



## ENGINEERING STUDY

KGNU-FM

Requesting a Minor Modification to  
License number BLED-20100528ADY

Channel 203A (88.5MHz)

(Upgrade to 203C2)

Boulder, CO

Facility ID 6512

August, 2021

# **KGNU-FM**

## **Requesting a Minor Modification to License BLED-20100528ADY**

**Facility ID 6512**

**August, 2021**

### **TECHNICAL STATEMENT**

This technical statement and attached exhibits were prepared on behalf of the Boulder Community Broadcast Association, Inc. ("BCBA"), licensee of radio station KGNU-FM, Channel 203A, 88.5MHz, Boulder, CO. Facility ID 6512. This application seeks to relocate to a new tower site 25km from the currently licensed site, increase HAAT, modify the directional pattern, and increase peak ERP. The Class changes from 203A to 203C2.

#### **Facilities Proposed**

Location (NAD83)	40° 05' 57" N Latitude, 104° 54' 03.2" W Longitude
Channel	203C2 (88.5MHz)
Tower Overall AGL Height-	353.2m
Tower ASR (Attached Exhibit D)	1254146 (coordinates updated 8/6/2021)
Proposed Antenna	Shively 6025 Array (tentative)
Antenna AGL Height-	308m
Site AMSL Height-	1,551.4m
COR AMSL Height	1,859.4m
HAAT	339.4m
ERP	6.5 kW DIRECTIONAL

### **ALLOCATION**

The proposed operation will utilize a directional antenna (See Exhibit A) and will meet all contour protection requirements toward other stations. The allocation study attached as Exhibit B indicates that four facilities are close enough to warrant close examination. KCME (204C1), KVXO (202A), KFFR (202C3), and KRFC (205C2). The map attached as Exhibit C demonstrates compliance with 47 C.F.R. Section 73.509. The terrain database used for the contour calculations was NAD03. Exhibit D lists the

Distance To Contour calculations to and from the proposed KGNU-FM and the two closest limits, KVXO and KCME.

Station KVOD (201C3) is second adjacent to KGNU. It is currently licensed under a "Raleigh Waiver" which allows stations to voluntarily accept 2<sup>nd</sup> adjacent interference to their 60dBu contour. The proposed KGNU-FM will continue to cause interference to the KVOD 60dBu contour, however, due to the rural nature of the tower location, less potential listeners to KVOD will be affected.

The proposed facility is not within 320km of the Canadian or Mexican border.

### **TV CHANNEL 6 PROTECTION**

There are no full power channel 6 TV stations currently licensed to operate within 300km of the proposed KGNU-FM transmitter site.

### **COMMUNITY COVERAGE**

As demonstrated in Exhibit E, the proposed facility will cover 100% of Boulder, CO in area and population with the 60dBu signal.

### **ENVIRONMENTAL CONSIDERATIONS**

The proposed antenna will be attached to an existing tower. The tower is owned by American Tower, Corp. Corp (ASR 1254146). A copy of the ASR is attached as Exhibit F.

The attachment of the proposed antenna for KGNU-FM will not alter the existing proposed tower structure for purposes of the Nationwide Programmatic Agreement and the NHPA Section 106. There are several non-excluded RF sources located on the tower supporting the proposed KGNU-FM antenna, they are all TV facilities; KAVC-LD (channel 27, 2kW), KDEN-TV (channel 29), and KPJR-TV (channel 17).

The proposed KGNU-FM antenna will operate at a maximum power level of 6.5kW ERP and will operate at 308m AGL. Based upon the FCC “FM Model”<sup>1</sup> Power Density vs. Distance calculator using a worst-case “EPA Type 1, Ring and Stub type antenna setting, the maximum power density at 2m AGL contributed by KGNU-FM is expected to be 3.0  $\mu\text{W}/\text{cm}^2$  or 1.5% of the permitted 200  $\mu\text{W}/\text{cm}^2$  limit for uncontrolled exposure. There are no tall buildings within 1,000m of the proposed tower.

