

ENGINEERING STATEMENT

The engineering data contained herein have been prepared on behalf of TENNESSEE TV, LLC, licensee of full-power digital television station WKNX-TV, Channel 7 in Knoxville, Tennessee, in support of its Application for Construction Permit to operate on digital Channel 21. No change in site location or antenna height is proposed herein.

It is proposed to mount a Dielectric omnidirectional elliptically-polarized slotted cylinder antenna at the 310-meter level of the existing 332-meter tower on which the present WKNX-TV antenna is mounted. The proposed effective radiated power is 1000 kW in the horizontal plane. Below are operating parameters for the station's operation on Channel 21:

Site coordinates: 36-00-36.0 N, 83-55-57.0 W (NAD83)

Site elevation: 383.0 meters AMSL

Overall tower height: 332.0 meters AMSL

FCC Antenna Structure Registration Number: 1043696

Antenna height above ground: 310 meters

Antenna height above mean sea level: 693 meters

Antenna height above average terrain: 382 meters

Antenna make/model: Dielectric TFU-31JSC

Antenna orientation: omnidirectional

Electrical beam tilt: 0.75 degrees

Effective radiated power: 1000 kW (H-pol)

It should be noted that the proposed facility exceeds the power/height limits for a digital UHF station, as set forth in Section 73.622(f)(8) of the Commission's Rules. However, the area within the proposed WKNX-TV f(50,90) noise-limited dipole-adjusted service contour is less than that of the largest television station in the market, namely WBXX-TV, Channel 31 in

EXHIBIT A

Crossville, Tennessee, part of the Knoxville, Tennessee, Designated Market Area (DMA). The area within the noise-limited dipole-adjusted service contour of WBXX-TV comprises an area of 49,860 square kilometers, whereas that for the proposed WKNX-TV Channel 21 facility is only 36,795 square kilometers. Therefore, the proposed Channel 21 facility meets requirements of Section 73.622(f)(5) of the Rules, which stipulates that the Commission's power/height limitations of Section 73.622(f)(8) can be exceeded as long as the coverage area of the proposed operation does not exceed that of the largest station in the same market.

Exhibit B is a map upon which the predicted service contours are plotted. As shown, the community of Knoxville, Tennessee, is completely encompassed by the proposed 48 dBu city-grade service contour. Elevation pattern data for the proposed antenna is provided in Exhibit C. Exhibit D contains the summary results from a TVStudy interference study, which was conducted using a cell size of 1.0 kilometer and an increment spacing of 0.1 kilometer. It concludes that the proposed WKNX-TV facility on Channel 21 meets the Commission's *de minimis* interference criteria to all co-channel and adjacent-channel post-repack full-power and Class A facilities.

A power density calculation appears as Exhibit E.

Since no change in the overall height or location of the WKNX-TV tower is proposed herein, the Federal Aviation Administration has not been notified of this application. In addition, the Federal Communications Commission has issued Antenna Structure Registration Number 1043696 to this tower.

It is important to note that a detailed "loss area" analysis was provided by the applicant in its Petition for Rulemaking to substitute Channel 21 for licensed Channel 7. That

EXHIBIT A

analysis was accepted by the Commission when it released its Report and Order approving the channel change. While not included in this engineering report, that study can be resubmitted as an amendment to this application, if the FCC staff believes it to be required.

I declare under penalty of perjury that the foregoing statements and the attached exhibits, which were prepared by me or under my immediate supervision, are true and correct to the best of my knowledge and belief.

A handwritten signature in blue ink, appearing to read 'K. T. Fisher', with a stylized, elongated final letter.

