

APPLICATION FOR MINOR  
MODIFICATION TO A PERMITTED DTV  
BROADCAST STATION  
FCC FILE NO.: BPEDT-20080310ACR  
TO MAXIMIZE AND OPERATE IN THE POST  
DTV TRANSITION PERIOD  
WENH-DT  
UNIVERSITY OF NEW HAMPSHIRE  
DURHAM, NH

KESSLER & GEHMAN ASSOCIATES, INC.  
TELECOMMUNICATIONS CONSULTING ENGINEERS

20080613

*Prepared by Ryan Wilhour*

*KG&A*

507 N.W. 60th Street, Suite C  
Gainesville, Florida 32607

## **KESSLER AND GEHMAN ASSOCIATES, INC.**

ENGINEERING STATEMENT OF RYAN WILLOUR OF THE FIRM KESSLER AND  
GEHMAN ASSOCIATES, INC., CONSULTING ENGINEERS IN CONNECTION WITH  
AN APPLICATION FOR MINOR MODIFICATION OF A PERMITTED DTV  
BROADCAST STATION WENH-DT FCC FILE NUMBER BPEDT-20080310ACR TO  
MAXIMIZE OPERATION IN THE POST DTV TRANSITION PERIOD  
UNIVERSITY OF NEW HAMPSHIRE  
DURHAM, NEW HAMPSHIRE

I, Ryan Wilhour, am an associate of Kessler and Gehman Associates, Inc. with offices in Gainesville, Florida. I am a graduate of the University of Florida with a Bachelor of Science degree in electrical engineering. This firm has been employed by The University of New Hampshire to prepare engineering studies and a minor modification application to FCC file number BPEDT-20080310ACR for post DTV transition maximization.

### ATTACHED FIGURES

In carrying out the engineering studies the following attached figures were prepared:

1. Engineering Specifications (Exhibit E1)
2. Elevation drawing of the antenna system (Exhibit E2)
3. Antenna azimuth and elevation patterns (Exhibit E3).
4. USGS 7.5 minute topographic quadrangle showing the proposed transmitter location and the coordinate lines (Exhibit E4)
5. Map showing the predicted DTV coverage contour (Exhibit E5)
6. Allocation Analysis (Exhibit E6)
7. Environmental Impact/ RFR Hazard Analysis (Exhibit E7)

### NARRATIVE

The University of New Hampshire noncommercial licensee of WENH-DT proposes to operate its post-transition Channel 11 digital facility using the existing support structure. It is proposed to maximize coverage by replacing the permitted antenna, increasing the center of radiation height by 2.3 meters, and the maximum ERP from 15.8 kW to 30.0 kW, no other changes are proposed.

ALLOCATION ANALYSIS

It is proposed to modify the above referenced channel 11 digital permitted facility to maximize its coverage area without causing impermissible interference to other post DTV transition facilities. Exhibit E6 demonstrates the interference considerations for the proposed facility and further illustrates complete compliance to the 0.5% interference threshold criteria.

ENVIRONMENTAL IMPACT/RFR HAZARD ANALYSIS

An analysis has been made of the human exposure to RFR using the calculation methodology described in OET Bulletin 65, Edition, 97-01. Exhibit E7 is a RFR study demonstrating compliance within 5% of the most restrictive permissible exposure at any location 2 meters above the ground. Exhibit E7 calculations were made using a frequency of 198 MHz, which is the lower edge of the proposed channel. To account for ground reflections, a coefficient of 1.6 was included in the calculations.

Pursuant to OET Bulletin 65 concerning multiple-user transmitter sites only those licensees whose transmitters produce power density levels greater than 5.0% of the exposure limit are considered significant contributors to RFR. Since the proposed operation is well within 5% of the most permissible exposure at any location 2 meters above the ground, it is not considered a significant contributor to RFR exposure. Thus, contributions to exposure from other RF sources in the vicinity of WENH-DT were not taken into account. The instant proposal complies with the FCC limits for human exposure to RF radiation and thus is excluded from further environmental processing.

DECLARATION OF ENGINEER

The foregoing statement and the report regarding the aforementioned engineering work are true and correct to the best of my knowledge. Executed on June 13, 2008.

The logo for Kessler and Gehman Associates, Inc. (KGA) features the letters 'KGA' in a stylized, serif font. The letters are white and are superimposed on a thick, horizontal gray bar that extends to the left and right of the text.

Ryan Wilhour

A handwritten signature in blue ink that reads 'Ryan Wilhour'. The signature is written in a cursive, flowing style.

