

Radiofrequency Electromagnetic (RF) Measurements

Background

KZLU has been constructed on an existing communications site shared by several other broadcasters. On April 23, 2008, Educational Media Foundation (EMF) completed construction of the KZLU facility.

Normally, EMF would use its Narda SRM-3000 RFR measurement equipment to evaluate RF compliance at the KZLU transmitter site. Unfortunately, prior to leaving for the site, the engineer accidentally checked the previous Construction Permit (CP) to determine the need for RF measurements, and since that CP did not contain an RF measurement requirement, he erroneously believed no measurements were required and did not take the necessary equipment with him.

EMF owns two Narda SRM-3000 units. At the time of the KZLU construction, one of EMF's Narda units had been sent to the factory for calibration, and the other was in Arkansas for routine evaluation of another EMF facility. By the time the engineer realized that he had reviewed the incorrect CP, it was too late to have the unit in Arkansas shipped to the site prior to the CP expiration.

Therefore, EMF will base its initial RF conclusions on recent measurements done by other parties, combined with theoretical values from the antenna used by EMF. As soon as possible, EMF will revisit the site with one of its Narda units and provide complete documentation to the Commission so as to fully meet its obligations under the Construction Permit.

Discussion

In March, 2008, both Family Radio (licensee of KFRJ China Lake CA, FIN 89174), as part of their license application (File number BLED-20080317AGX), and Adelman Broadcasting (licensee of KRAJ, Johannesburg CA, FIN 84860), as part of their license modification application (BMLH-20080311ACO), performed on-site RF measurements to show that their facilities complied with the requirements of OET-65. Both applications have been subsequently granted. Further EMF, on October 19, 2006, performed on-site measurements as part of a routine proof-of-performance for its co-located facility KGBM Randsburg CA, FIN 24706. These three studies are attached, as part of this Exhibit, for the Commission's convenience.

Because KFRJ and KRAJ are located at the south end of the radio compound, on a different tower than KGBM and KZLU (which are located at the opposite (northern) end of the compound), this analysis will combine the worst-case results from the on-site measurements, plus the worst-case theoretical results from the Scala CA5-CP used by KZLU.

KFRJ's study shows that the highest reading found using a Narda Model 8718B with a Model 8722 shaped probe was 66.15% of the uncontrolled/public limits of OET-65. Family indicates that this maximum reading, along with other slightly lower readings, was found on the roadway south of the entire radio compound.

KRAJ's showing, determined using a Narda unit with a shaped probe (no models given), indicates that the highest value found was 57% of the OET-65 uncontrolled/public limit. Unfortunately, no specific location(s) were given as part of their study.

EMF's October, 2006 RF study of the KGBM tower area showed the highest readings (21.9% and 20.8% of uncontrolled/public limits) were found toward the rest of the compound, to the southeast and south, respectively.

Because of the geographic and documentation disparities, it is difficult to ensure accurate results when combining these three measurement sets. Therefore, it seems appropriate to rely on the 66.15% worst-case reading of Family Radio as a baseline, while still recognizing that those results are on the opposite end of the compound from the KZLU tower, and that the KZLU antenna is oriented at 350° true, pointing away from the area where Family found its highest readings.

Since the Scala CA-5/CP antenna is not an antenna modeled in the EPA antenna list, EMF will take the elevation field data provided in the Shively proof of performance to determine the amount of power that would be found at ground level from the antenna at various distances from the tower.

For each horizontal distance from the base of the tower, in one-meter increments, the distance to the head of a 2-meter tall person can be determined based on the center of radiation above ground by using the Pythagorean theorem to determine the hypotenuse of the triangle, as follows:

$$d = \sqrt{(H^2 + D^2)}$$

Where:

d = distance to top of 2-meter tall person's head

H = Height of the antenna above the head of a 2-meter tall person at the base of the tower, determined by subtracting 2 meters from the Center of Radiation above ground, in meters.

