



TECHNICAL REPORT DTR-R-12

DEPARTMENT OF COMMUNICATIONS
OTTAWA

SPECTRUM INTERFERENCE SURVEY
PROPOSED TELESAT EARTH STATION
QU'APPELLE, SASKATCHEWAN

TK
6553
Q82
1970

TELECOMMUNICATIONS REGULATION BRANCH
TELECOMMUNICATIONS ENGINEERING DIVISION



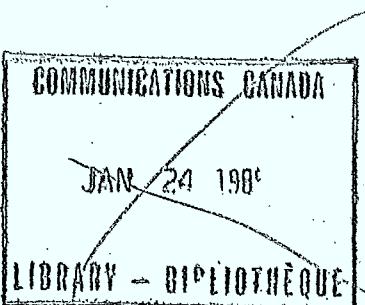
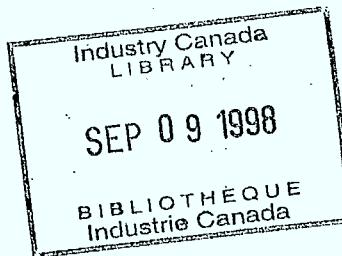
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1970

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TECHNICAL REPORT DTR-K

DEPARTMENT OF COMMUNICATIONS
OTTAWA

SPECTRUM INTERFERENCE SURVEY
PROPOSED TELESAT EARTH STATION
QU'APPELLE, SASKATCHEWAN



TELECOMMUNICATIONS REGULATION BRANCH
TELECOMMUNICATIONS ENGINEERING DIVISION

(1)

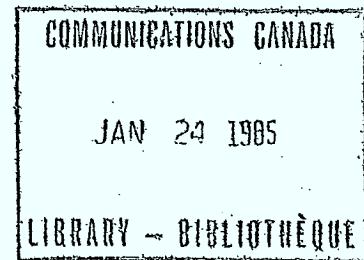
QU'APPELLE EARTH STATION

SPECTRUM INTERFERENCE SURVEY

Measurements conducted by the Department of Communications
Regulations Engineering Laboratory
for the Radio Authorization and Enforcement Division,
and for Telesat Canada on August 20-23, 1970.

MEASUREMENTS CONDUCTED

AND REPORT WRITTEN BY: D. Morland DOC/LAB



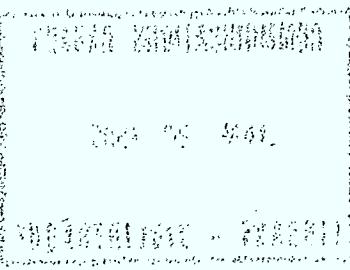
P. Bisson DOC/LAB

D. Fraser DOC/HQ

L. Beaudet TELESAT
CANADA

TK
b553
Q82
1970

DD 5069061
DL 5069083



CONTENTS

	<u>Page</u>
1.0 <u>INTRODUCTION</u>	
1.1 general	1
1.2 purpose of investigation	
2.0 <u>CONCULSIONS</u>	
2.1 spectrum search	2
2.2 radiation from power lines	
2.3 radar spurious and harmonics emissions	
3.0 <u>DETAILED TEST REPORT</u>	
3.1 test equipment	3
3.2 topographical location	
3.3 topographical environment data	
3.4 measurement locations	
4.0 <u>GENERAL SYSTEM INFORMATION</u>	
4.1 systems under test	6
4.2 scope of tests	
4.3 date of tests	
4.4 Limitations of equipment	
5.0 <u>EARTH STATION INFORMATION</u>	
5.1 function	8
5.2 characteristics	
6.0 <u>TEST METHOD AND RESULTS</u>	
6.1 tests conducted	9-10
6.2 test #1 spectrum search	
6.3 test #2 power line radiation and TV signals 54-88 MHz	
6.4 test #3 azimuthal radiation checks	
6.5 test #4 radar interference	

APPENDIX A

1	calibration 3.5 - 4.3 GHz range	A1
2-19	test results spectrum search 3.5 - 4.25 GHz	A2-19

APPENDIX B

20	calibration 5.8 - 7.0 GHz	B20
21-38	test results spectrum search 5.8 - 7.0 GHz	B21-38

APPENDIX C

39	test results 54 - 80 MHz range	C39
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APPENDIX D

40	calibration 5.8 - 6.5 GHz	D40
41	azimuthal radiation tests (McLean site)	D41

APPENDIX E

42	calibration 3.5 - 4.2 GHz	E42
43	azimuthal search (McLean site)	E43
44	azimuthal search (Regina site)	E44
45	azimuthal search (Findlater)	E45

APPENDIX F

46-50	area frequency listings	F46-50
-------	-------------------------	--------

APPENDIX G

51	FIM sensitivity calibration	G51
52	Watkins-Johnson TWT Characteristics	G52
53-54	Stoddart log periodic antenna	G53-54
55	Instruments	G55

FIGURES

A	Contour map of Qu'Appelle site	4
B	Test sites 1, 2 and 3	5
C	4 and 6 GHz microwave routes	6

TABLE 1

Qu'Appelle earth station characteristics

PHOTOGRAPHS

1. Air photo Qu'Appelle site
2. Site #1
3. Site #2
4. Site #3
5. Log periodic test antenna
6. Field intensity meter and X-Y recorder.

1.0 INTRODUCTION

- 1.1 General As the space services and terrestrial microwave systems share the same frequency bands it is essential to insure that mutual compatibility exists where such services propose to operate within interference range of each other. A standard method of calculating potential interference exists, however, on-site measurements are essential to validate theoretical studies and to ascertain if any unknown sources of interference can be detected.
- 1.2 Purpose of Investigation The Telecommunications Engineering Division of D.O.C. and Telesat Canada as a co-operative effort conducted a survey of the frequency spectrum in the vicinity of Qu'Appelle, Sask., where a proposed earth station is to be located. The earth station will be receiving in the band 3700 to 4200 MHz and (if necessary) transmitting in the 5925 to 6425 MHz band.

Spectrum measurements are required at this proposed site to determine the extent and levels of emissions that might be present from different microwave transmitters in the above frequency bands, and the electromagnetic radiation from high voltage power lines in the area. This information is essential for our System Co-ordination group in the study of system compatibility and to validate calculations done by Telesat/DOC.

As radar transmitters are capable of radiating high levels of spurious or harmonic emissions in the 4 or 6 GHz bands, it is essential to determine what actual radiations are present.

2.0 CONCLUSIONS

- 2.1 Spectrum Search In the frequency spectrum from 3.5 - 4.2 and 5.8 - 7.3 GHz no emissions from the existing microwave transmitters at various directions from Qu'Appelle (0-360°) could be detected above the minimum discernible signal (MDS) level of the Field Intensity Meter (FIM MDS -105 dBm). The receiving test antenna has a gain of +19 to 21 dbi (4 and 6 GHz) resulting in a minimum detectable system signal level from -124 to -126 dBm.
- 2.2 Power line radiation Radiation from power lines in the vicinity of Qu'Appelle site #2 were detected and measured as 10 dBuV at frequencies of 70, 72, & 74.8 MHz. No continuing difficulty is anticipated from this source of interference as the problem could likely be traced to a faulty connector or in the grounding system which can be easily eliminated by the local power company.
- 2.3 Radar emissions No radar spurious or harmonic emissions were detected in the frequency ranges 3700 - 4200 or 5925 - 6425 MHz. Although fundamental radar signals were easily detectable at site #3, no problems are anticipated from military or civil radars in the vicinity.

3.0 DETAILED TEST REPORT

- 3.1 Test Equipment Used See General Information - Instruments, appendix 55 - Antenna characteristics appendix 53 and 54 - TWT characteristics appendix 52.
- 3.2 Topographical Location The proposed Satellite Earth Station is to be located at Qu'Appelle, Sask. which is approximately 28 miles northeast of Regina, Sask. (Figure A).
- 3.3 Topographical Environmental Data The area of measurement was at Qu'Appelle Valley on the farm of Mr. Henry Wagner, Markinch, Sask. The farm is located at township 21, ten miles south of Markinch. The area is cultivated farmland with Loon Creek and Qu'Appelle Valley in the immediate area. (refer to Figure B and photo 1).
- 3.4 Measurement Locations The initial measurement was conducted at the earth station surveyed site which is approximately 1660 feet ASL (Site #1 see photo 2). Site #2 (see photo 3) was approximately 500 feet northwest of site #1 at an elevation of approximately 1636 feet. The final location site #3 (see photo 4) was located at an elevation of 1900 feet approximately $\frac{1}{2}$ mile from the proposed earth station location.

Raymore 30m

R 19
53

30'

R 1854

- 4 - R 17 55

15'

R 16 56

R 15

104°00'

51°00'

Tp 23

To
NeudorfLap
gm
564

Tp 22

563

Tp 21

45'

562

Tp 20

To Fort
Qu'Appelle

Tp 19

560

To
Broadview

Tp 18

30'

559

Tp 17

FIG. A

QU'APPELLE EARTH STATION

Scale: 4 mile to 1 inch

Contour intervals 50'

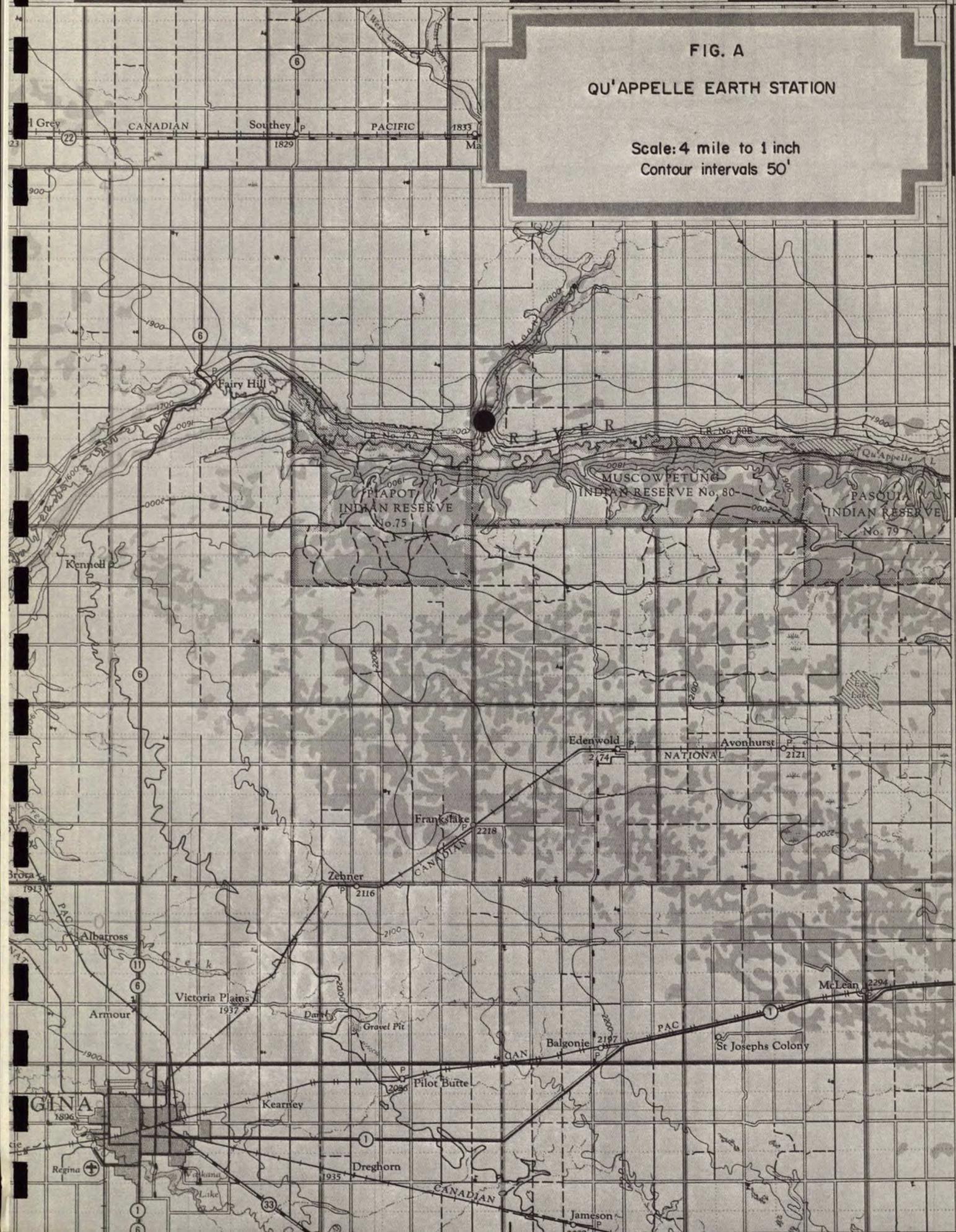
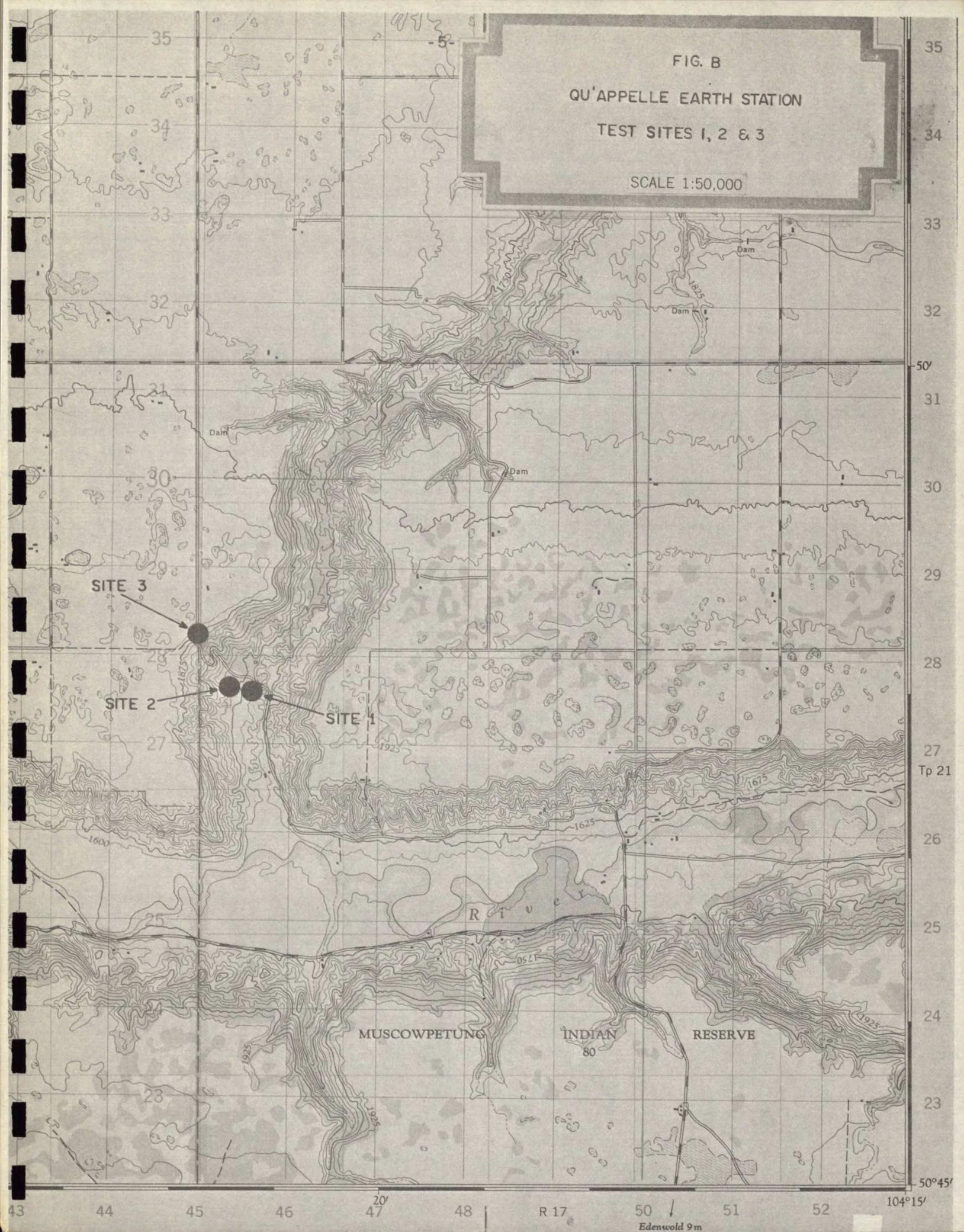


FIG. B

QU'APPELLE EARTH STATION

TEST SITES 1, 2 & 3

SCALE 1:50,000



4.0 GENERAL SYSTEM INFORMATION

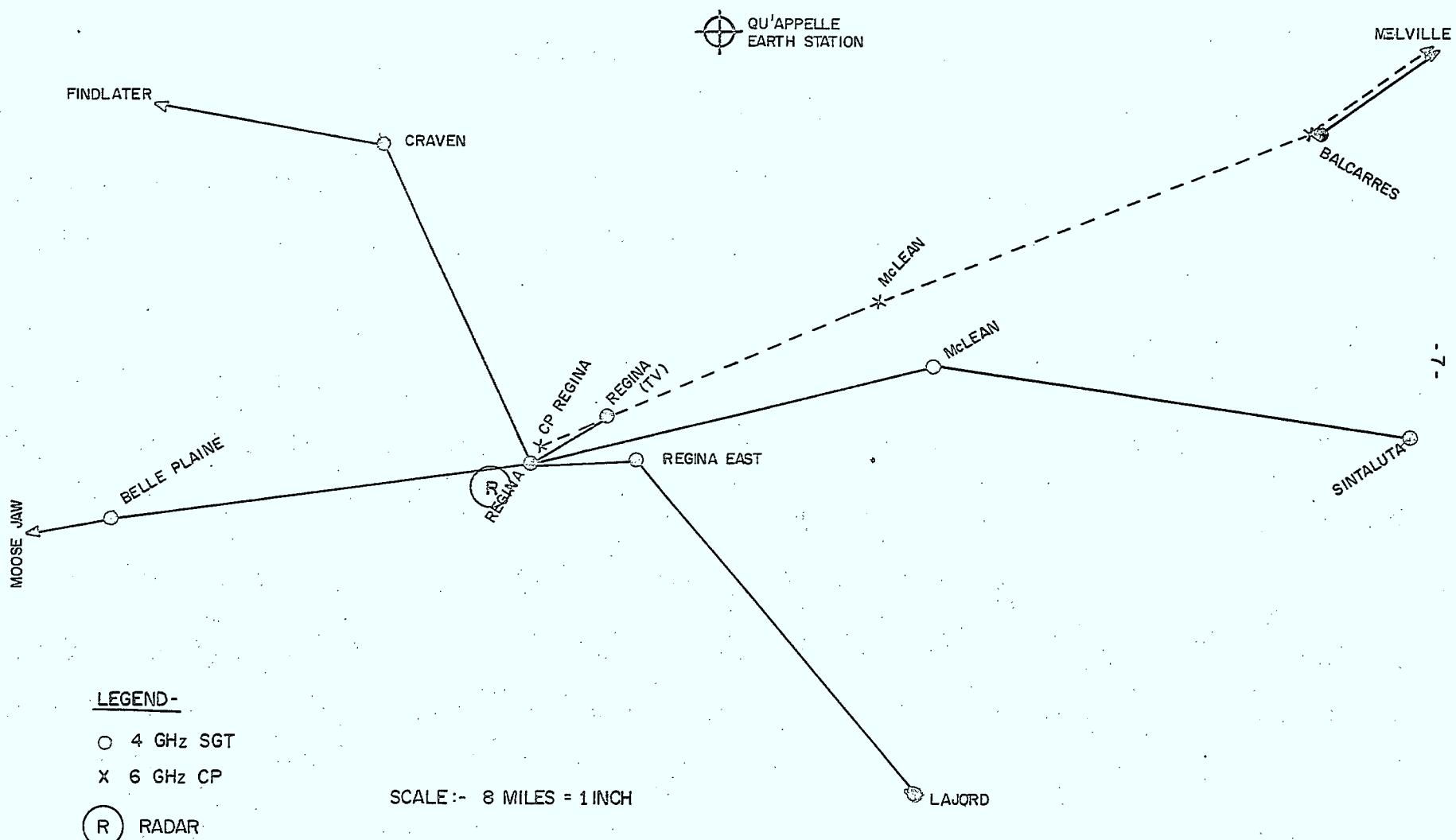
- 4.1 Systems The systems under test (Figure C) were the various military radar transmitters, Airport and Airways Surveillance radars, weather radars, Secondary radars, Tacan, microwave communications systems and radiation emanating from the power lines in the vicinity of Qu'Appelle. The Canadian Pacific Telecommunication 6 GHz microwave system at McLean was closely checked to determine if signals could be detected at sites 1, 2 or 3. In addition, the Saskatchewan Government Telephone 4 GHz repeaters at Regina, McLean, and Findlater were monitored to determine received signal levels at all test sites. Frequency listings of area stations are shown in Appendix F46-50.
- 4.2 Scope of the Tests The tests were conducted to check for any detectable signals and to measure absolute levels of detectable transmissions in the microwave bands 3.700 to 4.200 GHz, 5.925 to 6.425 GHz and power line radiation or other detectable signals in the band 70 MHz \pm 20 MHz.
- 4.3 Month and Year of Measurement The tests began on August 20 and were completed on August 23, 1970.
- 4.4 Limitations of Equipment The local oscillator of the FIM and/or the drift in the X - Y amplifier recorder causes some variation in the recordings which should not affect the detection of signals over the ranges scanned. There is some play in the telescoping sections of the antenna mast plus the readout on the rotary control indicator is accurate only to approximately $\pm 2^\circ$.

(R)

FIG. C

SASK. GOVT. TELEPHONES AND C.P.
4 AND 6 GHz
TELECOMMUNICATIONS ROUTES

(R)



5.0 SPECIFIC EARTH STATION INFORMATION

- 5.1 Function The Qu'Appelle earth station is to serve as a Network TV site in the Canadian Domestic Communication Satellite System. As a Network TV station, it will be equipped initially for reception of two television channels. Further expansion will be possible including the capability to transmit where necessary. The channel switching functions will be remotely controlled from the Master Control station at Allan Park, Ont.
- 5.2 Characteristics Characteristics of proposed Communication Satellite Earth Station at Qu'Appelle, Sask. are shown in Table 1 and Figures 1, 2, 3, 4 attached.

6.0 TEST METHOD AND RESULTS

6.1 The following tests were conducted:

Test #1. Microwave measurements 1-10 GHz scanning through azimuths 0-360°
(see appendix A2-19 and B21-39).

Test #2. Power line radiation and TV signal measurements 54-88 MHz
(see appendix C39).

Test #3. Azimuthal search for particular microwave stations.
(see D41 and E43-45).

Test #4. Radar interference measurements 4 and 6 GHz bands.
(refer to all X-Y plots)

6.2 Test #1. Prior to making measurements the equipment was calibrated according to the following procedures:

The signal generator was fed to the FIM via the input cabling and the TWT. (see appendix G51) Frequency markers were plotted manually on the X - Y plotter every 50 MHz between 3.8 and 4.25 GHz. Next the X - Y plotter was calibrated in 5 dB increments starting at -105 dBm and at each of the above frequency markers. With the input cable terminated an X - Y plot was obtained showing the noise level of the FIM from 3.8 to 4.25 GHz.

With the equipment calibrated as above X - Y plots were made of the spectrum between 3.5 and 4.25 GHz, with the appropriate polarization. Starting at 0° true North and every 10° thereafter the spectrum was automatically scanned on the FIM for the bands concerned. (see appendices A2-19 for results).

The same procedure was used to calibrate in the frequency range 4.4 - 7.3 GHz and a spectrum search was done in the same manner as in the 4 GHz band. (Test results are shown in Appendices B21-39).

6.3 Test #2. For the power line radiation tests, the dipole antenna was mounted on top of the mobile laboratory and oriented towards the power line for maximum readings. As TV signals were present in the frequency range 54-88 MHz these signals were noted and stations identified wherever possible. The FIM readings in dBuV were recorded and converted to a power level as shown in appendix C39.

During the above tests automobile ignition noise was not detected due to the remoteness of the site.

6.4 Test #3. Particular attention was given to the Canadian Pacific Telecommunications 6 GHz site at McLean which was located a distance of 18.3 miles at a bearing of 150°. The Saskatchewan Government telephone 4 GHz sites at Regina, McLean and Findlater were monitored closely in an attempt to detect emissions in the 3.7 - 4.2 GHz band. No microwave signals were detected at any of the test sites. (see D41, E43-45).

6.5 Test #4. In checking for radar emissions in the 4 and 6 GHz bands the same procedures as outlined in 6.2 was used. Specific frequency ranges in the 3.7 - 4.2 and 5.925 - 6.425 GHz bands were manually scanned with the test receiving antenna oriented towards known radar sites.

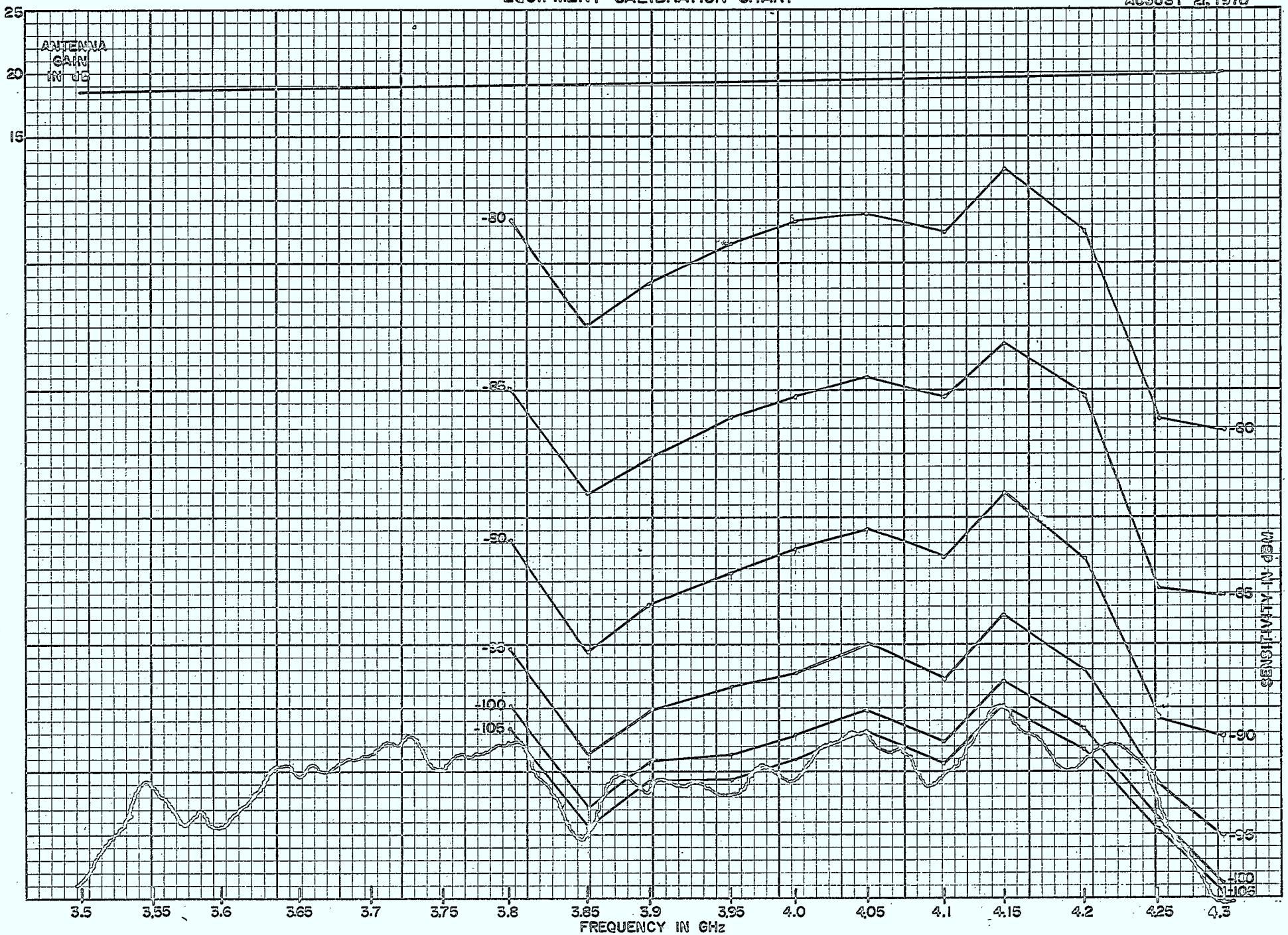
APPENDIX A
(SITE #1)

