



**Kessler and Gehman Associates**  
Consultants • Broadcast • Wireless

# MINOR MODIFICATION OF A LICENSED NON-COMMERCIAL FM BROADCAST STATION

**CALL SIGN: KVNO(FM)**  
**FACILITY ID: 69395**  
**FCC FILE NO.: BLED-20041013AAU**  
**LOCATION: OMAHA, NE**

## *Prepared For:*

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## **1.0 PURPOSE OF FM MODIFICATION APPLICATION**

The Board of Regents of the University of Nebraska (“BRUN”) has a license<sup>1</sup> to operate KVNO(FM) on Channel 214 with an ERP of 8.9 kW at a height of 540 m AMSL. It is herein proposed to move the licensed facility from Antenna Structure Registration Number (“ASRN”) 1025131 to 1242828 which is distance of 0.242 km at a bearing of 19.56 degrees from true north. It is also proposed to increase the ERP to 9.0kW and reduce the antenna height by 6.7m relative to sea level. Appendix A illustrates all the perinate site elevations for the proposed facility.

## **2.0 MAXIMUM CLASS EFFECTIVE RADIATED POWER**

Pursuant to 47 C.F.R. Section 73.211(b) entitled “Maximum limits”, Class C2 FM stations will be authorized to operate with maximum facilities of 50kW ERP at 150 meters HAAT. An FM station with a HAAT which exceeds 150 meters will not be permitted to operate with an ERP greater than that which would result in a 60 dBu contour of 52 kilometers.

Since the proposed calculated HAAT is 191m as demonstrated in Appendix B, the maximum allowable ERP is calculated to be 31.0 KW as illustrated in Appendix C. It is thus demonstrated that the proposed HAAT of 191m and ERP of 9kW is well within the power/height margin for the station class.

## **3.0 FREQUENCY ALLOCATION STUDY**

Appendix D demonstrates compliance with the following sections of the FCC rules:

- 47 CFR § 73.509 – Contour overlap Protection
- 47 CFR § 73.207 – Spacing Requirements
- 47 CFR § 73.525 – Television Channel 6 Protection

All contours were generated in accordance with 47 CFR § 73.333 engineering charts utilizing FCC 30 arc second terrain data.

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<sup>1</sup> FCC File No.: BLED-20041013AAU

#### **4.0 FM TRANSMITTER LOCATION AND COVERAGE REQUIREMENTS**

Appendix F demonstrates that the transmitter location has been chosen so that, on the basis of the effective radiated power and antenna height above average terrain employed, a minimum field strength of 60 dB $\mu$ V/m (1- uV/m) will be provided over the entire principal community of Omaha, NE.

#### **5.0 AM STATION PROXIMITY**

Pursuant to 47 C.F.R. Section 1.30002(b), there are 3 AM Station located within 3km of the proposed facility: KXSP, KCRO, and KIBM

#### **6.0 INTERNATIONAL COORDINATION**

The proposed facility is not within 320km of any international borders and is not subject to international coordination.

#### **7.0 FM BLANKETING INTERFERENCE.**

The blanketing contour (115 dBu) extends 1.18 km from the transmitter. If blanketing interference is caused to any residents in this area the BRUN will take steps to eliminate the interference in accordance with the FCC Rules. It is safe to conclude that the emissions will be insignificant and well within the maximum allowable requirements. If other antennas are placed on the tower in the future, the applicant will cooperate with those users by reducing or completely terminating the power to the antenna when maintenance workers are in danger from the electromagnetic radiation emanating from the antenna.

#### **8.0 RADIO FREQUENCY RADIATION (RFR) COMPLIANCE**

Appendix G is an RFR analysis which demonstrates that the peak RFR exposure is less than 5% of the most restrictive permissible exposure threshold standing

anywhere at ground level and in any proximity to the proposed support structure. Pursuant to OET Bulletin 65, since the proposed operation does not exceed 5% of the most permissible exposure at any location 2 meters above the ground, it is not considered a significant contributor to RFR and other sources of RFR need not be taken into consideration for a net effect. The instant application is compliant with the FCC limits for human exposure to RFR and thus is excluded from further environmental processing.

