

ENGINEERING STATEMENT  
RE REQUEST FOR MINOR CHANGE IN  
DTV CONSTRUCTION PERMIT  
ON BEHALF OF  
**KOET-DT, EUFAULA, OKLAHOMA**  
CHANNEL 31 1000 KW ERP 364.1 METERS HAAT

OCTOBER 2002

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CONSULTING ENGINEERS  
RADIO AND TELEVISION  
WASHINGTON, D.C.

This engineering statement has been prepared in support of an application for a minor change in an outstanding construction permit on behalf of Oklahoma Educational Television Authority, licensee of KOET(TV), Eufaula, Oklahoma. KOET(TV) is licensed to operate on NTSC television Channel 3 with a maximum visual effective radiated power of 100 kW and a HAAT of 399 meters (1309 feet). KOET-DT has been authorized to use DTV Channel 31 with facilities of 1000 kW (maximum) and HAAT of 376.3 meters. KOET-DT proposes to construct DTV facilities of 1000 kW (non-directional) at a slight decrease in height. The proposed height above average terrain is now 364.1 meters.

This statement also serves to correctly align the coordinates of the antenna location with the outstanding tower registration.

The KOET-DT antenna will be side-mounted on the existing tower so that the center of radiation is 164.9 meters (541 feet) above ground level. The existing transmitter site is located on Blue Mountain, 25.74 km southeast of Eufaula, Oklahoma. The registration number for the existing tower is 1057887.

The INCORRECT geographic coordinates listed in the construction permit are 35° 11' 01" N x 95° 20' 20" W. The CORRECT geographic coordinates of the existing site are as follows.

North Latitude: 35° 11' 01"

West Longitude: 95° 20' 19"

(NAD-27)

Equipment Data

Antenna: Dielectric, TFU-31JSC-R04 (or equivalent) antenna with 1.0° electrical beam tilt. The vertical plane pattern and other exhibits required by Section 73.625(c) are included in Exhibits E-2a and E-2b.

Transmission Line: 208.8 meters (685 ft) of Dielectric, Type EIA/DCA, 7-3/16", 75 ohm or equivalent

Power Data

Transmitter output	40.5 kW	16.07 dBk
Transmission line loss	85.3%	0.69 dB
Input power to the antenna	34.5 kW	15.38 dBk
Antenna power gain, Main Lobe	29	14.62 dB
Effective Radiated Power, Maximum	1000 kW	30 dBk

Elevation Data

Elevation of the site above mean sea level	411.5 meters (1350 feet)
Elevation of the top of existing supporting structure above ground including appurtenances	213 meters (699 feet)
Elevation of the top of supporting structure above mean sea level including appurtenances	624.5 meters (2049 feet)
Height of DTV antenna radiation center meters above ground	164.9 meters (541 feet)
Height of DTV antenna radiation center above mean sea level	576.4 meters (1891 feet)
Height of DTV antenna radiation center above average terrain	364.1 meters (1195 feet)

### Authorized Effective Radiated Power

The maximum ERP authorized by the outstanding construction permit (BPEDT-20000426ABQ) for the DTV operation is 1000 kW at 376.3 meters HAAT. Station KOET-DT is proposing to operate its DTV facility with a maximum ERP of 1000 kW and 364.1 meters HAAT using a non-directional transmitting antenna. This power and height will ensure that it does not extend the predicted 41 dBu contour in any direction beyond that authorized by the construction permit.

The attached map (Exhibit E-3) shows the computed F(50,90) 41 dBu contours for both the facilities authorized by the construction permit and the modified facilities mentioned herein. These contours were predicted according to Section 73.625(b) of the Commission's rules.

### Principal Community Coverage

In MM Docket No. 00-39, the Commission adopted rules to require DTV stations to place a stronger TV signal over the principal community.

The operation proposed by Station KOET-DT places a predicted 48 dBu contour over the community of license.

### Topographic Data

The average elevation data of the eight cardinal radials from 3.2 to 16.1 kilometers, is based on the NGDC 3-second computerized terrain database.

### Contour Data

Utilizing the formula in Section 73.625(b)(2) for the effective heights shown on the attached tabulation, the depression angle  $A_h$ , for each azimuth has been calculated. The maximum radiation value has been used to calculate ERP where the vertical radiation pattern at these angles is greater than 90% of the maximum.

