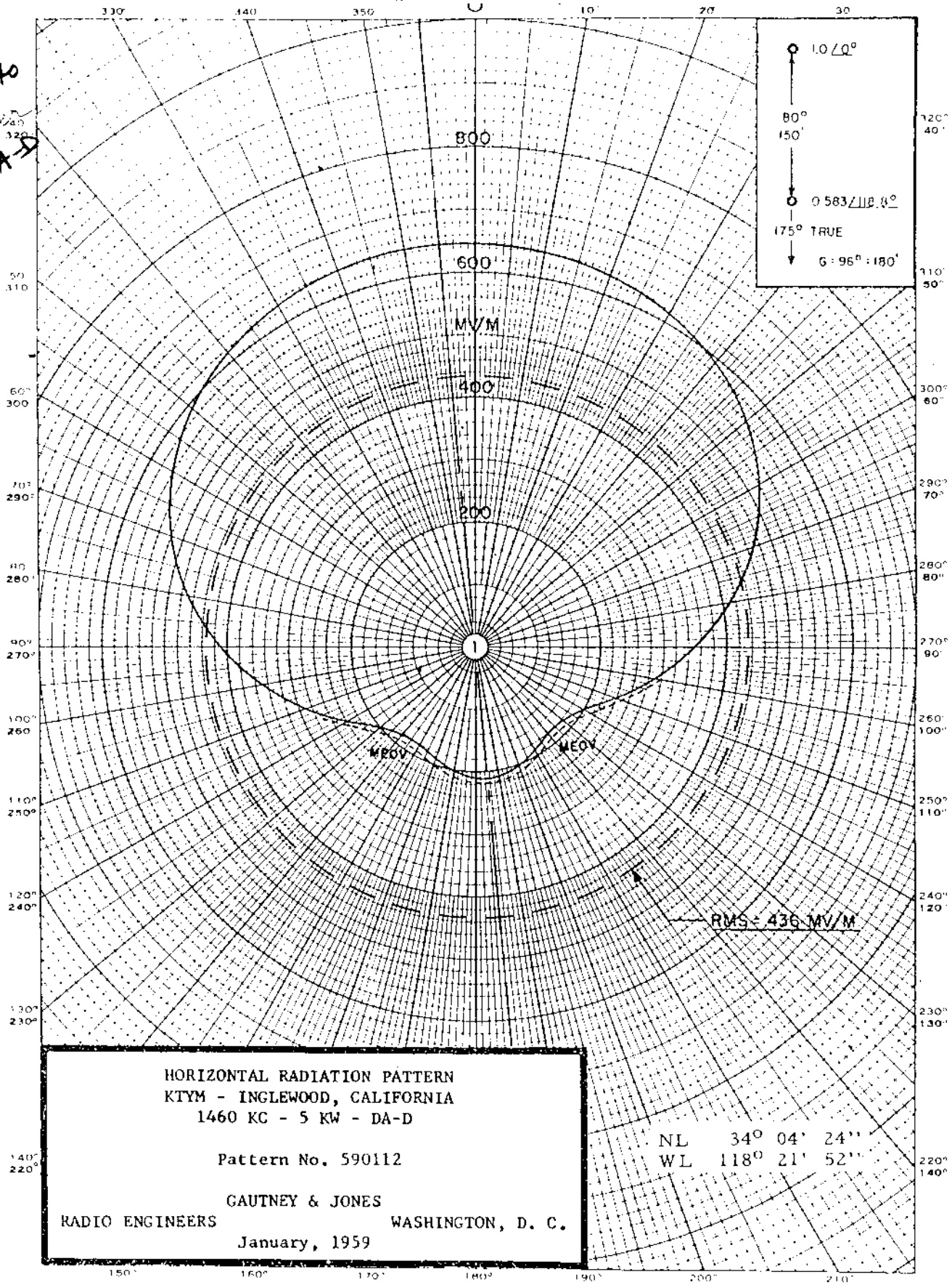
CARL T. JONES ASSOCIATES - CONSULTING ENGINEERS

KTYM

PROPOSED DAY
(3-23-59g)

Station KTYM
Inglewood, California

5kw, DA-D,D
1460 KC



HORIZONTAL RADIATION PATTERN
KTYM - INGLEWOOD, CALIFORNIA
1460 KC - 5 KW - DA-D

Pattern No. 590112

GAUTNEY & JONES
RADIO ENGINEERS WASHINGTON, D. C.
January, 1959

FCC File No. BP-12791
Accepted 2-24-59

Station KTYM
Inglewood, California

1460 KC

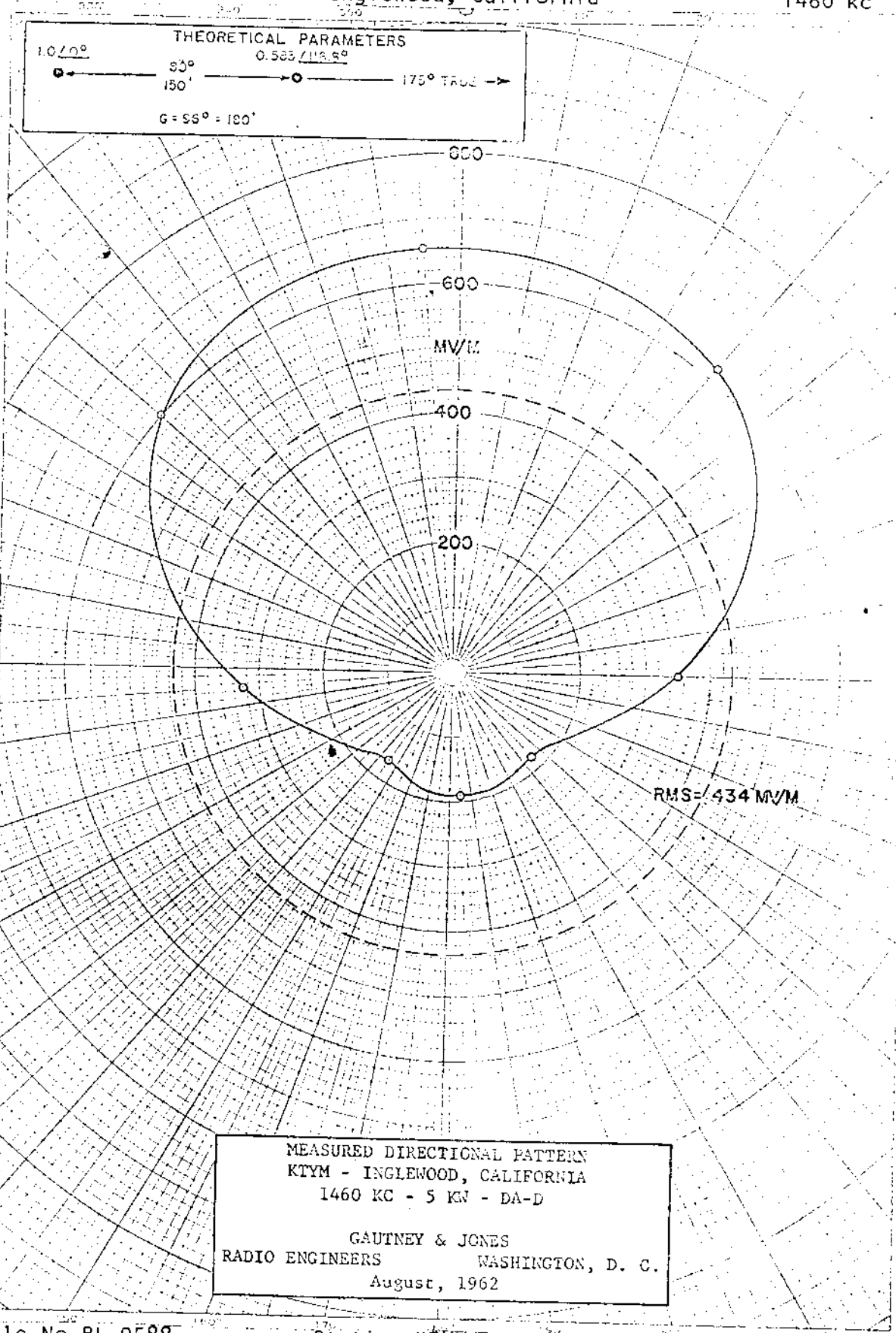
KTYM

Measured Day
(10-26-62ct)

Station KTYM
Inglewood, California

5kw,DA-D,D
1460 kc

1-25-63 granted L for increase in day power and DA-D



FCC File No. BL-9588
Accepted 10-11-62

Station KTYM
Inglewood, California

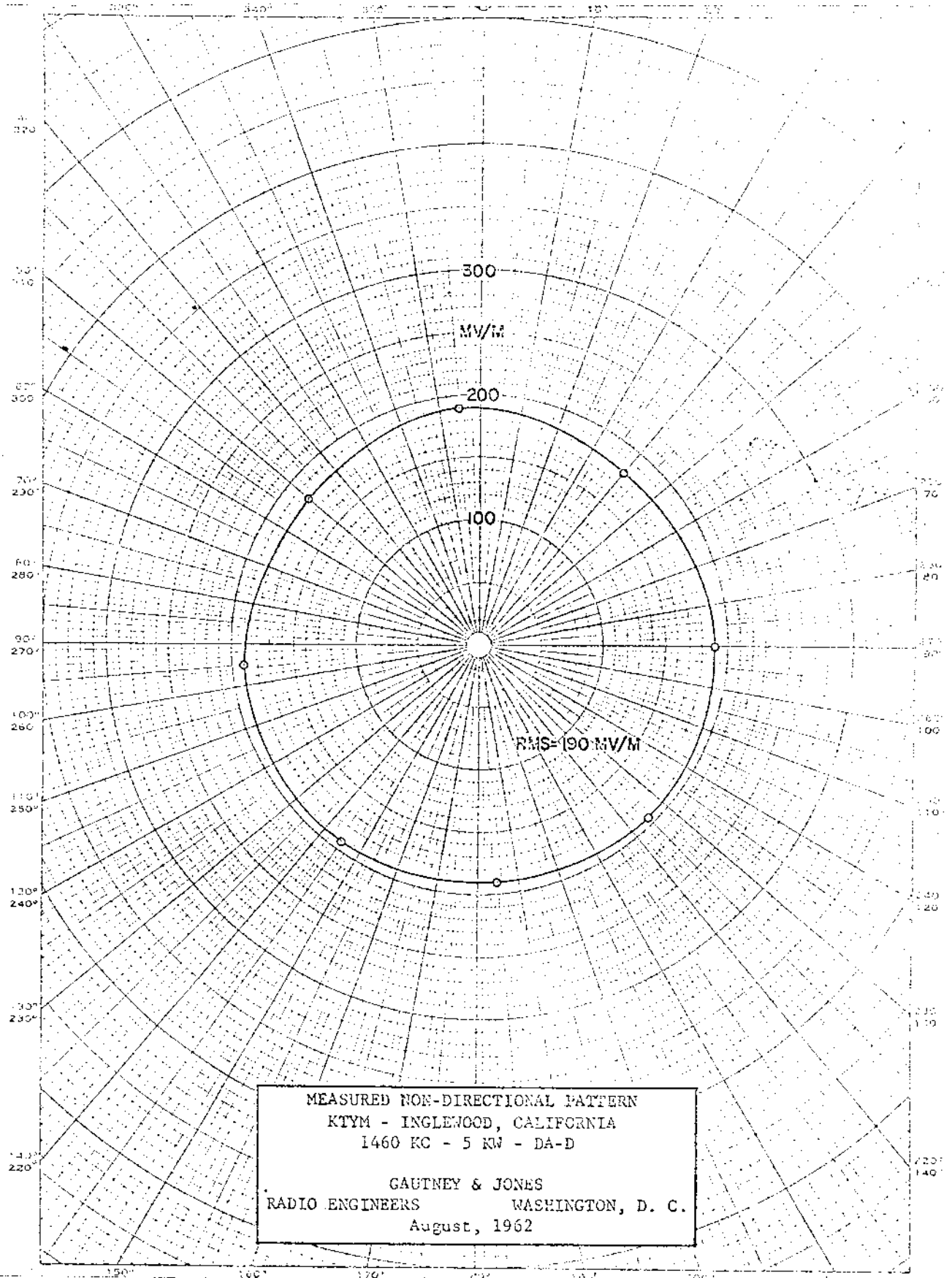
1460 kc

KTYM

Measured Non-DA
(10-26-62ct)

Station KTYM
Inglewood, California

5kw,DA-D,D
1460 kc



MEASURED NON-DIRECTIONAL PATTERN
KTYM - INGLEWOOD, CALIFORNIA
1460 KC - 5 KW - DA-D

GAUTNEY & JONES
RADIO ENGINEERS WASHINGTON, D. C.
August, 1962

FCC File No. BL-9588
Accepted 10-11-62

Station KTYM
Inglewood, California

1460 kc

Santa Rosa, Calif.

KVRE

PROPOSED DAY (5-28-59g)

New; Santa Rosa B/C Co.
Santa Rosa, California

1kw, DA-D,D
1460 KC

granted CP for New Station
4-20-60

A. E. Towne Associates Inc.
Radio Engineering Consultants
San Francisco, California

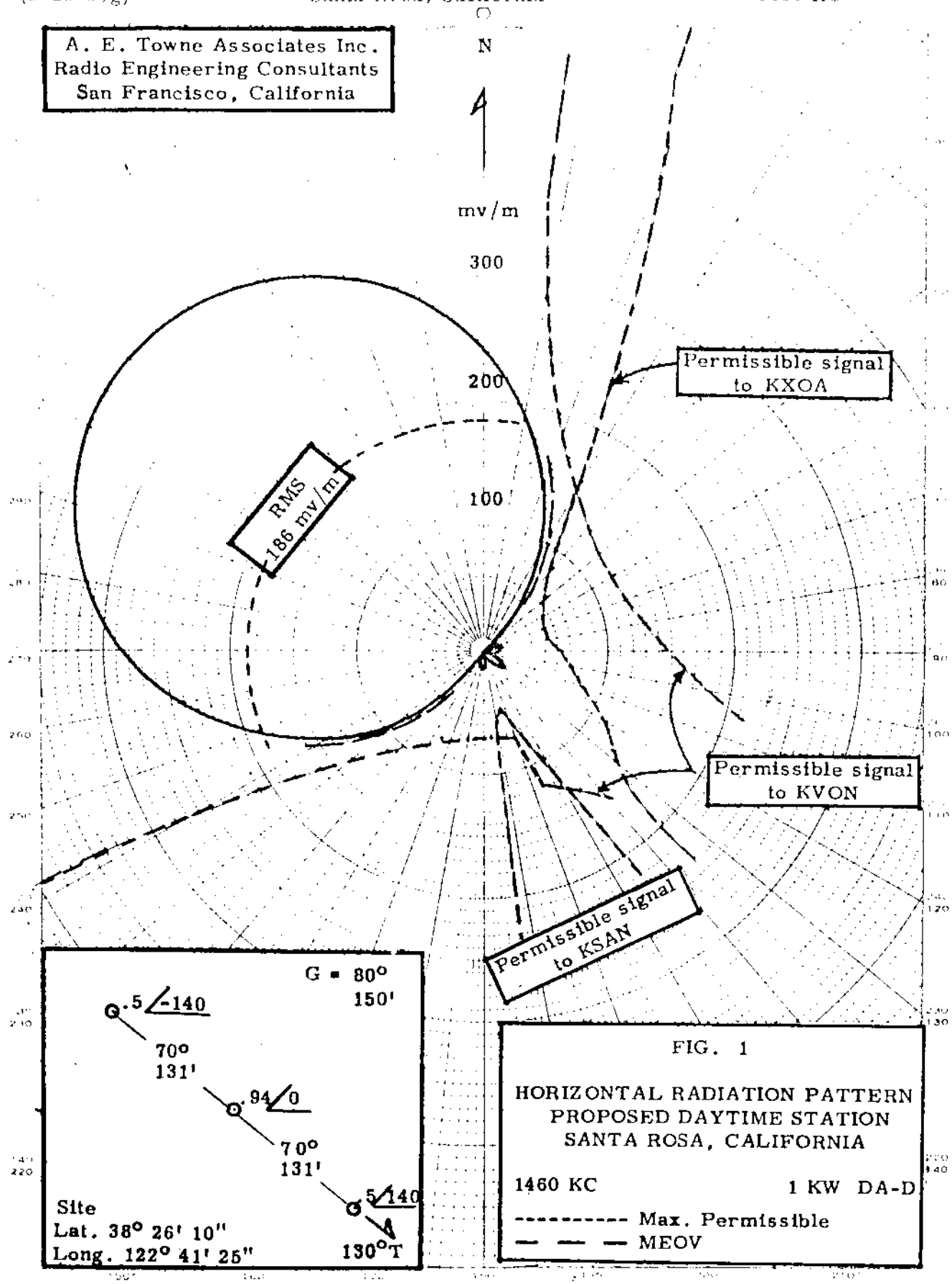


FIG. 1

HORIZONTAL RADIATION PATTERN
PROPOSED DAYTIME STATION
SANTA ROSA, CALIFORNIA

1460 KC 1 KW DA-D

---------- Max. Permissible
— — — MEOV

FCC File No. BP-11573

Santa Rosa Broadcasting Company
Santa Rosa, California 1460 KC

Santa Rosa, Calif.

KVRE

PROPOSED DAY NULLS
(5-28-59g)

New; Santa Rosa B/C Co.
Santa Rosa, California

1kw, DA-D,D
1460 KC

Granted CP for new station 4-20-60

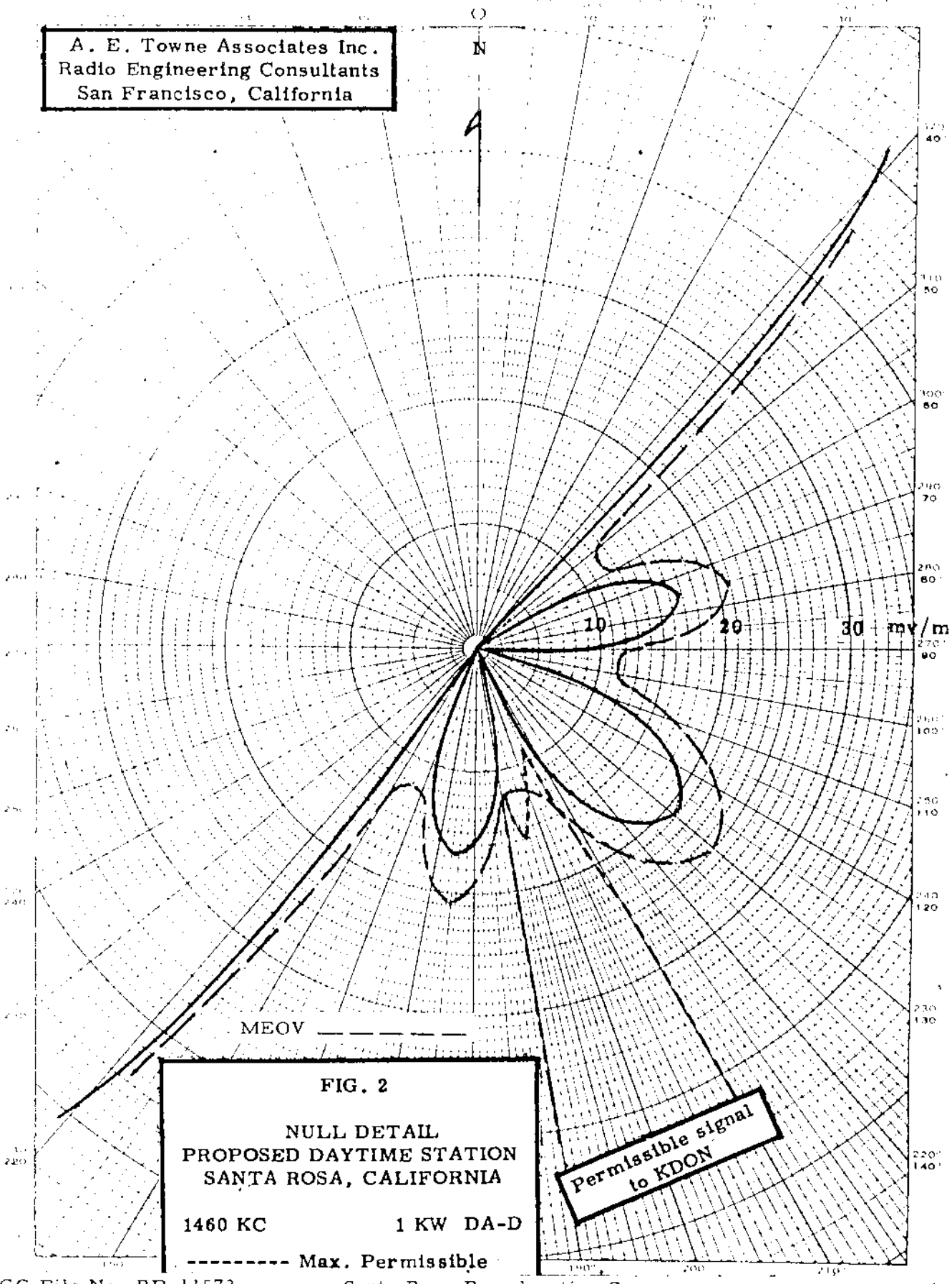


FIG. 2

NULL DETAIL
PROPOSED DAYTIME STATION
SANTA ROSA, CALIFORNIA

1460 KC 1 KW DA-D

--------- Max. Permissible

FCC File No. BP-11573

Santa Rosa Broadcasting Company
Santa Rosa, California

1460 KC

KVRE

Measured Day
(5-25-62ct)

Station KVRE
Santa Rosa, California

1kw,DA-D,D
1460 kc

4-19-63 granted license on new AM station

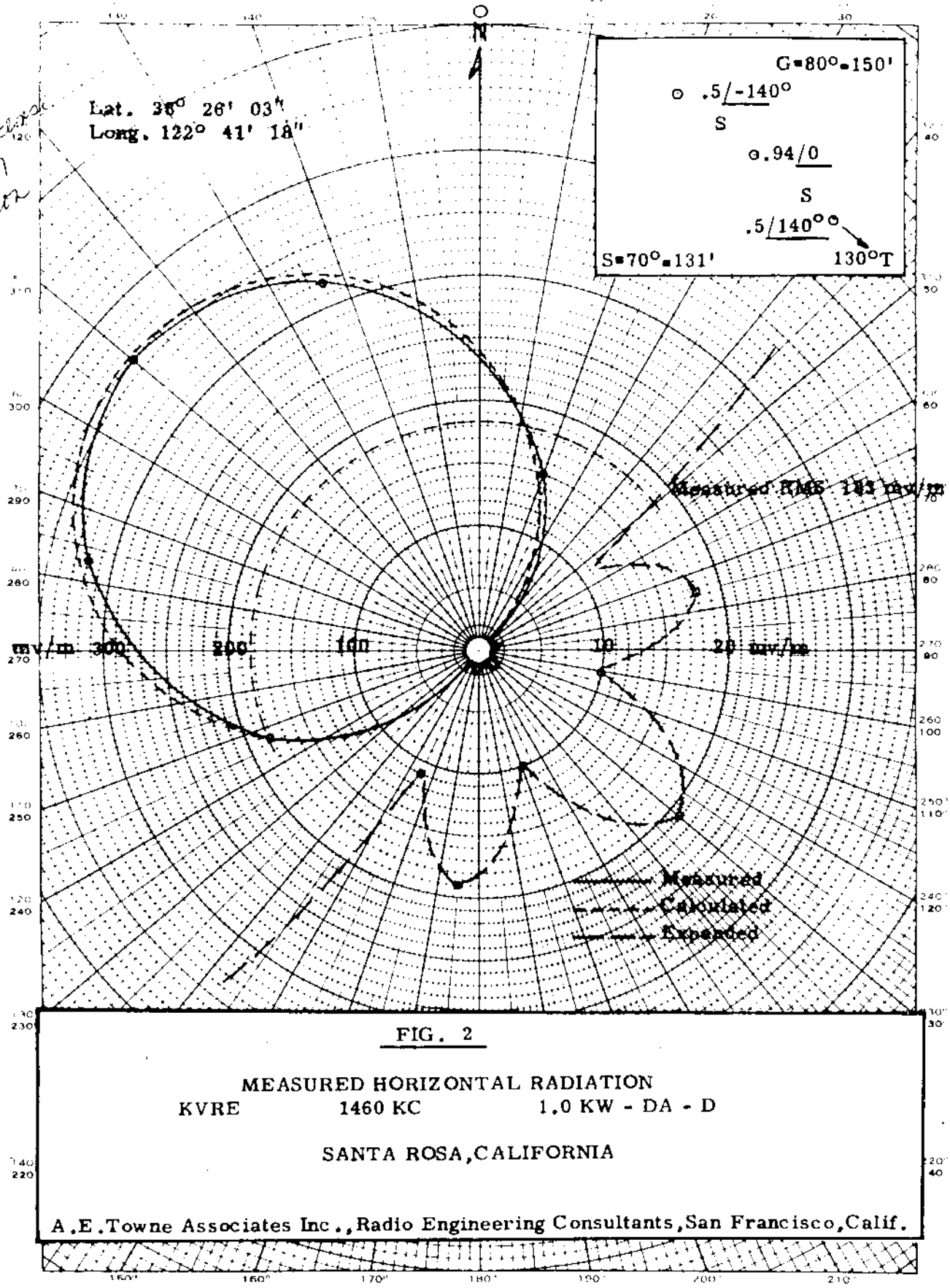


FIG. 2

MEASURED HORIZONTAL RADIATION
KVRE 1460 KC 1.0 KW - DA - D

SANTA ROSA, CALIFORNIA

A.E.Towne Associates Inc., Radio Engineering Consultants, San Francisco, Calif.

FCC File No.BL-9247
Accepted 5-14-62

Station KVRE
Santa Rosa, California

1460 kc

KVRE

Measured Non-DA
(5-25-62ct)

Station KVRE
Santa Rosa, California

1kw,DA-D,D
1460 kc

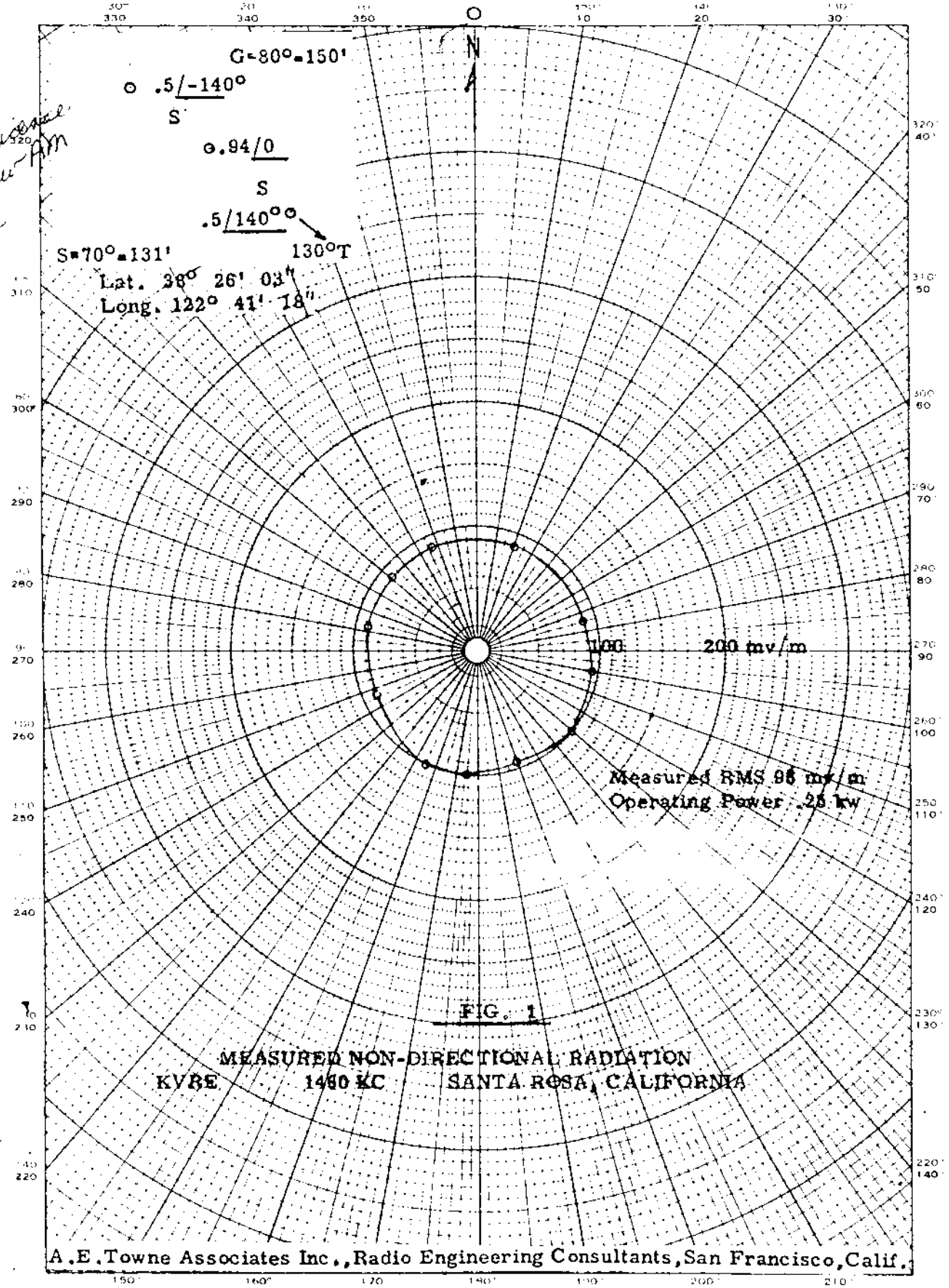


FIG. 1

MEASURED NON-DIRECTIONAL RADIATION
KVRE 1460 KC SANTA ROSA, CALIFORNIA

A.E.Towne Associates Inc.,Radio Engineering Consultants,San Francisco,Calif.

FCC File No.BL-9247
Accepted 5-14-62

Station KVRE
Santa Rosa, California

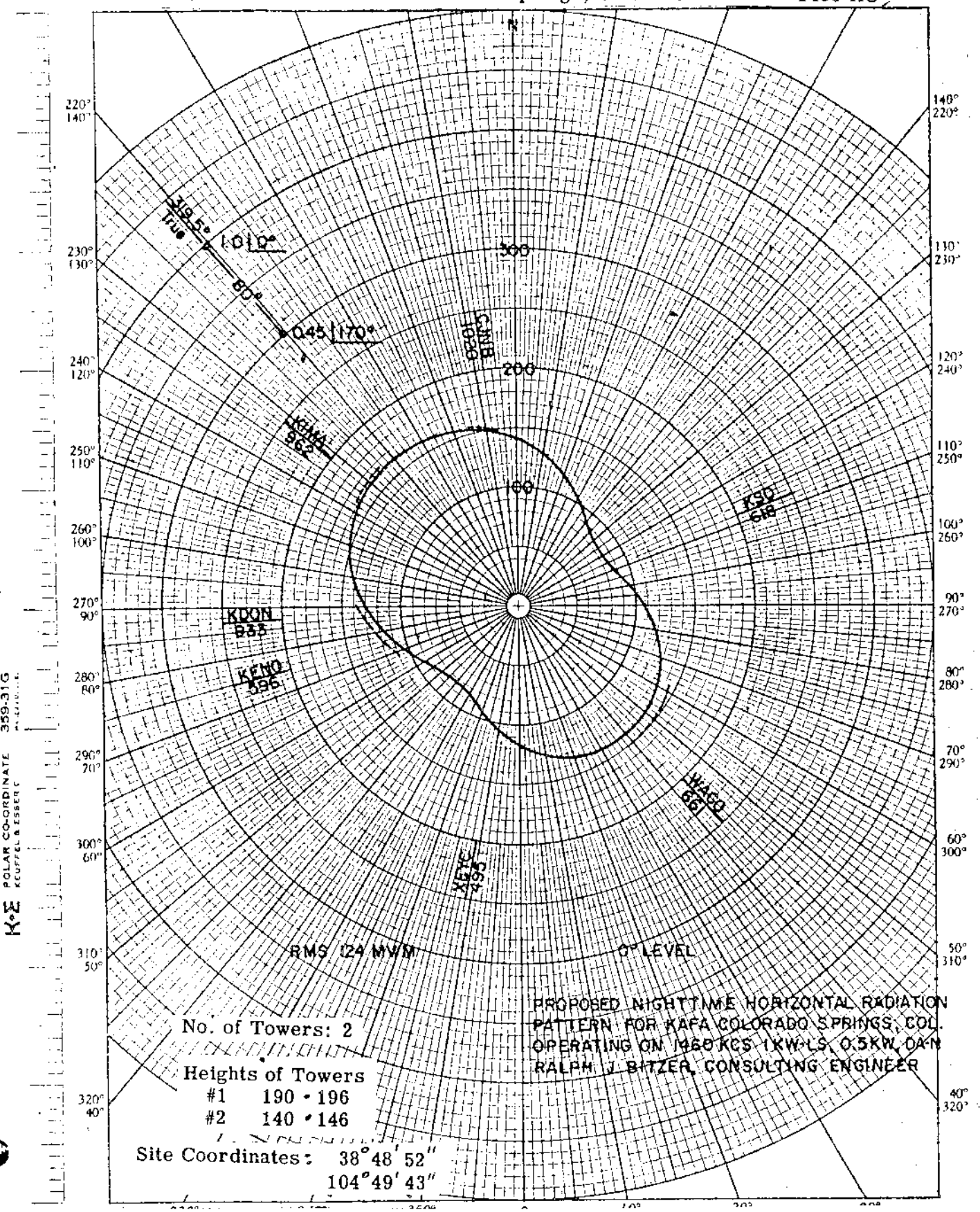
1460 kc

Granted CP 10/30/57 to change from Non DA day to DA-N only to 5-1-LS DA-N

KYSN

PROPOSED NIGHT
(4/5/57g)

Station KAFA 500w,1kw-LS, DA-N,U
Colorado Springs, Colorado 1460 KC



No. of Towers: 2

Heights of Towers
#1 190 - 196
#2 140 - 146

Site Coordinates: 38°48' 52"
104°49' 43"

PROPOSED NIGHTTIME HORIZONTAL RADIATION PATTERN FOR KAFA COLORADO SPRINGS, COL. OPERATING ON 1460 KCS 1KW-LS, 0.5KW, DA-N RALPH J. BITZER, CONSULTING ENGINEER

FCC File No. BP-11,133
Accepted 3/22/57

KAFA
Colorado Springs, Colorado 1460 KC

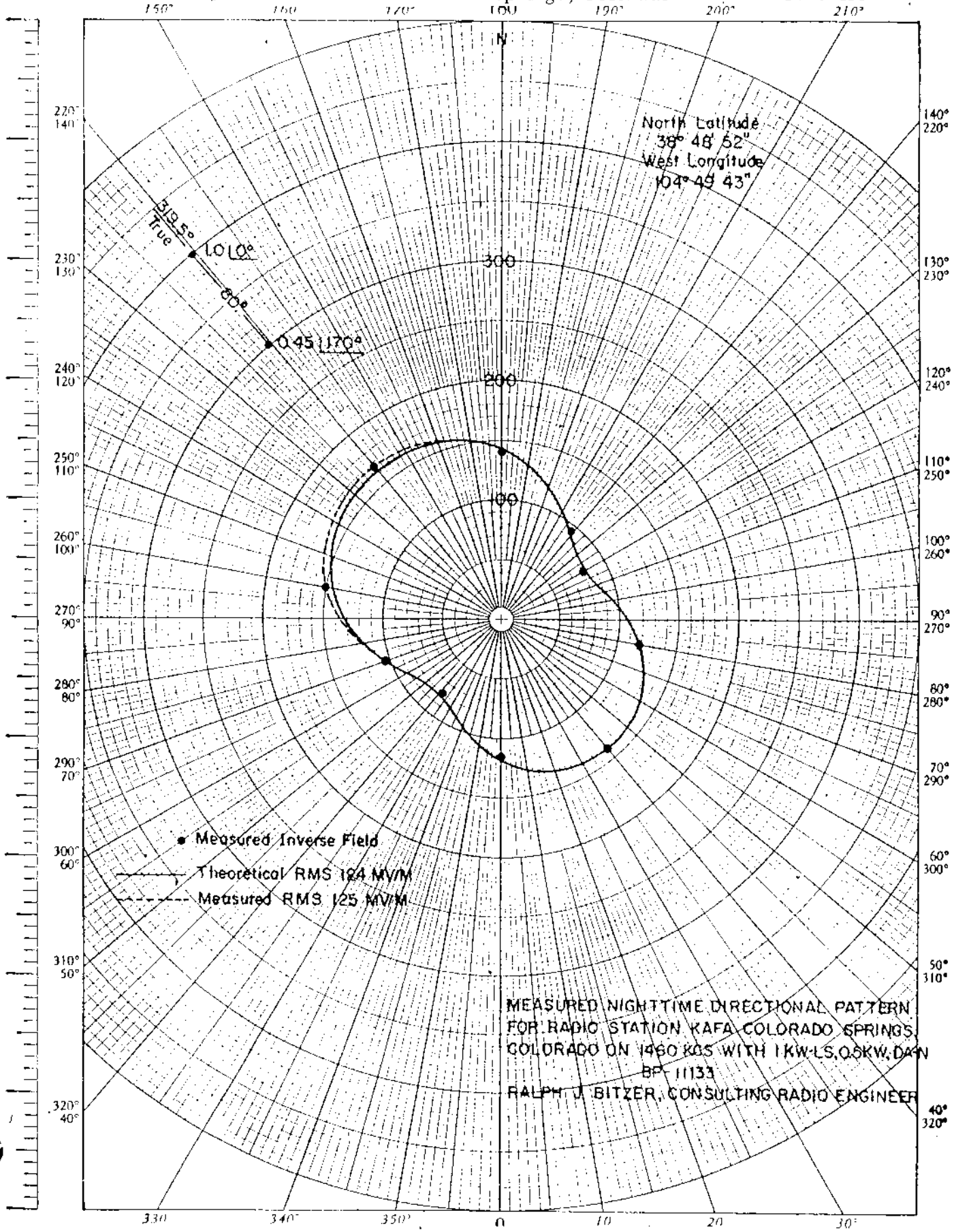
Granted license 12/18/58 for change in hours + for DA-N

KYSN

MEASURED NIGHT
(10-24-58g)

Station KYSN
Colorado Springs, Colorado

500w,1kw-LS, DA-N,U
1460 KC



FCC File No. BL-7215
Accepted 10-2-58

KYSN
Colorado Springs, Colorado

1460 KC

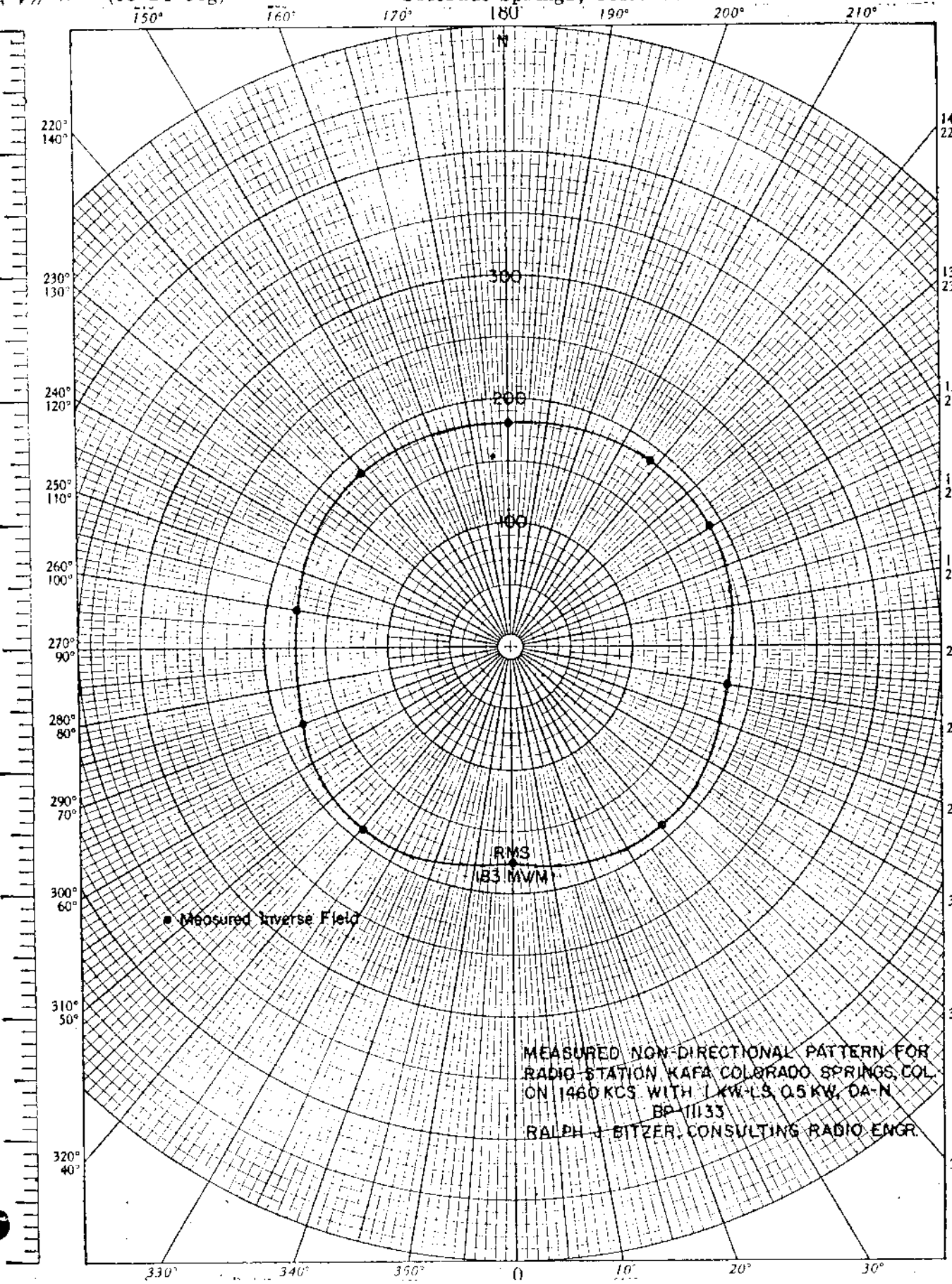
Granted license 12/18/58 for change in hours & for DA-N

KYSN

MEASURED NON-DA (10-24-58g)

Station KYSN
Colorado Springs, Colorado

500w,1kw-LS, DA-N,U
1460 KC



FCC File No. BL-7215
Accepted 10-2-58

KYSN
Colorado Springs, Colorado 1460 KC

MARIANNA, ARK.

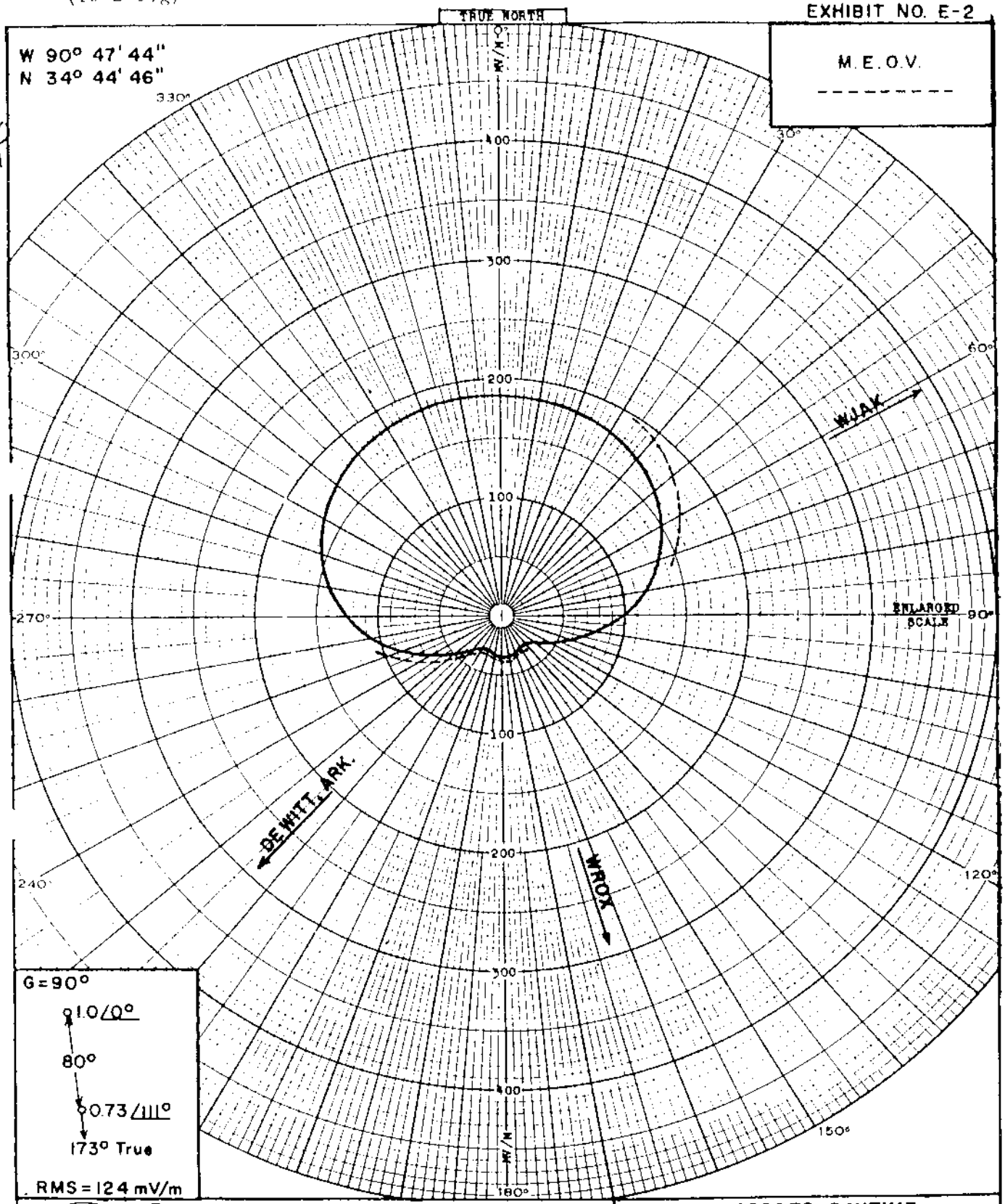
KZOT

PROPOSED DAY
(10-2-59g)

New; Lee B/C Co., Inc.
Marianna, Arkansas

500w, DA-D,D
1460 KC

EXHIBIT NO. E-2



COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON, D.C. HOLLYWOOD

PATTERN:	PROPOSED DAYTIME
FOR:	MARIANNA, ARK.
POWER:	500W-D FREQ: 1460 KC
DATE:	6/18/59

FCC File No. BP-13460
Accepted 9-30-59

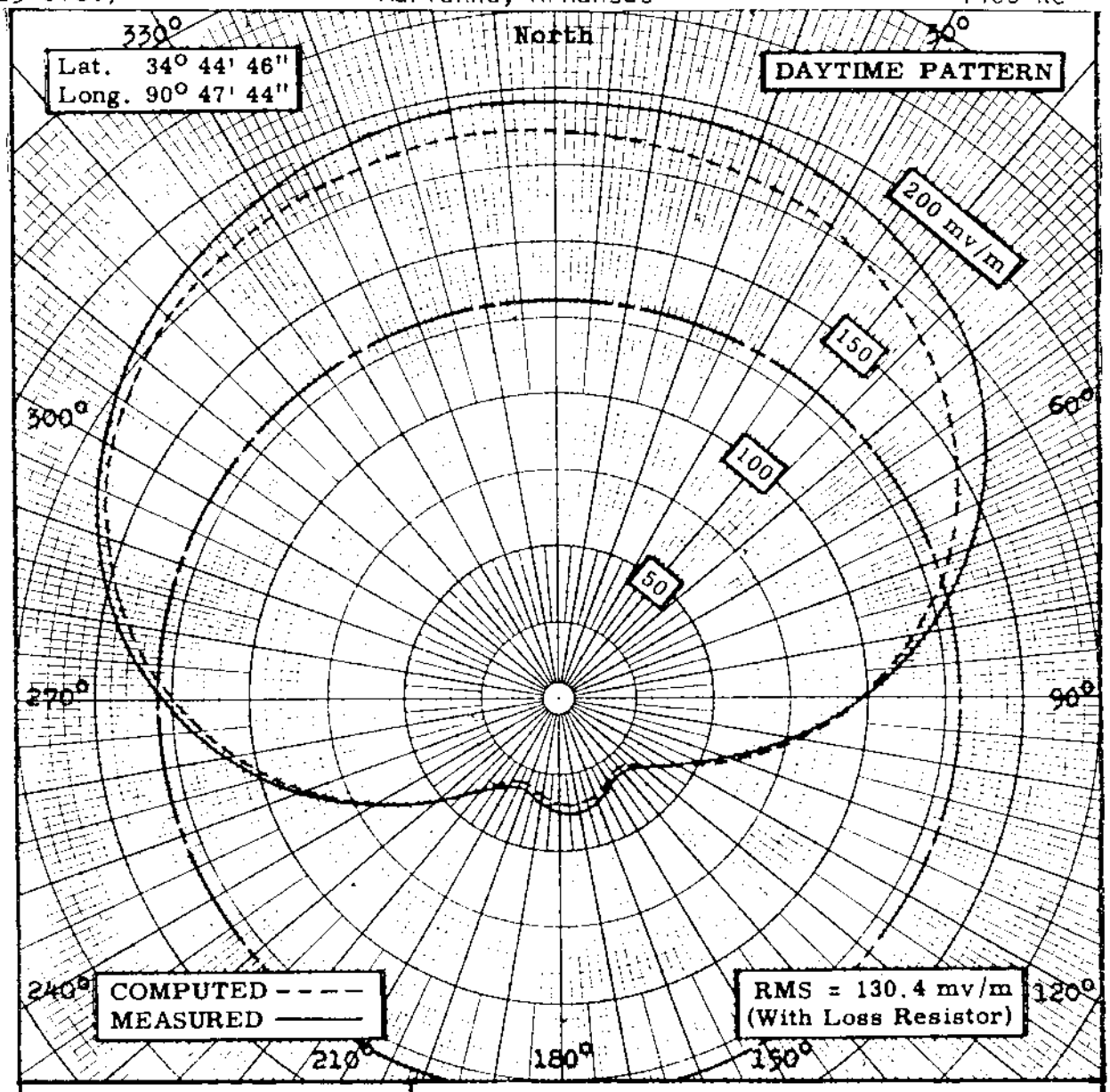
Lee Broadcasting Company, Incorporated
Marianna, Arkansas
1460 KC

KZOT

MEASURED DAY
(10-25-61ct)

Station KZOT
Marianna, Arkansas

500w,DA-D,D
1460 kc



Theoretical

① 1.0/0°

② 0.73/111°

N 173° E

G = 90° = 168'
S = 80° = 149.8'

RADIO STATION KZOT
MARIANNA, ARKANSAS

MEASURED DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
1460 KC 500 WATTS

091661-3

FIGURE 3

MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS

BL-8778

FCC File No. BL-8778
Accepted 10-12-61

Station KZOT
Marianna, Arkansas

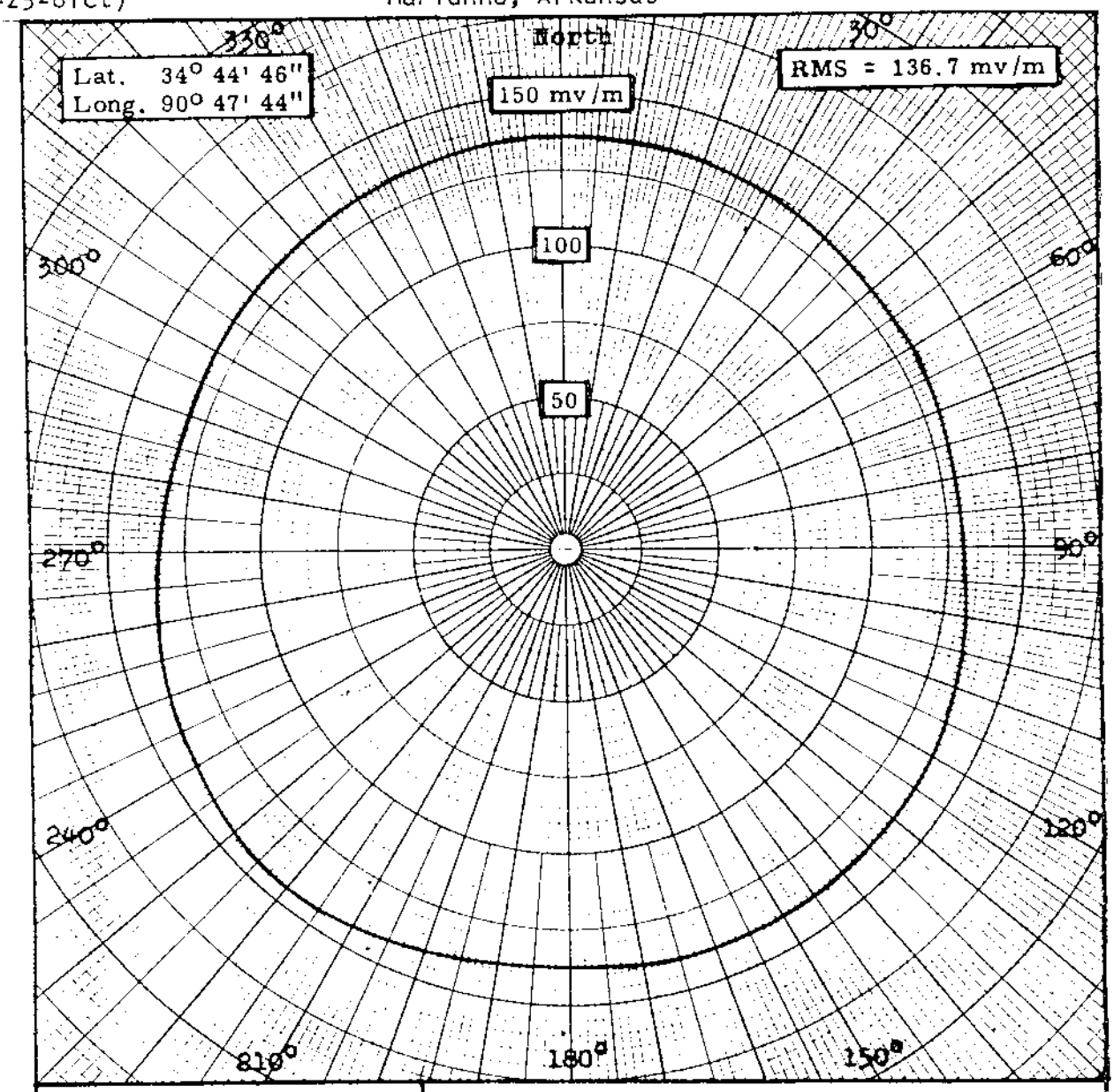
1460 kc

KZOT

MEASURED NON-DA
(10-25-61ct)

Station KZOT
Marianna, Arkansas

500w,DA-D,D
1460 kc



1 500 Watts

2 Isolated
N 173° E

G = 90° = 168·
S = 80° = 149.8'

RADIO STATION KZOT
MARIANNA, ARKANSAS

MEASURED NON-DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
1460 KC 500 WATTS

091661-2

FIGURE 2

MERL SAXON
CONSULTING RADIO ENGINEER
LUFKIN, TEXAS

BL 8778

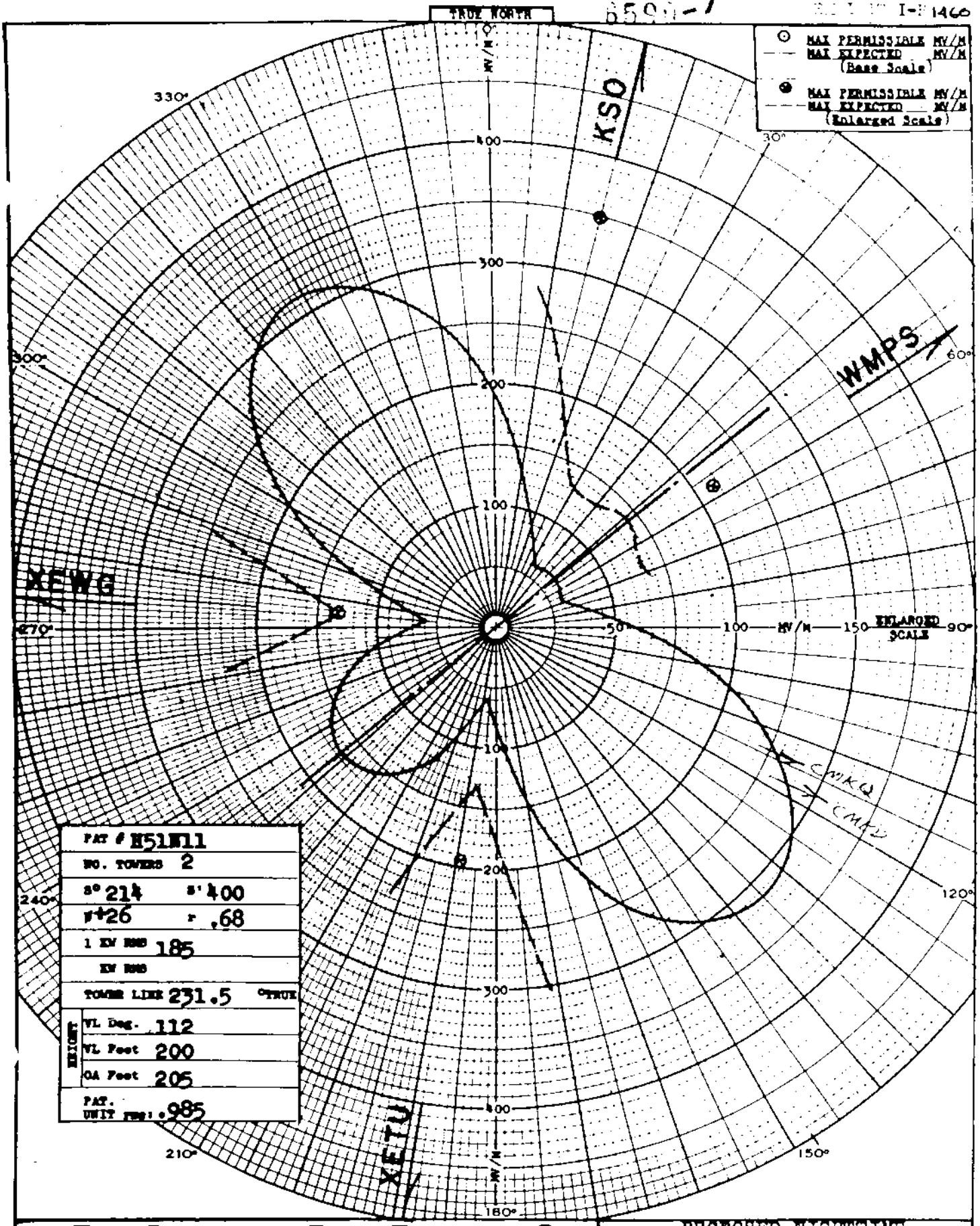
FCC File No. BL-8778
Accepted 10-12-61

Station KZOT
Marianna, Arkansa

1460 kc

WACO

I-1460



COMMERCIAL RADIO EQUIPMENT CO.

RADIO ENGINEERING CONSULTANTS

KANSAS CITY WASHINGTON, D.C. HOLLYWOOD

PATTERN: PROPOSED NIGHTTIME

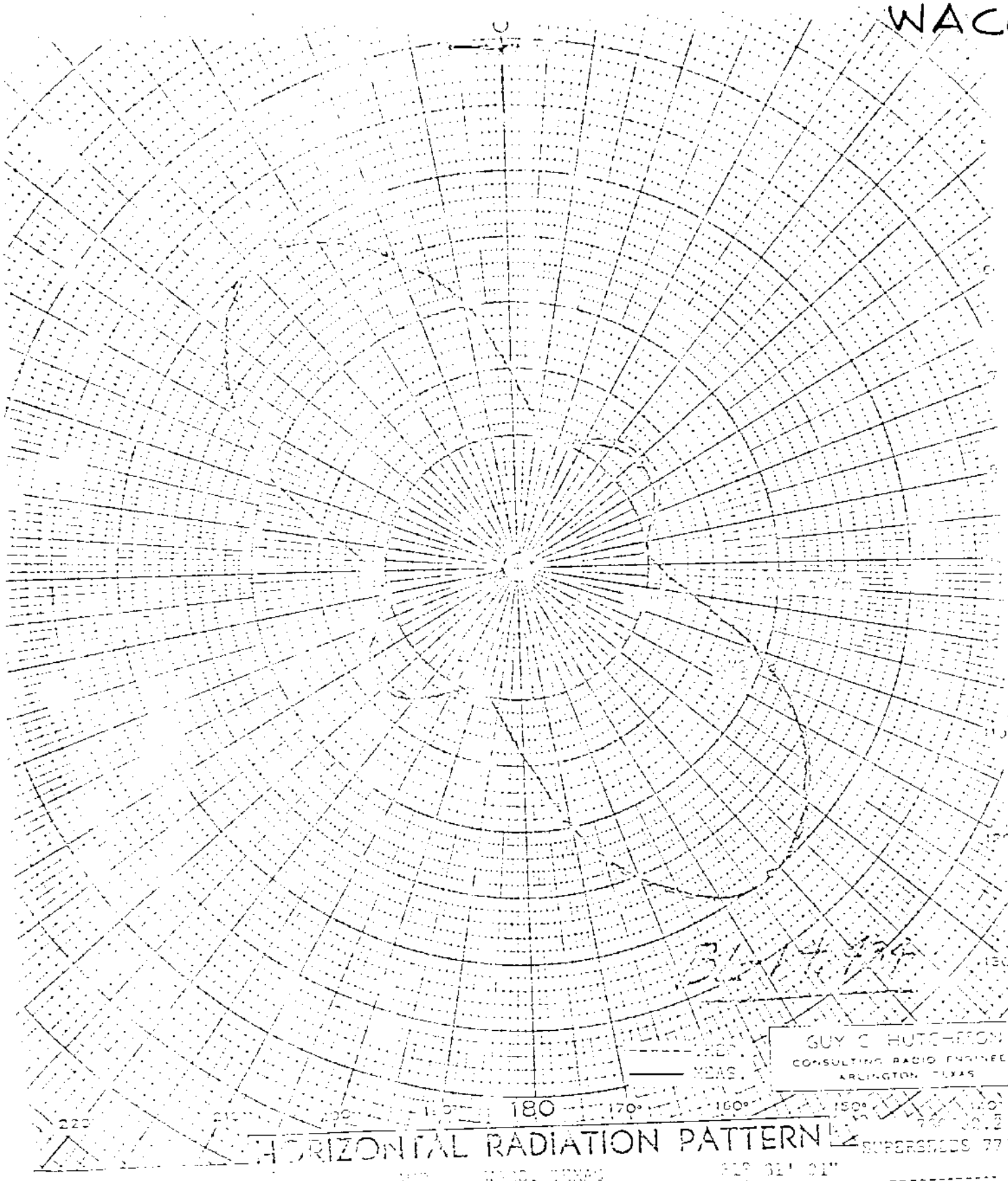
FOR: WACO, WACO, TEXAS

POWER: 1 KW FREQ: 1460 KC

DATE: AUG. 17, 1945 BY: KMH

WACO

BL-2119



GUY C. HUTCHISON
CONSULTING RADIO ENGINEER
ARLINGTON, TEXAS

HORIZONTAL RADIATION PATTERN

SUPERSEDES 771

Session
1460
Frequency
Power

MEASURED DA NIGHTTIME PATTERN

FIGURE 1A

WACO

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WACO

Main Studio: Waco, Texas

Frequency: 1460 kHz

Power: 1 kW

Notification List No. 1703

Date: September 22, 1976

Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 31 ° 31 ' 01 "
West Longitude: 97 ° 06 ' 38 "

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 2
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	W(#2)	E(#1)	
HEIGHT ABOVE INSULATORS:	200'	200'	(106.9°)
PHASING:	0°	0°	
FIELD RATIO:	0.5	1.0	

SPACING AND ORIENTATION: Towers are spaced 400' (213.75°) on a line bearing 231.5° true.

GROUND SYSTEM: 200-200' equally spaced copper radials plus a 14' square ground screen about each tower.

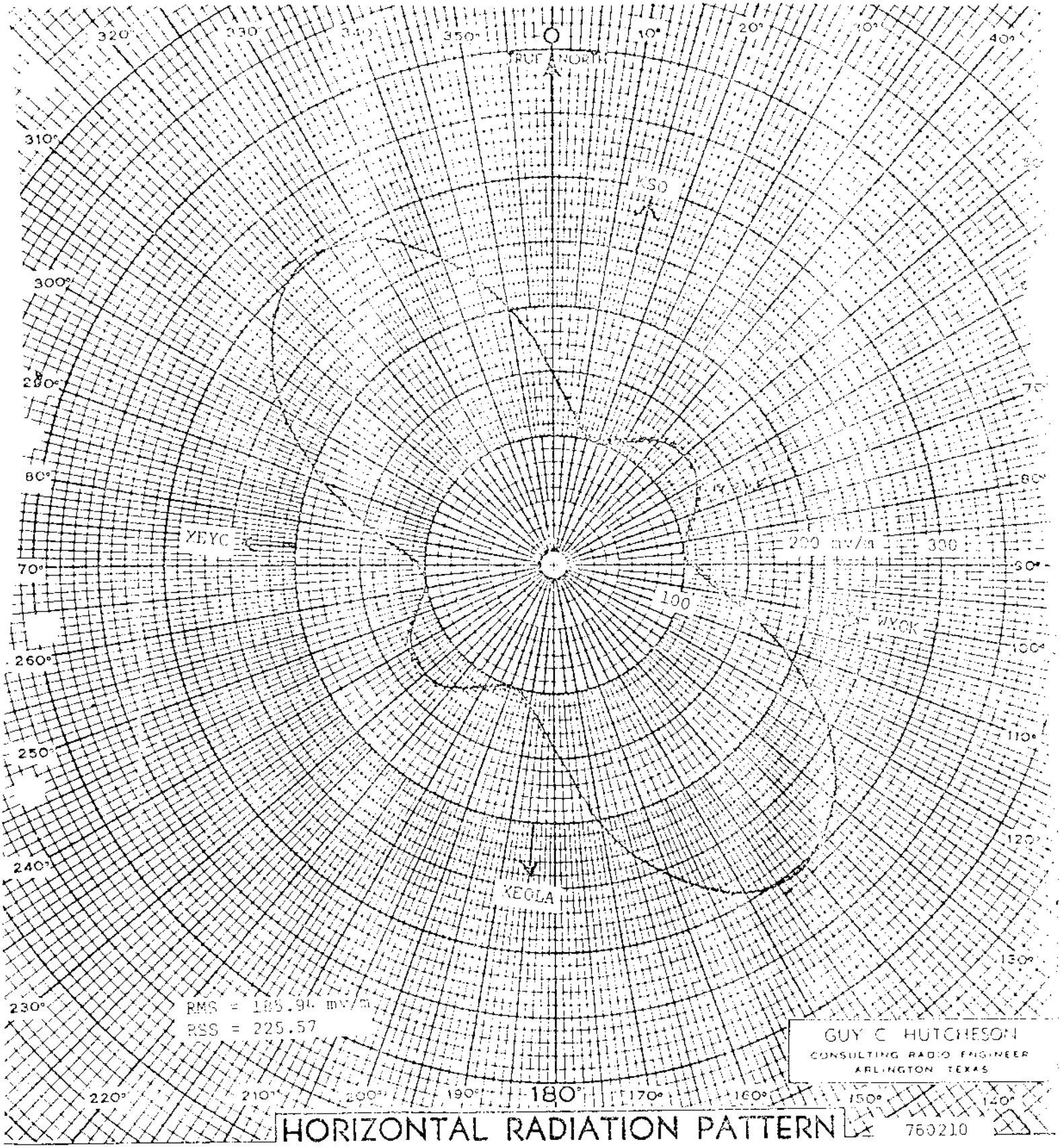
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS
Day	197 mv/m
Night	185.94 mv/m

This notification concerns a change in the Nighttime operation of the station and corrects the geographical coordinates of the transmitter location.

CTR NO: 31271A3

WACO



GUY C. HUTCHESON
CONSULTING RADIO ENGINEER
ARLINGTON, TEXAS

HORIZONTAL RADIATION PATTERN

760210

#1 EAST
1.0 / 0°

#2 WEST
0.5 / 0°

231.5° True

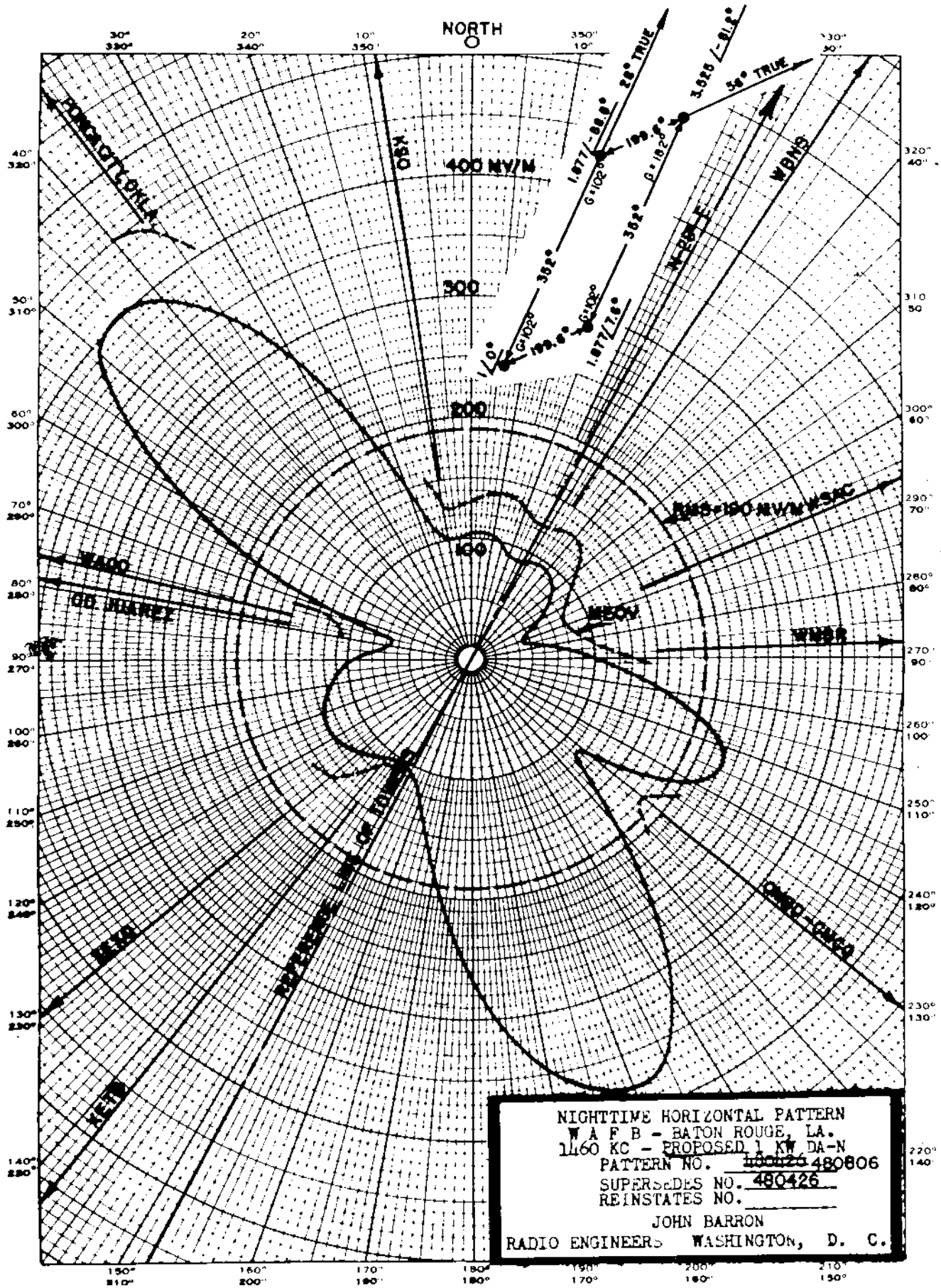
WACO — Station
WACO, TEXAS
31° 31' 01"
97° 06' 38"

1460 KHz — Frequency
1 kw — Power

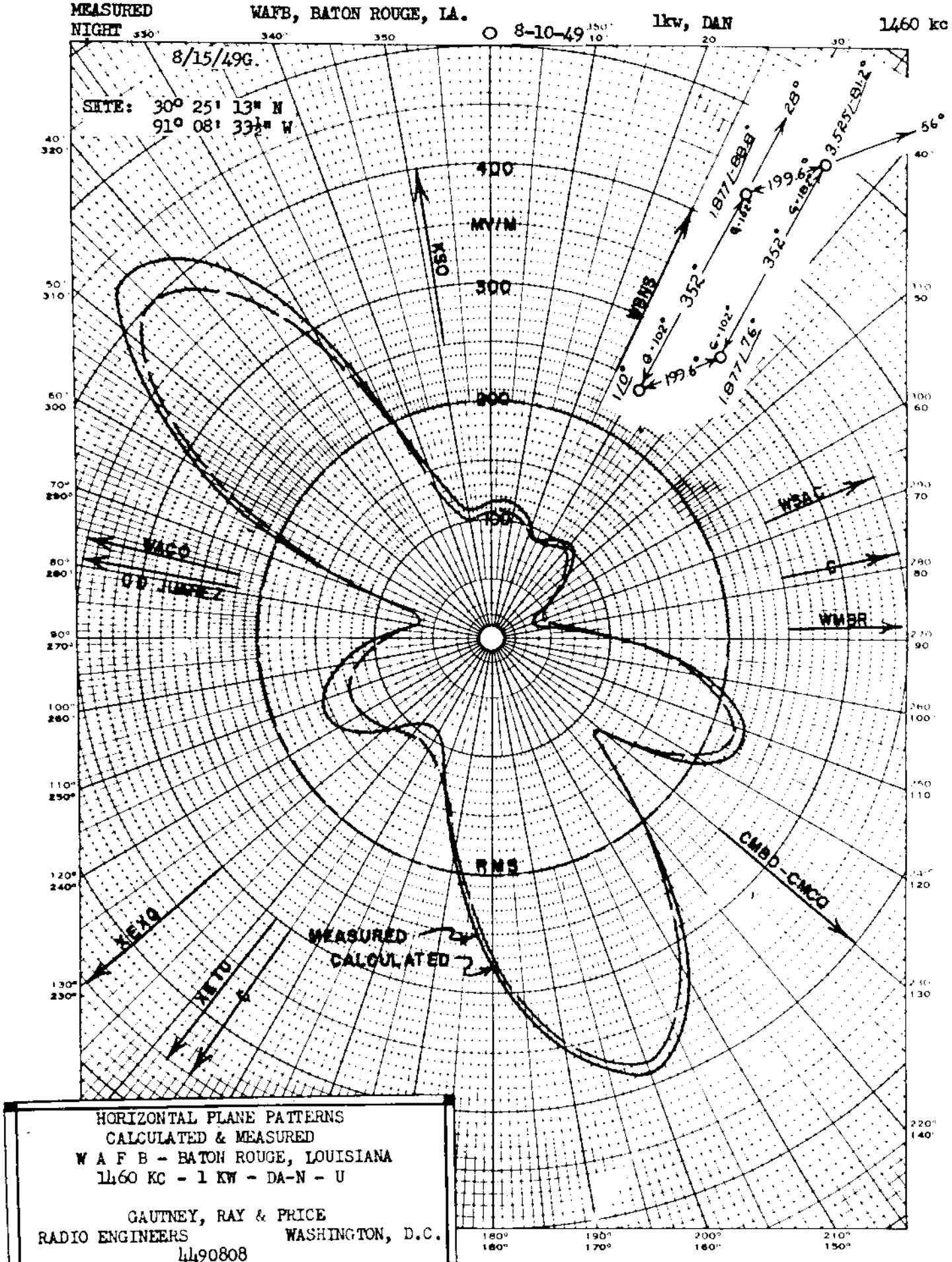
200' = 106.9° — Height of Antennas

PROPOSED NIGHTTIME
HORIZONTAL PATTERN

WAIL
1460


NORTH
400 MV/M
300
200
100
WBNS
WBOV
WMMB
WAGC
WLAC
KEIL
WSAI
WKRC
WLW
WSAI-50 MV/M
WLW-50 MV/M
WSAI-100 MV/M
WLW-100 MV/M
WSAI-190 MV/M
WLW-190 MV/M
1.877/-88.8°
1.877/7.8°
1.0°
G=102°
β=182°
382°
382°
58° TRUE
28° TRUE
3.528/-81.8°
NIGHTTIME HORIZONTAL PATTERN
W A F B - BATON ROUGE, LA.
1460 KC - PROPOSED 1 KW DA-N
PATTERN NO. ~~460426~~ 480806
SUPERSEDES NO. 480426
REINSTATES NO. _____
JOHN BARRON
RADIO ENGINEERS WASHINGTON, D. C.

WAIL



HORIZONTAL PLANE PATTERNS
CALCULATED & MEASURED
W A F B - BATON ROUGE, LOUISIANA
1460 KC - 1 KW - DA-N - U

GAUTNEY, RAY & PRICE
RADIO ENGINEERS WASHINGTON, D.C.
4490808

WAFB, Baton Rouge, La. 1460 kc

WAKS

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WAKS Main Studio: Fuquay-Varina, North Carolina

Frequency: 1460 kHz Power: 5 kW

Notification List No. 1735 Date: May 25, 1977 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 35° 36' 37"
West Longitude: 78° 48' 14"

ANTENNA CHARACTERISTICS

Authorized for Daytime operation. (DA-D)
Number of elements: 2
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

	SW(#1)	NE(#2)
TOWER:		
HEIGHT ABOVE INSULATORS:	402'(215°)	168'(90°)
PHASING:	0°	-131.32°
FIELD RATIO:	1	0.69

SPACING AND ORIENTATION: Towers are spaced 143'(76.6°) on a line bearing 54° true.

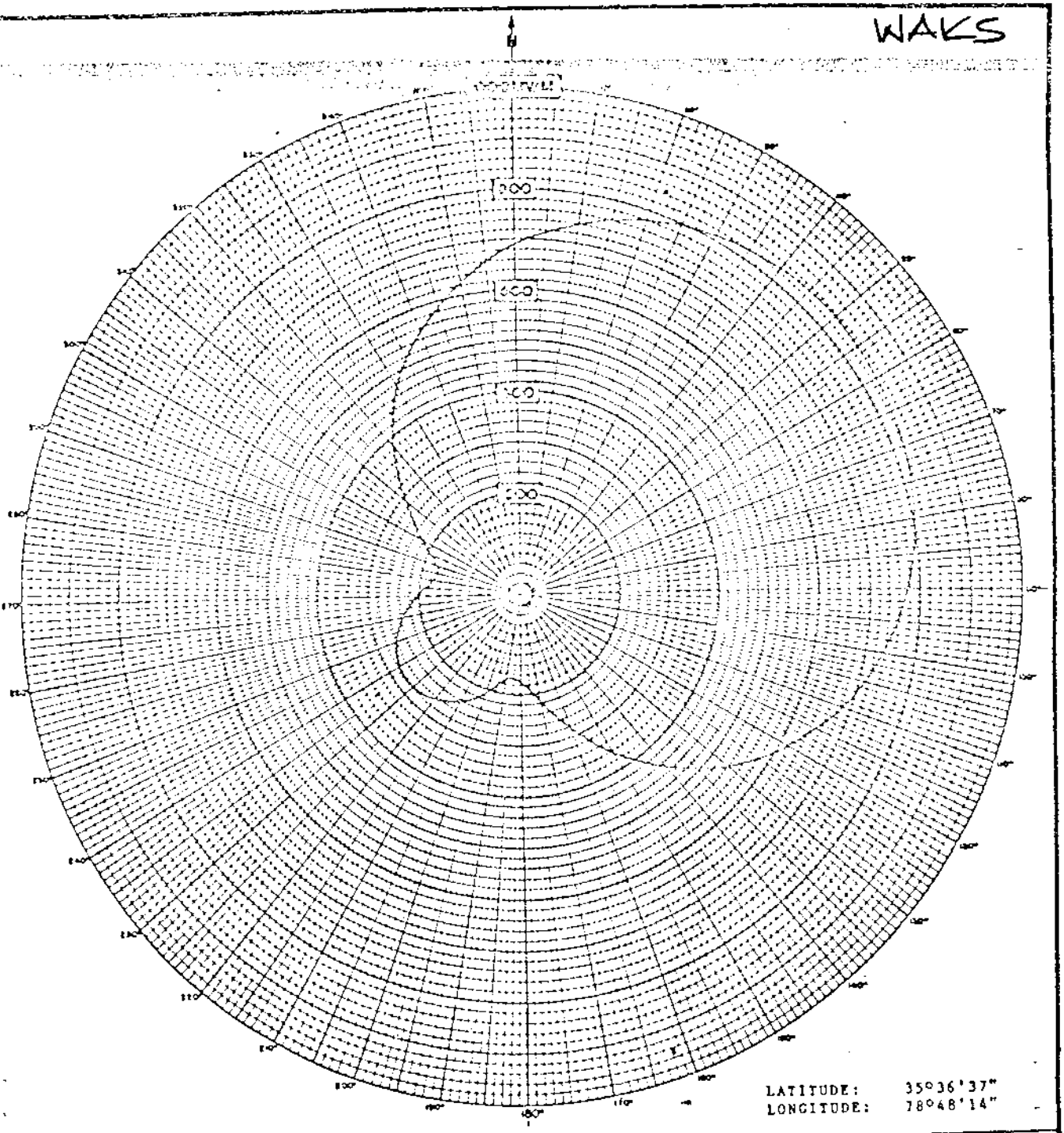
GROUND SYSTEM: 120-110' to 230' equally spaced copper radials about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

THEORETICAL		STANDARD
RMS	RSS	RMS
506.581 mv/m	638.771 mv/m	531.910 mv/m

Note: This notification concerns changes in main studio location and increase in power with directional antenna system.

WAKS

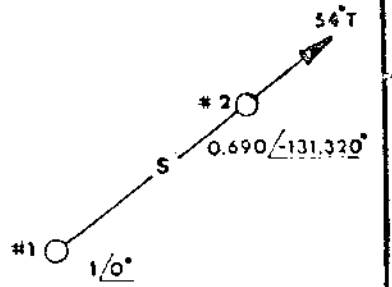


LBA

LAWRENCE BEHR ASSOCIATES INC

GREENVILLE, S C 29601

ANTENNA PARAMETERS



S = 76.6°
G_1 = 215°
G_2 = 90°

RSS_{th}/RMS_{th}	= 1.261
RSS_{th}	= 638.771
RSS_{std}	= 670.710
RMS_{th}	= 506.581
RMS_{std}	= 531.910

FIGURE 13

PROPOSED STANDARD DAYTIME
HORIZONTAL PATTERN

RADIO STATION WAKS
WAKE COUNTY BROADCASTING COMPANY
FUQUAY-VARINA, NORTH CAROLINA

1460 KHZ 5 KW, DA-D

REV 5 77

MEASURED NON-DA Station WHEC 5kw, DA-N,U
Rochester, New York

WAXC

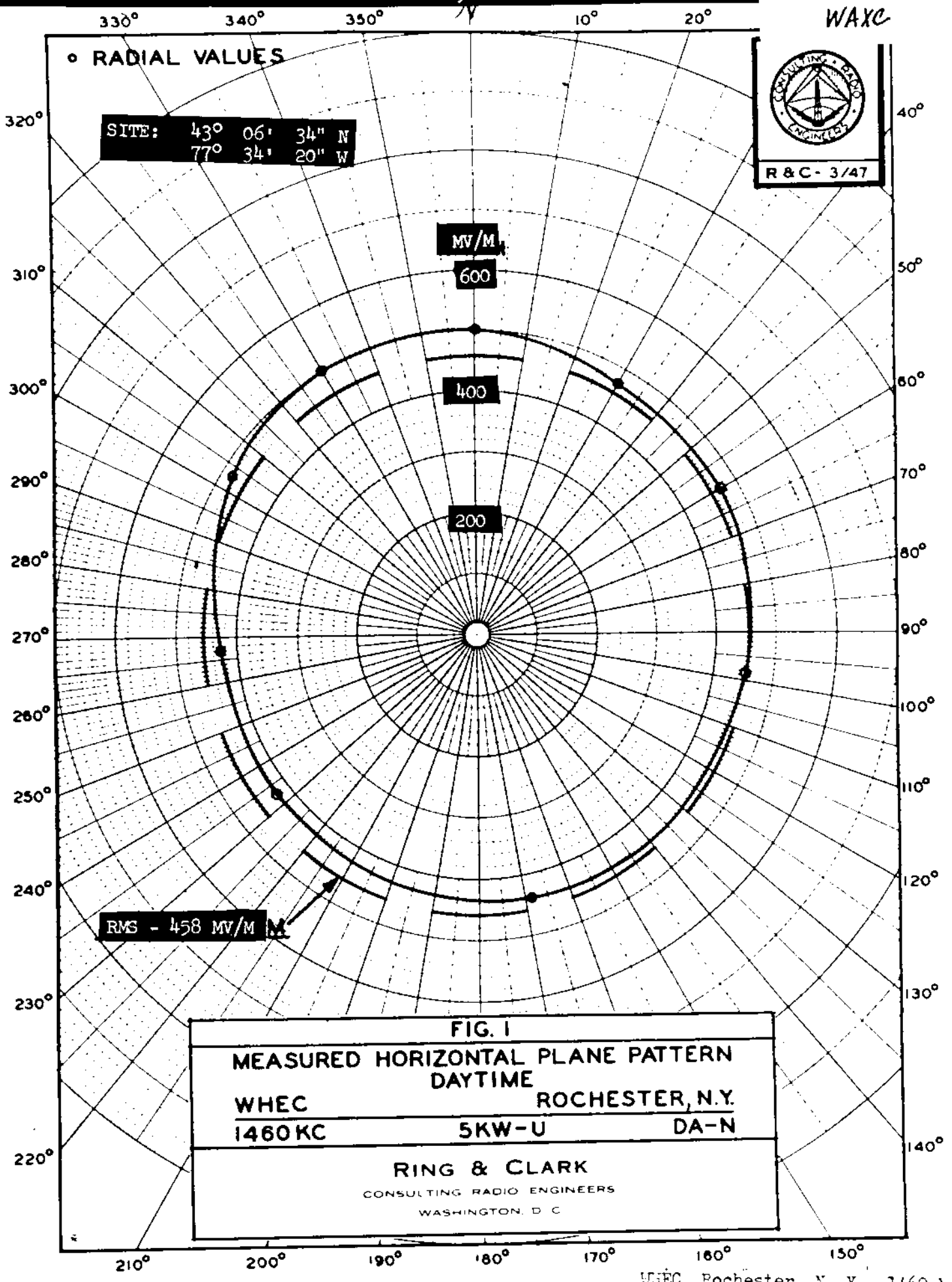


FIG. 1

MEASURED HORIZONTAL PLANE PATTERN
DAYTIME

WHEC ROCHESTER, N.Y.

1460 KC 5KW-U DA-N

RING & CLARK
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

L-2339 WAXC C

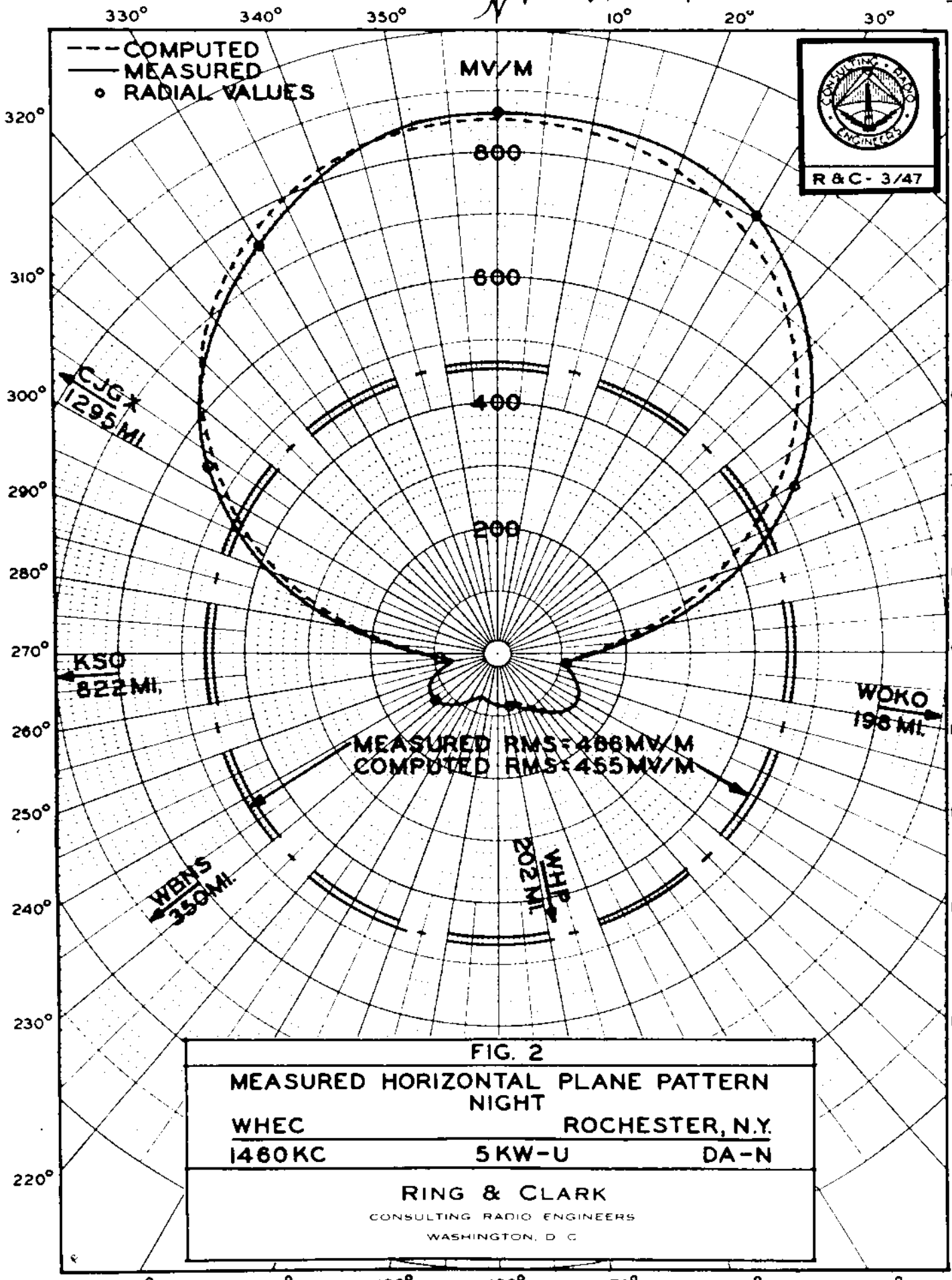


FIG. 2

MEASURED HORIZONTAL PLANE PATTERN
NIGHT

WHEC ROCHESTER, N.Y.

1460 KC 5 KW-U DA-N

RING & CLARK
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

13

PATTERN NO
SUPERSEDES

WAXC

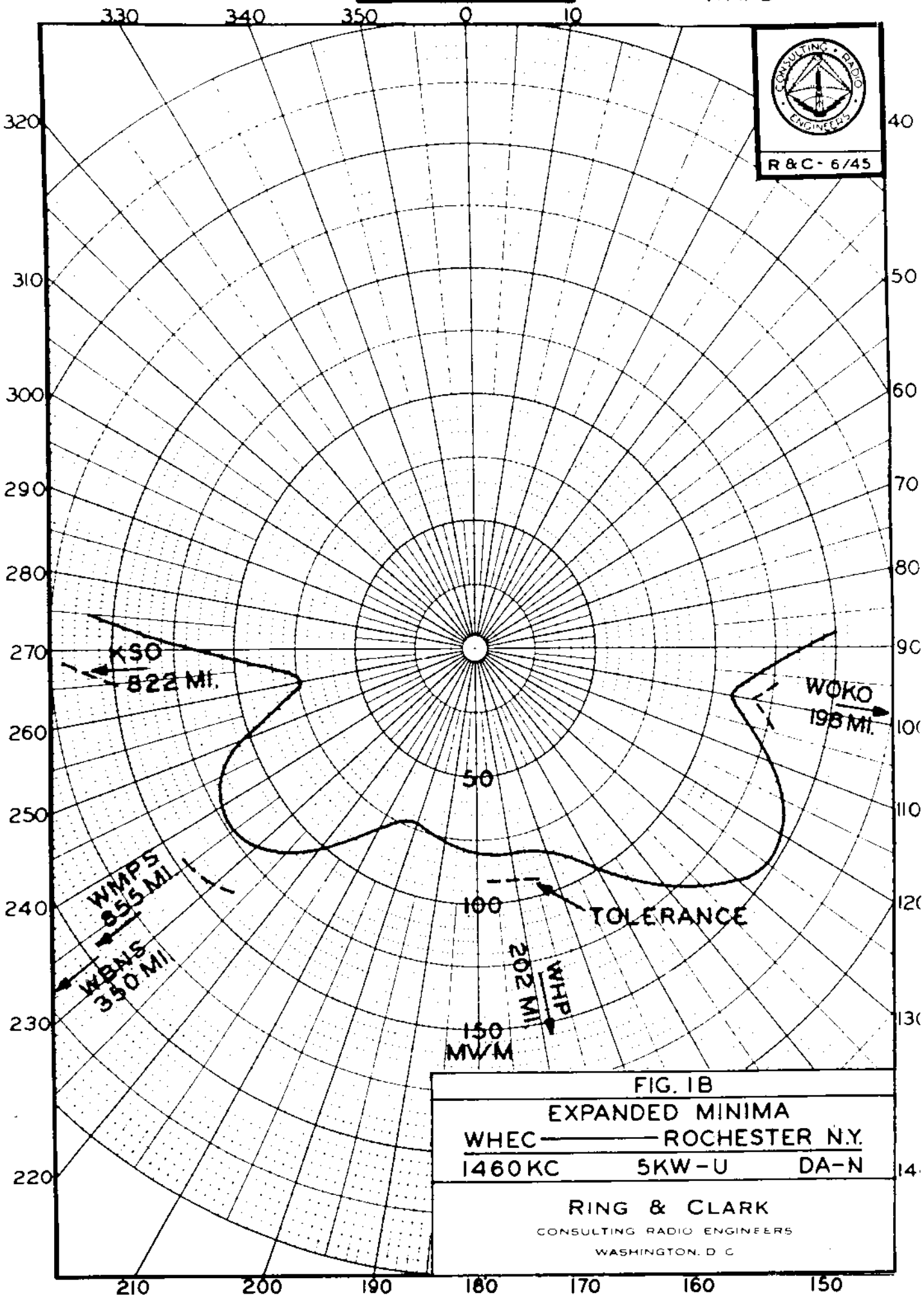


FIG. 1B

EXPANDED MINIMA

WHEC ——— ROCHESTER N.Y.

1460 KC 5KW-U DA-N

RING & CLARK

CONSULTING RADIO ENGINEERS

WASHINGTON, D C

PATTERN NO.:
SUPERSEDES:

WAXC 0

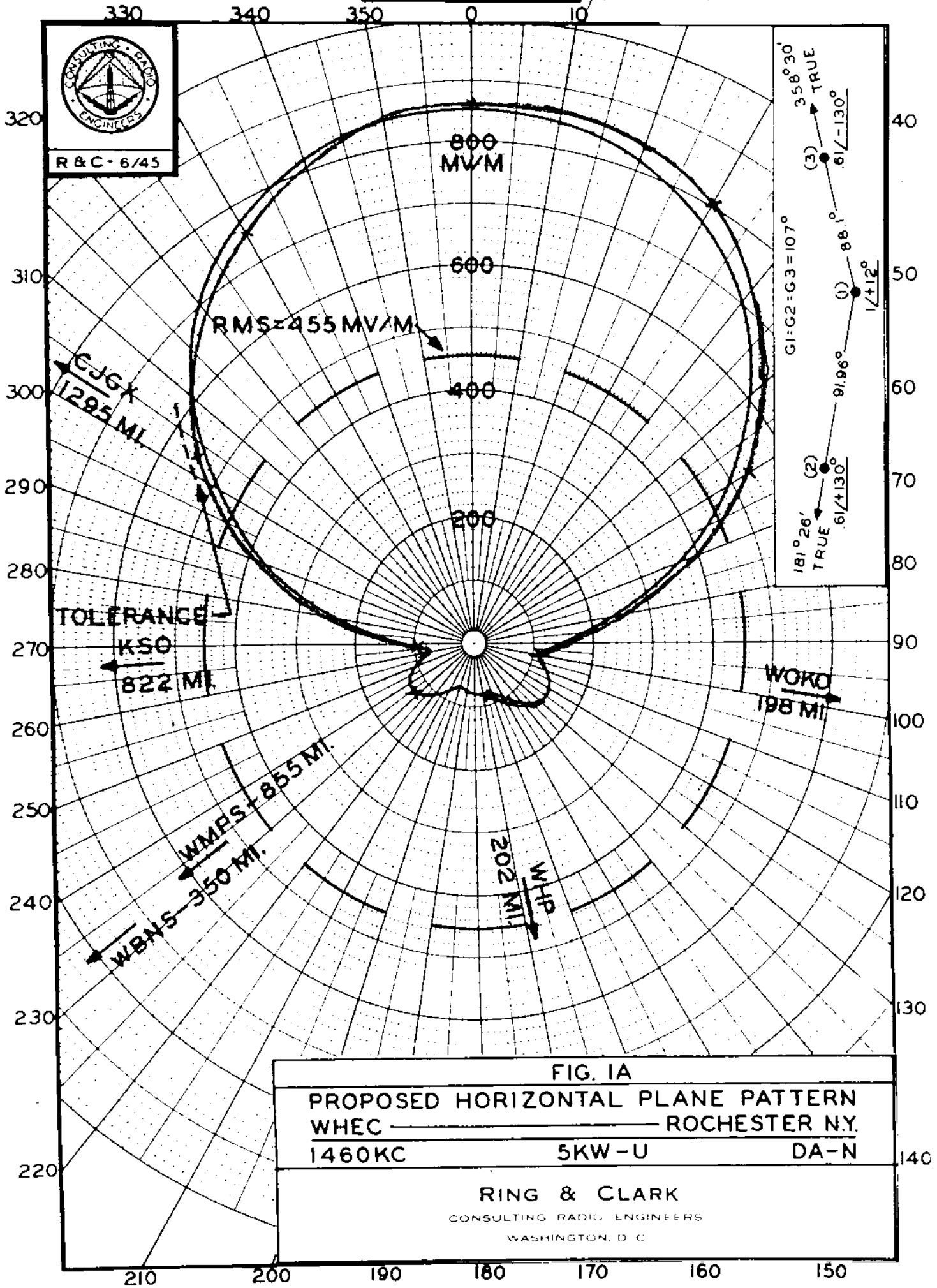


FIG. 1A

PROPOSED HORIZONTAL PLANE PATTERN

WHEC — ROCHESTER N.Y.

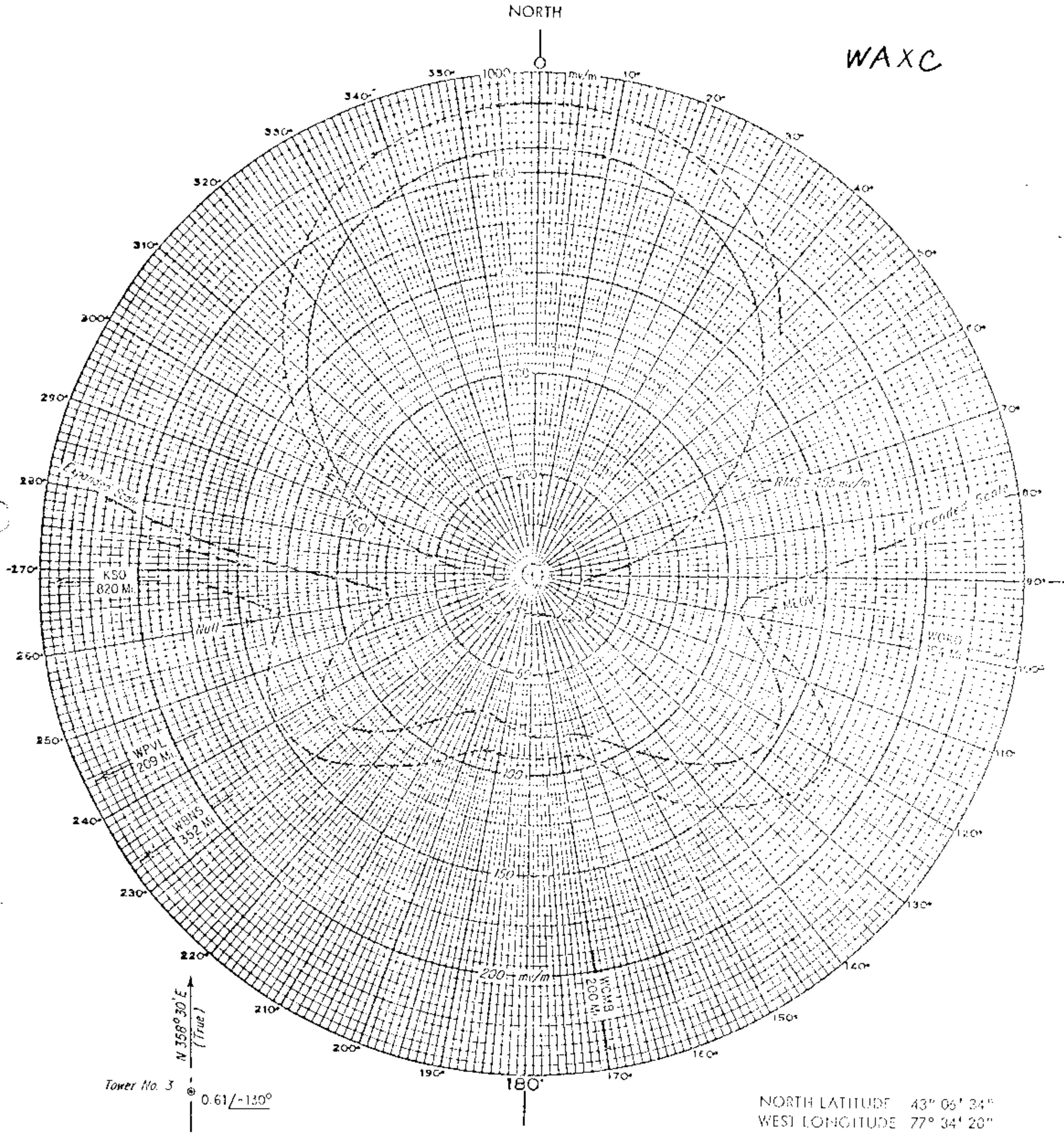
1460KC 5KW-U DA-N

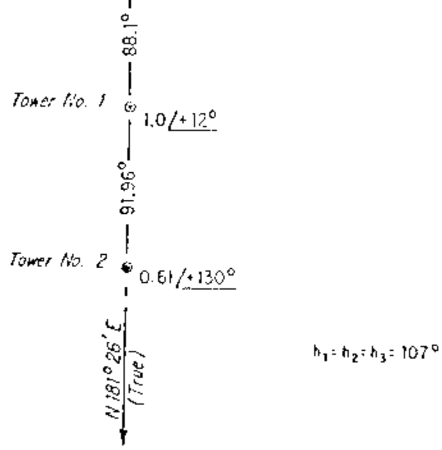
RING & CLARK

CONSULTING RADIO ENGINEERS

WASHINGTON, D. C.

WAXC





NORTH LATITUDE 43° 06' 34"
WEST LONGITUDE 77° 34' 20"

FIGURE 2 (REVISED)
NIGHTTIME HORIZONTAL PLANE
RADIATION PATTERN
WHEC 5 KW DA-N 1460 KC
ROCHESTER, NEW YORK

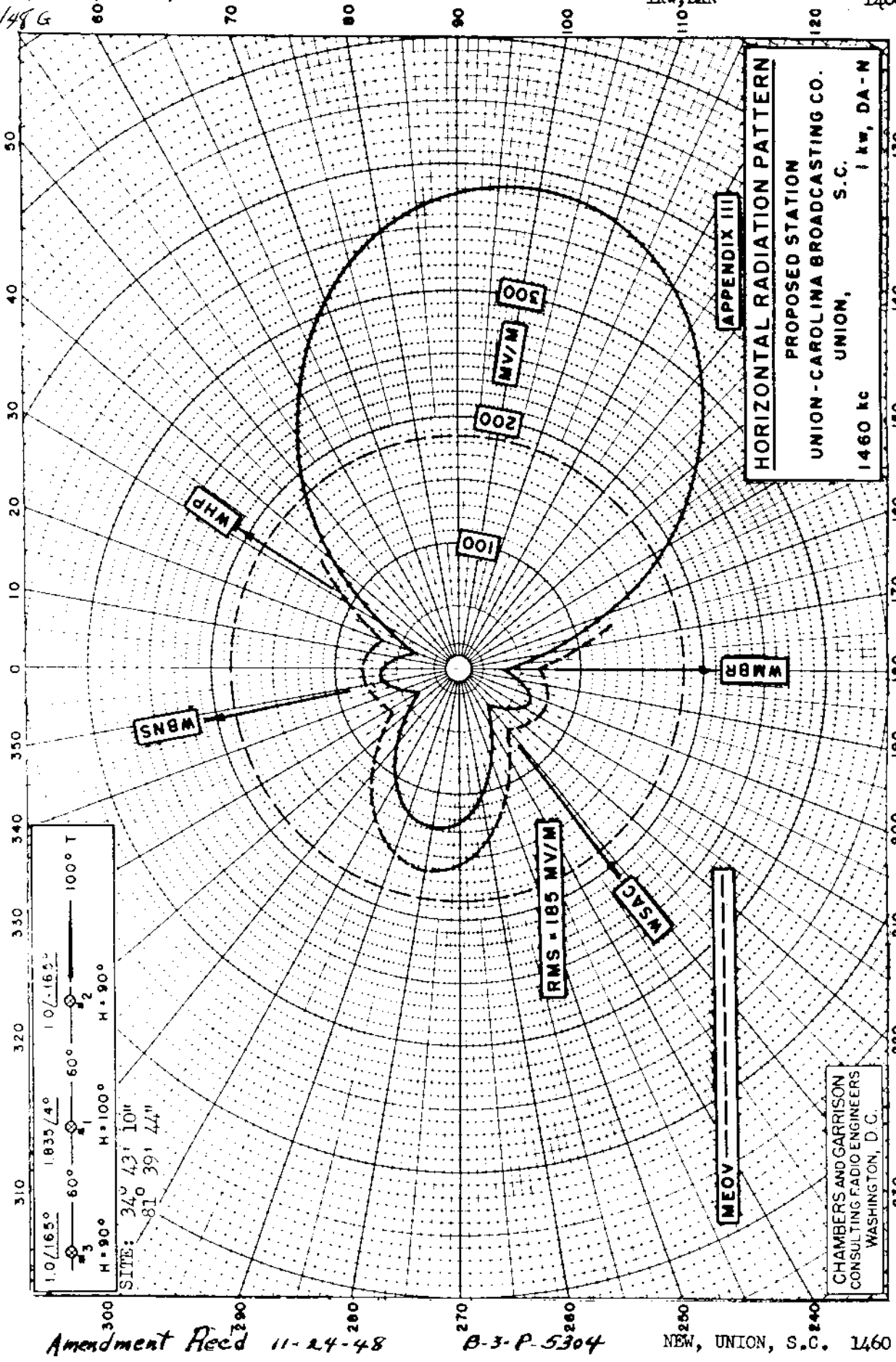
Prepared by
Lohnes and Culver Washington, D. C.
January, 1971

granted change 1-7-49 from Unlimited time to Specified hours

WBCU
UNION, S.C.
1460kc

PROPOSED
NIGHT 12/2/48 G

NEW, UNION, S. C. 1kw, DAN



Amendment Recd 11-24-48 B-3-P-5304 NEW, UNION, S.C. 1460 kc

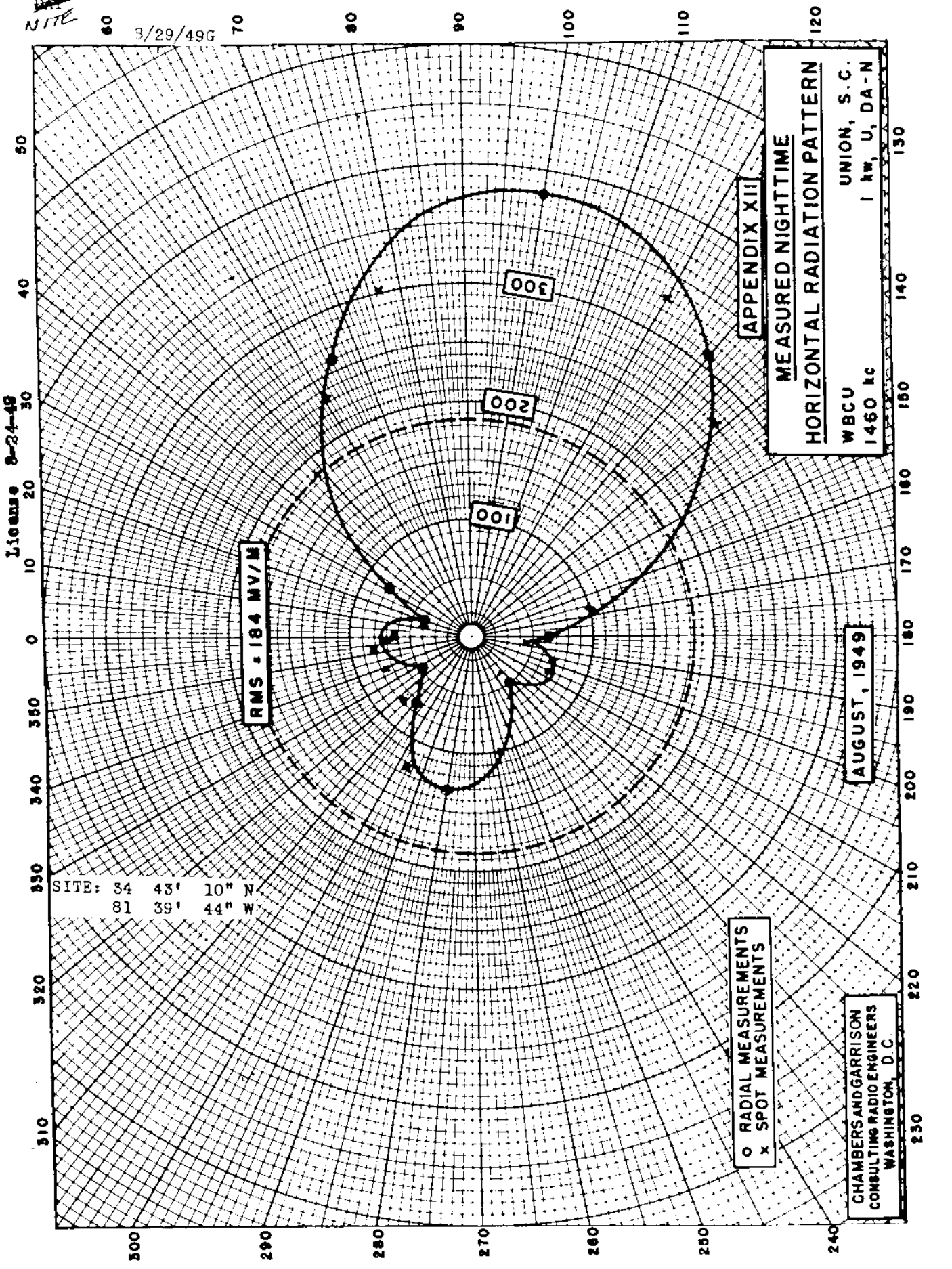
granted change in hours from unlimited time to specified hours

MEASURED WBCU, UNION, S.C. 1kw, DAN, U

WBCU
1460 kc

~~DAY~~
NITE

3/29/49G



WBCU, UNION, S.C. 1460 kc

WBET

PROPOSED WBET, BROCKTON, MASS. 5 kW/1 KW N U, DA-N 1460 KC
NIGHT 11/12/52G

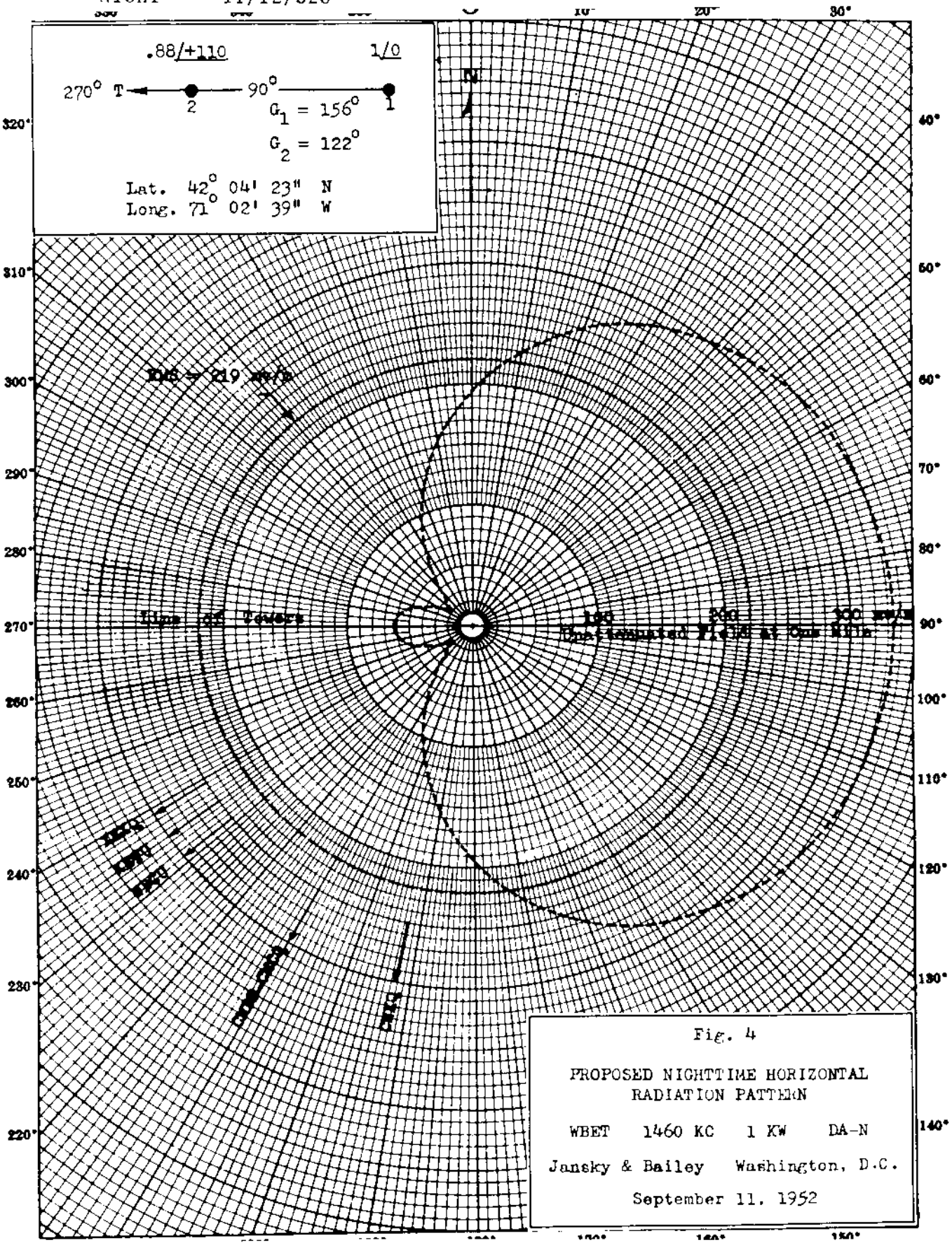


Fig. 4

PROPOSED NIGHTTIME HORIZONTAL RADIATION PATTERN

WBET 1460 KC 1 KW DA-N

Jansky & Bailey Washington, D.C.

September 11, 1952

APPL RECD 9/24/52 ACC 10/14/52 BMP-6015 WBET, BROCKTON, MASS.
1460 KC

WBET

5KW/

PROPOSED NIGHT NULLS 11/12/52G — WBET, BROCKTON, MASS. 1 KW N U, DA-N — 1460 KC

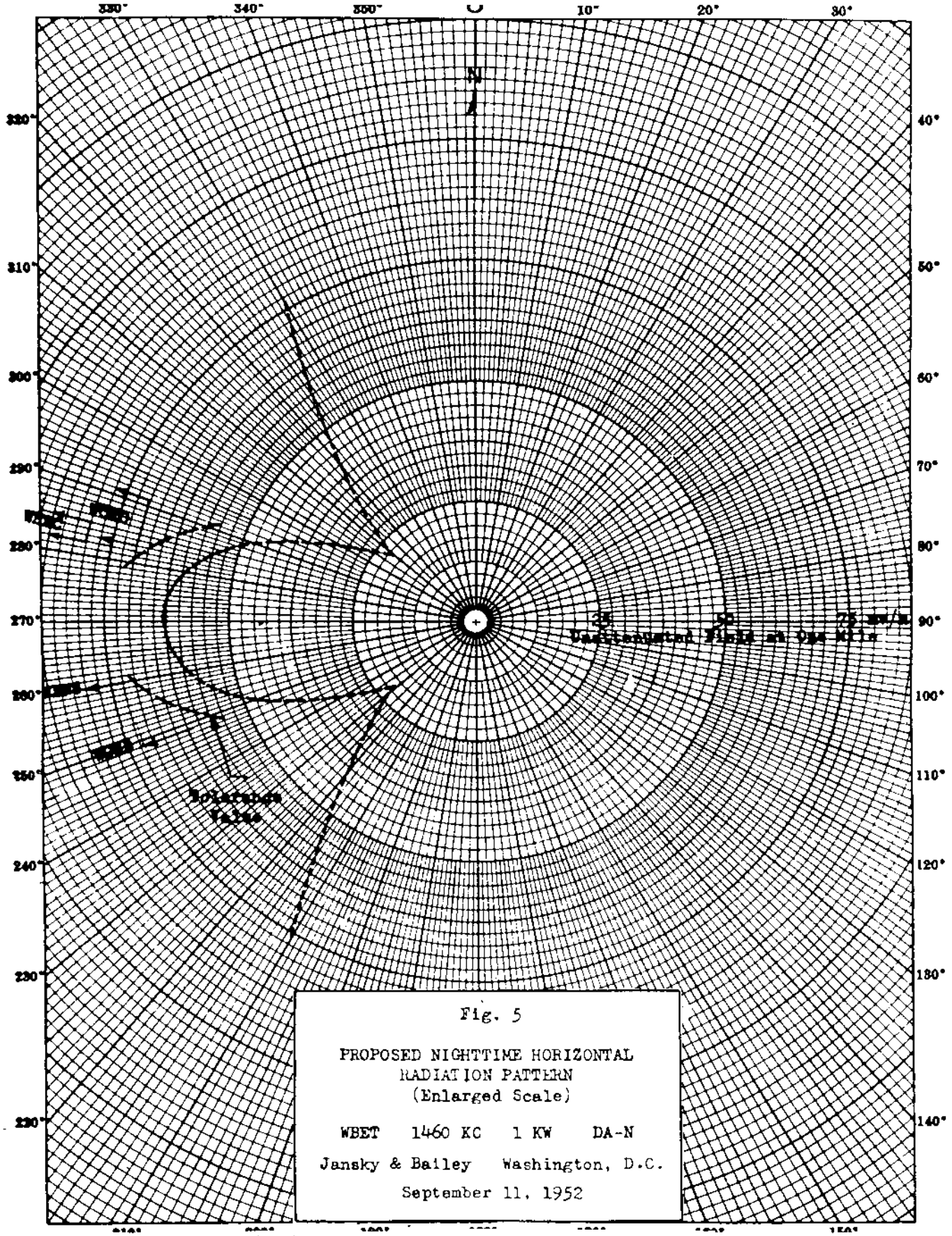


Fig. 5

PROPOSED NIGHTTIME HORIZONTAL RADIATION PATTERN
(Enlarged Scale)

WBET 1460 KC 1 KW DA-N

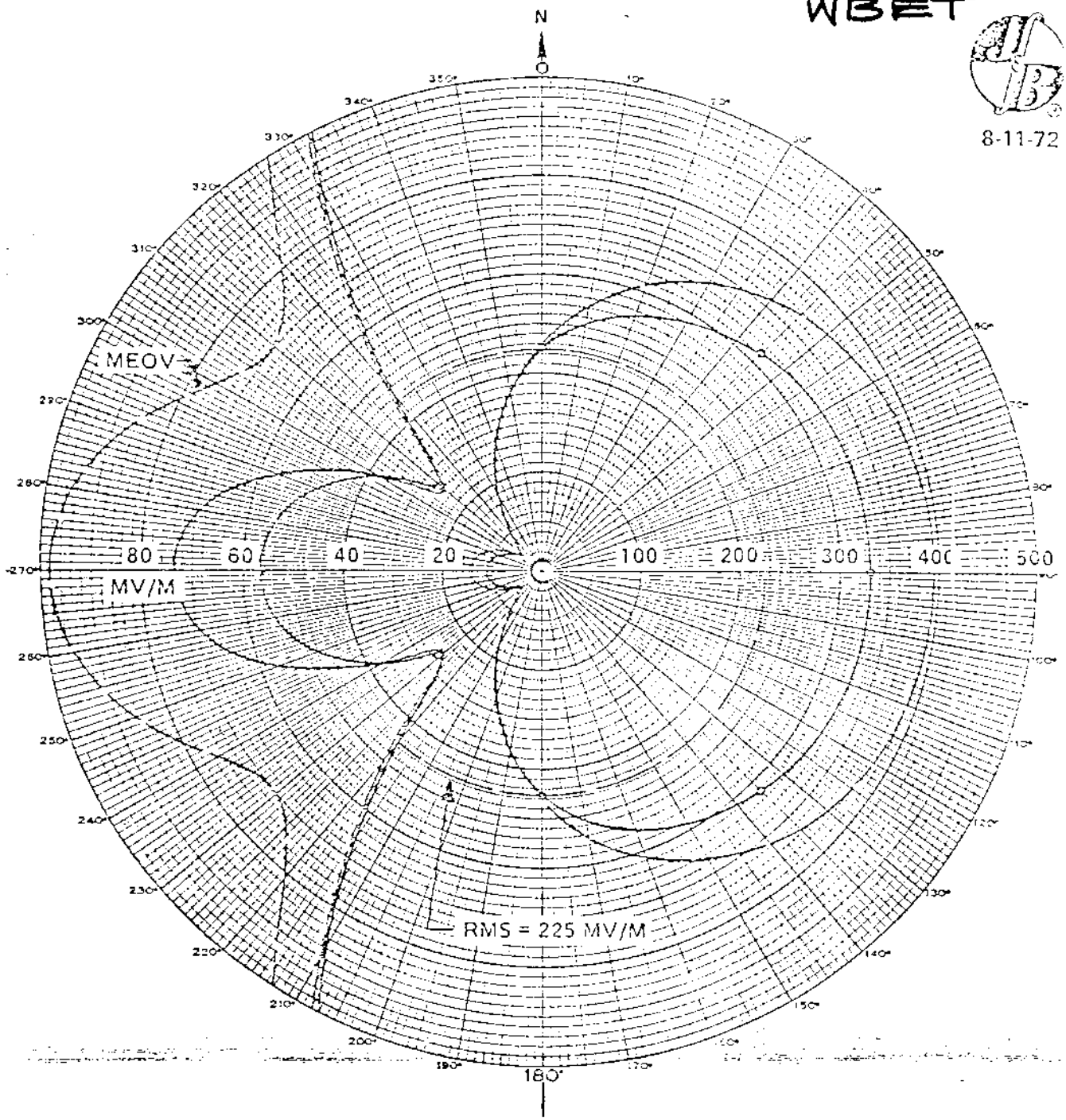
Jansky & Bailey Washington, D.C.

September 11, 1952

APPL RECD 9/24/52 ACC 10/14/52 BMP-6015 WBET, BROCKTON, MASS. 1460 KC

WBET

8-11-72



MEASURED PARAMETERS

.88 ∠110° 1 ∠0°

270°T ◄—○— 90° —○►

G_2 = 122° G_1 = 156°

TOWER	BASE CURRENT	PHASE
1	3.7A	0°
2	1.65A	+22°

——— THEORETICAL

———○——— MEASURED

FIG. 2
MEASURED NIGHTTIME
HORIZONTAL RADIATION PATTERN

WBET 1460 kHz 1 kW-N, 5 kW-D DA-N

ENTERPRISE PUBLISHING COMPANY
BROCKTON, MASSACHUSETTS

BL-13546

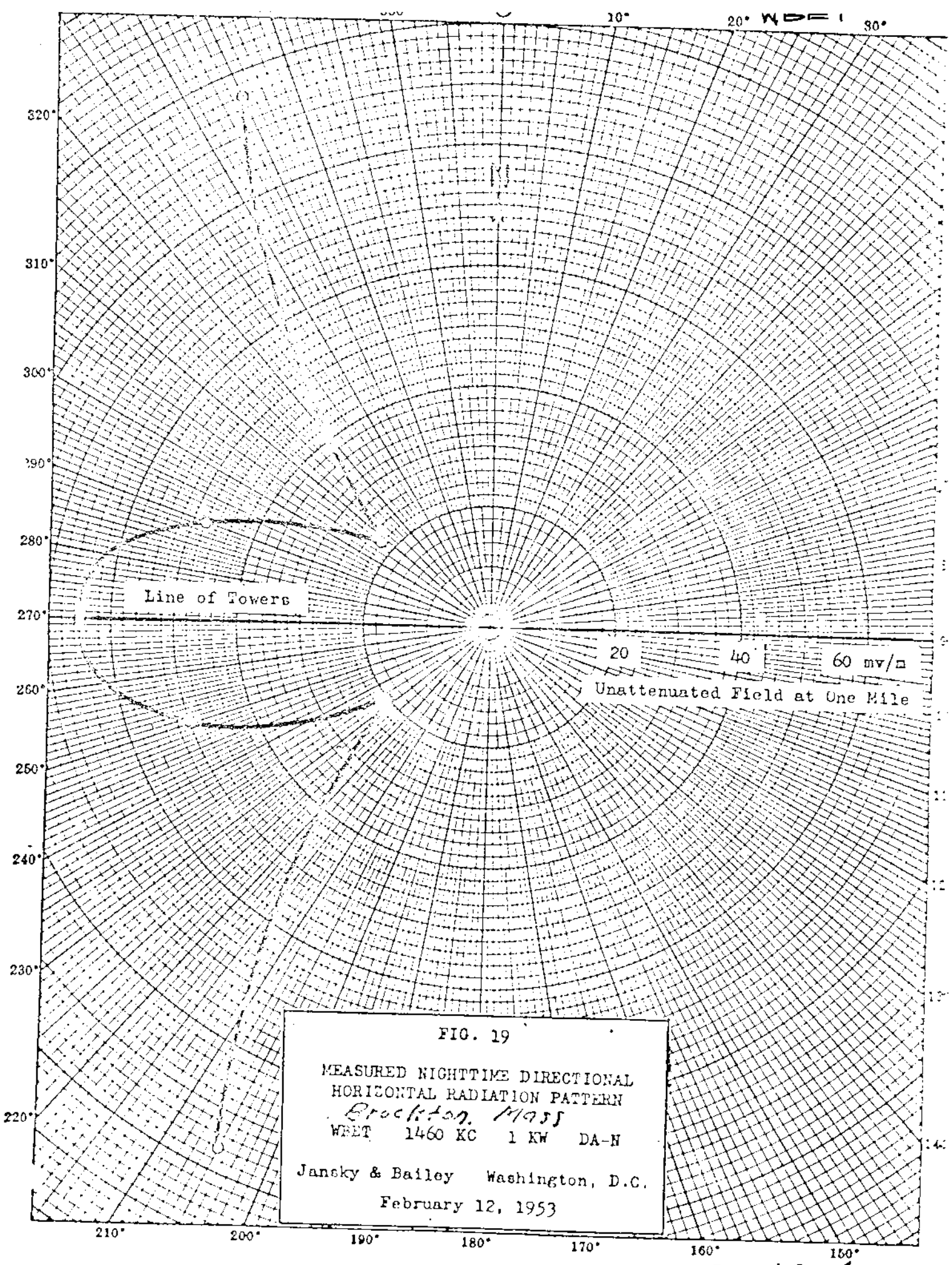


FIG. 19

MEASURED NIGHTTIME DIRECTIONAL HORIZONTAL RADIATION PATTERN

Brockton, Mass

WBET 1460 KC 1 KW DA-N

Jansky & Bailey Washington, D.C.

February 12, 1953

BL-4934

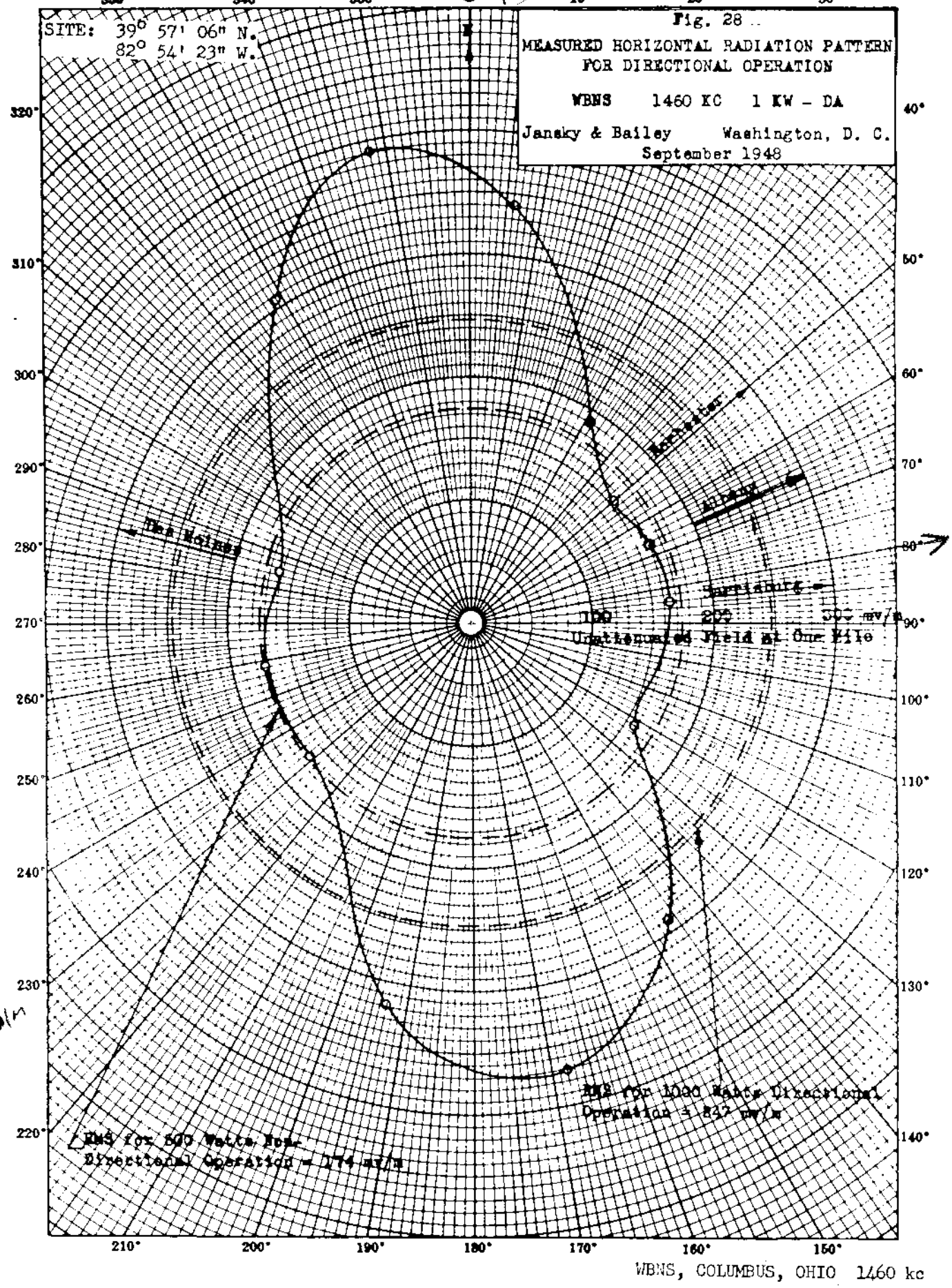
WBNS

MEASURED NIGHT

WBNS, COLUMBUS, OHIO 1/21/49 G

OVER FOR DESCRIPTION

1kw, 5kw-LS, DAN 1460kc



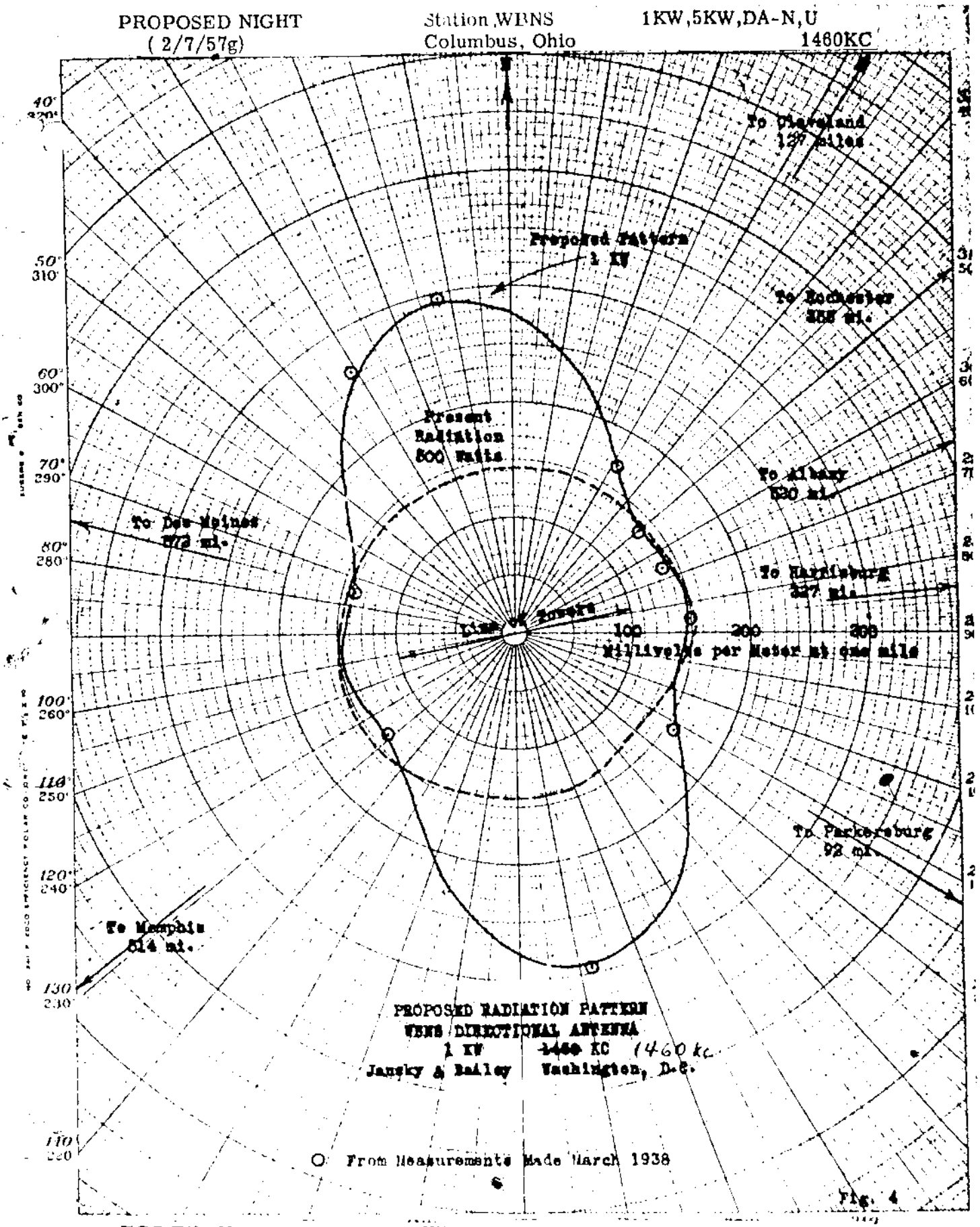
WBNS, COLUMBUS, OHIO 1460 kc

WBNS

PROPOSED NIGHT
(2/7/57g)

Station WBNS
Columbus, Ohio

1KW,5KW,DA-N,U
1460KC



PROPOSED RADIATION PATTERN
WBNS DIRECTIONAL ANTENNA
1 KW ~~1460~~ KC 1460 kc
Jansky & Bailey Washington, D.C.

○ From Measurements Made March 1938

Fig. 4

FCC File No.
BP-1354 Ammended

WBNS
Columbus, Ohio

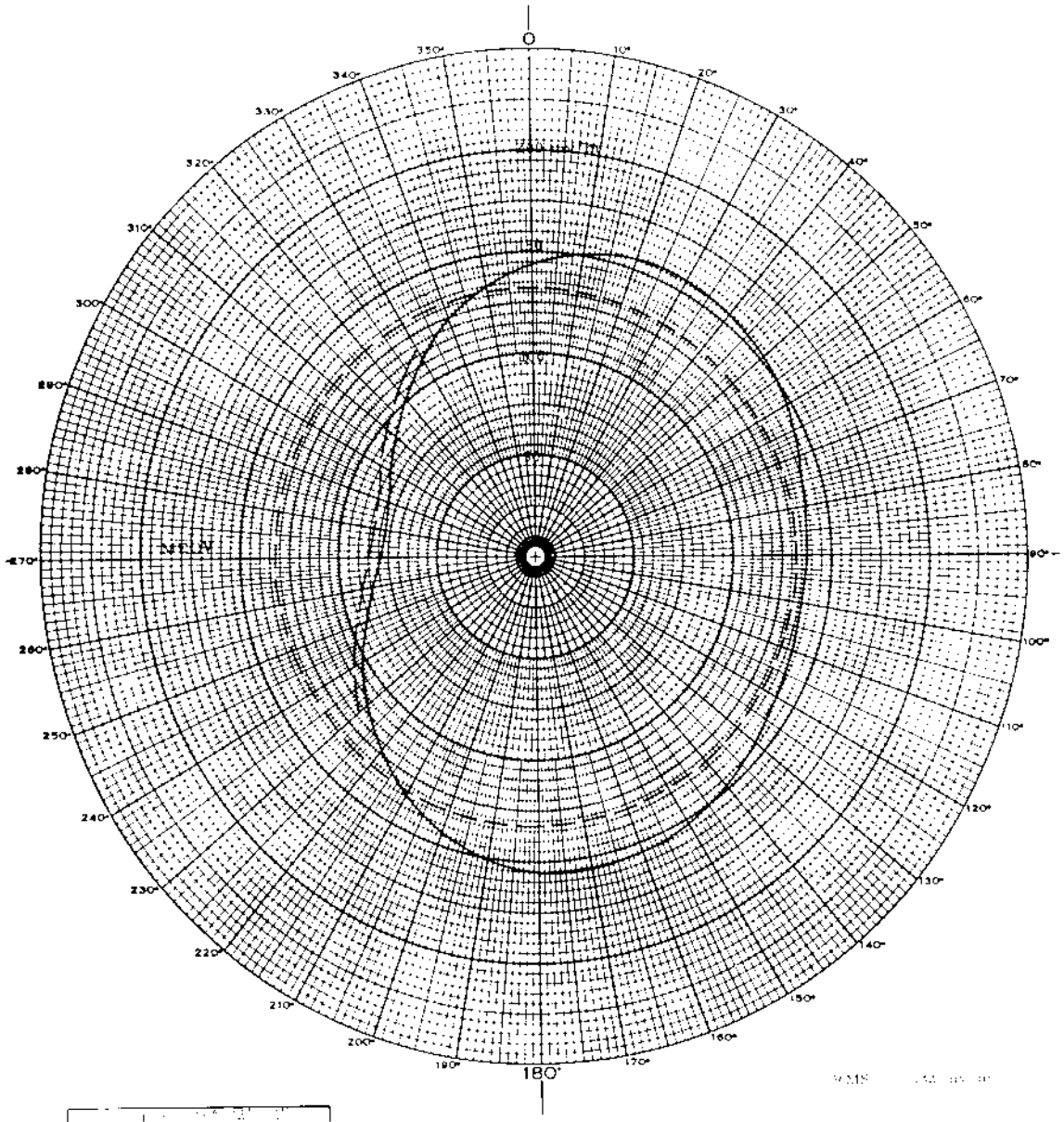
1460KC

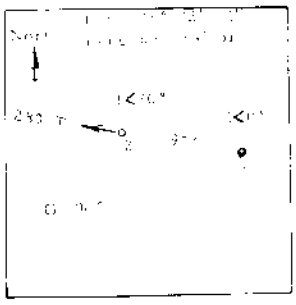
WCID

Proposed Day
(4-29-68ct)

New; Juncos Broadcasting Corp.
Juncos, Puerto Rico

500w,DA-D,D
1460 kc





WILLIS C. BEECHER
CONSULTING ENGINEER
WASHINGTON D.C.

FIGURE 6
CALCULATED HORIZONTAL PLANE PATTERN
JUNCOS BROADCASTING CORPORATION
JUNCOS, PUERTO RICO
1460KC 0.5KW D, DA-D
JANUARY 1968

FCC File No.BP-18055
Accepted 4-12-68

New; Juncos Broadcasting Corp.
Juncos, Puerto Rico

1460 kc

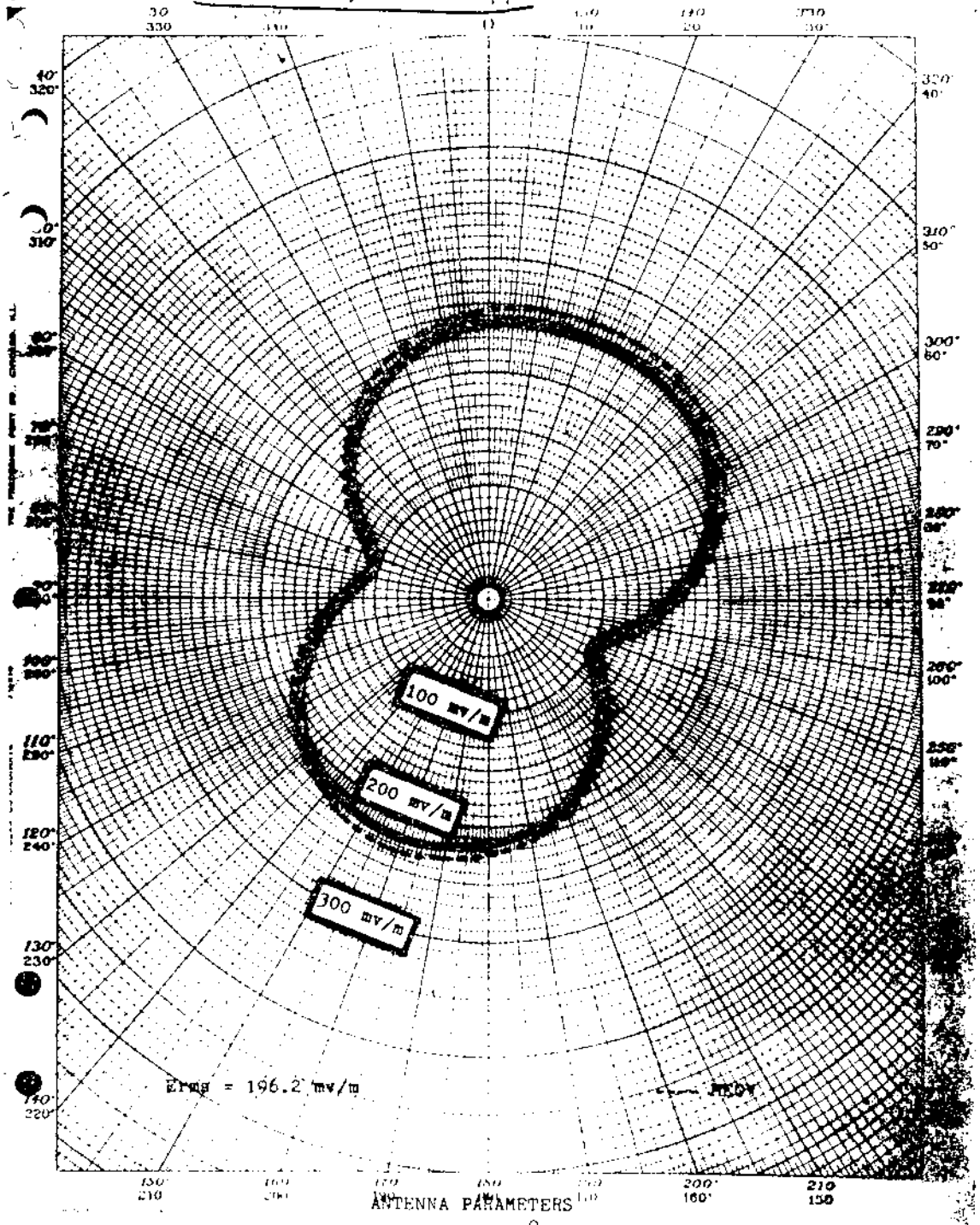
WCIS ~~WACY~~

Proposed Day
(6-22-62ct)

New;Costal Cities Bctg. Co.,Inc. 1kw,DA-D,D
Moss Point, Mississippi 1460 kc

#176 (8-24-62)
Amend to increase
height to 177.5'

Proposed Day
[illegible]



ANTENNA PARAMETERS

LAT: 30° 23' 15"
LONG: 88° 31' 00"

N 0°E
#2 0.4 -165°
S = 135°
#1 1.0 0°
N 000°E

AMBROSE W. KRAMER
CONSULTING RADIO ENGINEER

FIGURE - 3
PROPOSED DAYTIME
HORIZONTAL PATTERN

COASTAL CITIES BDCSTNG. CO.INC.
MOSS POINT, MISSISSIPPI.
1460 kcs. 1 kw. DA-D-D.