## **9.0 CERTIFICATION**

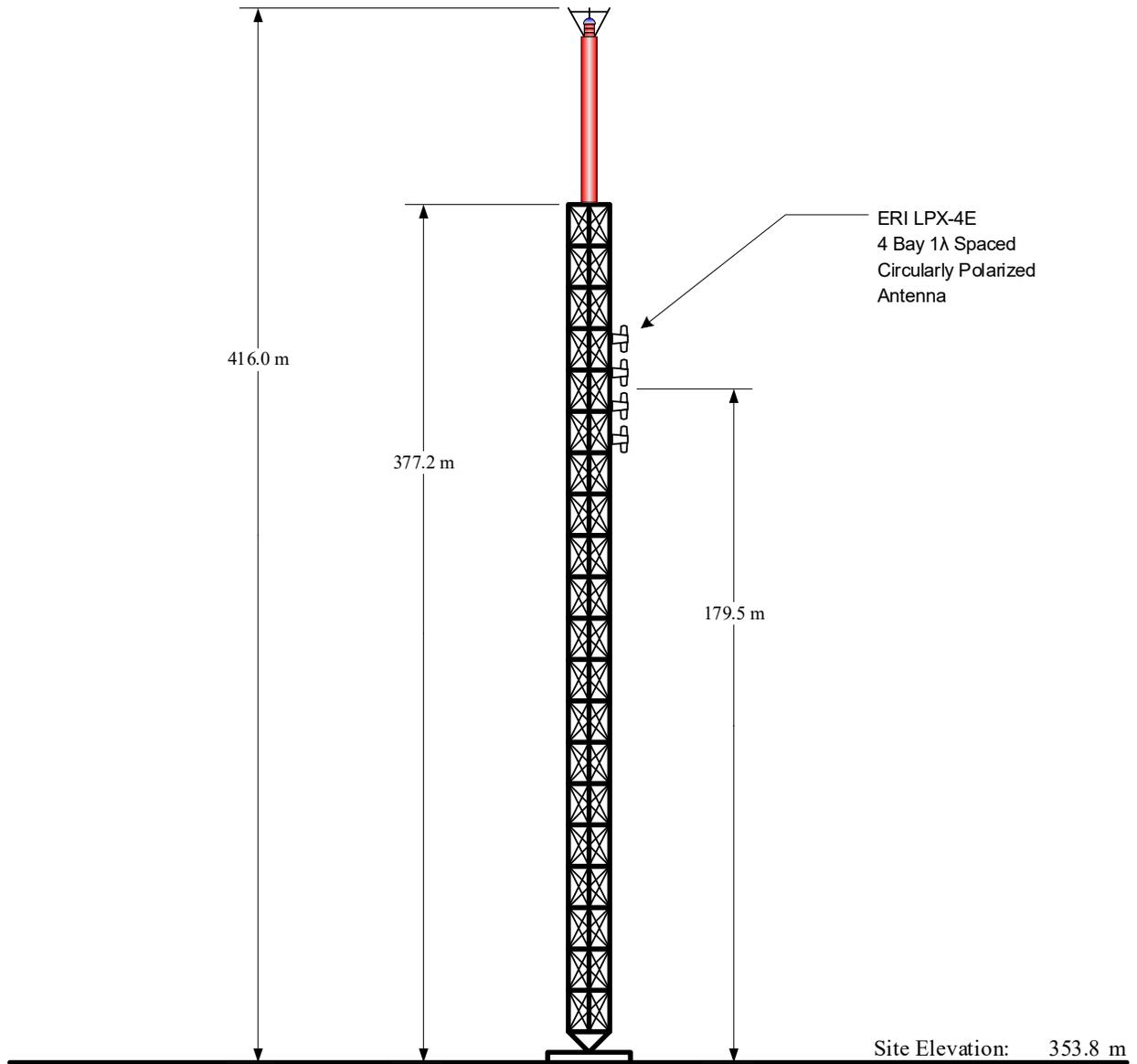
The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on April 26, 2019.