D = horizontal distance from tower base

For each horizontal distance from the base of the tower, in one-meter increments, the angle of declination is determined using the formula:

$$a = \arctangent(H/D)$$

Where:

a = angle, in degrees, of declination

H = Height of the antenna above the head of a 2-meter tall person at the base of the tower, determined by subtracting 2 meters from the Center of Radiation above ground, in meters.

D = horizontal distance from tower base

Finally, we determine the power density for each location using the formula:

$$D_p = (33.4(F^2)(P)) / d^2$$

Where:

D_p = Power Density in $\mu W/cm^2$

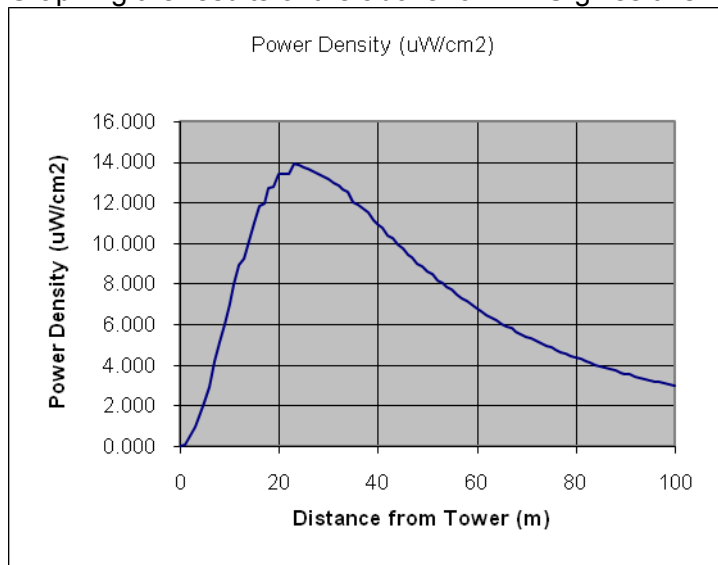
33.4 = constant

F = Field of antenna at the appropriate angle

P = ERP, in watts

d = distance to top of 2-meter tall person's head at the horizontal location from the base of the tower

Graphing the results of the above for KZLU gives this result:



The data indicates a maximum power density of $13.9 \mu\text{W}/\text{cm}^2$ at 23 meters from the base of the tower. This is 6.95% of the uncontrolled/public exposure limits of OET-65.

Adding this to the Family Radio worst-case result of 66.15% gives 73.1%, still well within the FCC's limits, recognizing that these two worst-case areas are physically disparate from one another, and therefore would not be combined together in the real world.

Therefore, EMF concludes that KZLU fully complies with the FCC guidelines.

Conclusion

The March, 2008 measurements, combined with the theoretical results described above indicate that KZLU is well within the FCC guidelines for human exposure to RF fields. Nonetheless, EMF will revisit the site as soon as possible and take an additional set of readings using its own Narda equipment to fully demonstrate real-world compliance.

After those measurements are taken, EMF will amend this application with a supplemental exhibit.

**Family Stations, Inc.
KFRJ, China Lake, CA
BPED-20070907AGW, Facility ID 89174
302 FM License Application**

**Exhibit 10
March 2008**

The Construction Permit special operating conditions or restrictions require submission of RFR field strength measurements and formal request for program test authority as specified below:

United States of America FEDERAL COMMUNICATIONS COMMISSION FM BROADCAST STATION CONSTRUCTION PERMIT		Call sign: KFRJ		Permit No.: BPED-20070907AGW	
Official Mailing Address:		Transmitter: Type Accepted. See Sections 73.1660, 73.1665 and 73.1670 of the Commission's Rules.			
FAMILY STATIONS INC 4135 NORTHGATE BLVD SUITE 1 SACRAMENTO CA 95834		Transmitter output power: As required to achieve authorized ERP.		Antenna type: Non-Directional	
Facility ID: 89174		Antenna Coordinates: North Latitude: 35 deg 28 min 39 sec		Horizontally Polarized Antenna	
Call Sign: KFRJ		West Longitude: 117 deg 41 min 59 sec		Vertically Polarized Antenna	
Permit File Number: BPED-20070907AGW		Effective radiated power in the Horizontal Plane (ERP):		5.5	
Subject to the provisions of the Communications Act of 1934, as amended, subsequent acts and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to the conditions set forth in this permit, the permittee is hereby authorized to construct the radio transmitting apparatus herein described. Installation and adjustment of equipment not specifically set forth herein shall be in accordance with representations contained in the permittee's application for construction permit except for such modifications as are presently permitted, without application, by the Commission's Rules.		Height of radiation center above ground (Meters):		19	
Commission rules which became effective on February 16, 1999, have a bearing on this construction permit. See Report & Order, Streamlining of Mass Media Applications, MM Docket No. 98-43, 13 FCC RCD 23056, Para. 71-92 (November 25, 1998); 63 Fed. Reg. 70029 (December 18, 1998). Pursuant to these rules, this construction permit will be subject to automatic forfeiture unless construction is complete and an application for license to cover is filed prior to expiration. See Section 73.3598.		Height of radiation center above mean sea level (Meters):		1351	
Equipment and program tests shall be conducted only pursuant to Sections 73.1610 and 73.1620 of the Commission's Rules.		Height of radiation center above average terrain (Meters):		386	
Name of Permittee: FAMILY STATIONS INC		Antenna structure registration number: Not Required		Overall height of antenna structure above ground: 36 Meters	
Station Location: CA-CHINA LAKE		Obstruction marking and lighting specifications for antenna structure:		It is to be expressly understood that the issuance of these specifications is in no way to be considered as precluding additional or modified marking or lighting as may hereafter be required under the provisions of Section 303(g) of the Communications Act of 1934, as amended.	
Frequency (MHz): 91.1		None Required		Special operating conditions or restrictions:	
Channel: 216		1 Waiver of 47 C.F.R. Section 73.1125 was granted to allow operation of this facility a satellite operation of the following station:		KECR (AM), El Cajon, CA	
Class: B		2 The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.		3 THE AUTOMATIC PROGRAM TEST PROVISIONS OF 47 C.F.R. SECTION 73.1620 DO NOT APPLY IN THIS CASE. A FORMAL REQUEST FOR PROGRAM TEST AUTHORITY MUST BE FILED IN CONJUNCTION WITH FCC FORM 302-PM, APPLICATION FOR LICENSE, BEFORE PROGRAM TESTS WILL BE AUTHORIZED. This request should be submitted at least 10 days prior to the date on which program tests are desired to commence. This request must contain documentation which demonstrates compliance with the following special operating condition(s):	
Hours of Operation: Unlimited		3 THE AUTOMATIC PROGRAM TEST PROVISIONS OF 47 C.F.R. SECTION 73.1620 DO NOT APPLY IN THIS CASE. A FORMAL REQUEST FOR PROGRAM TEST AUTHORITY MUST BE FILED IN CONJUNCTION WITH FCC FORM 302-PM, APPLICATION FOR LICENSE, BEFORE PROGRAM TESTS WILL BE AUTHORIZED. This request should be submitted at least 10 days prior to the date on which program tests are desired to commence. This request must contain documentation which demonstrates compliance with the following special operating condition(s):			
FCC Form 351A October 21, 1985		Page 1 of 3		FCC Form 351A October 21, 1985	
Call sign: KFRJ		Permit No.: BPED-20070907AGW		Special operating conditions or restrictions:	
4 The permittee/licensee shall, upon completion of construction and during the equipment test period, make proper radiofrequency electromagnetic (RF) field strength measurements throughout the transmitter site area to determine if there are any areas that exceed the FCC guidelines for human exposure to RF fields. If necessary, a fence must be erected at such distances and in such a manner as to prevent the exposure of humans to RF fields in excess of the FCC Guidelines (OET Bulletin No. 65, Edition 97-03, August 1997). The fence must be a type which will preclude casual or inadvertent access, and must include warning signs at appropriate intervals which describe the nature of the hazard. Any areas within the fence found to exceed the recommended guidelines must be clearly marked with appropriate visual warning signs.		5 Documentation demonstrating compliance with the special operating condition(s) may be submitted in advance of the filing of FCC Form 302-PM. The Commission's staff will review it for compliance and respond by letter stating whether automatic PTA has been reinstated.		*** END OF AUTHORIZATION ***	
FCC Form 351A October 21, 1985		Page 3 of 3			

