

ENGINEERING STATEMENT  
CONCERNING HUMAN EXPOSURE TO RF ELECTROMAGNETIC ENERGY  
PREPARED FOR  
WFXT(TV)/DT, BOSTON, MASSACHUSETTS, CHANNELS 25/31  
WSBK-TV, BOSTON, MASSACHUSETTS, CHANNEL 38  
WLVI-TV/DT, CAMBRIDGE, MASSACHUSETTS, CHANNELS 56/41

This Engineering Statement was prepared on behalf of the analog and digital television broadcast stations located on the Needham, Massachusetts antenna supporting structure located at 140 Cabot Street (FCC Antenna Structure Registration No. 1004233).<sup>\*</sup> This statement was prepared concerning an evaluation of compliance with Section 1.1307(b) of the FCC Rules<sup>†</sup> regarding human exposure to radio frequency (RF) energy.<sup>‡</sup>

The Needham tower is a guyed tower, which supports the main transmitting antennas for broadcast stations: WFXT(TV), WFXT-DT, WSBK-TV, WLVI-TV and WLVI-DT. The antennas are mounted near the top of the structure having an overall height above ground of 366.0 m (1201 ft) above ground level. A platform mounted on the top of the tower supports the subject transmitting antennas. There are other non-broadcast related transmitting antennas located on the tower. However, these facilities are excluded from the analysis pursuant to normal FCC practice since they are of such low power that their RF energy contributions are negligible.

The attached Figure 1 is an aerial photograph of the Needham tower site and vicinity. Figure 2 is a topographic map of the Needham tower site and vicinity.

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<sup>\*</sup> Geographic coordinates: 42-18-11N / 71-13-05W (NAD83).

<sup>†</sup> See Rules of the United States Federal Communications Commission (FCC), generally at Title 47 of the Code of Federal Regulations (Telecommunication).

<sup>‡</sup> See FCC Office of Engineering and Technology Bulletin No. 56 for background information on non-ionizing RF energy of the type discussed here. Internet web reference:

[http://www.fcc.gov/Bureaus/Engineering\\_Technology/Documents/bulletins/oet56/oet56e4.pdf](http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet56/oet56e4.pdf)

The following table summarizes the stations considered and the technical details and assumptions made as part this analysis:

Call Sign / Mode	Channel / Frequency	Effective Radiated Power (kW) <sup>§</sup>	Antenna Radiation Center Height Above Ground (meters) / (feet)	Transmitting Antenna Make and Model / Polarization
WFXT(TV) / analog	25 / 536-542 MHz	1950	356 / 1168	RCA, TFU-25G / horizontal
WFXT-DT License / digital	31 / 572-578 MHz	78	328 / 1076	Shively, 2200 / horizontal
WFXT-DT Application ** / digital	31 / 572-578 MHz	1,000 H / 250 V 1,250 total	339 / 1112	Andrew, ATW22H3-EDCX-31S / elliptical
WSBK-TV / analog	38 / 614-620 MHz	2340	356 / 1168	RCA, TFU-25G / horizontal
WLVI-DT / digital	41 / 632-638 MHz	550	344 / 1129	DCA, TFU-24DSB-B(C) / horizontal
WLVI-TV / analog	56 / 722-728 MHz	2240	360 / 1181	RCA, TFU-25G / horizontal

The elevation patterns employed for each of the above listed antennas are included herein as an Appendix to this exhibit.

<sup>§</sup> Peak visual effective radiated power for analog stations and average effective radiated power for digital stations. Analog stations are assumed to operate with an aural effective radiated power of 10% of peak visual.

\*\* Pending application for WFXT-DT, FCC File No. BPCDT-19991027ADI.

Based on Section 73.1310 of the FCC Rules, the pertinent maximum permissible exposure (MPE) limits for the subject stations are as follows:

Call Sign	Frequency (MHz)	MPE for General Population/Uncontrolled (GP/U) Exposure (uW/cm <sup>2</sup> )	MPE for <u>5% Exclusion Level</u> for GP/U Exposure (uW/cm <sup>2</sup> )
WFXT(TV)	536	357.3	17.9
WFXT-DT	572	381.3	19.1
WSBK-TV	614	409.3	20.5
WLVI-DT	632	421.3	21.1
WLVI-DT	722	481.3	24.1

Also indicated in the table above are the 5% MPE levels below which the RF energy level contributions are considered to be negligible. Those licensees whose transmitters produce RF energy levels in excess of 5.0% of the applicable exposure limit at an accessible location are considered to be significant contributors and would share in the responsibility to bring the RF exposure levels into compliance in a multiple user environment.

