

TECHNICAL EXHIBIT  
AUXILIARY STATION CONSTRUCTION PERMIT  
STATION KUCD(FM)  
PEARL CITY, HAWAII  
CH 270C 50 KW (MAX-DA) 567 M

Technical Narrative

The technical exhibit of which this narrative is part was prepared on behalf of radio station KUCD(FM) at Pearl City, Hawaii. The KUCD(FM) main facility is presently licensed on Channel 270C with a maximum effective radiated power of 100 kilowatts employing a directional antenna and antenna height above average terrain of 599 meters.<sup>1</sup> By this instant application, KUCD(FM) is proposing a new auxiliary (stand-by) construction permit authorization. The proposed auxiliary transmitter site is located immediately adjacent to the main transmitter site. Several FM stations, including KUCD(FM), will employ this auxiliary transmitter site and common master FM antenna.

Transmitter Location

The proposed auxiliary site location is uniquely described by the following NAD-27 coordinates:

21° 23' 52.1" North Latitude  
158° 06' 01.1" West Longitude

A topographic map showing the locations of both the existing KUCD(FM) and proposed KUCD(FM) transmitter sites are shown in Figure 1. As can be seen, the proposed auxiliary site is located less than 200 feet away from the existing main transmitter site. A sketch showing the antenna and supporting structure is shown on Figure 2. It is proposed to operate with a maximum ERP of 50 kilowatts.

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<sup>1</sup> See FCC File No. BLH-19950202KA.

### Monitoring Station Impact

The KUCD(FM) main facility and herein proposed auxiliary facility are located near the FCC's Waipahu, Hawaii monitoring station. This FCC monitoring station is located 10.8 kilometers away from KUCD(FM) at an azimuth of 101.1 degrees, true with a depression angle of 3.6 degrees below the horizontal plane. The path profile between KUCD(FM) and the monitoring station is line-of-sight.

As KUCD(FM) is fully-spaced to all stations, the antenna directionality is not employed for allocation protection to other broadcast stations. The antenna is directional to (1) permit a lower operating transmitter power output to limit the amount of electrical power necessary for a Class C station and (2) protect the FCC monitoring station. The same type of directional antenna is that used by the main facility will be employed by the auxiliary facility, except it will employ 7 levels instead of the current 14 levels.

According to the KUCD(FM) license, the limit at the Waipahu monitoring station is 27 mV/m. Based upon past measurements made at the Waipahu monitoring station using the same type of transmission antenna and effective radiated power to be employed by the KUCD(FM) auxiliary, the 27 mV/m limit is not exceeded. Therefore, the KUCD(FM) herein proposed auxiliary facility is expected to be in compliance with the limit of 27 mV/m at the monitoring station.

The Appendix contains the manufacturer supplied vertical plane pattern for the proposed 7 level Shively 6014 panel antenna.

### Coverage Contours

The predicted 60 dBu coverage contours for the auxiliary operation and the existing main operation were calculated in accordance with the provisions of Section 73.313. In accordance with current FCC practice, the distances to the contours were calculated without consideration given to terrain roughness correction factors.

The average terrain elevations from 3 to 16 kilometers along eight radials evenly spaced at 45 degree intervals were obtained from the National Geophysical Data Center's (NGDC) 30-second terrain database. The terrain elevations were then used in combination with the effective radiated power for determining the distances to coverage contours.

Figure 3 is a map showing the predicted 60 dBu coverage contours for the licensed and proposed operations. As the map illustrates, the predicted auxiliary's 60-dBu contour is entirely encompassed by the primary station's 60-dBu contour except for a section over the Pacific Ocean. This is due to the fact that the licensed KUCD(FM) facility is authorized by its actual directional antenna pattern and not the pattern envelope that is now commonly used to define such stations employing directional antenna systems. An envelope is used to define the directional pattern of the auxiliary and this same envelope could be licensed by the main station. Therefore, there is no auxiliary contour extension beyond what the main KUCD(FM) facility would be if its directional pattern was defined by an envelope pattern. Furthermore, the contour extension from the auxiliary facility occurs over the Pacific Ocean.

