

KBPI (FM), Denver, Colorado  
Facility ID No: 29731  
Jacor Broadcasting of Colorado, Inc.  
Comprehensive Engineering Exhibit  
**Minor Modification of Construction Permit**  
**BPH-20061116ACX**  
November 6, 2007

This application is for minor modification of construction permit BPH-20061116ACX (the "CP") for KBPI(FM), Denver, Colorado. Due to a change in plans, the CP facility has not, and will not, be constructed. Instead, KBPI will continue to operate with technical facilities as authorized in its current license, BLH-19851120KC. This application is being filed to correct the coordinates and elevations to match the Antenna Structure Registration of the support tower, which is the same tower specified in the outstanding CP.

The tower is described by Antenna Structure Registration Number 1044149. The antenna is 99 meters above ground level.

As with the granted CP, this application seeks classification of KBPI as a Class C0 facility. The height above average terrain ("HAAT") has been calculated in accordance with the "Joint Engineering Statement" attached hereto, which was previously submitted with File No. BPH-20061116ACX. From the location specified in this application, KBPI is fully spaced as a Class C0 facility in accordance with Section 73.207 to all known facilities, applications and allocations.

### **Protection of Table Mountain Radio Receiving Zone**

As this application seeks no physical modification of presently authorized facilities, there will be no change in the RF environment in regards to the Table Mountain Radio Receiving Zone.

### **Blanketing**

As this application seeks no physical modification of presently authorized facilities, there will be no change in the blanketing effects caused by this application.

### **Radio Frequency Radiation Study and Statement**

As this application seeks no physical modification of presently authorized facilities, there will be no change in the RF environment near the tower caused by this application. Attached as part of this exhibit is the RF exhibit from the most recent license renewal application, dated November 3, 2004.

# KBPI-FM

## RF Exposure Measurements

November 3, 2004

Although KBPI-FM, FCC Facility ID 29739, is not eligible to use the "RF Exposure Worksheet", the facility does comply with the FCC established guidelines regarding exposure to RF electromagnetic fields as described in OET Bulletin 65 Edition 97-01. The alternate method for showing compliance is described below.


### **Facilities:**

KBPI-FM utilizes a Harris Model FMH-6BC antenna, manufactured by ERI. The antenna has six sections, is circularly polarized and is side mounted on a 135 meter self supporting tapered steel tower, with a center of radiation of 99 meters above ground level. KBPI-FM is licensed for an ERP (H & V) of 100 kW. KBPI-FM operates on a common tower which also supports KALC-FM, KWGN-TV (analog), KWGN-TV (HD), KCEC-TV, K57BT-TV, KTFD-LP-TV. KFMD-FM has a tower located less than 70 meters from the KBPI-FM tower which supports KFMD-FM, KBPI-FM AUX, and KALC-FM STA.

### **General Population/Uncontrolled Exposure:**

To determine the level of RF exposure, measurements were made on November 2, 2005 in all accessible areas at the transmitter site and surrounding areas. A Narda survey meter model 8718B with an A8742D probe was utilized. The probe is calibrated in percent of limit for Controlled Exposure for frequencies ranging from 300KHz to 3.0 GHz. The "Max Hold" setting was used to record the highest levels measured. Measurements were made at 2 meters above the ground while walking the entire area at the site and in the adjacent areas out to a distance of up to 200 meters from the tower base. The maximum RF exposure level measured was below 20% of controlled exposure which equals 100% of the public exposure limit in all locations not fenced to public access, for general population/uncontrolled Exposure. Therefore, KBPI-FM does comply with OET Bulletin 65 Edition 97-01 with regard to General Population/Uncontrolled Exposure.

**Controlled Exposure:** There are no accessible areas on this site which exceed the public limit of 20% of controlled exposure. This statement is based on measurements made with the Narda survey meter using the methods described above. Therefore, KBPI-FM does comply with OET Bulletin 65 Edition 97-01 with regard to controlled Exposure.

