

ENGINEERING EXHIBIT

Modification of a Construction Permit for LPTV K49FA-D (K08QE-D)

prepared for

West Central Minnesota Educational Television Company
Fergus Falls, Minnesota
Facility ID 71562
Ch. 8 (Digital) 3 kW

Table of Contents

FCC Form 2100, Schedule C – Engineering Data (Digital)

Statement A	Comprehensive Engineering Statement
Attachment	TV_Study Interference Report

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Statement A
COMPREHENSIVE ENGINEERING STATEMENT
prepared for
West Central Minnesota Educational Television Company
Fergus Falls, Minnesota
Facility ID 71562
Ch. 8 (Digital) 3 kW

West Central Minnesota Educational Television Company (“*Central Minnesota*”) is the licensee of low power television station K49FA-D, Channel 49, Fergus Falls, MN, Facility ID 71562 (LMS File No. BLDTT-20111109AEH). K49FA-D is displaced by full service and Class A Low Power television stations as a result of the TV Band Repack. Under the provisions of the FCC’s Special Displacement Filing Window for low power television stations and television translators that are out of core, *Pioneer* requests a displacement channel change to Channel 8.

Nature of the Proposal

The proposed antenna system for the K49FA-D (K08QE-D) operation is an omnidirectional Scala model 3VTV184 omnidirectional superturnstyle which will be side-mounted on the current licensed tower with ASR number 1058524 at 144.3 meters AGL.

The proposed digital facility will operate on Channel 8 using a “full service” out of channel emission mask, a maximum effective radiated power of 3 kW, and an antenna height of 613 meters AMSL.

Allocation Considerations

The instant proposal complies with the Commission’s interference protection requirements toward all DTV, television translator, LPTV, and Class A stations. A detailed interference study was conducted in accordance with the terrain dependent Longley-Rice point-to-point propagation model, per the Commission’s Office of Engineering and Technology Bulletin No. 69, *Longley-Rice Methodology for Evaluating TV Coverage and Interference*, February 6, 2004 (“OET-69”)¹. The interference study examined the change in interference as experienced by nearby pertinent stations that would result from the proposed facility.

¹ The implementation of OET-69 for this study (*TV Study*) followed the guidelines of OET-69 as specified therein. **A cell size of 0.5 km and a terrain increment of 0.1 km were employed.** Comparisons of various results of this computer program (run on a Sun processor) to the Commission’s implementation of OET-69 show excellent correlation.

Exhibit 13 - Statement A
COMPREHENSIVE ENGINEERING STATEMENT
(Page 2 of 5)

The results of this study shows that any new interference does not exceed the Commission's interference limits (0.5 percent to full service and Class A stations, and 2.0 percent to secondary stations). Accordingly, the instant proposal complies with §74.793 regarding interference protection to analog and digital television, low power television, television translator, and Class A television facilities. The results of this study are shown at the end of this document.

International Coordination

The proposed transmitter site is located 271.1 km from the closest point on the U.S.-Canadian border and 1862 km from the U.S. – Mexico border. The proposal's 21 dB μ worst-case contour does not cross the Canadian border. Therefore, International coordination is not required.

Other Allocation Considerations

The nearest FCC monitoring station is at Grand Island, NE at a distance of 647 km from the proposed site. The proposed site is also located outside the areas specified in §73.1030(a)(1) and §73.1030(b). Thus, notification of the instant proposal to the National Radio Astronomy Observatory at Green Bank, West Virginia, or the Table Mountain Radio Receiving Zone in Boulder County, Colorado is not required. There are no AM broadcast stations located within 3.2 km (2 miles) of the proposed site according to information extracted from the Commission's engineering database.

Environmental Considerations

The instant proposal is not believed to have a significant environmental impact as defined under §1.1306 of the Commission's Rules. Consequently, preparation of an Environmental Assessment is not required. *Central Minnesota* herein proposes to construct the proposed facility on an existing tower with ASR Number 1058524.

The use of existing antenna support structures has been characterized as being environmentally preferable by the Commission, according to Note 1 of §1.1306 of the FCC

Exhibit 13 - Statement A
COMPREHENSIVE ENGINEERING STATEMENT
(Page 3 of 5)

Rules. No change in 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 electromagnetic field using the procedures outlined in the Commission's OET Bulletin 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.

The K49FA-D Channel 8 antenna center of radiation will be 136.9 meters above ground level. An effective radiated power of 3 kilowatts, horizontally polarized, will be employed utilizing an ERI model ATW16V2-HSO-8 omni-directional antenna. A "worst-case" relative field value of 50 percent (from 10° to 90° below the horizontal) is assumed for purposes of the calculation. The "uncontrolled/general population" limit specified in §1.1310 for Channel 8 (center frequency 183 MHz) is 200 $\mu\text{W}/\text{cm}^2$.

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 (10) in OET-65.

Exhibit 13 - Statement A
COMPREHENSIVE ENGINEERING STATEMENT
(Page 4 of 5)

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

Where:

- S = power density in microwatts/cm²
- ERP = total (average) ERP in Watts
- F = relative field factor
- D = distance in meters

Using this formula and the above assumptions, the proposed facility would contribute a power density of 1.4 μ W/cm² at two meters above ground level near the antenna support structure, or 0.7 percent of the general population/uncontrolled limit.

§1.1307(b)(3) states that facilities at locations with multiple emitters are categorically excluded from responsibility for taking any corrective action in the areas where their contribution is less than five percent of the pertinent MPE limit. 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 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 or near the base of 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, site access will continue to be restricted and controlled through the use of a locked fence. Additionally, appropriate RF exposure warning signs are currently 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 or at the base of the top mounted tower structure. A site exposure policy will be employed protecting maintenance workers from excessive exposure when work must be performed on the tower or in areas where high RF levels may be present. Such protective measures may include, but will not be limited to, restriction of

Exhibit 13 - Statement A
COMPREHENSIVE ENGINEERING STATEMENT
(Page 5 of 5)

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 would otherwise 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 complies with all Commission Rules and policies.