

Engineering Statement

Purpose

The instant Form 318 has been prepared on behalf of Zuma Beach FM and Emergency Community Broadcasters, Inc. (“Zuma”), permittee of Low Power FM station KBUU-LP, Malibu, CA, Facility ID 195574, channel 248 (97.5 MHz).

This Engineering Statement is being submitted in support of a minor amendment to pending minor modification application BMPL-20140530ACZ. As detailed below, this minor amendment proposes to change the antenna type from non-directional to directional in order to eliminate predicted interference to one household in the 2nd adjacent channel overlap area. Additionally, a very slight adjustment of 0.1” latitude and 0.3” longitude has been made to the antenna coordinates which removes the rounding that occurred when the coordinates were converted from NAD83 to NAD27.

Figure 1 shows the overlapping 60 dBu contours of the authorized construction permit and the proposed facilities. The distance between the two transmitter sites is approximately 1.4 km.

Background

The FCC granted Zuma’s construction permit, BNPL-20131113BMD, on March 10, 2014. Since receiving its CP, Zuma has been trying to obtain a local building permit for the authorized transmitter site; however, it does not appear that Zuma will be able to obtain the necessary permits to build a tower at the CP site in a timely manner due to land use and zoning restrictions. Therefore, other transmitter sites have been researched and considered.

Malibu is a uniquely shaped community; it is probably the longest and narrowest city in America. The city limits extend east-west for almost 21 miles (34 kilometers) along the Pacific Ocean, while the average north-south width extends less than 1 mile (1.6 kilometers) into the Santa Monica Mountains. The mountainous terrain, along with local zoning and height restrictions for antenna structures, has made it extremely challenging to find a new transmitter location. Complicating the site search is the fact that Malibu is located within the protected contour of 2nd adjacent KLAX-FM, East Los Angeles; this requires that the KBUU-LP transmitter site not be located in a populated area to avoid predicted interference to the listeners of KLAX-FM.

The proposed transmitter site in the instant application appears to be a suitable location both from a local zoning/permitting perspective and for being able to provide good signal strength to the western portion of Malibu while meeting FCC interference criteria.

Proposed Facilities and HAAT Calculation

Zuma proposes to construct and operate KBUU-LP with the following parameters:

Channel: 248 (97.5 MHz)

Coordinates: 34-02-26.1 / 118-47-19.7 (NAD27)
 Ground Elevation: 282 m
 Antenna HAGL: 9 m
 Antenna HAMSLL: 291 m
 HAAT: 50 m
 ERP: 0.035 kW
 Antenna Type: Circularly polarized, directional

As per section 73.813 of the rules and regulations, LPFM stations follow the procedures in section 73.313(d) for calculation of HAAT. Because the proposed KBUU-LP transmitter site has radials that go over the Pacific Ocean, and because most computer programs do not automatically account for the portion or the entire radial that goes over the ocean, the HAAT was manually calculated; the tabulation is shown below. The NGDC 30-second terrain database¹, which closely matches the FCC's 30-second terrain database, was used. A sampling interval of 0.2 km was used for the 3.0-16.0 km land portion of each radial. Figure 2 depicts the 3-16 km radials.

<u>Radial (deg)</u>	<u>AT (m)</u>	<u>HAAT (m)</u>	<u>Comment</u>
0	407.8	-116.8	
45	363.9	-72.9	
90	87.3	203.7	
135	- -	- -	Omitted; entirely over the ocean
180	- -	- -	Omitted; entirely over the ocean
225	35.8	255.2	3-4 km over land
270	92.9	198.1	3-10 km over land
315	457.9	-166.9	
		<u>300.4</u> / 6 = 50 m	

After calculating the HAAT, the maximum ERP was then calculated. LP100 stations are allowed a maximum ERP of 100 watts at a HAAT of 30 meters. With a HAAT of 50 meters, the ERP was computed as 35 watts to produce an equivalent maximum facility.

Interference Analysis and 2nd Adjacent Channel Waiver Request

Attached as Table 1 is a spacing study for the proposed KBUU-LP transmitter site. With the exception of KLAX-FM, East Los Angeles on 2nd adjacent channel 250B (97.9 MHz), the proposed KBUU-LP facility is fully spaced from all licensed facilities and pending applications for new stations. The proposed KBUU-LP transmitter site is short-spaced to KLAX-FM by 10.6 km and is located within KLAX-FM's protected 54 dBU contour (see Figure 3). The proposed KBUU-LP transmitter site is 1.3 km closer to KLAX-FM than the currently authorized site.