X-Y PLOTS OF FREQUENCY RANGE 3.5 - 4.3 GHz

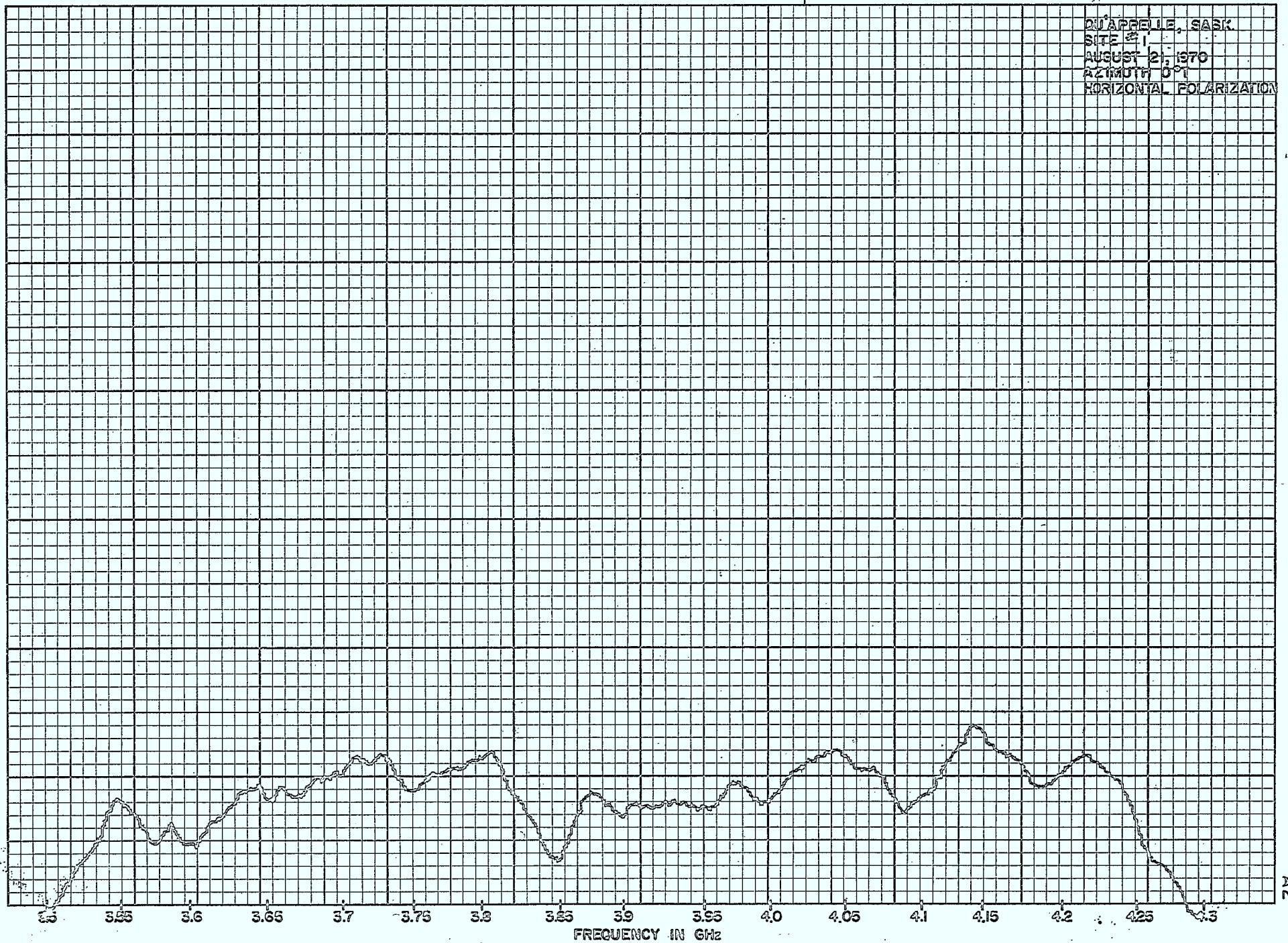
- APPENDIX A1 Equipment Calibration Chart indicating measurement sensitivity.
- APPENDICES A2-I9 Show frequency scans in azimuths 0-360° using horizontal polarization

EQUIPMENT CALIBRATION CHART

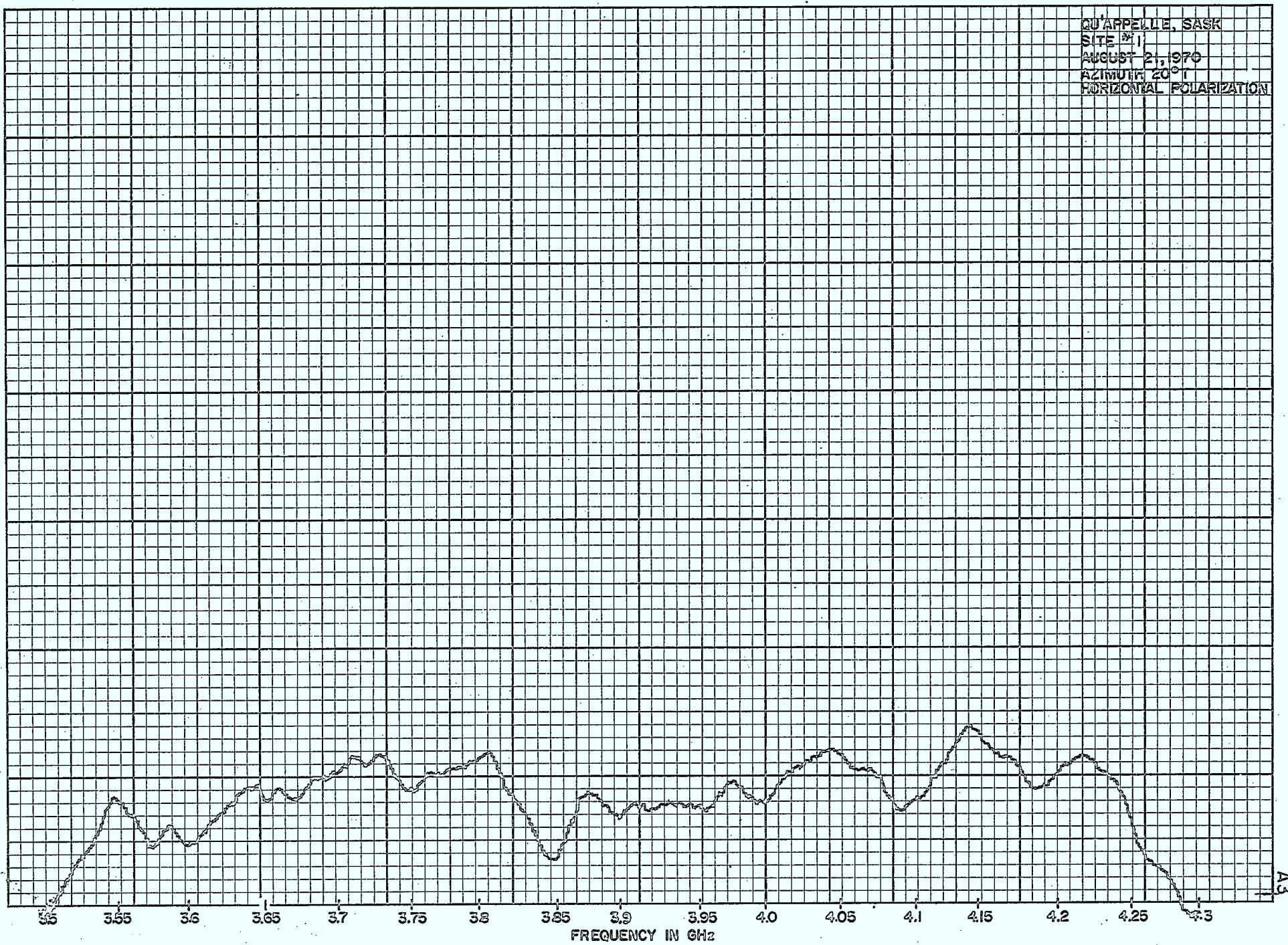
AUGUST 21, 1970



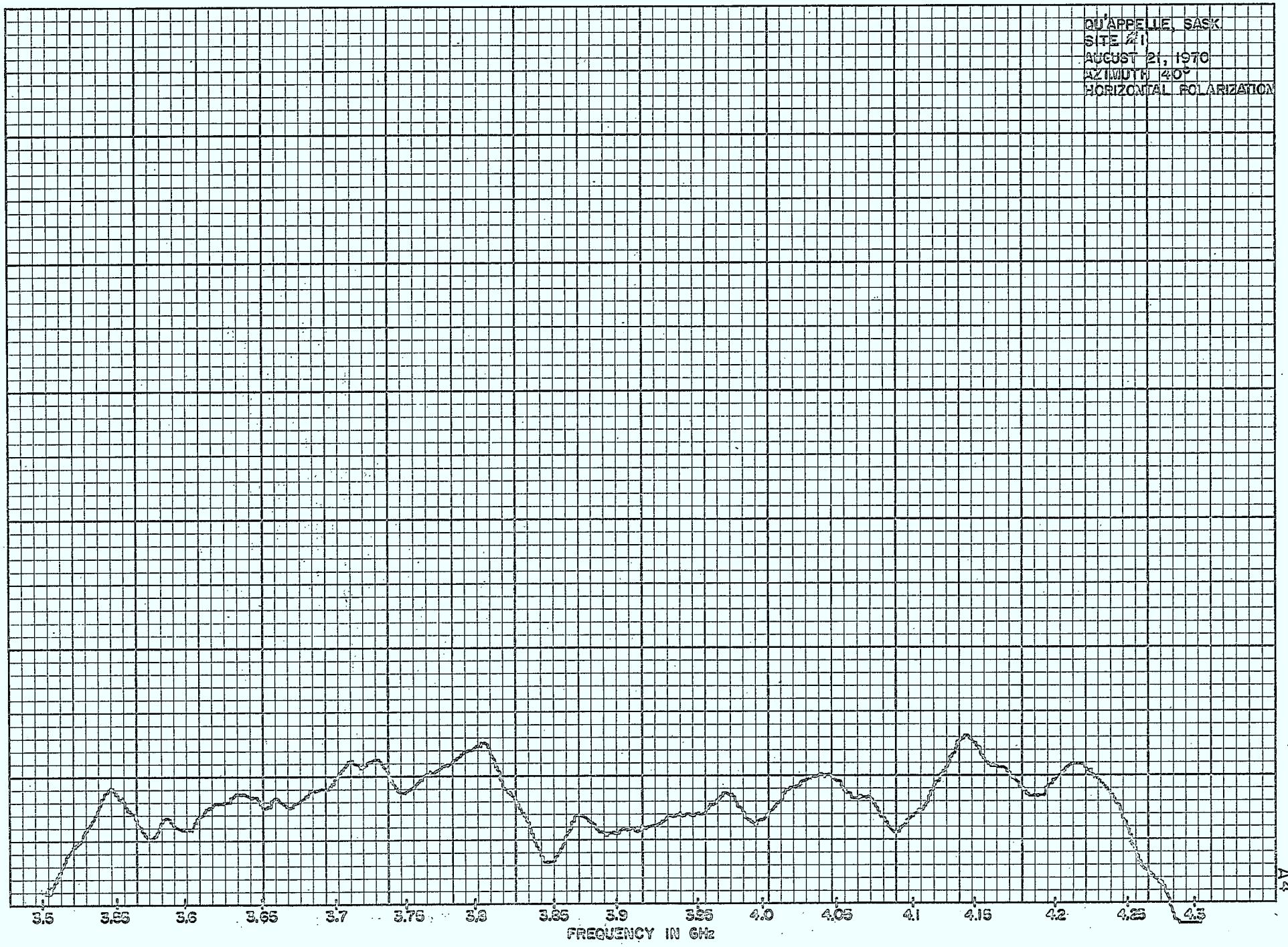
DU'APPELLE, SASK.
SITE 1
AUGUST 21, 1970
AZIMUTH 0°
HORIZONTAL POLARIZATION



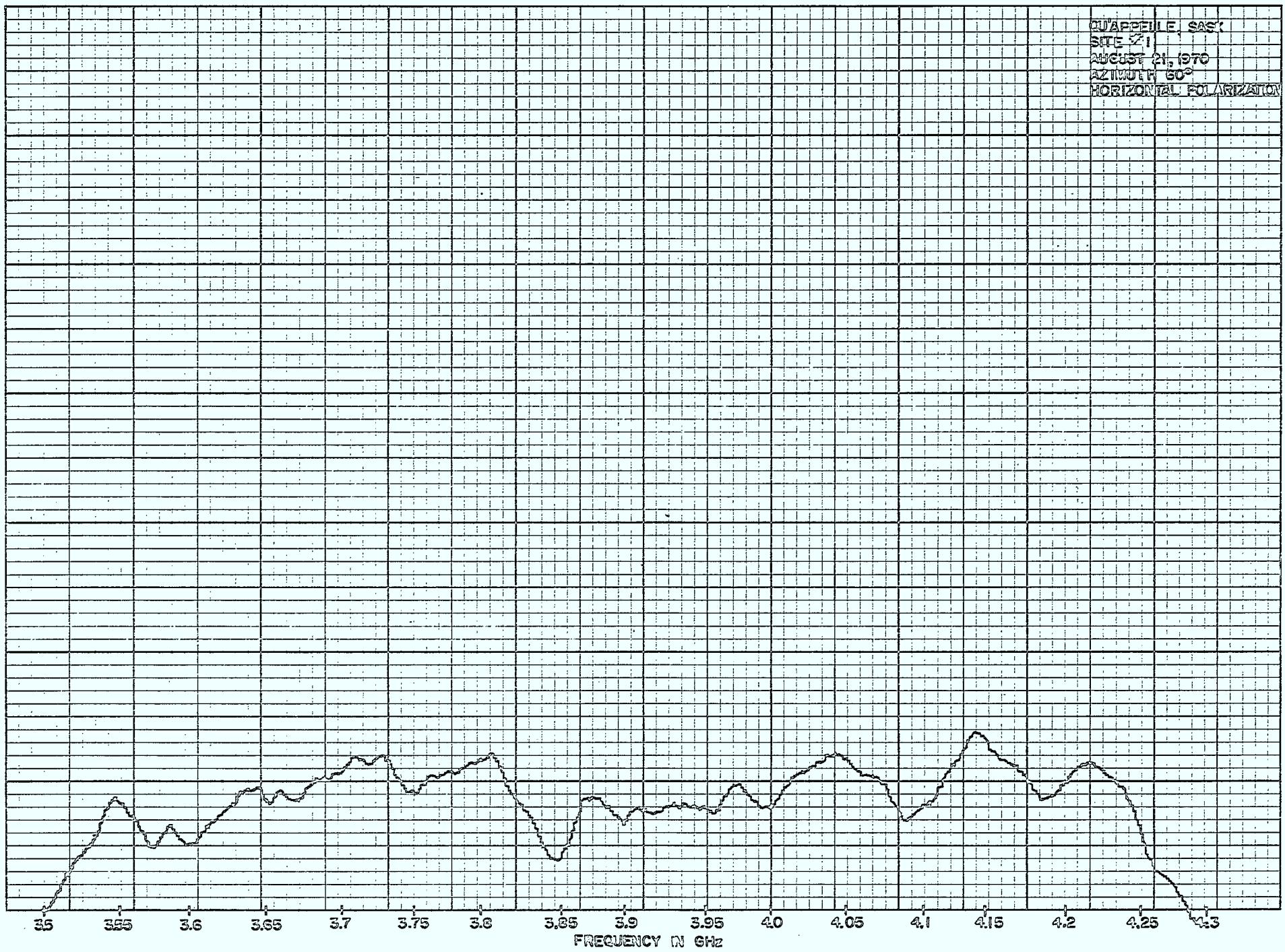
QUARRVILLE, SASK
SITE #11
AUGUST 21, 1970
AZIMUTH: 20°
HORIZONTAL POLARIZATION



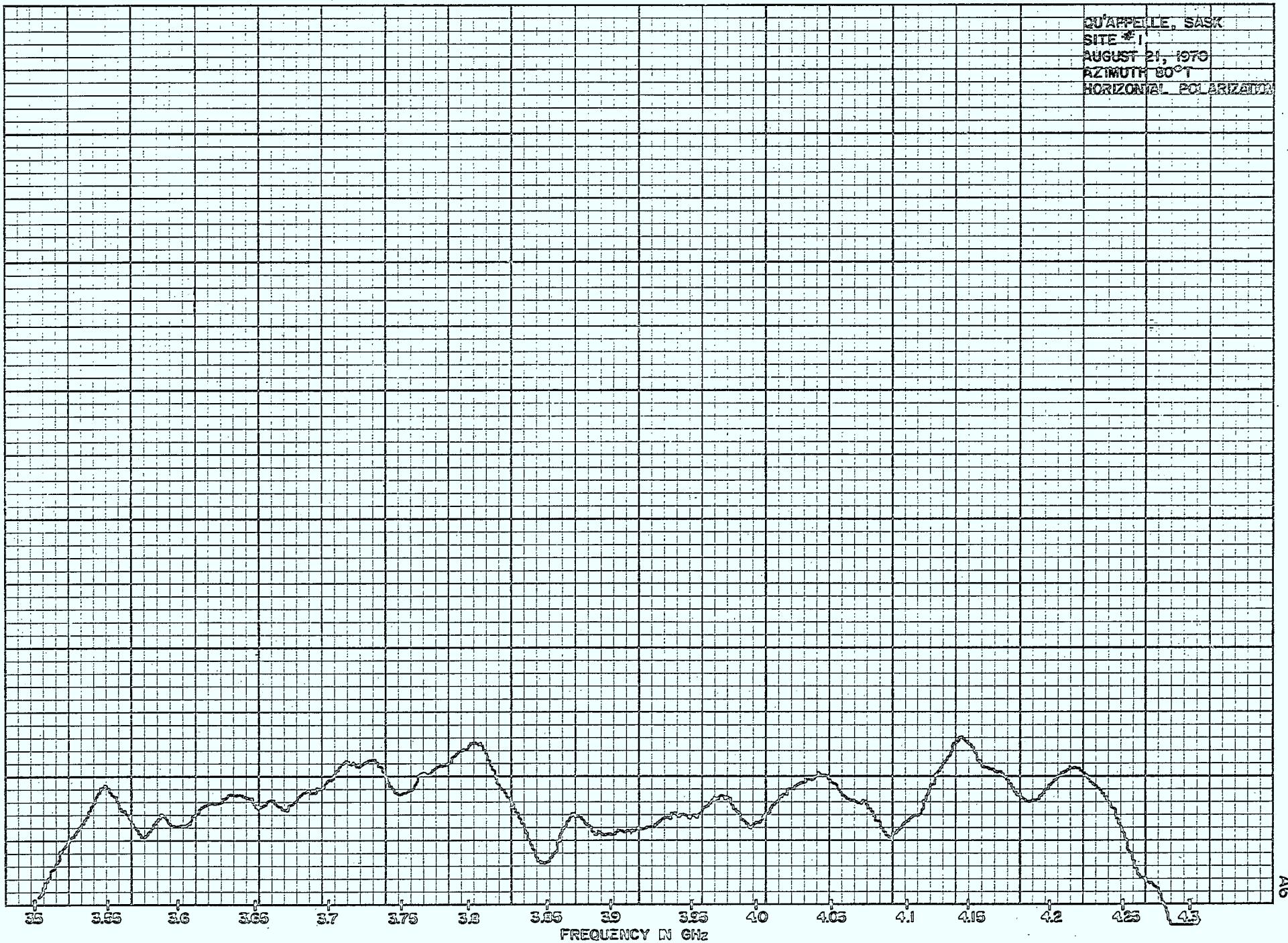
DU'APPELLE, SASK
SITE 211
AUGUST 21, 1970
AZIMUTH 140°
HORIZONTAL POLARIZATION



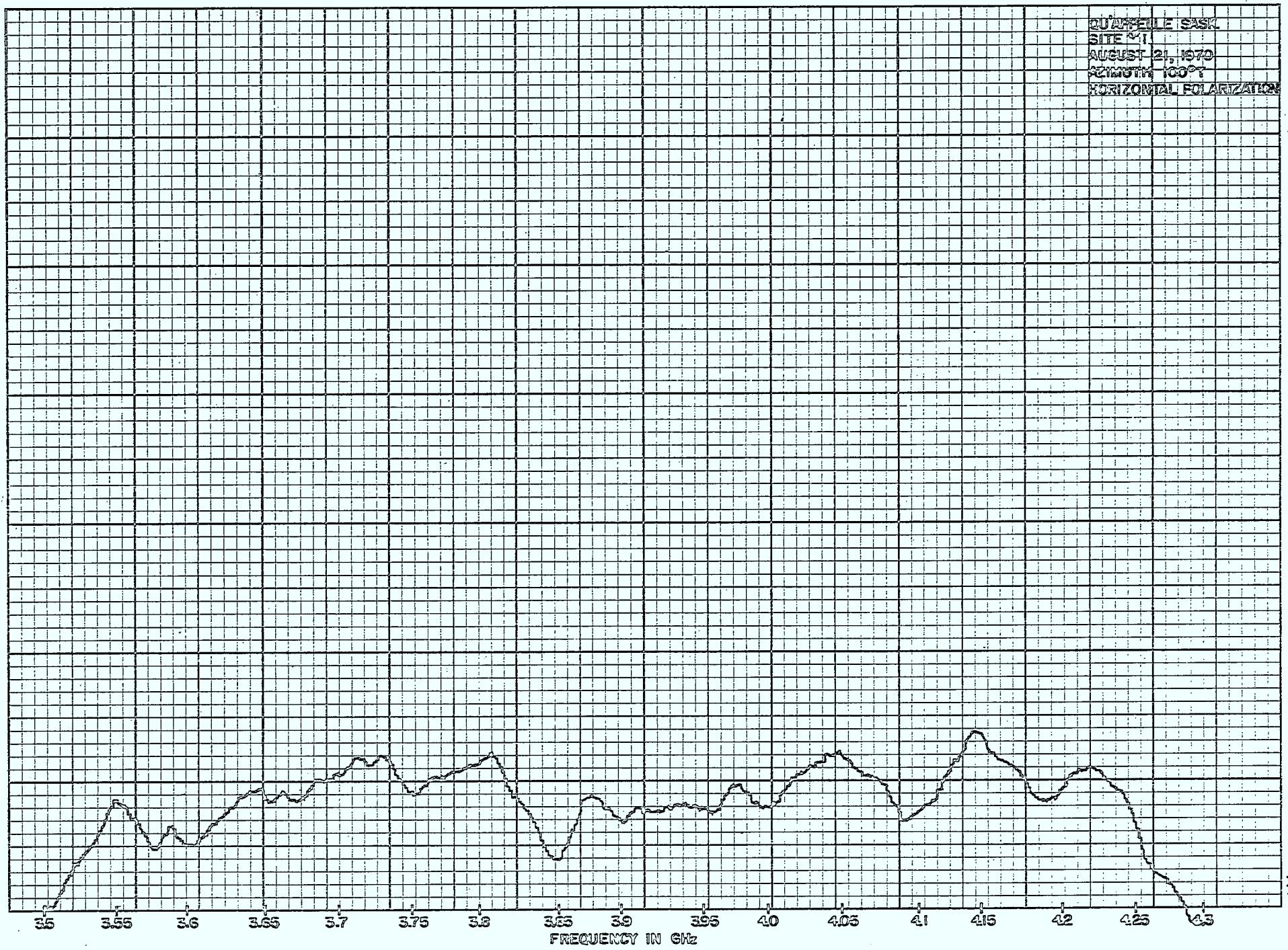
QU'APPÈLE, SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 60°
HORIZONTAL POLARIZATION



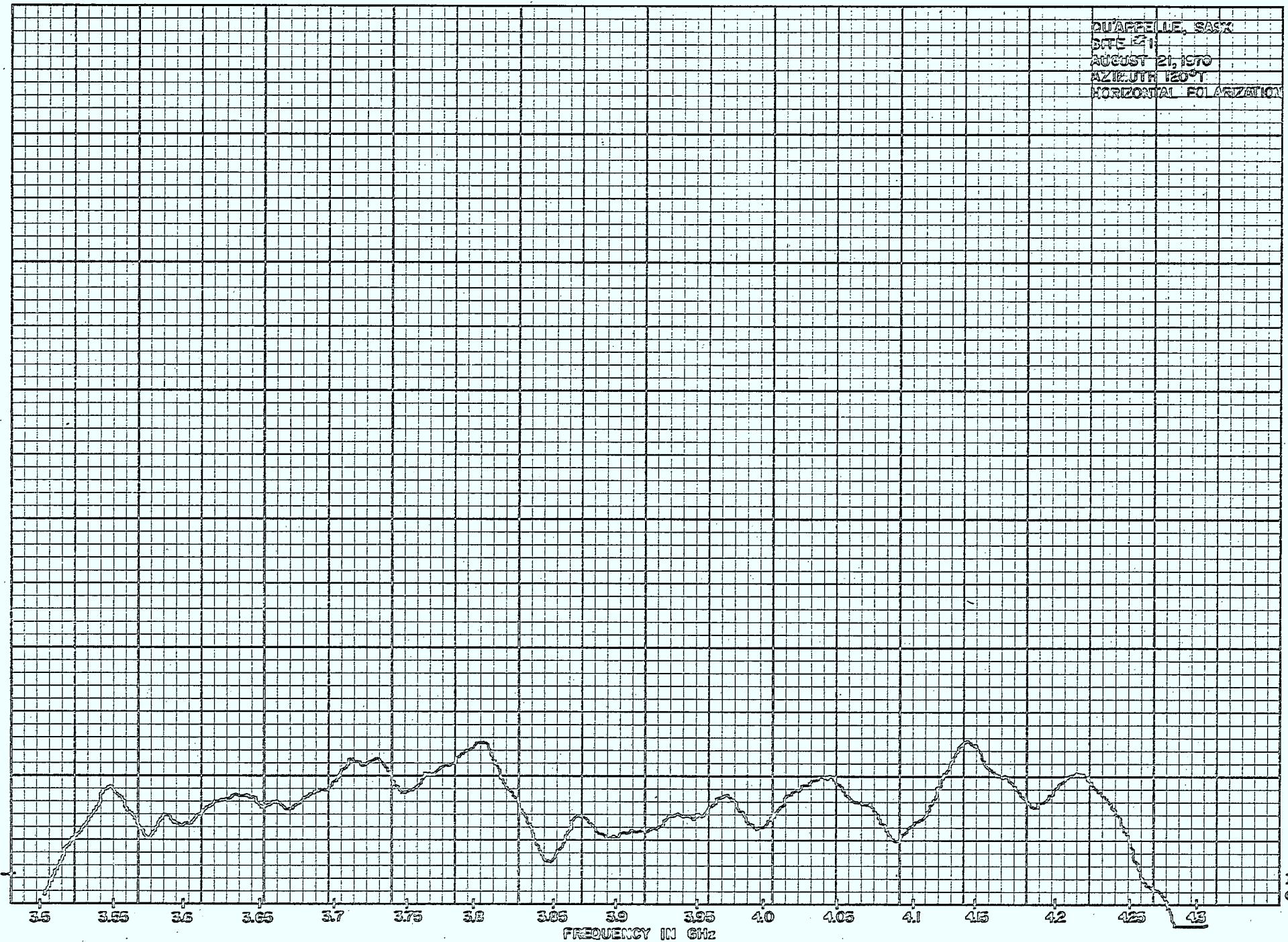
DU'AMPELLE, SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 60°
HORIZONTAL POLARIZATION



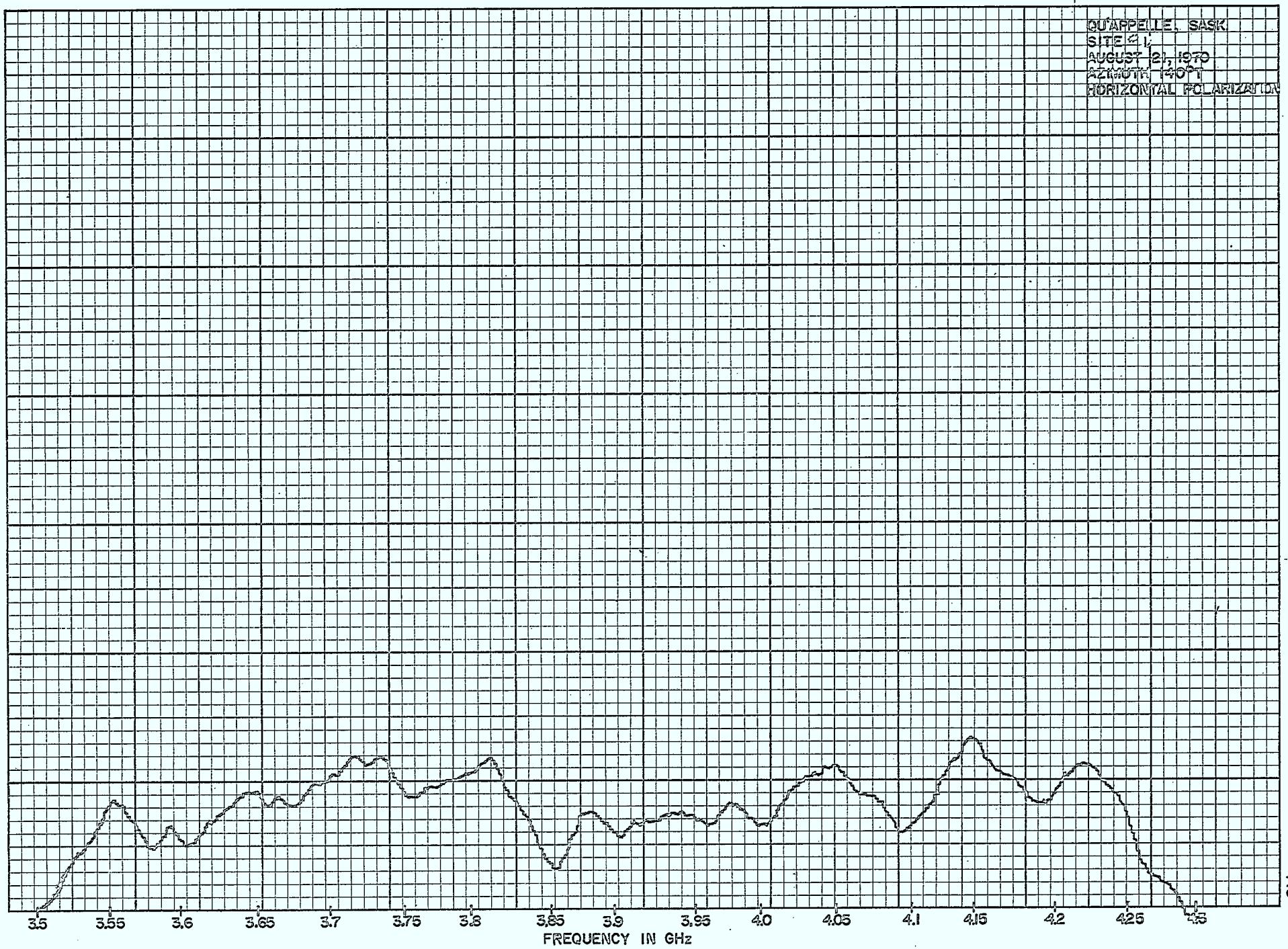
DUARRELL SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 100°
HORIZONTAL POLARIZATION