#### Radiofrequency Electromagnetic Field Considerations

The KUCD(FM) auxiliary facilities will be surveyed at ground level with respect to the radiofrequency electromagnetic field considerations after construction is complete. The results of the survey will be provided with the application for license.

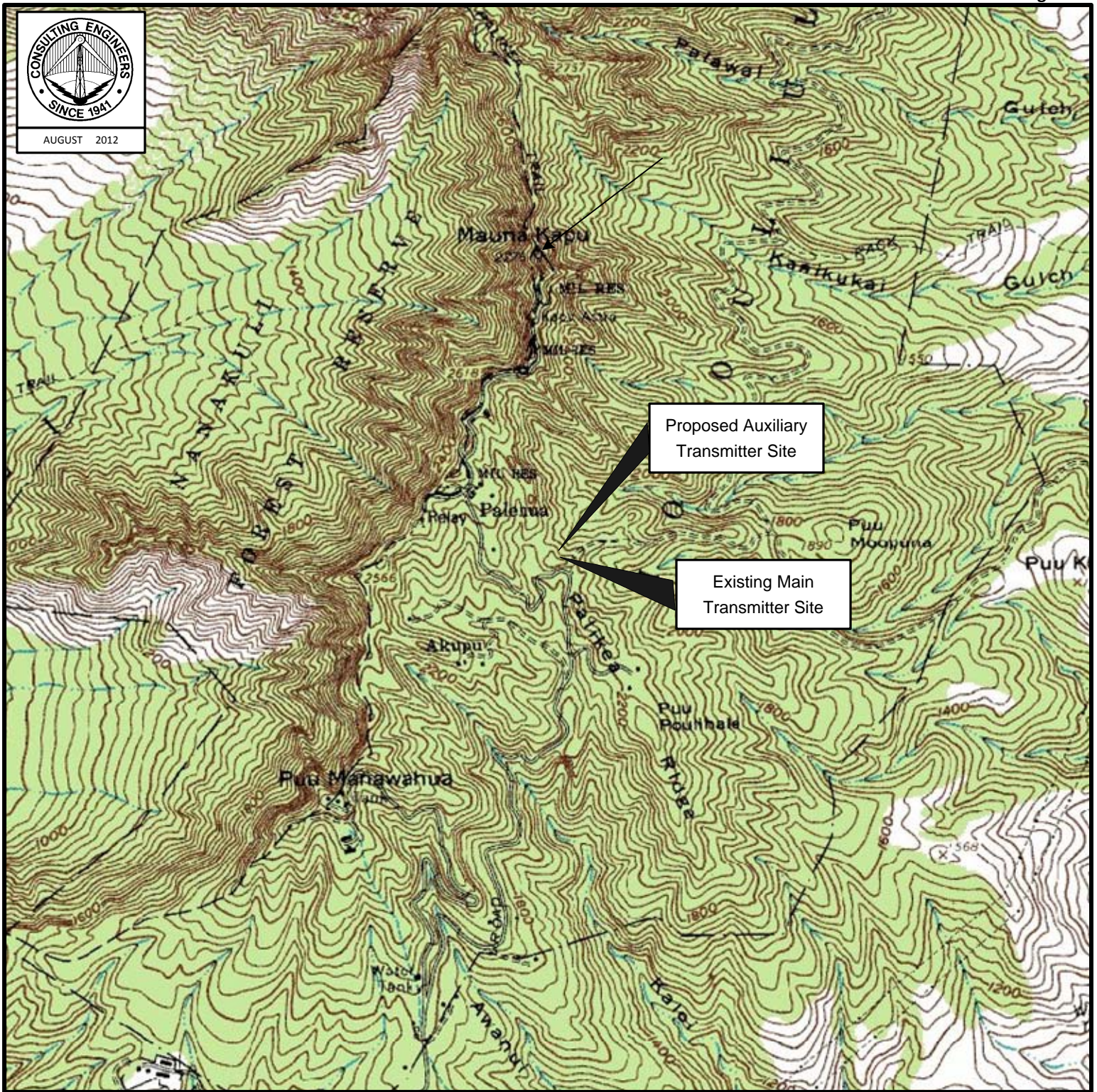
Charles A. Cooper

du Treil, Lundin & Rackley, Inc.  
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Sarasota, Florida 34237  
941.329.6000