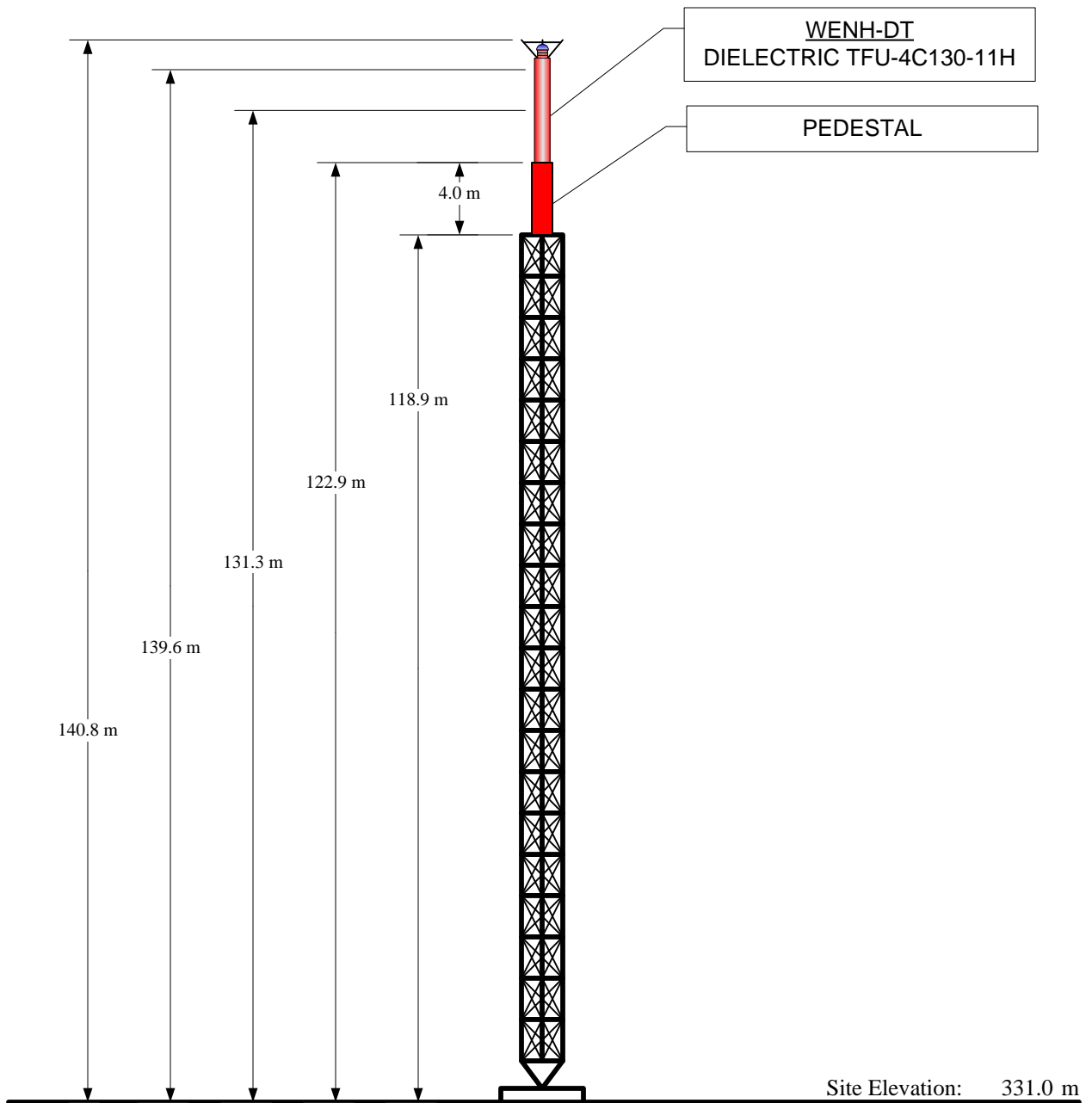
Consulting Engineer

WENH-DT

DURHAM, NH

ENGINEERING SPECIFICATIONS

- A. Transmitter Site (NAD 27)
- |                            |   |
|----------------------------|---|
| North Latitude             | 43 ° 10 ' 33 "                            |
| West Longitude             | 71 ° 12 ' 29 "                            |
| Street Address or Location | Atop Saddleback Mountain<br>Deerfield, NH |
- B. Proposed Facility
- |             |           |               |
|-------------|-----------|---------------|
| DTV Channel | Number    | 11            |
|             | Frequency | 198 - 204 MHz |
- C. Elevations
- |   |         |
|---|---------|
| Height of Site Above Mean Sea Level (AMSL)  | 331.0 m |
| Overall Height of Structure Above Ground<br>(including all appurtenances)         | 140.8 m |
| Overall Height of Structure Above Mean Sea Level<br>(including all appurtenances) | 471.8 m |
| Effective Height of Antenna Above Ground  | 131.3 m |
| Effective Height of Antenna Above Average Terrain                                 | 304.1 m |
| Effective Height of Antenna Above Mean Sea Level                                  | 462.3 m |
- D. Antenna Parameters – Horizontal Polarization
- |  |           |
|--|-----------|
| Maximum Antenna Gain in Beam Maximum     | 11.14 dB  |
| Maximum Antenna Gain in Horizontal Plane | 10.92 dB  |
| Maximum Effective Radiated Power         | 14.77 dBk |
| In Beam Maximum                          | 30.0 kW   |
| Maximum Effective Radiated Power         | 14.55 dBk |
| In Horizontal Plane                      | 28.52 kW  |



Overall Height AGL:	140.8 m
Overall Height AMSL:	471.8 m
Radiation Center AGL:	131.3 m
Radiation Center AMSL:	462.3 m
Radiation Center HAAT:	304.1 m
Average Terrain:	158.2 m

NAD 27 Coordinates:	
N. Latitude:	43° 10' 33"
W. Longitude:	71° 12' 29"

FCC Tower Registration Number:	1034696
FAA Aeronautical Study Number:	96-ANE-95-OE