Section 73.807(e)(1) states:

Waiver of the second-adjacent channel separations. The Commission will entertain requests to waive the second-adjacent channel separations in paragraphs (a) through (c) of this section on a case-by-case basis. In each case, the LPFM station must establish, using methods of predicting

¹ Software by EDX Engineering, Inc. was used for extracting the terrain values from the database.

interference taking into account all relevant factors, including terrain-sensitive propagation models, that its proposed operations will not result in interference to any authorized radio service. The LPFM station may do so by demonstrating that no actual interference will occur due to intervening terrain or lack of population. The LPFM station may use an undesired/desired signal strength ratio methodology to define areas of potential interference.

The Commission previously granted Zuma a 2nd adjacent channel spacing waiver for the currently authorized site based on a non-interference showing using the Desired-to-Undesired methodology to identify potentially affected population. Zuma again respectfully requests that a waiver be granted based on this methodology.

Similar to FM translator stations, LPFM stations use the same D/U ratios shown in 74.1204(a)(1) for protecting short-spaced 2nd and 3rd adjacent full power FM stations. For these stations, the D/U ratio is -40 dB (i.e., the undesired signal has to be 40 dB or more stronger than the desired signal to cause interference).

Referring again to Figure 3, KLAX-FM has a calculated field strength of 61.3 dBu (F50,50) at the proposed KBUU-LP transmitter site; therefore, the interfering contour for identifying potentially affected population is the KBUU-LP 101.3 dBu (F50,10) contour. At the proposed ERP of 35 watts at 50 m HAAT, the KBUU-LP interfering contour has a free-space distance of approximately 360 meters in the main lobe.²

As shown in Figure 4, there are no residences, businesses or major roads within the proposed KBUU-LP 101.3 dBu contour.³ This is made possible by the use of a directional antenna (see below).

Directional Antenna

Zuma proposes to use a customized directional antenna to avoid predicted interference to one household – that of the transmitter site property owner. Normally, LPFM stations are required to use non-directional antennas, but directional antennas are allowed under certain circumstances. One such allowed use is for elimination of 2nd adjacent channel interference.

Section 73.816(c)(2) states:

LPFM permittees and licensees proposing a waiver of the second-adjacent channel spacing requirements of Section 73.807 may utilize directional antennas for the sole purpose of justifying such a waiver.

The proposed antenna is a composite array consisting of two model CA2-FM/CP antennas manufactured by Kathrein-Scala. The azimuth pattern and tabulations are shown in Figures 5A and 5B.

² For contour distances calculated to be less than 1.5 km, the FCC's free-space formula is used.

³ The other buildings visible in the aerial photo within the KBUU-LP 101.3 dBu contour are unoccupied outbuildings.

AFFIDAVIT

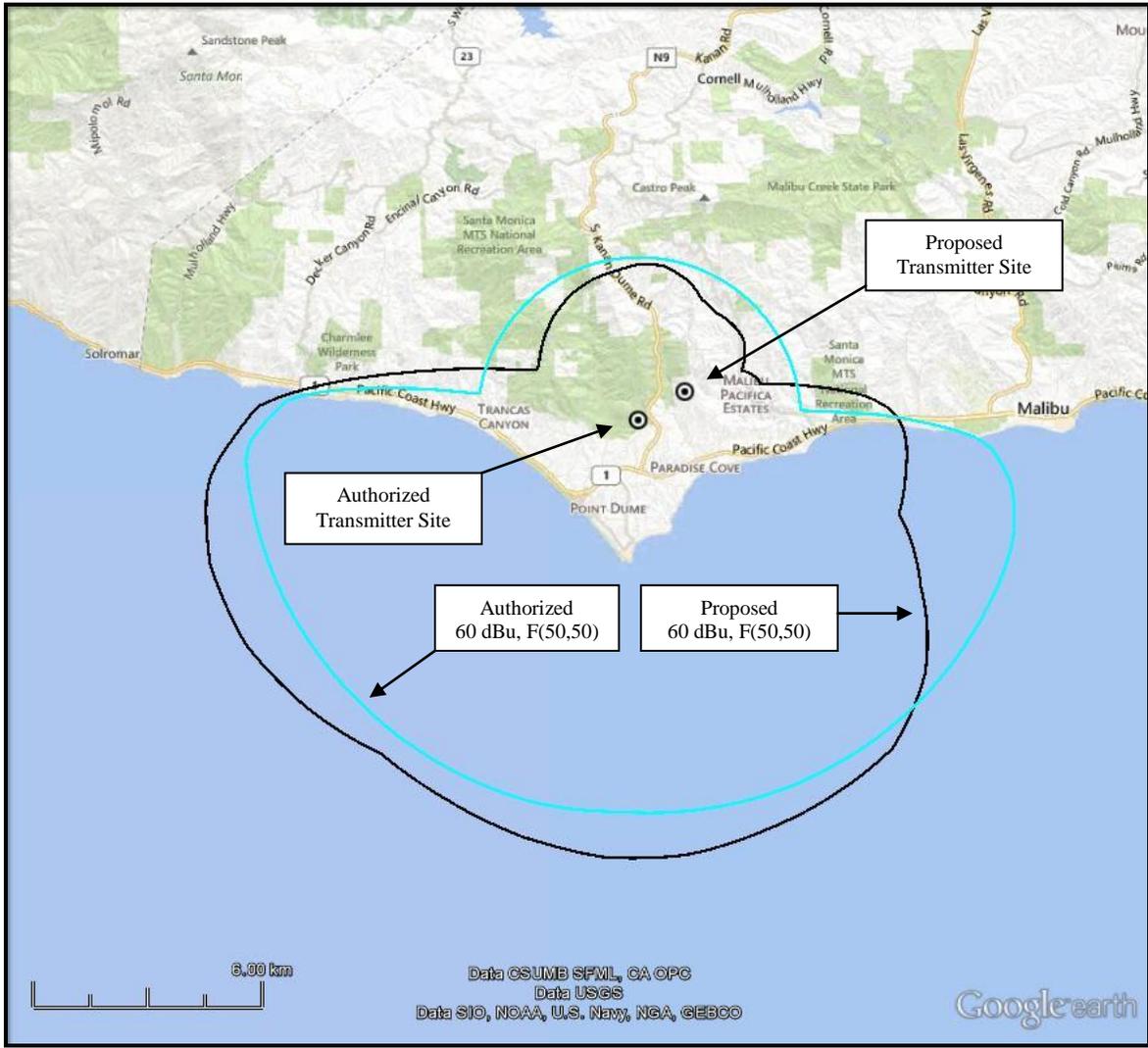
I, Timothy P. Schultz, do hereby certify that this Engineering Statement, the accompanying figures and tables, and all technical portions of this application were prepared by me personally. All facts herein are known to be true based on fact, belief and personal experience.