Table I provides the distances along the eight cardinal radials to the predicted F(50,90) 48 dBu and 41 dBu contours, the average elevations, and the effective antenna heights.

The distances along each radial to the limits of the F(50,90) 48 dBu and 41 dBu contour were determined as specified in Section 73.625(b) by reference to the propagation data for Channels 14-69, as published by the Commission in Figures 10b and 10c, Section 73.699 of its rules.

### Other Stations

There is only one TV (KOET(TV)) located within 5 km of the proposed site. There are no FM broadcast stations within 4 km of the proposed site. There are no AM stations within 3.22 km of the proposed site. No objectionable interference problems are anticipated, however, if any problems occur, the applicant will take the necessary steps to resolve them.

Environment Statement

The two following broadcast stations are operating from the tower:

KOET(TV)

KOET-DT

The RF contribution of the two DTV stations will be calculated and added to this value.

Station KOET(TV)

Channel 3      Freq: 60-66 MHz Range

$$S = \frac{33.4 (F^2) ERP}{R^2}$$

ERP = 100 watts (Horizontal only)
R = 175.5 meters (antenna height above ground -2 meters)
F = 0.2 (assumed)

$$S = <1.75 \mu\text{W}/\text{cm}^2$$

Therefore KOET(TV) contributes less than 1.75  $\mu\text{W}/\text{cm}^2$  at 2 meters above the ground.

The limit for an uncontrolled environment (general population) for this frequency range is 200  $\mu\text{W}/\text{cm}^2$ .

**KOET(TV) contributes less than 0.87% RFF level for an uncontrolled environment (general population) two meters above the ground.**

Station KOET-DT

Channel 31      Freq: 572-578 MHz Range

$$S = \frac{33.4 (F^2) ERP}{R^2}$$

ERP = 1000 kW (Horizontal only)
R = 162.9 meters (antenna height above ground -2 meters)
F = 0.1 (assumed)

$$S = <12.6 \mu\text{W}/\text{cm}^2$$

Therefore, KOET-DT contributes less than 12.6  $\mu\text{W}/\text{cm}^2$  at 2 meters above the ground.

The limit for an uncontrolled environment for this frequency is 383.33  $\mu\text{W}/\text{cm}^2$ .

Therefore under the proposed scenario:

**KOET-DT contributes less than 3.3% RFF level for an uncontrolled environment (general population) two meters above the ground.**

Therefore the total RF percentage two meters above the ground at the highest RFF point will still be less than 5% of the limit, when KOET(TV) and KOET-DT are operational.

The licensee indicates that all authorized personnel climbing the tower will be alerted to the potential zones of high radiation on the tower, and if necessary, power will be reduced or terminated while work on the tower is being done.

#### Summary of Environmental Assessment

An environmental assessment ("EA") is categorically excluded under Section 1.1306 of the FCC Rules and Regulations since the permittee indicates:

- (a)(1) The proposed facilities will not be located in an officially designated wilderness area.
- (a)(2) The proposed facilities will not be located in an officially designated wildlife preserve.
- (a)(3) The proposed facilities will not affect any listed threatened or endangered species or habitats.
- (a)(3)(ii) The proposed facilities will not jeopardize the continued existence of any proposed endangered or threatened species or likely to result in the destruction or adverse modification of proposed critical habitats.
- (a)(4) The proposed facilities will not affect any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.
- (a)(5) The proposed facilities will not be located near any known Indian religious sites.
- (a)(6) The proposed facilities will not be located in a flood plain.

- (a)(7) The installation of the DTV facilities on an existing guyed tower will not involve a significant change in surface features of the ground in the vicinity of the tower.
- (a)(8) High intensity strobe lights have been installed on the tower for quite some time. However, they have not been a source of local controversy.
- (b) Workers and the general public will not be subjected to RFF levels in excess of the current FCC guidelines. Authorized personnel will be alerted to areas of the antennas where potential radiation levels are in excess of the FCC guidelines.