KESSLER AND GEHMAN ASSOCIATES, INC.



Ryan Wilhour  
Consulting Engineer

**APPENDIX A – Tower Elevation Profile**



|                        |         |
|------------------------|---------|
| Overall Height AGL:    | 416.0 m |
| Overall Height AMSL:   | 769.8 m |
| Radiation Center AGL:  | 179.5 m |
| Radiation Center AMSL: | 533.3 m |
| Radiation Center HAAT: | 191 m   |

NOTE: NOT TO SCALE

|                     |               |
|---------------------|---------------|
| NAD 27 Coordinates: |               |
| N. Latitude:        | 41° 18' 32.0" |
| W. Longitude:       | 96° 01' 33.1" |

ASR No.: 1242828

FAA Study No.: 2004-ACE-68-OE

## **APPENDIX B – Height Above Average Terrain Calculation**

The Height Above Average Terrain (HAAT) was calculated from the FCC's HAAT Calculator tool:

<https://www.fcc.gov/media/radio/haat-calculator>

Results are as follows:

### **Antenna Height Above Average Terrain Calculations -- Results**

#### **Input Data**

Latitude **41° 18' 32" North**

Longitude **96° 1' 33.1" West (NAD 27)**

These coordinates convert to NAD 83 coordinates of  
41° 18' 31.99", North, 96° 01' 34.16" West (NAD 83).

Height of antenna radiation center above mean sea level: **533.3 meters AMSL**

Number of Evenly Spaced Radials = **8**     0° is referenced to True North

#### **Results**

**Calculated HAAT = 191 meters**

Antenna Height Above Average Terrain calculated  
using FCC 30 second terrain database (continental USA only)

#### **Individual "Radial HAAT" Values, in meters**

|      |         |
|------|---------|
| 0°   | 161.9 m |
| 45°  | 219.7 m |
| 90°  | 213.0 m |
| 135° | 197.7 m |
| 180° | 204.9 m |
| 225° | 190.4 m |
| 270° | 177.1 m |
| 315° | 164.1 m |

## APPENDIX C – Class A Equivalent Power Determination

The ERP was calculated from the FCC’s “FMPOWER” tool:

<https://www.fcc.gov/media/radio/fmpower>

Results are as follows:

### FMpower Results

**Class C2 facilities for equivalency determination:**

Reference ERP = 50.000 kW ERP

Reference HAAT= 150 meters HAAT

F(50.50) 60 dBu protected contour at 52.2 km distance

**Equivalent ERP = 31.000 kilowatts (kW)**  
(rounded per 47 CFR 73.212)

Unrounded ERP = 30.727 kW for 191 meters HAAT

C, C0, C1, C2, and C3 stations are authorized in NE.

**APPENDIX D – Allocation Studies and Maps**

REFERENCE CH# 214C2- 90.7 MHz, Pwr= 9 kW, HAAT= 191.0 M, COR= 533.3 M DISPLAY DATES  
 41 18 32.0 N. Average Protected F(50-50)= 41.5 km DATA 04-26-19  
 96 01 33.1 W. Omni-directional SEARCH 04-26-19