The subject facilities were evaluated for RF exposure at 2-m AGL using the procedures outlined in OET Bulletin No. 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields<sup>††</sup>, with the following results:

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<sup>††</sup> Federal Communications Commission, Office of Engineering and Technology, OET Bulletin No. 65, Edition 97-01, August, 1997.

Call Sign	Distance (m)	Assumed Antenna Downward Relative Field Factor <sup>††</sup>	Calculated Power Density (uW/cm <sup>2</sup> )	Percent of GP/U MPE (%)
WFXT(TV)	354	0.10	2.6	<b>0.7</b>
WFXT-DT Lic.	326	0.10	0.25	<b>0.07</b>
WFXT-DT App.	337	0.10	3.7	<b>1.0</b>
WSBK-TV	354	0.10	3.1	<b>0.8</b>
WLVI-DT	342	0.15	3.57	<b>0.8</b>
WLVI-TV	358	0.10	2.92	<b>0.6</b>

The calculations indicate that the overall RF field level as a percent of the GP/U MPE at 2-m above ground level will not exceed 1.0% for any of the facilities. Therefore, since this is below 5%, it is concluded that the subject facilities are negligible contributors to the RF environment at all ground level locations.<sup>§§</sup>

In addition to the above, studies were conducted to determine the maximum height above ground that a person could be located before the 5% exclusion level is reached. Examining all five facilities within a radius of 500-meters (1640-feet or 0.31-mile) of the tower, it was determined that any height below 189 meters (620-feet) above ground would result in every one of the broadcast facilities having an individual RF exposure level of less than 5% of the applicable MPE for GP/U environments. Therefore, any person that is located within 500-meters radius of the tower on a building or other structure may be elevated to as much as 189 meters above ground before

<sup>††</sup> Conservative estimate of downward relative field factor.

<sup>§§</sup> Furthermore, the facilities are excluded from routine environmental evaluation pursuant to Section 1.1307(b)(3)(ii) of the FCC Rules.

reaching the 5% RF exclusion level for any one of the broadcast stations considered herein.

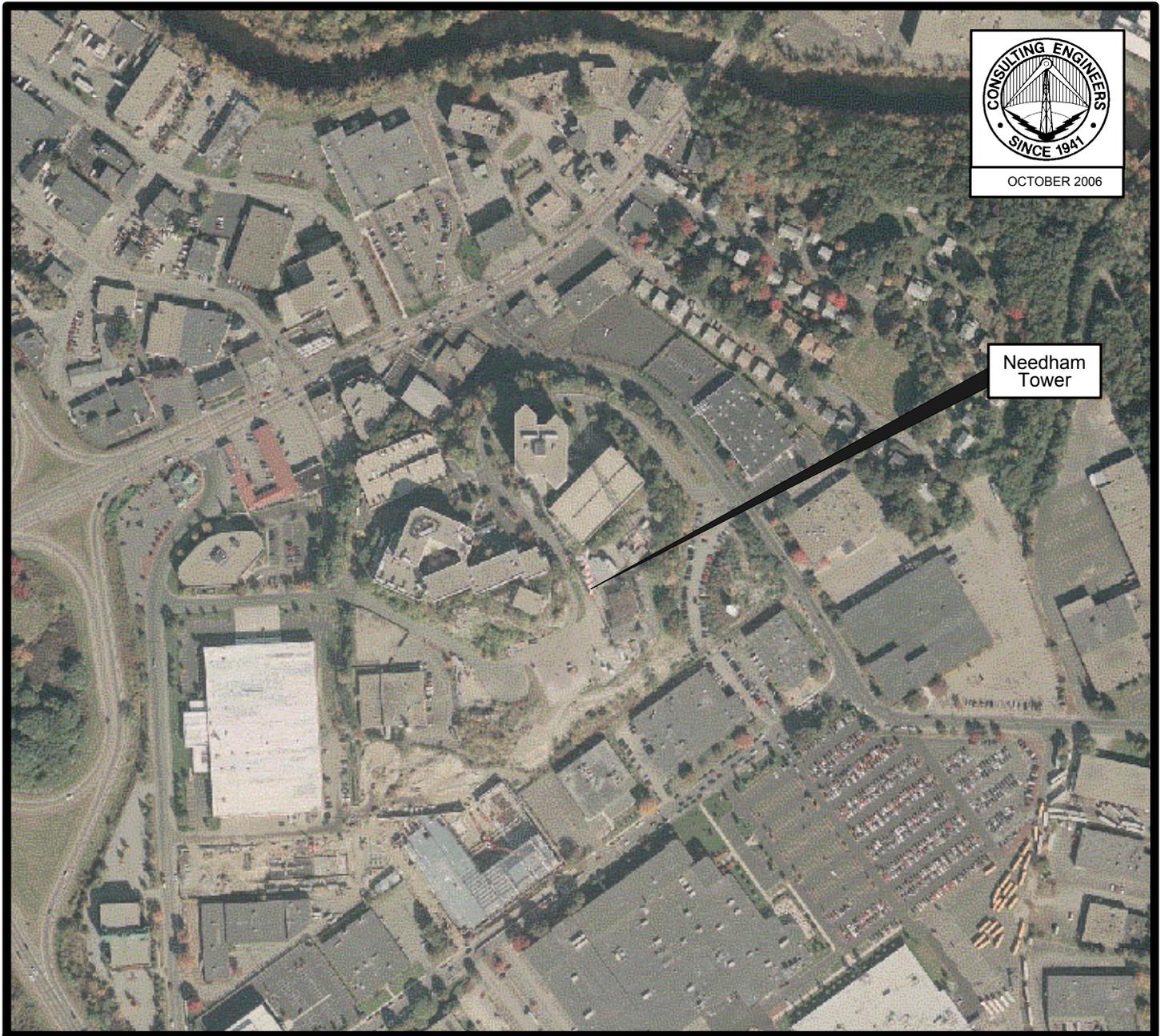
With regard to tower workers, all the licensees located at the Needham transmitter site, shall cooperate in the reduction of power or cessation of operations as necessary to protect persons having access to the tower or antennas from RF radiation in excess of the FCC guidelines.



