



Proposal #: **EM-070918-1** Antenna Type: **TUM-C5SP-14/60H-2-T-R** Channel: **30 DTV**  
 Call Letters: **KQED-DT** Location: **San Francisco, CA**

Electrical Specifications		Value		Remarks	
		Ratio	dBd		
RMS Gain at Main Lobe over Halfwave Dipole	Hpol	21.1	13.24		
	Vpol	4.2	6.23		
RMS Gain at Horizontal over Halfwave Dipole	Hpol	11.4	10.57		
	Vpol	2.3	3.62		
Peak Directional Gain over Halfwave Dipole	Hpol	40.1	16.03		
	Vpol	8.0	9.03		
Peak Directional Gain at Horizontal over Halfwave Dipole	Hpol	21.7	13.36		
	Vpol	4.3	6.33		
Circularity Directional		dB			
Axial Ratio		dB			
Beam Tilt		0.75 deg			
Average Power		96 kW	19.82 dBk		
Antenna Input: T/L 2 x		6-1/8 in	50.0 ohm	Type: EIA/DCA	
Maximum Antenna Input VSWR		Channel 1.10 : 1		Notes: 5 psi dry air or Nitrogen required.	
Patterns	Azimuth	TUM-C5SP-5690 TUM-C5SP-5690			
	Elevation	14U263075 14U263075-90			
Mechanical Specifications		Metric	English	Preliminary	
Height with Lightning Protector	H4	m	ft		
Height Less Lightning Protector	H2	17.8 m	58.5 ft		
Height of Center of Radiation	H3	8.0 m	27.6 ft		
Basic Wind Speed	V	136.8 km/h	85 mi/h		
Structure Class IV	Exposure Category C		Topographic Category 1		TIA/EIA-222-G.
Effective Projected Area	(EPA)s	TBD m²	TBD ft²		
Moment Arm	D1	m	ft		
Effective Projected Area	(EPA)s	m²	ft²		
Moment Arm	D3	m	ft		
Weight	W	TBD t	TBD lbs		
Radome Full Cylindrical					
Antenna designed in accordance with AISC specifications for design of structural steel for building as prescribed by TIA/EIA-222-G.					

NOTE:

Prepared By : **EHM** Approved By : **AJS**  
 Original Date : **18-Sep-07**

This document contains proprietary and confidential information of Dielectric Communications and SPX Corporation. It is to be used solely for the purpose for which it is provided. No disclosure, reproduction, or use of this document or any part of it may be made without the written permission of Dielectric Communications or SPX Corporation.

