

**MULLANEY ENGINEERING, INC.**

9049 SHADY GROVE COURT  
GAITHERSBURG, MD 20877

**ENGINEERING EXHIBIT EE-1:**

**KRJ COMPANY**

**MODIFICATION OF EXISTING  
FM BROADCAST CONSTRUCTION PERMIT**

**KXRC (FM)  
FM CHANNEL 287C3  
DURANGO, COLORADO  
FCC FACILITY ID: 88463**

**FEBRUARY 2013**

ENGINEERING EXHIBIT  
IN SUPPORT OF  
AN APPLICATION FOR  
A FM RADIO CONSTRUCTION PERMIT  
(MODIFICATION OF EXISTING PERMIT)  
FOR  
FM STATION KXRC  
DURANGO, COLORADO

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**FEBRUARY 2013**

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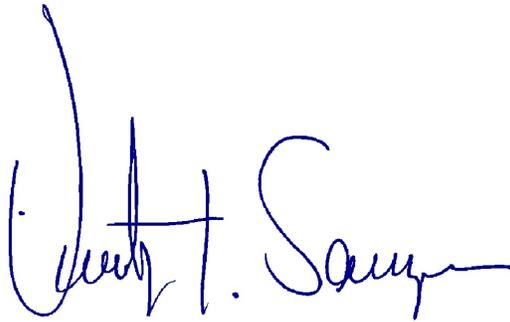
1. F.C.C. Form 301, Section III (certification)
2. F.C.C. Form 301, Section III-B (engineering)
3. Declaration of Engineer
4. Narrative Statement
5. Figure 1, FAA/Tower-Air Slope Test/FCC Tower Registration
6. Figure 2, Topographic Site Map
7. Figure 3, Vertical Sketch of Existing Antenna/Tower Structure
8. Figure 4, Proposed Antenna Details - Nondirectional Antenna - Vertical Relative Field Pattern.
9. Figure 5, Map Showing Predicted Service Contours and City of License
10. Figure 6, FM Channel Separation Study at Proposed Site

**DECLARATION**

I, Timothy Z. Sawyer, declare and that I have provided engineering services in the area of telecommunications since 1969. My qualifications are a matter of record with the Federal Communications Commission. I am a senior engineer with the firm of Mullaney Engineering, Inc., consulting radio telecommunications engineers with offices in Gaithersburg, Maryland.

The firm of Mullaney Engineering, Inc., has been retained by KRJ COMPANY, to prepare the instant engineering exhibit in support of *an Application for a FM Broadcast Station Construction Permit on Channel 287C3 at Durango, Colorado. KXRC(FM) FCC Facility ID:88463.*

All facts contained herein are true of my own knowledge except those stated to be on information and belief, and as to those facts, I believe them to be true. I declare under penalties of perjury that the foregoing is true and correct.



---

Timothy Z. Sawyer

Executed on the 6th day of February 2013

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**FEBRUARY 2013**

**NARRATIVE STATEMENT:**

**I. GENERAL:**

This engineering statement and the instant engineering exhibit of which it is part has been prepared on behalf of KRJ COMPANY, (hereinafter “KRJ”).

By means of the instant application, KRJ proposes to MODIFY its existing construction permit (BPH-19970925MP) to specify a new tower site, and make minor changes in antenna heights concerning KXRC (FM) Durango, Colorado.

This application is classified as a “minor change application” under the Commission processing rules.

The facilities will be built to comply with the *FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields* and the instant proposal is categorically excluded from environmental processing pursuant to the provisions of Section 1.1306 of the Commission’s Rules. A more detailed discussion of environmental factors is included under the heading Environmental Considerations below.

Information requested by exhibits in response to questions on Section III-B of FCC Form 301 is incorporated in the following paragraphs, figures, and/or tables.

**II. ENGINEERING DISCUSSION:**

**A. Transmitter/Antenna Location:**

KRJ proposes to side-mount a standard ***non directional*** 5-bay FM antenna on an existing tower.

The existing tower does not require FCC tower registration or notification to the FAA and passes the FCC Tower-Air slope test. See Figure 1.

No change in the height of the existing structure will occur. The overall height of the supporting structure is 56.9 meters above ground level, 2404.5 meters above mean sea level.

A large-scale topographic map with the proposed site marked upon has been provided as Figure 2.

The center of radiation of the antenna will be 50.0 meters above ground (AGL), and an antenna center of radiation height above mean sea level of 2,397.6 meters (AMSL). The antenna height above average terrain (HAAT) is 123.3 meters.