FCC File No.BP-15515
Accepted 6-11-62

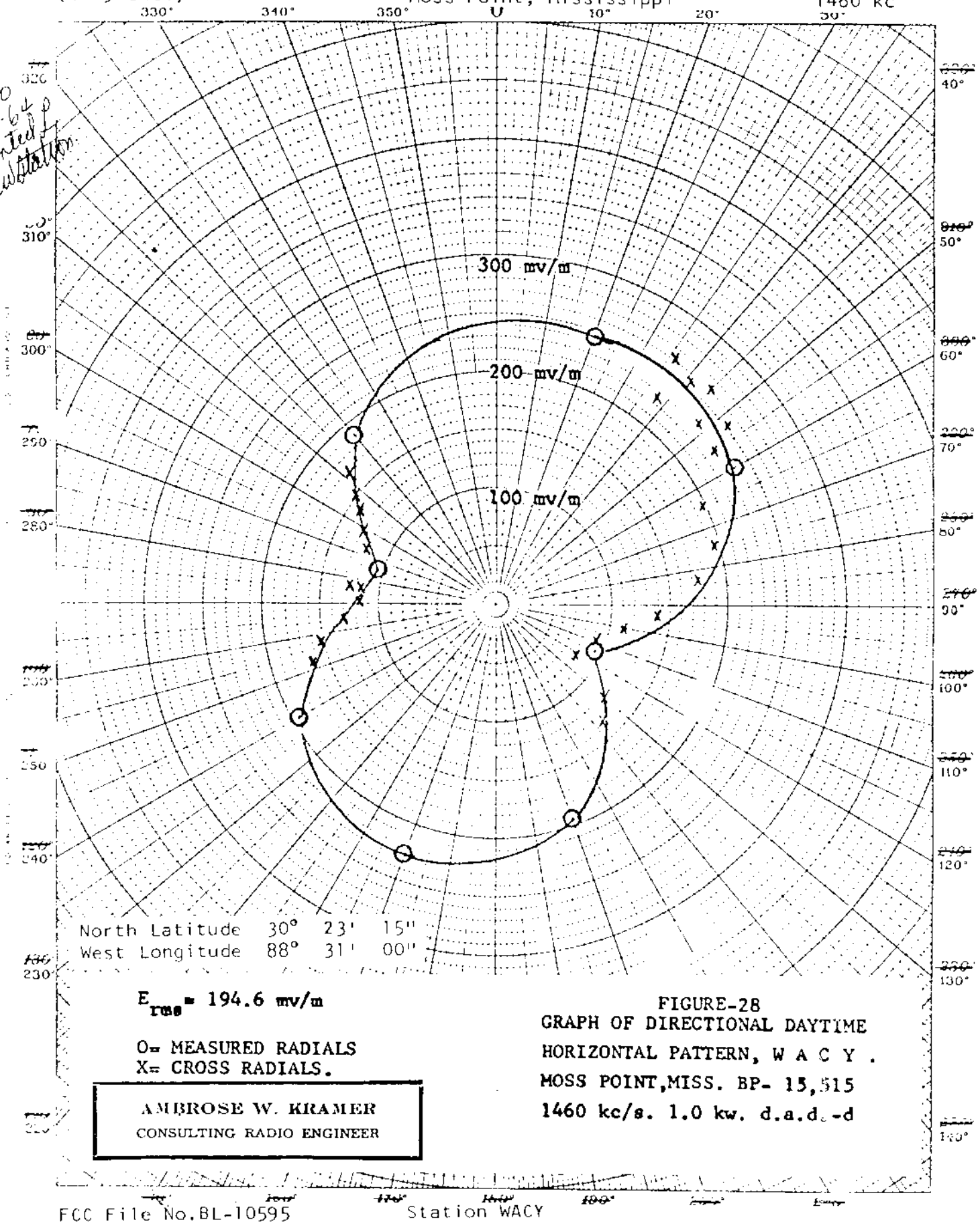
New;Costal Cities Bctg. Co.,Inc.
Moss Point, Mississippi
1460 kc

WCIS ~~WACY~~

Measured Day
(6-29-64ct)

Station WACY
Moss Point, Mississippi

1kw,DA-D,D
1460 kc



E_{rms} = 194.6 mv/m

O= MEASURED RADIALS
X= CROSS RADIALS.

AMBROSE W. KRAMER
CONSULTING RADIO ENGINEER

FIGURE-28
GRAPH OF DIRECTIONAL DAYTIME
HORIZONTAL PATTERN, W A C Y .
MOSS POINT,MISS. BP- 15,515
1460 kc/s. 1.0 kw. d.a.d.-d

FCC File No.BL-10595
Accepted 5-27-64

Station WACY
Moss Point, Mississippi

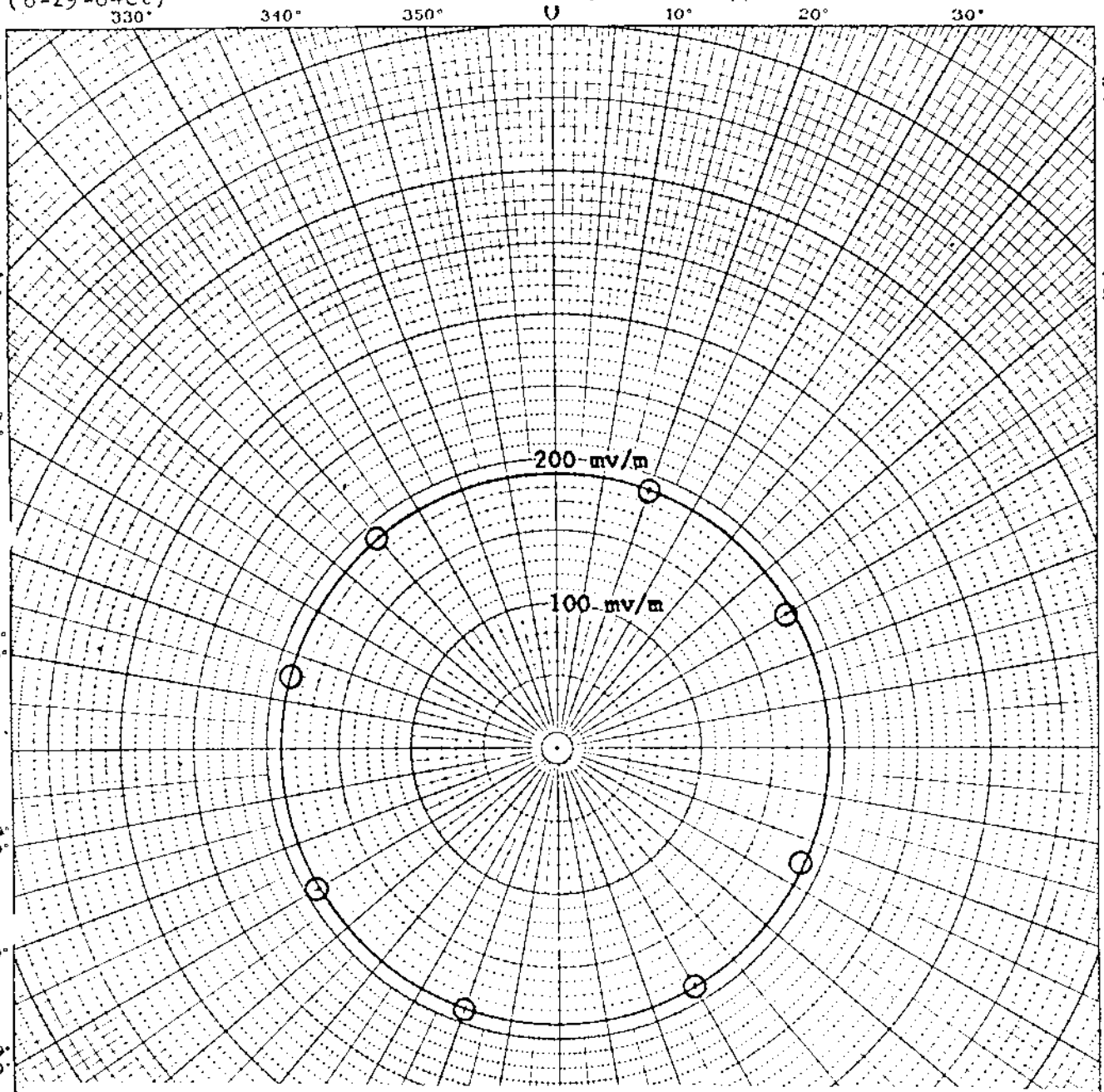
1460 kc

WCIS ~~WACY~~

Measured Non-DA
(6-29-64ct)

Station WACY
Moss Point, Mississippi

1kw,DA-D,D
1460 kc



THE FREDERICK POST CO. CHICAGO 11

7½x10

POLAR COORDINATE

NO. 364

E_{rms} = 189.5 mv/m

O= MEASURED RADIALS

FIGURE-26
GRAPH NON DIRECTIONAL
HORIZONTAL PATTERN
W A C Y, 1460 kc/s.
MOSS POINT. BP-15,515

AMBROSE W. KRAMER
CONSULTING RADIO ENGINEER

FCC File No.BL-10595
Accepted 5-27-64

Station WACY
Moss Point, Mississippi

1460 kc

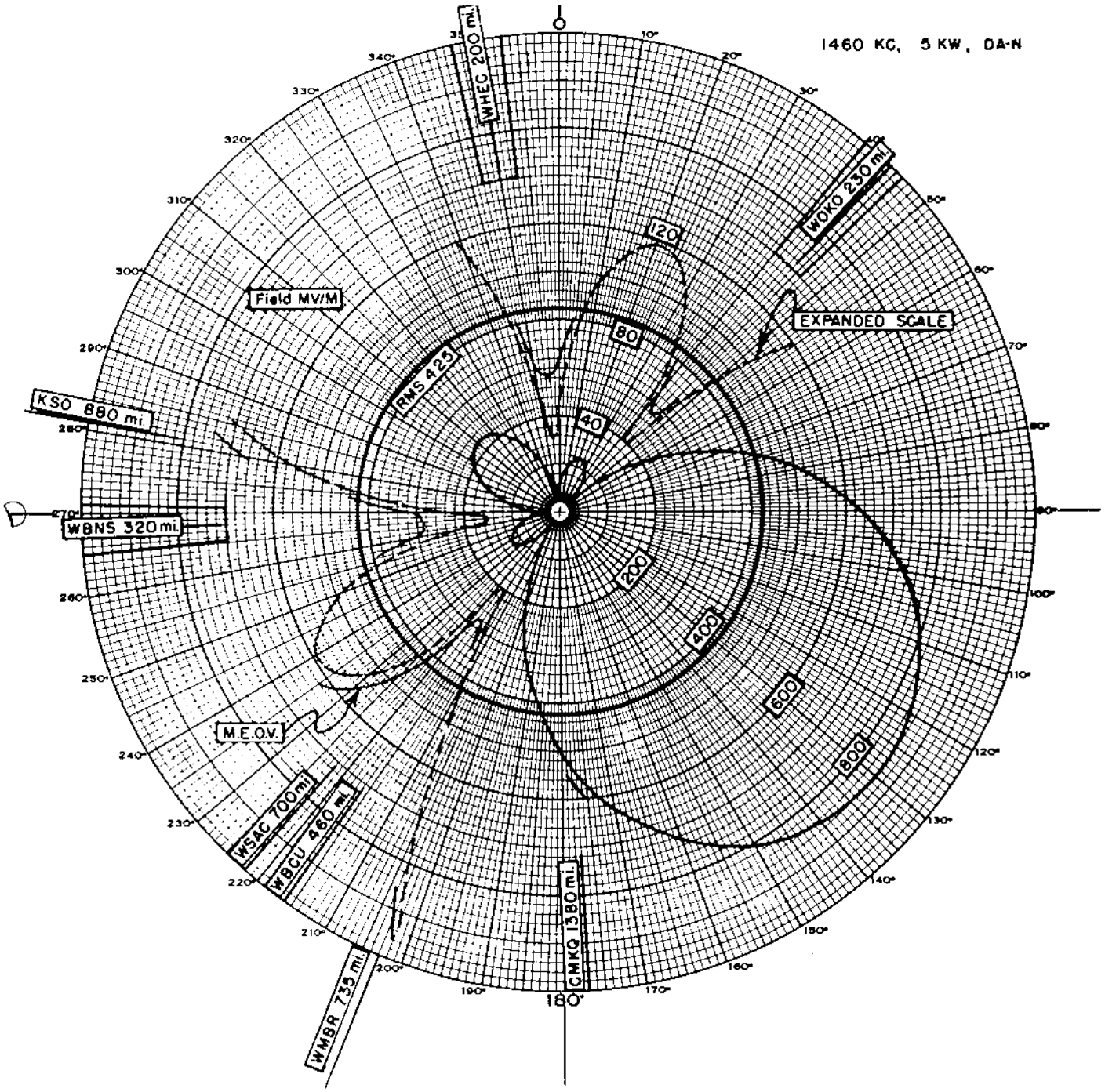
WCMB

PROPOSED
NIGHT 1-11-56G

STATION WCMB
HARRISBURG, PA.

5 KW
DA-~~N~~, U

1460 KC



ROSSMOYNE CORPORATION LEMOYNE, PENN.		Figure I Series C490604
		1460 KC 5000 WATTS DA-N
N ① 170° H=81° ② 1.49λ 209° ③ 0.83λ 56° SPACING 90° 130°T	PROPOSED DIRECTIONAL ANTENNA PATTERN	McINTOSH & INGLIS *Consulting Radio Engineers* Washington, D.C.

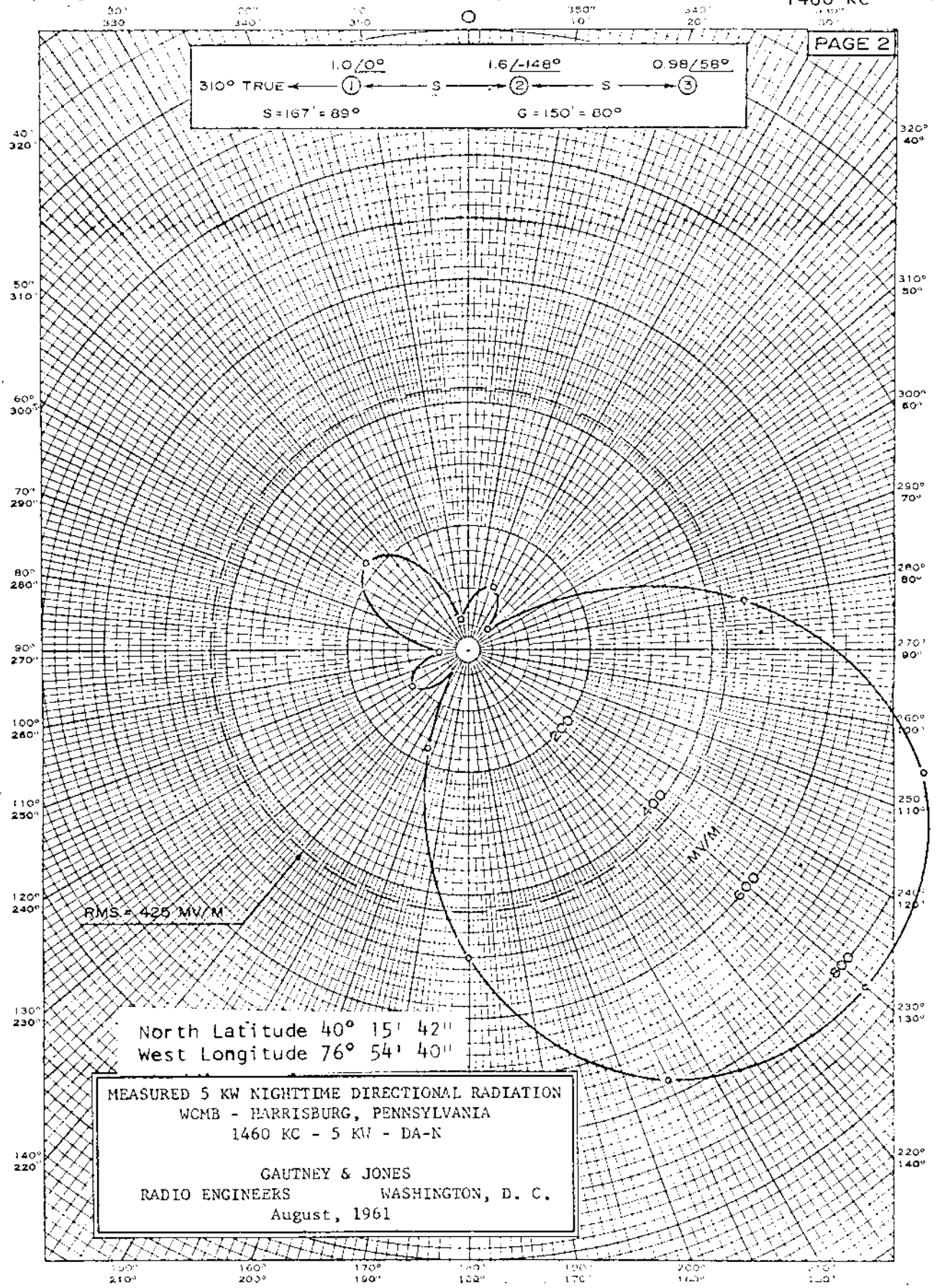
FCC File No. BP-7296 Accepted 7-22-49 WCMB, Harrisburg, Pa. 1460 KC

WCMB

Measured Night
(11-30-61ct)

Station WCMB
Harrisburg, Pennsylvania

5kw, DA-N, U
1460 kc



FCC File No. BL-8783
Accepted 11-3-61

Station WCMB
Harrisburg, Pennsylvania

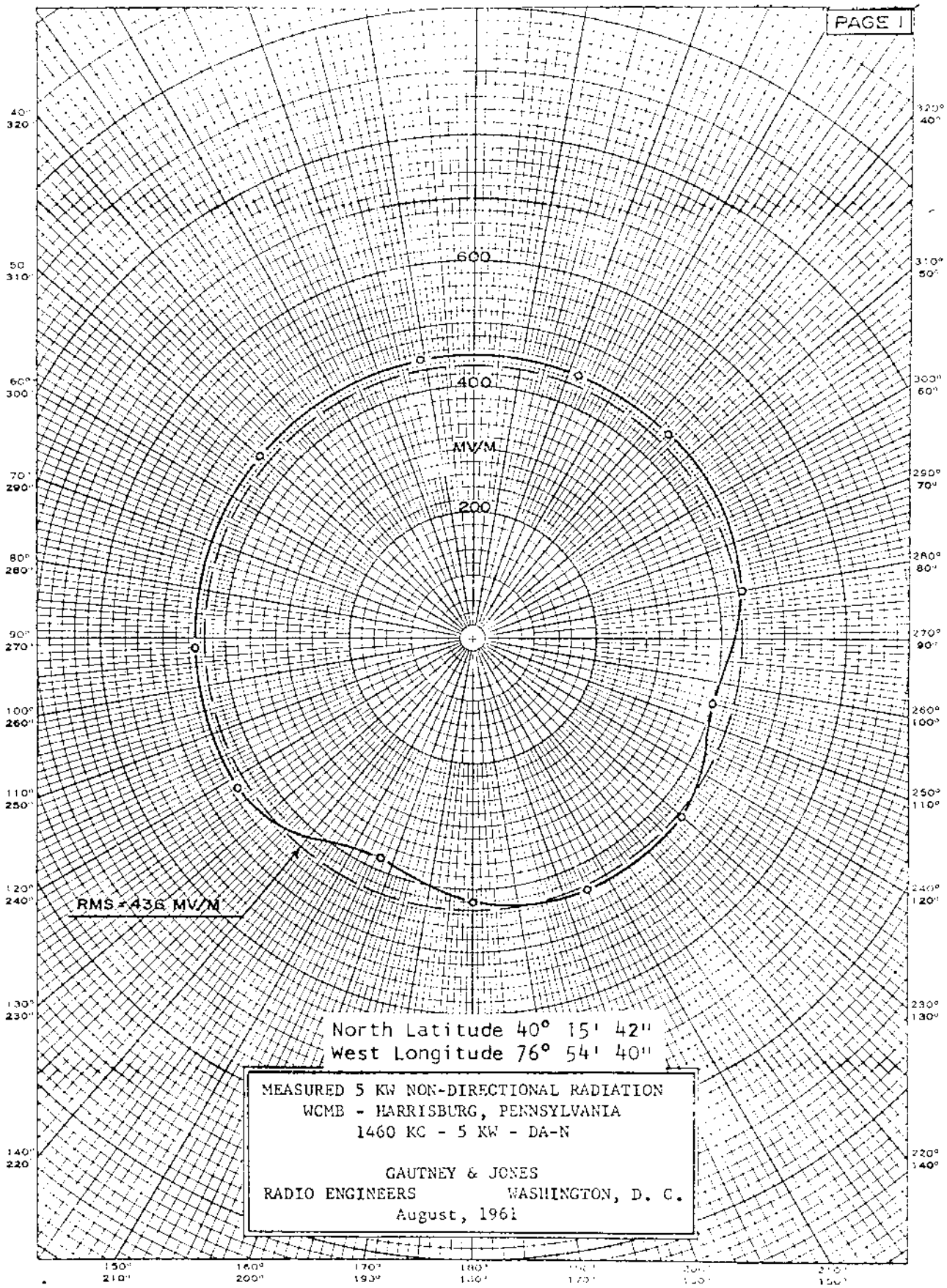
1460 kc

WCMB

Measured Non-DA
(11-30-61ct)

Station WCMB
Harrisburg, Pennsylvania

5kw, DA-N, U
1460 kc



FCC File No. BL-8783
Accepted 11-3-61

Station WCMB
Harrisburg, Pennsylvania

1460 kc

WEMD

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WEMD — Main Studio: Easton, Maryland

Frequency: 1460 kHz — Power: 0.5 kW Night 1 kW Day

Notification List No. 1597 — Date: September 11, 1974 — Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 38° 46' 13"
West Longitude: 76° 04' 55"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 3
Type of elements: Series-e cited, uniform cross-section, guyed vertical steel towers.

TOWER:	NW(#2)	C(#3)	SE(#1)
HEIGHT ABOVE INSULATORS:	270'(144.3°)	180'	180'(96°)
NIGHT PHASING:	-	+125°	0°
NIGHT FIELD RATIO:	-	1.55	1.0
DAY PHASING:	+15°	-145°	0°
DAY FIELD RATIO:	1.2	0.7	1.0

SPACING AND ORIENTATION: From tower #1; tower #3 is spaced 159'(85°) on a line bearing 320° true and tower #2 is spaced 318'(170°) on a line bearing 310° true.

GROUND SYSTEM: 120-200' equally spaced copper radials plus a 24' square ground screen about each tower. Radials are shortened and bonded to transverse straps along intersections between towers.

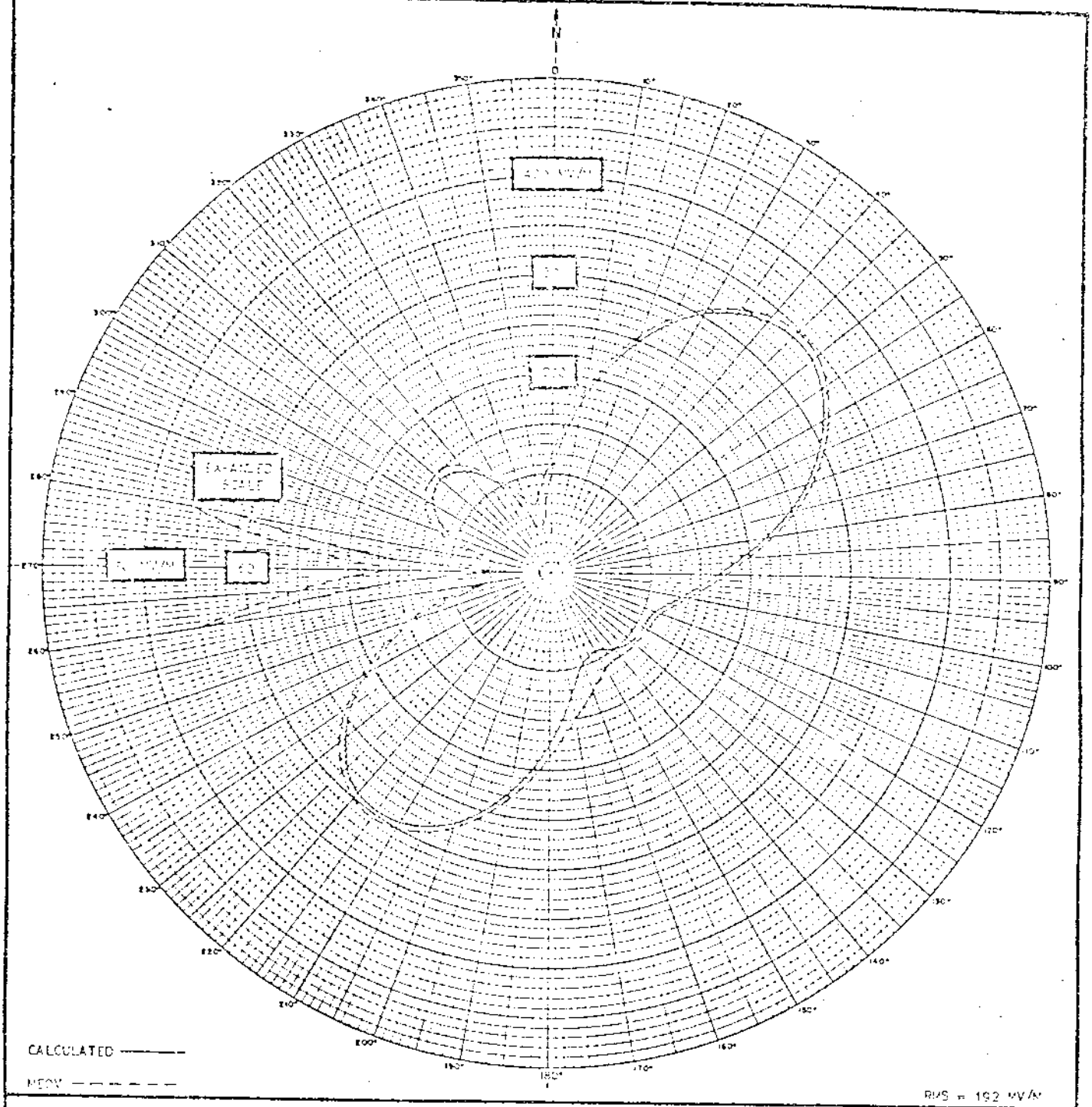
Predicted effective Night Field: 138 mv/m at rated power.

Predicted effective Day Field: 192 mv/m at rated power.

Note: Please retain the Nighttime directional antenna radiation pattern notified for Station WEMD in United States Change List Number 1039 dated December 4, 1963, and attach to this Revised Description Sheet and Daytime pattern. This notification concerns changes in the heigh of tower #2 and the effective day field with Nighttime operation continued as previously notified.

CTR NO 31162A3

WEMD



$H_1 = H_3 = 150°$

$H_2 = 270°$

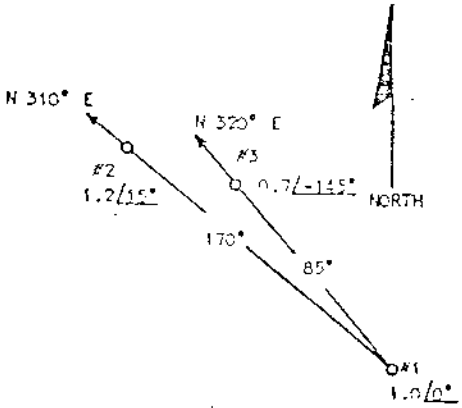


EXHIBIT C

PROPOSED HORIZONTAL PLANE
DAYTIME RADIATION PATTERN

WEMD

EASTON, MARYLAND
1450 KC 1 KW-LS, 500 W DA-2

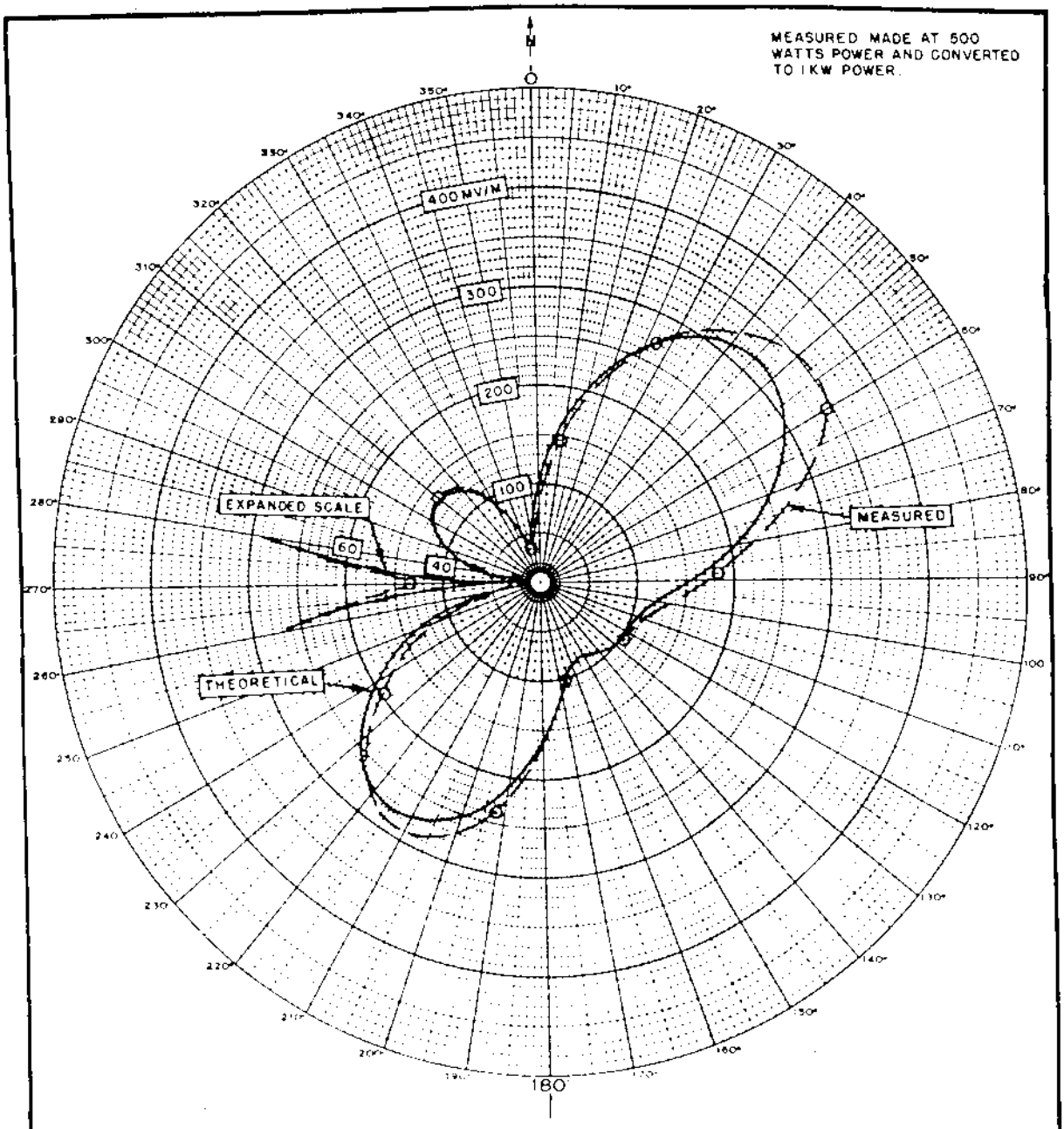
WEMD

Measured Day
(8-27-65ct)

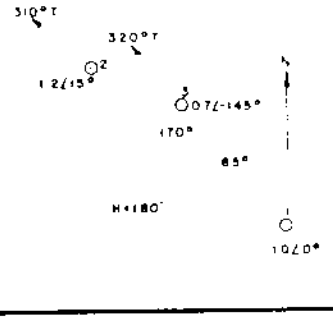
Station WEMD
Easton, Maryland

500w, 1kw-LS, DA-2, U
1460 kc

LIC 9-1-65
CHG HRS, PWR, DA



North Latitude 38° 46' 13"
West Longitude 76° 04' 55"



MEASURED HORIZONTAL PLANE
DAYTIME RADIATION PATTERN

WEMD
EASTON, MARYLAND
1460 KC 1KW-LS, 500 W DA-2

MARIANNA WOODSON COBB
CONSULTING RADIO ENGINEER
WASHINGTON D. C.

FCC File No. BL-10971
Accepted 8-16-65

Station WEMD
Easton, Maryland

1460 kc

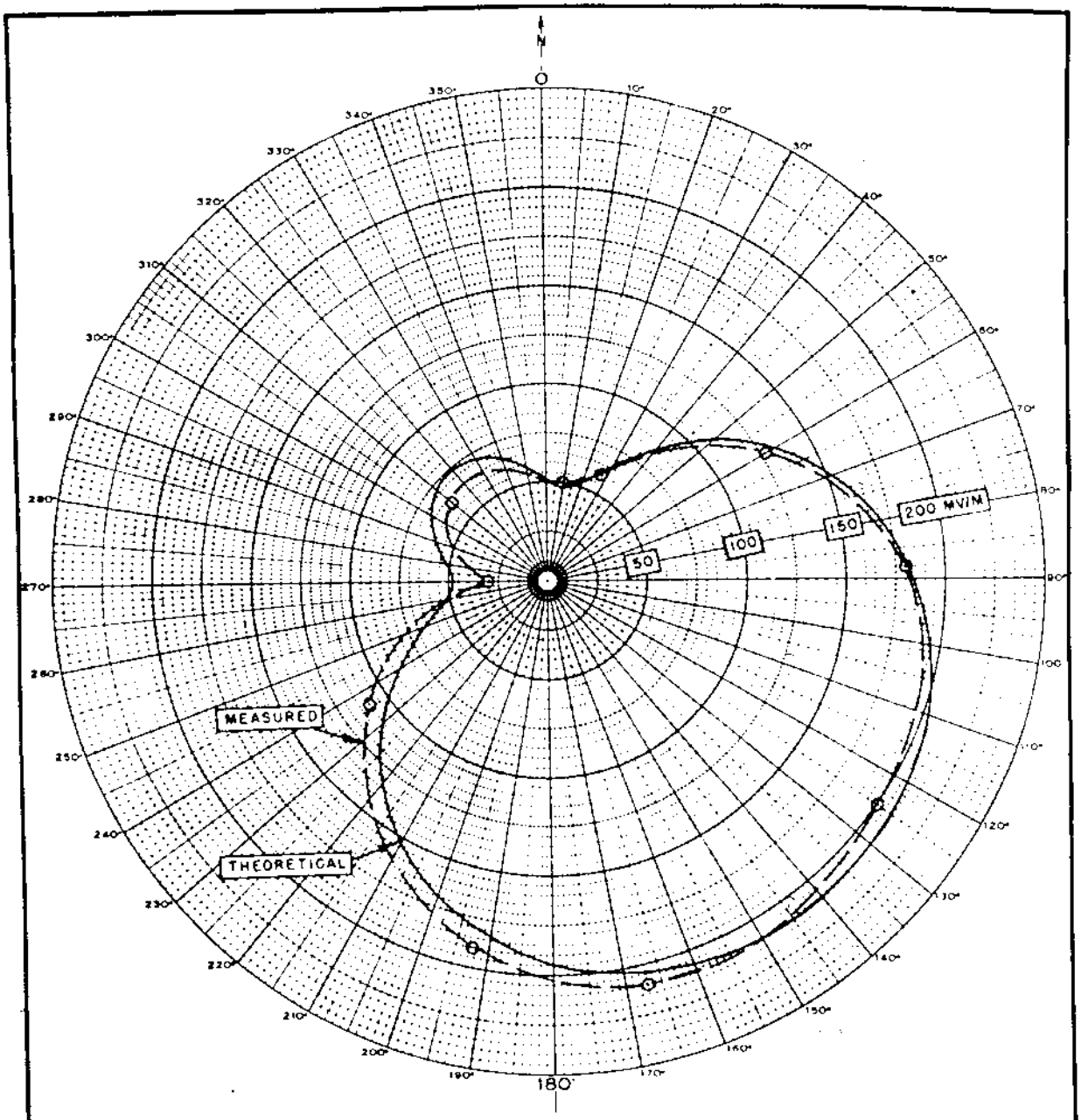
WEMD

Measured Night
(8-27-65ct)

Station WEMD
Easton, Maryland

500w, 1kw-LS, DA-2, U
1460 kc

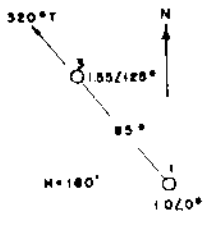
1-IC 9-1-65
-HG: HRS, PWR, DA



THEORETICAL RMS = 138 MV/M
MEASURED RMS = 138 MV/M

EXHIBIT J

North Latitude 38° 46' 13"
West Longitude 76° 04' 55"



ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MI. IN FOR 1 KW	HEIGHT DEG

MEASURED HORIZONTAL PLANE
NIGHTTIME RADIATION PATTERN

WEMD

EASTON, MARYLAND
1460 KC 1KW-LS, 500 W DA-2

MARIANNA WOODSON COBB
CONSULTING RADIO ENGINEER
WASHINGTON D. C.

FCC File No.BL-10971
Accepted 8-16-65

Station WEMD
Easton, Maryland

1460 kc

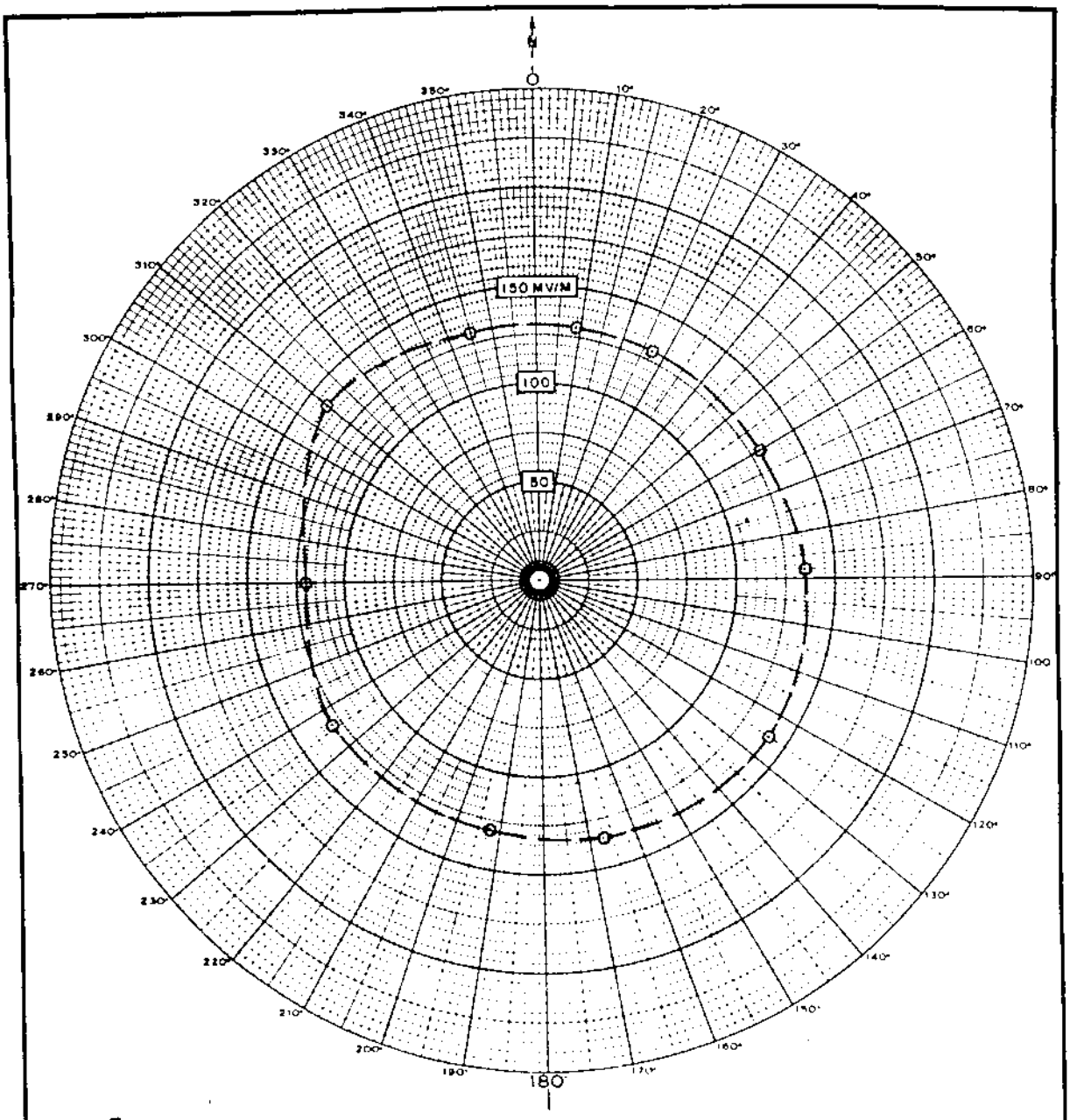
WEMD

Measured Non-DA
(8-27-65ct)

Station WEMD
Easton, Maryland

500w, 1kw-LS, DA-2, U
1460 kc

LIC 9-1-65
LIMITED HRS, PWR, DA



MEASURED HORIZONTAL PLANE
NON-DIRECTIONAL
RADIATION PATTERN
(TOWER NO. 3)

[redacted]

WEMD
EASTON, MARYLAND
1460 KC 1 KW-LS, 500 W DA-2

MARIANNA WOODSON COBB
CONSULTING RADIO ENGINEER

FCC File No. BL-10971
Accepted 8-16-65

Station WEMD
Easton, Maryland

1460 kc

WENO
1460 kHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WENO

Main Studio: Laurinburg, North Carolina

Frequency: 1460 kHz

Power: 5kw Night 5kw Day

Notification List No. 1787-

Date: July 10, 1980 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 34° 47' 00"
West Longitude: 79° 30' 40"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 4
Type of elements: Series excited, uniform fross-section, guyed, vertical steel towers.

TOWER:	N(#1)	C(#2)	SW(#3)	SE(#4)
HEIGHT ABOVE INSULATORS:	168'	168'	168'	168' (89.78°)
NIGHT PHASING:	0°	-156.74°	+51.96°	---
NIGHT FIELD RATIO:	1.0	1.846	0.987	---
DAY PHASING:	0°	---	-100°	-95.5°
DAY FIELD RATIO:	1.0	---	0.464	1.062

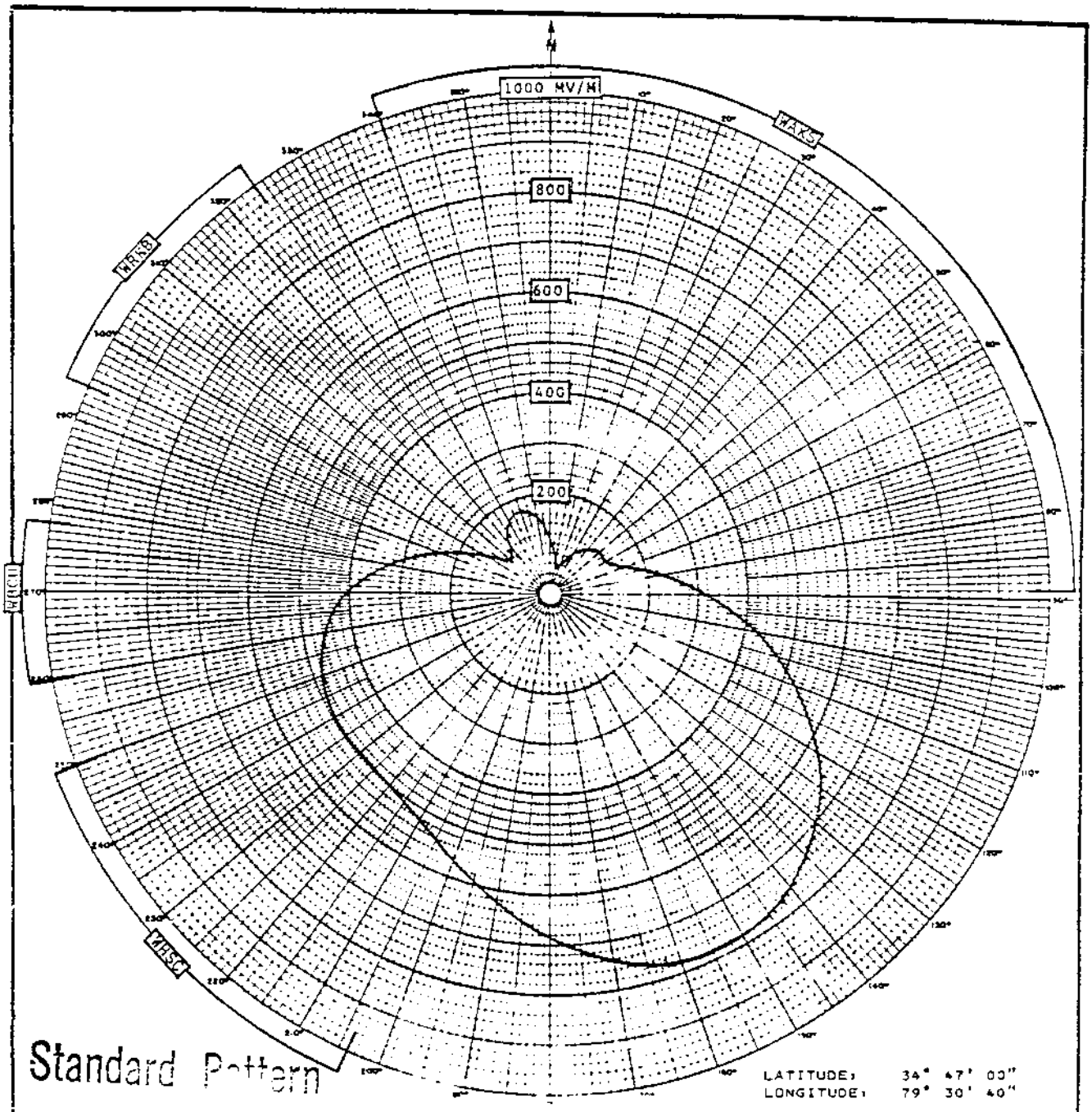
SPACING AND ORIENTATION: With the north (#1) tower as reference, the center #2 tower is spaced 132.9' (71°) on a line bearing 106° true, the Southwest (#3) tower is spaced 258.2' (138°) on a line bearing 106° true, and the Southeast (#4) tower is spaced 224.6'(120°) on a line bearing 194° true.

GROUND SYSTEM: 120 168' equally spaced copper radials plus a 24' square ground screen about each tower. Radials are shortened and bonded to transverse straps along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	420.49 mv/m	453.84 mv/m	441.522 mv/m
Night	404.00 mv/m	948.48 mv/m	424.20 mv/m

WENO
1460 kHz
DA-D



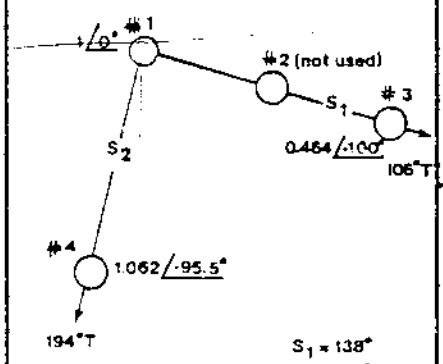
Standard Pattern

LATITUDE: 34° 47' 00"
LONGITUDE: 79° 30' 40"

LBA

LAWRENCE, BEHR ASSOCIATES, INC.
GREENVILLE, S. C. 29614

ANTENNA PARAMETERS



$S_1 = 138°$
$S_2 = 120°$
$G_{1-4} = 90°$

RSS_{TH}	=	453.840
RSS_{STD}	=	476.532
RMS_{TH}	=	420.497
RMS_{STD}	=	441.522
RSS/RMS	=	1.074

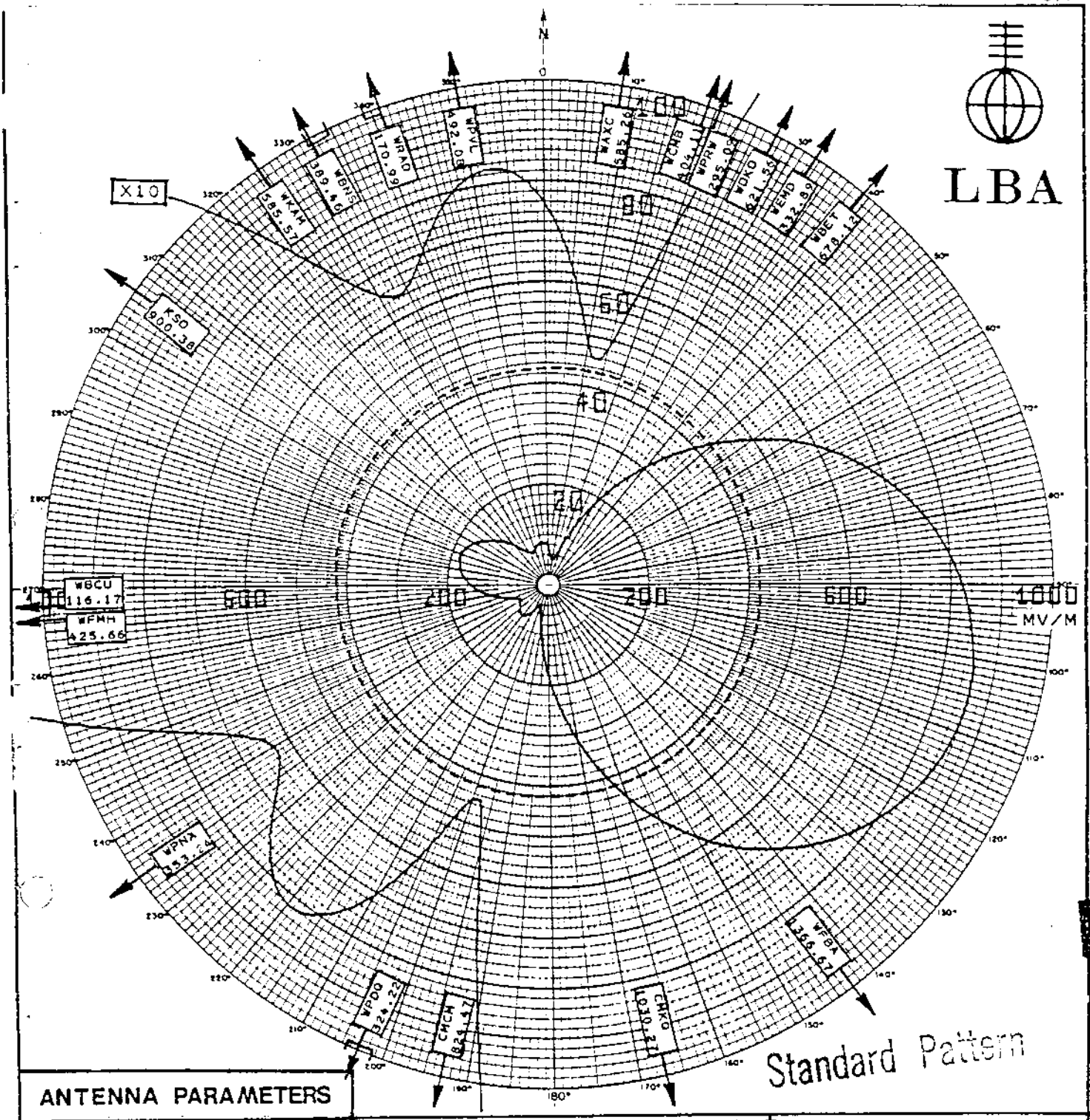
FIGURE 13

PROPOSED STANDARD HORIZONTAL DAY PATTERN

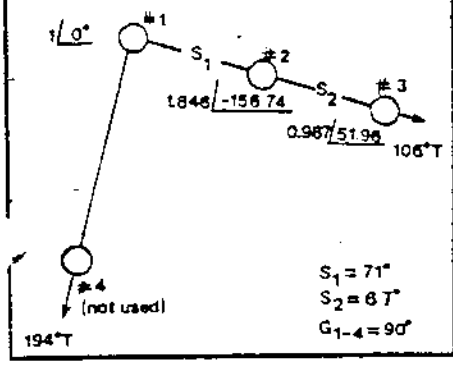
RADIO STATION WENO
CURTIS & ASSOCIATES, INC.
LAURINBURG, NORTH CAROLINA
1460 KHZ, 5.0D/5.0N, DA-2

9-77

WENO
1460 KHz
DA-2



ANTENNA PARAMETERS



RSS_{TH}	=	948.480
RSS_{STD}	=	995.504
RMS_{TH}	=	404.000
RMS_{STD}	=	424.200
RSS/RMS	=	2.348

DISTANCES IN MILES.

LATITUDE: 34° 47' 00"
LONGITUDE: 79° 30' 40"

FIGURE 17A

PROPOSED STANDARD HORIZONTAL NIGHT PATTERN

CURTIS & ASSOCIATES, INC.
LAURINBURG, NORTH CAROLINA
1460 KHZ, 5.0D/5.0N, DA-2

9-78

WFAB
1460KHz

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WFAB

Main Studio: Juncos, Puerto Rico

Frequency: 1460 kHz

Power: .5kw Night .5kw Day

Notification List No. 1785

Dat November 16, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 18° 12' 54"
West Longitude: 65° 54' 33"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 2
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	E(#1)	W(#2)
HEIGHT ABOVE INSULATORS:	303.49' (162.18°)	168.42' (90°)
NIGHT PHASING:	0°	84.56°
NIGHT FIELD RATIO:	1	0.477
DAY PHASING:	0°	30°
DAY FIELD RATIO:	1	1

SPACE AND ORIENTATION: Adjacent towers in a row are spaced 168.42' (90°) on a line bearing 280° true.

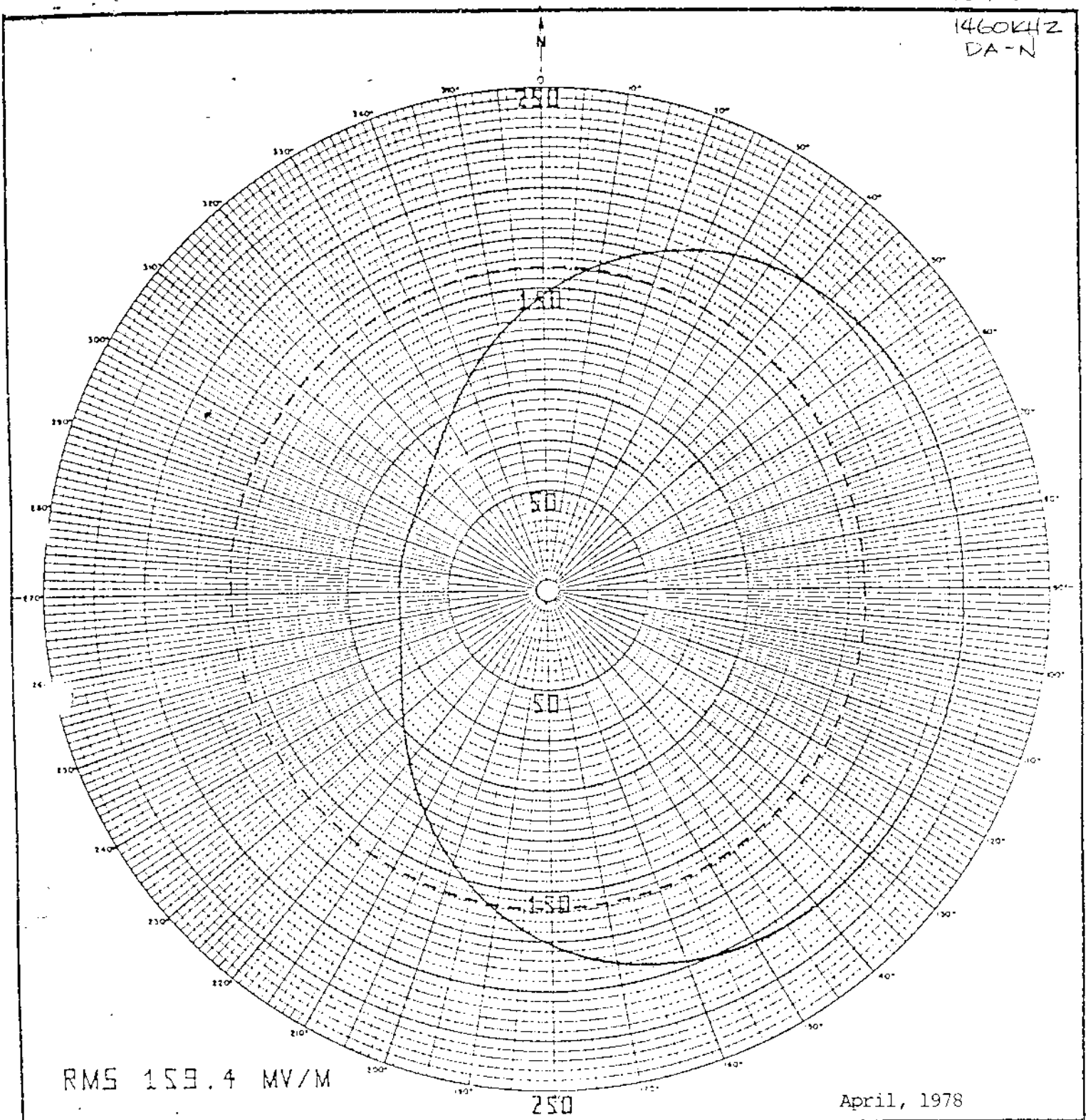
GROUND SYSTEM: 120 - 168.5' equally spaced copper radials plus a 24' x 24' square ground screen about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Night	159.4 mv/m		167.37 mv/m

Note: Please retain the Daytime directional antenna radiation pattern notified for Station (NEW) in United States Change List Number 1377 dated June 17, 1970 and attach to this Revised Description Sheet and Nighttime pattern.

WFAB
1460KHZ
DA-N



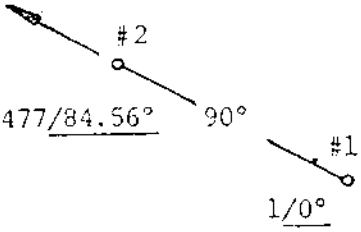
RMS 153.4 MV/M

April, 1978

N. Lat.: 18° 12' 54"

W. Long: 65° 54' 33"

N-280°-E



G_1=162.18°
G_2=90°

PETER J. GONCALVES & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FIGURE 3

PLOT OF NIGHTTIME DIRECTIONAL ANTENNA PATTERN

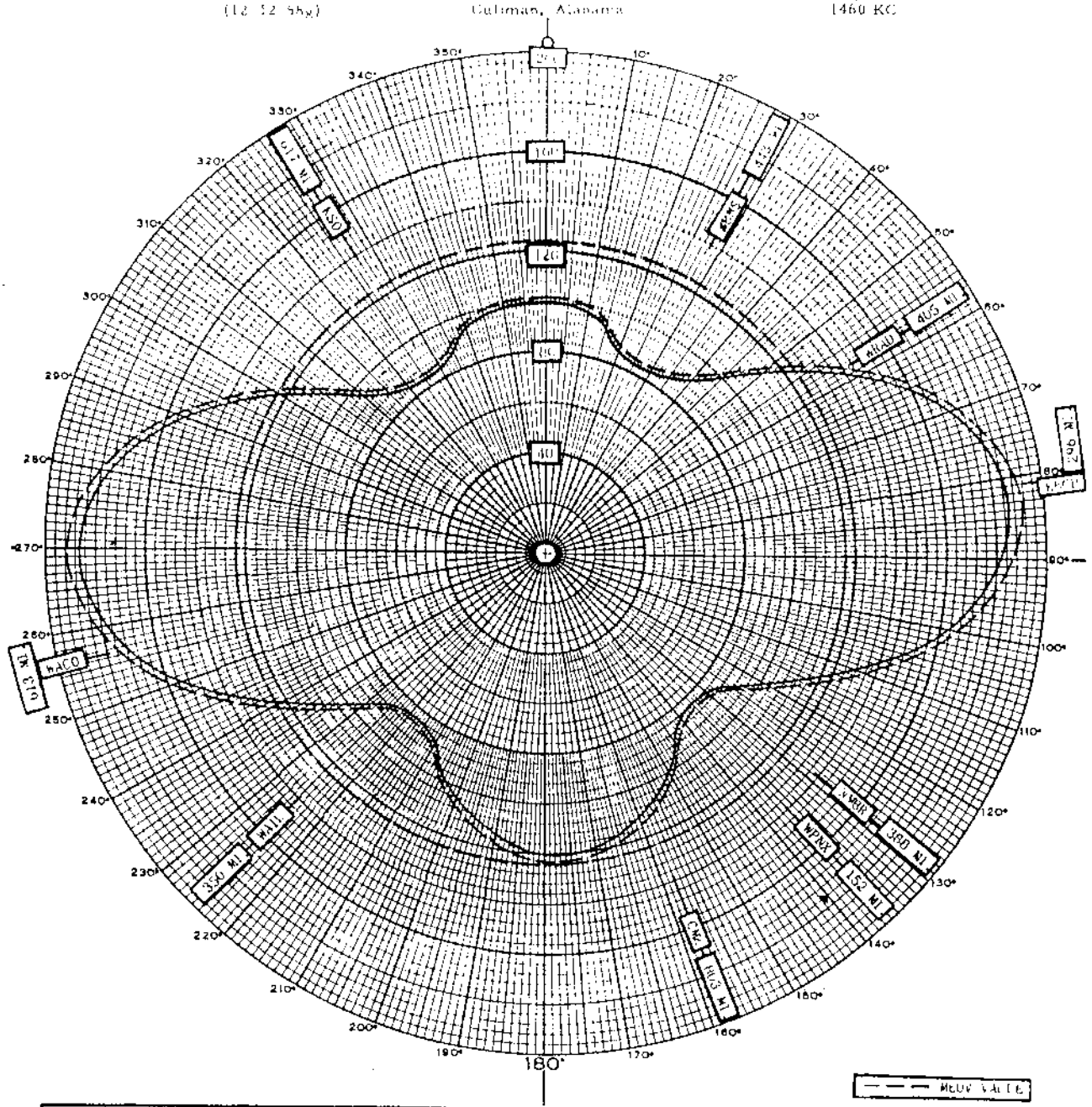
RADIO STATION WFAB
JUNCOS, P.R.

1460 KHz 0.5kw,DA-2,U

WFMH

POLAR COORDINATE PAPER NO 10 HP CLEVELAND INSTITUTE OF RADIO ELECTRONICS CLEVELAND OHIO

PROPOSED NIGHT (12 52 55g) | Station WFMH Cullman, Alabama | 500w, 5kw-LS, DA-N, U | 1460 KC



MEAN VALUE

TOWER PLACEMENT SKETCH

N 356.5° E

#1 O .382/-12.6°

230° 430.5'

#2 O 1/000°

PATTERN PARAMETERS

TOWER No.	ELECTRICAL HEIGHT ϕ°	TRUE TOWER ORIENTATION ϕ°	SPACING s°	PHASING ψ°	HORIZONTAL FIELD E	FIELD RATIO f	ELEV ANGLE θ°	ELEVATION AMS FIELD E_θ
1	180	356.5	230	-12.6		.382	0	
2	180	48.00	000	000		1.000	10	
3							20	
4							30	
5							40	
6							50	
7							60	
8							70	
9							80	
10								

ϵ_1 = 124.4 mv/m

DAYTIME OPERATION ☐ NIGHTTIME OPERATION ☒ E_1 = 0.5 mv

STATION DATA

CALL	WFMH
FREQUENCY	1460 kc
POWER	0.5 kw
TIME OF OPERATION	NIGHT
TYPE OF OPERATION	DA
DAYTIME TOWERS	1
NIGHTTIME TOWERS	1 & 2
No RADIALS PER TOWER	120
LENGTH OF RADIALS	100 °/337 ft.
GROUND SCREEN DIMENSION	24X24
LAT.	34° 10' 44"
LONG.	86° 51' 36"
SUPERSEDES	
PATTERN No.	580071E

CLAUDE M GRAY
CONSULTING RADIO ENGINEER
BIRMINGHAM ALA.

EXHIBIT 2
3-4-6

RADIATION PATTERN
[illegible] WFMH
[illegible] 1460 KC
[illegible]

FCC File No. BP-12515
Accepted 11-18-58

WFMH
Cullman, Alabama

1460 KC

grants for full night DA.

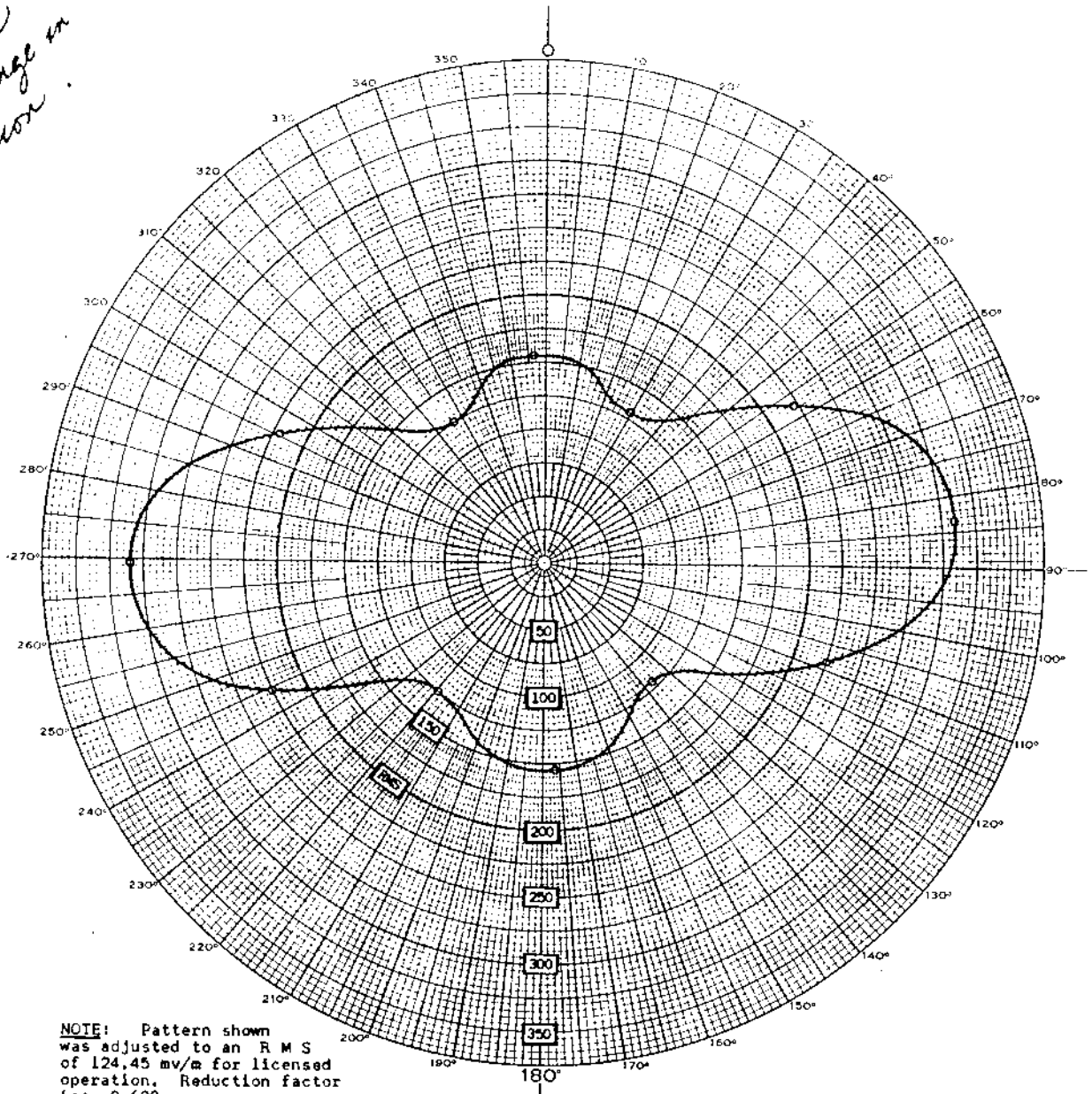
WFMH

Measured Night
(5-25-62ct)

Station WFMH
Cullman, Alabama

500w, 5kw-LS, DA-N, U
1460 kc

8-9-62
granted L for
DA-N and change in
hours of operation.



NOTE: Pattern shown was adjusted to an R M S of 124.45 mv/m for licensed operation. Reduction factor is: 0.622

TOWER PLACEMENT SKETCH

N356.5°E

#1 ○ .382/-12.6°

230°

430.5'

#2 ○ 1.00/00°

PATTERN PARAMETERS

TOWER No	ELECTRICAL HEIGHT θ°	TRUE TOWER ORIENTATION β°	SPACING s'	PHASING ψ°	HORIZONTAL FIELD mv/m F	FIELD RATIO F
1	180°	356.5°	230°	-12.6°		.382
2	180°	000°	000°	00.0°		1.000
3						
4						
5						
6						
7						
8						
9						
10						

DAYTIME OPERATION ☐ NIGHTTIME OPERATION ☒

ELEV ANGLE θ°	ELEVATION RMS FIELD mv/m E_θ
0	
10	
20	
30	
40	
50	
60	
70	
80	
RMS 200 mv/m F_{rms}	

STATION DATA

CALL	W F M H
FREQUENCY	1460 kc
POWER	0.5 kw
TIME OF OPERATION	Night
TYPE OF OPERATION	DA
DAYTIME TOWERS	#1
NIGHTTIME TOWERS	1 & 2
No RADIALS PER TOWER	120
LENGTH OF RADIALS	180° 337 ft
GROUND SCREEN DIMENSION	24 x 24°
LAT.	34° 10' 44"
LONG.	86° 51' 36"
SUPERSEDES	
PATTERN No	611205A

CLAUDE M. GRAY
CONSULTING RADIO ENGINEER
BIRMINGHAM, ALA.

MEASURED HORIZONTAL RADIATION PATTERN

W F M H CULLMAN, ALABAMA

0.5 KW, 5.0 KW-LS, DA-N 1460 KC

FCC File No. BL-9200
Accepted 5-3-62

Station WFMH
Cullman, Alabama

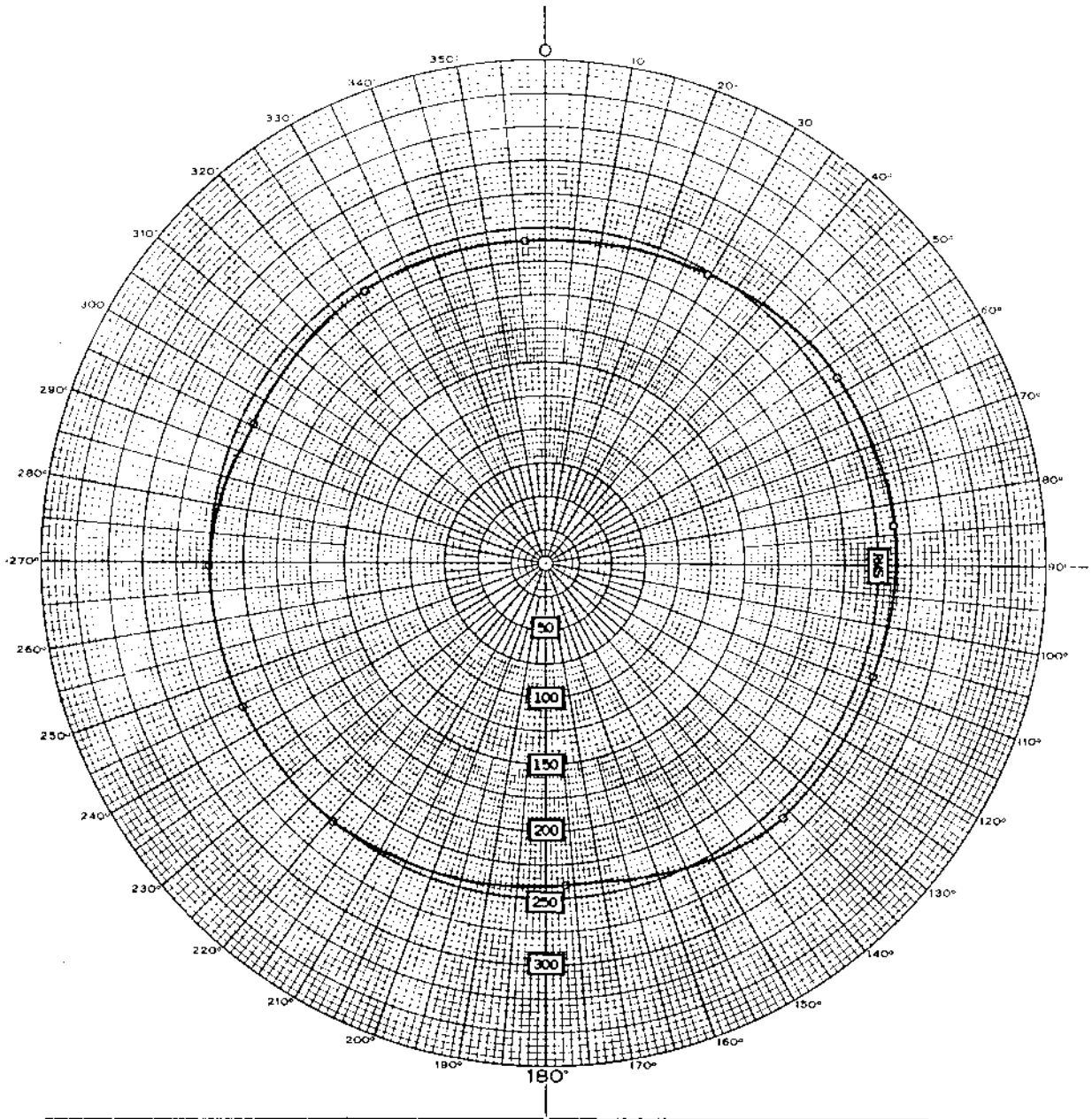
1460 kc

WFMH

Measured Non-DA
(5-25-62ct)

Station WFMH
Cullman, Alabama

500w,5kw-LS,DA-N,U
1460 kc



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA	
N356.5°E #1 ○ 1.0/00° 230° 430.5' #2 ○	TOWER No.	ELECTRICAL HEIGHT — θ°	TRUE TOWER ORIENTATION φ°	SPACING S°	PHASING ψ°	HORIZONTAL FIELD ratio E	FIELD RATIO f	ELEV ANGLE θ°	ELEVATION RMS FIELD ratio Eθ	CALL	W F M H
	1	180°	000°	000°	000°		1.00	0		FREQUENCY	1460 kc
	2							10		POWER	1.0 kw
	3							20		TIME OF OPERATION	Day
	4							30		TYPE OF OPERATION	N D
	5							40		DAYTIME TOWERS	#1
	6							50		NIGHTTIME TOWERS	1 & 2
	7							60		NO. RADIALS PER TOWER	120
	8							70		LENGTH OF RADIALS	180° 337 ft
	9							80		GROUND SCREEN DIMENSION	24 x 24
	10							RMS	250 mv/m	LAT.	34° 10' 44"
	DAYTIME OPERATION ☒ 5 kw NIGHTTIME OPERATION ☐									LONG	86° 51' 36"
										SUPERSEDES	
										PATTERN No.	611204A

CLAUDE M. GRAY
CONSULTING RADIO ENGINEER
BIRMINGHAM, ALA.

MEASURED HORIZONTAL RADIATION PATTERN

W F M H CULLMAN, ALABAMA

0.5 KW, 5.0 KW-LS, DA-N 1460 KC

FCC File No.BL-9200
Accepted 5-3-62

Station WFMH
Cullman, Alabama

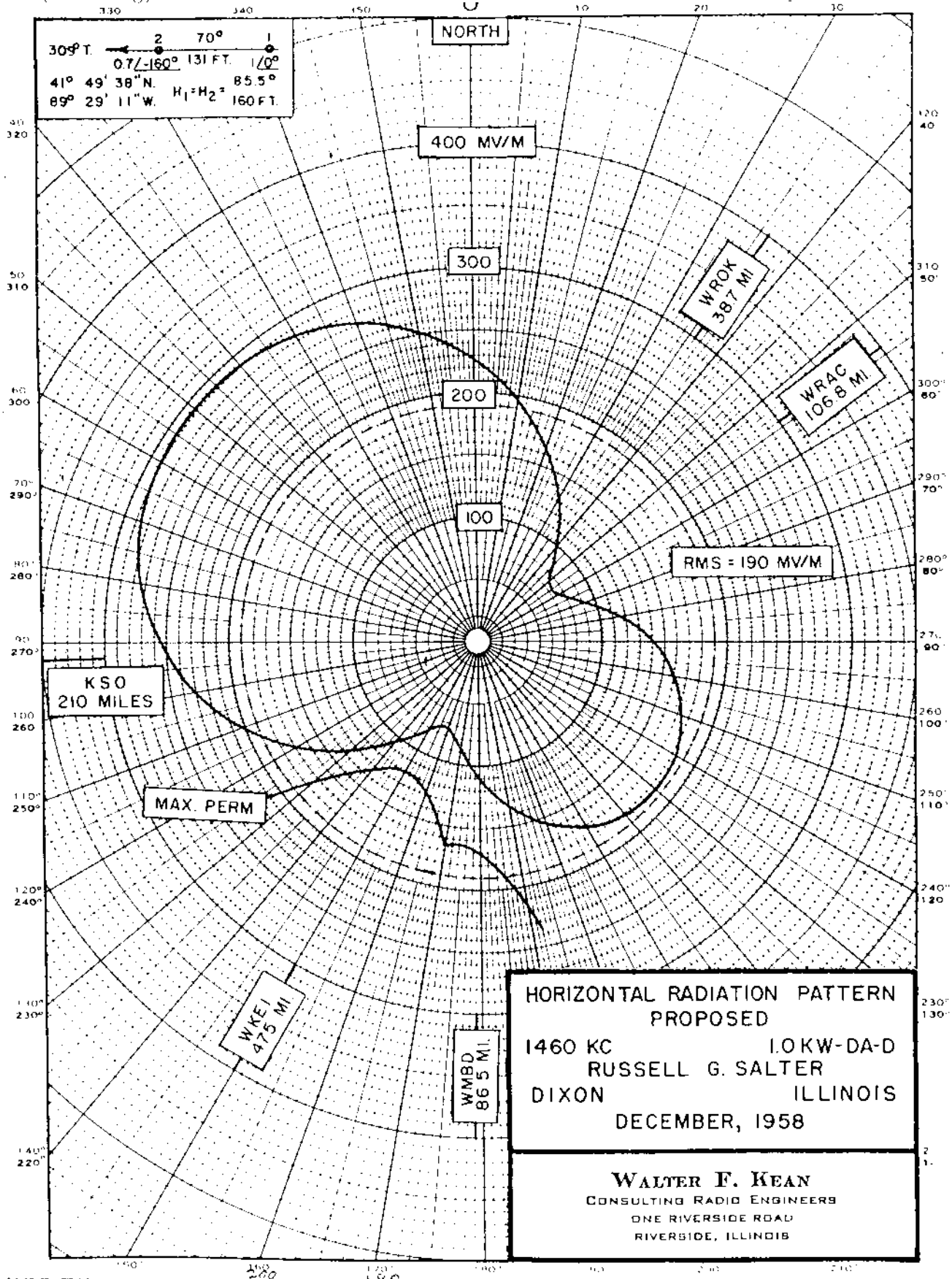
1460 kc

Dixon, Ill. WIXN

PROPOSED DAY
(3-23-59g)

New; Russell G. Salter
Dixon, Illinois

1kw, DA-D,D
1460 KC



HORIZONTAL RADIATION PATTERN
PROPOSED
1460 KC 1.0KW-DA-D
RUSSELL G. SALTER
DIXON ILLINOIS
DECEMBER, 1958

WALTER F. KEAN
CONSULTING RADIO ENGINEERS
ONE RIVERSIDE ROAD
RIVERSIDE, ILLINOIS

FCC File No. BP-10858
Accepted 2-2-59 (Amended)

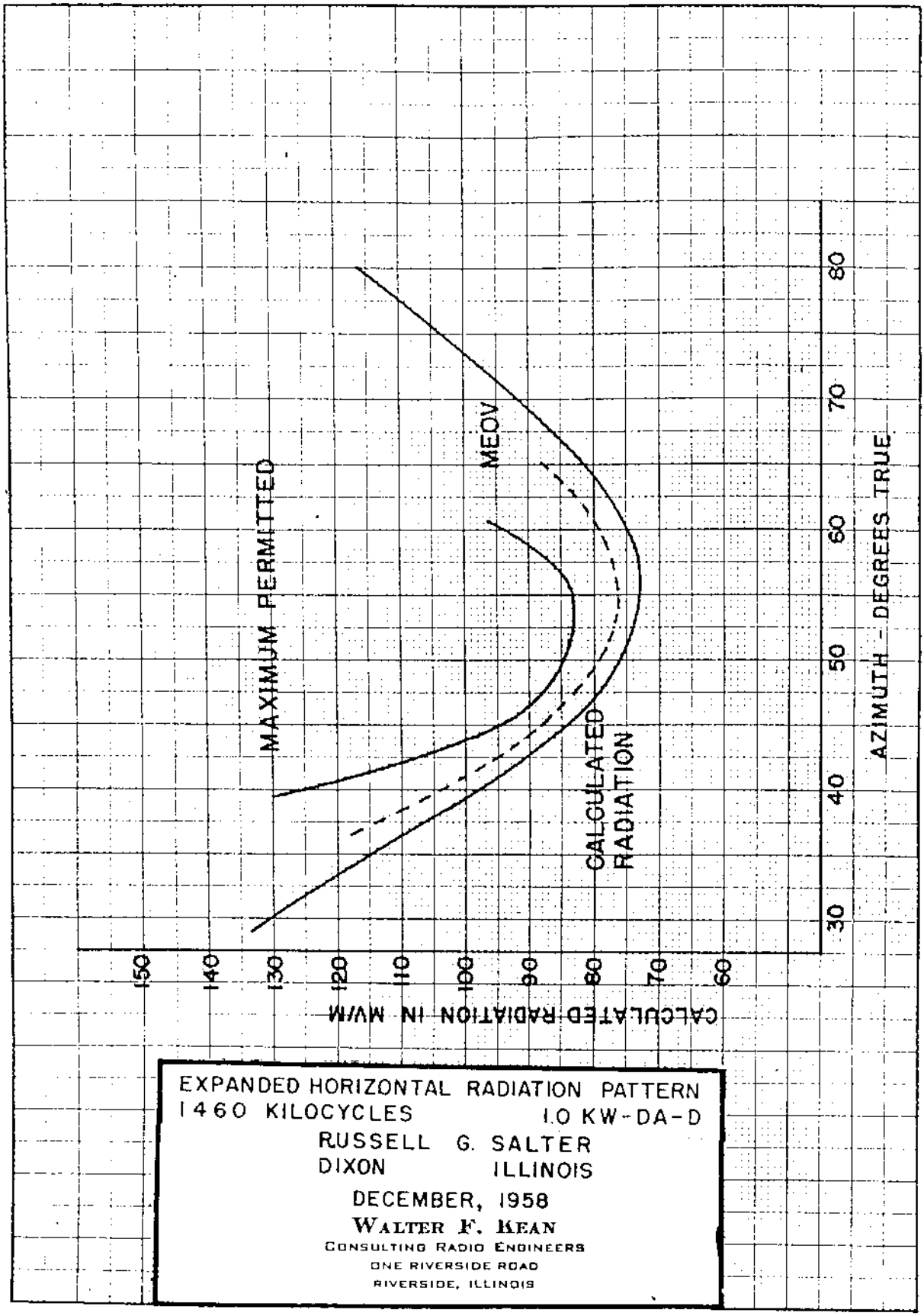
Russell G. Salter
Dixon, Illinois

1460 KC

Dixon, Ill.

WIXN

PROPOSED DAY NULLS (3-23-59g) | New; Russell G. Salter, Dixon, Illinois | 1kw, DA-D,D 1460 KC



FCC File No. BP-10858 Accepted 2-2-59 (Amended) | Russell G. Salter, Dixon, Illinois | 1460 KC

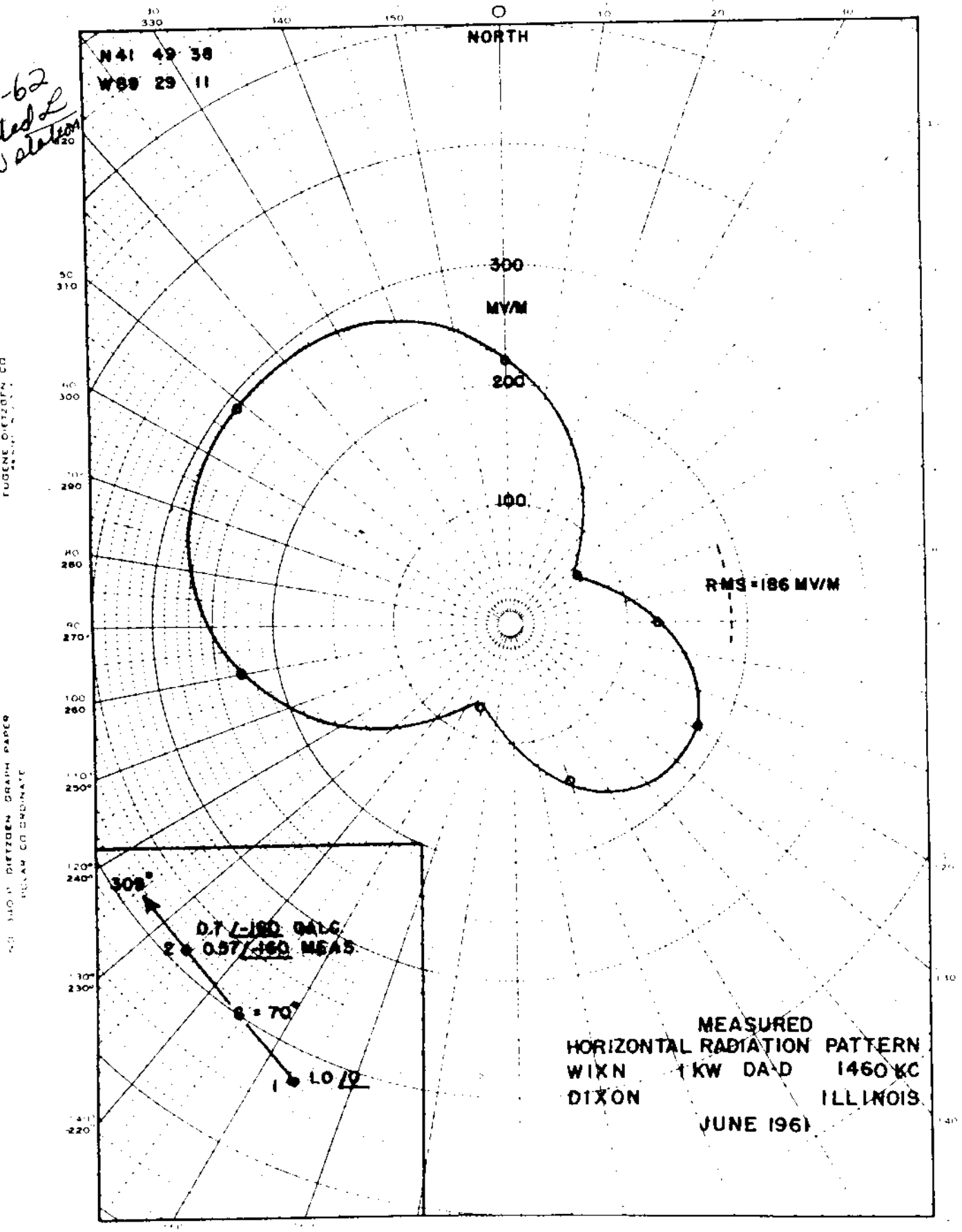
WIXN

MEASURED DAY
(9-20-61ct)

Station WIXN
Dixon, Illinois

1kw, DA-D, D
1460 kc

-14-62
wanted L
w new station



FCC File No. BL-8647
Accepted 8-23-61

Station WIXN
Dixon, Illinois

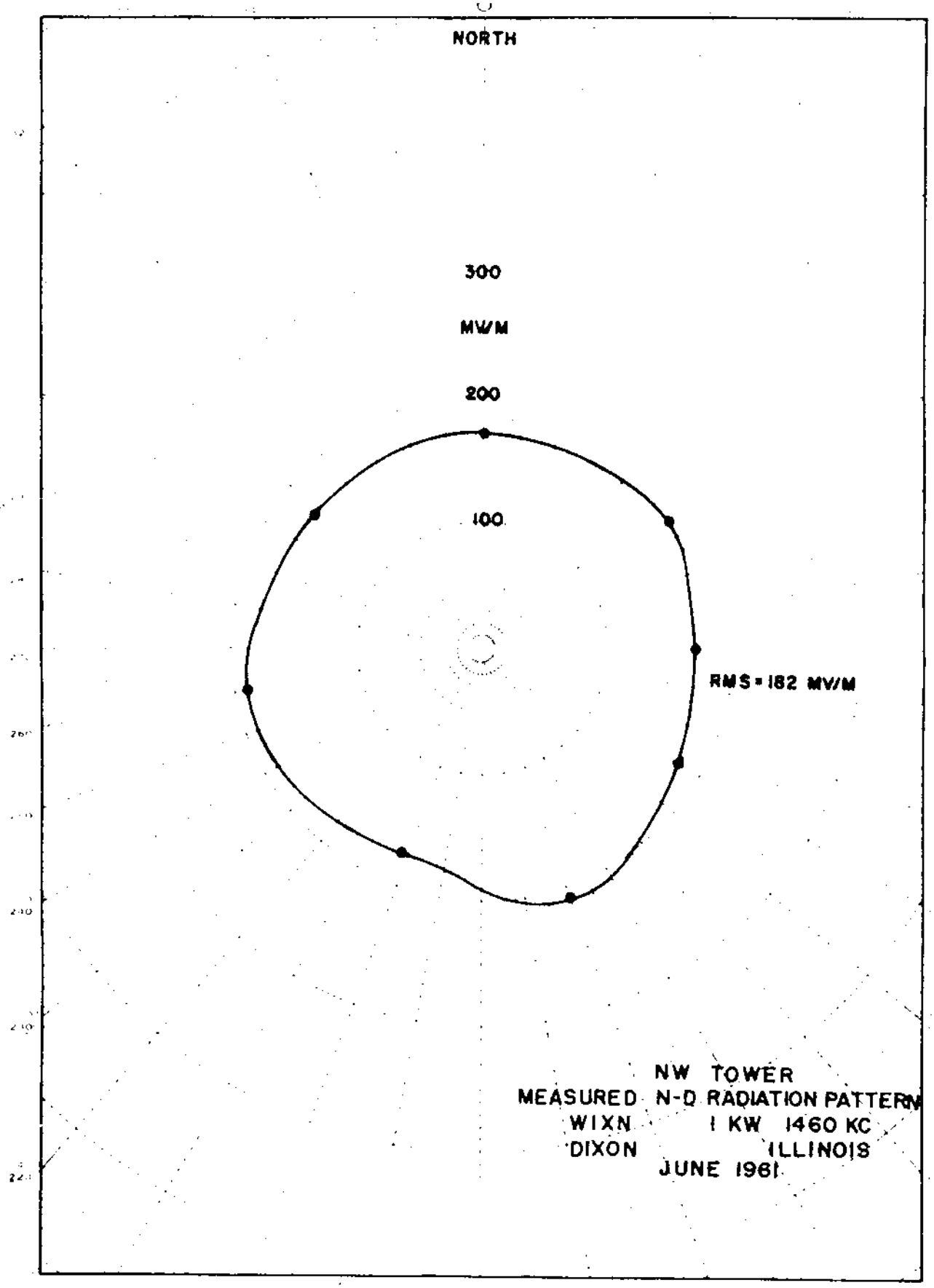
1460 kc

WIXN

MEASURED NON-DA
(9-20-61ct)

Station WIXN
Dixon, Illinois

1kw,DA-D,D
1460 kc



FCC File No. BL-8647
Accepted 8-23-61

Station WIXN
Dixon, Illinois

1460 kc

WJJZ

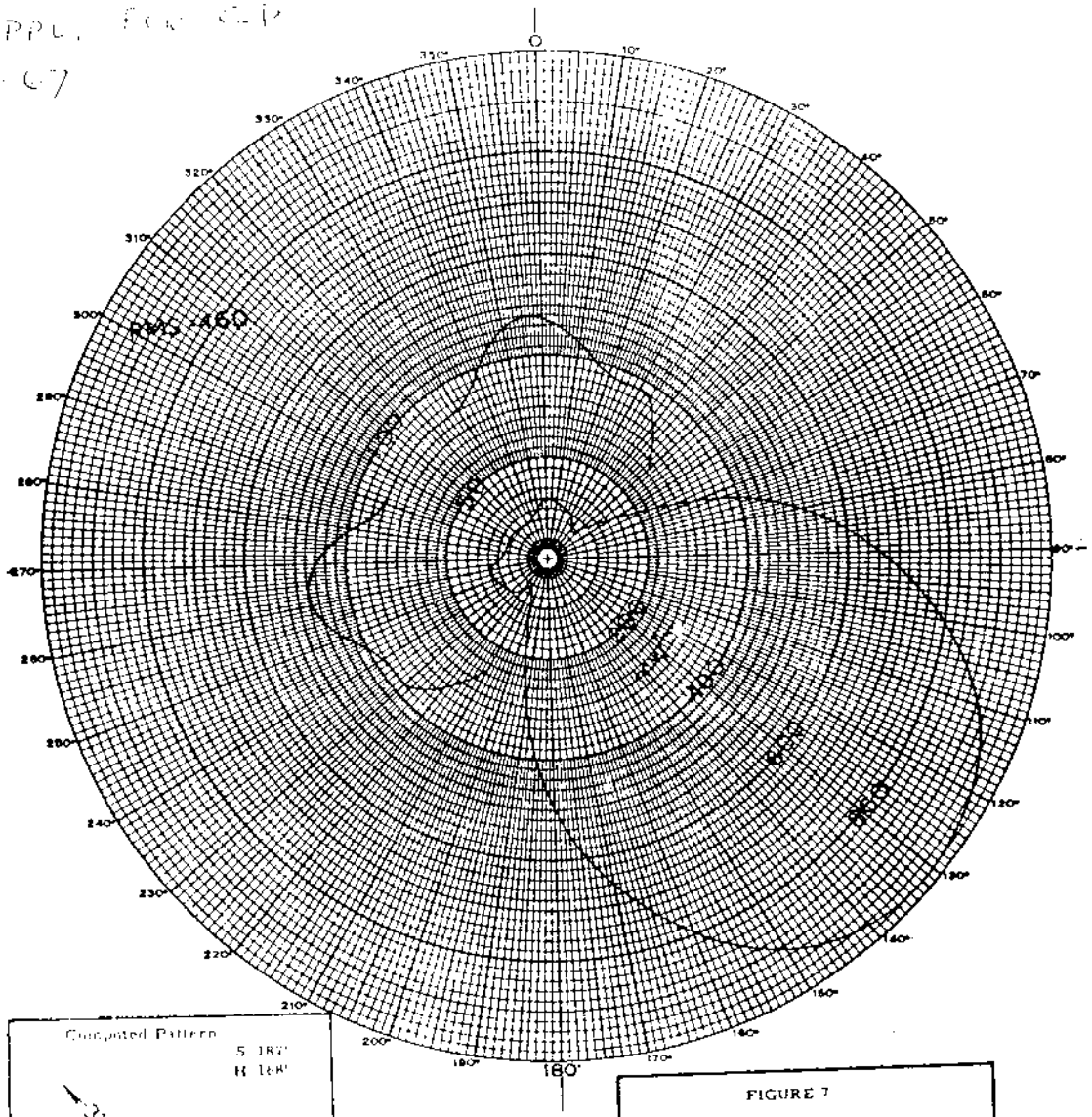
Proposed Day
(12-29-65ct)

New; West Jersey Bcstg. Co.
Mt. Holly, New Jersey

5kw,DA-D,D
1460 kc

BP-16357

GRANTED APPL. FOR CP
3-30-67



Computed Pattern
S 180°
H 180°
310°
NWIII
NWOIII
SEOIII
SEIII
#1 1.0/0°
#2 1.444/110.5°
#3 1.167/110.5°
#4 0.440/32°
N. Latitude 40° 05' 21"
W. Longitude 74° 50' 31"

DREUTZ & SNOWBERGER
Consulting Engineers

FIGURE 7
COMPUTED DAYTIME HORIZONTAL
RADIATION PATTERN
RADIO STATION WJJZ
MOUNT HOLLY, NEW JERSEY
1460KC 5KW DA-D
NOVEMBER 1965

FCC File No.BP-16357
Accepted 11-24-65

New; West Jersey Bcstg. Co.
Mt. Holly, New Jersey

1460 kc

WJJZ

Measured Day
(8-28-67ct)

Station WJJZ
Mt. Holly, New Jersey

5kw, DA-D, D
1460 kc

9-7-67
GRANTED
LICENSE
FOR NEW
AM STATION

MEASURED DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
WJJZ-1460 kHz. 5 kw., MT. HOLLY, N.J.

PAUL GODLEY CO.
CONSULTING RADIO ENGINEERS
LITTLE FALLS, N.J. 6/67

NORTH
0°
350°
10°
340°
20°

LINE OF TOWERS

100
50
250
500
750
1000 MV/M

Measured RMS
445 mv/m

ENLARGED DETAIL

LAT. 40° 05' 23"
LONG. 74° 50' 36"

FCC File No. BL-11717
Accepted 8-22-67

Station WJJZ
Mt. Holly, New Jersey

1460 kc

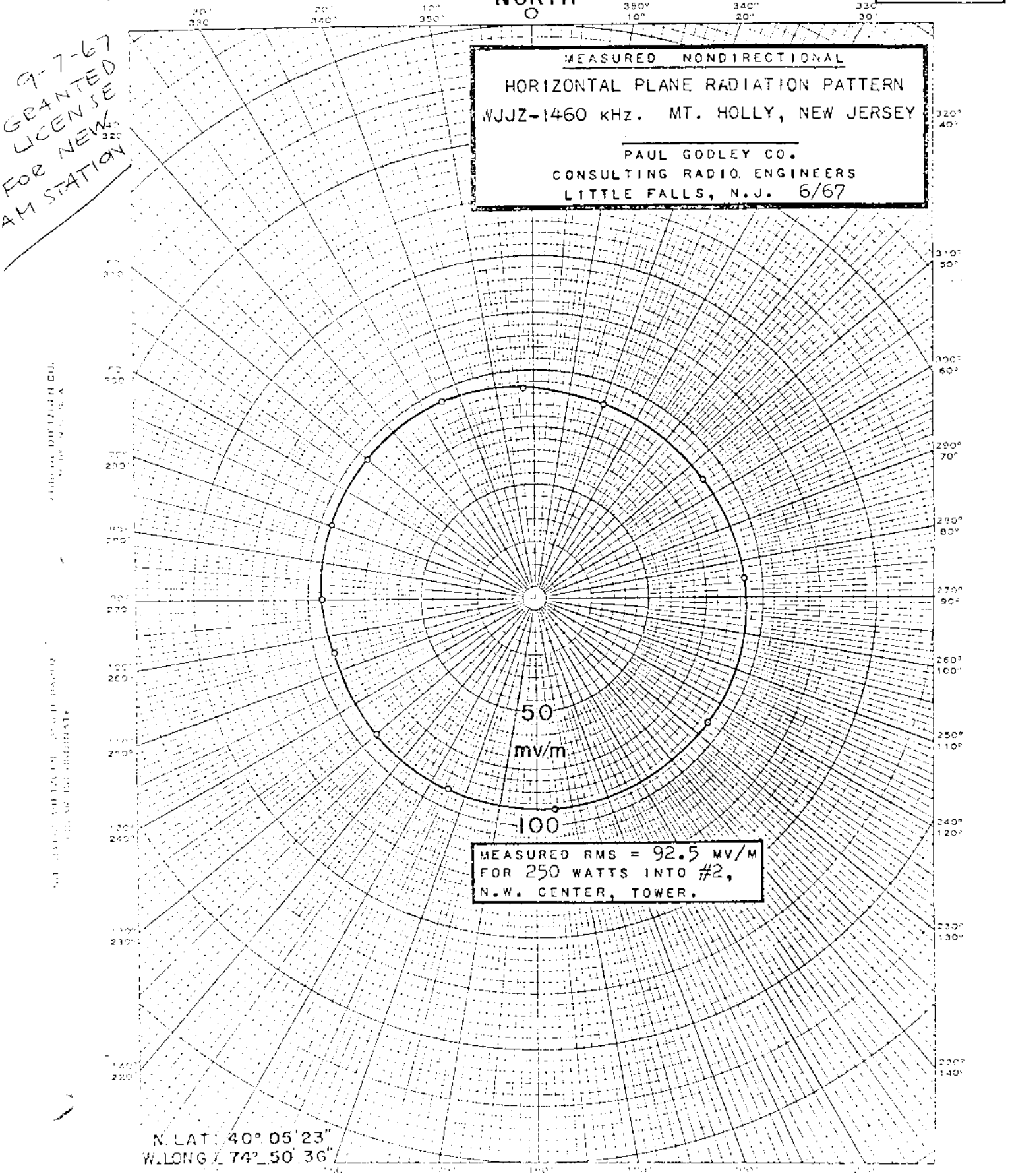
WJJZ

Measured Non-DA
(8-28-67ct)

Station WJJZ
Mt. Holly, New Jersey

5kw, DA-D, D
1460 kc

9-7-67
GRANTED
LICENSE
FOR NEW
AM STATION



FCC File No. BL-11717
Accepted 8-22-67

Station WJJZ
Mt. Holly, New Jersey

1460 kc

WKAM

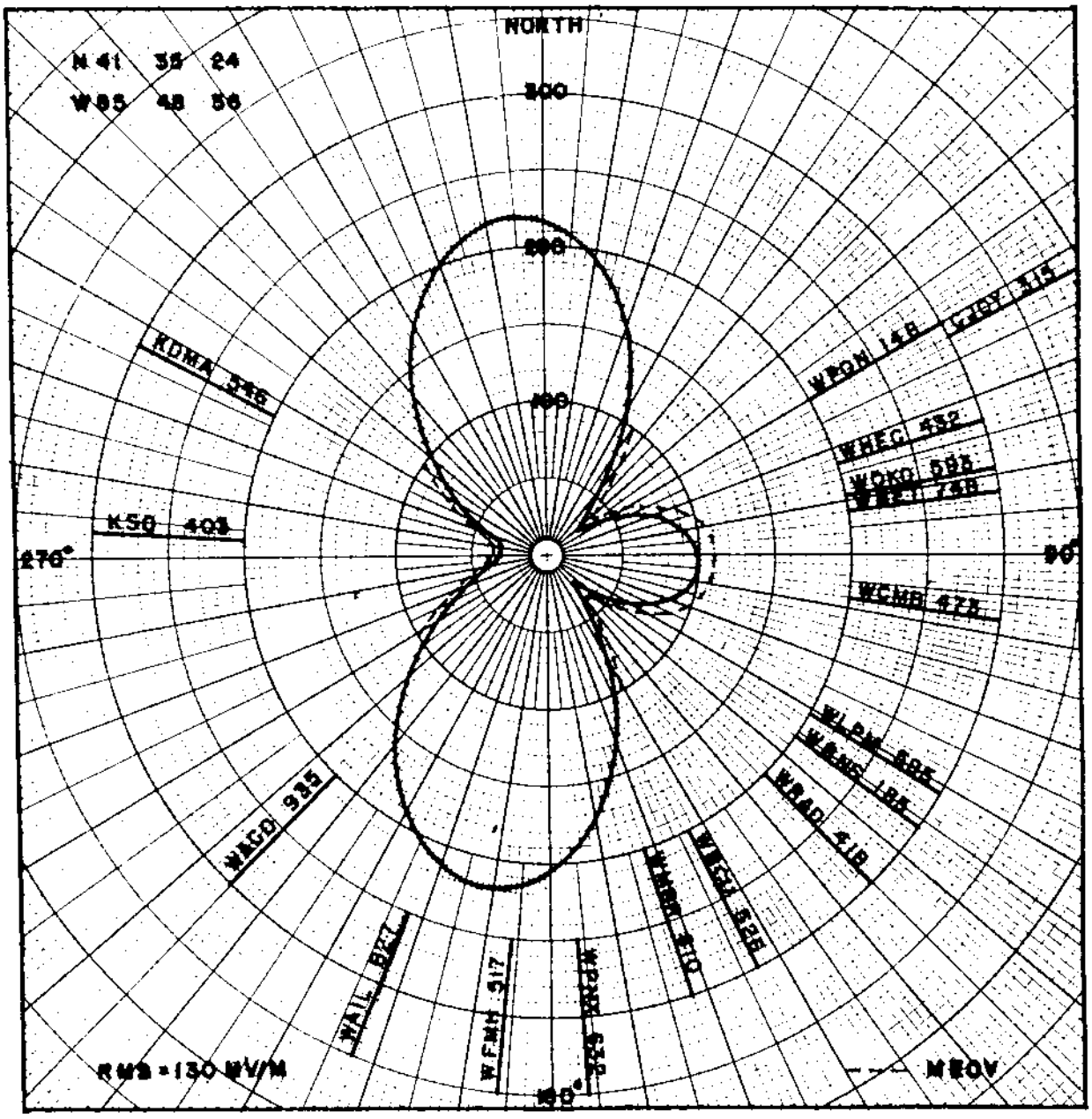
Proposed Night
(3-30-63ct)

Station WKAM
Goshen, Indiana

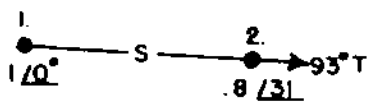
500w, ~~5kw-LS~~ 1Kw-LS, DA-N, U
1460 kc

Granted (1-14-64) CP to change from 1Kw D to .5, LS DA-N, U.

3/13/64 Pet. set aside show action



DESIGN VALUES



S = 201° = 376'

G = 110° = 200'

HORIZONTAL
PLANE RADIATION PATTERN
WKAM 1460 KC .5KW NIGHT
GOSHEN, INDIANA
JAN. 1962

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FCC File No. BP-15863
Accepted 3-14-63

Station WKAM
Goshen, Indiana

1460 kc

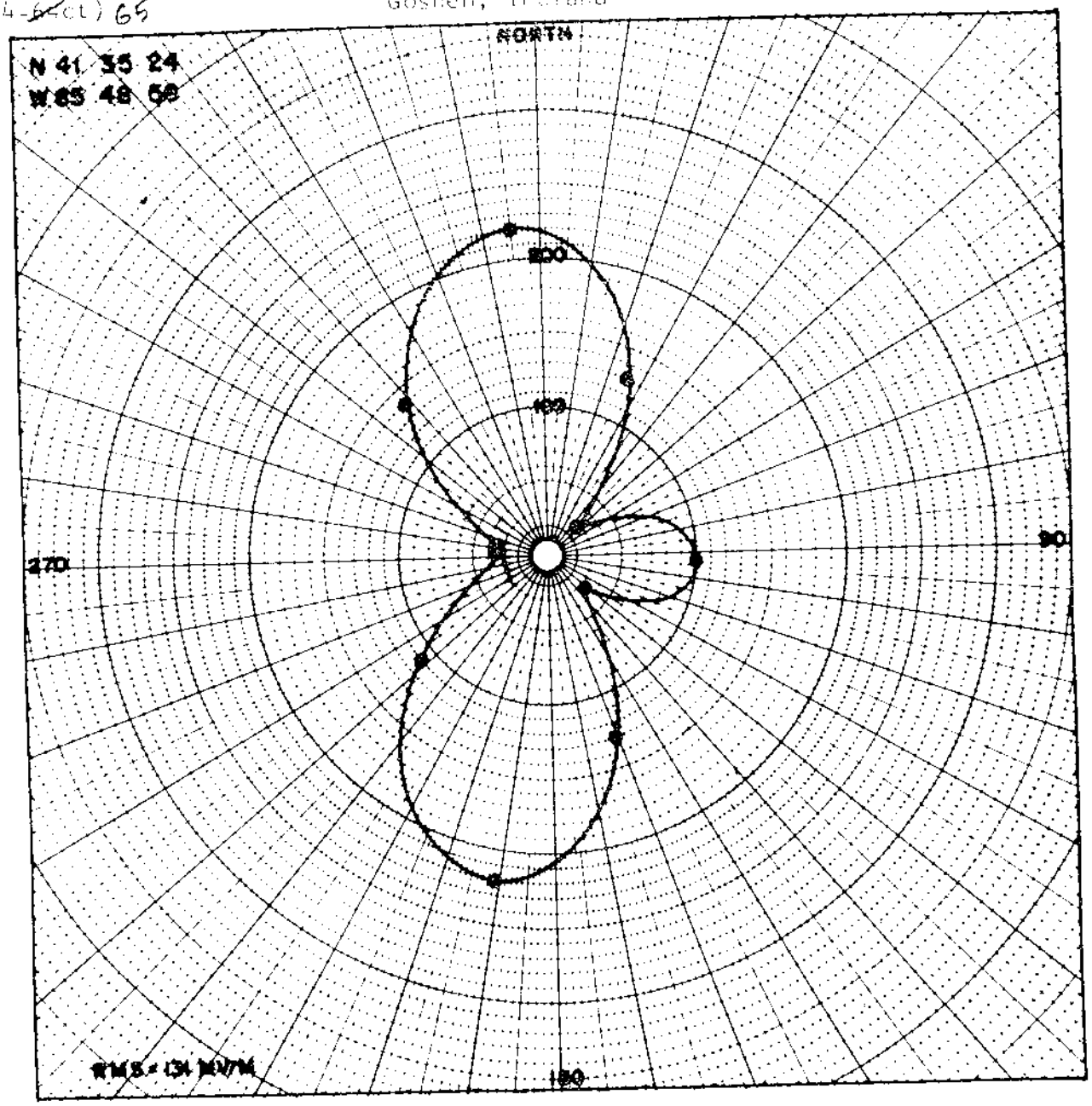
WKAM

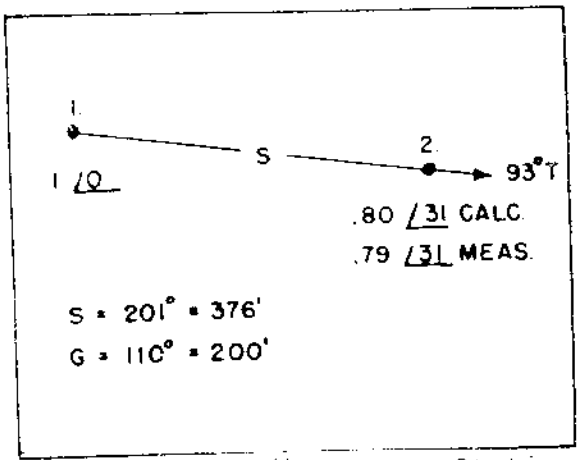
Measured Night
(2-24-~~64~~ct) 65

Station WKAM
Goshen, Indiana

500w, 1kw-LS, DA-N, U
1460 kc

BL-10764
3-4-65 LIC
CHG. HRS, DA-N





NIGHT
HORIZONTAL RADIATION
PATTERN

WKAM 0.5KW 1460 KC

GOSHEN INDIANA

SEPT. 1964

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FCC File No. BL-10764
Accepted 2-23-65

Station WKAM
Goshen, Indiana

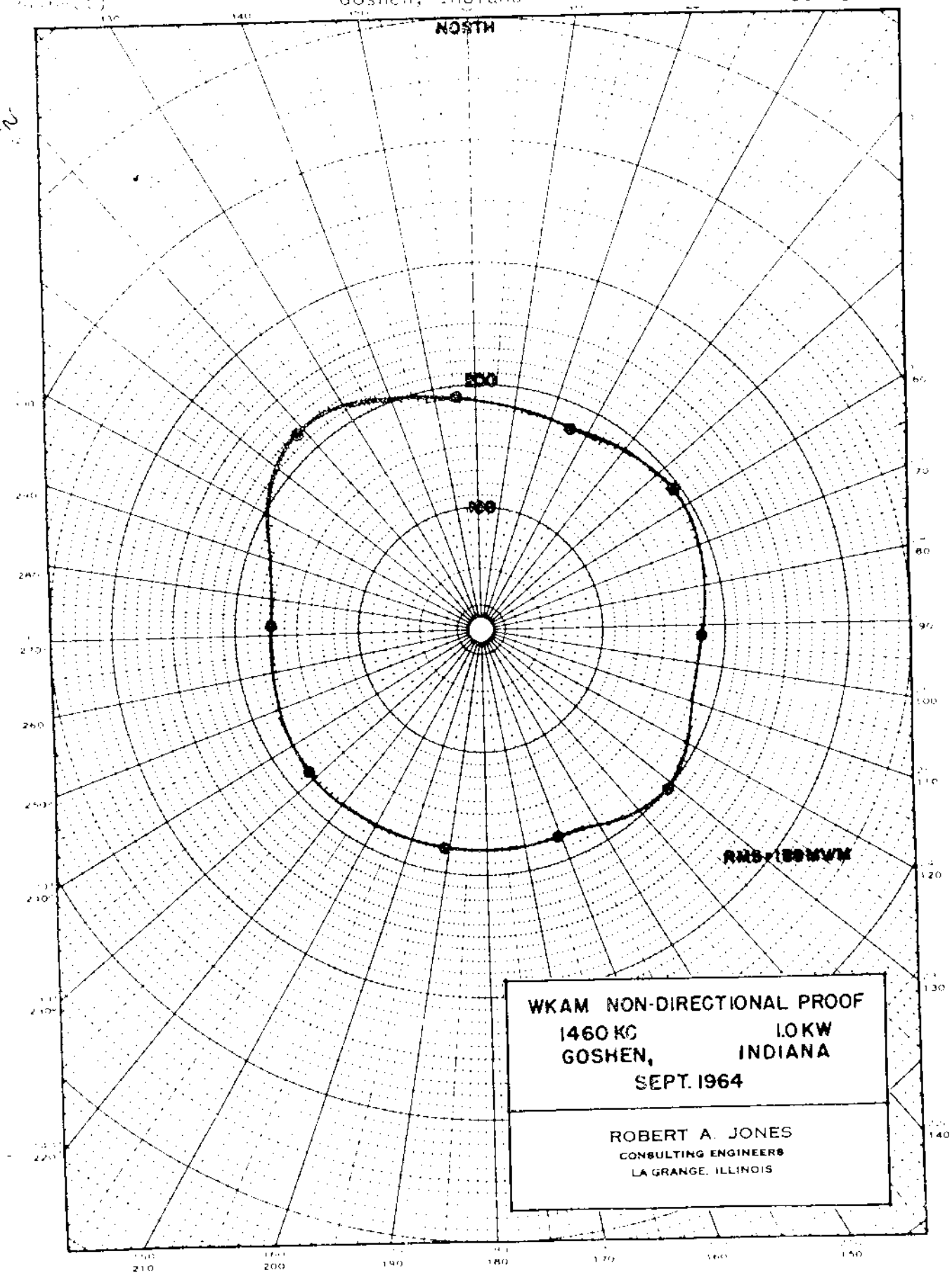
1460 kc

WKAM

Station WKAM
Goshen, Indiana

500w, 1kw-LS, DA-N, U
1460 kc

BL-10 764
3-4-65 LIC
-HG. HRS. DA-N



FCC File No. BL-10764
Accepted 2-23-65

Station WKAM
Goshen, Indiana

1460 kc

WLPM

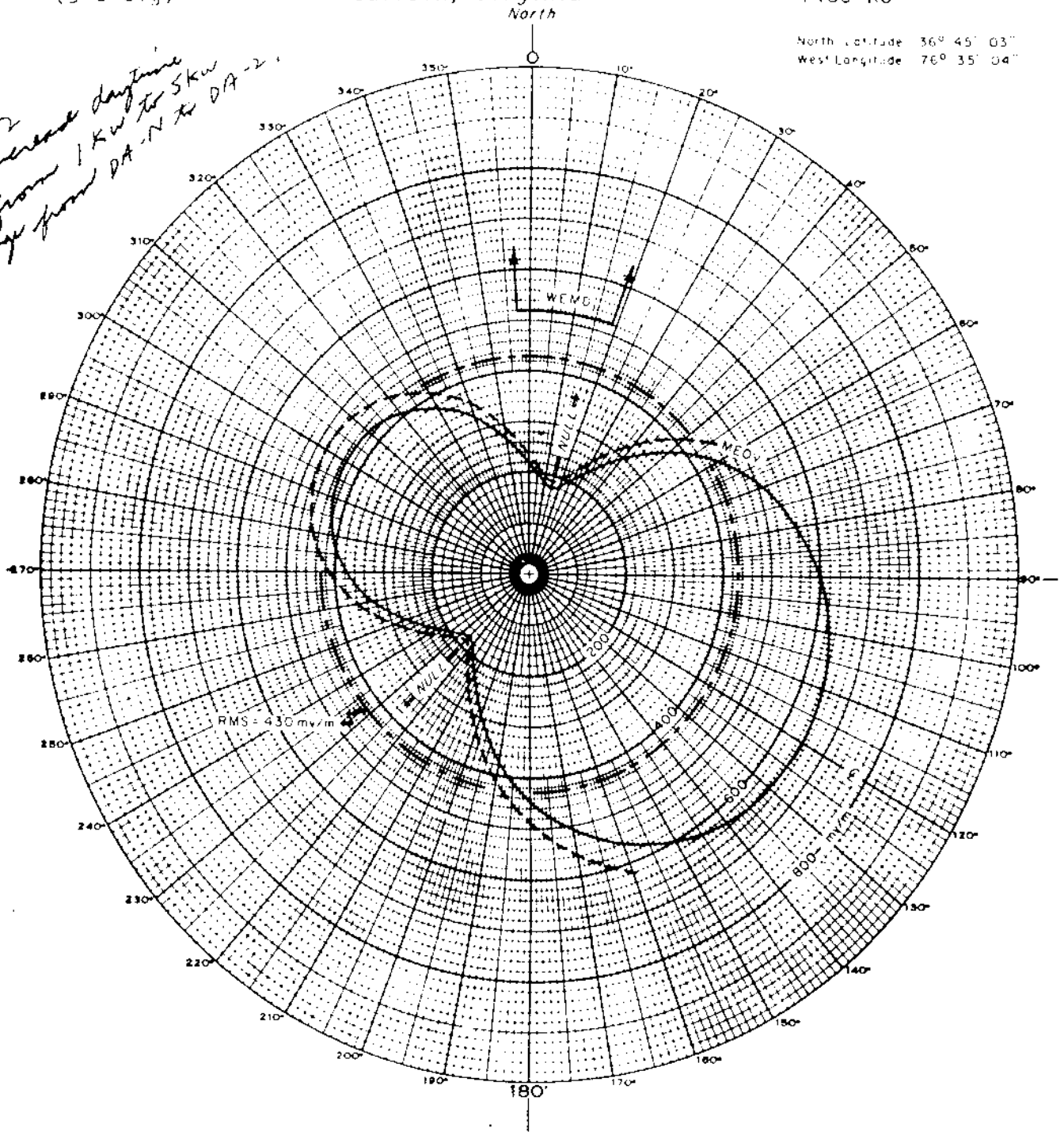
PROPOSED DAY
(5-8-61g)

Station WLPM
Suffolk, Virginia

500w, 5kw-LS, DA-2, U
1460 KC

6-20-62
granted increase daytime power from 1 KW to 5KW and change from DA-N to DA-2

North Latitude 36° 45' 03"
West Longitude 76° 35' 04"



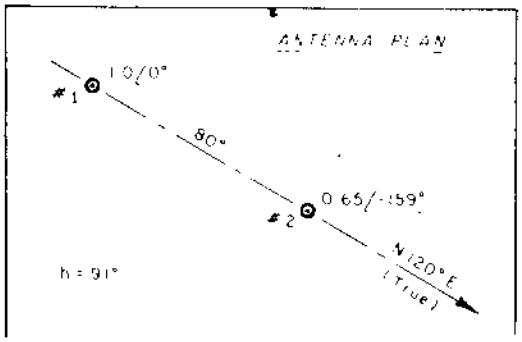


FIGURE 1
DAYTIME HORIZONTAL RADIATION PATTERN
WLPM 500W, 5KW-LS, DA-2 1460 KC
SUFFOLK, VIRGINIA

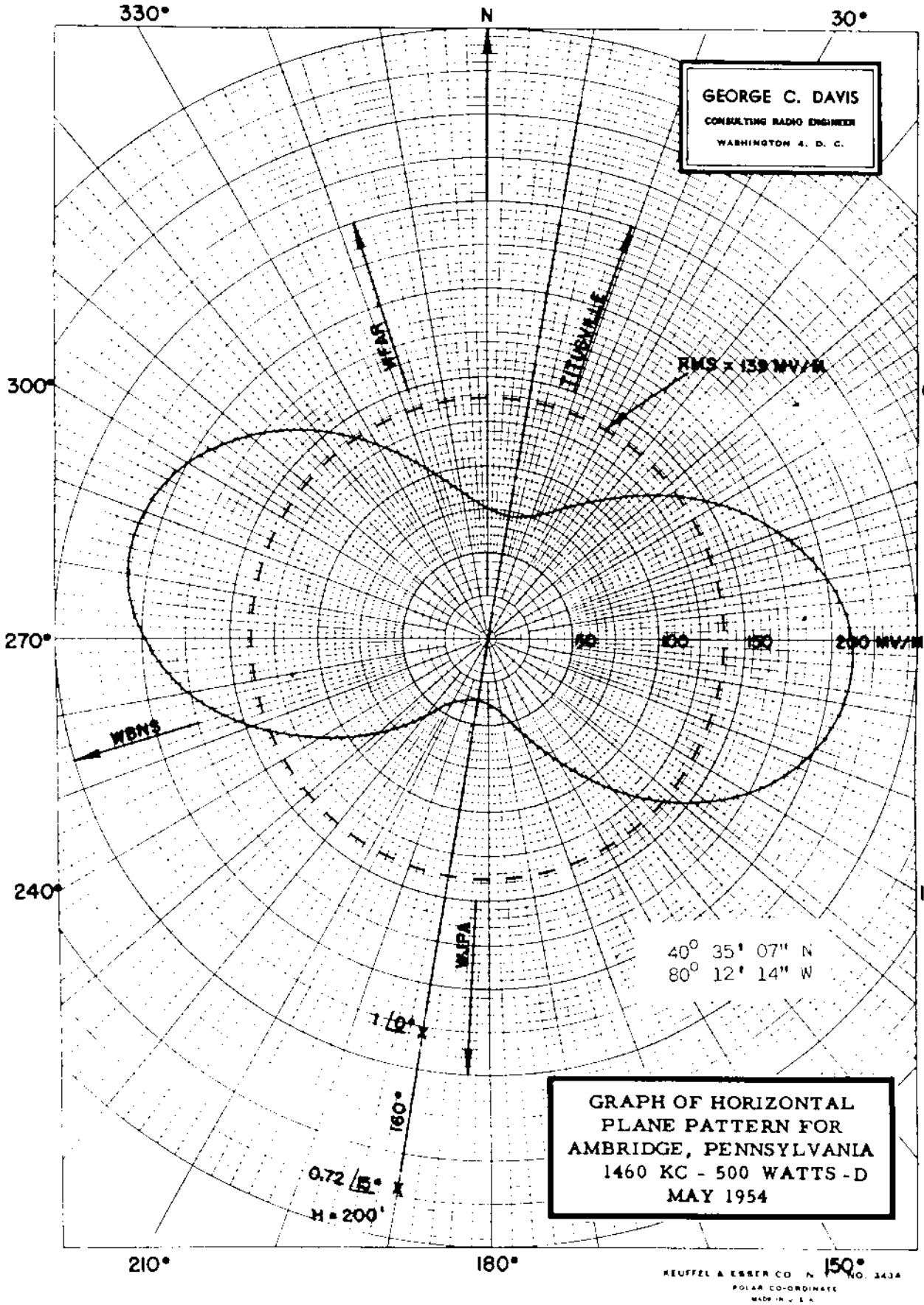
Prepared by
Lohnes and Culver Washington, D.C.

FCC File No. BP-14754
Accepted 4-25-61

WLPM
Suffolk, Virginia 1460 KC

WMBA
AMBRIDGE, PA

PROPOSED MINERS B/C SERVICE, INC. Ambridge, Pa. 500W, D, DA-D 1460 kc
DAY (6/11/54)



GRAPH OF HORIZONTAL PLANE PATTERN FOR AMBRIDGE, PENNSYLVANIA 1460 KC - 500 WATTS - D MAY 1954

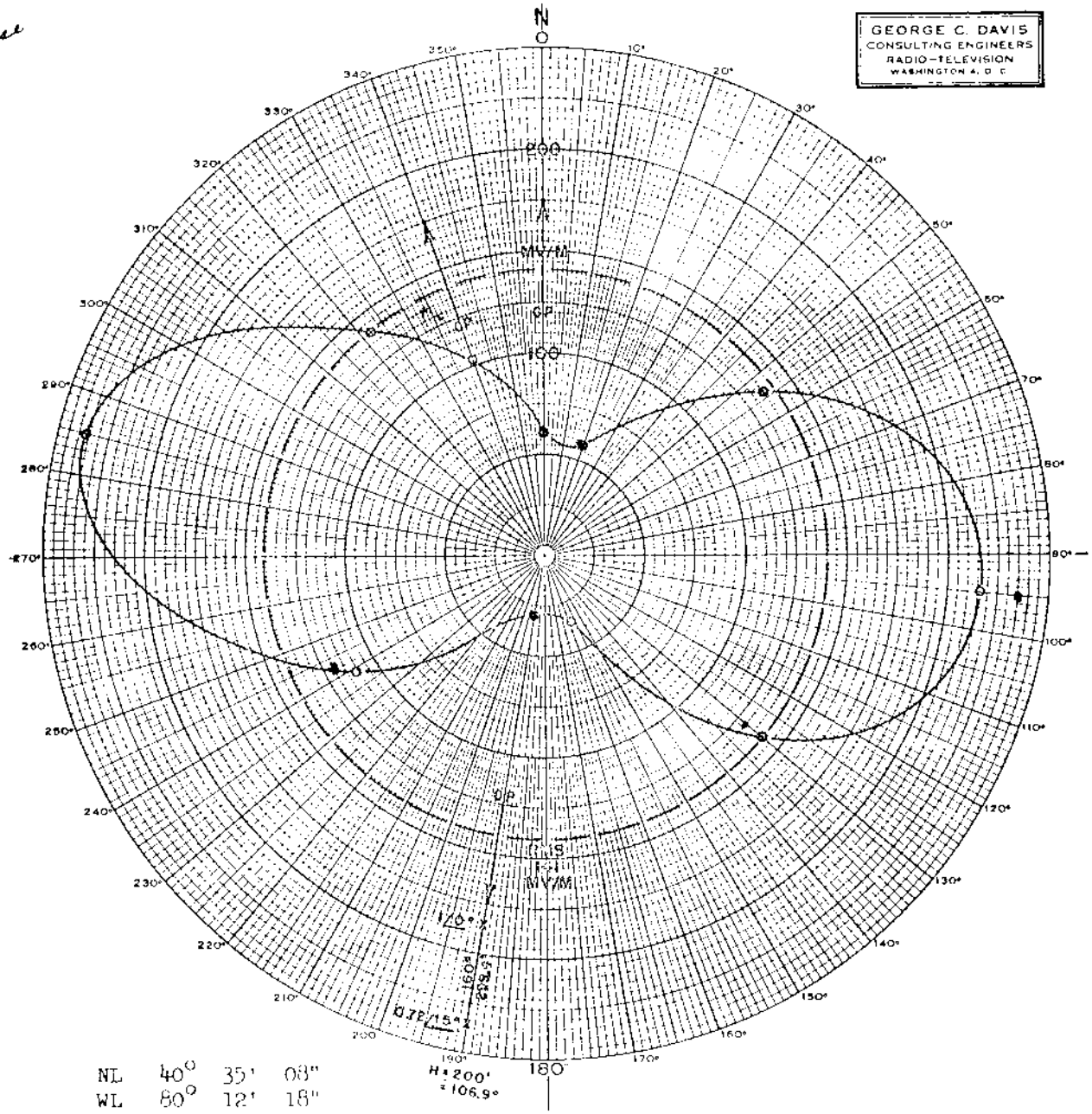
FCC File No. BP-9102 Amended Accepted 5/20/54 MINERS B/C SERVICE, INC. 1460 kc

WMBA

MEASURED DAY
(3-19-58g)

Station WMBA 500w, DA-D,D
Ambridge, Pennsylvania 1460 KC

granted license 7/15/58 for a new station



NL 40° 35' 08"
WL 80° 12' 18"

MEASURED
HORIZONTAL PLANE PATTERN
FOR WMBA, AMBRIDGE, PA.
1460 KC, 500 W, DA-D
FEBRUARY 1958

FCC File No. BL-7036
Accepted 3-10-58

WMBA
Ambridge, Pennsylvania 1460 KC

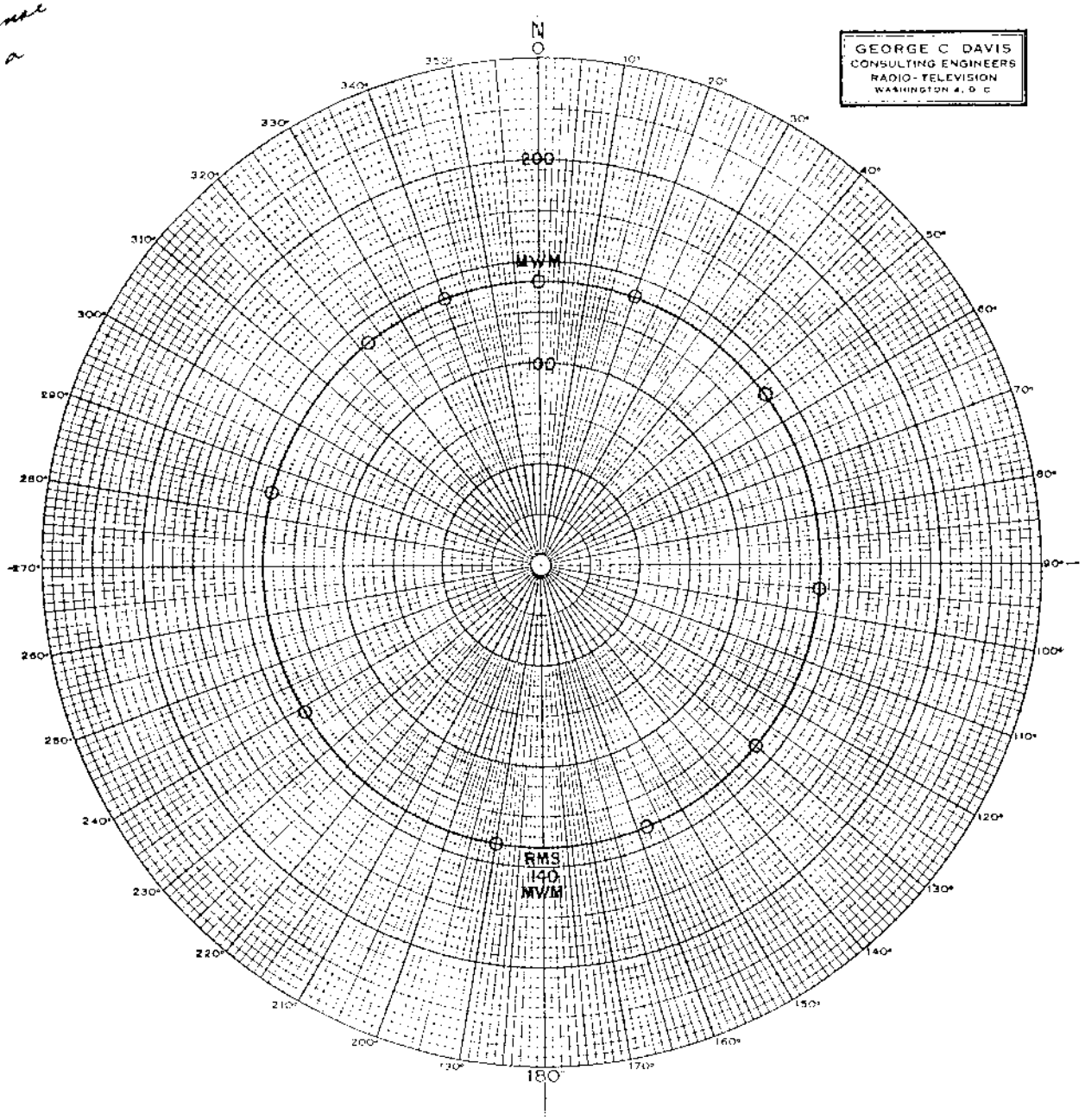
WMBA

MEASURED NON-DA
(3-19-58g)

Station WMBA
Ambridge, Pennsylvania

500w, DA-D,D
1460 KC

Granted license 7/15/58 for a new station



GEORGE C DAVIS
CONSULTING ENGINEERS
RADIO-TELEVISION
WASHINGTON 4, D. C.

NL 40° 35' 08"
WL 80° 12' 18"

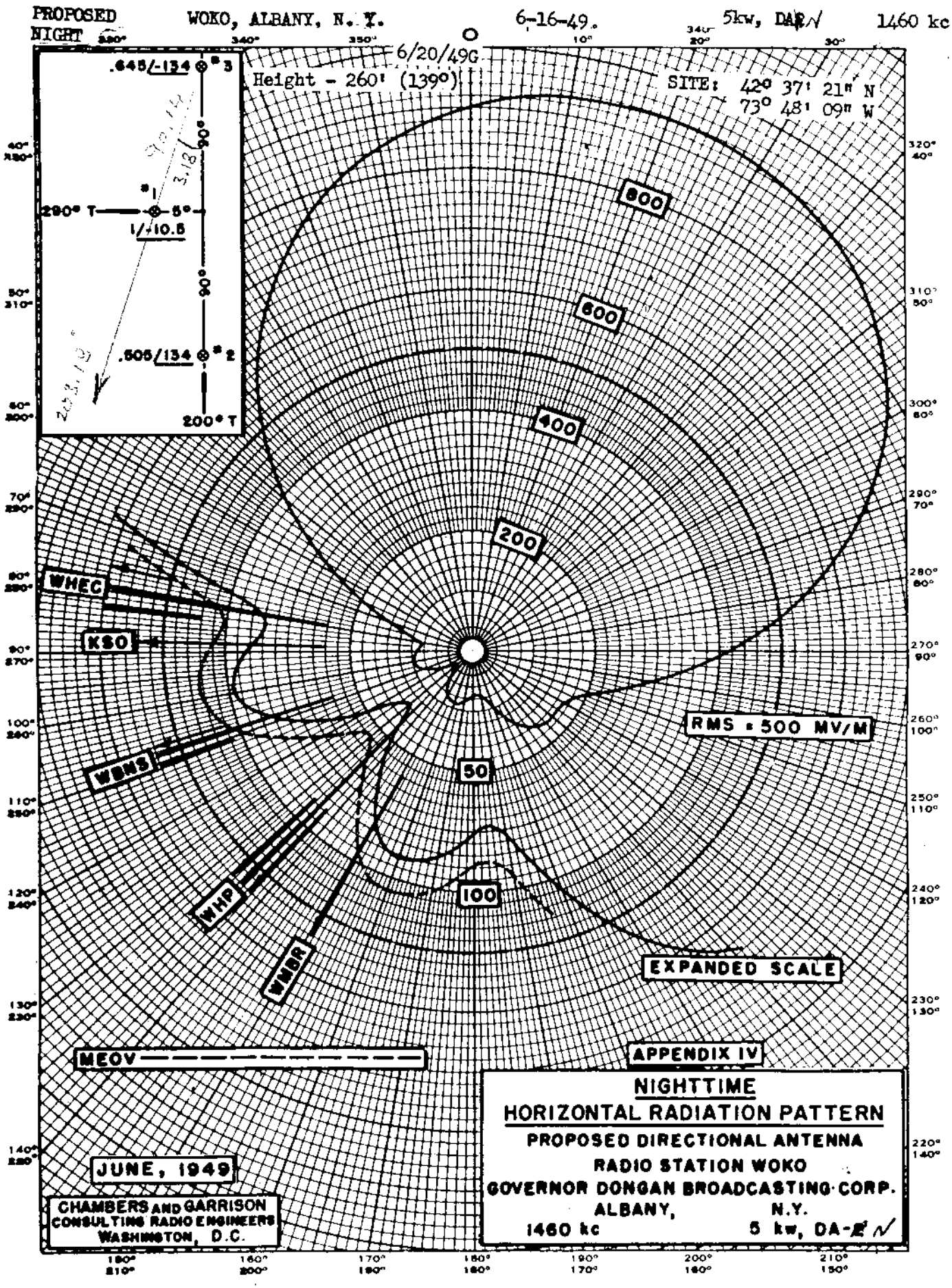
MEASURED
NON-DIRECTIVE
FIELD INTENSITY
FOR WMBA, AMBRIDGE, PA.
1460 KC, 500 W,
FEBRUARY 1958

FCC File No. BL-7036
Accepted 3-10-58

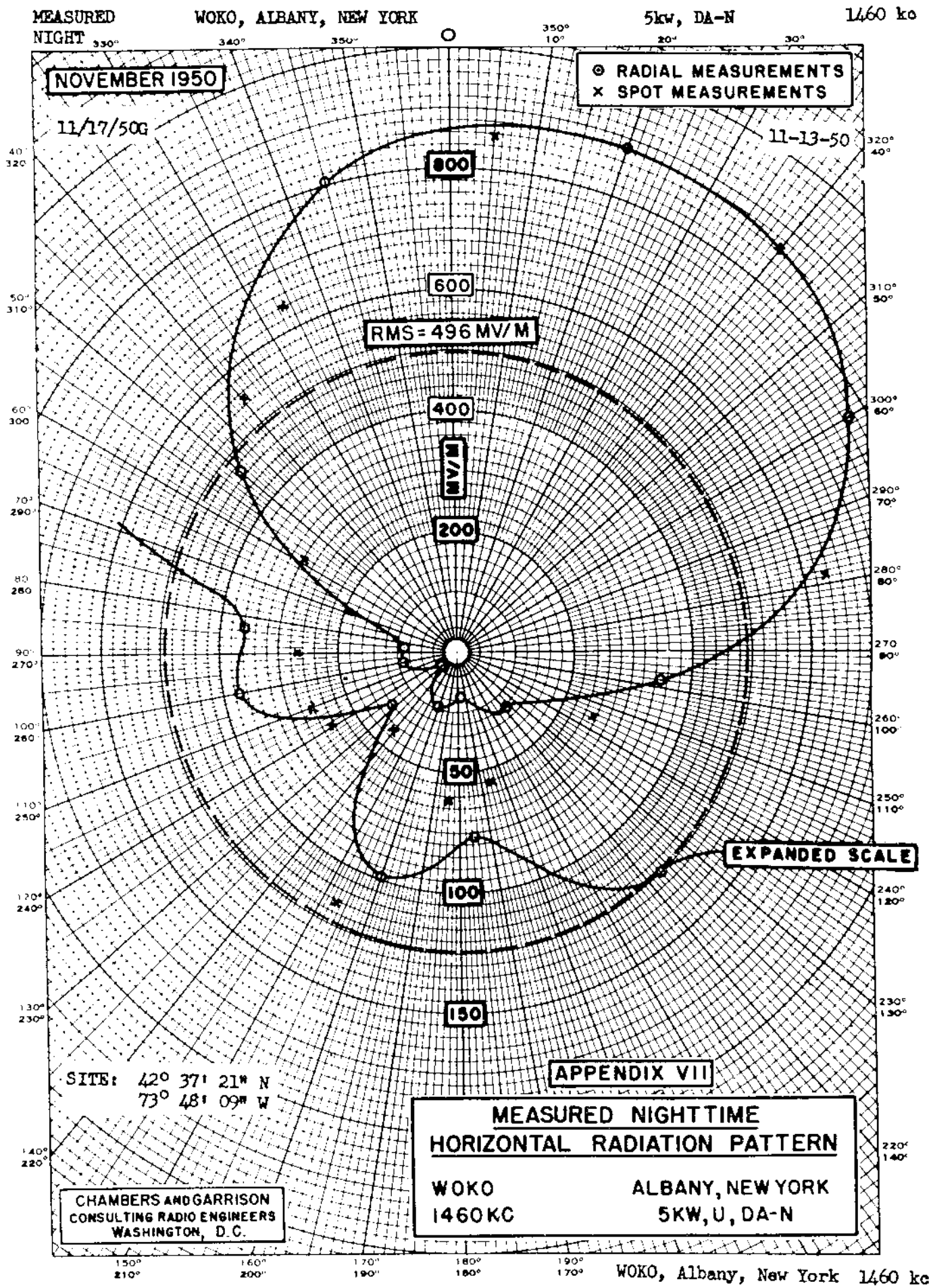
WMBA
Ambridge, Pennsylvania

1460 KC

WOKO

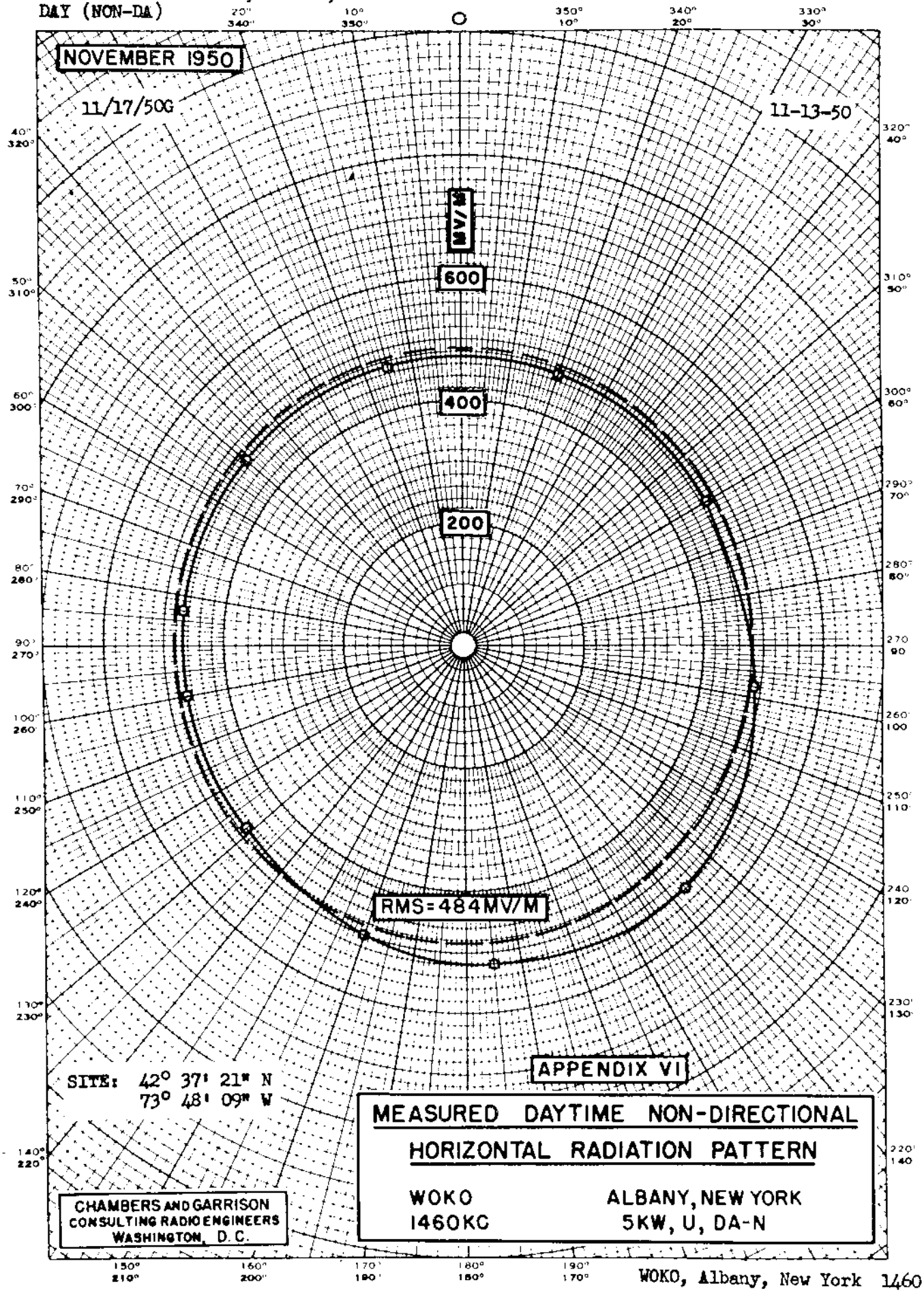

PROPOSED NIGHT
WOKO, ALBANY, N. Y.
6-16-49.
5kw, DA-N
1460 kc
6/20/49G
Height - 260' (139°)
SITE: 42° 37' 21" N
73° 48' 09" W
.645/-134 *3
3.18
90°
*1
290° T
5°
1/-10.8
90°
.505/134 *2
200° T
800
600
400
200
50
100
WHEC
KSO
WBNS
WHP
WMBR
MEOV
RMS = 500 MV/M
EXPANDED SCALE
APPENDIX IV
NIGHTTIME
HORIZONTAL RADIATION PATTERN
PROPOSED DIRECTIONAL ANTENNA
RADIO STATION WOKO
GOVERNOR DONGAN BROADCASTING CORP.
ALBANY, N.Y.
1460 kc
5 kw, DA-N
JUNE, 1949
CHAMBERS AND GARRISON
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

WOKO



WOKO, Albany, New York 1460 kc

MEASURED DAY (NON-DA) WOKO, ALBANY, NEW YORK 5kw, DA-N 1460 kc



WOKO, Albany, New York 1460 kc

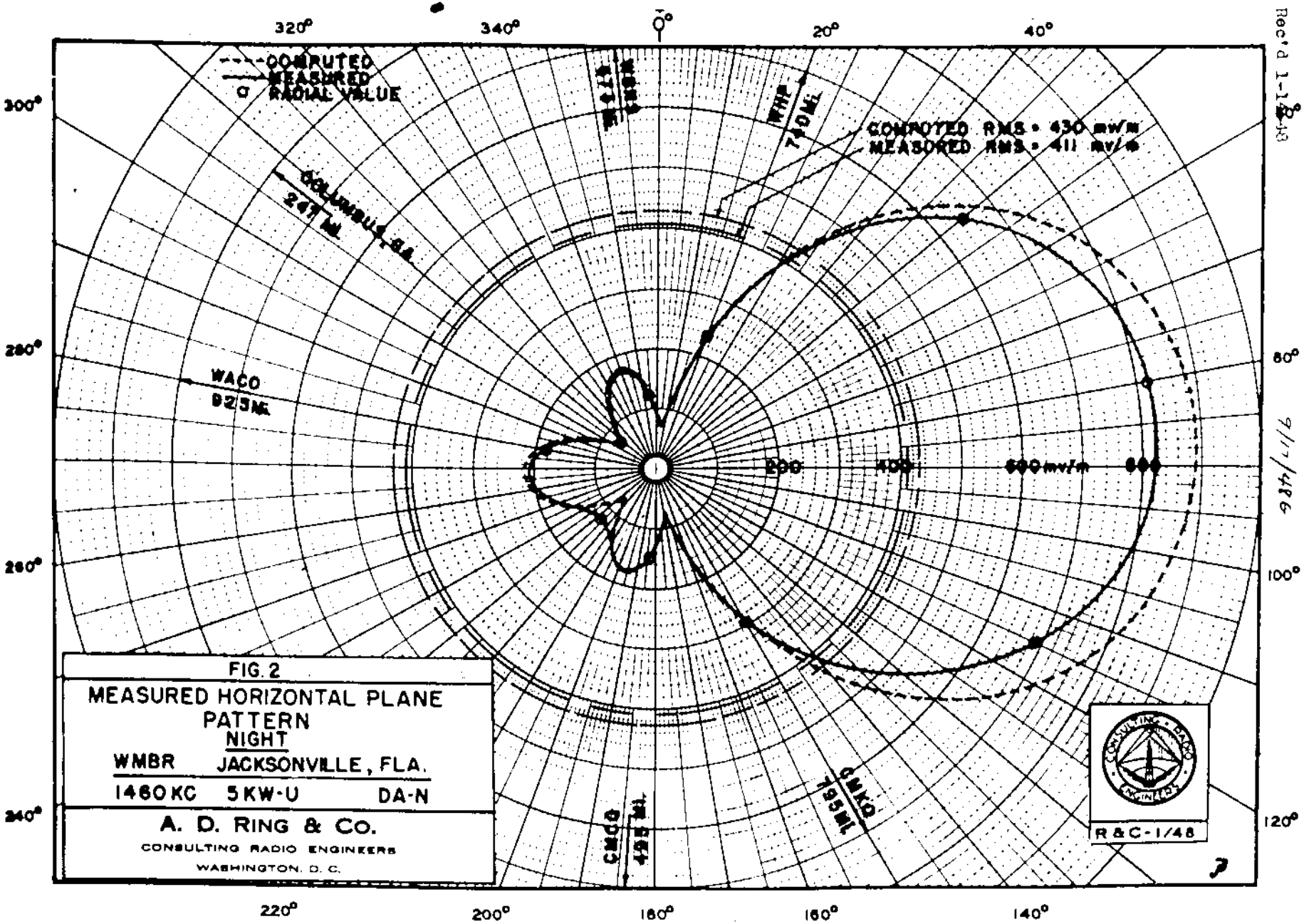


FIG. 2

MEASURED HORIZONTAL PLANE PATTERN

NIGHT

WMBR JACKSONVILLE, FLA.

