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**Engineering Statement
Minor Modification of KFJX
Channel 13 at Pittsburg, KS
November 2017**

Expansion Application

This Engineering Statement has been prepared on behalf of Sagamorehill of Missouri Licenses, LLC, licensee of digital television station KFJX at Pittsburg, Kansas. This application specifies a minor modification of the licensed KFJX facility, to implement a power increase with a new antenna system.

Interference Study

An interference study has been conducted using the Commission's TVStudy software. The results of the study demonstrate that this proposal will have no additional interference impact on other stations (licenses, permits, and applications) beyond the nominal 0.5% value as permitted by the FCC Rules.

This interference study was conducted using a 1.0 kilometer grid spacing, with terrain extracted at 0.5 kilometer intervals.

While the study results indicate an MX (mutually-exclusive) situation with a minor modification application filed by WIBW-TV Ch13 Topeka (File No. 35760), the indicated interference is received by the proposed KFJX facility. No interference in excess of 0.5% is caused to the pending WIBW-TV application facility, and therefore this MX "hit" would not be considered an impediment to grant of the instant application.

Study created: 2017.11.29 10:21:50

Study build station data: LMS TV 2017-11-29 (78)

Proposal: KFJX D13 DT APP PITTSBURG, KS
 File number: KFJX45_1KW
 Facility ID: 83992
 Station data: User record
 Record ID: 408
 Country: U.S.
 Zone: II

Stations affected by proposal:

Call	Chan	Svc	Status	City, State	File Number	Distance
KGEB	D12	DT	CP	TULSA, OK	BLANK0000029672	171.7 km
KEMV	D13	DT	LIC	MOUNTAIN VIEW, AR	BLEDT20100608ACU	266.6
WIBW-TV	D13	DT	APP	TOPEKA, KS	BLANK0000035760	230.5
WIBW-TV	D13	DT	LIC	TOPEKA, KS	BLCDT20110111ABO	230.5
KETA-TV	D13	DT	LIC	OKLAHOMA CITY, OK	BLEDT20140929AOU	307.4

No non-directional AM stations found within 0.8 km

No directional AM stations found within 3.2 km

Record parameters as studied:

Channel: D13
 Latitude: 37 13 15.00 N (NAD83)
 Longitude: 94 42 26.00 W
 Height AMSL: 607.7 m
 HAAT: 337.0 m
 Peak ERP: 45.1 kW
 Antenna: DIE-THV-8A13-R C145 0.0 deg
 Elev Pattn: Generic
 Elec Tilt: 0.5

36.0 dBu contour:

Azimuth	ERP	HAAT	Distance
0.0 deg	6.93 kW	336.3 m	92.2 km
45.0	15.3	339.1	98.5
90.0	39.5	339.6	106.4
135.0	44.1	343.3	107.7
180.0	41.0	345.8	107.3
225.0	44.1	331.7	106.7
270.0	39.5	333.3	105.9
315.0	15.3	328.9	97.7

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

Distance to Canadian border: 1121.8 km

Distance to Mexican border: 1034.0 km

Conditions at FCC monitoring station: Grand Island NE
 Bearing: 323.2 degrees Distance: 521.8 km

Proposal is not within the West Virginia quiet zone area

Conditions at Table Mountain receiving zone:

Bearing: 292.7 degrees Distance: 967.2 km

Study cell size: 1.00 km
Profile point spacing: 0.50 km

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

**MX with BLANK0000035760 APP, 5.52% interference, scenario 1
Proposal receives 4.74% interference from scenario 2

Facilities Proposed

The proposed operation will be on Channel 13 with an effective radiated power of 45.1 kilowatts (H pol) and 24.3 kilowatts (V pol), using an antenna with 0.5 degrees of electrical beam tilt. Operation is proposed with a Dielectric model THV-8A13-R C145 antenna, which will be mounted on an existing tower with FCC Antenna Structure Registration Number is 1032005.

RF Exposure Calculations

OET Bulletin 65 Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields (Edition 97-01) states in part that:

When performing an evaluation for compliance with the FCC's RF guidelines all significant contributors to the ambient RF environment should be considered. . . For purposes of such consideration, significance can be taken to mean any transmitter producing more than 5% of the applicable exposure limit (in terms of power density or the square of the electric or magnetic field strength) at accessible locations.

As will be demonstrated below, the proposed operation will produce less than 5% of the applicable exposure limit for both controlled and uncontrolled environments. Thus, the proposed facility is categorically excluded from the requirement of further study. Therefore, pursuant to §1.1307(b)(3) of the Commission's Rules no calculations are required for the other FM and TV facilities in the vicinity, and precise calculations are made only with regard to the levels from this proposal.