KEVIN T. FISHER

November 1, 2023

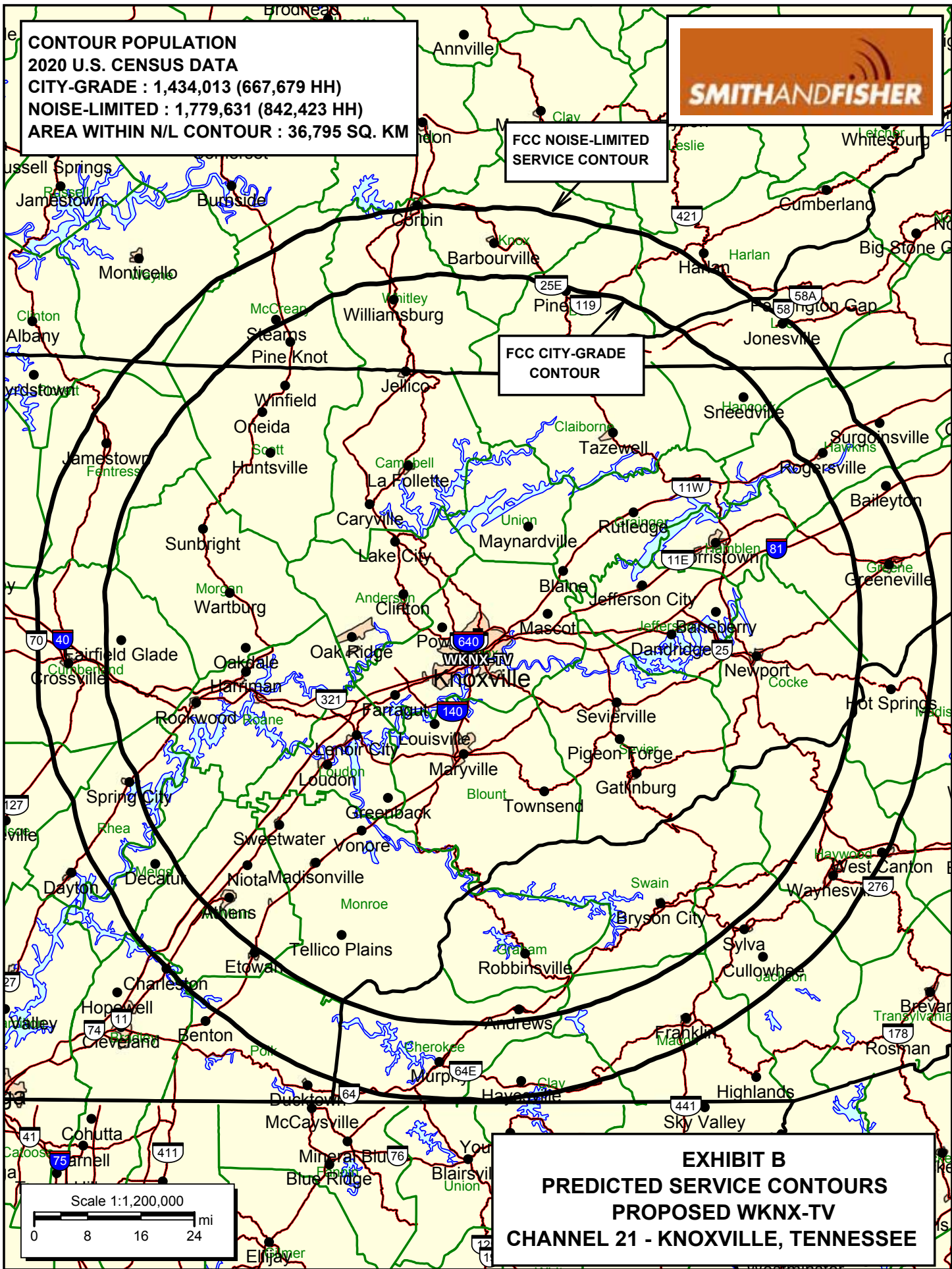
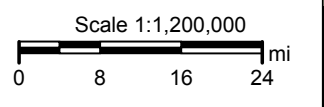
**CONTOUR POPULATION**  
**2020 U.S. CENSUS DATA**  
**CITY-GRADE : 1,434,013 (667,679 HH)**  
**NOISE-LIMITED : 1,779,631 (842,423 HH)**  
**AREA WITHIN N/L CONTOUR : 36,795 SQ. KM**



**FCC NOISE-LIMITED  
SERVICE CONTOUR**

**FCC CITY-GRADE  
CONTOUR**

**EXHIBIT B**  
**PREDICTED SERVICE CONTOURS**  
**PROPOSED WKNX-TV**  
**CHANNEL 21 - KNOXVILLE, TENNESSEE**



## ELEVATION PATTERN

Exhibit No.

