EXHIBIT E

ENGINEERING STATEMENT
RE DTV BROADCAST ENGINEERING DATA
ON BEHALF OF
AMARILLO JUNIOR COLLEGE DISTRICT
KACV-DT, AMARILLO, TEXAS
CHANNEL 8 5.0 KW ERP 519 METERS HAAT

OCTOBER 2002

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RADIO AND TELEVISION
WASHINGTON, D.C.

This engineering statement has been prepared on behalf of Amarillo Junior College District, licensee of KACV(TV), Channel 2, Amarillo, Texas. The purpose of this engineering statement is to accompany its request to construct digital television ("DTV") facilities on Channel 8 as authorized by Docket No. 02-96 (RM-10410) and to provide those data required in the electronic filed FCC Form 340, Section VII and amends the application for DTV Channel 21 on file (FCC File No. BPEDT-20000417ABM).

KACV(TV) is licensed to operate on NTSC Television Channel 2 with a maximum visual effective radiated power (ERP) of 100 kW (horizontal polarization) and height above average terrain (HAAT) of 401.0 meters (1315.62 feet). KACV(TV) had been allocated DTV Channel 21 with facilities of 1000 kW and an HAAT of 401 meters in the revised DTV Table of Allotments.[1] KACV-DT proposes to construct Channel 8 DTV facilities as authorized by the Docket No. 02-96. The facilities of 5.0 kW (horizontal polarization) at a HAAT of 519 meters are requested.

The DTV antenna will be diplexed into the current KVII-TV NTSC antenna and is top-mounted on the existing tower (Exhibit E-1) located 2.7 miles west of U.S. Route 87, and 10.4 miles north of the city of Amarillo. The existing tower has an overall structure height above ground of 495.6 meters (1626 feet). Exhibit E-1 shows a vertical sketch and the arrangement of the television antenna on the tower. The tower registration number is 1054167.

[1] "In the Matter of Advanced Television Systems and Their Impact Upon the Existing Television Broadcast Service", MM Docket No. 87-286, Memorandum Opinion and Order on Reconsideration of the Sixth Report and Order (FCC 98-24), 2/12/98, DTV Table of Allotments.

The geographic coordinates of the site are:

North Latitude: 35E 22' 30"

West Longitude: 101E 52' 56"

NAD-27

Equipment Data

Antenna: GE, Type TY-53A, horizontally polarized antenna with 0.7º electrical beam tilt. The vertical plane pattern information required by Section 73.625(c) is herein included as Exhibit E-2.

Power Data

Transmitter output	0.500 kW	-3.03 dBk
Transmission line efficiency loss Prodeline, 100-847, 6-1/8", 75 ohm or equivalent, length: 486 meters (1594.5 feet)	80%	0.98 dB
Combiner Loss*	-	-
Input power to the antenna	0.4 kW	-4.01 dBk
Antenna power gain, Main lobe	12.6	11.0 dB
Effective Radiated Power, Maximum	5.0 kW	6.99 dBk

*unavailable—manufacturer will supply at a later date.

Elevation Data

Vertical dimension of top-mounted Channel 8 antenna including appurtenances	30.3 meters 99.4 feet
Overall height above ground of existing antenna structure (including appurtenances)	495.6 meters 1625.98 feet
Center of radiation of Channel 8	481.7 meters

antenna above ground	1580.38 feet
Elevation of site above mean sea level	1043.3 meters 3422.90 feet
Center of radiation of Channel 8 antenna above mean sea level	1525 meters 5003.28 feet
Overall height above mean sea level of existing tower (including beacon)	1538.9 meters 5048.88 feet
Antenna height above average terrain	519 meters

Coverage

The average elevation data for 3 to 16 km along the standard eight radials has been determined from the NGDC 3-second database. The F(50,90) DTV coverage contours has been computed from reference to the propagation data for Channel 8, as published by the FCC in Figure 10 and 10a, Section 73.699 of the FCC Rules and Regulations. Utilizing the formula in Section 73.625(b)(2) of the rules for the effective heights, it is found that the depression angle, A_h, varies from 0.599 to 0.659 degrees. Since the relative vertical field is greater than 90% of the maximum at these depression angles, the maximum power was used in determining the distance to the DTV contour.

