



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
RADIO AND TELEVISION

WILLIAM F. HAMMETT, P.E.
DAN E. ERICKSEN, P.E.
STANLEY SALEK, P.E.
MARK D. NEUMANN, P.E.
ROBERT P. SMITH, JR.
RAJAT MATHUR, P.E.
FERNANDO DIZON
ROBERT L. HAMMETT, P.E.
1920-2002
EDWARD EDISON, P.E.

BY E-MAIL ERICD@SUTROTOWER.COM

July 10, 2009

Mr. Eric Dausman
Vice President
Sutro Tower, Inc.
One La Avanzada Street
San Francisco, California 94131-1124

Dear Eric:

As you requested, we have performed a new set of measurements of existing RF levels at 208 locations within 1,000 feet of Sutro Tower for the DTV auxiliary antenna operation. An electronic copy of our summary report is attached.

The measurements have been conducted in accordance with the conditions suggested by Sutro Tower as part of the original DTV transmitting facilities project. All of the requirements contained in the 1997 Proposed Sutro Tower Agreement were met. At all points, the maximum ambient RF levels were well below the prevailing standard and, at the 26 reference locations used in the previous reports, all measurements were less than the calculated values.

Also of note, and included in the body of our report, the RF exposure levels at all but one of the 26 reference points are less than those measured during the last set of measurements done in June 2006.

We appreciate the opportunity to be of continuing service and would welcome any questions on this material. Please let us know if we may be of any additional assistance.

Sincerely,

Mark D. Neumann

tm

Enclosures

cc: Mr. Eugene Zastrow (w/encls) – BY E-MAIL GENEZ@SUTROTOWER.COM

e-mail: mneumann@h-e.com
US Mail: Box 280068 • San Francisco, California 94128
Delivery: 470 Third Street West • Sonoma, California 95476
Telephone: 707/996-5200 San Francisco • 707/996-5280 Facsimile • 202/396-5200 D.C.

Sutro Tower, Inc. • San Francisco, California

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained by Sutro Tower, Inc. to evaluate RF exposure levels at the Sutro Tower broadcast site, 1 La Avanzada Street, San Francisco, California, for compliance with appropriate guidelines limiting human exposure to radio frequency electromagnetic fields.

Background Information

Sutro Tower is located near Mt. Sutro in San Francisco, California, and currently supports the transmitting facilities for eleven DTV stations and four FM stations. As part of the final DTV antenna installation project, Sutro Tower agreed to provide measurement data of existing RF exposure levels at 200 locations within a 1,000-foot radius of the tower within six months of the activation of any new DTV antenna and every three years thereafter. The auxiliary antenna facilities for all eleven stations are now operational and measurements have been made on these antennas, which will be utilized during installation of the new main DTV antennas. Although not specifically required by the conditions of approval, the measurement results have been reviewed under three criteria:

1. Compare measured RF levels to the calculations provided in the EIR at 26 previously identified reference points
2. Identify any locations with RF levels at or above 5% of the FCC standard
3. Identify any localized fields in excess of the standard.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission (“FCC”) evaluate its actions for possible significant impact on the environment. In Docket 93-62, effective October 15, 1997, the FCC adopted the human exposure limits for field strength and power density recommended in Report No. 86, “Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements (“NCRP”). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, “Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” includes similar exposure limits. A summary of the FCC’s exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.



Sutro Tower, Inc. • San Francisco, California

Measurement Procedure

The site was visited by the undersigned engineer and by Rajat Mathur, P.E., a qualified engineer employed by Hammett & Edison, Inc., on July 1, 2009. Measurements were made at 208 locations along all residential streets within a 1,000-foot radius of Sutro Tower, as shown by the purple dots on Figure 2. Measurements were taken at a typical spacing of about 60–75 feet along the streets, although variations occurred due to topography and street layout. Measurements were made using a Wandel & Goltermann Type EMR-300 Radiation Meter (Serial No. AR-01258) with Type 8 and 25 Isotropic Electric Field Probes (Serial Nos. P-0036 and E-0001, respectively), last calibrated by the manufacturer on May 7, 2009, June 5, 2008, and May 6, 2009, respectively.

