Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained by Sutro Tower, Inc., to evaluate the addition of several radio facilities on the Sutro Tower in San Francisco, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Executive Summary

Sutro Tower is the principal broadcast site serving San Francisco, supporting operations for eleven TV stations and four FM stations as well as a number of other communications facilities. It is proposed to install several additional antennas on the tower; their operation will, together with the existing facilities on the tower, comply with the FCC guidelines limiting public exposure to RF energy.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission ("FCC") evaluate its actions for possible significant impact on the environment. 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. The most restrictive FCC limit for exposures of unlimited duration to radio frequency energy for several wireless services are as follows:

Radio Frequency Service	Frequency Band	Occupational Limit	Public Limit
Microwave (Point-to-Point)	5–80 GHz	5.00 mW/cm^2	1.00 mW/cm^2
WiFi	2–5	5.00	1.00
UHF-TV (Ch 14–51)	470–698 MHz	1.55–2.35	0.31–0.47
VHF-TV (Ch 7–13)	174–216	1.00	0.20
FM	88–108	1.00	0.20

Proposed Changes

It is proposed to relocate one existing antenna on the tower and to install 51 new appurtenances. As listed in more detail in Figure 2, these include two additional TV main broadcast antennas, one additional FM main broadcast antenna, two standby auxiliary antennas, fifteen community broadband antennas, and 13 microwave antennas, along with 16 receive-only antennas, two camera mounts, and a satellite receive dish at ground-level. Thus, the total number of proposed alterations is 52, with 51 of these changes being on the tower itself. The tower elevation sketch in Figure 3 indicates their relative position on the tower.

Study Results

The maximum RF exposure level for a person anywhere at ground near the site has been calculated for each individual transmitting source, based on the information reported here, and these values are listed in Figure 2. The maximum combined contribution from all the additional radio frequency sources would be 3.3% of the applicable public limit, reflecting the fact that the individual maximum levels do not necessarily occur at the same locations. It should be noted that these results include several "worst-case" assumptions and therefore are expected to overstate actual power density levels.

Together with the maximum for the existing operations, the maximum cumulative level would be 6.2% of the applicable public limit, which is less than 13.3% of the public limit that was measured during the DTV transition period, when both analog and digital TV stations were operating. As more detailed information becomes available about the operating parameters of the antennas to be installed, it would be possible to make more precise calculations of the combined ground-level power density. However, those values will be lower than the worst-case numbers shown in this preliminary study.

Once the new antennas have been installed, updated ground measurements would be made both for normal operation on main antennas and for maintenance operation on auxiliary antennas. Because the KOIT(FM) auxiliary antenna has been a large contributor to the ground-level power densities in the neighborhoods around the Sutro Tower, and since that antenna would be substantially increased in height, the measured ground-level power density for the new auxiliary antenna case is expected to show a measurable decrease over the current configuration.

Conclusion

Based on the information and analysis above, it is the undersigned's professional opinion that the proposed modifications to the facilities at the Sutro Tower in San Francisco, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not for this reason cause a significant impact on the environment. The highest calculated level in publicly accessible areas is much less than the prevailing standards allow for exposures of unlimited duration. This finding is consistent with measurements of actual exposure conditions taken near this site.

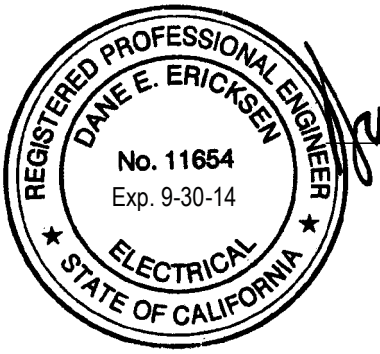
List of Figures

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

1. FCC exposure limits
2. Table of proposed modifications
3. Tower elevation sketch.

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration No. E-11654, which expires on September 30, 2014. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.