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October 30, 2006

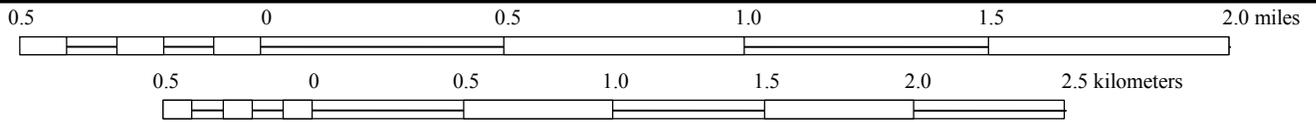
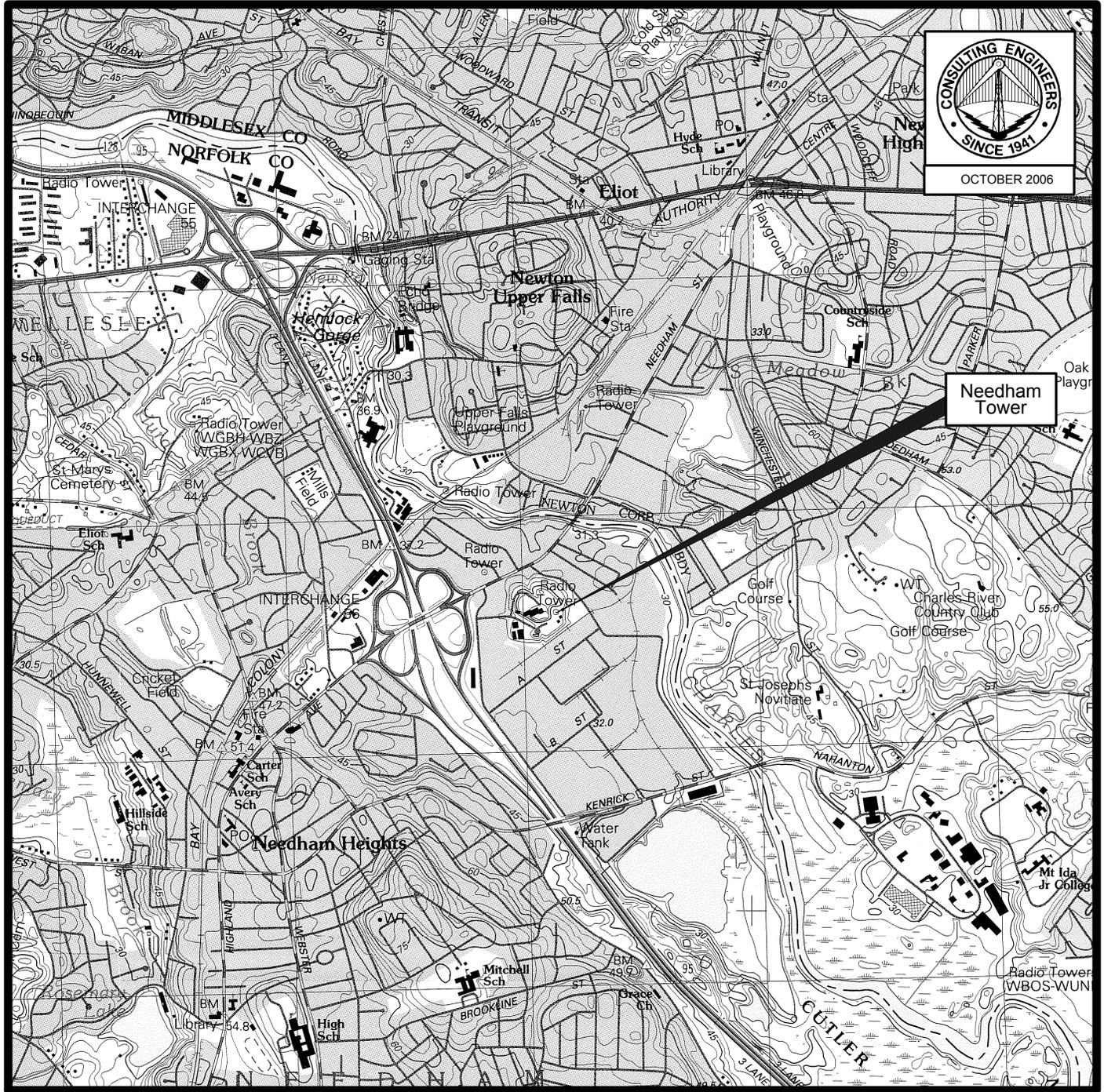