TABLE I  
DTV COVERAGE DATA  
REQUEST FOR MINOR CHANGE IN DTV CONSTRUCTION PERMIT  
KOET-DT, EUFAULA, OKLAHOMA  
CHANNEL 31 1000 KW ERP 364.1 METERS HAAT  
OCTOBER 2002

<u>Radial</u> N ° E, T	<u>Average</u> <u>Elevation *</u> <u>3.2-16.1 km</u> meters	<u>Effective</u> <u>Height</u> meters	<u>ERP</u> kW	<u>Distance to</u> 48 dBu F(50,90) <u>Contour</u> km	<u>Distance to</u> 41 dBu F(50,90) <u>Contour</u> km
0	197.3	379.1	1000	90.9	104.3
45	184.1	392.3	1000	91.6	105.5
90	218.6	357.8	1000	89.2	102.5
135	195.0	381.4	1000	91.0	104.5
180	239.5	336.9	1000	87.2	100.7
225	231.7	344.7	1000	88.0	101.4
270	188.3	388.1	1000	91.4	105.1
315	243.7	332.7	1000	86.8	100.3

\* Based on data from the FCC 3-second database.

DTV Channel 31 (572-578 MHz)  
 Average Elevation 3 to 16 km 212.3 meters AMSL  
 Center of Radiation 576.4 meters AMSL  
 Antenna Height Above Average Terrain 364.1 meters  
 Site Elevation 411.5 meters AMSL  
 Effective Radiated Power 1000 kW (30 dBk) Max. at 1.0° Tilt

(NAD-27)

North Latitude: 35° 11' 01"  
 West Longitude: 95° 20' 19"

