

TECHNICAL EXHIBIT
APPLICATION FOR MODIFICATION
OF CONSTRUCTION PERMIT
RADIO STATION WBUR-FM
BOSTON, MASSACHUSETTS

November 6, 2003

CH 215B 12 KW (MAX-DA) 305 M

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THE TRUSTEES OF BOSTON UNIVERSITY
RADIO STATION WBUR-FM
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Technical Narrative

The technical exhibit of which this narrative is part was prepared on behalf of the Trustees of Boston University (herein "Applicant"), licensee of noncommercial, educational FM station WBUR-FM. Station WBUR-FM is licensed to operate on channel 215B at Boston, Massachusetts and has been granted a construction permit to improve its coverage (BPED-19910617ID). It has been more than 12 years since the applicant filed for this construction permit, and since that time changes in the allocation situation have provided opportunity for further improvement to WBUR-FM's coverage. The applicant, therefore, requests modification of its construction permit for WBUR-FM to specify an increase in maximum effective radiated power (ERP) from 7.2 kW to 12 kW along with a modification of its authorized directional antenna pattern. No change in antenna height or transmitter location is proposed. The proposal is classified as a minor change.

The proposal does not appear to be subject to environmental processing in accordance with 47 CFR 1.1306. It is believed that the proposal conforms with all applicable rules and regulations of the Federal Communications Commission.

Transmitter Location

The transmitting facility will consist of a circularly polarized, directional FM antenna, side-mounted on the same tower from which the station now operates. The location is uniquely described by the following geographic coordinates (NAD '27), which were taken from the station license:

42° 18' 27" North Latitude

71° 13' 27" West Longitude

The tower registration number is 1004623.

Directional Antenna

A new directional antenna pattern envelope is proposed for use by WBUR-FM in order to increase coverage and to provide protection to other existing and proposed FM stations. A graph and tabulation of the horizontal plane, radiation pattern envelope are included herein as Figure 1.

The directional antenna ultimately constructed will be custom designed to maintain radiation within the proposed pattern envelope. Details concerning the directional antenna will be supplied with the WBUR-FM application for license. The proposed antenna will be side-mounted on the existing tower in accordance with specific instructions provided by the manufacturer. The proposed antenna will be mounted with antenna center of

radiation at the same elevation as that of the existing antenna.

Predicted Coverage

Figure 2 is a map showing the predicted 60 dBu coverage contour for the proposed facility. As can be seen on the map, the entire city of Boston is within the predicted 60 dBu contour. The proposed 60 dBu contour encompasses a land area of 6,174 square kilometers within which an estimated 4,111,419 persons reside. The land area was estimated using a root-mean-squared methodology. The population within the contour was estimated by means of a computer program that sums the populations of U.S. Census blocks having centroids within the contour; 2000 U.S. Census data were employed.

Allocation Considerations

The proposed facility complies with 47 CFR 73.207 with respect to all intermediate frequency (IF) related stations. The proposed facility also complies with the requirements of 47 CFR 73.509 with respect to all other NCE-FM stations with which there is presently no prohibited contour overlap.

Both the licensed and authorized WBUR-FM facilities have existing contour overlap with seven other FM stations. The following table summarizes the existing contour overlap with these stations.

Station	Nature of Existing Contour Overlap with WBUR-FM
WDJM-FM, CH 217A, Framingham, MA	100 dBu contour of WDJM-FM lies completely within WBUR-FM 60 dBu contour.
WSHL-FM, CH 217A, Easton, MA	100 dBu contour of WSHL-FM lies completely within WBUR-FM 60 dBu contour.
WBIM-FM, CH 218A, Bridgewater, MA	100 dBu contour of WBIM-FM lies completely within WBUR-FM 60 dBu contour.
WJUL(FM), CH 218A, Lowell, MA	100 dBu contour of WJUL(FM) lies completely within WBUR-FM 60 dBu contour.
WMFO(FM), CH 218A, Medford, MA	100 dBu contour of WMFO(FM) lies completely within WBUR-FM 60 dBu contour.
WMLN-FM, CH 218A, Milton, MA	100 dBu contour of WMLN-FM lies completely within WBUR-FM 60 dBu contour.
WZBC(FM), CH 212A, Newton, MA	100 dBu contour of WZBC(FM) lies completely within WBUR-FM 60 dBu contour; 100 dBu contour of WBUR-FM lies completely within the WZBC(FM) 60 dBu contour.