Dane E. Ericksen P.E.
707/996-5200

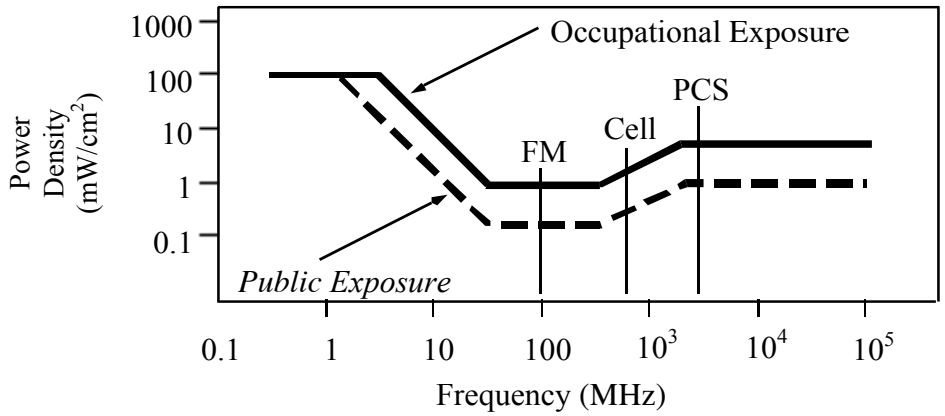
April 3, 2013

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



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

Summary of Proposed Modifications

Antenna/Facility	Make/Model	Height Above Ground	Power/ Polarization	Maximum RF Level
KQED-FM Auxiliary	ERI SHPX-4AC6-HW	815 ft	20 kW/C	0.2%
KTNC-TV D14	Dielectric TFU-24DSC	800	1,000 kW/E	2.6%
KEMO-TV D32 DTS	RFS RD24-D-578/704-FR	800	200 kW/H	0.4%
KREV(FM)	Antenna Concepts ATI 6M	762	0.27 kW/C	<0.1%
KOIT(FM) Aux (relocated)	ERI SHPX-6AC-HW	621	35.5 kW/C	0.3%
KTNC-TV D14 auxiliary	Dielectric TFU-10DSC	525	250 kW/E	3.2%
New EMF Radio FM translator	Scala CLFM/2	375	0.070 kW/C	<0.1%
Communications receive antennas				
136–174 MHz	Bird BA40-41-DIN	657	receive	N/A
330–420 MHz	Bird BA40-57-DIN	657	receive	N/A
400–520 MHz	Bird BA8080-67-DIN	657	receive	N/A
746–806 MHz	Bird COL811-806	657	receive	N/A
806–860 MHz	Bird COL85-870	657	receive	N/A
Second ENG Receive				
KTVU	NSI Superquad	670	receive	N/A
KRON-TV	NSI Superquad	650	receive	N/A
KPIX-TV	NSI Superquad	640	receive	N/A
KGO-TV	NSI Superquad	630	receive	N/A
KNTV	NSI Superquad	620	receive	N/A
KFSF-DT	NSI Superquad	610	receive	N/A
South leg weather cameras	Canon BU-46H	595	cameras	N/A
North leg weather cameras	Canon BU-46H	590	cameras	N/A
Bayweb microwave (6)	Andrew VHLP6-11	550	~66 dBm	<0.001%
SF Community Broadband (15)	Ubiquiti MINO Bridge	375	~47 dBm/H&V	<0.001%
Microwave Data Links				
KMTP-TV STL	Andrew UHX6-65	187	receive	N/A
KCSM-TV STL	Andrew UHX6-65	187	receive	N/A
KREV(FM) STL	Andrew KP4-820	650	receive	N/A
Bay Bridge	Radio Waves HP6-11	187	62.4 dBm	<0.001%
San Mateo Bridge	Radio Waves HP6-11	187	62.4 dBm	<0.001%
Golden Gate Bridge	Radio Waves HP3-18	187	54.0 dBm	<0.001%
Richmond-San Rafael Bridge	Radio Waves HP6-11	187	~66 dBm	<0.001%
Dumbarton Bridge	Radio Waves HP6-11	187	~66 dBm	<0.001%
Carquinez Bridge	Radio Waves HP6-11	187	~66 dBm	<0.001%
SFO Airport	Radio Waves HP6-11	187	receive	N/A
Satellite dish	Simulsat 7-meter	ground	receive	N/A

Notes:

For broadcast service, indicated power is effective radiated power (ERP) in kW. For microwave antennas, indicated power is equivalent isotropic radiated power (EIRP) in dBm. C = circular polarization; E = elliptical polarization, most 20% VPOL (each station's actual VPOL component used); H = horizontal polarization; V = vertical polarization. DTS = distributed transmission system.