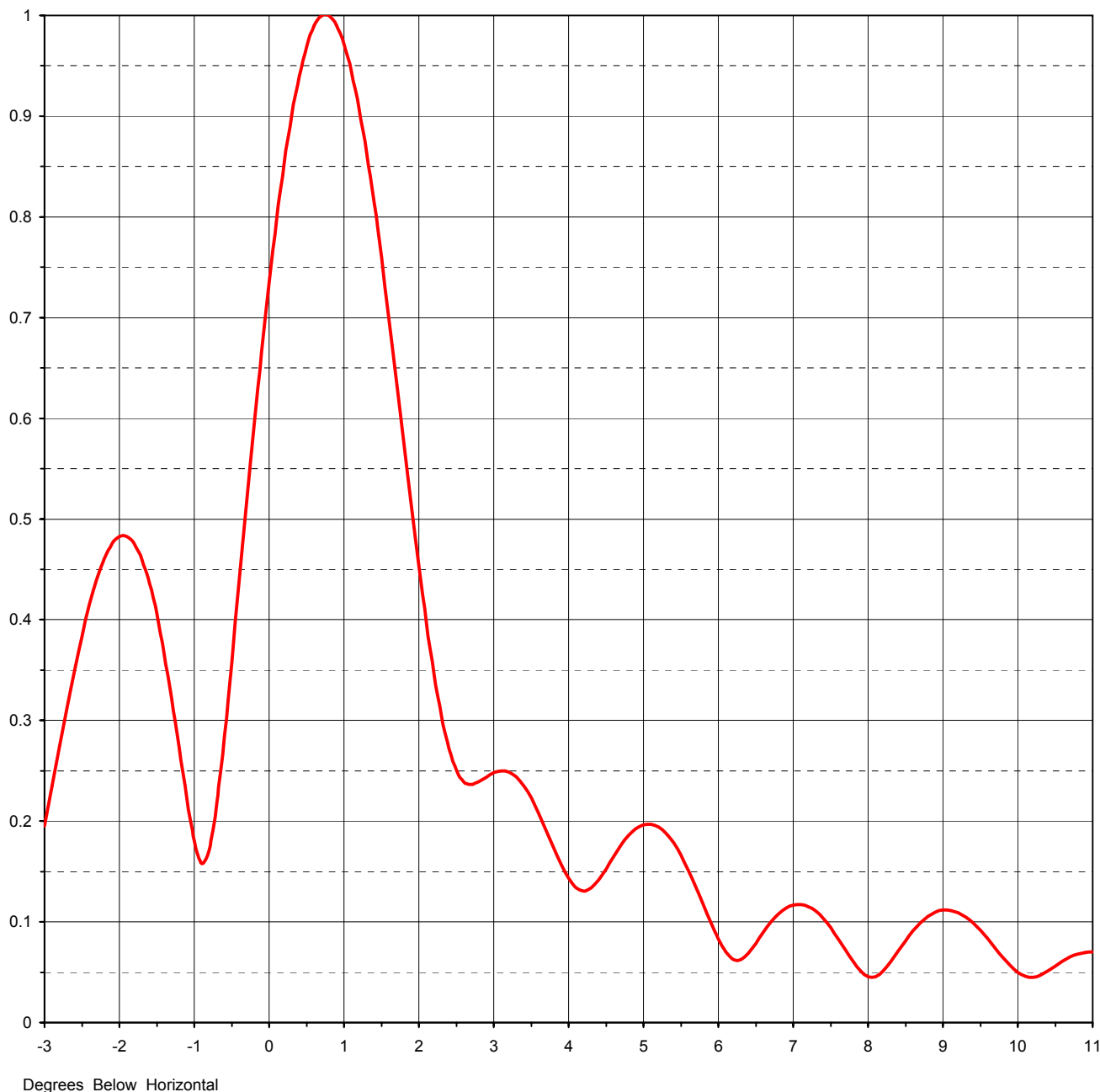


Proposal Number **EM-070918-1**  
Date **18-Sep-07**  
Call Letters **KQED-DT** Channel **30**  
Location **San Francisco, CA**  
Customer  
Antenna Type **TUM-C5SP-14/60H-2-T-R**

## ELEVATION PATTERN

RMS Gain at Main Lobe **25.30 ( 14.03 dB )**  
RMS Gain at Horizontal **13.70 ( 11.37 dB )**  
Calculated / Measured **Calculated**