100 0 100 200 300 400 500 meters

## **AERIAL PHOTOGRAPH OF NEEDHAM TOWER SITE**

WFXT(TV)/DT, BOSTON, MASSACHUSETTS, CHANNELS 25/31  
WSBK-TV, BOSTON, MASSACHUSETTS, CHANNEL 38  
WLVI-TV/DT, CAMBRIDGE, MASSACHUSETTS, CHANNELS 56/41

du Treil, Lundin & Rackley, Inc. Sarasota, Florida



Scale 1:25 000

## TOPOGRAPHIC MAP OF NEEDHAM TOWER SITE

WFXT(TV)/DT, BOSTON, MASSACHUSETTS, CHANNELS 25/31  
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Manufacturer's Relative Field Elevation Patterns

Six sheets follow.

# TABULATED DATA FOR VERTICAL PATTERN

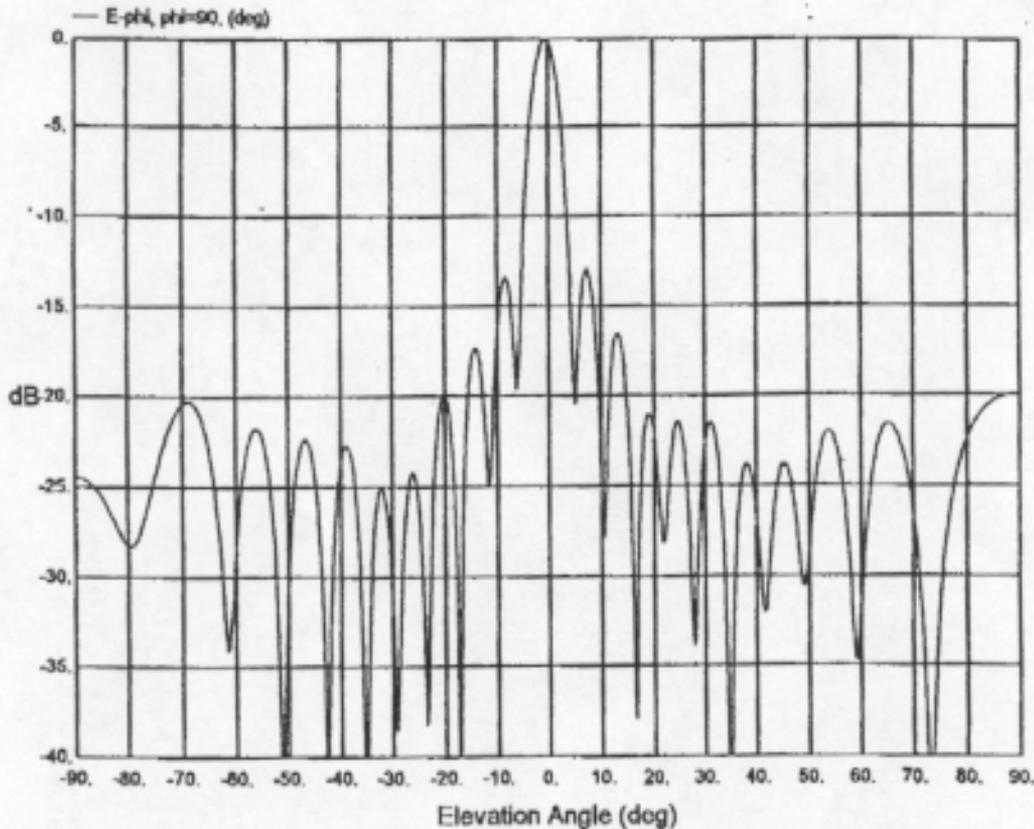
WFXT(TV)

