



**STATEMENT OF JOHN E. HIDLE, P.E.
IN SUPPORT OF A PETITION TO AMEND
THE DIGITAL TELEVISION TABLE OF ALLOTMENTS
KTUL - TULSA, OKLAHOMA
DTV - CH. 14 - 1000 kW - 578 m HAAT**

Prepared for: KTUL LICENSEE, LLC

I am a Consulting Engineer, an employee in the firm of Carl T. Jones Corporation, with offices located in Springfield, Virginia. My education and experience are a matter of record with the Federal Communications Commission. I am a Licensed Professional Engineer in the Commonwealth of Virginia, No. 7418, and in New York State, No. 63418.

GENERAL

This office has been authorized by KTUL LICENSEE, LLC, licensee of KTUL, channel 10, licensed to Tulsa, Oklahoma, to prepare this statement in support of a Petition to Amend the Digital Television (DTV) Post Repack Table of Allotments, §73.622(i) of the FCC Rules. The petitioner requests that §73.622(i) of the Commission's Rules be modified in the following manner:

Present

TULSA, OK 8, 10,*11, 12, 16, 20, 22, 26, 28, 34, 36

Proposed

8, *11, 12, 14, 16, 20, 22, 26, 28, 34, 36

DTV channel 10 is the channel currently specified in the Digital Television Table of Allotments for KTUL. The petitioner requests herein to substitute DTV channel 14 for DTV channel 10. The proposed arrangement of allotments is made to enhance potential viewers' ability to more easily receive the broadcast signal of KTUL. For example when a

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signal strength of 80 dBu is compared channel 10 provides a potential viewer population of 826,637 persons while channel 14 provides an 80 dBu population of 1,088,646 persons. Additionally the UHF channel 14 requires a significantly smaller receiving antenna less than one-half the size of an equivalent antenna for channel 10. This fact bodes well for UHF channels, especially when the ATSC 3.0 DTV standard is considered.

There remain serious propagation problems associated with digital television broadcast (DTV) use of high-VHF television channels (7-13). These are also well documented, both before and especially after the initial digital transition on June 12, 2009. These propagation and reception problems for channels 7-13 are also severe enough for the FCC to have granted, in Zone I where the ERP limit for channels 7-13 is 30 kW at 305 meters HAAT, the FCC granted a construction permit for channel 7 with an ERP of 34 kW at 500 meters HAAT. The Zone I ERP Limit for high-VHF channels at 500 meters HAAT is 5.8 kW, which is more than 5 times the zone I limit. And yet when ATSC 3.0 is considered the remaining problems continue to frustrate DTV broadcasters that use VHF channels, and many of those station still struggle with propagation problems and the subsequent viewer complaints. This proposal seeks to remedy this well known systemic problem in this instance and to provide viewers with a significant improvement in reception capability.

EXPLANATION OF REASON FOR REQUEST

The licensee of KTUL has been dealing with digital reception problems since the station shut down its channel 8 analog facility on June 12, 2009. KTUL which was initially permitted an ERP of only 6.9 kW immediately realized a significant loss of viewership and

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began to suffer reception problems. The licensee immediately requested an STA to increase its ERP to 9.46 kW (BDSTA-20090721AAE) pending the implementation of its construction permit (BPCDT-20080620AGA) which authorized an ERP of 15 kW @ 578 meters HAAT. The construction permit was subsequently implemented and licensed (BLCDT-20100505AGI).

The ERP increase helped but has not provided a real long-term solution to the VHF DTV propagation problems that KTUL has incurred for the last 11 years, with very few options for any effective solutions.

ATSC 3.0 PERMISSIBLE DTV STANDARD

A more immediate concern is the future migration to the ATSC 3.0 permissible standard for over-the-air DTV and the multitude of potential benefits expected to accrue. Probably the most anticipated benefit is the ability to reach portable and mobile devices that have become the essence of the ubiquitous smart-phone culture. However, these devices must be small to fit the culture. Therein lies the intractable problem for VHF DTV stations. Channel 10, for example, has a wavelength of 5.04 feet. A simple half-wave dipole antenna, used as a reference with 0 dB gain, must be 2.52 feet long. The DTV planning factors set forth in the Sixth Report and Order (FCC 97-115) call for an antenna with 6 dB of gain elevated to 30 feet above the ground to just barely receive a signal at a strength of 36 dBu. An antenna for channel 10 with 6 dB of gain would measure 2.52 feet wide and at least 12 to 14 feet long. Channel 13 requires an antenna more than two feet wide. Obviously the required size of antennas for VHF channels precludes their use in the smart-phone culture. Therefore KTUL will likely be precluded from participation in ATSC

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3.0 serving the portable and mobile users of these services. Reductio ad absurdum. KTUL's licensee has heretofore been unable to consider a truly effective solution to its reception problems, and sees absolutely no viable solution to the portable, mobile problem while broadcasting on its VHF channel 10, until now.

KTUL's licensee herein seeks an effective solution: change to a UHF channel. KTUL's licensee has determined that the proposed migration to channel 14 will be a favorable arrangement of allotments based on the enhanced signal levels that will be delivered to a majority of the population within the station's "protected service area". For example: The percentage of population receiving a signal greater than 100 dBu is 0.02% for channel 10, while the percentage that is predicted to receive a signal greater than 100 dBu is 42.9% for channel 14. The higher signal levels provided by use of channel 14 will enable an ease of reception for mobile and portable devices, the smartphone set. The populations predicted for each channel and signal levels are shown in the attached map exhibits. Please note there is no predicted loss of population when migrating to channel 14. The licensee fervently believes that changing KTUL to operate on channel 14 will solve a vast majority of its current reception problems.

DETERMINATION OF THE "LARGEST STATION IN THE MARKET"

It appears from an analysis of the stations that are licensed to communities located in the Tulsa, Oklahoma Designated Market Area (DMA) that the largest station in geographic area is KOED-TV. license file number, BLEDT-20120419ABK, for channel 11, Tulsa, Oklahoma with a predicted 36 dBu noise limited contour coverage area of 46,912 square kilometers. The instant application to change KTUL's channel to 30 with an ERP

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of 1000 kW results in a predicted 38.72 dBu noise limited contour coverage area of 46,406 square kilometers. KTUL is therefore entitled, according to Section 73.622(f)(5), to the herein proposed channel 30 ERP of 1000 kW at 578 meters HAAT.

TECHNICAL STUDY

An engineering study of all pertinent allotments, assignments, applications, construction permits and DTV licenses reveals that DTV channel 14 can be allotted to Tulsa, Oklahoma in lieu of channel 10, and meet all of the Commission's interference criteria. The allotment reference coordinates for DTV channel 14 at Tulsa, Oklahoma: 35 58' 08.0" N.L. and 95 36' 56.0" W.L.¹ The Tulsa allotment reference site meets the allotment standards in §73.616(b) with respect to: the requirements set forth in §73.616(f); the requirements set forth in §73.623(e), the requirement set forth in §73.623(f), and the principal community coverage requirements set forth in §73.625(a).

The petitioner proposes to install a new Dielectric model TFU-29ETT/VP-R 4C130 directional antenna for channel 14 at KTUL's current centerline height above mean sea level (AMSL) of 1388 meters and 743 meters above average terrain. The proposed changes include the new directional antenna, an increase in ERP to 1000kW and a change from channel 10 to channel 14, These changes affect the predicted Radio Frequency Radiation Safety considerations which have been revised. The coverage area and population predicted to be served by KTUL are increased. All other station parameters are to remain unchanged.