Because the maximum contribution of KGNU-FM for the uncontrolled environment is less than the 10  $\mu\text{W}/\text{cm}^2$  (5.0%) limit as set forth by §1.1307(b)(3), the facility will be in compliance with FCC guidelines. §1.1307(b)(3) states that facilities contributing less than five percent of the exposure limit at locations with multiple transmitters are categorically excluded from responsibility for taking any corrective action in the areas where its contribution is less than five percent. Since this instant application meets the five percent exclusion test at all ground level areas, the impact of the proposed facility may be considered independently from other facilities operating at or nearby this site. It is believed the impact of the proposed operation should not be a factor at ground level as defined under §1.1307(b)(3).

Radio station KGNU-FM along with other users at the site will maintain an occupational safety policy and agrees to reduce power or cease operation during periods of maintenance to avoid potentially harmful exposure of personnel to non-ionizing RF radiation.

Respectfully Submitted

A handwritten signature in black ink, appearing to read "Bert Goldman", with a long horizontal flourish extending to the right.

Bert Goldman  
Technical Consultant

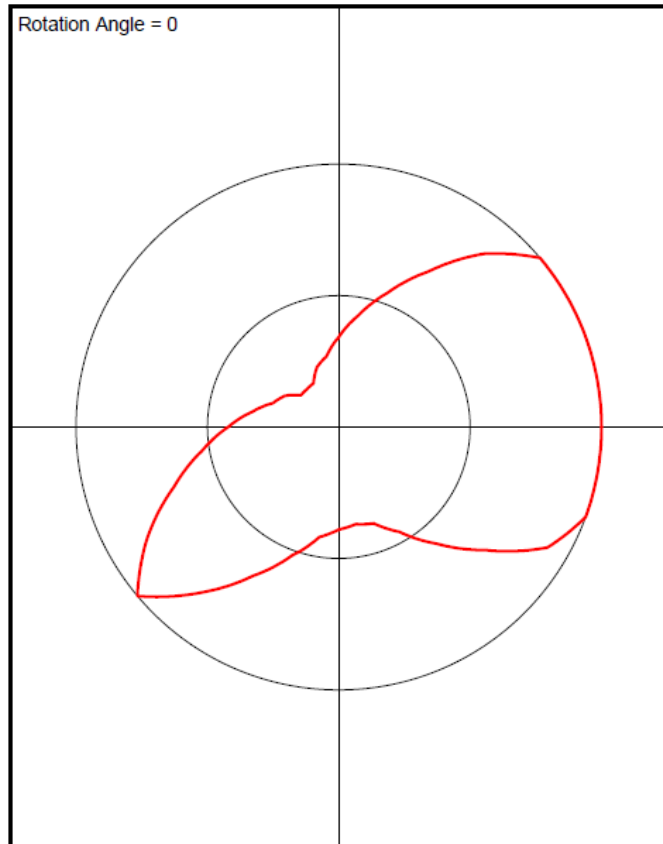
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<sup>1</sup> <https://www.fcc.gov/general/fm-model>

## EXHIBIT A- ANTENNA PATTERN

KGNU Proposed Antenna  
Pre-Rotation Antenna Pattern....

Azimuth (deg)	Relative Field
0.0	0.342
5.0	0.3865
10.0	0.431
15.0	0.487
20.0	0.543
25.0	0.613
30.0	0.683
35.0	0.7715
40.0	0.86
45.0	0.93
50.0	1.0
55.0	1.0
60.0	1.0
65.0	1.0
70.0	1.0
75.0	1.0
80.0	1.0
85.0	1.0
90.0	1.0
95.0	1.0
100.0	1.0
105.0	1.0
110.0	1.0
115.0	0.9585
120.0	0.917
125.0	0.8225
130.0	0.728
135.0	0.6535
140.0	0.579
145.0	0.5195
150.0	0.46
155.0	0.425
160.0	0.39
165.0	0.3825
170.0	0.375
175.0	0.3825
180.0	0.39
185.0	0.4075
190.0	0.425
195.0	0.4725
200.0	0.52
205.0	0.587
210.0	0.654
215.0	0.7385
220.0	0.823
225.0	0.9115
230.0	1.0
235.0	0.9205
240.0	0.841
245.0	0.7545
250.0	0.668
255.0	0.599
260.0	0.53
265.0	0.4755
270.0	0.421
275.0	0.3775
280.0	0.334
285.0	0.3
290.0	0.266
295.0	0.2515
300.0	0.237
305.0	0.2125
310.0	0.188
315.0	0.188



