



**STATEMENT OF JOHN E. HIDLE, P.E.
IN SUPPORT OF AN APPLICATION FOR A
CONSTRUCTION PERMIT TO SPECIFY CHANNEL 14
IN LIEU OF CHANNEL 10 IN 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, FCC Form 2100, Schedule A, its technical sections, and the associated exhibits in support of an application for a minor change to specify channel 14 in lieu of channel 10 as ordered in the REPORT AND ORDER in MB Docket No. 21-9; RM-11872; DA 21-1161; FR ID 49364.

DIRECTIONAL ANTENNA

The applicant intends to install a Dielectric model TFU-29ETT/VP-R 4C130 elliptically polarized directional antenna. The antenna's center of radiation will be located at a height above ground of 567 meters, and a height above average terrain of 578 meters. The antenna's horizontal azimuth radiation patterns for both its horizontally and vertically polarized components and its vertical elevation pattern, showing its radiation characteristics above and below the horizontal plane are shown and tabulated in the antenna exhibit.

PREDICTED COVERAGE CONTOURS

The predicted coverage contours were calculated in accordance with the method described in Section 73.625(b) of the Rules, utilizing the appropriate F(50,90) propagation curves (47 CFR Section 73.699, Figure 9), proposed Effective Radiated Power, and antenna height above average terrain as determined for each profile radial. The average terrain on the eight cardinal radials from 3 kilometers to 16 kilometers from the site, was determined using the NED Three Second US Terrain Database as permitted in the FCC Rules. The antenna site elevation and coordinates were determined from FCC antenna registration data. The map exhibit shows the predicted Noise Limited (38.72 dBu) contour, and the principal community (48 dBu) contour which completely encompasses the principal community of license, Tulsa, Oklahoma.

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 46,867 square kilometers. The instant application to change KTUL’s channel to 14 with an ERP of 1000 kW results in a predicted 38.72 dBu noise limited contour coverage area of 46,380 square kilometers. KTUL is therefore entitled, according to Section 73.622(f)(5), to the herein proposed channel 14 ERP of 1000 kW at 578 meters HAAT.

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 800 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 KTUL on 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.

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 facility 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 9 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.

SECTION 73.687 COMPLIANCE

KTUL's Licensee is authorized by the Commission to change its channel to 14 in lieu of channel 10, and is herein submitting an application for a construction permit to effectuate that authorized channel change. KTUL's Licensee is committed to comply fully with the conditions set forth in Section 73.687 to avoid interference to authorized protected land mobile facilities that operate in 460 to 470 MHz frequency band that is directly adjacent in frequency to DTV channel 14 (470-476 MHz), as well as any additional conditions that might be imposed by an issued construction permit, prior to commencing broadcasting on channel 14.

KTUL's licensee has identified all land-mobile licensees that operate on frequencies between 460 MHz and 470 MHz that are located within the geographic confines of KTUL's proposed predicted channel 14 noise limited coverage contour (38.72 dBu), a distance of between 125 and 130 kilometers from KTUL's transmitter site. There are four-hundred ninety four unique land mobile facility call signs authorized to operate within KTUL's channel 14 noise limited contour. In order to more efficiently determine which of these facilities might be likely to experience interference these call signs have been sorted according to distance from the KTUL site and the authorized frequencies have been sorted as well.

In the Report and Order in MM Docket No. 21-9, RM 11872, DA 21-1161 the Bureau stated in paragraph 9 "...As the Commission pointed out in the *Land Mobile Interference Order*, "[t]he vast majority of these interference cases occur where the land mobile base receiver is within 8 kilometers (5 miles) of the TV transmitter site" and "[o]ur experience has

STATEMENT OF JOHN E. HIDLE, P.E.
KTUL - Tulsa, Oklahoma
PAGE 6

also been that the few instances of reported interference where the separation was greater than 8 km have been readily resolved by the installation of appropriate filters.”...”

This observation does provide guidance for assessing the potential for an individual land mobile licensed facility to experience interference due to proximity to a channel 14 DTV station.

KTUL’s licensee has identified two facilities that are located closer than 8 kilometers to KTUL’s site. WQAX439 is co-located with KTUL and uses two frequencies; 460.375 and 465.375 MHz. WQAX617 is located 6.7 km from KTUL and operates on 460.375 and 465.375 MHz. Because these frequencies are far removed from the channel 14 band edge of 470 MHz neither of these facilities is likely to experience interference.

WQRH285 is 8.7 km from KTUL and operates on 460.125 and 461.125 MHz. WQPY579 is 10.0 km from KTUL and operated on 461.6625; 463.9375; 466.6625 and 468.9375 MHz. WQSG743 is 11.6 km from KTUL and operates on 462.2875; 467.2175; 467.2875 and 467.8375 MHz. No interference is expected since these three facilities are located more than 8 km from KTUL’s site and all licensed frequencies for these three facilities are located more than one MHz below channel 14's lower edge.

Eleven additional land mobile facilities are located between 11.6 and 17.2 km from KTUL’s site. They are: WQUZ938; WQVA938; WPYV492; WQRM720; WPWM801; WQOV273; WQQV442; WPDM868; WQZP989; WRJG334 and WPNV663. KTUL’s licensee expects no interference to any of these facilities since all of the frequencies used by these stations are located more than 2 MHz below channel 14's lower edge. Should any interference be identified from KTUL the license is committed to resolve the issue.

DIELECTRIC MASK AND SIDEBAND FILTER

KTUL wishes to set forth the attenuation characteristics of the standard 12-pole high power channel 14 mask and lower-sideband filter manufactured by Dielectric which is to be utilized in the implementation of KTUL's proposed change from channel 10 to channel 14. In so doing the KTUL's licensee wishes to provide adequate documentation to demonstrate that no objectionable interference will be caused to existing land mobile radio facilities that are located in the 460 MHz to 470 MHz band directly adjacent to channel 14 (470 - 476 MHz). KTUL's licensee, in order to comply with the FCC's channel 14 special operating conditions that will be set forth in its initial construction permit, is committed to install the proposed special RF filter with highly suppressive characteristics in the adjacent frequency band below channel 14. The manufacturer's standard channel 14 mask and lower-sideband measurement data from other identical filters it has provided for other channel 14 DTV facilities, which is included herein, show the sufficiently suppressive "out-of-band" characteristics of the filter.

Prior to implementation a mass mailing notification will be made to all identified potentially affected land mobile facilities that are located within a relevant distance from the KTUL transmission site. Should there subsequently arise any interference complaint(s) the licensee will respond accordingly and immediately notify FCC staff.

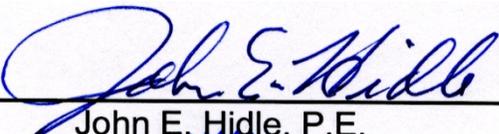
SUMMARY

It is submitted that the instant application for construction permit for KTUL to broadcast on channel 14 in lieu of channel 10, as described herein, complies with the Rules, Regulations and relevant Policies of the Federal Communications Commission.

