

TECHNICAL EXHIBIT
APPLICATION FOR CONSTRUCTION PERMIT

DIGITAL TELEVISION TRANSLATOR STATION W22CI-D
BLOOMINGTON, WISCONSIN
FACILITY ID: 63057
CHANNEL 22-D / 1.93 kW ERP / ND

STATE OF WISCONSIN - EDUCATIONAL COMMUNICATIONS BOARD

NOVEMBER, 2013

© 2013 JEREMY RUCK & ASSOCIATES, INC.

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

11.1.2013

APPLICATION FOR CONSTRUCTION PERMIT

The following engineering statement and attached exhibits have been prepared for **State of Wisconsin - Educational Communications Board** ("Wisconsin"), licensee of digital low power television translator W22CI-D at Bloomington, Wisconsin, and are in support of their application for construction permit to modify that facility.¹

Following a determination of structural issues with the tower that is utilized for the support of the W22CI-D transmitting antenna, Wisconsin entered into a project to reduce the overall height of the structure. The Federal Aviation Administration was advised of the proposed change in the height via notification to that agency.² Changes to the antenna structure registration data have been made to reflect the necessary modification to the tower. This tower bears Antenna Structure Registration Number 1035075.

This application seeks to modify the licensed facility in connection with a lower overall tower height. In addition to a reduction in the center of radiation above mean sea level, changes to the maximum effective radiated power and antenna model are proposed, as is a correction to the geographic coordinates associated with the facility.

The proposed facility would operate on channel 22 with a maximum effective radiated power of 1.93 kW at a center of radiation of 417.3 meters AMSL utilizing a simple emission

¹ The Facility ID for W22CI-D at Bloomington, Wisconsin is 63057.

² See FAA Study 2013-AGL-5617-OE issued June 25, 2013.

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

mask. The antenna utilized by the facility is being changed to an Electronics Research, Inc. (ERI) AL8-22-PL, which is considered a non-directional antenna. This particular antenna has an electrical beamtilt of 1.75 degrees.

As indicated on the form pages, the specified transmitter power output is 200 Watts. This value achieves the proposed maximum effective radiated power of 1.93 kW. The transmission line between the transmitter and the antenna is 340 feet in length. The type of transmission line is Andrew/Commscope HJ7-50A, which is air dielectric transmission line with a nominal diameter of 1 5/8 inches. Data from the manufacturer specifies the efficiency of this particular run of line as 66.75 percent. This yields an antenna input power of 133.5 Watts, which when combined with the peak power gain of the antenna at 14.45 yields the specified effective radiated power of 1.93 kW.

The proposed facility would comply with all of the applicable rule sections. Exhibit E-1 illustrates the areas of predicted interference to other relevant facilities resulting from the specified technical parameters. As the tabulation in Exhibit E-2 demonstrates, the proposed facility is predicted to cause interference to 0.06 percent of the population served by KWWF. This value not only complies with the Commission's Rules, but also represents a *reduction* in the level of interference when compared against the licensed facility.

The proposed facility would not constitute a substantial environmental impact, and is exempt from environmental processing. The facility would continue to utilize an existing tower that is registered with the Commission. In addition, the facility would not constitute a radiofrequency radiation exposure hazard to persons at or in the vicinity of the site.

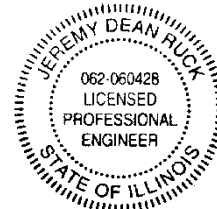
JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

Under a worst case scenario where all of the radiation from the facility is assumed to be directed downwards, the power density calculated using the equations in Appendix A of *OET Bulletin 65* is $6.71 \mu\text{W}/\text{cm}^2$. This value is considerably less than the upper limit permissible under the uncontrolled environment condition of the safety standard. Wisconsin certifies that it will coordinate with all other users of the site to ensure that workers and other personnel having access to the site are not exposed to levels of radiofrequency radiation in excess of the applicable safety standards. Such coordination will include, but is not necessarily limited to, a reduction in transmitter power or cessation of operation.

The preceding statement and attached exhibits have been prepared by me, or under my direction, and are true and accurate to the best of my belief and knowledge.