Maximum RF levels are calculated at 2 meters above ground and expressed as percent of pertinent FCC public limit; see text.

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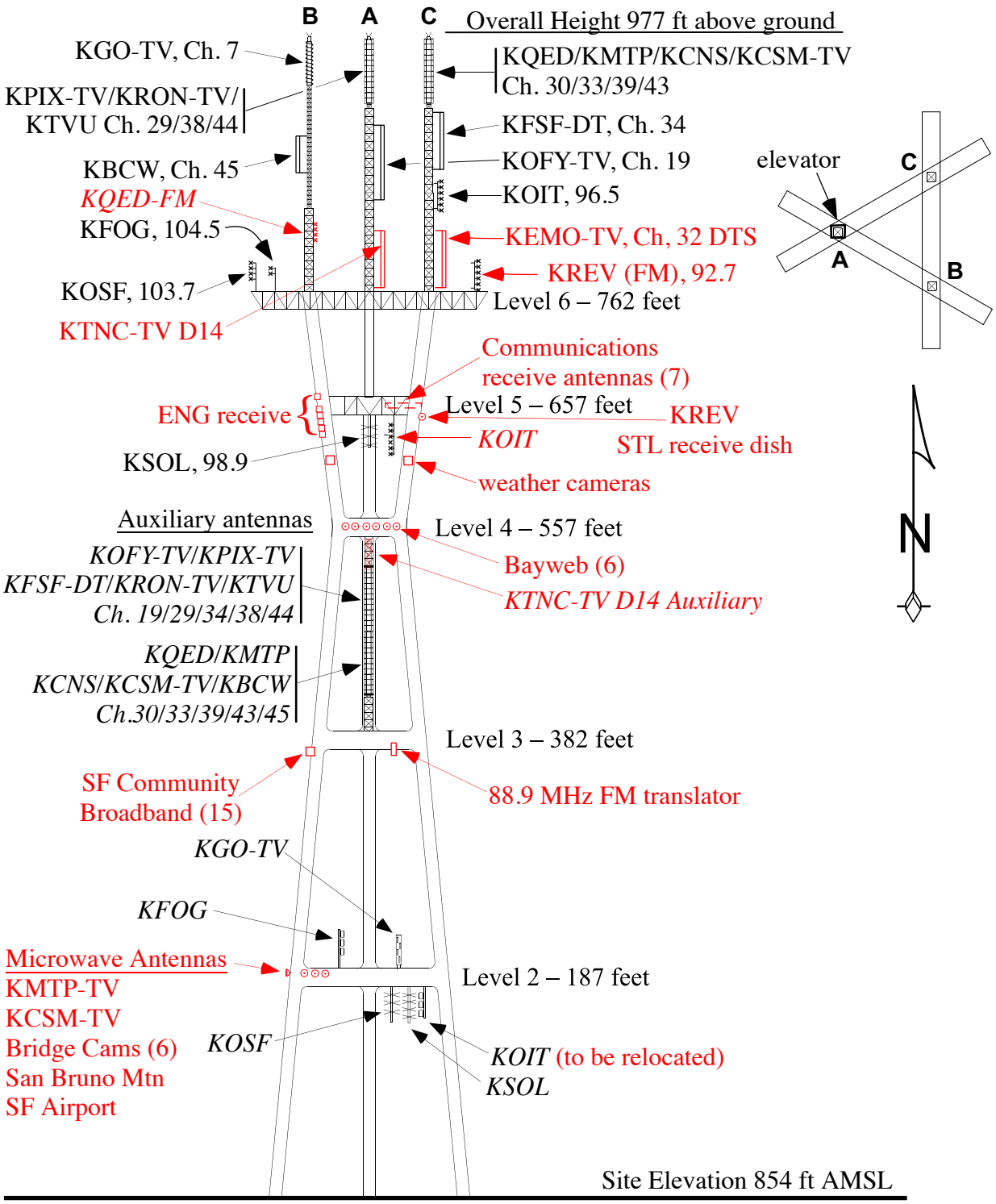
Summary of Proposed Modifications
(view from east)



Auxiliary antennas in *italics*. Proposed new antennas in red. Not to scale.