

ENGINEERING STATEMENT
APPLICATION FOR A DTV
CONSTRUCTION PERMIT FOR FLASHCUT FOR
AN EXISTING TELEVISION TRANSLATOR
K42FI, WATERTOWN, SOUTH DAKOTA
CHANNEL 42 6.516 KW MAX ERP 645.8 METERS RC/AMSL

JULY 2015

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington)
) ss
District of Columbia)

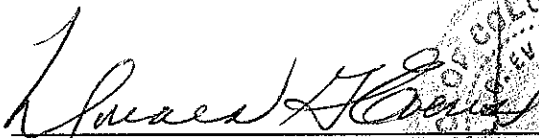
Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1420 N Street, N.W., Suite One, Washington, D.C. 20005;

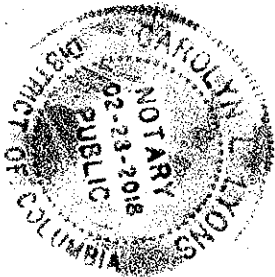
That his qualifications are a matter of record in the Federal Communications Commission;

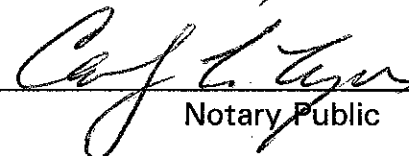
That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.


Donald G. Everist
District of Columbia
Professional Engineer
Registration No. 5714

Subscribed and sworn to before me this 29th day of July, 2015.




Notary Public

My Commission Expires: 2/23/2018

Introduction

This engineering statement has been prepared on behalf of Red River Broadcast Co. LLC, licensee of TV translator, K42FI, Watertown, South Dakota. This statement supports the licensee's request to convert to DTV operation on the currently licensed analog Channel 42, commonly referred to as "flash-cut" with a maximum DTV effective radiated power ("ERP") of 6.516 kW at a radiation center above mean sea level ("RCAMSL") of 645.8 meters. The FCC staff indicates that the application does not require Canadian concurrence.

Transmitter Site

The existing antenna will be utilized and no significant alteration of the tower is proposed or required. The existing tower (Exhibit E-1) is located 3.2 km south of Watertown on Highway 81. There is no change in transmitter site. The geographic coordinates of the site follow below.

North Latitude: 44° 52' 16"

West Longitude: 97° 06' 34"

NAD-27

The antenna registration number is 1042185. The application will specify the ASRN NAD-83 coordinates which are:

North Latitude: 44° 52' 16"

West Longitude: 97° 06' 35"

NAD-83

Elevation Data

| | |
|---|-------------------------------|
| Elevation of site above mean sea level | 525.8 meters (1725 feet) |
| Center of radiation of antenna above ground level | 120.0 meters (393.7 feet) |
| Center of radiation of antenna above mean sea level | 645.8 meters (2118.8 feet) |
| Overall height of tower above ground level including appurtenances | 124 meters (407 feet) |

Equipment Data

| | |
|--------------------|--|
| Transmitter: | Type-approved |
| Transmission Line: | Andrew, Type HJ7-50A, 1-5/8", 103.6 meters (340 feet) with 63.8% efficiency |
| Antenna: | ERI, AL12-42PL with maximum gain of 13.1dB and 1.25° electrical beam tilt |

Power Data

| | | |
|-------------------------|----------|-----------|
| Transmitter: | 0.500 kW | -3.01 dBk |
| Emission Mask: | Simple | |
| Transmission Line Loss: | 0.181 kW | 1.95 dB |
| Input Into Antenna: | 0.319 kW | -4.96 dBk |
| Antenna Gain: | 20.4 | 13.1 dB |
| ERP: | 6.516 kW | 8.13 dBk |

As indicated above, the transmitter with typical power output of 0.5 kW will deliver 0.319 kW to the input of the antenna. The antenna, having a maximum gain of 13.1 dB and an electrical beam tilt of 1.25°, will produce maximum ERP of 6.516 kW. A map providing the protected contour of the proposed facility compared to the currently licensed operation of K42FI has been included as Exhibit E-2 of this report. The antenna elevation pattern and associated tabulation and the horizontal pattern and accompanying tabulation are on file at the Commission as this antenna make and model has been designated as “Off-the-Shelf”, and is the currently licensed antenna for K42FI with no alterations proposed.

