



Comprehensive Engineering Statement

6/8/2020

The applicant proposes to move the transmitter and antenna of K216DQ

Old Coordinates (NAD 83)

N. Lat. 37-11-33.30

W. Lng. 104-33-22.50

Proposed New Coordinates: (Existing Tower)

N. Lat. 37-14-17.75 (NAD 83)

W. Lng. 104-30-55.49

Proposed COR AMSL, 2,198 m

Elevation at the site, 2,164 m

Tower height above ground, 36.0.m

Antenna height C.O.R. above ground, 34 m

Antenna Type, NICOM BKG-77

This application is proposed as a minor change.

Page #2 of this statement is a contour-to-contour study of the proposed channel analysis.

Page #3 is a narrative on how to read the computer printout.

Page #4 is a site map showing the hill-top area where the existing tower is located. This map shows the U-to-D calculated interference area within the red circle.

Pages #5 through #8, compose the allocation study that shows that all the Commission's rules under section 74.1204 regarding protection to other stations and translators have been followed.

Page #9 is a coverage map showing the 60 dBu of the proposed facility and that of the existing facility. Note that the old 60 dBu is almost entirely contained within the proposed 60 dBu coverage.

Due to the low power radiated and the relatively high antenna height, provided by the existing tower, this translator is be considered "categorically excluded" from further R.F. hazard analysis.

Colorado Public Radio
The Colorado College

REFERENCE
37 14 17.75 N.
104 30 55.49 W.

CH# 216D - 91.1 MHz, Pwr= 0.016 kW, HAAT= 260.4 M, COR= 2198 M
Average Protected F(50-50)= 10.62 km
Omni-directional

DISPLAY DATES
DATA 06-02-20
SEARCH 06-02-20

CH CITY	CALL	TYPE STATE	ANT	AZI <--	DIST FILE #	LAT LNG	PWR(kW) HAAT(M)	INT(km) COR(M)	PRO(km) LICENSEE	*IN* (Overlap in km)	*OUT*
216D Raton, Etc.	K216DQ	LIC D NM		215.5 35.4	6.23 BLFT20101012ADN	37 11 33.30 104 33 22.50	0.080 70	2084	---Reference---		
214A Trinidad	KTDL	LIC CO		172.3 352.3	27.56 BLED20071115AAB	36 59 33.10 104 28 26.00	0.450 296	1.5 2610	28.6 Educational	15.4 Communications	-1.3*<--
215C3 Rye	KRWA	LIC CO		331.6 151.3	89.34 BLED20110307ABR	37 56 40.00 104 59 58.00	10.000 35	81.6 2577	48.9 Way Media, Inc.	-0.6	16.8
219A Starkville	KCCS	LIC CO		172.3 352.3	27.56 BLED20080912AAL	36 59 33.10 104 28 26.00	0.370 303	1.3 2615	27.5 The Colorado College	15.6	-0.1<--
213D Eagle Nest	K213ET	LIC NM		218.6 38.2	97.23 BLFT20091112AKM	36 33 11.10 105 11 42.00	0.010 660	0.2 3433	15.5 Regents Of The University	87.1	81.1
213C0 Colorado Springs	KTLF	LIC CO		349.9 169.6	170.26 BLED20040225AAB	38 44 43.00 104 51 40.90	20.000 673	8.6 2923	85.9 Educational	149.8 Communications	83.6
216C0 Morrison	KLDV	LIC CO		347.2 166.8	269.45 BMLD20160830ABQ	39 35 59.90 105 12 36.90	100.000 356	166.1 2448	66.8 Educational Media Foundati	91.6	151.2
215D Silver Cliff	K215DA	LIC CO		315.6 135.0	127.53 BLFT20001005AHU	38 03 12.90 105 32 04.00	0.250 -164	24.1 2766	15.0 Educational	93.2 Communications	97.0
217A Sanford	KASV	LIC CO		271.9 91.0	122.30 BLED20180118AAS	37 15 59.00 105 53 49.10	2.500 7	18.6 2339	12.7 Top O' Texas Educational B	97.7	101.8
215A Alamosa	KASF	LIC CO		282.6 101.8	123.20 BLED20010419AAA	37 28 20.00 105 52 41.10	1.100 27	14.5 2316	10.4 Adams State College	101.9	107.1
215D Silver Cliff	K215DA	CP D CO		323.0 142.5	124.20 BPFT20180201AAF	38 07 39.50 105 22 10.70	0.013	6.1 2860	4.5 Educational	107.3 Communications	104.4
215A Arroyo Seco	KRRT	LIC D NM		224.7 44.1	130.80 BLED20120203ABW	36 23 52.10 105 32 38.00	5.100 -186	14.5 2283	10.6 Regents Of The University	106.6	105.8
218C1 Colorado Springs	KRCC	LIC D CO		349.8 169.6	170.27 BLED19940124KZ	38 44 42.90 104 51 43.90	2.100 687	3.1 2920	61.5 The Colorado College	155.3	107.9