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

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

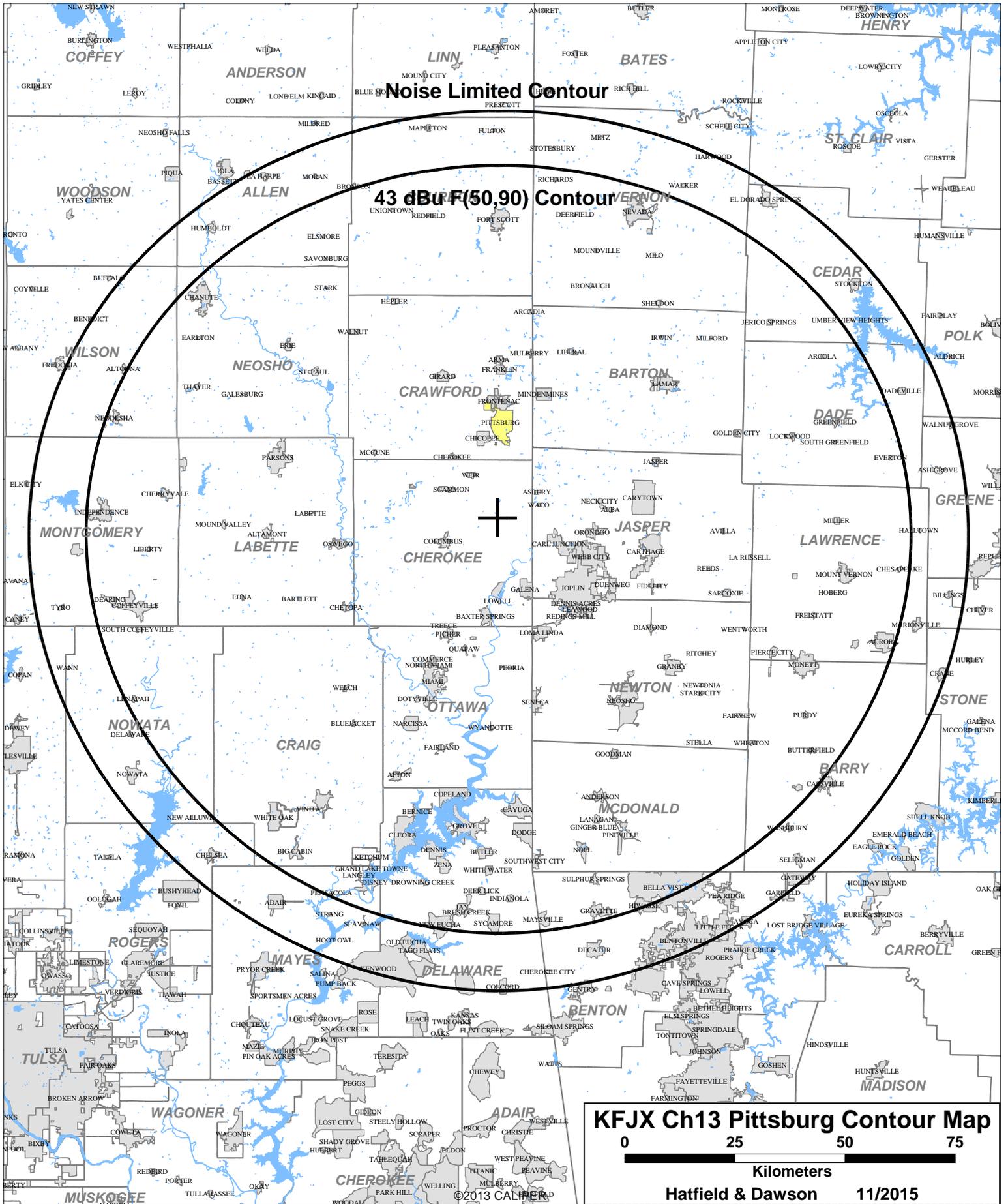
Where: *AdjERP(Watts)* is the maximum lobe effective radiated power times the element pattern factor times the array pattern factor.

