EXHIBIT E

ENGINEERING STATEMENT RE
APPLICATION FOR AUXILIARY OPERATION
ON BEHALF OF
RED ROCK RADIO CORP.
WWAX(FM), HERMANTOWN, MINNESOTA
CHANNEL 221C3, 0.987 KW ERP, 113 METERS HAAT

MAY 2004

COHEN, DIPPELL AND EVERIST, P.C.
CONSULTING ENGINEERS
RADIO AND TELEVISION
WASHINGTON, D.C.

COHEN, DIPPELL AND EVERIST, P. C.

City of Washington)
) ss
District of Columbia)

Donald G. Everist, being duly sworn upon his oath, deposes and states that:

He is a graduate electrical engineer, a Registered Professional Engineer in the District of Columbia, and is President, Secretary and Treasurer of Cohen, Dippell and Everist, P.C., Consulting Engineers, Radio - Television, with offices at 1300 L Street, N.W., Suite 1100, Washington, D.C. 20005;

That his qualifications are a matter of record in the Federal Communications Commission;

That the attached engineering report was prepared by him or under his supervision and direction and

That the facts stated herein are true of his own knowledge, except such facts as are stated to be on information and belief, and as to such facts he believes them to be true.

Donald G. Everist
District of Columbia
Professional Engineer
Registration No. 5714

Subscribed and sworn to before me this 27th day of May, 2004.

Notary Public

My Commission Expires: 2/28/2008

Introduction

This engineering statement has been prepared on behalf of Red Rock Radio Corp. ("Red Rock"), licensee of WWAX(FM). The purpose of this engineering statement is to request an authorization to construct an auxiliary operation for WWAX(FM). Red Rock proposes to locate the auxiliary antenna on the current tower from which WWAX(FM), Hermantown, Minnesota operates.

Red Rock is currently authorized to operate Station WWAX(FM) on Channel 221C3 with a maximum effective radiated power (ERP) of 5.4 kW (circular polarization) at an antenna height above average terrain ("HAAT") of 215 meters. The licensee proposes constructing FM auxiliary facilities with a maximum ERP of 0.987 kW (circular polarization) at an HAAT of 113 meters per Section 73.1675 of the FCC Rules.

WWAX(FM) Tower

The new auxiliary FM antenna will be side-mounted on an existing tower with an overall structure height above ground of 153.3 meters. No change in the tower height is proposed in this application, therefore, FAA airspace approval is not required. The tower registration number is 1023509.

The geographic coordinates of the tower are:

North Latitude: 46° 47' 41"

West Longitude: 92° 07' 05"

(NAD 27)

A tower sketch is provided as Exhibit E-1.

Equipment Data

Antenna: The applicant is proposing to install a Jampro JLCP-2 2-bay antenna. See Exhibit E-2.

Transmission Line: 42.7 meters (140ft) of Andrew, Type LDF50, 1-5/8" 50 ohm, or equivalent.

Power Data

Transmitter Output Power	1.1 kW	(0.41 dBk)
Transmission Line efficiency/loss	94.02%	(0.27 dB)
Antenna Input	1.03 kW	(0.14 dBk)
Antenna Gain	0.955	(-0.20 dB)
Maximum Effective Radiated Power	0.987 kW	(-0.06 dBk)

Elevation Data

Elevation of site above mean sea level	388.6 meters (1274.9 feet)
Overall height above ground of the existing tower (including beacon)	153.3 meters (502.9 feet)
Overall height above mean sea level of existing tower (including beacon)	541.9 meters (1777.8 feet)
Center of radiation of auxiliary FM antenna above ground	36.4 meters (119.5 feet)
Center of radiation of auxiliary FM antenna above mean sea level	425 meters (1394.4 feet)
Antenna height above average terrain	113 meters

Note: Slight height differences result due to conversion to metric.

Allocation Study

An FM allocation study is not required

Canadian Clearance

At the existing site, WWAX(FM) is fully spaced to all Canadian stations and allotments. Therefore, no Canadian concurrence is needed.

Main Studio

The WWAX(FM) main studio remains unchanged.

Coverage

The average elevation data for 3.2 to 16.1 km along each radial has been determined using the NGDC 3 second database.

The distances to the coverage contours have been calculated in accordance with Section 73.333 of the FCC Rules.

The predicted 3.16 mV/m [F(50,50)] coverage contour from the proposed auxiliary operation and the 1.0 mV/m [F(50,50)] coverage contours from the proposed auxiliary operation and the licensed facility are plotted on the map in Exhibit E-3. This map shows that the proposed auxiliary 1.0 mV/m contour is completely contained within the 1.0 mV/m contour of the licensed facility. Table I lists, for each of the eight radials, the average elevation 3.2 to 16.1 km, the effective antenna height above average terrain, the effective radiated power and the predicted distances to the coverage contours for the proposed auxiliary operation.

Other Licensed and Broadcast Facilities

There are no AM stations located within 3.2 km of the proposed WWAX(FM) site.

There is an adjacent tower located approximately 54 meters[1] from the proposed WWAX(FM) tower. Stations KQDS-FM, 94.9 MHz, and KQDS-TV, Channel 21 currently operate from this adjacent tower. Filed as Exhibit E-4 with the WWAX(FM) engineering statement[2] was the current location of all towers on the property. The only change is that the KQDS(AM) transmitter site has been relocated.

In addition, the licensee of KQDS-TV has filed to operate DTV Station KQDS-DT, Channel 17, from this adjacent tower. KQDS-DT is currently operating under Special Temporary Authority ("STA").