Date

26 Jan 2023

[EXHIBIT C](#)

Call Letters

Channel

21

Antenna Type

TFU-31JSC TFU

Location

Customer

**Future fill is available!**

RMS Gain at Main Lobe

**28.0 (14.47 dB)**

Beam Tilt

**0.75 Degrees**

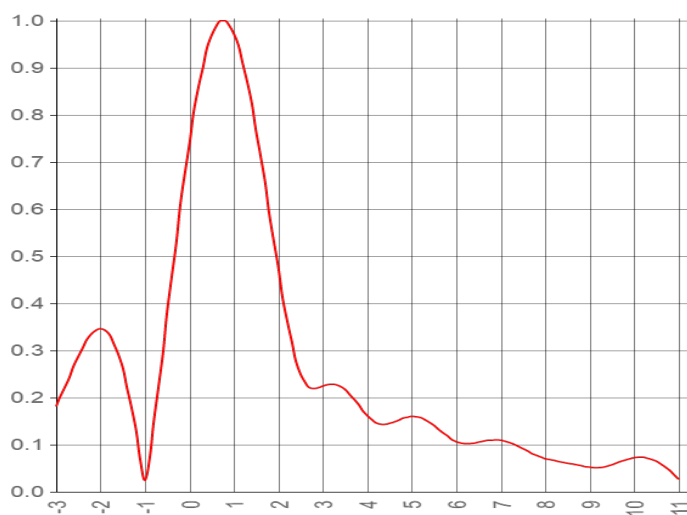
RMS Gain at Horizontal

**15.5 (11.91 dB)**

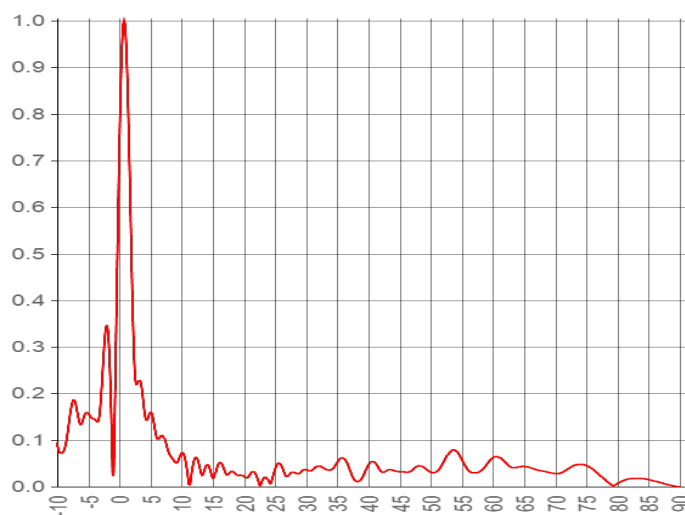
Drawing #

**31Z280075**

**Calculated**



Degrees below horizontal



Degrees below horizontal

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10	0.095	10	0.072	30	0.037	50	0.031	70	0.028
-9	0.076	11	0.026	31	0.036	51	0.033	71	0.030
-8	0.149	12	0.058	32	0.044	52	0.051	72	0.038
-7	0.177	13	0.035	33	0.038	53	0.073	73	0.045
-6	0.136	14	0.046	34	0.036	54	0.077	74	0.048
-5	0.157	15	0.019	35	0.052	55	0.058	75	0.045
-4	0.145	16	0.051	36	0.061	56	0.036	76	0.038
-3	0.181	17	0.030	37	0.035	57	0.030	77	0.027
-2	0.346	18	0.033	38	0.012	58	0.034	78	0.015
-1	0.024	19	0.025	39	0.019	59	0.048	79	0.004
0	0.745	20	0.022	40	0.046	60	0.062	80	0.007
1	0.973	21	0.027	41	0.052	61	0.063	81	0.013
2	0.471	22	0.024	42	0.033	62	0.052	82	0.017
3	0.224	23	0.014	43	0.035	63	0.041	83	0.018
4	0.161	24	0.011	44	0.035	64	0.042	84	0.018
5	0.160	25	0.038	45	0.032	65	0.044	85	0.015
6	0.106	26	0.046	46	0.031	66	0.041	86	0.012
7	0.109	27	0.022	47	0.035	67	0.036	87	0.008
8	0.070	28	0.031	48	0.044	68	0.034	88	0.005
9	0.052	29	0.030	49	0.040	69	0.031	89	0.002

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TVSTUDY INTERFERENCE ANALYSIS RESULTS  
 PROPOSED WKNX-TV  
 CHANNEL 21 – KNOXVILLE, TENNESSEE

Study created: 2023.11.01 11:43:00

Study build station data: LMS TV 2023-11-01

Proposal: WKNX-TV D21 DT CP KNOXVILLE, TN

File number: BLANK0000210505

Facility ID: 83931

Station data: User record

Record ID: 19

Country: U.S.

