

TECHNICAL EXHIBIT  
MINOR MODIFICATION APPLICATION  
STATION KHNL-DT (FACILITY ID 34867)  
HONOLULU, HAWAII

JUNE 28, 2005

CH 35 5.9 KW (MAX-DA) 453 M

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Technical Narrative

This Technical Exhibit was prepared on behalf of digital television broadcast station KHNL-DT at Honolulu, Hawaii. Station KHNL-DT is authorized for operation on channel 35 with a non-directional antenna effective radiated power (ERP) of 25 kW and an antenna height above average terrain (HAAT) of 39 meters (BPCDT-19991029AFK).

The proposed facility will not result in any extension of the allotted noise-limited contour as shown in Figure 3. Therefore, the proposal meets the terms of the FCC Filing Freeze for digital television stations.<sup>1</sup>

Proposed Facilities

KHNL-DT proposes to authorize and license its current STA facilities. Thus this application is to modify the current CP to match the STA operation. From the current authorization, there is a proposed change in coordinates, reduction in ERP and increase in antenna HAAT. There is no proposed change in channel (35) or city of license (Honolulu). The proposed site is located 30 kilometers west-northwest of the CP site and is described by the following NAD27 coordinates: 21-22-55 N, 158-06-19 W. A directional antenna maximum ERP of 5.9 kW and antenna HAAT of 453 meters are proposed. It is proposed to use a Dielectric TUA-C1-1/1H-1-S antenna at the 12.2 meter (40 foot) level on the proposed tower structure (see Figure 2). The proposed antenna radiation center above mean sea level is 560.8 meters.

Figure 3 is a map showing the predicted noise-limited (41 dBu) and city-grade (48 dBu) contours for the proposed operation, along with the noise-limited contour for the

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<sup>1</sup> See August 2004 Filing Freeze PN, DA 04-2446 (MB released Aug. 3, 2004).

allotted KHNL-DT operation. The Honolulu city limits were derived from information contained in the 2000 U.S. Census for Hawaii. The proposal complies with the city coverage requirements of Section 73.625(a).

#### Nearby Broadcast Facilities

The site is located where various other FM and TV broadcast stations operate. Although no adverse electromagnetic impact is expected, the applicant recognizes its responsibility to correct problems that result from its proposed DTV operation.

The closest FCC monitoring station is at Waipahu, Hawaii, approximately 11 kilometers to the east. There is no proposed change in current STA operation parameters. Longley-Rice calculations indicate the proposed operation (current STA) will provide 2.7 dB less signal at the Waipahu monitoring station as compared to the KHNL-DT CP (authorized) operation.

#### Allocation Considerations

Interference calculations have been made using the procedures outlined in the FCC's OET-69 bulletin, using a 2 kilometer grid spacing. The proposed KHNL-DT operation does not cause excessive (greater than 2%, up to 10% total) calculated interference to any analog or DTV assignment. Below is the list of stations considered in the OET-69 analysis.

Stations Potentially Affected by Proposed KHNL-DT						
Chan	Call	City/State	Dist(km)	Status	Application	Ref. No.
20	KIKU	HONOLULU HI	1.8	LIC	BLCT-19910806KE	
32	KBFD	HONOLULU HI	26.3	LIC	BLCT-19860903KF	
36	KAIH-TV	WAILUKU HI	205.7	CP	BPCDT-19991101AEI	
36	KAIH-DT	WAILUKU HI	205.7	PLN	DTVPLN-DTVP1010	
38	KALO	HONOLULU HI	1.6	LIC	BLET-20020520ABM	

The proposed KHNL-DT operation does not cause new calculated interference to any above listed analog or DTV or Class A station. Therefore, it is believed the proposal complies with the FCC's "de minimis" interference policy.

Radiofrequency Electromagnetic Field Exposure

The proposed KHNL-DT STA facilities were evaluated in terms of potential radio frequency (RF) energy exposure at ground level to workers and the general public. The radiation center for the proposed DTV STA antenna is located 12.2 meters above ground level with a maximum ERP of 5.9 kW. A conservative relative field value of 0.3 was assumed for the antenna calculation. The calculated power density at a point 2 meters above ground level will be  $0.17 \text{ mW/cm}^2$ . This is 42% of the FCC's recommended limit of  $0.40 \text{ mW/cm}^2$  for channel 35 for an "uncontrolled" environment.

The only other known or proposed broadcast operation within 1 kilometer is the STA for KFVE-DT. The KFVE-DT STA contributes a power density level of 31%. Thus, the combined power density for both operations is 73%, or less than 100% of the limit for an uncontrolled environment.

