



## ENGINEERING STATEMENT

**In support of a request for**

**Modification to a Construction Permit**

**For Digital Channel 25**

**KOZJ-DT Joplin, MO**

**55 kW ERP 281 m HAAT**

### PURPOSE

MARSAND, INC. has been retained by Board of Governors, Missouri State University (KOZJ), Permittee of KOZJ-DT, CH25D of Joplin, MO, to prepare this Engineering Statement in support of a Modification to a Construction Permit (CP). The Federal Communications Commission (Commission) granted a CP (BPEDT-20000414AAZ) to KOZJ for an ERP of 200 kW and 279.5 m HAAT using a directional antenna. Subsequently, an application for STA was filed and accepted (BDSTA-20031016ACN) establishing digital service using a non-directional antenna at 55 kW ERP and 284 m HAAT. It is proposed herein to modify the existing CP to reflect the changes authorized under the existing STA with a slight correction to the HAAT.

### DISCUSSION

The original CP was filed to co-locate the digital service with the paired analog CH26- utilizing a new directional antenna and increased ERP. Due to tower loading considerations and the associated financial burdens, initial digital service was established under the STA mentioned above at 55 kW ERP into the same antenna as the paired analog CH26-. This application for modification to CP seeks to establish the facilities authorized under the STA as the permanent digital service for KOZJ.

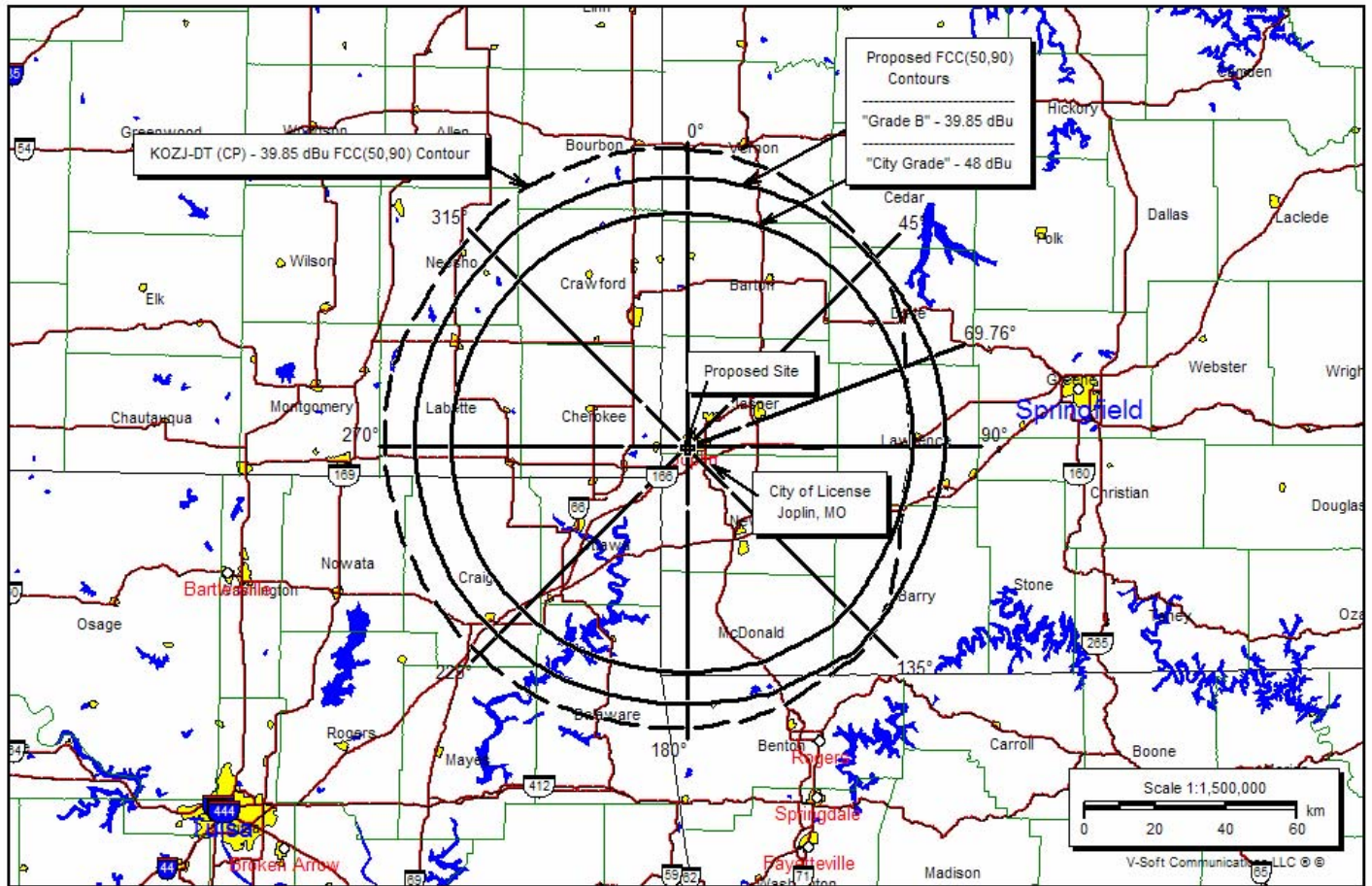
**Figure 1**, below, shows a comparison of the FCC(50, 90) "Grade B" 39.85 dBu contours for both the existing CP and the proposed. The "Grade B" contour encompasses 17,419 sq.

km and 385,387 total population (2000 US Census). No additional interference to others is anticipated beyond what has already been authorized.

## **CONCLUSION**

It is respectfully requested that the Commission grant the CP for the proposed facility as indicated in the accompanying application.

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**Figure 1**

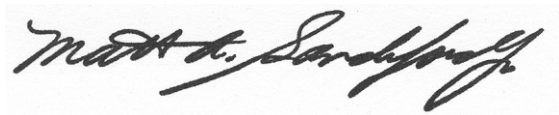
**DECLARATION**

Matthew A. Sanderford, Jr., P.E., declares and states that he is a graduate Electrical Engineer with a Bachelor of Science Degree in Electrical Engineering from the University of Texas at El Paso, a Licensed Professional Engineer in the State of Texas, and his qualifications are known to the Federal Communications Commission, and that he is President of MARSAND, INC., a Registered Professional Engineering firm in the State of Texas, and that firm has been retained by KOZJ, to perform the engineering support as contained in this report.

All facts contained herein are true of his own knowledge except where stated to be on information or belief provided by KOZJ, and as to those facts, he believes them to be true.

\_\_\_\_\_

I declare under penalty of perjury that the foregoing is true and correct.



\_\_\_\_\_  
Matthew A. Sanderford, Jr., P.E.  
President - MARSAND, INC.

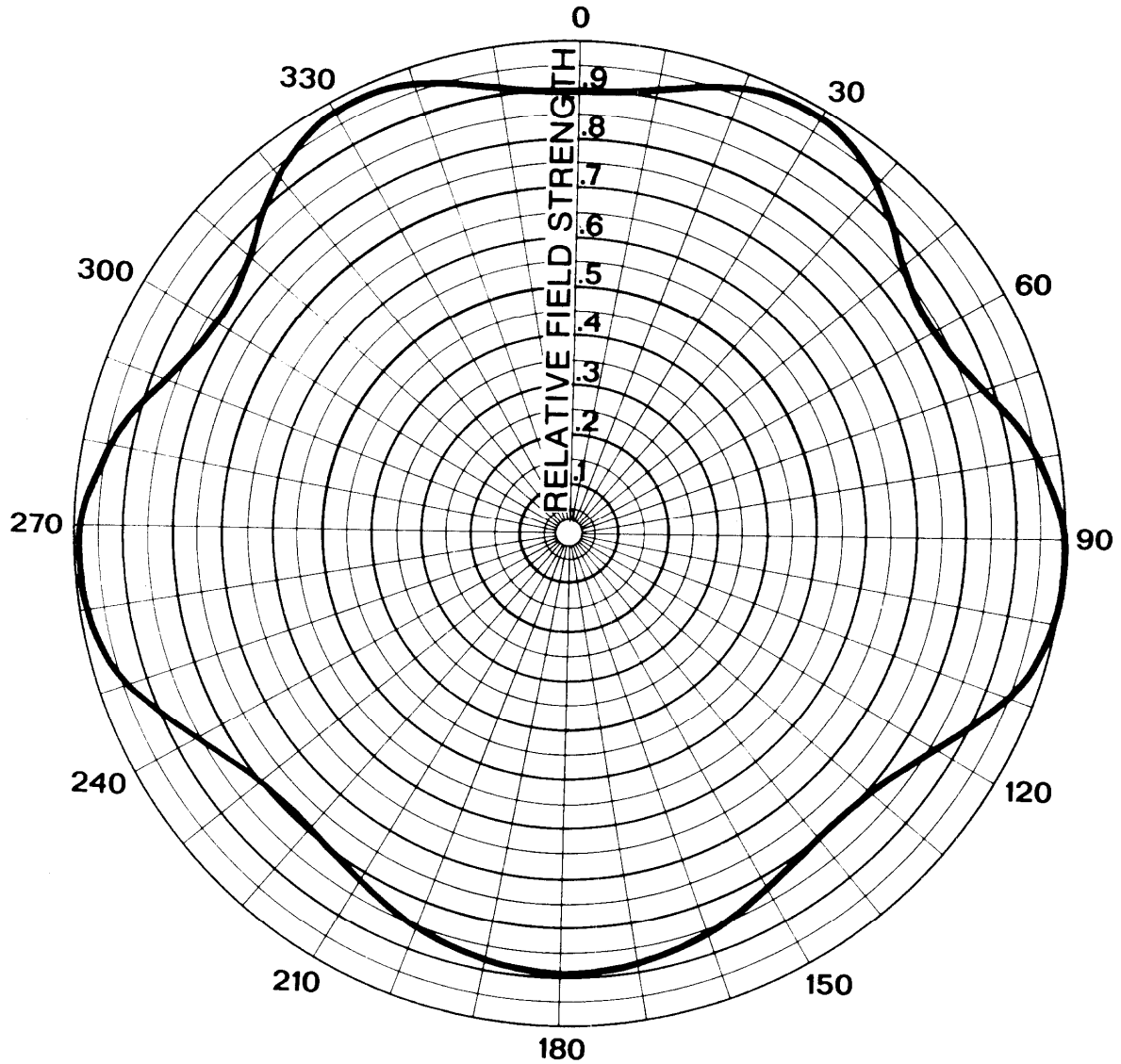
Executed this 28<sup>th</sup> day of February, 2006  
State of Texas

**Appendix**

**BOGNER  
ANTENNAS**

**HORIZONTAL  
PLANE  
PATTERN**

**PATTERN O - 360° COVERAGE  
LOW AND MEDIUM POWER  
ANTENNAS - CATALOG 301**



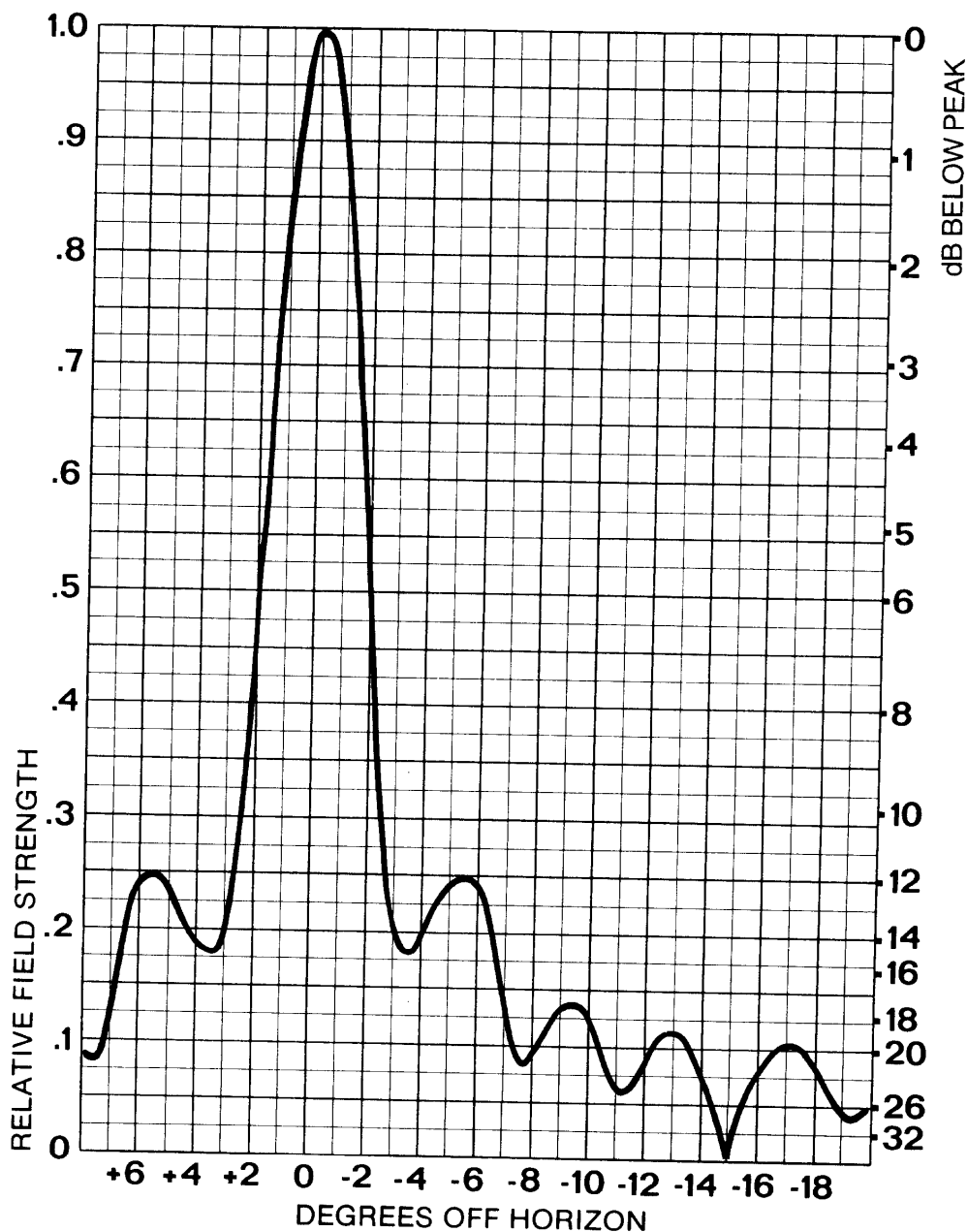
**Bogner Broadcast Equipment Corp.**  
401 Railroad Avenue, Westbury, N.Y. 11590  
Tel: (516) 997-7800

**Manufacturer's Antenna Horizontal Pattern**

**BOGNER**  
ANTENNAS

**VERTICAL  
PLANE  
PATTERN**

16 BAY (B16U, B16S)  
LOW AND MEDIUM POWER  
ANTENNAS - CATALOG 301



**Bogner Broadcast Equipment Corp.**  
401 Railroad Avenue, Westbury, N.Y. 11590  
Tel: (516) 997-7800

**Manufacturer's Antenna Vertical Pattern**

## EFFECTIVE RADIATED POWER CALCULATIONS

Call letters:	<b>KOZJ-DT</b>	Date:	<b>3/1/2006</b>
Location:	<b>Joplin, MO</b>		
Channel:	<b>25</b>		
Frequency:	<b>539 MHz Mid-Band</b>		
Antenna:	<b>Bogner BU16OM</b>		

Transmitter Power Output (TPO):	<b>5.100 kW avg.</b>	<b>7.08 dBk</b>
Filter Type:	Loss:	<b>dB</b>
Transmission Line:		
Loss per 100 ft.:	<b>-0.319 dB</b>	
Line Length:	<b>993 ft.</b>	
Total Line Loss:	<b>-3.168 dB</b>	<b>-3.17 dB</b>

Antenna Input Power:	<b>2.46 kW</b>	<b>3.91 dBk</b>
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Efficiency: **48.2206 %**

Elevation Antenna Gain -

*Horizontal -*

Vert. Polarization -	Gain	<b>dB</b>
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Hor. Polarization -	1.00 Gain	<b>0.00 dB</b>
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Maximum -

Vert. Polarization -	Gain	<b>dB</b>
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Hor. Polarization -	1.00 Gain	<b>0.00 dB</b>
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Azimuthal Antenna Gain -

Vert. Polarization -	Gain	<b>dB</b>
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Hor. Polarization -	22.39 Gain	<b>13.50 dB</b>
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**Horizontal ERP -**

Vertical Polarization:	<b>kW</b>	<b>dBk</b>
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Horizontal Polarization:	<b>55.06 kW</b>	<b>17.41 dBk</b>
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**Maximum ERP -**

Vertical Polarization:	<b>kW</b>	<b>dBk</b>
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Horizontal Polarization:	<b>55.06 kW</b>	<b>17.41 dBk</b>
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Call Letters: KOZJ-DT (Proposed)  
 Latitude: 37-04-37 N  
 Longitude: 094-32-15 W  
 ERP: 55.00 kW  
 Channel: 25  
 Frequency: 539.0 MHz  
 AMSL Height: 577.5 m  
 Elevation: 318.5 m  
 HAAT: 280.72 m  
 Horiz. Antenna Pattern: Omni  
 Vert. Elevation Pattern: Yes  
 Electrical Beam Tilt: 0.0

Type of contour: FCC  
 Location Variability: 50.0 %  
 Time Variability: 90.0 %  
 # of Radials Calculated: 360  
 Field Strength: 39.85 dBuV/m

Primary Terrain: V-Soft 3 Second US Terrain

Bearing (deg)	Distance (km)	HAAT (m)
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0.0	75.6	294.0
10.0	75.2	289.2
20.0	75.2	289.0
30.0	75.1	288.3
40.0	74.6	283.0
50.0	74.0	275.8
60.0	73.5	269.8
70.0	73.2	266.6
70.0	73.2	266.6
80.0	72.9	263.3
90.0	72.6	259.0
100.0	71.8	248.2
110.0	71.5	244.5
120.0	71.8	247.9
130.0	72.9	263.5
140.0	74.3	279.9
150.0	72.9	263.1
160.0	73.1	265.8
170.0	72.4	256.4
180.0	72.1	253.1
190.0	72.3	254.7
200.0	73.0	264.8
210.0	74.0	275.6
220.0	74.5	281.7
230.0	75.1	288.4
240.0	75.7	294.7
250.0	75.9	296.8
260.0	75.8	296.0
270.0	76.3	301.2
280.0	76.7	304.9
290.0	76.7	305.6
300.0	76.5	303.2
310.0	76.7	305.5
320.0	77.2	310.5
330.0	76.9	307.0
340.0	76.5	302.8
350.0	76.2	299.9

**Distance to Contour Report – 39.85 dBu FCC(50/90)**

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 Latitude: 37-04-37 N  
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 Channel: 25  
 Frequency: 539.0 MHz  
 AMSL Height: 577.5 m  
 Elevation: 318.5 m  
 HAAT: 280.72 m  
 Horiz. Antenna Pattern: Omni  
 Vert. Elevation Pattern: Yes  
 Electrical Beam Tilt: 0.0

Type of contour: FCC  
 Location Variability: 50.0 %  
 Time Variability: 90.0 %  
 # of Radials Calculated: 360  
 Field Strength: 48.00 dBuV/m

Primary Terrain: V-Soft 3 Second US Terrain

Bearing (deg)	Distance (km)	HAAT (m)
-----	-----	-----
0.0	65.6	294.0
10.0	65.3	289.2
20.0	65.3	289.0
30.0	65.3	288.3
40.0	65.0	283.0
50.0	64.5	275.8
60.0	64.2	269.8
70.0	64.0	266.6
80.0	63.8	263.3
90.0	63.5	259.0
100.0	62.9	248.2
110.0	62.7	244.5
120.0	62.9	247.9
130.0	63.8	263.5
140.0	64.8	279.9
150.0	63.8	263.1
160.0	63.9	265.8
170.0	63.4	256.4
180.0	63.2	253.1
190.0	63.3	254.7
200.0	63.9	264.8
210.0	64.5	275.6
220.0	64.9	281.7
230.0	65.3	288.4
240.0	65.6	294.7
250.0	65.8	296.8
260.0	65.7	296.0
270.0	66.0	301.2
280.0	66.3	304.9
290.0	66.3	305.6
300.0	66.2	303.2
310.0	66.3	305.5
320.0	66.6	310.5
330.0	66.4	307.0
340.0	66.1	302.8
350.0	66.0	299.9

**Distance to Contour Report – 48 dBu FCC(50/90)**