ABOVE GROUND

ABOVE MEAN SEA LEVEL

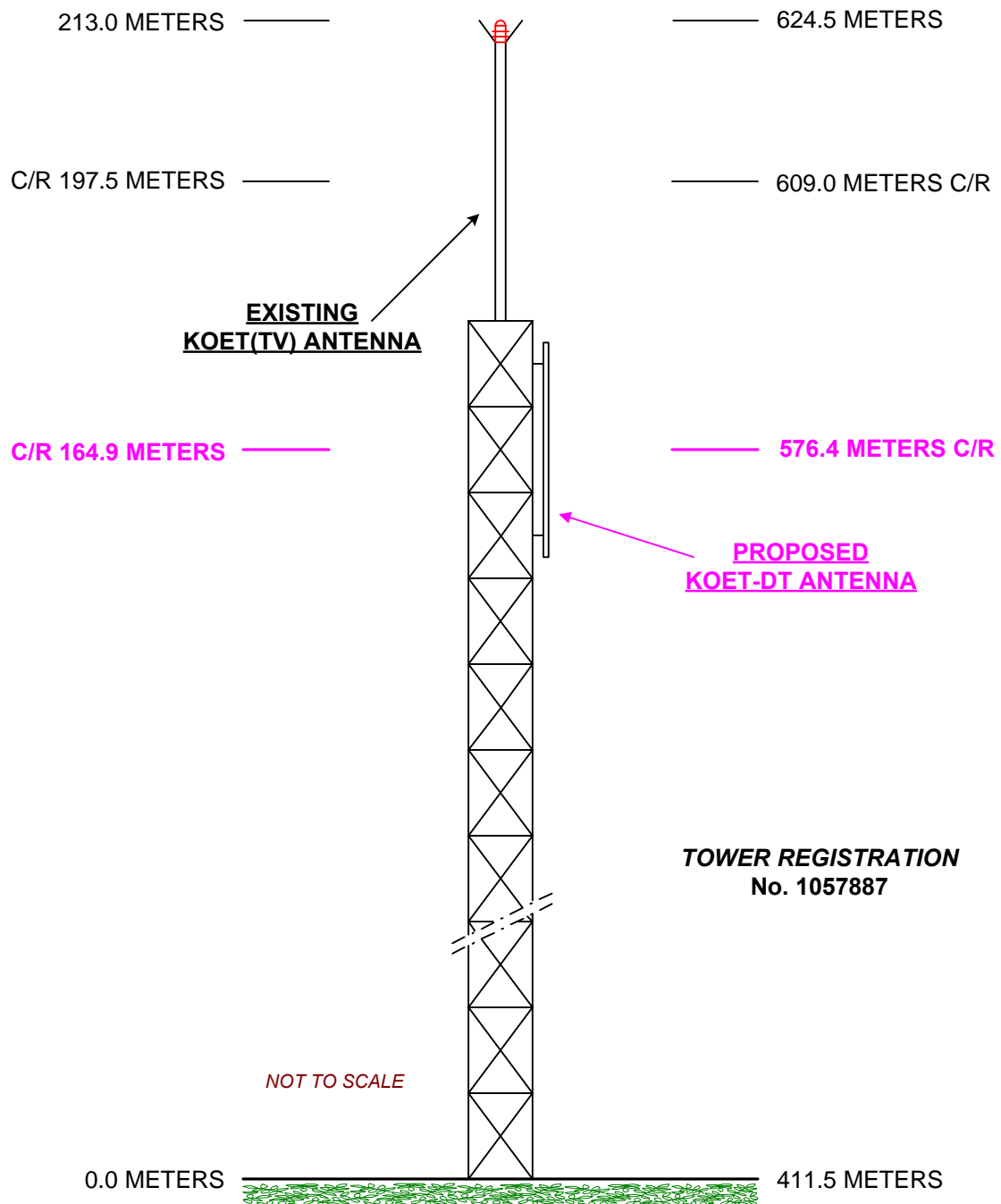


EXHIBIT E - 1  
VERTICAL SKETCH  
FOR THE PROPOSED DTV OPERATION OF  
**KOET-DT, EUFAULA, OKLAHOMA**  
OCTOBER 2002

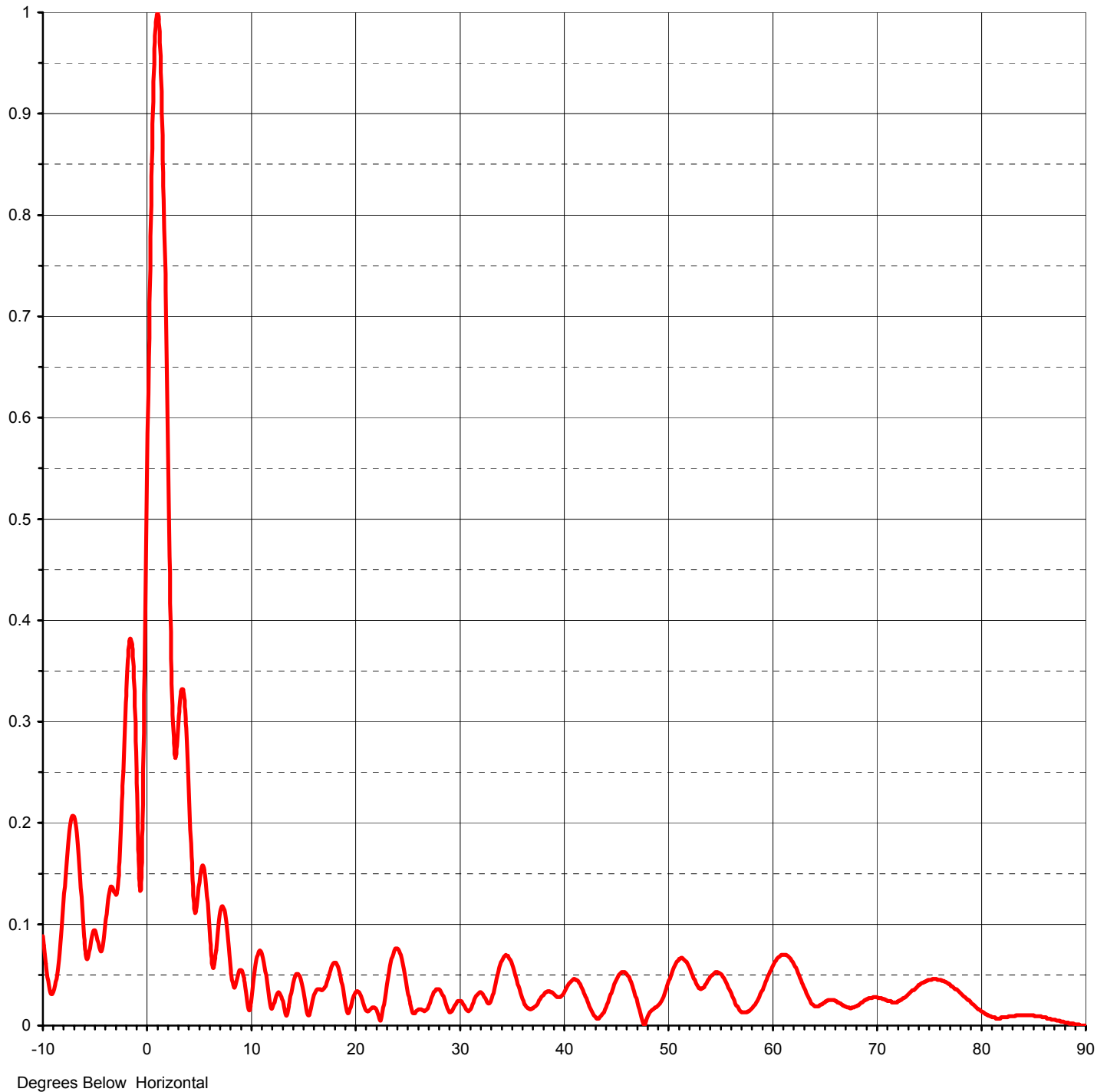


Proposal Number	<b>DCA-9944</b>	
Date	<b>13-May-02</b>	
Call Letters	<b>KOET-DT</b>	Channel <b>31</b>
Location	<b>Eufaula, OK</b>	
Customer		
Antenna Type	<b>TFU-31JSC-R 04</b>	

## ELEVATION PATTERN

RMS Gain at Main Lobe	<b>29.00 ( 14.62 dB )</b>
RMS Gain at Horizontal	<b>8.60 ( 9.34 dB )</b>
Calculated / Measured	<b>Calculated</b>

Beam Tilt	<b>1.00 deg</b>
Frequency	<b>575.00 MHz</b>
Drawing #	<b>31Y290100-90</b>