A vertical sketch of the supporting structure with antenna location marked upon it is included herein as Figure 3.

**B. Proposed Antenna - Standard FM Non directional Antenna:**

KRJ proposed to utilize a circularly-polarized non directional, 1.0 - wavelength spaced, 5-bay FM antenna, Shively Labs 6813.

The maximum effective radiated power (ERP) from the antenna is 16.5 kilowatts horizontal and vertical. The gain of the antenna and the vertical relative field pattern are contained within Figure 4.

The applicant will comply with all Commission rules and the antenna manufacturer's recommendations concerning the proper mounting of the antenna.

The actual transmitter power output (TPO) and line losses will be provided to the Commission in the station license application (FCC Form 302-FM) following completion of construction.

**C. Predicted Coverage Contours:**

Figure 5, contains a map upon which the 60 and 70 dBu (f 50,50) predicted coverage contours have been drawn. As can be seen from this map, the community (city) of license, Durango, Colorado is completely encompassed by the 70 dBu signal contour.

The proposed facility will serve a population of 60,597 persons (U.S. Census 2010) which reside within the predicted FCC f(50,50) 60 dBu contour.

**D. FM Class C3 Channel 287 Spacing/Channel Study**

Figure 6, contains a FM Channel Study (separation study) that demonstrates that Class C3 operation as proposed herein can be granted and approved and is fully spaced.

No short-spacings are known to exist to other stations or pending applications at the time of filing.

**E. Environmental Considerations:**

The applicant believes its proposal will not significantly affect the environment for the following reasons.

The proposal does not meet any of the criteria specified in Section 1.1307 of the FCC Rules. More specifically, the proposed facilities are not known to fall within any of the categories enumerated in Sections 1.1307(a)(1)-(7) and will not involve the use of high intensity white lights. Furthermore, operation of the proposed facility will not involve the exposure of workers or the general public to levels of radio frequency electromagnetic fields exceeding guidelines adopted by the Federal Communications Commission. (The current FCC guidelines are based upon criteria contained in the National Council of Radiation Protection and Measurements (NCRP) Report No.86 (1986) and ANSI/IEEE C95.1-1992.)

The proposed 5-bay antenna (1.0 -wave length spacing between elements/bays) is 50.0 meters above ground level, and utilizing a “worst-case” vertical relative field value (as provided by the antenna manufacturer - see Figure 4) of 0.32 from the antenna, for all angles 15 degrees and greater below the horizon. The power density at 2 meters above ground was computed to be 0.0490 mW/cm<sup>2</sup>

The power density value is 4.9 percent of the Commission's standard of 1.0 mW/cm<sup>2</sup> for a controlled area and 24.5 percent of the Commission's standard of 0.20 mW/cm<sup>2</sup> for an uncontrolled (public) area.

However, as this is a shared use communications site, the contributions of the other known emitters at the site were also evaluated:

CALL LETTERS	FREQ. (MHZ)	POWER (KW)	ANT AGL (m)	RELATIVE FIELD FACTOR *	FCC GUIDELINES CONTROLLED (%)
KXRC (FM)	103.5	16.5 H/V	50.0	0.32	4.90
KREZ(DT)	479.0	46.0 H	24.4	0.18	3.07
KRMU(DT)	509.0	12.6 H	14.3	0.23	3.47
K29CZ (LP)	563.0	6.3 H	12.8	0.33	4.71
Computed TOTAL					24.99%

\*Relative Field factor(downward radiation) is derived from published manufacturers antenna specifications - depression angle 15 degrees and greater below the horizon.

The applicant will comply with the Commissions guidelines and standards. Access to the tower/structure IS strictly restricted and suitable warning signs are posted. No access to the immediate site area by unauthorized personnel, i.e., the general public, is authorized. The applicant will coordinate its use of the site with all other site users.

**NHPA Section 106 - Review:**

The application is exempt from conducting an NHPA Section 106 review or further notification under the NHPA Section 106 guidelines/rules. The applicant proposes the use of an existing tower/structure. No changes to this structure are proposed.

**III. SUMMARY:**

The applicant proposes operation on FM Channel 287C3 at Durango, Colorado. The proposal as presented herein is in compliance with the Commission's rules and regulations.

Operation as proposed herein would not cause any normally prohibited contour overlap, and would not have any significant impact on the environment.

The proposed operation will not create prohibited interference. The proposed operation as a Class C3 FM station is fully-spaced. The proposed operation is fully in compliance with the Commission's rules and applicable international agreements.