NOTE: NOT TO SCALE

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EXHIBIT E2

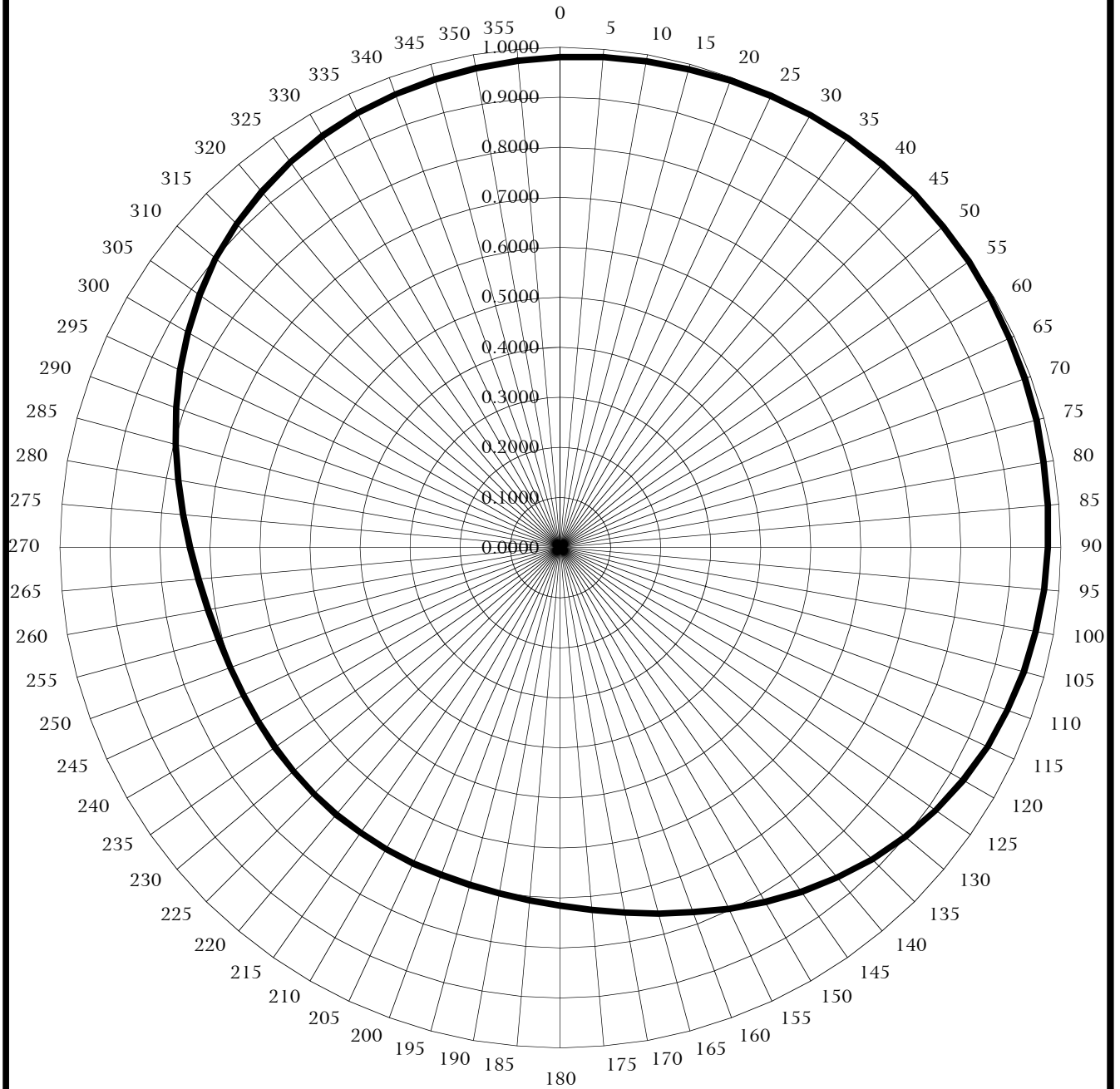
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TABULATION OF RELATIVE FIELD FOR PROPOSED DIRECTIONAL ANTENNA

<u>AZIMUTH</u>	<u>RELATIVE FIELD</u>	<u>AZIMUTH</u>	<u>RELATIVE FIELD</u>
N000°E	0.980	N180°E	0.715
N010°E	0.987	N190°E	0.702
N020°E	0.993	N200°E	0.696
N030°E	0.998	N210°E	0.696
N040°E	1.000	N220°E	0.696
N050°E	0.998	N230°E	0.696
N060°E	0.993	N240°E	0.696
N070°E	0.987	N250°E	0.702
N080°E	0.980	N260°E	0.715
N090°E	0.973	N270°E	0.740
N100°E	0.964	N280°E	0.775
N110°E	0.950	N290°E	0.817
N120°E	0.929	N300°E	0.860
N130°E	0.899	N310°E	0.899
N140°E	0.860	N320°E	0.929
N150°E	0.817	N330°E	0.950
N160°E	0.775	N340°E	0.964
N170°E	0.740	N350°E	0.973

MAXIMUM OF 1.000 AT N040°E

# RELATIVE FIELD AZIMUTH PATTERN



DIELECTRIC - TFU-4C130-11TH  
ORIENTED WITH BEAM MAXIMA A 40°  
AZIMUTH GAIN: 1.3 (1.14 dBd)