Terrain database is FCC NGDC 30 Sec, R= 73.215 qualifying spacings or FCC minimum Spacings in KM, M= Margin in KM
In & Out distances between contours are shown at closest points. Reference zone= West Zone, Co to 3rd adjacent.
Ant Column: (D= DA Standard, Z= DA 73.215, N= Not DA 73.215, _= Omni), Polarization (C,H,V,E), Beamtilt(Y,N,X)
"*"affixed to 'IN' or 'OUT' values = site inside restricted contour.
<-- Overlap protected by U-to-D. Please see the coverage map

HOW TO READ THE FM COMPUTER PRINT-OUT

Translator Reference Station

The computer printout should be self-explanatory for the most part. The parameters of the station being checked, (reference station) are printed in the heading. The 60 dBu protected contour is predicted from the Commission's F(50-50) table. Contour distances are in kilometers and are predicted using the Commission's TVFMINT FORTRAN subroutine. When interference contour distances are less than 16 kilometers the F(50-50) tables are used. If signal contour distances are less than 1.6 km the free-space equation is used.

All distances are derived by the method detailed in Sec. 73.208 of the Rules and Regulations as amended in Docket 80-90. The column labeled "* OUT *" shows the greatest distance in kilometers of overlap (or smallest distance of clearance) between the reference station's interference contour and the database station's protected contour. Negative distance figures in this column indicate outgoing contour overlap. Since translators are able to receive interference there is no "In" or incoming column in this report.

Listed antenna heights and power are the specific antenna heights and power from the FCC database.

Under the "AZI" column, the first row of numbers indicate the True North azimuths from the reference station toward the database stations, while the numbers in the second row indicate the reverse bearings from the database stations to the reference station. Bearings are calculated using spherical trigonometry.