Drawing No. 25G250075

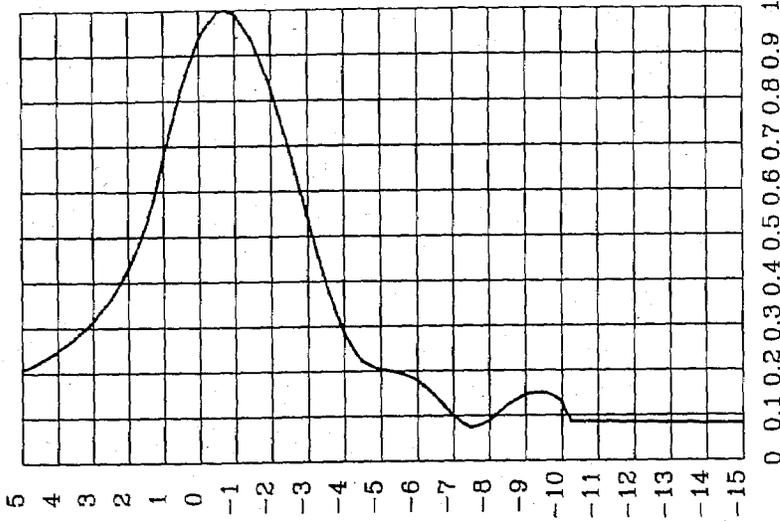
Elev Angle°	Relative Field	dB	Elev Angle°	Relative Field	dB	Elev Angle°	Relative Field	dB	Elev Angle°	Relative Field	dB
<b>-10° to -3°</b>			8.0	.109	-19.22	26.5	.004	-47.57	58.5	.008	-42.21
<b>In 0.5° Increments</b>			8.6	.109	-19.29	27.0	.006	-43.81	59.0	.011	-39.57
-10.0	.016	-35.82	9.2	.105	-19.61	27.5	.005	-46.15	59.5	.011	-39.02
-9.5	.015	-36.55	9.8	.102	-19.85	28.0	.001	-64.37	60.0	.010	-40.29
-9.0	.002	-53.22	10.4	.103	-19.70	28.5	.004	-47.98	60.5	.006	-44.14
-8.5	.014	-37.10	11.0	.108	-19.36	29.0	.006	-44.07	61.0	.001	-56.74
-8.0	.022	-33.21	-2.6	.093	-20.63	29.5	.005	-46.04	61.5	.004	-48.54
-7.5	.014	-36.99	-2.0	.045	-26.86	30.0	.001	-60.39	62.0	.008	-41.45
-7.0	.006	-44.44	-1.4	.147	-16.68	30.5	.004	-48.95	62.5	.012	-38.47
			- .8	.452	-6.90	31.0	.006	-44.27	63.0	.014	-37.38
-6.5	.025	-31.93	- .2	.766	-2.31	31.5	.005	-45.43	63.5	.013	-37.71
-6.0	.029	-30.89	.4	.967	- .29	32.0	.002	-55.21	64.0	.010	-39.62
-5.5	.009	-40.55	1.0	.983	- .15	32.5	.003	-51.10	64.5	.006	-44.18
-5.0	.023	-32.94	1.6	.828	-1.64	33.0	.006	-44.68	65.0	.001	-61.67
-4.5	.045	-26.92	2.2	.588	-4.61	33.5	.006	-44.63	65.5	.005	-46.20
-4.0	.037	-28.75	2.8	.366	-8.74	34.0	.003	-50.76	66.0	.010	-39.80
-3.5	.008	-42.27	3.4	.221	-13.12	34.5	.002	-56.32	66.5	.014	-36.78
-3.0	.066	-23.64	4.0	.158	-16.01	35.0	.005	-45.70	67.0	.017	-35.33
			4.6	.143	-16.86	35.5	.006	-44.03	67.5	.018	-34.98
			5.2	.139	-17.13	36.0	.004	-47.29	68.0	.016	-35.66
<b>-3° to +11°</b>			5.8	.129	-17.81	36.5	.000	-70.96	68.5	.013	-37.58
<b>In 0.2° Increments</b>			6.4	.116	-18.74	37.0	.004	-48.23	69.0	.008	-41.58
-3.0	.066	-23.64	7.0	.108	-19.30	37.5	.006	-44.15	69.5	.002	-52.73
-2.4	.092	-20.77	7.6	.108	-19.31	38.0	.006	-45.00	70.0	.004	-47.29
-1.8	.002	-52.85	8.2	.110	-19.21	38.5	.002	-52.22	70.5	.011	-39.20
-1.2	.240	-12.41	8.8	.107	-19.38	39.0	.002	-54.61	71.0	.017	-35.36
- .6	.562	-5.01	9.4	.103	-19.73	39.5	.005	-45.42	71.5	.022	-33.11
.0	.851	-1.40	10.0	.102	-19.85	40.0	.007	-43.74	72.0	.026	-31.81
.6	.994	- .05	10.6	.105	-19.59	40.5	.005	-46.34	72.5	.028	-31.21
1.2	.947	- .47				41.0	.001	-59.62	73.0	.027	-31.22
1.8	.752	-2.47	<b>+11° to +90°</b>			41.5	.003	-49.90	73.5	.025	-31.87