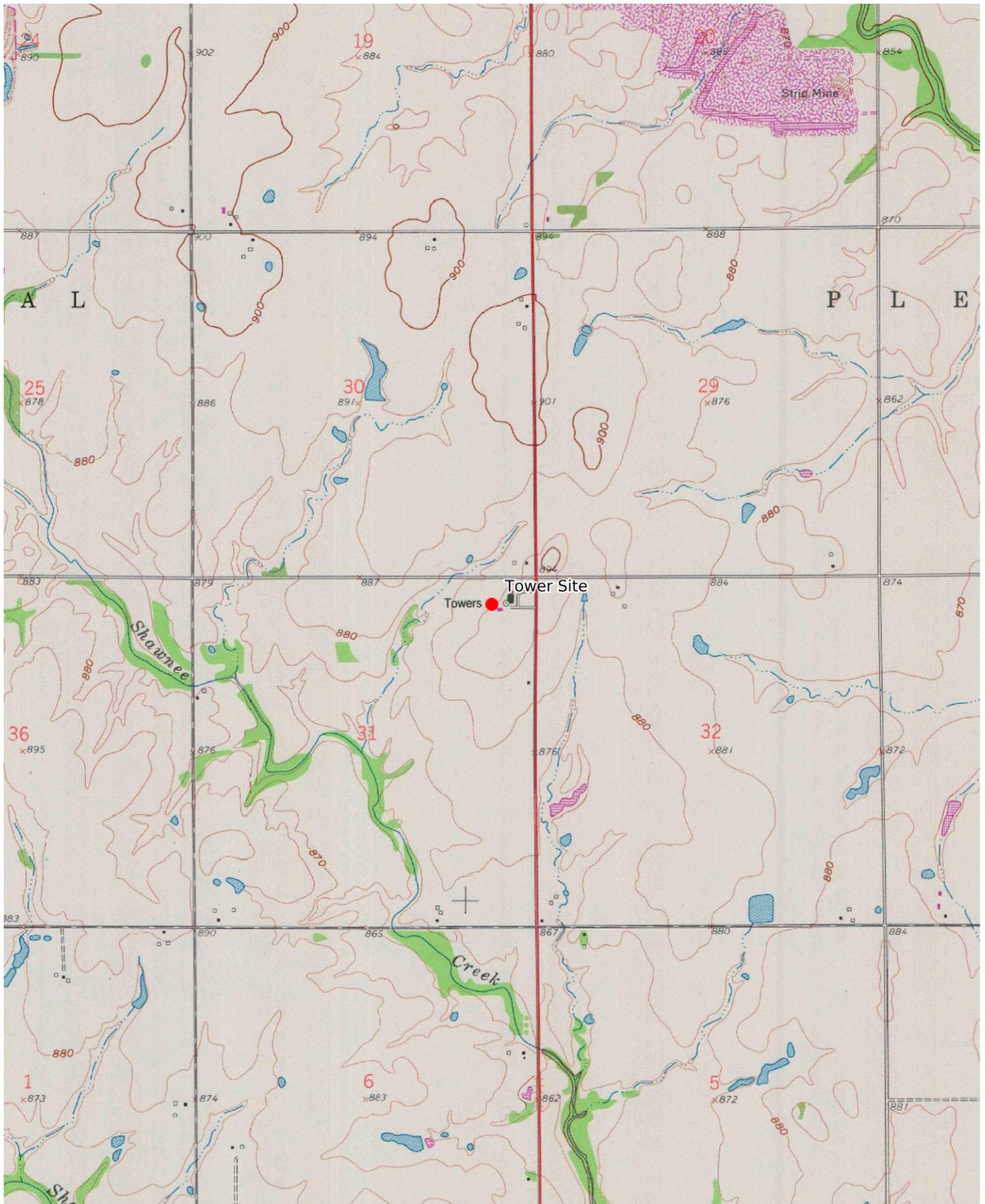
D is the distance in meters from the center of radiation to the calculation point.

Power density levels produced by the proposed facility were calculated for an elevation of 2 meters above ground (335 meters below the antenna radiation center). The worst case power density levels occur at depression angles between 45 and 90 degrees below the horizontal. The calculations in this report assume a worst-case relative field value of 0.144 at these angles, based on the manufacturer's vertical plane pattern for the Dielectric model THV-8A13-R C145 antenna proposed in this application. This relative field value yields a worst-case adjusted average effective radiated power of 1440 watts at depression angles between 45 and 90 degrees below the horizontal. Assuming this power and the shortest distance between the antenna radiation center and 2 meters above ground level (i.e. straight down), the highest calculated power density from the proposed antenna alone occurs at the base of the antenna support structure. At this point the power density is calculated to be $0.4 \mu\text{W}/\text{cm}^2$, which is 0.2% of $200 \mu\text{W}/\text{cm}^2$ (the FCC maximum for uncontrolled environments at the Channel 13 frequency).

These calculations show that the maximum calculated power density produced at two meters above ground level by the proposed operation alone is less than 5% of the applicable FCC exposure limit at all locations between 1 and 500 meters from the base of the antenna support structure. Section 1.1307(b)(3) of the Commission's Rules excludes applications for new facilities or modifications to existing facilities from the requirement of preparing an environmental assessment when the calculated emissions from the applicants proposed facility are predicted to be less than 5% of the applicable FCC exposure limit. Therefore, the proposed facility is in compliance with Section 1.1301 *et seq* and no further analysis of RF exposure at this site is required in this application.

Pursuant to OET Bulletin No. 65, all station personnel and contractors are required to follow appropriate safety procedures before any work is commenced on the antenna tower, including reduction in power or discontinuance of operation before any maintenance work is undertaken. The permittee/licensee in coordination with other users of the site must reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency exposure in excess of FCC guidelines.





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