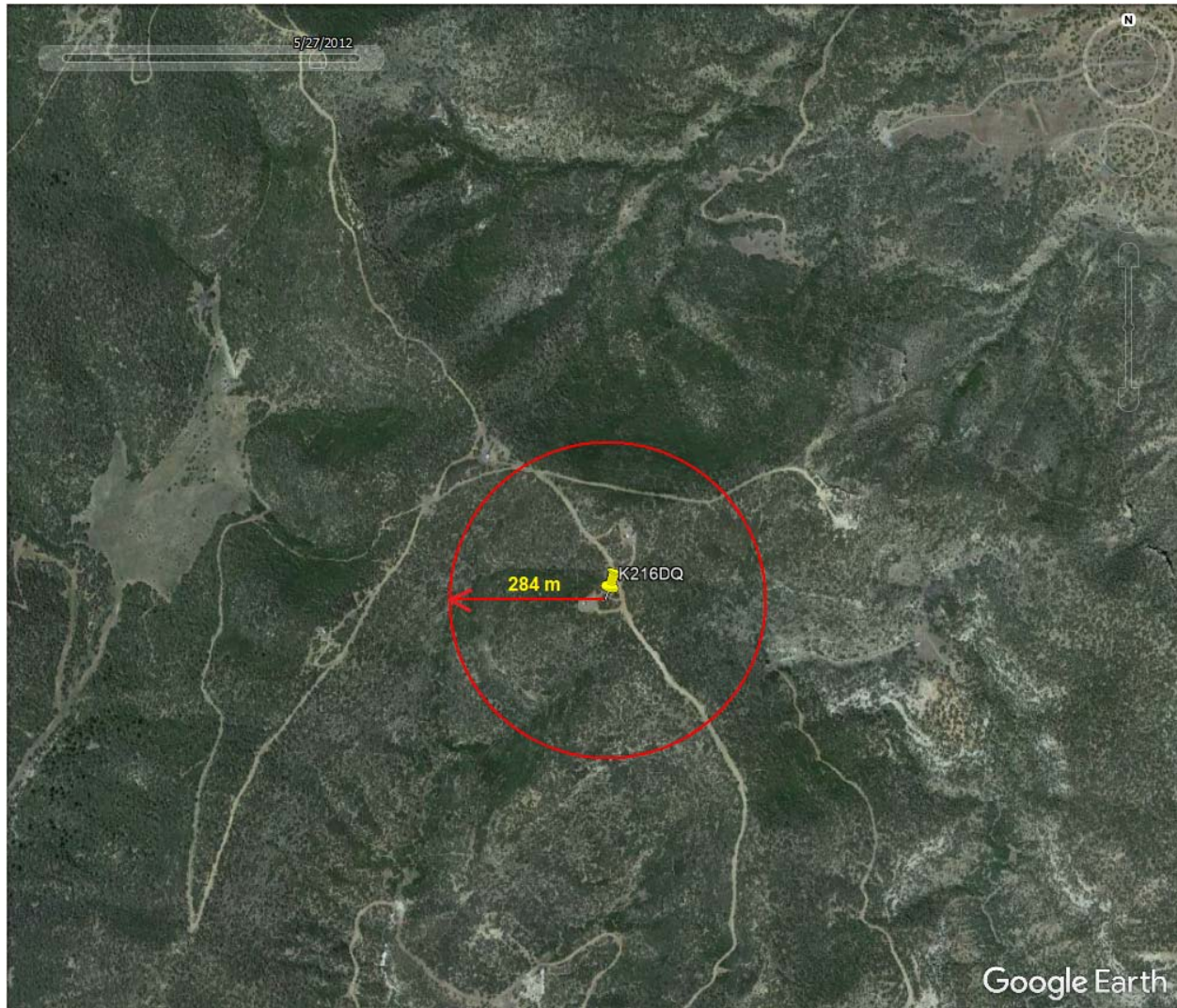
The columns labeled "INT" and "PRO" contain the distance in kilometers of the appropriate interference contour and the protected contour of a data base station.

For I.F. relationships the minimum spacings the "OUT" columns change its significance. The letter "R" stands for the minimum **required** distance in kilometers, while the letter "M" in the next column displays the **available clear space** separation in kilometers. Minimum separation distances when displayed are taken from Sec 73.207 of the rules as amended. Canadian and Mexican separation distances, U/D ratios and protected contour values are from the US/Mexican Working Agreement and the US/Canada Working Agreement".

The first three letters of the "TYPE" column identify the current FCC status of the stations. The fourth letter will be a "D" if the facility is directional. "Z" indicates a 73.215 directional. An "N" indicates it is a 73.215 station that operates with an omni-directional antenna. The fifth letter will be an E, H or V depending on the type of antenna polarization. The sixth letter will be a "Y" if the antenna uses beam tilt or an "X" if the commission is not sure, otherwise it will be an "N" or left blank.

Tower site.

The mountain top location area of the proposed existing tower is completely devoid of housing and major roads. Therefore, 2nd adjacent contour overlaps to KTDL and 3rd adjacent overlap to KCCS will not cause 'interference'. (Two antenna sites are found within the circle shown below.)



The 284-meter circle radius, shown above, represents the contour overlap with KCCS as calculated using the standard U-to-D ratio method. The KTFL contour overlap is slightly less at 260 meters.