Other Broadcast Facilities

A brief analysis was completed to determine the presence of stations in the vicinity of the K42FI tower using the July 1, 2015 data contained within the Commission’s Consolidated Database System (“CDBS”). Within 500 meters of the proposed site, there are one authorized FM radio stations on same tower, no authorized DTV and NTSC television stations, and no authorized low-power analog television or television translator stations aside from K42FI. There is one AM facility within 3.2 km of the existing tower. Although no adverse technical affects are expected due to the proposed changes, the licensee will take measures to resolve any problems proven to be related to the changes proposed in this application.

Interference Analysis

A study of predicted interference caused by the proposed K42FI low-power digital operation has been performed using the Longley-Rice program for which the source data has been posted by the Commission on its website at http://www.fcc.gov/oet/dtv/dtv_apps.html. The

FCC's FORTRAN-77 code was modified only to the extent necessary (primarily input/output handling) for the program to run on a Microsoft Windows XP/Intel platform. Comparison of service/interference areas and population indicates this model closely matches the FCC's digital low-power TV/translator evaluation program. Best efforts have been made to use data and calculation identical to the FCC's program. The model employs the Longley-Rice propagation methodology and evaluates in grid cells of approximately 1 sq. km. Using 3-second terrain data sampled approximately every 1.0 km at one-degree azimuth intervals with 2000 census centroids, all studies are based upon data in the current CDBS database update of the FCC's engineering database. A Longley-Rice study was performed with the proposed K42FI low-power digital facilities and all relevant stations listed in the FCC database as of July 1, 2015. The study results and the included stations are listed in Table I.

Other Licensed and Broadcast Facilities

No adverse technical effect is anticipated by the proposed DTV operation to any other FCC licensed facility. If required, the licensee will install filters or take other measures as necessary to resolve the problem.

FCC Rule, Section 1.1307

Pursuant to OET Bulletin No. 65 dated August 1997, these non-broadcast stations are all exempt from RFF evaluations for the following reason:

| <u>Station</u> | <u>Licensed Under Part No.</u> | <u>Reason for Exemption</u> |
|----------------|--------------------------------|-----------------------------|
| | Part 74, Subpart F | Subpart F Exempt |
| | Part 90 | Antenna Height > 10 meters |

| | |
|--------------------|------------------|
| Part 90 | ERP < 1000 watts |
| Part 74, Subpart F | Subpart F Exempt |

The RFF contribution of each station will be calculated using the following formula:

$$S = \frac{33.4(F^2) \text{ Total ERP}}{R^2}$$

where:

S = power density in $\mu\text{W}/\text{cm}^2$

F = relative field factor

Total ERP = ERP Horizontal Polarization + ERP Vertical Polarization

R = RCAGL - 2 meters

ERP = RMS ERP in watts for DTV Stations

ERP = $[0.4 \text{ ERP}_V + \text{ERP}_A]$ for NTSC Stations

ERP_V = peak visual ERP in watts

ERP_A = RMS aural ERP in watts

The proposed 6.516 kW directional operation will utilize an ERI, Type AL12-42PL antenna (or equivalent) described above with a center of radiation above ground of 120 meters. The proposed antenna is side-mounted on an existing tower with an overall height of 124 meters above ground. The proposed digital operation of K42FI will create a radiofrequency field level of $1.0 \mu\text{W}/\text{cm}^2$ at the base of the tower. This level is less than 0.3% of the Maximum Permissible Exposure (“MPE”) limit for the general population and uncontrolled environment.

Authorized personnel and rigging contractors will be alerted to the potential zone of high field levels on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized

personnel or contractors to perform work on or near the tower. Workers and the general public, therefore, will not be subjected to RFF levels in excess of the current FCC guidelines.