¹ The channel 14 DTV allotment reference coordinates are the same as the DTV channel 10 allotment reference coordinates (as defined in Section 73.622(i) of the FCC Rules) of the petitioner's licensed KTUL, Tulsa, Oklahoma tower site. BLCDDT-20100505AGI (See FCC tower registration number 1010985).

ALLOCATION CONSIDERATIONS

Post-Transition DTV Considerations

A study was performed, using the FCC's software, *tvstudy* v2.2.5, to determine if the instant petition to amend the post-transition Table is predicted to cause new prohibited interference to DTV stations, construction permits or DTV allotments. Results of the study indicate that the instant petition is predicted to cause no new interference greater than 0.5% to the populations served by any full-power DTV station, construction permit or allotment. See Appendix B. These results comply with the 0.5% limit for new post-repack interference set forth in §73.616(e) of the Commission's Rules.

International DTV Considerations

The KTUL site is located more than 500 kilometers from the nearest point on either the US-Mexican border or the US-Canadian border. Therefore there are no international considerations.

Class A Television Allocation Considerations

As required in Section 73.616(f) of the FCC's Rules, the study results contained in Appendix B showed that there is no Class A station that is predicted to be affected by the proposed re-allotment of KTUL to channel 14.

Land Mobile and FM radio Considerations

The *tvstudy* results found no Land Mobile violations for this site, and the site is deemed OK toward AM radio stations. However, since this proposal seeks the use of channel 14 the licensee of KTUL has surveyed the Land Mobile licensees within 100 kilometers of the allotment site and is proceeding to notify the licensees of this proposal.

RADIO FREQUENCY IMPACT, SAFETY & STATEMENT OF COMPLIANCE

The licensee of KTUL is committed to the protection of station personnel and/or tower contractors working in the vicinity of the KTUL antenna and will reduce power or cease operation, when necessary, to ensure protection to personnel.

As shown in Appendix A the KTUL channel 14 request for Amendment of the Table of Allotments as proposed herein will operate with a maximum ERP of 1000 kW from an elliptically polarized directional transmitting antenna with a centerline height of 567 meters above ground level (AGL). Considering the elevation pattern submitted elsewhere in this submission, the vertical plane relative field factor is less than 0.100 at all depression angles greater than 8 degrees. The proposed KTUL channel 14 facility is predicted to produce a worst-case power density at two meters above ground level, at 326.2 meters from the tower base, of $0.098 \mu\text{W}/\text{cm}^2$, which is 0.03% of the FCC guideline value of $315.33 \mu\text{W}/\text{cm}^2$ for an "uncontrolled" environment, and 0.006% of the FCC's guideline value for "controlled" environments. Therefore, pursuant to Section 1.1307(b)(3) of the FCC Rules, because the proposed facility would not exceed 5% of the uncontrolled and controlled exposure limits, the proposal's power density contribution is considered insignificant.

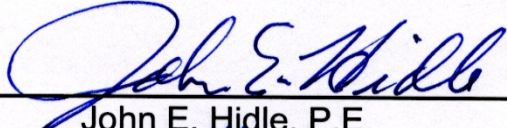
Further, the Applicant will continue to cooperate/coordinate with other site users and reduce power and/or cease operation during times of service or maintenance of the transmission systems as necessary to avoid potentially harmful exposure to personnel. In light of the above, the proposed facility should be categorically excluded from RF environmental processing under Section 1.1307(b) of the Commission's Rules.

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SUMMARY

It is submitted that the instant Petition to Amend the DTV Table of Allotments to substitute DTV channel 14 for DTV channel 10 in Tulsa, Oklahoma, as described herein, complies with the Rules, Regulations and relevant Policies of the Federal Communications Commission. This statement was prepared by me, or under my direct supervision, and its contents are believed to be true and correct to the best of my knowledge and belief.

DATED: November 11, 2020



John E. Hidle, P.E.



KTUL-D 10 Tulsa OK to Channel 14, as Proposed

KTUL-D - CH10

Tulsa, OK - 195.0 MHz
 FACID:35685
 File:BLCDT-20100505AGI
 Lat: 35-58-07.64 N
 Long: 095-36-55.08 W
 ERP: 15.00 kW HAAT: 578.0
 RCAMSL: 763.0 m
 Ground Elev: 196.0 m
 Pattern: Omni

KTUL-14.EZp - CH14

Tulsa, OK - 473.0 MHz
 FACID:0
 File:
 Lat: 35-58-08 N
 Long: 095-36-56 W
 ERP:1000.00 kW HAAT: 578.0
 RCAMSL: 763.0 m
 Ground Elev: 183.0 m
 Pattern: Directional

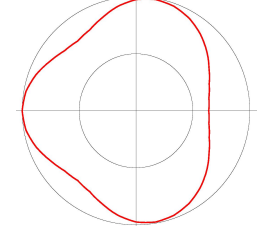
Population Report for All Contours

2010 US Census

	Population	Housing Units	Area (sq. km)
KTUL-D (10) [Tulsa, OK]			
FCC F(50-90) 36.00 dBu (	1,415,259	633,864	41320.9
KTUL-14.EZp (14) [Tulsa, OK]			
FCC F(50-90) 38.72 dBu (	1,517,325	680,175	46405.6

■ KTUL-D (10)
 ■ KTUL-14.EZp (14)

TFU-29EEE 4C130



Consulting Engineers
CTJC
 CARL T. JONES CORPORATION

Scale 1:1,850,000
 0 20 40 60 km

KTUL-D 14 Tulsa OK and KOED-TV 11 Tulsa OK

KOED-TV - CH11

Tulsa, OK - 201.0 MHz
 FACID:66195
 File:BLEDT-20120419ABK
 Lat: 36-01-15 N
 Long: 095-40-33 W
 ERP: 47.00 kW HAAT: 521.0
 RCAMSL: 716.3 m
 Ground Elev: 216.4 m
 Pattern: Omni

KTUL-TV 14 - CH14

Tulsa, OK - 473.0 MHz
 FACID:0
 File:
 Lat: 35-58-08 N
 Long: 095-36-56 W
 ERP:1000.00 kW HAAT: 578.0
 RCAMSL: 763.0 m
 Ground Elev: 183.0 m
 Pattern: Directional

Population Report for All Contours

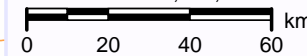
2010 US Census

	Population	Housing Units	Area (sq. km)
KOED-TV (11) [Tulsa, OK]			
FCC F(50-90) 36.00 dBu (	1,503,481	674,228	46912.6
KTUL-TV 14 (14) [Tulsa, OK]			
FCC F(50-90) 38.72 dBu (	1,517,325	680,175	46405.6

■ KOED-TV (11)
 ■ KTUL-TV 14 (14)

Consulting Engineers
CTJC
 CARL T. JONES CORPORATION

Scale 1:1,850,000



KTUL-D

BLCDD-20100505AGI
Latitude: 35-58-08 N
Longitude: 095-36-56 W
ERP: 15.00 kW
Channel: 10
Frequency: 195.0 MHz
AMSL Height: 763.0 m
Elevation: 196.0 m
Horiz. Pattern: Omni
Vert. Pattern: Yes
Elec Tilt: 0.75
Prop Model: Longley-Rice
Climate: Cont temperate
Conductivity: 0.0050
Dielec Const: 15.0
Refractivity: 311.0
Receiver Ht AG: 10.0 m
Receiver Gain: 0 dB
Time Variability: 90.0%
Sit. Variability: 50.0%
ITM Mode: Broadcast