Beam Tilt **0.75 deg**  
Frequency **569.00 MHz**  
Drawing # **14U263075**

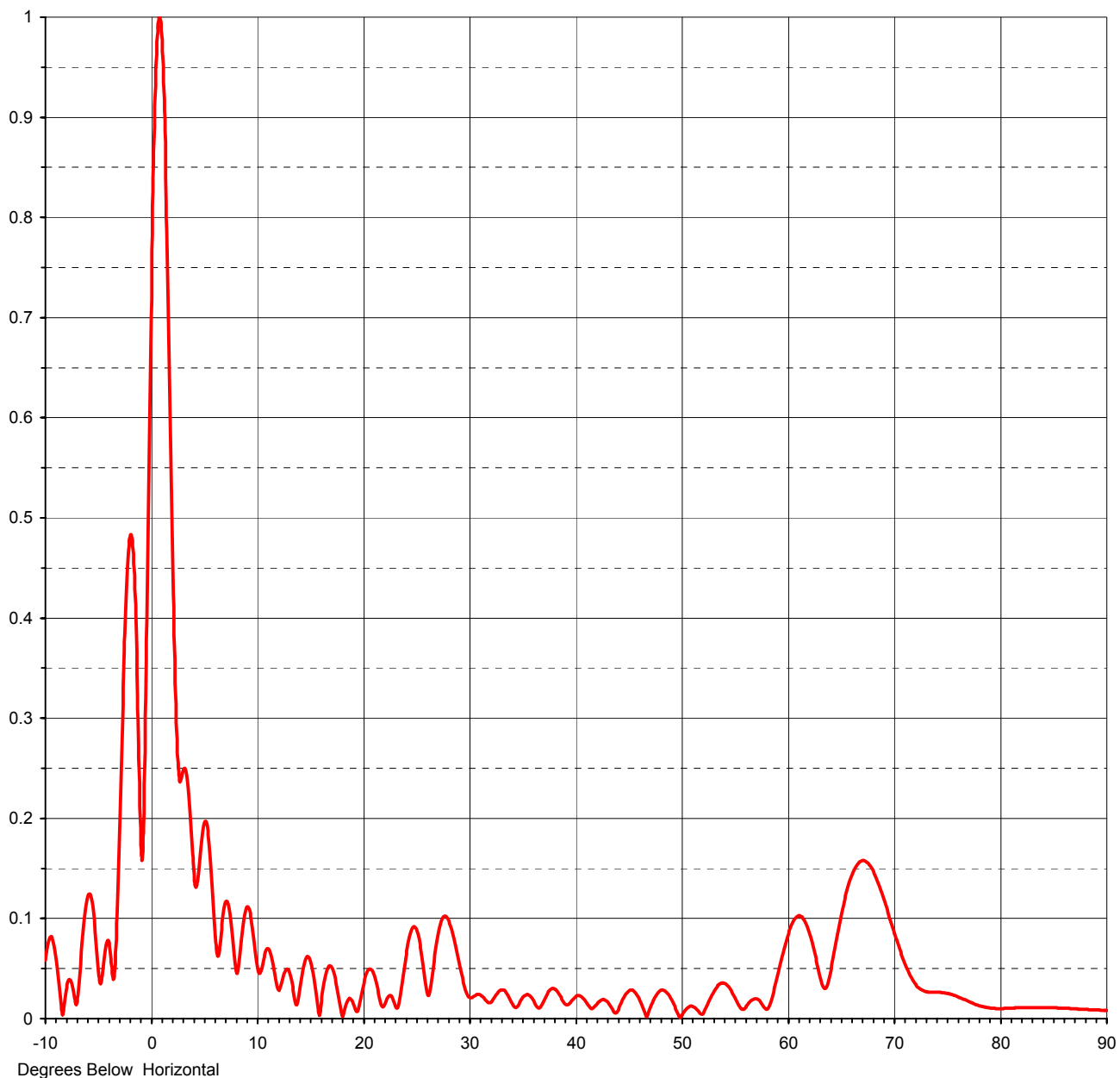




Proposal Number	<b>EM-070918-1</b>		
Date	<b>18-Sep-07</b>		
Call Letters	<b>KQED-DT</b>	Channel	<b>30</b>
Location	<b>San Francisco, CA</b>		
Customer			
Antenna Type	<b>TUM-C5SP-14/60H-2-T-R</b>		

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>25.30 ( 14.03 dB )</b>	Beam Tilt	<b>0.75 deg</b>
RMS Gain at Horizontal	<b>13.70 ( 11.37 dB )</b>	Frequency	<b>569.00 MHz</b>
Calculated / Measured	<b>Calculated</b>	Drawing #	<b>14U263075-90</b>