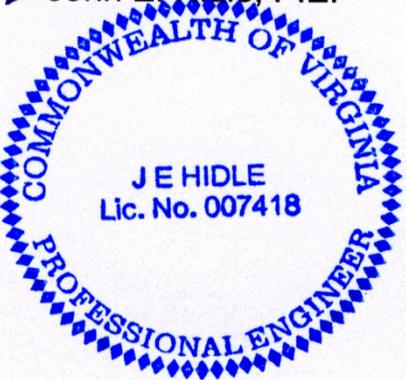
STATEMENT OF JOHN E. HIDLE, P.E.
KTUL - Tulsa, Oklahoma
PAGE 8

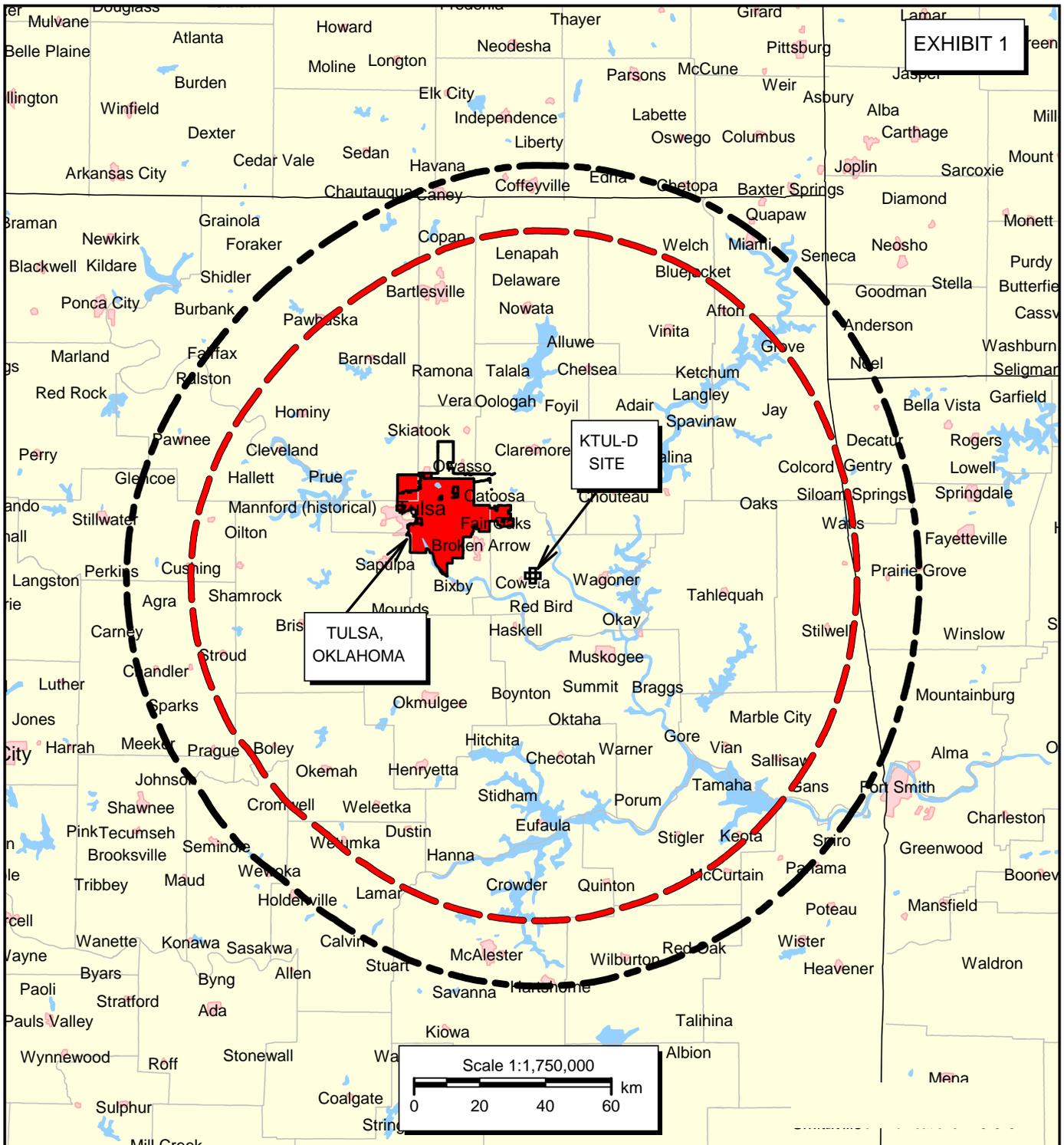
This statement was prepared by me, or under my direct supervision, and its contents are believed to be true and correct to the best of my knowledge and belief.

DATED: November 22, 2021



John E. Hidle, P.E.





PREDICTED COVERAGE CONTOURS

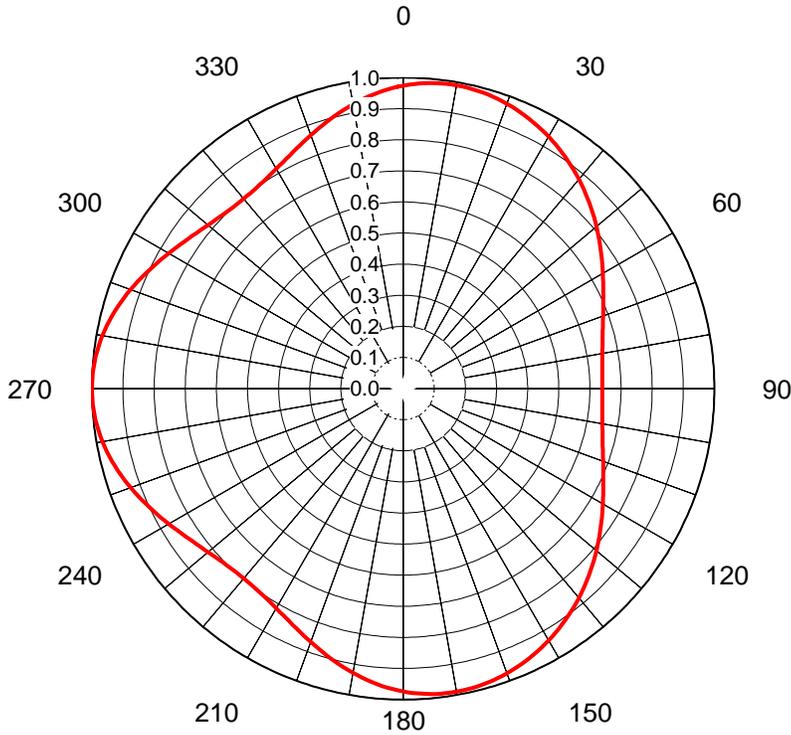
KTUL-D - TULSA, OKLAHOMA
 DTV Channel 14 - 1000 kW ERP - 578 M HAAT
 NOVEMBER, 2021

— Predicted Noise Limited 38.72 dBu
 F(50,90) Coverage Contour



- - - Predicted Principal Community 48 dBu
 F(50,90) Coverage Contour

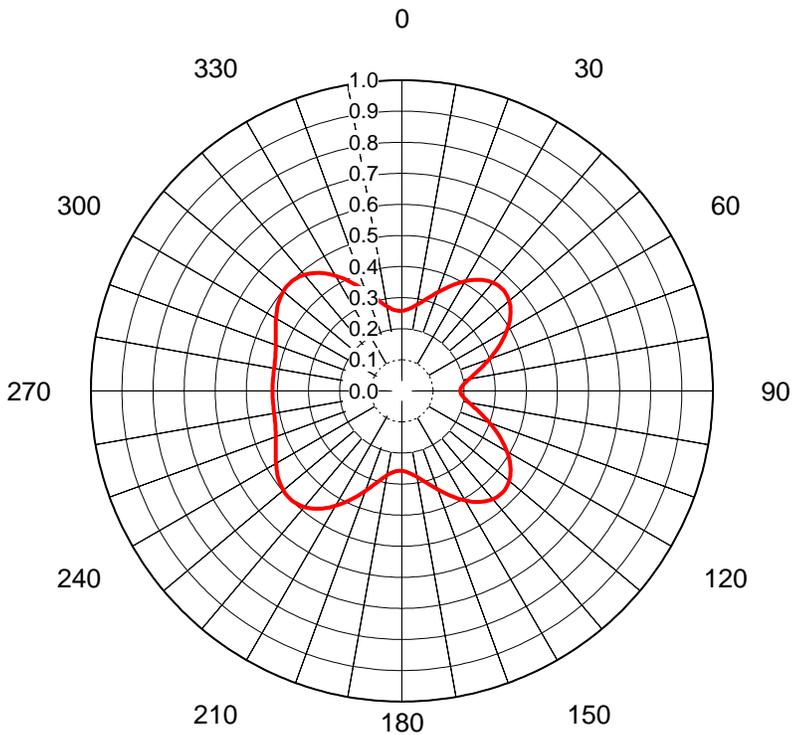
AZIMUTH PATTERN Horizontal Polarization



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																		
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	324	0.800
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	325	0.801
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	326	0.803
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	327	0.806
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	328	0.809
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	329	0.812
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	330	0.816
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	331	0.820
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	332	0.824
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	333	0.829
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	334	0.833
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	335	0.839
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	336	0.844
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	337	0.849
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	338	0.855
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	339	0.861
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	340	0.867
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	341	0.873
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	342	0.879
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	343	0.886
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	344	0.892
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	345	0.898
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	346	0.904
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	347	0.911
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	348	0.917
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	349	0.922
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	350	0.928
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	351	0.934
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	352	0.939
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	353	0.945
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	354	0.950
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	355	0.954
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	356	0.959
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	357	0.963
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	358	0.967
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	359	0.971

