

# ENGINEERING EXHIBIT

## Application for Digital Television Station Construction Permit

prepared for

**Ohio University**  
WOUC-DT Cambridge, Ohio

Facility ID 50141  
Ch. 35 310 kW 385 m

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FCC Form 340, Section VII

#### Exhibit 33

Statement A	Antenna Description - Allocation Considerations
Figure 1	Antenna Horizontal Plane Radiation Pattern
Figure 2, 2A	Antenna Vertical Plane (Elevation) Radiation Pattern
Figure 3	Proposed Coverage Contours
Figure 4	Coverage Contour Comparison

#### Exhibit 36

Statement B	Environmental Considerations
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*This material supplies a "hard copy" of the engineering portions of this application as entered November 1, 2004 for filing electronically. Since the FCC's electronic filing system may be accessed by anyone with the applicant's name and password, and electronic data may otherwise be altered in an unauthorized fashion, we cannot be responsible for changes made subsequent to our entry of this data and related attachments.*

**Section VII Preparer's Certification**

I certify that I have prepared Section VII (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 JOSEPH M. DAVIS, P.E.		Relationship to Applicant (e.g., Consulting Engineer) CONSULTING ENGINEER	
Signature		Date 11/1/2004	
Mailing Address CAVELL MERTZ & DAVIS, INC. 7839 ASHTON AVENUE			
City MANASSAS		State or Country (if foreign address) VA	Zip Code 20109-
Telephone Number (include area code) 7033929090		E-Mail Address (if available) JDAVIS@CMDCONSULTING.COM	

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).

<b>SECTION VII - DTV Engineering</b>	
<b>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.</b>	
<b>Certification Checklist:</b> 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. <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span> (b) It will operate from a transmitting antenna located within 5.0 km (3.1 miles) of the DTV reference site for this location as established in 47 C.F.R. Section 73.622. <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span> (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. <span style="float: right;"><input type="radio"/> Yes <input checked="" type="radio"/> No</span>
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. Applicant must <b>submit the Exhibit</b> called for in Item 13. <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>
3.	Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community. <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>
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. <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>
5.	The antenna structure to be used by this facility has been registered by the Commission and will not require registration 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. <span style="float: right;"><input checked="" type="radio"/> Yes <input type="radio"/> No</span>

**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.

<b>TECH BOX</b>

1.	Channel Number: DTV 35 Analog TV, if any 44																																																																																																																								
2.	Zone: <input checked="" type="radio"/> I <input type="radio"/> II <input type="radio"/> III																																																																																																																								
3.	Antenna Location Coordinates: (NAD 27)  Latitude: Degrees 40 Minutes 5 Seconds 32 <input checked="" type="radio"/> North <input type="radio"/> South  Longitude: Degrees 81 Minutes 17 Seconds 19 <input checked="" type="radio"/> West <input type="radio"/> East																																																																																																																								
4.	Antenna Structure Registration Number: 1008520 <input type="checkbox"/> Not Applicable <input type="checkbox"/> Notification filed with FAA																																																																																																																								
5.	Antenna Location Site Elevation Above Mean Sea Level: 341.3 meters																																																																																																																								
6.	Overall Tower Height Above Ground Level: 363.9 meters																																																																																																																								
7.	Height of Radiation Center Above Ground Level: 358 meters																																																																																																																								
8.	Height of Radiation Center Above Average Terrain (HAAT): 385.1 meters																																																																																																																								
9.	Maximum Effective Radiated Power (average power): 310 kW																																																																																																																								
10.	<p>Antenna Specifications:</p> <p>a. Manufacturer DIE Model TUF-C4SP-7/28HSP-1-T</p> <p>b. Electrical Beam Tilt: 0.5 degrees <input type="checkbox"/> Not Applicable</p> <p>c. Mechanical Beam Tilt: degrees toward azimuth degrees True <input checked="" type="checkbox"/> Not Applicable</p> <p>Attach as an Exhibit all data specified in 47 C.F.R. Section 73.685(c). <span style="float: right;">[Exhibit 32]</span></p> <p>d. Polarization: <input checked="" type="radio"/> Horizontal <input type="radio"/> Circular <input type="radio"/> Elliptical</p> <p>e. Directional Antenna Relative Field Values: <input type="checkbox"/> Not applicable (Nondirectional)</p> <p>[For a composite directional (not off-the-shelf) antenna, press the following button to fill in the relative field values subform.] [Relative Field Values]</p> <div style="text-align: center; padding: 10px;"> <p><b>10e. Directional Antenna Relative Field Values</b></p> <p>[Fill in this subform for a composite directional (not off-the-shelf) antenna, only.]</p> </div> <table border="1" style="width:100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td colspan="12">e. Directional Antenna Relative Field Values:</td> </tr> <tr> <td colspan="12">Rotation (Degrees): <input checked="" type="checkbox"/> No Rotation</td> </tr> <tr> <th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th><th>Degrees</th><th>Value</th> </tr> <tr> <td>0</td><td>0.902</td><td>10</td><td>0.887</td><td>20</td><td>0.78</td><td>30</td><td>0.617</td><td>40</td><td>0.47</td><td>50</td><td>0.411</td> </tr> <tr> <td>60</td><td>0.392</td><td>70</td><td>0.378</td><td>80</td><td>0.396</td><td>90</td><td>0.408</td><td>100</td><td>0.399</td><td>110</td><td>0.372</td> </tr> <tr> <td>120</td><td>0.382</td><td>130</td><td>0.394</td><td>140</td><td>0.414</td><td>150</td><td>0.524</td><td>160</td><td>0.722</td><td>170</td><td>0.881</td> </tr> <tr> <td>180</td><td>0.927</td><td>190</td><td>0.887</td><td>200</td><td>0.783</td><td>210</td><td>0.72</td><td>220</td><td>0.753</td><td>230</td><td>0.771</td> </tr> <tr> <td>240</td><td>0.749</td><td>250</td><td>0.806</td><td>260</td><td>0.94</td><td>270</td><td>0.999</td><td>280</td><td>0.967</td><td>290</td><td>0.853</td> </tr> <tr> <td>300</td><td>0.769</td><td>310</td><td>0.777</td><td>320</td><td>0.763</td><td>330</td><td>0.697</td><td>340</td><td>0.723</td><td>350</td><td>0.84</td> </tr> <tr> <td>Additional</td><td></td><td>2</td><td>0.906</td><td>182</td><td>0.929</td><td>227</td><td>0.775</td><td>272</td><td>1</td><td>314</td><td>0.78</td> </tr> </table>	e. Directional Antenna Relative Field Values:												Rotation (Degrees): <input checked="" type="checkbox"/> No Rotation												Degrees	Value	0	0.902	10	0.887	20	0.78	30	0.617	40	0.47	50	0.411	60	0.392	70	0.378	80	0.396	90	0.408	100	0.399	110	0.372	120	0.382	130	0.394	140	0.414	150	0.524	160	0.722	170	0.881	180	0.927	190	0.887	200	0.783	210	0.72	220	0.753	230	0.771	240	0.749	250	0.806	260	0.94	270	0.999	280	0.967	290	0.853	300	0.769	310	0.777	320	0.763	330	0.697	340	0.723	350	0.84	Additional		2	0.906	182	0.929	227	0.775	272	1	314	0.78										
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	Azimuths		
Relative Field Polar Plot			
If a directional antenna is proposed, the requirements of 47 C.F.R. Sections 73.625(c) must be satisfied. <b>Exhibit required.</b>			[Exhibit 33]
11.	Does the proposed facility satisfy the interference protection provisions of 47 C.F.R. Section 73.623(a)? (Applicable only if <b>Certification Checklist</b> items 1(a), (b), or (c) are answered "No".)	<input checked="" type="radio"/> Yes <input type="radio"/> No	
If "No", attach as an Exhibit justification therefor, including a summary of any related previously granted waivers.			[Exhibit 34]
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 <b>Certification Checklist</b> item 3 is answered "No".)		[Exhibit 35]
13.	<b>Environmental Protection Act. Submit in an Exhibit</b> the following: a. If <b>Certification Checklist</b> 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 <b>Certification Checklist</b> 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 <b>Certification Checklist</b> Item 2 is answered "No," an Environmental Assessment as required by 47 C.F.R Section 1.1311.		[Exhibit 36]
<b>PREPARERS CERTIFICATION ON PAGE 8 MUST BE COMPLETED AND SIGNED.</b>			

**Exhibits**

**Exhibit 33**

**Description:** EXHIBIT 33 - STATEMENT A - ALLOCATION

EXHIBIT 33 - STATEMENT A - ANTENNA DESCRIPTION - ALLOCATION CONSIDERATIONS

**Attachment 33**

Description
EXHIBIT 33 - STATEMENT A - ALLOCATION

**Exhibit 36**

**Description:** EXHIBIT 36 - STATEMENT B - ENVIRONMENTAL

EXHIBIT 36 - STATEMENT B - ENVIRONMENTAL CONSIDERATIONS

**Attachment 36**

Description
EXHIBIT 36 - STATEMENT B - ENVIRONMENTAL

Exhibit 36 - Statement B  
**ENVIRONMENTAL CONSIDERATIONS**

prepared for  
**Ohio University**  
WOUC-DT Cambridge, Ohio  
Facility ID 50141  
Ch. 35 310 kW 385 m

The instant proposal is not believed to have a significant environmental impact as defined under Section 1.1306 of the Commission's Rules. Consequently, preparation of an Environmental Assessment is not required.

**Nature of The Proposal**

*Ohio University* ("Ohio") herein proposed a minor change to WOUC-DT, Channel 35, Cambridge, Ohio. *Ohio* proposes use of a replacement antenna, due to the failure of the recently licensed facility (BLEDT-20040714ABH). The WOUC-DT facility will continue to employ the same transmitting location using an existing antenna supporting structure (FCC Registration number 1008520) currently authorized for WOUC-TV (analog Ch. 44) and WOUC-FM (Ch. 206B1, Cambridge, OH).

The use of existing transmitting locations has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC Rules. No change in overall structure height is proposed, thus no change in current structure marking and lighting requirements is anticipated. Therefore, it is believed that this application may be categorically excluded from environmental processing pursuant to §1.1306 of the Commission's rules.

**Human Exposure to Radiofrequency Electromagnetic Field**

The proposed operation was evaluated for human exposure to radiofrequency energy using the procedures outlined in the Commission's OET Bulletin No. 65 ("OET 65"). OET 65 describes a means of determining whether a proposed facility exceeds the radiofrequency exposure guidelines adopted in §1.1310. Under present Commission policy, a facility may be presumed to comply with the limits specified in §1.1310 if it satisfies the exposure criteria set forth in OET 65. Based upon that methodology, and as demonstrated in the following, the proposed transmitting system will comply with the cited adopted guidelines.

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**ENVIRONMENTAL CONSIDERATIONS**  
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The proposed WOUC-DT antenna will be situated such that its center of radiation is 358 meters above ground level. An effective radiated power (“ERP”) of 310 kilowatts, horizontally polarized, will be employed. According to elevation pattern data provided by the antenna manufacturer, the proposed WOUC-DT antenna will have a relative field of 25 percent or less from 10 to 90 degrees below the horizontal plane (i.e.: below the antenna). Thus, a value of 25 percent relative field is used for this calculation. The “uncontrolled/general population” limit specified in §1.1310 for Channel 35 (center frequency 599 MHz) is 399.3  $\mu\text{W}/\text{cm}^2$ .

OET-65’s formula for television transmitting antennas is based on the NTSC transmission standards, where the average power is normally much less than the peak power. For the DTV facility in the instant proposal, the peak-to-average ratio is different than the NTSC ratio. The DTV ERP figure herein refers to the *average* power level. The formula used for calculating DTV signal density in this analysis is essentially the same as equation (9) in OET-65.

$$S = (33.4098) (F^2) (ERP) / D^2$$

Where:

<i>S</i>	=	power density in microwatts/cm <sup>2</sup>
<i>ERP</i>	=	total (average) ERP in Watts
<i>F</i>	=	relative field factor
<i>D</i>	=	distance in meters

Using this formula, the proposed facility would contribute a power density of 5.1  $\mu\text{W}/\text{cm}^2$  at two meters above ground level near antenna support structure, or 1.3 percent of the general population/uncontrolled limit. At ground level locations away from the base of the tower, the calculated RF power density is even lower, due to the increasing distance from the transmitting antenna.

§1.1307(b)(3) states that facilities contributing less than five percent of the exposure limit at locations with multiple transmitters are categorically excluded from responsibility for taking any corrective action in the areas where their contribution is less than five percent. Since the instant

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**ENVIRONMENTAL CONSIDERATIONS**  
(page 3 of 3)

situation meets the five percent exclusion test at all ground level areas, the impact of any other facilities near this site may be considered independently from this proposal. Accordingly, it is believed that the impact of the proposed operation should not be considered to be a factor at or near ground level as defined under §1.1307(b).

**Safety of Tower Workers and the General Public**

As demonstrated herein, excessive levels of RF energy attributable to the proposal will not be caused at publicly accessible areas at ground level near the antenna supporting structure. Consequently, members of the general public will not be exposed to RF levels in excess of the Commission's guidelines. Nevertheless, tower access will be restricted and controlled through the use of a locked fence. Additionally, appropriate RF exposure warning signs will be posted.

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure would not occur in areas at ground level. A site exposure policy will be employed protecting maintenance workers from excessive exposure when work must be performed on the tower in areas where high RF levels may be present. Such protective measures may include, but will not be limited to, restriction of access to areas where levels in excess of the guidelines may be expected, power reduction, or the complete shutdown of facilities when work or inspections must be performed in areas where the exposure guidelines will be exceeded. On-site RF exposure measurements may also be undertaken to establish the bounds of safe working areas. The applicant will coordinate exposure procedures with all pertinent stations.

**Conclusion**

Based on the preceding, it is believed that the instant proposal may be categorically excluded from environmental processing under Section 1.1306 of the Rules, hence preparation of an Environmental Assessment is not required.