I have been gainfully employed in the broadcast engineering field since 1977, working in all phases of AM, FM and Television engineering. I have prepared several engineering applications for the Commission and have a working knowledge of current FCC Rules and Regulations. I hold valid FCC License PG-11-27583 and am Professionally Certified by the Society of Broadcast Engineers.

Signed: 

Dated: 7-18-14

Timothy P. Schultz, CPBE
7007 Arizona Avenue
Los Angeles, CA 90045



60 dBu Contour Overlap Map

KBUU-LP, Malibu, CA
Channel 248 (97.5 MHz)
0.035 kW – DA, 50 m HAAT

Figure 1

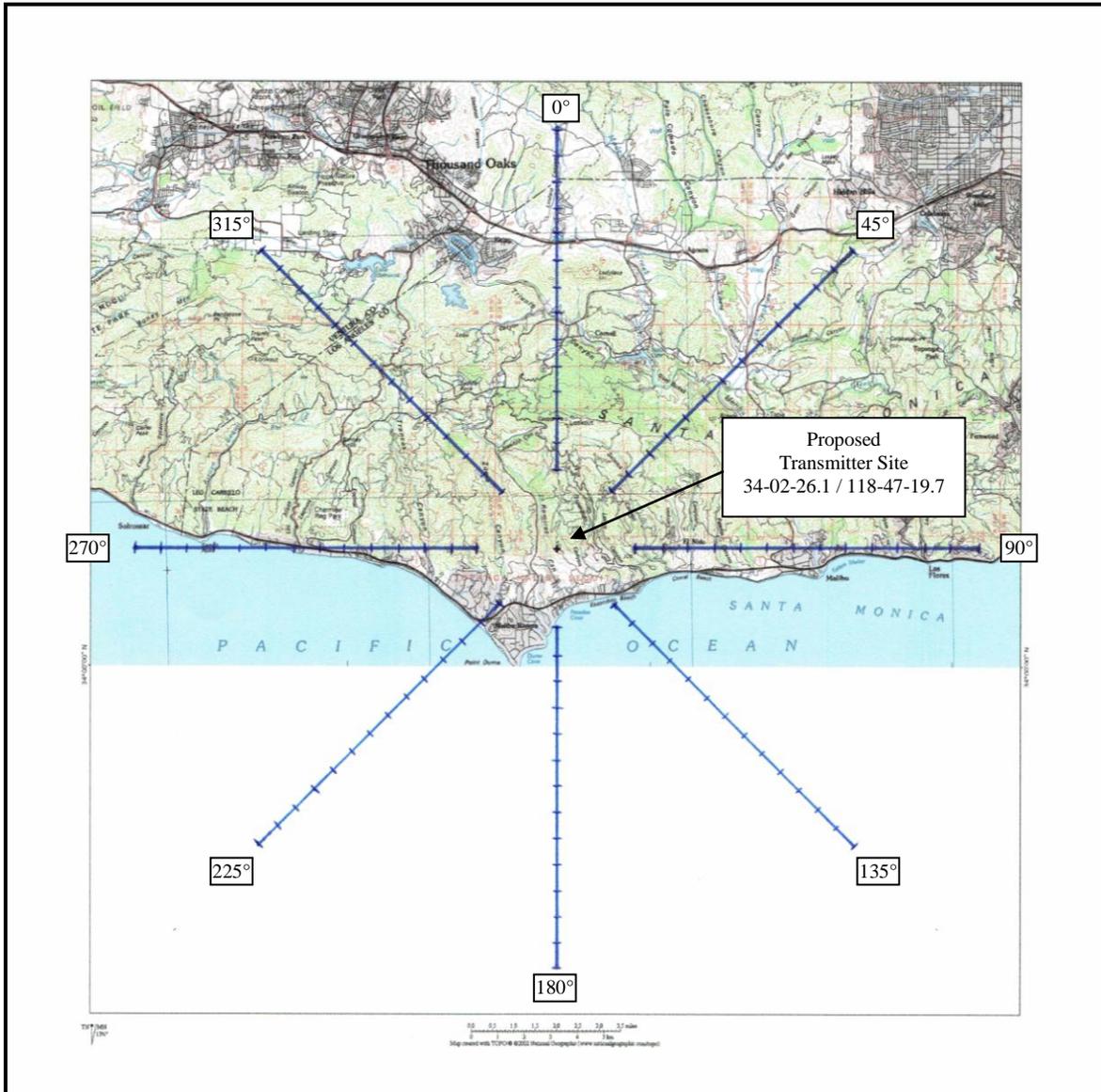
TABLE 1

Applicant: Zuma Beach FM Emergency and Community Broadcasters, Inc. - KBUU-LP, Malibu, CA
 Channel: 248L1 (97.5 MHz)
 Coordinates: 34-02-26.1 / 118-47-19.7 (NAD27)
 Search Radius: 150 km
 FCC Database: 7/16/2014

Callsign City of License	Auth	Licensee State FCC File No.	Chan Freq	HAAT HAMSL	ERP (kW)	Latitude Longitude	Bear (deg)	Dist (km)	Req (km)
NEW SANTA BARBARA	APP	SOUTH COAST COMMUNITY MEDIA ACCESS CA BNPL-20131113BOA	245L1 96.9	-148 25	0.1 H 0 V	34-25-50 119-40-90	298.1	91.4	0 CLEAR
KAMP-FM LOS ANGELES	LIC	CBS RADIO EAST INC. CA BMLH-19900206KB	246B 97.1	915 1809	21 H 21 V	34-13-00 118-03-00	72.5	69.8	67 CLOSE
KAMP-FM LOS ANGELES	LIC	CBS RADIO EAST INC. CA BXLH-20100806AAO	246B 97.1	405 851	7 H 7 V	34-11-12 118-15-58	70.3	51.9	67 SHORT
KRJK LAMONT	LIC	BUCK OWENS PRODUCTION COMPANY, INC CA BLH-20111004AAT	247A 97.3	171 838	2 H 2 V	35-11-00 118-43-00	2.8	128.0	56 CLEAR
K247BU LANCASTER	CP	MARY V. GUTHRIE CA BNPFT-20130822AFZ	247D 97.3	-17 770	0.055 H 0.055 V	34-39-00 118-07-00	41.1	91.6	8 CLEAR
KLYY RIVERSIDE	LIC	ENTRAVISION HOLDINGS, LLC CA BXLH-20020225AAS	248B 97.5	485 928	3 H 3 V	33-57-00 117-17-00	93.0	138.8	112 CLEAR