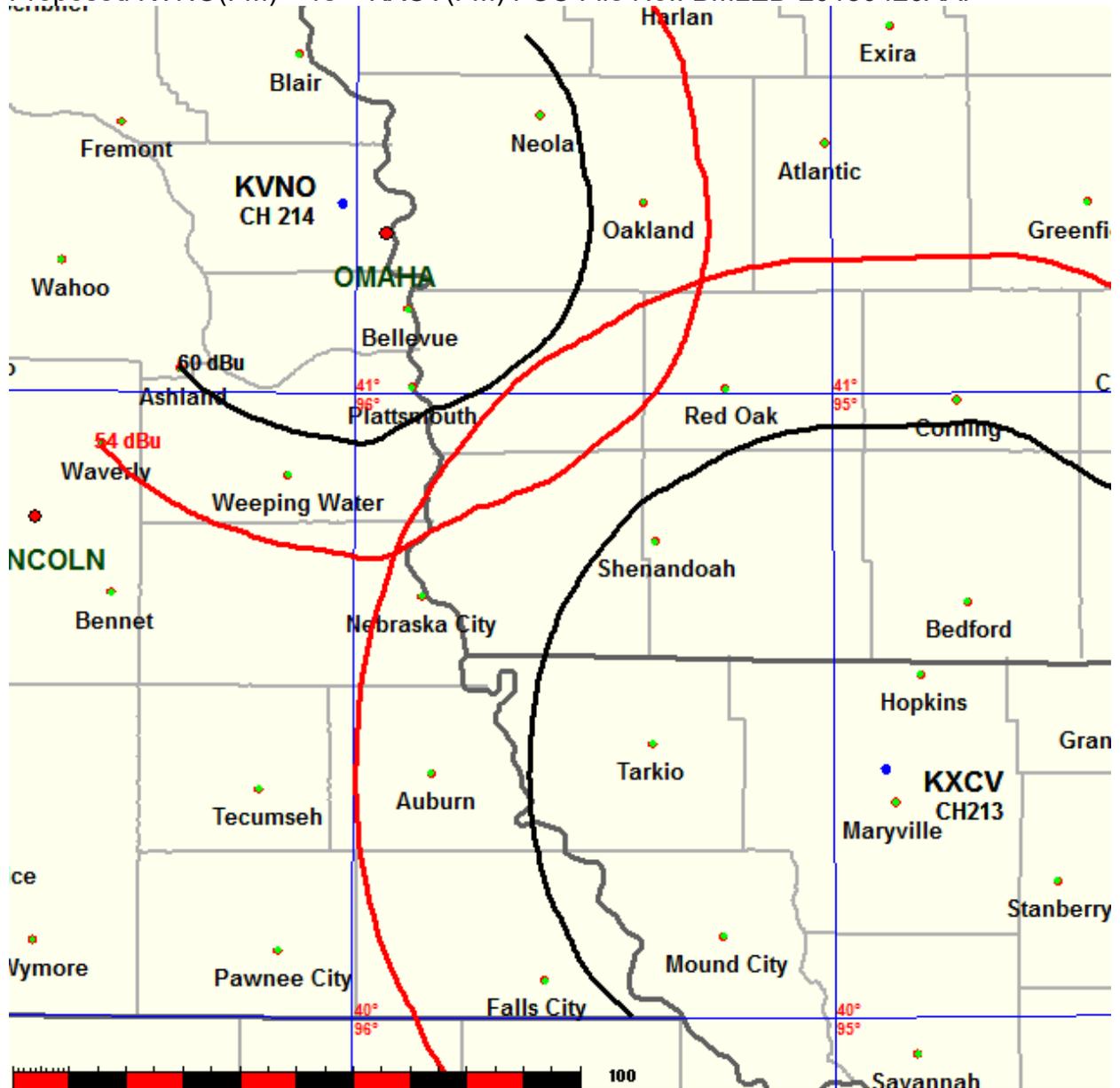
| CH CITY | CALL              | TYPE | ANT STATE | AZI. <--       | DIST FILE #                | LAT. LNG.                | Pwr (kW) HAAT (M) | INT (km) COR (M) | PRO (km) LICENSEE                  | *IN* (Overlap in km) | *OUT* |
|---------|-------------------|------|-----------|----------------|----------------------------|--------------------------|-------------------|------------------|------------------------------------|----------------------|-------|
| 214C3   | KNSC<br>Carroll   | LIC  | CX IA     | 47.7<br>228.5  | 135.29<br>BLED20021121AAF  | 42 07 14.0<br>94 48 49.0 | 10.000<br>88      | 87.9<br>464      | 25.3<br>Iowa State University Of S | 3.7                  | 0.3   |
| 213C1   | KXCV<br>Maryville | LIC  | CX MO     | 136.1<br>316.8 | 139.06<br>BMLED20180420AAP | 40 24 09.0<br>94 53 16.0 | 100.000<br>193    | 94.8<br>522      | 63.9<br>Northwest Missouri State U | 2.4                  | 13.3  |
| 211C1   | KZLW<br>Gretna    | LIC  | DCX NE    | 258.5<br>78.1  | 55.73<br>BLED20110228AAL   | 41 12 27.0<br>96 40 38.0 | 100.000<br>21     | 3.9<br>415       | 37.6<br>Calvary Chapel Of Omaha    | 11.3                 | 14.2  |