KTUL - Ch, 10

15 kW - 578 m HAAT

POPULATION by Signal

>100 dBu = 317

>80 dBu = 826,637

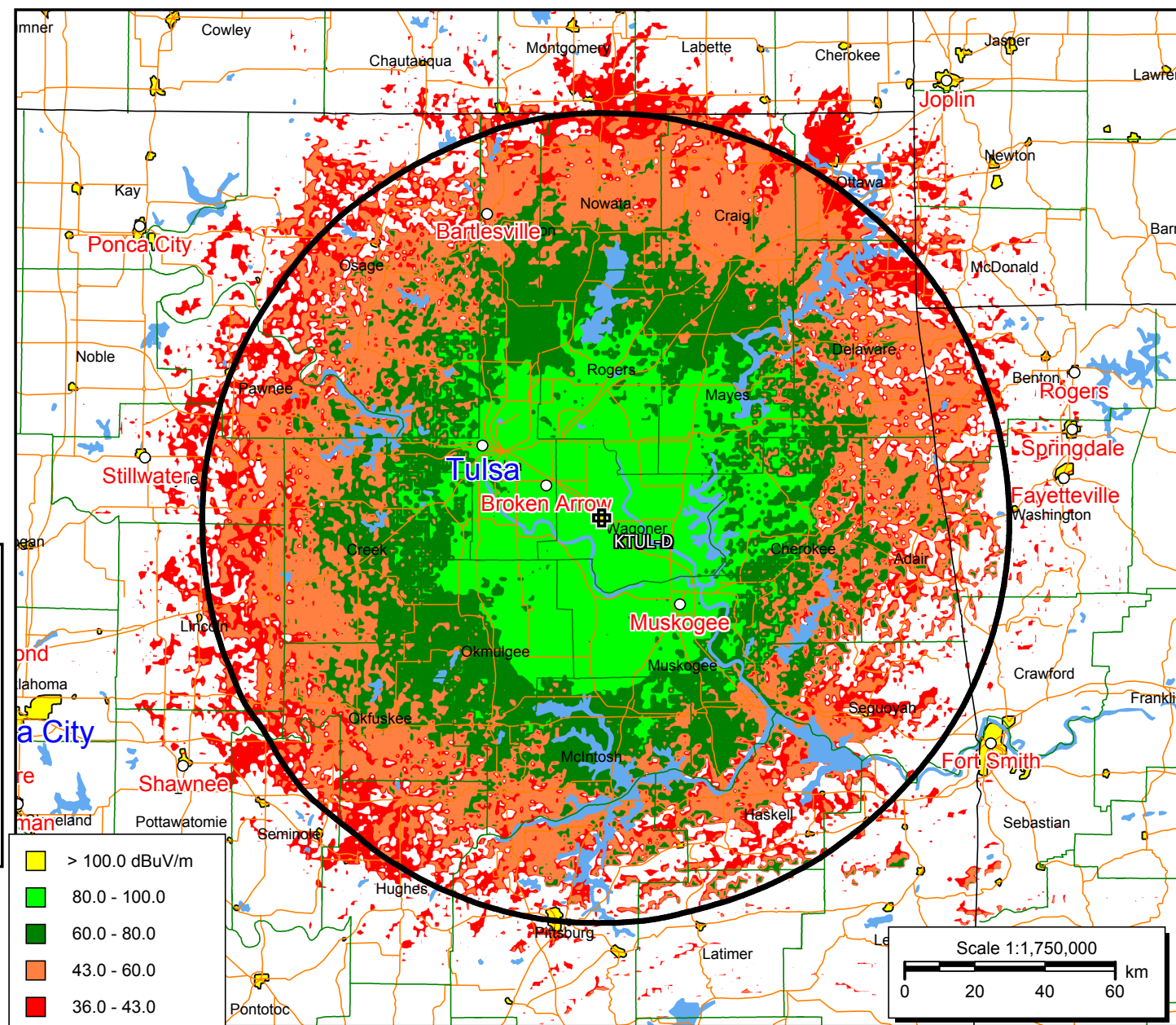
>60 dBu = 1,080,895

>Principal Community

43 dBu = 1,290,185

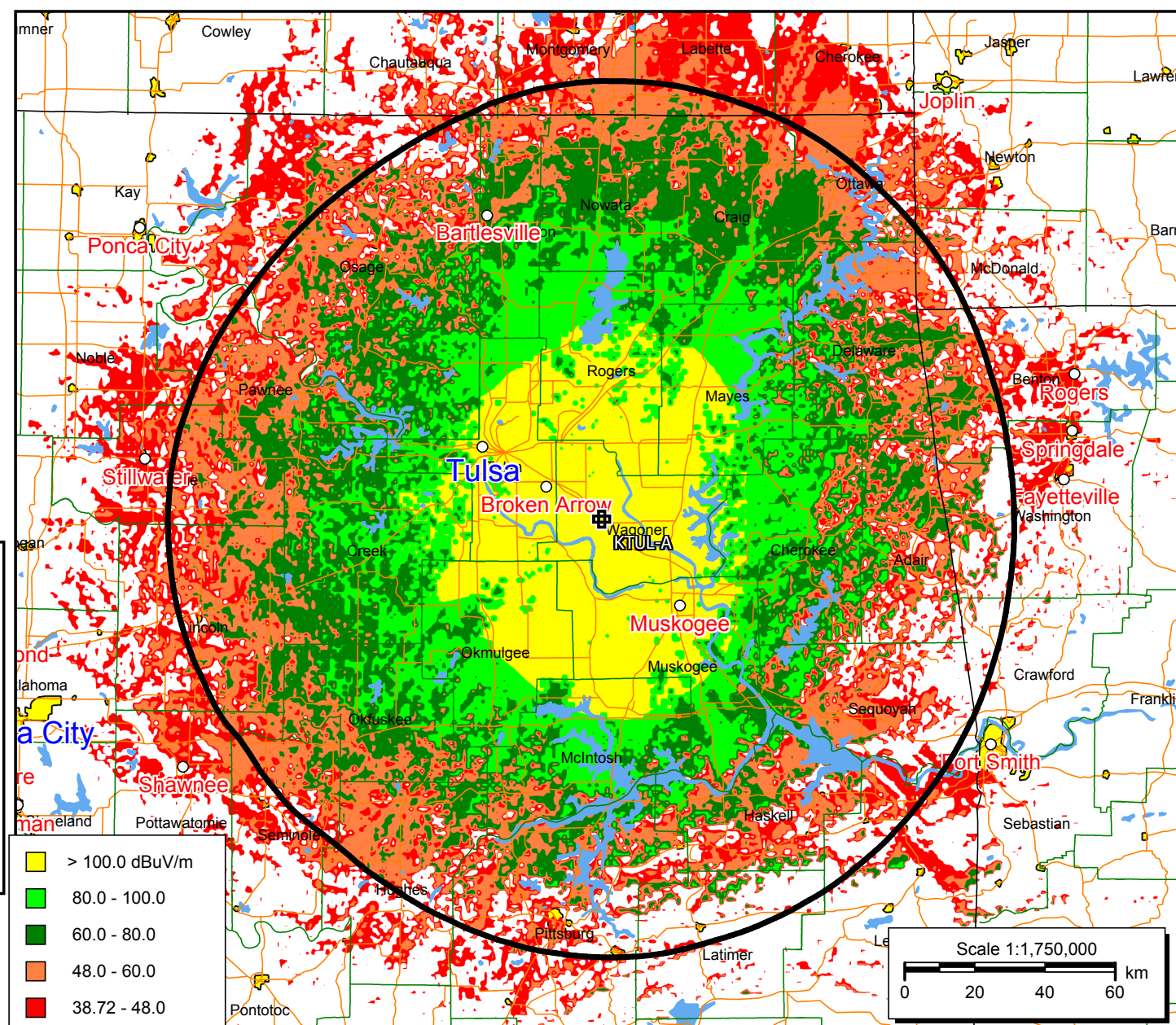
>Noise Limited

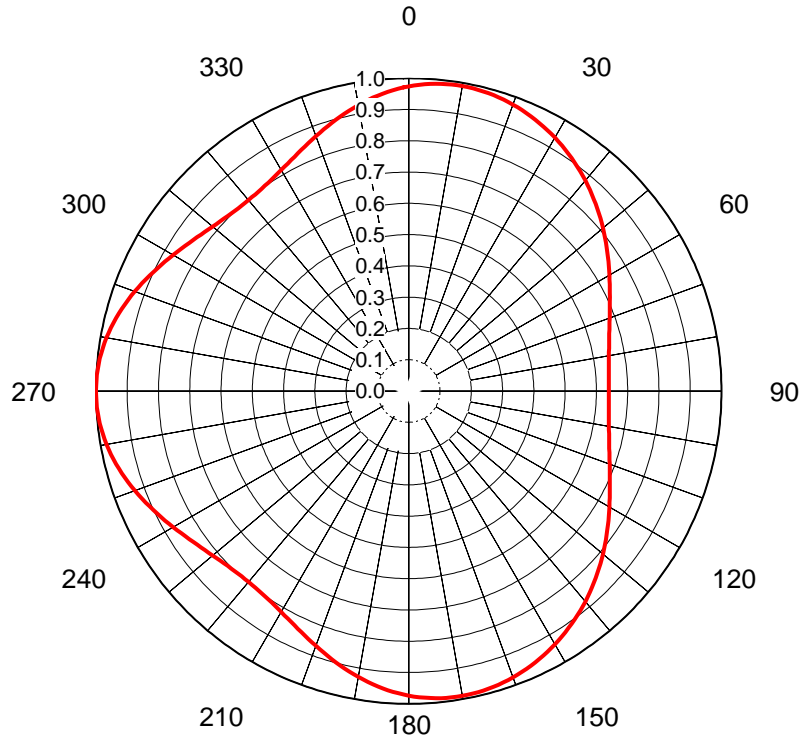
36 dBu = 1,422,935



DTVBL35685
Latitude: 35-58-08.36 N
Longitude: 095-36-55.93 W
ERP: 1000.00 kW
Channel: 14
Frequency: 473.0 MHz
AMSL Height: 763.0 m
Elevation: 181.92 m
Horiz. Pattern: Directional
Vert. Pattern: Yes
Elec Tilt: 0.75
Prop Model: Longley-Rice
Climate: Cont temperate
Conductivity: 0.0050
