KDVB
245C2
ONE-STEP UPGRADE

This technical report has been developed in support of an application for minor modifications to KDVB (FCC facility #164159) at Effingham, KS. A one-step co-channel upgrade from 245A to 245C2 is requested at a new site.

One-step Upgrade Gains:

	70 dBu Pop	**70 dBu Area**	**60 dBu Pop**	**60 dBu Area**
Application	181,439	2,775.1	322,203	7,338.5
License	699	56.1	1,065	179.5
Gain	**180,740**	**2,719.0**	**321,138**	**7,159.0**

Allocations analysis:

The proposed facility is fully-spaced at the new site on co-channel 245C2. The following exhibits are provided. All analyses utilized the NED 30 meter terrain database. Alternate prediction methods are used to establish community of license 70 dBu coverage.

E1 KDVB-AP Spacing Study
E2A 70 dBu coverage of Effingham using FCC FM Point to Pont V2
E2A1 FMPTP-V2 contours tabulation
E2B 70 dBu city grade coverage utilizing Longley-Rice
E2B1 Longley-Rice documentation
E3 KDVB Fully-spaced reference point spacing study
E4 KDVB reference point uniform maximum class 70 dBu
E5 Reference point topographic map and aerial photograph
E6 ASR

Proposed application site:

The facility will be relocated to an existing registered tower (ASR #1032508) at:

N 39-15-41.0 W 95-39-21.0 (NAD 83).

A channel study demonstrating compliance with §73.207 is included (E1), and 70 dBu coverage of Effingham is demonstrated in E2 utilizing FCC FM Point to Point Version 2 and Longley-Rice methodologies (see below). The proposed one-step upgrade is clearly mutually exclusive with the KDVB licensed facility.

Fully spaced reference point:

A fully-spaced 245C2 reference point is provided at:

N 39-24-15.0 W 95-27-13.0 (NAD 83).

A channel study is provided as E3, 70 dBu community coverage as E4 and site map as E5.

HAAT and contour tabulation:

North Latitude = 39-15-41.0 West Longitude = 95-39-21.0

HAAT and Distance to Contour, FCC, FM 2-10 Miles, 51 Points Method - NED 30 Meter Terrain

Az	AV EL	HAAT	ERP (kW)	60 dBu (km)	70 dBu (km)
000	335.8	113.9	50.0	47.06	28.81
045	318.8	130.9	50.0	49.55	30.55
090	318.7	131.0	50.0	49.56	30.56
135	310.5	139.2	50.0	50.72	31.42
180	314.3	135.4	50.0	50.19	31.02
225	332.4	117.3	50.0	47.58	29.18
270	335.8	113.9	50.0	47.06	28.81
315	357.2	92.5	50.0	43.39	26.18

Additional Radials (Not Considered in Average):

038	320.5	129.2	50.0	49.30	30.38

Ave El= 327.93 M HAAT= 121.77 M AMSL= 449.7 M

Effingham 70 dBu coverage established using alternate methods:

In an abundance of caution, Effingham 70 dBu coverage is demonstrated using two Commission approved methods - FCC's FM Point to Point Version 2 and Longley-Rice. In both cases, the +10% threshold of *Hardinsburg, KY* (25 FCC Rcd 13204 (2010)) is exceeded.

FCC FM Point to Point Version 2 :

Exhibit E2A shows that the 70 dBu contour calculated using the Commission's own algorithm for FMPTP-V2 provided in V-Soft's Probe 4 encompasses 100% of the 2010 boundaries of Effingham,KS, exceeds the FCC 70 dBu standard method contour by well more than 10% (see E2A1) and is contained within the FCC method predicted 60 dBu. This method has been accepted by the Commission and resulted in application grants in a number of cases. Specifically, WPNA-FM application #000011965 and WYFX application BPH-20151223BAM are cited. All calculations used the NED 30 meter terrain database.

Longley-Rice demonstrates Effingham, KS 70 dBu community coverage:

Exhibit E-2B demonstrates that the proposed facility will place a 70 dBu contour over one hundred percent (100) of the Effingham, KS, 2010 boundaries using the Longley-Rice "first occurrence" contour calculated using the V-Soft *Probe 4* software and the NED 30 meter terrain database. It is noted that the calculated 73 dBu Longley-Rice contour is used in order to accommodate a 3 dB clutter loss in accordance with OET's operating policy. Effingham, KS has a 2010 population of 546 and clearly does not require more clutter loss. In fact 2 dB has been used in similar communities.

The NED 30 meter terrain database is among the most accurate available and, in keeping with Commision policy, is preferred over the Globe 30 meter or USGS 3 second databases for Longley-Rice calculations.

