ENGINEERING BRIEF

IN SUPPORT OF

AN APPLICATION FOR

AUTHORITY TO ESTABLISH

NEW AM SOUND BROADCASTING STATION

AT TORONTO, ONTARIO

CLASS II 50,000 WATTS 1540 KCS

DAYTIME ONLY DA/D

REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
D. B. WILLIAMSON
PROVINCE OF ONTARIO

Revision #1

Client:

CHFI-FM LIMITED

Prepared By:

D.B.Williamson, P. Eng
Consulting Engineer.

June 23, 1961

DIRECTIONAL ANTENNA DESCRIPTION SHEET

STATION: CHFI

MAIN STUDIO: Toronto, Ontario

FREQUENCY: 1540 KCS

POWER: 50KW CLASS: II

Notification List No:

DATE:

Geographical Location of the Antenna System:

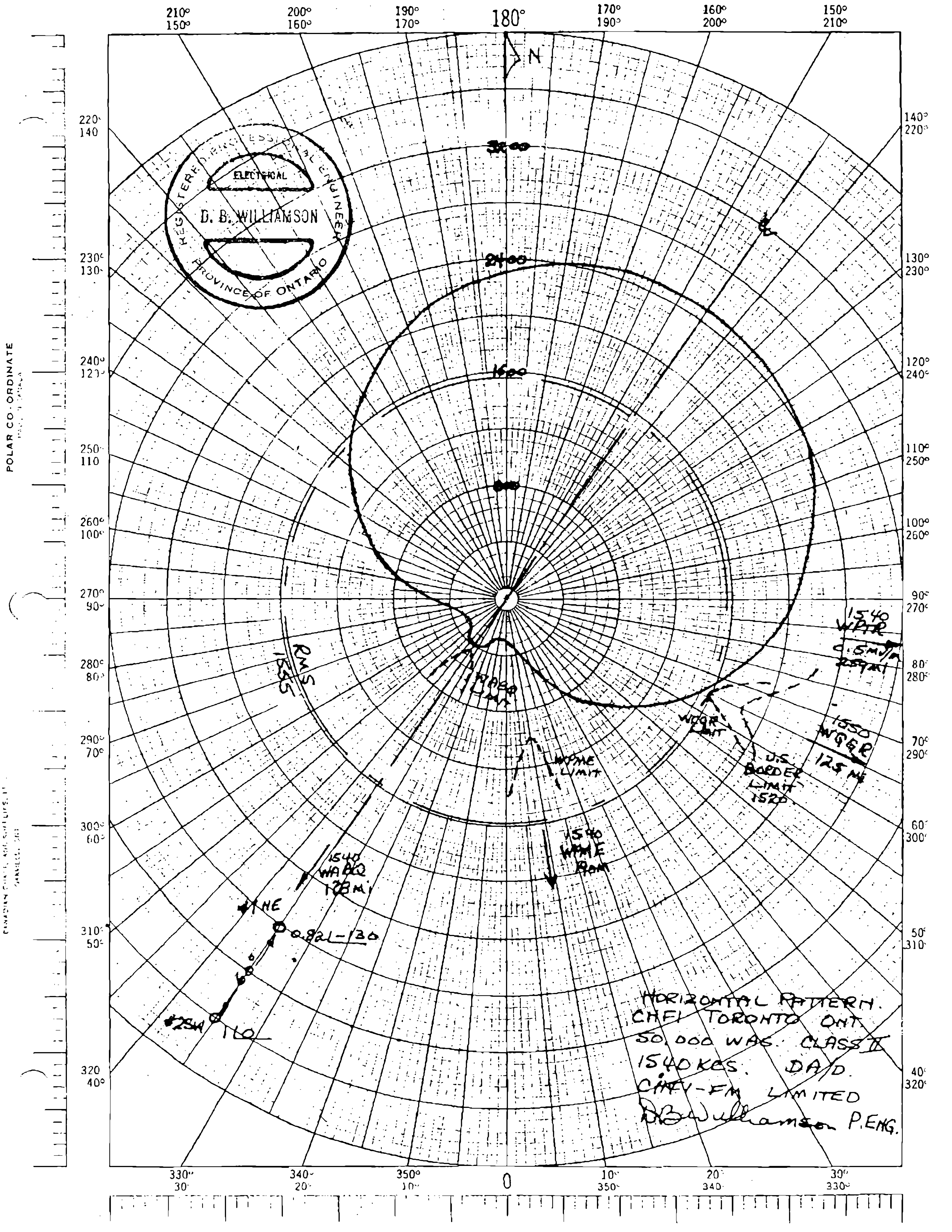
North Latitude: 43° 36' 01"
West Longitude: 79° 37' 25"

ANTENNA CHARACTERISTICS

Mode of Operation:	DA/D	
Number of Elements:	2	
Type of Elements:	guyed, uniform cross-section, series fed, no top loading	
TOWERS:	NE	SW
HEIGHT OVER INSULATORS:	200' (115°)	200' (115°)
OVERALL HEIGHT:	205'	205'
SPACING:	106.5 (60°)	
PHASING:	0	+ 130°
RATIO:	1.00	0.820
GROUND SYSTEM:	120 radials per tower 0.4 wavelengths long, spaced 3° around tower base. Radials bonded to common chord	

PREDICTED EFFECTIVE FIELD: 220 MV/M for 1 KW
1555 MV/M for 50KW

ORIENTATION: 035° TRUE


POLAR CO-ORDINATE
180°
N
REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
D. B. WILLIAMSON
PROVINCE OF ONTARIO
RMS
1525
1540
WPTR
0.5 MV/M
1550
WGGR
125 MI
U.S.
BORDER
LIMIT
1520
WPME
LIMIT
1540
WPME
1540
WABC
#1 NE
0.821-130
#2 SW
110
HORIZONTAL PATTERN.
CHFI TORONTO ONT.
50,000 WAS. CLASS II
1540 KCS. DA/D.
CHFI-FM LIMITED
P.ENG.

REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
D. B. WILLIAMSON
PROVINCE OF ONTARIO

ENGINEERING BRIEF

IN SUPPORT OF

AN APPLICATION FOR

AUTHORITY TO ESTABLISH

NEW AM SOUND BROADCASTING STATION

AT TORONTO, ONTARIO

CLASS II 50,000 WATTS 1540 KCS

DAYTIME ONLY DA/D

Client:

CHFI - FM LIMITED

Revision #2

Prepared By:

D. B. Williamson, P. Eng.
Consulting Engineer.
Supplement to Application.
Dated: JUne 23, 1961.

1. INTRODUCTION:

This engineering brief has been prepared in support of an application by Radio Station CHFI - FM Limited for authority to establish an AM affiliate on 1540 KCS DA/D with a power of 50,000 watts. This submission shows that the proposed assignment meets all requirements of NARBA and Domestic DOT specifications.

2. DISCUSSION:

The 1540 Kc channel has been selected because of the obvious economies in land requirements due to shorter wavelength and the low limitation to the predicted extent of coverage. No interference will be experienced to the protected sections of the 0.5 mv/m contour.

The station is intended to serve Metropolitan Toronto and surrounding area. A minimum signal strength of 10 mv/m is provided over the city. The 250 mv/m contour does not violate the 1% rule and proof of this fact is supplied under the covering letter January 20, 1961 enclosing a DBS analysis of the population within the 250 and 25 mv/m contours.

An analysis of the population within the 1000 mv/m contour is also included under separate cover and an undertaking by the applicant to service complaints of signal saturation.

The new site has been checked with Air Services and no problem will exist in obtaining air clearance at the new location.

The assignment is protected under Canadian List #162, July 26, 1961 and no protections are violated in shifting the transmitter to a point 1.4 miles S. W. of the approved location.

3. <u>REFERENCES AND INFORMATION SOURCES:</u>

This engineering brief has been prepared in accordance with DOT Specification # 13 and in accordance with good engineering practice. The reference specifications used in the analysis are the 1950 NARBA and FCC/DOT current AM specifications. International assignment data up to and including the following issues were employed in the interference analysis:-

Canadian List # 166 January 5, 1962.

U. S. List # 936 December 6, 1961.

Map sheets used in the brief are as follows:-

Toronto	30M
Markham	30M/14 E & W
Brampton	30M/12 E & W
Toronto	30 M/11 E & W
Owen Sound	41 S. E.
Windsor - Toronto	
Toronto - Ottawa	31 S. W.

Map sheets used in the brief (continued)

Rolph Clarke Toronto Metro

4. INTERFERENCE:

The proposed assignment is daytime only so only applicable assignments are considered in the analysis. Those considered are as follows:-

FREQUENCY	LOCATION		CLASS
1540	WPTR ALBANY	50 KW	II DA/1
1540	WABQ CLEVELAND	1 KW	II ND
1540	WPME PUNXSUTAWNEY	1 KW	II ND
1520	WKBW BUFFALO	50 K	1B DA/ 1
1550	CBE WINDSOR	10 K	1B DA/1
1560	CFCR SIMCOE	0.25 D	II ND
1550	WCGR CANANDAIGUA	0.25 D	II ND

a) Co-channel

1. WPTR ALBANY N. Y. 50 KW II DA/1

Published 0.5 mv/m contour passes through Johnstown N. Y. at closest point to Toronto. This point is 260 miles from the CHFI site. Brg. at Toronto 096.5 °.

Path conductivity from Toronto:

6.5 miles	6×10^{-14} emu
135 miles	15×10^{-14} emu
118.5 miles	4×10^{-14} emu

Signal strength @ WPTR 0.5 mv/m contour

0.00065 for 100 mv/m @ 1 mile

Actual field strength	1920 mv/m @ 1 mile
Allowable field strength	3840 mv/m @ 1 mile

2. WABQ CLEVELAND, OHIO 1 Kw II ND-D

Point to point mileage 178 miles (175 mv/m @ 1 mile).

WABQ 0.5 mv/m @ 28 miles from Cleveland. (Conductivity FCC M3 = 8×10^{-14} emu) CHFI site to WABQ 0.5 mv/m = 150 miles. Path conductivity from Toronto. Brg. at Toronto for WABQ 216 $^{\circ}$.

19 miles	10×10^{-14} emu
38 miles	20×10^{-14} emu
30 miles	4×10^{-14} emu
63 miles	10×10^{-14} emu

Signal strength @ WABQ contour - 0.0055 mv/m for 100 mv/m @ 1 mile.

Actual field strength	395 mv/m @ 1 mile
Allowable field strength	455 mv/m @ 1 mile

3. WPME PUNXSUTAWNEY, PA. 1 KW II ND-D

236 mv/m @ 1 mile. Point to point mileage - 190 miles

WPME 0.5 mv/m @ 16 miles from WPME. Conductivity FCC M 3

2 x 10^{-14} emu. CHFI site to WPME 0.5 mv/m = 174 miles.

Brg. at CHFI - 171^{o}. Path conductivity from Toronto

7 miles	10 x 10^{-14} emu
20.5 miles	15 x 10^{-14} emu
24 miles	20 x 10^{-14} emu
27.5 miles	10 x 10^{-14} emu
11.5 miles	8 x 10^{-14} emu
40.5 miles	4 x 10^{-14} emu
43 miles	2 x 10^{-14} emu

Signal strength @ WPME 0.5 mv/m contour - 0.0025 mv/m

for 100 mv/m @ 1 mile.

Actual field strength @ WPME 0.5 mv/m contour - 0.01 mv/m

Actual field strength 400 mv/m @ 1 mile

Allowable field strength 1000 mv/m @ 1 mile

b) Adjacent Channel - 10 KCS

1. CBE WINDSOR, ONTARIO 10 KW DA/1

Published 0.5 mv/m contour 108 miles from CHFI sie at closest point to Toronto. Brg. at CHFI - 238^{o}.

Path conductivity from CHFI

16.5 miles	10 x 10^{-14} emu
63.0 miles	4 x 10^{14} emu

Path Conductivity from CHFI (continued)

28.5 miles	20×10^{-14} emu

Signal strength @ CBE 0.5 mv/m contour - 0.0088 mv/m for 100 mv/m @ 1 mile.

Actual field strength	310 mv/m @ 1 mile
Allowable field strength	2840 mv/m @ 1 mile

2. WCGR CANANDAIGUA, N. Y. 0.25 KW II ND-D

95.5 mv/m @ 1 mile. Point to point mileage - 126 miles.

WCGR 0.5 mv/m contour at 15 miles (FCC M3) conductivity 4×10^{-14} emu) Brg. at CHFI site 114°.

Conductivity from CHFI to WCGR 0.5 mv/m

5.5 miles	6×10^{-14} emu
45 miles	15×10^{-14} emu
55 miles	8×10^{-14} emu
5.5 miles	4×10^{-14} emu

Signal strength @ WCGR 0.5 mv/m contour - 0.015 for 100 mv/m @ 1 mile.

Actual field strength	1570 mv/m @ 1 mile
Allowable field strength	1665 mv/m @ 1 mile

c) ADJACENT CHANNEL - 20 KCS

1) WKBW BUFFALO, N. Y. 50 Kw IB DA - 1

Protected at U. S. Border. Distance CHFI to border 24.5 miles.

Conductivity Brg. 115^{O}.

5.0 miles	6×10^{-14} emu
19.5 miles	15×10^{-14} emu

Signal strength @ border 0.75 mv/m for 100 mv/m @ 1 mile.

Actual field strength	1550 mv/m @ 1 mile
Allowable field strength	2000 mv/m @ 1 mile

2) CFRS SIMCOE, ONTARIO 0.25 KW II ND-D

Published 0.5 mv/m CFRS located 34 miles from CHFI site along Brg. 200^{o}. Path conductivity from CHFI

16 miles	10×10^{-14} emu
18 miles	20×10^{-14} emu

Signal strength @ CFRS 0.5 mv/m contour 0.38 mv/m for 100 mv/m @ 1 mile.

Actual field strength	350 mv/m @ 1 mile
Allowable field strength	3950 mv/m @ 1 mile

5. TRANSMITTER FACILITIES :

The proposed site is located so as to provide service to the city of Toronto without the problem of saturation due to high power. It is proposed to use a two tower array with an RMS radiation efficiency of

220 mv/m at 1 mile for 1 KW.

1555 mv/m at 1 mile for 50 KW.

6. Oscillator Radiation:

The frequency 1540 KCS is located on the I. F. image of 1090 KCS which is licensed at Brampton, Ontario, 250 watts. This station covers a relatively small area and although some interference from receiver oscillators is expected, the proposed signal strength of CHFI over the coverage of CHIC Brampton will be sufficient to overide any interference from this source.

7. GENERAL

No problems are expected from intermodulation with other stations as the relative signal intensities of each station at the site of the others and the proposed station are within reasonable limits.

8. ESTIMATED COVERAGE:

The enclosed maps show the calculated coverage. The conductivity of DOT conductivity map sheet # 2 was assumed for Central Ontario.

9. ENGINEER RESPONSIBLE FOR BRIEF:

D. B. Williamson, P. Eng. is the engineer responsible for the brief. His qualifications are on file with the Department of Transport, Ottawa. Engineering seal and signature are provided for reference.

D B Williamson

REGISTERED PROFESSIONA
ELECTRICAL
D. B. WILLIAMSON
PROVINCE OF ONTARIO

DIRECTIONAL ANTENNA
DESCRIPTION SHEET

STATION:	CHFI	MAIN STUDIO:	Toronto
FREQUENCY:	1540 KCS	POWER: 50 KW	CLASS: II
Notification List No:		DATE:	

Geographical Location of the Antenna System:

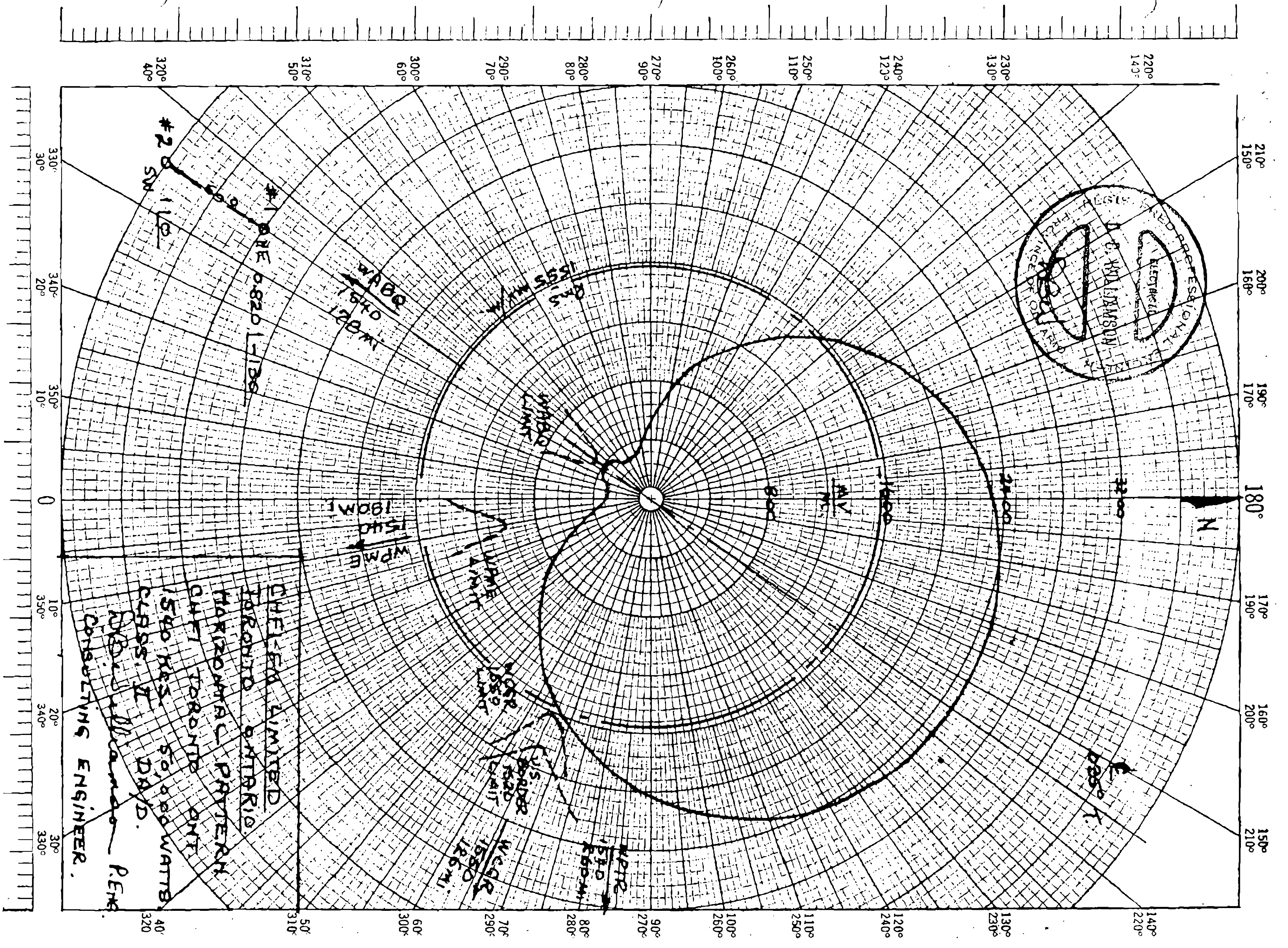
North Latitude: 43° 35' 27"
West Longitude 79° 39' 14"

ANTENNA CHARACTERISTICS

Mode of Operation:	DA/D	
Number of Elements:	2	
Type of Elements:	guyed, univorm cross-section, series fed, no top loading	
TOWERS:	NE	SW
HEIGHT OVER INSULATORS:	200' (115°)	200' (115°)
OVERALL HEIGHT:	205'	205'
SPACING	106.5' (60°)	
PHASING:	0	+ 130°
RATIO:	1.00	0.820
GROUND SYSTEM:	120 radials per tower 0.4 wavelengths long, spaced 3° around tower base. Radials bonded to common chard.	
PREDICTED EFFECTIVE FIELD:	220 MV/M for 1 KW 1555 MV/M for 50 KW	
ORIENTATION:	035° True	

CANADIAN CHARTS AND SUPPLIES, LTD.
OAKVILLE, ONT.

POLAR CO-ORDINATE
MADE IN CANADA



B R I E F

to the

BOARD OF BROADCAST GOVERNORS

FROM: CHFI-FM
August 1, 1961

In Support of August 22, 1961, Application

- Daytime - only AM extension of facilities
- Proposed frequency - 1540 KCS
- Proposed power - 50 KW
- Proposed location of transmitter
  Burnhamthorpe Road (Northwest Toronto)

INTRODUCTION

CHFI-FM Limited, the licensee of CHFI-FM, is seeking authority from the Board of Broadcast Governors to extend its facilities and to make available to the rest of the radio listening audience in the Metropolitan Toronto area the same high standard of programming - and the same relative freedom from commercial announcements - that has long characterized CHFI-FM. It is submitted that such an expansion would not offend the Board's enunciated policy and that it would furnish a service that is not now available to eighty-five per cent of the public.

The ten months that have passed since the present proprietors assumed direction of the affairs of CHFI-FM have seen many changes and improvements in the station. New studio and transmitter equipment has been acquired, the library has been greatly expanded, a more varied program fare has been supplied to the FM listening audience, and great efforts have been exerted in making the whole of the public aware of the special and desirable characteristics of the FM medium. This has meant hard work, much study, and the expenditure of a substantial amount of money.

It has long been recognized that the main tast facing FM broadcasters is the stimulating of the public appetite for that type of musical programming that has become known as FM programming.

This application for a daytime-only AM licence - for simultaneous FM programming - parallels the answer found in many American cities for strengthening the financial base of FM stations. With the entrance into the Toronto market of a competing commercial FM station supported by a well-established AM station, the time has come for this solution to be made available to CHFI to enable it to maintain its present programming standards.

By extending this highly desirable type of service to the large segment of the public not now able to enjoy the advantages of FM programming, during the daytime only, we will not overshadow, but rather popularize the FM medium. There is no more effective or economical way of promoting FM as a medium, FM listening, or FM stereo listening than through associated AM radio because it allows the station to reach the 85% of the people who do not yet own FM receivers. As well, it puts CHFI on a fair competitive basis. It would allow us not only to maintain but even to improve still further the quality of our programming.

In the relatively near future, this should enable CHFI-FM to supply programming to other Canadian FM stations which do not possess sufficient resources to enable them to program separately on their own. It would further establish CHFI as a positive and constructive factor in the national development of FM as a popular broadcast medium.

REASONS FOR GRANTING THIS APPLICATION

1. The whole of the listening public will be able to hear continuous good music programming - with limited commercial announcements - not now available on the AM dial.

We believe it to be in the public interest that as many people as possible have an opportunity to hear what has become known as FM programming. Not everyone who would appreciate this mature and tasteful programming has an FM set and it is likely to take some years before FM penetration reaches even 50% of the total audience. In the meantime, with little of this kind of programming of Canadian origin available on the AM dial, the granting of this application would make the program choice on the AM band truly "comprehensive".

A great deal of effort and expense has gone into creating CHFI's excellent programming. It is already in existence - and deserves the privilege of being available to the entire listening public.

It is significant that CHFI's programming closely parallels that recommended recently by the Board of Broadcast Governors in the memorandum to stations on improving standards of broadcasting. In our view, the general public should be enabled to hear the very kind of programming that the Board in the public interest has endorsed. A good example sometimes has more effect than all the regulations that can be promulgated.

This application, if granted, would contribute to the improvement of the service available, and would extend CHFI's service to a large segment of the public not now receiving it.

2. It will popularize FM programming and stimulate FM set sales.

No other means, no matter how much money one wished to spend, could promote FM more effectively, or create such an awareness of FM in the Toronto area, than an extension of CHFI's facilities to the AM band.

Such an extension in the availability of FM programming, coupled with announcements extolling the advantages of FM, would reach the 85% of the people without FM sets. It would offer to this vast audience the opportunity to "Feel the Goods", rather than be exposed only to newspaper, billboard, program and magazine advertisements. These are not only costly but they do not convey fully the nature of good FM programming.

3. It will provide a sound economic base to allow the continuation of the station's FM development and high quality programming.

Separately programmed FM in Canada will need financial support for at least four or five years. To achieve full development, FM needs broadcasters who are prepared to employ first class equipment and good program source material. In our view, these broadcasters will need an AM service to broaden their revenue base.

WQXR in New York City, which has provided quality programming simulcast on FM and AM, serves as an example to this station. WQXR has done much to popularize quality broadcasting in the last fifteen years by making it available to the entire public. However, should the Board so request, CHFI covenants to provide separate AM programming after a period of three years, relying upon due consideration having been given to the economics involved and to the restrictions on operating hours.

It has been stated that it is in the national interest that additional FM licences be issued in Canada. CHFI-FM has previously indicated to the Board its belief that it is desirable that FM should be programmed separately from AM. We feel strongly that FM programming standards should be kept on a high plane, and can certainly demonstrate that this is expensive.

Although the Board has indicated that it favours moving toward separate programming, it has not required any of the Toronto area FM outlets to be separate all of the time. The CBC, CFRB, CKLB and CHIC are all permitted to simulcast part of the time.

CHFI-FM would also be separate part of the time if this application were granted. The CBC, CKLB and CHIC are separate from early evening onwards - so would be CHFI-FM.

With CHFI on a sound economic basis, it can and will make available its high quality FM programming to encourage the development of separate FM service in other areas of Ontario that could otherwise not afford it. This supplying of FM separate programming is proposed to be done on a tower-to-tower basis at no cost to the recipient.

With CHFI not on a sound economic basis, its owners, whoever they may be, would have great difficulty in providing the public with the programming standards it has been enjoying and which, we feel, it is entitled to receive.

The proposed extension of CHFI's facilities should result in a considerable impetus to FM development in Southern Ontario and convert CHFI-FM from, in effect, a struggling pioneer, to a sound and expanding example of development of this new medium. We can be a positive instrument of assistance to other broadcasters who are now hesitant to request separate FM licencing due to the high programming cost factors, and to the manufacturers of FM receivers, who are presently restricted by the limited number of stations.

This application is based on a sincere desire to enable the station to make an even greater contribution to the public and to the Broadcasting Industry.

4. It will not affect adversely other broadcasters.

Only the existing advertising availabilities will be for sale. CHFI-FM allows only six commercials per hour and in practice averages about four. Some other stations have a commercial on an average of every three or four minutes. CHFI-FM accepts no "hard sell" commercials or common singing jingles. We would continue to fail to attract certain of the usual AM advertising accounts.

Because CHFI has so few commercial availabilities for sale and because of their restricted nature, even if CHFI were sold out, it would not hurt other stations in any way.

5. Standard of service is worthy of support.

On the basis of the continuous high level of programming and commercial standards of the station, and its willingness to improve its standard of service and assist actively in the promotion of the FM medium, as evidenced by its efforts and expenditures in the past, it is felt that an extension of the Station's service is warranted and in the public interest.

IS CHFI-FM PROVIDING A SERVICE WORTHY OF EXTENSION?

1. 1957 - 1960.

CHFI-FM was the first Canadian station to provide the new concept of programming service of good music and limited talk and commercials. Later, stations in Montreal and Ottawa started to provide this type of service on FM. More recently, other broadcasters have been emulating this concept of programming.

CHFI-FM won a loyal following, even though it was limited by old equipment and was unable to afford the purchase of large numbers of new records or other desirable programming additions.

By late 1959 and in 1960 other stations were providing high quality FM programming. The CBC-FM network commenced with great emphasis on classical music. CFRB-AM started FM type evening programming, heard on both their AM and FM. Additional FM service became available in the Toronto area with the licensing of more Buffalo FM stations. Oshawa and Brampton AM affiliates started a separate FM service.

CHFI-FM could not afford to compete with the CBC and the various AM affiliates in providing new technical equipment, new records, and new program source material. Between 1958 and 1960, even though the number of FM sets in the coverage area doubled, the advent of this competition - all of it subsidized in one way or another - resulted in a decline in the evening audience of CHFI-FM.

2. October, 1960 - July, 1961.

The station was purchased by Aldred Rogers Limited in October, 1960. They believed that CHFI-FM was providing a good service and that, with an infusion of additional capital and a further development of its programming and program sources, it could be put on a sound basis. Mr. Rogers, as Chairman, took action under the following headings:

(a) To increase immediately the promotion of FM and the station and institute without delay a continuing campaign to make people conscious of the advantages of FM radio.

Great effort, time and expense have gone into the promotional efforts of the station to arouse interest in FM. It has been hailed as one of the finest and most effective campaigns ever waged to develop FM in North America. U.S. FM Magazine featured the efforts of CHFI-FM in its July issue.

Newspaper, billboard, program and magazine advertisements have all been used to reach the 85% of the people who do not have FM and are not familiar with FM programming. This has been very expensive.

(b) To improve the programming and provide necessary additional program source material.

The station's programming suffered from repetition due to the limited budget for new records. More than two thousand high fidelity long playing records, many in stereo, have been purchased in the last six months.

The station signed a contract for fifty-two direct rebroadcasts of the Philadelphia Orchestra and bid for concerts of the Boston Symphony Orchestra. Clearance for these programs has not yet been received from the Musicians Union.

The station has installed additional news teletype and has subscribed to international news audio reports. Direct reports from correspondents in Ottawa and Washington are now heard regularly. A five-minute stock market report direct from the Toronto and New York Stock Exchanges has been instituted.

(c) To give the morale of the staff a boost.

Key members of the staff have visited other FM operations across North America. Every effort has been made to excite a feeling of growth and opportunity in FM in the staff. Most important, the key staff have been given much more freedom of action and responsibility.

(d) To raise the technical quality of the station to the highest standards.

The principal characteristic of FM is the higher technical performance of which it is capable. Great efforts have been expended in this area and they are continuing. Over $100,000 has been spent on new equipment and more is required.

(e) To establish the over-all station image as a high quality broadcasting station and not a provider of storecasting or background music services.

The storecasting and background music services, which formerly provided certain revenue, have been sold. This has enabled the station to increase its advertising rates, but the precedent of free radio time to storecasting customers has been difficult to overcome.

(f) To establish sound office, bookkeeping and operating procedures.

Months of effort have gone into this and the work is continuing. A great deal of research, study and the examination of various functions has taken place.

If the station is to make any continuing contribution to the development of Canadian FM broadcasting, it must operate with businesslike procedures, be efficient and have a broad enough economic base to generate sufficient revenue to meet increasing program and other expenses. Sound internal practices have now been established.

MATTERS OF INTEREST

The following points are discussed as they are of prime interest in this application.

1. There will be nothing new to sell - no additional sales force - no additional studios - no additional programs - in fact, no new radio station.

This application is essentially an extension of facilities similar to a power increase or higher antenna, in that more people will be able to hear the existing station, its programs, and its program format.

2. This is a daytime-only application. It would not over-shadow, but would give added impetus to FM.

It would help popularize FM programming and would promote FM constantly, just as our local competition does. We would continue to promote the sale of FM sets, but to a wider audience, thereby increasing the number of people listening to and enjoying FM.

3. <u>The reason for the proposed 50KW power is to most closely duplicate our FM coverage.</u>

Our development efforts will be directed to increased evening FM listening and FM popularity throughout our whole coverage area. In this way we can make maximum use of the Canadian channel, and so meet all of the technical specifications.

4. <u>If people can hear FM programming on AM, then why should they buy an FM set?</u>

(a) First of all, the public will not buy FM sets in large quantities unless some way is found to expose it to FM type programming and thereby activate a desire to hear more of it.

(b) The CBC, CFRB, CKLB and CHIC are all allowed to broadcast part simultaneous and part separate. The Board by its decisions has indicated that this is not hindering the development of FM, but is furthering it. CHFI should be allowed to do the same.

(c) If people like the FM programming they hear during the day, they will wish to purchase an FM receiver so that they may continue hearing the programming in the evening.

(d) Certainly the quality FM type programming of WQXR heard simulcast in New York for many years has been a big factor in increasing purchases of FM sets. It has also made a major contribution in broadening public taste.

(e) Announcements on the benefits of FM for your car, cottage, etc., are bound to have a substantial and beneficial effect, and should generate increased activity among manufacturers to step up the merchandising of FM receivers. This would be a boost for the electronics industry.

(f) Listeners will not be able to hear stereo on their AM set. If multiplex is authorized, descriptions of the stereophonic music being broadcast are bound to excite buying interest in stereo FM receivers.

(g) It becomes possible to reach the eighty-five per cent of the population who do not own FM sets with regular messages on the advantages of FM sound, FM evening programming and FM stereo.

5. Would the application, if granted, have any effect on commercial policy?

No! CHFI-FM would be bound by the commercial regulations for FM, even though, with the extension of facilities, it would also be heard on AM during the daytime.

It is of interest that CHFI-FM has always programmed a maximum of six commercial minutes per hour. It continues this policy despite the fact that the new local competition has eight or more commercials per hour.

CHFI believes there would be substantial goodwill created in having FM-type programming, and restricted commercials available on AM so that the general public can enjoy this form of programming for the first time on the regular broadcast band.

6. What will be the effect on the advertising market?

There will be no additional advertising time for sale as transmission would be simultaneous. We envisage that the broader base of audience would make it much easier to sell our existing time during the day, to assist us in meeting our programming expenses.

It would help balance the competitive situation between the two Toronto commercial FM stations. CFRB-FM has a multitude of advantages because of its large AM staff, facilities, network connection and complete audio broadcasting service. As well, CFRB-FM offers an advertiser an AM audience simultaneously in prime FM evening time. CHFI-FM would be able to supply an advertiser an AM audience simultaneously in the daytime only.

Because only the existing FM advertising availabilities would be for sale and because there are so few commercial locations available, coupled with the station's restrictions upon types of commercials, there would be no effect on the sales revenues of the other stations in Toronto.

7. What is your estimate of revenue?

ESTIMATED DOLLAR REVENUE - 1962 WITH AM/FM COMBINED OPERATION.

Based upon average of four spots per hour at average net rate of $10.00 each.

7:00 A.M. - 5:30 P.M.	
$40.00 per hour for 10½ hours	$420.00 per day
Average six day week	$2,520.00
Add Sunday	$ 200.00
Total Daytime Weekly Revenue	$2,720.00

5:30 P.M. to Sign-Off	
Estimated Nightly Revenue	$115.00
For six nights	$690.00
Add Sunday	60.00
Total Night-Time Weekly Revenue	$750.00
Total weekly estimated average net revenue	$ 3,470.00
Average annual (52 week) net revenue	$181,440.00

8. Why not have a daytime AM operating separately?

(a) You would fail to achieve the purpose of making the general public familiar with FM programming.

(b) CHFI covenants that it will provide separate AM programming after a period of three years, if the Board so requests and feels that this would make the best use of the frequencies - after giving due consideration to the economics involved and to the restrictions on operating hours.

(c) Our research and surveys indicate that the operation of a daytime AM station (standing alone, without an FM station) in Toronto would be uneconomic. The limited hours, changing between winter and summer, in such a tough competitive metropolitan market would make it extremely difficult to conduct a successful operation.

No one has applied in the last ten years for permission to operate such an enterprise, and it is unlikely that anyone who has sound financial advice would be so inclined in the foreseeable future.

(d) This marriage of two otherwise uneconomic elements into an efficient and sound unit has proven to be successful in many areas in North America.

It provides a sizeable potential audience during the daytime. It provides the most effective and least expensive method yet devised for promoting FM listening.

As essentially all of the requisite facilities, staff and programming are already provided by CHFI-FM, no increase in operating costs is foreseen - apart, of course, from charges for depreciation and maintenance of some additional transmission equipment.

It is the sound approach to take. It is necessary to provide the essential financial stability if FM in Canada is to have orderly growth and continue to provide good programming and maximum service.

9. Is this the last Toronto AM frequency available?

No! We are advised that three AM frequencies could be used in the City of Toronto with varying costs. These are:

a) 810 KCS Directional Antenna.
b) 1190 KCS Directional Antenna.
c) 1540 KCS Directional Antenna.

We chose 1540 because the amount of land required for the antenna system was the smallest. A copy of our Consultant's letter is attached to this Brief.

10. Would the application, if granted, cause any effect on programming?

No! The main effect would be to broaden the economic base so as to allow the quality to be maintained and improved. Apart from live programming, a good library of high fidelity and stereo long-playing records is most expensive to build and maintain. Improved programming requires more extensive equipment and a larger staff of experienced creative people.

Canadian Sponsor in its feature article on FM on Page 28 of the June 26th issue stated:

"If FM is to become more aggressively experimental, ranging beyond the fine music format, it will be difficult to keep costs down. Almost everything associated with FM is more expensive than AM, particularly equipment. Recordings cost more initially, get used infrequently, are discarded sooner; and most FM stations require larger libraries. Live talent costs can be higher in FM because usually it demands artists with more formal training, more established reputations; even the acoustics require more attention to details."

11. <u>How does Toronto compare with other metropolitan cities in the number of AM outlets?</u>

*Principal City of Metro Area	*Metro Population 1960 Census	*Number of AM Outlets in Principal City (1)
Toronto	1,559,400	4 + 2 CBC (2)
	United States	
Baltimore	1,727,023	10
Minneapolis	1,482,030	8
Houston	1,243,158	9
Milwaukee	1,194,290	7
Seattle	1,107,213	11
Dallas	1,083,601	7
Cincinnati	1,071,624	7
San Diego	1,033,011	6
Atlanta	1,017,188	10
Denver	929,383	7
New Orleans	868,480	11
San Antonio	687,151	10
Memphis	627,019	9

*N.A.F.M.B.
(1) In principal city only - does not include stations in outlying suburbs.
(2) CBC stations noted separately because they do not solicit advertising to the same extent as private stations.

Principal City of Metro Area	*Metro Population 1960 Census	**Number of AM Outlets in Principal City (1)
Toronto	1,559,400	4 + 2 CBC (2)
	Canada	
Vancouver	755,400	4 + 1 CBC
Calgary	247,700	3
Edmonton	311,800	5 + 2 CBC
Regina	102,300	3 + 1 CBC
Winnipeg	445,100	3 + 1 CBC
Hamilton	373,400	3
Ottawa	400,400	2 + 1 CBC
Montreal	1,800,500	5 + 2 CBC
Quebec	338,300	3 + 1 CBC

*N.A.F.M.B. and Survey of Markets 1960.
**CBC
(1) In principal city only - does not include stations in outlying suburbs.
(2) CBC stations noted separately because they do not solicit advertising to the same extent as private stations.

12. What effect would the introduction of stereo radio have on CHFI-FM?

(a) Additional studio equipment, stereo music source programming material, test controls, etc., are expensive. It will increase operating costs. But it should attract advertising from manufacturers and retailers selling adapters and stereo sets.

(b) A fair proportion of early purchasers of stereo radio equipment will already own FM, but later purchasers will be new FM homes.

(c) FM broadcasters in the United States are moving slowly into stereo. As of August 1st only a handful are in stereo operation. This is probably due to the fact that there are many technical complexities and very few sets are yet on the market. Opinion is divided as to how broad a market stereo will attain. For several years at least it will be a minority of a minority. But it should attract a new interest to FM.

13. If Third Channel Multiplex is authorized by the Department of Transport for background music, what revenue would it produce for CHFI-FM?

CHFI-FM has an agreement with Muzak whereby the station will receive $3.00 per month for each of the first one hundred background music subscribers and $2.50 per month for each account thereafter.

Muzak pays all the expenses of receivers, antennas and servicing. Muzak pays all the sales expenses. This is the most efficient method - it puts all the responsibilities and work of the background music operation in the hands of experienced background music operators. It allows the station to devote all of its efforts to broadcasting. It should be noted that it will take time after authorization for Muzak to purchase the multiplex third channel receivers. It will also be expensive and Muzak plans to continue to operate accounts on simplex-beeping in order to recover their large investment in simplex receivers.

Muzak has about 600 accounts in the Metropolitan Toronto Area. It is estimated one quarter to one third would be receiving service from CHFI through multiplex and simplex. This would provide approximately $5,000 - $6,500 per year. This is a most welcome addition to the revenues of the station, but of course it comes nowhere near answering the full problem.

14. How quickly will FM grow in Canada?

The growth of the FM audience has been more rapid in the United States than in Canada. We seem to be several years behind in our acceptance of the new medium. Despite extensive promotion and the sale of FM sets by the Toronto and Montreal stations, growth has been slow. In Toronto, between 1957 and 1961, FM homes have grown from approximately 5% to 15% of the total.

* Toronto	15%	** Hamilton	11.4%
* Montreal	11.8	** Kitchener	10.5
* Ottawa	8.		

* CBC Survey 1960

** Elliott-Haynes July 1961 CHFI-FM Survey.

It takes a long time to persuade the public to buy a reasonably expensive item like an FM set. Even in the United States where lower priced sets have been available for years and many stations have been promoting both the sets and the medium, FM receiver penetration is still relatively small. The average for the United States is 28%.

Some important facts appear in the May, 1961, N.A.F.M.B. FM Industry Survey.

* 66.5% of US FM stations have less than $40,000 total investment in their antenna, transmitter and studio equipment.

* 61.5% of US stations have less than $24,000 per year gross time sales. A staggering 86.9% have less than $48,000 yearly time sales.

* Only 27.3% of the FM stations are breaking even on their time sales. It is clear, that even in the more advanced United States situation, it will be several years before FM has achieved a sound financial position.

* FM Penetration in Key Cities in the United States.

Baltimore	27.9%	Milwaukee	22.1%
Buffalo	34.8	Minneapolis	16.9
Chicago	42.9	New Orleans	24.1
Cincinnati	30.6	New York	56.7
Cleveland	36.1	Philadelphia	36.3
Dallas	20.7	Pittsburgh	30.1
Houston	31.2	San Antonio	17.1
Indianapolis	23.	San Francisco	47.3
Los Angeles	48.9	Syracuse	24.1
Miami	31.7		

*Source: N.A.F.M.B. 1961: Pulse, February 1960
Air Media Basics 1960

15. NEW YORK CITY AND SUBURBAN FM STATIONS

In one of the most advanced FM markets in North America, it is interesting to note the present development.

Of eighteen stations, five are educational and non-commercial, eight duplicate AM programming, one is Muzak background music, one is exclusively storecasting, and only three do any separate programming.

Location	Call Letters	Frequency	E.R.P.	Ant.Hght.	Programming
New York	WCBS	101.1	1,500	1,270	Dupes AM
"	WEVD	97.9	20,000	340	" "
"	WNEW	102.7	1,300	1,360	" "
"	WOR	98.7	1,700	1,260	" "
"	WQXR	96.3	11,000	675	" "
"	WNBC	97.1	1,100	1,445	" "
New Jersey	WNTA	94.7	13,500	621	" "
"	WPAT	93.1	20,000	310	" "
New York	WABC	95.5	1,500	1,270	Dupes AM 12:01AM-6PM Separate FM 6:00PM-12PM
New York	WBFM	101.9	10,300	650	MUZAK Background music.
New York	WHOM	92.3	11,000	630	STORECAST/ Foreign Language.
New York	WNCN	104.3	15,000	560	FM Classical
Woodside	WRFM	105.1	20,000	235	FM Programmatic.
New York	WFUV	90.7	Non-Commercial		Fordham University.
New York	WKCR	89.9	Non-Commercial		Columbia University.
New York	WNYC	93.9	Non-Commercial		New York City.
New York	WBAI	99.5	Non-Commercial		Pacifica Foundation.
New York	WRVR	106.7	Non-Commercial		Riverside Church

For an independent FM station to be an economic operation and at the same time achieve a high standard of service, the FM penetration should be at least forty per cent.

Often forgotten is that even in those homes which have FM, there is frequently only a single set. The main problem today apart from low set saturation, is that few of the limited number of people who own FM are able to hear FM when in their car or in most rooms of their home.

FM in Canada will need associated financial support for at least four or five years. To achieve full development, FM needs broadcasters who are prepared to supply first class equipment and good program source material. These broadcasters will need an AM service to broaden their source of revenue, to share overhead and to provide a more complete broadcast service. FM frankly needs broadcasters who are enthusiastic and who believe that they can translate their dreams into a sound reality.

CONCLUSION

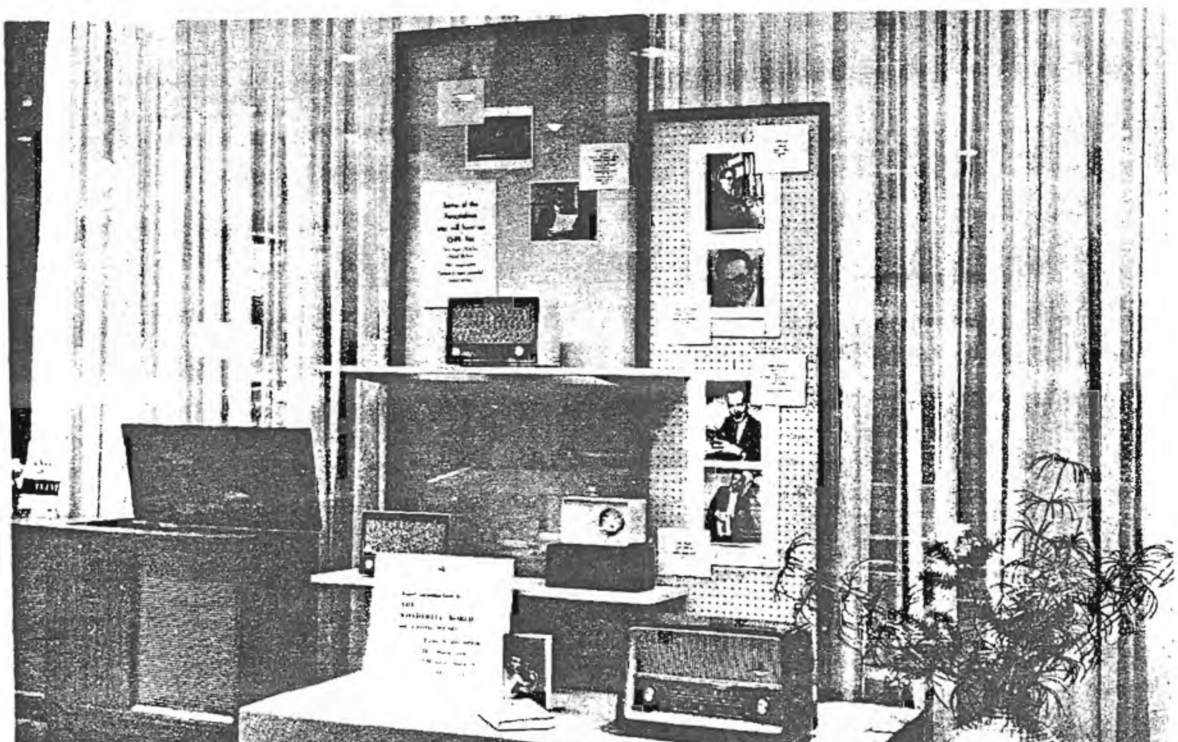
This application is designed to enable the station to continue to make a positive contribution to FM growth.

It is well and carefully conceived. It is in the public interest within our coverage area, and is a positive step in the national interest in encouraging increased Canadian FM development, as well as increasing high quality separate FM programming in smaller areas.

It makes possible a sound economic basis for Canada's first independent FM station, allowing it to retain its image and attain a sound foundation to expand its efforts in FM development.

'FI-FM PROMOTION

Choice location in Simpson's Toronto



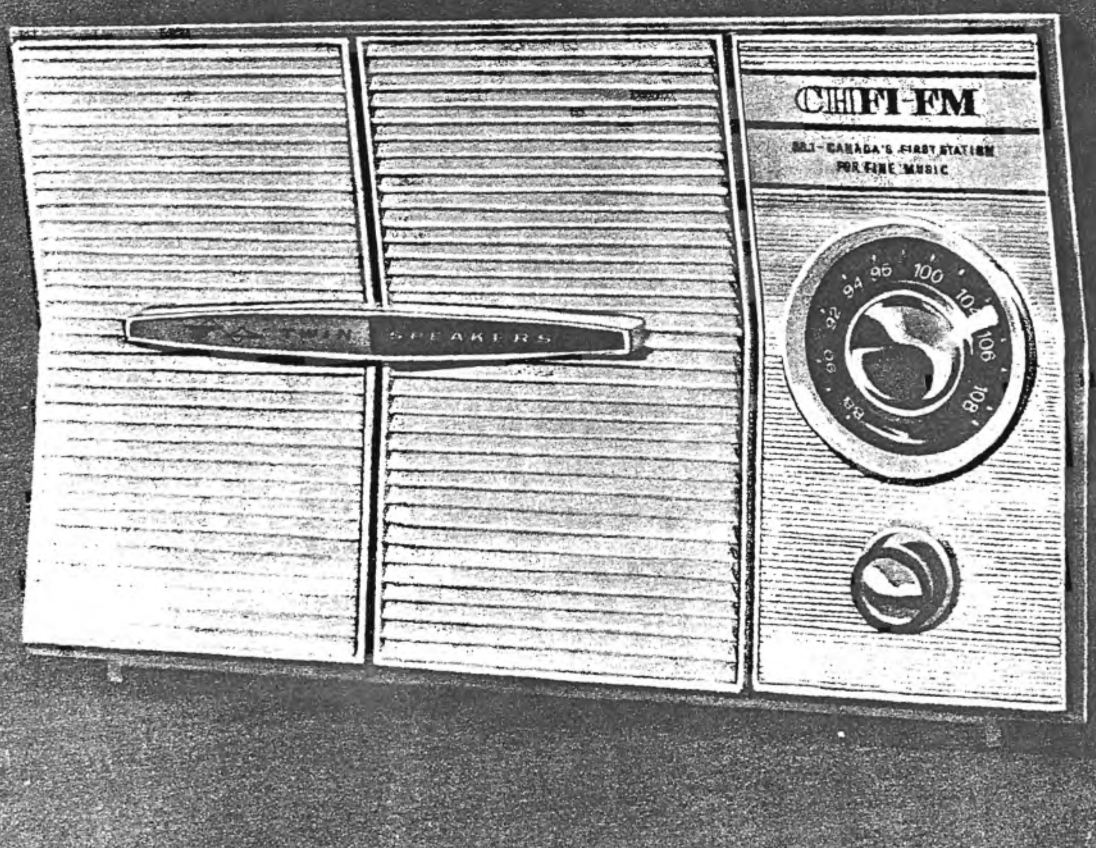
This is one of three show case displays in Eaton's College Street.

SPECIAL ORDER!

CHFI-FM is providing this special twin-speaker FM radio (made for us by Westinghouse) at special savings.

The first 1,000 sets will be made available at the CHFI-FM booth at the C.N.E. this year. The price will be $39.00 to our listeners—$32.00 to the advertising industry.

We think you'll like these FM sets—and the programmes you will hear at 98.1 megacycles—CHFI-FM!



CHFI-FM [illegible] [illegible] [illegible].

[illegible]

RADIO CHUM-1050 LTD.

1331 YONGE STREET TORONTO 7 ONTARIO

WA. 5-6666

2,

August 11, 1961.

REGISTERED

RECEIVED
AUG 14 1961
BBG
OTTAWA

Mr. W. D. Mills, Secretary
Board of Broadcast Governors,
Transportation Building,
48 Rideau Street,
OTTAWA, Canada..

Dear Sir:

This letter is in reference to the application by CHFI-FM for a 50,000-watt AM station in Toronto, to be heard in Ottawa at the August 22nd hearings.

CHUM requests permission to appear at these hearings concerning this application.

We believe the Board of Broadcast Governors is aware that CHUM applied to the Department of Transport, December 30th, 1959, for an increase in power to 10,000 watts day and night, and were turned down because we exceeded the 1% ruling. Subsequently, we endeavoured to reinstate our application on September 7th, 1960, because CKFH in Toronto were granted a power increase to 10,000 watts from relatively the same transmitter location as CHUM. We were again turned down. As it seemed we were completely thwarted in our efforts to obtain 10,000 watts power from our present transmitter location (Toronto Island), we purchased a transmitter site on the south shore of Lake Ontario near Jordan Harbour. We have erected a building on this site and put in a base for the erection of a tower which we intend using to test the signal strength from this alternate transmitter location. At the present moment, we are awaiting permission from the Department of Transport to erect this tower and to make the tests.

We find it hard to understand how the CHFI brief for a 50,000-watt station can conform to the 1% rule, and CHUM's brief for a power

.......2

increase to 10,000 watts cannot.

We are in the process of obtaining technical information pertinent to this matter and would request the opportunity of presenting this at the August 22nd hearings.

Yours very truly,

RADIO CHUM-1050 LIMITED,

Allan F. Waters ER.

Allan F. Waters,
President.

AFW/ER

CHFI-FM "Limited" applic. file A/Sec.

CHWO RADIO LTD. 1250 ON YOUR RADIO DIAL

11th August, 1961.

The Board of Broadcast Governors,
48 Rideau Street,
Ottawa,
Ontario.

Attn: Mr.W.D.Mills, Secretary.

Dear Sirs,

It is noted that at the forthcoming public meeting of the Board, commencing 22nd August 1961, an application will be made for a new 50,000 watt AM Radio Station in Toronto to broadcast on a frequency of 1540 kc's, by CHFI-FM Limited of Toronto. It is also noted that in Part I of the Board's regulations respecting Rules of Procedure of the Board's hearing, that in paragraph 6(1) any person wishing to oppose an application must file ten copies of a notice of intention to oppose an application, setting out the grounds of such opposition in the brief or notice. Please consider this as our brief in opposition to this application by CHFI-FM Limited.

It is recognized that CHWO does not operate, nor receive revenue of any substantial nature from the city of Toronto and that, further, the amount of national business being placed on CHWO at the present time is also extremely limited. Nevertheless, the granting of still another licence to serve the Toronto-Hamilton area, particularly in view of the fact that it is understood that the proposed station's transmitting towers will be located in the Port Credit-Cooksville vicinity, gives us cause for grave concern.

It is not necessary to remind the Board that many radio stations are finding it difficult today to make ends meet. The smaller community radio stations on the fringes of metropolitan areas are perhaps hardest hit by the vastly increased competitive nature of the broadcasting business today.

The advent of the second television station in Toronto has had a profound effect on the whole advertising

34A COLBORNE ST. WEST, OAKVILLE, ONTARIO • TELEPHONE VICTOR 5-

DIRECT LINES FROM TORONTO - WA 3-6814 HAMILTON - JA 2-5242

BURLINGTON OFFICE - NE 7-1414

situation. National advertising revenues now being placed on CFTO-TV, plus a more intensive commercial drive both locally and nationally by the CBC, have made other major broadcast media in the locality more conscious of their share of the national advertising dollar, and a much more aggressive and competitive sales competition has been in evidence for the past nine months. This, as can be well realized, creates a chain reaction which reaches right down to the smaller community station such as ourselves, Brampton and Richmond Hill.

For example, salesmen from both radio and television in Hamilton have, of recent date, been selling on the main streets of Oakville, while the promotional activities of several Toronto stations have been stepped up considerably in an attempt to gain listener and advertiser support in the same community.

The activity in the FM field has also been felt. The increase in power of two Toronto stations, as well as the program changes by CFRB-FM, have had a disturbing influence among advertisers, since both these stations are conducting fairly aggressive promotional campaigns to capture listeners and sponsors.

It was, I believe, the intent of the Board that no new licences would be granted in Toronto until at least a year after the establishment of the new Toronto television station. This was indeed welcome news to those of us trying to maintain some semblance of order in our business during these chaotic times. Unfortunately, the FM changes noted above, the requests for greater power by other AM licensees, as well as the applications for changes of network affiliation by TV stations and the like, have tended to maintain a most unsettled and difficult atmosphere in the advertising world for the past year, and the promised reprieve has not been forthcoming.

For the above reasons, CHWO Radio Limited finds itself opposed to this proposed new 50,000 watt AM application for the Toronto area, and earnestly requests the Board to give careful consideration to the difficult economic situation in which some radio stations find themselves today. Granting to licensees in this area a further breathing spell to try to find a firmer foothold in this constantly changing market would, in our opinion, do much to strengthen the entire economic situation insofar as radio is concerned, not only in the Toronto and Southern Ontario area, but, indeed, for perhaps the whole country.

Unless the Board feels otherwise, it is not my intention to oppose in person at the forthcoming Meeting at which this application will be heard, but it is earnestly requested that this letter be considered as a sincere request to deny the application by CHFI-FM Limited.

Respectfully submitted.

Yours very truly,
CHWO RADIO LIMITED.

Howard C. Caine

Howard C. Caine.
President and General Manager.

HC/JC

CHIC
BRAMPTON
1090-AM
102.1-FM

47

CHIC LTD., 2 ELLEN ST., BRAMPTON

Applicant by
advised
telegram 29/1/62
[illegible]

22nd January, 1962.

Dr. Andrew Stewart,
Chairman,
Board of Broadcast Governors,
48 Rideau Street,
OTTAWA, Canada.

Dear Dr. Stewart:

This letter deals with the application from CHFI-FM Limited for a license to establish a new AM radio station in Toronto at a power of 50,000 Watts on the frequency of 1540 Kilocycles, which is listed as Item No.28 in the Board's "Notice of Public Hearing" to be held in Quebec City, commencing February 6th, 1962.

We wrote to the Board on August 11th, 1961, placing ourselves, with regret, on record as opposing the granting of this new franchise, and we are attaching a copy of that letter.

The letter reviewed briefly the existing competitive situation in the Metropolitan Toronto area, and raised a technical objection to the use of the 1540 KC frequency which, because it is an harmonic of our frequency of 1090 KC, may create problems for us in the future in any expansion of power or hours of service.

As the Board is fully aware, the Toronto area now has available to it a minimum of fifteen AM radio signals (the six stations in Toronto, three in Hamilton, three in Buffalo, plus Richmond Hill, St. Catherines and, in our area, Oakville)and all of these signals can be received easily in the town of Brampton and the surrounding region. As a matter of fact, we have three 50,000 watt transmitters for Toronto virtually on our doorstep and this application, we understand, would place a fourth 50 KW transmitter within four or five miles of Brampton town limits.

In addition to this wide choice in radio reception, the same area receives very well six television signals from Toronto, Hamilton and Buffalo.

It would appear that this area is already receiving more than adequate broadcast service and it is difficult to see what new or unique service could be provided by a further AM station in the Toronto region.

Although this leads us into the realm of conjecture, in reviewing the history of CHFI-FM we remember that the Board has already granted to this applicant a change of ownership, a change in transmitter location, and a very substantial increase in power - all designed to develop fully the FM field in this area. Since it seems to be normal practice for the operator of an AM station to go forward into frequency modulation broadcasting, we are forced to wonder a little - when we see an FM operator proposing to back up into the AM field - as to where his true interest will lie if this new application is granted.

We are also concerned about the ultimate effect on this area of two changes which have been authorized by the Board, but whose full impact cannot yet be measured. We are referring to the increase in power and antenna height granted to CHCH-TV in Hamilton, and the increase in power and change of transmitter location granted to CFGM in Richmond Hill which has had the effect of making this station virtually another Toronto outlet. Since, as we reported earlier, CHIC is currently in a loss position, we are understandably most concerned about any new stations in this area and a further fragmentation of this advertising market.

In the light of all these conditions, plus the fact that it seems apparent that CFTO-TV in Toronto itself has yet to achieve a stable position in either audience or finance, we would respectfully request that the Board of Broadcast Governors deny this application from CHFI-FM Limited.

We understand further that a similar application from Mr. Bellman of Vancouver is pending and may be heard at the Board's February meeting. We would register the same objections to this application when it may appear.

Yours very truly,

CHIC RADIO LIMITED

John Fox

John Fox, Manager.

PRIVATE COMMERCIAL BROADCASTING STATION LICENCE No. 1.12

LICENCE TO USE RADIO

Issued in accordance with the provisions of the Radio Act, and the Regulations made thereunder.

~~Rogers Broadcasting Limited~~, OFT ~~2.2.63~~ Radio 1540 Limited, 26.2.65
~~CHFI-FM Limited~~, 637 College Street, 30.5.66 OFD
~~Suite 601, 150 University Avenue~~, OFD
~~Toronto 5~~, Ontario.
4

is hereby authorized to establish and operate Broadcasting Transmitters at the following locations:

Lat. 43° 35' 27" N. Long. 79° 39' 14" W.

Part of Lot 10, Second Concession, North of Dundas Street in the

Township of Toronto, near Toronto, Ontario.

This licence shall remain in force from the date hereof until the thirty-first day of March, 1968, on payment of the prescribed annual fees and subject to observance of the provisions of the Radio Act, and of the Broadcasting Act, and regulations heretofore or hereafter made under the authority thereof and the conditions contained herein. The transmitter(s) shall be operated so as to comply in all respects with these regulations and during such periods as the Board of Broadcast Governors may prescribe.

COPY

The assignment of the frequency or frequencies prescribed in this licence is subject to International and Regional Agreements to which Canada is a party.

No transfer of this licence or of any rights granted herein shall be made by the licensee.

The frequency and power of each transmitter authorized herein shall be as prescribed hereunder.

Call Sign	Frequency	Tolerance	Power (Watts)	Type of Emission
CHIN 30.6.66 OFD				
~~CHFI~~	± 1540 kc/s	20 cycles	50,000 or 10,000 (standby) 30.9.63 OFD	10A3

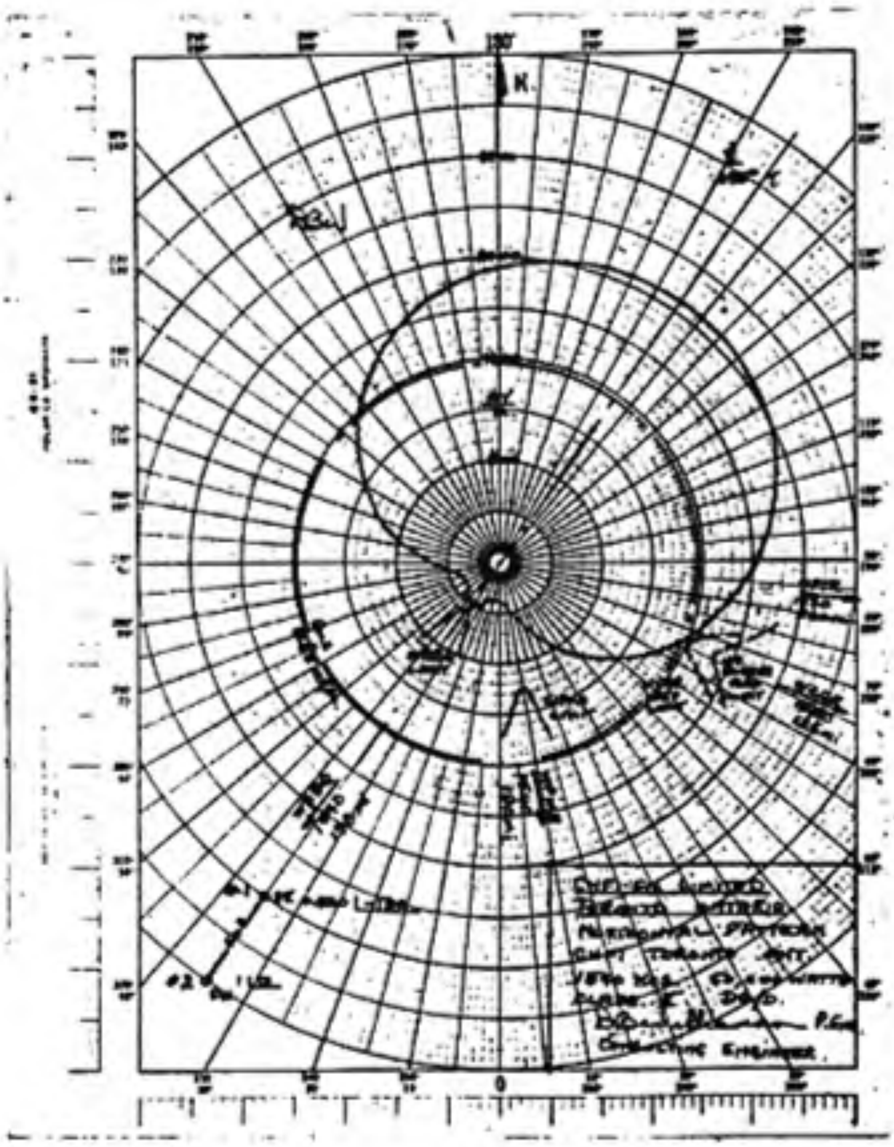
Original signed by
H. J. WILLIAMSON

Date August 3, 1962. for Minister of Transport

CONDITIONS

or 10,000 watts (standby) 30.9.63

* The operation of a radio transmitter during the hours between sunrise and sunset on the frequency of 1540 kc/s with a power of 50,000 watts/ or 10,000 watts (standby) is authorised herein, provided that the directional antenna array approved by the Department is installed and maintained in proper adjustment, and the field strength shall not exceed that established in the following directional radiation pattern:



The hours of sunrise and sunset must be observed strictly in accordance with the following schedule of times:

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Sunrise	7.45	7.15	6.30	5.30	5.00	4.30	4.45	5.15	6.00	6.30	7.15	7.45	E.S.T.
Sunset	5.00	5.45	6.15	7.00	7.30	8.00	8.00	7.15	6.30	5.30	5.00	4.45	

A phase monitor of approved type shall be permanently installed and continuously operated at the station.

The antenna structure of the station licensed, consisting of two vertical masts with an overall height above grade level of 205 feet on the position shown in the Technical Brief as Latitude 43° 35' 27" North, Longitude 79° 39' 14" West at the point represented in the Brief as 525 feet plus or minus 25 feet, above mean sea level, is acceptable from an aviation point of view, provided that it is painted and lighted in accordance with Broadcast Procedure No. 16.

The licensee's attention is drawn to the Special Conditions on the back hereof.

APPROVED
OCT 9 1962

FINAL

PROOF OF PERFORMANCE

FOR

CHIN ~~CHFI~~ Toronto, Ontario

50 Kw 1540 Kc/s Class II DA-D

Prepared for

CHFI-FM Limited
13 Adelaide St. East.,
Toronto, Ontario

Prepared By

ELECTRONIC EQUIPMENT AND TUBE DEPARTMENT
CANADIAN GENERAL ELECTRIC COMPANY LIMITED
TORONTO, ONTARIO
August, 1962

TABLE OF CONTENTS

SECTION 1 - GENERAL

1.1 The Purpose of This Submission

This submission has been prepared in accordance with specification No. 2 of the Department of Transport to show that the pattern of the broadcast array is in agreement with that predicted in the Engineering Brief and approved by the Department.

1.2 Engineers Responsible for Proof of Performance

W.E. Wright	-Whose qualifications are on file with the Department of Transport.
H. Peerenboom	-Mr. Peerenboom has been retained by the Electronic Equipment and Tube Department of the Canadian General Electric Company Limited to carry out field measurements and adjustments on broadcast antenna arrays. Mr. Peerenboom has formally been employed by radio station CFRA in Ottawa and has since been carrying out Proof of Performance work for broadcast consultants.

1.3 Dates When Measurements Were Carried Out

Measurements for the Preliminary Proof of Performance were carried out between July 23rd and July 29, 1962.

Measurements for the Final Proof of Performance were carried out between July 29th and August 24th, 1962.

1.4 Procedure for Proving Pattern

The shape of the directional pattern was determined by taking ratio measurements at 32 points about the array, and plotting the results on polar co-ordinate graph paper. In plotting the pattern, the ratio points were multiplied by 1300, the efficiency of the omni radiator. The theoretical pattern in size and shape is plotted on the same graph for comparison. The graph appears in Section 4.11.

The size of the directional pattern was calculated from field strength measurements taken at points on radials A, B, C, D, E, F, G, H and I bearing 38°, 71°, 111°, 157°, 180° 219°, 259°, 298° and 345° respectively from true north.

1.5 Discussion of Results of Measurements

The position of the array with respect to power lines in the area made the taking of field strength measurements very difficult. The results of external interference can be seen by observing the close in field strength measurements on radials A, G and I bearing 38°, 259° and 345° respectively.

The measured efficiency as indicated by the nine radials plotted in Section 4.31 shows the measured efficiency is as predicted.

When setting up the array, to the parameters as listed on the Description of Array Sheet, the operating impedance of the S W tower became approximately zero. In order to have good impedances at both towers and also to have no greater than a 5 to 1 power split the towers were transposed. The array is now operating satisfactorily and the correct pattern has been obtained. The Description of Array Sheet has been re-notified listing the transposed parameters.

The self-impedances of the towers were re-measured after the Preliminary Proof of Performance was completed as the isolating coils on the phase sampling loops were not resonated at the 1540 Kc/s frequency. These coils have now been resonated using a grid-dip meter.

1.6 Instruments Used for Proof of Performance Measurements

Field intensities were measured by an RCA WX-2-C Field Strength Meter.

For impedance measurements, a General Radio Type 916A, radio frequency bridge was used. The accuracy of this instrument was checked by measuring impedances of known value.

1.7 Engineering Seal and Signature

W. E. Wright, P. Eng.,
Engineer-Broadcast Systems
Electronic Equipment and Tube Department,
Canadian General Electric Company Limited.

2.1 DIRECTIONAL ANTENNA DESCRIPTION SHEET

Station: CHFI

Main Studio: Toronto, Ontario.

Frequency: 1540 Kc/s

Power: 50 Kw   Class: 11

GEOGRAPHICAL LOCATION OF THE ANTENNA SYSTEM:

North Latitude: 43° 35' 27"

West Longitude: 79° 39' 14"

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-D
Number of Elements: Two
Type of Elements: Vertical radiators, guyed uniform cross section, base insulated, series fed. No. 2 (SW)

POWER:	No. 1 (NE)		No. 2 (SW)
HEIGHT ABOVE INSULATORS:	200'		200' (115°)
OVERALL HEIGHT:	205'		205
SPACING:		106.5' (60°)	
PHASING:	-130°		0°
FIELD RATIO:	0.820		1.0

ORIENTATION: On alline bearing 35° east of true north.

GROUND SYSTEM: 120 radials per tower, spaced every 3° maximum 0.4 wave lengths

Predicted Effective Field RMS 1555 mv/m (220 mv/m for 1 Kw)

Measured Effective Field RMS 1555 mv/m (220 mv/m for 1 Kw)

2.2 Methods of Measurement

The self-impedance of each tower was obtained by floating one tower and measuring the base impedance of the second tower using an impedance bridge.

The results are tabulated in section 2.3

The mutual impedance between the two towers was measured by resonating one tower to ground, and feeding the second tower. The mutual impedance is:

$$Z_{12} = Z_{21} = 132\angle{-50^\circ}$$

The operating impedance are computed from the formula:

$$Z_1 = Z_{11} + \frac{I_2}{I_1} Z_{12}$$

$$Z_2 = Z_{22} + \frac{I_2}{I_2} Z_{12}$$

The operating impedances are:

$$Z_1 = 184 + J378 \text{ ohms}$$

$$Z_2 = 46 + J228 \text{ ohms}$$

2.3 Impedance Data

Self-Impedance Tower No. 1

Frequency Kc/s	Resistance	Reactance
1480	128	+J180
1500	137	+J192
1520	146	+J206
1540	157	+J223
1560	170	+J241
1580	181	+J256
1600	193	+J278

Self-Impedance Tower No. 2

Frequency Kc/s	Resistance	Reactance
1480	130	+J182
1500	138	+J191
1520	148	+J209
1540	157	+J221
1560	169	+J239
1580	180	+J255
1600	193	+J279

Self-Impedance

Z_{11} = 157 +J223 ohms

Z_{22} = 157 +J221 ohms

2.4 Power Analysis

R. F. Line Current		13.2 amps
P. A. Plate Voltage		9,100 volts
P. A. Plate Current		6.7 amps
R. F. Line Current		15.0 amps
Common Point Impedance		232 +J24 ohms
No. 1 Tower Current		14.2 amps
No. 2 Tower Current		16.8 amps
Transmitter Plate Power Input		61,000 watts
Transmitter Power Into Array		52,200 watts
Transmitter Efficiency	$\frac{52,200 \times 100}{61,000}$ =	85.7%
Power Output No. 1 Tower	$(14.2)^2 \times 184$ =	37,100 watts
Power Output No. 2 Tower	$(16.8)^2 \times 46$ =	13,000 watts
Tower Power Output		50,100 watts

Phase Monitor Readings

No. 1 tower lags No. 2 tower by 130°

Current Ratio 0.85

3.1 Ratio Measurements

Point	Bearing (degrees)	Omni mv/m	Directional	Ratio	1300 x Ratio mv/m
R1	190	500	141	0.282	364
2	194	415	113	0.272	354
3	202	680	242	0.356	462
4	208	700	204	0.291	378
5	214	545	211	0.388	503
6	218	620	176	0.284	369
7	222	500	160	0.320	416
8	228	425	140	0.330	429
9	234	300	114	0.380	493
10	238	362	97	0.268	348
11	242	226	56.5	0.250	325
12	254	245	68	0.278	361
13	269	191	78.5	0.411	534
14	282	190	126	0.663	861
15	293	170	144	0.847	1,100
16	310	135	160	1.185	1,540
17	326	136	192	1.41	1,830
18	348	91	158	1.74	2,260
19	10	195	376	1.93	2,510
20	26	190	408	2.15	2,800
21	35	152	304	1.97	2,570
22	52	191	356	1.86	2,420
23	71	130	250	1.93	2,500
24	88	260	427	1.64	2,130
25	108	300	375	1.25	1,620
26	122	190	216	1.14	1,480
27	136	380	312	0.820	1,070
28	150	410	215	0.538	700
29	159	375	165	0.440	572
30	164	430	190	0.442	573
31	171	660	230	0.349	453
32	182	805	218	0.271	353

3.2 Field Intensity Measurements

Radial "A" Bearing 38°

Point	Distance (miles)	Field Intensity (mv/m) Directional	Field Intensity (mv/m) Omni-directional
1	.4	6500	3250
2	.5	4525	2260
3	.6	3650	1820
4	.7	3180	1550
5	.8	2170	1060
6	.9	2250	1100
7	1.1	2060	1010
8	1.2	1870	915
9	1.4	1800	880
10	1.7	1570	670
10A	1.85	960	
11	2.1	695	340
12	2.6	565	275
13	3.3	550	268
13A	3.8	375	
14	4.2	400	195
14A	4.4	278	
14B	4.7	265	
15	5.1	210	103
15A	5.4	278	
16	5.6	184	90
16A	6.1	192	
17	6.4	262	128
18	7.1	205	100
19	7.7	135	66
19A	8.4	96	
20	8.7	100	50
20A	9.4	72	
21	9.8	88	43
21A	10.5	53	
21B	10.9	52	
22	11.5	49	24
23	13.2	41	
24	15	32	20
25	18.5	16	15.5
26	23.5	17	8.0
27	27	10.5	
28	30	8.6	
29	34	4.7	
30	38	4.3	

Point	Distance (miles)	Field Intensity (mv/m)	
		Directional	Omni-directional
31	45	3.2	
32	51	1.8	
33	65	1.3	
34	79	.72	
35	86	.48	
36	96	.23	

RADIAL MEASUREMENTS CHFI TORONTO

RADIAL "B" 71°

Point	Distance	Field
1	.8	2375
2	.9	2200
3	1.0	1850
4	1.1	1600
5	1.2	1425
6	1.3	1350
7	2.3	480
8	2.9	430
9	3.2	400
10	3.7	325
11	4.6	280
12	5.3	260
13	6.1	170
14	6.6	139
15	7.1	140
16	7.8	102
17	9.0	75
18	11.5	52
19	13.0	55
20	15.2	33
21	19.5	12
22	23.0	8.8
23	28.5	5.6
24	35.	3.7
25	40.	2.8
26	52.7	2.2
27	73.	.62
28	79.	.9
29	93.2	.33
30	100.	.30
31	120.	.18

RADIAL "C" 111°

Point	Distance	Field
1	.45	3150
2	.5	2810
3	.65	2100
4	.75	1850
5	.8	1650
6	1.2	1010
7	1.5	900
8	1.7	740
9	2.0	580
10	2.3	560
11	2.9	362
12	3.7	228
13	4.3	212
14	4.6	190

RADIAL MEASUREMENTS CHFI TORONTO

RADIAL "D" 157°			RADIAL "E" 180°		
Point	Distance	Field	Point	Distance	Field
1	.3	1850	1	.6	420
2	.4	1425	2	.7	395
3	.5	1050	3	.8	290
4	.6	890	4	.9	280
5	.7	815	5	1.0	275
6	.8	725	6	1.1	240
7	.9	640	7	1.2	200
8	1.2	490	8	1.7	140
9	1.5	340	9	2.3	95
10	1.8	250	10	2.8	72
11	2.6	190	11	3.4	60
12	3.1	155	12	3.6	53
13	3.3	120	13	3.9	47
14	3.8	102	14	4.2	48
15	4.3	73	15	4.8	36
16	4.8	83	16	5.2	32
17	5.3	56	17	6.0	24
18	5.8	36	18	25.5	2.6
19	6.2	34	19	26.5	2.2
20	30.0	4.7	20	29.5	1.5
21	33.5	3.5	21	31.5	.9
22	36.5	2.6	22	36.0	.93
23	41.0	1.8	23	40.0	.75
24	52.5	.9	24	48.0	.65
25	58.	.63			

RADIAL MEASUREMENTS CHFI TORONTO

RADIAL "F" 219°

Point	Distance	Field
1	.5	750
2	.6	675
3	.7	510
4	.8	425
5	.9	360
6	1.0	340
7	1.1	360
8	1.2	290
9	1.3	255
10	1.9	155
11	2.6	47
12	3.3	66
13	4.3	48
14	5.0	33
15	5.6	31
16	6.1	23
17	6.9	21
18	7.4	19
19	7.8	16
20	8.2	14.5
21	12.5	11
22	17.5	5.2
23	18.7	3.8
24	21.6	2.8
25	23.5	1.6
26	26.5	1.65
27	32.0	1.2
28	37.5	.75
29	43.0	.48

RADIAL "G" 259°

Point	Distance	Field
1	.5	720
2	.6	700
3	.7	505
4	.8	410
5	.9	390
6	1.1	300
7	1.3	340
8	1.6	260
9	2.1	185
10	2.4	135
11	2.7	85
12	2.8	80
13	3.2	90
14	3.7	71
15	4.2	55
16	5.0	77
17	6.5	26
18	8.5	25
19	11.5	15
20	14.0	9.5
21	15.5	3.9
22	19.5	3.6
23	21.0	2.8
24	25.0	1.4
25	27.0	1.1
26	30	.5
27	32	.72
28	35	.8
29	38	.55

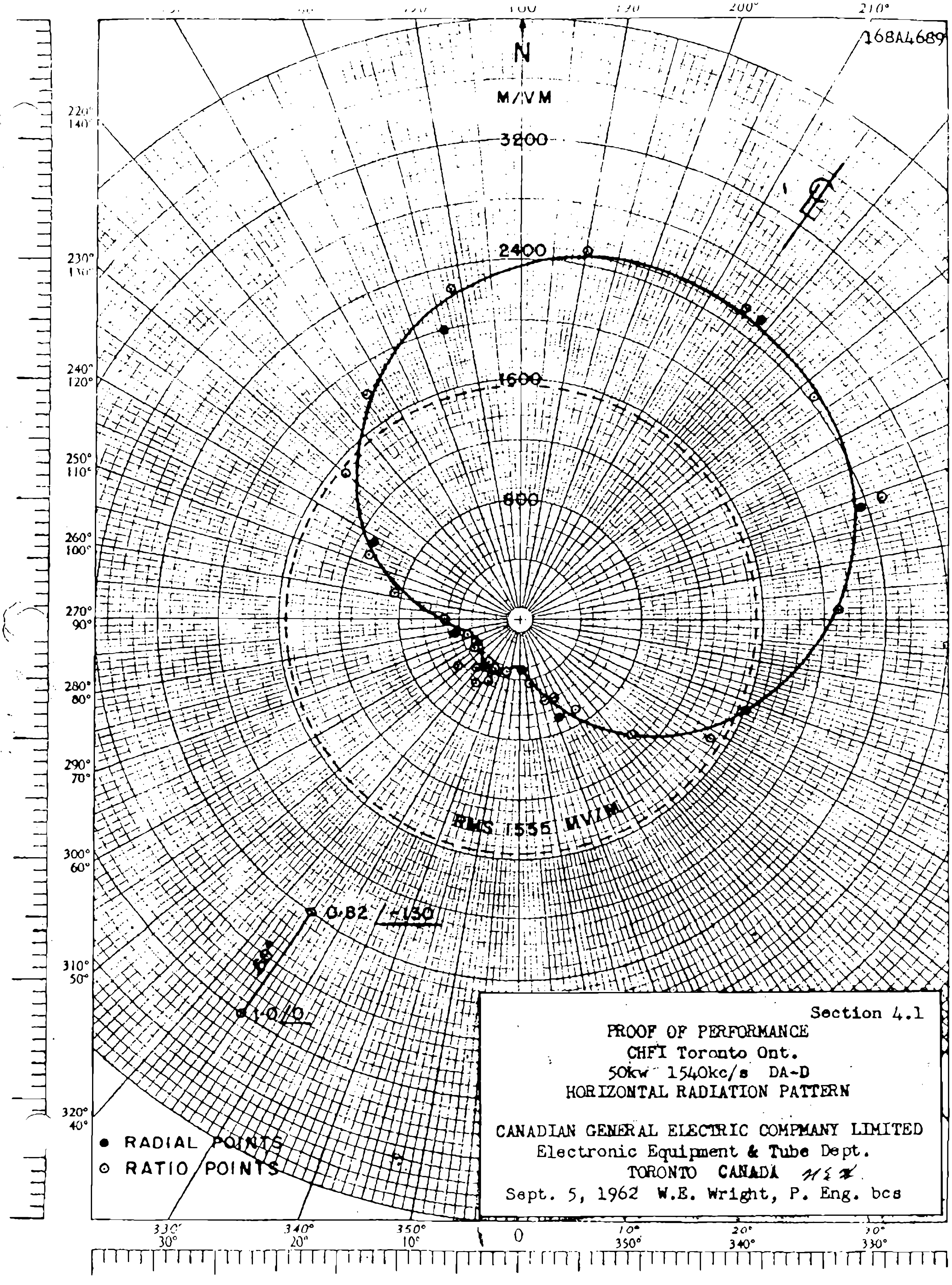
RADIAL MEASUREMENTS CHFI TORONTO

RADIAL "H" 298°

Point	Distance	Field
1	.6	1560
2	.7	1340
3	.8	1100
4	.9	950
5	1.0	880
6	1.1	825
7	1.6	500
8	2.1	390
9	2.8	220
10	3.3	158
11	3.7	170
12	4.7	108
13	6.2	53
14	7.5	48
15	8.8	33
16	10	22
17	10.7	20
18	13.4	13
19	16	6
20	19	3.4
21	21	3.2
22	23.7	2.3
23	27.8	.6
24	39.5	1.0
25	51.5	.75
26	57.5	.52

RADIAL "I" 345°

Point	Distance	Field
1	0.80	1220
2	1.0	1150
3	1.23	1040
4	1.55	785
5	1.95	504
6	3.30	300
7	3.65	278
8	4.90	190
9	5.70	158
10	6.60	110
11	8.10	89
12	10.0	62
13	10.5	48
14	11.2	48
15	12.4	40
16	16.4	23
17	20.2	17.6
18	21.3	11.0
19	23.5	8.8
20	28.1	4.1
21	31.5	3.7
22	37.0	2.6
23	40.5	1.90
24	48.0	1.65
25	52.5	1.10
26	61.5	0.62
27	67.5	0.54

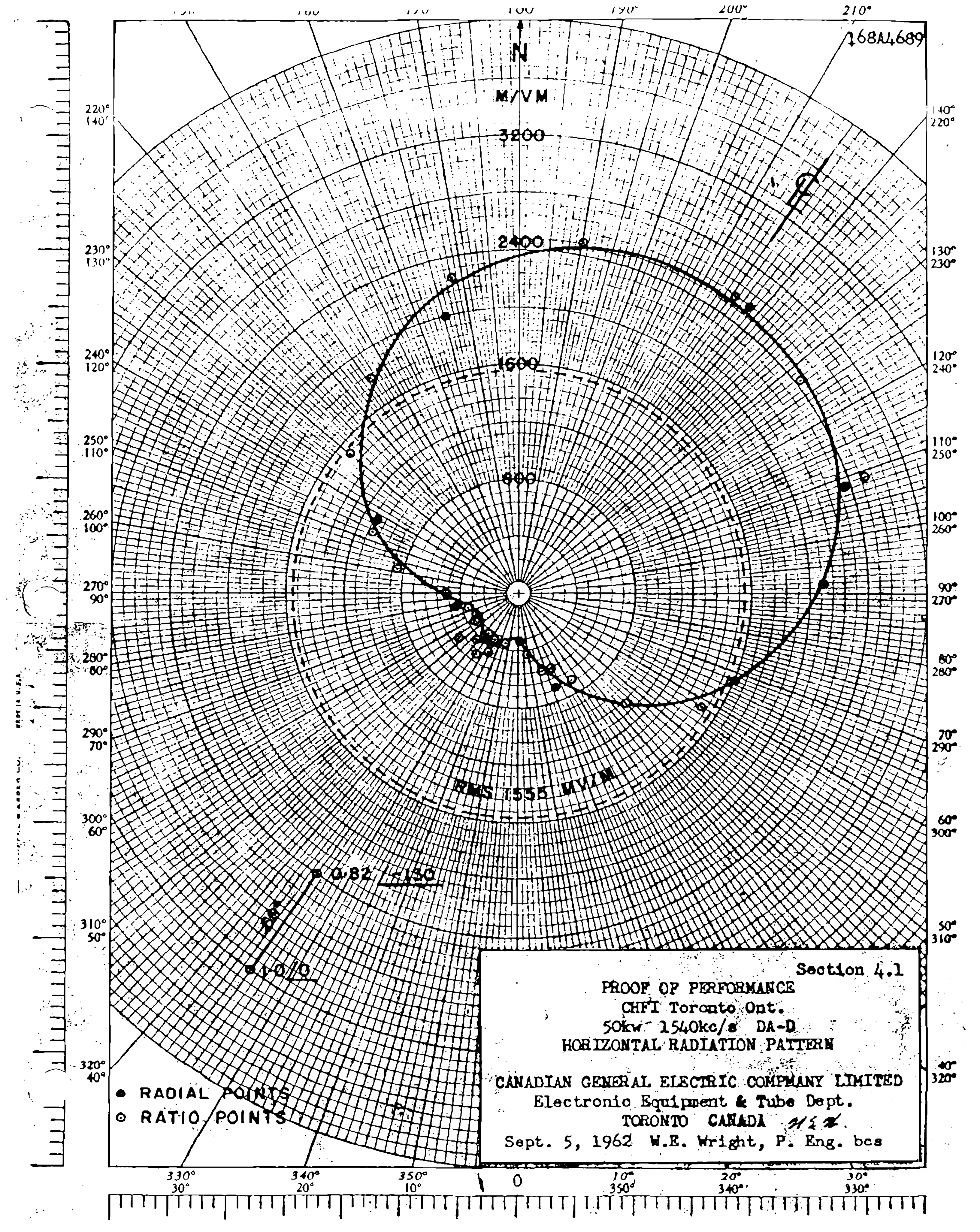


Section 4.1

PROOF OF PERFORMANCE
CHFI Toronto Ont.
50kw 1540kc/s DA-D
HORIZONTAL RADIATION PATTERN

CANADIAN GENERAL ELECTRIC COMPMANY LIMITED
Electronic Equipment & Tube Dept.
TORONTO CANADA

Sept. 5, 1962 W.E. Wright, P. Eng. bcs



Section 4.1

PROOF OF PERFORMANCE
CHFI Toronto Ont.
50kw 1540kc/s DA-D
HORIZONTAL RADIATION PATTERN

CANADIAN GENERAL ELECTRIC COMPANY LIMITED
Electronic Equipment & Tube Dept.
TORONTO CANADA
Sept. 5, 1962 W.E. Wright, P. Eng. bcs

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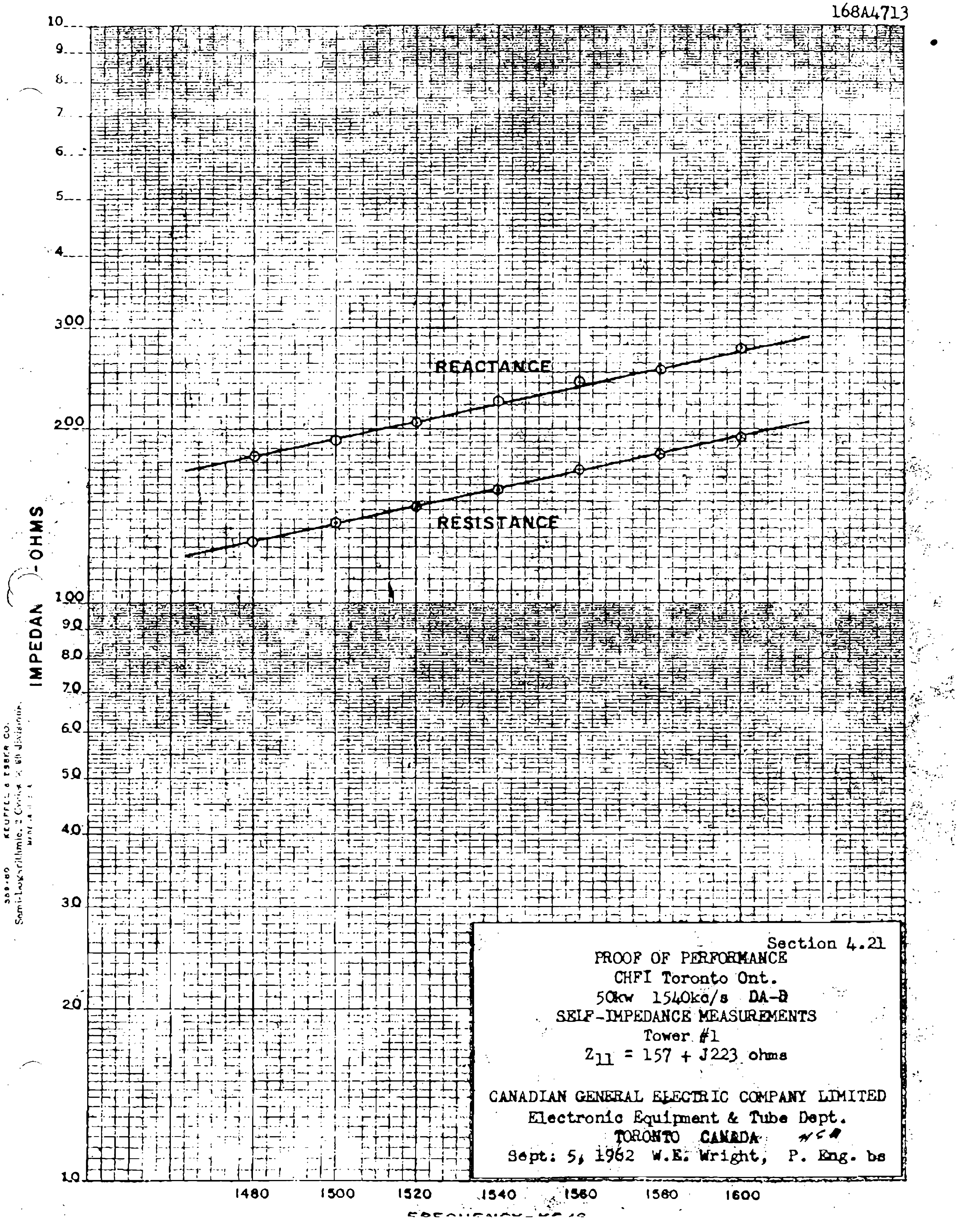

Section 4.21

PROOF OF PERFORMANCE

CHFI Toronto Ont.

50kw 1540kc/s DA-2

SELF-IMPEDANCE MEASUREMENTS

Tower #1

Z_{11} = 157 + J223 ohms

CANADIAN GENERAL ELECTRIC COMPANY LIMITED

Electronic Equipment & Tube Dept.

TORONTO CANADA

Sept. 5, 1962 W.E. Wright, P. Eng. bs

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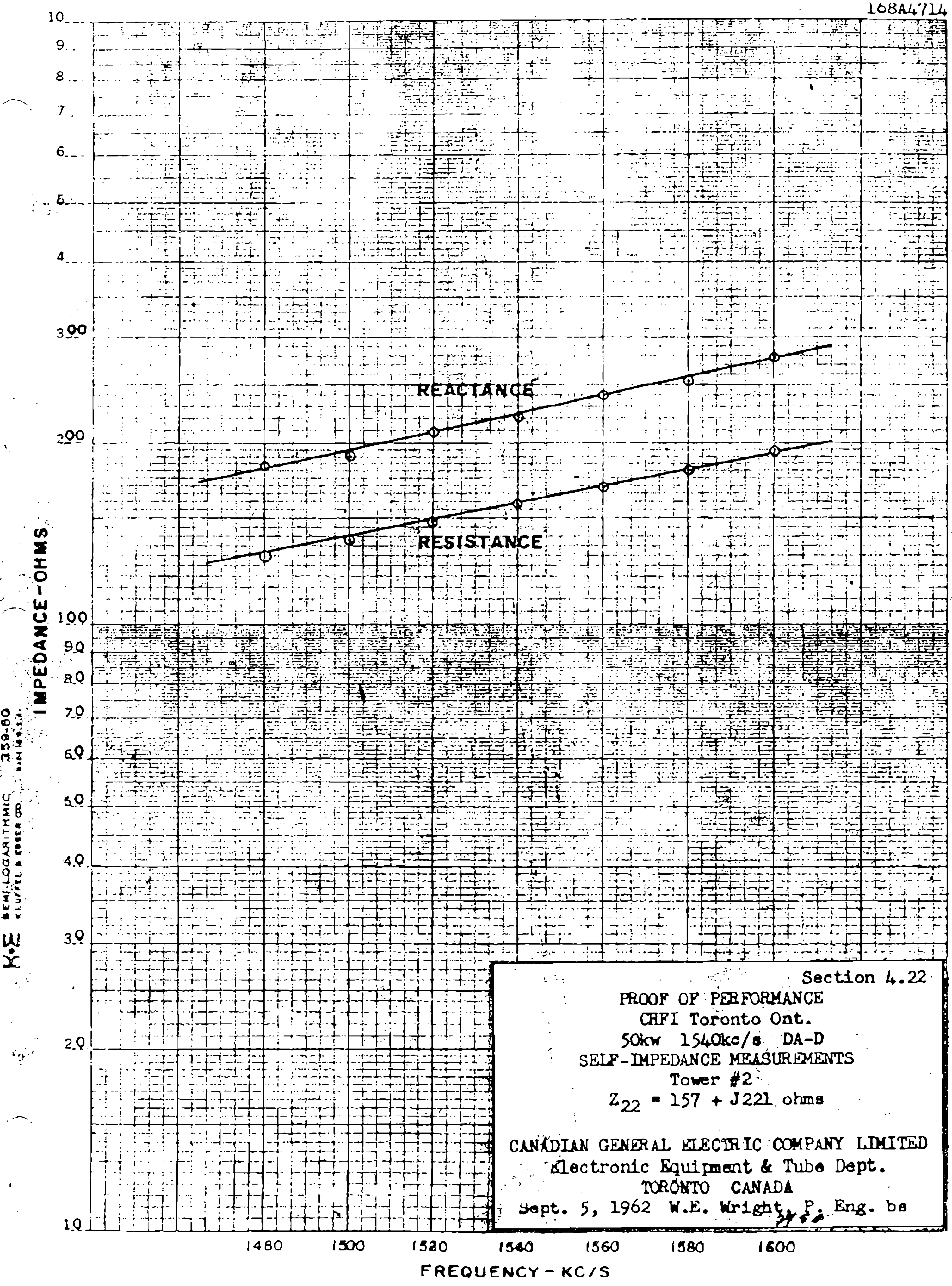


Section 4.22

PROOF OF PERFORMANCE
CHFI Toronto Ont.
50kw 1540kc/s DA-D
SELF-IMPEDANCE MEASUREMENTS
Tower #2
Z_{22} = 157 + J221 ohms

CANADIAN GENERAL ELECTRIC COMPANY LIMITED
Electronic Equipment & Tube Dept.
TORONTO CANADA
Sept. 5, 1962 W.E. Wright, P. Eng. bs

SOUWESTO BROADCASTERS LIMITED

ST. THOMAS, ONTARIO

27th February 1963.

F. G. Nixon, Esq.,
Director of Telecommunication,
Department of Transport,
OTTAWA, Canada.

Dear Sir:

Souwesto Broadcasters Limited, licensee of Radio Station CHLO, St. Thomas, hereby gives consent and permission to the application of Rogers Broadcasting Limited, licensee of CHFI, Toronto for a change of facilities to provide for night-time only service on the frequency of 680 kcs. in Metropolitan Toronto for CHFI.

We have examined the engineering implications of this application and its effect on CHLO and are in agreement and will accept the granting of same.

Yours truly,

SOUWESTO BROADCASTERS LIMITED

President

DATED the 27th day of February, 1963

EDWARD S. ROGERS

- and -

JOHN L. MOORE

- and -

ANDREW A. McDERMOTT

A G R E E M E N T

PAYTON, BIGGS & GRAHAM
250 UNIVERSITY AVENUE
TORONTO ONTARIO

AGREEMENT made this 27th day of February, 1963.

B E T W E E N :

EDWARD S. ROGERS, of the City of Toronto, in the County of York and Province of Ontario,

(hereinafter called the "Offeror")

OF THE FIRST PART,

- and -

JOHN L. MOORE, of the City of St. Thomas, in the County of Elgin and Province of Ontario and ANDREW A. McDERMOTT, of the said City of Toronto,

(hereinafter called the "Offerees")

OF THE SECOND PART.

WHEREAS the Offeror is the beneficial owner of all the issued shares of Rogers Broadcasting Limited, the licensee of radio station CHFI (hereinafter called "CHFI") in the City of Toronto;

AND WHEREAS each of the Offerees is the beneficial owner of one-half of the issued shares of Souwesto Broadcasters Limited, the licensee of radio station CHLO (hereinafter called "CHLO") in the City of St. Thomas;

AND WHEREAS CHFI and CHLO each experience deficiencies in technical service and the parties hereto desire to co-operate together to make possible improved coverage and service to the respective service or trading areas of CHFI and CHLO respectively;

AND WHEREAS in particular, CHLO presently has deep nulls causing lack of consistency of signal and serious derogation of service in its prime service area and which are impossible of correction on its existing frequency;

AND WHEREAS in particular, CHFI presently is a daytime-only station which makes impossible a continuity of service to the bulk of the public in its service area and which is impossible of correction on its existing frequency;

AND WHEREAS it is in the interest of the public in the St. Thomas and Metropolitan Toronto areas that consistency of service and the elimination of the existing technical defects of CHLO and CHFI be undertaken;

AND WHEREAS it is in the national interest that existing Canadian licensees co-operate together to improve and maximize the use of available frequencies and facilities;

NOW THEREFORE the Parties in consideration of the premises and the mutual undertakings hereinafter contained agree each with the other as follows:

1. The Offerees will cause CHLO to apply forthwith for authority to change its frequency from 680 kcs. to 1410 kcs. and its power from 1,000 watts day/night to 10,000 watts day (2,500 watts night).

2. The Offeror will cause CHFI to apply forthwith for authority to change its facilities to add night-time only service on 680 kcs. with a power of 10,000 watts. The Offerees will ensure that all requested supporting approvals of this application by CHLO are furnished to CHFI.

3. Upon CHLO securing a favourable recommendation from the Board of Broadcast Governors on its application referred to in paragraph 1, the Offeror will cause CHFI to apply for authority to change its day-time frequency from 1540 kcs. to 680 kcs. with a power of 50,000 watts day (10,000 watts night).

4. The Parties hereto shall cause each of the foregoing applications to be prosecuted with the utmost vigour and despatch.

5. The Offeror will cause CHFI to pay all proper engineering, legal and other costs in relation to the foregoing applications.

6. Upon CHLO receiving authority from the Minister of Transport to change its facilities in accordance with the application referred to in paragraph 1, the Offeror (a) will supply or cause to be supplied for use in connection with such new facilities and will convey or cause to be conveyed to or to the order of the Offerees, without charge and free of encumbrence, all required land, transmitter buildings and transmission equipment; and (b) will pay or cause to be paid to CHLO the sum of $10,000.00.

(7A. On the 31st day of October in each of the years 1964 to 1970 inclusive, all requisite approvals, authorities and licenses in connection with the applications referred to in clauses 1 and 3 hereof having been secured, the Offeror will pay or cause to be paid to CHLO the sum of $5000.00.

ESR.
AAMcD

7. Upon all requisite approvals, authorities and licenses being secured in connection with the applications referred to in clauses I and 3 hereof, CHLO may dispose of its present transmitter site and equipment and may retain the proceeds thereof for its own use absolutely.

AAMcD
ESR.

7A. See above.

8. If in any of the fiscal years of CHLO ending on the 31st days of October in the years 1964 to 1970 inclusive, the gross revenue of CHLO from broadcast sources (being gross broadcast revenue less agency commissions) as shown in the audited financial statements of CHLO is less than $170,000.00, the Offeror (all requisite approvals, authorities and licenses in connection with the applications referred to in clauses I and 3 hereof having been secured) will cause CHFI to pay to CHLO the amount of such deficit up to a maximum amount of $15,000.00. Until the 31st day of October, 1970 each of the Offerees undertakes to use his own best efforts to further the success and prosperity of CHLO.

9. Each of the Parties agrees to provide or cause to be provided to the other all documents, supporting letters and approvals and all such co-operation, including all requisite corporate action by CHFI and/or CHLO, as may be of assistance in carrying out all aspects of this Agreement.

10. Save with respect to obligations personally to be performed this Agreement shall enure to the benefit of and be binding upon the successors and assigns of the Parties hereto.

11. Copies of this Agreement shall be furnished to the Board of Broadcast Governors.

IN WITNESS WHEREOF the Parties have signed on the day first above mentioned.

WITNESS:

Edward S. Rogers

John L. Moore

Andrew A. McDermott

ENGINEERING BRIEF

FOR

NIGHT-TIME OPERATION

AT

SOUND BROADCASTING STATION CHFI

TORONTO, ONTARIO.

Present Operation	- 1540 Kc/s, 50 KW DA-D Class II
Proposed Operation	- 1540 Kc/s, 50 KW DA-D Class II Day
	680 Kc/s, 10 KW DA Class II Night

Prepared for

CHFI-FM Limited
13 Adelaide St. East,
Toronto, Ont.

Prepared by

ELECTRONIC EQUIPMENT AND TUBE DEPARTMENT
CANADIAN GENERAL ELECTRIC COMPANY LIMITED
TORONTO, ONTARIO.

March, 1963.
Revised: March 26, 1963.

TABLE OF CONTENTS

Section 1 - GENERAL

1.1 Purpose of Brief

This brief has been prepared to support the application of CHFI-FM Limited for authority to operate station CHFI with a power of 50 KW on 1540 Kc/s day-time and with a power of 10 KW on 680 Kc/s night-time.

1.2 Purpose of Change in Operation

The proposed full time operation will provide an improved broadcast service in the present service area.

1.3 Engineers Responsible for Brief

W.E. Wright	Mr. Wright's qualifications are on file with the Department of transport.
H. Z. Rogers	Mr. Roger's qualifications are on file with the Department of transport.

1.4 Proposed Location of Station

The present transmitter site is suitable for the proposed operation.

Geographic Location of Site	North Latitude:	43° 35' 27"
	West Longitude:	79° 39' 14"

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

2.11 Frequency

For night operation it is proposed to use the frequency of 680 Kc/s.

2.12 Skywave Interference

The table of co-channel night-timo interference conditions is shown in Section 6.1.

In this table, it may be seen that the possibility of night-time interference in the Toronto area was considered for the following stations:-

Station	Class	Power (Kw)	Location
WPTF	II	50.	Raleigh, North Carolina
CHLO	II	1.	St. Thomas, Ont.
CKGB	II	10.	Timmins, Ont.
WNAC	II	50.	Boston, Mass.
WINR	II	1/15	Binghamton, N.Y.
WCBM	II	10./5.	Baltimore, Md.
WCTT	II	1.	Corbin, Kentucky

The 10% co-channel night-time limitation to CHFI has been established by the 50% RSS rule to be 18.6 mv/m.

2.13 Groundwave Interference

The possibility of groundwave interference to co-channel and adjacent channel stations was investigated and the results are shown in Section 6.2.

It may be seen that no appreciable groundwave interference will be caused to or by the proposed station.

In Section 6.7 the 0.5 mv/m night-time contour of CHLO is shown. Also shown are the areas where CHLO's groundwave protection ratio is less than 20.1. It can be seen that this area is very insignificant.

2.2 Permissible Radiation

2.21 Skywave

Radio Stations toward which radiation was considered are as follows:-

2.2 Permissible Radiation (cont'd)

Station	Class	Power (Kw)	Location
KNBC	1-B	50.	San Francisco, Calif.
WPTF	II	50.	Raleigh, N.C.
CHLO	II	1.	St.Thomas,Ont.
CKGB	II	10.	Timmins, Ont.
WDBC	II	10/1.	Escanaba, Mich.
CJOB	II	10/2.5	Winnipeg, Man.
WNAC	II	50.	Boston, Mass.
WINR	II	1/0.5	Binghampton, N.Y.

Permissible radiation towards the above stations has been determined from calculations by the 50% RSS rule for limitations to these stations and the results are tabulated in Section 6.1. It will be noted that the proposed radiation to the above stations will not increase the night-time limitation to any of the co-channel stations.

2.22 Groundwave

Radio stations towards which groundwave radiation at night was considered are as follows:-

Station	Class	Power (Kw)	Location
WINR	II	1/0.5	Binghampton N.Y.
CHLO	II	1.	St. Thomas, Ont.

Permissible radiation to the above assignments has been determined by the Equivalent Distance Method and the results are tabulated in Section 6.2. The table indicates that adequate groundwave protection is provided.

2.3 Pattern Design

The skywave protection requirements limits the horizontal radiation to the West and South East. The pattern was designed to meet the protection requirements and still provide optimum coverage to the city of Toronto.

2. Directional Antenna Description Sheet

St: ion: CHFI

Main Studio: Toronto, Ontario.

Frequency: 680 Kc/s

Power: 10 KW Class: 11

Notification List No.:

Date:

GEOGRAPHICAL LOCATION
OF THE ANTENNA SYSTEM: North Latitude: 43° 35' 27"
West Longitude: 79° 39' 14"

ANTENNA CHARACTERISTICS

Mode of Operation: DA (Night only)
Number of elements: 9
Type of elements: Guyed, uniform cross section,
series fed, no top loading.

TOWER:	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9
HEIGHT ABOVE INSULATORS:	250' (62°)	250'	250'	250'	250'	250'	250'	250'	250'
OVERALL HEIGHT:	254'	254'	254'	254'	254'	254'	254'	254'	254'
SPACING:		886'(220°)	886'		886'	886'		886'	886'
SPACING:	No. 1-4-7 (282')70°			No. 2-5-8, 282'			No. 3-6-9, 282'		
PHASING:	0°	+5°	+10°	-122°	-117°	-112°	-244°	-239°	-234°
FIELD RATIO:	1.0	1.91	1.0	1.95	3.72	1.95	1.0	1.91	1.0

ORIENTATION: Towers No. 1, 2 and 3 bearing 50° west of north
Towers No. 4, 5 and 6 bearing 50° west of north
Towers No. 7, 8 and 9 bearing 50° west of north
Towers No. 1, 4 and 7 and No. 2, 5 and 8, also No. 3, 6 and 9 bearing 53° east of true north.

GROUND SYSTEM: 120 radials of No. 10 AWG soft copper wire. Radials between towers bonded to No. 4 stranded copper wire. Equivalent length of radials 0.4λ

Predicted effective field: Night: 553 mv/m (175 mv/m for 1 KW)

Revised April 17/63.

Section 3 - STATION COVERAGE

3.1 Proposed Station Location

The present transmitter site is suitable for the proposed change in operation. The location of the station was selected so that the city will receive an adequate signal level without high intensity radiation in the residential area. With this change in operation at night, the radiation pattern is such that a reduction of high intensity will take place in the areas of high density population.

3.2 Ground Conductivity

The ground conductivity for the Toronto area is 8×10^{-14} e.m.u. as reported in the CHFI Final Proof of Performance.

3.3 Area to be Served by the Station

The maps in Section 6 indicate the extent of primary service (night-time limit contour) in the Toronto area and the extent of secondary service as provided by the .5 mv/m contour.

3.4 The applicant will undertake to correct any interference to existing services as a result of the proposed operation, including interference within the 1 v/m contour.

Section 4 - SOURCES OF DESIGN INFORMATION

Station lists and recent amendments for Canada (List 176) for U.S. (List 996) and Cuba, from the Department of Transport were used for a study of channel conditions.