2.4	.508	-5.88	<b>In 0.5° Increments</b>			42.0	.006	-44.24	74.0	.022	-33.29
3.0	.307	-10.25				42.5	.007	-43.65	74.5	.016	-35.83
3.6	.192	-14.32	11.0	.108	-19.36	43.0	.004	-47.26	75.0	.009	-40.70
4.2	.150	-16.47	11.5	.106	-19.29	43.5	.000	-69.14	75.5	.001	-58.59
4.8	.142	-16.94	12.0	.104	-19.65	44.0	.004	-48.38	76.0	.008	-42.30
5.4	.136	-17.30	12.5	.095	-20.42	44.5	.007	-43.70	76.5	.017	-35.40
6.0	.124	-18.12	13.0	.085	-21.37	45.0	.007	-43.37	77.0	.026	-31.56
6.6	.112	-18.99	13.5	.079	-22.10	45.5	.004	-46.97	77.5	.036	-28.94
7.2	.108	-19.35	14.0	.077	-22.32	46.0	.000	-66.25	78.0	.045	-27.02
7.8	.109	-19.26	14.5	.078	-22.13	46.5	.004	-48.53	78.5	.053	-25.56
8.4	.109	-19.23	15.0	.080	-21.97	47.0	.007	-43.48	79.0	.060	-24.42
9.0	.106	-19.49	15.5	.078	-22.21	47.5	.007	-42.67	79.5	.066	-23.55
9.6	.102	-19.81	16.0	.071	-23.03	48.0	.005	-45.22	80.0	.072	-22.89
10.2	.102	-19.80	16.5	.061	-24.35	48.5	.002	-55.30	80.5	.076	-22.40
10.8	.106	-19.47	17.0	.051	-25.84	49.0	.003	-51.43	81.0	.079	-22.06
-2.8	.083	-21.58	17.5	.044	-27.07	49.5	.006	-44.02	81.5	.081	-21.86
-2.2	.076	-22.35	18.0	.040	-27.89	50.0	.008	-41.98	82.0	.081	-21.78
-1.6	.067	-23.53	18.5	.037	-28.72	50.5	.007	-42.88	82.5	.081	-21.82
-1.0	.343	-9.30	19.0	.030	-30.34	51.0	.004	-47.57	83.0	.080	-21.96
- .4	.668	-3.50	19.5	.020	-33.79	51.5	.000	-78.09	83.5	.078	-22.21
.2	.919	- .73	20.0	.008	-41.65	52.0	.004	-46.98	84.0	.074	-22.57
.8	.999	- .01	20.5	.002	-52.13	52.5	.008	-42.37	84.5	.071	-23.03
1.4	.894	- .97	21.0	.008	-41.69	53.0	.009	-41.25	85.0	.066	-23.60
2.0	.671	-3.47	21.5	.008	-42.37	53.5	.007	-42.71	85.5	.061	-24.30
2.6	.433	-7.27	22.0	.002	-52.80	54.0	.004	-48.04	86.0	.055	-25.14
3.2	.259	-11.73	22.5	.004	-48.13	54.5	.001	-65.39	86.5	.049	-26.14
3.8	.172	-15.30	23.0	.007	-42.81	55.0	.005	-45.99	87.0	.043	-27.35
4.4	.146	-16.73	23.5	.006	-44.57	55.5	.008	-41.56	87.5	.036	-28.83
5.0	.141	-17.02	24.0	.001	-59.55	56.0	.010	-40.24	88.0	.029	-30.68
5.6	.133	-17.53	24.5	.004	-47.47	56.5	.009	-41.10	88.5	.022	-33.12
6.2	.120	-18.44	25.0	.007	-43.36	57.0	.006	-44.74	89.0	.015	-36.60
6.8	.110	-19.18	25.5	.005	-45.63	57.5	.001	-57.28	89.5	.007	-42.59
7.4	.108	-19.35	26.0	.001	-63.81	58.0	.003	-49.13	90.0	.000	-80.00

