

# **APPLICATION FOR A MINOR MODIFICATION OF A CONSTRUCTION PERMIT**

**FCC FORM 349**

**File Number BMPFTB-20050516AUF**

**Facility Number - 162588**

**(PRIMARY STATION - KBRU-FM, Facility Number - 38629)**

**KBRU-FM1**

**Commerce City, Colorado**

**CHANNEL 268 – 101.5 MHz**

**ERP: 20.0 kW (H&V)**

**APPLICANT: On-Air Family, LLC**

**June, 2005**

**Prepared by:**



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**Engineering Statement  
In Support of an Application for a Minor  
Modification of a Construction Permit**

**KBRU-FM1, Commerce City, Colorado, Channel 268**

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**ENGINEERING STATEMENT**  
**Of**  
**Lee S. Reynolds**  
**And**  
**Virgle Leon Strickland**  
**In Support of a Application for a Minor**  
**Modification of a Construction Permit**

**KBRU-FM1**  
**Commerce City, Colorado**  
**Channel 268 – 101.5 MHz**  
**ERP: 20 kW(H&V)**

**June, 2005**

**General**

As broadcast technical consultants doing business as Reynolds Technical Associates (RTA), we have been authorized by On-Air Family, LLC (herein referred to as “On-Air Family” as well as “The Applicant”), to conduct engineering studies and prepare the engineering portion of an application to modify the construction permit of a FM booster (file number BMPFTB-20050516AUF). The modified facility will operate on channel 268 with a directional antenna and an effective radiated power of 20 kilowatts.

This modification changes the antenna type and model, not other changes are made.

The KBRU-FM1 facility will broadcast the programming of KBRU-FM, Strasburg, Colorado, by receiving the signal from the main studio of KBRU-FM by using a STL

(microwave). The 60 dBu of the proposed facility is within the 60 dBu contour of the KBRU-FM licensed facility.

On-Air Family, LLC, the licensee of KBRU-FM is the same entity filing the instant FM booster application.

The following engineering studies and exhibits support this instant application.

**Surrounding Terrain and Predicted Contours for the Proposed Site**  
**(Exhibit E, Figures 1 through 4)**

Exhibit E, Figure 1 is a terrain averaging and service contour study showing the FCC F(50/50) 60 dBu contour of the licensed main facilities.

Exhibit E, Figure 2 is a terrain averaging and service contour study showing the FCC F(50/50) 60 dBu contour of the proposed FM booster.

The resulting contours for the proposed booster are shown in map form as Exhibit E, Figure 3 depicting that the 60 dBu contour of the proposed booster is inside of the 60 dBu contour of the main facility.

The distance to the blanketing contour is calculated to be 1.762 kilometer (1.096 mile).

Exhibit E, Figure 4 is a vertical sketch of the existing antenna supporting structure with elevations. The antenna structure registration number for the existing tower is 1201369.

There are no proposed or authorized FM or TV transmitters that may produce receiver-induced interference within ten (10) kilometers of the proposed.

**Human Exposure**  
**(Exhibit E, Figure 5)**

The proposed FM facility was evaluated in terms of potential radiofrequency radiation exposure at ground level. Exhibit E, Figure 5 is the results of that study.

Should anyone be required to climb the tower, the facilities located on the tower have an agreement to either reduce power or cease operation, whichever is necessary, to prevent hazardous exposure to radiofrequency radiation.

**Environmental Impact**  
**(No Exhibits)**

A grant of the proposed construction would not constitute a major action as defined in the Commission's Rules and Regulations.

During operation, the facility will produce no chemical or significant thermal pollution, and no ionizing radiation will be generated. Areas of high intensity radiofrequency fields will be confined to the immediate area of the transmitting antenna, far above the ground and away from any human and wildlife population.

The area is not officially designated as a wilderness area or wildlife preserve and is not pending consideration. The area has no significant value in American history, architecture, archaeology, or culture, which is listed in the Register of Historic Places, and it is not eligible for listing. It is not recognized either nationally or locally for special scenic or recreational value.

## **Conclusion**

This statement/application has been prepared for The Applicant by utilizing the latest available information, cross-checked with the Federal Communications Commission and other sources. Therefore, it is submitted that the proposed is in compliance with the Commission's Rules and Regulations and other sources. We welcome the opportunity to discuss with the staff of the Federal Communications Commission the engineering data contained in this application. Should any questions arise concerning the information, please contact us.