6 February 2013

A handwritten signature in blue ink, reading "Timothy Z. Sawyer". The signature is written in a cursive style with a large initial 'T' and 'S'.

---

Timothy Z. Sawyer

Mullaney Engineering, Inc.  
9049 Shady Grove Court  
Gaithersburg, MD 20877  
301-921-0115 ext 3  
email: [tzsawyer@mullengr.com](mailto:tzsawyer@mullengr.com)

# FAA NOTIFICATION OR FCC TOWER REGISTRATION IS NOT REQUIRED

TOWAIR's findings are not definitive or binding, and we cannot guarantee that the data in TOWAIR are fully current and accurate. In some instances, TOWAIR may yield results that differ from application of the criteria set out in 47 C.F.R. Section 17.7 and 14 C.F.R. Section 77.13. A positive finding by TOWAIR recommending notification should be given considerable weight. On the other hand, a finding by TOWAIR recommending either for or against notification is not conclusive. It is the responsibility of each ASR participant to exercise due diligence to determine if it must coordinate its structure with the FAA. TOWAIR is only one tool designed to assist ASR participants in exercising this due diligence, and further investigation may be necessary to determine if FAA coordination is appropriate.

<b>DETERMINATION Results</b>							
<b>PASS SLOPE(100:1): NO FAA REQ-RWY MORE THAN 10499 MTRS &amp; 6639.76 MTRS (6.63980 KM) AWAY</b>							
Type	C/R	Latitude	Longitude	Name	Address	Lowest Elevation (m)	Runway Length (m)
AIRP	R	37-12-34.00N	107-51-58.00W	ANIMAS AIR PARK	LA PLATA DURANGO, CO	2019.8	1527.0999999999999
<b>Your Specifications</b>							
<b>NAD83 Coordinates</b>							
Latitude						37-15-46.0 north	
Longitude						107-54-00.2 west	
<b>Measurements (Meters)</b>							
Overall Structure Height (AGL)						56.9	
Support Structure Height (AGL)						56.9	
Site Elevation (AMSL)						2347.6	
<b>Structure Type</b>							
GTOWER - Guyed Structure Used for Communication Purposes							