Measurement Results

1. RF power density calculations had been made on a 500-by-500 meter grid centered on Sutro Tower using the final auxiliary antenna operating specifications as provided below. Calculations were made using U.S.G.S. 10-meter terrain data with calculation points in five-meter increments. Previous measurement reports for Sutro Tower have provided a comparison between calculated values to measured results at 26 reference points shown by the circled purple dots in Figure 2. Measurements results at those 26 points versus the maximum calculated values within 5 meters of the measurement location based upon the calculation grid size are provided in Figure 3.
2. Power density levels in excess of 5% of the FCC standard for public exposure were noted at Summit Reservoir (Maximum = 13.2% of public limit) and on the street in the following two areas:
 - End of Farview Court (Maximum = 7.35% of public limit)
 - In area of 521 Dellbrook Avenue (Maximum = 5.3% of public limit)
3. There were no localized fields observed in excess of the FCC standard.
4. The most recent modifications at Sutro Tower are the first phase of a wholesale reconfiguration of the Sutro Tower television broadcasting facilities. For comparison, Figure 3 provides the last set of measurement results (made on June 30, 2006) under the previous configuration of ten full-service analog television stations and eleven full-service DTV stations operating from the interim antenna below Level 6 on the tower. Of note, RF levels at all but one of the 26 reference locations were lower under the auxiliary antenna operation versus those July 2006 measurements.



Sutro Tower, Inc. • San Francisco, California

The final specifications of the auxiliary antennas as operating during the July 1, 2009, measurements are as follows:

Station	Channel	Effective Radiated Power	Antenna Make & Model	COR Ht AMSL
KGO-DT	D07	72 kW	Dielectric THV-5A7-R C170	317.4 m
KOFY-DT	D19	500	Dielectric TUA-C4SP-12/40U-1-S	402.3
KPIX-DT	D29	500	Dielectric TUA-C4SP-12/40U-1-S	402.3
KQED-DT	D30	500	Dielectric TUA-C4SP-12/40U-1-S	387.8
KMTP-DT	D33	500	Dielectric TUA-C4SP-12/40U-1-S	387.8
KFSF-DT	D34	250	Dielectric TUA-C4SP-12/40U-1-S	402.3
KRON-DT	D38	500	Dielectric TUA-C4SP-12/40U-1-S	402.3
KCNS-DT	D39	500	Dielectric TUA-C4SP-12/40U-1-S	387.8
KCSM-DT	D43	500	Dielectric TUA-C4SP-12/40U-1-S	387.8
KTVU-DT	D44	500	Dielectric TUA-C4SP-12/40U-1-S	402.3
KBCW-DT	D45	500	Dielectric TUA-C4SP-12/40U-1-S	387.8

Conclusion

It is my professional opinion that the measurements reported above comply with the requirements of the project proposal. Further, it is my professional opinion that the TV and FM broadcast stations at Sutro Tower continue to comply with prevailing standards for limiting public exposure to radio frequency energy.

Figures

In carrying out these engineering studies, the following attached figures were prepared under my direct supervision:

1. Summary of FCC RF exposure guidelines
2. Map showing measurement locations and calculation grid
3. Comparison of measurements with calculated power density levels.

July 10, 2009



Mark D. Neumann
Mark D. Neumann, P.E.

