

# **ENGINEERING EXHIBIT**

## **Application for Modification of Digital Television Station Construction Permit**

prepared for

### **West Central Minnesota Educational TV**

KWCM-DT Appleton, Minnesota

Facility ID 71549

Ch. 31 288 kW 364 m

### **Table of Contents**

FCC Form 340, Section VII-D - DTV Engineering

#### **Exhibit 33**

Statement A	Nature of the Proposal, Allocation Considerations
Figure 1	Antenna Horizontal Plane Radiation Pattern
Figure 2	Antenna Vertical (Elevation) Plane 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 April 20, 2006 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 ROBERT J. CLINTON		Relationship to Applicant (e.g., Consulting Engineer) CONSULTANT	
Signature		Date 4/20/2006	
Mailing Address CAVELL, MERTZ & DAVIS, INC. 7839 ASHTON AVENUE			
City MANASSAS	State or Country (if foreign address) VA		Zip Code 20109-2883
Telephone Number (include area code) 7033929090		E-Mail Address (if available) BCLINTON@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.	<p>The proposed DTV facility complies with 47 C.F.R. Section 73.622 in the following respects:</p> <p>(a) It will operate on the DTV channel for this station as established in 47 C.F.R. Section 73.622. <input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>(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. <input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>(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. <input checked="" type="radio"/> Yes <input type="radio"/> No</p>
2.	<p>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. <input checked="" type="radio"/> Yes <input type="radio"/> No</p> <p>Applicant must <b>submit the Exhibit</b> called for in Item 13.</p>
3.	<p>Pursuant to 47 C.F.R. Section 73.625, the DTV coverage contour of the proposed facility will encompass the allotted principal community. <input checked="" type="radio"/> Yes <input type="radio"/> No</p>
4.	<p>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. <input checked="" type="radio"/> Yes <input type="radio"/> No</p>
5.	<p>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. <input checked="" type="radio"/> Yes <input type="radio"/> No</p>

**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 31 Analog TV, if any 10
2.	Zone: <input type="radio"/> I <input checked="" type="radio"/> II <input type="radio"/> III
3.	Antenna Location Coordinates: (NAD 27)  Latitude: Degrees 45 Minutes 10 Seconds 3 <input checked="" type="radio"/> North <input type="radio"/> South  Longitude: Degrees 96 Minutes 0 Seconds 2 <input checked="" type="radio"/> West <input type="radio"/> East
4.	Antenna Structure Registration Number: 1031878 <input type="checkbox"/> Not Applicable <input type="checkbox"/> Notification filed with FAA
5.	Antenna Location Site Elevation Above Mean Sea Level: 315.5 meters
6.	Overall Tower Height Above Ground Level: 391 meters
7.	Height of Radiation Center Above Ground Level: 357.5 meters
8.	Height of Radiation Center Above Average Terrain (HAAT): 364.3 meters
9.	Maximum Effective Radiated Power (average power): 288 kW
10.	<p>Antenna Specifications:</p> <p>a. Manufacturer DIE Model TFU-28DSC C170</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 Attach as an Exhibit all data specified in 47 C.F.R. Section 73.685(c). [Exhibit 32]</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> <p style="text-align: center;"><b>10e. Directional Antenna Relative Field Values</b></p>

[Fill in this subform for a composite directional (not off-the-shelf) antenna, only.]

e. Directional Antenna Relative Field Values:

Rotation (Degrees): 0 ☒ No Rotation

Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value	Degrees	Value
0	0.94	10	0.987	20	1	30	0.988	40	0.963	50	0.936
60	0.917	70	0.905	80	0.9	90	0.899	100	0.9	110	0.905
120	0.917	130	0.936	140	0.963	150	0.988	160	1	170	0.987
180	0.94	190	0.854	200	0.733	210	0.588	220	0.437	230	0.302
240	0.218	250	0.207	260	0.232	270	0.245	280	0.232	290	0.207
300	0.218	310	0.302	320	0.437	330	0.588	340	0.733	350	0.854
Additional Azimuths		19	1	161	1						

Relative Field Polar Plot

If a directional antenna is proposed, the requirements of 47 C.F.R. Sections 73.625(c) must be satisfied. **Exhibit required.** [Exhibit 33]

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 [Exhibit 34]

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

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 35]

13. **Environmental Protection Act. Submit in an Exhibit** the following: [Exhibit 36]  
 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.

**PREPARERS CERTIFICATION ON PAGE 8 MUST BE COMPLETED AND SIGNED.**

## Exhibits

### Exhibit 33

**Description:** EXHIBIT 33 - STATEMENT A

EXHIBIT 33 - STATEMENT A - ANTENNA DESCRIPTION, ALLOCATION CONSIDERATIONS

### Attachment 33

Description
EXHIBIT 33 - STATEMENT A

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

EXHIBIT 36 - STATEMENT B - ENVIRONMENTAL CONSIDERATIONS

**Attachment 36**

Description
EXHIBIT 36 - STATEMENT B

Exhibit 36 - Statement B  
**ENVIRONMENTAL CONSIDERATIONS**  
prepared for  
**West Central Minnesota Educational TV**  
KWCM-DT Appleton, Minnesota  
Facility ID 71549  
Ch. 31 288 kW 364 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**

*West Central Minnesota Educational TV* ("WCMET") is the permittee of KWCM-DT, Channel 31, Appleton, Minnesota and licensee of the paired analog KWCM-TV Channel 10 facility. KWCM-DT is authorized to operate with an effective radiated power ("ERP") of 1000 kW and an antenna height above average terrain ("HAAT") of 364 meters. Under the instant application, *WCMET* seeks to modify the KWCM-DT CP to specify a reduction in ERP to 288 kW.

The proposed KWCM-DT facility will utilize the authorized side-mounted antenna on the existing KWCM-DT antenna support structure. 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 Commission's Rules. No increase in overall structure height is proposed, thus no change in structure lighting or marking is anticipated. Thus, 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 (RF) energy using the procedures outlined in the Commission's OET Bulletin No. 65 ("OET 65"). The Channel 31 DTV antenna is situated such that its center of radiation is 357.5 meters above ground. An ERP of 288 kilowatts, horizontally polarized, will be employed. According to elevation pattern data provided by the antenna manufacturer, the KWCM-DT Channel 31

Exhibit 36 - Statement B  
**ENVIRONMENTAL CONSIDERATIONS**  
(page 2 of 3)

antenna has a relative field of less than 10 percent from 15 to 90 degrees below the horizontal plane (i.e., below the antenna). Thus, a value of 10 percent relative field is used for this calculation. The “uncontrolled/general population” limit specified in §1.1310 for Channel 31 (center frequency 575 MHz) is 383.3  $\mu\text{W}/\text{cm}^2$ .

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 DTV facilities, 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 0.8  $\mu\text{W}/\text{cm}^2$  at two meters above ground level near antenna support structure, or 0.2 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 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).

Exhibit 36 - Statement B  
**ENVIRONMENTAL CONSIDERATIONS**  
(page 3 of 3)

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

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

With respect to worker safety, it is believed that based on the preceding analysis, excessive exposure does not occur in areas at ground level. A site exposure policy will continue to 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 any 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.