August 27, 2012



Figure 1



## **PROPOSED TRANSMITTER SITE LOCATION**

AUXILIARY FM STATION KUCD(FM)

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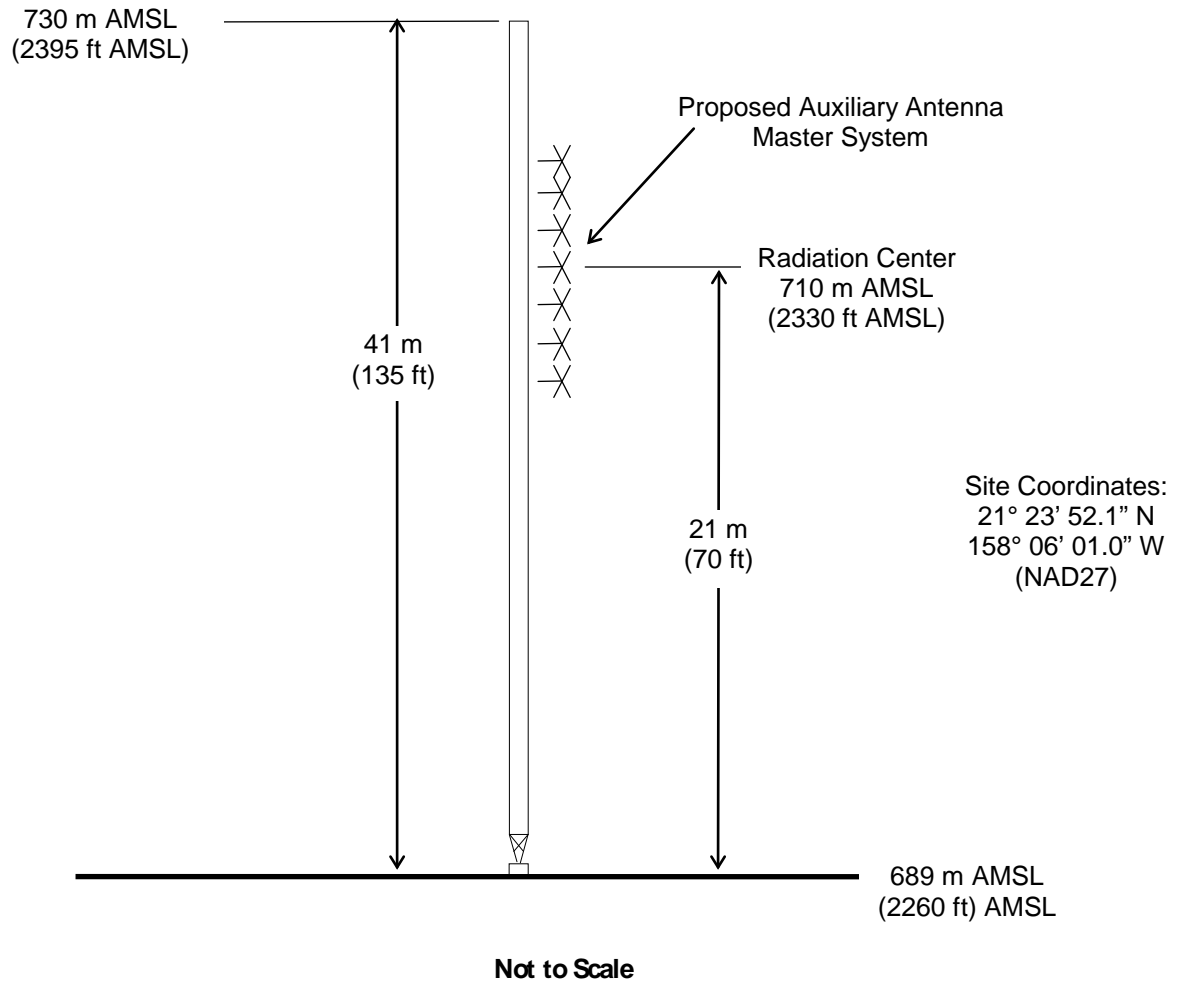
du Treil, Lundin & Rackley, Inc Sarasota, Florida



