

THOMAS M. ECKELS, PE  
STEPHEN S. LOCKWOOD, PE  
DAVID J. PINION, PE  
ERIK C. SWANSON, PE

THOMAS S. GORTON, PE  
MICHAEL H. MEHIGAN, PE

JAMES B. HATFIELD, PE  
BENJAMIN F. DAWSON III, PE  
CONSULTANTS

HATFIELD & DAWSON  
CONSULTING ELECTRICAL ENGINEERS  
9500 GREENWOOD AVE. N.  
SEATTLE, WASHINGTON 98103

TELEPHONE (206) 783-9151  
FACSIMILE (206) 789-9834  
E-MAIL [hatdaw@hatdaw.com](mailto:hatdaw@hatdaw.com)

MAURY L. HATFIELD, PE  
(1942-2009)  
PAUL W. LEONARD, PE  
(1925-2011)

**Engineering Statement  
Post-Auction Technical Facilities for KUVB-CD  
Channel 36 at Tucson, AZ  
October 2017**

**Expansion Application**

This Engineering Statement has been prepared on behalf of Univision Tucson LLC, licensee of digital Class A television station KUVB-CD at Tucson, Arizona. KUVB-CD presently operates on Channel 42. The Commission's *Channel Reassignment Public Notice* (DA 17-314), released on April 13, 2017, specified the station's post-auction facilities on Channel 36.

This application specifies expansion facilities, and is being filed during the second filing window for alternate channels and expanded facilities.

## Interference Study

An interference study has been conducted using the Commission's TVStudy software. The results of the study demonstrate that this proposal will have no additional interference impact on other stations.

Study created: 2017.10.19 11:37:57

Study build station data: LMS TV 2017-10-18 (53)

Proposal: KUVE-CD D36 DC APP TUCSON, AZ  
 File number: KUVESD-XP  
 Facility ID: 78036  
 Station data: User record  
 Record ID: 262  
 Country: U.S.

### Build options:

Protect records not on baseline channel  
 Protect LPTV records from Class A

### Stations affected by proposal:

Call	Chan	Svc	Status	City, State	File Number	Distance
KFTU-DT	D36	DT	LIC	DOUGLAS, AZ	BLCDT20090616ABO	138.5 km
KAZT-CD	D36	DC	LIC	PHOENIX, AZ	BLDTA20100120ACL	149.5
NEW	D36	LD	APP	SIERRA VISTA, AZ	BDCCDTL20061003AFJ	138.6

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

### Record parameters as studied:

Channel: D36  
 Mask: Stringent  
 Latitude: 32 14 55.80 N (NAD83)  
 Longitude: 111 6 59.90 W  
 Height AMSL: 1362.0 m  
 HAAT: 0.0 m  
 Peak ERP: 15.0 kW  
 Antenna: DIE-TLP-12M/VP 0.0 deg  
 Elev Pattn: Generic  
 Elec Tilt: 1.5

### 50.9 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	13.6 kW	642.4 m	68.1 km
45.0	13.0	639.6	67.7
90.0	12.7	618.5	67.0
135.0	13.9	529.9	64.9
180.0	5.27	573.6	60.2
225.0	0.544	626.6	47.0
270.0	0.502	603.6	46.1
315.0	4.55	536.1	58.3

Database HAAT does not agree with computed HAAT  
 Database HAAT: 0 m Computed HAAT: 596 m

\*\*Proposal service area extends beyond baseline plus 1.0%  
Proposal service area population is more than 95.0% of baseline

Distance to Canadian border: 1861.6 km

\*\*Proposal is within coordination distance of Mexican border  
Distance to Mexican border: 93.9 km

Conditions at FCC monitoring station: Douglas AZ  
Bearing: 120.7 degrees Distance: 161.2 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:  
Bearing: 29.3 degrees Distance: 1020.0 km

Study cell size: 1.00 km  
Profile point spacing: 1.00 km

Maximum new IX to full-service and Class A: 0.50%  
Maximum new IX to LPTV: 2.00%

No IX check failures found.

**Facilities Proposed**

The proposed operation will be on Channel 36 with a maximum lobe effective radiated power of 15 kilowatts (H pol) and 4.5 kilowatts (V pol). Operation is proposed with a Dielectric TLP-12M/VP antenna, which will be mounted on an existing tower at the Tucson Mountain communications site, with FCC Antenna Structure Registration Number 1218272.