This proposal will result in no increase in contour overlap with the first six of the seven stations listed in the table above. With respect to third-adjacent channel station WZBC(FM), channel 212A, Newton, MA, there will be an increase in overlap between the WBUR-FM predicted 100 dB μ [F(50,10)] interfering contour and the WZBC predicted 60 dB μ [F(50,50)] protected contour. Due to the fact that the 100 dB μ [F(50,10)] contour of WBUR-FM lies completely within the 60 dB μ [F(50,50)] contour of WZBC, it is not possible for WBUR-FM to improve its facility without increasing the predicted overlap area. Should the Commission determine that the proposed increase in the WBUR-FM facilities is in contravention of the provisions of 47 CFR 73.509 due to the WZBC situation, a waiver is respectfully requested. Details on the

allocation situation with WZBC(FM) and support for a grant of such a waiver are provided in a separate section below.

Figure 3 is an allocation study with respect to pertinent proposed and authorized FM stations. Contained in Figure 3 are maps showing the protected and interfering contours along all azimuths for the applicant's facility and along the required azimuths for other pertinent FM stations. Sheet 1 of Figure 3 shows the allocation situation with respect to other co-channel and first adjacent channel stations. Sheet 2 of Figure 3 shows the allocation situation with respect to second and third adjacent channel stations. Sheet 3 of Figure 3 shows the allocation situation with respect to third-adjacent channel station WZBC. Sheet 4 of Figure 3 shows the predicted interference to station WZBC from both the proposed and authorized facilities of WBUR-FM.

Predicted Interference to Station WZBC

As was previously mentioned, the 100 dBu [F(50,10)] contour of WBUR-FM lies entirely within the 60 dBu [F(50,50)] contour of third-adjacent channel station WZBC(FM).¹ This situation is illustrated on Sheet 3 of Figure 3. However, the actual interference caused to WZBC(FM) by WBUR-FM is predicted to be far less than that indicated by the 100 dBu/60 dBu contour overlap shown on Sheet 3 of Figure 3. This is because the transmitter sites for WBUR-FM and WZBC(FM) are only five kilometers apart and therefore the WZBC(FM) field strength [F(50,50)] is predicted to be between 82 dBu and 72 dBu over the

¹ The 100 dBu [F(50,10)] of WZBC(FM) also lies entirely within the 60 dBu [F(50,50)] contour of WBUR-FM.

areas where actual interference may occur. Using a +40 dB undesired to desired signal ratio for third-adjacent channel interference, the actual interfering field strength for WBUR-FM is between 112 dBu and 122 dBu.

Therefore, to more accurately predict the interference area to WZBC(FM), the ratios of the interfering signal from both the proposed and authorized WBUR-FM facilities to the protected signal of WZBC(FM) were determined at locations around the WBUR-FM transmitter site.² On Sheet 4 of Figure 3 are shown the areas within which the WBUR-FM undesired signal is predicted to exceed the WZBC desired signal by more than 40 dB. As can be seen in this exhibit the predicted interference areas are much smaller than the areas within the 100 dBu contours of the authorized and proposed WBUR-FM facilities.

Based on the predicted interference areas shown on Sheet 4 of Figure 3, the new interference area will be 0.83 square kilometers larger than that from the authorized WBUR-FM facility and encompasses 792 more persons than that from the authorized facility. When compared with the increase in coverage for WBUR-FM that results from this proposal, the increased interference is very small. The following table summarizes both the coverage for WBUR-FM and the predicted interference from WBUR-FM to WZBC(FM).

² The normal FCC field strength prediction method was used to predict distances to the respective field strength contours for both stations.

Facility	Land Area (sq. km.)		Population (2000 U.S. Census)	
	Within 60 dBu Coverage Contour	Within Predicted Interference Area to WZBC	Within 60 dBu Coverage Contour	Within Predicted Interference Area to WZBC
Authorized WBUR-FM	5,193	1.55	3,865,443	1,779
Proposed WBUR-FM	6,174	2.38	4,111,419	2,571
Increase of Proposed over Authorized WBUR-FM	981	0.83	245,976	792

The increase in the predicted interference area to WZBC(FM) (0.83 sq. km.) is only eight-hundredths of one percent (0.08%) of the increase in coverage area for WBUR-FM (981 sq. km.). The increase in population predicted to receive interference to reception of WZBC(FM) from WBUR-FM (792 persons) is only thirty-two hundredths of one percent (0.32%) of the population predicted to receive new coverage from WBUR-FM (245,976 persons).