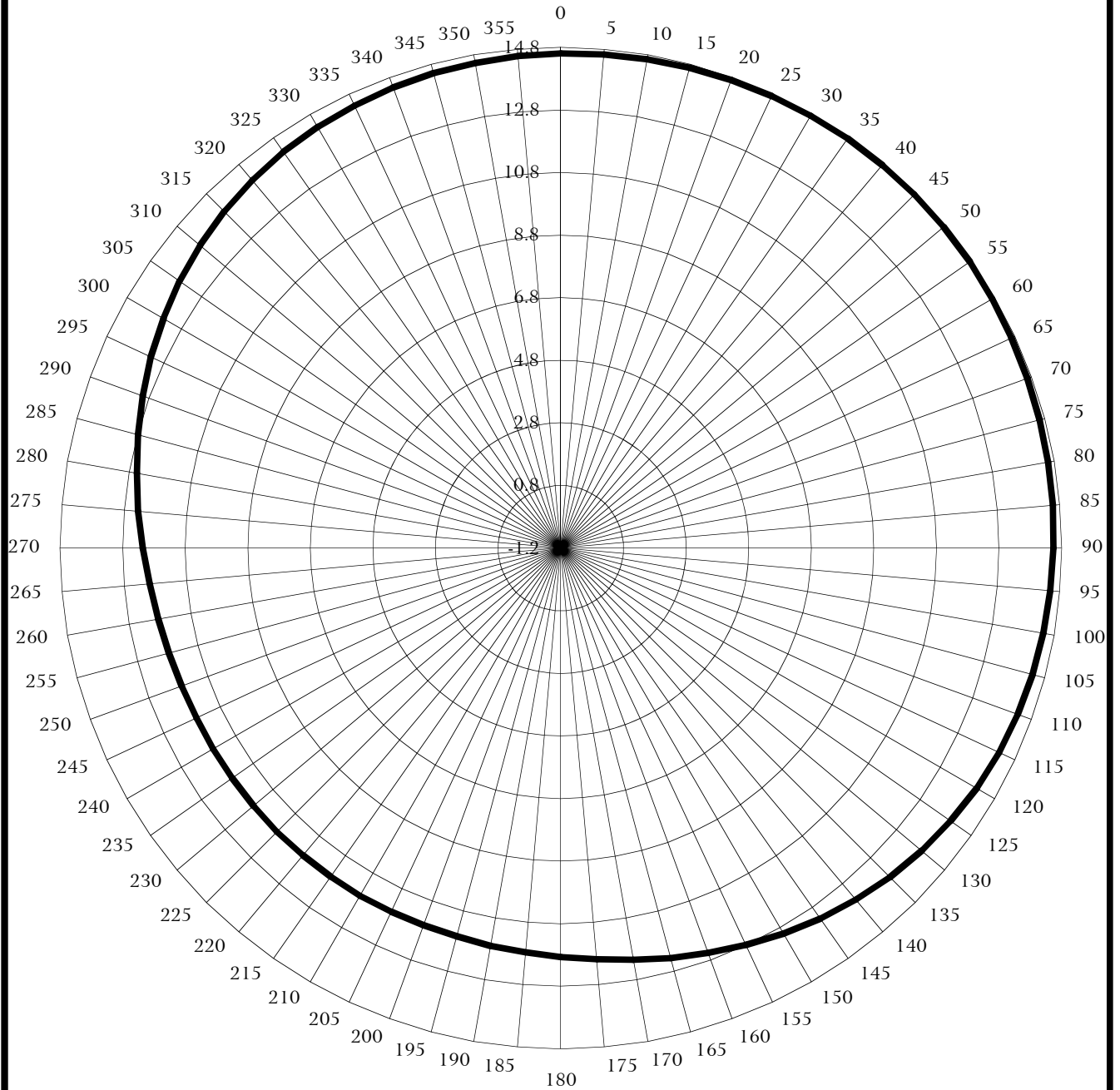
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EXHIBIT E3B

# ERP - dBk



DIELECTRIC - TFU-4C130-11TH  
ORIENTED WITH BEAM MAXIMA A 40°  
AZIMUTH GAIN: 1.3 (1.14 dBd)

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EXHIBIT E3C



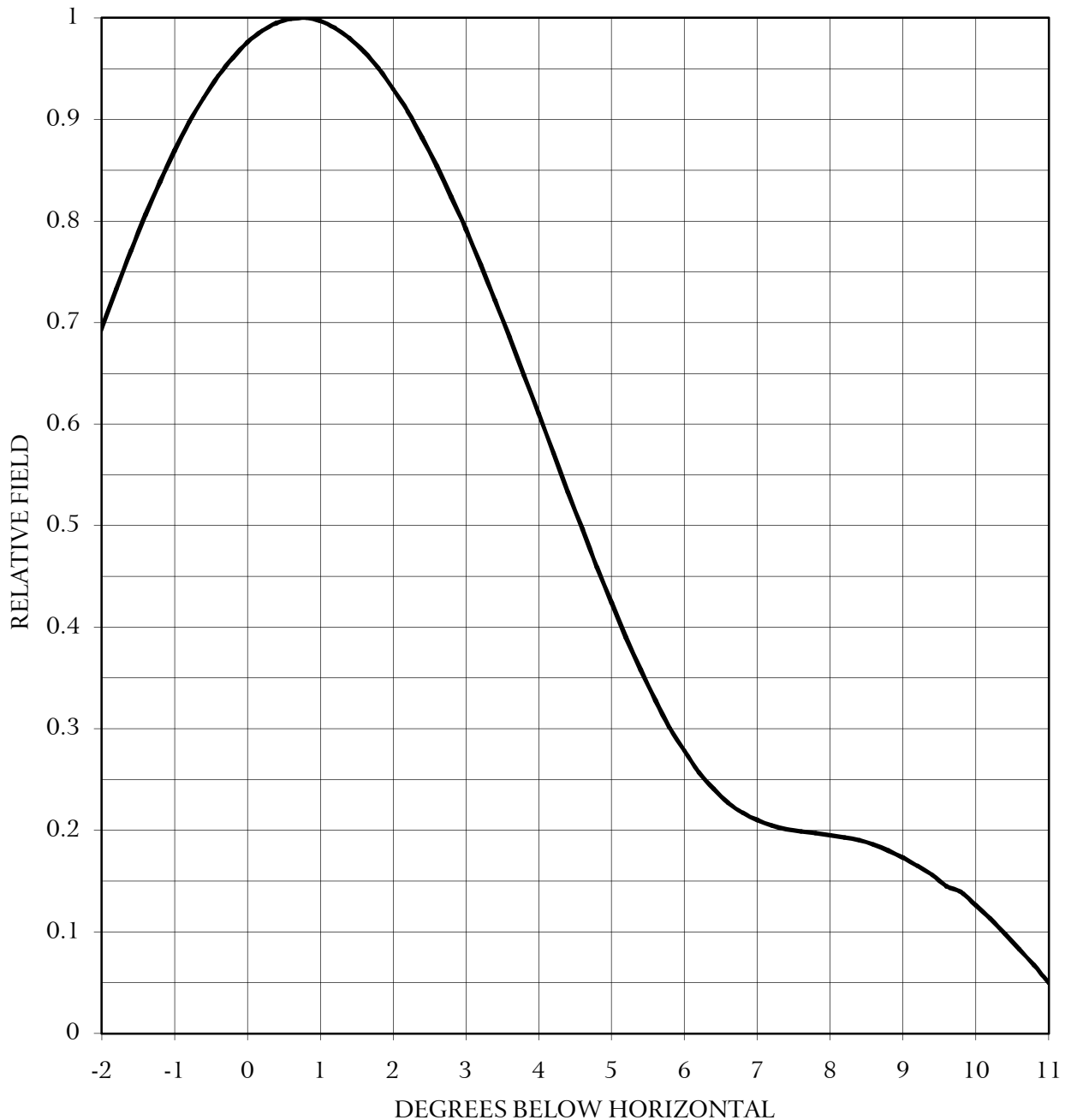
# ELEVATION PATTERN

DIELECTRIC - TFU-4C130-11TH

RMS Gain at Main Lobe : 10.00 (10.00 dBd)