| 215C1   | KPNO<br>Norfolk   | LIC  | CX NE     | 309.6<br>128.7 | 140.37<br>BLED20031014AMI  | 42 06 16.0<br>97 20 11.0 | 100.000<br>103    | 77.7<br>611      | 48.1<br>The Praise Network, Inc.   | 22.9                 | 33.4  |
| 215C1   | KLOX<br>Creston   | CP   | VX IA     | 99.7<br>280.8  | 145.47<br>BPED20160229AAL  | 41 04 38.0<br>94 19 09.0 | 100.000<br>104    | 77.2<br>484      | 47.6<br>Florida Public Radio, Inc. | 24.7                 | 33.5  |
| 212A    | KRNU<br>Lincoln   | LIC  | CN NE     | 226.5<br>46.0  | 78.68<br>BLED19870205KA    | 40 49 11.0<br>96 42 11.0 | 0.100<br>38       | 0.7<br>412       | 8.5<br>University Of Nebraska      | 36.5                 | 66.1  |
| 216C1   | KUCV<br>Lincoln   | LIC  | DEX NE    | 215.6<br>35.1  | 107.79<br>BMLED20130228AMW | 40 31 06.0<br>96 46 06.0 | 100.000<br>210    | 8.7<br>641       | 65.8<br>Nebraska Educational Telec | 57.5                 | 37.9  |
| 213C2   | KGKD<br>Columbus  | LIC  | CX NE     | 281.2<br>100.1 | 140.59<br>BLED20130405AAK  | 41 32 28.0<br>97 40 45.0 | 10.000<br>170     | 60.6<br>672      | 41.1<br>The Praise Network, Inc.   | 39.8                 | 40.1  |