1460 KC 5 KW-U DA-N

A. D. RING & CO.

CONSULTING RADIO ENGINEERS

WASHINGTON, D. C.

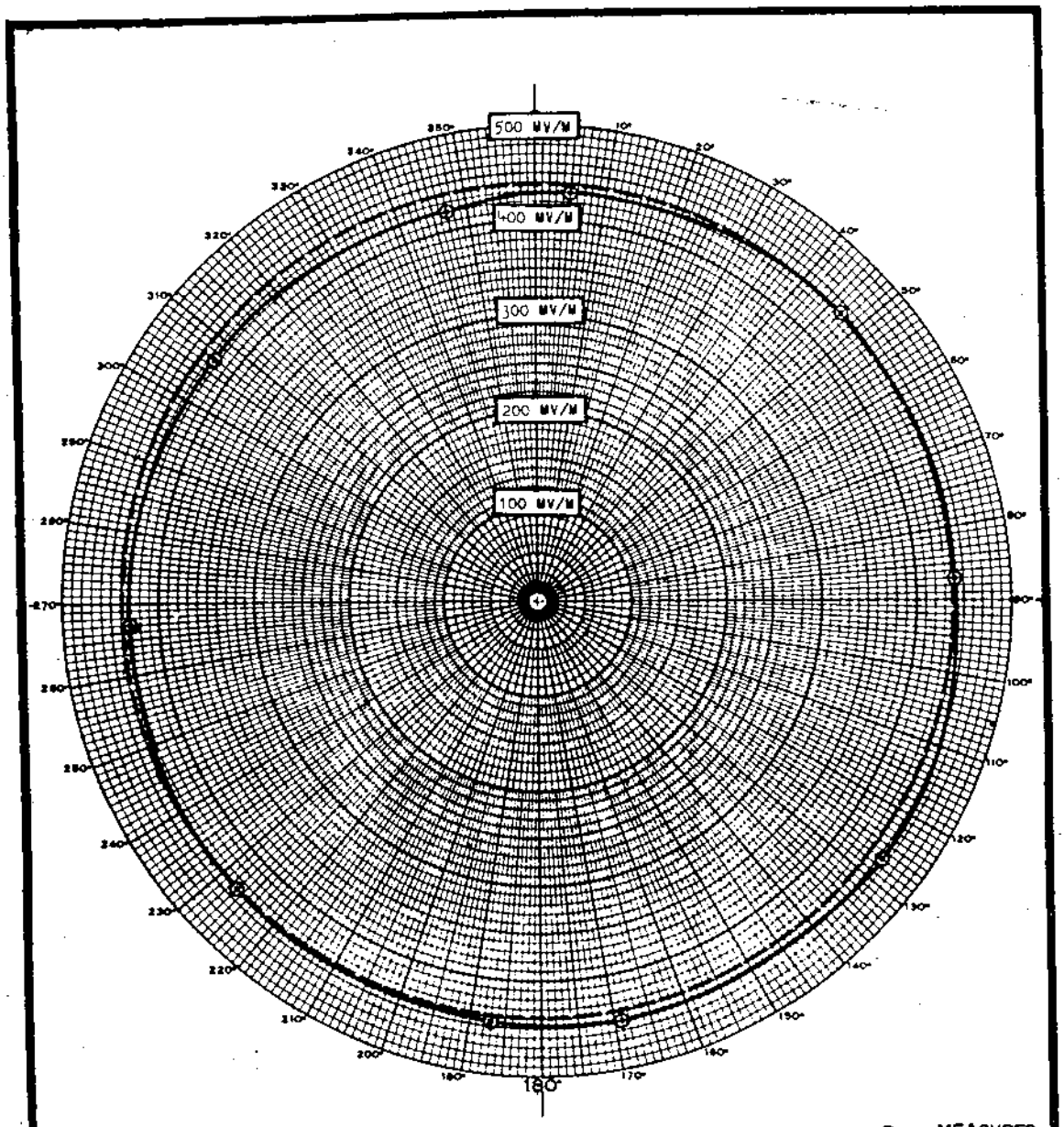
WPDQ

Measured Non-DA
(8-26-66ct)

Station WMBR
Jacksonville, Florida

5kw,DA-N,U
1460 kc

-IC 9-1-66



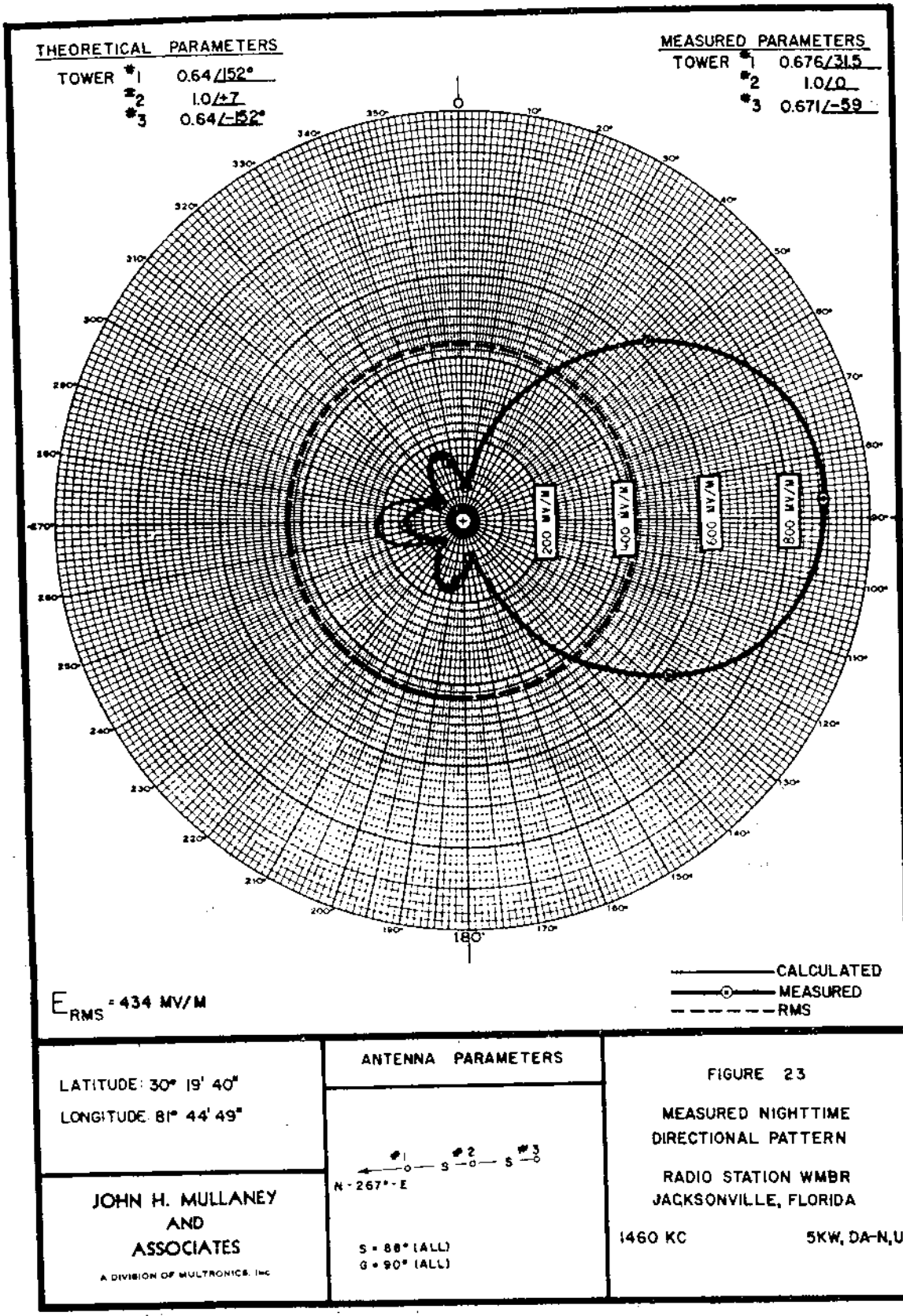
LATITUDE: 30° 19' 40" LONGITUDE: 81° 44' 49"	ANTENNA PARAMETERS TOWER #2	FIGURE 22 MEASURED NON DIRECTIONAL PATTERN RADIO STATION WMBR JACKSONVILLE, FLORIDA 1460 KC 5KW, DA-N,U
JOHN H. MULLANEY AND ASSOCIATES A DIVISION OF MULTRONICS, INC		

FCC File No. BL-11385
Accepted 8-18-66

Station WMBR
Jacksonville, Florida

1460 kc

LIC 9-1-66


THEORETICAL PARAMETERS
TOWER #1 0.64/152°
#2 1.0/+7
#3 0.64/-152°
MEASURED PARAMETERS
TOWER #1 0.676/31.5
#2 1.0/0
#3 0.671/-59
200 MV/M
400 MV/M
600 MV/M
800 MV/M
180°
CALCULATED
MEASURED
RMS
E RMS = 434 MV/M
LATITUDE 30° 19' 40"
LONGITUDE 81° 44' 49"
JOHN H. MULLANEY AND ASSOCIATES
A DIVISION OF MULTRONICS, INC
ANTENNA PARAMETERS
#1 S #2 S #3
N - 267° - E
S = 88° (ALL)
G = 90° (ALL)
FIGURE 23
MEASURED NIGHTTIME DIRECTIONAL PATTERN
RADIO STATION WMBR
JACKSONVILLE, FLORIDA
1460 KC
5KW, DA-N, U

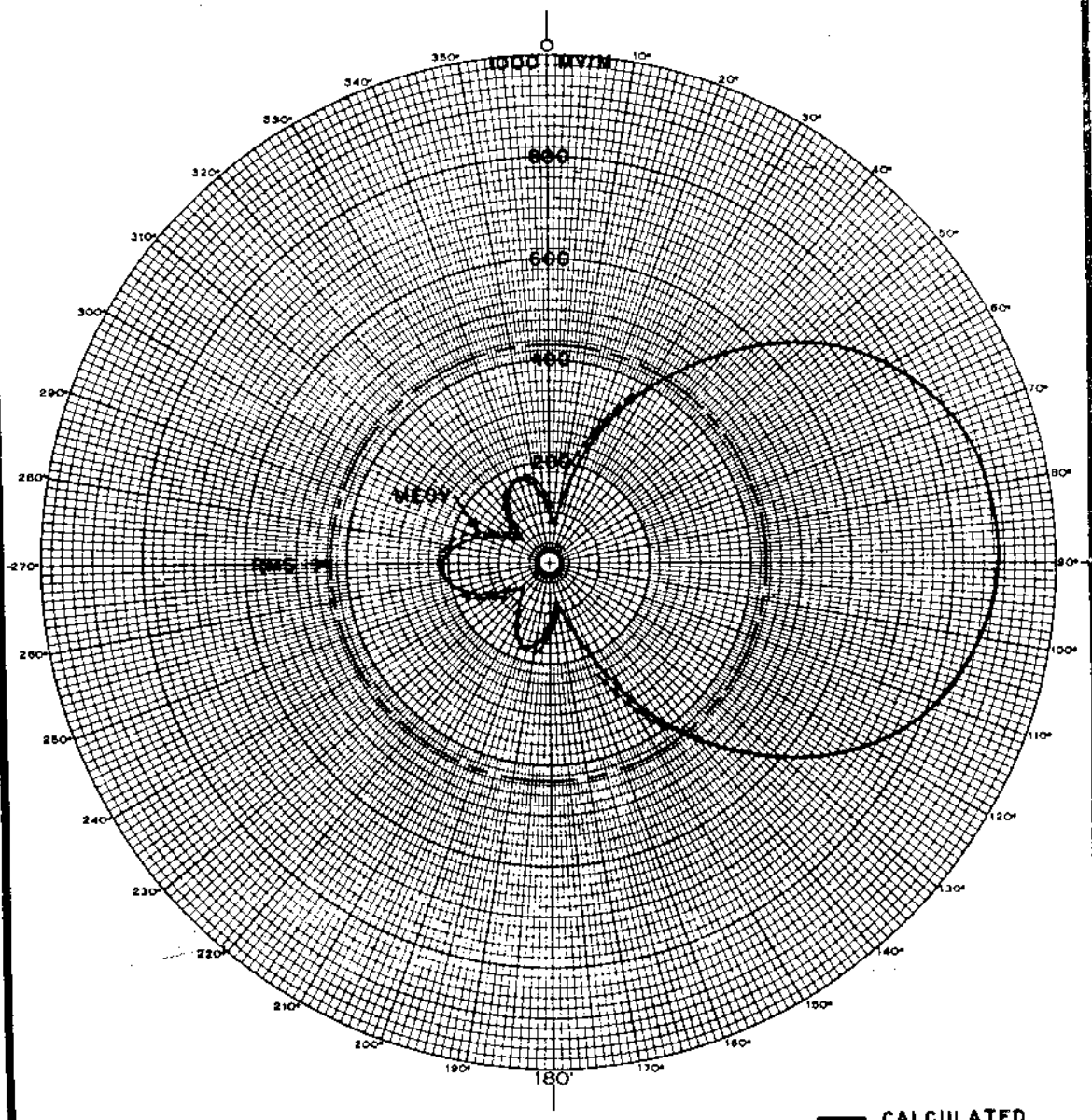
WPDQ

Proposed Night
(9-28-65ct)

Station WMBR
Jacksonville, Florida

5kw,DA-N,U
1460 kc

-P 9-21-65
CHG. LOC.



E_{RMS} = 430 MV/M

—— CALCULATED
---- MEOV

LONGITUDE: W 81° 44' 49.5"
LATITUDE: N 30° 19' 40.5"

JOHN H. MULLANEY
AND
ASSOCIATES
A DIVISION OF MULTRONICS, INC.

ANTENNA PARAMETERS

267° 1 —88°— 2 —88°— 3
0.64∠152° 1+7 0.64∠-152°

$G_1 = G_2 = G_3$ = 90°-170'

FIGURE 1

NIGHTTIME DIRECTIONAL
HORIZONTAL PATTERN
RADIO STATION
WMBR
JACKSONVILLE, FLORIDA

1460 KC 5 KW-U DA-N

FCC File No. BP-16697
Accepted 8-31-65

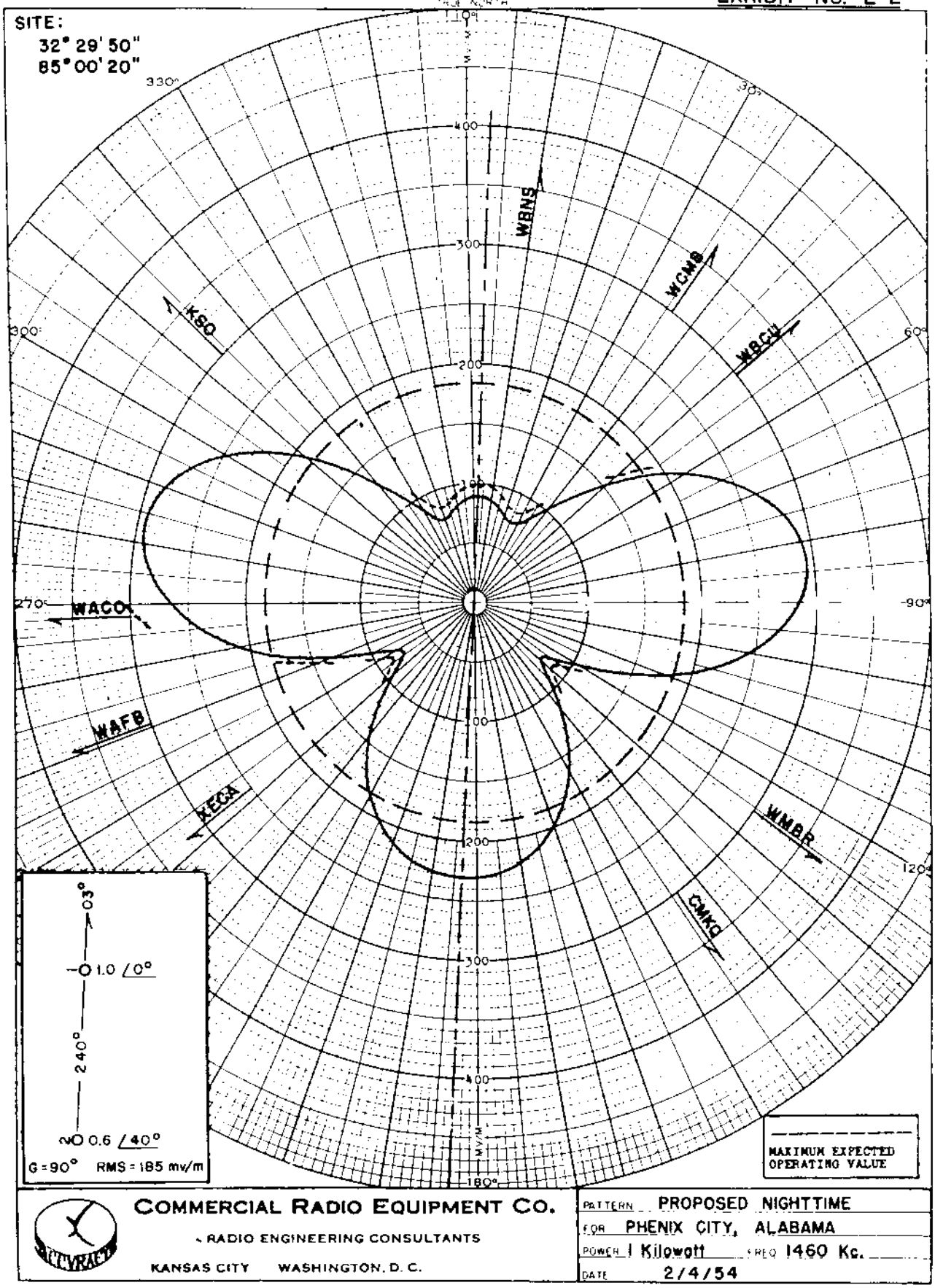
Station WMBR
Jacksonville, Florida

1460 kc

PROPOSED NIGHT (3/12/54G) WPNX, Phenix City, Alabama 1KW, U, DA-N 1460 kc

EXHIBIT NO. E-2

Granted increase to 1 KW in 7/24/54 in non DA-Day power



COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON, D. C.

PATTERN PROPOSED NIGHTTIME
FOR PHENIX CITY, ALABAMA
POWER 1 Kilowatt FREQ 1460 Kc.
DATE 2/4/54

granted increase 11/17/55 to 5 KW of daytime ND power

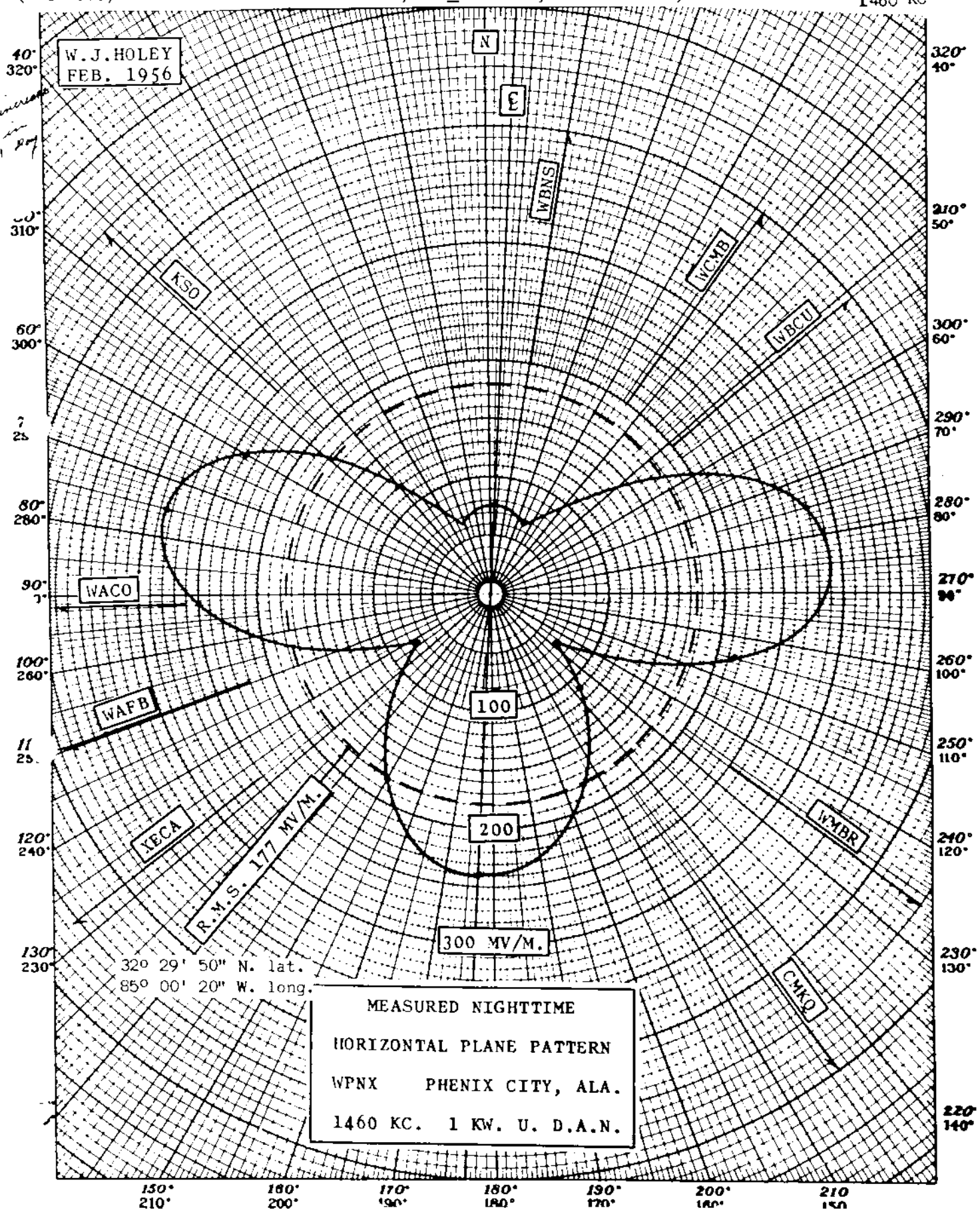
WPNX

MEASURED NIGHT (4-17-56G)

STATION WPNX
PHENIX CITY, ALA-COLUMBUS, GA.

1KW
DA-N, U

1460 KC



Granted increase 7/24/58 to non-DA power

32° 29' 50" N. lat.
85° 00' 20" W. long.

MEASURED NIGHTTIME
HORIZONTAL PLANE PATTERN
WPNX PHENIX CITY, ALA.
1460 KC. 1 KW. U. D.A.N.

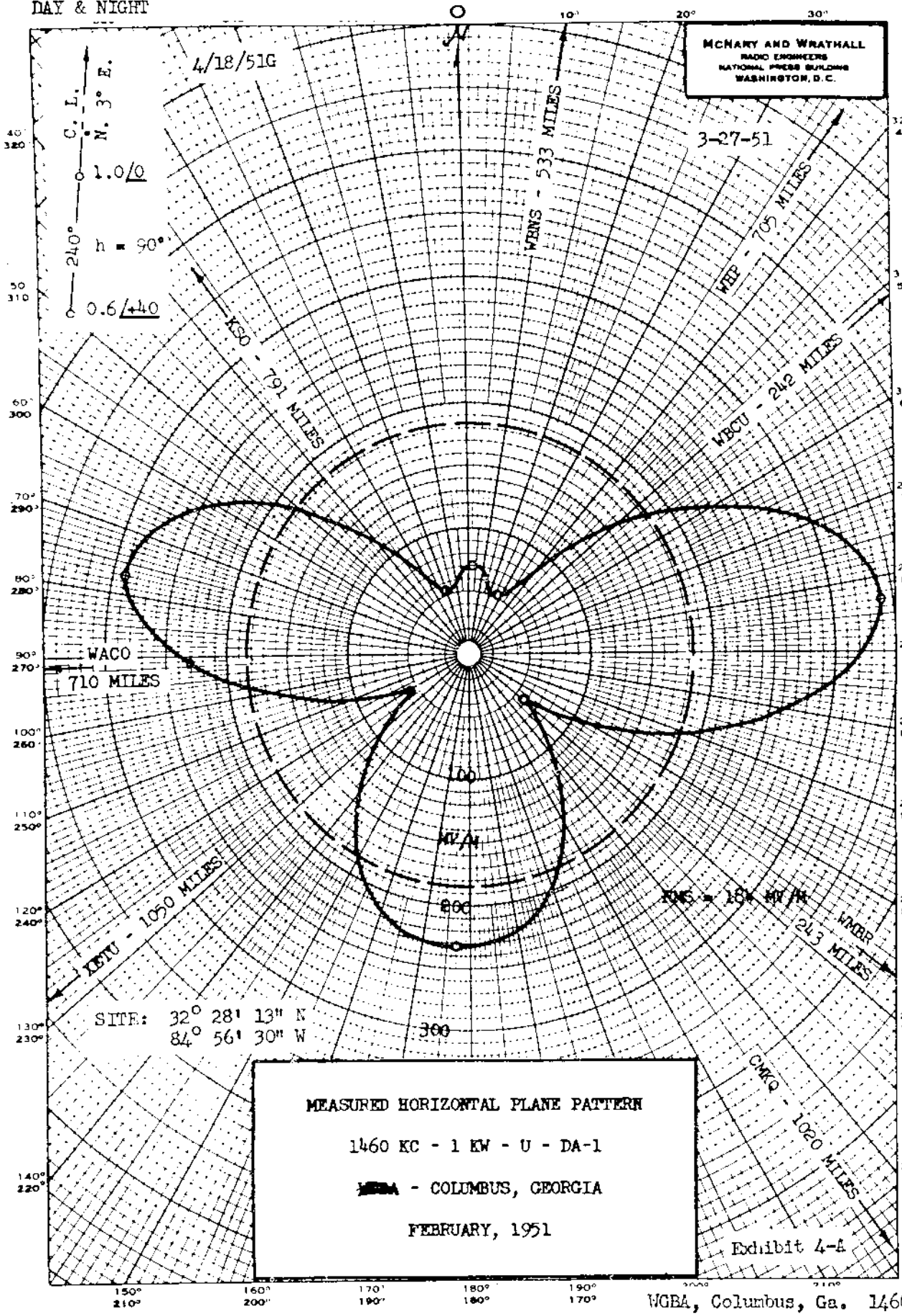
FILE NO. BL-6109

ACCEPTED 3-14-56 FCC

WPNX, Phenix City, Ala.
Columbus, Ga. 1460 KC

WPNY PHOENIX CITY, A 1-A

MEASURED DAY & NIGHT ~~WGBA, COLUMBUS, GA.~~ BZ-3281 1kw, DA-1 1460 kc



WGBA, Columbus, Ga. 1460 kc

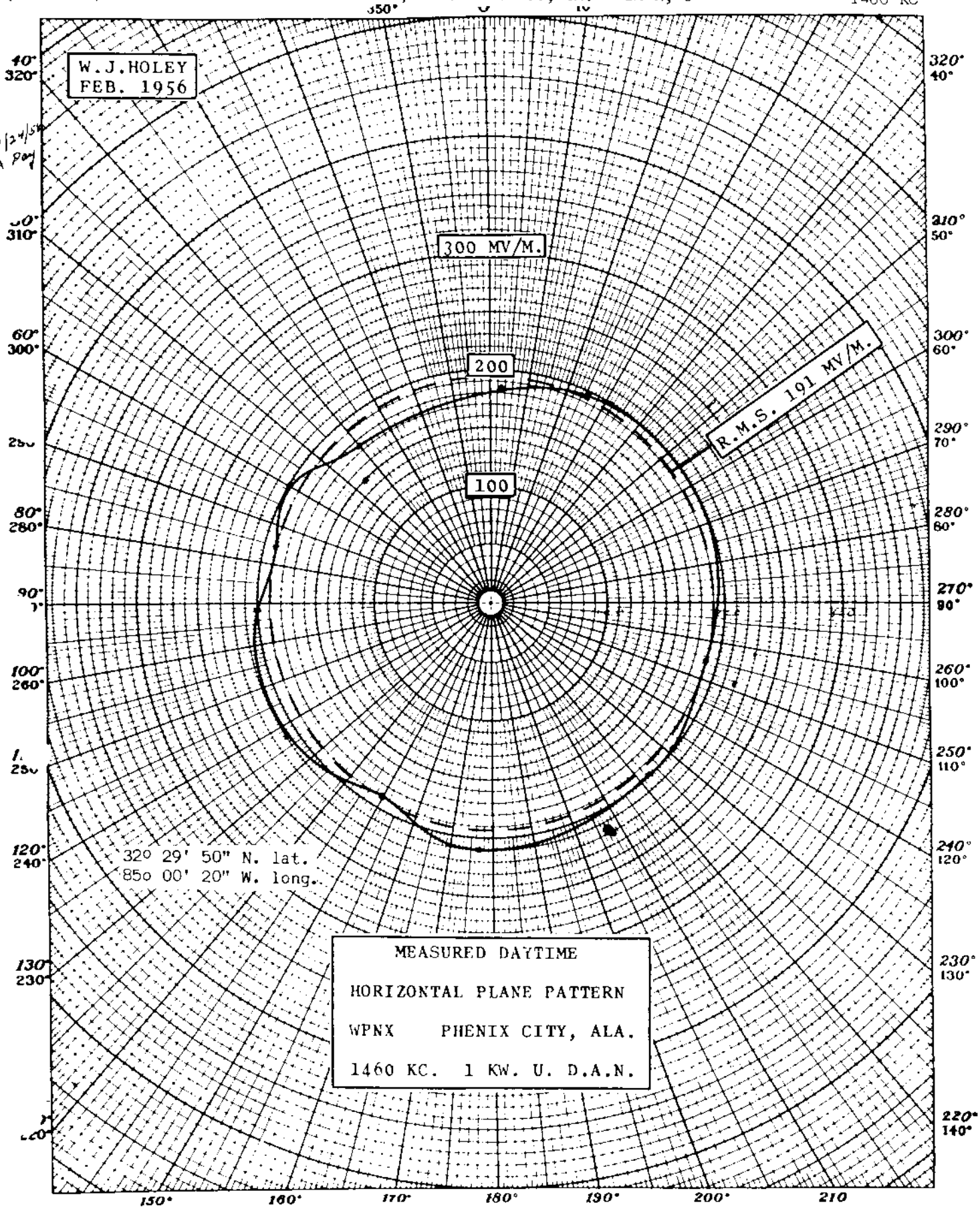
WPNX

MEASURED DAY(NON-DA)
(4-17-56G)

STATION WPNX
PHENIX CITY, ALA.-COLUMBUS, GA.

1KW
DA-N, U

1460 KC



FILE NO. BL-6109

ACCEPTED 4-13-56 FCC

WPNX, Phenix City, Ala.
Columbus, Ga. 1460 KC

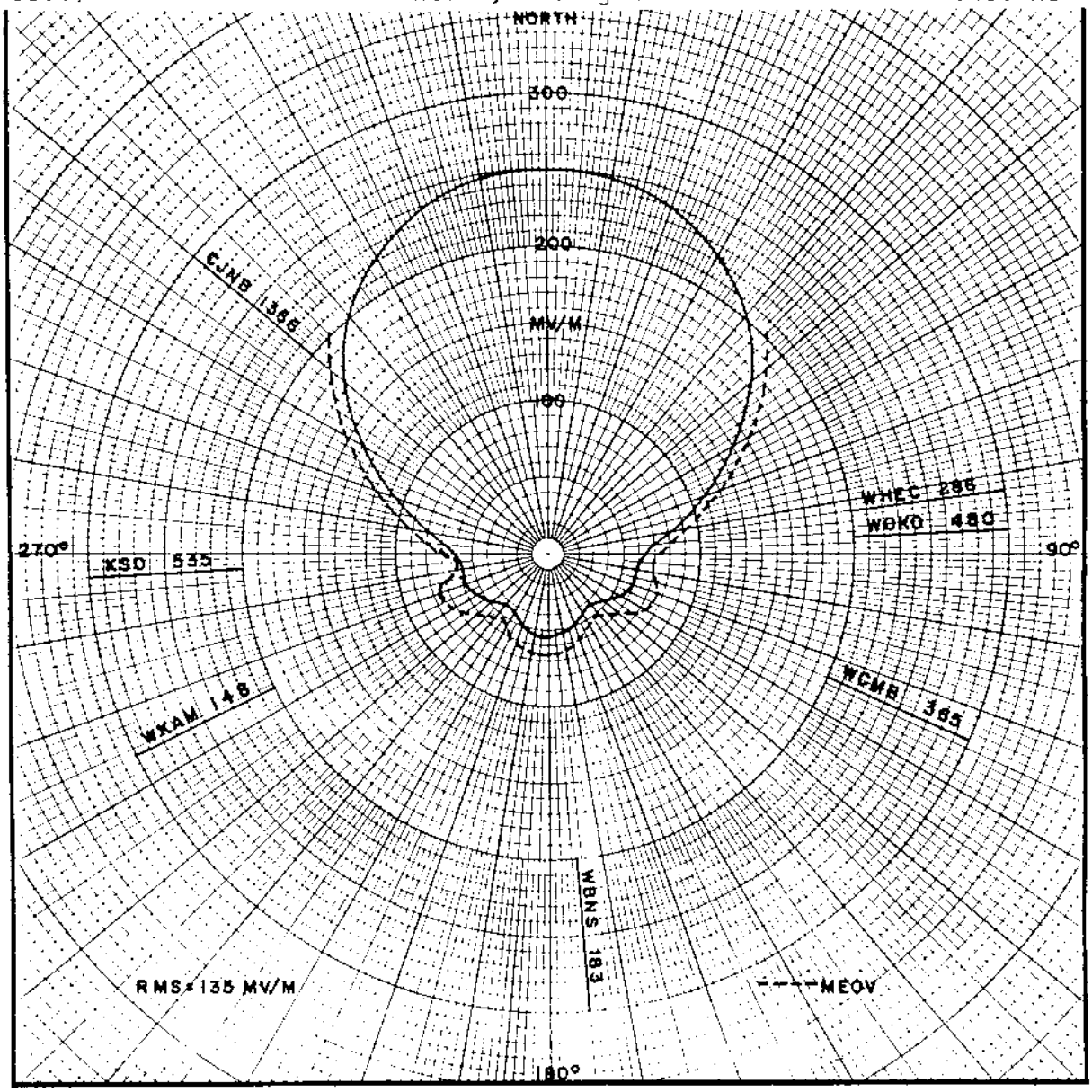
WPON

Proposed Night
(5-28-68ct)

Station WPON
Pontiac, Michigan

500w, 1kw-LS, DA-N, U
1460 kc

5-20-68
GRANTED
CP



PATTERN PARAMETERS

0° TRUE

1. 1.000/ 0°

S

2. 0.965/136.7

S

3. 0.378/102

S=90°

DIRECTIONAL
RADIATION PATTERN

W P O N Inc.

☐ MEASURED ☒ PROPOSED

FREQ: 1460 (KHZ) POWER .5/1 (KW) ☐ DA-D

N. LAT. 42° 36' 22.5" ☒ DA-N

W. LONG. 83° 17' 27.5" ☐ N-D

LOCATION: Pontiac, Michigan

DATE: January, 1968

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FCC File No. BP-18162
Accepted 5-15-68

Station WPON
Pontiac, Michigan

1460 kc

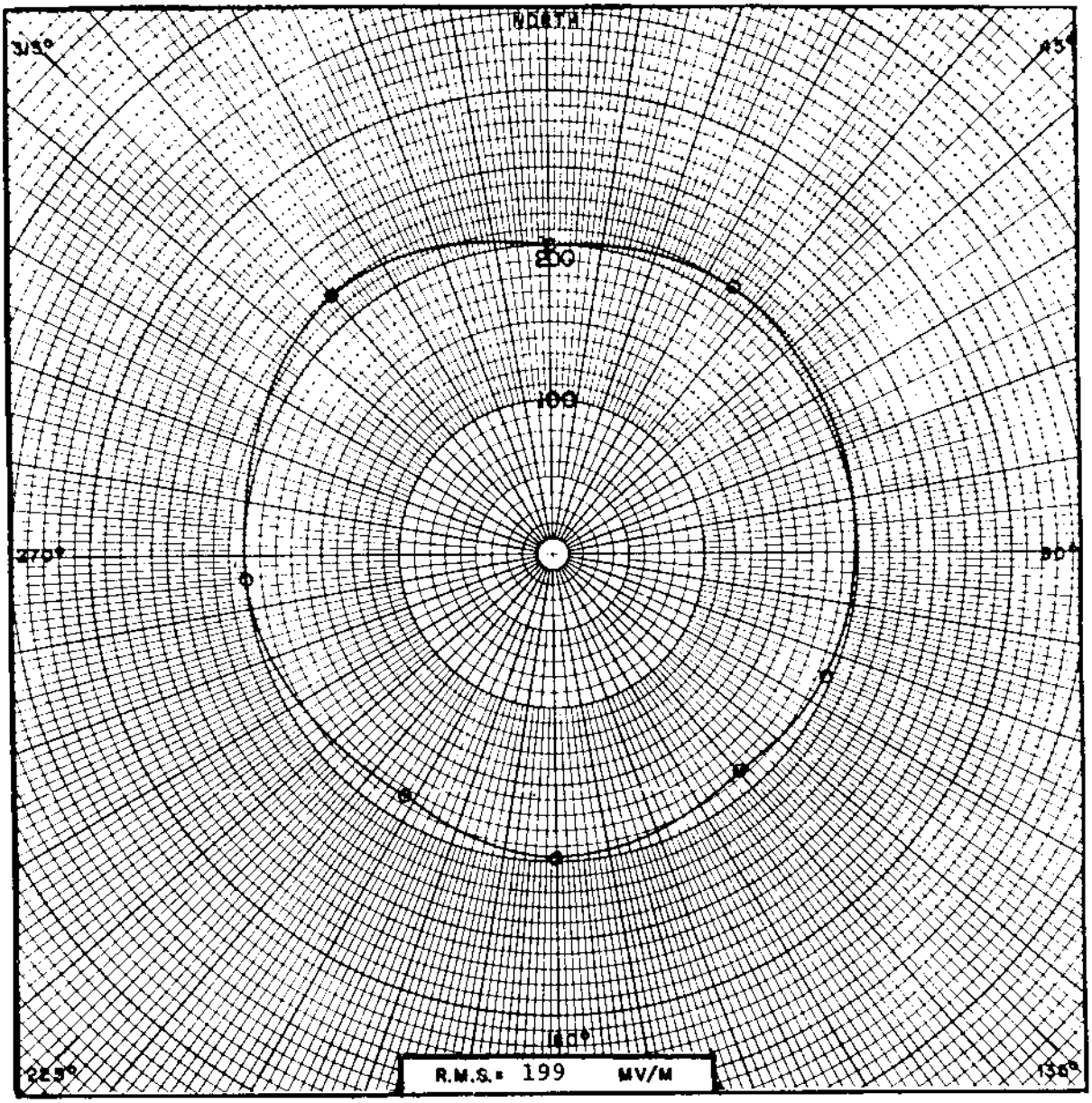
WPON

Measured Non-DA
(11-29-68ct)

Station WPON
Pontiac, Michigan

500w, 1kw-LS, DA-N, U
1460 kc

11-21-68
GRANTED LIC.
COVERING
CHANGE FROM
DA-2 TO DA-N



PATTERN PARAMETERS

DIRECTIONAL
RADIATION PATTERN

W P O N, Inc.

[x] MEASURED [ ] PROPOSED

FREQ: 1460 (KHZ) POWER 1.0 (KW) [ ] DA-D
N. LAT. 42° 36' 22.5" [ ] DA-N
W. LONG. 83° 17' 27.5" [x] N-D

LOCATION: Pontiac, Michigan

DATE: August, 1968

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FCC File No. BL-12165
Accepted 11-13-68

Station WPON
Pontiac, Michigan

1460 kc

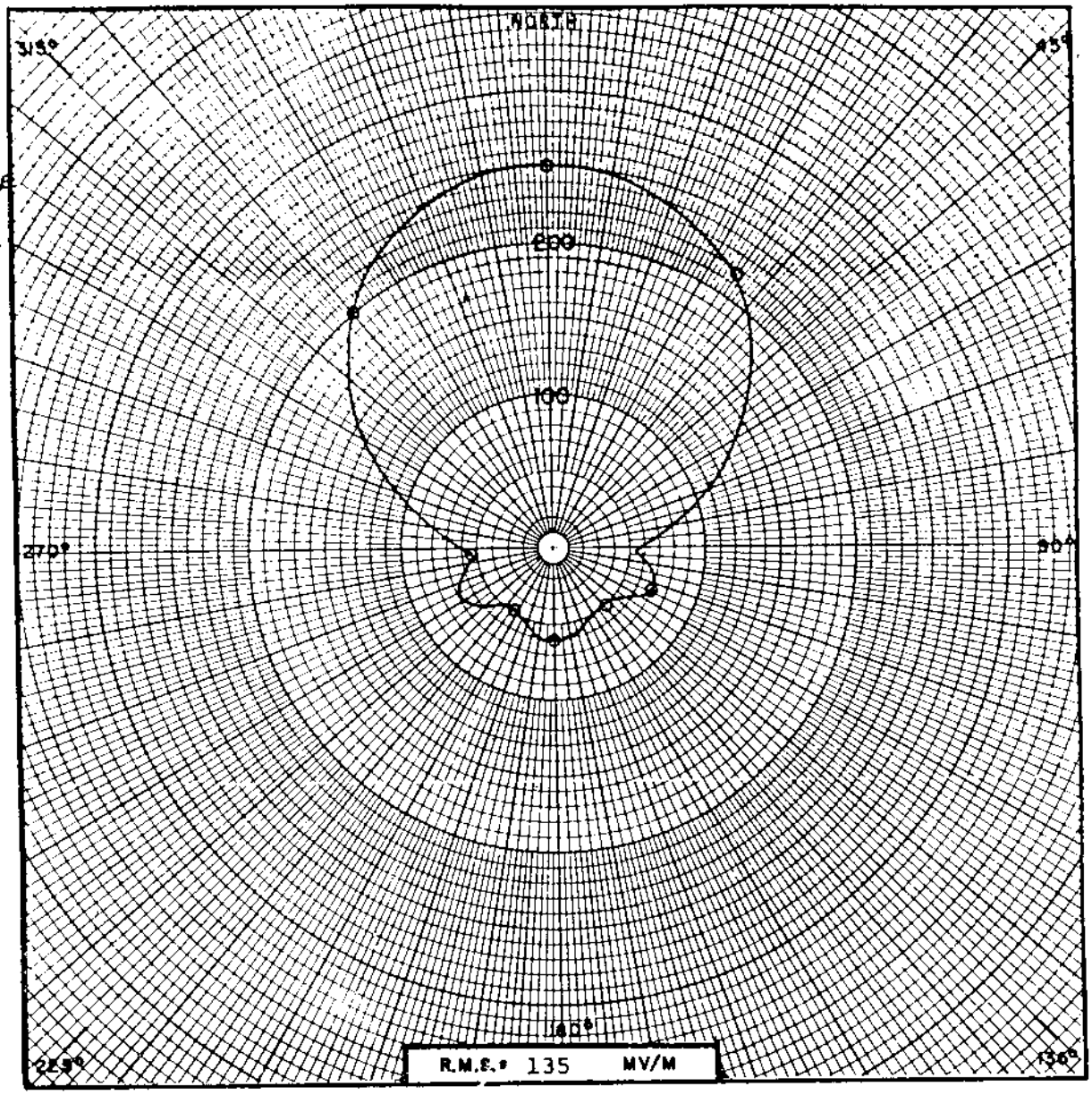
WPON

Measured Night
(11-29-68ct)

Station WPON
Pontiac, Michigan

500w, 1kw-LS, DA-N, U
1460 kc

11-21-68
GRANTED LICENSE
COVERING
CHANGE FROM
DA-2 TO DA-N.



PATTERN PARAMETERS

0T°

	THEO.	MEAS.
1.	1.00 / 0°	1.00 / 0°
S		
2.	0.965 / 136.7°	1.39 / 175°
S		
3.	0378 / -78°	1.15 / -55°

H = 101.5° S = 90°

DIRECTIONAL RADIATION PATTERN

W P O N, Inc.

[X] MEASURED [ ] PROPOSED

FREQ. 1460 (KHZ) POWER 0.5 (KW) [ ] DA-D

N. LAT. 42 ° 36 ' 22.5" [X] DA-N

W. LONG. 83 ° 17 ' 27.5" [ ] N-D

LOCATION: Pontiac, Michigan

DATE: August, 1968

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FCC File No. BL-12165
Accepted 11-13-68

Station WPON
Pontiac, Michigan

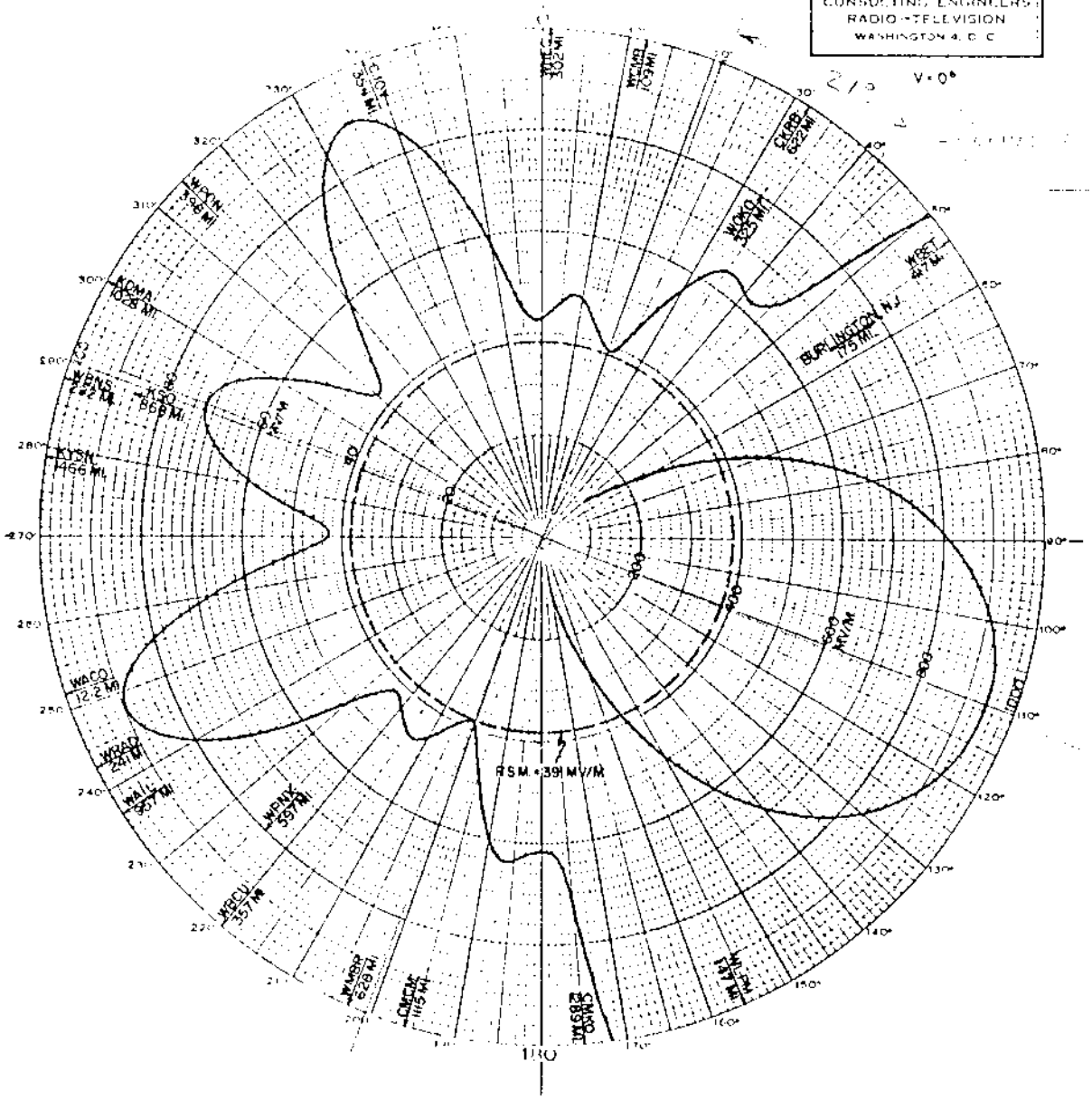
1460 kc

WPRW

PROPOSED NIGHT
(6-14-61g)

Station WPRW 5kw, DA-2,U
Manassas, Virginia 1460 KC

GEORGE C. DAVIS
CONSULTING ENGINEERS
RADIO-TELEVISION
WASHINGTON 4, D. C.



COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR PROPOSED NIGHTTIME OPERATION
AT MANASSAS, VIRGINIA
1460 KC 5 KW DA-2 U
FEBRUARY 1961

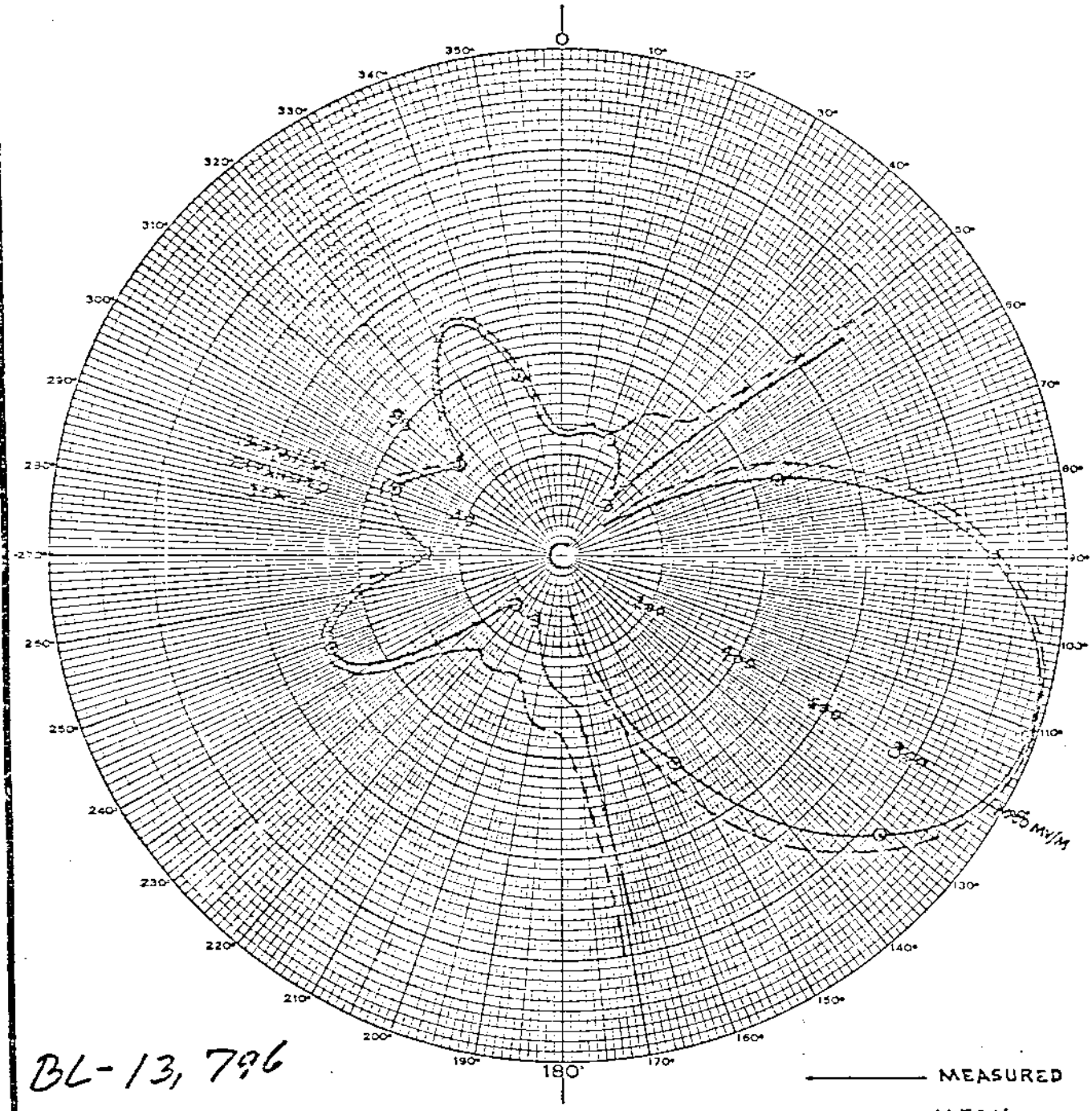
229 /52 474 /155 440/332 301/302 1/32

NORTH LATITUDE 38° 45' 00"
WEST LONGITUDE 77° 30' 49"

FCC File No. BP-14780
Accepted 5-15-61

WPRW
Manassas, Virginia 1460 KC

WPRW



BL-13, 796

E_{RMS} = 404.5 mv/m

OCT., 1974

——— MEASURED

– – – – – MEOV

⊙ MEASURED RADIALS

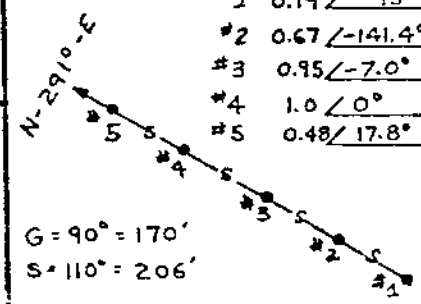
LATITUDE: 38° 45' 00"

LONGITUDE: 77° 30' 49"

PETER V. SUPERCHIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

ANTENNA PARAMETERS
TOWERS

#1	0.19 ∠ -93°
#2	0.67 ∠ -141.4°
#3	0.95 ∠ -7.0°
#4	1.0 ∠ 0°
#5	0.48 ∠ 17.8°



G = 90° = 170'

S = 110° = 206'

FIGURE 68
MEASURED
POLAR PLOT OF NIGHTTIME
DIRECTIONAL PATTERN
RADIO STATION WPRW
MANASSAS, VIRGINIA
1460 kHz 5kW, DA-2-U

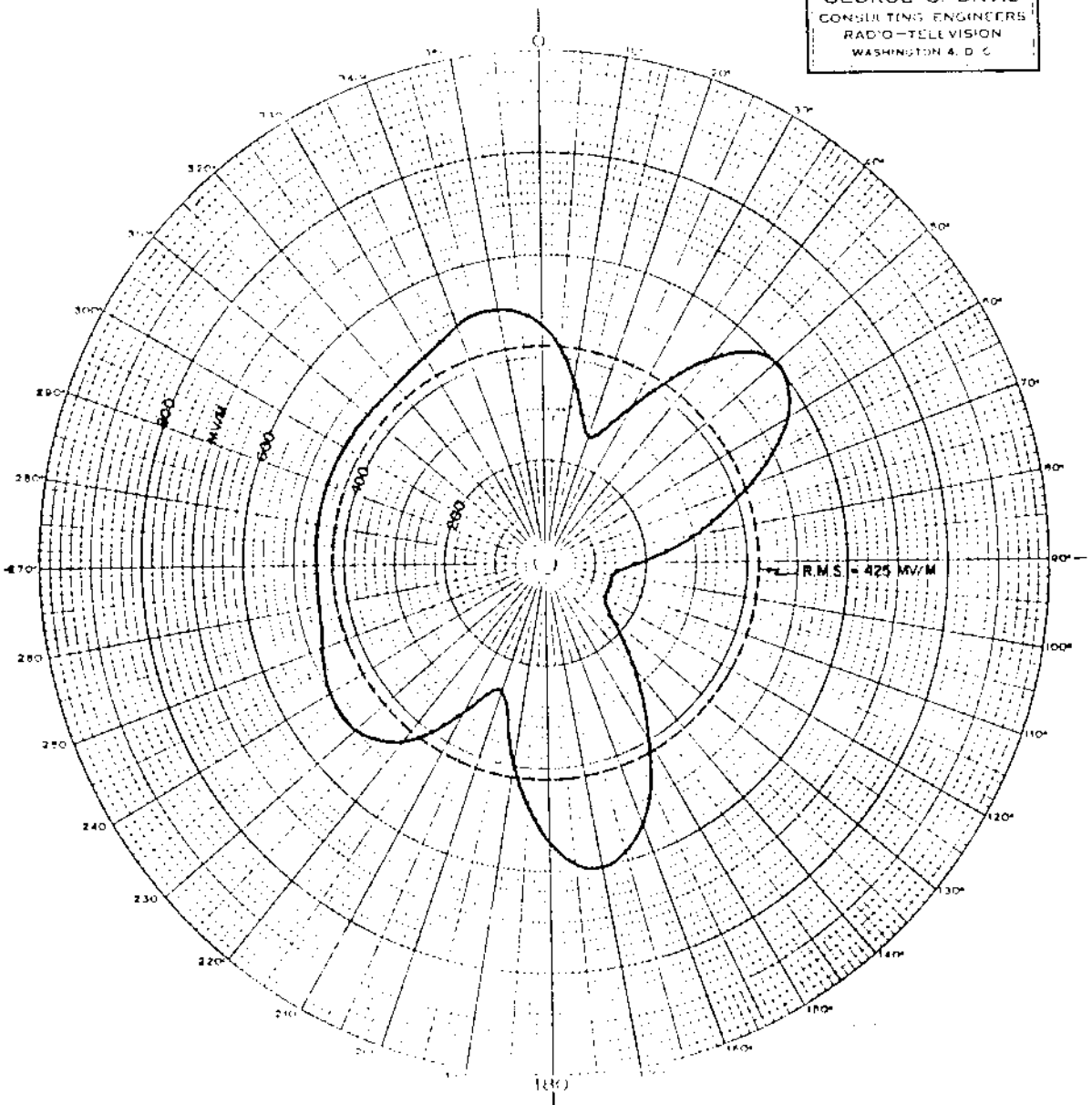
WPRW

PROPOSED DAY
(6-14-61g)

Station WPRW 5kw, DA-2,U
Manassas, Virginia 1460 KC

GEORGE C. DAVIS
CONSULTING ENGINEERS
RADIO—TELEVISION
WASHINGTON 4, D. C.

#203
11-18-64
granted CP for
5-DA-2-U.



COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR PROPOSED DAYTIME OPERATION
AT MANASSAS, VIRGINIA
1460 KC, 5 KW, DA-2 - U
FEBRUARY 1961

1.67 ∠ .55 2.64 ∠ 87.9 2.71 ∠ -108.5 4.16 ∠ 132.7 1 ∠ 55

→ N 29°E ←110°→ ←80°→ ←110°→ ←110°→

S: 140°-206° H: 90°-170°

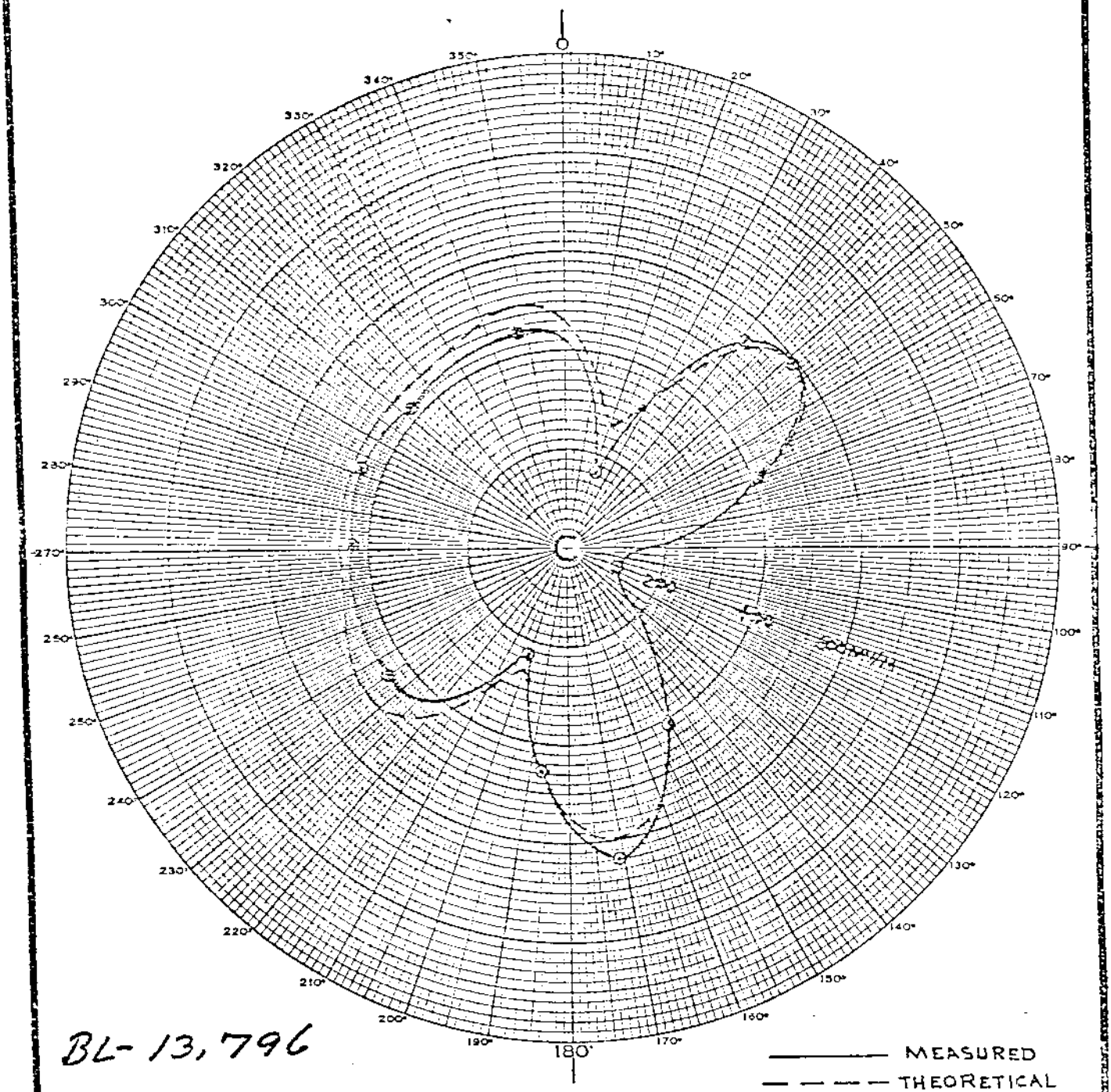
PAGE NO. 9

NORTH LATITUDE 38° 45' 00"
WEST LONGITUDE 77° 30' 49"

FCC File No. BP-14780
Accepted 5-15-61

WPRW
Manassas, Virginia 1460 KC

WPRW



BL-13,796

E_{RMS} = 409 MV/M

OCT., 1974

——— MEASURED

— — — — THEORETICAL

⊙ MEASURED RADIALS

LATITUDE: 38° 45' 00"

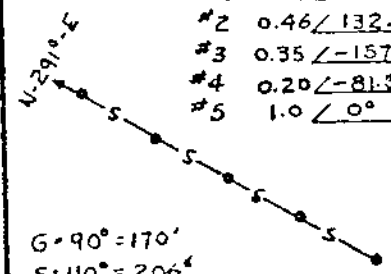
LONGITUDE: 77° 30' 49"

PETER J. CURTIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

ANTENNA PARAMETERS

TOWERS

#1 0.13 ∠ -84.7°
#2 0.46 ∠ 132.1°
#3 0.35 ∠ -157°
#4 0.20 ∠ -81.3°
#5 1.0 ∠ 0°



G = 90° = 170°
S = 110° = 206°

FIGURE 67

MEASURED
POLAR PLOT OF DAYTIME
DIRECTIONAL PATTERN

RADIO STATION WPRW
MANASSAS, VIRGINIA

1460 KHz 5kW, DA2-U

WPRW

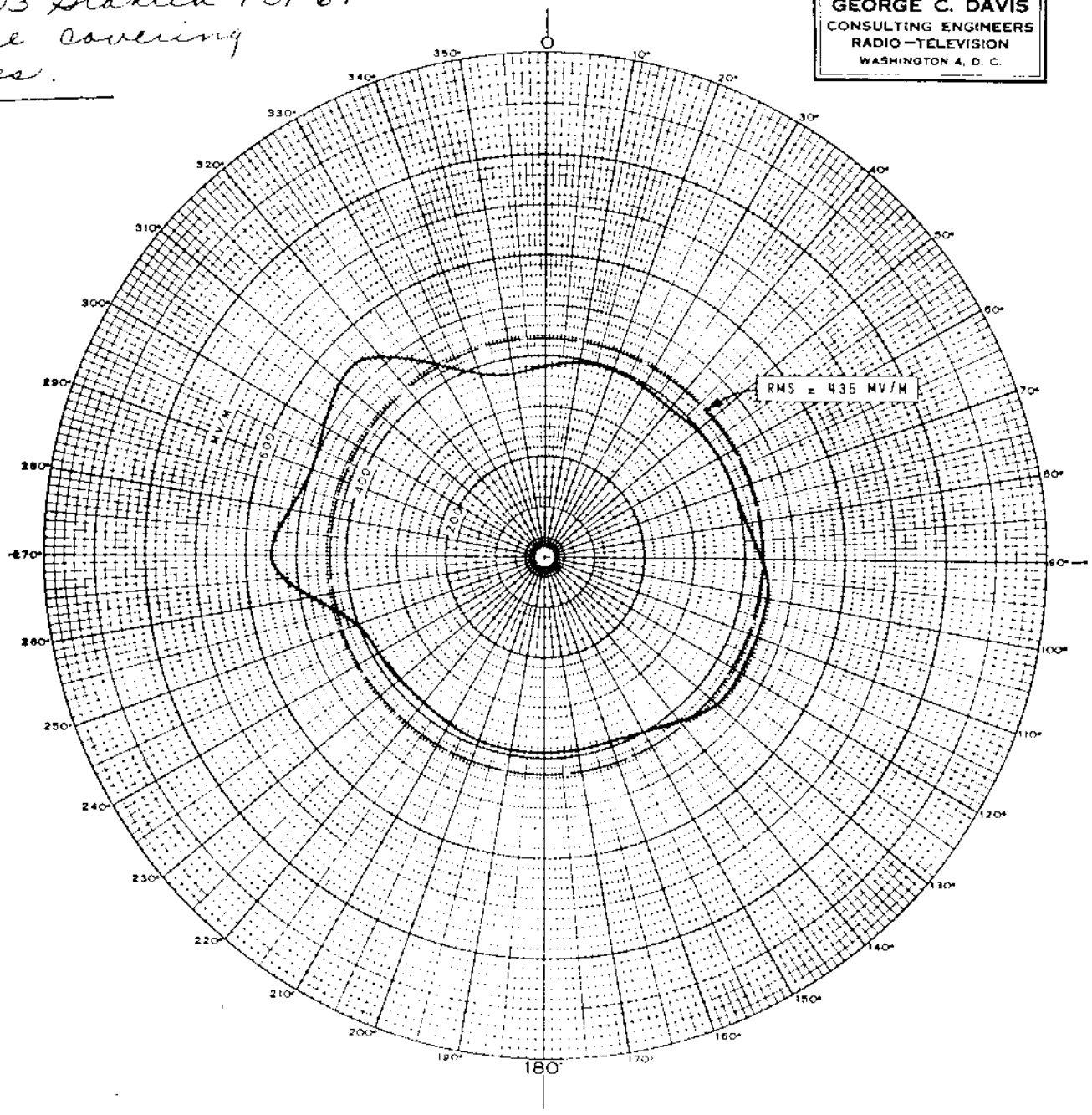
Measured Non-DA
(10-28-66ct)

Station WPRW
Manassas, Virginia

5kw, DA-2, U
1460 kc

BL-11403 Granted 1-31-69
license covering
changes.

GEORGE C. DAVIS
CONSULTING ENGINEERS
RADIO—TELEVISION
WASHINGTON 4, D. C.



REFERENCE ANTENNA UNATTENUATED
FIELD INTENSITY AT ONE MILE
WPRW, MANASSAS, VIRGINIA
1460 KC 5 KW DA-2 U
MAY 1966

FCC File No. BL-11403
Accepted 9-30-66

Station WPRW
Manassas, Virginia

1460 kc

WPVL

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WPVL — Main Studio: Painesville, Ohio

Frequency: 1460 kHz — Power: 0.5 kW Night 1 kW Day

Notification List No. 1627 — Date: April 9, 1975 — Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 41° 44' 20"
West Longitude: 81° 14' 09"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 4
Type of elements: Series-excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	S(#1)	SC(#2)	NC(#3)	N(#4)	
HEIGHT ABOVE INSULATORS:	200'	200'	200'	200'	(106.8°)
NIGHT PHASING:	0°	-165.3°	+25.2°	-136.6°	
NIGHT FIELD RATIO:	1.00	1.558	1.086	0.269	
DAY PHASING:	0°	---	---	0°	
DAY FIELD RATIO:	1.0	---	---	0.4	

SPACING AND ORIENTATION: From tower #1; tower #2 is spaced 136.5' (72.89°) on a line bearing 336.5° true, tower #3 is spaced 331.3' (176.97°) on a line bearing 342.66° true, and tower #4 is spaced 421' (225°) on a line bearing 350° true.

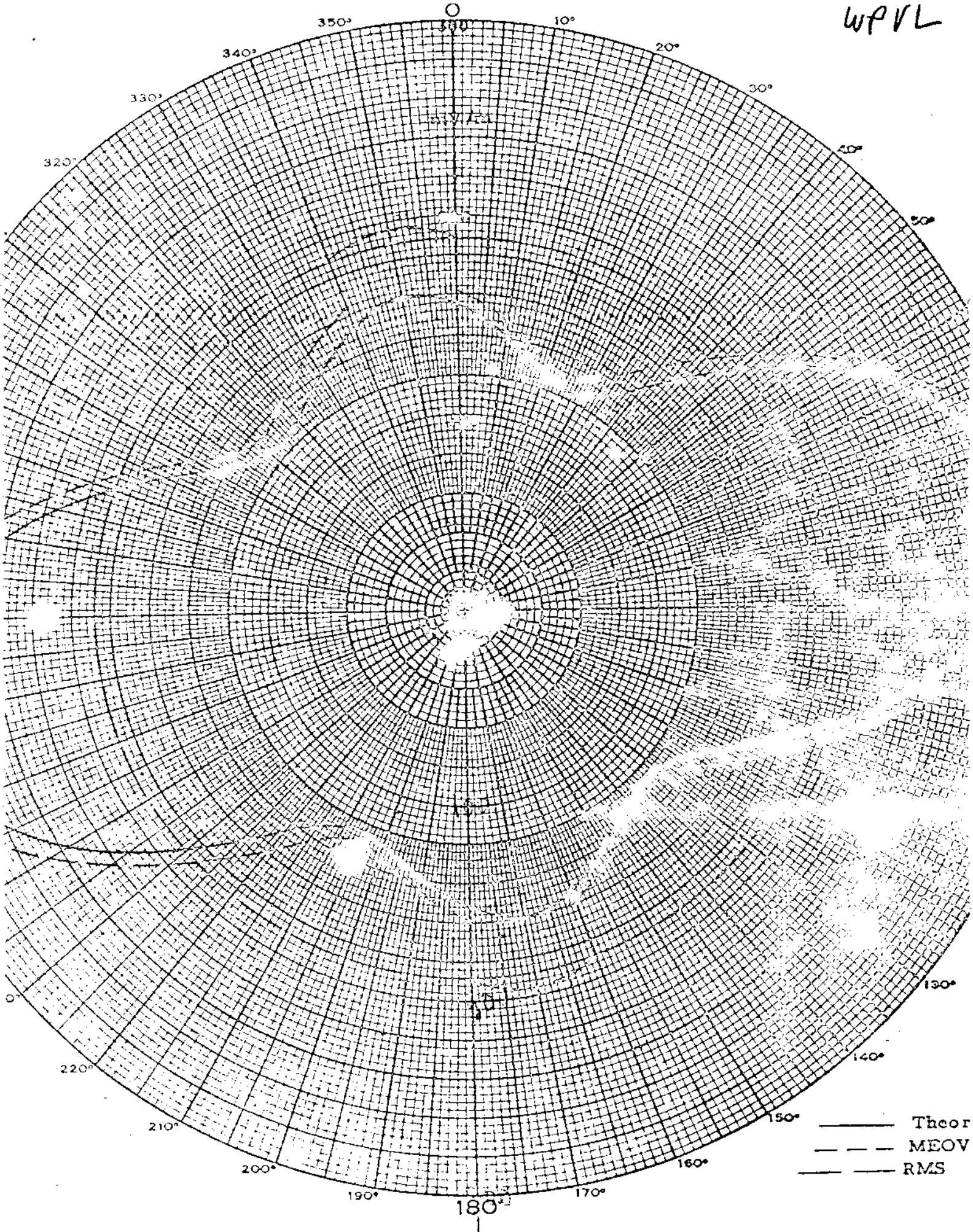
GROUND SYSTEM: 120-169' equally spaced copper radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers.

Predicted effective Night Field: 138.62 mv/m at rated power.

Predicted effective Day Field: 188 mv/m at rated power.

Note: Please retain the Nighttime directional antenna radiation pattern notified for Station WPVL in United States Change List Number 1438, dated August 18, 1971, and attach to this Revised Description Sheet and Daytime pattern. This notification concerns only a change in meovs of radition in the Daytime operation of the station with Nighttime operation continued as previously notified.

CTR NO 31298A4

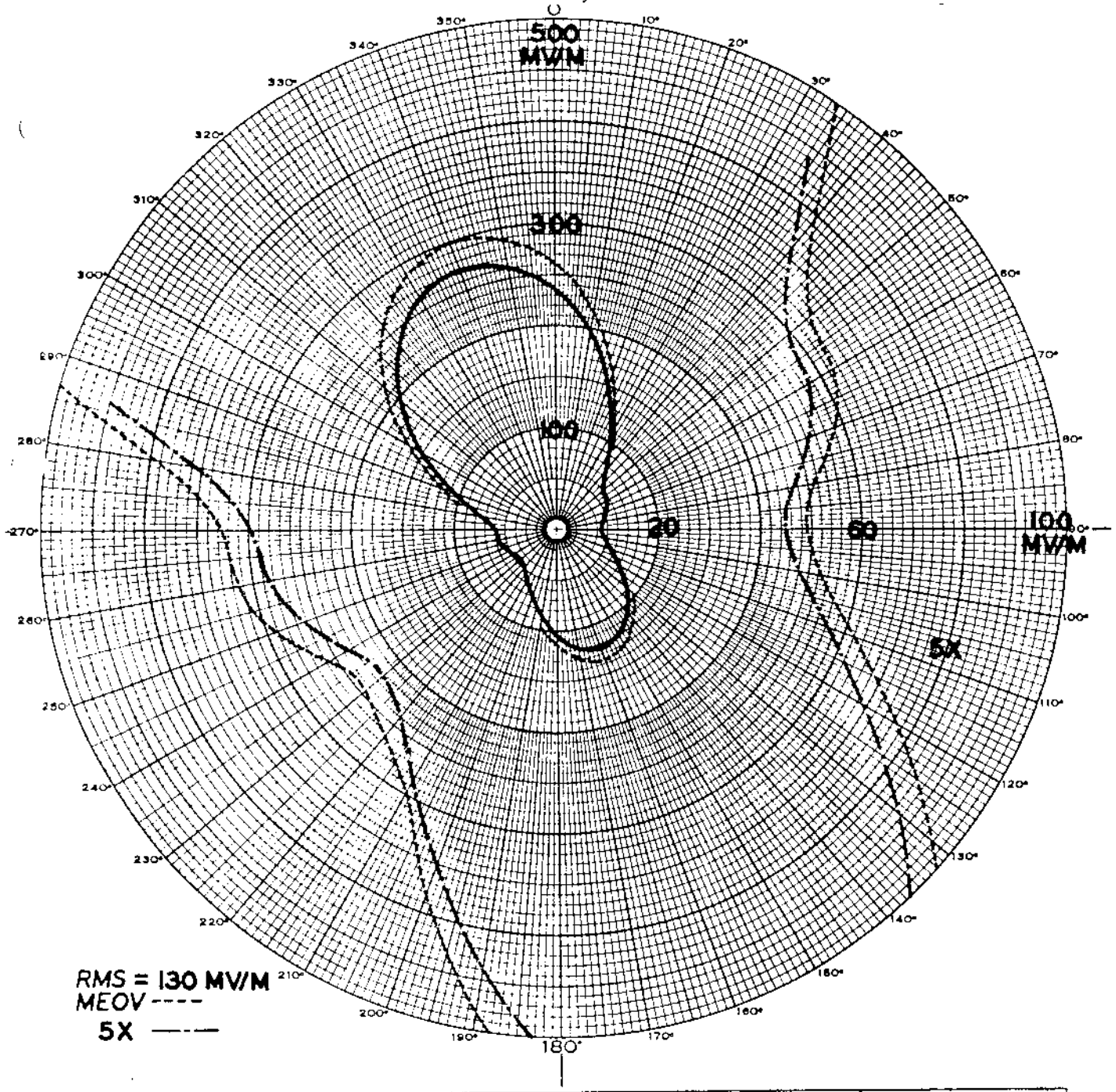

WPVL
0°
10°
20°
30°
40°
50°
130°
140°
150°
160°
170°
180°
190°
200°
210°
220°
330°
340°
350°
Theor
MEOV
RMS

WPVL

Proposed Night
(7-29-70ct)

Station WPVL
Painesville, Ohio

500w,1kw-LS,DA-2,U
1460 kc



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	FIGURE 7-N	STATION DATA
340° T. No. 4 0.25∠2/-137.00° No. 3 0.9953/25.124° No. 2 1.5258/-167.565° No. 1 1.00/0 S's-106.9	TOWER / ELECTRICAL HEIGHT / SPACING / PHASING / FIELD RATIO DAYTIME OPERATION ☐ NIGHTTIME OPERATION ☒	WPVL PAINESVILLE, OHIO ********* PROPOSED NIGHTTIME PATTERN θ°= 0°	CALL WPVL FREQ 1460 KHz. POWER 0.5 Kw TYPE DA-2 TIME UNLIMITED LAT. N-41-44-23 LONG. W-81-14-09 E.H.MUNN,JR. RADIO ENGINEER COLDWATER, MICH.

FCC File No.BP-18071
Accepted 6-24-70

Station WPVL
Painesville, Ohio

1460 kc

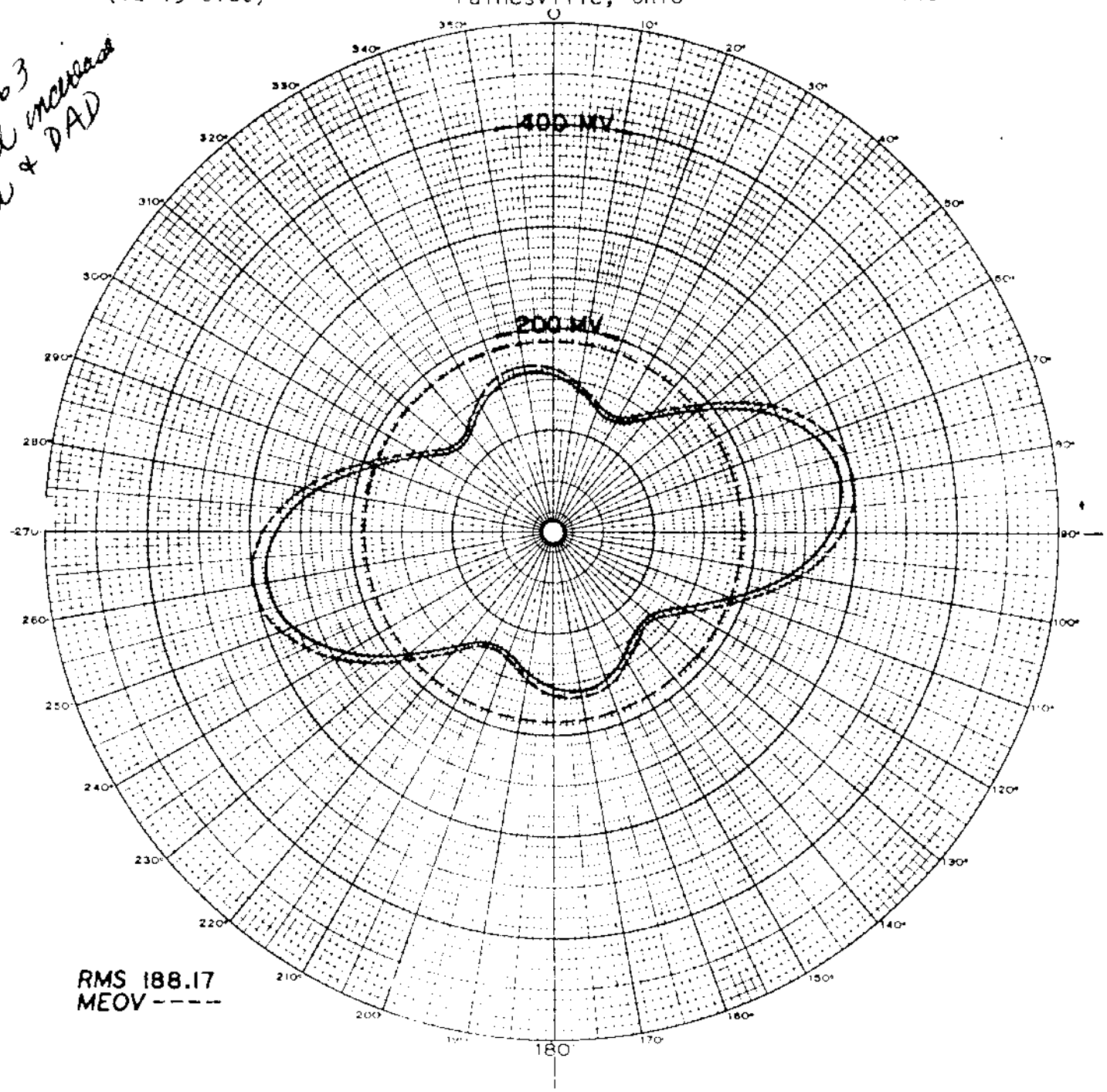
WPVL

Proposed Day
(12-19-61ct)

Station WPVL
Painesville, Ohio

1kw, DA-D, D
1460 kc

2-13-63
granted increase
in power & DAD



RMS 188.17
MEOV ----

TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	FIGURE 9	STATION DATA
350° NO.1 ○ 0.4 / 0 225° NO. 2 ○ 1.0 / 0	TOWER / ELECTRICAL HEIGHT / SPACING / PHASING / FIELD RATIO No. / ° / ° / ° / °	PROPOSED DAYTIME DIRECTIONAL θ = 0°	CALL WPVL FREQ 1460 POWER 1 KW TYPE DA-D TIME DAY LAT. 41° 44' 23" LONG. 81° 14' 09"
			E.H.MUNN, JR. RADIO ENGINEER COLDWATER, MICH.

FCC File No. BP-15192
Accepted 11-30-61

Station WPVL
Painesville, Ohio

1460 kc

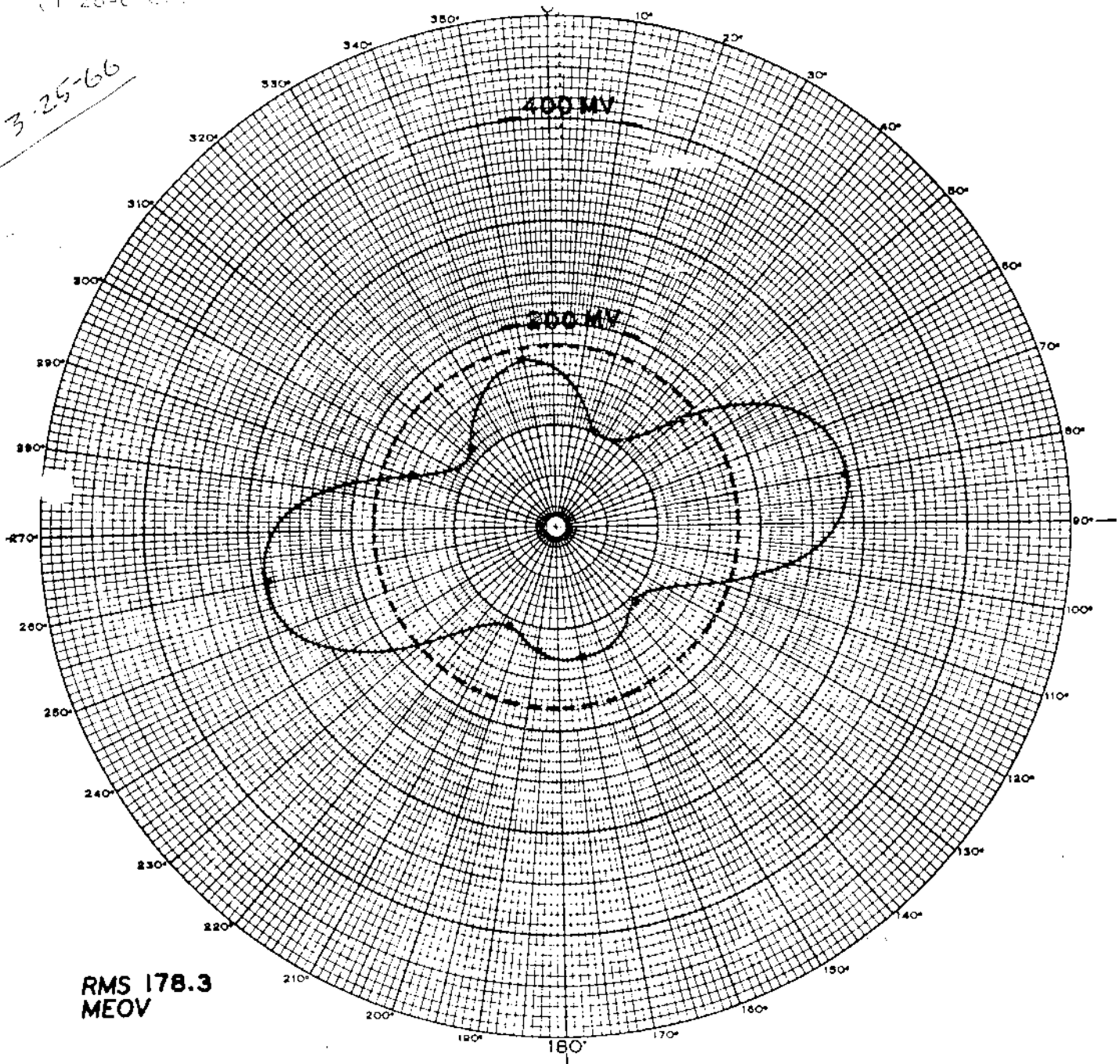
WPVL

1kw, DA-D, D
1460 kc

Measured Day
(1 28-6

Station WPVL
Painesville, Ohio

HC 3-25-66



RMS 178.3
MEOV

TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	FIGURE 4	STATION DATA
350° T. NO. 1 ● 0.51 ∠ 8° 225° NO. 2 ● 1.0 ∠ 0° G'S = 107°	TOWER No. / ELECTRICAL HEIGHT °T / SPACING ° / PHASING ° / FIELD RATIO 1 2 3 4 5 6 7 8 9 10 DAYTIME OPERATION ☒ NIGHTTIME OPERATION ☐	WPVL MEASURED DAY DIRECTIONAL PATTERN OCTOBER - 1965 θ° = 0°	CALL WPVL FREQ 1460 Kc/S POWER 1 Kw TYPE DA-D TIME DAYTIME LAT. N 41°44'23" LONG. W 81°14'09" E.H. MUNN, JR. RADIO ENGINEER COLDWATER, MICH.

FCC File No. BL-11194
Accepted 1-19-66

Station WPVL
Painesville, Ohio

1460 kc

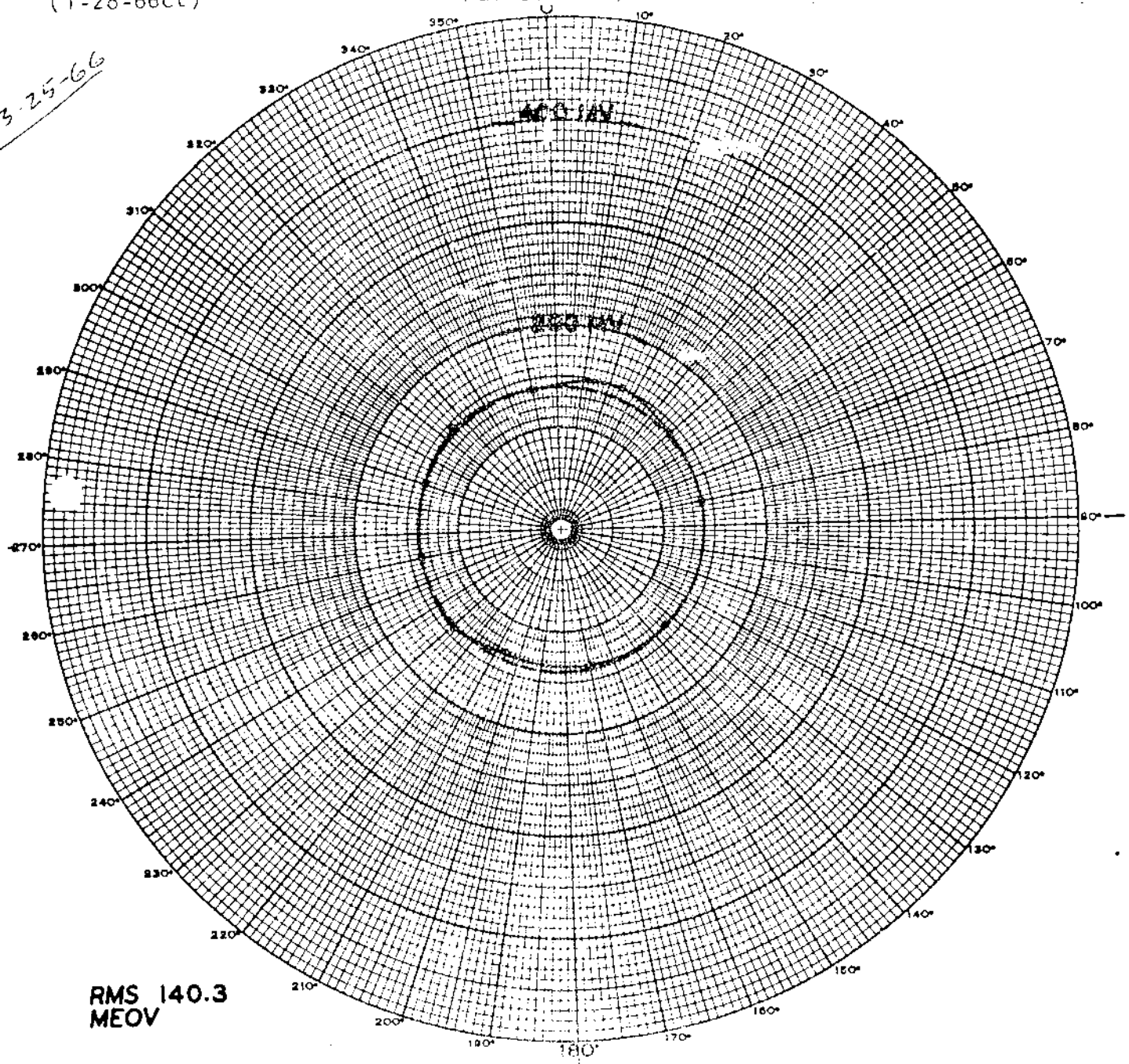
WPVL

Measured Non-DA
(1-28-66ct)

Station WPVL
Painesville, Ohio

1kw, DA-D, D
1460 kc

LIC 3-25-66



RMS 140.3
MEOV

TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	FIGURE 5	STATION DATA
350° T. NO. 1 ○ (NOT USED) 225° NO. 2 ● (NDA TEST) G'S = 107°	TOWER / ELECTRICAL HEIGHT / SPACING / PHASE / FIELD RATIO No. / 0° 1 2 3 4 5 6 7 8 9 10 DAY-TIME OPERATION / NIGHT-TIME OPERATION	WPVL MEASURED NON-DIRECTIONAL PATTERN USING SOUTH TOWER WITH 0.5 KW POWER θ° = 0°	CALL WPVL FREQ 1460 Kc/S POWER 1 Kw TYPE DA-D TIME TEST LAT. N 41°44'23" LONG W 81°14'09" E.H. MUNN, JR. RADIO ENGINEER COLDWATER, MICH.

FCC File No. BL-11194
Accepted 1-19-66

Station WPVL
Painesville, Ohio

1460 kc

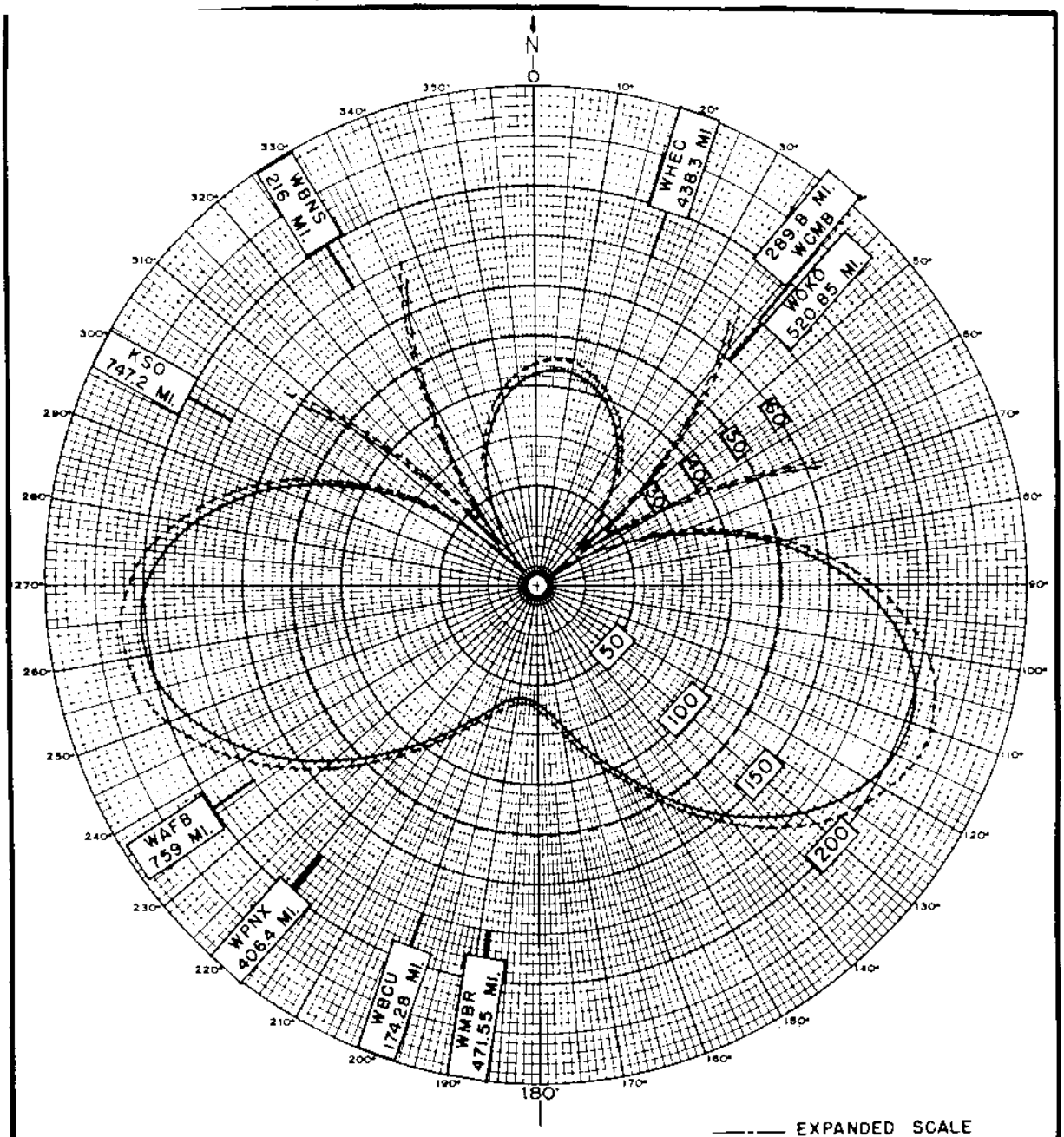
WRAD

PROPOSED NIGHT
(11-28-55G)

STATION WRAD
RADFORD, VIRGINIA

500W, 5KW-LS
DA-N, U

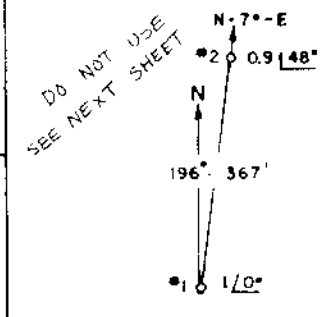
1460 KC



ERMS = 125.6 MV/M

LATITUDE: 37° 08' 35.4"
LONGITUDE: 80° 34' 38.4"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON D. C.



G = 106.5°

AMENDED
FIGURE 4

NIGHTIME HORIZONTAL POLAR PATTERN
0° ELEVATION (GROUND)

RADIO STATION WRAD

RADFORD, VIRGINIA

1460 KC 0.5-5KW LS, DA-N

WRAD

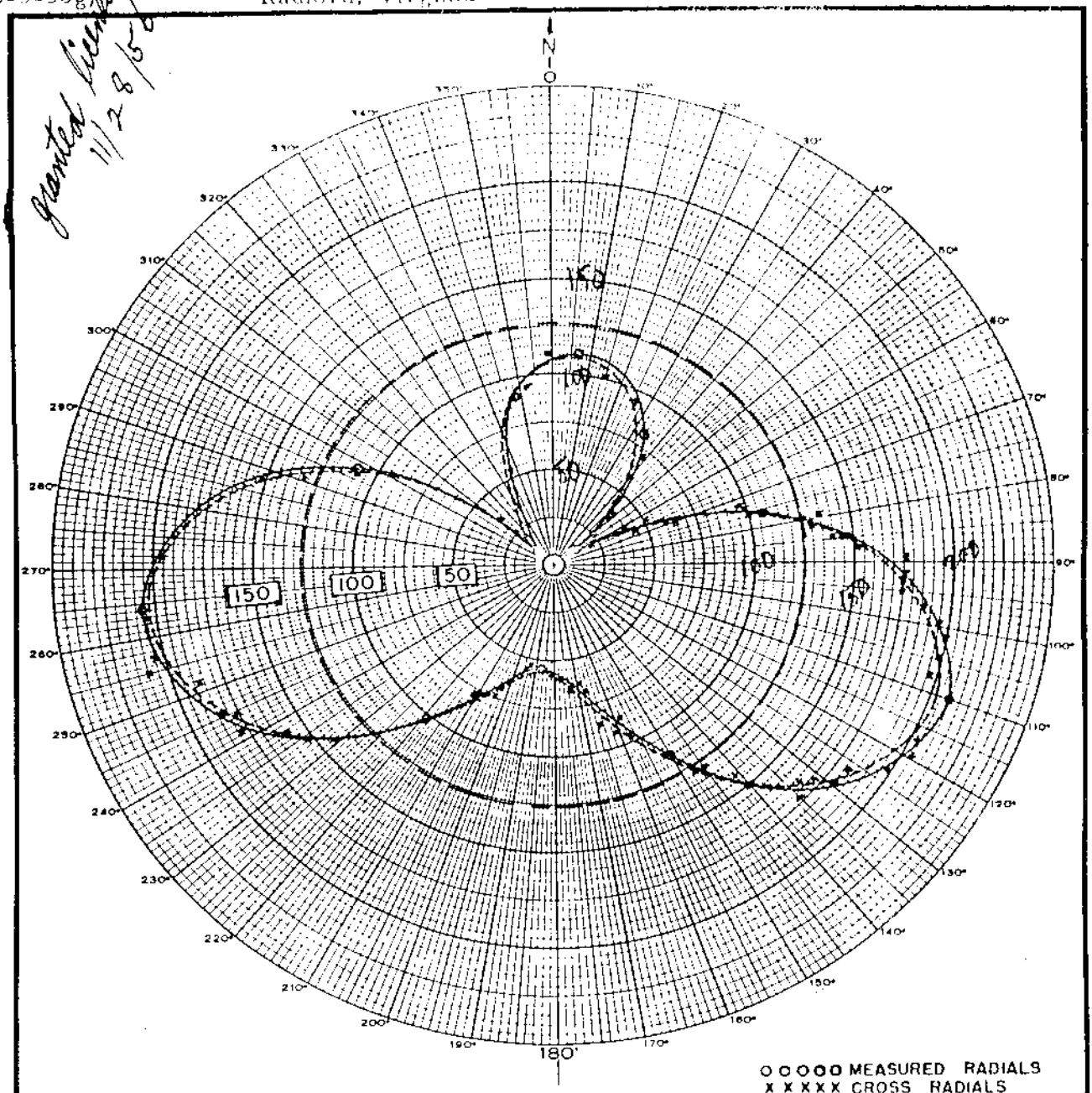
MEASURED NIGHT (10-5-56g)

Station W R A D
Radford, Virginia

5 KW, 500W, DA-N, U

1460 K C

Granted License 11-28-56



ERMS = 126.5 MV/M

LATITUDE: 37° 08' 35.4"
LONGITUDE: 80° 34' 38.4"

JOHN H. MULLANEY

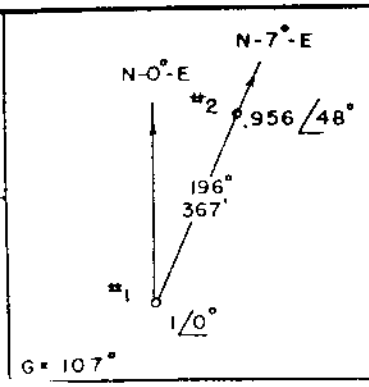


FIGURE 19

MEASURED
NIGHT HORIZONTAL PATTERN

RADIO STATION WRAD
RADFORD, VIRGINIA

1460 KC 0.5 KW,5KW-LS,DA-N,U

FCC File No. B1-6301

Accepted 9-21-56

Station WRAD
Radford, Va.

1460 K C

WRAD

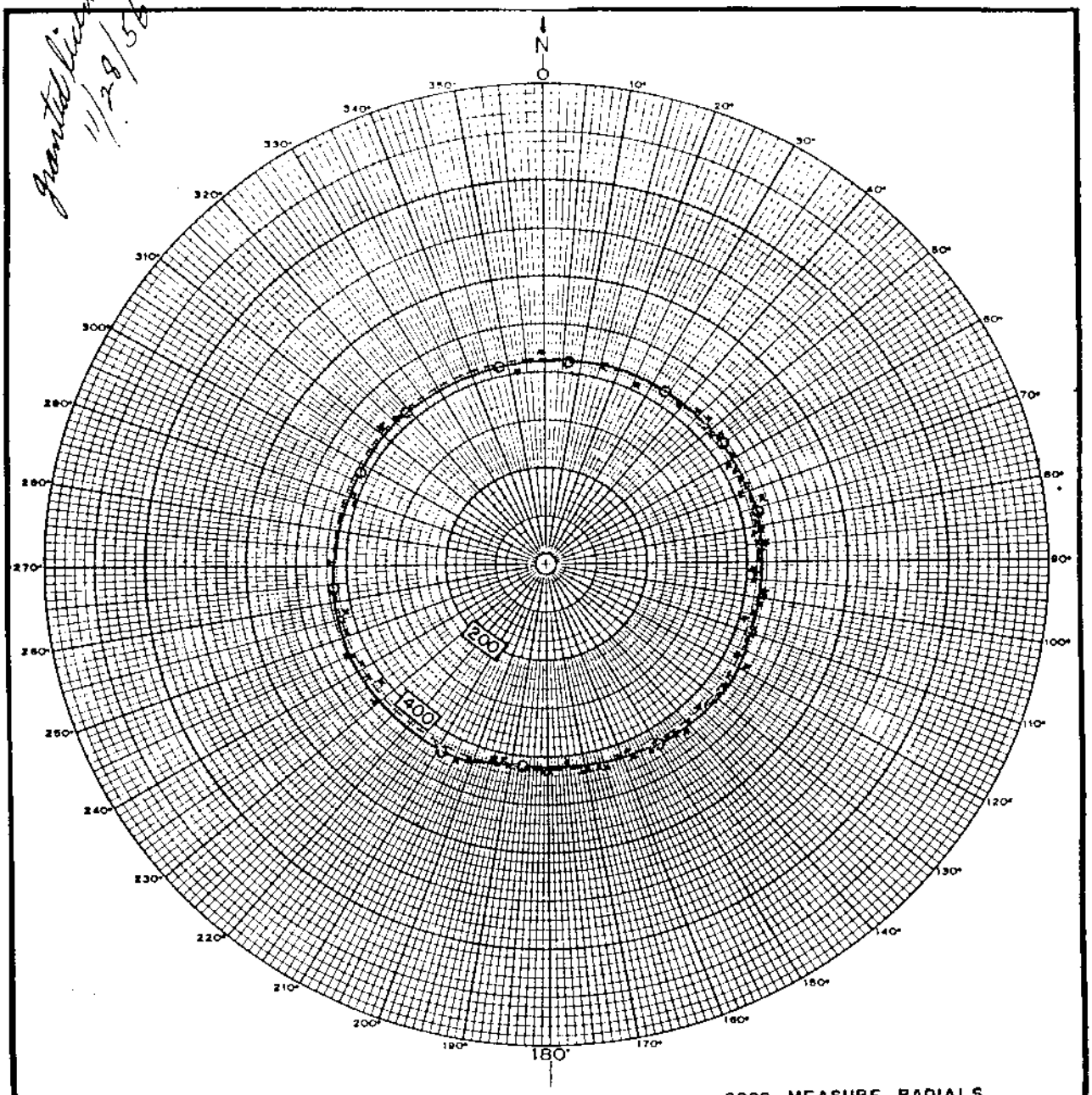
MEASURED
NON-DA(LO-5-56g)

Station W R A D
Radford, Virginia

5 KW, 500W, DA-N, U

1460 K C

granted license 11/29/56



ERMS = 427 MV/M

0000 MEASURE RADIALS
xxxx CROSS RADIALS

LATITUDE: 37° 08' 35.4"
LONGITUDE: 80° 34' 38.4"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

G = 107°

FIGURE 17

MEASURED
NON-DA HORIZONTAL PATTERN

RADIO STATION WRAD
RADFORD, VIRGINIA

1460KC 0.5KW, 5KW-LS, DA-N, U

FCC File No.
BL-6301

Accepted 9-21-56

Station WRAD
Radford, Va.

1460 KC

WRTL

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WRTL — Main Studio: Rantoul, Illinois

Frequency: 1460 kHz — Power: 0.5 kW

Notification List No. 1593 — Date: August 14, 1974 — Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 40° 18' 37"
West Longitude: 88° 12' 54"

ANTENNA CHARACTERISTICS

Authorized for Daytime operation. (DA-D)
Number of elements: 2
Type of elements: Series-excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	NW(#1)	SE(#2)
HEIGHT ABOVE INSULATORS:	250'(80°)	300'(160°)
PHASING:	0°	-126°
FIELD RATIO:	1	0.90

SPACING AND ORIENTATION: Elements are spaced 112'(60°) on a line bearing 115° true.

GROUND SISTEM: 120-150' equally spaced copper radials about each tower.

Predicted effective Field: 125 mv/m at rated power.

Note: This notification concerns only changes to add meov's of radiation to the directional antenna radiation pattern.

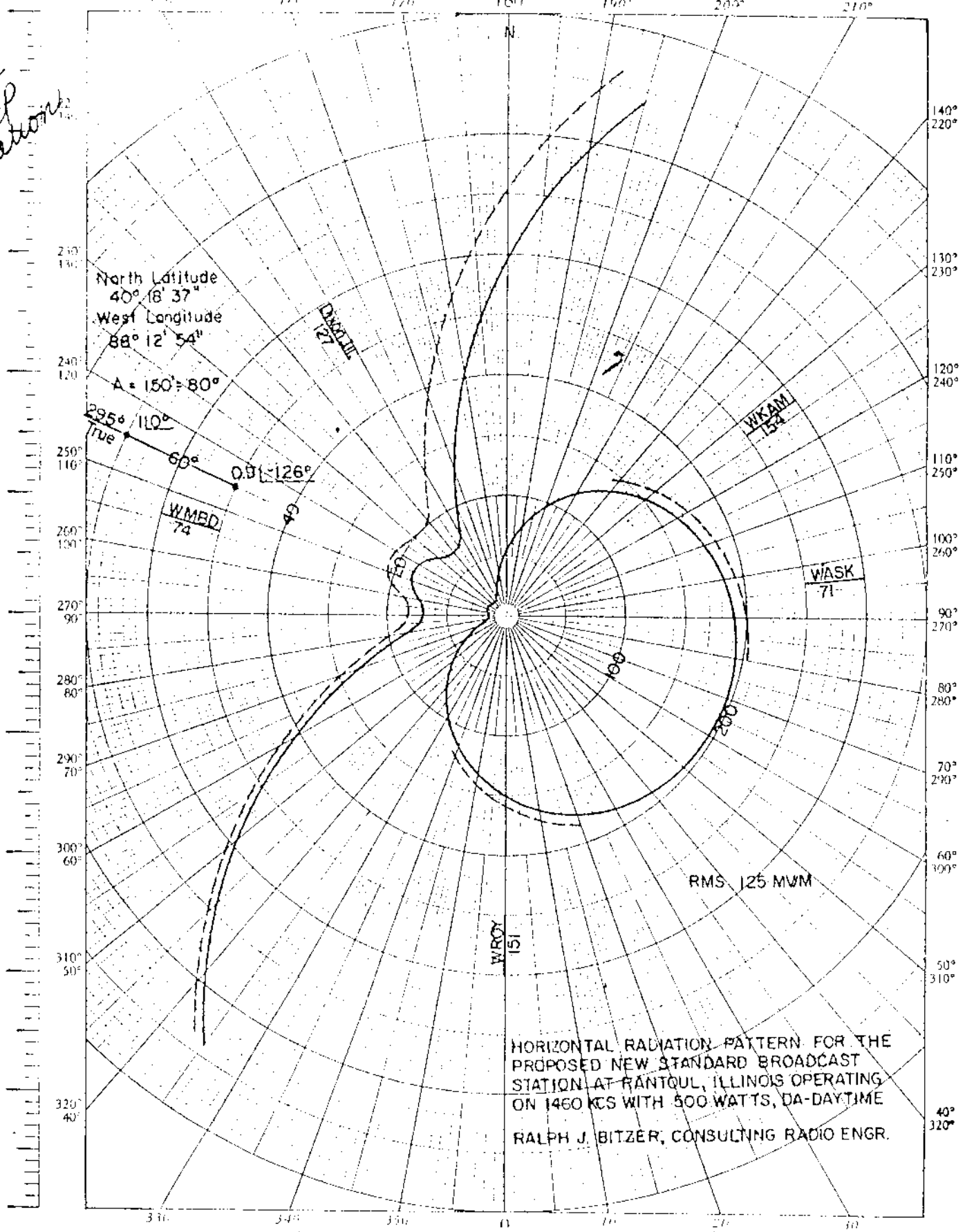
RANTOUL, ILLINOIS WRTL

5-16-62 granted CP for new station

PROPOSED DAY
(12-21-59g)

New; Regional Radio Service
Rantoul, Illinois

500w, DA-D, D
1460 KC

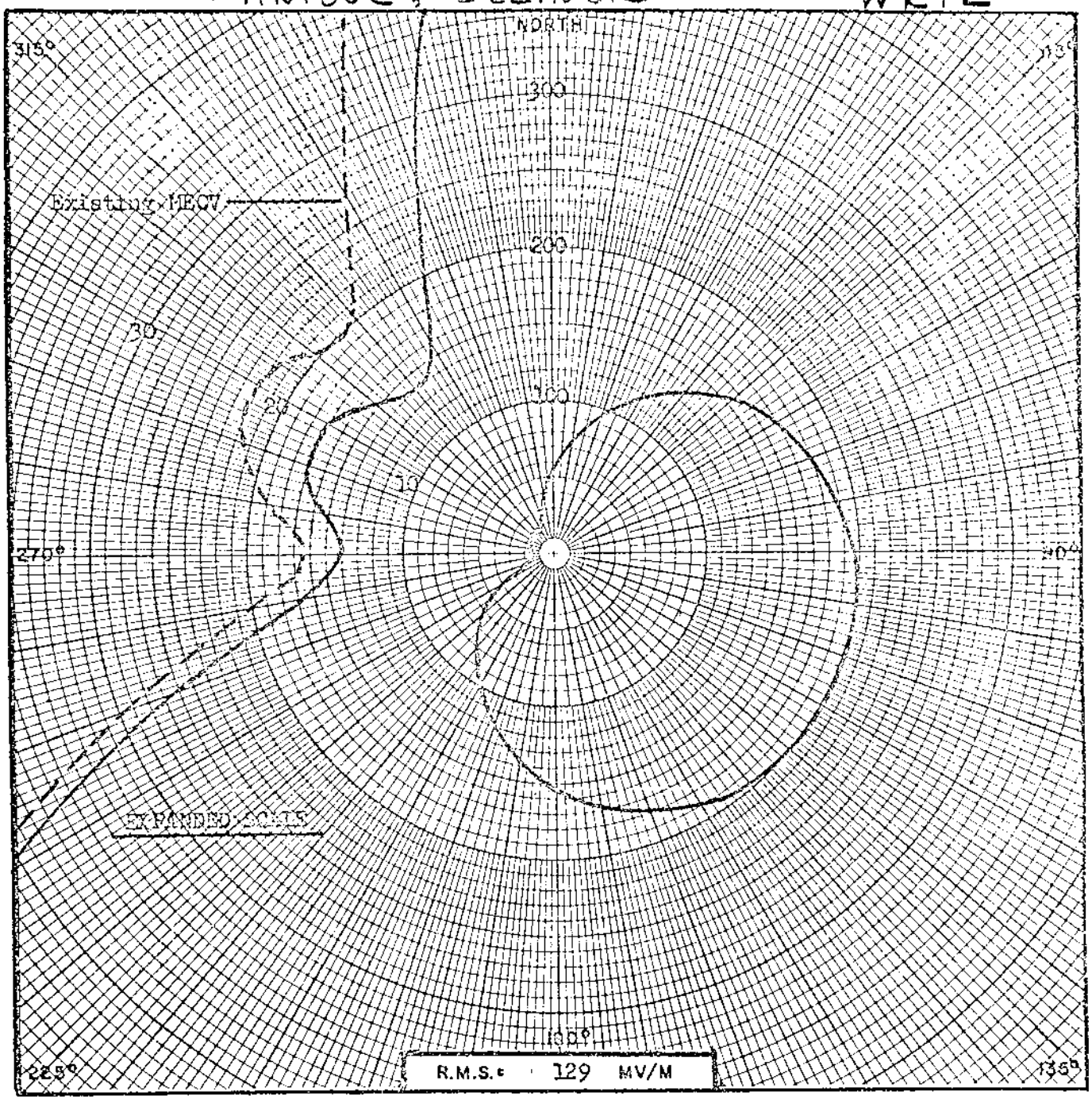


FCC File No. BP-13670
Accepted 12-7-59

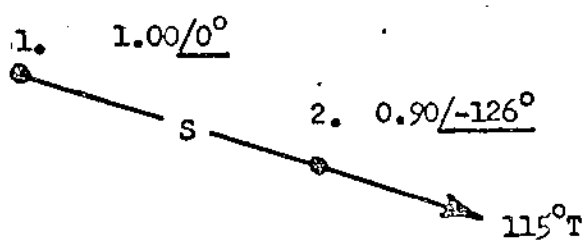
Regional Radio Service
Rantoul, Illinois

1460 KC

RANTOUL, ILLINOIS WRTL



PATTERN PARAMETERS



S = 60° G_1 = 80° G_2 = 160°

DIRECTIONAL RADIATION PATTERN

Regional Radio Service (WRTL)

☐ MEASURED ☒ PROPOSED

FREQ: 1460 (KHZ) POWER 0.5 (KW) ☒ DA-D

N. LAT. 40 ° 18 ' 37 " ☐ DA-N

W. LONG. 88 ° 12 ' 54 " ☐ N-D

LOCATION: Rantoul, Illinois

DATE: June, 1971

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

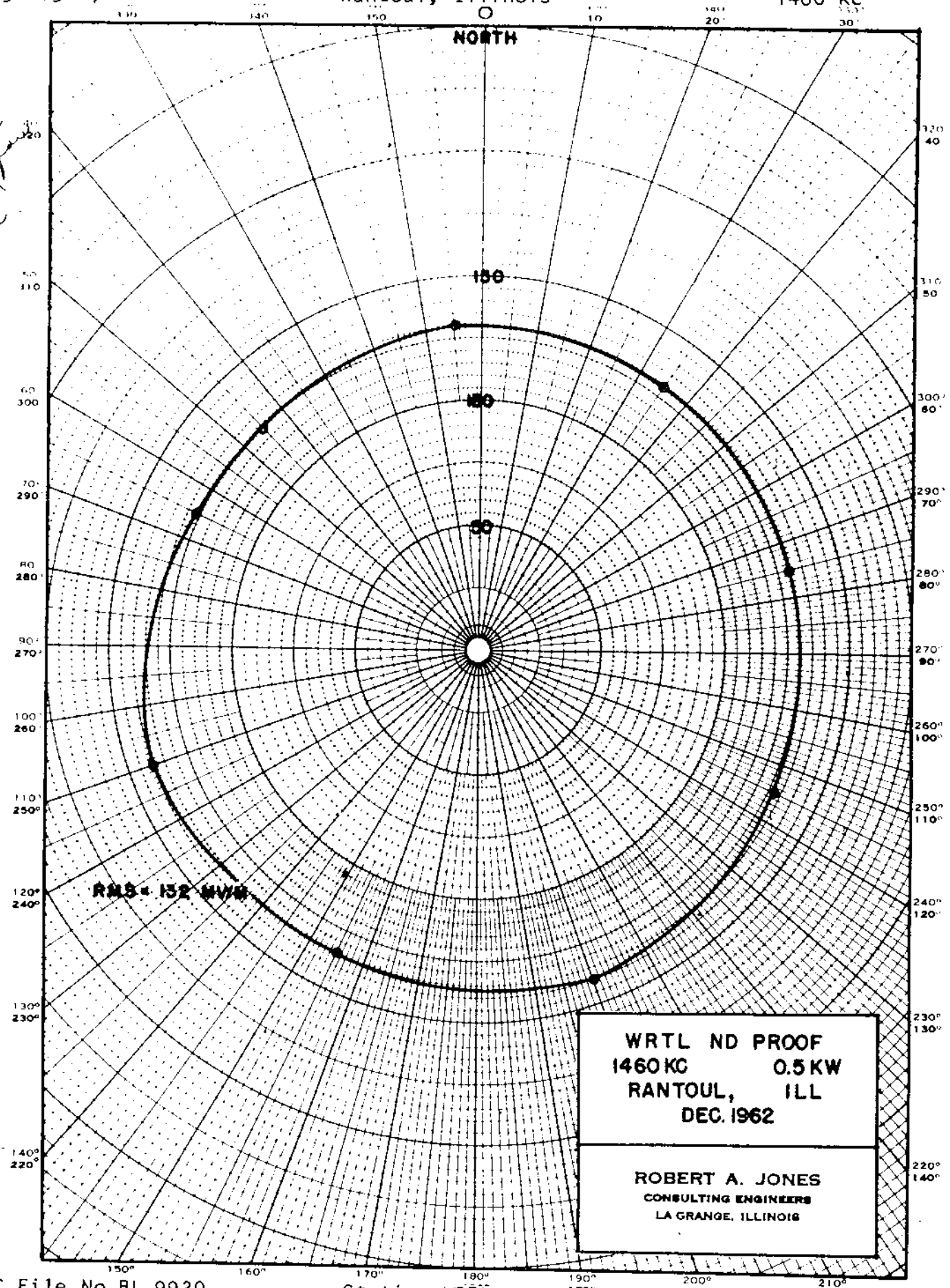
WRTL

Measured Non-DA
(4-30-63ct)

Station WRTL
Rantoul, Illinois

500w, DA-D,D
1460 kc

8-7-63
Granted
License for
new AM
station



FCC File No.BL-9930
Accepted 4-18-63

Station WRTL
Rantoul, Illinois

1460 kc

WXOK

Proposed Night
(5-27-69ct)

Station WXOK
Baton Rouge, Louisiana

1kw, 5kw-LS, DA-N, U
1460 kc

BP-18186
Granted
9/8/69 CP
to change
antenna
transmitter
location
& change
antenna
system

PAGE 14
(AMENDED)

PROPOSED NIGHTTIME HORIZONTAL
RADIATION PATTERN
WXOK - BATON ROUGE, LOUISIANA
1460 KC - 1/5 KW-LS-DA-N

JANUARY, 1969

GAUTNEY & JONES—CONSULTING ENGINEERS

KSO
WFMH
WPNX
meov
WMBR
WACO
XEJT
XEOL
CJCM
100
200
300
MV/M

RMS: 180 MV/M

S_1 = 333.22°
S_2 = 140°
G = 90°=168'

#1 1.010 | +72.6°
#2 0.3428 | +155.18°
#3 0.1774 | +62.58°
#4 0.5175

N 30° 28' 08"
W 91° 12' 24"

EUGENE DIETZGEN CO.
MADE IN U.S.A.

NO. 340-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE

FCC File No. BP-18186
Accepted 5-9-69 Amended

Station WXOK
Baton Rouge, Louisiana

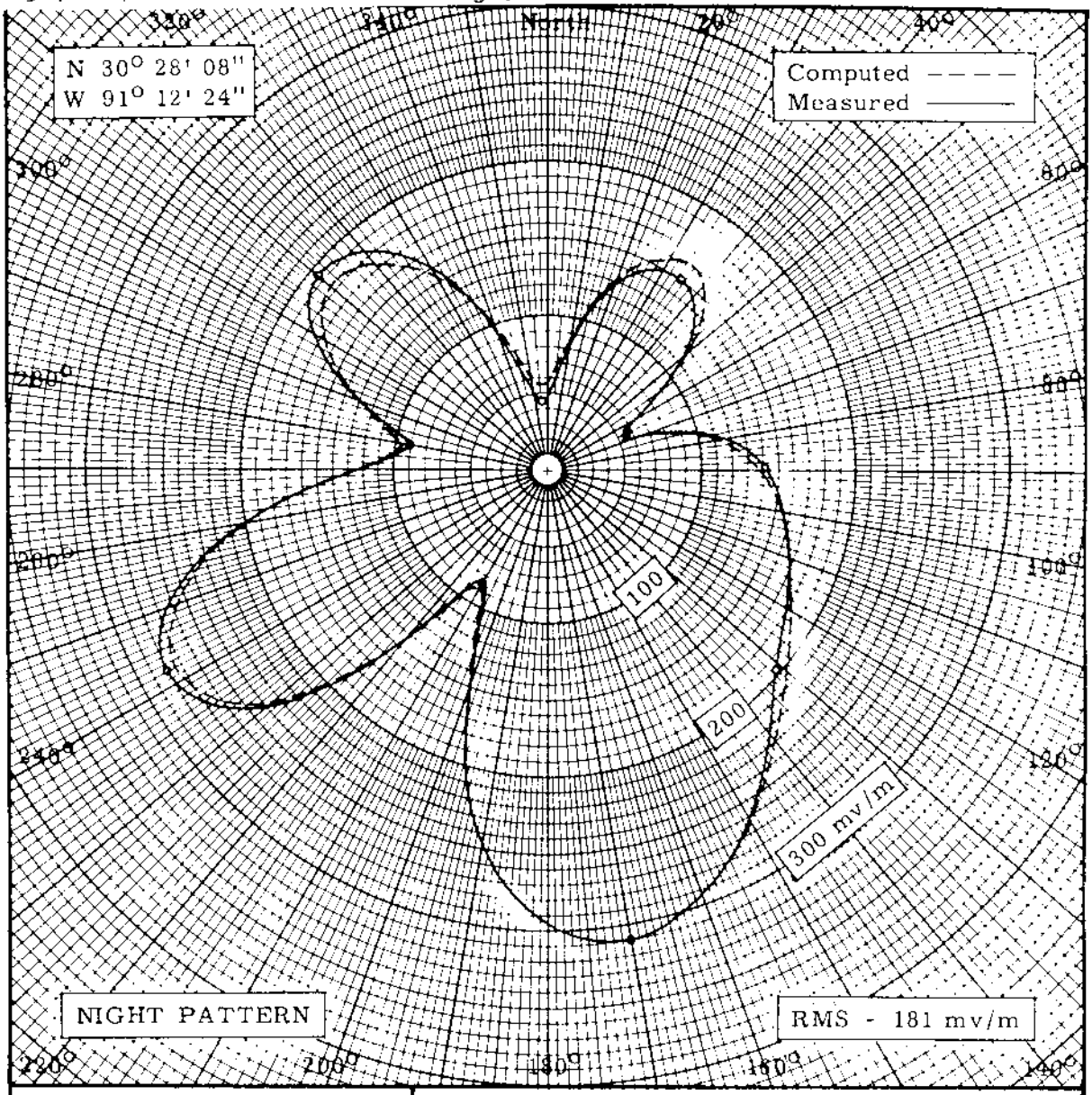
1460 kc

WXOK

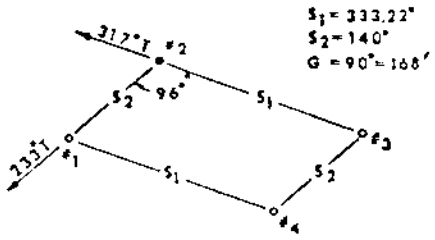
Measured Night
(12-23-70ct)

Station WXOK
Baton Rouge, Louisiana

1kw, 5kw-LS, DA-N, U
1460 kc



Theoretical values



#1 1.000°
#2 0.3428 ∠ +72.6°
#3 0.1774 ∠ +155.18°
#4 0.5175 ∠ -82.56°

RADIO STATION WXOK
BATON ROUGE, LOUISIANA

MEASURED DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
1460 KHZ 1000 WATTS

100770	*MERL SAXON*
FIGURE 2	*CONSULTING RADIO ENGINEER*
	LUFKIN, TEXAS

FCC File No. BL-12801
Accepted 11-27-70

Station WXOK
Baton Rouge, Louisiana

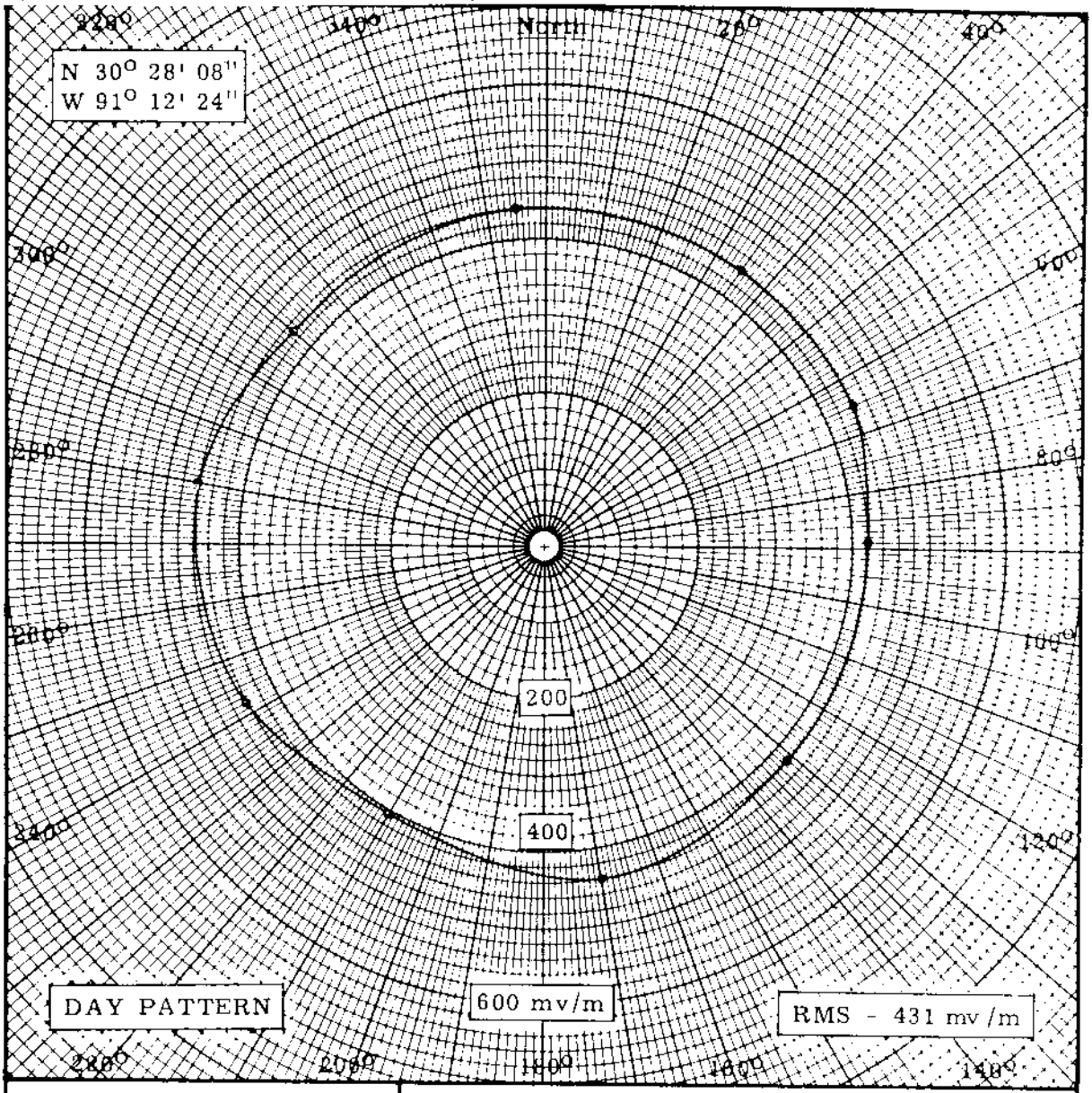
1460 kc

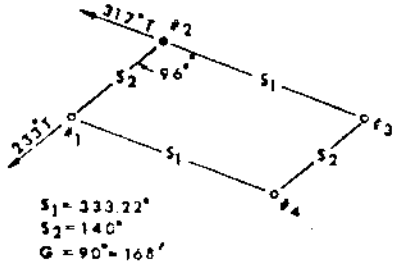
WXOK

Measured Non-DA
(12-23-70ct)

Station WXOK
Baton Rouge, Louisiana

1kw, 5kw-LS, DA-N, U
1460 kc





No. 3 tower fed 5000 watts while remaining towers are isolated by floating

RADIO STATION WXOK
BATON ROUGE, LOUISIANA

MEASURED NON-DIRECTIONAL
HORIZONTAL PLANE RADIATION PATTERN
1460 KHZ 5000 WATTS

100770	*MERL SAXON*
FIGURE 1	*CONSULTING RADIO ENGINEER*
	LUFKIN, TEXAS

FCC File No. BL-12801
Accepted 11-27-70

Station WXOK
Baton Rouge, Louisiana

1460 kc

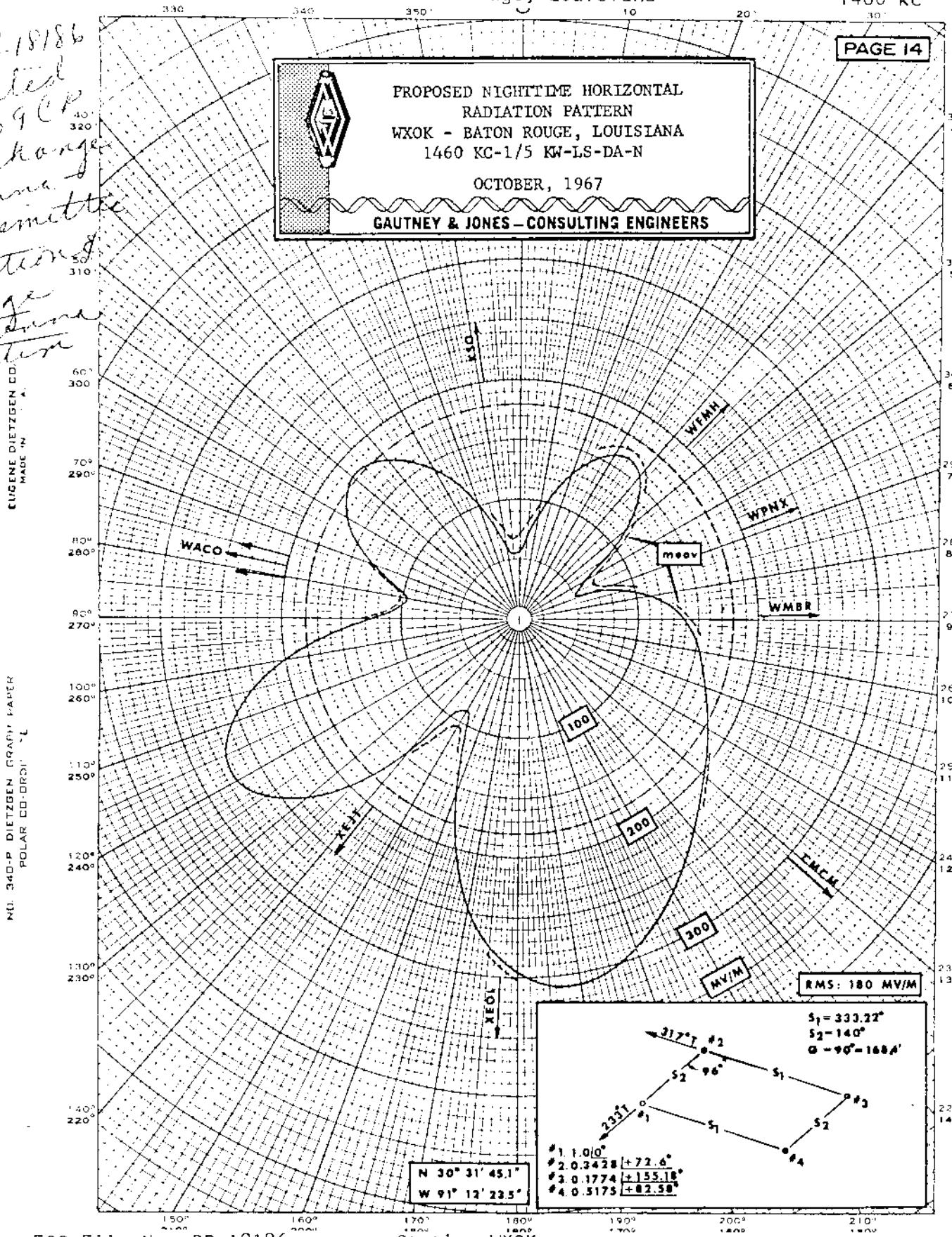
WXOK

Proposed Night
(5-28-68ct)

Station WXOK
Baton Rouge, Louisiana

1kw, 5kw-LS, DA-N, U
1460 kc

BP-18186
Granted
9/8/69 CP
to change
antenna &
transmitter
location &
change
antenna
system



FCC File No. BP-18186
Accepted 5-22-68

Station WXOK
Baton Rouge, Louisiana

1460 kc

BP-18186 Granted 9-8-69 CP to change antenna-transmitter location & change antenna system

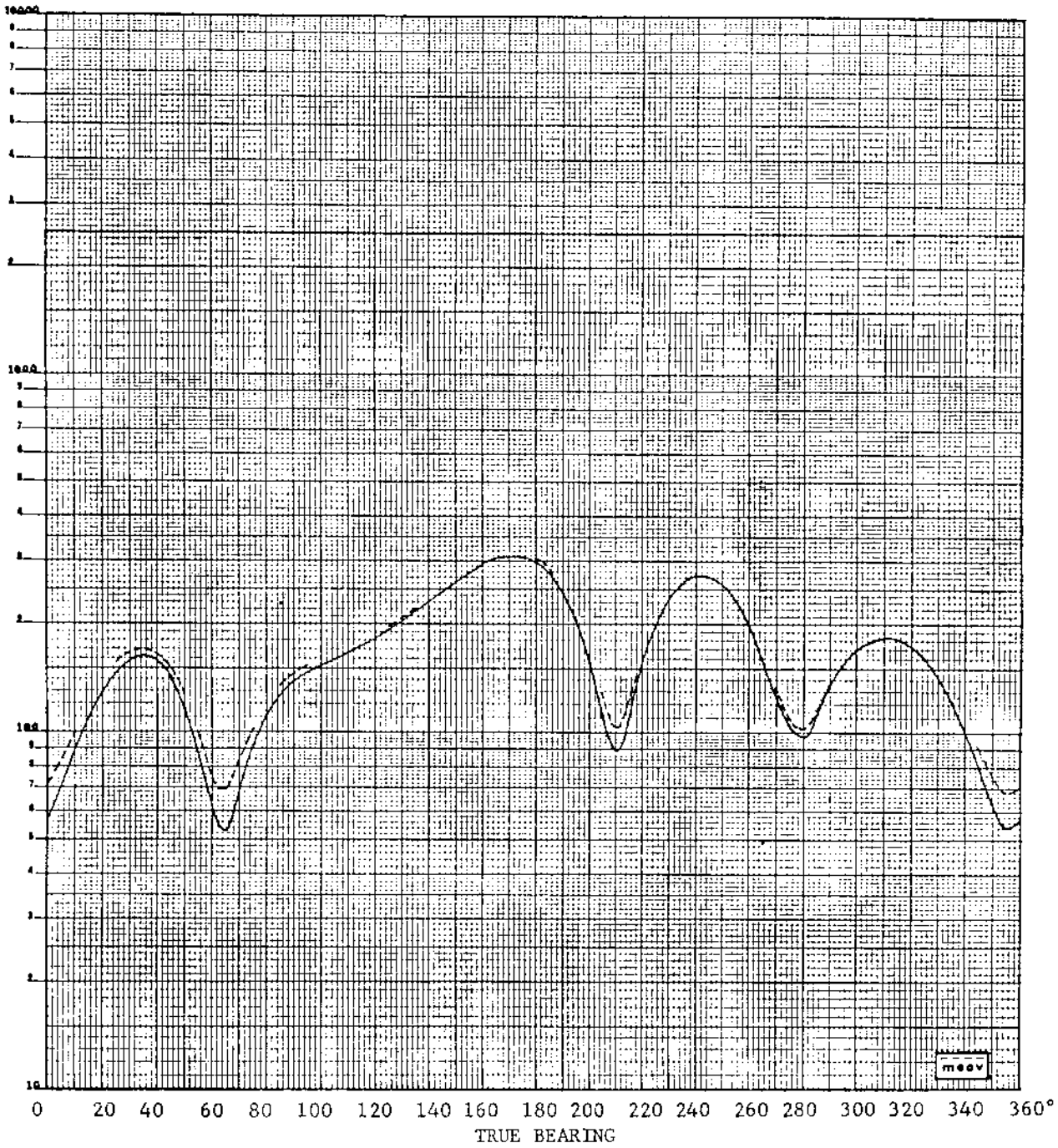
WXOK

Proposed Night Nulls
(5-28-68ct)

Station WXOK
Baton Rouge, Louisiana

1kw, 5kw-LS, DA-N, U
1460 kc

0° VERTICAL RADIATION PATTERN



PROPOSED HORIZONTAL
RADIATION PATTERN
WXOK - BATON ROUGE, LOUISIANA
1460 KC - 1/5 KW - LS - DA-N
OCTOBER, 1967

GAUTNEY & JONES—CONSULTING ENGINEERS

FCC File No. BP-18186
Accepted 5-22-68

Station WXOK
Baton Rouge, Louisiana

1460 kc

NEW

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: (New) Main Studio: Dickinson, North Dakota

Frequency: 1460 kilz Power: 5 kW

Notification List No. 1725 Date: March 16, 1977 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 46° 50' 56"
West Longitude: 102° 49' 41"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 3
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	N(#3)	C(#2)	S(#1)
HEIGHT ABOVE INSULATORS:	170'	300' (160°)	170' (90°)
PHASING:	-132°	0°	+148°
FIELD RATIO:	0.515	1	0.515

SPACING AND ORIENTATION: Adjacent towers are spaced 187' (100°) on a line bearing 20° true.

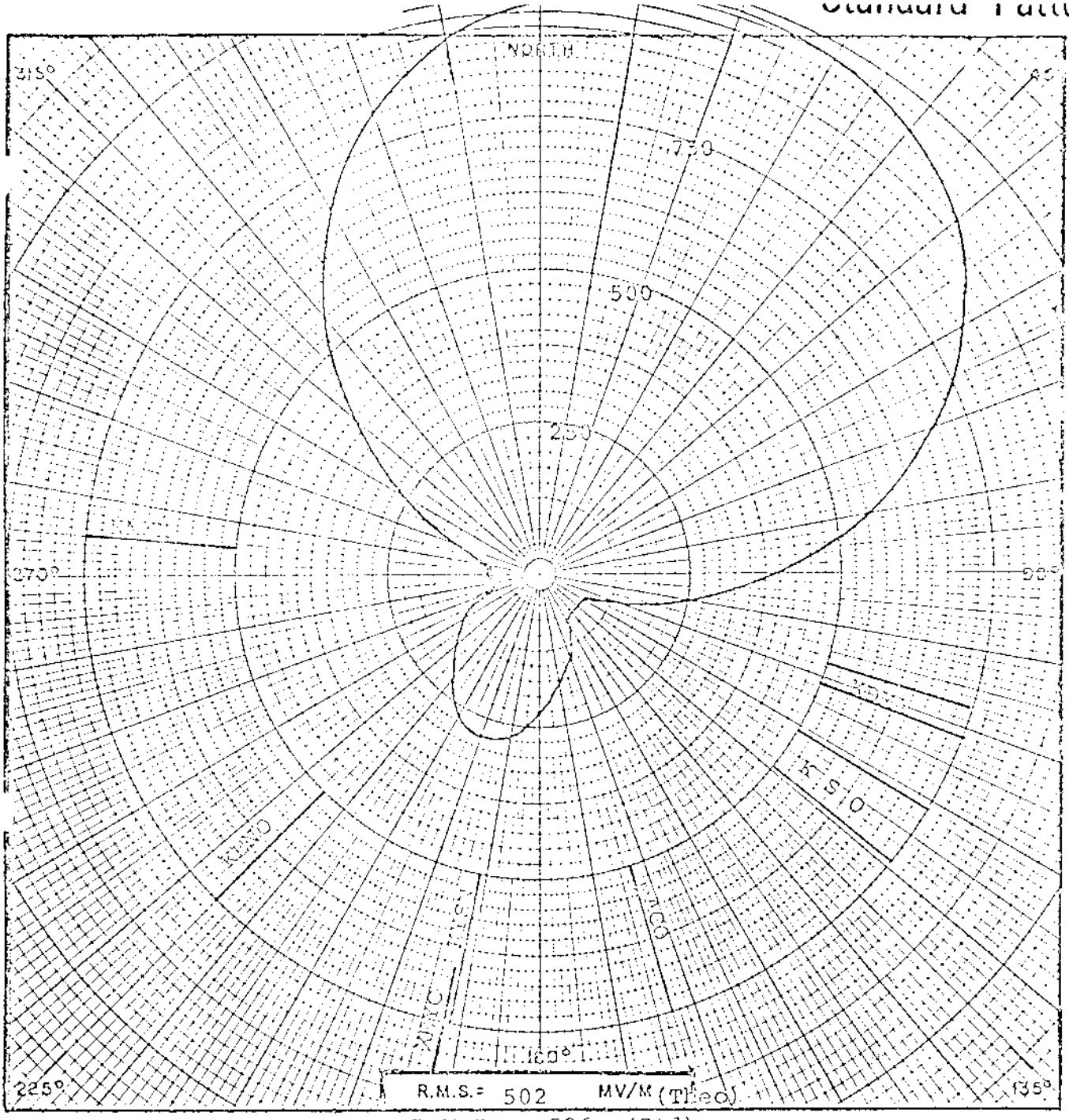
GROUND SYSTEM: 120-169' equally spaced copper radials plus 120-50' interspaced radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day 1/	497 mv/m	- mv/m	- mv/m
Night	502 mv/m	653.7 mv/m	526 mv/m

1/ Tower #2

Standard Pattern NEW



R.M.S. = 526 (Std).