RMA Gain at Horizontal: 9.50 (9.78 dBd)

Beam Tilt: 0.75 deg



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EXHIBIT E3D

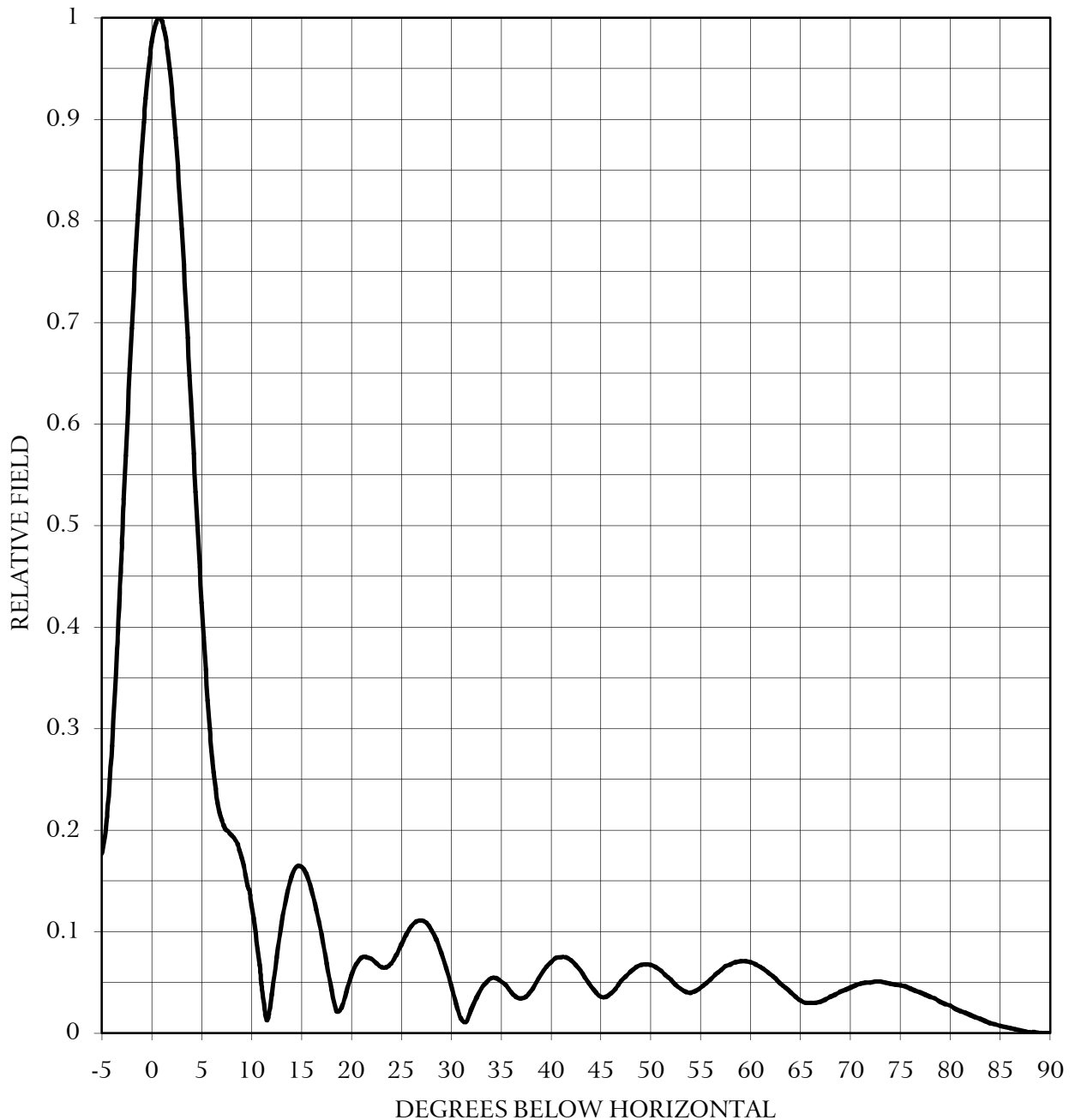
# ELEVATION PATTERN

DIELECTRIC - TFU-4C130-11TH

RMS Gain at Main Lobe : 10.00 (10.00 dBd)

RMA Gain at Horizontal: 9.50 (9.78 dBd)