Access to the transmitting site will be restricted and appropriately marked with warning signs. In the event that workers or other authorized personnel enter restricted areas or climb the tower, appropriate measures will be taken to assure worker safety with respect to radio frequency radiation exposure. Such measures include reducing the average exposure by spreading out the work over a longer period of time, wearing "accepted" RFR protective clothing and/or RFR exposure monitors or scheduling work when the stations are at reduced power or shut down.



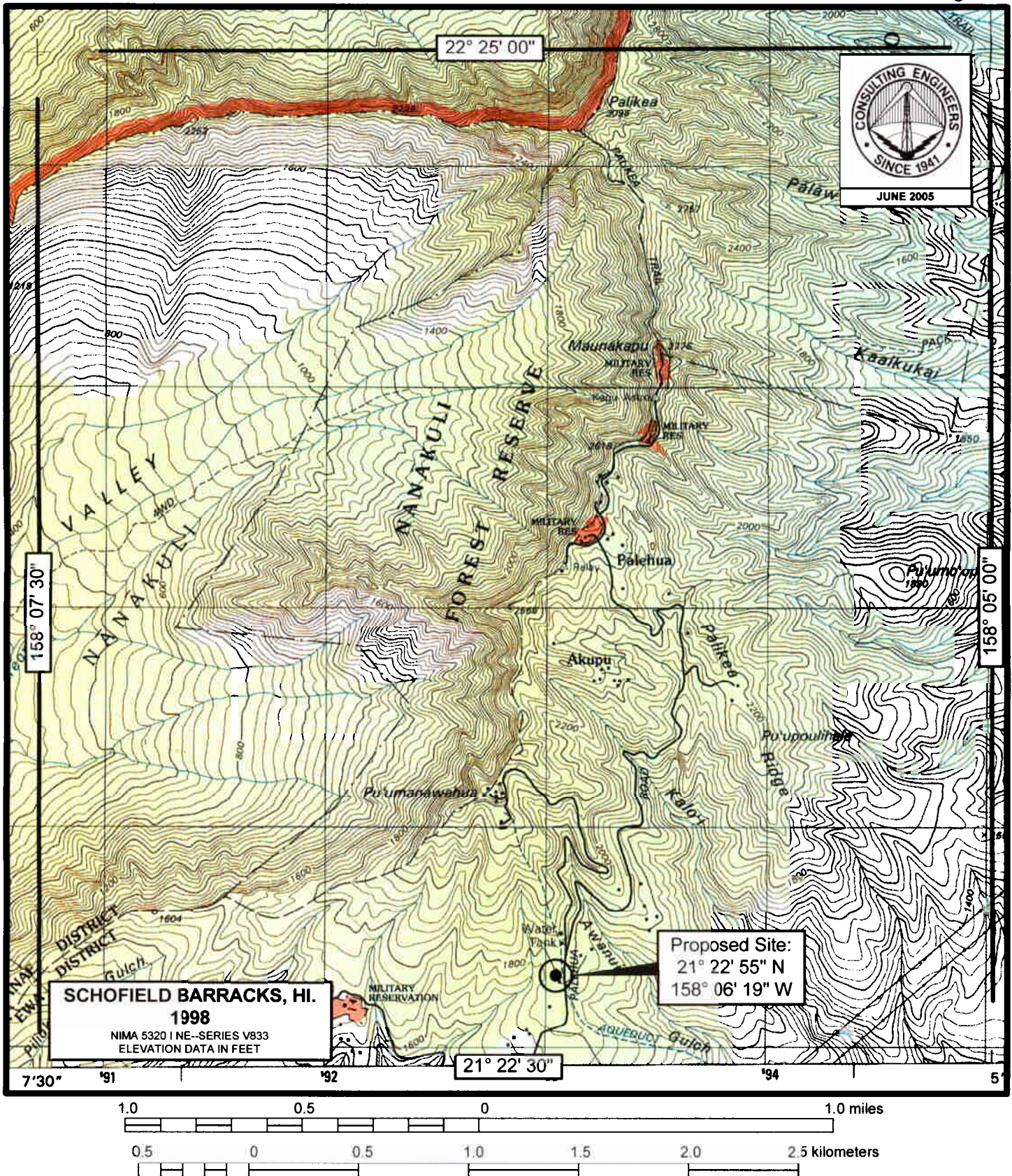
Jonathan N. Edwards

du Treil, Lundin & Rackley, Inc.  
201 Fletcher Avenue  
Sarasota, Florida 34237  
(941) 329-6000