Environmental Assessment

An environmental assessment ("EA") is categorically excluded under Section 1.1306 of the FCC Rules and Regulations as the tower was constructed prior to the requirements specified in WT Docket No. 03-128 and the licensee indicates:

- (a)(1) The existing tower is not located in an officially designated wilderness area.
- (a)(2) The existing tower is not located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.
- (a)(4) The proposed facilities located on a tower which was built prior to the adoption of WT Docket No. 03-128 and is grandfathered and has not affected any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The existing tower is not located near any known Indian religious sites.
- (a)(6) The existing tower is not located in a flood plain.
- (a)(7) The installation of the DTV facilities on an existing tower will not involve a significant change in surface features of the ground in the vicinity of the tower.
- (a)(8) It is not proposed to equip the tower with high intensity white lights unless required by the FAA.

- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines contained in OET Bulletin No. 65, Edition 97-01, dated August 1997 and Supplement A.

ABOVE GROUND

ABOVE MEAN SEA LEVEL

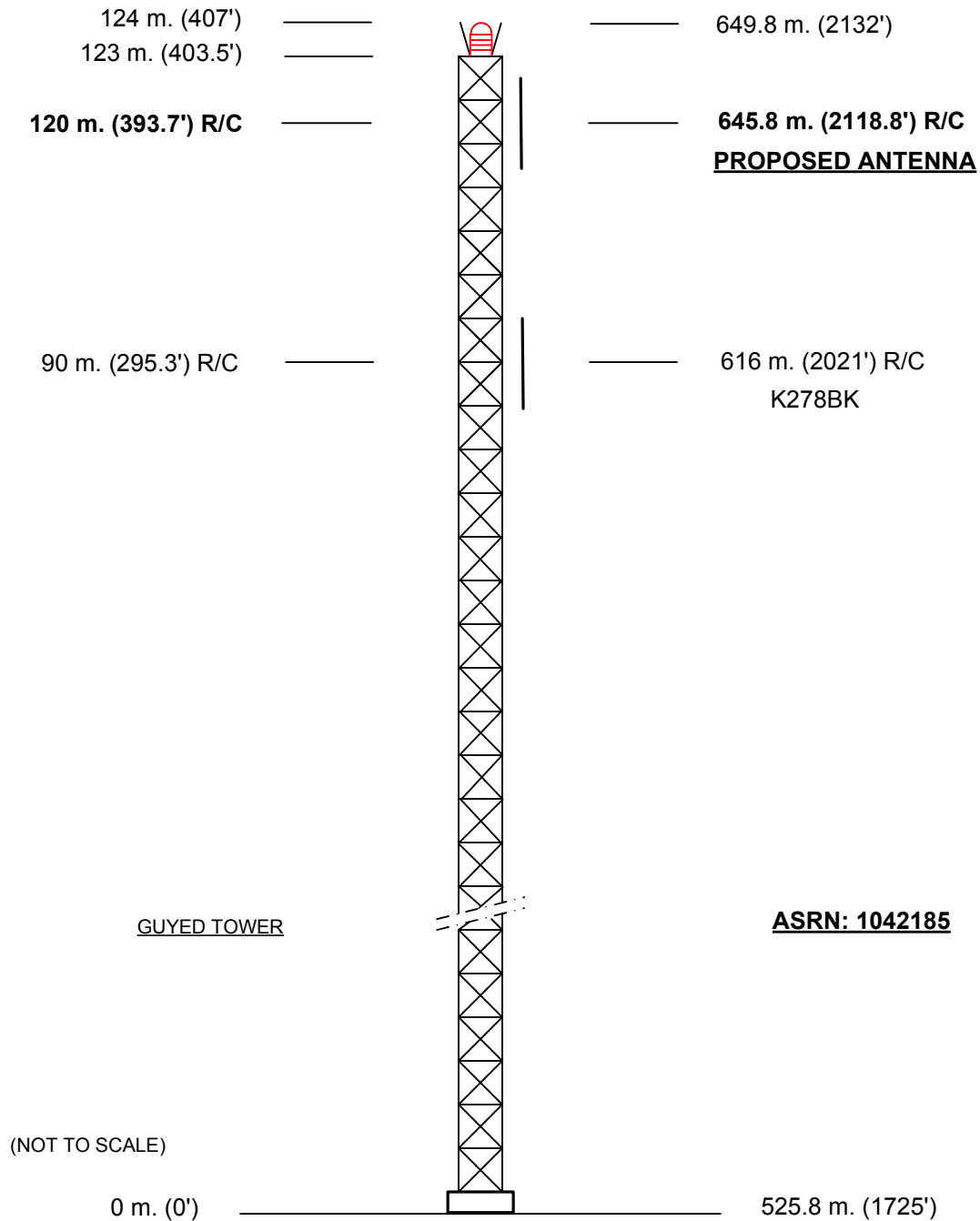
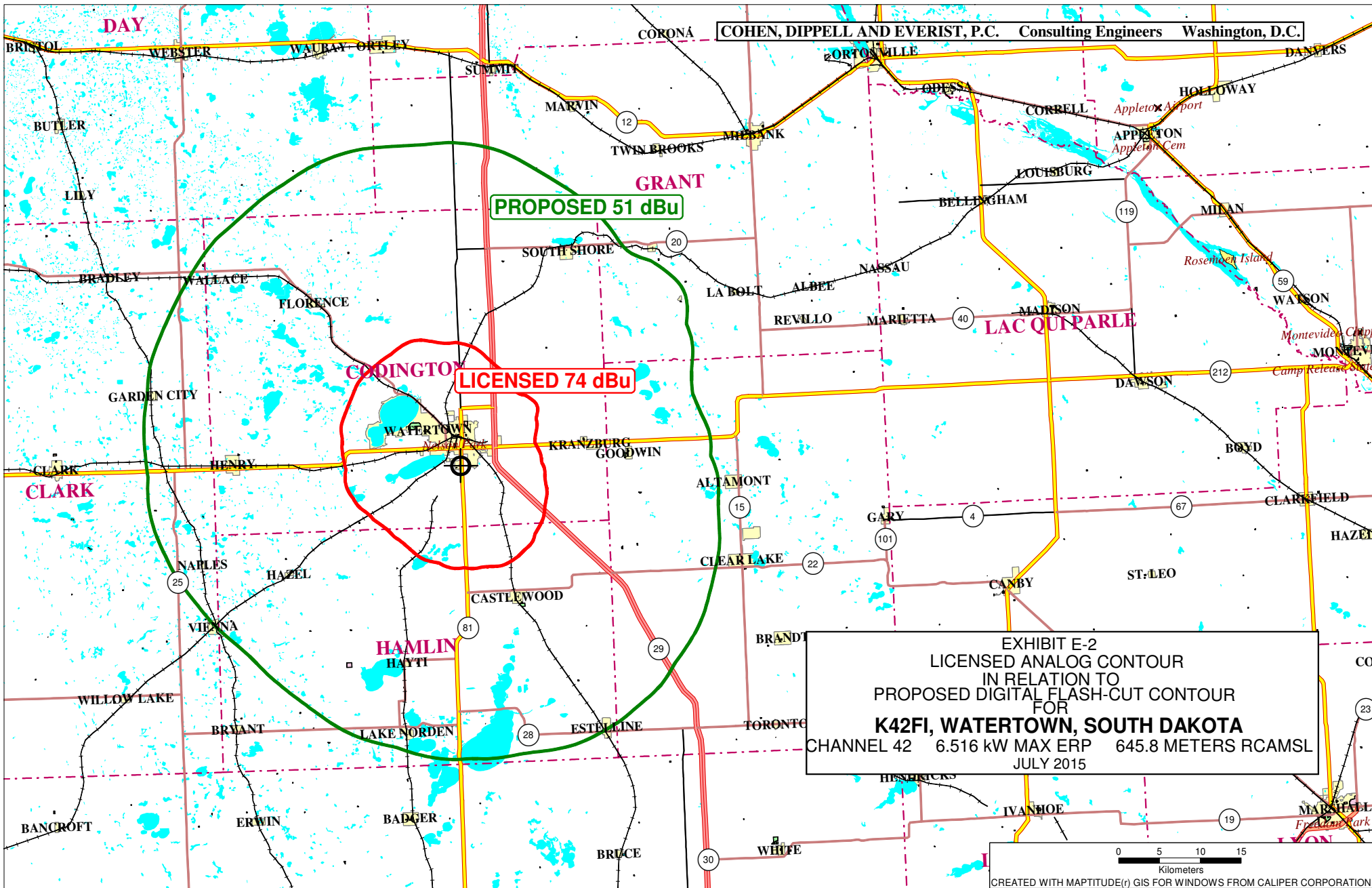


