OWL ENGINEERING & EMC TEST LABS, INC.

CONSULTING COMMUNICATIONS ENGINEERS · EMC TEST LABORATORIES

5844 Hamline Avenue North, Shoreview, MN 55126
651-784-7445 • Fax 651-784-7541

ENGINEERING EXHIBIT FOR AN APPLICATION FOR A CONSTRUCTION PERMIT FOR A MINOR CHANGE TO TRANSLATOR K254DT FACILITY ID# 203044

SUBARCTIC MEDIA

CHANNEL 254D 0.25 KW (H&V) 147 METERS HAAT

May 22, 2022

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TABLE OF CONTENTS

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ENGINEERING STATEMENT

This engineering exhibit, of which this Statement is a part, was prepared in accordance with the Rules and Regulations of the Federal Communications Commission and pursuant to the provisions of Section III-B of FCC Form 349 on behalf of SubArctic Media, LLC. (Hereafter ("**SubArctic**") in support of an application for authority to modify an existing FM Translator. The purpose of this application is to modify the site location using a power output of 250 watts ERP, antenna height and 147 meters HAAT. This power/height combination is an allowable Class D facility permitted under the current rules and regulations. An application for k276EH is also being filed to a show a combined antenna system.

SubArctic proposes to operate from a site uniquely described by the geographic coordinates:

(NAD 83)
44° 07' 39" North Latitude
94° 02' 04" West Longitude

The proposed facility will be located on an existing tower (ASR# 1023783). Engineering Figure 1 is a portion of the Mankato West, MN 7.5 minute USGS map that shows the exact location of the proposed new tower. Figure 2 is an aerial view of the site. The applicant is aware of the provisions of §74.1203 of the FCC's Rules and the requirement for satisfying all complaints of interference that are received.

ALLOCATION CONSIDERATIONS

A review of allotments and assignments on channel 254, on the three immediately upper adjacent, the three immediately lower adjacent channels and the two channels removed by 53 and 54 channels (201) shows that the site proposed has no short-spaced conditions. The results of the allocation study are shown in Figure 3.

Using the FCC sanctioned U/D method of establishing translator interference to full-service FM stations, the interfering signal of the proposed translator to second-adjacent channel KEEZ is 84.1 dBu. Based on the antenna pattern having no vertical directivity (a single bay antenna), the 124.1 dBu contour distance is predicted to be 69.29 meters. The proposed antenna will be mounted with a center of radiation of 145 meters and the contour will not contact the ground. Therefore the interference is eliminated.

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COVERAGE CONTOURS

The three-to-sixteen-kilometer average terrain elevations were derived from the NGDC 30-second terrain database.

DISTANCES TO CONTOURS (Kilometers):
Antenna COR elevation (AMSL): 435 meters Average HAAT: 147 meters
Frequency: 98.7 MHz
Coordinates: N 44° 7′ 39.00″ W 94° 2″ 4.00″
F(50,50) Curves Number of Contours: 2

AZ (degs)	HAAT (m)	ERPd (kW)	CONTOUR LEVELS (dBu): 70.0	60.0
0.0	160	0.2500	9.3	16.5
30.0	163	0.2500	9.4	16.7
60.0	129	0.2500	8.3	14.8
90.0	138	0.2500	8.6	15.3
120.0	135	0.2500	8.5	15.2
150.0	139	0.2500	8.6	15.3
180.0	142	0.2500	8.7	15.5
210.0	146	0.2500	8.8	15.7
240.0	139	0.2500	8.6	15.3
270.0	145	0.2500	8.8	15.7
300.0	165	0.2500	9.4	16.8
330.0	148	0.2500	8.9	15.8

The effective antenna radiation center height for each of the twelve standard 30-degree spaced radials was used in conjunction with the F (50, 50) metric curves of Figure 1 of §73.333 of the Rules to determine the distances to the coverage contours. Figure 4 shows the proposed 70 and 60 dBuV signal contours.

The present licensed and proposed 60 dBuV contours overlap since no change in location is proposed allowing a minor change application.

ANSI Power Density Calculations

The power density at the base of the tower was calculated using the following formula from OST Bulletin Number 65, August, 1997:

$$S = \frac{0.64 \times 1.64 \times ERP}{\pi(R^2)}$$

Where: S = power density in μW/ centimeter^2

ERP = effective radiated power in watts
R = distance to radiation source in centimeters
π = 3.14

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The site is considered to be a controlled site since access to the tower area is restricted. Access to RF circuitry is restricted by a property fence that surrounds the tower and limits access to the public. Signs are posted warning of the potential danger. When persons require access to the site, tower or antenna for maintenance purposes, the transmitter power will be reduced or completely eliminated to comply with ANSI guidelines. Hence, the conditions of §1.1306(b) (3) would not be involved.