June 28, 2005



Figure 1



## PROPOSED TRANSMITTER SITE

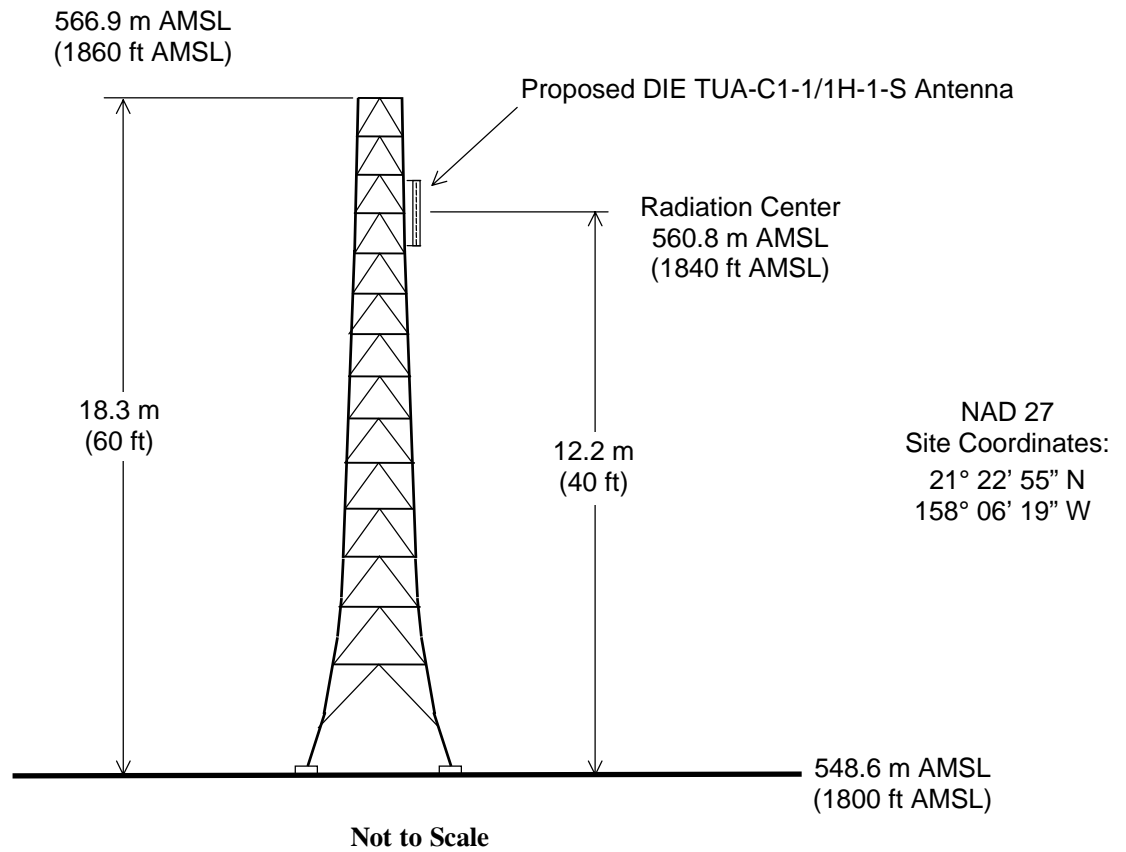
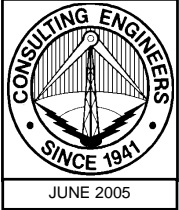
STATION KHNL-DT  
HONOLULU, HAWAII