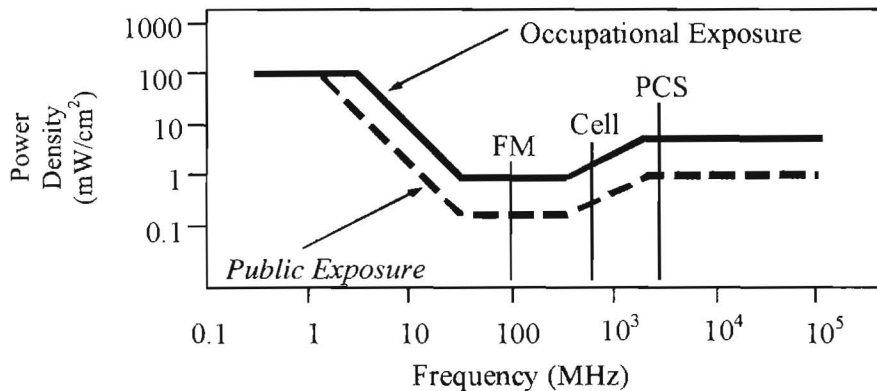


FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, “Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements (“NCRP”). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, “Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

Frequency Applicable Range (MHz)	Electromagnetic Fields (f is frequency of emission in MHz)					
	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm ²)	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/ f	<i>823.8/f</i>	4.89/ f	<i>2.19/f</i>	900/ f ²	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√f	<i>1.59√f</i>	√f/106	<i>√f/238</i>	f/300	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>