The following pages of this Exhibit contain the certification of the RFR field strength measurements taken at the site.

KFRJ Radiofrequency Electromagnetic Field Strength Measurements

On March 5, 2008, radiofrequency electromagnetic field measurements were performed throughout the transmitter site area using a Narda Model 8718B (8718-10) Survey Meter with a Model 8722 Shaped E-Field probe, both calibrated April 4, 2007.

KFRJ was operated at 5.5 kW ERP for the purpose of these measurements. The specific tower under review and measurement is also occupied by KRAJ, at 1.5 kW ERP, and KLOA-FM, at 1.5 kW ERP.

Measurements were performed incorporating special average readings at predetermined locations that encompass the areas accessible to the public. Instantaneous peak readings at these locations were also logged.

No locations outside of the fenced area, around the tower or along the public trails were found to exceed the general public levels of the FCC Guidelines (OET Bulletin No.65, Edition 97-01, August 1997).

The highest average reading noted was 66% of the general public standard and the highest peak reading noted was 33% of said standard. Said standard is 20% of the occupational standard.

The permittee/licensee in coordination with other users of the site will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

Jeffrey A. Zimmer
Chief Operator, KFRJ

C:\PROGRA~1\8718B\SSDATA\03061152.CSV

Run Ref. Number: 01

Date: 03/05/08 Start Time: 21:47

Model 8718 S/N: 1314 Cal Date: 04/04/07 Due: 04/04/08

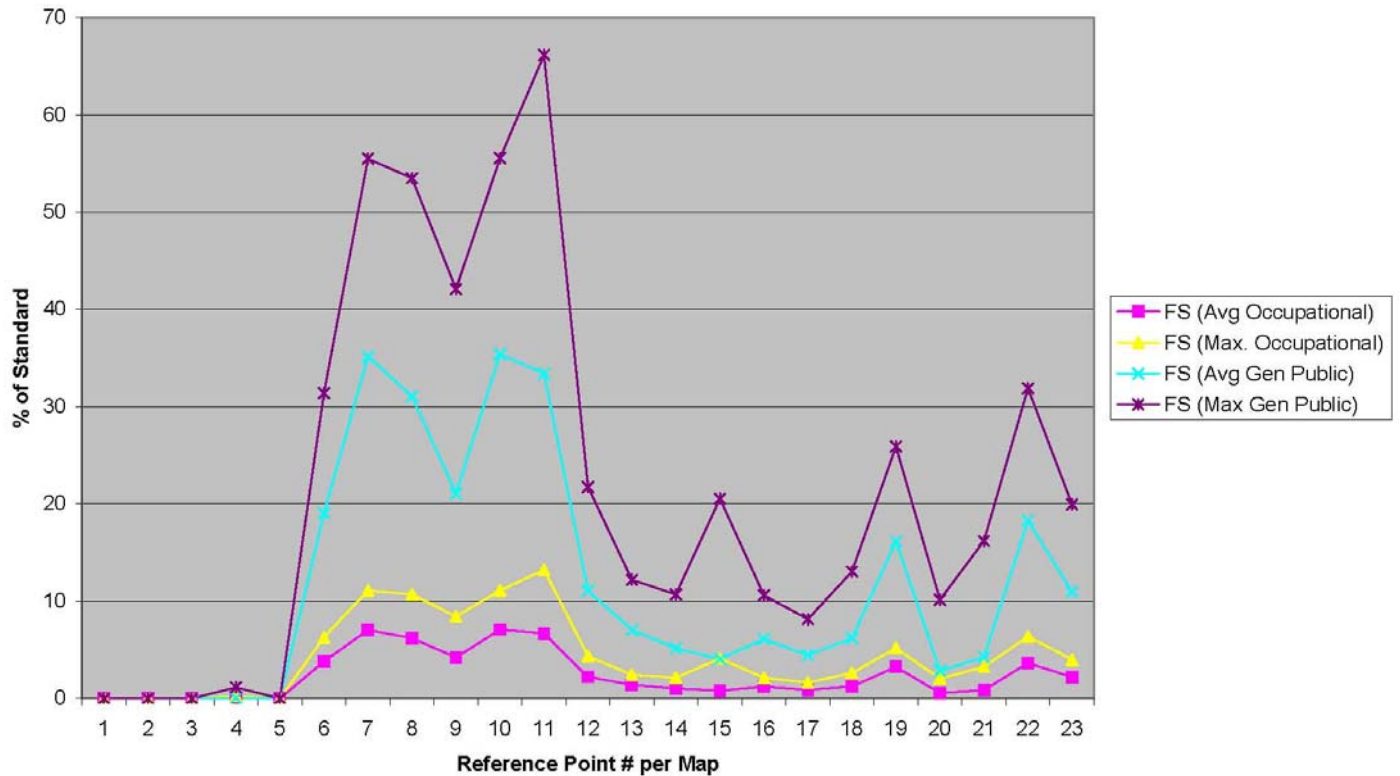
Probe: 8722 S/N: 15018 Cal Date: 04/04/07 Due: 04/04/08