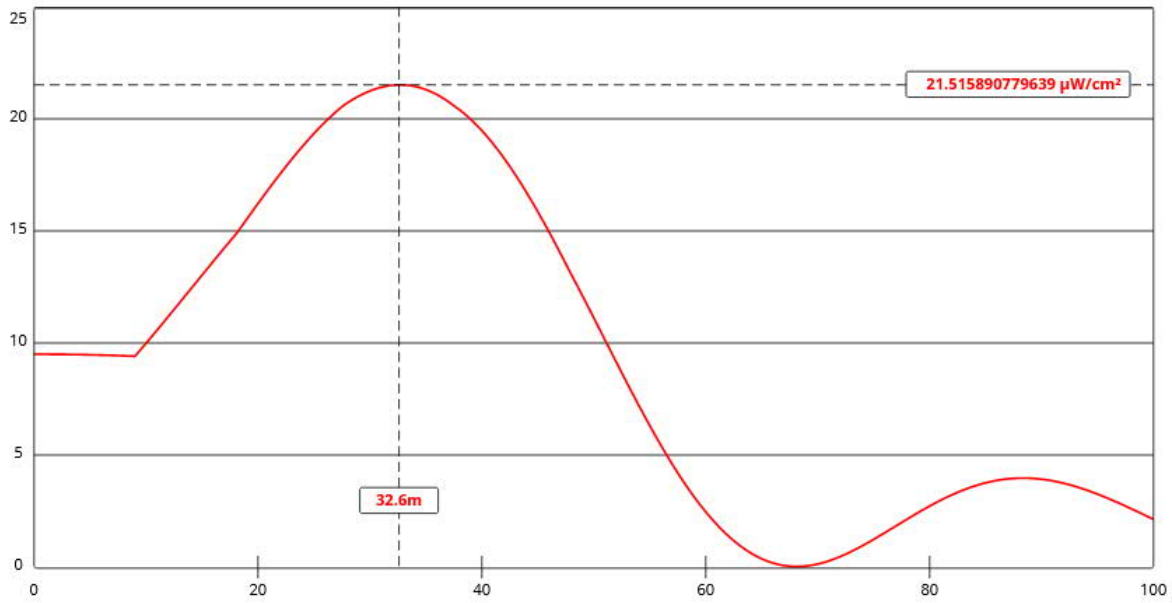
Probe 4 is based on the NTIA Longley-Rice algorithm, and its use has been regularly accepted by the Commission in allocation proceedings in the past.

Use of Longley-Rice is permitted based on Commission policy and the *Hardinsburg, KY* ruling, 25 FCC Rcd 13204 (2010), which allows its use when the Longley-Rice predicted 70 dBu exceeds the FCC predicted 70 dBu by at least 10% on a radial through the community of license. Exhibit E2A

includes a tabulation of the FCC and Longley-Rice 70 dBu contours through the range of azimuths of 36° to 39° true that encompass the entire Effingham, KS boundary. The Longley-Rice 70 dBu exceeds the FCC 70 dBu by more than 10% at all azimuths including the 37.5° azimuth directly through the community (+24.25%).

RF Exposure Calculation:

A six bay MPX-6E full-wave spaced antenna will be mounted at 105 meters AGL. The RF exposure was calculated using the Commission's FMMODEL program to be 21.51 μWatts/cm^2 at 32.6 meters or 10.8% of the maximum permissible for general public exposure.



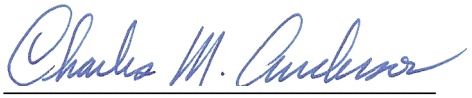
View Tabular Results +

Channel Selection	Channel 245 (96.9 MHz)		
Antenna Type +	EPA Type 3: Opposed U Dipole		
Height (m)	105	Distance (m)	100
ERP-H (W)	50000	ERP-V (W)	50000
Num of Elements	6	Element Spacing (λ)	1
Num of Points	500	Apply	

Since no other attributable facilities are collocated, the RF level complies with Commission limits.

Conclusion:

It is concluded that the minor modifications of KDVB are in full compliance with Commission rules and policies.



Charles M. Anderson 3-13-2021

E1 CHANNEL STUDY

REFERENCE
39 15 41.00 N.
95 39 21.00 W.