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AZIMUTH PATTERN Vertical Polarization

Proposal No. **C-71585-2**
 Date **10-Nov-20**
 Call Letters **KTUL**
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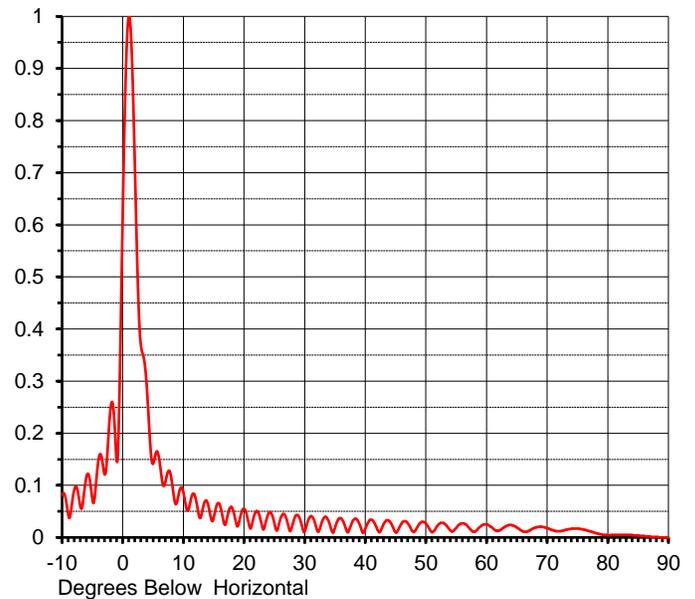
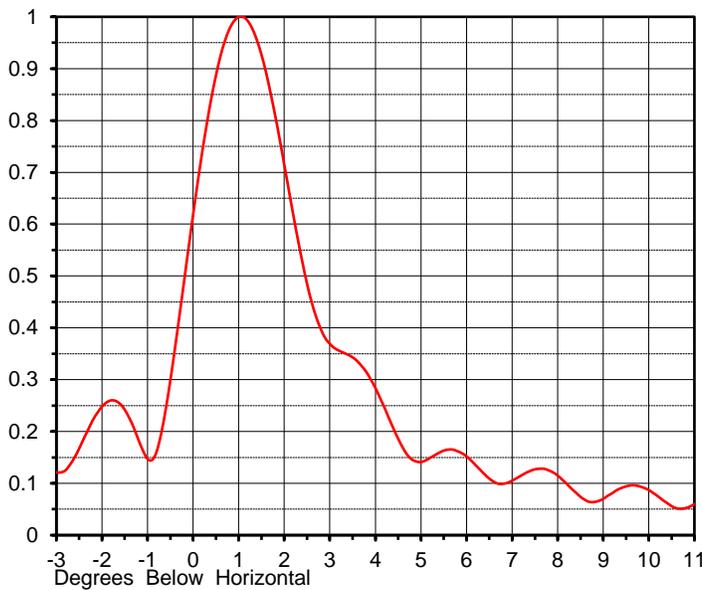
Deg	Value																		
0	0.258	36	0.441	72	0.281	108	0.281	144	0.441	180	0.258	216	0.469	252	0.427	288	0.427	324	0.469
1	0.258	37	0.445	73	0.272	109	0.290	145	0.436	181	0.257	217	0.474	253	0.425	289	0.429	325	0.463
2	0.259	38	0.449	74	0.264	110	0.300	146	0.431	182	0.258	218	0.479	254	0.423	290	0.432	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								
-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	90.0	0.000

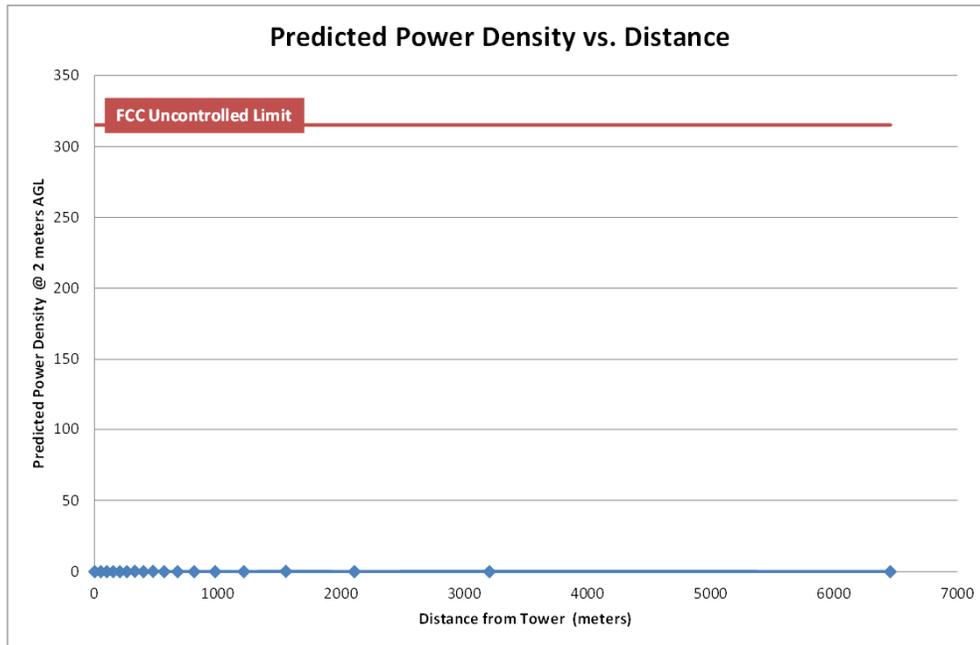
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Maximum ERP 1000 kW

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			0.618	381.9240			
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	0.012	0.1440	0.025	0.01%	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	BLANK000064020	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	1,168,673	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	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	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 BLCDT20020904AAX LIC scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance								
Desired: KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDT20020904AAX									
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	BLEDT20030108ABK	309.4								
KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDT20111028AAX	310.6								
KOZK	D16	DT	LIC	SPRINGFIELD, MO	BLANK0000096081	164.2								
Service area	21951.0	Terrain-limited	761,319	20211.1	IX-free, before	697,286	19936.2	IX-free, after	679,589	19853.4	676,794	Percent New IX	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 BLCDT20111028AAX LIC scenario 1

Call	Chan	Svc	Status	City, State	File Number	Distance								
Desired: KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDT20111028AAX									
Undesireds: KTUL	D14	DT	APP	TULSA, OK	KTUL 14 AP 1000KW EZpr	174.2 km								
KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDT20020904AAX	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	BLCDT20090303ACS	190.3								
Service area	33727.8	Terrain-limited	1,585,075	33409.7	IX-free, before	1,583,188	31374.4	IX-free, after	1,564,809	31343.2	1,564,496	Percent New IX	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	BLEDT20140903AFQ	400.2						
KHOG-TV	D15	DT	LIC	FAYETTEVILLE, AR	BLCDT20020904AAX	137.9						
KTBO-TV	D15	DT	LIC	OKLAHOMA CITY, OK	BLCDT20111028AAX	174.2						
Service area	46360.9	Terrain-limited	1,517,959	44925.7	IX-free	1,490,400	44328.2	IX-free	1,470,664	Percent IX	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.