KYGA GOLETA	LIC	EDUCATIONAL MEDIA FOUNDATION CA BLED-20130307ABR	248B 97.5	890 1252	17.5 H 17.5 V	34-31-00 119-57-00	297.0	120.3	112 CLEAR
KBUU-LP MALIBU	CP	ZUMA BEACH FM EMERGENCY AND COMMUN CA BNPL-20131113BMD	248L1 97.5	9 175	0.05 H 0 V	34-02-04 118-48-33	238.6	1.4	24 SHORT
NEW SAN PEDRO	APP	SAN PEDRO HISPANIC COMMUNITY RADIO CA BNPL-20131112ALV	248L1 97.5	414 465	0.0011 H 0 V	33-44-00 118-20-00	127.9	52.9	24 CLEAR
NEW CANOGA PARK	APP	CANOGA PARK HISPANIC COMMUNITY CA BNPL-20131112ADP	248L1 97.5	299 672	0.0014 H 0 V	34-14-00 118-40-00	25.2	25.0	24 CLOSE
NEW LOS ANGELES	APP	COMUNIDAD HISPANA DE LOS ANGELES CA BNPL-20131112BHF	248L1 97.5	288 481	0.0015 H 0 V	34-07-00 118-22-00	76.1	40.0	24 CLEAR
NEW CASTAIC	CP MOD	SLOAN CANYON COMMUNICATIONS CA BMPL-20140430AAA	248L1 97.5	546 1248	0.001 H 0 V	34-34-10 118-44-20	4.3	58.7	24 CLEAR
KBUU-LP MALIBU	APP	ZUMA BEACH FM EMERGENCY AND COMMUN CA BMPL-20140530ACZ	248L1 97.5	160 291	0.0035 H 0 V	34-02-00 118-47-00	0.0	0.0	24 SHORT
NEW CASTAIC	APP	SLOAN CANYON COMMUNICATIONS CA BMPL-20140623AAG	248L1 97.5	106 594	0.0074 H 0 V	34-29-00 118-38-60	15.2	52.6	24 CLEAR
KTPI-FM MOJAVE	LIC	RZ RADIO LLC CA BLH-19880201KG	249A 97.7	91 945	3 H 3 V	34-58-00 118-10-00	28.4	118.7	56 CLEAR
KLAX-FM EAST LOS ANGELES	LIC	KLAX LICENSING, INC. CA BLH-19971231KC	250B 97.9	184 596	33 H 33 V	34-09-00 118-11-00	75.8	56.4	67 SHORT
KLAX-FM EAST LOS ANGELES	LIC	KLAX LICENSING, INC. CA BXMLH-20011015AAD	250B 97.9	119 189	14 H 14 V	34-00-00 118-21-00	95.3	39.3	67 SHORT
KCPK-LP PINE MOUNTAIN CL	CP MOD	CENTER OF THE WORLD FESTIVAL, INC. CA BMPL-20140505AAN	250L1 97.9	93 1672	0.01 H 0.01 V	34-51-20 119-09-10	339.2	96.2	0 CLEAR
K251AH GRAND TERRACE	LIC	THE ASSOCIATION FOR COMMUNITY EDUC CA BLFT-19970929TH	251D 98.1	337 747	0 H 0.008 V	34-01-00 117-17-00	90.4	137.9	21 CLEAR