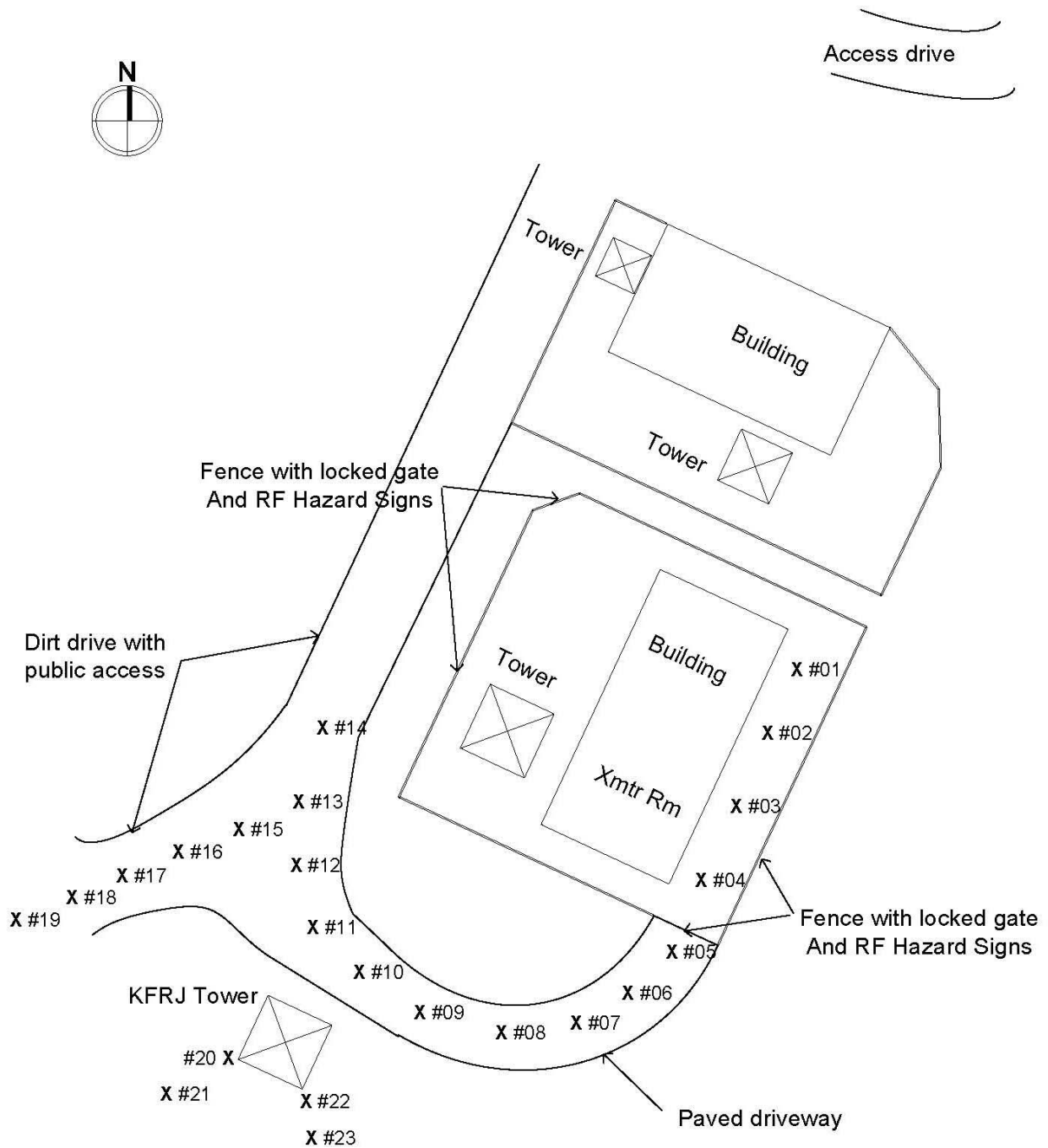
Freq: N/A Cor. Factor: 1.00 Logging Rate: N/A

Avg Mode: Spatial Avg. & Max.

Ref#	FS (Avg Occupational)	FS (Max. Occupational)	FS (Avg Gen Public)	FS (Max Gen Public)
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0.01	0.23	0.05	1.15
5	0	0	0	0
6	3.81	6.28	19.05	31.4
7	7.03	11.1	35.15	55.5
8	6.21	10.7	31.05	53.5
9	4.21	8.42	21.05	42.1
10	7.08	11.11	35.4	55.55
11	6.68	13.23	33.4	66.15
12	2.21	4.35	11.05	21.75
13	1.41	2.44	7.05	12.2
14	1.03	2.14	5.15	10.7
15	0.81	4.11	4.05	20.55
16	1.22	2.12	6.1	10.6
17	0.89	1.63	4.45	8.15
18	1.24	2.61	6.2	13.05
19	3.23	5.18	16.15	25.9
20	0.57	2.03	2.85	10.15
21	0.85	3.24	4.25	16.2
22	3.66	6.38	18.3	31.9
23	2.19	3.99	10.95	19.95

**KFRJ Field Strength as % of Standard
Average and Maximum
(Occupational and General Public)**





Plat of measurement points for KFRJ
RFR exposure study

APPLICATION FOR STATION LICENSE

FCC FORM 302-FM

KRAJ, FACILITY ID 84860

CH265B1, JOHANNESBURG, CA

ADELMAN BROADCASTING, INC.

MARCH 2008

**BY:
BEEM CO.
ARCADIA, CA
(626) 446-3468**

ENGINEERING STATEMENT OF JOEL T. SAXBERG

This statement addresses the Special Operating Conditions or Restrictions associated with the construction permit No. MPH-20070502AAC, assigned to Adelman Broadcasting, Inc. for FM Broadcast Station KRAJ, CH265B1, Johannesburg, California. This reply was prepared by Joel T. Saxberg of Arcadia, California.