Beam Tilt: 0.75 deg



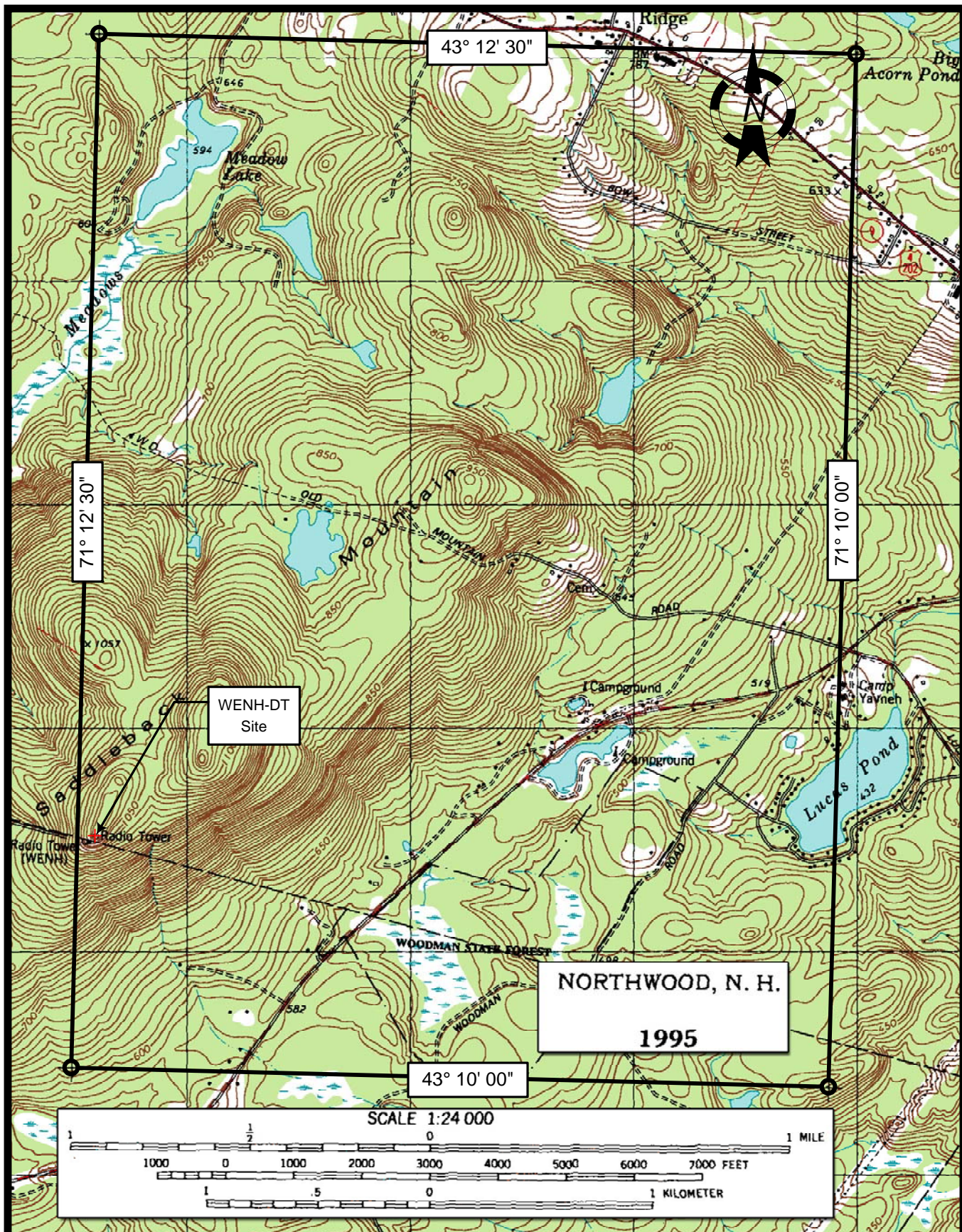
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EXHIBIT E3E