**EXISTING COMMUNICATION TOWER - NO CHANGES ARE PROPOSED**



## FAA NOTIFICATION AND/OR FCC TOWER REGISTRATION NOT REQUIRED

KXRC FM CHANNEL 287C3  
DURANGO, COLORADO

**FIGURE  
1**

GAITHERSBURG, MARYLAND U.S.A

SIZE

A

FSCM NO

N/A

DWG NO

20130206KXRCF1

REV

NONE

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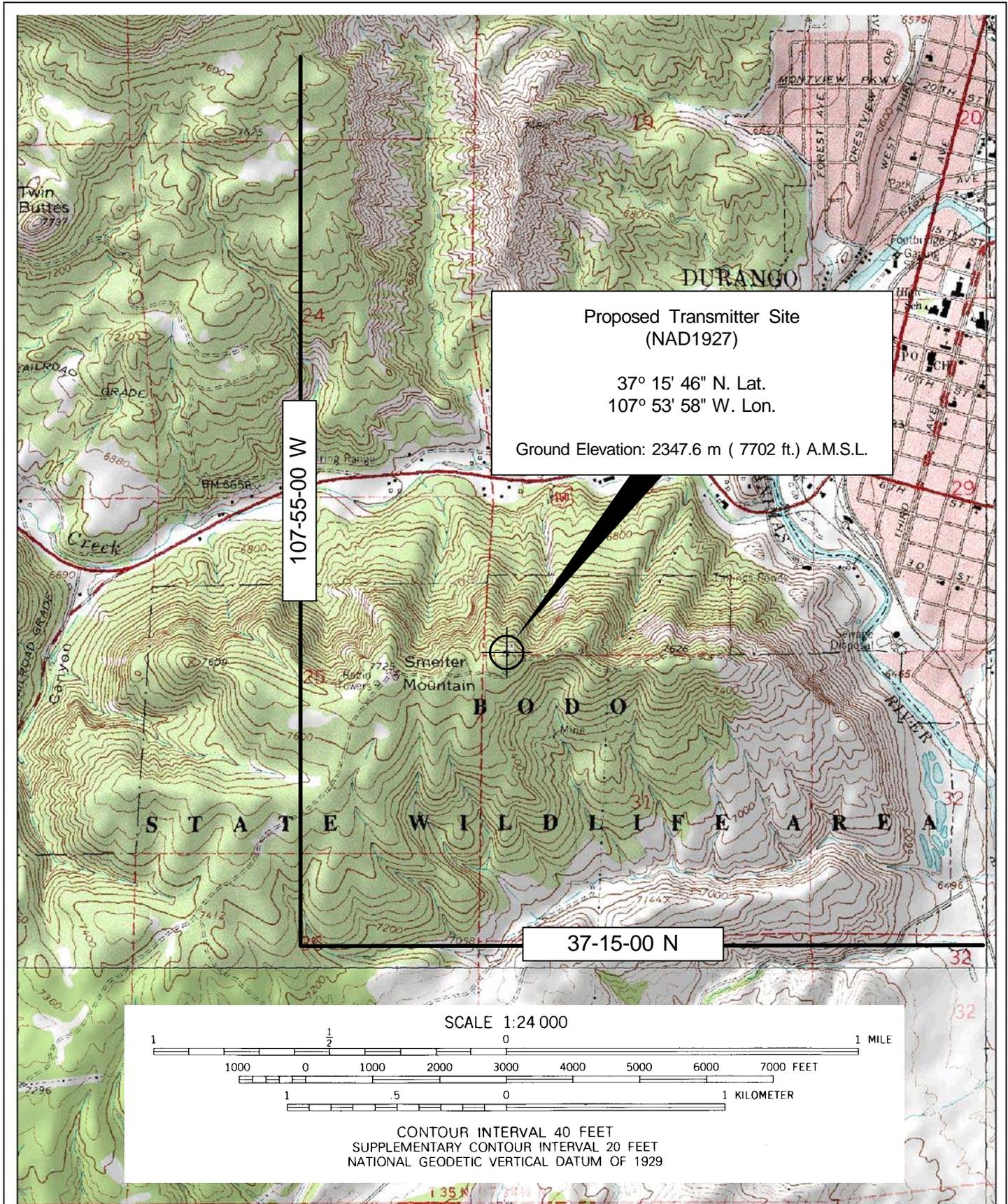
SCALE