Figure 2



Registration No. N/A



## ANTENNA AND SUPPORTING STRUCTURE

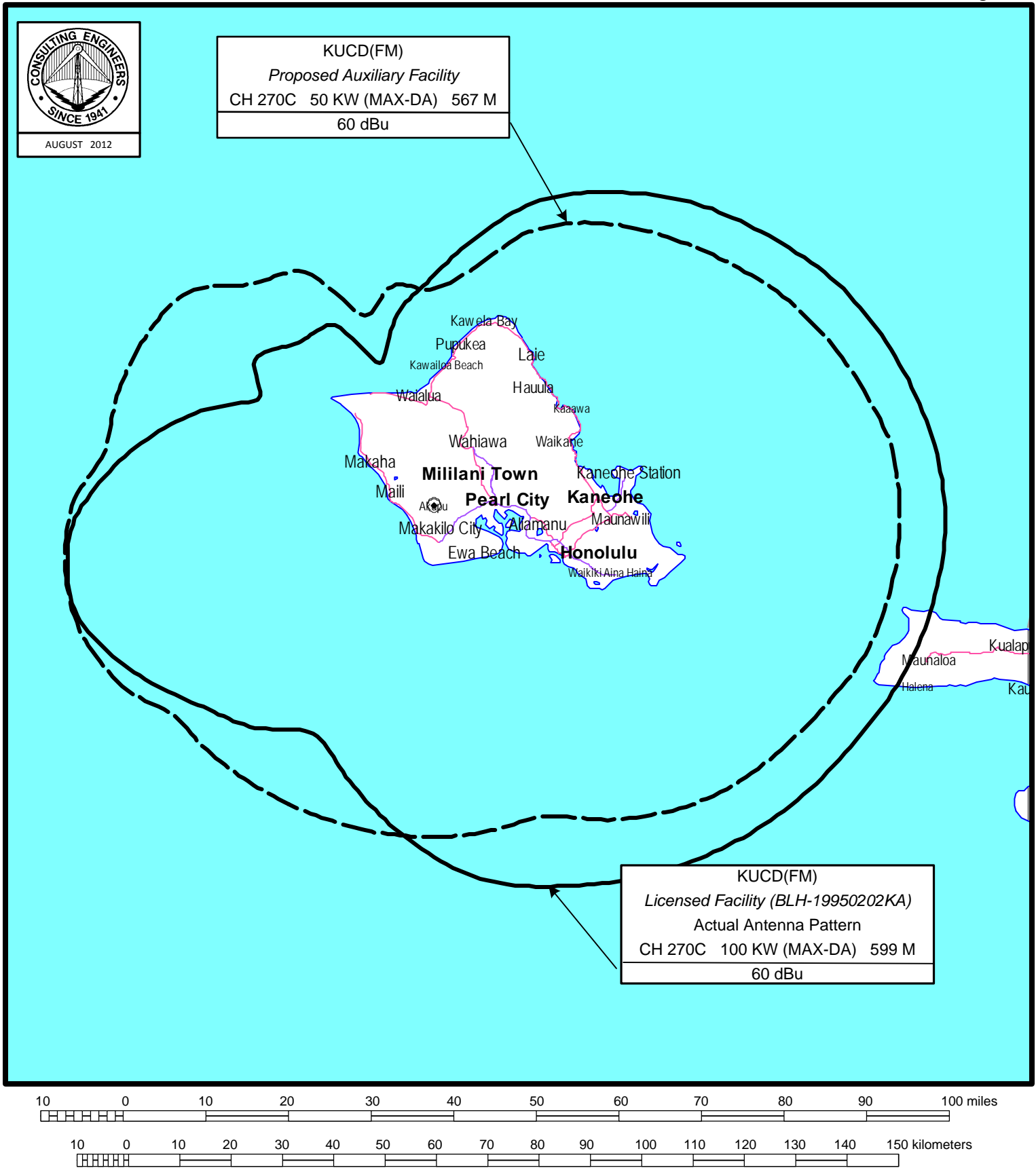
AUXILIARY STATION KUCD(FM)