Dielec Const: 15.0
Refractivity: 311.0
Receiver Ht AG: 10.0 m
Receiver Gain: 0 dB
Time Variability: 90.0%
Sit. Variability: 50.0%
ITM Mode: Broadcast

1000 kW - 578 m HAAT
POPULATION by Signal
>100 dBu = 831,149
>80 dBu = 1,088,646
>60 dBu = 1,278,433
>Principal Community
48 dBu = 1,481,573
>Noise Limited
38.72 dBu = 1,935,568





AZIMUTH PATTERN Horizontal Polarization

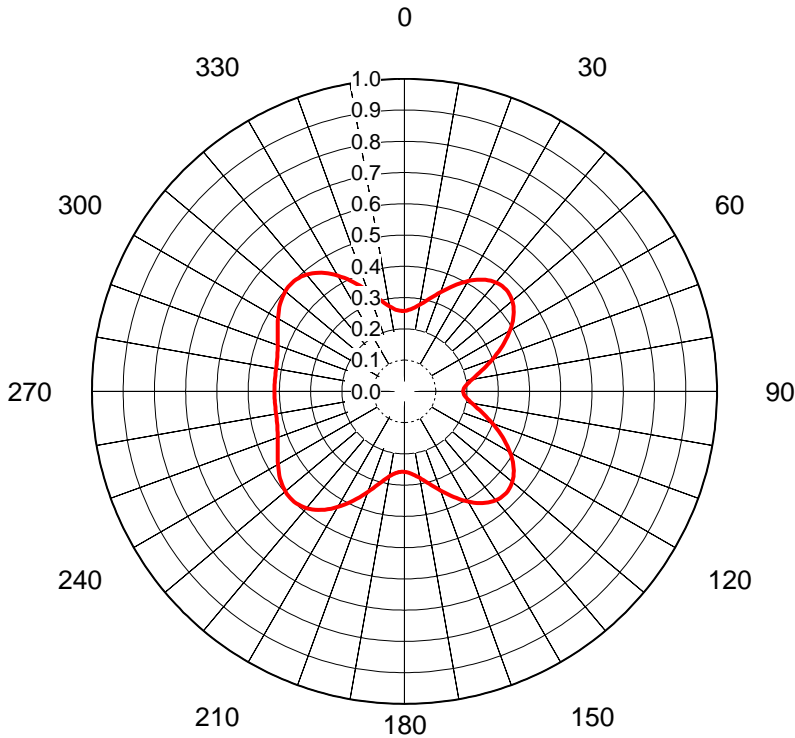
Proposal No. **C-71585-2**
 Date **10-Nov-20**
 Call Letters **KTUL**
 Channel **14**
 Frequency **473 MHz**
 Antenna Type **TFU-29ETT/VP-R 4C130**
 Gain **1.33 (1.25dB)**
 Calculated