PATTERN PARAMETERS

20°True RSS=653.7mv/m

3. 0.515/-132°

S

S = 100°

2. 1.000/ 0

S

$G_1=G_3=90°$

1. 0.515/+148° $G_2=160°$

DIRECTIONAL
RADIATION PATTERN

ROUGHRIDER B/C

☐ MEASURED ☒ PROPOSED

FREQ: 5.0 (KHZ) POWER 1460 (KW) ☐ DA-D

N. LAT. 46 ° 50 ' 56 " ☒ DA-N

W. LONG. 102 ° 49 ' 41 " ☐ N-D

LOCATION: Dickinson, North Dakota

DATE: June 1974

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FIGURE 1.

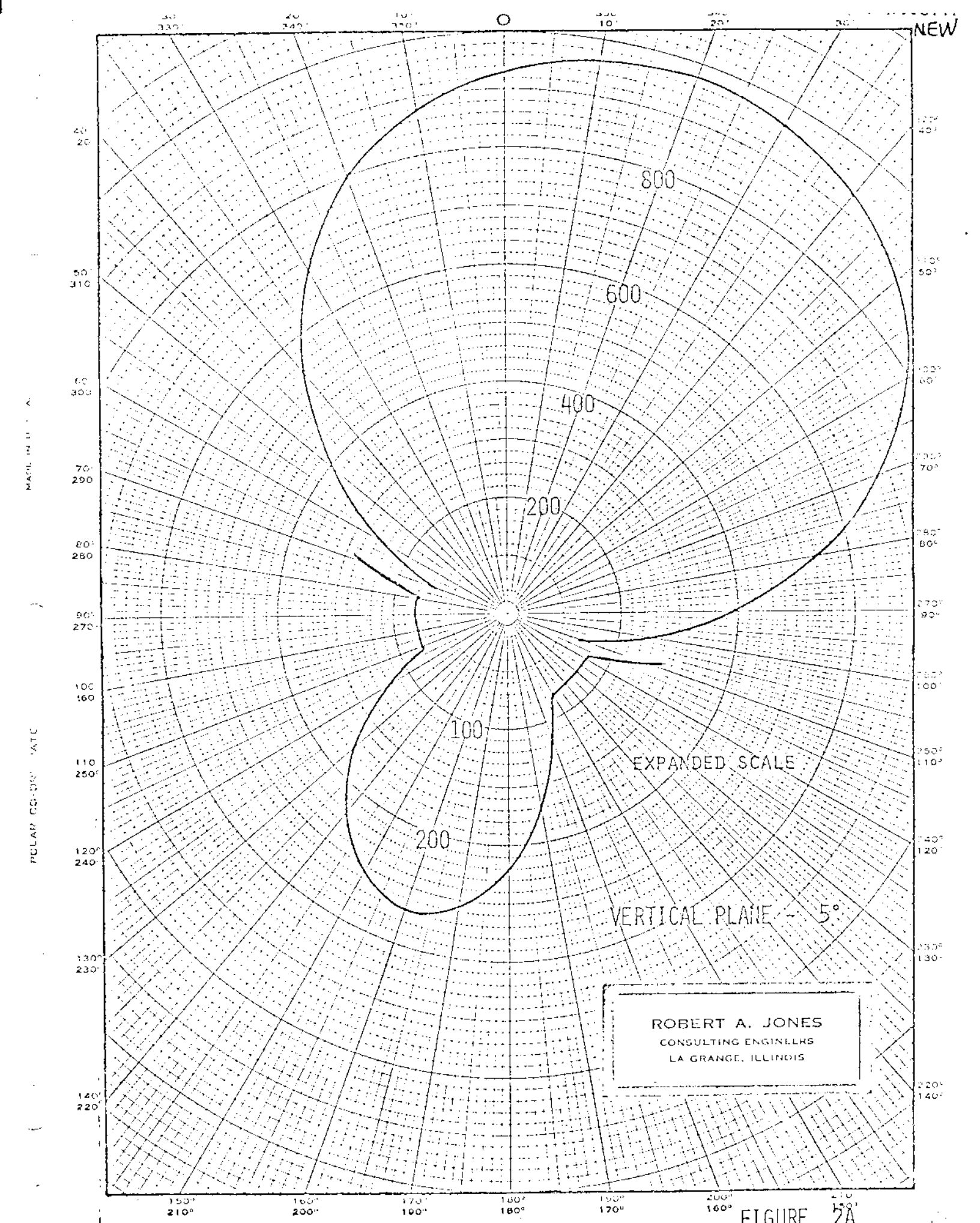

NEW
800
600
400
200
100
200
EXPANDED SCALE
VERTICAL PLANE - 5°
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FIGURE 2A

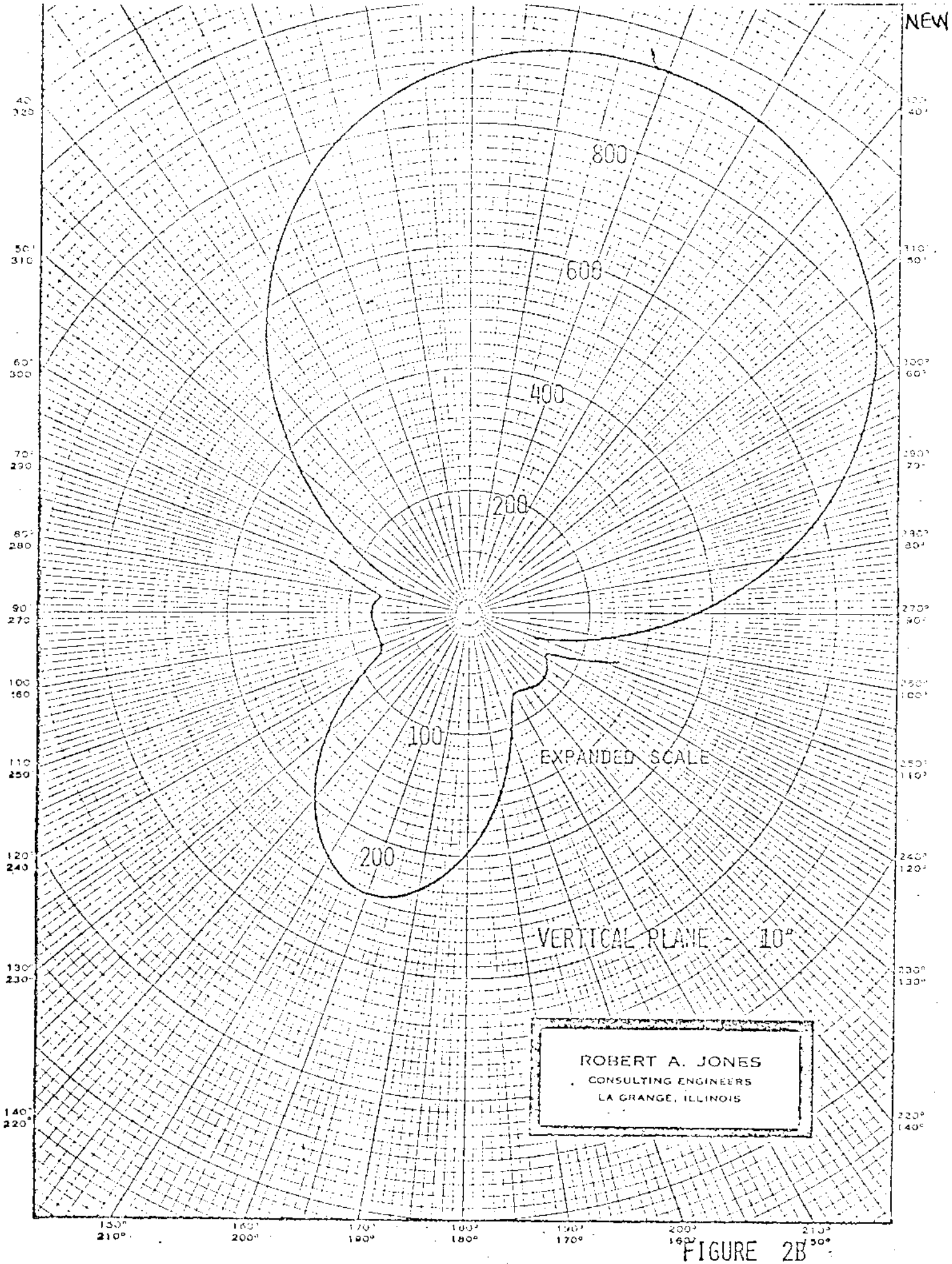

NEW
800
600
400
200
100
200
EXPANDED SCALE
VERTICAL PLANE - 10°
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FIGURE 2B

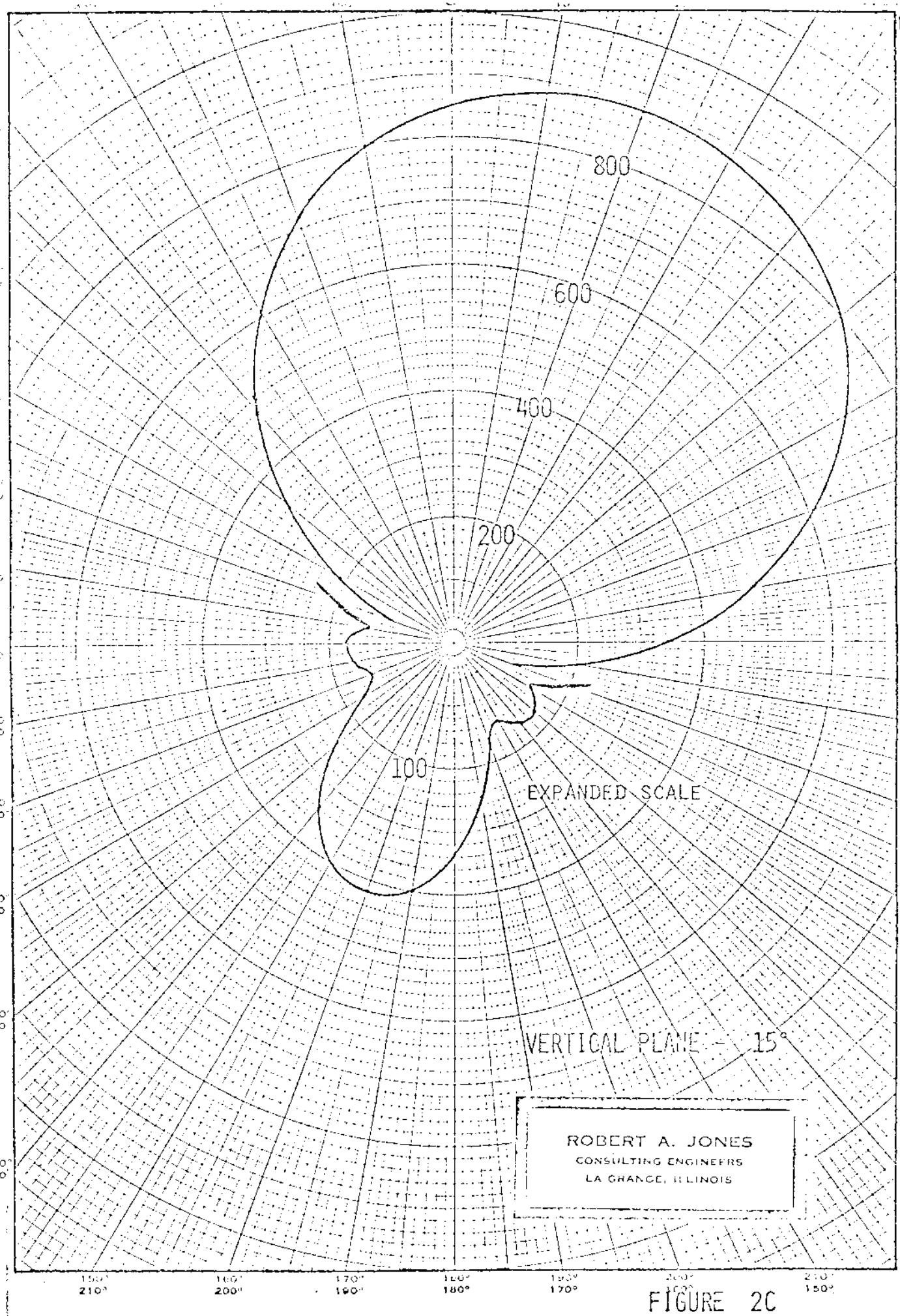

NEW
800
600
400
200
100
EXPANDED SCALE
VERTICAL PLANE - 15°
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FIGURE 2C

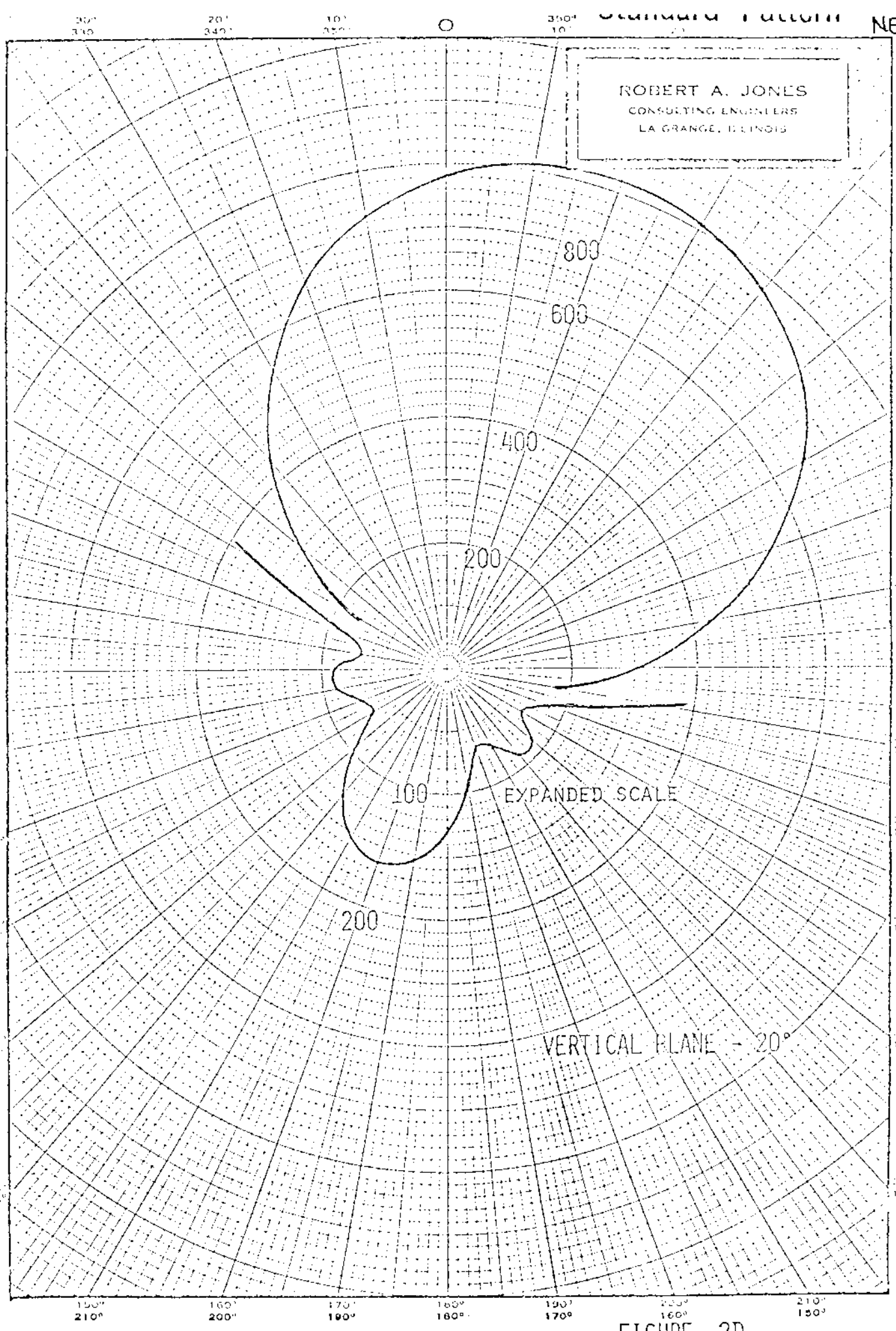

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS
800
600
400
200
100
EXPANDED SCALE
200
VERTICAL PLANE - 20°

FIGURE 2D

Standard Pattern NEW

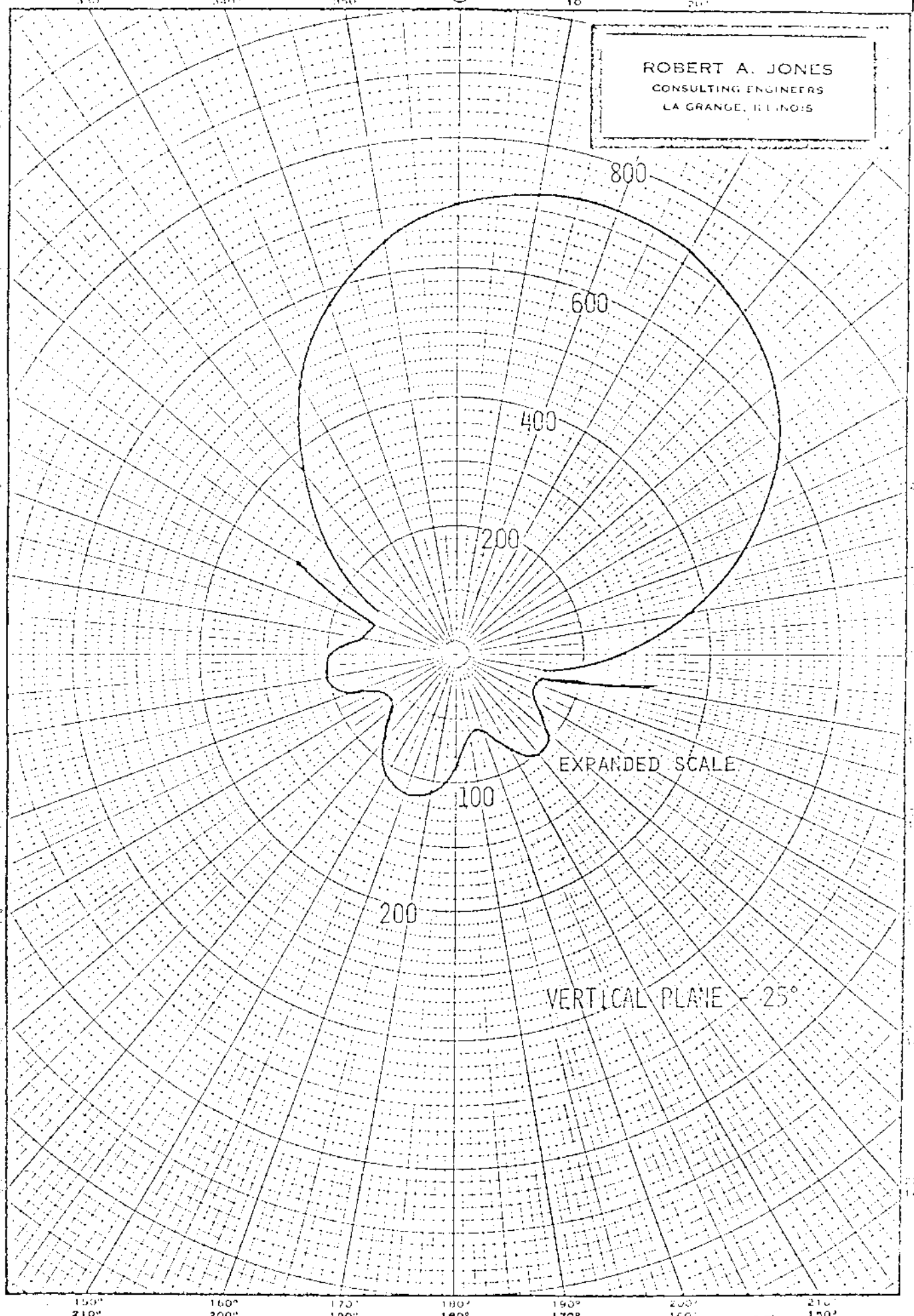


FIGURE 2E

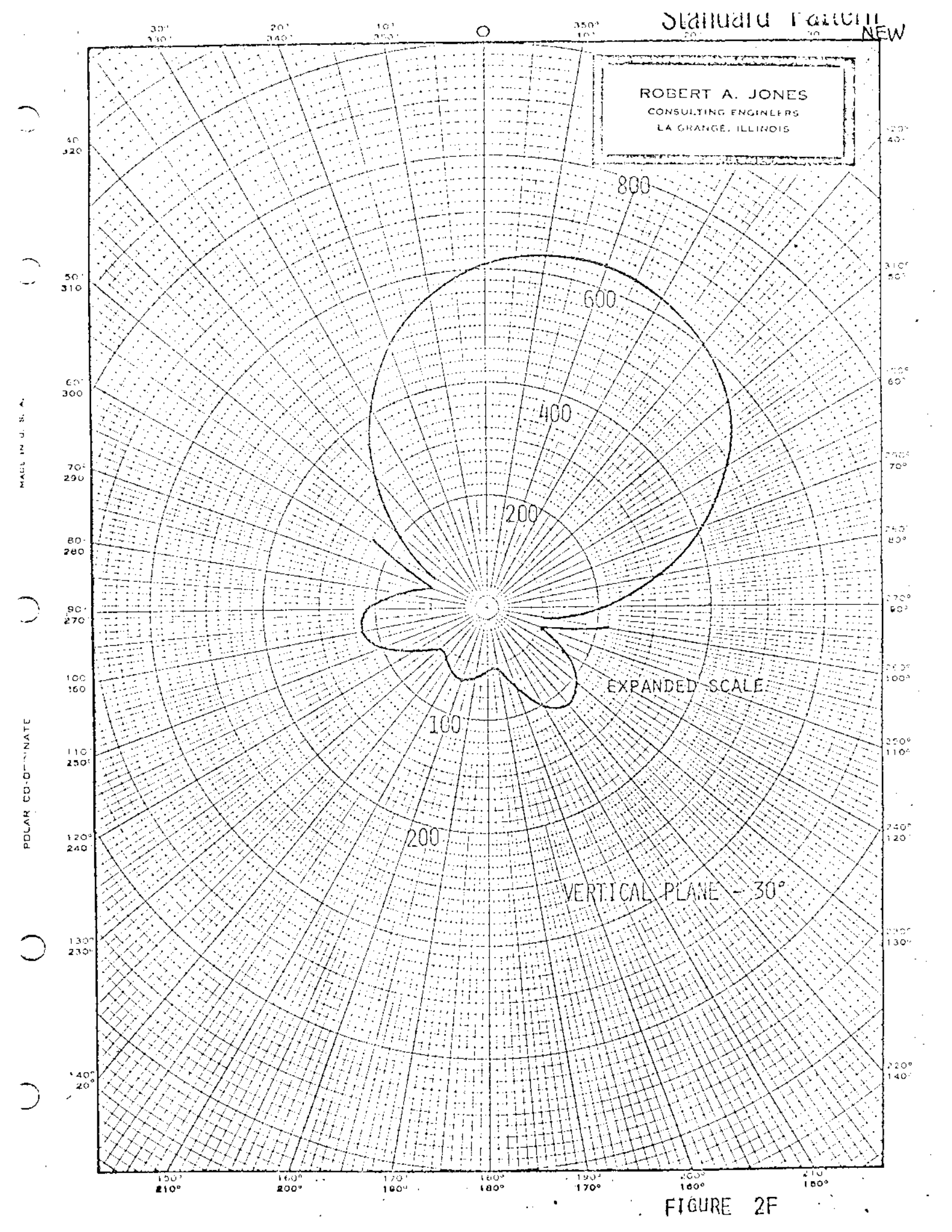

Standard Pattern
NEW
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS
800
600
400
200
100
200
EXPANDED SCALE
VERTICAL PLANE - 30°
POLAR CO-ORDINATE
MADE IN U. S. A.

FIGURE 2F

Standard Pattern NEW

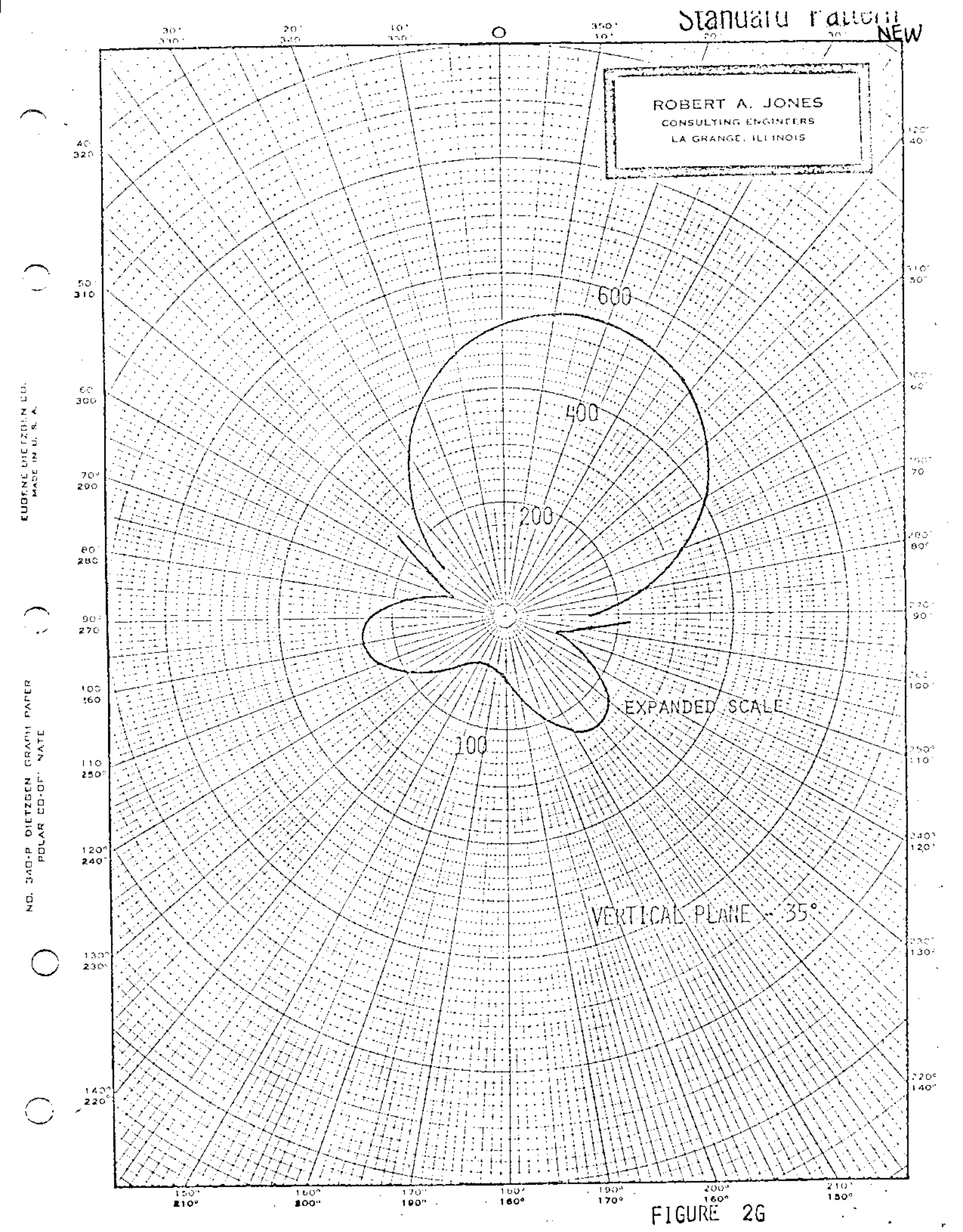


FIGURE 2G

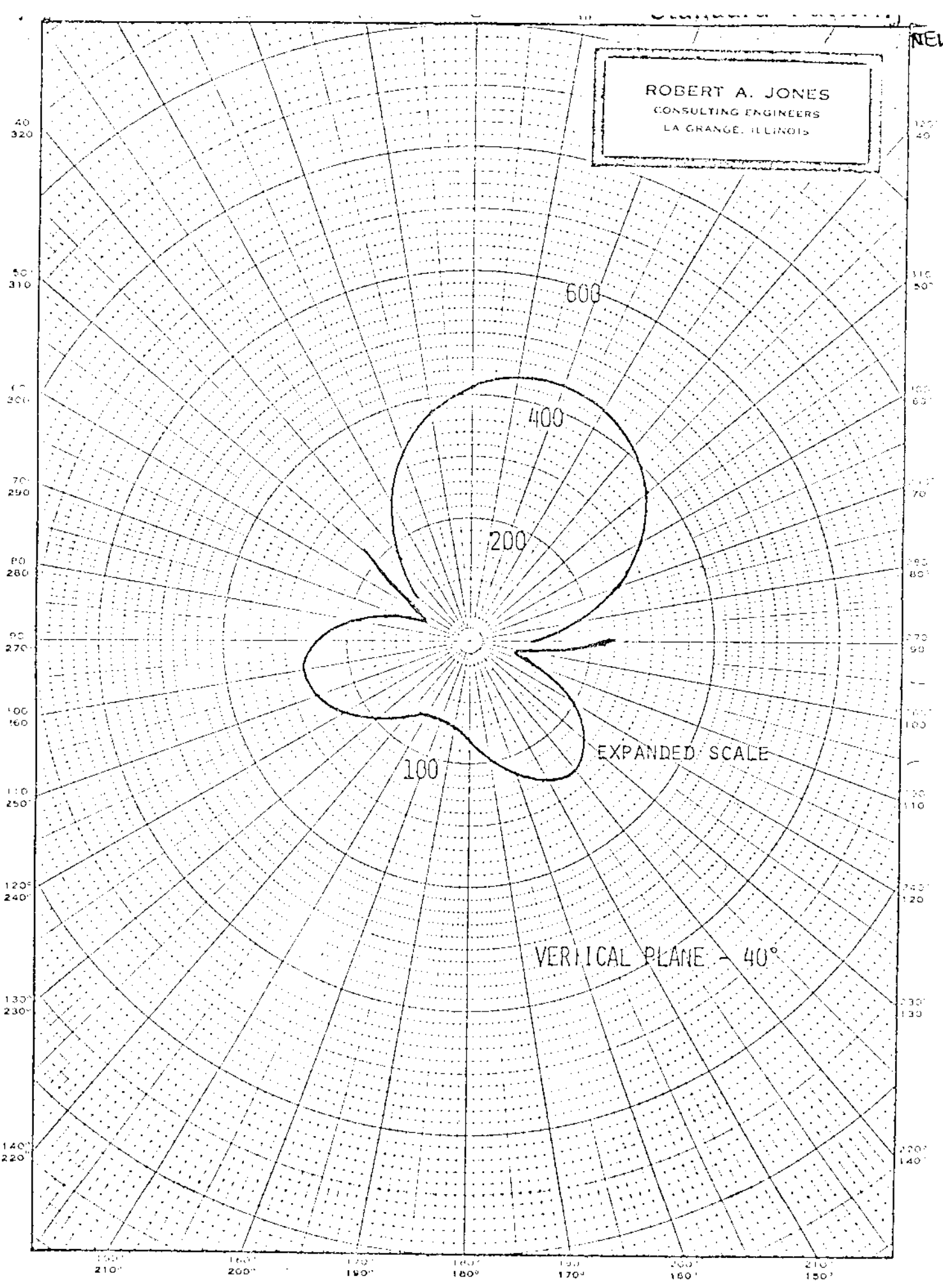

NEW
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS
600
400
200
100
EXPANDED SCALE
VERTICAL PLANE - 40°

FIGURE 2H

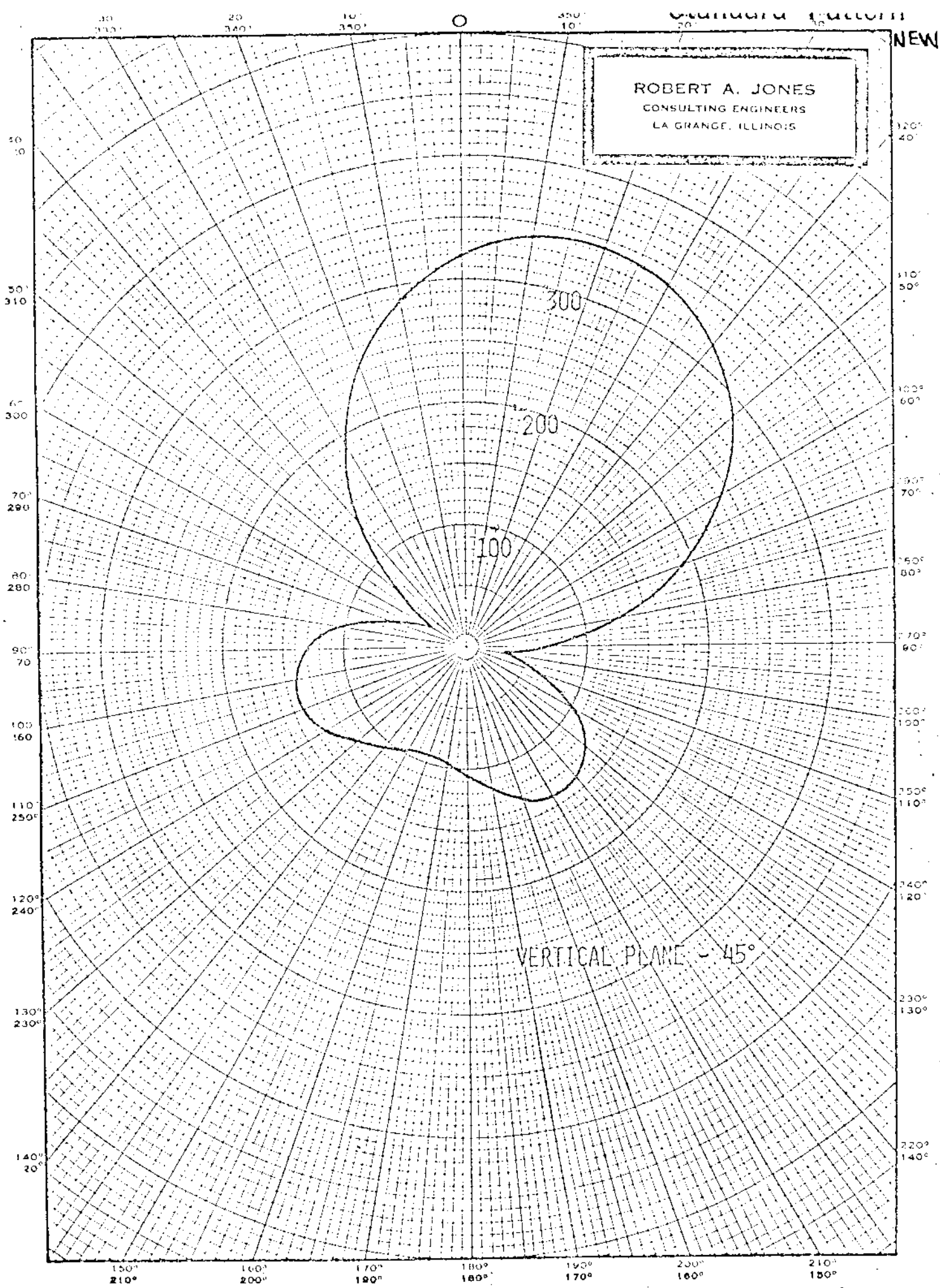

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS
300
200
100
VERTICAL PLANE - 45°
POLAR CO-ORDINATE

FIGURE 21

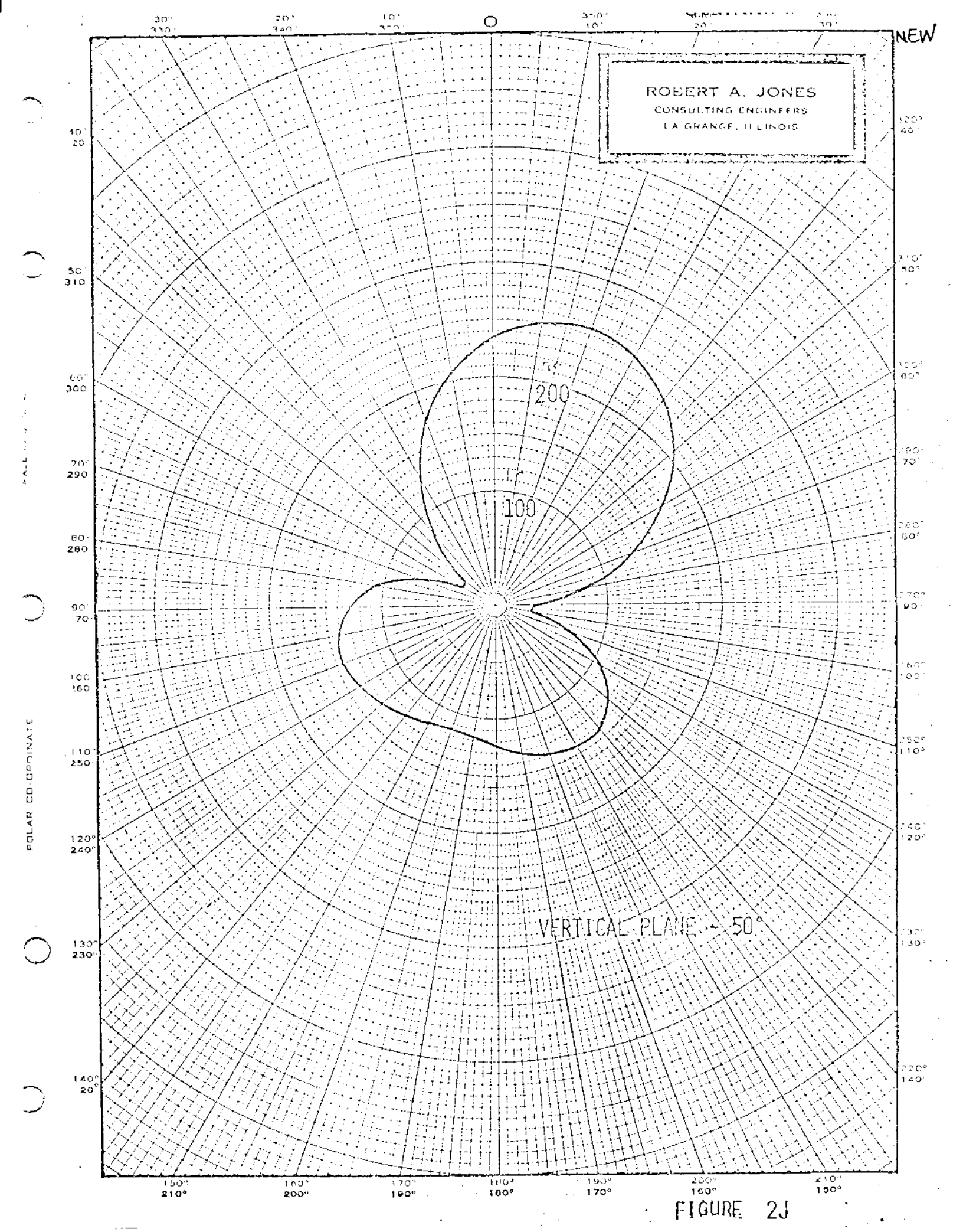
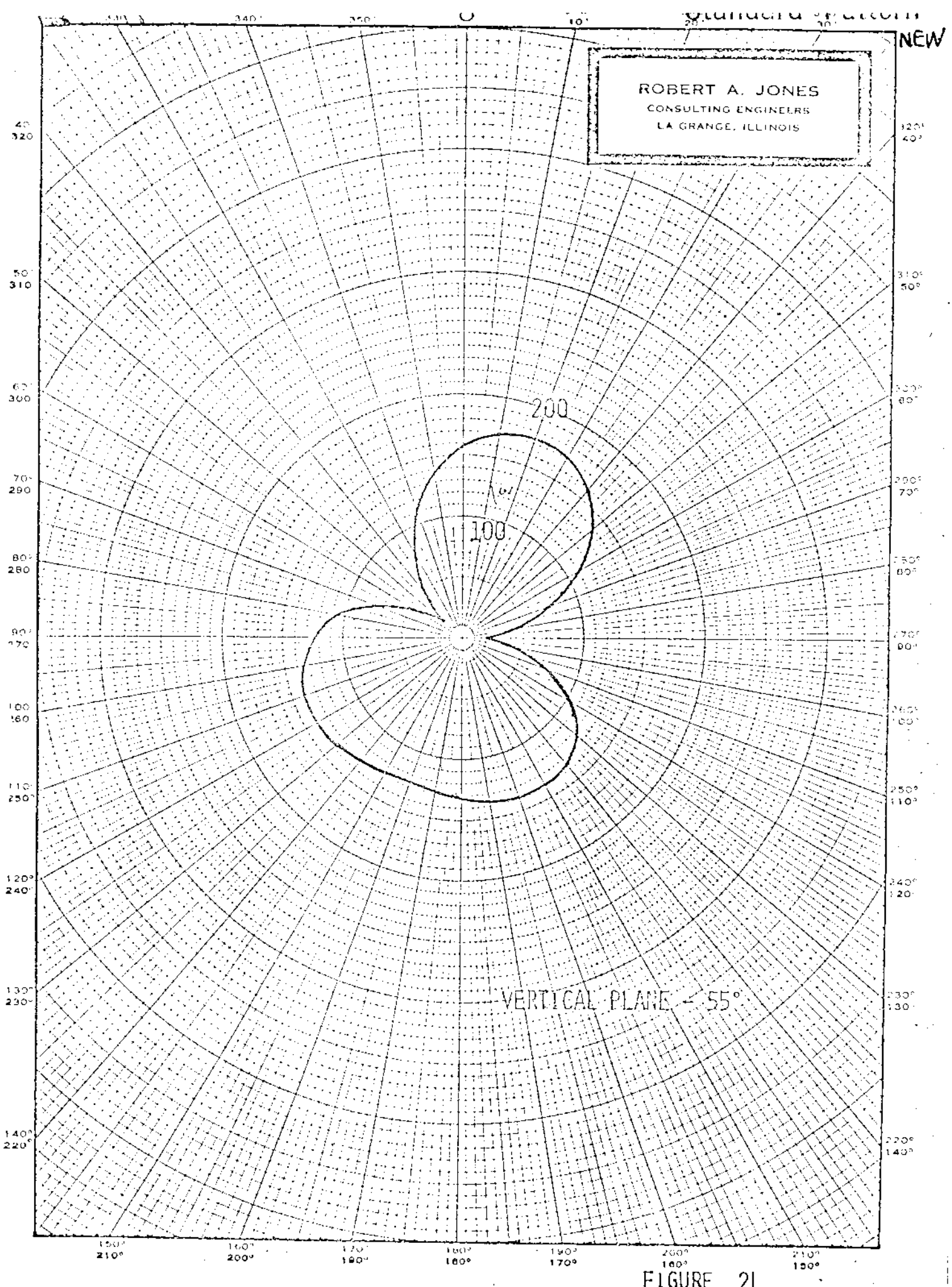

NEW
ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS
200
100
VERTICAL PLANE - 50°
POLAR CO-ORDINATE

FIGURE 2J



NEW

FIGURE 2L

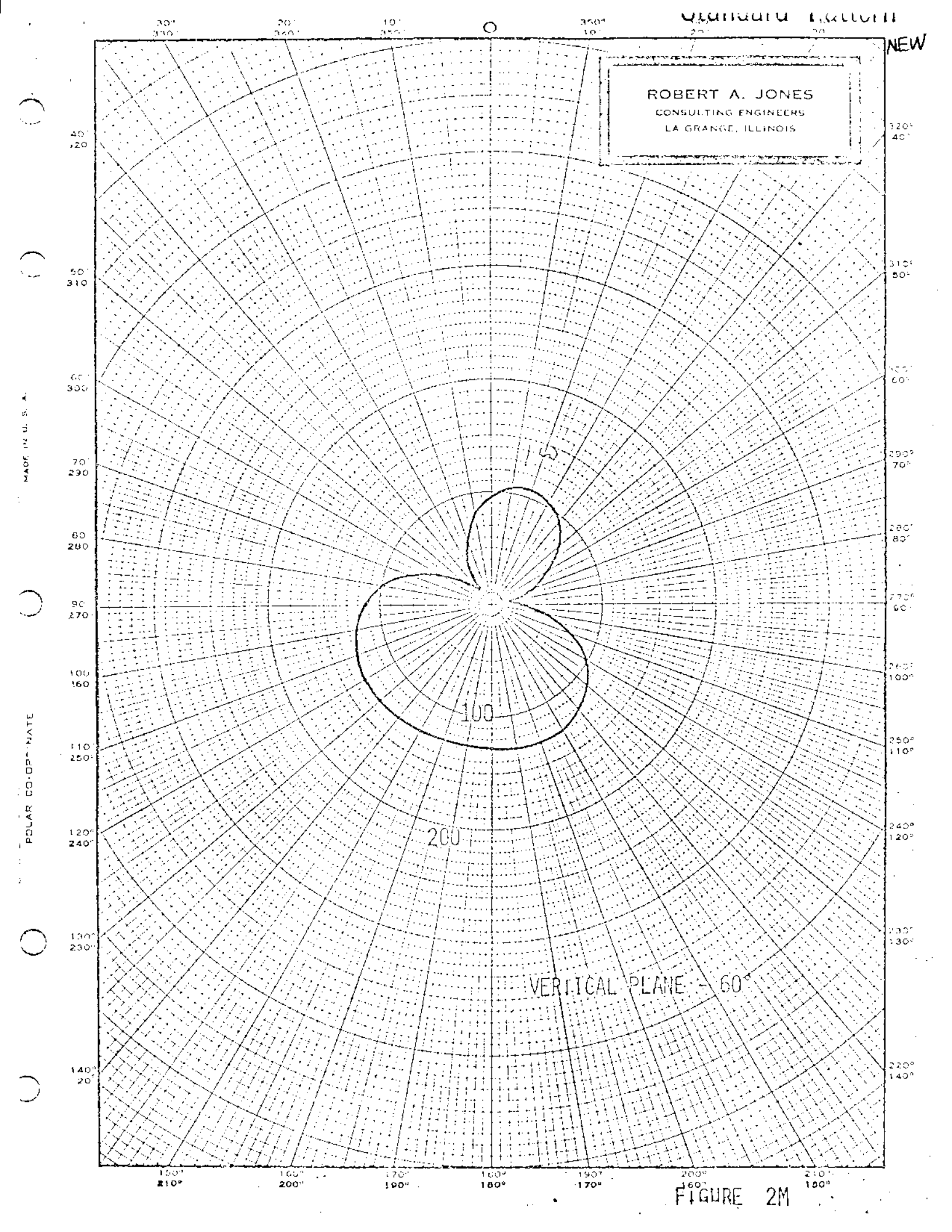
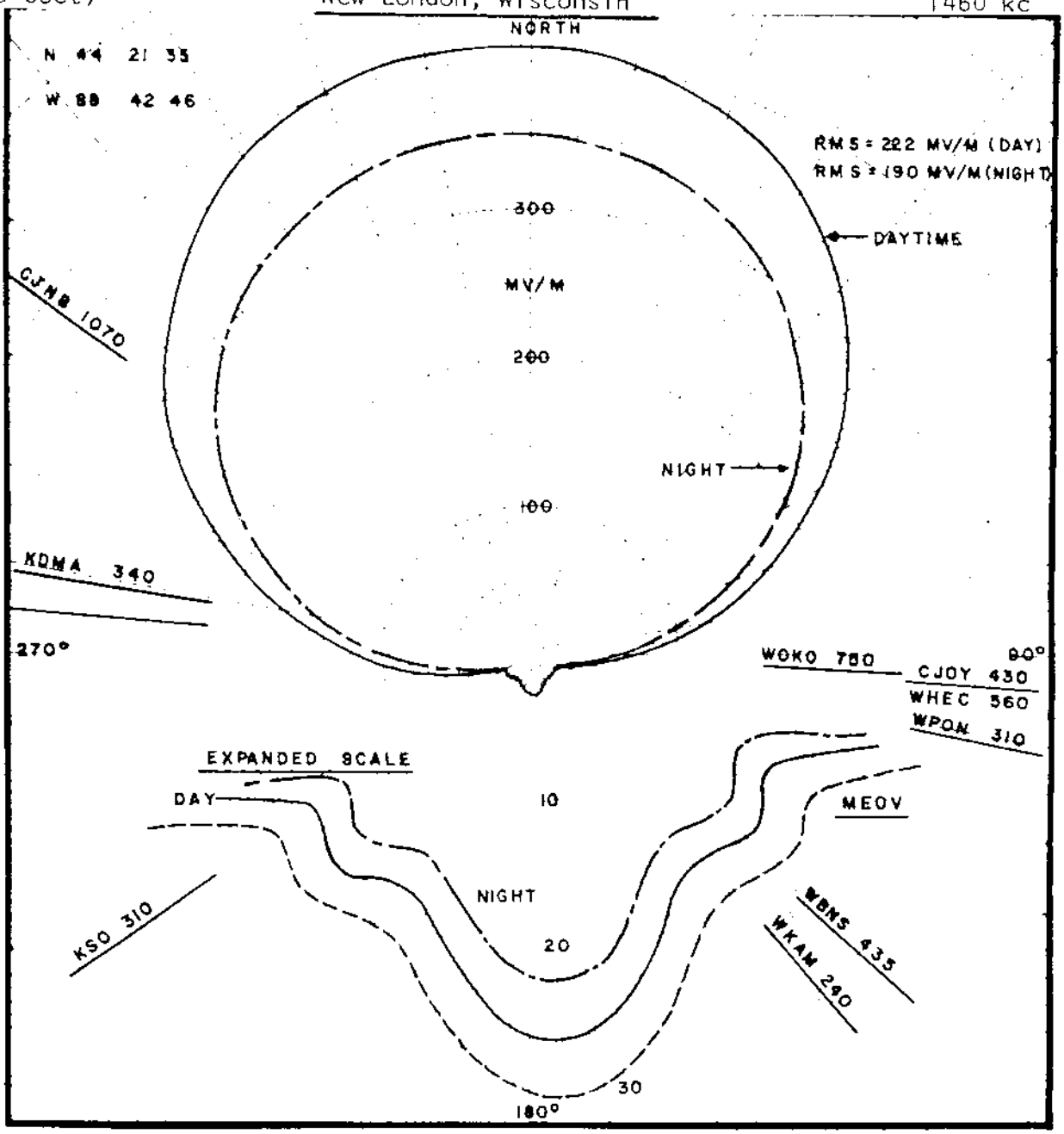

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS
NEW
100
200
VERTICAL PLANE - 60°
POLAR CO-ORDINATE

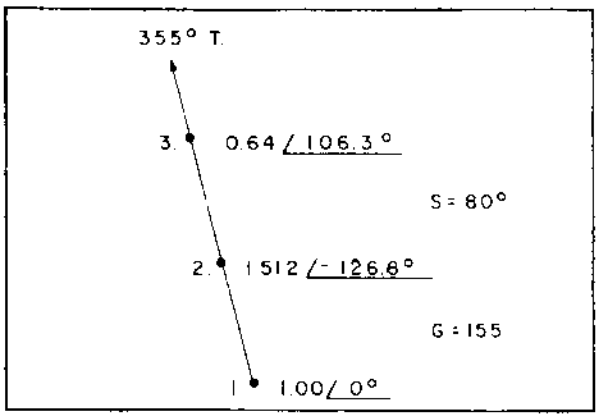
FIGURE 2M

Proposed Day & Night
(3-28-68ct)

New; New London Enterprises, Inc.
New London, Wisconsin

1kw, DA-2, U
1460 kc





PROPOSED RADIATION PATTERN
1460 KHZ 1 KW DA-2
NEW LONDON, WISC.
MARCH, 1967

ROBERT A. JONES
CONSULTING ENGINEERS
LA GRANGE, ILLINOIS

FCC File No. BP-18100
Accepted 3-19-68

New; New London Enterprises, Inc.
New London, Wisconsin

1460 kc

XELX

14287

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: XELX — Main Studio: Zitacuaro, Michoacan

Frequency: 1460kc — Power: 10kw

Notification List No. 150 — Date: June 13, 1952 Class: III-A

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 19° 26' 21"

West Longitude: 100° 20' 20"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: Two (2)
Type of elements: Series-fed, uniform cross-section, guyed vertical steel towers.

TOWER:	North		South
HEIGHT ABOVE INSULATORS:	168'		168'
SPACING:	86'	or	46° between adjacent towers
NIGHT PHASING:	140°		0°
NIGHT FIELD RATIO:	1.0		1.0

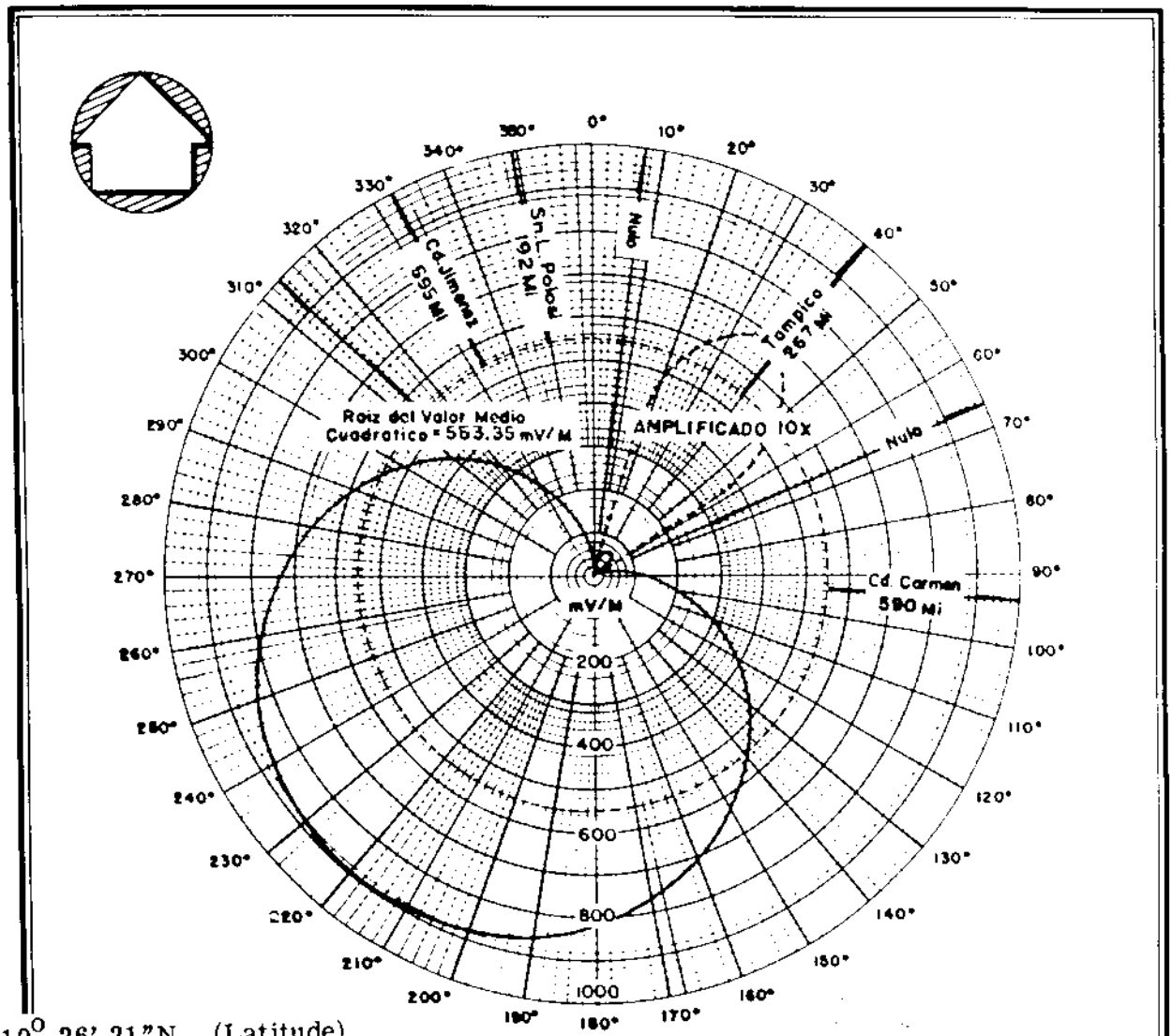
ORIENTATION: Elements on a line bearing 36.8° true.

GROUND SYSTEM: Equivalent to 120 - 168' equally spaced radials about each tower base. Radials are shortened and bonded between towers.

Predicted effective Night Field: 553.35 mv/m (at rated power)

Note: The Federal Communications Commission has objected to this assignment.

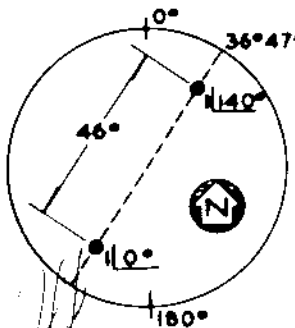
XELX



19° 26' 21"N (Latitude)
100° 20' 20"W (Longitude)

PATRON HORIZONTAL DE RADIACION EN mV/M A 1 Mi.

POSICION RELATIVA DE LAS TORRES



RADIODIFUSORA

XELX

ZITACUARO, MICH.

1460 KC.

10 000 WATTS

LUIS VASQUEZ ORTIZ
PASANTE DE ING DE COMUNICACIONES ELECTRICAS Y ELECTRONICA — E.S.I.M.E.

ANTENNA DESCRIPTION SHEET

DIRECTIONAL DA-2

STATION CALL:
MAIN STUDIO: Vancouver, B. C.
FREQUENCY: 1470 kc/s
POWER: 10,000 watts
CLASS: III
TIME: Unlimited

NOTIFICATION REFERENCE: #261 Dated: November 5, 1969.

GEOGRAPHICAL LOCATION: Lat 49°11'36", Lon 123°00'39"

ARRAY CHARACTERISTICS: Three elements, guyed, uniform cross section, base insulated, series feed. Height 167 feet or 90 degrees.

TOWER		ONE	TWO	THREE
spacing		ref	120° 223.2'	240° 446.4'
bearing		ref	340°	340°
Day	R	1000	1000	
	ø	00°	-61°	
Night	R	1000	1880	1000
	ø	68°	00°	-68°

Ground System: 120 radials per tower, #10 AWG bare, soft copper wire, spaced uniformly, buried approximately 8 inches. Radials bonded along line between towers and bonded to soft copper strap at tower base. Maximum radial length 268 feet.

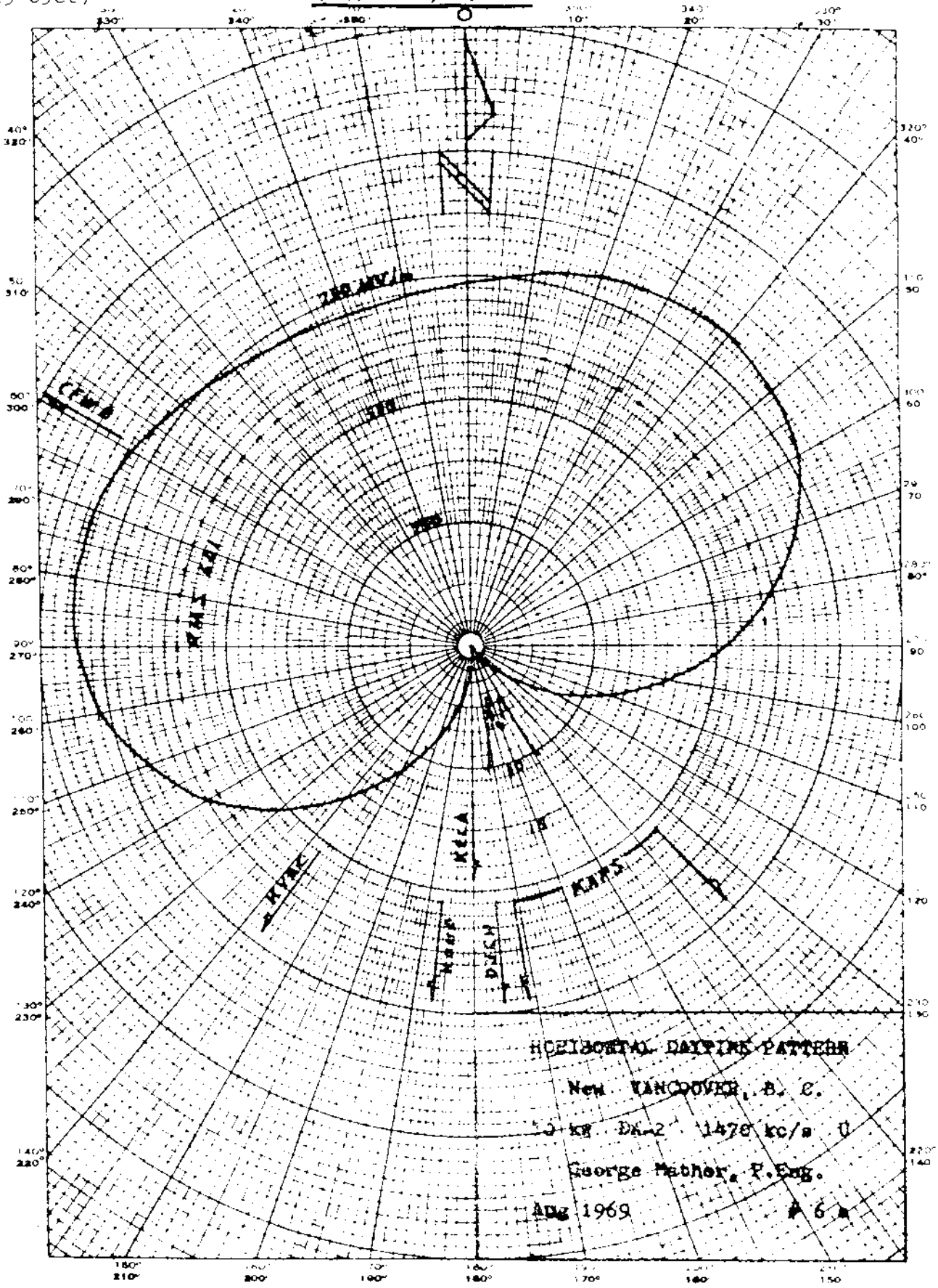
Predicted RMS:
Day 601 mv/m at 1 mi for 10 kw
190 mv/m at 1 mi for 1 kw

Night 601 mv/m at 1 mi for 10 kw
190 mv/m at 1 mi for 1 kw

Proposed Day
(11-29-69ct)

New Station
Vancouver, B. C.

10kw, DA-2, U, Class III
1470 kc



EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 340-P DIETZGEN GRAPH PAPER
POLAR CO-ORDINATE

HORIZONTAL DAYTIME PATTERN

New VANCOUVER, B. C.

10 kw DA-2 1470 kc/s U

George Mather, P.Eng.

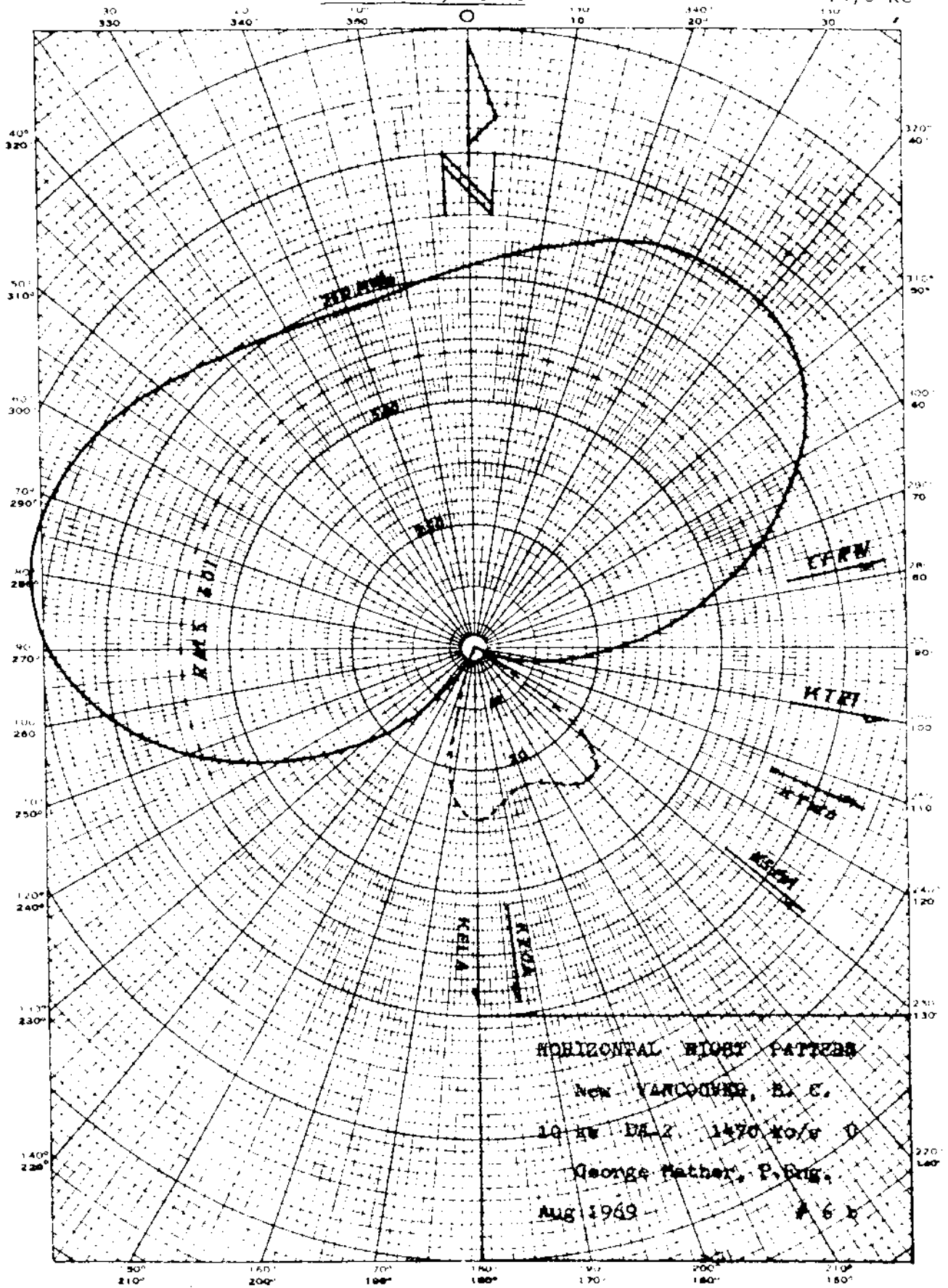
Aug 1969

6

Proposed Night
(11-29-69ct)

New Station
Vancouver, B. C.

10kw,DA-2,U,Class II
1470 kc



EUGENE DIETZGEN CO.
MADE IN U. S. A.

NO. 340-P DIETZGEN GRAPH PAPER
POLAR COORDINATE

POINTE CLAIRE, QUEBEC CFOX

DESCRIPTION SHEET

Station:	CFOX	Main Studio:	Pointe Claire, Quebec
Frequency:	1470 kHz	Power:	50 kW
Time:	Unlimited	Class:	III
Notification List No.:	232	Date:	August 27, 1971.
Geographic Location:	North Lat. 45°20' 03" West Long. 73°35' 35"		

Antenna System:

Mode of Operation: DA-1

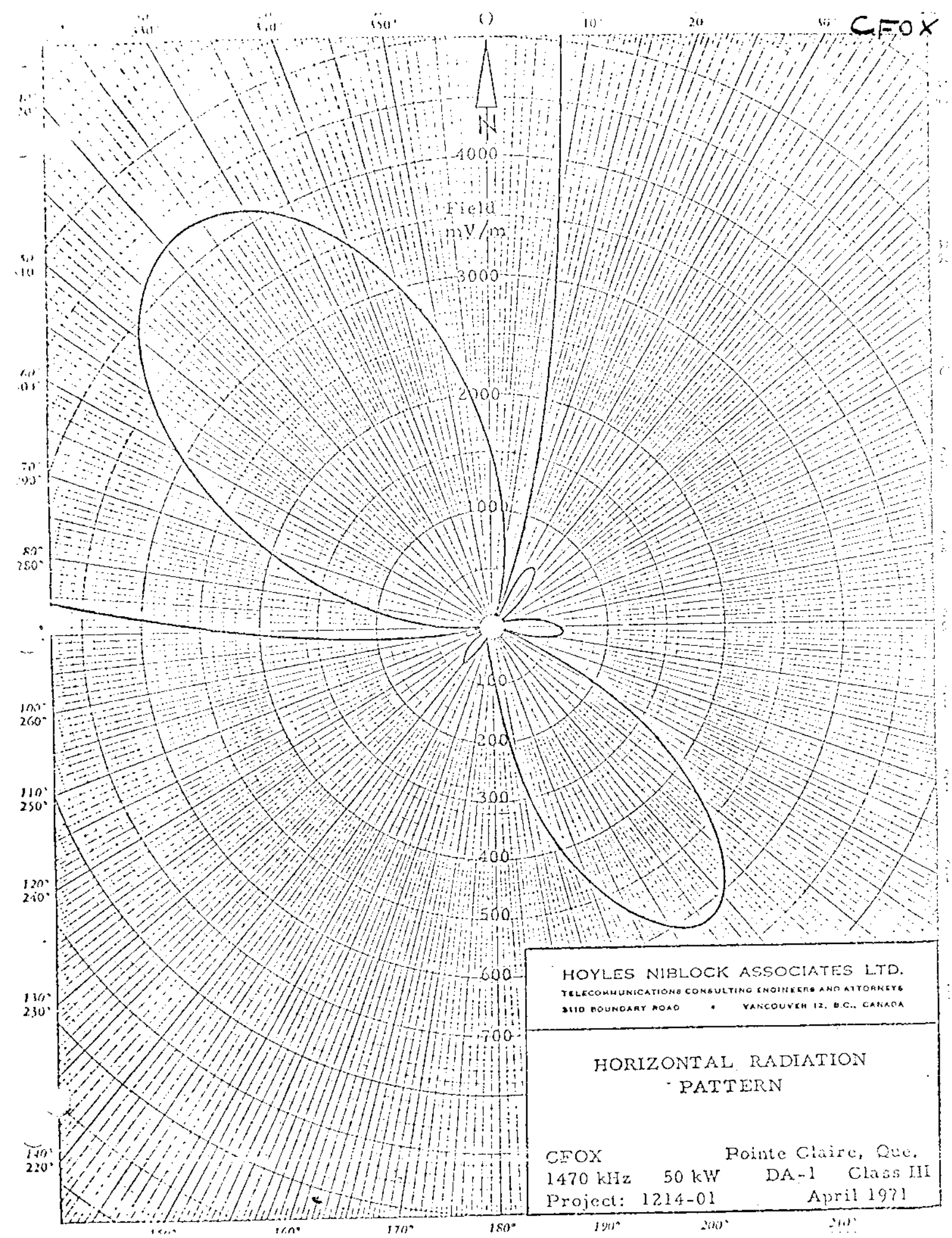
Elements: Six uniform cross section, guyed steel towers, base insulated and series fed. Top loaded using upper guys to an equivalent height of 210°.

Towers	1	2	3	4	5	6
Height above insulators	316'	316'	316'	316'	316'	316'
Overall Height	321'	321'	321'	321'	321'	321'
Spacing: Deg.	ref.	70	140	262.444	222.123	199.0
Feet	ref.	130.14	260.29	487.94	412.97	369.98
Phasing	0	-152.189	55.622	52.122	-155.689	- 3.5
Current Ratio	1	1.789	1	1	1.789	1
Orientation	ref.	- 31.5	- 31.5	16.809	30.420	48.5

Ground System: The ground system shall consist of 120, copper wire radials per tower, buried approximately 8-10 inches below grade. The area covered is equivalent to a 0.4 length system.

Predicted Effective Field: 1570 mV/m for 50 kW
222 mV/m for 1 kW

CFOX



HOYLES NIBLOCK ASSOCIATES LTD.

TELECOMMUNICATIONS CONSULTING ENGINEERS AND ATTORNEYS

3110 BOUNDARY ROAD • VANCOUVER 12, B.C., CANADA

HORIZONTAL RADIATION PATTERN

CFOX Pointe Claire, Que.

1470 kHz 50 kW DA-1 Class III

Project: 1214-01 April 1971

CFRW

Description Sheet
(8-28-68ct)

Station CFRW
Winnipeg, Manitoba
CORRECTED

5kw,DA-1,U,Class III
1470 kc

DIRECTIONAL ARRAY - DESCRIPTION SHEET

STATION: CFRW MAIN STUDIO: Winnipeg, Man.

FREQUENCY: 1470 KC POWER: 5 KW CLASS: III

Notification List No.: 140 Date: October 23, 1959

GEOGRAPHICAL LOCATION OF THE ANTENNA ARRAY:

NORTH LATITUDE: 49° 47' 58"

WEST LONGITUDE: 97° 16' 29"

ANTENNA CHARACTERISTICS:

Mode of Operation: Directional full time, same pattern day and night (DA-1)

Number of Elements: Three (3)

Type of Elements: Square uniform cross-section, guyed, insulated from ground, series fed, no top loading.

TOWER:	#1 (S)	#2 (C)	#3 (N)
HEIGHT ABOVE INSULATOR:	170'	170'	170' (91.5°)
OVERALL HEIGHT:	175'	175'	175'
SPACING:	90° between towers (167.3')		
PHASING:	+122	0	-122
FIELD RATIO:	0.885	1	0.318

ORIENTATION: on a line bearing 15 degrees East of True North.

GROUND SYSTEM: 120 equally spaced radials per mast extending to a maximum distance of 270' (0.4 of a wavelength) and bonded together at points equidistant between towers.

PREDICTED EFFECTIVE FIELD: 418 mv/m at 1 mile for 5 Kw. radiated

or 187 mv/m at 1 mile per Kw.

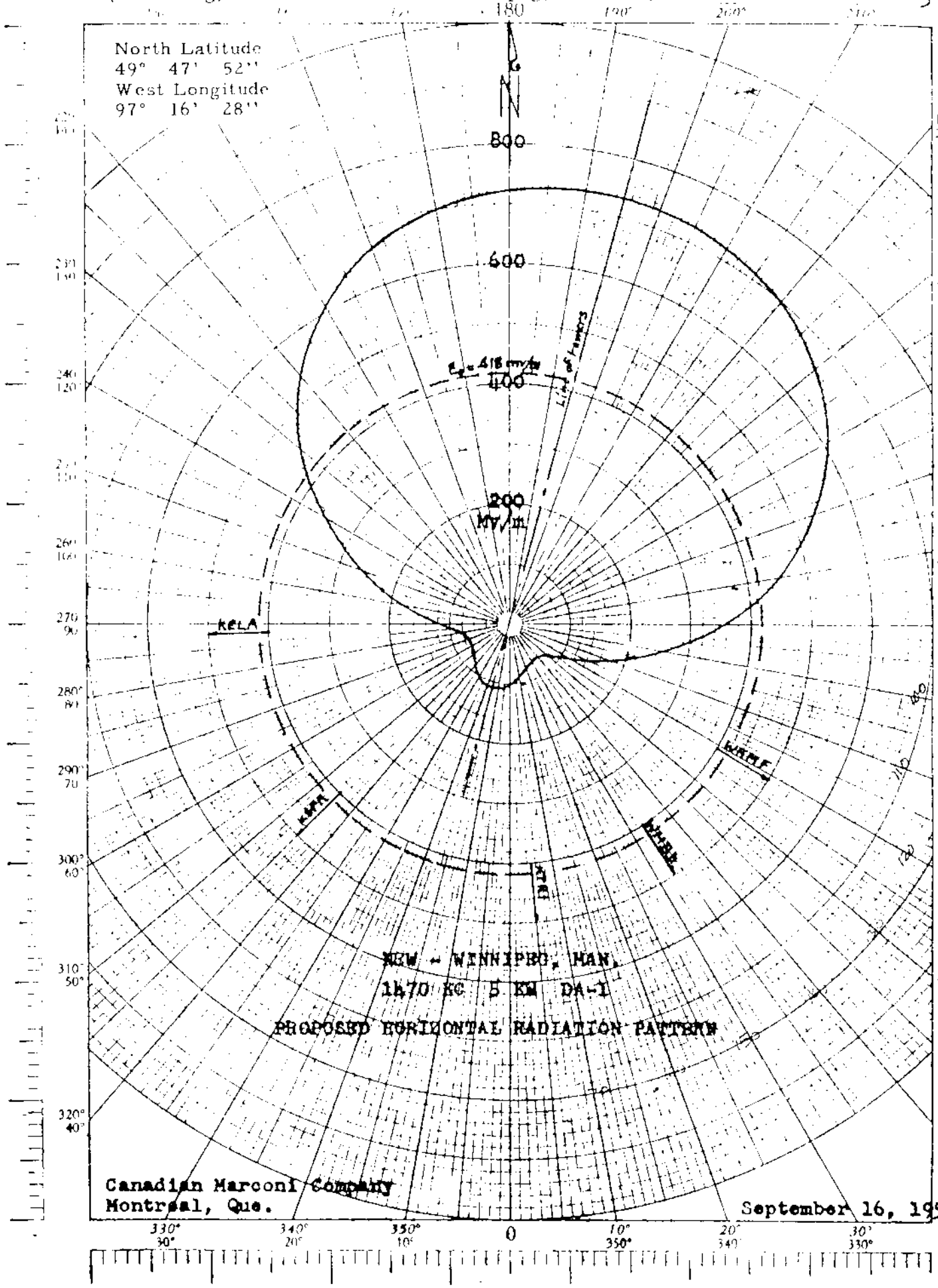
Note: Please retain patterns previously notified for CFRW Winnipeg, Man. and attach to this corrected Description Sheet. This notification is for the purpose of indicating a change in coordinates only.

B.T.M.A. 7-8-68

Winnepeg, Manitoba

PROPOSED DAY & NIGHT
(11-16-59g)

New Station 5kw, DA-1,U, Class III
Winnepeg, Manitoba, Canada 1470 KC



CHOW
1470 KHz

TABLE 1-1

ANTENNA DESCRIPTION SHEET

STATION CALL: CHOW
MAIN STUDIO: WELLAND, ONTARIO
FREQUENCY: 1470 kHz
POWER: 10 kW
CLASS: III
MODE: DA-2
TIME: UNLIMITED

NOTIFICATION LIST NO.: 382 DATE: March 8, 1979

GEOGRAPHICAL LOCATION: Latitude 42° 56' 52" North
Longitude 79° 16' 19" West

ARRAY CHARACTERISTICS: Eight steel towers; guyed and of uniform cross section; base insulated; series fed; height 112' (60.0°) above insulator and top load to approximately 80° for towers 1, 3, 4 and 5; height 150' (80.7°) with no top loading for towers 2, 6, 7 and 8.

GROUND SYSTEM: 120 equally spaced copper radial wires per tower, buried 8" - 12" deep, of average length 0.4λ(267'); minimum length 0.25λ(167').

TOWER NUMBER	SPACING FEET	SPACING DEGREES	BEARING DEGREES	NIGHT FIELD RATIO	NIGHT PHASE DEGREES	DAY FIELD RATIO	DAY PHASE DEGREES
1	0	0	0	0.605	-131.2	—	—
2	399.3	214.76	89.67	0.421	-153.9	—	—
3	167.3	90	172	1	0	0.841	82.1
4	439.4'	236.3	109.8	0.934	-22.8	1	0
5	334.6'	180	172	0.51	129.1	—	—
6	536.6'	288.61	124.39	0.622	106.3	—	—
7	307.2'	165.22	234.09	—	—	0.371	171.6
8	784.4'	421.85	98.01	—	—	0.861	-79.4

Please retain the night-time directional antenna radiation patterns from Change List 375 dated June 29, 1978. This proposal is for an increase in day-time power.
RMS DAY 553.4 mV/m (175 mV/m/kW) RMS NIGHT 560 mV/m (177.1 mV/m/kW)

CHOW

TABLE 1-I

ANTENNA DESCRIPTION SHEET

STATION CALL:	CHOW
MAIN STUDIO:	WELLAND, ONTARIO
FREQUENCY:	1470 kHz
POWER:	2.5N/10D kW
CLASS:	III
MODE:	DA-2
TIME:	UNLIMITED

COHEN AND DIPPELL
RECEIVED
SEP 5 1974
WASHINGTON, D.C.

NOTIFICATION LIST NO.: .328... DATE: July 23, 1974

GEOGRAPHICAL LOCATION: Latitude 42° 56' 52" North
Longitude 79° 16' 19" West

ARRAY CHARACTERISTICS: Eleven steel towers; guyed and of uniform cross section except #4 and #6 which are self supporting; base insulated; series fed; height 160' (86.1°); no top loading.

GROUND SYSTEM: 120 equally spaced copper radial wires per tower, buried 8" - 12" deep, of average length 0.4λ(267'); minimum length 0.25λ(167').

PREDICTED EFFICIENCY: (UNATTENUATED HORIZONTAL FIELD INTENSITY AT 1 MILE)

DAY	560 mV/m	for 10 kW
NIGHT	280 mV/m	for 2.5 kW
OR	177 mV/m	per kW.

ANTENNA DESCRIPTION SHEET

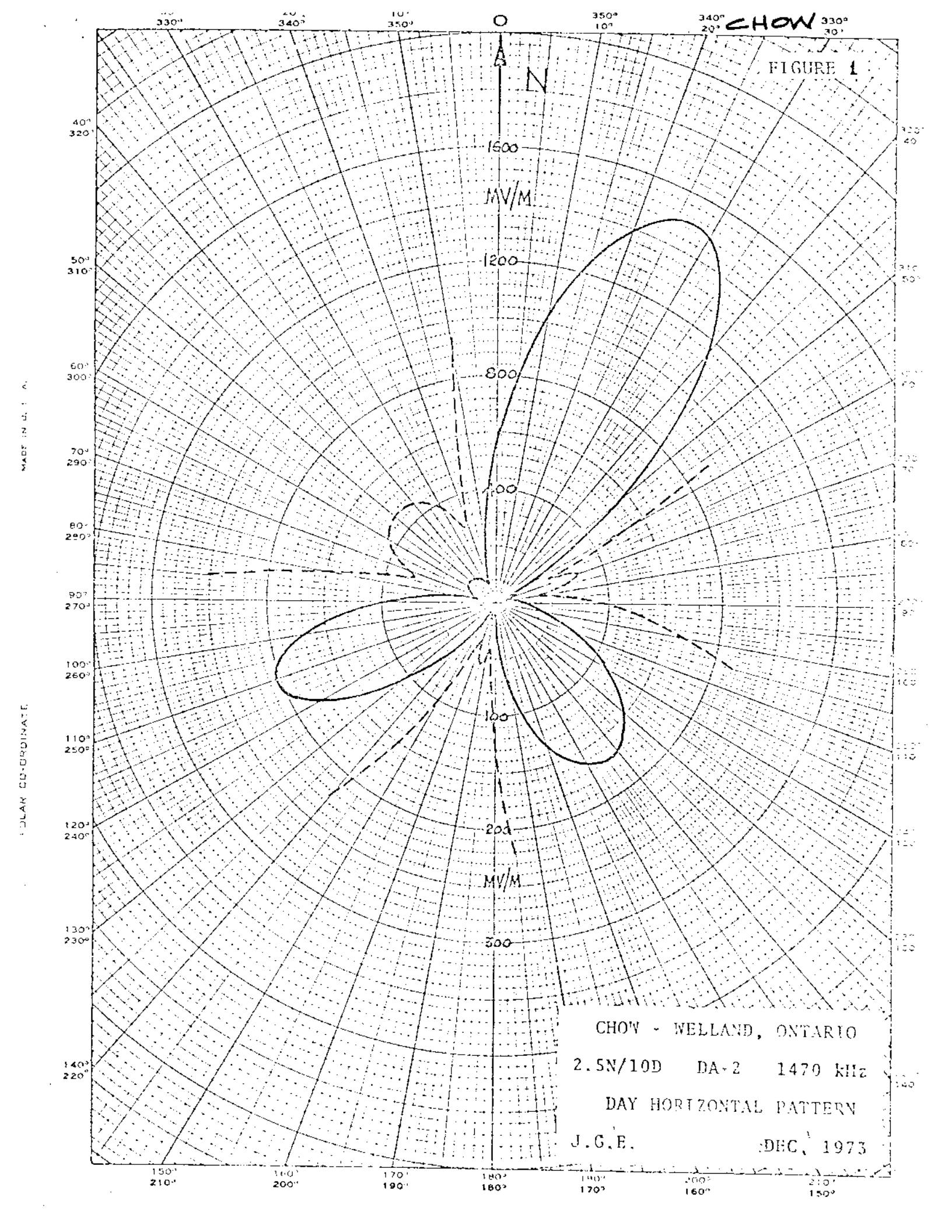
TOWER		1(NW)	2	3	4(SE)	5	6	7(NE)	8	9	10	11
DAY	FIELD	1.00	1.42	0.67	0.40	0.85	0.60	-	-	-	-	-
	PHASE	0°	65°	130°	235°	170°	105°	-	-	-	-	-
NIGHT	FIELD	-	1.00	-	-	-	-	0.90	1.371	0.567	0.630	1.523
	PHASE	-	0°	-	-	-	-	351°	115.67°	245°	254°	124.67°
SPACING		240°	0°	240°	379.806°	150°	126.284°	240°	254.608°	294.109°	170°	085°
		446.0'		446.0'	705.9'	278.7'	234.7'	446.0'	473.2'	546.6'	315.9'	157.9'
BEARING		313°	0°	133°	143.329°	160°	280.367°	100°	119.502°	135.311°	190°	190°

NOTE: The array consists of two six tower parallelograms.

ELDER ENGINEERING LIMITED

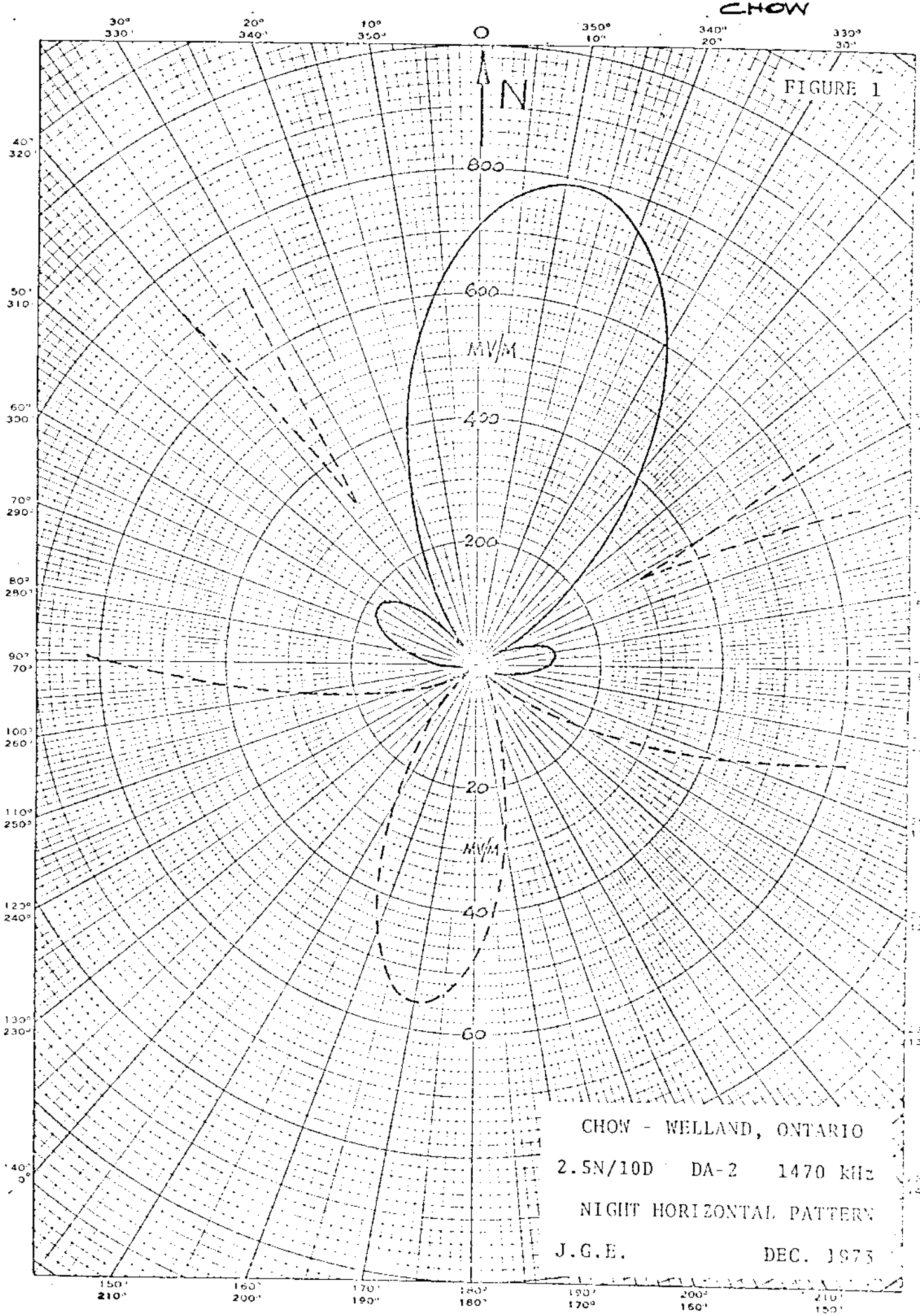
CHOW

TABLE 1-2


CHOW
FIGURE 1
N
1600
MV/M
1200
800
400
200
MV/M
300
CHOW - WELLAND, ONTARIO
2.5N/10D DA-2 1470 kHz
DAY HORIZONTAL PATTERN
J.G.E. DEC, 1973
POLAR CO-ORDINATE
MADE IN U.S.A.

CHOW

FIGURE 1



CHOW - WELLAND, ONTARIO

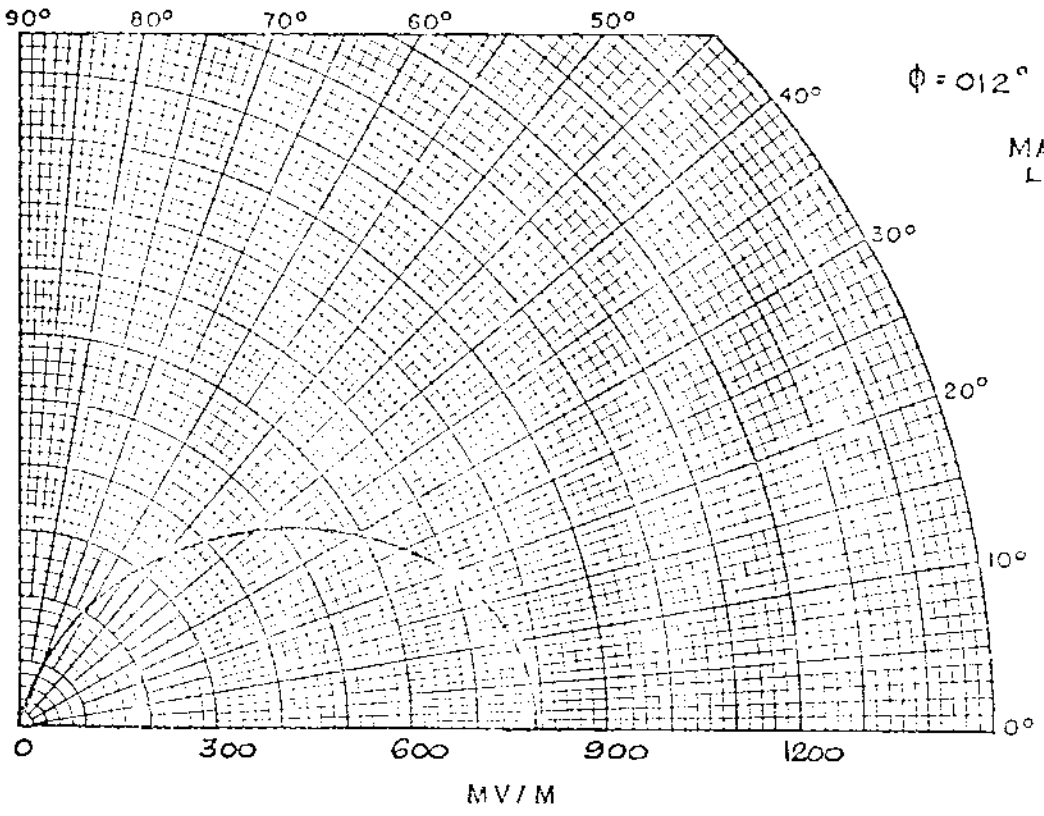
2.5N/10D DA-2 1470 KHz

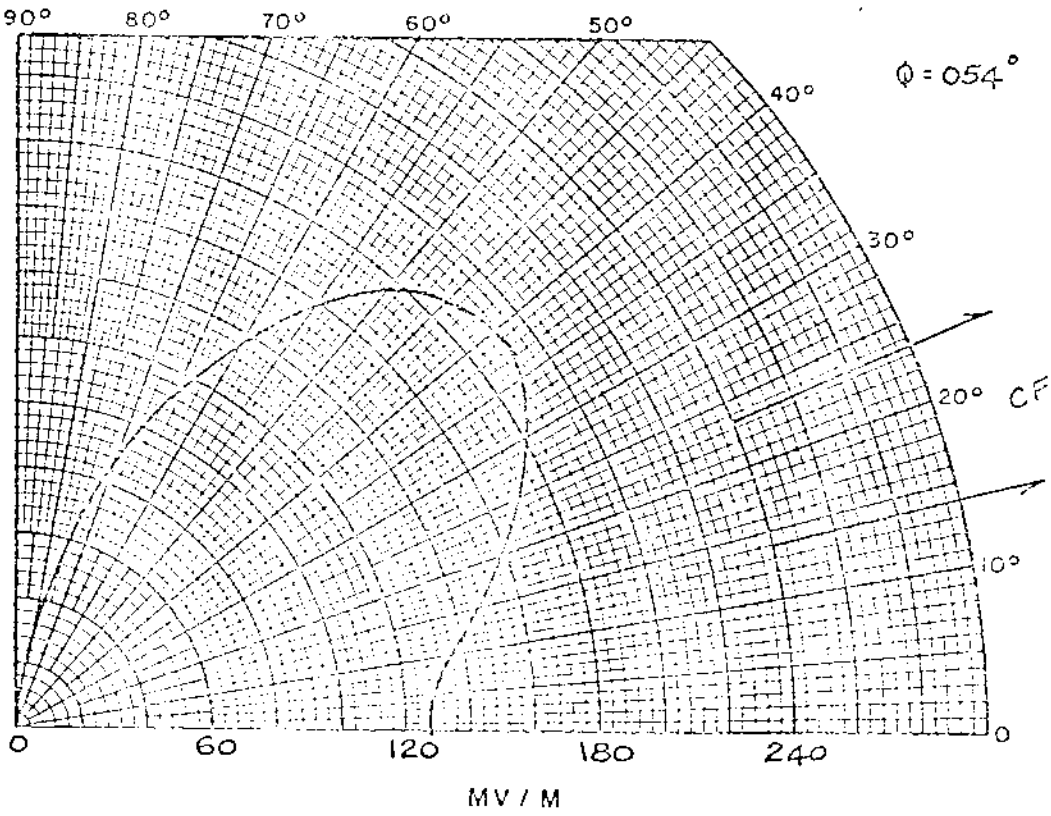
NIGHT HORIZONTAL PATTERN

J.G.E. DEC. 1973

CHOW

FIGURE 2-1





VERTICAL RADIATION PATTERNS

CHOW - WELLAND, ONTARIO

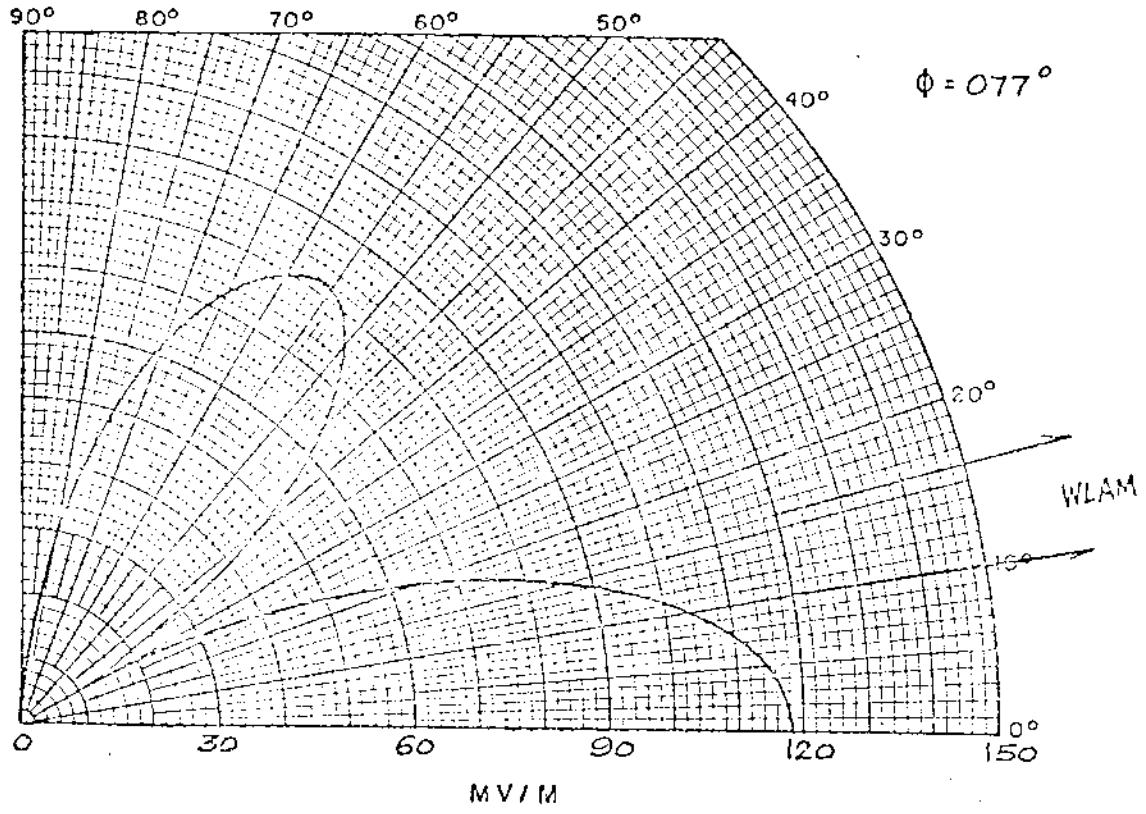
2.5N/10D kW DA-2 1470 kHz

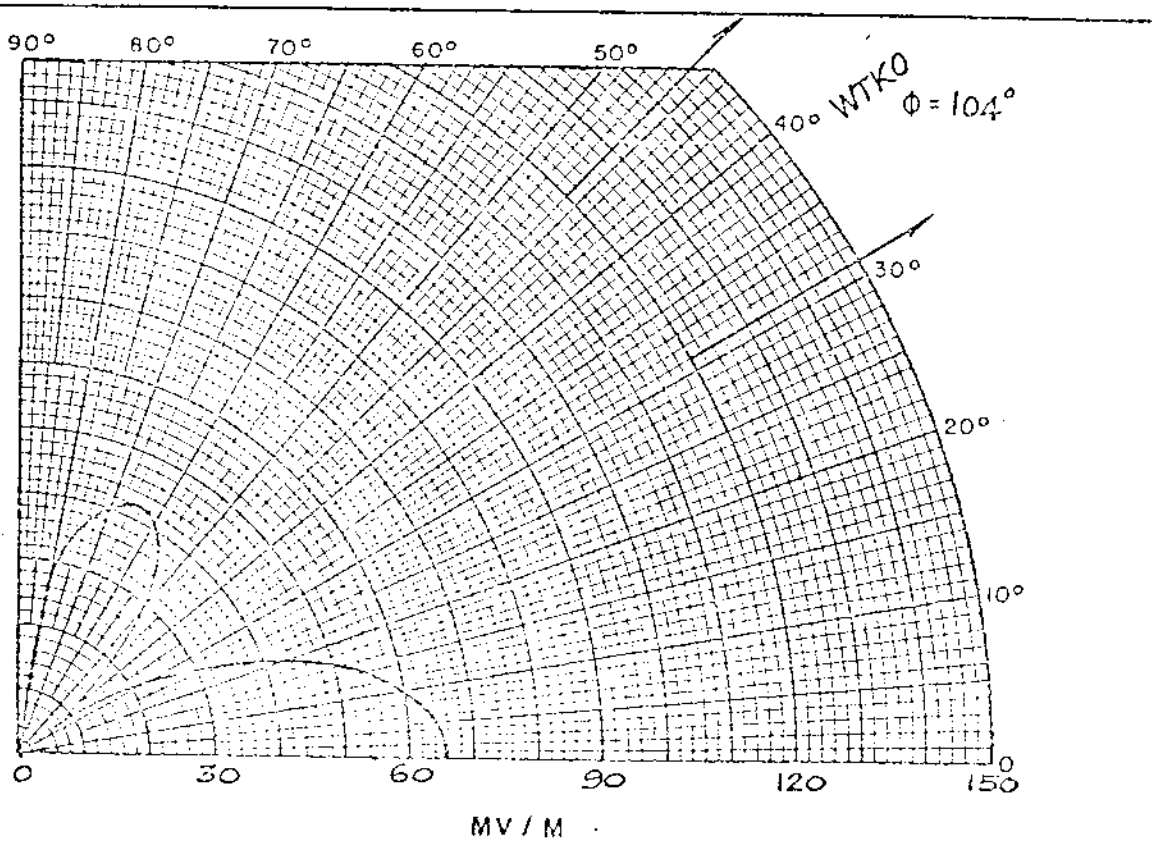
J.G.E. JANUARY 1974

CLEVELAND INSTITUTE OF RADIO ELECTRONICS
CLEVELAND, OHIO
NO. 15 LV
POLAR CO-ORDINATE
MADE IN U.S.A.

CHOW

FIGURE 2-2





VERTICAL RADIATION PATTERNS

CHOW - WELLAND, ONTARIO

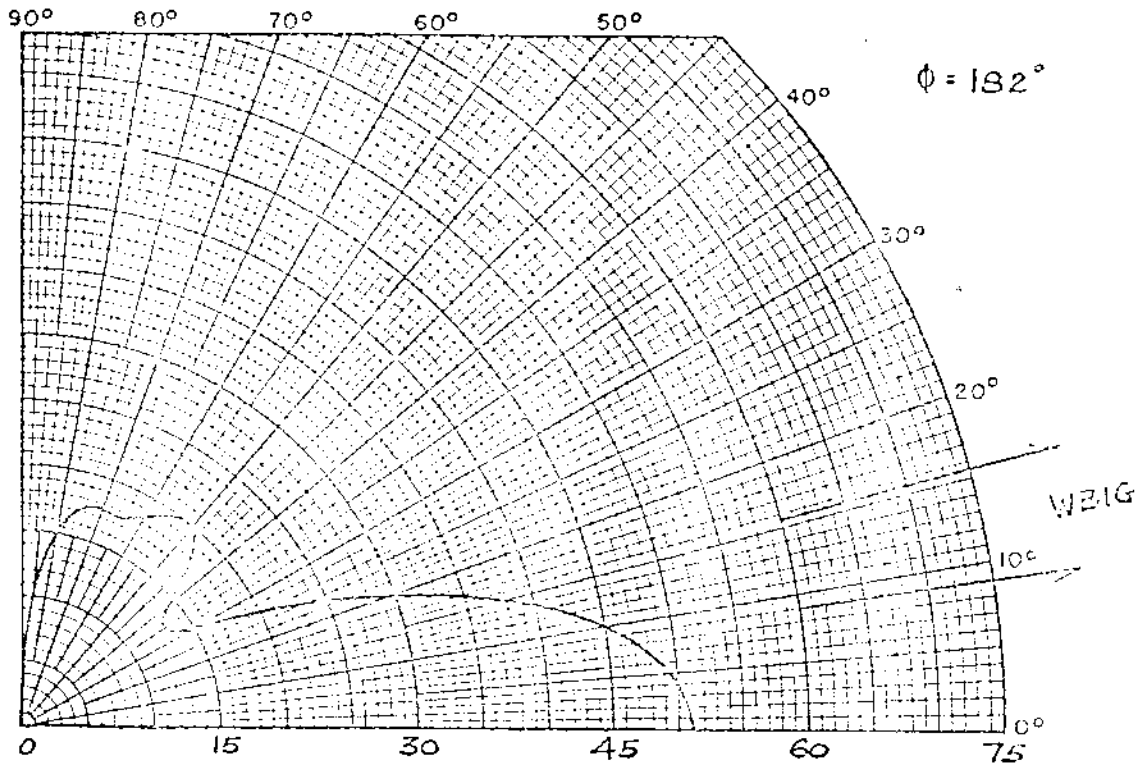
2.5N/10D kW DA-2 1470 kHz

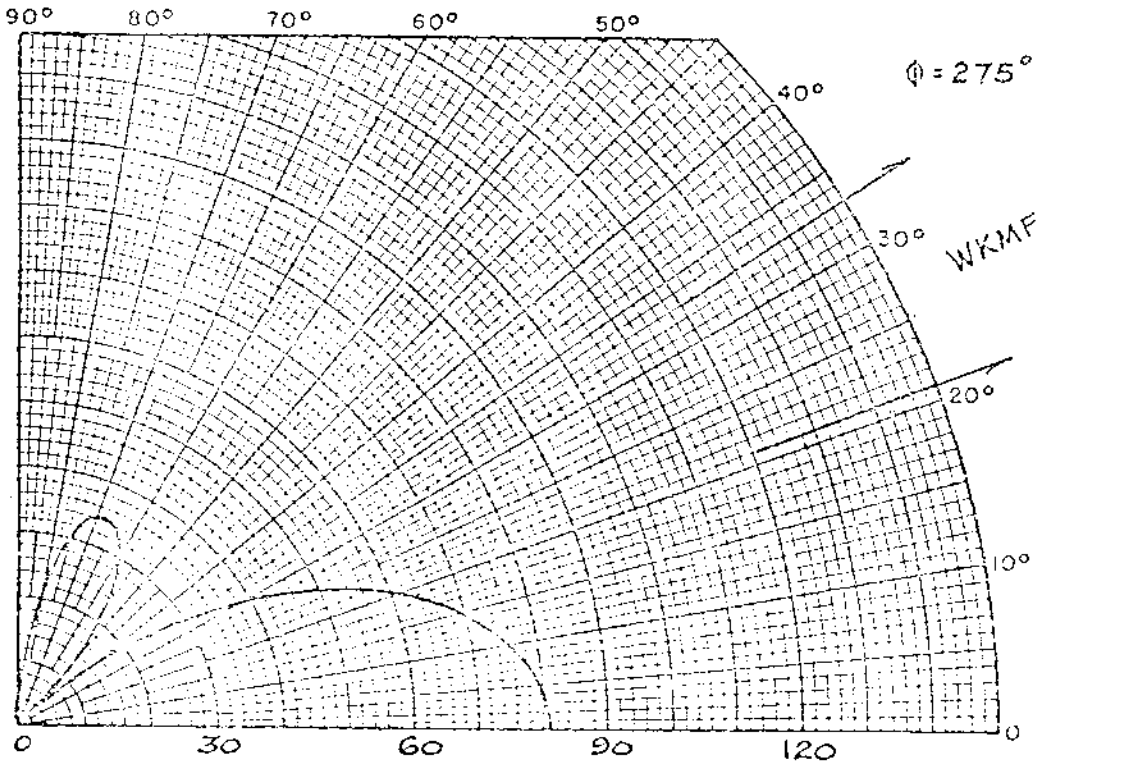
J.G.E. JANUARY 1974

CLEVELAND INSTITUTE OF RADIO ELECTRONICS
CLEVELAND, OHIO
NO. 15 LV
POLAR CO-ORDINATE
MADE IN U.S.A.

CHOW

FIGURE 2-3





VERTICAL RADIATION PATTERNS

CHOW - WELLAND, ONTARIO

2.5N/10D kW DA-2 1470 kHz

J.G.E. JANUARY 1974

CLEVELAND INSTITUTE OF RADIO ELECTRONICS
CLEVELAND, OHIO
NO. 15 LV
POLAR CO-ORDINATE
MADE IN U.S.A.

TABLE 1

ANTENNA DESCRIPTION SHEET

STATION CALL: CHOW

MAIN STUDIO: WELLAND, ONTARIO

FREQUENCY: 1470 kHz

POWER: 5D/10N kW

CLASS: III

MODE: DA-2

TIME: UNLIMITED

NOTIFICATION LIST NO.: 375... DATE: June 29, 1978

GEOGRAPHICAL LOCATION: Latitude 42° 56' 52" North
Longitude 79° 16' 19" West

ARRAY CHARACTERISTICS: Seven steel towers; guyed and of uniform cross section; base insulated; series fed; height 112' (60.0°) above insulator and top loaded to approximately 80° for towers 1, 3, 4 and 5; height 150' (80.7°) with no top loading for towers 2, 6 and 7.

GROUND SYSTEM: 120 equally spaced copper radial wires per tower, buried 8" - 12" deep, of average length 0.4λ(267'); minimum length 0.25λ(167').

TOWER NUMBER	SPACING FEET	SPACING DEGREES	BEARING DEGREES	NIGHT FIELD RATIO	NIGHT PHASE DEGREES	DAY FIELD RATIO	DAY PHASE DEGREES
1	0	0	0	0.605	-131.2	—	—
2	399.3	214.76	89.67	0.421	-153.9	—	—
3	167.3	90	172	1	0	1	0
4	439.4'	236.3	109.8	0.934	-22.8	0.758	-49.6
5	334.6'	180	172	0.51	129.1	—	—
6	536.6'	288.61	124.39	0.622	106.3	—	—
7	773.7'	416.1	106.2	—	—	0.26	-110.8

PREDICTED EFFICIENCY: DAY 396 mV/m for 5 kW
(UNATTENUATED HORIZONTAL NIGHT 560 mV/m for 10 kW
FIELD INTENSITY AT 1 MILE) 177.1 mV/m per kW

TABLE 1-1
CHOW

ANTENNA DESCRIPTION SHEET

STATION CALL: CHOW
MAIN STUDIO: WELLAND, ONTARIO
FREQUENCY: 1470 kHz
POWER: 10 kW
CLASS: III
MODE: DA-2
TIME: UNLIMITED

NOTIFICATION LIST NO.: .382.. DATE: March 8,.1979

GEOGRAPHICAL LOCATION: Latitude 42° 56' 52" North
Longitude 79° 16' 19" West

ARRAY CHARACTERISTICS: Eight steel towers; guyed and of uniform cross section; base insulated; series fed; height 112' (60.0°) above insulator and top load to approximately 80° for towers 1, 3, 4 and 5; height 150' (80.7°) with no top loading for towers 2, 6, 7 and 8.

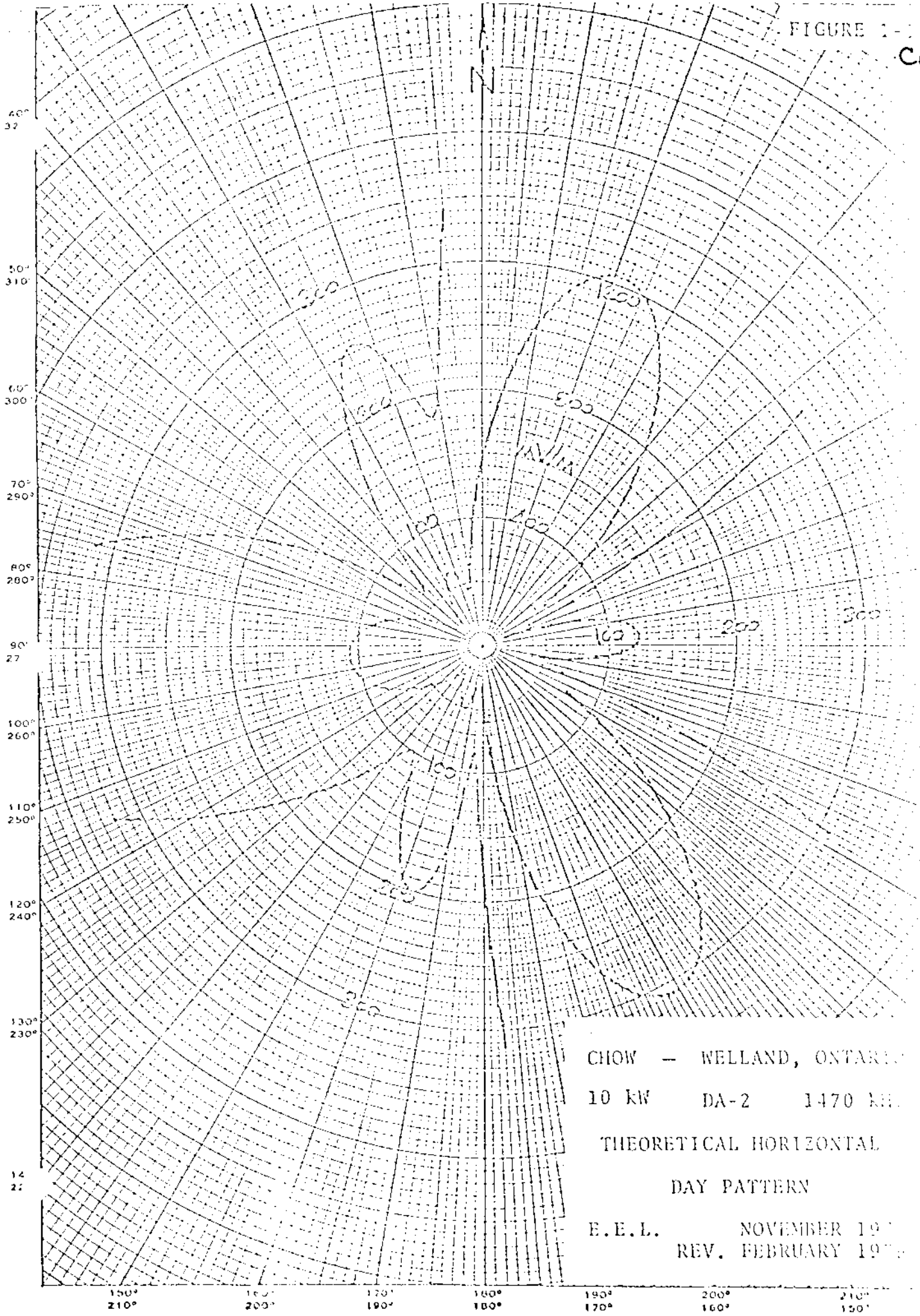
GROUND SYSTEM: 120 equally spaced copper radial wires per tower, buried 8" - 12" deep, of average length 0.4λ(267'); minimum length 0.25λ(167').

TOWER NUMBER	SPACING FEET	SPACING DEGREES	BEARING DEGREES	NIGHT FIELD RATIO	NIGHT PHASE DEGREES	DAY FIELD RATIO	DAY PHASE DEGREES
1	0	0	0	0.605	-131.2	—	—
2	399.3	214.76	89.67	0.421	-153.9	—	—
3	167.3	90	172	1	0	0.841	82.1
4	439.4'	236.3	109.8	0.934	-22.8	1	0
5	334.6'	180	172	0.51	129.1	—	—
6	536.6'	288.61	124.39	0.622	106.3	—	—
7	307.2'	165.22	234.09	—	—	0.371	171.6
8	784.4'	421.85	98.01	—	—	0.861	-79.4

Please retain the night-time directional antenna radiation patterns from Change List 375 dated June 29, 1978. This proposal is for an increase in day-time power.

FIGURE 1-

CHOW



CHOW — WELLAND, ONTARIO

10 kW DA-2 1470 KC.

THEORETICAL HORIZONTAL

DAY PATTERN

E.E.L. NOVEMBER 19

REV. FEBRUARY 19

CJVB

PROJECT #16602

DESCRIPTION SHEET - DIRECTIONAL ANTENNA

STATION: CJVB

LOCATION: VANCOUVER, B.C.

FREQUENCY: 1470 kHz

POWER: 50 kW CLASS III

NOTIFICATION LIST NO. 363

DATE: May 10, 1977

GEOGRAPHICAL LOCATION:

Latitude 49° 11' 36" North
Longitude 123° 01' 17" West

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-2
Number of Elements: 3 (Three)
Type of Elements: Guyed steel towers, uniform cross-section, base insulated for series feed

TOWER	#1 (S)	#2 (C)	#3 (N)
Height above base insulator:	167' (90°)	167' (90°)	167' (90°)
Overall height:	172'	172'	172'
Field Ratio:			
Nighttime	1.0	2.0	.99
Daytime	1.3	2.0	.69
Phasing:			
Nighttime	Ref.	-84.3°	-170.5°
Daytime		-60.5°	-121°
Spacing:	Ref.	223.2' (120°)	446.4' (240°)
Orientation:	Ref.	340°	340°

GROUND SYSTEM: 120 equally spaced radials of No. 10 bare copper wire extend from each tower base. Radial Length: 268' (144°), with the exception of those joined along the common chords.

PREDICTED EFFECTIVE FIELDS:

Nighttime: 1305 mV/m at 1 mile for 50 kW
184.5 mV/m at 1 mile for 1 kW

Daytime: 1270 mV/m at 1 mile for 50 kW
179.5 mV/m at 1 mile for 1 kW

January 14, 1976

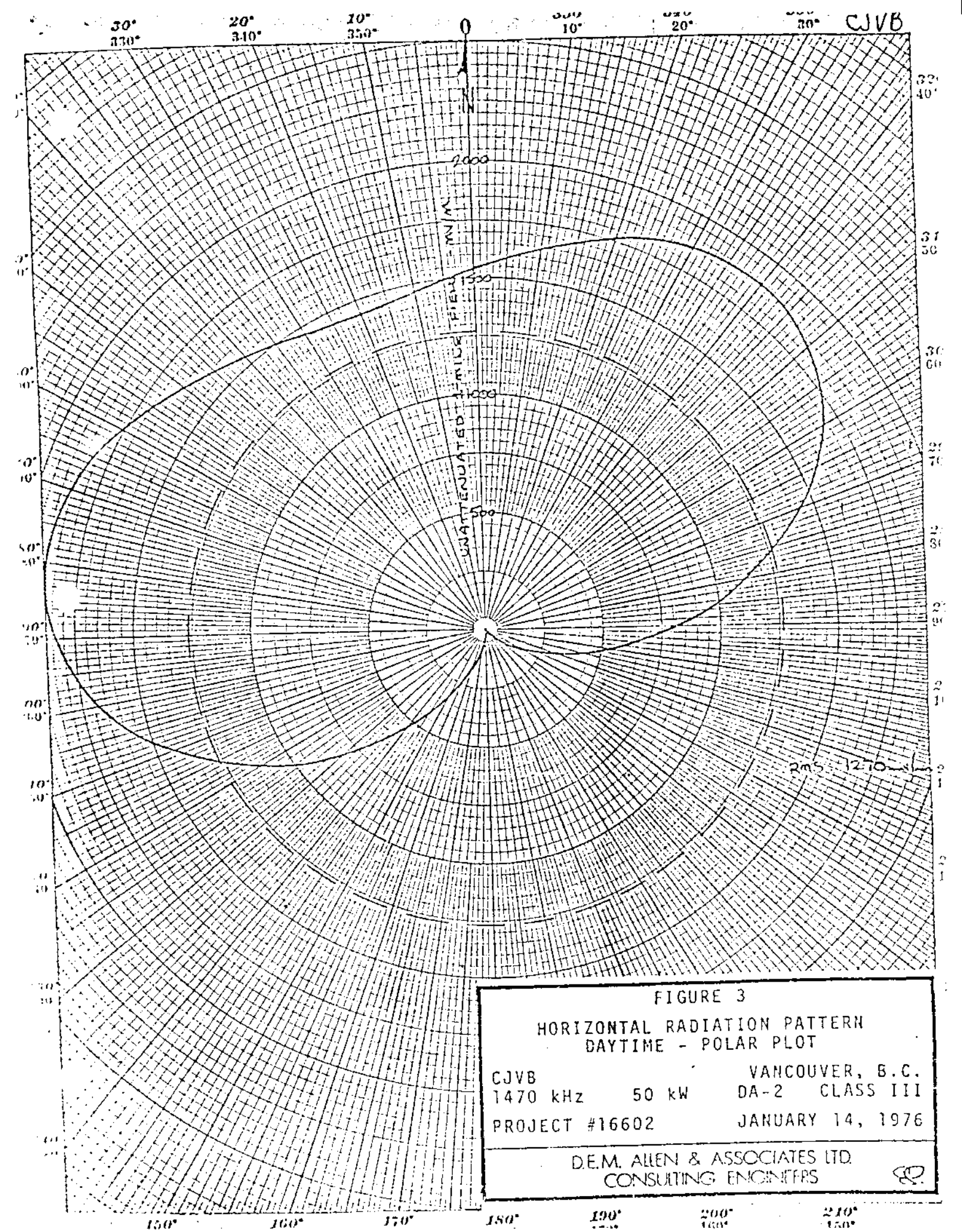


FIGURE 3

HORIZONTAL RADIATION PATTERN
DAYTIME - POLAR PLOT

CJVB — VANCOUVER, B.C.
1470 kHz — 50 kW — DA-2 — CLASS III

PROJECT #16602 — JANUARY 14, 1976

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

CJVB

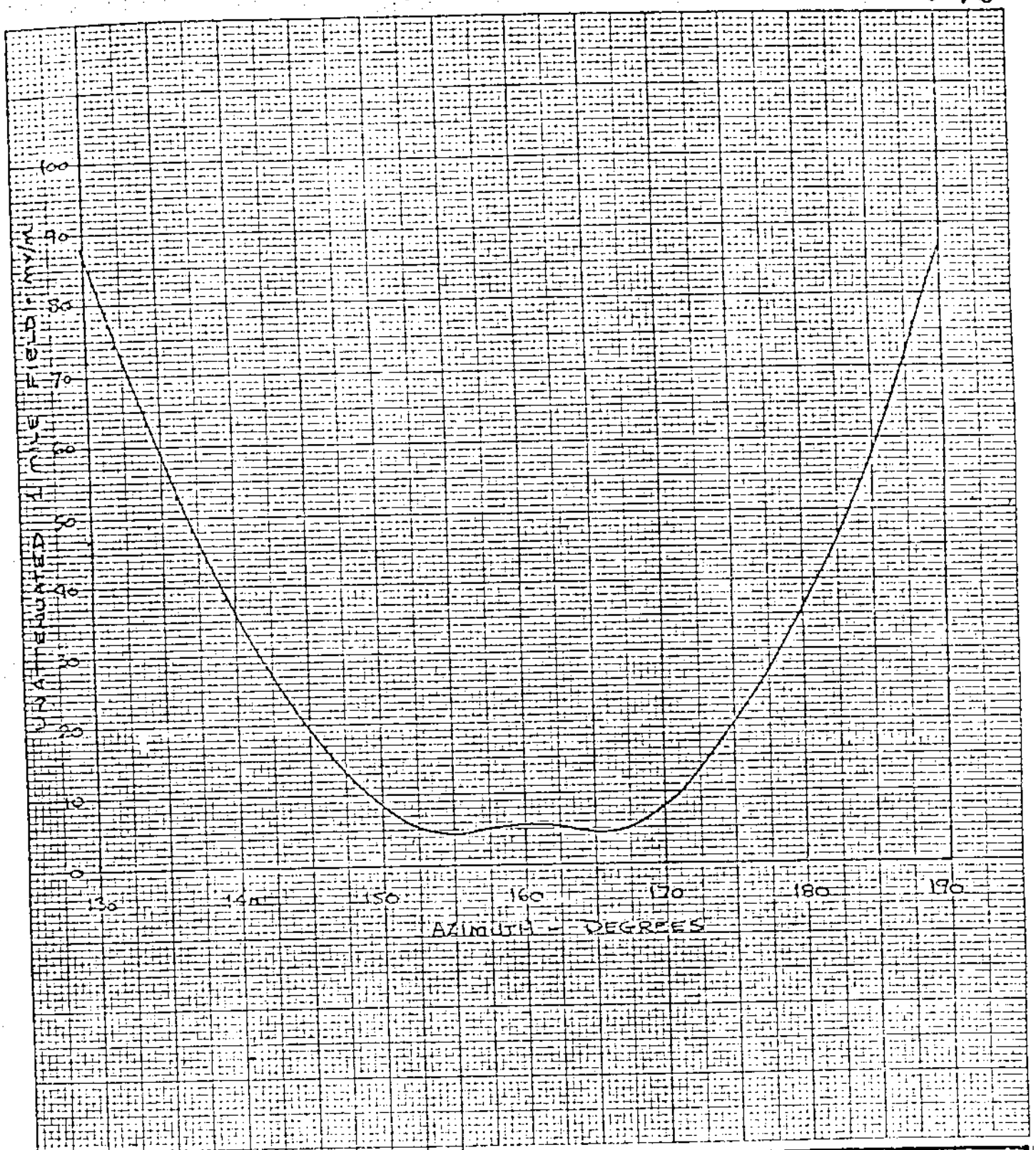


FIGURE 4

HORIZONTAL RADIATION PATTERN
DAYTIME - EXPANDED PLOT

CJVB VANCOUVER, B.C.
1470 kHz 50 kW DA-2 CLASS III

PROJECT #16602 JANUARY 14, 1976

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

KEUFFEL & ESSER CO. MADE IN U.S.A.

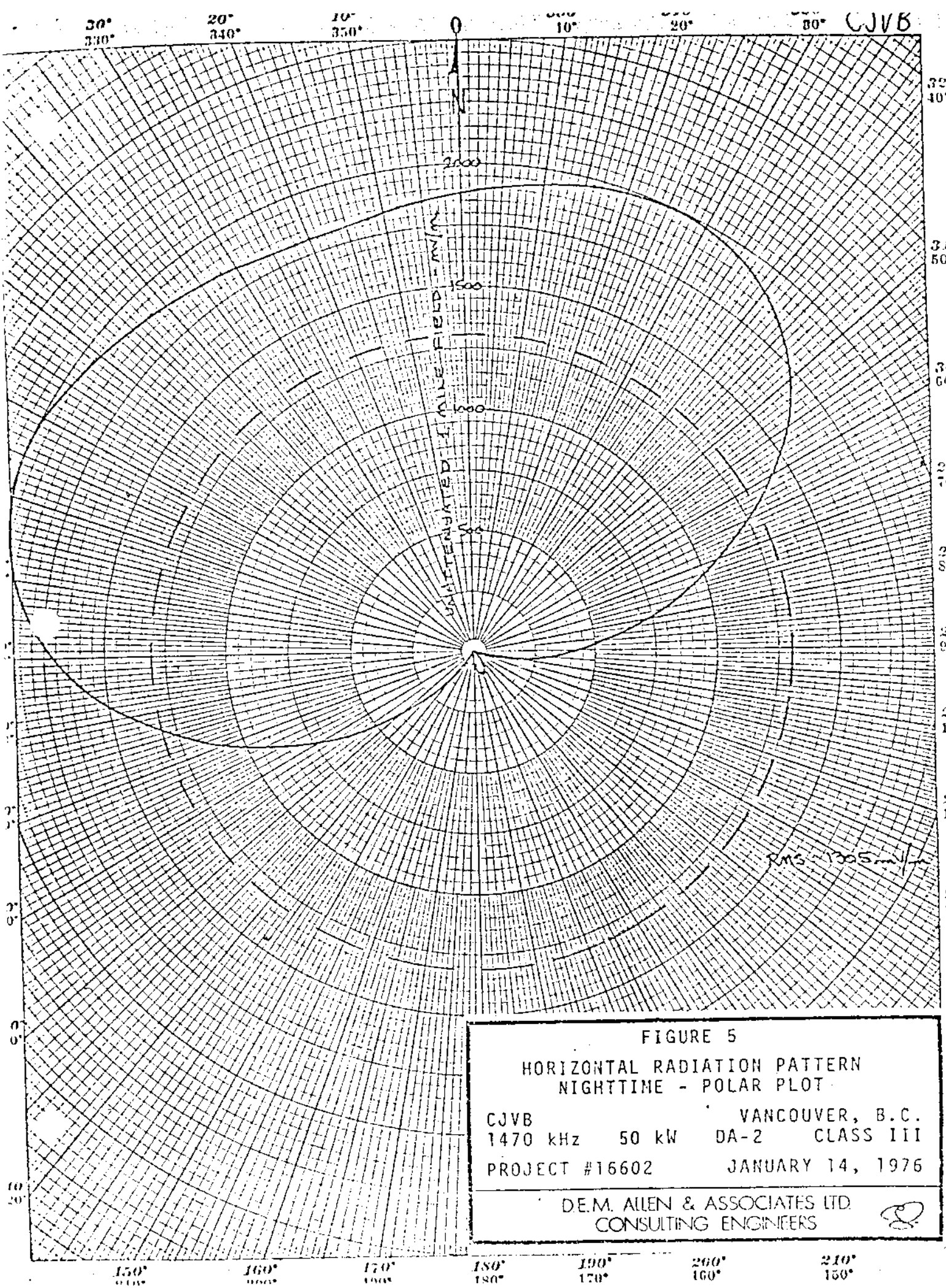


FIGURE 5

HORIZONTAL RADIATION PATTERN
NIGHTTIME - POLAR PLOT

CJVB VANCOUVER, B.C.
1470 kHz 50 kW DA-2 CLASS III

PROJECT #16602 JANUARY 14, 1976

D.E.M. ALLEN & ASSOCIATES LTD.
CONSULTING ENGINEERS

CJVB

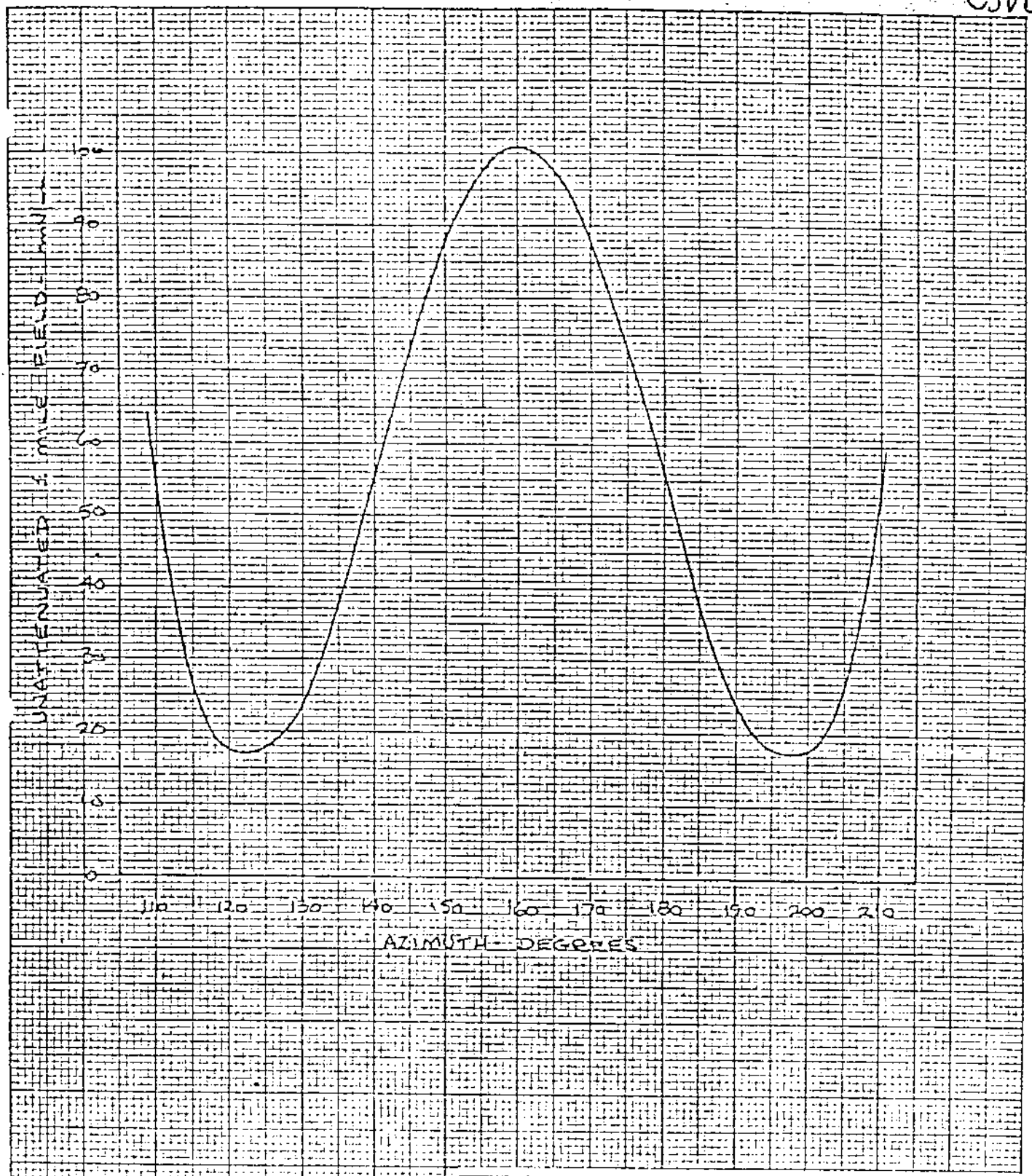


FIGURE 6

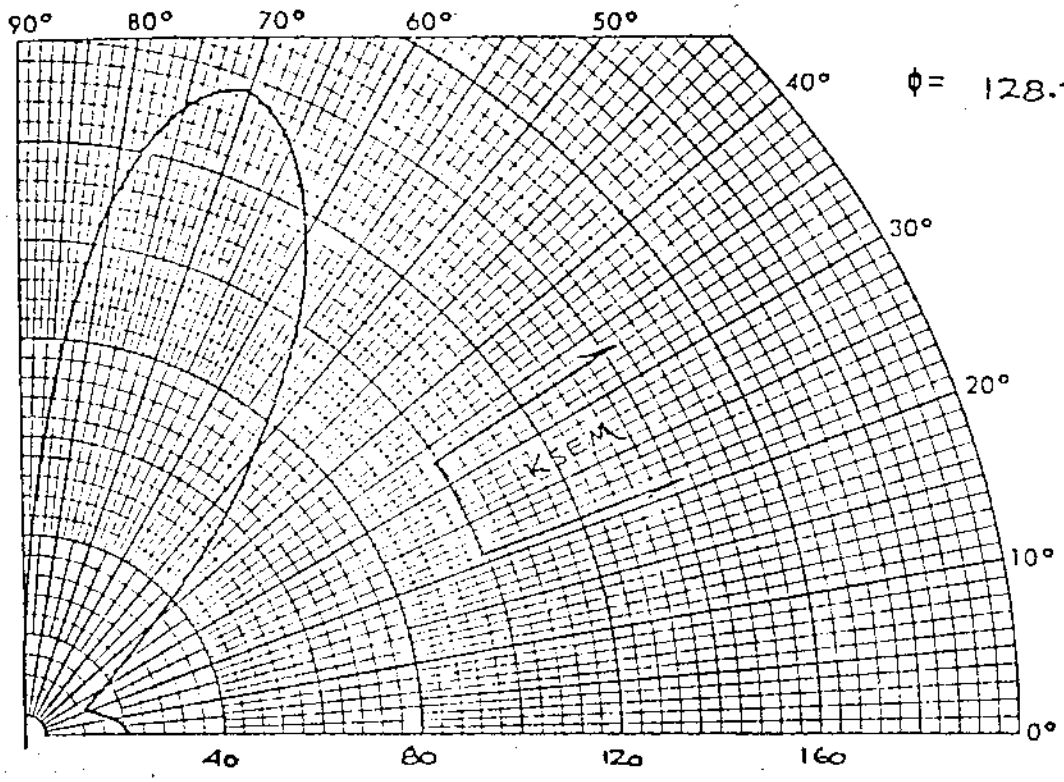
HORIZONTAL RADIATION PATTERN
NIGHTTIME - EXPANDED PLOT

CJVB VANCOUVER, B.C.
1470 kHz 50 kW DA-2 CLASS III

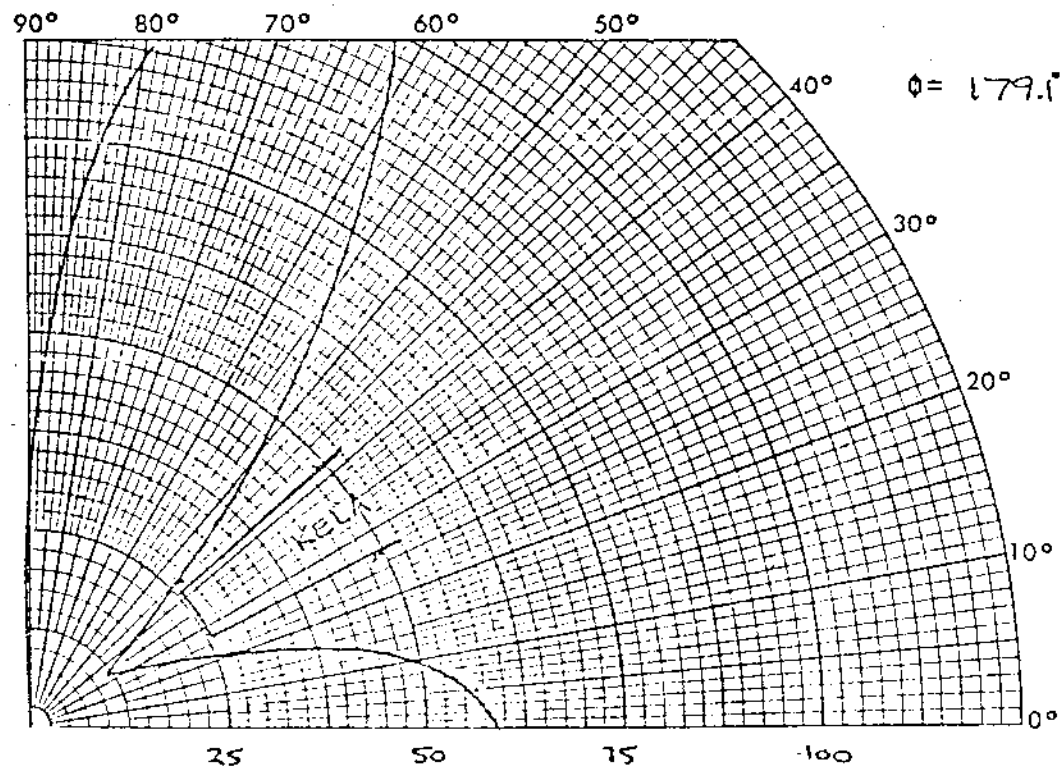
PROJECT #16602 JANUARY 14, 1976

D.E.M. ALLEN & ASSOCIATES LTD
CONSULTING ENGINEERS

CJVB



UNATTENUATED (MV/M) 1 MILE FIELD



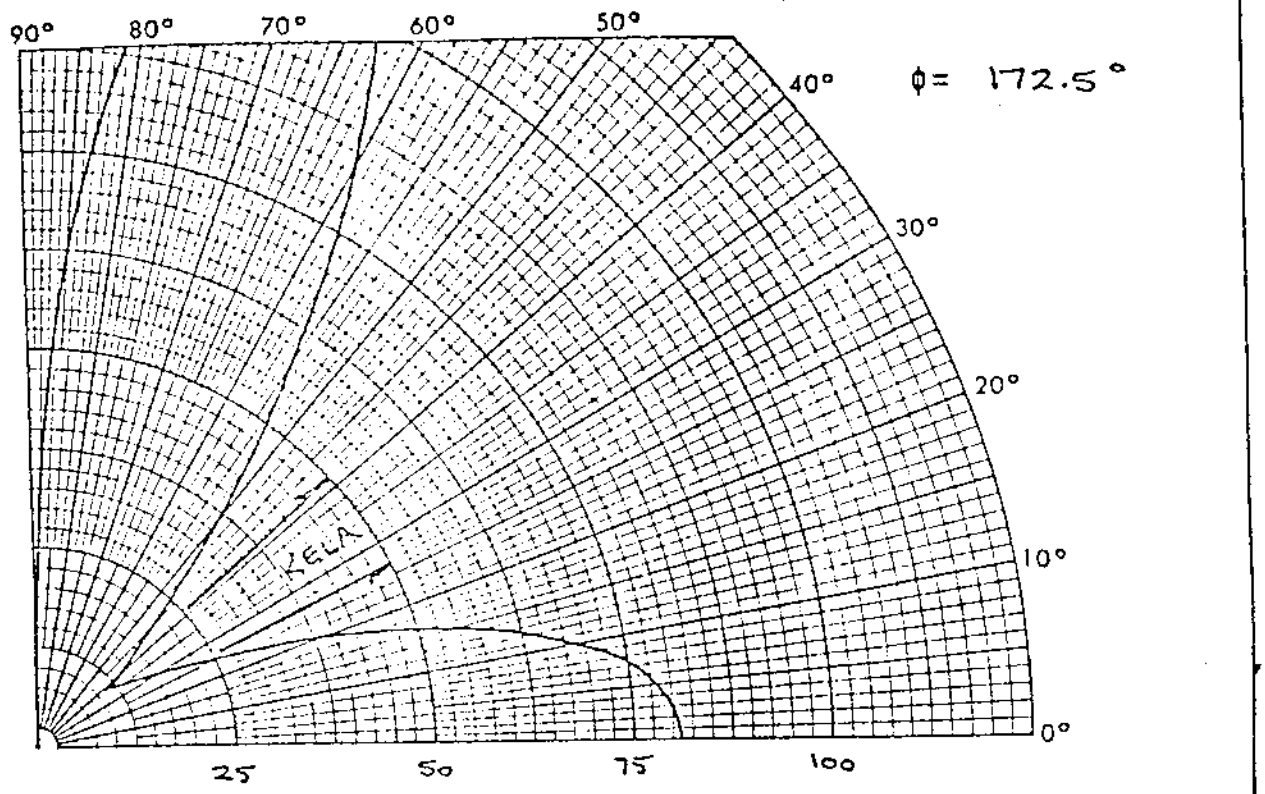
UNATTENUATED (MV/M) 1 MILE FIELD

VERTICAL RADIATION PATTERNS

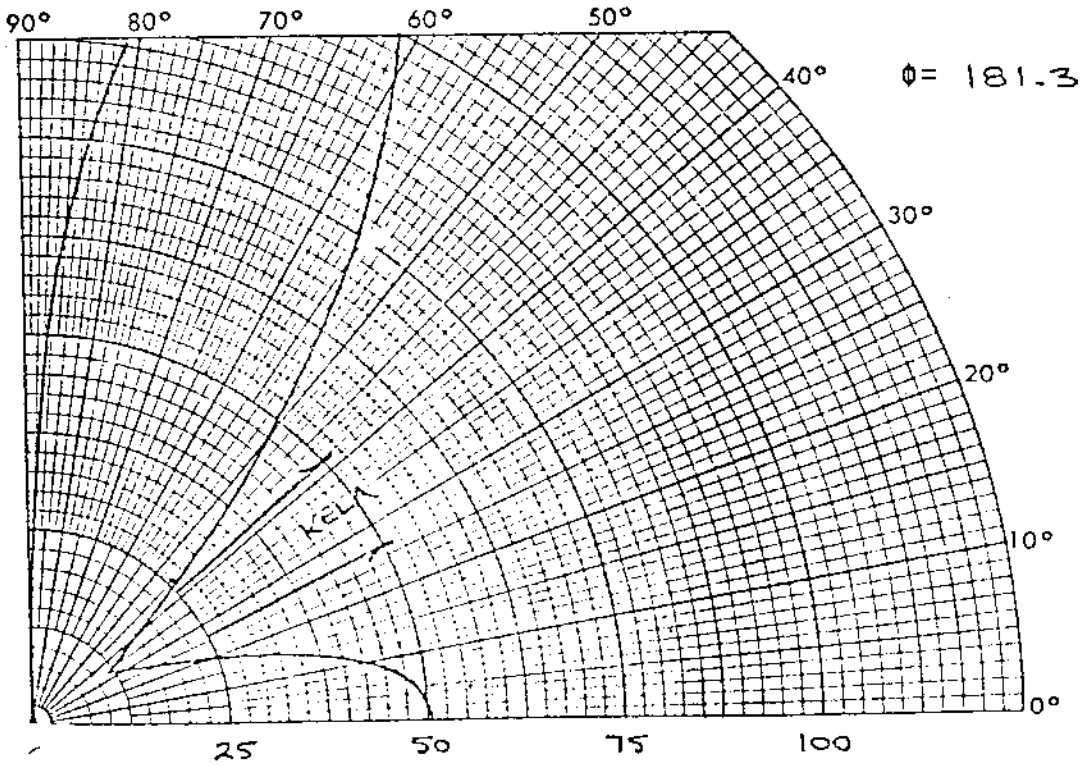
FIGURE 7

CJVB — VANCOUVER, B.C.
1470 kHz — 50 kW — DA-2 — CLASS III
PROJECT #16602 — JANUARY 14, 1976
D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS

CJVB



UNATTENUATED (MV/M) 1 MILE FIELD



UNATTENUATED (MV/M) 1 MILE FIELD

VERTICAL RADIATION PATTERNS

FIGURE 8

CJVB
1470 kHz 50 kW DA-2
PROJECT #16602

VANCOUVER, B.C.
CLASS III
JANUARY 14, 1976

D.E.M. ALLEN & ASSOCIATES LTD., CONSULTING ENGINEERS

G9-10159 (NO 12LV)
POLAR CO-ORDINATE
MADE IN CANADA

CJVB

SUPPLEMENTAL DIRECTIONAL

ANTENNA DESCRIPTION SHEET

Station: CJVB Main Studio: Vancouver, British Columbia

Frequency: 1470 kHz Power: 10kW, Class III

Notification List No: 354 Date: May 12, 1976

Geographical Location of
the Center of the Antenna System:

North Latitude: 49° 11' 36"
West Longitude: 123° 01' 17"

Mode of Operation - DA-2

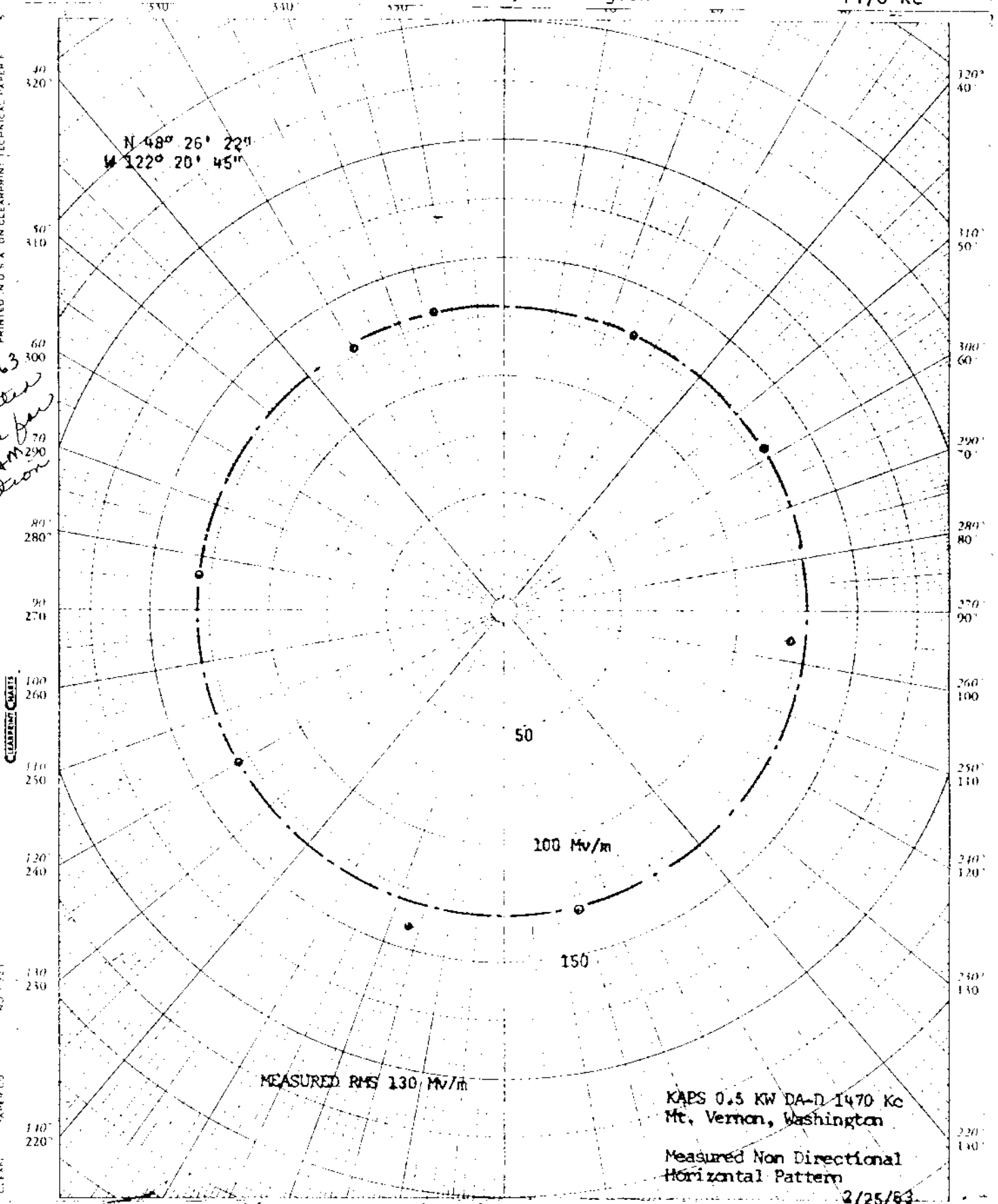
Note: Please retain the description sheet and directional antenna radiation patterns notified for station CJVB in Canadian Change List Number 298 dated October 27, 1972 and attach to this supplemental description sheet. This notification is for the purpose of indicating only a correction in the geographical coordinates.