# Shively Labs

Model 2200 Broadband, 6 Bay, Superturnstile,  
SN 101 - WFXT-TV Boston FOX  
Elevation Pattern - Channel 31



Vertical Plane Pattern



WFXT-DT  
Fox Television Stations  
Boston, Massachusetts

Exhibit 3

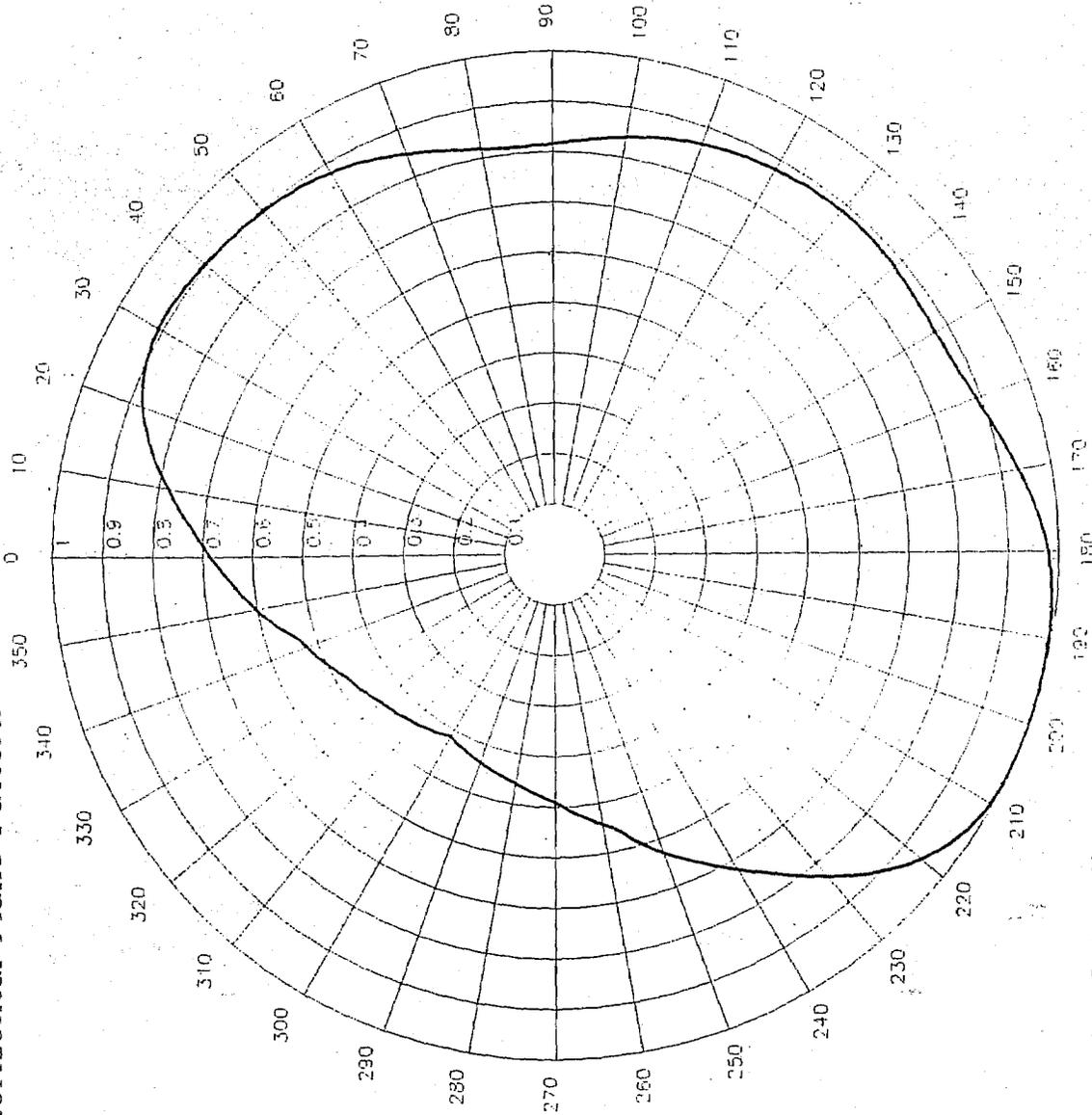
Section III-D Q10  
HORIZONTAL POLARIZATION



NEWS TECHNOLOGY GROUP

wfxt-hor-max (10-13-98)