Proposal Number **EM-070918-1**  
Date **18-Sep-07**  
Call Letters **KQED-DT** Channel **30**  
Location **San Francisco, CA**  
Customer  
Antenna Type **TUM-C5SP-14/60H-2-T-R**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **14U263075-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.059	2.4	0.272	10.6	0.056	30.5	0.023	51.0	0.013	71.5	0.043
-9.5	0.082	2.6	0.239	10.8	0.065	31.0	0.024	51.5	0.009	72.0	0.034
-9.0	0.061	2.8	0.239	11.0	0.070	31.5	0.019	52.0	0.005	72.5	0.029
-8.5	0.012	3.0	0.248	11.5	0.057	32.0	0.016	52.5	0.014	73.0	0.027
-8.0	0.031	3.2	0.249	12.0	0.029	32.5	0.023	53.0	0.026	73.5	0.026
-7.5	0.035	3.4	0.235	12.5	0.041	33.0	0.029	53.5	0.033	74.0	0.026
-7.0	0.019	3.6	0.208	13.0	0.048	33.5	0.026	54.0	0.036	74.5	0.026
-6.5	0.080	3.8	0.174	13.5	0.025	34.0	0.017	54.5	0.031	75.0	0.025
-6.0	0.122	4.0	0.143	14.0	0.024	34.5	0.012	55.0	0.022	75.5	0.024
-5.5	0.108	4.2	0.131	14.5	0.056	35.0	0.020	55.5	0.012	76.0	0.022
-5.0	0.048	4.4	0.142	15.0	0.060	35.5	0.024	56.0	0.010	76.5	0.019
-4.5	0.057	4.6	0.164	15.5	0.033	36.0	0.019	56.5	0.017	77.0	0.017
-4.0	0.075	4.8	0.185	16.0	0.010	36.5	0.011	57.0	0.020	77.5	0.015
-3.5	0.042	5.0	0.197	16.5	0.043	37.0	0.017	57.5	0.016	78.0	0.013
-3.0	0.195	5.2	0.194	17.0	0.052	37.5	0.027	58.0	0.009	78.5	0.012
-2.8	0.274	5.4	0.178	17.5	0.035	38.0	0.030	58.5	0.019	79.0	0.011
-2.6	0.350	5.6	0.151	18.0	0.006	38.5	0.024	59.0	0.039	79.5	0.010
-2.4	0.414	5.8	0.117	18.5	0.016	39.0	0.015	59.5	0.061	80.0	0.010
-2.2	0.461	6.0	0.083	19.0	0.018	39.5	0.015	60.0	0.081	80.5	0.010
-2.0	0.483	6.2	0.063	19.5	0.007	40.0	0.022	60.5	0.096	81.0	0.011
-1.8	0.475	6.4	0.069	20.0	0.031	40.5	0.023	61.0	0.102	81.5	0.011
-1.6	0.436	6.6	0.089	20.5	0.048	41.0	0.017	61.5	0.100	82.0	0.011
-1.4	0.367	6.8	0.108	21.0	0.045	41.5	0.010	62.0	0.088	82.5	0.011
-1.2	0.273	7.0	0.117	21.5	0.025	42.0	0.014	62.5	0.069	83.0	0.011
-1.0	0.181	7.2	0.115	22.0	0.013	42.5	0.019	63.0	0.046	83.5	0.011
-0.8	0.172	7.4	0.104	22.5	0.023	43.0	0.018	63.5	0.030	84.0	0.011
-0.6	0.284	7.6	0.084	23.0	0.015	43.5	0.010	64.0	0.043	84.5	0.011
-0.4	0.437	7.8	0.061	23.5	0.021	44.0	0.007	64.5	0.077	85.0	0.011
-0.2	0.592	8.0	0.045	24.0	0.057	44.5	0.019	65.0	0.104	85.5	0.011
0.0	0.735	8.2	0.051	24.5	0.086	45.0	0.027	65.5	0.127	86.0	0.010
0.2	0.853	8.4	0.071	25.0	0.090	45.5	0.028	66.0	0.144	86.5	0.010
0.4	0.940	8.6	0.091	25.5	0.068	46.0	0.021	66.5	0.154	87.0	0.010
0.6	0.989	8.8	0.105	26.0	0.030	46.5	0.008	67.0	0.158	87.5	0.009
0.8	1.000	9.0	0.112	26.5	0.040	47.0	0.008	67.5	0.155	88.0	0.009
1.0	0.972	9.2	0.109	27.0	0.078	47.5	0.021	68.0	0.147	88.5	0.009
1.2	0.908	9.4	0.099	27.5	0.100	48.0	0.028	68.5	0.134	89.0	0.009
1.4	0.814	9.6	0.083	28.0	0.100	48.5	0.027	69.0	0.119	89.5	0.009
1.6	0.700	9.8	0.074	28.5	0.084	49.0	0.021	69.5	0.102	90.0	0.008
1.8	0.576	10.0	0.057	29.0	0.059	49.5	0.010	70.0	0.085		
2.0	0.454	10.2	0.046	29.5	0.036	50.0	0.002	70.5	0.069		
2.2	0.347	10.4	0.047	30.0	0.022	50.5	0.010	71.0	0.055		