FORMAL REQUEST FOR PROGRAM TEST AUTHORITY - The permittee/licensee has made proper radiofrequency electromagnetic field measurements throughout the transmitter site area and has determined that there are no areas that exceed FCC guidelines for human exposure to RF fields. On Friday 3/7/2008 a Narda Survey Meter with a shaped E-Field probe was used to make measurements around the site. KFRJ, 1.5 kW ERP, KLOA-FM, 1.5 kW ERP and KFRJ, 5.5 kW ERP were operated at their nominal power levels while taking measurements. KRAJ occupies the top tower position, KLOA-FM's top bay is approx. 3 meters below KRAJ's bottom bay and KFRJ's top bay is approx. 3 meters below KLOA's bottom bay. All three stations employ 1/2 wavelength spaced antennas for reduced downward electromagnetic fields.

Initial measurements were made with the Survey meter set to read instantaneous peak hold readings. No locations around the tower were found to exceed the general public levels, which are 20% of the occupational standard readings. Spatial Average readings were taken at a few locations where instantaneous peak hold readings showed maximum values that approached the general public limit. The highest spatial average reading was 11.4% of the occupational limit or 57% of the maximum permissible FCC guideline limit for the general public.

While taking radiofrequency electromagnetic field readings a Narda XT Personal Monitor was worn. The logged data from the Narda Personal monitor did not indicate any points that exceeded the General Public limit.

Mr. Jeffrey Zimmer, Chief Engineer for KFRJ, using different Narda survey equipment made radiofrequency electromagnetic field at the site under the same operating conditions on 3/5/2008. In reviewing his results, I find close agreement with those reading I took. Again his results showed no locations where the power density exceeded the MPE guideline limit for the general public.

No fenced areas exceeded general public FCC guideline limits.

The permittee/lieensee in coordination with other users of the site will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic fields in excess of FCC guidelines.

ENGINEERING CERTIFICATION

JOEL T. SAXBERG deposes and says:

1. That he is President of Broadcast Engineering and Equipment Maintenance Company, "BEEM CO.", radio engineering consultants. BEEM CO. maintains offices at: 2322 S. Second Avenue, Arcadia, CA 91006. Telephone (626) 446-3468
2. That he was graduated from California State University at Los Angeles, February 1966, with a Bachelor of Science degree in Electronic Engineering. He received a MS degree in Electronic Engineering Technology in August 1996.
3. That he has submitted many applications to the Federal Communications Commission for broadcast and auxiliary broadcast construction permits and licenses.
4. That his experience in broadcast engineering is a matter of record and he has spent over forty years working in the field of radio engineering.
5. That the attached report was prepared by him or under his direction and supervision. That he believes the facts stated therein to be both true and accurate. Statements that are based on information supplied by others are also believed to be true and accurate.
6. That he has performed field work on AM and FM broadcast transmitting systems throughout this country and continues to provide technical consulting services on a daily basis to broadcasters.
7. That he declares under penalty of perjury the foregoing is true and correct.