The groundwave propagation curves, Appendix I, Graph 5 of the Standards of Good Engineering Practice were used to determine contour distances. Ground conductivity was taken from the Proof of Performance for station CHFI, Toronto, Ontario. Conductivity in the United States was taken from FCC Figure M3.

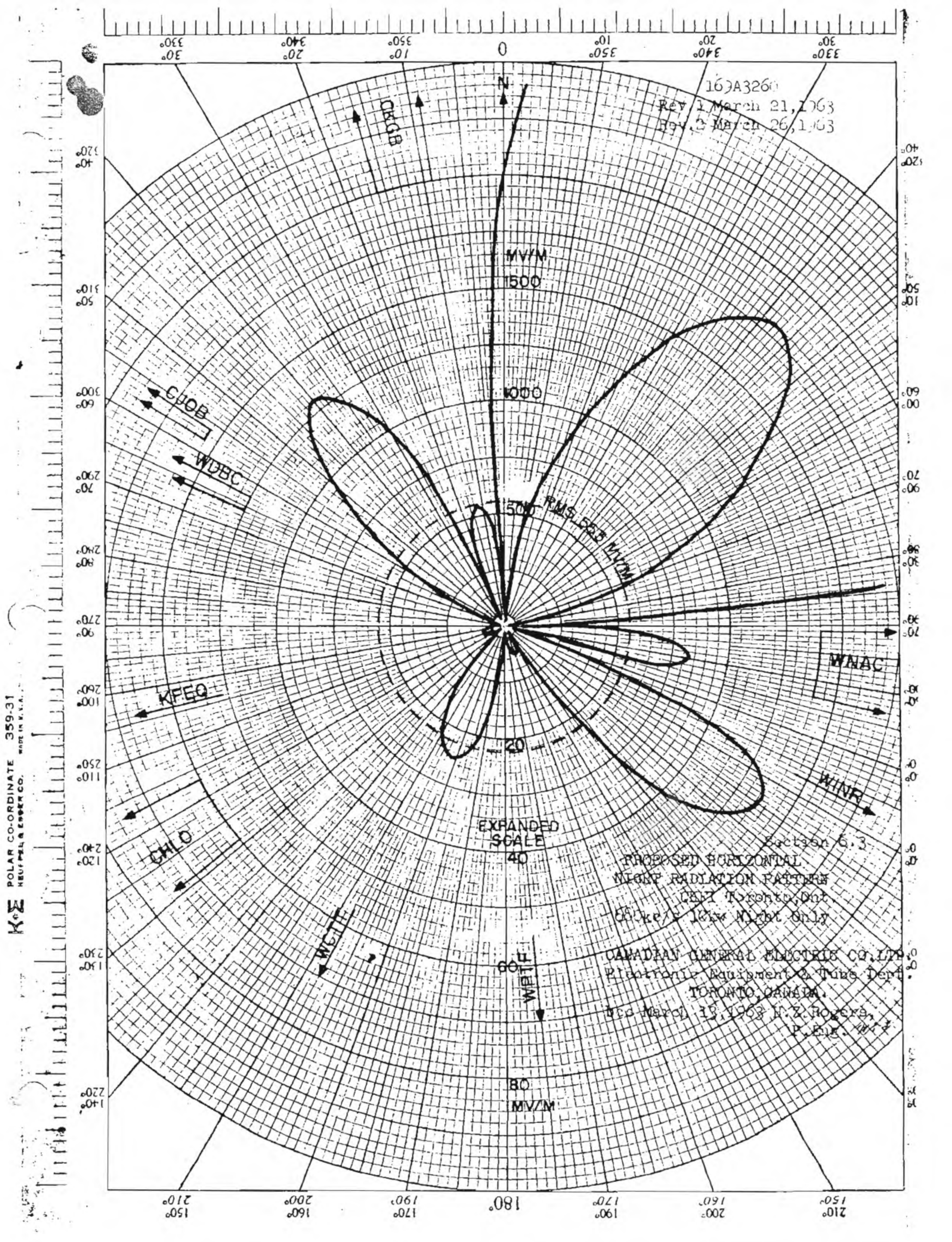
The predicted Effective Field was determined using the curve, Field Intensity for 1 Kilowatt, recently published by the Department of Transport.

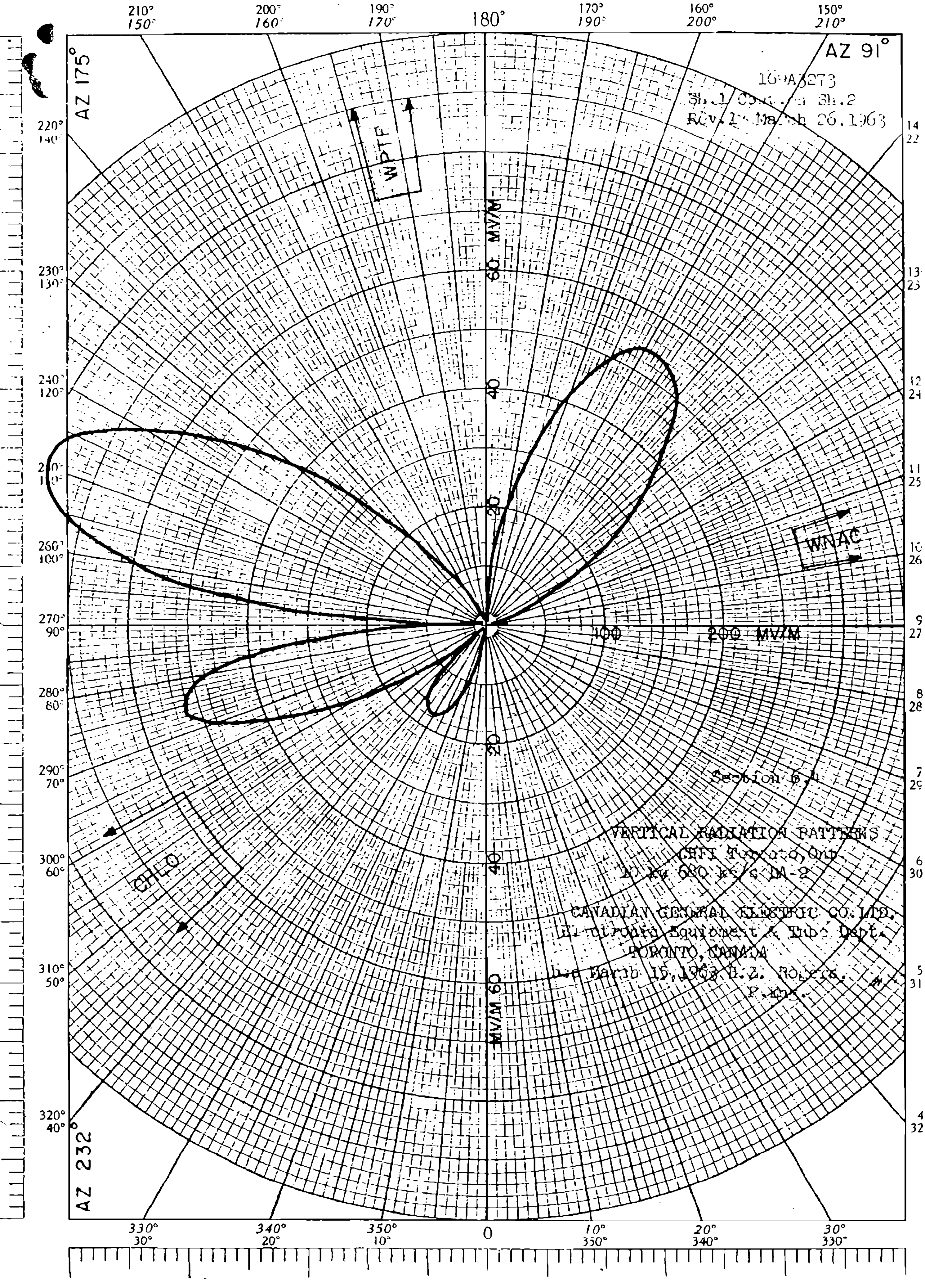
Bearings used in the Table of Interference Conditions were determined from a Lambert Conic Projection Map and distances from an Albers Equal Area Projection Map, scale 1/2, 500, 000.

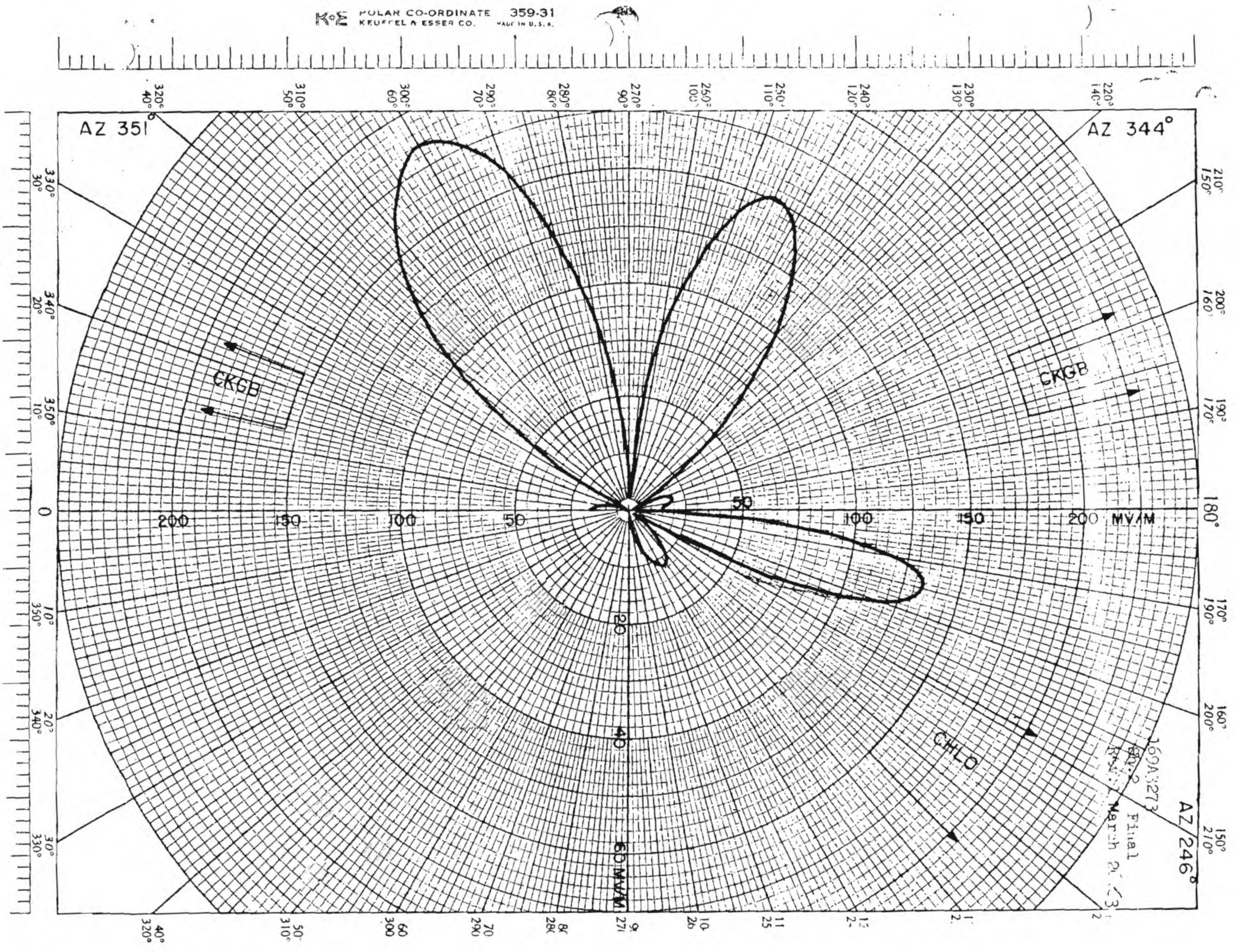
Section 5 - ENGINEERING SEAL AND SIGNATURE

W.E. Wright, P.Eng.,
Broadcast Consultant,
Electronic Equipment and Tube Department,
Canadian General Electric Company Limited.

H.Z. Rogers, P.Eng.,
Broadcast Consultant,
Electronic Equipment and Tube Department,
Canadian General Electric Company Limited.


K&E POLAR CO-ORDINATE 359-31
KEUFFEL & ESSER CO. MADE IN U.S.A.
163A3260
Rev 1 March 21,1963
Rev 2 March 26,1963
N
CKGB
CJOB
WDBC
KFEQ
CHLO
WCTT
WPTF
WNAC
WINR
MV/M
1500
1000
500
RMS 563 MV/M
20
EXPANDED
SCALE
40
60
80
MV/M
Section 6.3
PROPOSED HORIZONTAL
NIGHT RADIATION PATTERN
CELT Toronto,Ont.
680kc/s 10kw Night Only
CANADIAN GENERAL ELECTRIC CO.LTD.
Electronic Equipment & Tube Dept.
TORONTO,CANADA.
Dcs March 15,1963 N.Z.Rogers,
P.Eng.

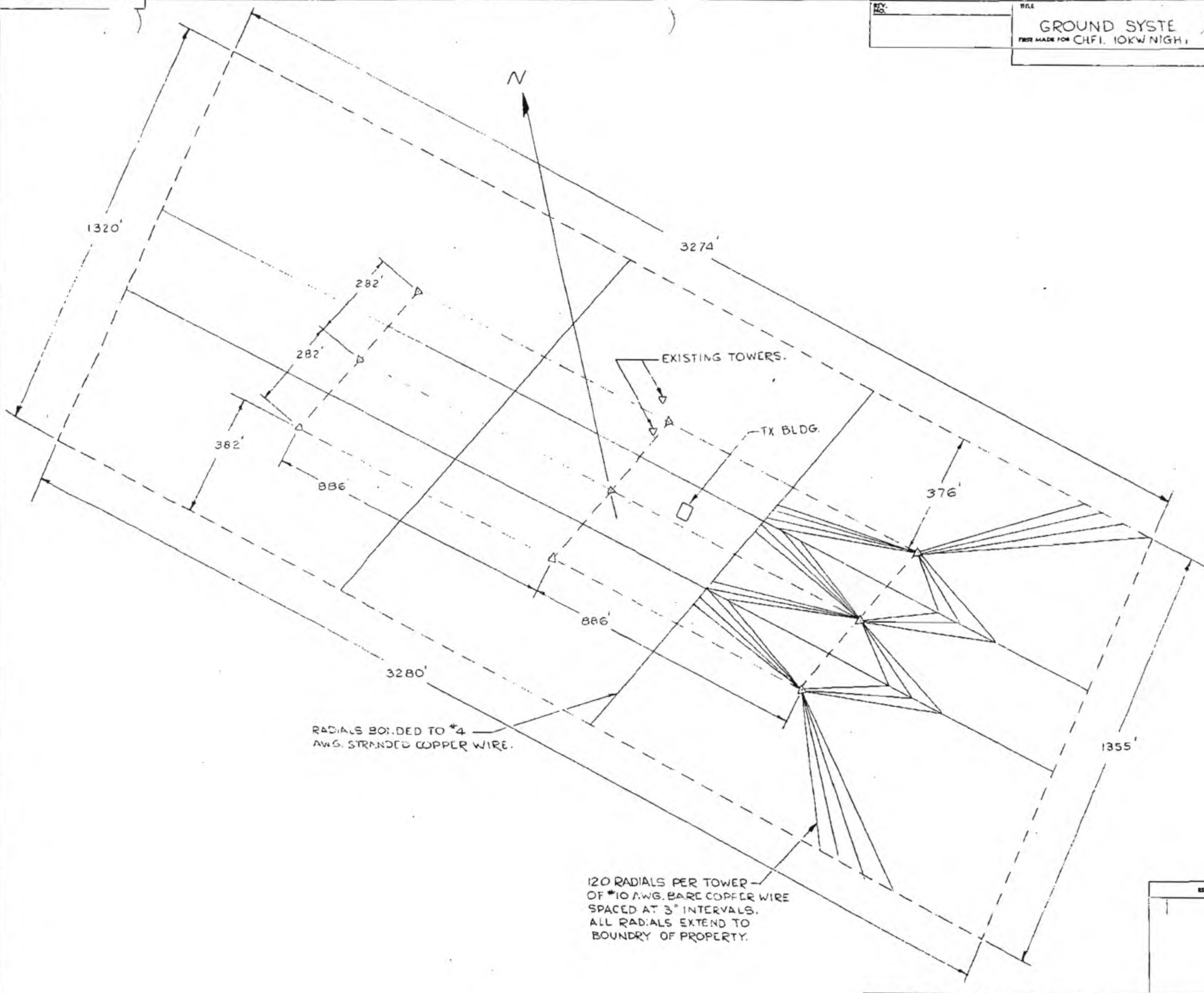

AZ 91°
AZ 175°
AZ 232°
Sh.1 Cont. on Sh.2
Rev.1 March 26,1963
WPTF
WNAC
CHLO
100
200 MV/M
MV/M
Section 6.4
VERTICAL RADIATION PATTERNS
CHFI Toronto,Ont
10 kw 680 kc/s DA-2
CANADIAN GENERAL ELECTRIC CO.LTD.
Electronic Equipment & Tube Dept.
TORONTO,CANADA
March 15,1963 D.Z. Roberts.
P.Eng.
POLAR CO-ORDINATE 359-31
KEUFFEL & ESSER CO.



K+E POLAR CO-ORDINATE 359-31
KEUFFEL & ESSER CO.
AZ 351°
AZ 344°
CKGB
CKGB
CHLD
AZ 246°
200
150
100
50
50
100
150
200 MV/M
20
40
60 MV/M
Final

COMPANY LIMITED 954C636

GROUND SYSTE LAYOUT
FIRST MADE FOR CHFI. 10KW NIGH, TORONTO, ONTARIC



DRAWN BY J.C.Belt APR-19/65 | CHECKED BY | EE#7D ROYCE | 954C636

Schedule 18.

to an application by Rogers Broadcasting Limited dated March 14, 1963.

Program Planning

Separate Programming

It is the intention of the Applicant to commence full time AM service by operating the AM station with programming substantially identical to the programming of Station CHFI-FM. The Applicant proposes to experiment with separate FM and AM programming in order to meet the needs of the community as conditions warrant.

By the end of the first year of operation of the full time AM service the Applicant undertakes to have an average of 21 hours per week of separate programming on both of the stations. By the end of the second year of operation, the Applicant anticipates having an average of 28 hours per week of separate programming; by the end of the third year 35 hours; by the end of the fourth year 42 hours, and by the end of the fifth year 50 hours. The Applicant proposes to increase the amount of separate programming still further as funds become available.

Ethnic Programming

The Applicant proposes to provide an integrated professional ethnic programming service under the supervision of Company Director Mr. Johnny Lombardi for two hours each evening on AM only. Mr. Lombardi is Canada's foremost authority on programming for the large ethnic audience in the Metropolitan Toronto area. The FM station would continue to broadcast the CHFI-FM programming separately. It is hoped that this FM programming will also serve as the cornerstone for the proposed FM Network in Southern Ontario.

6

Schedule 19.

to an application by Rogers Broadcasting Limited dated March 14, 1963.

Plans for developing local community talent

It is intended that the full time AM Station will continue with CHFI-FM to cooperate in every way in furthering the promotion and encouragement of all organizations whose main objective is the enlargement and advancement of the cultural life of the community.

CHFI has already built a reputation of service as the Fine Arts Station and the extended facilities will give the stations an opportunity to extend and expand this service. The nature of the proposed programming is such that the development of local talent will necessarily be restricted to the encouragement of those whose talents advance these aspects of the life of the community.

Schedule 20.

to an application by Rogers Broadcasting Limited dated March 14, 1963.

Extent of Improvement of Service from this Application.

CHFI has pioneered FM service in Canada. Substantial improvement in FM service to the public of Metropolitan Toronto has taken place in the last few years. The completion of the AM service will provide the funds necessary to support the existing FM service, despite the present cut-throat FM competition in Toronto. It will indeed make possible and support an improved FM service to the public in our listening area.

It will also provide the required subsidy and ensure the necessary stability to make a FM network economically secure, and thus it would result in a very substantial improvement in FM service to listeners in the rural areas across Southern Ontario.

No other Toronto station offers a consistent good music programming service to the majority of the population which presently is an AM-only audience. The extension to full time AM would complete the existing unique service and satisfy a very real need.

The present daytime only Good Music broadcasting on CHFI can not satisfy fully the desires of our audience. The changing hours of sunrise and sunset cause annoyance to our listeners, and render a complete service difficult. This application would permit that continuity of service which is much to be preferred.

The existence of a restrained commercial policy on CHFI represents a very real improvement in service to the listeners over that available from other local AM stations. This policy is only possible economically if the station has access to an audience large enough to permit the unit rate to be kept high. The full time AM service is needed to give access to this audience, especially in the hours from six a.m. to nine a.m.

The Applicant believes that the principal of spectrum conservation is that the broadcast frequency should be used to provide maximum coverage for the greatest number of people. This application is a normal and we believe desirable development to make the best possible service available on a regular and consistent basis.

It is hoped ultimately to make possible a substantial improvement in signal strength in our prime market area - Metropolitan Toronto - in its daytime service. The present signal is weaker than was anticipated, and the new service would give it a level equal to the other Toronto stations. It will improve the clarity and sound quality of the AM service so as to make it more compatible with the reputation of the station on FM.

Schedule 21.

to an application by Rogers Broadcasting Limited dated March 14, 1963.

Effect of new station on general broadcasting service to the community.

The effects of this application are threefold:

(a) To support the FM development activities of CHFI-FM, by granting access to the basic AM audience and revenue of the early morning 6 a.m. to 9 a.m. period.

(b) To provide a consistent and regular service to the large segment of the public listening to the unique good music service on AM.

(c) To make possible Toronto's first integrated professional ethnic programming service under the supervision of Company Director Johnny Lombardi.

Schedule 22.

to an application by Rogers Broadcasting Limited dated March 14, 1963.

Ability of Community to Support a new station in the area.

CHFI attracts a large number of Good Music advertisers who do not use ordinary radio. These sponsors will expand their CHFI budgets when a full time service becomes operational.

CHFI suffers a very real handicap (because of the late AM sign on in winter months) with regular radio advertizers who prefer the 6:00 a.m. to 9:00 a.m. period.

Any additional revenue which would accrue to CHFI in consequence of this application would have only a minimal effect on the total broadcasting market in the Toronto area.

Schedule 28.

to an application by Rogers Broadcasting Limited dated March 14, 1963.

Applicant's conception of public service broadcasting

CHFI and CHFI-FM provide a service to the Arts, Letters and Science community which is unique in Toronto radio. The quality broadcasting of the stations attracts a large segment of the cultural and charitable leaders in the area. As a result, the stations have developed a rapport and special communication with this segment of the community.

The AM Station is designed to provide a specialized programming service to a substantial part of the public that was previously not being served in Toronto. This large audience now has a day-time Station catering especially to its needs and requirements.

CHFI is dedicated to the growth of FM in Canada. The whole concept of its AM service is to provide a unique programming service to the people in its coverage area and at the same time to generate the requisite revenue to continue and expand its FM service not only in its own community but in other areas across Ontario through the proposed FM Network.

CHFI is making many contributions in various areas of public service broadcasting. However, the most important of all to the licencee is its contribution towards the full development of FM broadcasting in this country.

DATED the 27th day of February, 1963

EDWARD S. ROGERS

- and -

JOHN L. MOORE

- and -

ANDREW A. McDERMOTT

A G R E E M E N T

PAYTON, BIGGS & GRAHAM
250 UNIVERSITY AVENUE
TORONTO ONTARIO

AGREEMENT made this 27th day of February, 1963.

B E T W E E N :

EDWARD S. ROGERS, of the City of Toronto, in the County of York and Province of Ontario,

(hereinafter called the "Offeror")

OF THE FIRST PART,

- and -

JOHN L. MOORE, of the City of St. Thomas, in the County of Elgin and Province of Ontario and ANDREW A. McDERMOTT, of the said City of Toronto,

(hereinafter called the "Offerees")

OF THE SECOND PART.

WHEREAS the Offeror is the beneficial owner of all the issued shares of Rogers Broadcasting Limited, the licensee of radio station CHFI (hereinafter called "CHFI") in the City of Toronto;

AND WHEREAS each of the Offerees is the beneficial owner of one-half of the issued shares of Souwesto Broadcasters Limited, the licensee of radio station CHLO (hereinafter called "CHLO") in the City of St. Thomas;

AND WHEREAS CHFI and CHLO each experience deficiencies in technical service and the parties hereto desire to co-operate together to make possible improved coverage and service to the respective service or trading areas of CHFI and CHLO respectively;

AND WHEREAS in particular, CHLO presently has deep nulls causing lack of consistency of signal and serious derogation of service in its prime service area and which are impossible of correction on its existing frequency;

AND WHEREAS in particular, CHFI presently is a daytime-only station which makes impossible a continuity of service to the bulk of the public in its service area and which is impossible of correction on its existing frequency;

AND WHEREAS it is in the interest of the public in the St. Thomas and Metropolitan Toronto areas that consistency of service and the elimination of the existing technical defects of CHLO and CHFI be undertaken;

AND WHEREAS it is in the national interest that existing Canadian licensees co-operate together to improve and maximize the use of available frequencies and facilities;

NOW THEREFORE the Parties in consideration of the premises and the mutual undertakings hereinafter contained agree each with the other as follows:

1. The Offerees will cause CHLO to apply forthwith for authority to change its frequency from 680 kcs. to 1410 kcs. and its power from 1,000 watts day/night to 10,000 watts day (2,500 watts night).

2. The Offeror will cause CHFI to apply forthwith for authority to change its facilities to add night-time only service on 680 kcs. with a power of 10,000 watts. The Offerees will ensure that all requested supporting approvals of this application by CHLO are furnished to CHFI.

3. Upon CHLO securing a favourable recommendation from the Board of Broadcast Governors on its application referred to in paragraph 1, the Offeror will cause CHFI to apply for authority to change its day-time frequency from 1540 kcs. to 680 kcs. with a power of 50,000 watts day (10,000 watts night).

4. The Parties hereto shall cause each of the foregoing applications to be prosecuted with the utmost vigour and despatch.

5. The Offeror will cause CHFI to pay all proper engineering, legal and other costs in relation to the foregoing applications.

6. Upon CHLO receiving authority from the Minister of Transport to change its facilities in accordance with the application referred to in paragraph 1, the Offeror (a) will supply or cause to be supplied for use in connection with such new facilities and will convey or cause to be conveyed to or to the order of the Offerees, without charge and free of encumbrance, all required land, transmitter buildings and transmission equipment; and (b) will pay or cause to be paid to CHLO the sum of $10,000.00.

7A. On the 31st day of October in each of the years 1964 to 1970 inclusive, all requisite approvals, authorities and licenses in connection with the applications referred to in clauses 1 and 3 hereof having been secured, the Offeror will pay or cause to be paid to CHLO the sum of $5000.00.

ESR.

AAMcD

7. Upon all requisite approvals, authorities and licenses being secured in connection with the applications referred to in clauses 1 and 3 hereof, CHLO may dispose of its present transmitter site and equipment and may retain the proceeds thereof for its own use absolutely.

AAMcD ESR.

7A. See above.

8. If in any of the fiscal years of CHLO ending on the 31st days of October in the years 1964 to 1970 inclusive, the gross revenue of CHLO from broadcast sources (being gross broadcast revenue less agency commissions) as shown in the audited financial statements of CHLO is less than $170,000.00, the Offeror (all requisite approvals, authorities and licenses in connection with the applications referred to in clauses 1 and 3 hereof having been secured) will cause CHFI to pay to CHLO the amount of such deficit up to a maximum amount of $15,000.00. Until the 31st day of October, 1970 each of the Offerees undertakes to use his own best efforts to further the success and prosperity of CHLO.

9. Each of the Parties agrees to provide or cause to be provided to the other all documents, supporting letters and approvals and all such co-operation, including all requisite corporate action by CHFI and/or CHLO, as may be of assistance in carrying out all aspects of this Agreement.

10. Save with respect to obligations personally to be performed this Agreement shall enure to the benefit of and be binding upon the successors and assigns of the Parties hereto.

11. Copies of this Agreement shall be furnished to the Board of Broadcast Governors.

IN WITNESS WHEREOF the Parties have signed on the day first above mentioned.

WITNESS:

Edward S. Rogers

John L. Moore

A. A. McDermott
Andrew A. McDermott

CHFI

TORONTO PRIVATE RADIO STATIONS

COVERAGE GROWTH

The domination of the Toronto radio market by CFRB has existed for many years. It has been the result of good management and a preferential position created by the restrictions imposed on the other private stations under the former policy. Until 1957, the daytime reach of CFRB exceeded those of all other private stations combined.

Since 1957, all other Toronto private stations have improved their facilities and increased their power in order to be on a more even footing. The result is seen in the following charts. When CKEY builds its new facilities, and if CHFI and CHUM are authorized to proceed with their planned improvements, any future domination of Toronto radio will be earned by individual initiative. It will no longer remain automatically with CFRB as a result of a coverage-licencing monopoly.

DAYTIME PRIME COVERAGE EXPANSION

Other Developments in Brackets

Underlining indicates new grant

25 mv prime coverage — number of people*

	1957	1958-59-60	1961-62-63	*1964
CFRB	**1,561,000**	1,561,000	1,561,000	**1,561,000**
(Controlled by Argus Corporation Limited)		(Purchased CJAD Montreal)	(Awarded Separate Toronto FM—Montreal FM)	(CJAD power increase to 50,000 watts)
CHUM	**562,820**	**861,230**	**1,030,810**	**1,523,240**
(Owner and manager, Allan Waters)			(Awarded Toronto FM—Purchased half of CKPT Peterborough)	
CKEY	**890,540**	890,540	890,540	**1,606,130**
(Controlled by The Globe and Mail and Westinghouse)			(Change of Ownership)	(Can increase power)
CHFI	—	—	**1,210,850**	**1,728,760**
(Owner and manager, Ted Rogers)		(Change of Ownership) (Holds 10% of CFTO)	(FM power increase)	
CKFH	**89,064**	**853,850**	**936,000**	**936,000**
(Owner and manager, Foster Hewitt)		(Holds 12% of CFTO)		(Can increase power)

NIGHT-TIME & EARLY MORNING COVERAGE EXPANSION

Underlining indicates new grant

Night-time limit coverage — number of people*

	1957	1958-59-60	1961-62-63	*1964
CFRB	**1,714,870**	1,714,870	1,714,870	**1,714,870**
CHUM	**No Night-Time**	611,840	611,840	**1,506,710**
CKEY	**1,283,650**	1,283,650	1,283,650	**1,615,750** (Can increase power)
CHFI	—	—	No Night-Time	**1,672,420**
CKFH	**487,120**	**1,250,860**	1,250,860	**1,250,860** (Can increase power)

SOURCES: Population figures estimated by McDonald Research Limited from Department of Transport Coverage Maps.

*NOTE: Based on 1963 population — showing number of people today if stations had former years power; under 1964 — shows number of people if current applications for CHFI and CHUM are approved and on completion of authorized changes by CKEY.

ROGERS BROADCASTING LIMITED

AYTON, BIGGS & GRAHAM

BARRISTERS & SOLICITORS

RUSSELL T. PAYTON, Q.C.
JOHN W. GRAHAM, Q.C.
STANLEY C. BIGGS, Q.C., LL.B.
V. R. E. PERRY, B.A.
TERENCE A. WARDROP, B.A.
IAN F. H. ROGERS, M.A.
ROBERT J. PIRIE, B.A.

TELEPHONE EMPIRE 6-3011

CABLE ADDRESS "BIGGS"

BANK OF CANADA BUILDING
250 UNIVERSITY AVENUE
TORONTO 1, CANADA

April 29th, 1963.

Mr. F. K. Foster,
Telecommunications and
Electronics Branch,
Department of Transport,
#3 Building,
Ottawa, Ontario.

Dear Mr. Foster: Re: Rogers Broadcasting Limited
Pending Application For Night-
Time Only Licence

You have requested of Rogers Broadcasting Limited certain information in connection with the pending Application of that Company for authority to establish a Private Commercial Broadcasting Station (sound).

Mr. Ted Rogers, the President of the Company, will be furnishing to you the balance of the information requested, but he has asked me to forward to you the desired data in connection with the real estate purchases that are contemplated.

I enclose three photostatic copies of each of two Offers to Purchase:

(a) Approximately 20 acres from Rose Rodaro;

(b) Approximately 50 acres from Norman E. Clark.

Each of these properties is contiguous to the property presently being utilized in the Township of Toronto by Station CHFI. The first of the two properties lies between the existing site and Burnhamthorpe Road, and the second property lies to the west of the existing property and the first property mentioned above.

Mr. F. K. Foster.

The agreed terms of purchase are as follows:

	Total consideration	Cash Payment	Vendors' Mortgages
(a)	$ 80,000.00	$6,000.00	$ 74,000.00
(b)	$160,000.00	$40,000.00	$120,000.00
	$240,000.00	$46,000.00	$194,000.00

Schedule 24 of the pending Application sets out the estimated capital cost of the land as $240,000.00, but Schedule 23 under-estimates the amount available by means of Vendors' mortgages by stating it to be $162,000.00. The attached photostatic copies reveal that, in fact, the total Vendors' mortgages will amount to $194,000.00. This involves a lesser drain upon the funds of the owner of the Applicant Company.

You will notice that in each of the contemplated transactions the closing date is September 15th, 1963.

Yours sincerely,

JWG/C:
Encs.

11/S-5

CFRB
LIMITED

W. C. THORNTON CRAN, *President*

37 Bloor Street West, Toronto 5, Ontario / Telephone 924-5711

276-CHFI-9

May 22, 1963.

W. D. Mills, Esquire,
Secretary,
Board of Broadcast Governors,
48 Rideau Stréet,
Ottawa, Ontario.

Dear Mr. Mills:

Pursuant to Section 6 of the Board of Broadcast Governors' Procedure Regulations, we are enclosing herewith ten (10) copies of CFRB Limited's notice of intention to oppose the application of CHLO and Rogers Broadcasting Limited which is to be heard by the Board at its meetings beginning June 4, 1963.

We trust that you will find this in order.

Yours very truly,

WCTC/hj

RECEIVED
MAY 24 1963
BBG
OTTAWA

CFRB
LIMITED

W. C. THORNTON CRAN, *President*

37 Bloor Street West, Toronto 5, Ontario / Telephone 924-5711

May 22, 1963.

Board of Broadcast Governors,
48 Rideau Street,
Ottawa, Ontario.

Dear Sirs:

CFRB Radio Station observes that Radio Station CHLO, St. Thomas, Ontario is applying for permission to vacate the highly desirable frequency of 680 Kc/s and to go on the much less desirable frequency of 1410 Kc/s, and at the same time Rogers Broadcasting Limited is applying for a new night time only AM radio station on the frequency of 680 Kc/s with a power of 10,000 watts.

The principals of Rogers Broadcasting Limited have an important interest in CFTO-TV, they have a licence to operate CHFI, an AM station, and a licence to operate CHFI-FM, and it is suggested that it is not in the public interest that they be granted a further licence in the Toronto area.

Also, as it seems improbable that Rogers Broadcasting Limited will be for long content to operate the proposed station as a night time station only, CFRB apprehends that an application will be made later to convert the proposed station into a day and night operation on the frequency of 680, and if there is any likelihood of that, then it is urged that the Board should consider this application in the light of that probability.

It is also urged that the Board should examine whatever arrangements have been made between CHLO and Rogers Broadcasting Limited, as it is most improbable that CHLO would abandon the frequency of 680 Kc/s without some consideration, and if they are being paid or indemnified in any way, that is a trafficing in Radio Licences which, it is respectfully suggested, the Board should not permit.

For the reasons above stated and for such other reasons as may appear after an examination of the material filed by the applicants, CFRB Limited hereby gives notice of intention to oppose the applications of CHLO and Rogers Broadcasting Limited, at the Board of Broadcast Governors Public Hearings commencing June 4, 1963.

The following will appear at the hearing to represent CFRB:

Mr. W. C. Thornton Cran, President
Mr. W. J. Holden, Vice-President
Mr. J. Lyman Potts, Assistant to the President
Mr. Clive Eastwood, Chief Engineer
Mr. Joseph Sedgwick, Q.C., Counsel.

Yours very truly,

WCTC/hj

27

May 22, 1963.

Mr. W. D. Mills,
Secretary,
Board of Broadcast Governors,
48 Rideau Street,
OTTAWA Ontario.

Gentlemen:

We have noted the two proposed applications before the Board for changes in power and frequency for CHUM and CHFI here in Toronto. We would like to go on record as not being opposed to either of these applications. We would like to repeat that we are in accord with all Canadian radio stations attempting to improve their technical facilities to the maximum permissable in order to safeguard frequencies, an important Canadian public resource, from foreign encroachment.

We would only hope that CKEY would receive favorable consideration in the event of an opportunity presenting itself for the improvement of our own technical facility to better serve our community at some time in the future.

Respectfully yours,

D. C. Trowell

D. C. Trowell,
Vice-President & General Manager.

DCT/AA

Rogers Broadcasting Limited
(AM) apple. night time - Toronto Ont.

4/Sotz

CKFH

ON THE RIGHT SIDE OF YOUR DIAL

10,000 WATTS 1430

May 24th,
1 9 6 3.

Mr. W. D. Mills, Secretary,
Board of Broadcast Governors,
48 Rideau Street,
Ottawa, Ont.

Dear Mr. Mills:

I wish to go on record on behalf of, radio s tation CKFH, Toronto in opposing the application of radio station CHFI, Toronto for the use of 680 Kcs. frequency.

Despite the fact we have not prepared our technical brief, nor filed an application for presentation at the hearing of June 4th, we do not want to be deprived of the opportunity of stating our case if, and when the 680 Kcs. frequency becomes available.

I am asking your support in deferring any decisions on present applications for 680 Kcs. frequency until the Department of Transport advises all consultants that the 680 Kcs. frequency is open for application. To my knowledge, this has always been a standard practice.

It is my earnest hope that the Board will see fit to accede to my request to give all applicants for the 680 Kcs. frequency the opportunity to apply on equal terms.

Kindest regards.

Sincerely,

Bill Hewitt

F. W. A. 'Bill' Hewitt
General Manager.

RECEIVED
MAY 27 1963
BBG
OTTAWA

hl:

(7.3)

Broadcasting Station

CHFI-FM

CHFI-AM

Toronto / Empire 3-1317

13 Adelaide St. East

May 24th., 1963.

RECEIVED
MAY 27 '63
BBG
OTTAWA

The Chairman and Members,
Board of Broadcast Governors,
48 Rideau Street,
Ottawa, Ontario.

Dr. Stewart, Dr. Connell and Gentlemen:

To assist you to understand fully all of the objectives and implications of the pending application by CHFI, we are furnishing to you herewith certain information.

CHFI is dedicated to the growth and development of FM broadcasting in Canada. We are also dedicated to the concept of good music broadcasting and wish to encourage this improved and higher standard of broadcasting in our listening area. We believe we have made substantial progress in the last year. The fundamental problem that faces us is that a station cannot operate economically with the dual limitations of limited commercials and limited hours. It is axiomatic that "minority" programming must have a broad "reach". With a limited number of commercials per hour a station must have an economic audience at all hours in order to sell the required number of commercials. With limited commercials a reasonably high rate per commercial must be secured or the funds required to provide quality broadcasting will not be forthcoming.

CHFI is proud of its record and is gratified with the recognition that has been accorded the station over the past year. However, it is imperative that a solution be found to our fundamental problem and that we be enabled to provide a consistent regular service. All other Toronto AM stations have both full hours and a full quota of commercial availabilities. CHFI is convinced that it can break even on AM and support the FM - but it will be necessary to remove one of the two limitations - limited hours or limited commercials.

..../2

I am personally dedicated to and love FM and quality broadcasting with commercial restraint. I believe we have provided a service in Toronto of which the Board and the public can be truly proud. I intend to submit our record of performance to the Board in the hope that the engineering feat that we have achieved, together with our programming and commercial standards, will meet with your approval.

John Moore of CHLO, St. Thomas also had substantial technical problems. He had three deep nulls which made a consistent standard of service in his prime area impossible. We two Canadian licencees have co-operated together in order to improve the technical facilities of both stations. The result is that the service to the public in both centres will be substantially improved. It is our view that Canadian broadcasters must co-operate and work together if we are to slow down the crowding of the spectrum by the horde of new U.S. stations. The agreement between the two stations was filed with the permanent members of the Board within a few days of signing. John Moore and I agreed without hesitation that all aspects of our agreement be made public and that nothing whatsoever be hidden. We have been completely open with the Board and we ask for your endorsement of this co-operation between Canadian licencees.

The normal procedure is as follows:

(a) <u>June 4, 1963</u> - Application by CHLO St. Thomas to switch frequencies from 680 kilocycles to 1410 kilocycles and to increase power from 1000 watts to 10,000 watts day and 2500 watts night.

(b) <u>August 9, 1963</u> - Provided the Board has given a favourable recommendation on the St. Thomas application and the Minister has subsequently issued a construction permit, applications for the frequency of 680 kilocycles can be filed with the Department of Transport. It is essential that they be filed by August 9, 1963 to be processed for the October hearing of the Board.

(c) <u>October 22, 1963</u> - Provided the St. Thomas

. . ./3

application has been granted and that technical briefs have been received by the Department of Transport by August 9, 1963, 680 kilocycles would be available to any and all applicants at the October hearing of the Board. CHFI realizes that in this case 680 kilocycles would have come back into the "public domain".

We believe that the CHFI case for 680 kilocycles is as strong as any applicant could ever desire. The following, in our view, are the key reasons.

(1) CHFI made 680 kilocycles available for use in the Toronto area by its persistent and costly engineering research.

(2) CHFI is an existing licencee and therefore would have preference over a new Toronto applicant.

(3) Other frequencies, for example 1410 kilocycles, have been available for full-time use in Southern Ontario for some years.

(4) CHFI has an outstanding record of good performance and of keeping its commitments. It programs the very kind of programming with the commercial restraint that the Board encourages, and therefore merits support and encouragement.

(5) Limited hours combined with a limited number of commercials constitute an intolerable burden. All other Toronto AM stations have both full hours and full commercials. CHFI receives only 6% of its revenue from the prime 6.00 a.m. to 9.00 a.m. AM hours, instead of the usual minimum of 30%, in spite of the most strenuous efforts to overcome the disability of varying hours by

featuring, during this period, outstanding live talent such as Pierre Berton, Larry Henderson, Andrew McFarlane and Scott Young.

(6) The greatest demand by advertisers for radio time is during the winter months. FM only transmission is not as attractive to them as the combination of AM and FM, and does not support economic rates. At the time of greatest demand there is the shortest supply of AM availabilities, as we have refused to increase our limited number of commercials per hour.

(7) 680 kilocycles will provide the support required to enable CHFI to continue and expand its FM development work. There is strenuous and growing competition in FM in Toronto, with each other FM station supported by an AM station which is not only full-time but which also carries a full quota of commercials. Rates and revenues are unsettled and uncertain. We are vitally concerned with the growth and development of the FM medium and this still requires steadfast and substantial support from other sources.

(8) CHFI will then offer a consistent controlled ethnic service to Toronto which is presently not available. It will represent a brand new service.

(9) It will make quality good music broadcasting available to all of the listening public. It will end the present public inconvenience and listener nuisance of the station going on and off the air at varying hours throughout the year.

(10) Good music broadcasting is designed for minority audiences. Thus, like the programming of the CBC, it must have a

wide reach. 680 kilocycles will make this unique Good Music - Limited Commercial service available to many small towns which presently have no such service. It is a small minority to whom we would cater in each town, but added together they make an economic audience.

(11) The present day-time service on 1540 kilocycles furnishes a weak signal and suffers much interference in Metropolitan Toronto. This is particularly disadvantageous for our Good Music - low modulation programming. It also places CHFI under a substantial handicap because all of the other Toronto stations are louder. 680 kilocycles would give CHFI the same signal strength in Toronto as the other Toronto stations during the daytime. We submit that this is only fair.

(12) Quality broadcasting in Toronto as supplied by CHFI still labours under many handicaps - limited commercials, limited hours, low signal strength, substantial interference, public inconvenience with the changing hours each month, and lack of access to the prime early morning AM hours.

June 4, 1963 - Night-time only Application on the frequency of 680 kilocycles.

Normally, it would be true that an applicant could not apply for 680 kilocycles in the Toronto area until permission had been granted for CHLO, St. Thomas, to move. It has, however, been technically and legally possible for twenty years for any applicant in Toronto to apply for night time on 680 kilocycles because St. Thomas cuts back its night time service and therefore no night-time interference would occur. Our brief has passed all of the technical requirements and standards of the Department of Transport.

There are several cogent reasons for our application at this time. CHFI wished to make it clear to all broadcasters and the public that it was co-operating with St. Thomas and intended to apply for 680 kilocycles full time as soon as possible. If there was any opposition, or if there were any other applicants for this frequency, we wanted to ensure that there was full public notice so that they could be heard at the June hearing. It is clear that the revenue increases which should result if CHFI becomes full-time and CHLO improves its facilities would be greater for Toronto because of the larger population in that area. It was felt by John Moore and me to be only fair that the total anticipated benefits should to some extent be pooled until the requisite equipment for both stations had been completely paid for. Therefore, CHFI is committed to an expenditure of approximately $145,000 if the St. Thomas application is approved. It is only natural, therefore, that we wished to do everything possible to give broad public notice of our full intentions at the June hearing. CHFI is very much aware of the possible risks involved, but it is absolutely necessary from an operational standpoint that we take these risks. Further, we are confident that our programming, commercial policies and record of honouring our commitments would ensure that we would receive sympathetic consideration from you.

If the night-time only application is granted, it would enable us to do much preliminary work, such as surveying, re-zoning, and land preparation. It would save us considerable time and advance the day when a full service with a good signal would be available to the Toronto listening public.

I am enclosing several schedules from our official application to the Department of Transport for your added reference. These include our specific commitments on separate programming and ethnic programming, and details of the capital cost estimates. These latter involve substantial amounts, but a large percentage is for land acquisition. The required land is contiguous to the present site and will need to be purchased in any event to protect the Station's future.

Your consideration of these matters is deeply appreciated.

Yours sincerely,

John S. Rogers

President.

Rogers Broadcasting Ltd.
Am appli. Toronto

171 Sets

CKFH
ON THE RIGHT SIDE OF YOUR DIAL
10,000 WATTS 1430

October 10th,
1963.

Dr. Andrew Stewart, Chairman,
Board of Broadcast Governors,
48 Rideau Street,
Ottawa, Ontario.

Dear Dr. Stewart:

I wish to go on record as opposing the application of radio station CHFI for a nighttime frequency of 680 Kcs. in Toronto. If this application is approved, it would be the first case in Canada of a radio station being granted the use of two AM frequencies in a major market. With the listeners in the Greater Toronto area already adequately served and with this view confirmed by the recent decision of the Board in denying an application for a radio station for Whitby and the surrounding area, it seems to me there cannot be any justification or wisdom in adding another frequency in such a saturated market.

When CHFI was granted a daytime license a year or so ago, the application was primarily based on the use of the daytime AM frequency to promote their own FM operation. Since then, their ideas have obviously changed. Does this suggest that their present unique application is only a forerunner of another plan to come?

Shortly after the last B.B.G. meeting in May, the Board announced officially that the CHFI application would not be heard again until after the New Year. On Friday, October 4th, an ad appeared in a Toronto newspaper announcing the re-hearing of the CHFI application. This short notice made it impossible to prepare a comprehensive brief on the subject. Thus I am confining my objections to letter form with the hope that the Board will see fit to turn down CHFI's application.

Kindest regards.

Sincerely,

Foster Hewitt.

Foster W. Hewitt

RECEIVED
OCT 11 1963
BBG :hl
OTTAWA

1 GRENVILLE ST., TORONTO 5 ● 923-0921

Broadcasting Station

CHFI-FM

CHFI-AM

Toronto / Empire 3-1317

13 Adelaide St. East

October 11th, 1963.

The Chairman and Members,
Board of Broadcast Governors,
48 Rideau Street,
Ottawa, Ontario.

Gentlemen:

On the agenda for your public hearing to be held this month is the application of Rogers Broadcasting Limited to establish a new night-time AM radio station on the frequency of 680 Kc/s with a power of 10,000 watts.

This application was made to the Department of Transport on March 14, 1963. The matter was duly referred to your Board and was heard on June 7, 1963. On the same day an application by Souwesto Broadcasters Limited (the licensee of station CHLO, St. Thomas, Ontario) for authority to change from 680 Kc/s to 1410 Kc/s was also heard. To some extent the two applications were coupled, as it had been the hope of Rogers Broadcasting Limited that it would subsequently be able to apply for the frequency of 680 Kc/s full time in Toronto.

Your recommendation with respect to the application of Souwesto Broadcasters Limited was not accepted by the Honourable the Minister of Transport, and that Company subsequently withdrew its application for a change in facilities. There is therefore no present possibility of the frequency of 680 Kc/s being available for full time use in the Toronto area.

Your Board reserved its decision with respect to the application of Rogers Broadcasting Limited, giving as its reason the desirability of providing an opportunity for the filing of applications for the use of 680 Kc/s on a full time day and night basis. This reason is no longer valid. It was also stated that "the Board is not prepared to hear applications for the use of 680 Kc/s on a full time day and night basis earlier than its first

. . . 2

hearings in 1964". No such application can now be made by anyone. Rogers Broadcasting Limited is therefore proceeding at this time with the application which was filed on March 14, 1963 for the use of 680 Kc/s night-time only.

A substantial amount of material is already in your hands with respect to this application. Not only has the formal application with supporting documents been referred to you, but a communication with additional detail was addressed to you on May 24, 1963 and you have recently received a binder containing copies of a number of letters evidencing local support for this application. Without wishing to be repetitious, it is felt that it would be of assistance to you in understanding fully the pending application if a brief statement of certain of its salient points was now submitted to you in writing prior to the forthcoming public hearing.

You are well aware of the history of service rendered to the public by CHFI-FM. You are equally aware of the fact that no FM station which endeavours to provide a complete program service is self-supporting. Invariably such FM stations are supported by related AM stations.

Our President, Mr. Edward S. Rogers, is dedicated to the futherance of the development of FM in Canada. He is Chairman of the FM committee of the Canadian Association of Broadcasters, has submitted many suggestions in connection with the proposed FM regulations, and is seeking to establish the first private FM network in Canada.

The many improvements which Mr. Rogers caused to be made to CHFI-FM increased greatly the acceptance of this station by the public, and placed it in the front rank of broadcasting stations in Canada. To support this development and make possible further advances a sound economic base is vital. Consideration was therefore given to applying for an AM licence which would stabilize the fortunes of the FM operation and provide the essential financial base.

It is not easy to locate an available frequency in the Toronto area. Extensive and expensive research revealed in 1961 that the frequency of 1540 Kc/s would provide a good signal in the Toronto area during daylight hours. At that time our engineering consultants were unable to formulate any recommendation with respect to night-time coverage. The urgency of the situation was such that CHFI applied for the use of 1540 Kc/s day-time only, and this application was approved by your Board with the comment that -

> "In the opinion of the Board, the proposed new AM radio station will provide a satisfactory service to listeners in the area and will support the FM service provided by CHFI-FM."

The Honourable the Minister of Transport approved this recommendation, and CHFI commenced to broadcast in August 1962 during daylight hours on 1540 Kc/s.

Although this extension of service alleviated to some extent the problems faced by Rogers Broadcasting Limited, it by no means solved them. The fact that the hours of sign-on and sign-off varied from month to month was disturbing to our listeners. The maintenance of the stations' policy of a limited number of commercials in each hour of broadcasting meant that during the winter months the number of combined AM - FM availabilities was sharply reduced. The most remunerative hours from a revenue standpoint for an AM broadcasting station are from 6:00 a.m. to 9:00 a.m. During the peak listening and advertising months of the year, CHFI was silent for a substantial part of this period.

Mr. Rogers therefore caused the consulting engineers to continue their research. As the Board knows, it had been hoped that a frequency would be found which was available full time day and night, and thereby enable the foregoing problems to be most easily resolved. This is not presently possible, and our advisers inform us that the only suitable and available night-time frequency is that of 680 Kc/s.

It is not suggested that the desired allocation of 680 Kc/s night-time only will provide the ideal answer. It is, however, the only frequency--for either day or night use--that is available in the Toronto area, and its allocation to CHFI is the only possible way in which the present situation may be improved. By such allocation the use of the frequency is ensured for Canada and further American encroachment is halted.

At the present time it is necessary for our listeners at sunset to re-tune their receivers, as it is at this varying time of the day that CHFI vacates 1540 Kc/s. With the allocation of 680 Kc/s to CHFI it will be possible for our considerable day-time audience (12.6 per cent of the total number of sets in use) to continue to receive the type of programming that they prefer by switching to a known frequency on the AM band. This would also mean that their sets in the winter months would in the mornings be already tuned to the frequency which would then be occupied by CHFI.

It must never be forgotten that a night-time station may be on the air in the early morning as well as during the evening. This application is designed to make available to our AM listeners a morning service which is presently not available to them. There will also be the consequential and most important result that these morning hours will be available for advertisers, thereby enabling the revenues of the station to be somewhat increased.

. . . 4

The present operation of CHFI-FM and CHFI day-time only cannot be maintained indefinitely if the present policy of limited commercials is to be continued. The combined disability of limited commercials and limited hours of simulcasting is too great a handicap. CHFI can make ends meet if it can provide 125 combined commercial availabilities each day. With the stations' policy of limiting availabilities to eight per hour--with four breaks only--it can be seen that a full broadcast day of some eighteen hours is required.

The situation facing CHFI is somewhat analagous to the situation which faced radio station CFRG in Gravelbourg, Saskatchewan, in 1955. That station was providing a unique service to southern Saskatchewan, and for technical and financial reasons was not able to utilize the same frequency on a full time day and night basis. In order to make available its unique services to the listeners in its area and to improve its economic condition it was necessary for it to employ different frequencies day and night. The station has operated in this way for some seven years.

We believe that CHFI provides a unique service in the Toronto area, we cannot utilize the same frequency on a full time day and night basis, and we wish to furnish a service to the listening public that is not now available on AM. At the same time, it is imperative--if the policy of limited commercials is to be maintained--for the economic position of the stations to be improved.

If this application is granted, we estimate that our gross revenues will increase by approximately $100,000 per year. Any increase in operating costs will be nominal, but this revenue should enable CHFI to show a modest profit. The following figures showing certain increases in annual costs arising since CHFI commenced broadcasting on 1540 Kc/s will be of interest.

	Already Incurred (70 additional acres of land and second transmitter)	To be Incurred (Towers and Tuning and phasing huts)	Total
Interest	$16,200	$ 9,600	$25,800
Amortisation	27,000	16,000	43,000
Total	$43,200	$25,600	$68,800

Every day-time station that is able to do so wishes to extend its service to a full time basis. If this application is approved CHFI would be the sixth station in this part of Ontario to go full time in as many years. The others are

CHUM	Toronto	1957
CKGM	Richmond Hill	1958
CHOW	Welland	1958
CHIC	Brampton	1963
CHUC	Cobourg	1963

Mr. Rogers is anxious that CHFI and CHFI-FM should program separately as soon as possible, particularly during the evening hours. A commitment of an average of 21 hours per week of separate programming on the two stations by the end of the first year of full time AM service has therefore been given, increasing to 50 hours by the end of the fifth year. A substantial part of the separate programming on AM will be designed expressly for the large ethnic audience in the Metropolitan Toronto area.

With this letter you will be receiving a brochure designed to acquaint you with CHFI as it exists to-day, a busy, integrated radio station, employing more than fifty skilled and experienced men and women, that is furnishing to many thousands of listeners a truly modern broadcasting service. For your information we are also sending to you a typical programme schedule, a tear-sheet of the guide published monthly in the magazine Ontario Homes & Living, and one of the very popular stereo listeners' guides. Appended hereto is a coverage map for 680 Kc/s night only, which makes clear the excellent signal that would be available throughout our coverage area.

We trust that this brief summary of certain of the main aspects of this application will be of assistance to you and hope that it will commend itself to you.

Yours sincerely,

Rogers Broadcasting Limited

by John W. Graham

Director.

ENGINEERING BRIEF

FOR

DAY-TIME OPERATION

BY

ROGERS BROADCASTING LIMITED

AT

TORONTO, ONTARIO

Presently Authorized
Operation: 680 kc/s 10 kw DA Night Class II

Proposed Operation:
680 kc/s 1/10 kw DA-2 Class II

Prepared for

Rogers Broadcasting Limited
13 Adelaide Street East
Toronto, Ontario

Prepared by

Canadian General Electric Company Limited
Electronic and Defence Products Department
Toronto, Canada

April 1964

Section 1 - GENERAL

1.1 Purpose of Brief

This brief is prepared to support the application of Rogers Broadcasting Limited for a proposed 1 Kw day-time operation to extend the presently authorized 10 Kw night-time only 680 Kc/s frequency to full-time operation on the same frequency.

1.2 Purpose of Change

The proposed change will allow the applicant to give full-time service on the frequency of 680 Kc/s with the addition of the proposed 1 Kw day-time pattern.

1.3 Engineers Responsible for Brief

R. B. Sandberg	- Mr. Sandberg's qualifications are on file with the Department of Transport.
W. E. Wright	- Mr. Wright is a Broadcast Consultant recognized by the Department of Transport.

1.4 Proposed Location of Station

The 680 Kc/s night-time transmitter site is suitable for the proposed operation. Its coordinates are:

North Latitude	43°	35'	27"
West Longitude	79°	39'	14"

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

2.11 Frequency

It is proposed to use the approved night-time frequency of 680 Kc/s.

2.12 Groundwave Interference

The possibility of groundwave interference to co-channel and adjacent channel stations was investigated and the results are shown in section 6.1. The station considered are:

Station	Class	Power	Freq.	Location
CHLO	II	1 kw	680	St. Thomas, Ont.
WRVM	II	250 watts	680	Rochester, N.Y.
WISR	II	250 watts	680	Butler, Penn.
WINR	II	1/0.5 kw	680	Binghampton, N.Y.

In calculating the protection to station WRVM the southern shore of Lake Ontario was taken for the International Boundary.

2.2 Harmonic Interference

There are no stations in the area with which a second harmonic relationship exsists, consequently no interference problems are anticipated.

2.3 Oscillator Radiation Interferences

There are no stations in the area with which receiver oscillation interference is anticipated.

2.4 Intermodulation with other Stations

Any possible intermodulation with other stations in the area will be remedied by the applicant.

2.5 Population within the 1 volt/meter Contour

The proposed day-time 1 v/m contour will be located inside the proposed authorized 1 v/m night contour, hence no blanketing problems are anticipated. The applicant agrees to undertake remedial action if required.

2.6 Grounding System and Tower Layout

The tower positions are shown in Section 6.7. It is proposed to use the same nine towers for both day and night operation.

The proposed grounding system will have, in addition to the normal 120 radials per tower, a ground screen at the base of each tower.

2.7 Array Design

The array as designed consists of nine towers with a radiation pattern as shown in Section 6.2 and 6.3. This pattern meets the minimum protection requirements to co-channel stations WRVM Rochester, N.Y. and CHLO St. Thomas, Ont. The radiation in these directions will be kept within the required values by carefull array adjustment as well as by considerations as to the effect of nearby towers and metallic structures. Experience in North America indicates this array is feasible and can be successfully operated.

2.8 DIRECTIONAL ANTE[illegible] DESCRIPTION SHEET

Station: Main Studio: Toronto, Onta[illegible]

Frequency: 680 kc/s Power: 1/10 kw Class: II Notification List No: Date:

Geographical Location of the Antenna System: North Latitude 43° 35' 27"
West Longitude 79° 39' 14"

Antenna Characteristics: Mode of Operation: DA-2 No. of Elements: 9
Type of Elements: Guyed uniform cross section, series fed, no top loading.

Tower	1	2	3	4	5	6	7	8	9
Height above Insulators:	250'(62°)	250'	250'	250'	250'	250'	250'	250'	250'
Overall Height:	254'	254'	254'	254'	254'	254'	254'	254'	254'

Spacing: 886' 886'(220°) 886' 886' 886' 886'

Spacing: No. 1-4-7 (282') 70° No. 2-5-8 282' No. 3-6-9 282'

	1	2	3	4	5	6	7	8	9
Phasing (day):	0°	+25.60°	+51.20°	+241.17°	+266.77°	+292.37°	+122.34°	+147.94°	+173.54°
(night):	0°	+5.00°	+10.00°	-122.00°	-117.00°	-112.00°	-244.00°	-239.00°	-234.00°
Field Ratio (day):	1.000	1.981	1.000	1.983	3.930	1.983	1.000	1.981	1.000
(night):	1.000	1.910	1.000	1.950	3.720	1.950	1.000	1.910	1.000

Orientation: Towers Nos: 1, 2 and 3 bearing 50° west of north
4, 5 and 6 bearing 50° west of north
7, 8 and 9 bearing 50° west of north
1, 4 and 7 and 2, 5 and 8, also 3, 6 and 9 bearing 53° east of true north.

Ground System: 120 Radials of number 10 AWG, soft copper wire, plus a ground screen at each tower. Radials running between towers bonded to number 4 AWG, stranded copper wire. Average length of radials 579' (0.4 λ).

Predicted Effective Field: Day RMS 175 mv/m --- Night RMS 553 mv/m (175 mv/m for 1 kw).

Section 3 - STATION COVERAGE

3.1 Area to be Served by the Station

The maps in Section 6 indicate the extent of the primary service in the Toronto area and the extent of the secondary service as provided by the 0.5 mv/m contour.

The shaded area on the coverage maps (Section 6) shows the area where WRVM's signal is greater than 1/20 of the predicted CHFI signal.

Since the proposed operation has a power of 1 KW and 10 KW is now authorized from the same site (with approximately and same patterns), no violation of Rule 2 on maximum radiation in Broadcast Procedure 1 is anticipated. The minimum urban coverage provided by the 5 mv/m contour, referred to in Rule 2 is also complied with.

3.2 Ground Conductivity

The ground conductivities used to predict coverage were taken from the Final Proof of Performance for CHFI on 1540 Kc/s. For the Toronto area the conductivity used was 8×10^{-14} e.m.u.

Section 4 - SOURCES OF DESIGN INFORMATION

Station lists and recent amendments for Canada (List 184) for U. S. (List 1049) and Cuba, from the Department of Transport were used for a study of channel conditions.

The groundwave propagation curves, Appendix I, Graph 5 of the Standards of Good Engineering Practice were used to determine contour distances. Ground conductivity was taken from the Proof of Performance for station CHFI, Toronto, Ontario. Conductivity in the United States was taken from FCC Figure M3.

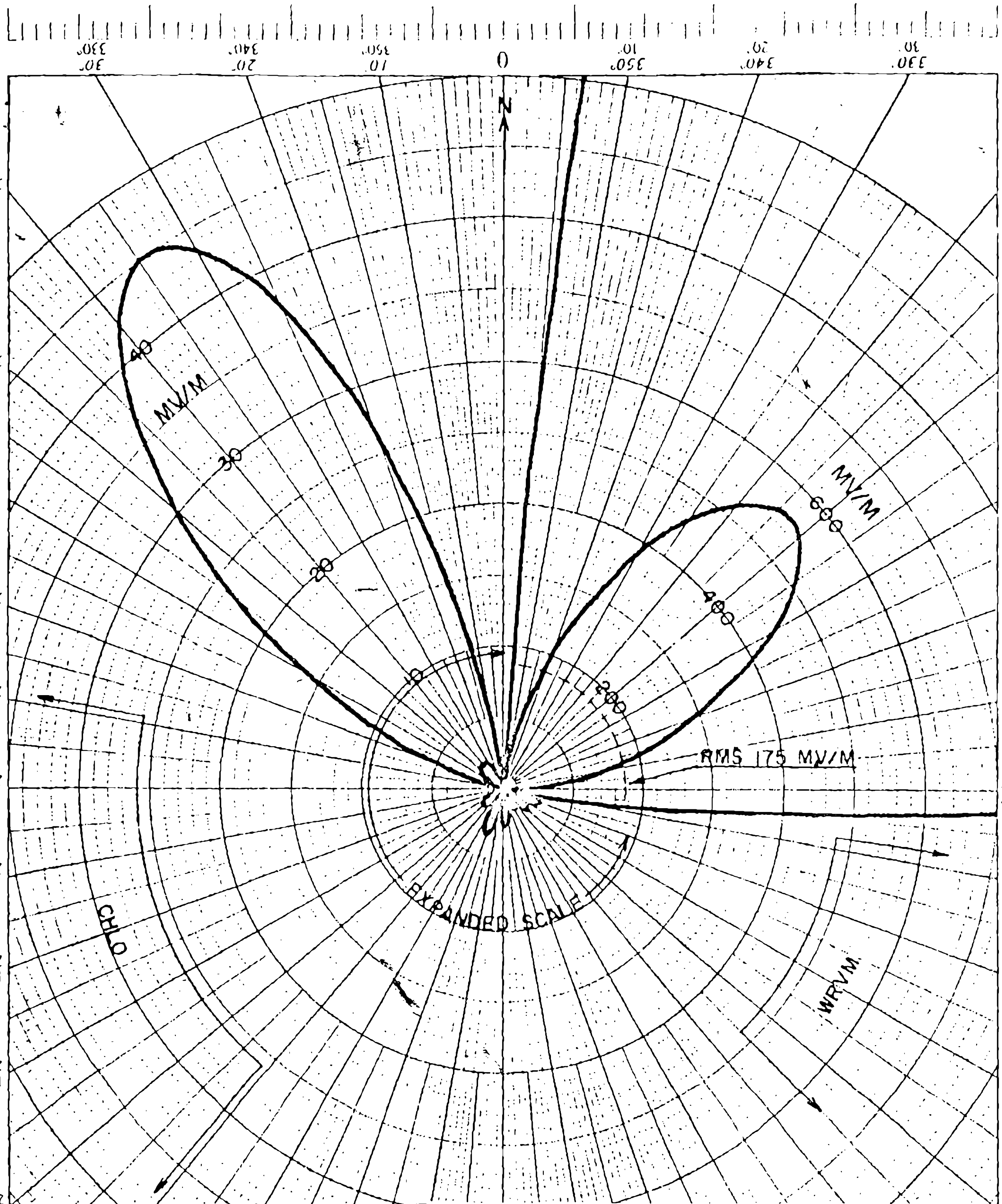
The predicted Effective Field was determined using the curve, Field Intensity for 1 Kilowatt, recently published by the Department of Transport.

Bearings used in the Table of Interference Conditions were determined from a Lambert Conic Projection Map and distances from an Albers Equal Area Projection Map, scale 1/2, 500, 000.

Field measurements were taken to establish the signal strength of station WRVM in Southern Ontario.

Section 5 - ENGINEERING SEAL AND SIGNATURE

W. E. Wright, P. Eng.,
Broadcast Consultant,
Electronic and Defence Products Department,
Canadian General Electric Company Limited.



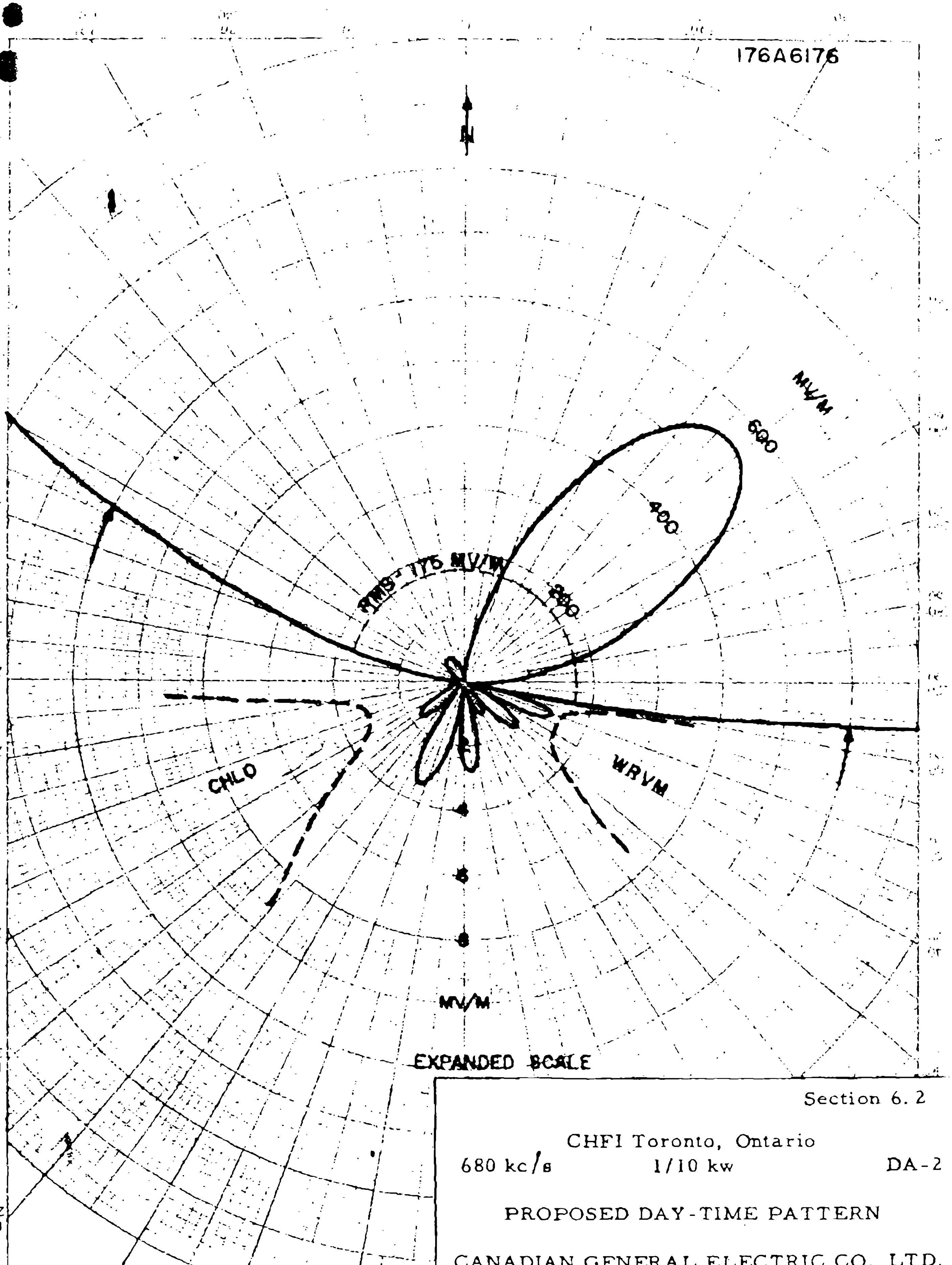
CHFI Toronto, Ontario
680 kc/s 1/10 kw DA-2

Horizontal Day-time Pattern

CANADIAN GENERAL ELECTRIC CO. LTD.
Electronic and Defence Products Department
TORONTO, CANADA

May, 1964 W. E. Wright, P. Eng.

176A6176



Section 6. 2

CHFI Toronto, Ontario

680 kc/s | 1/10 kw | DA-2

PROPOSED DAY-TIME PATTERN

CANADIAN GENERAL ELECTRIC CO. LTD.
Electronic and Defence Products Department
TORONTO, CANADA

ejf | April 1964 | R. B. Sandberg

SCHEDULE 5

Question No. 6

Directors and executive officers of applicant company -

Edward S. Rogers,
Director and President,
Canadian,
3 Frybrook Road,
Toronto 7, Ontario.

John W. Graham,
Director and Secretary,
Canadian,
405 Glenayr Road,
Toronto 10, Ontario.

John B. Lombardi,
Director,
Canadian,
66 Clinton Street,
Toronto 4, Ontario.

Terrence A. Wardrop,
Treasurer,
Canadian,
49 Oriole Gardens,
Toronto 7, Ontario.

April 6, 1964

SCHEDULE 6

Question No. 7

Stocks and bonds held -

(a) By the applicant

Baton Broadcasting Limited	$ 61,325 Series "B" Debentures
Baton Broadcasting Limited	$ 79,275 Series "D" Debentures

(b) By Mr. Edward S. Rogers

Baton Broadcasting Limited	135 common shares with a par value of $1.00 each
Standard Radio Limited	500 common shares without par value.

April 6, 1964

Question No. 18.

Since 1957 CHFI has been known as Canada's pioneer FM station, and its primary objective remains the growth and increased popularity of FM radio in Canada. To strengthen the base for this growth CHFI has operated during day-light hours since 1962 on 1540 Kc/s with a power of 50 Kws. During these varying hours, a consistent and fine signal has been available throughout a large part of Southern Ontario, though the reception of the signal in the built-up areas of Metropolitan Toronto itself has left much to be desired.

On January 3, 1964 the Honourable the Minister of Transport, following a favourable recommendation from the Board of Broadcast Governors, authorized CHFI to construct a night-time operation on 680 Kc/s with a power of 10 Kws. It is anticipated that this night-time service will be satisfactory within Metropolitan Toronto, but that it will not provide the broad regional coverage available in day-light hours on 1540 Kc/s.

This application is designed to provide a comparable day-time signal on 680 Kc/s to that presently authorized for night-time use on 680 Kc/s. For technical reasons it is presently impossible to provide a broader geographical coverage on this frequency either day or night. If approved, this application will result in the listening public of Metropolitan Toronto having made available to it a consistent day night service of fine music and limited commercials on 680 Kc/s. The existing day-time regional coverage on 1540 Kc/s would, of course, continue.

It is well known that the availability of AM frequencies in Toronto is very limited - if not non-existent. It is for this reason that the presently authorized split frequency operation was sanctioned. While this is substantially better than to deny the AM listeners of Metropolitan Toronto the opportunity to listen round-the-clock to the quality broadcasting of CHFI, it is obviously not an ideal answer. This application is designed to mitigate the situation.

Another point is of significance. There is presently operating from Rochester, New York, on 680 Kc/s a day-time station with a power of 250 Watts. In the absence of a successful result to this application, it would be possible for WRVM Rochester to increase power and thereby preclude for all time, a Canadian day-time use of 680 Kc/s in this part of Southern Ontario.

Further technical advances are hoped for, and CHFI is striving mightily to accelerate them and then realize upon them. Until better results on 680 Kc/s can be achieved, the use of 1540 Kc/s day-time, with its broad regional coverage, should continue. To suggest otherwise, would be to deprive hundreds of thousands of Canadians of a service that they are presently enjoying, and which is unique to them.

It is the view of the applicant that this application is in the public interest. It would provide improved service to more than one million Canadians, would not affect adversely any other broadcaster, would strengthen the base for the FM operations - present and planned - of CHFI, and would secure for Canada the use of a frequency presently unused in the Toronto area - which frequency could easily be denied to Canada for all time for day-time use in this populous area.

April 6, 1964

Broadcasting Station

CHFI-FM

Toronto / Empire 8-1317

13 Adelaide St. East

30th April 1964.

7825

F. G. Nixon, Esq.,
Director,
Telecommunications and Electronics Branch,
Department of Transport,
No. 3 Temporary Building,
OTTAWA, Ontario.

<u>Attention - W. A. Caton, Esq.</u>

Dear Sir:

Rogers Broadcasting Limited, which is licensed to operate a night-time only service on 680 Kc/s, has applied for an extension of these facilities to enable it to transmit on the same frequency during day-light hours. To assist you in your review of this Application, the following points may be deemed relevant.

1) This is an Application by an existing Licensee for an extension of facilities.

2) The 10 mv/m day-time contour encloses more than the entire Metropolitan area. In fact, the 15 mv/m contour encloses not less than seventy-five per cent of the entire area.

3) The 5 mv/m day-time contour is almost co-extensive with the night-time limit on 680 Kc/s. It is estimated that 1,700,000 people reside within this 5 mv/m contour, and they will receive a good day-time service. Of this number, 1,650,000 reside within the existing night-time limitation and will receive a good night-time service. For them the granting of this Application will improve substantially the overall situation by providing a consistent

2

day-night signal on 680 Kc/s, and by eliminating completely the necessity of switching twice daily from 1540 Kc/s. to 680 Kc/s. at varying hours.

4) The 25 mv/m contour encloses a substantial portion of the Metropolitan area presently used for industrial purposes. Co-channel limitations render the area enclosed within the 25 mv/m contour as large as is practicable. Persons residing within the industrial areas outside the 25 mv/m contour will continue to receive a good signal on 1540 Kc/s.

5) A study of the coverage maps of Stations CKFH, CHUM, CKEY, CFRB, CBL and CJBC reveals that none of them encloses the entire Metropolitan area within its 25 mv/m contour.

6) The night-time transmitting facilities requiring the use of nine towers, necessitated the purchase of a further seventy acres of land, and involve a total expenditure of approximately $400,000.00. The extension of facilities presently being applied for may be completed at infinitely less cost than any other applicant would be required to spend to utilize this day-time frequency. The desired extension would strengthen greatly the economic base of the entire AM operation of the applicant, thereby enabling the continuance of the high standard of broadcasting presently available on CHFI-FM.

7) The applicant has left no stone unturned in its effort to provide a consistent service to the large number of listeners in the Metropolitan Toronto area. Certain of the technical implications of the successful applications of CKFH, Toronto, and CFMB, Montreal, have been studied.

8) The proposed service will afford the best possible service to the Metropolitan Toronto area. More usually a day-time station applies for a night-time authority, and in such cases some latitude from the ideal is normally permitted. This case is the reverse, as in this case it is a night-time station applying for a day-time authority.

9) 680 Kc/s. is presently available for use in the Toronto area under NARBA. How long this condition will continue to exist is unknown.

For your assistance, I enclose:

1) A copy of the most recent land use map prepared for the Metropolitan Toronto Planning Area, with the political boundaries of Metropolitan Toronto outlined in red and various contours shown in black.

2) Three copies of a new coverage map which shows the 10 mv/m contour in addition to the normal contours.

3) Two photostats of a certification by McDonald Research Limited giving population figures enclosed by various contours to illustrate in particular that the 5 mv/m day-time contour is almost co-extensive with the night-time limit on 680 Kc/s.

It is submitted that the public interest will be well served by this Application, and that it merits favourable consideration. Any further information which we can supply and which may be of assistance to you and your colleagues will be gladly furnished on request.

Yours sincerely,

Edw S Rogers

President
ROGERS BROADCASTING LIMITED

ESR*mo
Encls.

c.c. - John W. Graham, Esq., Q.C.

400. CHF1-9
07. [illegible] June/64

OWNED & OPERATED BY SHOREACRES
BROADCASTING COMPANY LIMITED

CKEY RADIO 59

247 DAVENPORT ROAD, TORONTO 5,
ONTARIO, TELEPHONE WALNUT 5-3111

June 1st, 1964.

26

Dr. Andrew Stewart,
Chairman,
Board of Broadcast Governors,
48 Rideau Street,
OTTAWA Ontario.

Dear Dr. Stewart:

With regard to the application by Rogers Broadcasting Ltd. at the up-coming Hearings of the Board of Broadcast Governors in June, this letter will indicate that there is no opposition to the CHFI application by Shoreacres Broadcasting Company Limited. This is consistent with our publicly stated policy and position in matters of this kind.

I should also like to make clear that this letter is not to be construed as support of the application, however.

Respectfully yours,

D. C. Trowell

D. C. Trowell,
Vice-President & General Manager.

DCT/AA

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460-CHFI-9
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Toronto Dial
1090 • 277-9101

CHIC RADIO LIMITED

790 AM • 102-1 FM

EXECUTIVE OFFICES • 340 Main St. N., Brampton, Ontario
Phones: Brampton: 451-3110 • 451-3111
Serving the "Heartland of the Golden Horseshoe"

June 2, 1964

Mr. W.D. Mills,
Secretary,
The Board of Broadcast Governors,
48 Rideau Street,
OTTAWA, Ontario.

Dear Mr. Mills:

RE: Application by CHFI (Rogers Broadcasting Ltd) for use of 680 Kc/s Daytime at 1,000 watts power.

Would you be so kind as to pass along to the members of the Board of Broadcast Governors our re-actions to this application by Rogers Broadcasting Limited?

CHIC Radio has received an opinion from its consulting engineer about the possibility of any adverse effects resulting from any move, daytime, to 680 kilocycles by CHFI and while, technically, there should be no adverse results on our operation, there is a possibility that CHFI's transmitter, located in the heart of our basic coverage area, could cause us problems - particularly in the Cooksville, Port Credit, Streetsville regions in which we are considered by many people to be their "local" station. We provide daily news coverage of events in these and other lakeshore regions as well as extensive publicity for their public service etc., organizations.

At the moment, there are times when CHFI's transmitter, located adjacent to Cooksville, causes interference with our signal on 790 kilocycles. This interference is often quite serious on 800 kilocycles spreading over into our 790 frequency and, while we have complained to the Department of Transport's local monitoring stations, nothing seems to have been done about it. This interference is particularly serious to us since, by terms of our license, we have to limit the signal strength distributed by CHIC in the Cooksville-Port Credit-Lakeshore regions and any invasion of that signal by another station creates a real reception problem for our listeners.

While we hope any move by CHFI - a Toronto station - would not create

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interference with our signal in these basic coverage areas, we would like, at this time to go on record as wishing to have positive assurances from CHFI (Rogers Broadcasting Limited) that, should any interference be caused CHIC Radio's signal in the Cooksville-Port Credit-Streetsville region, as a result of any move and daytime broadcasting by CHFI on 680 kilocycles, CHFI would take any and all actions necessary to eliminate such interference.

No doubt such assurances have already been given to the Department of Transport by CHFI - but we would like to know, publicly, that CHFI is prepared to assure the Board of Broadcast Governors - and through the BBG - ourselves - that we can depend on such protection for our signal in the areas mentioned.

Thank you for making our views on this matter known. The points raised herein are matters of urgent concern to us.

Yours very truly,

Bruce McLeod

Bruce McLeod,
Vice-President & General Manager

Broadcasting Station

CHFI-FM

Toronto / Empire 3-1317

13 Adelaide St. East

June 4th, 1964.

The Chairman and Members of the
Board of Broadcast Governors,
48 Rideau Street,
Ottawa, Ontario.

Dr. Stewart, Mrs. Sweetman and Gentlemen:

To be heard by you at the Public Hearing commencing on June 16, 1964, is an Application by Rogers Broadcasting Limited for authority to change the facilities of a night-time only AM radio station which has been authorized on 680 Kc/s. with a power of 10,000 watts to a day-night station with powers of 1,000 watts and 10,000 watts respectively. The purpose of this letter is to furnish to you in advance of the Hearing certain facts which may help to explain its context and purpose.

Rogers Broadcasting Limited is the licensee of Canada's pioneer FM station, CHFI-FM. This station for twenty hours each day furnishes to a substantial audience in Southern Ontario balanced programming including good music in stereophonic sound, responsible news and adult commentary, and it observes a rigid policy of limited commercials, uses the finest of equipment, and the Company prides itself on fulfilling or exceeding every commitment it has ever made to you. You have received recently a summary of our commitments on both AM and FM, and how we have honoured them. No station in Canada has done more to popularize the FM medium nor to expand the public appetite for Good Music programming. No Canadian FM station is a commercial success, and CHFI-FM is no exception.

In 1962 The Honourable the Minister of Transport on the favourable recommendation of the Board of Broadcast Governors licensed Rogers Broadcasting Limited to operate station CHFI on 1540 Kc/s. from dawn to dusk. One of the principal reasons for this grant was to assist in providing a sound economic base for the FM operation. At that time it appeared that 1540 Kc/s. day only was the only AM frequency available in the Toronto area, either day or night. Since August, 1962 CHFI (AM) has broadcast simultaneously with CHFI-FM the latter's music, news and commentary, with limited commercials - only four breaks per hour.

This Applicant has caused a very substantial amount of engineering research to be carried out at very great cost. The broadcast art is constantly evolving and developing, and the impossibility of a few years ago is now the accepted fact. Rogers Broadcasting Limited has left no stone unturned in its effort to provide a consistent and good AM signal to the listeners of CHFI.

In 1963 it became possible to apply for a night-time licence on 680 Kc/s. In recommending the grant of a licence, the Board said:

> "In the development of FM Broadcasting the Board has approved the establishment of joint AM and FM radio stations. In all these cases the FM station is supported by a full-time AM operation. The Board considers that the performance of CHFI-FM in Toronto justifies the granting to it of the same conditions.
>
> Under these circumstances and in view of the fact that no other frequency is presently available for full-time use in Toronto, the Board is prepared to recommend that Rogers Broadcasting Limited be permitted to broadcast on different frequencies day and night. It is unlikely that a similar situation will occur again, and the Board's action in this case should not be considered as a precedent."

CHFI on 1540 Kc/s. provides a wide area coverage of Southern Ontario on a daytime only basis. This large reach is needed to make minority programming economically feasible. CHFI-1540 is the only source of good music and limited commercials on the regular broadcast band to more than 1,000,000 Canadians who live outside the Metropolitan Toronto area.

CHFI on 680 Kc/s. at night with a power of 10,000 watts can only cover Metropolitan Toronto at the present time. This facility requires the 1,700,000 residents of Metropolitan Toronto to re-tune twice daily at different times each month from 1540 Kc/s. to 680 Kc/s. and vice-versa, in accordance with the following schedule:

	Tune from 680 to 1540 "Sunrise"	Tune from 1540 to 680 "Sunset"
Jan.	7:45 am	5:00 pm
Feb.	7:15 am	5:45 pm
Mar.	6:30 am	6:15 pm
Apr.	5:30 am	7:00 pm
May*	6:00 am	8:30 pm
June*	5:30 am	9:00 pm
July*	5:45 am	9:00 pm
Aug.*	6:15 am	8:15 pm
Sept.*	7:00 am	7:30 pm
Oct.*	7:30 am	6:30 pm
Nov.	7:15 am	5:00 pm
Dec.	7:45 am	4:45 pm

*Daylight Time is in effect during these months.
All times shown are local Toronto Time.

CHFI's substantial engineering research has now made feasible a low power 680 Kc/s. day service covering only Metropolitan Toronto. This will provide a continuous and good day/night service to the residents of Metropolitan Toronto on one frequency and would eliminate completely the split frequency situation as only these Canadians can receive 680 Kc/s. at night from CHFI. The service to the public will be improved greatly, and the inconvenience and annoyance of shifting frequencies will be avoided. These are among the objects of the current Application.

The granting of this Application will permit the CHFI audience in Metropolitan Toronto to tune in to the station on the same frequency at all times of the year in the prime early morning listening time. The early morning period is the top AM radio advertising time. CHFI has been unable to generate enough supporting AM revenues chiefly because of its inability to participate fully in these early morning AM revenues. At present the daytime only AM station is "off-air" for substantial periods, and a split frequency operation is not expected to assist much in this early morning period. The inability of the station to service its regular daytime audience in the early morning period because of its enforced late sign-on is illustrated by the BBM Autumn 1963 survey showing CHFI's share of listening audience:

Share of Audience -	Daytime	- 9 am to 6 pm -	12.5%
Share of Audience -	Early Morning	- 6 am to 9 am -	3.9%

The estimated cost to CHFI of the proposed extension of facilities is much less than would be the cost to a new applicant for 680 Kc/s. on a daytime basis only with a power of 1,000 watts. The required one hundred acres of land are already owned, and the station will have the requisite nine towers and related equipment for the 680 Kc/s. night operation. Any other applicant would be obliged to lay out approximately half-a-million additional dollars.

If 680 Kc/s. is not used by CHFI during daytime hours, this frequency would become unusable for Canadian use in the Toronto area if WRVM, Rochester, N.Y., increased power from its present 250 watts upon the anticipated lifting of the F.C.C. AM freeze this summer. It is submitted that the loss of 680 Kc/s. on a full-time basis in frequency-scarce Metropolitan Toronto would not be in the public interest. Further, such a consequence would be catastrophic to CHFI whose existing investment of $600,000 in this frequency would be severely prejudiced.

The desired extension of facilities would strengthen greatly the economic base of the entire AM

The Chairman and Members of the
Board of Broadcast Governors.

operation of the Applicant over the long term, thereby enabling the continuance of the high standard of broadcasting presently available on CHFI-FM. A favourable recommendation by you is therefore requested.

Rogers Broadcasting Limited has no intention of abandoning its extensive programme of engineering research. It is this Applicant's most sincere hope that it may ultimately be possible to provide a good and consistent day/night service on a single AM frequency to listeners in the entire area of Metropolitan Toronto and its environs. Such a result is necessary to provide adequate long term support to our FM operations. The broadcast art continues to advance, and our future is related to the further broadening of horizons. Until our prime objective can be achieved, we most earnestly request that the present Application be granted, and that our present licence on 1540 Kc/s. be left undisturbed.

. . . .

It has been suggested in some quarters that it would not be in the public interest to permit CHFI to continue its existing service on 1540 Kc/s. Presumably it is thought that the same owner should not hold two AM licences in the same market.

It is important to CHFI to maintain its wide area coverage on 1540 Kc/s. in order to assist economically its good music, minority appeal programming and to enable it to continue to provide the only source of such broadcasting to over 1,000,000 Canadians.

It is submitted that the operation on 1540 Kc/s. would be that of a rebroadcasting AM station whose purpose would be to provide wide coverage. It is felt that this would be a proper use of this frequency within the Board's policy on rebroadcasting AM stations, dated December 11, 1961. It is submitted further that any other course of action would impose a very considerable economic hardship and loss on CHFI and would subtract substantially from the comprehensive and varied program fare now available on 1540 Kc/s. to 1,000,000 Canadians who reside outside the limits of Metropolitan Toronto.

The following points are submitted in this connection for your consideration:

The Chairman and Members of the
Board of Broadcast Governors.

(1) The granting of the 680 Kc/s. daytime extension to CHFI would not represent a "wasteful duplication" of the existing daytime licence on 1540 Kc/s., because no other Canadian can utilize economically this added facility in the Toronto area.

(2) CHFI does not now have, nor will it have, two separate stations with different programming. The same programming will be repeated on 1540 Kc/s., which will serve as a rebroadcasting AM station.

(3) CHFI-1540 is the only source of Good Music, Limited Commercial programming on the regular broadcast band to 1,000,000 Canadians who reside outside Metropolitan Toronto. Such programming is only economic when it serves a wide area and is not feasible on a confined local basis. The other Toronto AM station that appears to appeal most to listeners of similar tastes is CJBC which is going off the air in October. To eliminate both CHFI and CJBC from this rural Southern Ontario area would be to reduce greatly the "comprehensive and varied" programme fare presently available, and to deny such service completely to those Canadians who reside outside Toronto and now seek out and enjoy this type of minority programming.

(4) The CHFI-1540 facilities cost in excess of $200,000, of which not more than half could be recovered if the installation is to be destroyed. This would impose upon Rogers Broadcasting Limited a very substantial monetary penalty for having advanced further in implementing its desire to operate a continuous AM service for Metropolitan Toronto listeners.

(5) CHFI receives approximately one-half of its ratings from outside Toronto. A substantial portion of its ratings and hence of its revenue would be lost for some time at least if 1540 Kc/s. were eliminated. It would take a considerable period to overcome this with increased Toronto audiences.

McDonald Ratings - Breakdown Between Toronto And Outside Metro Average Half Hour Audiences (Mon.-Fri., 6 AM-Midnight)

Date of Rating	Toronto	Outside Toronto	Total	% of Outside Toronto
April 1964	4,428	4,911	9,339	52.5%
January 1964	6,478	5,066	11,544	43.8%
October 1963	6,467	5,975	12,442	48.0%
August 1963	5,467	3,706	9,175	40.3%
May 1963	7,997	5,453	13,450	40.5%
Feb-Mar. 1963	7,033	4,714	11,747	40.2%

The Chairman and Members of the
Board of Broadcast Governors.

(6) To cause the surrender of the 1540 Kc/s. licence would mean a reduction in daytime power from 50,000 watts to 1,000 watts. This would induce at least an interim anxiety among the agencies and sponsors which would in turn cause serious harm to CHFI's competitive position and revenues for at least twelve months.

(7) The FM revenues of CHFI-FM have declined despite the increase in FM penetration due to the subdividing of the audience by the newly licensed competitors and the ruinously low FM rates they are charging. These low rates are only made possible by a high degree of subsidization from their large AM profits. The first new FM competitor undertook to the Board to charge $25.00 per spot, but commenced operations with a $15.00 rate and reduced that to $12.50 when the third commercial FM station went on air last autumn in Toronto. This latter station has even lower rates. As a result, CHFI has had to reduce its own FM rates and because it has refused to increase the number of commercials to compensate for this reduction, CHFI's FM revenue has declined significantly.

(8) CHFI had large operating losses when operating as an FM-only station. If they are not recouped by 1966 the loss carry-forward under The Income Tax Act will expire. If the licence for 1540 Kc/s. is taken from CHFI before the end of its term it will be almost impossible for these FM losses to be recovered.

(9) Each of 1540 Kc/s. and 680 Kc/s. at the present time has serious deficiencies in the Toronto area. The first cannot provide continuous day-night service, while the latter has very sharply restricted coverage. While together not equal to the single frequency extended reach of other Toronto stations, the sum of these two basically uneconomic separate parts does make an economic and practical total interim service for CHFI.

(10) It would seem pointless to require CHFI to surrender its licence for 1540 Kc/s. and demolish the facilities, unless the Board has plans to licence another new Toronto AM station forthwith. In this connection, it is submitted that Toronto is not presently

in a position to support still another new radio competitor. In the past several years, Toronto has had two new separate FM stations (CFRB and CHUM) as well as one new AM station. Some of the Toronto stations, including CHFI, would be harmed if a new Toronto radio station were licensed in the near future.

(11) The Board's policy on rebroadcasting AM stations, dated December 11, 1961, would seem to encompass the continued use by CHFI of 1540 Kc/s. with power of 50,000 watts. The following extracts from the policy statement appear to be apt:

(a) "........the circumstances which might justify a favourable recommendation for a rebroadcasting --- AM station include the substantial use of a frequency to provide wide coverage. ---"

(b) "Where a broadcasting station is not in prospect, and the licensing of a rebroadcasting --- station will not impede further expansion of service, this is a valuable contribution to the development of broadcasting service."

(c) "........(Applicants) have the responsibility to lay down an adequate signal level, so far as possible, over the entire market area, with special attention being given to the principal community."

(12) The Board's policy on rebroadcasting AM stations was implemented in the recommendation announced on November 6, 1963 in the Steinbach-Altona case. This was a similar application for a rebroadcasting AM station to provide the same programming as the original station, and not an application for a new "station" with different programming. Many repeater stations have an overlap of coverage and in this case the Board allowed the same owner a substantial overlap by the two frequencies in the Metropolitan Winnipeg and adjacent rural areas. This rebroadcasting AM station was permitted under the second category of "circumstances which might justify a favourable recommendation for a rebroadcasting ---- AM station", namely that there was "a strong community of interest between the area proposed to

be served and the area receiving service from the parent station". Another similarity to the present Application is noteworthy in that the programming of that applicant was Good Music, and the minority appeal programming was allowed to overlap.

(13) The Application heard by the Board on March 26, 1963, for approval of a proposed change in ownership of stations CFCF and CFCF-FM involved a very different situation. It was not a request for a rebroadcasting AM station with the same programming as is contemplated by the principles outlined in the 1961 policy statement. It was a request for one person to own two AM stations with different programming in the same market. The Application was turned down. The Board in its reasons stated as an exception to the general principle that

> "It is the opinion of the Board that the issue to one party of two licenses to operate in the same medium in a particular market can be justified only where this appears to be necessary to ensure the support of a minority service.....".

This Application by CHFI is to assist in providing the revenue necessary to support its minority FM service. CHFI would not be operating two "stations" as the same programming is proposed for both. As well, no commercial advantage would be conferred by operating on the two frequencies. If any Toronto AM competitor thought otherwise, CHFI would be delighted, with the approval of the Board, to give up 680 Kc/s. and 1540 Kc/s. for such competitor's single frequency.

(14) In the United States, F.C.C. Rule 73.35 does not allow two licences in the same medium to the same owner where there is an overlap of a "substantial" portion of the primary service areas, "except upon a showing that public interest, convenience and necessity will be served through such multiple ownership situation.". It is submitted that the public interest, convenience and necessity will be served well by the granting of the desired extension of facilities on 680 Kc/s. The desired facilities will provide a continuous service for Metropolitan Toronto listeners, and permit the maintenance of the present 1540 Kc/s. facility for the 1,000,000 Canadians

The Chairman and Members of the
Board of Broadcast Governors.

outside the immediate area, who rely upon it for their sole source of Good Music and Limited Commercial programming on the regular broadcast band.

. . . .

Forwarded herewith are reproductions of certain maps, which it is hoped will assist you to visualize the coverages provided by 680 Kc/s. and 1540 Kc/s. They demonstrate clearly how nearly coextensive are the day and night 680 Kc/s. coverages, and how well served would be the public interest by the granting of this Application. We feel that we are making possible the creation of a new public asset - 680 Kc/s. daytime in Toronto, that we have demonstrated that facilities entrusted to us are in good hands, and that we may be counted on to develop this particular facility to its fullest potential in the national interest.

Needless to say, we intend to furnish any further details that may seem desirable at the time of the Public Hearing, and shall be prepared to answer any questions which any of you may wish to put to us.

Yours sincerely,

Edw. S. Rogers

President,
Rogers Broadcasting Limited.

REVISED

ENGINEERING BRIEF

FOR

DAY AND NIGHT-TIME OPERATION

AT

SOUND BROADCASTING STATION CHFI

TORONTO, ONTARIO

Authorized Operation: 680 kc/s 1/10 kw DA-2 Class II

Prepared for

Rogers Broadcasting Limited
13 Adelaide Street East
Toronto, Ontario

Prepared by

Canadian General Electric Company Limited
Electronic and Defence Products Department
Toronto, Canada

January, 1965

Section 1 - GENERAL

1.1 Purpose of Revised Brief

This revised brief is prepared to support the application of Rogers Broadcasting Ltd to change the antenna site and the day and night-time radiation patterns on the presently authorized frequency and power of 680 kc/s 1 kw day and 10 kw night.

1.2 Purpose of Change

The proposed changes will allow the applicant to develop fully the frequency of 680 kc/s. Changes were made necessary by the granting of a Newfoundland assignment after the original filing of the CHFI 680 kc/s 10 kw night brief, and the subsequent change of the Newfoundland transmitter site. The proposed change will also allow the applicant to improve the signal strength to the City of Toronto over that presently authorized in the 1 kw day and 10 kw night-time Engineering Briefs dated April'64 and March 26, 1963 respectively. The proposed change will further allow independent operation of the 680 kc/s frequency from a site removed from the present 1540 kc/s 50 kw day-time station and will not only eliminate diplexing equipment necessary for combined 1540 - 680 kc/s operation but will also reduce the parasitic excitation of nearby hydro towers.

1.3 Engineers Responsible for Brief

R. B. Sandberg	- Mr. Sandberg's qualifications are on file with the Department of Transport.
W.E. Wright	- Mr. Wright's qualifications are known and recognized by the Department of Transport.
J.G. Elder	- Mr. Elder's qualifications are known and recognized by the Department of Transport. Mr. Elder assisted in the preparation of the brief by submitting the attached addendum.

1.4 Proposed Location of Station

For the revised 680 kc/s brief it is proposed to utilize a new transmitter site 0.7 miles south-east of the present site (1540 kc/s site). The co-ordinates of the site are: North Latitude: 43° 34' 48"
West Longitude: 79° 38' 30"

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

2.11 Frequency

It is proposed to utilize the presently authorized frequency of 680 kc/s

2.12 Skywave Interference

The table of co-channel night-time conditions is shown in Section 6.1. The possibility of night-time interference to the Toronto area was considered for the following stations.

Station	Class	Power (KW)	Location
CKGB	11	10	Timmins, Ont.
WNAC	11	50	Boston, Mass
WINR	11	1/0.5	Binghamton, N.Y.
WCBM	11	10/5	Baltimore, Maryland
WPTF	11	50	Raleigh, N.C.
WCTT	11	1	Corbin, Kentucky
CHLO	11	1	St. Thomas, Ont.

The 10% co-channel night-time limitation to CHFI has been established by the 50% RSS rule to be 18.6 mv/m.

2.13 Groundwave Interference

The possibility of groundwave interference co-channel and adjacent channel station was investigated and the results are shown in Section 6.2.

From the results of the study undertaken by G. Elder, and as listed in the Appendix, the measured location of CHLO's 0.5 mv/m contour is not as shown in the Final Proof of Performance but is contracted in the N-E direction as shown. Also the measured conductivity from CHFI in the direction of CHLO's 0.5 mv/m contour is lower than that indicated by using the DOT conductivity maps.

It can be seen that the revised day-time pattern meets all groundwave protection requirements and fully protects the measured location of CHLO's 0.5 mv/m contour.

In Section 6.12 and 6.15 (Addendum) the location of CHLO's 0.5, 1 and 2 mv/m night-time contours as shown. Also shown is the area where CHLO, by an aggreement with CHFI have permitted a night-time enchroachment (area where CHLO's groundwave to groundwave protection ratio is less than 20:1) to the groundwave contours of CHLO. In Section 6.12 the area of enchroachment to CHLO is shown as calculated from the theoretical night-time pattern of CHFI. Since this latter area is calculated, based on the theoretical radiation of the pattern in a suppressed direction, some modification to the size and shape of this area is expected when the pattern is proved in. However, it can be seen that adequate groundwave protection to CHLO's 1 and 2 mv/m night-time contours is provided.

2.2 Permissible Radiation

2.21 Skywave

Radio stations toward which radiation was considered are as follows:

Station	Class	Power (Kw)	Location
KNBR	1-B	50	San Francisco, Calif
WPTF	11	50	Raleigh, N.C.
CHLO	11	1	St. Thomas, Ont
CKGB	11	10	Timmins, Ont
WDBC	11	10/1	Esconska, Mich
CJOB	11	10/2.5	Winnipeg, Man
WNAC	11	50	Boston, Mass
WINR	11	1/0.5	Binghampton, N.Y.
WCTT	11	1	Corkin, Kentucky
KFEQ	11	5	St. Joseph, Missouri
WMPS	11	10/5	Memphis, Tenn.
WCAW	11	10/.25	Charleston, W.V.
WCBM	11	10/5	Baltimore, Maryland
CJCN	11	10	Central Newfoundland

Permissible radiation towards the above stations has been determined from calculations by the 50% RSS rule for limitations to these stations and the results or tabulated in Section 6.1. It will be noted that the proposed radiation to the above stations will not increase the night-time limitation to any of the co-channel stations.

2.22 Groundwave

Radio stations towards which groundwave radiation has considered are as follows.

Station	Class	Power (Kw)	Location
WRVM	II	0.25	Rochester, N.Y.
CHLO	II	1	St. Thomas, Ont.
WISR	II	0.25	Butler Penn.
WINR	II	1/0.5	Binghampton, N.Y.

Permissible radiation to the above assignment has been determined by the equivalent distance method and the results are tabulated in Section 6.2. The table indicates that adequate groundwave protection is provided. (In calculating the protection to station WRVM the southern shore of Lake Ontario was taken for the International Boundary)

2.3 Harmonic Interference

There are no stations in the area with which a second harmonic relationship exists, consequently no interference problems are anticipated.

2.4 Oscillator Radiation Interference

There are no stations in the area with which receiver oscillation interference is anticipated.

2.5 Intermodulation with other Stations

Any possible intermodulation with other stations in the area will be remedied by the applicant.

2.6 Population Within the 1 Volt/meter Contour

It is not anticipated that blanketing will be a problem within the 1 V/meter contour. However, the applicant agrees to take remedial action if required.

2.7 Ground System and Tower Layout

The tower positions for the revised day and night-time patterns are shown in Section 6.13. The proposed ground system will have in addition to the normal 120 radials per tower an elevated 70' diameter counterpoise at the base of each tower. The counterpoises are elevated 9' above ground and consist of 240 radials of #8 AWG hard drawn copper wire. Since the transmitter site comprising 100 acres represents the maximum width physically available it is proposed to use 6' copper ground rods at the extremedies of these radials which are slightly less than 0.25 wavelengths. The effective length of ground system is 0.4λ (579')

2.8 Array Design

Day Pattern

The day pattern, as designed in this revised brief, consists of a nine tower array with a radiation pattern as shown in Section 2.9, 6.3 and 6.4. This pattern has been re-designed from that shown in the April 1964 brief to improve the operation of the array by increased tower spacing and tower height. This pattern meets the protection requirements to all co-channel station including WRVM Rochester N.Y. and CHLO St. Thomas, Ontario.

Since the minimum protection to CHLO and WRVM represents a pattern suppression of less than 2% of the peak horizontal value the radiation in this direction will be kept within the required protection by careful array adjustment as well as by "de-tuning" if necessary nearby towers and metallic strucutures. In addition, special counterpoises at each tower together with custom designed equipment will be utilized to achieve the stability necessary to maintain the pattern. Experience in North America indicates this array is feasible and can be successfully adjusted and operated.

Night Pattern

The night-pattern as designed in this revised brief consists of nine towers with a radiation pattern as shown in Section 2.9 and 6.5. This pattern has been re-designed from that shown in the March 26, 1963 brief to improve the operation of the array by increased tower spacing and tower height. This pattern meets all protection requirements to co-channel stations.

The minimum protection for night-time operation from Section 6.1 and 6.2 is 39.8 mv/m (WNAC). Since this represents a suppression ratio which is not less than 2% of the peak horizontal value no special equipment is considered necessary to maintain the array. However, careful array adjusting as well as "de-tuning" nearby towers may be necessary to achieve the required pattern and protection requirements.

Station: CHFI — Main Studio: Toronto, Ontario

Frequency: 680 kc/s — Power: 1/10 kw — Class: II

Geographical Location: North Latitude 43° 34' 48" West Longitude 79° 38' 30" — Mode Of Operation: DA-2 — No. of Elements: 9

Type of Elements: Guyed uniform cross section, series fed, no top loading

Antenna Characteristics:

Tower :	1	2	3	4	5	6	7	8	9
Height above Insulator:	300' (74.6°)	300'	300'	300'	300'	300'	300'	300'	300'
Overall Height :	309'	309'	309'	309'	309'	309'	309'	309'	309'

Spacing : 886' 886'(220°) 886' 886' 886' 886'

Spacing : No. 1-4-7 (322') 80° No. 2-5-8 322' No. 3-6-9 322'

Tower	1	2	3	4	5	6	7	8	9
Day Pattern:									
Phasing	0°	+25.61°	+51.22°	-104.00°	-78.39°	-52.78°	-203.00°	-177.39°	-151.78°
Field Ratio	1.000	1.981	1.000	2.000	3.962	2.000	1.000	1.981	1.000
Night Pattern:									
Phasing	0°	+6.00°	+10.00°	-111.90°	-105.90°	-101.90°	-219.00°	-213.00°	-209.00°
Field Ratio	1.000	1.910	1.000	1.974	3.770	1.974	1.000	1.910	1.000

Orientation: Towers No's
1, 2 and 3 bearing 50° west of north
4, 5 and 6 bearing 50° west of north
7, 8 and 9 bearing 50° west of north
1, 4 and 7; 2, 5 and 8; and also 3, 6 and 9 bearing 43° east of north

Ground System : 120 Radials of number 10 AWG, soft copper wire plus an elevated counter poise 70' in diameter at each tower. Towers interconnected by a 1-1/2 inch copper strap. Radials running between towers bonded to number 4 AWG, stranded copper wire. Effective length of radials 0.4λ.

Predicted Effective Field: Day RMS 175 mv/m - Night RMS 553 mv/m (175 mv/m for 1 kw)

Section 3 - STATION COVERAGE

3.1 Area to Be Served by the Station

The maps in Section 6 indicate the extent of the signal penetration to Toronto on both day and night patterns and the extent of the signal as provided by the 0.5 and 0.25 mv/m contours. In comparing the field strength contours, with those contained in the approved 1 kw day and 10 kw night briefs (April'64 and March 26, 1963), it can be seen that some increase in signal penetration to Toronto, on both day and night, is obtained. Since the antenna patterns on both day and night have not been basically changed, only modified, (increased tower spacing and slight change in tower orientation) the radiation patterns are essentially unchanged. The resulting coverage as shown by the 0.5 and 0.25 mv/m contours has been re-estimated based on conductivity information obtained by measurements on CBL Toronto and from the Proof of Performance of CBL and CJBC Toronto.

The shaded area on the day-time field strength contours (Section 6) shows the area where CHFI's proposed signal is less than 1/20 of the co-channel WRVM signal. The extent of the WRVM signal in Southern Ontario was established by field strength measurements taken on WRVM between June 28th to July 4th, 1963 and also between October 19th to 23rd, 1964.