The following pages are exhibits prepared and assembled in support of the proposed.

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### **Statement of the Consultants**

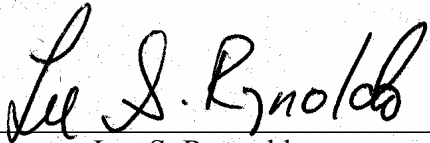
The instant engineering statement was prepared for “The Applicant” and supports an application for a construction permit for a FM booster for the main facility of KBRU-FM, Strasburg, Colorado. It was developed by RTA and may not be used for purposes other than submission to the Commission by the applicant.

It may not be reproduced in its entirety, or in part, by anyone (other than from the Commission) without the written consent of RTA.

It is prepared for The Applicant under contractual agreement, and its certification by RTA is used accordingly. If The Applicant fails in its contractual obligation, RTA reserves the right to withdraw its certification.

The information in this application is compiled from the most recent Commission and outside data. RTA is not responsible for errors resulting from incorrect data or unpublished rule and procedure changes.

For RTA:

  
\_\_\_\_\_  
Lee S. Reynolds

June 29<sup>th</sup>, 2005

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**Engineering Statement  
In Support of a Minor Modification  
of a Construction Permit**

**KBRU-FM1, Commerce City, Colorado  
Channel 268**

**Terrain-Contour Study for Main Facility**

**Reference Coordinates:**

**North Latitude: 39-55-22**

**West Longitude: 103-58-18**

ERP = 97.0 kW		FM - 2-6 Tables		F(50-50)
Azimuth	Ave. Elev.	Effective	ERP	Distance to
°T.	3 to 16 km	Antenna Height	(dBk)	60 dBu Contour
	Meters AMSL	Meters AAT		km
0	1461.2	647.6	19.868	93.3
5	1468.0	640.8	19.868	93.0
10	1469.4	639.4	19.868	93.0
15	1465.8	643.0	19.868	93.1
20	1460.2	648.6	19.868	93.3
25	1452.7	656.1	19.868	93.6
30	1454.8	654.0	19.868	93.6
35	1454.7	654.1	19.868	93.6
40	1455.7	653.1	19.868	93.5
45	1459.5	649.3	19.868	93.4
50	1461.6	647.2	19.868	93.3
55	1465.2	643.6	19.868	93.2
60	1467.0	641.8	19.868	93.1
65	1469.1	639.7	19.868	93.0
70	1472.1	636.7	19.868	92.9
75	1475.9	632.9	19.868	92.7
80	1477.8	631.0	19.868	92.7
85	1483.0	625.8	19.868	92.5
90	1491.2	617.6	19.868	92.2
95	1495.9	612.9	19.868	92.0
100	1497.3	611.5	19.868	91.9
105	1498.5	610.3	19.868	91.9
110	1501.0	607.8	19.868	91.8
115	1504.7	604.1	19.868	91.7
120	1505.5	603.3	19.868	91.6
125	1509.9	598.9	19.868	91.5
130	1516.1	592.7	19.868	91.2
135	1515.1	593.7	19.868	91.3
140	1526.1	582.7	19.868	90.8
145	1532.1	576.7	19.868	90.6
150	1538.3	570.5	19.868	90.3
155	1539.4	569.4	19.868	90.3