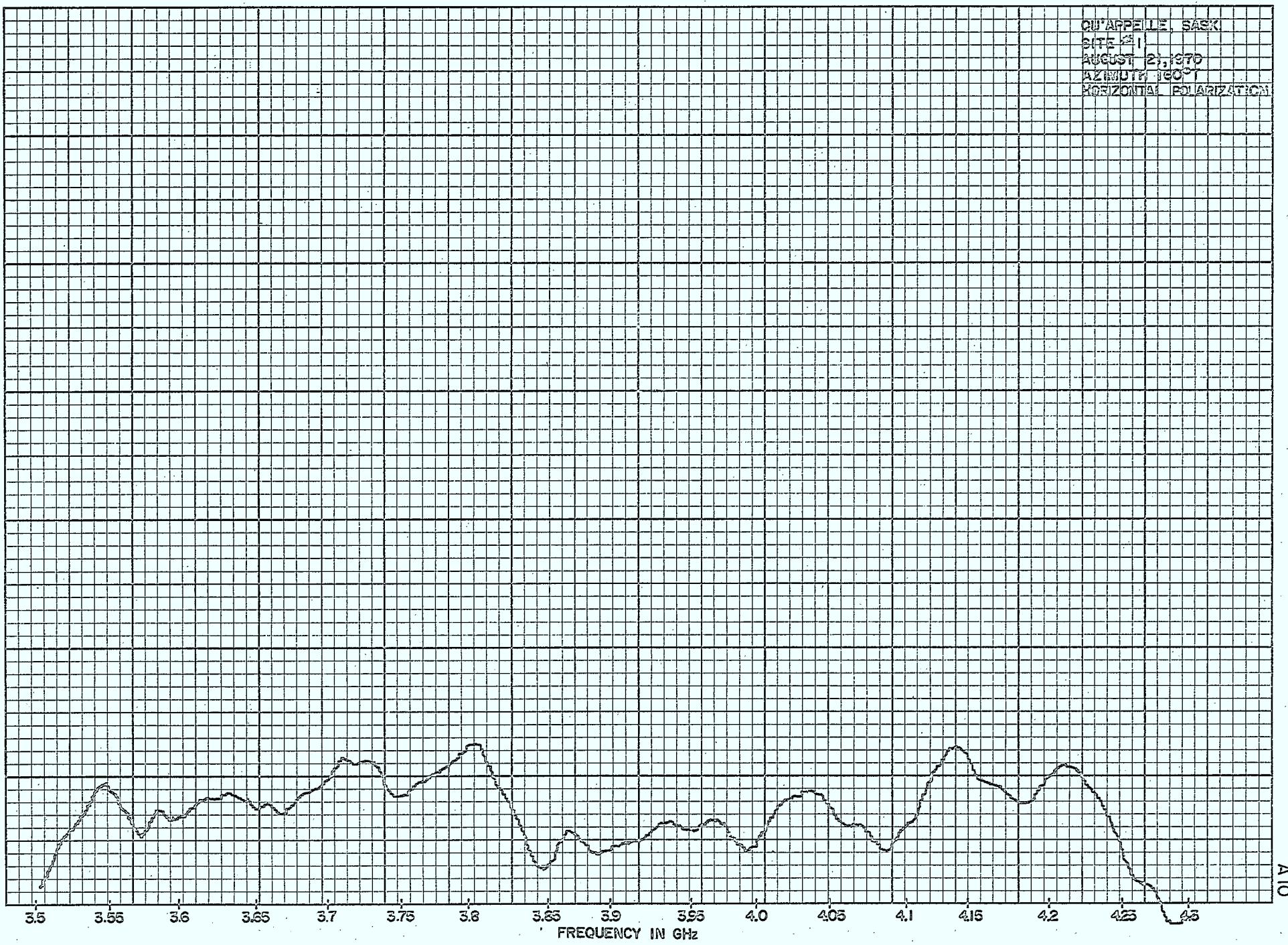
DUARVILLE, SASK
DATE 1211
AUGUST 21, 1970
AZIMUTH 120°
HORIZONTAL POLARIZATION



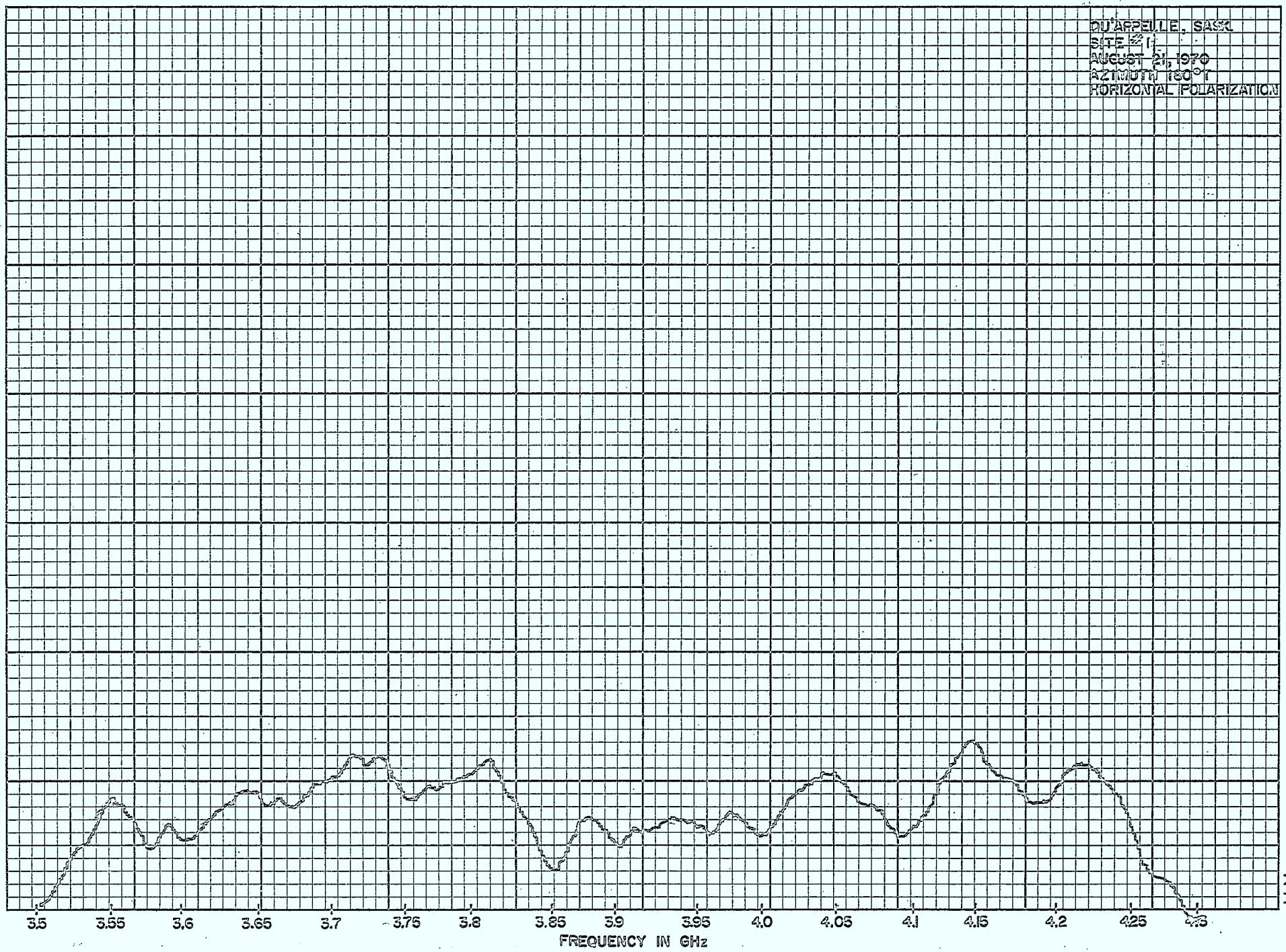
QU'APPÈLLE, SASK
SITE 4 L
AUGUST 21, 1970
AZIMUTH 140°
HORIZONTAL POLARIZATION



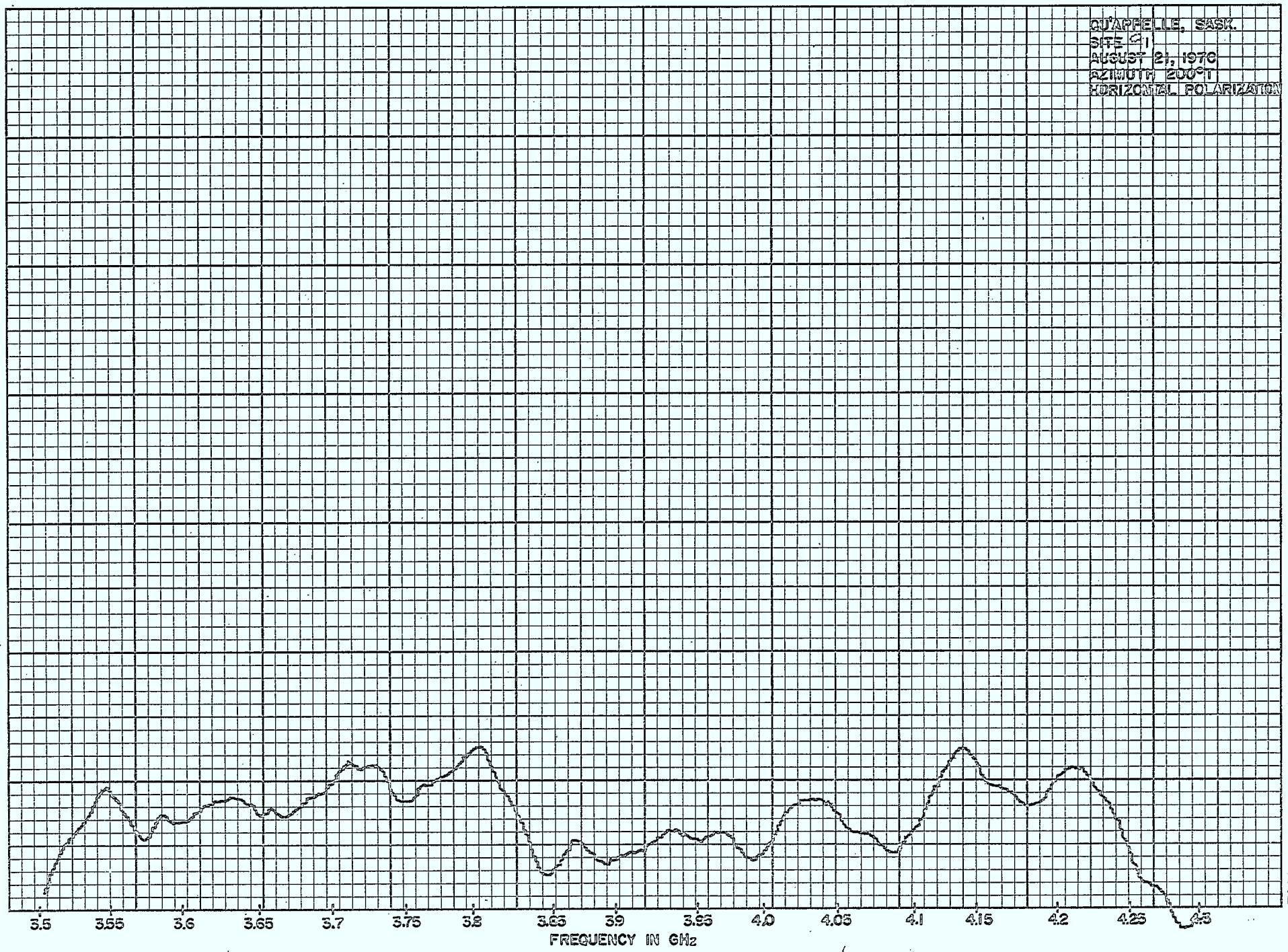
CUTARPELLE, SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 160°
HORIZONTAL POLARIZATION



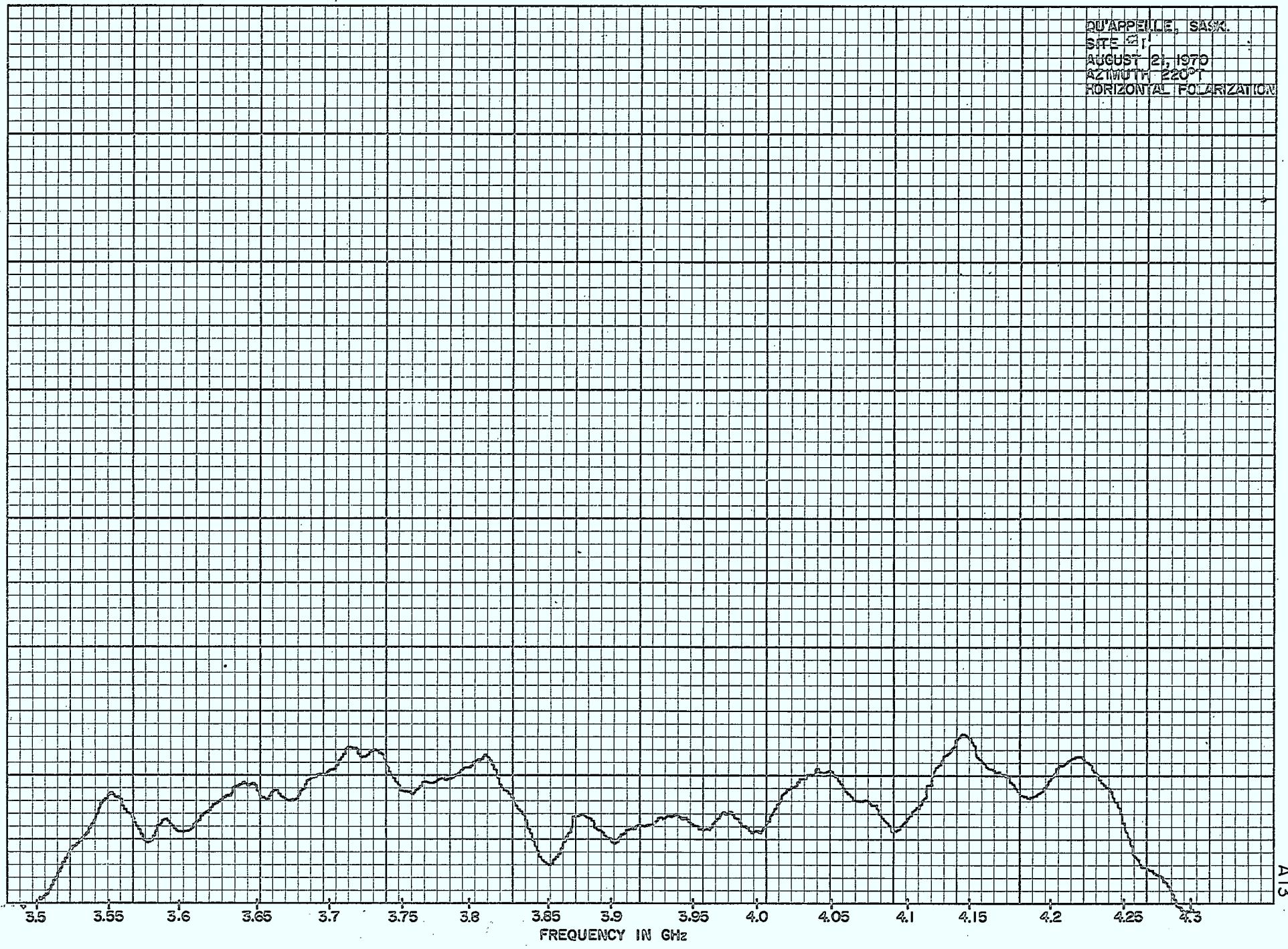
DU'APPELLE, SASK
SITE #11
AUGUST 21, 1970
AZIMUTH 180°
HORIZONTAL POLARIZATION



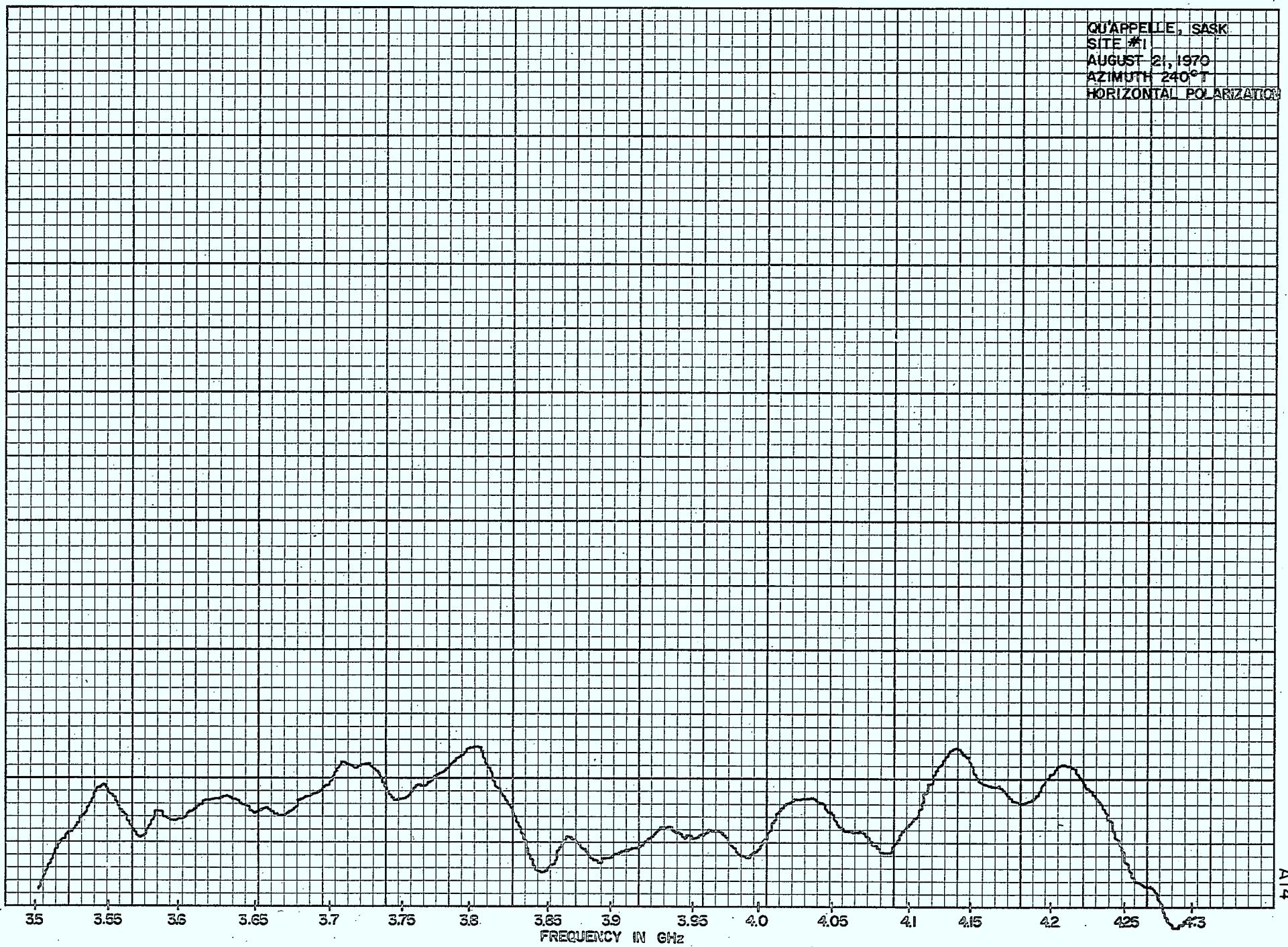
QUAPPILLE, SASK.
SITE C1
AUGUST 21, 1970
AZIMUTH 200°
HORIZONTAL POLARIZATION



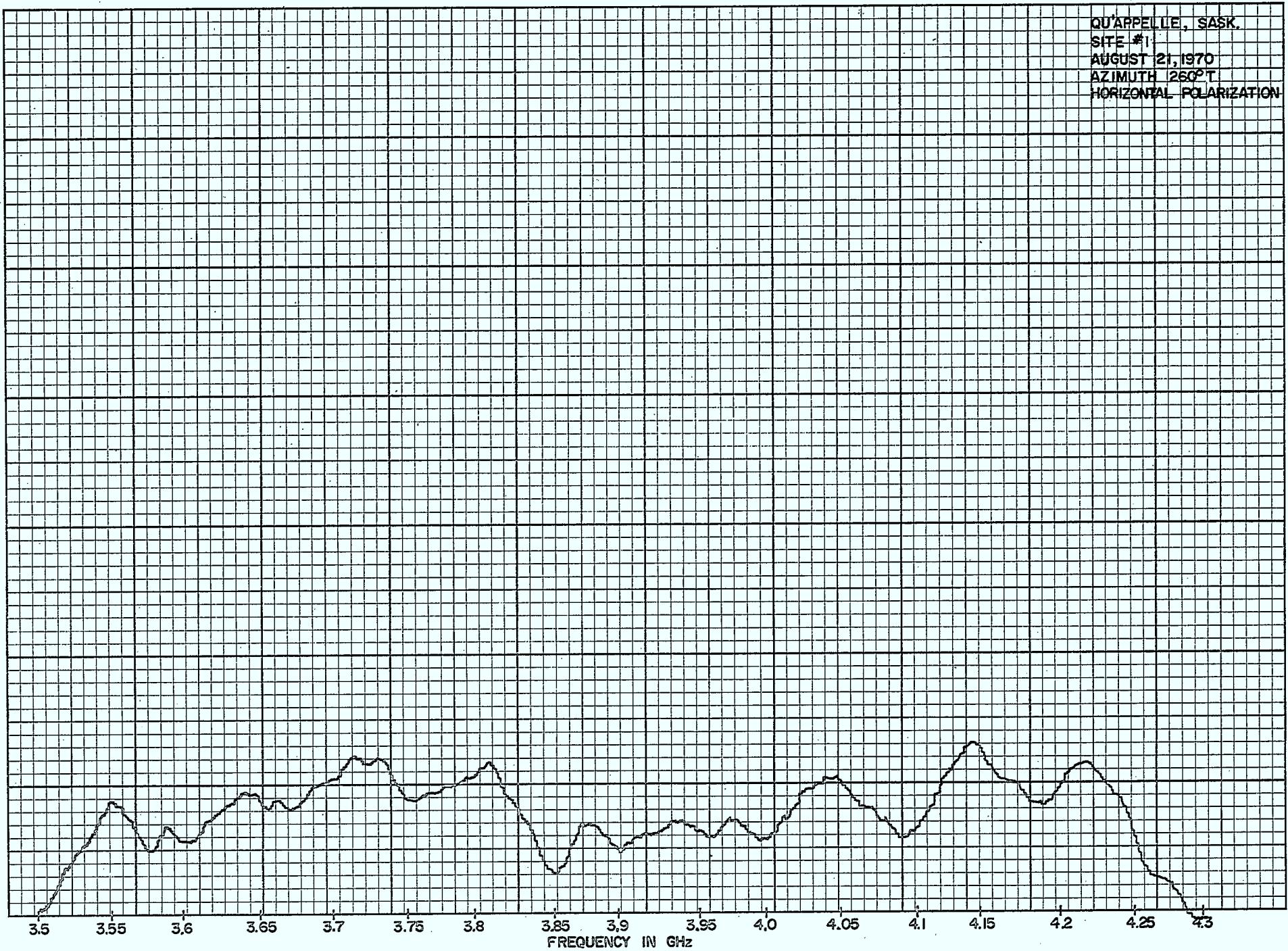
DUARVILLE, SASK.
SITE 21
AUGUST 21, 1970
AZIMUTH 220°
HORIZONTAL POLARIZATION



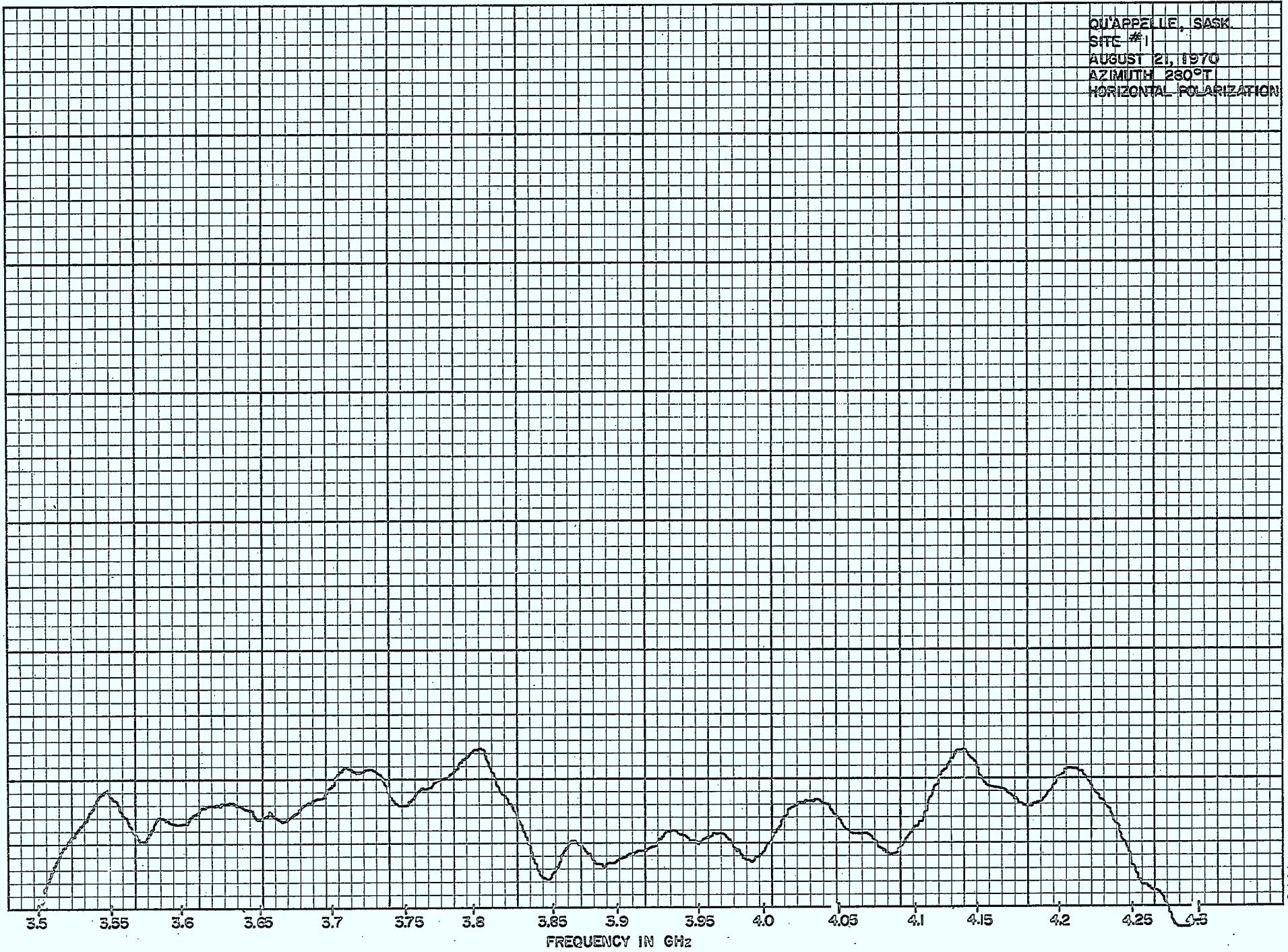
QU'APPELLE, SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 240° T
HORIZONTAL POLARIZATION