Zone: II

Stations potentially affected by proposal:

IX	Call	Chan	Svc	Status	City, State	File Number	Distance
No	WDNN-CD	D20	DC	LIC	DALTON, GA	BLANK0000098043	172.6 km
Yes	WYMT-TV	D20	DT	CP	HAZARD, KY	BLANK0000185947	147.7
Yes	WYMT-TV	D20	DT	BL	HAZARD, KY	DTVBL24915	147.7
Yes	WUNF-TV	D20	DD	LIC	ASHEVILLE, NC	BLANK0000093577	152.6
No	WZTV	D20	DT	LIC	NASHVILLE, TN	BLANK0000115725	258.4
Yes	WTTQ	D21	DT	LIC	HOMEWOOD, AL	BLANK0000192390	384.3
Yes	WABE-TV	D21	DT	LIC	ATLANTA, GA	BLANK0000143418	252.9
No	WFYI	D21	DT	LIC	INDIANAPOLIS, IN	BLEDT20100803ADB	475.7
No	WRLW-CD	D21-	DC	LIC	SALEM, IN	BLANK0000112941	345.2
Yes	WKYT-TV	D21	DT	LIC	LEXINGTON, KY	BLANK0000074953	229.4
Yes	WUNG-TV	D21	DT	LIC	CONCORD, NC	BLANK0000113063	308.5
No	WBNS-TV	D21	DT	LIC	COLUMBUS, OH	BLCDT20021025ABK	447.3
No	WEBA-TV	D21	DT	LIC	ALLENDALE, SC	BLANK0000145391	390.1
No	WJKT	D21	DT	LIC	JACKSON, TN	BLANK0000114687	465.8
Yes	WUXP-TV	D21	DT	LIC	NASHVILLE, TN	BLANK0000159943	258.4
Yes	WWCW	D21	DT	LIC	LYNCHBURG, VA	BLANK0000199504	410.1
No	WHSB-TV	D22	DT	LIC	MONROE, GA	BLANK0000081582	254.8
Yes	WCTE	D22	DT	LIC	COOKEVILLE, TN	BLEDT20110413ACS	128.0
Yes	WKPT-CD	D22	DC	LIC	KINGSPORT, TN	BLDTA20120420ACJ	133.6

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D21

Latitude: 36 0 36.00 N (NAD83)

Longitude: 83 55 57.00 W

Height AMSL: 693.0 m

HAAT: 382.0 m

Peak ERP: 1000 kW

Antenna: Omnidirectional

Elev Pattn: Generic

Elec Tilt: 0.75

39.5 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	1000 kW	330.4 m	103.2 km
45.0	1000	373.0	107.2
90.0	1000	405.0	110.3
135.0	1000	415.8	111.3
180.0	1000	413.6	111.1
225.0	1000	392.5	109.1
270.0	1000	362.6	106.2
315.0	1000	364.8	106.4

ERP exceeds maximum

ERP: 1000 kW ERP maximum: 943 kW

Distance to Canadian border: 639.1 km

Distance to Mexican border: 1663.3 km

Conditions at FCC monitoring station: Powder Springs GA

Bearing: 197.0 degrees Distance: 249.4 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:

Bearing: 290.2 degrees Distance: 1913.4 km

No land mobile station failures found

Study cell size: 1.00 km

Profile point spacing: 0.10 km

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

Maximum new IX to LPTV: 2.00%

---- Below is IX received by proposal BLANK0000210505 ----

Proposal receives 2.08% interference from scenario 1

Proposal receives 2.08% interference from scenario 2

No IX check failures found.

Study cell size: 1.00 km

Profile point spacing: 0.10 km

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

Maximum new IX to LPTV: 2.00%

No IX check failures found.



POWER DENSITY CALCULATION

PROPOSED WKNX-TV  
CHANNEL 21 – KNOXVILLE, TENNESSEE

Since the FCC considers the possible biological effects of RF transmissions in its environmental determinations, we have studied the matter with respect to this Knoxville facility. Employing the methods set forth in *OET Bulletin No. 65* and considering a main-lobe effective radiated power of 1000 kW (H and V), an antenna radiation center 310 meters above ground, and the specific elevation pattern of the proposed Dielectric omnidirectional antenna, maximum power density two meters above ground of  $0.0027 \text{ mW/cm}^2$  is calculated to occur 224 meters from the base of the tower. Since this is only 0.8 percent of the  $0.34 \text{ mW/cm}^2$  reference for uncontrolled environments (areas with public access) surrounding a facility operating on Channel 21 (512-518 MHz), a grant of this proposal may be considered a minor environmental action with respect to public exposure to non-ionizing electromagnetic radiation.

Further, the station owner will take whatever precautionary steps are necessary, such as reducing power or leaving the air temporarily, to ensure that workers operating in the vicinity of the antenna are not exposed to excessive non-ionizing radiation.