3.2 Ground Conductivity

The ground conductivity used to establish the field strength contours in the Toronto area was taken from the Final Proof of Performance for CHFI on 1540 kc/s. For this area the conductivity used was 8×10^{-14} e.m.u. (8 mmhos/m). In estimating the field strength outside the Toronto area, conductivity information was obtained from measurements taken on CBL Toronto (See Addendum) and from the location of the field strength contours of CBL and CJBC Toronto (Final Proof of Performance). The protection to CHLO's groundwave contour, as shown in Section 6.2 was based on the measured conductivity of CBL (740 kc/s) Toronto and the DOT Provisional Ground Conductivity map. For all remaining protections the DOT Provisional Ground Conductivity map and the FCC Figure M3 conductivity map was used.

Section 4 - SOURCES OF DESIGN INFORMATION

Station lists and recent notifications for Canada (List. No. 192) for U.S. (List No. 1089) and Cuba from the Department of Transport were used for study of channel conditions.

The groundwave propogation curves, Appendix 1, Graph 5 of the Standards of Good Engineering Practice were used to determine Contour distances. Ground conductivity was taken from 1) the proof of Performance for station CHFI (1540 kc/s) Toronto, 2) Proof of Performance for CBL and CJBC Toronto 3) Field strength measurements taken on CBL Toronto 4) the DOT Provisional Ground Conductivity Map and 5) the FCC Figure M3 conductivity map.

The predicted Effective Field was determined using the curve, Field Intensity for 1 Kilowatt, recently published by the Department of Transport.

Bearings used in the Table of Interference Conditions were determined from a Lambert Conic Projection Map and distances from an Albers Equal Area Projection Map, scale 1/2, 500,000.

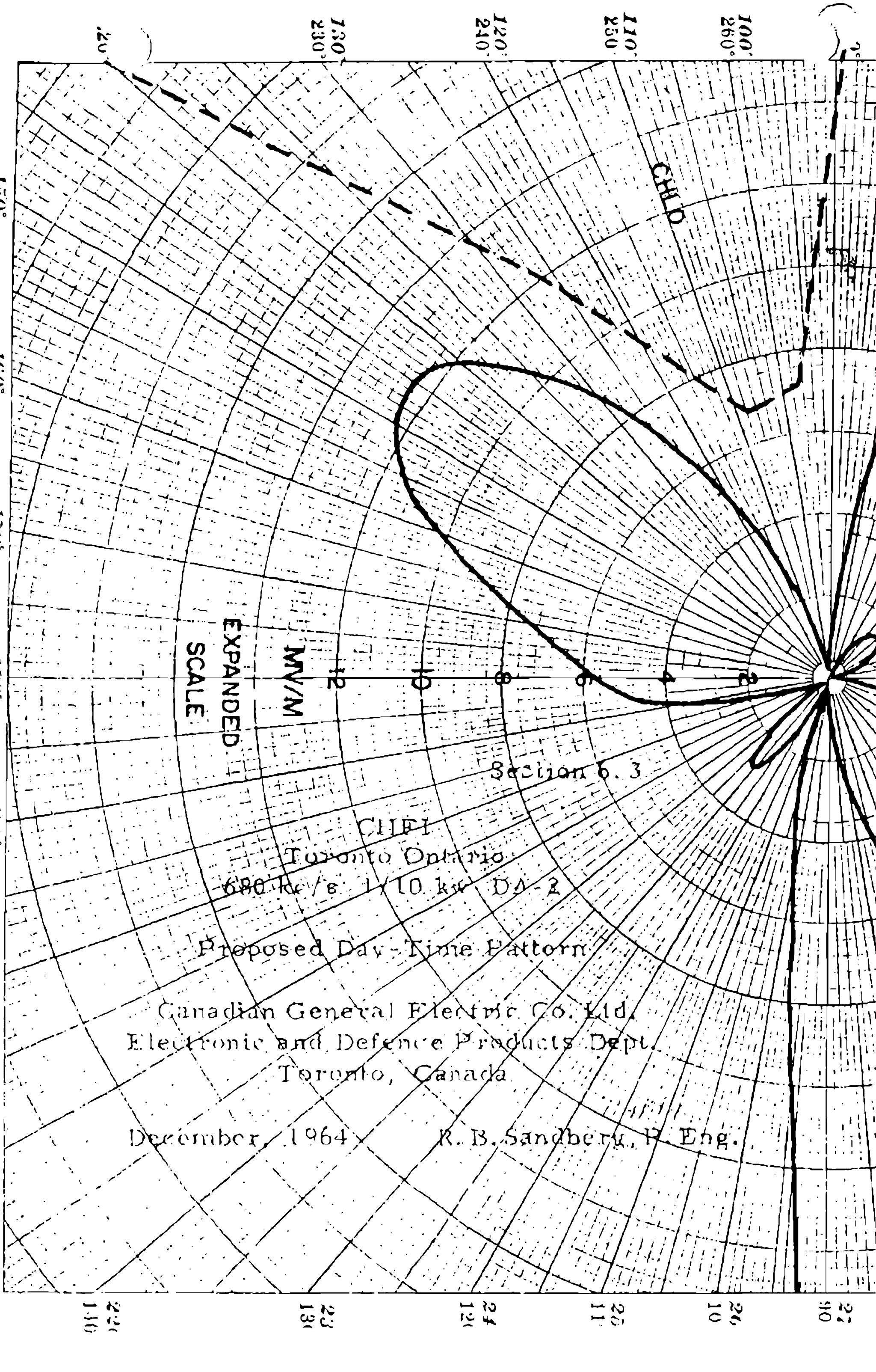
Field measurements were taken to establish the signal strength of station WRVM in Southern Ontario.

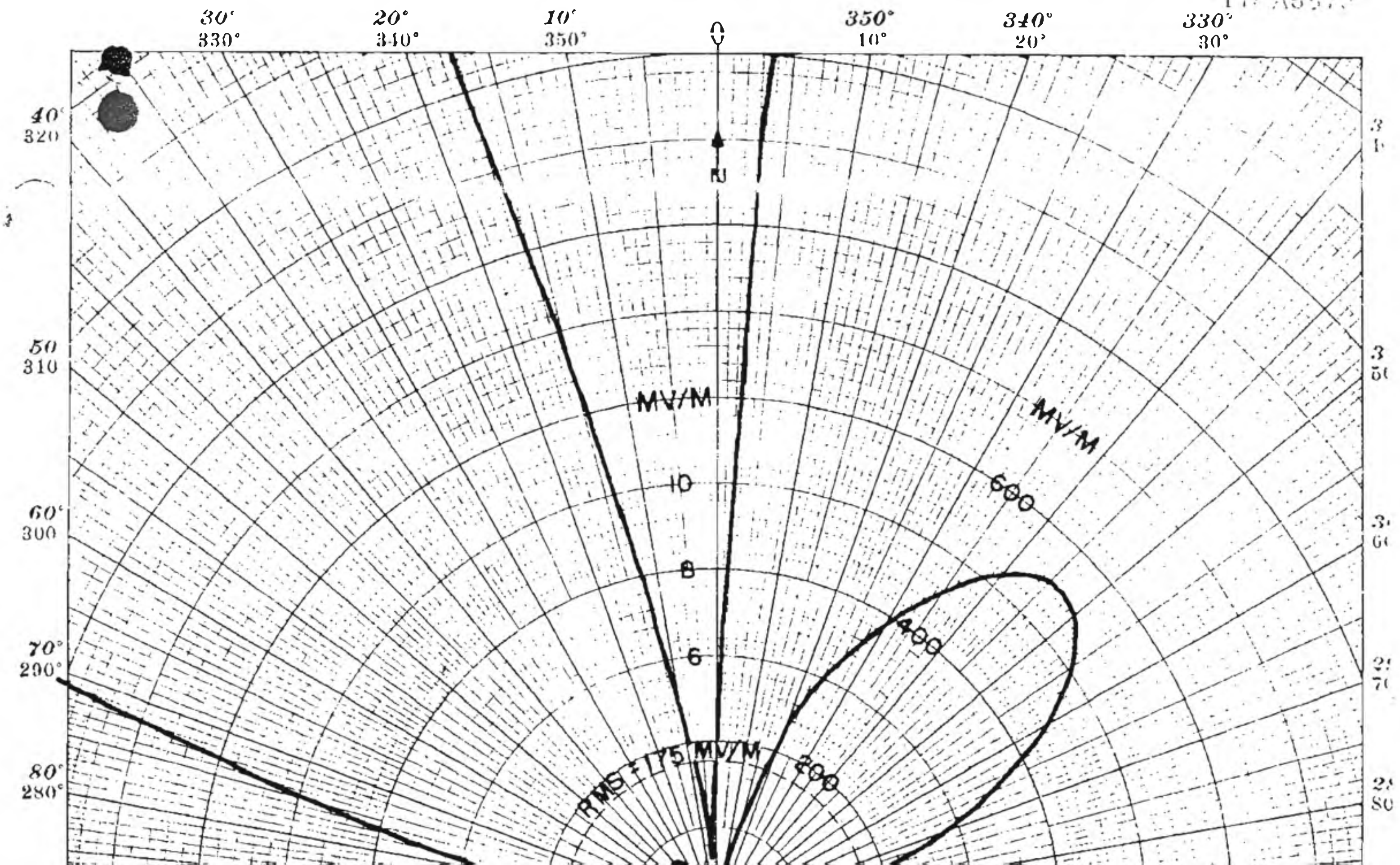
Section 5 - ENGINEERING SEAL AND SIGNATURE

W.E. Wright

W.E. Wright, P.Eng.,
Broadcast Consultant,
Electronic and Defence Products Department
Canadian General Electric Company Limited

M.W.


CHLO
MV/M
EXPANDED SCALE
12
10
8
6
4
2
Section 6.3
CHFI
Toronto Ontario
680 kc/s 1/10 kw DA-2
Proposed Day-Time Pattern
Canadian General Electric Co. Ltd.
Electronic and Defence Products Dept.
Toronto, Canada
December, 1964
R. B. Sandberg, P. Eng.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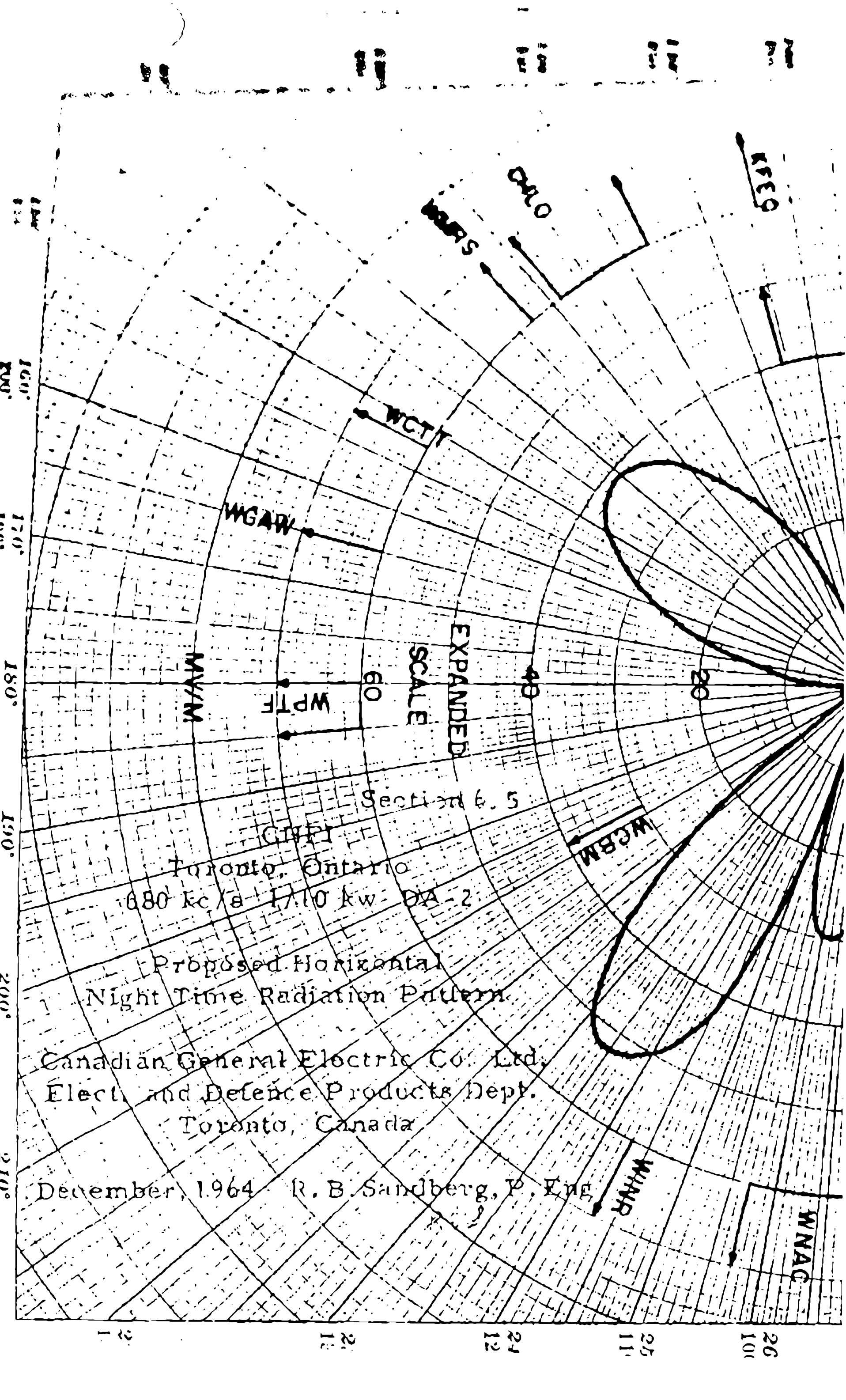
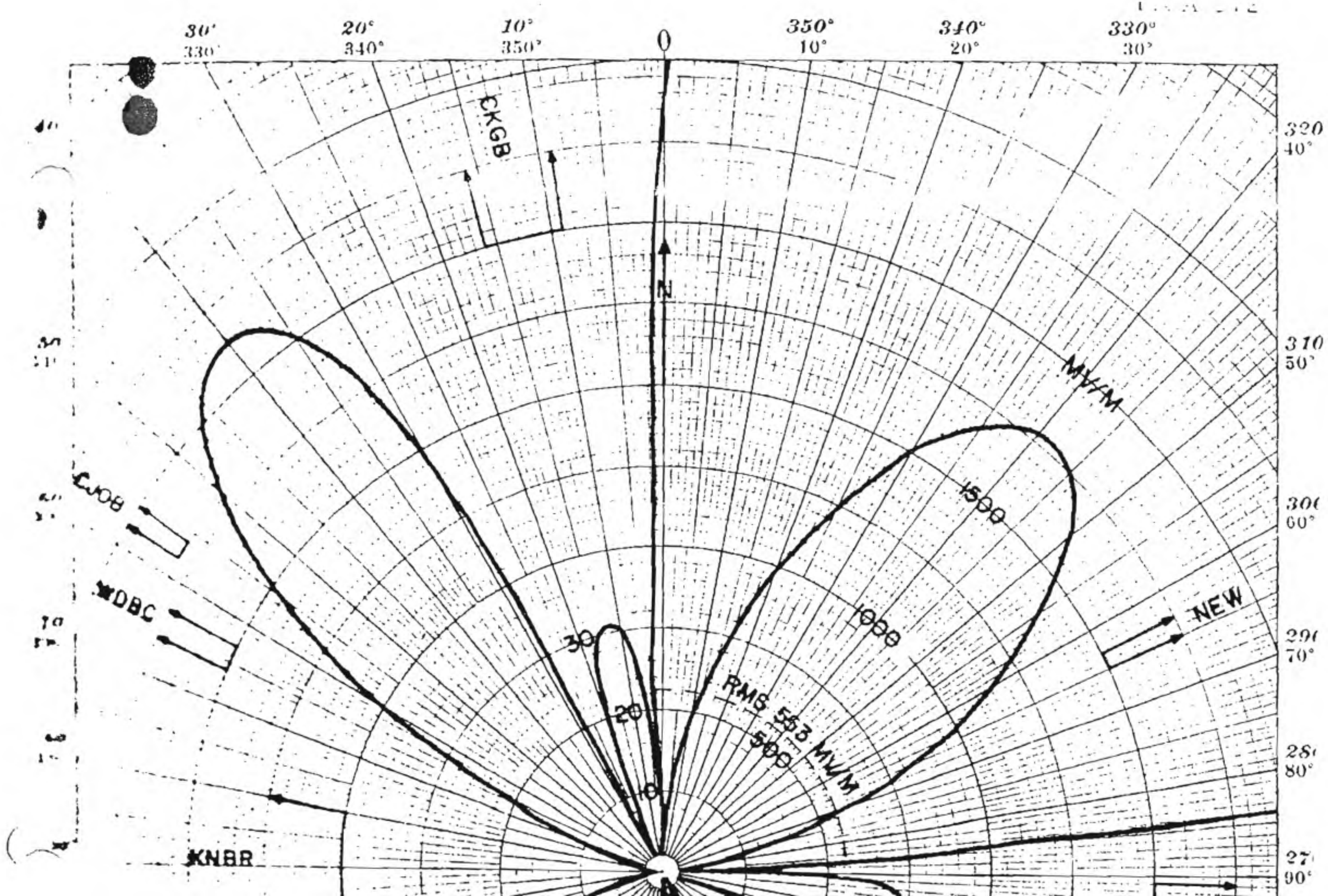
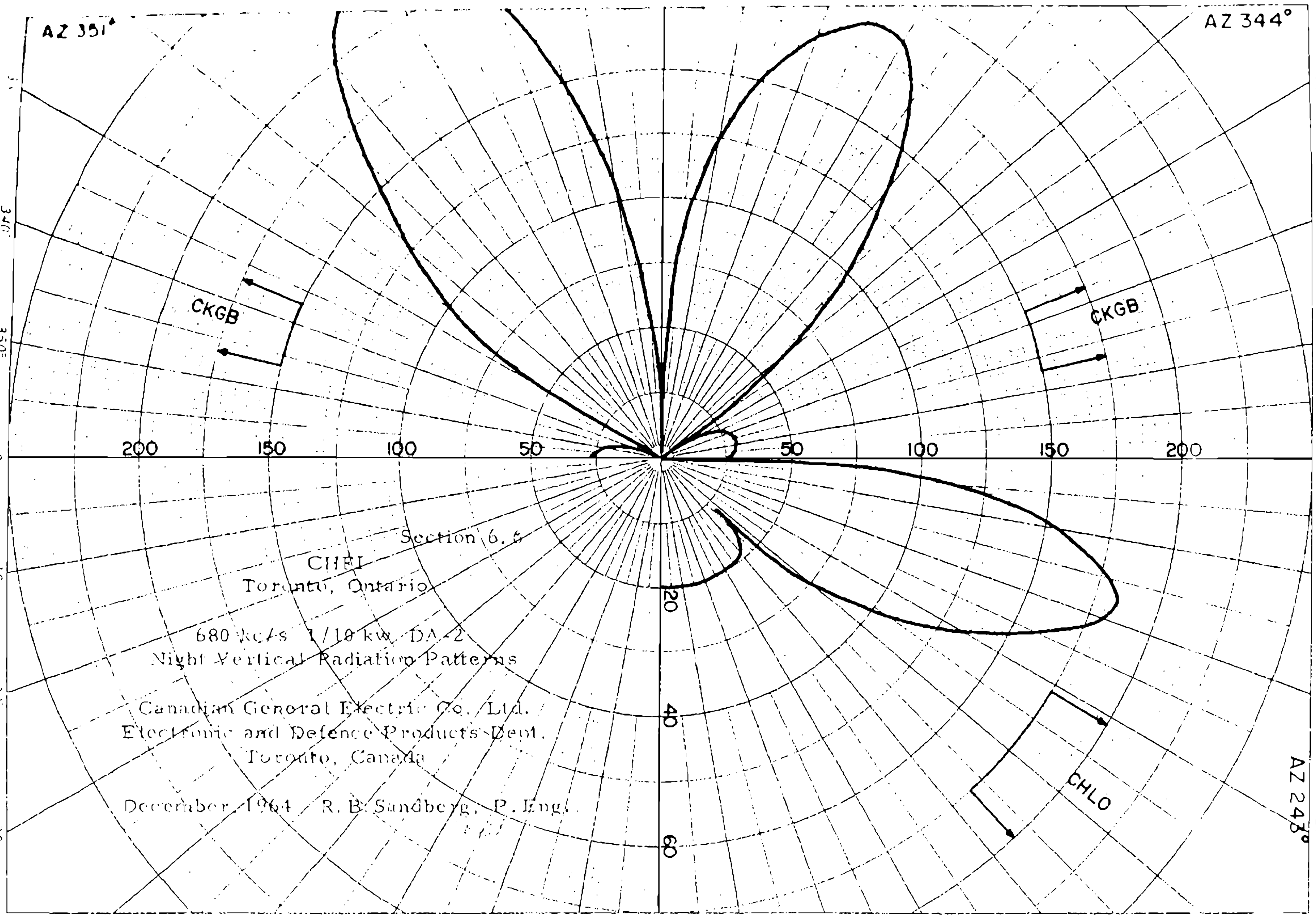
20° 340°
10° 350°
0
350° 10°
340° 20°
330° 30°
40° 320
50 310
60° 300
70° 290°
80° 280°
N
MV/M
10
8
6
RMS = 175 MV/M
MV/M
600
400
200

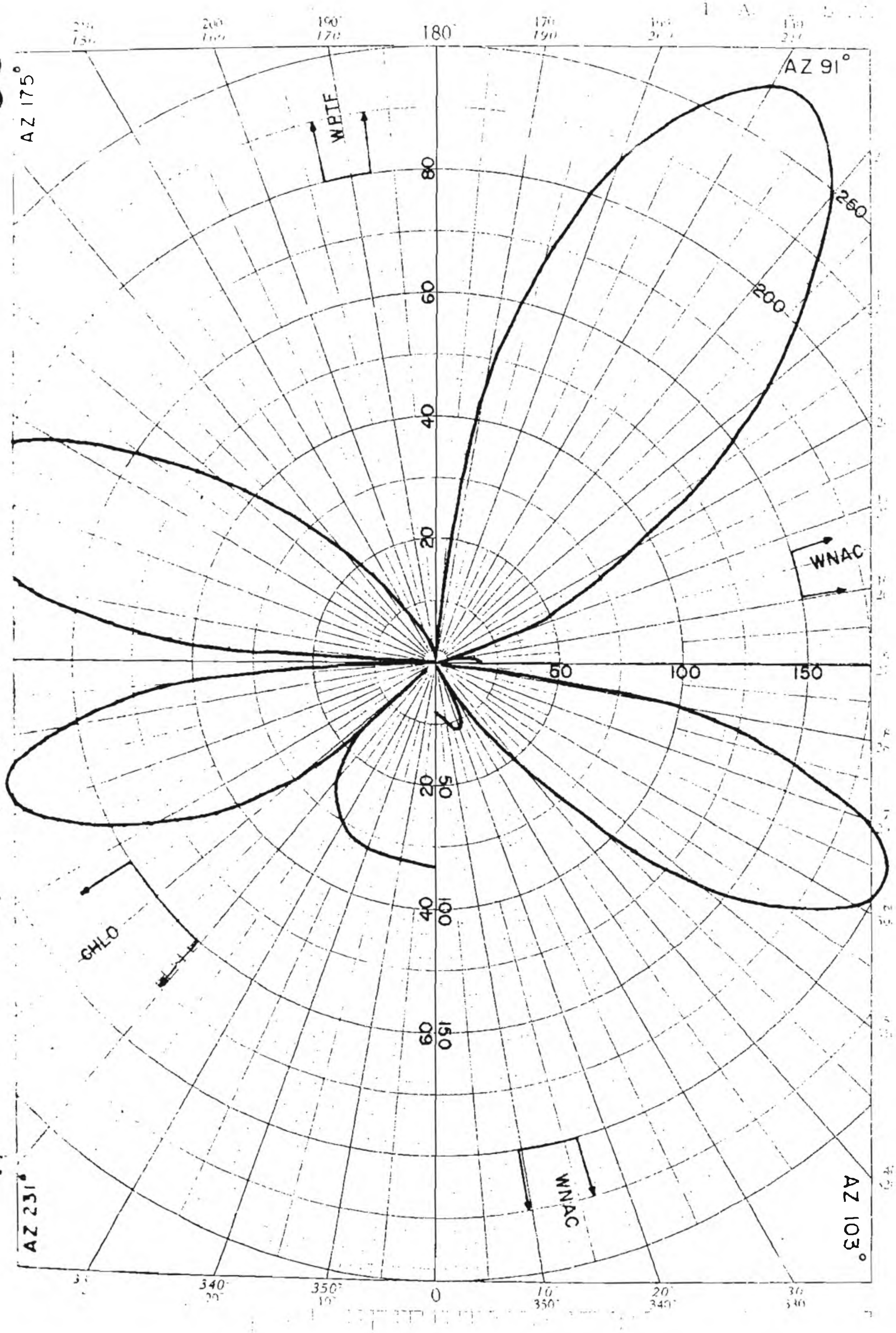

CKLO
KFEQ
WCTT
WGAW
EXPANDED SCALE
MV/M
WPTF
60
40
20
WCBM
WNAC
Section 6.5
CHFI
Toronto, Ontario
680 kc/s 17/10 kw DA-2
Proposed Horizontal
Night Time Radiation Pattern
Canadian General Electric Co. Ltd.
Elect. and Defence Products Dept.
Toronto, Canada
December, 1964 R. B. Sandberg, P. Eng.



30° 330°
20° 340°
10° 350°
0
350° 10°
340° 20°
330° 30°
320 40°
310 50°
300 60°
290 70°
280 80°
270 90°
CKGB
N
MV/M
1500
1000
500
RMS 553 MV/M
30
20
10
CJOB
WDBC
NEW
KNBR



AZ 351°
AZ 344°
AZ 243°
CKGB
CKGB
CHLO
0
180°
200
150
100
50
50
100
150
200
20
40
60
Section 6.6
CHEI
Toronto, Ontario
680 kc/s 1/10 kw DA-2
Night Vertical Radiation Patterns
Canadian General Electric Co. Ltd.
Electronic and Defence Products Dept.
Toronto, Canada
December 1964 R. B. Sandberg, P. Eng.



AZ 175°
AZ 91°
AZ 231°
AZ 103°
WPTF
WNAC
WNAC
CHLO
180°
0
50
100
150
200
250
20
40
60
80
340°
350°
10°
20°

ADDENDUM TO REVISED TECHNICAL BRIEF

1-INTRODUCTION

The investigation detailed in this report was undertaken on behalf of Rogers Broadcasting Limited. It formed part of a study programme concerning revisions to the technical briefs proposing facilities to serve the Toronto area on 680 kc/s. It is being submitted by Canadian General Electric Company Limited as an addendum to their combined and revised brief.

2-OBJECTIVE

The principal objective was to make radial measurements west and south west from station CBL Toronto, 50 kW ND on 740 kc/s. From the data obtained, the groundwave protection requirements to CHLO would be redetermined.

3-PROCEDURE

Measurements were made in unobstructed locations and averaged cluster readings were used. A Nems Clarke 120E field intensity meter was employed - serial # 824. Three radials were measured on true bearings of 214°, 240°± and 260°. CHLO's signal was measured in a number of unobstructed locations.

4-RESULTS

(reference: tables 1 & 2; figures 1 - 4)

The average path conductivity to CHLO's protected contour has a measured value of about three mmhos/m. On this basis a value of four mmhos/m would provide adequate protection. This is also the provisional conductivity map's nominal value over most of the path.

5-PROPOSAL

(a) Daytime

Full protection will be provided to CHLO's measured 0.5 mV/m contour shown on Figure four. Its location is in accordance with the station's final proof of performance except for the minor lobe facing north-east, which agrees with results contained in the 1964 supplementary proof of performance and other measurements included in this report. Shading denotes the area of excessive interference measured from WRVM, which was referred to in the same supplementary proof. The predicted limitation based upon nominal ground conductivities is somewhat greater. On the north-east and south-east minor lobes it is in the range 0.75 to 1.75 mV/m.

CHLO's technical brief predicted a daytime limitation of 1.38 mV/m imposed by WISR, Butler, Pennsylvania. An equivalent analysis was not included for WRVM, Rochester, New York. The dotted line inside the minor lobe facing south-east denotes the present location of CHLO's 0.5 mV/m, based upon radial measurements.

The above points are included for reference only. As previously stated, the final proof 0.5 mV/m contour (solid line) will be protected.

(b) Night Time

The 0.5 mV/m contour of WINR, Binghampton, New York, is protected from groundwave interference in accordance with normal procedures. Figure five illustrates the situation concerning CHLO, St. Thomas. All contour locations are in accordance with CHLO's final proof of performance, except those on the minor lobe facing north-east, which agree with results contained in the 1964 supplementary proof of performance. CHLO's recognized night time service is limited to the area enclosed by the 19.2 mV/m contour, due to cochannel skywave interference. Intermittent service is provided outside this contour, of course. However, it is most unlikely that it would extend as far as the 2.5 mV/m contour, which for long-established stations may be protected under NARBA. Thus the area between the 2.5 and 19.2 mV/m contours is lightly shaded.

It is proposed that CHLO's protected contour will be 1 mV/m except on the minor lobe facing north-east where it will be 2 mV/m. The map therefore includes relevant portions of these contours. The area between them and the 2.5 mV/m contour is moderately shaded. Similarly, between the 0.5 mV/m and the 1 or 2 mV/m contours the map is heavily shaded. This denotes the severe skywave interference in this area.

We respectfully advance the following reasons in support of this aspect of our proposals:

1) there are few if any listeners to be deprived of service;
2) alternative, stronger signals are available in all the affected area;
3) the owners and management of station CHLO concur (reference - their letter of dispensation);
4) it involves no conflict with NARBA;
5) it is a domestic situation within the scope of "Rule 13"
6) in our opinion it represents good allocation engineering practice.

6-<u>ENGINEER'S SEAL & SIGNATURE</u>

This report was prepared by the undersigned whose qualifications are known to the Department of Transport.

REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
J. GORDON ELDER
PROVINCE OF ONTARIO

J. Gordon Elder
----
28 December [illegible]

Private Commercial Broadcasting Station Licence No. 169

LICENCE TO USE RADIO

Issued in accordance with the provisions of the Radio Act, and the Regulations made thereunder.

Rogers Broadcasting Limited,
Suite 801, 250 University Avenue,
Toronto 1, Ont.

is hereby authorized to establish and operate Broadcasting Transmitters at the following locations:

Lat: 43° 34' 48" N. Long: 79° 38' 30" W.

North 1/2 of Lot 19, first Concession north of Dundas Street, Township of Toronto, Peel County, approximately one mile west of Cooksville, near Toronto, Ont.

This licence shall remain in force from the date hereof until the thirty-first day of March, 1971 on payment of the prescribed annual fees and subject to observance of the provisions of the Radio Act, and of the Broadcasting Act, and regulations heretofore or hereafter made under the authority thereof and the conditions contained herein. The transmitter(s) shall be operated so as to comply in all respects with these regulations and during such periods as the Board of Broadcast Governors may prescribe.

The assignment of the frequency or frequencies prescribed in this licence is subject to International and Regional Agreements to which Canada is a party.

No transfer of this licence or of any rights granted herein shall be made by the licensee.

The frequency and power of each transmitter authorized herein shall be as prescribed hereunder.

Call Sign	Frequency	Tolerance	Power (Watts)	Type of Emission
CHFI	680 kc/s	20 cycles	3,500 15,757 ~~1,000~~ and 10,000	10A3

COPY

Original Signed by
F. G. NIXON
for Minister of Transport

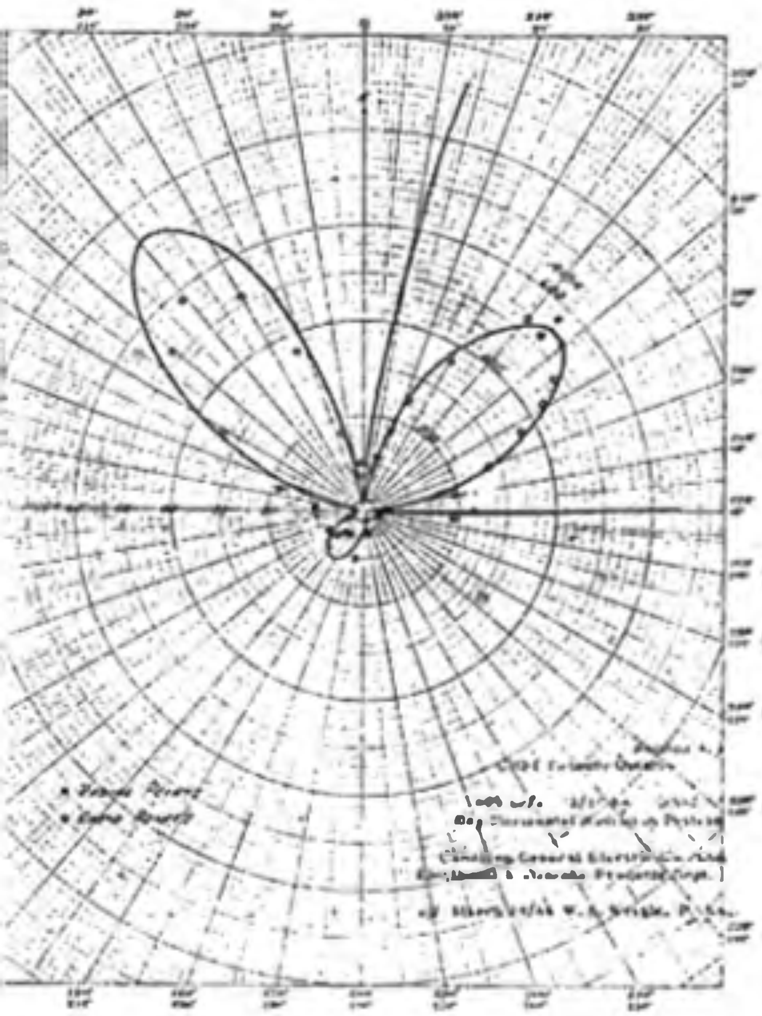
Date March 18, 1966.

CONDITIONS

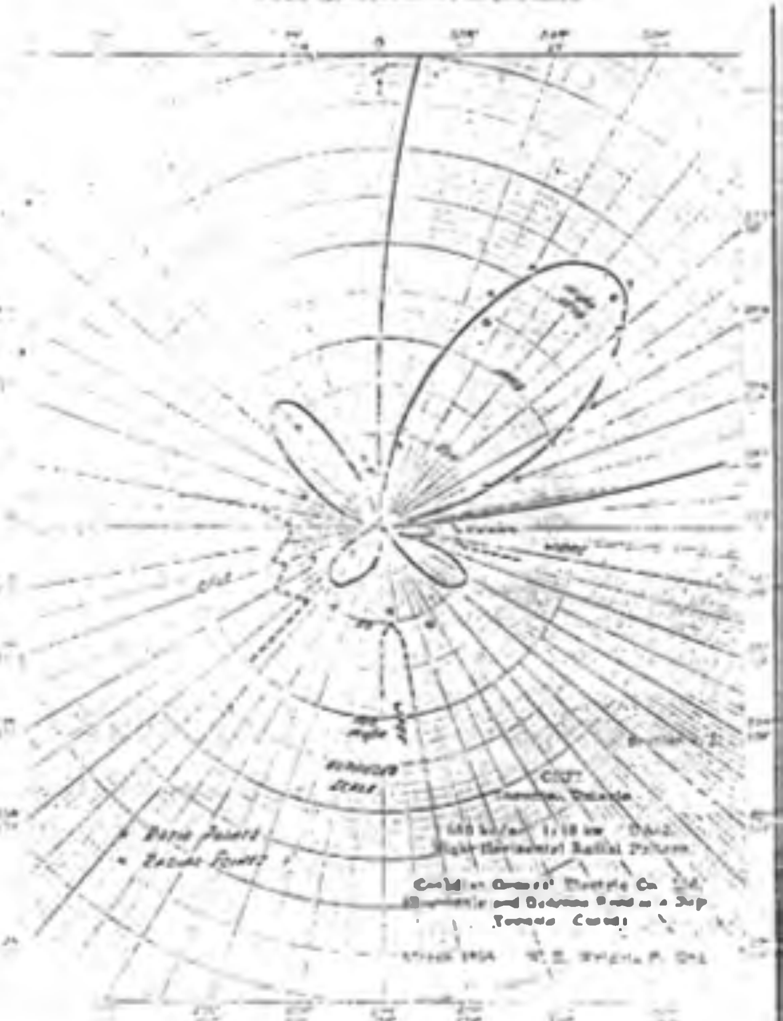
The operation of a radio transmitter on the frequency of 680 kc/s with a power of 1,000 watts between sunrise and sunset and 10,000 watts between sunset and sunrise is authorized herein, provided that the directional antenna array approved by the Department is installed and maintained in proper adjustment and the field strengths shall not exceed those established in the following directional radiation patterns for day-time operation and for night-time operation. The changes in modes of operation must be made at sunrise and sunset strictly in accordance with the following schedule of times.

	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	
Sunrise	7.45	7.15	6.30	5.30	5.00	4.30	4.45	5.15	6.00	6.30	7.15	7.45	E.S.T.
Sunset	5.00	5.45	6.15	7.00	7.30	8.00	8.00	7.15	6.30	5.30	5.00	4.45	

DAY-TIME OPERATION



NIGHT-TIME OPERATION



A phase monitor of approved type shall be permanently installed and continuously operated at the station.

The antenna structure of the station licensed, consisting of nine vertical masts with an overall height above grade level of 310 feet, on the position shown in the technical brief as Latitude 43° 34' 43" North, Longitude 79° 33' 30" West, at the point represented in the brief as 507 feet, plus or minus one foot above mean sea level is acceptable from an aviation point of view, provided that it is painted in accordance with Broadcast Procedure Number 16 and that the four corner towers forming the periphery of the group of towers and one centre tower are lighted in accordance with Broadcast Procedure Number 16. In addition all lights on the towers shall flash either simultaneously or consecutively. The rate of flash shall be between 20 and 60 per minute, preferably 40 per minute.

The licensee's attention is drawn to the Special Conditions on the back hereof.

6266-386

ENGINEERING BRIEF

for

NIGHT-TIME POWER INCREASE

at

SOUND BROADCASTING STATION CHFI

TORONTO, ONTARIO

Present Operation: - 680 KHz 1/10 kw DA-2 Class 11
Proposed Operation: - 680 KHz 1/25 kw DA-2 Class 11

Prepared for

Rogers Broadcasting Limited
13 Adelaide Street East
Toronto, Ontario

Prepared by

Canadian General Electric Company Limited
Electronic and Defence Products Department
Toronto, Canada

December, 1966

Section 1 - GENERAL

1.1 Purpose of Brief

This brief has been preposed to support the application of Rogers Broadcasting Ltd., Toronto, Ontario, for authority to increase the night-time power of Sound Broadcasting Station CHFI from the present operation of 1/10 kw DA-2 on the frequency of 680 KHz to 1/25 kw DA-2 on the same frequency. It is not proposed to change the transmitter site nor the present day-time mode of operation.

1.2 Purpose of Night-time Power Increase

The proposed increase in night-time power will improve the night-time service in the present coverage area.

1.3 Engineers Responsible for Brief

W. E. Wright - Mr. Wright's qualifications are known and recognized by the Department of Transport.

1.4 Proposed Location of Station

It is proposed to use the existing site. The co-ordinates are:

Lat: 43° 34' 48" N.
Long: 79° 38' 30" W

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

2.11 Frequency

It is proposed to utilize the presently authorized frequency of 680 kc/s

2.12 Skywave Interference

The table of co-channel night-time conditions is shown in Section 6.1. The possibility of night-time interference to the Toronto area was considered for the following stations.

Station	Class	Power (KW)	Location
CKGB	11	10	Timmins, Ont.
WNAC	11	50	Boston, Mass.
WINR	11	1/0.5	Binghamton, N.Y.
WCBM	11	10/5	Baltimore, Maryland
WPTF	11	50	Raleigh, N.C.
WCTT	11	1	Corbin, Kentucky
CHLO	11	1	St. Thomas, Ont.

The 10% co-channel night-time limitation to CHFI has been established by the 50% RSS rule (NARBA Appendix G) to be 18.4 mv/m.

2.13 Groundwave Interference

The possibility of night-time groundwave interference to the night-time RSS limitation contour of co-channel and adjacent channel stations was investigated and the results are shown in Section 6.2. From the table it can be seen that no groundwave interference is caused to the 10% RSS night-time limitation contour of co-channel or adjacent channel stations.

2.2 Permissible Radiation

2.21 Skywave

Radio stations toward which radiation was considered are as follows:

Station	Class	Power (Kw)	Location
KNBR	1-B	50	San Francisco, Calif.
WPTF	11	50	Raleigh, N.C.
CHLO	11	1	St. Thomas, Ont.
CKGB	11	10	Timmins, Ont.
WDBC	11	10/1	Escanaba, Mich.
CJOB	11	10/2.5	Winnipeg, Man.
WNAC	11	50	Boston, Mass.
WINR	11	1/0.5	Binghampton, N.Y.
WCTT	11	1	Corkin, Kentucky
KFEQ	11	5	St. Joseph. Missouri
WMPS	11	10/5	Memphis, Tenn.
WCAW	11	10/.25	Charleston, W.V.
WCBM	11	10/5	Baltimore, Maryland
CJCN	11	10	Grand Falls, Nfld.

Permissible radiation towards the above stations has been determined from calculations by the 50% RSS rule for limitations to these stations and the results are tabulated in Section 6.1. It will be noted that the proposed radiation to the above stations will not increase the night-time limitation to any of the co-channel stations.

2.22 Groundwave

Radio stations towards which groundwave radiation has considered are as follows.

Station	Class	Power (Kw)	Location
CHLO	11	1	St. Thomas, Ont.
WINR	11	1/0.5	Binghampton, N.Y.

The permissable radiation to the above assignments has been determined by the "Equivalent Distance" method together with the measured and published conductivity values. The results are shown in Section 6.2, and indicate that adequate night-time groundwave protection is provided.

2.3 Harmonic Interference

There are no stations in the area with which a second harmonic relationship exists.

2.4 Oscillator Radiation Interference

There are no stations in the area with which receiver oscillation interference is anticipated.

2.5 Intermodulation with other Stations

Any possible intermodulation with other stations in the area will be remedied by the applicant. However, based on the present operation no intermodulation problems are expected.

2.6 Population Within the 1 Volt/meter Contour

It is not anticipated that blanketing will be a problem within the 1 V/meter contour. However, the applicant agrees to take remedial action if required.

2.7 Ground System and Tower Layout

It is proposed to utilize the present tower positions and ground systems for the night-time power increase.

2.8 Array Design

The night-time pattern as designed utilizes the present nine towers in a parallelogram array. The night-pattern has been designed to meet both skywave and groundwave protection requirements to the 10% night-time RSS limitation contour of co-channel and adjacent channel stations. The pattern as designed will give an improved signal to the Metro Toronto area and will provide an increase in service to the communities to the south-west of the transmitter site.

The minimum protection requirements for night-time operation from Section 6.1 and 6.2 is 39.8 mv/m (WNAC). This represents a suppression ratio which is less than 2 % of the peak horizontal value. To achieve this value of radiation, careful array adjustment as well as "detuning" of metallic structures may be necessary. From the work which was undertaken in proving the present 1/10 kw array, it was found that with the special equipment now in use, the implementation of this array is feasible and that excellent array stability can be achieved.

Notification List No: MAR 3/67 — Section 2.9

Station:	CHFI	Main Studio:	Toronto, Ontario
Frequency:	680 kc/s	Power:	1/25 kw — Class: 11
Geographical Location:	North Latitude 43° 34' 48" West Longitude 79° 38' 30"	Mode of Operation:	DA-2 — No. of Elements: 9
		Type of Elements:	Guyed uniform cross section, series fed, no top loading

Antenna Characteristics:

Tower:	1	2	3	4	5	6	7	8	9
Height above Insulator:	300' (74.6°)	300'	300'	300'	300'	300'	300'	300'	300'
Overall Height:	309'	309'	309'	309'	309'	309'	309'	309'	309'

Spacing: 886' 886'(220o) 886' 886' 886' 886'

Spacing: No. 1-4-7 (322') 80° No. 2-5-8 322' No. 3-6-9 322'

	1	2	3	4	5	6	7	8	9
Day Pattern:									
Phasing	0°	$+25.61^{\circ}$	$+51.22^{\circ}$	-104.00°	-78.39°	-52.78°	-203.00°	-177.39°	-151.78°
Field Ratio	1.000	1.981	1.000	2.000	3.962	2.000	1.000	1.981	1.000
Night Pattern:									
Phasing	0°	$+1.00^{\circ}$	$+0^{\circ}$	-120.50°	-119.50°	-120.50°	-233.00°	-232.00°	-233.00°
Field Ratio	1.000	1.940	1.000	1.960	3.810	1.960	1.000	1.940	1.000

Orientation: Towers No's 1, 2 and 3 bearing 50° west of north
4, 5 and 6 bearing 50° west of north
7, 8 and 9 bearing 50° west of north
1, 4 and 7; 2, 5 and 8; and also 3, 6 and 9 bearing 43° east of north

Ground System: 120 Radials of number 10 AWG, soft copper wire plus an elevated counter poise 70' in diameter at each tower. Towers interconnected by 3#4 AWG stranded copper wires. Radials running between towers bonded to number 4 AWG, stranded copper wire. Effective length of radials 0.4λ.

Effective Field: Day RMS 175 mv/m - Night RMS 903 mv/m (180 mv/m for 1 kw)

Note: This Notification concerns a change in the night-time pattern only.
Day-time operation to remain as authorized in Notification List No: 194 Dated February 3. 1965.

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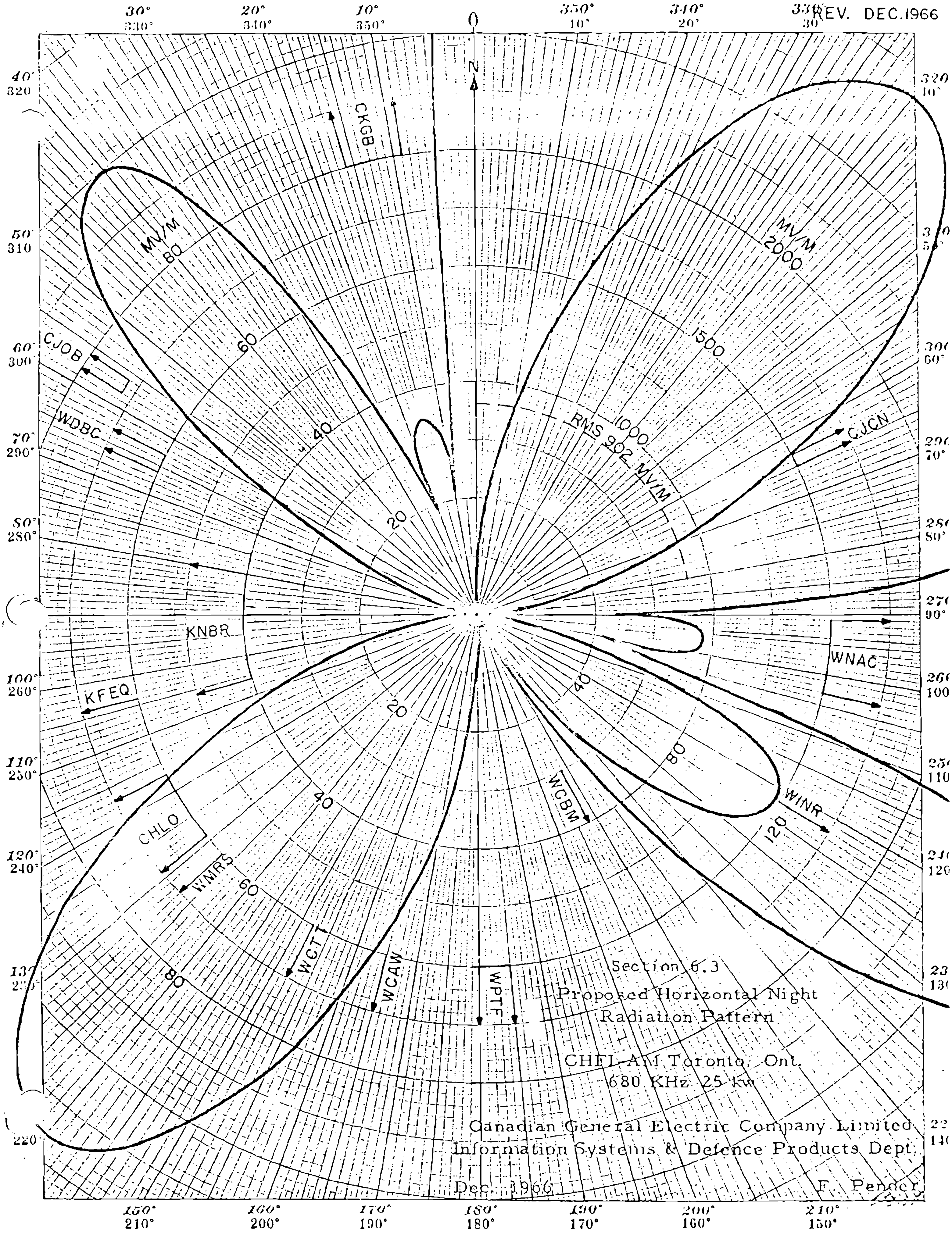
REV. DEC.1966



Section 6.3

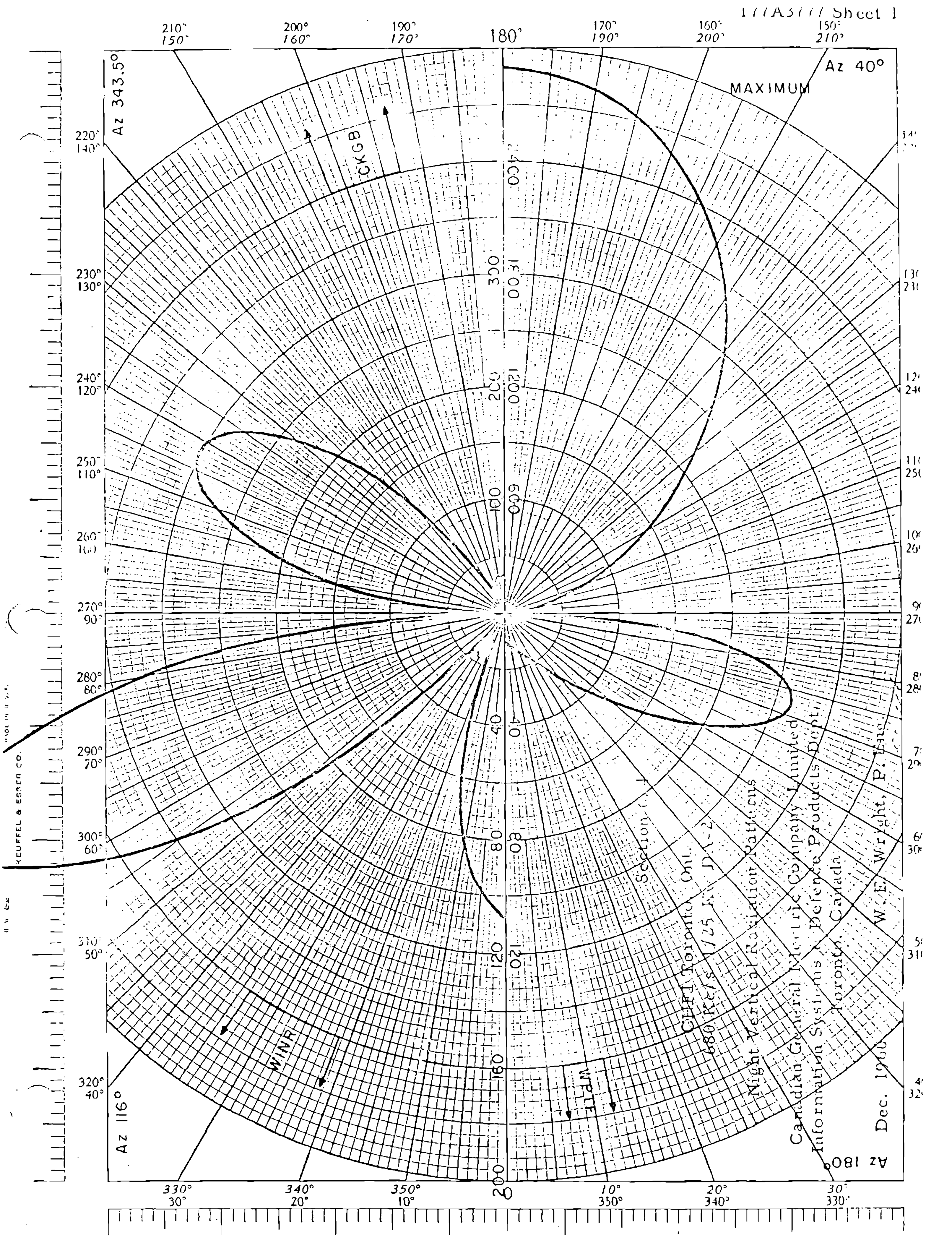
Proposed Horizontal Night Radiation Pattern

CHFI-AM Toronto, Ont.
680 KHz 25 Kw

Canadian General Electric Company Limited
Information Systems & Defence Products Dept.

Dec. 1966

F. Pender



Sheet 1
180°
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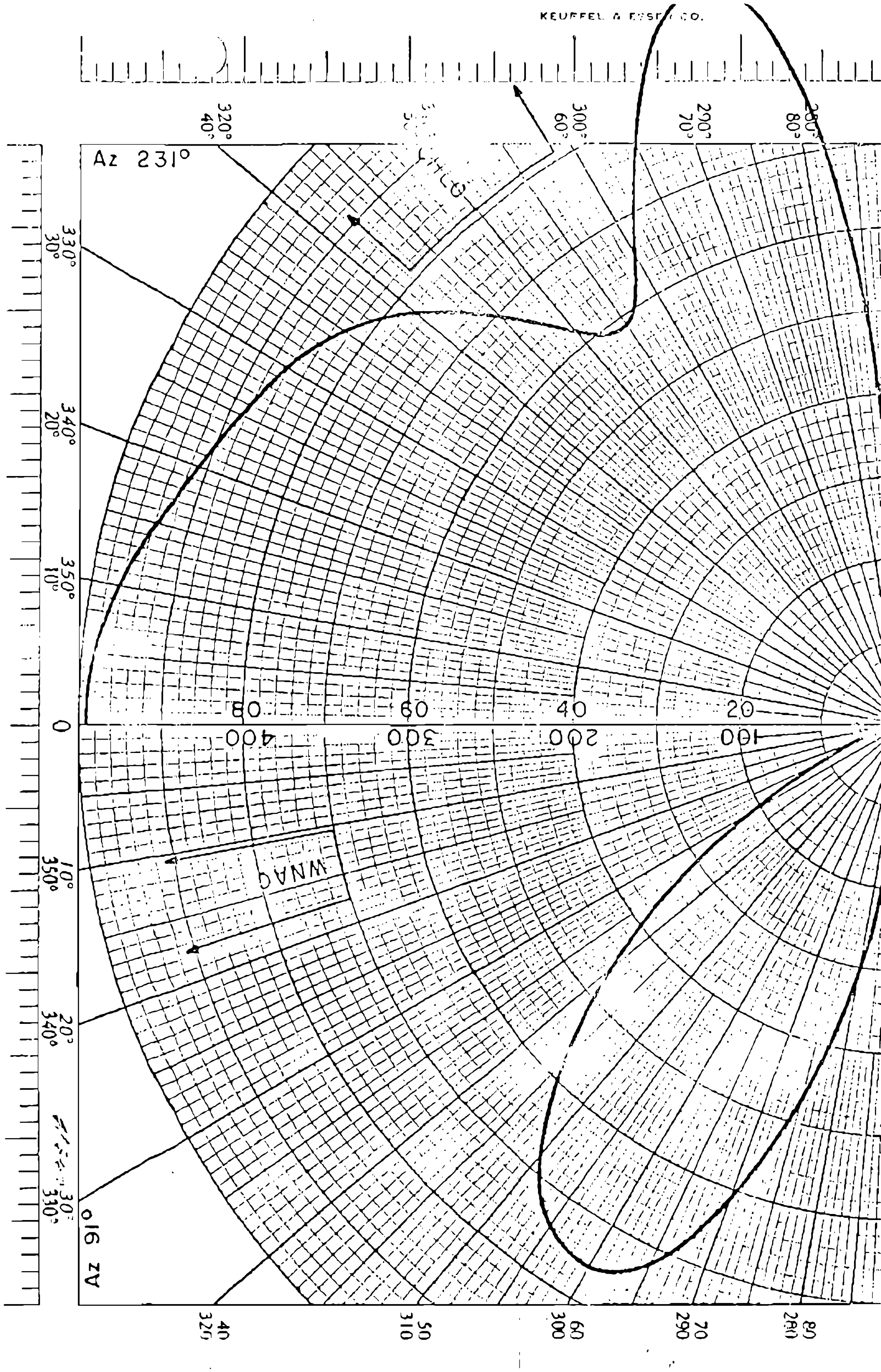
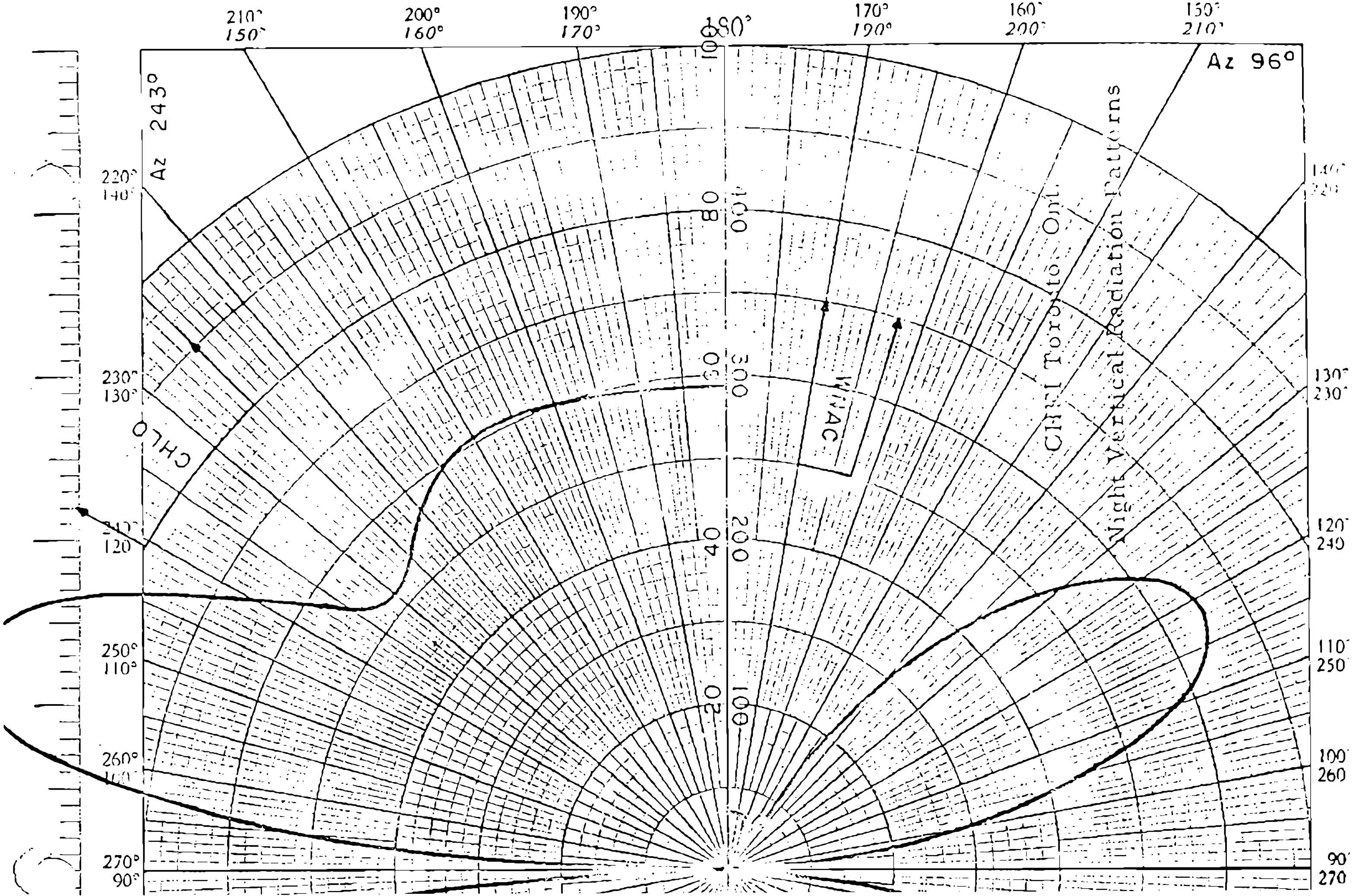
MAXIMUM
Az 343.5°
CKGB
WINR
WPTL
Az 116°
Az 180°
Night Vertical Radiation Patterns
CHFI Toronto, Ont.
Canadian General Electric Company Limited
Information Systems & Defence Products Dept.
Toronto, Canada
Dec. 1960
KEUFFEL & ESSER CO.


Az 231°
Az 91°
WNAC
80
60
40
20
400
300
200
100
0

177A3777 Sheet 2



TranSonic Limited

TELEPHONE
416-942-3240

—BROADCAST ELECTRONICS— McMASTER AVENUE
AJAX, ONTARIO —INDUSTRIAL ULTRASONICS—

File
411 CHFI-8

April 19th, 1967.

Dr. Andrew Stewart,
Chairman,
BOARD OF BROADCAST GOVERNORS,
48 Rideau Street,
OTTAWA, Ont.

Dear Dr. Stewart,

I find myself in a dilemma - as of today's date I have not received the order in council with respect to the Ajax application, so that officially I am not a licencee. I am therefore not in a position to file a legitimate opposition to the application by Rogers Broadcasting Limited to increase the night-time power of station CHFI Toronto from 10,000 watts to 25,000 watts.

Furthermore CHFI as a basic Toronto station, I have no grounds to oppose since Toronto is of no economic concern to Ajax. However the new application has the 25 m/v contour running through the centre of Ajax and I can only assume that, since the 10,000 watt night limitation contour is already adequate to provide a good service to Metropolitan Toronto, the new 25,000 watts is designed to increase the signal into Ontario County (BBM 820 and 809). This is the area Ajax was designed to service.

You will also be aware of the commitments I made to the Board relating to the relatively high content of quality music I propose to broadcast.

....Cont'd.

Dr. Andrew Stewart, ...Cont'd.
April 19th, 1967.

I would request the Board to defer the Rogers application until such time as the Ajax station is established.

I am quite prepared to appear at the hearing in opposition but I am not quite sure of my legal grounds.

Yours sincerely,

W Jones

W. Jones.

WJ/pc

ENGINEERING BRIEF

for

DAY-TIME POWER INCREASE

at

SOUND BROADCASTING STATION CHFI

TORONTO, ONTARIO

Present Operation:	680 KHz	1/25 Kw	DA-2	Class 11
Proposed Operation:	680 KHz	2.5/25 Kw	DA-2	Class 11

Prepared for

Rogers Broadcasting Limited
13 Adelaide Street East
Toronto, Ontario

Prepared by

Canadian General Electric Company Limited
Information Systems and Defence Products Department
Toronto, Canada

December, 1966
Revised December, 1967

Section 1 - GENERAL

1.1 Purpose of Brief

This brief has been prepared to support the application of Rogers Broadcasting Limited, Toronto, Ontario for authority to increase the day-time pattern of Sound Broadcasting Station CHFI from the present operation of 1/25 Kw DA-2 on the frequency of 680 KHz, to 2.5/25 Kw DA-2 on the same frequency. It is not proposed to change the transmitter site nor the present night-time mode of operation.

1.2 Purpose of Day-Time Power Increase

The proposed increase in day-time power will improve the day-time service in the present coverage area and will increase the received signal in those areas where co-channel interference is excessive.

1.3 Engineers Responsible for Brief

The original Brief dated December 1966 was prepared by:

W.E. Wright, P.Eng. - Mr. Wright's qualifications are known and recognized by the Department of Transport.

The Brief was revised December 1967 by:

N. Tomcio, P.Eng. - Mr. Tomcio's qualifications are on file with the Department of Transport.

1.4 Proposed Location of Station

It is proposed to use the existing site. The co-ordinates are:

Latitude:	43° 34' 48" N
Longitude:	79° 38' 30" W

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

2.1.1 Frequency

It is proposed to utilize the presently authorized frequency of 680 Kc/s.

2.1.2 Groundwave Interference

The possibility of groundwave interference to co-channel and adjacent channel station was investigated and the results are shown in Section 6.1.

For protection to CHLO St. Thomas, Ontario, the location of the 0.5 mv/m contour was taken as measured by G. Elder and as shown in the 1/10 Kw Engineering Brief dated, January 1965. In determining the permissible radiation to the 0.5 mv/m contour of CHLO, the measured conductivity as established from measurements by G. Elder and as shown in the 1/10 Kw Engineering Brief dated, January 1965, was used.

For protection to WNYR Rochester, N.Y., the location of the 0.5 mv/m contour as measured by Raymond E. Rohrer and Associates and as shown on the map included in the Appendix, was used. Since the ground conductivity in the area to the west of Rochester is lower than that shown on the FCC Figure M3 ground conductivity map and since measured data takes precedent over published map data, the 0.5 mv/m contour as shown is recognized as the official protected contour.

It can be seen that the day-time pattern meets all groundwave protection requirements and fully protects the 0.5 mv/m contour of co-channel and adjacent channel stations.

2.2 Permissible Radiation

2.2.1 Groundwave

Radio stations towards which groundwave radiation has been considered are as follows:

2.2 Permissible Radiation (cont'd)

2.2.1 Groundwave (cont'd)

Station	Class	Power (Kw)	Location
WNYR	11	0.25	Rochester, N.Y.
CHLO	11	1	St. Thomas, Ont.
WISR	11	0.25	Butler, Penn.
WINR	11	1/0.5	Binghampton, N.Y.

Permissible radiation to the above assignment has been determined by the equivalent distance method and the results are tabulated in Section 6.1. The table indicates that adequate groundwave protection is provided. (In calculating the protection to station WNYR the southern shore of Lake Ontario was taken for the International Boundary).

2.3 Harmonic Interference

There are no stations in the area with which a second harmonic relationship exists.

2.4 Oscillator Radiation Interference

There are no stations in the area with which receiver oscillation interference is anticipated.

2.5 Intermodulation with other Stations

Any possible intermodulation with other stations in the area will be remedied by the applicant. However, based on the present operation no intermodulation problems are expected.

2.6 Population Within the 1 Volt/Meter Contour

It is not anticipated that blanketing will be a problem within the 1 Volt/Meter contour. However, the applicant agrees to take remedial action if required.

2.7 Ground System and Tower Layout

It is proposed to utilize the present tower positions and ground system for the day-time power increase.

2.8 Array Design

Day Pattern

The day-time pattern as designed utilizes the present nine towers in a parallelogram array. The pattern has been designed to meet the co-channel and adjacent channel protection requirements to all stations including WNYR Rochester, N.Y. and CHLO St. Thomas, Ontario. The pattern as designed will provide an improved signal to the Toronto area and will improve the signal in those areas where the signal is presently interferred with by WNYR Rochester, N.Y.

Since the minimum protection to CHLO and WNYR represents a pattern suppression which is less than 2% of the peak horizontal value, the radiation in this direction will be kept within the required protection by careful array adjustment as well as by "de-tuning" if necessary, metallic structures. From the work which was undertaken in proving in the 1/10 Kw array, it was found that with the special equipment now in use, the implementation of this array is feasible and that excellent array stability can be achieved.

Section 2.9 Description of Array Sheet　　　　　　　　　　　　Section 2 - TECHNICAL DETAILS

Notification List No.

Station: CHFI　　　Main Studio: Toronto, Ontario

Frequency: 680 KHz　　　Power: 2.5/25 Kw　　　Class: 11

Geographical Location: North Latitude 43° 34' 48" West Longitude 79° 38' 30"

Mode of Operation: DA-2　　No. of Elements: 9

Type of Elements: Guyed uniform cross section, series fed, no top loading

Antenna Characteristics:

Tower:	1	2	3	4	5	6	7	8	9
Height above Insulator:	300'(74.6°)	300'	300'	300'	300'	300	300'	300'	300'
Overall Height:	309'	309'	309'	309'	309'	309'	309'	309'	309'
Spacing:	886'		886'(220°)	886'	886'		886'	886'	
Spacing:	No.1-4-7		(322')80°	No.2-5-8	322'		No.3-6-9	322'	
Day Pattern:									
Phasing	0°	$+25.61^{\circ}$	$+51.26^{\circ}$	-103.42°	-77.81°	-52.16°	-202.84°	-177.23°	-151.58°
Field Ratio	1.000	1.981	1.000	2.000	3.962	2.000	1.000	1.981	1.000
Night Pattern:									
Phasing	0°	$+1.00^{\circ}$	0°	-120.5°	119.50°	-120.50°	-233.0°	-232.00°	-233.0°
Field Ratio	1.000	1.940	1.000	1.960	3.810	1.960	1.00	1.940	1.000

Orientation: Tower Nos. 1, 2 and 3 bearing 50° west of north
4, 5 and 6 bearing 50° west of north
7, 8 and 9 bearing 50° west of north
1, 4 & 7; 2, 5 & 8; and also 3, 6 and 9, bearing 43° east of north

Ground System: 120 radials of number 10 AWG, soft copper wire plus an elevated counterpoise 70' in diameter at each tower. Towers interconnected by 3 #4 stranded copper wires. Radials running between towers bonded to number 4 AWG, stranded copper wire. Effective length of radials 0.4λ

Effective Field: Day - RMS 285 mv/m (180 mv/m for 1 kw)　　Night - RMS 903 mv/m (180 mv/m for 1 kw)

NOTE: This notification concerns a change in the day-time pattern only. Night-time operation to remain as authorized in notification List # 223 dated March 3rd, 1967.

Section 3 - STATION COVERAGE

3.1 Area to be Served by the Station

The coverage maps in Section 6 indicate the extent of the signal to Metro Toronto and surrounding area as well as the extent of the 0.5 and 0.25 mv/m day-time contours. The power increase from 1 Kw to 2.5 Kw will not only improve the signal in the city of Toronto but will extend the service to the East, thereby giving service to areas where an interference free signal at present is not obtained.

The shaded area on the day-time field strength contours (Section 6) shows the area where the proposed signal of CHFI is less than 1/20 of co-channel WNYR Rochester, N.Y. The extent of WNYR's signal in Southern Ontario was established by field strength measurements taken on WNYR Rochester, N.Y.

3.2 Ground Conductivity

The ground conductivity used in establishing the field strength contours was taken from the 1/10 Kw Final Proof of Performance for CHFI. For protection to CHLO's 0.5 mv/m groundwave contour, the measured conductivity as well as the location of this contour was taken as established from measurements undertaken by G. Elder. These measurements are listed in the 1/10 Kw Engineering Brief dated, January 1965. For protection to U.S. stations the DOT Provisional Ground Conductivity map and the FCC Figure M3 Ground Conductivity map was used.

Section 4 - SOURCES OF DESIGN INFORMATION

Station lists and recent notifications for Canada (List No. 233) for U.S. (List No. 1221) and Cuba from the Department of Transport were used for study of channel conditions.

The groundwave propagation curves, Appendix 1, Graph 5 of the Standards of Good Engineering Practice were used to determine Contour distances. Ground conductivity was taken from 1) the 1/10 Kw Final Proof of Performance for station CHFI 680 KHz Toronto, 2) Proof of Performance for CBL and CJBC Toronto, 3) Field strength measurements taken on CBL Toronto, 4) the DOT Provisional Ground Conductivity Map and 5) the FCC Figure M3 conductivity map.

The predicted Effective Field was determined using the curve Field Intensity for 1 Kilowatt, recently published by the Department of Transport.

Bearings used in the Table of Interference Conditions were determined from a Lambert Conic Projection Map and distances from an Albers Equal Area Projection Map, scale 1/2, 500,000.

Section 5 - ENGINEERING SEAL AND SIGNATURE

N. Tomcio, P.Eng.,
Broadcast Consultant,
Broadcast Engineering,
Canadian General Electric Company Limited,
Information Systems and Defence Products
Department.

Revised December, 1967

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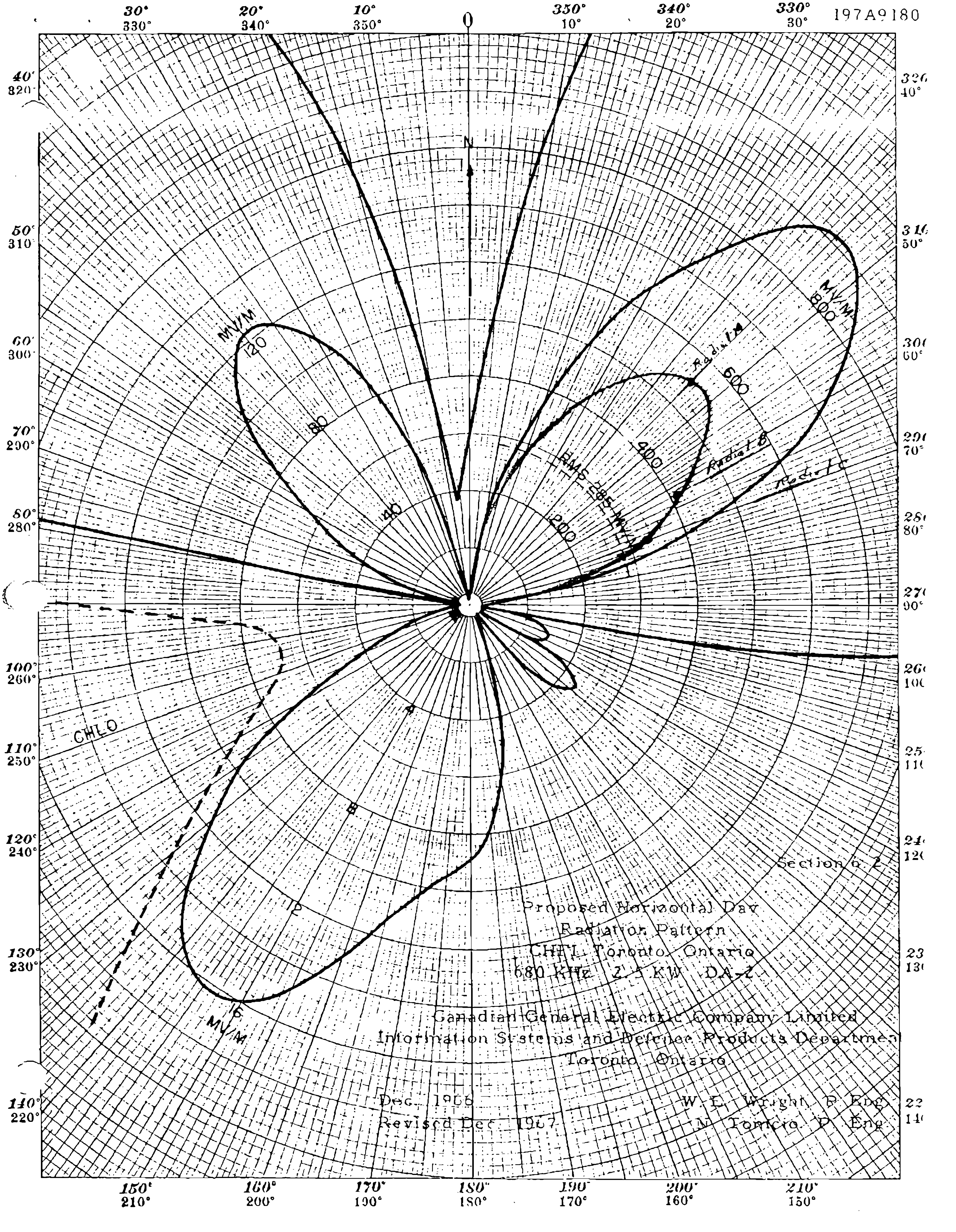


Section 6.2
Proposed Horizontal Day
Radiation Pattern
CHFI Toronto Ontario
680 KHz 2.5 KW DA-2
Canadian General Electric Company Limited
Information Systems and Defence Products Department
Toronto Ontario
Dec. 1966
Revised Dec. 1967
W. E. Wright P. Eng.
N. Tomcio P. Eng.
RMS 285 MV/M
MV/M
800
600
400
200
120
80
40
CHLO
16
MV/M
12
N

ENGINEERING BRIEF

for

DAY-TIME POWER INCREASE

at

SOUND BROADCASTING STATION CHFI

TORONTO, ONTARIO.

Present Operation:	680 KHz	2.5/25 Kw	DA-2	Class II
Proposed Operation:	680 KHz	10/25 Kw	DA-2	Class II

Prepared for

Rogers Broadcasting Limited,
13 Adelaide Street East,
Toronto, Ontario.

Prepared by

Canadian General Electric Company Limited,
Information Systems and Defence Products Department,
Toronto, Canada.

May, 1968.

Section 1 - GENERAL

1.1 Purpose of Brief

This brief has been prepared to support the application of Rogers Broadcasting Limited, Toronto, Ontario for authority to increase the day-time power of Sound Broadcasting Station CHFI from the present operation of 2.5/25 Kw DA-2 on the frequency of 680 KHz, to 10/25 Kw DA-2 on the same frequency. It is not proposed to change the transmitter site nor the present night-time mode of operation.

1.2 Purpose of Day-Time Power Increase

The proposed increase in day-time power will improve the day-time service in the present coverage area and will increase the received signal in some areas where co-channel interference is excessive.

1.3 Engineers Responsible for Brief

N. Tomcio, P.Eng.	- Mr. Tomcio's qualifications are on file with the Department of Transport.
F.R. Pender	- Mr. Pender's qualifications are on file with the Department of Transport.
A.F. Stevenson	- Mr. Stevenson's qualifications are on file with the Department of Transport.

1.4 Proposed Location of Station

It is proposed to use the existing site. The co-ordinates are:-

Latitude:	43°	34'	48"	N.
Longitude:	79°	38'	30"	W.

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

2.1.1 Frequency

It is proposed to utilize the presently authorized frequency of 680 Kc/s.

2.1.2 Groundwave Interference

The possibility of groundwave interference to co-channel and adjacent channel station was investigated and the results are shown in Section 6.1.

For protection to WNYR Rochester, N.Y., the location of the 0.5 mv/m contour as measured by Raymond E. Rohrer and Associates and as shown on the map included in the Appendix, was used. Since the ground conductivity in the area to the west of Rochester is lower than that shown on the FCC Figure M3 ground conductivity map and since measured data takes precedent over published map data, the 0.5 mv/m contour as shown is recognized as the official protected contour.

It can be seen that the day-time pattern meets all groundwave protection requirements and fully protects the 0.5 mv/m contour of co-channel and adjacent channel stations.

2.2 Permissible Radiation

2.2.1 Groundwave

Radio stations towards which groundwave radiation has been considered are as follows:

Station	Class	Power(Kw)	Location
WNYR	II	0.25	Rochester, N.Y.
WISR	II	0.25	Butler, Penn.
WINR	II	1/0.5	Binghampton, N.Y.
WDBC	II	10/1	Escanaba, Mich.

2.2 Permissible Radiation (cont'd)

2.2.1 Groundwave (cont'd)

Permissible radiation to the above assignments has been determined by the equivalent distance method and the results are tabulated in Section 6.1. The table indicates that adequate groundwave protection is provided. (In calculating the protection to station WNYR the southern shore of Lake Ontario was taken for the International Boundary).

2.3 Harmonic Interference

There are no stations in the area with which a second harmonic relationship exists.

2.4 Oscillator Radiation Interference

There are no stations in the area with which receiver oscillation interference is anticipated.

2.5 Intermodulation with Other Stations

Any possible intermodulation with other stations in the area will be remedied by the applicant. However, based on the present operation no intermodulation problems are expected.

2.6 Population Within the 1 Volt/Meter Contour

It is not anticipated that blanketing will be a problem within the 1 Volt/Meter contour. However, the applicant agrees to take remedial action if required.

2.7 Ground System and Tower Layout

The proposed day-time pattern utilizes six towers. Two of the existing towers shall be used, and four additional towers will be located within the existing nine tower layout. The locations of the proposed new towers are shown in Section 6.7.

2.8 Array Design

The proposed day-time pattern has been designed to make full use of radio station CHLO vacating the frequency of 680 KHz.

Coverage in northeast Toronto area will be improved. The sharp null existing to the north in the present array pattern will be eliminated. Coverage both to the west and southwest will be vastly improved.

The minimum protection to WNYR represents a pattern suppression of less than 2% of the peak horizontal value. The radiation in this direction will be kept within the required protection by careful array adjustment as well as by "de-tuning" metallic structures if necessary.

The precautions used in the construction of the original nine tower array, has produced an array of excellent stability. The same techniques will be employed for the addition of the four new towers. Listed below are some of the precautions used to ensure array stability and pattern control.

(a) High resolution and stable R.F. phase angle and amplitude monitor.

Nems-Clark Precision Phase Monitor Type PPM-101

(b) Counterpoise 70 feet in diameter, elevated nine feet above ground, around the base of each tower.

(c) All transmission lines, control, power and sampling lines, located on the ground system, have been buried.

(d) All towers have a minimum number of guy levels. The guys are broken-up by insulators at maximum lengths of 50 foot intervals.

(e) The tuning and phasing equipment is custom designed, with the power division and phase control, located centrally in the transmitter building.

2.8 Array Design (cont'd)

In addition suitable de-tuning techniques will be applied, as required, to reduce the re-radiation from the unused towers both on the day-time and night-time arrays.

Similar detuning techniques will be applied, as required, to any re-radiating structures outside of the array.

From the experience in the implementation of the presently operating 1/10 Kw array it is expected that the proposed array can be proven-in successfully.

Nevertheless, should all these measures prove to be insufficient the applicant agrees to reduce the power to an acceptable level.

2.9 Description of Array Sheet

Station: CHFI Main Studio: Toronto, Ontario

Frequency: 680 KHz Power: 10/25 Kw Class: II

Notification List No: Date:

Geographical Location:

North Latitude: 43° 34' 48"
West Longitude: 79° 38' 30"

ANTENNA CHARACTERISTICS:

Mode of Operation: DA-2
Number of Elements: 13
Type of Elements: Guyed uniform cross-section, series fed, no top loading.

Tower Height: (above insulators) 300' (74.6°) all Towers
(overall) 309' all Towers

Tower No.	Orientation (Azimuth)	Spacing (degrees)feet	Field Ratio Day	Field Ratio Night	Phasing Day	Phasing Night
1	REF.	REF.	1.000	1.000	0°	0°
2a	310.0	145° (583')	2.000		-44°	
2	310.0	220° (886')		1.940		+1.00°
3a	310.0	290° (1146')	1.000		-88°	
3	310.0	440° (1772')		1.000		0°
4	43.0	80° (322')		1.960		-120.5°
4a	358.4	106.8° (429.4')	0.900		-77°	
5	330.3	230.1° (925.2')	1.800	3.810	-121°	+119.5°
6a	322.5	369.6° (1486.1')	0.900		-165°	
6	320.4	443.1° (1781.7')		1.960		-120.5°
7	43.0	160° (644')		1.000		-233.0°
8	347.1	265.2° (1066.4')		1.940		-232.0°
9	330.3	460.3° (1850.9')		1.000		-233.0°

2.9 Description of Array Sheet (cont'd)

Ground System: 120 radials of #10 AWG, soft drawn copper wire, plus an elevated counterpoise 70' in diameter at each tower. Towers interconnected by $1\frac{1}{2}$" x 1/16" copper strap. Radials running between towers bonded to #4 AWG, stranded copper wire. Effective length of radials 0.4 λ.

Effective Field:	Day	RMS	537 mv/m	(170 mv/m for 1 Kw)
	Night	RMS	903 mv/m	(180 mv/m for 1 Kw)

NOTE:- The notification concerns a change in day-time pattern only. Night-time operation to remain as authorized in notification list No. 223 dated March 3rd, 1967.

2.10 Impedance Currents and Power

DAY

$Z_1 = 3.04 - J16.45$ ohms
$Z_{2a} = 13.69 - J29.27$ ohms
$Z_{3a} = 11.52 - J72.25$ ohms
$Z_{4a} = 44.91 - J31.95$ ohms
$Z_5 = 50.47 - J22.16$ ohms
$Z_{6a} = 57.98 - J48.66$ ohms

$I_1 = 5.6$ amps
$I_{2a} = 11.2$ amps
$I_{3a} = 5.6$ amps
$I_{4a} = 5.1$ amps
$I_5 = 10.1$ amps
$I_{6a} = 5.1$ amps

$P_1 = 96$ watts
$P_{2a} = 1731$ watts
$P_{3a} = 364$ watts
$P_{4a} = 1150$ watts
$P_5 = 5172$ watts
$P_{6a} = 1485$ watts

3.1 Area to be Served by the Station

The coverage maps in Section 6 indicate the extent of the signal to Metro Toronto and surrounding area as well as the extent of the 0.5 and 0.25 mv/m day-time contours. The power increase from 2.5 Kw to 10 Kw will not only improve the signal in the city of Toronto but will extend the service to the west, north and northeast, thereby giving service to areas where an interference free signal at present is not obtained.

The shaded area on the day-time field strength contours (Section 6) shows the area where the proposed signal of CHFI is less than 20/1 of co-channel WNYR Rochester, N.Y. The extent of WNYR's signal in Southern Ontario was established by field strength measurements taken on WNYR Rochester, N.Y.

3.2 Ground Conductivity

The ground conductivity used in establishing the field strength contours was taken from the 1/10 Kw Final Proof of Performance for CHFI. In those areas where insufficient ground conductivity information is available, particularly the west and northern section, map values shown on the DOT Provision Ground Conductivity map were used.

Section 4 - SOURCES OF DESIGN INFORMATION

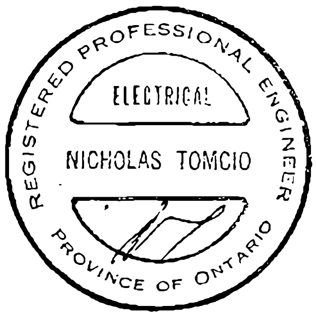
Station lists and recent notifications for Canada (List No. 241) for U.S. (List No. 1252) and Cuba from the Department of Transport were used for study of channel conditions.

The groundwave propagation curves, Appendix 1, Graph 5 of the Standards of Good Engineering Practice were used to determine Contour distances. Ground conductivity was taken from (1) the 1/10 Kw Final Proof of Performance for station CHFI 680 KHz Toronto, (2) the DOT Provisional Ground Conductivity Map and (3) the FCC Figure M3 conductivity map.

The predicted Effective Field was determined from information derived from spherical integration of the complete pattern. This value was then modified, using the curve, Field Intensity for 1 Kilowatt, published by the Department of Transport.

Bearings used in the Table of Interference Conditions were determined from great circle calculations and from a Lambert Conic Projection Map. Distances were obtained from an Albers Equal Area Projection Map, scale 1/2, 500,000.

Section 5 - ENGINEERING SEAL AND SIGNATURE



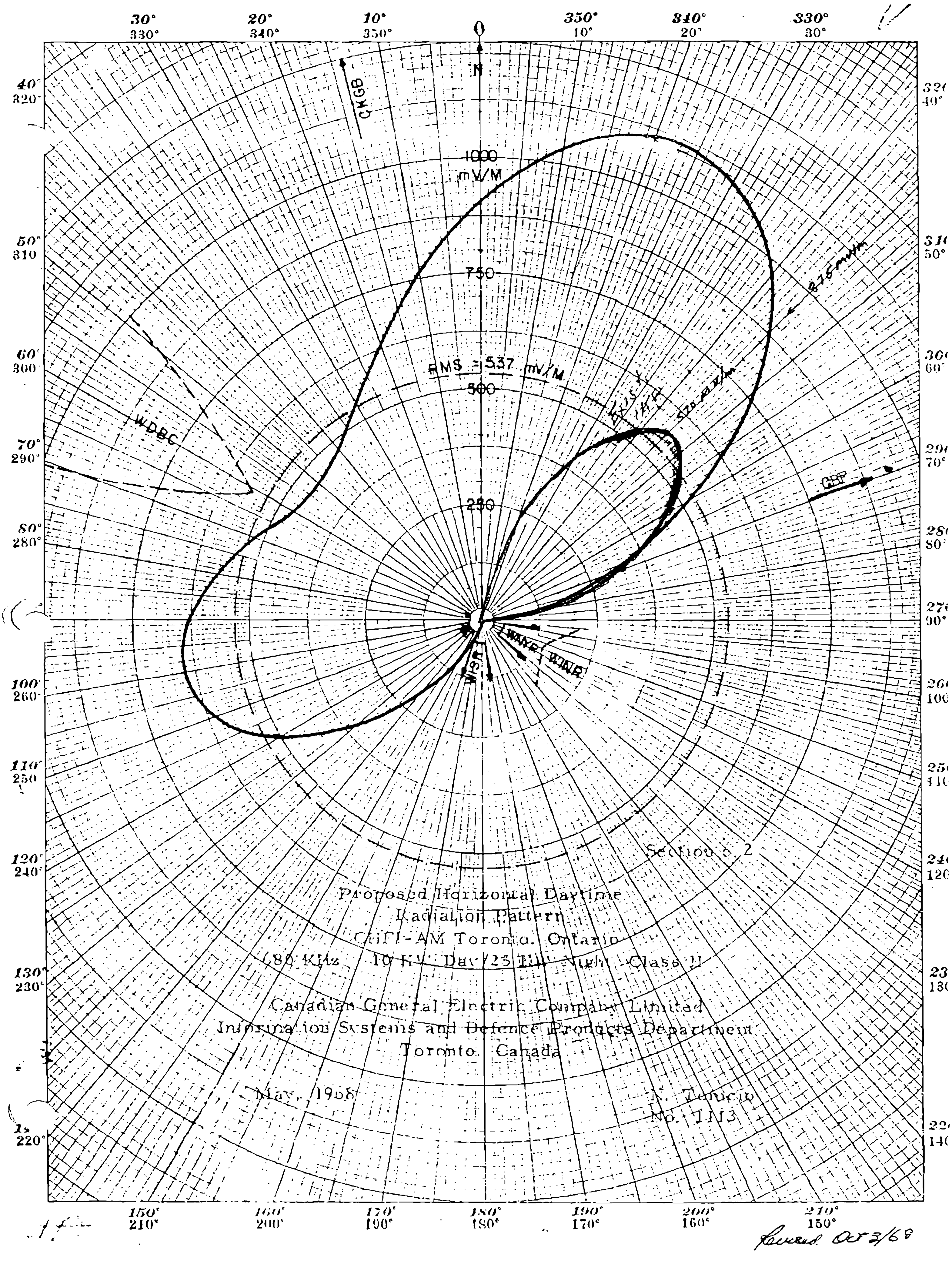
N. Tomcio, P.Eng.,
Broadcast Consultant,
Canadian General Electric Company Limited,
Information Systems and Defence Products
Department.

From	To	Contour mv/m		Azm. Deg.	Dist. miles	Cond./Dist. 10^{-14} emu/miles	Intf. 100 mv/m mv/m	Perm. Intf. mv/m	Perm. Rad. mv/m	Prop. Rad. mv/m **	Prop. Intf. mv/m
CHFI	WNYR (day only)	0.5	A	98	138	6/5, 8/133	0.061	0.025	41.0	9.96	0.006
			B	99.5	84	6/5, 8/79	0.208	0.025	12.0	7.01	0.0146
			C	103.5	61.8	6/5, 8/56.8	0.42	0.025	5.9	2.12	0.0088
			D	105.5	61.9	6/5, 8/56.9	0.42	0.025	5.9	0.91	0.0038
			E	123.5	72.2	6/4, 8/68.2	0.30	0.025	8.3	2.25	0.0068
			F	126.5	85.6	6/4, 8/81.6	0.20	0.025	12.5	2.39	0.0048
			G	132.0	88	6/4, 8/30, 20/7, 8/35, 4/12	0.25	0.025	10.0	2.09	0.0052
CHFI	WISR (day only)	0.5	A	173	185	10/8, 8/18, 20/25 8/41, 4/30, 2/63	0.0148	0.025	169	4.35	0.0006
			B	180	160	10/9, 8/16, 20/28 8/37, 4/33, 2/37	0.028	0.025	93.5	9.16	0.0026
			C	184	146	10/10, 8/14, 20/26, 8/40, 4/35 8/21	0.048	0.025	52.1	12.35	0.0059
			D	198	170	10/16, 8/6, 20/33 8/55, 4/13, 8/47	0.043	0.025	58.3	27.8	0.0121
CHFI	WINR (day)	0.5	A	98	213	6/5, 8/108, 4/100	0.012	0.025	208	9.96	0.0012
			B	115	198	6/4, 8/114, 4/80	0.0173	0.025	144.6	0.82	0.0001
			C	132	188	6/5, 8/73, 4/110	0.0153	0.025	163.4	2.09	0.0003

** Theoretical radiation based on pattern.

From	To	Contour mv/m		Azm. Deg.	Dist. miles	Cond./Dist. 10^{-14} emu/miles	Intf. 100 mv/m mv/m	Perm. Intf. mv/m	Perm. Rad. mv/m	Prop. Rad. mv/m **	Prop. Intf. mv/m
CHFI	WDBC	0.5	A	289	313	10/16, 4/29, 6/65, 8/203	0.0021	0.025	1190	521	0.011
			B	299	279	10/17, 4/33, 6/60, 8/169	0.0044	0.025	569	475	0.021
			C	311	308	10/18, 4/89, 8/201	0.0025	0.025	1000	459	0.011
CHFI	CKGB	0.5		346	316	10/22, 4/48, 10/61, 2/185	0.0013	0.025	1920	709	0.009
CHFI	CBF (690 KHz)	0.5		70	208	6/97, 4/55, 10/56	0.0125	0.25	2000	292	0.036

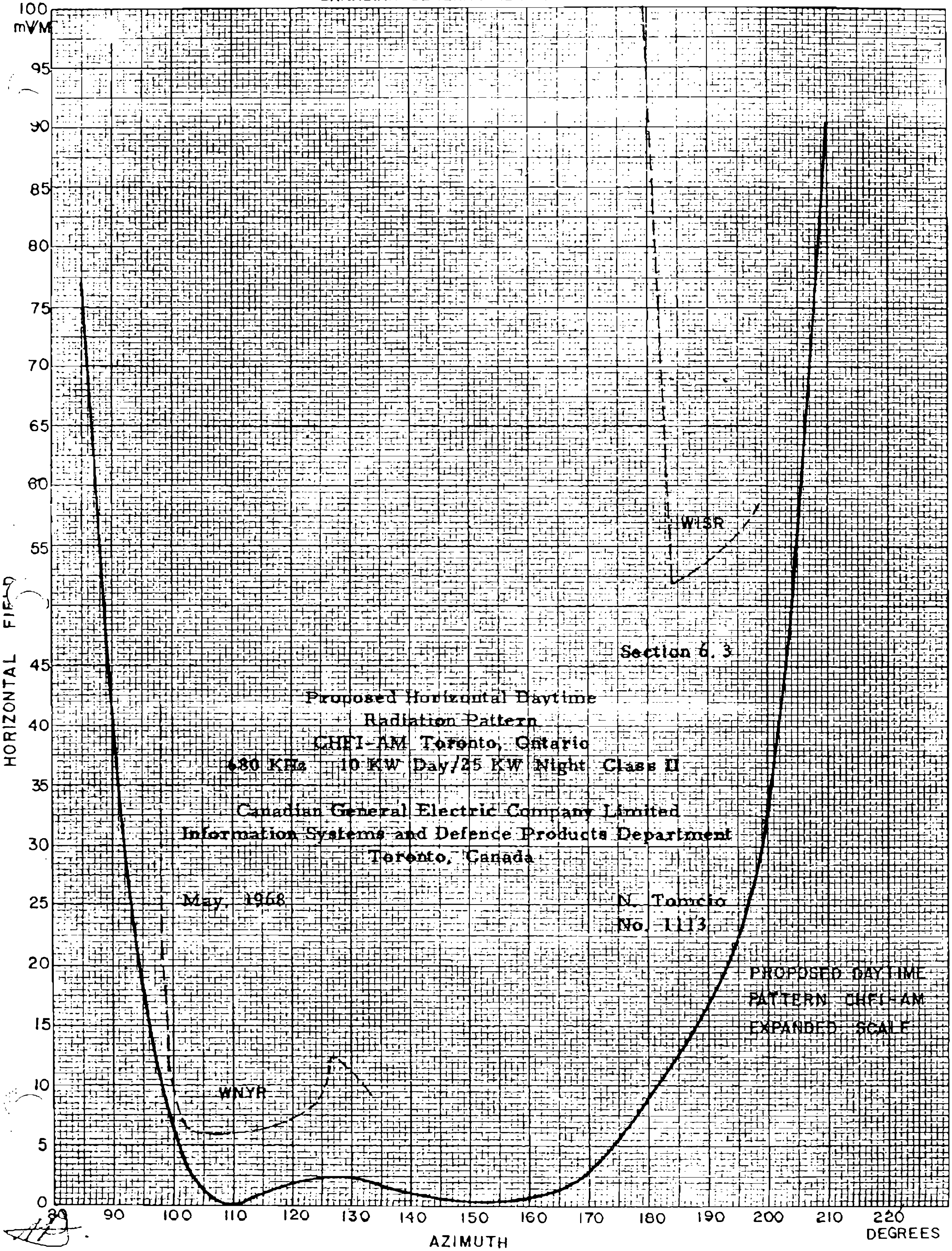
** Theoretical radiation based on pattern.

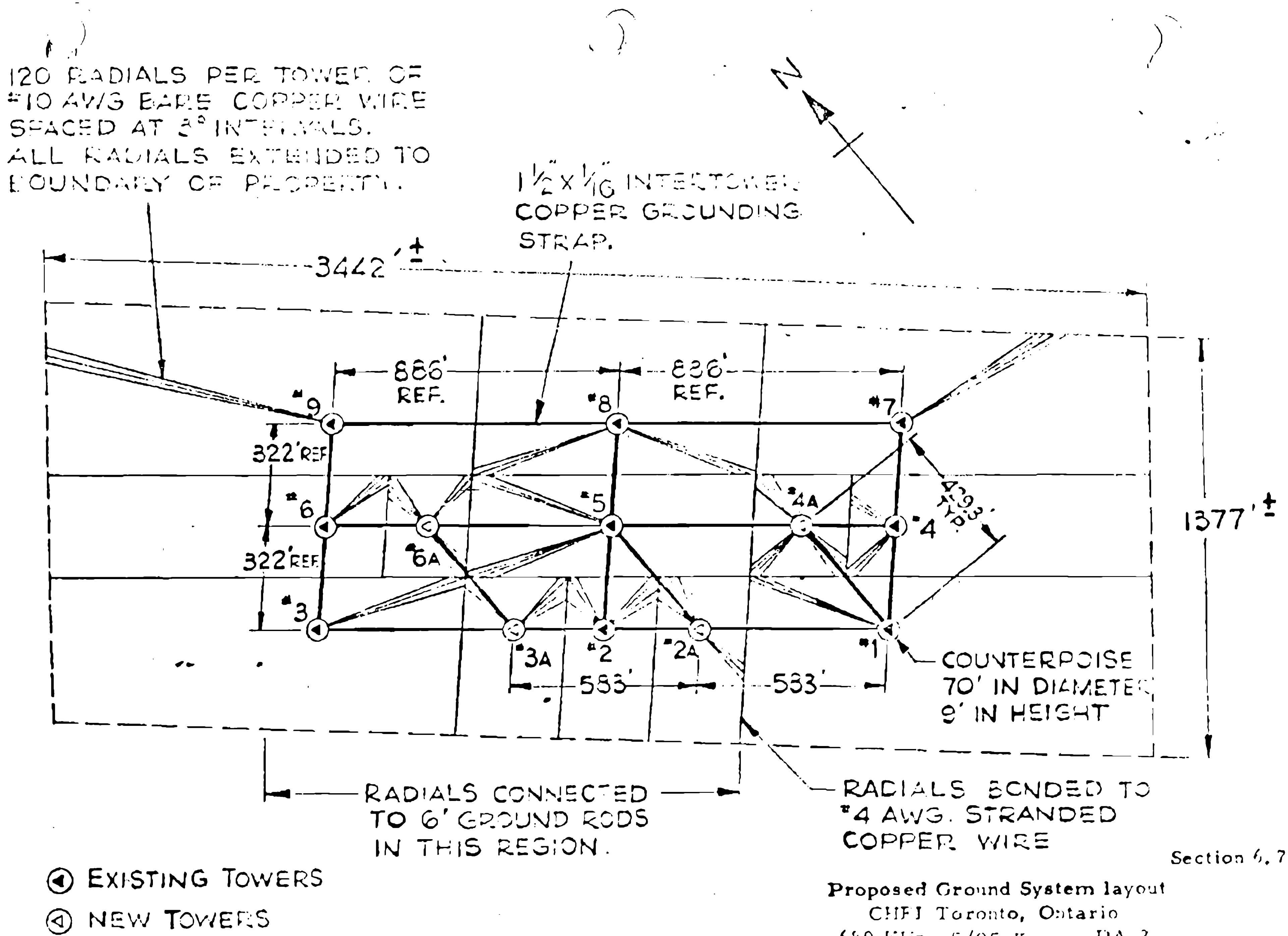


0
N
CKGB
WDBC
CBP
WINR
WSR
1000 mV/M
750
500
250
RMS = 537 mV/M
375 mV/m
Section 6.2
Proposed Horizontal Daytime
Radiation Pattern
CHFI-AM Toronto, Ontario
680 KHz 10 KW Day/2.5 KW Night Class II
Canadian General Electric Company Limited
Information Systems and Defence Products Department
Toronto, Canada
May, 1968
No. 113
Revised Oct 3/68

FW 1344 (G616A)

CANADIAN GENERAL ELECTRIC CO., LIMITED





Section 6.7

Proposed Ground System layout
CHFI Toronto, Ontario
680 KHz 5/25 Kw DA-2
Canadian General Electric Company Limited
Information Systems and Defence Products Department
MAY 31/68 E.M.

ENGINEERING BRIEF

FOR

CHANGE IN NIGHT-TIME RADIATION

PATTERN

AT

SOUND BROADCASTING STATION ~~CHFI~~

CFTR

TORONTO, ONTARIO

Present Operation: - 680 KHz 10/25 kw DA-2 Class II
Proposed Operation: - 680 KHz 10/25 kw DA-2 Class II

Prepared for

Rogers Broadcasting Limited
13 Adelaide Street East
Toronto, Ontario

Prepared by

Canadian General Electric Company Limited
Information Systems & Defence Products Department,
Toronto, Ontario

November 1968

2.9 Description of Array Sheet

Station: CHFI Main Studio: Toronto, Ontario.

Frequency 680 KHz Power: 10/25 kw Class II

Notification: List # Date:

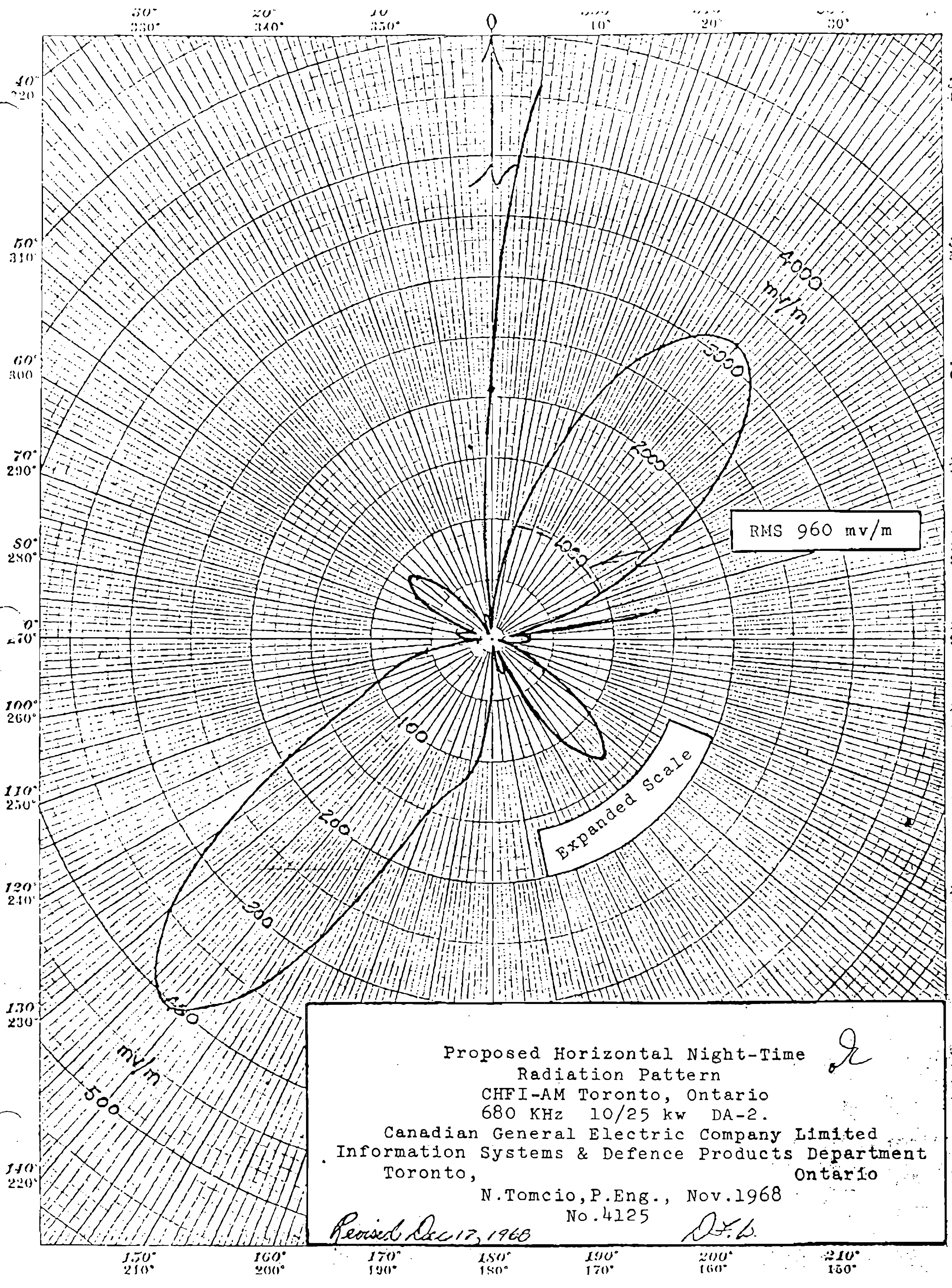
Geographical Location: North Latitude: 43° 34' 48" ✓
West Longitude: 79° 38' 30"

Antenna Characteristics:

Mode of operation- DA-2
Number of Elements- 13 ✓
Type of Elements- Guyed, uniform cross section, series fed, no top loading.