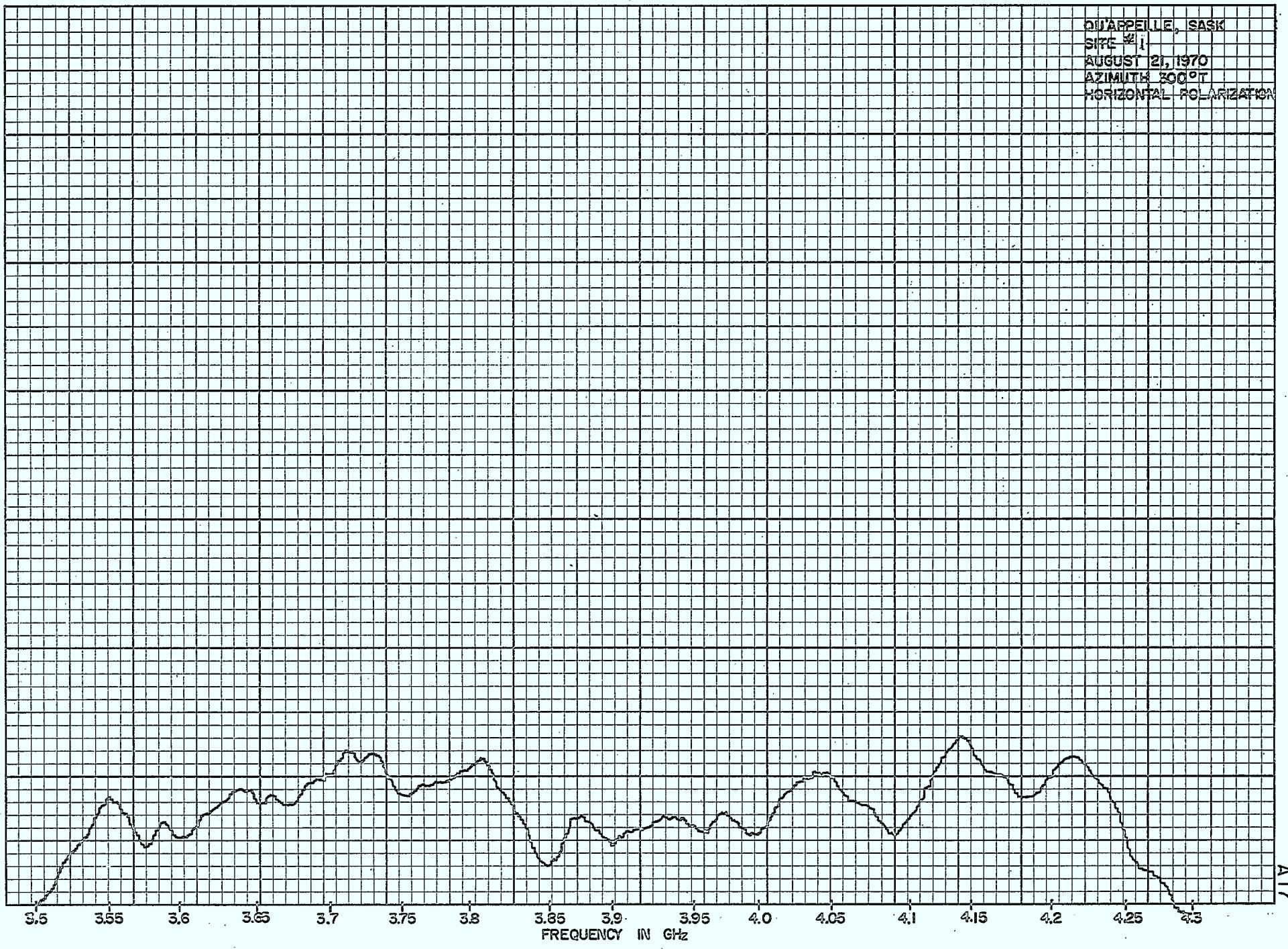
QU'APPELLE, SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH 260° T
HORIZONTAL POLARIZATION



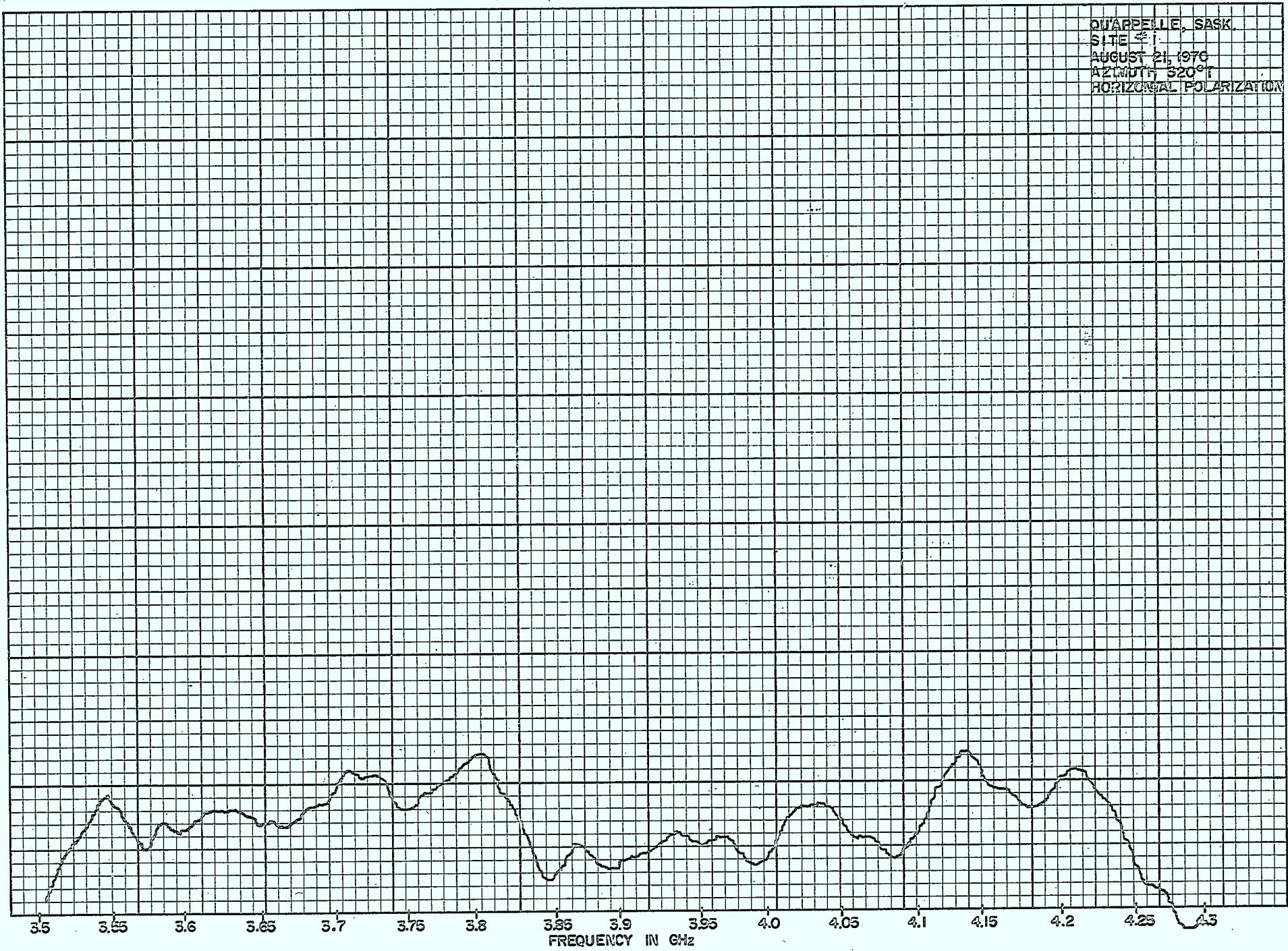
QU'APPELLE, SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH 230°
HORIZONTAL POLARIZATION



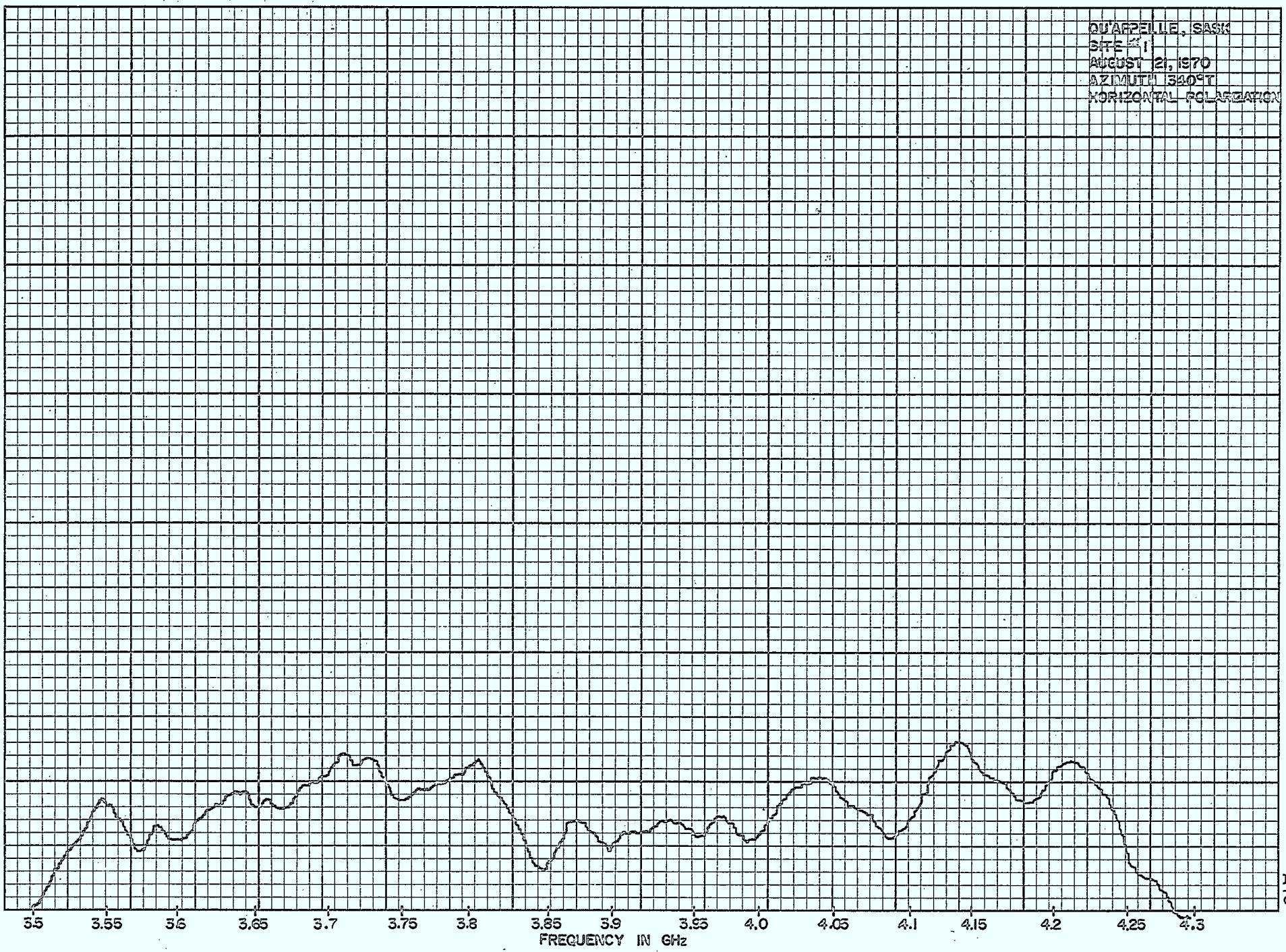
QU'APPELLE, SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 300°
HORIZONTAL POLARIZATION



DUARPELLE, SASK.
SITE #1
AUGUST 21, 1976
AZIMUTH 320° T
HORIZONTAL POLARIZATION



QU'APPELLE, SASK
SITE 11
AUGUST 2, 1970
AZIMUTH 340°
HORIZONTAL POLARIZATION



APPENDIX B
(SITE #1)

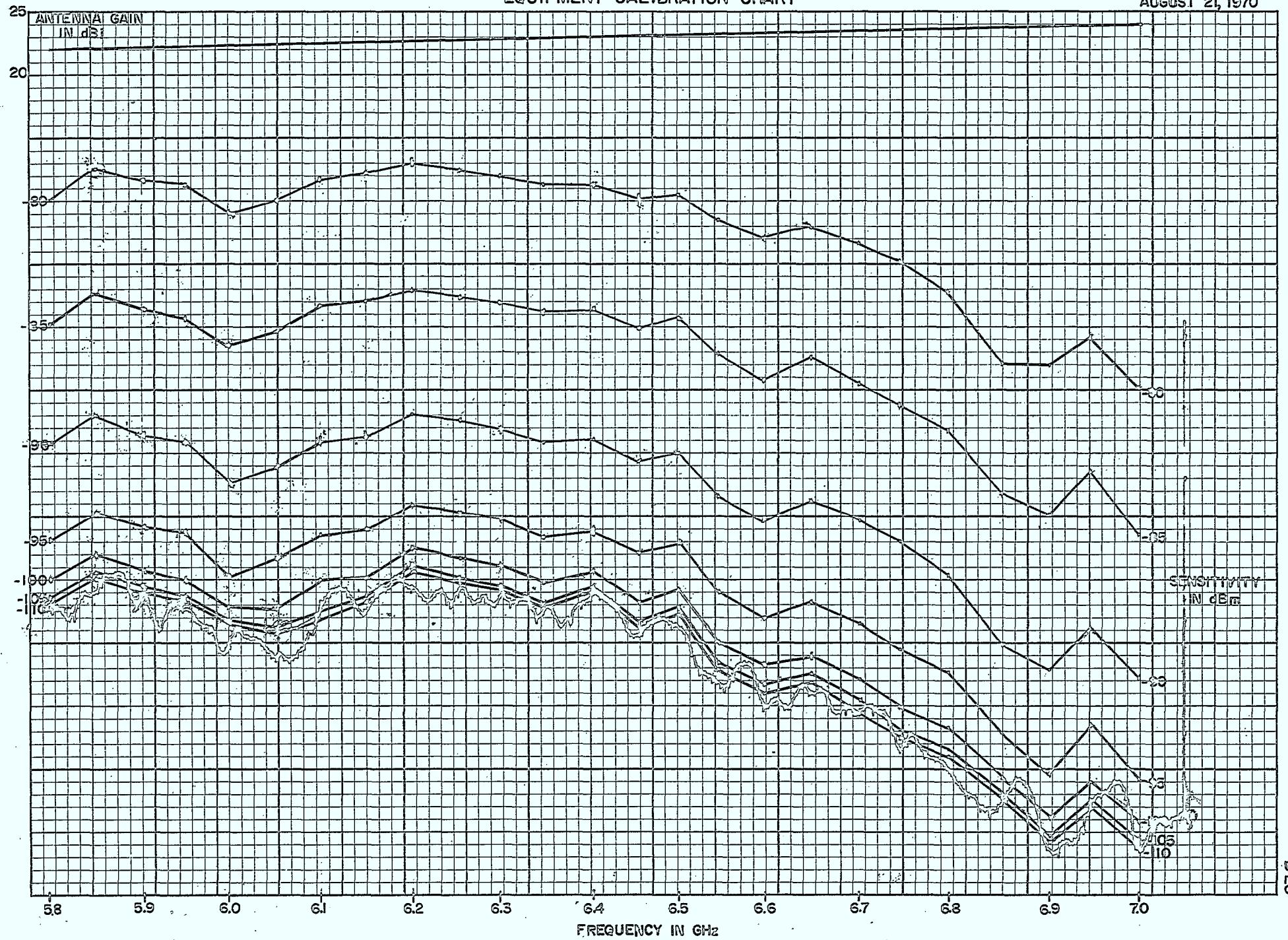
X-Y PLOTS OF FREQUENCY RANGE 5.8 - 7.0 GHz

APPENDIX B.20 Equipment Calibration Chart indicating measurement sensitivity.

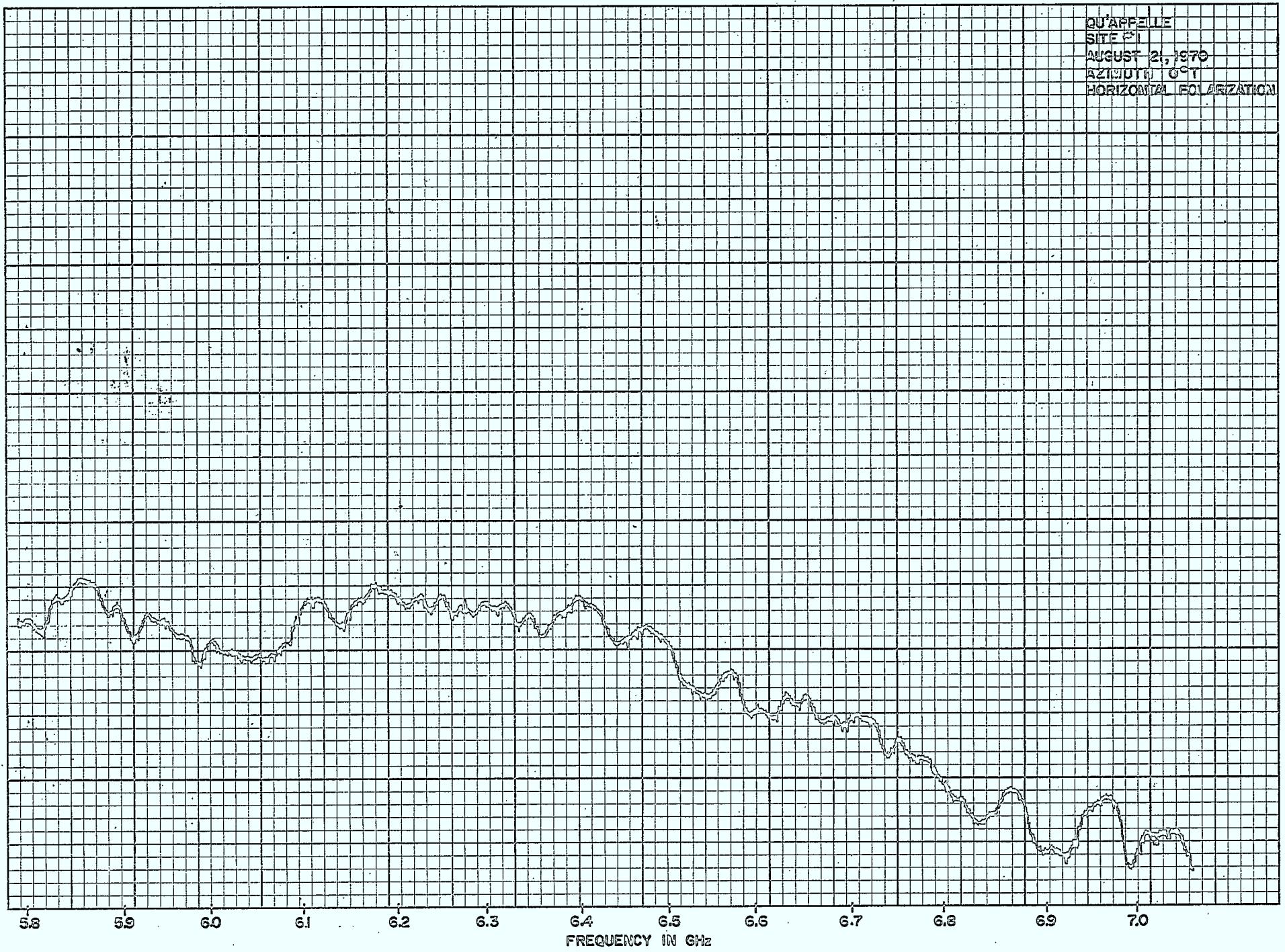
APPENDICES B2I-38 Show frequency scans in azimuths 0 - 360° using horizontal polarization

EQUIPMENT CALIBRATION CHART

AUGUST 21, 1970



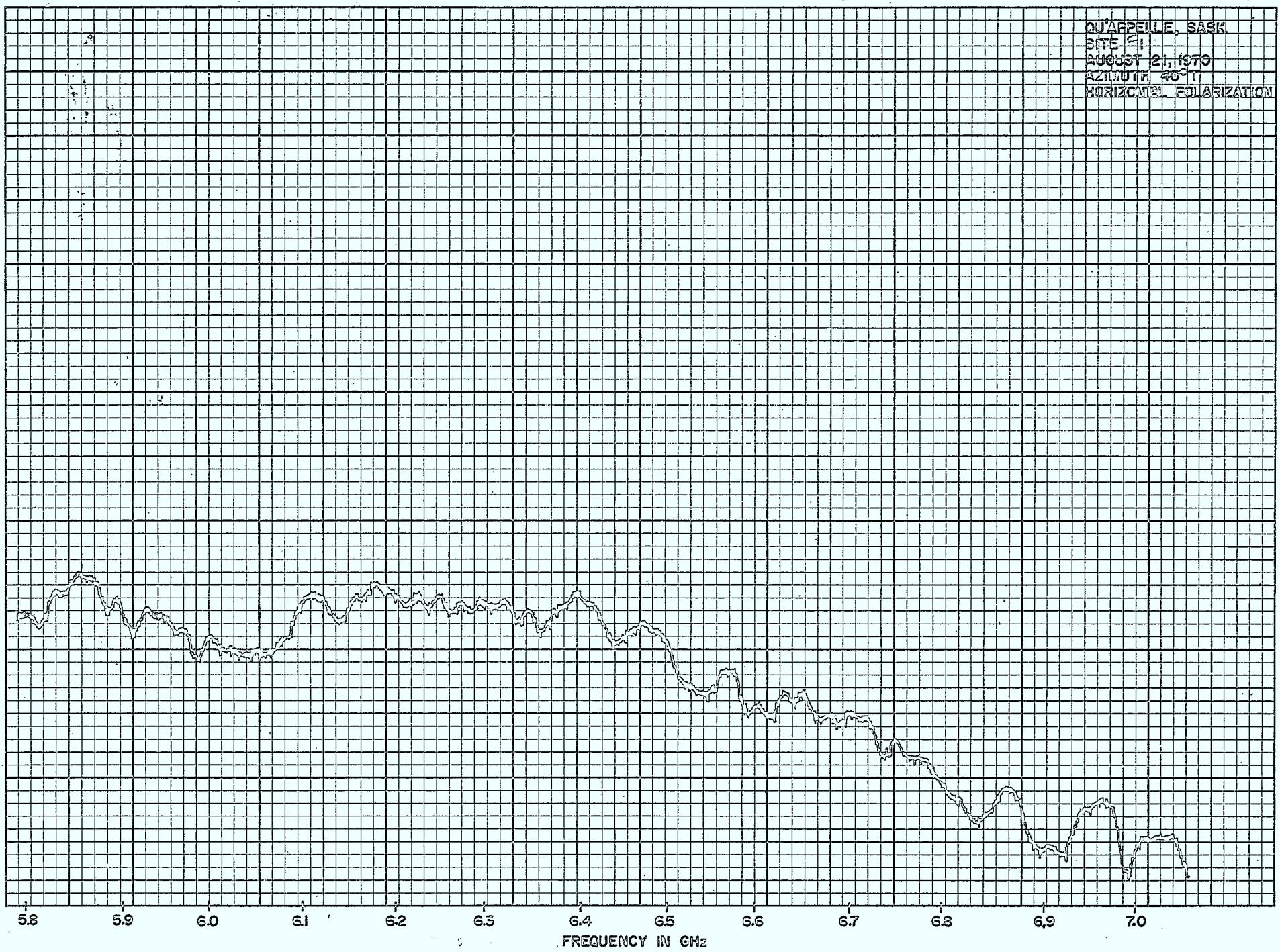
QU'APPÉLLE
SITE 21
AUGUST 21, 1970
AZIMUTH 0°
HORIZONTAL POLARIZATION



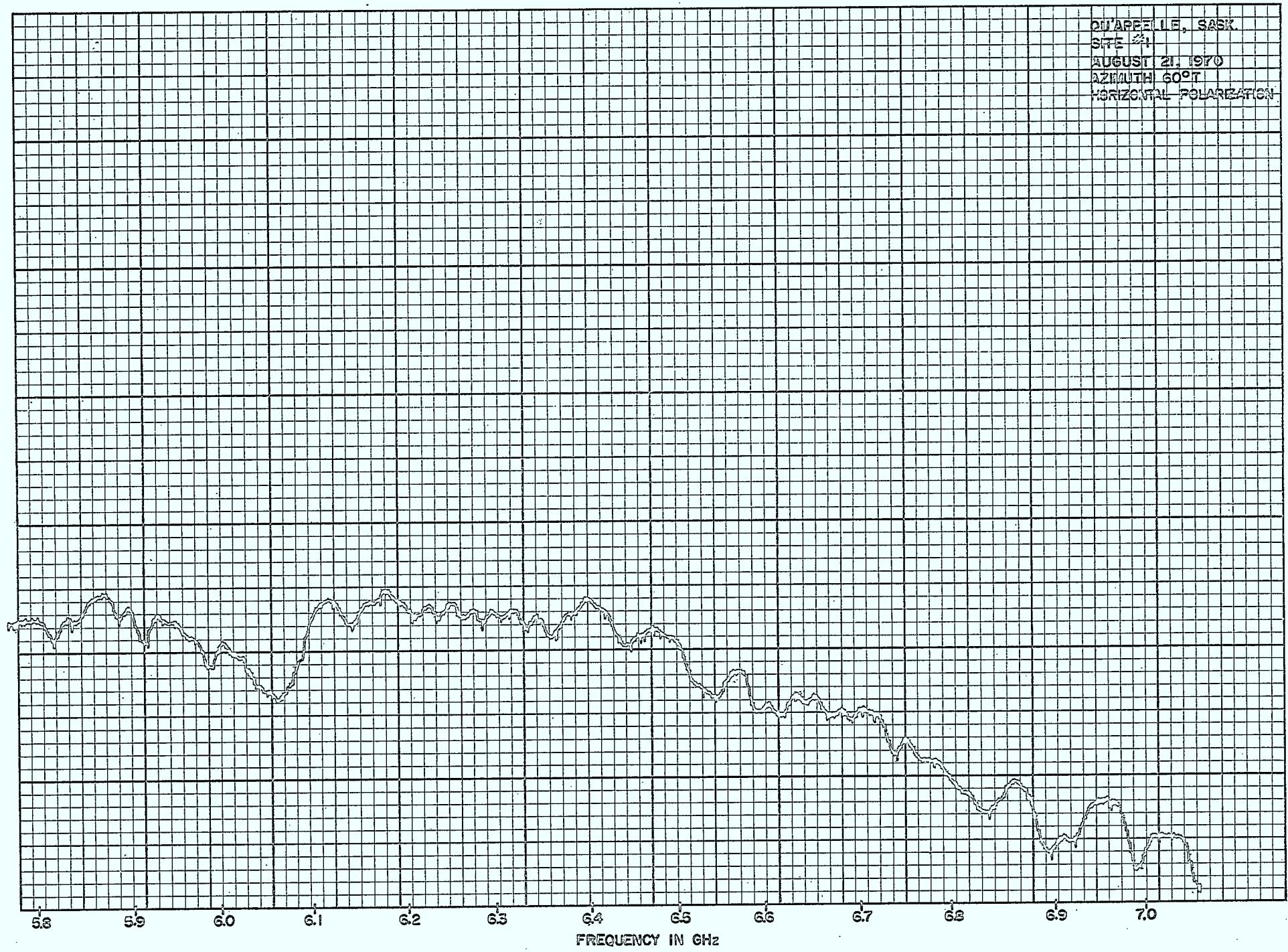
QU'APPELLE, SASK
SITE #1
AUGUST 21, 1976
AZIMUTH 20°
HORIZONTAL POLARIZATION



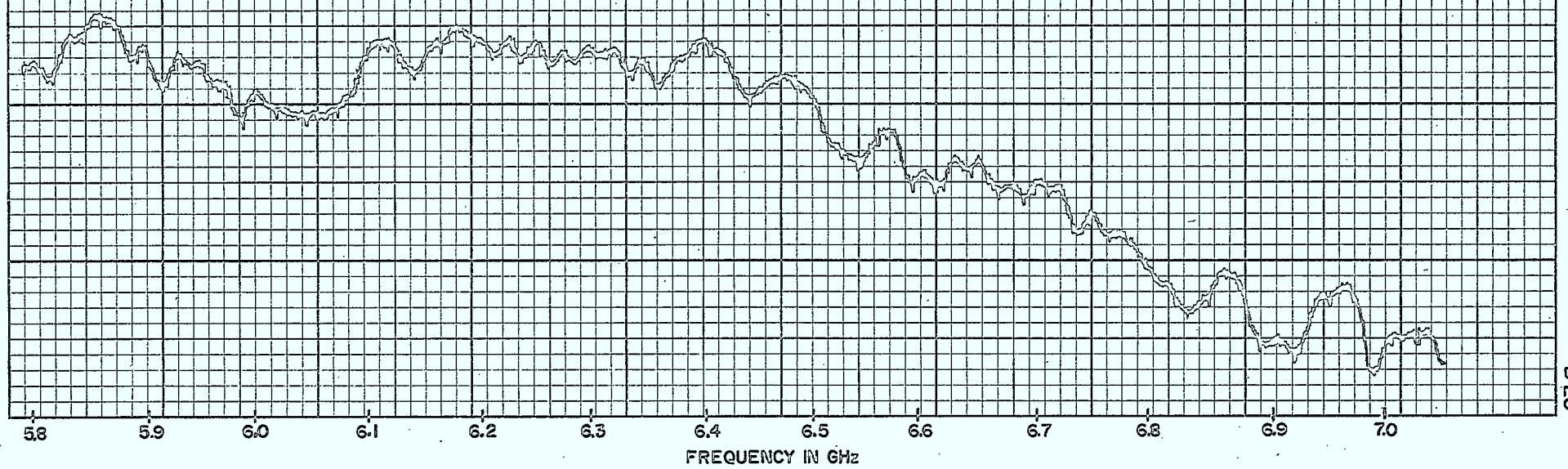
QUARRVILLE, SASK
SITE 21
AUGUST 21, 1970
AZIMUTH 90°
HORIZONTAL POLARIZATION



DU'APPELLE, SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 60°
HORIZONTAL POLARIZATION



QUAPPILLE, SASK.
SITE 4
AUGUST 21, 1970
AZIMUTH 30°T
HORIZONTAL POLARIZATION



DU'APPELLE, SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH 100°
HORIZONTAL POLARIZATION