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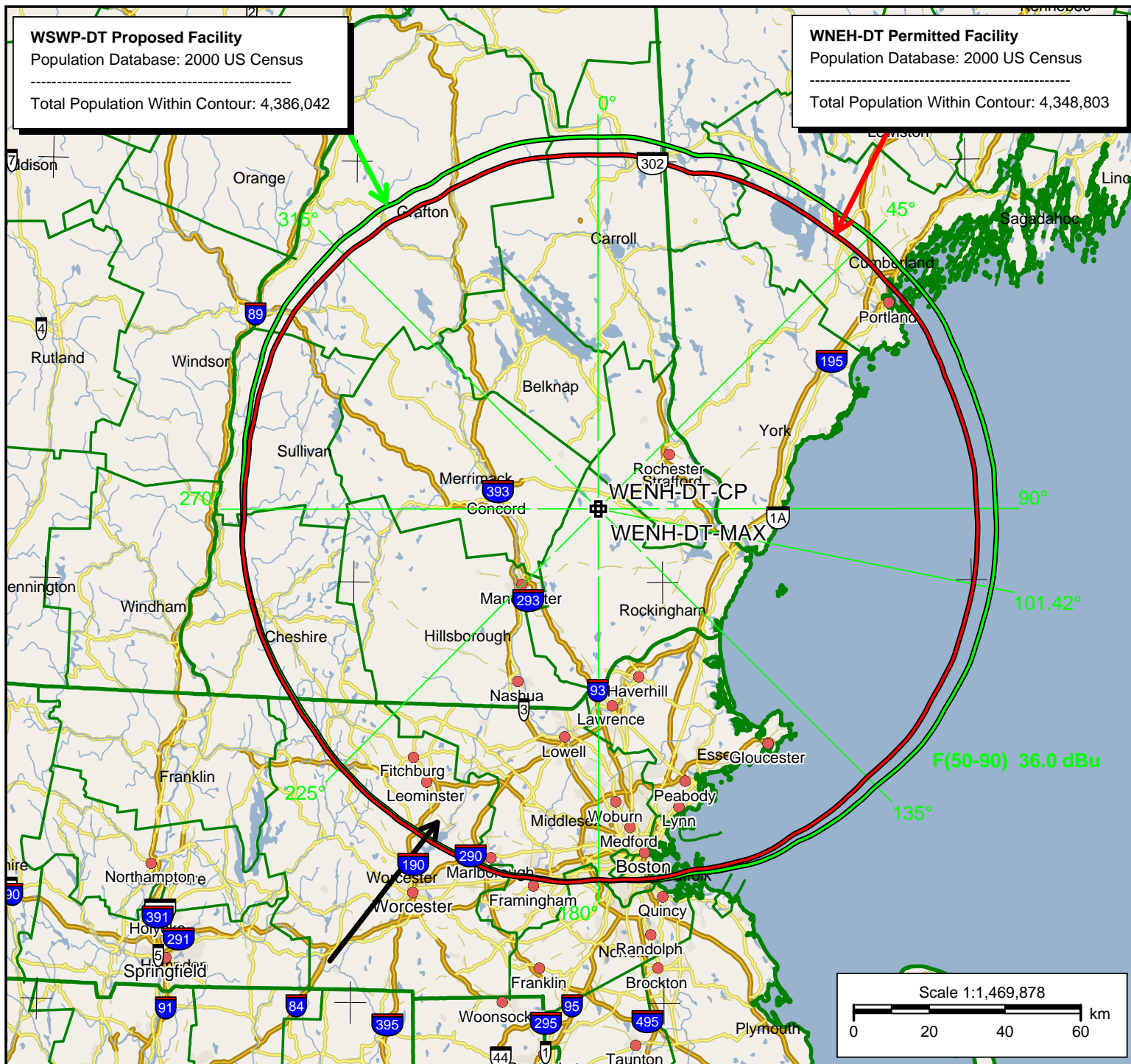
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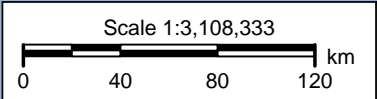
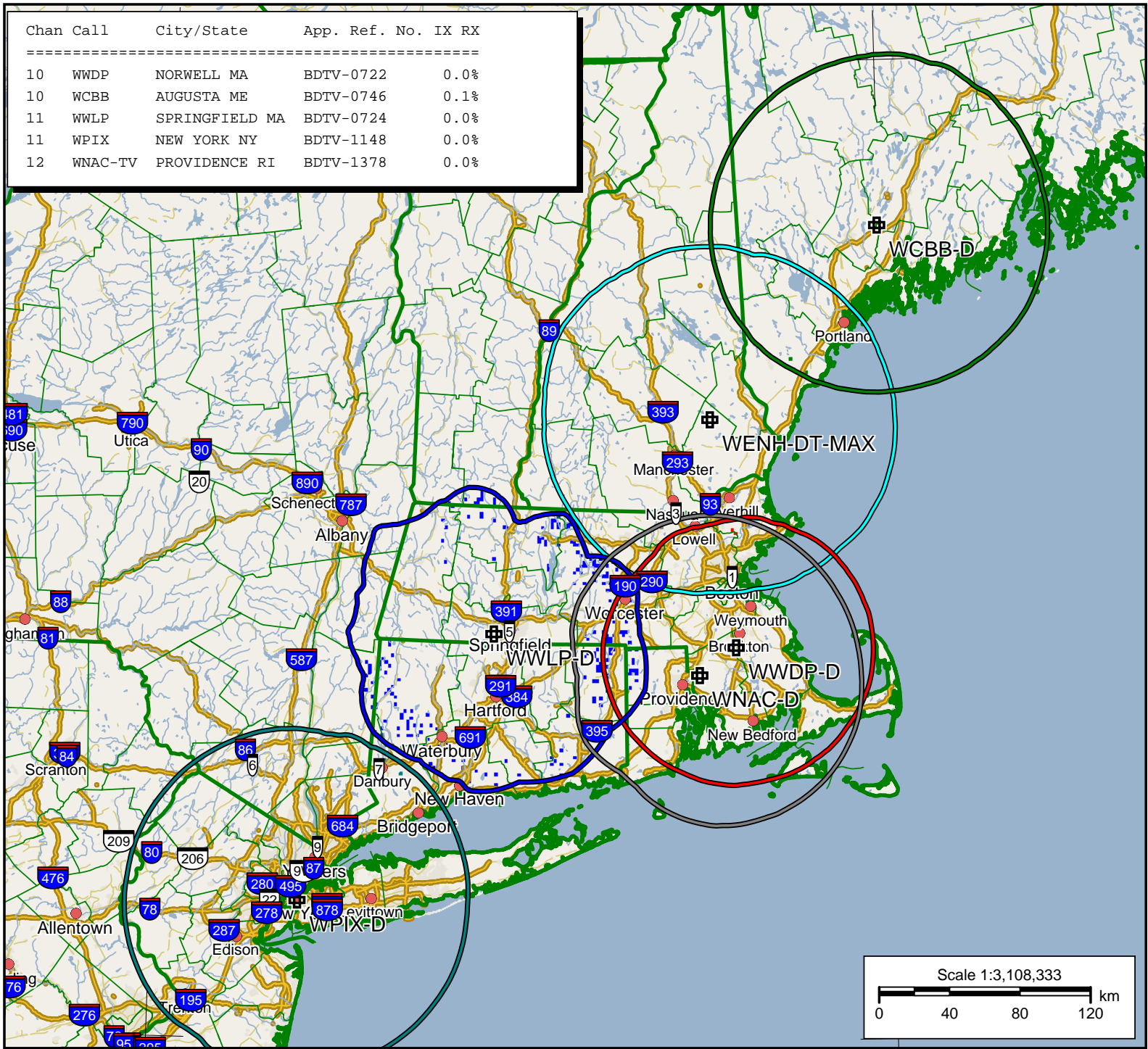
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EXHIBIT E4