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.974	36	0.903	72	0.675	108	0.675	144	0.903	180	0.974	216	0.800	252	0.943	288	0.943
1	0.977	37	0.897	73	0.671	109	0.679	145	0.908	181	0.971	217	0.798	253	0.949	289	0.937
2	0.980	38	0.891	74	0.667	110	0.684	146	0.914	182	0.967	218	0.797	254	0.954	290	0.932
3	0.982	39	0.885	75	0.664	111	0.688	147	0.919	183	0.963	219	0.797	255	0.959	291	0.926
4	0.984	40	0.878	76	0.660	112	0.693	148	0.925	184	0.959	220	0.797	256	0.964	292	0.919
5	0.986	41	0.872	77	0.657	113	0.699	149	0.930	185	0.954	221	0.797	257	0.969	293	0.913
6	0.987	42	0.866	78	0.655	114	0.704	150	0.935	186	0.950	222	0.798	258	0.973	294	0.907
7	0.988	43	0.859	79	0.652	115	0.710	151	0.940	187	0.945	223	0.799	259	0.977	295	0.901
8	0.989	44	0.852	80	0.650	116	0.716	152	0.944	188	0.939	224	0.801	260	0.981	296	0.894
9	0.990	45	0.845	81	0.648	117	0.722	153	0.949	189	0.934	225	0.803	261	0.985	297	0.888
10	0.990	46	0.839	82	0.646	118	0.728	154	0.953	190	0.928	226	0.805	262	0.988	298	0.882
11	0.989	47	0.832	83	0.644	119	0.734	155	0.957	191	0.922	227	0.808	263	0.991	299	0.876
12	0.989	48	0.825	84	0.643	120	0.741	156	0.961	192	0.917	228	0.811	264	0.993	300	0.870
13	0.988	49	0.818	85	0.642	121	0.747	157	0.965	193	0.911	229	0.814	265	0.995	301	0.864
14	0.987	50	0.811	86	0.641	122	0.754	158	0.968	194	0.904	230	0.818	266	0.997	302	0.858
15	0.986	51	0.803	87	0.640	123	0.761	159	0.971	195	0.898	231	0.822	267	0.998	303	0.852
16	0.984	52	0.796	88	0.640	124	0.768	160	0.974	196	0.892	232	0.827	268	0.999	304	0.847
17	0.982	53	0.789	89	0.640	125	0.775	161	0.977	197	0.886	233	0.831	269	1.000	305	0.841
18	0.980	54	0.782	90	0.639	126	0.782	162	0.980	198	0.879	234	0.836	270	1.000	306	0.836
19	0.977	55	0.775	91	0.640	127	0.789	163	0.982	199	0.873	235	0.841	271	1.000	307	0.831
20	0.974	56	0.768	92	0.640	128	0.796	164	0.984	200	0.867	236	0.847	272	0.999	308	0.827
21	0.971	57	0.761	93	0.640	129	0.803	165	0.986	201	0.861	237	0.852	273	0.998	309	0.822
22	0.968	58	0.754	94	0.641	130	0.811	166	0.987	202	0.855	238	0.858	274	0.997	310	0.818
23	0.965	59	0.748	95	0.642	131	0.818	167	0.988	203	0.849	239	0.864	275	0.995	311	0.814
24	0.961	60	0.741	96	0.643	132	0.825	168	0.989	204	0.844	240	0.870	276	0.993	312	0.811
25	0.957	61	0.734	97	0.644	133	0.832	169	0.989	205	0.839	241	0.876	277	0.991	313	0.808
26	0.953	62	0.728	98	0.646	134	0.839	170	0.990	206	0.833	242	0.882	278	0.988	314	0.805
27	0.949	63	0.722	99	0.648	135	0.845	171	0.990	207	0.829	243	0.888	279	0.985	315	0.803
28	0.944	64	0.716	100	0.650	136	0.852	172	0.989	208	0.824	244	0.894	280	0.981	316	0.801
29	0.940	65	0.710	101	0.652	137	0.859	173	0.988	209	0.820	245	0.901	281	0.977	317	0.799
30	0.935	66	0.704	102	0.655	138	0.866	174	0.987	210	0.816	246	0.907	282	0.973	318	0.798
31	0.930	67	0.699	103	0.657	139	0.872	175	0.986	211	0.812	247	0.913	283	0.969	319	0.797
32	0.925	68	0.693	104	0.660	140	0.878	176	0.984	212	0.809	248	0.919	284	0.964	320	0.797
33	0.919	69	0.688	105	0.664	141	0.885	177	0.982	213	0.806	249	0.926	285	0.959	321	0.797
34	0.914	70	0.684	106	0.667	142	0.891	178	0.980	214	0.803	250	0.932	286	0.954	322	0.797
35	0.908	71	0.679	107	0.671	143	0.897	179	0.977	215	0.801	251	0.937	287	0.949	323	0.798

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AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-71585-2**
 Date **10-Nov-20**
 Call Letters **KTUL**
 Channel **14**
 Frequency **473 MHz**
 Antenna Type **TFU-29ETT/VP-R 4C130**
 Gain **1.69 (2.27dB)**
 Calculated



Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.258	36	0.441	72	0.281	108	0.281	144	0.441	180	0.258	216	0.469	252	0.427	288	0.427	324	0.469
1	0.258	37	0.445	73	0.272	109	0.290	145	0.436	181	0.257	217	0.474	253	0.425	289	0.429	325	0.463
2	0.259	38	0.449	74	0.264	110	0.300	146	0.431	182	0.258	218	0.479	254	0.423	290	0.432	326	0.457
3	0.261	39	0.452	75	0.255	111	0.309	147	0.426	183	0.258	219	0.484	255	0.421	291	0.434	327	0.450
4	0.263	40	0.455	76	0.247	112	0.318	148	0.420	184	0.259	220	0.488	256	0.420	292	0.437	328	0.443
5	0.265	41	0.457	77	0.240	113	0.328	149	0.414	185	0.261	221	0.491	257	0.419	293	0.441	329	0.435
6	0.267	42	0.459	78	0.233	114	0.337	150	0.407	186	0.263	222	0.494	258	0.418	294	0.444	330	0.428
7	0.270	43	0.460	79	0.226	115	0.346	151	0.401	187	0.265	223	0.496	259	0.417	295	0.448	331	0.419
8	0.274	44	0.460	80	0.219	116	0.356	152	0.394	188	0.268	224	0.498	260	0.417	296	0.452	332	0.411
9	0.277	45	0.460	81	0.214	117	0.365	153	0.387	189	0.272	225	0.499	261	0.417	297	0.455	333	0.403
10	0.281	46	0.459	82	0.208	118	0.373	154	0.380	190	0.276	226	0.500	262	0.416	298	0.459	334	0.394
11	0.286	47	0.458	83	0.204	119	0.382	155	0.373	191	0.281	227	0.500	263	0.416	299	0.463	335	0.385
12	0.290	48	0.456	84	0.199	120	0.390	156	0.366	192	0.286	228	0.500	264	0.416	300	0.467	336	0.377
13	0.295	49	0.454	85	0.196	121	0.398	157	0.358	193	0.291	229	0.499	265	0.416	301	0.471	337	0.368
14	0.300	50	0.450	86	0.193	122	0.406	158	0.351	194	0.298	230	0.498	266	0.416	302	0.475	338	0.359
15	0.306	51	0.447	87	0.191	123	0.413	159	0.344	195	0.304	231	0.496	267	0.416	303	0.479	339	0.351
16	0.312	52	0.442	88	0.189	124	0.420	160	0.337	196	0.311	232	0.494	268	0.416	304	0.482	340	0.342
17	0.318	53	0.438	89	0.188	125	0.426	161	0.331	197	0.318	233	0.492	269	0.416	305	0.486	341	0.334
18	0.324	54	0.432	90	0.188	126	0.432	162	0.324	198	0.326	234	0.489	270	0.416	306	0.489	342	0.326
19	0.331	55	0.426	91	0.188	127	0.438	163	0.318	199	0.334	235	0.486	271	0.416	307	0.492	343	0.318
20	0.337	56	0.420	92	0.189	128	0.442	164	0.312	200	0.342	236	0.482	272	0.416	308	0.494	344	0.311
21	0.344	57	0.413	93	0.191	129	0.447	165	0.306	201	0.351	237	0.479	273	0.416	309	0.496	345	0.304
22	0.351	58	0.406	94	0.193	130	0.450	166	0.300	202	0.359	238	0.475	274	0.416	310	0.498	346	0.298
23	0.358	59	0.398	95	0.196	131	0.454	167	0.295	203	0.368	239	0.471	275	0.416	311	0.499	347	0.291
24	0.366	60	0.390	96	0.199	132	0.456	168	0.290	204	0.377	240	0.467	276	0.416	312	0.500	348	0.286
25	0.373	61	0.382	97	0.204	133	0.458	169	0.286	205	0.385	241	0.463	277	0.416	313	0.500	349	0.281
26	0.380	62	0.373	98	0.208	134	0.459	170	0.281	206	0.394	242	0.459	278	0.416	314	0.500	350	0.276
27	0.387	63	0.365	99	0.214	135	0.460	171	0.277	207	0.403	243	0.455	279	0.417	315	0.499	351	0.272
28	0.394	64	0.356	100	0.219	136	0.460	172	0.274	208	0.411	244	0.452	280	0.417	316	0.498	352	0.268
29	0.401	65	0.346	101	0.226	137	0.460	173	0.270	209	0.419	245	0.448	281	0.417	317	0.496	353	0.265
30	0.407	66	0.337	102	0.233	138	0.459	174	0.267	210	0.428	246	0.444	282	0.418	318	0.494	354	0.263
31	0.414	67	0.328	103	0.240	139	0.457	175	0.265	211	0.435	247	0.441	283	0.419	319	0.491	355	0.261
32	0.420	68	0.318	104	0.247	140	0.455	176	0.263	212	0.443	248	0.437	284	0.420	320	0.488	356	0.259
33	0.426	69	0.309	105	0.255	141	0.452	177	0.261	213	0.450	249	0.434	285	0.421	321	0.484	357	0.258
34	0.431	70	0.300	106	0.264	142	0.449	178	0.259	214	0.457	250	0.432	286	0.423	322	0.479	358	0.258
35	0.436	71	0.290	107	0.272	143	0.445	179	0.258	215	0.463	251	0.429	287	0.425	323	0.474	359	0.257

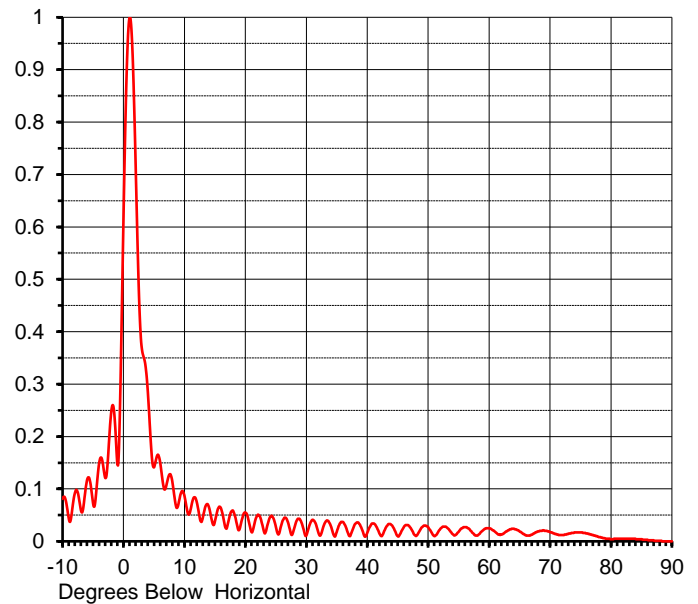
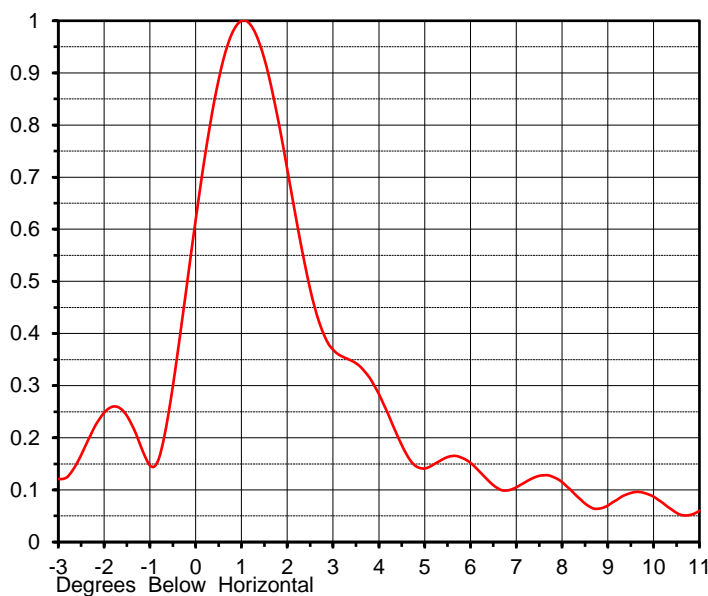
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ELEVATION PATTERN

Proposal No. **C-71585-2**
 Date **10-Nov-20**
 Call Letters **KTUL**
 Channel **14**
 Frequency **473 MHz**
 Antenna Type **TFU-29ETT/VP-R 4C130**

RMS Directivity at Main Lobe **26.8 (14.28 dB)**
 RMS Directivity at Horizontal **10.2 (10.09 dB)**
Calculated

Beam Tilt **1.05 deg**
 Pattern Number **105**



Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.081	10.0	0.087	30.0	0.011	50.0	0.027	70.0	0.018
-9.0	0.045	11.0	0.060	31.0	0.041	51.0	0.010	71.0	0.014
-8.0	0.091	12.0	0.076	32.0	0.016	52.0	0.024	72.0	0.012
-7.0	0.060	13.0	0.044	33.0	0.034	53.0	0.027	73.0	0.014
-6.0	0.116	14.0	0.066	34.0	0.030	54.0	0.014	74.0	0.017
-5.0	0.073	15.0	0.038	35.0	0.018	55.0	0.018	75.0	0.017
-4.0	0.149	16.0	0.063	36.0	0.037	56.0	0.027	76.0	0.015
-3.0	0.121	17.0	0.027	37.0	0.011	57.0	0.020	77.0	0.012
-2.0	0.248	18.0	0.058	38.0	0.033	58.0	0.011	78.0	0.008
-1.0	0.147	19.0	0.022	39.0	0.027	59.0	0.021	79.0	0.006
0.0	0.618	20.0	0.055	40.0	0.016	60.0	0.025	80.0	0.004
1.0	1.000	21.0	0.018	41.0	0.034	61.0	0.018	81.0	0.005
2.0	0.715	22.0	0.050	42.0	0.015	62.0	0.013	82.0	0.005
3.0	0.369	23.0	0.021	43.0	0.025	63.0	0.020	83.0	0.005
4.0	0.284	24.0	0.045	44.0	0.031	64.0	0.024	84.0	0.005
5.0	0.141	25.0	0.028	45.0	0.010	65.0	0.019	85.0	0.004
6.0	0.152	26.0	0.035	46.0	0.027	66.0	0.012	86.0	0.003
7.0	0.105	27.0	0.036	47.0	0.027	67.0	0.013	87.0	0.002
8.0	0.115	28.0	0.024	48.0	0.010	68.0	0.019	88.0	0.001
9.0	0.070	29.0	0.041	49.0	0.027	69.0	0.021	89.0	0.000
								90.0	0.000