Proposal Number **DCA-9944**

Date **13-May-02**

Call Letters **KOET-DT**

Channel **31**

Location **Eufaula, OK**

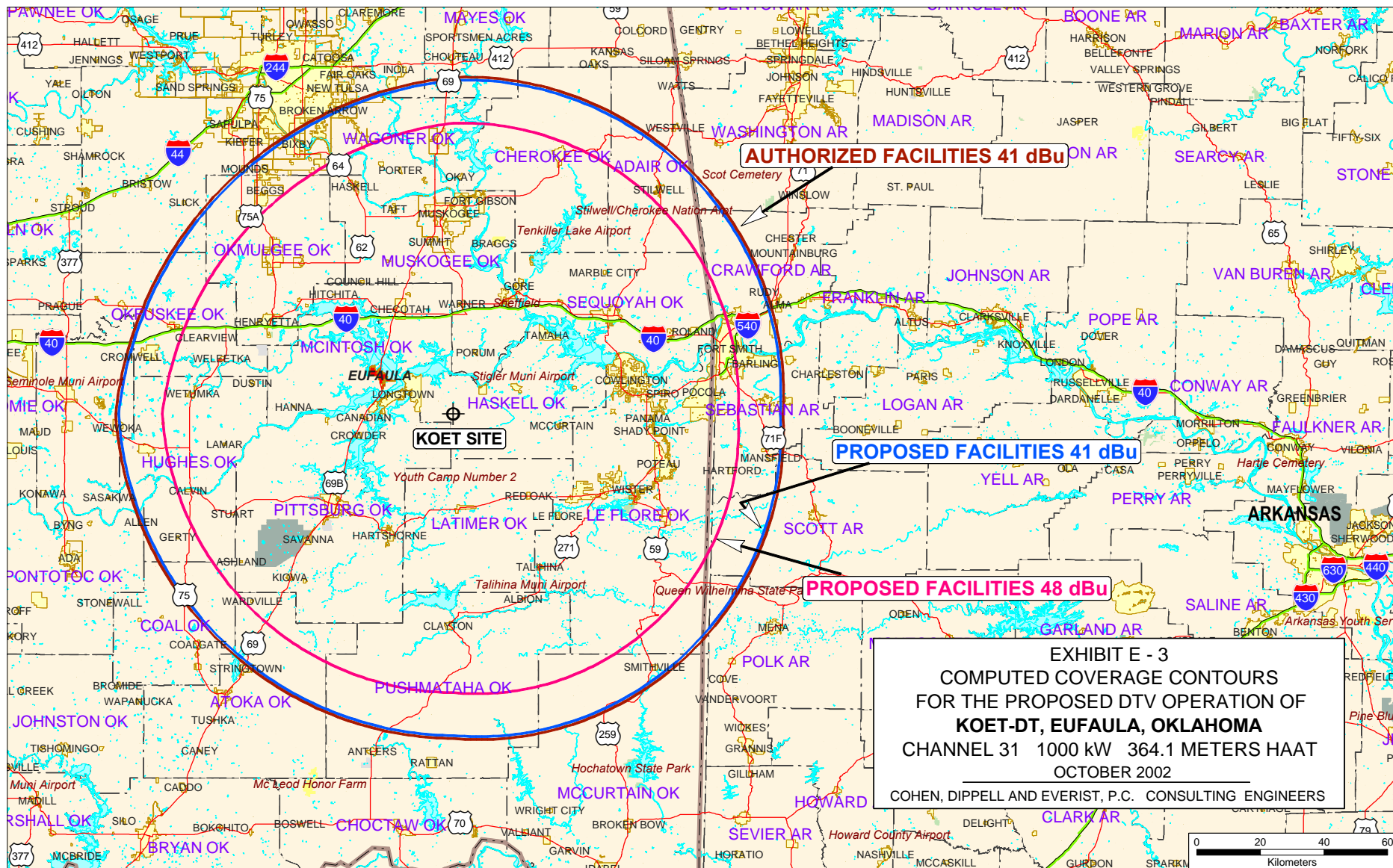
Customer

Antenna Type **TFU-31JSC-R 04**

## TABULATION OF ELEVATION PATTERN

Elevation Pattern Drawing #: **31Y290100-90**

Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field	Angle	Field
-10.0	0.088	2.4	0.326	10.6	0.066	30.5	0.020	51.0	0.064	71.5	0.023
-9.5	0.044	2.6	0.270	10.8	0.073	31.0	0.015	51.5	0.066	72.0	0.024
-9.0	0.033	2.8	0.270	11.0	0.073	31.5	0.026	52.0	0.059	72.5	0.027
-8.5	0.061	3.0	0.298	11.5	0.050	32.0	0.033	52.5	0.047	73.0	0.031
-8.0	0.123	3.2	0.324	12.0	0.017	32.5	0.027	53.0	0.037	73.5	0.035
-7.5	0.187	3.4	0.332	12.5	0.030	33.0	0.023	53.5	0.038	74.0	0.040
-7.0	0.206	3.6	0.318	13.0	0.028	33.5	0.041	54.0	0.046	74.5	0.043
-6.5	0.159	3.8	0.283	13.5	0.010	34.0	0.061	54.5	0.052	75.0	0.045
-6.0	0.081	4.0	0.234	14.0	0.037	34.5	0.070	55.0	0.052	75.5	0.046
-5.5	0.076	4.2	0.180	14.5	0.051	35.0	0.063	55.5	0.045	76.0	0.045
-5.0	0.094	4.4	0.133	15.0	0.038	35.5	0.047	56.0	0.034	76.5	0.043
-4.5	0.074	4.6	0.111	15.5	0.011	36.0	0.029	56.5	0.022	77.0	0.040
-4.0	0.100	4.8	0.121	16.0	0.026	36.5	0.018	57.0	0.014	77.5	0.036
-3.5	0.137	5.0	0.141	16.5	0.036	37.0	0.017	57.5	0.013	78.0	0.032
-3.0	0.129	5.2	0.155	17.0	0.036	37.5	0.021	58.0	0.016	78.5	0.027
-2.8	0.139	5.4	0.157	17.5	0.048	38.0	0.029	58.5	0.023	79.0	0.023
-2.6	0.172	5.6	0.145	18.0	0.062	38.5	0.034	59.0	0.033	79.5	0.018