TABLE 1 (con't)

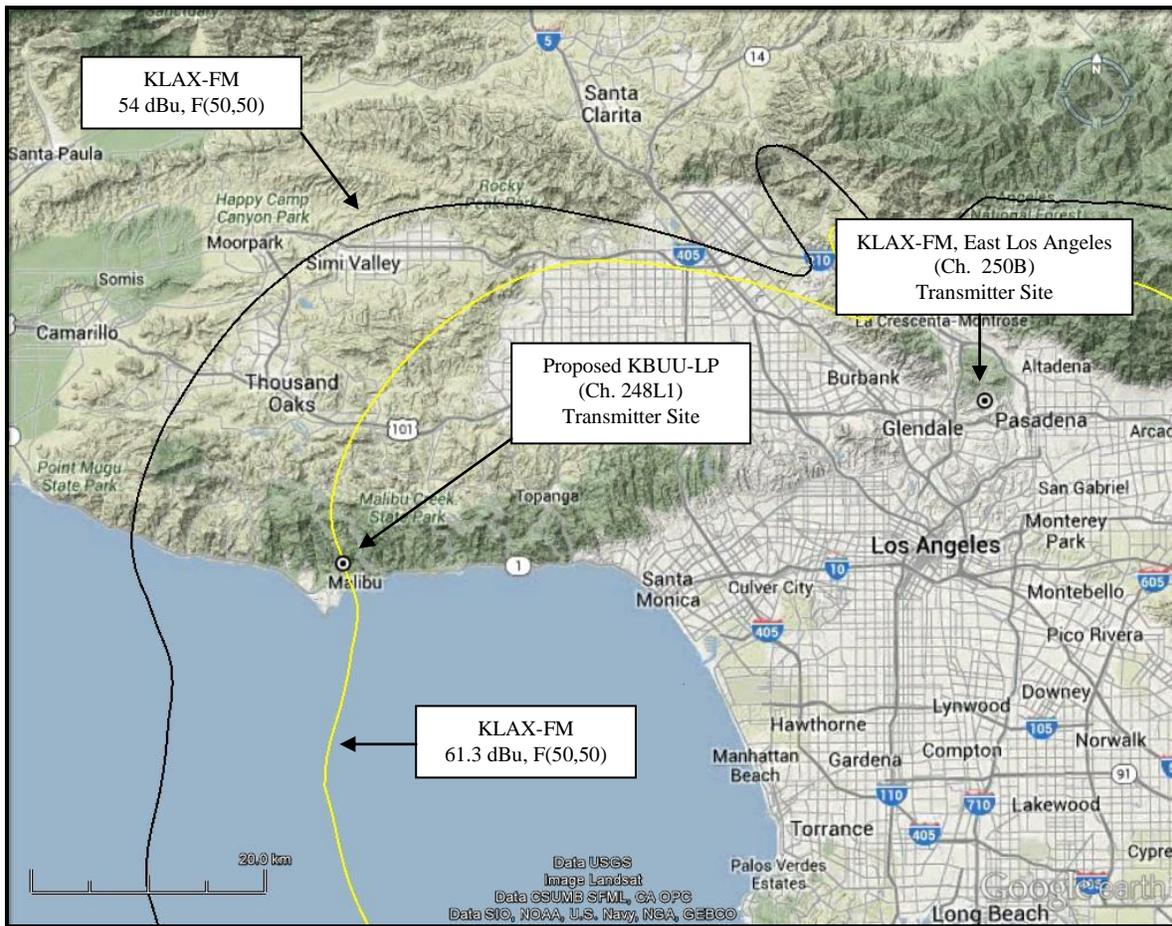
Callsign	Auth	Licensee	Chan	HAAT	ERP	Latitude	Bear	Dist	Req
City of License		State FCC File No.	Freq	HAMSL	(kW)	Longitude	(deg)	(km)	(km)
K251BK	CP	GOLD COAST BROADCASTING LLC	251D	722	0 H	34-41-00	15.3	74.0	21
THREE POINTS		CA BNPFT-20130829AGT	98.1	1756	0.0075 V	118-34-00			CLEAR
KCGV-LP	CP	CALIFORNIA FAMILY COUNSELING NETWO	251L1	0	0.1 H	35-02-60	352.1	111.3	0
LEBEC		CA BNPL-20131028AAX	98.1	257	0 V	118-57-60			CLEAR