320.0	0.188
325.0	0.19
330.0	0.192
335.0	0.217
340.0	0.242
345.0	0.257
350.0	0.272
355.0	0.307

## EXHIBIT B- ALLOCATION STUDY

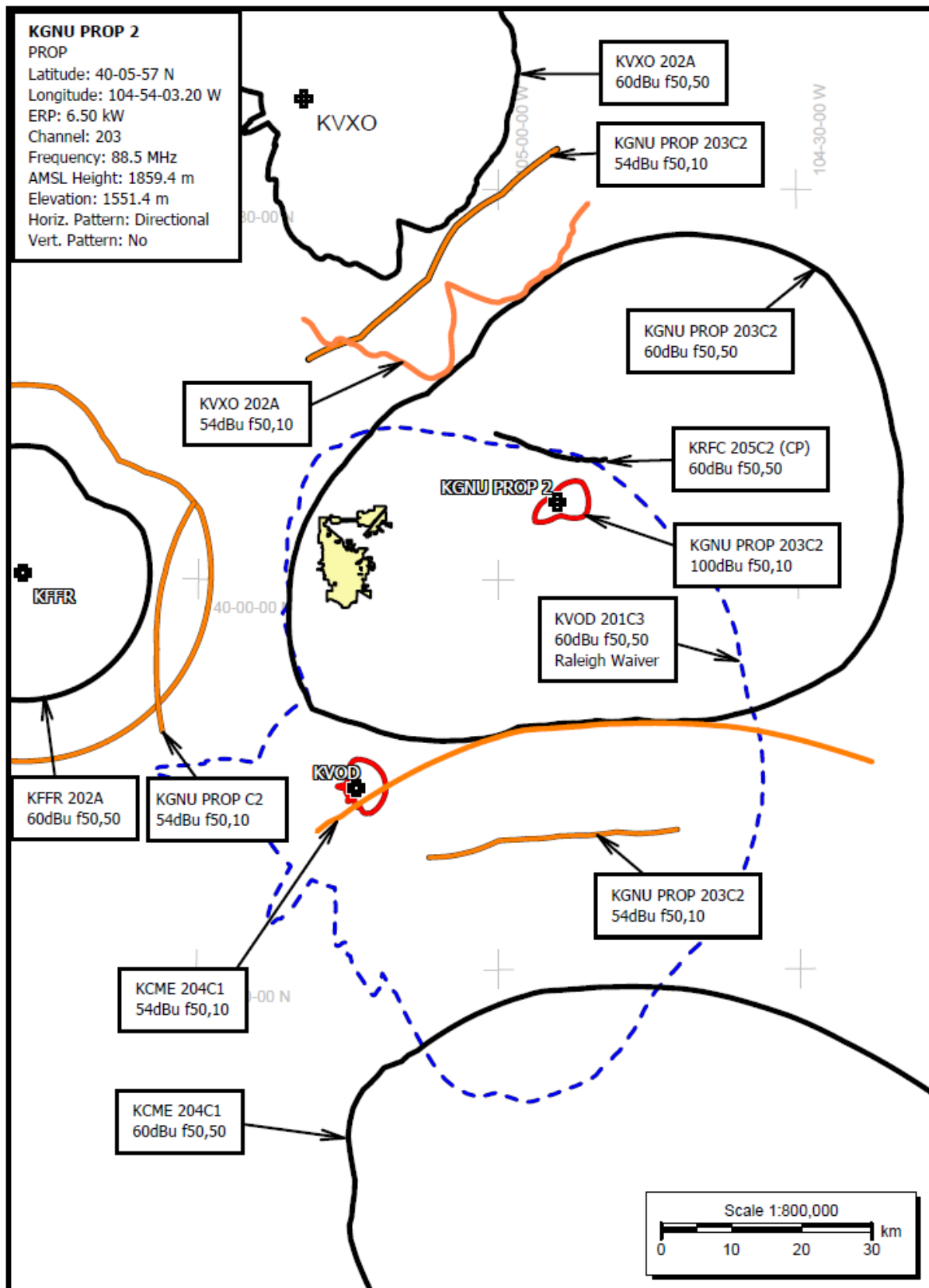
ComStudy 2.2 search of channel 203 (88.5 MHz Class A) at 40-05-57.0 N, 104-54-03.2 W.