-2.4	0.222	5.8	0.121	18.5	0.055	39.0	0.032	59.5	0.045	80.0	0.014
-2.2	0.279	6.0	0.091	19.0	0.028	39.5	0.028	60.0	0.057	80.5	0.011
-2.0	0.331	6.2	0.064	19.5	0.014	40.0	0.031	60.5	0.066	81.0	0.008
-1.8	0.368	6.4	0.057	20.0	0.031	40.5	0.040	61.0	0.070	81.5	0.007
-1.6	0.382	6.6	0.074	20.5	0.031	41.0	0.046	61.5	0.069	82.0	0.008
-1.4	0.368	6.8	0.096	21.0	0.017	41.5	0.042	62.0	0.063	82.5	0.008
-1.2	0.323	7.0	0.112	21.5	0.016	42.0	0.032	62.5	0.052	83.0	0.009
-1.0	0.250	7.2	0.118	22.0	0.017	42.5	0.019	63.0	0.040	83.5	0.010
-0.8	0.164	7.4	0.114	22.5	0.005	43.0	0.009	63.5	0.028	84.0	0.010
-0.6	0.135	7.6	0.101	23.0	0.034	43.5	0.008	64.0	0.020	84.5	0.010
-0.4	0.235	7.8	0.081	23.5	0.064	44.0	0.016	64.5	0.020	85.0	0.010
-0.2	0.386	8.0	0.059	24.0	0.076	44.5	0.029	65.0	0.023	85.5	0.009
0.0	0.546	8.2	0.042	24.5	0.066	45.0	0.043	65.5	0.025	86.0	0.008
0.2	0.696	8.4	0.038	25.0	0.039	45.5	0.052	66.0	0.024	86.5	0.007
0.4	0.824	8.6	0.045	25.5	0.014	46.0	0.052	66.5	0.022	87.0	0.006
0.6	0.922	8.8	0.053	26.0	0.015	46.5	0.043	67.0	0.019	87.5	0.005
0.8	0.982	9.0	0.055	26.5	0.015	47.0	0.027	67.5	0.017	88.0	0.003
1.0	1.000	9.2	0.050	27.0	0.017	47.5	0.008	68.0	0.019	88.5	0.002
1.2	0.976	9.4	0.039	27.5	0.030	48.0	0.007	68.5	0.023	89.0	0.001
1.4	0.912	9.6	0.024	28.0	0.036	48.5	0.015	69.0	0.026	89.5	0.000
1.6	0.815	9.8	0.018	28.5	0.029	49.0	0.019	69.5	0.027	90.0	0.000
1.8	0.694	10.0	0.019	29.0	0.015	49.5	0.026	70.0	0.028		
2.0	0.561	10.2	0.036	29.5	0.018	50.0	0.040	70.5	0.026		
2.2	0.432	10.4	0.053	30.0	0.024	50.5	0.055	71.0	0.024		