KAPS

Measured Non-DA
(6-28-63ct)

Station KAPS
Mount Vernon, Washington

500w,DA-D,D
1470 kc



-16-63 another case for new AM station

FCC File No.BL-10016
Accepted 6-13-63

Station KAPS
Mount Vernon, Washington

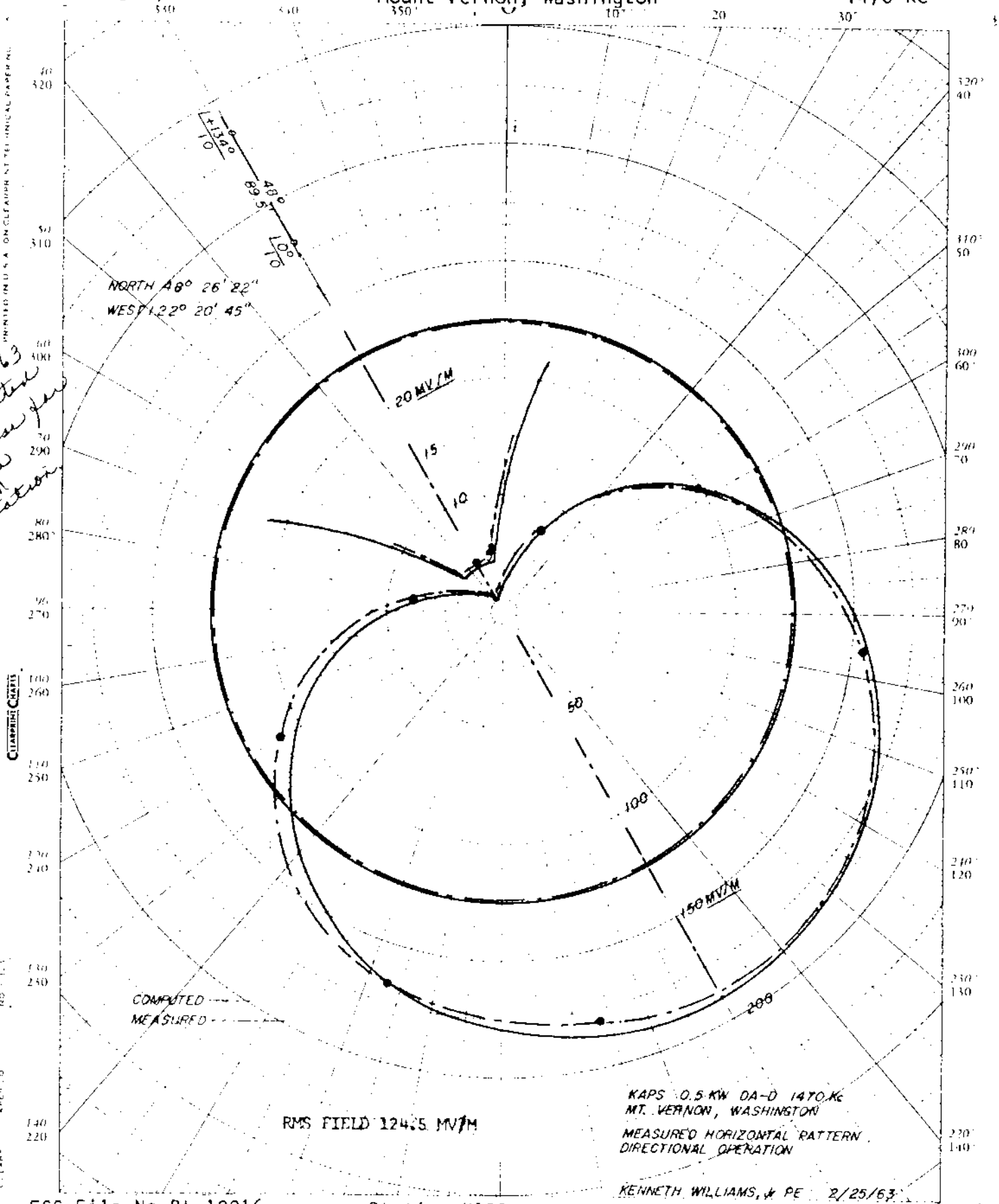
1470 kc

KAPS

Measured Day
(6-28-63ct)

Station KAPS
Mount Vernon, Washington

500w,DA-D,D
1470 kc



8-16-63
monitor
receiver
near
AM
station

FCC File No.BL-10016
Accepted 6-13-63

Station KAPS
Mount Vernon, Washington

1470 kc

Mt. Vernon, Wash.

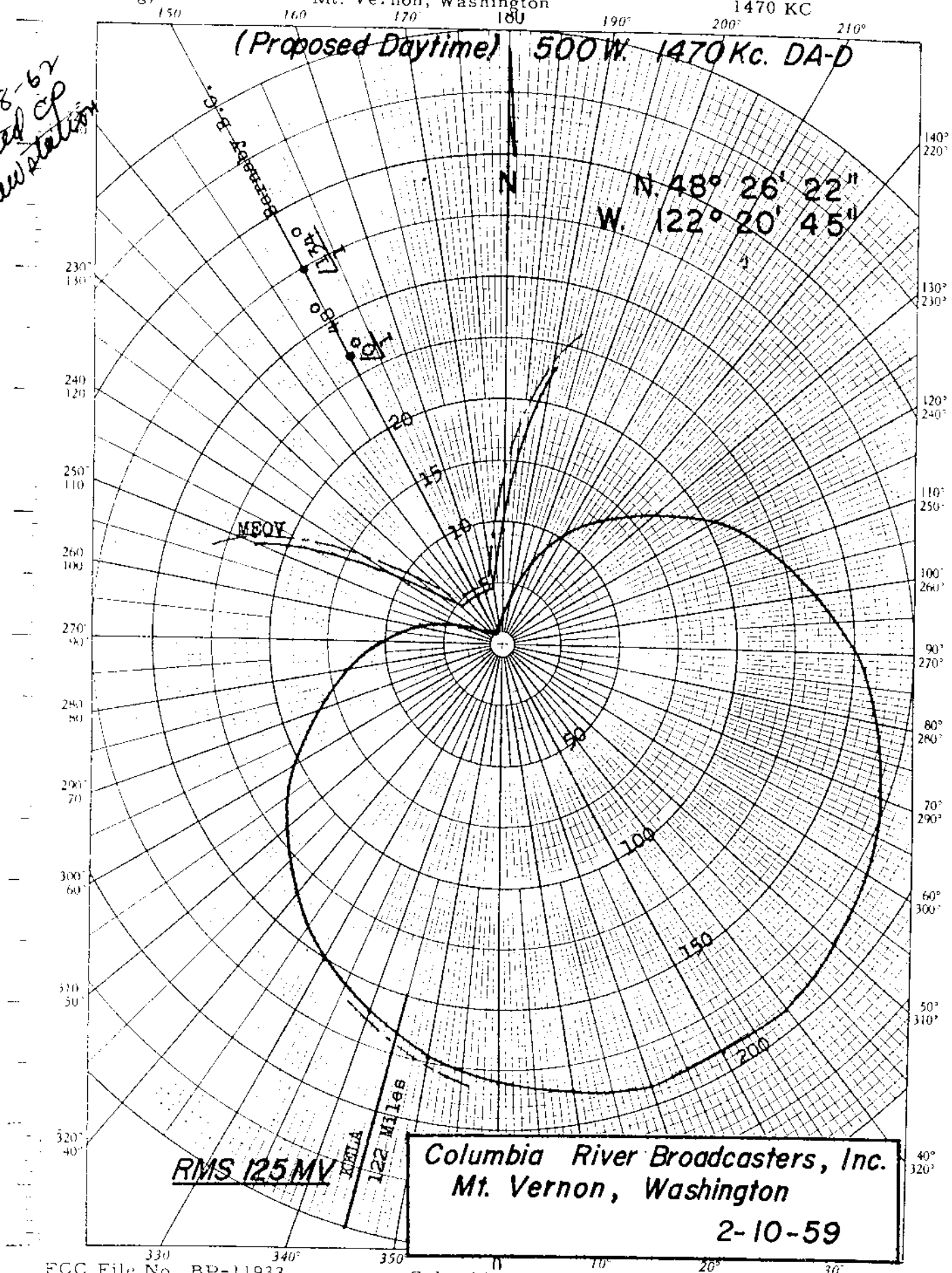
KAPS

PROPOSED DAY
(5-28-59g)

New; Columbia River Bcstrs.
Mt. Vernon, Washington

500w, DA-D,D
1470 KC

3-28-62 granted CP a new station



FCC File No. BP-11933
Accepted 5-4-59 (Amended)

Columbia River Broadcasters
Mt. Vernon, Washington
1470 KC

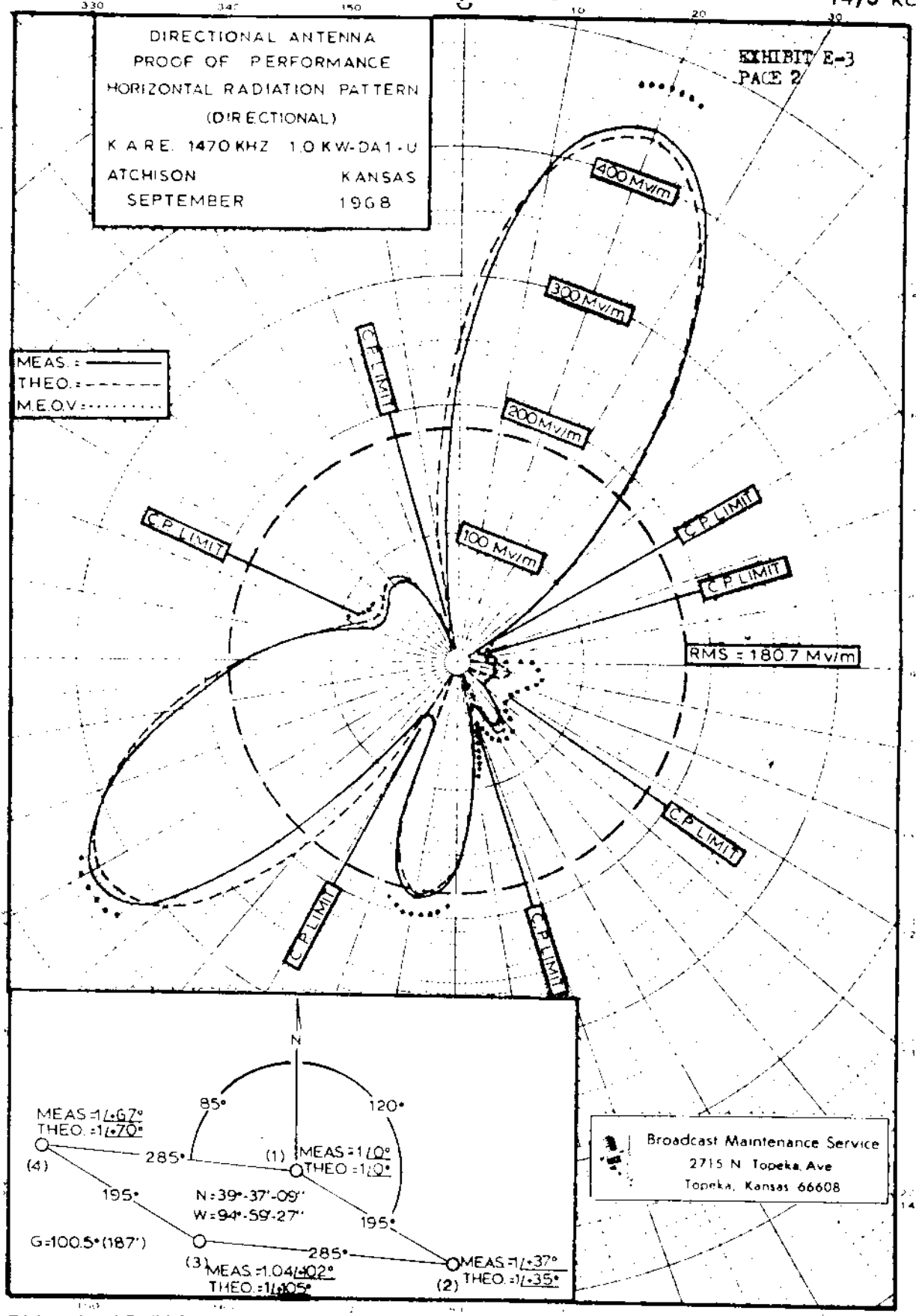
KARE

Measured Day & Night
(2-28-69ct)

Station KARE
Atchison, Kansas

1kw, DA-1, U
1470 kc

EXHIBIT E-3
PAGE 2



FCC File No. BZ-7105
Accepted 2-14-69

Station KARE
Atchison, Kansas

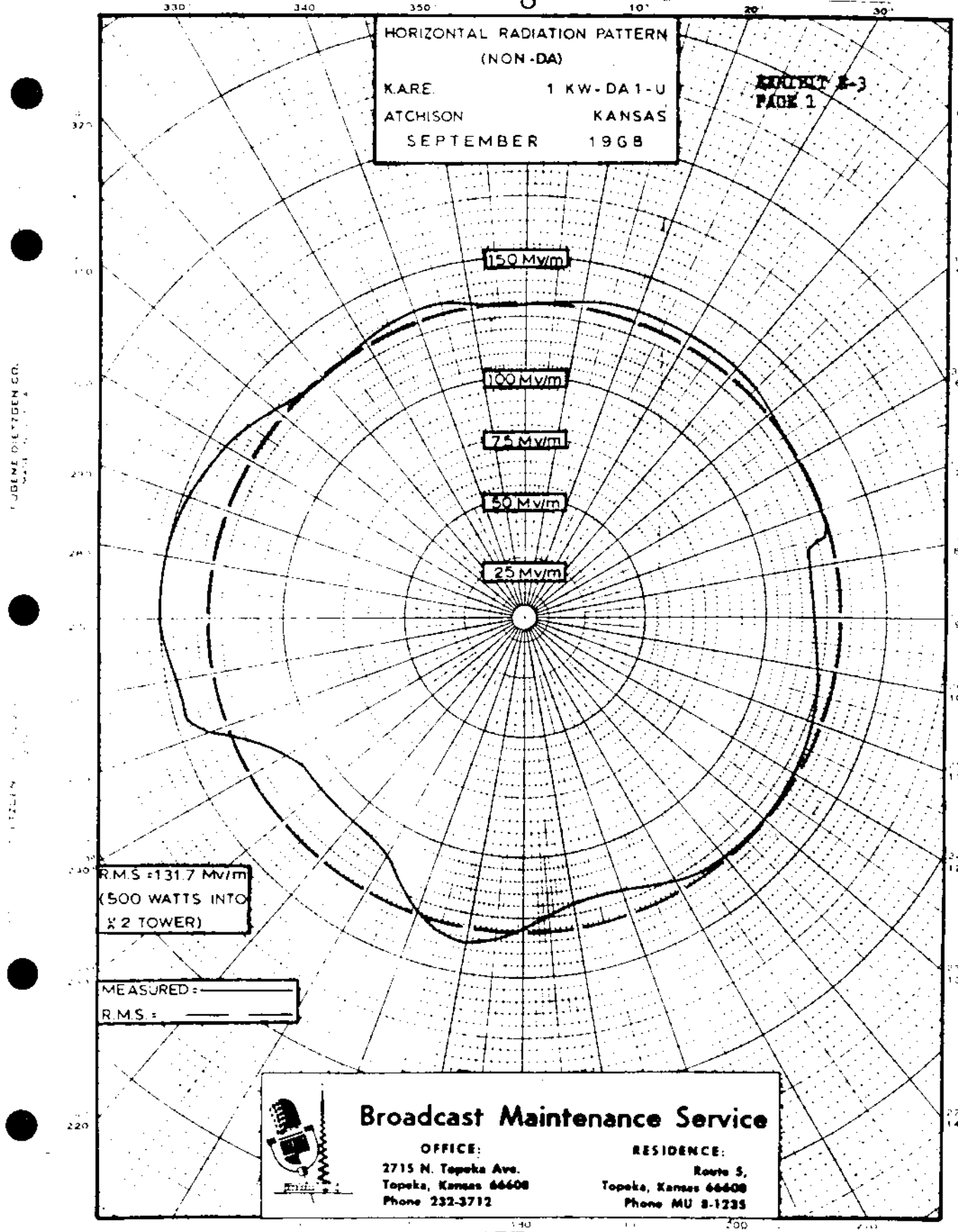
1470 kc

KARE

Measured Non-DA
(2-28-69ct)

Station KARE
Atchison, Kansas

1kw, DA-1, U
1470 kc



FCC File No. BZ-7105
Accepted 2-14-69

Station KARE
Atchison, Kansas

1470 kc

PROPOSED
NIGHT&DAY

KVAK, ATCHISON, KANS.

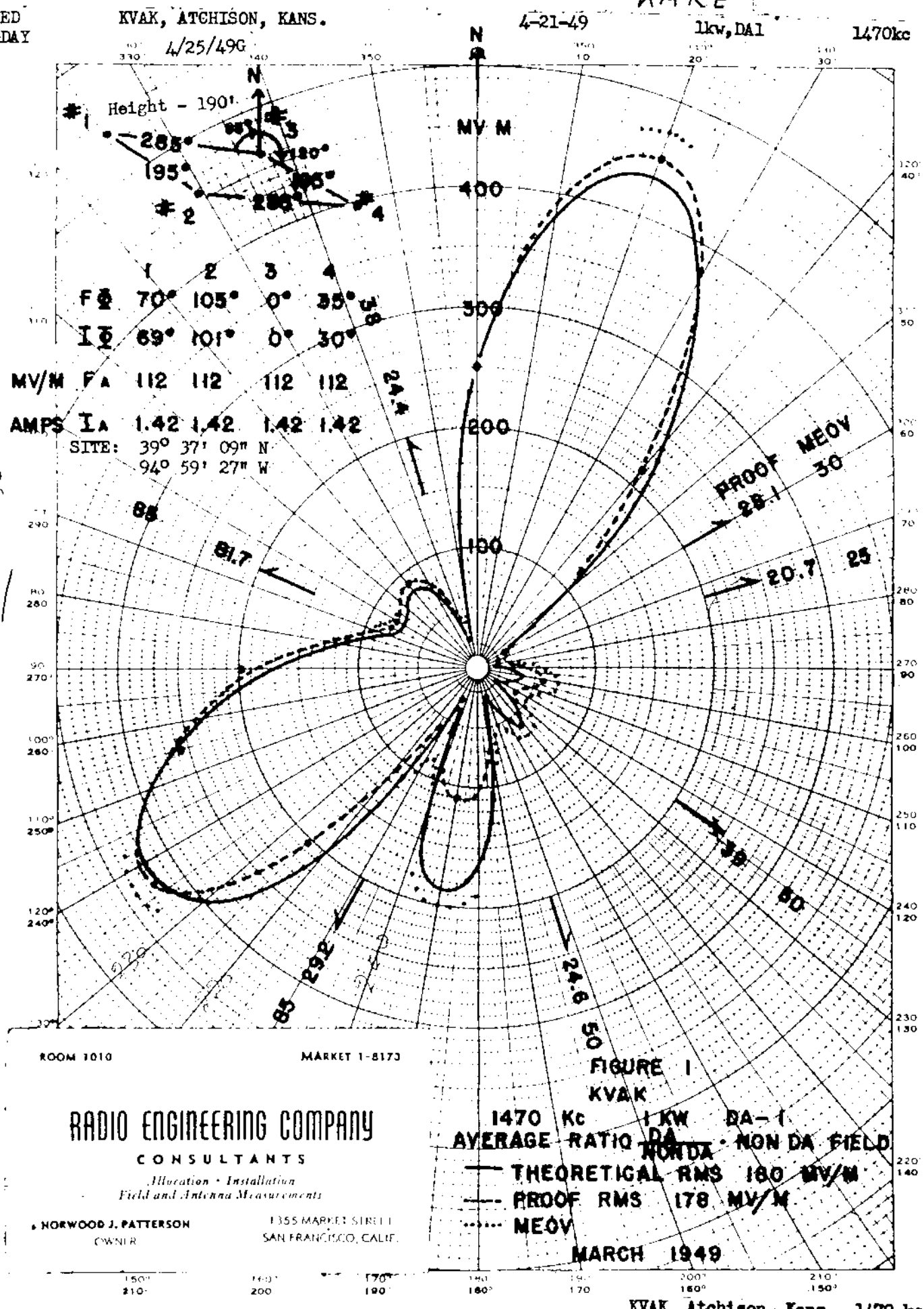
4/25/49G

KARE

4-21-49

1kw, DA1

1470kc



Consult CP

ROOM 1010 MARKET 1-8173

RADIO ENGINEERING COMPANY

CONSULTANTS

Allocation • Installation
Field and Antenna Measurements

NORWOOD J. PATTERSON
OWNER

1355 MARKET STREET
SAN FRANCISCO, CALIF.

FIGURE 1
KVAK
1470 Kc 1 KW DA-1
AVERAGE RATIO DA ÷ NON DA FIELD
NON DA
— THEORETICAL RMS 180 MV/M
— PROOF RMS 178 MV/M
···· MEOV
MARCH 1949

KVAK, Atchison, Kans. 1470 kc

KANE
1470 KC

PROPOSED DAY & NIGHT NULLS Station KVAK 1kw, DA-1,U

Rec'd 9-2 -47 Atchison, Kansas

ROOM 1010 MARKET 8175

RADIO ENGINEERING COMPANY

CONSULTANTS

HORWOOD J. PATTERSON
OWNER

1355 MARKET STREET
SAN FRANCISCO, CALIF.

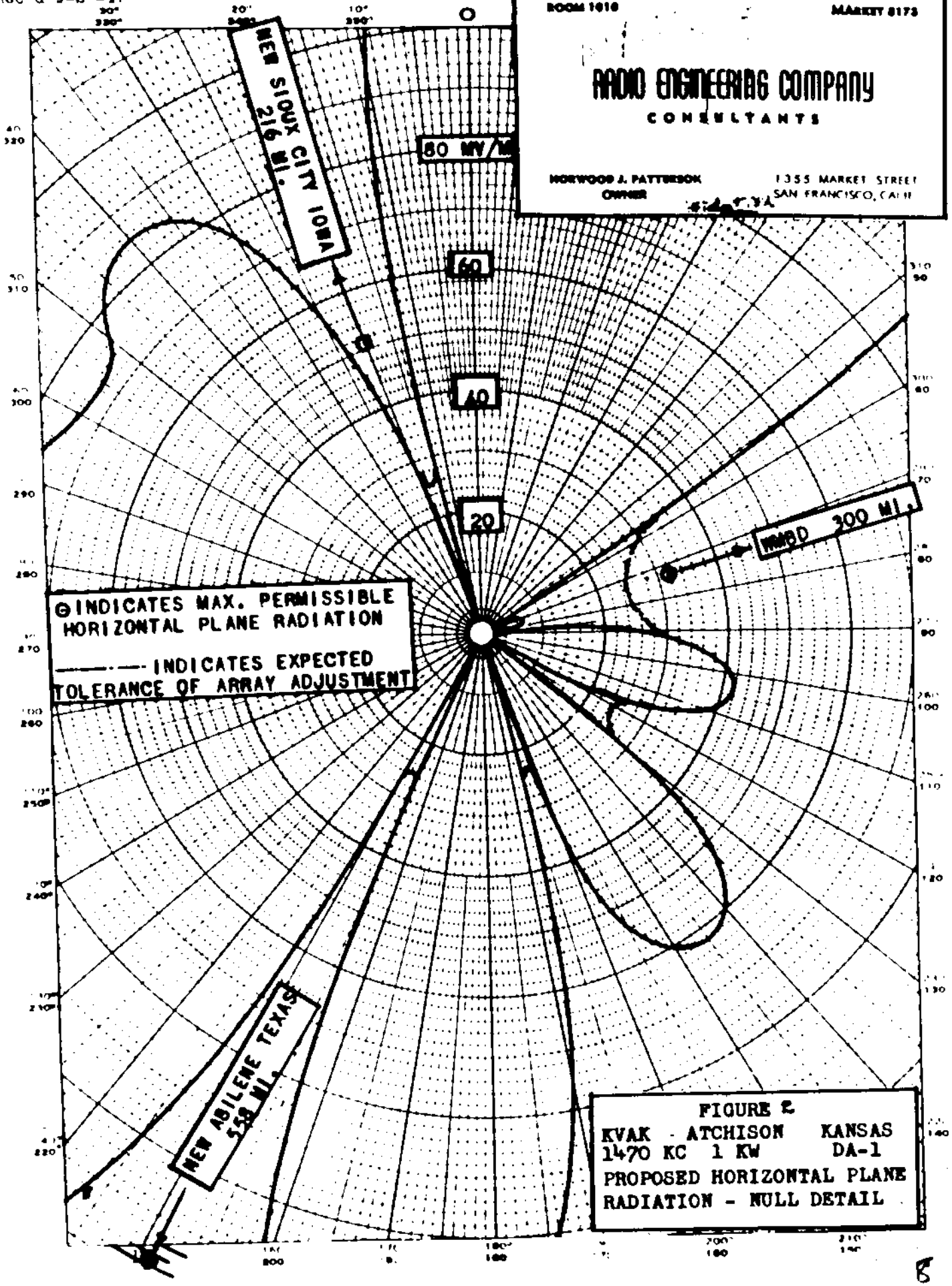


FIGURE 2
KVAK - ATCHISON KANSAS
1470 KC 1 KW DA-1
PROPOSED HORIZONTAL PLANE
RADIATION - NULL DETAIL

5

KARE KVAK

MEASURED
DAY & NIGHT

KVAK Atchison, Kans. 11/10/48 G N 11-5-48 1kw, DA-1 1470kc

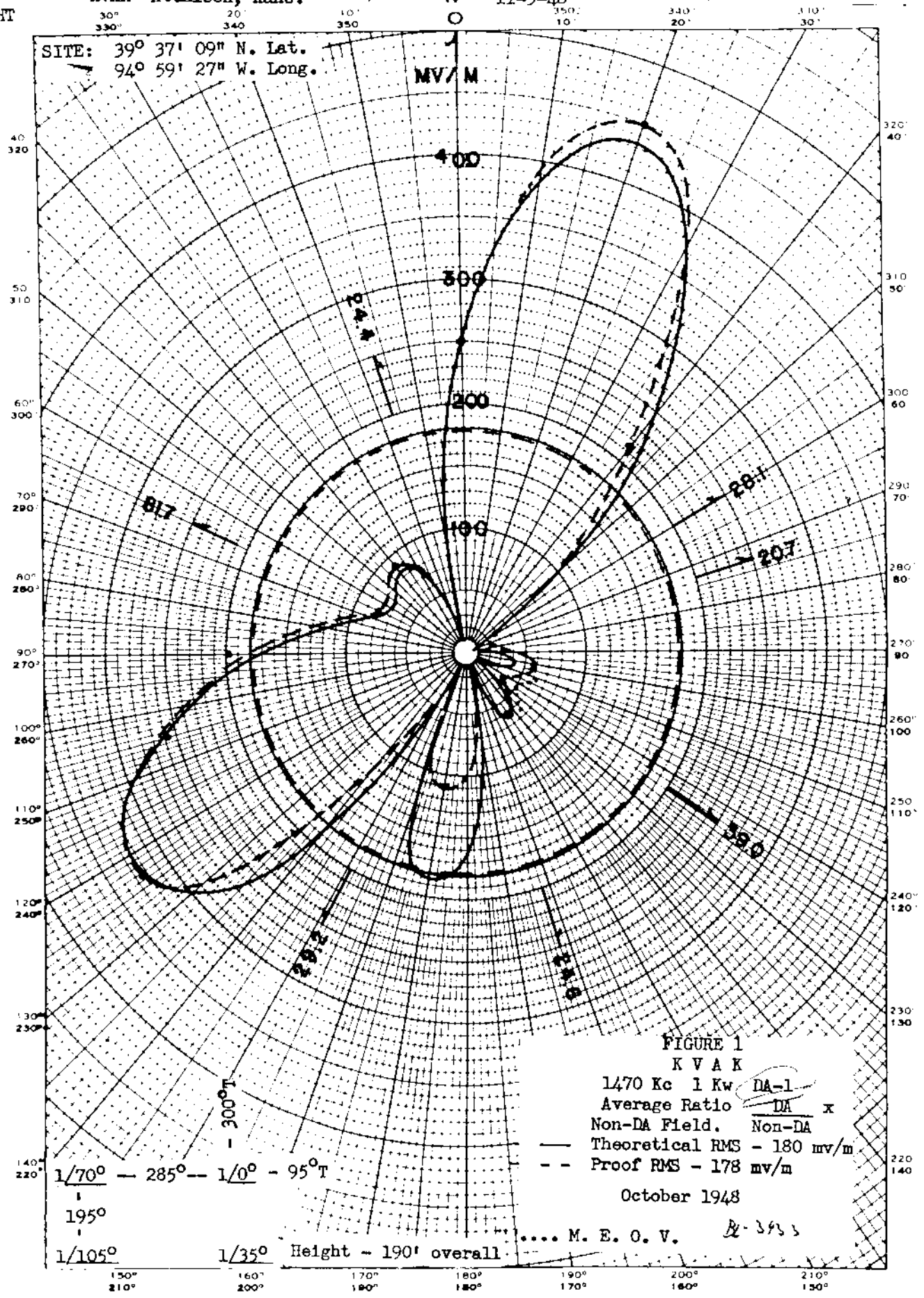


FIGURE 1
K V A K
1470 Kc 1 Kw DA-1
Average Ratio DA / Non-DA x
Non-DA Field.
—— Theoretical RMS - 180 mv/m
- - Proof RMS - 178 mv/m
October 1948

Noi...ed J. Patterson- Engr. San Francisco, Calif.

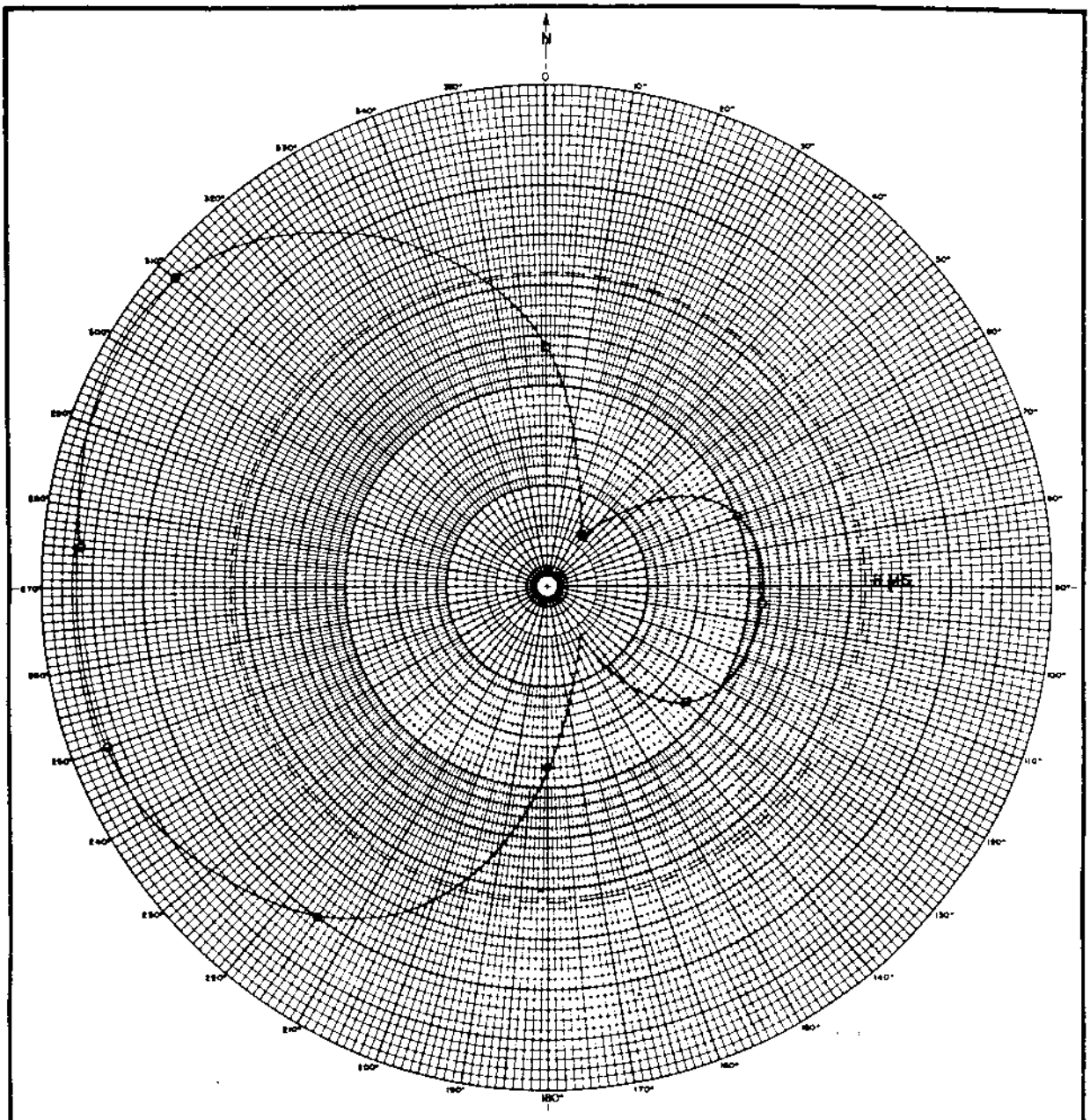
KDHN IV

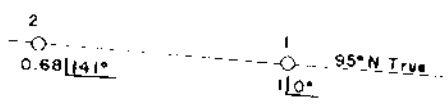
Measured Day
(3-30-64ct)

Station KDHN
Dimmitt, Texas

500w, DA-D, D
1470kc

#200
8-19-64
granted L for
new station





S=70°

G=78.2°

APPLICANT	HIGH PLAINS BROADCASTING COMPANY
LOCATION	DIMMITT, TEXAS
FREQUENCY	1470 kc/s
POWER	500 watts
LATITUDE	34°35'11"
LONGITUDE	102°18'38"
WHEN USED	DAYTIME ONLY
RMS FIELD	126 mv/m
DATE	NOVEMBER, 1963
	KDHN

William B. Carr
CONSULTING ENGINEER
FORT WORTH, TEXAS

FCC File No. BL-10446
Accepted 3-19-64

Station KDHN
Dimmitt, Texas

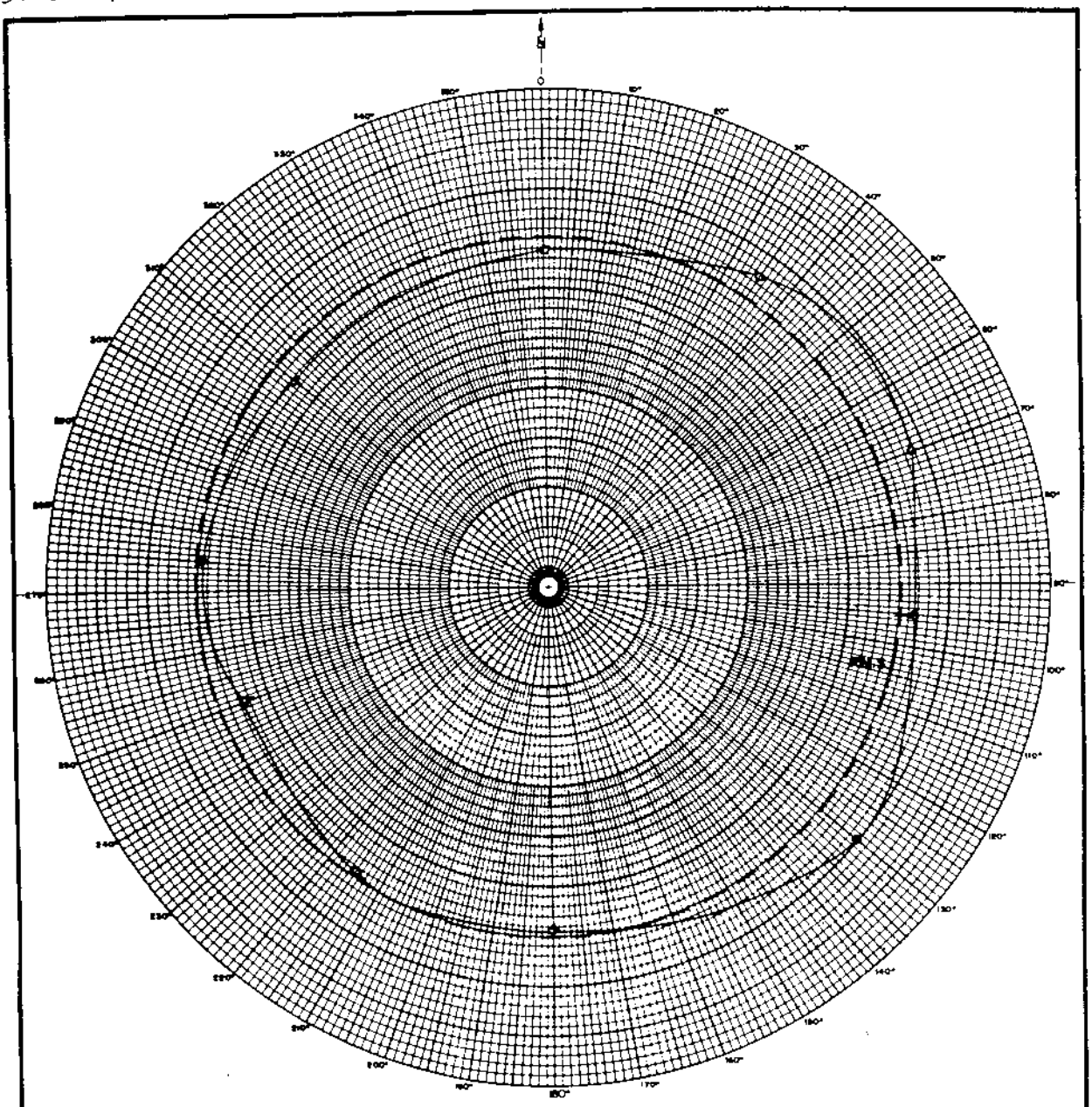
1470kc

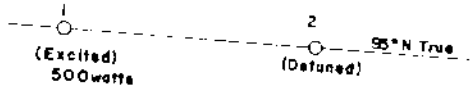
KDHN

Measured Non-DA
(3-30-64ct)

Station KDHN
Dimmitt, Texas

500w, DA-D, D
1470kc





APPLICANT	HIGH PLAINS BROADCASTING COMPANY
LOCATION	DIMMITT, TEXAS
FREQUENCY	1470 kc/s
POWER	500 watts
LATITUDE	34° 35' 11"
LONGITUDE	102° 18' 35"
WHEN USED	NON-DIRECTIONAL
RMS FIELD	141 mv/m
DATE	NOVEMBER, 1963
	KDHN

William B. Carr
CONSULTING ENGINEER
FORT WORTH, TEXAS

FCC File No. BL-10446
Accepted 3-19-64

Station KDHN
Dimmitt, Texas

1470kc

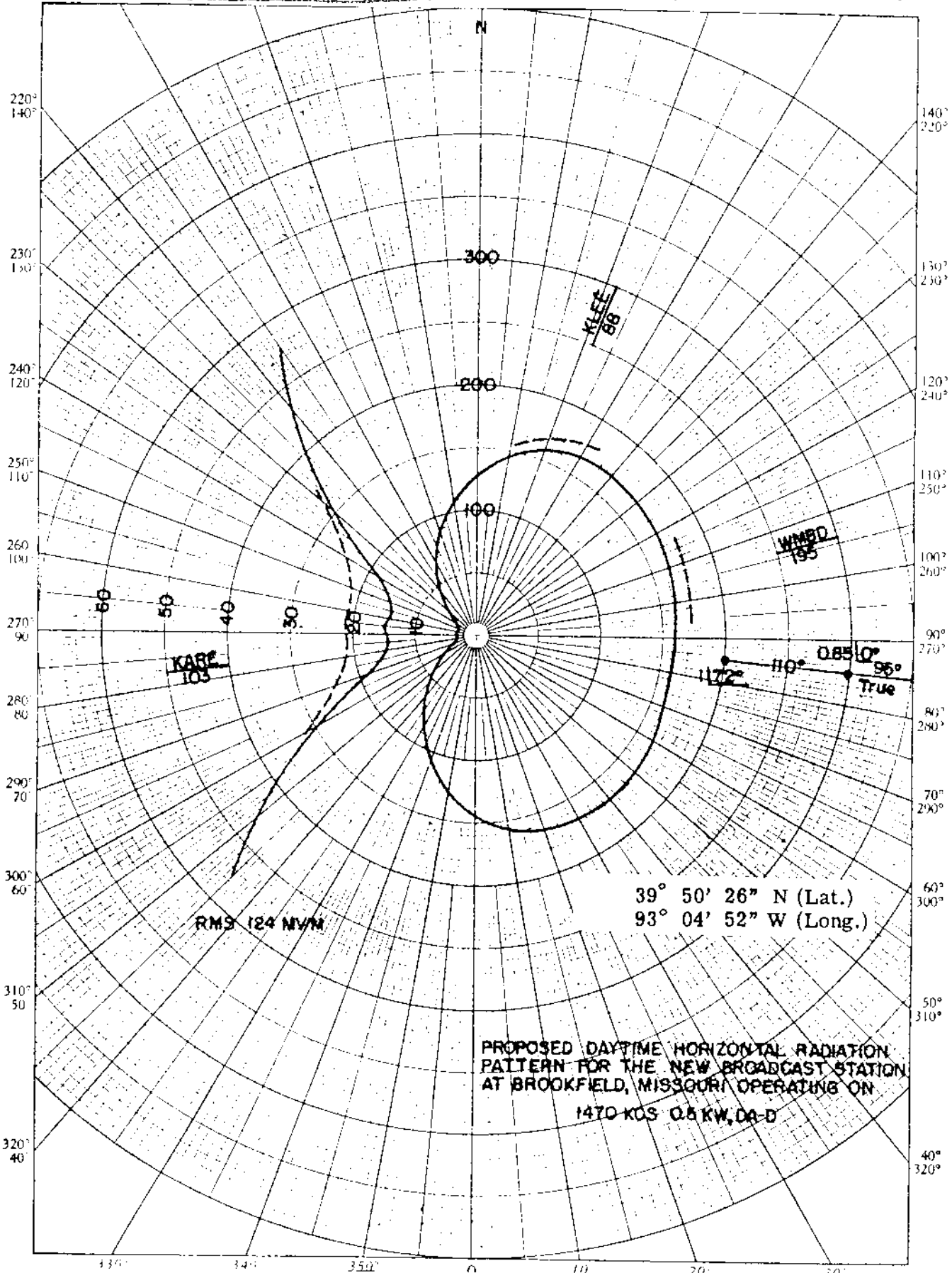
KGHM

PROPOSED
DAY (7-18-55G)

Green Hills B/C Co.
Brookfield, Missouri

500 W
DA-D, D

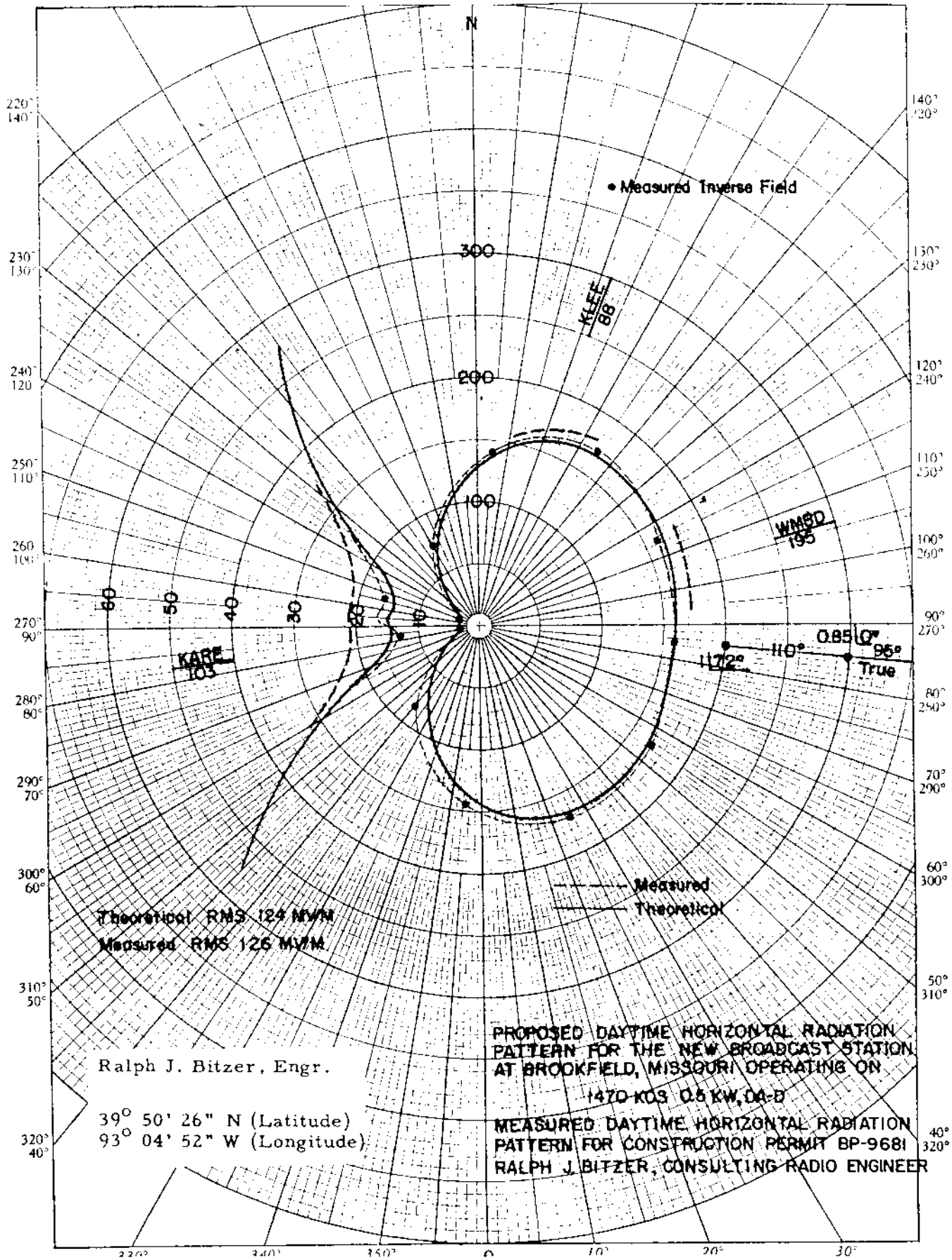
1470 KC



File BP-9681 (Amended) Accepted 6-30-55 FCC Green Hills B/C Co. 1470 KC
Brookfield, Missouri

KGHM

MEASURED DAY (2/28/56g) | STATION KGHM BROOKFIELD, MO. | 500 W DA-D,D | 1470 KC



FCC File No. BL-6073 Accepted 2-15-56 KGHM, Brookfield, Mo. 1470 KC

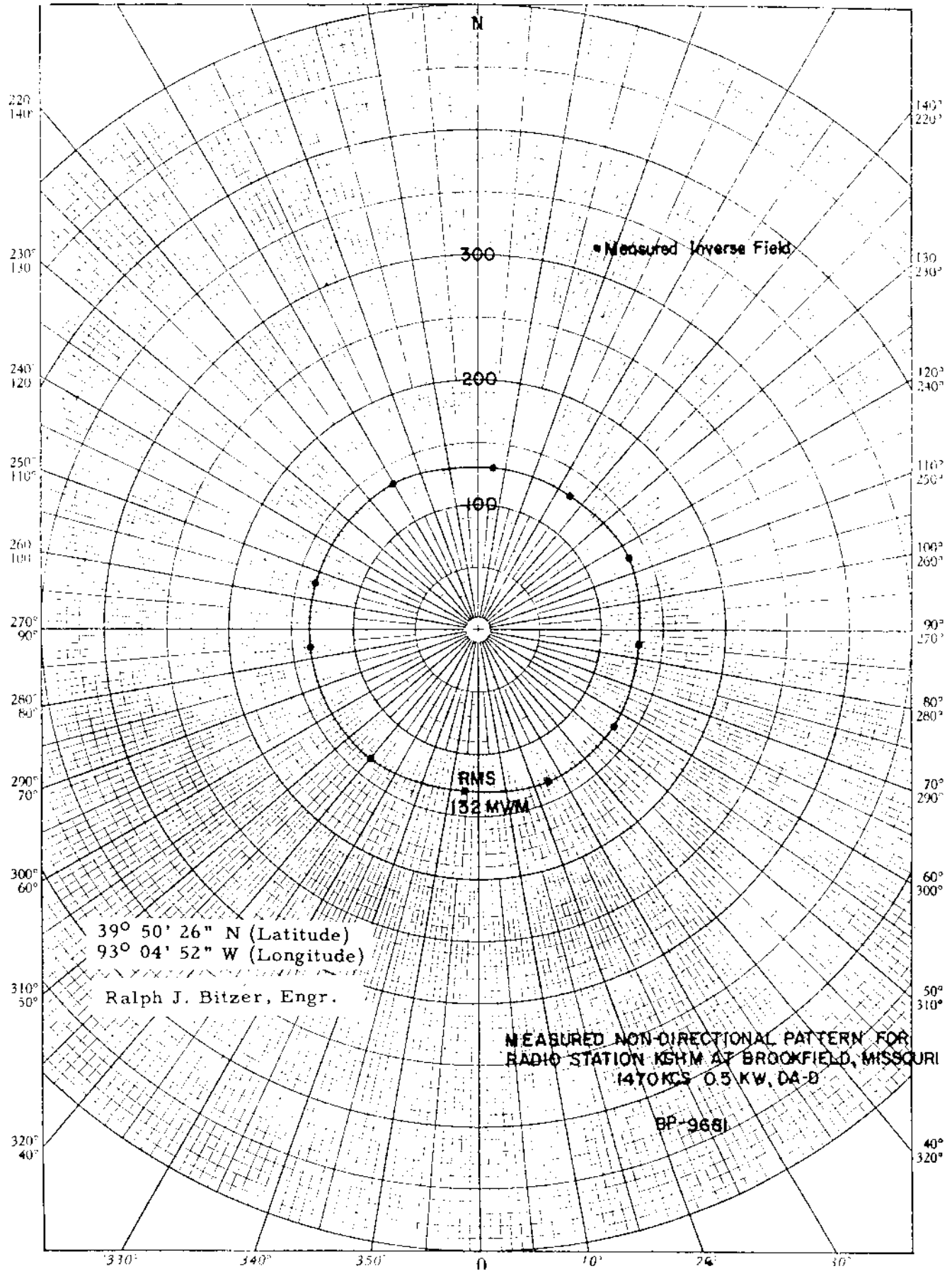
KGHM

MEASURED
NON-DA (2/28/56g)

STATION KGHM
BROOKFIELD, MO.

500 W
DA-D,D

1470 KC



39° 50' 26" N (Latitude)
93° 04' 52" W (Longitude)

Ralph J. Bitzer, Engr.

MEASURED NON-DIRECTIONAL PATTERN FOR
RADIO STATION KGHM AT BROOKFIELD, MISSOURI
1470 KCS 0.5 KW, DA-D

BP-9681

FCC File No. BL-6073 Accepted 2-15-56 KGHM, Brookfield, Mo. 1470 KC

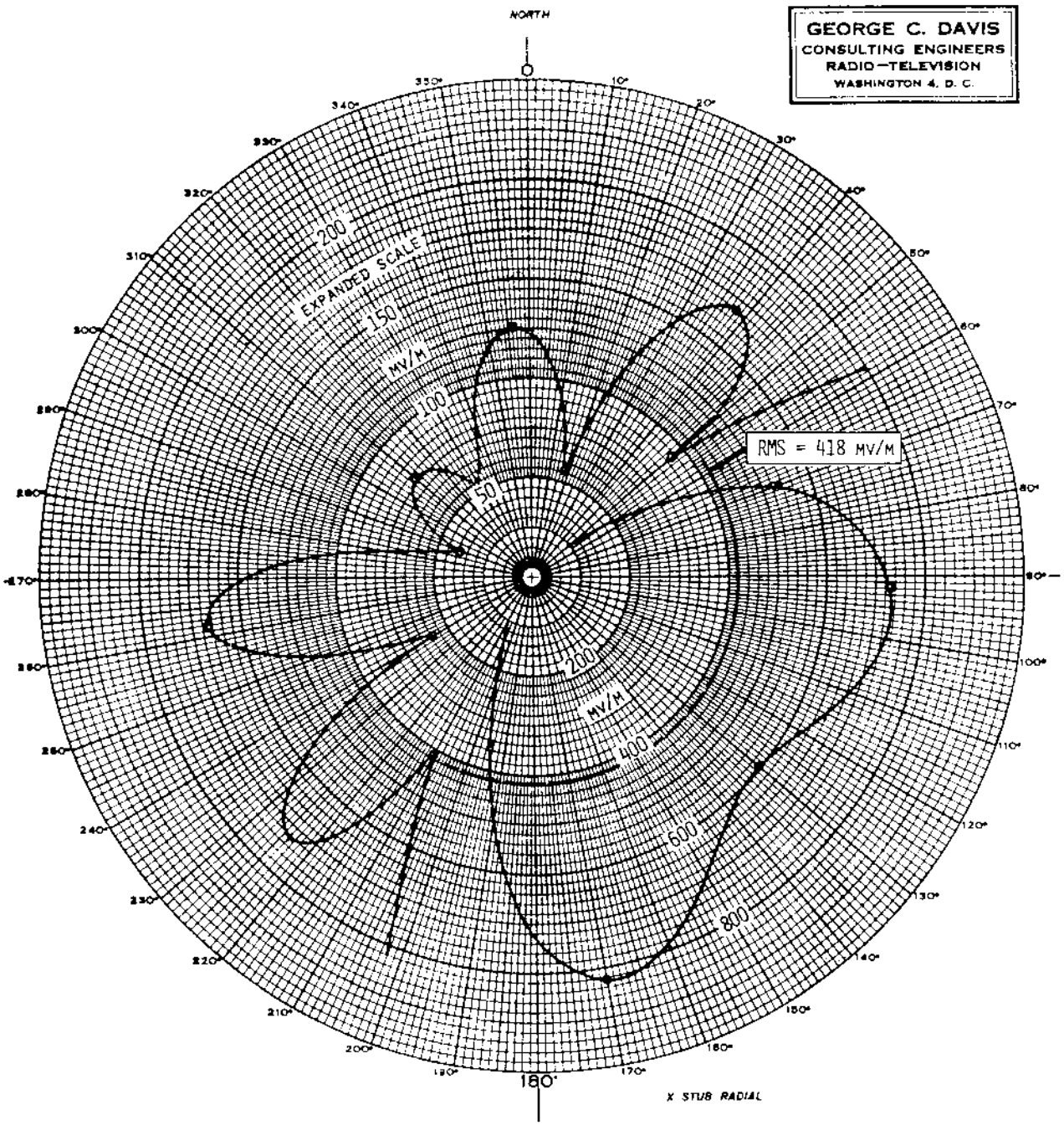
BL 12489
GR (2-13-70) Lic. Covering CP for Changes

~~KPLC~~ KLCL

Measured Night
(2-28-70ct)

Station KPLC
Lake Charles, Louisiana

5kw, DA-N, U
1470 kc



MEASURED HORIZONTAL PLANE RADIATION PATTERN
FOR NIGHTTIME OPERATION OF
KPLC, LAKE CHARLES, LOUISIANA
1470 KHZ - 5 KW - DA-N
AUGUST 1969

FCC File BL-12489
Accepted 2-4-70

Station KPLC
Lake Charles, Louisiana

1470 kc

BL 12489
Gtz (2-13-70) L.c. Covering CP for changes

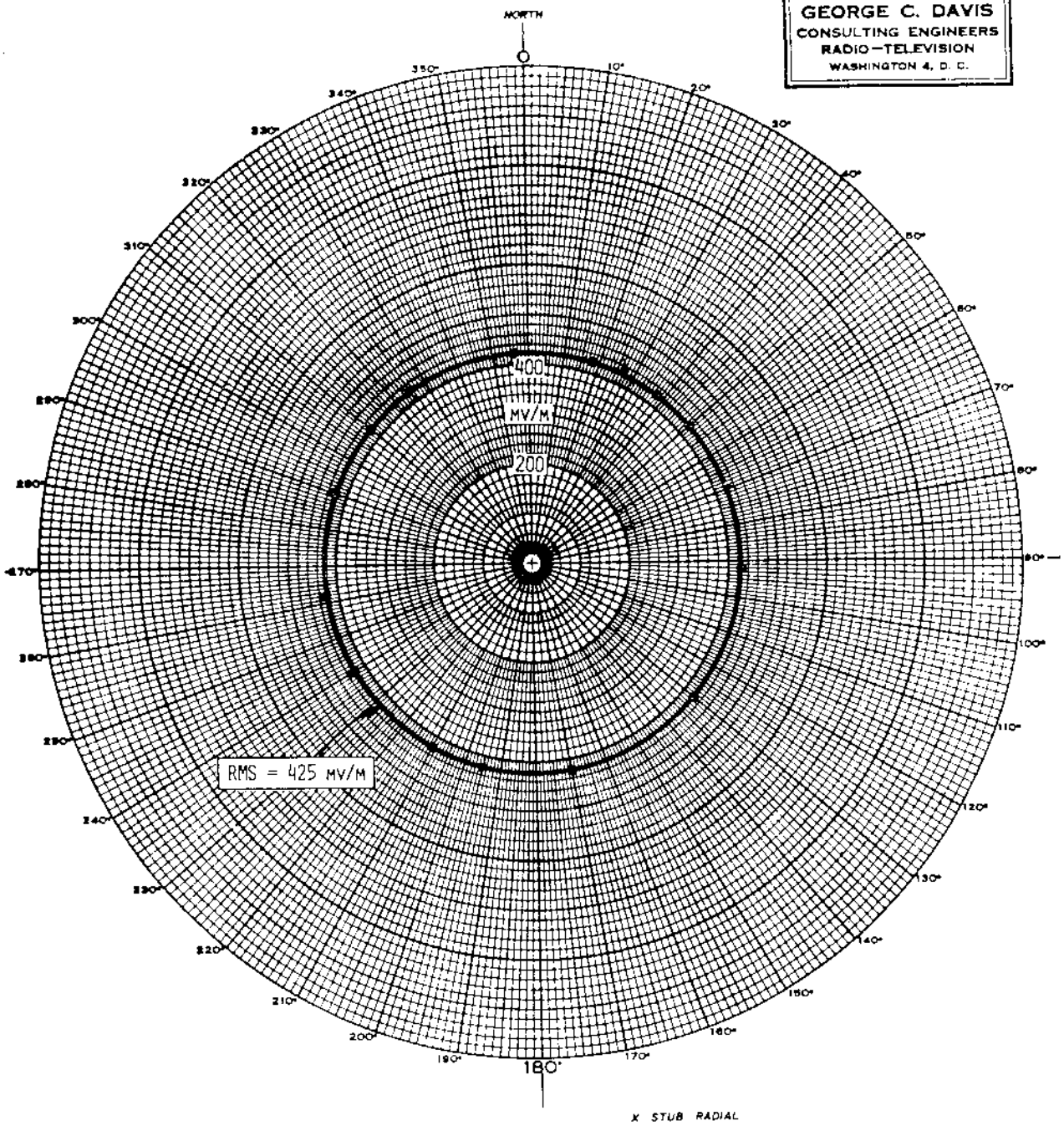
KLCL
~~KPLC~~

Measured Non-DA
(2-28-70ct)

Station KPLC
Lake Charles, Louisiana

5kw, DA-N, U
1470 kc

GEORGE C. DAVIS
CONSULTING ENGINEERS
RADIO—TELEVISION
WASHINGTON 4, D. C.



MEASURED NON-DIRECTIONAL UNATTENUATED
FIELD INTENSITY AT ONE MILE FOR
KPLC, LAKE CHARLES, LOUISIANA
1470 KHZ - 5 KW - DA-N
AUGUST 1969

FCC File No. BL-12489
Accepted 2-4-70

Station KPLC
Lake Charles, Louisiana

1470 kc

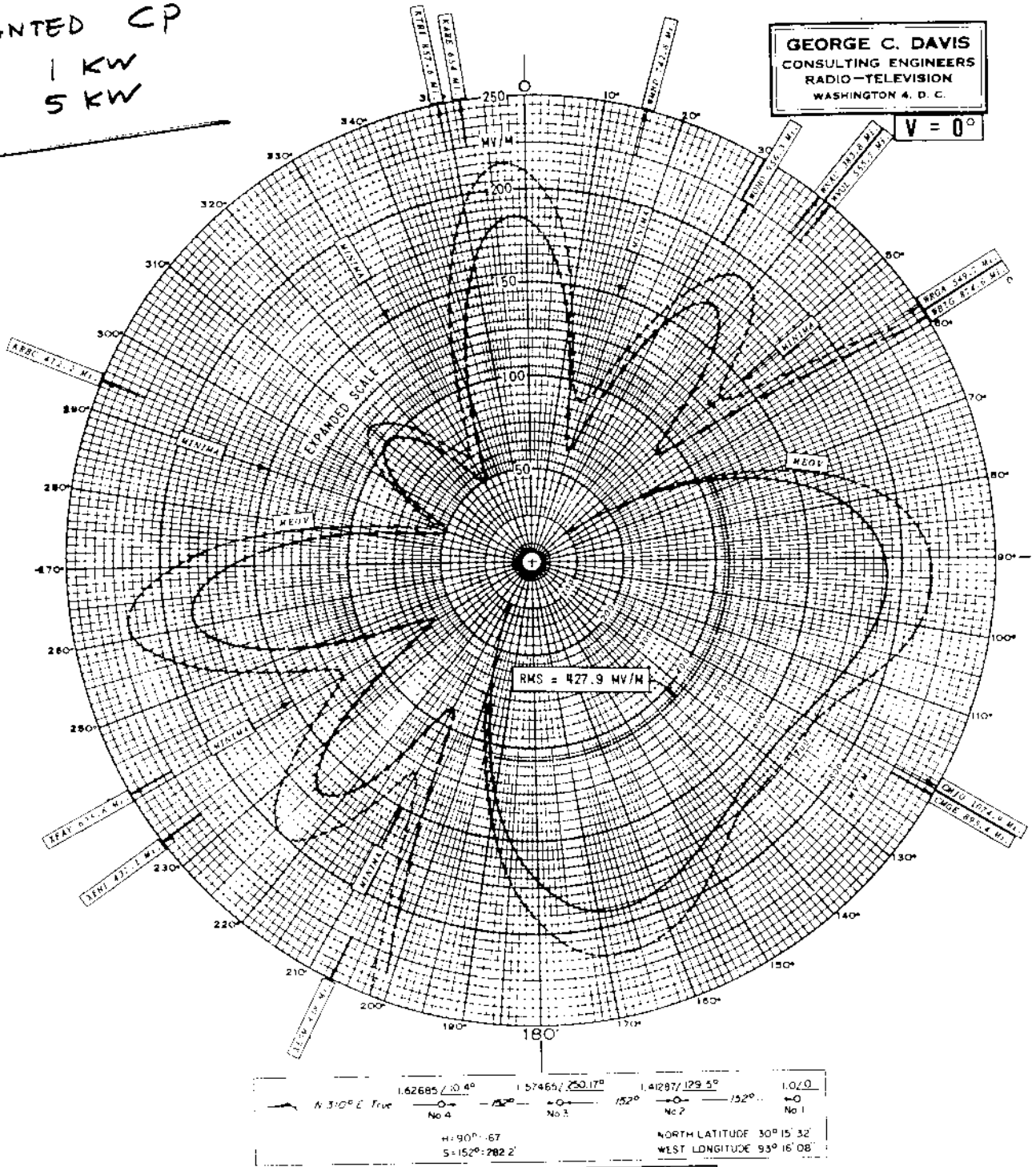
KLCL KPLC

Proposed Night
(4-29-68ct)

Station KPLC
Lake Charles, Louisiana

5kw,DA-N,U
1470 kc

6-10-68
GRANTED CP
FROM 1 KW
TO 5 KW



COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR THE PROPOSED NIGHTTIME OPERATION OF
KPLC, LAKE CHARLES, LOUISIANA
1470 KHz - 5 KW - DA-N - U
DECEMBER 1967

FCC File No.BP-18052
Accepted 4-17-68

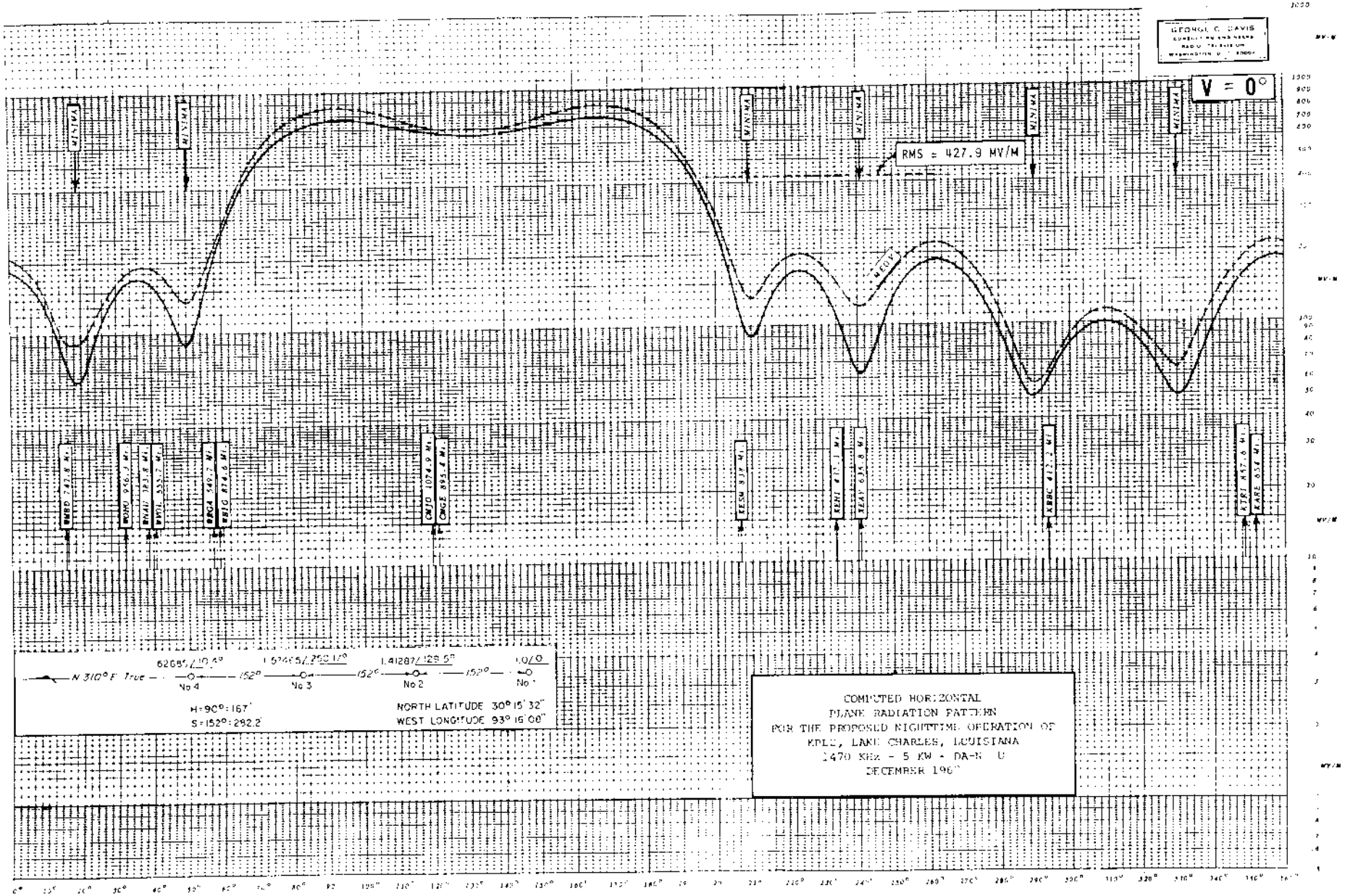
Station KPLC
Lake Charles, Louisiana

1470 kc

Proposed Night Null's
(5-23-68)

Station KPLC
Lake Charles, Louisiana

5kw,DA-N,U
1470 kc



FCC File No.BP-18057
Accepted 4-17-68

Station KPLC
Lake Charles, Louisiana

1470 kc

KLCL KPLC

SEE KNDE
REVERSE SIDE

~~KXOA~~

Proposed Day
(6-29-70ct)

Station KXOA
Sacramento, California

1kw, 5kw-LS, DA-2, U
1470 kc

N. Lat. 38° 35' 29"
W. Long. 121° 27' 43"

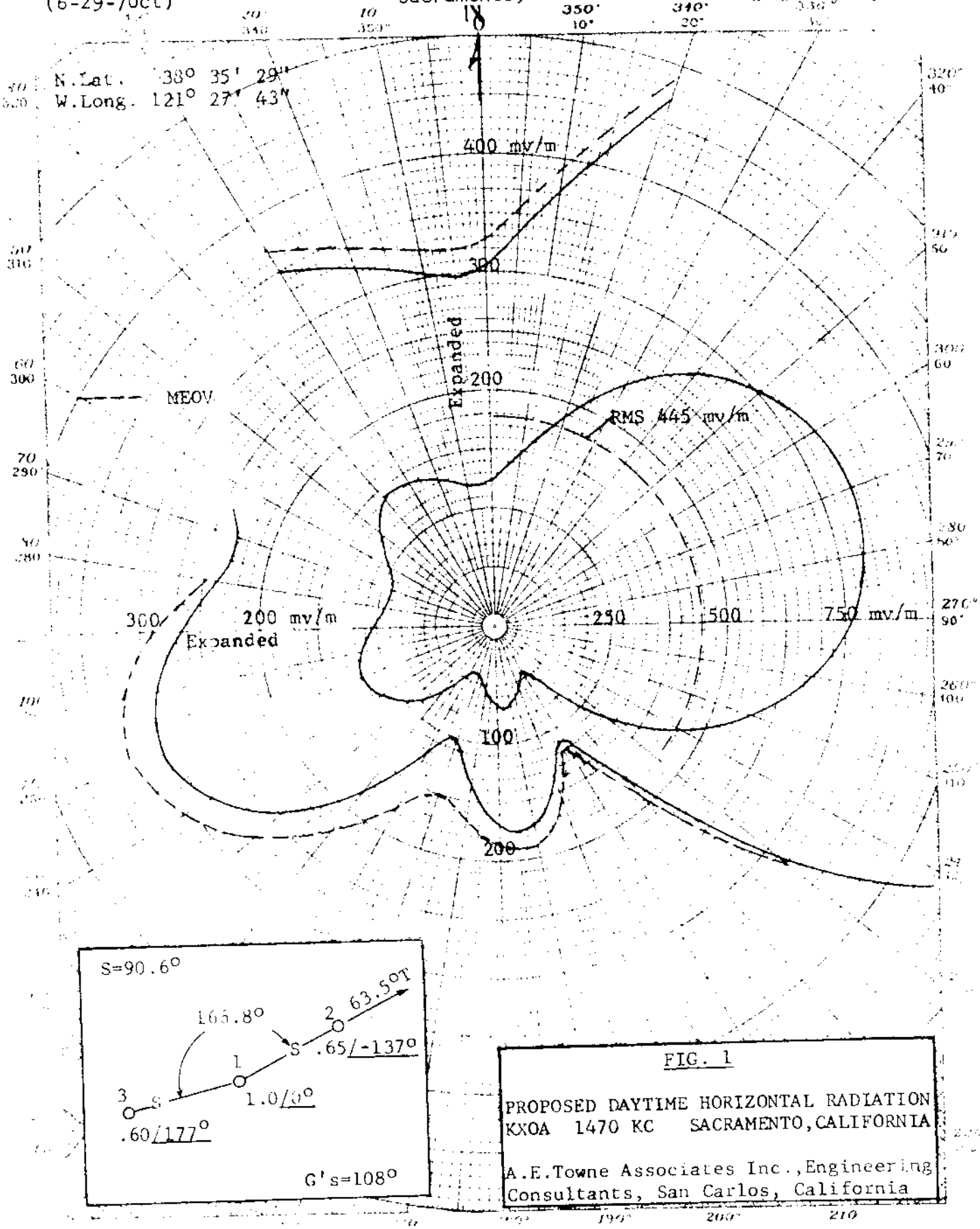


FIG. 1

PROPOSED DAYTIME HORIZONTAL RADIATION
KXOA 1470 KC SACRAMENTO, CALIFORNIA

A.E. Towne Associates Inc., Engineering Consultants, San Carlos, California

FCC File No. BMP-13012
Accepted 6-12-70

Station KXOA
Sacramento, California

1470 kc

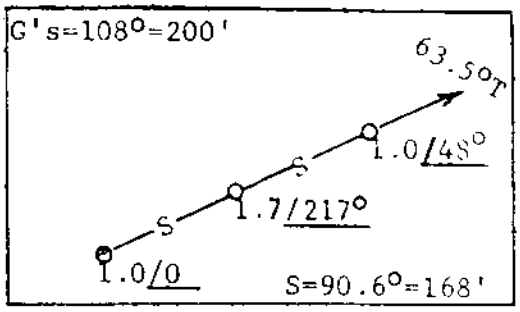
KNDE ~~KXOA~~

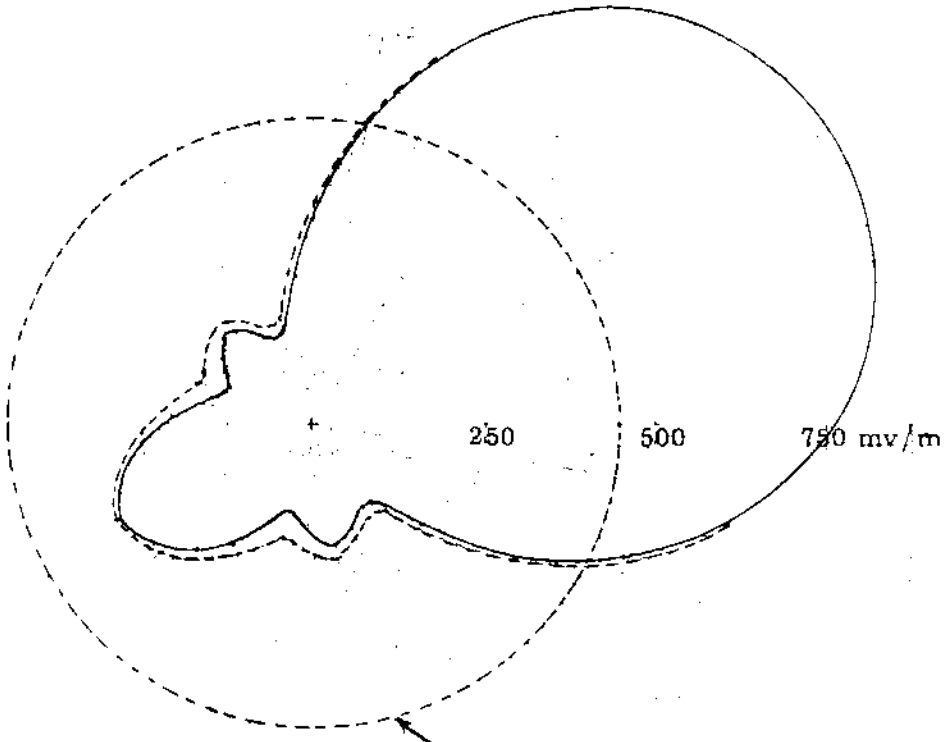
Proposed Day
(3-28-68ct)

Station KXOA
Sacramento, California

1kw, 5kw-LS, DA-2, U
1470 kc

3-27-68
GRANTED
CP





----- MEOV

RMS = 448 mv/m

N.Lat. 38° 35' 29"
W.Long. 121° 27' 43"

FIG. 1

HORIZONTAL DAYTIME RADIATION
PROPOSED NEW SITE
KXOA 1470 KC SACRAMENTO, CALIFORNIA

A.E.Towne Assoc.Inc., Engineering Consultants, San Carlos, Calif.

FCC File No.BP-18036
Accepted 2-28-68

Station KXOA
Sacramento, California

1470 kc

KNDE ~~KXOA~~

PROPOSED DAY
(3-23-59g)

Station KXOA
Sacramento, California

1kw, 5kw-LS, DA-2,U
1470 KC

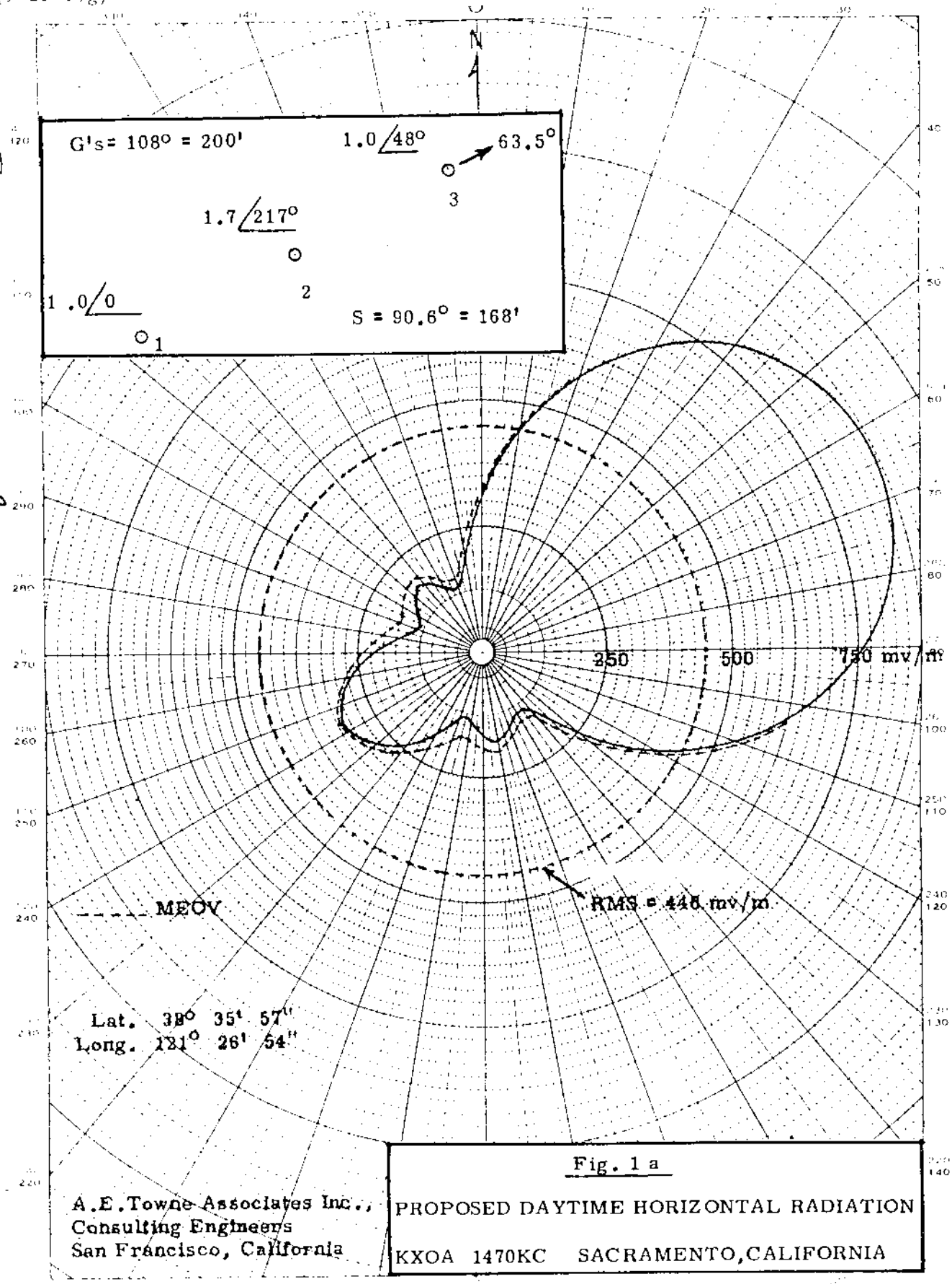


Fig. 1 a

PROPOSED DAYTIME HORIZONTAL RADIATION

KXOA 1470KC SACRAMENTO, CALIFORNIA

A.E. Towne Associates Inc.,
Consulting Engineers
San Francisco, California

FCC File No. BP-11534
Accepted 3-10-59 (Amended)

Station KXOA
Sacramento, California

1470 KC

Granted CP for increase in day power to 5 kw and change to DA-2 (10-28-59)

0-6-0 granted extension

KNDE ~~KXOA~~

Proposed Night
(3-28-68ct)

Station KXOA
Sacramento, California

1kw, 5kw-LS, DA-2, U
1470 kc

3-27-68
GRANTED
CP

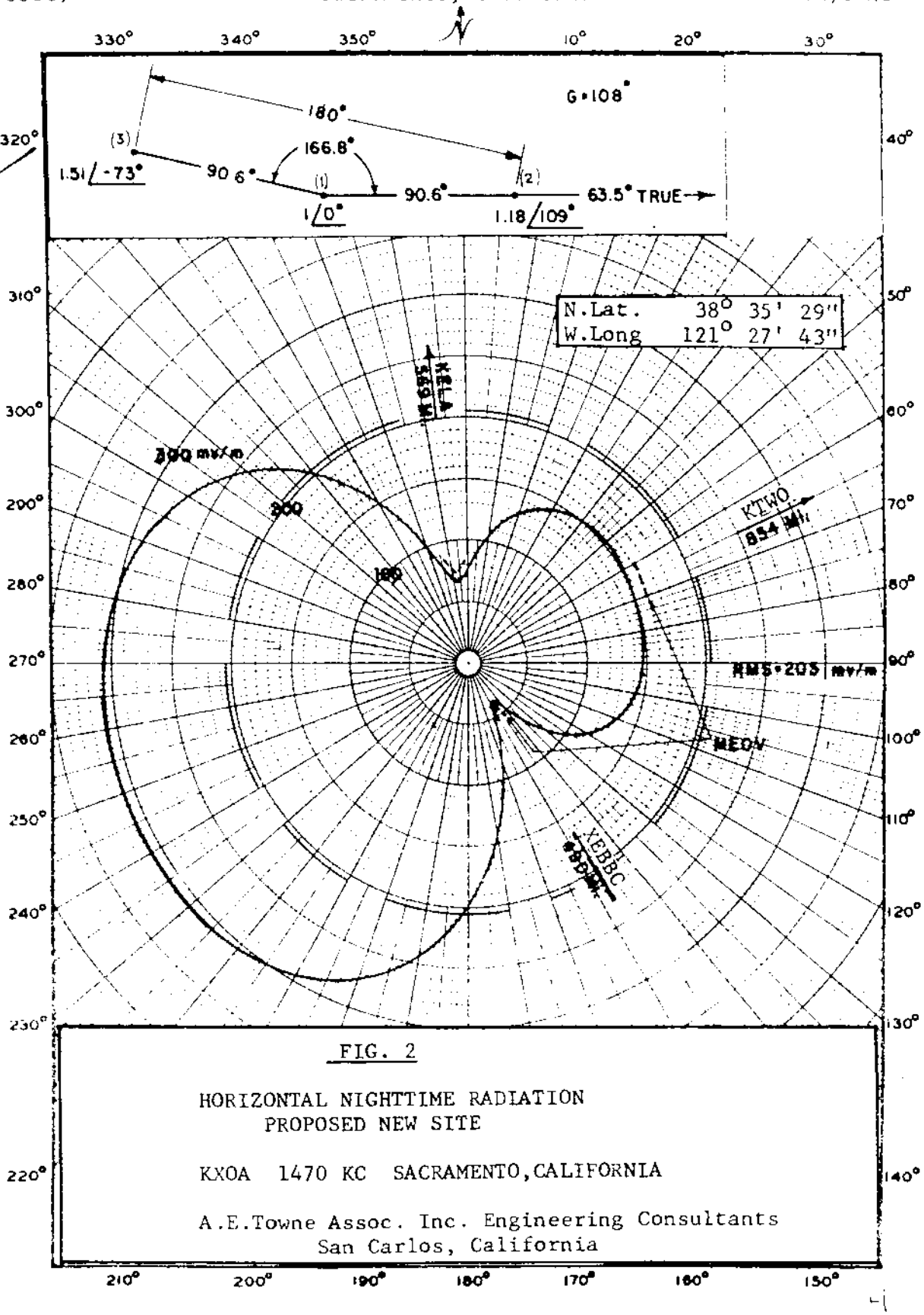


FIG. 2

HORIZONTAL NIGHTTIME RADIATION
PROPOSED NEW SITE

KXOA 1470 KC SACRAMENTO, CALIFORNIA

A.E.Towne Assoc. Inc. Engineering Consultants
San Carlos, California

KNDE ~~KXOA~~

MEASURED DAY
(5-27-60g)

Station KXOA
Sacramento, California

1kw, 5kw-LS, DA-2,U
1470 KC

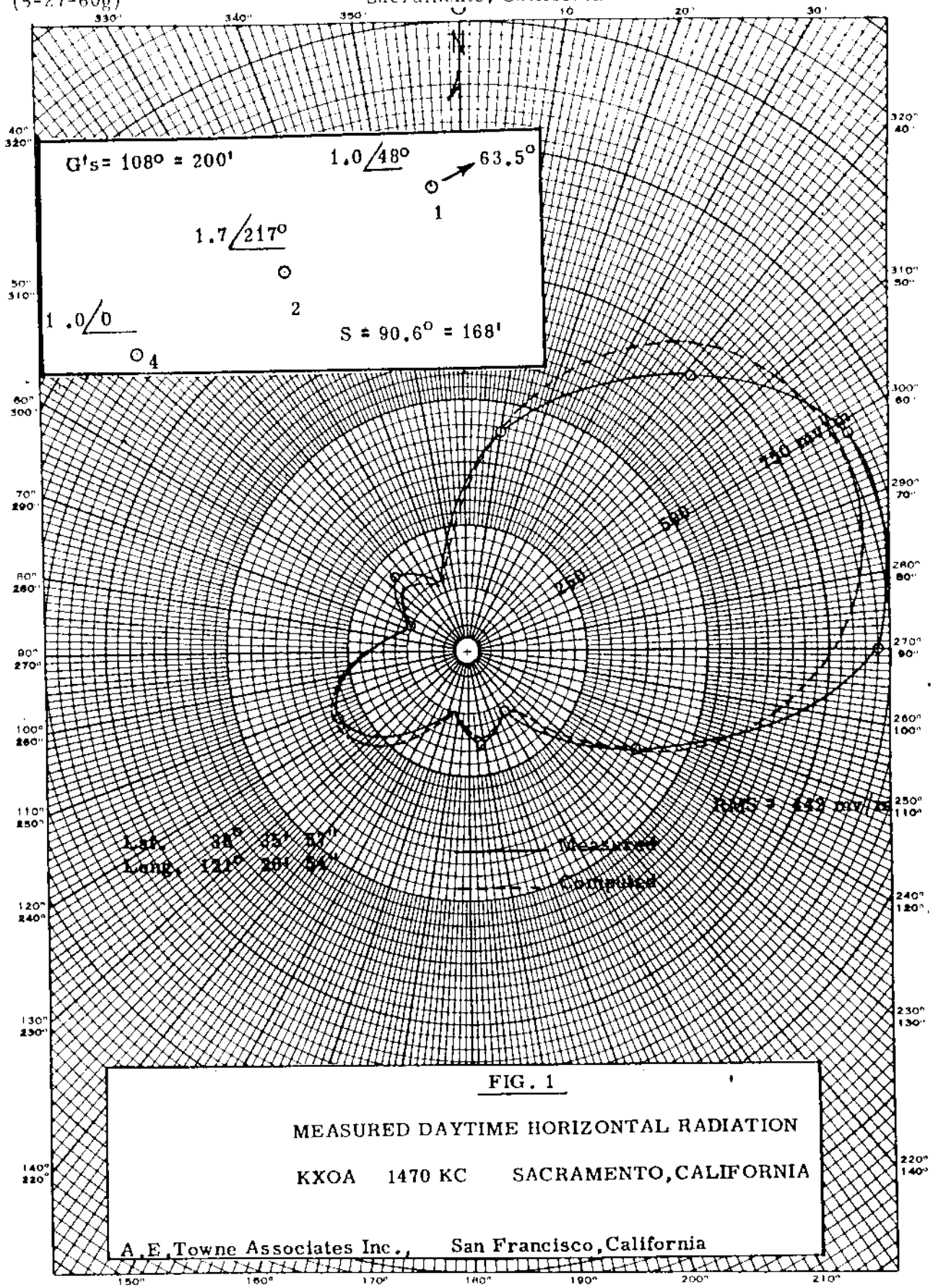


FIG. 1

MEASURED DAYTIME HORIZONTAL RADIATION

KXOA 1470 KC SACRAMENTO, CALIFORNIA

A.E. Towne Associates Inc., San Francisco, California

FCC File No. BL-7925
Accepted 5-11-60

KXOA
Sacramento, California

1470 KC

KNDE KXOA

MEASURED KXOA, SACRAMENTO, CAL. License 1-10-49 1kw, DA1 1470kc
NIGHT&DAY 12/16/49

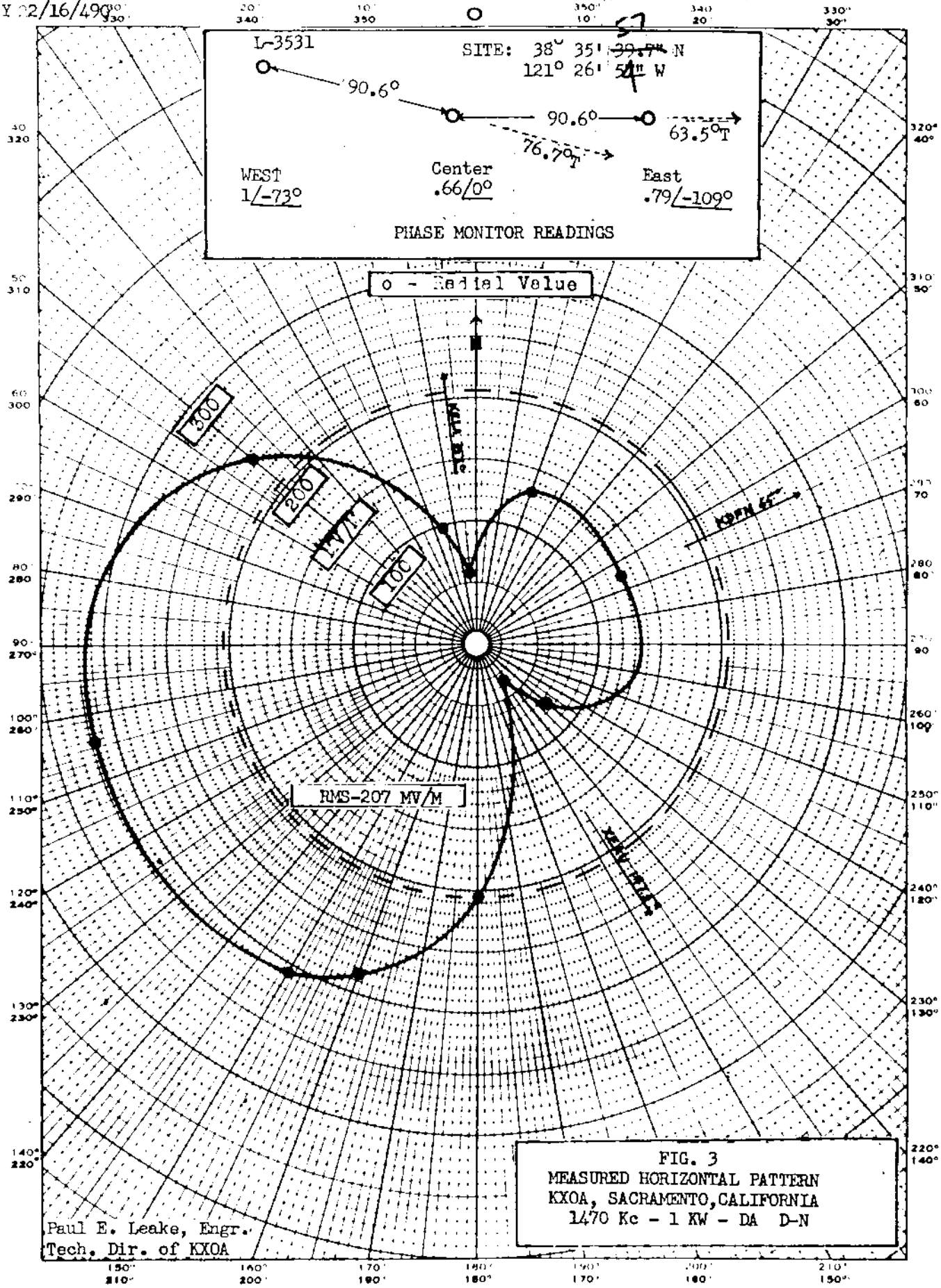


FIG. 3
MEASURED HORIZONTAL PATTERN
KXOA, SACRAMENTO, CALIFORNIA
1470 Kc - 1 KW - DA D-N

Paul E. Leake, Engr.
Tech. Dir. of KXOA

KNUE proof

KXOA

KXOA 1470 KC

Rec'd 11-13-47

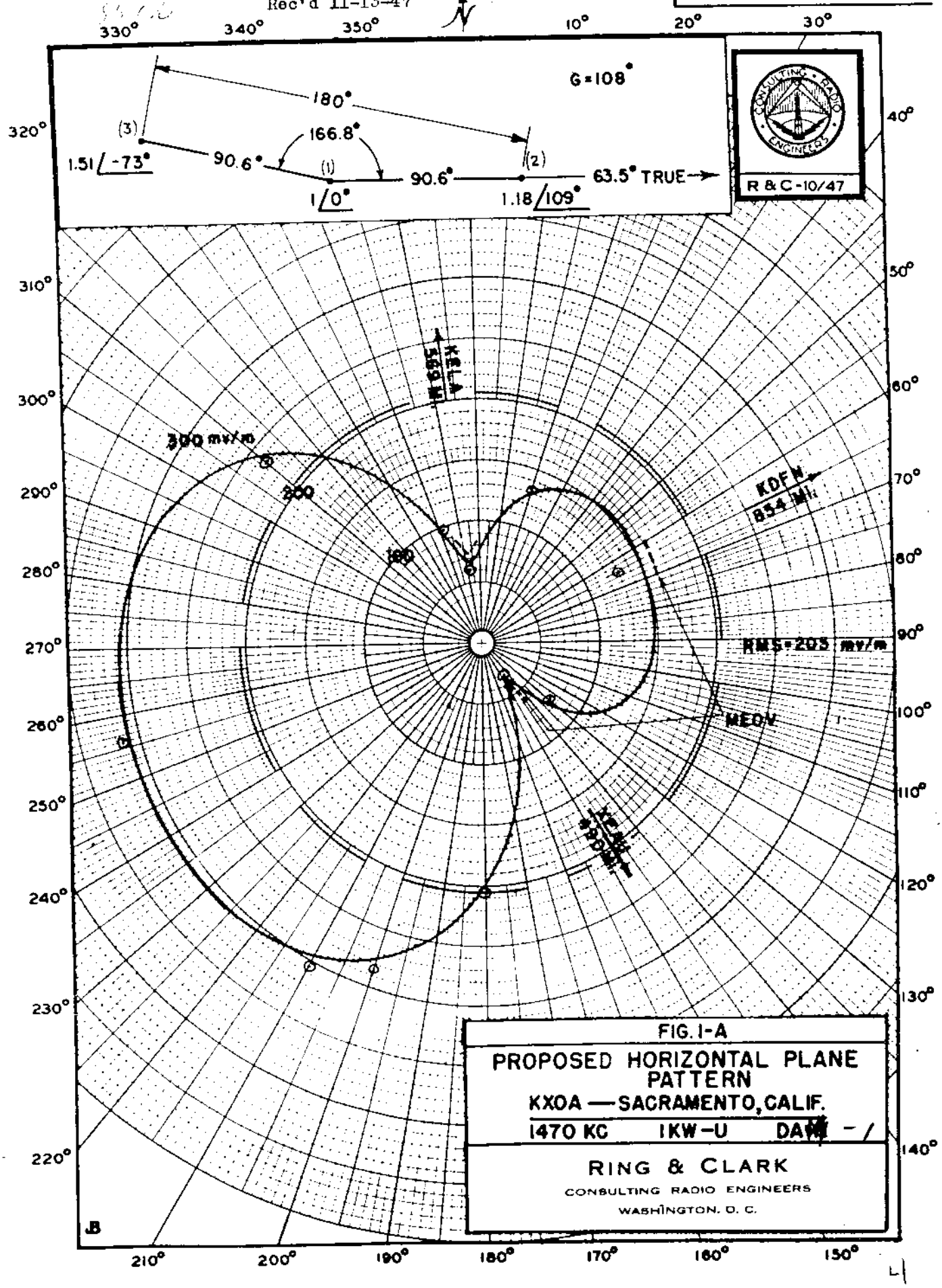


FIG. 1-A

PROPOSED HORIZONTAL PLANE PATTERN

KXOA — SACRAMENTO, CALIF.

1470 KC 1KW-U DA

RING & CLARK

CONSULTING RADIO ENGINEERS

WASHINGTON, D. C.

KNCL KXOA

MEASURED NON-DA
(5-27-60g)

Station KXOA
Sacramento, California

1kw, 5kw-LS, DA-2,U
1470 KC

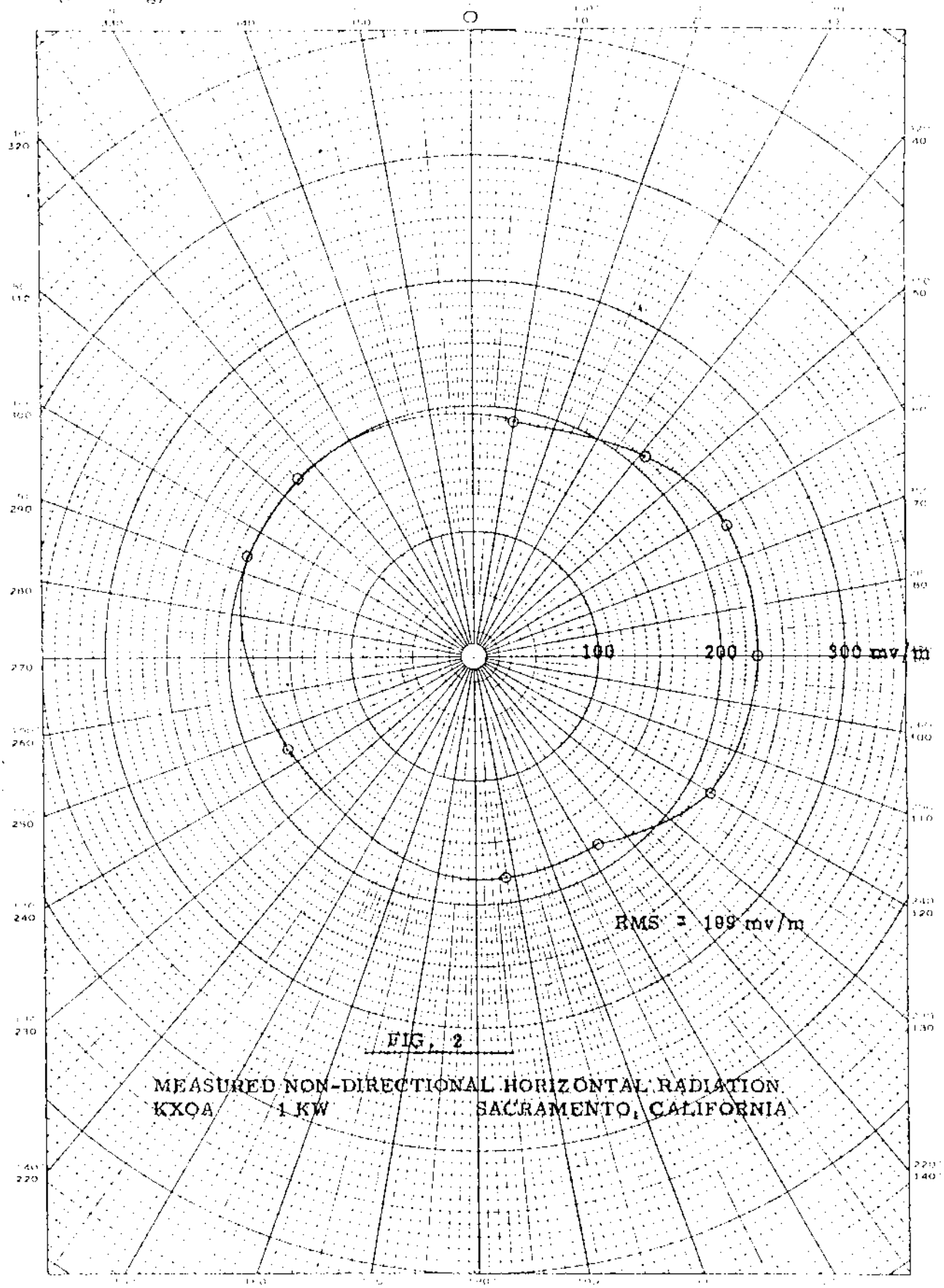


FIG. 2

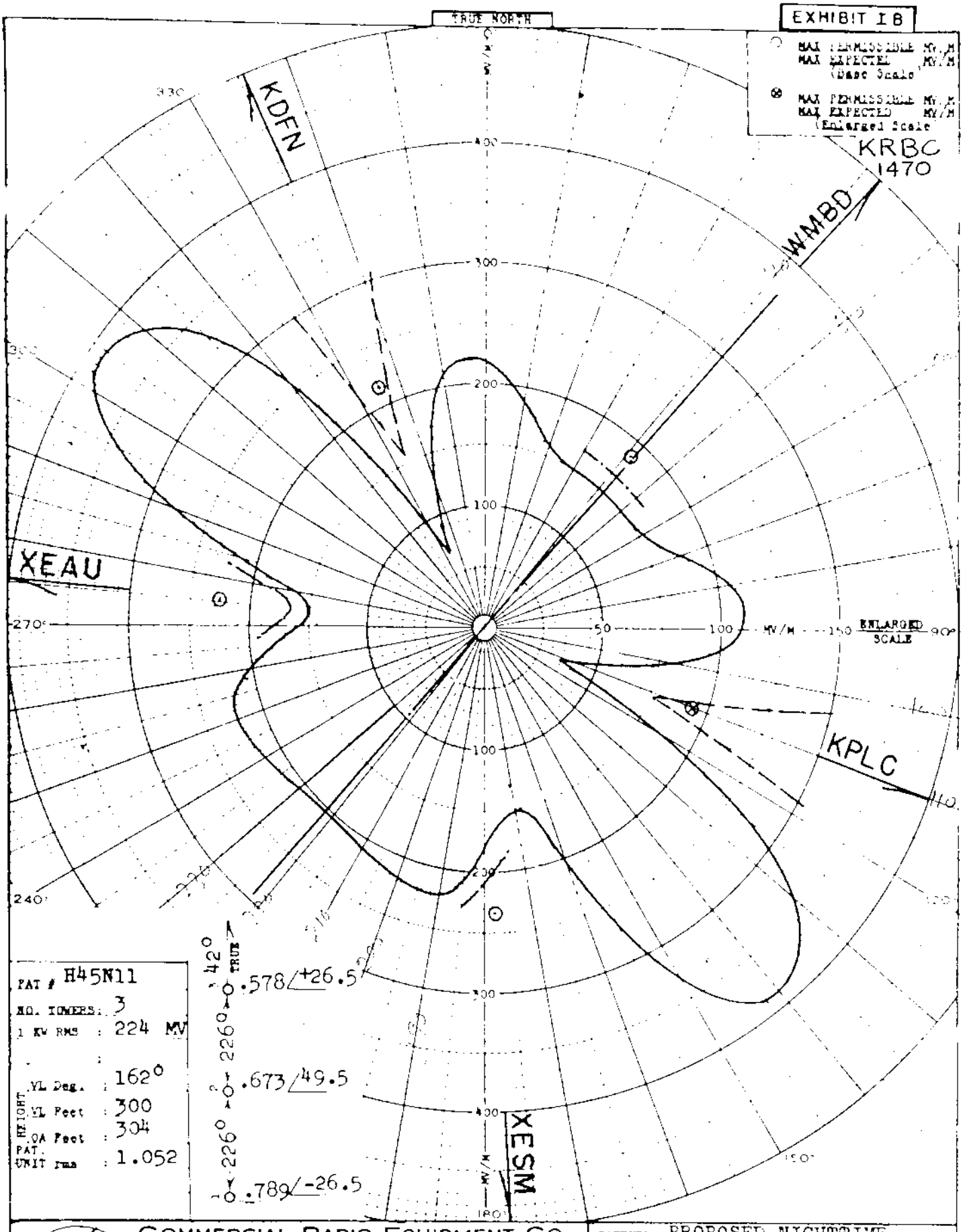
MEASURED NON-DIRECTIONAL HORIZONTAL RADIATION
KXOA 1 KW SACRAMENTO, CALIFORNIA

FCC File No. BL-7925
Accepted 5-11-60

KXOA
Sacramento, California

1470 KC

EXHIBIT I B



PAT # H45N11
NO. TOWERS: 3
1 KW RMS : 224 MV

HEIGHT
VL Deg. : 162°
VL Feet : 300
OA Feet : 304
PAT. UNIT rms : 1.052

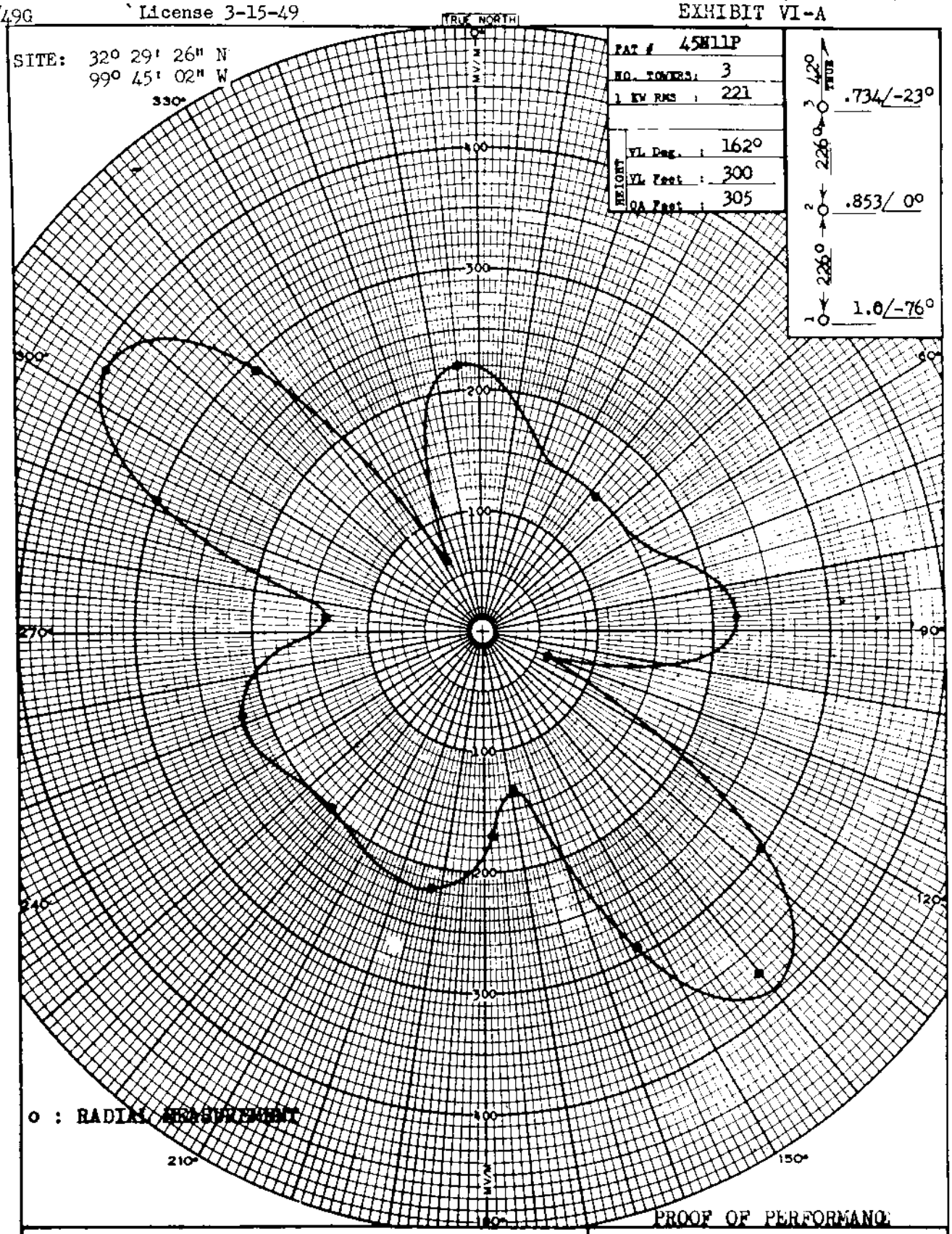
42° TRUE .578/+26.5°
226° .673/49.5°
226° .789/-26.5°

COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON D C HOLLYWOOD

PATTERN: PROPOSED NIGHTTIME
FOR: KRBC, ABILENE, TEXAS
POWER: 1 KW FREQ: 1470 KC
DATE: AUG. 11, 1945 BY: KMH

KRBC

MEASURED KRBC, ABILINE, TEX. 1kw, 5kw-LS, DAN 1470 kc
NIGHT 3/18/49G License 3-15-49 EXHIBIT VI-A



COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON, D. C.

PROOF OF PERFORMANCE
PATTERN H45N11P; ANTENNA: DA-N
FOR KRBC, ABILINE TEX.
POWER 1KW-N FREQ 1470KC
DATE MARCH 4, 1949 BY KMH

KSEM

PROPOSED
DAY (6-20-56g)

STATION KSEM
MOSES LAKE, WASH.

1 KW, 5 KW
DA-2. U

1470 KC

C Granted 7/12/56

Figure 4
KSEM, Inc
AMENDED DAYTIME
HORIZONTAL PLANE RADIATION
1470 kc 5 kw day
1 kw night DA-2
Moses Lake, Wash.

May, 1956

Line of Towers - N 14° E (true)
Spacing - 80°
Phasing - North lags 120°
Field ratios - 0.6

47° 05' 54" N (Latitude)
119° 17' 47" W (Longitude)

800 mv/m
700
600
500
400
300
200
100

RMS - 512 mv/m

Calculated Fields			
Az.	E'	Az.	E
14	767	274-114	369
4- 24	764	264-124	300
354- 34	755	254-134	244
344- 44	740	244-144	211
334- 54	715	234-154	203
324- 64	680	224-164	213
314- 74	636	214-174	228
304- 84	580	204-184	240
294- 94	515	194	244
284-104	442		

No. of towers: 2
Height of towers: 310' (315' overall)

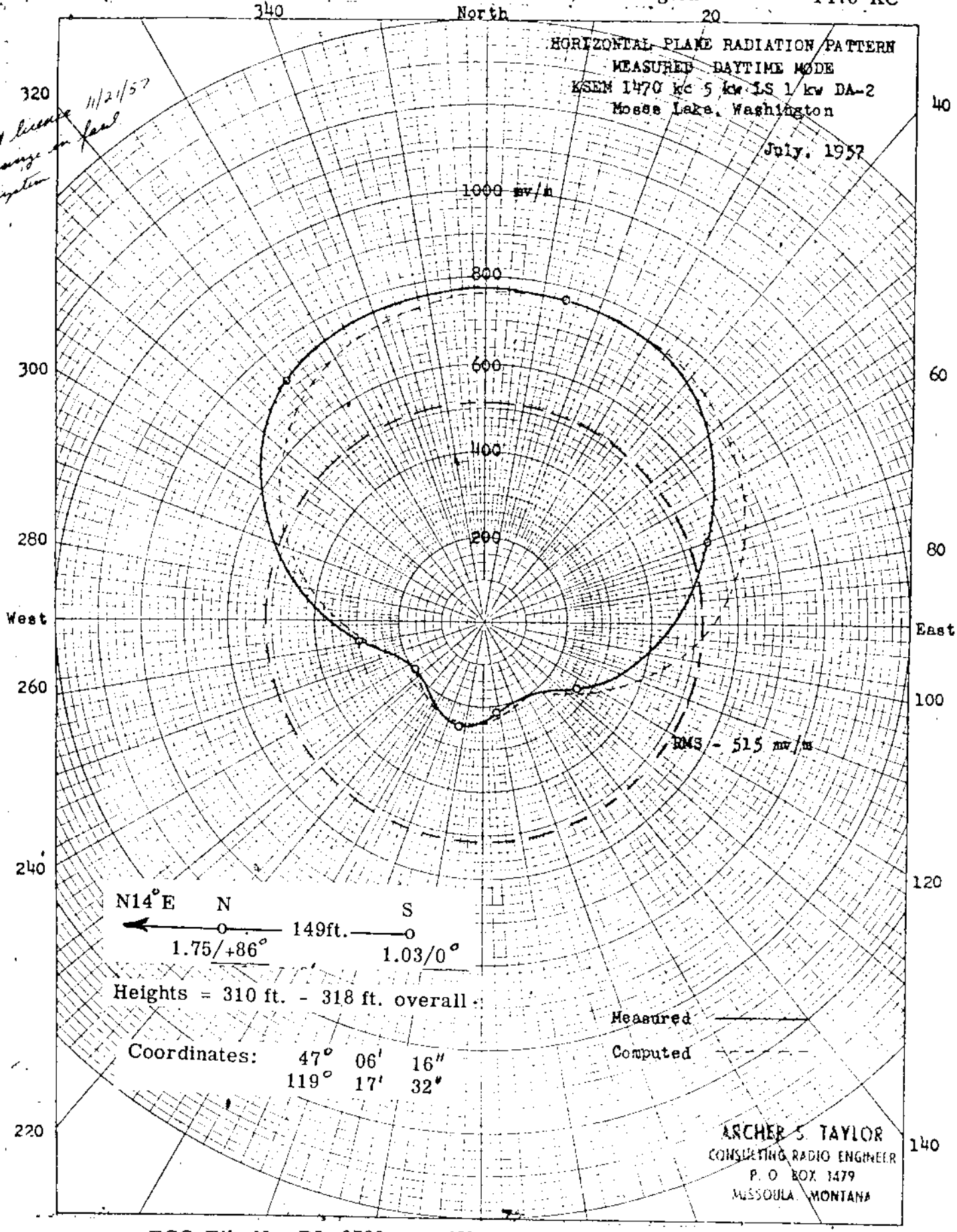
Archer S. Taylor
Consulting Radio Engineer
Missoula, Montana

FCC File No. BMP-7100 (Amended) Accepted 6-14-56 KSEM, Moses Lake, Wash. 1470 KC

KSEM

MEASURED DAY
(10/11/57g)

Station KSEM 1kw,5kw-LS, DA-2,U
Moses Lake, Washington 1470 KC

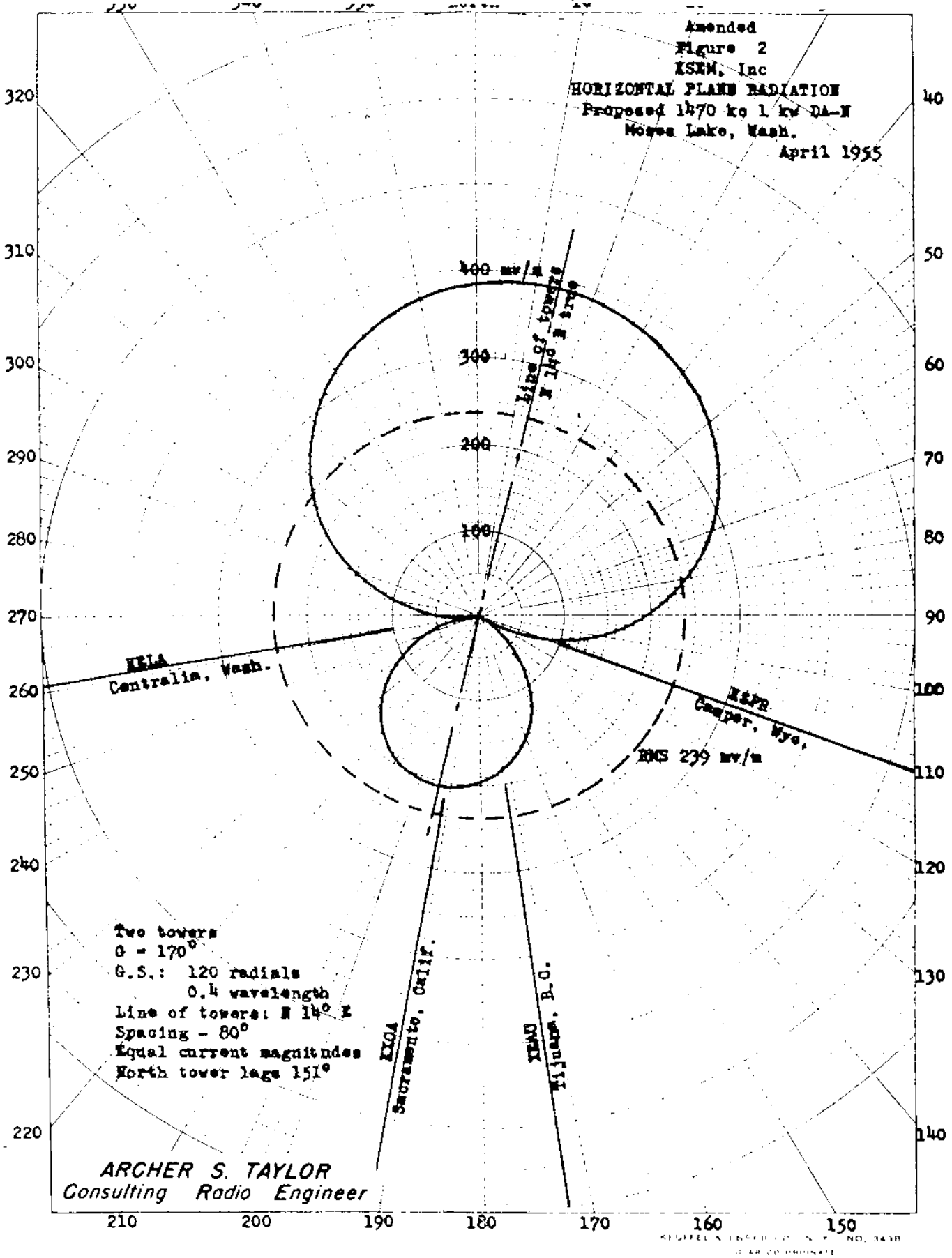


FCC File No. BL-6766
Accepted 8/12/57

KSEM
Moses Lake, Washington 1470 KC

KSEM

PROPOSED NIGHT (6/6/55G) STATION KSEM MOSES LAKE, WASHINGTON 1 KW DA-2 ~~DA-N, U~~ 1470 KC

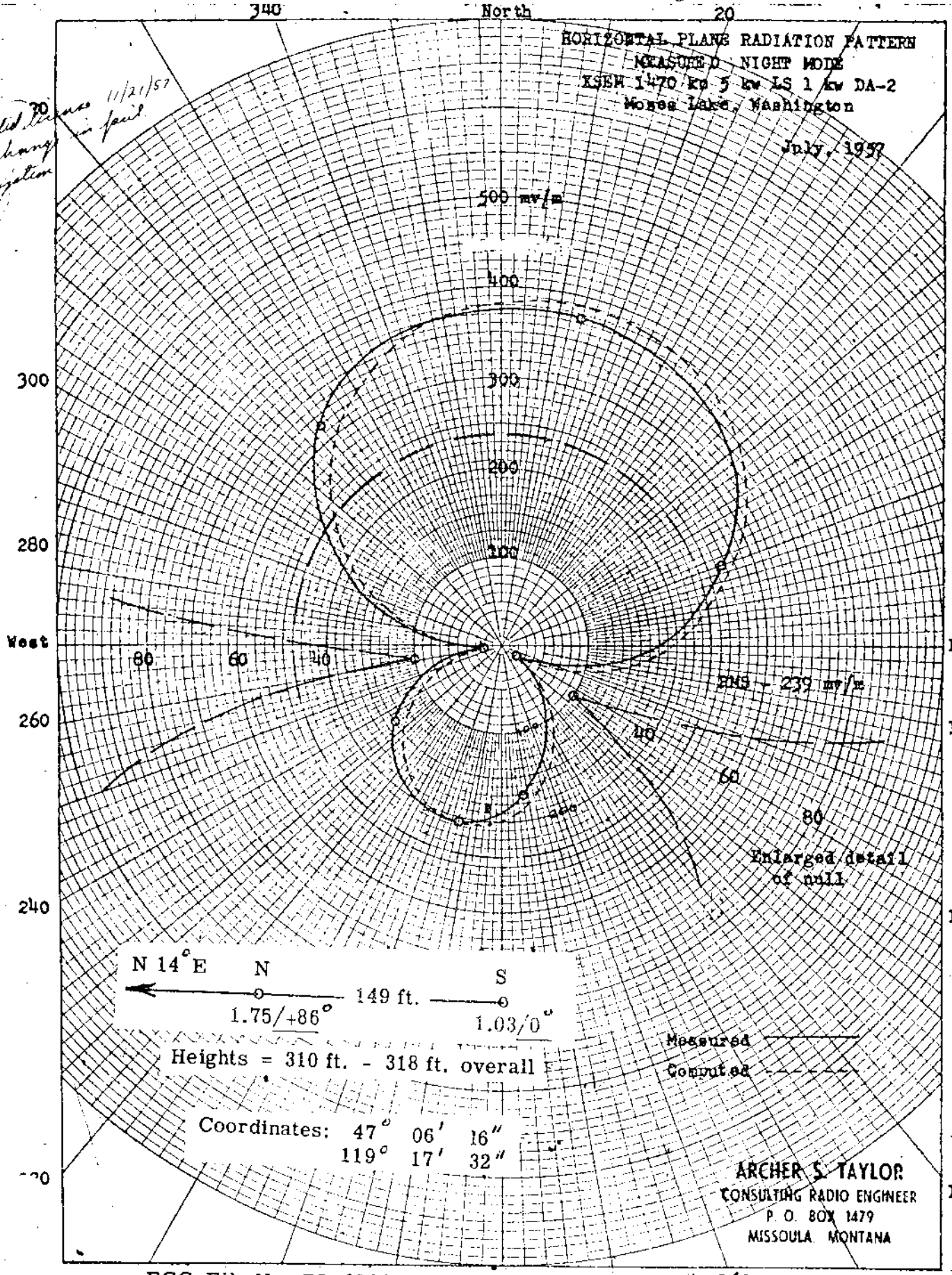


FILE NO. BP-9615(Amended) Accepted FCC 5/11/55 KSEM, Moses Lake, Washington 1470 KC

KSEM

MEASURED NIGHT
(10/11/57g)

Station KSEM 1kw,5kw-LS, DA-2,U
Moses Lake, Washington 1470 KC



Applied license for change in DA system 11/21/57

FCC File No. BL-6766
Accepted 8/12/57

KSEM
Moses Lake, Washington 1470 KC

KVLH

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station : KVLH Main Studio: Pauls Valley, Oklahoma

Frequency : 1470 KHz Power : _____ Night 1 kW Day

Notification: 1782 Date : October 26, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 34 ° 42 ' 15 "
West Longitude: 97 ° 15 ' 19 "

ANTENNA CHARACTERISTICS

Authorized for Daytime operation. (DA-D)
Number of elements: 3
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers..

TOWER :	C(#1)	SE(#2)	NW(#3)			
HEIGHT ABOVE INSULATORS :	220'8118.3°)	199'(107°)	150'(80.7°)			
DAY PHASING: :	0°	-127.2°	159.5°			
DAY FIELD RATIO:	1.0	0.46	0.5			

SPACING AND ORIENTATION: With the center tower (#1) as reference, the SE (#2) tower is spaced 130.2' (70°) apart at an azimuth of 121° true, the NW(#3) tower is spaced 130.2' (70°) apart at an azimuth of 304.5° true.

GROUND SYSTEM: 120 - 167' equally spaced copper radials about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers. Centers of system are bonded together.

KVLH

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

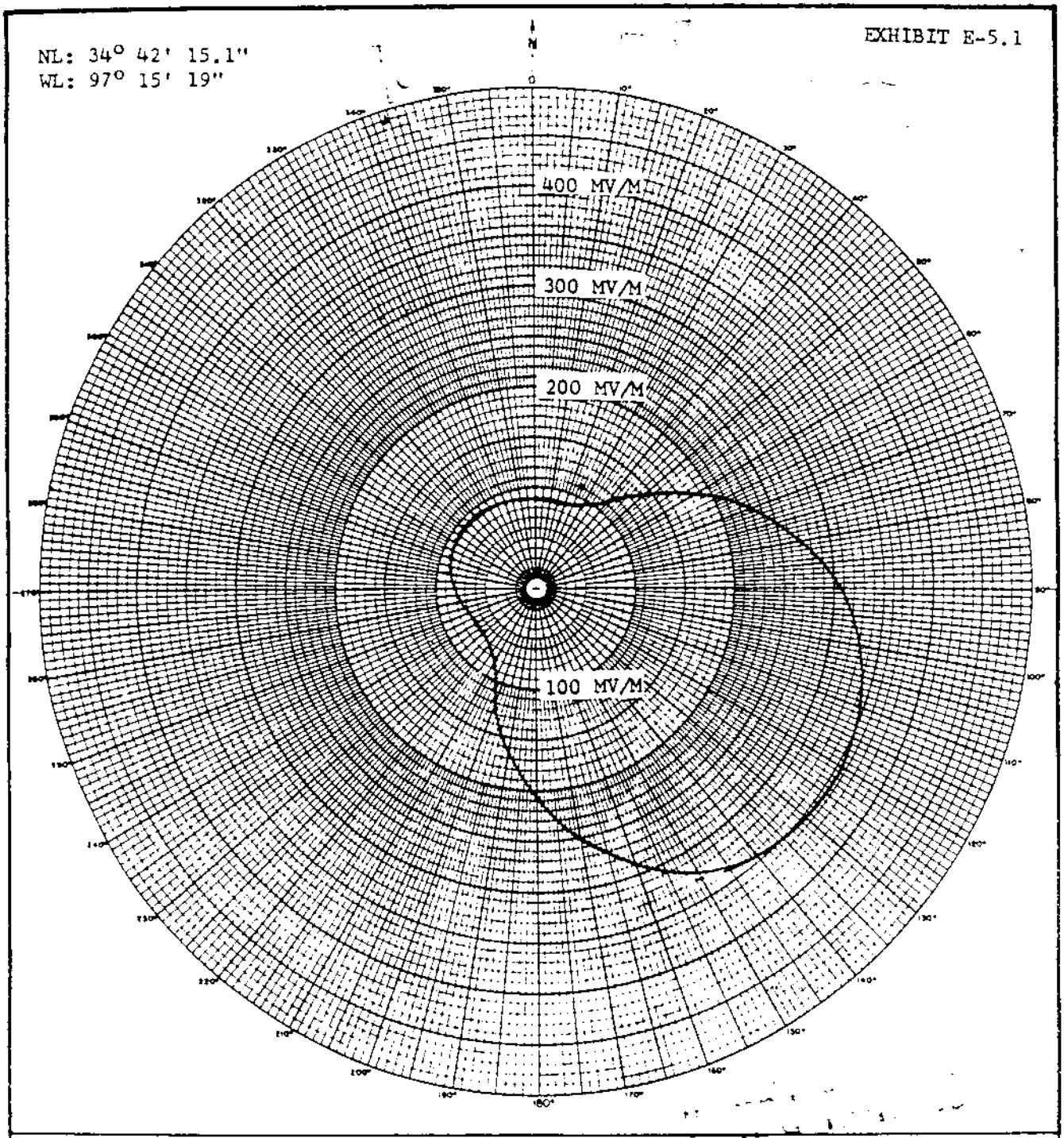
	THEORETICAL		STANDARD
	RMS	RSS	RMS
Day	185.0 mV/m	325.078 mV/m	194.4 mV/m

Note:

KVLH

EXHIBIT E-5.1

NL: 34° 42' 15.1"
WL: 97° 15' 19"



STANDARD HORIZONTAL RADIATION PATTERN

K FACTOR	268.889 MV/M
Theo. RMS **	185.000 MV/M
Theo. RSS **	325.078 MV/M
STD. RMS **	194.437 MV/M
Q FACTOR	8.12696
ELECT. HEIGHT	#1 - 220 Feet - 118.29°
	#2 - 199 Feet - 107°
	#3 - 150 Feet - 80.65°

** ADJUSTED VALUES

RADIO STATION KVLH
GARVIN COUNTY BROADCASTING, INC.
1470 KHZ - 1 KW DA-D
PAULS VALLEY, OKLAHOMA
JUNE 1976

0.5/ 159.5° — 304.5° — 70° — 130.2 FEET

1/ 0° — 70° — 130.2 FEET

0.46/ -127.2° — 121°

ROBERT L. MIERS
CONSULTING RADIO ENGINEER
P. O. BOX 11 ROLLA, MISSOURI 65401 PHONE 314 [illegible]

Waverly, Iowa

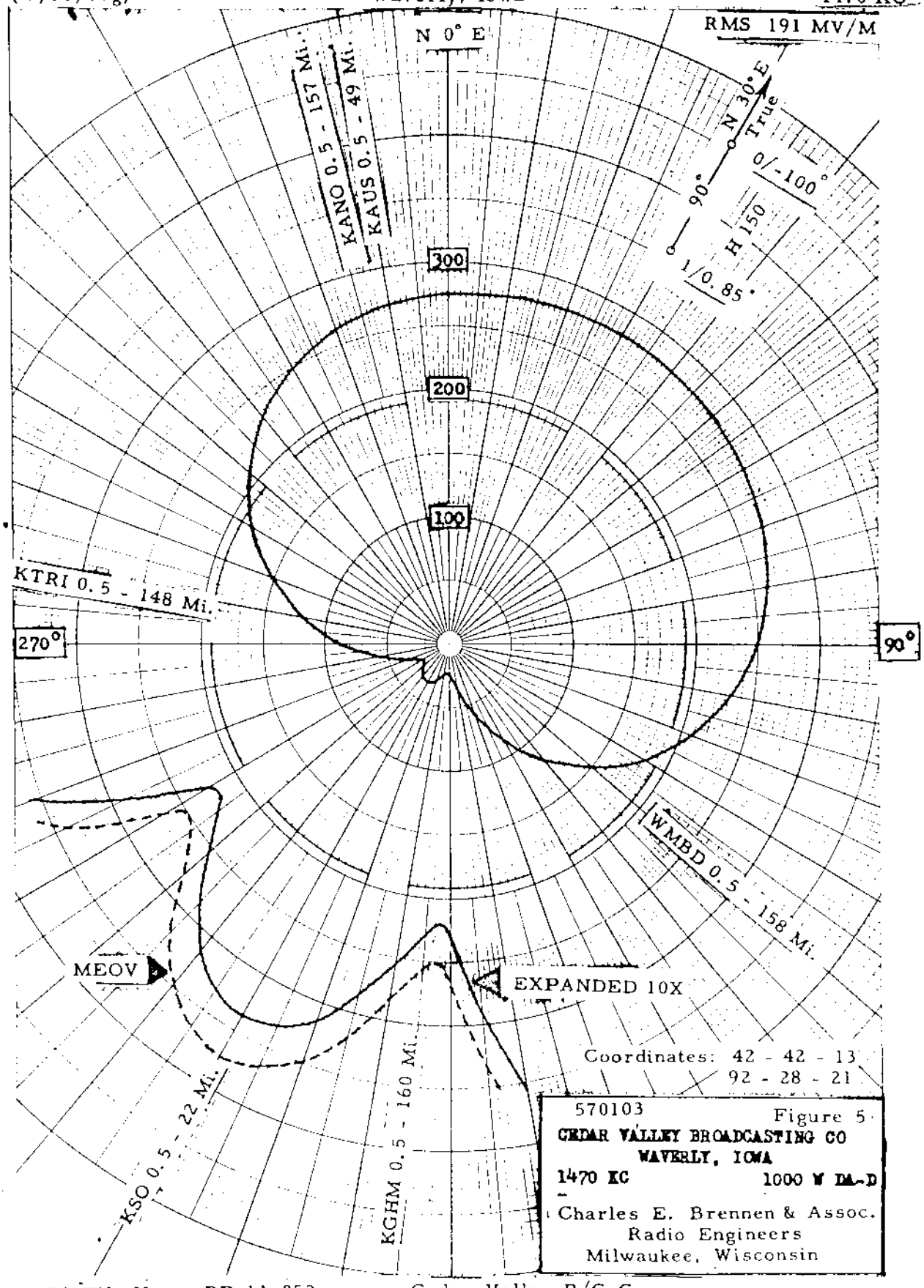
KWAY

PROPOSED DAY
(2/25/57g)

Cedar Valley B/C Co.
Waverly, Iowa

1KW, DA-D, D
1470 KC

Granted CP 8/11/57 for new station



Coordinates: 42 - 42 - 13
92 - 28 - 21

570103 Figure 5
CEDAR VALLEY BROADCASTING CO
WAVERLY, IOWA
1470 KC 1000 W DA-D

Charles E. Brennen & Assoc.
Radio Engineers
Milwaukee, Wisconsin

FCC File No. BP-11,052
Accepted 2/13/57

Cedar Valley B/C Co.
Waverly, Iowa

1470 KC

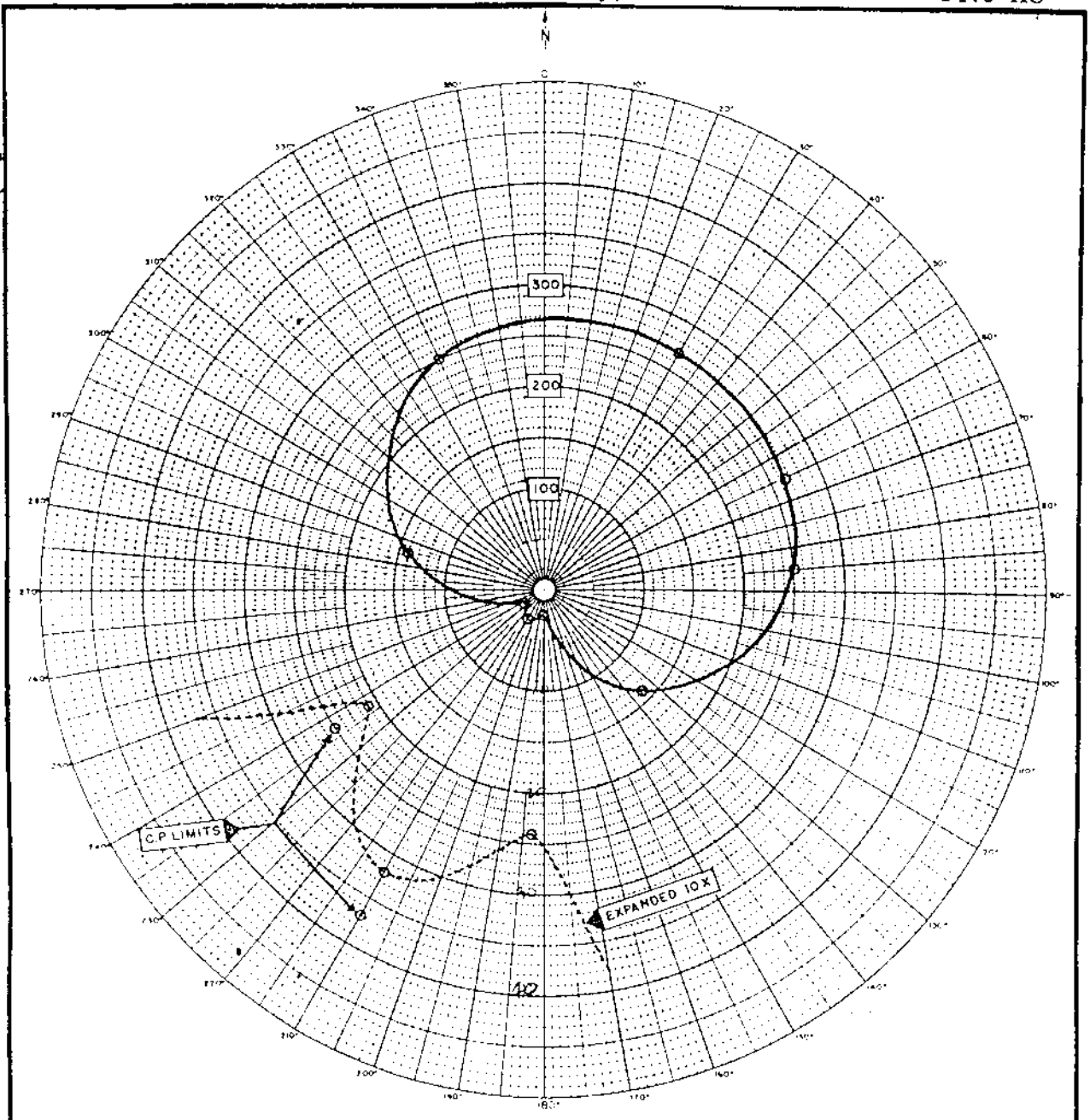
KWAY

MEASURED DAY
(6-20-58g)

Station KWVY
Waverly, Iowa

1kw, DA-D,D
1470 KC

granted
7/15/58 licens
to new statio



E_{RMS} = 185 MV/M

LATITUDE 42° 42' 13"
LONGITUDE 92° 28' 21"

CHARLES E. BRENNAN & ASSOCIATES
MILWAUKEE 7, WISCONSIN

ANTENNA PARAMETERS

G=80.5°

30°T

•.85∠-100°

S=90°

•1.0∠0°

MEASURED DIRECTIONAL PATTERN

RADIO STATION KWVY
WAVERLY, IOWA

1470 KC

1000 W DA-D

580414

FIGURE 4

FCC File No. BL-7115
Accepted 5-26-58

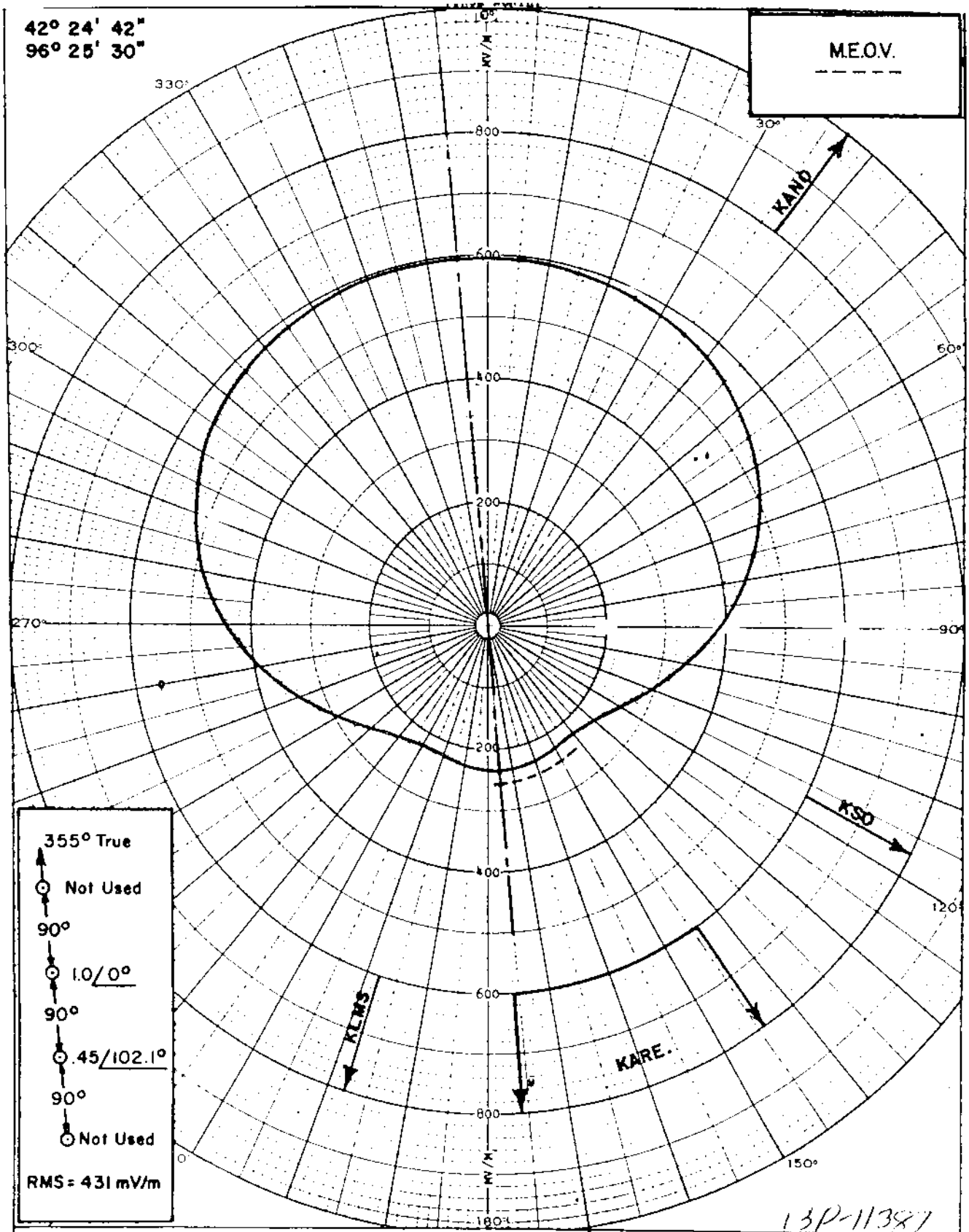
KWVY
Waverly, Iowa

1470 KC

~~KTRI~~ KWSL

PROPOSED DAY (7/19/57g) | Station KTRI Sioux City, Iowa | 5kw, DA-2, U 1470 KC

granted C.P. 8/16/57 to change DA system



BP-11387

COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
WASHINGTON, D. C.