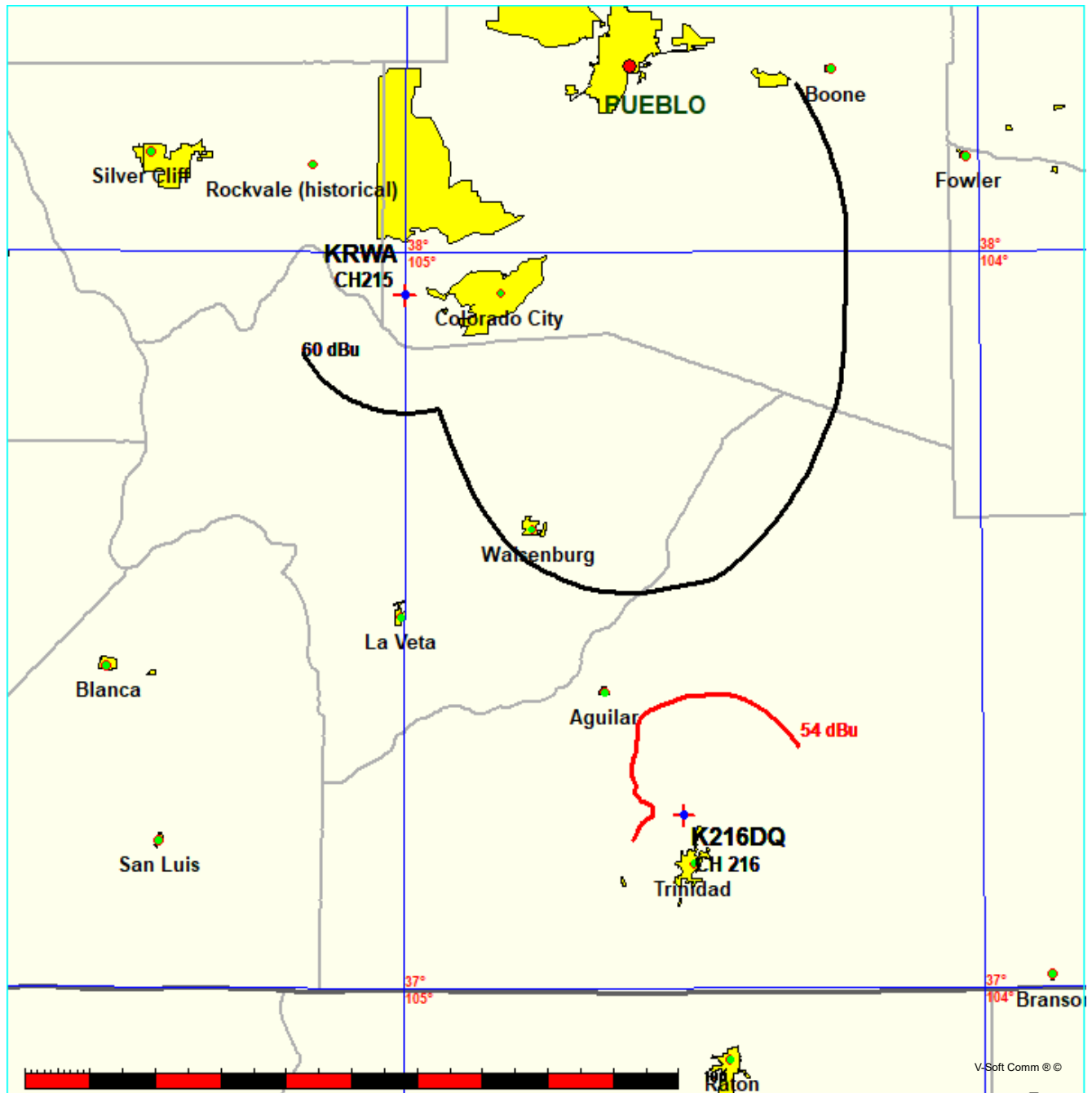
FMCommander Single Allocation Study - 06-02-2020 - FCC NGDC 30 Sec
K216DQ's Overlaps (In= -0.57 km, Out= 16.81 km)

K216DQ CH 216 D

Lat= 37 14 17.75, Lng= 104 30 55.49
0.016 kW 260.4 m HAAT, 2198 m COR
Prot.= 60 dBu, Intef.= 54 dBu

KRWA CH 215 C3 BLED20110307ABR

Lat= 37 56 40.00, Lng= 104 59 58.00
10.0 kW 34.6 m HAAT, 2577 m COR
Prot.= 60 dBu, Intef.= 54 dBu