CH 35 5.9 KW (MAX-DA) 453 M

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



Figure 2

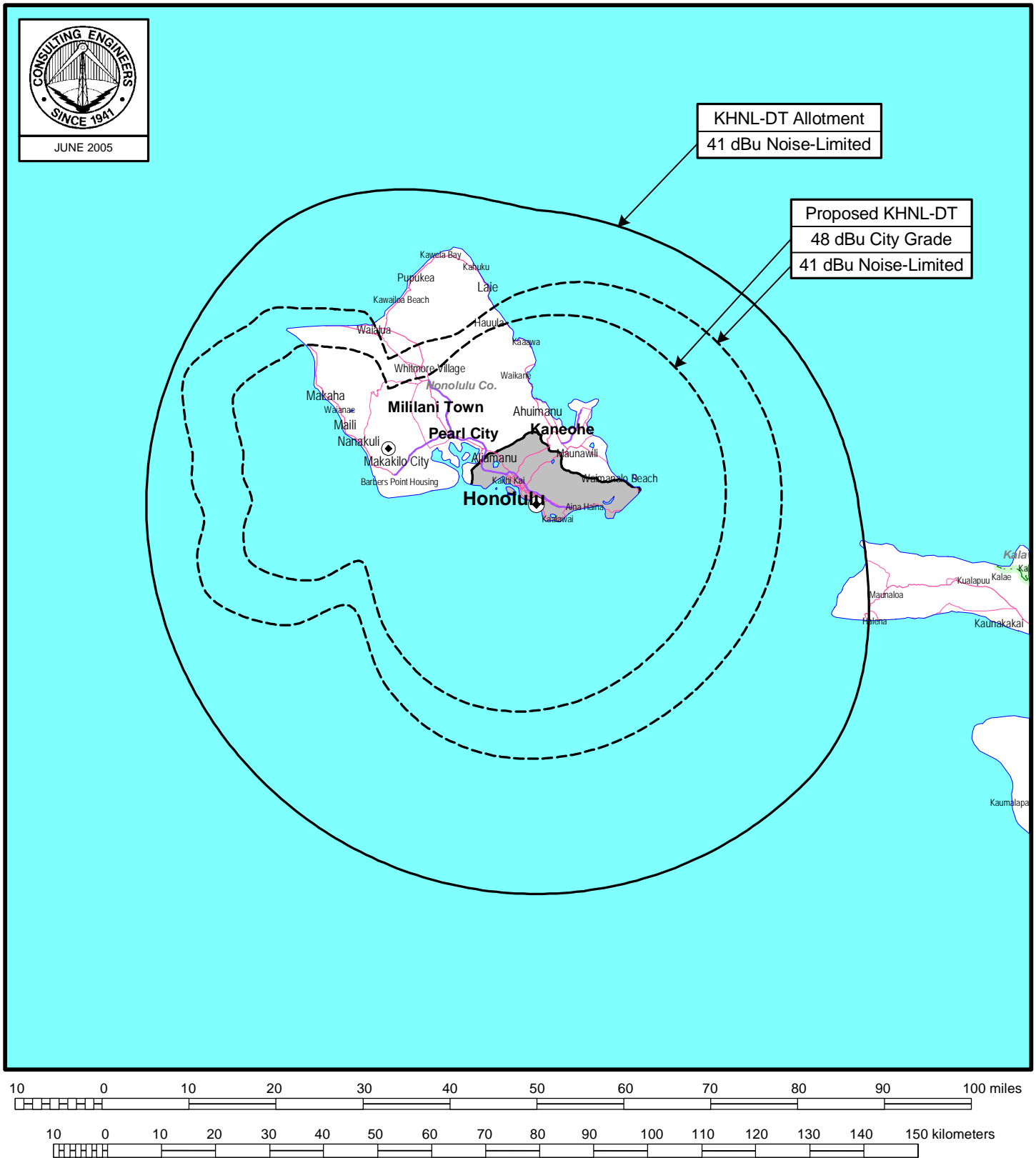


## **PROPOSED ANTENNA AND SUPPORTING STRUCTURE**

STATION KHNL-DT  
HONOLULU, HAWAII

**CH 35 5.9 KW (MAX-DA) 453 M**

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



## PREDICTED COVERAGE CONTOURS

STATION KHNL-DT

HONOLULU, HAWAII

CH 35 5.9 KW (MAX-DA) 453 M

du Treil, Lundin & Rackley, Inc Sarasota, Florida



Antenna Manufacturer Pattern Information



Proposal Number

Revision

Date

01 Jun 2004

Call Letters

KHNL-DT

Channel

35

Location

Honolulu, HI

Customer

Antenna Type

TUA-C1-1/1H-1-S

### AZIMUTH PATTERN

Gain

5.90 (7.71 dB)