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KTUL

Channel 14 - Tulsa OK

ERP = 1000000.00 WATTS

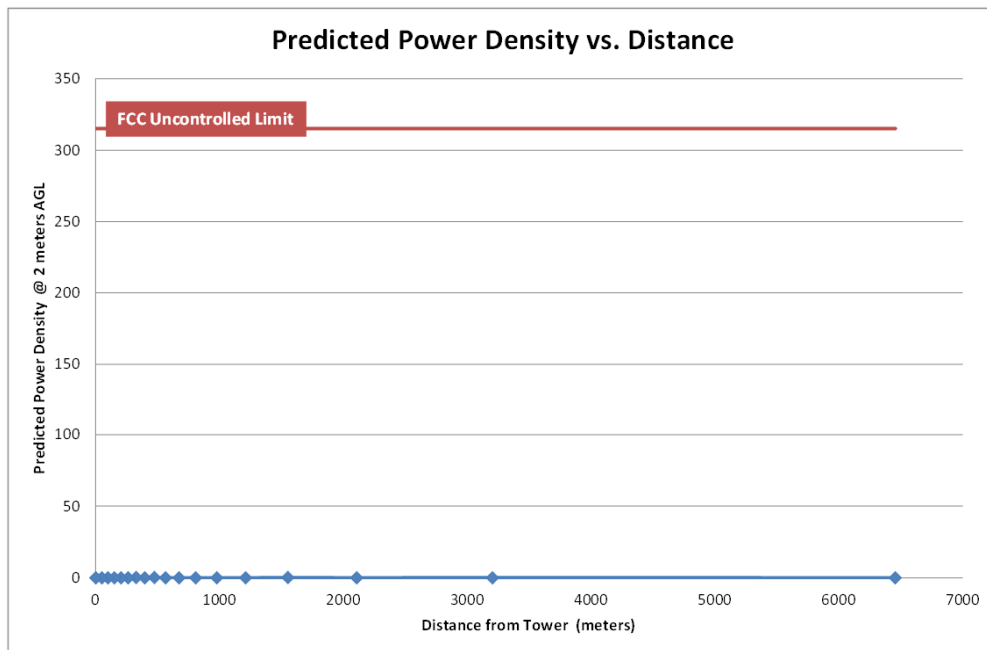
APPENDIX A

Maximum ERP 1000 kW

Polarization ----- 2 Circular
Antenna Height Above Ground -- 567 meters 1860.2 feet
FCC Uncontrolled RFR Limit ---- 315.33 $\mu\text{W}/\text{cm}^2$

Maximum Computed Power Density 0.098 $\mu\text{W}/\text{cm}^2$
0.03% of limit

Angle Below Horizontal (degrees)	<Point X> Horiz Distance from tower to 2 m AGL (meters)	Slant Distance from antenna to Point X (meters)	Vertical Pattern (REL. FIELD)	KTUL ERP (kW)	KTUL Calculated Power Density $\mu\text{W}/\text{cm}^2$	Percent Limit	Limit Exceeded?
0			1.000	1000.0000			
5	6458.0	6482.6	0.141	19.8810	0.032	0.01%	No
10	3204.3	3253.7	0.087	7.5690	0.048	0.02%	No
15	2108.6	2183.0	0.038	1.4440	0.020	0.01%	No
20	1552.3	1651.9	0.055	3.0250	0.074	0.02%	No
25	1211.6	1336.9	0.028	0.7840	0.029	0.01%	No
30	978.6	1130.0	0.011	0.1210	0.006	0.00%	No
35	806.9	985.0	0.018	0.3240	0.022	0.01%	No
40	673.3	879.0	0.016	0.2560	0.022	0.01%	No
45	565.0	799.0	0.010	0.1000	0.010	0.00%	No
50	474.1	737.6	0.027	0.7290	0.090	0.03%	No
55	395.6	689.7	0.018	0.3240	0.045	0.01%	No
60	326.2	652.4	0.025	0.6250	0.098	0.03%	No
65	263.5	623.4	0.019	0.3610	0.062	0.02%	No
70	205.6	601.3	0.018	0.3240	0.060	0.02%	No
75	151.4	584.9	0.017	0.2890	0.056	0.02%	No
80	99.6	573.7	0.004	0.0160	0.003	0.00%	No
85	49.4	567.2	0.004	0.0160	0.003	0.00%	No
90	0.0	565.0	0.000	0.0000	0.000	0.00%	No





KTUL - TULSA, OKLAHOMA **NOVEMBER 2020** **APPENDIX B** **Longley-Rice Interference Analysis**

tvstudy v2.2.5 (4uoc83)
 Database: localhost, Study: KTUL 14 AP 1000KW EZprop 4C130 #5198, Model: Longley-Rice
 Start: 2020.11.11 11:30:48

Study created: 2020.11.11 11:30:48

Study build station data: LMS TV 2020-11-11

Proposal: KTUL D14 DT APP TULSA, OK
 File number: KTUL 14 AP 1000KW EZprop 4C130
 Facility ID: 35685
 Station data: User record
 Record ID: 1303
 Country: U.S.
 Zone: II

Search options:
 Non-U.S. records included
 Baseline record excluded if station has CP

Individual records excluded:
 24485 KGEB D14 DT BL TULSA, OK DTVBL24485
 52420 KWNL-CD D14 DC BL BENTONVILLE, AR DTVBL52420

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
Yes	KARZ-TV	D14	DT	BL	LITTLE ROCK, AR	DTVBL37005	310.8 km
No	KOCW	D14	DT	LIC	HOISINGTON, KS	BLCDT20090622AFO	411.4
Yes	KERA-TV	D14	DT	LIC	DALLAS, TX	BLEDT20140903AFQ	400.2
Yes	KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDT20020904AAX	137.9
No	KSNW	D15	DT	LIC	WICHITA, KS	BLANK0000107924	262.2
Yes	KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDT20111028AAX	174.2

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D14
 Latitude: 35 58 8.00 N (NAD83)
 Longitude: 95 36 56.00 W
 Height AMSL: 763.0 m
 HAAT: 578.0 m
 Peak ERP: 1000 kW
 Antenna: DIE KTUL EZprop 4C130 0.0 deg
 Elev Pattn: Generic
 Elec Tilt: 0.75

38.7 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	949 kW	586.6 m	124.6 km
45.0	713	592.0	122.0
90.0	408	599.6	117.0
135.0	713	581.3	121.4
180.0	949	585.0	124.5

Appendix B - Interference Analysis
KTUL - Tulsa, Oklahoma
Channel 14 -1000 kW - Page 2

225.0 652 576.3 120.2
 270.0 1000 559.5 123.4
 315.0 652 556.9 119.0

Database HAAT does not agree with computed HAAT
 Database HAAT: 578 m Computed HAAT: 580 m

ERP exceeds maximum
 ERP: 1000 kW ERP maximum: 351 kW

Distance to Canadian border: 1265.6 km

Distance to Mexican border: 875.0 km

Conditions at FCC monitoring station: Grand Island NE
 Bearing: 336.9 degrees Distance: 602.5 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
 Bearing: 301.6 degrees Distance: 958.5 km

No land mobile station failures found

Study cell size: 1.00 km
 Profile point spacing: 0.20 km

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

 Interference to DTVBL37005 BL scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KARZ-TV	D14	DT	BL	LITTLE ROCK, AR	DTVBL37005	
Undesireds:	KTUL	D14	DT	APP	TULSA, OK	KTUL 14 AP 1000KW EZpr	310.8 km
	WDBD	D14	DT	LIC	JACKSON, MS	BLANK0000064020	348.0
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
36361.3 1,186,626		35066.5 1,170,547		35064.5 1,170,547		34974.8 1,168,673	0.26 0.16
Undesired		Total IX		Unique IX, before		Unique IX, after	
KTUL D14 DT APP		89.7		1,874		89.7	1,874
WDBD D14 DT LIC		2.0		0		2.0	0

 Interference to BLEDT20140903AFQ LIC scenario 1

Desired:	Call	Chan	Svc	Status	City, State	File Number	Distance
	KERA-TV	D14	DT	LIC	DALLAS, TX	BLEDT20140903AFQ	
Undesireds:	KTUL	D14	DT	APP	TULSA, OK	KTUL 14 AP 1000KW EZpr	400.2 km
	KXLK-CD	D14	DC	LIC	AUSTIN, TX	BLANK0000123233	259.0
	KBTX-TV	D14	DT	BL	BRYAN, TX	DTVBL6669	237.9
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
39215.6 6,681,116		38841.0 6,677,999		38636.1 6,675,346		38627.2 6,675,258	0.02 0.00
Undesired		Total IX		Unique IX, before		Unique IX, after	
KTUL D14 DT APP		8.9		88		8.9	88
KXLK-CD D14 DC LIC		10.1		58		1.0	0
KBTX-TV D14 DT BL		203.8		2,653		194.7	2,595