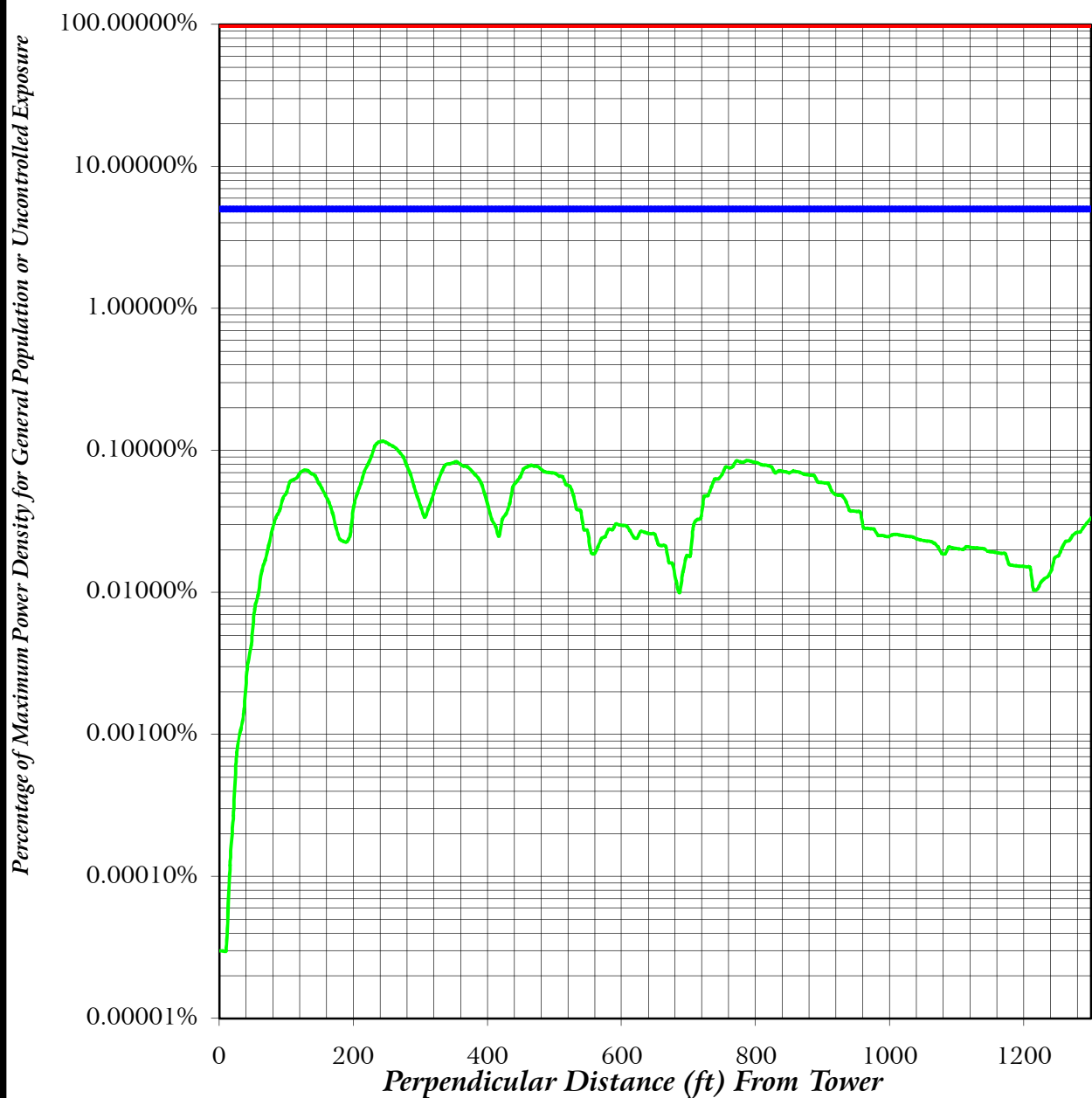
Chan	Call	City/State	App. Ref. No.	IX	RX
10	WWDP	NORWELL MA	BDTV-0722	0.0%	
10	WCBB	AUGUSTA ME	BDTV-0746	0.1%	
11	WWLP	SPRINGFIELD MA	BDTV-0724	0.0%	
11	WPIX	NEW YORK NY	BDTV-1148	0.0%	
12	WNAC-TV	PROVIDENCE RI	BDTV-1378	0.0%	



**WENH-DT-MAX**  
Maximized  
Latitude: 43-10-33 N  
Longitude: 071-12-29 W  
ERP: 30.00 kW  
Channel: 11  
Frequency: 201.0 MHz  
AMSL Height: 462.3 m  
Elevation: 300.483 m  
Horiz. Pattern: Directional  
Vert. Pattern: Yes  
Elec Tilt: 0.0  
Prop Model: Longley/Rice  
Climate: Cont temperate  
Conductivity: 0.0050  
Dielec Const: 15.0  
Refractivity: 301.0  
Receiver Ht AG: 10.0 m  
Receiver Gain: 0 dB  
Time Variability: 10.0%  
Sit. Variability: 50.0%  
ITM Mode: Broadcast

Exhibit E6

# FAR FIELD EXPOSURE TO RF EMISSIONS



- Maximum Allowable General Population or Uncontrolled Exposure
- 5 % of Maximum General Population or Uncontrolled Exposure
- Percentage of Maximum General Population or Uncontrolled Exposure

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EXHIBIT E7



METHODOLOGY AND EXPLANATION OF  
ENVIRONMENTAL IMPACT / RADIO FREQUENCY RADIATION  
HAZARD ANALYSIS

A theoretical analysis has been conducted of the human exposure to radio frequency radiation ("RFR") using the calculation methodology described in *OET Bulletin 65, Edition 97-01*. The RFR analysis is conducted pursuant to the following methodology:

Terrain<sup>1</sup> extraction is compiled from the proposed tower site to radial lengths of 0.25 miles in 0.001 mile increments for 360 radials. The power density is calculated for each terrain point at 6 feet above ground level using the elevation and azimuth pattern of the proposed broadcast antenna. The power density calculations are conducted using the lower edge of the proposed channel frequency. To account for ground reflections, a coefficient of 1.6 was included in the calculation.

The resulting cylindrical polar analysis is then summarized into a coordinate plane graph using the following methodology:

Starting from the origin the maximum calculated RFR value is determined among the 360 degree radials for each 0.001 mile increment, the value is then converted into a percentage of the maximum allowable general population or uncontrolled exposure and plotted as a function of perpendicular distance from the tower.

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<sup>1</sup> Terrain extraction is based upon a 3 arc second point spacing terrain database.