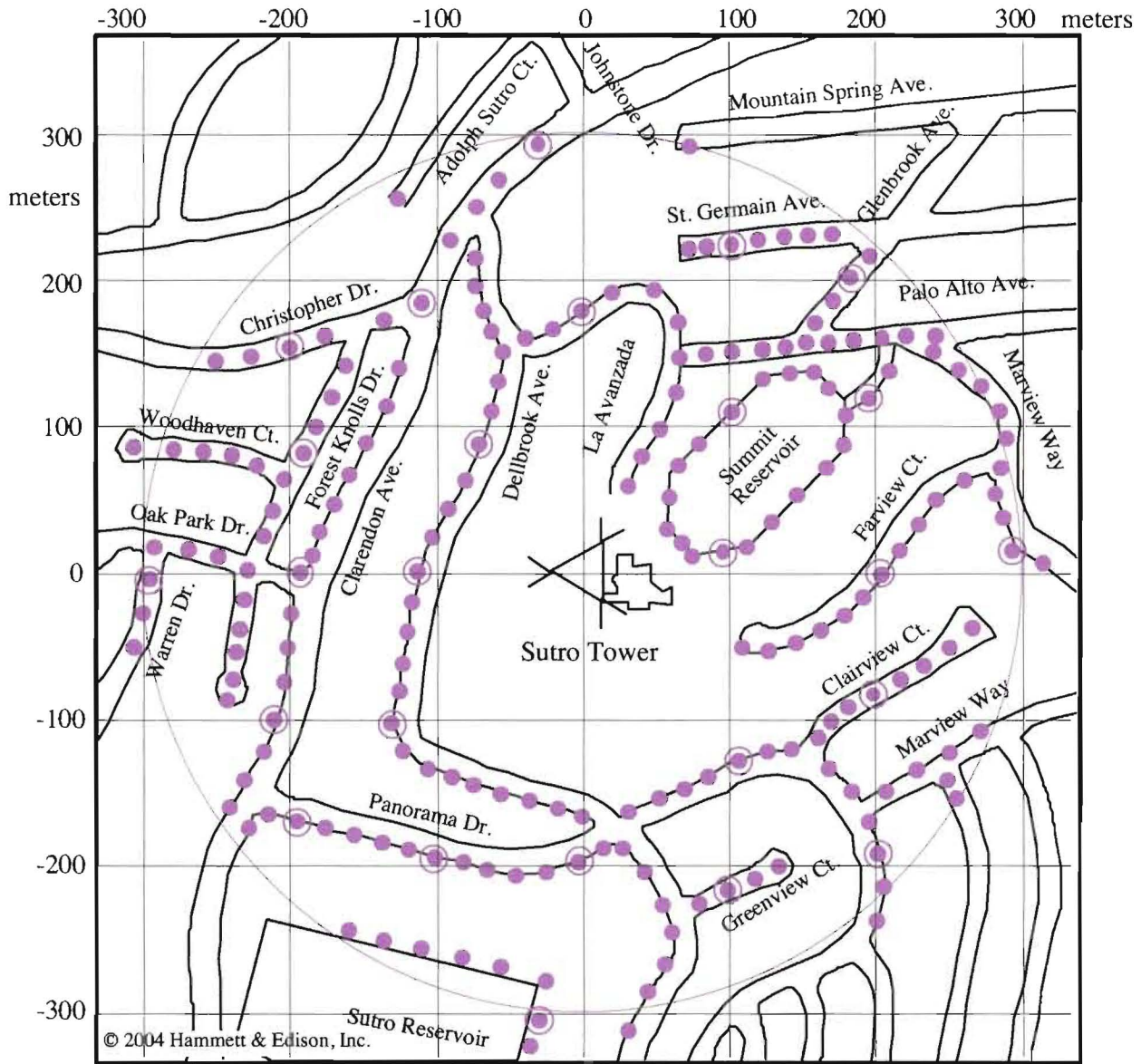


Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.



Sutro Tower, Inc. • San Francisco, California

Calculation and Measurement Locations



Purple circle represents 1000-foot radius from Sutro Tower.
Purple dots denote measurements taken July 1, 2009.
Circled purple dots are reference locations used for comparison with calculations in Figure 3.

Sutro Tower, Inc. • San Francisco, California

**Comparison of Measured vs. Calculated RF Power Density
for Auxiliary Antenna Operations**

Calculated* Power Density	Nearby Street Address	Measured† Power Density	Measured less than Calculated?	June 30, 2006 Measurements‡
0.46%	5 Warren Drive	0.21%	yes	1.62%
0.85%	15 Christopher Drive	0.37%	yes	3.32%
0.78%	38 Forest Knolls Drive	0.59%	yes	2.81%
0.64%	Clarendon Avenue at Oak Park	0.35%	yes	2.45%
0.62%	Clarendon 150 ft north of Panorama	0.20%	yes	1.72%
0.69%	791 Panorama Drive	0.28%	yes	3.18%
1.44%	Clarendon at Christopher Drive	0.48%	yes	2.69%
3.35%	559 Dellbrook Avenue	2.25%§	yes	2.1%§**
2.25%	507 Dellbrook Avenue	1.00%	yes	3.06%
1.59%	465 Dellbrook Avenue	0.97%	yes	3.18%
1.42%	737 Panorama Drive	0.65%	yes	3.32%
2.24%	Clarendon near Johnstone Drive	0.18%	yes	0.58%
5.11%	La Avanzada	0.20%	yes	1.92%
4.54%	705 Panorama Drive	0.51%	yes	4.01%
2.21%	Sutro Reservoir	0.24%	yes	1.72%
2.24%	160 St. Germain Avenue	0.37%	yes	2.34%
6.37%	Summit Reservoir (northwest edge)	2.86%	yes	8.49%
14.07%	Summit Reservoir (south edge)	5.20%§	yes	7.00%§
7.30%	630 Panorama Drive	2.84%	yes	6.50%
2.21%	17 Greenview Court	0.76%	yes	4.50%§
3.22%	100 Glenbrook Avenue	2.67%	yes	3.73%
3.38%	Summit Reservoir (northeast path)	3.21%	yes	5.00%
5.05%	48 Farview Court	0.80%	yes	5.75%§
2.64%	27 Clairview Court	0.92%	yes	5.10%§
2.54%	546 Panorama Drive	1.30%	yes	6.65%§
3.38%	173 Marview Way	0.96%	yes	3.18%

* Calculations based upon operation of DTV auxiliary antennas at the time of measurements (see Report), expressed as percent of FCC public limits.

† Measurements taken on July 1, 2009, June 30, 2006, and November 13, 2003 expressed as percent of most restrictive FCC limit of 0.2 mW/cm², except as noted.

‡ Operation of ten analog and eleven digital TV stations on main facilities. Plus four FM stations.

§ Percentage of applicable public limit for frequencies involved. Type 25 frequency-shaped probe used.

** Based on November 13, 2003 measurements. No shaped probe measurements were made in June 2006 at this location.