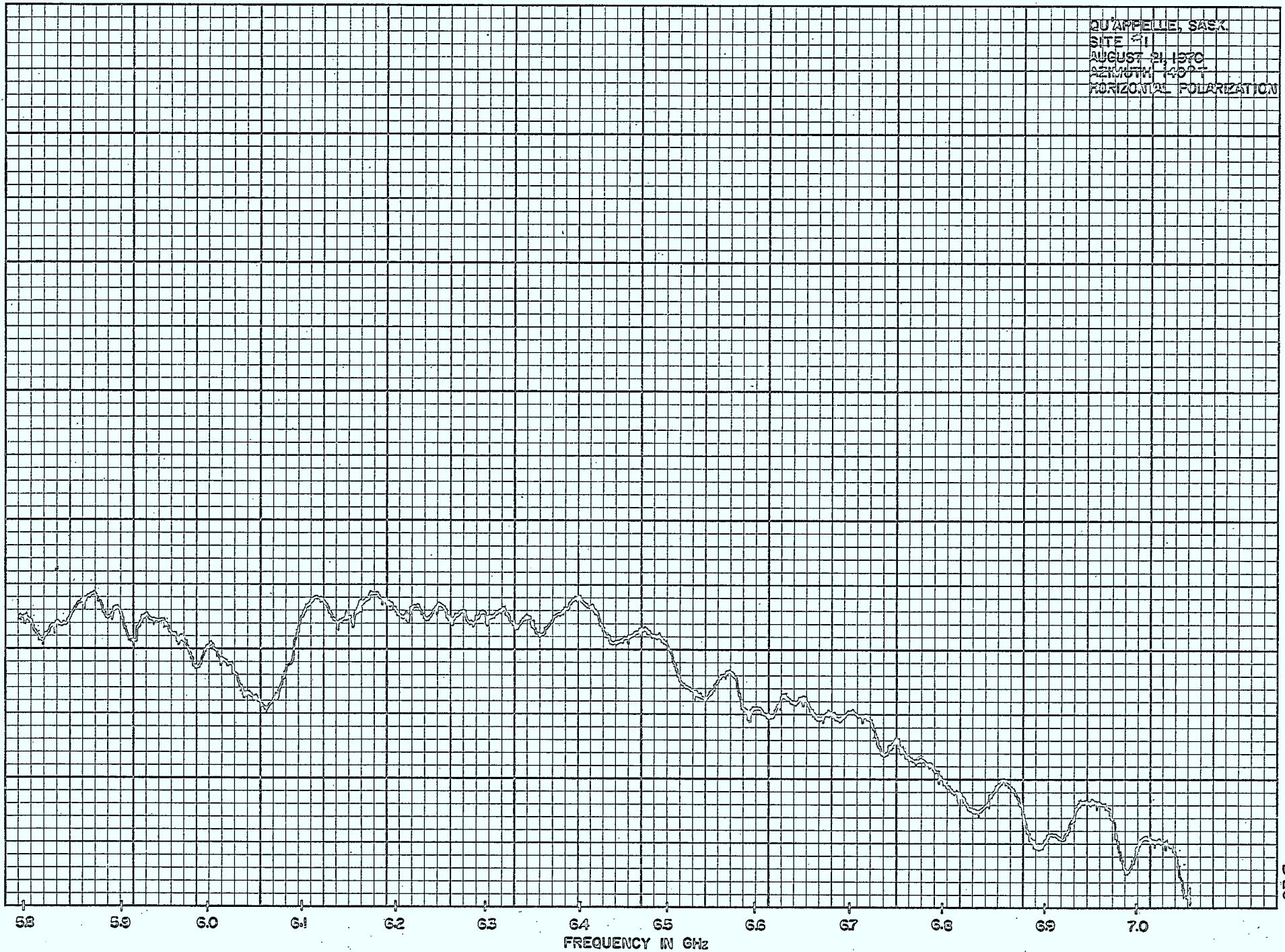


QU'APPELLE, SASK.
SITE 1
AUGUST 21, 1970
AZIMUTH 20°T
HORIZONTAL POLARIZATION



B27

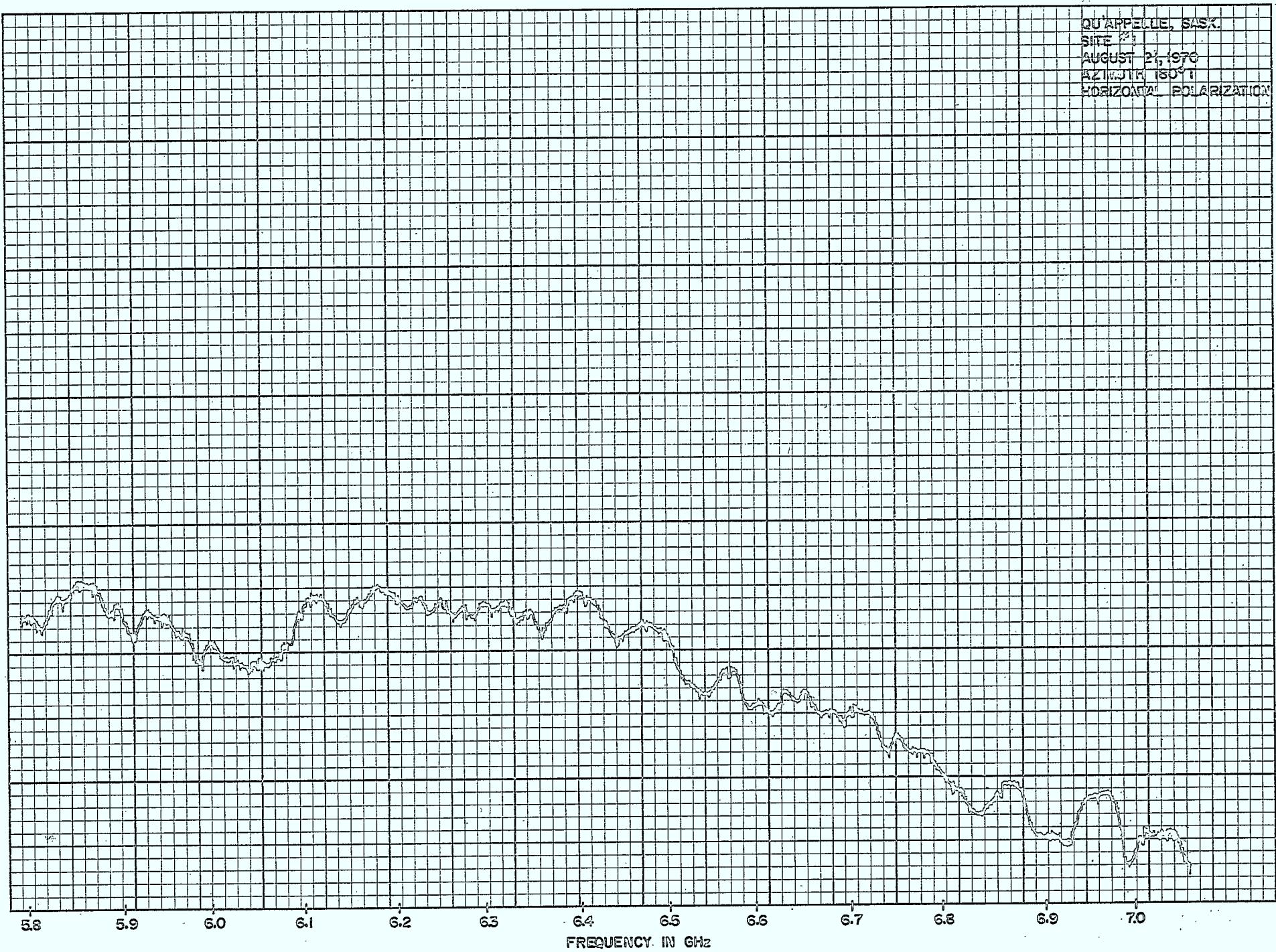
QU'APPELLE, SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH: 140°
HORIZONTAL POLARIZATION



ON'APPELLE, SASK.
SITE 21
AUGUST 21, 1970
AZIMUTH 160° T
HORIZONTAL POLARIZATION



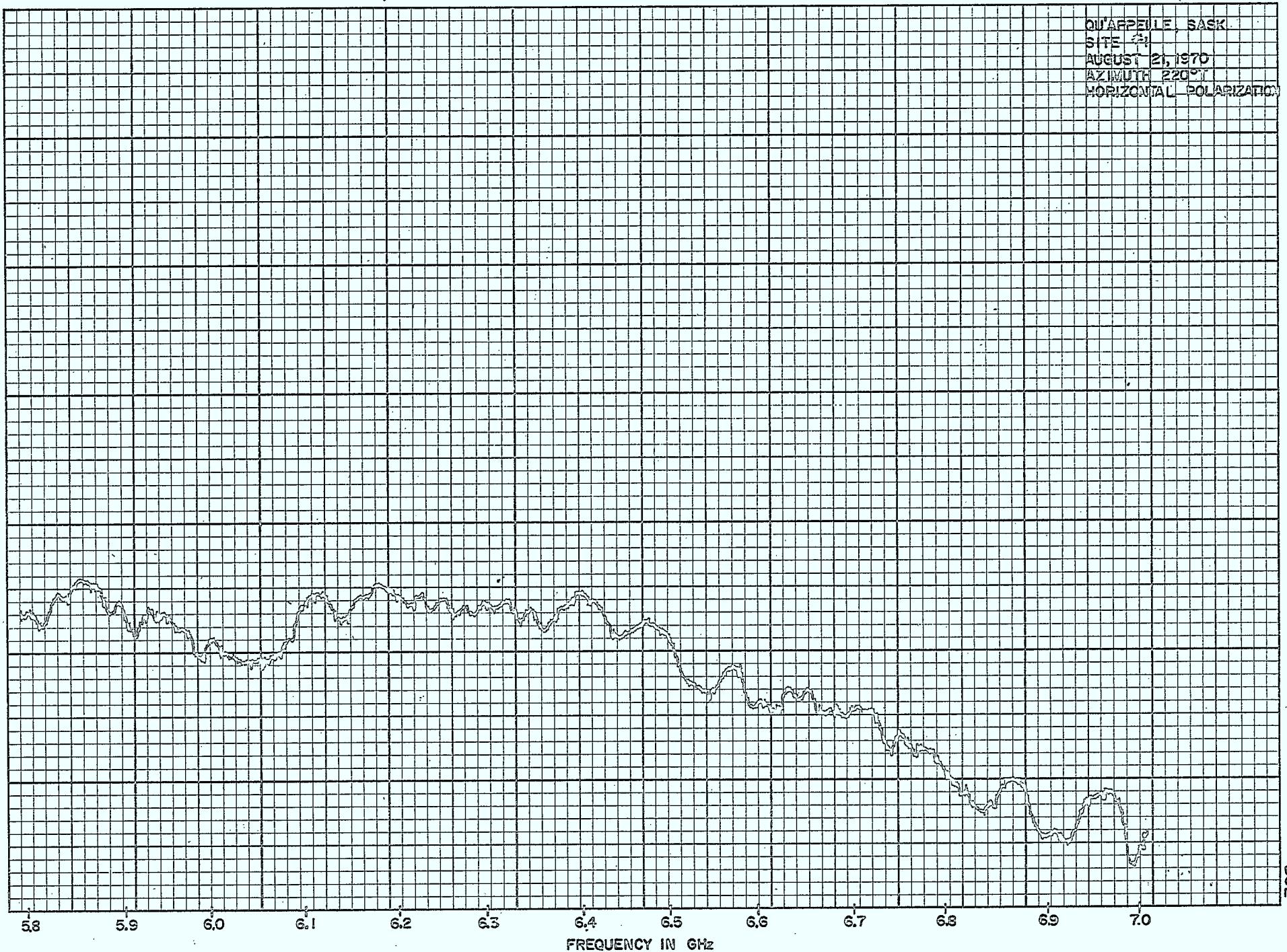
QU'APPHELLE, SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH 180°
HORIZONTAL POLARIZATION



DU'APPELLE, SASK.
SITE 21
AUGUST 21, 1970
AZIMUTH 200°
HORIZONTAL POLARIZATION



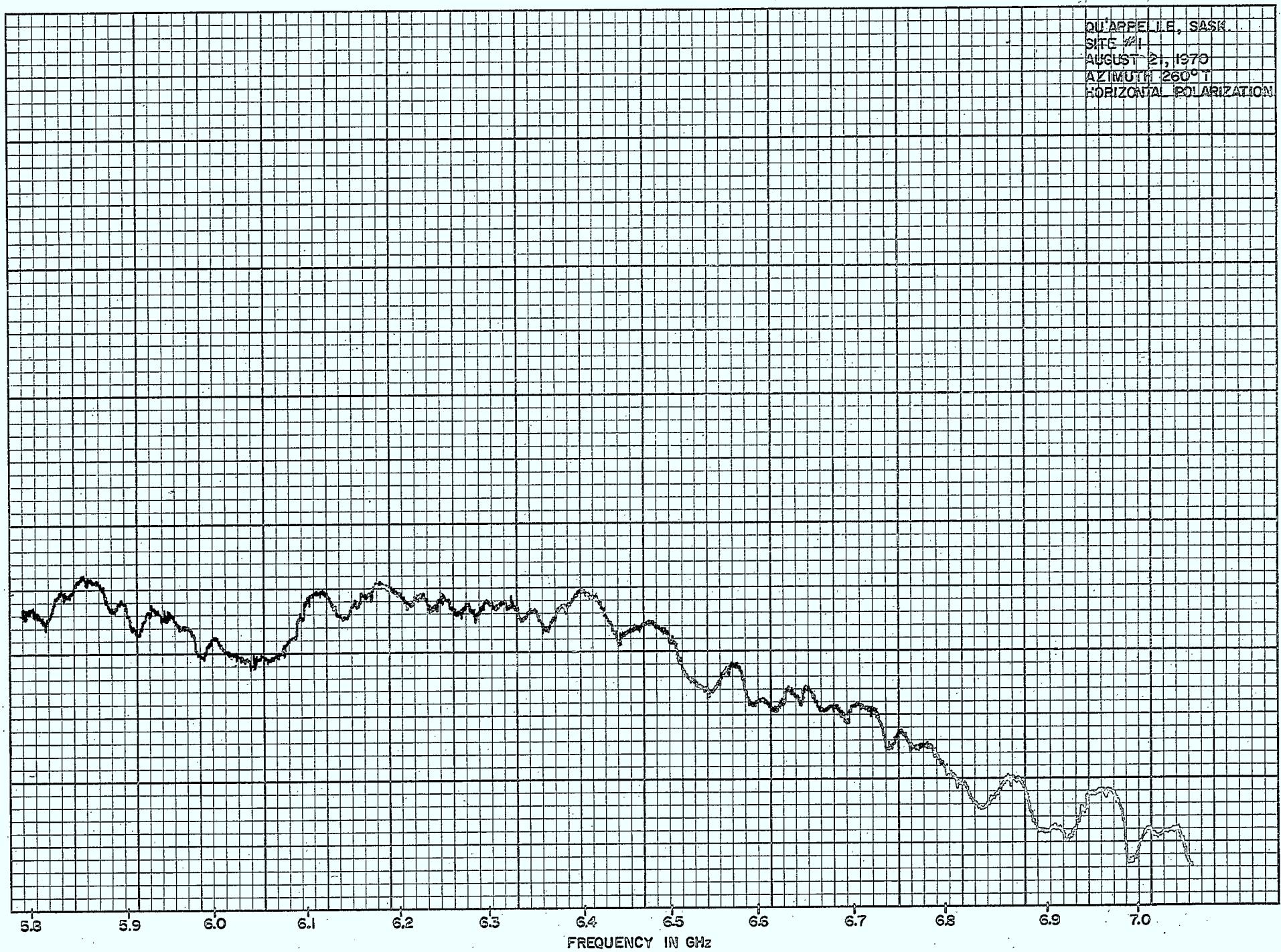
QU'APPÈLLE, SASK.
SITE 41
AUGUST 21, 1970
AZIMUTH 220°
HORIZONTAL POLARIZATION



QU'APPELLE, SASK.
SITE #1
AUGUST 21, 1970
821MHz 240°C
HORIZONTAL POLARIZATION



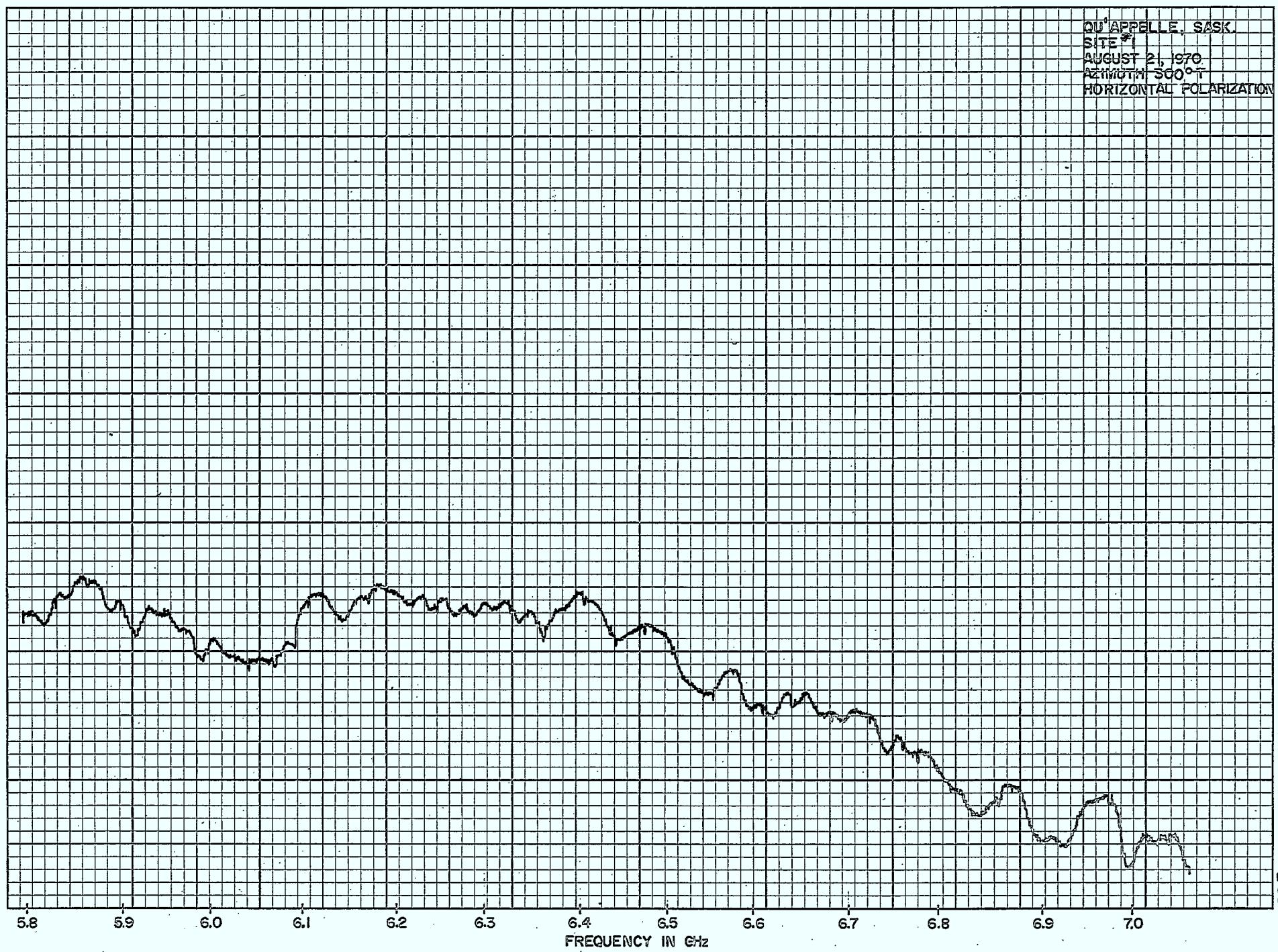
QU'APPELLE, SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH 260° T
HORIZONTAL POLARIZATION



ON'APPELIE SASK
SITE #1
AUGUST 21, 1970
AZIMUTH 260°
HORIZONTAL POLARIZATION



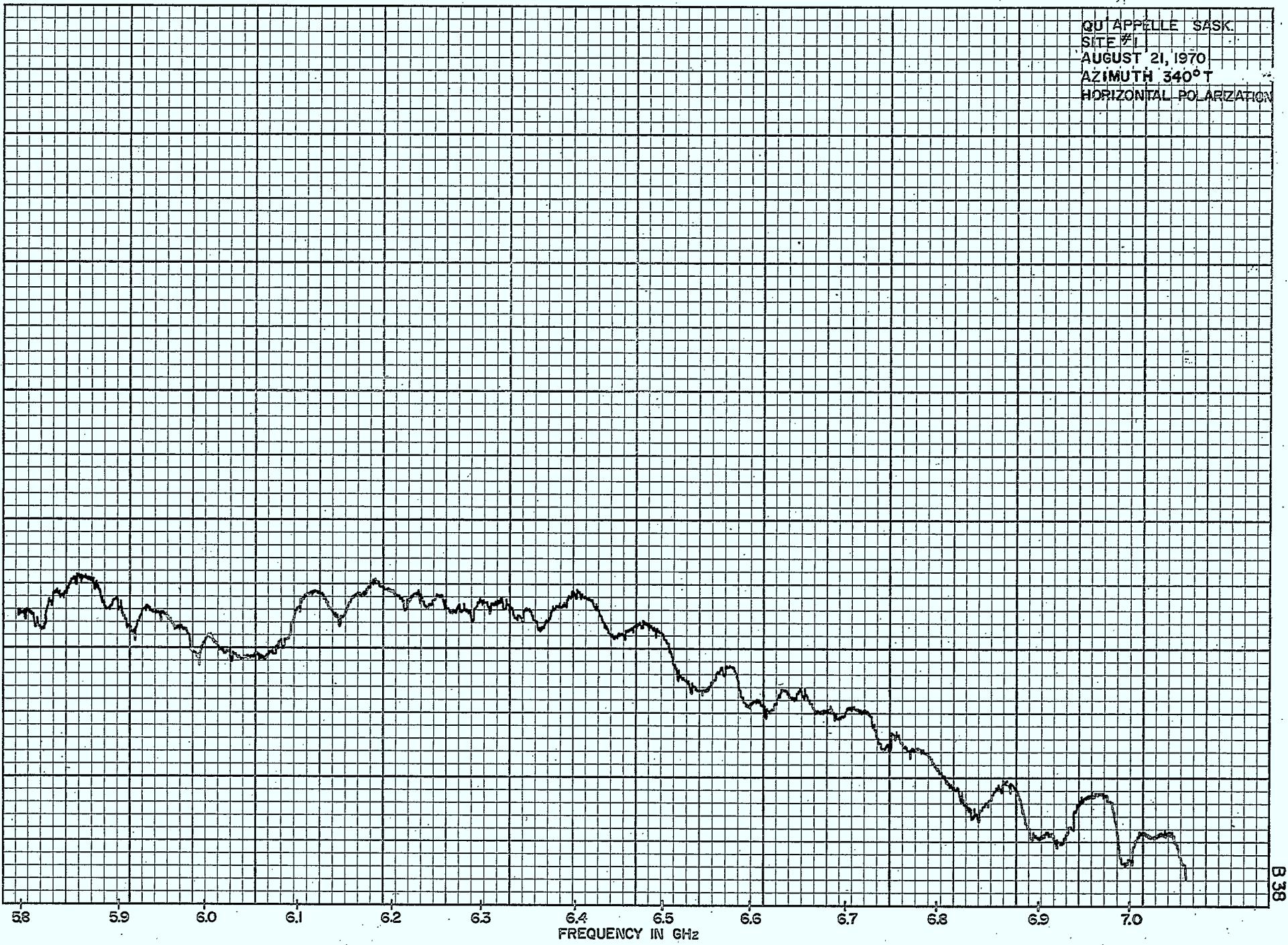
QU'APPÉLLE, SASK.
SITE #1
AUGUST 21, 1970.
AZIMUTH: 300°
HORIZONTAL POLARIZATION



QU'APPELLE, SASK.
SITE 1
AUGUST 21, 1970
AZIMUTH 520°
HORIZONTAL POLARIZATION



QU'APPELLE SASK.
SITE #1
AUGUST 21, 1970
AZIMUTH 340° T
HORIZONTAL POLARIZATION



APPENDIX C

SITE #2 TEST RESULTS - FREQUENCY RANGE 54-80 MHz

FIM DIAL FREQUENCY MHz	AZIMUTH	METER READING		REMARKS
		IN dBuV	IN dBm	
55.2	0/180°	17	-90	TV VIDEO
60.0	020/200°	25	-82	REGINA TV
61.8	080/260°	6	-101	-
66	070/250°	2	-105	-
70	160°	10	-97	HYDRO LINE INTERFERENCE
72	160°	10	-97	" "
74.8	160°	10	-97	" "

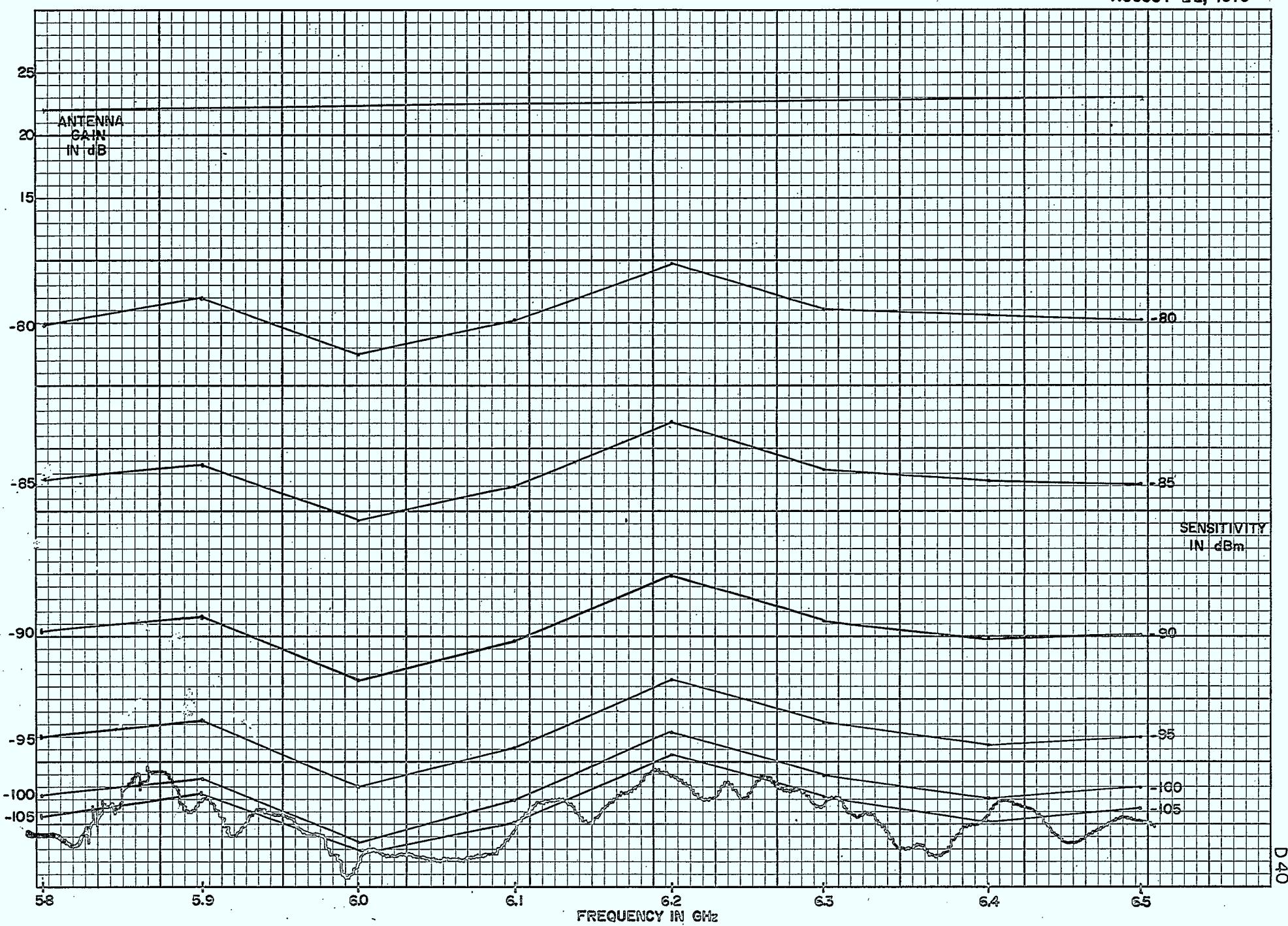
APPENDIX D
(SITE #3)