No other FM or full-service TV stations are located within 100 meters.

No adverse technical effect is anticipated by the proposed FM operation to any other FCC licensed facility. If required, the licensee will install filters or take other measurements as necessary to resolve the problem.

Radiofrequency Field Level at Tower Site

The radiofrequency field (RFF) level two meters above the ground at the tower site will be calculated. The RFF study will include the following stations:

WWAX(FM), Channel 221C3	Aux FM Facility
KQDS-FM, Channel 235C1	FM Facility

[1] FCC's CDBS database shows a distance of 131 meters.

[2] Report entitled "Engineering Statement Re: Minor Change Application on behalf of Red Rock Radio Corp. WWAX(FM), Hermantown, Minnesota, Ch. 221C3, 5.4 kW ERP, 215 Meters HAAT. March 2000.

KQDS-TV, Channel 21 NTSC Facility

KQDS-DT, Channel 17 DTV Facility

Radio frequency field level calculations for FM, NTSC and DTV Stations within 100 meters.

The radio frequency field ("RFF") contribution of each FM, NTSC and DTV station will be calculated using the following formula abstracted from OET Bulletin No. 65 dated August 1997.

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

where:

S = power density in $\mu W/cm^2$
F = relative field factor
Total ERP = ERP Horizontal Polarization + ERP Vertical Polarization
R = RCAGL - 2 meters

ERP = RMS ERP in watts for DTV Stations and FM Stations.

$ERP = [0.4ERP_V + ERP_A]$ for NTSC Stations
ERP_V = peak visual ERP in watts
ERP_A = RMS aural ERP in watts

Total ERP

The FM, NTSC and DTV stations are operating or propose to operate with the following ERP values:

Station	ERP Horizontal (kW)	ERP Vertical (kW)	Total ERP (H + V) (watts)
WWAX(FM) (Channel 221C3)	.987	.987	1,974
KQDS-FM (Channel 235C1)	100	100	200,000

Station	ERP Horizontal (kW)	ERP Vertical (kW)	Total ERP (H + V) (watts)
KQDS-TV (Channel 21)	(0.4)[550 (visual)] + 55.0 (aural)	(0.4)[168 (visual)] + 16.8 (aural)	359,000
KQDS-DT (Channel 17)	1000	0	1,000,000

Relative Field

The relative field factor will be determined based upon the elevation pattern for FM, NTSC and DTV broadcast antenna considered in this study. The antenna types currently being used by each station are listed below. The elevation pattern for each antenna is included in this report. The exhibit number for each elevation pattern is listed below. A conservative value for the relative field will be used based on a depression angle of no more then 10° toward the ground.

Station	Antenna Type	F	Elevation Pattern
WWAX(FM) (Channel 221C3)	Jampro 2-Bay	0.5	Exhibit E-2
KQDS-FM (Channel 235C1)	ERI 10-Bay	0.3	Exhibit E-4
KQDS-TV (Channel 21)	Dielectric TFU-22JBH/VP-R O6	0.1	Exhibit E-5
KQDS-DT (Channel 17)	Dielectric TFU-20GTH-R O4	0.1	Exhibit E-6

RFF Level

The RFF contributed by the FM, NTSC and DTV stations will be calculated two meters above the ground at tower site. The RFF contributed by each station will be determined using the total ERP values and relative field factors listed above. The antenna height above ground, minus two meters, is listed for each station. The RFF limit, based on an uncontrolled environment, will be calculated for each station. The percentage contribution of each station will also be provided.

Station	Total ERP (watts)	RCAGL-2 (meters)	F	S ($\mu W/cm^2$)	Uncontrolled Limit ($\mu W/cm^2$)	Percent (%)
WWAX(FM) (Channel 221C3)	1,974	34.4	0.5	13.9	200	7.0
KQDS-FM (Channel 235C1)	200,000	190.0	0.3	16.7	200	8.4
KQDS-TV (Channel 21)	359,000	216.3	0.1	1.3	343.33	0.4
KQDS-DT (Channel 17)	1,000,000	230.7	0.1	6.3	327.33	1.9

Total RFF Radiation at Tower Site

The total percentage contribution of RF radiation can be calculated by combining the percentage contribution of each station.

Total RFF = WWAX(FM) + KQDS-FM + KQDS-TV + KQDS-DT

Total RFF = 7.0% + 8.4% + 0.4% + 1.9%

Total RFF = 17.7%

Therefore, the total RFF contribution of all stations two meters above ground at the tower site is less than 18% of the RFF limit for an uncontrolled environment.

Finally, provisions will be made to reduce power or to terminate the transmitter emissions as appropriate when it is necessary for authorized personnel to climb the tower. All facilities operating at the tower site will coordinate to ensure that workers will not be subjected to RFF levels in excess of the current FCC guidelines.

FCC Rule, Section 1.1307

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

(a)(1) The existing tower is not located in an officially designated wilderness area.

(a)(2) The existing tower is not located in an officially designated wildlife preserve.

(a)(3) The mounting of an antenna on an existing tower will not affect any listed threatened or endangered species or habitats.

(a)(3)(ii) The mounting of an antenna on an existing tower 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 mounting of an antenna on an existing tower will not affect any known districts, sites, buildings, structures, or objects significant in American history, architecture, archaeology, engineering, or culture.

(a)(5) The existing tower is not located near any known Indian religious sites.

(a)(6) The existing tower is not located in a flood plain.

(a)(7) The installation of a new FM antenna on an existing guyed tower will not involve a significant change in surface features of the ground in the vicinity of the tower.

(a)(8) It is not proposed to equip the tower with high intensity white lights unless required by the FAA.

(b) Workers and the general public will not be subjected to RFR levels in excess of the current FCC guidelines. Authorized personnel climbing the tower will not be exposed to RFR levels in excess of the FCC guidelines listed OET Bulletin No. 65, dated August 1997.

TABLE I
FM COVERAGE DATA
FOR THE PROPOSED AUXILIARY OPERATION OF
WWAX(FM), HERMANTOWN, MINNESOTA
MAY 2004

Radial N ° E, T	Average Elevation* 3.2-16.1 km meters	Effective Height meters	Effective Radiated Power kW	3.16 mV/m F(50,50) km	1.00 mV/m F(50,50) km
0	423.2	1.8	0.987	5.62	10.1
45	326.2	98.8	0.987	10.0	17.9
90	183.1	241.9	0.987	16.0	28.1
135	183.0	242.0	0.987	16.0	28.1
180	194.7	230.3	0.987	15.5	27.3
225	350.6	74.4	0.987	8.09	14.3
270	407.7	17.3	0.987	5.62	10.1
315	429.6	- 4.6	0.987	5.62	10.1
Average	312.3	112.7			

*Terrain Data from USGS 30 second database

FM Channel 221C3 (92.1 MHz)
Center of Radiation 425 meters AMSL
Average Elevation 312.3 meters AMSL
Antenna Height Above Average Terrain 113 meters

North Latitude: 46° 47' 41"
West Longitude: 92° 07' 05"

(NAD-27)

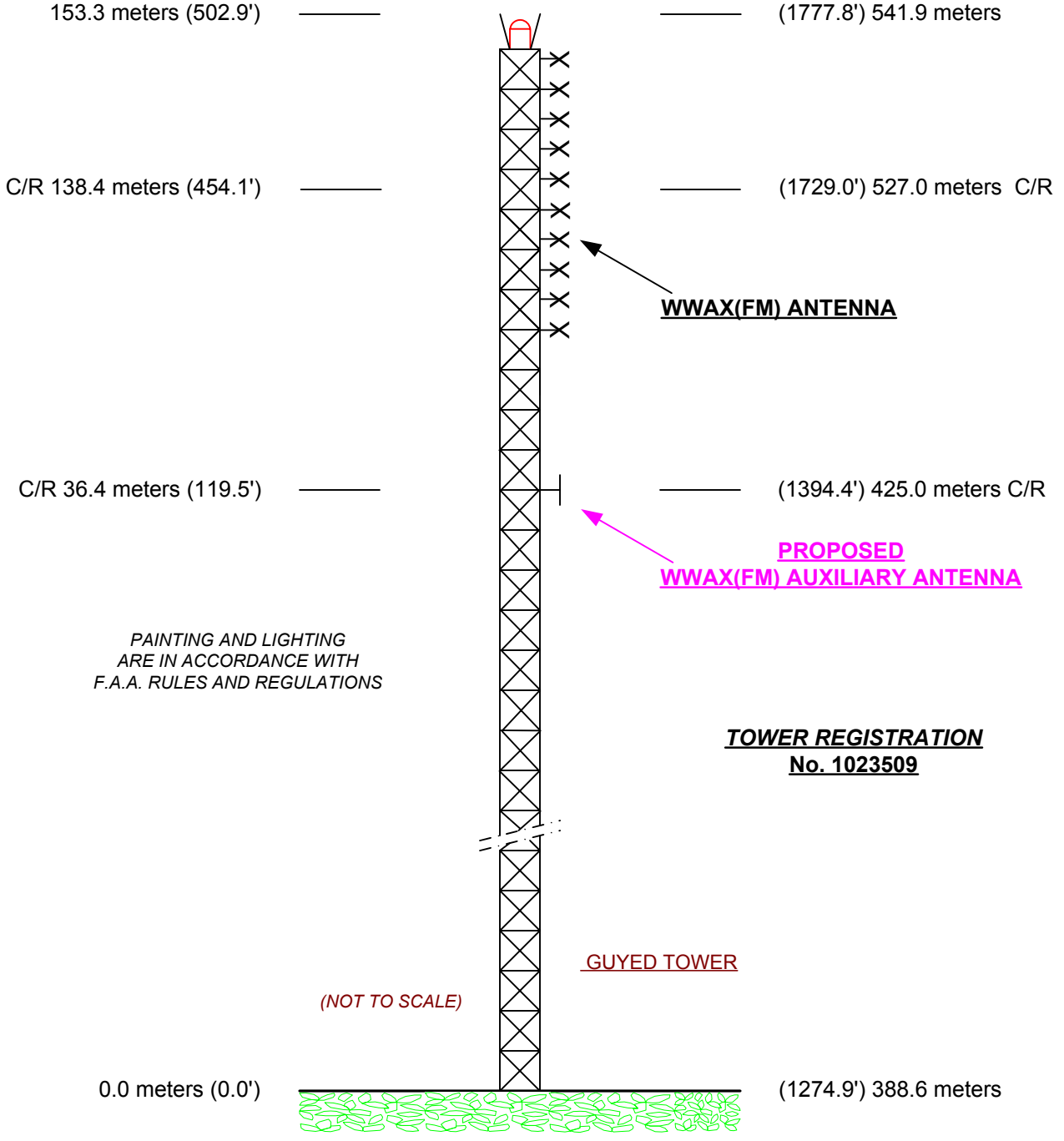


EXHIBIT E - 1

VERTICAL SKETCH

FOR THE PROPOSED AUXILIARY OPERATION OF

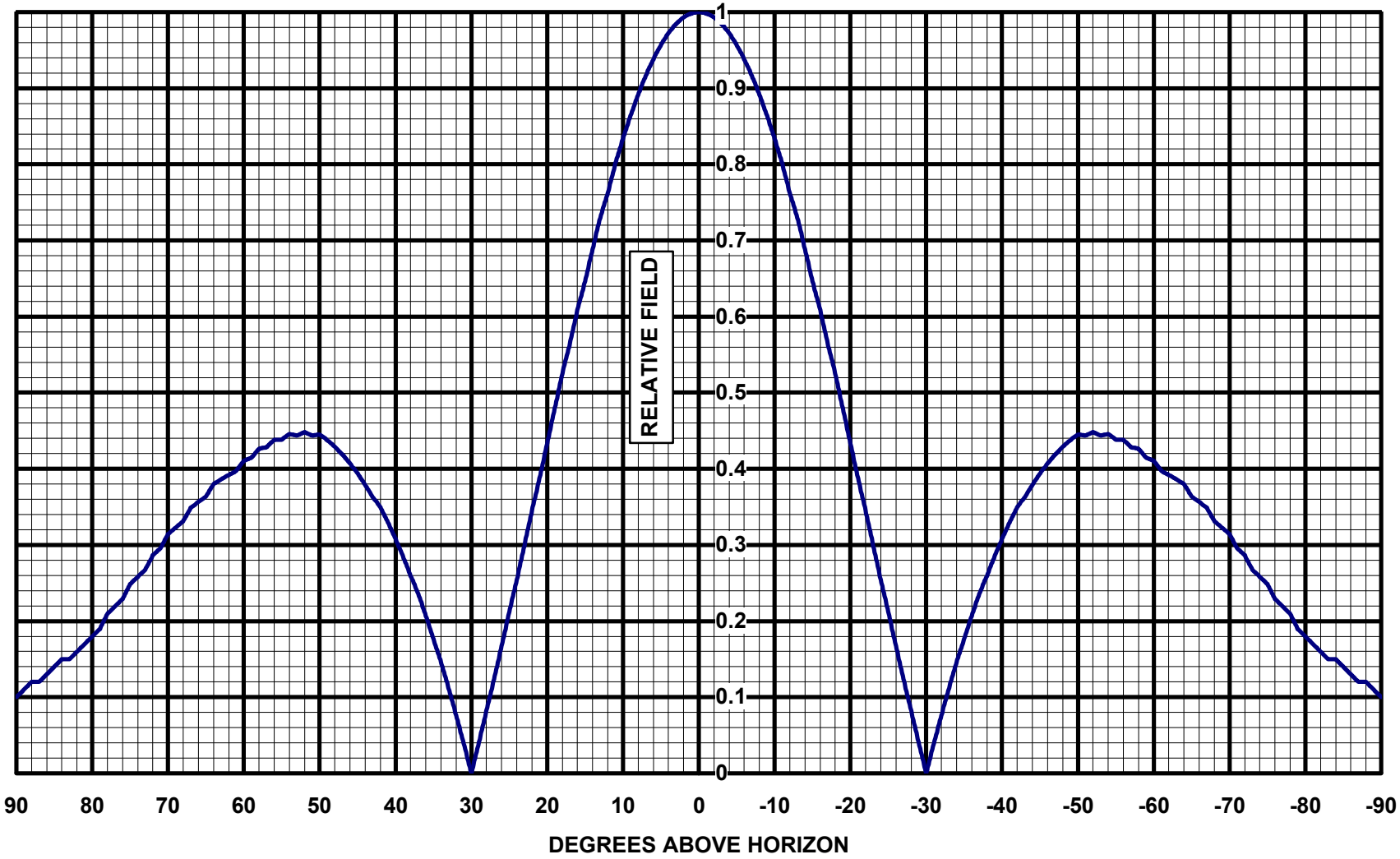
WWAX(FM), HERMANTOWN, MINNESOTA

MAY 2004

COHEN, DIPPELL and EVERIST, P.C. CONSULTING ENGINEERS

JAMPRO ANTENNAS, INC.

JLCP-2, 92.1 MHz , B.T. = 0º, N.F. = 0% First Null
COMPUTED ELEVATION PATTERN



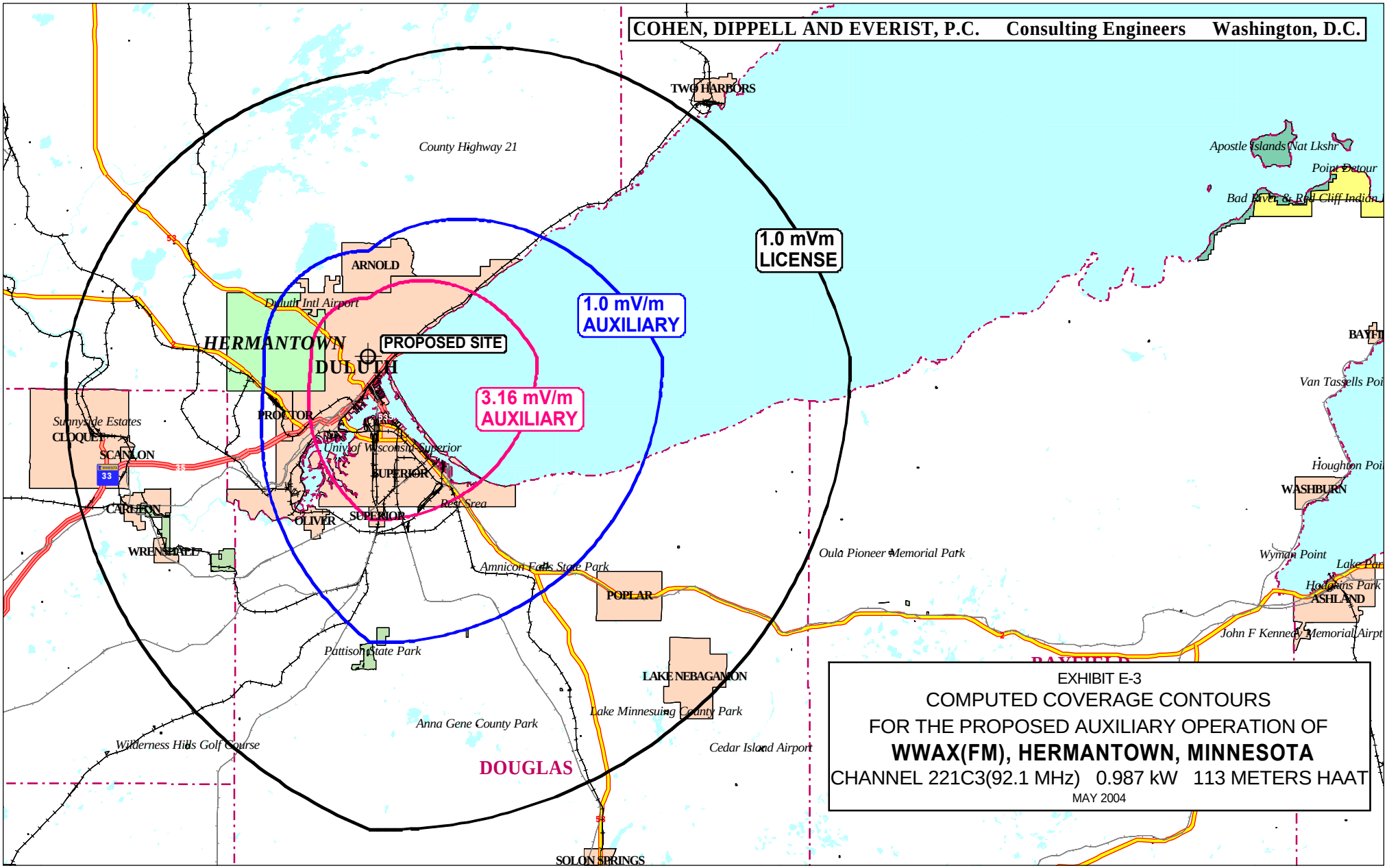
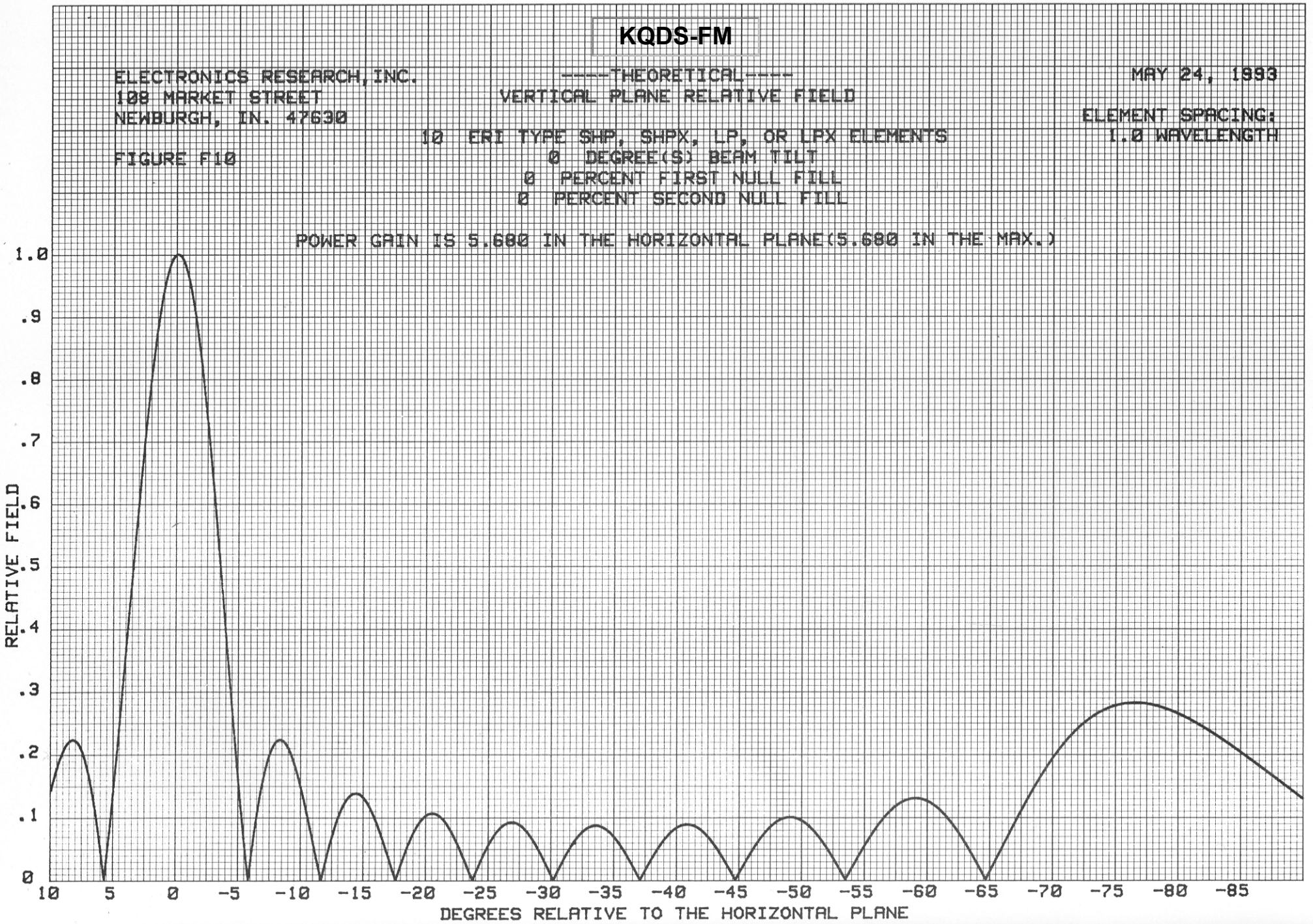

COHEN, DIPPELL AND EVERIST, P.C. Consulting Engineers Washington, D.C.
1.0 mVm LICENSE
1.0 mV/m AUXILIARY
3.16 mV/m AUXILIARY
PROPOSED SITE
HERMANTOWN
DULUTH
ARNOLD
PROCTOR
SUPERIOR
OLIVER
CARLTON
SCANLON
CLOQUET
WRENSHALL
POPLAR
LAKE NEBAGAMON
DOUGLAS
SOLON SPRINGS
TWO HARBORS
WASHBURN
ASHLAND
BAYFIELD
County Highway 21
Duluth Intl Airport
Univ of Wisconsin-Superior
Rest Srea
Amnicon Falls State Park
Pattison State Park
Anna Gene County Park
Lake Minnesuing County Park
Cedar Island Airport
Wilderness Hills Golf Course
Oula Pioneer Memorial Park
Apostle Islands Nat Lkshr
Point Detour
Bad River & Red Cliff Indian
Van Tassells Poi
Houghton Poi
Wyman Point
Hodgkins Park
John F Kennedy Memorial Airpt
Sunnyside Estates
EXHIBIT E-3
COMPUTED COVERAGE CONTOURS
FOR THE PROPOSED AUXILIARY OPERATION OF
WWAX(FM), HERMANTOWN, MINNESOTA
CHANNEL 221C3(92.1 MHz) 0.987 kW 113 METERS HAAT
MAY 2004

Exhibit E-4


KQDS-FM
ELECTRONICS RESEARCH, INC.
108 MARKET STREET
NEWBURGH, IN. 47630
FIGURE F10
-----THEORETICAL-----
VERTICAL PLANE RELATIVE FIELD
MAY 24, 1993
ELEMENT SPACING:
1.0 WAVELENGTH
10 ERI TYPE SHP, SHPX, LP, OR LPX ELEMENTS
0 DEGREE(S) BEAM TILT
0 PERCENT FIRST NULL FILL
0 PERCENT SECOND NULL FILL
POWER GAIN IS 5.680 IN THE HORIZONTAL PLANE(5.680 IN THE MAX.)
RELATIVE FIELD
1.0
.9
.8
.7
.6
.5
.4
.3
.2
.1
0
10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50 -55 -60 -65 -70 -75 -80 -85
DEGREES RELATIVE TO THE HORIZONTAL PLANE

Dielectric

Exhibit E-5

Proposal Number	**DCA-8240**		
Date	**17-Aug-99**		
Call Letters	**KQDS**	Channel	**21**
Location	**Duluth, MN**		
Customer			
Antenna Type	**TFU-22JBH/VP-R O6**		

ELEVATION PATTERN

RMS Gain at Main Lobe	**20.50 (13.12 dB)**	Beam Tilt	**0.75 deg**
RMS Gain at Horizontal	**15.90 (12.01 dB)**	Frequency	**515.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**22J205075-90**

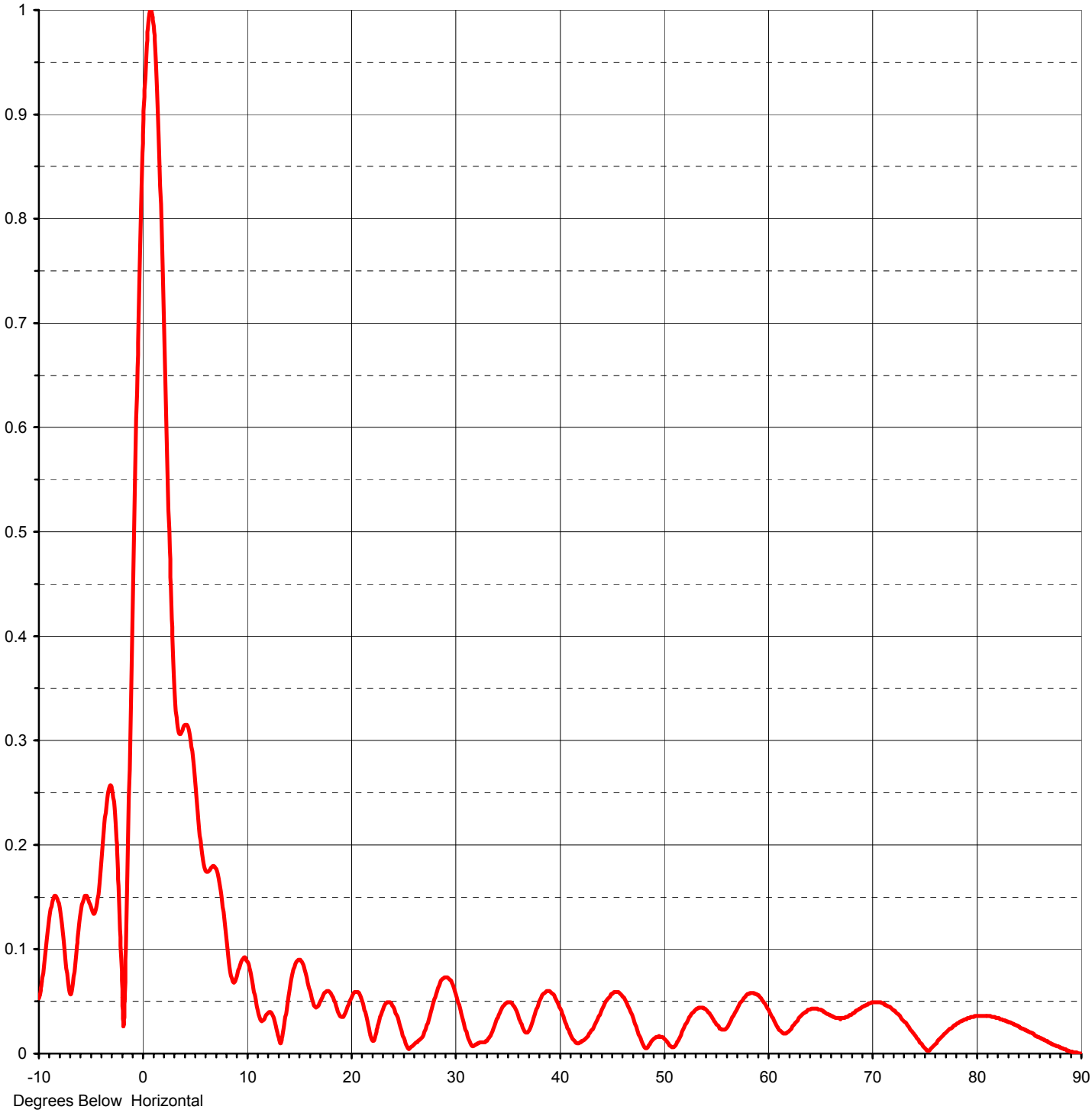


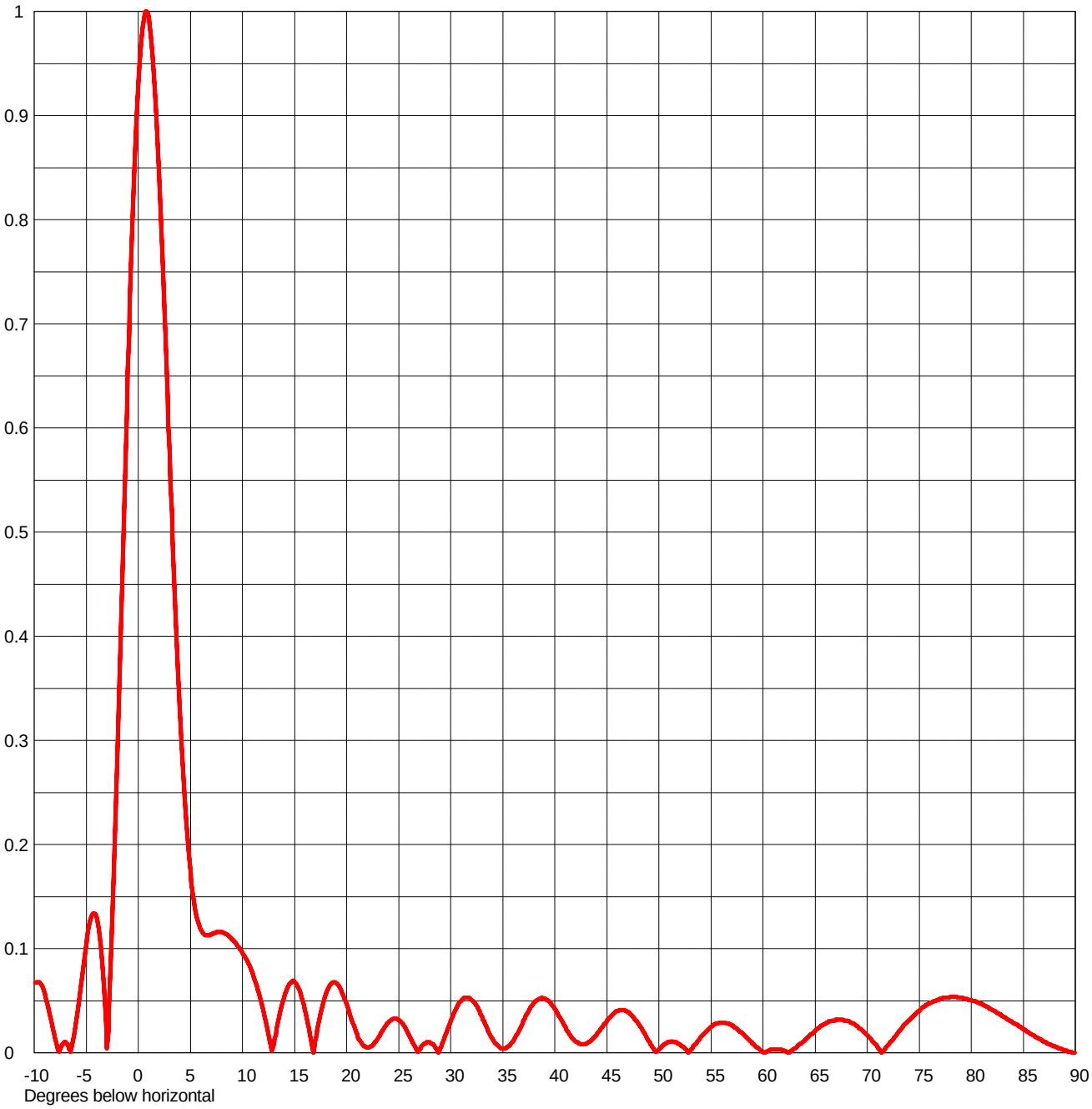
Exhibit E-6

Dielectric

Proposal Number			
Date	**12 May 2004**		
Call Letters	**KQDS-DT**	Channel	**17**
Location	**Duluth, MN**		
Customer			
Antenna Type	**TFU-20GTH-R O4**		

ELEVATION PATTERN

RMS Gain at Main Lobe	**17.5 (12.43 dB)**	Beam Tilt	**0.75 Degrees**
RMS Gain at Horizontal	**15.1 (11.79 dB)**	Frequency	**491.00 MHz**
Calculated / Measured	**Calculated**	Drawing #	**20G175075-90**



Remarks:

SECTION III-B FM 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: 221

2. Class: ☐ A ☐ B1 ☐ B ☒ C3 ☐ C2 ☐ C1 ☐ C ☐ D

3. Antenna Location Coordinates: (NAD 27)

46 ° 47 ' 41 " ☒ N ☐ S Latitude

92 ° 07 ' 05 " ☐ E ☒ W Longitude

4. One-Step Proposal Allotment Coordinates: (NAD 27) ☒ Not applicable

____ ° ____ ' ____ " ☐ N ☐ S Latitude

____ ° ____ ' ____ " ☐ E ☐ W Longitude

5. Antenna Structure Registration Number: 1023509

☐ Not applicable ☐ FAA Notification Filed with FAA

6. Overall Tower Height Above Ground Level: 153.3 meters

7. Height of Radiation Center Above Mean Sea Level: 425 meters (H) 425 meters (V)

8. Height of Radiation Center Above Ground Level: 36.4 meters (H) 36.4 meters (V)

9. Height of Radiation Center Above Average Terrain: 113 meters (H) 113 meters (V)

10. Effective Radiated Power: 0.987 kW (H) 0.987 kW (V)

11. Maximum Effective Radiated Power: ☒ Not applicable ____ kW (H) ____ kW (V)
(Beam-Tilt Antenna ONLY)

12. Directional Antenna Relative Field Values: ☒ 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											

NOTE: In addition to the information called for in this section, an explanatory exhibit providing full particulars must be submitted for each question for which a "No" response is provided.

CERTIFICATION

AUXILIARY ANTENNA APPLICANTS ARE NOT REQUIRED TO RESPOND TO ITEMS 13-16. PROCEED TO ITEM 17.

13. **Allotment.** The proposed facility complies with the allotment requirements of 47 C.F.R. Section 73.203. ☐ Yes ☐ No — See Explanation in Exhibit No.

14. **Community Coverage.** The proposed facility complies with 47 C.F.R. Section 73.315. ☐ Yes ☐ No — See Explanation in Exhibit No.

15. **Main Studio Location.** The proposed main studio location complies with 47 C.F.R. Section 73.1125. ☐ Yes ☐ No — See Explanation in Exhibit No.

16. **Interference.** The proposed facility complies with all of the following applicable rule sections. Check all those that apply. ☐ Yes ☐ No — See Explanation in Exhibit No.

Separation Requirements.

a. ☐ 47 C.F.R. Section 73.207.

Grandfathered Short-Spaced.

b. ☐ 47 C.F.R. Section 73.213(a) with respect to station(s): _____ **Exhibit Required.** — Exhibit No.

c. ☐ 47 C.F.R. Section 73.213(b) with respect to station(s): _____ **Exhibit Required.** — Exhibit No.

d. ☐ 47 C.F.R. Section 73.213(c) with respect to station(s): _____ **Exhibit Required.** — Exhibit No.

Contour Protection.

e. ☐ 47 C.F.R. Section 73.215 with respect to station(s): _____ **Exhibit Required.** — Exhibit No.

17. **Environmental Protection Act.** The proposed facility is excluded from environmental processing under 47 C.F.R. Section 1.1306 (*i.e.*, the facility will not have a significant environmental impact and complies with the maximum permissible radiofrequency electromagnetic exposure limits for controlled and uncontrolled environments). Unless the applicant can determine compliance through the use of the RF worksheets in Appendix A, an **Exhibit is required.** ☒ Yes ☐ No — See Explanation in Exhibit No. E

By checking "Yes" above, 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.

PREPARER'S CERTIFICATION ON PAGE 3 MUST BE COMPLETED AND SIGNED.

I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith. I acknowledge that all certifications and attached Exhibits are considered material representations. I hereby waive any claim to the use of any particular frequency as against the regulatory power of the United States because of the previous use of the same, whether by license or otherwise, and request an authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended.)

Typed or Printed Name of Person Signing	Typed or Printed Title of Person Signing
Signature	Date

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).

SECTION III PREPARER'S CERTIFICATION

I certify that I have prepared Section III (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 Donald G. Everist		Relationship to Applicant (e.g., Consulting Engineer) Consulting Engineer
Signature		Date May 27, 2004
Mailing Address Cohen, Dippell and Everist, P.C., 1300 L Street, NW, Suite 1100		
City Washington	State or Country (if foreign address) DC	ZIP Code 20005
Telephone Number (include area code) (202) 898-0111	E-Mail Address (if available) cde@attglobal.net	

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).