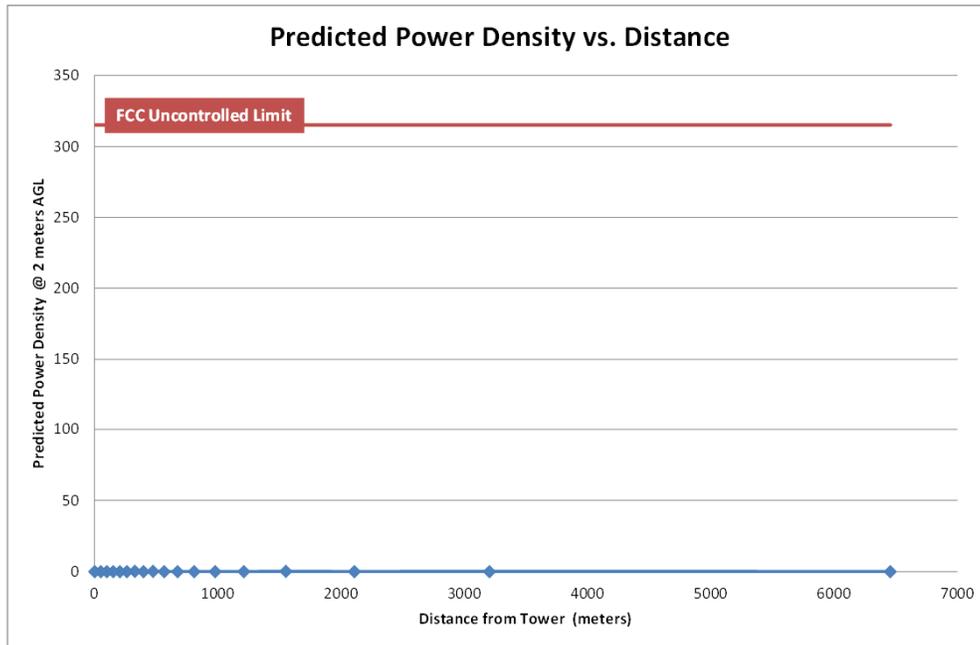
As shown in Appendix A the KTUL channel 14 facility as proposed herein will operate with a maximum ERP of 1000 kW from an elliptically polarized directional transmitting antenna with a centerline height of 567 meters above ground level (AGL). Considering the elevation pattern submitted elsewhere in this submission, the vertical plane relative field factor is less than 0.100 at all depression angles greater than 9 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.

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

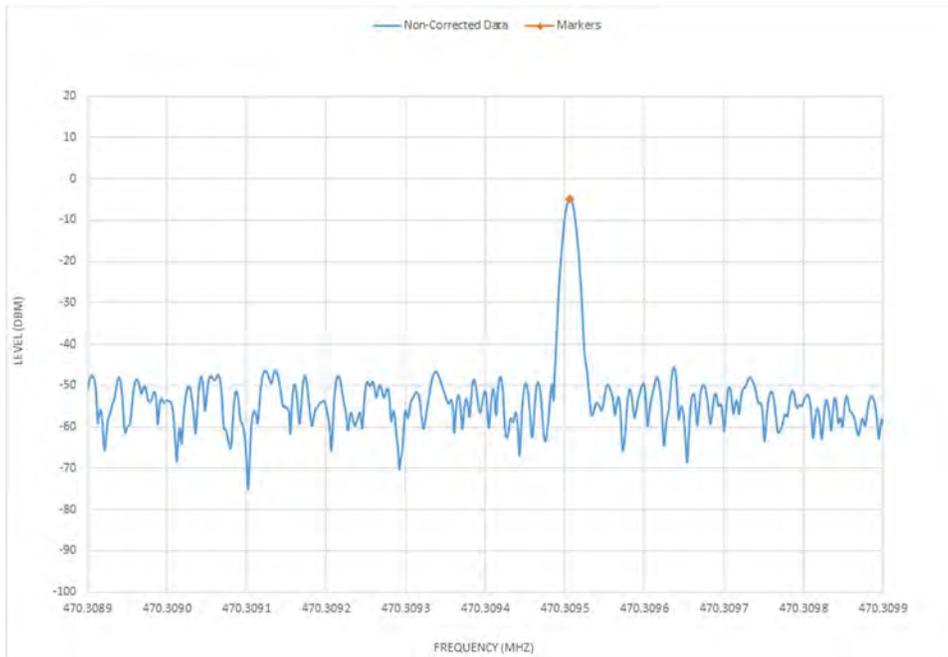
Angle Below Horizontal (degrees)	<Point X> Horiz Distance from tower to 2 m AGL (meters)	Slant Distance from antenna to Point X (meters)	Vertical Pattern (REL. FIELD)	KTUL ERP (kW)	KTUL Calculated Power Density $\mu\text{W}/\text{cm}^2$	Percent Limit	Limit Exceeded?
0			0.618	381.9240			
5	6458.0	6482.6	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	0.012	0.1440	0.025	0.01%	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