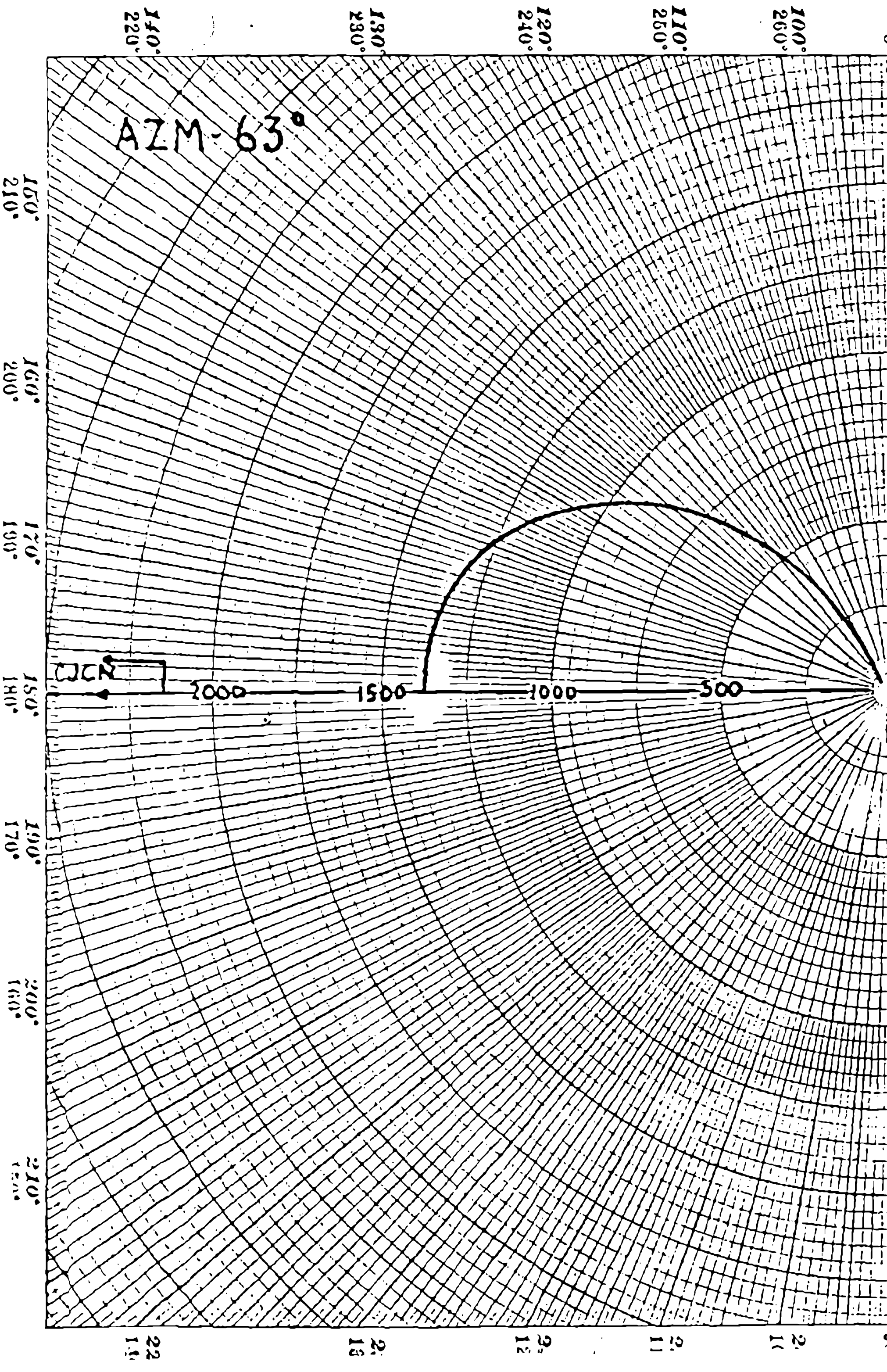
Tower Height: Above insulators 300' (74.6°) ✓ all towers
Overall 309' all towers

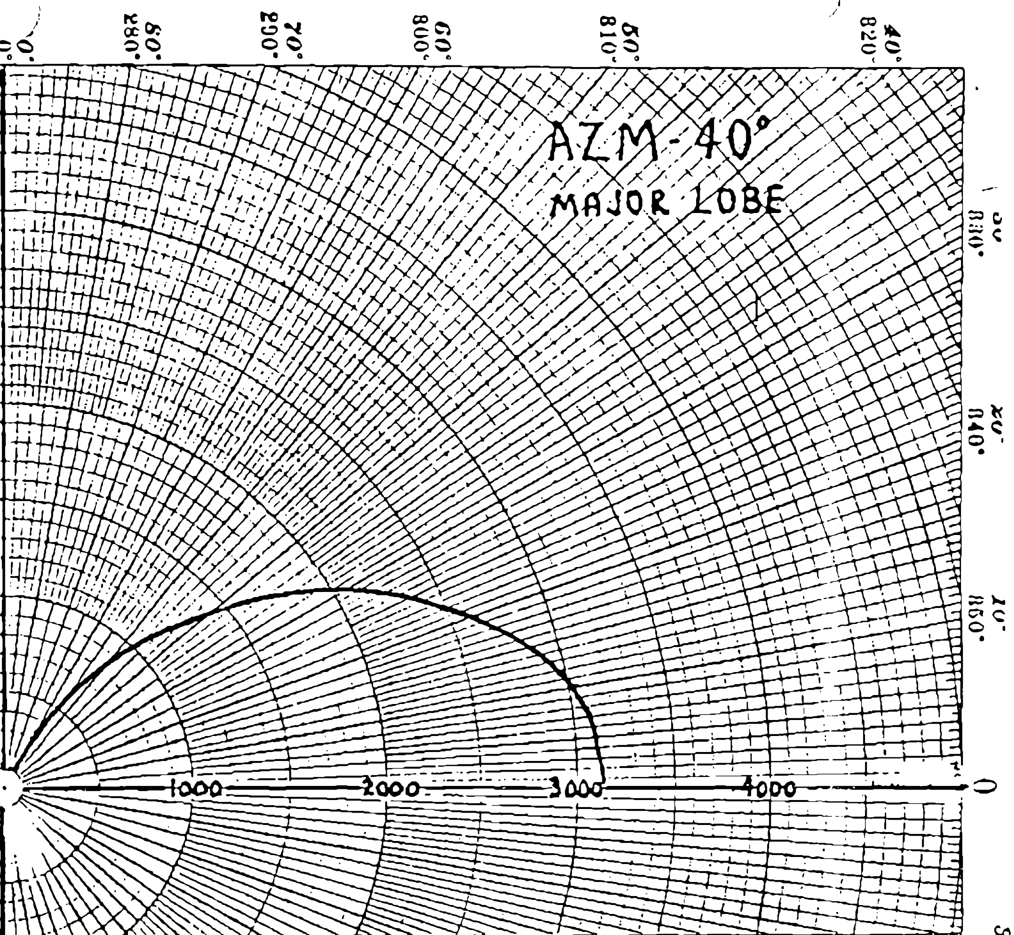
Tower No.	Orientation Azimuth	Spacing Degrees-Feet	Field Ratio Day	Field Ratio Night	Phasing Day	Phasing Night
1	Ref	Ref	1.000	1.000	0°	0°
2a	310.0	145° (583')	2.000		-44°	
2	310.0	220° (886')		1.900		355°
3a	310.0	290° (1146')	1.000		-88°	
3	310.0	440° (1772')		1.000		351°
4	43.0	80° (322')		1.280		-163°
4a	358.4	106.8° (429.4')	0.900		-77°	
5	330.3	230.1° (925.2')	1.800	2.432	-121°	-168°
6a	322.5	369.6° (1486.1')	0.900		-165°	
6	320.4	443.1° (1781.7')		1.280		-172°
7	43.0	160° (644')		1.000		-313°
8	347.1	265.2° (1066.4')		1.900		-318°
9	330.3	460.3° (1850.9')		1.000		-322°



Proposed Horizontal Night-Time
Radiation Pattern
CHFI-AM Toronto, Ontario
680 KHz 10/25 kw DA-2.
Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto, Ontario
N.Tomcio, P.Eng., Nov.1968
No.4125

Revised Dec 17, 1968


AZM-63°
140° 220°
130° 230°
120° 240°
110° 250°
100° 260°
150° 210°
160° 200°
170° 190°
180° 180°
190° 170°
200° 160°
210°
2000
1500
1000
500



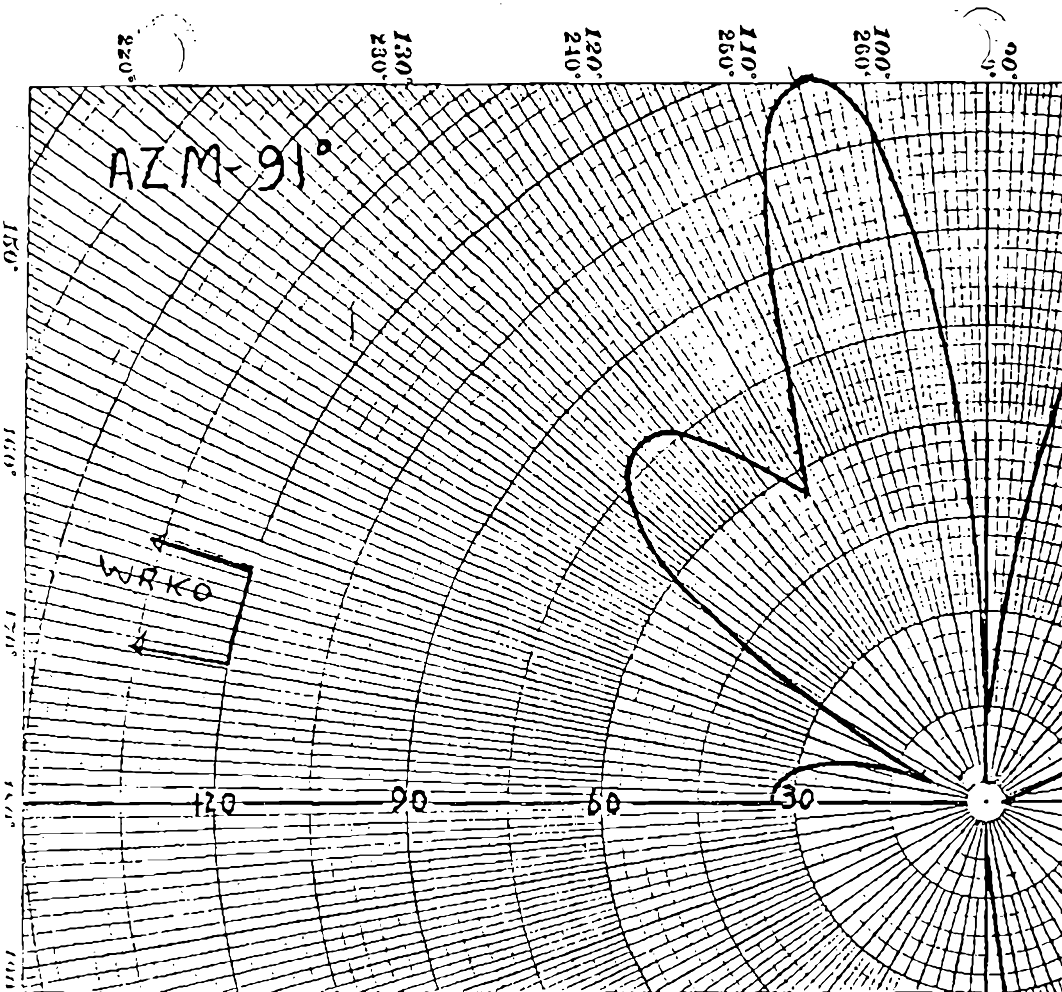
Section 6.4

Proposed Night-time Vertical
Radiation Patterns

CHFI-AM Toronto,Ontario
680 KHz 10/25kw DA-2.

Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto Ontario

N.Tomcio,P.Eng. Nov.1968
No.4125
Revised Mar.24/69



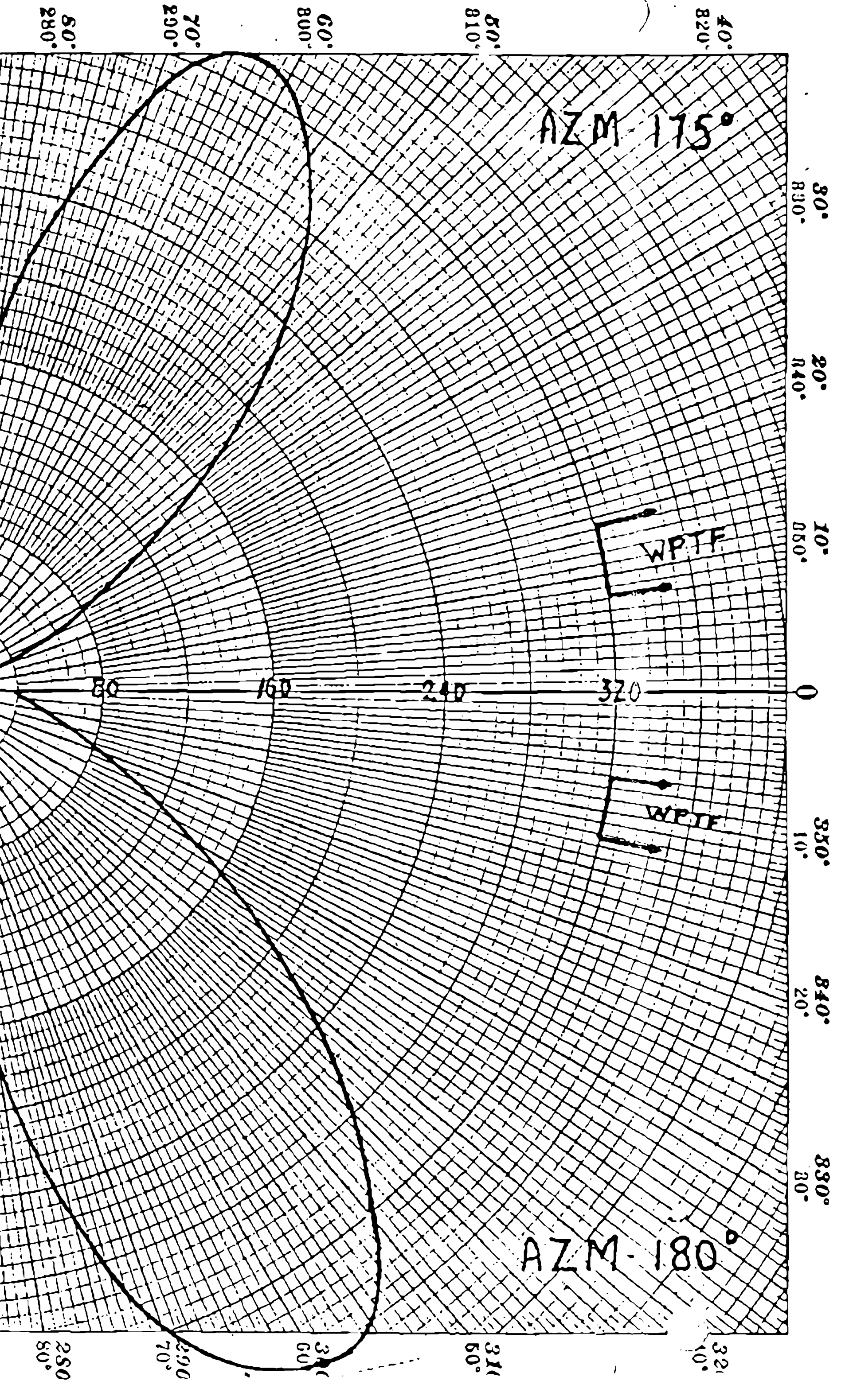
Section 6.4

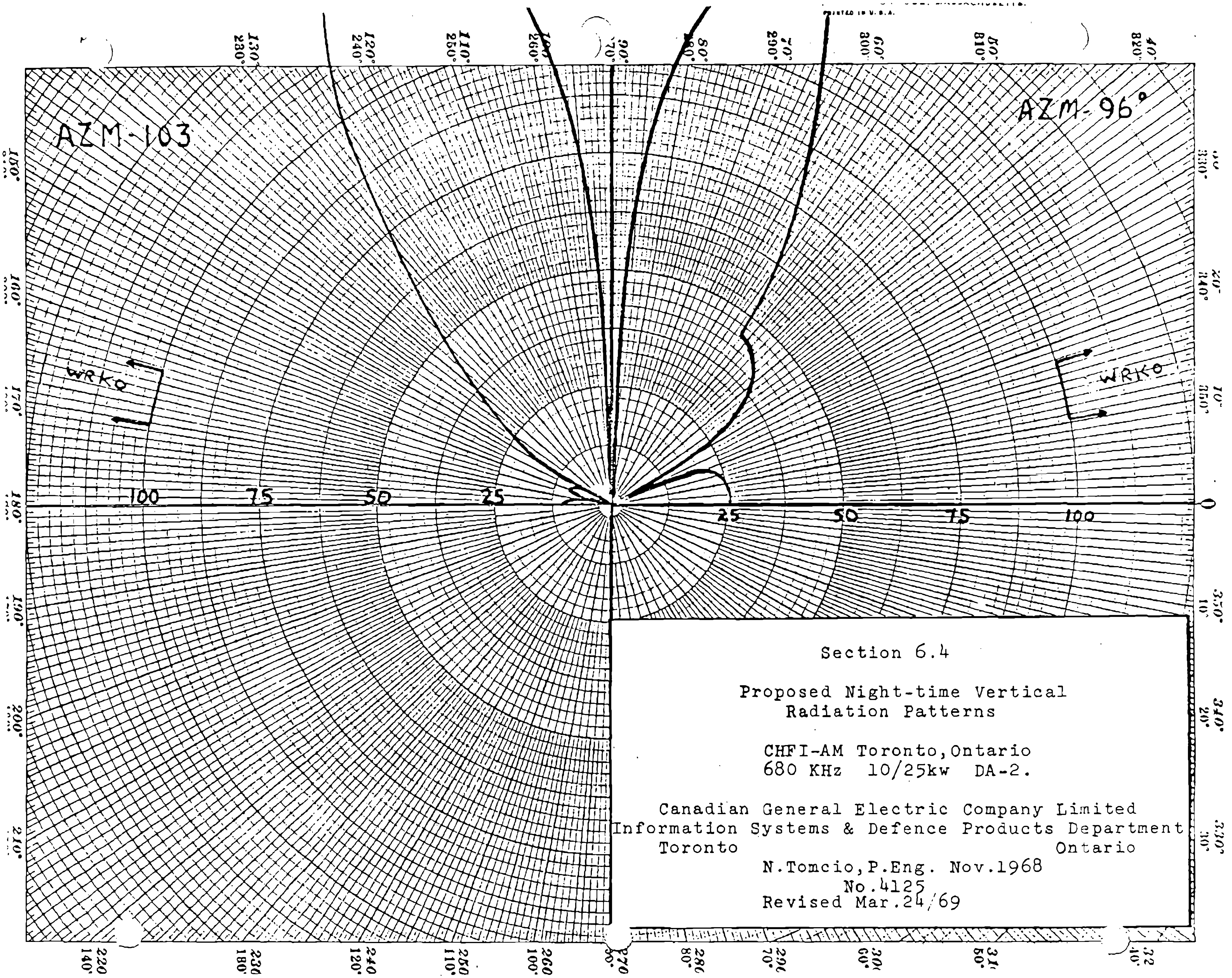
Proposed Night-time Vertical Radiation Patterns

CHFI-AM Toronto, Ontario
680 KHz 10/25kw DA-2.

Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto Ontario

N. Tomcio, P.Eng. Nov. 1968
No. 4125
Revised Mar. 24/69


AZM 175°
WPTF
80
160
240
320
0
WPTF
AZM 180°



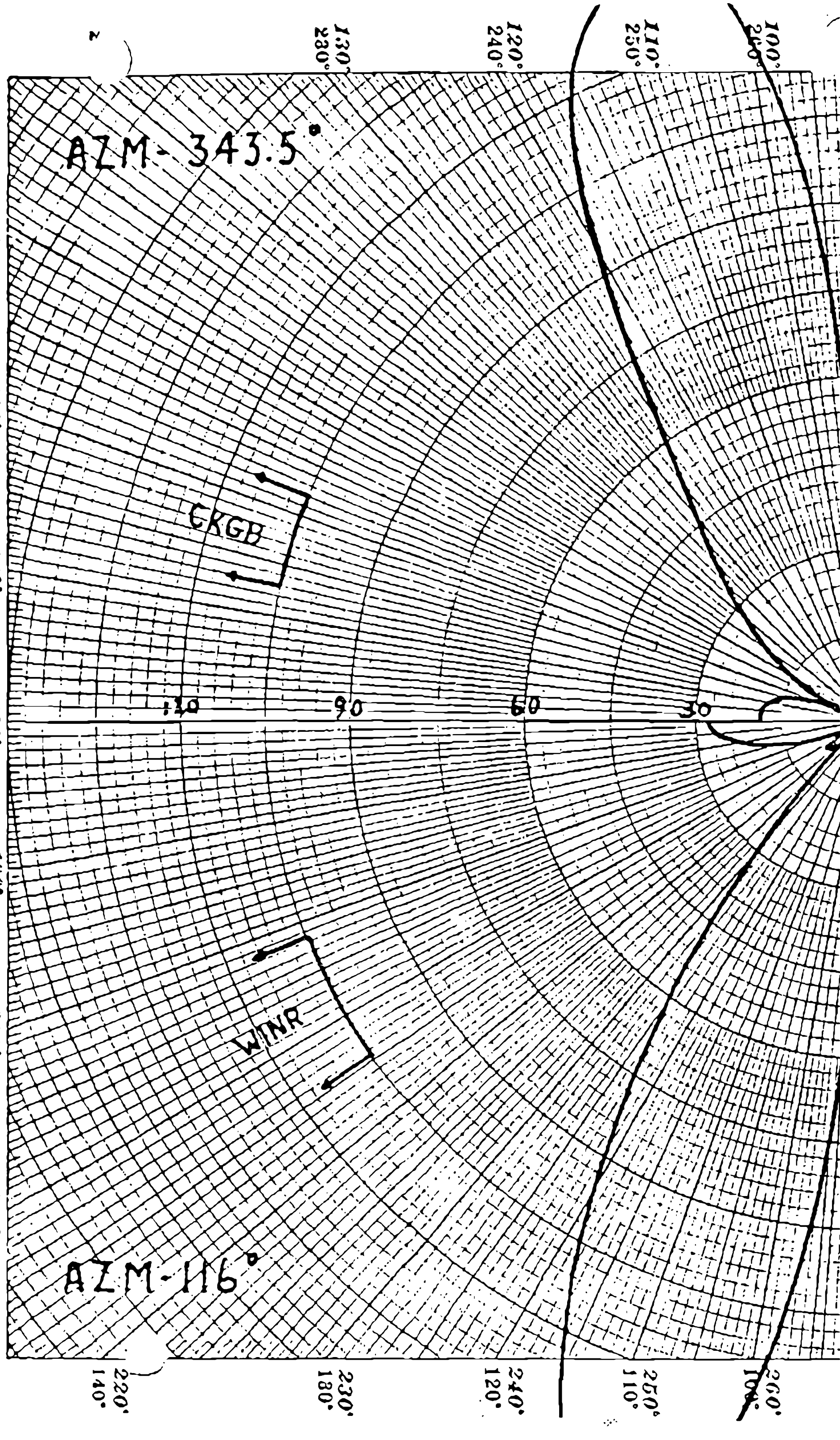
Section 6.4

Proposed Night-time Vertical Radiation Patterns

CHFI-AM Toronto, Ontario
680 KHz 10/25kw DA-2.

Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto Ontario

N.Tomcio, P.Eng. Nov.1968
No.4125
Revised Mar.24/69



AZM-343.5°
CKGB
WINR
AZM-116°
120
90
60
30

Section 6.4

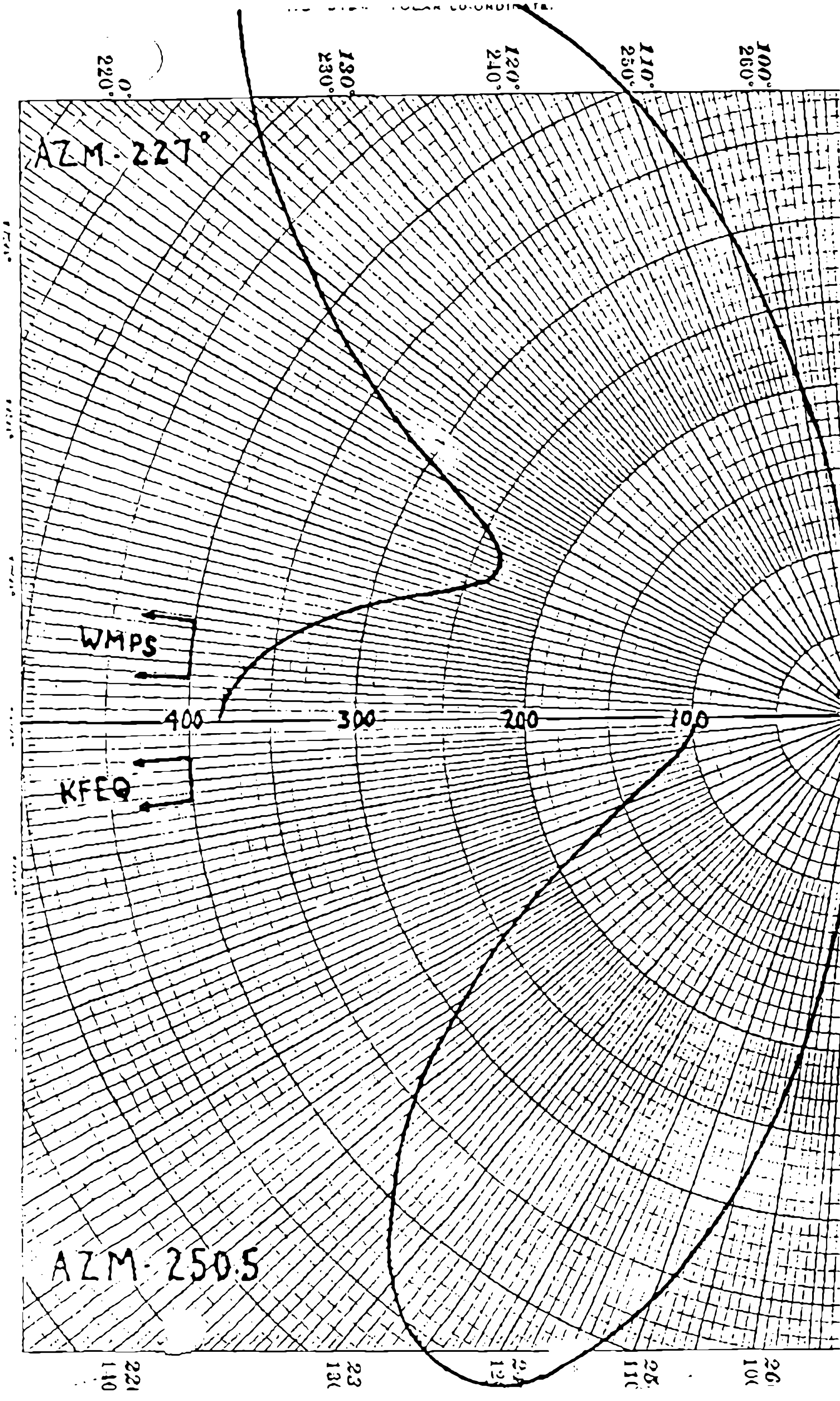
Proposed Night-time Vertical Radiation Patterns

CHFI-AM Toronto, Ontario
680 KHz 10/25kw DA-2.

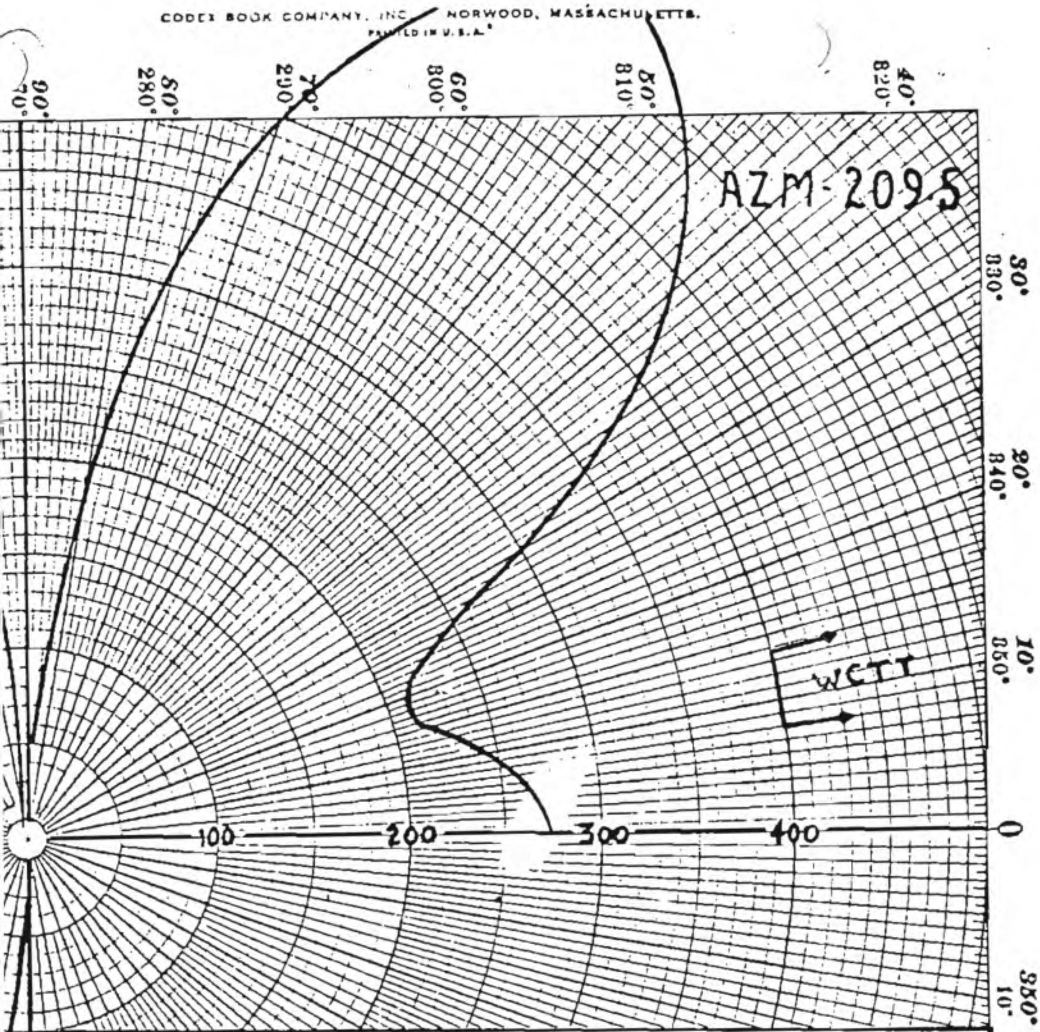
Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto Ontario

N.Tomcio, P.Eng. Nov.1968

No.4125
Revised Mar.24/69



AZM 227°
WMPS
KFEQ
AZM 250.5
400
300
200
100
0°
220°
130°
230°
120°
240°
110°
250°
100°
260°



Section 6.4

Proposed Night-time Vertical
Radiation Patterns

CHFI-AM Toronto, Ontario
680 KHz 10/25kw DA-2.

Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto Ontario
N.Tomcio, P.Eng. Nov.1968
No.4125
Revised Mar.24/69

17

Schedule 4
Annexe 4

RADIO ROGERS LIMITED - RE TORONTO

Name of Director	Address of Residence	Do you reside full time in area being served YES or NO
Nom de l'administrateur	Adresse Résidentielle	Demeurez-vous à plein temps dans la zone desservie OUI ou NON
Edward S. Rogers	3 Frybrook Road, Toronto M4V 1Y7, Ont.	YES
John W. Graham	258 Forest Hill Road, Toronto M5P 2N5, Ont.	YES
Loretta A. Rogers	3 Frybrook Road, Toronto M4V 1Y7, Ont.	YES
Richard J. Stanbury	16 Dell Park Avenue, Toronto M6B 2T4, Ont.	YES
Thomas I. Hull	251 Warren Road, Toronto M4V 2S7, Ont.	YES
John A. Tory	41 Glenallan Road, Toronto M4N 1G9, Ont.	YES
Keith J. Dancy	1360 Nocturne Court, Mississauga, Ontario.	YES
A. H. C. Lewis	98 Farnham Avenue, Toronto M4V 1H4, Ont.	YES
Frank I. Hayes	70 Pleasant Blvd., Town House #8, Toronto M4T 1J8, Ont.	YES
George G. Ledingham	25 Edenbridge Drive, Islington, M9A 3E8, Ont.	YES

Citizenship	Term of Office Date of Commencement	Date of Termination	Present	Proposed
Citoyenneté	Mandat Date d'entrée en vigueur	Date d'échéance	Actuels	Projetés
Canadian	March 1, 1961		YES	YES
Canadian	July 5, 1961		YES	YES
Canadian	June 15, 1964		YES	YES
Canadian	May 31, 1963		YES	YES
Canadian	July 5, 1966		YES	YES
Canadian	July 5, 1966		YES	YES
Canadian	February 10, 1971		YES	YES
Canadian	May 20, 1971		YES	YES
Canadian	January 24, 1972		YES	YES
Canadian	June 29, 1972		YES	YES

2.10 Description of Array Sheet

STATION: CHFI

MAIN STUDIO: Toronto, Ontario

FREQUENCY: 680 kHz

POWER: 10 kwD/25 KwN Class II

NOTIFICATION LIST #: 267

DATE: April 3. 1970

GEOGRAPHICAL

North Lat: 43° 34' 48"
West Long: 79° 38' 30"

ANTENNA CHARACTERISTICS:

Mode of Operation	DA-2
Number of Elements	13
Type of Elements	Guyed uniform cross section, series fed, no top loading.

Tower Height - (above insulators) 300' (74.6°) all towers
(overall) 309' all towers

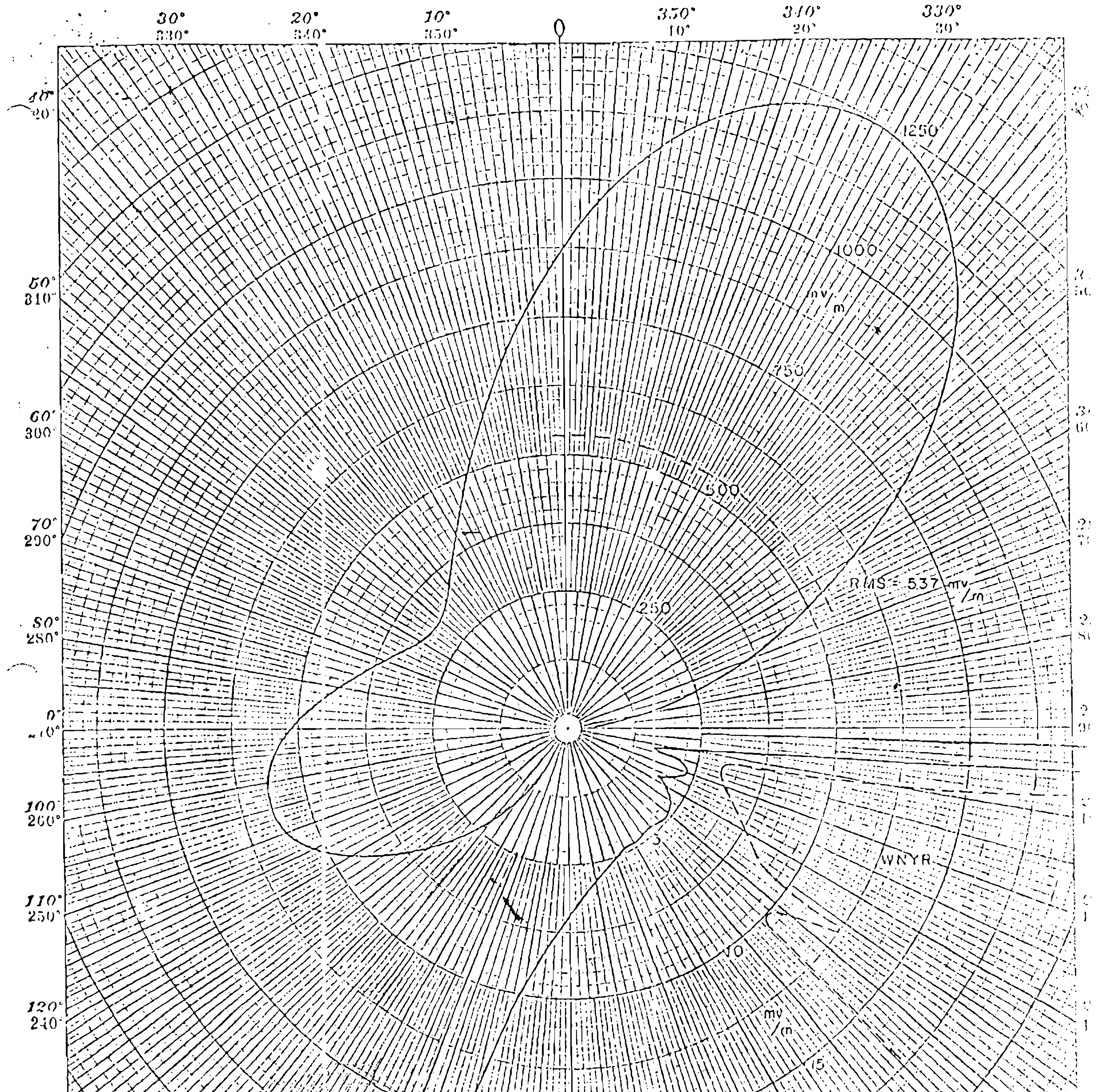
Tower #	Orientation (Az.°)	Spacing Degrees	Spacing Feet	Field Ratio. Day	Field Ratio. Night	Phasing Day	Phasing Night
1	Reference	Reference		1.00	1.000	0.0°	0.0°
2a	310.00	155.00	622.97	2.00		-35.0	
2	310.00	220.00	884.22		1.900		355.0
3a	310.00	310.00	1245.94	1.00		-70.0	
3	310.00	440.00	1768.43		1.000		351.0
4a	2.72	100.40	403.54	0.98		-80.0	
4	43.00	80.00	321.52		1.280		-163.0
5	330.31	230.13	924.91	1.93	2.432	-115.0	-168.0
6a	322.16	379.32	1524.56	0.98		-150.0	
6	320.39	443.07	1780.79		1.280		-172.0
	43.00	160.00	643.07		1.000		-313.0
8	347.05	265.17	1065.76		1.900		-318.0
9	330.31	460.25	1849.82		1.000		-322.0

GROUND SYSTEM:

120 radials of #10 AWG soft drawn copper wire plus an elevated counterpoise 70' in diameter at each tower. Towers interconnected by $1\frac{1}{2}$" x 1/16" copper strap. Radials running between towers bonded to #4 AWG stranded copper wire. Effective length of radials 0.4 λ.

PREDICTED RMS FIELD:

Day RMS	537 mv/m	(170 mv/m for 1 kw)
Night RMS	960 mv/m	(192 mv/m for 1 kw)



Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto, Ontario

AM RADIO STATION CHFI TORONTO, ONTARIO
680 kHz 10 kw D/25 kw N, DA-2 Class II
Pattern No.2024M
Proposed Horizontal Radiation Pattern
Daytime

Date: Apr[illegible] 15, [illegible] | N.Tomcio, P.Eng/ [illegible]

(10)

GOWLING, MacTAVISH, OSBORNE & HENDERSON

E. GORDON GOWLING, Q.C., LL.D.
J. E. OSBORNE, Q.C.
GORDON F. HENDERSON, Q.C.
CHARLES F. SCOTT, Q.C.
KEITH E. EATON
GEORGE PERLEY-ROBERTSON, Q.C.
DAVID WATSON
E. PETER NEWCOMBE, Q.C.
R. G. McCLENAHAN
ROSS W. CLEARY
ROBERT CHEVRIER
JOHN D. RICHARD
BRIAN A. CRANE
WAYNE B. SPOONER
CHARLES E. O'CONNOR
C. ROSS CARSON
DOUGLAS F. SMITH
DAVID F. ALEXANDOR
ROBERT J. LAUGHTON
ROSE-MARIE PERRY
DOUGLAS R. ADAMS
KENT H. E. PLUMLEY
JOHN I. TAVEL
J. RALPH JOHNSTON
DAVID H. HILL
DAVID G. CASEY
Y. A. GEORGE HYNNA
THOMAS A. McDOUGALL
JOANNE B. VEIT

ROBERT M. FOWLER, LL.D.

BARRISTERS & SOLICITORS
PATENT & TRADE MARK AGENTS
116 ALBERT STREET, OTTAWA 4, CANADA

COUNSEL
BERNARD M. ALEXANDOR, Q.C.

TELEPHONE 232-1781
AREA CODE 613
CABLE, HERSON

PATENT AGENTS
MAURICE A. MOFFAT
G. RONALD BELL
ELI J. McKHOOL
WILLIAM N. MACE
VIVIAN H. WICKHAM
BRUCE DUDLEY
JOHN W. ROSS
DONALD W. PUTTICK
NEVILLE S. HEWITT
GEORGE E. FISK
RICHARD J. HICKS
KALEVI P. ASPILA

TRADE MARK AGENTS
BRIAN L. GRAHAM
MARC FORGET
DONALD A. SMYTH
ROBERT W. STERLING
JANE MYERS
ROMA COLBERT

November 6, 1968.

Canadian Radio-Televison Commission,
48 Rideau Street,
Ottawa, Ontario.

Dear Sirs: Re: Rogers Broadcasting Limited Application to amend its broadcasting licence

We are writing this letter of opposition as solicitors for The Simcoe Broadcasting Company Limited.

The Simcoe Broadcasting Company Limited by this letter opposes the application by Rogers Broadcasting Limited to amend its broadcasting licence for CHFI to permit it to broadcast on a frequency of 680 Kc/s at 10,000 watts daytime and 25,000 watts night time.

The reason for the opposition of Simcoe Broadcasting Company Limited to the application of Rogers Broadcasting Limited is that the proposed amendment is dependent upon the successful outcome of an application by Souwesto Broadcasters Limited of St. Thomas, Ontario to amend the broadcasting licence for CHLO to permit it to change its frequency from 680 Kc/s to 1570 Kc/s and to increase its power daytime and night time from 1,000 watts to 10,000 watts. This proposed change in frequency will adversely affect The Simcoe Broadcasting Company Limited.

The Simcoe Broadcasting Company Limited (Radio Station CFRS) is presently broadcasting on a frequency of 1560 daytime at 750 watts. The company has filed an application for amendment of its licence to permit it to broadcast on a frequency of 1560 daytime at 1,000 watts and 1570 night time at 1,000 watts. This application is presently pending before the Commission to be heard at a later date.

If Souwesto Broadcasters Limited is permitted to change its frequency for daytime and night time broadcasting to 1570 Kc/s, this becomes unavailable to Station CFRS for night time broadcasting. As a practical matter, station CFRS would be prevented from expanding its service in keeping with the demands of its market. The Counties of Norfolk and Haldimand represent the area of coverage of Station CFRS and these counties are in the stage of economic growth and development. There is a present need for expanded local radio service in this area. This station provides the only local service to a substantial portion of the area.

If Souwesto Broadcasters Limited is permitted to change its frequency from 680 Kc/s to 1570 Kc/s for the purpose of freeing frequency 680 Kc/s for the benefit of Rogers Broadcasting Limited, then The Simcoe Broadcasting Company Limited will be inhibited in providing a local service to a growing local community.

A station restricted to daytime service is destined to economic stagnation. It has no real future in broadcasting.

The success of this application and that of Souwesto Broadcasters Limited would result in placing Station CFRS in an impossible technical and economic position.

The Simcoe Broadcasting Company Limited has explored possible alternatives and none appear to be either technically or economically feasible and we, therefore, urge the Commission to deny this application by the Rogers Broadcasting Limited.

Yours very truly,

Gowling MacTavish Osborne & Henderson

GFH:jm

TO: CANADIAN RADIO-TELEVISION COMMISSION November 18, 1968

SUPPLEMENTAL SUBMISSION
TO THE STATEMENT OF OPPOSITION

TO APPLICATION BY ROGERS BROADCASTING LIMITED FOR AUTHORITY TO ESTABLISH A STUDIO AT BURLINGTON ONTARIO FOR RADIO STATION CHAM, HAMILTON, ONTARIO (ITEM 18 ON AGENDA OF PUBLIC HEARINGS, OTTAWA, NOVEMBER 19, 1968)

AND TO THE STATEMENT OF COMMENTS

TO APPLICATION BY ROGERS BROADCASTING LIMITED TO AMEND ITS BROADCASTING LICENCE FOR RADIO STATION CHFI, TORONTO, ONTARIO, (ITEM 7)

AND TO THE APPLICATION BY ROGERS CABLE TV LIMITED FOR A LICENCE TO CARRY ON A NEW C.A.T.V. BROADCASTING UNDERTAKING TO SERVE BURLINGTON AREAS (ITEM 42).

AND TO THE APPLICATION BY SOUWESTO BROADCASTERS LIMITED TO AMEND ITS BROADCASTING LICENCE FOR STATION CHLO, ST. THOMAS, ONTARIO (ITEM 8)

THIS SUPPLEMENTAL SUBMISSION IS MADE TO THE CANADIAN RADIO-TELEVISION COMMISSION BY ANDREW J. BATHGATE AND ROBERT McLAUGHLIN BY THEIR SOLICITORS, MINDEN & GROSS PER J.S. GRAFSTEIN, 111 RICHMOND STREET WEST, TORONTO 1, ONTARIO.

1. On Wednesday, November 13th, 1968, Mr. E. S. Rogers of Rogers Broadcasting Limited contacted Mr. Donald B. Williamson, the broadcasting consultant for Andrew J. Bathgate and Robert McLaughlin, to discuss the above-cited Statement of Opposition and Statement of Comments. Mr. Williamson arranged a meeting with Mr. Rogers and Mr. McLaughlin at the office of Minden & Gross for November 14th, 1968.

2. On November 14th, Mr. Rogers attended a meeting with Messrs. McLaughlin, Williamson and Grafstein. At a subsequent meeting held on November 15th, Mr. Turnpenny of Rogers Broadcasting Limited also attended.

3. At the outset Mr. Rogers stated that the application of Rogers Broadcasting Limited to establish a studio in the Town of Burlington for radio station CHAM was only to provide a supplemental broadcasting facility which would partially serve the local needs of the Town of Burlington as an interim measure until the granting of a local radio licence for the Town of Burlington by the Commission.

4. Mr. Rogers stated that since November 1st, Station CHAM was no longer on the air broadcasting from its studio in the Burlington Mall.

5. Mr. Rogers further stated that coincident with the commencement of local broadcast service by a station licensed for the Town of Burlington, radio station CHAM would cease broadcasting from its studio in the Burlington Mall if the present application of CHAM is approved.

6. Mr. Rogers further stated that Rogers Broadcasting Limited's lease for the studio in the Burlington Mall allows Rogers Broadcasting Limited to terminate such lease if the Commission grants a radio licence for the Town of Burlington.

7. Mr. Rogers, on behalf of Rogers Broadcasting Limited, has further undertaken that the studio facilities in the Town of Burlington would be made available to a local radio licensee subject to reasonable terms being agreed upon between such parties.

8. Mr. Rogers further stated that Rogers Broadcasting Limited has not and will not oppose any local broadcasting application for the Town of Burlington and that the present application to provide for a studio in the Town of Burlington was only to provide interim service to the local community.

9. Mr. Rogers further stated that the application of Rogers Broadcasting Limited to establish a studio in the Town of Burlington was not made to prejudice the granting of a local radio licence for the Town of Burlington. Mr. Rogers considers that the establishment of a purely local broadcast service for the Town of Burlington would be in the best interests of the community should the Commission so determine, based on the policies followed by the Commission in the granting of radio licences for local service stations.

10. CONCLUSION: In the light of the foregoing, Messrs. Bathgate and McLaughlin submit that should the Commission determine that it is in the best interests of local broadcasting that the present application of Rogers Broadcasting Limited to allow a studio for the Town of Burlington be granted, such amendment to the licence be made subject to the foregoing conditions.

11. This supplemental submission has been acknowledged by E.S. Rogers on behalf of Rogers Broadcasting Limited and by their Counsel, Mr. J. W. Graham, and they have concurred with the statements as set forth herein.

Acknowledged on behalf
of Rogers Broadcasting Limited
Edw S Rogers President
[illegible] Counsel
20.11.68

File (10

SIMCOE BROADCASTING COMPANY LIMITED
P.O. Box 98
Simcoe, Ontario.

November 22, 1968.

Mr. F.K Foster,
Secretary,
Canadian Radio Television Commission,
48 Rideau Street,
Ottawa, Ontario.

Dear Sir:

It has come to our attention that there is now on file with you a letter dated November 13, 1968 from Mr. J.W. Graham, Q.C. to which is appended a technical report prepared on behalf of Rogers Broadcasting Limited. Since the letter and technical report purport to make proposals for alternate frequencies for C.F.R.S., this company is affected by the proposal. We believe it, therefore, to be in the interests of the Commission, the public as well as this company for the Commission to have on record our views relating to such proposals.

We believe that there are certain technical deficiencies in these proposals of alternatives and channel sharing propositions which must be examined and evaluated. On the basis of this evaluation a judgment may be made with respect to the relative merit of each of the propositions.

As we see it at the moment 1600 kc is not available to C.F.R.S. Simcoe if it is related to Rule 14 of Department of Transport Broadcast procedure No. 1. This rule is concerned with image interference which in this case involves a frequency separation between C.H.F.I. on 680 kc and a possibility of CFRS on 1600 kc. If the Department would waive Rule 14, provided an understanding could be reqched with CHFI, then this objection to 1600 kc is removed. However, one other item which has to be studied is the compatibility of CFRS on 1600 kc and a proposed Guelph assignment on 1590 kc.

With regard to the 1090 kc alternative the proposal which was presented to CFRS has not revealed all the implications related to the use of this frequency. The utilization of this channel must be related to the provisions of Rule 11 of the Department of Transport Boradcast Procedure No. 1. The Rule is concerned with the prospect of interference to reception caused by receiver oscillator radiation. In this instance a receiver tuned to CFCO Chatham on 630 kc may create some limitations to the service to be realized by CFRS on 1090 kc. In addition, the study in hand does not show the restriction caused by the existence of CFTJ Galt on 1110 kc, within the proposed 1090 coverage area, nor does the study show that WKYC Cleveland, with 50 kws on 1100 kc will cause some limitation. Furthermore, the use of 1090 at CFRS could inhibit the expansion of CFTJ Galt on 1110 kc. This is so because once CFRS accepts a certain area of limitation, it would be contrary to the rules to contemplate an expansion of this area of limitation through a power increase at CFTJ on 1110 kc. We are not, however, concerned about service in the Galt area and we are prepared to be realistic with respect to expansion of the CFTJ facilities. The 1090 kc array is complex and has not to our knowledge been examined by the Department of Transport. The proposed system for 1090 kc is expensive and if subsequent studies indicated that the proposed sytem should be even more complex the cost factor is an item that must have careful consideration.

If the decision in this matter of the overall utilization of frequencies is influenced by the suggestion that Burlington and St. Thomas are compatible on 1570 kc then we urge that this also be examined. The Burlington and St. Thomas transmitter site separation is of the order of 75 miles and it is our understanding on the basis of discussions with engineers at the Department of Transport that the existing technical rules and criteria do not enable an evaluation of the night-time skywave interference situation where the separation is less than 100 miles. Therefore we believe that new criteria will have to be established to enable an appraisal and assessment of the night-time sharing of the 1570 kc channel by Burlington and St. Thomas.

There is no indication that the Department of Transport has or will judge the Rogers Broadcasting Limited proposals as valid or that a complete engineering submission will be technically acceptable.

It is our hope that the foregoing will assist in the examination of this complex situation. We respectfully request that our remarks be considered in the spirit of co-operation in which they are offered.

Yours very truly,

T.M. Fielder,
President,
Simcoe Broadcasting Company Limited.

c.c. Mr. Pierre Juneau,
Mr. W.J. Wilson, D.O.T.

CANADIAN RADIO-TELEVISION COMMISSION
CONSEIL DE LA RADIO-TÉLÉVISION CANADIENNE

LICENCE TO CARRY ON A BROADCASTING TRANSMITTING UNDERTAKING

Issued in accordance with the provisions of the Broadcasting Act, and the Regulations made thereunder:

RADIO ROGERS LIMITED 29-8-72
~~ROGERS BROADCASTING LIMITED~~

is hereby authorized to carry on a Broadcasting Transmitting Undertaking at TORONTO, ONTARIO

with the broadcasting transmitting antenna located 43° 35' ± 01' N., 79° 30' ± 01' W., Toronto, Ontario.

This licence is granted on the basis of the contours and particulars contained in the approved application with the programs received from the studios located at 13 Adelaide St., East, Toronto, Ontario.

This licence shall remain in force from the date hereof until March 31, 1974 on payment of the prescribed annual licence fees and subject to observance of the provisions of the Broadcasting Act and Regulations heretofore or hereafter made under the authority thereof and the conditions contained herein.

This licence is not valid during any period while the associated technical construction and operating certificate issued under the Radio Act is suspended or revoked.

LICENCE D'EXPLOITATION D'UNE ENTREPRISE D'ÉMISSION DE RADIODIFFUSION

Délivrée conformément aux dispositions de la Loi sur la radiodiffusion et des règlements établis en vertu de cette loi

RADIO ROGERS LIMITED 29-8-72
~~ROGERS BROADCASTING LIMITED~~

est autorisé(e) par les présentes à exploiter une entreprise d'émission de radiodiffusion à TORONTO, ONTARIO
l'antenne émettrice étant située à 43° 35' ± 01' N., 79° 30' ± 01' O., Toronto, Ontario.

La présente licence est accordée en fonction des contours et des détails contenus dans la demande approuvée, les émissions devant etre celles reçues des studios situés à 13 est, rue Adelaide, Toronto, Ontario.

La licence restera en vigueur à partir de la date indiquée ci-dessous jusqu'au 31 mars 1974 moyennant paiement de la redevance annuelle prescrite et sous réserve des dispositions de la Loi sur la radiodiffusion et des règlements déjà établis ou qui pourront l'être par la suite en vertu de cette Loi, et des conditions qui y sont prescrites.

Cette licence n'a aucune validité pendant toute période où le certificat technique de construction et de fonctionnement délivré en vertu de la Loi sur la radiodiffusion est suspendu ou retiré.

COPY COPIE

Call Sign / Indicatif d'appel	*Frequency / Fréquence*	*Power / Puissance (Watts)*
~~CHFI~~ J.A.G. CFTR 21.6.71	680 KHz	10,000 Day /Jour 25,000 Night/Nuit

The licensee's attention is drawn to the Conditions on back hereof

Le titulaire est prié de bien noter les conditions qui sont inscrites au verso.

Date April 1, 1971

Original Signed by
F. DELANEY

Engineering Brief

for a

Change in the Daytime Antenna Pattern

and an

Increase in Daytime Power

at

AM Broadcasting Station CFTR

Toronto, Ontario

Present Operation: 680 KHZ 10D/25N DA-2 Class II

Proposed Operation: 680 KHZ 25KW DA-2 Class II

Prepared for
Rogers Broadcasting Limited
13 Adelaide St. East
Toronto, Ontario

Prepared by
Canadian General Electric Company Limited
Commercial Communications Section
Toronto, Ontario
May 1972.

Section 1 - GENERAL

1.1 Purpose of Brief

This Engineering Brief has been prepared to support the application of Rogers Broadcasting Limited, Toronto, Ontario for authority to change the daytime antenna pattern and increase the daytime power of AM Broadcasting Station CFTR Toronto, Ontario. The present operation is 10 KW daytime/25KW nightime, DA-2, on 680 KHZ. The proposed operation is 25 KW DA-2 on the same frequency. It is not proposed to change the transmitter site nor the present night-time mode of operation. The change in the daytime pattern shape is minor.

1.2 Purpose of Daytime Power Increase

The proposed increase in daytime power will improve service in the present coverage area and will increase the received signal strength in the area where co-channel interference is excessive.

1.3 Location of Station

It is proposed to use the existing site. The co-ordinates are

43° 34' 48" North Latitude
79° 38' 30" West Longitude

Section 2 - TECHNICAL DETAILS

2.1 Channel Conditions

It is proposed to use the presently authorized frequency of 680 KHZ.

The possibility of ground wave interference to co-channel and adjacent channel stations was investigated for:

Station	Frequency KHZ	Class	Power KW	Location
WNYR	680	II	0.25	Rochester N.Y.
WISR	680	II	0.25	Butler, Pa
WINR	680	II	10/0.5N	Binghampton, N.Y.
WDBC	680	II	10D/IN	Escanaba, Mich.
CKGB	680	II	10 DA- 2	Timmins, Ontario.
CBF	690	I-A	50	Montreal, P.Q.

Permissable radiation to the above assignments has been determined by the equivalent distance method.

For the protection to WNYR, the location of its 0.5 mv/m contour as measured by Raymond E. Rohrer and Associates and as shown on the map included on Section 6 was used as the basis of the calculation.

(Since the ground conductivity in the area to the west of Rochester is lower than that shown on the FCC Ground Conductivity Map and since measured data takes precedence over the theoretical map data, the 0.5 mv/m contour as shown is recognised as the official protected contour.)

The calculation of permissable radiation towards WDBC was based on its proposed change in daytime pattern notified in US Change List No. 1456.

The calculation of permissable radiation towards CBF was based on its proposed change of site notified in Canadian Change List No. 288.

The results of the calculations have been tabulated in Section 6.1. The table indicates that adequate ground wave protection is provided.

2.2 Harmonic Interference

There are no stations in the area with which a second harmonic relationship exists.

2.3 Oscillator Radiation Interference

There are no stations in the area with which receiver oscillation interference is anticipated.

2.4 Intermodulation and Crossmodulation Interference

Any intermodulation or crossmodulation problems with other stations in the area will be remedied by the applicant. Based on the present operation, no such problems are expected.

2.5 Image Interference

The shaded areas on the map in Section 6 show the estimated extent of possible image interference to CFTR in the Guelph and Hamilton areas.

The area near Guelph shows the region in which the field intensity from the proposed but not implemented Guelph station on 1590 KHZ is equal to or greater than the field intensity from the proposed CFTR 25KW daytime pattern.

Similarly, the shaded area near Hamilton shows the region in which the field intensity of CJRN Niagara Falls, Ontario (1600 KHZ, 10KW, DA-2) is equal to or greater than the field intensity from CFTR.

Should this type of interference prove to be a problem, the applicant will endeavour to satisfy all legitimate claims of image interference to CFTR or, if this is impractical, will accept a loss of coverage in the affected area.

2.6 Population within the 1V/m contour

It is not anticipated that blanketing will be a problem within the 1 V/m contour. However, the applicant agrees to take remedial action if required.

2.7 Array Design

The change in daytime antenna pattern and increase in daytime power to 25 KW will utilize the tower configuration presently used by the CFTR 10KW daytime pattern.

The change in the daytime pattern shape is slight, consisting of a reduction of radiation towards WNYR.

The protection to WNYR will represent a pattern suppression of less than 2% of the peak horizontal value. The radiation in the direction of WNYR will be kept within the required protection by careful array adjustment as well as by detuning metallic structures if necessary.

Constructional details as outlined in the original 10KW Day Brief (May 1968) and which have been proved to be successful in the implementation of the 1KW,2.5 KW and 10KW Daytime patterns as well as the 10KW and 25KW nighttime patterns will be used to ensure array stability and pattern control.

For example:

1) Use of a high resolution and highly stable RF phase angle and amplitude monitor-Nems-Clarke Type PPM-101.

2) Using a counterpoise 70 feet in diameter, elevated nine feet above ground, around the base of each tower.

3) All transmission lines, control, AC power and sampling lines to the tower have been buried.

4) All towers have a minimum of guy levels. These guys are broken up by insulators at maximum intervals of 50 feet.

5) The tuning and phasing equipment is custom designed, with the power division and phase control equipment located in the transmitter building.

6) The method of detuning the unused towers in the array, which was found to be successful during the 10KW Day and 25KW Night Proofs of Performance, will be employed for the new pattern.

Similar detuning techniques will be applied as required, to any re-radiating structures outside the array.

Should all these above measures prove to be insufficient to establish an acceptable radiation pattern, the applicant agrees to reduce the power to an acceptable level.

SECTION 2 - TECHNICAL DETAILS

2.8 Description of Array Sheet

STATION: CFTR

MAIN STUDIO: Toronto, Ontario

FREQUENCY: 680 kHz

POWER: 25KW DA-2 Class 11

NOTIFICATION LIST #:

DATE:

GEOGRAPHICAL

North Lat: 43° 34' 48"
West Long: 79° 38' 30"

ANTENNA CHARACTERISTICS:

Mode of Operation	DA-2
Number of Elements	13
Type of Elements	Guyed uniform cross section, series fed, no top loading.

Tower Height - (above insulators) 300' (74.6°) all towers
(overall) 309 all towers

Tower #	Orientation (Az.°)	Spacing Degrees	Field Ratio Day	Field Ratio Night	Phasing Day	Phasing Night
1	Reference	Reference	1.00	1.000	0.0°	0.0°
2a	310.00	155.00	2.00		-35.0	
2	310.00	220.00		1.900		355.0
3a	310.00	310.00	1.00		-70.0	
3	310.00	440.00		1.000		351.0
4a	2.7214	100.4028	0.97		-80.0	
4	43.00	80.00		1.280	-115	-163.0
5	330.3137	230.1256	1.93	2.432	-155.0	-168.0
6a	322.1583	379.3216	0.98		-150.0	
6	320.3878	443.0751		1.280		-172.0
7	43.00	160.00		1.000		-313.0
8	347.0533	265.1708		1.900		-318.0
9	330.3137	460.2511		1.000		-322.0

GROUND SYSTEM:

120 radials of #10 AWG soft drawn copper wire plus an elevated counterpoise 70' in diameter at each tower. Towers interconnected by 1-1/2" x 1/16" copper strap. Radials running between towers bonded to #4 AWG stranded copper wire. Effective lenght of radials 0.4

PREDICTED RMS FIELD:

Day RMS	850	(170 mv/m for 1kw)
Night RMS	960 mv/m	(192 mv/m for 1kw)

2.9 Operating Impedances, Currents and Powers

Z_{1} =	-2.9 -j39.4	ohms
Z_{2a} =	11.5 -j68.7	ohms
Z_{3a} =	4.7 -j1006	ohms
Z_{4a} =	47.5 -j51.0	ohms
Z_{5} =	47.0 -j30.6	ohms
Z_{6a} =	47.5 -j59.0	ohms
I_{1} =	-9.7	amperes
I_{2a} =	15.8	amperes
I_{3a} =	9.3	amperes
I_{4a} =	9.2	amperes
I_{5} =	17.2	amperes
I_{6a} =	9.3	amperes
P_{1} =	-273	watts
P_{2a} =	2871	watts
P_{3a} =	407	watts
P_{4a} =	4020	watts
P_{5} =	13904	watts
P_{6a} =	4108	watts

The above figures were derived from the CFTR 10KW Daytime Final Proof of Performance.

Section 3 - STATION COVERAGE

3.1 Area to be Served by the Station

The coverage maps in Section 6 indicate the extent of the signal to Metropolitan Toronto and surrounding area, and the extent of the 0.5 and 0.25 mv/m contours. The increase in power will improve the signal to all areas presently served by the station, while maintaining the protection to co-channel and adjacent channel stations.

The shaded area on the 0.5 mv/m map shows the area where the expected CFTR/WNYR field intensity rato is less than 20/1. The extent of WNYR's signal in Southern Ontario was established by field strength measurements.

3.2 Ground Conductivity

The ground conductivity used in estimating the station coverage was taken from the CFTR 10KW Day and 25KW Night Proofs of Performance.

Section 4 SOURCES OF DESIGN INFORMATION

4.1 Station lists and change list up to an including

- Canada Change List #292
- U.S. Change List #1458

4.2 Ground conductivity data

- 10 KW Day and 25KW Night Proofs of Performance for CFTR
- DOC Provisional Ground Conductivity Map
- FCC Figure M3 Ground Conductivity Map

4.3 The predicted effective (R.M.S.) field was derived by spherical integration of the complete pattern, then modifying the value thus obtained by use of the curve "Field Intensity for 1 Kilowatt" published by the Department of Communications.

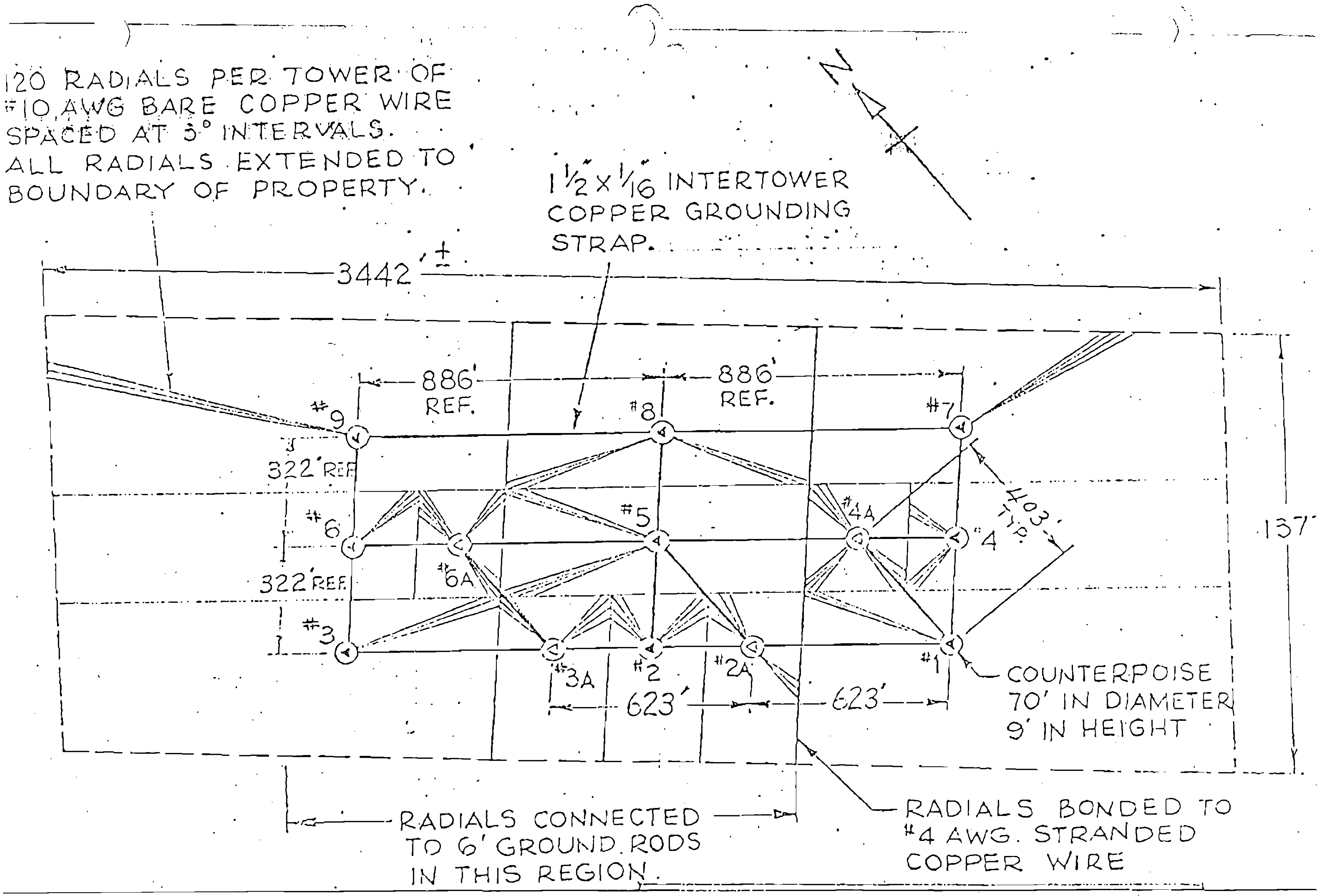
4.4 Bearings were determined from great circle calculations and from a Lambert conic projection map. Distances were computed from great circle calculations and from an Albers equal area projection map: scale 1:2, 500,000.

Section 5 - Engineer Responsible for Brief

David Wood

D.F. Wood P. Eng.
Technical Administrator
Broadcast Consulting Engineering Services
& AM/FM Broadcast Systems
Canadian General Electric Company Ltd.

June 6,1972.



AM RADIO STATION CFTR
TORONTO, ONTARIO

TOWER LAYOUT

August 25, 197

GROUNDWAVE INTERFERENCE ANALYSIS Section 6.1

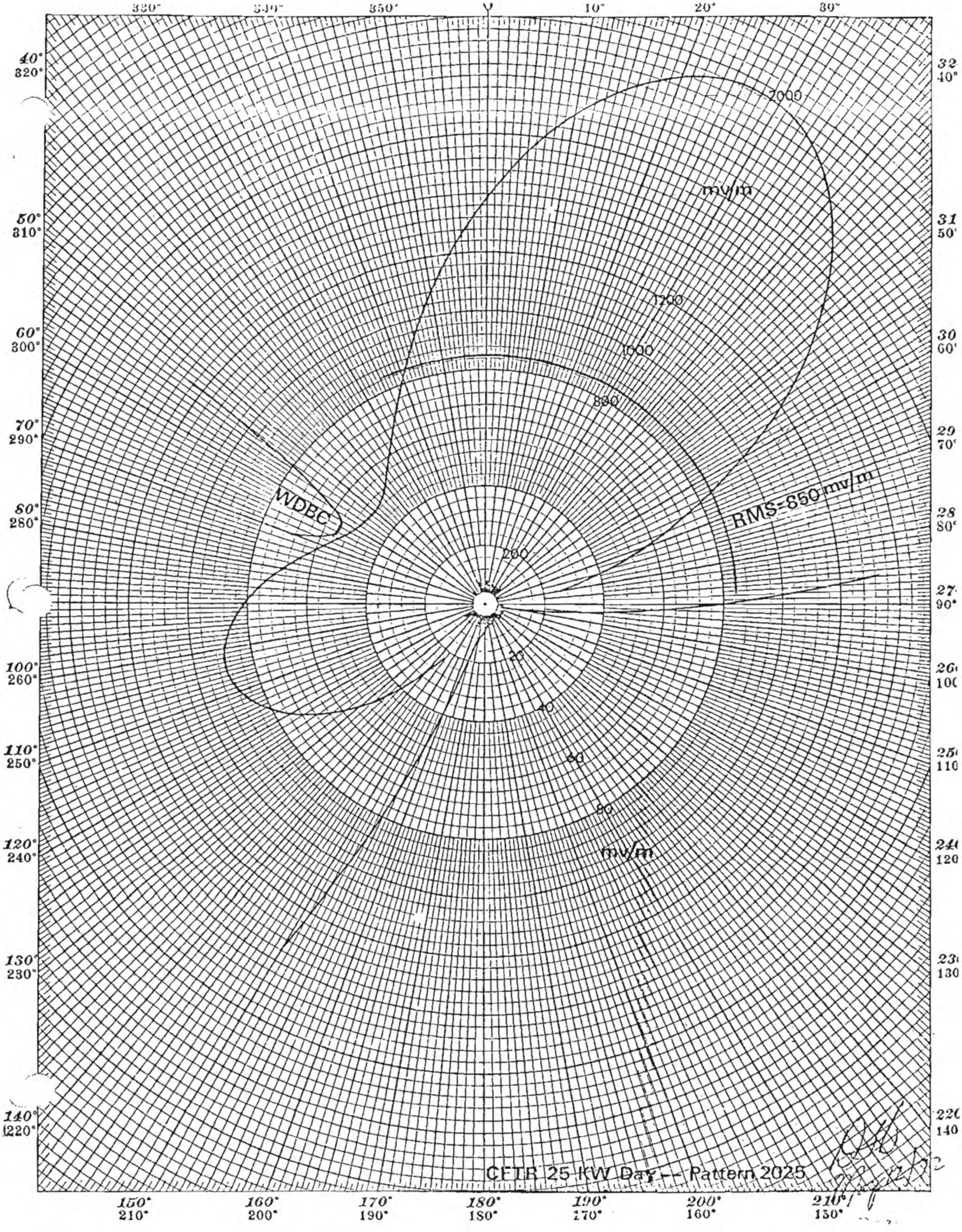
From	To	Contour mv/m	Azm. Deg.	Dist. miles	Cond. /Dist. 10^{-14} emu/miles	Intf. 100 mv/m mv/m	Perm. Intf. mv/m	Perm. Rad. mv/m	* Prop. Rad. mv/m	Prop. Intf. mv/m
CFTR	WNYR	0.5 A	98	138	6/5,8/133	0.061	0.025	41.0	16.00	0.0098
		B	99.5	84	6/5,8/79	0.208	0.025	12.0	10.50	0.0218
		C	103.5	61.8	6/5,8/56.8	0.42	0.025	5.9	3.70	0.0155
		D	105.5	61.9	6/5,8/56.9	0.42	0.025	5.9	4.2	0.0176
		E	123.5	72.2	6/4,8/68.2	0.30	0.025	8.3	5.9	0.0177
		F	126.5	85.6	6/4,8/81.6	0.20	0.025	12.5	6.3	0.0126
		G	132.0	88	6/4,8/30 20/7,8/35,4/12	0.25	0.025	10.0	6.2	0.0154
CFTR	WISR	0.5 A	173	185	10/8,8/18,20/25 8/41,4/30/2/63	0.0148	0.025	169	6.90	0.00102
		B	180	160	10/9,8/16,20/28 8/37,4/33,2/37	0.028	0.025	93.5	9.1	0.00255
		C	184	146	10/10,4/14 20/26,8/40,4/35 8/21	0.048	0.025	52.1	10.7	0.00514
		D	194	170	10/16,8/6,20/33 8/55,4/13,4/47	0.043	0.025	58.3	28.6	0.0123
CFTR	WINR	0.5 A	98	213	6/5,8/108,4/100	0.012	0.025	208	16.0	0.00192
		B	115	198	6/4,4/114,4/80	0.0173	0.025	144.6	4.50	0.00078
		C	132	188	6/5,8/73,4/110	0.0153	0.025	163.4	6.2	0.00095

*Based on theoretical pattern #2025

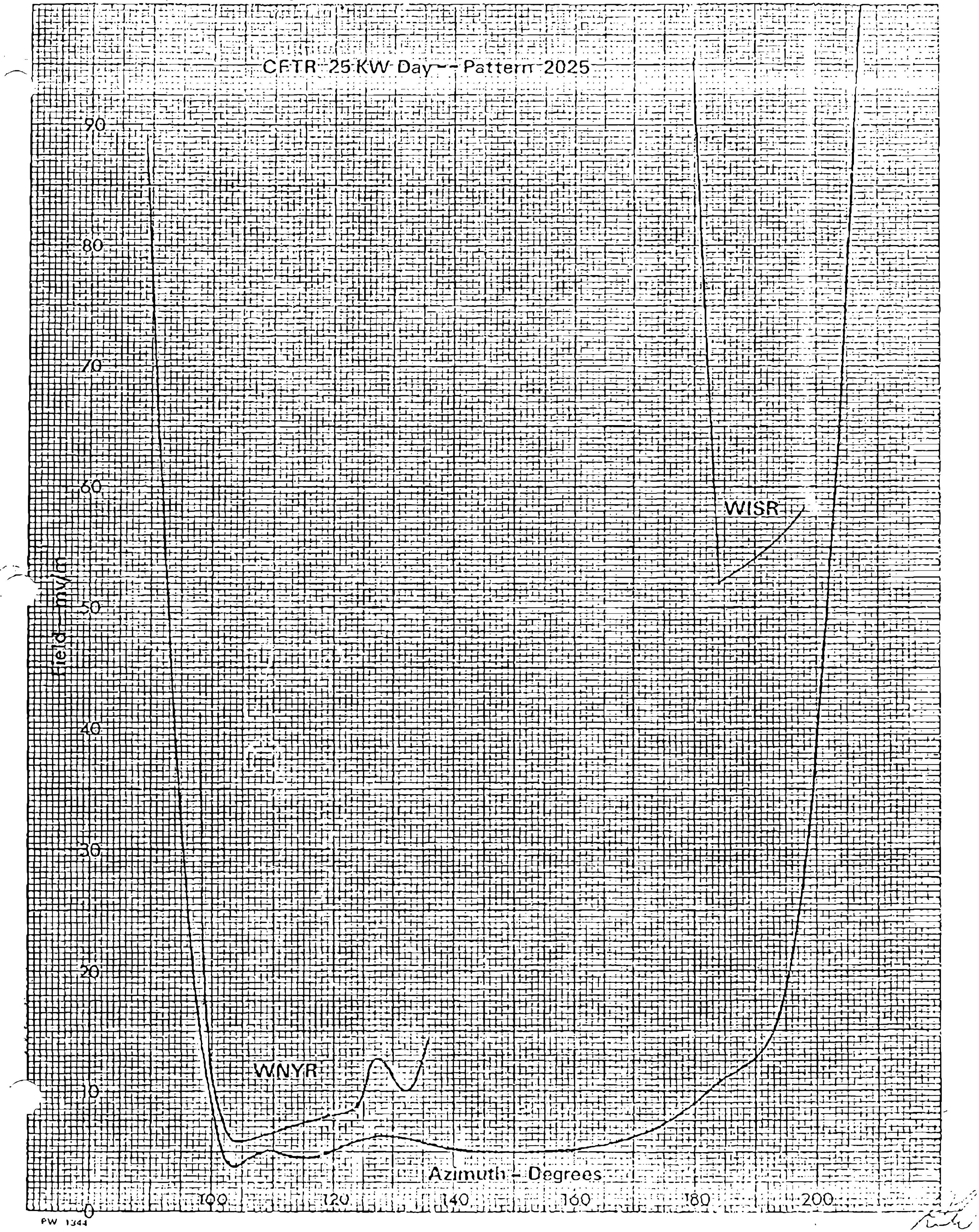
GROUNDWAVE INTERFERENCE ANALYSIS

From	To	Contour mv/m	Azm. Deg.	Dist. miles	Cond. /Dist. 10^{-14} emu/miles	Intf. 100 mv/m mv/m	Perm. Intf. mv/m	Perm. Rad. mv/m	* Prop. Rad. mv/m	Prop. Intf. mv/m
CFTR	WDBC	0.5	283.5	345	10/16,4/29,6/62, 8/176,2/52,8/11	0.0009	0.025	2780	648	0.00584
			290	293	10/16.6,4/29,6/64.4 8/183	0.0036	0.025	694	577.7	0.0208
			295	276	10/17,4/34,6/50 8/175	0.0045	0.025	556	534.8	0.024
			297	277	10/17.2,4/31.8, 6/60.2, 8/167.8	0.0045	0.025	556	521.0	0.0234
			300	278	10/17.2,4/34,6/57.8 8/169	0.0045	0.025	556	504.1	0.0227
			307	303	10/18,4/90,8/195	0.0020	0.025	1250	484	0.00969
CFTR	CKGB	0.5	346.3	316	10/22,4/48,10/61 2/185	0.0013	0.025	1920	969.5	0.0126
CFTR	CBF (690KHz)	0.5	65.1	188	6/97.4,4/90.6	0.015	0.25	1668	766.9	0.0115

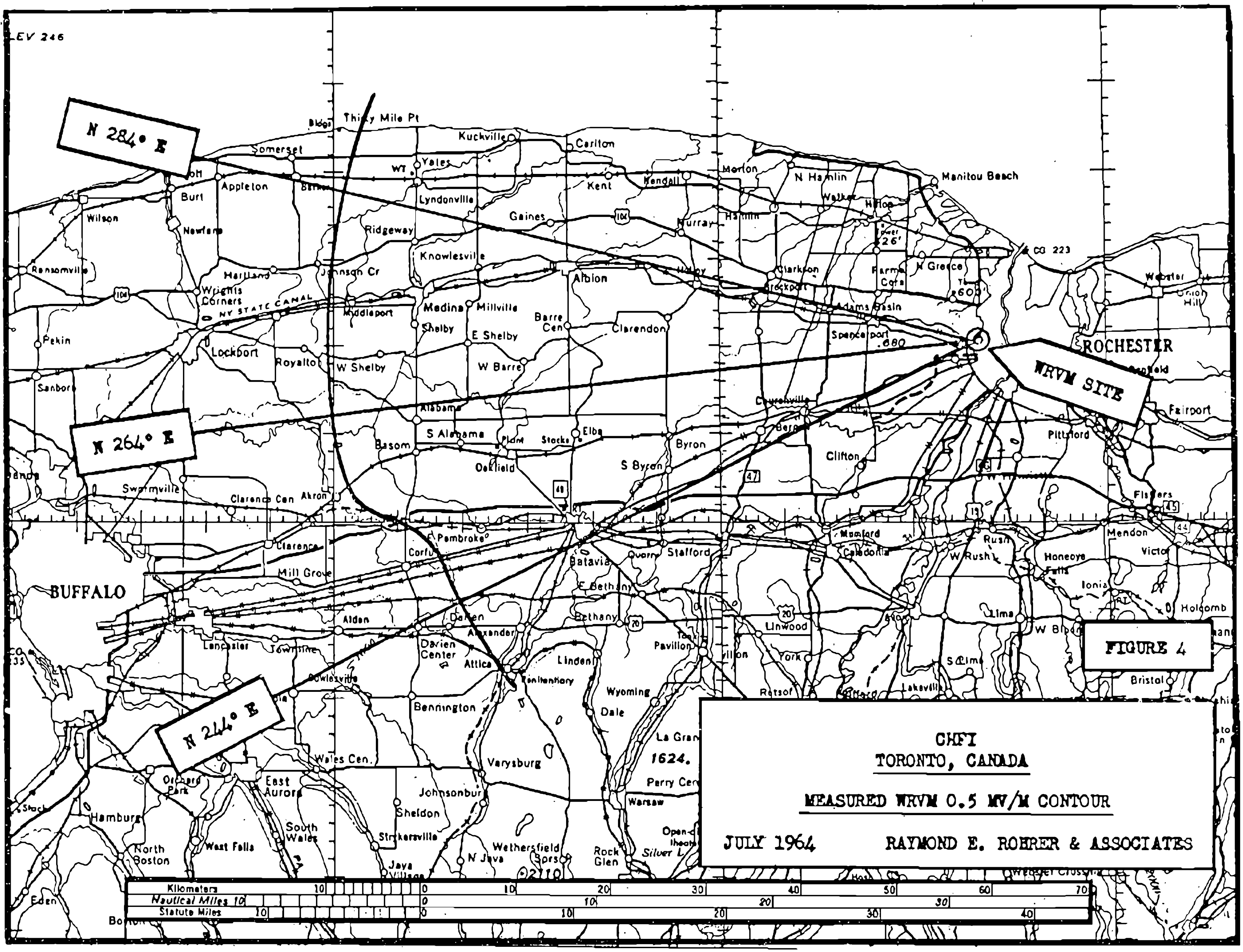
*Based on theoretical Pattern #2025



2000
mv/m
1200
1000
800
WDBC
RMS-850 mv/m
200
20
40
60
80
mv/m
CFTR 25 KW Day -- Pattern 2025



CFTR 25 KW Day -- Pattern 2025
Field — mv/m
90
80
70
60
50
40
30
20
10
0
WISR
WNYR
Azimuth - Degrees
100
120
140
160
180
200



CHFI
TORONTO, CANADA

MEASURED WRVM 0.5 MV/M CONTOUR

JULY 1964 RAYMOND E. ROHRER & ASSOCIATES

FIGURE 4

Addendum to the
Engineering Brief
for a
Change in the Daytime Antenna Pattern
and an
Increase in Daytime Power
at

AM Broadcasting Station CFTR
Toronto, Ontario

Present Operation: 680 KHZ 10 KW D/25 KW N DA-2 Class II

Proposed Operation: 680 KHZ 25 KW DA-2 Class II

Prepared for
Rogers Radio Broadcasting Limited
25 Adelaide St. East
Toronto Ontario M5C 1H3

Prepared by
Canadian General Electric Company Limited
Communications Systems and Services Department
Toronto, Ontario
September 1973

INTRODUCTION

This "Addendum to the Engineering Brief....." has been prepared by Elder Engineering Limited and Canadian General Electric Company Limited in reply to the comments of the United States' Federal Communications Commission on the application by Rogers Radio Broadcasting Limited for a day-time power increase to 25 KW for CFTR Toronto, Ontario on 680 KHz.

The previously proposed radiation pattern of CFTR was modified to decrease the radiation towards WNYR Rochester, New York.

Field strength measurements were taken on radials from CFTR towards WDBC Escanaba, Michigan, to establish the actual values of ground conductivity in Canada.

The results of these investigations are presented in this Addendum.

RADIATION PATTERN #2025E

Introduction

Minor changes were made to the tower field ratios and phase angles that were used to produce radiation pattern #2025, with the aim of minimizing the radiated field strength to WNYR. The resulting pattern has been called #2025E.

The details of the array parameters and patterns are shown on the following pages.

DESCRIPTION OF ARRAY

Station:	C F T R	Main Studio:	Toronto, Ontario
Frequency:	680 KHz	Power:	25 KW D/25 KW N
Time:	Unlimited	Class:	II
Notification List #		Date:	
Geographic Location:		43° 34' 48" N. Lat. 79° 38' 30" W. Long.	

ARRAY CHARACTERISTICS

Mode of Operation:	DA-2
Number of elements:	13
Type of elements:	guyed, uniform cross section, series fed, no top loading
Tower height:	300' (74.6°) above insulators (all towers) 309' above ground (all towers)

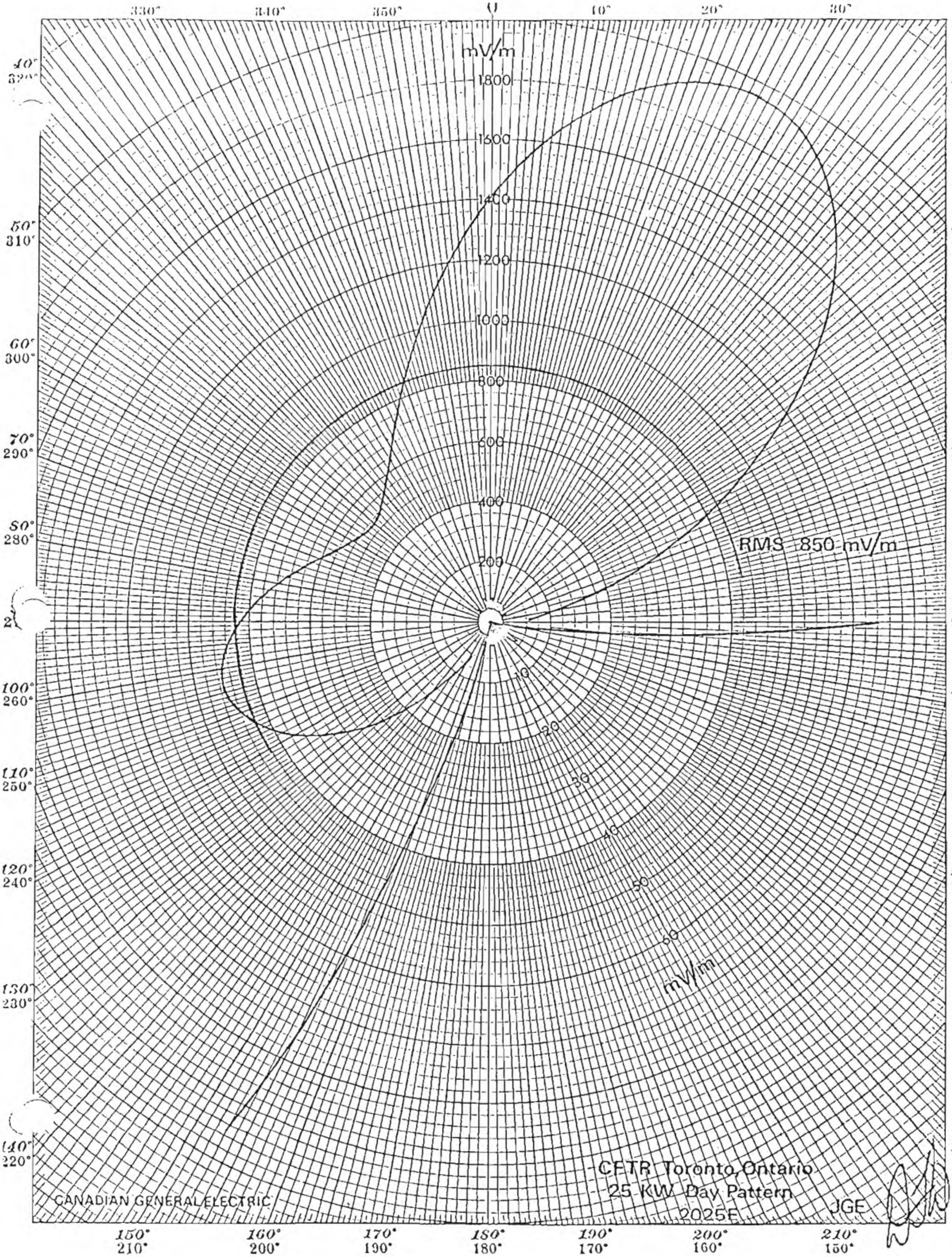
Tower #	Azimuth Degrees	Spacing Degrees	Field Day	Ratio Night	Phasing Day	(degrees)	Night
1	ref.	ref.	1.00	1.000	0.		0.
2a	310.0000	155.0000	1.989		-37.		
2	310.0000	220.0000		1.900			355.
3a	310.0000	310.0000	1.00		-74.		
3	310.0000	440.0000		1.000			351.
4a	2.7214	100.4028	1.00		-80.		
4	43.0000	80.0000		1.280			-163.
5	330.3137	230.1256	1.989	2.432	-117.		-168.
6a	322.1583	379.3216	1.00		-154.		
6	320.3878	443.0751		1.280			-172.
7	43.0000	160.0000		1.000			-313.
8	347.0533	265.1708		1.900			-318.
9	330.3137	460.2511		1.000			-322.

Predicted RMS Field:

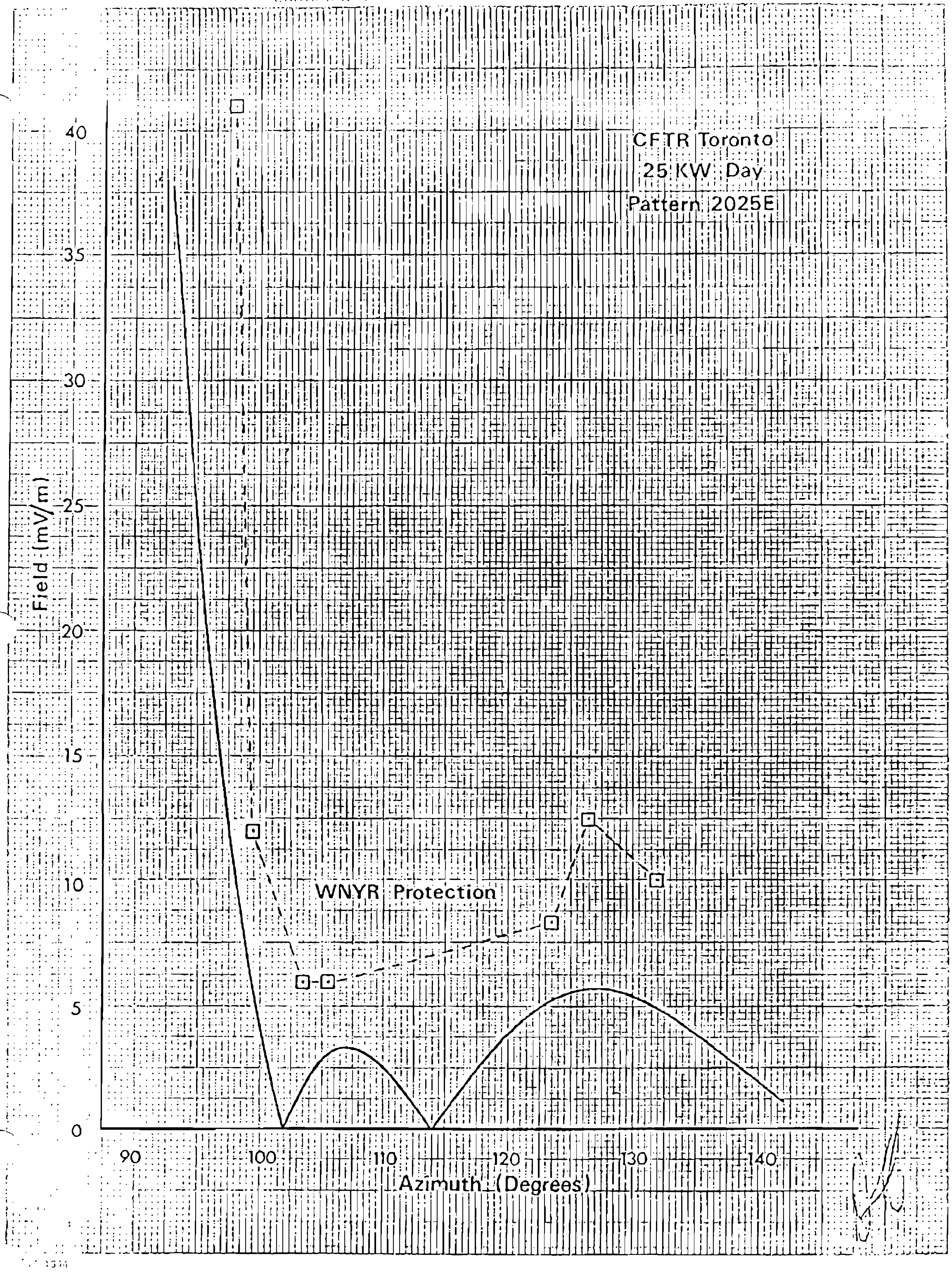
Day	850 mV/m	170 mV/M for 1 KW
Night	960 Mv/M	192 mV/m for 1 KW

Ground System:

120 radials of #10 AWG soft drawn copper wire from the perimeter of an elevated counterpoise 70' in diameter at each tower. Tower interconnected by 1-1/2" x 1/16" copper strap. Radials running between towers bonded to #4 AWG stranded copper wire. The effective length of the radials is 0.4 λ .



CFTR Toronto, Ontario
25 KW Day Pattern
2025E
JGE
RMS 850 mV/m
mV/m
CANADIAN GENERAL ELECTRIC

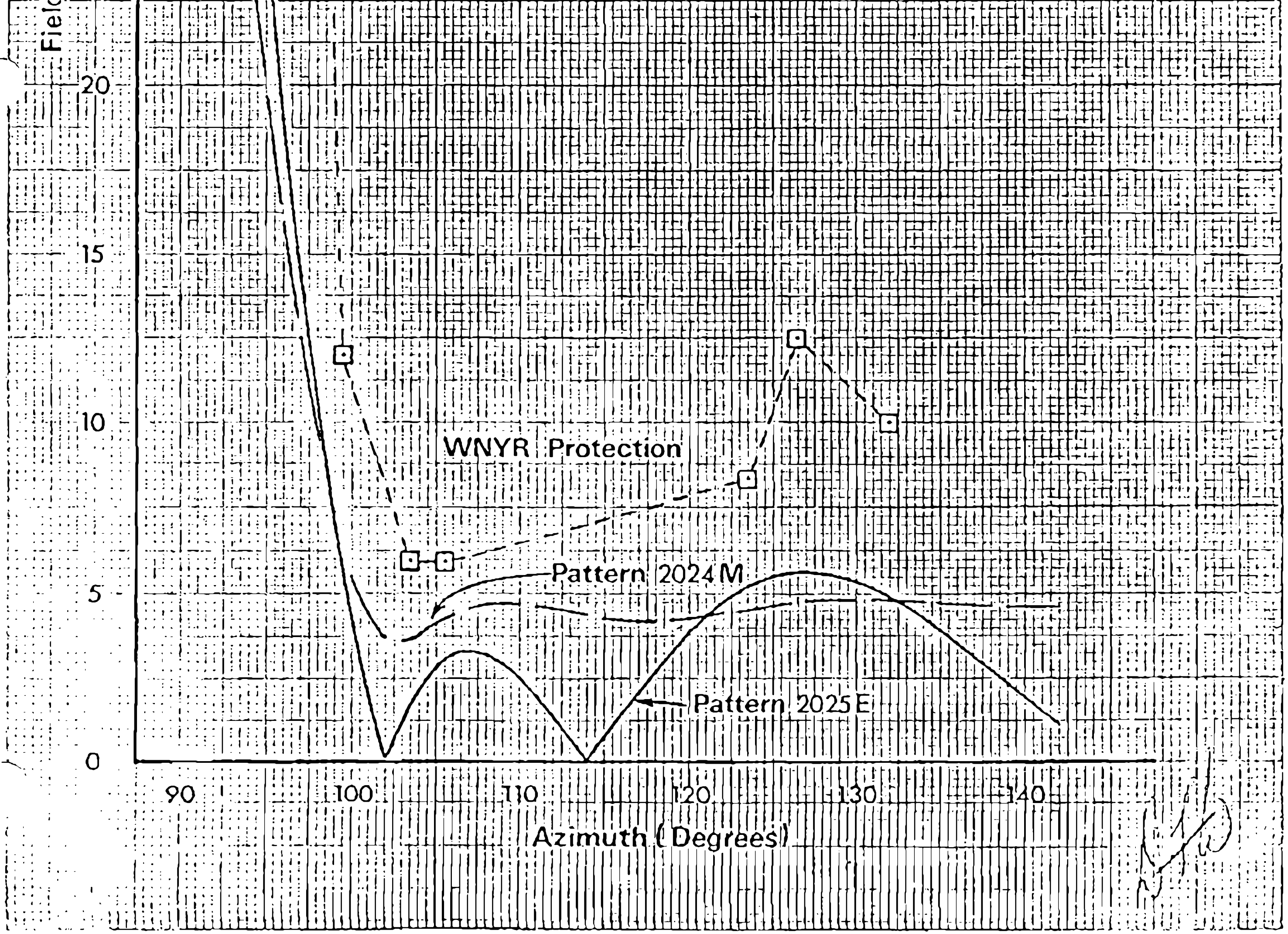

CFTR Toronto
25 KW Day
Pattern 2025E
WNYR Protection
Field (mV/m)
0
5
10
15
20
25
30
35
40
Azimuth (Degrees)
90
100
110
120
130
140

PROTECTION TO WNYR ROCHESTER, NEW YORK

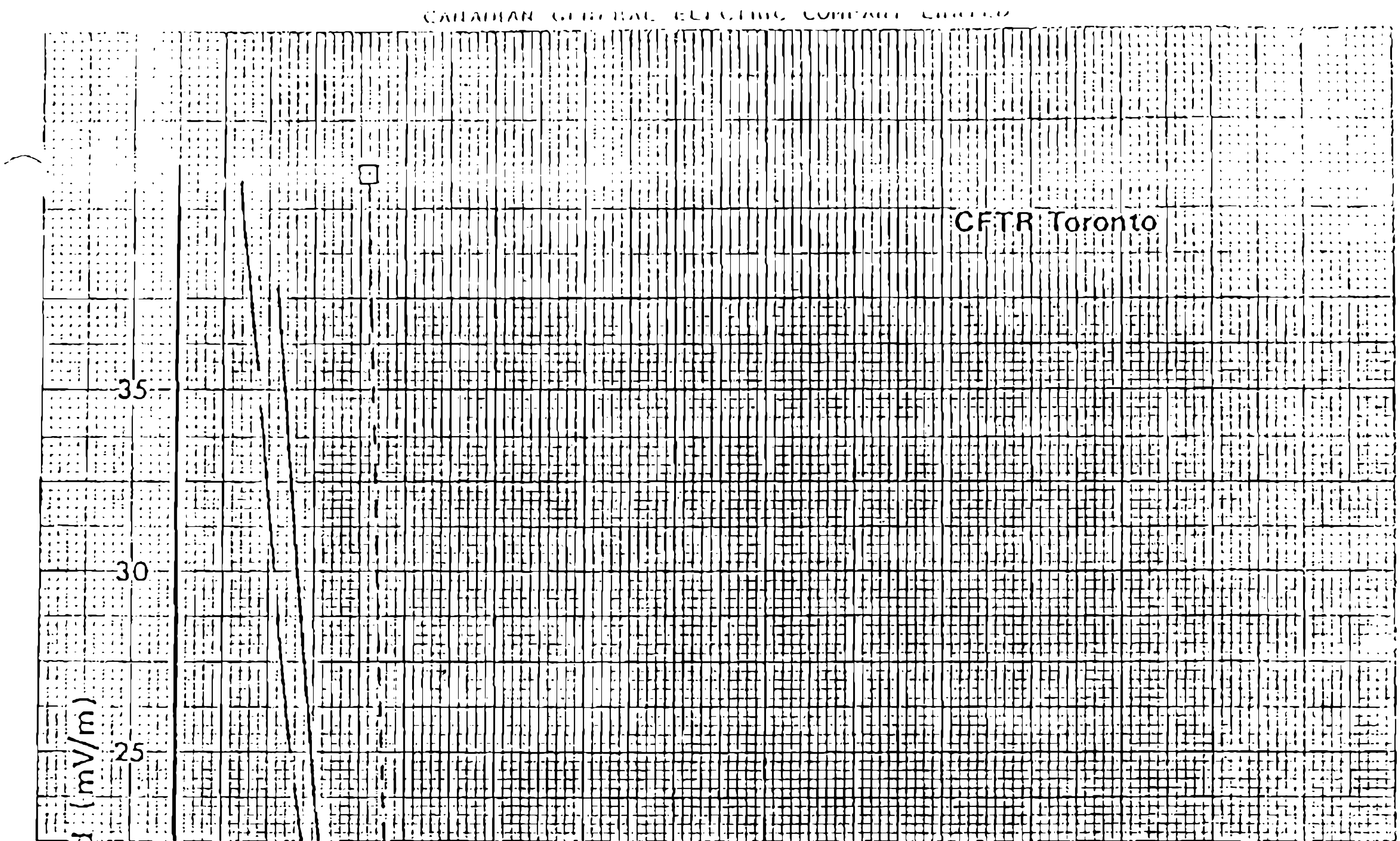
Introduction

Elder Engineering Limited was requested to study the effect of random variations in tower field ratios and phase angles on the radiated field strength from pattern #2025E towards WNYR. Their report follows.

A graph of the radiated field strength towards WNYR from the proposed 25 KW day-time operation and present 10 KW day-time operation is included. The proposed radiation over the critical bearings towards WNYR is less than that of the present 10 KW day-time operation.



Field
20
15
10
5
0
90
100
110
120
130
140
Azimuth (Degrees)
WNYR Protection
Pattern 2024M
Pattern 2025E


CANADIAN GENERAL ELECTRIC COMPANY LIMITED
CFTR Toronto
35
30
25
(mV/m)

CFTR'S PROPOSED 25 KW DAYTIME FACILITIES

INTRODUCTION:

Elder Engineering Limited has been requested by Canadian General Electric Company to study the proposed array - in particular, with respect to the protection accorded to station WNYR, Rochester, New York.

REFERENCE:

Comments made by the FCC in response to the notification on Canadian change list #301 and contained in a letter to the licencee, Rogers Radio Broadcasting Limited dated March 29, 1973.

DISCUSSION:

Minor electrical changes were made in the tower field ratios and phase angles in order to minimize the radiation towards WNYR.

Optimum results were obtained with the following values:

TOWER	FIELD RATIO	ANGLE
1	1.000	000°
2a	1.989	323°
3a	1.000	286°
4a	1.000	280°
5	1.989	243°
6a	1.000	206°

The total radiated field intensities towards the protected 0.5 mV/m contour were estimated for random variations in tower currents of ±0.5° and ±0.5% respectively, with tower 2a as reference. Twenty iterations were made for valid sampling. The results are contained in the accompanying table. They demonstrate that adequate protection would be provided. It is assumed that external reradiation will be reduced to a low level.

Assessments of service and interference based upon statistical probability are used extensively in broadcast engineering and this is a realistic method of assessing array stability. Improbably high or maximum values of radiation never occur in practice if the facilities are well engineered and maintained.

A Nems Clarke type PPM-101 precision phase monitor is in use at CFTR. We are familiar with the installation and estimate that an overall system measurement accuracy of 0.5° and 0.5% can be maintained.

<u>ENGINEER'S SEAL AND SIGNATURE:</u>

This addendum was prepared by the undersigned, a consultant practicing in the field of broadcast engineering.

REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL
J. GORDON ELDER
PROVINCE OF ONTARIO

J. Gordon Elder

J. Gordon Elder, P. Eng.

17th May 1973

INTERNAL ARRAY STABILITY VS PROTECTION OF WNYR

CFTR 25 kW DAY

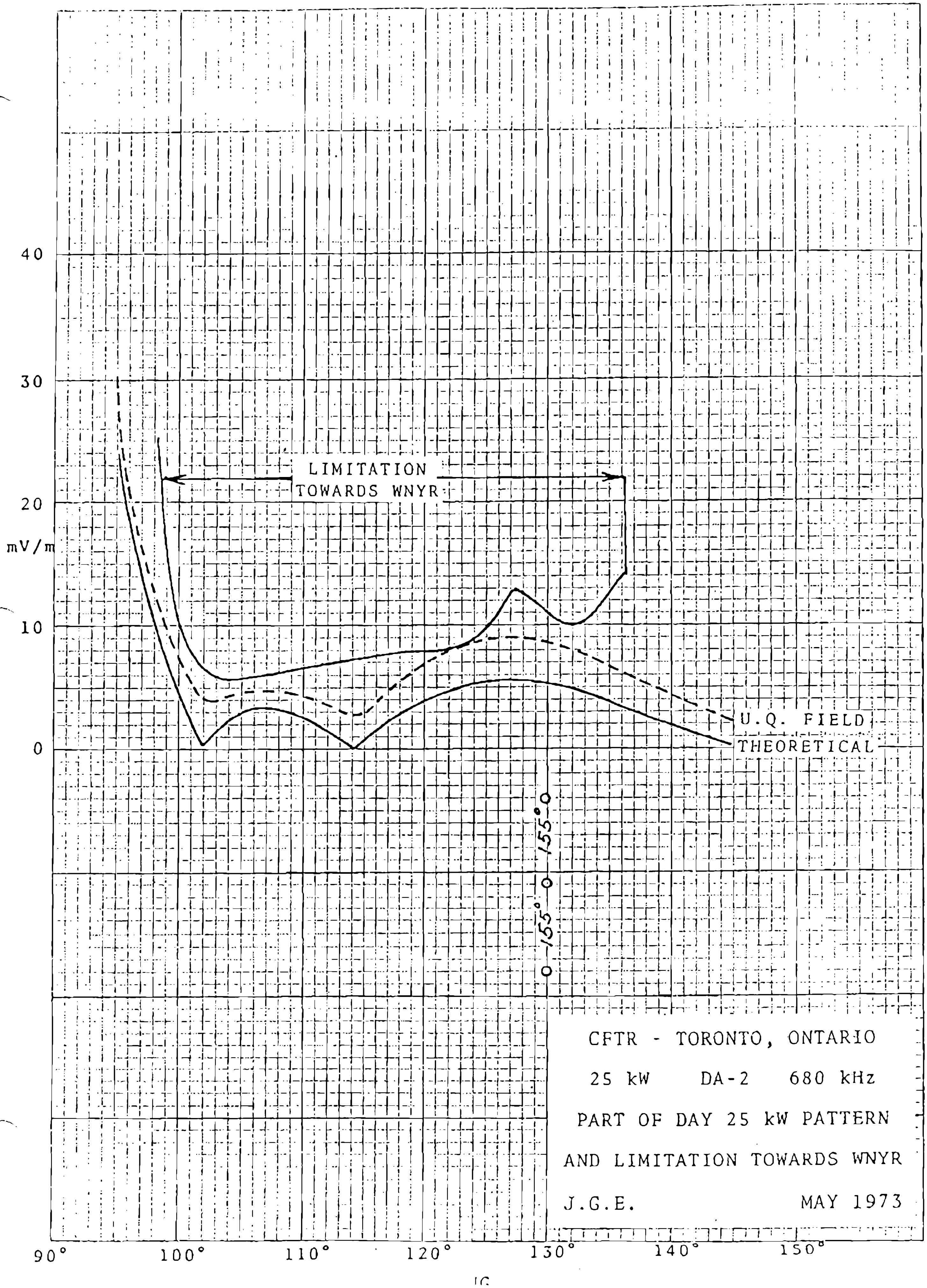
ALL RADIATED FIELD INTENSITIES EXPRESSED IN mV/m.