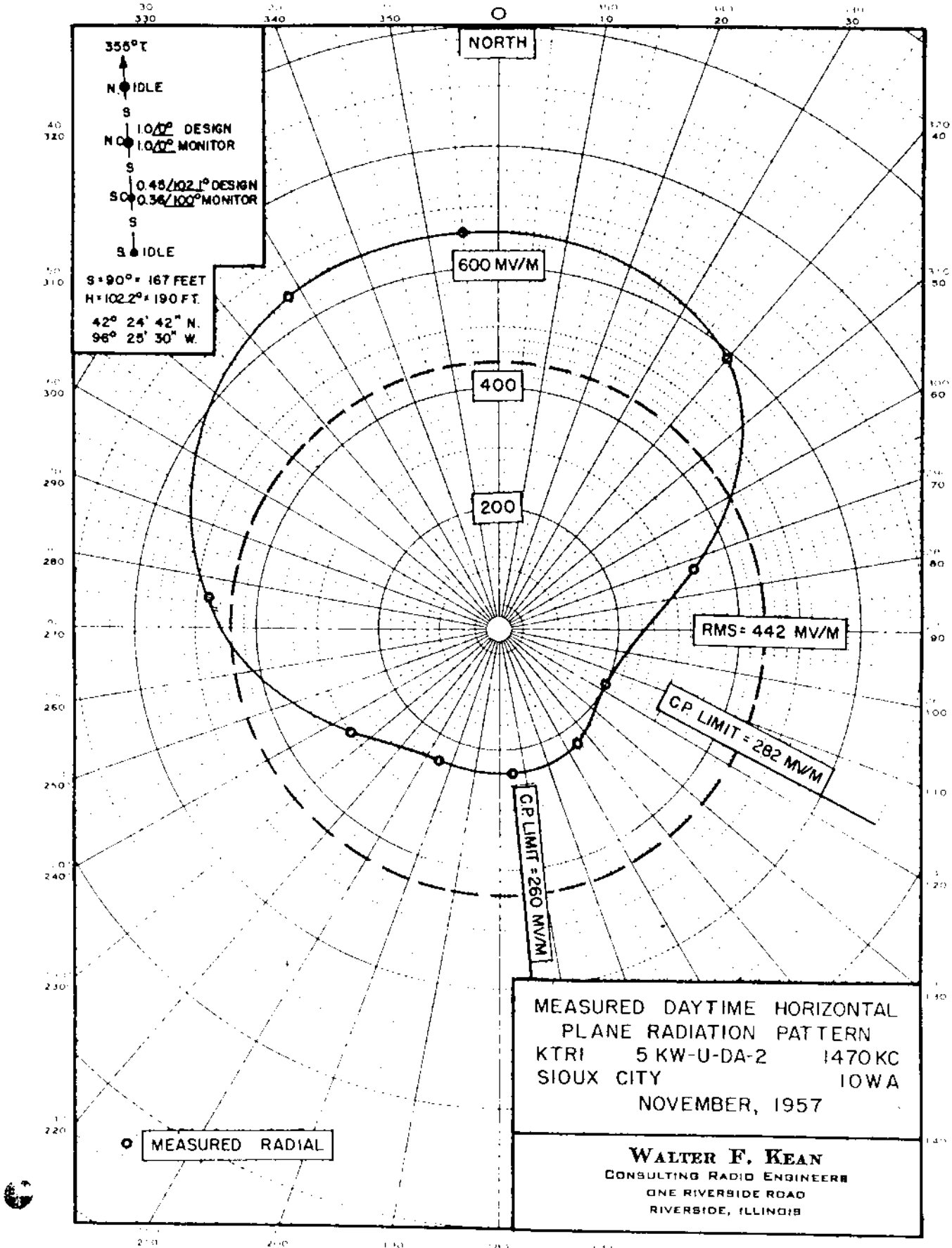
PATTERN: PROPOSED DAYTIME
FOR: KTRI, SIOUX CITY, IOWA
POWER: 5 KW-U FREQ: 1470 KC
DATE: 6/17/57

FCC File No. BP-11,387 | KTRI | 1470 KC
Accepted 7/15/57 | Sioux City, Iowa

Granted license (3-25-58) for change in day DA system

~~KTRI~~
KWSL

MEASURED DAY (2-11-58g) | Station KTRI Sioux City, Iowa | 5kw, DA-2,U 1470 KC



FCC File No. BL-6959
Accepted 1-28-58

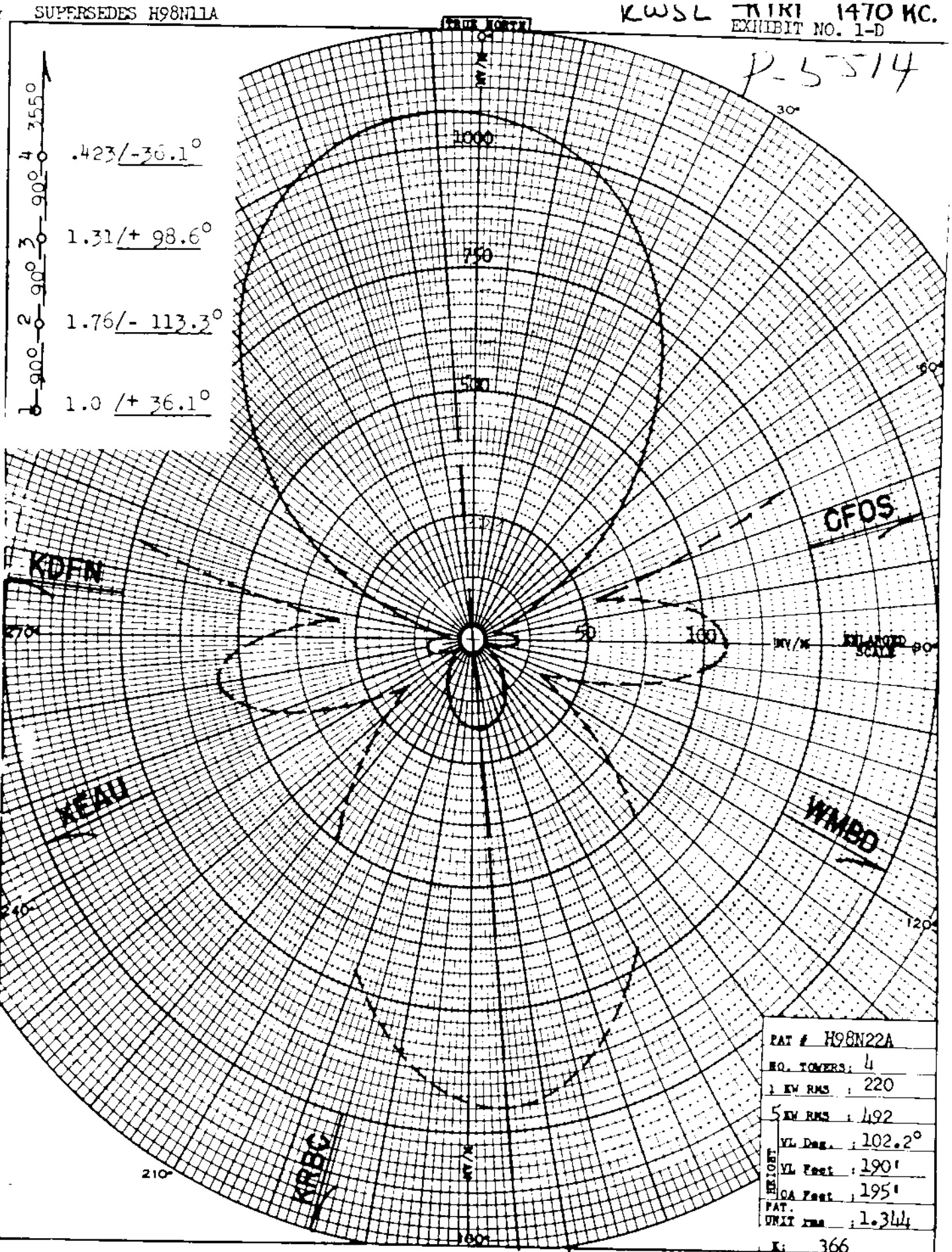
KTRI
Sioux City, Iowa

1470 KC

44 SUPERSEDES H98N11A

KWSL KTRI 1470 KC.
EXHIBIT NO. 1-D

P-5514



PAT #	H98N22A
NO. TOWERS:	4
1 KW RMS	220
5 KW RMS	492
ANTENNA VL Deg.	102.2°
ANTENNA VL Feet	190'
ANTENNA OA Feet	195'
PAT. UNIT RMS	1.344
K:	366

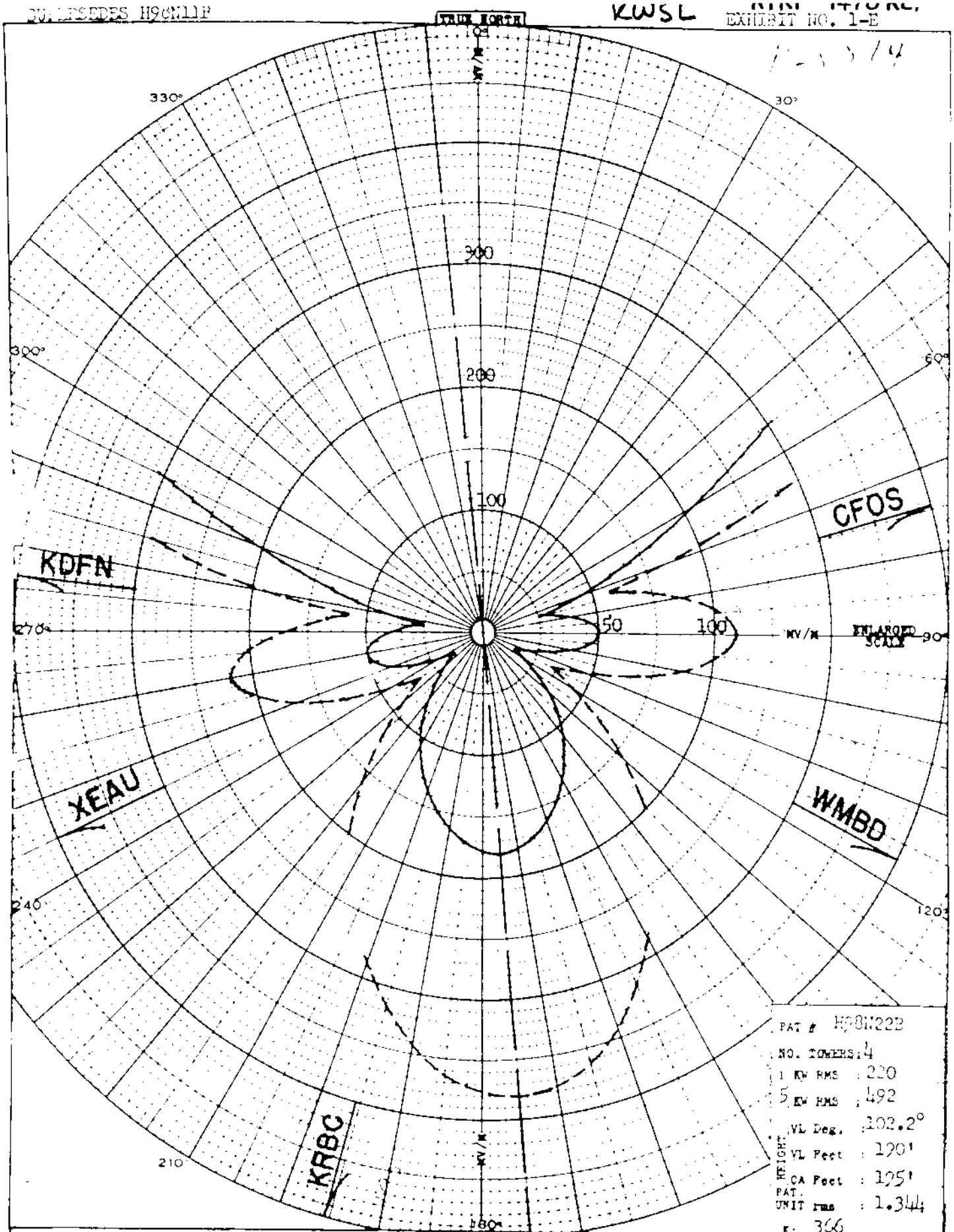
COMMERCIAL RADIO EQUIPMENT CO.
RADIO ENGINEERING CONSULTANTS
KANSAS CITY WASHINGTON, D.C. HOLLYWOOD

PATTERN: PROPOSED NIGHTTIME
FOR: KTRI, SIOUX CITY, IOWA
POWER: 5 KW FREQ: 1470 KC.
DATE: MARCH 1, 1947 BY: ITN

SUPERSEDES H96N11F

KWSL KNN KFOR

EXHIBIT NO. 1-E



PAT # H98N223

NO. TOWERS: 4

1 KW RMS : 220

5 KW RMS : 492

VL Deg. : 102.2°

HEIGHT VL Feet : 190'

CA Feet : 195'

PAT. UNIT RMS : 1.344

K: 366

COMMERCIAL RADIO EQUIPMENT CO.

RADIO ENGINEERING CONSULTANTS

KANSAS CITY WASHINGTON, D. C. HOLLYWOOD

PATTERN: MODIFIED DIRECTIONAL

FOR: KTRI, SIOUX CITY, IOWA

POWER: 5 KW FREQ: 1470 KC

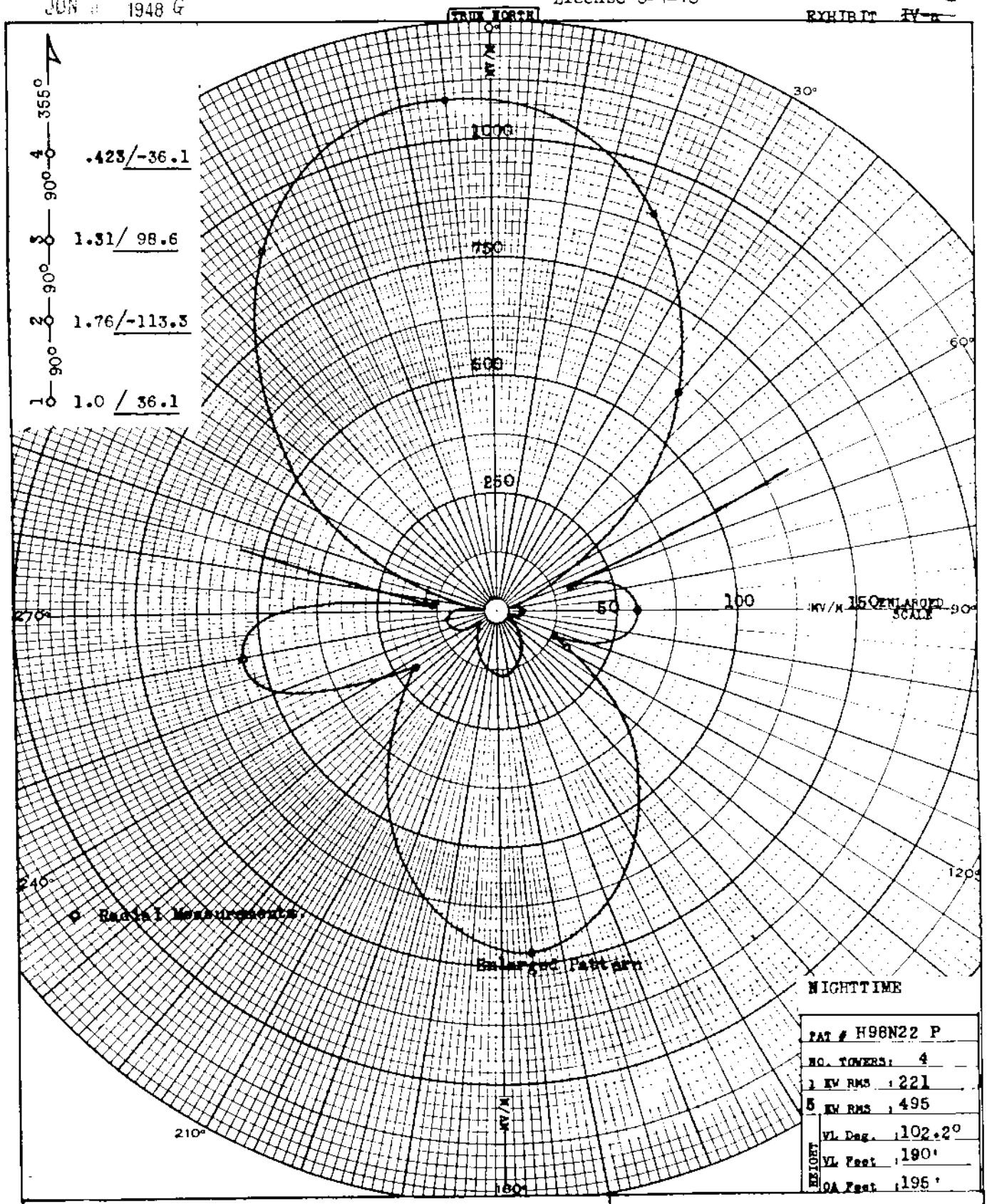
DATE: [illegible] 1, 1947 BY: JTT

KWSL KTRI 470 IIF-b

JUN 1948 G

License 6-4-18

EXHIBIT IV-B



NIGHTTIME

PAT #	H98N22 P
NO. TOWERS:	4
1 KV RMS :	221
5 KV RMS :	495
HEIGHT VL Deg. :	102.2°
HEIGHT VL Feet :	190'
HEIGHT DA Feet :	195'

COMMERCIAL RADIO EQUIPMENT CO.

RADIO ENGINEERING CONSULTANTS

KANSAS CITY WASHINGTON, D.C. HOLLYWOOD

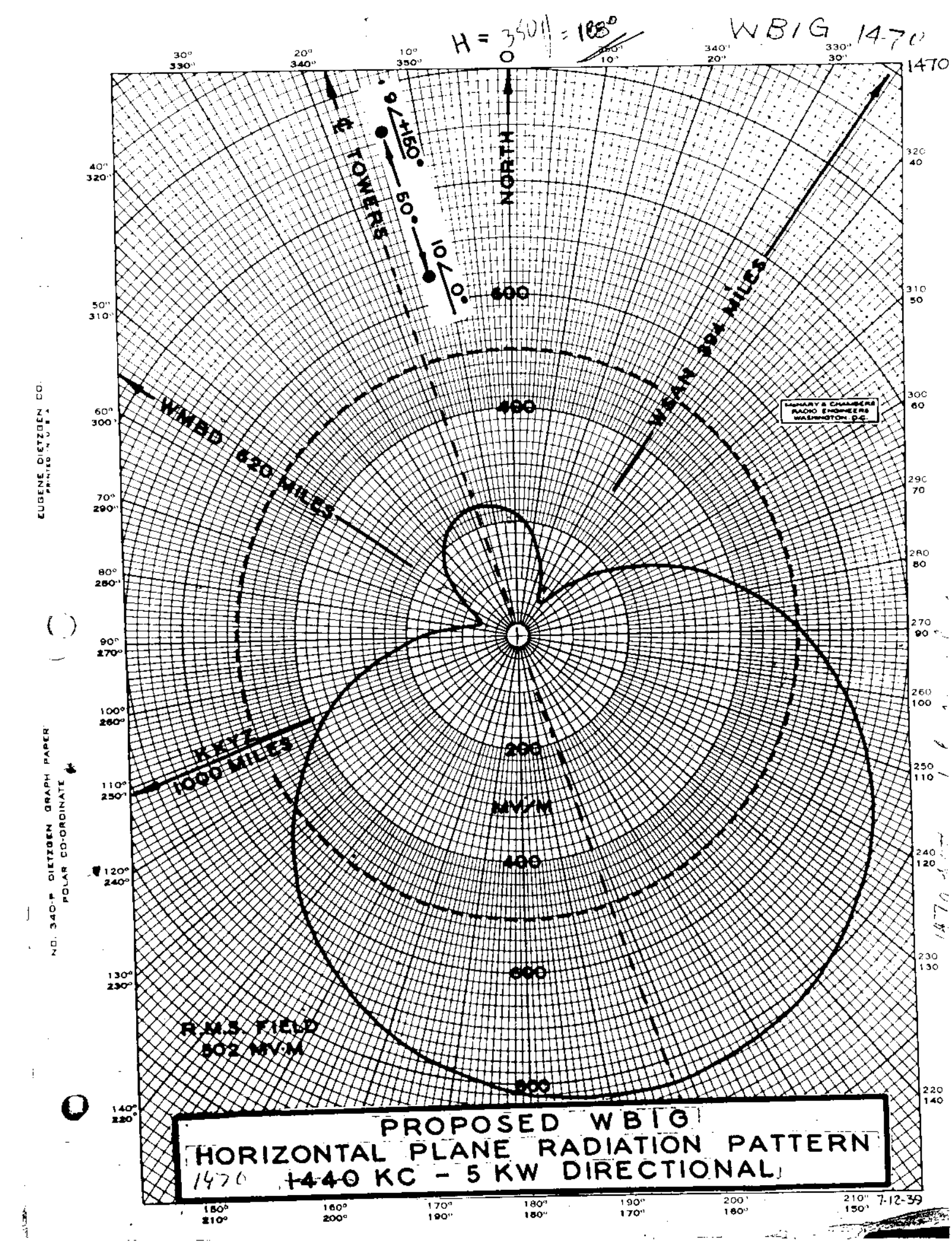
PATTERN: PROOF OF PERFORMANCE

FOR: KTRI, DAKOTA CITY, NEBRASKA/CWA

POWER: 5KW, DA-2 FREQ: 1470KC

DATE: May 28, 1948 BY: KWH

License 6-4-18

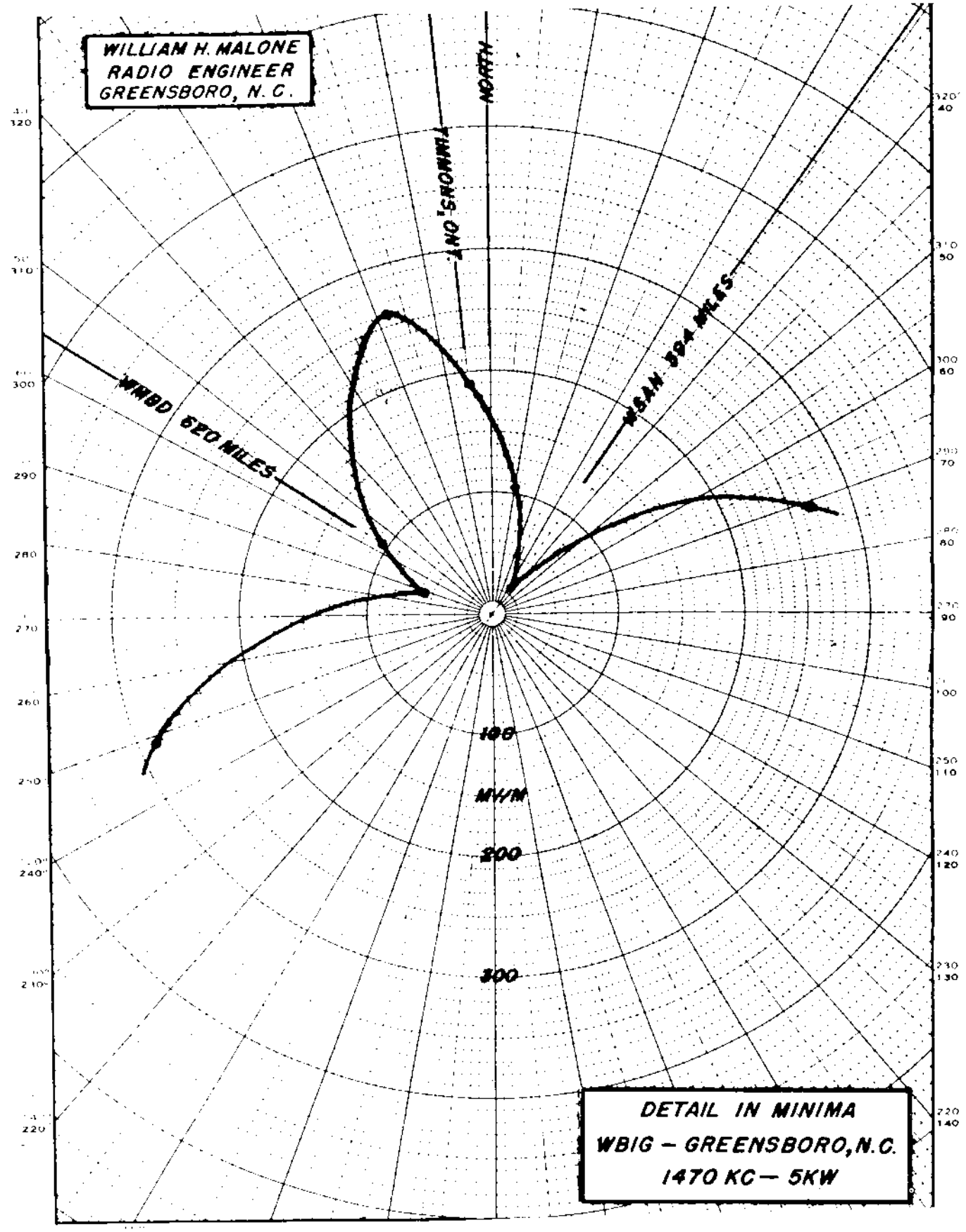

H = 340 / = 108°
WBIG 1470
1470
NORTH
2 TOWERS
+150°
50°
0°
WMBD 620 MILES
WGAN 284 MILES
KXYZ 1000 MILES
R.M.S. FIELD 502 MV/M
MV/M
200
400
600
800
HUBARY & CHAMBERS RADIO ENGINEERS WASHINGTON D.C.
EUGENE DIETZGEN CO.
NO. 340-P DIETZGEN GRAPH PAPER POLAR CO-ORDINATE
PROPOSED WBIG
HORIZONTAL PLANE RADIATION PATTERN
1470 ~~1440~~ KC - 5 KW DIRECTIONAL
7-12-39

WBIG

1470 kc

MEASURED NIGHT NULLS (4/5/54G)

WBIG, Greenboro, N. C. 5kw, U, DA-N



Accepted 7/16/54

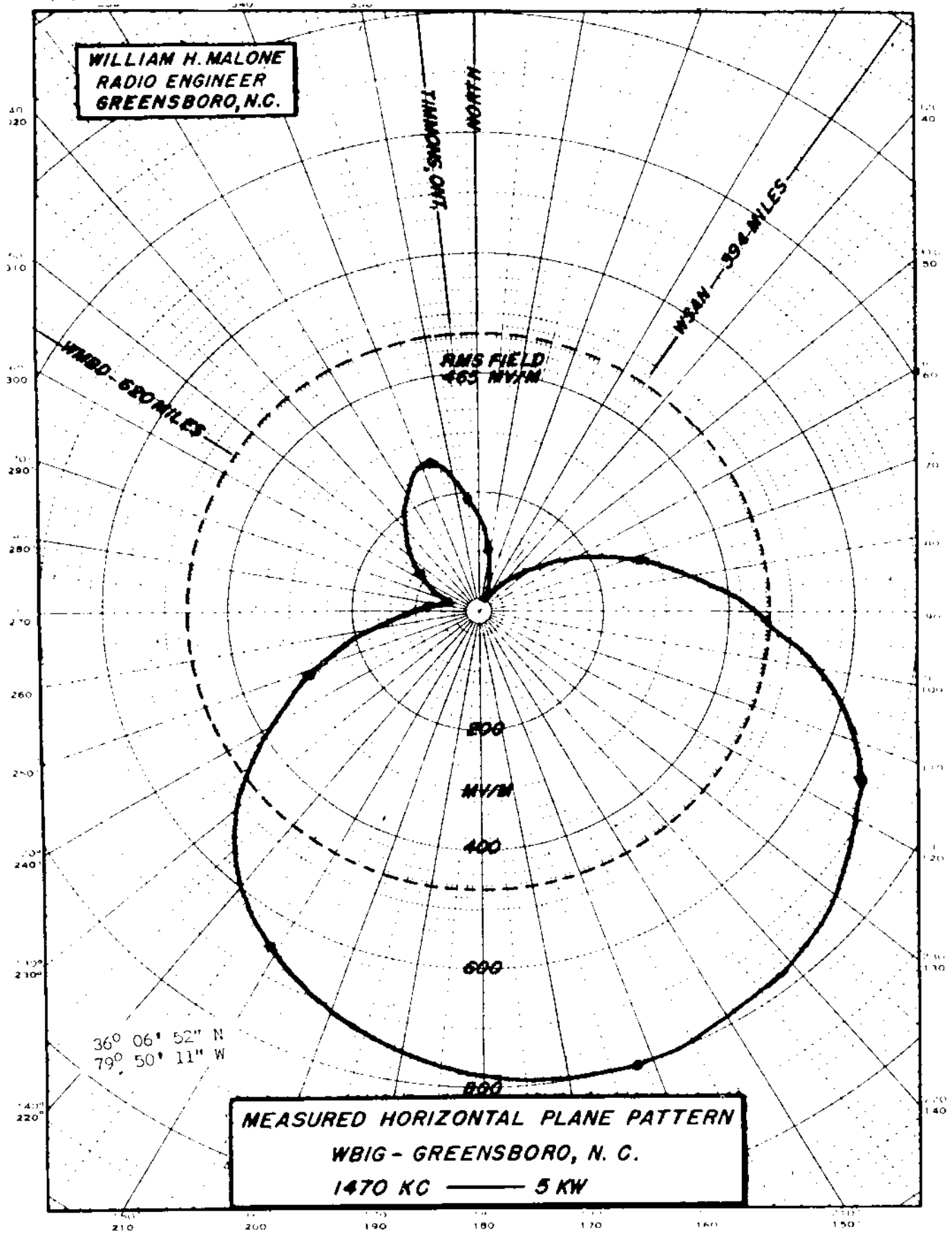
WBIG, Greenboro, N. C.

1470 kc

WBIG

1470 kc

MEASURED NIGHT (4/5/54G) WBIG, Greenboro, N. C. 5kw, U, DA-N



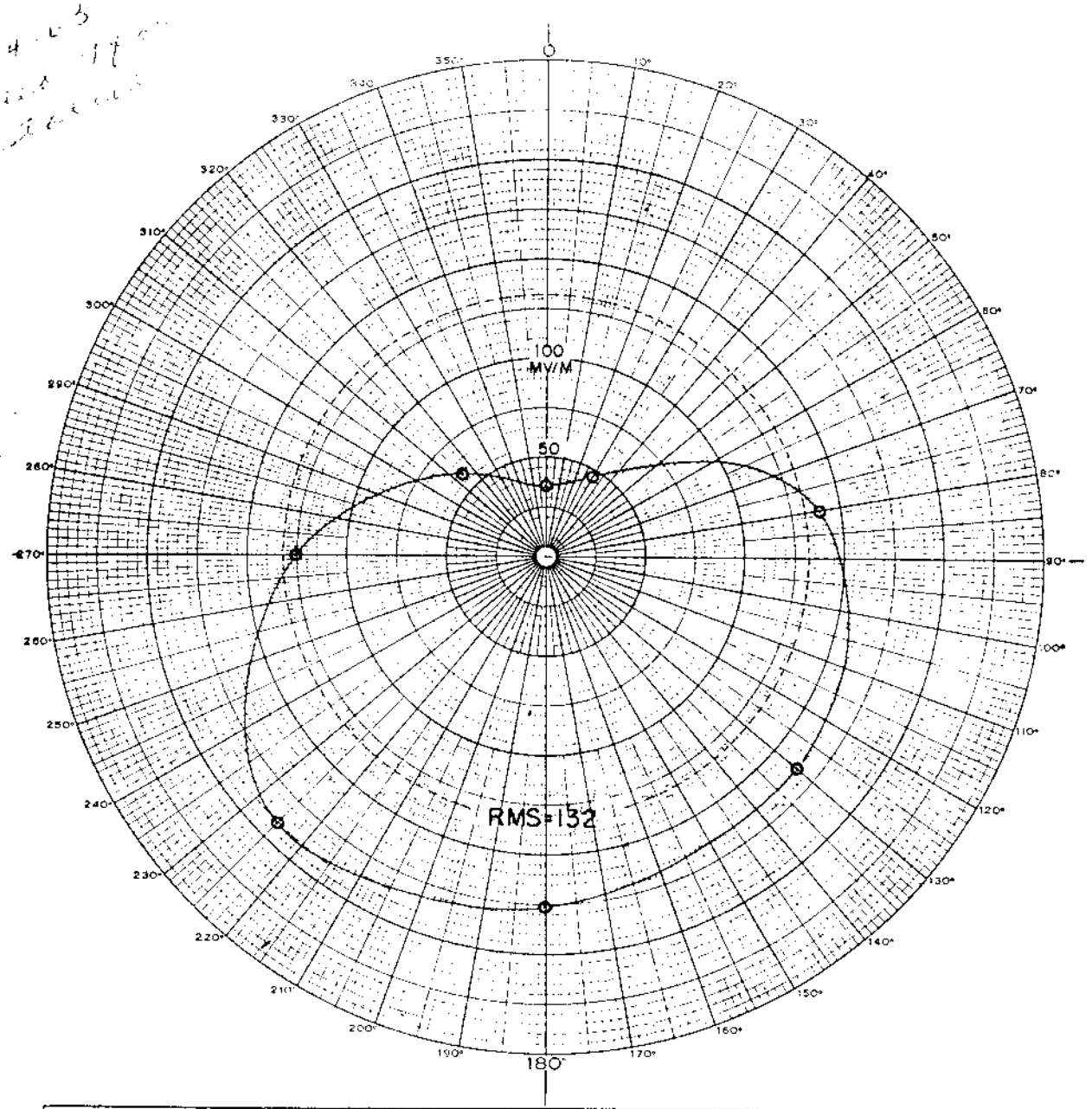
Accepted 7/16/53

WBZE

Measured Day
(6-28-63ct)

Station WBZE
Wheeling, West Virginia

500w, DA-D, D
1470 kc



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	STATION DATA

0°

No.1 ○ 0.65 ∠ 100°

80° — 149'

No.2 ○ 1.0 ∠ 0°

TOWER No.	ELECTRICAL HEIGHT (DEGREES)	TRUE TOWER ORIENTATION (DEGREES)	SPACING (DEGREES)	PHASING (DEGREES)	HORIZONTAL FIELD (mV/m at 1 mile)	FIELD RATIO	ELEV. ANGLE (DEGREES)	ELEVATION RMS FIELD (mV/m)
1	72	0	80	100		0.65	0	132
2	72	0	0	0		1.0	10	
3							20	
4							30	
5							40	
6							50	
7							60	
8							70	
9							80	
10							90	

PART TIME OPERATION ☒ LIMITED TIME OPERATION ☐

STATION DATA	
CALL	WBZE
FREQUENCY	1470 kc
POWER	0.5 kw
TIME OF OPERATION	Day
TYPE OF OPERATION	DA
DAYTIME TOWERS	2
NIGHTTIME TOWERS	---
No. RADIALS PER TOWER	120
LENGTH OF RADIALS	90' 167'
GROUND SCREEN DIMENSION	24' X 24'
LAT.	49° 05' 09"
LONG.	80° 41' 02"
SUPERSEDES	
PATTERN No.	

Carl E. Smith Consulting Radio Engineers

FIG. NO. 7.10
Measured Directional
Horizontal Pattern

FCC File No. BL-10038
Accepted 6-17-63

Station WBZE
Wheeling, West Virginia

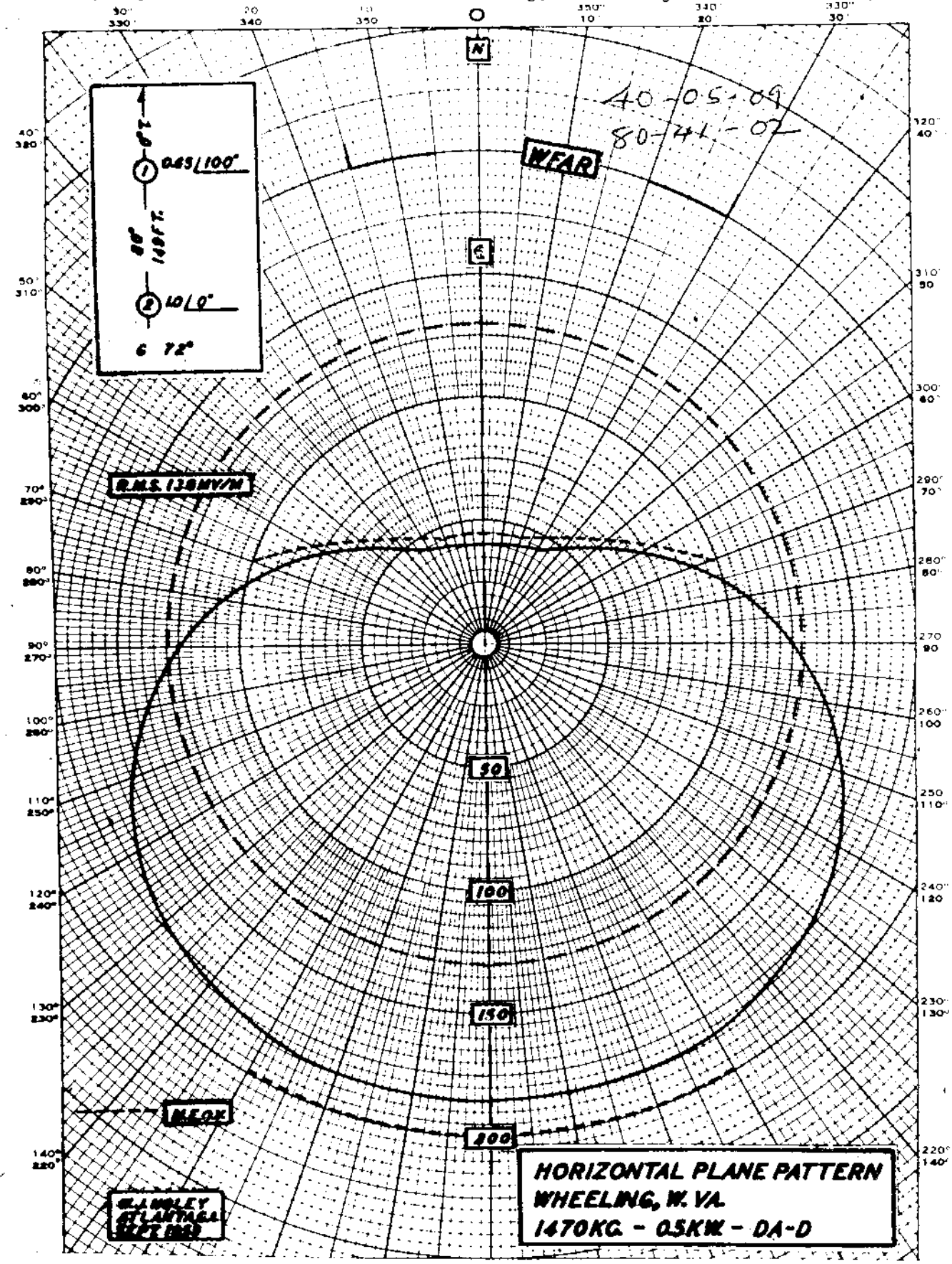
1470 kc

WBZE

Proposed Day
(11-30-61ct)

Station WJBT over
Wheeling, West Virginia

500w,DA-D,D
1470 kc



FCC File No. BMP-9876
Accepted 11-3-61

Station WJBT
Wheeling, West Virginia

1470 kc

WFAR

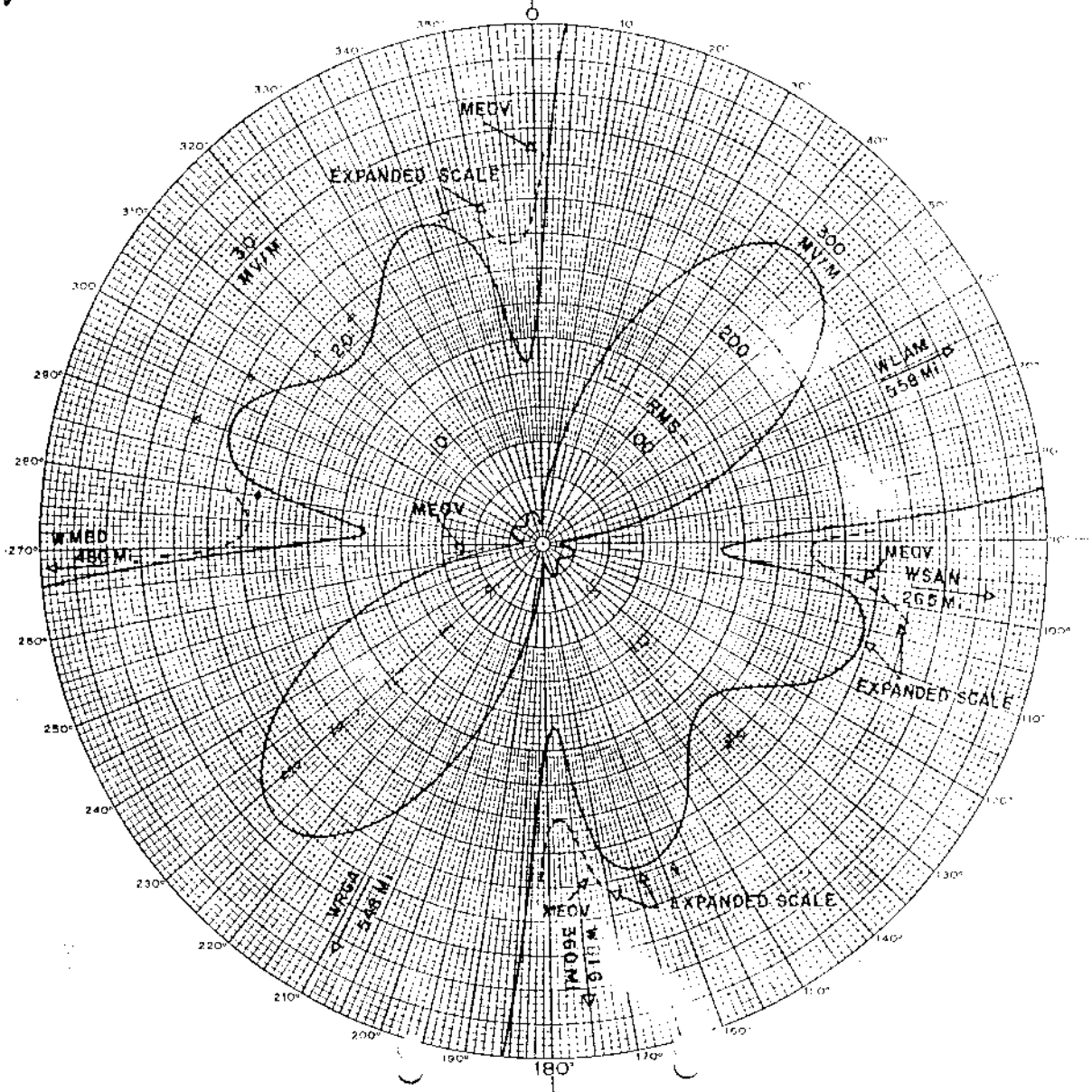
Granted MOP to allow DA pattern 1-13-60

POLAR COORDINATE — NO. 15 HP — CLEVELAND INSTITUTE OF RADIO ELECTRONICS

PROPOSED NIGHT
(1-29-60g)

Station WFAR
Farrell, Pennsylvania

500w, 1kw-LS DA-N,U
1470 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS									STATION DATA
0.58/-2° ② 200° 371.8° N ① 1/+5.8 200° 371.8° ④ 0.58/+2° 135° TRUE	TOWER No.	ELECTRICAL HEIGHT (DEGREES)	TRUE TOWER ORIENTATION (DEGREES)	SPACING (DEGREES)	PHASING (DEGREES)	HORIZONTAL FIELD RATIO	FIELD RATIO	ELEV. ANGLE (DEGREES)	ELEVATION PATTERN FILE NAME	CALL: WFAR FR: 1470 KC POWER: 0.5/1.0 KW TIME OF OPERATION: U TYPE OF OPERATION: DA-N DAYTIME TOWERS: No. 1 NIGHTTIME TOWERS: 1 2 3 NO. RADIALS PER TOWER: 120 LENGTH OF RADIALS: 260 ft GROUND SCREEN DIMENSION: NONE LAT.: 41° 11' 58" LONG.: 80° 31' 22" SUPERVISOR: 591124 PATTERN No.: 591209
	1	140	0	0	+5.8		1.0	0	130.7	
	2	91.5	315	200	-2		.58	10		
	3	91.5	135	200	+2		.58	20		
	4							30		
	5							40		
	6							50		
	7							60		
	8							70		
	9							80		
	10									
	DAY VS. OPERATION ☐ NIGHTTIME OPERATION ☒									

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FIG. 1.2
HORIZONTAL PATTERN

FCC File No. BMP-8805
Accepted 12-21-59 (Amended)

WFAR
Farrell, Pennsylvania

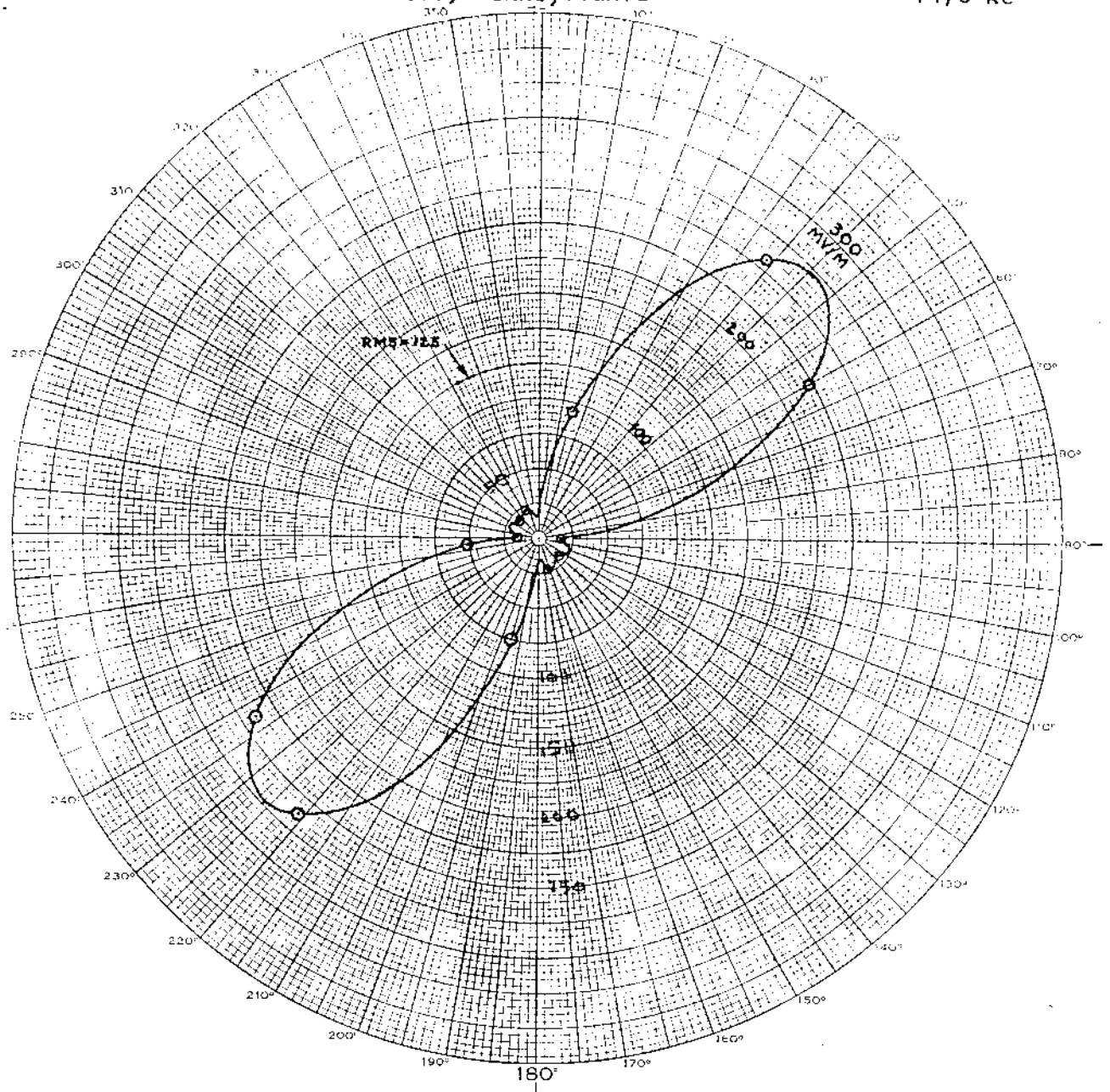
1470 KC

WFAR

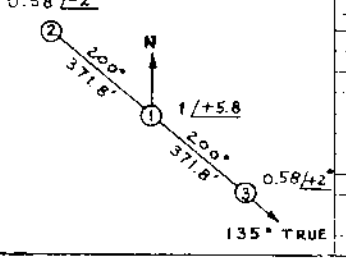
Measured Night
(4-28-67ct)

Station WFAR
Farrell, Pennsylvania

500w, 1kw-LS, DA-N, U
1470 kc



TOWER PLACEMENT SKETCH



PATTERN PARAMETERS

TOWER No.	ELECTRICAL HEIGHT θ°	TYPE TOWER OPERATION β°	SPACING S°	PHASING ζ°	HORIZONTAL FIELD ratio F	FIELD RATIO f
1	140	0	0	+5.8		1.0
2	91.5	315	200	-2		.58
3	91.5	135	200	+2		.58
4						
5						
6						
7						
8						
9						

TAKE-OFF ANGLE θ°	ELEVATION RMS FIELD ratio Fθ
0	125
10	
20	
30	
40	
50	
60	
70	
80	
FOR TYPE	
FOR TYPE	

STATION DATA

CALL	WFAR
FREQUENCY	1470
POWER	0.5 /1.0 kw
TIME OF OPERATION	U
TYPE OF OPERATION	DA-N
DAYTIME TOWERS	NO. 1
NIGHT TIME TOWERS	NO. 1, 2 & 3
ANTENNA EFF. DAYTIME TOWER	120
LENGTH OF RADIUS	260 mi
GROUND SYSTEM DAYTIME TOWER	NONE
LAT.	41 ° 11 ' 58 "
LONG.	80 ° 31 ' 22 "
ANTENNA USE	
PATTERN No.	5912.20

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FIG. 7.15
MEASURED DIRECTIONAL HORIZONTAL PATTERN
SANFORD A. SCHAFITZ
FARRELL, PA.

NO CHANGE
670405

FCC File No. BRC-3085
Accepted 4-17-67

Station WFAR
Farrell, Pennsylvania

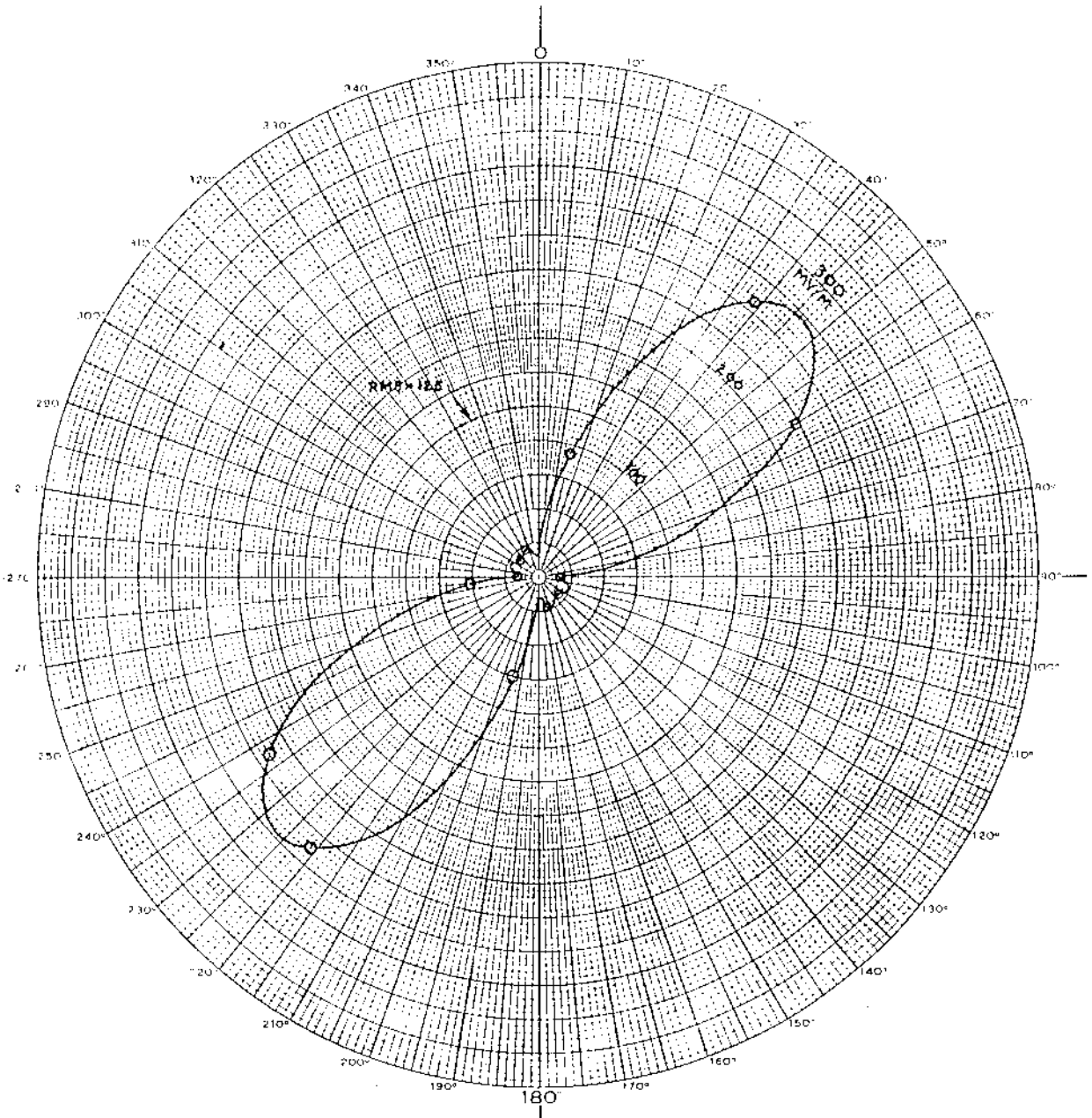
1470 kc

WFAR

MEASURED NIGHT
(2-26-60E)

Station WFAR
Farrell, Pennsylvania

500w, 1kw-LS, DA-N,U
1470 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	STATION DATA

0.58 /-2°
200°
371.8°
1/+56
N
200°
371.8°
0.58/+2°
135° TRUE

TOWER No.	ELECTRICAL HEIGHT θ°	OFF-AZIMUTH ORIENTATION φ°	SPACING s°	PHASING ψ°	HORIZONTAL FIELD RATIO F	E FIELD RATIO F	ELEV. ANGLE θ°	ELEVATION PATTERN FACTOR F_θ
1	140	0	0	+5.8		1.0	0	125
2	91.5	315	200	-2		.58	10	
3	91.5	135	200	+2		.58	20	
4							30	
5							40	
6							50	
7							60	
8							70	
9							80	
10							E_θ =	mv/m
							F_θ =	mv

DAYTIME OPERATION ( ) NIGHTTIME OPERATION (X)

CALL	WFAR
FREQUENCY	1470 kc
POWER	0.5 / 1.0 kw
TIME OF OPERATION	U
TYPE OF OPERATION	DA-N
DAYTIME TOWERS	NO. 1
NIGHTTIME TOWERS	NO. 1, 2 & 3
NO. RADIALS PER TOWER	120
LENGTH OF RADIALS	260 ft
GROUND SCREEN DIMENSION	NONE
LAT	41 ° 11 ' 58 "
LONG	80 ° 31 ' 22 "
SUPERSEDES	
PATTERN No.	5912 20

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FIG. 7.15
MEASURED DIRECTIONAL HORIZONTAL PATTERN
SANFORD A. SCHAFITZ
FARRELL, PA.

FCC File No. BL-7798
Accepted 2-3-60

WFAR
Farrell, Pennsylvania

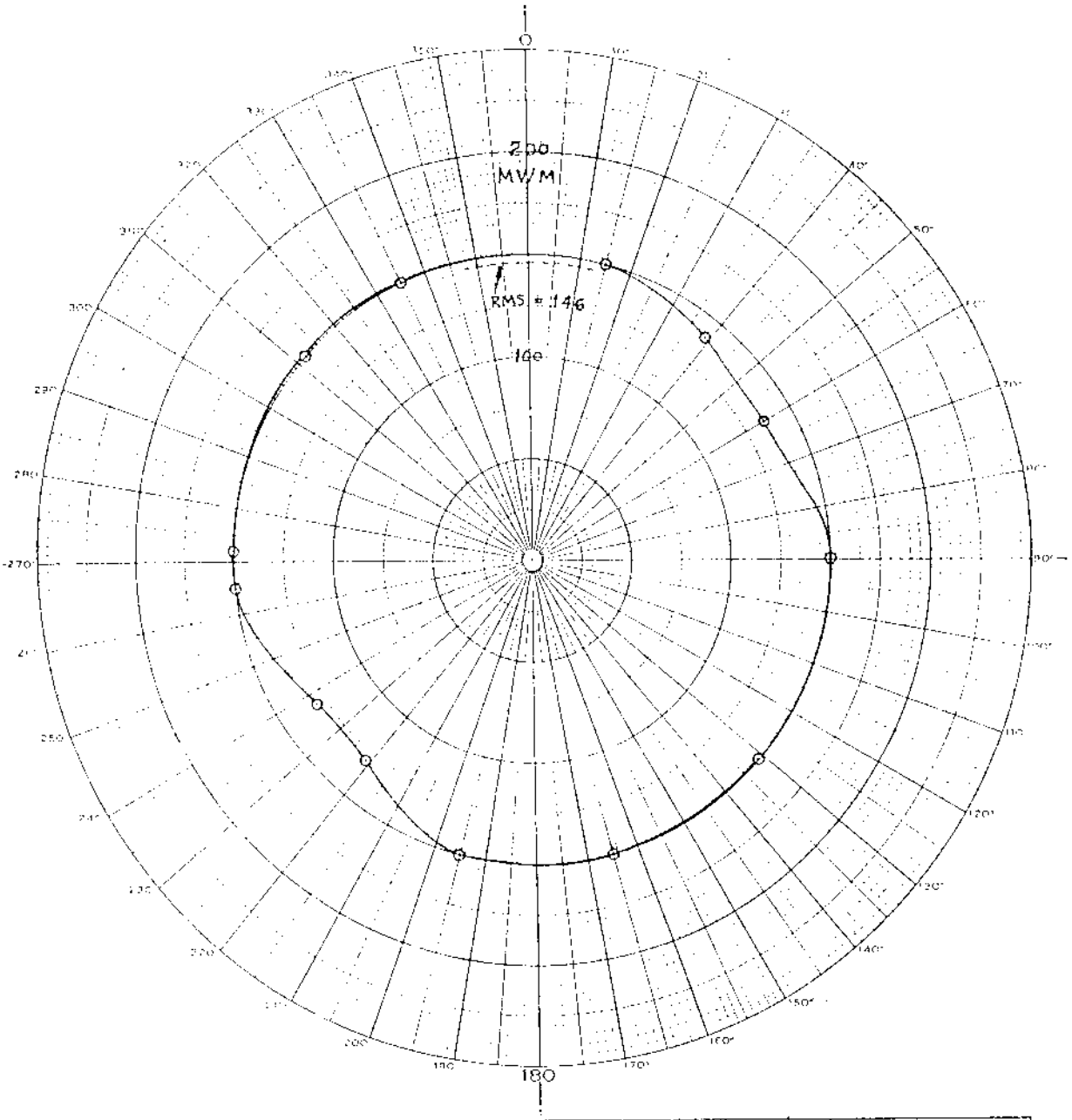
1470 KC

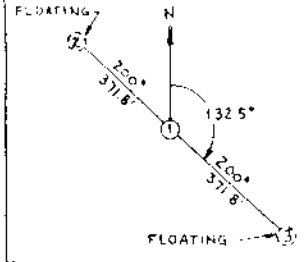
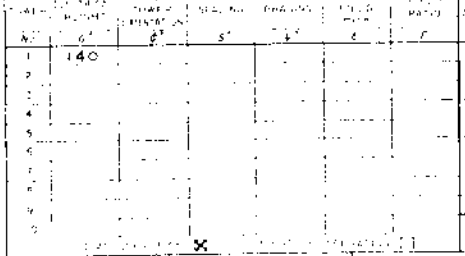
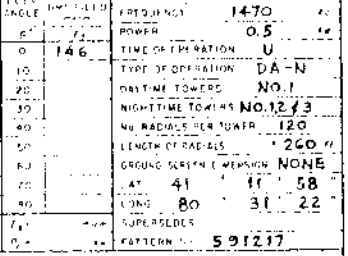
WFAR

MEASURED NON-DA (2-26-60)

Station WFAR
Farrell, Pennsylvania

500w, 1kw-LS, DA-N,U
1470 KC



TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	STATION DATA
		

CARL E. SMITH
CONSULTING RADIO ENGINEERS

FIG. 6.14
MEASURED NON-DIRECTIONAL HORIZONTAL PATTERN
SANFORD A. SCHAFITZ
FARRELL, PA.

FCC File No. BL-7798
Accepted 2-3-60

WFAR
Farrell, Pennsylvania

1470 KC

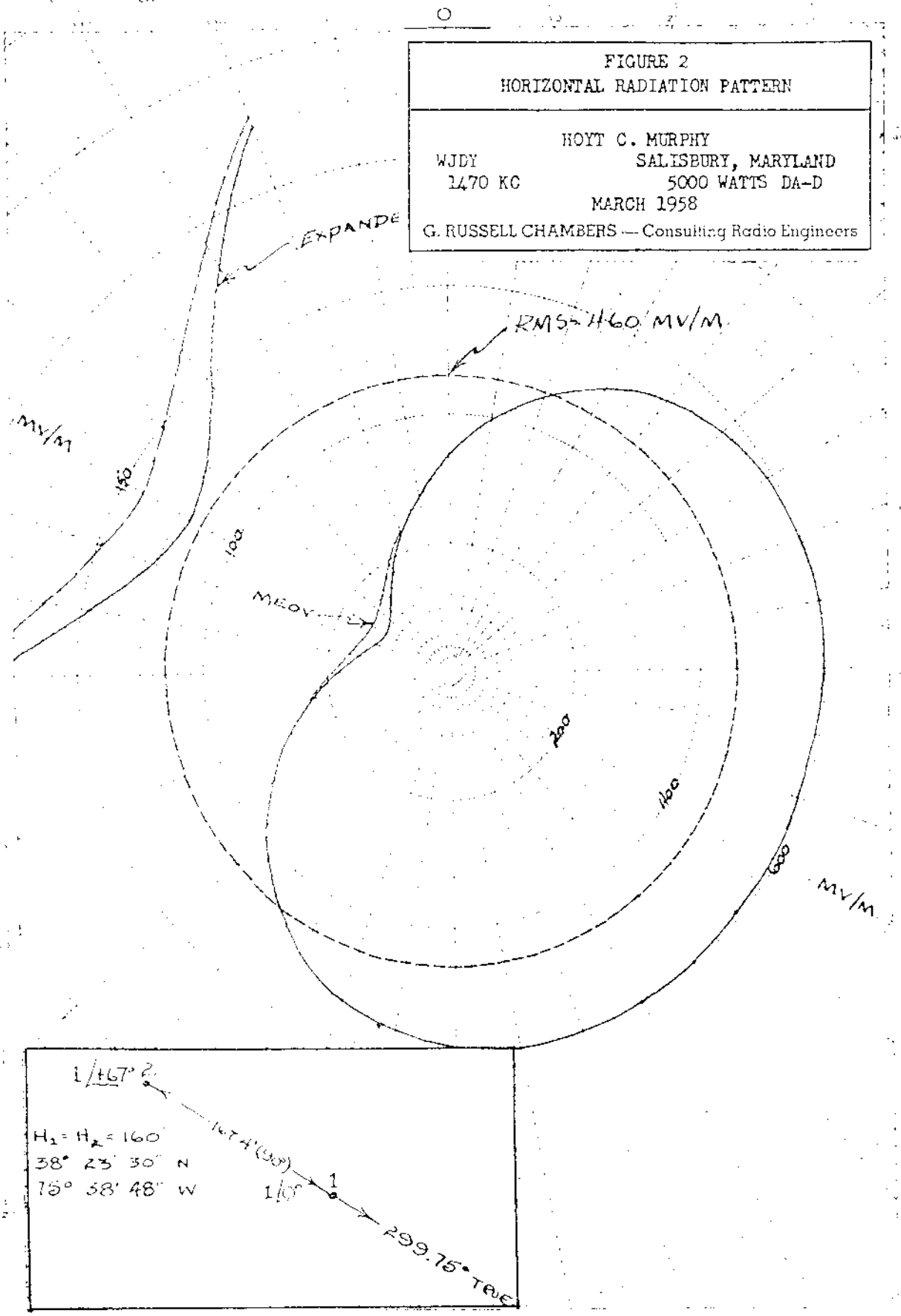
PROPOSED DAY
(3-26-58g)

Station WJDY
Salisbury, Maryland

5kw, DA-D,D
1470 KC

FIGURE 2
HORIZONTAL RADIATION PATTERN

HOYT C. MURPHY
WJDY SALISBURY, MARYLAND
1470 KC 5000 WATTS DA-D
MARCH 1958
G. RUSSELL CHAMBERS — Consulting Radio Engineers



FCC File No. BMP-8045 WJDY
Accepted 3-12-58 (Amended) Salisbury, Maryland 1470 KC

WJDY

MEASURED DAY
(3-26-58g)

Station WJDY
Salisbury, Maryland

5kw, DA-D,D
1470 KC

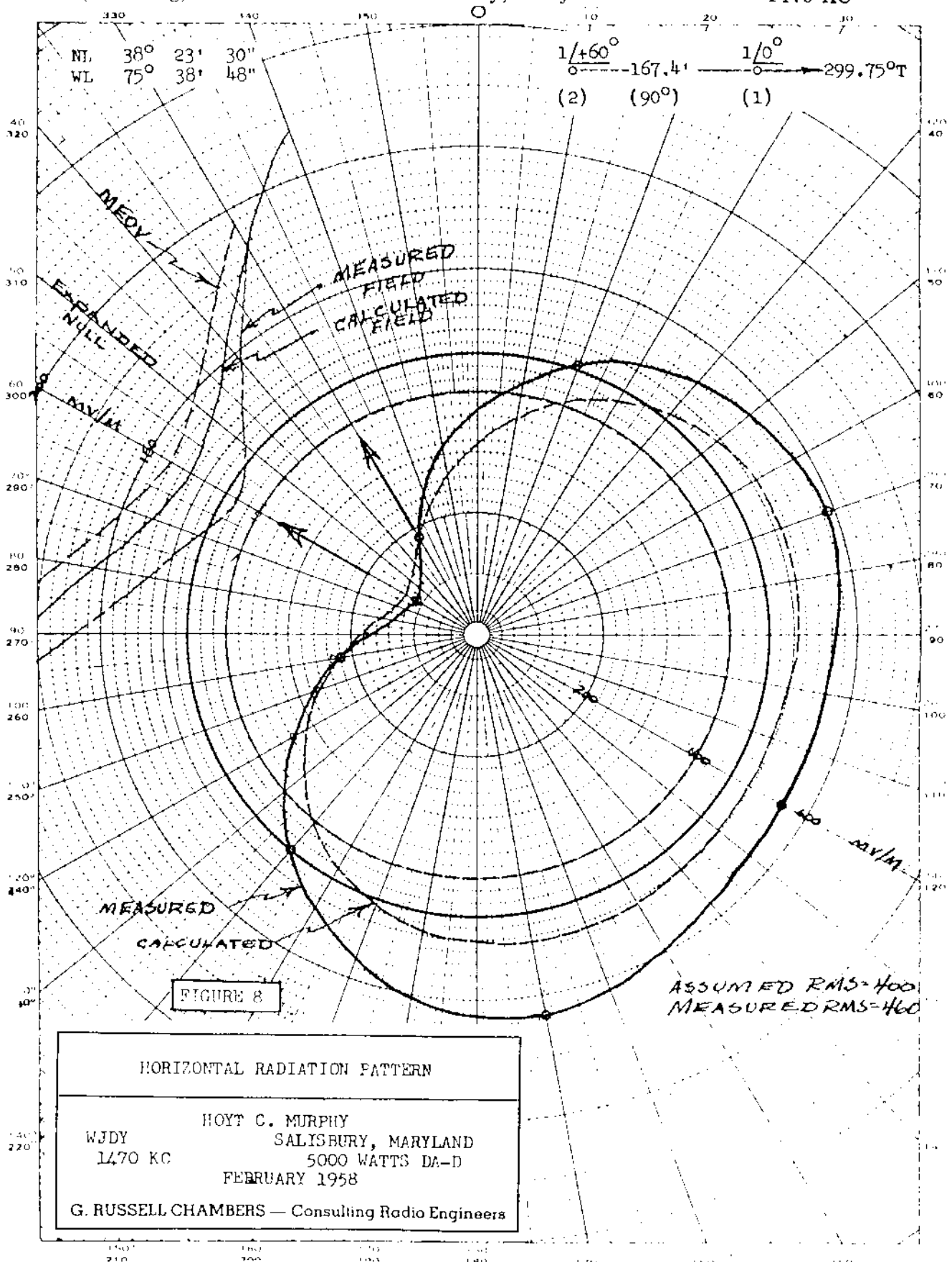


FIGURE 8

HORIZONTAL RADIATION PATTERN

HOYT C. MURPHY
WJDY SALISBURY, MARYLAND
1470 KC 5000 WATTS DA-D
FEBRUARY 1958

G. RUSSELL CHAMBERS — Consulting Radio Engineers

Granted 8/11/58 license for new station

FCC File No. BL-7050
Accepted 3-17-58

WJDY
Salisbury, Maryland

1470 KC

WJDY

MEASURED NON - DA
(3-26-58g)

Station WJDY
Salisbury, Maryland

5kw, DA-D,D
1470 KC

Granted 8/11/58 license for new station

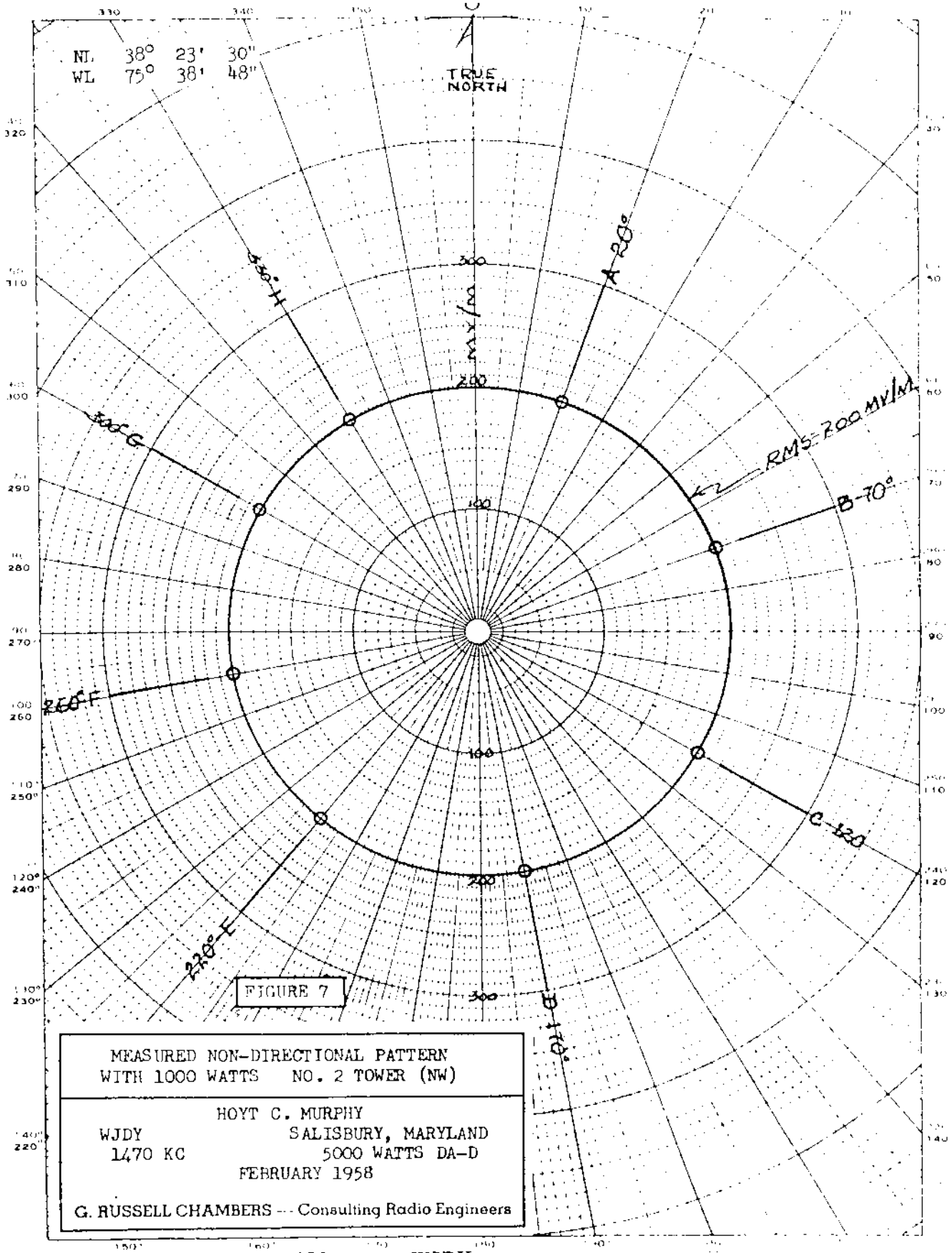


FIGURE 7

MEASURED NON-DIRECTIONAL PATTERN
WITH 1000 WATTS NO. 2 TOWER (NW)

HOYT C. MURPHY
WJDY SALISBURY, MARYLAND
1470 KC 5000 WATTS DA-D
FEBRUARY 1958

G. RUSSELL CHAMBERS --- Consulting Radio Engineers

FCC File No. BL-7050
Accepted 3-17-58

WJDY
Salisbury, Maryland

1470 KC

WKMF

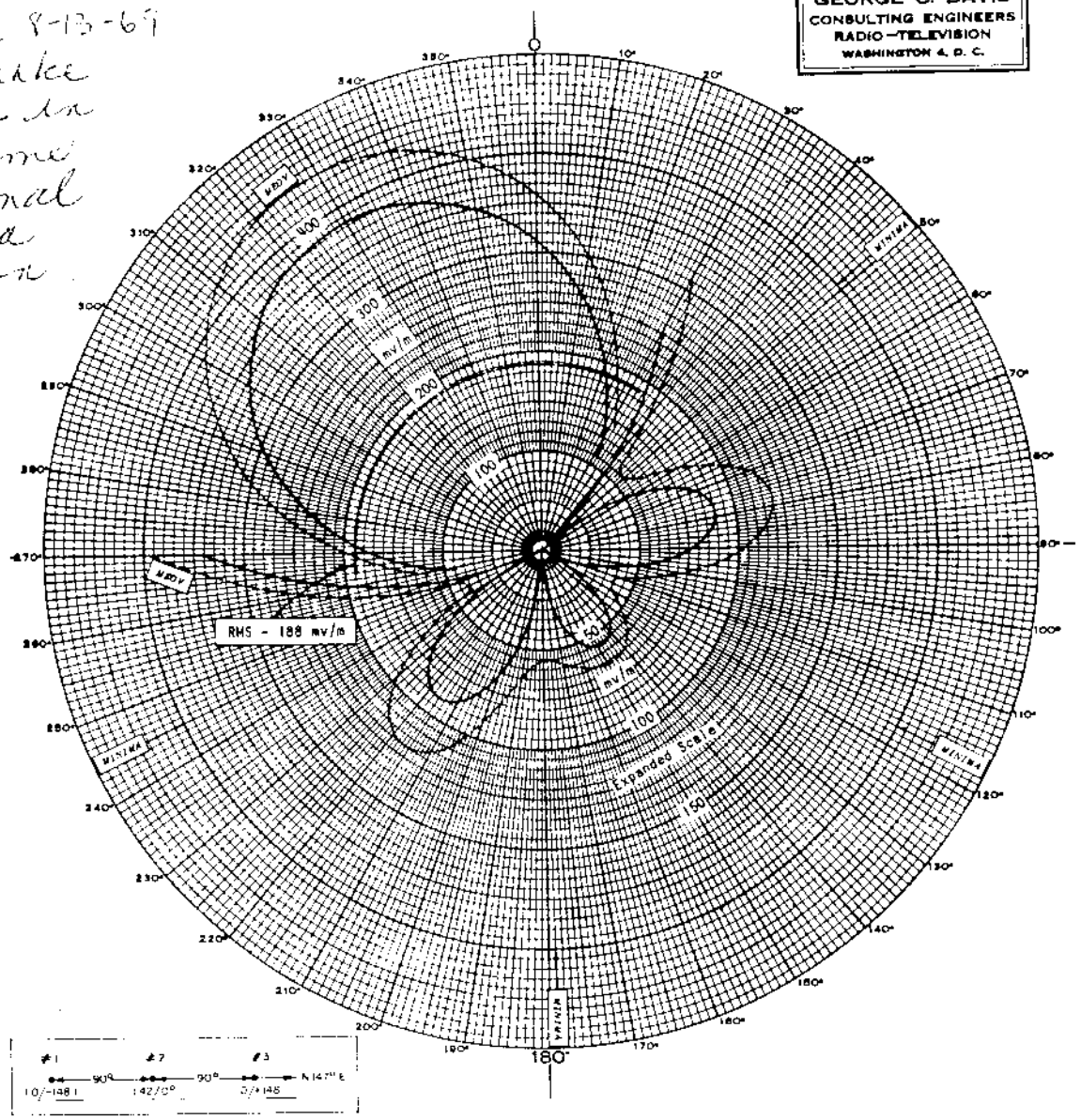
Proposed Night
(8-22-69ct)

Station WKMF
Flint, Michigan

1kw, 5kw-LS, DA-2, U
1470 kc

BP-18609
Granted 8-13-69
CP to make
changes in
nighttime
directional
antenna
pattern

GEORGE C. DAVIS
CONSULTING ENGINEERS
RADIO—TELEVISION
WASHINGTON 4, D. C.



North Latitude 42° 58' 22"
West Longitude 83° 38' 24"

COMPUTED HORIZONTAL
PLANE RADIATION PATTERN
FOR THE PRESENT NIGHTTIME OPERATION OF
WKMF, FLINT, MICHIGAN
1470 KHz - 1/5 KW - DA-2 U
SHOWING PROPOSED CHANGES IN MEOV
JUNE 1969

FCC File No. BP-18609
Accepted 8-8-69

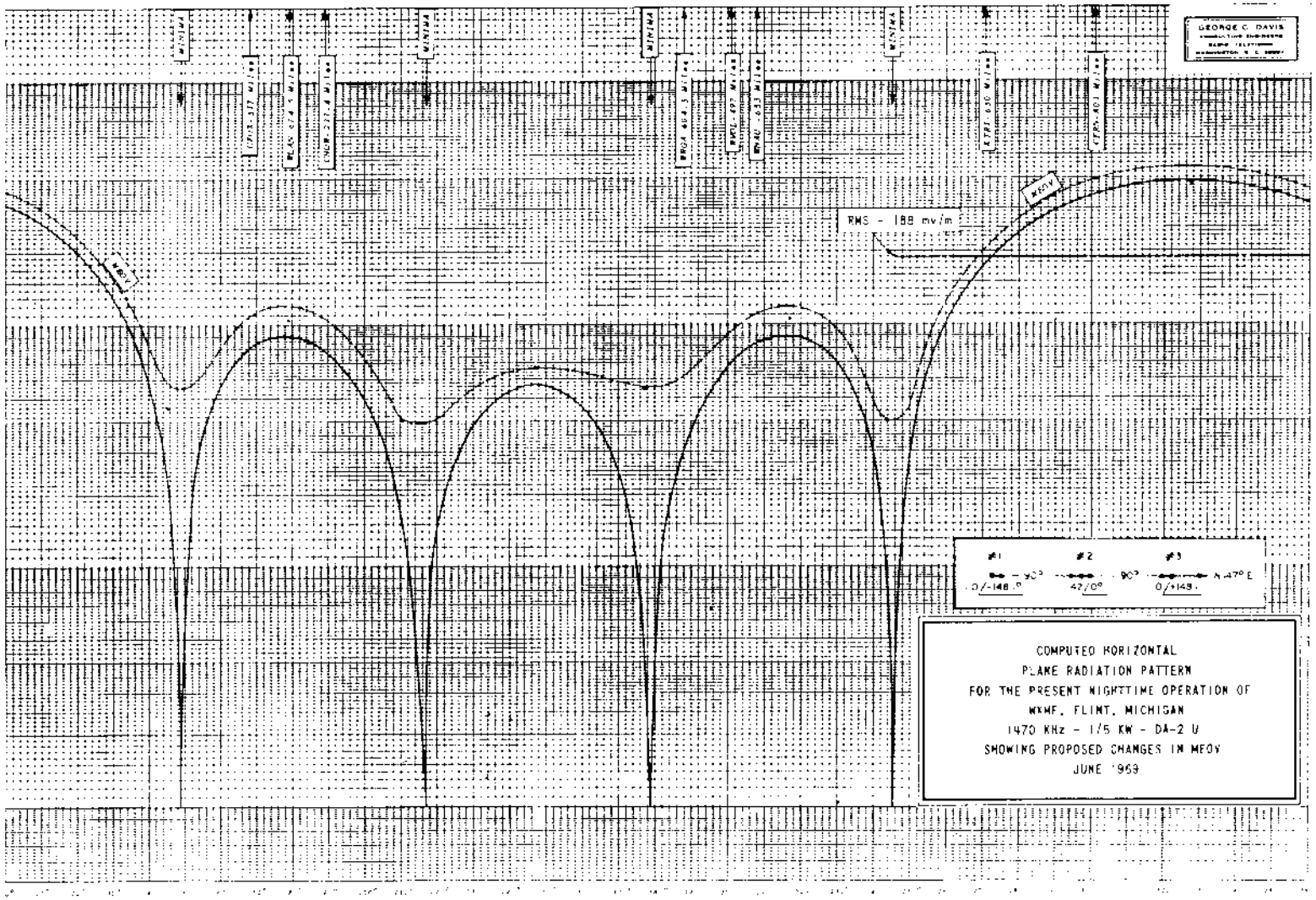
Station WKMF
Flint, Michigan

1470 kc

Proposed Night Nulls
(8-22-69ct)

Station WKMF
Flint, Michigan

1kw, 5kw-LS, DA-2, U
1470 kc



FCC File No. BP-18609
Accepted 8-8-69

Station WKMF
Flint, Michigan

1470 kc

BP-18609 Granted 8-13-69
CP to make changes in
nighttime directional antenna
pattern.

WKMF

WKMF

W K M F DAYTIME ANTENNA SYSTEM

Azimuth	1968 1959 Ratio	1959 Unatt. (Proof)	1968 Unatt. (Ratio x Proof)	Calc. or M.E.O.V.*
20° T.	1.035	550 mv/m	570 mv/m	555 mv/m
63	0.951	60.0	57.0	62.0*
85	0.895	102.0	91.5	103.0*
110.5	0.906	38.0	34.5	40.0*
147	0.922	115.0	106.0	125.0*
183	1.015	38.0	38.6	40.0*
209	0.919	100.0	92.0	104.0*
290	0.986	765	755	765
327	1.19	820	976	940
350	0.973	820	798	872

W K M F DAYTIME MONITOR POINTS

Azimuth	1959 Meas.	1968 Meas.	License Limit
63° T.	9.5 mv/m	9.4 mv/m	9.81 mv/m
85	13.5	11.0	15.0
110.5	8.4	8.0	9.3
147	34.0	24.0	36.3
209	23.0	23.0	23.9

WKMF

KEAN, SKILOM & STEPHENS CO. • RIVERSIDE, ILLINOIS

W K M F NIGHTTIME ANTENNA SYSTEM

Azimuth	1968 1952 Ratio	1962 1952 Ratio	1968 1962 Ratio	1952 Unatt. (Proof)	1962 Unatt. (Ratio x Proof)	1968 Unatt. (Ratio x Proof)	Calc. or 1962 M.E.O.V.*
20°T	1.077	1.085	0.978	192 mv/m	208 mv/m	206.5mv/m	202 mv/m
45.5	1.614	1.865	0.929	15	28	24.2	57*
79	0.955	0.956	1.007	86	82	82	105*
110.5	0.679	0.955	0.79	19.5	18.6	13.2	40*
147	1.13	1.238	0.964	43	53.2	48.6	66*
177	0.843	0.675	1.19	14	9.45	11.8	55*
217	0.965	0.96	1.013	85	81.5	82	105*
244	1.65	1.7	0.96	16.5	28	27.2	40*
290	0.959	0.928	1.009	290	269	278	296
327	0.999	0.732	1.148	380	278	380	388
350	1.024	1.113	0.928	345	384	353	350

W K M F NIGHTTIME MONITOR POINTS

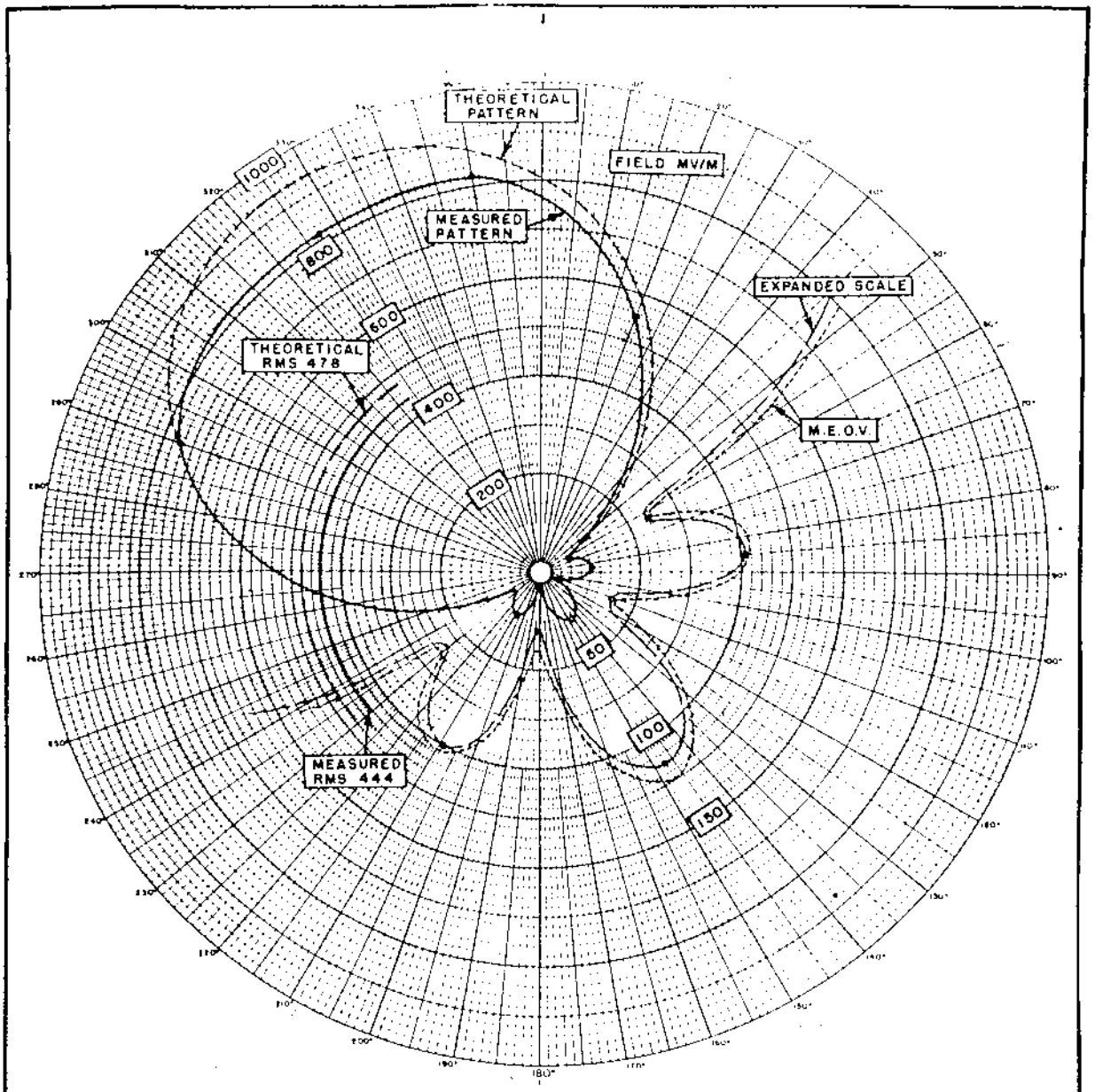
Azimuth	1952 Meas.	1962 Meas.	1968 Meas.	License Limit
45.5°	6.0 mv/m	15.0 mv/m	14.0 mv/m	20.0 mv/m
79	23.0	27.0	29.0	34.0
110.5	4.7	4.75	5.0	6.0
147	12.0	15.6	16.5	19.3
177	9.8	9.0	8.2	11.5
217	19.5	19.5	20.5	25.0
244	3.7	6.8	6.7	9.0

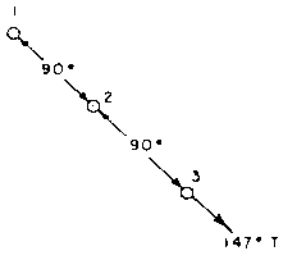
WKMF

MEASURED DAY
(7-8-59p)

Station WKMF
Flint, Michigan

1kw, 5kw-LS, DA-2, U
1470 KC





LATITUDE 42° 58' 22" North
LONGITUDE 83° 38' 24" West

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
1	S E E	S E E	-138.5	1.0	190	90
2			2.4	1.69	190	90
3	DIAGRAM	DIAGRAM	138.5	1.0	190	90

MEASURED DAYTIME
HORIZONTAL RADIATION PATTERN
FOR
WKMF
FLINT, MICHIGAN
1470 KC 1KW, 5KW LS DA-2

590323

KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7500
Accepted 6-22-59

WKMF
Flint, Michigan

1470 KC

WKMF

PROPOSED DAY
(11-28-55G)

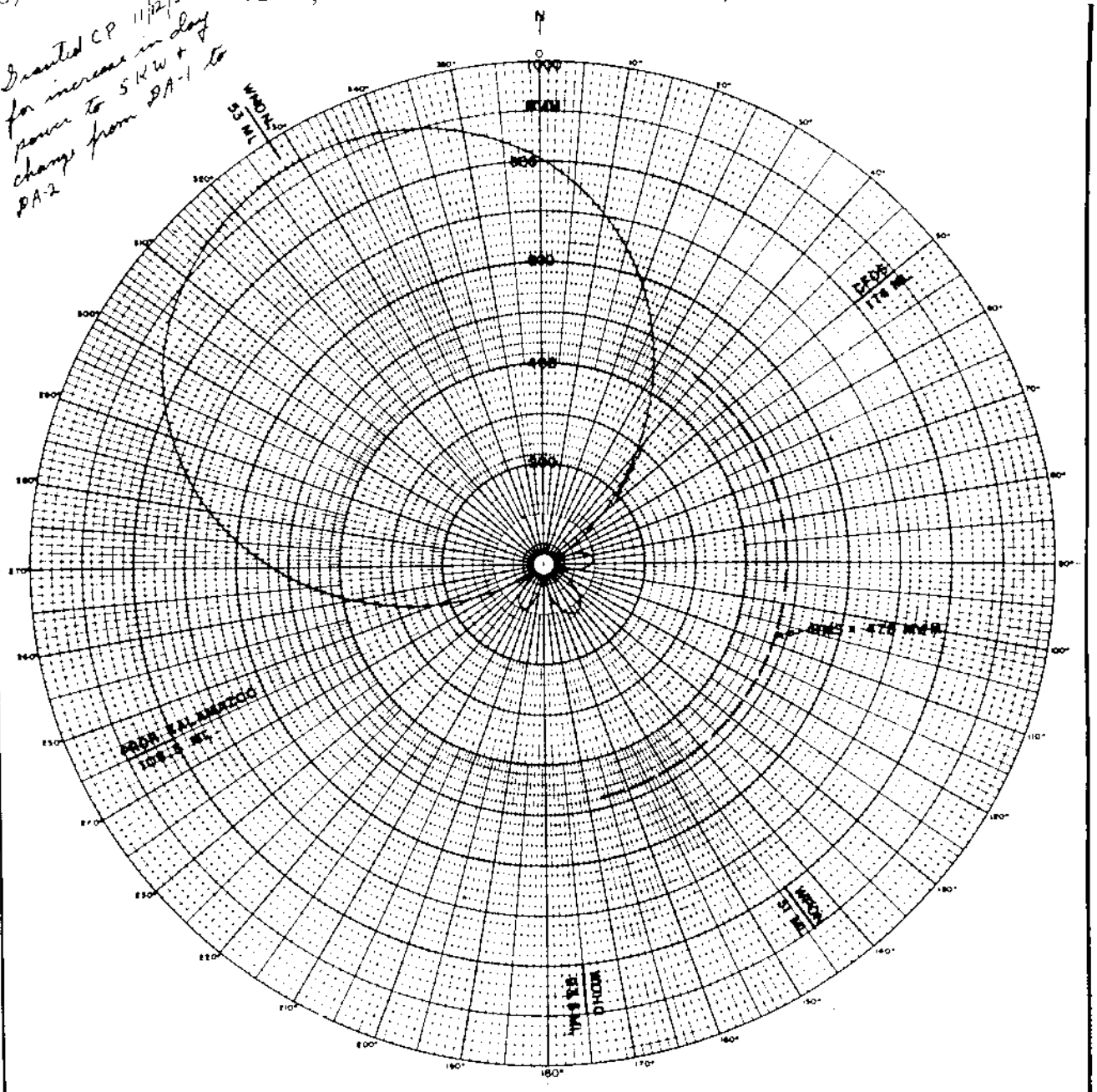
STATION WKMF
FLINT, MICHIGAN

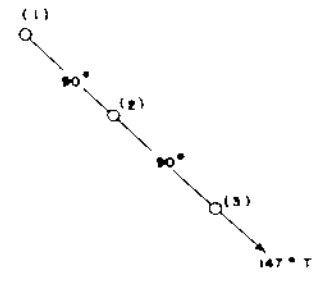
1KW, 5KW-LS
DA-2, U

1470 KC

Granted CP 11/12/58 for increase in day power to 5 KW + change from DA-1 to DA-2

8-17-60 granted license





LATITUDE	42° 56' 22"
LONGITUDE	83° 38' 24"

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
1	SEE DIAGRAM	SEE DIAGRAM	-138.5	1.0	190	90
2			2.4	1.69	190	90
3			138.5	1.0	190	90

PROPOSED DAYTIME
HORIZONTAL RADIATION PATTERN
FOR
WKMF — FLINT, MICH.
1470 KC. — 1 KW, 5 KW LS - DA-2
550925

KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

FILE NO. BP-10,170 ACCEPTED 11-7-55 FCC WKMF, Flint, Michigan 1470 KC

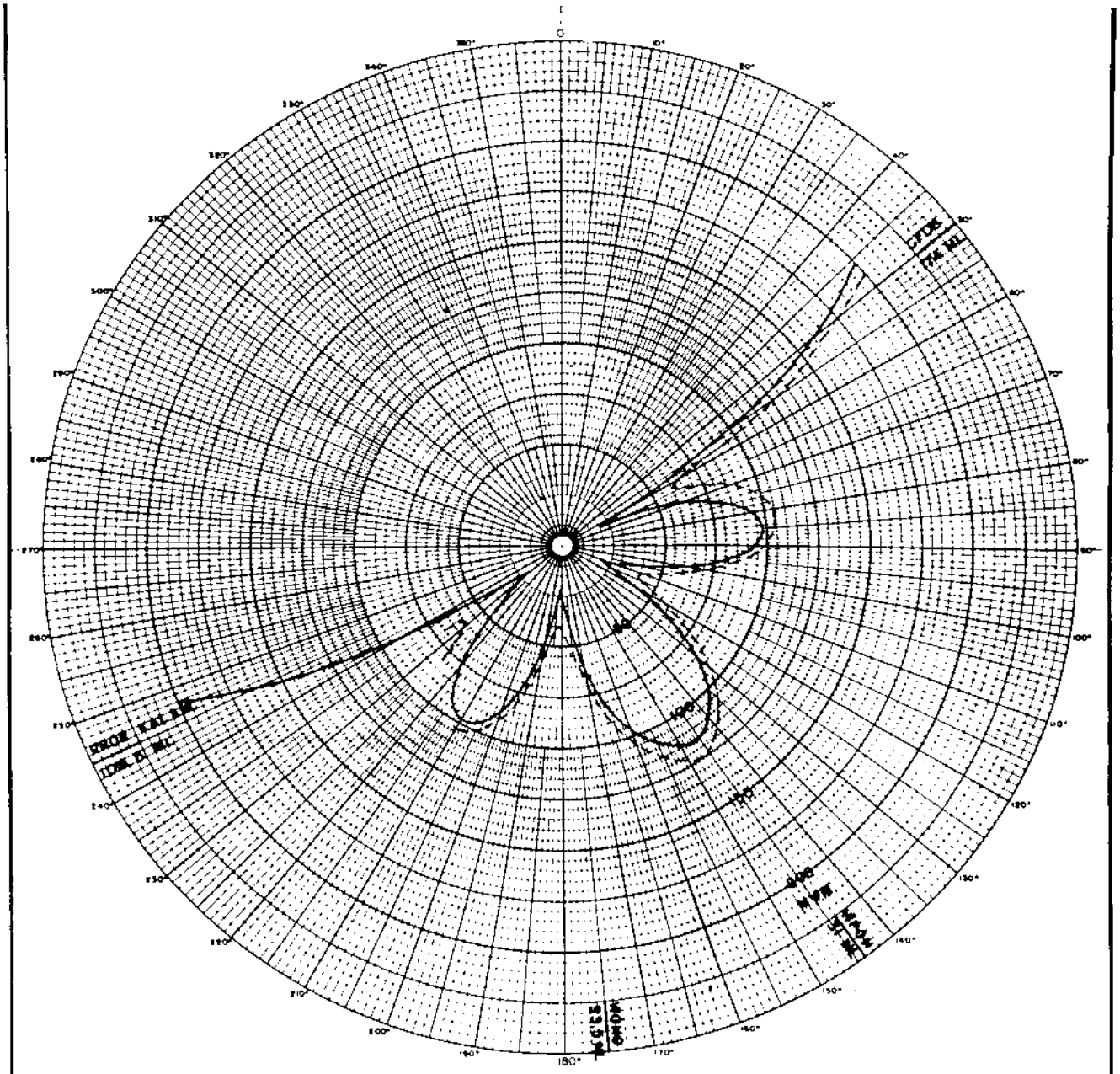
WKMF

PROPOSED DAY NULLS (11-28-55)

STATION WKMF
FLINT, MICHIGAN

1KW, 5KW-LS
DA-2, U

1470 KC



ANTENNA NUMBER	AZIMUTH DEG.	SPACING DEG.	PHASING DEG.	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG.

LAT-TUDE
LONGITUDE

EXPANDED SCALE
PROPOSED DAYTIME
HORIZONTAL RADIATION PATTERN
FOR
WKMF — FLINT, MICH.
1470 KC. 1KW, 5KW-LS DA-2

550930

KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

FILE NO. BP-10,170

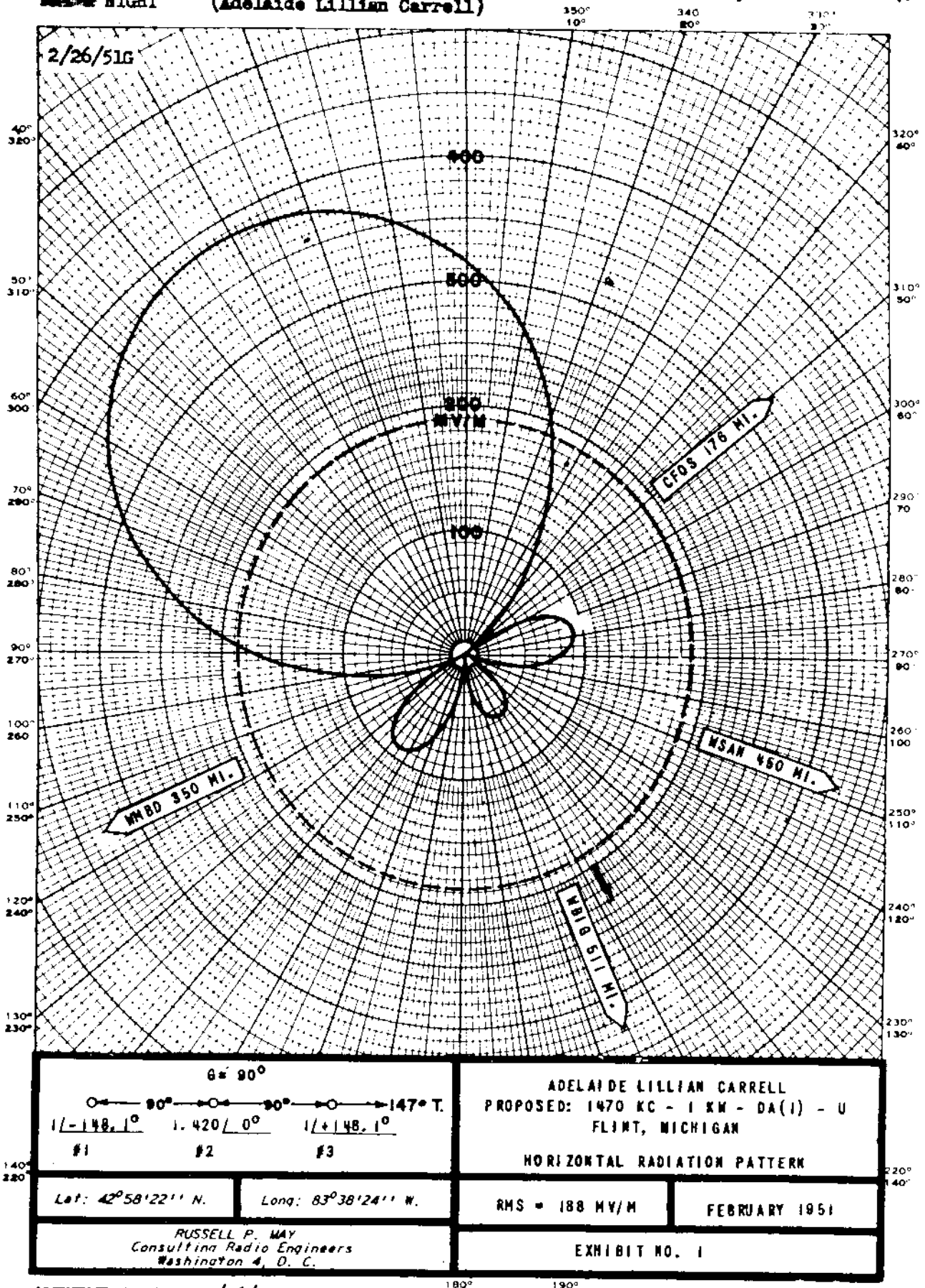
ACCEPTED 11--7-55 FCC

WKMF, Flint, Michigan

1470 KC

WKMF
FLINT, MICH

PROPOSED NIGHT — NEW, FLINT, MICH. (Adelaide Lillian Carrell) — 1kw, DA-1 — 1470 kc



θ = 90°

90° — 90° — 147° T.

1/-148.1° | 1.420/0° | 1/+148.1°

#1 #2 #3

ADELAIDE LILLIAN CARRELL
PROPOSED: 1470 KC - 1 KW - DA(1) - U
FLINT, MICHIGAN

HORIZONTAL RADIATION PATTERN

Lat: 42°58'22" N. | Long: 83°38'24" W.

RMS = 188 MV/M | FEBRUARY 1951

RUSSELL P. MAY
Consulting Radio Engineers
Washington 4, D. C.

EXHIBIT NO. 1

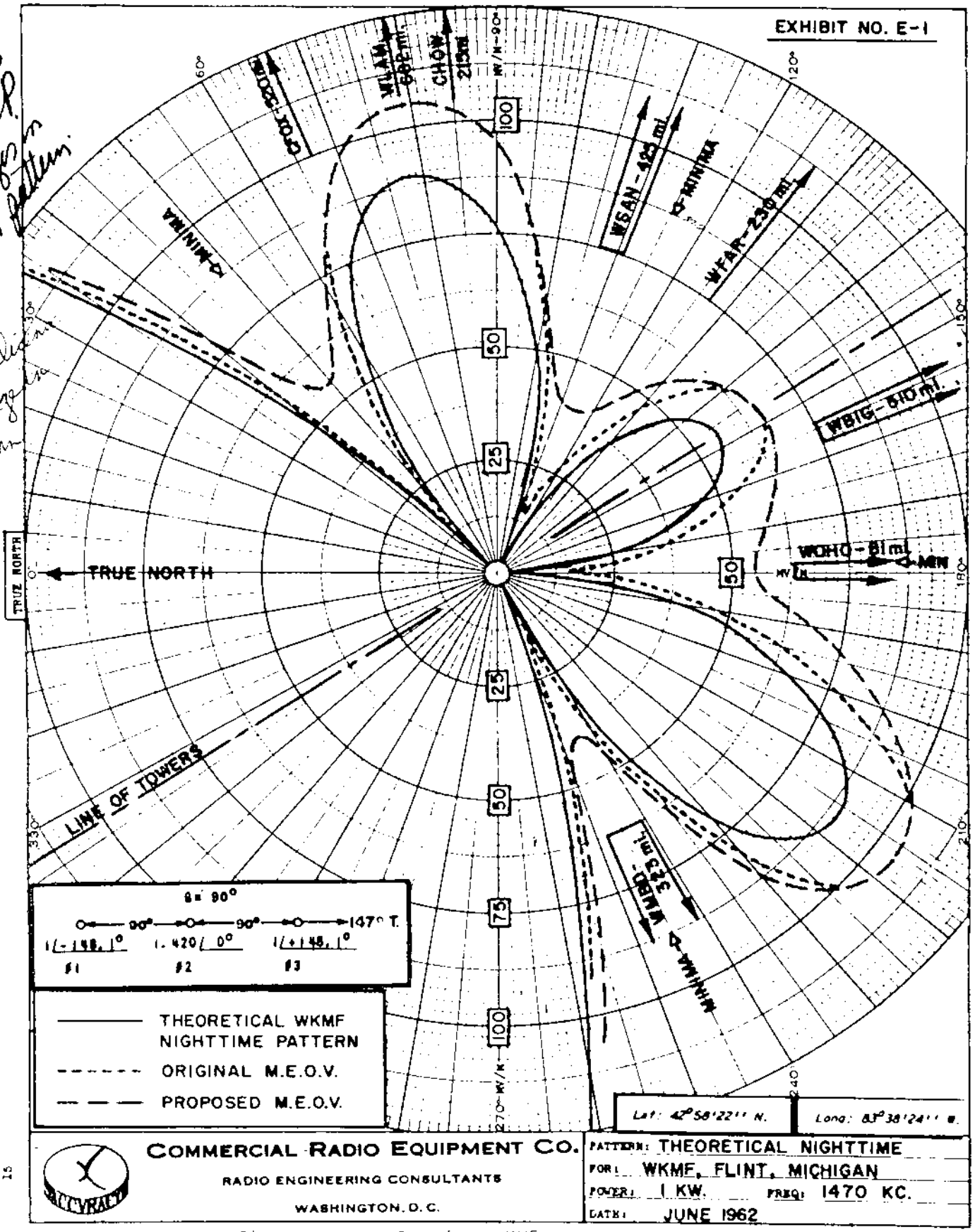
AMENDMENT RECD 2/16/51 BP-7840 — New, Flint, Mich. 1470 kc

WKMF

Proposed Night
(2-26-63ct

Station WKMF
Flint, Michigan

1kw, 5kw-LS, DA-2, U
1470 kc



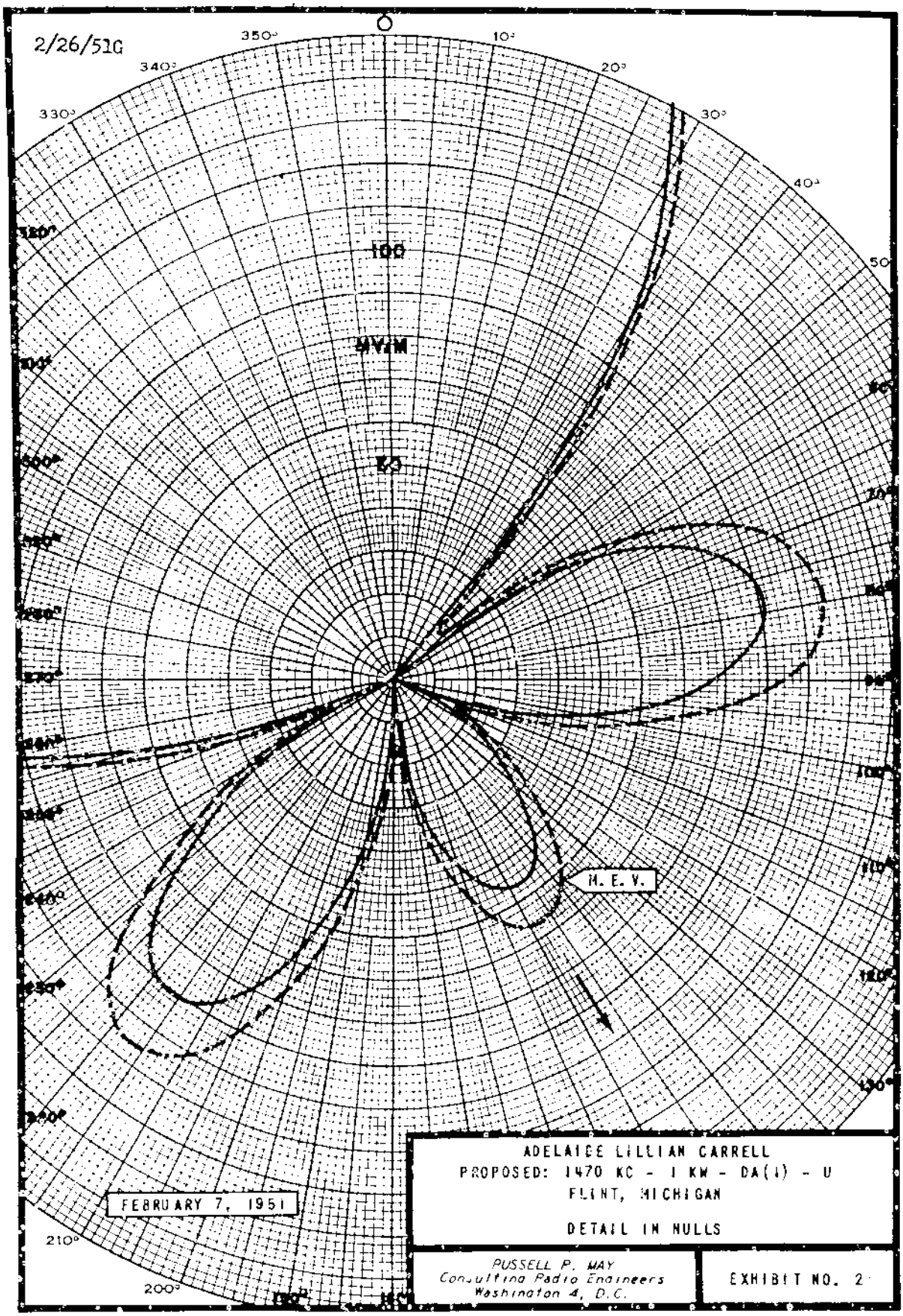
FCC File No. BP-15842
Accepted 2-7-63

Station WKMF
Flint, Michigan

1470 kc

WKMF
FLINT, MICH

PROPOSED NEW, FLINT, MICH. 1kw, DA-1 1470 kc
~~DAY~~NIGHT NULLS (Adelaide Lillian Carrell)

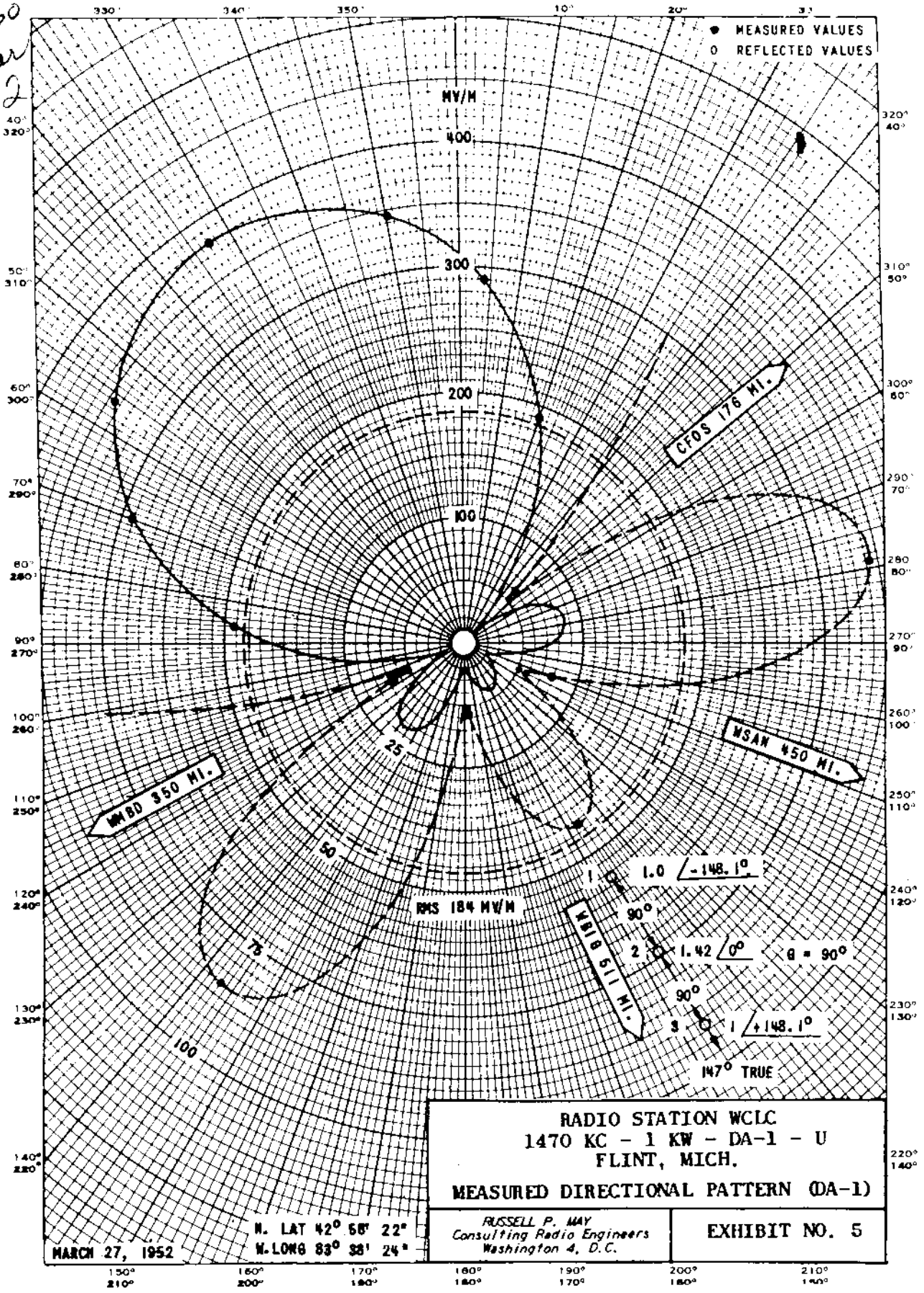


AMENDMENT RECD 2/16/51 BP-7840 New, Flint, Mich. 1470 kc

WKMF

MEASURED WCLC, FLINT, MICH. 1 KW, U, DA-1 1470 KC
NIGHT [redacted] 5/26/52G

8-17-60
Increase - far
Change to DA-2



RADIO STATION WCLC
1470 KC - 1 KW - DA-1 - U
FLINT, MICH.

MEASURED DIRECTIONAL PATTERN (DA-1)

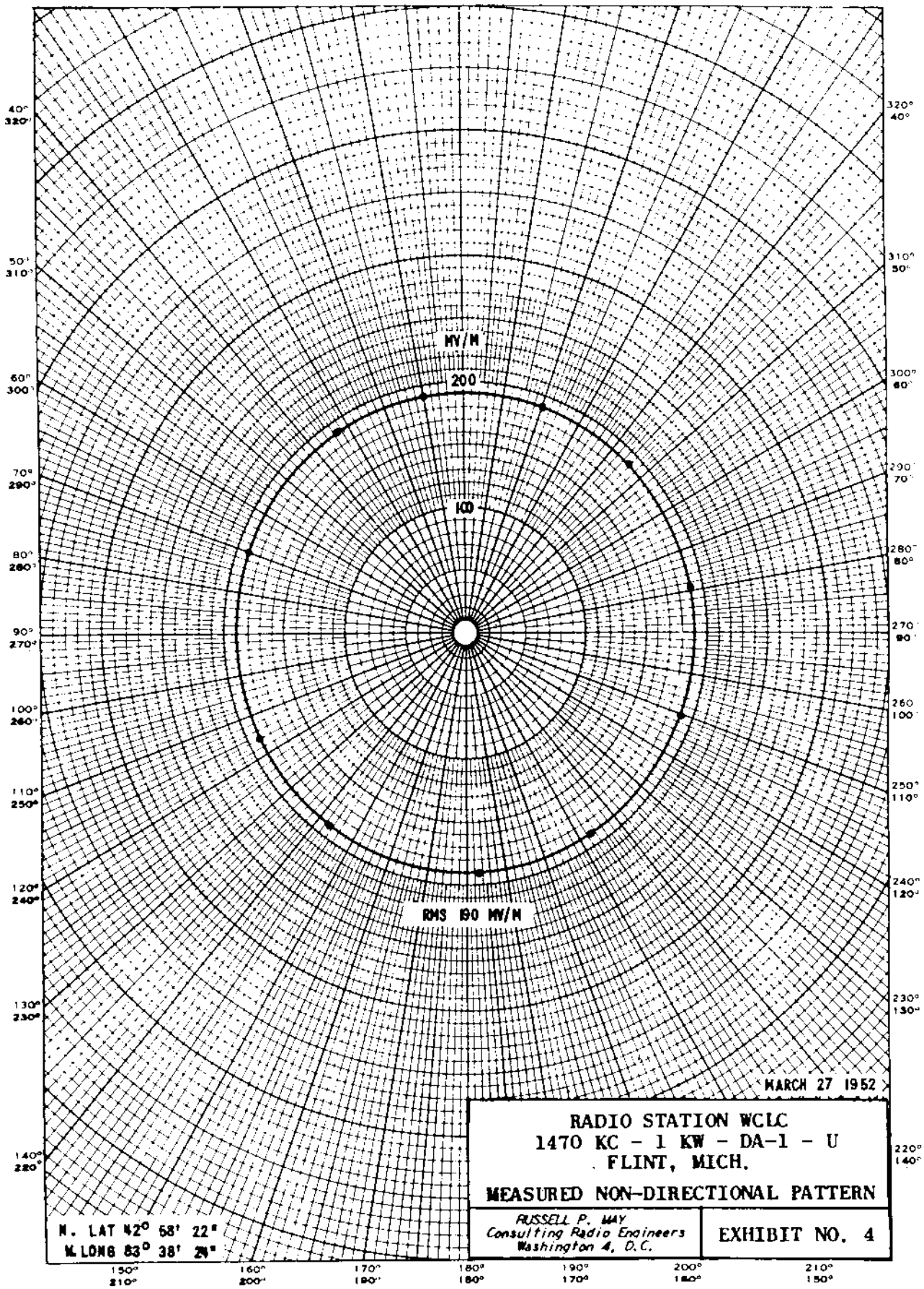
RUSSELL P. MAY
Consulting Radio Engineers
Washington 4, D.C.

EXHIBIT NO. 5

APPL RECD 4/2/52 ACC 5/12/52 BL-4706 WCLC, FLINT, MICH. 1470 KC

WKMF

MEASURED NON-DA | WCLC, FLINT, MICH. 5/26/52G | 1 KW, U, DA-1 | 1470 KC



APPL RECD 4/2/52 ACC 5/12/52 BL-4706 | WCLC, FLINT, MICH. | 1470 KC

WLAM

SUPPLEMENTAL DIRECTIONAL ANTENNA
DESCRIPTION SHEET

Station: WLAM Main Studio: Lewiston, Maine

Frequency: 1470 KHz Power: 5 kW

Notification List No. 1643 Date: July 30, 1975 Class: III

GEOGRAPHICAL LOCATION OF THE
CENTER OF THE ANTENNA SYSTEM: North Latitude: 44° 03' 47"
West Longitude: 70° 15' 00"

Authorized for Day and Night operation (DA-1).

Note: Please retain the description sheet and directional antenna radiation patterns notified for station WLAM in United States Change List Number 225, dated May 2, 1947, and attach to this supplemental Description Sheet. This notification is for the purpose of indicating only a correction in the geographical coordinates of the center of the antenna system.

CTR NO 31176A4

PROPOSED DAY & NIGHT | Station WLAM, Lewiston, Maine | 5kw, DA-1,U, 1470 KC | WLAM

42

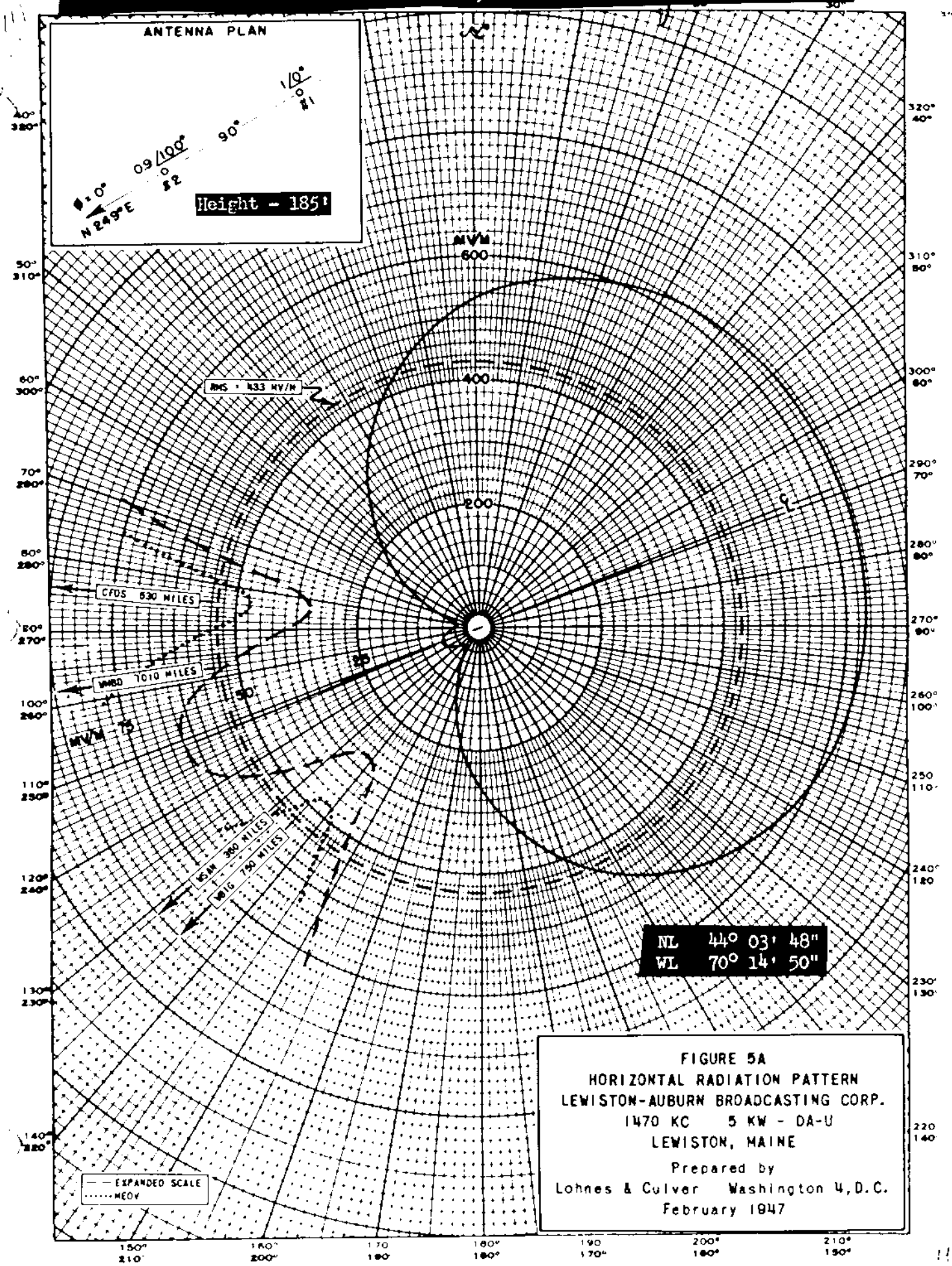


FIGURE 5A
HORIZONTAL RADIATION PATTERN
LEWISTON-AUBURN BROADCASTING CORP.
1470 KC 5 KW - DA-U
LEWISTON, MAINE
Prepared by
Lohnes & Culver Washington 4, D.C.
February 1947

WLAM 1470

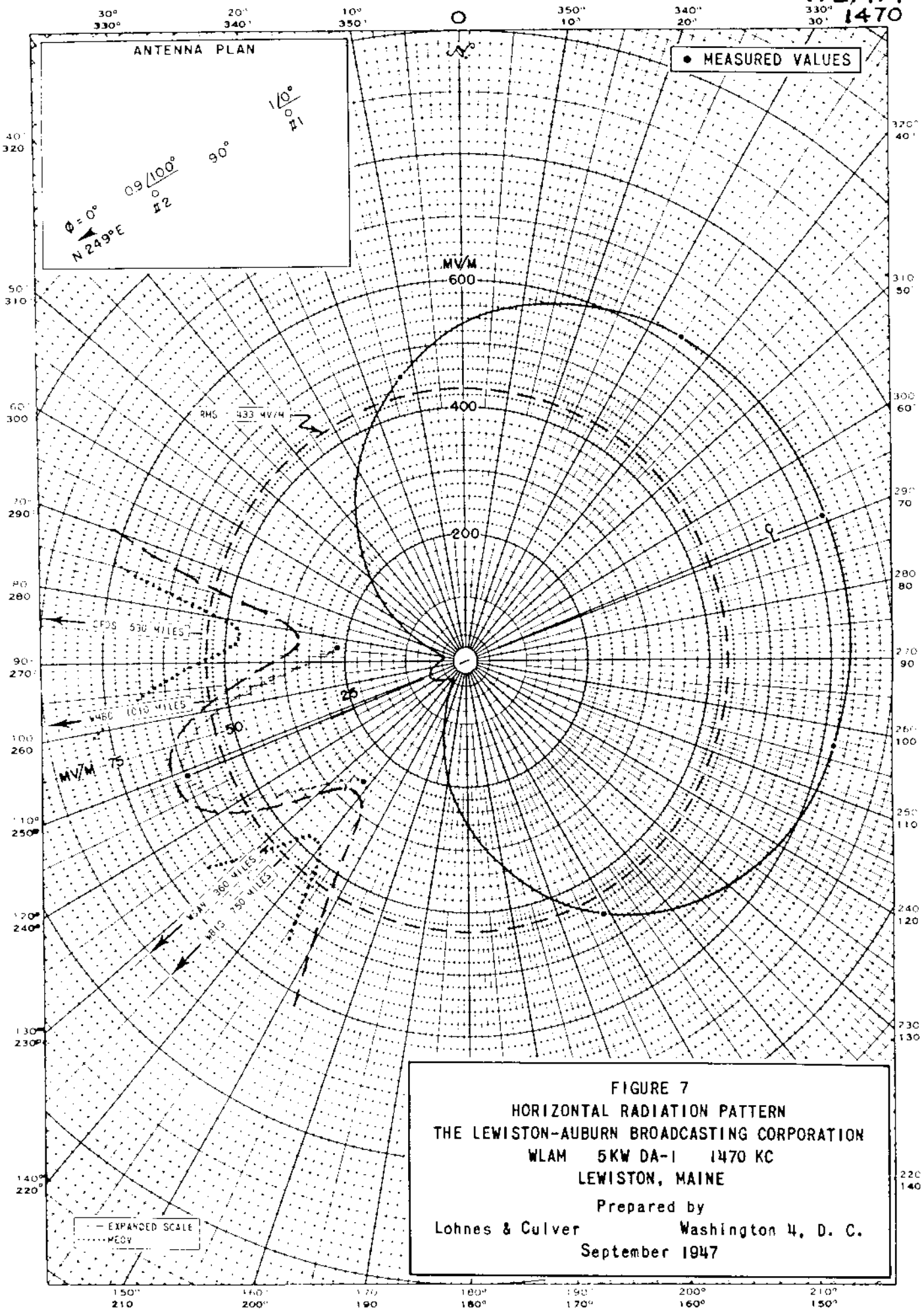


FIGURE 7
HORIZONTAL RADIATION PATTERN
THE LEWISTON-AUBURN BROADCASTING CORPORATION
WLAM 5KW DA-1 1470 KC
LEWISTON, MAINE

Prepared by
Lohnes & Culver Washington 4, D. C.
September 1947

WMBD

PROPOSED WMBD, PEORIA, ILL. 5kw, DA-2 1470 kc

DAY 8/16/49G NIGHT 8-9-49

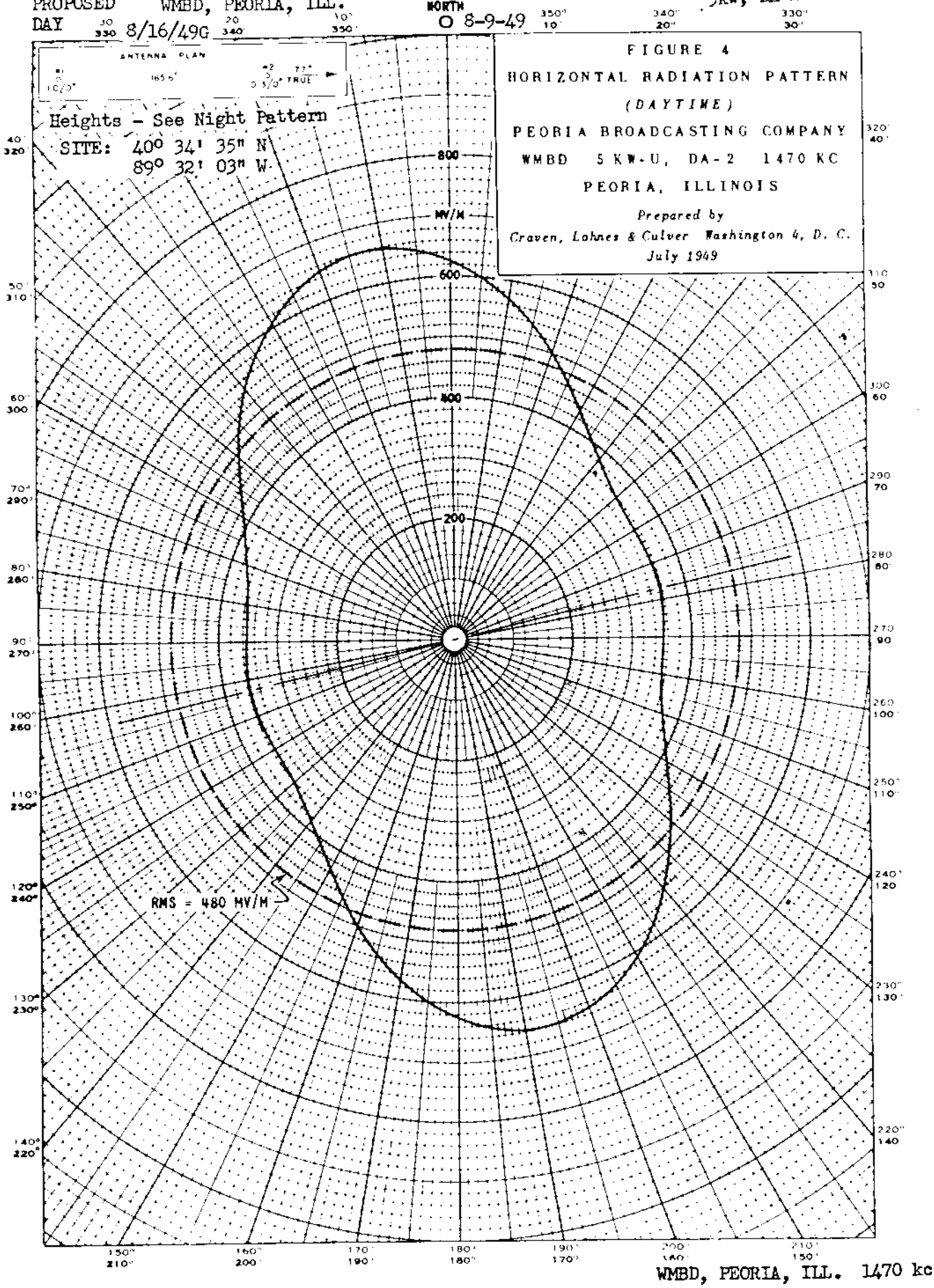


FIGURE 4

HORIZONTAL RADIATION PATTERN

(DAYTIME)

PEORIA BROADCASTING COMPANY

WMBD 5 KW-U, DA-2 1470 KC

PEORIA, ILLINOIS

Prepared by

Craven, Lohnes & Culver Washington 4, D. C.

July 1949

WMBD, PEORIA, ILL. 1470 kc

WMBD

MEASURED DAY — WMBD, PEORIA, ILL. — 5kw, DA-2 — 1470 kc

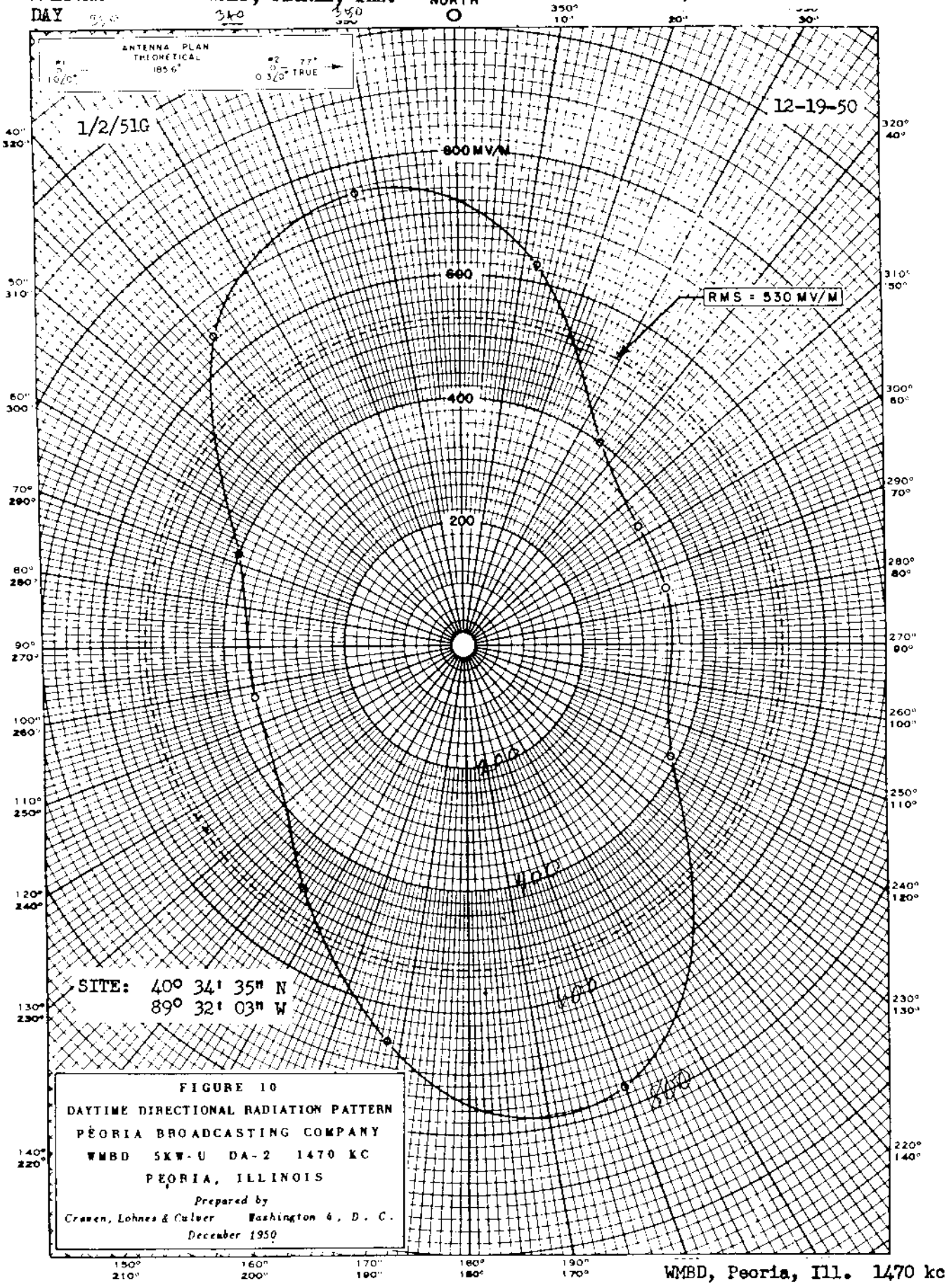


FIGURE 10

DAYTIME DIRECTIONAL RADIATION PATTERN

PEORIA BROADCASTING COMPANY

WMBD 5KW-U DA-2 1470 KC

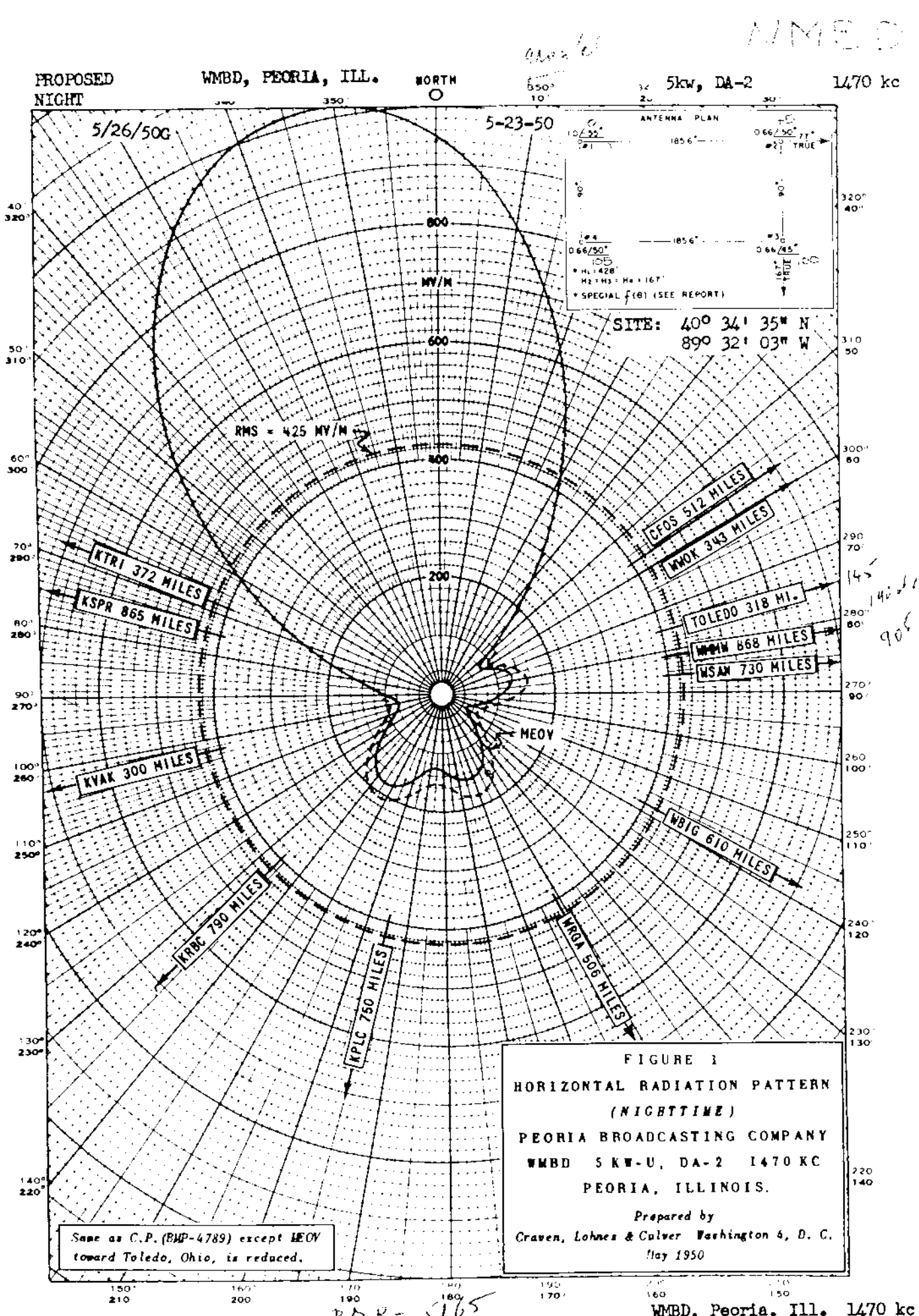
PEORIA, ILLINOIS

Prepared by

Cohen, Lohnes & Culver Washington 4, D. C.

December 1950

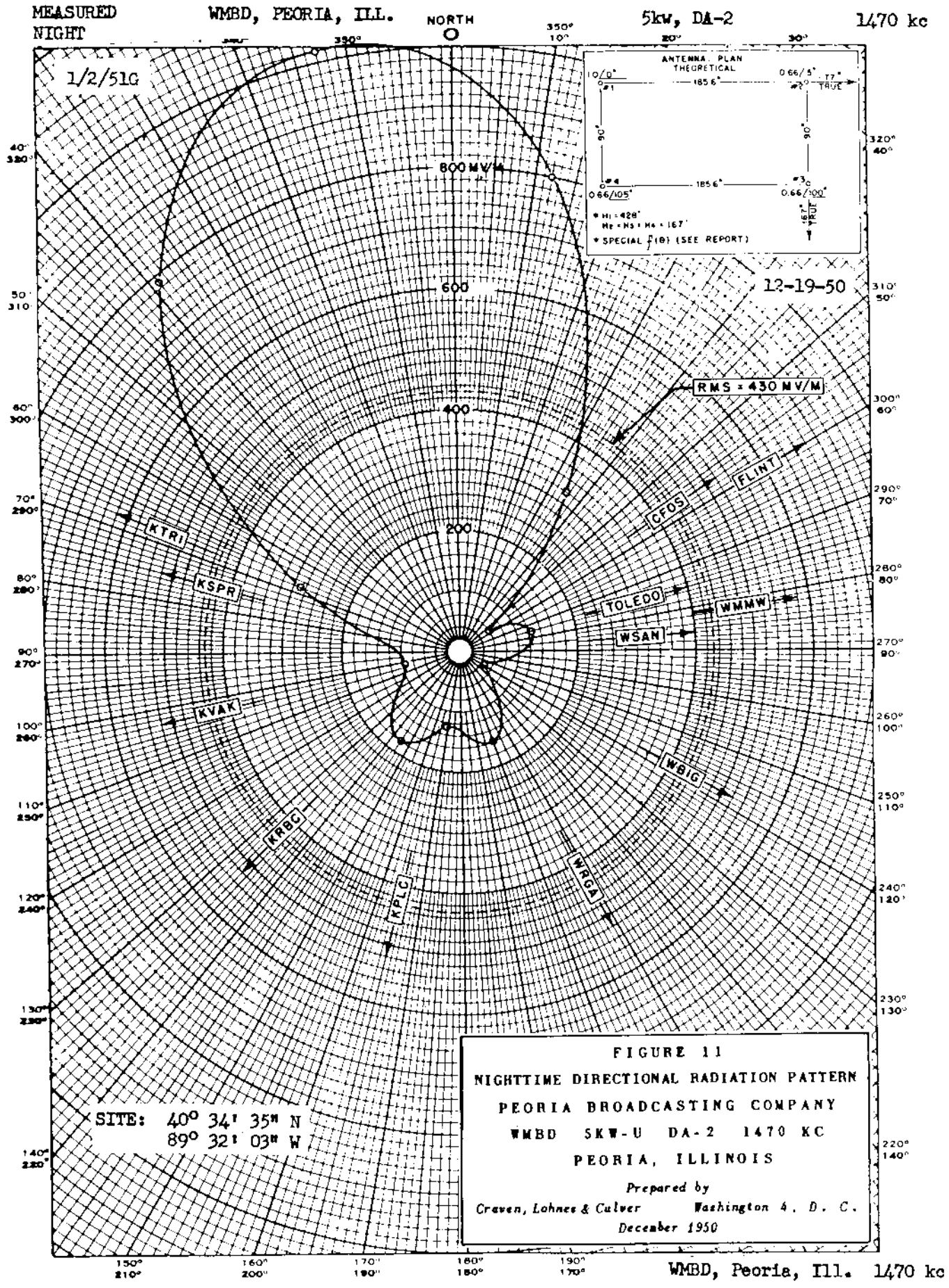
WMBD, Peoria, Ill. 1470 kc



BMP-5165

WMBD, Peoria, Ill. 1470 kc

WMBD


MEASURED NIGHT
WMBD, PEORIA, ILL.
NORTH
5kw, DA-2
1470 kc
1/2/51G
ANTENNA PLAN THEORETICAL
185.6°
77° TRUE
90°
185.6°
0.66/105°
0.66/100°
167° TRUE
* H1 = 428'
H2 = H3 = H4 = 167'
* SPECIAL f(θ) (SEE REPORT)
12-19-50
800 MV/M
600
400
200
RMS = 430 MV/M
KTRI
KSPR
KVAK
KRBC
KPLC
WRGA
WBIG
WSAN
TOLEDO
WMMW
CFOS
FLINT
SITE: 40° 34' 35" N
89° 32' 03" W
FIGURE 11
NIGHTTIME DIRECTIONAL RADIATION PATTERN
PEORIA BROADCASTING COMPANY
WMBD 5KW-U DA-2 1470 KC
PEORIA, ILLINOIS
Prepared by
Craven, Lohnes & Culver Washington 4, D. C.
December 1950
WMBD, Peoria, Ill. 1470 kc

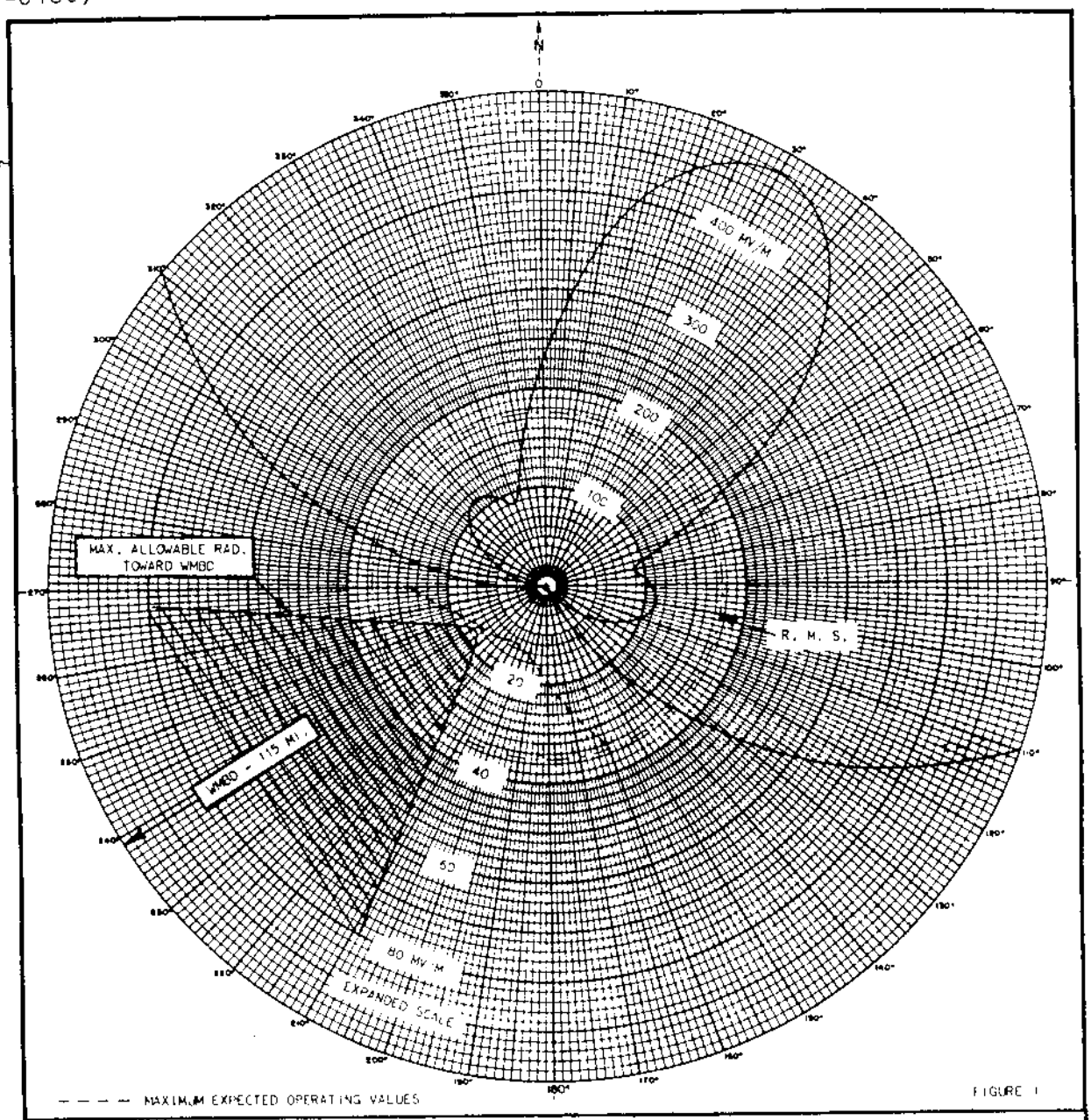
WMPP

Proposed Day
(1-29-64ct)

Station WMPP
Chicago Heights, Illinois

1kw,DA-D,D
1470 kc

11/4/64
granted CP
for new AM
station.