N/A

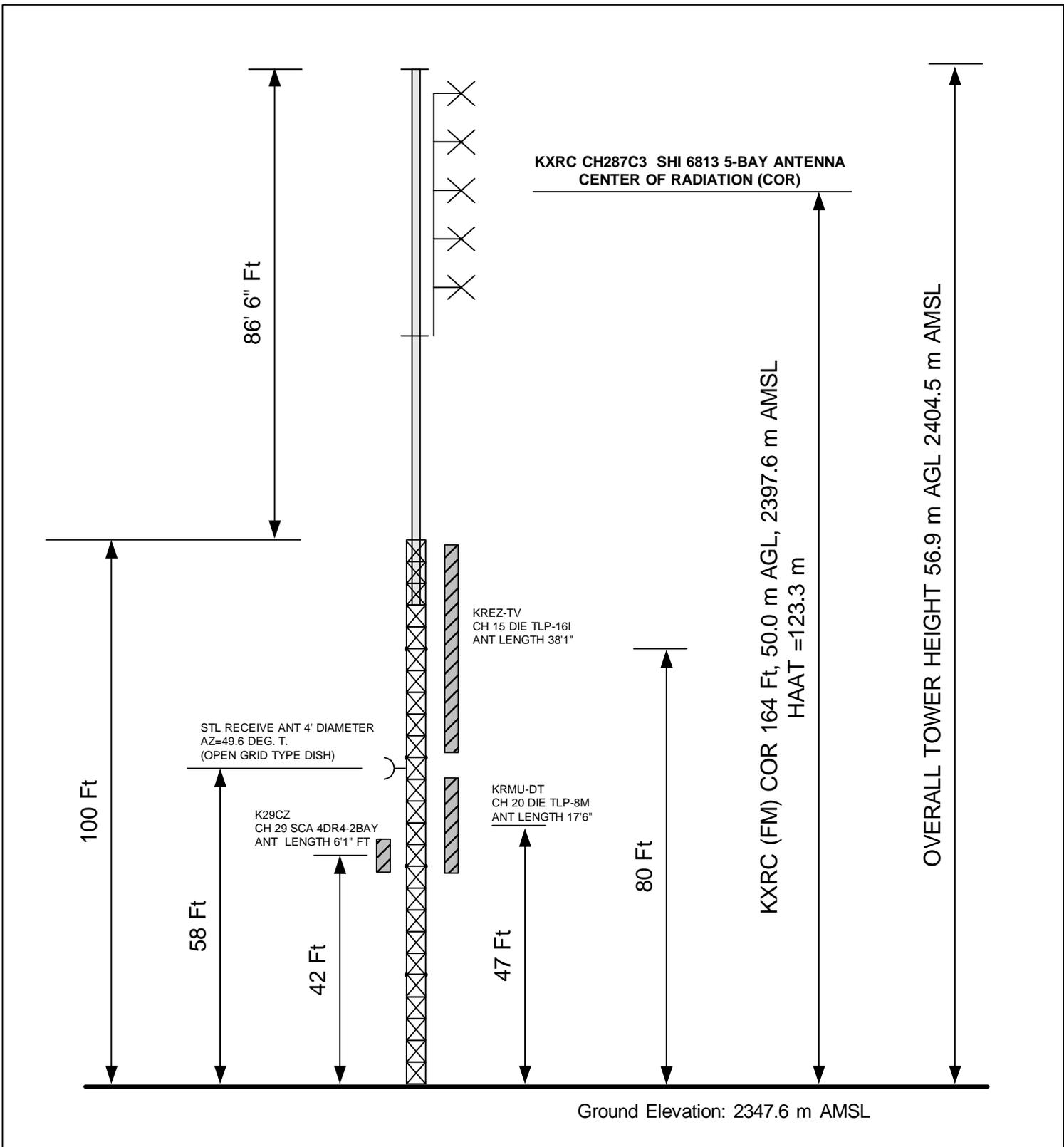
FEBRUARY 2013

SHEET

1 OF 1



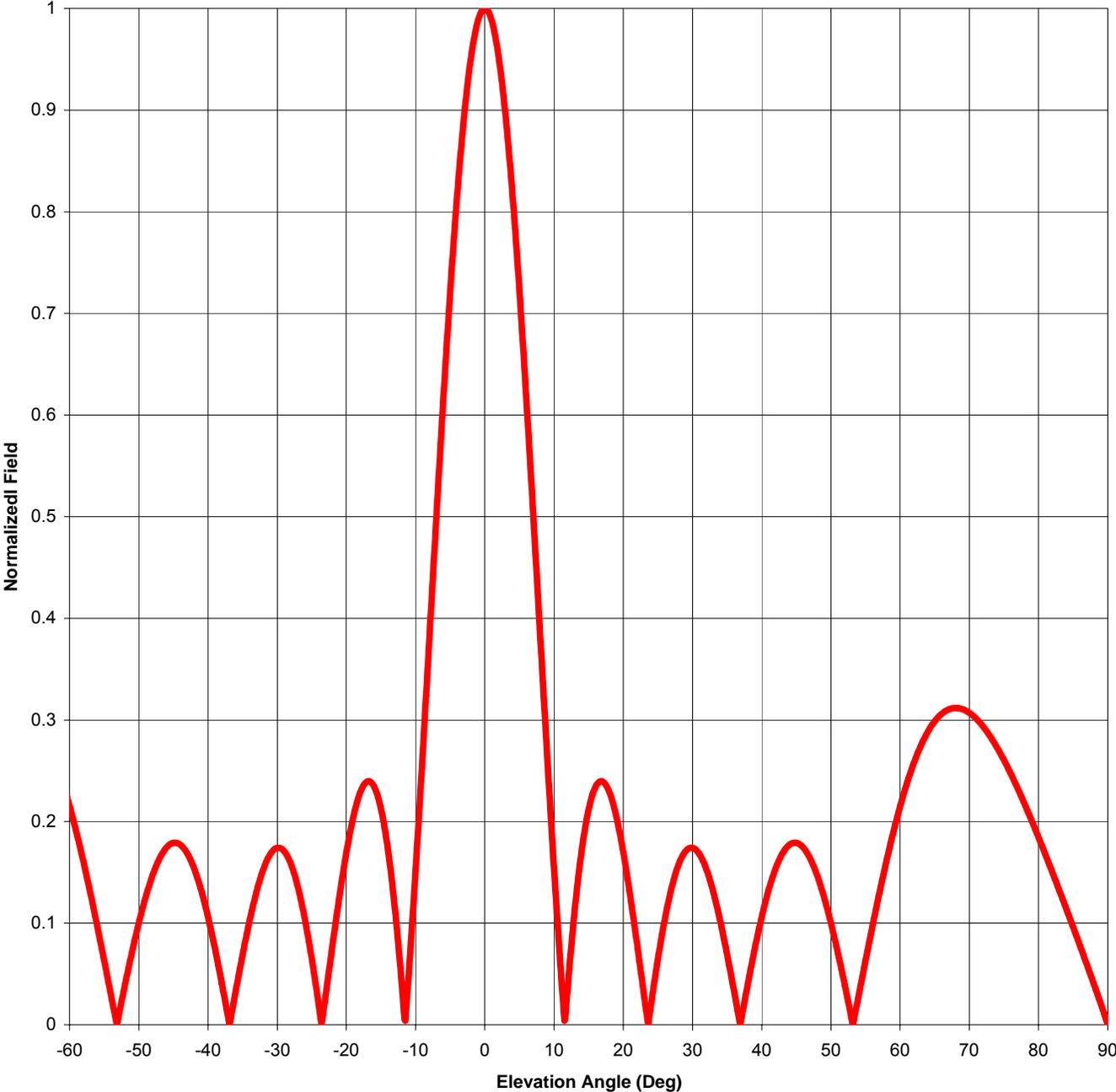
 <b>Mullaney Engineering, Inc.</b>	<b>PROPOSED TRANSMITTER SITE</b>			<b>FIGURE 2</b>
	<b>TOPOGRAPHIC MAP OF SITE</b>			
	<b>KXRC FM CH 287C3</b>			
	<b>DURANGO, CO</b>			
<b>GAITHERSBURG, MARYLAND U.S.A</b>	SIZE A	ESCM NO N/A	DWG NO 20120206KXRCF2	REV NONE
<b>(C) 2013, ALL RIGHTS RESERVED</b>	SCALE 1:24,000	FEBRUARY 2013	SHEET	1 OF 1