Compliance with U.S./Canadian Agreement

The transmitter site for WBUR-FM is within 320 km (200 mi) of the U.S. border with Canada. It is fully-spaced to all Canadian FM stations and allotments. The station has previously been coordinated with Canada as a class B station, and since no change in class of station or transmitter site is proposed, it is believed that the proposed operation complies with the U.S. Canadian agreement. The applicant requests coordination with Canada if such coordination is required.

Coverage, Protected and Interfering Contours

The predicted coverage, protected and interfering contours were calculated in accordance with the provisions of 47 CFR 73.313. In accordance with the current FCC practice, no consideration was given to terrain roughness correction factors.

For all FM facilities considered in the allocation study, the average terrain elevations from 3 to 16 kilometers from their respective sites along 36 radials, evenly spaced at 10-degree intervals, were determined using the N.G.D.C. 3-second terrain database. For the proposed WBUR-FM, in addition to the average terrain elevations along the 36 evenly-spaced radials, the average terrain elevations were also determined along a limited number of supplemental radials as noted in the directional antenna pattern envelope tabulated in Figure 1.

The antenna radiation center heights above average terrain in the individual radial directions and the corresponding effective radiated powers were used in conjunction with the F(50,50) and F(50,10) curves of 47 CFR 73.333 (Figures 1 and 1a) to determine distances to the coverage, protected and interfering contours.

TV Channel 6 Protection

The Commission requires that noncommercial, educational FM facilities provide interference protection

to affected TV channel 6 facilities as defined in 47 CFR 73.525(a). For channel 215 FM facilities, TV Channel 6 stations within 180 km of the proposed FM transmitter site are considered to be affected stations per 47 CFR 73.525(a). There are two such TV stations within 180 km of WBUR-FM: WCSH, Portland, Maine and WLNE-TV, New Bedford, Massachusetts. Station WCSH is located 177.3 km from WBUR-FM and the closest point on its predicted 47 dBu, Grade B contour falls approximately 54 kilometers from the WBUR-FM transmitter site. Taking into account the +27 dB (U/D) protection ratio found in 47 CFR 73.599, Figure 2 and the 6 dB adjustment for television receive antenna directivity, the calculated NCE-FM interfering contour is 80 dBu at the WCSH 47 dBu contour. The WBUR-FM 80 dBu contour falls approximately 33.5 km short of the WCSH 47 dBu contour and so there is no predicted interference.

Channel 6 television station WLNE-TV, New Bedford, Massachusetts is located 79 kilometers from the WBUR-FM site and therefore requires study. Figure 4 is a study demonstrating that the proposed WBUR-FM facility meets the requirements of 47 CFR 73.525 with respect to WLNE-TV. As can be seen in Figure 4, the predicted interference area to WLNE-TV is outside of the WLNE-TV Grade A contour and outside of the ADI/DMA for the Providence, Rhode Island-New Bedford, Massachusetts market. The predicted interference area is totally within the City Grade Contour of channel 5, television station WCVB-TV, Boston, Massachusetts. Both stations, WLNE-TV and WCVB-TV, are affiliated with the ABC Television Network. The WBUR-FM proposal therefore meets the requirements of 47 CFR 73.525.

It is further noted that there is an authorization for DTV station WEDY on channel 6 at New Haven, Connecticut. The transmitter site for WEDY is located 177.1 km from WBUR-FM, and the closest point on the 41 dBu [F(50,90)] contour for WEDY-DT falls approximately 140 km from WBUR-FM. Therefore, it is predicted that there will be no adverse affect on WEDY-DT from the proposed WBUR-FM.

Environmental Considerations

The proposed facility was evaluated in terms of potential radiofrequency radiation exposure at 2 meters above ground level in accordance with OET Bulletin No. 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," Edition 97-01. Using the appropriate equation shown in the Bulletin and a "worst case" relative field factor of 1.0, the maximum power density at any location around the tower at 2.0 meters above ground level, attributable to the proposed FM operation is predicted to be 0.008 mW/cm^2 , or 4 percent of the FCC standard for an uncontrolled environment. Since, the proposed operation of WBUR-FM produces a "worst-case" predicted power density of less than 5 percent of the FCC standard for an uncontrolled environment, it complies with the FCC Guidelines and is exempt from shared responsibility for compliance at this multi-user site per 47 CFR 1.1307(b)(3).