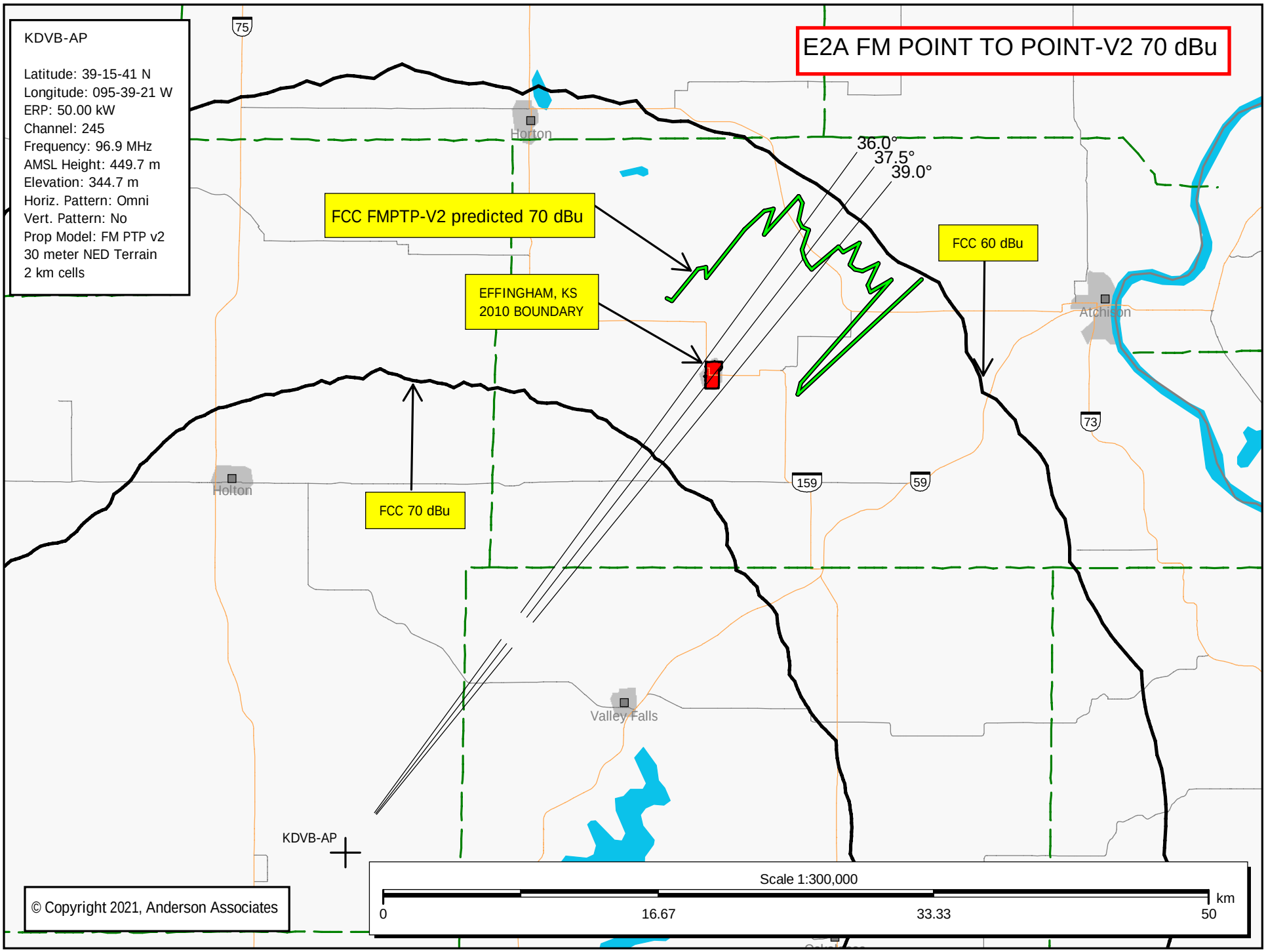
CLASS = C2
Current Spacings to 3rd Adj.

DISPLAY DATES
DATA 03-09-21
SEARCH 03-09-21

Channel 245 - 96.9 MHz

Call	Channel	Location		Azi	Dist	FCC	Margin
KDVB	LIC 245A	Effingham	KS	37.3	36.45	165.5	-129.1
AL0976	RSV-A 244A	Emporia	KS	208.1	107.55	105.5	2.1
KKOW-FM	LIC 245C1	Pittsburg	KS	161.1	228.48	223.5	5.0
KZKX	LIC 245C1	Seward	NE	334.6	229.81	223.5	6.3
KRBZ	LIC 243C0	Kansas City	MO	104.8	102.24	88.5	13.7
KMAJ-FM	LIC 299C1	Carbondale	KS	213.0	40.68	26.5	14.2
KMAJ-FM	CP 299C1	Carbondale	KS	213.0	40.68	26.5	14.2
KLRX	RSV-A 247C1	Lee's Summit	MO	102.6	93.96	78.5	15.5

RSV-R = reserved - needs protection, RSV-A = allocation
All separation margins include rounding.