06-02-2020

Terrain Data: FCC NGDC 30 Sec

FMOver Analysis

KRWA BLED20110307ABR

K216DQ

Channel = 215C3

Max ERP = 10 kW

RCAMSL = 2577 m

N. Lat. 37 56 40.00

W. Lng. 104 59 58.00

Protected

60 dBu

Channel = 216D

Max ERP = 0.016 kW

RCAMSL = 2198 m

N. Lat. 37 14 17.75

W. Lng. 104 30 55.49

Interfering

54 dBu

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)	IX (km)
091.0	010.0000	0588.1	067.2	017.8	000.0160	0384.8	081.0	26.39	
092.0	010.0000	0585.5	067.1	017.9	000.0160	0385.3	079.8	26.80	
093.0	010.0000	0587.0	067.1	018.2	000.0160	0386.0	078.7	27.20	
094.0	010.0000	0588.3	067.2	018.5	000.0160	0386.8	077.6	27.61	
095.0	010.0000	0590.7	067.3	018.7	000.0160	0387.5	076.5	28.01	
096.0	010.0000	0594.2	067.4	019.1	000.0160	0388.3	075.4	28.42	
097.0	010.0000	0596.6	067.5	019.3	000.0160	0388.9	074.2	28.83	
098.0	010.0000	0597.9	067.6	019.5	000.0160	0389.4	073.1	29.23	
099.0	010.0000	0599.0	067.6	019.8	000.0160	0389.9	071.9	29.64	
100.0	010.0000	0601.0	067.7	020.0	000.0160	0390.3	070.8	30.05	
101.0	010.0000	0603.6	067.8	020.2	000.0160	0390.8	069.6	30.46	
102.0	010.0000	0605.6	067.9	020.4	000.0160	0391.2	068.5	30.88	
103.0	010.0000	0606.2	067.9	020.6	000.0160	0391.5	067.3	31.29	
104.0	010.0000	0606.0	067.9	020.7	000.0160	0391.7	066.1	31.71	
105.0	010.0000	0604.7	067.9	020.8	000.0160	0391.8	064.9	32.13	
106.0	010.0000	0601.7	067.7	020.7	000.0160	0391.8	063.7	32.55	
107.0	010.0000	0597.4	067.6	020.7	000.0160	0391.7	062.6	32.97	
108.0	010.0000	0593.2	067.4	020.6	000.0160	0391.5	061.4	33.39	
109.0	010.0000	0590.4	067.3	020.5	000.0160	0391.3	060.2	33.82	
110.0	010.0000	0588.8	067.2	020.4	000.0160	0391.2	059.0	34.25	
111.0	010.0000	0588.0	067.2	020.4	000.0160	0391.2	057.8	34.69	
112.0	010.0000	0587.4	067.2	020.3	000.0160	0391.1	056.7	35.13	
113.0	010.0000	0586.6	067.1	020.3	000.0160	0390.9	055.5	35.57	
114.0	010.0000	0585.1	067.1	020.1	000.0160	0390.6	054.3	36.00	
115.0	010.0000	0582.7	067.0	019.9	000.0160	0390.2	053.2	36.43	
116.0	010.0000	0579.5	066.8	019.6	000.0160	0389.5	052.0	36.85	
117.0	010.0000	0576.3	066.7	019.3	000.0160	0388.8	050.9	37.26	
118.0	010.0000	0573.6	066.6	018.9	000.0160	0388.0	049.8	37.67	
119.0	010.0000	0571.3	066.4	018.6	000.0160	0387.1	048.6	38.07	
120.0	010.0000	0569.0	066.3	018.2	000.0160	0386.0	047.5	38.46	
121.0	010.0000	0566.5	066.2	017.7	000.0160	0384.7	046.4	38.85	
122.0	010.0000	0563.8	066.1	017.2	000.0160	0383.2	045.3	39.24	
123.0	010.0000	0560.9	065.9	016.6	000.0160	0381.4	044.3	39.63	
124.0	010.0000	0557.7	065.8	016.0	000.0160	0379.4	043.2	40.00	