Proposal Number

**EM-070918-1**

Date

**18-Sep-07**

Call Letters

**KQED-DT**

Channel

**30**

Location

**San Francisco, CA**

Customer

Antenna Type

**TUM-C5SP-14/60H-2-T-R**

## AZIMUTH PATTERN

Gain

**1.90**

**( 2.79 dB)**

Calculated / Measured

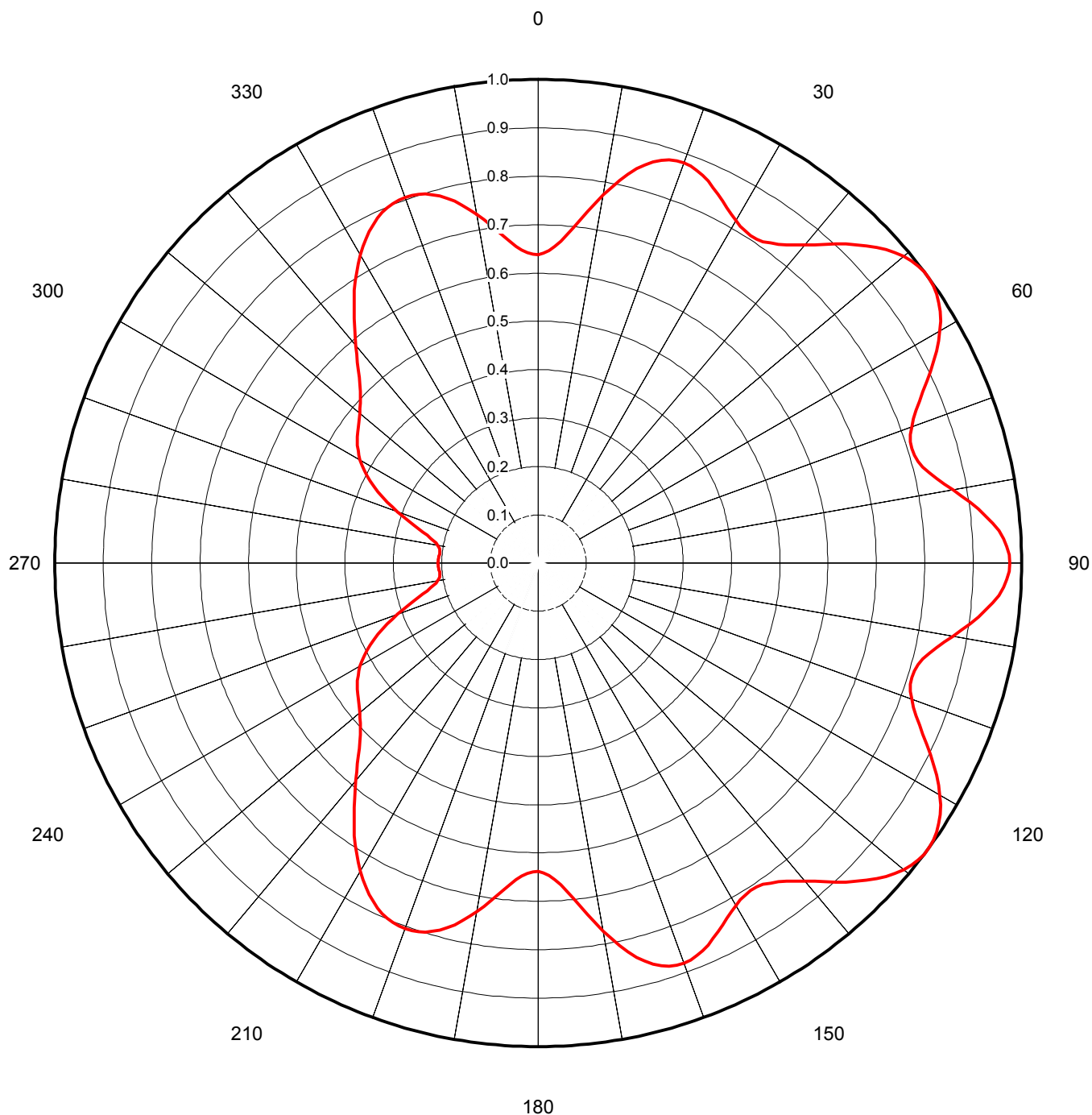
**Calculated**

Frequency

**569.00 MHz**

Drawing #

**TUM-C5SP-5690**





Proposal Number

**EM-070918-1**

Date

**18-Sep-07**

Call Letters

**KQED-DT**

Channel

**30**

Location

**San Francisco, CA**

Customer

Antenna Type

**TUM-C5SP-14/60H-2-T-R****TABULATION OF AZIMUTH PATTERN**Azimuth Pattern Drawing #: **TUM-C5SP-5690**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
0	0.638	45	0.931	90	0.976	135	0.931	180	0.638	225	0.522	270	0.207	315	0.522
1	0.640	46	0.944	91	0.974	136	0.916	181	0.638	226	0.512	271	0.207	316	0.533
2	0.646	47	0.957	92	0.970	137	0.902	182	0.642	227	0.503	272	0.207	317	0.545
3	0.655	48	0.968	93	0.964	138	0.887	183	0.648	228	0.495	273	0.206	318	0.558
4	0.667	49	0.978	94	0.955	139	0.873	184	0.656	229	0.488	274	0.206	319	0.572
5	0.681	50	0.986	95	0.944	140	0.859	185	0.667	230	0.482	275	0.205	320	0.587
6	0.698	51	0.993	96	0.931	141	0.846	186	0.679	231	0.476	276	0.205	321	0.602
7	0.715	52	0.997	97	0.917	142	0.835	187	0.691	232	0.471	277	0.205	322	0.617
8	0.734	53	1.000	98	0.902	143	0.825	188	0.705	233	0.466	278	0.206	323	0.633