X-Y PLOTS

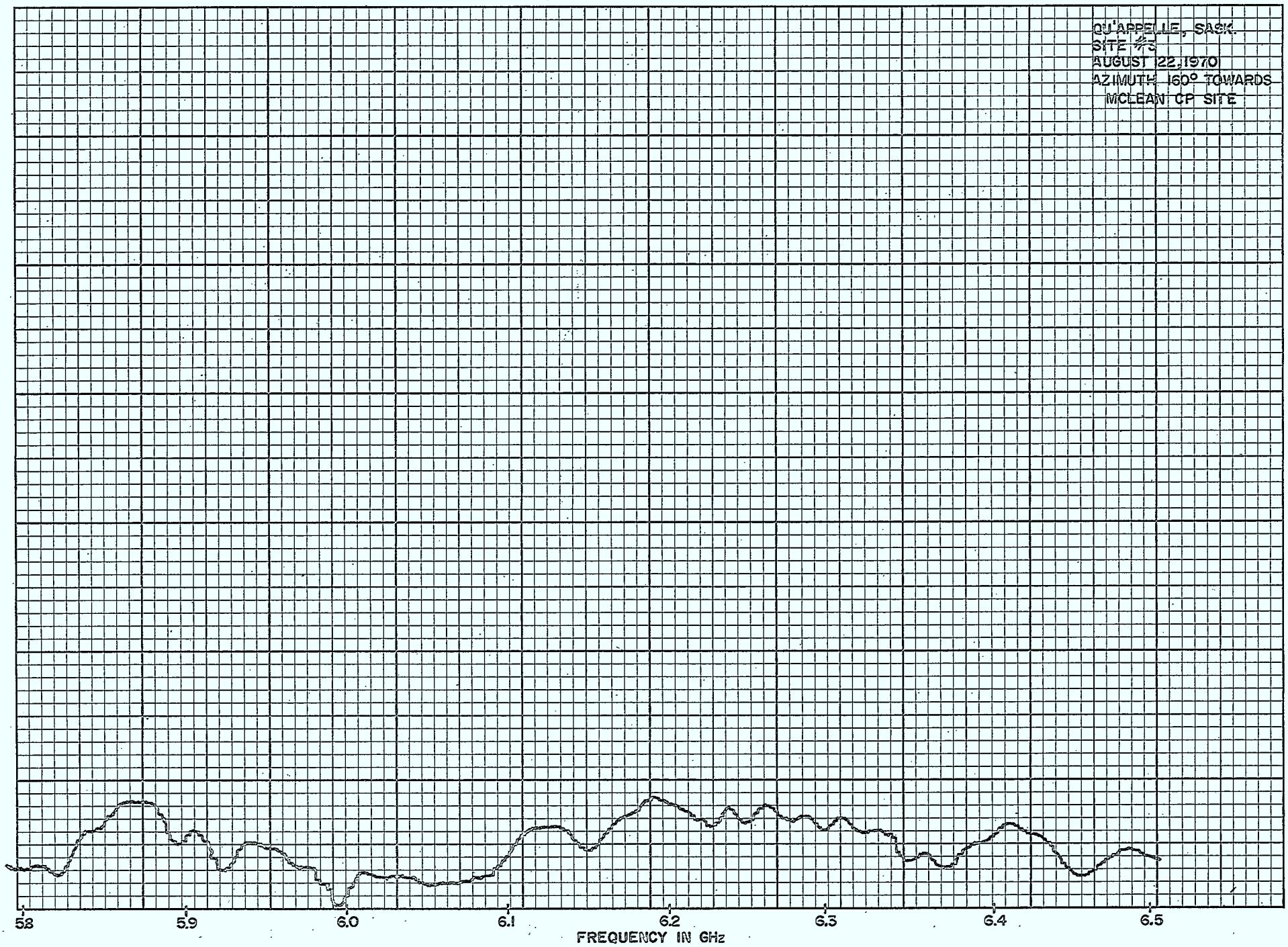
- APPENDIX D40 Equipment Calibration Chart indicating measurement sensitivity.
- APPENDIX D41 Spectrum search 5.8-6.5 GHz with receiving antenna towards McLean, Sask. (CP site)

EQUIPMENT CALIBRATION CHART

AUGUST 22, 1970



QU'APPELLE, SASK.
SITE #3
AUGUST 22, 1970
AZIMUTH 160° TOWARDS
MCLEAN CP SITE



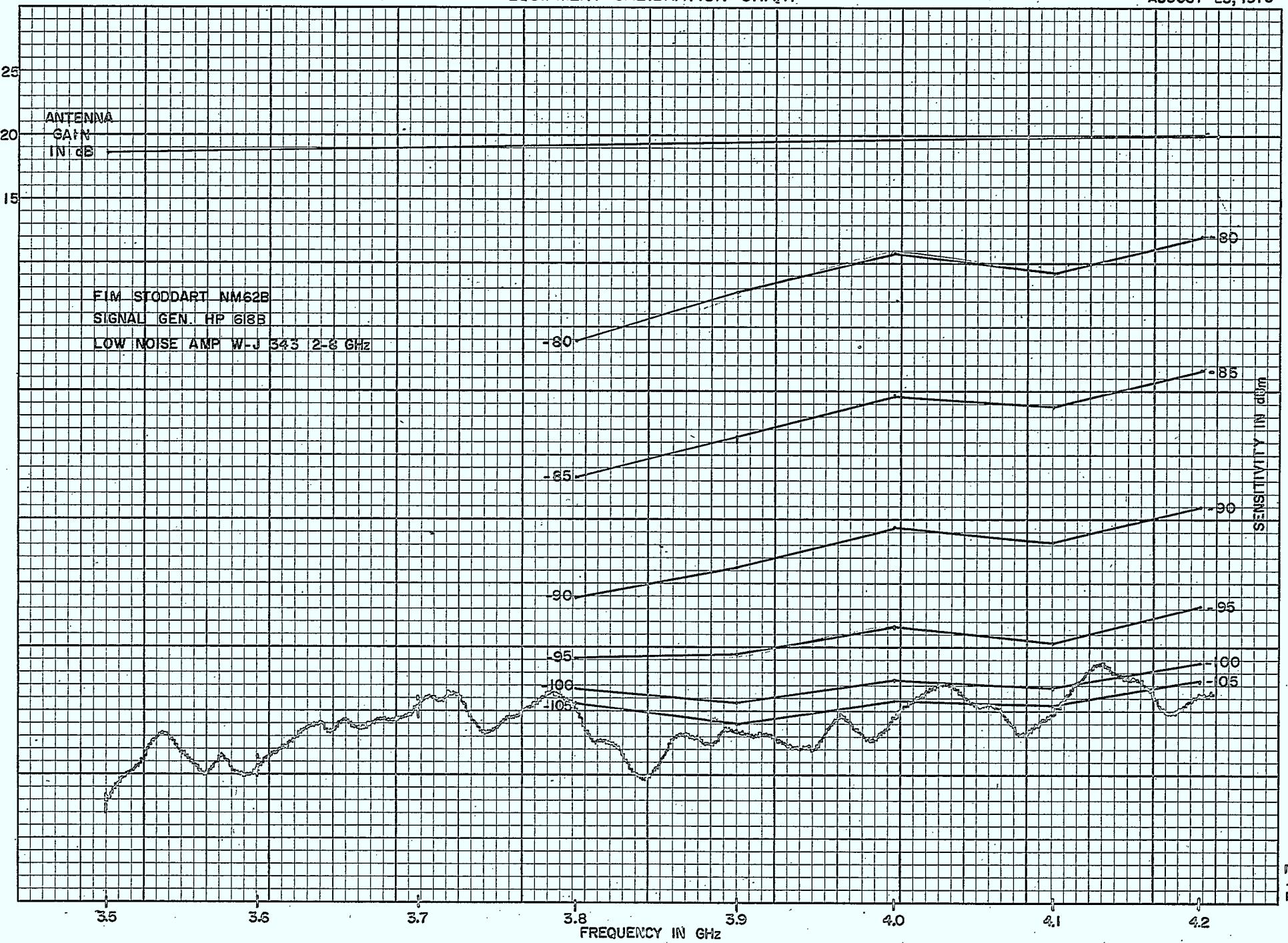
APPENDIX E
(SITE #3)

X-Y PLOTS

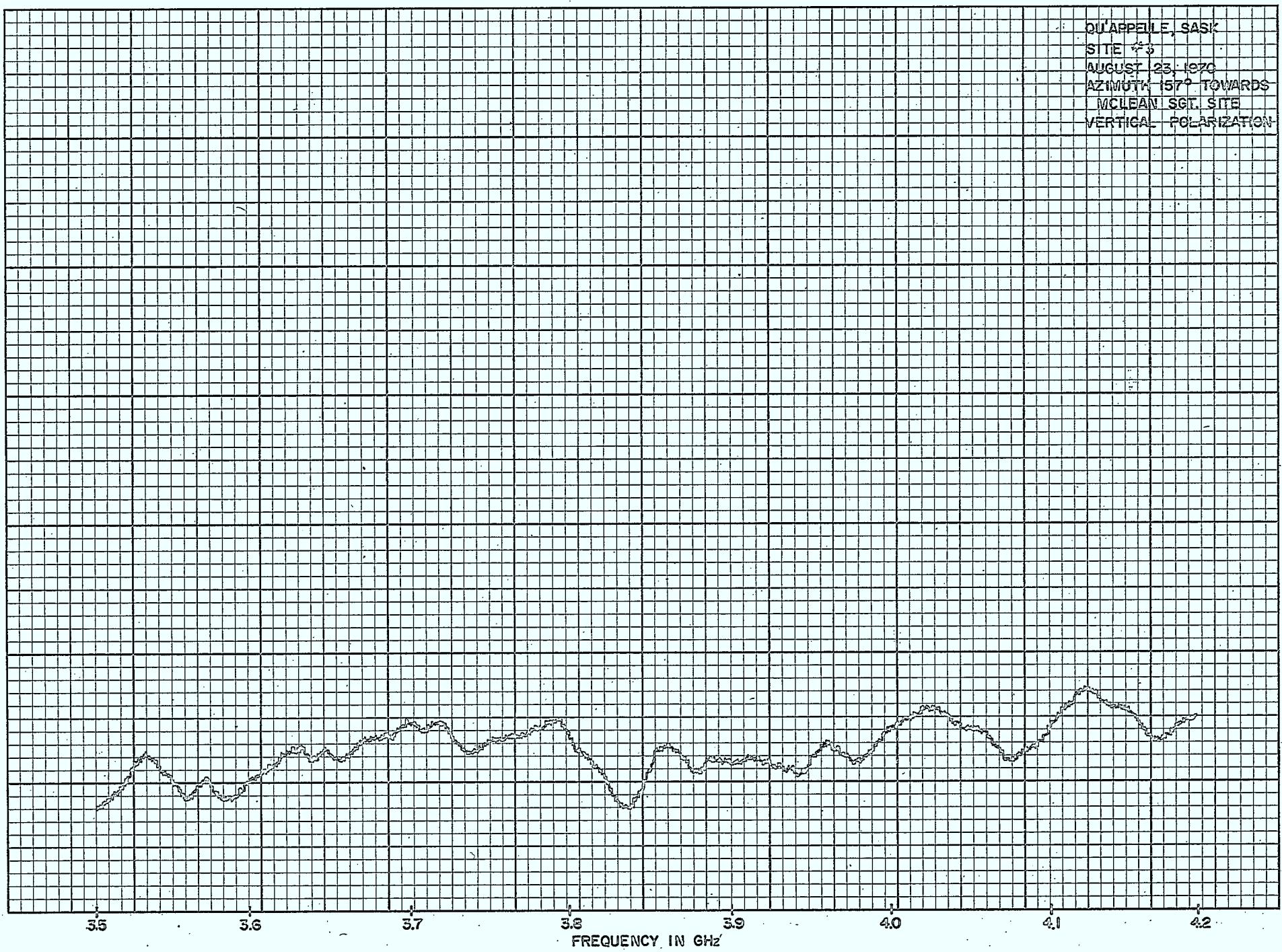
- APPENDIX E42 Equipment Calibration Chart indicating measurement sensitivity.
- APPENDIX E43 Spectrum search 3.5 - 4.2 GHz receiving antenna pointing towards McLean (SGT site)
- APPENDIX E44 Spectrum search 3.5 - 4.2 GHz receiving antenna pointing towards Regina (SGT)
- APPENDIX E45 Spectrum search 3.5 - 4.2 GHz receiving antenna pointing towards Eindlater (SGT SITE)

EQUIPMENT CALIBRATION CHART

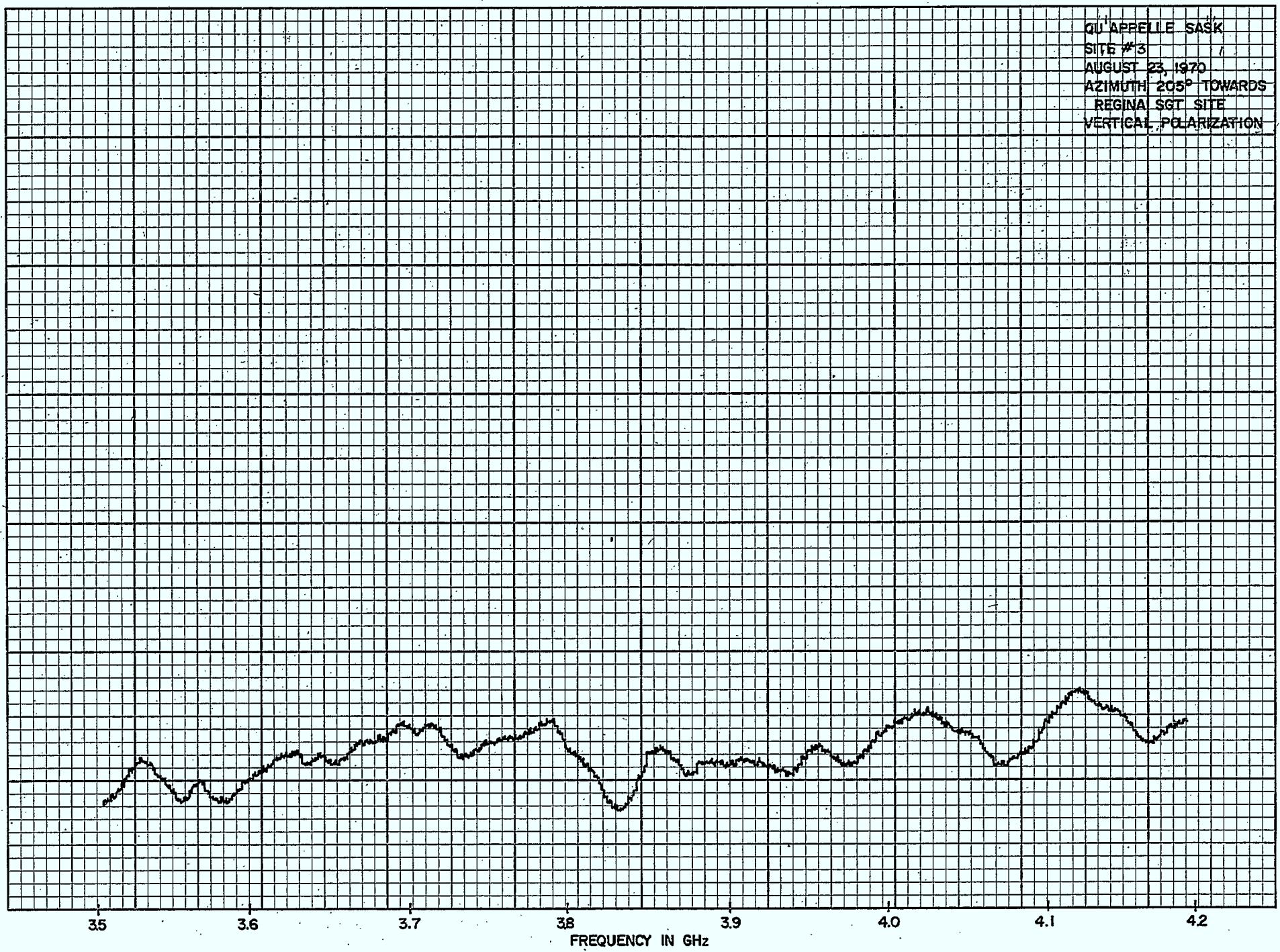
AUGUST 23, 1970



QU'APPELLE, SASK
SITE #3
AUGUST 23, 1970
AZIMUTH 157° TOWARDS
MCLEAN SGT. SITE
VERTICAL POLARIZATION

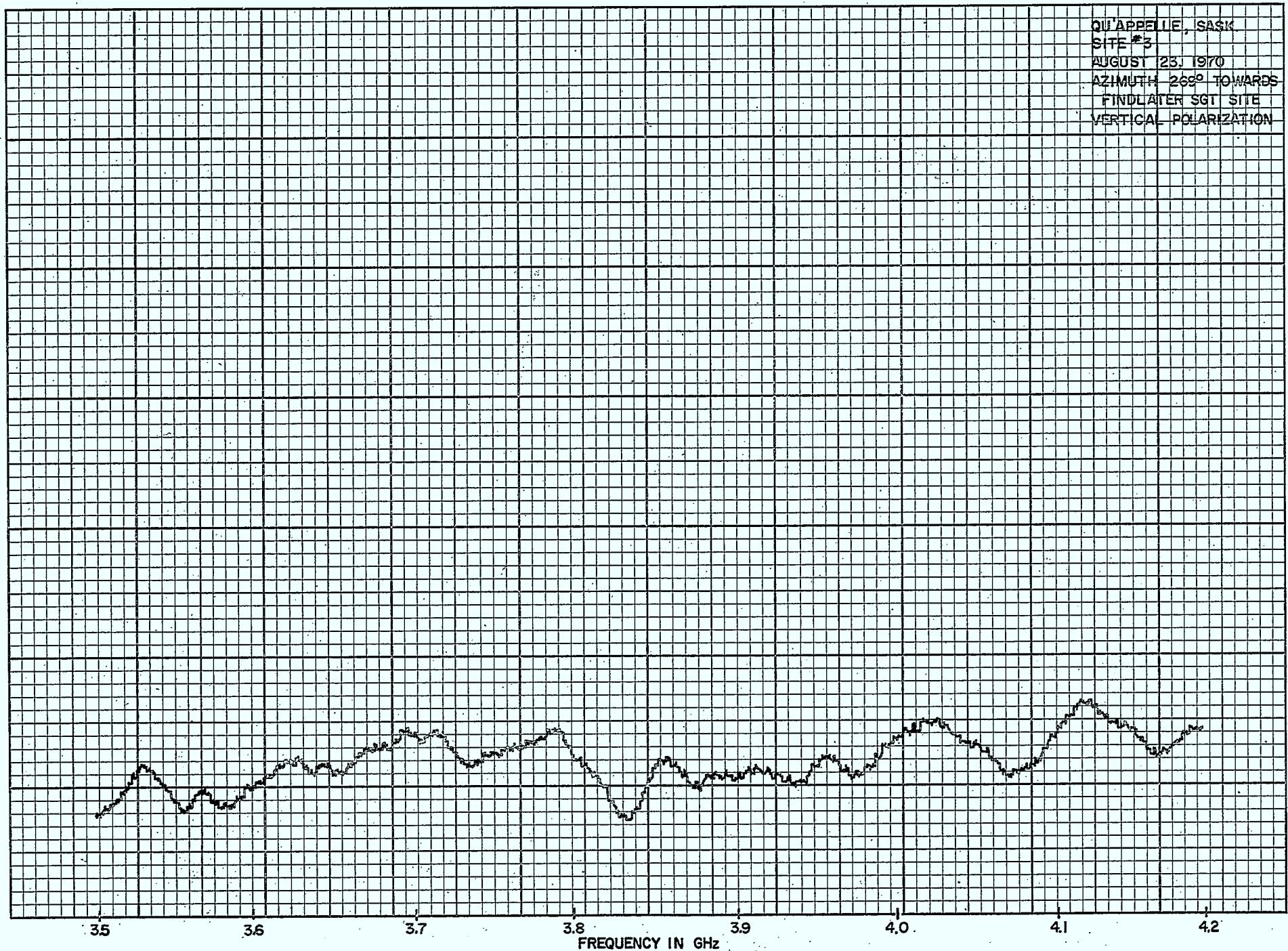


GU'APPELLE SASK
SITE #3
AUGUST 23, 1970
AZIMUTH 205° TOWARDS
REGINA SGT SITE
VERTICAL POLARIZATION



E44

QUI'APPELLE, SASK
SITE #3
AUGUST 23, 1970
AZIMUTH 269° TOWARDS
FINDLATER SGT SITE
VERTICAL POLARIZATION



APPENDIX F

APPENDICES F46-50 Area frequency listings

JOB.21 AREA FREQUENCY LISTING						DATE 09 JUL 1970		DEPARTMENT OF COMMUNICATIONS FREQUENCY ASSIGNMENT						
STATUS	ASSIGNED FREQUENCY	DATE ASSIGNED	CALL SIGN	NAME OF TX. STATION	REGN. PROV.	GEOGRAPHICAL CO-ORDINATES	RECEPTION POINT(S)	NO. OF MBL UNITS	CLASS AND NATURE	NECESSARY BANDWIDTH AND TYPE OF EMISSION	TX. RF PWR OUTPUT	E(I)/RP dBw	AN	
		DAY/MO/YR.				LAT.	LONG.						AZIM.	dB GAIN
	18780000050766CHE80	MOOSE JAW	3S5023391053209CRSTWYND							FXCP6070F9	2.0	198	33	
	18780000080667CHF34	VI SCOUNT	3S5156351053914HUMBOLDT							FXCP7570F9	1.0	50	32	
	18850000031166CHE29	MORSE	3S5027501070158SWFTCRNT							FXCP6070F9	2.0	256	33	
	18850000230666CHE36	FINDLATR	3S5046521052358CRAVEN							FXCP6070F9	2.0	99	33	
	18850000230664CHE38	BLADWRTH	3S5122151060824CRAIK							FXCP6070F9	2.0	151	33	
	18850000080667CHF34	VI SCOUNT	3S5156351053914WATROUS							FXCP7570F9	1.0	156	32	
	18920000080667CHF34	VI SCOUNT	3S5156351053914ALLAN							FXCP7570F9	1.0	258	32	
	1892000281168CHF64	REGINA	E3S5026461042837CRAVEN							FXCP6070F9	2.0	323	34	
	18990000290567CHE38	BLADWRTH	3S5122151060824STRNGFLD							FXCP3000F9	2.0	262	30	
	18990000280767CHF64	REGINA	E3S5026461042837LAJORD							FXCP7570F9	1.0	144	32	
	18990000061069CHF209CL BT		3S5047381063029SECRETAN							FXCP3000F9	2.0	174	33	
D1	19230000281165CHE26	BELLEPLN	3S5024451050959MOOSEJAW							FXCP3000F9		3080265	33	
D1	19300000281165CHE26	BELLEPLN	3S5024451050959REGINA							FXCP3000F9		3080264	33	
	20090000281165CHC40	REGINA	3S5026581043646MILESTON							FXCP6070F9	2.0	170	33	
D1	20245000281165CHE80	MOOSE JAW	3S5023391053209BELLEPLN							FXCP3000F9		3040265	33	
D1	20490000281165CHC40	REGINA	3S5026581043646BELLEPLN							FXCP3000F9		3090264	33	
	20670000281165CHC40	REGINA	3S5026581043646MILESTON							FXCP6070F9	2.0	170	33	
	37100000160164CHE25	MCLEAN	3S5030291040404REGINA							FXCP20000F59	1.0	260	39	
	010457					SINTALUT				FXCP20000F9	1.0	103	39	
	37100000160164CHE26	BELLEPLN	3S5024451050959CARON							FXCP20000F59	1.0	268	39	
	010457					REGINA				FXCP20000F9	1.0	84	39	
	37100000010457CHE28	SECRETAN	3S5020241062738CARON							FXCP20000F9	1.0	107	39	
	160164					MORSE				FXCP20000F59	1.0	268	39	
	37100000160164CHE30	SWFTCRNT	3S5020291074740WEBB							FXCP20000F59	1.0	236	39	
	010457					MORSE				FXCP20000F9	1.0	76	39	
	37100000010457CHE35	CRAVEN	3S5043081046739FINDLATR							FXCP20000F9	1.0	279	39	
A1	37100000060170CHE35	CRAVEN	3S5043001044751REGINA	E						FXCP18900F9	9	14251393		
A1	37100000060170CHE37	CRAIK	3S5103161055133FINDLATR							FXCP18900F9	9	13304393		
	010457					BLADWRTH				FXCP20000F9	1.0	331	39	
A1	37100000060170CHE39	HANLEY	3S5140411062304BLADWRTH							FXCP18900F9	9	15330393		
	010457					SASKATON				FXCP20000F9	1.0	339	39	
	37100000260667CHF65	LAJORD	3S5008091040738OSAGE							FXCP18500F9	9.0	118	41	
	37500000160164CHC40	REGINA	3S5026581043646BELLEPLN							FXCP20000F59	1.0	264	39	
	010457					CRAVEN				FXCP20000F9	1.0	337	39	
	010457					MCLEAN				FXCP20000F9	1.0	80	39	
	3750000010457CHE27	CARON	3S5023481055530BELLEPLN							FXCP20000F9	1.0	88	39	
	160164					SECRETAN				FXCP20000F59	1.0	283	39	
	37500000160164CHE29	MORSE	3S5027501070158SWFTCRNT							FXCP20000F59	1.0	256	39	
	010457					SECRETAN				FXCP20000F9	1.0	88	39	
	3750000010457CHE36	FINDLATR	3S5046521052358CRAIK							FXCP20000F9	1.0	314	39	
A1	060170					CRAVEN				FXCP18900F9	9	9921393		
	3750000010457CHE38	BLADWRTH	3S5122151060824HANLEY							FXCP20000F9	1.0	334	39	
A1	060170					CRAIK				FXCP18900F9	9	15045393		
	37500000260667CHF64	REGINA	E3S5026461042837LAJORD							FXCP18500F9	9.0	144	41	
A1	37500000060170CHF255PIKE L		3S5151141065616HANLEY							FXCP10900F9	9	11653406		

DEPARTMENT OF COMMUNICATIONS
FREQUENCY ASSIGNMENTJOB.21 AREA FREQUENCY LISTING
SUPPLEMENT

DATE 09 JUL 1970

STATUS	ASSIGNED FREQUENCY	DATE ASSIGNED DAY MO YR.	CALL SIGN	NAME OF TX. STATION	REG. NO. PER.	GEOGRAPHICAL CO-ORDINATES		RECEPTION POINT(S)	NO. OF MBL UNITS	CLASS AND NATURE	NECESSARY BANDWIDTH AND TYPE OF EMISSION	TX. RF PWR OUTPUT	E(I)RP dBw	AN	
						LAT.	LONG.							AZIM.	UB GAIN
	37900000010457CHE25	MCLEAN	3S5030291040404SINTALUT								FXCP 20000F9	1.0	103	39	
	37900000031063CHE26	BELLEPLN	3S5024451050959MOOSEJAW								FXCP 20000F9	1.0	265	38	
	010457							REGINA			FXCP 20000F9	1.0	84	39	
	37900000010457CHE28	SECRETAN	3S5028241062738CARON								FXCP 20000F9	1.0	103	39	
	37900000010457CHE30	SWFTCRNT	3S5020291074740MORSE								FXCP 20000F9	1.0	76	39	
A1	37900000060170CHE35	RAVEN	3S5043001044751REGINA E								FXCP 18900F9	.9	14251393		
	37900000010457CHE35	RAVEN	3S5043081044739FINDLATR								FXCP 20000F9	1.0	279	39	
A1	37900000060170CHE37	CRAIK	3S5103161055133BLADWRTH								FXCP 18900F9	.9	13304393		
	010457										FXCP 20000F9	1.0	331	39	
	37900000010457CHE39	HANLEY	3S5140411062304SASKATON								FXCP 20000F9	1.0	339	39	
A1	060170							BLADWRTH			FXCP 18900F9	.9	15330393		
	37900000260667CHF65	LAJORD	3S50080910407380SAGE								FXCP 18500F9	9.0	118	41	
	38300000031063CHC40	REGINA	3S5026581043646BELLEPLN								FXCP 20000F9	1.0	265	39	
	010457							RAVEN			FXCP 20000F9	1.0	337	39	
	010457							MCLEAN			FXCP 20000F9	1.0	80	39	
	38300000010457CHE27	CARON	3S5023481055530BELLEPLN								FXCP 20000F9	1.0	88	39	
	38300000010457CHE29	MORSE	3S5027501070158SECRETAN								FXCP 20000F9	1.0	88	39	
	38300000010457CHE36	FINDLATR	3S5046521052358CRAIK								FXCP 20000F9	1.0	314	39	
A1	060170							RAVEN			FXCP 18900F9	.9	9921393		
A1	38300000060170CHE38	BLADWRTH	3S5122151060824CRAIK								FXCP 18900F9	.9	15045393		
	010457							HANLEY			FXCP 20000F9	1.0	334	39	
	38300000260667CHF64	REGINA	E3S5026461042837LAJORD								FXCP 18500F9	9.0	144	41	
A1	38300000060170CHF255PIKE L		3S5151141065616HANLEY								FXCP 18900F9	.9	11653406		
	38700000010459CHE25	MCLEAN	3S5030291040404SINTALUT								FXCP 20000F9	1.0	103	39	
	387000000310459CHE26	BELLEPLN	3S5024451050959REGINA								FXCP 20000F9	1.0	84	39	
	38700000010459CHE28	SECRETAN	3S5028241062738CARON								FXCP 20000F9	1.0	103	39	
	38700000010459CHE30	SWFTCRNT	3S5020291074740MORSE								FXCP 20000F9	1.0	76	39	
	387000000220863CHE35	RAVEN	3S5043081044739FINDLATR								FXCP 20000F9	1.0	279	39	
	387000000220863CHE37	CRAIK	3S5103161055133BLADWRTH								FXCP 20000F9	1.0	331	39	
	387000000220863CHE39	HANLEY	3S5140411062304SASKATON								FXCP 20000F9	1.0	339	39	
	391000000220863CHC40	REGINA	3S5026581043646RAVEN								FXCP 20000F9	1.0	337	39	
	010459							MCLEAN			FXCP 20000F9	1.0	80	39	
	39100000010459CHE27	CARON	3S5023481055530BELLEPLN								FXCP 20000F9	1.0	80	39	
	39100000010459CHE29	MORSE	3S5027501070158SECRETAN								FXCP 20000F9	1.0	88	39	
	391000000220863CHE36	FINDLATR	3S5046521052358CRAIK								FXCP 20000F9	1.0	313	39	
	391000000220863CHE38	BLADWRTH	3S5122151060824HANLEY								FXCP 20000F9	1.0	334	39	
	39700000010457CHC40	REGINA	3S5026581043646BELLEPLN								FXCP 20000F9	1.0	264	39	
	39700000010457CHE27	CARON	3S5023481055530SECRETAN								FXCP 20000F9	1.0	283	39	
	39700000010457CHE29	MORSE	3S5027501070158SWFTCRNT								FXCP 20000F9	1.0	256	39	
	39700000010457CHE36	FINDLATR	3S5046521052358RAVEN								FXCP 20000F9	1.0	99	39	
	39700000010457CHE38	BLADWRTH	3S5122151060824CRAIK								FXCP 20000F9	1.0	151	39	
	397000000931063CHE00	MOOSEJAW	3S5023371053211BELLEPLN								FXCP 20000F9	1.0	85	37	
	40100000010457CHE25	MCLEAN	3S5030291040404REGINA								FXCP 20000F9	1.0	260	39	
	40100000010457CHE26	BELLEPLN	3S5024451050959CARON								FXCP 20000F9	1.0	268	39	
	031063							REGINA			FXCP 20000F9	1.0	84	39	
	40100000010457CHE28	SECRETAN	3S5028241062738MORSE								FXCP 20000F9	1.0	268	39	
	40100000010457CHE30	SWFTCRNT	3S5020291074740WEBB								FXCP 20000F9	1.0	236	39	
	40100000010457CHE35	RAVEN	3S5043081044739REGINA								FXCP 20000F9	1.0	157	39	
	40100000010457CHE37	CRAIK	3S5103161055133FINDLATR								FXCP 20000F9	1.0	134	39	
	40100000010457CHE39	HANLEY	3S5140411062304BLADWRTH								FXCP 20000F9	1.0	154	39	
A1	40300000060170CHE35	RAVEN	3S5043001044751FINDLATR								FXCP 18900F9	.9	27949393		