Executed on March 8, 2008



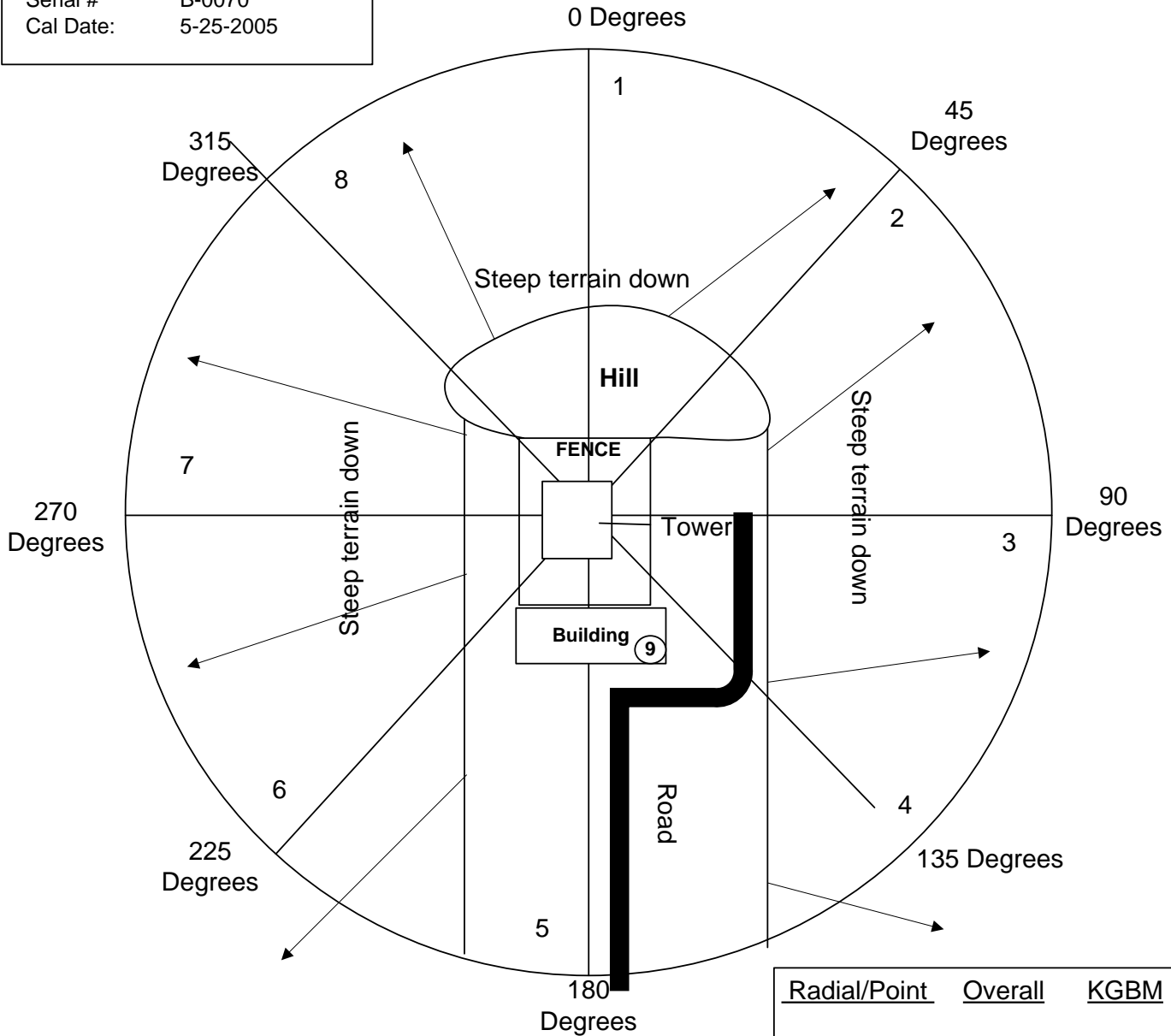
Joel T. Saxberg

Date: 10/19/2006
Time: 12:00 PM
WX conditions: Clear
Readings taken by: David Smith
Instrument Used:

RFR Study Form

KGBM-Randsburg, CA

Unit 1
Make Narda
Model SRM3000
Serial # B-0070
Cal Date: 5-25-2005



Not to Scale

<u>Radial/Point</u>	<u>Overall</u>	<u>KGBM</u>
1	21.9 %	2.8 %
2	16.1 %	7.8 %
3	14.3 %	12.7 %
4	17.2 %	0.3 %
5	20.8 %	4.2 %
6	11.7 %	.15 %
7	8.6 %	.29 %
8	12.8 %	.20 %
9*	8.8 %	.59 %