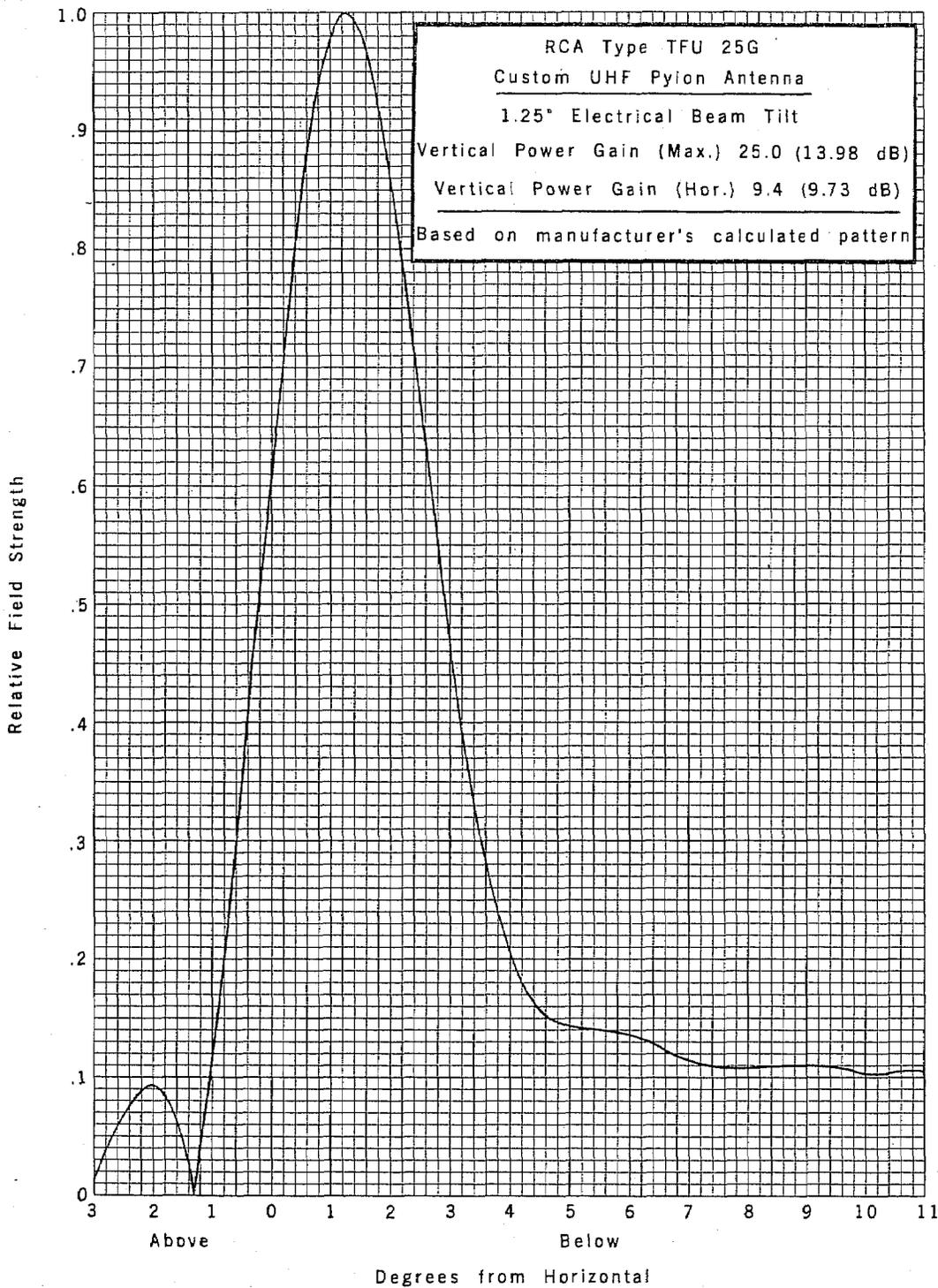
Horizontal Plane Pattern



Relative Intensity

APRIL 1975

WSBK-TV



ANTENNA VERTICAL PLANE RADIATION PATTERN

NEW BOSTON TELEVISION, INC.

STATION WSBK-TV BOSTON, MASSACHUSETTS

CH 38 3090 KW (MAX) 1180 FT

Jules Cohen & Associates Consulting Electronics Engineers



WLVI-DT

Date  
Call Letters WLVI-DT  
Location  
Customer  
Antenna Type

### ELEVATION PATTERN

RMS Gain at Main Lobe	23.5 (13.71 dB)	Beam Tilt	1.50 Degrees
RMS Gain at Horizontal	3.2 (5.05 dB)	Frequency	MHz
Calculated / Measured	Calculated	Drawing #	24B235150-90