Table I lists along every 45 degrees the average elevation 3.22 to 16.1 km, the antenna height above average terrain, the effective radiated power, and the predicted distance to the 43 and 36 dBu F(50,90) coverage contours. The map in Exhibit E-3 shows the proposed 43 and 36 dBu F(50,90) coverage contours. The legal boundaries of Amarillo, Texas, are highlighted on the map.

Population Information

The 36 dBu contour of the KACV-DT station covers an area of approximately 32,730 km^2. The population within this area is 301,293. This data was obtained by using the information supplied by the Census Bureau in 1990.

Interference Analysis

A study of predicted interference caused by the proposed KACV-DT operation has been performed using a version of the Longley-Rice program as described in OET Bulletin No. 69 (July 2, 1997) and the Public Notice, "Additional Application Processing Guidelines for Digital Television (DTV)" (August 1998) and submitted in the rule making (MB Docket No. 02-96; RM-10410) that was adopted August 2, 2002. There is no essential change in this requested facility from that authorized in the rule making.

Other Licensed and Broadcast Facilities

There are no AM stations located within 3.2 km of the existing KACV-DT site. NTSC station KVII-TV, Channel 7 on the existing tower with a center of radiation of 481.7 meters above ground. DTV station KVII-DT, holds a construction permit (FCC File No. BPCDT-19991029ACE) for Channel 23 facilities on the existing tower with center of radiation of 452.7 meters above ground. No adverse technical effect is anticipated by the proposed DTV operation to any other FCC licensed facility. If required, the licensee of KACV-DT will install filters or take other measures as necessary to resolve any problem.

RF Field Levels

The DTV antenna will be top-mounted on the existing tower with an overall height of 495.6 meters above ground.

There are numerous other transmitters that are authorized to operate or are operating from the tower. In addition to KACV-DT, the following broadcast facilities are shown in the FCC database from the tower:

KACV-DT

KVII-DT

KVII(TV)

The radiofrequency field level ("RFF") contribution of the two NTSC stations will be calculated and totaled.

Station KVII(TV)

Channel 7 Freq: 174-180 MHz Range

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

ERP = 316 kW (Horizontal only)
R = 479.7 meters (antenna height above ground -2 meters)
F = 0.2 (assumed)

$S = <0.918\ FW/cm^2$

Therefore KVII(TV) contributes less than 0.918 FW/cm² at 2 meters above ground.

The limit for an uncontrolled environment (general population) for this frequency is 200 FW/cm².

KVII(TV) contributes less than 0.46% RFF level for an uncontrolled environment (general population) two meters above the ground.

Station KACV-DT

Channel 8 Freq: 180-186 MHz Range

$S = \frac{33.4 (F^2) ERP}{R^2}$ ERP = 5 kW (Horizontal only)
R = 479.7 meters (antenna height above ground -2 meters)
F = 0.2 (assumed)
S= <0.029 FW/cm²

Therefore, KACV-DT contributes less than 0.029 FW/cm² at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is 200 FW/cm².

KACV-DT contributes less than 0.015% RFF level for an uncontrolled environment (general population) two meters above the ground.

Station KVII-DT (operation based on current construction permit)[2]

It is understood that application to move this authorization to another site will be filed. Therefore this calculation is provided to demonstrate that it will not be a significant contribution.

Channel 23 Freq: 524-530 MHz Range

$S = \frac{33.4 (F^2) ER \quad ERP}{R^2}$ = 685 kW (Horizontal only)
R = 479.7 meters (antenna height above ground -2 meters)
F = 0.1 (assumed)
S= <0.955 FW/cm²

Therefore KVII-DT contributes less than 0.955 FW/cm² at 2 meters above ground.

The limit for an uncontrolled environment for this frequency is 351.33 FW/cm².

KVII-DT contributes less than 0.272% RFF level for an uncontrolled environment (general population) two meters above the ground.

[2]Provided for information only, as it is understood that KVII-DT will be making application for this DT operation at a different site.

Therefore the total RF percentage two meters above the ground at the highest RFF measurement point will still be less than 1% of the limit for an uncontrolled environment when three stations are operational. Based on this analysis, RFF levels will not exceed current FCC guidelines.

Radio Frequency Field Level

This section evaluates the radio frequency field ("RFF") exposure condition created by the operation of the proposed KACV-DT, the licensed KVII-TV operation, and construction permit KVII-DT. As previously indicated, there are no AM stations located within one km of the existing KACV-DT tower site. According to the FCC database, there are no other stations located within 500 meters. Access to the tower is prevented by a fence with a locked gate.

For NTSC, Channel 7, KVII-TV will use its existing GE, Type TY-53A. The antenna manufacturer's data indicates that the elevation pattern for the antenna shows a maximum relative field of less than 0.2 towards the ground in the vicinity of the tower. Using this relative field factor and the procedures prescribed in OET Bulletin No. 65, the maximum RFF resulting from the NTSC operation at two meters above the base of the tower is calculated to be less than 0.92 microwatts/cm.^{2} This is less than 0.46% of the 200 FW/cm^2 RFF exposure guideline for the general population.

For the KACV-DT Channel 8 operation proposes to diplex into the KVII-TV, GE, Type TY-53A antenna as described above. The elevation pattern for this antenna shows a maximum relative field of less than 0.2 towards the ground in the vicinity of the tower. Using this relative field factor and the procedures prescribed in OET Bulletin No. 65, the maximum

RFF resulting from the proposed operation is less than 0.03 uW/cm.^{2} This is less than 0.014 percent of the 200 uW/cm.^{2} MPE guideline for the general population.

For the DTV KVII-DT Channel 23 operation proposes to use a Dielectric, Model TFU-30DSC. The elevation pattern for this antenna shows a maximum relative field of less than 0.1 towards the ground in the vicinity of the tower. Using this relative field factor and the procedures prescribed in OET Bulletin No. 65, the maximum RFF resulting from the proposed operation is less than 0.955 uW/cm.^{2} This is less than 0.27% of the 351.33 uW/cm.^{2} MPE guideline for the general population.

The total contribution by the KVII-TV NTSC station and the proposed DTV operations at 2 meters above ground level is less than 0.747% of the current FCC guidelines for general population exposure. Authorized personnel and rigging contractors will be alerted to the potential zone of high radiation on the tower, and if necessary, the station will operate with reduced power or terminate the operation of the transmitter as appropriate when it is necessary for authorized personnel or contractors to perform work on the tower. Workers and the general public, therefore, will not be subjected to RFF levels in excess of the current FCC guidelines.

The proposed operation based upon the current OET Bulletin No. 65, Edition 97-01, dated August 1997 and Supplement A meets the provisions of the FCC RFF guidelines, and thus, complies with Section 1.1307 of the FCC Rules.

Section 1.1307

The proposed operation based upon the current OET Bulletin No.65, Edition 97-01 dated August 1997 and Supplement A meets the provisions of the FCC radio frequency field guidelines, and thus, complies with Section 1.1307 of the FCC Rules.

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

(a)(1) The existing facilities are not located in an officially designated wilderness area.

(a)(2) The existing facilities are not 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 existing facilities are not located near any known Indian religious sites.

(a)(6) The existing facilities are not located in a flood plain.

(a)(7) The use of an existing tower at an existing site will not involve a significant change in surface features of the ground in the vicinity of the tower.

(a)(8) No change in lighting is proposed.

(b) Workers and the general public will not be subjected to RF radiation levels in excess of FCC guidelines. Authorized personnel will be alerted

to areas of the tower where potential radiation levels are in excess of the FCC guidelines. A security fence with a locked gate deters unauthorized access to the tower site.

TABLE I
COMPUTED COVERAGE DATA
FOR THE PROPOSED DTV OPERATION OF
KACV-DT, AMARILLO, TEXAS
CHANNEL 8 5 KW 519 METERS
OCTOBER 2002

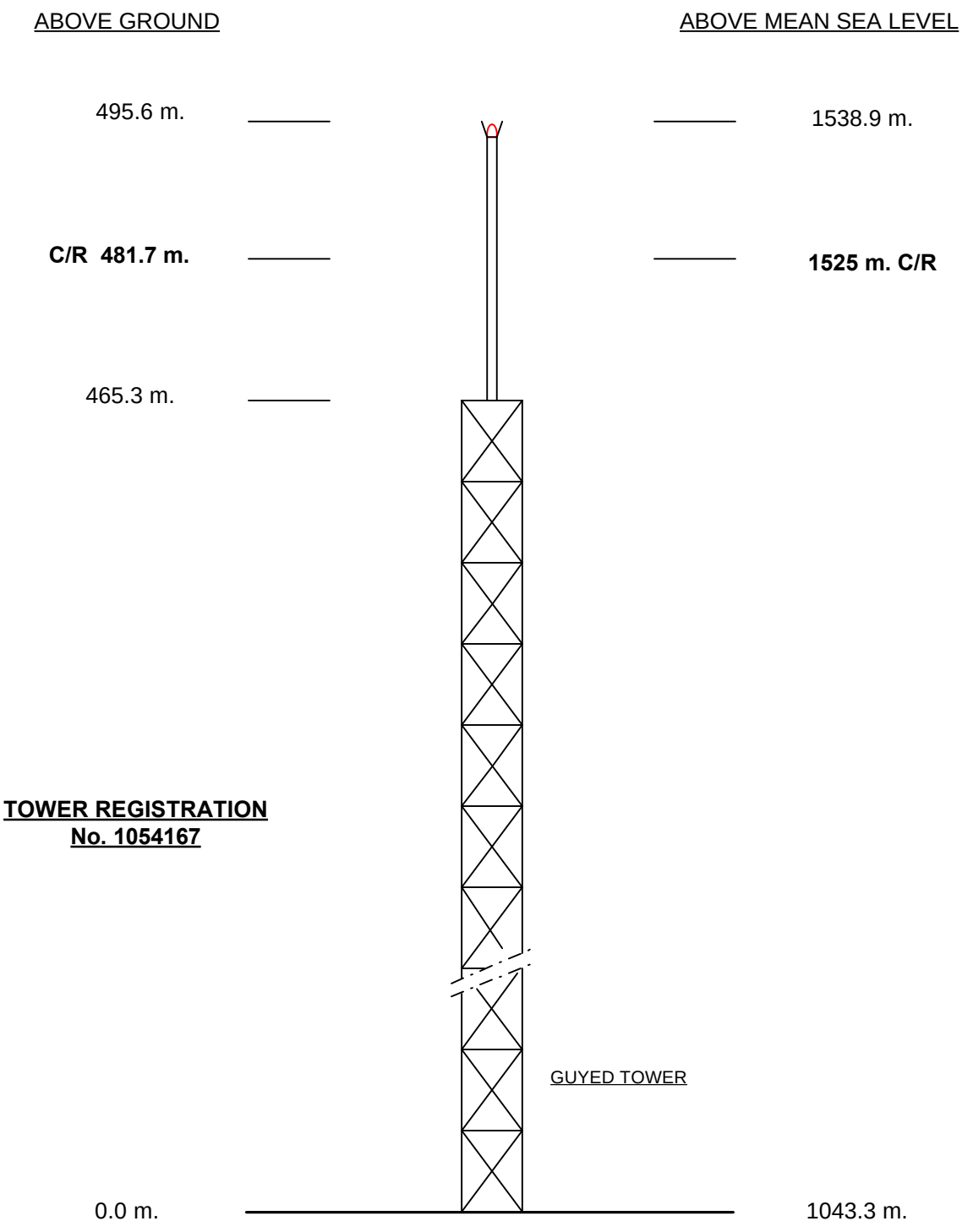
Radial Bearing N E E, T	Average* Elevation 3.2 to 16.1 km meters	Effective Height meters	Depression Angle	ERP at Radio Horizon kW	Distance to Contour F(50,90) 43 dBu Principal Community km	36 dBu Noise-Limited km
0	962.3	562.7	0.657	5.0	91.8	104.9
45	960.9	564.1	0.658	5.0	91.9	105.0
90	1026	499.0	0.619	5.0	88.0	100.8
135	1048.3	476.7	0.605	5.0	86.7	99.1
180	1057.6	467.4	0.599	5.0	86.1	98.4
225	1028	497.0	0.618	5.0	87.9	100.7
270	1006	519.0	0.631	5.0	89.2	102.3
315	958.5	566.5	0.659	5.0	92.0	105.1
Average	1006	519.0				

*Based on data from FCC 3-second data base

DTV Channel 8 (180-186 MHz)
Average Elevation 3.2 to 16.1 km 1006 meters AMSL
Center of Radiation 1525 meters AMSL
Antenna Height Above Average Terrain 519 meters
Effective Radiated Power 5 kW (6.99 dBk) Max.

North Latitude: 35E 22' 30"
West Longitude: 101E 52' 56"

NAD-27

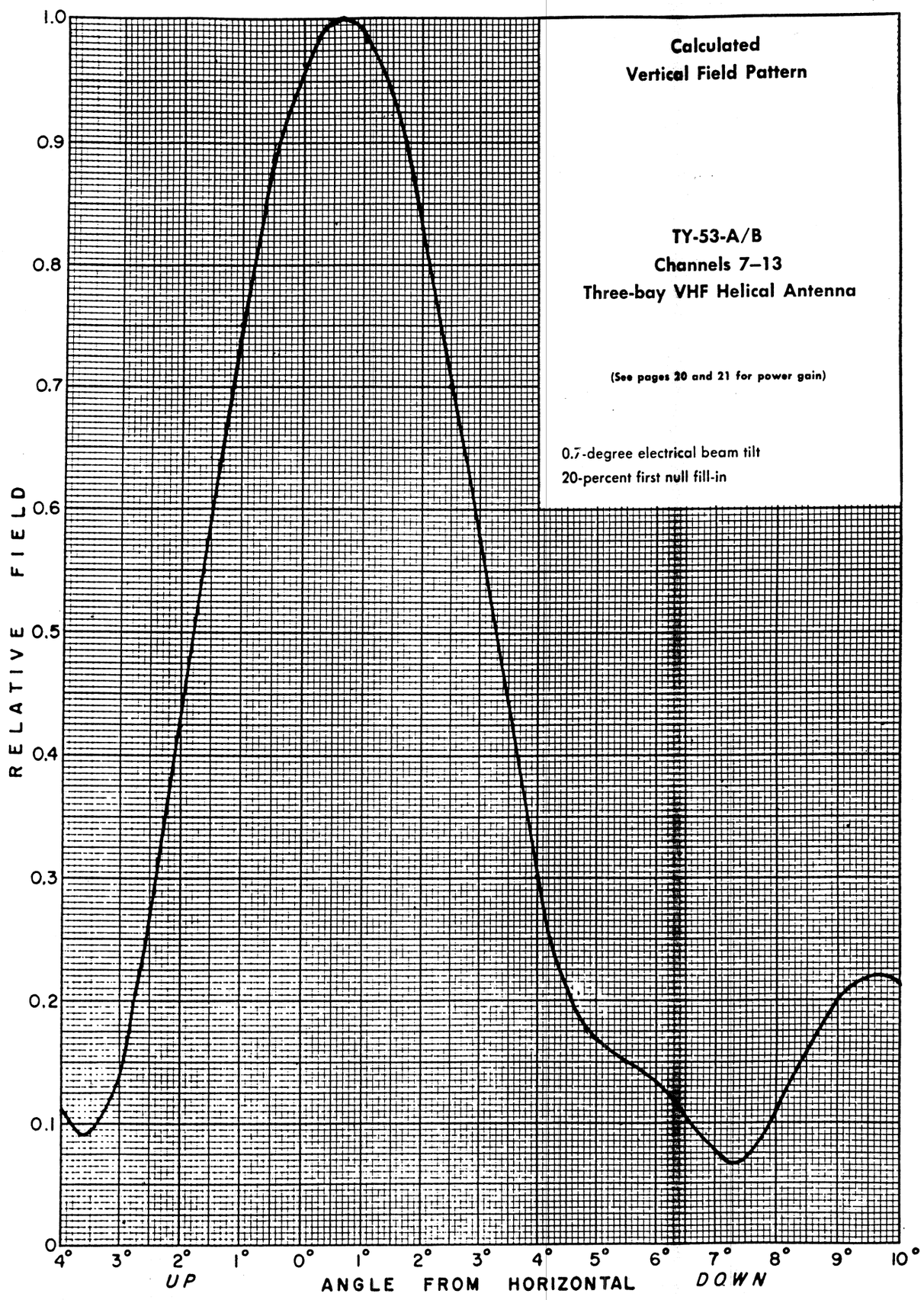


(NOT TO SCALE)

EXHIBIT E - 1
VERTICAL SKETCH
FOR THE PROPOSED DTV OPERATION OF
KACV-DT, AMARILLO, TEXAS
AUGUST 2002

COHEN, DIPPELL AND EVERIST, P.C. Consulting Engineers Washington, D.C.

EXHIBIT E-2


Calculated
Vertical Field Pattern
TY-53-A/B
Channels 7–13
Three-bay VHF Helical Antenna
(See pages 20 and 21 for power gain)
0.7-degree electrical beam tilt
20-percent first null fill-in
RELATIVE FIELD
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4° 3° 2° 1° 0° 1° 2° 3° 4° 5° 6° 7° 8° 9° 10°
UP
ANGLE FROM HORIZONTAL
DOWN

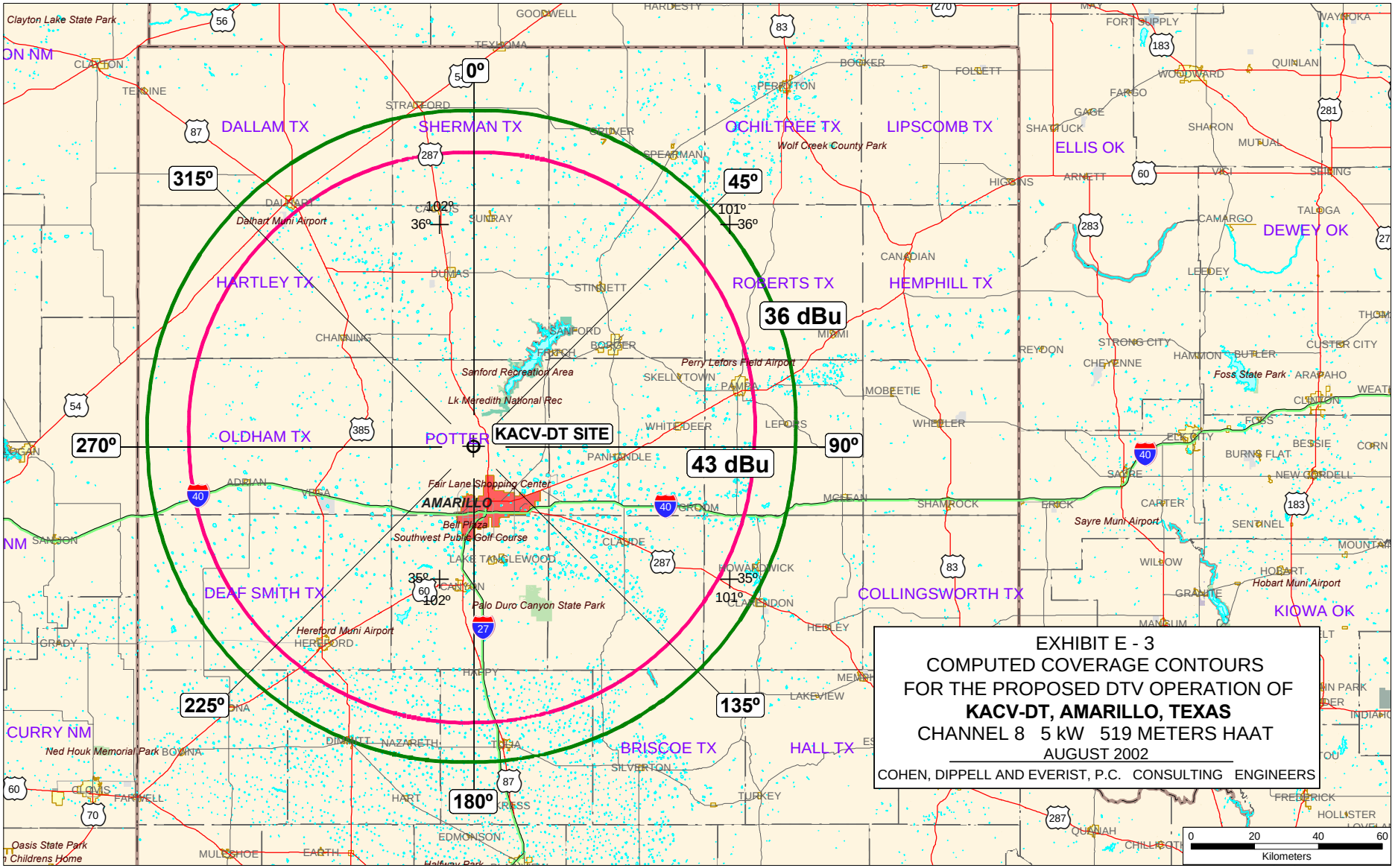


EXHIBIT E - 3
COMPUTED COVERAGE CONTOURS
FOR THE PROPOSED DTV OPERATION OF
KACV-DT, AMARILLO, TEXAS
CHANNEL 8 5 kW 519 METERS HAAT
AUGUST 2002
COHEN, DIPPELL AND EVERIST, P.C. CONSULTING ENGINEERS

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. [X] 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. [X] 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. [X] 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. [X] 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. [X] 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. [X] 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. [X] 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 **8** Analog TV, if any **2**

2. Zone: ☐ I ☒ II ☐ III

3. Antenna Location Coordinates: (NAD 27)

35 ° **22** ' **30** " ☒ N ☐ S Latitude

101 ° **52** ' **56** " ☐ E ☒ W Longitude

4. Antenna Structure Registration Number: **1054167**

☐ Not applicable ☒ FAA Notification Filed with FAA

5. Antenna Location Site Elevation Above Mean Sea Level: **1043.3** meters

6. Overall Tower Height Above Ground Level: **495.6** meters

7. Height of Radiation Center Above Ground Level: **481.7** meters

8. Height of Radiation Center Above Average Terrain: **519** meters

9. Maximum Effective Radiated Power (average power): **5.0** kW

10. Antenna Specifications:

a.

Manufacturer	Model
GE	**TY-53A**

b. Electrical Beam Tilt: **0.7** 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. Polorization: ☒ Horizontal ☐ Circular ☐ Elliptical

TECH BOX

e. Directional Antenna Relative Field Values: [X] 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. **E-2, etc.**

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.")

[X] 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. **E**

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.