Appendix B - Interference Analysis
KTUL - Tulsa, Oklahoma
Channel 14 -1000 kW - Page 3

Interference to BLCDDT20020904AAX LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDDT20020904AAX	
Undesireds:	KTUL	D14	DT	APP	TULSA, OK	KTUL 14 AP 1000KW EZpr	137.9 km
	KSNW	D15	DT	LIC	WICHITA, KS	BLANK0000107924	362.2
	KMOS-TV	D15	DT	LIC	SEDALIA, MO	BLDDT20030108ABK	309.4
	KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDDT20111028AAX	310.6
	KOZK	D16	DT	LIC	SPRINGFIELD, MO	BLANK0000096081	164.2
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
21951.0 761,319		20211.1 697,286		19936.2 679,589		19853.4 676,794	0.42 0.41
Undesired		Total IX		Unique IX, before		Unique IX, after	
KTUL D14 DT APP		124.1 3,278		82.7 2,795			
KSNW D15 DT LIC		19.1 217		4.0 83			
KMOS-TV D15 DT LIC		106.6 1,903		67.4 1,581			
KTBO-TV D15 DT LIC		155.2 15,574		140.1 15,490			
KOZK D16 DT LIC		46.3 401		17.1 192			

Interference to BLCDDT20111028AAX LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDDT20111028AAX	
Undesireds:	KTUL	D14	DT	APP	TULSA, OK	KTUL 14 AP 1000KW EZpr	174.2 km
	KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDDT20020904AAX	310.6
	KSNW	D15	DT	LIC	WICHITA, KS	BLANK0000107924	244.3
	KCIT	D15	DT	LIC	AMARILLO, TX	BLANK0000004834	393.4
	KJTL	D15	DT	LIC	WICHITA FALLS, TX	BLCDDT20090303ACS	190.3
Service area		Terrain-limited		IX-free, before		IX-free, after	Percent New IX
33727.8 1,585,075		33409.7 1,583,188		31374.4 1,564,809		31343.2 1,564,496	0.10 0.02
Undesired		Total IX		Unique IX, before		Unique IX, after	
KTUL D14 DT APP		56.4 776		31.2 313			
KHOG-TV D15 DT LIC		62.1 382		12.0 25			
KSNW D15 DT LIC		774.7 3,890		361.4 2,089			
KCIT D15 DT LIC		19.9 53		0.0 0			
KJTL D15 DT LIC		1652.0 16,259		1226.7 14,343			

Interference to proposal scenario 1
1.32% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KTUL	D14	DT	APP	TULSA, OK	KTUL 14 AP 1000KW EZpr	
Undesireds:	KARZ-TV	D14	DT	BL	LITTLE ROCK, AR	DTVBL37005	310.8 km
	KERA-TV	D14	DT	LIC	DALLAS, TX	BLDDT20140903AFQ	400.2
	KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDDT20020904AAX	137.9
	KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDDT20111028AAX	174.2
Service area		Terrain-limited		IX-free		Percent IX	
46360.9 1,517,959		44925.7 1,490,400		44328.2 1,470,664		1.33 1.32	
Undesired		Total IX		Unique IX		Prcnt Unique IX	
KARZ-TV D14 DT BL		260.0 8,770		244.8 7,844		0.55 0.53	
KERA-TV D14 DT LIC		41.0 1,601		39.0 1,335		0.09 0.09	
KHOG-TV D15 DT LIC		105.0 6,644		91.9 5,984		0.20 0.40	
KTBO-TV D15 DT LIC		206.6 3,647		206.6 3,647		0.46 0.24	



RADIO FREQUENCY IMPACT, SAFETY & STATEMENT OF COMPLIANCE

The licensee of KTUL is committed to the protection of station personnel and/or tower contractors working in the vicinity of the KTUL antenna and will reduce power or cease operation, when necessary, to ensure protection to personnel.

As shown in Appendix A the KTUL channel 14 request for Amendment of the Table of Allotments as proposed herein will operate with a maximum ERP of 1000 kW from an elliptically polarized directional transmitting antenna with a centerline height of 567 meters above ground level (AGL). Considering the elevation pattern submitted elsewhere in this submission, the vertical plane relative field factor is less than 0.100 at all depression angles greater than 8 degrees. The proposed KTUL channel 14 facility is predicted to produce a worst-case power density at two meters above ground level, at 326.2 meters from the tower base, of $0.098 \mu\text{W}/\text{cm}^2$, which is 0.03% of the FCC guideline value of $315.33 \mu\text{W}/\text{cm}^2$ for an "uncontrolled" environment, and 0.006% of the FCC's guideline value for "controlled" environments. Therefore, pursuant to Section 1.1307(b)(3) of the FCC Rules, because the proposed facility would not exceed 5% of the uncontrolled and controlled exposure limits, the proposal's power density contribution is considered insignificant.

Further, the Applicant will continue to cooperate/coordinate with other site users and reduce power and/or cease operation during times of service or maintenance of the transmission systems as necessary to avoid potentially harmful exposure to personnel. In light of the above, the proposed facility should be categorically excluded from RF environmental processing under Section 1.1307(b) of the Commission's Rules.

KTUL

Channel 14 - Tulsa OK

ERP = 1000000.00 WATTS

APPENDIX A

Maximum ERP 1000 kW

Polarization ----- 2 Circular
Antenna Height Above Ground -- 567 meters 1860.2 feet
FCC Uncontrolled RFR Limit ---- 315.33 $\mu\text{W}/\text{cm}^2$

Maximum Computed Power Density 0.098 $\mu\text{W}/\text{cm}^2$
0.03% of limit

Angle Below Horizontal (degrees)	<Point X> Horiz Distance from tower to 2 m AGL (meters)	Slant Distance from antenna to Point X (meters)	Vertical Pattern (REL. FIELD)	KTUL ERP (kW)	KTUL Calculated Power Density $\mu\text{W}/\text{cm}^2$	Percent Limit	Limit Exceeded?
0			1.000	1000.0000			
5	6458.0	6482.6	0.141	19.8810	0.032	0.01%	No
10	3204.3	3253.7	0.087	7.5690	0.048	0.02%	No
15	2108.6	2183.0	0.038	1.4440	0.020	0.01%	No
20	1552.3	1651.9	0.055	3.0250	0.074	0.02%	No
25	1211.6	1336.9	0.028	0.7840	0.029	0.01%	No
30	978.6	1130.0	0.011	0.1210	0.006	0.00%	No
35	806.9	985.0	0.018	0.3240	0.022	0.01%	No
40	673.3	879.0	0.016	0.2560	0.022	0.01%	No
45	565.0	799.0	0.010	0.1000	0.010	0.00%	No
50	474.1	737.6	0.027	0.7290	0.090	0.03%	No
55	395.6	689.7	0.018	0.3240	0.045	0.01%	No
60	326.2	652.4	0.025	0.6250	0.098	0.03%	No
65	263.5	623.4	0.019	0.3610	0.062	0.02%	No
70	205.6	601.3	0.018	0.3240	0.060	0.02%	No
75	151.4	584.9	0.017	0.2890	0.056	0.02%	No
80	99.6	573.7	0.004	0.0160	0.003	0.00%	No
85	49.4	567.2	0.004	0.0160	0.003	0.00%	No
90	0.0	565.0	0.000	0.0000	0.000	0.00%	No