CALL	CITY	ST CHN CL	DIST	SEP	BRNG	CLEARANCE
KVOD	LAKEWOOD	CO 201 C3	49.80	42.00	215.1	-4.72 dB Continues Raleigh Waiver
KCME	MANITOU SPRINGS	CO 204 C1	150.51	133.00	178.7	0.18 dB Exhibit C
KFFR	WINTER PARK	CO 202 C3	76.91	89.00	262.6	0.10 dB Exhibit C
KVXO	FORT COLLINS	CO 202 A	67.86	72.00	328.0	0.09 dB Exhibit C
KRFC	FORT COLLINS	CO 205 C2	51.99	55.00	358.6	1.25 dB Exhibit C
KVQI	VAIL	CO 203 A	143.01	115.00	248.3	5.44 dB
KRFC	FORT COLLINS	CO 205 A	53.48	31.00	359.5	8.94 dB
KDNR	SOUTH GREELEY	WY 204 A	111.63	72.00	354.7	10.39 dB
KUWY	LARAMIE	WY 203 A	142.32	115.00	341.0	12.78 dB
KRNC	STEAMBOAT SPRINGS	CO 203 A	170.53	115.00	284.3	17.08 dB
KTPL	PUEBLO	CO 202 C1	239.42	133.00	182.1	19.97 dB
KBWA	BRUSH	CO 206 A	103.44	31.00	82.3	22.51 dB
KLJV	SCOTTSBLUFF	NE 202 A	213.10	72.00	24.5	32.99 dB
KGNI	GUNNISON	CO 204 C3	245.56	89.00	225.2	33.08 dB
KFCY	CHEYENNE	WY 201 A	118.67	31.00	7.2	34.81 dB
KUAD-FM	WINDSOR	CO 256 C1	60.62	22.00	6.6	38.6

LMS as of 8/9/2021

## EXHIBIT C Pertinent Protection Contours

KGNU Proposed 6.5kW @ 339m HAAT 203C2



## EXHIBIT D-Distance to Contour Calculations

### KGNU

DTC Report KGNU PROP 60dBu f50,50

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 3 Second US Terrain

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Transmitter Information:

Call Letters: KGNU PROP  
File Number: PROP  
Latitude: 40-05-57 N  
Longitude: 104-54-03.20 W  
ERP: 6.50 kW  
Channel: 203  
Frequency: 88.5 MHz  
AMSL Height: 1859.4 m  
Elevation: 1551.4 m  
Horiz. Antenna Pattern: Directional  
Vert. Elevation Pattern: No  
-----

Azimuth (deg)	Distance (km)
-----	-----
0.0	33.06
5.0	34.81
10.0	36.33
15.0	38.26
20.0	40.13
25.0	42.14
30.0	43.76
35.0	45.58
40.0	47.40
45.0	48.87
50.0	50.10
55.0	49.92
60.0	49.73
65.0	49.49
70.0	49.26
75.0	48.89
80.0	48.89
85.0	49.06
90.0	48.78
95.0	48.91
100.0	48.67
105.0	48.69
110.0	48.45
115.0	47.70
120.0	46.89
125.0	44.88
130.0	42.86
135.0	41.21
140.0	39.40
145.0	37.79

DTC Report KGNU PROP 54dBu f50,10

Type of contour: FCC  
Location Variability: 50.0 %  
Time Variability: 10.0 %  
# of Radials Calculated: 360  
FCC Matching HAAT Calculation Used  
Field Strength: 54.00 dBuV/m

Primary Terrain: NED 3 Second US Terrain

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Transmitter Information:

Call Letters: KGNU PROP  
File Number: PROP  
Latitude: 40-05-57 N  
Longitude: 104-54-03.20 W  
ERP: 6.50 kW  
Channel: 203  
Frequency: 88.5 MHz  
AMSL Height: 1859.4 m  
Elevation: 1551.4 m  
Horiz. Antenna Pattern: Directional  
Vert. Elevation Pattern: No  
-----

Azimuth (deg)	Distance (km)
-----	-----
0.0	55.40
5.0	55.60
10.0	55.80
15.0	56.00
20.0	56.20
25.0	56.40
30.0	56.60
35.0	56.80
40.0	57.00
45.0	57.21
50.0	57.41
55.0	57.61
60.0	57.81
65.0	58.01
70.0	58.21
75.0	58.41
80.0	58.61
85.0	58.81
90.0	59.01
95.0	59.21
100.0	59.41
105.0	59.61
110.0	59.82
115.0	60.02
120.0	60.22
125.0	60.42
130.0	60.62
135.0	60.82
140.0	61.02
145.0	61.22



KGNU 60dBu f50,50 Cont'd

150.0	35.88
155.0	34.45
160.0	32.85
165.0	32.30
170.0	31.56
175.0	31.53
180.0	31.48
185.0	31.88
190.0	32.46
195.0	34.42
200.0	35.87
205.0	37.45
210.0	38.94
215.0	40.54
220.0	41.84
225.0	43.66
230.0	45.65
235.0	44.80
240.0	43.70
245.0	42.23
250.0	40.66
255.0	39.33
260.0	37.76
265.0	36.20
270.0	34.35
275.0	32.71
280.0	30.92
285.0	29.67
290.0	28.43
295.0	27.76
300.0	26.93
305.0	25.58
310.0	24.17
315.0	24.05
320.0	23.92
325.0	24.07
330.0	24.30
335.0	25.90
340.0	27.55
345.0	28.48
350.0	29.32
355.0	31.20

KGNU 54dBu f50,10 Cont'd

150.0	61.42
155.0	61.62
160.0	61.82
165.0	62.02
170.0	62.23
175.0	62.43
180.0	62.63
185.0	62.83
190.0	63.03
195.0	63.23
200.0	63.43
205.0	63.63
210.0	63.83
215.0	64.03
220.0	64.23
225.0	64.43
230.0	64.63
235.0	64.84
240.0	65.04
245.0	62.98
250.0	60.78
255.0	58.94
260.0	56.73
265.0	54.46
270.0	51.78
275.0	51.98
280.0	52.18
285.0	52.39
290.0	52.59
295.0	52.79
300.0	52.99
305.0	53.19
310.0	53.39
315.0	53.59
320.0	53.79
325.0	53.99
330.0	54.19
335.0	54.39
340.0	54.59
345.0	54.80
350.0	55.00
355.0	55.20

## KVXO

DTC Report KVXO LIC 60dBu f50,50

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 3 Second US Terrain

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Transmitter Information:

Call Letters: KVXO  
File Number: BLED20140731AQY  
Latitude: 40-37-00 N  
Longitude: 105-19-36 W  
ERP: 0.14 kW  
Channel: 202  
Frequency: 88.3 MHz  
AMSL Height: 2545.0 m  
Elevation: 2527.0 m  
Horiz. Antenna Pattern: Omni  
Vert. Elevation Pattern: No  
-----

Azimuth (deg)	Distance (km)
-----	-----
0.0	24.81
5.0	26.68
10.0	24.46
15.0	25.84
20.0	26.47
25.0	27.13
30.0	28.26
35.0	28.65
40.0	27.30
45.0	28.02
50.0	29.34
55.0	30.14
60.0	31.00
65.0	30.79
70.0	31.05
75.0	30.98
80.0	30.85
85.0	30.39
90.0	29.78
95.0	29.11
100.0	29.19
105.0	28.65
110.0	27.66
115.0	27.12
120.0	27.49
125.0	27.39
130.0	26.79
135.0	26.12
140.0	23.20
145.0	24.19
150.0	27.31
155.0	28.11
160.0	25.60