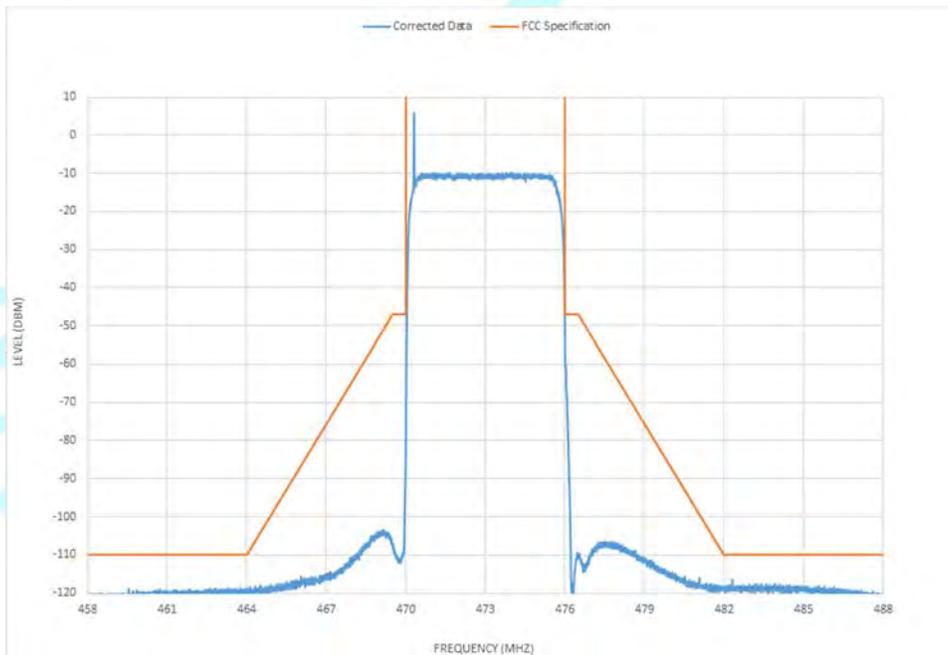


3.5 Exciter Plots

3.5.1 Exciter A - Pilot Frequency

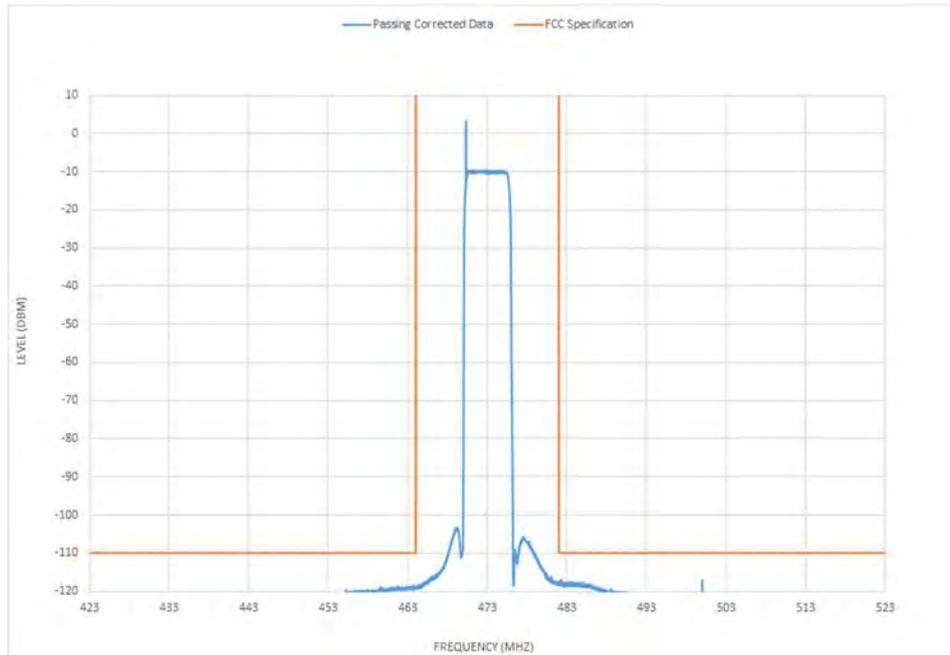


3.5.2 Exciter A - Narrow Band Mask Filter Plot

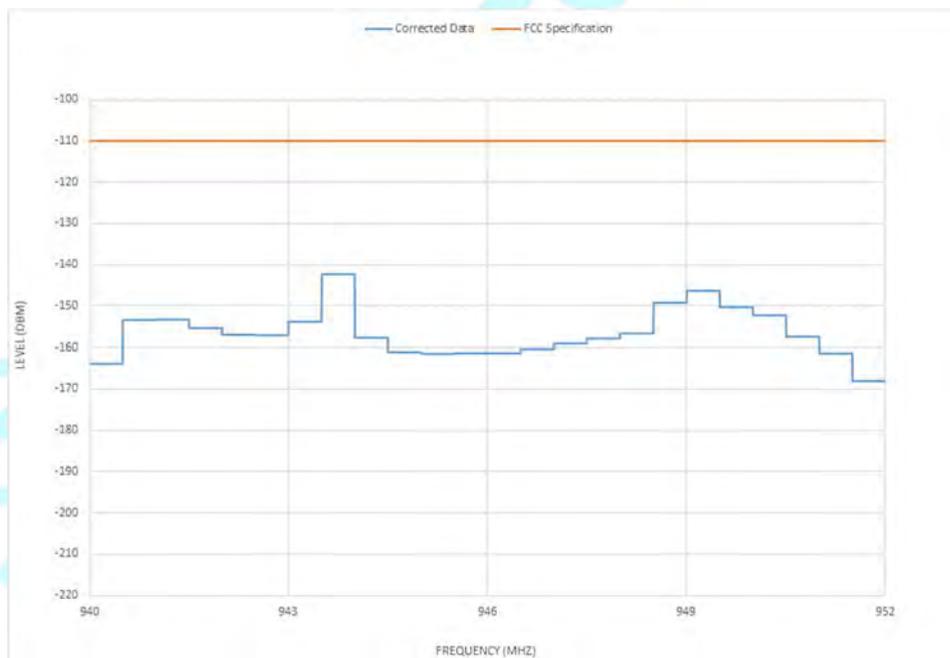




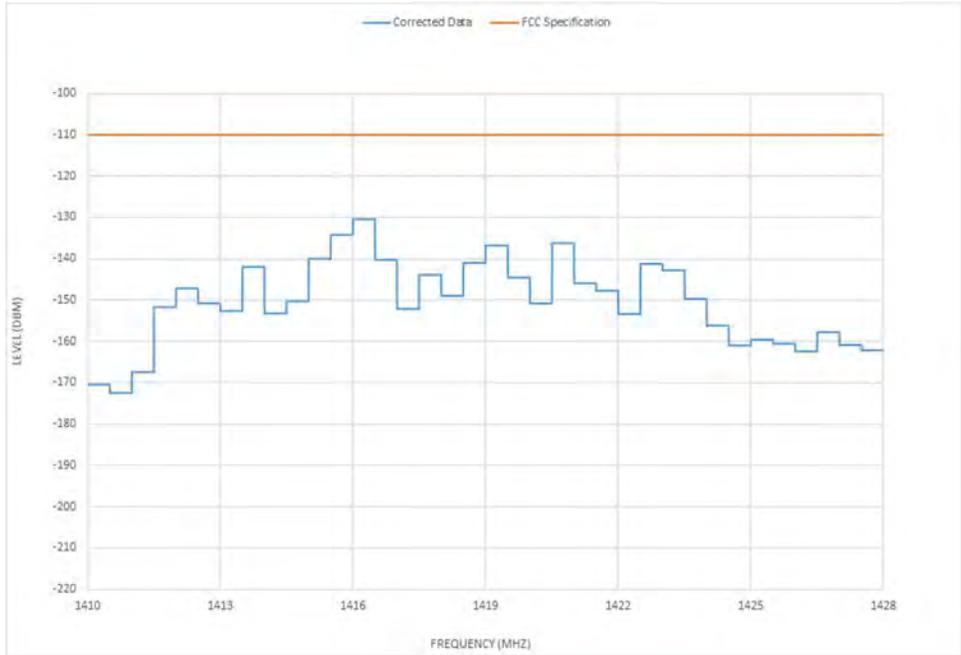
3.5.3 Exciter A - Wide Band Plot



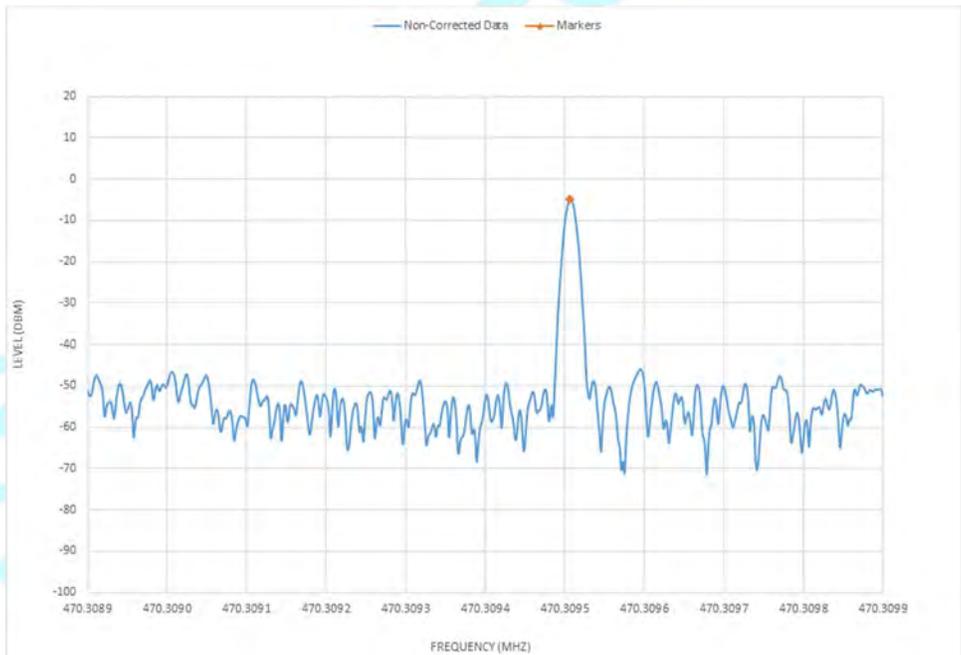
3.5.4 Exciter A - Second Harmonic Plot



3.5.5 Exciter A - Third Harmonic Plot

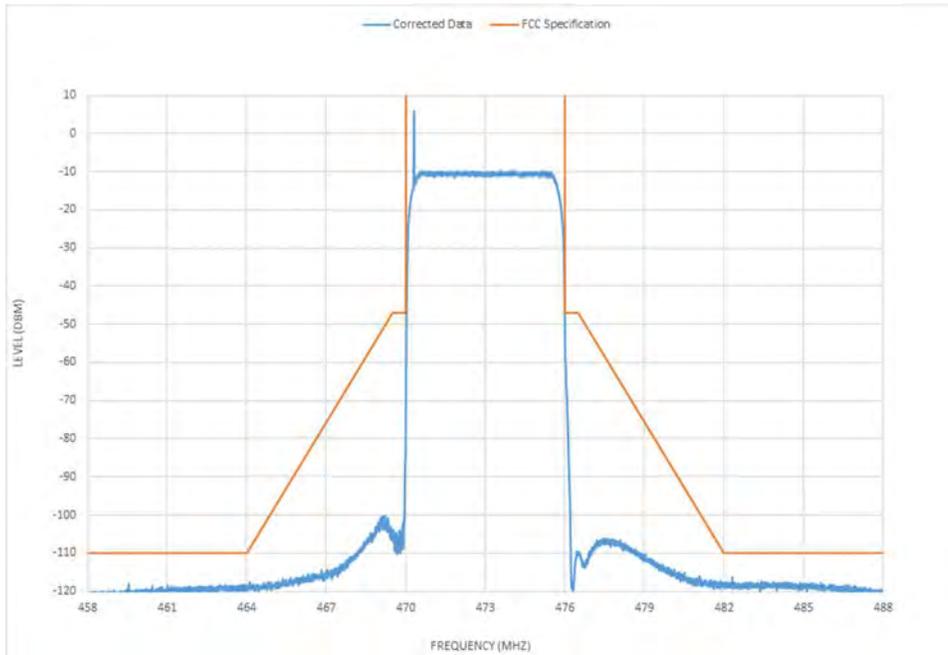


3.5.6 Exciter B - Pilot Frequency

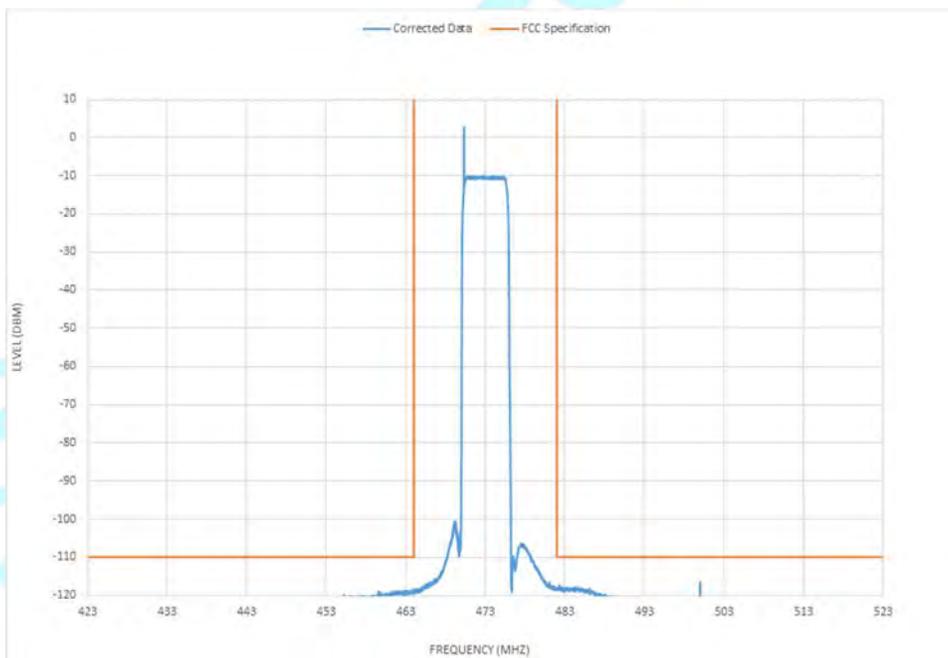




3.5.7 Exciter B - Narrow Band Mask Filter Plot

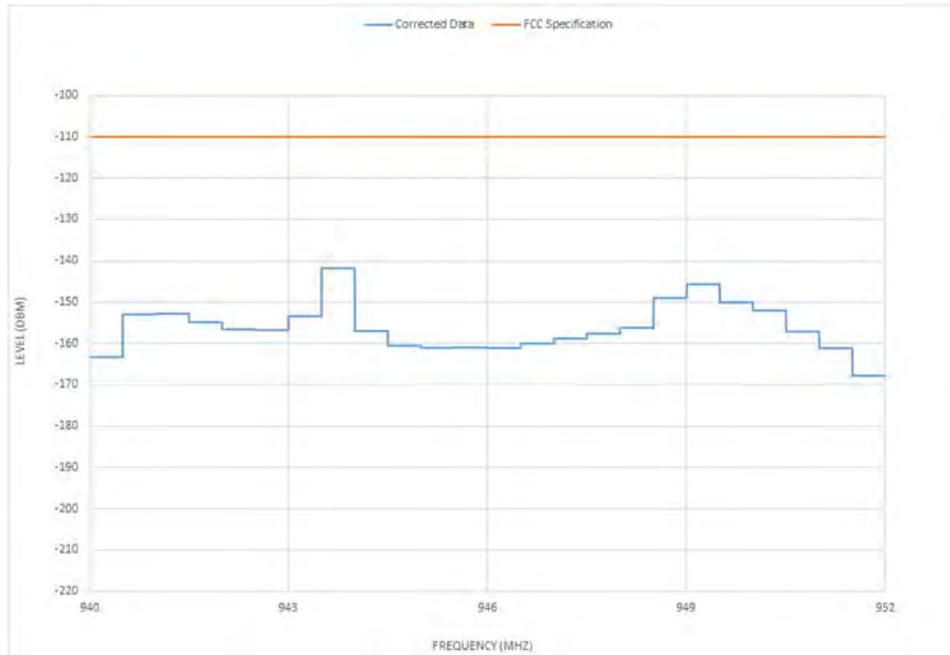


3.5.8 Exciter B - Wide Band Plot

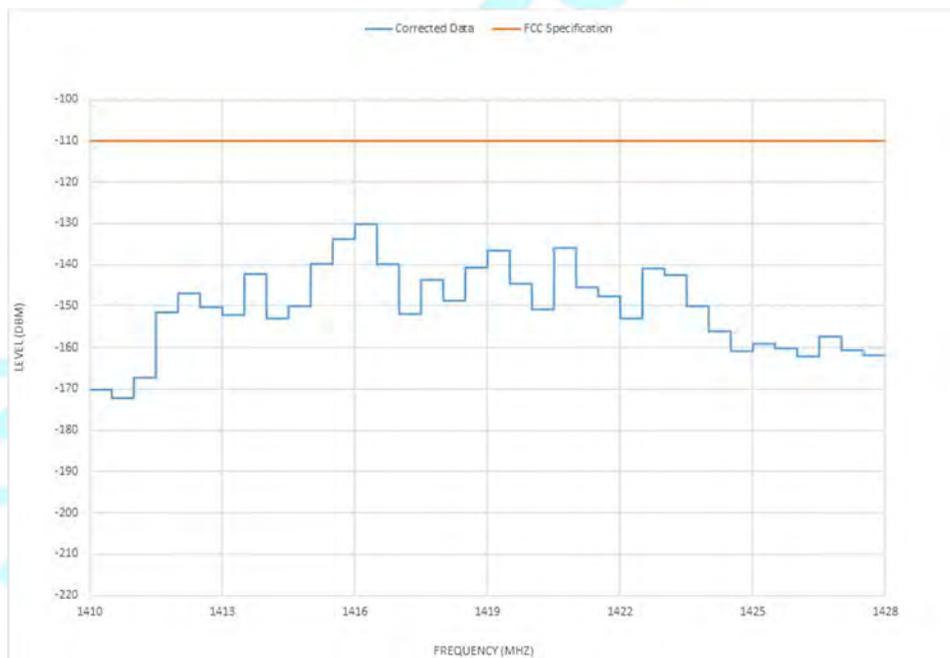




3.5.9 Exciter B - Second Harmonic Plot



3.5.10 Exciter B - Third Harmonic Plot



3.8 FCC Limits

3.8.1 Out of Channel Requirements

Full Service transmitters should meet the following Out-of-Channel Emissions requirements [FCC 47CFR§73.622(h)]:

- a) In the range between $\frac{1}{2}$ the width of the Resolution Bandwidth filter used and 500 kHz from the Channel Edge:

$$\text{Emissions} \leq -47 \text{ dB}_{\text{DTV}} \text{ (4)}$$

- b) More than 6 MHz from the Channel Edge:

$$\text{Emissions} \leq -110 \text{ dB}_{\text{DTV}} \text{ (5)}$$

- c) At any frequency between 500 kHz and 6 MHz from the Channel Edge:

$$\text{Emissions} \leq -(11.5(|\Delta F|-0.5)+47) \text{ dB}_{\text{DTV}} \text{ (6)}$$

Where:

ΔF is the frequency difference, in MHz, from the Channel Edge

3.8.2 Notes for all Masks

Note 1: Measurements need not be made any closer to the Channel Edge than one half of the width of the Resolution Bandwidth filter used in the measurement instrument.

Note 2: While Figure 3, Figure 4, and Figure 5 depict only the band of frequencies near the transmitter's output signal, the FCC's ultimate attenuation requirement specifically applies to all Emissions greater than 6.0 MHz away from the transmitter's Channel Edges, including harmonics, sub-harmonics or other spurious signals.