Using:

ERP = 0.25 KW Vertical & 0.25 KW Horizontal
R = 14,500 cm.

Using this formula and the values shown below, a power density of less than 1.0 μW/cm^2 is found to exist at the base of the tower. This predicted value is 0.4% of the controlled exposure maximum limit of 1,000 μW/cm^2 or 0.08% of the General Population exposure limit.

ENVIRONMENTAL IMPACT STATEMENT

The instant proposal is categorically excluded from environmental processing since none of the conditions of §1.1306(b)(2) and (3) would be involved for the following reasons:

1) The site proposed is not in or near any location referenced in §1.1306(b)(1) as being of environmental interest.

2) The provisions of §1.1306(b)(2) relating to the use of high intensity strobe lighting do not apply since this tower is not utilizing this type of lighting.

3) Compliance to §1.1306(b)(3) regarding human exposure to RF radiation was examined for multiple sources. A search was made about the proposed site coordinates to locate any additional sources of RF radiation and none were found.

CONCLUSIONS

Based on the engineering studies provided, the proposal is in complete conformance with all technical rules of the Federal Communications Commission.

Garrett G. Lysiak, P.E.
May 22, 2022

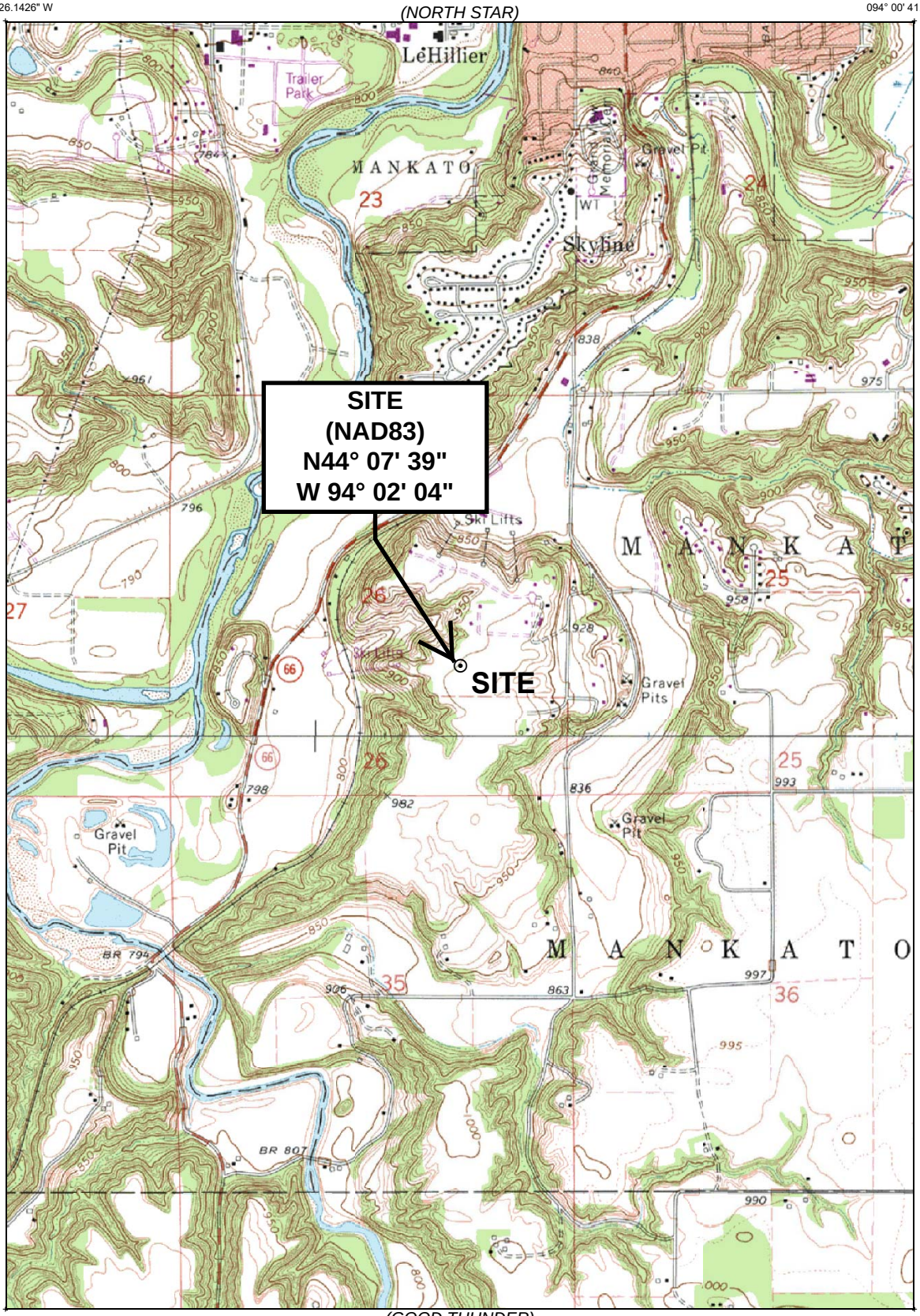
MANKATO WEST QUADRANGLE
MINNESOTA
TOPOGRAPHIC SERIES

(NICOLLET) (ST PETER)

094° 03' 26.1426" W
044° 09' 02.5874" N

(NORTH STAR)

094° 00' 41.3304" W
044° 09' 02.5874" N



(JUDSON) (MANKATO EAST)

044° 06' 15.0012" N
094° 03' 26.1426" W

(GOOD THUNDER)

044° 06' 15.0012" N
094° 00' 41.3304" W

(LAKE CRYSTAL) (BEAUFORD)

SCALE 1:24000

Declination
MN
GN

GN 0° 43' W
MN 0° 45' E

0 1
Mile

0 1000
Yards

0 1
Kilometer

CONTOUR INTERVAL 10 FT
[BASE MAP VERTICAL DATUM]

MANKATO WEST, MN
JAN 1, 1993

FIGURE 1 - SITE MAP

FIGURE 2 - AERIAL VIEW

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Figure 3 Allocation Study

Subarctic Media, LLC

REFERENCE — CH# 254D - 98.7 MHz, Pwr= 0.25 kW, HAAT= 147.6 M, COR= 435 M — DISPLAY DATES
44 07 39.0 N. — Average Protected F(50-50)= 15.7 km — DATA 05-02-22
94 02 04.0 W. — Omni-directional — SEARCH 05-18-22

CH CITY	CALL STATE	TYPE	ANT <--	AZI. FILE #	DIST	LAT. LNG.	Pwr(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
254D Mankato	K254DT! MN	LIC	CN	0.0 0.0 0000145124	0.00	44 07 39.00 94 02 04.00	0.250	440	---Reference--- Subarctic Media, LLC		
256C1 Mankato	KEEZ-FM MN	LIC	CN	248.4 68.2 BLH20010420AAG	22.87	44 03 05.90 94 17 59.90	100.000 239	9.2 543	68.0 Alpha 3e Licensee LLC Debt	-1.7	-46.3*
254C0 Pipestone	KISD MN	LIC	CN	261.2 79.9 BLH20160119AAN	155.52	43 53 51.90 95 56 51.10	100.000 330	176.7 851	75.2 Christensen Broadcasting,	-36.9*	28.6
254C3 Osage	KSMA-FM IA	LIC	CN	136.6 317.3 BLH20020129AAA	116.16	43 21 52.90 93 02 53.70	25.000 100	111.9 463	37.3 Coloff Media, LLC	-10.8	28.8
253C0 Minneapolis	KTIS-FM MN	LIC	CN	34.5 215.2 BMLED20030304AAJ	126.17	45 03 29.90 93 07 27.80	100.000 315	107.0 593	73.7 University Of Northwestern	1.9	27.5
201A Mankato	766784 MN	APP	CN	74.6 254.7 0000167620	16.18	44 09 57.10 93 50 21.50	2.000 52	0.0 357	0.0 Southern Minnesota Catholi	10.0R	6.2M
251C3 Blue Earth	KBEW-FM MN	LIC	CN	187.8 7.8 BLH19940105KD	51.66	43 40 00.80 94 07 19.80	25.000 100	4.2 429	40.1 Riverfront Broadcasting Of	32.0	10.5
201A New Market Elko	768186 MN	CP	DCN	45.1 225.6 0000166956	69.94	44 34 09.00 93 24 34.00	0.100 41	0.0 350	0.0 Poderosa Broadcasting, Inc	10.0R	59.9M

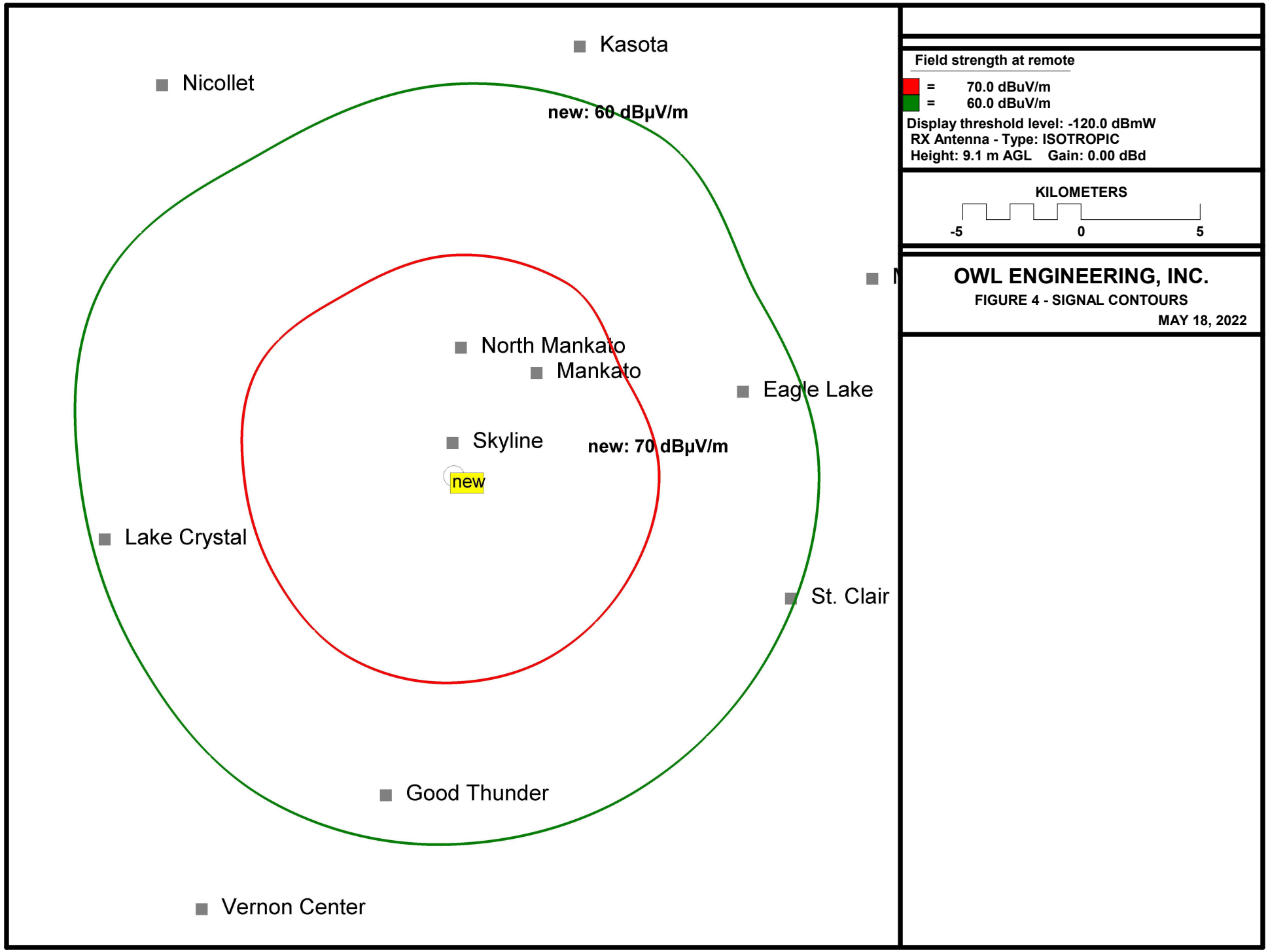
Kasota
Nicollet
new: 60 dBµV/m
North Mankato
Mankato
Eagle Lake
Skyline
new: 70 dBµV/m
new
Lake Crystal
St. Clair
Good Thunder
Vernon Center
Field strength at remote
= 70.0 dBuV/m
= 60.0 dBuV/m
Display threshold level: -120.0 dBmW
RX Antenna - Type: ISOTROPIC
Height: 9.1 m AGL Gain: 0.00 dBd
KILOMETERS
-5
0
5
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FIGURE 4 - SIGNAL CONTOURS
MAY 18, 2022