DTC Report KVXO LIC 54dBu f50,10

Type of contour: FCC  
Location Variability: 50.0 %  
Time Variability: 10.0 %  
# of Radials Calculated: 360  
FCC Matching HAAT Calculation Used  
Field Strength: 54.00 dBuV/m

Primary Terrain: NED 3 Second US Terrain

-----  
Transmitter Information:

Call Letters: KVXO  
File Number: BLED20140731AQY  
Latitude: 40-37-00 N  
Longitude: 105-19-36 W  
ERP: 0.14 kW  
Channel: 202  
Frequency: 88.3 MHz  
AMSL Height: 2545.0 m  
Elevation: 2527.0 m  
Horiz. Antenna Pattern: Omni  
Vert. Elevation Pattern: No  
-----

Azimuth (deg)	Distance (km)
-----	-----
0.0	38.64
5.0	38.84
10.0	39.05
15.0	39.25
20.0	39.45
25.0	39.66
30.0	39.86
35.0	40.06
40.0	40.26
45.0	40.47
50.0	40.67
55.0	40.87
60.0	41.08
65.0	41.28
70.0	41.48
75.0	41.68
80.0	41.89
85.0	42.09
90.0	42.29
95.0	42.50
100.0	42.70
105.0	42.90
110.0	43.10
115.0	42.17
120.0	42.81
125.0	42.61
130.0	41.57
135.0	40.44
140.0	35.71
145.0	37.45
150.0	42.45
155.0	43.85
160.0	39.60

## KVXO 60dBu f50,50 Cont'd

165.0	24.43
170.0	22.81
175.0	22.77
180.0	21.05
185.0	19.54
190.0	16.57
195.0	15.05
200.0	12.22
205.0	12.10
210.0	8.57
215.0	6.96
220.0	6.14
225.0	6.14
230.0	6.14
235.0	6.14
240.0	9.79
245.0	9.02
250.0	6.14
255.0	6.14
260.0	6.14
265.0	6.14
270.0	6.14
275.0	6.14
280.0	10.02
285.0	12.48
290.0	13.98
295.0	16.65
300.0	18.79
305.0	19.99
310.0	21.22
315.0	22.49
320.0	23.04
325.0	21.00
330.0	21.68
335.0	22.91
340.0	23.05
345.0	24.29
350.0	23.45
355.0	24.23

## KVXO 54dBu f50,10 Cont'd

165.0	37.81
170.0	34.94
175.0	34.81
180.0	31.34
185.0	31.54
190.0	31.74
195.0	31.95
200.0	32.15
205.0	32.35
210.0	32.56
215.0	32.76
220.0	32.96
225.0	33.16
230.0	33.37
235.0	33.57
240.0	33.77
245.0	33.98
250.0	34.18
255.0	34.38
260.0	34.58
265.0	34.79
270.0	34.99
275.0	35.19
280.0	35.40
285.0	35.60
290.0	35.80
295.0	36.00
300.0	36.21
305.0	36.41
310.0	36.61
315.0	36.82
320.0	37.02
325.0	37.22
330.0	37.42
335.0	37.63
340.0	37.83
345.0	38.03
350.0	38.24
355.0	38.44

## KCME

DTC Report KCME LIC 54dBu f50,10

Type of contour: FCC  
Location Variability: 50.0 %  
Time Variability: 10.0 %  
# of Radials Calculated: 360  
FCC Matching HAAT Calculation Used  
Field Strength: 54.00 dBuV/m

Primary Terrain: NED 3 Second US Terrain

-----  
Transmitter Information:

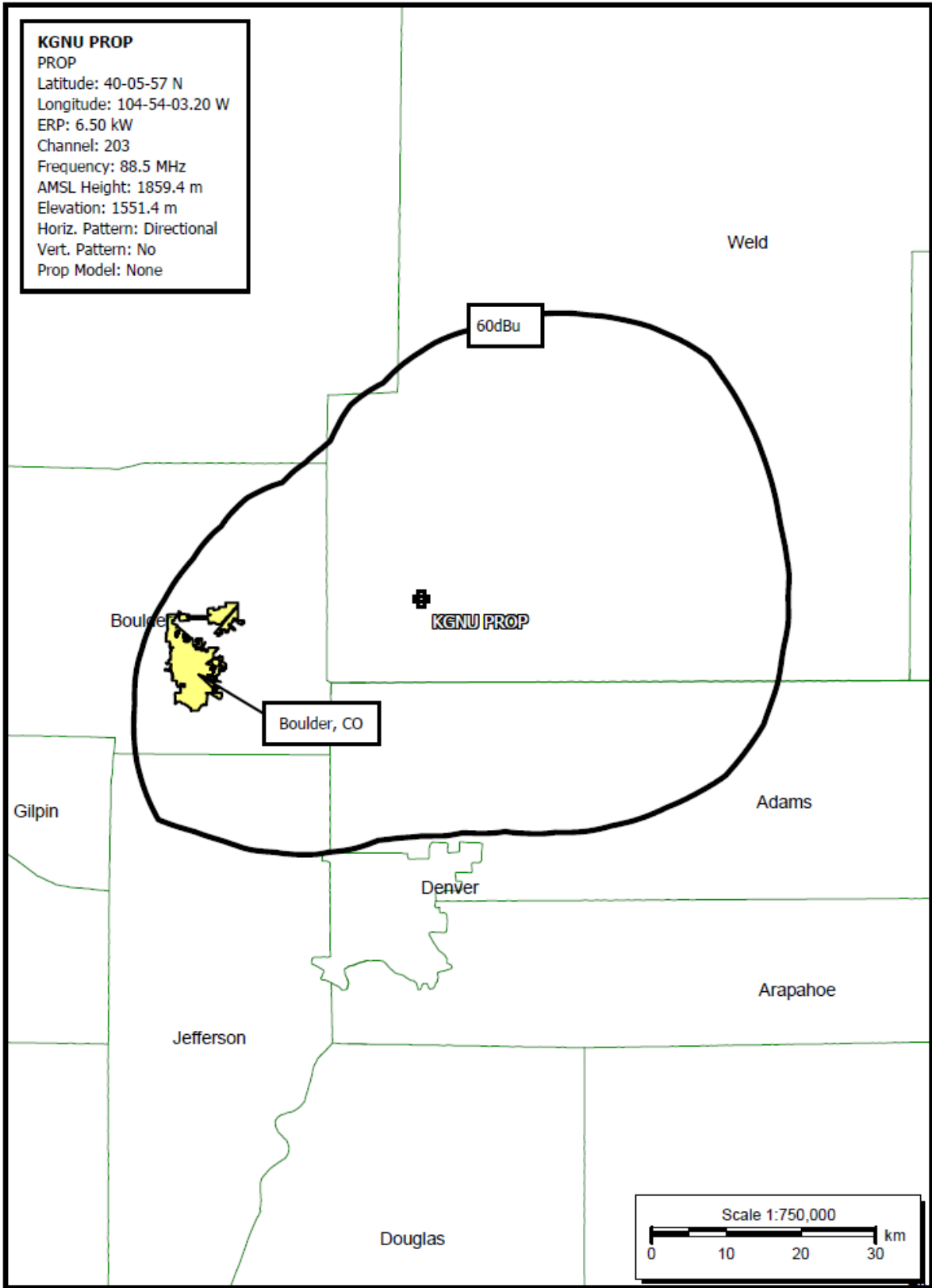
Call Letters: KCME  
File Number: BLED19990203KA  
Latitude: 38-44-40 N  
Longitude: 104-51-41 W  
ERP: 12.00 kW  
Channel: 204  
Frequency: 88.7 MHz  
AMSL Height: 2918.0 m  
Elevation: 2868.0 m  
Horiz. Antenna Pattern: Omni  
Vert. Elevation Pattern: No

Azimuth (deg)	Distance (km)
-----	-----
0.0	118.52
5.0	119.40
10.0	120.30
15.0	120.60
20.0	120.67
25.0	120.51
30.0	120.35
35.0	120.19
40.0	120.02
45.0	119.86
50.0	119.70
55.0	119.53
60.0	119.37
65.0	119.21
70.0	119.05
75.0	118.88
80.0	118.72
85.0	118.56
90.0	118.40
95.0	118.23
100.0	118.07
105.0	117.91
110.0	117.75
115.0	117.58
120.0	117.42
125.0	117.26
130.0	117.10
135.0	116.93
140.0	116.77
145.0	116.61
150.0	116.45
155.0	116.28
160.0	116.12
165.0	115.96