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Figure 3



## PREDICTED COVERAGE CONTOURS

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## APPENDIX

### MANUFACTURER PROVIDED DIRECTIONAL ANTENNA VERTICAL PLANE PATTERN

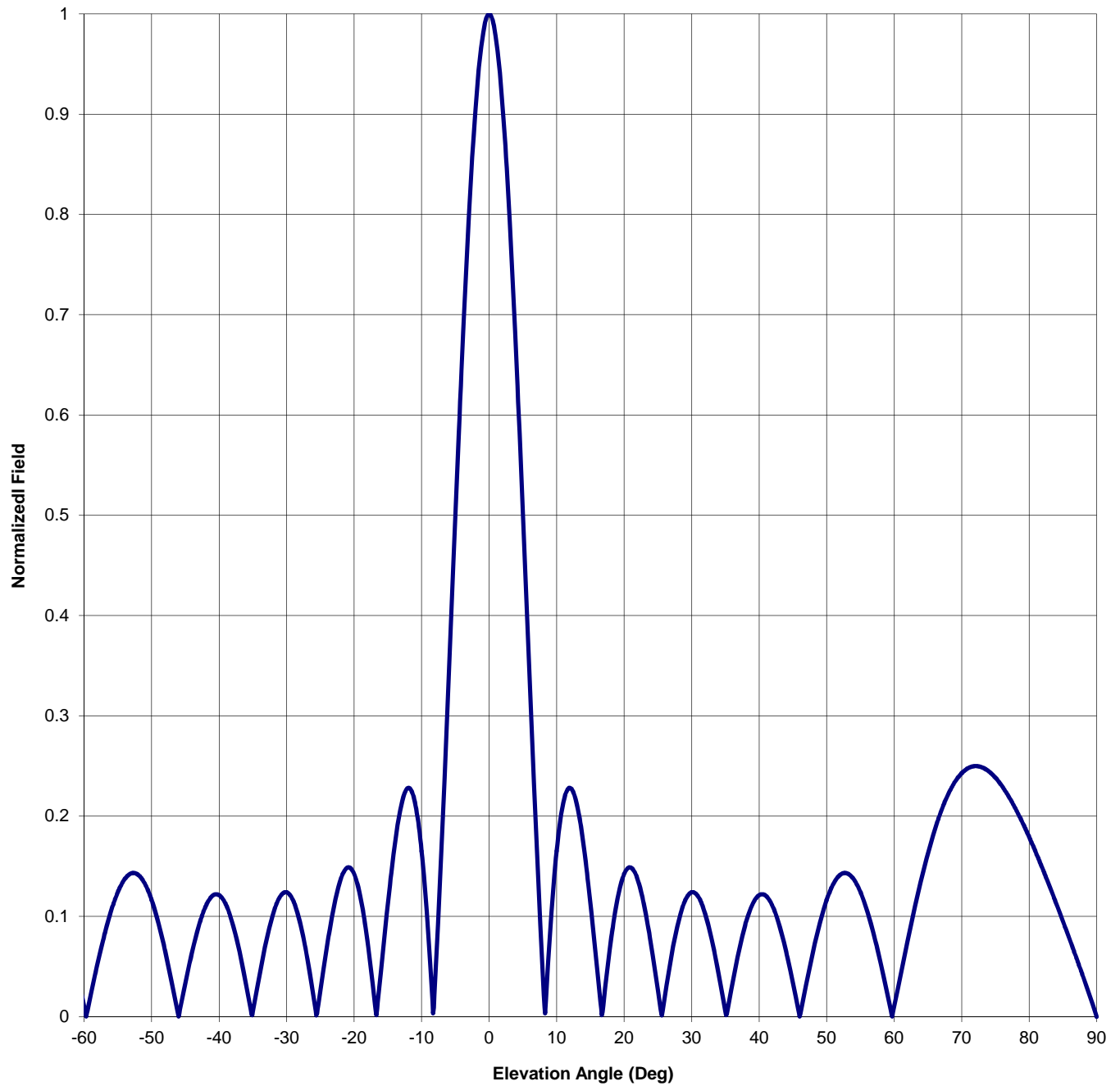
Antenna Mfg.: Shively Labs  
Antenna Type: 6014-14/1-DA