## SECTION VII- DTV Engineering

**Complete Questions 1-5 of the Certification Checklist and provide all data and information for the proposed facility, as requested in Technical Specifications, Items 1-13.**

**Certification Checklist:** A correct answer of "Yes" to all of the questions below will ensure an expeditious grant of a construction permit. However, if the proposed facility is located within the Canadian or Mexican borders, coordination of the proposal under the appropriate treaties may be required prior to grant of the application. An answer of "No" will require additional evaluation of the applicable information in this form before a construction permit can be granted.

1. The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:

- (a) It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622. ☐ Yes ☐ No
- (b) It will operate from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this station as established in 47 C.F.R. Section 73.622. ☐ Yes ☐ No
- (c) It will operate with an effective radiated power (ERP) and antenna height above average terrain (HAAT) that do not exceed the DTV reference ERP and HAAT for this station as established in 47 C.F.R. Section 73.622. ☐ Yes ☐ No

2. The proposed facility will not have a significant environmental impact, including exposure of workers or the general public to levels of RF radiation exceeding the applicable health and safety guidelines, and therefore will not come within 47 C.F.R. Section 1.1307. ☐ Yes ☐ No

Applicant must **submit the Exhibit** called for in Item 13.

3. Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community. ☐ Yes ☐ No
4. The requirements of 47 C.F.R. Section 73.1030 regarding notification to radio astronomy installations, radio receiving installations and FCC monitoring stations have either been satisfied or are not applicable. ☐ Yes ☐ No
5. The antenna structure to be used by this facility has been registered by the Commission and will not require reregistration to support the proposed antenna, OR the FAA has previously determined that the proposed structure will not adversely effect safety in air navigation and this structure qualifies for later registration under the Commission's phased registration plan, OR the proposed installation on this structure does not require notification to the FAA pursuant to 47 C.F.R. Section 17.7. ☐ Yes ☐ No

## SECTION VII - DTV Engineering

### TECHNICAL SPECIFICATIONS

Ensure that the specifications below are accurate. Contradicting data found elsewhere in this application will be disregarded. All items must be completed. The response "on file" is not acceptable.