170.0	115.80
175.0	115.63
180.0	115.47
185.0	115.31
190.0	115.15
195.0	114.98
200.0	114.82
205.0	114.66
210.0	114.50
215.0	114.33
220.0	114.17
225.0	114.01
230.0	113.85
235.0	113.68
240.0	113.52
245.0	113.36
250.0	113.20
255.0	113.03
260.0	112.87
265.0	112.71
270.0	112.55
275.0	112.38
280.0	112.22
285.0	112.06
290.0	111.90
295.0	111.73
300.0	111.57
305.0	111.41
310.0	111.25
315.0	111.08
320.0	110.92
325.0	110.76
330.0	110.60
335.0	110.43
340.0	110.27
345.0	112.96
350.0	115.72
355.0	117.96

**EXHIBIT E Community Coverage**

KGNU PROP 203C2 Community Coverage, Boulder, CO



## EXHIBIT F- Antenna Structure Registration

### Registration 1254146

[Map Registration](#)

Registration Detail			
Reg Number	1254146	Status	Granted
File Number	A1198376	Constructed	07/14/2016
EMI	No	Dismantled	
NEPA	No		
Antenna Structure			
Structure Type	GTOWER - Guyed Structure Used for Communication Purposes		
Location (in NAD83 Coordinates)			
Lat/Long	40-05-57.0 N 104-54-03.2 W	Address	6870 Weld County Rd 17 (282680)
City, State	Fort Lupton , CO	County	WELD
Zip	80621-9017	Position of Tower in Array	
Center of AM Array			
Heights (meters)			
Elevation of Site Above Mean Sea Level	Overall Height Above Ground (AGL)		
1551.4	352.9		
Overall Height Above Mean Sea Level	Overall Height Above Ground w/o Appurtenances		
1904.3	306.9		
Painting and Lighting Specifications			
FAA Chapters 4, 9, 12			
Paint and Light in Accordance with FAA Circular Number 70/7460-1K			
FAA Notification			
FAA Study	2021-ANM-5069-OE	FAA Issue Date	08/05/2021
Owner & Contact Information			
FRN	0011498342	Owner Entity Type	Limited Liability Company
Owner			
American Towers LLC Attention To: FAA/FCC Regulatory Team 10 Presidential Way Woburn , MA 01801		P: (781)926-4500 F: E: faa-fcc@americantower.com	
Contact			
Attention To: FAA/FCC Regulatory Team 10 Presidential Way Woburn , MA 01801		P: (781)926-4500 F: E: faa-fcc@americantower.com	
Last Action Status			
Status	Granted	Received	08/06/2021
Purpose	Modification	Entered	08/06/2021
Mode	Interactive		
Related Applications			
08/06/2021	A1198376 - Modification (MD)		
07/21/2016	A1042476 - Notification (NT)		
03/07/2016	A1000255 - Modification (MD)		
Related applications (9)			
Comments			
Comments			
08/09/2021	The FAA has approved the absence of steady burning red obstruction (L-810) lights on this structure. This tower will employ dual lighting (High-intensity white flashing lights (L-856) for daytime use and red flashing lights (L-864 for nighttime use).		
03/08/2016	Special Condition: The FAA has approved the absence of steady burning red obstruction (L-810) lights on this structure. Accordingly, this tower will employ dual lighting (High-intensity white flashing lights (L-856) for daytime use		
03/08/2016	and red flashing lights (L-864 for nighttime illumination). Refer to the Technical Report (Technical Note DOT/FAA/TC-TN12/9 Evaluation of New Obstruction Lighting Techniques to Reduce Avian Fatalities)		
History			
Date	Event		
08/09/2021	Modification Received		
07/21/2016	Construction Notification Received		
03/09/2016	Registration Printed		
All History (20)			
Pleadings			
Pleading Type	Filer Name	Description	Date Entered
None			