Terrain database is FCC NGDC 30 Sec, R= 73.215 qualifying spacings or FCC minimum spacings in KM, M= Margin in KM  
 Contour distances are on direct line to and from reference station. Reference Zone= , Co to 3rd adjacent.  
 All separation margins (if shown) include rounding.  
 Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, \_= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)  
 < = Station meets FCC minimum distance spacing for its class.

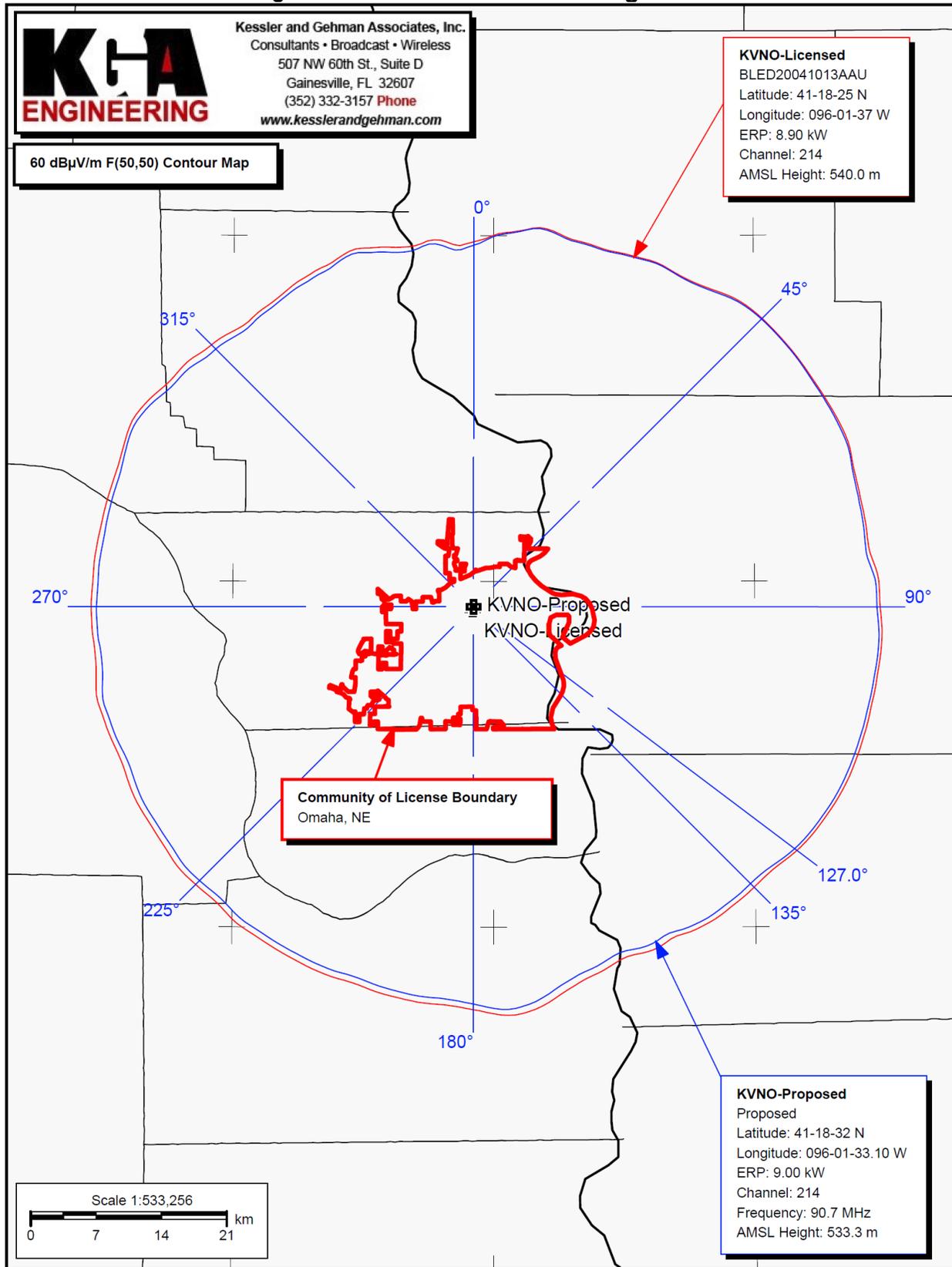


**KVNO(FM) – Minor Modification Application**  
Omaha, NE

Proposed KVNO(FM) – vs – KXCV(FM) FCC File No.: BMLED-20180420AAP



**APPENDIX E – 47 CFR § 73.313 - Prediction of coverage**



**APPENDIX F – Topographical Site Location Map**



## **APPENDIX G – OET65 Far Field Exposure to RF Emissions**

A theoretical analysis has been conducted of the human exposure to radio frequency radiation (“RFR”) using the calculation methodology described in OET Bulletin 65, Edition 97-01. The RFR analysis is conducted pursuant to the following methodology:

Terrain<sup>2</sup> extraction is compiled from the support structure site, if the support structure is on a rooftop with no higher elevations (e.g., elevator shaft) then flat terrain is compiled. Terrain is extracted using radial lengths of 0.25 miles in 0.001 mile increments for 360 radials. The power density is calculated for each terrain point at 6 feet above ground level using the elevation and azimuth pattern of the proposed broadcast antenna. The power density calculations are conducted using the lower edge of the proposed channel frequency. To account for ground reflections, a coefficient of 1.6 was included in the calculation.

The resulting cylindrical polar analysis is then summarized into a coordinate plane graph using the following methodology:

Starting from the origin the maximum calculated RFR value is determined among the 360 degree radials for each 0.001 mile increment, the value is then converted into a percentage of the maximum allowable general population or uncontrolled exposure and plotted as a function of perpendicular distance from the tower.

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<sup>2</sup> Terrain extraction is based upon a 3 arc second point spacing terrain database.