3 - 16 km Radials Map

KBUU-LP, Malibu, CA
Channel 248 (97.5 MHz)
0.035 kW – DA, 50 m HAAT

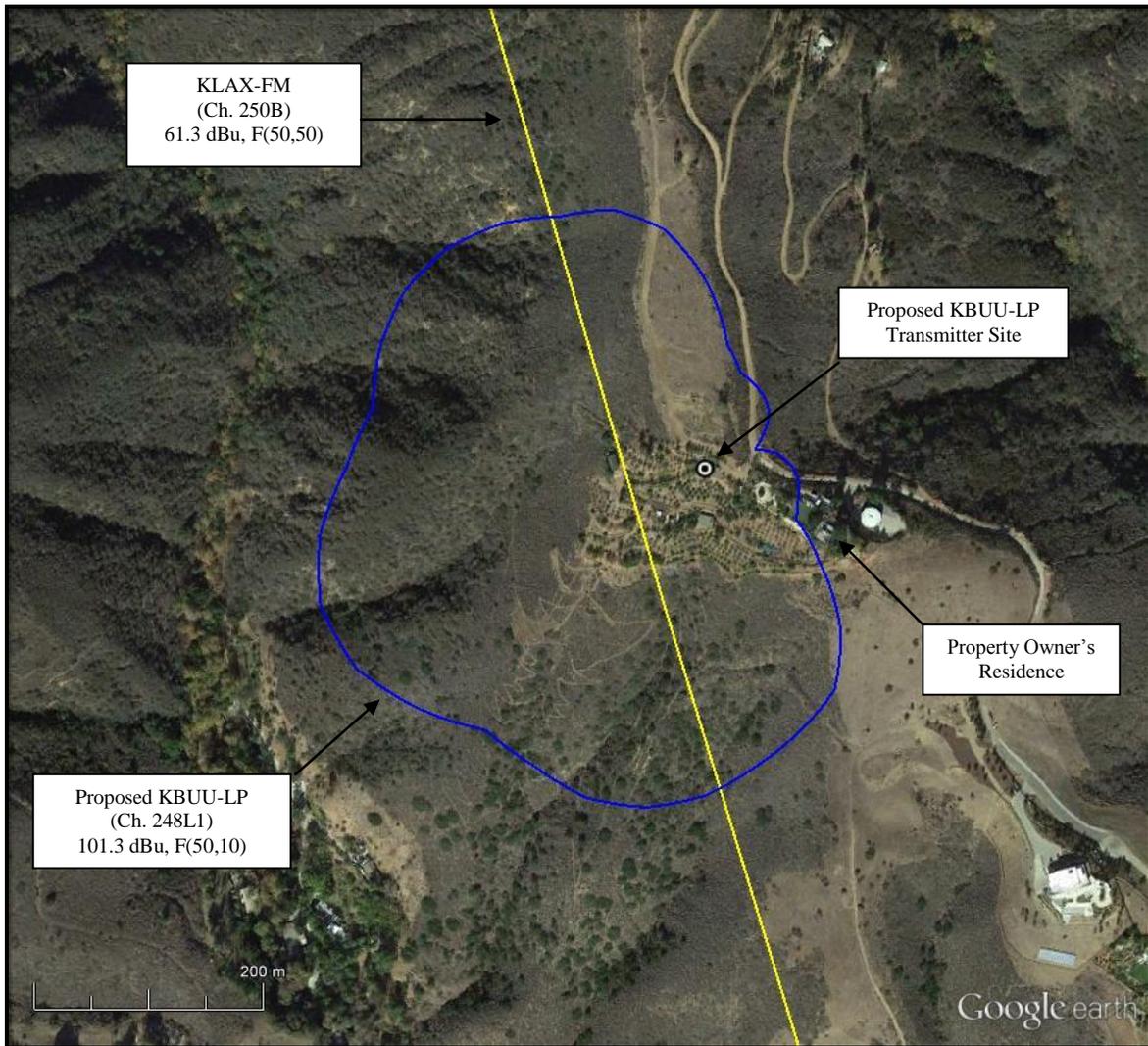
Figure 2



2nd Adjacent Contour Overlap Map

**KBUU-LP, Malibu, CA
Channel 248 (97.5 MHz)
0.035 kW – DA, 50 m HAAT**

Figure 3

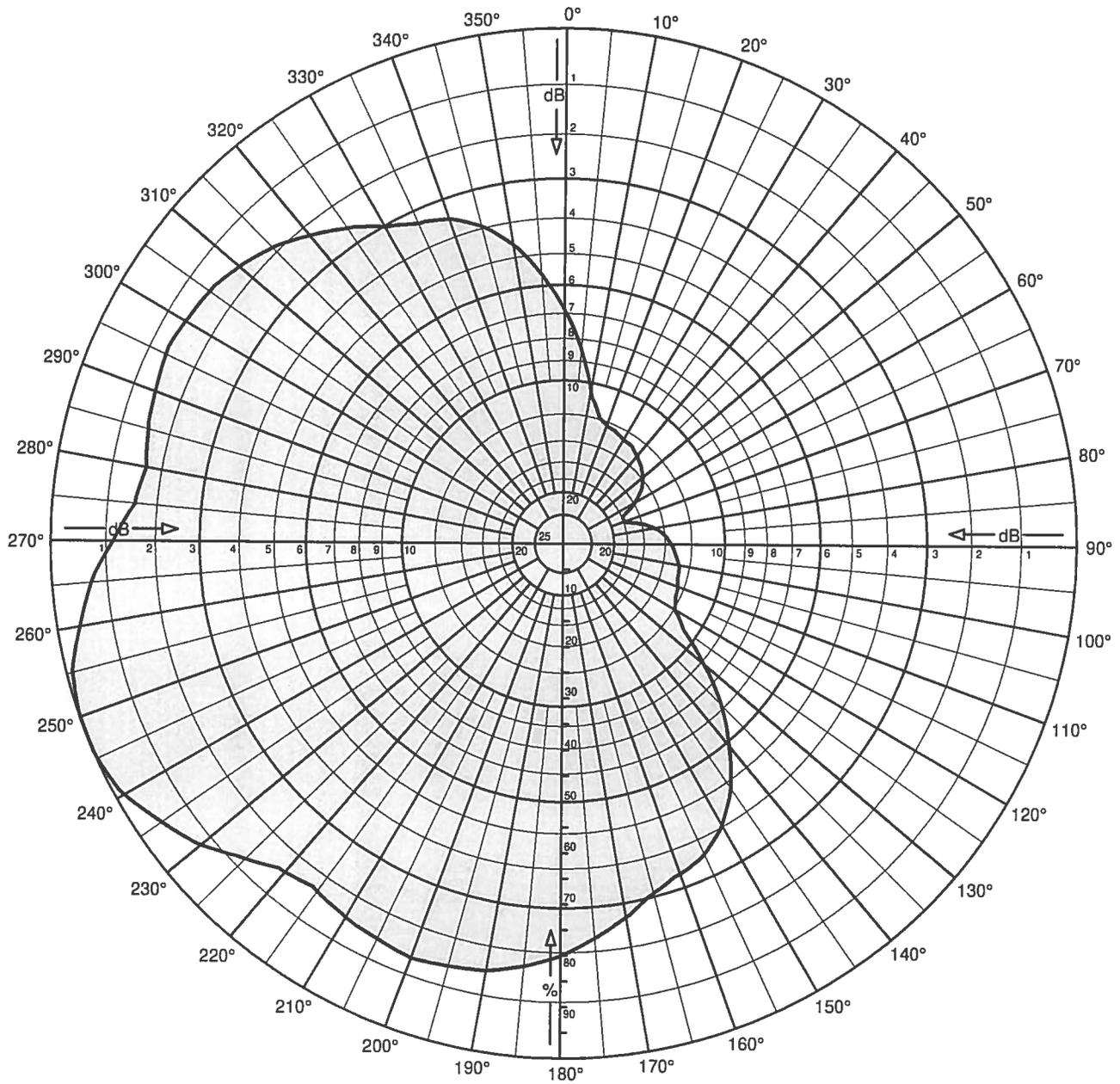


2nd Adjacent Contour Overlap - Aerial Photograph

**KBUU-LP, Malibu, CA
Channel 248 (97.5 MHz)
0.035 kW – DA, 50 m HAAT**

Figure 4

FIGURE 5A



Two CA2-FM/CP Antennas
 Oriented one each at 200 & 296 degrees
 Frequency: 97.5 MHz
 Gain: -1.0 dBd (x 0.8)
 Circular Polarization
 Horizontal plane Pattern