### TECH BOX

1. Channel Number: DTV \_\_\_\_\_ Analog TV, if any \_\_\_\_\_
2. Zone: ☐ I ☐ II ☐ III
3. Antenna Location Coordinates: (NAD 27)
- \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " ☐ N ☐ S Latitude  
\_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ " ☐ E ☐ W Longitude
4. Antenna Structure Registration Number: \_\_\_\_\_
- ☐ Not applicable ☐ FAA Notification Filed with FAA
5. Antenna Location Site Elevation Above Mean Sea Level: \_\_\_\_\_ meters
6. Overall Tower Height Above Ground Level: \_\_\_\_\_ meters
7. Height of Radiation Center Above Ground Level: \_\_\_\_\_ meters
8. Height of Radiation Center Above Average Terrain: \_\_\_\_\_ meters
9. Maximum Effective Radiated Power (average power): \_\_\_\_\_ kW
10. Antenna Specifications:
- a. 

Manufacturer	Model
--------------	-------
- b. Electrical Beam Tilt: \_\_\_\_\_ degrees ☐ Not Applicable
- c. Mechanical Beam Tilt: \_\_\_\_\_ degrees toward azimuth \_\_\_\_\_ degrees True ☐ Not Applicable
- Attach as an Exhibit all data specified in 47 C.F.R. Section 73.625(c). 

Exhibit No.
-------------
- d. Polarization: ☐ Horizontal ☐ Circular ☐ Elliptical

# TECH BOX

e. Directional Antenna Relative Field Values: ☐ Not applicable (Nondirectional)

Rotation: \_\_\_\_\_ ° ☐ No rotation

Degree	Value	Degree	Value	Degree	Value	Degree	Value	Degree	Value	Degree	Value
0		60		120		180		240		300	
10		70		130		190		250		310	
20		80		140		200		260		320	
30		90		150		210		270		330	
40		100		160		220		280		340	
50		110		170		230		290		350	
Additional Azimuths											

If a directional antenna is proposed, the requirements of 47 C.F.R. Section 73.625(c) must be satisfied. **Exhibit required.**

Exhibit No.

11. Does the proposed facility satisfy the interference protection provisions of 47 C.F.R. Section 73.623(a)? (Applicable only if **Certification Checklist** Items 1(a), (b), or (c) are answered "No.") ☐ Yes ☐ No

If "No," attach as an Exhibit justification therefor, including a summary of any related previously granted waivers.

Exhibit No.

12. If the proposed facility will not satisfy the coverage requirement of 47 C.F.R. Section 73.625, attach as an Exhibit justification therefor. (Applicable only if **Certification Checklist** Item 3 is answered "No.")

Exhibit No.

13. **Environmental Protection Act. Submit in an Exhibit** the following:

Exhibit No.

- a. If **Certification Checklist** Item 2 is answered "Yes," a brief explanation of why an Environmental Assessment is not required. Also describe in the Exhibit the steps that will be taken to limit RF radiation exposure to the public and to persons authorized access to the tower site.

By checking "Yes" to **Certification Checklist** Item 2, the applicant also certifies that it, in coordination with other users of the site, will reduce power or cease operation as necessary to protect persons having access to the site, tower or antenna from radiofrequency electromagnetic exposure in excess of FCC guidelines.

If **Certification Checklist** Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R. Section 1.1311.

**PREPARER'S CERTIFICATION ON PAGE 8 MUST BE COMPLETED AND SIGNED.**



I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith. I acknowledge that all certifications and attached Exhibits are considered material representations. I hereby waive any claim to the use of any particular frequency as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and request an authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended.)

Typed or Printed Name of Person Signing	Typed or Printed Title of Person Signing
Signature	Date

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).

### SECTION III PREPARER'S CERTIFICATION

I certify that I have prepared Section III (Engineering Data) on behalf of the applicant, and that after such preparation, I have examined and found it to be accurate and true to the best of my knowledge and belief.

Name	Relationship to Applicant (e.g., Consulting Engineer)	
Signature	Date	
Mailing Address		
City	State or Country (if foreign address)	ZIP Code
Telephone Number (include area code)	E-Mail Address (if available)	

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).