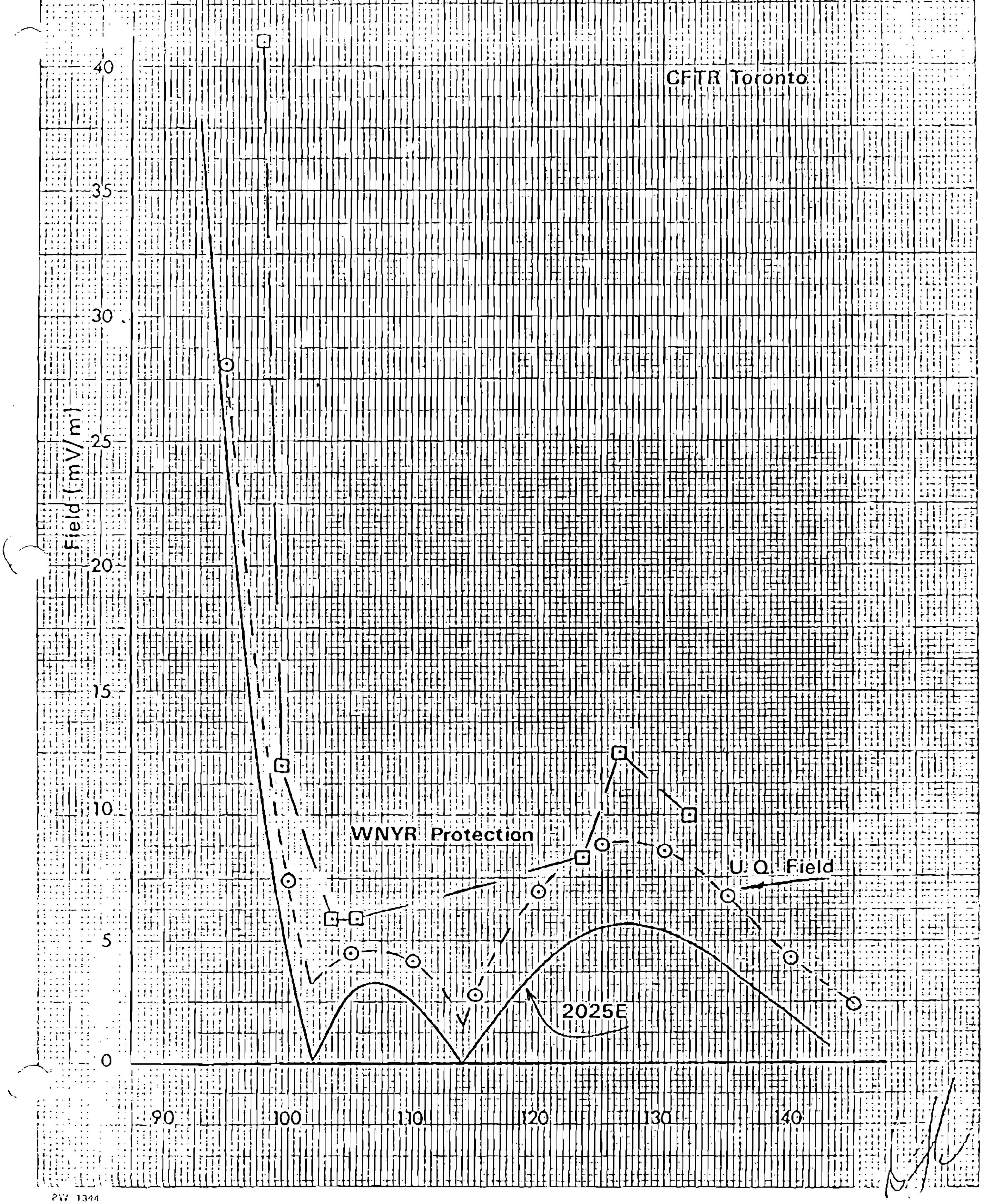
BEARING	THEORETICAL FIELD	STANDARD DEVIATION	U.Q.[1] FIELD	PERMISSIBLE FIELD *
095°	24.5	3.6	28.1	-
100°	4.2	3.2	7.4	10.0
105°	2.8	1.7	4.5	5.9
110°	2.5	1.7	4.2	6.6
115°	0.7	2.1	2.8	7.4
120°	3.9	3.1	7.0	7.9
125°	5.5	3.3	8.8	9.8
130°	5.4	3.2	8.6	11.0
135°	3.9	2.9	6.8	12.5
140°	1.9	2.4	4.3	-
145°	0.2	2.2	2.4	-

NOTE: Standard (RMS) Deviations were computed for random tolerances of ±0.5° and ±0.5%.

1 Assuming normal distribution, the normal or theoretical field plus the standard deviation ≈ upper quartile value of total field.

*Permissible values of radiated field intensity are those contained in CGE's brief and were based upon the agreement between the licencees of CFTR and WNYR, copies of which are on file with the Department.


40
30
20
mV/m
10
0
LIMITATION
TOWARDS WNYR
U.Q. FIELD
THEORETICAL
155°
155°
90°
100°
110°
120°
130°
140°
150°
CFTR - TORONTO, ONTARIO
25 kW DA-2 680 kHz
PART OF DAY 25 kW PATTERN
AND LIMITATION TOWARDS WNYR
J.G.E. MAY 1973


CFTR Toronto
Field (mV/m)
40
35
30
25
20
15
10
5
0
90
100
110
120
130
140
WNYR Protection
U. Q. Field
2025E

PROTECTION TO WDBC ESCANABA, MICHIGAN

Introduction

The daytime radiation pattern of WDBC Escanaba, Michigan was derived from the Directional Antenna Description Sheet dated August 4, 1971. The location of its 0.5 mV/m contour was determined by the equivalent distance method using ground conductivity values from the FCC Figure M3 ground conductivity map.

Ground conductivity values in Canada were determined by Elder Engineering Limited in July of this year. Their report follows.

The groundwave interference analysis was checked by Canadian General Electric Company Limited and our analysis follows.

CFTR'S PROPOSED 25 kW DAYTIME FACILITIES

INTRODUCTION:

Elder Engineering Limited has been requested by Canadian General Electric Company to undertake this study as an addendum to the technical brief. It demonstrates that the proposed facilities will provide adequate daytime protection to station WDBC, Escanaba, Michigan.

DISCUSSION:

Radial measurements were made by Mr. Michael Hately, on true bearings of 290° and 300° from CFTR. A Nems Clarke 120E field intensity meter was employed that is known to be accurate. Measurements were made as distant as possible from buildings, wires and other obstructions. The input power to and operation of CFTR's daytime array was carefully monitored during the period of measurement, to ensure that the authorized parameters were in use.

RESULTS:

The results are contained in the accompanying tables and graphs. They demonstrate that the overall conductivity overland within Canada is between 4 mmhos/m and 5 mmhos/m. This is somewhat less than the provisioned conductivity map value, though greater than the 3 mmhos/m that was measured on 290° true during the final proof of performance on CFTR's present daytime facilities.

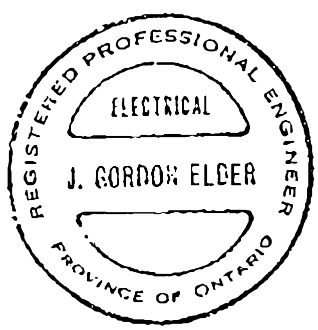
PROTECTION ANALYSIS:

WDBC's 10 kW daytime facilities notified on change list #1436 was assumed for protection purposes. WDBC's domestic "standard pattern" is included therein, though it is not recognized under NARBA. As a result, somewhat greater safety margins will be provided by CFTR towards WDBC's protected 0.5 mV/m contour, than those shown in the accompanying table.

Distances and bearings were determined using a great circle computer programme. Conductivity values were those published by DOC and FCC except as measured overland in Canada.

ENGINEER'S SEAL AND SIGNATURE:

This addendum was prepared by the undersigned, a consultant practicing in the field of broadcast engineering.



J. Gordon Elder

J. Gordon Elder, P. Eng.

9th July 1973

RADIAL FIELD INTENSITY MEASUREMENTS

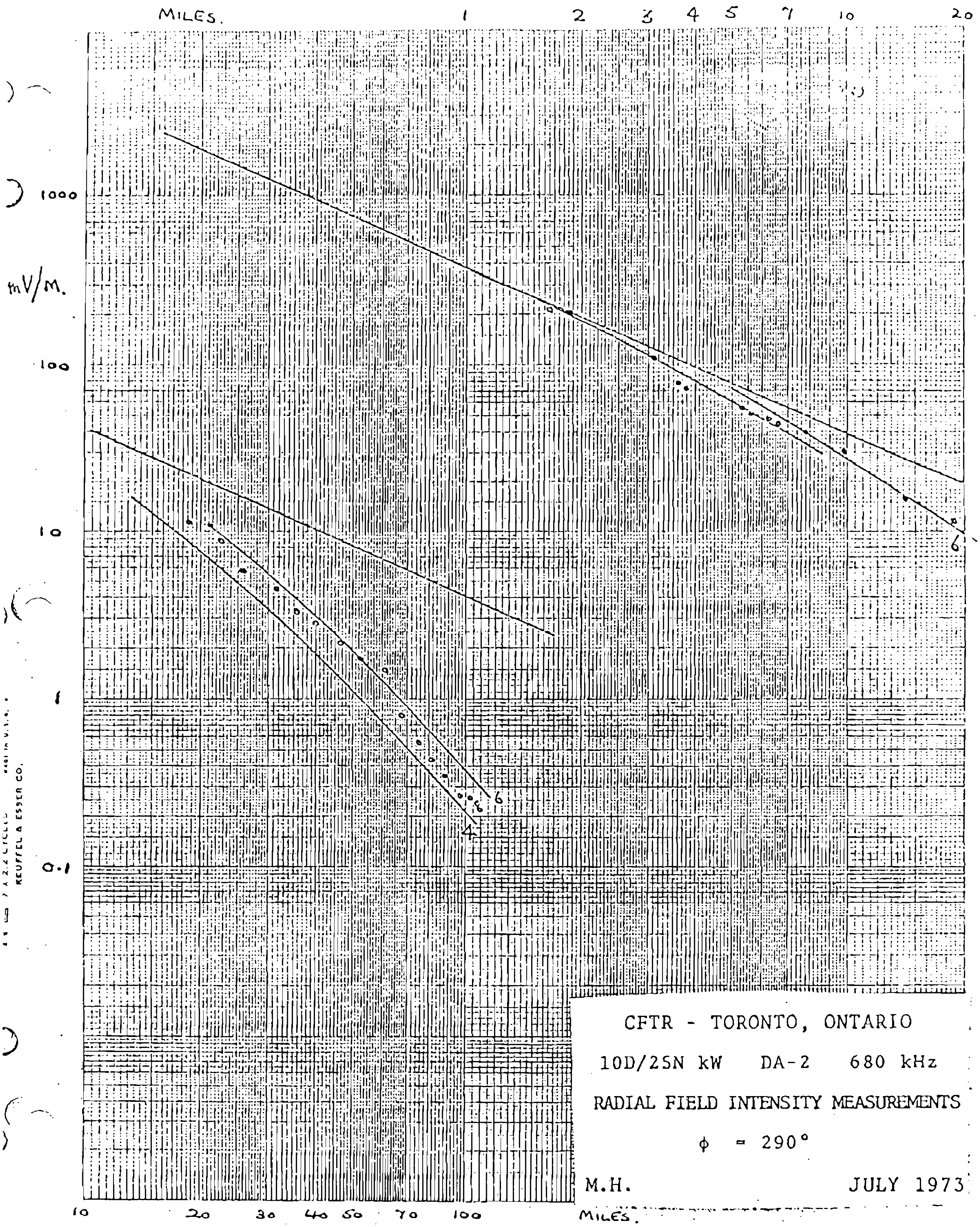
φ = 290° CFTR - 680 kHz - DAY PATTERN June 13, 1973

POINT	DISTANCE(MILES)	READING(mV/m)
1	1.65	215
2	1.85	205
3	3.1	110
4	3.6	78
5	3.8	72
6	5.3	56
7	5.65	51
8	6.2	48
9	6.6	45
10	7.8	40
11	9.8	31
12	-	-
13	14.1	16
14	18.7	11.5
15	22.7	8.8
16	25.8	5.4
17	31.8	4.55
18	35.6	3.3
19	40.0	2.8
20	46.8	2.15
21	52.5	1.75
22	61.4	1.5
23	66.5	0.82
24	75.5	0.55
25	80.5	0.43
26	88.3	0.35
27	96.4	0.265
28	102	0.255
29	103	0.245
30	108	0.24
31	109.5	0.225

RADIAL FIELD INTENSITY MEASUREMENTS

$\phi = 300°$ CFTR - 680 kHz - DAY PATTERN June 13, 1973

POINT	DISTANCE(MILES)	READING (mV/m)
1	1.5	160
2	1.6	158
3	2.3	125
4	3.0	98
5	3.4	94
6	4.0	75
7	4.7	56
8	6.2	42
9	7.3	40
10	9.2	28.5
11	11.0	22.5
12	13.0	14.25
13	15.7	12.75
14	17.7	11.5
15	19.2	10.0
16	24.2	5.6
17	29.1	3.55
18	33.5	2.65
19	35.8	2.20
20	37.2	2.15
21	39.5	1.90
22	48.0	1.17
23	52.5	0.84
24	56.6	0.70
25	65.6	0.45
26	79.1	0.26
27	91.5	0.195
28	96.7	0.158
29	104.5	0.155
30	109.5	0.145



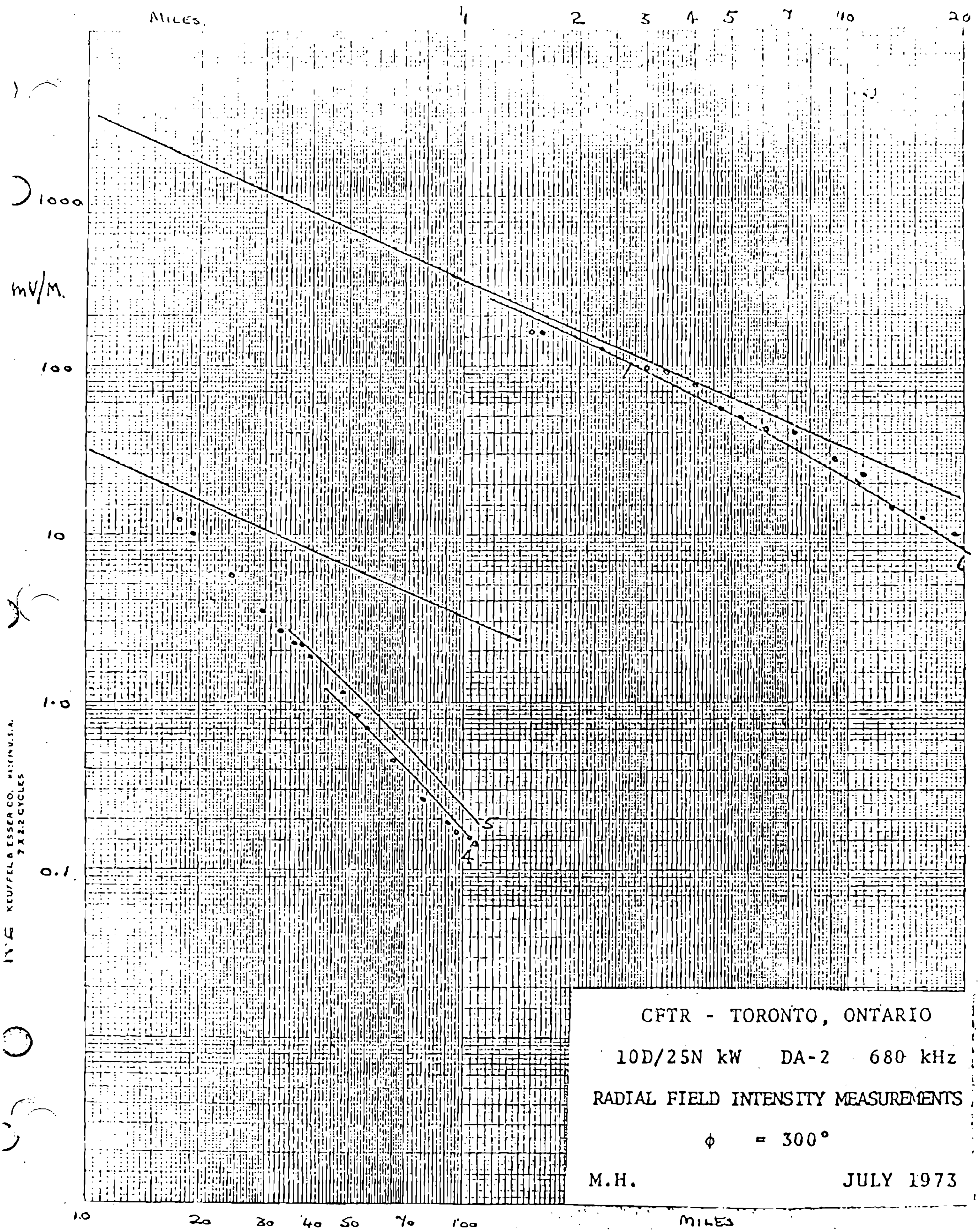
CFTR - TORONTO, ONTARIO

10D/25N kW DA-2 680 kHz

RADIAL FIELD INTENSITY MEASUREMENTS

$\phi = 290°$

M.H. JULY 1973


MILES
1
2
3
4
5
7
10
20
1000
mV/M.
100
10
1.0
0.1
7
6
5
4
1.0
20
30
40
50
70
100
MILES
KEUFFEL & ESSER CO.
CFTR - TORONTO, ONTARIO
10D/25N kW DA-2 680 kHz
RADIAL FIELD INTENSITY MEASUREMENTS
ϕ = 300°
M.H.
JULY 1973

GROUNDWAVE INTERFERENCE TO GROUNDWAVE SERVICE

FROM	TO	PROTECTED CONTOUR				BRG. DEGS. TRUE	COND./DIST. mmhos/m	NOISE SIGNAL PER 100 µV/m	PERMISSIBLE		PROPOSED	
		FIELD INT. mV/m	BRG. DEGS. TRUE	RAD. mV/m	DIST. MILES				NOISE µV/m	RAD. mV/m	NOISE µV/m	RAD. mV/m
CFTR	WDBC	0.5	per notification on U.S. list #1436 dated August 4, 1971			291	4.9/110,10/32 8/139	3.95	25	624	23.8	592
						292.5	4.8/109,10/34, 8/134	4.05	25	618	23.5	580
						293.7	4.6/108,10/36 8/131	4.1	25	610	23.4	571
						294.8	4.5/108,10/38, 8/128	3.95	25	624	22.6	562
						296.7	4.3/109,10/40, 8/123	3.95	25	624	22.0	549
						298	4.2/108,10/40, 8/123	3.95	25	624	21.6	540

July 1973

GROUNDWAVE INTERFERENCE ANALYSIS

From	To	(1) Contour mv/m	Azm. Deg.	(2) Dist. miles	(2) Cond. /Dist. 10^{-14} emu/miles	Intf. (2) 100 mv/m mv/m	Perm. Intf. mv/m	Perm. Rad. mv/m	Prop. (3) Rad. mv/m	Prop. Intf. mv/m
CFTR	WDBC	0.5	291	281	4.9/110,10/32,8/139	0.00395	0.025	633	593	0.0234
			292.5	277	4.8/109,10/34,8/134	0.00405	0.025	617	580	0.0235
			293.7	275	4.6/108,10/36,8/131	0.0041	0.025	610	571	0.0234
			294.8	274	4.5/108,10/38,8/128	0.00395	0.025	633	560	0.0221
			296.7	272	4.3/109,10/40,8/123	0.00395	0.025	633	548	0.0216
			298	271	4.2/108,10/40,8/123	0.00395	0.025	633	540	0.0213

(1) The 0.5mV/m contour as determined by the theoretical radiation pattern and FCC Map ground conductivity values.

(2) From Elder Engineering Limited field strength measurements

(3) Theoretical radiation figures taken from the CFTR (proposed) 25KW daytime pattern #2025E.

Del Aug 21/

CONCLUSION

Based on the outcome of the studies conducted by Canadian General Electric Company Limited and Elder Engineering Limited, we conclude that adequate protection to the present operation of WNYR Rochester, New York and to the proposed daytime operation of WDBC Escanaba, Michigan will be provided by the operation of CFTR at 25 KW daytime, with the radiation pattern called #2025E.

REGISTERED PROFESSIONAL ENGINEER
D. F. WOOD
PROVINCE OF ONTARIO

D.F. Wood, P. Eng.
Technical Administrator
Broadcasting Consulting
Engineering Services & AM/FM Broadcast Systems
Canadian General Electric Company Limited
September 20, 1973

REFER # 12 (a)

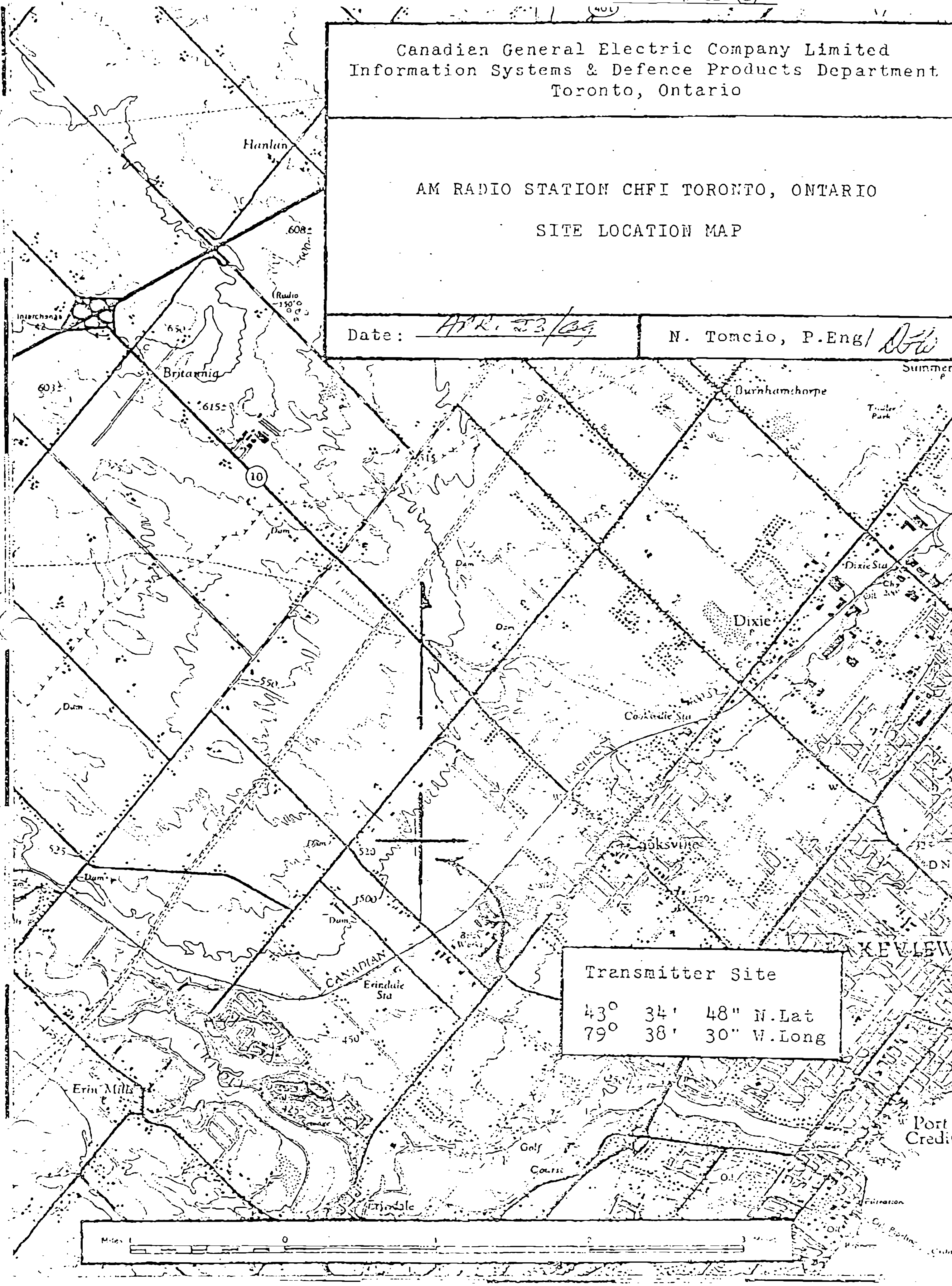
Canadian General Electric Company Limited
Information Systems & Defence Products Department
Toronto, Ontario

AM RADIO STATION CHFI TORONTO, ONTARIO

SITE LOCATION MAP

Date: Apr. 23/[illegible]

N. Tomcio, P.Eng/



ROGERS TELECOMMUNICATIONS LIMITED
25 ADELAIDE STREET EAST, SUITE 2020
TORONTO, ONTARIO M5C 1Y2

790313100

OFFICE OF THE PRESIDENT

TELEPHONE: (416) 864-2101

25

9 March 1979

Mr Gilles Courtemanche,
Director,
Broadcast Regulations Branch,
Telecommunications Regulatory Service,
Department of Communications,
300 Slater Street,
Ottawa, Ontario,
K1A 0C8.

Dear Sir:

Please find enclosed technical application for Radio Station CFTR, Toronto, Ontario, for the following:

Day Time Only

(a) Change of Site

(b) Increase in Power

Night time operation will continue from the present site and at a future date will be the subject of an application.

This application should be considered urgent so as to relieve the problem of severe re-radiation interference to WNYR in Rochester.

Buildings, up to the height of 24 stories, are being constructed as close as 6/10 of a mile from the present CFTR transmitter site, on the junction of Highway 10 and Burnhamthorpe Road in Mississauga, creating severe interference to the Rochester station on 680 KHz. As there is no known method of reducing re-radiation from complex structures such as the type presently being constructed, the only alternatives open to CFTR are :

1. Reducing power to approximately 200 watts thereby not covering its major city, Toronto.
2. CFTR leaving the air

Both alternatives are unacceptable, therefore the only course of action open is to resite CFTR to Grimsby, Ontario, at the earliest possible time.

Grimsby is located on the other side of Lake Ontario, and is the only site available to CFTR now, as all other areas investigated between Toronto, Port Credit, Oakville, Burloak and Burlington either present :

continued . . .

24

1. Hostile environment resulting in re-radiation
2. Land not available due to industrial development or other services such as Oakville Radio Station, Ontario Hydro, refineries, Greenbelt, prohibiting the siting of a radio station.

The advantages of Grimsby are :- No possibility of large structures in front of the array thereby causing re-radiation. Power lines are no problem, access is excellent and protection to Rochester, WNYR, is considerably easier than from the present site. This will result in a permanent site for CFTR for the future, without any possibility of interference to other stations due to re-radiation.

CFTR has co-operated since 1965 with Malrite Corporation, who holds the licence of WNYR, Rochester. During that time everything has been done to maximize the 680 frequency between the two stations, including the fact that this company purchased land in Henrietta, near Rochester, to allow WNYR to go full time and cover Henrietta as its major city. Unfortunately, because of FCC delays and rules this has not come to fruition.

Due to the urgency of resiting CFTR, we request an exception from the usual procedure rules, and that the application be heard at the Hearing on May 15th, 1979.

To permit speedier passage of this application, we have sent copies to both the DOC and CRTC, to enable processing to start as soon as possible.

Also, we request of the DOC that the brief be expediently processed and the necessary clearance passed on to the CRTC before waiting for comments from the FCC, which could cause an extended delay.

Trusting this application meets with your approval.

Yours truly,

Edw S Rogers

Edward S. Rogers
President

/encls.

Lety
CFTR-
(Pm) 52-

chtb AM 610 FM 97.7
BOX 610 ST. CATHARINES, ONTARIO L2R 6X7
THE NIAGARA DISTRICT BROADCASTING CO. LIMITED
12 YATES ST., ST. CATHARINES, ONT
(416) 684-1174

May 22, 1979.

INTERVENTION

790313100

29

Mr. J.G. Patenaude,
Acting Secretary General,
Canadian Radio-television and
Telecommunications Commission,
100 Metcalfe Street,
OTTAWA, Ontario.
K1A 0N2.

Re: Application (790313100)
Rogers Radio Broadcasting Limited. H 90 1404
Power increase and Transmitter re-location.

Dear Mr. Patenaude:

Please be advised that the Niagara District Broadcasting Co. Limited files this intervention in relation to application (790313100) Rogers Radio Broadcasting Limited with respect to an increase in daytime power to 50,000 watts for CFTR and the re-location of the transmitter to 56 kilometers south-west of Toronto at Grimsby.

While our inspection of the proposed coverage seems to indicate no increased signal strength within the Niagara Region, we feel it is of the utmost importance that assurance be obtained that;

(a) No attempt is made to alter the proposed pattern of broadcasting to increase the signal in the St.Catharines/Niagara area in the future.

(b) That it is understood that CFTR is licensed to serve Toronto and not the St.Catharines/ Niagara area and therefore the existing stations in the Niagara Region will be protected from further intrusion from outside stations.

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We believe maintaining local radio service is of sufficient importance to the citizens of this area to warrant our appearance at this hearing in order to express our concerns. We therefore request an appearance on June 20th in Hull.

We shall look forward to being advised of the acceptance of our intervention.

Yours truly,

R.A. Reinhart,
General Manager.

RAR/bh.

copy to:

Rogers Radio Broadcasting Limited,
25 Adelaide Street East,
Toronto, Ontario. M5C 1Y2.

Secty.
CFTR-4
(AM)

Rogers Radio Broadcasting Limited.

int.
052
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June 8, 1979

H901676

Mr. J.G. Patenaude
Acting Secretary General
Canadian Radio-television and
Telecommunications Commission
100 Metcalfe Street
Ottawa, Ontario
K1A 0N2

Dear Mr. Patenaude:

Re: Intervention by Mr. R.A. Reinhart on Behalf of Niagara District Broadcasting Co. Limited against application by Rogers Radio Broadcasting Limited (#790313100) to Amend Licence for CFTR Toronto

This is in response to the intervention by Mr. R.A. Reinhart dated May 22, 1979. Attached herewith please find a copy of the registration receipt providing proof of delivery of this response to Mr. Reinhart.

We have no hesitation in giving assurance to the Commission and to the intervenor that:

(a) No attempt will be made to alter the proposed pattern of broadcasting in order to increase the signal strength in the St. Catherines/Niagara area in the future.

(b) We understand and accept that CFTR is licenced to serve Toronto and not the St. Catherines/Niagara area.

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25 Adelaide Street East, Toronto, M5C 1H3 Ontario

We assure the Commission and the intervenor that, should this application be approved, our programming on CFTR will continue to address the concerns, desires, and interests of the residents of Metropolitan Toronto.

Yours truly,

Jim Sward

Jim Sward
President

JS/jh
Attachment

cc: Mr. R.A. Reinhart
General Manager
Radio Station CKTB
P.O. Box 610
St. Catherines, Ontario
L2R 6X7

CKOC 1150
RADIO HAMILTON
73 GARFIELD AVENUE SOUTH, P.O. BOX 1150
HAMILTON, ONTARIO L8N 3P5
PHONE 545-5885 — TELEX 061-8660

62

Secty
CFTR-4
(AM)

INTERVENTION
790313100

#29

May 25th, 1979

H90 1452

Canadian Radio-television and
Telecommunications Commission,
Ottawa, Ontario. KIA ON2

RE: CFTR INTERVENTION
(790313100)

We categorically oppose the move of CFTR to a transmitter site at Grimsby. Our opposition covers two basic concerns. One has to do with technical protection of our signal and the other has to do with protection of our AM license to serve Hamilton and environs.

TECHNICAL

We believe, and this is supported by advice from Doug Allen and Associates, Consulting Engineers, that higher levels of signal from CFTR over our prime coverage area could result in simply moving CFTR's problem from Toronto to the Hamilton area. In fact, Hamilton could have cross modulation problems. Simply stated, we could have CFTR being heard over top of our signal. And Hamilton already has, what our Consulting Engineers consider to be serious cross modulation problems because of the three existing AM stations. If CFTR is allowed to make this move, it could lead to several other Toronto stations making a move across the lake with further encroachment on CKOC's pattern of coverage. Indeed, we understand that as we submit this intervention, another Toronto station is processing an application for change of site to across the lake.

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We cannot take the matter of cross modulation lightly. We do not want our listeners bothered with cross talk from CFTR. And here is an important engineering fact. Cross modulation cannot be solved at transmitter sites. This kind of interference occurs for various reasons in the coverage area which are outside of the direct control of engineers. The only way to avoid cross talk is to disallow too many strong signals over the prime coverage area.

Our fears of cross talk and indeed new re-radiation in Hamilton are very real. Indeed, if interference should result we would have no recourse but to call for interference problems to be rectified or'ask that CFTR cease broadcasting from their new site.

The proposed pattern of CFTR shows a distinct cutting back of signal to the North of Toronto. A long established principle in these matters dictates that whatever changes occur, the new pattern essentially should cover the old pattern, or people will lose the service of CFTR. And it's important to observe that a highly sophisticated engineering feat is involved in supressing signal strength in the direction of the New York station, our Consulting Engineers say it is equally possible to direct CFTR's signal strength over Toronto without having strong signal strength spilled over Hamilton-Stoney Creek-Burlington area, the traditional prime coverage area of CKOC and other Hamilton stations.

We'd like to see CFTR's problem solved at their present site. Frankly, since we see a station wanting to put a strong local signal right overtop of our prime coverage area, we have to seriously question motives and technical facts. Has technical data been submitted detailing the re-radiation problem at the present site? Indeed, is their present antennae system properly adjusted at this time? We understand that technical studies have been made. Have they been submitted to this Commission?

Quite apart from cross modulation, we are not terribly confident that the re-radiation problems of CFTR might not simply be moved from Toronto to Hamilton. And new difficulties could be created in an attempt to solve re-radiation.

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We believe a serious attempt should be made to solve the New York interference problem at the WNYR site. It appears that the New York station is quite unaware of any technical details of the CFTR move. Surely they should be consulted on possible new interference effects.

AM LICENSE

We believe that we were licensed to serve Hamilton and environs and have, through almost 60 years, established a service area for which we have been licensed. We believe that our license is being encroached upon by a Toronto license holder in a blatant attempt to increase audience at our expense. And we believe our license should provide protection from such encroachment. We point out that CFTR's programming is similar to ours and that the encroachment not only involves coverage area, but the very demographic and program interest to such an extent that it would be like granting another competing Hamilton license. CFTR is a Toronto license and should not be allowed to leave Toronto. Any new pattern developed by them should be equal to or no more that they presently put into the Grimsby-Stoney Creek-Hamilton-Burlington area.

There is now a delicate balance of audience and revenue factors that would be seriously disrupted by the impact of another "local" strength signal being broadcast in Hamilton. There are almost 40 AM & FM signals strong enough to be heard and recorded in BBM audience research. It is our opinion, based on a constant study of research in these matters, that CFTR would subtract from our audience and perhaps from other local stations. In the case of CKOC, we would lose audience and thereby revenue. It is not good enough to say CFTR would not sell in Hamilton. The dynamics do not work that way. Our revenue level is tied directly to our average quarter hour audiences and the "cost per thousand". A drop of 10% or 15% in audience would result directly in a corresponding drop in the rate we could expect to get on the open market for national and regional advertising. The fact is CFTR would have two prime broadcast signals feeding into our broadcast area since they already have a prime FM signal in this area (CHFI). This new encroachment into our market will only add to our growing concern of how our single AM outlet in Hamilton would continue to operate with our present high level of program service. We are in fact an island in a sea of AM-FM combination stations.

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I believe the Commission should be aware of considerable opposition from residents and planning authorities at the proposed CFTR site in Grimsby. Their concern centers on immediate zoning matters, but also on the possibility that the whole area would become a "transmitter farm" for Toronto stations. Although we are not directly concerned we have received several enquiries from local residents. Local planning authorities say no By-law has been passed to allow for construction of towers.

This intervention is submitted with very deep concern for the future of our AM station, it's listeners and it's staff, and it's almost 60 year history of service.

I will be at the hearing on June 20th, and will be in the public audience with Mr. Doug Allen, Consulting Engineer should you wish us to comment. We'd appreciate advance notification if you wish us to appear.

Sincerely,

R. K. Macdonald,
General Manager,
RADIO HAMILTON CKOC.

RKM/ds

cc: Mr. T. McLean,
General Manager,
CFTR,
25 Adelaide St. E.,
11th Floor,
Toronto, Ontario. M5C IH3

Secty
CFTR-4
(AM)

Rogers Radio Broadcasting Limited.

c.c. Mr. R.K. Macdonald
General Manager,
Radio Station CKOC,
73 Garfield Avenue South,
Hamilton, Ontario

Mr. Douglas Allen
D.E.M. Allen Associates,
2639 Portage
Winnipeg, Manitoba

June 8, 1979

Mr. J.G. Patenaude,
Acting Secretary General,
Canadian Radio-television and
Telecommunications Commission,
Ottawa, Ontario
KIA ON2

H901675

int.
062
#29

Dear Mr. Patenaude:

Re: Intervention by Mr. R.K. Macdonald on behalf of Radio Station CKOC Hamilton Against Rogers Radio Broadcasting Limited Application (#790313100) to Amend the Licence for Radio Station CFTR Toronto

This is a response to an intervention filed with the CRTC dated May 25, 1979. Please see attached copies of registration receipts providing proof of delivery of this response to Mr. Macdonald and Mr. D. Allen as the consulting engineer referred to in Mr. Macdonald's intervention.

The intervention is divided into two parts therefore this response is similarily divided.

TECHNICAL

We attach a reply prepared by E.W. Horrigan and Associates Limited (a company of registered professional engineers) dated May 31, 1979 which we believe answers fully the technical concerns of this intervention.

This intervention indicates a concern about other Toronto broadcasters moving their transmitting sites to the Niagara area and further states that they know of one other Toronto broadcaster who is currently processing an application to accomplish this. We have contacted the chief officers of some Toronto radio stations and we were unable to substantiate this as fact. It should be pointed out that a move of this type for any Toronto radio station requires substantial capital investment and also an ongoing substantial

cont'd

(A)

increase in operating costs in maintaining a site so far from the station studios. Only Toronto broadcasters with insurmountable problems with their current transmitting facility would consider this expensive move.

A.M. LICENCE

CFTR has been broadcasting from a frequency of 680 Khz at a power of 25,000 watts since 1975 and this has provided a signal strength in Metropolitan Hamilton of approximately 3.3 mv/m as confirmed by the intervention by Mr. Don Luzzi dated May 28, 1979 on behalf of Radio ML Ltd. This signal strength of 3.3 mv/m is capable of delivering an interference free signal to all radio receivers in the Hamilton area with the possible exception of extremely poor quality receivers. When this signal power is increased it is unlikely that the average listener with an average radio receiver will notice any difference.

If this application is approved CFTR will not be orienting its programming towards the Hamilton audience. The differences which exist today between any Hamilton radio station and CFTR will continue to exist in the future. Hamilton residents will not receive adequate local news, community information or community involvement by CFTR while these services are provided by local Hamilton broadcasters. Further CFTR will continue to refrain from seeking advertising revenue directly from local businesses in Hamilton.

For years most Toronto radio stations have been capable of being received in Hamilton and Hamilton radio stations have been capable of being received in Toronto, yet the first choice of local residents in each community has been towards their local radio station. It is our belief that this situation will not change if this application is approved.

For the information of the CRTC and the intervenor we reveal that we have caused a further technical brief to be prepared. A copy of the technical map outlining the resulting signal strengths is attached. In the event that this revised technical brief, which will be submitted prior to July 1, 1979, is approved the signal power to be propogated within the Hamilton area by CFTR daytime would be reduced.

Yours truly,

Jim Sward

Jim Sward
President

JS/vs

E.W. Horrigan & Associates Limited
CONSULTING ENGINEERS

Suite 310
4800 Leslie Street
Willowdale, Ontario
M2J 2K9 (416) 496-1644

REPLY TO THE TECHNICAL QUESTIONS RAISED

in the

INTERVENTION OF RADIO HAMILTON CKOC

to the

APPLICATION BY ROGERS RADIO BROADCASTING LIMITED

to

CHANGE THE DAY-TIME ANTENNA SITE

and

INCREASE THE DAY-TIME POWER

of

AM RADIO STATION CFTR TORONTO, ONTARIO

(CRTC #790313100)

Prepared for: Rogers Radio Broadcasting Limited,
25 Adelaide Street Est,
Toronto, Ontario
M5C 1Y2

May 31, 1979

An intervention to the application by Rogers Radio Broadcasting Limited for authority to change the day-time antenna site and increase the day-time power of AM Radio Station CFTR (CRTC #790313100) was filed with the Canadian Radio-Television and Telecommunications Commission by Radio Hamilton CKOC on May 25, 1979.

The following is submitted on reply to the section head "Technical" of this intervention.

The proposal for the change of antenna site of CFTR was occasioned by the construction of a number of 20 storey-plus apartment buildings within the 1 V/m contour of the station. The high incident field on these buildings induced re-radiation, with the result that severe co-channel interference was experienced at WNYR Rochester, New York, where none previously existed. It is the opinion of this company, and of Elder Engineering Limited, that an attempt to de-tune this apartment complex would prove to be a costly exercise in futility. The situation is too complex for simple solutions, therefore extensive research would be needed with little guarantee of a successful outcome. Rogers Radio Broadcasting Limited therefore decided to seek a new antenna site, which would permit a continued service to as much as possible of the existing service area, which would be relatively free from re-radiation problems, and which would intrinsically have a greater measure of protection from re-radiation problems occasioned by future urban growth.

These aims are realized with the proposed site. The total area of Metropolitan Toronto is enclosed by the 25 mV/m (city grade) contour. There is only one metal-tower Hydro line which has only two miles of its length located within the 250 mV/m contour of CFTR at this new locations.

Rogers Radio Broadcasting Limited have much experience in the detuning of Hydro lines at 680 KHz. The following lines near their present Mississauga site have been successfully treated:

1. Manby - Lakeview Line
2. Lakeview - Richview Line
3. BB Line
4. McGuigan Line
5. Pleasant Feeder

We anticipate no problems detuning the Hydro line in question in light of previous experience, and it is our considered opinion that CFTR's problem is not being moved from Toronto to the Hamilton area as was suggested.

However, we find it difficult to rationalize CKOC's logic - They state that they have a real fear of new re-radiation problems in Hamilton as a result of the proposed move. Yet the proposed CFTR array will impress a field strength of 250 mV/m or greater on only two miles of a single metal tower Hydro line. However, an examination of the proposed CKOC 50 KW daytime radiation pattern and its new site location indicates that CKOC will put a field strength of 250 mV/m or greater on three different Hydro lines for a total of thirteen miles.

The proposed site is well protected from the effects of future urban development, and conversely any new residences would be protected from excessively high field strengths from CFTR. The major lobe from CFTR is oriented towards Toronto, thus the area of high field strength in the major lobe area is over Lake Ontario, as the antenna site is located on the lakeshore. To the west of the site, the Niagara Regional Municipality's reservoirs and pumping station, the Department of National Defense rifle range, and the Fifty Mile Point Conservation Area prevent new development within 1 km of the proposed site. To the south, the Queen Elizabeth Way also provides some degree of protection.

The CKOC intervention raises the question of cross-modulation interference. Since the 250 mV/m contour of the existing CKOC operation, the existing CHML operation, the existing CJJD operation and the proposed CFTR operation do not overlap, far less than enclosing one snother's antenna sites, intermodulation problems are not anticipated. We note that the operations of CFTR, CHIN and CFGM in Mississauga co-exist without obvious intermodulation problems. Furthermore, we note that both CHML and CKOC are currently proposing changes of site which will remove them even farther from the proposed CFTR site. It is our opinion that the possibility of cross-modulation interference is remote enough to be considered non-existent.

While there is a reduction in the CFTR coverage area to the north of Metropolitan Toronto, it does not result from a deliberate cutting back of signal, but from the forced change to a new site, which is some 25 miles south of the existing one. Unfortunately the land area which would be required to accomplish the doubly sophisticated engineering feat of establishing an antenna array to provide the necessary co-channel protections and ensure that no appreciable signal is directed into the city of Hamilton, is not available.

An inspection of the CFTR array at Mississauga, was made by this firm when the re-radiation problem became apparent. At that time, both the antenna monitor readings and the field strength measurements confirmed the fact that the array itself was operating in its normal satisfactory manner.

In conclusion, we contend that this station has been located and designed to:

(1) provide the required protection to all other stations in keeping with the spirit and content of NARBA and the DOC regulations;
(2) provide protection from future re-radiation problems of a major nature by reason of the maximum field being directed over Lake Ontario;
(3) provide an antenna system which will prove reasonable to implement and maintain;
(4) provide our client with a good service in their primary market area.

E.W. Horrigan & Associates Limited

REGISTERED PROFESSIONAL ENGINEER
D. F. WOOD
PROVINCE OF ONTARIO

David F. Wood, P. Eng.
Senior Project Engineer

REGISTERED PROFESSIONAL ENGINEER
E. W. HORRIGAN
PROVINCE OF ONTARIO

E. W. Horrigan, P. Eng.
Designated Consulting Engineer & Radio Physicist
Designated Specialist-Communications and Control.

900 CHML

68

RADIO M L LTD., 848 MAIN STREET EAST, HAMILTON, CANADA L8M 1M1

CKDS Stereo 95

May 28, 1979

DELIVERED BY COURIER

Public Hearing Division
Canadian Radio-television and
Telecommunications Commission
Centre Building
Terasses de la Chaudiere
1 rue Principale
Hull, Quebec

INTERVENTION
790313100
#29

H901521

Dear Sirs:

Re: Application - Toronto, Ontario (#790313100)
Rogers Radio Broadcasting Limited

Review of the above-quoted application (#790313100) by Radio ML Limited, Hamilton, Ontario (operating AM radio station CHML and FM radio station CKDS) has been completed, and objection to the proposal is made for the following reasons:

(A) CFTR, presently licensed to serve the Metro Toronto market, provides a signal of *3.3 MV/M in the Hamilton market. The current proposed contour coverage indicates a signal strength of 25 MV/M in the same area measured of east end Hamilton, which will, in effect, make it another Hamilton station, without being so licensed. This strength of signal could result in severe overloading of receivers in this eastern portion of the Hamilton-Wentworth region.

* Source: Reading taken May 25, 1979 (12:15PM) 43°-15'-8" Longitude by 79°-52'-8" Latitude

(B) Radio ML Limited, through CHML/AM, currently provides service to many listeners in the Niagara Peninsula including the more populated areas of Grimsby and Beamsville, Ontario. These listeners will be subjected to extremely high RF fields from proposed 50 kilowatt transmitter of CFTR.

(C) CHML presently experiences re-radiation and intermodulation problems from both the licensed AM Hamilton stations (CKOC and CJJD). The signals from these Hamilton stations re-radiate from existing hydro towers and bus power lines, causing interference to CHML listeners. CFTR's proposed signal would in fact become an additional source of the same type of interference.

ma

Continued ... 2

Public Hearing Division
Canadian Radio-television and
Telecommunications Commission

May 28, 1979

(D) The Hamilton-Wentworth and Halton regions are continually being fragmented by out-of-town stations (both AM and FM), with much weaker signals than that being proposed by CFTR. This proposal would allow an even further erosion of the marketplace, allowing CFTR an opportunity to capture an audience in a market completely separate from the city in which it is licensed.

The applicant has been notified at 25 Adelaide Street East, Toronto, Ontario of the objection by Radio ML Ltd., by private messenger (Purolator Courier Ltd.) receipt number 5653586.

The intervener (Radio ML Ltd.) will not be present at the public hearing June 20, 1979 in Hull, Quebec.

Yours sincerely,

Don Luzzi
Vice President & General Manager

DL/sf
Enc.

c.c. Mr. James Sward, President
Rogers Radio Broadcasting Limited
25 Adelaide Street East, 12th Floor
Toronto, Ontario
M5C 1Y2

Secty
CFTR-4
(AM)

Rogers Radio Broadcasting Limited.

June 8, 1979

H90 1673

int.
068
29

Mr. J.G. Patenaude,
Acting Secretary General,
Canadian Radio-television and
  Telecommunications Commission,
Ottawa, Ontario
KIA ON2

Dear Mr. Patenaude:

Re: Intervention by Mr. Don Luzzi on Behalf of Radio ML Ltd. Against Application by Rogers Radio Broadcasting Limited (#790313100) to Amend the Licence for Radio Station CFTR Toronto.

This is a response to the intervention by Mr. Luzzi dated May 28, 1979. Attached herewith please find a copy of the registration receipt providing proof of delivery of this response to Mr. Luzzi. Also attached herewith is a copy of a brief prepared for our company by E.W. Horrigan and Associates (a company of registered professional engineers) responding to the technical questions raised in the intervention by Radio ML Ltd. in their paragraphs "A", "B" and "C".

In regard to the concern raised in paragraph "D", we have the following response. CFTR has been broadcasting from a frequency of 680 Khz at a power of 25,000 watts since 1975 and this has provided a signal strength in Metropolitan Hamilton of approximately 3.3 mv/m as confirmed by the intervenor's reading taken on May 25, 1979. This signal strength of 3.3 mv/m is capable of delivering an interference-free signal to all radio receivers in the Hamilton area with the possible exception of extremely poor quality receivers. When this signal power is increased it is unlikely that the average listener with an average radio receiver will notice any difference.

If this application is approved CFTR will not be orienting its programming toward the Hamilton audience. The differences which exist today between any Hamilton radio station and CFTR will continue to exist in the future. Hamilton residents will not receive adequate local news, community information or community involvement by CFTR while these services are provided by local Hamilton broadcasters. Further CFTR will continue to

cont'd

(ma)

refrain from seeking advertising revenue directly from local businesses in Hamilton.

For years most Toronto radio stations have been capable of being received in Hamilton and Hamilton radio stations have been capable of being received in Toronto, yet the first choice of local residents in each community has been towards their local radio station. It is our belief that this situation will not change if this application is approved.

For the information of the CRTC and the intervenor we reveal that we have caused a further technical brief to be prepared. A copy of the technical map outlining the resulting signal strengths is attached. In the event that this revised technical brief, which will be submitted prior to July 1, 1979, is approved the signal power to be propogated within the Hamilton area by CFTR daytime would be reduced.

Yours truly,

Jim Sward

Jim Sward
President

JS/vs

c.c. Mr. Don Luzzi
Vice-President and General Manager,
Radio ML Ltd.,
848 Main Street East,
Hamilton, Ontario
L8M 1M1

E.W. Horrigan & Associates Limited
CONSULTING ENGINEERS

Suite 310
4800 Leslie Street
Willowdale, Ontario
M2J 2K9 (416) 496-1644

REPLY TO THE TECHNICAL QUESTIONS RAISED

in the

INTERVENTION OF RADIO ML LIMITED

to the

APPLICATION BY ROGERS RADIO BROADCASTING LIMITED

to

CHANGE THE DAY-TIME ANTENNA SITE

and

INCREASE THE DAY-TIME POWER

of

AM RADIO STATION CFTR TORONTO, ONTARIO

(CRTC #790313100)

Prepared for:

Rogers Radio Broadcasting Limited
25 Adelaide Street East
Toronto, Ontario
M5C 1Y2

May 31, 1979

E.W. Horrigan & Associates Limited

An intervention to the application by Rogers Radio Broadcasting Limited for authority to change the day-time antenna site and increase the day-time power of AM Radio Station CFTR (CRTC #790313100) was filed with the Canadian Radio-Television and Telecommunications Commission by Radio ML Limited on May 28, 1979.

The following statements are submitted in reply to the technical aspects of this intervention.

A.1. The reported field strength measurement of 3.3 mV/m, taken at location 43° 15' 08" North Latitude by 79° 52' 08" West Longtitude at 12.15 p.m. on May 25, 1979 is consistent with the field strength measurements taken during the CFTR Final Proof of Performance.

A.2. The Department of Communications Broadcast Procedure Number 1, Rule 2, indicates that blanketing interference is considered to be possible within the 250 mV/m contour. Population within this contour has been kept to a minimum by siting the proposed CFTR operation on the shore of Lake Ontario in such a way that the high field strength area of the major lobe of the station is located over Lake Ontario.

Rogers Radio Broadcasting Limited have already agreed to remedy, at their expense, all reasonable complaints of blanketing interference within the 250 mV/m contour.

B. Coverage maps for the proposed CFTR operation were included with the Engineering Brief, and were circulated by the CRTC. These maps demonstrate that, not only will the towns of Grimsby and Beamsville not be subjected to high field strength from CFTR, but because of the protection requirement to co-channel station WNYR Rochester, New York, these areas will not receive a signal from CFTR of sufficient magnitude to be considered as providing coverage.

C. The proposed site and radiation pattern of CFTR is such that only a minimum amount of treatment to a relatively short length of one Hydro line is required to reduce re-radiation to an acceptable level.

Since the 250 mV/m contour of the present operation of CHML and of the proposed operation of CFTR do not overlap, far less than enclosing each other's antenna site, intermodulation problems are not anticipated (DOC BP #1, Rule 3). Furthermore, it should also be noted Radio ML Limited intend to move their antenna site to a location which is more than 27 miles away from the proposed CFTR antenna site, resulting in an even greater separation between the two stations' 250 mV/m daytime contour.

In our considered opinion it is extremely unlikely that a set of circumstances could exist whereby the proposed CFTR signal would be of sufficient magnitude to intermodulate with those of CHML considering their proposed antenna locations.

In conclusion, we contend that this station has been located and designed to:

(1) provide the required protection to all other stations in keeping with the spirit and content of NARBA and the DOC regulations;

(2) provide protection from future re-radiation problems of a major nature by reason of the maximum field being directed over Lake Ontario;

(3) provide an antenna system which will prove reasonable to implement and maintain;

(4) provide our client with a good service in their primary market area.

E.W. Horrigan & Associates Limited

REGISTERED PROFESSIONAL ENGINEER
D. F. WOOD
PROVINCE OF ONTARIO

David F. Wood, P. Eng.
Senior Project Engineer

May 31, 1979

REGISTERED PROFESSIONAL ENGINEER
E. W. HORRIGAN
PROVINCE OF ONTARIO

E. W. Horrigan, P. Eng.
Designated Consulting Engineer, Radio Physicist,
Designated Specialist-Communications and Control

CHSC

AM-1220 FM-105.7

INTERVENTION

79031310O

Lcty
CFTR-67
PM)

#29 May 28, 1979

Mr. J.G. Patenaude
Acting Secretary General
Canadian Radio-Television Commission
100 Metcalfe Street
Ottawa, Ontario
KlA ON2

H90 1520

RE: Application (790313100)
Rogers Radio Broadcasting Limited
Power Increase and transmitter re-location

Dear Sir:

Please be advised that Radio Station CHSC Limited and Radio Station CHNR, Simcoe, both owned and operated by Radio Station CHSC Limited, files this intervention in relation to Application (790313100) Rogers Radio Broadcasting Limited with respect to an increase in daytime power to 50,000 watts for CFTR and the re-location of the transmitter to 56 kilometers South West of Toronto at Grimsby.

Moving the transmitter site to a more central geographic position in the Province cannot be done without some technical difficulty to local service in areas outside of Toronto. We refer specifically to "Image Interference" in South Western Ontario.

The C.R.T.C. will judge the applicants proposal on the merit of better coverage in the Toronto area, therefore, we ask the Commission require the applicant to accept Image Interference to CFTR in view of the present signal strength of CHNR, Simcoe and a new proposal by this Company in South Western Ontario.

A

Radio Station CHSC Ltd., 36 Queenston Street, Box 3020, St. Catharines, Ontario L2R 7C7. Telephone (416) 682-6691

The Department of Communications has been advised of this new proposal.

You will note from the enclosed map, designated by a red marking, the extent of possible image interference is soley in South Western Ontario and not Toronto.

This has been communicated to the applicant by way of a technical drawing prepared by our Consultant, Mr. Gordon Elder. A copy of this drawing is enclosed.

The abové intervention is on technical grounds only and is in our opinion, concise and clear.

In view of the importance of this intervention, as far as our Company is concerned, we would <u>prefer</u> to have a representative in attendance at the hearing to answer any questions or expand on the information contained in this letter.

Sincerely,

RADIO STATION CHSC LIMITED

Robert E. Redmond
President

RER/sk

c.c. - 1 enclosure - map

Secty
CFTR-4
(AM)

Rogers Radio Broadcasting Limited.

June 8, 1979

Mr. J.G. Patenaude,
Acting Secretary General,
Canadian Radio-television and
Telecommunications Commission,
Ottawa, Ontario
KIA ON2

int.
067
#29

Dear Mr. Patenaude:

HSO 1674

Re: Intervention by Mr. R.E. Redmond on Behalf of Radio Station CHNR Simcoe Ontario Against Rogers Radio Broadcasting Limited Application (790313100) to Amend the Licence for Radio Station CFTR Toronto.

This is a response to an intervention filed with the CRTC dated May 28, 1979. Please see attached herewith a registration receipt as proof of delivery of a copy of this response to Mr. Redmond.

We received a telephone call from Mr. Redmond on Wednesday, May 23, 1979 informing us that he was planning to apply for authority to increase the signal strength of CHNR Simcoe Ontario and thus possibly cause increased Image Interference to CFTR in South Western Ontario. He suggested that he would not intervene against our application if we were to accept this increased potential interference and not intervene against his future power increase application for CHNR Simcoe Ontario. We stated that we would like to examine the technical details of his proposal before making a decision on his request.

Mr. Redmond referred us to Mr. Gordon Elder as the professional engineer developing this new proposal for CHNR Simcoe. We telephoned Mr. Elder later that same day and found that his firm knew nothing of the CHNR proposal and therefore they were unable to supply us with any details. We assume that Mr. Elder was contacted by Mr. Redmond either later on the 23rd of May or early on May 24th, because Mr. Elder delivered a map to us late on May 24th showing an extended area of possible Image Interference which would occur if Mr. Redmond's

cont'd

(A)

25 Adelaide Street East, Toronto, M5C 1H3 Ontario

application was approved.

Since this request by Mr. Redmond is in regard to a highly complicated technical matter we requested the views of Mr. D.F. Wood, a registered professional engineer. A copy of his opinion dated May 31,1979 is attached.

Yours truly,

Jim Sward

Jim Sward
President

JS/vs

c.c. Mr. R.E. Redmond
President,
Radio Station CHSC Ltd.,
P.O. Box 3020
St. Catherines, Ontario
L2R 7C7

E.W. Horrigan & Associates Limited
CONSULTING ENGINEERS

Suite 310
4800 Leslie Street
Willowdale, Ontario
M2J 2K9 (416) 496-1644

May 31, 1979

Mr. R.H. Turnpenny
Vice President, Engineering
Rogers Radio Broadcasting Limited
25 Adelaide Street East
Toronto, Ontario
M5C 1Y2

Dear Mr. Turnpenny:

Re: Image Interference from Proposed CHNR Simcoe, Ontario

As you will recall, the 1600 KHz operation at Simcoe was approved by DOC and CRTC despite interventions by Rogers Radio Broadcasting Limited, and thus CFTR was at that time forced to accept an area of potential image interference in Southern Ontario. Now that CHNR are on the air, they propose to increase still further this area of potential interference.

On principle, we object to any situation where a broadcaster can effectively increase the area of DOC-defined interference of another station. This is especially so when the proposed increase in area where image interference may occur is extremely large, and covers a quite heavily populated area. This could prove to be detrimental to the CFTR service in the areas of Kitchener, Galt, Paris and Woodstock, and certainly meets neither the spirit nor the letter of the DOC BP 1 Rule 14 regarding image interference. It is our opinion that such a proposal should be rejected by the DOC on technical grounds.

If the DOC does permit this encroachment into the CFTR service area on the basis of good spectrum management, then we would most strongly recommend that Rogers Radio Broadcasting Limited insist on strict enforcement of Rule 14 inasmuch as "the applicant (CHNR) will investigate complaints of image interference and assume full financial responsibility for the remedial measures.".

With Best Regards,

REGISTERED PROFESSIONAL ENGINEER
D.F. WOOD
PROVINCE OF ONTARIO

David F. Wood, P. Eng.

DFW/kp

66

Grant Broadcasting Limited

CKAR/CKQT-FM.95
360 King Street West
Oshawa, Ontario L1J 2K2
Oshawa: (416) 571-1350
Toronto: (416) 686-1350

G. H. Grant, President

Canadian Radio Television and
Telecommunications Commission
I Rue Principal
Hull, Quebec

May 29, 1979

790313100
#29

Dear Sirs:

RE: INTERVENTION TO THE APPLICATION OF
ROGERS RADIO BROADCASTING LIMITED
APPLICATION # 790313100

The interest of the intervenor is as a broadcaster in the Regional Municipality of Durham. This is an area affected by the above application.

We intervene in opposition to the application as expressed in the contour maps dated February 23, 1979, on the grounds that such ammendments to the CFTR daytime coverage area will effectively increase its signal into our area as follows:

in Oshawa	- almost triple the existing CFTR signal strength
in Whitby	- more than double the existing CFTR signal strength
in Ajax	- provide a signal even stronger than our AM station, CKAR

Our biggest competition is already the Toronto stations, who currently dominate our marketplace, both in signal strength and national and regional advertising. Accordingly, further penetration by a Toronto station is therefore intolerable.

We wish to appear at the June, 1979 hearing.

If the applicant abandons the February 23, 1979 plans filed with the Commission and replaces them (as we have been promised) with revised contour maps dated May 4, 1979, which were provided to us by Rogers Radio Broadcasting Limited, we are prepared to withdraw this intervention and will not appear.

Particulars of the intervenor are noted above.

GRANT BROADCASTING LIMITED

per ____________

Rogers Radio Broadcasting Limited.

066
#29

June 8, 1979

Mr. J.G. Patenaude,
Acting Secretary General,
Canadian Radio-television and
Telecommunications Commission,
Ottawa, Ontario
KIA ON2

Dear Mr. Patenaude:

Re: Intervention by Mr. G.H. Grant on Behalf of Grand Broadcasting Limited Against Application By Rogers Radio Broadcasting Limited (#790313100) to Amend the Licence for Radio Station CFTR Toronto.

This is a response to the intervention by Mr. Grant dated May 29, 1979. Attached herewith please find a copy of the registration receipt providing proof of delivery of this response to Mr. Grant.

For the information of the CRTC and the intervenor we reveal that we have caused a further technical brief to be prepared. A copy of the technical map outlining the resulting signal strengths is attached. In the event that this technical brief, which will be submitted prior to July 1, 1979, is approved it is submitted that the concerns expressed by the intervenor will be answered fully.

Yours truly,

Jim Sward

Jim Sward
President

JS/vs

c.c. Mr. G.H. Grant
President
Grant Broadcasting Limited,
360 King Street West,
Oshawa, Ontario

(A)

25 Adelaide Street East, Toronto, M5C 1H3 Ontario

E. W. Horrigan & Associates Limited

6-380 (43)

Final Proof of Performance

of the

50 kW Day-time Pattern

of

CFTR Toronto, Ontario

680 kHz   Antenna Type B   Class B

Antenna Site: 43° 12' 50" North Latitude
79° 36' 30" West Longitude

Prepared for:

Rogers Radio Broadcasting Limited
25 Adelaide Street East
Toronto, Ontario
M5C 1H3

Prepared by:

E. W. Horrigan & Associates Limited
4800 Leslie Street Suite 310
Willowdale, Ontario
M2J 2K9

January 18, 1985

E. W. Horrigan & Associates Limited

Table of Contents

1.0 General

1.1 Introduction

E.W. Horrigan & Associates Limited has been retained by Rogers Radio Broadcasting Limited to prepare the Final Proof of Performance for AM radio station CFTR Toronto, Ontario. This Final Proof of Performance has been prepared in accordance with Broadcast Specification No. 2, Issue 1, and demonstrates that the 50 kW Day-time operation of CFTR is identical, for all practical purposes, to that operation proposed in the Revised Engineering Brief for this station dated April 15, 1983.

1.2 Personnel

All array adjustments and measurements were carried out by:

W. B. Groh, who has assisted the writer in achieving Proofs of Performance for CFTR and other radio stations; and

D. F. Wood, P. Eng., Consulting Engineer, whose qualifications are on file with the Department.

1.3 Test Equipment

Test equipment used in achieving this proof are:

Potomac Instruments, Inc. FIM-21 field strength meter, serial number 507;

Potomac Instruments, Inc. SD-31 synthesizer/detector, serial number 202;

Delta Electronics, Inc. OIB-1 operating impedance bridge;

General Radio Inc. RF bridge #1606B, serial number 3376;

Delta Electronics, Inc. TCA RF ammeters, various ranges;

Potomac Instruments, Inc. PM-19 antenna monitor with PMA-19 precision monitor adapter.

1.0 General (cont'd)

1.4 Time Span

Tuning of the Day-time array commenced on May 7, 1984. Field Strength measurements were completed on November 4, 1984.

1.5 Methodology

The total length of each coaxial line of the array monitoring system, including the length of line on the tower, in the isolation coil and the long buried section was confirmed by open- and short- circuit impedance measurements. These lengths were judged to be identical on all eight towers.

The LC parallel-tuned sampling isolation assemblies were then adjusted for maximum attenuation.

The tower base self impedances were measured, with the other towers of the array floating.

A 1 kW transmitter was used at first, operating into the tuning and phasing networks to provide a low power source to permit the tracing of the usual system start-up problems and initial tuning of the array. (This transmitter was also used in the determination of the base operating impedances of the high-power towers of the array.)

The main transmitter, first at the 25 kW power level, then at the 50 kW power level was used to drive the array while components were adjusted until the field magnitude ratios and phase angles of all towers, as displayed on the antenna monitor, were observed to be within ± 3% and ± 3° respectively of those parameters specified in the Engineering Brief.

At this point, the current distribution of each tower was determined by use of a probing meter at intervals of twenty feet up each tower. These readings were plotted on cartesian co-ordinate graph paper as relative field versus height, and the relative areas under the curves were calculated and used to calibrate the antenna monitor with respect to field ratio. The tuning procedure was continued until the field magnitude ratios and phase angles of all towers were observed to be within ± 1% and ± 1° respectively, of those parameters specified in the Engineering Brief.

1.0 General (cont'd)

1.5 Methodology (cont'd)

Radials on bearings of 110.5°, 122.5° and 194.4° were selected for use as 'talk-down' radials. Mr. Groh positioned a field strength meter at known distances from Tower #6 of the CFTR array on each of these radials, and monitored the field strength from the array, providing feedback via two-way radio as the array was adjusted to a field strength at or near a null value as measured at each point. When the field strength was observed to be at or near a null value, a complete set of antenna monitor readings was taken. The complete set of readings was then input to a computer program which uses a 'steepest descent' technique to provide compensation for antenna monitoring system errors and to output the antenna monitor readings needed to achieve the required pattern. The array was tuned until the required readings were observed on the antenna monitor.

Field strength readings were made along radials at 110.5°, 122.5°, 194.4° and 287.1° to ensure that the desired pattern shape and size had indeed been achieved. (It should be noted that the 'proximity effect' of the array at close-in measurement points, i.e. the effect of the array not being a point source, was included in the evaluation.) At this time, the Department was asked to approve a test operation during normal Day-time broadcasting hours to permit field strength measurements to be made to determine the coverage of the station.

Ratio measurements were not taken, as it was uncertain that the detuning of the seven unused towers in the array was of sufficient magnitude to ensure a true omni-directional operation of Tower #6. Because Broadcast Specification No. 2 mentions ratio measurements only as a suggestion, and as ratio measurements had not been required on previous Proofs of Performance of CFTR, we trust that the Department will accept this omission. It is our considered opinion that the size and shape of the Day-time array of CFTR is adequately demonstrated by the radial measurements documented herein.

1.6 Discussion of Results

The CFTR 50 kW Day-time array has behaved substantially as foreseen by its designers. The stability of the array has proven to be excellent, as observed at both the array monitor and at the field strength monitoring point.

The protection requirements to all co-channel stations have been met.

The coverage predicted for the array has been achieved in all directions, with the exception of the northerly bearings, where the coverage predictions have been exceeded because the conductivity of Lake Ontario was somewhat higher than that indicated on the Department's ground conductivity map. A small area of extremely low conductivity was found to exist directly to the west of the antenna site, but the signal strength was found to 'recover' further along the westward radials.

The phasor input bandwidth was found to be extremely good, and the array should prove to permit good performance with an AM Stereo signal.

1.7 Conclusions

It is our considered opinion that the CFTR 50 kW Day-time array is performing in accordance with the technical parameters set out in the Engineering Brief dated April 15, 1983. Permission is therefore requested to commence regularly scheduled broadcasting using this installation.

1.8 Engineer's Seal and Signature

David F. Wood, P. Eng.
Consulting Engineer

January 18, 1985

IFRB Serial No. 12079

FORM FOR THE APPLICATION OF ARTICLE 4 OF THE AGREEMENT

CHARACTERISTICS OF A REGION 2 BROADCASTING STATION IN THE BAND 535 - 1605 kHz

PART I GENERAL INFORMATION

(01) Administration: CANADA | Sheet No. 421 | Date 830726

Assigned frequency (kHz)		(02)	680
Transmitting station	Name of the station	(03)	TORONTO ON
	Call sign	(04)	CFTR
	Additional Identification	(05)	
	Station class	(06)	B
	Operational Status	(07)	P
Country		(08)	CAN
Geographical coordinates of the transmitting station		(09)	79W3630 43N1250

(11) a) New assignment [ ] b) Modification of characteristic of an assignment recorded in the plan [X] c) Cancellation of an assignment [ ]

(12) Modification under Section 4.2.14 Yes [ ] No [X]

(13) Date of bringing into service or cessation of operation [ ] Year Month Day

STATION PARAMETERS		DAYTIME OPERATION		NIGHT-TIME OPERATION
Station power (kW)	(21)	50.	(31)	50. No change
r.m.s. value of radiation for station power (mV/m at 1 km)	(25)	2034.88	(35)	
Antenna type	(26)	B	(36)	
Simple vertical antenna electrical height (degrees)	(27)		(37)	

(44) Remarks

COORDINATION UNDER ARTICLE 4:

COUNTRY	USA						
IN PROGRESS	X						
ACCEPTANCE OBTAINED							

FORM FOR THE APPLICATION OF ARTICLE 4 OF THE AGREEMENT
CHARACTERISTICS OF A REGION 2 BROADCASTING STATION IN THE BAND 535 -1605 kHz

IFRB Serial No. 12079

PART II Section I

Description of a directional antenna consisting of vertical conductors

Sheet No. 421 Date 830726

(01) Name of transmitting station: TORONTO ON

(02) Country: CAN

(03) Hours of operation: D

(04) Total number of towers: 8

(05) Tower No.	(06) Tower field ratio	(07) Phase difference of the field (± degrees)	(08) Electrical tower spacing (degrees)	(09) Angular tower orientation (degrees)	(10) Reference tower indicator	(11) Electrical height of tower (degrees)	(12) Tower structure
1	.338	169.2	0.	0.	—	99.5	
2	.999	129.2	154.	292.5		99.5	
3	1.003	89.2	308.	292.5		99.5	
4	.339	51.3	462.	292.5		99.5	
5	.336	-39.	485.782	303.013		99.5	
6	1.	0.	335.546	307.816		99.5	
7	1.001	38.4	191.338	320.088		99.5	
8	.339	78.7	90.	12.5		99.5	
	.	.	.	.		.	
	.	.	.	.		.	
	.	.	.	.		.	
	.	.	.	.		.	

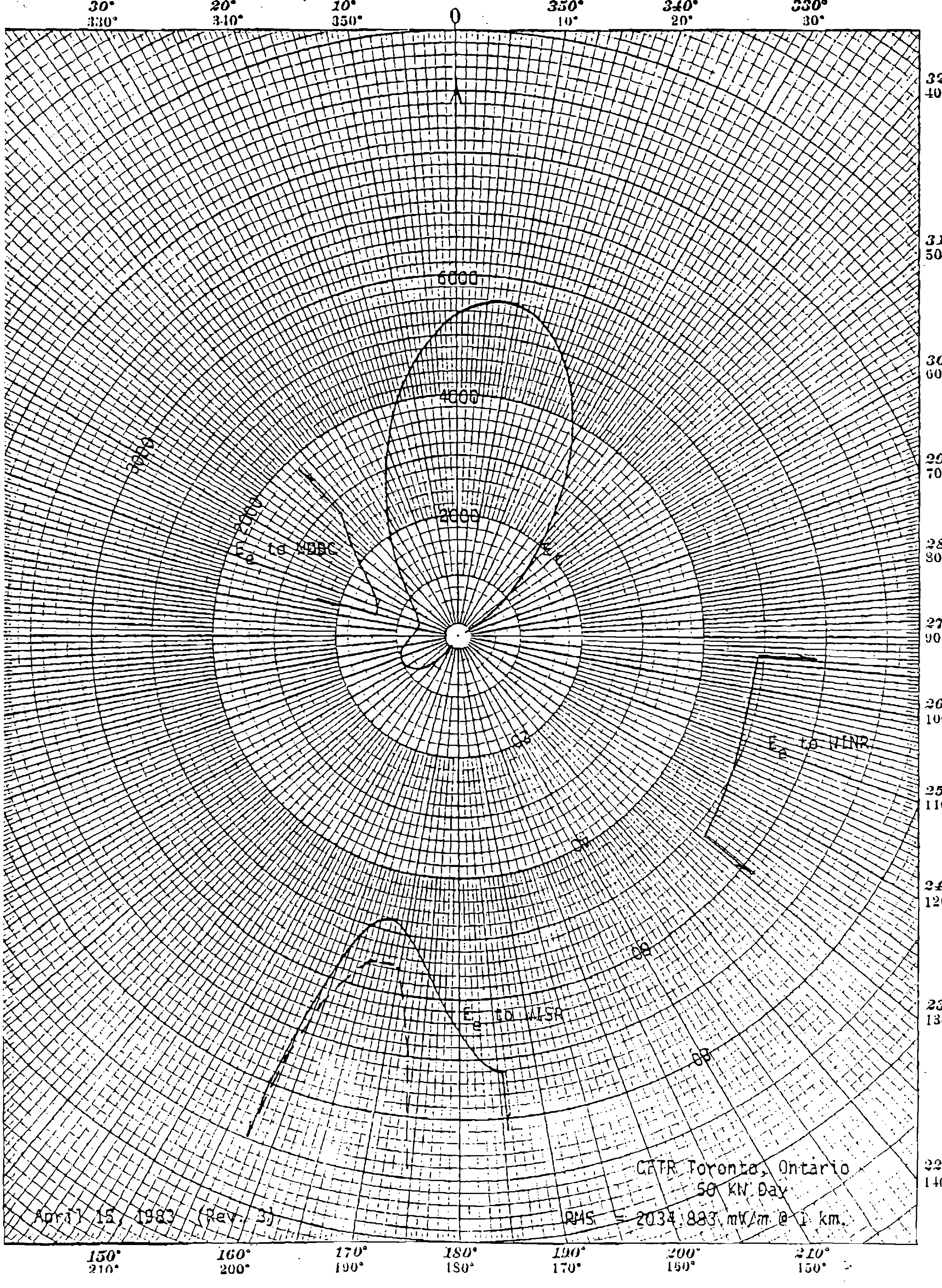
(14) r.m.s value of radiation: 2034.88 mV/m at 1 km

(15) Type of pattern: E

(16) Special quadrature factor: 40.6 mV/m at km

(17) SUPPLEMENTARY INFORMATION

. W. Horrigan & Associates Limited



E. W. Horrigan & Associates Limited

3.1 Tower Self Impedance

	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #1	625	54+j 72
	635	58+j 84
	645	63+j 93
	655	68+j104
	665	74+j116
	675	88+j124
	685	95+j126
	695	95+j153
	705	104+j163
	715	114+j176
	725	123+j186
	735	137+j195
At 680 kHz (interpolated)		84.5+j136
Tower #2	625	58+j 72
	635	64+j 87
	645	69+j 98
	655	75+j108
	665	82+j120
	675	84+j130
	685	99+j145
	695	110+j155
	705	120+j166
	715	133+j173
	725	143+j185
At 680 kHz (interpolated)		95.5+j141
Tower #3	625	55+j 77
	635	60+j 85
	645	65+j 98
	655	71+j108
	665	77+j119
	675	86+j129
	685	93+j142
	695	101+j154
	705	108+j166
	715	123+j176
	725	130+j185
	735	142+j195
At 680 kHz (interpolated)		90+j140

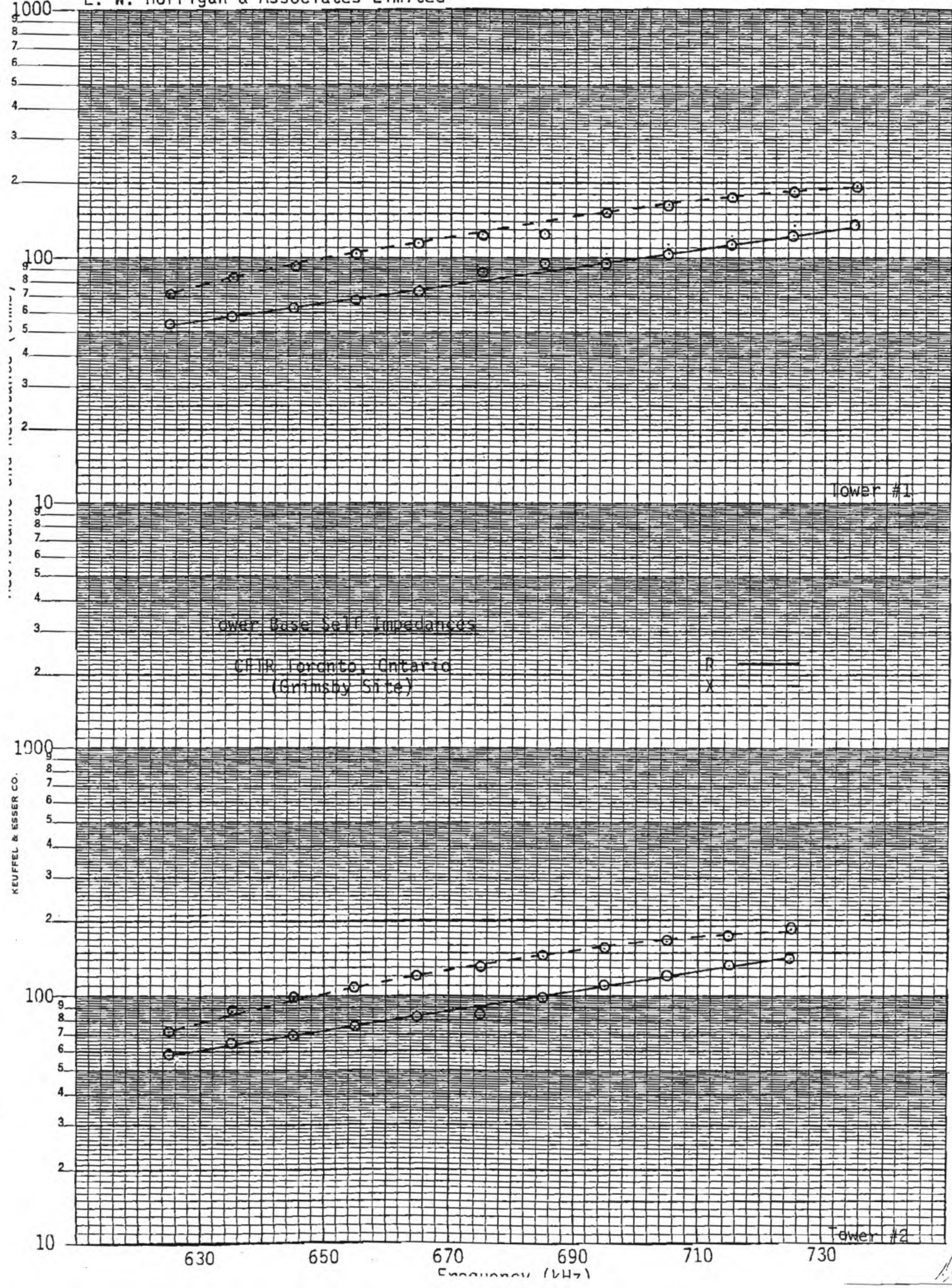
3.1 Tower Self Impedance (cont'd)

	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #4	625	54+j 72
	635	58+j 84
	645	63+j 95
	655	68+j105
	665	73+j117
	675	81+j129
	685	84+j143
	695	94+j155
	705	104+j167
	715	113+j179
	725	127+j190
	735	138+j201
At 680 kHz (interpolated)		85+j 136
Tower #5	625	54+j 72
	635	59+j 84
	645	63+j 93
	655	68+j104
	665	74+j116
	675	84+j130
	685	89+j139
	695	94+j151
	705	103+j165
	715	114+j172
	725	123+j183
	735	136+j193
At 680 kHz (interpolated)		85+j133
Tower #6	625	56+j 77
	635	61+j 90
	645	66+j 99
	655	72+j110
	665	78+j120
	675	88+j141
	685	92+j158
	695	102+j155
	705	113+j166
	715	122+j176
	725	131+j183
	735	140+j191
At 680 kHz (interpolated)		90.5+j 137

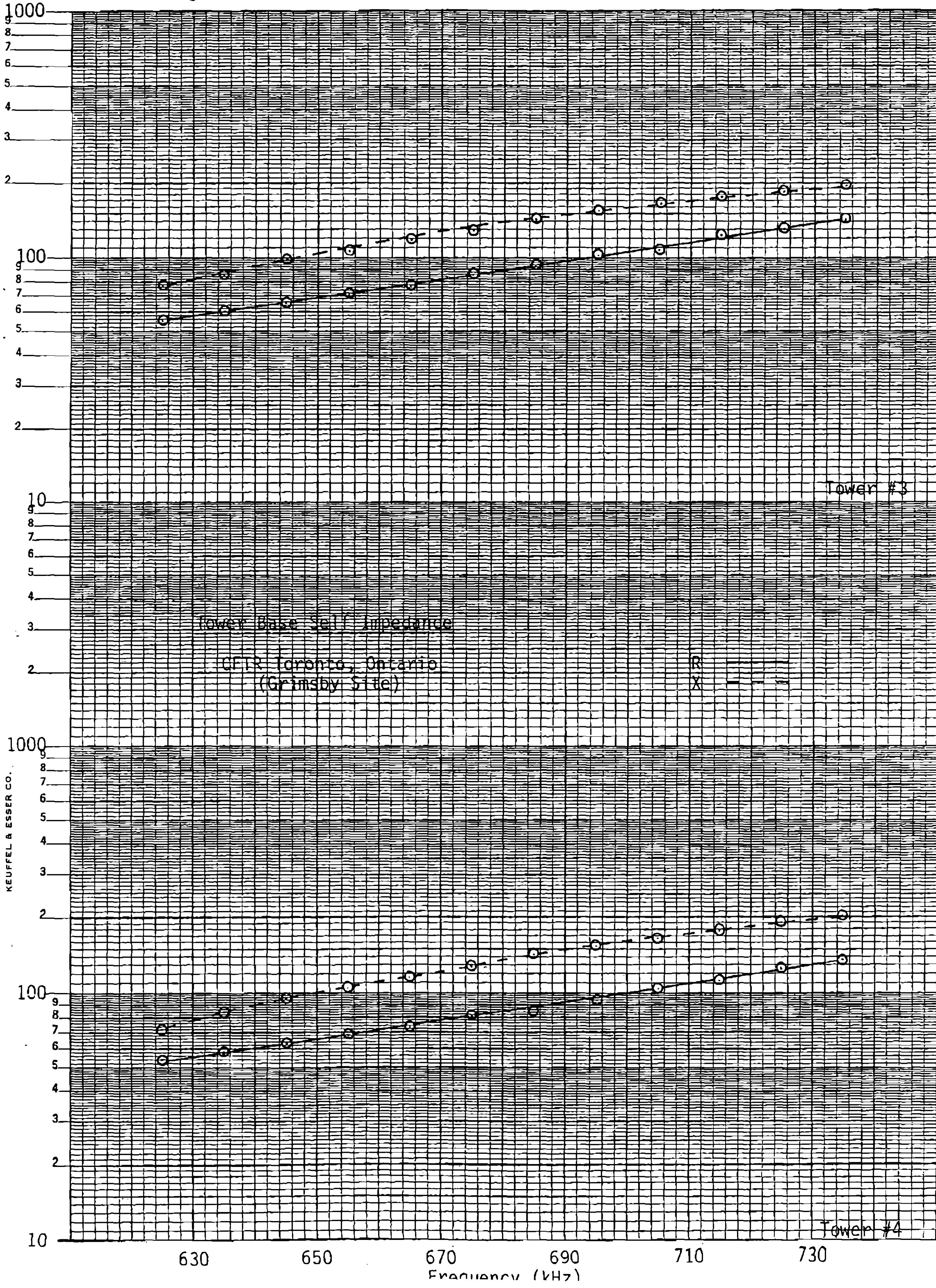
3.1 Tower Self Impedance (cont'd)

	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #7	625	55+j 77
	635	59+j 87
	645	64+j 98
	655	70+j108
	665	76+j117
	675	89+j136
	685	89+j142
	695	99+j154
	705	109+j163
	715	118+j173
	725	129+j185
	735	139+j195
	At 680 kHz (interpolated)	86.5+j134
Tower #8	625	52+j 71
	635	57+j 84
	645	61+j 95
	655	66+j105
	665	71+j117
	675	76+j129
	685	84+j139
	695	92+j154
	705	102+j167
	715	113+j178
	725	123+j189
	735	131+j188
	At 680 kHz (interpolated)	83.0+j144

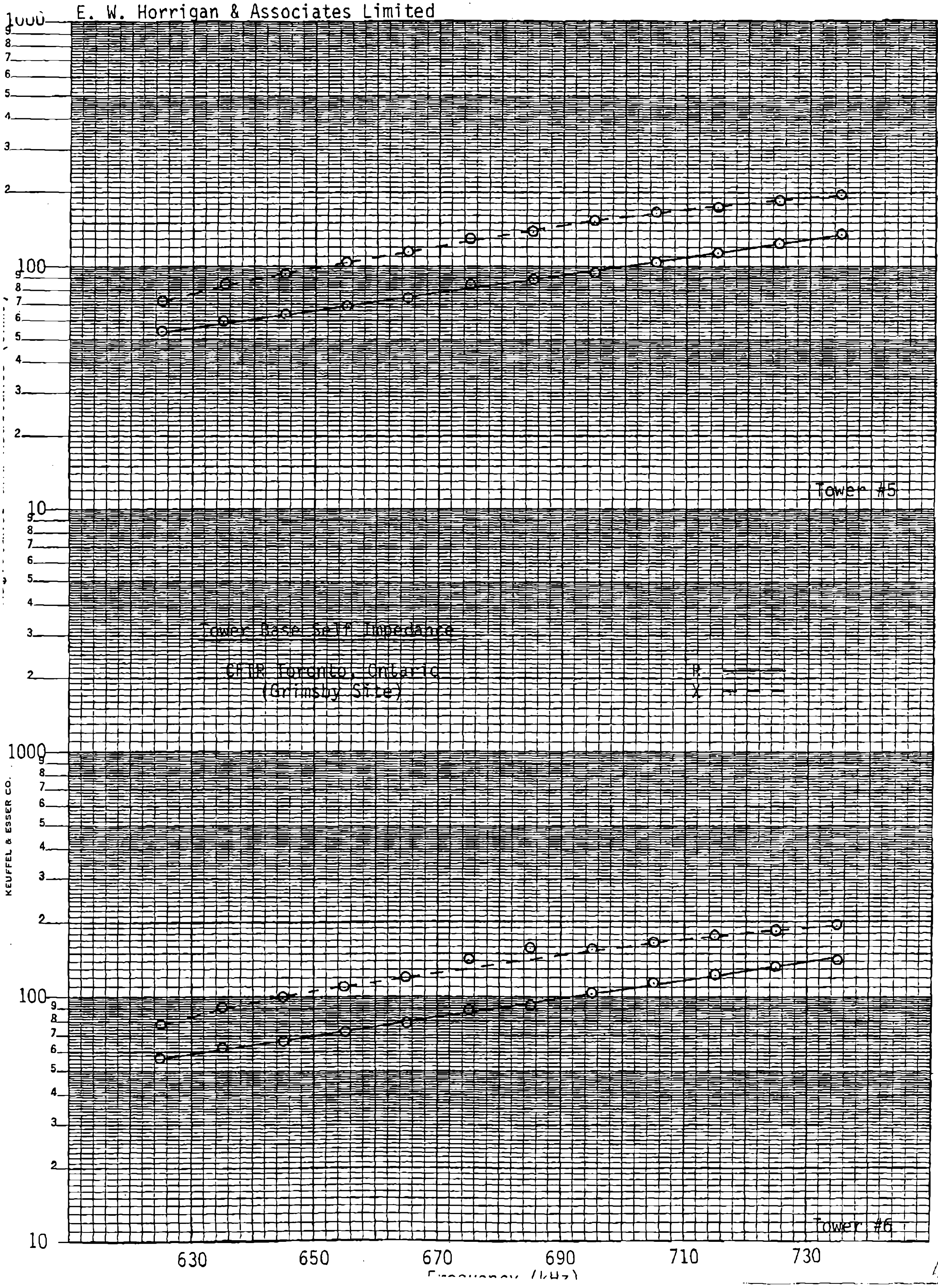
E. W. Horrigan & Associates Limited

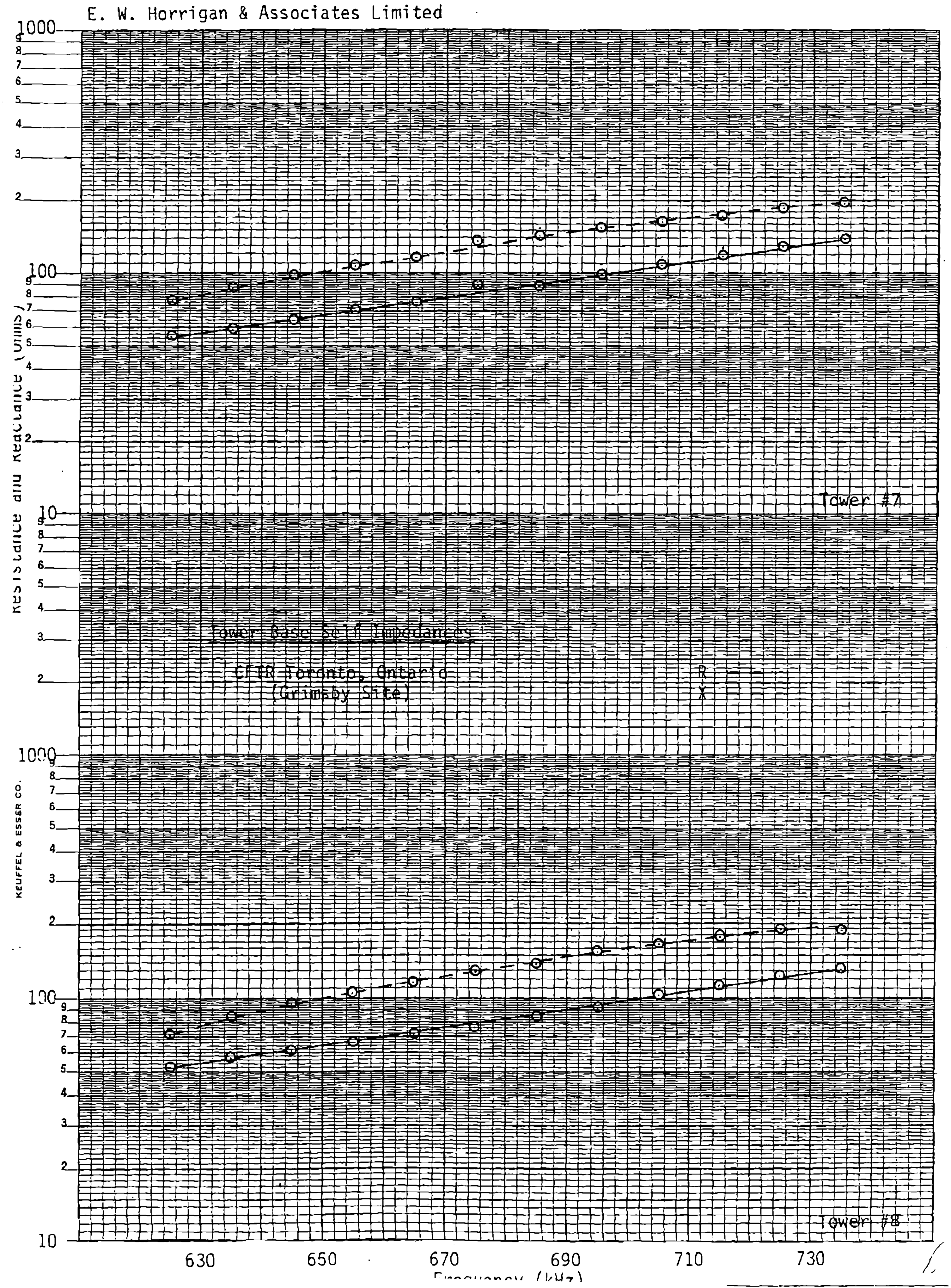


E. W. Horrigan & Associates Limited



E. W. Horrigan & Associates Limited




E. W. Horrigan & Associates Limited
Resistance and Reactance (Ohms)
Tower #7
Tower Base Self Impedances
CFTR Toronto, Ontario
(Grimsby Site)
R
X
Tower #8
KEUFFEL & ESSER CO.
630
650
670
690
710
730
Frequency (kHz)

3.2 Array Power Analysis

Tower #	Base Operating Impedance (Ohms)	Base Current (Amperes)	Power (Watts)
1	2. +j109.	4.6	42
2	19. +j 88.	12.0	2736
3	17. +j 67.	13.2	2962
4	− 25. +j 56.	5.6	−784
5	139. +j 31.	5.4	4053
6	152. +j 90.*	11.5	20102
7	132. +j109.*	11.8	18380
8	87. +j 95.	5.1	2263

Total Power	49754.	Watts
Common Point Impedance	50 +j 0	Ohms
Common Point Current	32.8	Amperes
Common Point Power	53792	Watts
Power Loss in Antenna Feed System	4038	Watts

Tower #	Line Attenuation (dB)	Line VSWR	Mismatch Loss (dB)	Total Line Loss (Watts)
1	0.228	7.00	3.590	59
2	0.028	1.34	0.093	77
3	0.106	4.60	2.316	2212
4	0.421	1.32	0.083	−66
5	0.245	1.02	0.000	240
6	0.091	1.20	0.036	597
7	0.056	1.08	0.006	264
8	0.136	1.14	0.019	82

Total Line Losses	3445
Therefore, loss in tuning networks	593

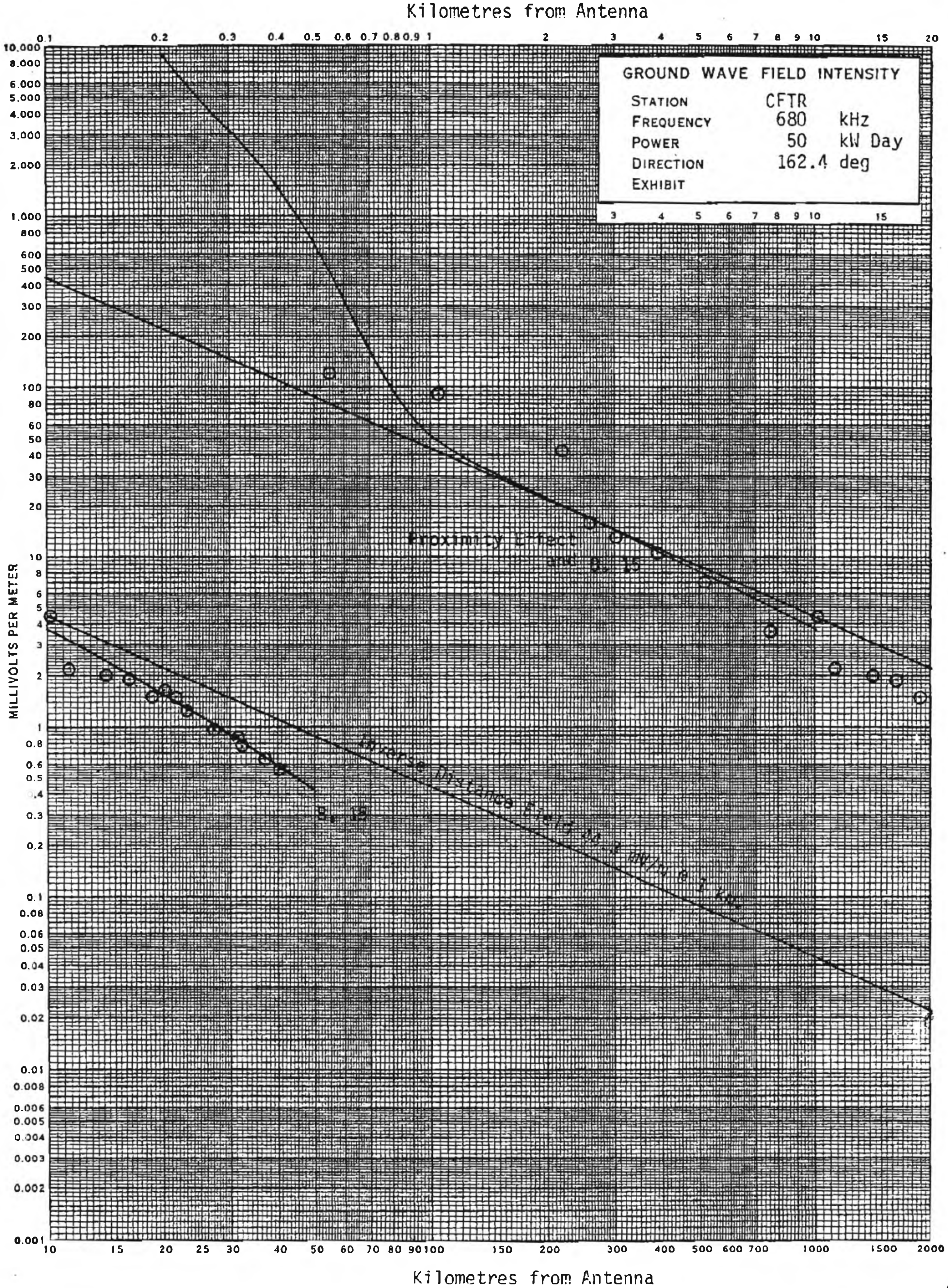
* Measured at 1 kW.

Radial at Azimuth 162.4 Degrees

Measured February 28, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.60	120
2	0.88	92
3	2.30	42.5
4	2.70	16
5	3.15	13
6	4.10	10.5
7	5.30	7.0
8	7.70	3.6
9	10.2	4.5
10	11.5	2.2
11	14.3	2.0
12	16.4	1.9
13	18.8	1.5
14	20.2	1.65
15	21.6	1.5
16	23.1	1.24
17	27.3	1.0
18	31.2	0.88
19	32.1	0.76
20	37.0	0.65
21	40.3	0.56

Radial ends at Lake Erie shoreline.



Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 162.4 deg
EXHIBIT
MILLIVOLTS PER METER
Proximity Effect and 8, 15
8, 15
Inverse Distance Field
Kilometres from Antenna

K&E

3.2 Array Power Analysis

Tower #	Base Operating Impedance (Ohms)	Base Current (Amperes)	Power (Watts)
1	2. +j109.	4.6	42
2	19. +j 88.	12.0	2736
3	17. +j 67.	13.2	2962
4	-25. +j 56.	5.6	- 784
5	139. +j131.	5.4	4053
6	152. +j 90.*	11.5	20102
7	132. +j109.*	11.8	18380
8	87. +j 95.	5.1	2263
Total Power			49754

Common Point Impedance	50 +j 0	Ohms
Common Point Current	32.8	Amperes
Common Point Power	53792	Watts
Power Loss in Antenna Feed System	4038	Watts

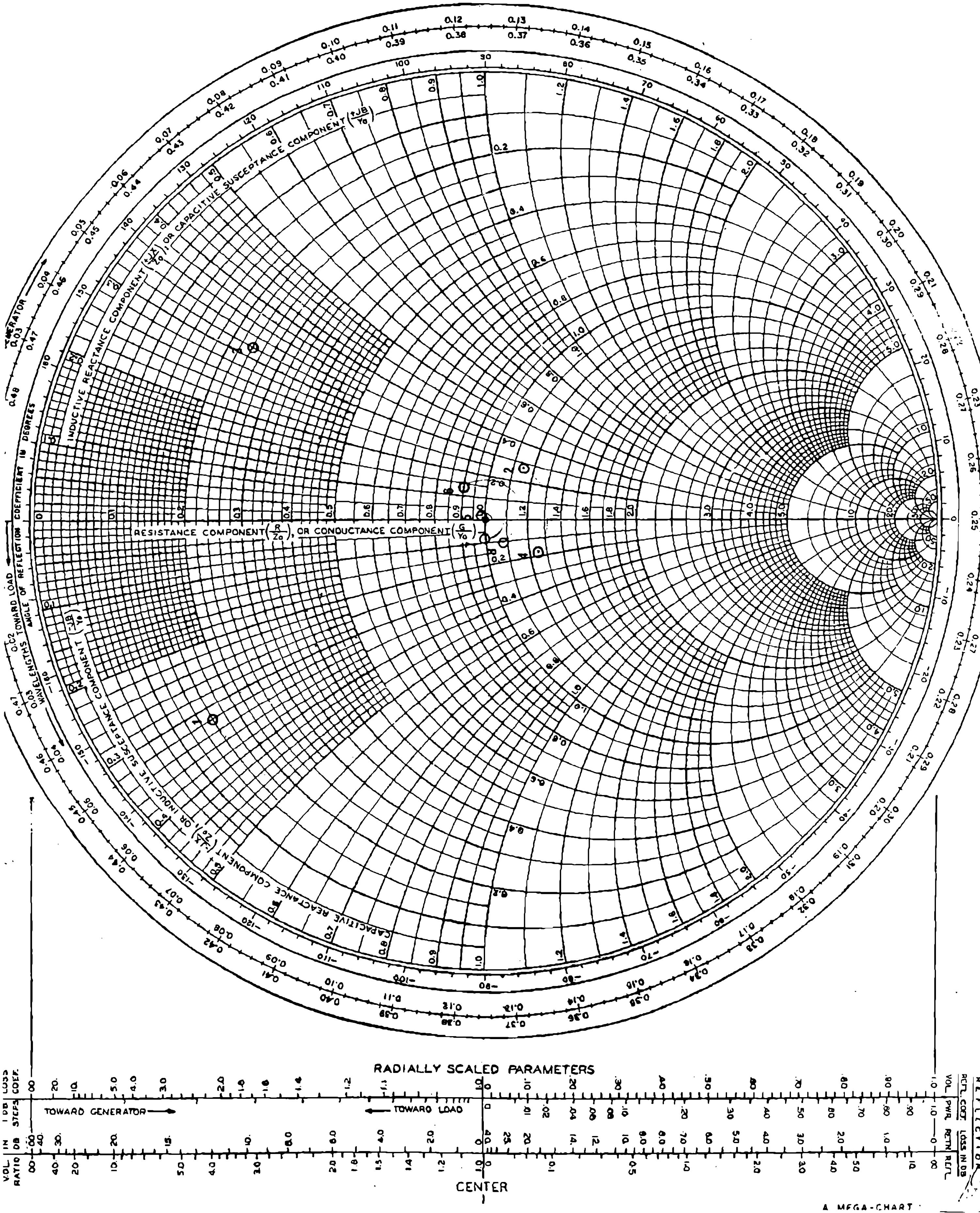
Tower #	Line Attenuation (dB)	Line VSWR	Mismatch Loss (dB)	Line Loss (Watts)
1	0.228	7.00	3.590	54
2	0.028	1.34	0.093	59
3	0.106	4.60	2.316	2087
4	0.421	1.32	0.083	-15
5	0.245	1.02	0.000	0
6	0.091	1.20	0.036	167
7	0.056	1.08	0.006	25
8	0.136	1.14	0.019	10
Total Line Losses				2387

Therefore, loss in tuning networks 1651

* measured at 1 kW.

NAME CFTR Day	TITLE Transmission Line VSWR	DWG. NO.
SMITH CHART FORM 82BSPR (2-49)	KAY ELECTRIC COMPANY, PINE BROOK, N.J. ©1949 PRINTED IN U.S.A.	DATE December 4, 1984

IMPEDANCE OR ADMITTANCE COORDINATES



A MEGA-CHART

3.4 Antenna Monitor Readings

The antenna monitor readings output from the 'talk-down' parameter seeker program were achieved to within ± 1% in field ratio and ± 1° in phase angle. The antenna monitor readings that were maintained during the Proof measurement period are given below.

Tower #	Deviation (%)	Phase (deg)
1	-2.9	172.0
2	-2.4	127.2
3	-1.6	85.3
4	5.9	48.3
5	-3.8	-39.3
6	0.0	0.0
7	-0.6	37.9
8	2.4	76.1

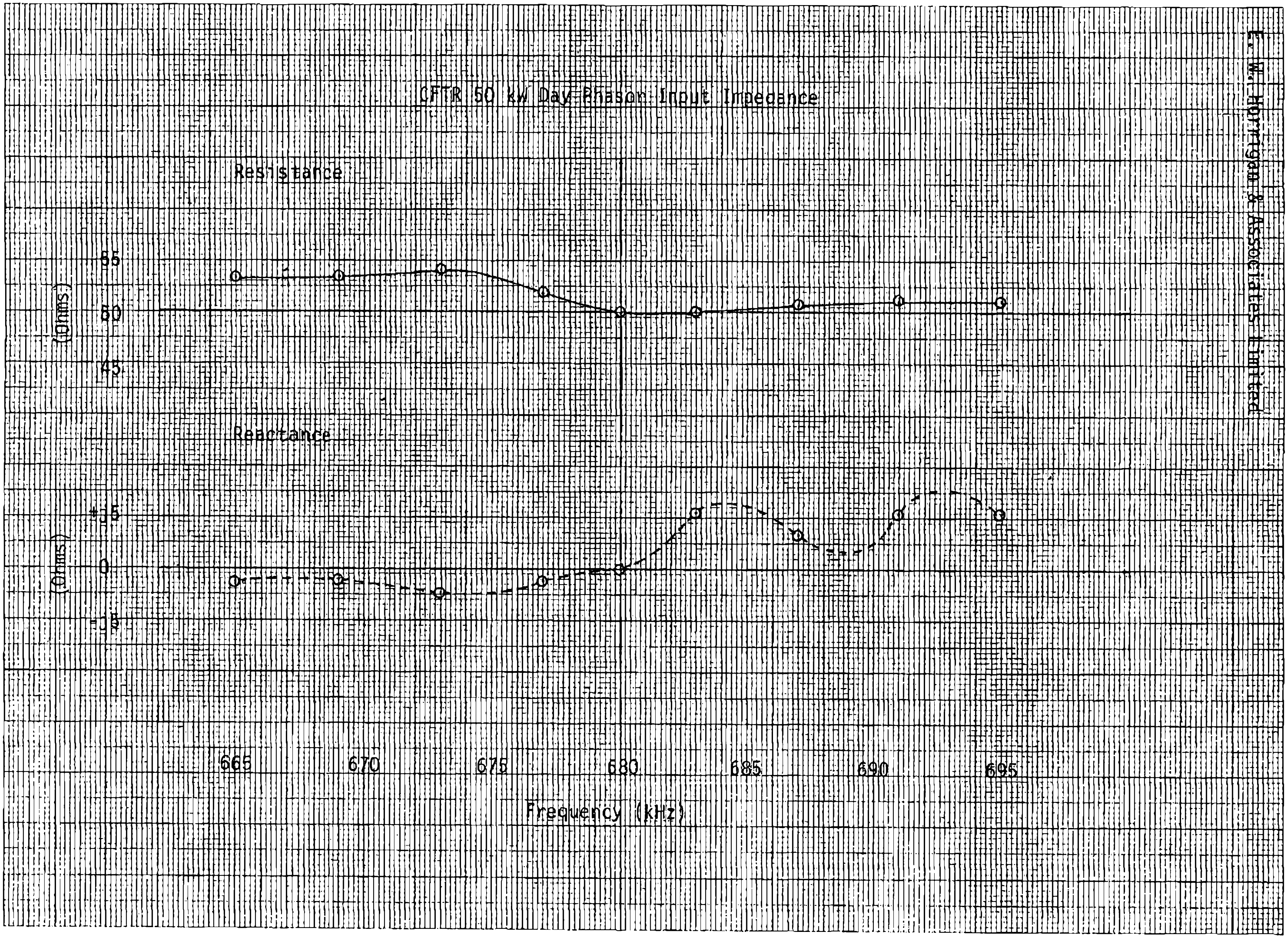
The Phasor control settings at this time were:

Tower #	Power	Phase
1	172.5	049
2	085	111
3	114	108
4	153	064
5	082.5	107
6	101	283
7	249	135
8	095	112.5

3.5 Phasor Input Impedance

Frequency (kHz)	Impedance (Ohms)
665	53.3-j 1.3
669	53.3-j 1.1
673	54.1-j 2.3
677	51.9-j 1.2
680	50.0-j 0.0
683	50.0+j 5.5
687	50.7+j 3.4
691	51.2+j 5.4
695	51.2+j 5.4

METRIC



CFTR 50 kW Day Phasor Input Impedance
Resistance
55
50
45
(Ohms)
Reactance
+15
0
-15
(Ohms)
665
670
675
680
685
690
695
Frequency (kHz)
E. W. Horrigan & Associates Limited

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 110.5 Degrees

Measured September 17, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	3.17	4.5
2	3.27	5.1
3	3.43	5.2
4	3.55	4.2
5	3.64	4.6
6	3.70	3.5
7	3.85	4.2
8	3.93	4.6
9	3.98	3.5
10	4.33	3.9
11	4.51	2.75
12	5.0	4.3
13	5.54	3.9
14	7.17	2.5
15	7.90	2.3
16	10.60	1.4
17	12.4	1.1
18	17.82	0.7
19	23.6	0.6
20	31.25	0.48
21	41.9	0.27

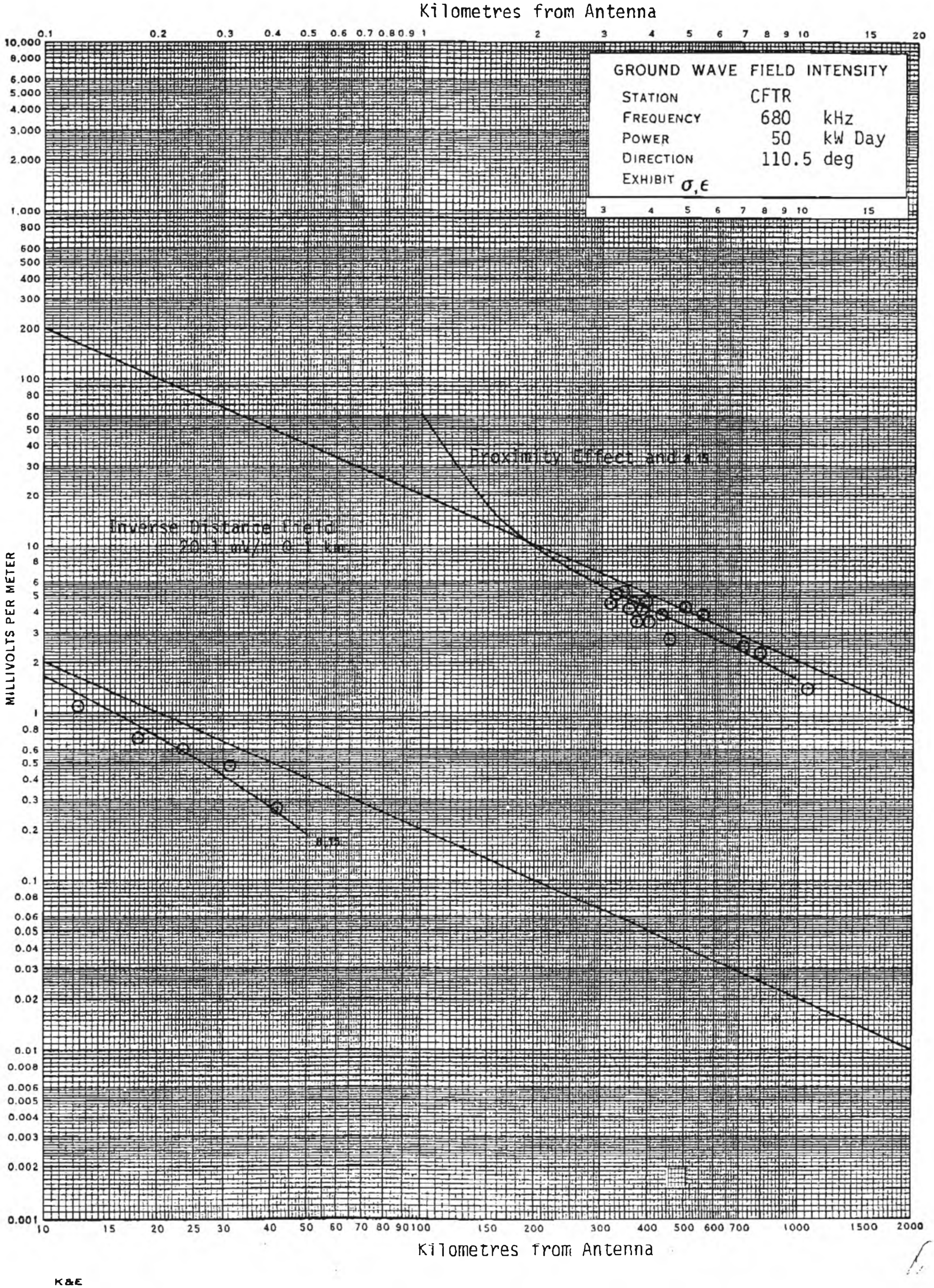
Filename CF7RD

Proximity Effect Radial @ 110.5 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	30432.33
.126	29884.74
.158	40360.36
.200	85556.85
.251	23191.53
.316	13169.90
.398	13088.65
.501	1800.87
.631	466.62
.794	154.58
1.000	62.11
1.259	29.31
1.585	16.10
1.995	10.27
2.512	7.40
3.162	5.71
3.981	4.55
5.012	3.66
6.310	2.95
7.943	2.38
10.000	1.91

Far Field = 20.1 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 110.5 deg
EXHIBIT σ,ε
Proximity Effect and
Inverse Distance Field
20.1 mV/m @ 1 km
MILLIVOLTS PER METER
Kilometres from Antenna
K&E

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 122.5 Degrees

Measured September 20, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	3.43	6.0
2	3.62	6.2
3	3.72	5.6
4	4.22	4.4
5	4.60	4.1
6	4.84	4.2
7	4.96	4.9
8	5.35	3.9
9	5.77	4.2
10	5.92	3.3
11	6.20	3.1
12	6.70	3.1
13	7.50	1.8
14	9.40	2.8
15	10.8	1.45
16	11.3	1.45
17	12.2	1.3
18	14.0	0.85
19	17.05	1.25
20	19.2	1.0
21	20.1	1.0
22	21.1	0.9
23	27.6	0.6
24	31.8	0.35
25	43.3	0.30

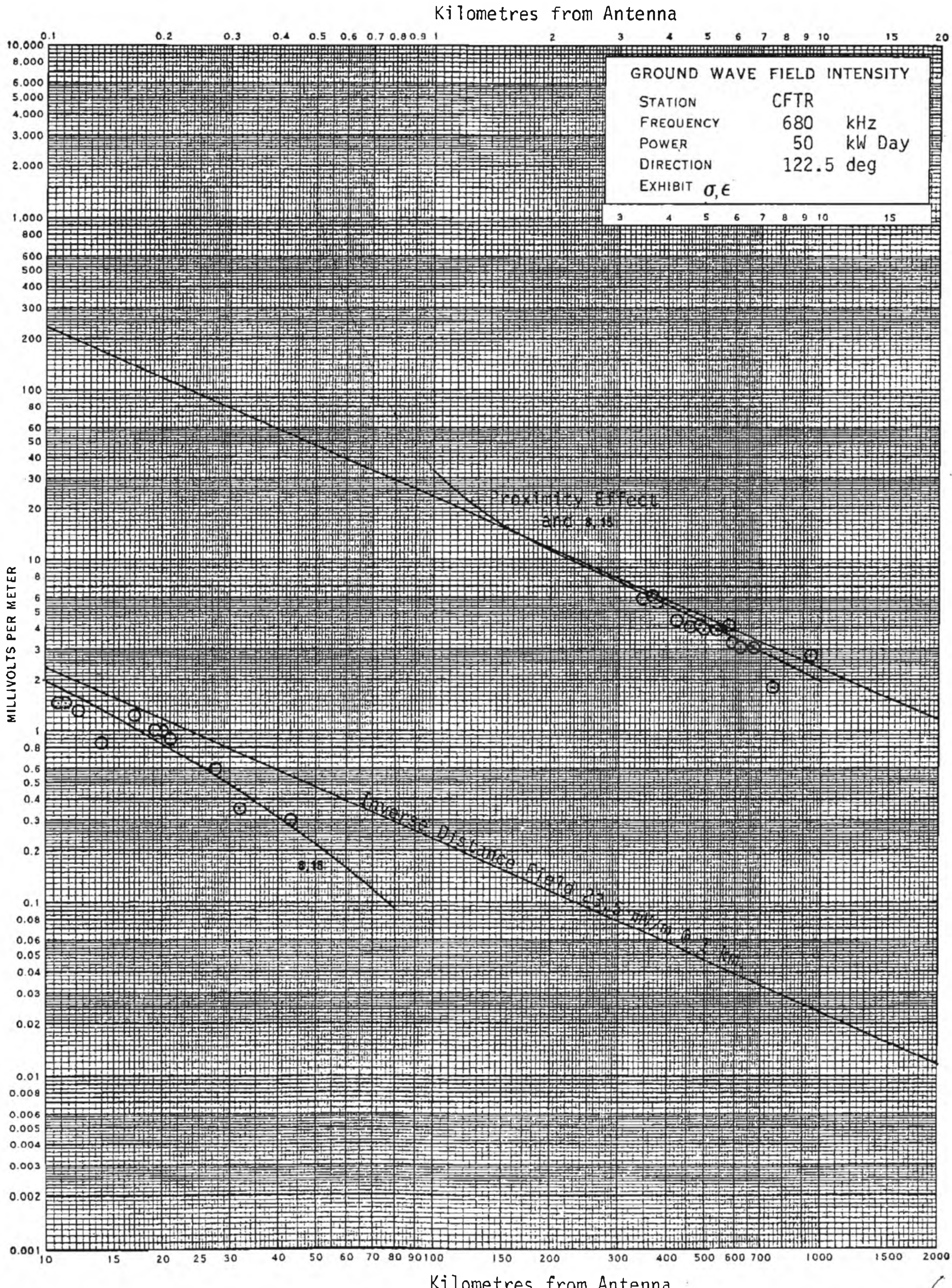
Filename CFTRO

Proximity Effect Radial @ 122.5 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	29879.79
.126	29013.79
.158	32970.48
.200	35717.08
.251	19360.17
.316	11420.69
.398	4769.69
.501	1070.35
.631	223.18
.794	72.87
1.000	34.13
1.259	21.33
1.585	15.51
1.995	11.97
2.512	9.42
3.162	7.46
3.981	5.92
5.012	4.70
6.310	3.74
7.943	2.97
10.000	2.36

Far Field = 23.5 mV/m at 1 km.



Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 122.5 deg
EXHIBIT σ,ε
Proximity Effect
and 8,15
8,15
Inverse Distance Field 23.5 mV/m @ 1 km
MILLIVOLTS PER METER
Kilometres from Antenna

K&E

6

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 194.4 Degrees

Measured September 19, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	0.50	1020
2	1.30	140
3	1.84	72
4	2.88	15.3
5	4.40	5.3
6	6.42	2.8

The presence of interference made the validity of further measurements questionable.

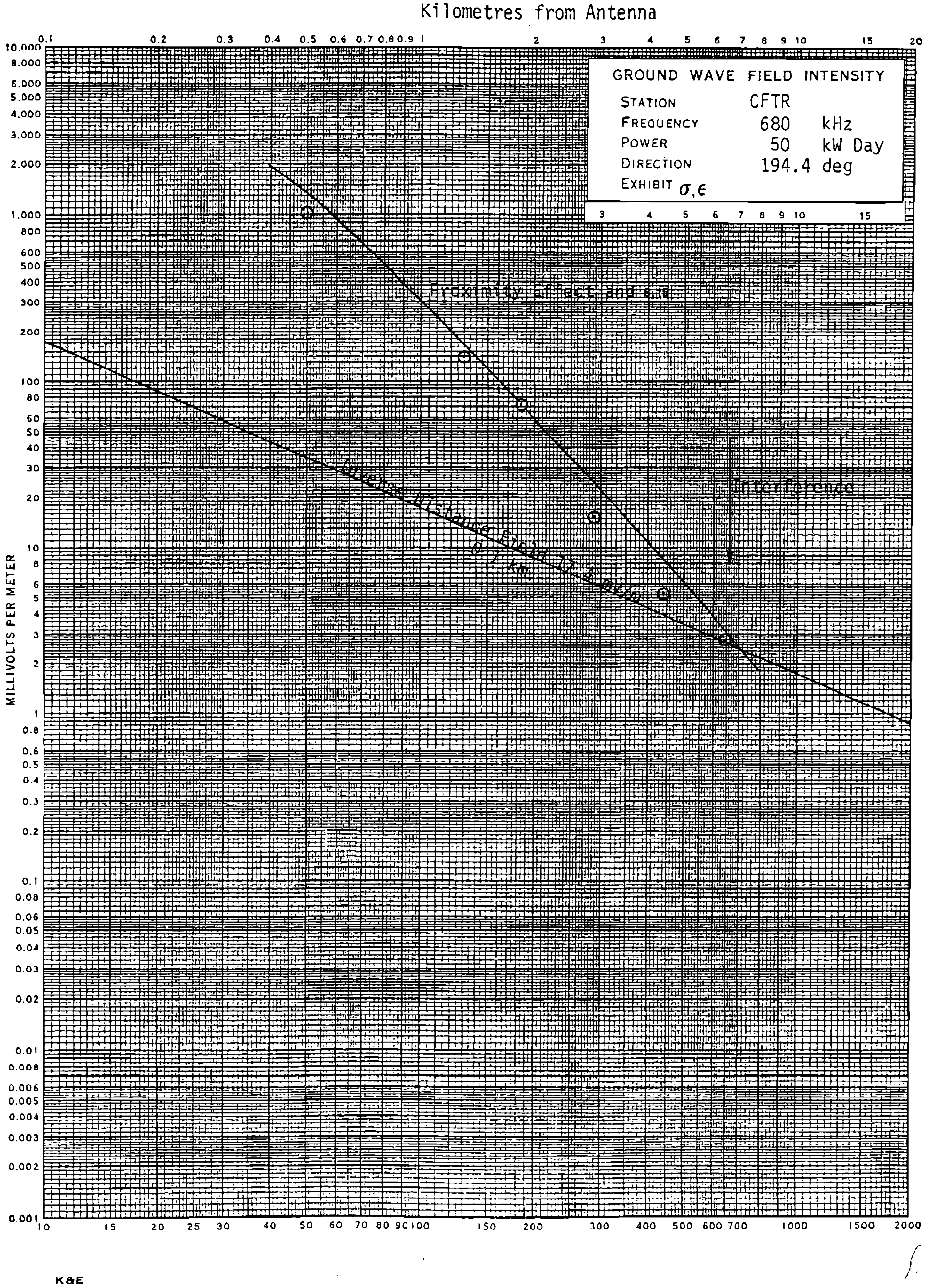
lename CFTRD

Proximity Effect Radial @ 194.4 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	79670.29
.126	50080.45
.158	10626.40
.200	5062.82
.251	3701.49
.316	2761.30
.398	1970.44
.501	1335.65
.631	857.39
.794	526.10
1.000	313.48
1.259	183.92
1.585	107.19
1.995	62.31
2.512	36.14
3.162	20.88
3.981	11.98
5.012	6.79
6.310	3.80
7.943	2.11
10.000	1.20

Far Field = 17.4 mV/m at 1 km.



Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 194.4 deg
EXHIBIT σ,ε
MILLIVOLTS PER METER
Interference
K&E

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 247.0 Degrees

Measured October 17, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	0.68	1100
2	0.74	890
3	1.26	740
4	2.13	400
5	2.85	285
6	3.88	203
7	5.50	150
8	6.10	135
9	8.55	96
10	9.55	86
11	10.15	68
12	10.70	70
13	11.65	61
14	13.00	57
15	16.25	46
16	18.50	30
17	20.90	34
18	23.0	32
19	25.1	30
20	27.1	26
21	29.8	20.5
22	31.4	23
23	34.8	18.0
24	37.8	17.0
25	42.3	14.0
26	46.2	10.0
27	51.0	8.8
28	55.4	9.4
29	59.0	8.0
30	66.5	6.0
31	74.0	3.5
32	85.0	2.05
33	92.5	2.22
34	98.0	2.4
35	102.5	1.92
36	109	1.58
37	118	1.24
38	127	1.35
39	139	0.88
40	149.5	0.6

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 247.0 Degrees (cont'd)

Measured October 17, 1984

Point #	Distance (km)	Field Strength (mV/m)
41	160	0.62
42	174	0.57
43	182	0.54
44	192	0.49
45	200	0.295
46	211	0.385

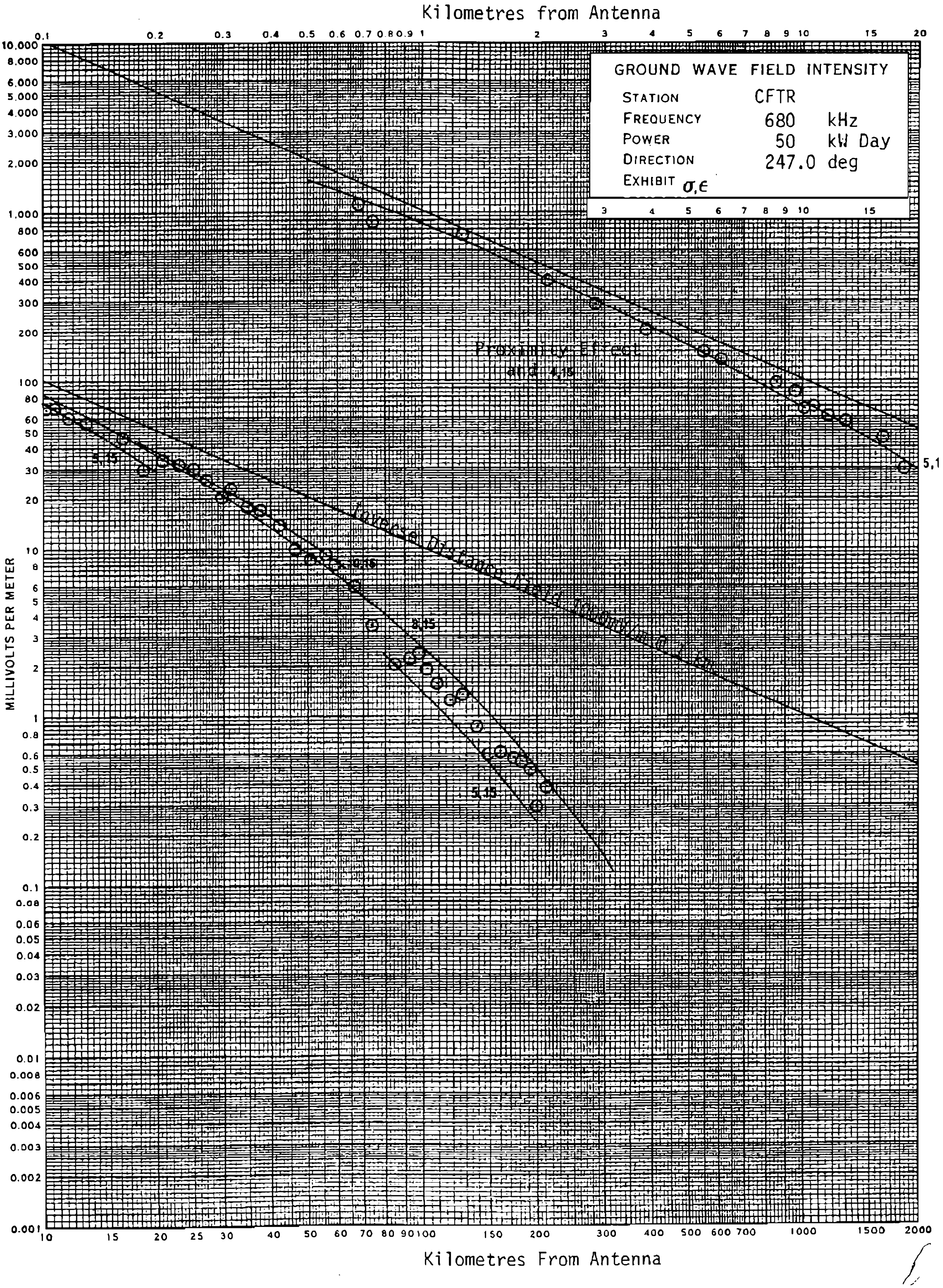
Filename CF7RD

Proximity Effect Radial @ 247 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	16051.28
.126	12542.43
.158	8209.66
.200	3299.70
.251	945.81
.316	1717.87
.398	1792.07
.501	1601.72
.631	1359.18
.794	1127.43
1.000	923.62
1.259	750.55
1.585	606.37
1.995	487.75
2.512	391.05
3.162	312.76
3.981	249.69
5.012	199.07
6.310	158.56
7.943	126.21
10.000	100.40

Far Field = 1009.1 mV/m at 1 km.



Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 247.0 deg
EXHIBIT σ,ε
Proximity effect
and 4,15
5,15
5,10,15
8,15
5,15
5,1
Inverse Distance Field 100mV/m @ 1 km
MILLIVOLTS PER METER
Kilometres From Antenna

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 279.8 Degrees

Measured October 18, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	0.95	500
2	1.55	300
3	2.15	225
4	2.54	205
5	2.95	170
6	3.82	110
7	4.77	93
8	5.73	84
9	6.44	54
10	8.10	65
11	8.60	48
12	9.88	42
13	10.7	36.5
14	11.4	47
15	12.5	45
16	13.3	45
17	14.3	35
18	15.2	28.5
19	16.1	26.0
20	17.0	23.0
21	17.4	32
22	18.2	26.5
23	19.5	23.0
24	20.5	21.0
25	21.85	20.0
26	23.0	14.5
27	23.5	17.0
28	24.3	14.0
29	25.7	14.0
30	26.7	17.0
31	27.4	10.0
32	27.7	8.0
33	28.6	15.0
34	29.25	9.5
35	29.8	12.0
36	30.4	10.0
37	32.0	9.0
38	35.0	8.2
39	36.2	7.9
40	43.0	6.9

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 279.8 Degrees (cont'd)

Measured October 18, 1984

Point #	Distance (km)	Field Strength (mV/m)
41	51.5	4.7
42	64.0	2.15
43	73.0	1.95
44	84.4	1.30
45	92.8	1.19
46	103	1.18
47	116	0.825
48	126	0.64
49	138	0.70
50	148.5	0.455
51	158	0.40
52	167	0.355
53	173.3	0.395

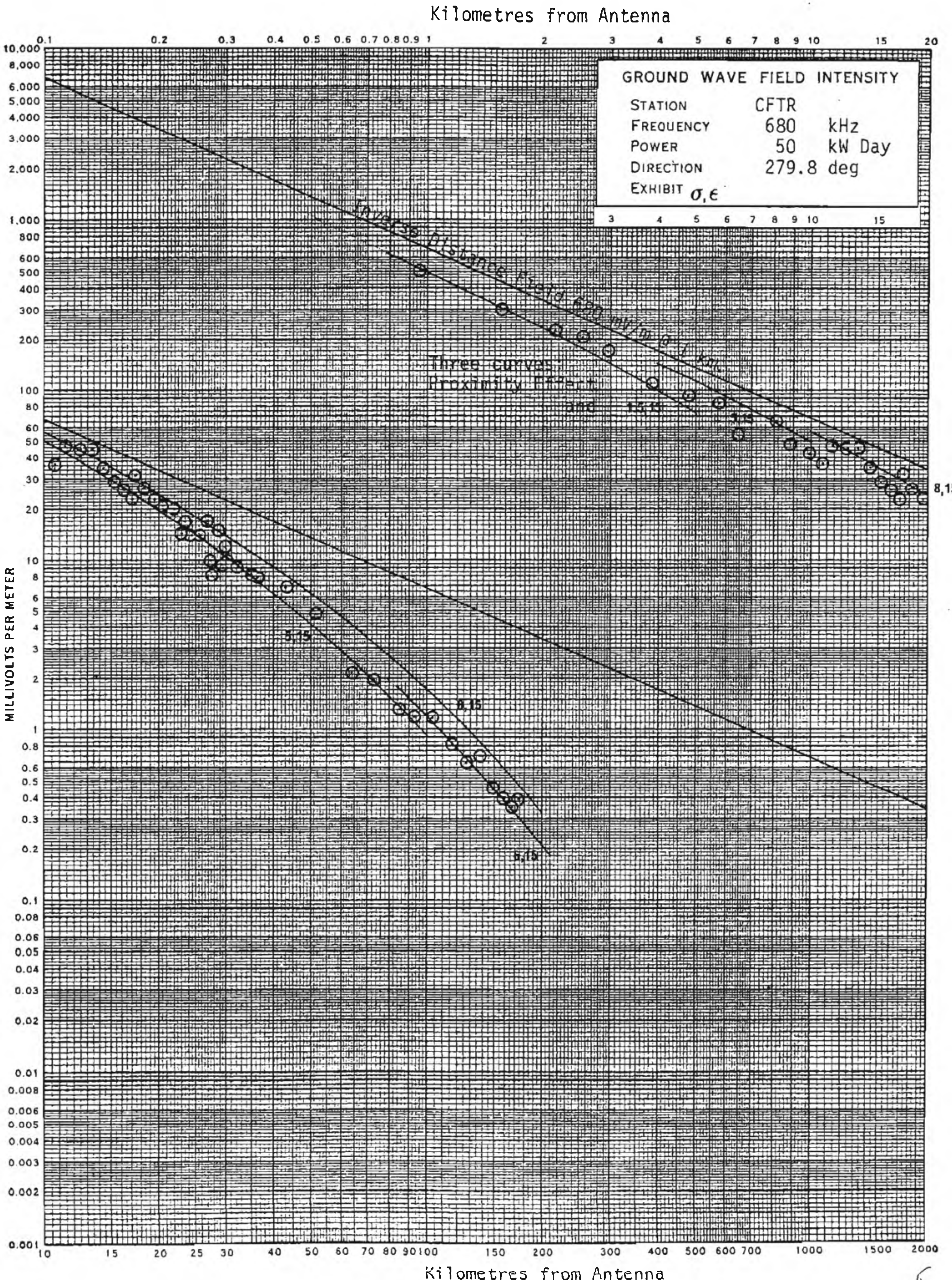
Filename CFTRD

Proximity Effect Radial @ 279.8 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	19909.35
.126	17652.74
.158	15055.02
.200	10578.90
.251	4608.72
.316	2266.59
.398	1515.91
.501	1172.46
.631	941.75
.794	761.74
1.000	615.97
1.259	497.16
1.585	400.40
1.995	321.80
2.512	258.15
3.162	206.74
3.981	165.34
5.012	132.06
6.310	105.38
7.943	84.01
10.000	66.93

Far Field = 677.3 mV/m at 1 km.



Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 279.8 deg
EXHIBIT σ,ε
Inverse Distance Field 680 mV/m @ 1 km
Three curves:
Proximity Effect
and 15,15
8,15
5,15
8,15
5,15
MILLIVOLTS PER METER
Kilometres from Antenna

K&E

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 287.1 Degrees

Measured September 18, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	0.95	540
2	1.4	335
3	1.55	230
4	1.75	255
5	2.18	200
6	2.4	185
7	2.55	180
8	2.8	140
9	3.0	148
10	3.2	120
11	5.3	107
12	5.53	76
13	6.37	70
14	7.05	66
15	7.47	64
16	7.7	65
17	9.0	61
18	9.7	51
19	10.7	38.5
20	12.4	37

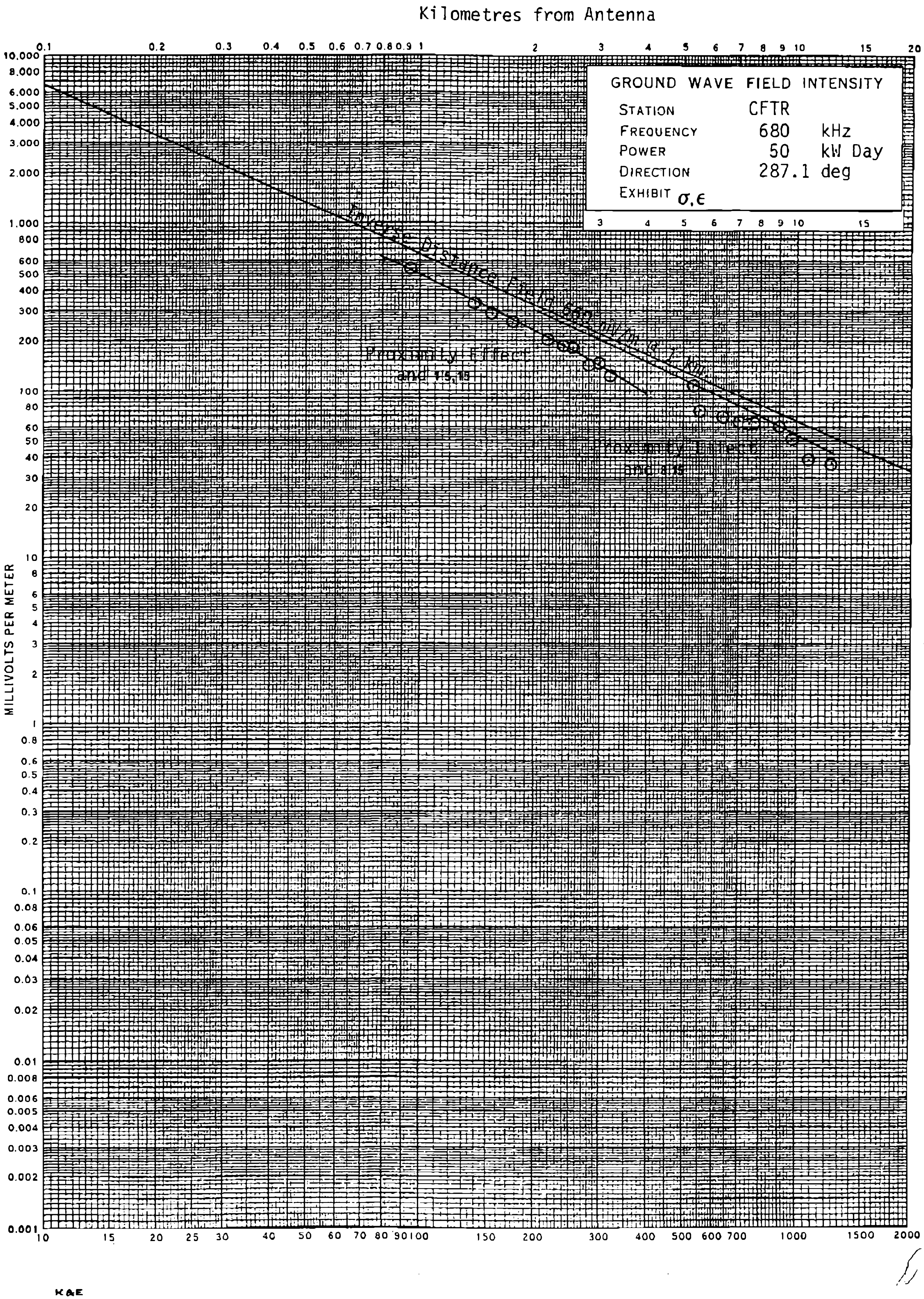
lename CFTRD

Proximity Effect Radial @ 287.1 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	20378.40
.126	18570.64
.158	17990.64
.200	18179.22
.251	5750.19
.316	2654.85
.398	1633.45
.501	1203.06
.631	947.89
.794	760.67
1.000	612.49
1.259	492.82
1.585	395.88
1.995	317.44
2.512	254.13
3.162	203.17
3.981	162.23
5.012	129.42
6.310	103.16
7.943	82.17
10.000	65.41

Far Field = 660 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 287.1 deg
EXHIBIT σ,ϵ
Proximity Effect
Proximity Effect
MILLIVOLTS PER METER
K&E

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 314.8 Degrees

Measured October 23, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	18.95	49
2	19.1	51
3	19.47	52
4	19.75	47
5	20.2	44
6	20.94	47
7	21.25	54
8	21.94	54
9	22.8	46
10	23.5	45
11	24.5	42
12	26.1	37
13	28.2	33
14	30.26	31
15	31.5	22
16	33.4	21
17	35.2	17
18	36.45	17
19	39.5	14
20	41.35	10
21	42.6	10.8
22	44.8	8.2
23	48.7	5.0
24	51.8	5.8
25	55.0	5.2
26	62.3	4.6
27	65.2	3.75
28	71.5	2.85
29	79.0	3.15
30	82.0	3.2
31	88.2	3.1
32	94.0	2.85
33	97.3	3.1
34	103	2.18
35	106	2.0
36	110	2.34
37	114.8	1.92
38	120	1.55
39	124.5	1.6
40	132.6	1.35

E. W. Horrigan & Associates Limited

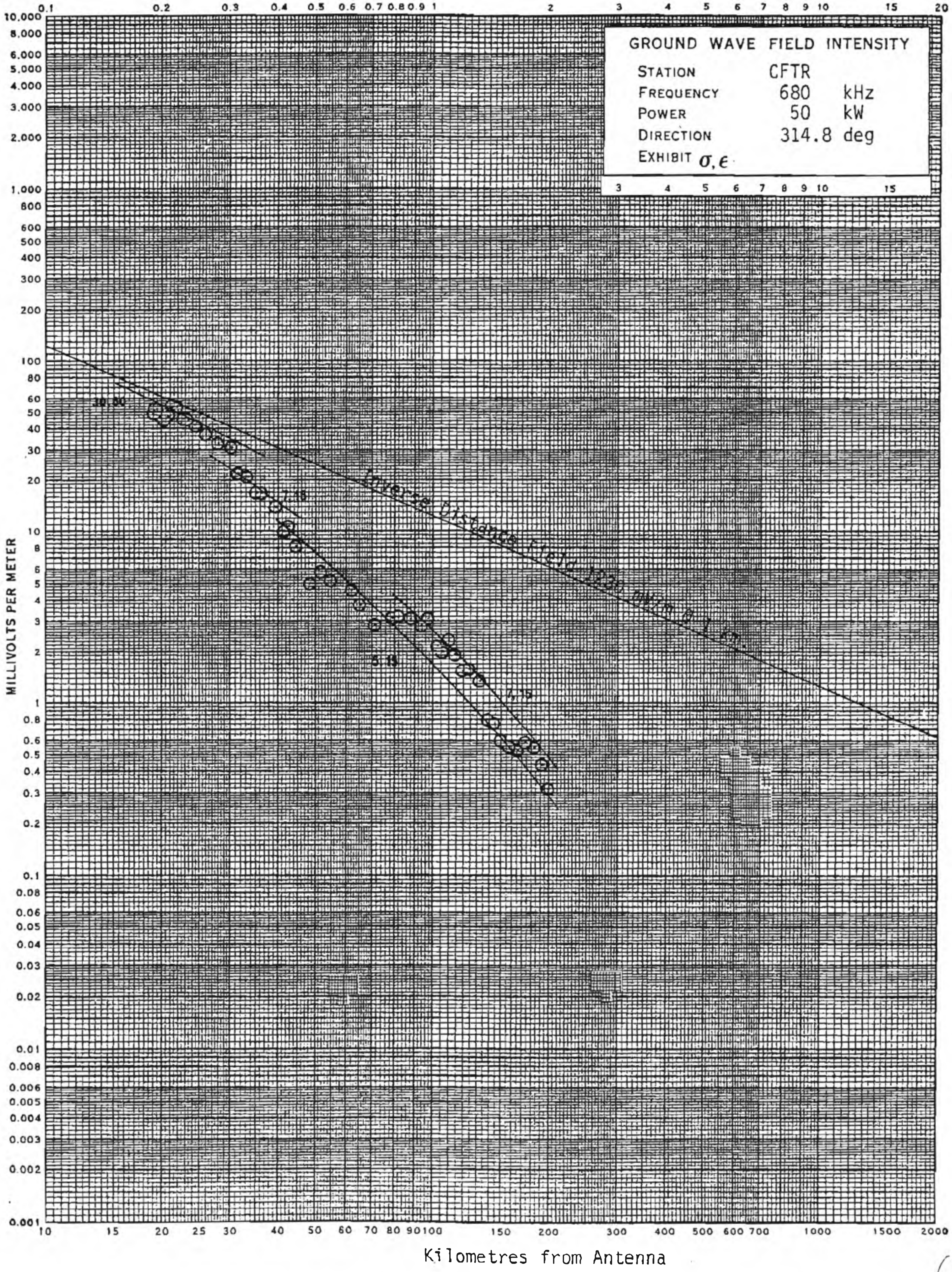
CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 314.8 Degrees (cont'd)

Measured October 23, 1984

Point #	Distance (km)	Field Strength (mV/m)
41	139.5	0.80
42	145.0	0.76
43	150.4	0.60
44	158.0	0.56
45	166.0	0.53
46	174.0	0.59
47	184.0	0.55
48	191.0	0.44
49	200.0	0.32

Radial ends at Lake Huron shoreline.


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW
DIRECTION 314.8 deg
EXHIBIT σ, ε
MILLIVOLTS PER METER
Kilometres from Antenna
Inverse Distance Field 1230 mV/m @ 1 km
10,50
7,15
5,15
4,15

K&E

E. W. Horrigan & Associates Limited

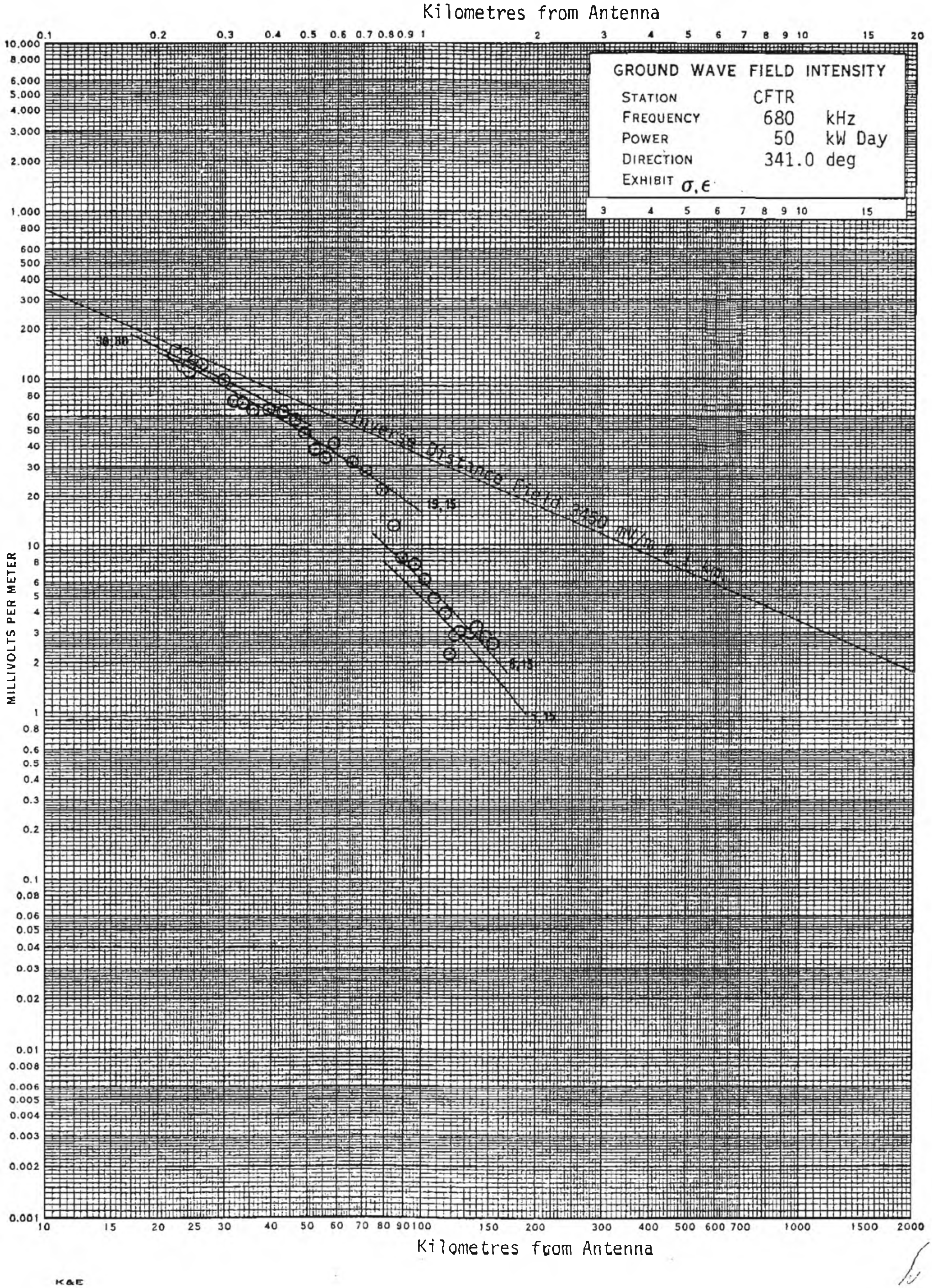
CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 341.0 Degrees

Measured October 24, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	22.0	139
2	22.2	150
3	22.6	129
4	23.2	119
5	23.4	125
6	23.6	140
7	23.7	120
8	24.0	110
9	24.4	117
10	24.8	118
11	25.8	120
12	27.2	123
13	29.9	98.0
14	31.7	74.0
15	33.3	72.0
16	35.8	66.0
17	39.4	66.0
18	43.0	64.0
19	46.5	57.0
20	49.0	48.0
21	52.2	38.0
22	55.5	34.0
23	59.0	41.0
24	66.0	32.0
25	71.5	28.0
26	78.3	21.7
27	85.0	13.0
28	89.5	8.4
29	96.3	7.7
30	102	6.2
31	109.1	4.8
32	115	3.95
33	118.5	2.25
34	122	2.9
35	127	3.0
36	134.5	2.95
37	140	3.25
38	147.3	2.8
39	154	2.6

Radial ends at Georgian Bay shoreline.



Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 341.0 deg
EXHIBIT σ,ε
Inverse Distance Field 3450 mV/m @ 1 km.
30,80
15,15
8,15
5,15
MILLIVOLTS PER METER
Kilometres from Antenna
K&E

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 7.3 Degrees

Measured October 27-28, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	41.4	103
2	41.7	88
3	42.5	115
4	43.5	88
5	44.7	100
6	45.0	86
7	45.8	94
8	47.3	64
9	47.9	90
10	49.2	81
11	50.4	68
12	51.7	86
13	52.8	75
14	53.6	69
15	54.5	72
16	56.0	62
17	57.2	67
18	58.9	72
19	60.8	72
20	63.3	59
21	68.2	56
22	70.5	45
23	72.8	42
24	75.0	35
25	79.5	27
26	81.3	27.5
27	84.0	29.5
28	86.2	26.5
29	88.3	19.0
30	89.6	21.8
31	90.8	19.7
32	94.0	17.0
33	95.7	20.0
34	100	19.0
35	104	19.0
36	109	15
37	115.5	13.2
38	119.7	12.0
39	124.0	11.5
40	154.0	7.8

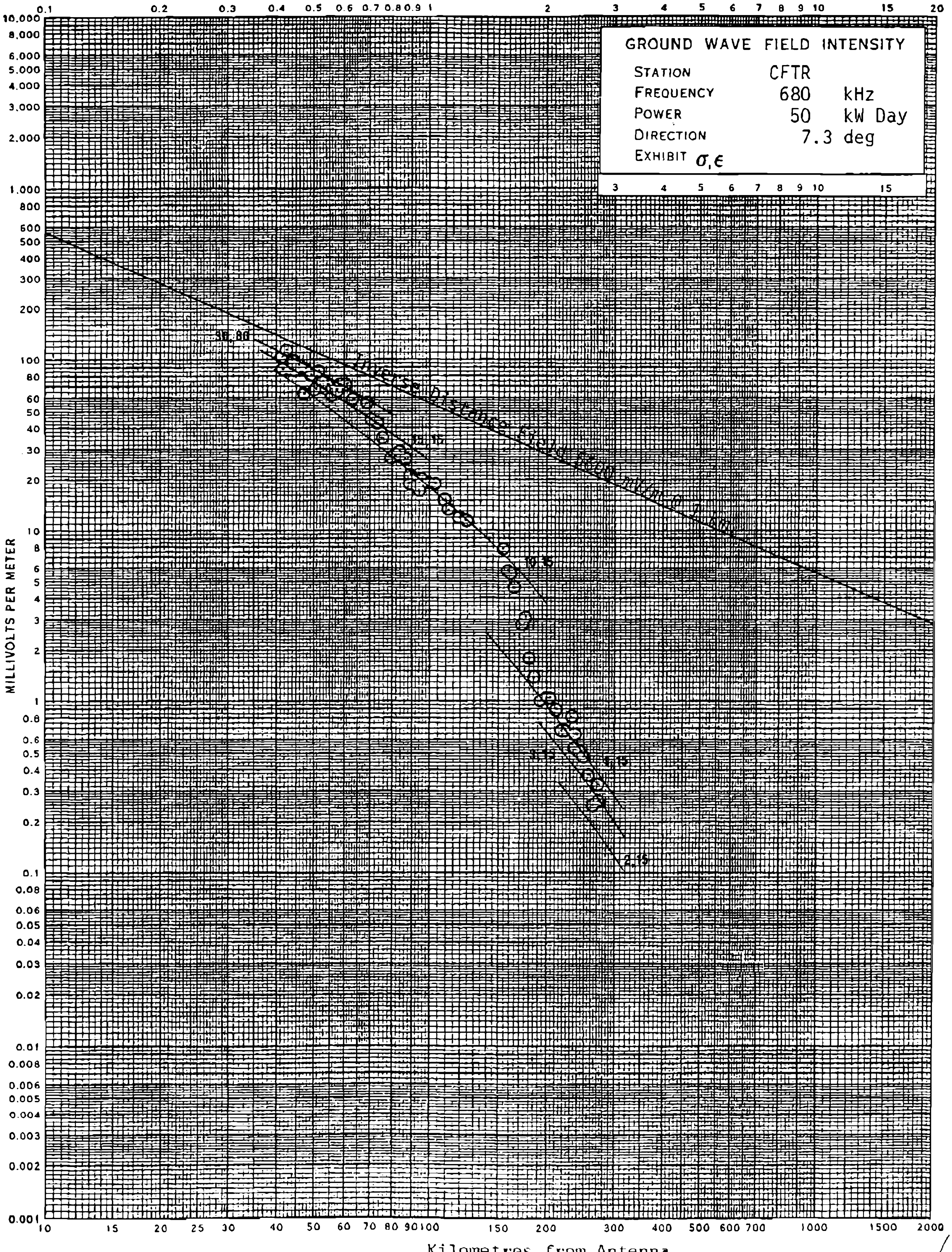
E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 7.3 Degrees (cont'd)

Measured October 27-28, 1984

Point #	Distance (km)	Field Strength (mV/m)
41	159.0	5.8
42	162.0	5.6
43	164.5	4.6
44	167.8	5.5
45	171.3	2.8
46	176.0	3.1
47	180.0	1.8
48	185.0	1.4
49	192.5	1.0
50	200.0	1.05
51	204.5	1.05
52	212.3	0.90
53	219.0	0.68
54	225.0	0.68
55	230.5	0.81
56	236.0	0.54
57	238.0	0.65
58	244.0	0.51
59	250.0	0.48
60	257.0	0.37
61	264.0	0.25
62	272.0	0.33
63	272.5	0.265


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 7.3 deg
EXHIBIT σ,ϵ
MILLIVOLTS PER METER
Kilometres from Antenna
Inverse Distance Field 500 mV/m @ 1 km
30, 80
15, 15
10, 15
5, 15
3, 15
2, 15

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 17.0 Degrees

Measured October 28-29, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	48.9	62
2	49.0	94
3	49.8	85
4	50.7	82
5	51.6	68
6	52.3	70
7	53.6	72
8	55.0	54
9	55.4	77
10	55.9	52
11	56.6	56
12	59.2	50
13	61.6	42
14	63.3	43
15	64.0	41.5
16	65.0	34.0
17	66.3	41.0
18	66.6	28.5
19	69.5	30.0
20	69.8	35.0
21	72.5	29.5
22	75.6	29.8
23	77.7	32.5
24	80.0	31.0
25	82.5	30.0
26	84.8	24.0
27	87.4	26.8
28	89.8	23.3
29	94.0	19.5
30	97.0	18.8
31	100.5	10.5
32	105	12.4
33	110	10.6
34	115	6.5
35	120	7.0
36	125	7.5
37	130	6.8
38	134.5	6.2
39	140.5	5.8
40	145.5	5.2

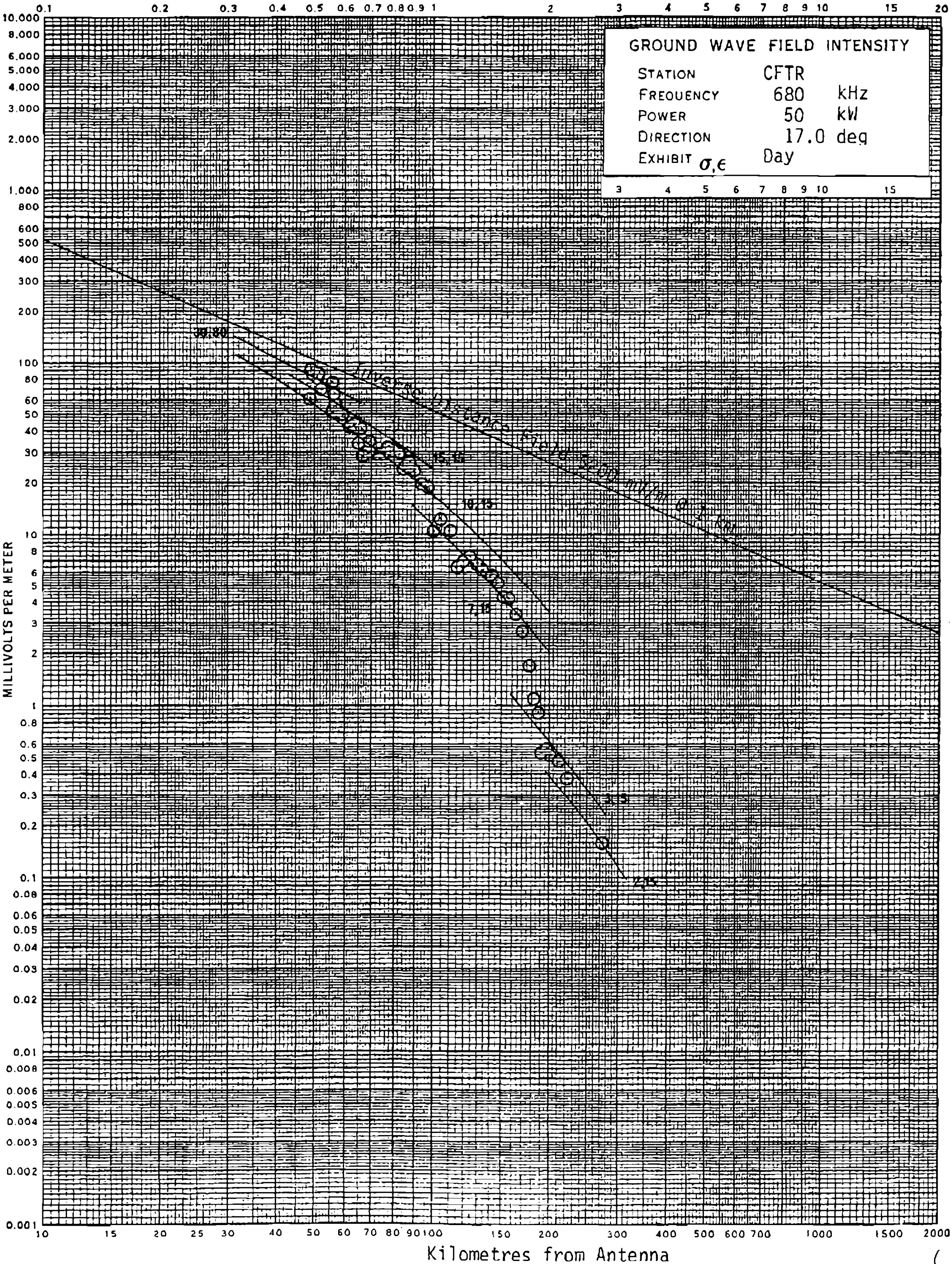
E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 17.0 Degrees (cont'd)

Measured October 28-29, 1984

Point #	Distance (km)	Field Strength (mV/m)
41	152	4.3
42	156	4.2
43	163	3.4
44	170.5	2.7
45	179	1.7
46	184	1.1
47	188	0.92
48	192	0.54
49	198	0.57
50	202	0.52
51	213	0.48
52	223	0.38
53	275	0.16


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW
DIRECTION 17.0 deg
EXHIBIT σ,ε Day
Inverse Distance Field 3200 mV/m @ 1 km
30,80
15,15
10,15
7,15
3,15
2,15
MILLIVOLTS PER METER
Kilometres from Antenna
K&E

E. W. Horrigan & Associates Limited

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 31.4 Degrees

Measured October 31 - November 1, 1984

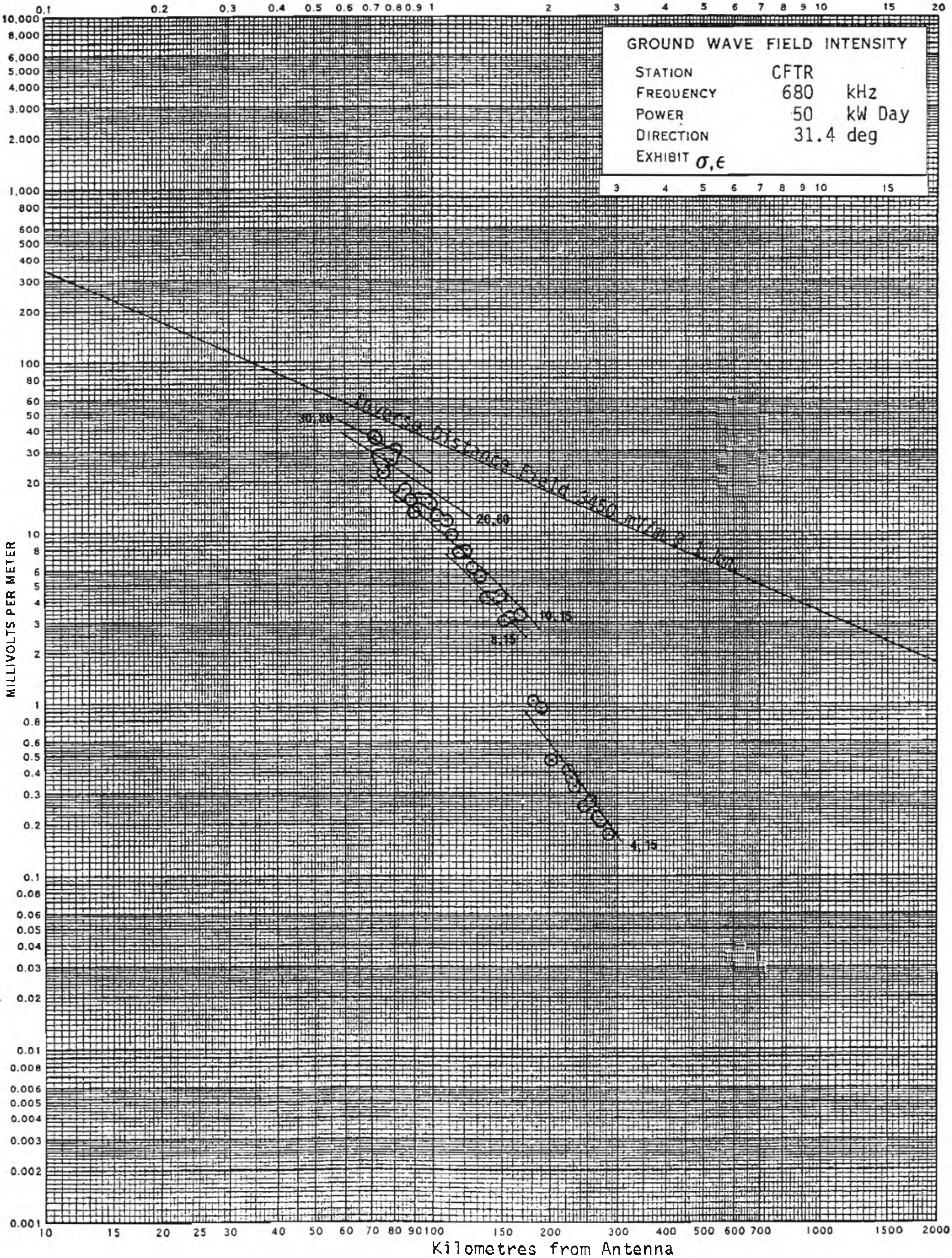
Point #	Distance (km)	Field Strength (mV/m)
1	71.5	37
2	72.2	35
3	72.9	28
4	73.6	26
5	74.2	25
6	74.8	22.5
7	75.4	28.5
8	76.3	26.5
9	79.1	26.4
10	79.9	29
11	81.7	30.4
12	82.9	16
13	85.0	17.9
14	88.4	15.8
15	90.5	13.2
16	92.6	16
17	96.3	15.9
18	98.5	14.9
19	103	12.8
20	108	11.8
21	111.5	9.7
22	116	7.6
23	122	7.9
24	126.5	6.2
25	133	5.5
26	138.7	4.2
27	143.3	4.1
28	148	4.3
29	153.5	3.1
30	159	3.2
31	166.5	3.3
32	181.5	1.03
33	191	0.95
34	225	0.41
35	228	0.37
36	233	0.33
37	246	0.25
38	257	0.27
39	268.5	0.22
40	274	0.21

CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 31.4 Degrees (cont'd)

Measured October 31 - November 1, 1984

Point #	Distance (km)	Field Strength (mV/m)
41	285	0.18
42	292.5	0.16
43	299.5	0.14


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 31.4 deg
EXHIBIT σ,ϵ
Inverse Distance Field 3450 mV/m @ 1 km
30,80
20,80
10,15
8,15
4,15
MILLIVOLTS PER METER
Kilometres from Antenna

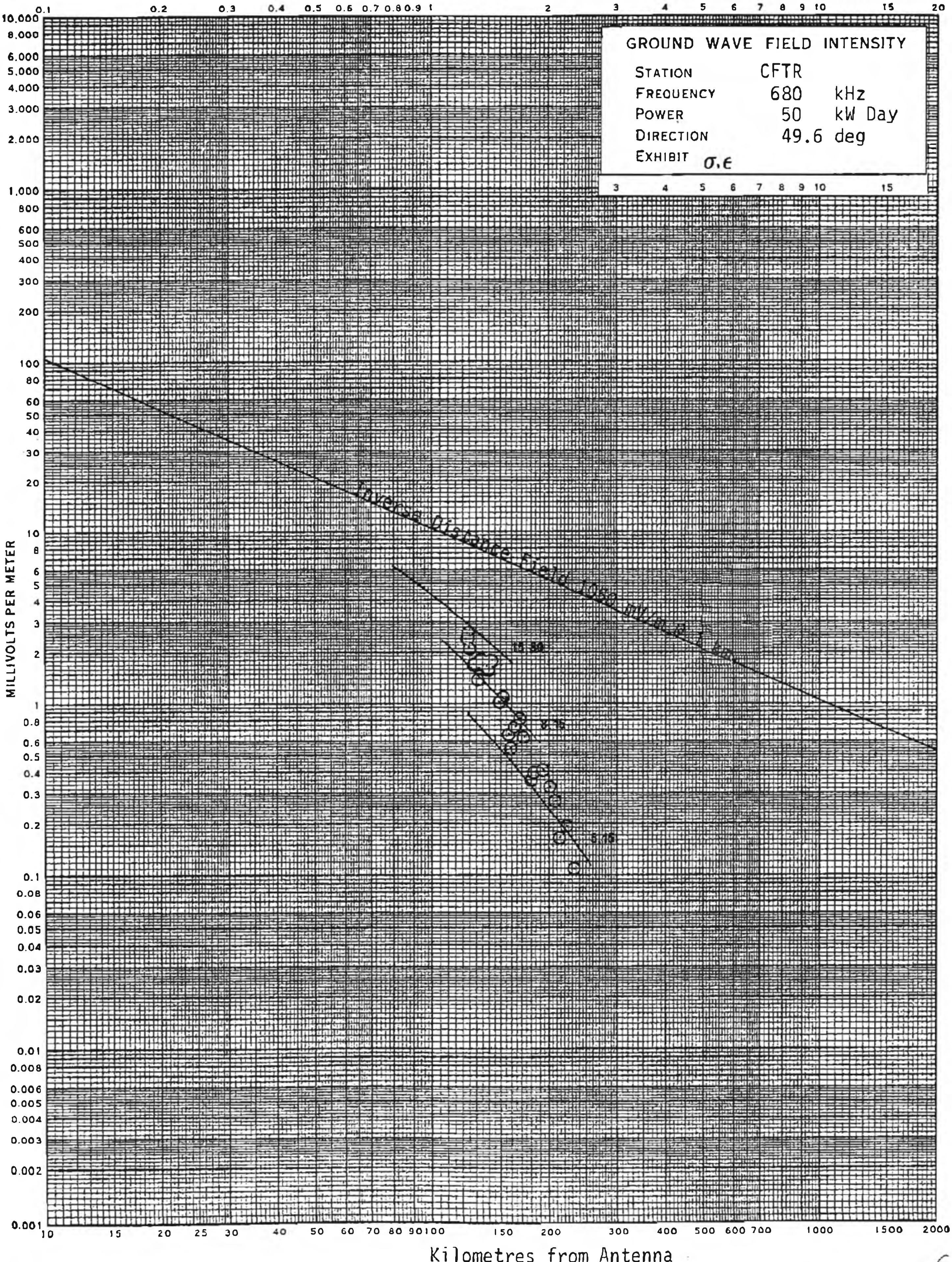
E. W. Horrigan & Associates Limited

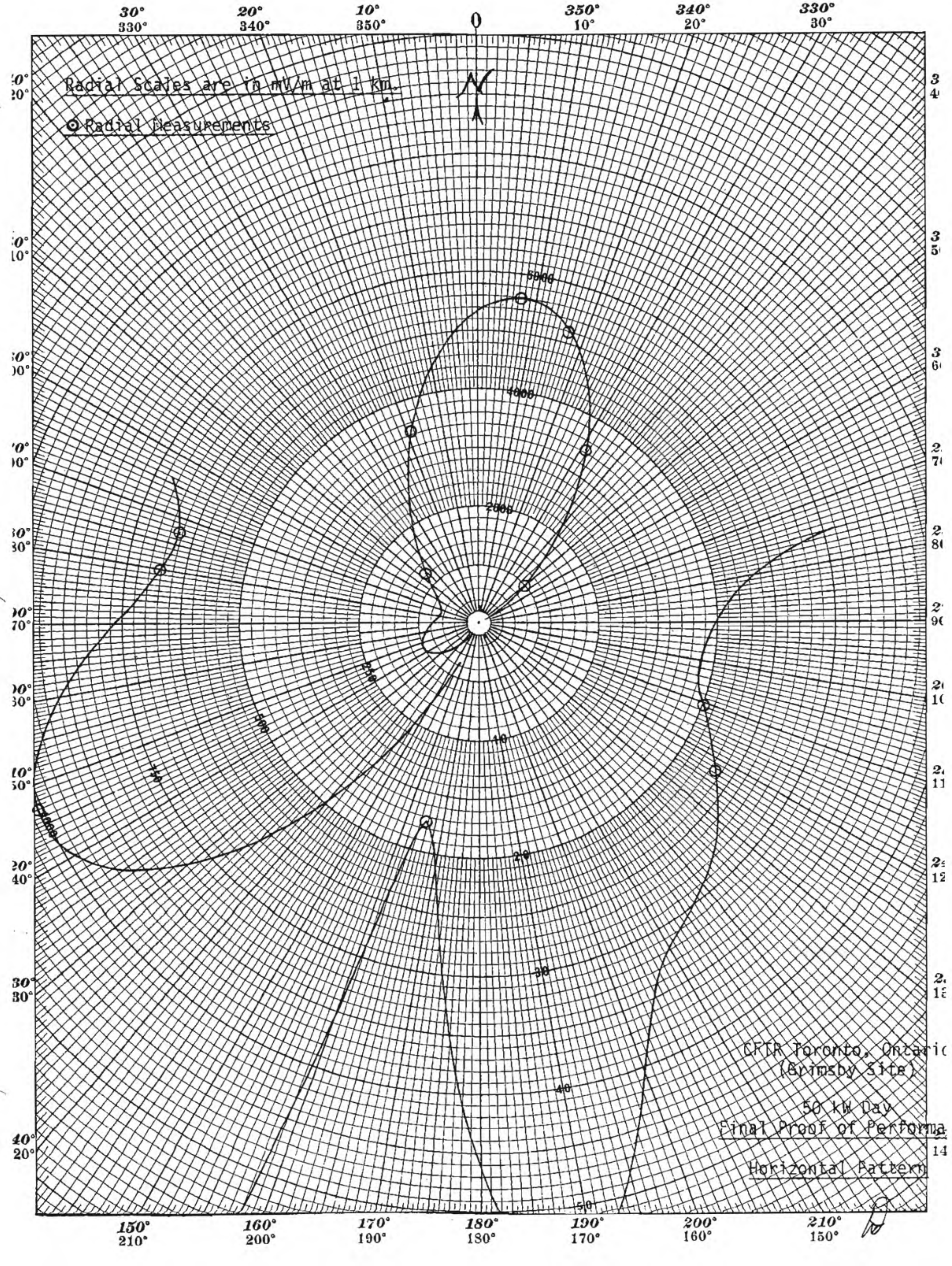
CFTR Toronto, Ontario 50 kW Day

Radial at Azimuth 49.6 Degrees

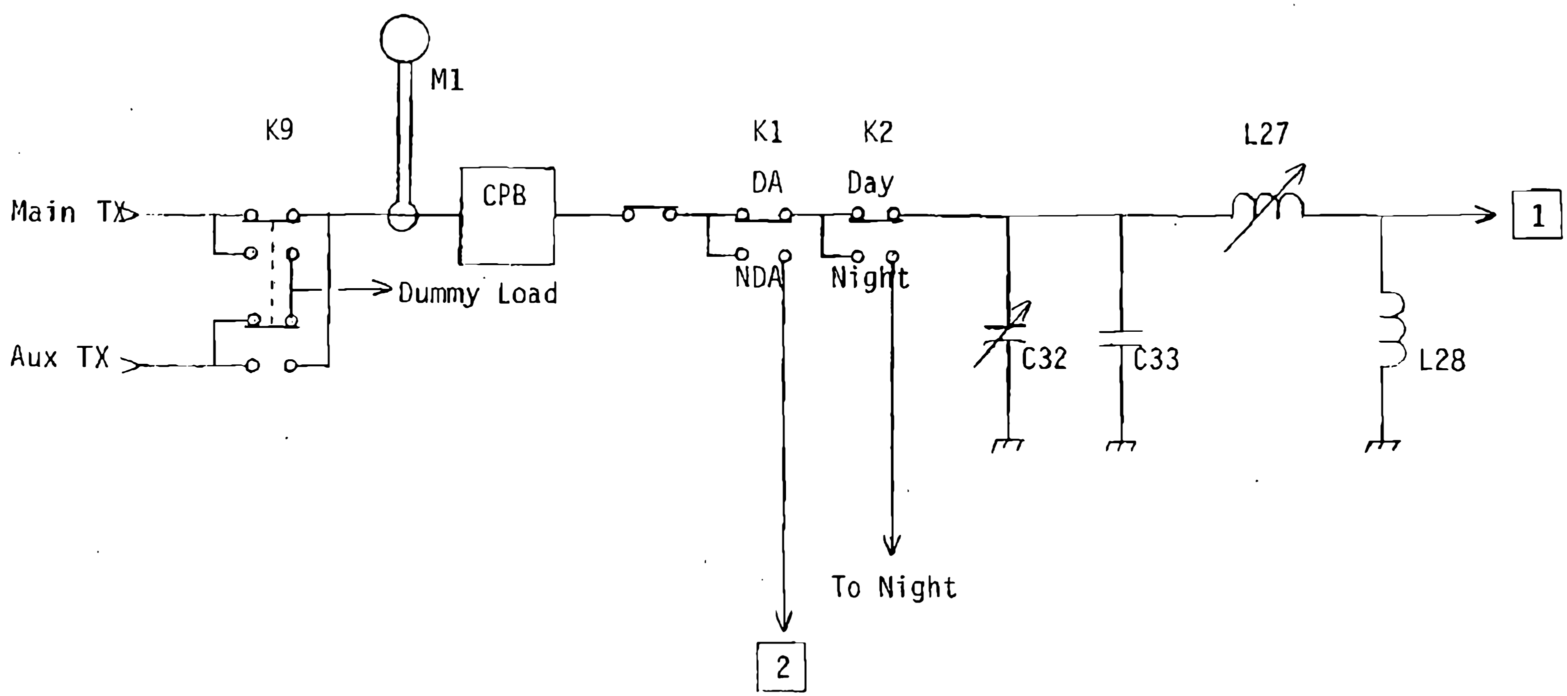
Measured November 1 and November 4, 1984

Point #	Distance (km)	Field Strength (mV/m)
1	122.2	2.4
2	123.1	2.6
3	124.6	2.15
4	127.6	1.7
5	130.2	1.4
6	133.2	1.8
7	135.0	1.7
8	137.6	1.68
9	140.0	1.6
10	143.2	1.8
11	149.0	1.02
12	150.7	1.1
13	157.5	0.66
14	159.2	0.55
15	163.4	0.74
16	168.5	0.82
17	173.5	0.64
18	180.0	0.36
19	184.0	0.40
20	194.0	0.41
21	202.0	0.33
22	208.5	0.27
23	213.5	0.165
24	223.0	0.195
25	234.0	0.11


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Day
DIRECTION 49.6 deg
EXHIBIT σ,ε
Inverse Distance Field 1050 mV/m @ 1 km
MILLIVOLTS PER METER
Kilometres from Antenna

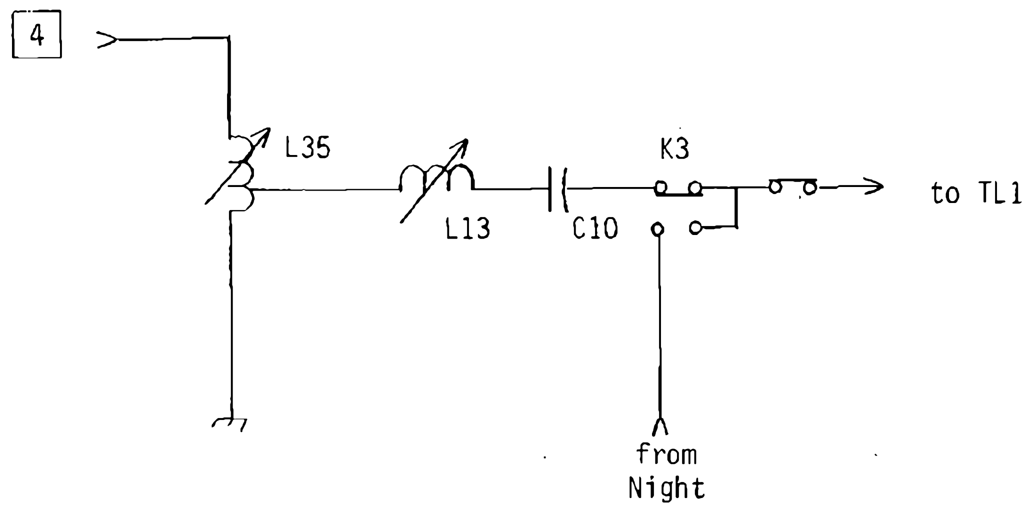

Radial Scales are in mV/m at 1 km.
Radial Measurements
CFTR Toronto, Ontari
(Grimsby Site)
50 kW Day
Final Proof of Performa
Horizontal Pattern

C32	50-2000 pF	10 kV	ITT UCSXF-10
C33	2000 pF	10 kV	ITT CFDP2000-10S
L27	22 uH	60 A	Harris
L28	42 uH	40 A	Harris

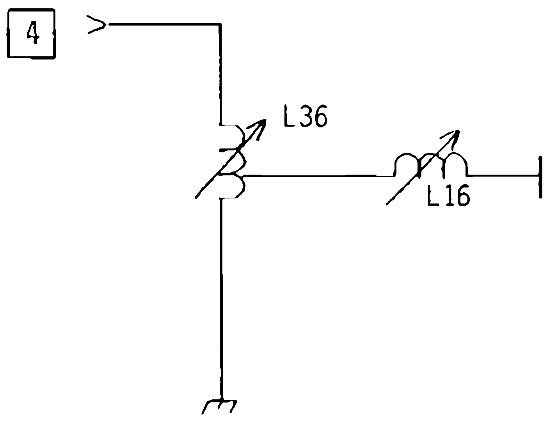


CFTR 50 kW Day Common Point

C10	4000 pF	8 kV	Acushnet		
L13	42 uH	20 A	Harris	Variable	
L35	42 uH	20 A	Harris	Variable	



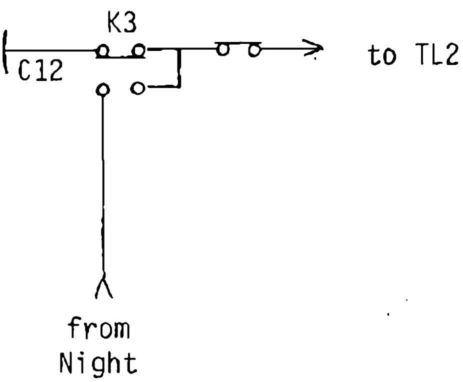
CFTR 50 kW Day Phasor #1



4
L36
L16

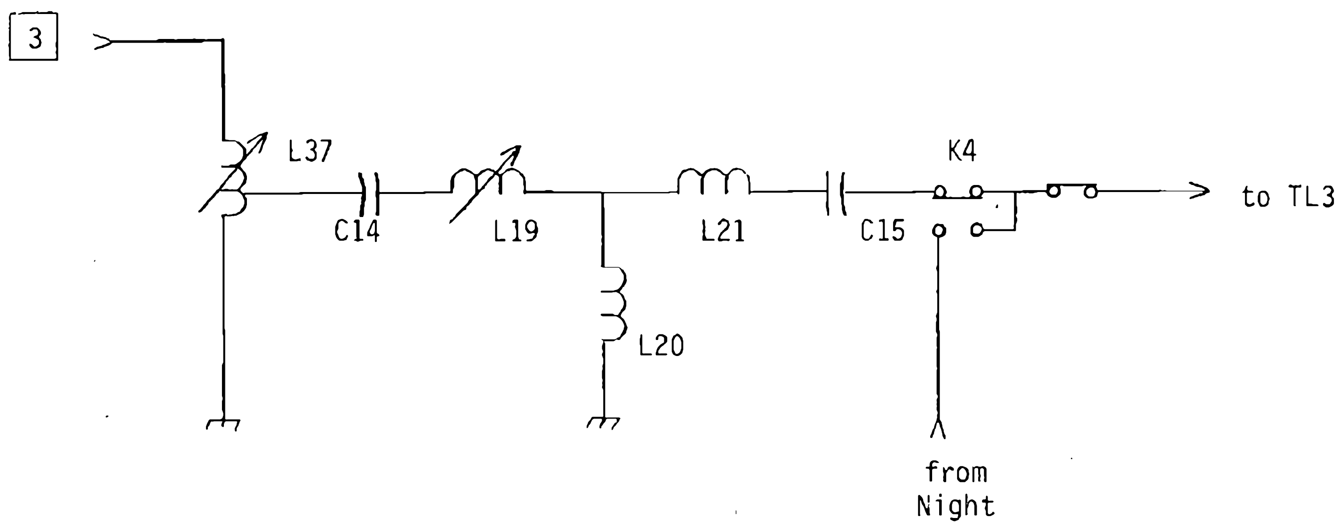
C12	4000 pF	12 kV	Acushnet
L16	42 uH	20 A	Harris Variable
L36	42 uh	20 A	Harris Variable

E. W. Horrigan & Associates Limited



CFTR 50 kW Day Phasor #2

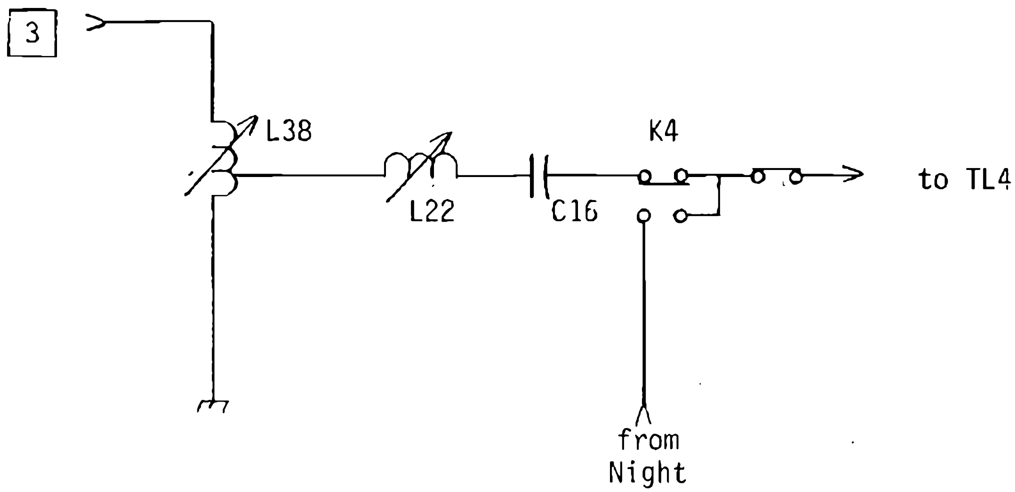
C14	4000 pF	12 kV	Acushnet
C15	4000 pF	12 kV	Acushnet
L19	42 uH	20 A	Harris variable
L20	42 uH	20 A	Harris
L21	24 uH	20 A	Harris
L37	42 uH	20 A	Harris variable



CFTR 50 kW Day Phasor #3

E. W. Horrigan & Associates Limited

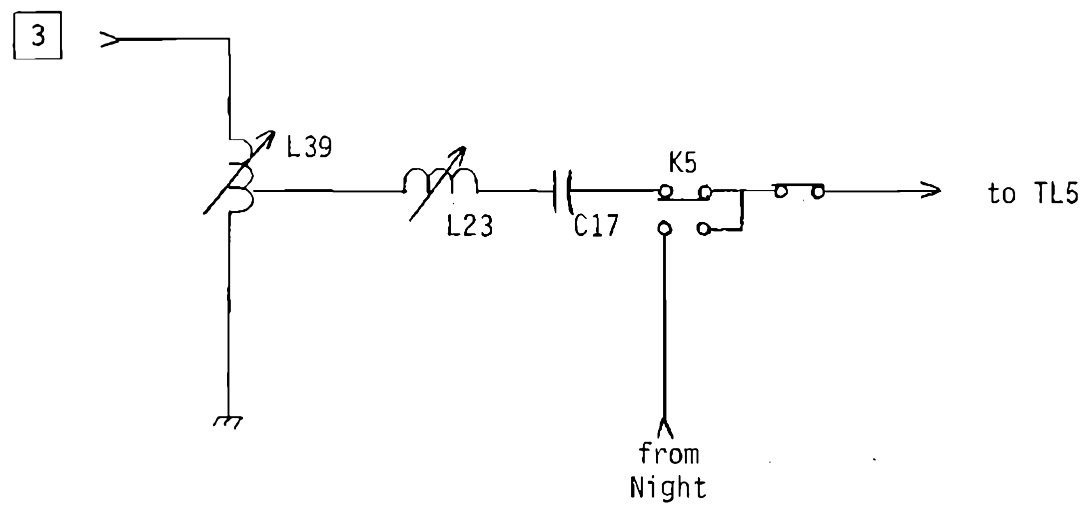
C16	4000 pF	8 kV	Acushnet
L22	42 uH	20 A	Harris variable
L38	42 uH	20 A	Harris variable



CFTR 50 kW Day Phasor #4

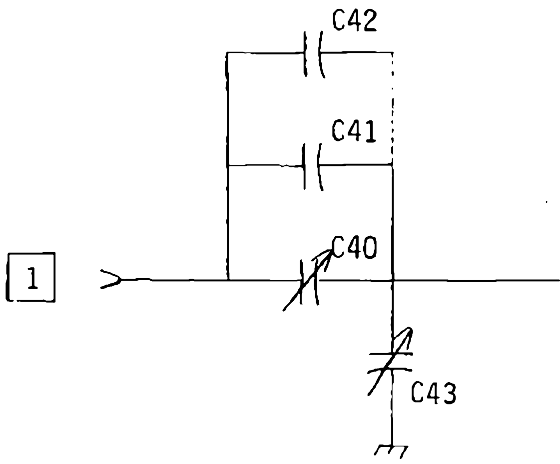
E. W. Horrigan & Associates Limited

C17	4000 pF	12 kV	Acushnet
L23	42 uH	20 A	Harris variable
L39	42 uH	20 A	Harris variable

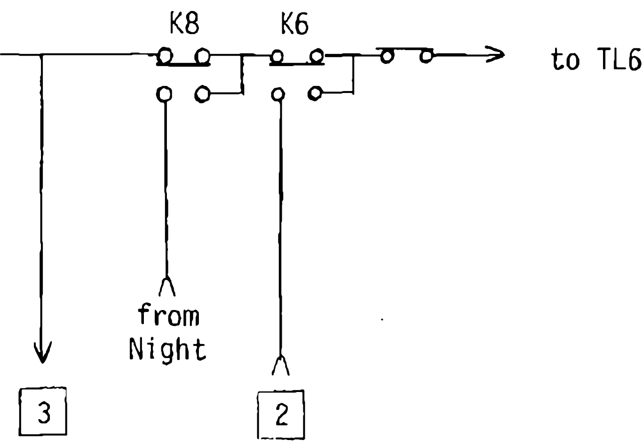


CFTR 50 kW Day Phasor #5

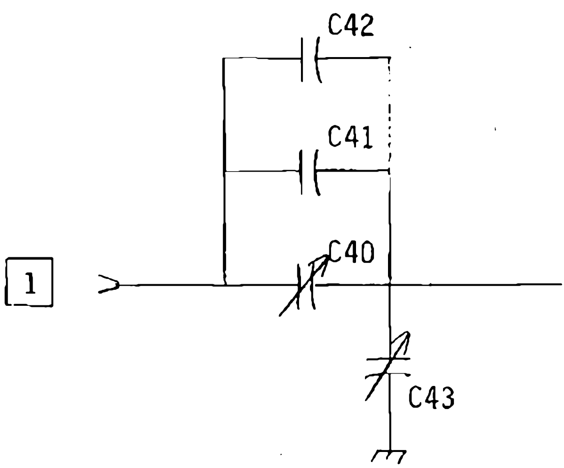
E. W. Horrigan & Associates Limited


C42
C41
C40
1
C43

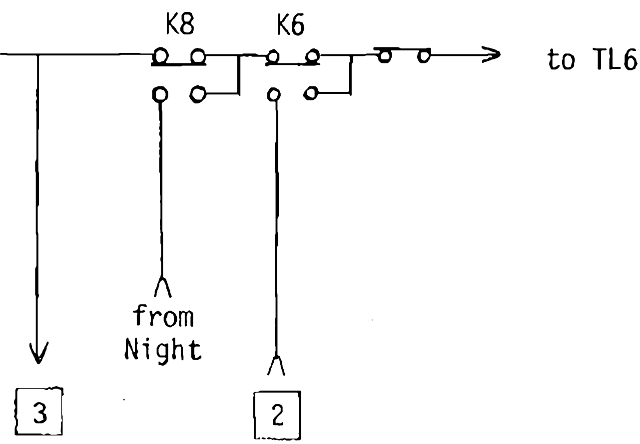
C40	50-2300 pF	15 kV	ITT	CVDP2300-15S
C41	2000 pF	15 kV	ITT	CFDP2000-15S
C42	1000 pF	15 kV	ITT	CFED1000-15S
C43	50-2300 pF	15 kV	ITT	CVDP2300-15S



CFTR 50 kW Day Phasor #6


C42
C41
C40
1
C43

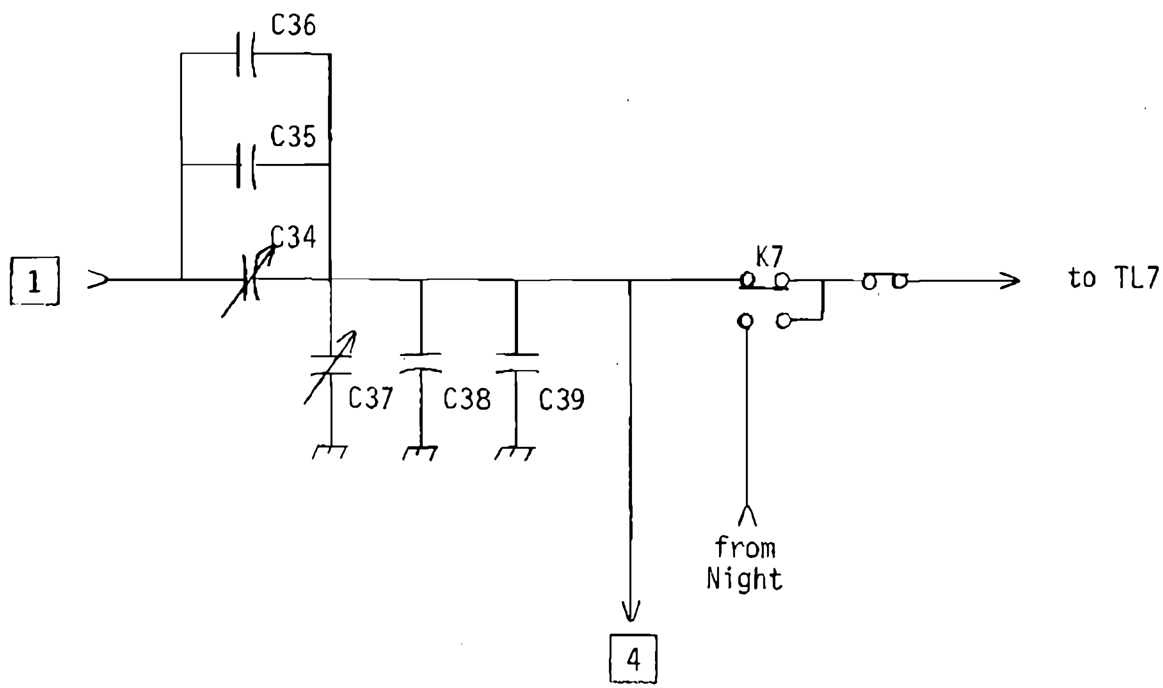
C40	50-2300 pF	15 kV	ITT	CVDP2300-15S
C41	2000 pF	15 kV	ITT	CFDP2000-15S
C42	1000 pF	15 kV	ITT	CFED1000-15S
C43	50-2300 pF	15 kV	ITT	CVDP2300-15S



CFTR 50 kW Day Phasor #6

E. W. Horrigan & Associates Limited

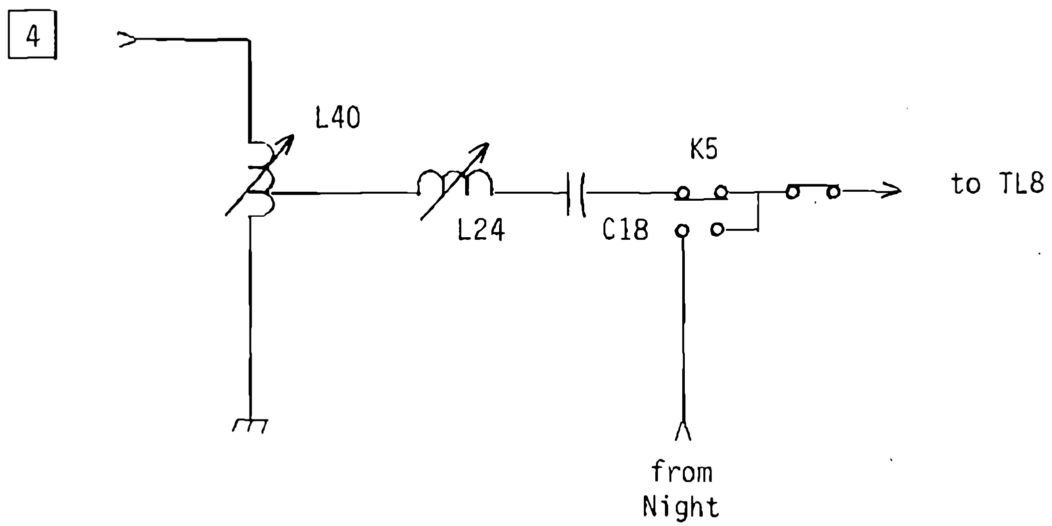
C34	50-2300 pF	15 kV	ITT CVDP2300-15S
C35	2000 pF	15 kV	ITT CFDP2000-15S
C36	1000 pF	15 kV	ITT CFED1000-15S
C37	50-2300 pF	15 kV	ITT CVDP2300-15S
C38	2000 pF	15 kV	ITT CFDP2000-15S
C39	1000 pF	15 kV	ITT CFED1000-15S



CFTR 50 kW Day Phasor #7

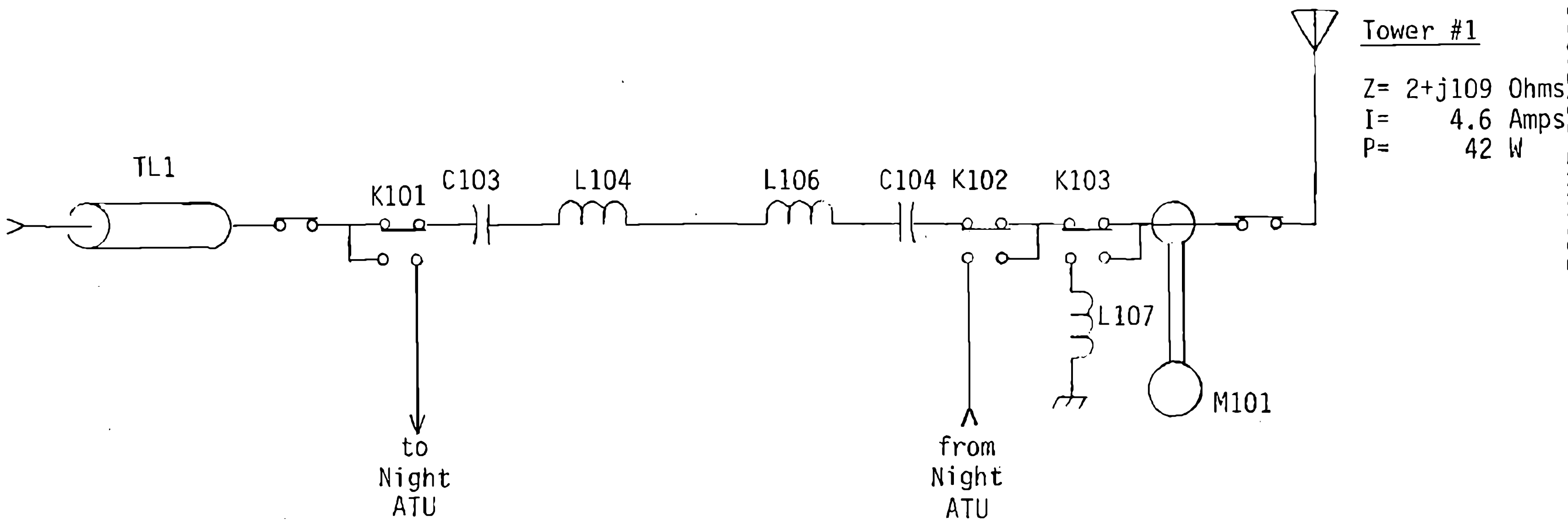
E. W. Horrigan & Associates Limited

C18	4000 pF	12 kV	Acushnet
L24	42 uH	20 A	Harris variable
L40	42 uH	20 A	Harris variable



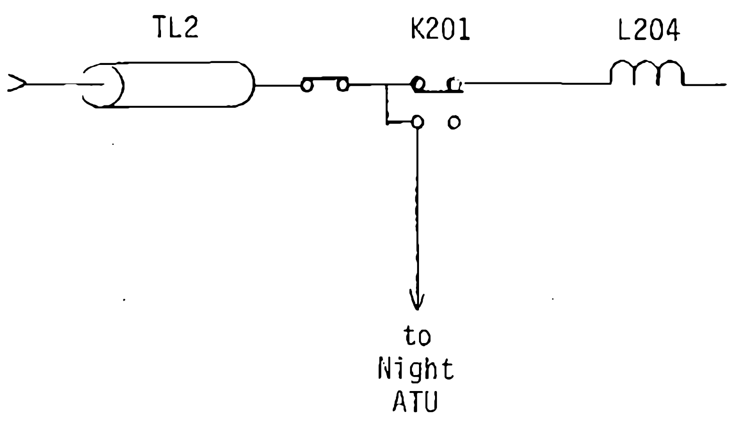
CFTR 50 kW Day Phasor #8

C103	4000	pF	8	kV	Acushnet	
C104	1000	pF	20	kV	Acushnet	
L104	24	uH	20	A	Harris	
L106	95	uH	20	A	Harris	
L107	(2)87	uH	10	A	Harris	
M101			10	A	Delta TCA	
TL1	199.7°				Cablewave	HCC78-50J



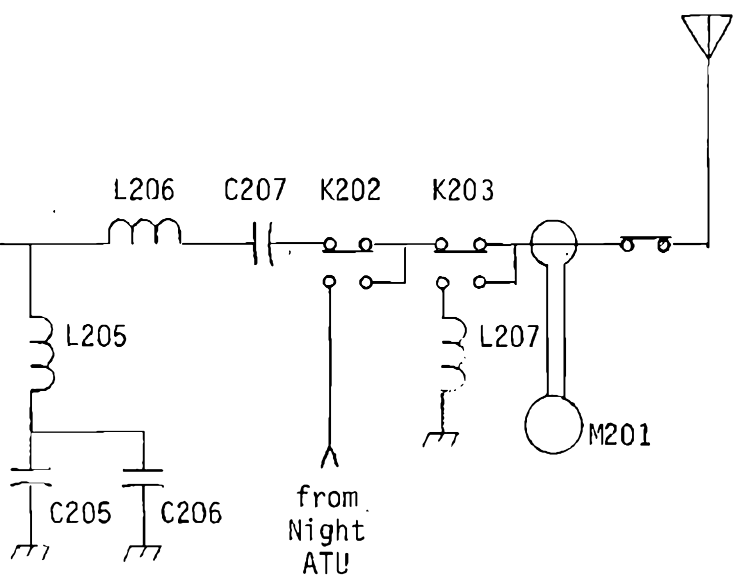
CFTR 50 kW Day #1 ATU

E. W. Horrigan & Associates Limited


TL2
K201
L204
to
Night
ATU

C205	2000 pF	15 kV	Acushnet
C206	2000 pF	15 kV	Acushnet
L204	24 uH	20 A	Harris
L205	20 uH	30 A	Harris
L206	65 uH	30 A	Harris
L207 (2)	87 uH	10 A	Harris
TL2	42.6°		Cablewave HCC158-50J

E. W. Horrigan & Associates Limited



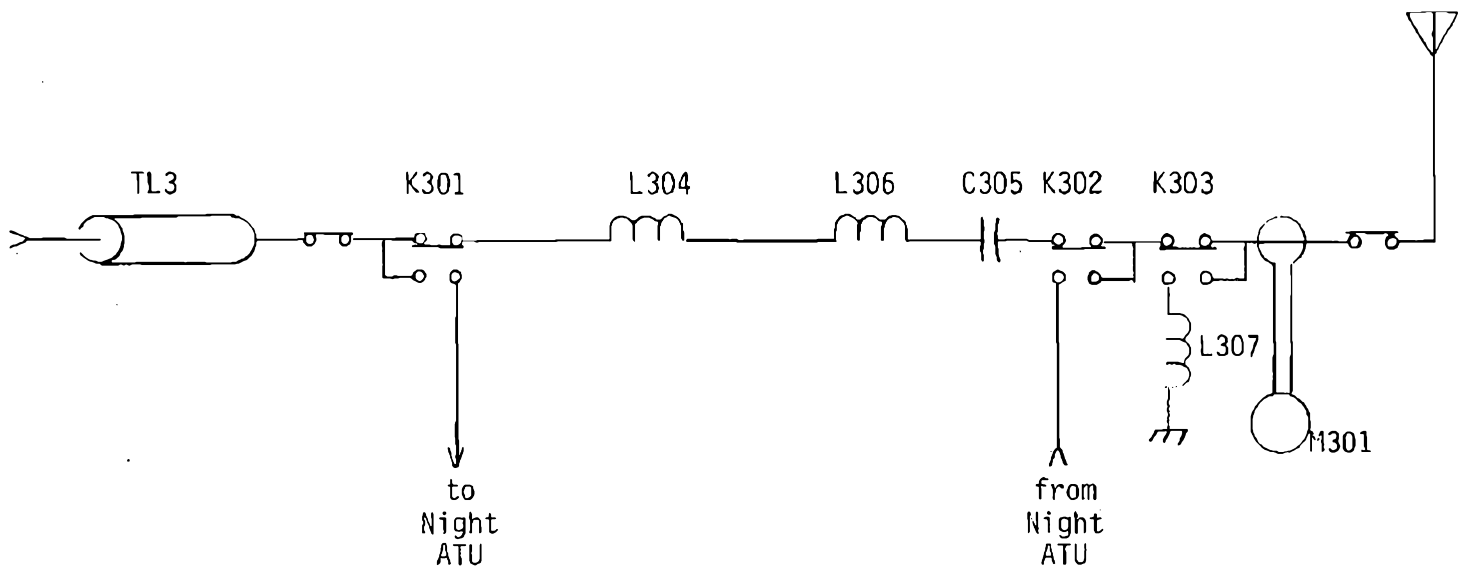
Tower #2

Z = 19 + j 88 Ohms
I = 12.0 A
P = 2736 W

CFTR 50 kW Day Tower #2 ATU

C305	2000 pF	15 kV	ITT CFDP2000-15S
L304	24 uH	20 A	Harris
L306	45 uH	30 A	Harris
L307	(2) 87 uH	10 A	Harris
M301		20 A	Delta TCA
TL3	163.4^{o}		Cablewave HCC158-50J

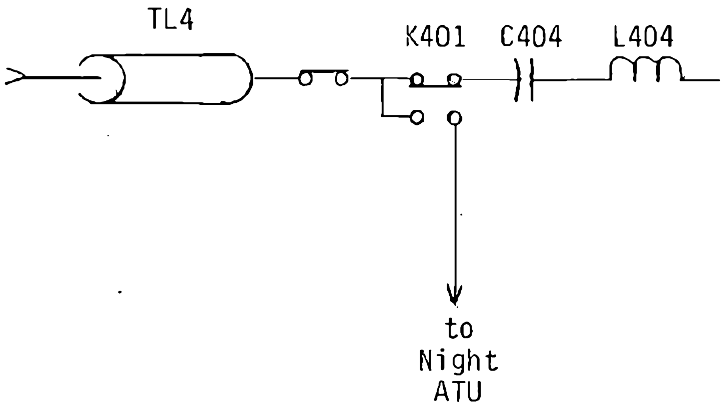
E. W. Horrigan & Associates Limited



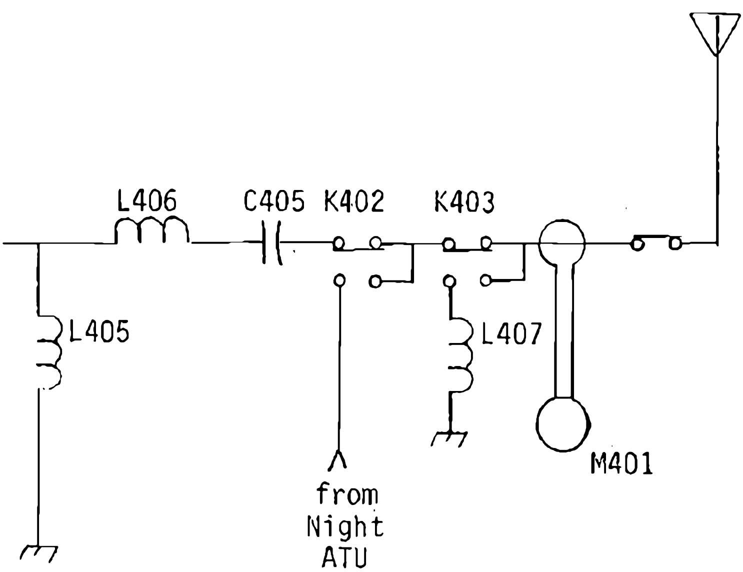
Tower #3

Z = 19 + j 88 Ohms
I = 13.2 Amps
P = 2962 Watts

CFTR 50 kW Day Tower #3 ATU


TL4
K401
C404
L404
to
Night
ATU

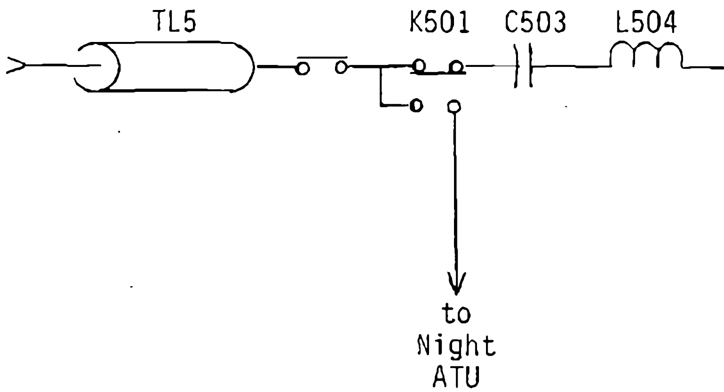
C404	3000 pF	8 kV	Acushnet
C405	2000 pF	10 kV	Sangamo
L404	42 uH	20 A	Harris
L405	24 uH	20 A	Harris
L406	42 uH	20 A	Harris
L407	(2) 87 uH	10 A	Harris
M401		10 A	Delta TCA
TL4	368.9^{0}		Cablewave HCC78-50J



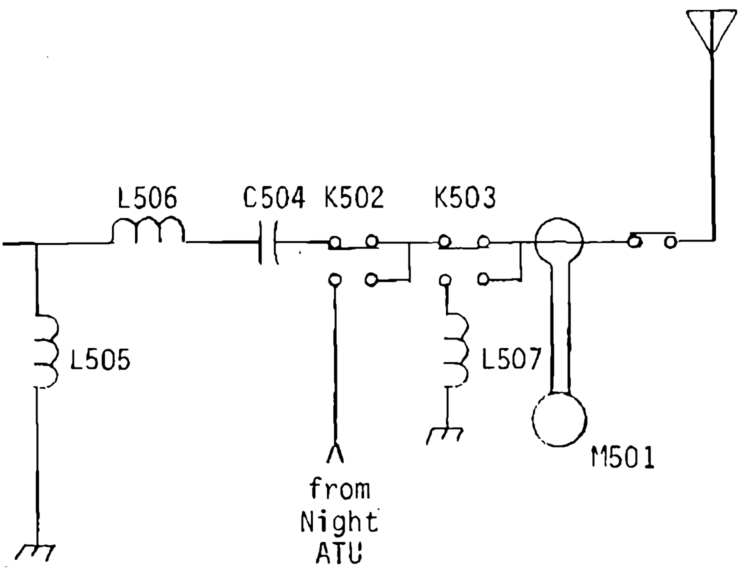
Tower #4

$Z = -25 + j\ 56$ Ohms
$I =$ 5.6 Amps
$P =$ -784 Watts

CFTR 50 kW Day Tower #4 ATU


TL5
K501
C503
L504
to
Night
ATU

C503	2000 pF	15 kV		Acushnet
C504	2000 pF	15 kV		Acushnet
L504	24 uH	20	A	Harris
L505	42 uH	20	A	Harris
L506	24 uH	20	A	Harris
L507	(2) 87 uH	10	A	Harris
M501		10	A	Delta TCA
TL5	377.7^{0}			Cablewave HCC158-50J

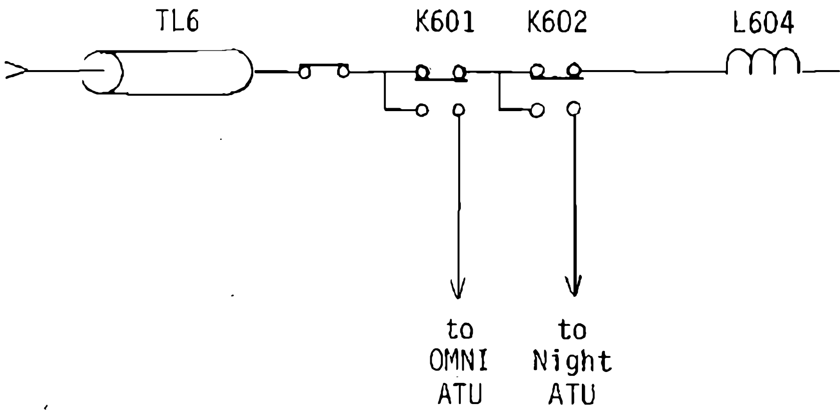


<u>Tower #5</u>

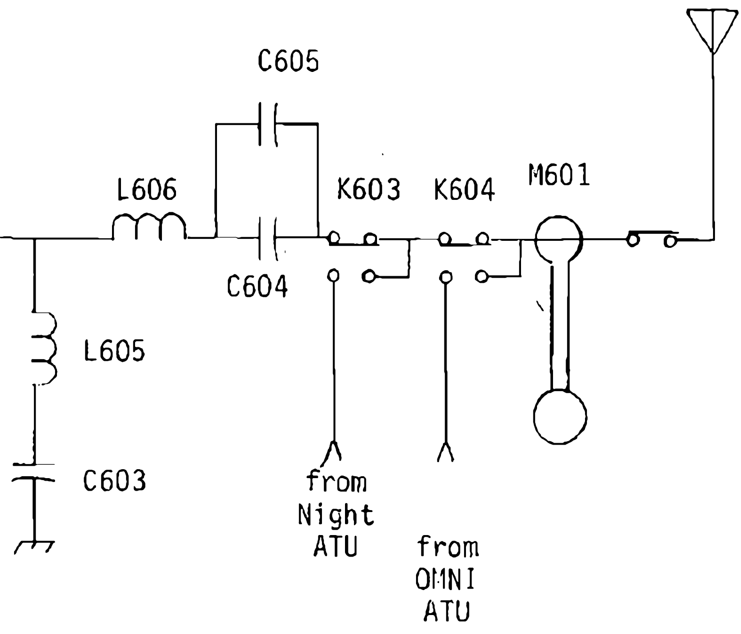
Z = 139 + j 131 Ohms
I = 5.4 Amps
P = 4053 Watts

<u>CFTR 50 kW Day Tower #5 ATU</u>

E. W. Horrigan & Associates Limited


TL6
K601
K602
L604
to
OMNI
ATU
to
Night
ATU

C603	2000 pF	15 kV	ITT CFDP2000-15S
C604	1000 pF	15 kV	ITT CFED1000-15S
C605	500 pF		
L604	45 uH	30 A	Harris
L605	20 uH	30 A	Harris
L606	45 uH	30 A	Harris
M601		20/40 A	Delta TCA
TL6	214.0^{o}		Cablewave HCC300-50J



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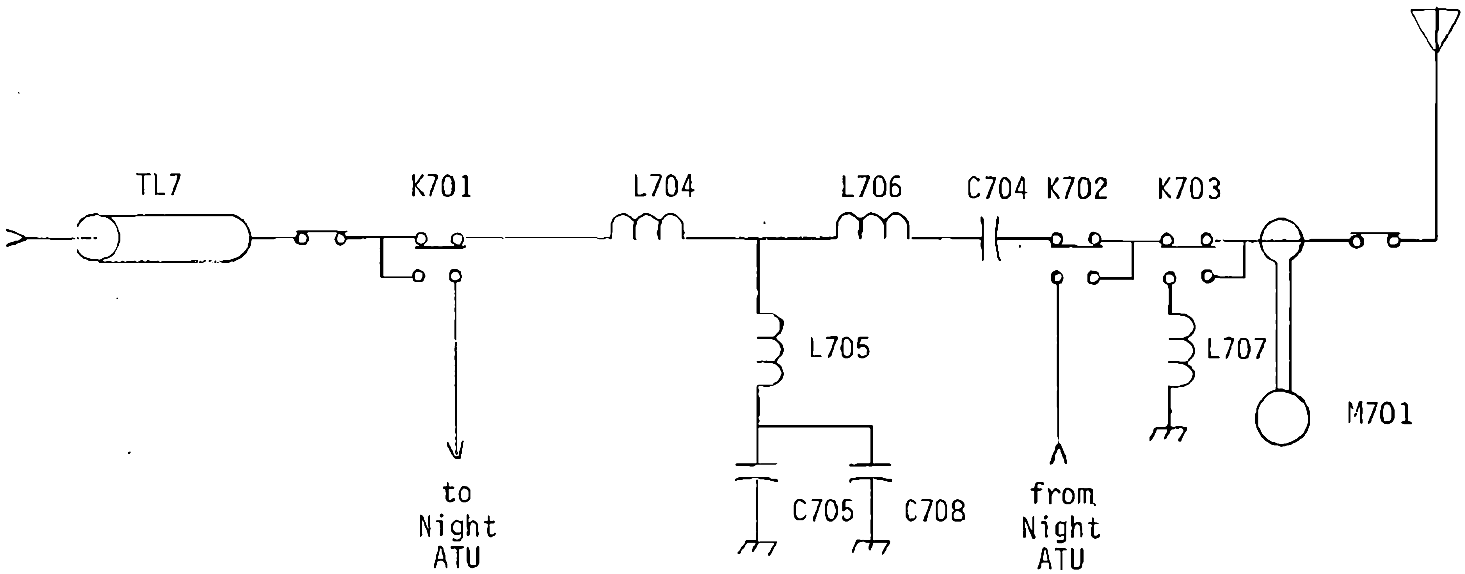
Tower #6

Z = 152 + j 90 Ohms
I = 11.5 Amps
P = 20102 Watts

CFTR 50 kW Day Tower #6 ATU

C704	2000 pF	15 kV	ITT CFDP2000-15S
C705	1000 pF	25 kV	ITT MLC1000 -25S
C708	1000 pF	25 kV	ITT MLC1000 -25S
L704	45 uH	30 A	Harris
L705	20 uH	30 A	Harris
L706	65 uH	30 A	Harris
L707 (2)	87 uH	10 A	Harris
M701		20 A	Delta TCA
TL7	132.2°		Cablewave HCC300-50J



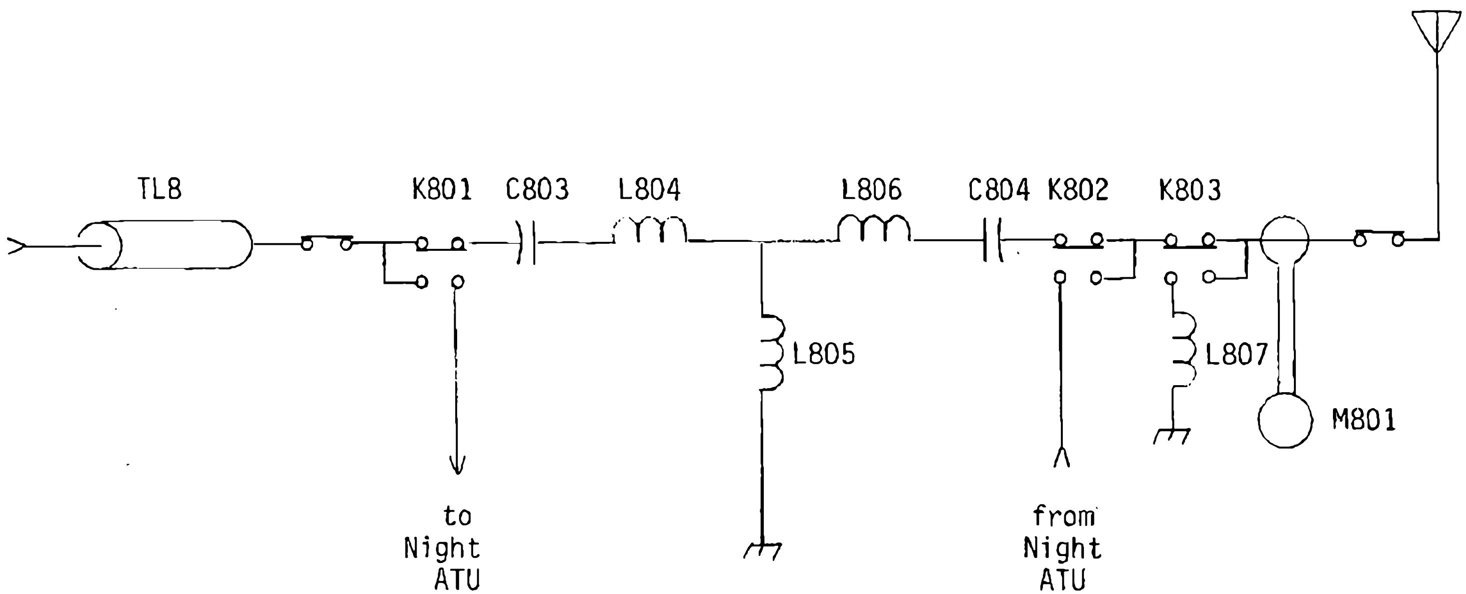
E. W. Horrigan & Associates Limited

<u>Tower #7</u>

Z = 132 + j 109 Ohms
I = 11.8 Amps
P = 18380 Watts

<u>CFTR 50 kW Day Tower #7 ATU</u>

C803	3000 pF	8 kV	Acushnet
C804	1000 pF	20 kV	Acushnet
L804	24 uH	20 A	Harris
L805	42 uH	20 A	Harris
L806	63 uH	20 A	Harris
L807	(2) 87 uH	10 A	Harris
M801		10 A	Delta TCA
TL8	208.8°		Cablewave HCC158-50J



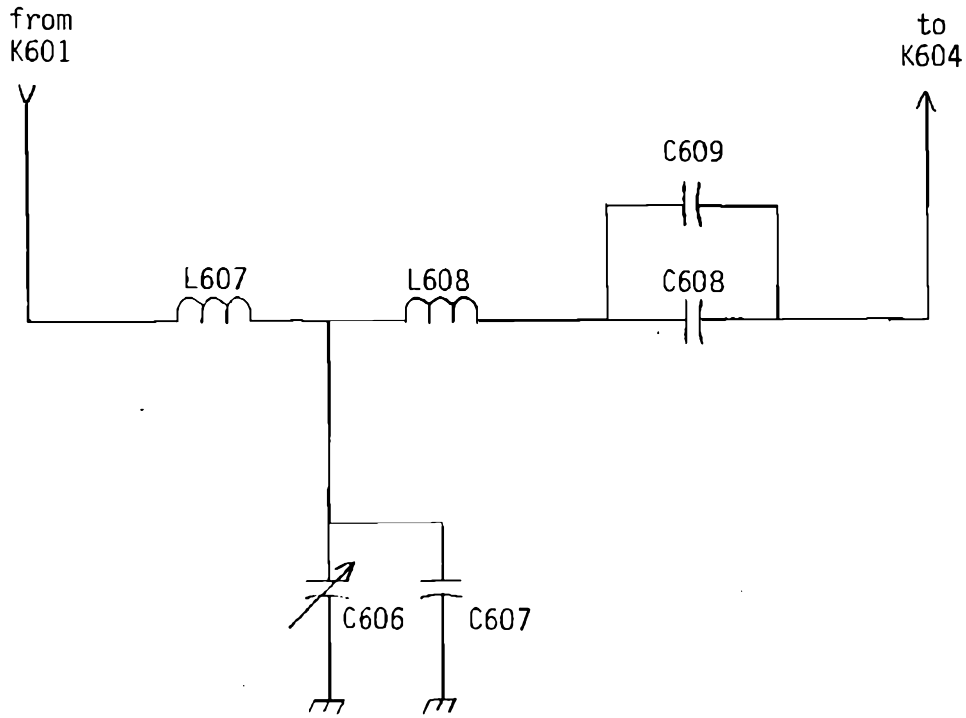
Tower #8

Z = 87 + j 95 Ohms
I = 5.1 Amps
P = 2763 Watts

CFTR 50 kW Day Tower #8

E. W. Horrigan & Associates Limited

C606	50-2300 pF	15 kV	ITT CVDP2300-15S
C607	2000 pF	15 kV	ITT CFDP2000-15S
C608	1000 pF	15 kV	ITT CFED1000-15S
C609	1000 pF	15 kV	ITT CFED1000-15S
L607	35 uH	40 A	Harris
L608	35 uH	40 A	Harris



Tower #6 (OMNI)

Z = 90 + j 138 Ohms

CFTR 50 kW Day Tower #6 (OMNI)

E. W. Horrigan & Associates Limited

CFTR

06-00380 (43)

E. W. Horrigan & Associates Limited

APPROVED

JUIN JUNE 21 1985

Final Proof of Performance

of the

50 kW Night-time Pattern

of

CFTR Toronto, Ontario

680 kHz   Antenna Type B   Class B

Antenna Site: 43° 12' 50" North Latitude
79° 36' 30" West Longitude

Prepared for: Rogers Radio Broadcasting Limited
25 Adelaide Street East
Toronto, Ontario
M5C 1H3

Prepared by: E. W. Horrigan & Associates Limited
4800 Leslie Street Suite 310
Willowdale, Ontario
M2J 2K9

June 10, 1985

Table of Contents

Table of Contents (cont'd)

1.0 General

1.1 Introduction

E. W. Horrigan & Associates Limited has been retained by Rogers Radio Broadcasting Limited to prepare the Final Proof of Performance for AM radio station CFTR Toronto, Ontario. This Final Proof of Performance has been prepared in accordance with Broadcast Specification No. 2, Issue 1, and demonstrates that the 50 kW Night-time operation of CFTR is identical, for all practical purposes, to that operation proposed in the Revised Engineering Brief for this station dated September 23, 1981.

1.2 Personnel

All array adjustments and measurements were carried out by:

W. B. Groh, who has assisted the writer in achieving Proofs of Performance for CFTR and other radio stations; and

D. F. Wood, P. Eng., Consulting Engineer, whose qualifications are on file with the Department.

1.3 Test Equipment

Test equipment used in achieving this proof are:

Potomac Instruments, Inc. FIM-21 field strength meter, serial number 507;

Potomac Instruments, Inc. SD-31 synthesizer/detector, serial number 202;

Delta Electronics, Inc. OIB-1 operating impedance bridge;

1.0 General (cont'd)

1.3 Test Equipment (cont'd)

General Radio Inc. RF bridge #1606B, serial number 3376;

Delta Electronics, Inc. TCA RF ammeters, various ranges;

Potomac Instruments, Inc. PM-19 antenna monitor with PMA-19 precision monitor adapter.

1.4 Time Span

Tuning of the Night-time array commenced on November 5, 1984. No work was done during the BBM rating periods of January 7 through February 3 and April 1 through May 21, 1985. Field Strength measurements were completed on May 28, 1985. Thus the time span for this Proof was 16 weeks.

1.5 Methodology

A 1 kW transmitter was used at first, operating into the tuning and phasing networks to provide a low power source to permit the initial tuning of the array. This transmitter was also used in the determination of the base operating impedances of the high-power towers of the array.

The main transmitter, first at the 25 kW power level, then at the 50 kW power level was used to drive the array while components were adjusted until the field magnitude ratios and phase angles of all towers, as displayed on the antenna monitor, were observed to be within ± 3% and ± 3° respectively of those parameters specified in the Engineering Brief.

1.0 General (cont'd)

1.5 Methodology (cont'd)

At this point, the current distribution of each tower was determined by use of a probing meter at intervals of twenty feet up each tower. These readings were plotted on cartesian co-ordinate graph paper as relative field versus height, and the relative areas under the curves were calculated and used to calibrate the antenna monitor with respect to field ratio. The tuning procedure was continued until the field magnitude ratios and phase angles of all towers were observed to be within ± 1% and ± 1° respectively, of those parameters specified in the Engineering Brief.

Radials on bearings of 110.5°, 122.5° and 265.8° were selected for use as 'talk-down' radials. Mr. Groh positioned a field strength meter at known distances from Tower #6 of the CFTR array on each of these radials, and monitored the field strength from the array, providing feedback via two-way radio as the array was adjusted to a field strength at or near a null value as measured at each point. When the field strength was observed to be at or near a null value, a complete set of antenna monitor readings was recorded. The complete set of readings was then input to a computer program which used a 'steepest descent' technique to provide compensation for antenna monitoring system errors and to output the antenna monitor readings needed to achieve the required pattern. The array was tuned until the required readings were observed on the antenna monitor.

1.0 General (cont'd)

1.5 Methodology (cont'd)

Field strength readings were made along radials at 110.5°, 122.5°, 133.8° and 265.8° to ensure that the desired pattern shape and size had indeed been achieved. The effect of the array not being a point source and the effect of the cos ø pattern of the field strength meter loop was included in the evaluation.

At this time, the Department was asked to approve a test operation of the Night-time operation during Day-time broadcasting hours to permit field strength measurements to be made to determine the coverage of the station.

Ratio measurements were not taken, as it was uncertain that the detuning of the seven unused towers in the array was of sufficient magnitude to ensure a true omni-directional operation of Tower #6. Because Broadcast Specification No. 2 mentions ratio measurements only as a suggestion, and as ratio measurements had not been required on previous Proofs of Performance of CFTR, we trust that the Department will accept this omission. As a sufficient number of field strength readings have been made on bearings of far field nulls to demonstrate their existance, it is our considered opinion that the size and shape of the Night-time array of CFTR is adequately demonstrated by the radial measurements documented herein.

1.0 General (cont'd)

1.6 Discussion of Results

The CFTR 50 kW Night-time array has behaved substantially as foreseen by its designers. The stability of the array has proven to be acceptable, as observed at both the array monitor and at the field strength monitoring point.

The protection requirements to all co-channel stations have been met.

The coverage predicted for the array has been achieved in all directions, with the exception of the northerly bearings, where the coverage predictions have been exceeded because the conductivity of Lake Ontario was somewhat higher than that indicated on the Department's ground conductivity map. A small area of extremely low conductivity was found to exist directly to the west of the antenna site, but the signal strength was found to 'recover' further along the westward radials.

A further anomaly was found to exist when measuring the field strength on the far field null areas of the array. Measurements made close in to the antenna showed good co-relation to anticipated theoretical near field values. However, at greater distances, which corresponded to measurement points on top of the Niagara Escarpment, measured fields were somewhat higher than predicted. As the distance from the array increased, the field strength decreased rapidly to a point where co-channel interference masked the true readings.

1.0 <u>General</u> (cont'd)

1.6 Discussion of Results

It our opinion that the increased elevation at the edge of the escarpment caused us to measure a direct ray or sky-wave component of the CFTR signal on top of the ground-wave signal. As the distance increased, i. e. as the measurement points moved beyond the ridge, this component became negligible, the ground-wave approached a far field null, and measurements became masked by co-channel interference.

The phasor input bandwidth was found to be extremely good, and the array should prove to permit good performance with an AM Stereo signal.

1.7 Conclusions

It is our considered opinion that the CFTR 50 kW Night-time array is performing in accordance with the technical parameters set out in the Revised Engineering Brief dated September 23, 1981. Permission is therefore requested to commence regularly scheduled broadcasting using this installation.

1.8 Engineer's Seal and Signature

David F. Wood, P. Eng.
Consulting Engineer

June 10, 1985

FORM FOR THE APPLICATION OF ARTICLE 4 OF THE AGREEMENT
CHARACTERISTICS OF A REGION 2 BROADCASTING STATION IN THE BAND 535 - 1 605 kHz

PART I GENERAL INFORMATION

(01) Administration: Canada | Sheet No. 1 | Date:

Assigned frequency (kHz)		02	0680
Transmitting station	Name of the station	03	Toronto ON
	Call sign	04	CFTR
	Additional Identification	05	
	Station class	06	B
	Operational Status	07	O
Country		08	CAN
Geographical coordinates of the transmitting station		09	79 W 36 30 43 N 12 50

(11) a) New assignment [ ] b) Modification of characteristic of an assignment recorded in the Plan [x] c) Cancellation of an assignment [ ]

(12) Modification under Section 4.2.14 Yes [ ] No [x]

(13) Date of bringing into service or cessation of operation: Year 85 Month Day

STATION PARAMETERS	DAYTIME OPERATION	NIGHT-TIME OPERATION
Station power (kW)	21	31 50.0
r.m.s. value of radiation for station power (mV/m at 1 km)	25	35 2036.36
Antenna type	26	36 B
Simple vertical antenna electrical height (degrees)	27	37

(44) Remarks

COORDINATION UNDER ARTICLE 4 :								
COUNTRY								
IN PROGRESS								
ACCEPTANCE OBTAINED								

FORM FOR THE APPLICATION OF ARTICLE 4 OF THE AGREEMENT
CHARACTERISTICS OF A REGION 2 BROADCASTING STATION IN THE BAND 535 - 1 605 kHz

PART II Section I

Description of a directional antenna consisting of vertical conductors

Sheet No.: 2

Date: June 10/85

(01) Name of transmitting station: TORONTO ON

(02) Country: CAN

(03) Hours of operation: HN

(04) Total number of towers: 08

(05) Tower No.	(06) Tower field ratio	(07) Phase difference of the field (± degrees)	(08) Electrical tower spacing (degrees)	(09) Angular tower orientation (degrees)	(10) Reference tower indicator	(11) Electrical height of tower (degrees)	(12) Tower structure
1	0.430	119.3	0.0	0.0		99.5	0
2	1.000	103.3	154.000	292.500		99.5	0
3	1.000	95.1	308.000	292.500		99.5	0
4	0.430	79.1	462.000	292.500		99.5	0
5	0.430	-16.0	485.782	303.013		99.5	0
6	1.000	0.0	335.546	307.816		99.5	0
7	1.000	8.2	191.388	320.088		99.5	0
8	0.430	24.2	90.000	12.500		99.5	0

(14) r.m.s. value of radiation: 2036.36 mV/m at 1 km

(15) Type of pattern: Expanded

(16) Special quadrature factor: 51.02 mV/m at 1 km

(17) SUPPLEMENTARY INFORMATION

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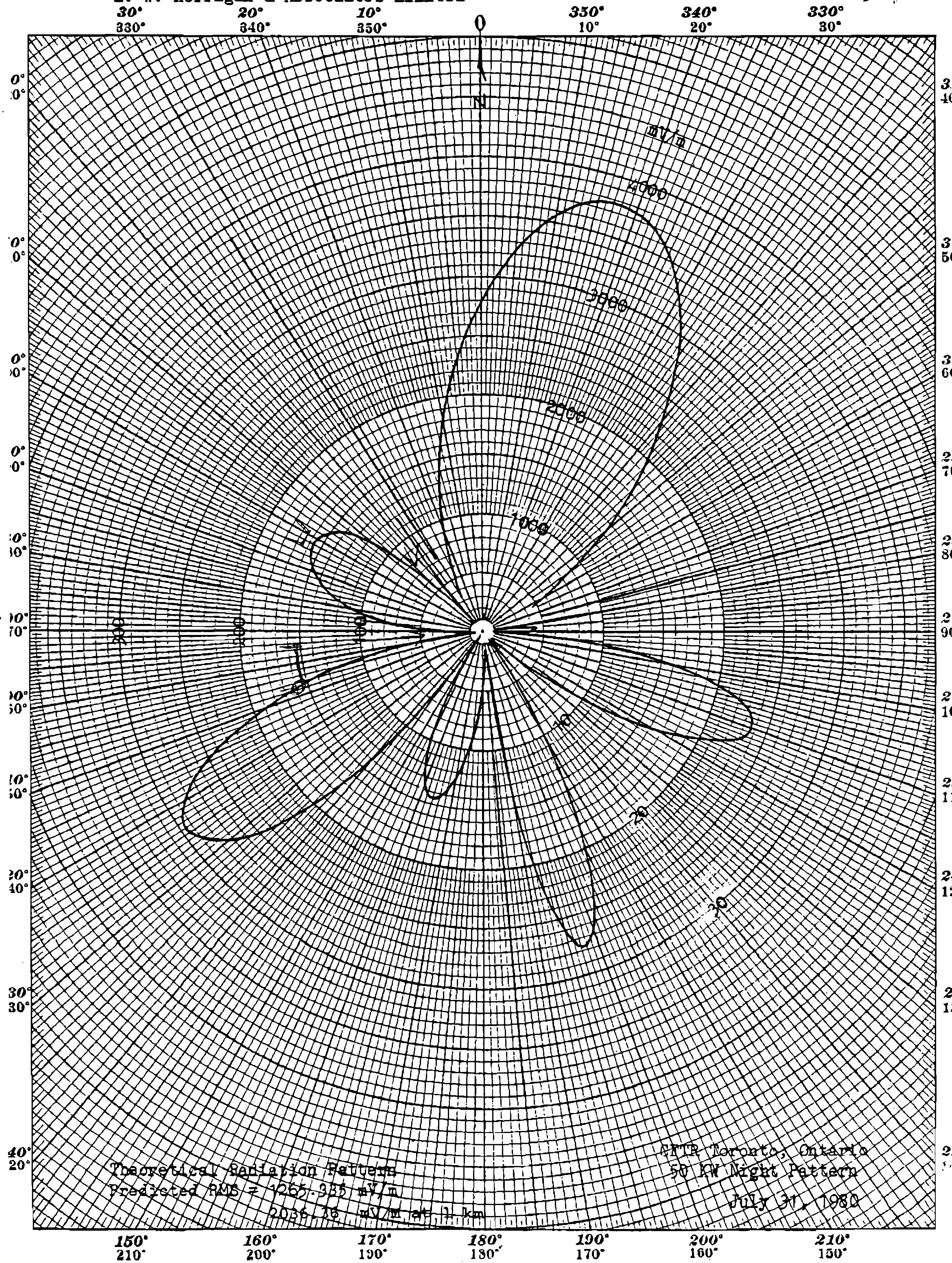

N
mV/m
4000
3000
2000
1000
Theoretical Radiation Pattern
Predicted RMS = 1265.335 mV/m
2036.16 mV/m at 1 km
CFTR Toronto, Ontario
50 KW Night Pattern
July 31, 1980

3.1 Tower Self Impedance

	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #1	625	54+j 72
	635	58+j 84
	645	63+j 93
	655	68+j104
	665	74+j116
	675	88+j124
	685	95+j126
	695	95+j153
	705	104+j163
	715	114+j176
	725	123+j186
	735	137+j195
At 680 kHz (interpolated)		84.5+j136
Tower #2	625	58+j 72
	635	64+j 87
	645	69+j 98
	655	75+j108
	665	82+j120
	675	84+j130
	685	99+j145
	695	110+j155
	705	120+j166
	715	133+j173
	725	143+j185
At 680 kHz (interpolated)		95.5+j141

3.1 Tower Self Impedance (cont'd)

	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #3	625	55+j 77
	635	60+j 85
	645	65+j 98
	655	71+j108
	665	77+j119
	675	86+j129
	685	93+j142
	695	101+j154
	705	108+j166
	715	123+j176
	725	130+j185
	735	142+j195
At 680 kHz (interpolated)		90+j140
Tower #4	625	54+j 72
	635	58+j 84
	645	63+j 95
	655	68+j105
	665	73+j117
	675	81+j129
	685	84+j143
	695	94+j155
	705	104+j167
	715	113+j179
	725	127+j190
	735	138+j201
At 680 kHz (interpolated)		85+j 136

3.1 Tower Self Impedance

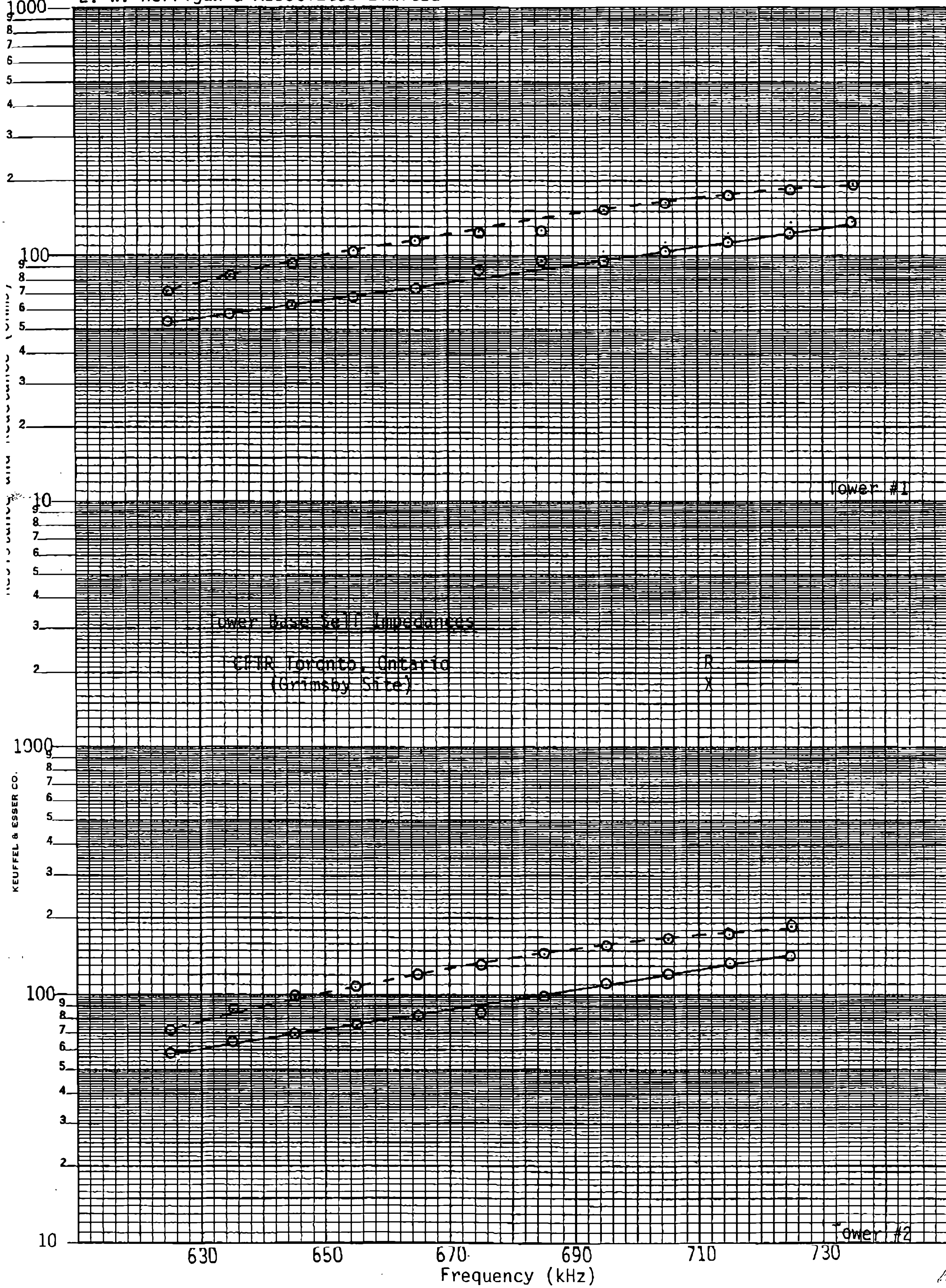
	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #5	625	54+j 72
	635	59+j 84
	645	63+j 93
	655	68+j104
	665	74+j116
	675	84+j130
	685	89+j139
	695	94+j151
	705	103+j165
	715	114+j172
	725	123+j183
	735	136+j193
At 680 kHz (interpolated)		85+j133

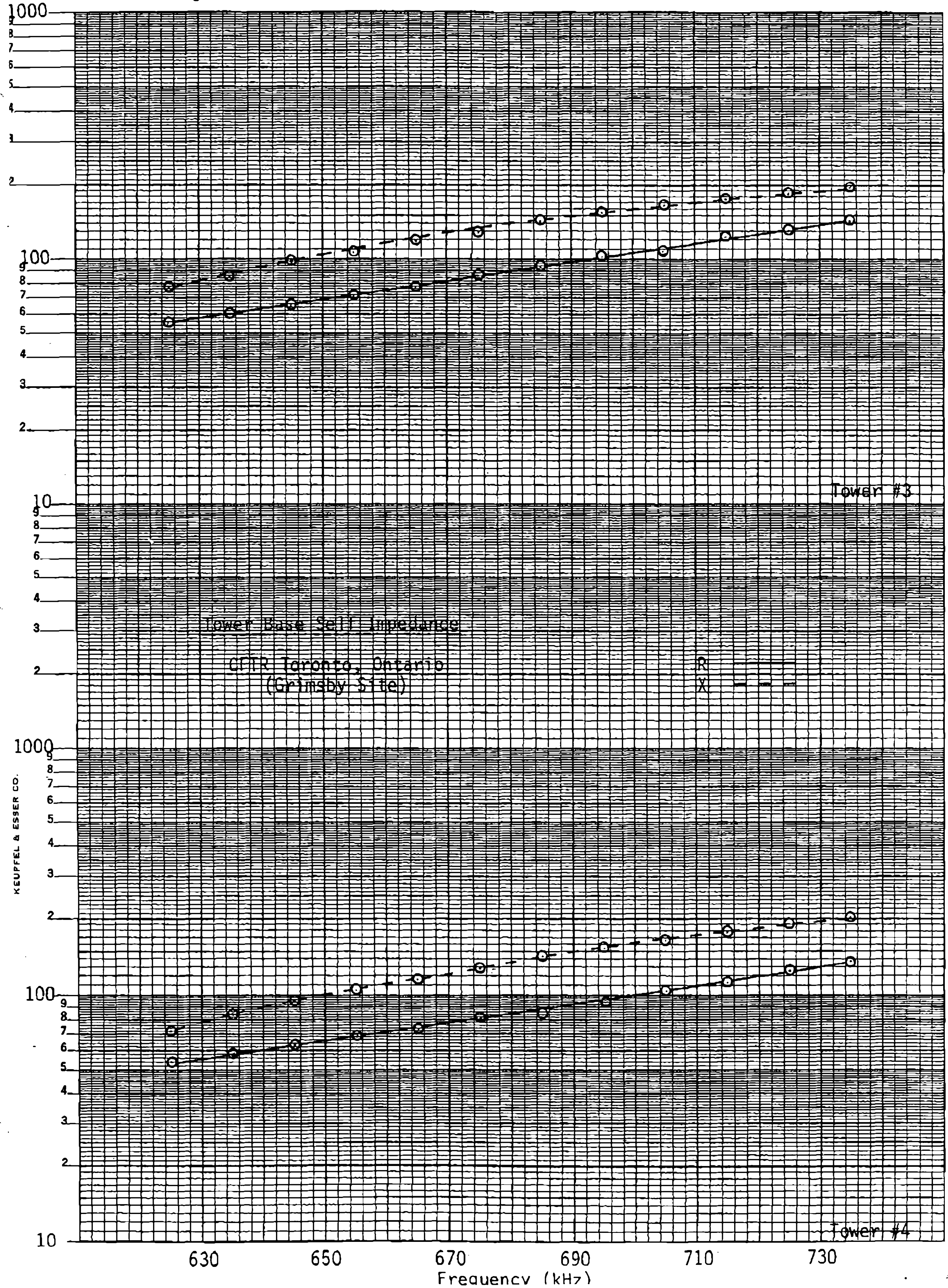
	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #6	625	56+j 77
	635	61+j 90
	645	66+j 99
	655	72+j110
	665	78+j120
	675	88+j141
	685	92+j158
	695	102+j155
	705	113+j166
	715	122+j176
	725	131+j183
	735	140+j191
At 680 kHz (interpolated)		90.5+j 137

3.1 <u>Tower Self Impedance</u> (cont'd)

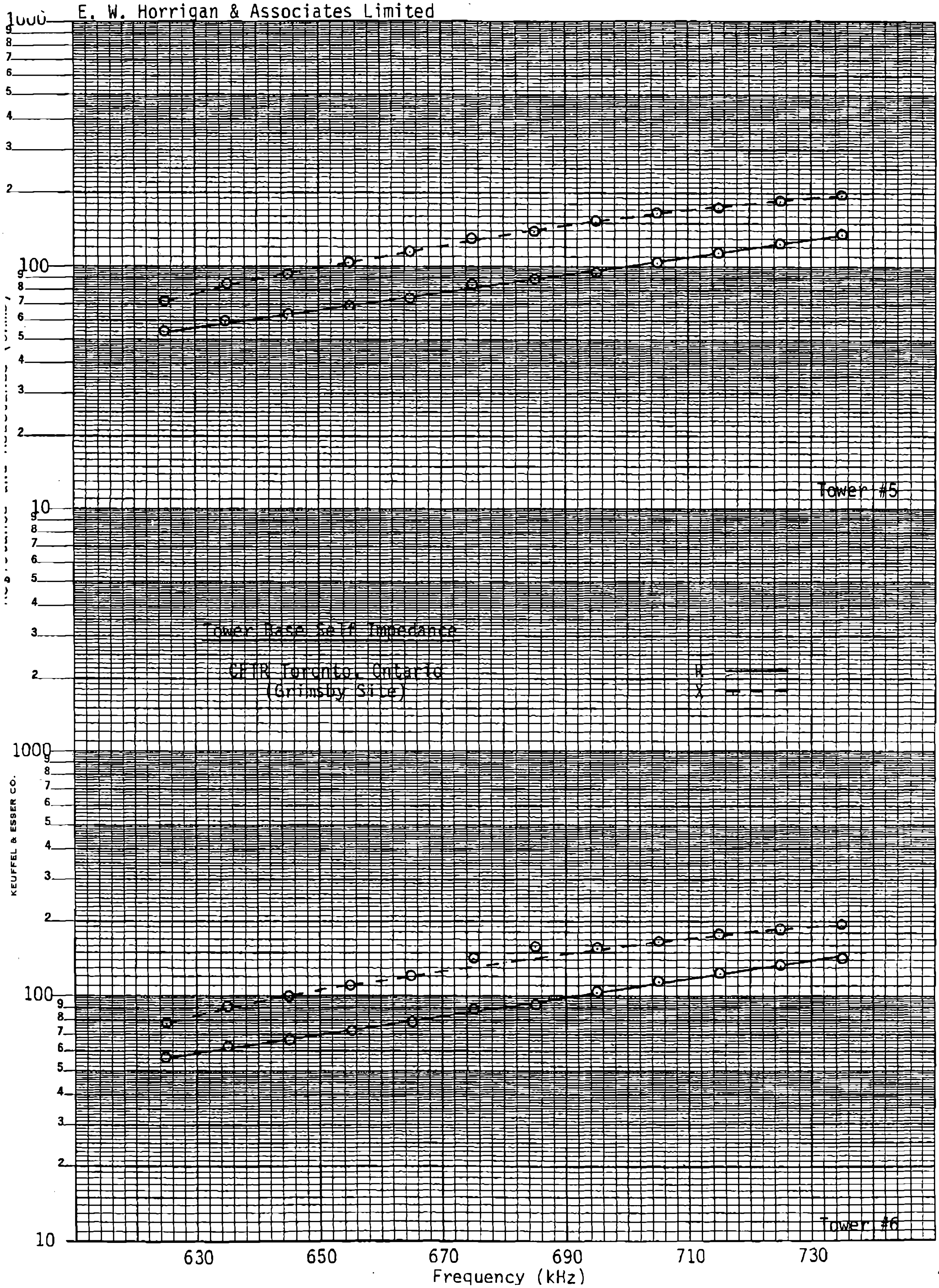
	Frequency (kHz)	Impedance R+jX (Ohms)
Tower #7	625	55+j 77
	635	59+j 87
	645	64+j 98
	655	70+j108
	665	76+j117
	675	89+j136
	685	89+j142
	695	99+j154
	705	109+j163
	715	118+j173
	725	129+j185
	735	139+j195
At 680 kHz (interpolated)		86.5+j134
Tower #8	625	52+j 71
	635	57+j 84
	645	61+j 95
	655	66+j105
	665	71+j117
	675	76+j129
	685	84+j139
	695	92+j154
	705	102+j167
	715	113+j178
	725	123+j189
	735	131+j188
At 680 kHz (interpolated)		83.0+j144

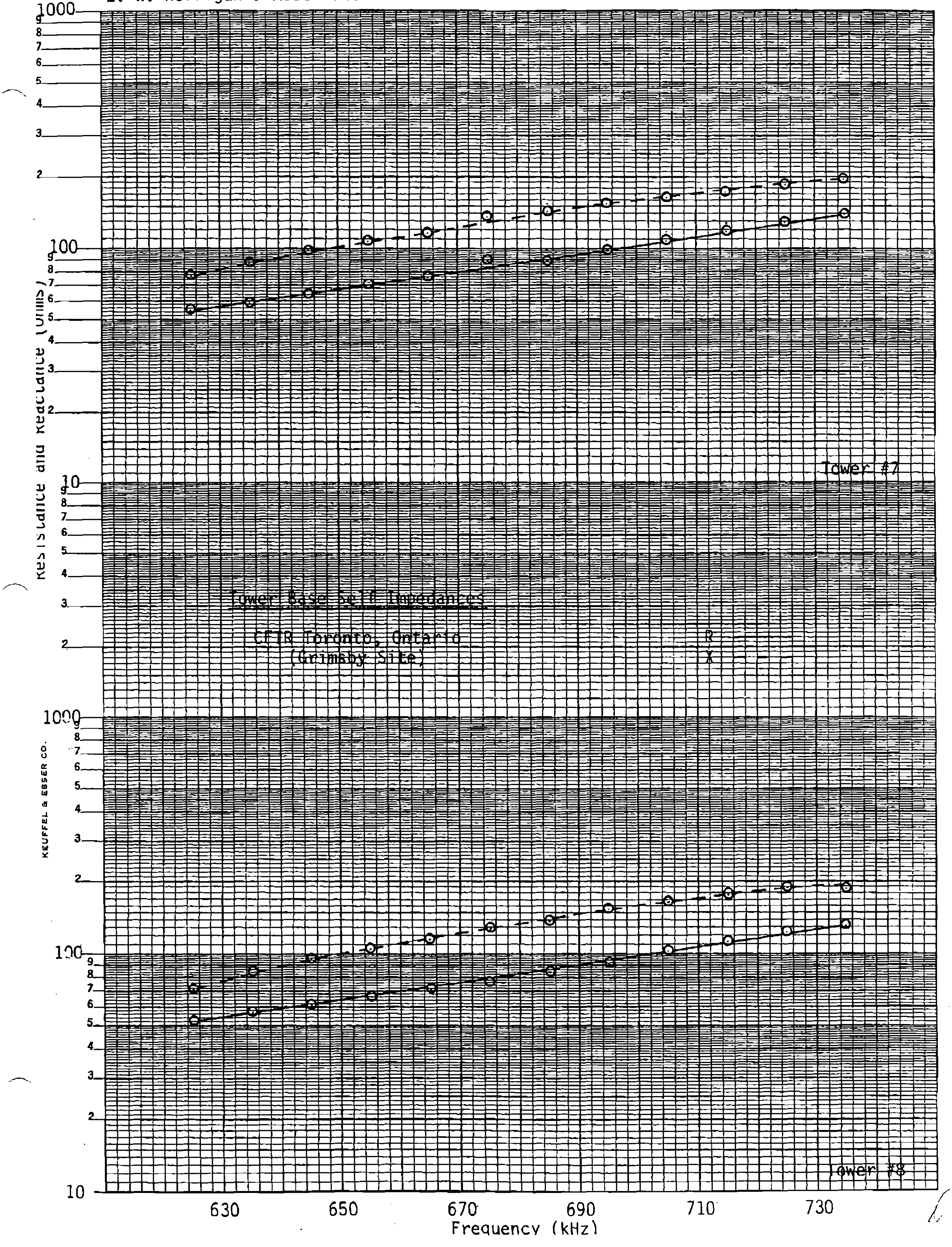
E. W. Horrigan & Associates Limited




1000
100
10
Tower #3
Tower Base Self Impedance
CFTR Toronto, Ontario
(Grimsby Site)
R
X
1000
100
10
Tower #4
630
650
670
690
710
730
Frequency (kHz)
KEUFFEL & ESSER CO.

E. W. Horrigan & Associates Limited




Resistance and Reactance (Ohms)
Tower #7
Tower Base Self Impedances
CFTR Toronto, Ontario
(Grimsby Site)
R
X
Tower #8
1000
100
10
630
650
670
690
710
730
Frequency (kHz)
KEUFFEL & ESSER CO.

3.2 Array Power Analysis

Tower #	Base Operating Impedance (Ohms)	Base Current (Amperes)	Power (Watts)
1	4. +j103.	5.3	112
2	13. +j 90.	13.1	2231
3	- 2. +j 91.	13.1	- 343
4	- 10. +j 90.	5.2	-270
5	119. +j 75.	5.1	3095
6	130. +j 95.*	12.3	19666
7	134. +j 85.*	12.8	21955
8	118. +j 69.	5.4	3441

Total Power	49889.	Watts
Common Point Impedance	50 +j 0	Ohms
Common Point Current	32.0	Amperes
Common Point Power	51200	Watts
Power Loss in Antenna Feed System	1311	Watts

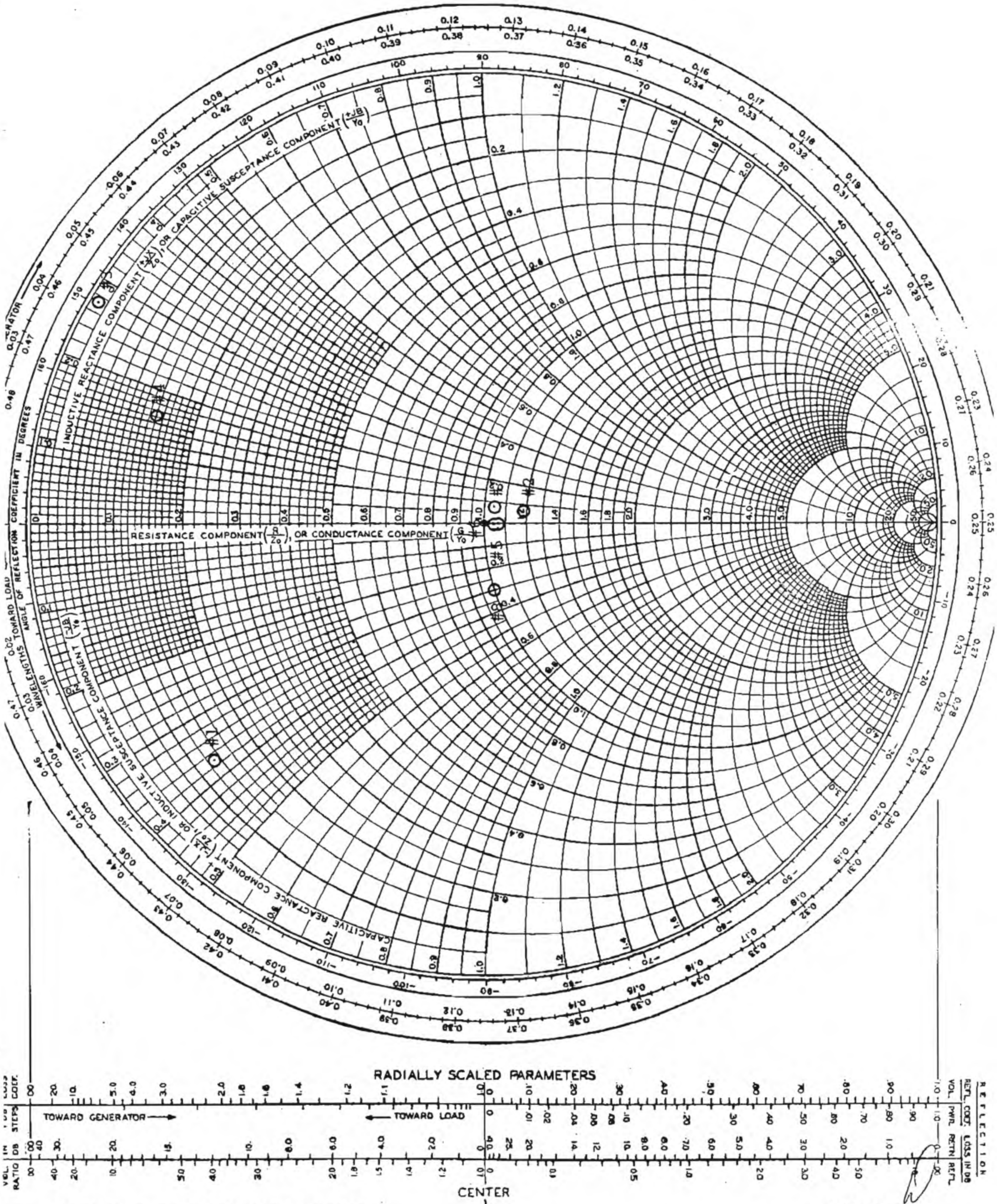
Tower #	Line Attenuation (dB)	Line VSWR	Mismatch Loss (dB)	Total Line Loss (Watts)
1	0.228	8.82	4.370	211
2	0.028	1.21	0.039	35
3	0.106	107.4	14.37	- 331
4	0.421	7.30	3.728	- 166
5	0.245	1.07	0.005	183
6	0.091	1.04	0.002	426
7	0.056	1.09	0.008	326
8	0.136	1.35	0.097	190

Total Line Losses	684
Therefore, loss in tuning networks	627

* Measured at 1 kW.

NAME	TITLE	DWG. NO.
CFTR Night	Transmission Line VSWR	
SMITH CHART FORM 82BSPR (2-49)	KAY ELECTRIC COMPANY, PINE BROOK, N.J. ©1949 PRINTED IN U.S.A.	DATE June 10, 1985

IMPEDANCE OR ADMITTANCE COORDINATES



3.4 Antenna Monitor Readings

The antenna monitor readings output from the "talk-down" parameter seeker program were realized to within ± 1% in field ratio and ± 1° in phase angle. The antenna monitor readings that were maintained during the Proof measurement period are given below.

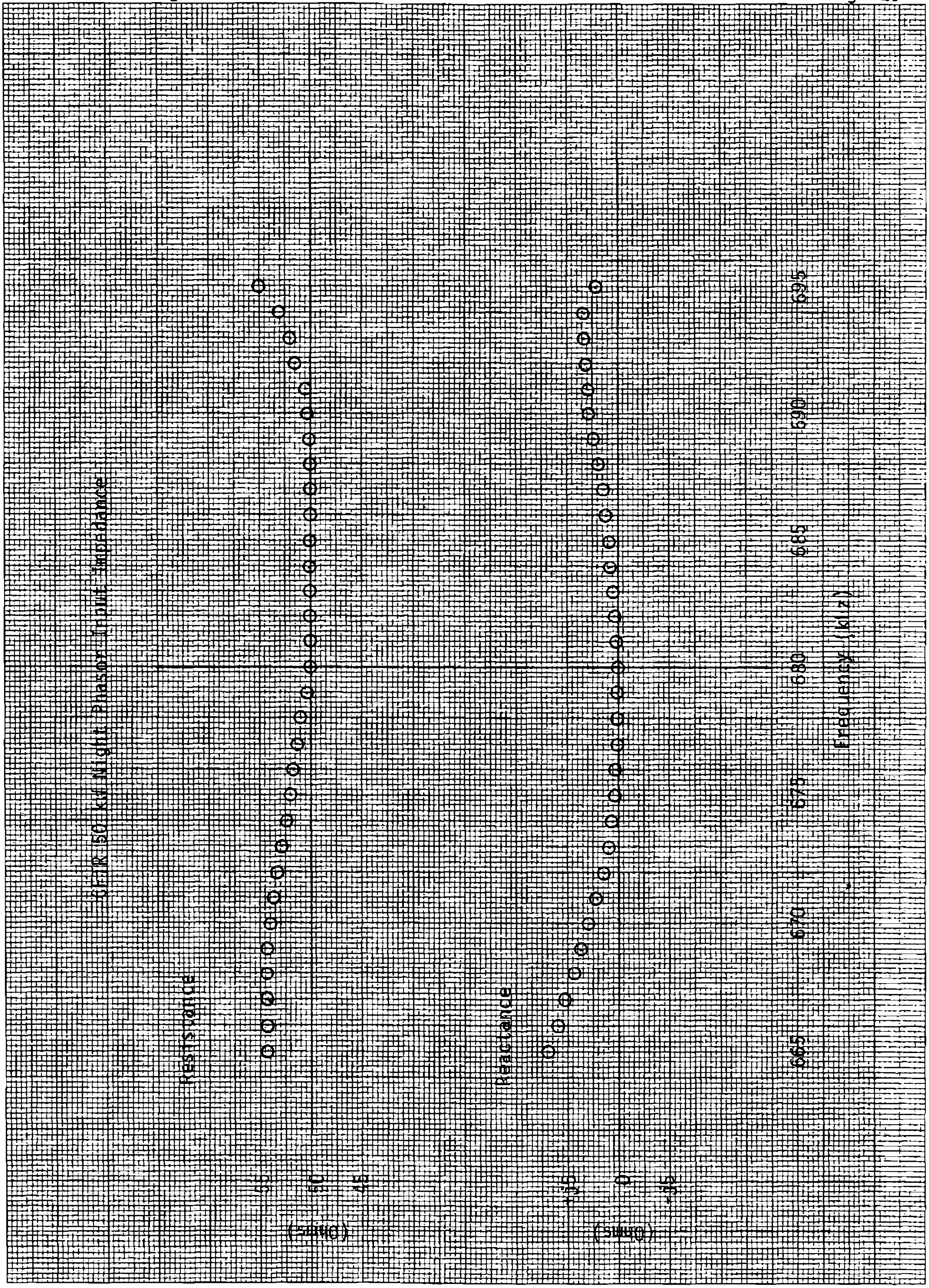
Tower #	Deviation (%)	Phase (deg)
1	− 5.4	118.2
2	− 5.5	106.0
3	− 3.8	97.5
4	− 4.0	78.1
5	− 9.6	−13.6
6	0.0	0.0
7	− 2.1	10.1
8	− 2.2	26.5

The Phasor control settings at this time were:

Tower #	Power	Phase
1	193.5	096.5
2	082	086.5
3	190.5	163
4	188.5	167
5	082	083
6	298	162
7	275	205
8	159	021.5
Common Point	G = 052	B = 053

3.5 Phasor Input Impedance

Frequency (kHz)	Impedance (Ohms)
665	54.3 +j 6.9
666	54.3 +j 5.9
667	54.3 +j 5.2
668	54.3 +j 4.3
669	54.3 +j 3.6
670	54.0 +j 2.9
671	53.6 +j 2.0
672	53.3 +j 1.4
673	52.8 +j 0.9
674	52.3 +j 0.6
675	51.9 +j 0.4
676	51.7 +j 0.2
677	51.3 +j 0.0
678	51.0 +j 0.0
679	50.3 +j 0.1
680	50.0 +j 0.0
681	50.0 +j 0.1
682	50.0 +j 0.3
683	50.0 +j 0.5
684	50.0 +j 0.7
685	50.0 +j 0.7
686	50.0 +j 1.1
687	50.0 +j 1.4
688	50.0 +j 1.8
689	50.0 +j 2.3
690	50.3 +j 2.7
691	50.5 +j 2.9
692	51.5 +j 3.1
693	52.0 +j 3.3
694	53.0 +j 3.4
695	55.0 +j 2.0


CFTR 50 kW Night Phasor Input Impedance
Resistance
Reactance
55
50
45
(Ohms)
+j5
0
-j5
(Ohms)
665
670
675
680
685
690
695
Frequency (kHz)

METRIC

6

Radial at Azimuth 110.5 Degrees

Measured March 19, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	3.17	8.4
2	3.27	9.2
3	3.34	7.2
4	3.43	8.6
5	3.55	7.0
6	3.64	8.5
7	3.70	6.2
8	3.85	7.8
9	3.93	8.3
10	4.14	6.0
11	4.28	5.8
12	4.45	7.2
13	4.72	5.0
14	5.00	6.3
15	5.54	5.3
16	6.47	5.7
17	7.17	4.8
18	7.90	4.2
19	9.72	3.0
20	10.6	2.8
21	11.5	2.8
22	12.4	2.85
23	13.6	2.4
24	15.1	2.7
25	16.1	2.5
26	17.8	1.85
27	19.3	1.7
28	31.3	1.0
29	32.3	0.99
30	40.1	0.82
31	41.8	0.7
32	49.6	0.4
33	51.0	0.15

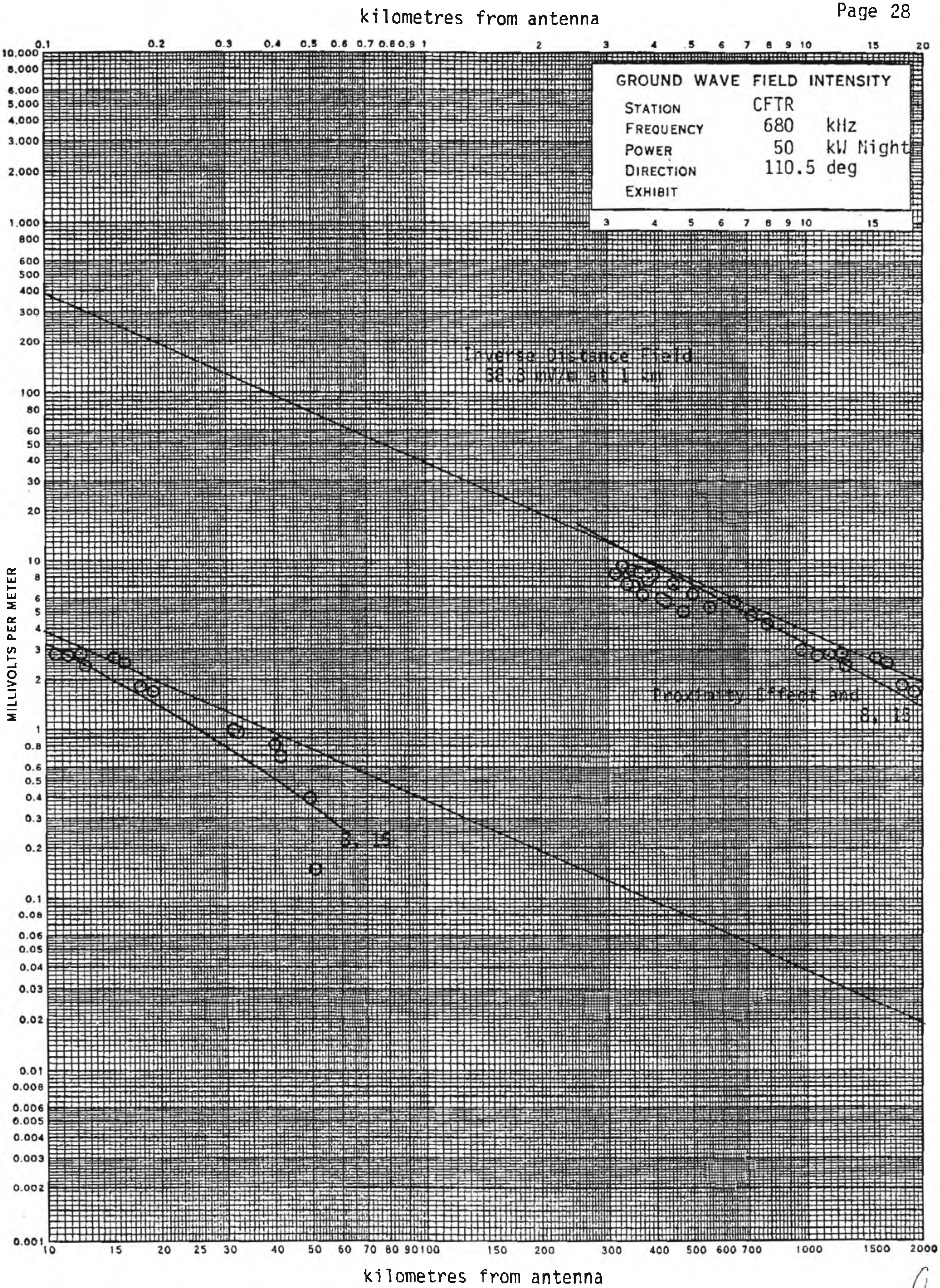
ename CFTRN

Proximity Effect Radial @ 110.5 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	30215.58
.126	31651.43
.158	43607.50
.200	88068.58
.251	25706.48
.316	17208.43
.398	18298.19
.501	2816.86
.631	790.05
.794	279.07
1.000	118.23
1.259	59.55
1.585	35.39
1.995	23.87
2.512	17.38
3.162	13.16
3.981	10.17
5.012	7.94
6.310	6.24
7.943	4.92
10.000	3.89

Far Field = 38.3 mV/m at 1 km.


kilometres from antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 110.5 deg
EXHIBIT
Inverse Distance Field
MILLIVOLTS PER METER
kilometres from antenna

Radial at Azimuth 122.5 Degrees

Measured March 20, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	1.0	350
2	1.32	155
3	2.05	10.0
4	2.46	9.0
5	3.27	5.3
6	3.43	6.2
7	3.91	4.5
8	4.17	5.4
9	4.84	4.0
10	5.1	3.7
11	6.2	3.2
12	6.7	3.6
13	7.5	3.05
14	10.8	1.55
15	11.3	1.8
16	14.7	1.4
17	16.4	1.1
18	18.2	1.0
19	27.6	0.7
20	31.8	0.35
21	35.8	0.33
22	57.2	0.24
23	60.9	0.22
24	65.8	0.13
25	66.3	0.16

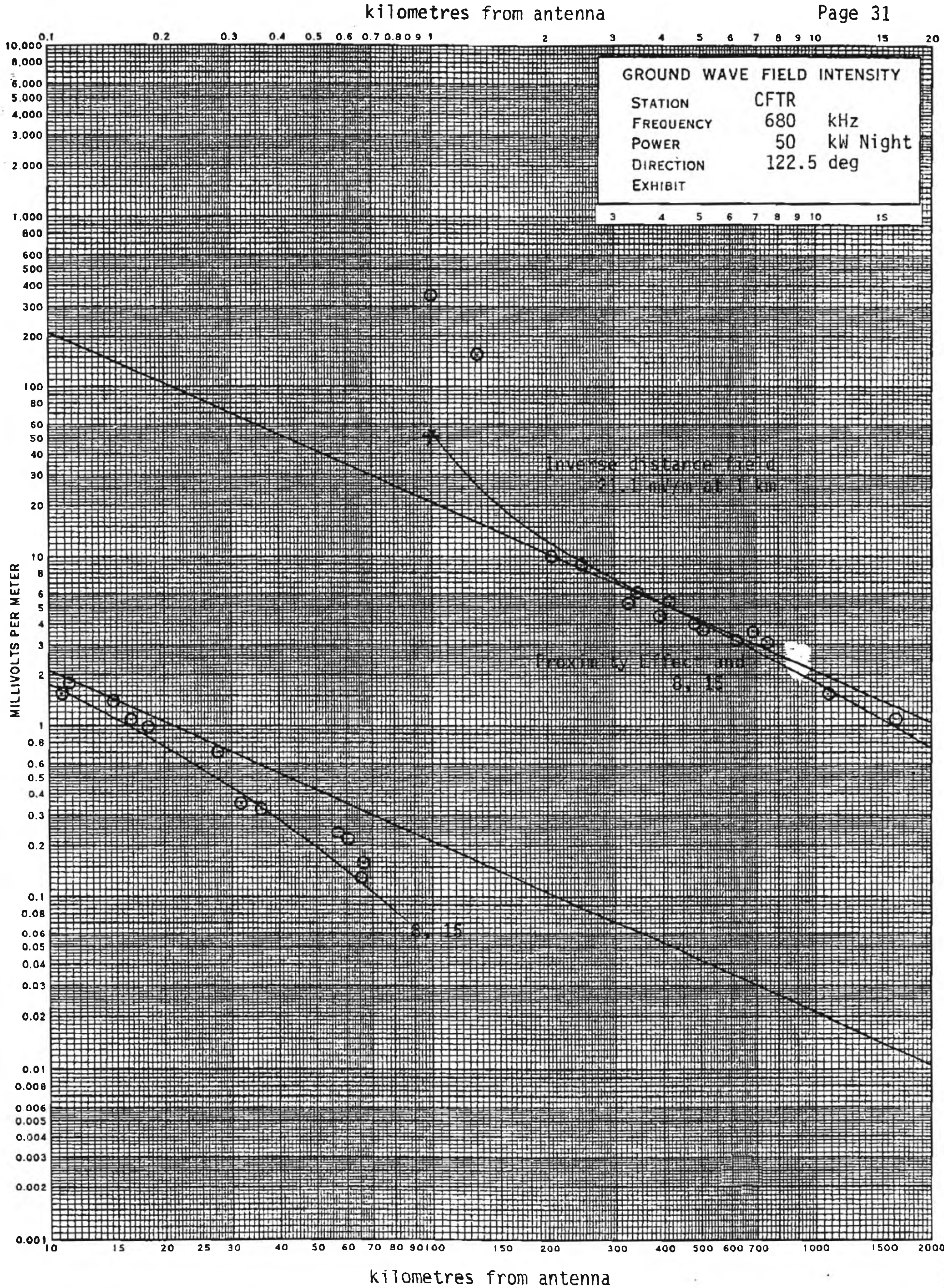
ename CFTRNP

Proximity Effect Radial @ 122.5 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	29043.59
.126	29960.67
.158	35233.81
.200	37311.82
.251	20464.06
.316	13668.43
.398	6635.79
.501	1439.20
.631	342.98
.794	123.12
1.000	55.12
1.259	29.65
1.585	18.68
1.995	13.10
2.512	9.73
3.162	7.44
3.981	5.76
5.012	4.49
6.310	3.52
7.943	2.77
10.000	2.18

Far Field = 21.1 mV/m at 1 km.


kilometres from antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 122.5 deg
EXHIBIT
MILLIVOLTS PER METER
Inverse distance field
21.1 mV/m at 1 km
8, 15
kilometres from antenna

K&E

Radial at Azimuth 133.8 Degrees

Measured March 13, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	1.64	42.0
2	2.40	21.0
3	2.54	18.0
4	2.60	15.0
5	3.45	13.0

33

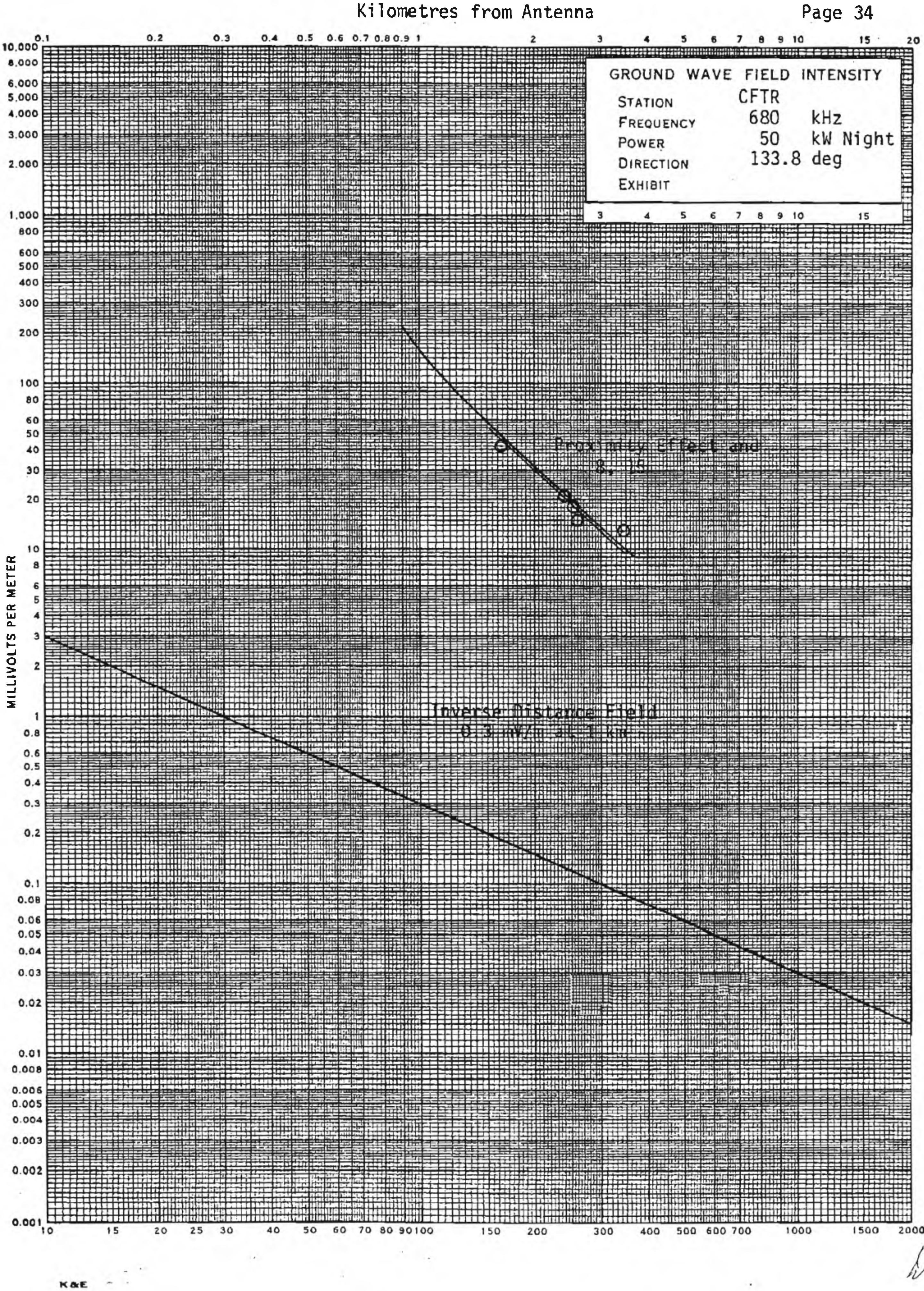
ename CFTRN

Proximity Effect Radial @ 133.8 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	26313.20
.126	25507.80
.158	23564.79
.200	17636.55
.251	19865.72
.316	8317.09
.398	5548.28
.501	1506.55
.631	242.67
.794	59.00
1.000	24.88
1.259	14.19
1.585	8.66
1.995	5.36
2.512	3.33
3.162	2.08
3.981	1.30
5.012	.82
6.310	.51
7.943	.32
10.000	.20

Far Field = 0 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 133.8 deg
EXHIBIT
Proximity Effect and
8, 15
Inverse Distance Field
0.3 mV/m at 1 km
MILLIVOLTS PER METER
K&E

Radial at Azimuth 133.8 Degrees

Measured March 13, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	1.64	42.0
2	2.40	21.0
3	2.54	18.0
4	2.60	15.0
5	3.45	13.0

:name CFTRN

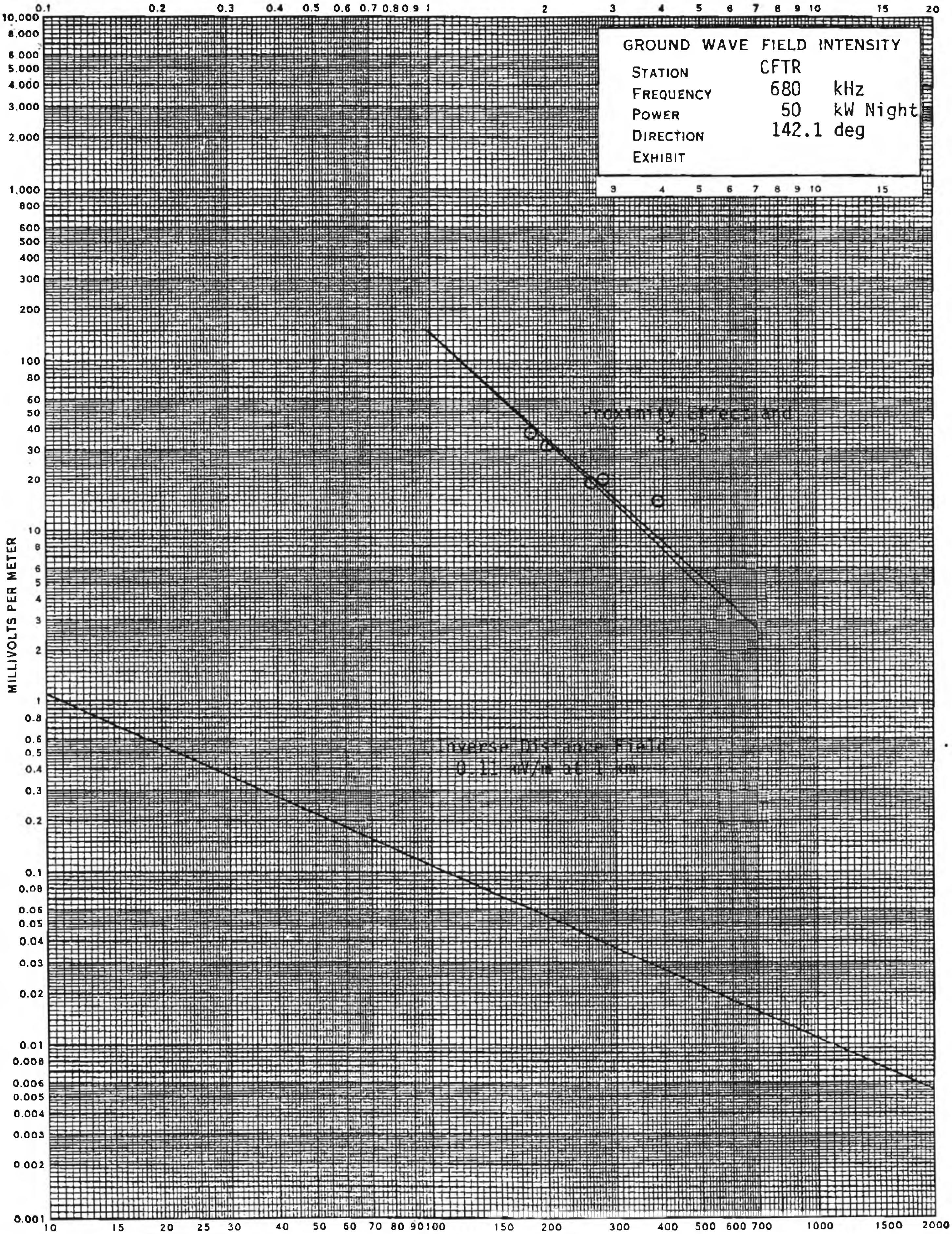
Proximity Effect Radial @ 142.1 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	23556.60
.126	21815.74
.158	18097.03
.200	16164.02
.251	43317.92
.316	6604.65
.398	2958.49
.501	865.07
.631	223.64
.794	78.13
1.000	42.01
1.259	25.98
1.585	16.29
1.995	10.19
2.512	6.36
3.162	3.97
3.981	2.48
5.012	1.55
6.310	.97
7.943	.61
10.000	.38

Far Field = 0 mV/m at 1 km.

Kilometres from Antenna



K&E

Radial at Azimuth 162.4 Degrees

Measured March 22, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.60	520
2	0.88	200
3	1.20	94
4	1.70	39
5	2.30	25
6	2.70	19
7	3.15	10
8	4.10	10
9	5.30	6.0
10	7.70	3.5
11	10.2	4.2
12	11.5	2.1
13	14.3	1.85
14	16.4	2.0
15	18.8	1.6
16	20.2	1.56
17	21.7	1.65
18	23.1	1.2
19	24.8	0.66
20	25.4	0.66
21	27.3	1.0
22	28.6	0.5
23	31.2	0.9
24	32.1	0.8
25	34.2	0.46
26	37.0	0.29
27	38.4	0.68
28	40.3	0.27

Radial ends at Lake Erie shoreline.

Image CFTRN

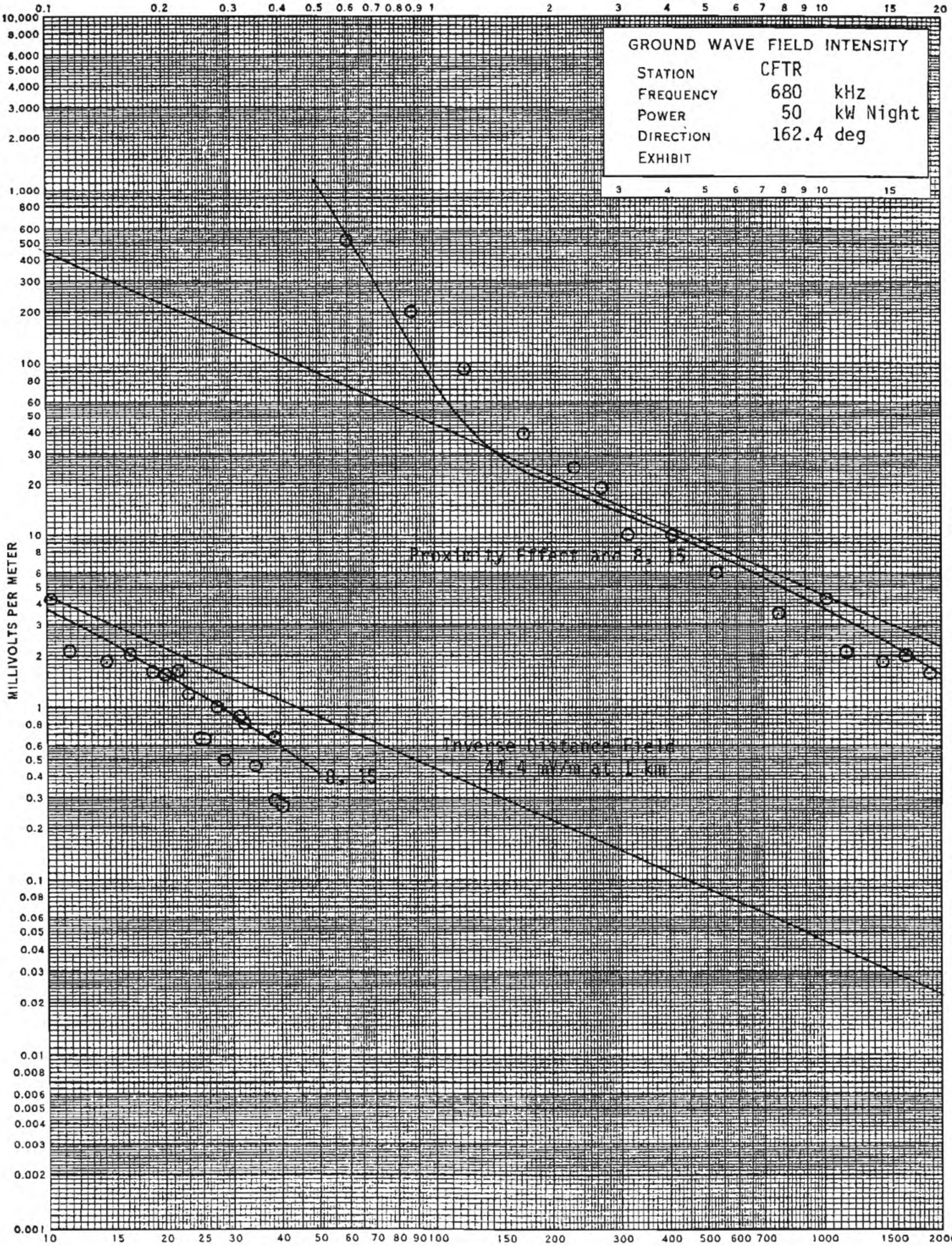
Proximity Effect Radial @ 162.4 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	15161.45
.126	13051.99
.158	11069.57
.200	8053.52
.251	5106.42
.316	3166.51
.398	2050.25
.501	1083.73
.631	474.56
.794	192.98
1.000	80.58
1.259	40.30
1.585	26.93
1.995	21.11
2.512	17.11
3.162	13.83
3.981	11.11
5.012	8.88
6.310	7.08
7.943	5.63
10.000	4.47

Far Field = 44.4 mV/m at 1 km.

Kilometres from Antenna



Kilometres from Antenna

K&E

Radial at Azimuth 173.1 Degrees

Measured March 14, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.55	840
2	1.70	74.0
3	1.85	49.0
4	3.00	37.0

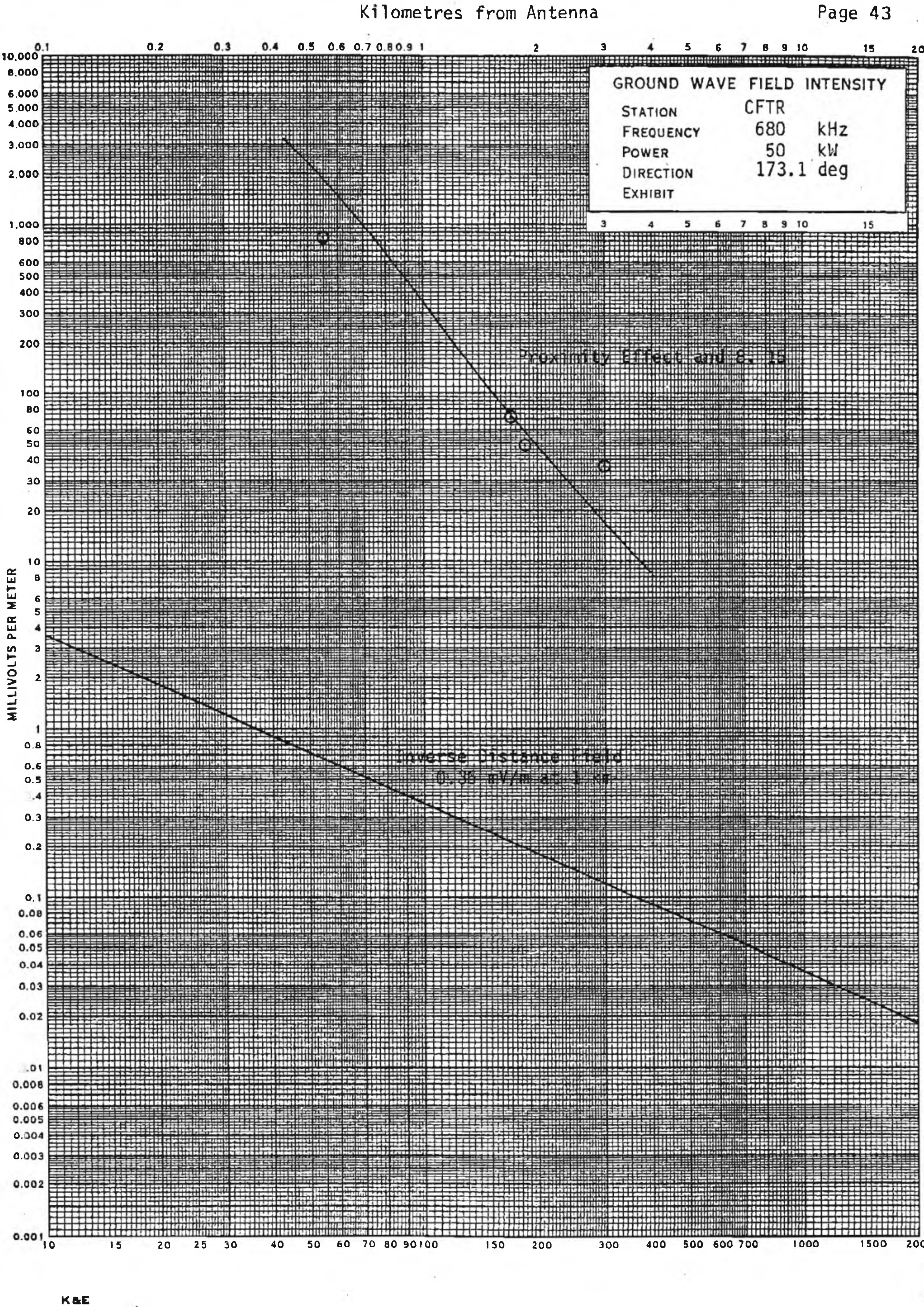
name CFTRN

Proximity Effect Radial @ 173.1 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	14545.29
.126	12276.41
.158	8546.27
.200	6389.19
.251	4303.27
.316	2781.12
.398	1867.55
.501	1165.10
.631	648.85
.794	337.99
1.000	172.74
1.259	89.08
1.585	46.97
1.995	25.43
2.512	14.14
3.162	8.06
3.981	4.69
5.012	2.78
6.310	1.67
7.943	1.01
10.000	.62

Far Field = .2 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW
DIRECTION 173.1 deg
EXHIBIT
MILLIVOLTS PER METER
Proximity Effect and 8. 15
Inverse Distance Field
0.36 mV/m at 1 km
K&E

Radial at Azimuth 194.4 Degrees

Measured March 14, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.50	800
2	0.59	660
3	0.73	570
4	0.94	460
5	1.10	340
6	2.85	130
7	4.40	84
8	6.35	44.0
9	8.42	28.0
10	9.65	23.0
11	11.7	22.0
12	13.5	17.9
13	14.9	14.0
14	16.2	11.1
15	17.7	10.0
16	19.0	8.2
17	20.7	8.1
18	24.5	6.2
19	25.6	6.5
20	27.4	5.0
21	29.4	5.0
22	32.7	4.0
23	35.3	4.4
24	37.7	4.3
25	39.2	3.55
26	41.1	3.2

Radial ends at Lake Erie shoreline.

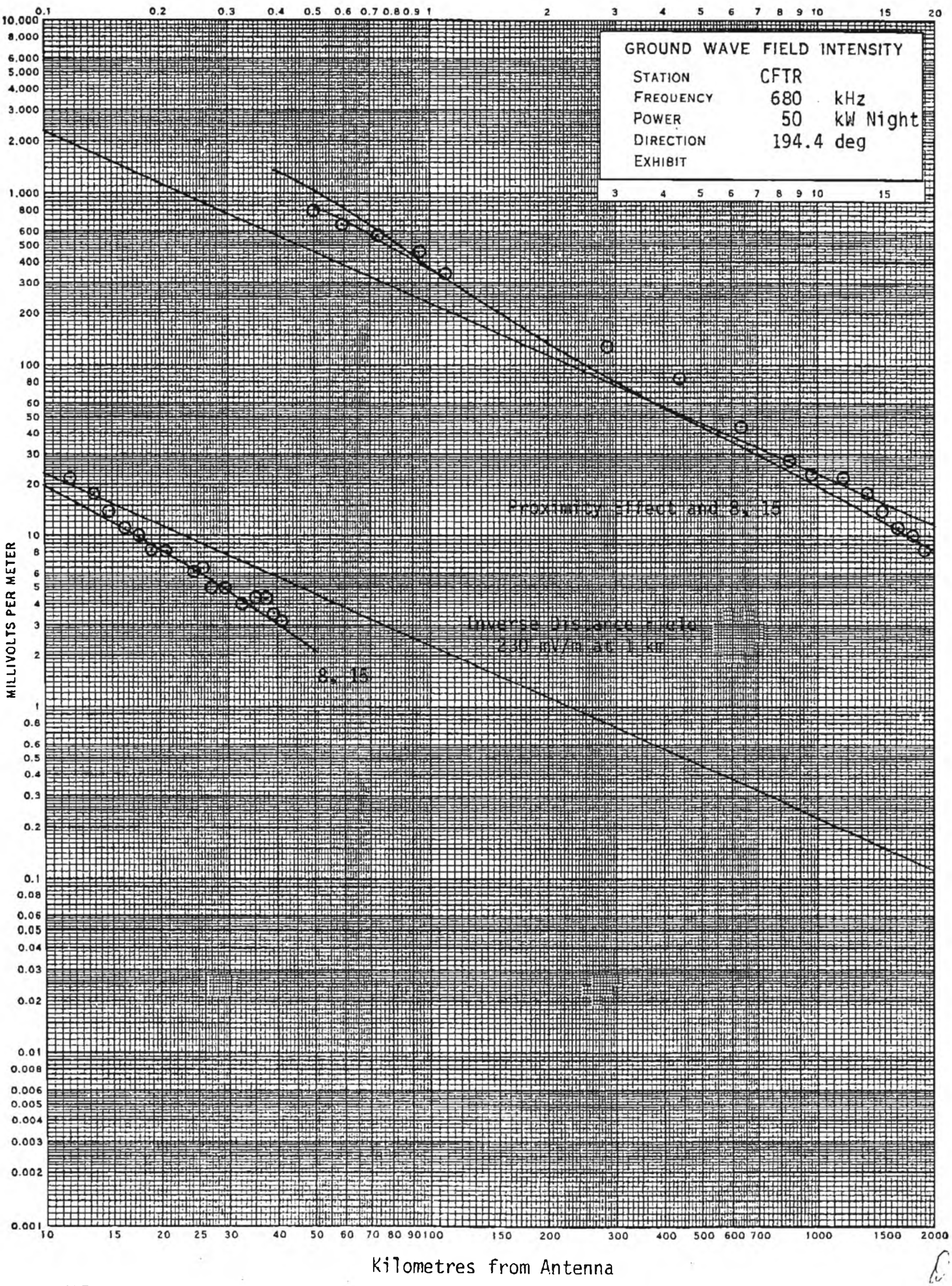
name CFTRN

Proximity Effect Radial @ 194.4 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	81043.45
.126	51402.05
.158	10152.87
.200	3379.12
.251	2170.18
.316	1734.50
.398	1370.76
.501	1050.29
.631	769.90
.794	544.55
1.000	380.01
1.259	267.10
1.585	191.44
1.995	140.45
2.512	105.26
3.162	80.25
3.981	61.95
5.012	48.24
6.310	37.80
7.943	29.74
10.000	23.46

Far Field = 230 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 194.4 deg
EXHIBIT
MILLIVOLTS PER METER
Proximity effect and 8, 15
Inverse Distance Field
230 mV/m at 1 km
8, 15
Kilometres from Antenna
K&E

Radial at Azimuth 211.9 Degrees

Measured March 13, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.48	365
2	0.75	107
3	1.32	100
4	1.76	71.0
5	2.30	78.0

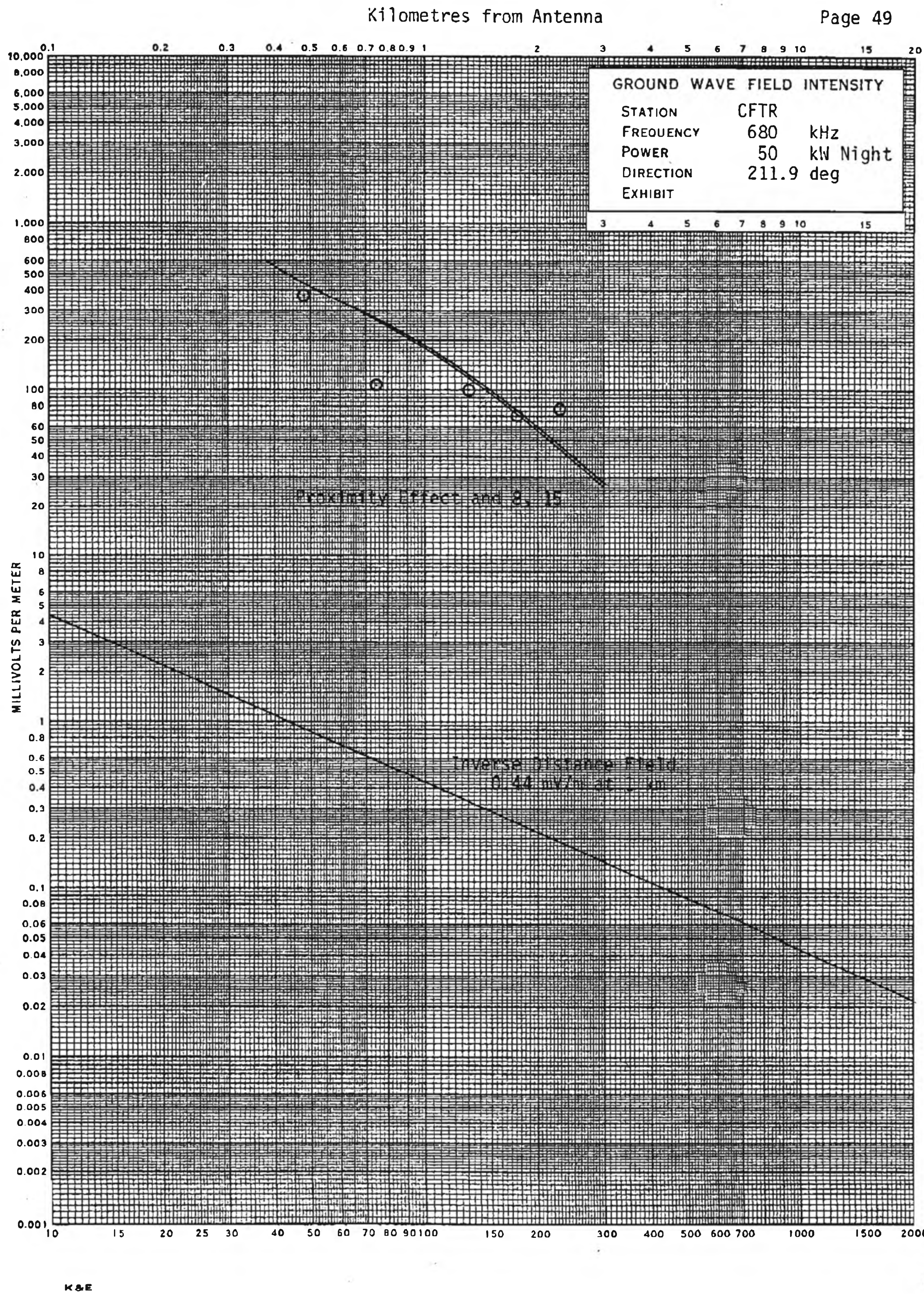
:name CFTRN

Proximity Effect Radial @ 211.9 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	13872.54
.126	11421.61
.158	5516.81
.200	2598.74
.251	1503.77
.316	938.41
.398	617.87
.501	459.84
.631	365.72
.794	284.28
1.000	210.12
1.259	148.39
1.585	101.27
1.995	67.48
2.512	44.23
3.162	28.67
3.981	18.45
5.012	11.81
6.310	7.53
7.943	4.79
10.000	3.05

Far Field = .5 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 211.9 deg
EXHIBIT
MILLIVOLTS PER METER
Proximity Effect and 8.15
Inverse Distance Field
0.44 mV/m at 1 km
K&E

Radial at Azimuth 247.0 Degrees

Measured March 29, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.68	275
2	0.74	248
3	1.26	243
4	2.13	139
5	2.85	107
6	3.88	68.0
7	5.50	54.0
8	6.10	49.0
9	8.55	34.2
10	9.55	33.0
11	10.2	25.0
12	10.7	26.0
13	11.7	21.0
14	13.0	20.3
15	16.2	16.4
16	18.5	10.0
17	19.5	14.0
18	20.9	13.2
19	23.0	11.8
20	25.1	11.2
21	27.1	10.1
22	29.8	8.7
23	31.4	7.4
24	34.8	7.0
25	37.8	5.55
26	42.5	4.8
27	46.2	3.6
28	51.0	3.1
29	55.4	3.3
30	59.0	2.6

Radial at Azimuth 247.0 Degrees (cont'd)

Measured March 29, 1985

Point #	Distance (km)	Field Strength (mV/m)
31	66.5	2.07
32	74.0	1.55
33	85.0	1.23
34	92.5	0.92
35	98.5	0.95
36	102.5	0.74
37	109.0	0.72
38	118	0.51
39	127	0.47
40	139	0.34
41	150	0.25
42	157	0.29
43	174	0.21
44	182	0.215
45	192	0.16

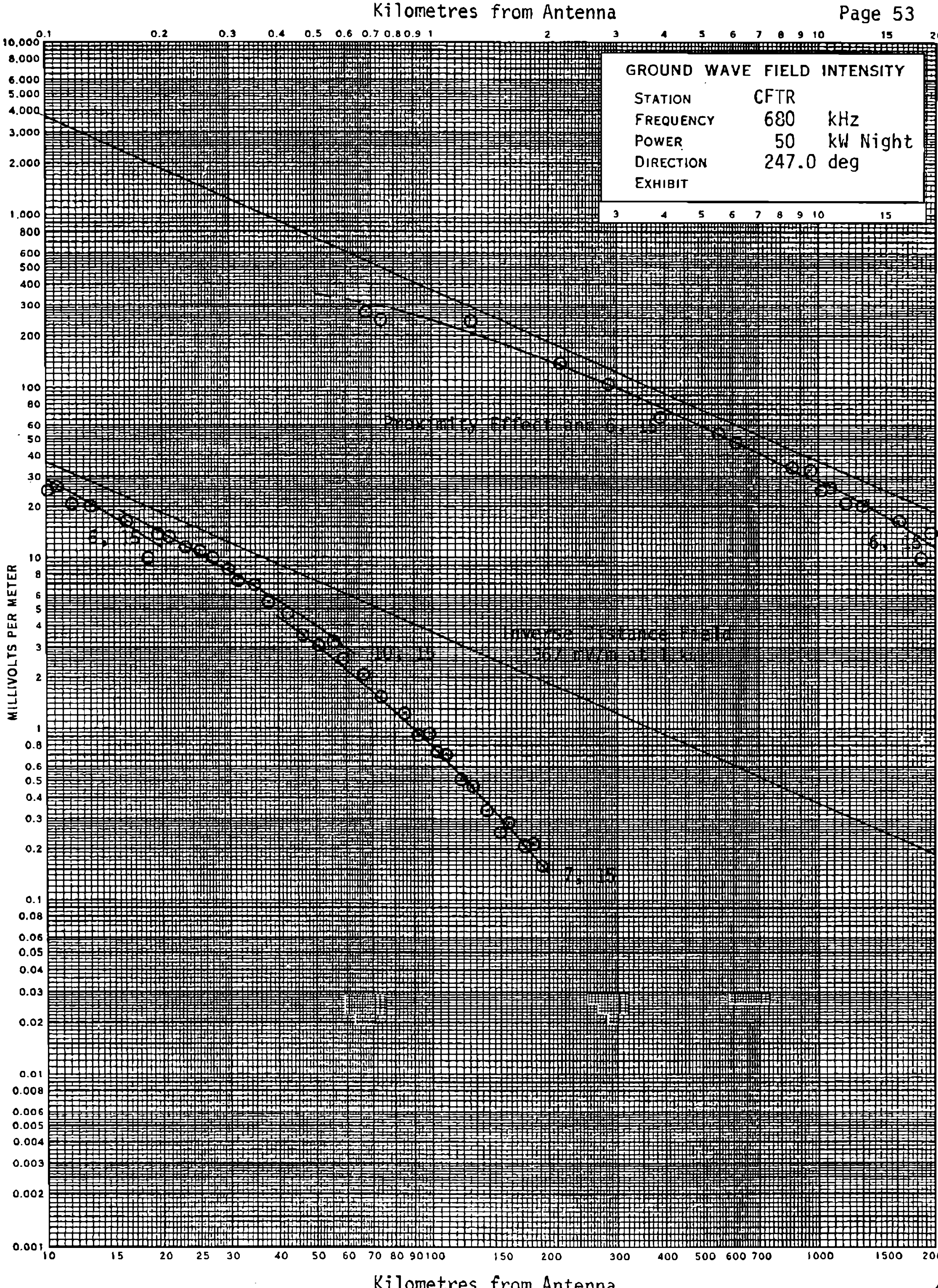
name CFTRNP

Proximity Effect Radial @ 247 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	14143.22
.126	10478.69
.158	6333.69
.200	4674.11
.251	1995.56
.316	362.20
.398	297.28
.501	356.70
.631	337.83
.794	298.51
1.000	257.26
1.259	218.71
1.585	183.92
1.995	153.12
2.512	126.34
3.162	103.45
3.981	84.18
5.012	68.14
6.310	54.94
7.943	44.16
10.000	35.40

Far Field = 366.5 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 247.0 deg
EXHIBIT
MILLIVOLTS PER METER
Proximity Effect and 6, 15
6, 15
6, 15
20, 15
7, 15
Inverse Distance Field
Kilometres from Antenna

Radial at Azimuth 265.8 Degrees

Measured March 13, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	1.00	30.0
2	1.30	20.0
3	2.40	9.8
4	3.20	6.2
5	4.14	5.0
6	5.94	3.4

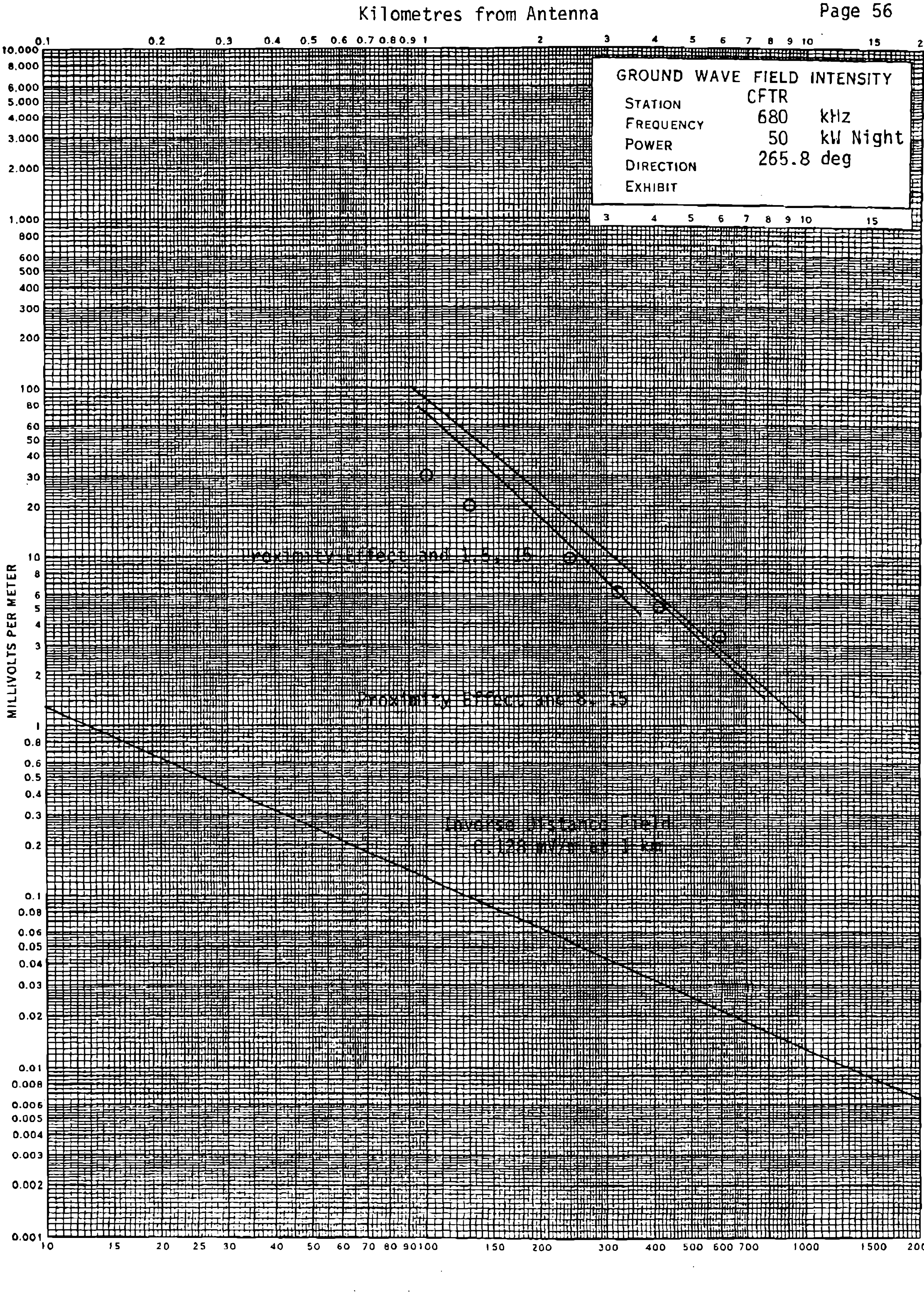
ename CFTRN

Proximity Effect Radial @ 265.8 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	17034.98
.126	13542.85
.158	8275.65
.200	13326.58
.251	2443.27
.316	713.23
.398	607.01
.501	449.16
.631	309.75
.794	207.41
1.000	136.84
1.259	89.45
1.585	58.08
1.995	37.51
2.512	24.12
3.162	15.45
3.981	9.86
5.012	6.28
6.310	3.99
7.943	2.53
10.000	1.60

Far Field = .2 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 265.8 deg
EXHIBIT
MILLIVOLTS PER METER
Inverse Distance Field
K&E

Radial at Azimuth 298.0 Degrees

Measured March 25 and 26, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	0.93	249
2	1.30	136
3	1.80	98
4	2.23	72
5	2.60	60
6	16.0	5.5
7	20.9	5.6
8	21.4	5.0
9	21.7	5.0
10	22.1	6.2
11	23.1	5.4
12	23.7	5.5
13	25.5	4.4
14	26.1	3.2
15	26.4	3.3
16	27.4	4.1
17	29.3	2.7
18	31.1	3.45
19	33.0	2.0
20	36.3	1.58
21	38.7	1.5
22	41.5	2.05
23	44.6	1.33
24	46.7	1.2
25	49.1	1.15
26	52.3	1.0
27	55.4	0.74
28	58.5	0.68
29	61.2	0.8
30	64.1	0.51

Radial at Azimuth 298.0 Degrees (cont'd)

Measured March 25 and 26, 1985

Point #	Distance (km)	Field Strength (mV/m)
31	65.5	0.66
32	73.3	0.41
33	76.7	0.38
34	82.0	0.47
35	87.0	0.4
36	91.0	0.38
37	98.5	0.33
38	104	0.27
39	111	0.235

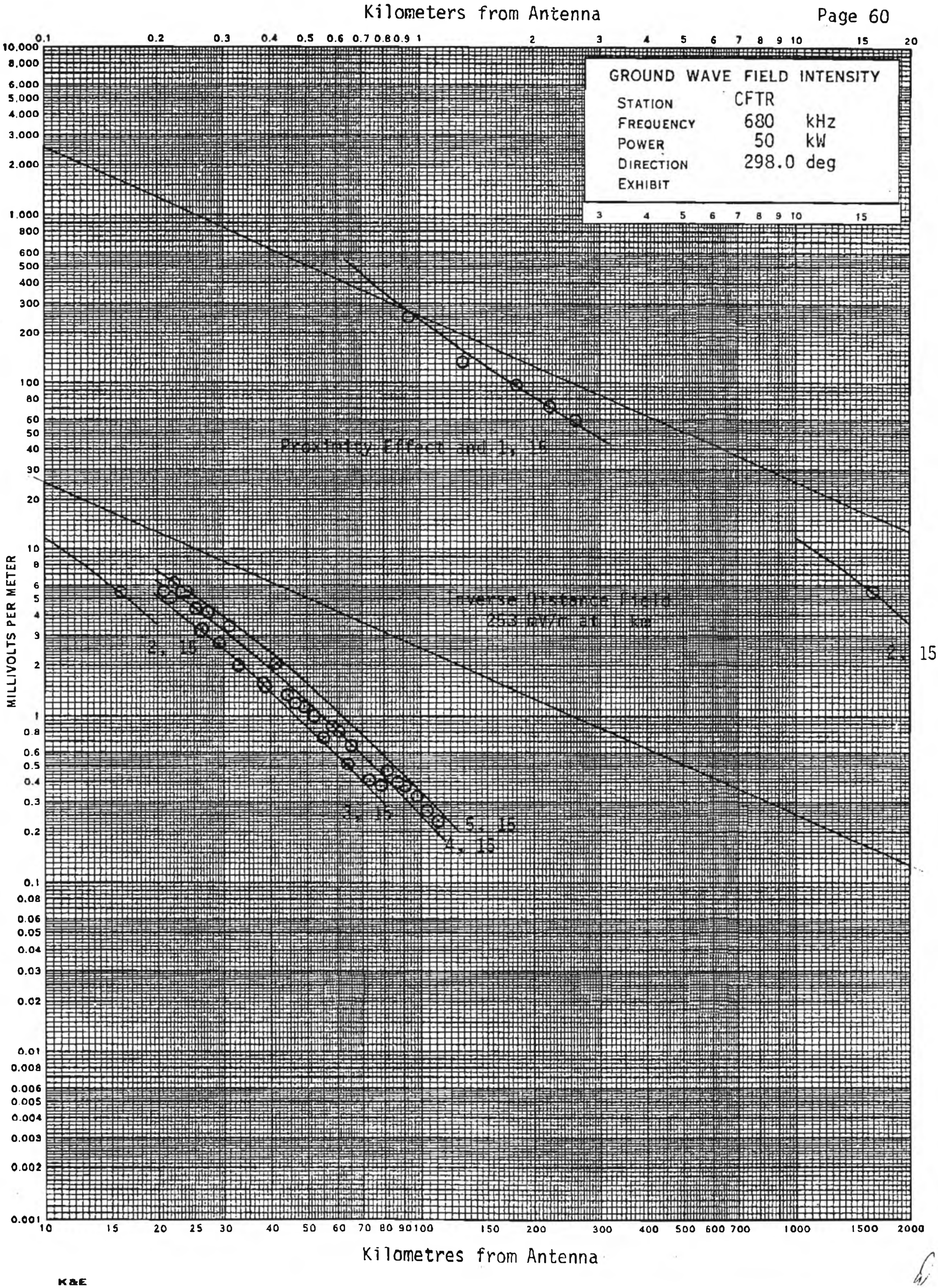
name CFTRN

Proximity Effect Radial @ 298 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	19668.98
.126	18061.46
.158	18784.05
.200	21921.01
.251	7296.73
.316	3478.12
.398	1891.78
.501	1116.93
.631	704.63
.794	469.59
1.000	327.40
1.259	236.79
1.585	176.28
1.995	134.13
2.512	103.66
3.162	80.98
3.981	63.71
5.012	50.34
6.310	39.89
7.943	31.66
10.000	25.15

Far Field = 253 mV/m at 1 km.


Kilometers from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW
DIRECTION 298.0 deg
EXHIBIT
Proximity Effect and 1, 15
Inverse Distance Field
253 mV/m at 1 km
2, 15
3, 15
4, 15
5, 15
2, 15
MILLIVOLTS PER METER
Kilometres from Antenna
K&E

Radial at Azimuth 319.2 Degrees

Measured March 27, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	1.10	220
2	1.45	140

Radial ends at Lake Ontario shoreline.

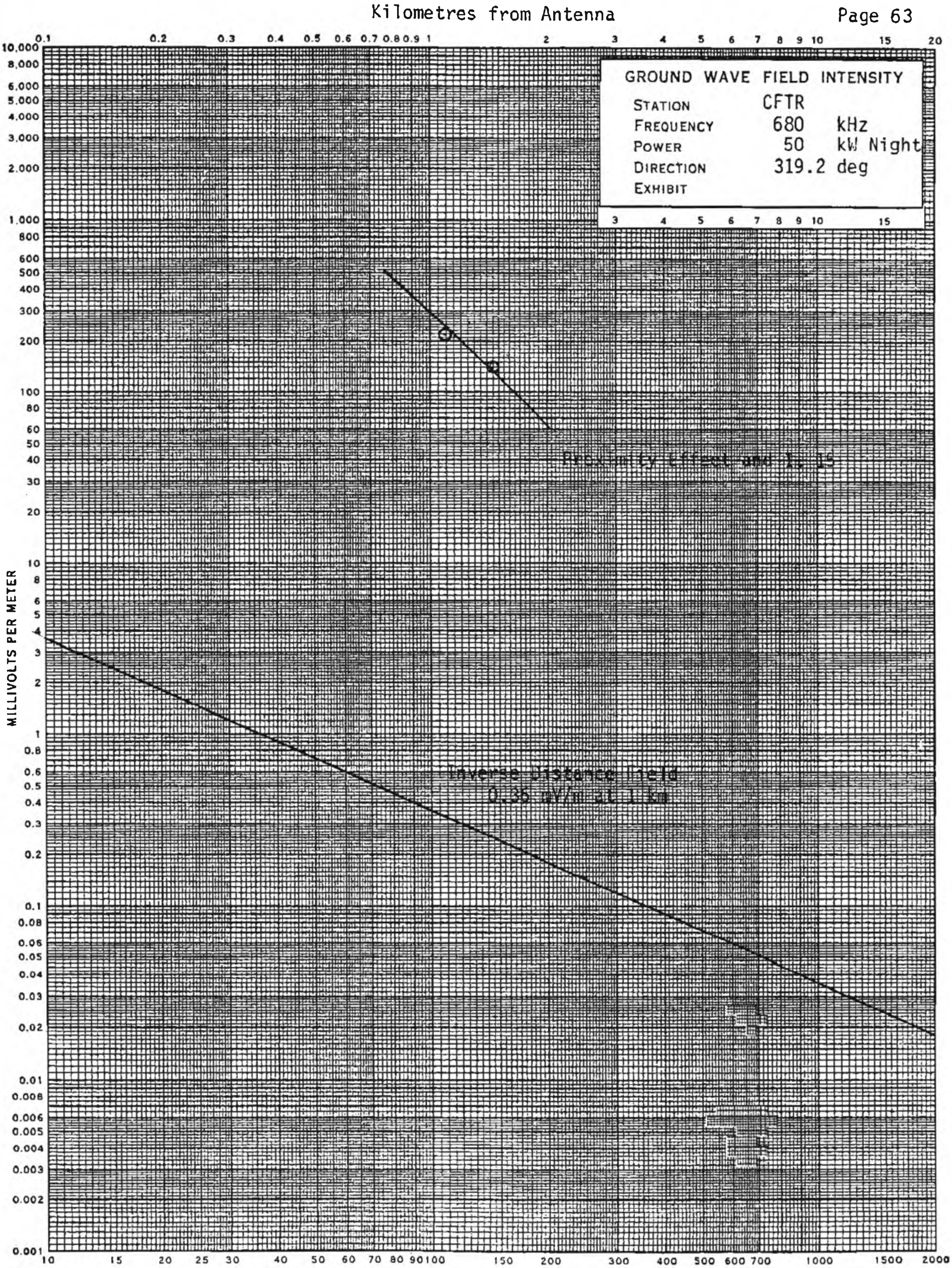
ename CFTRN

Proximity Effect Radial @ 319.2 Degrees

Reference Tower is # 6

Distance (km.)	Field (mV/m)
.100	18962.41
.126	16659.68
.158	13635.54
.200	9861.92
.251	6385.06
.316	3981.72
.398	2482.09
.501	1558.45
.631	986.12
.794	627.96
1.000	401.62
1.259	257.43
1.585	165.10
1.995	105.83
2.512	67.74
3.162	43.29
3.981	27.62
5.012	17.59
6.310	11.19
7.943	7.10
10.000	4.51

Far Field = .4 mV/m at 1 km.


Kilometres from Antenna
GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 319.2 deg
EXHIBIT
MILLIVOLTS PER METER
Proximity Effect and
Inverse Distance Field
0.36 mV/m at 1 km
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1 2 3 4 5 6 7 8 9 10 15 20
10,000 8,000 6,000 5,000 4,000 3,000 2,000 1,000 800 600 500 400 300 200 100 80 60 50 40 30 20 10 8 6 5 4 3 2 1 0.8 0.6 0.5 0.4 0.3 0.2 0.1 0.08 0.06 0.05 0.04 0.03 0.02 0.01 0.008 0.006 0.005 0.004 0.003 0.002 0.001
10 15 20 25 30 40 50 60 70 80 90 100 150 200 300 400 500 600 700 1000 1500 2000

K&E

Radial at Azimuth 341.0 Degrees

Measured March 27, 1985

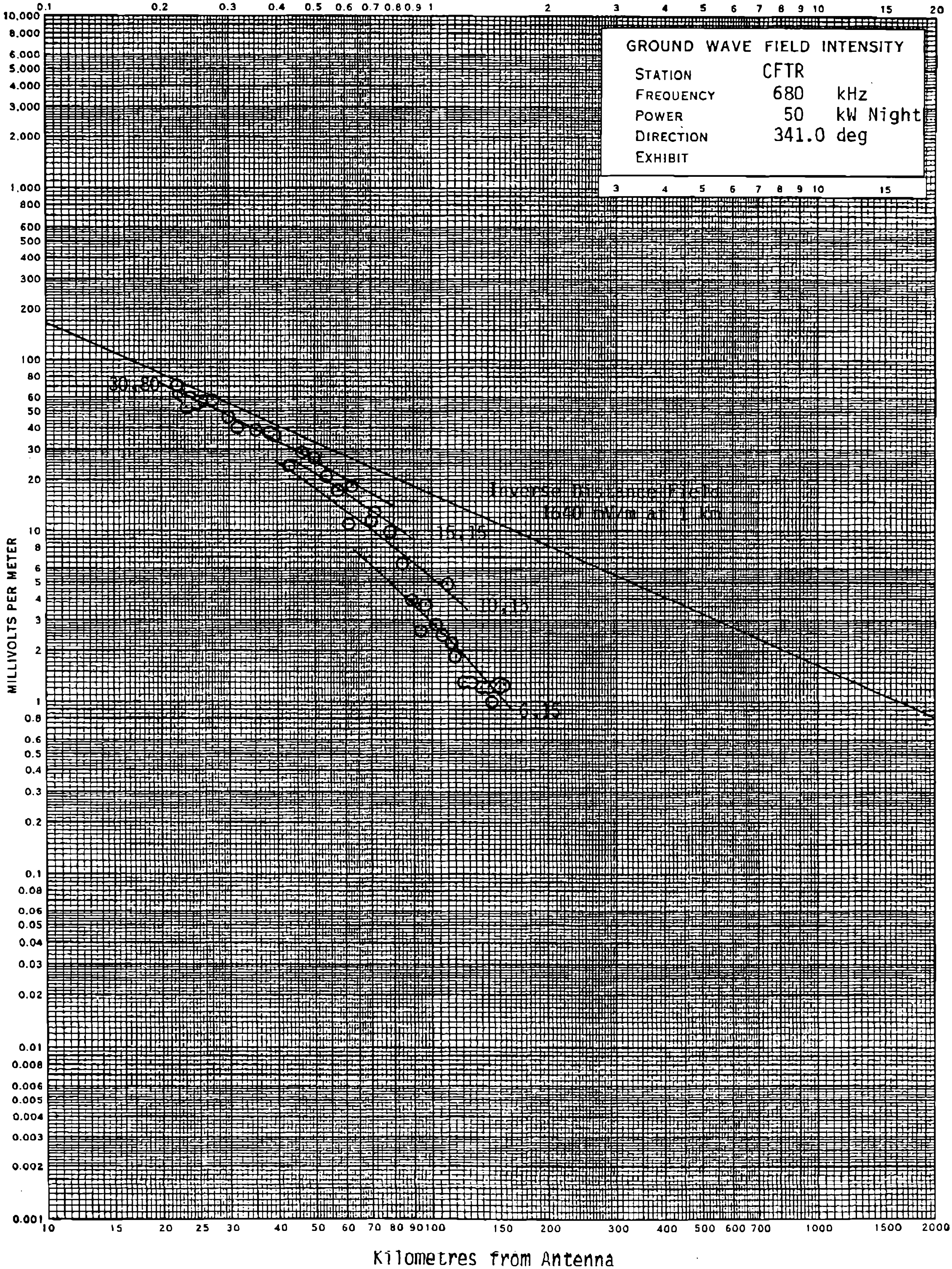
Point #	Distance (km)	Field Strength (mV/m)
1	22.0	72.0
2	22.4	64.0
3	22.5	62.0
4	23.2	53.0
5	23.7	61.0
6	24.4	58.0
7	24.8	57.0
8	25.7	58.0
9	27.2	58.0
10	29.9	47.0
11	31.7	40.0
12	35.3	39.0
13	38.3	38.0
14	39.4	36.5
15	43.0	24.0
16	46.5	29.0
17	50.1	27.0
18	53.8	21.0
19	57.4	17.2
20	61.5	11.0
21	62.5	18.5
22	66.0	15.3
23	70.0	11.5
24	71.5	13.0
25	78.3	10.0
26	84.2	6.5
27	89.5	3.9
28	94.0	2.65
29	96.3	3.75
30	102	2.83

Radial at Azimuth 341.0 Degrees (cont'd)

Measured March 27, 1985

Point #	Distance (km)	Field Strength (mV/m)
31	106	2.47
32	112	2.22
33	115	1.87
34	121	1.32
35	127	1.30
36	134.5	1.23
37	140	1.25
38	143.5	1.00
39	145.2	1.29
40	146.6	1.32
41	149.5	1.23
42	154.0	1.28

Radial ends at Georgian Bay shoreline.


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 341.0 deg
EXHIBIT
30,30
15,15
10,15
6,15
Inverse Distance Field
1640 mV/m at 1 km
MILLIVOLTS PER METER
Kilometres from Antenna

K&E

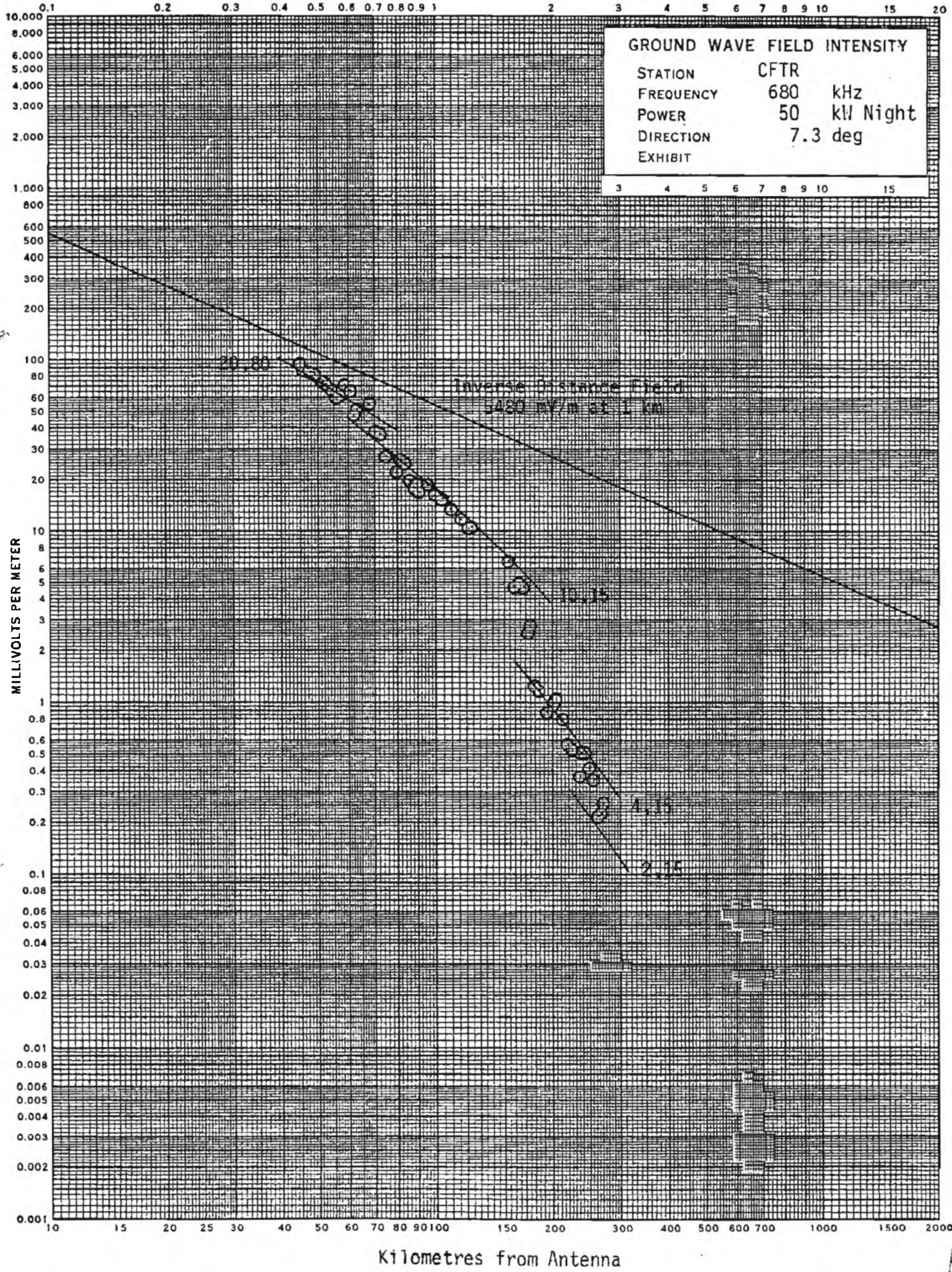
Radial at Azimuth 7.3 Degrees

Measured May 22 - 23, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	41.0	84
2	41.4	93
3	41.7	80
4	42.5	95
5	43.5	85
6	45.0	97
7	45.8	88
8	47.9	85
9	49.2	82
10	51.7	74
11	52.8	72
12	54.5	67
13	56.0	60
14	57.2	62
15	58.9	72
16	60.8	66
17	62.2	48
18	63.3	51
19	68.2	55
20	70.5	38
21	72.8	37
22	75.0	27
23	79.5	22
24	81.3	26
25	84.0	25.9
26	86.2	20.0
27	88.3	18.0
28	89.6	19.0
29	90.8	17.0
30	95.7	18.8

Radial at Azimuth 7.3 Degrees (cont'd)

Point #	Distance (km)	Field Strength (mV/m)
31	100	16.2
32	104	15.5
33	109	13.5
34	116	11.6
35	121	10.2
36	124	10.5
37	154	6.6
38	159	4.7
39	164	5.0
40	168	4.7
41	171	2.5
42	175	2.8
43	180	1.25
44	185	1.19
45	193	0.88
46	200	0.98
47	205	1.05
48	213	0.80
49	219	0.57
50	225	0.54
51	236	0.37
52	238	0.51
53	244	0.52
54	250	0.42
55	257	0.355
56	264	0.22
57	268	0.228
58	272	0.26


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 7.3 deg
EXHIBIT
Inverse Distance Field
5480 mV/m at 1 km
20,80
10,15
4,15
2,15
MILLIVOLTS PER METER
Kilometres from Antenna

K&E

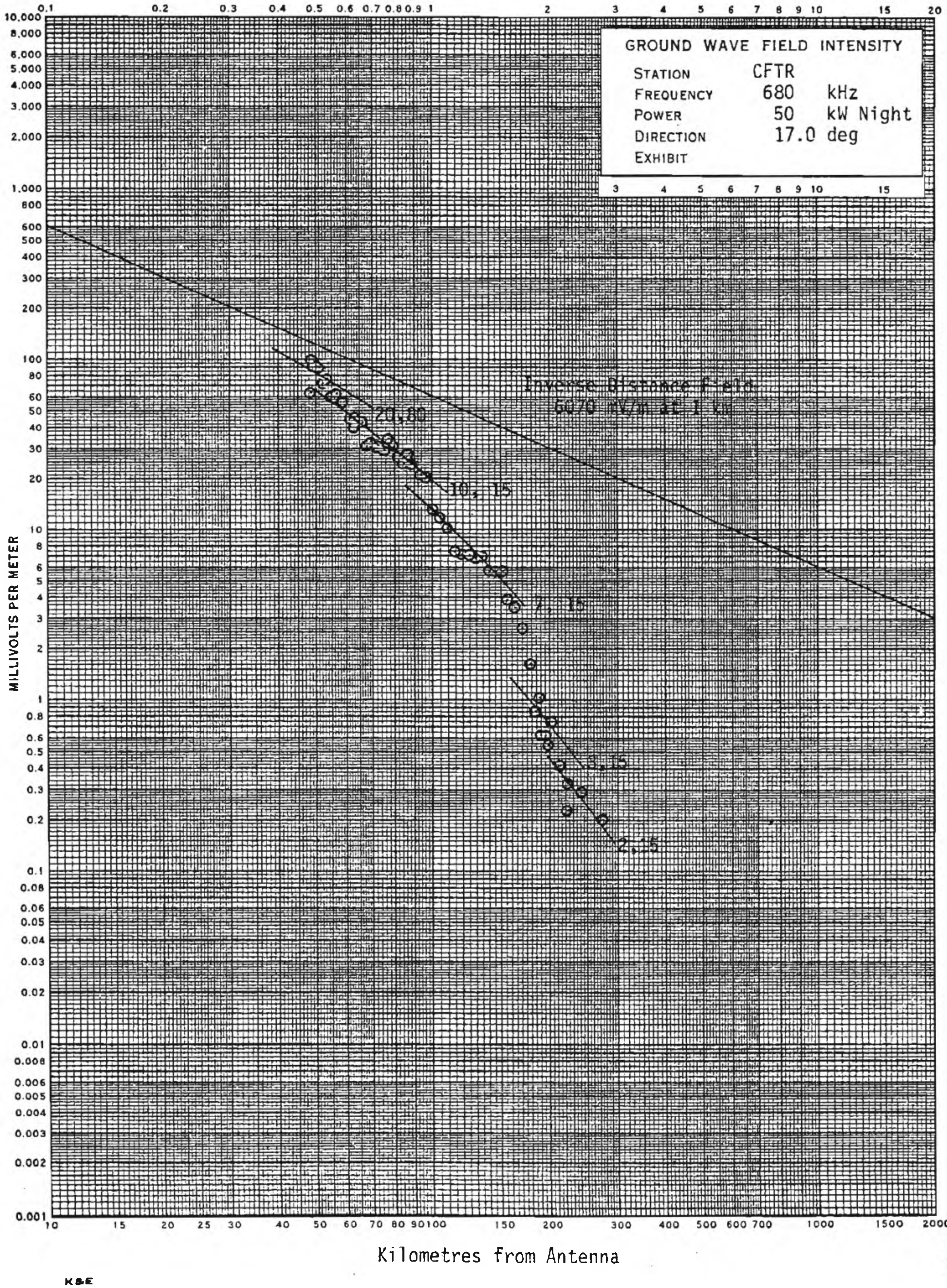
Radial at Azimuth 17.0 Degrees

Measured May 23 - 24, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	48.9	64
2	49.0	100
3	49.8	98
4	50.7	90
5	51.6	90
6	52.3	72
7	53.6	76
8	55.0	60
9	55.9	60
10	56.6	64
11	58.0	82
12	59.2	56
13	61.6	45
14	62.4	40
15	63.3	46
16	66.3*	43
17	68.0	31
18	69.5	33
19	72.5	31.5
20	75.6	29.5
21	77.7	34.5
22	80.0	31.0
23	82.5	27.0
24	84.8	24.8
25	87.4	28.0
26	89.8	24.3
27	94.0	21.2
28	97.0	20.3
29	101	13.1
30	105	11.9

Radial at Azimuth 17.0 Degrees (cont'd)

Point #	Distance (km)	Field Strength (mV/m)
31	110	10.2
32	115	7.5
33	120	7.2
34	125	7.2
35	130	6.9
36	135	7.0
37	141	5.8
38	146	5.7
39	152	5.8
40	156	3.9
41	163	3.5
42	171	2.65
43	179	1.62
44	184	0.86
45	188	1.03
46	190	0.63
47	196	0.63
48	198	0.55
49	202	0.75
50	213	0.42
51	223	0.33
52	243	0.29
53	275	0.20


GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 17.0 deg
EXHIBIT
Inverse Distance Field
6070 mV/m at 1 km
20,80
10, 15
7, 15
3,15
2,15
MILLIVOLTS PER METER
Kilometres from Antenna
K&E

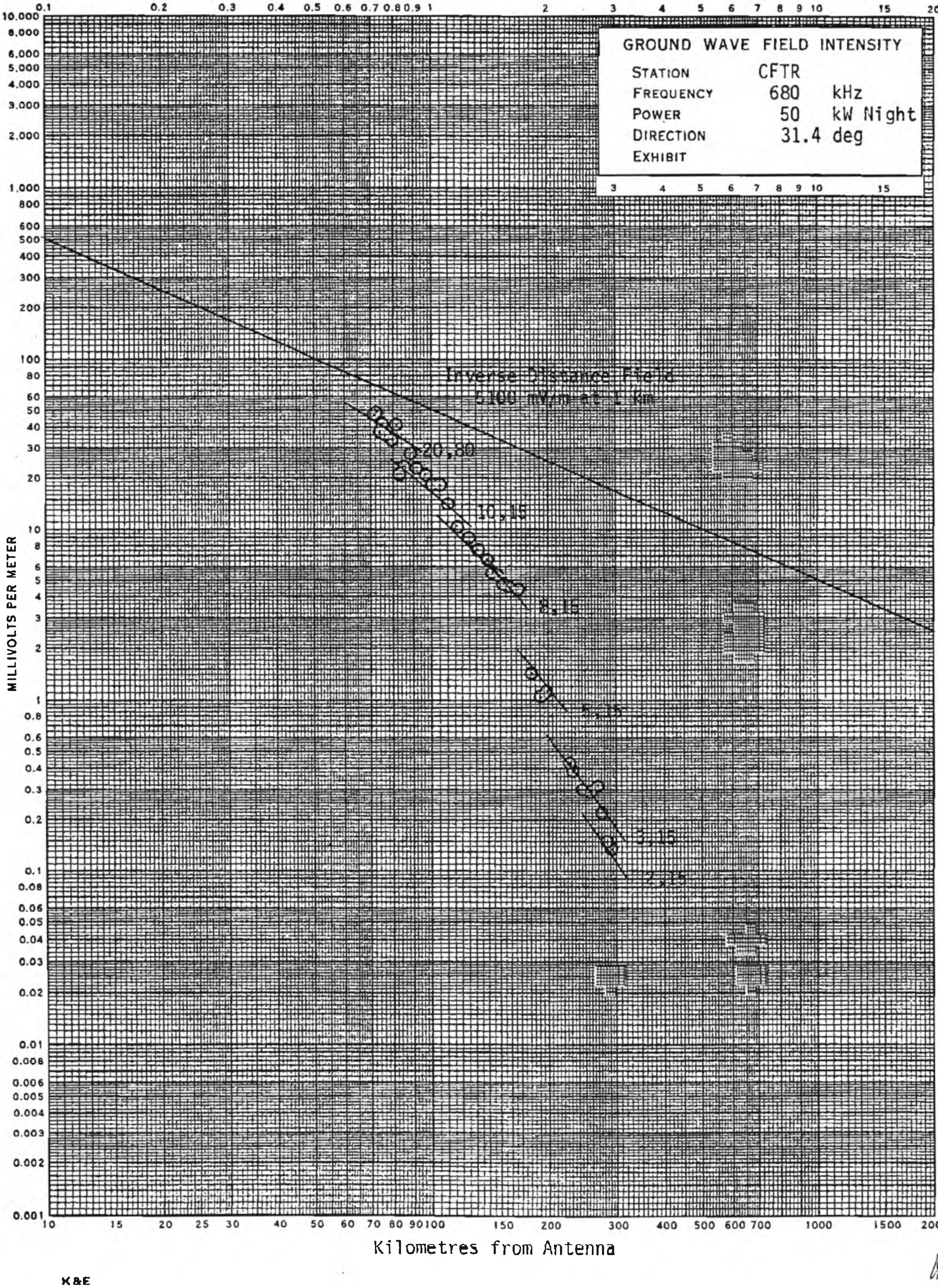
Radial at Azimuth 31.4 Degrees

Measured May 27 - 28, 1985

Point #	Distance (km)	Field Strength (mV/m)
1	71.5	47
2	72.2	49
3	73.6	37
4	75.4	42
5	76.3	36
6	79.1	34
7	81.7	41.5
8	82.9	21.0
9	85.0	23.4
10	88.5	28.0
11	91.6	23.0
12	96.3	21.0
13	100.5	18.4
14	105	18.3
15	110	14.0
16	116	10.5
17	124	9.0
18	131	7.6
19	139	6.7
20	143	5.5
21	148	5.35
22	154	4.8
23	159	4.6
24	167	4.5
25	182	1.42
26	191	1.06
27	198	1.13
28	228	0.43
29	233	0.38
30	246	0.30

Radial at Azimuth 31.4 Degrees (cont'd)

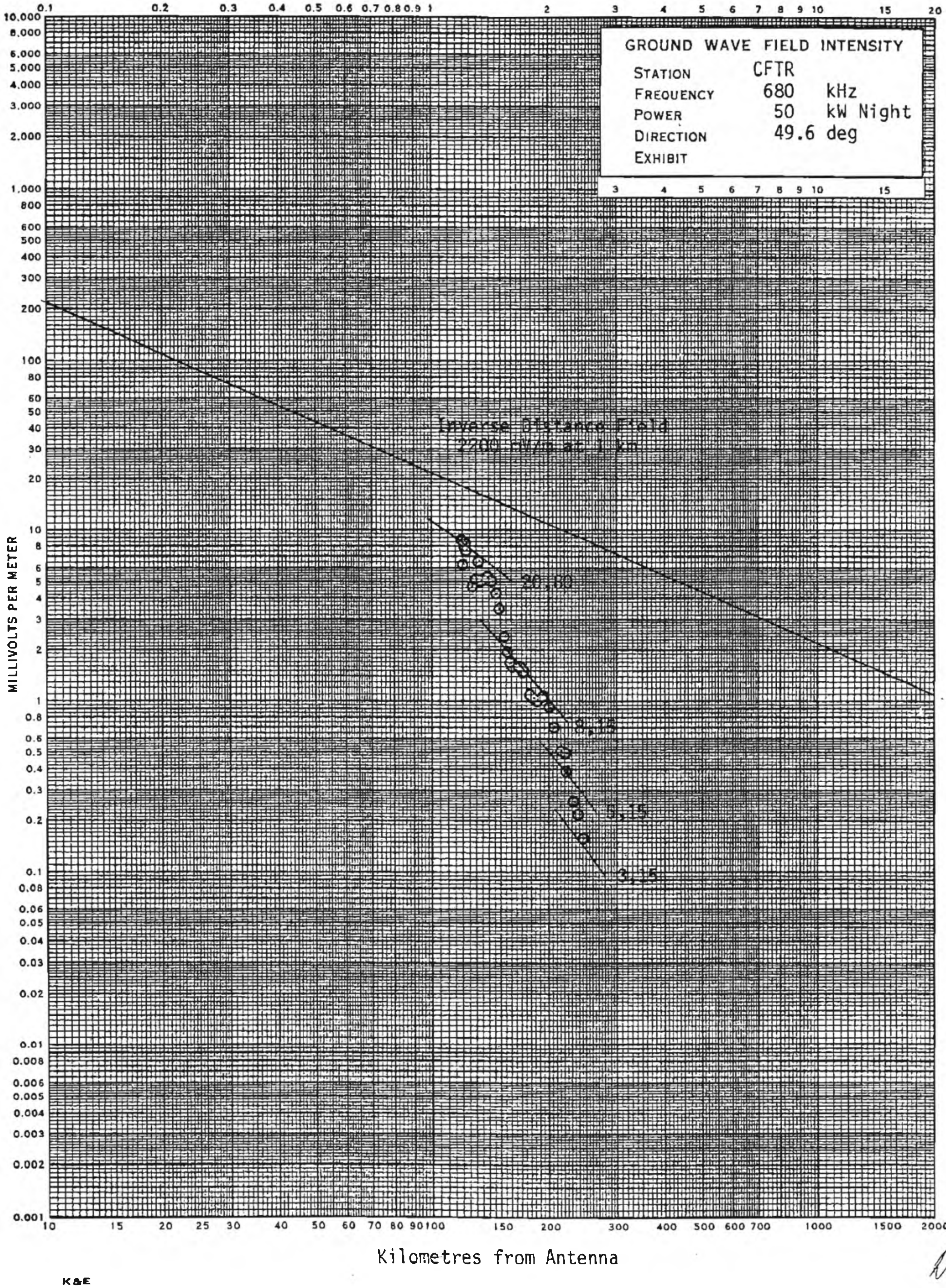
Point #	Distance (km)	Field Strength (mV/m)
31	257	0.295
32	268	0.32
33	276	0.22
34	285	0.15
35	293	0.135

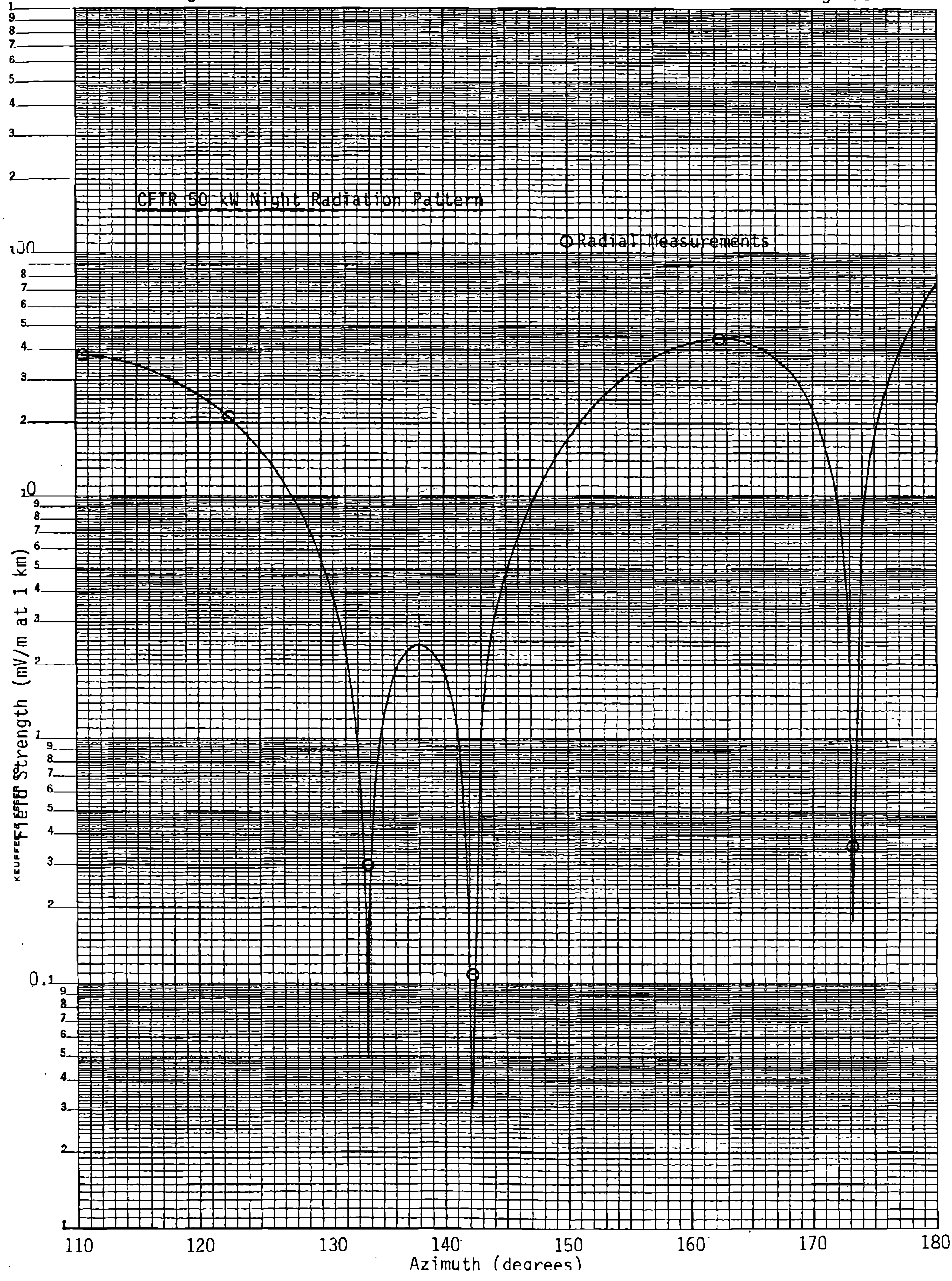

GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 31.4 deg
EXHIBIT
Inverse Distance Field
5100 mV/m at 1 km
20,80
10,15
8,15
5,15
3,15
2,15
MILLIVOLTS PER METER
Kilometres from Antenna
K&E

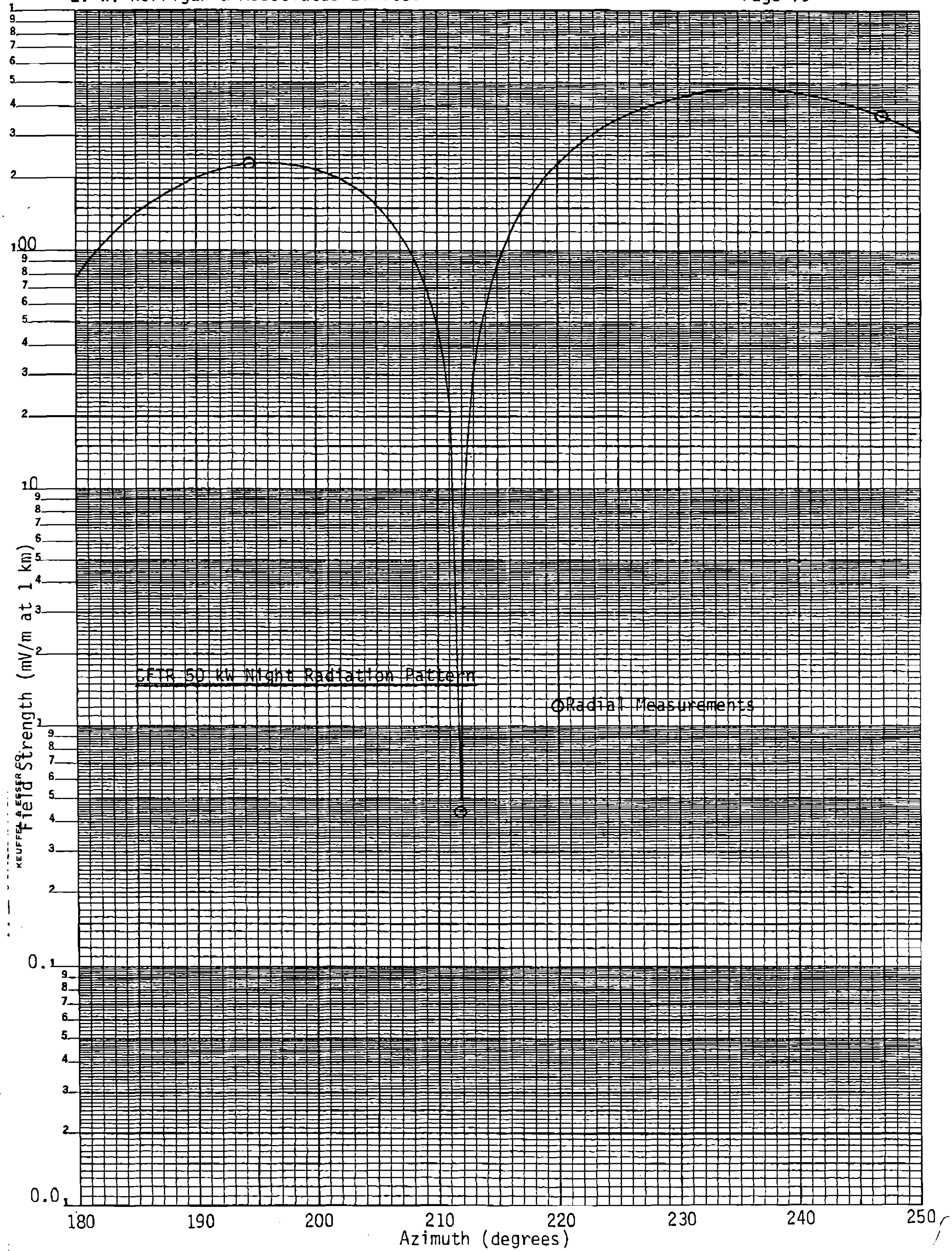
Radial at Azimuth 49.6 Degrees

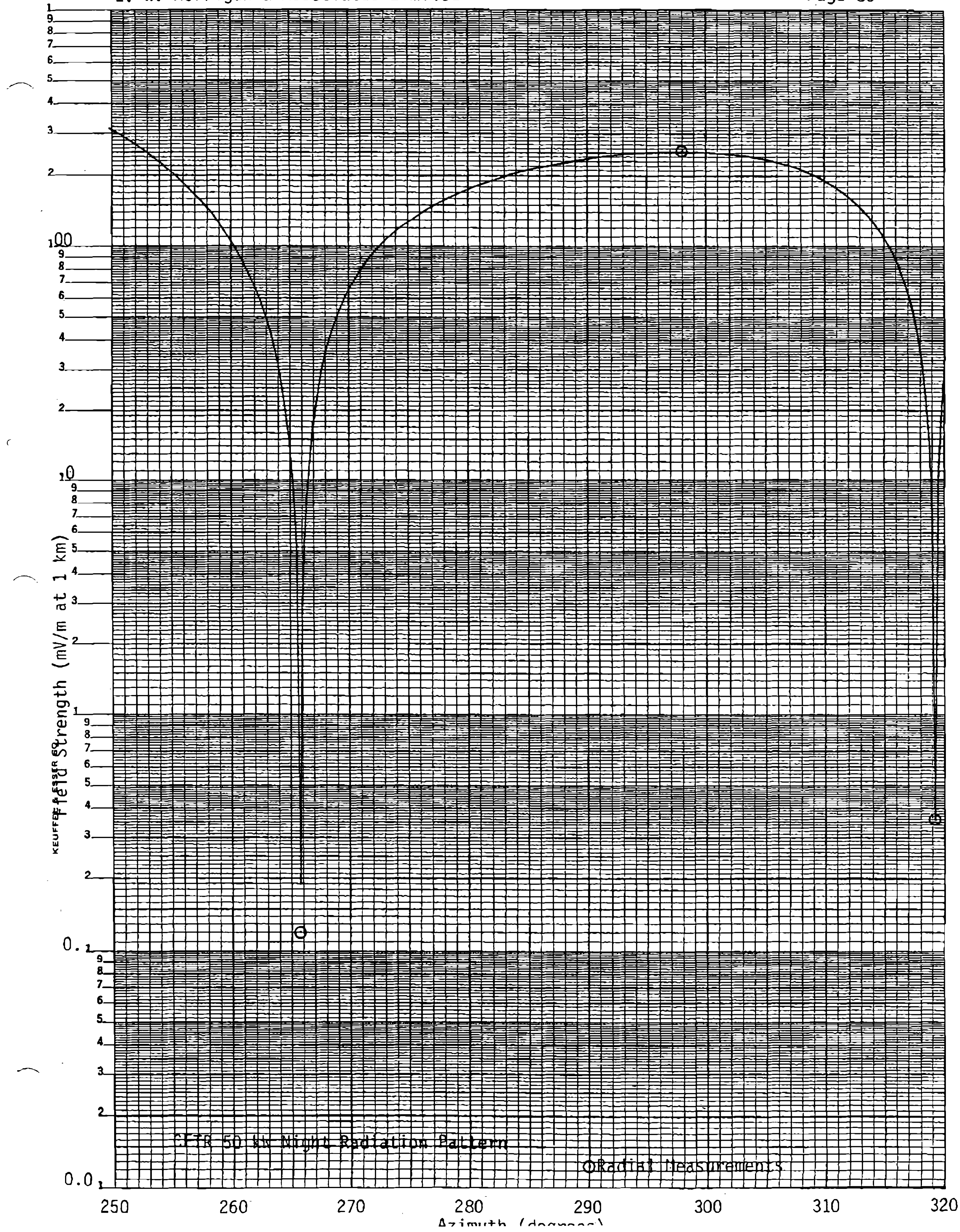
Measured May 24, 1985

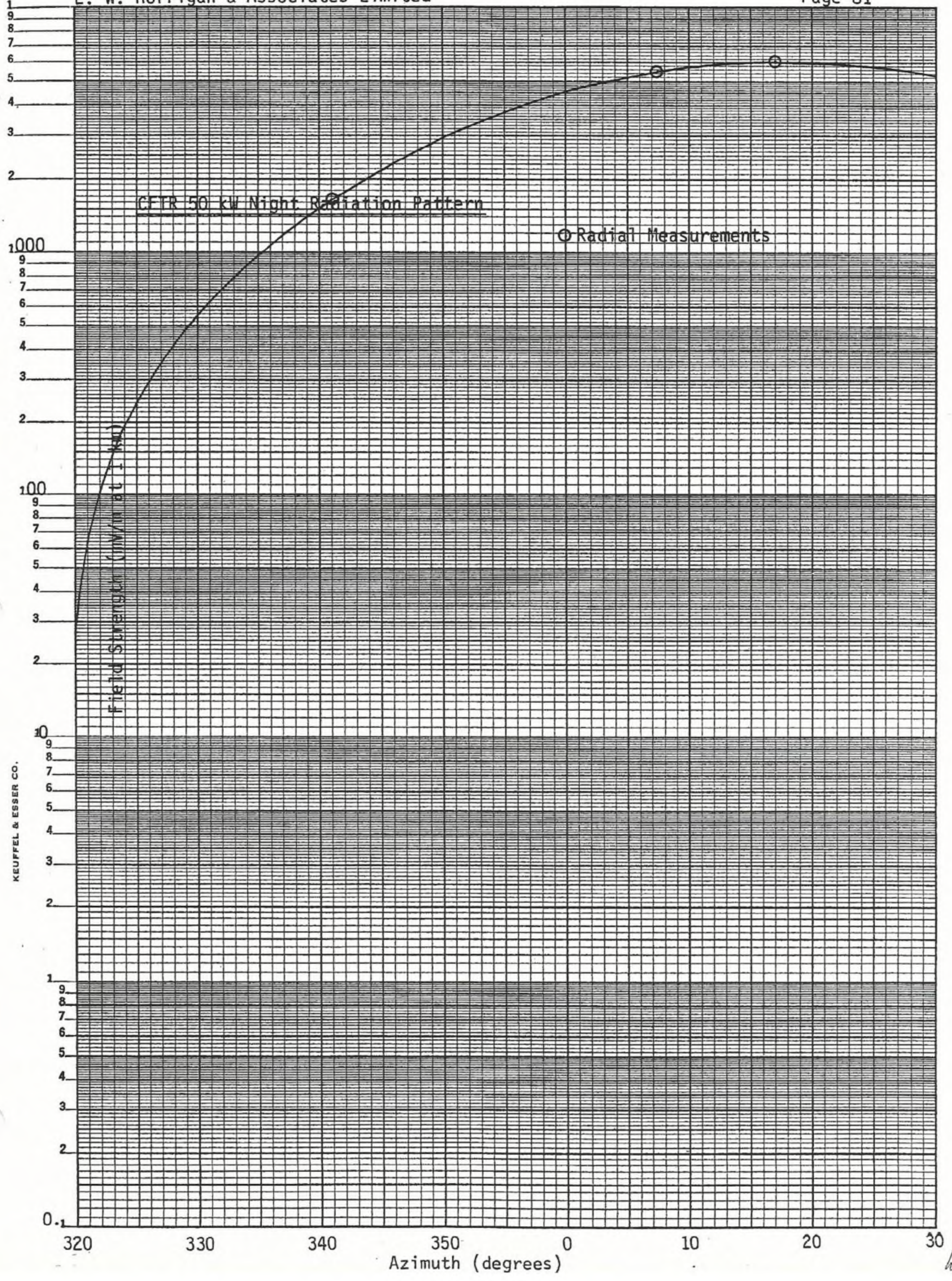
Point #	Distance (km)	Field Strength (mV/m)
1	120	8.8
2	121	6.4
3	122	8.3
4	123	7.6
5	125	7.9
6	128	4.7
7	130	5.2
8	133	6.6
9	135	5.1
10	140	5.4
11	143	5.05
12	147	4.3
13	149	3.5
14	155	2.4
15	158	1.95
16	159	1.7
17	163	1.6
18	169	1.6
19	174	1.5
20	180	1.1
21	184	1.05
22	188	1.02
23	194	1.1
24	202	0.92
25	209	0.7
26	216	0.51
27	223	0.39
28	234	0.26
29	240	0.22
30	247	0.16

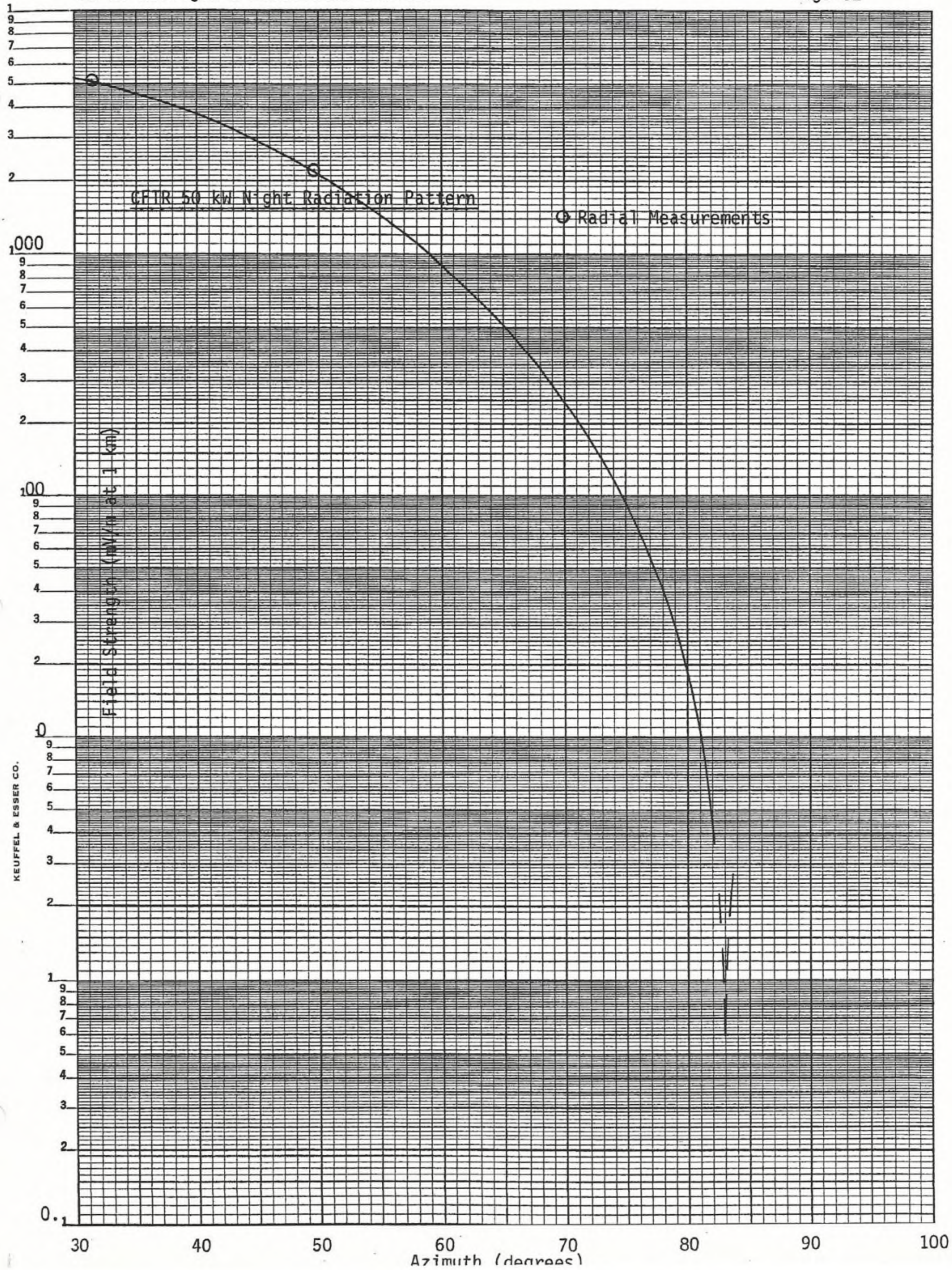

GROUND WAVE FIELD INTENSITY
STATION CFTR
FREQUENCY 680 kHz
POWER 50 kW Night
DIRECTION 49.6 deg
EXHIBIT
Inverse Distance Field
2200 mV/m at 1 km
20,60
8,15
5,15
3,15
MILLIVOLTS PER METER
Kilometres from Antenna
K&E


CFTR 50 kW Night Radiation Pattern
Radial Measurements
Field Strength (mV/m at 1 km)
100
10
1
0.1
110
120
130
140
150
160
170
180
Azimuth (degrees)
KEUFFEL & ESSER CO.

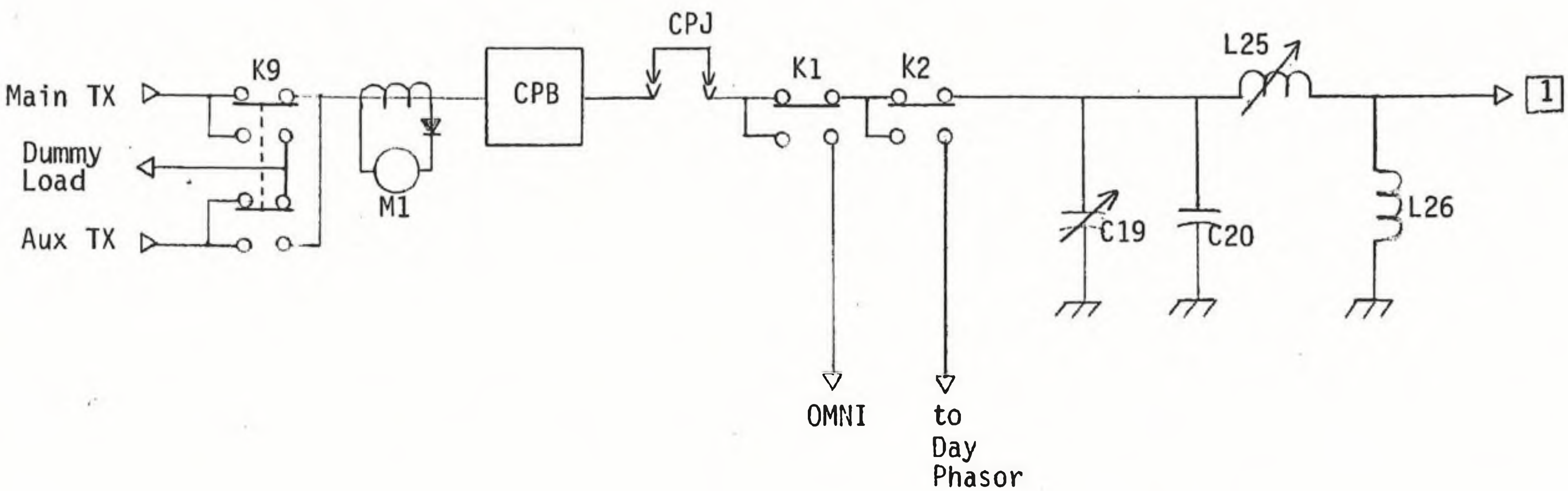

CFTR 50 kW Night Radiation Pattern
Radial Measurements
Field Strength (mV/m at 1 km)
Azimuth (degrees)
100
10
1
0.1
0.01
180
190
200
210
220
230
240
250
KEUFFEL & ESSER CO.


Field Strength (mV/m at 1 km)
1000
100
10
1
0.1
0.01
250
260
270
280
290
300
310
320
Azimuth (degrees)
CFTR 50 kW Night Radiation Pattern
Radial Measurements
KEUFFEL & ESSER CO.


CFTR 50 kW Night Radiation Pattern
Radial Measurements
Field Strength (mV/m at 1 km)
Azimuth (degrees)
320
330
340
350
0
10
20
30
1000
100
10
0.1
KEUFFEL & ESSER CO.

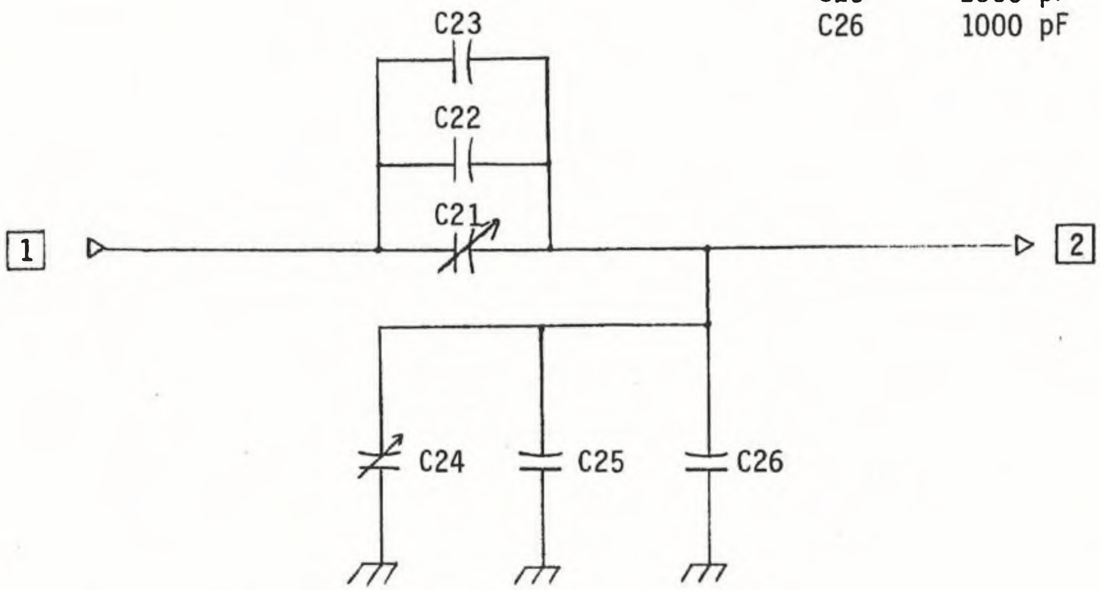

CFTR 50 kW Night Radiation Pattern
Radial Measurements
Field Strength (mV/m at 1 km)
Azimuth (degrees)
1000
100
10
1
0.1
30
40
50
60
70
80
90
100
KEUFFEL & ESSER CO.

C19	50-2000 pF	10 kV	ITT UCSXF-10
C20	2000 pF	10 kV	ITT CFDP2000-10S
L25	22 uH	60 A	CSP variable
L26	42 uH	40 A	42-FCT
M1		40 A	Delta TCA
CPB			Delta CPB-1A



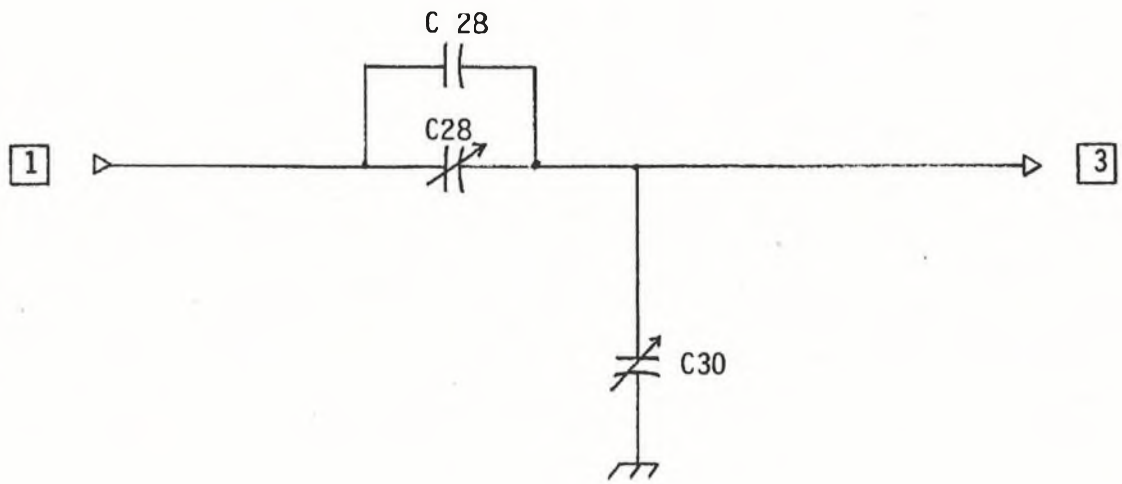
CFTR 50 kW Night Common Point

C21	50-2300 pF	15 kV	CVDP-2300-15
C22	2000 pF	15 kV	CFDP-2000-15
C23	1000 pF	15 kV	CFED-1000-15
C24	50-2300 pF	15 kV	CVDP-2300-15
C25	2000 pF	15 kV	CFDP-2000-15
C26	1000 pF	15 kV	CFED-1000-15



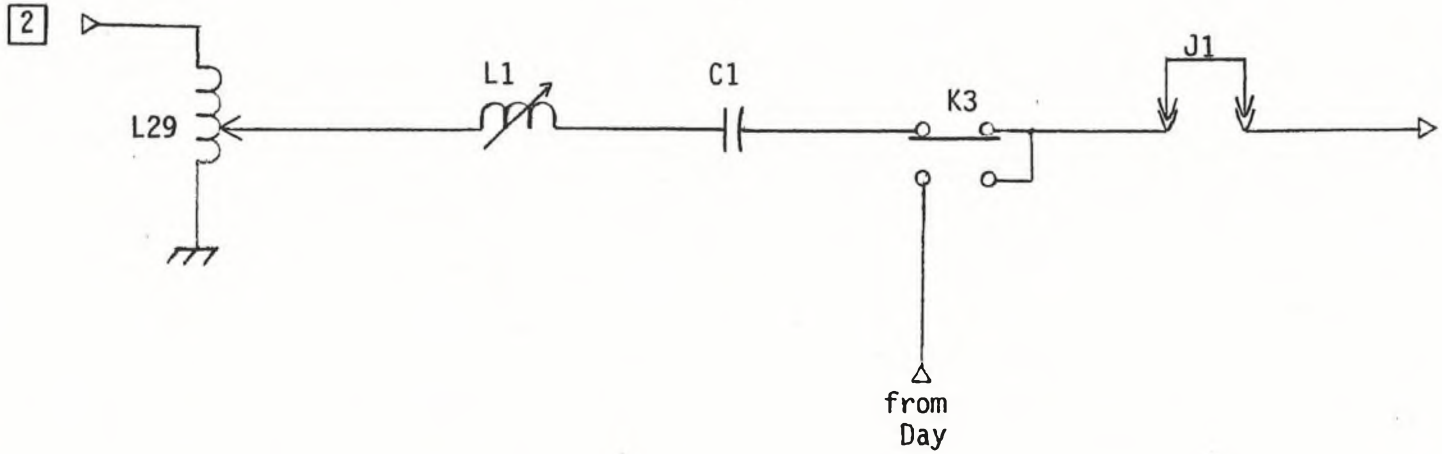
CFTR 50 kW Night Phasor Input #1 #2 #7 #8

C27	50-2300 pF	15 kV	CVDP-2300-15
C28	2000 pF	15 kV	CFDP2000-15S
C30	50-2300 pF	15 kV	CVDP-2300-15



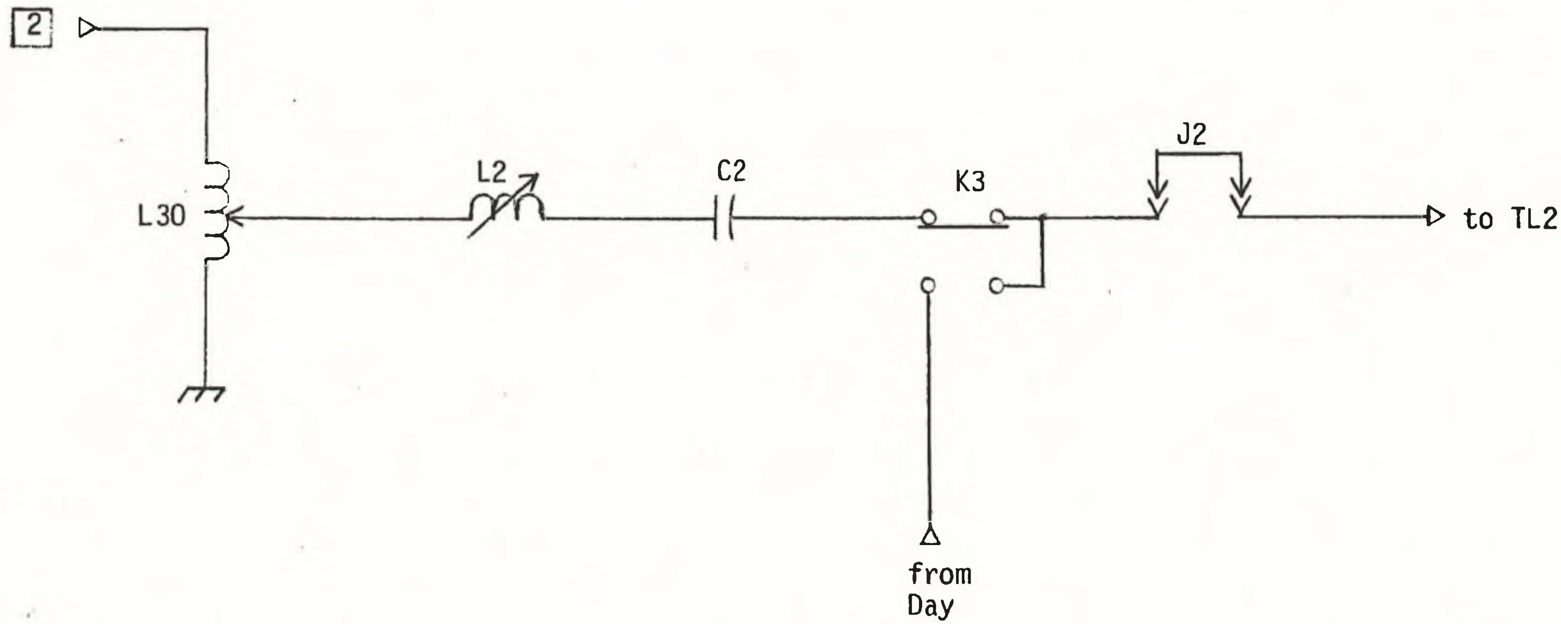
CFTR 50 kW Night Phasor Input #3 #4 #5 #6

C1	4000 pF	8 kV	Acushnet
L1	42 uH	20 A	Harris variable
L29	42 uH	20 A	Harris variable



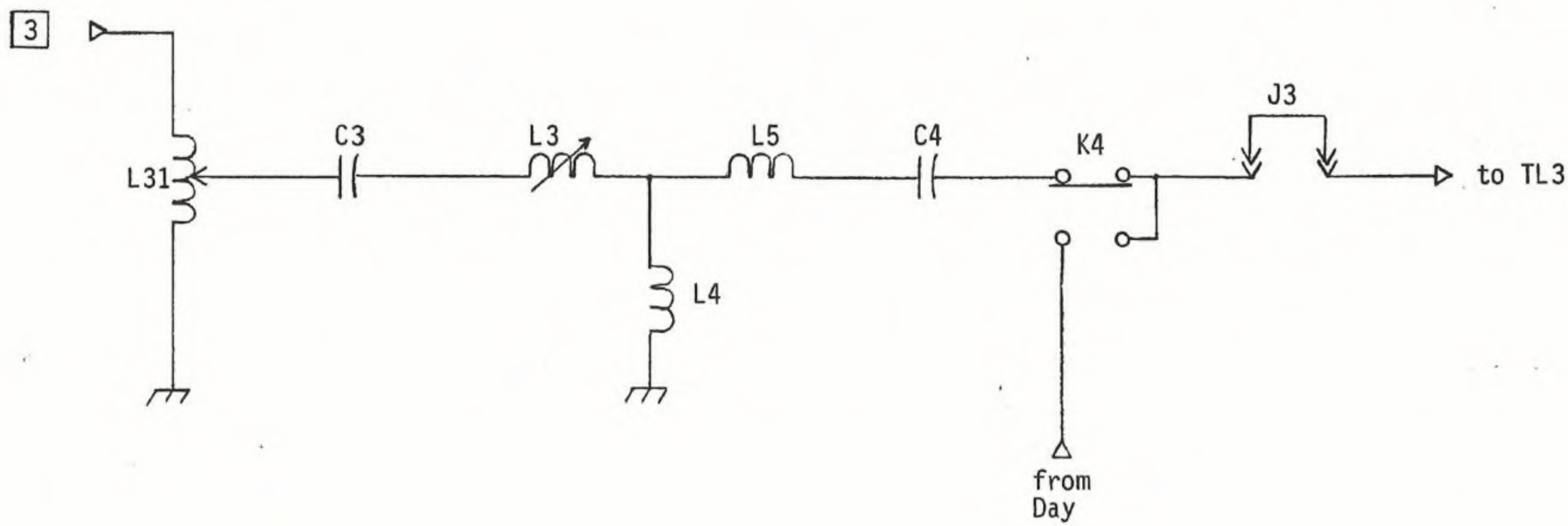
CFTR 50 kW Night Phasor #1

C2	4000 pF	8 kV	Acushnet	
L2	42 uH	20 A	Harris variable	
L30	42 uH	20 A	Harris variable	



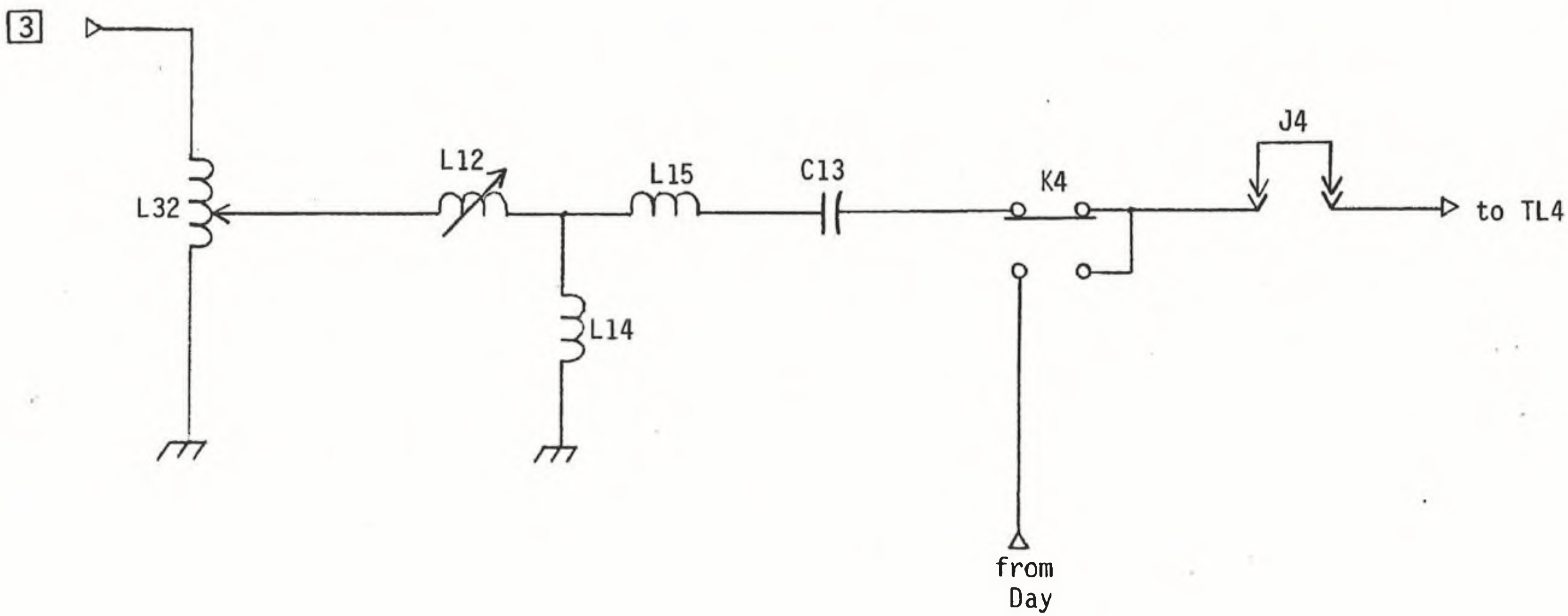
CFTR 50 kW Night   Phasor #2

C3	4000	pF	8 kV	Acushnet
C4	4000	pF	12 kV	Acushnet
L3	42	uH	20 A	Harris variable
L4	42	uH	20 A	Harris
L5	24	uH	20 A	Harris
L31	42	uH	20 A	Harris variable



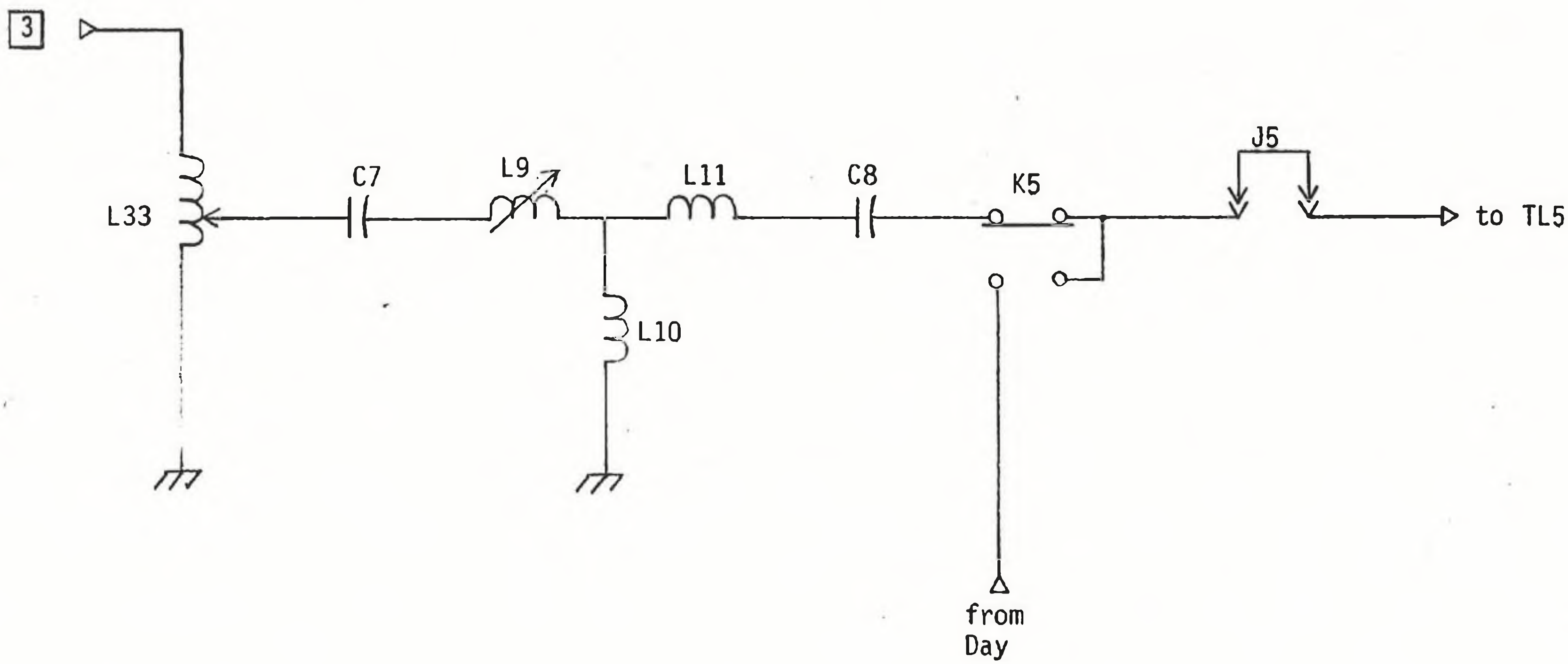
CFTR 50 kW Night Phasor #3

C13	2000 pF	15 kV	ITT CFDP2000-15S
L12	42 uH	20 A	Harris variable
L14	24 uH	20 A	Harris
L15	24 uH	20 A	Harris
L32	42 uH	20 A	Harris variable

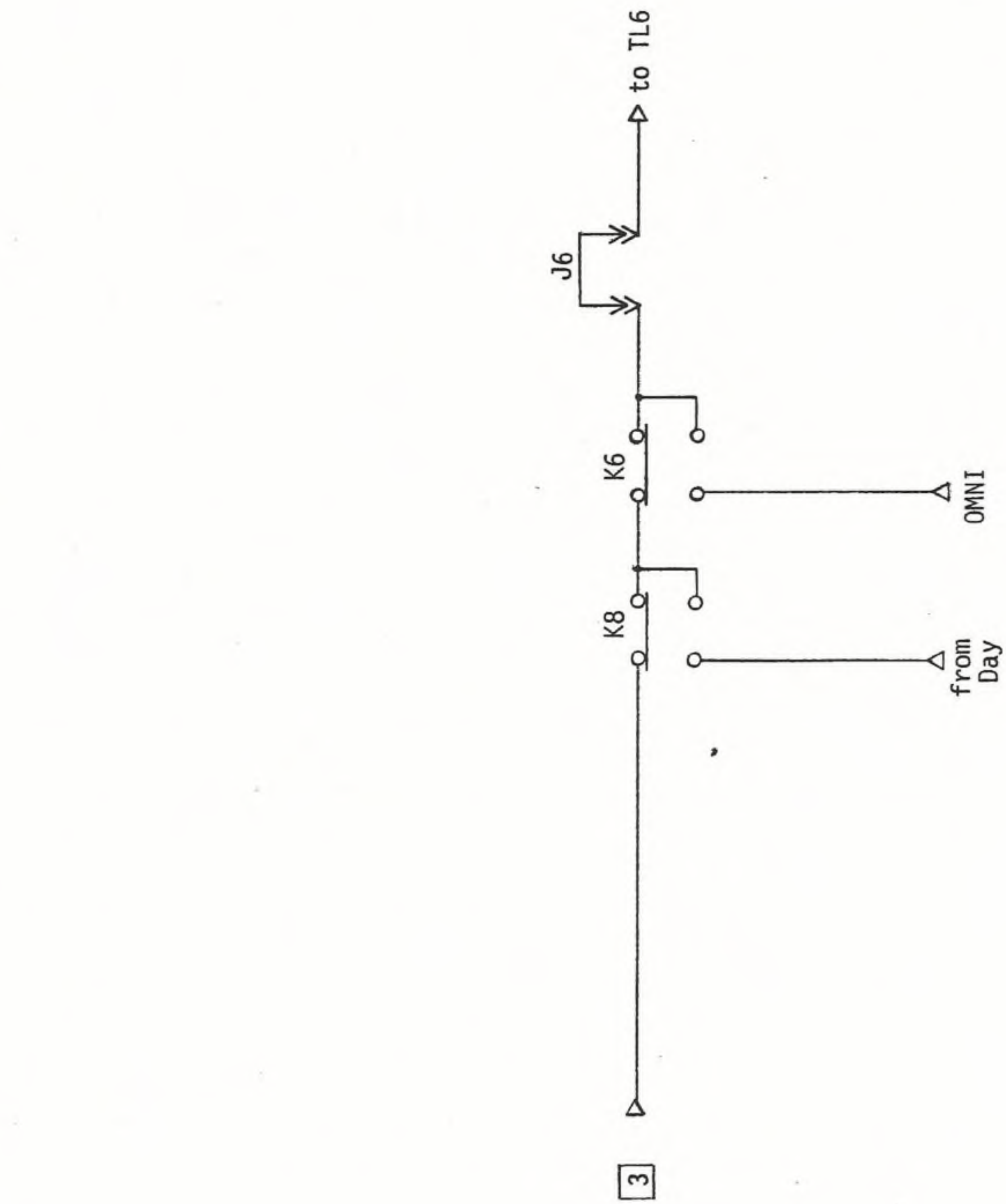


CFTR 50 kW Night Phasor #4

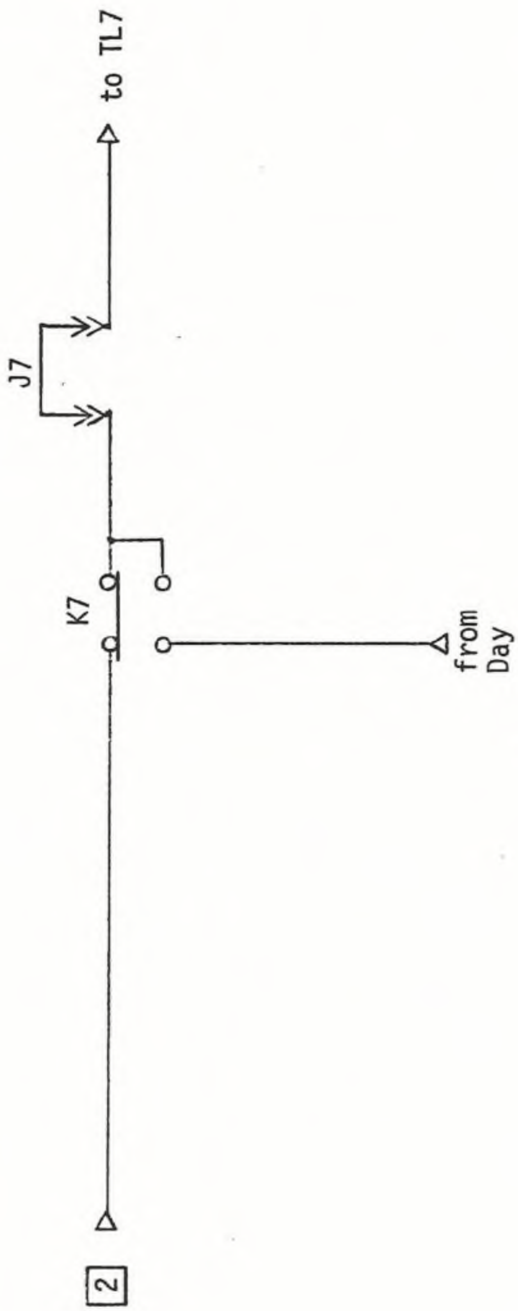
C7	4000	pF	12 kV	Acushnet
C8	4000	pF	12 kV	Acushnet
L9	42	uH	20 A	Harris variable
L10	42	uH	20 A	Harris
L11	24	uH	20 A	Harris
L33	42	uH	20 A	Harris variable



CFTR 50 kW Night Phasor #5

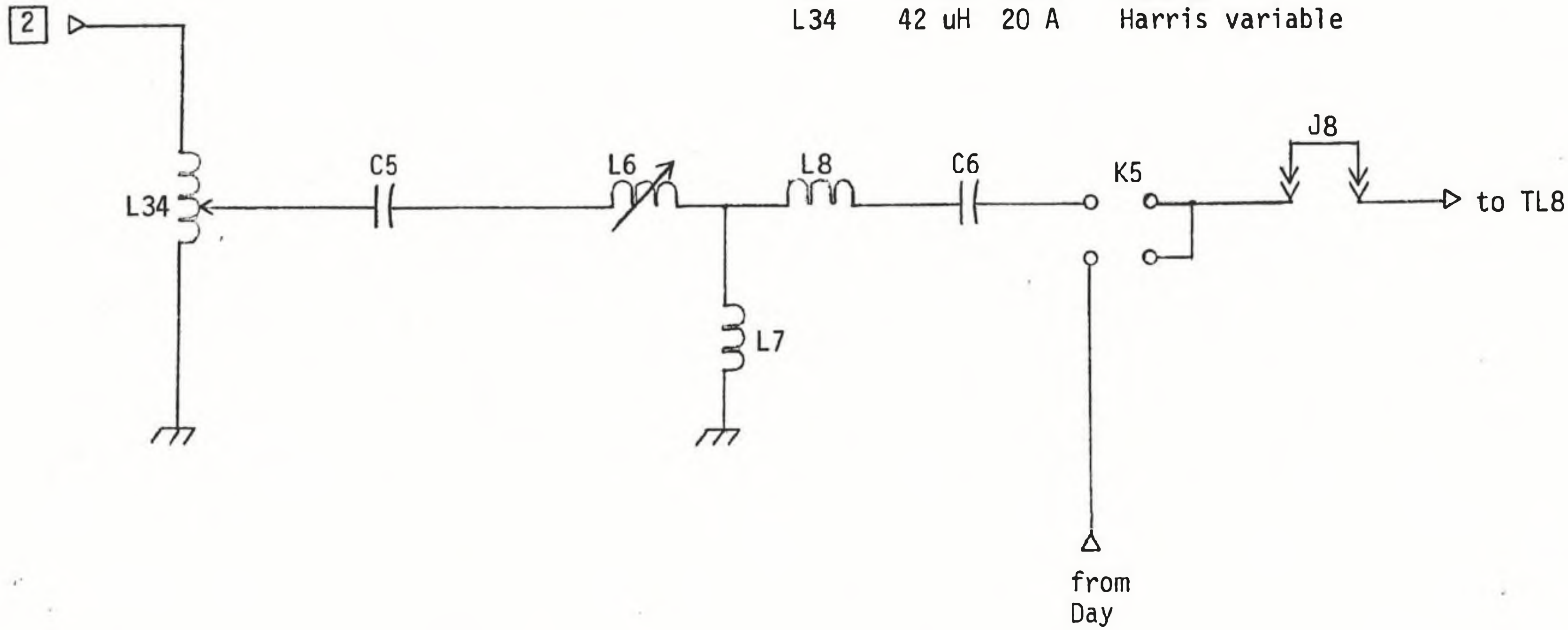


CFTR 50 kW Night Phasor #6



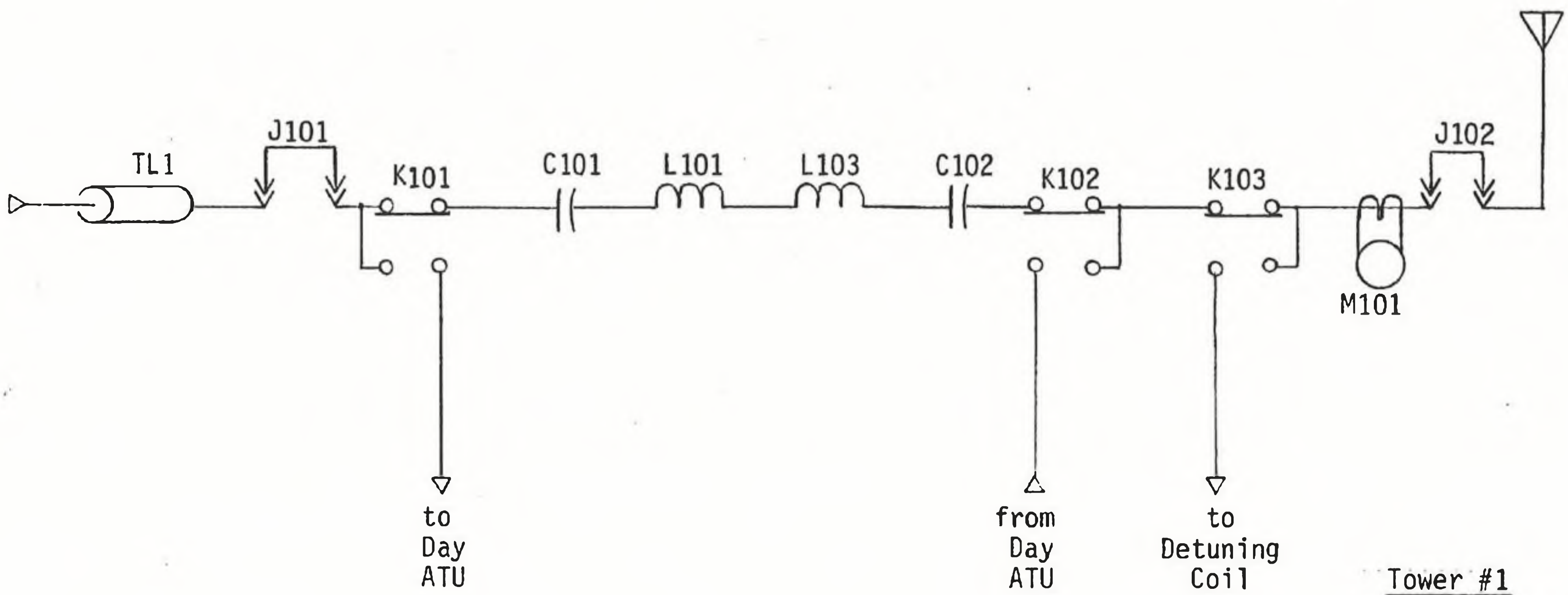
CFTR 50 kW Night Phasor #7

C5	3000 pF	8 kV	Acushnet
C6	3000 pF	8 kV	Acushnet
L6	42 uH	20 A	Harris variable
L7	24 uH	20 A	Harris
L8	24 uH	20 A	Harris
L34	42 uH	20 A	Harris variable



CFTR 50 kW Night Phasor #8

C101	4000 pF	8 kV	Acushnet
C102	750 pF	30 kV	
L101	24 uH	20 A	Harris
L103	95 uH	20 A	Harris
M101		10 A	Delta TCA
TL1	199.7°		Cablewave HCC78-50J

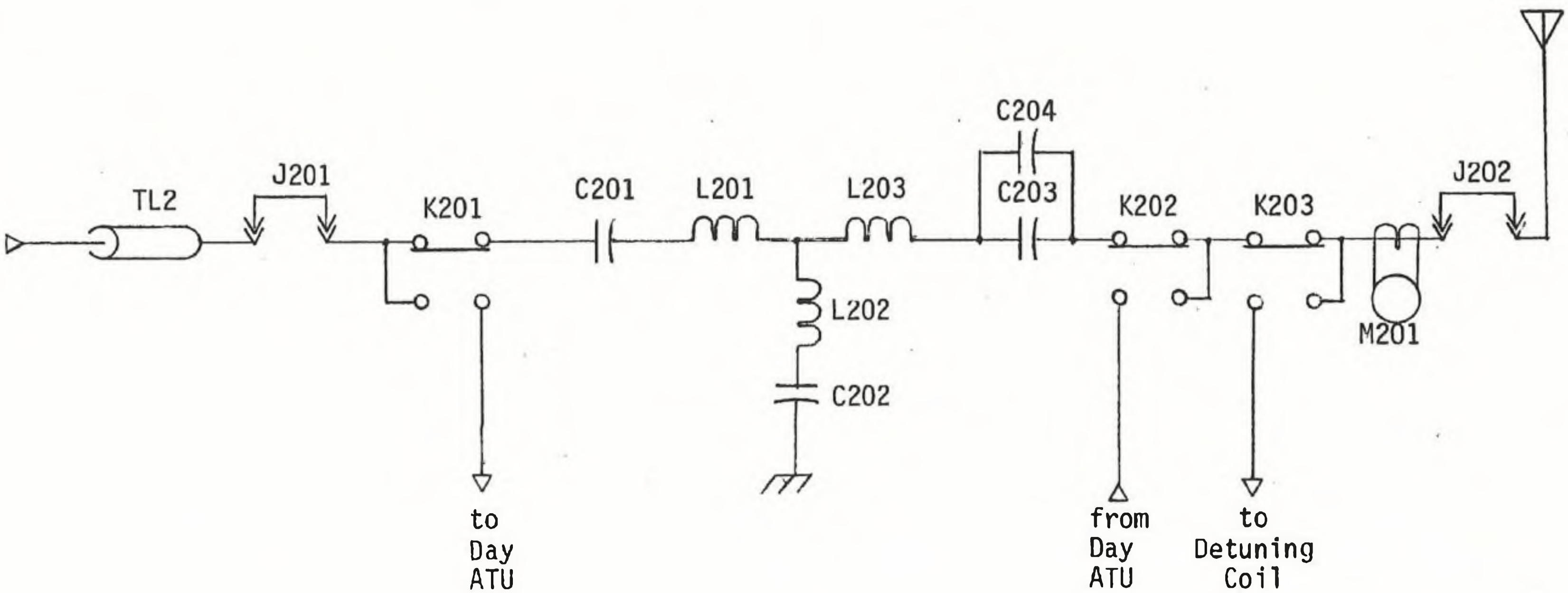


<u>Tower #1</u>

Z = 4 + j103 Ohms
I = 5.3 Amps
P = 112 Watts

<u>CFTR 50 kW Night Tower #1 ATU</u>

C201	4000 pF	12 kV	Acushnet
C202	4000 pF	12 kV	Acushnet
C203	750 pF	25 kV	MLC-750-25
C204	750 pF	25 kV	MLC-750-25
L201	24 uH	20 A	Harris
L202	24 uH	20 A	Harris
L203	45 uH	40 A	Harris
M201		20 A	Delta TCA
TL2	42.6°		Cablewave HCC158-50J

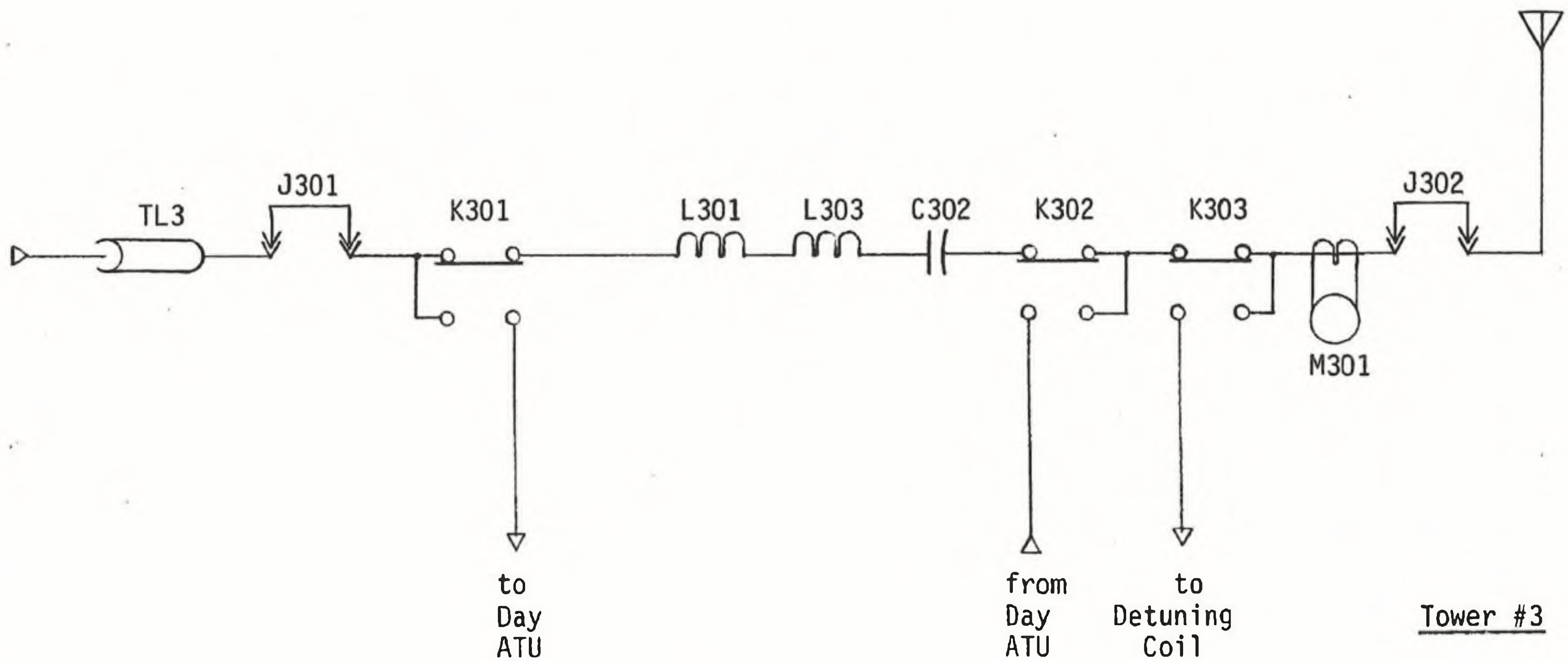


Tower #2

Z = 13 + j90 Ohms
I = 13.1 Amps
P = 2231 Watts

CFTR 50 kW Night Tower #2 ATU

C302	1000 pF	30 kV	MCL-1000-30
L301	24 uH	20 A	Harris
L303	65 uH	40 A	Harris
M301		20 A	Delta TCA
TL3	163.4^{o}		Cablewave HCC158-50J

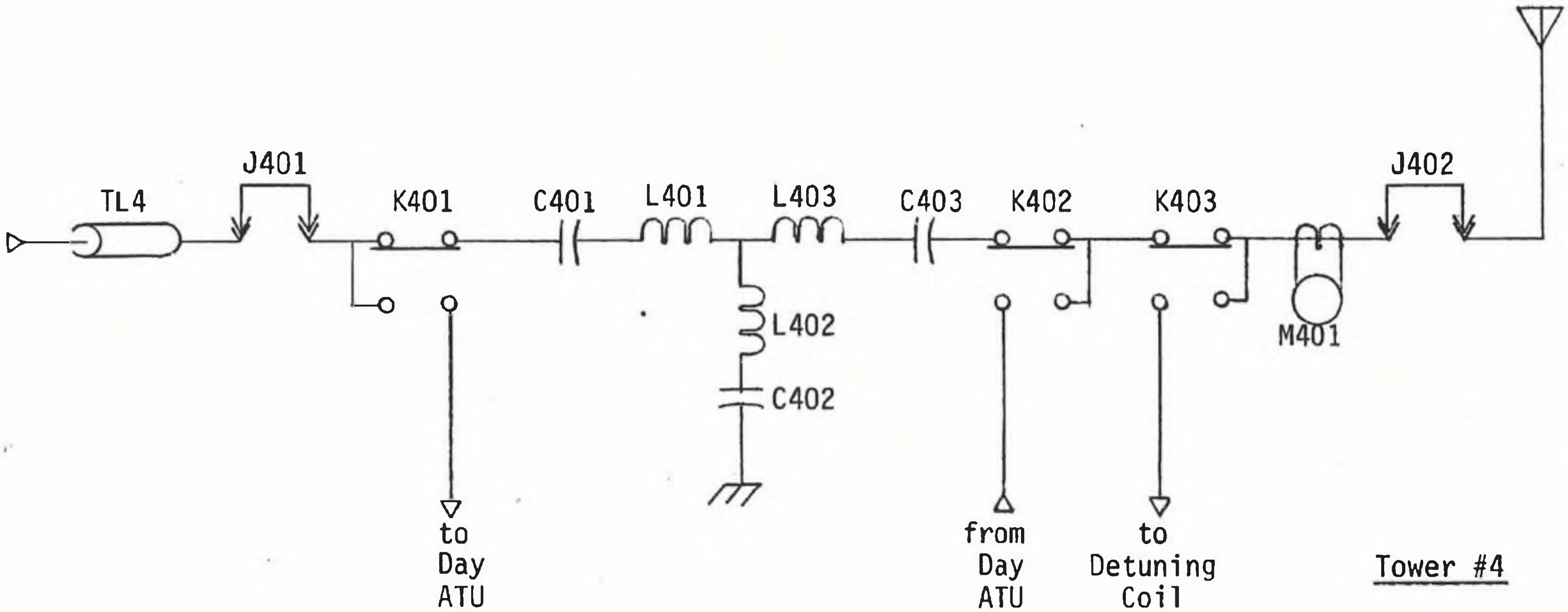


Tower #3

Z = -2 + j91 Ohms
I = 13.1 Amps
P = -343 Watts

CFTR 50 kW Night Tower #3 ATU

C401	6000 pF	5 kV	Acushnet
C402	4000 pF	8 kV	Acushnet
C403	1500 pF	15 kV	Acsuhnet
L401	24 uH	20 A	Harris
L402	24 uH	20 A	Harris
L403	63 uH	20 A	Harris
M401		10 A	Delta TCA
TL4	368.9^{0}		Cablewave HCC78-50J

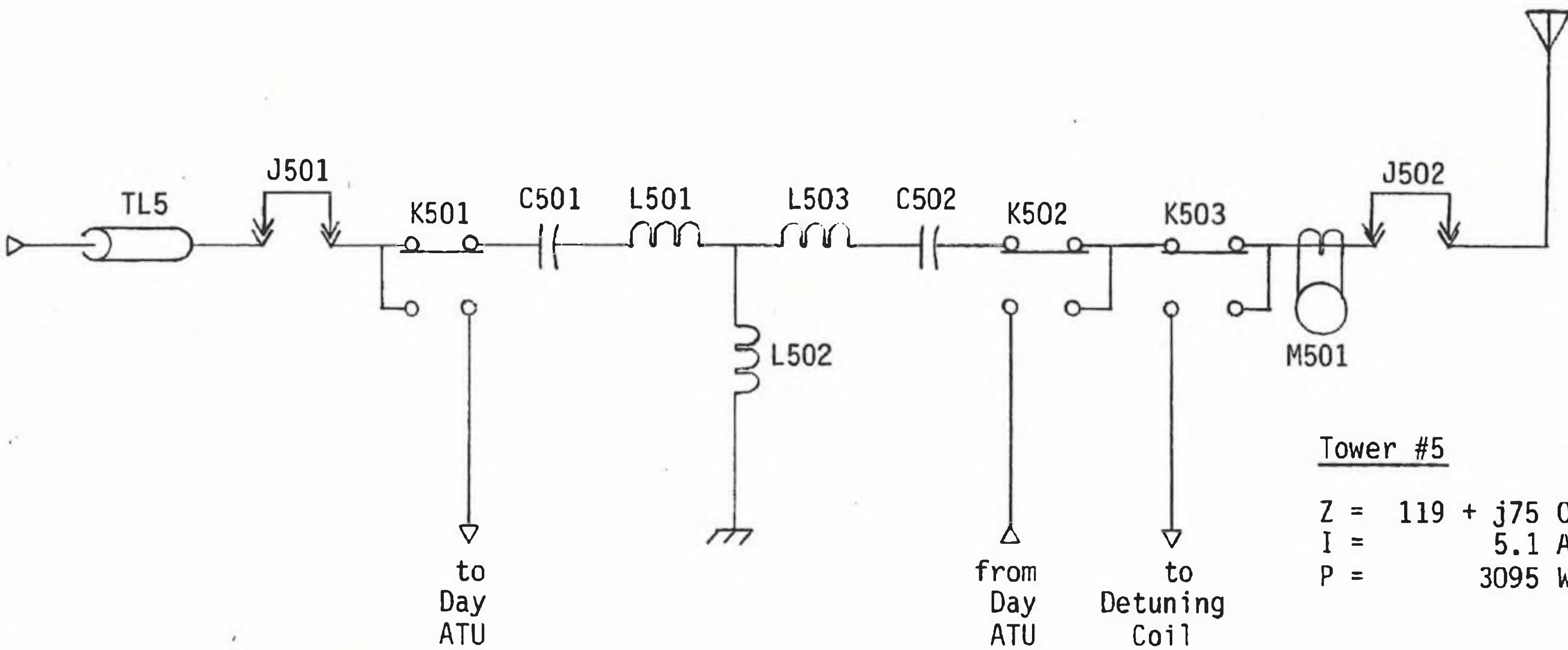


Tower #4

Z = -10 + j90 Ohms
I = 5.2 Amps
P = -270 Watts

CFTR 50 kW Night Tower #4 ATU

C501	2000 pF	15 kV	Acushnet
C502	1000 pF	30 kV	MLC-1000-30
L501	42 uH	20 A	Harris
L502	42 uH	20 A	Harris
L503	95 uH	20 A	Harris
M501		10 A	Delta TCA
TL5	377.7°		Cablewave HCC158-50J

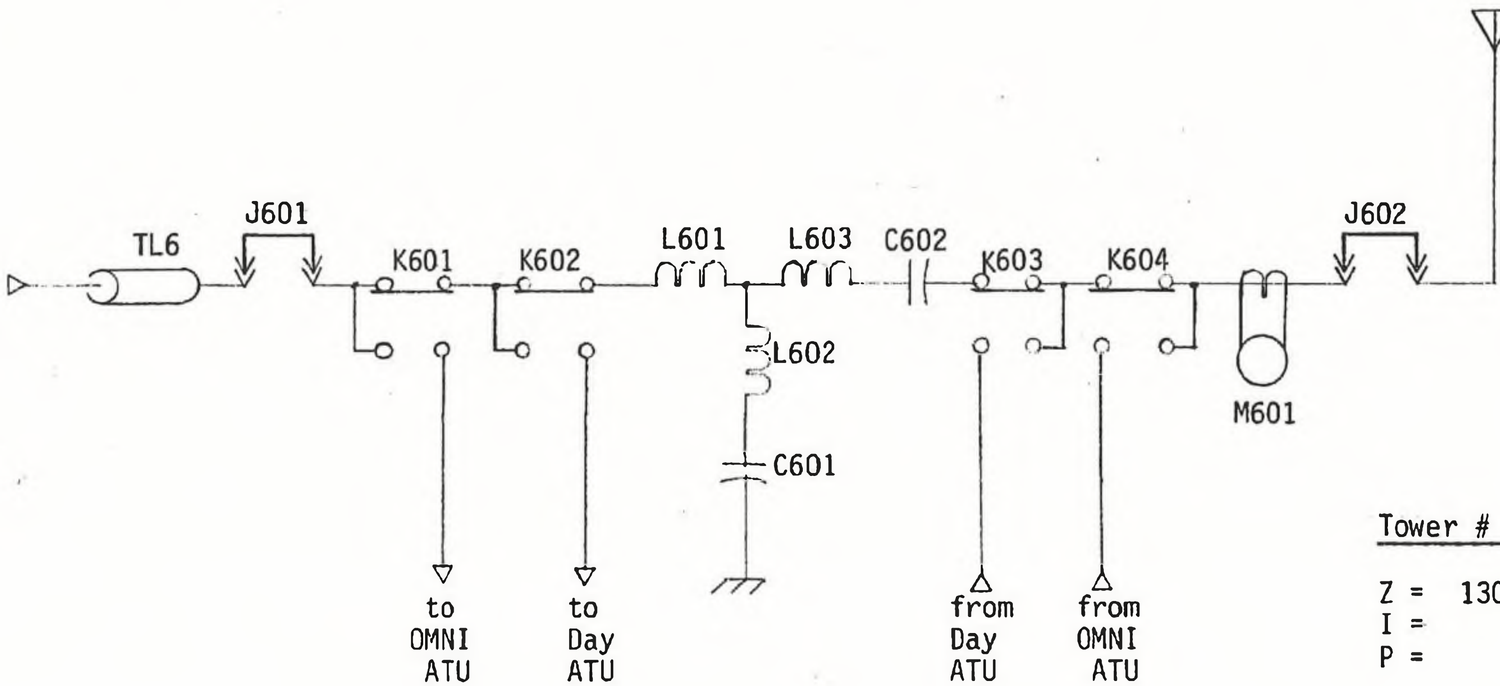


Tower #5

Z = 119 + j75 Ohms
I = 5.1 Amps
P = 3095 Watts

CFTR 50 kW Night Tower #5 ATU

C601	2000 pF	15 kV	ITT CFDP2000-15S
C602	1000 pF	25 kV	MLC-1000-25
L601	45 uH	40 A	Harris
L602	20 uH	40 A	Harris
L603	65 uH	40 A	Harris
M601		20/40 A	Delta TCA
TL6	214.0°		Cablewave HCC300-50J

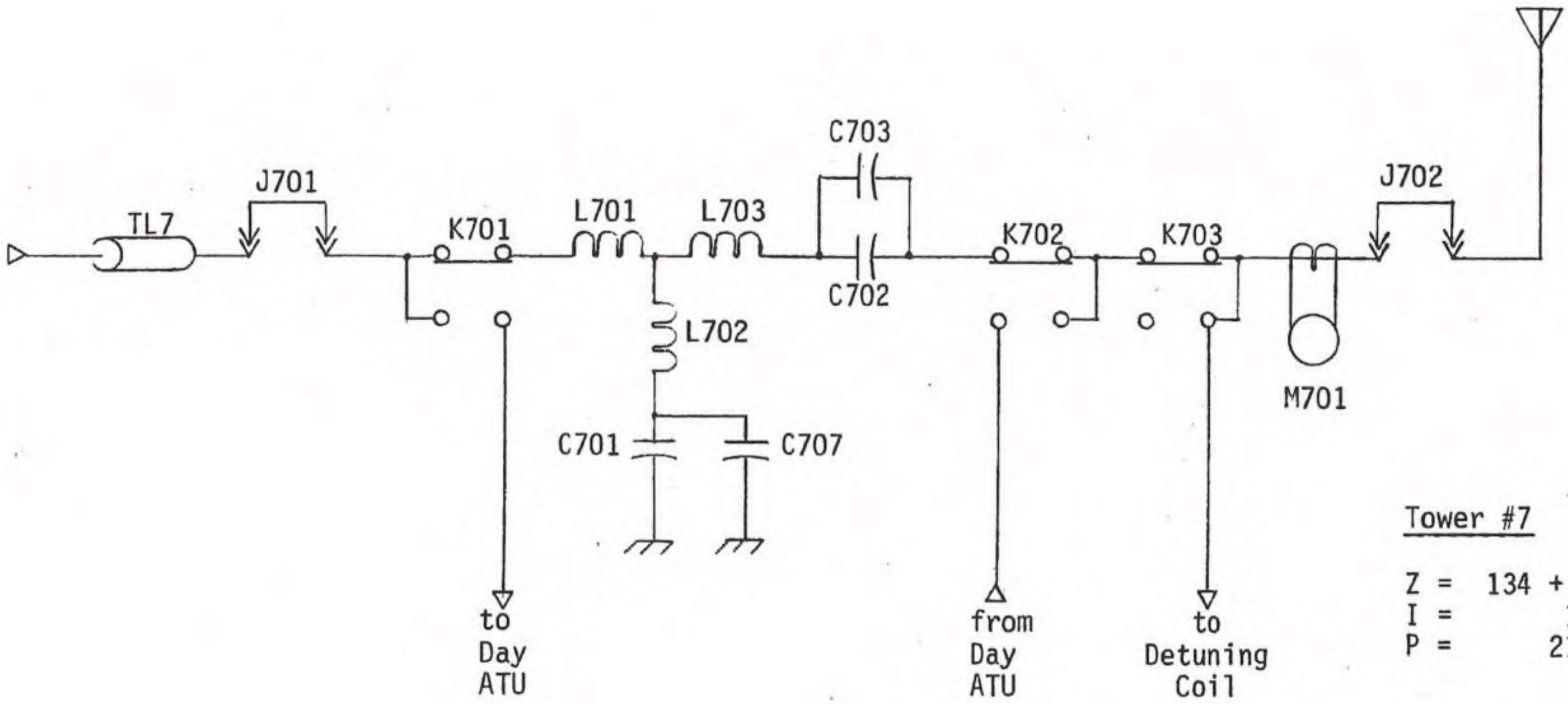


Tower # 6

Z = 130 + j95 Ohms
I = 12.3 Amps
P = 19668 Watts

CFTR 50 kW Night Tower #7 ATU

C701	1000 pF	25 kV	ITT MCL-1000-25
C702	500 pF	15 kV	Jennings JCS-500-15
C703	1000 pF	15 kV	ITT MCL-1000-25
C707	1000 pF	25 kV	ITT MCL-1000-25
L701	45 uH	40 A	Harris
L702	35 uH	40 A	Harris
L703	65 uH	40 A	Harris
M701		20 A	Delta TCA
TL7	132.2^{o}		Cablewave HCC300-50J

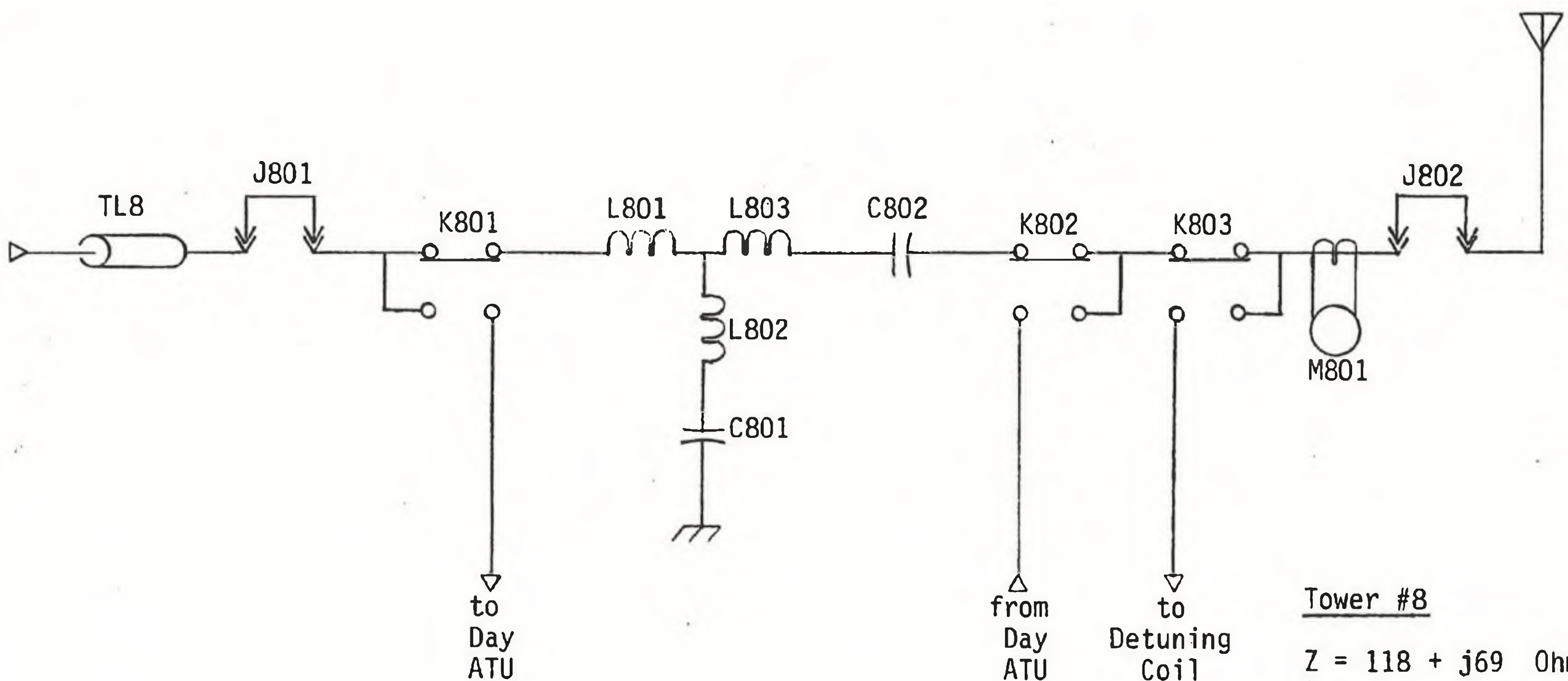


Tower #7

Z = 134 + j85 Ohms
I = 12.8 Amps
P = 21955 Watts

CFTR 50 kW Night Tower #7 ATU

C801	2000 pF	10 kV	Sangamo
C802	2000 pF	10 kV	Sangamo
L801	24 uH	20 A	Harris
L802	42 uH	20 A	Harris
L803	63 uH	20 A	Harris
M801		10 A	Delta TCA
TL8	208.8^{o}		Cablewave HCC 158-50J



Tower #8

Z =	118 + j69	Ohms
I =	5.4	Amps
P =	3441	Watts

CFTR 50 KW Night Tower #8