EXHIBIT E - 1
VERTICAL SKETCH
FOR THE DT FLASH-CUT OPERATION OF
K42FI, WATERTOWN, SOUTH DAKOTA

JULY 2015

COHEN, DIPPELL and EVERIST, P.C. CONSULTING ENGINEERS



COHEN, DIPPELL AND EVERIST, P.C.

TABLE I
LONGLEY-RICE INTERFERENCE
FOR THE PRELIMINARY ALLOCATION FOR DIGITAL FLASHCUT
K42FI, WATERTOWN, SOUTH DAKOTA
CHANNEL 42 6.516 KW ERP 645.8 METERS RC/AMSL
JULY 2015

N 44° 52' 16"

W 97° 06' 34"

NAD-27

Emission Mask: Simple

| <u>Channel</u> | <u>Call</u> | <u>City/State</u> | <u>Dist(km)</u> | <u>Status</u> | <u>FCC File No.</u> | <u>Result</u> |
|----------------|-------------|-------------------|-----------------|---------------|---------------------|-----------------|
| 35 | K35GR | BADGER SD | 43.8 | LIC | BLTT-20030610AAT | No interference |
| 40 | K40FZ | BROOKINGS SD | 65 | LIC | BLTTL-20020903ABX | 0.00% |
| 41 | K41NC-D | ALEXANDRIA MN | 170 | CP | BNPDTL-20100505AKQ | 0.00% |
| 41 | K41MF-D | GRANITE FALLS MN | 120.7 | LIC | BLDTT-20110824ACN | No interference |
| 42 | KIMT | MASON CITY IA | 383.6 | LIC | BLCDDT-20090331ACH | No interference |
| 42 | KSAX | ALEXANDRIA MN | 177 | LIC | BLCDDT-20090622ACC | No interference |
| 42 | K42FH | BEMIDJI MN | 347.2 | APP | BSTA-20121025ABW | No interference |
| 42 | K42FH | BEMIDJI MN | 347.2 | LIC | BLTT-20050922AEL | No interference |
| 42 | K42LR-D | RUSHMORE MN | 174.6 | CP | BNPDTL-20100510AIA | No interference |
| 42 | K42KM-D | HILLSBORO ND | 283.8 | CP | BNPDTL-20100504ANN | No interference |
| 42 | K42KN-D | WAHPETON ND | 163.1 | CP | BNPDTL-20100505ADQ | No interference |
| 42 | K42KO-D | ARLINGTON SD | 54.8 | CP | BNPDTL-20100505AEH | 2.26% |
| 42 | K42LT-D | MITCHELL SD | 152.6 | CP | BNPDTL-20100510AIE | No interference |
| 42 | KAUN-LP | SIOUX FALLS SD | 151.3 | LIC | BLTTL-19880527II | No interference |
| 43 | K43LX-D | ROCK RAPIDS IA | 181.4 | LIC | BLDTT-20101213ABA | 0.00% |
| 43 | K43OB-D | ASHBY MN | 164.5 | CP | BNPDTL-20100505AKU | 0.00% |
| 43 | K43MH-D | VESTA MN | 135 | LIC | BLDTL-20120821AAW | No interference |
| 43 | DK43GX | MADISON SD | 104.2 | LIC | BLTT-20011101AAE | No interference |