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
125.0	010.0000	0554.0	065.6	015.2	000.0160	0376.8	042.2	40.36
126.0	010.0000	0550.3	065.4	014.4	000.0160	0373.9	041.2	40.71
127.0	010.0000	0546.6	065.2	013.5	000.0160	0370.8	040.2	41.04
128.0	010.0000	0543.4	065.0	012.6	000.0160	0367.2	039.3	41.37
129.0	010.0000	0540.5	064.8	011.6	000.0160	0363.1	038.4	41.67
130.0	010.0000	0537.2	064.6	010.5	000.0160	0358.3	037.5	41.94
131.0	010.0000	0532.4	064.3	009.2	000.0160	0353.9	036.7	42.19
132.0	010.0000	0525.7	063.9	007.7	000.0160	0352.0	036.0	42.46
133.0	010.0000	0516.9	063.3	005.9	000.0160	0350.7	035.4	42.69
134.0	010.0000	0506.7	062.6	003.9	000.0160	0347.8	035.0	42.81
135.0	010.0000	0495.9	061.9	001.9	000.0160	0343.8	034.6	42.86
136.0	010.0000	0485.1	061.2	359.8	000.0160	0338.9	034.4	42.85
137.0	010.0000	0474.5	060.6	357.7	000.0160	0331.4	034.2	42.74
138.0	010.0000	0463.9	059.9	355.6	000.0160	0322.6	034.0	42.56
139.0	010.0000	0453.4	059.3	353.6	000.0160	0317.9	033.9	42.48
140.0	010.0000	0442.7	058.7	351.6	000.0160	0316.0	033.9	42.44
141.0	010.0000	0431.0	058.0	349.5	000.0160	0313.9	033.9	42.34
142.0	010.0000	0418.2	057.3	347.5	000.0160	0310.7	034.1	42.16
143.0	010.0000	0404.8	056.5	345.4	000.0160	0307.0	034.4	41.91
144.0	010.0000	0391.2	055.8	343.5	000.0160	0302.6	034.8	41.61
145.0	010.0000	0377.3	055.0	341.6	000.0160	0300.6	035.2	41.34
146.0	010.0000	0363.6	054.2	339.8	000.0160	0298.0	035.8	41.01
147.0	010.0000	0349.4	053.3	338.0	000.0160	0293.9	036.4	40.57
148.0	010.0000	0334.3	052.3	336.3	000.0160	0288.0	037.2	40.01
149.0	010.0000	0318.3	051.3	334.8	000.0160	0281.5	038.1	39.37
150.0	010.0000	0302.6	050.3	333.4	000.0160	0274.4	039.1	38.71
151.0	010.0000	0287.2	049.2	332.1	000.0160	0266.5	040.1	38.00
152.0	010.0000	0271.9	048.2	330.9	000.0160	0257.0	041.2	37.20
153.0	010.0000	0256.0	047.1	329.8	000.0160	0245.6	042.3	36.31
154.0	010.0000	0239.3	045.9	328.8	000.0160	0233.4	043.5	35.33
155.0	010.0000	0221.8	044.7	328.0	000.0160	0223.1	044.9	34.32
156.0	010.0000	0203.0	043.3	327.3	000.0160	0215.4	046.3	33.35
157.0	010.0000	0183.5	041.7	326.7	000.0160	0209.9	048.0	32.43
158.0	010.0000	0164.0	039.9	326.3	000.0160	0206.0	050.0	31.46
159.0	010.0000	0144.4	037.6	326.2	000.0160	0204.2	052.3	30.44
160.0	010.0000	0124.4	035.2	326.1	000.0160	0203.6	054.8	29.45
161.0	010.0000	0103.4	032.4	326.2	000.0160	0205.1	057.7	28.41
162.0	010.0000	0080.0	028.6	326.7	000.0160	0209.8	061.5	27.17
163.0	010.0000	0053.7	024.0	327.4	000.0160	0216.8	066.0	25.88
164.0	010.0000	0027.2	018.1	328.5	000.0160	0228.7	071.8	24.37
165.0	010.0000	0002.3	018.1	328.2	000.0160	0225.8	071.9	24.24
166.0	010.0000	-0020.0	018.1	328.0	000.0160	0223.0	072.0	24.10
167.0	010.0000	-0041.8	018.1	327.8	000.0160	0220.4	072.1	23.97
168.0	010.0000	-0063.5	018.1	327.5	000.0160	0217.8	072.2	23.83
169.0	010.0000	-0083.6	018.1	327.3	000.0160	0215.3	072.3	23.70
170.0	010.0000	-0105.8	018.1	327.1	000.0160	0213.1	072.4	23.58
171.0	010.0000	-0130.5	018.1	326.8	000.0160	0210.9	072.5	23.45
172.0	010.0000	-0160.8	018.1	326.6	000.0160	0208.6	072.7	23.32
173.0	010.0000	-0196.0	018.1	326.4	000.0160	0206.4	072.8	23.18
174.0	010.0000	-0234.6	018.1	326.2	000.0160	0204.2	073.0	23.05
175.0	010.0000	-0274.1	018.1	325.9	000.0160	0202.1	073.1	22.91

Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Azimuth (degrees)	ERP (kW)	HAAT (m)	Dist (km)	Actual (dBu)
176.0	010.0000	-0314.7	018.1	325.7	000.0160	0200.1	073.3	22.78
177.0	010.0000	-0357.1	018.1	325.5	000.0160	0198.2	073.4	22.65
178.0	010.0000	-0391.8	018.1	325.3	000.0160	0196.3	073.6	22.52
179.0	010.0000	-0424.4	018.1	325.1	000.0160	0194.4	073.8	22.38
180.0	010.0000	-0457.1	018.1	324.9	000.0160	0192.6	074.0	22.25
181.0	010.0000	-0474.8	018.1	324.7	000.0160	0190.7	074.1	22.11
182.0	010.0000	-0481.0	018.1	324.5	000.0160	0188.8	074.3	21.97
183.0	010.0000	-0486.8	018.1	324.3	000.0160	0187.0	074.5	21.83
184.0	010.0000	-0492.8	018.1	324.1	000.0160	0185.2	074.7	21.69
185.0	010.0000	-0495.4	018.1	323.9	000.0160	0183.5	074.9	21.55
186.0	010.0000	-0491.3	018.1	323.8	000.0160	0181.8	075.2	21.41
187.0	010.0000	-0484.1	018.1	323.6	000.0160	0180.2	075.4	21.27
188.0	010.0000	-0477.5	018.1	323.4	000.0160	0178.6	075.6	21.13
189.0	010.0000	-0469.1	018.1	323.2	000.0160	0177.1	075.8	20.99
190.0	010.0000	-0458.7	018.1	323.1	000.0160	0175.6	076.0	20.85
191.0	010.0000	-0448.9	018.1	322.9	000.0160	0174.2	076.3	20.72
192.0	010.0000	-0440.3	018.1	322.8	000.0160	0172.9	076.5	20.58
193.0	010.0000	-0432.2	018.1	322.6	000.0160	0171.7	076.8	20.45
194.0	010.0000	-0422.4	018.1	322.5	000.0160	0170.6	077.0	20.33
195.0	010.0000	-0410.9	018.1	322.3	000.0160	0169.5	077.3	20.20
196.0	010.0000	-0399.7	018.1	322.2	000.0160	0168.6	077.5	20.08
197.0	010.0000	-0388.3	018.1	322.1	000.0160	0167.7	077.8	19.96
198.0	010.0000	-0377.8	018.1	321.9	000.0160	0167.0	078.0	19.84
199.0	010.0000	-0369.2	018.1	321.8	000.0160	0166.3	078.3	19.73
200.0	010.0000	-0363.2	018.1	321.7	000.0160	0165.7	078.6	19.62
201.0	010.0000	-0357.4	018.1	321.6	000.0160	0165.2	078.8	19.51
202.0	010.0000	-0351.1	018.1	321.4	000.0160	0164.7	079.1	19.40
203.0	010.0000	-0344.8	018.1	321.3	000.0160	0164.3	079.4	19.30
204.0	010.0000	-0338.7	018.1	321.2	000.0160	0164.1	079.7	19.20
205.0	010.0000	-0331.3	018.1	321.1	000.0160	0163.9	080.0	19.10
206.0	010.0000	-0321.9	018.1	321.0	000.0160	0163.7	080.2	19.00
207.0	010.0000	-0312.1	018.1	320.9	000.0160	0163.5	080.5	18.91
208.0	010.0000	-0305.4	018.1	320.8	000.0160	0163.4	080.8	18.81
209.0	010.0000	-0303.1	018.1	320.8	000.0160	0163.2	081.1	18.71
210.0	010.0000	-0304.4	018.1	320.7	000.0160	0163.0	081.4	18.61

Existing vs Proposed 60 dBu Coverage The Colorado College

Coverage Study - FCC NGDC 30 Sec
06-02-2020