Above signature is digitized copy of actual signature
License Expires November 30, 2015

Jeremy D. Ruck, PE
November 1, 2013

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com

11.1.2013

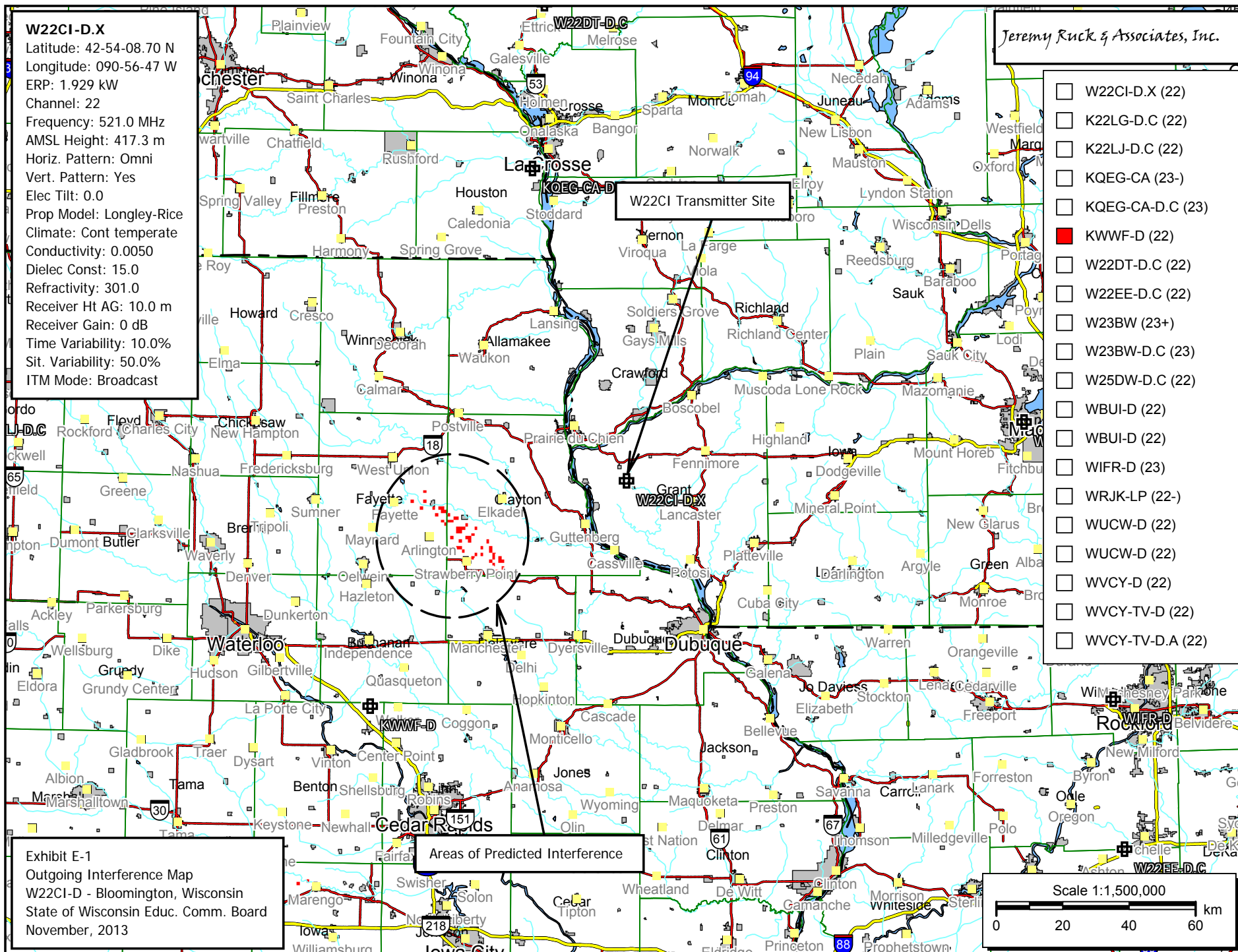


Exhibit E-2 - Outgoing Interference Tabulation

Outgoing Interference Population Report

W22CI-D.X (22) Bloomington, WI
 Broadcast Type: Digital Service: G [Simple Emission Mask]
 Lat: 42-54-08.70 N Lng: 090-56-47 W ERP: 1.929 kW AMSL: 417.3 m
 TV Outgoing Interference Study
 Signal Resolution: 1.0 km
 Consider NTSC Taboo: Yes
 KWX error points are considered to
 be interference free coverage.
 Default # of radials computed for contours: 360
 Contours calculated using 8 radial HAAT.
 LR Profile Spacing Increment: 0.1 km
 Masked interference points are being
 counted as interference.
 Using LPTV/translator D/U rules.
 Pop Centroid DB: 2010 US Census (PL)