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ERP =	97.0 kW		FM - 2-6 Tables	
Azimuth	Ave. Elev.	Effective		F(50-50)
°T.	3 to 16 km	Antenna Height	ERP	Distance to
	Meters AMSL	Meters AAT	(dBk)	70 dBu Contour
				km
160	1543.9	564.9	19.868	90.1
165	1538.9	569.9	19.868	90.3
170	1532.2	576.6	19.868	90.6
175	1529.3	579.5	19.868	90.7
180	1519.7	589.1	19.868	91.1
185	1515.9	592.9	19.868	91.2
190	1510.5	598.3	19.868	91.4
195	1508.8	600.0	19.868	91.5
200	1504.3	604.5	19.868	91.7
205	1506.3	602.5	19.868	91.6
210	1505.1	603.7	19.868	91.6
215	1502.4	606.4	19.868	91.7
220	1499.6	609.2	19.868	91.9
225	1497.6	611.2	19.868	91.9
230	1496.3	612.5	19.868	92.0
235	1493.6	615.2	19.868	92.1
240	1489.5	619.3	19.868	92.2
245	1484.8	624.0	19.868	92.4
250	1482.0	626.8	19.868	92.5
255	1480.7	628.1	19.868	92.6
260	1478.7	630.1	19.868	92.6
265	1476.8	632.0	19.868	92.7
270	1474.5	634.3	19.868	92.8
275	1473.3	635.5	19.868	92.8
280	1471.3	637.5	19.868	92.9
285	1469.5	639.3	19.868	93.0
290	1467.2	641.6	19.868	93.1
295	1464.8	644.0	19.868	93.2
300	1464.0	644.8	19.868	93.2
305	1463.0	645.8	19.868	93.2
310	1462.2	646.6	19.868	93.3
315	1459.6	649.2	19.868	93.4
320	1457.3	651.5	19.868	93.5
325	1455.3	653.5	19.868	93.5
330	1451.6	657.2	19.868	93.7
335	1449.0	659.8	19.868	93.8
340	1447.6	661.2	19.868	93.8
345	1449.3	659.5	19.868	93.8
350	1448.6	660.2	19.868	93.8
355	1454.6	654.2	19.868	93.6

**Engineering Statement  
In Support of a Minor Modification  
of a Construction Permit**

**KBRU-FM1, Commerce City, Colorado  
Channel 268**

**Terrain-Contour Study for Booster Facility**

**Reference Coordinates:**

**North Latitude: 39-40-31**

**West Longitude: 104-52-22**

ERP = 20.0 kW		FM - 2-6 Tables		F(50-50)
Azimuth	Ave. Elev.	Effective	ERP	Distance to
°T.	3 to 16 km	Antenna Height	(dBk)	60 dBu Contour
	Meters AMSL	Meters AAT		km
0	1622.4	144.2	13.010	42.7
5	1625.5	141.1	13.010	42.3
10	1627.5	139.1	13.010	42.0
15	1631.6	135.0	13.010	41.0
20	1636.4	130.2	13.010	40.0
25	1641.7	124.9	13.010	39.2
30	1647.9	118.7	13.010	38.4
35	1654.0	112.6	13.010	38.2
40	1658.6	108.0	13.010	38.2
45	1666.1	100.5	13.010	37.3
50	1672.6	94.0	13.010	35.6
55	1677.9	88.7	13.010	33.8
60	1680.3	86.3	13.010	32.3
65	1683.7	82.9	13.010	31.5
70	1691.7	74.9	13.010	29.8
75	1700.2	66.4	13.010	29.1
80	1704.4	62.2	13.010	29.1
85	1710.8	55.8	13.010	28.1
90	1720.4	46.2	13.010	26.0
95	1722.4	44.2	13.010	25.3
100	1728.4	38.2	13.010	23.5
105	1737.1	29.5	13.010	20.6
110	1746.8	19.8	13.010	20.1
115	1756.1	10.5	13.010	20.2
120	1758.8	7.8	13.010	20.3
125	1759.9	6.7	13.010	20.9
130	1758.0	8.6	13.010	21.5
135	1754.7	11.9	13.010	21.2
140	1749.9	16.7	13.010	20.6
145	1736.0	30.6	13.010	20.7
150	1726.6	40.0	13.010	23.3
155	1729.7	36.9	13.010	22.9