  
Jack Lambiotte  
Director of Technical Services  
Clear Channel Denver  
4695 South Monaco Street  
Denver, CO 80237  
303-713-8860 (voice)  
303-713-8894 (fax)

November 3, 2004

**MULLANEY ENGINEERING, INC.**

9049 SHADY GROVE COURT  
GAITHERSBURG, MD 20877

**JOINT ENGINEERING STATEMENT**

**In Support of a Request for  
ALTERNATIVE METHODOLOGY FOR CALCULATION OF HAAT**

**Prepared on Behalf of  
CITICASTERS LICENSES, L.P.  
AND  
JACOR BROADCASTING OF COLORADO, INC.**

NOVEMBER 2006

The instant engineering statement has been prepared on behalf of Jacor Broadcasting of Colorado, Inc. ("Jacor") and Citicasters Licenses, L.P. ("Citicasters") (collectively referred to as "Clear Channel"). Jacor is the licensee of FM broadcast stations KRFX and KBPI, both licensed to Denver, Colorado and Citicasters is the licensee of FM broadcast station KPTT, also licensed to Denver, Colorado (collectively referred to as "the stations"). The stations are each filing an application for construction permit requesting a minor modification of the respective station's facilities. The applications each include a request for reclassification of the station from Class C to Class C0 and, in support of that reclassification, each requests use of an alternative methodology for determining the station's overall height above average terrain (HAAT). As demonstrated herein, use of the alternative methodology will prevent understating the class of the stations, thereby minimizing interference caused and received which would occur were the stations considered to be Class C1 rather than Class C0 as requested herein. The remainder of this statement sets forth the specifics of the requested alternative methodology and presents the engineering basis for its use.

The normal methodology for determining the overall station HAAT is to use the average of the individual radial HAATs for a minimum of eight evenly spaced radials starting at True North. The proposed alternative methodology

is that when the terrain exhibits an extreme amount of variability from radial to radial, up to two of the normal minimum eight radials may be omitted from calculation of the overall station HAAT. To the extent use of such an alternative methodology requires waiver of Section 73.313(d) of the Commission's Rules, it is hereby requested. The criteria proposed for defining what constitutes "an extreme amount of variability" in terrain are laid out below.

When there are extreme variations from radial to radial in the terrain within 3-16 kilometers around a station's transmitter site<sup>1</sup>, including the contribution of all eight radials in the calculation of the station's overall HAAT may result in the class of the station being understated. This can be especially true if one or more of the individual radial HAATs are less than 30 meters<sup>2</sup> (or negative). In such cases the station's service area in most directions would be equivalent to that for a higher class of station than that for which the normally employed 8-radial HAAT would qualify. This would result in creating, in essence, a new group of "grandfathered superpower" facilities. That is, the signal extends significantly further (and out past the class reference distance) than would be predicted by virtue of the normal 8-radial HAAT, but only the equivalent class maximum facilities are protected. This would place a significant portion of the station's **existing service area** at risk of receiving interference from newly allotted/modified stations authorized at the reduced spacing requirements. Likewise, the normally protected service areas for these **newly allotted/modified stations would receive interference** from the existing station in directions of significant terrain advantage.

---

<sup>1</sup> The differences here between the minimum and maximum individual radial HAAT values are over 700 meters - more than double the 8-radial overall HAATs of 237 and 274 meters.

<sup>2</sup> Per §73.313(e) of the Commission's Rules, when the radial HAAT is less than 30 meters (or negative), an HAAT of 30 meters shall be used in calculation of distances to contours.

To provide an objective metric to use in identifying instances of “an extreme amount of variability” in terrain, a statistical analysis of the variation in individual radial HAATs for all FM stations was carried out. This analysis found that for a small number of stations, the standard deviation of the eight default radial HAATs was of the same order of magnitude or even larger than the average of the eight default radial HAATs. The magnitude of the standard deviation (especially compared to the data average) is a primary indication of the dispersion of the data points being analyzed - the larger the standard deviation, the more dispersed the data. That such large standard deviations exist for only a small handful of the thousands of FM stations (and are located in an extremely limited portion of the country) supports the position that the terrain surrounding these stations is highly unusual compared with that for the rest of the country.

The details of the proposed alternative methodology are as follows:

- If the standard deviation for all eight radials is at least 75% of the 8-radial HAAT, then the radial with the lowest individual HAAT is omitted from the overall terrain average and a new 7-radial HAAT is determined.
- If the standard deviation of the remaining seven radials is at least 75% of the 7-radial HAAT, then a second radial (with the lowest remaining individual HAAT) is omitted from the overall terrain average and a new 6-radial HAAT is determined.<sup>3</sup>
- All radials omitted from the HAAT calculation are less than 30 meters (or are negative)

The attached tabulations at Tables 1-3 provide calculation details of applying the alternative methodology to stations KPTT, KRFX, and KBPI.

---

<sup>3</sup> The statistical analysis carried out in preparation of the instant engineering statement revealed that, in all cases, no station that had not already qualified for Class C status with the omission of one or two radials, had a 6-radial standard deviation at least 75% of the 6-radial HAAT. In other words, **under the criteria set forth herein for use of the alternative methodology, no station qualified for omission of more than two radials from its HAAT calculation.**

In summary, reclassification of the stations based upon the normal 8-radial HAAT would not be in the public interest. As demonstrated by the attached maps at Figures 1-3, over most of the respective station's service area, the proposed 60 dBu protected service contour extends almost as far as the class distance for a Class C station. However, based on the normal 8-radial HAAT (237 meters for KPTT/KRFX and 274 meters for KBPI) the stations would be reclassified as Class C1. From the attached maps, it is readily apparent that as Class C1 facilities a significant portion of each station's actual 60 dBu contour would not be protected from interference. By application of the alternative methodology for calculation of HAAT presented herein, the modified HAAT for the stations would be 346 meters for KPTT/KRFX and 382 meters for KBPI. As a result, all three stations would qualify for Class C0 status, thereby limiting the amount of each station's 60 dBu contour subject to potential interference. In addition this would limit the amount of interference the stations might cause to other facilities that were allocated based on the assumption that the stations were operating with Class C1 facilities in the pertinent direction when in fact they are actually operating with facilities somewhat greater than those for a Class C0 station.

The circumstances under which the alternative methodology presented herein would apply are easily and objectively determined, calculation of the alternative HAAT is straightforward, and the number of stations which could potentially qualify to employ the alternative methodology are no more than 12.



Alan E. Gearing, PE



John J. Mullaney

**TABLE 1**

CALCULATIONS FOR PROPOSED KPTT, CH 239, DENVER COLORADO (collocated with KRFX, CH 278)									
	8-radial			7-radial			6-radial		
	Sample Data ( $x$ )	Deviation ( $x - \bar{x}$ )	Deviation Squared ( $x - \bar{x}$ ) <sup>2</sup>	Sample Data ( $x$ )	Deviation ( $x - \bar{x}$ )	Deviation Squared ( $x - \bar{x}$ ) <sup>2</sup>	Sample Data ( $x$ )	Deviation ( $x - \bar{x}$ )	Deviation Squared ( $x - \bar{x}$ ) <sup>2</sup>
	407	170	28900	407	114	12996	407	61	3721
	542	305	93025	542	249	62001	542	196	38416
	545	308	94864	545	252	63504	545	199	39601
	459	222	49284	459	166	27556	459	113	12769
	83	-154	23716	83	-210	44100	83	-263	69169
	-23	-260	67600	-23	-316	99856			0
	37	-200	40000	37	-256	65536	37	-309	95481
	-157	-394	155236			0			0
<b>Sum:</b>	1893		552625	2050		375549	2073		259157
<b>Mean or Average</b> ( $\bar{x}$ )	237			293			346		
<b>Standard Deviation:</b>			281		250			228	
		118.6% of average			85.3% of average			65.9% of average	

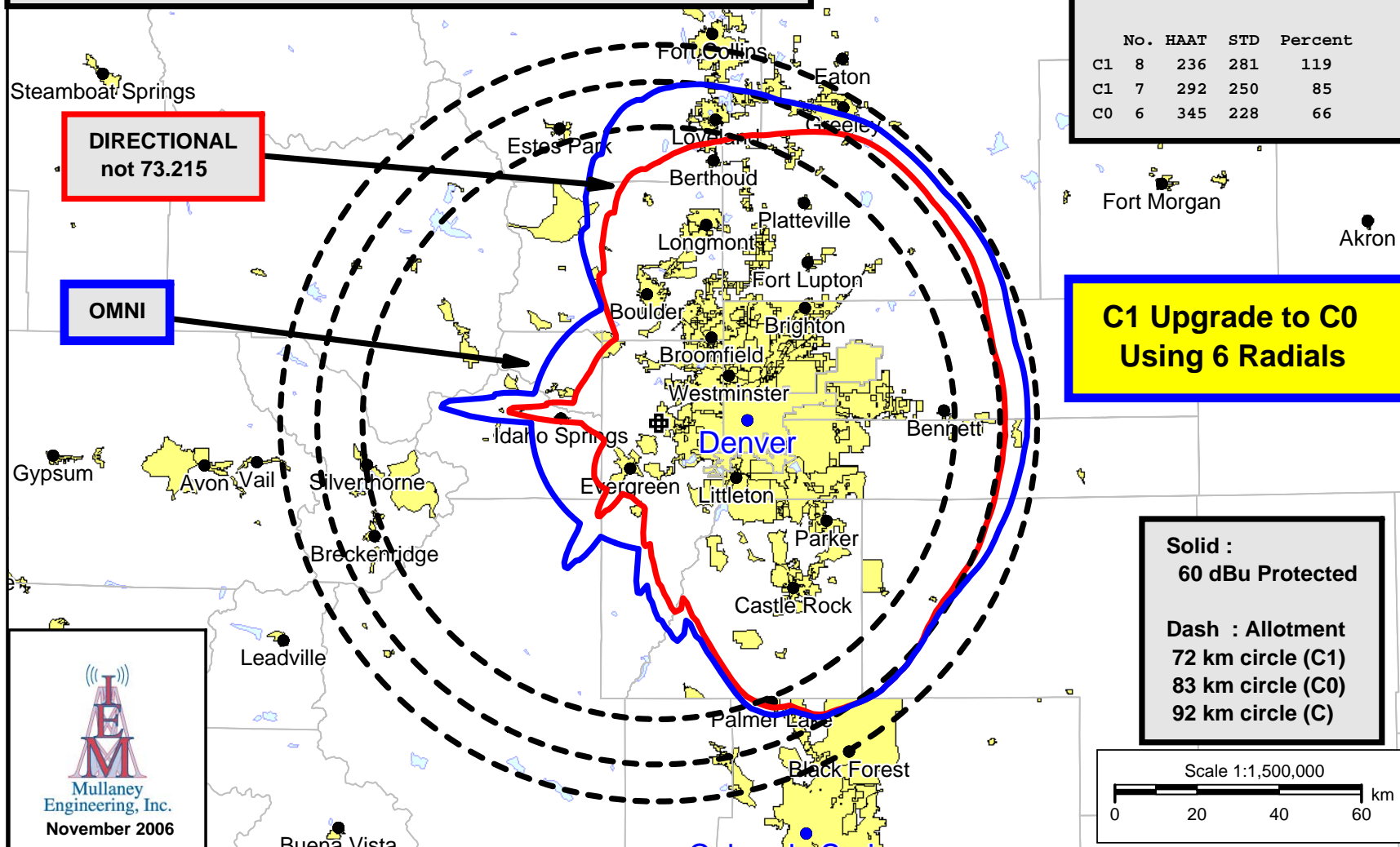
**TABLE 2**

<b>CALCULATIONS FOR PROPOSED KRFX, CH 278, DENVER COLORADO</b> <b>(collocated with KPTT, CH 239)</b>									
	8-radial			7-radial			6-radial		
	Sample Data ( $x$ )	Deviation ( $x - \bar{x}$ )	Deviation Squared ( $x - \bar{x}$ ) <sup>2</sup>	Sample Data ( $x$ )	Deviation ( $x - \bar{x}$ )	Deviation Squared ( $x - \bar{x}$ ) <sup>2</sup>	Sample Data ( $x$ )	Deviation ( $x - \bar{x}$ )	Deviation Squared ( $x - \bar{x}$ ) <sup>2</sup>
	407	170	28900	407	114	12996	407	61	3721
	542	305	93025	542	249	62001	542	196	38416
	545	308	94864	545	252	63504	545	199	39601
	459	222	49284	459	166	27556	459	113	12769
	83	-154	23716	83	-210	44100	83	-263	69169
	-23	-260	67600	-23	-316	99856			0
	37	-200	40000	37	-256	65536	37	-309	95481
	-157	-394	155236			0			0
<b>Sum:</b>	1893		552625	2050		375549	2073		259157
<b>Mean or Average</b> ( $\bar{x}$ )	237			293			346		
<b>Standard Deviation:</b>			281		250			228	
		118.6% of average			85.3% of average			65.9% of average	

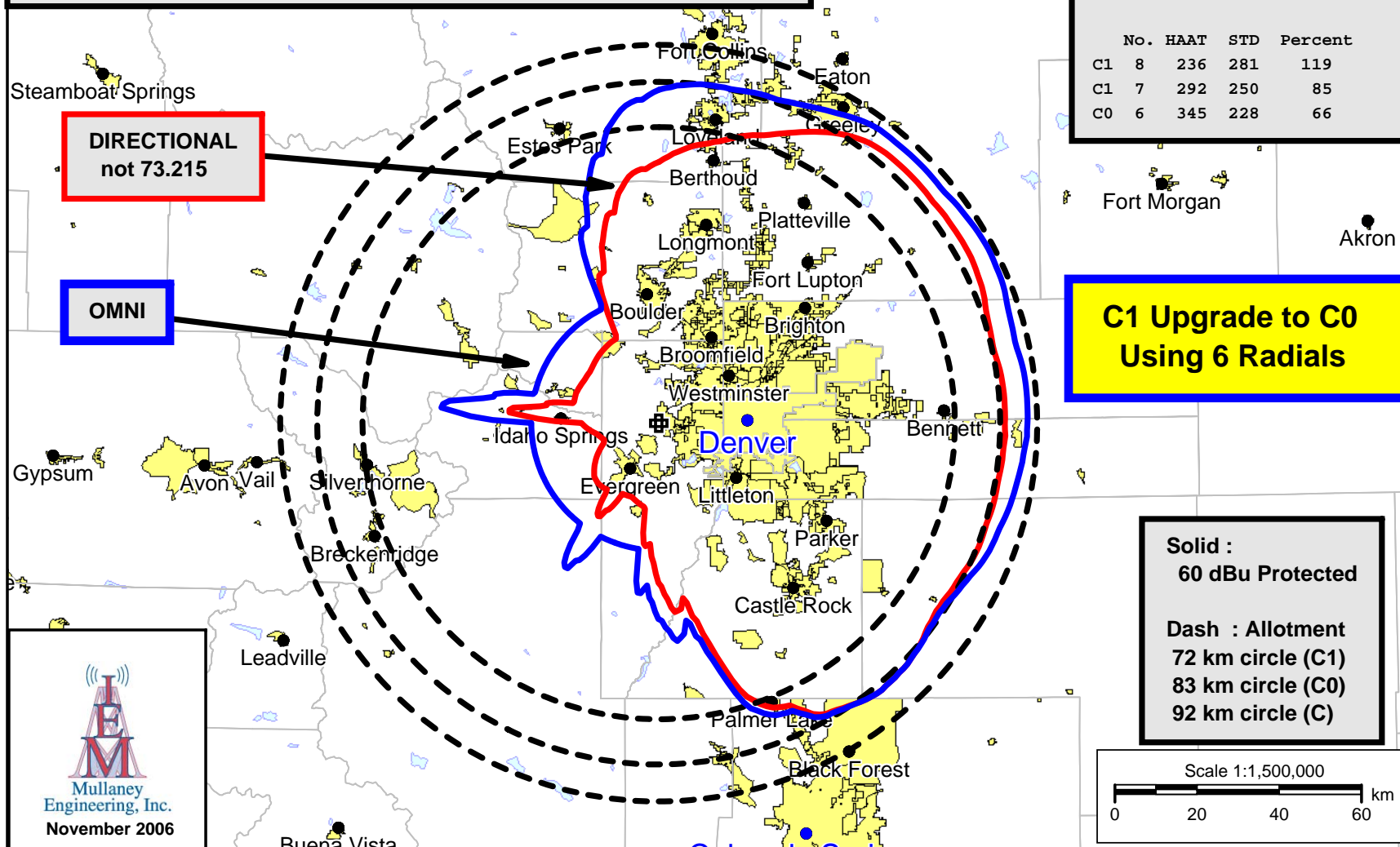
TABLE 3

CALCULATIONS FOR PROPOSED KBPI, CH 294, DENVER COLORADO									
	8-radial			7-radial			6-radial		
	Sample Data (x)	Deviation (x - $\bar{x}$ )	Deviation Squared (x - $\bar{x}$ ) <sup>2</sup>	Sample Data (x)	Deviation (x - $\bar{x}$ )	Deviation Squared (x - $\bar{x}$ ) <sup>2</sup>	Sample Data (x)	Deviation (x - $\bar{x}$ )	Deviation Squared (x - $\bar{x}$ ) <sup>2</sup>
	445	171	29241	445	115	13225	445	63	3969
	578	304	92416	578	248	61504	578	196	38416
	581	307	94249	581	251	63001	581	199	39601
	496	222	49284	496	166	27556	496	114	12996
	121	-153	23409	121	-209	43681	121	-261	68121
	16	-258	66564	16	-314	98596			0
	71	-203	41209	71	-259	67081	71	-311	96721
	-117	-391	152881			0			0
Sum:	2191		549253	2308		374644	2292		259824
Mean or Average ( $\bar{x}$ )	274			330			382		
Standard Deviation:			280		250			228	
		102.2% of average			75.8% of average			59.7% of average	

**FIGURE 1**  
**60 dBu CONTOUR vs: ALLOTMENT CIRCLE**  
**KPTT.App Ch. 239C - Denver, CO**



**FIGURE 2**  
**60 dBu CONTOUR vs: ALLOTMENT CIRCLE**  
**KRFX.app Ch. 278C - Denver, CO**



**FIGURE 3**  
**60 dBu CONTOUR vs: ALLOTMENT CIRCLE**  
**KBPI.APP Ch. 294C - Denver, CO**