Date: 12/27/2011

Station: KUCD  
Frequency: 101.9  
Channel #: 270

Beam Tilt	0	
Gain (Max)	16.033	12.050 dB
Gain (Horizon)	16.033	12.050 dB

Figure: Figure 3





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Figure: Figure 3

Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field	Angle of Depression (Deg)	Relative Field
-90	0.000	-44	0.065	0	1.000	46	0.000
-89	0.020	-43	0.091	1	0.976	47	0.034
-88	0.040	-42	0.110	2	0.907	48	0.066
-87	0.059	-41	0.121	3	0.799	49	0.094
-86	0.077	-40	0.121	4	0.659	50	0.116
-85	0.095	-39	0.112	5	0.501	51	0.133
-84	0.113	-38	0.093	6	0.336	52	0.142
-83	0.130	-37	0.066	7	0.177	53	0.143
-82	0.147	-36	0.032	8	0.035	54	0.137
-81	0.164	-35	0.005	9	0.081	55	0.124
-80	0.179	-34	0.042	10	0.165	56	0.105
-79	0.194	-33	0.076	11	0.214	57	0.081
-78	0.207	-32	0.103	12	0.228	58	0.053
-77	0.219	-31	0.119	13	0.212	59	0.022
-76	0.230	-30	0.124	14	0.171	60	0.010
-75	0.238	-29	0.115	15	0.113	61	0.043
-74	0.245	-28	0.094	16	0.048	62	0.076
-73	0.249	-27	0.061	17	0.017	63	0.107
-72	0.250	-26	0.019	18	0.074	64	0.136
-71	0.248	-25	0.026	19	0.117	65	0.163
-70	0.243	-24	0.071	20	0.142	66	0.186
-69	0.234	-23	0.110	21	0.149	67	0.206
-68	0.222	-22	0.137	22	0.137	68	0.222
-67	0.206	-21	0.149	23	0.110	69	0.234
-66	0.186	-20	0.142	24	0.071	70	0.243
-65	0.163	-19	0.117	25	0.026	71	0.248
-64	0.136	-18	0.074	26	0.019	72	0.250
-63	0.107	-17	0.017	27	0.061	73	0.249
-62	0.076	-16	0.048	28	0.094	74	0.245
-61	0.043	-15	0.113	29	0.115	75	0.238
-60	0.010	-14	0.171	30	0.124	76	0.230
-59	0.022	-13	0.212	31	0.119	77	0.219
-58	0.053	-12	0.228	32	0.103	78	0.207
-57	0.081	-11	0.214	33	0.076	79	0.194
-56	0.105	-10	0.165	34	0.042	80	0.179
-55	0.124	-9	0.081	35	0.005	81	0.164
-54	0.137	-8	0.035	36	0.032	82	0.147
-53	0.143	-7	0.177	37	0.066	83	0.130
-52	0.142	-6	0.336	38	0.093	84	0.113
-51	0.133	-5	0.501	39	0.112	85	0.095
-50	0.116	-4	0.659	40	0.121	86	0.077
-49	0.094	-3	0.799	41	0.121	87	0.059
-48	0.066	-2	0.907	42	0.110	88	0.040
-47	0.034	-1	0.976	43	0.091	89	0.020
-46	0.000	0	1.000	44	0.065	90	0.000
-45	0.034			45	0.034		