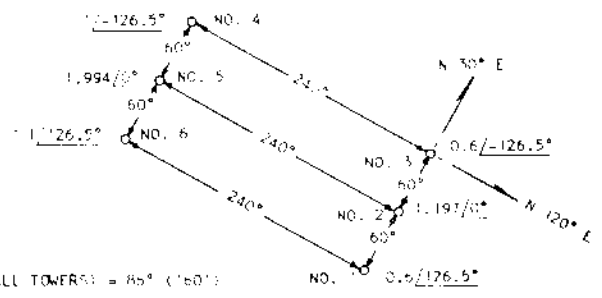


— — — — MAXIMUM EXPECTED OPERATING VALUES

FIGURE 1

HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION



G (ALL TOWERS) = 85° (-60°)

APPLICANT	SEAWAY BROADCASTING CO., INC.
LOCATION	CHICAGO HEIGHTS, ILL. (WMPP)
FREQUENCY	1470 KC/S
POWER	1 KW - DA - D
LATITUDE	41 DEG 25 MIN 29 SEC.
LONGITUDE	87 DEG 38 MIN 27 SEC.
WHEN USED	DAYTIME
RMS FIELD	176 MV/M (THEO.)
DATE	DECEMBER 1963

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No.BMP-10970
Accepted 1-9-64 Amended

Station WMPP
Chicago Heights, Illinois

1470 kc

WMPP

Measured Day
(4-24-64ct)

Station WMPP
Chicago Heights, Illinois

1kw,DA-D,D
1470 kc

FCC 9-15-65

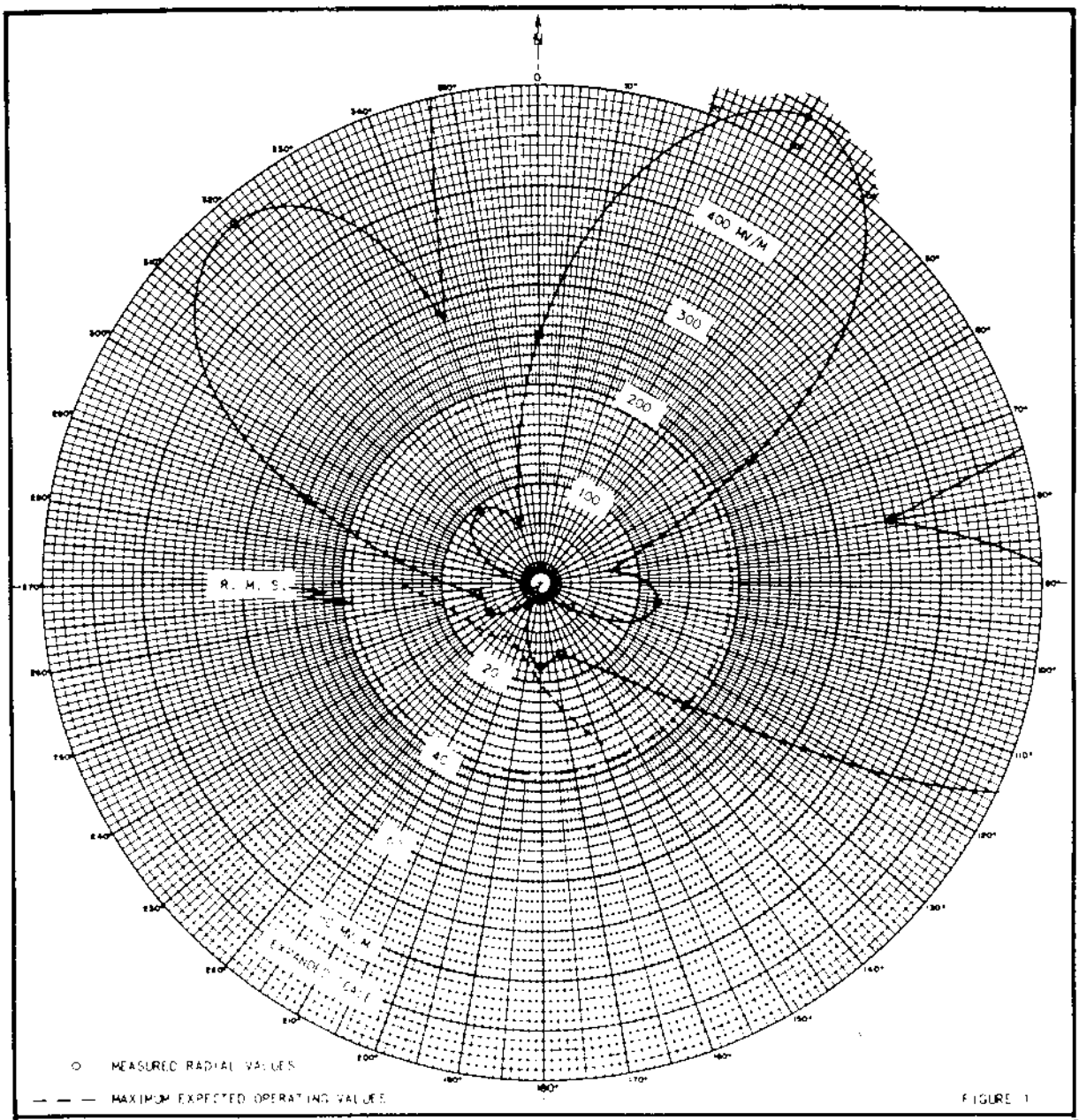
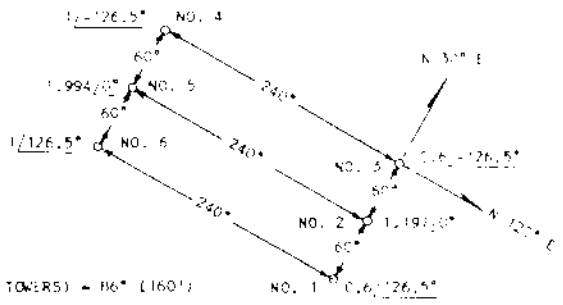


FIGURE 1

HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION



G (ALL TOWERS) = 86° (160°)

APPLICANT	SEAWAY BROADCASTING CO., INC.
LOCATION	CHICAGO HEIGHTS, ILL. (WMPP)
FREQUENCY	1470 KC/S
POWER	1 KW - DA - D
LATITUDE	41 DEG 25 MIN 29 SEC
LONGITUDE	87 DEG 38 MIN 27 SEC
WHEN USED	DAYTIME
RMS FIELD	192 MV/M (MEASURED)
DATE	DECEMBER 1963

SILLIMAN, MOFFET & KOWALSKI
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-10470
Accepted 3-25-64

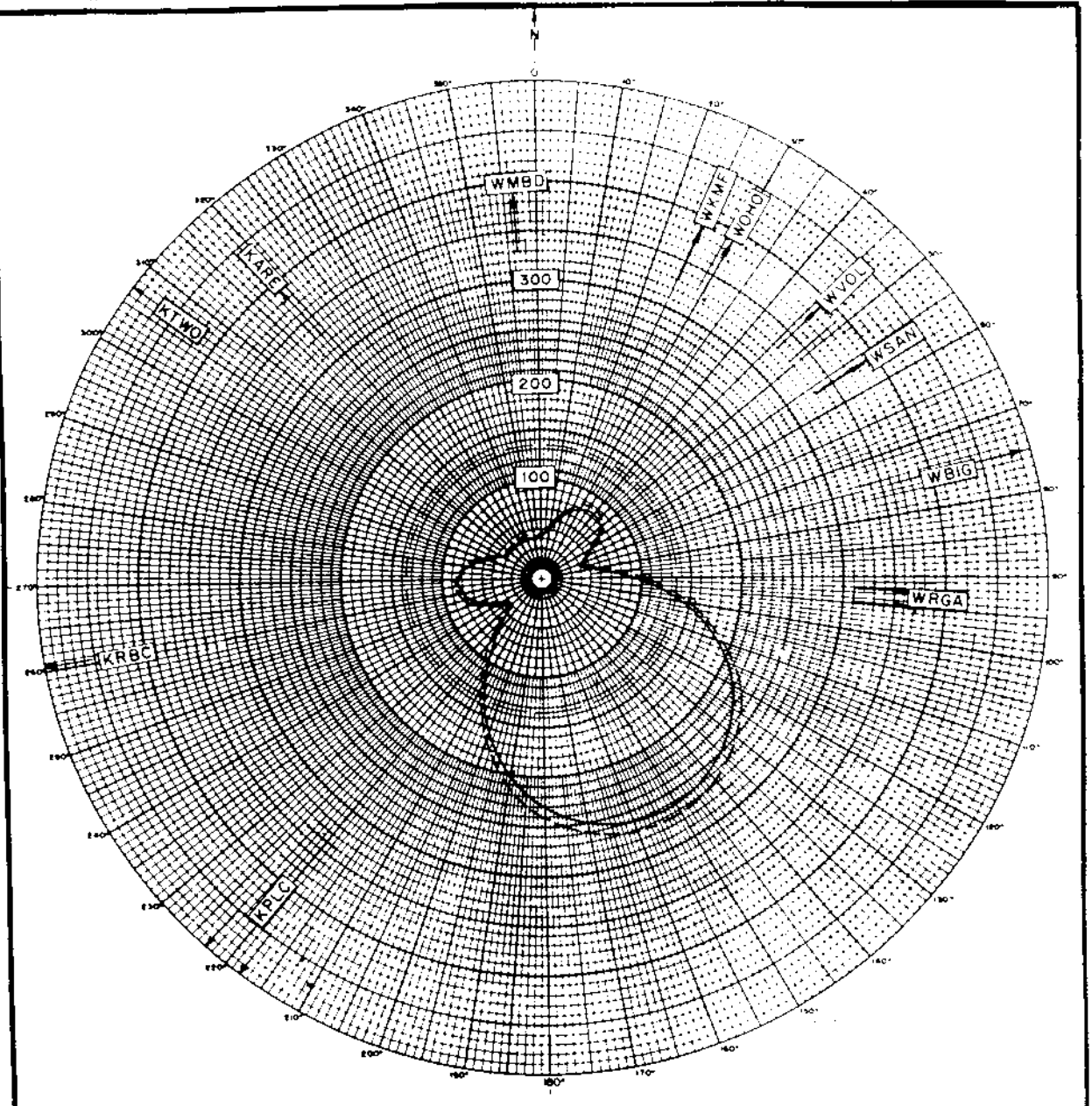
Station WMPP
Chicago Heights, Illinois

1470 kc

WNAU

PROPOSED NIGHT (9-27-60g) | Station WNAU New Albany, Mississippi | 500w, DA-N,U 1470 KC

12-7-60 granted for DA-N Condition 7



--- MEOV

E_{RMS} = 135 MV/M

LATITUDE 34° 29' 48"
LONGITUDE 89° 00' 51.5"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS

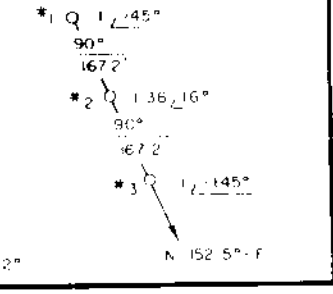


FIGURE 4

HORIZONTAL POLAR PATTERN
NIGHTTIME

RADIO STATION WNAU
NEW ALBANY, MISS.

1470 KC 0.5 KW, DA-N,U

FCC File No. BP-12949
Accepted 9-13-60 (Amended)

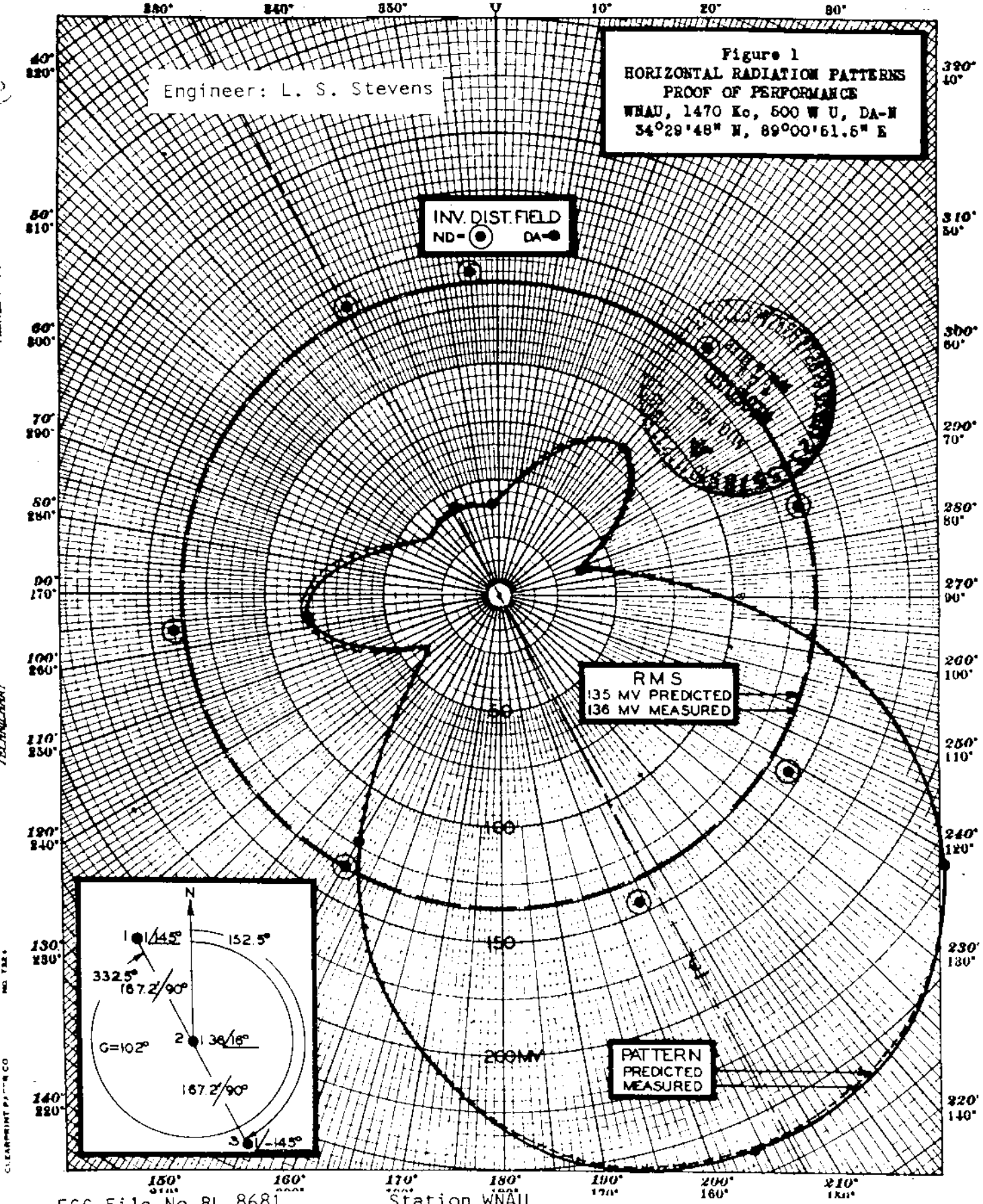
WNAU
New Albany, Mississippi 1470 KC

WNAU

MEASURED NIGHT
(9-20-61ct)

Station WNAU
New Albany, Mississippi

500w,DA-N,U
1470 kc



FCC File No. BL-8681
Accepted 8-24-61

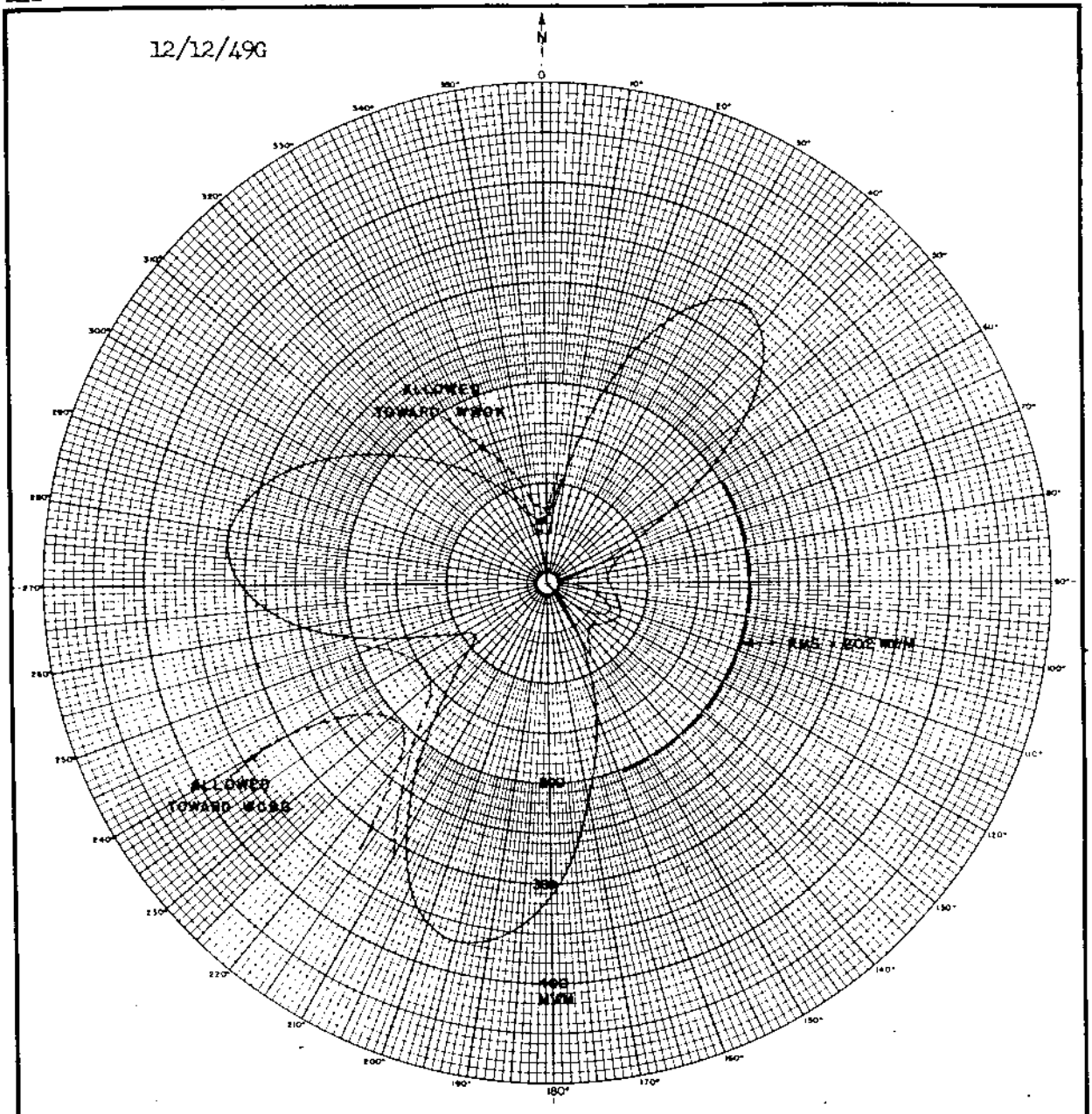
Station WNAU
New Albany, Mississippi

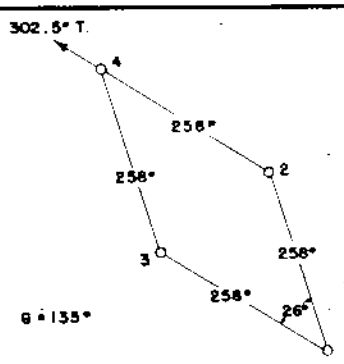
1470 kc

WOHO
Toledo

PROPOSED DAY — NEW, TOLEDO, OHIO (Midwestern Bg. Co.) — 1kw, DA-2 — 1470 kc

12/12/49G





LATITUDE 41° 37' 55"
LONGITUDE 83° 28' 45"

ANTENNA NUMBER	AZIMUTH DEG.	SPACING DEG.	PHASING DEG.	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG.
1	SEE DIAGRAM	SEE DIAGRAM	+42.5	1	192.5	135
2			-100	1.73	192.5	135
3			+100	1.73	192.5	135
4			-42.5	1	192.5	135

CALCULATED DAYTIME HORIZONTAL PLANE PATTERN
FOR
PROPOSED STATION
TOLEDO, OHIO
1470 KC. 1KW. U,DA-2

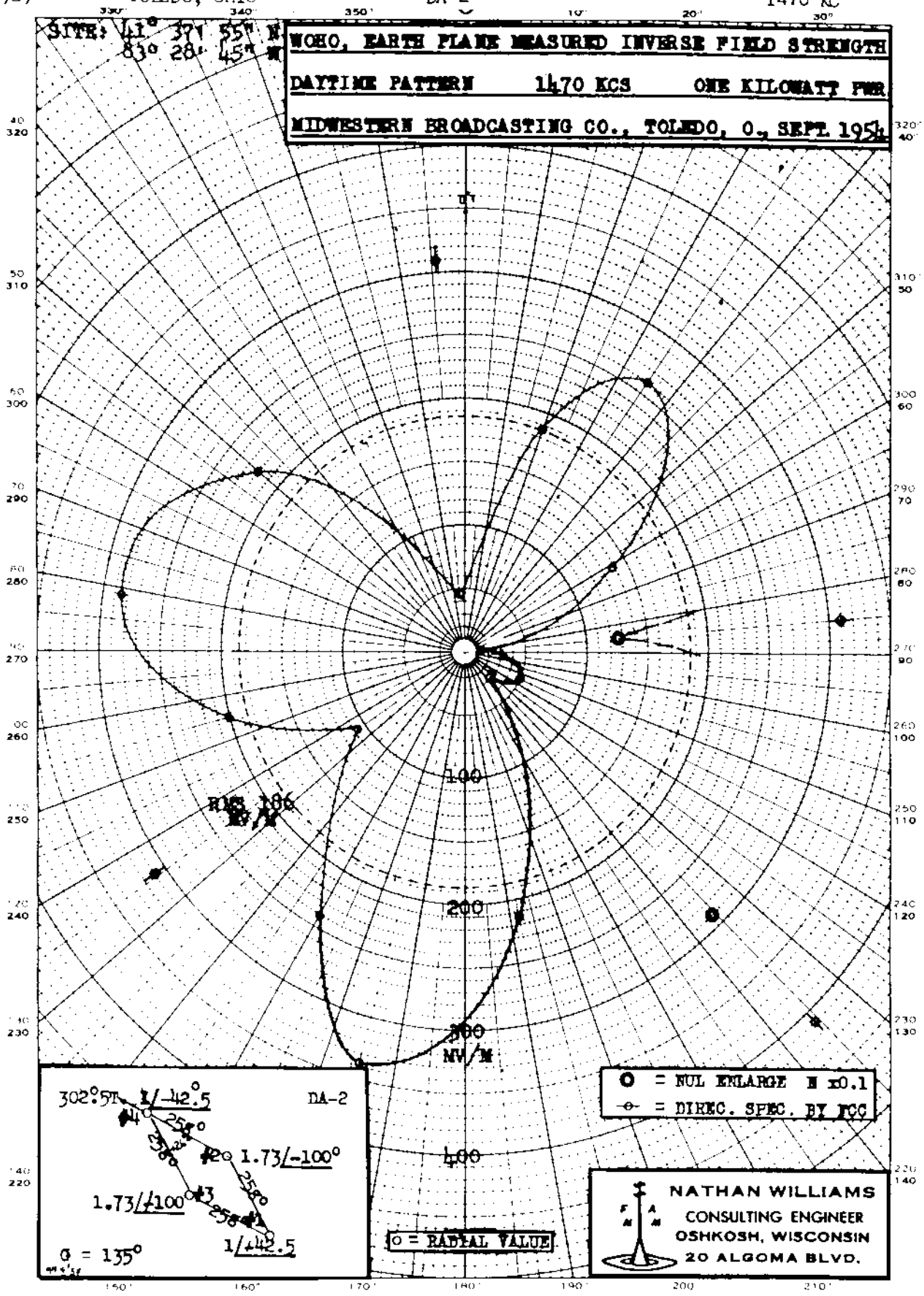
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D C

491024

AMENDMENT RECD 11-21-49 ACC 11-30-49 BP-6421 — NEW, Toledo, Ohio 1470 kc

WOHO

MEASURED DAY (10/18/54)G) | STATION WOHO TOLEDO, OHIO | 1 KW U DA-2 | 1470 KC

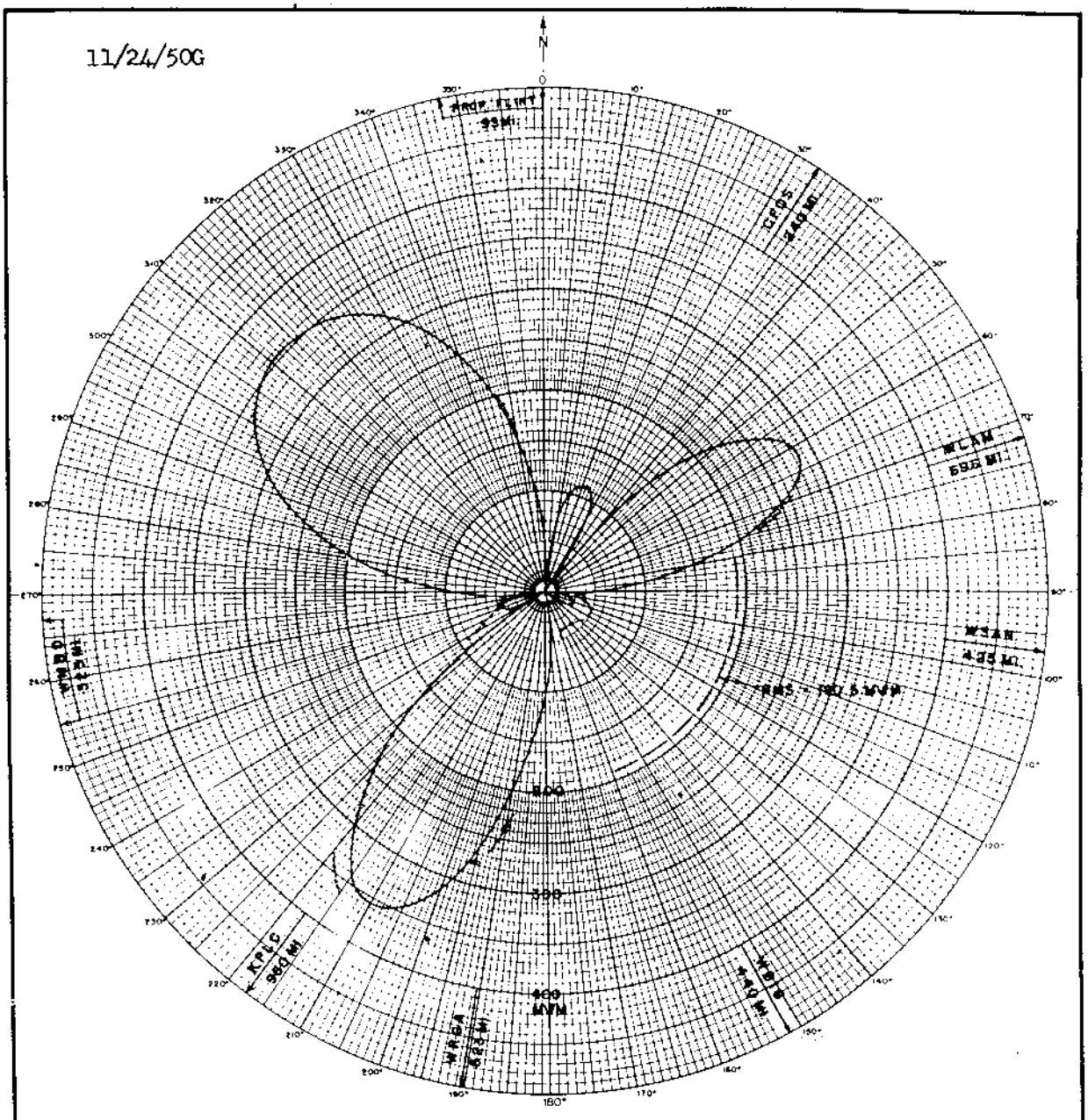


File No. BL-5471 Accepted October 8, 1954 WOHO, Toledo, Ohio 1470 KC

WOHO

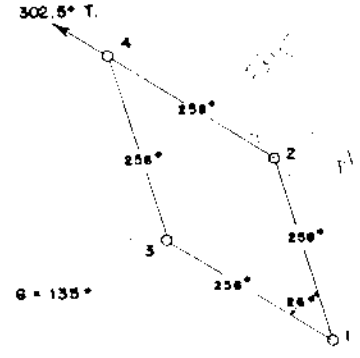
PROPOSED NIGHT | NEW, TOLEDO, OHIO (Midwestern Bg. Co.) | 1kw, DA-2 | 1470 kc

11/24/50G



---- MEOV (SEE TABULATION)

SITE: 41° 37' 55" N
83° 28' 45" W



LATITUDE 41° 37' 55"
LONGITUDE 83° 28' 45"

ANTENNA NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG
1	See Diagram	See Diagram	0	1	192.5	135
2			+77.2	1	192.5	135
3			+53	1	192.5	135
4			+130.2	1	192.5	135

CALCULATED NIGHTTIME HORIZONTAL PLANE PATTERN
for
PROPOSED STATION
TOLEDO, OHIO
1470 KC. 1 KW U, DA-2

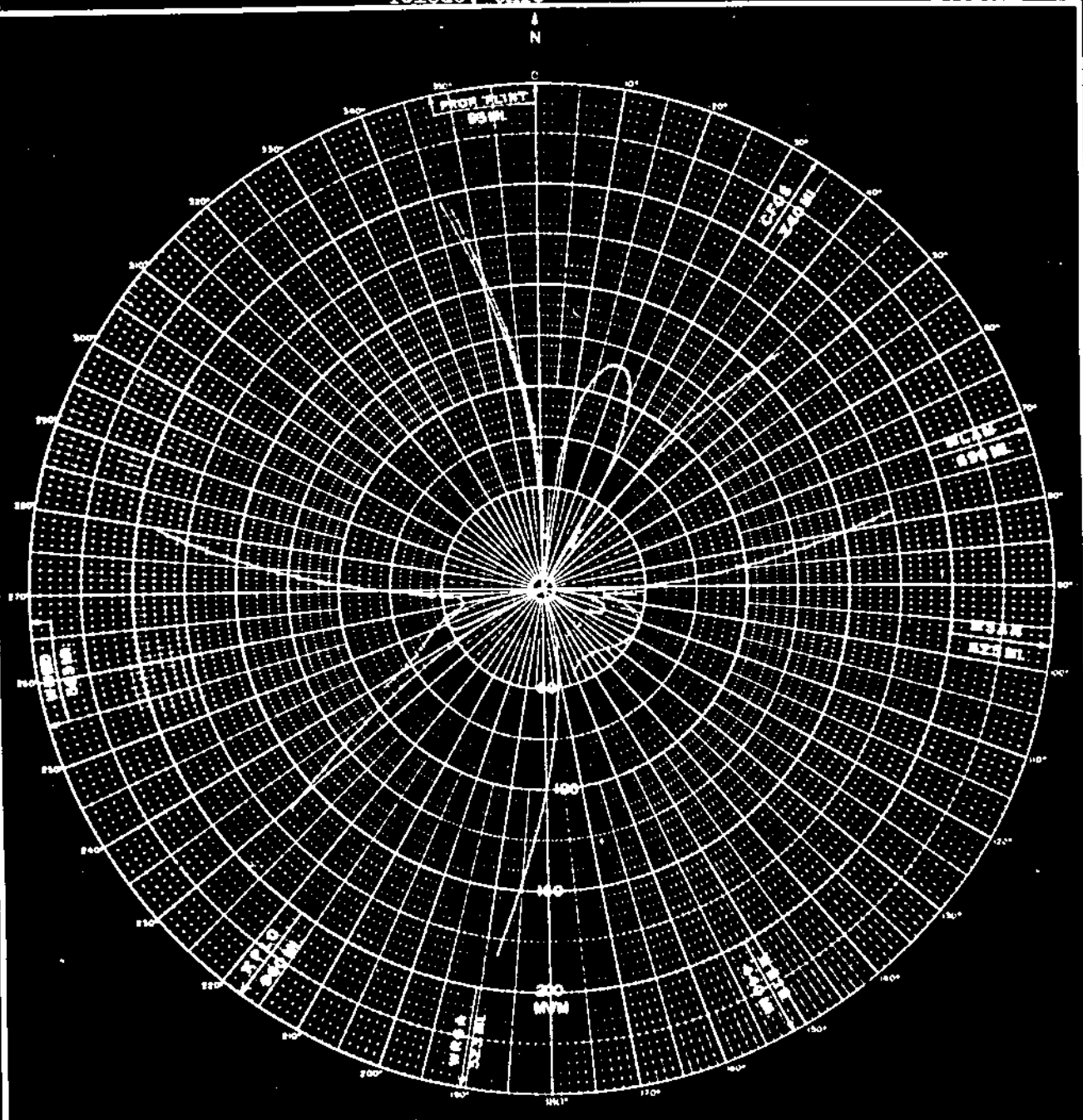
KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D.C.

501030

AMENDMENT RECD 11/7/50 ACC 11/17/50 BP-6421

New, Toledo, Ohio 1470 kc
(Midwestern Bg. Co.)

PROPOSED NIGHT NULLS Station wohc 1kw, DA-2,U
Toledo, Ohio 1470 KC



LATITUDE LONGITUDE						
STATION NUMBER	AZIMUTH DEG	SPACING DEG	PHASING DEG	FIELD RATIO	MV/M FOR 1 KW	HEIGHT DEG

EXPANDED SCALE CALCULATED NIGHTTIME HORIZONTAL PLANE PATTERN
FOR
PROPOSED STATION
TOLEDO OHIO
1470 KC 1KW U, DA-2

KEAR AND KENNEDY
CONSULTING ENGINEERS
WASHINGTON, D C

801030

14

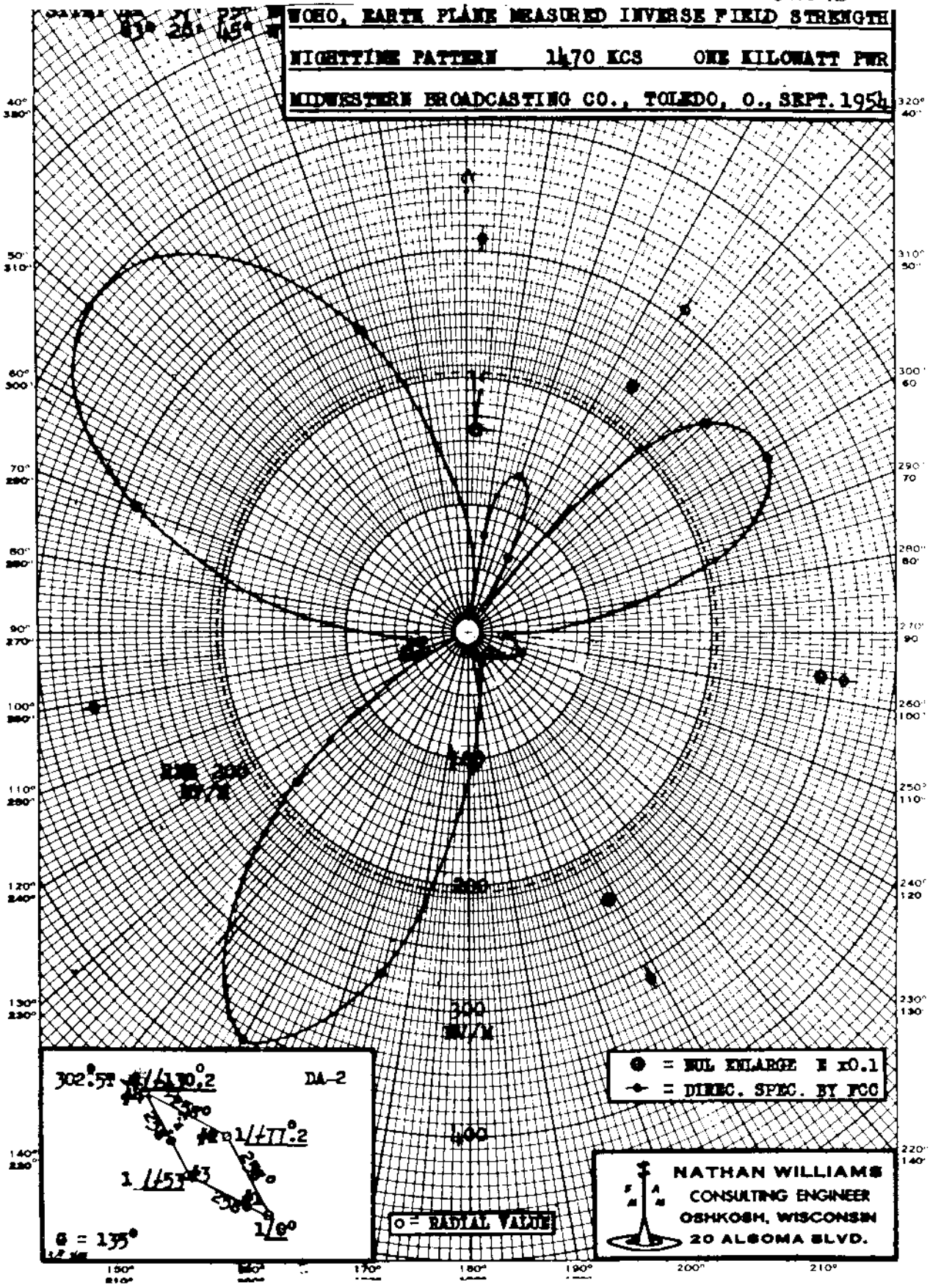
WOHO

MEASURED NIGHT (10/18/54 G)

STATION WOHO
TOLEDO, OHIO

1 KW U
DA-2

1470 KC

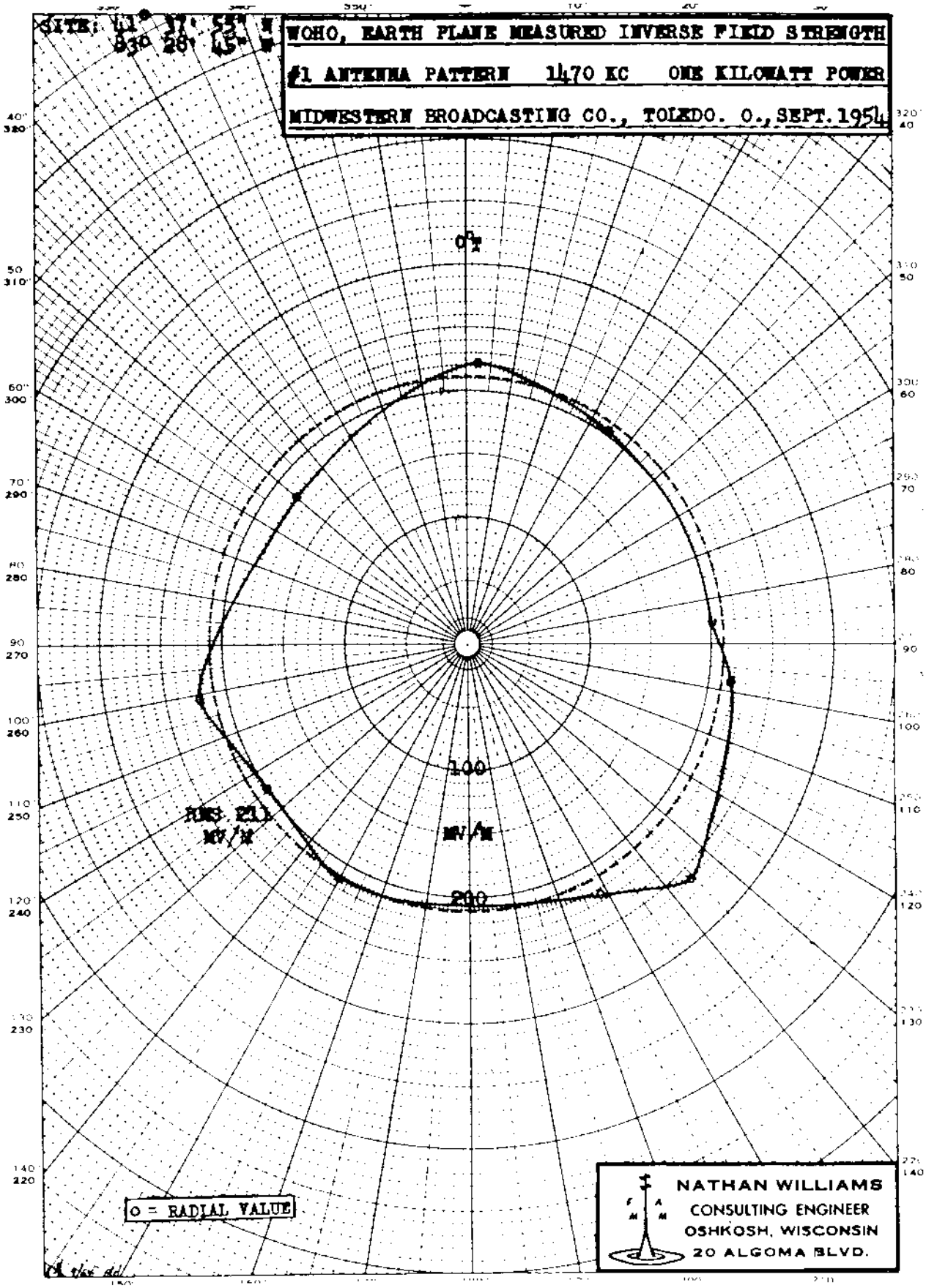


File No. BL-5471 Accepted October 8, 1954 WOHO Toledo, Ohio 1470 KC

WOHO

ND

MEASURED ~~NIGHT AND DAY~~ STATION WOHO 1 KW U
(10/18/54 G) TOLEDO, OHIO DA-2 PATTERN #1 1470 KC



File No. BL-5471 Accepted October 8, 1954 WOHO, Toledo, Ohio 1470 KC

WRBD

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: WRBD — Main Studio: Pompano Beach, Florida

Frequency: 1470 kHz — Power: 2.5 kW Night 5 kW Day

Notification List No. 1731 — Date: April 27, 1977 — Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 26° 10' 47"
West Longitude: 80° 13' 14"

ANTENNA CHARACTERISTICS

Authorized for Daytime and Nighttime operation. (DA-2)
Number of elements: 6
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	SW(#6)	CW(#5)	NW(#4)	SE(#3)	CE(#2)	NE(#1)
HEIGHT ABOVE INSULATORS:	167'	167'	167'	392'(211°)	167'	167'(90°
NIGHT PHASING:	+87°	-58°	+161°	-74°	+141°	0°
NIGHT FIELD RATIO:	0.23	0.85	0.91	0.25	0.93	1
DAY PHASING:	-	-	-	0°	-94°	-
DAY FIELD RATIO:	-	-	-	1.0	0.90	-

SPACING AND ORIENTATION: The towers are located in two parallel rows with 3 towers per row. Adjacent towers in a row are spaced 167.4' (90°) on a line bearing 35° true. End towers forming a side of the parallelogram are spaced 167.4' (90°) on a line bearing 285° true.

GROUND SYSTEM: 120-170' equally spaced copper radials about each tower. Radials are shortened and bonded to transverse straps along intersections between towers. Centers of system are bonded together.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

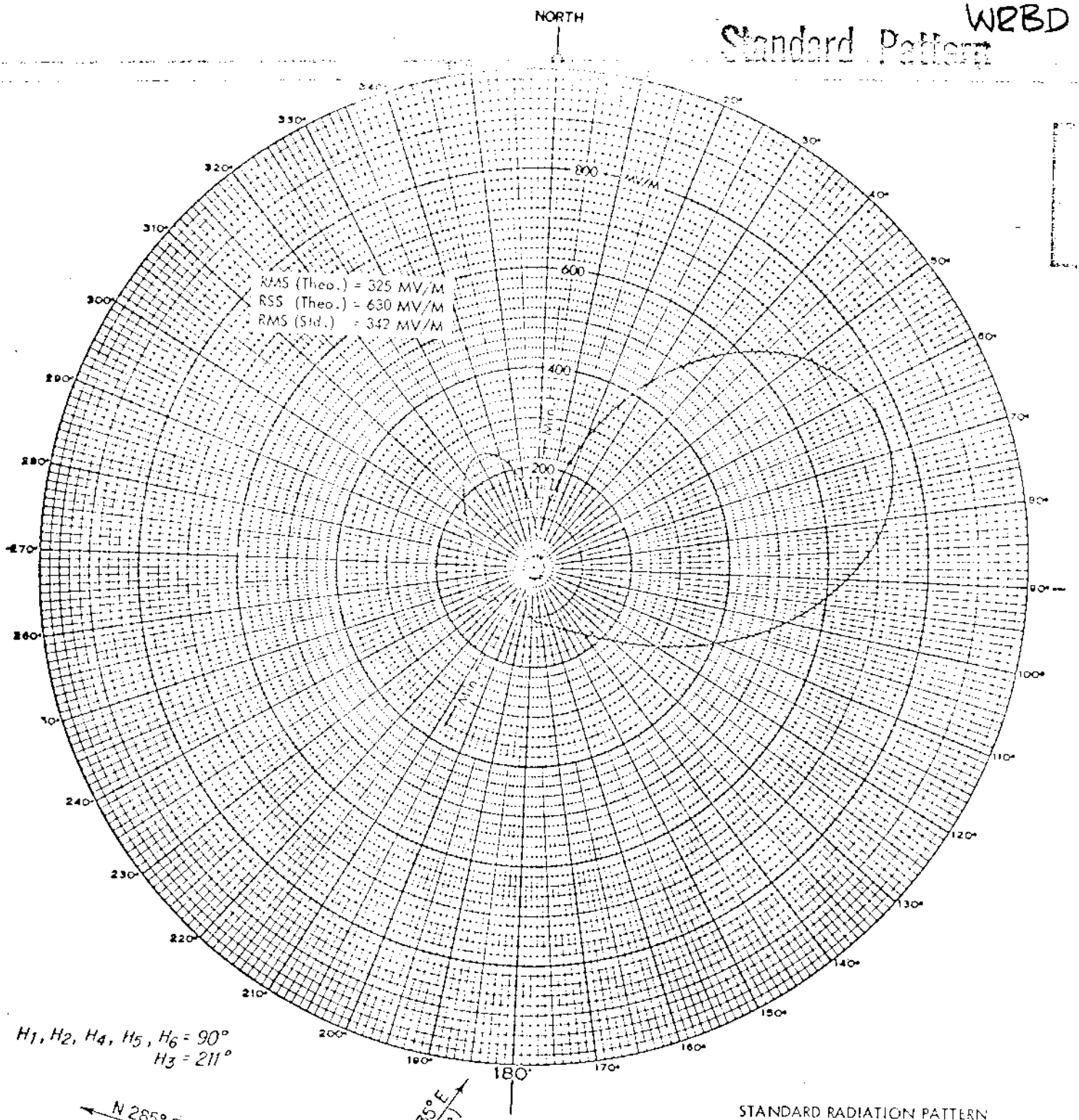
	THEORETICAL		STANDARD
	RMS	RSS	RMS
Day	496 mv/m	- mv/m	- mv/m
Night	325 mv/m	630 mv/m	342 mv/m

(Cont'd)

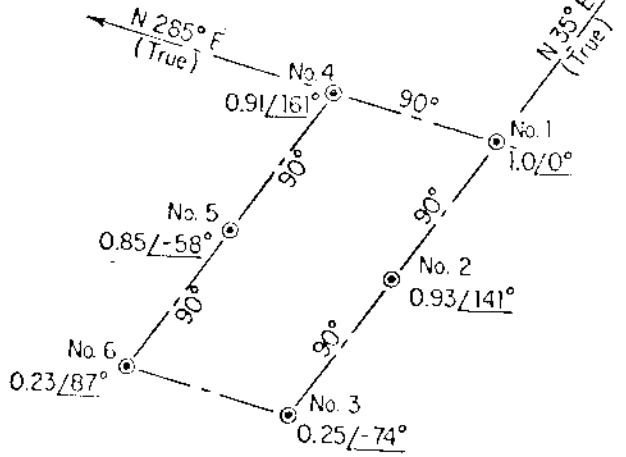
Note: Please retain the proposed Daytime directional antenna radiation pattern notified for station WRBD in United States Change List Number 1654 dated October 15, 1975 and attach to this Revised Description Sheet and Nighttime pattern. Also retain the existing daytime directional antenna radiation pattern notified in U.S. Change List No. 1326 dated June 25, 1969. This notification concerns only the addition of new nighttime operation with existing and proposed Daytime operation continued as previously notified.

CTR NO 31295A3

Standard Pattern WRBD



$H_1, H_2, H_4, H_5, H_6 = 90°$
$H_3 = 211°$

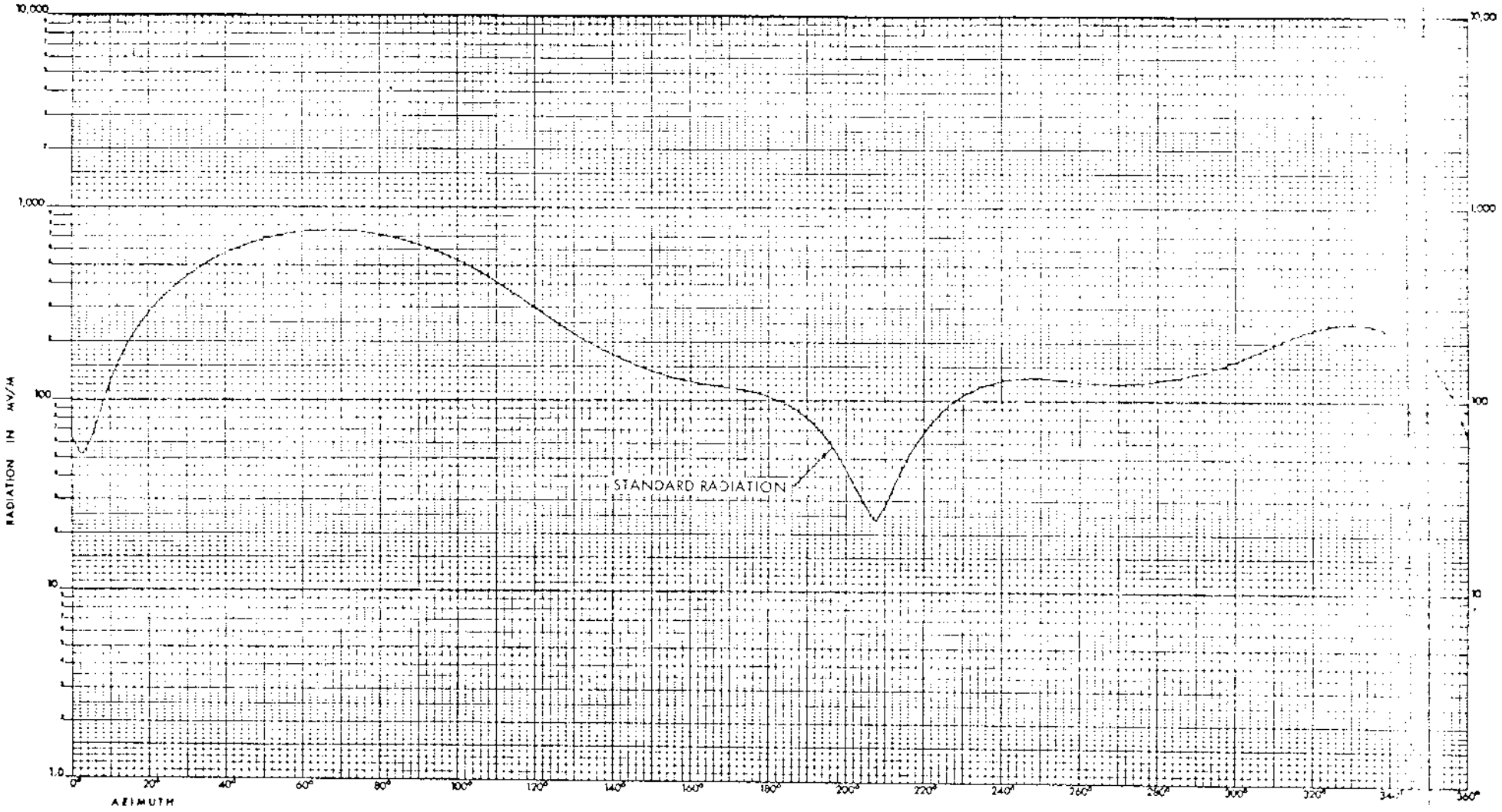


STANDARD RADIATION PATTERN

NORTH LATITUDE: 26° 10' 47"
WEST LONGITUDE: 80° 13' 14"

FIGURE 3 AMENDED
PROPOSED NIGHTTIME HORIZONTAL PLANE
RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976



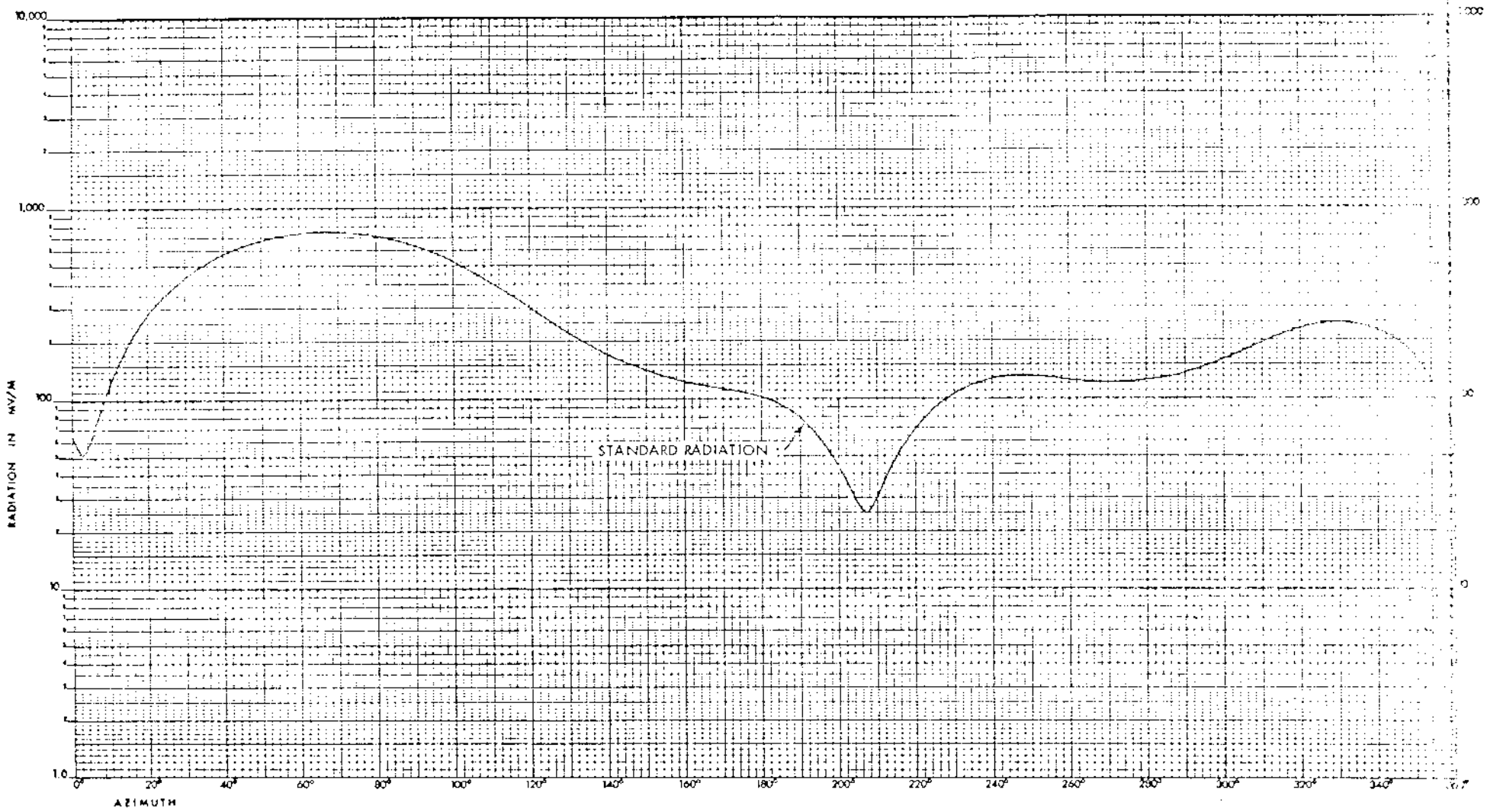
ELEVATION ANGLE - 0°

FIGURE 3A AMENDED
PROPOSED NIGHTTIME HORIZONTAL PLANE
RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



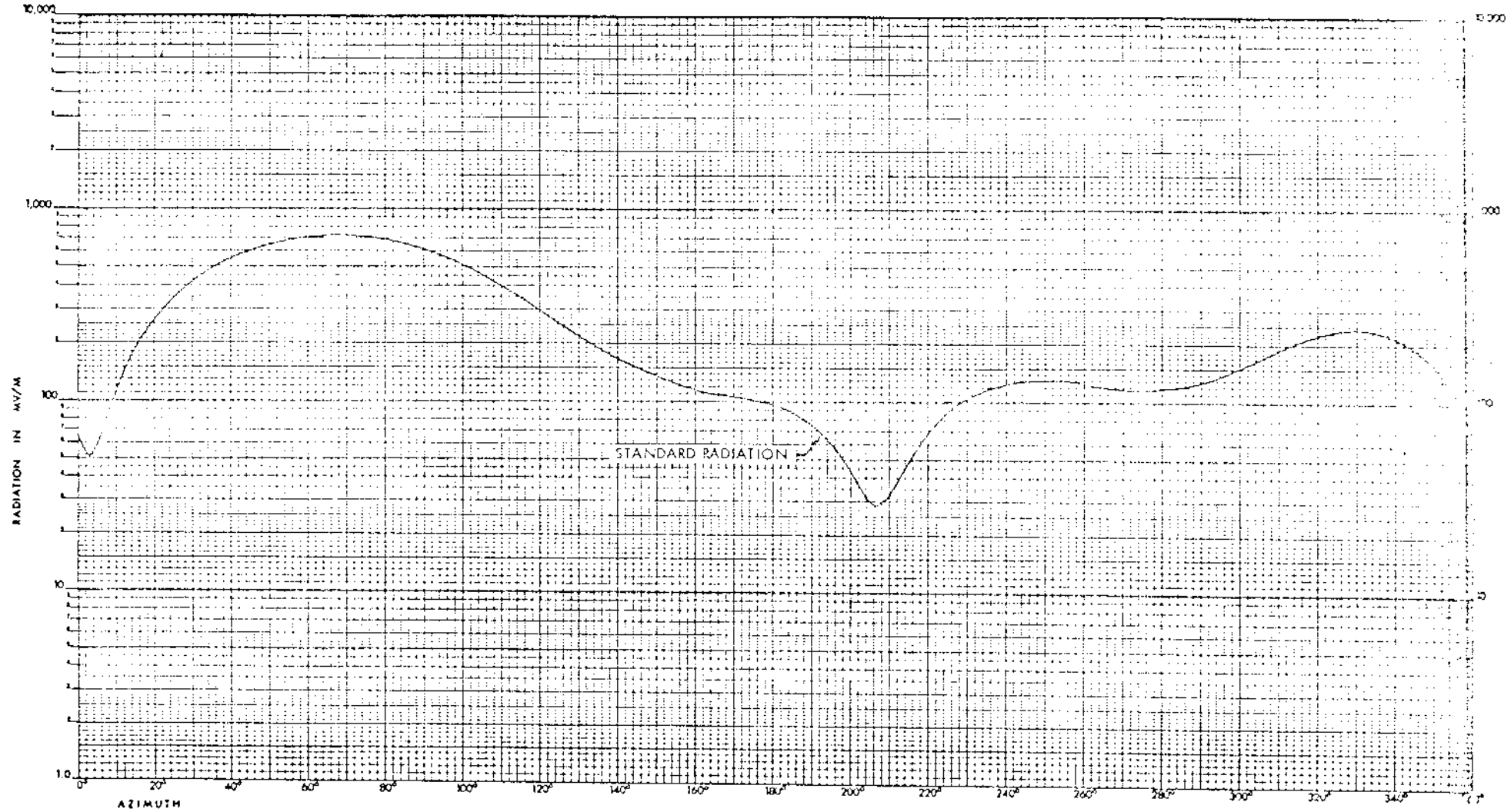
ELEVATION ANGLE = 5°

FIGURE 3B AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KV/-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



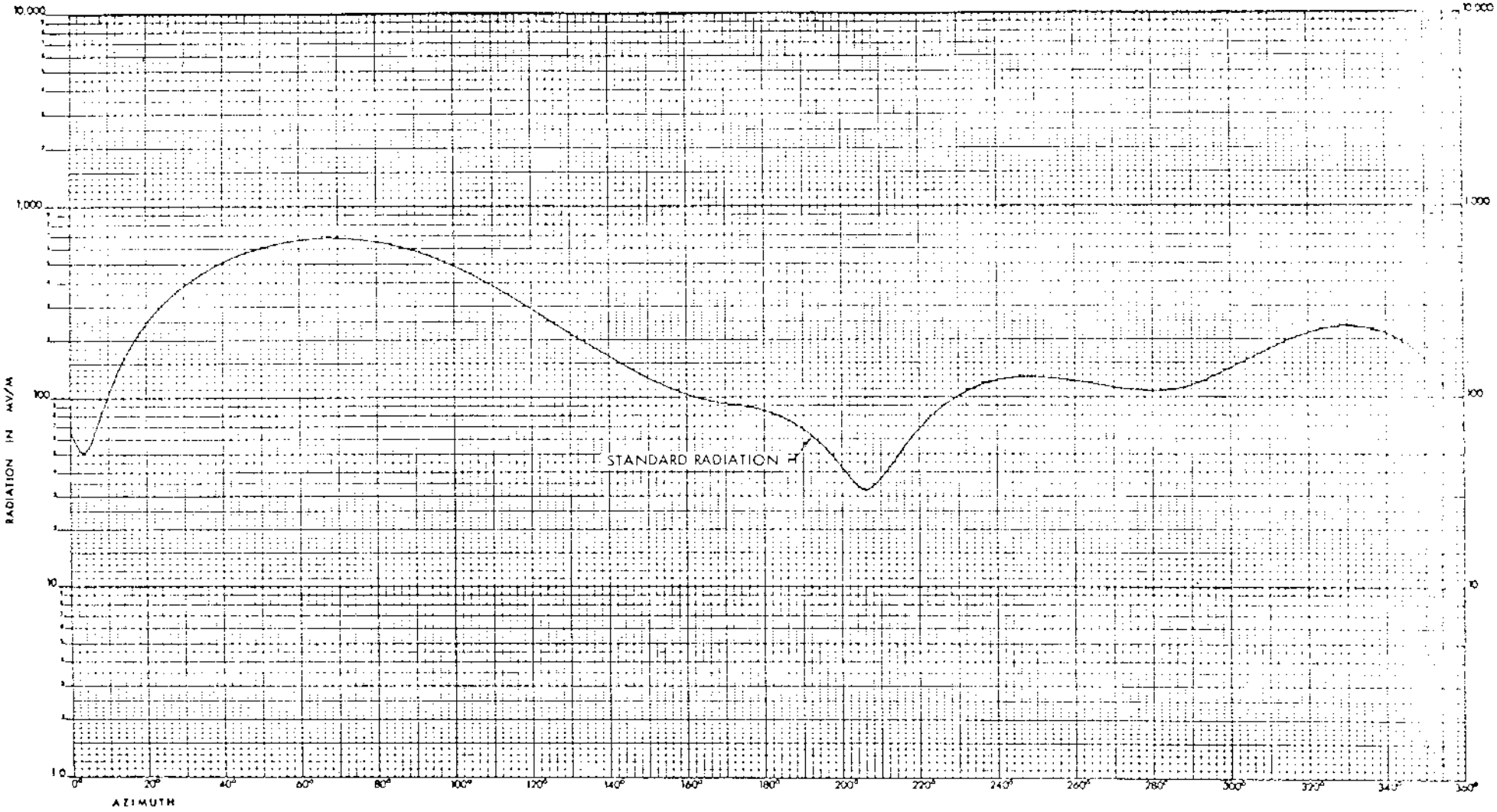
ELEVATION ANGLE = 10°

FIGURE 3C AMENDED
NIGHTTIME RADIATION PATTERN
WR8D 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WR8D



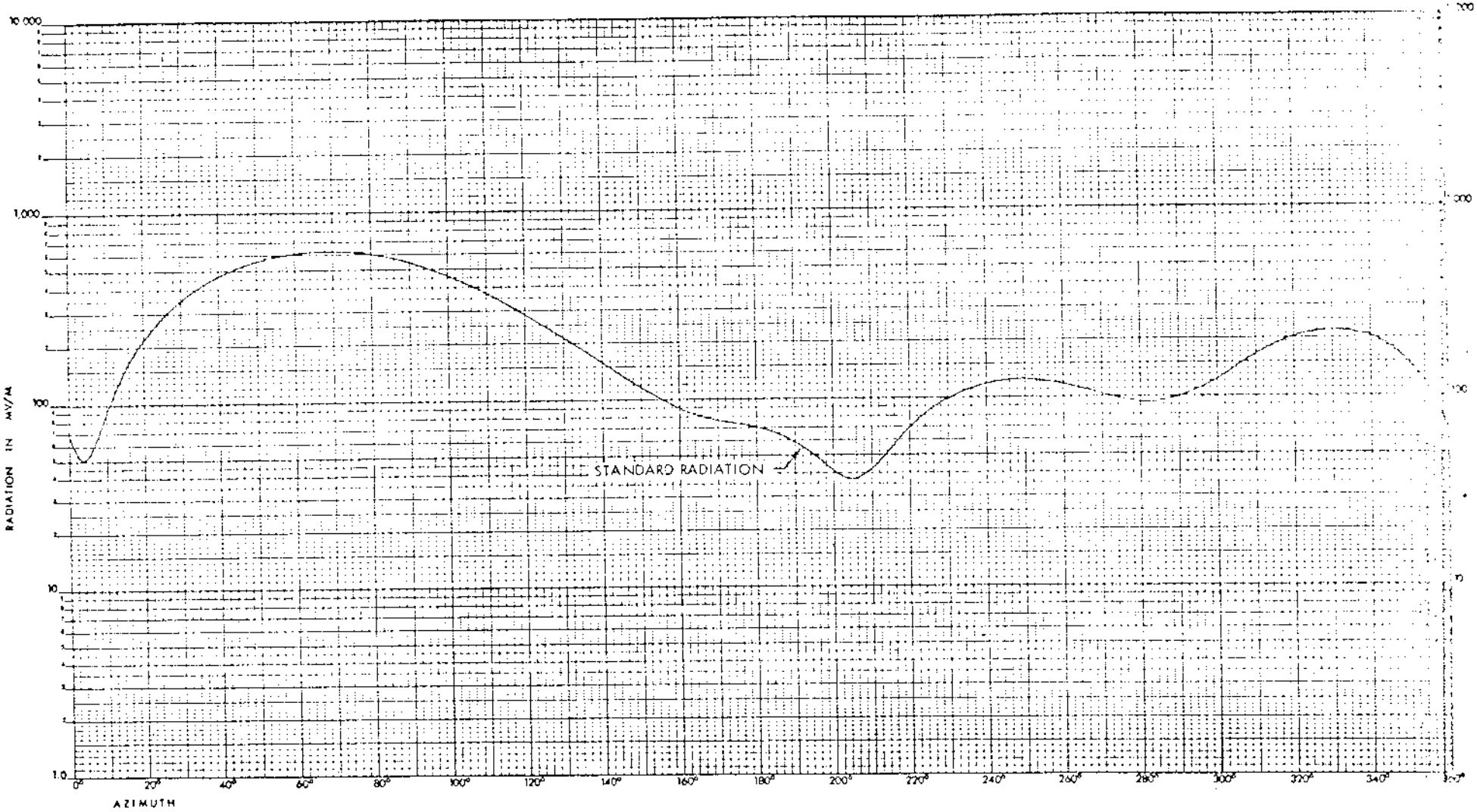
ELEVATION ANGLE = 15°

FIGURE 3D AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



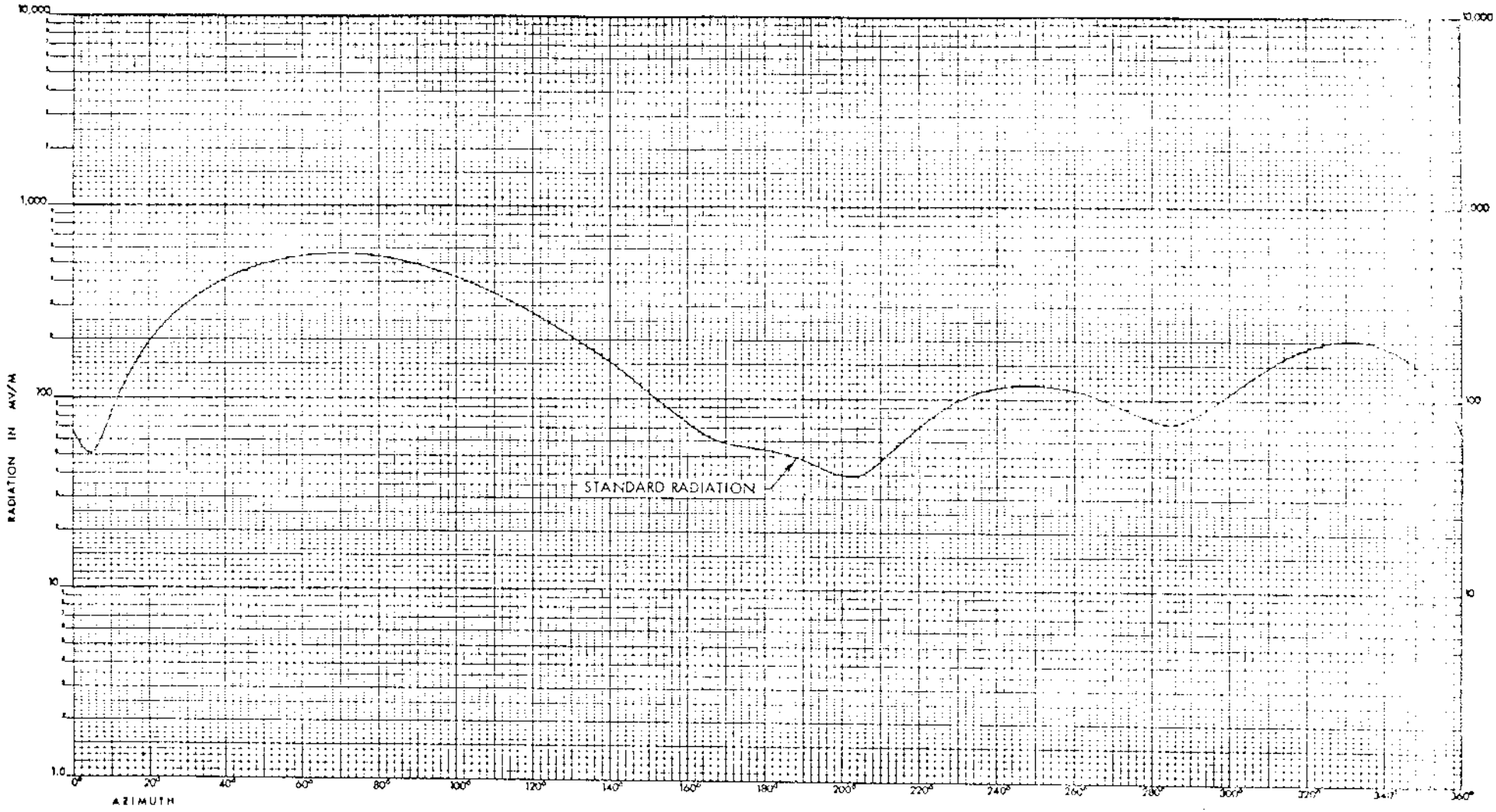
ELEVATION ANGLE - 20°

FIGURE 3E AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



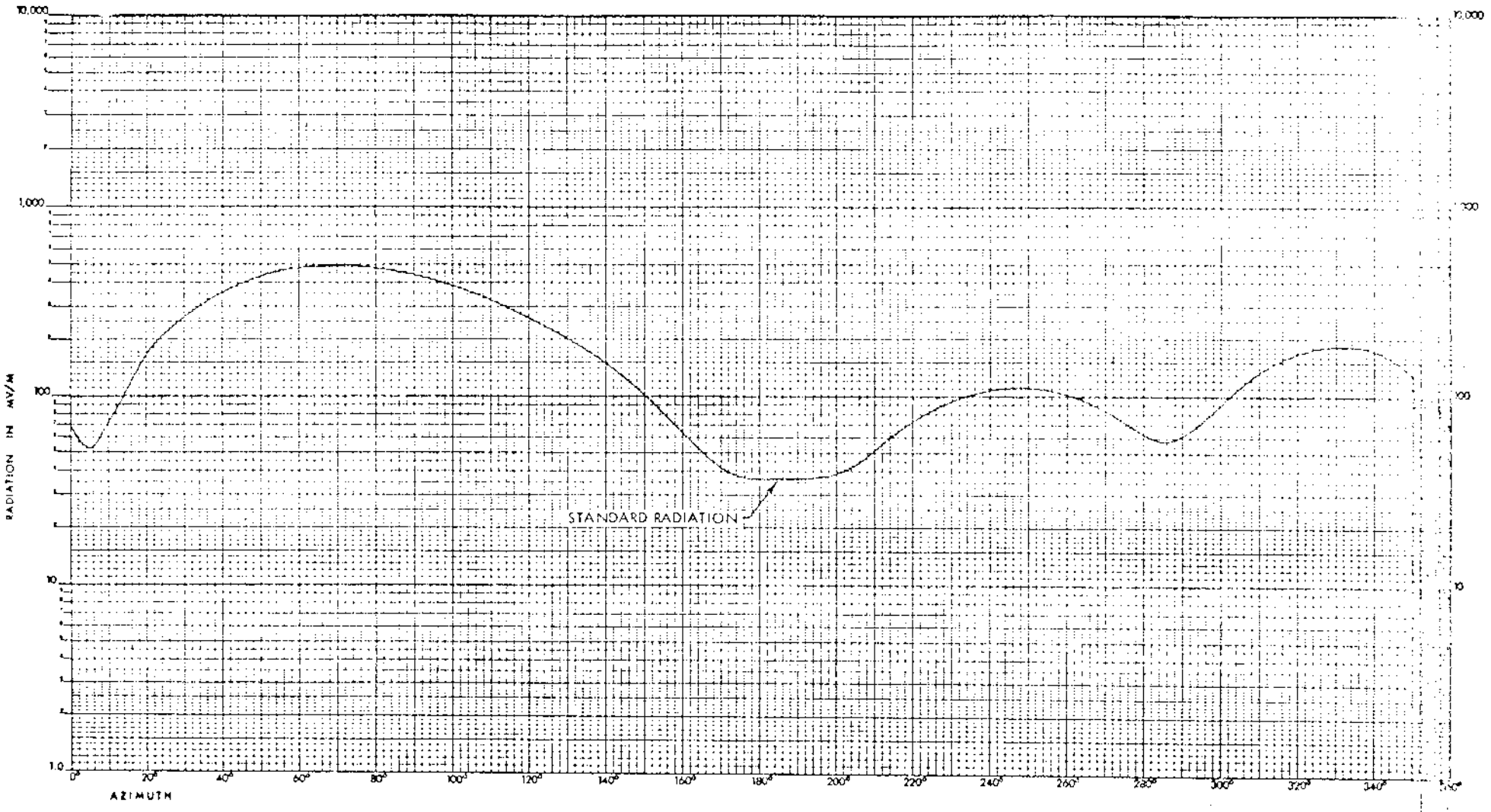
ELEVATION ANGLE = 25°

FIGURE 3F AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



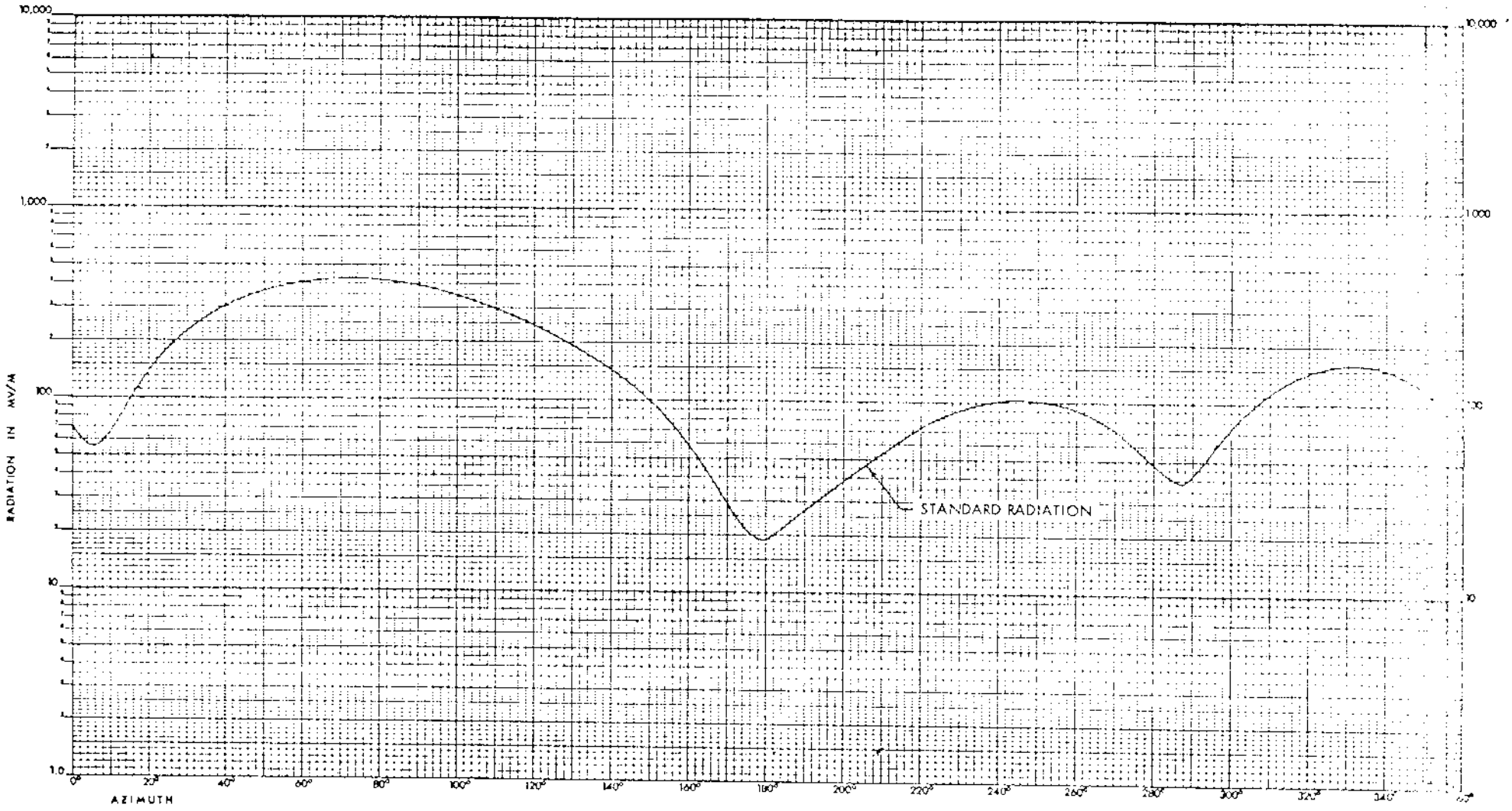
ELEVATION ANGLE = 30°

FIGURE 3G AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



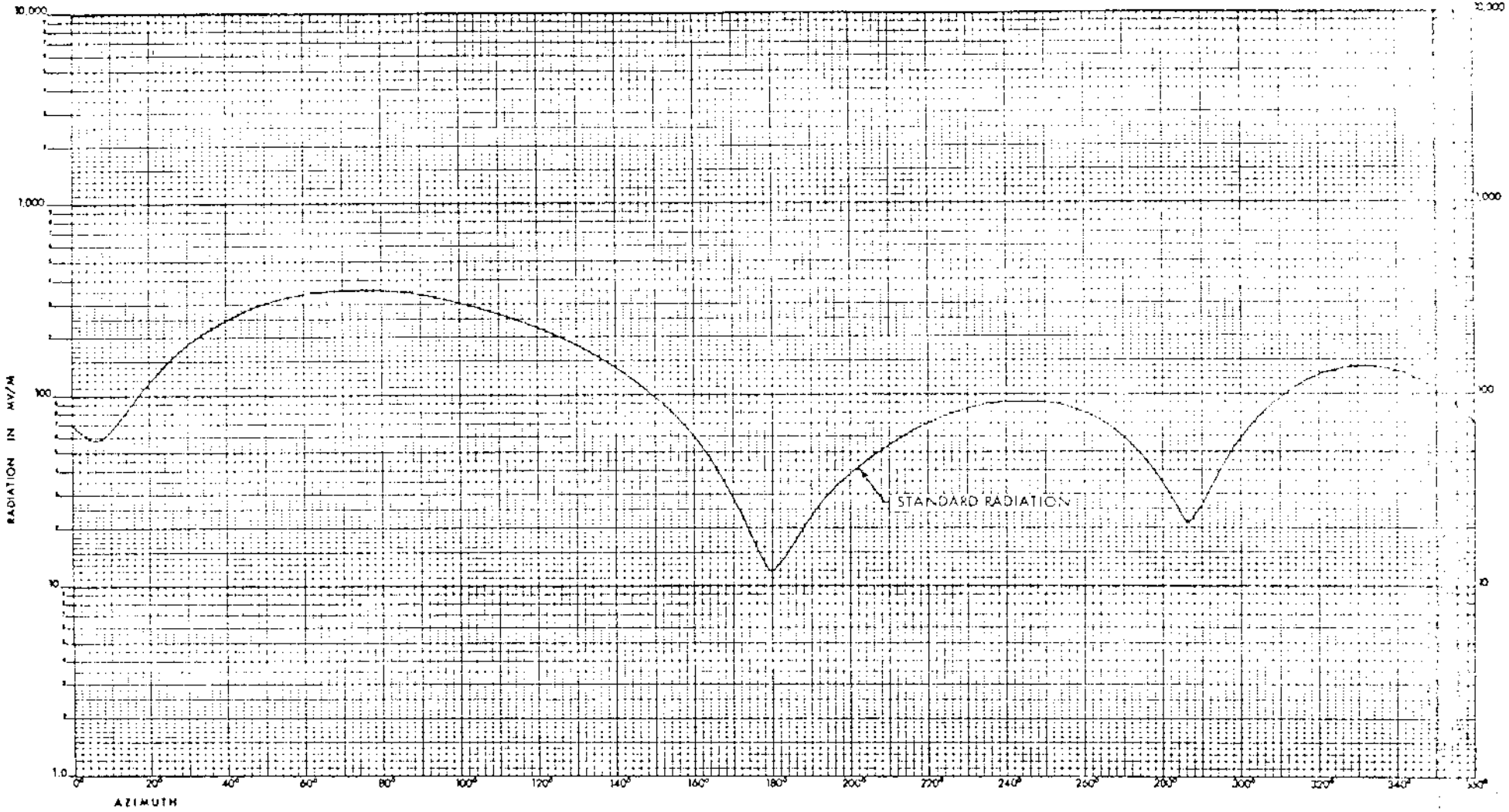
ELEVATION ANGLE = 35°

FIGURE 3H AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



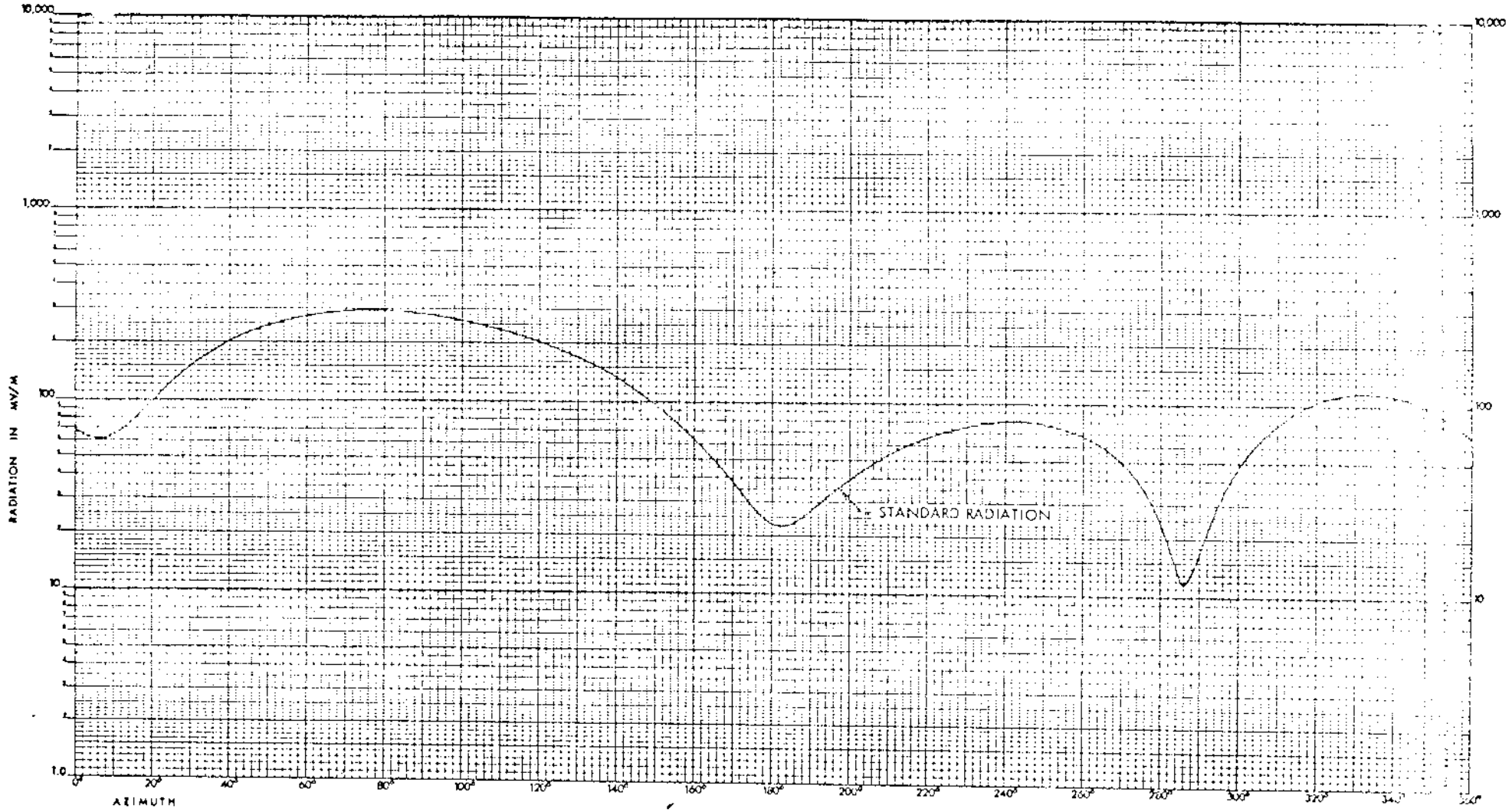
ELEVATION ANGLE = 40°

FIGURE 31 AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



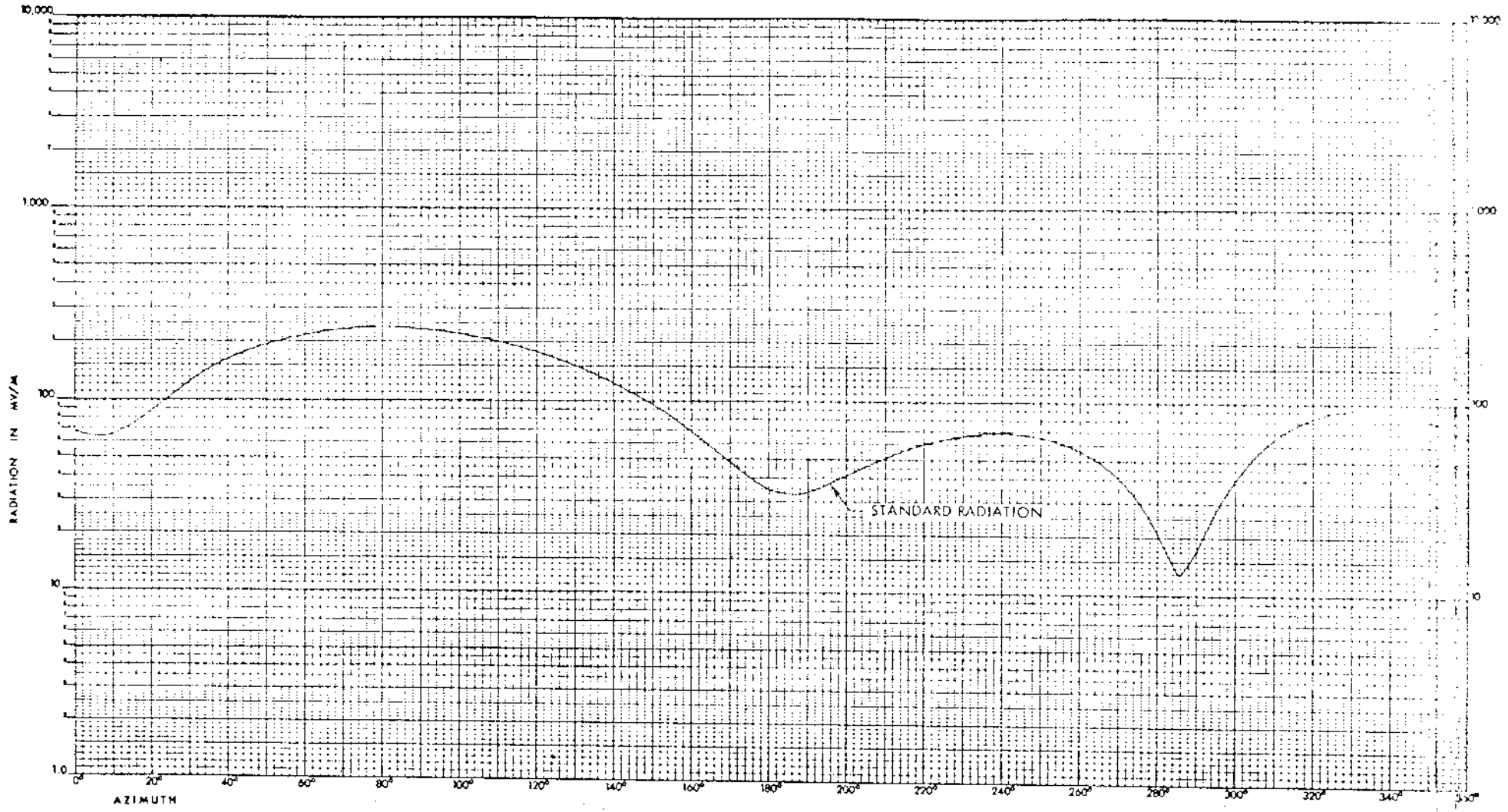
ELEVATION ANGLE = 45°

FIGURE 3J AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD



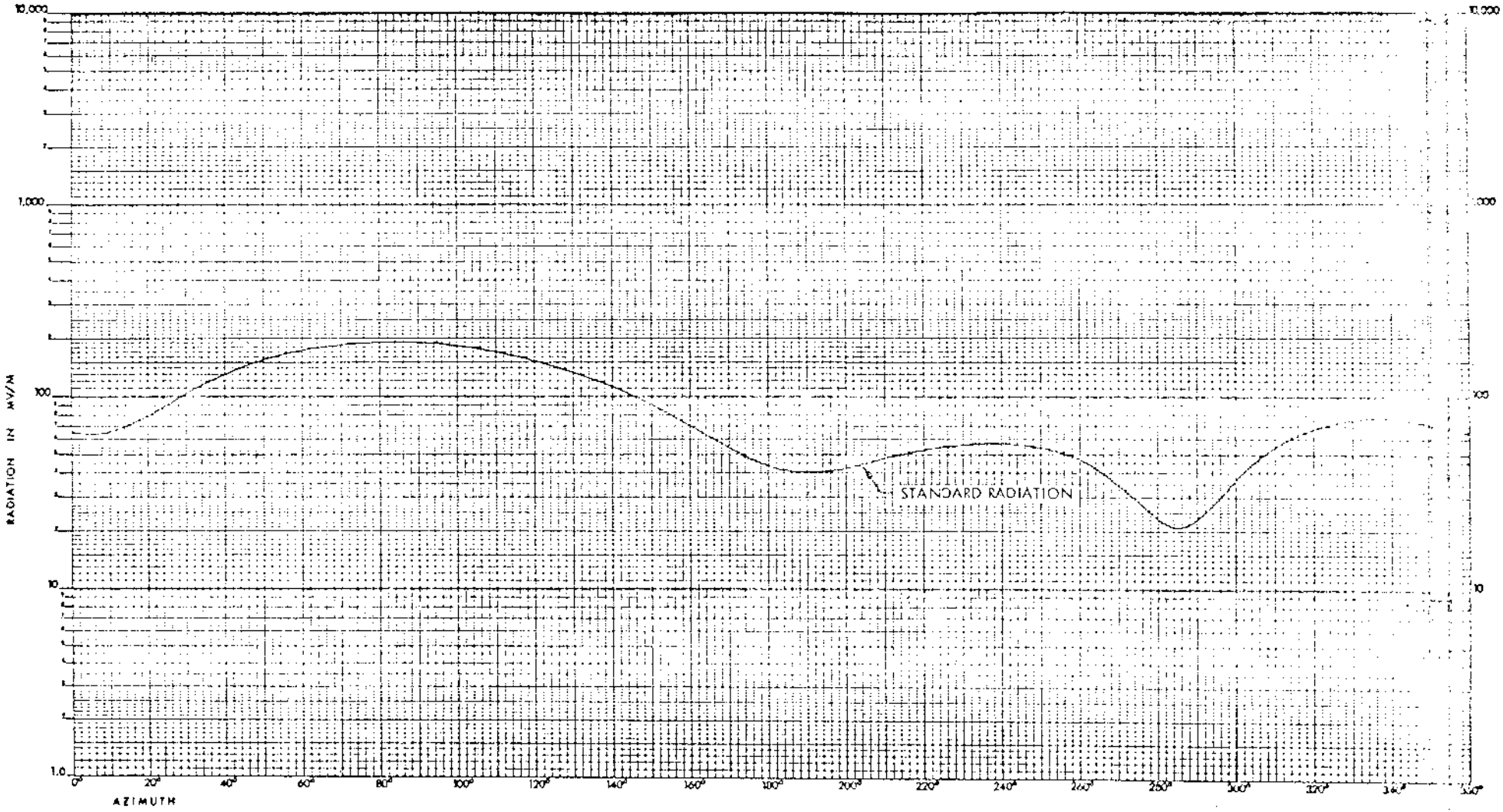
ELEVATION ANGLE = 50°

FIGURE 3K AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD

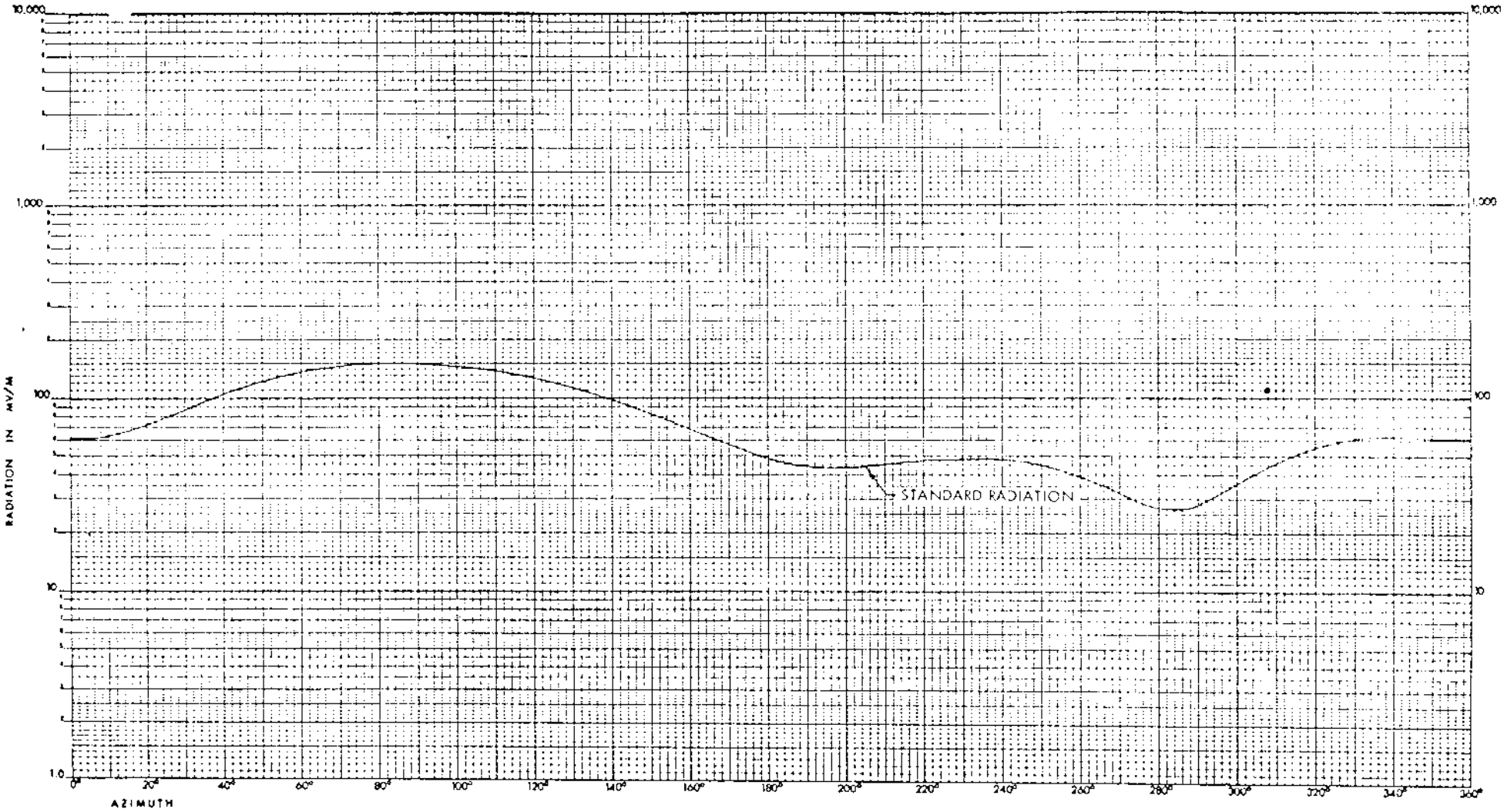


ELEVATION ANGLE - 55°

FIGURE 3L AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

WRBD



ELEVATION ANGLE = 60°

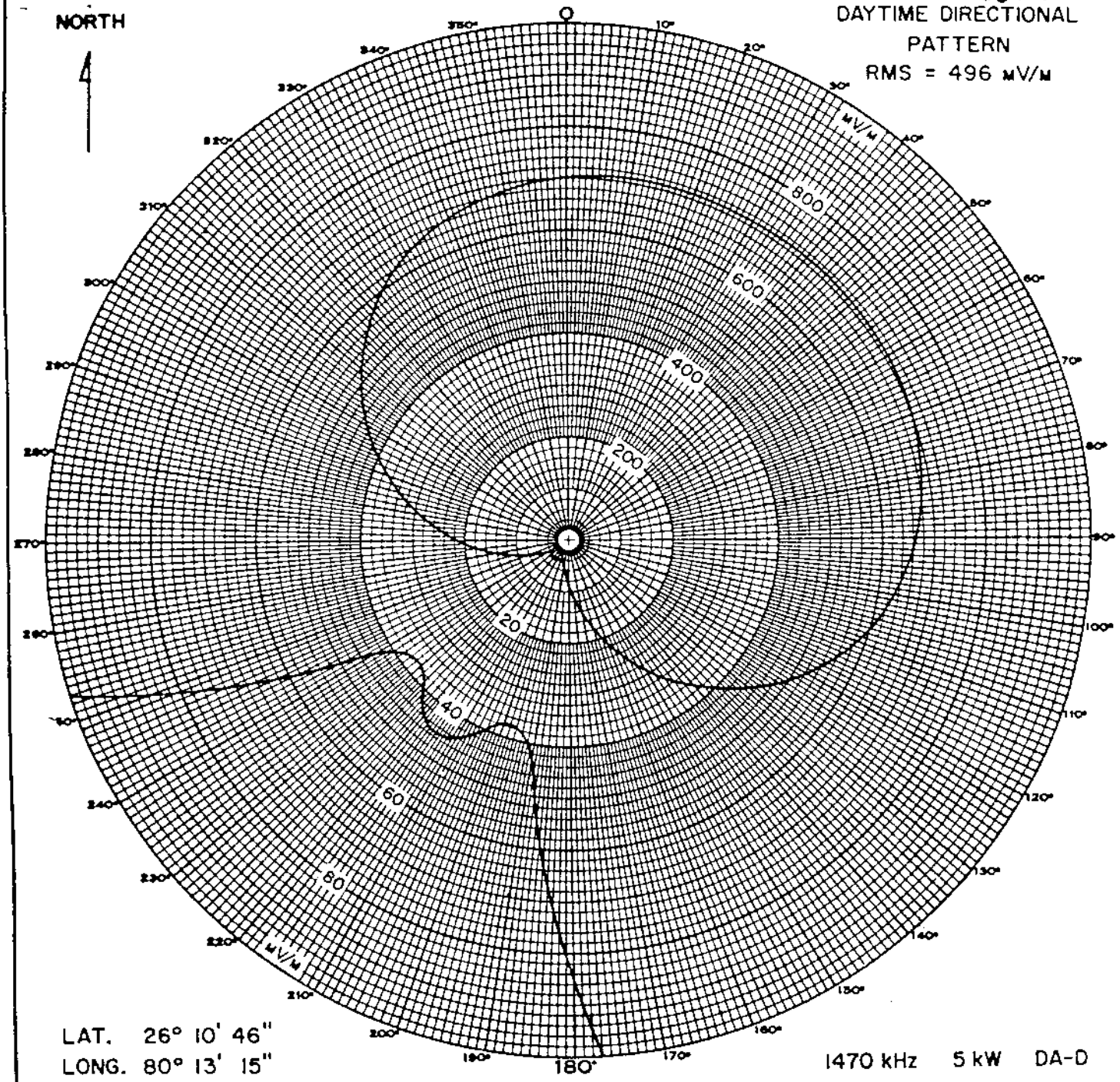
FIGURE 3M AMENDED
NIGHTTIME RADIATION PATTERN
WRBD 2.5KW-N, 5KW-LS DA-2 1470 KHz
POMPANO BEACH, FLORIDA

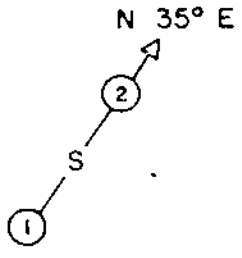
Prepared by
Lohnes and Culver Washington, D. C.
October, 1976

Standard Pattern

WRBD

WRBD





S = 167.4' = 90°
G1 = 392.0' = 211°
G2 = 167.0' = 90°

THEORETICAL ANTENNA PARAMETERS

TOWER	FIELD	PHASE
1	1.00	00°
2	0.90	-94°

PREPARED BY
THE FIRM OF A. EARL CULLUM, JR.
CONSULTING ENGINEERS

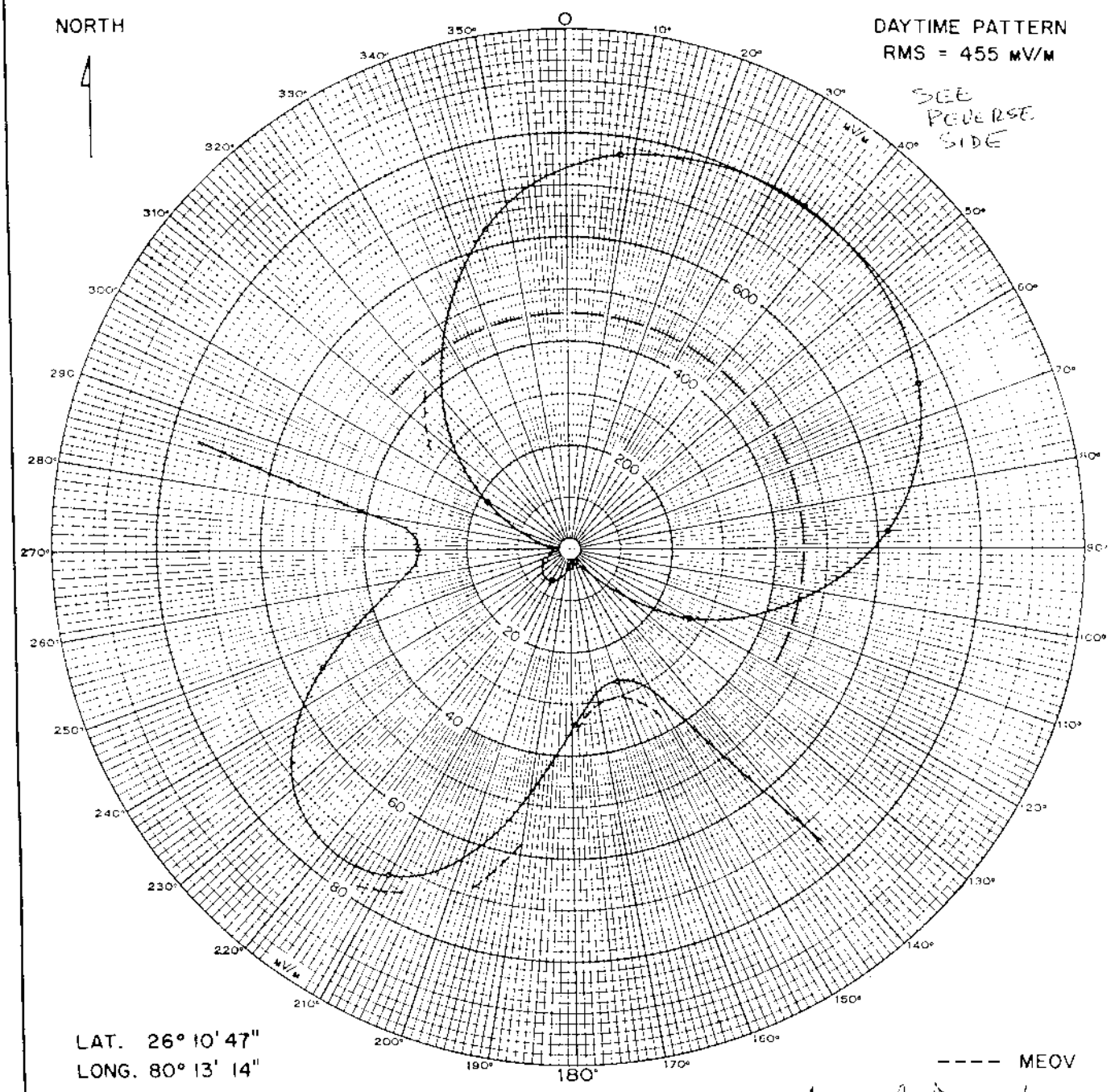
RADIO STATION WRBD
POMPANO BEACH, FLORIDA
750204.2 FIGURE 2A

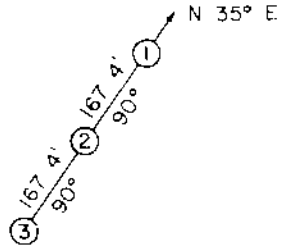
WRBD

Measured Day
(1-28-70ct)

Station WRBD
Pompano Beach, Florida

5kw, DA-D, D
1470 kc





G = 90°

ANTENNA PARAMETER

TOWER	THEORETICAL FIELD	THEORETICAL PHASE	OBSERVED FIELD	OBSERVED PHASE
1	0.50	-123.0°	0.54	-115.0°
2	1.00	3.5°	1.00	0.0°
3	0.50	+123.0°	0.52	+122.0°

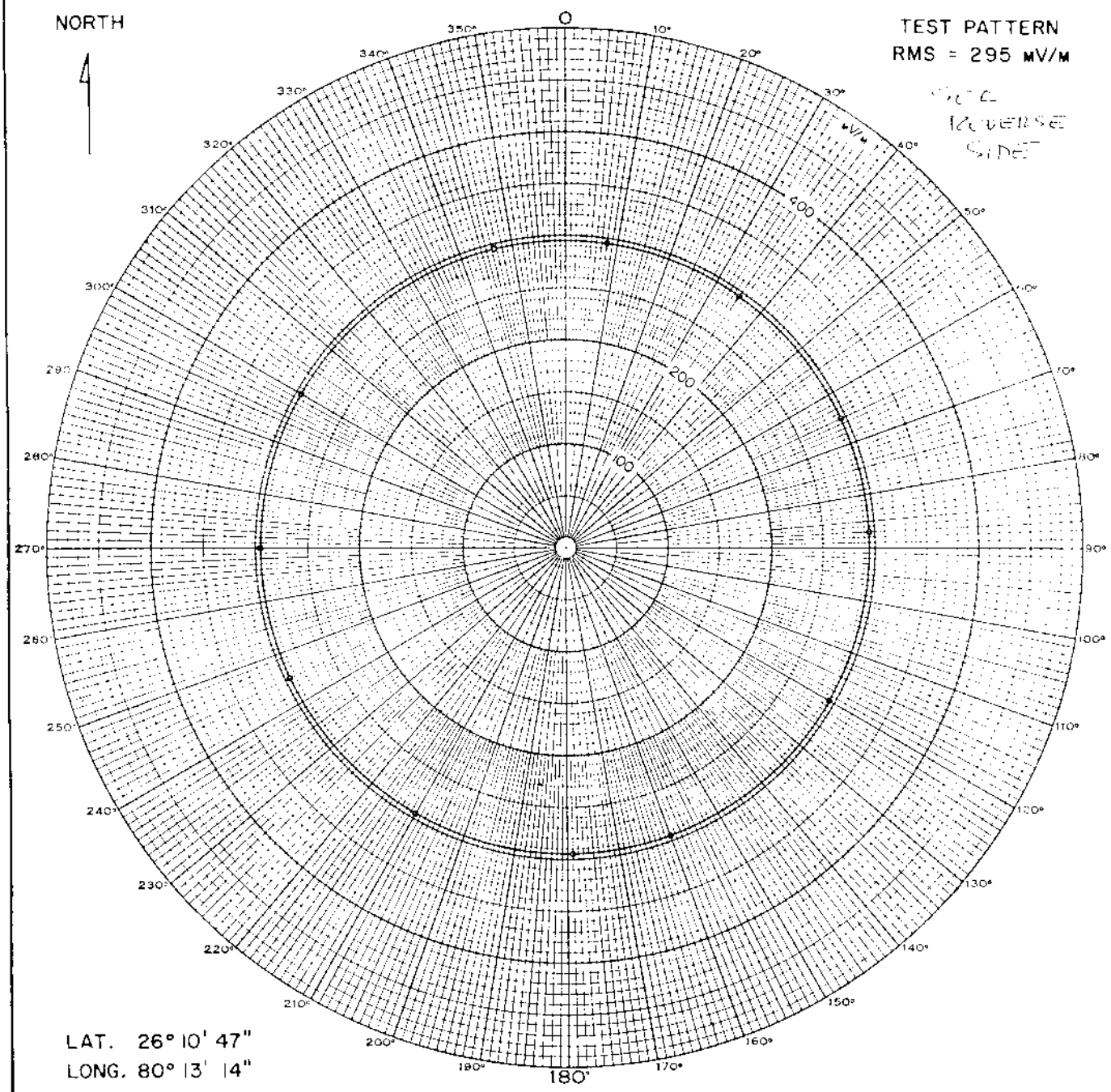
PREPARED BY
THE FIRM OF A. EARL CULLUM, JR.
CONSULTING ENGINEERS

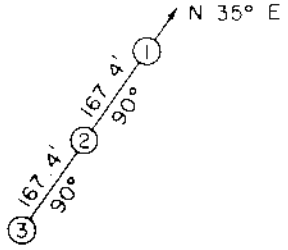
RADIO STATION WRBD
1470 kHz 5 kW DA-D
691001 FIGURE 2B

FCC File No. BL-12467
Accepted 1-16-70

Station WRBD
Pompano Beach, Florida

1470 kc





G = 90°

TOWER	OPERATION
1	FLOATING
2	SERIES FED
3	FLOATING

PREPARED BY
THE FIRM OF A. EARL CULLUM, JR.
CONSULTING ENGINEERS

RADIO STATION WRBD
1470 kHz 5 kW DA-D
691001 FIGURE 2A

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station : WRBD

Frequency : 1470 kHz

Notification List No.: 1754

Main Studio: Pompano Beach, Florida

Power : 2.5kw Night 5kw Day

Date : October 27, 1977 Class: III

GEORGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

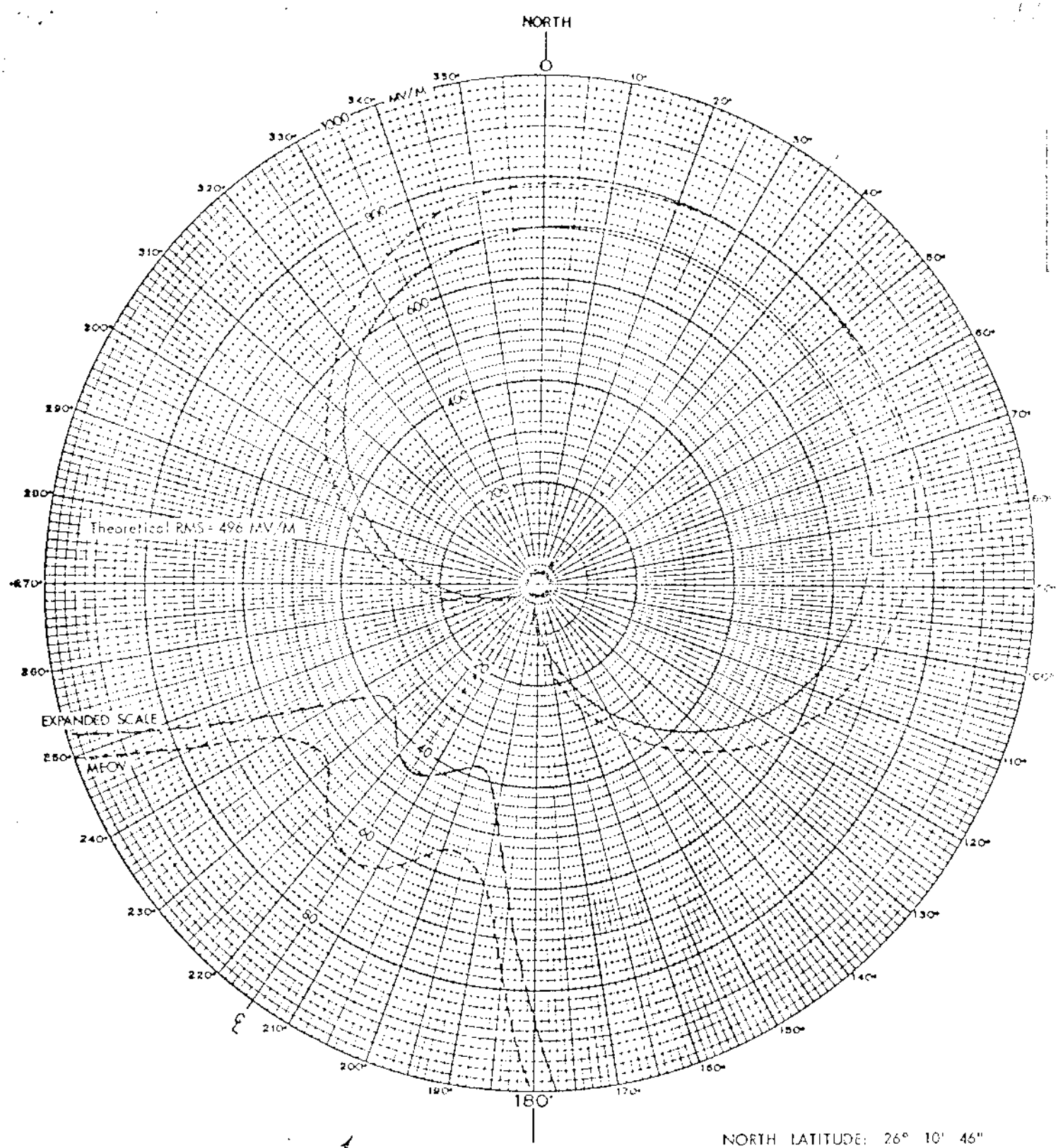
North Latitude: 26° 10' 47"
West Longitude: 80° 13' 14"

Authorized for Day and Night operation (DA-2).

PREDICTED EFFECTIVE DAY FIELD:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	496 mv/m		
Night	325 mv/m	630 mv/m	342 mv/m

Note: Please retain the description sheet and directional antenna radiation patterns notified for Station WRBD in United States Change List Number 1731, dated April 27, 1977 and attach to this supplemental Description Sheet and Daytime pattern. This notification is for the purpose of indicating only a change to add m.e.o.v.s of radiation to the daytime pattern with no changes in the proposed nighttime operation.



NORTH LATITUDE: 26° 10' 46"
WEST LONGITUDE: 80° 13' 15"

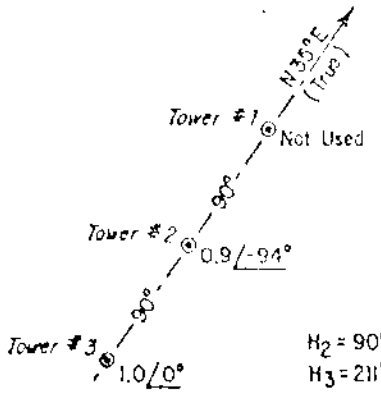
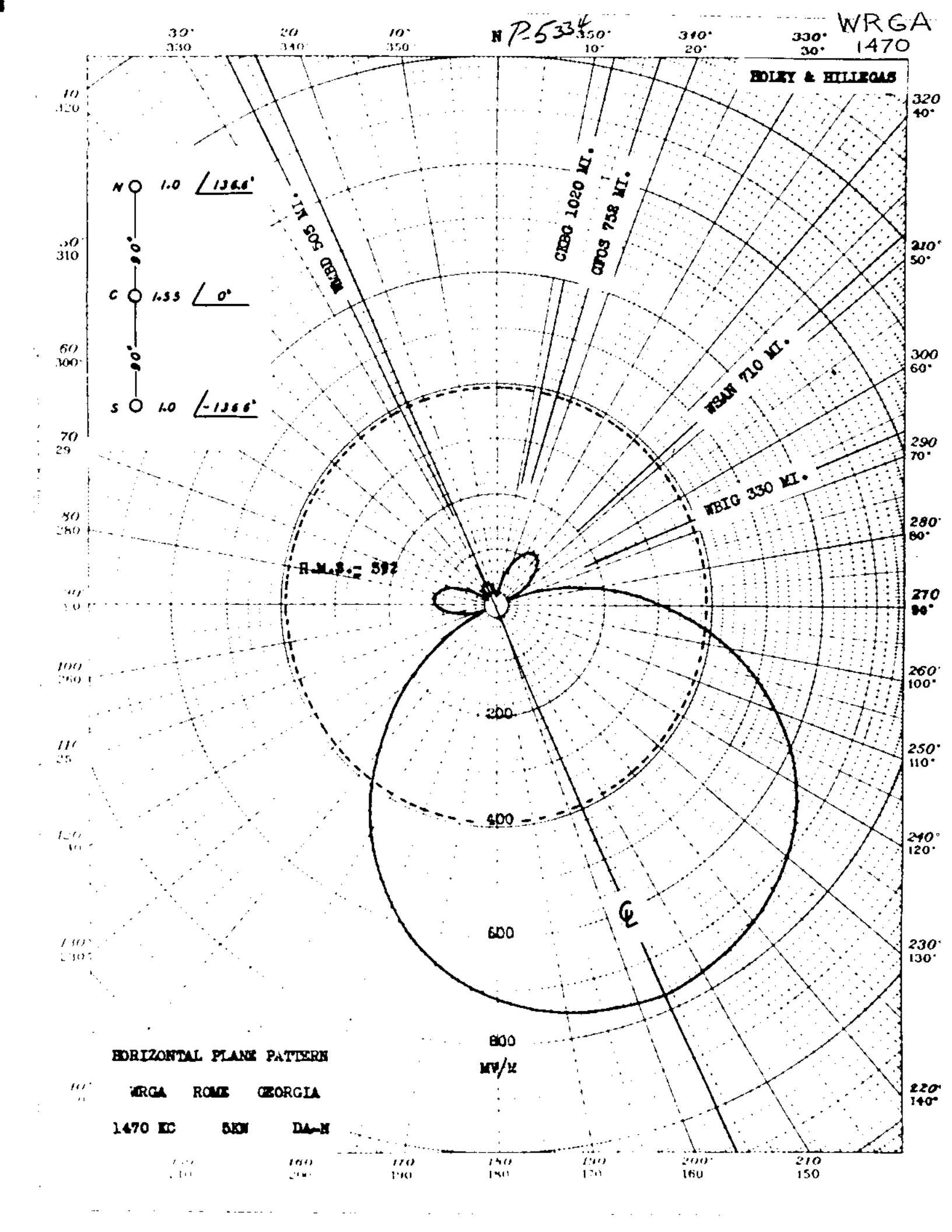
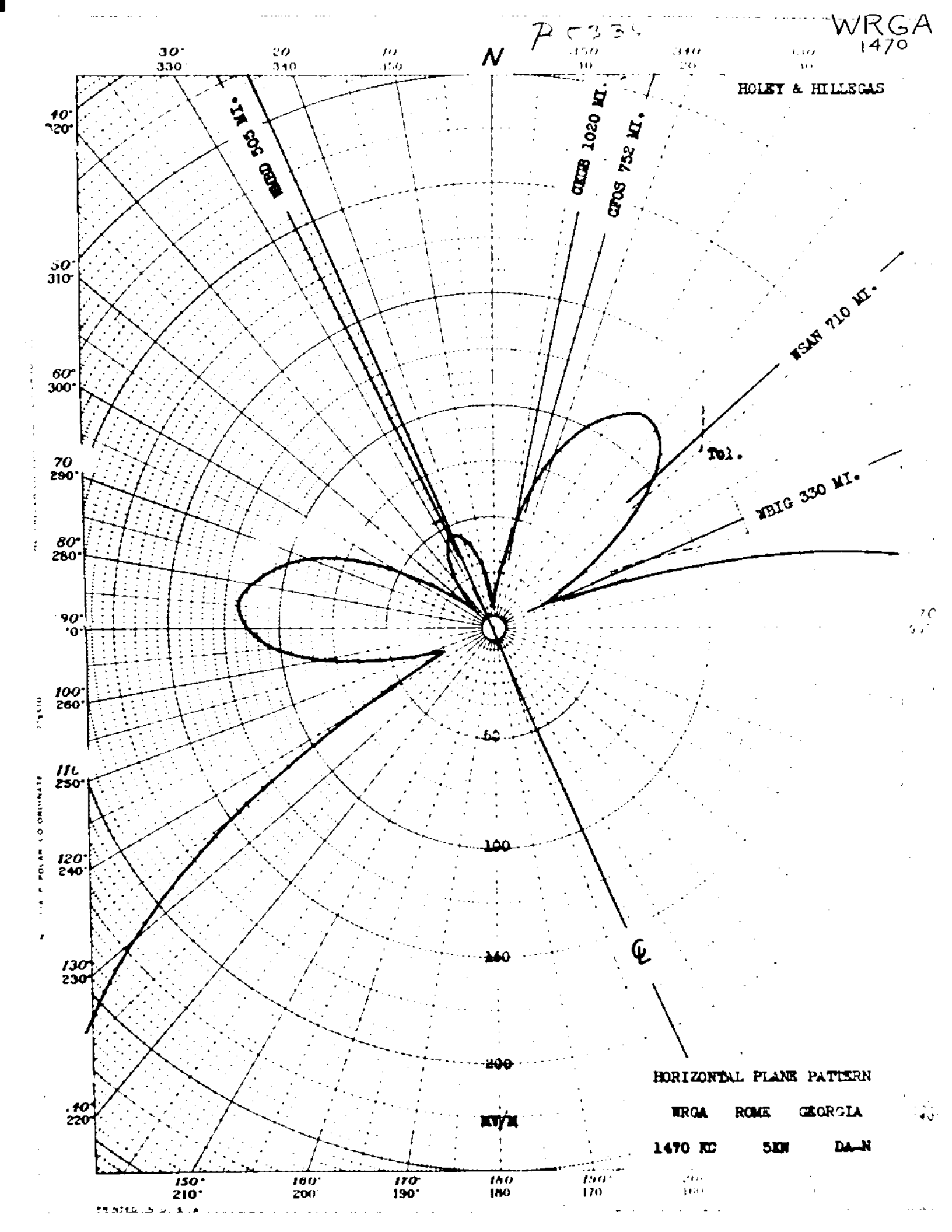


FIGURE 1
DAYTIME RADIATION PATTERN
WRBD 5KW, DA-DAY 1470 KHz
POMPANO BEACH, FLORIDA

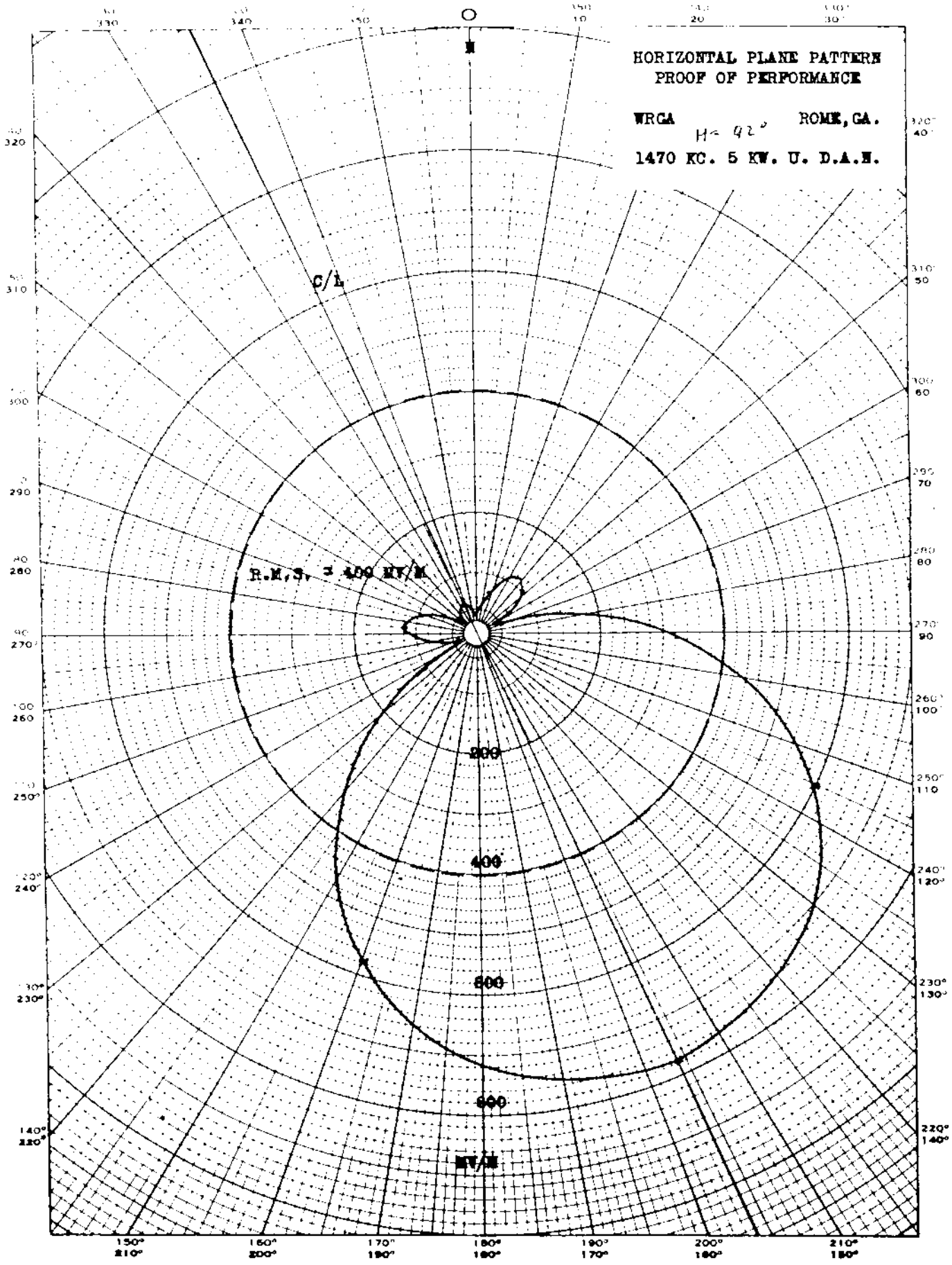
Prepared by
Lohnes and Culver Washington, D. C.
June, 1976


N P-5334
WRGA
1470
RILEY & HILLEGAS
N 1.0 ∠ 136.6°
90°
C 1.55 ∠ 0°
90°
S 1.0 ∠ -136.6°
WLBD 505 MI.
CKBO 1020 MI.
CFOS 758 MI.
WSAN 710 MI.
WBIG 330 MI.
H.M.S.= 592
200
400
600
800
MV/M
HORIZONTAL PLANE PATTERN
WRGA ROME GEORGIA
1470 KC 5KW DA-N


WRGA
1470
HOLEY & HILLEGAS
N
WSAN 710 MI.
WBIG 330 MI.
Tol.
KWKO 1020 MI.
KFOS 752 MI.
WMBD 503 MI.
60
100
140
200
KV/M
HORIZONTAL PLANE PATTERN
WRGA ROME GEORGIA
1470 KC 5KW DA-N

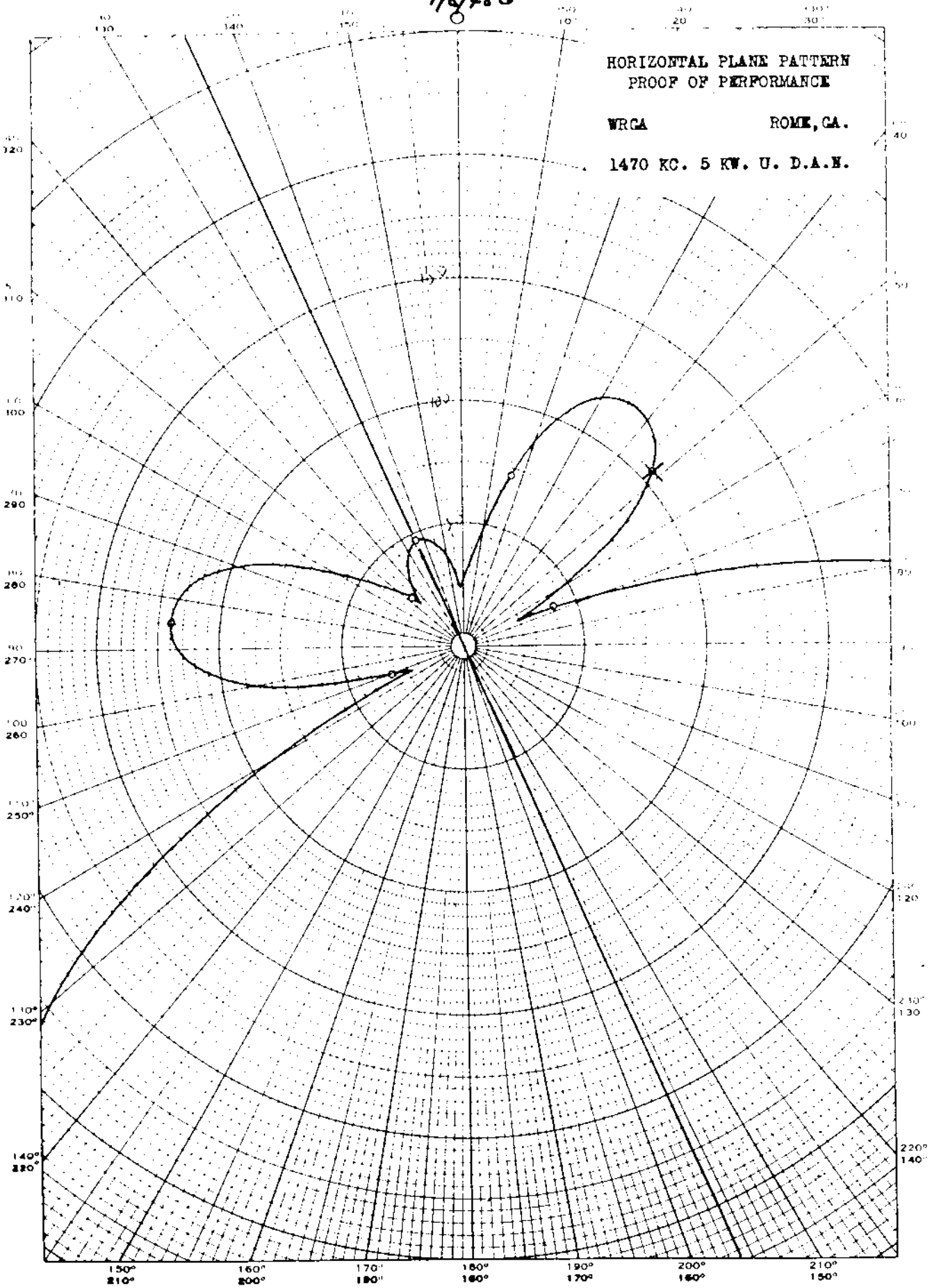
WRGA
1470

9/8/48 G



WRGA
1470

9/8/48 G



WSAN
1470 KC.

Station WSAN | Main Studio Allentown, Pennsylvania

Power 5 kw | Frequency 1470 kc

Authorized May 10, 1946 | Notification No. 171

Location: North Latitude 40° 38' 10"

West Longitude 75° 29' 06"

Antenna:

Authorized for Nighttime operation

Three elements, Self-supporting, steel, tapered, series-fed, vertical towers.

Tower:	N.W.	Center	S.E.
Height above insulators:	190'	190'	190'
Spacing:	167.5'	90°	167.5'
Phasing:	-32.4°	174.18°	32.4°
Field Ratio:	1.0	1.427	1.0

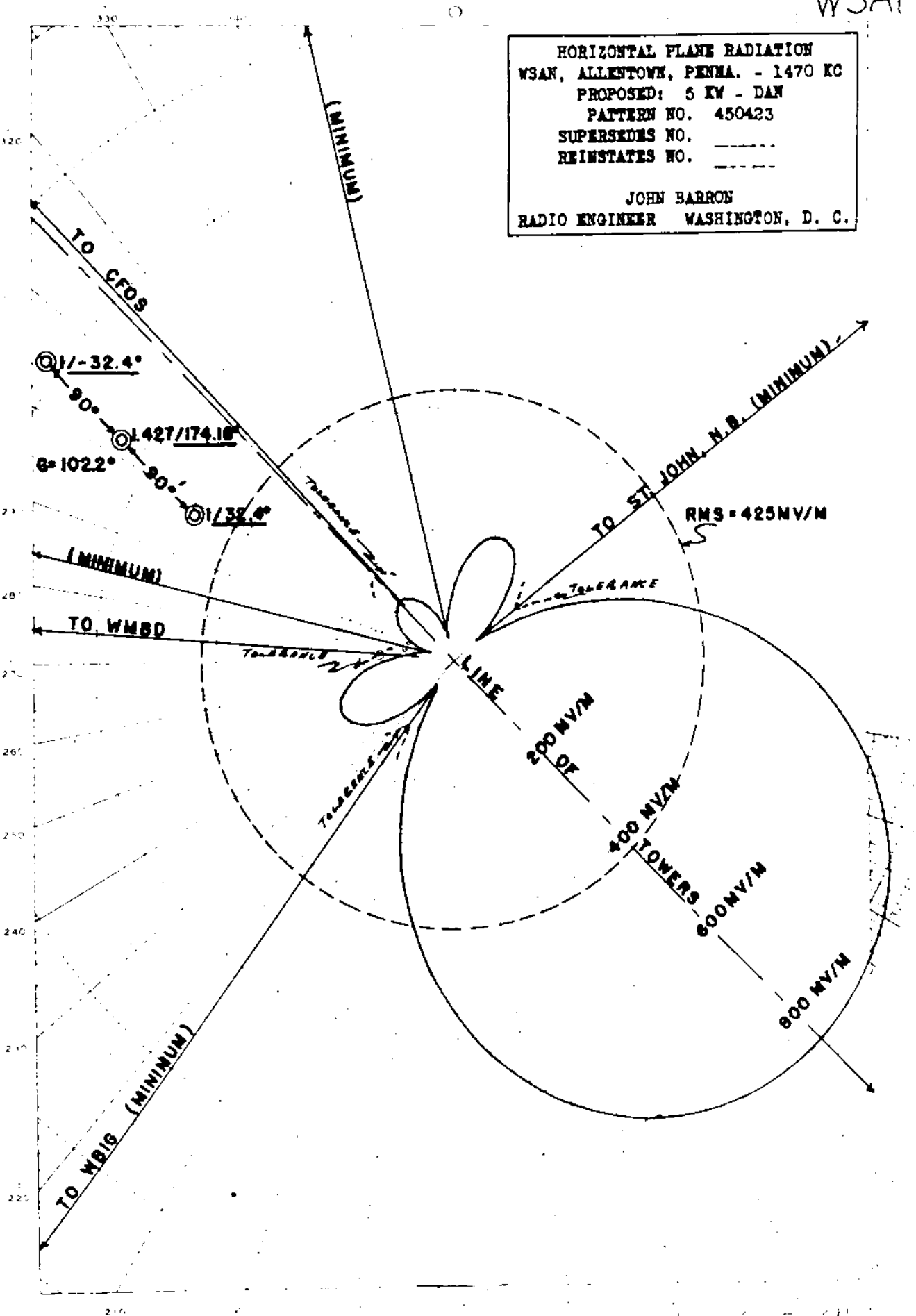
Ground System: 120 radials 340' long, or to property limits (Minimum 290' approx.), spaced 3°, plus 120 radials, 50' long, about each tower.

Orientation: On a line bearing 135° true.

Predicted effective field 425 mv/m (190 for 1 kw)

WSAN New - 1470 KC

WSAN

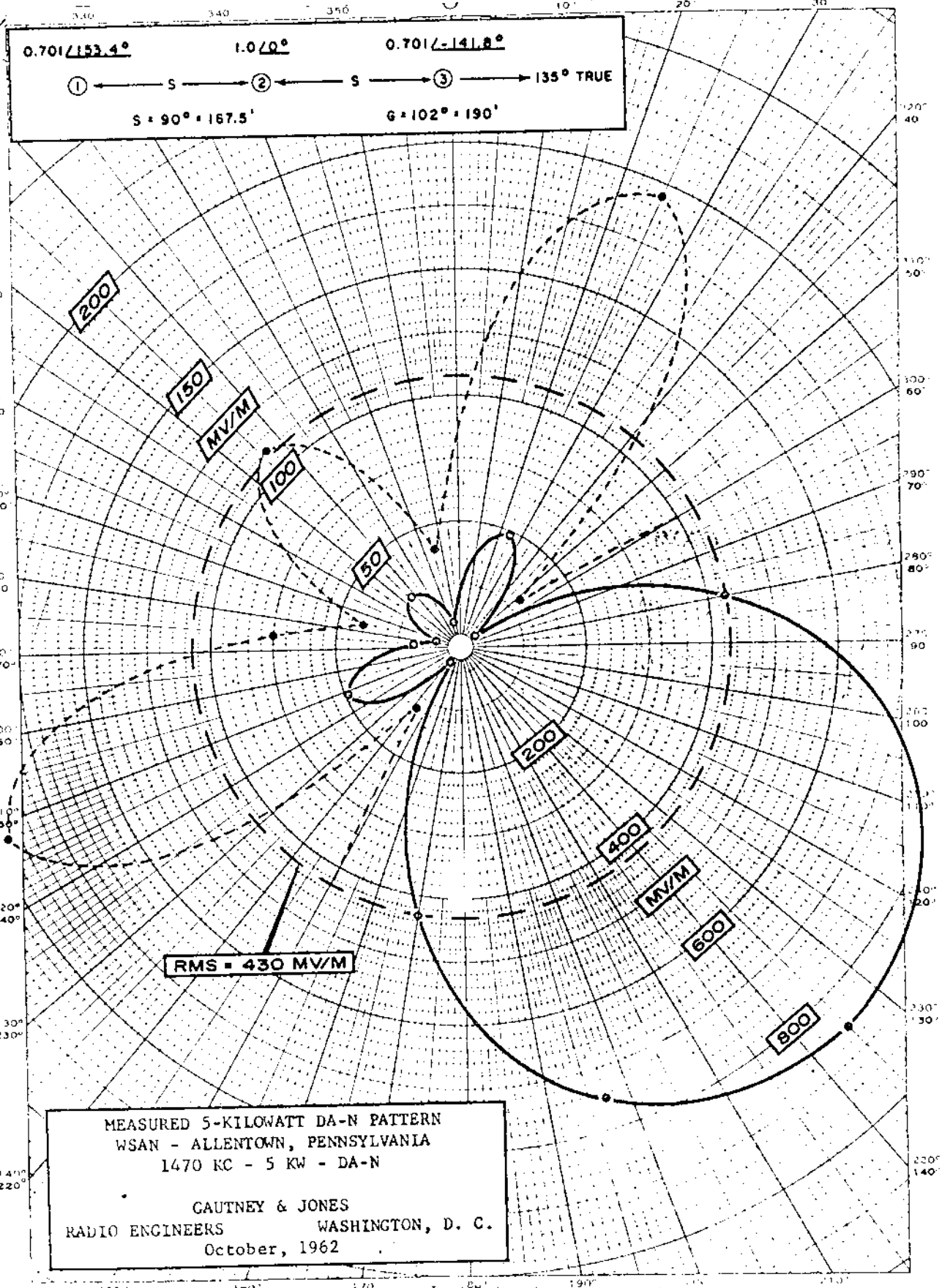


WSAN

Measured Night
(1-28-66ct)

Station WSAN
Allentown, Pennsylvania

5kw, DA-N, U
1470 kc



MEASURED 5-KILOWATT DA-N PATTERN
WSAN - ALLENTOWN, PENNSYLVANIA
1470 KC - 5 KW - DA-N

CAUTNEY & JONES
RADIO ENGINEERS WASHINGTON, D. C.
October, 1962

FCC File No. BL-9812
Accepted

Station WSAN
Allentown, Pennsylvania

1470 kc

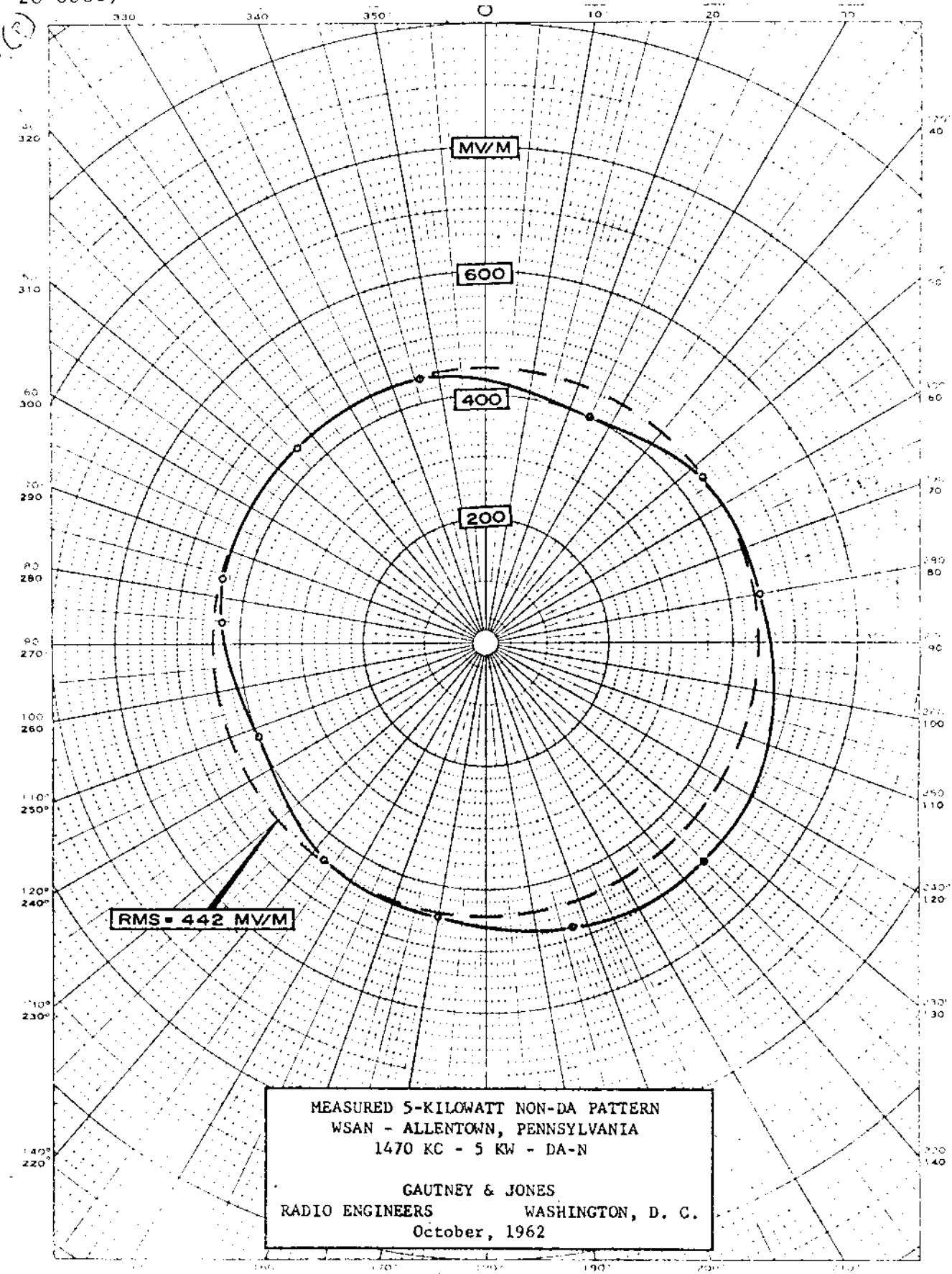
WSAN

Measured Non-DA
(1-28-66ct)

Station WSAN
Allentown, Pennsylvania

5kw,DA-N,U
1470 kc

LIC. 5-6-65 (?)



FCC File No. [illegible]12
Accepted

Station WSAN
Allentown, Pennsylvania

5kw,DA-N,U
1470 kc

WSRO

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station : WSRO Main Studio: Marlborough, Massachusetts

Frequency : 1470 KHz Power : 5 kW Night 5 kW Day

Notification: 1782 Date : October 26, 1979 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE DAYTIME AND NIGHTTIME ANTENNA SYSTEMS:

	DAYTIME				NIGHTTIME			
North Latitude:	42°	20'	58"		North Latitude:	42°	23'	06"
West Longitude:	71°	32'	03"		West Longitude:	71°	35'	41"

NIGHTTIME ANTENNA CHARACTERISTICS

Authorized for nighttime operation (DA-N)
Number of elements: 3
Type of elements : Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER :	#1(SE)	#2(C)	#3(NW)			
HEIGHT ABOVE INSULATORS :	167'	167'	167'(90°)			
NIGHT PHASING :	0°	142.94°	283.05°			
NIGHT FIELD RATIO:	1.0	1.914	1.005			

SPACING AND ORIENTATION: With the #1 (SE) tower as a reference, tower #2(C) is spaced 168.2'(90.5°) on a line bearing 313.9° true, and the #3(NW) tower is spaced 336.97'(181.3°) on a line bearing 312.9° true.