Study Date: 11/1/2013
 TV Database Date: 11/1/2013

Primary Terrain: NED 3 Second US Terrain
 Secondary Terrain: FCC 30 Second US Database

Population Database: 2010 US Census (PL)

----- Stations Considered:

Call Letters	City	State	Dist	Azi
K22LG-D.C (22)	Wells	MN	241.7	291.1
K22LJ-D.C (22)	Mason City	IA	198.1	276.1
KQEG-CA (23-)	La Crescent	MN	98.2	343.3
KQEG-CA-D.C (23)	La Crescent	MN	98.2	343.3
KWWF-D (22)	Waterloo	IA	102.7	228.7
W22DT-D.C (22)	Galesville	WI	145.7	350.2
W22EE-D.C (22)	Rockford	IL	186.4	126.5
W23BW (23+)	Madison	WI	120.9	81.6
W23BW-D.C (23)	Madison	WI	120.9	81.6
W25DW-D.C (22)	Arbury Hills	IL	296.1	111.3
WBUI-D (22)	Decatur	IL	372.3	151.0
WBUI-D (22)	DECATUR	IL	372.3	151.0
WIFR-D (23)	FREEMPORT	IL	160.5	114.2
WRJK-LP (22-)	Arlington Heights	IL	257.9	108.2
WUCW-D (22)	Minneapolis	MN	297.5	324.5
WUCW-D (22)	MINNEAPOLIS	MN	297.5	324.5
WVCY-D (22)	MILWAUKEE	WI	248.9	84.0
WVCY-TV-D (22)	Milwaukee	WI	249.0	84.0
WVCY-TV-D.A (22)	Milwaukee	WI	249.0	84.0

Call	Area	HUnits	Contour	Masked Ix	Unmasked Ix	%
K22LG-D.C (22)	0.0	0	7,520	0	0	0.00
K22LJ-D.C (22)	0.0	0	70,548	0	0	0.00
KQEG-CA (23-)	0.0	0	123,763	0	0	0.00
KQEG-CA-D.C (23)	0.0	0	227,741	0	0	0.00
KWWF-D (22)	47.6	75	241,470	0	153	0.06
W22DT-D.C (22)	0.0	0	2,882	0	0	0.00
W22EE-D.C (22)	0.0	0	42,542	0	0	0.00
W23BW (23+)	0.0	0	410,936	0	0	0.00
W23BW-D.C (23)	0.0	0	572,110	0	0	0.00
W25DW-D.C (22)	0.0	0	5,596,836	0	0	0.00
WBUI-D (22)	0.0	0	977,861	0	0	0.00
WBUI-D (22)	0.0	0	961,814	0	0	0.00
WIFR-D (23)	0.0	0	1,059,499	0	0	0.00

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
 221 S. 1st Avenue
 Canton, IL 61520

Tel: 309.647.1200
 Fax: 855.332.9537
 jeremyruck.com

11.1.2013

WRJK-LP (22-)	0.0	0	191,321	0	0	0.00
WUCW-D (22)	0.0	0	3,663,885	0	0	0.00
WUCW-D (22)	0.0	0	3,662,459	0	0	0.00
WVCY-D (22)	0.0	0	2,619,492	0	0	0.00
WVCY-TV-D (22)	0.0	0	2,555,829	0	0	0.00
WVCY-TV-D.A (22)	0.0	0	2,555,829	0	0	0.00

	Housing Units	Population
Iowa		
Clayton County		
Total	8,999	18,129
KWWF-D (22)	56	120
Delaware County		
Total	8,028	17,764
KWWF-D (22)	3	2
Fayette County		
Total	9,558	20,880
KWWF-D (22)	12	23
Iowa County		
Total	7,258	16,355
KWWF-D (22)	4	8

JEREMY RUCK & ASSOCIATES, INC.

P.O. Box 415
221 S. 1st Avenue
Canton, IL 61520

Tel: 309.647.1200
Fax: 855.332.9537
jeremyruck.com