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ERP =	20.0 kW	FM - 2-6 Tables		F(50-50)
Azimuth	Ave. Elev.	Effective	ERP	Distance to
°T.	3 to 16 km	Antenna Height	(dBk)	70 dBu Contour
	Meters AMSL	Meters AAT		km
160	1736.0	30.6	13.010	21.5
165	1740.5	26.1	13.010	21.0
170	1748.1	18.5	13.010	20.7
175	1753.5	13.1	13.010	19.9
180	1755.0	11.6	13.010	19.2
185	1752.0	14.6	13.010	17.6
190	1745.0	21.6	13.010	15.9
195	1737.9	28.7	13.010	13.4
200	1729.2	37.4	13.010	11.6
205	1726.9	39.7	13.010	9.2
210	1716.5	50.1	13.010	5.5
215	1704.5	62.1	13.010	7.3
220	1693.0	73.6	13.010	9.1
225	1681.9	84.7	13.010	9.5
230	1675.7	90.9	13.010	9.1
235	1670.0	96.6	13.010	9.0
240	1663.8	102.8	13.010	8.8
245	1656.3	110.3	13.010	8.7
250	1650.7	115.9	13.010	8.4
255	1646.5	120.1	13.010	9.0
260	1642.0	124.6	13.010	9.7
265	1642.6	124.0	13.010	9.9
270	1641.4	125.2	13.010	10.2
275	1637.6	129.0	13.010	10.3
280	1635.6	131.0	13.010	10.4
285	1631.1	135.5	13.010	10.3
290	1625.1	141.5	13.010	10.3
295	1621.9	144.7	13.010	10.4
300	1621.7	144.9	13.010	10.4
305	1620.8	145.8	13.010	9.9
310	1621.0	145.6	13.010	9.4
315	1619.8	146.8	13.010	9.4
320	1619.0	147.6	13.010	9.5
325	1618.5	148.1	13.010	21.1
330	1619.3	147.3	13.010	27.4
335	1619.2	147.4	13.010	33.3
340	1617.4	149.2	13.010	38.2
345	1617.9	148.7	13.010	40.2
350	1618.3	148.3	13.010	42.1
355	1619.9	146.7	13.010	42.4