Note 3: The FCC accepts measurements made using one of two methods [FCC Public Notice DA-05-1321A1, May 10, 2005, "OET Clarifies Emission Mask Measurement for DTV Transmitters"]:

Method 1: Measure the Emissions in a narrow Resolution Bandwidth (30 kHz, 10 kHz or narrower). Either scale the measured power to a 500 kHz bandwidth based on IEEE P1631™/D3, February, 2008 $10 \log(500 \text{ kHz}/\text{noise bandwidth of the resolution filter})$ or scale the measured attenuation (i.e., $10 \log(\text{measured power}/\text{total signal power})$) based on $10 \log(\text{noise bandwidth of the resolution filter}/500 \text{ kHz})$. These values are then compared point by point to the emission mask.

Method 2: Sum the power across a 500 kHz window in order to implement an effective measurement bandwidth of 500 kHz; this power is then compared to the emission mask value computed for the center frequency of the 500 kHz Sub-Band. This method may be performed either by manually summing the measurements or by using a measurement instrument's Band Power Measurement function. It is sufficient to measure a contiguous sequence of twelve 500 kHz windows across each adjacent Channel, plotting the measured value at the center of the 500 kHz Sub-Band window.

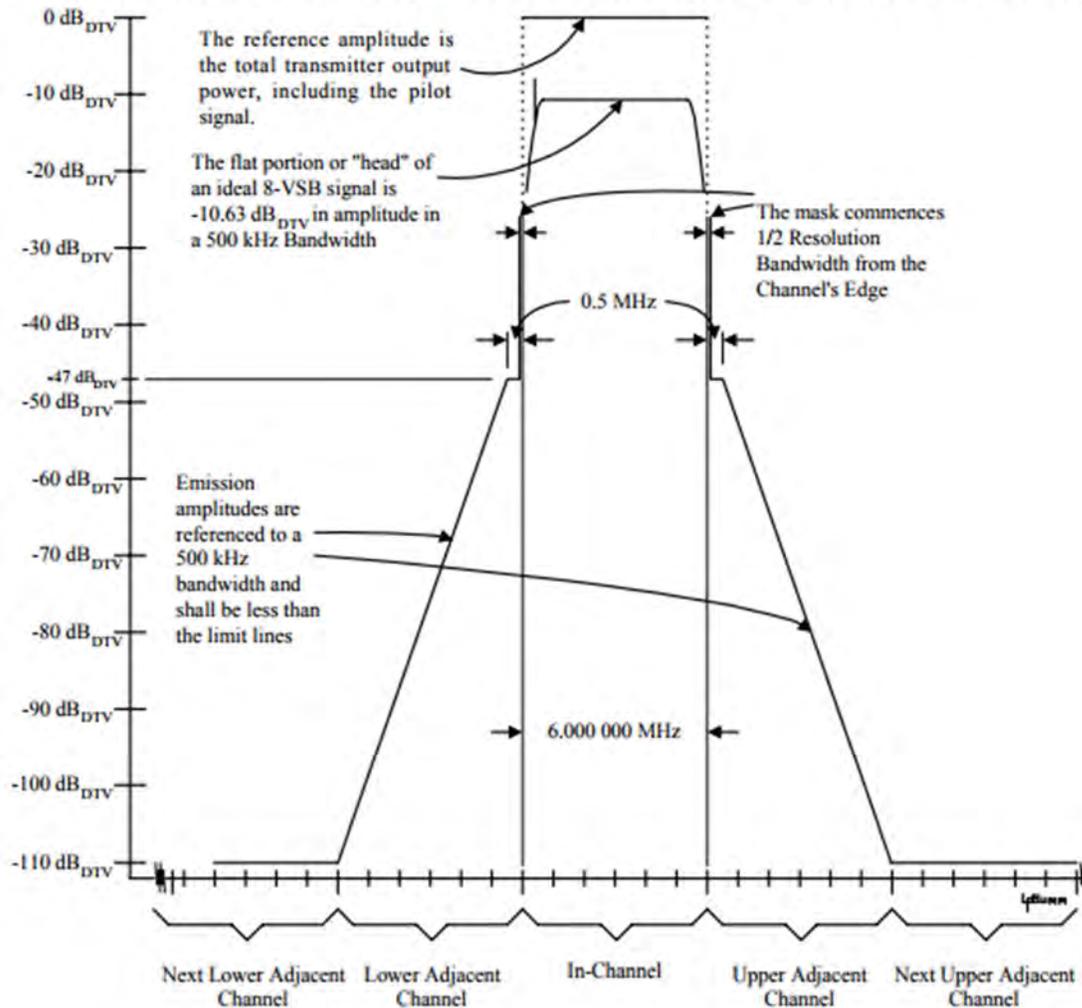
The FCC allows a single method to be used for all measurements, or, if desired, one of the above methods may be employed in the 500 kHz window adjacent to each Channel Edge and the other method for all other measurements further from the Channel Edge. The FCC requires that the frequency bin

spacing on the measurement test instrument is to be less than or equal to the Resolution Bandwidth as displayed.

Note 4: Mask measurements performed in accordance with IEEE-1631-2008 section 4.6.2 using method 4.6.5 (described above). To overcome the limitations of direct measurement with the test equipment, the spectral response was measured prior to the mask filter with a RBW of 10 kHz, span of 30 MHz and utilizing 6001 points. The mask filter was directly swept using a 30 MHz span and utilizing 6001 points. The data from both sweeps are imported into a spreadsheet, corrected for RBW and coupler frequency response on a point by point basis. The result is then plotted against the FCC mask requirements for verification of mask compliance.