JOB 21 AREA FREQUENCY LISTING DATE 09 JUL 1970
SUPPLEMENT

STATUS	ASSIGNED FREQUENCY	DATE ASSIGNED DAY MO. YR.	CALL SIGN	NAME OF TX. STATION	REGN PROV	GEOGRAPHICAL CO-ORDINATES		RECEPTION POINT(S)	NO. OF MBL UNITS	CLASS AND NATURE	NECESSARY BANDWIDTH AND TYPE OF EMISSION	TX. RF PWR OUTPUT	EIRP dBw	AN	
						LAT.	LONG.							AZIM.	dB GAIN
A1	4030000060170CHE37	CRAIK	3S5103161055133	BLADWRTH							FXCP18900F9	9		33058393	
A1	4030000060170CHE39	HANLEY	3S5140411062304	PIKE L							FXCP18900F9	9		29719393	
	40300000260667CHF65	LAJORD	3S5008091040738	REGINA B							FXCP18500F9	9.0	324	41	
	4050000010459CHC40	REGINA	3S5026581043646	BELLEPLN							FXCP20000F9	1.0	264	39	
	160164			MCLEAN							FXCP20000F59	1.0	80	39	
	4050000010459CHE27	CARON	3S5023481055530	SECRETAN							FXCP20000F9	1.0	283	39	
	160164			BELLEPLN							FXCP20000F59	1.0	88	39	
	4050000010459CHE29	MORSE	3S5027501070158	SWFTCRNT							FXCP20000F9	1.0	256	39	
	160164			SECRETAN							FXCP20000F59	1.0	88	39	
	40500000220863CHE36	FINDLATR	3S5046521052358	RAVEN							FXCP20000F9	1.0	99	39	
	40500000220863CHE38	BLADWRTH	3S5122151060824	CRAIK							FXCP20000F9	1.0	151	39	
A1	4070000060170CHE36	FINDLATR	3S5046521052358	CRAIK							FXCP18900F9	9		31325393	
A1	4070000060170CHE38	BLADWRTH	3S5122151060824	HANLEY							FXCP18900F9	9		33342393	
A1	4070000060170CHF64	REGINA	3S5026461042837	RAVEN							FXCP18900F9	9		32306606	
A1	4070000060170CHF255PIKE L		3S5151141065616	ASQUITH							FXCP18900F9	9		33102406	
	4090000010459CHE25	MCLEAN	3S50302910404045	SINTALUT							FXCP20000F59	1.0	103	39	
	910459			REGINA							FXCP20000F9	1.0	260	39	
	4090000010459CHE26	BELLEPLN	3S5024451050959	CARON							FXCP20000F9	1.0	268	39	
	160164			REGINA							FXCP20000F59	1.0	84	39	
	4090000010459CHE28	SECRETAN	3S5028241062738	MORSE							FXCP20000F9	1.0	268	39	
	160164			CARON							FXCP20000F59	1.0	103	39	
	40900000160164CHE30	SWFTCRNT	3S5020291074740	MORSE							FXCP20000F9	1.0	76	39	
	910459			WEBB							FXCP20000F9	1.0	236	39	
	40900000220863CHE35	RAVEN	3S5043081044739	REGINA							FXCP20000F9	1.0	157	39	
	40900000220863CHE37	CRAIK	3S5103161055133	FINDLATR							FXCP20000F9	1.0	133	39	
	40900000220863CHE39	HANLEY	3S5140411062304	BLADWRTH							FXCP20000F9	1.0	154	39	
A1	4110000060170CHE35	RAVEN	3S5043001044751	FINDLATR							FXCP18900F9	9		27949393	
A1	4110000060170CHE37	CRAIK	3S5103161055133	BLADWRTH							FXCP18900F9	9		33058393	
A1	4110000060170CHE39	HANLEY	3S5140411062304	PIKE L							FXCP18900F9	9		29719393	
A1	41100000260667CHF65	LAJORD	3S5008091040738	REGINA B							FXCP18500F9	9.0	324	41	
	4130000010457CHC40	REGINA	3S5026581043646	BELLEPLN							FXCP20000F9	1.0	264	39	
	910457			MCLEAN							FXCP20000F9	1.0	80	39	
	4130000010457CHE27	CARON	3S5023481055530	SECRETAN							FXCP20000F9	1.0	283	39	
	910457			BELLEPLN							FXCP20000F9	1.0	88	39	
	4130000010457CHE29	MORSE	3S5027501070158	SECRETAN							FXCP20000F9	1.0	88	39	
	910457			SWFTCRNT							FXCP20000F9	1.0	256	39	
	4130000010457CHE36	FINDLATR	3S5046521052358	RAVEN							FXCP20000F9	1.0	99	39	
	4130000010457CHE38	BLADWRTH	3S5122151060824	CRAIK							FXCP20000F9	1.0	151	39	
A1	4150000060170CHE38	BLADWRTH	3S5122151060824	HANLEY							FXCP18900F9	9		33342393	
A1	4150000060170CHF64	REGINA	3S5026461042837	RAVEN							FXCP18900F9	9		32306406	
A1	4150000060170CHF255PIKE L		3S5151141065616	ASQUITH							FXCP18900F9	9		33102406	
	4170000010457CHE25	MCLEAN	3S50302910404045	REGINA							FXCP20000F9	1.0	260	39	
	910457			SINTALUT							FXCP20000F9	1.0	103	39	
	4170000010457CHE26	BELLEPLN	3S5024451050959	CARON							FXCP20000F9	1.0	268	39	
	910457			REGINA							FXCP20000F9	1.0	84	39	
	4170000010457CHE28	SECRETAN	3S5028241062738	CARON							FXCP20000F9	1.0	103	39	
	910457			MORSE							FXCP20000F9	1.0	268	39	
	4170000010457CHE30	SWFTCRNT	3S5020291074740	MORSE							FXCP20000F9	1.0	76	39	
	910457			WEBB							FXCP20000F9	1.0	236	39	
	4170000010457CHE35	RAVEN	3S5043081044739	REGINA							FXCP20000F9	1.0	157	39	

JOB.21 AREA FREQUENCY LISTING DATE 09 JUL 1970
SUPPLEMENT

STATUS	ASSIGNED FREQUENCY	DATE ASSIGNED DAY MO. YR.	CALL SIGN	NAME OF TX. STATION	REGN. PROV.	GEOGRAPHICAL CO-ORDINATES LAT. LONG.	RECEPTION POINT(S)	NO. OF MBL UNITS	CLASS AND NATURE	NECESSARY BANDWIDTH AND TYPE OF EMISSION	TX. RF PWR OUTPUT	EIRP dBw	AN	
													AZIM.	dB GAIN
	4170000010457CHE37	CRAIK	3S5103161055133FINDLATR							FXCP12000F9	1.0	134	39	
	4170000010457CHE39	HANLEY	3S5140411062304BLADWRTH							FXCP12000F9	1.0	154	39	
	5945200010563CHE81	DENNY	3S5126501071443HANLEY							FXCP12000F39	1.0	66	43	
	59600300150763CHB917REGINA		3S5027081043640MCLEAN							FXCP12100F9	5.0	68	43	
	5974800010563CHE81	DENNY	3S5126501071443ROSETOWN							FXCP12000F39	1.0	279	43	
	59748500150763CHB866TOUCHWOD	3S5137301041855LOCKWOOD								FXCP17000F9	5.0	274	43	
	59748500150763CHB868YOUNG	3S5145501053715BRADWELL								FXCP17000F9	5.0	292	43	
	60341500150763CHB866TOUCHWOD	3S5137301041855LEROSS								FXCP17000F9	5.0	125	43	
	60341500150763CHB868YOUNG	3S5145501053715LOCKWOOD								FXCP17000F9	5.0	106	43	
	6063800010563CHE81	DENNY	3S5126501071443HANLEY							FXCP12000F39	1.0	66	43	
	60786300150763CHB917REGINA		3S5027081043640MCLEAN							FXCP12100F9	5.0	68	43	
	60934500150763CHB866TOUCHWOD	3S5137301041855LOCKWOOD								FXCP17000F9	5.0	274	43	
	60934500150763CHB868YOUNG	3S5145501053715BRADWELL								FXCP17000F9	5.0	292	43	
	6093500010563CHE81	DENNY	3S5126501071443ROSETOWN							FXCP12000F39	1.0	279	43	
	61527500150763CHB866TOUCHWOD	3S5137301041855LEROSS								FXCP17000F9	5.0	125	43	
	61527500150763CHB868YOUNG	3S5145501053715LOCKWOOD								FXCP17000F9	5.0	106	43	
	61950000170457CHE41	REGINA	3S5026521043000REGINA							FXCP20000F5	1.0			
	6197200010563CHE39	HANLEY	3S5140411062304DENNY							FXCP12000F39	1.0	246	43	
	6197200010563CHE82	ROSETOWN	3S5132011075905STRANRAR							FXCP12000F39	1.0	294	41	
	62120700150763CHB916MCLEAN		3S5034151040836BALCARRS							FXCP12100F9	5.0	73	43	
	150763		REGINA							FXCP12100F9	5.0	248	43	
	62269000150763CHB867LOCKWOOD	3S5139151050020YOUNG								FXCP17000F9	5.0	286	43	
	62269000150763CHB869BRADWELL	3S5154501061300SASKATON								FXCP17000F9	5.0	302	43	
	6226900010563CHE39	HANLEY	3S5140411062304SASKATON							FXCP12000F39	1.0	340	43	
	6226900010563CHE82	ROSETOWN	3S5132011075905DENNY							FXCP12000F39	1.0	99	39	
	62862000150763CHB867LOCKWOOD	3S5139151050020TOUCHWOD								FXCP17000F9	5.0	94	43	
	62862000150763CHB869BRADWELL	3S5154501061300YOUNG								FXCP17000F9	5.0	112	43	
	63159000010563CHE39	HANLEY	3S5140411062304DENNY							FXCP12000F39	1.0	246	43	
	63159000010563CHE82	ROSETOWN	3S5132011075905STRANRAR							FXCP12000F39	1.0	294	41	
	63306700150763CHB916MCLEAN		3S5034151040836BALCARRS							FXCP12100F9	5.0	73	43	
	150763		REGINA							FXCP12100F9	5.0	248	43	
	63455000150763CHB867LOCKWOOD	3S5139151050020YOUNG								FXCP17000F9	5.0	286	43	
	63455000150763CHB869BRADWELL	3S5154501061300SASKATON								FXCP17000F9	5.0	302	43	
	63455000010563CHE39	HANLEY	3S5140411062304SASKATON							FXCP12000F39	1.0	340	43	
	63455000010563CHE82	ROSETOWN	3S5132011075905DENNY							FXCP12000F39	1.0	99	39	
	63750000010457CHC40	REGINA	3S5026581043646REGINA							FXCP20000F5	1.0	91	40	
	64048000150763CHB867LOCKWOOD	3S5139151050020TOUCHWOD								FXCP17000F9	5.0	94	43	

DEPARTMENT OF COMMUNICATIONS
 FREQUENCY ASSIGNMENT

 JOB.21 AREA FREQUENCY LISTING
 SUPPLEMENT DATE 09 JUL 1970

STATUS	ASSIGNED FREQUENCY	DATE ASSIGNED DAY MO. YR.	CALL SIGN	NAME OF TX. STATION REGN. PROV.	GEOGRAPHICAL CO-ORDINATES LAT. . LONG.	RECEPTION POINT(S)	NO. OF MBL UNITS	CLASS AND NATURE	NECESSARY BANDWIDTH AND. TYPE OF EMISSION	TX. RF PWR OUTPUT	ENRP dBw	AN	
												AZIM.	db GAIN
	64048000150763	CHB869	BRADWELL	3S5154501061300	YOUNG			FXCP17000F9		5.0		112	43
	65800000261064	CHE41	REGINA	3S5026521043000	STONYBCH			FXCP17000F9		1.0		281	42
	66600000261064		STONYBCH	3S5038431054606	MARQUIS			FRCP					
	66600000261064	CHF99	STONYBCH	3S5031351052652	MARQUIS			FXCP17000F9		1.0		287	40
	69375000130764		REGINA	3S5026511043000	REGINA			FRCV					
	69375000130764	CJY283	REGINA	3S5026511043000	REGINA			FXCV6000A5		1.0			
	69625000010459		MOOSE JAW	3S5023251055538	MOOSEJAW			FRCV					
	69625000290159C	JY46	MOOSE JAW	3S5023301053202	MOOSEJAW			FXCV25000F3F5		1.0		270	34
	70375000190963		REGINA	3S5028581043020	REGINA			FRCP					
	70375000190963	CHC40	REGINA	3S5026521043000	REGINA			FXCP21000F9		1.0		116	36
	70600000170567	FOAM L		3S5142301041755	WYN YARD			FRCV					
	70600000290567C	JY727ZELMA		3S5150001055304	WATROUS			FXCO17000F9		2.0		151	
	71420000250469CHC40	REGINA		3S5026581043646	BELLEPLN			FXCP12290F9		1.0		264	45
	71420000250469CHE27	CARON		3S50234810555305	SECRETAN			FXCP12290F9		1.0		282	43
	71615000250469CHE27	CARON		3S5023481055530	BELLEPLN			FXCP12290F9		1.0		88	45
	71615000250469CHE29	MORSE		3S5027501070158	SECRETAN			FXCP12290F9		1.0		88	43
	71615000110468CHF64	REGINA	E	3S5026461042837	MCLEAN			FXCP12290F9		1.0		76	45
	71810000250469CHE27	CARON		3S5023481055530	MOOSE JAW			FXCP12290F9		1.0		90	43
	73095000110468CHE25	MCLEAN		3S5030291040404	SINTALUT			FXCP12290F9		1.0		102	45
	73095000290469CHE26	BELLEPLN	3S5024451050959	REGINA				FXCP12290F9		1.0		83	43
	73095000250469CHE28	SECRETAN	3S5028241062738	CARON				FXCP12290F9		1.0		102	43
	73290000110468CHE25	MCLEAN	E	3S5030291040404	REGINA			FXCP12290F9		1.0		256	45
	73290000250469CHE26	BELLEPLN	3S5024451050959	CARON				FXCP12290F9		1.0		268	43
	73290000250469CHE28	SECRETAN	3S5028241062738	MORSE				FXCP12290F9		1.0		268	43
	73290000230569CHE30	SWFTCRNT	3S5020291074740	WEBB				FXCP7640F9		1.0		235	43
	73485000250469CHE80	MOOSE JAW	3S5023391053209	CARON				FXCP12290F9		1.0		270	43
	74770000250469CHE27	CARON		3S5023481055530	BELLEPLN			FXCP12290F9		1.0		88	45
	74770000250469CHE29	MORSE		3S5027501070158	SECRETAN			FXCP12290F9		1.0		88	43
	74770000110468CHF64	REGINA	E	3S5026461042837	MCLEAN			FXCP12290F9		1.0		76	45
	74965000250469CHC40	REGINA		3S5026581043646	BELLEPLN			FXCP12290F9		1.0		264	45
	74965000250469CHE27	CARON		3S50234810555305	SECRETAN			FXCP12290F9		1.0		282	43
	75160000250469CHE27	CARON		3S5023481055530	MOOSE JAW			FXCP12290F9		1.0		90	43
	76445000110468CHE25	MCLEAN		3S5030291040404	REGINA	E		FXCP12290F9		1.0		256	45
	76445000250469CHE26	BELLEPLN	3S5024451050959	CARON				FXCP12290F9		1.0		268	43
	76445000250469CHE28	SECRETAN	3S5028241062738	MORSE				FXCP12290F9		1.0		268	43
	76445000230569CHE30	SWFTCRNT	3S5020291074740	WEBB				FXCP7640F9		1.0		235	43
	76640000110468CHE25	MCLEAN		3S5030291040404	SINTALUT			FXCP12290F9		1.0		102	45
	76640000250469CHE26	BELLEPLN	3S5024451050959	REGINA				FXCP12290F9		1.0		83	43
	76640000250469CHE28	SECRETAN	3S5028241062738	CARON				FXCP12290F9		1.0		102	43

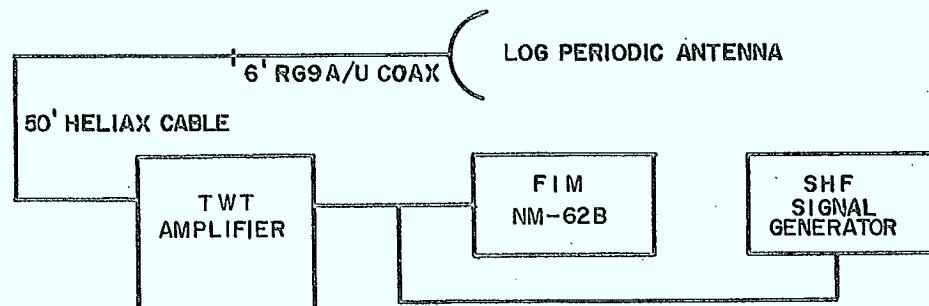
APPENDIX G

- APPENDIX G51 Measurement of FIM sensitivity
- APPENDIX G52 TWT Amplifier
- APPENDIX G53 Test antenna Stoddart log periodic effective area
- APPENDIX G54 Stoddart log periodic characteristics
- APPENDIX G55 General information (instruments)

APPENDIX G51

MEASUREMENT OF FIM SENSITIVITY

Block Diagram

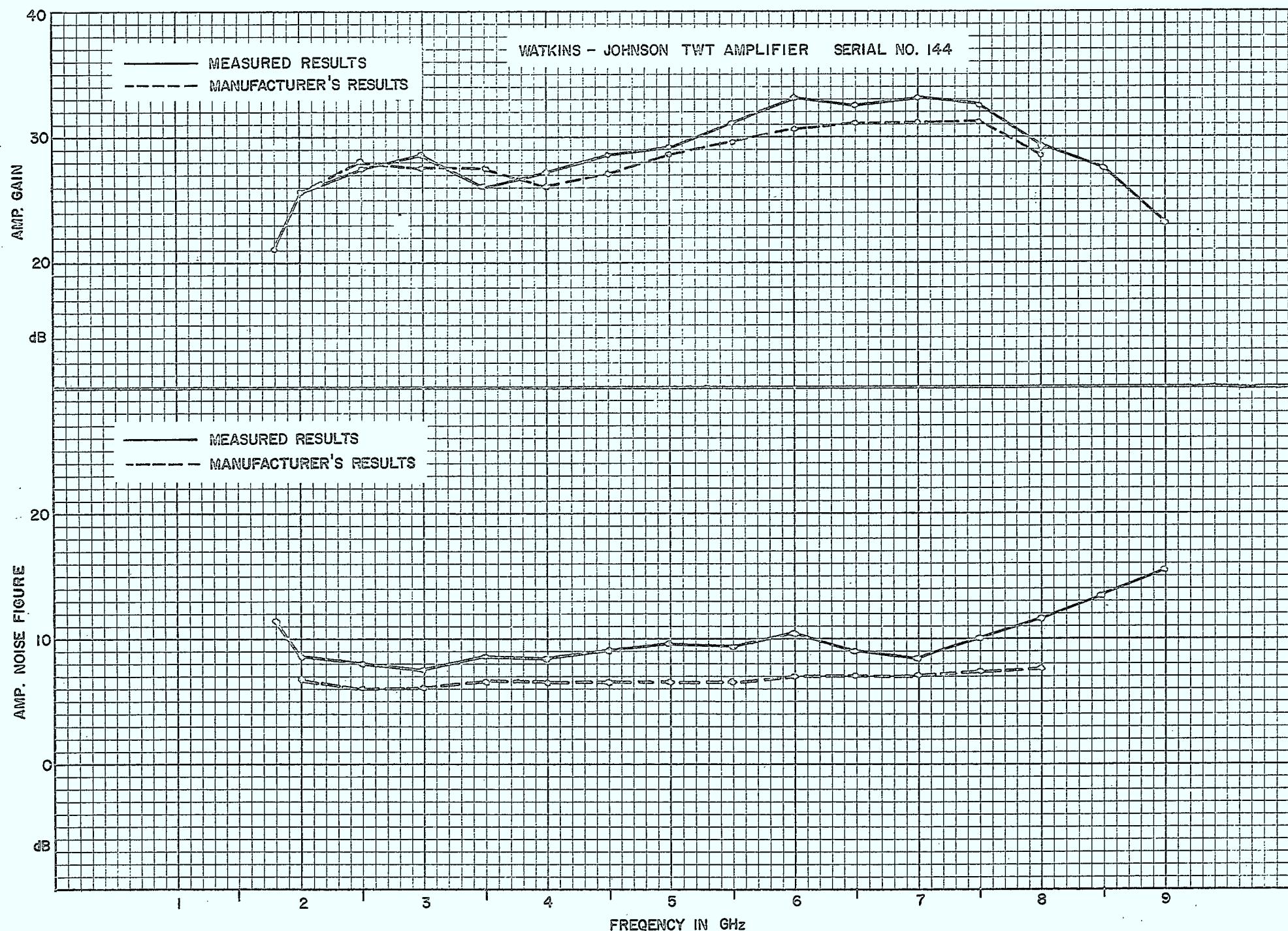
Method of Measurement

The equipment was calibrated in the following manner:

- i) the generator signal was fed to the FIM, first without the TWT amplifier, then with it in the circuit and the MDS (minimum discernible signal) noted.
- ii) the input cable was then disconnected at the antenna and the signal generator signal fed to the FIM via the input cable and TWT amplifiers and the MDS noted as before.
- iii) the FIM sensitivity at the input to the log periodic antenna is determined after adding the antenna gain. Test results are listed below.

Table of Results

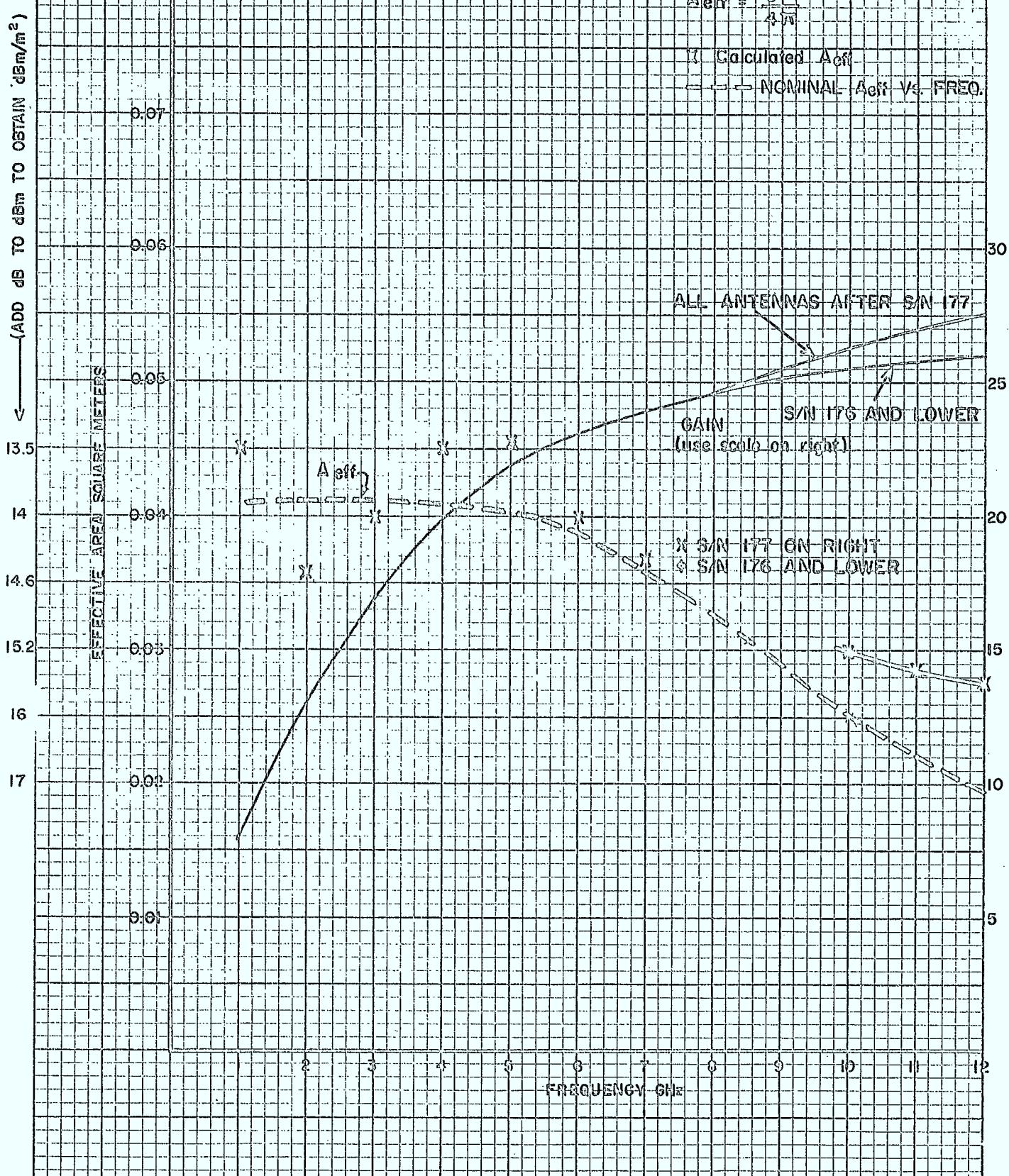
FIM Dial Freq. GHz	SIGNAL		Antenna Gain in dBi	System Sensitivity in dBm
	Generator input without TWT	with TWT		
3.8	-91 dBm	-113 dBm	19	-132
4.2	-89 "	-113 "	21	-134
4.3	-83 "	-109 "	21	-130



STODDART LOG PERIODIC ANTENNA

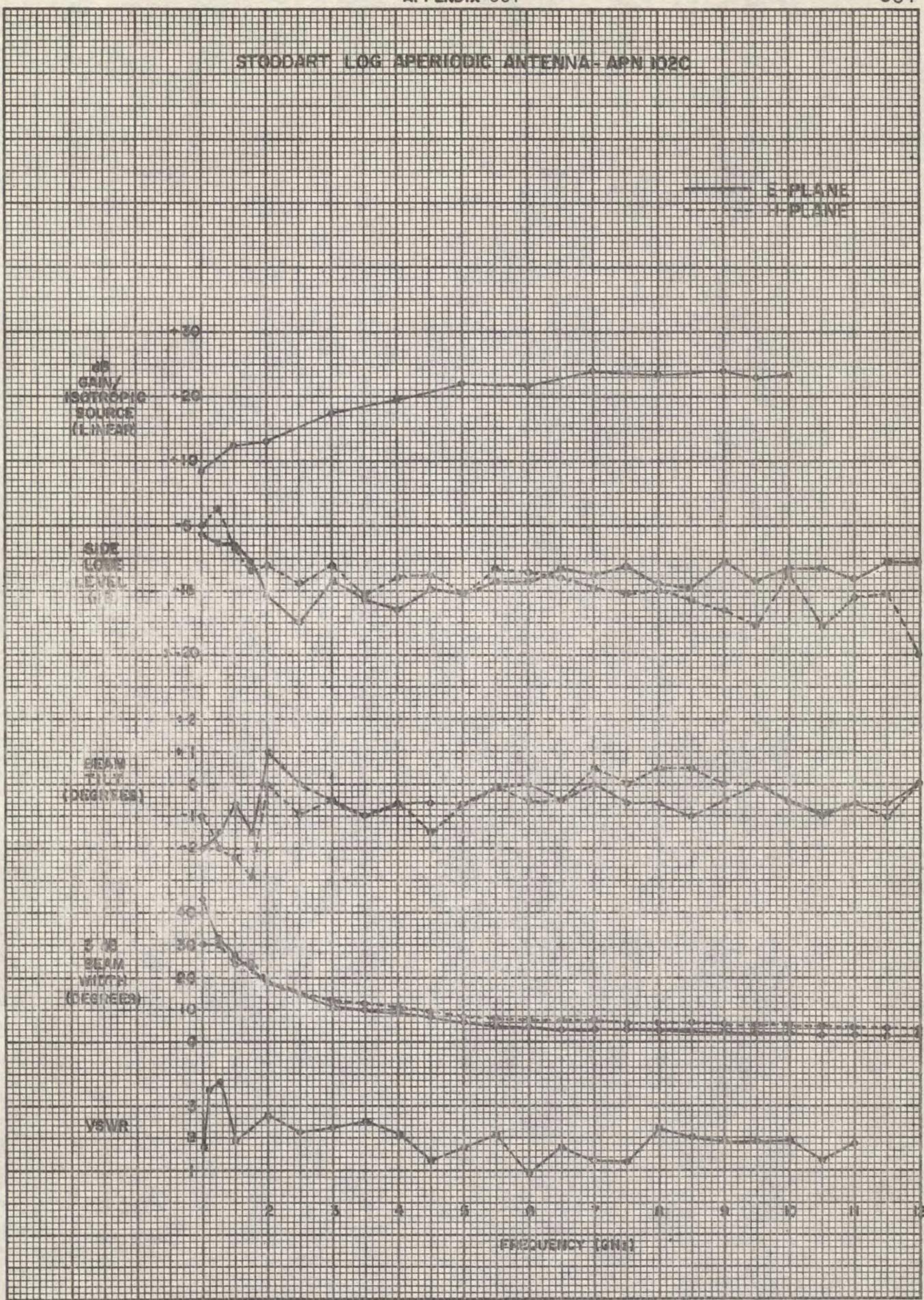
Effective Area and Gain

$$A_{eff} = \frac{G \lambda^2}{4\pi}$$

Calculated A_{eff}NOMINAL A_{eff} VS. FREQ.