9	0.754	54	1.000	99	0.886	144	0.817	189	0.718	234	0.461	279	0.208	324	0.649
10	0.773	55	0.998	100	0.870	145	0.812	190	0.732	235	0.456	280	0.211	325	0.664
11	0.791	56	0.994	101	0.856	146	0.808	191	0.744	236	0.451	281	0.215	326	0.680
12	0.809	57	0.988	102	0.842	147	0.807	192	0.756	237	0.446	282	0.221	327	0.695
13	0.825	58	0.981	103	0.830	148	0.809	193	0.767	238	0.439	283	0.229	328	0.709
14	0.840	59	0.971	104	0.820	149	0.812	194	0.777	239	0.433	284	0.237	329	0.723
15	0.852	60	0.960	105	0.813	150	0.817	195	0.786	240	0.425	285	0.247	330	0.736
16	0.863	61	0.947	106	0.809	151	0.824	196	0.793	241	0.417	286	0.258	331	0.748
17	0.871	62	0.933	107	0.808	152	0.831	197	0.798	242	0.408	287	0.270	332	0.759
18	0.876	63	0.918	108	0.809	153	0.840	198	0.802	243	0.398	288	0.283	333	0.770
19	0.879	64	0.902	109	0.814	154	0.848	199	0.804	244	0.387	289	0.296	334	0.779
20	0.880	65	0.887	110	0.822	155	0.857	200	0.805	245	0.375	290	0.310	335	0.786
21	0.879	66	0.872	111	0.831	156	0.864	201	0.804	246	0.363	291	0.323	336	0.793
22	0.876	67	0.857	112	0.843	157	0.871	202	0.802	247	0.350	292	0.337	337	0.798
23	0.871	68	0.843	113	0.857	158	0.876	203	0.798	248	0.337	293	0.350	338	0.802
24	0.864	69	0.831	114	0.872	159	0.879	204	0.793	249	0.323	294	0.363	339	0.804
25	0.857	70	0.822	115	0.887	160	0.880	205	0.786	250	0.310	295	0.375	340	0.805
26	0.848	71	0.814	116	0.902	161	0.879	206	0.779	251	0.296	296	0.387	341	0.804