KDVB-AP
Latitude: 39-15-41 N
Longitude: 095-39-21 W
ERP: 50.00 kW
Channel: 245
Frequency: 96.9 MHz
AMSL Height: 449.7 m
Elevation: 344.7 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: FM PTP v2
30 meter NED Terrain
2 km cells
E2A FM POINT TO POINT-V2 70 dBu
FCC FMPTP-V2 predicted 70 dBu
EFFINGHAM, KS
2010 BOUNDARY
FCC 60 dBu
FCC 70 dBu
36.0°
37.5°
39.0°
Horton
Holton
Atchison
Valley Falls
75
73
159
59
KDVB-AP
Scale 1:300,000
0
16.67
33.33
50
km
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E2A1 FM Point to Point Version 2 Contours Tabulation

Type of contour: FMPTP v2
Type of FMPTP Curve: Service
Field Strength: 70.00 dBuV/m

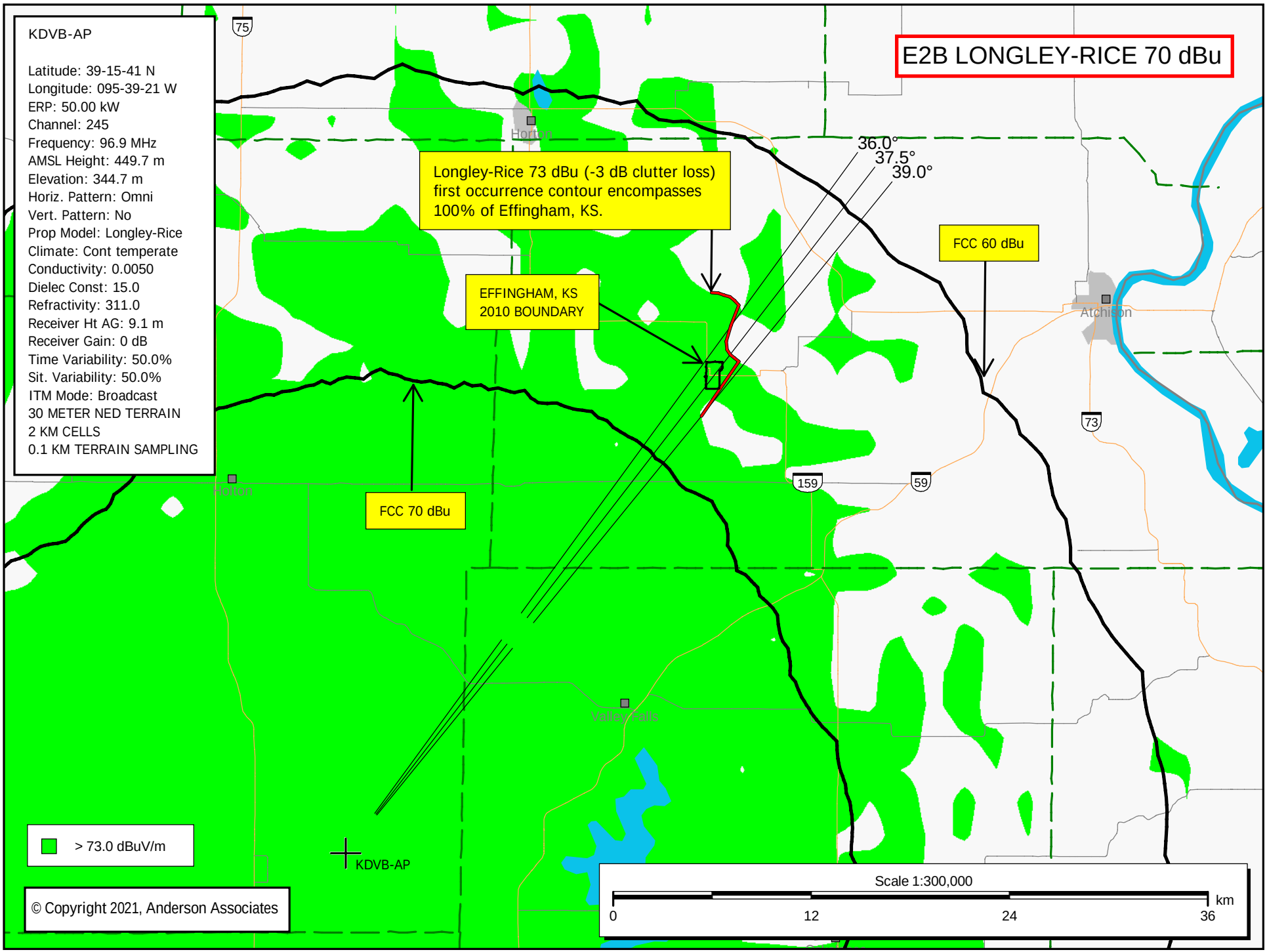
Primary Terrain: NED 30 Meter Terrain
Secondary Terrain: V-Soft 3 Second US Terrain

Transmitter Information:

Call Letters: KDVB-AP
Latitude: 39-15-41 N
Longitude: 095-39-21 W
ERP: 50.00 kW
Channel: 245
Frequency: 96.9 MHz
AMSL Height: 449.7 m
Elevation: 344.7 m
HAAT: 30.5 m
Horiz. Antenna Pattern: Omni
Vert. Elevation Pattern: No