Frequency

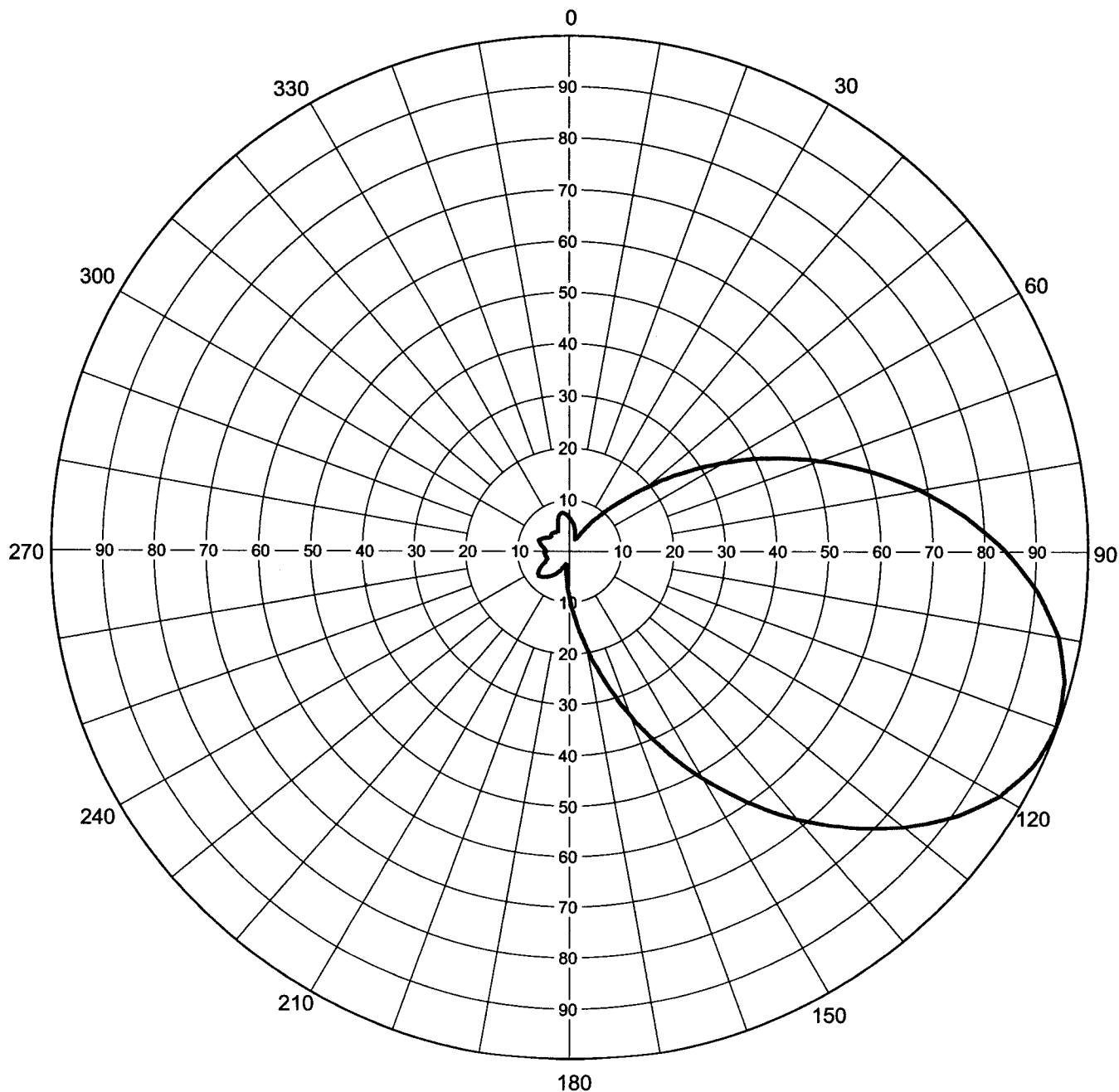
599 MHz

Calculated / Measured

Calculated

Drawing #

TUA-C1-5990



Remarks:



Proposal Number

Revision

Date

01 Jun 2004

Call Letters

KHNL-DT

Channel

35

Location

Honolulu, HI

Customer

Antenna Type

TUA-C1-1/1H-1-S

## TABULATION OF AZIMUTH PATTERN

Azimuth Pattern Drawing #

TUA-C1-5990

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.065	45	0.133	90	0.841	135	0.766	180	0.089	225	0.072	270	0.045	315	0.048
1	0.064	46	0.145	91	0.854	136	0.750	181	0.083	226	0.073	271	0.045	316	0.048
2	0.063	47	0.157	92	0.867	137	0.734	182	0.076	227	0.074	272	0.046	317	0.048
3	0.061	48	0.169	93	0.880	138	0.718	183	0.069	228	0.075	273	0.046	318	0.047
4	0.060	49	0.180	94	0.893	139	0.702	184	0.062	229	0.076	274	0.046	319	0.047
5	0.059	50	0.192	95	0.906	140	0.686	185	0.056	230	0.077	275	0.046	320	0.047
6	0.057	51	0.206	96	0.916	141	0.669	186	0.051	231	0.076	276	0.048	321	0.047
7	0.056	52	0.221	97	0.926	142	0.651	187	0.046	232	0.075	277	0.049	322	0.046
8	0.054	53	0.235	98	0.937	143	0.634	188	0.041	233	0.075	278	0.050	323	0.046
9	0.053	54	0.249	99	0.947	144	0.617	189	0.036	234	0.074	279	0.051	324	0.045
10	0.051	55	0.264	100	0.957	145	0.600	190	0.031	235	0.073	280	0.053	325	0.045
11	0.049	56	0.280	101	0.964	146	0.582	191	0.030	236	0.071	281	0.054	326	0.045
12	0.048	57	0.295	102	0.970	147	0.565	192	0.029	237	0.070	282	0.055	327	0.045
13	0.046	58	0.311	103	0.976	148	0.548	193	0.027	238	0.068	283	0.056	328	0.045
14	0.044	59	0.327	104	0.982	149	0.530	194	0.026	239	0.066	284	0.057	329	0.045
15	0.042	60	0.343	105	0.989	150	0.513	195	0.025	240	0.065	285	0.058	330	0.045
16	0.040	61	0.360	106	0.991	151	0.496	196	0.027	241	0.062	286	0.059	331	0.046
17	0.038	62	0.376	107	0.993	152	0.478	197	0.028	242	0.059	287	0.060	332	0.047
18	0.036	63	0.393	108	0.995	153	0.461	198	0.029	243	0.057	288	0.061	333	0.049
19	0.033	64	0.410	109	0.998	154	0.444	199	0.030	244	0.054	289	0.062	334	0.050
20	0.031	65	0.426	110	1.000	155	0.426	200	0.031	245	0.052	290	0.063	335	0.052
21	0.030	66	0.444	111	0.998	156	0.410	201	0.033	246	0.050	291	0.062	336	0.054
22	0.029	67	0.461	112	0.995	157	0.393	202	0.036	247	0.049	292	0.061	337	0.057
23	0.028	68	0.478	113	0.993	158	0.376	203	0.038	248	0.047	293	0.060	338	0.059
24	0.027	69	0.496	114	0.991	159	0.360	204	0.040	249	0.046	294	0.059	339	0.062
25	0.025	70	0.513	115	0.989	160	0.343	205	0.042	250	0.045	295	0.058	340	0.065
26	0.026	71	0.530	116	0.982	161	0.327	206	0.044	251	0.045	296	0.057	341	0.066
27	0.027	72	0.548	117	0.976	162	0.311	207	0.046	252	0.045	297	0.056	342	0.068
28	0.029	73	0.565	118	0.970	163	0.295	208	0.048	253	0.045	298	0.055	343	0.070
29	0.030	74	0.582	119	0.964	164	0.280	209	0.049	254	0.045	299	0.054	344	0.071
30	0.031	75	0.600	120	0.957	165	0.264	210	0.051	255	0.045	300	0.053	345	0.073
31	0.036	76	0.617	121	0.947	166	0.249	211	0.053	256	0.045	301	0.051	346	0.074
32	0.041	77	0.634	122	0.937	167	0.235	212	0.054	257	0.046	302	0.050	347	0.075
33	0.046	78	0.651	123	0.926	168	0.221	213	0.056	258	0.046	303	0.049	348	0.075
34	0.051	79	0.669	124	0.916	169	0.206	214	0.057	259	0.047	304	0.048	349	0.076
35	0.056	80	0.686	125	0.906	170	0.192	215	0.059	260	0.047	305	0.046	350	0.077
36	0.062	81	0.702	126	0.893	171	0.180	216	0.060	261	0.047	306	0.046	351	0.076
37	0.069	82	0.718	127	0.880	172	0.169	217	0.061	262	0.047	307	0.046	352	0.075
38	0.076	83	0.734	128	0.867	173	0.157	218	0.063	263	0.048	308	0.046	353	0.074
39	0.083	84	0.750	129	0.854	174	0.145	219	0.064	264	0.048	309	0.045	354	0.073
40	0.089	85	0.766	130	0.841	175	0.133	220	0.065	265	0.048	310	0.045	355	0.072
41	0.098	86	0.781	131	0.826	176	0.125	221	0.067	266	0.047	311	0.046	356	0.071
42	0.107	87	0.796	132	0.811	177	0.116	222	0.068	267	0.047	312	0.046	357	0.070
43	0.116	88	0.811	133	0.796	178	0.107	223	0.070	268	0.046	313	0.047	358	0.068
44	0.125	89	0.826	134	0.781	179	0.098	224	0.071	269	0.046	314	0.047	359	0.067

Remarks:



Proposal Number

Revision

Date

01 Jun 2004

Call Letters

KHNL-DT

Channel

35

Location

Honolulu, HI

Customer

Antenna Type

TUA-C1-1/1H-1-S

**ELEVATION PATTERN**

RMS Gain at Main Lobe

**2.4 (3.80 dB)**

Beam Tilt

**0.00 Degrees**

RMS Gain at Horizontal

**2.4 (3.80 dB)**

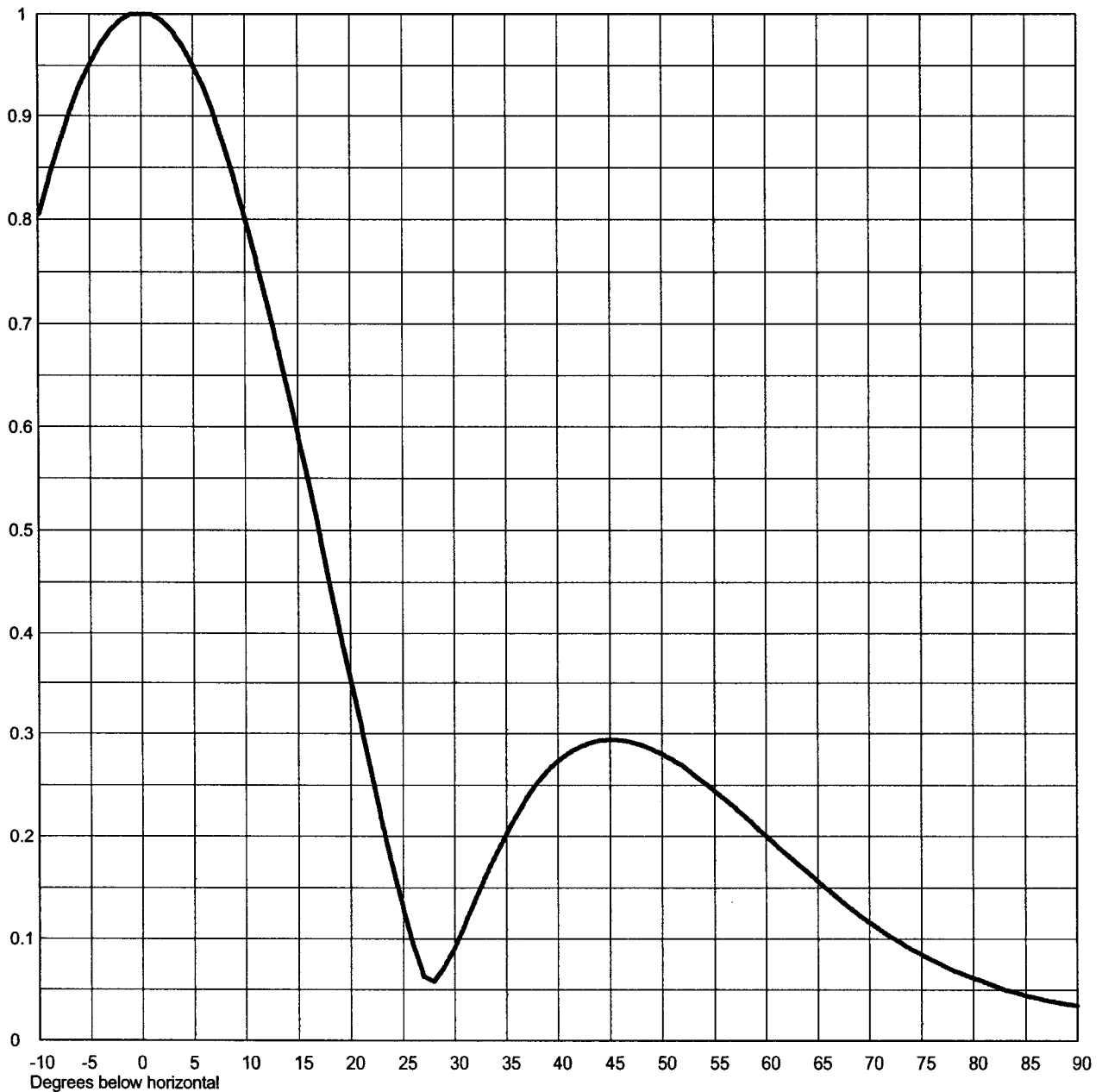
Frequency

**599.00 MHz**

Calculated / Measured

**Calculated**

Drawing #

**01U024000-5990-90**

Remarks:



Proposal Number

Revision

Date

01 Jun 2004

Call Letters

KHNL-DT

Channel

35

Location

Honolulu, HI

Customer

Antenna Type

TUA-C1-1/1H-1-S

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #

01U024000-5990-90

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.801	2.4	0.990	10.6	0.778	30.5	0.103	51.0	0.274	71.5	0.106
-9.5	0.819	2.6	0.988	10.8	0.771	31.0	0.114	51.5	0.271	72.0	0.102
-9.0	0.837	2.8	0.986	11.0	0.763	31.5	0.126	52.0	0.268	72.5	0.099
-8.5	0.854	3.0	0.984	11.5	0.744	32.0	0.138	52.5	0.264	73.0	0.096
-8.0	0.871	3.2	0.981	12.0	0.724	32.5	0.150	53.0	0.260	73.5	0.093
-7.5	0.886	3.4	0.978	12.5	0.703	33.0	0.161	53.5	0.256	74.0	0.090
-7.0	0.902	3.6	0.975	13.0	0.682	33.5	0.172	54.0	0.253	74.5	0.087
-6.5	0.916	3.8	0.972	13.5	0.660	34.0	0.182	54.5	0.248	75.0	0.085
-6.0	0.930	4.0	0.969	14.0	0.639	34.5	0.192	55.0	0.244	75.5	0.082
-5.5	0.940	4.2	0.965	14.5	0.616	35.0	0.202	55.5	0.240	76.0	0.079
-5.0	0.950	4.4	0.962	15.0	0.593	35.5	0.211	56.0	0.236	76.5	0.076
-4.5	0.960	4.6	0.958	15.5	0.571	36.0	0.220	56.5	0.232	77.0	0.074
-4.0	0.969	4.8	0.954	16.0	0.548	36.5	0.229	57.0	0.228	77.5	0.071
-3.5	0.977	5.0	0.950	16.5	0.524	37.0	0.238	57.5	0.224	78.0	0.069
-3.0	0.984	5.2	0.946	17.0	0.500	37.5	0.245	58.0	0.219	78.5	0.067
-2.8	0.986	5.4	0.942	17.5	0.475	38.0	0.252	58.5	0.214	79.0	0.065
-2.6	0.988	5.6	0.938	18.0	0.449	38.5	0.258	59.0	0.209	79.5	0.063
-2.4	0.990	5.8	0.934	18.5	0.425	39.0	0.264	59.5	0.205	80.0	0.061
-2.2	0.992	6.0	0.930	19.0	0.400	39.5	0.268	60.0	0.200	80.5	0.059
-2.0	0.994	6.2	0.924	19.5	0.377	40.0	0.273	60.5	0.196	81.0	0.058
-1.8	0.995	6.4	0.918	20.0	0.353	40.5	0.277	61.0	0.191	81.5	0.056
-1.6	0.996	6.6	0.913	20.5	0.331	41.0	0.281	61.5	0.187	82.0	0.054
-1.4	0.998	6.8	0.907	21.0	0.308	41.5	0.283	62.0	0.182	82.5	0.052
-1.2	0.999	7.0	0.902	21.5	0.284	42.0	0.286	62.5	0.178	83.0	0.050
-1.0	1.000	7.2	0.895	22.0	0.261	42.5	0.288	63.0	0.174	83.5	0.049
-0.8	1.000	7.4	0.889	22.5	0.237	43.0	0.291	63.5	0.170	84.0	0.047
-0.6	1.000	7.6	0.883	23.0	0.213	43.5	0.292	64.0	0.165	84.5	0.046
-0.4	1.000	7.8	0.877	23.5	0.192	44.0	0.293	64.5	0.161	85.0	0.044
-0.2	1.000	8.0	0.871	24.0	0.171	44.5	0.294	65.0	0.156	85.5	0.043
0.0	1.000	8.2	0.864	24.5	0.151	45.0	0.294	65.5	0.152	86.0	0.042
0.2	1.000	8.4	0.857	25.0	0.131	45.5	0.294	66.0	0.148	86.5	0.041
0.4	1.000	8.6	0.851	25.5	0.112	46.0	0.294	66.5	0.144	87.0	0.040
0.6	1.000	8.8	0.844	26.0	0.093	46.5	0.293	67.0	0.139	87.5	0.039
0.8	1.000	9.0	0.837	26.5	0.078	47.0	0.292	67.5	0.135	88.0	0.038
1.0	1.000	9.2	0.830	27.0	0.062	47.5	0.290	68.0	0.131	88.5	0.037
1.2	0.999	9.4	0.823	27.5	0.060	48.0	0.289	68.5	0.127	89.0	0.036
1.4	0.998	9.6	0.816	28.0	0.058	48.5	0.287	69.0	0.123	89.5	0.035
1.6	0.996	9.8	0.808	28.5	0.065	49.0	0.285	69.5	0.119	90.0	0.034
1.8	0.995	10.0	0.801	29.0	0.072	49.5	0.282	70.0	0.116		
2.0	0.994	10.2	0.794	29.5	0.081	50.0	0.280	70.5	0.113		
2.2	0.992	10.4	0.786	30.0	0.091	50.5	0.277	71.0	0.109		

Remarks: