

**LCG-----RF INCREASE OR DECREASE?**

**RF INCREASES OVER 270 DEGREE ARC AROUND  
TOWER:**

**1936 RESIDENCES WITHIN 2 MILES**

**RF DECREASES OVER 90 DEGREE ARC TO WEST OF  
TOWER:**

**304 RESIDENCES WITHIN 2 MILES**

**MANY MORE RESIDENCES WOULD EXPERIENCE  
INCREASE THAN DECREASE**

**RESIDENTIAL INFORMATION PROVIDED BY COUNTY  
ASSESSOR'S OFFICE**

## **RF Increase or Decrease Overall**

The question has been raised as to whether the LCG proposal would result in an “overall” increase or decrease in RF radiation. Mr. Hart stated at the LCG hearing that the RF radiation would go down overall, whereas I believe it would go up. This difference of opinion may have been due to the fact that Mr. Hart did not consider where RF might be decreasing or increasing. My calculations indicate that the LCG proposal would result in RF decreases in some areas and increases in others. Those areas where RF power densities decrease have few exposed residences, whereas many areas where RF would increase are heavily populated.

Ideally, in order to determine whether the LCG proposal would increase or decrease “overall” RF levels with respect to populated areas, one would calculate RF power densities for conditions both “before” and “after” implementation of the LCG proposal for every residence and business (or perhaps for every building). Since all other emitters in the area would remain the same (or at least not change on account of the LCG proposal), calculations would involve no emitters other than the four existing LCG emitters and the eight proposed LCG emitters. The amounts of the increases or decreases for all the buildings would then be totaled, and the result would either be positive or negative, yielding the answer as to whether RF would go up or down overall. Thus, the RF increases and decreases would be “integrated” over the populated areas surrounding the proposed tower. For example, if ten homes experienced an RF increase of 1 microwatt/cm<sup>2</sup>, and one home experienced a decrease of 10 microwatt/cm<sup>2</sup>, the proposal would be considered RF “neutral,” having no net RF increase or decrease.

The performance of such an extensive series of calculations would be a daunting task, especially considering the limited time before the next scheduled hearing. However, some very reasonable conclusions can be obtained from a limited number of calculations and observations.

The accompanying map shows a circle of 2 mile radius centered at the proposed LCG tower site. Radiating from the LCG site are shown the relative field lines typical of the directional LCG antenna patterns. The lengths of the lines represent the strength of the fields in the direction of the lines.

One can see that in the quadrant extending from 225 degrees to 315 degrees, the field lines are short. In this quadrant, one would expect RF power reductions from Channels 7 & 9, whose antenna patterns would be converted from omnidirectional to directional on the proposed tower. New stations that would be added as a result of the proposal would also be expected to produce reduced additional RF power density in this quadrant. One thing that is evident from the map is that there are few roads in this quadrant. Another feature of this quadrant is variability in exposure to the antennas. Some homes high on Colorow Road currently have high exposures and would benefit from the directional antennas, but many of the roads in this quadrant are shadowed from the towers by intervening terrain, and would not benefit from reductions suggested by the new proposal. This can be verified by viewing terrain profiles on a computerized TOPO map.

In the other three quadrants, extending clockwise from 315 degrees to 225 degrees, the radial field lines are long, indicating high field strengths in those directions. In those three quadrants (and certainly between 340 degrees and 200 degrees), the azimuthal directionality of the antennas does not contribute significantly to decrease RF power densities. Thus, with the increased effective radiated power levels in these three quadrants, one would expect the groundlevel RF power densities to increase in three of the four quadrants surrounding the proposed LCG tower.

It should be noted that the addition of four new DTV transmitters in the LCG proposal can *in no way* contribute to a reduction in RF levels anywhere.

In order to test the above claims, detailed calculations were performed at 16 points (number of points limited by the available time) at various places surrounding the proposed LCG tower. All points represent existing residences or institutions. Points were picked both on top of Lookout Mountain and at institutions and populated areas of interest in the Golden area below. Calculations include the five previously verified points to the south of the LCG proposed tower, which were intended to demonstrate the large area over which RF levels increased greatly. Points also were included such as those at the Boettcher Mansion and on Cedar Lake Road and Colorow Road, which were expected to show the greatest RF reductions due to the LCG proposal. The calculation details and a comparison sheet are included with this report. The comparison sheet also includes the azimuth angle from the proposed LCG tower to the calculation point.

## **OBSERVATIONS REGARDING RESULTS OF THE CALCULATED RF INCREASES AND DECREASES AND POPULATION DISTRIBUTION**

No points within the three quadrants clockwise from 315 degrees to 225 degrees were found that had reduced RF power densities. All points that had calculated reductions of RF power densities were within the 225 to 315 degree quadrant.

One point within the 225 to 315 degree quadrant (Cody Park) actually had an increase when a decrease was expected. This was due to Line-Of-Sight blockages of some antennas, both existing and proposed.

The populated area with the highest RF increases extended from azimuth angles 183 to 212 degrees. A large number of homes in the area around Mountsfield Drive in Panorama Estates, and Paradise Road, Cabrini Blvd, and Dekker Drive in Paradise Hills would experience significant RF increases similar to those calculated for representative residences in those areas.

The County Assessor's office has provided a map and analysis of the number of residential structures surrounding the tower site. The Assessor's data states that within a 2 mile radius, there are 304 residences within the "reduced RF" 225-315 degree quadrant, and that there are 1936 residences within the other three quadrants that would experience an RF increase.

## CONCLUSIONS

It is evident from viewing the map and the calculation comparison sheet that any significant RF reductions are limited to the 225 to 315 degree quadrant where only 304 residences exist within a 2 mile radius. RF increases are experienced in the other three quadrants that have 1936 residences within a 2 mile radius. Clearly, with respect to populated areas (and even unpopulated areas) RF levels are going up overall.

I may be accused of deliberately picking calculation points that are guaranteed to prove my assertion, so I invite others to pick an equal or greater number of similarly dispersed exposed residences or institutions to determine whether RF levels go up or down overall.

## ADDENDUM

It is likely that Lake Cedar Group will submit a report purporting to prove that RF levels will decrease overall as a result of LCG's proposal. If this is the case, care should be taken to ensure that all the "improvements" claimed are solely the result of implementation of the LCG proposal. In LCG's RF emissions study (LCG Exhibit 17), LCG "took credit" for several recently completed or anticipated improvements to FM antennas on Lookout Mountain that were not associated with LCG's proposal. Relocations of, and changes to, FM antennas should not be included in any analysis of the LCG proposal. Specifically, relocation of KRFX-FM from the Channel 4 tower to the Clear Channel tower should not be included in the analysis, as KRFX has applied to the FCC for a construction permit on the Clear Channel tower regardless of the outcome of the LCG rezoning proposal. Further, the relocation of KRMA Channel 6 and the two associated FM stations should also not be considered in the analysis, as those stations are no longer part of the LCG proposal, and will be moving to Mount Morrison regardless of the outcome of the LCG rezoning proposal. The before/after radiation level maps provided as part of LCG's rezoning application are no longer valid due to the fact that they include the effects of improvements to several Lookout Mountain FM antennas and relocation of the KRMA-TV, KUVO-FM, KVOD-FM & KRFX-FM, all of which are not part of the current LCG proposal.

Again, any analysis of changes of RF power densities due to the LCG proposal should be based solely on the changes to the four existing LCG stations and the addition of four more proposed LCG DTV stations. Detailed calculations and data such as those submitted with this report should be submitted with any analysis in order to facilitate verification.

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