**RF Exposure Calculations**

The power density calculations shown below were made using the techniques outlined in OET Bulletin No. 65. "Ground level" calculations in this report have been made at a reference height of 2 meters above ground to provide a worst-case estimate of exposure for persons standing on the ground in the vicinity of the tower. The equation shown below was used to calculate the ground level power density figures from each antenna.

$$S(\mu W / cm^2) = \frac{33.40981 \times AdjERP(Watts)}{D^2}$$

Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

*D* is the distance in meters from the center of radiation to the calculation point.

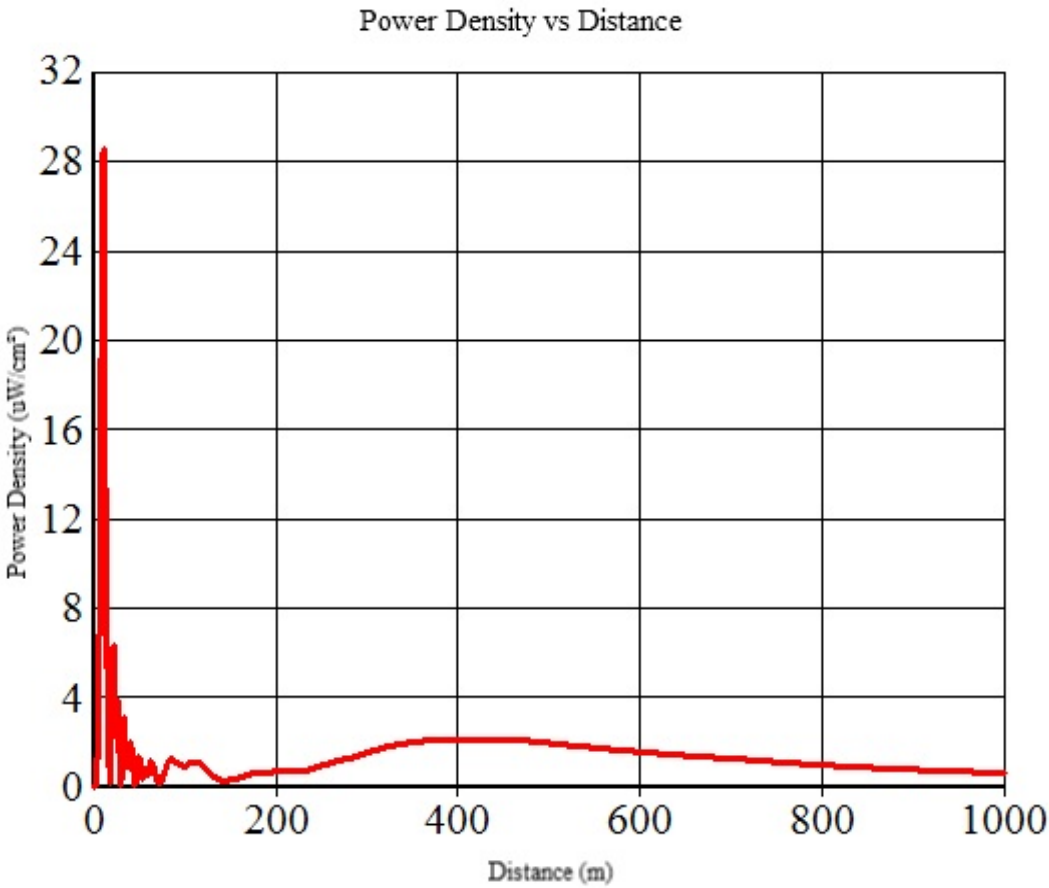
Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground using the manufacturer's vertical plane pattern for the elliptically-polarized Dielectric TLP-12M/VP antenna proposed in this application. The highest calculated power density from the proposed antenna alone occurs at a point 10 meters from the base of the antenna support structure. At this point the power density is calculated to be 28.5  $\mu W/cm^2$ , which is 7.1% of 401.3  $\mu W/cm^2$  (the FCC maximum for uncontrolled environments at the Channel 36 frequency).