**KBRU-FM1**  
**Commerce City, Colorado**  
**Amendment of**  
**Service Contour Map**

60 dBu Contour for Booster

Main Facility

KBRUFM.C

Commerce City

Denver

KBRU-FM1

Proposed Booster Facility

60 dBu Contour for Main

Jefferson

Douglas

Arapahoe

Adams

Elbert

Boulder

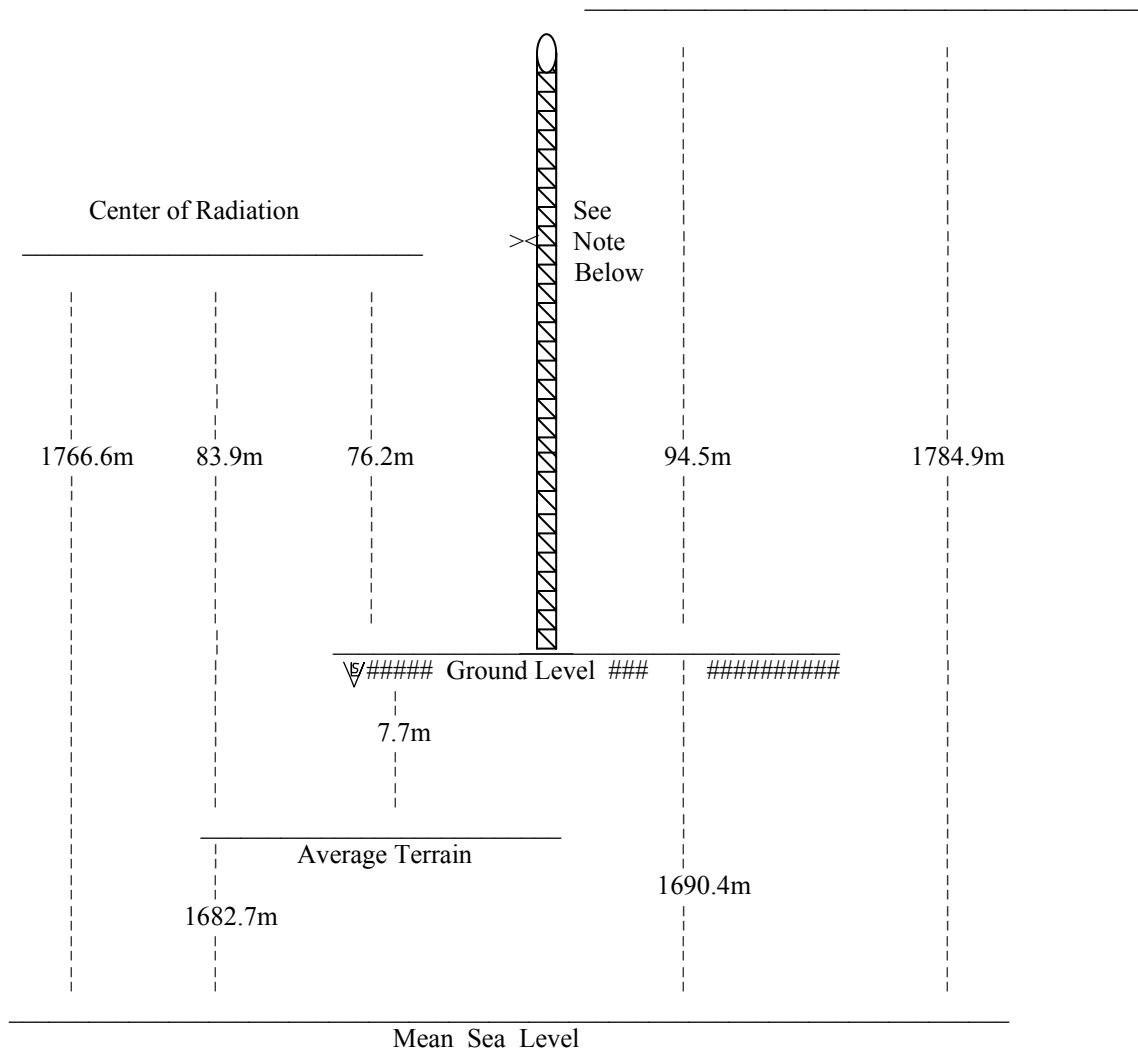
Gilpin

Morg

**Exhibit E, Figure 3**

Scale 1:750,000





Proposed Location - 39° 40' 31" N. Lat. 104° 52' 22" W. Long. [NAD 27]

NOT DRAWN TO SCALE

Proposed antenna - Shively Labs, 6016-1/3

Antenna Structure Registration Number: 1201368

Note: The antenna is being proposed to be used as a common antenna (shared with proposed KSIR-3 with the same ERP).

**Engineering Statement**  
**In Support of an Application to**  
**Modify a Construction Permit**

**KBRU-FM1, Commerce City, Colorado**

**Human Exposure To Radiofrequency Radiation Study**

<u>CALL</u>	<u>Service</u>	<u>Channel</u>	<u>Freq.</u>	<u>Polori- zation</u>	<u>Antenna Height* (AGL)</u>	<u>ERP (kW)</u>	<u>Relative Field Factor</u>	<u>Vertical Predicted Power Density (mW/cm<sup>2</sup>)</u>	<u>FCC Uncontrolled Limit (mW/cm<sup>2</sup>)</u>	<u>Percent of Uncontrolled Limit</u>
KBRU-FM1	FB	268	101.5	H&V	76	20.000	1.000	0.0311035	0.200	15.5518%
KSIR-3	FB	296	107.1	H&V	76	20.000	1.000	0.0311035	0.200	15.5518%

Total Percentage of ANSI (uncontrolled) value = 31.104%

\* The antenna height indicated above is 2 meters less than the actual antenna height so that the predicted power density consider the 2 meter human height allowance.

The tabulation of elevation pattern for the antenna for each facility was used to determine the power density for each. Furthermore, the highest field between the depression angles of 70 and 90 degrees were used. At a depression angle of 70 degrees or less, the inclination of the angle would place the area of concern 2 meters above ground level. The power density for the FM facility was determined by use the following formula:

$$(33.41 * \text{Total ERP in kW considering the elevation pattern tabulations}) / (\text{COR in meters} - 2 \text{ meter})^2$$

The KBRU-FM1 facility proposes to use a Shively Labs 6016-1/3 antenna (single level, 3 panel) mounted 76 meters above ground level with 20 kw. ERP. It was determined that 70 degrees was the highest between 70 and 90 degrees by using tabulations of vertical field provided by Shively Labs. ) is 0.357. The power density at 70 degrees was computed to be 36.835  $\mu\text{W}/\text{cm}^2$ .

The KSIR-3 facility proposes to use a Shively Labs 6016-1/3 antenna (single level, 3 panel) mounted 76 meters above ground level with 20 kw. ERP. It was determined that 70 degrees was the highest between 70 and 90 degrees by using tabulations of vertical field provided by Shively Labs. ) is 0.357. The power density at 70 degrees was computed to be 36.835  $\mu\text{W}/\text{cm}^2$ .

As demonstrated, the total percentage of the ANSI values, considering the radiation of the proposed combined facilities on the supporting structure of the study site is 31.104% of the limit for the “uncontrolled” environments and 6.22% of the limit for the “controlled” environments.

Attached is documentation of the vertical relative field for KBRU-FM1 and KSIR-3 provided by Shively Labs.