3.8.3 Transmitter Emission Limit Diagram

8-VSB Full Service Transmitter Emission Limits



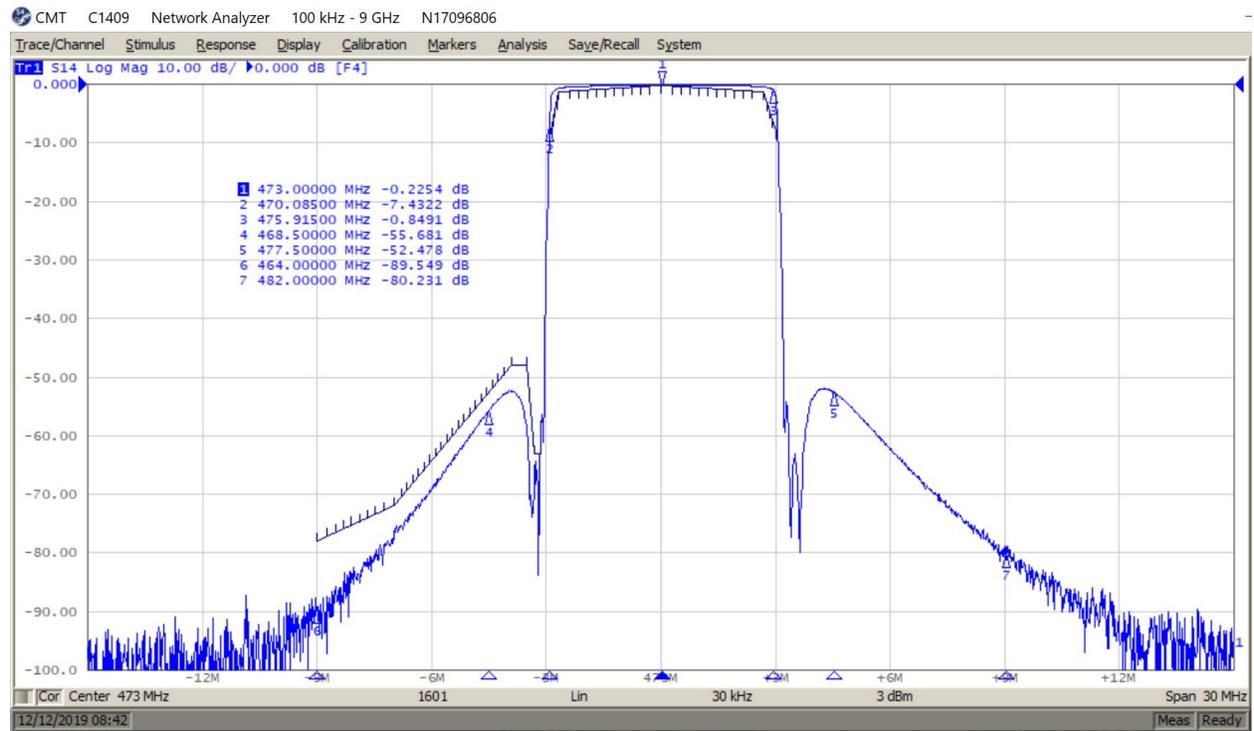


C 14 CIF WITH 6 INCH OUTPUT SWITCH

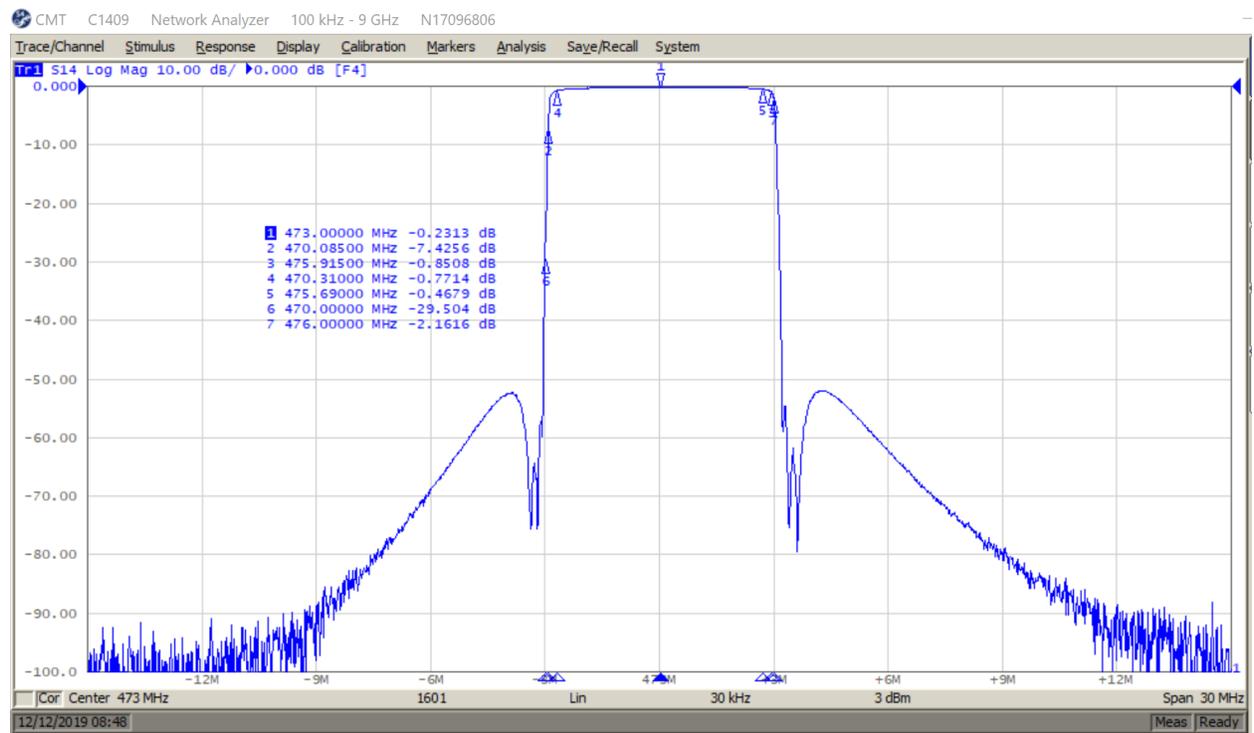
SO 1698661 LINE 4 PN 400010433

WFGX

FILTER RESPONSE



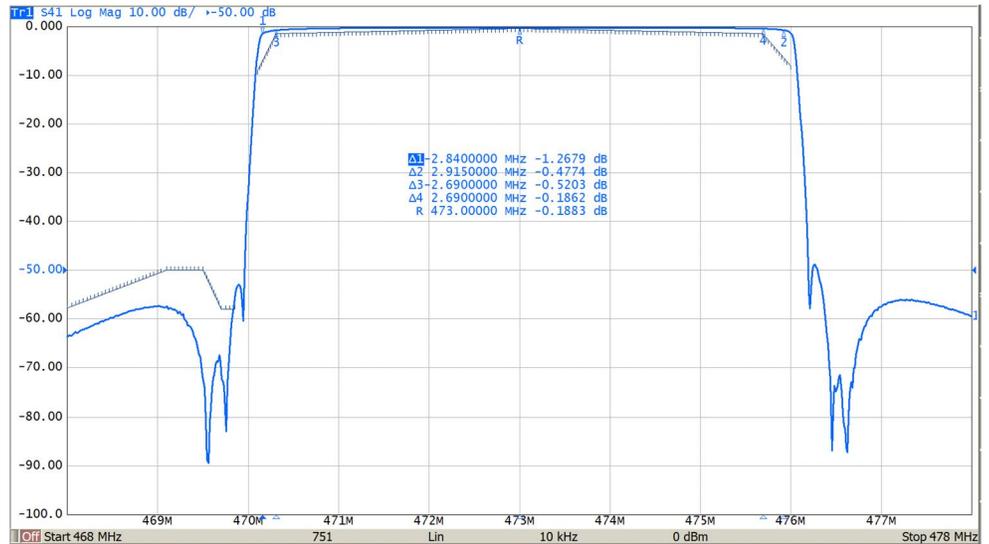
FILTER RESPONSE



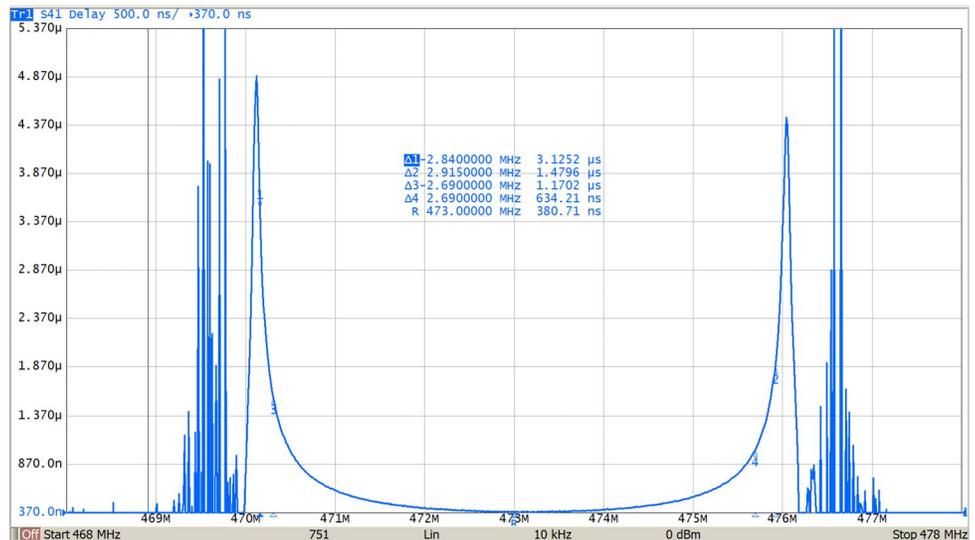
KTUL Mask Filter Proposal

Specification	
Passband	fo -2.84 to +2.915 MHz
VSWR	< 1.08
Typical Insertion Loss	
fo	<0.25 dB
fo - 2.84 MHz	<1.6 dB
fo + 2.915 MHz	<1 dB
470.1 MHz	<9 dB
Typical Group Delay	
fo - 2.69 MHz	1200 ns
fo + 2.69 MHz	700 ns
fo - 2.84 MHz	3200 ns
fo + 2.915 MHz	1500 ns
Rejection (increasing or decreasing linearly with increasing frequency)	
464 MHz	>78 dB
466 MHz	>72 dB
469.1 MHz	>50 dB
469.5 MHz	>50 dB
469.7 MHz	>58 dB
469.85 MHz	>58 dB

Response



Group Delay



KTUL Mask Filter Proposal

Dimensions:

