Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
KHQA LICENSEE, LLC	)	MB Docket No. 20- _____
	)	RM - ____
Petition for Rulemaking to Amend the	)	
DTV Table of Allotments for	)	
Station KHQA-TV, Hannibal, MO	)	
(Facility ID No. 4690)	)	

PETITION FOR RULEMAKING

KHQA LICENSEE, LLC, licensee of television station KHQA-TV, Hannibal. MO (Facility ID No. 4690) ("KHQA" or the "Station"), hereby requests that the Commission commence a rulemaking pursuant to Section 1.401 of the Commission's rules[1] in order to amend the DTV Table of Allotments by allotting UHF Channel 22 to KHQA in lieu of VHF Channel 7 consistent with the technical parameters as set forth in the attached Engineering Statement.[2] As demonstrated herein, the proposed channel substitution for KHQA from VHF Channel 7 to UHF Channel 22 would allow KHQA to significantly improve its over-the-air service to the Station's viewers in the Hannibal, MO market. As shown below, the proposed channel change from Channel 7 to Channel 22 would result in a substantial increase in signal receivability for KHQA's core viewers, and enable viewers to receive the Station's signal with a significantly smaller antenna.

The proposed channel substitution would serve the public interest because KHQA has had a long history of dealing with severe reception problems. The reception issues were

[1] 47 C.F.R. § 1.401.

[2] *See* Engineering Statement of John E. Hidle, P.E., In Support of a Petition to Amend the Table of Allotments for KHQA, Hannibal. MO ("Engineering Statement").

exacerbated by the analog to digital conversion. This is not surprising as the Commission has long recognized that "VHF channels have certain characteristics that have posed challenges for their use in providing digital television service," including "propagation characteristics of these channels [that] allow undesired signals and noise to be receivable at relatively farther distances," and the fact that "reception of VHF signals requires physically larger antennas that are generally not well suited to the mobile applications expected under flexible use, relative to UHF channels."[3] The Commission has also stated that studies have found "large variability in the performance (especially intrinsic gain) of indoor antennas available to consumers, with most antennas receiving fairly well at UHF and the substantial majority not so well to very poor at high-VHF."[4]

These sound conclusions by the Commission have proven to be absolutely correct and are entirely consistent with the experience of KHQA operating on VHF Channel 7. Indeed, KHQA has received numerous complaints from viewers unable to receive the Station's over-the-air signal, despite being able to receive signals from other local stations. Permitting KHQA to operate on UHF Channel 22 instead of VHF Channel 7 will alleviate the Station's reception issues and will improve service to local viewers. Importantly, the proposal will result in more effective building penetration for indoor antenna reception and will also greatly improve the Station's ability to provide ATSC 3.0 service to homes, vehicles and portable devices, to the ultimate benefit of the Station's viewers and the public interest in Hannibal, MO.

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[3] *Innovation in the Broadcast Television Bands: Allocations, Channel Sharing and Improvements to VHF*, NPRM, 25 FCC Rcd 16498, 16511 ¶ 42 (2010) ("*VHF Improvements NPRM*").

[4] *Id. at 16512* ¶ 44. *See also Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations*, Second R&O, 25 FCC Rcd 10732, 10750 ¶ 37 (2011) ("As a result of the full power digital television transition, some full power stations on VHF channels have experienced reception problems and such problems have not been alleviated even by allowing these stations to operate with the maximum power permitted under the full power television rules.").

As an initial matter, for the Station's signal to be received at all by viewers, it would require an antenna gain of at least 6 dB (according to planning factors) and an antenna elevated 30 feet above ground! As further evidence of why the requested channel change from VHF Channel 7 is absolutely necessary, attached are charts taken from the instruction manuals for Potomac Instruments Field Strength Meters, which are used to determine the actual physical size of the wavelengths of digital VHF and UHF channels. These charts are specifically utilized to adjust the length of the reference dipole antennas associated with each instrument according to the frequency being measured. As shown in the charts, the dipole antenna length for Channel 13, the shortest VHF antenna, would be **over two feet** for a portable device, and an antenna for Channel 7 would be even longer. An antenna of this size is unrealistic for use in a portable mobile device. In contrast, the charts indicate the dipole length for Channel 14, the longest UHF antenna, to be only **10.2 inches**, which is used in portable devices capable of UHF signal reception which are currently being manufactured. Consequently, the ability of broadcast television stations to use the groundbreaking new ATSC 3.0 technology, which will dramatically enhance the television viewing experience for mobile consumers, depends on those stations being able to broadcast on UHF channels. This fact alone should justify the requested channel change as being overwhelmingly in the public interest.

As shown in the attached Engineering Statement, the proposed migration of KHQA from Channel 7 to Channel 22 will be a favorable arrangement of allotments based on the enhanced signal levels that will be delivered to a large percentage of the population within the Station's "protected service area." For example: The percentage of population receiving a signal greater than 100 dBu is **9.4%** for Channel 7, while the percentage that is predicted to receive a signal greater than 100 dBu is **14.8%** for Channel 22 with a population increase of over **43,500** persons on Channel 22. The respective populations predicted for each channel and

signal levels are shown in the Exhibits attached to the Engineering Statement. As these population figures demonstrate, the proposed channel change from Channel 7 to Channel 22 would result in a substantial increase in signal receivability for KHQA's core viewers, without any predicted loss of coverage.[5] Consequently, the proposed move to Channel 22 would serve the public interest by giving Hannibal, MO viewers significantly improved access to KHQA's signal.

Now that Phase 10 has been completed and the repack is winding down, and the freeze on the filing of rulemaking petitions for channel changes has been lifted, grant of the instant Petition would have no impact on the Post-Transition Table of DTV Allotments or otherwise affect the analysis of repacking methodologies.[6] Indeed, the Media Bureau has already permitted full power, Class A, and low power stations to propose substitutions of their assigned channels as part of the post-auction transition.[7] Additionally, as shown in the attached Engineering Statement, KHQA's proposed move from Channel 7 to Channel 22 protects all operating and approved post-Auction facilities in accordance with the Commission's rules. Further, KHQA has confirmed with its vendors that they have the capacity to supply the antenna

[5] As the Bureau is aware, even where a proposed modification would result in some minimal service loss, the Commission will approve the proposed modification provided that it is "supported by a strong showing of countervailing public interest," such as offsetting service gains. *See Third Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, NPRM, 22 FCC Rcd 9478, 9493 ¶ 38 & n.70.

[6] *See Amendment of Section 73.622(i), Post-Transition Table of DTV Allotments, Station WNLO(TV), Buffalo, New York*, NPRM, MB Docket No. 19-118, DA 19-316 at ¶ 6 (MB April 23, 2019) (proposing to waive channel-substitution and contour extension freezes "because the underlying purpose of the freeze is not implicated" given that "the incentive auction and repacking have been completed"), *proposal adopted by* Report and Order, MB Docket No. 19-118, DA 19-553 (MB June 12, 2019). *See also, Media Bureau Lifts Freeze on the Filing of Television Station Minor Modification Applications and Rulemaking Petitions Effective Fifteen Days After Publication in the Federal Register*, Public Notice, DA 20-1269 (MB October 29, 2020).

[7] *See Incentive Auction Closing and Channel Reassignment Public Notice the Broadcast TV Incentive Auction Closes; Reverse Auction and Forward Auction Results Announced; Final TV Band Channel Assignments Announced; Post-Auction Deadlines Announced, Public Notice*, 32 FCC Rcd. 2786 ¶ 71 (2017); *Incentive Auction Task Force and Media Bureau Announce Post Incentive Auction Special Displacement Window April 10, 2018, Through May 15, 2018, And Make Location and Channel Data Available*, Public Notice, 33 FCC Rcd. 1234 ¶ 6 (IATF and MB 2018).

and transmitter equipment necessary for KHQA's proposed Channel 22 facility without adversely impacting any other station's repack progress. KHQA's proposed channel substitution thus does not in any way obstruct the Commission's repacking process, making the instant Petition ripe for Media Bureau approval and grant.

Accordingly, the public interest would be best served by promptly granting the Station's request to move from Channel 7 to Channel 22 with the specifications set forth in the Engineering Statement, so that Hannibal. MO-area viewers may benefit from substantially improved over-the-air broadcast television service as soon as possible, consistent with §73.622(i) of the Commission's Rules.

Conclusion

For the foregoing reasons, the proposed amendment to the DTV Table of Allotments will clearly serve the public interest. Petitioner therefore respectfully requests that the DTV Table of Allotments be amended in accordance with the specifications set forth in the attached Engineering Statement.

Respectfully submitted,

KHQA LICENSEE, LLC

By: /s/ *Paul A. Cicelski*
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Counsel to KHQA Licensee, LLC

Dated: November 27, 2020

Consulting Engineers
CTJC
CARL T. JONES CORPORATION

STATEMENT OF JOHN E. HIDLE, P.E.
IN SUPPORT OF A PETITION TO AMEND
THE DIGITAL TELEVISION TABLE OF ALLOTMENTS
KHQA-TV - HANNIBAL, MISSOURI
DTV - CH. 22 - 750 kW - 271 m HAAT

Prepared for: KHQA 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 KHQA LICENSEE, LLC, licensee of KHQA-TV channel 7, licensed to Hannibal, Missouri, 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 to change KHQA-TV's allotted channel. DTV channel 7 is currently specified in the Digital Television Table of Allotments for KHQA-TV. The petitioner requests herein to substitute DTV channel 22 for DTV channel 7. The proposed arrangement of allotments is made to enhance potential viewers' ability to more easily receive the broadcast signal of KHQA-TV. For example, when a signal strength of 80 dBu is compared, channel 7 provides a potential viewer population of 89,411 persons while channel 22 provides a population of 156,252 persons. Further, comparing a signal strength of 60 dBu channel 7 equals 175,257 while channel 22 equals 273,105. A signal level greater than 100 dBu provides the most dramatic comparison. For a predicted

channel 7 signal greater than 100 dBu the predicted population is 37,613 persons while the channel 22 predicted greater than100 dBu population is 85,402 persons. Additionally the UHF channel 22 requires a significantly smaller receiving antenna approximately one-third the size of an equivalent antenna for channel 7. This smaller antenna size by one-third and the >100 dBu signal level population by several thousand times bodes well for changing from channel 7 to UHF channel 22, especially when the ATSC 3.0 DTV standard is considered.

However, serious propagation problems associated with digital television broadcast (DTV) use of high-VHF television channels (7-13) remain. 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 have been severe enough for the FCC to have, in Zone I where the ERP limit for channels 7-13 is 30 kW at 305 meters HAAT, 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. 34 kW 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

KHQA-TV's licensee has determined that the proposed migration from channel 7 to channel 22 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 9.4% for channel 7 while the percentage that is predicted to receive a signal greater than 100 dBu is 15% for channel 22. The populations predicted for each channel and signal levels are shown in the attached map exhibits. Note that a change to channel 22 results in a predicted increase of more than 168,000 persons in the overall population. The licensee believes that changing KHQA-TV to operate on channel 22 will solve most, if not all of its current reception problems.

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 7, for example, has a wavelength of 5.56 feet. A simple half-wave dipole antenna, used as a reference with 0 dB gain, must be 2.78 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 7 with 6 dB of gain would measure 2.60 feet wide and at least 11 to 13 feet long. Obviously the required size of antennas for VHF channels precludes their use in the smart-phone culture. Therefore KHQA-TV on channel 7 will likely be precluded from participation in ATSC 3.0 serving the portable and mobile users of these services. KHQA-TV's licensee has heretofore been unable to consider a truly effective solution to its reception problems, and sees no viable solution to the portable, mobile problem while broadcasting on its VHF channel 7, until now. KHQA-TV's licensee herein seeks an effective solution: change to a UHF channel.

KHQA-TV's licensee has determined that the proposed migration to channel 22 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". As previously noted the percentage of population receiving a signal greater than 100 dBu is 9.4% for channel 7, while the percentage that is predicted to receive a signal greater than 100 dBu is 15% for channel 22. The higher signal levels provided by use of channel 22 will enable an ease of reception for mobile and portable devices users, notably the smartphone set. The populations predicted for each channel and signal levels are shown in the attached map exhibits. Please note there is a predicted population gain of more than 168,000 for KHQA-TV on channel 22 compared to channel 7.

TECHNICAL STUDY

An engineering study of all pertinent allotments, assignments, applications, construction permits and DTV licenses reveals that DTV channel 22 can be allotted to Hannibal, Missouri in lieu of channel 7, and meet all of the Commission's interference criteria. The allotment reference coordinates for DTV channel 22 at Hannibal, Missouri are: 39 58' 22.0" N.L. and 91 19' 55.0" W.L.[1] The Hannibal allotment reference site meets the allotment standards in §73.616(b); 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-33ETT/VP-R O6 non-directional antenna for channel 22 at KHQA-TV's current centerline height above

[1] The channel 22 DTV allotment reference coordinates are the same as the DTV channel 7 allotment reference coordinates (as defined in Section 73.622(i) of the FCC Rules) of the petitioner's licensed KHQA-TV, Hannibal, Missouri tower site. License BLCDT-20090622AFC (See FCC tower registration number 1009005).

mean sea level (AMSL) of 461.4 meters and 271 meters above average terrain. The proposed changes include the new non-directional antenna, an increase in ERP to 1000kW and a change from channel 7 to channel 22, The coverage area and population predicted to be served by KHQA-TV are increased. All other station parameters are to remain unchanged.

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 KHQA-TV site is located more than 700 kilometers from the nearest point on the US-Canadian border and 1,400 kilometers from the nearest point on the US-Mexican border. Therefore no international coordination is required.

Class A Television Allocation Considerations

As required in Section 73.616(f) of the FCC's Rules, the study results in Appendix B shows no Class A station predicted to be affected by the re-allotment of KHQA-TV.

Land Mobile and FM radio Considerations

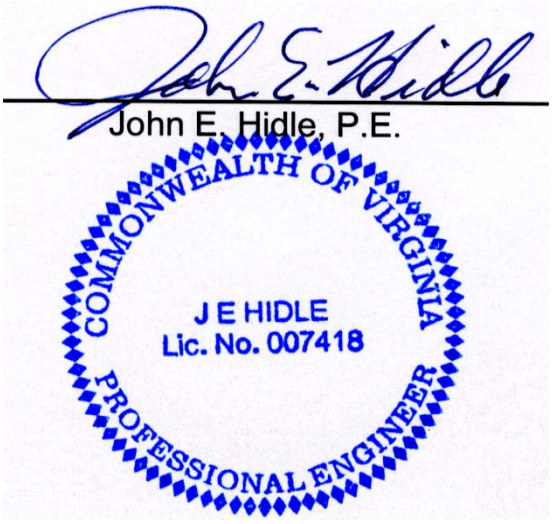
The *tvstudy* results found no Land Mobile violations for this site, and the site is located within 3.2 km of AM radio station WGEM, Quincy, Illinois. Ultimately this proposal

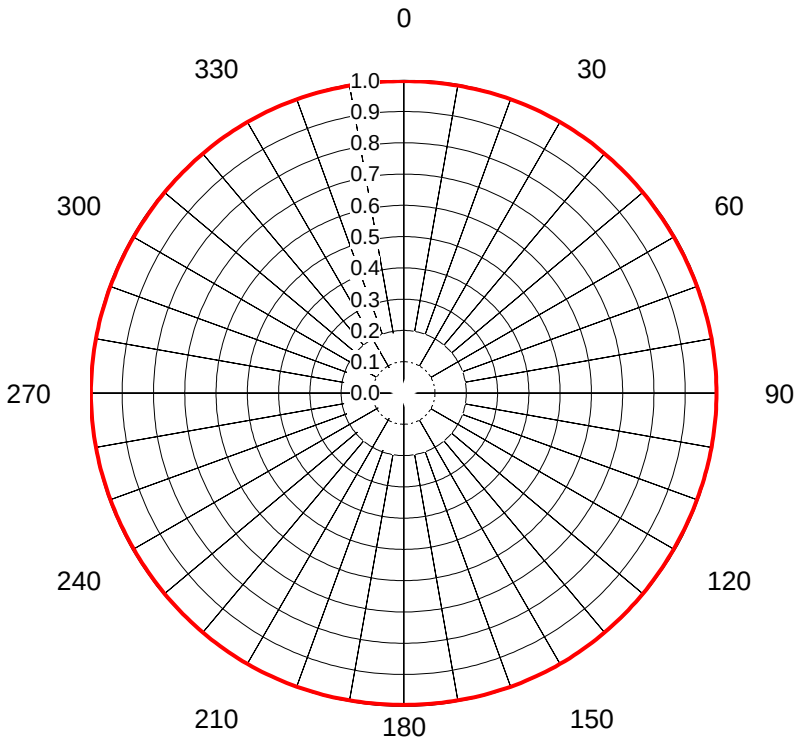
involves only an exchange of a new DTV antenna for an existing antenna, therefore no effect to WGEM is expected.

SUMMARY

It is submitted that the instant Petition to Amend the DTV Table of Allotments to substitute DTV channel 22 for DTV channel 7 in Hannibal, Missouri, 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 22, 2020



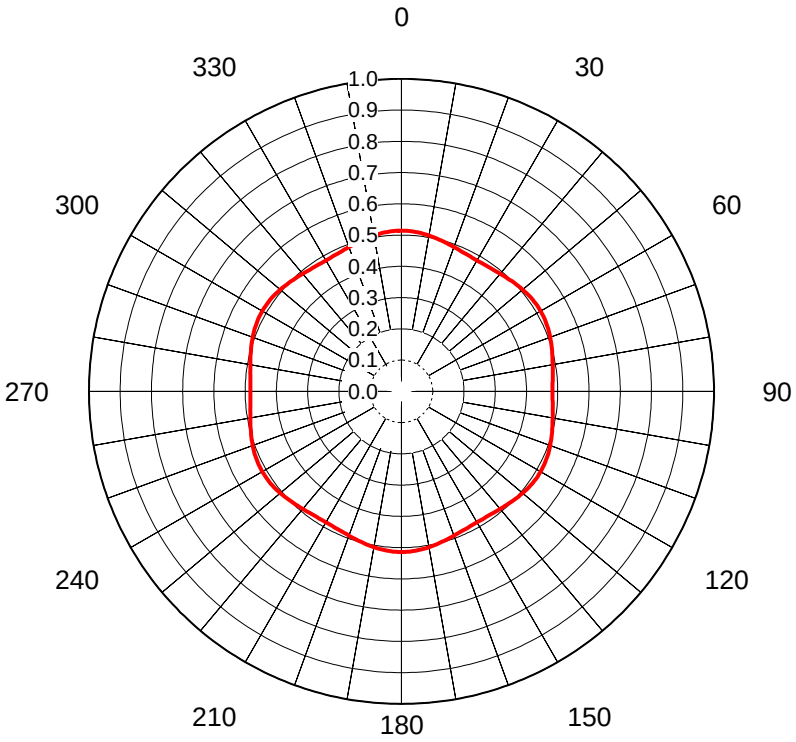


AZIMUTH PATTERN
Horizontal Polarization

Proposal No.	**C-71636**
Date	**9-Nov-20**
Call Letters	**KHQA-TV**
Channel	**22**
Frequency	**521 MHz**
Antenna Type	**TFU-33ETT/VP-R O6**
Gain	**1 (0.01dB)**
	Calculated
Circularity	**+/- 1.0 dB**

Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.997	36	1.000	72	0.998	108	0.998	144	1.000	180	0.997	216	1.000	252	0.998	288	0.998	324	1.000
1	0.997	37	1.000	73	0.998	109	0.998	145	1.000	181	0.997	217	1.000	253	0.998	289	0.998	325	1.000
2	0.997	38	1.000	74	0.998	110	0.998	146	1.000	182	0.997	218	1.000	254	0.998	290	0.998	326	1.000
3	0.997	39	0.999	75	0.999	111	0.998	147	1.000	183	0.997	219	0.999	255	0.999	291	0.998	327	1.000
4	0.997	40	0.999	76	0.999	112	0.998	148	1.000	184	0.997	220	0.999	256	0.999	292	0.998	328	1.000
5	0.997	41	0.999	77	0.999	113	0.998	149	1.000	185	0.997	221	0.999	257	0.999	293	0.998	329	1.000
6	0.997	42	0.999	78	0.999	114	0.997	150	1.000	186	0.997	222	0.999	258	0.999	294	0.997	330	1.000
7	0.998	43	0.999	79	0.999	115	0.997	151	1.000	187	0.998	223	0.999	259	0.999	295	0.997	331	1.000
8	0.998	44	0.999	80	0.999	116	0.997	152	1.000	188	0.998	224	0.999	260	0.999	296	0.997	332	1.000
9	0.998	45	0.999	81	0.999	117	0.997	153	1.000	189	0.998	225	0.999	261	0.999	297	0.997	333	1.000
10	0.998	46	0.998	82	1.000	118	0.997	154	1.000	190	0.998	226	0.998	262	1.000	298	0.997	334	1.000
11	0.998	47	0.998	83	1.000	119	0.997	155	1.000	191	0.998	227	0.998	263	1.000	299	0.997	335	1.000
12	0.998	48	0.998	84	1.000	120	0.997	156	1.000	192	0.998	228	0.998	264	1.000	300	0.997	336	1.000
13	0.998	49	0.998	85	1.000	121	0.997	157	1.000	193	0.998	229	0.998	265	1.000	301	0.997	337	1.000
14	0.998	50	0.998	86	1.000	122	0.997	158	1.000	194	0.998	230	0.998	266	1.000	302	0.997	338	1.000
15	0.999	51	0.998	87	1.000	123	0.997	159	0.999	195	0.999	231	0.998	267	1.000	303	0.997	339	0.999
16	0.999	52	0.998	88	1.000	124	0.997	160	0.999	196	0.999	232	0.998	268	1.000	304	0.997	340	0.999
17	0.999	53	0.998	89	1.000	125	0.997	161	0.999	197	0.999	233	0.998	269	1.000	305	0.997	341	0.999
18	0.999	54	0.997	90	1.000	126	0.997	162	0.999	198	0.999	234	0.997	270	1.000	306	0.997	342	0.999
19	0.999	55	0.997	91	1.000	127	0.998	163	0.999	199	0.999	235	0.997	271	1.000	307	0.998	343	0.999
20	0.999	56	0.997	92	1.000	128	0.998	164	0.999	200	0.999	236	0.997	272	1.000	308	0.998	344	0.999
21	0.999	57	0.997	93	1.000	129	0.998	165	0.999	201	0.999	237	0.997	273	1.000	309	0.998	345	0.999
22	1.000	58	0.997	94	1.000	130	0.998	166	0.998	202	1.000	238	0.997	274	1.000	310	0.998	346	0.998
23	1.000	59	0.997	95	1.000	131	0.998	167	0.998	203	1.000	239	0.997	275	1.000	311	0.998	347	0.998
24	1.000	60	0.997	96	1.000	132	0.998	168	0.998	204	1.000	240	0.997	276	1.000	312	0.998	348	0.998
25	1.000	61	0.997	97	1.000	133	0.998	169	0.998	205	1.000	241	0.997	277	1.000	313	0.998	349	0.998
26	1.000	62	0.997	98	1.000	134	0.998	170	0.998	206	1.000	242	0.997	278	1.000	314	0.998	350	0.998
27	1.000	63	0.997	99	0.999	135	0.999	171	0.998	207	1.000	243	0.997	279	0.999	315	0.999	351	0.998
28	1.000	64	0.997	100	0.999	136	0.999	172	0.998	208	1.000	244	0.997	280	0.999	316	0.999	352	0.998
29	1.000	65	0.997	101	0.999	137	0.999	173	0.998	209	1.000	245	0.997	281	0.999	317	0.999	353	0.998
30	1.000	66	0.997	102	0.999	138	0.999	174	0.997	210	1.000	246	0.997	282	0.999	318	0.999	354	0.997
31	1.000	67	0.998	103	0.999	139	0.999	175	0.997	211	1.000	247	0.998	283	0.999	319	0.999	355	0.997
32	1.000	68	0.998	104	0.999	140	0.999	176	0.997	212	1.000	248	0.998	284	0.999	320	0.999	356	0.997
33	1.000	69	0.998	105	0.999	141	0.999	177	0.997	213	1.000	249	0.998	285	0.999	321	0.999	357	0.997
34	1.000	70	0.998	106	0.998	142	1.000	178	0.997	214	1.000	250	0.998	286	0.998	322	1.000	358	0.997
35	1.000	71	0.998	107	0.998	143	1.000	179	0.997	215	1.000	251	0.998	287	0.998	323	1.000	359	0.997

Dielectric®



AZIMUTH PATTERN
Vertical Polarization

Proposal No.	**C-71636**
Date	**9-Nov-20**
Call Letters	**KHQA-TV**
Channel	**22**
Frequency	**521 MHz**
Antenna Type	**TFU-33ETT/VP-R O6**
Gain	**1.06 (0.26dB)**
	Calculated
Circularity	**+/- 1.0 dB**

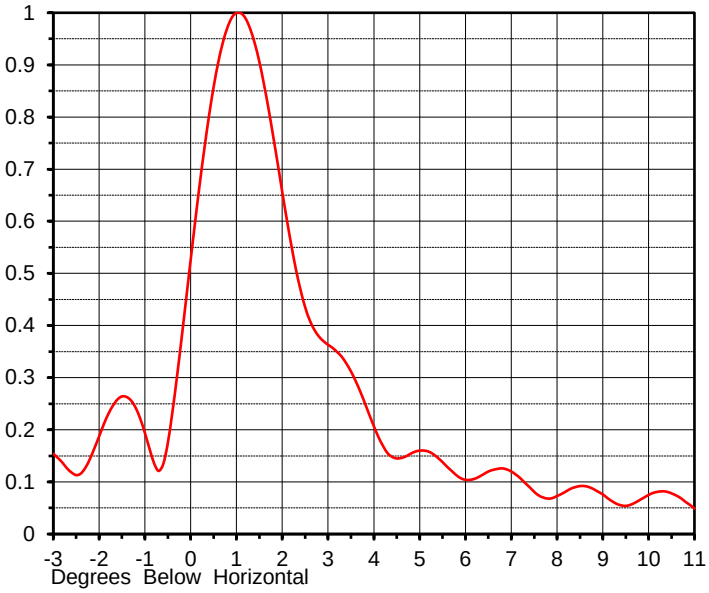
Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value	Deg	Value
0	0.514	36	0.486	72	0.503	108	0.503	144	0.486	180	0.514	216	0.486	252	0.503	288	0.503	324	0.486
1	0.514	37	0.487	73	0.502	109	0.505	145	0.486	181	0.514	217	0.487	253	0.502	289	0.505	325	0.486
2	0.514	38	0.489	74	0.500	110	0.506	146	0.485	182	0.514	218	0.489	254	0.500	290	0.506	326	0.485
3	0.513	39	0.490	75	0.499	111	0.508	147	0.484	183	0.513	219	0.490	255	0.499	291	0.508	327	0.484
4	0.513	40	0.491	76	0.497	112	0.509	148	0.484	184	0.513	220	0.491	256	0.497	292	0.509	328	0.484
5	0.512	41	0.493	77	0.496	113	0.510	149	0.484	185	0.512	221	0.493	257	0.496	293	0.510	329	0.484
6	0.511	42	0.494	78	0.494	114	0.511	150	0.484	186	0.511	222	0.494	258	0.494	294	0.511	330	0.484
7	0.510	43	0.496	79	0.493	115	0.512	151	0.484	187	0.510	223	0.496	259	0.493	295	0.512	331	0.484
8	0.509	44	0.497	80	0.491	116	0.513	152	0.484	188	0.509	224	0.497	260	0.491	296	0.513	332	0.484
9	0.508	45	0.499	81	0.490	117	0.513	153	0.484	189	0.508	225	0.499	261	0.490	297	0.513	333	0.484
10	0.506	46	0.500	82	0.489	118	0.514	154	0.485	190	0.506	226	0.500	262	0.489	298	0.514	334	0.485
11	0.505	47	0.502	83	0.487	119	0.514	155	0.486	191	0.505	227	0.502	263	0.487	299	0.514	335	0.486
12	0.503	48	0.503	84	0.486	120	0.514	156	0.486	192	0.503	228	0.503	264	0.486	300	0.514	336	0.486
13	0.502	49	0.505	85	0.486	121	0.514	157	0.487	193	0.502	229	0.505	265	0.486	301	0.514	337	0.487
14	0.500	50	0.506	86	0.485	122	0.514	158	0.489	194	0.500	230	0.506	266	0.485	302	0.514	338	0.489
15	0.499	51	0.508	87	0.484	123	0.513	159	0.490	195	0.499	231	0.508	267	0.484	303	0.513	339	0.490
16	0.497	52	0.509	88	0.484	124	0.513	160	0.491	196	0.497	232	0.509	268	0.484	304	0.513	340	0.491
17	0.496	53	0.510	89	0.484	125	0.512	161	0.493	197	0.496	233	0.510	269	0.484	305	0.512	341	0.493
18	0.494	54	0.511	90	0.484	126	0.511	162	0.494	198	0.494	234	0.511	270	0.484	306	0.511	342	0.494
19	0.493	55	0.512	91	0.484	127	0.510	163	0.496	199	0.493	235	0.512	271	0.484	307	0.510	343	0.496
20	0.491	56	0.513	92	0.484	128	0.509	164	0.497	200	0.491	236	0.513	272	0.484	308	0.509	344	0.497
21	0.490	57	0.513	93	0.484	129	0.508	165	0.499	201	0.490	237	0.513	273	0.484	309	0.508	345	0.499
22	0.489	58	0.514	94	0.485	130	0.506	166	0.500	202	0.489	238	0.514	274	0.485	310	0.506	346	0.500
23	0.487	59	0.514	95	0.486	131	0.505	167	0.502	203	0.487	239	0.514	275	0.486	311	0.505	347	0.502
24	0.486	60	0.514	96	0.486	132	0.503	168	0.503	204	0.486	240	0.514	276	0.486	312	0.503	348	0.503
25	0.486	61	0.514	97	0.487	133	0.502	169	0.505	205	0.486	241	0.514	277	0.487	313	0.502	349	0.505
26	0.485	62	0.514	98	0.489	134	0.500	170	0.506	206	0.485	242	0.514	278	0.489	314	0.500	350	0.506
27	0.484	63	0.513	99	0.490	135	0.499	171	0.508	207	0.484	243	0.513	279	0.490	315	0.499	351	0.508
28	0.484	64	0.513	100	0.491	136	0.497	172	0.509	208	0.484	244	0.513	280	0.491	316	0.497	352	0.509
29	0.484	65	0.512	101	0.493	137	0.496	173	0.510	209	0.484	245	0.512	281	0.493	317	0.496	353	0.510
30	0.484	66	0.511	102	0.494	138	0.494	174	0.511	210	0.484	246	0.511	282	0.494	318	0.494	354	0.511
31	0.484	67	0.510	103	0.496	139	0.493	175	0.512	211	0.484	247	0.510	283	0.496	319	0.493	355	0.512
32	0.484	68	0.509	104	0.497	140	0.491	176	0.513	212	0.484	248	0.509	284	0.497	320	0.491	356	0.513
33	0.484	69	0.508	105	0.499	141	0.490	177	0.513	213	0.484	249	0.508	285	0.499	321	0.490	357	0.513
34	0.485	70	0.506	106	0.500	142	0.489	178	0.514	214	0.485	250	0.506	286	0.500	322	0.489	358	0.514
35	0.486	71	0.505	107	0.502	143	0.487	179	0.514	215	0.486	251	0.505	287	0.502	323	0.487	359	0.514

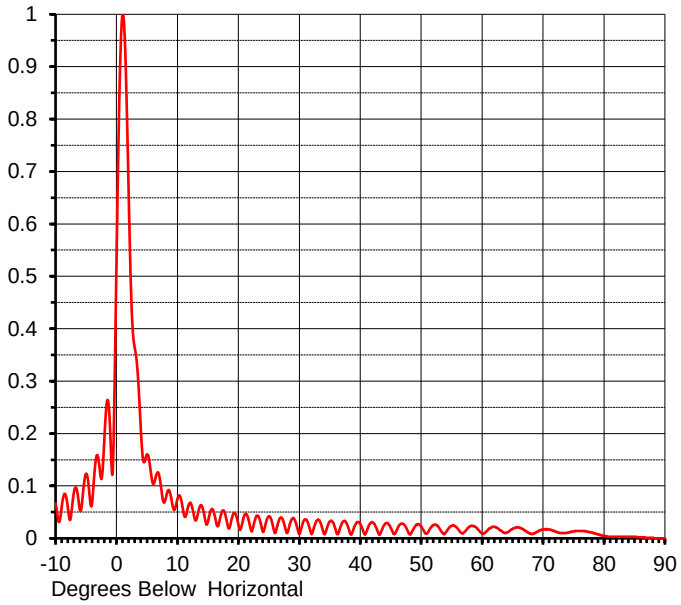
ELEVATION PATTERN

Proposal No.	**C-71636**
Date	**9-Nov-20**
Call Letters	**KHQA-TV**
Channel	**22**
Frequency	**521 MHz**
Antenna Type	**TFU-33ETT/VP-R O6**

RMS Directivity at Main Lobe	**30.0 (14.77 dB)**	Beam Tilt	**1.05 deg**
RMS Directivity at Horizontal	**8.3 (9.19 dB)**	Pattern Number	**105**

Calculated

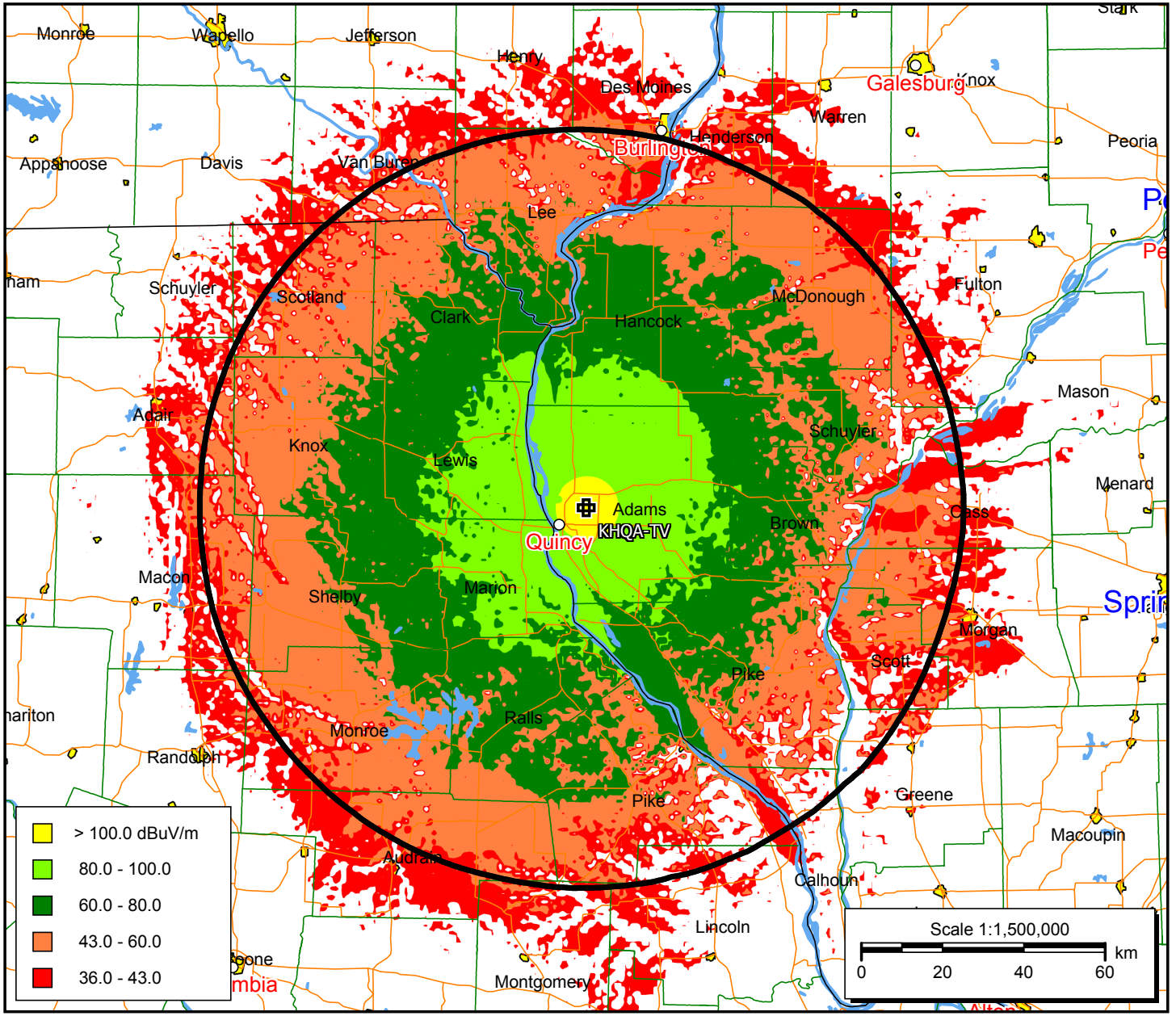




Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.067	10.0	0.075	30.0	0.008	50.0	0.023	70.0	0.017
-9.0	0.059	11.0	0.049	31.0	0.036	51.0	0.010	71.0	0.017
-8.0	0.060	12.0	0.067	32.0	0.008	52.0	0.025	72.0	0.013
-7.0	0.087	13.0	0.034	33.0	0.035	53.0	0.019	73.0	0.010
-6.0	0.054	14.0	0.062	34.0	0.010	54.0	0.011	74.0	0.011
-5.0	0.123	15.0	0.031	35.0	0.032	55.0	0.024	75.0	0.013
-4.0	0.068	16.0	0.049	36.0	0.015	56.0	0.018	76.0	0.014
-3.0	0.154	17.0	0.038	37.0	0.029	57.0	0.011	77.0	0.013
-2.0	0.187	18.0	0.038	38.0	0.022	58.0	0.023	78.0	0.011
-1.0	0.194	19.0	0.041	39.0	0.021	59.0	0.021	79.0	0.008
0.0	0.526	20.0	0.027	40.0	0.028	60.0	0.009	80.0	0.005
1.0	1.000	21.0	0.044	41.0	0.012	61.0	0.017	81.0	0.003
2.0	0.656	22.0	0.019	42.0	0.031	62.0	0.022	82.0	0.003
3.0	0.363	23.0	0.043	43.0	0.009	63.0	0.015	83.0	0.003
4.0	0.207	24.0	0.013	44.0	0.026	64.0	0.011	84.0	0.003
5.0	0.160	25.0	0.042	45.0	0.020	65.0	0.018	85.0	0.003
6.0	0.104	26.0	0.010	46.0	0.016	66.0	0.021	86.0	0.002
7.0	0.120	27.0	0.040	47.0	0.028	67.0	0.015	87.0	0.001
8.0	0.073	28.0	0.010	48.0	0.009	68.0	0.009	88.0	0.001
9.0	0.076	29.0	0.039	49.0	0.023	69.0	0.012	89.0	0.000
								90.0	0.000

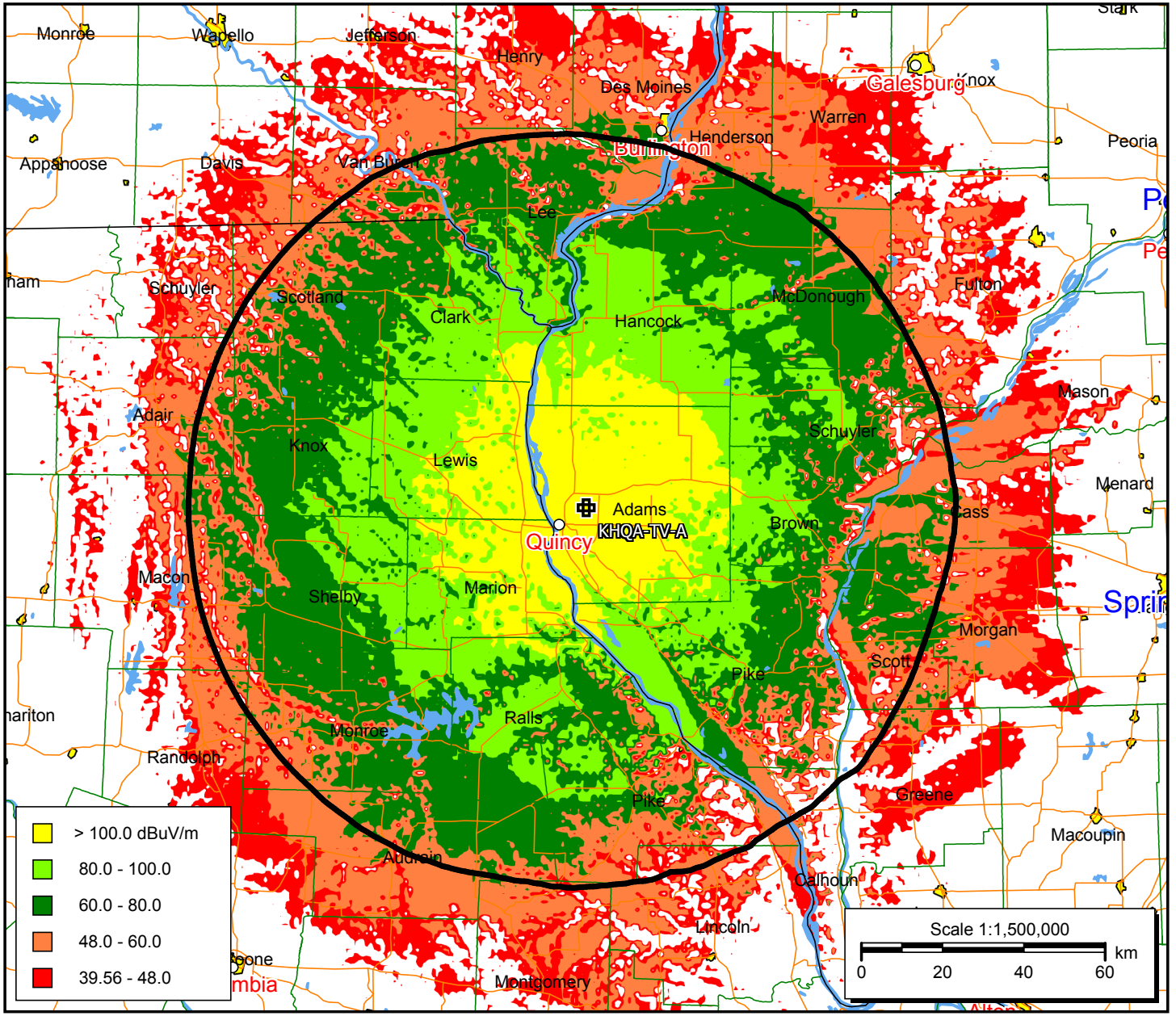
KHQA-TV
BLCDT-20090622AFC
Latitude: 39-58-22 N
Longitude: 091-19-55 W
ERP: 13.60 kW
Channel: 7
Frequency: 177.0 MHz
AMSL Height: 461.4 m
Elevation: 226.4 m
Horiz. Pattern: Omni
Vert. Pattern: Yes
Elec Tilt: 1.0
Prop Model: Longley-Rice
Climate: Cont temperate
Conductivity: 0.0050
Dielec Const: 15.0
Refractivity: 311.0
Receiver Ht AG: 10.0 m
Receiver Gain: 0 dB
Time Variability: 90.0%
Sit. Variability: 50.0%
ITM Mode: Broadcast

KHQA-TV - Ch.7
13.6 kW - 271 m HAAT
POPULATION by Sugnal
>100 dBu = 37,613
>80 dBu = 89,411
>60 dBu = 175,257
>Principal Community
43 dBu = 295,313
>Noise Limited
36 dBu = 401,723



KHQA-TV-A
DTV pet - 22
Latitude: 39-58-22.17 N
Longitude: 091-19-54.53 W
ERP: 750.00 kW
Channel: 22
Frequency: 521.0 MHz
AMSL Height: 461.4 m
Elevation: 223.04 m
Horiz. Pattern: Omni
Vert. Pattern: Yes
Elec Tilt: 1.0
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

KHQA-TV - Ch.22
750 kW - 271 m HAAT
POPULATION by Signal
>100 dBu = 85,402
>80 dBu = 156,252
>60 dBu = 273,105
>Principal Community
48 dBu = 429,638
>Noise Limited
39.56 dBu = 569,783



KHQA-TV - HANNIBAL, MISSOURI
NOVEMBER 2020
APPENDIX B
Longley-Rice Interference Analysis

```
tvstudy v2.2.5 (4uoc83)
Database: localhost,  Study: KHQA 22 750K OMNI #865,  Model: Longley-Rice
Start: 2020.11.19 11:34:34

Study created: 2020.11.19 11:34:33

Study build station data: LMS TV 2020-11-19

    Proposal: KHQA-TV D22 DT APP HANNIBAL, MO
 File number: KHQA 22 750K OMNI
 Facility ID: 4690
Station data: User record
   Record ID: 271
     Country: U.S.
        Zone: I

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

Stations potentially affected by proposal:

IX   Call      Chan       Svc Status  City, State              File Number            Distance
Yes  KGCW      D21        DT  LIC     BURLINGTON, IA           BLANK0000107917        170.7 km
No   KEFN-CD   D21        DC  BL      ST. LOUIS, MO            DTVBL9375              189.5
Yes  KPXR-TV   D22        DT  LIC     CEDAR RAPIDS, IA         BLANK0000063428        262.3
Yes  WLS-TV    D22        DT  CP      CHICAGO, IL              BLANK0000086908        375.8
Yes  WBUI      D22        DT  LIC     DECATUR, IL              BLCDT20091119ACF       212.6
No   WTVW      D22        DT  LIC     EVANSVILLE, IN           BLANK0000087257        405.5
No   WXIN      D22        DT  LIC     INDIANAPOLIS, IN         BLANK0000093989        437.3
Yes  KRBK      D22        DT  LIC     OSAGE BEACH, MO          BLANK0000063419        336.7
No   WOWT      D22        DT  LIC     OMAHA, NE                BLCDT20110509AAN       422.9
No   WQPT-TV   D23        DT  CP      MOLINE, IL               BLANK0000035678        169.2
No   WQPT-TV   D23        DT  LIC     MOLINE, IL               BLEDT20030702AAR       169.2
No   KETC      D23        DT  LIC     ST. LOUIS, MO            BLANK0000055432        184.2

No non-directional AM stations found within 0.8 km

Directional AM stations within 3.2 km:
WGEM 1440 L DA2 D QUINCY, IL BL9964
WGEM 1440 L DA2 N QUINCY, IL BL9964

Record parameters as studied:

    Channel: D22
   Latitude:  39 58 22.00 N (NAD83)
  Longitude:  91 19 55.00 W
Height AMSL: 461.4 m
       HAAT: 271.0 m
   Peak ERP: 750 kW
    Antenna: Omnidirectional
Elev Pattrn: Generic
  Elec Tilt: 1.00

39.6 dBu contour:
Azimuth      ERP       HAAT   Distance
  0.0 deg    750 kW   259.2 m   91.2 km
```

45.0	750	245.7	89.0
90.0	750	251.7	90.0
135.0	750	259.0	91.2
180.0	750	268.2	92.8
225.0	750	294.2	96.5
270.0	750	304.8	97.8
315.0	750	300.0	97.2

Database HAAT does not agree with computed HAAT
Database HAAT: 271 m Computed HAAT: 273 m

Distance to Canadian border: 723.4 km

Distance to Mexican border: 1456.9 km

Conditions at FCC monitoring station: Allegan MI
Bearing: 55.2 degrees Distance: 535.8 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:
Bearing: 275.4 degrees Distance: 1180.8 km

Study cell size: 2.00 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%

Interference to BLANK0000107917 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KGCW	D21	DT	LIC	BURLINGTON, IA	BLANK0000107917	
Undesireds:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	170.7 km
	WJYS	D21	DT	LIC	HAMMOND, IN	BLANK0000087539	236.1
	WIFS	D21	DT	LIC	JANESVILLE, WI	BLANK0000090143	204.3
	KPXR-TV	D22	DT	LIC	CEDAR RAPIDS, IA	BLANK0000063428	164.8

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
26086.3	949,575	25942.5	945,476	25702.1	934,984	25702.1	934,984	0.00	0.00

Undesired	Total IX		Unique IX, before		Unique IX, after	
KHQA-TV D22 DT APP	4.0	0			0.0	0
WJYS D21 DT LIC	100.1	8,701	51.9	2,282	51.9	2,282
WIFS D21 DT LIC	188.5	8,210	136.3	1,781	132.3	1,781
KPXR-TV D22 DT LIC	4.0	10	0.0	0	0.0	0

Interference to BLANK0000063428 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KPXR-TV	D22	DT	LIC	CEDAR RAPIDS, IA	BLANK0000063428	
Undesireds:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	262.3 km
	KGCW	D21	DT	LIC	BURLINGTON, IA	BLANK0000107917	164.8
	WLS-TV	D22	DT	CP	CHICAGO, IL	BLANK0000086908	353.6
	WUCW	D22	DT	LIC	MINNEAPOLIS, MN	BLCDT20060405AAI	323.6
	WOWT	D22	DT	LIC	OMAHA, NE	BLCDT20110509AAN	360.1
	WFRV-TV	D22	DT	LIC	GREEN BAY, WI	BLANK0000086896	388.5
	KCWI-TV	D23	DT	APP	AMES, IA	BPCDT20130205AAY	151.7
	WQPT-TV	D23	DT	CP	MOLINE, IL	BLANK0000035678	165.9

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
30686.6	828,915	30382.2	821,250	29737.9	780,332	29548.5	776,801	0.64	0.45

Undesired		Total IX	Unique IX, before		Unique IX, after	
KHQA-TV D22 DT APP	249.5	7,114			189.4	3,531
KGCW D21 DT LIC	8.0	9	8.0	9	4.0	9
WLS-TV D22 DT CP	104.2	7,071	104.2	7,071	60.1	3,575
WUCW D22 DT LIC	79.7	1,068	75.7	791	75.7	791
WOWT D22 DT LIC	24.1	392	4.0	48	4.0	48
WFRV-TV D22 DT LIC	4.0	6,432	4.0	6,432	4.0	6,432
KCWI-TV D23 DT APP	448.4	26,567	428.3	26,223	420.3	26,162

Interference to BLANK0000063428 LIC scenario 2

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KPXR-TV	D22	DT	LIC	CEDAR RAPIDS, IA	BLANK0000063428	
Undesireds:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	262.3 km
	KGCW	D21	DT	LIC	BURLINGTON, IA	BLANK0000107917	164.8
	WLS-TV	D22	DT	CP	CHICAGO, IL	BLANK0000086908	353.6
	WUCW	D22	DT	LIC	MINNEAPOLIS, MN	BLCDT20060405AAI	323.6
	WOWT	D22	DT	LIC	OMAHA, NE	BLCDT20110509AAN	360.1
	WFRV-TV	D22	DT	LIC	GREEN BAY, WI	BLANK0000086896	388.5
	KCWI-TV	D23	DT	LIC	AMES, IA	BLCDT20090612AIO	151.7
	WQPT-TV	D23	DT	CP	MOLINE, IL	BLANK0000035678	165.9

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
30686.6	828,915	30382.2	821,250	30054.1	804,496	29860.6	800,961	0.64	0.44

Undesired		Total IX	Unique IX, before		Unique IX, after	
KHQA-TV D22 DT APP	249.5	7,114			193.4	3,535
KGCW D21 DT LIC	8.0	9	8.0	9	4.0	9
WLS-TV D22 DT CP	104.2	7,071	104.2	7,071	60.1	3,575
WUCW D22 DT LIC	79.7	1,068	75.7	791	75.7	791
WOWT D22 DT LIC	24.1	392	8.0	72	8.0	72
WFRV-TV D22 DT LIC	4.0	6,432	4.0	6,432	4.0	6,432
KCWI-TV D23 DT LIC	128.2	2,379	112.1	2,059	108.1	2,002

Interference to BLANK0000086908 CP scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WLS-TV	D22	DT	CP	CHICAGO, IL	BLANK0000086908	
Undesireds:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	375.8 km
	KPXR-TV	D22	DT	LIC	CEDAR RAPIDS, IA	BLANK0000063428	353.6
	WBUI	D22	DT	LIC	DECATUR, IL	BLCDT20091119ACF	237.1
	WXIN	D22	DT	LIC	INDIANAPOLIS, IN	BLANK0000093989	251.9
	WLLA	D22	DT	LIC	KALAMAZOO, MI	BLANK0000122579	194.7
	WBGU-TV	D22	DT	LIC	BOWLING GREEN, OH	BLANK0000063785	321.1
	WFRV-TV	D22	DT	LIC	GREEN BAY, WI	BLANK0000086896	274.3

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
41896.9	10,276,809	41760.4	10,272,935	40838.6	10,225,130	40834.5	10,225,024	0.01	0.00

Undesired		Total IX	Unique IX, before		Unique IX, after	
KHQA-TV D22 DT APP	56.2	519			4.0	106
KPXR-TV D22 DT LIC	116.2	2,839	0.0	0	0.0	0
WBUI D22 DT LIC	128.2	3,280	31.9	849	31.9	849
WXIN D22 DT LIC	345.0	18,787	292.7	9,400	292.7	9,400
WLLA D22 DT LIC	160.3	15,617	132.2	7,854	132.2	7,854
WBGU-TV D22 DT LIC	8.0	334	0.0	0	0.0	0
WFRV-TV D22 DT LIC	404.7	20,035	296.6	17,476	296.6	17,476

Interference to BLCDT20091119ACF LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	WBUI	D22	DT	LIC	DECATUR, IL	BLCDT20091119ACF	

Appendix B - Interference Analysis
KHQA-TV - Hannibal, Missouri
Channel 22- 750kW - Page 4

Undesireds:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	212.6 km
	KPXR-TV	D22	DT	LIC	CEDAR RAPIDS, IA	BLANK0000063428	364.9
	WLS-TV	D22	DT	CP	CHICAGO, IL	BLANK0000086908	237.1
	WTVW	D22	DT	LIC	EVANSVILLE, IN	BLANK0000087257	249.0
	WXIN	D22	DT	LIC	INDIANAPOLIS, IN	BLANK0000093989	224.7
	WUSI-TV	D23	DT	LIC	OLNEY, IL	BLANK0000087280	137.5

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
26387.9	981,884	26379.9	981,868	25377.1	970,044	25220.4	968,765	0.62	0.13

Undesired	Total IX		Unique IX, before		Unique IX, after	
KHQA-TV D22 DT APP	220.7	1,646			156.7	1,279
KPXR-TV D22 DT LIC	8.0	23	0.0	0	0.0	0
WLS-TV D22 DT CP	699.7	7,373	655.5	6,999	615.5	6,764
WTVW D22 DT LIC	254.8	3,118	207.0	2,742	199.0	2,715
WXIN D22 DT LIC	108.5	1,902	52.4	1,465	52.4	1,465
WUSI-TV D23 DT LIC	27.9	179	0.0	0	0.0	0

Interference to BLANK0000063419 LIC scenario 1

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KRBK	D22	DT	LIC	OSAGE BEACH, MO	BLANK0000063419	
Undesireds:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	336.7 km
	KATV	D22	DT	LIC	LITTLE ROCK, AR	BLCDT20090225AAV	272.4
	KOKI-TV	D22	DT	LIC	TULSA, OK	BLCDT20021127AGL	277.2
	KODE-TV	D23	DT	LIC	JOPLIN, MO	BLANK0000071606	143.1

Service area		Terrain-limited		IX-free, before		IX-free, after		Percent New IX	
41547.1	983,888	40782.8	966,187	39760.3	934,682	39582.5	931,977	0.45	0.29

Undesired	Total IX		Unique IX, before		Unique IX, after	
KHQA-TV D22 DT APP	181.8	2,705			177.8	2,705
KATV D22 DT LIC	522.9	18,035	459.0	13,263	455.0	13,263
KOKI-TV D22 DT LIC	403.6	15,335	167.6	2,535	167.6	2,535
KODE-TV D23 DT LIC	332.0	10,935	159.9	2,907	159.9	2,907

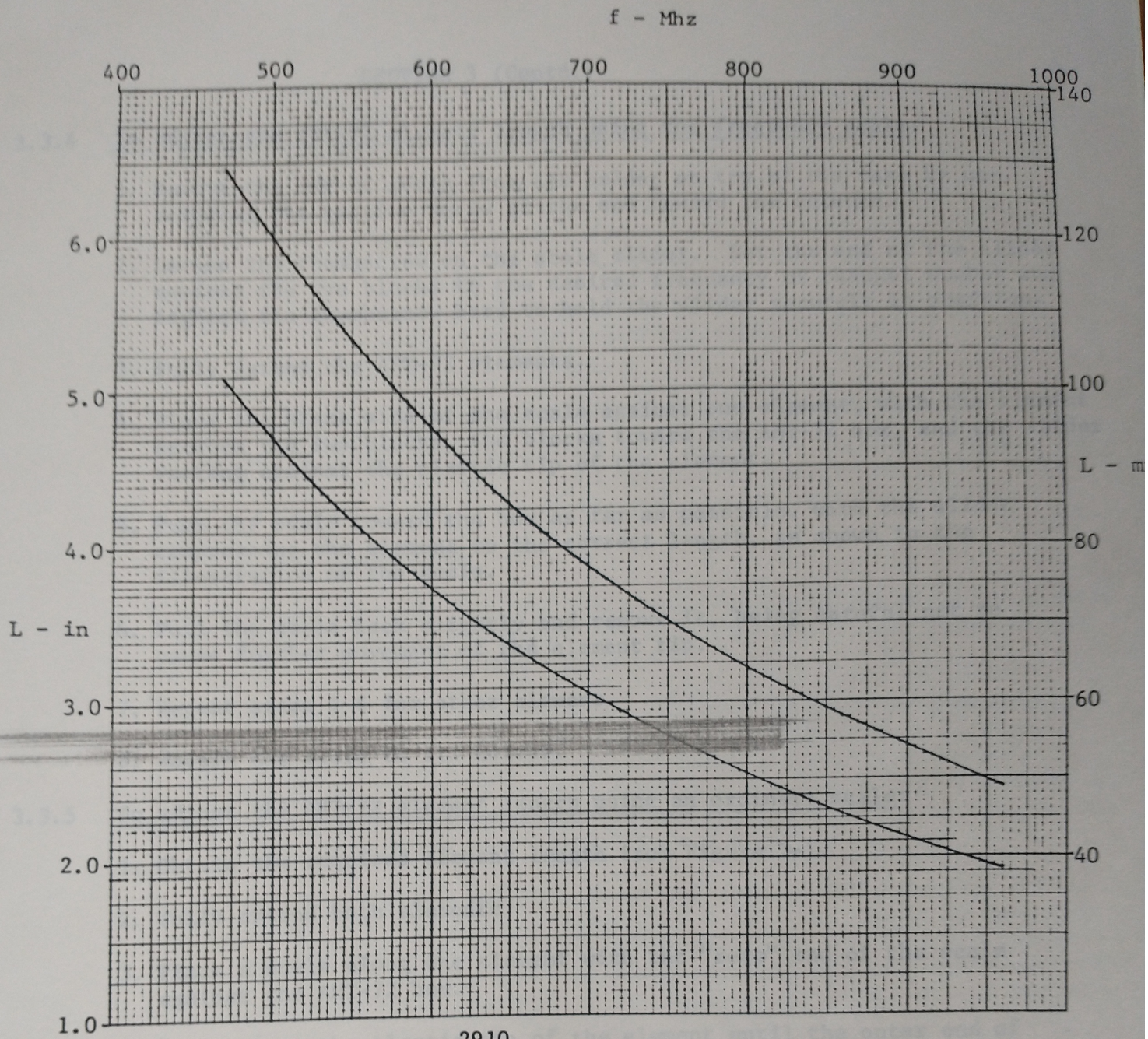
Interference to proposal scenario 1 **Applicant will accept predicted incoming interference**
0.76% interference received

	Call	Chan	Svc	Status	City, State	File Number	Distance
Desired:	KHQA-TV	D22	DT	APP	HANNIBAL, MO	KHQA 22 750K OMNI	
Undesireds:	KPXR-TV	D22	DT	LIC	CEDAR RAPIDS, IA	BLANK0000063428	262.3 km
	WBUI	D22	DT	LIC	DECATUR, IL	BLCDT20091119ACF	212.6
	KRBK	D22	DT	LIC	OSAGE BEACH, MO	BLANK0000063419	336.7
	WQPT-TV	D23	DT	CP	MOLINE, IL	BLANK0000035678	169.2

Service area		Terrain-limited		IX-free		Percent IX	
27351.7	315,664	27236.2	315,165	26699.5	312,767	1.97	0.76

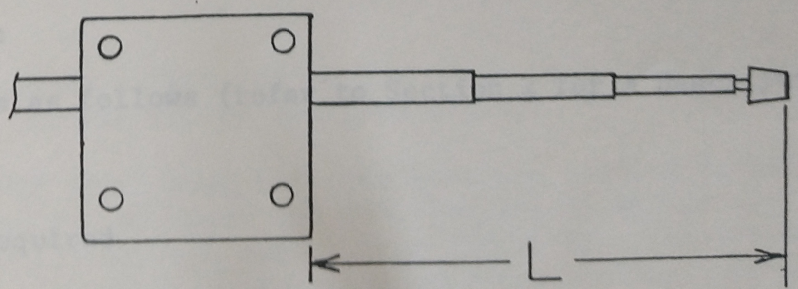
Undesired	Total IX		Unique IX		Prcnt Unique IX	
KPXR-TV D22 DT LIC	48.0	677	28.0	493	0.10	0.16
WBUI D22 DT LIC	480.9	1,840	417.1	1,497	1.53	0.47
KRBK D22 DT LIC	71.6	224	27.9	65	0.10	0.02

ANTENNA PERFORMANCE CHARTS



Formulas for curves: $L = \frac{2910}{f} - 1.10$ f in Mhz, L in inches

$L = \frac{73,914}{f} - 27.9$ L in millimeters



Antenna Element Length vs. Frequency

Figure 3-1

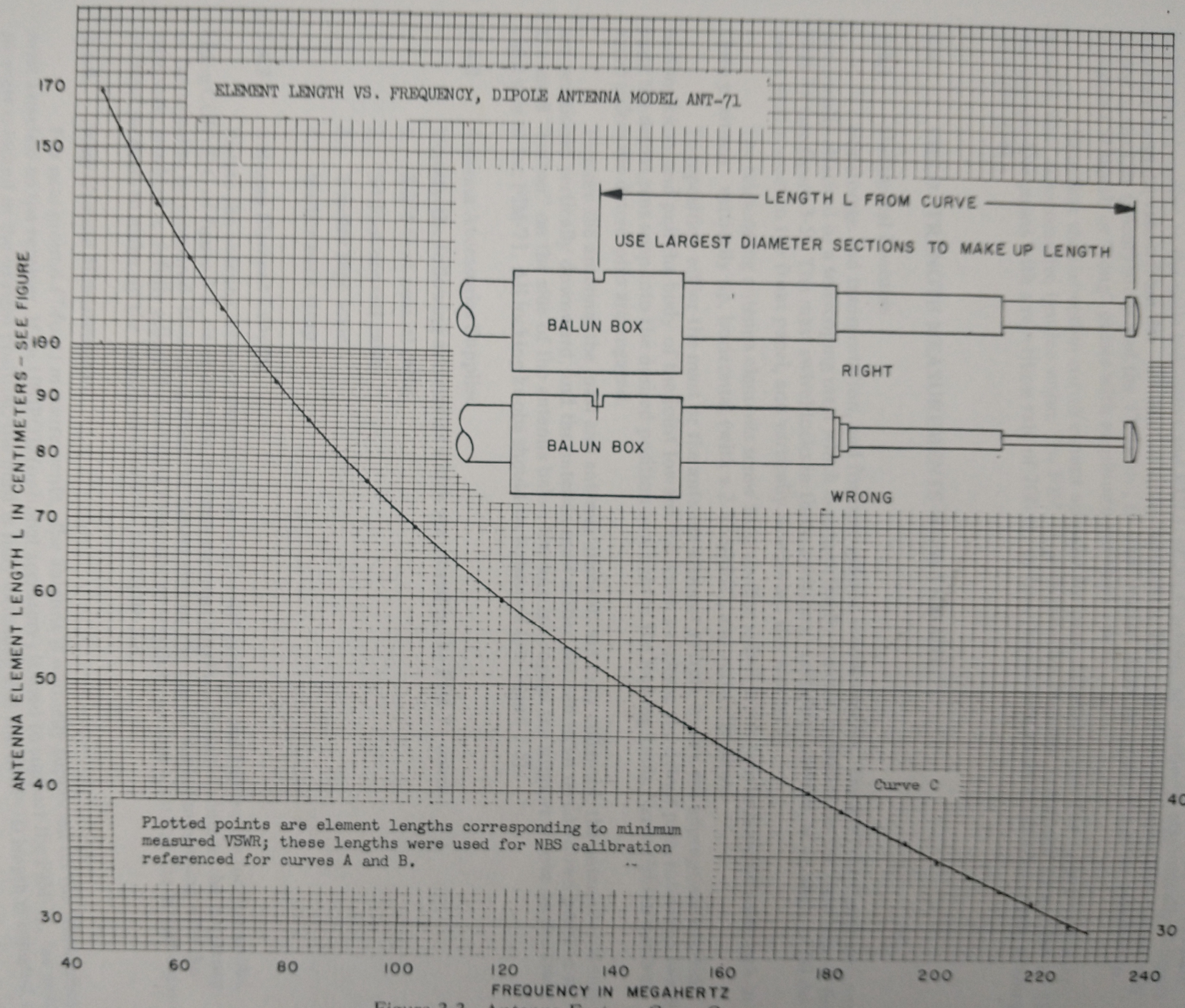


Figure 3-3. Antenna Factors, Curve C