The transmitter site on Tucson Mountain is remotely located atop a steep peak. Road access is restricted by locked gates. Advisory signs are posted throughout the site, on the transmitter buildings, at the tower bases, and along the access road. Pursuant to OET Bulletin No. 65, all

station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken. 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 exposure in excess of FCC guidelines.

KUVE-CD Ch36 Tucson  
Ground-Level Power Density Calculations  
Using Manufacturer's Vertical Plane Pattern

Antenna Dielectric TLP-12M/VP  
ERP 15000 Watts H (avg)  
4500 Watts V (avg)  
Antenna AGL 27 meters less 2m is 25 meters above the reference plane  
  
Calculated  
Maximum is 28.54 uW/cm<sup>2</sup> at 10 meters from the tower



Distance From Tower (meters)	Hypotenuse (meters)	Depression Angle (degrees)	Interp Rel Field	Adjusted ERP (watts)	Power Density uW/cm <sup>2</sup>
0	25.00	90.00	0.001	0.0	0.00
1	25.02	87.71	0.004	0.3	0.02
2	25.08	85.43	0.011	2.5	0.13
3	25.18	83.16	0.024	11.3	0.59
4	25.32	80.91	0.042	34.2	1.78
5	25.50	78.69	0.066	85.0	4.37
6	25.71	76.50	0.096	179.5	9.07
7	25.96	74.36	0.126	308.8	15.31
8	26.25	72.26	0.156	474.2	22.99
9	26.57	70.20	0.175	594.4	28.13
10	26.93	68.20	0.178	619.2	28.54
11	27.31	66.25	0.166	534.1	23.92
12	27.73	64.36	0.139	378.8	16.46
13	28.18	62.53	0.111	241.8	10.17

14	28.65	60.75	0.091	159.8	6.50
15	29.15	59.04	0.073	104.9	4.13
16	29.68	57.38	0.049	46.5	1.76
17	30.23	55.78	0.016	5.3	0.19
18	30.81	54.25	0.034	22.0	0.78
19	31.40	52.77	0.074	106.6	3.61
20	32.02	51.34	0.098	187.0	6.09
21	32.65	49.97	0.102	201.7	6.32
22	33.30	48.65	0.087	149.2	4.50
23	33.97	47.39	0.075	108.8	3.15
24	34.66	46.17	0.076	113.1	3.15
25	35.36	45.00	0.087	147.6	3.94
26	36.07	43.88	0.088	149.4	3.84
27	36.80	42.80	0.071	99.2	2.45
28	37.54	41.76	0.040	30.7	0.73
29	38.29	40.76	0.015	4.5	0.10
30	39.05	39.81	0.039	29.7	0.65
31	39.82	38.88	0.070	96.7	2.04
32	40.61	38.00	0.089	154.5	3.13
33	41.40	37.15	0.090	157.4	3.07
34	42.20	36.33	0.079	120.3	2.26
35	43.01	35.54	0.063	77.0	1.39
36	43.83	34.78	0.051	51.6	0.90
37	44.65	34.05	0.053	54.6	0.91
38	45.49	33.34	0.066	85.4	1.38
39	46.32	32.66	0.076	112.8	1.76
40	47.17	32.01	0.082	131.0	1.97
41	48.02	31.37	0.073	104.5	1.51
42	48.88	30.76	0.060	70.0	0.98
43	49.74	30.17	0.040	31.0	0.42
44	50.61	29.60	0.026	13.7	0.18
45	51.48	29.05	0.016	5.0	0.06
46	52.35	28.52	0.034	22.6	0.28
47	53.24	28.01	0.055	58.2	0.69
48	54.12	27.51	0.067	86.8	0.99
49	55.01	27.03	0.078	119.4	1.32
50	55.90	26.57	0.077	115.1	1.23
51	56.80	26.11	0.075	108.4	1.12
52	57.70	25.68	0.063	78.2	0.79
53	58.60	25.25	0.049	47.5	0.46
54	59.51	24.84	0.044	37.5	0.35
55	60.42	24.44	0.051	50.7	0.46
56	61.33	24.06	0.058	65.5	0.58
57	62.24	23.68	0.059	67.9	0.59
58	63.16	23.32	0.059	67.9	0.57
59	64.08	22.96	0.060	70.4	0.57
60	65.00	22.62	0.070	96.7	0.76