KATHREIN
SCALA DIVISION
 Post Office Box 4580 Phone:(541)779-6500
 Medford, OR 97501 (USA) Fax:(541)779-3991
<http://www.kathrein-scala.com>



FIGURE 5B

Two CA2-FM/CP Antennas

Oriented one each at 200 & 296 degrees

Frequency: 97.5 MHz

Gain: -1.0 dBd (x 0.8)

Circular Polarization

Horizontal plane Pattern

Angle	Field	Rel.dB	dBd	PwrMult	Angle	Field	Rel.dB	dBd	PwrMult
0	0.454	-6.86	-7.86	0.16	180	0.801	-1.93	-2.93	0.51
5	0.378	-8.45	-9.45	0.11	185	0.824	-1.68	-2.68	0.54
10	0.302	-10.39	-11.39	0.07	190	0.843	-1.48	-2.48	0.56
15	0.261	-11.67	-12.67	0.05	195	0.851	-1.40	-2.40	0.57
20	0.245	-12.22	-13.22	0.05	200	0.858	-1.33	-2.33	0.59
25	0.240	-12.39	-13.39	0.05	205	0.849	-1.42	-2.42	0.57
30	0.234	-12.63	-13.63	0.04	210	0.841	-1.50	-2.50	0.56
35	0.232	-12.71	-13.71	0.04	215	0.828	-1.64	-2.64	0.54
40	0.222	-13.06	-14.06	0.04	220	0.837	-1.55	-2.55	0.56
45	0.214	-13.40	-14.40	0.04	225	0.870	-1.21	-2.21	0.60
50	0.202	-13.88	-14.88	0.03	230	0.916	-0.77	-1.77	0.67
55	0.187	-14.58	-15.58	0.03	235	0.950	-0.45	-1.45	0.72
60	0.161	-15.86	-16.86	0.02	240	0.984	-0.14	-1.14	0.77
65	0.130	-17.73	-18.73	0.01	245	0.999	-0.01	-1.01	0.79
70	0.127	-17.92	-18.92	0.01	250	1.000	-0.00	-1.00	0.79
75	0.154	-16.23	-17.23	0.02	255	0.989	-0.10	-1.10	0.78
80	0.181	-14.84	-15.84	0.03	260	0.956	-0.39	-1.39	0.73
85	0.199	-14.01	-15.01	0.03	265	0.923	-0.69	-1.69	0.68
90	0.211	-13.50	-14.50	0.04	270	0.877	-1.14	-2.14	0.61
95	0.220	-13.13	-14.13	0.04	275	0.838	-1.54	-2.54	0.56
100	0.230	-12.78	-13.78	0.04	280	0.825	-1.67	-2.67	0.54
105	0.233	-12.64	-13.64	0.04	285	0.837	-1.55	-2.55	0.56
110	0.239	-12.45	-13.45	0.05	290	0.847	-1.44	-2.44	0.57
115	0.243	-12.31	-13.31	0.05	295	0.856	-1.35	-2.35	0.58
120	0.253	-11.95	-12.95	0.05	300	0.852	-1.39	-2.39	0.58
125	0.289	-10.80	-11.80	0.07	305	0.845	-1.47	-2.47	0.57
130	0.361	-8.84	-9.84	0.10	310	0.828	-1.64	-2.64	0.54
135	0.440	-7.14	-8.14	0.15	315	0.806	-1.87	-2.87	0.52
140	0.509	-5.86	-6.86	0.21	320	0.775	-2.21	-3.21	0.48
145	0.577	-4.78	-5.78	0.26	325	0.743	-2.59	-3.59	0.44
150	0.627	-4.05	-5.05	0.31	330	0.706	-3.02	-4.02	0.40
155	0.662	-3.58	-4.58	0.35	335	0.682	-3.32	-4.32	0.37
160	0.681	-3.34	-4.34	0.37	340	0.668	-3.51	-4.51	0.35
165	0.701	-3.08	-4.08	0.39	345	0.636	-3.93	-4.93	0.32
170	0.737	-2.66	-3.66	0.43	350	0.588	-4.62	-5.62	0.27
175	0.769	-2.28	-3.28	0.47	355	0.523	-5.62	-6.62	0.22