	<b>VERTICAL SKETCH OF SUPPORTING STRUCTURE</b>			
	KXRC (FM) DURANGO, COLORADO			<b>FIGURE 3</b>
<b>GAITHERSBURG, MARYLAND U.S.A</b>	SIZE	FSCM NO	DWG NO	REV
	A	N/A	20130206KXRCF3	12/03/12
(c) 2013, ALL RIGHTS RESERVED	SCALE	1"=25'	FEBRUARY 2013	SHEET 1 OF 1

Antenna Mfr.: Shively Labs  
Antenna Type: 6813 5-Bay, full-wave-spaced  
Frequency: 105.3

6813 Gain (Max) 2.73 4.36 dB



# Shively Labs®

## FIGURE 4

### Elevation Pattern Tabulation, Sidemount 5-Bay Antennas, Full-Wave-Spaced

Includes Models 6014, 6015, 66xx series except 6602B, 65xx series, 68xx series except 6812B & 6832.

Relative Field at 0° Depression = 1.000

Degrees	Rel. Field
1	0.988
2	0.952
3	0.894
4	0.816
5	0.722
6	0.616
7	0.501
8	0.383
9	0.265
10	0.153
11	0.051
12	0.039
13	0.114
14	0.172
15	0.212
16	0.234
17	0.239
18	0.229

Degrees	Rel. Field
19	0.205
20	0.170
21	0.127
22	0.079
23	0.029
24	0.020
25	0.065
26	0.104
27	0.135
28	0.158
29	0.171
30	0.174
31	0.168
32	0.153
33	0.131
34	0.102
35	0.069
36	0.033

Degrees	Rel. Field
37	0.004
38	0.041
39	0.075
40	0.106
41	0.133
42	0.154
43	0.169
44	0.177
45	0.179
46	0.174
47	0.164
48	0.147
49	0.126
50	0.100
51	0.071
52	0.039
53	0.006
54	0.029

Degrees	Rel. Field
55	0.063
56	0.097
57	0.130
58	0.160
59	0.189
60	0.215
61	0.238
62	0.258
63	0.275
64	0.288
65	0.299
66	0.306
67	0.310
68	0.312
69	0.311
70	0.307
71	0.301
72	0.293

Degrees	Rel. Field
73	0.284
74	0.273
75	0.260
76	0.247
77	0.232
78	0.217
79	0.201
80	0.184
81	0.167
82	0.150
83	0.132
84	0.114
85	0.096
86	0.078
87	0.059
88	0.040
89	0.021
90	0.000

**KXRC CP MOD**

MOD OF CP APPLICATION

Latitude: 37-15-46 N

Longitude: 107-53-58 W

ERP: 16.50 kW

Channel: 287 Frequency: 105.3 MHz

Antenna HAAT Height: 123.23 m

Antenna AMSL Height: 2397.6 m

Antenna AGL Height: 50.0 m

Ground Elevation: 2347.6 m

Horiz. Pattern: Omni

**PROPOSED KXRC (FM) SERVICE CONTOURS**

CHANNEL 287C3

ERP: 16.5 KW HAAT:123.2 M

DURANGO, COLORADO

ERP = 16.5 KW HAAT = 123.2 M

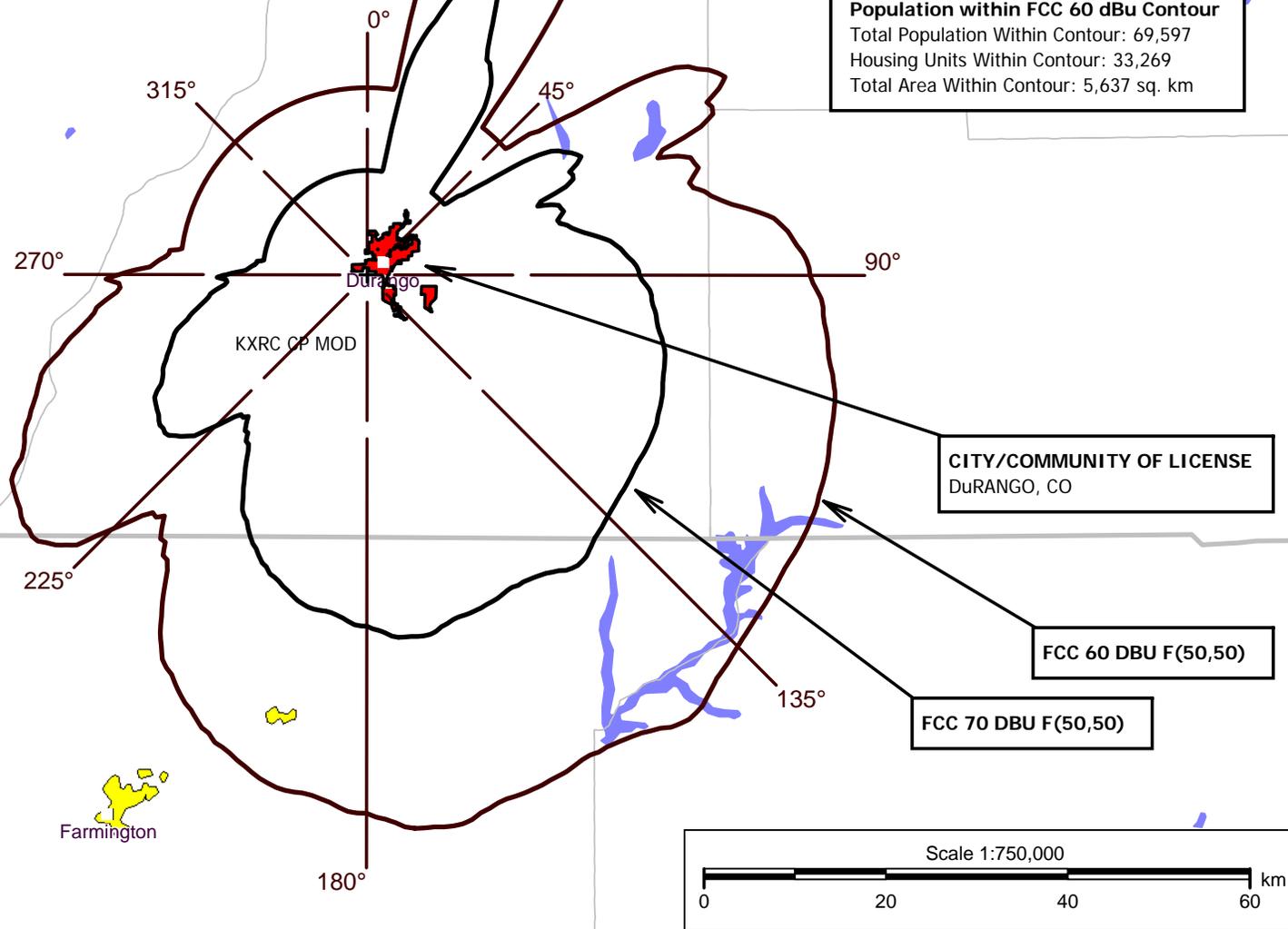
FIGURE 5

**Population within FCC 60 dBu Contour**

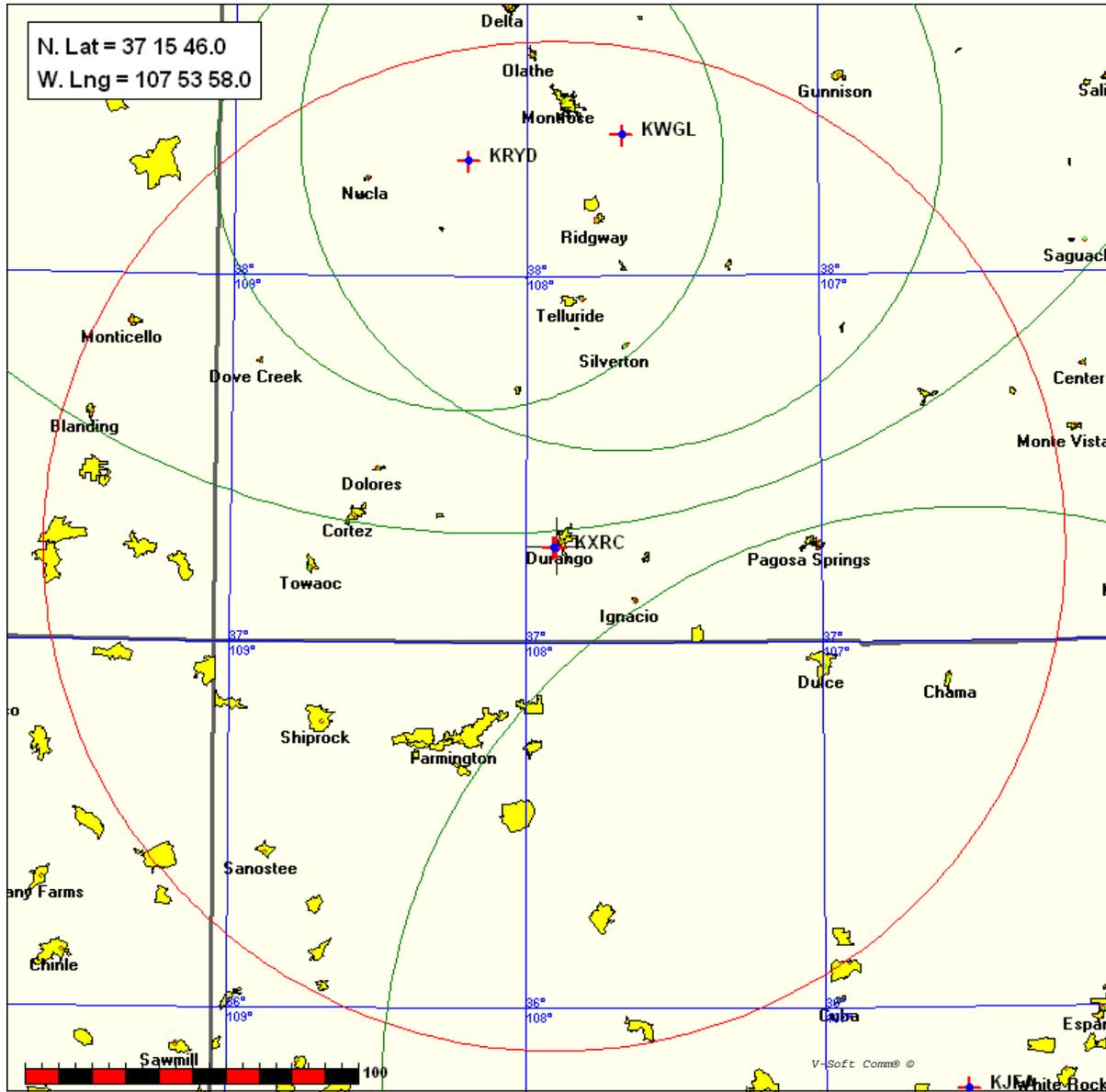
Total Population Within Contour: 69,597

Housing Units Within Contour: 33,269

Total Area Within Contour: 5,637 sq. km



Current Spacings to 3rd Adj.  
 KXRC CHANNEL 287C3 SPACING STUDY  
 FULLY SPACED FACILITY



Data Date:02-06-13 Job Date:02-06-13

Call	CH#	Type	Location		Azi	D-KM	FCC	Margin
KXRC.C	287C3	CP	Durango	CO	261.1	0.59	153.0	-152.4
KZKS	287C	LIC	Rifle	CO	355.3	241.67	237.0	4.7
KJFA	286C	LIC	Santa Fe	NM	142.9	205.41	176.0	29.4
KWGL	289C	LIC	Ouray	CO	8.9	126.42	96.0	30.4
KRYD	285C1	LIC	Norwood	CO	347.4	119.87	76.0	43.9