K# 5 X 5 TO 1/2 INCH 46 0867
 7 X 10 IN. • ALBANEUS MADE IN U.S.A.
 REUFFEL & ESSER CO.

STOODART LOG APERIODIC ANTENNA- APN 102C



General InformationInstruments

Type of Instruments	Manufacturer	Model Number	Serial Number	REL Number	Date of Calibration
Log Periodic Antenna	Stoddart	APN101A	299	F1161	
50 feet Heliax Cable	Andrews	HJ2-50			
Low-Noise Amplifier	Watkins-Johnson	WJ-343	144	A207	
Field Intensity Meter	Stoddart	NM-62B	560-13	F116	April 13/70
Field Intensity Meter	EMC Instrumentation	EMA-910	123-111	F130	Factory
Field Intensity Meter	Stoddart	NM-30A	66AD79	F123A	May 25/70
Head phones	Benaudi			P702	
X - Y Recorder	Mosely	7030A	325	R304	
SHF Signal Generator	Hewlett Packard	618B	951-1489	G222	April 1/70
Mobile Laboratory	D.O.C.				
6' Co-Ax	Amphenol	RG214/U		G222	
6' Co-Ax	Amphenol	RG9A/U		G210A	
16' Co-Ax	Amphenol	RG9A/U			

TABLE I

CHARACTERISTICS OF PROPOSED NETWORK QUALITY
TV EARTH STATION AT REGINA, SASK.

Name of Station:	Qu'Appelle
Latitude	50°48'00"
Longitude	104°21'16"
Nature of Service	Space Service
Class of Station	Communication-Satellite Earth Station
Transmit Frequency Band	5925-6425 MHz
Receive Frequency Band	3700-4200 MHz
Transmit & Receive Freq. Plan	Fig. 1 Attached
Operating Company	Telesat Canada
Ground Elevation AMSL	1630 feet
Horizon Profile at Site	Fig. 2 Attached
Communications Antenna Characteristics	
a) Antenna Diameter	≥35 feet
b) Antenna Height AMSL	1690 feet
c) Minimum Main Beam Antenna Gain	54.0 at 5925 MHz 51.0 at 3700 MHz
d) Azimuthal Range	110°/250°
e) Minimum Operating Elevation Angle	12° minimum
f) Gain in Direction of Horizon	Fig. 3 Attached
g) Maximum Gain in Direction of Horizon	10 dB
h) Off-Axis Gain	As per CCIR S.G. IV Draft Recommendation L.2.f (IV)

TABLE I (Cont'd)

Transmission Characteristics for any R.F. Channel

a) Main Beam EIRP (Clear weather)	83 dBW
b) Max. Power/4 KHz Input to Antenna	7 dBW/4 KHz

Reception Characteristics for any R.F. Channel

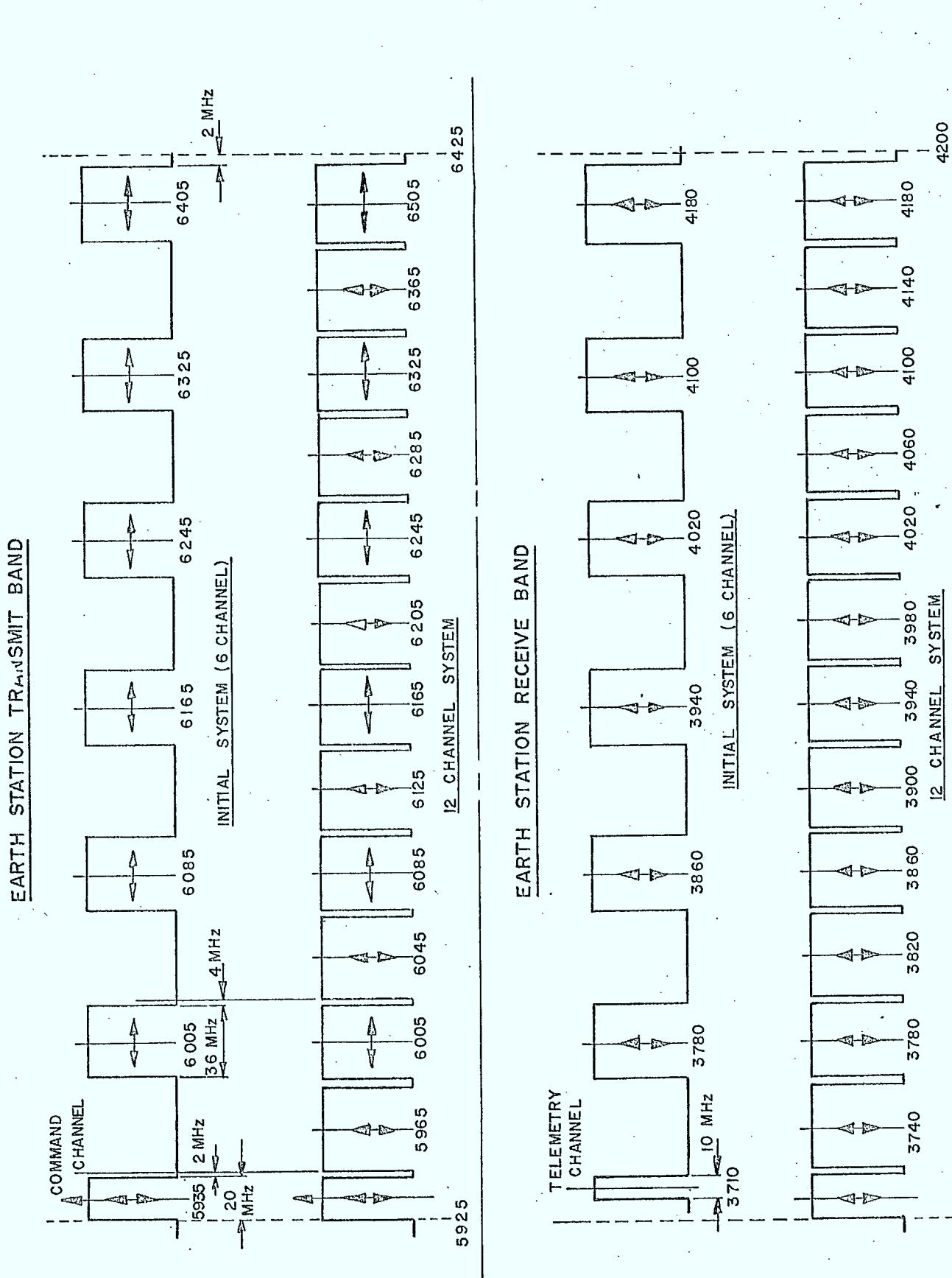
a) Overall receiving system noise temperature (clear weather, 12° elevation angle)	160° K
b) Minimum clear weather G/T	29 dB/ ^o K
c) Useable R.F. Channel bandwidth	36 MHz
d) Minimum Received Signal Level (clear weather)	-113.0 dBW
e) Maximum interfering carrier power level at input of low noise paramp. per exposure, not to be exceeded for more than 0.01% of the worst month	-131 dBW

FIG. 1 DOMESTIC SYSTEM FREQUENCY PLAN.

FIG. 2 HORIZON PROFILE AT QU'APPELLE.

FIG. 3 ANTENNA GAIN IN DIRECTION OF HORIZON VS. AZIMUTH AT QU'APPELLE.

FIG. 4 COORDINATION CONTOURS FOR PROPOSED TELESAT EARTH STATION AT QU'APPELLE.



NOMINAL VERTICAL POLARIZATION (PARALLEL TO SATELLITE SPIN AXIS)
NOMINAL HORIZONTAL POLARIZATION (PERPENDICULAR TO SATELLITE SPIN AXIS)

FIGURE 1 FREQUENCY & POLARIZATION PLAN

HORIZONTAL PROFILE OF OUT APPARATUS

ELEVATION ANGLE - degrees

100

120

140

160

180

200

220

240

260

AZIMUTH - degrees

60

45

30

280

300

320

340

0

20

40

60

80

AZIMUTH - degrees

FIGURE 2

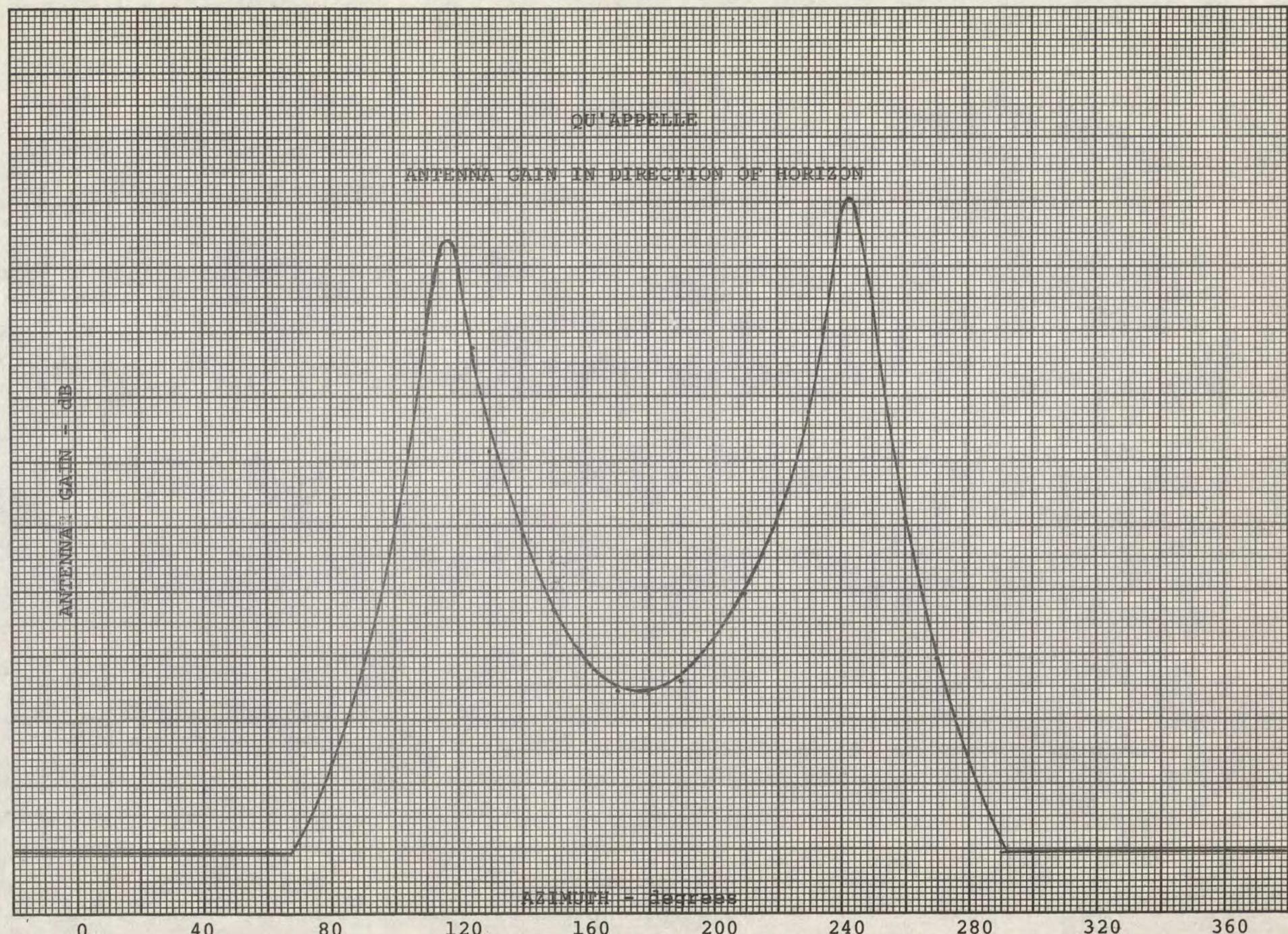


FIGURE 3

QU'APPELLE, SASK.
 LAT- $50^{\circ} 48' 00''$
 LONG- $104^{\circ} 21' 16''$

LEGEND

----- 6 GHz CONTOUR
 ——— 4 GHz CONTOUR

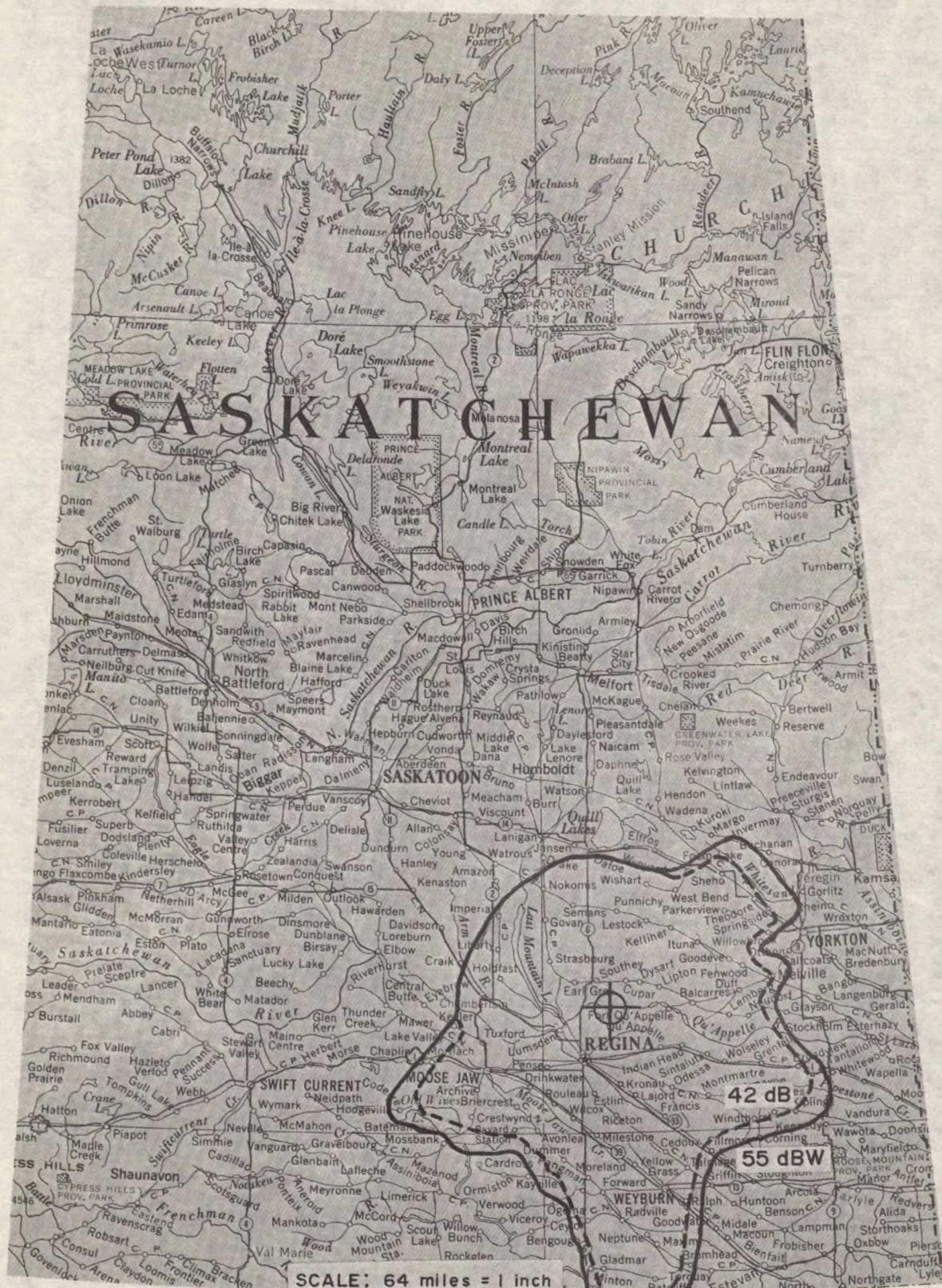


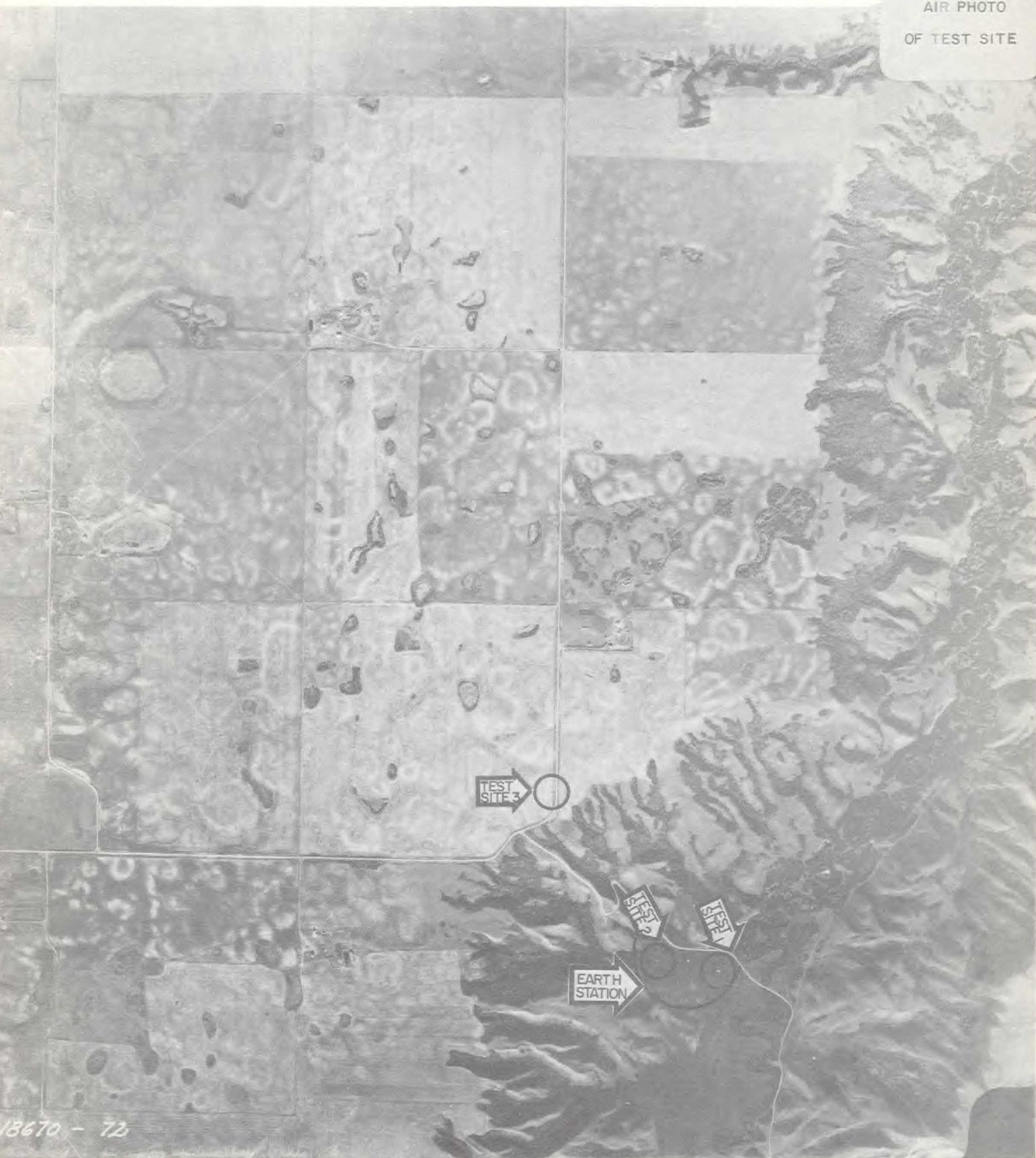
FIG 4. COORDINATION CONTOURS FOR PROPOSED TELESAT CANADA EARTH STATION AT QU'APPELLE, SASK, CANADA

PHOTOGRAPHS

- 1 Air Photo Qu'appelle Earth Station and test sites
- 2 Ground photo of test site #1
- 3 Ground photo of test site #2
- 4 Ground photo of test site #3
- 5 Log periodic test antenna
- 6 Field intensity meter, TWT and X-Y recorder

PHOTO 1

AIR PHOTO
OF TEST SITE



A 18670 - 72

PHOTO 2

PHOTOGRAPH OF
SITE 1 LOOKING
SOUTHWARD.
SITE ELEVATION 1660'



PHOTO 3

PHOTOGRAPH OF
SITE 2 LOOKING
GENERALLY SOUTH-
WARD.
SITE ELEVATION 1636'



PHOTO 4

PHOTOGRAPH OF
SITE 3 LOOKING
SOUTHWARD.
SITE ELEVATION 1900'



PHOTO 5

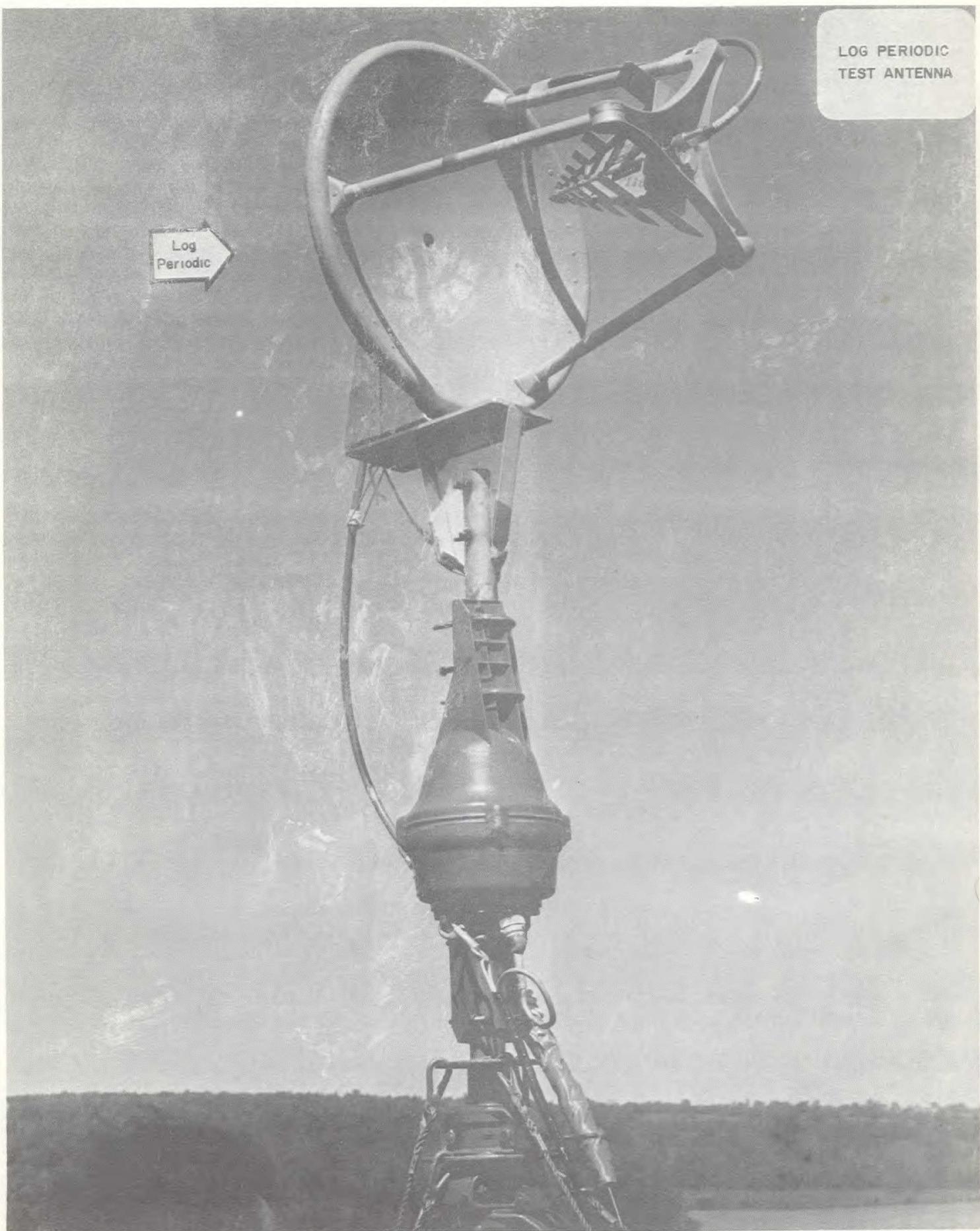
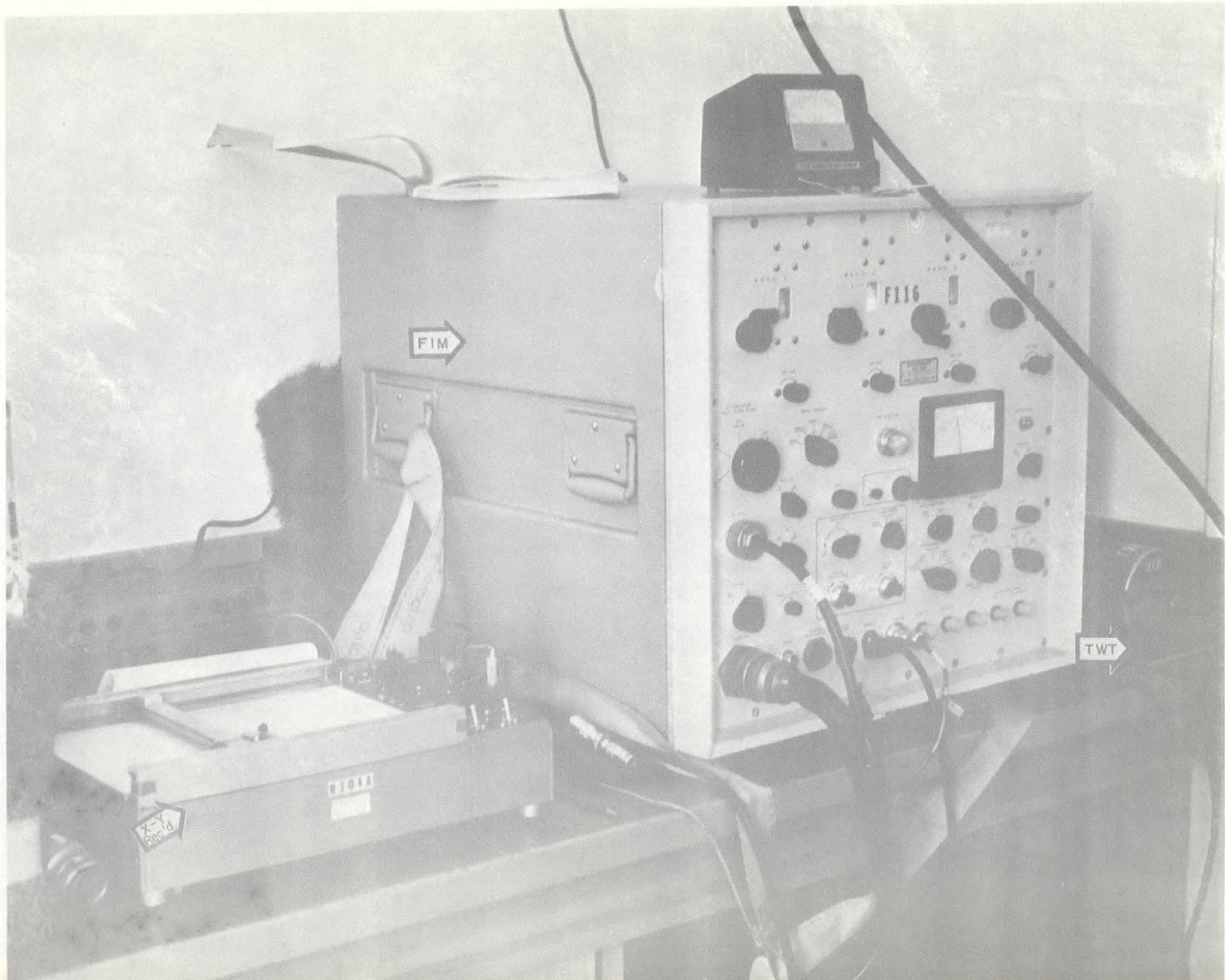


PHOTO 6



CACC / CCAC
83573



83573

QU'APPELLE EARTH STATION SPECTRUM INTERFERENCE SURVEY.

TK
6553
Q82
1970

DATE DUE
DATE DE RETOUR

LOWE-MARTIN No. 1137