27	0.840	72	0.809	117	0.918	162	0.876	207	0.770	252	0.283	297	0.398	342	0.802
28	0.831	73	0.808	118	0.933	163	0.871	208	0.759	253	0.270	298	0.408	343	0.798
29	0.824	74	0.809	119	0.947	164	0.863	209	0.748	254	0.258	299	0.417	344	0.793
30	0.817	75	0.813	120	0.960	165	0.852	210	0.736	255	0.247	300	0.425	345	0.786
31	0.812	76	0.820	121	0.971	166	0.840	211	0.723	256	0.237	301	0.433	346	0.777
32	0.809	77	0.830	122	0.981	167	0.825	212	0.709	257	0.229	302	0.439	347	0.767
33	0.807	78	0.842	123	0.988	168	0.809	213	0.695	258	0.221	303	0.446	348	0.756
34	0.808	79	0.856	124	0.994	169	0.791	214	0.680	259	0.215	304	0.451	349	0.744
35	0.812	80	0.870	125	0.998	170	0.773	215	0.664	260	0.211	305	0.456	350	0.732
36	0.817	81	0.886	126	1.000	171	0.754	216	0.649	261	0.208	306	0.461	351	0.718
37	0.825	82	0.902	127	1.000	172	0.734	217	0.633	262	0.206	307	0.466	352	0.705
38	0.835	83	0.917	128	0.997	173	0.715	218	0.617	263	0.205	308	0.471	353	0.691
39	0.846	84	0.931	129	0.993	174	0.698	219	0.602	264	0.205	309	0.476	354	0.679
40	0.859	85	0.944	130	0.986	175	0.681	220	0.587	265	0.205	310	0.482	355	0.667
41	0.873	86	0.955	131	0.978	176	0.667	221	0.572	266	0.206	311	0.488	356	0.656
42	0.887	87	0.964	132	0.968	177	0.655	222	0.558	267	0.206	312	0.495	357	0.648
43	0.902	88	0.970	133	0.957	178	0.646	223	0.545	268	0.207	313	0.503	358	0.642
44	0.916	89	0.974	134	0.944	179	0.640	224	0.533	269	0.207	314	0.512	359	0.638