Azimuth (deg)	FCC 70 dBu (km)	PTP-V2 70 dBu (km)	% Increase	HAAT (m)
36.0	30.5	46.90	53.8	130.7
37.0	30.5	45.80	50.2	130.8
38.0	30.4	45.30	49.0	129.2
39.0	30.4	47.30	55.6	129.7

NED 30 meter terrain
2 km cells
0.1 km terrain intervals


KDVB-AP
Latitude: 39-15-41 N
Longitude: 095-39-21 W
ERP: 50.00 kW
Channel: 245
Frequency: 96.9 MHz
AMSL Height: 449.7 m
Elevation: 344.7 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: Longley-Rice
Climate: Cont temperate
Conductivity: 0.0050
Dielec Const: 15.0
Refractivity: 311.0
Receiver Ht AG: 9.1 m
Receiver Gain: 0 dB
Time Variability: 50.0%
Sit. Variability: 50.0%
ITM Mode: Broadcast
30 METER NED TERRAIN
2 KM CELLS
0.1 KM TERRAIN SAMPLING
E2B LONGLEY-RICE 70 dBu
Longley-Rice 73 dBu (-3 dB clutter loss) first occurrence contour encompasses 100% of Effingham, KS.
EFFINGHAM, KS 2010 BOUNDARY
FCC 60 dBu
FCC 70 dBu
36.0°
37.5°
39.0°
Horton
Hiawatha
Atchison
Valley Falls
75
73
159
59
> 73.0 dBuV/m
KDVB-AP
© Copyright 2021, Anderson Associates
Scale 1:300,000
0
12
24
36
km

E2B1 Longley-Rice-FCC 70 dBu Tabulation

Longley-Rice Distance to Contour Report

Using the first occurence method at 73.0 dBu (70 dBu + 3 dB for clutter loss)

Transmitter Information:

Call Letters: KDVB-AP

Latitude: 39-15-41 N
Longitude: 095-39-21 W
ERP: 50.00 kW
Channel: 245
Frequency: 96.9 MHz
AMSL Height: 449.7 m
Elevation: 344.7 m
Horiz. Antenna Pattern: Omni
Vert. Elevation Pattern: No

Azimuth (deg)	FCC 70 dBu (km)	LR 73 dBu (km)	% Increase	HAAT (m)
36.0	30.5	39.5	29.5	130.7
37.0	30.5	38.2	25.2	130.8
38.0	30.4	38.1	25.3	129.2
39.0	30.4	34.1	12.2	129.7

KDVB-AP

Latitude: 39-15-41 N
Longitude: 095-39-21 W
ERP: 50.00 kW
Channel: 245
Frequency: 96.9 MHz
AMSL Height: 449.7 m
Elevation: 344.7 m
Horiz. Pattern: Omni
Vert. Pattern: No
Prop Model: Longley-Rice
Climate: Cont temperate
Conductivity: 0.0050
Dielec Const: 15.0
Refractivity: 311.0
Receiver Ht AG: 9.1 m
Receiver Gain: 0 dB
Time Variability: 50.0%
Sit. Variability: 50.0%
ITM Mode: Broadcast
30 METER NED TERRAIN
2 KM CELLS
0.1 KM TERRAIN SAMPLING

E2C FCC 60 & 70 dBu Tabulations

Transmitter Information:

Call Letters: KDVB-AP

Latitude: 39-15-41 N
Longitude: 095-39-21 W
ERP: 50.00 kW
Channel: 245
Frequency: 96.9 MHz
AMSL Height: 449.7 m
Elevation: 344.7 m
HAAT: 30.5 m
Horiz. Antenna Pattern: Omni
Vert. Elevation Pattern: No

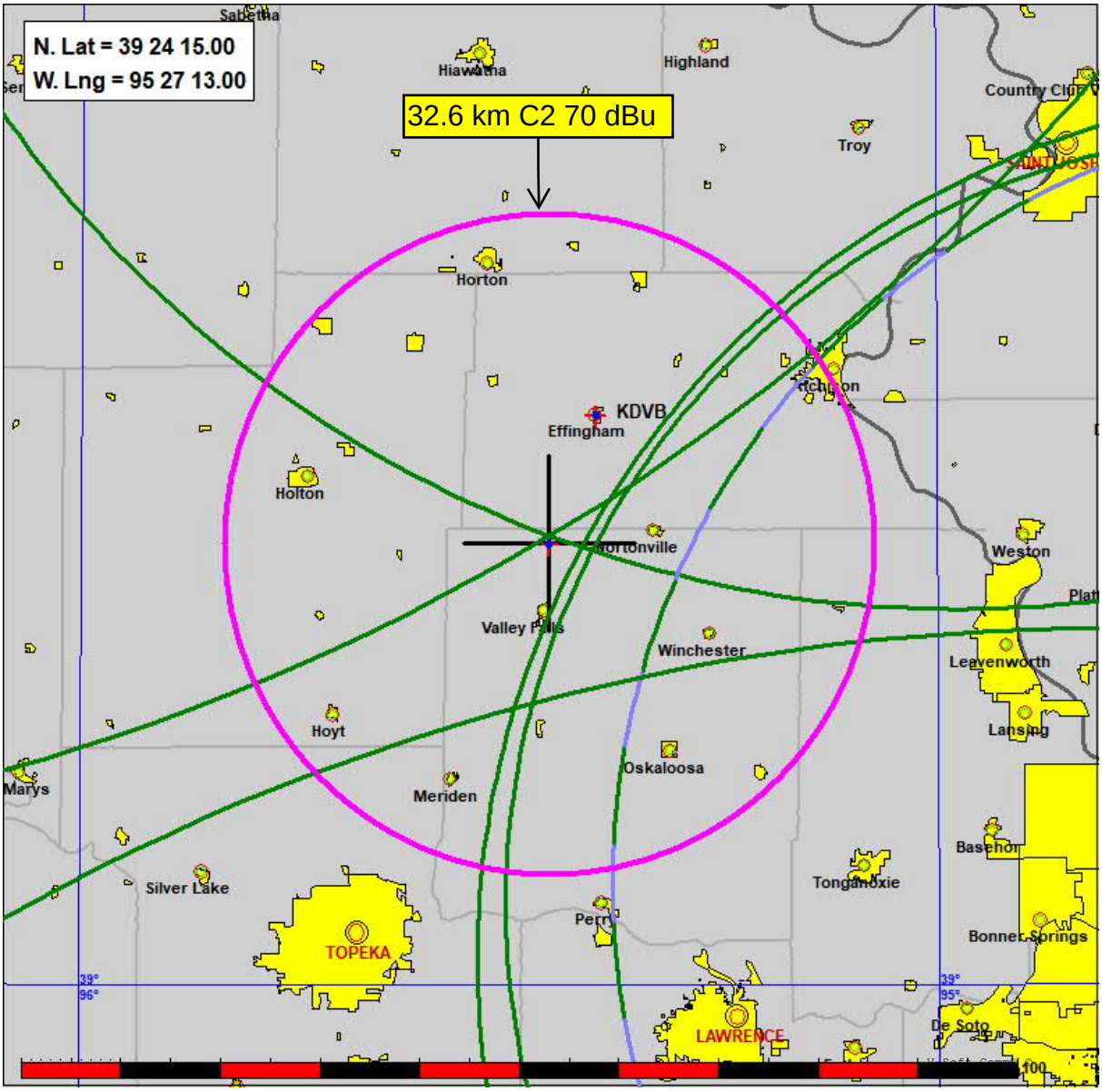
Type of Contour: FCC
Location Variability: 50.0 %
Time Variability: 50.0 %
FCC Matching HAAT Calculation Used
Field Strength: 70.00 dBuV/m
Primary Terrain: NED 30 Meter Terrain
Secondary Terrain: V-Soft 3 Second US Terrain

Azimuth (deg)	Distance (km)	HAAT (m)
36.0	30.5	130.7
37.0	30.5	130.8
38.0	30.4	129.2
39.0	30.4	129.7

Type of contour: FCC
Location Variability: 50.0 %
Time Variability: 50.0 %
# of Radials Calculated: 360
FCC Matching HAAT Calculation Used
Field Strength: 60.00 dBuV/m
Primary Terrain: NED 30 Meter Terrain
Secondary Terrain: V-Soft 3 Second US Terrain

Azimuth (deg)	Distance (km)	HAAT (m)
36.0	49.5	130.7
37.0	49.5	130.8
38.0	49.3	129.2
39.0	49.4	129.7

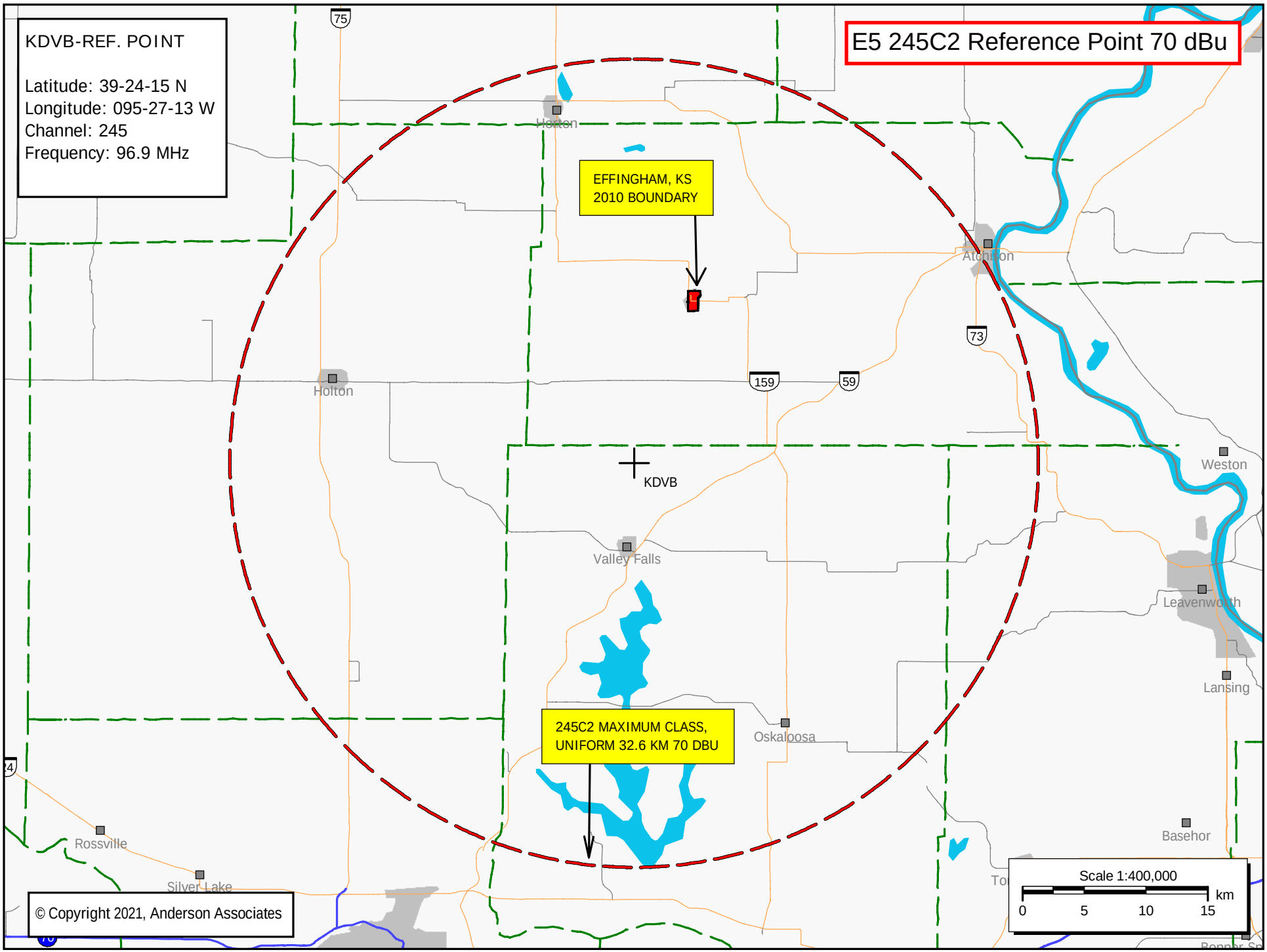
E4 245C2 Reference Point Channel Study



Call	CH#	Type	Location		Azi	D-KM	FCC	Margin
KDVB	245A	LIC	Effingham	KS	19.9	13.91	165.5	-151.6
KZKX	245C1	LIC	Seward	NE	328.9	224.13	223.5	0.6
KVVL	246C3	LIC	Maryville	MO	20.5	117.27	116.5	0.8
KRBZ	243C0	LIC	Kansas City	MO	117.4	91.57	88.5	3.1
KLRX	247C1	RSV-A	Lee's Summit	MO	116.3	82.70	78.5	4.2
KLRX	247C1	LIC-N	Lee's Summit	MO	112.1	91.62	78.5	13.1
KKOW-FM	245C1	LIC	Pittsburg	KS	166.4	238.79	223.5	15.3

RSV-R, reserved, needs protection, RSV-A, allocation, does not if a CP or LIC has been granted.

All separation margins include rounding.


KDVB-REF. POINT
Latitude: 39-24-15 N
Longitude: 095-27-13 W
Channel: 245
Frequency: 96.9 MHz
E5 245C2 Reference Point 70 dBu
EFFINGHAM, KS
2010 BOUNDARY
245C2 MAXIMUM CLASS,
UNIFORM 32.6 KM 70 DBU
KDVB
Holton
Holton
Atchison
Valley Falls
Oskaloosa
Weston
Leavenworth
Lansing
Basehor
Rossville
Silver Lake
75
73
159
59
Scale 1:400,000
km
0
5
10
15
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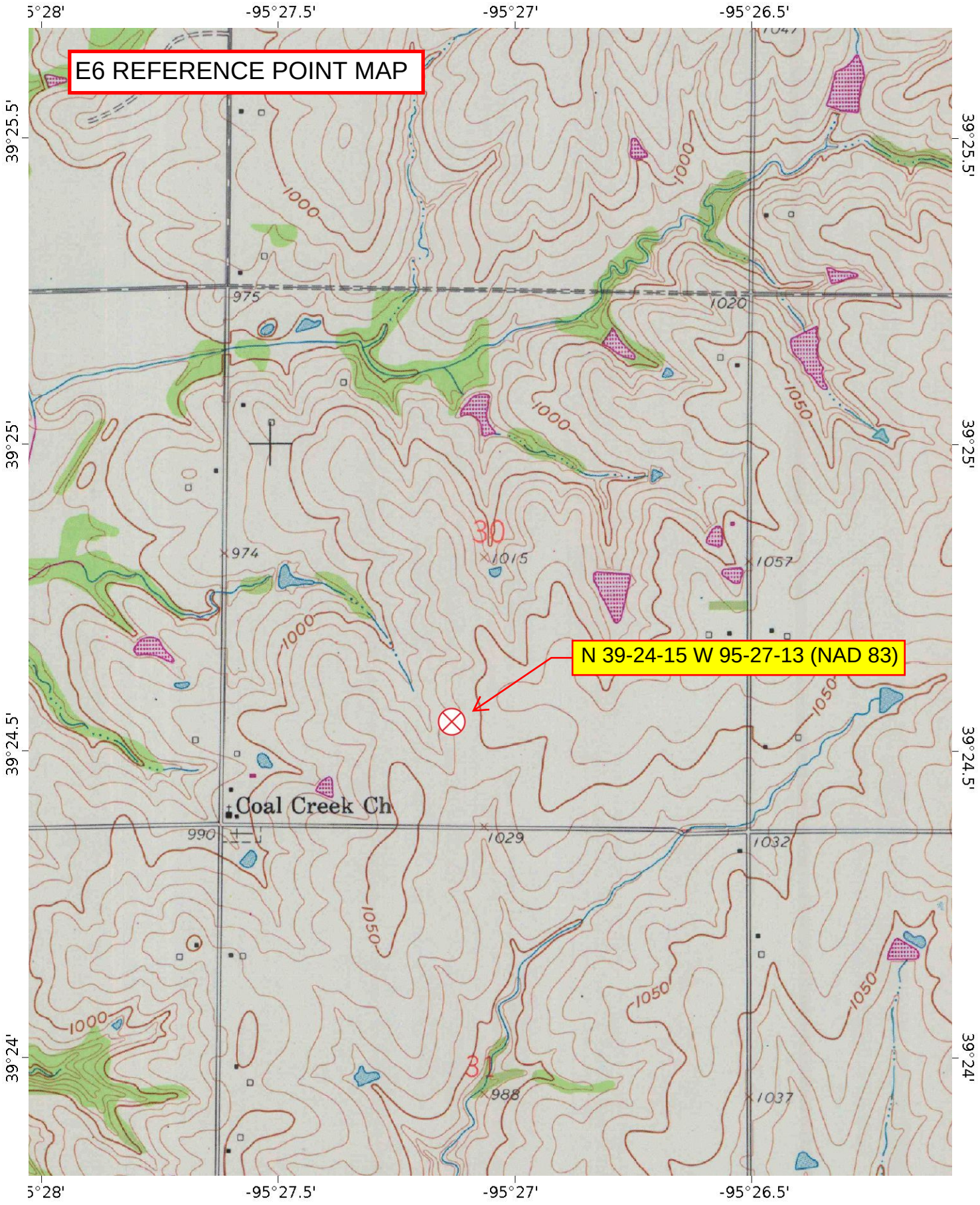

Mercator Projection
WGS84
USNG Zone 15STD

CALTOPO

0.5 1.0 1.5 km
0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 mi

Scale **1:15193** 1 inch = 1266 feet

N MN 2°

E5 REFERENCE POINT PHOTOGRAPH

E6 Registration 1032508

Map Registration

Registration Detail

Reg Number	1032508	Status	Constructed
File Number	A0314190	Constructed	12/01/1963
EMI	No	Dismantled	
NEPA	No		

Antenna Structure

Structure Type TOWER - Free standing or Guyed Structure used for Commu

Location (in NAD83 Coordinates)

Lat/Long	39-15-41.0 N 095-39-21.0 W	Address	4.2 KM ENE
City, State	HOYT , KS		
Zip	66440	County	JACKSON
Center of AM Array		Position of Tower in Array	

Heights (meters)

Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)
344.7	124.4
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances
469.1	115.2

Painting and Lighting Specifications

FCC Paragraphs A2, H

FAA Notification

FAA Study	87-ACE-0505-OE	FAA Issue Date	04/08/1988

Owner & Contact Information

FRN	0006799621	Owner Entity Type	

Owner

Heartland Tower Inc.
Attention To: Robert Nall
PO Box 5307
Topeka , KS 66605

P: (785)266-3999
F:
E: fcc@heartlandtower.com

Contact

P:
F:
E:

Last Action Status

Status	Constructed	Received	02/27/2003
Purpose	Admin Update	Entered	02/27/2003
Mode	Interactive		

Related Applications