GROUND SYSTEM: 120 - 167' equally spaced copper radials plus a 48' square ground screen about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers.

WSRO

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day	178 mV/m	_____ mV/m	_____ mV/m
Night	462.6 mV/m	666.07 mV/m	486.0 mV/m

DAYTIME ANTENNA CHARACTERISTICS

Authorized for Daytime operation. (DA-D)
Number of elements: 2
Type of elements : Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER :	SW(#1)	NE(#2)	_____	_____	_____	_____
HEIGHT ABOVE INSULATORS :	167'(90°)	167'	_____	_____	_____	_____
DAY PHASING :	0°	+45.0°	_____	_____	_____	_____
DAY FIELD RATIO:	1.0	1.0	_____	_____	_____	_____

SPACING AND ORIENTATION: Adjacent towers in a row are spaced 223.5' (120°) on a line bearing 45° true.

GROUND SYSTEM: 120 - 168' to equally spaced copper radials about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers.

Note: Please retain the nighttime directional antenna radiation pattern notified for Station WSRO in United States Change List Number 812 dated May 27, 1959, and attach to this Revised Description Sheet and Nighttime pattern.

WSRO

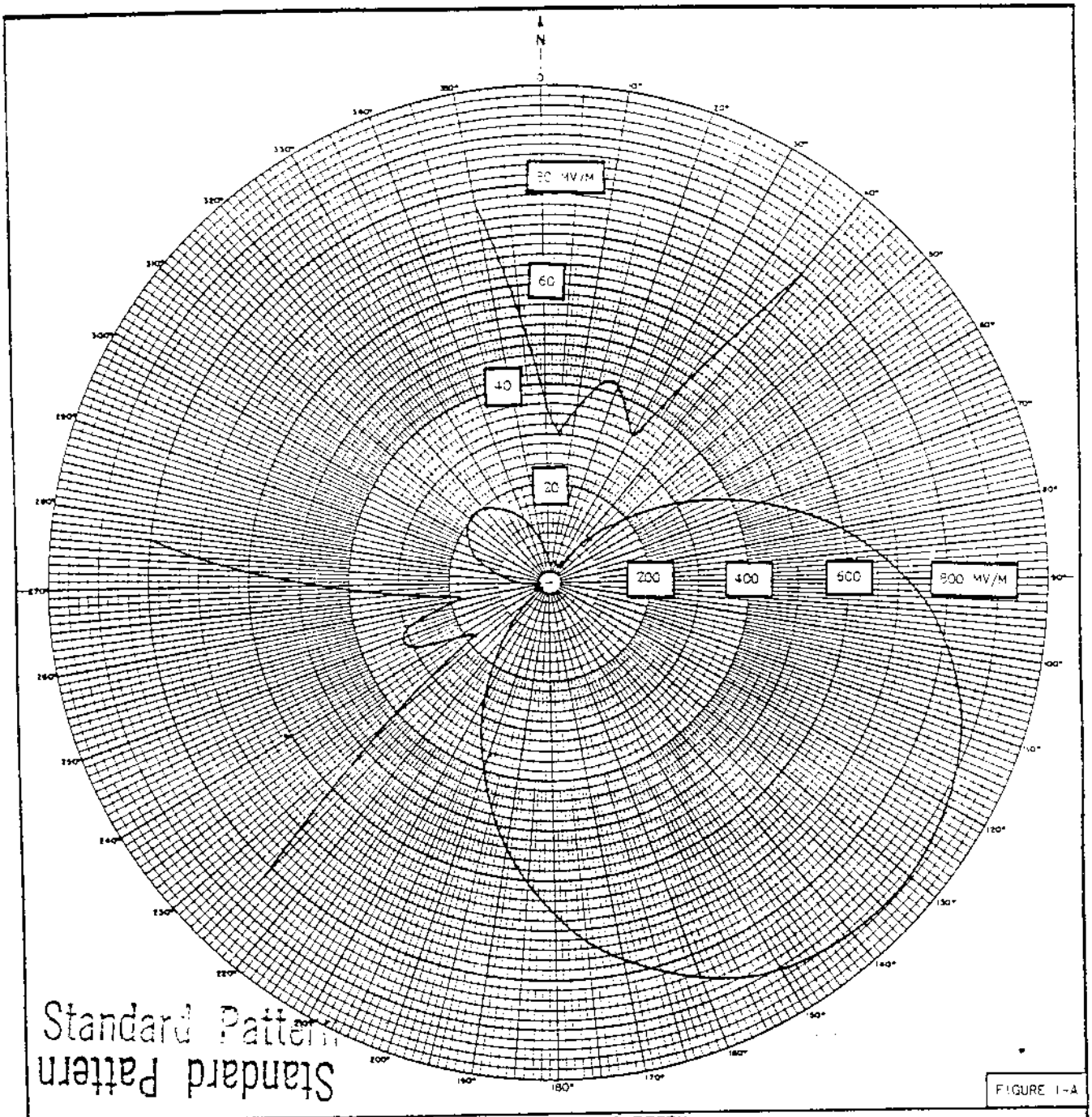
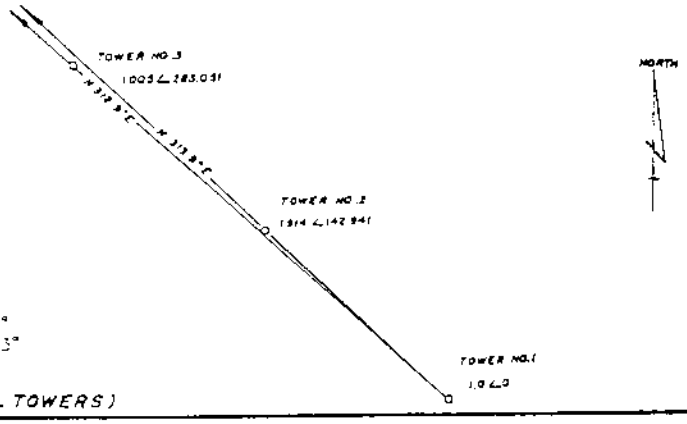


FIGURE 1-A

STANDARD HORIZONTAL PLANE PATTERN

ERSS: 666.07
O: 16.65

THEORETICAL PARAMETERS



SPACINGS

S1 to S2 : 90.5°
S1 to S3 : 181.3°

G = 90.0° (ALL TOWERS)

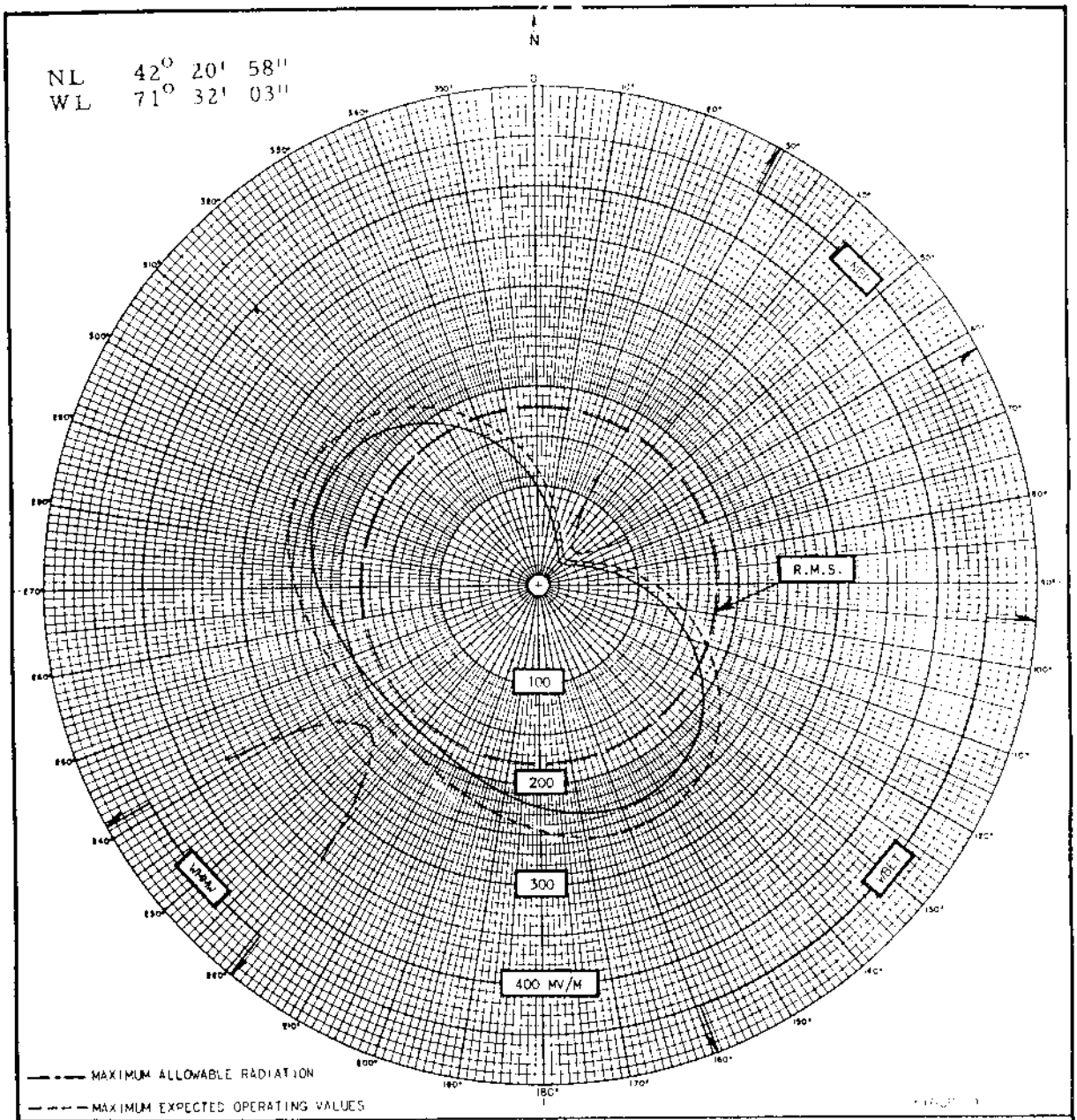
CALL	WSRO
APPLICANT	WSRO INC.
LOCATION	MARLBOROUGH, MASSACHUSETTS
FREQUENCY	1470 KHz
POWER	5.0 KW DA-2 U
LATITUDE	42 DEG. 23 MIN. 26 SEC.
LONGITUDE	71 DEG. 35 MIN. 41 SEC.
WHEN USED	NIGHTTIME
R.M.S. FIELD	462.60 MV/M (THEORETICAL) 486.05 MV/M (STANDARD)
DATE	DECEMBER 1977

SILLIMAN, MOFFET & KOWALSKI, P.C.
CONSULTING RADIO ENGINEERS
[illegible] NORTH LYNN STREET
ARLINGTON, VA. 22209

PROPOSED DAY
(6-16-59g)

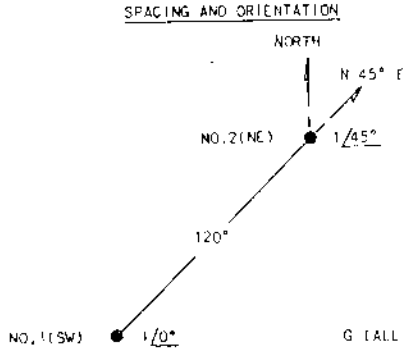
Station WSRO
Marlboro, Massachusetts

1kw, DA-D, D
1470 KC



HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION



G (ALL TOWERS) = 90°

APPLICANT : COUNTY BROADCASTING CORP.
LOCATION : MARLBORO, MASS.
FREQUENCY : 1470 KCS
POWER : 1 KW-D 1 KW-N
LATITUDE : 42 DEG 21 MIN 58 SEC
LONGITUDE : 71 DEG 32 MIN 3 SEC
WHEN USED : DAYTIME
RMS FIELD : 179 MV/M
DATE : 4/59

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON D.C.

FCC File No. BP-12966
Accepted 4-17-59
granted CP 6-18-59 chng DA

WSRO
Marlboro, Massachusetts

1470 KC

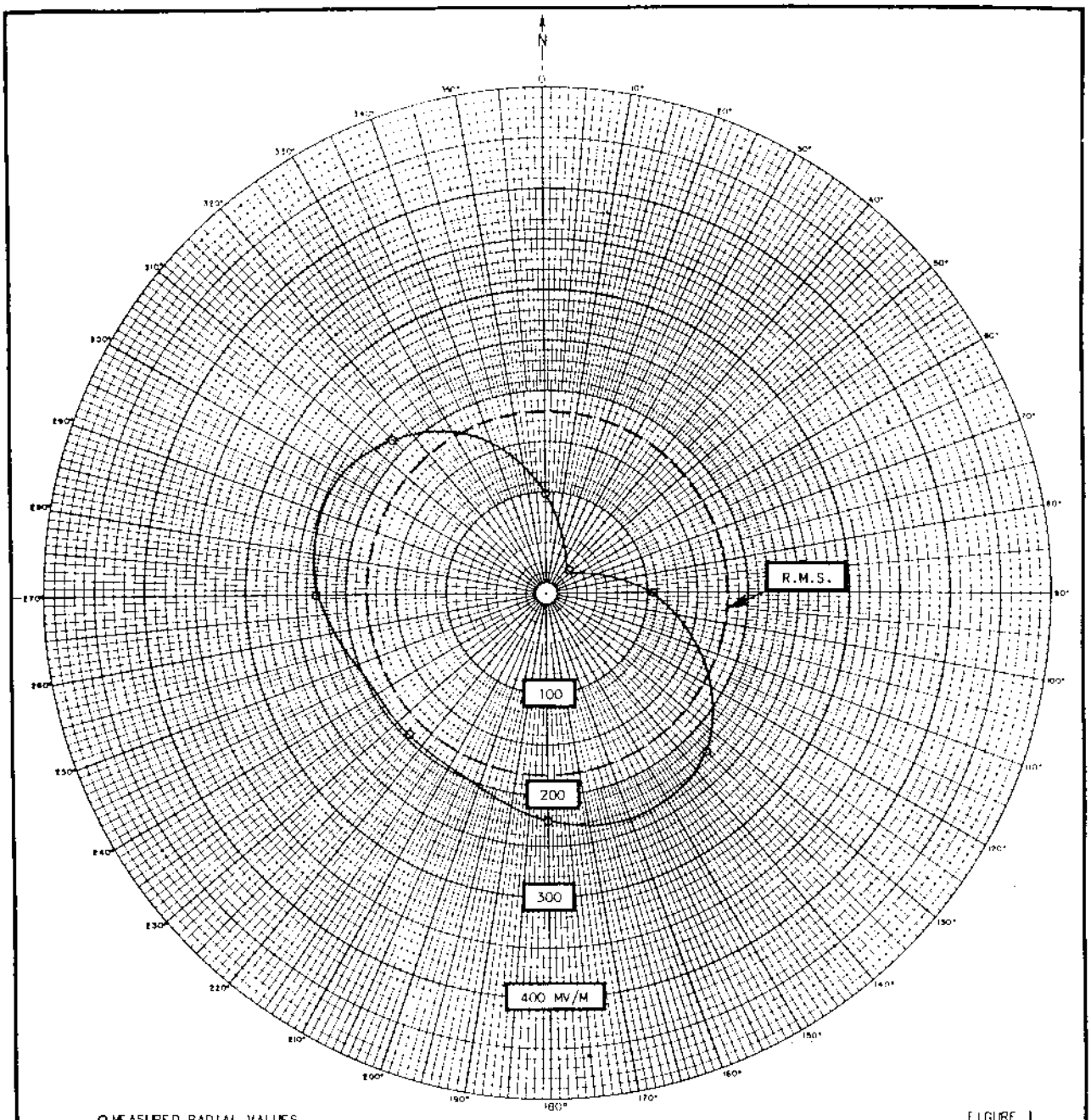
WSRC

MEASURED DAY
(11-16-59g)

Station WSRO
Marlboro, Massachusetts

1kw, DA-D,D
1470 KC

Granted for change in A pattern 6-2-61



O MEASURED RADIAL VALUES

FIGURE 1

HORIZONTAL RADIATION PATTERN

SPACING AND ORIENTATION

NORTH

N 45° E

NO.2(E) ● 1/45°

120°

NO.1(W) ● 1/0°

G (ALL TOWERS) - 90°

APPLICANT	W S R O
LOCATION	MARLBORO, MASS.
FREQUENCY	1470 KC/S
POWER	1 KW-D (DA)
LATITUDE	42 DEG 20 MIN 55 SEC
LONGITUDE	71 DEG 32 MIN 05 SEC
WHEN USED	DAYTIME
RMS FIELD	179 MV/M
DATE	JULY 1959

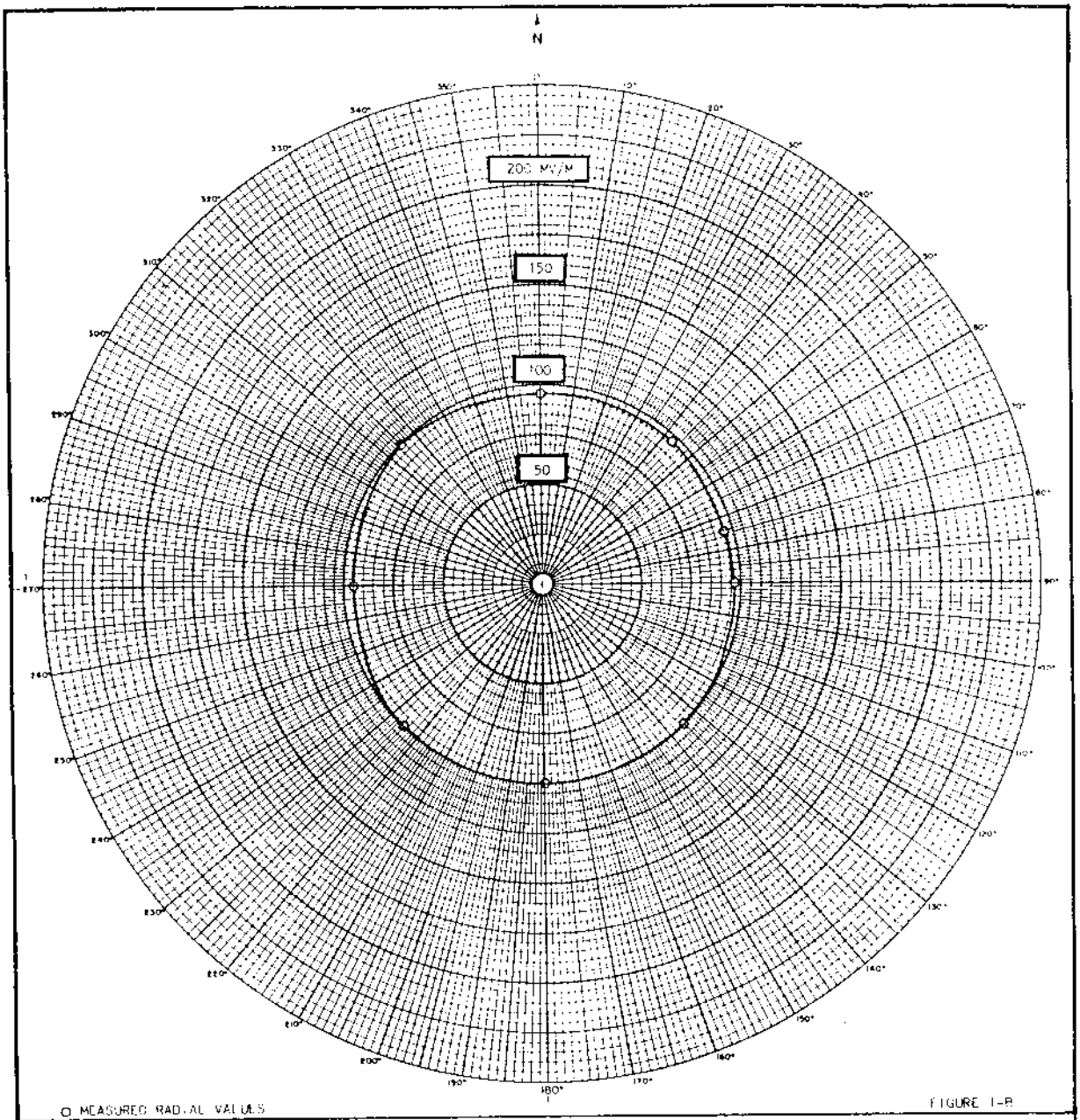
SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7646
Accepted 10-28-59

WSRO
Marlboro, Massachusetts

1470 KC

MEASURED NON-DA (3-23-59g) | Station WSRO, Marlborough, Massachusetts | 1kw, DA-D,D 1470 KC



O MEASURED RADIAL VALUES

FIGURE 1-B

HORIZONTAL RADIATION PATTERN

NON-DIRECTIONAL SURVEY

APPLICANT	COUNTY BCSTG. CORP. (WSRO)
LOCATION	MARLBOROUGH, MASSACHUSETTS
FREQUENCY	1470 KC/S
POWER	250 WATTS
LATITUDE	42 DEG 20 MIN 58 SEC
LONGITUDE	71 DEG 32 MIN 00 SEC
WHEN USED	NON-DIRECTIONAL SURVEY
R.M.S. FIELD	98 MV/M
DATE	DECEMBER 1959

SILLIMAN, MOFFET & ROHRER
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FCC File No. BL-7368
Accepted 2-19-59

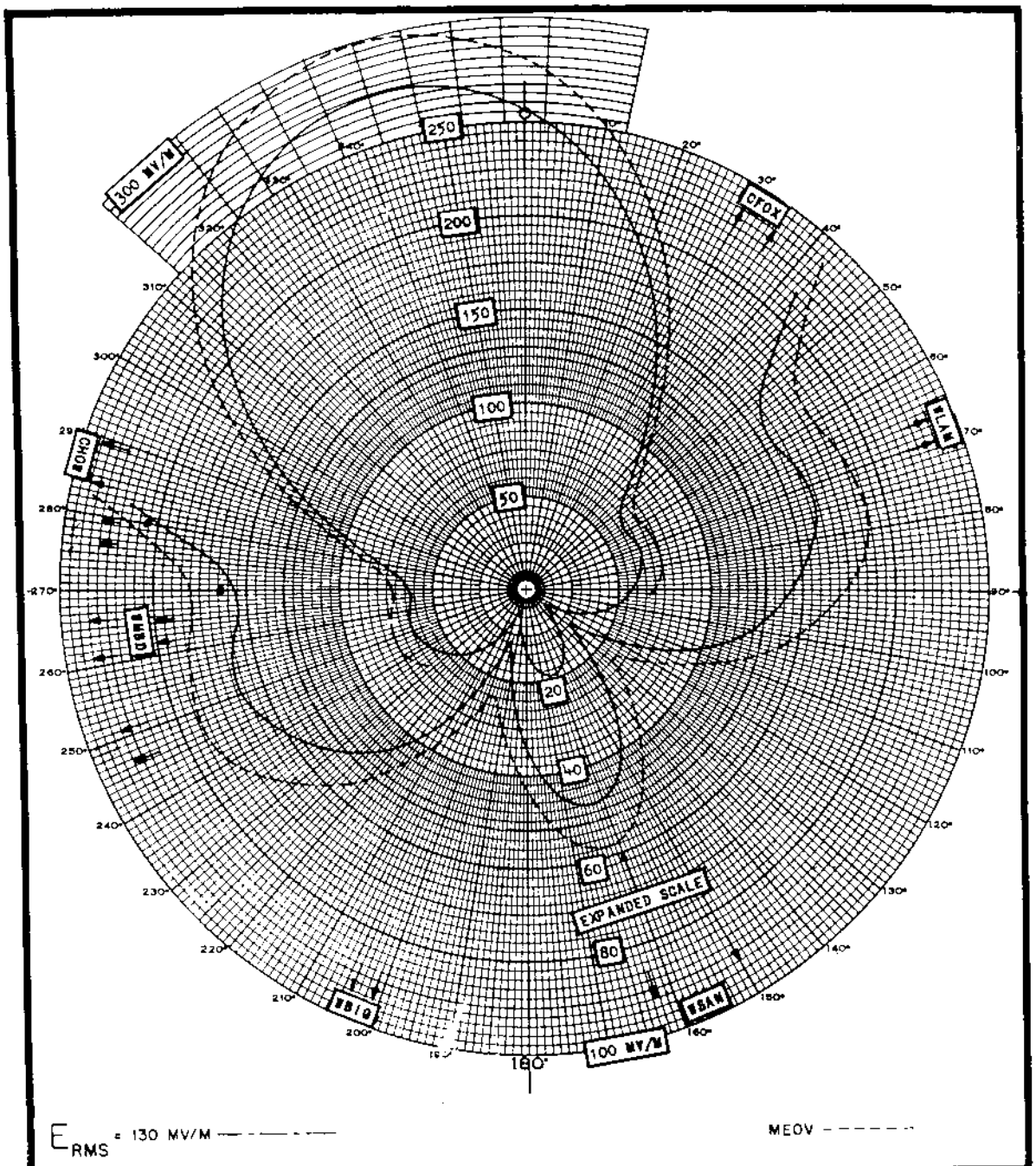
WSRO
Marlborough, Massachusetts 1470 KC

WTKO

Proposed Night
(11-29-68ct)

Station WTKO
Ithaca, New York

500w, 1kw-LS, DA-N, U
1470 kc



LATITUDE: 42° 24' 24"
LONGITUDE: 76° 29' 18"

JOHN H. MULLANEY
AND
ASSOCIATES

ANTENNA PARAMETERS

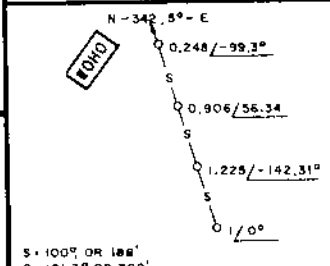


FIGURE 2A

PROPOSED
NIGHTTIME DIRECTIONAL
PATTERN

RADIO STATION WTKO
ITHACA, NEW YORK

1470 KHz 0.5/1KW-LS, DA-N, U

FCC File No. BP-18303
Accepted 10-29-68

Station WTKO
Ithaca, New York

1470 kc

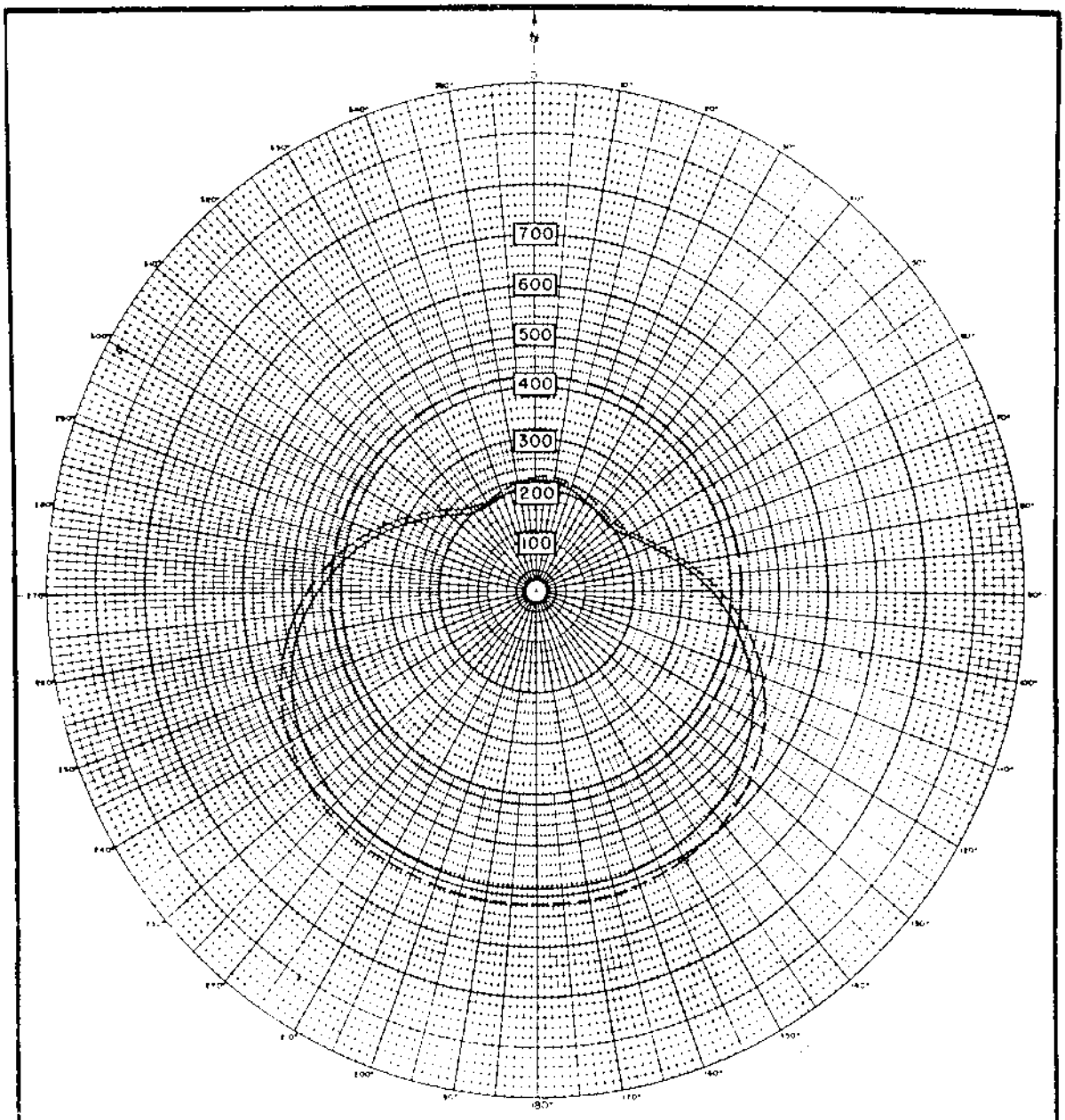
WVOL

PROPOSED DAY
(4-24-58g)

Station WVOL
Berry Hill, Tennessee

1kw, 5kw-LS, DA-2,U
1470 KC

Granted CP 10/1/58 to increase day power to 5 KW & install DA-2 system & change station location to Berry Hill



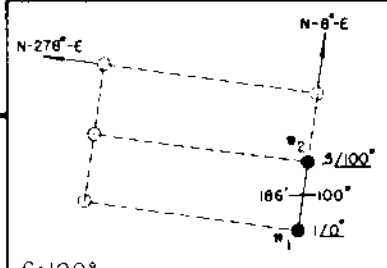
E_{RMS} = 425 MV/M

----MEOV

LATITUDE 36° 12' 01"
LONGITUDE 86° 46' 47"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS



G=100°

FIGURE 4

DAYTIME
HORIZONTAL PATTERN
RADIO STATION WSOK
BERRY HILL, TENN.

1470 KC 1 KW, 5 KW-LS, DA-2

FCC File No. BP-11,284
Accepted 4-16-58

WVOL (formerly WSOK)
Berry Hill, Tennessee

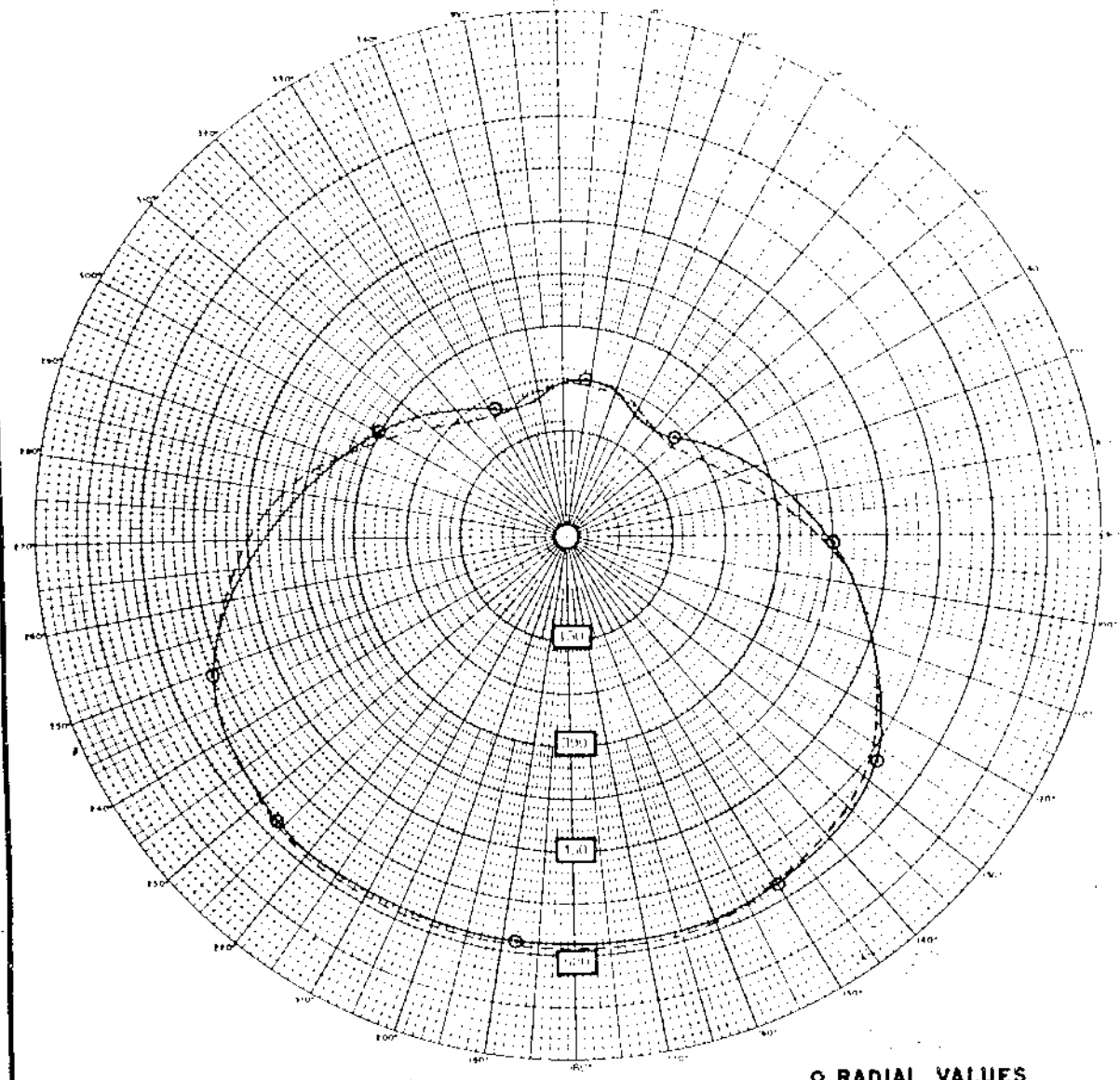
1470 KC

WVOL

MEASURED DAY
(2-26-60g)

Station WVOL
Berry Hill, Tennessee

1kw, 5kw-LS, DA-2,U
1470 KC



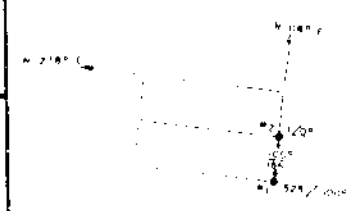
o RADIAL VALUES
— MEASURED PATTERN
--- THEORETICAL PATTERN

E_{RMS} = 426 MV/M (MEASURED)

LATITUDE 36° 12' 01"
LONGITUDE 86° 46' 47"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS



G=100°

FIGURE 22

PLOT OF MEASURED DAYTIME HORIZONTAL PATTERN

RADIO STATION WVOL
BERRY HILL, TENN.

1470 KC 1KW, 5KW-LS, DA-2, U

FCC File No. BL-7805
Accepted 2-10-60

WVOL
Berry Hill, Tennessee

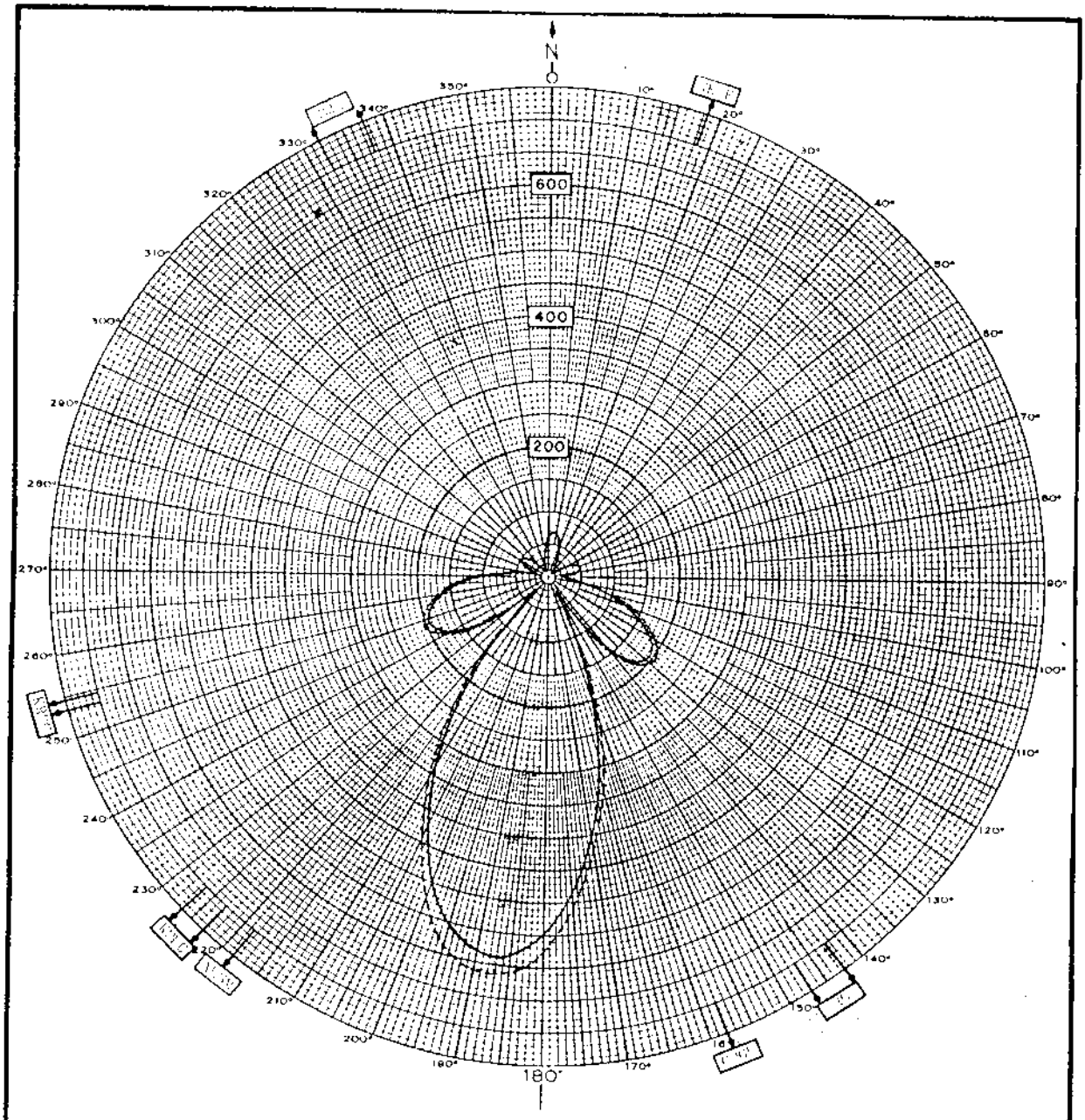
1470 KC

WVOL

PROPOSED NIGHT
(4-24-58g)

Station WVOL 1kw, 5kw-LS, DA-2,U
Berry Hill, Tennessee 1470 KC

Granted CP
10/11/68



E_{RMS} = 200.5 MV/M

----MEOV

LATITUDE: 36° 12' 01"
LONGITUDE: 86° 46' 47"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

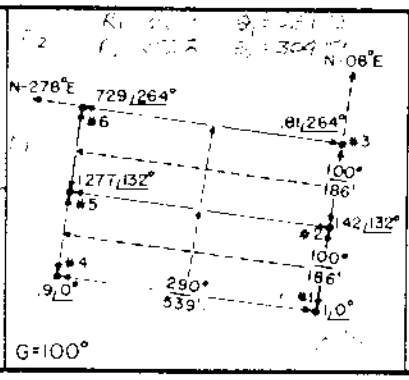


FIGURE 6

NIGHTTIME HORIZONTAL PATTERN RADIO STATION WSOK BERRY HILL, TENN.

1470 KC 1 KW, 5 KW-LS, DA-2

FCC File No. BP-11,284
Accepted 4-16-58

WVOL (formerly WSOK)
Berry Hill, Tennessee 1470 KC

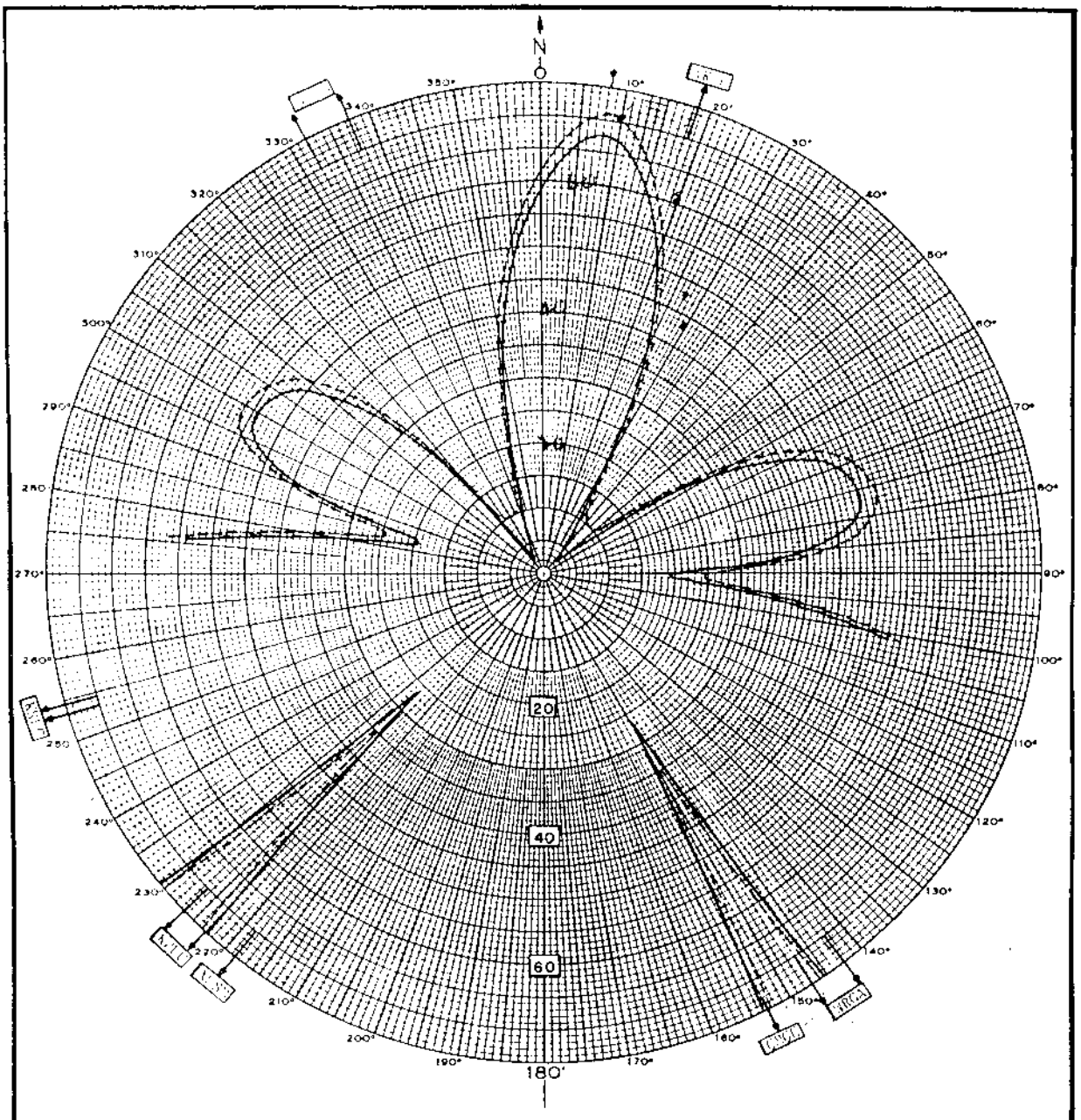
WVOL

PROPOSED NIGHT NULLS (4-24-58g)

Station WVOL Berry Hill, Tennessee

1kw, 5kw-LS, DA-2,U 1470 KC

Granted CP 10/1/58



LATITUDE: 36° 12' 01"
LONGITUDE: 86° 46' 47"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

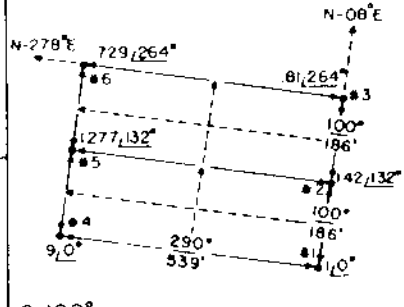


FIGURE 6A
(EXPANDED SCALE)
NIGHTTIME HORIZONTAL PATTERN

RADIO STATION WSOK
BERRY HILL, TENN.

1470 KC 1 KW, 5 KW-LS, DA-2

FCC File No. BP-11,284
Accepted 4-16-58

WVOL (formerly WSOK)
Berry Hill, Tennessee

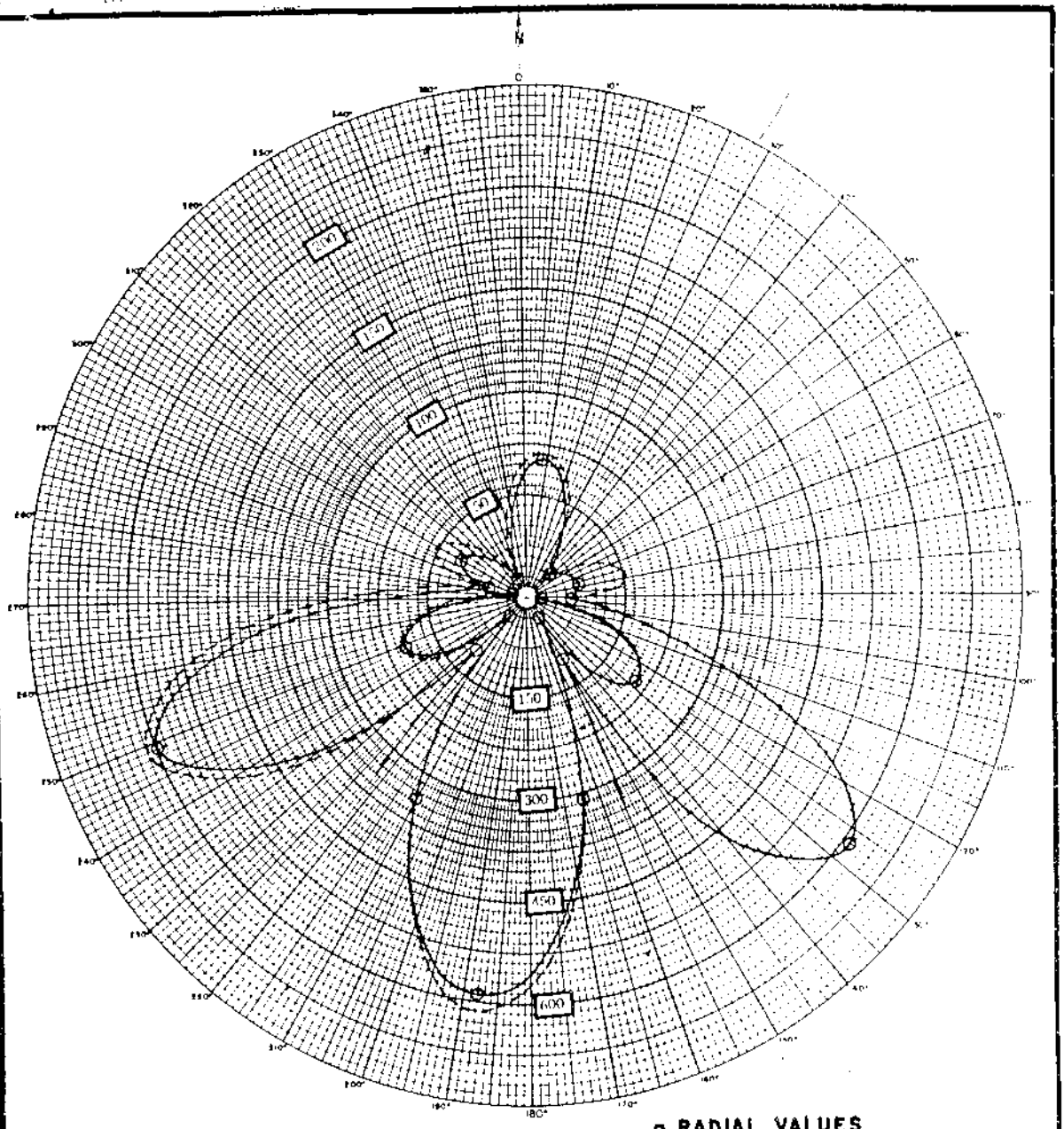
1470 KC

WVOL

MEASURED NIGHT
(2-26-60g)

Station WVOL
Berry Hill, Tennessee

1kw, 5kw-LS, DA-2,U
1470 KC



o RADIAL VALUES
--- THEORETICAL PATTERN (MEOV)
—— MEASURED PATTERN

E_{RMS} = 199 MV/M (MEASURED)

LATITUDE: 36° 12' 01"
LONGITUDE: 86° 46' 47"

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

ANTENNA PARAMETERS

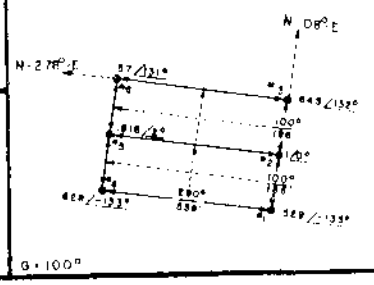


FIGURE 24

PLOT OF MEASURED NIGHTTIME HORIZONTAL PATTERN

RADIO STATION WVOL
BERRY HILL, TENN.

1470KC, 1KW, 5KW-LS, DA-2, U

FCC File No. BL-7805
Accepted 2-10-60

WVOL
Berry Hill, Tennessee

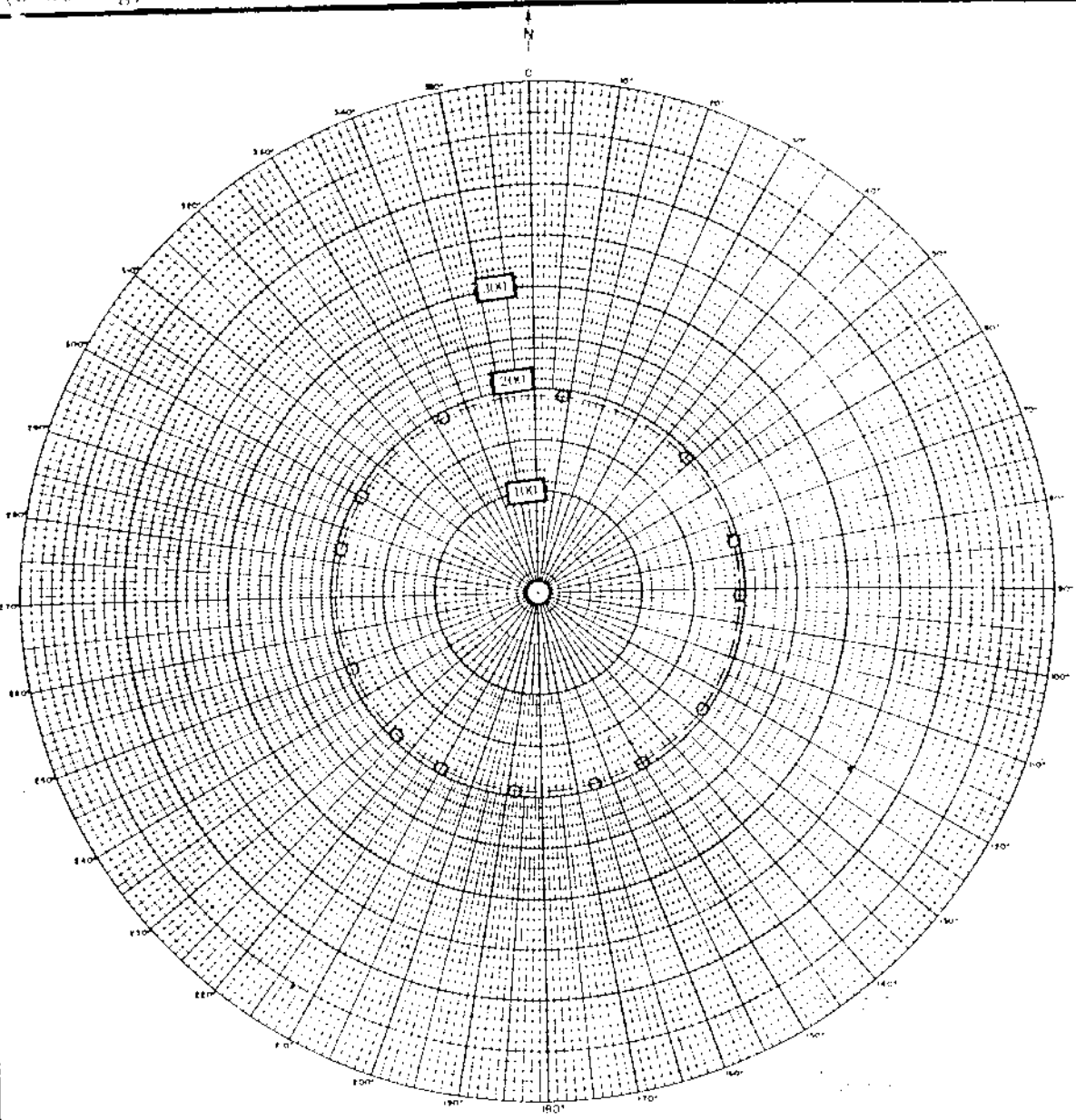
1470 KC

WVOL

MEASURED NON-DA
(2-26-60g)

Station WVOL
Berry Hill, Tennessee

1kw, 5kw-LS, DA-2,U
1470 KC



E_{RMS} = 195 MV/M (MEASURED)

o RADIAL VALUES

LATITUDE 36° 12' 01"
LONGITUDE 86° 46' 47"

ANTENNA PARAMETERS

0 - 100°

JOHN H. MULLANEY
CONSULTING RADIO ENGINEERS
WASHINGTON, D. C.

FIGURE 20

PLOT OF MEASURED NON-DIRECTIONAL PATTERN

RADIO STATION WVOL
BERRY HILL, TENN.

1470 KC, 1 KW, 5KW-LS, DA-2, U

FCC File No. BL-7805
Accepted 2-10-60

WVOL
Berry Hill, Tennessee

1470 KC

NEW

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: (New) Main Studio: Orocovis, Puerto Rico

Frequency: 1470 kHz Power: 1 kW

Notification List No. 1738 Date: June 23, 1977 Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 18° 14' 56"
West Longitude: 66° 24' 47"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 2
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	W(#1)	E(#2)
HEIGHT ABOVE INSULATORS:	185'	185' (99.49°)
PHASING:	0°	-62°
FIELD RATIO:	1	0.792

SPACING AND ORIENTATION: Towers are spaced 223' (120°) on a line bearing 105° true.

GROUND SYSTEM: 120-170' equally spaced copper radials plus 120-50' interspaced radials about each tower. Radials are shortened and bonded to a transverse strap along intersections between towers. Centers of system are bonded together.

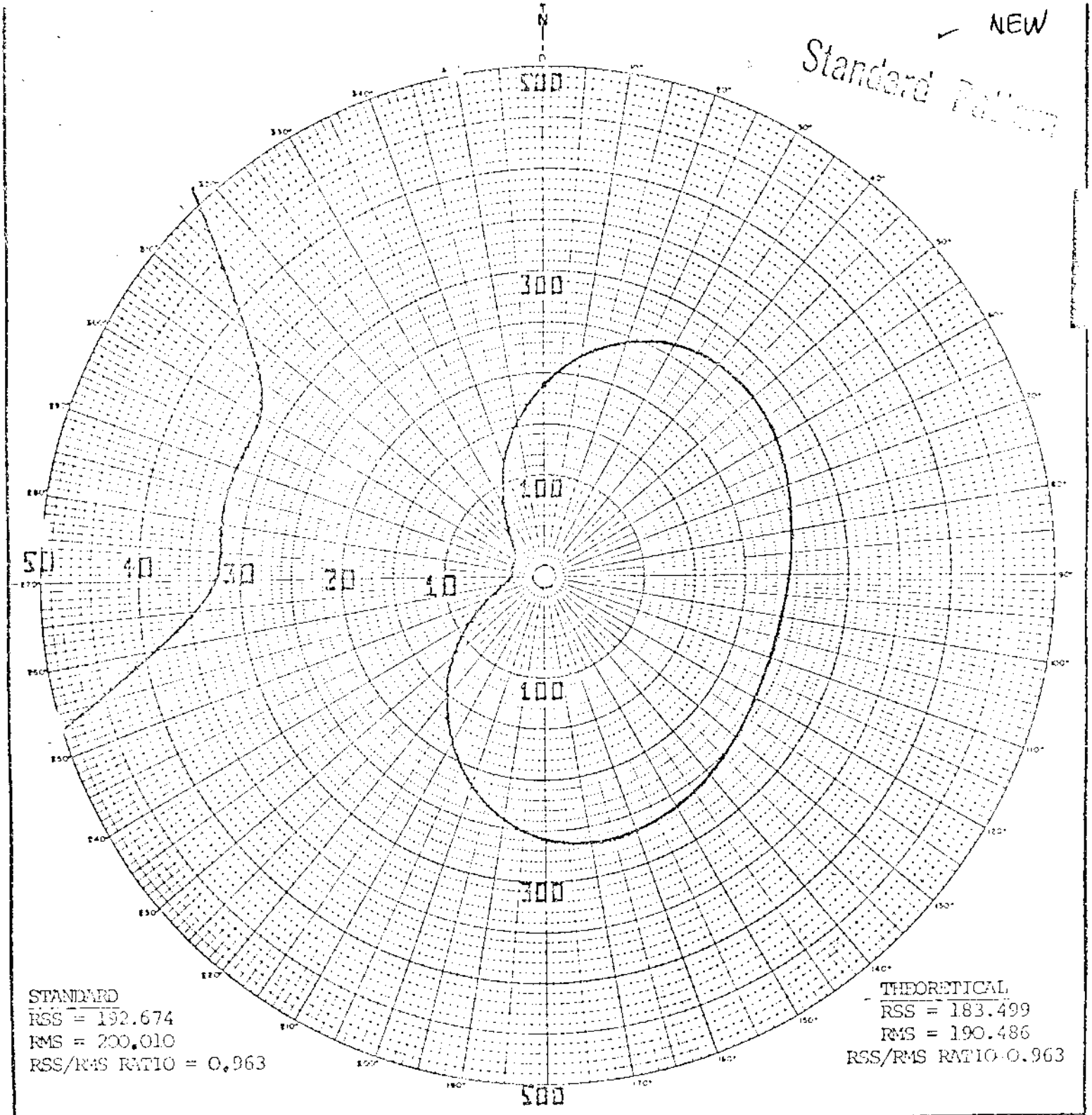
PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS	THEORETICAL RSS	STANDARD RMS
Day 1/	185 mv/m	- mv/m	
Night	190.49 mv/m	183.50 mv/m	200.01 mv/m

1/ By adjustment of input power.

NEW

Standard Pattern



STANDARD
RSS = 192.674
RMS = 200.010
RSS/RMS RATIO = 0.963

THEORETICAL
RSS = 183.499
RMS = 190.486
RSS/RMS RATIO 0.963

LAT. 18° 14' 56.3"
LONG. 66° 24' 47.3"

1
120°
2 N-105°-E
110°
0.792 -62°

G =99.49°

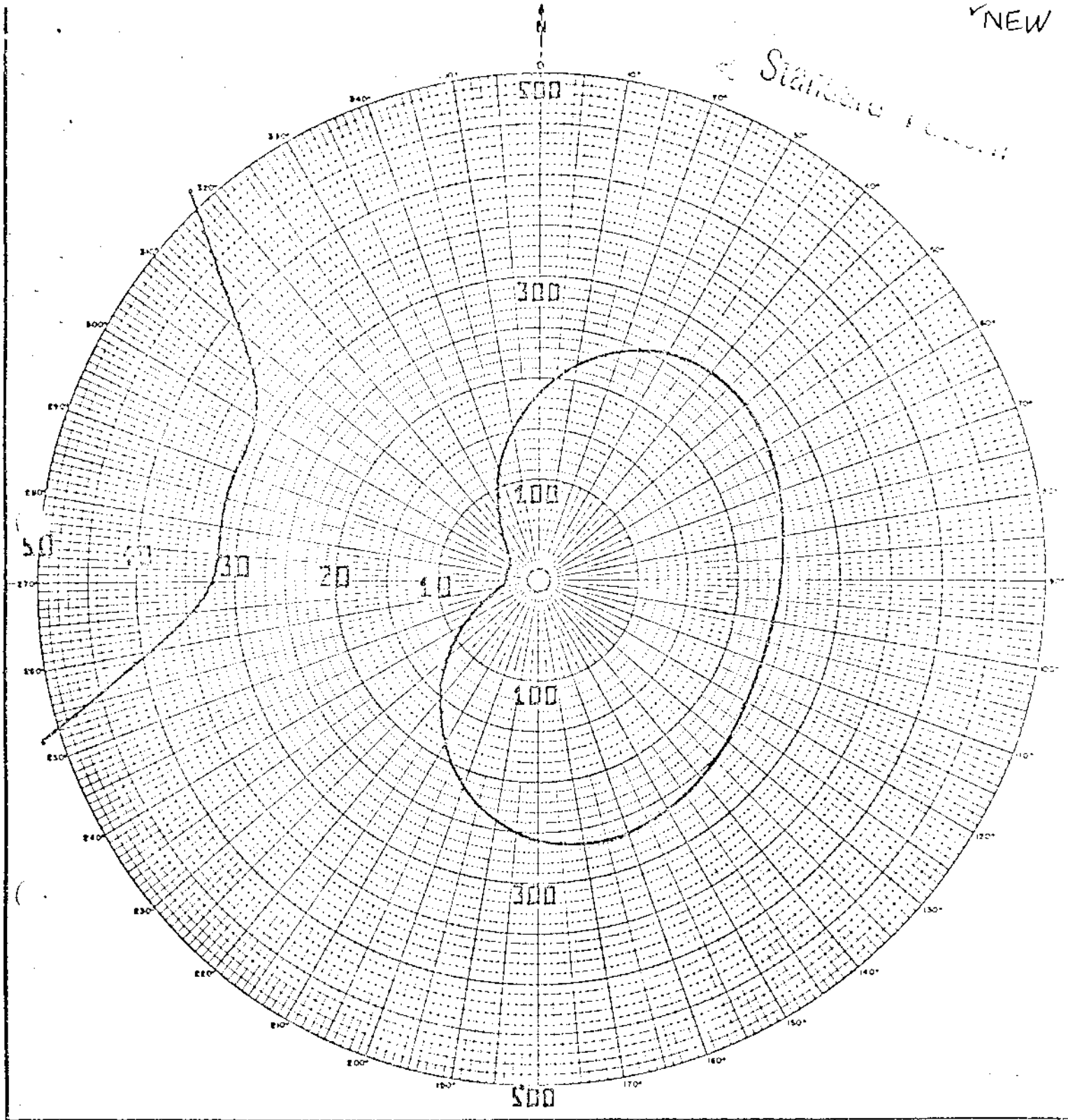
FIGURE 3

PROPOSED NIGHTTIME DIRECTION HORIZONTAL PATTERN

PETER V. SUREVICH & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

RADIO SOL BROADCASTING CORP.
OROCOVIS, P. R.

1470 KHz 1 KW,DA-N



NEW

FIGURE 4

PETER V. GORECKIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

5° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

NEW

Slanted Pattern

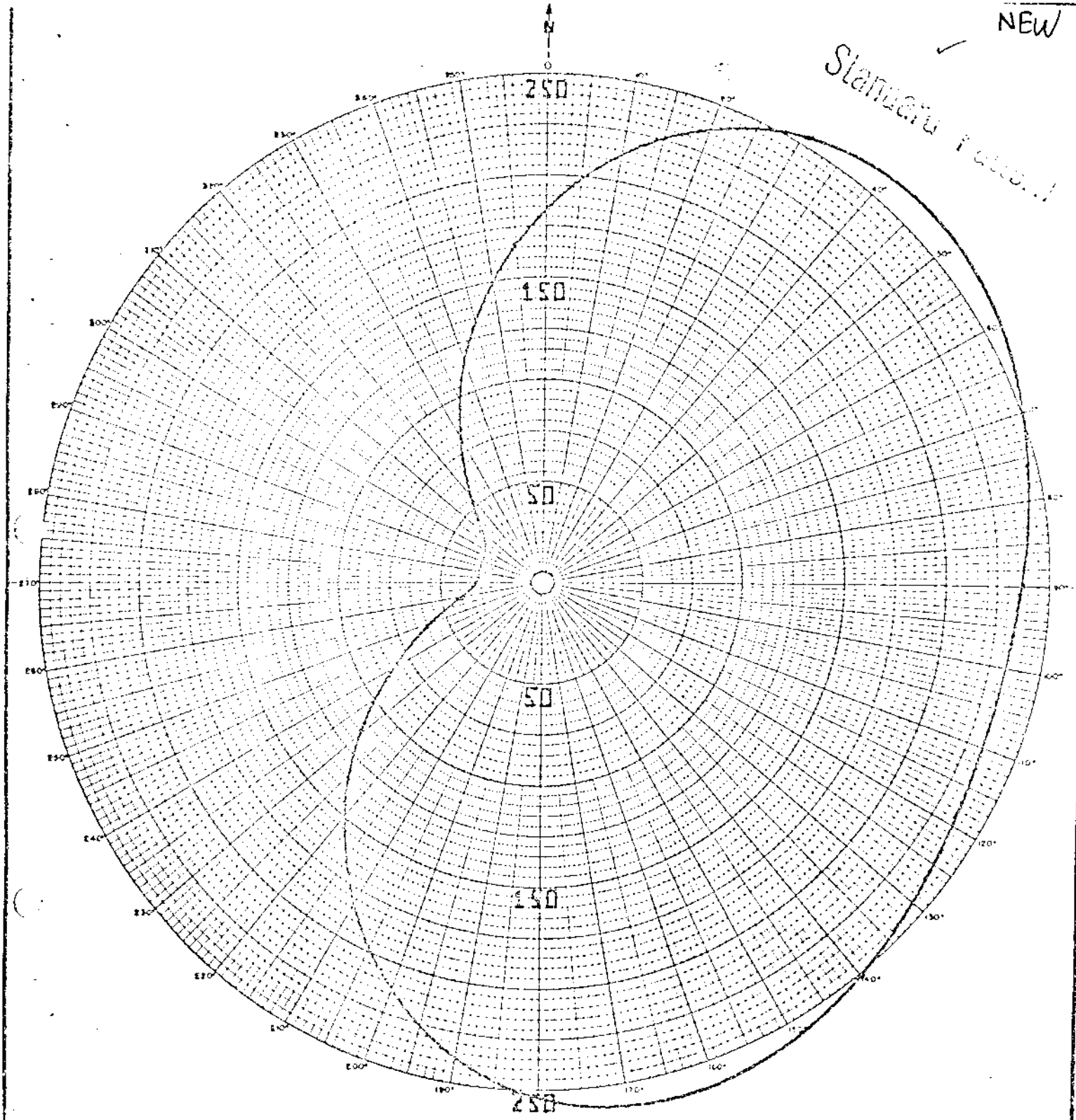


FIGURE 5

10° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

PETER V. CURECKIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

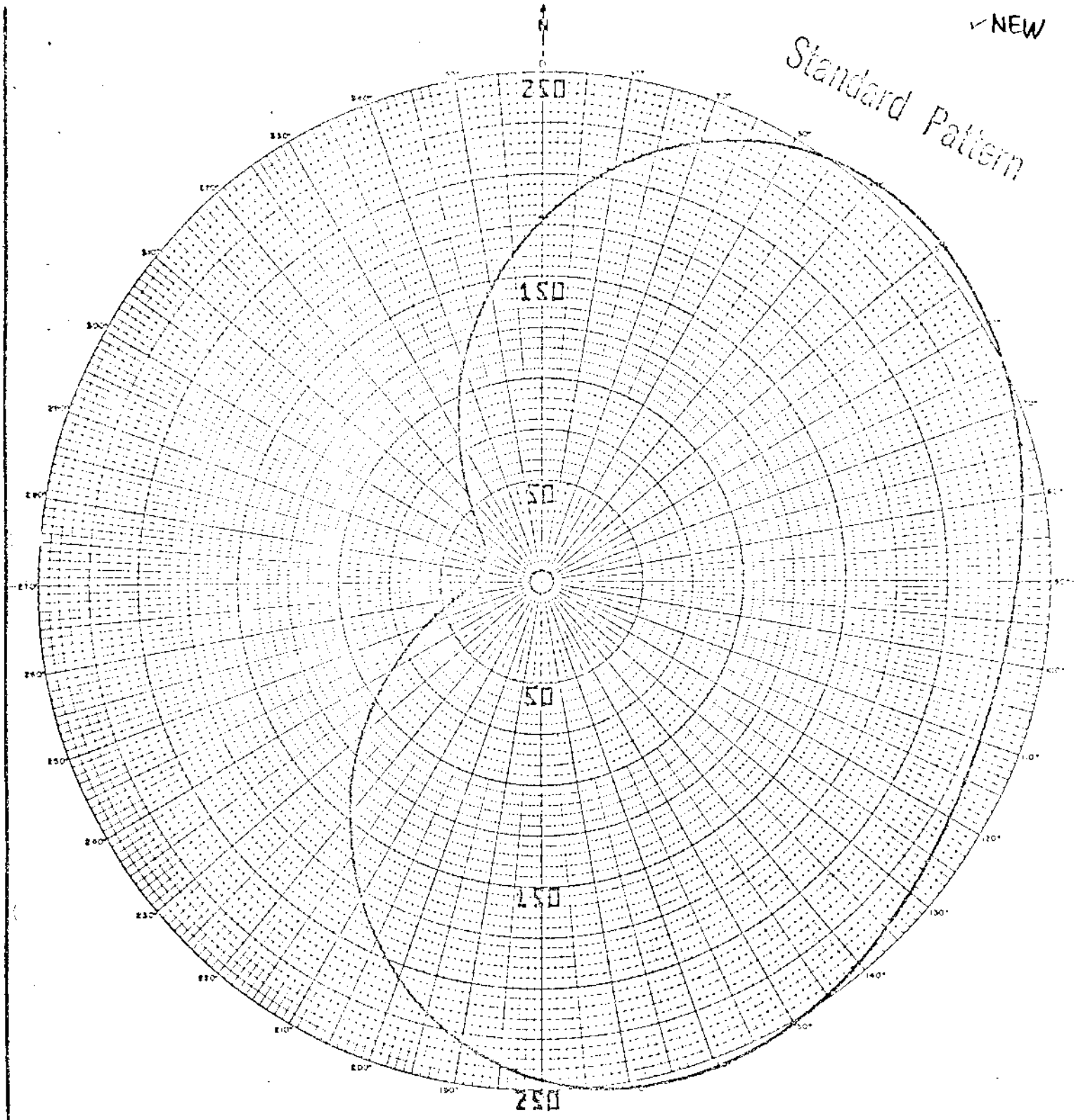


FIGURE 6

PETER V. GUREVICH & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

15° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

NEW

Standard Pattern

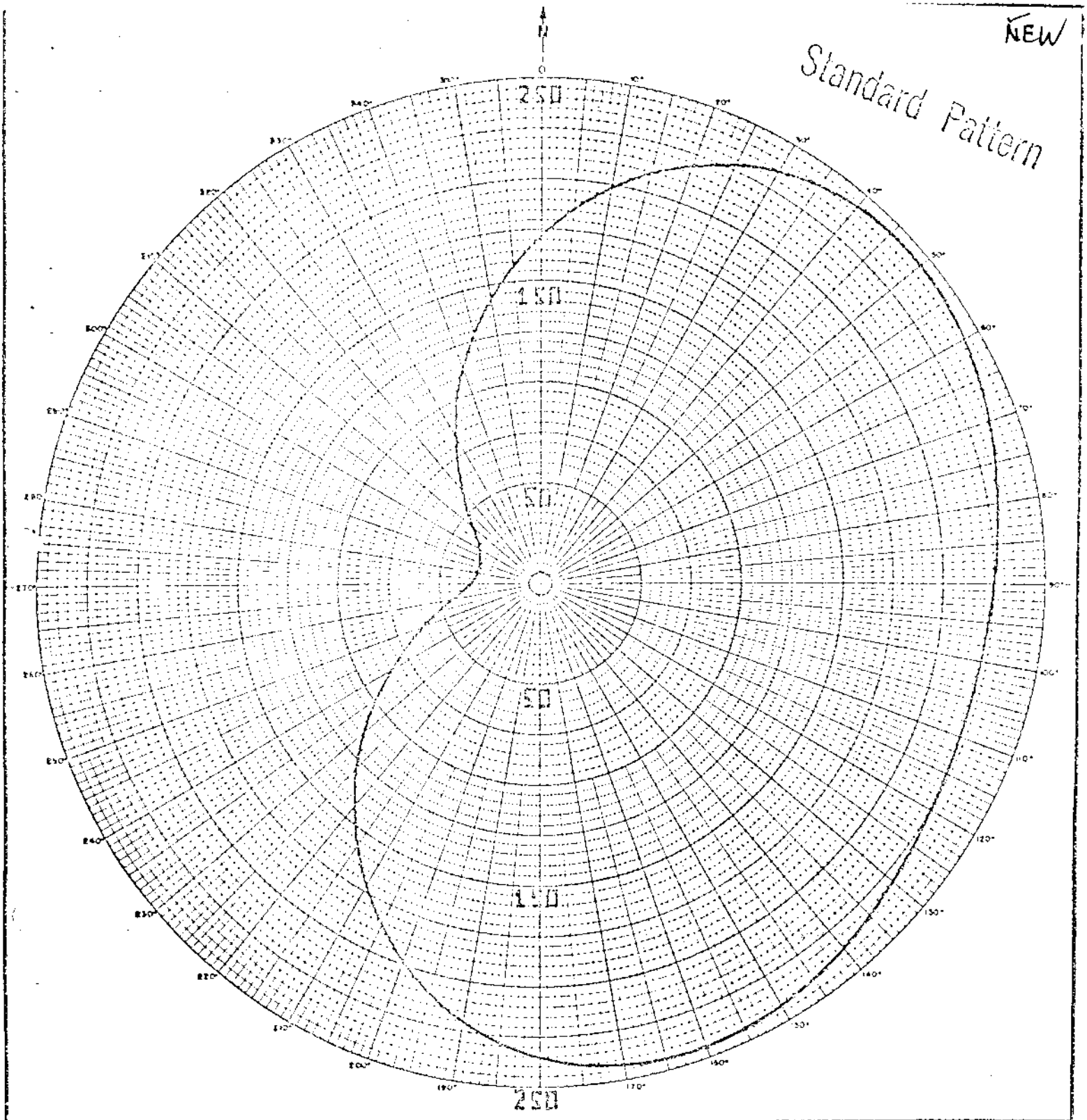


FIGURE 7

PETER V. GUREVICH & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

20° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

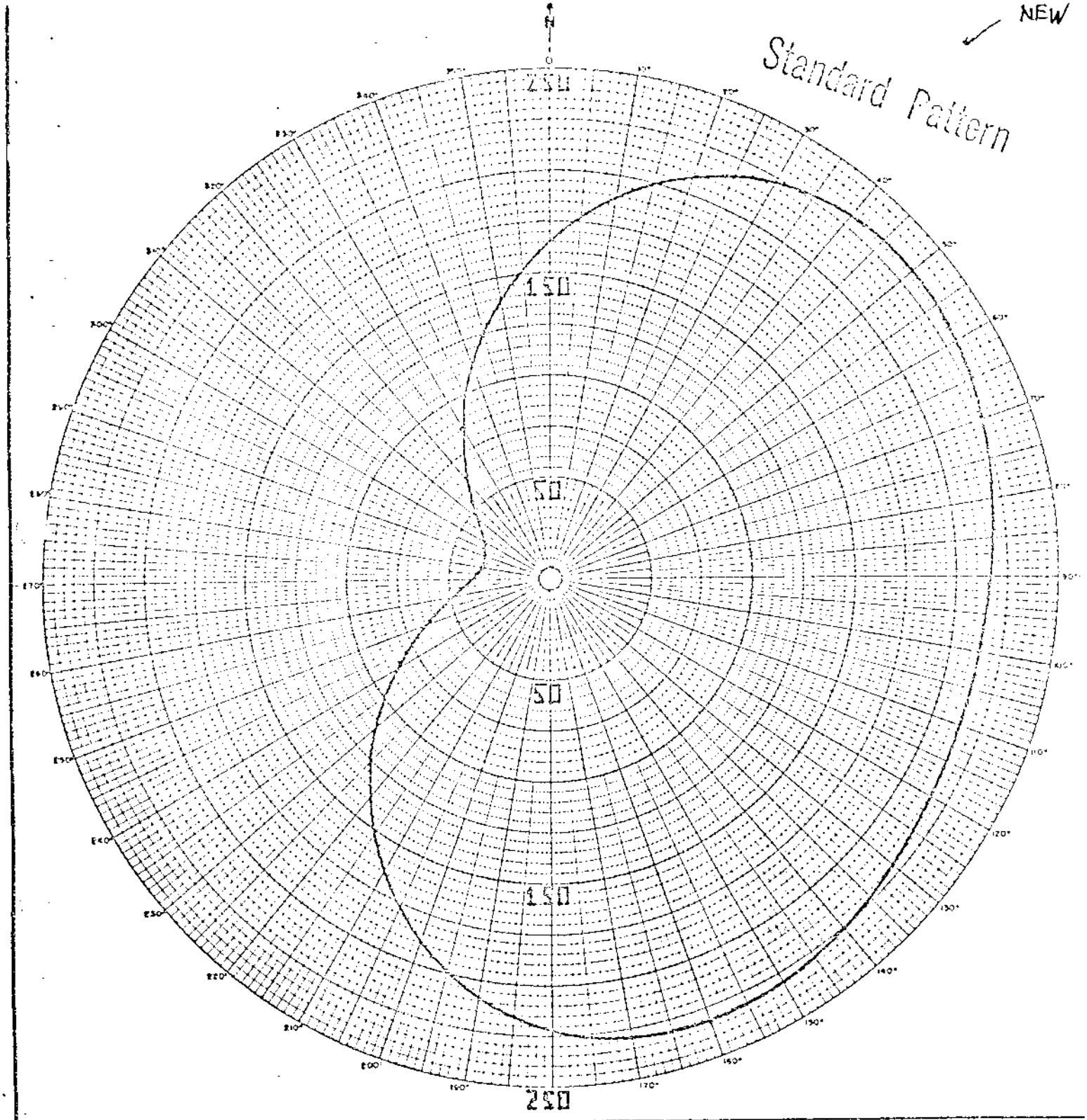


FIGURE 8

PETER V. GURECKIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

25° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

NEW
Standard Pattern

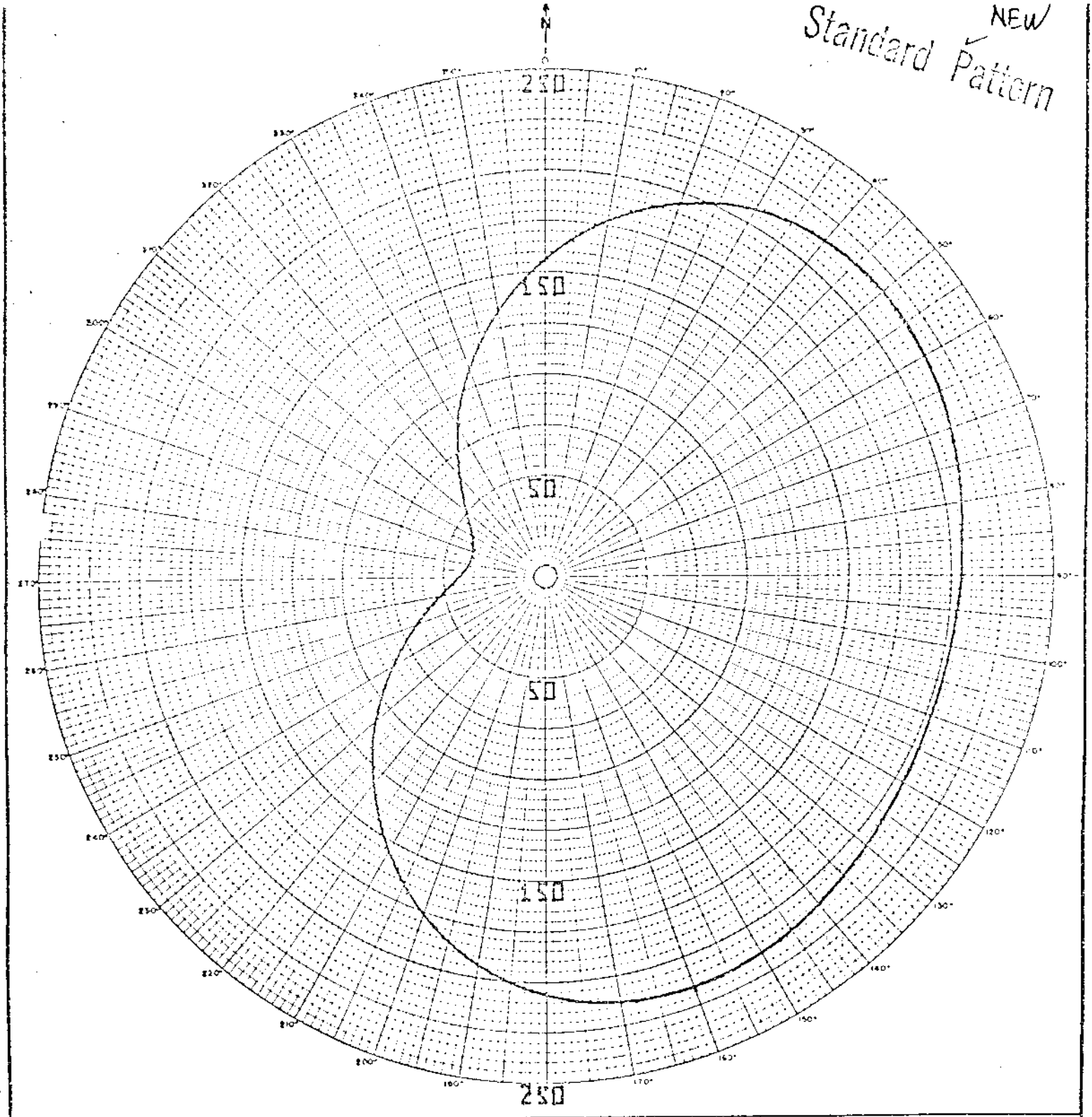


FIGURE 9

PETER V. GURECHIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

30° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

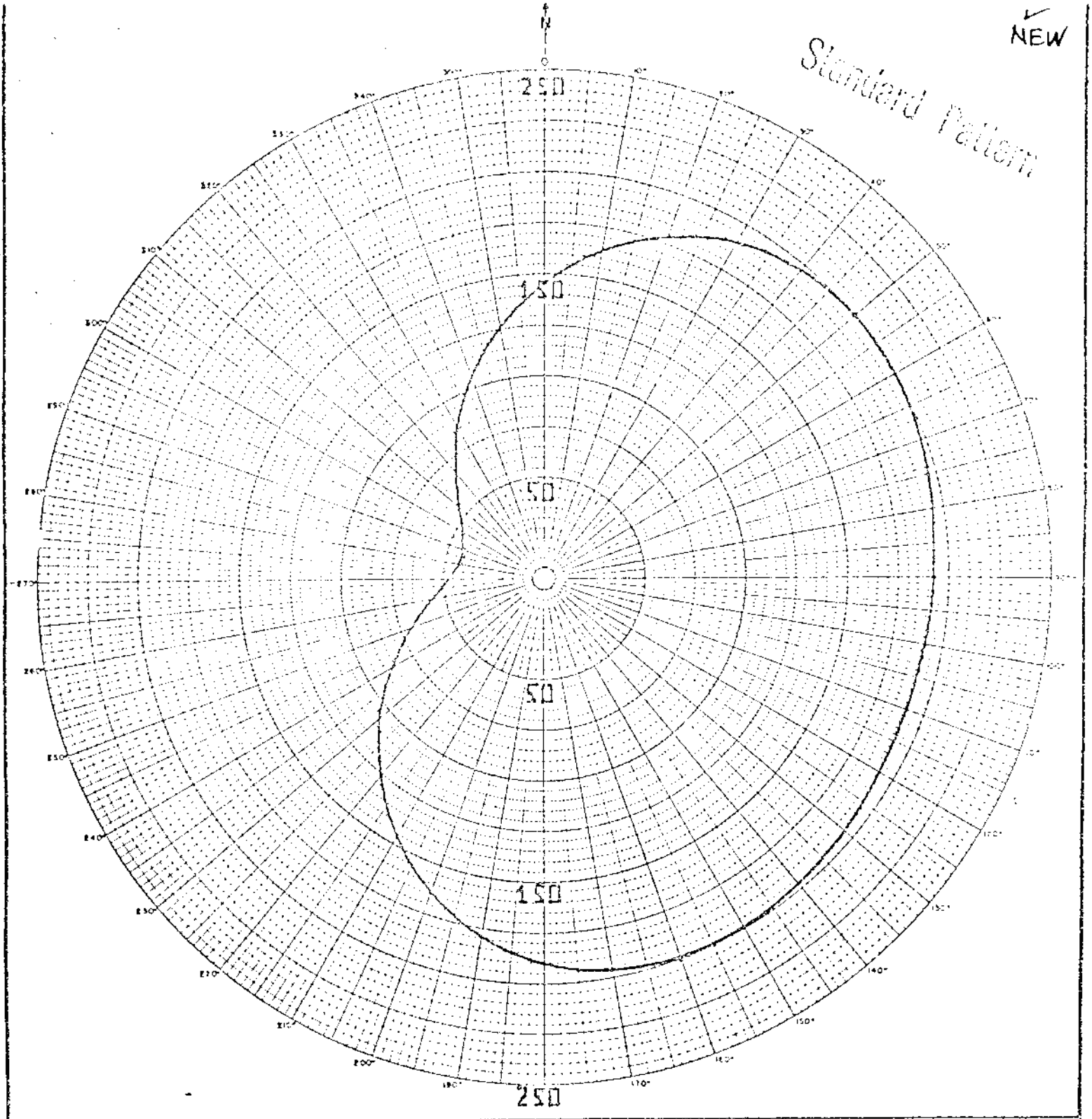


FIGURE 10

PETER V. GUNDACKS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

35° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

NEW

Standard Pattern

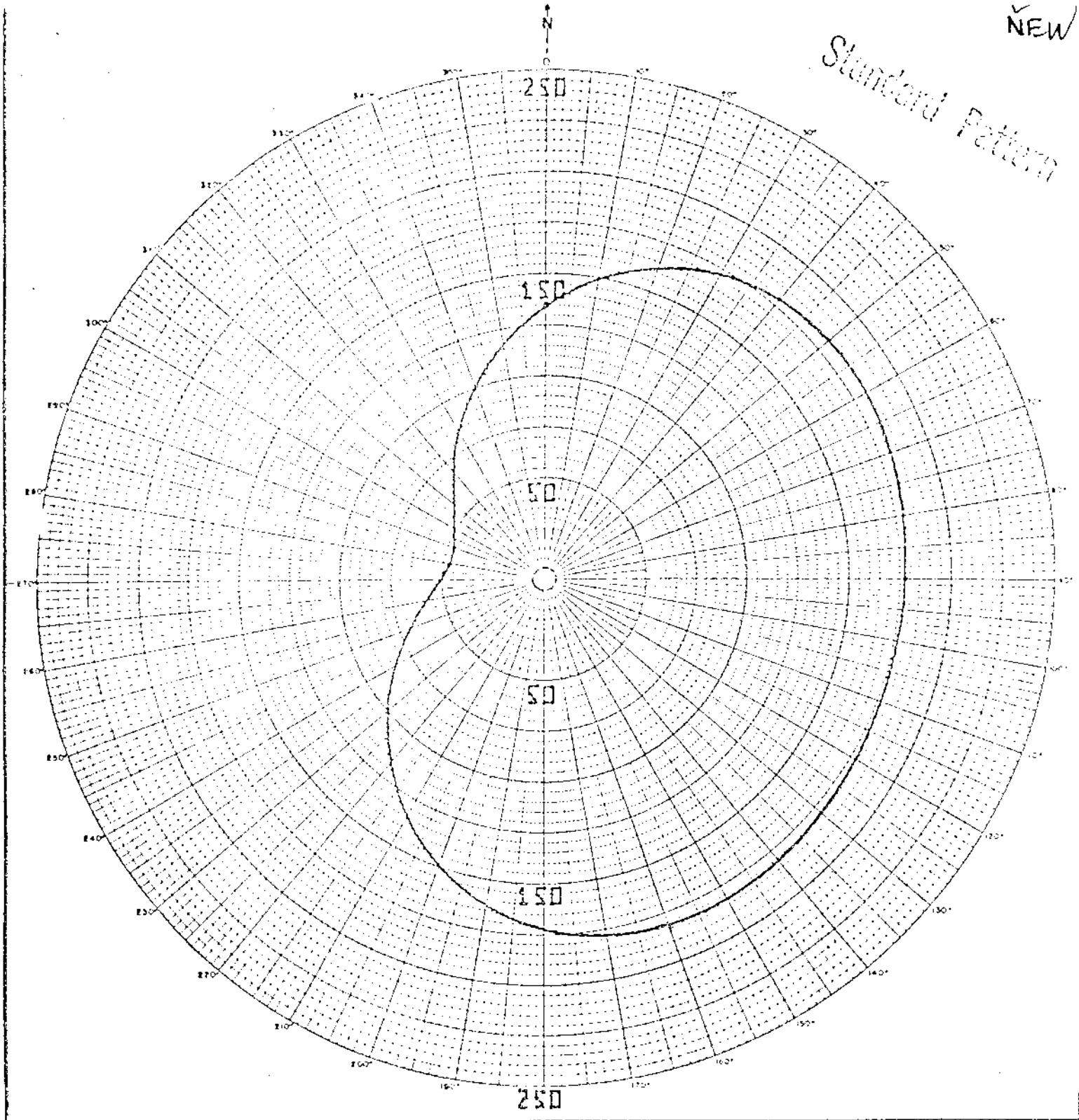


FIGURE 11

PETER V. GUPECKIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

40° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

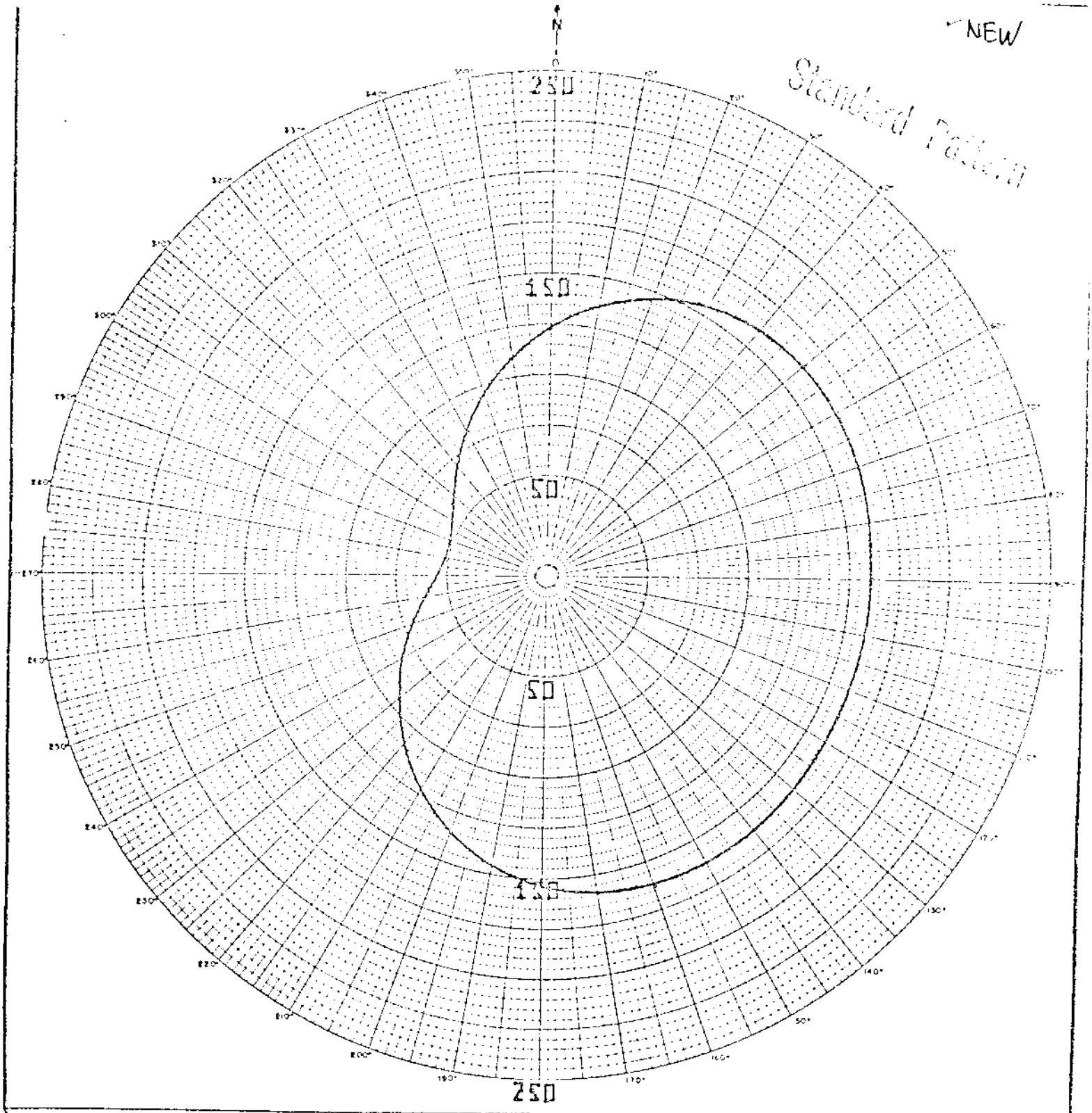


FIGURE 12

45° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz 1 KW-DA-N

PETER V. SUPECKIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

NEW

Standard Pattern

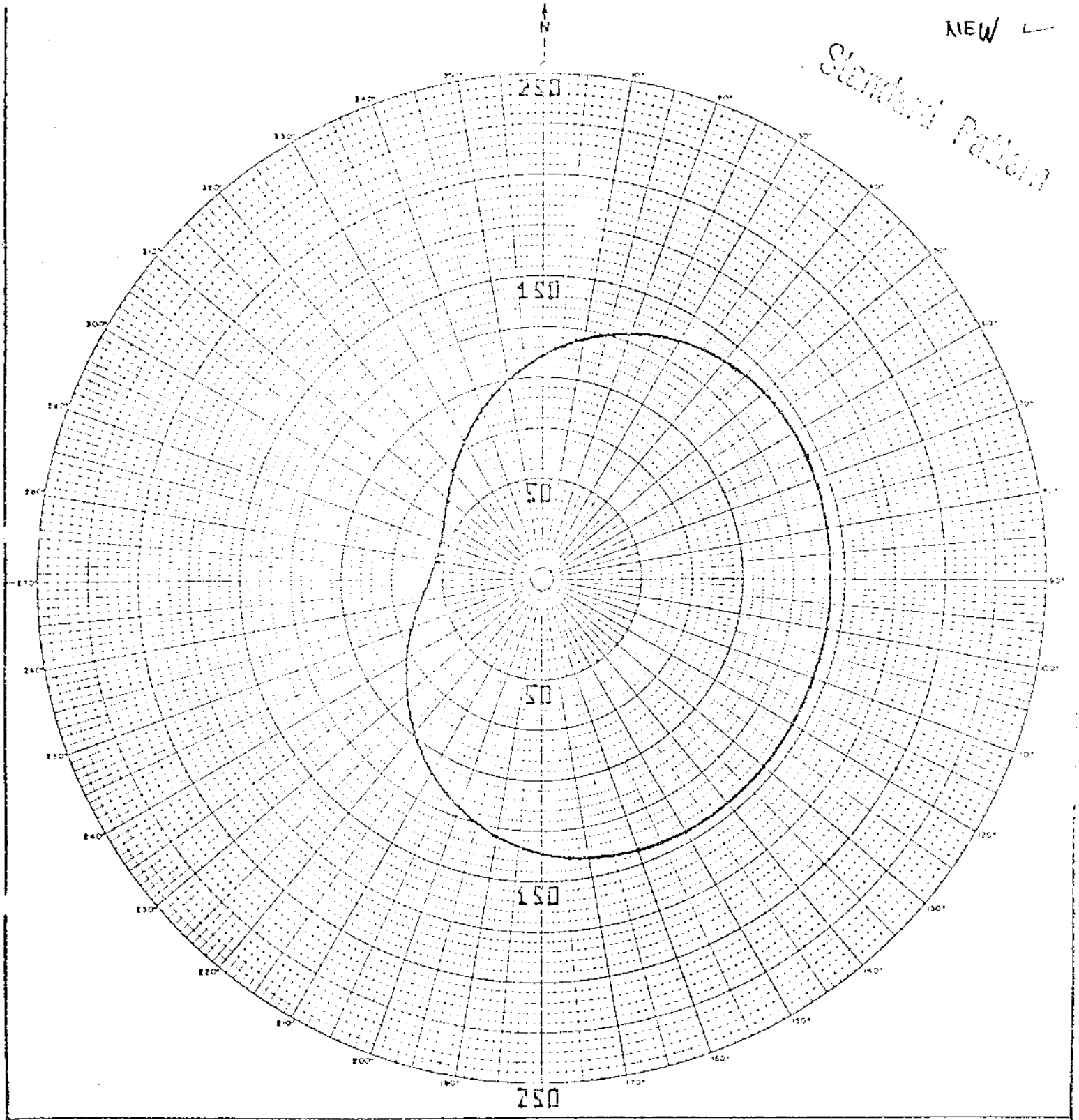


FIGURE 13

PETER V. GUNECKES & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

50° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz, 1 KW-DA-N

NEW

Standard Pattern

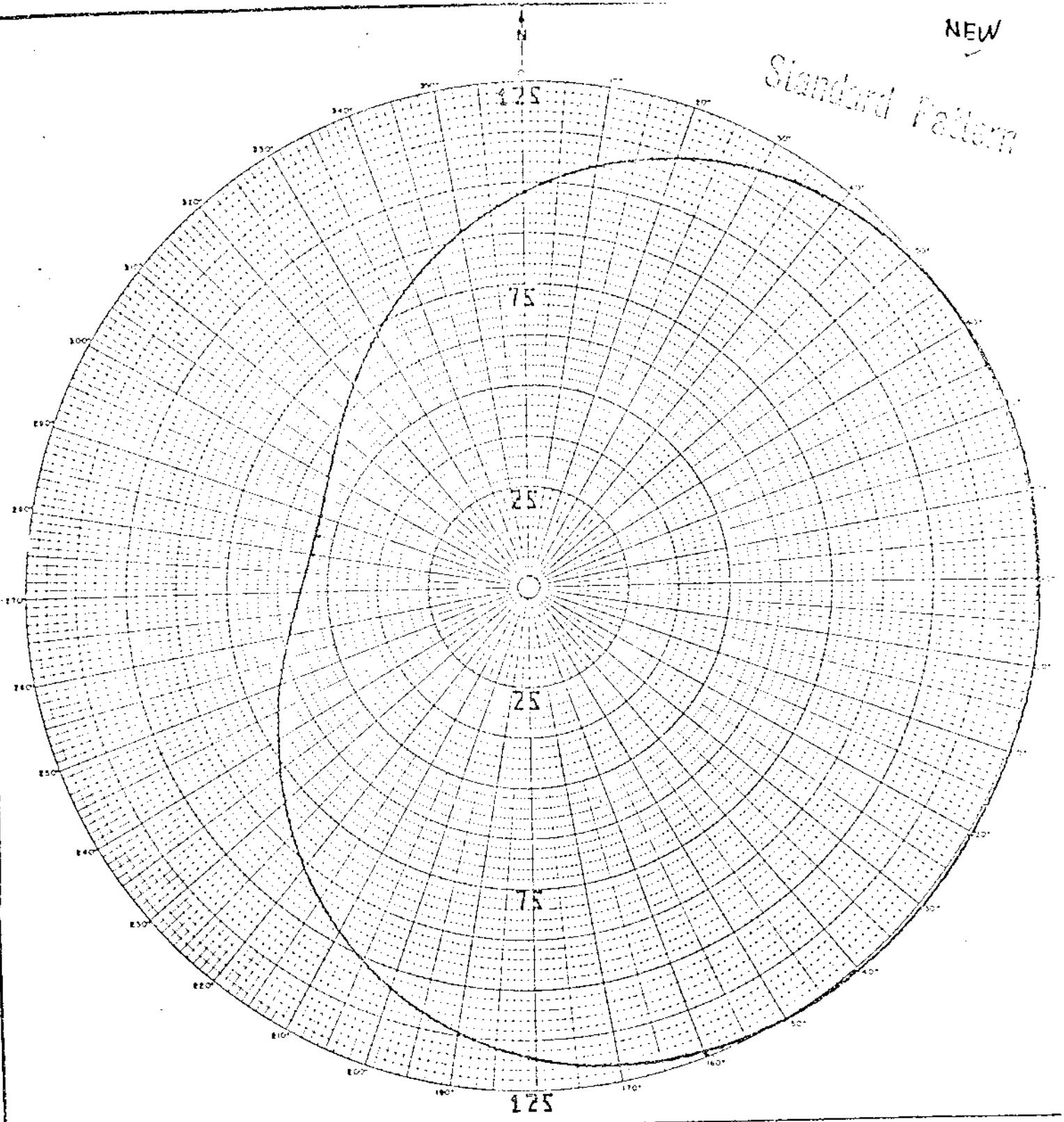
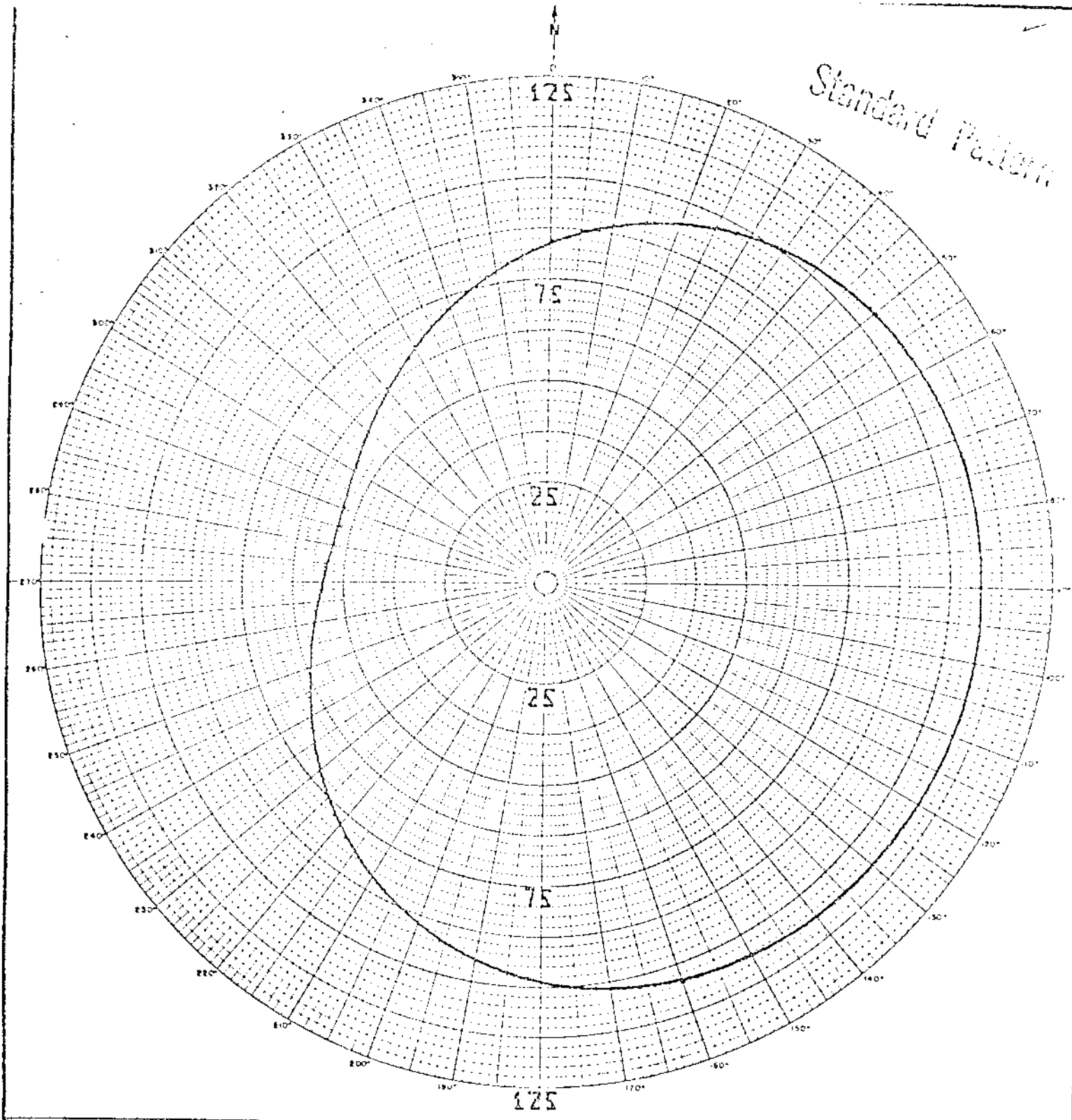


FIGURE 14

55° ELEVATION
OROCOVIS, PUERTO RICO
1470 KHz, 1 KW-DA-N

PETER V. GOTTSCHALK & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

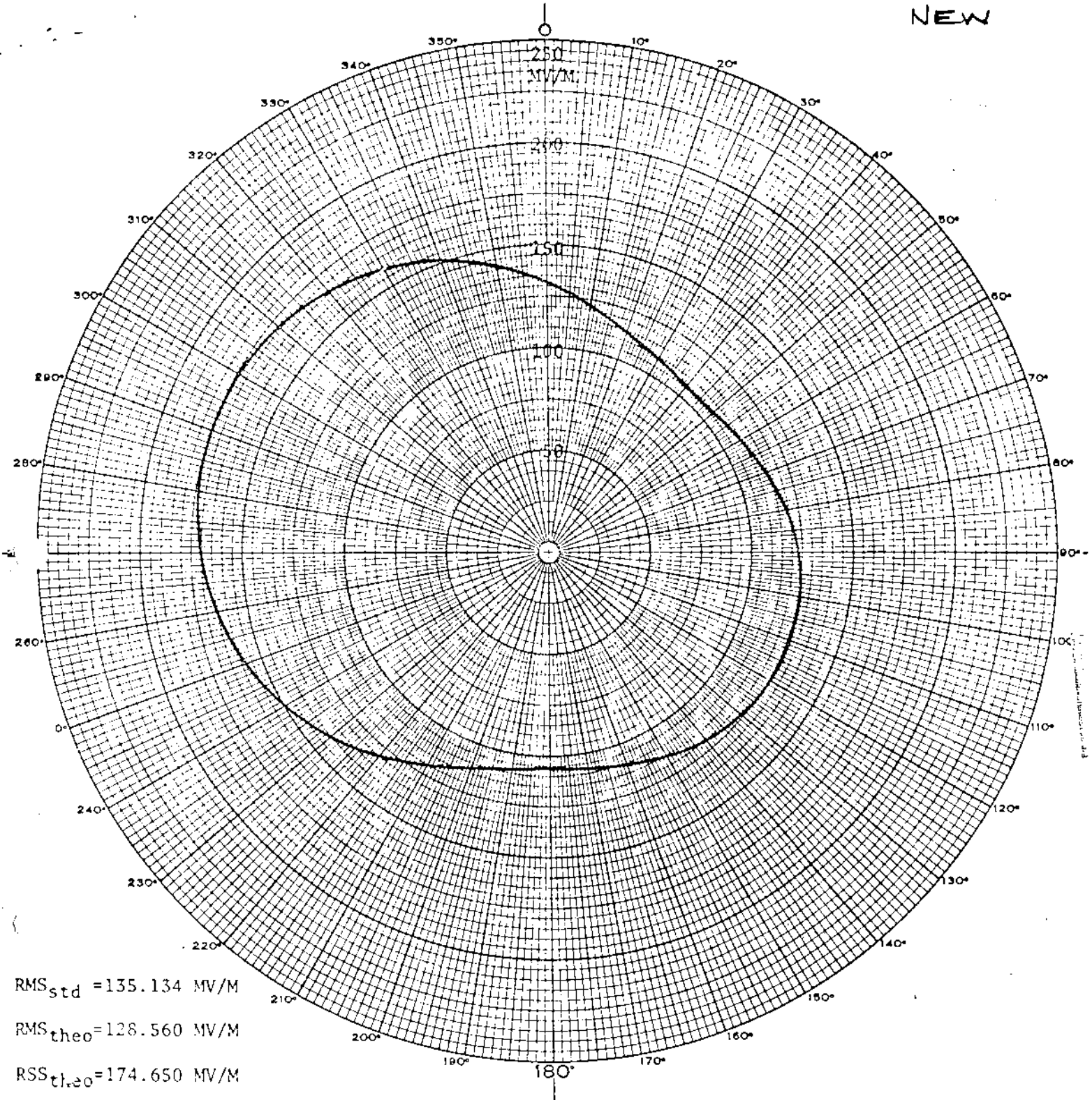


PETER V. GORECKIS & ASSOC.
CONSULTING RADIO ENGINEERS
WASHINGTON, D.C.

FIGURE 15

60° ELEVATION
OROCOVIS, PUERTO RICO
1470 Khz 1 KW-DA-N

NEW



RMS_{std} =135.134 MV/M

RMS_{theo}=128.560 MV/M

RSS_{theo}=174.650 MV/M

TOWER PLACEMENT SKETCH	PATTERN PARAMETERS	FIGURE 3	STATION DATA

#1 $1.0/0^{o}$ — 60^{o} — #2 $0.38/158^{o}$ — 111^{o}

G's=60^{o}

TOWER No.	ELECTRICAL HEIGHT G°	SPACING S°	PHASING ψ°	FIELD RATIO F
1				
2				
3				
4				
5				
6				

DAYTIME OPERATION ☒ NIGHTTIME OPERATION ☐

PROPOSED DAYTIME STANDARD PATTERN

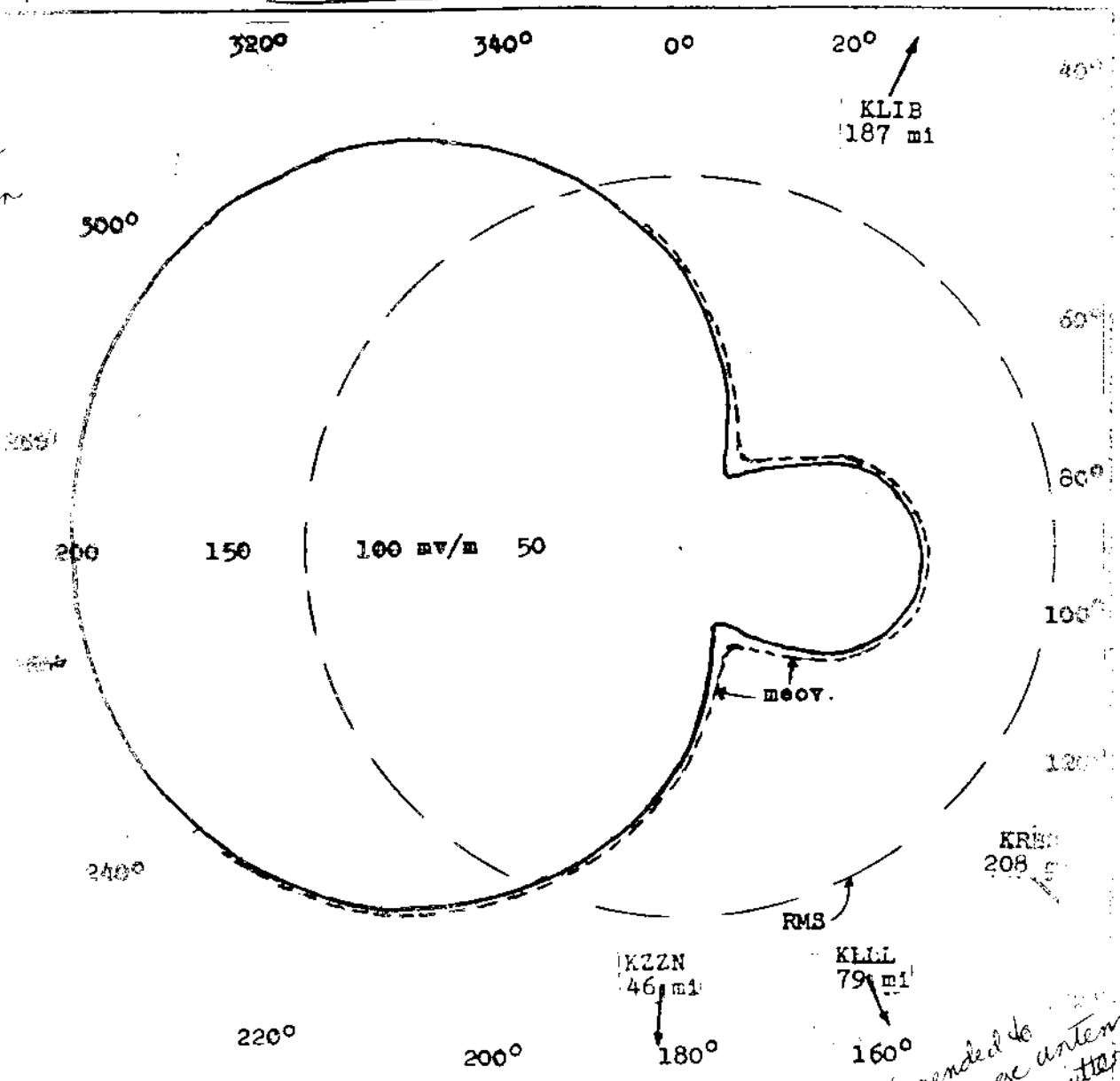
θ^{o} = 0^{o}

CALL	NEW
FREQ	1470 KHz
POWER	0.5 Kw
TYPE	DA-D
TIME	Daytime
LAT.	37-53-21
LONG.	83-51-57

E.H.MUNN,JR.
RADIO ENGINEER
COLDWATER, MICH.

PROPOSED DAY (8-22-61ct) High Plains Broadcasting Co. Dimmitt, Texas 500w, DA-D, D 1470 KC

re 4-24-63 Granted CP for new AM station



Amended to change antenna transmitter loc

N. LAT. 34° 35' 22" from to 34°-35'-06
W LONG. 102° 18' 55" 102° 18' 4

275° true — 0.8/-145° (2) — S — 1/0° (1) — 95° true

S = 70° = 129.6'

G = 78.2° = 145'

RMS = 124 mv/m (175.3/kw)

Figure E 3
HIGH PLAINS BROADCASTING CO.
Proposed New Station
Dimmitt, Texas

Horizontal Plane
Radiation Pattern

BP-

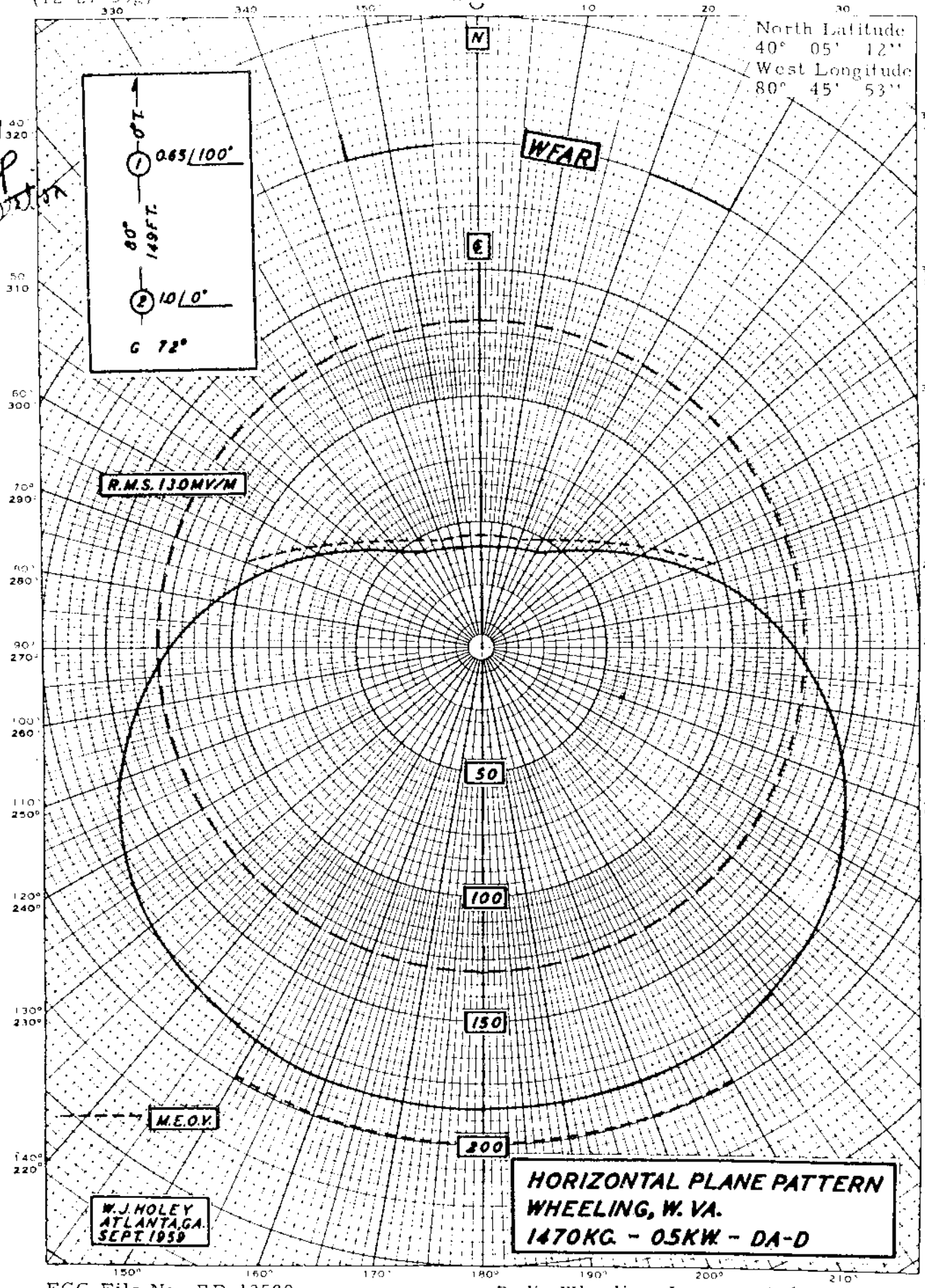
FCC File No. BP-14941 High Plains Broadcasting Co.
Accepted 7-26-61 Dimmitt, Texas 1470 KC

WHEELING, W.VA

PROPOSED DAY
(12-21-59g)

New: Radio Wheeling, Inc.
Wheeling, West Virginia

500w, DA-D,D
1470 KC



3-15 6/ passed up

FCC File No. BP-13580
Accepted 11-4-59 (formerly BP-13012)

Radio Wheeling, Incorporated
Wheeling, West Virginia 1470 KC

XEQF

DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: XEQF

Main Studio: Loma Bonita, Oax.

Frequency: 1470 kHz

Power: 5 kW

Notification List No. 278

Date: February, 1977

Class: III

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:

North Latitude: 18° 05' 25"
West Longitude: 95° 54' 40"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)
Number of elements: 2
Type of elements: Series excited, uniform cross-section, guyed, vertical steel towers.

TOWER:	#1(SE)	#2(NW)
HEIGHT ABOVE INSULATORS:	167.3'	167.3' (90°)
PHASING:	0°	+112°
FIELD RATIO:	1	1

SPACING AND ORIENTATION: The towers are located in a row spaced 139.5' (75°) on a line bearing 292° true.

GROUND SYSTEM: 90-167.3' equally spaced copper radials about each tower.

PREDICTED EFFECTIVE FIELDS AT RATED POWER:

	THEORETICAL RMS
Night	435.8 mv/m

CTR NO 20436A3

XEQF

— XEQF —

1470 KHz. 5000 W

Loma Bonita, Oaxaca.

TABLA DEL DIAGRAMA DE RADIACION HORIZONTAL

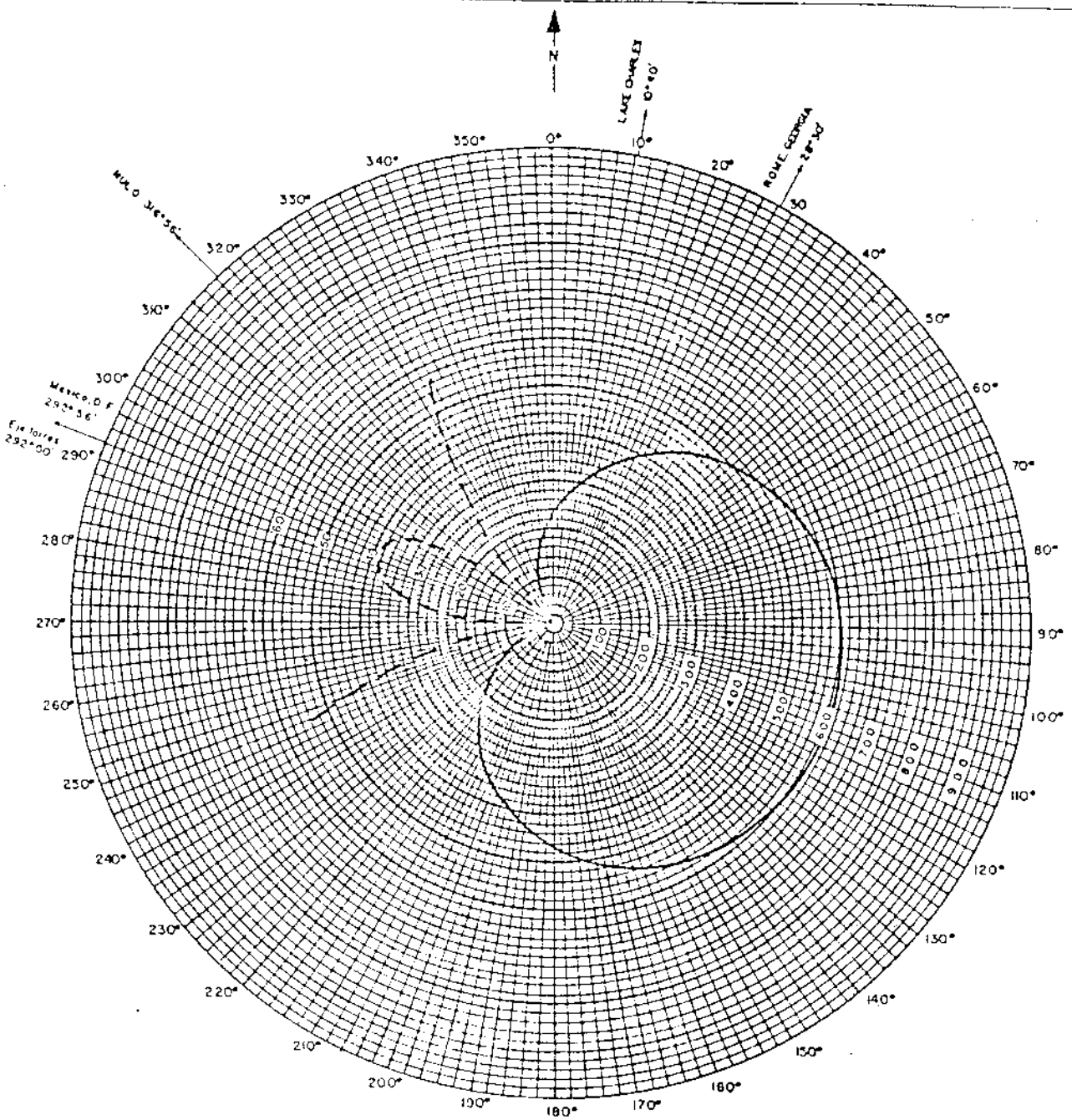
$E = 2E_o \cos(S/2 \cos\theta + \phi/2)$ mV/m

Azimut Verdadero.	θ	A	B	C	D	E mV/m
		Cos θ	A x 37.5°	B + 56°	Cos C	D x 2 E_o
292° 00' 00"	000° 00' 00"	1.00000	37.5	93.50000	0.08104	39.31879
292° 56' 40"	000° 56' 40"	0.99986	37.49490	93.49490	0.08095	39.40043
302° 00' 00"	010° 00' 00"	0.98460	36.93000	92.93000	0.05111	33.08979
312° 00' 00"	020° 00' 00"	0.93985	35.23837	91.23837	0.02161	13.99081
318° 57' 04"	024° 57' 04"	0.90666	33.99999	89.99999	0.00000	00.00000
322° 00' 00"	030° 00' 00"	0.86602	32.47500	88.47500	0.02661	17.22792
332° 00' 00"	040° 00' 00"	0.76604	28.72650	84.72650	0.09191	54.50465
342° 00' 00"	050° 00' 00"	0.64278	24.10425	80.10425	0.17185	111.25956
352° 00' 00"	060° 00' 00"	0.50000	18.75000	74.75000	0.26303	170.29170
002° 00' 00"	070° 00' 00"	0.34202	12.82575	68.82575	0.36120	233.84923
010° 40' 56"	078° 40' 59"	0.19623	07.35862	63.35862	0.44840	290.30453
012° 00' 00"	080° 00' 00"	0.17364	06.51150	62.51150	0.46157	298.83109
022° 00' 00"	090° 00' 00"	0.00000	00.00000	56.00000	0.55919	362.03254
028° 30' 32"	096° 30' 32"	-0.11333	-4.25062	51.74936	0.61910	400.81985
032° 00' 00"	100° 00' 00"	-0.17364	-6.51150	49.48850	0.64960	420.56606
042° 00' 00"	110° 00' 00"	-0.34202	-12.82575	43.17425	0.72927	472.14826
052° 00' 00"	120° 00' 00"	-0.50000	-18.75000	37.25000	0.79600	515.34681
062° 00' 00"	130° 00' 00"	-0.64278	-24.10425	31.89574	0.84901	549.66871
072° 00' 00"	140° 00' 00"	-0.76604	-28.72650	27.27350	0.88860	575.44262
082° 00' 00"	150° 00' 00"	-0.86602	-32.47500	23.52500	0.91668	593.60981
092° 00' 00"	160° 00' 00"	-0.93969	-35.23837	20.76163	0.93506	605.57947
102° 00' 00"	170° 00' 00"	-0.98480	-36.93000	19.07000	0.94512	611.89254
112° 00' 00"	180° 00' 00"	-1.00000	-37.50000	18.50000	0.94832	613.96430
267° 02' 55"	335° 02' 55"	0.90666	33.99999	89.99999	0.00000	000.00000

$2E_o = 647.42313$ $S = 75°$ $\phi = 112°$

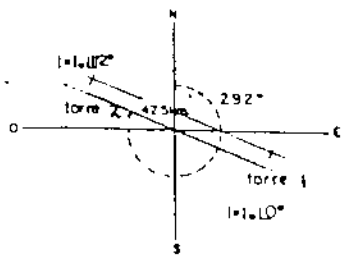
DIRECCION GENERAL DE TELECOMUNICACIONES
Departamento de Frecuencias
Oficina de Radiodifusión

XEQF



OPERACION NOCTURNA

DIAGRAMA DE RADIACION HORIZONTAL CALCULADO EN mV/m a 1609 m.



1470 KHz.

XEQF

Latitud Norte 18° 05'25"
Long Oeste 95°54'40"

Potencia
5,000 Watts A.D.N

Clase

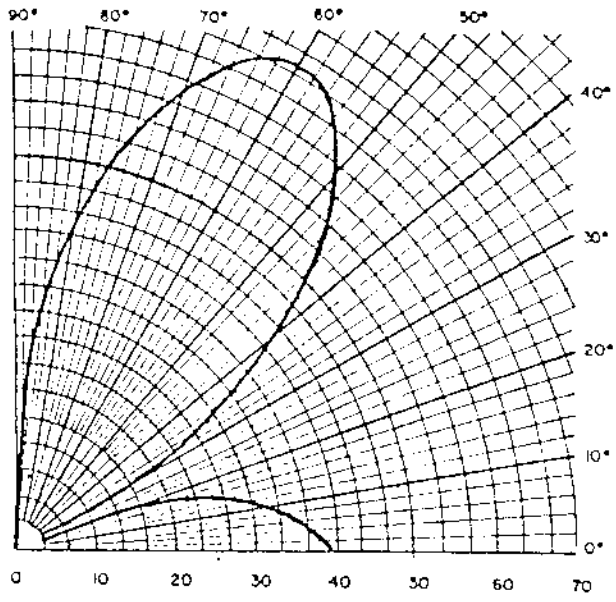
Departamento Técnico no 26

Fecha de Inspección
NOVIEMBRE DEL 76

XEQF

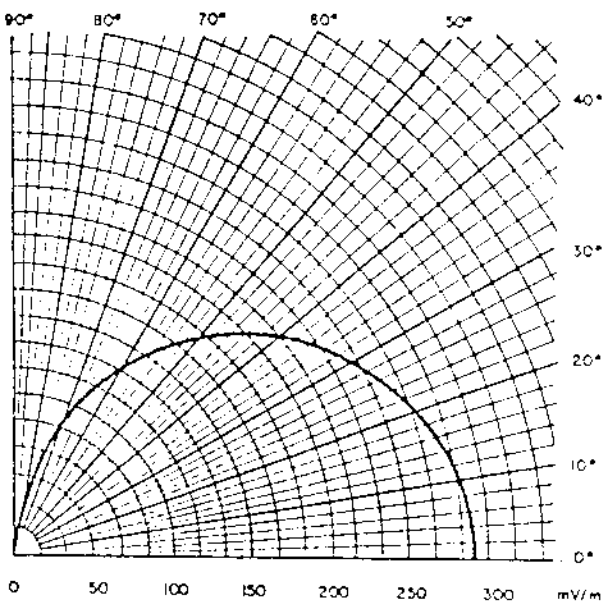
DIAGRAMAS DE RADIACION VERTICALES TABULADOS

E = 614.33709 f(θ) Cos(37.5° x 0.99986 x Cos θ + 56°) mV/m



MEXICO, D. F.
Azimut = 297° 56' 40" = 292.94443°
Distancia 362.2504 Kms = 225.1023 Millas
θ = 26° 40'

E = 614.33709 f(θ) Cos(37.5° x 0.19623 COS θ 456°) mV/m.



LAKE CHARLES, L. A.
Azimut = 101° 40' 59.77" = 101.68327°
Distancia = 1378.2623 Kms = 856.432 Millas
θ = 4° 30'

I	II
θ°	E_θ
0°	- 39.46043
10°	- 32.30120
20°	- 12.73796
30°	14.10290
40°	41.36520
50°	62.21753
60°	71.15860
70°	64.67334
80°	41.07821
90°	00.00000

I	II
θ°	E_θ
0°	290.30453
10°	284.98750
20°	269.50295
30°	245.12383
40°	213.63925
50°	176.92897
60°	136.55317
70°	93.50777
80°	48.10701
90°	00.00000

FRECUENCIA

1470 KHZ.

DISTINTIVO DE LLAMADA

XEQF

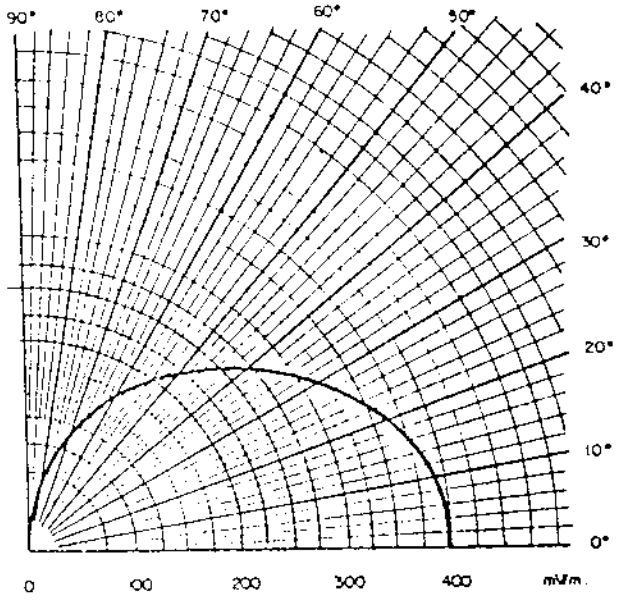
LOMA BONITA, OAXACA.

PERMISO EN TELECOMS

DIREC. GRAL. DE TELECOMUNICACIONES
Departamento de Proyectos
Lic. No 25
Oficina de Aviaciones

XEQF

DIAGRAMA DE RADIACION VERTICAL TABULADO



$$E = 647.42\,S\,3\,f(\theta)\cos(37.5°\,x - 0.11335\cos\theta + 56°)\ mV/m.$$

I	II
θ°	Eθ
0°	400.81965
10°	391.39406
20°	364.36984
30°	323.12000
40°	272.24670
50°	216.42786
60°	159.46937
70°	103.85693
80°	50.71100
90°	00.0000

FRECUENCIA

1470 KHZ

DISTINTIVO DE LLAMADA

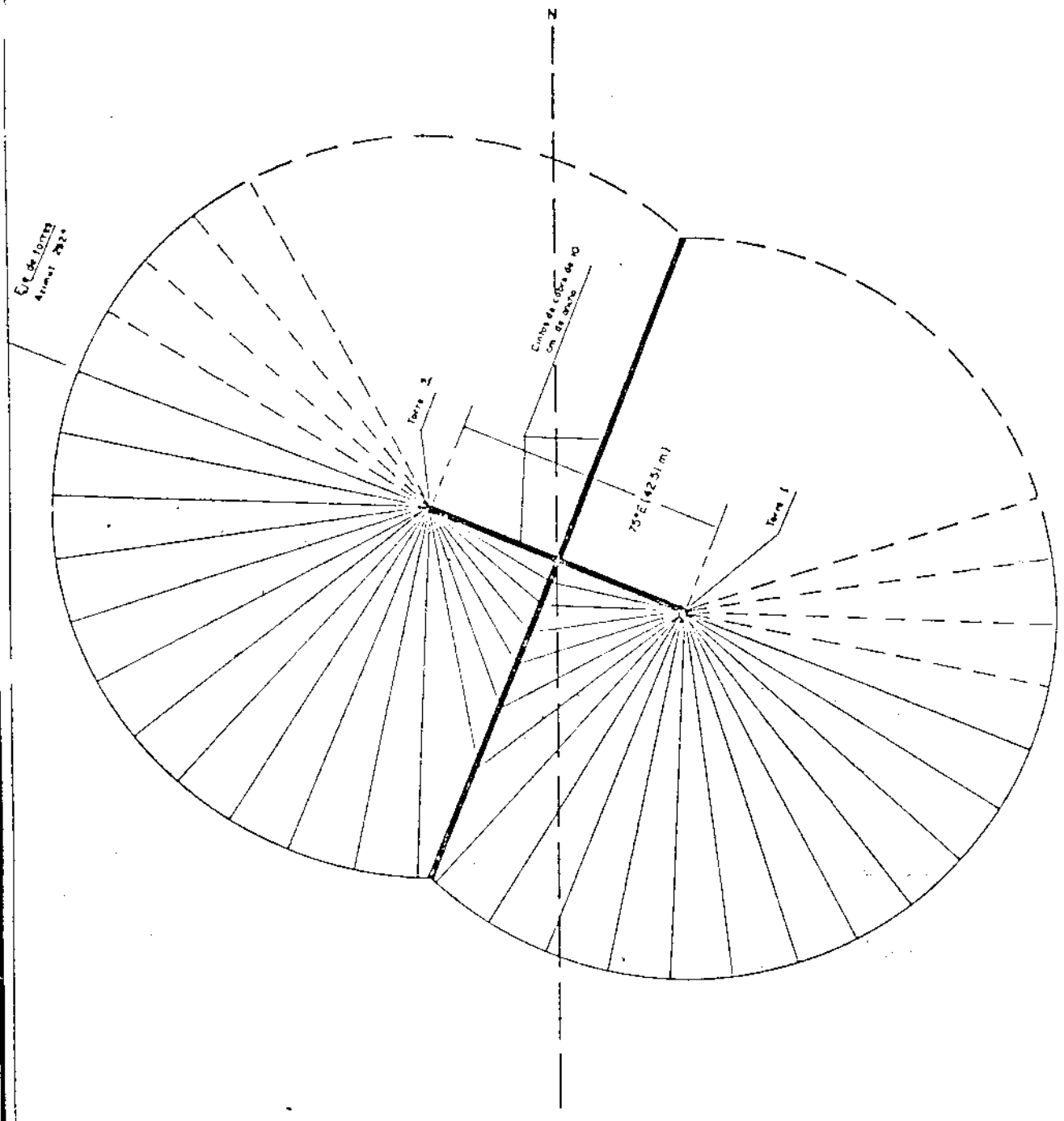
XEQF

LOMA BONITA, OAXACA.

PERITO EN TELECOMS.

DIREC. GRAL. DE TELECOMUNICACIONES
ING. J. LUIS GONZALEZ
Departamento de Estudios
Oficina de Ingenieros

XEQF



SISTEMA DE TIERRA

Descripcion del material

Son 30 radiales por torre, espaciados cada 4° (por claridad de dibujo se muestran cada 10°), de alambre de cobre desnudo del no 10 AWG, unidos al cuerpo de torres por cinta de cobre de 10cm de ancho, enterrada toda el sistema 0.15 mts.

Longitud = 31mts.

Separacion de las torres = 47.31mts.(75°E)

XEQF

1470 KHZ

Frecuencia

1470 KHz.

Departamento de Concesiones

Oficina de Asignaciones

NOVIEMBRE DE 1976.

XEDS
XERL
1470 KC

DIRECTIONAL ANTENNA DESCRIPTION SHEET 40142

Station: XERL Main Studio: Colima, Colima

Frequency: 1470 kc. Power: 1 kw

Notification List No. 195 Date: August 15, 1956 Class: III-B

GEOGRAPHICAL LOCATION OF THE CENTER OF THE ANTENNA SYSTEM:
North Latitude: 19° 14' 27"
West Longitude: 103° 42' 47"

ANTENNA CHARACTERISTICS

Authorized for Nighttime operation. (DA-N)

Number of elements: 2

Type of elements: Series-excited, guyed, vertical steel towers.

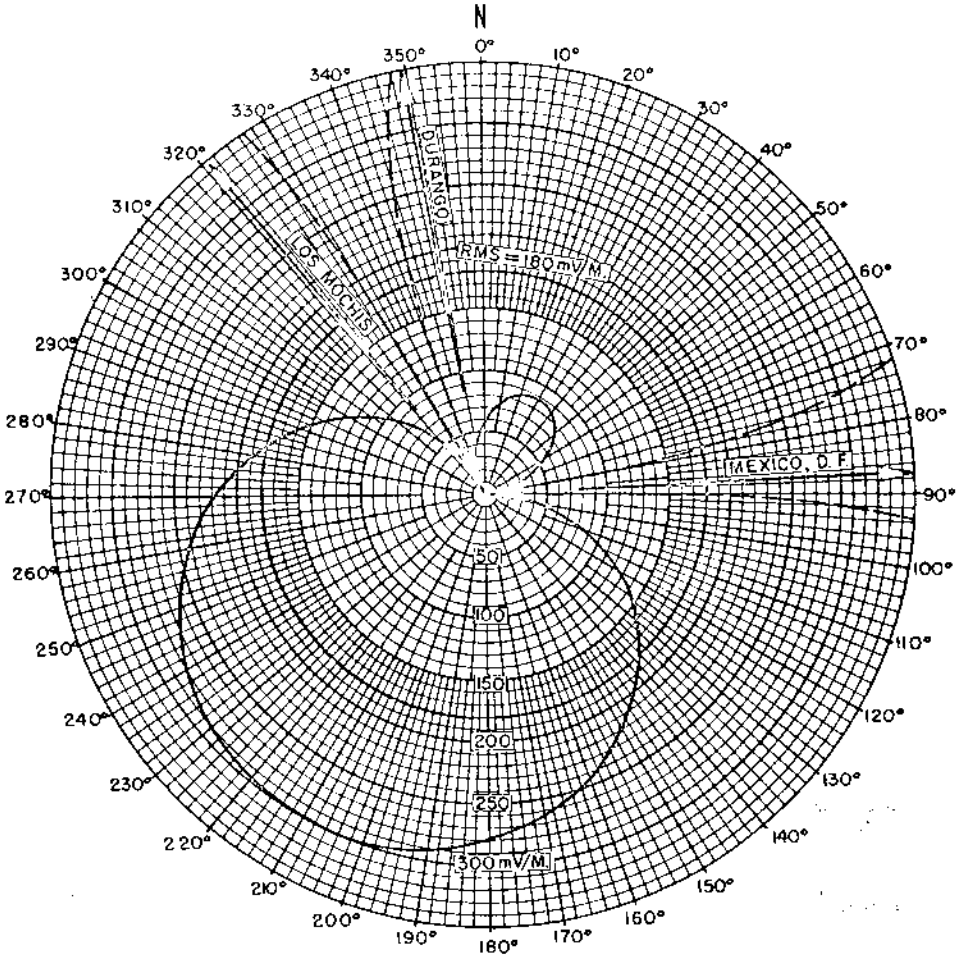
TOWER:	North	South
HEIGHT ABOVE INSULATORS:	120°	120°
PHASING:	+145°	0°
FIELD RATIO:	1.0	1.0

SPACING AND ORIENTATION: Adjacent elements are spaced (60°) on a line bearing 30° true.

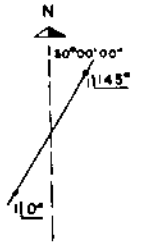
GROUND SYSTEM: The equivalent of 120-223' equally spaced copper radials about each tower with radials shortened and bonded to a transverse strap along intersections between towers.

Predicted effective Field: 180 mv/m at rated power.

XERL
1470 KC



PATRON DE RADIACION HORIZONTAL CALCULADO EN mV/M. A UNA MILLA.



RADIODIFUSORA

XERL

Colima, Col.

1470 KHz.
1,000 Watts.

ARTURO AMADOR

PASANTE ING. COMUNICACIONES.

Dib. E.Sesma.