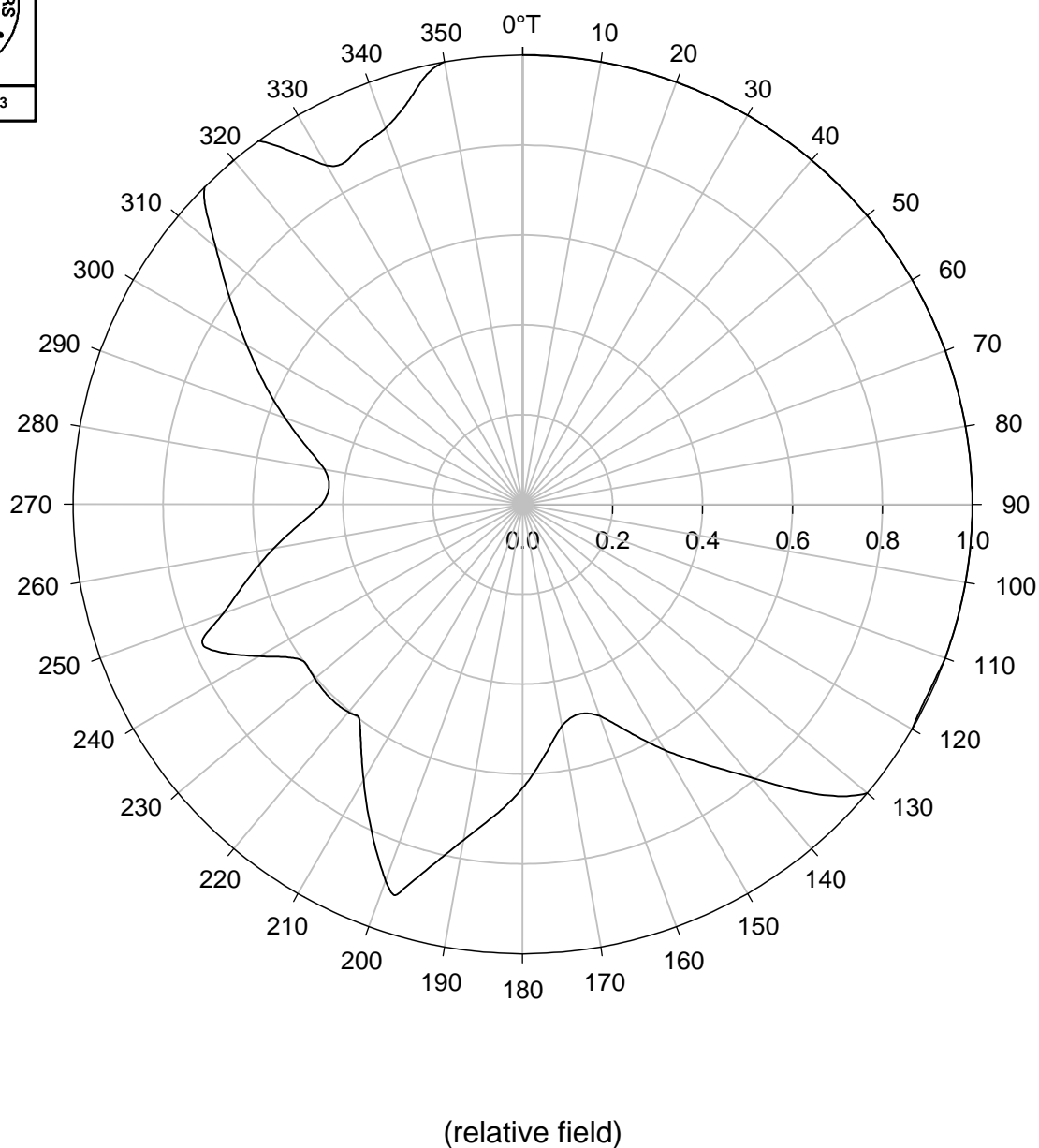
The applicant verifies that a fence restricts access to the tower and that appropriate warning signs are posted. Furthermore, the applicant verifies that in

concert with other tower users, appropriate measures to protect workers or other authorized personnel granted access to the tower structure will be taken to assure that no exposure of radiofrequency radiation in excess of the FCC guidelines will occur. These measures include, but are not limited to, a reduction in, or shut down of station power, as necessary.

Since the proposal involves use of an existing communications tower and since it meets the requirements of 47 CFR 1.1307(b) with respect to radiofrequency radiation exposure, it appears to be categorically excluded from environmental processing, as it appears to meet all of the criteria for such an exclusion in 47 CFR 1.1306.

David E. Dickmann
du Treil, Lundin & Rackley, Inc.
201 Fletcher Avenue
Sarasota, Florida 34237
(941) 329-6000

November 6, 2003



PROPOSED DIRECTIONAL ANTENNA PATTERN ENVELOPE

RADIO STATION WBUR-FM
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CH 215B 12 KW (MAX-DA) 305 M

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

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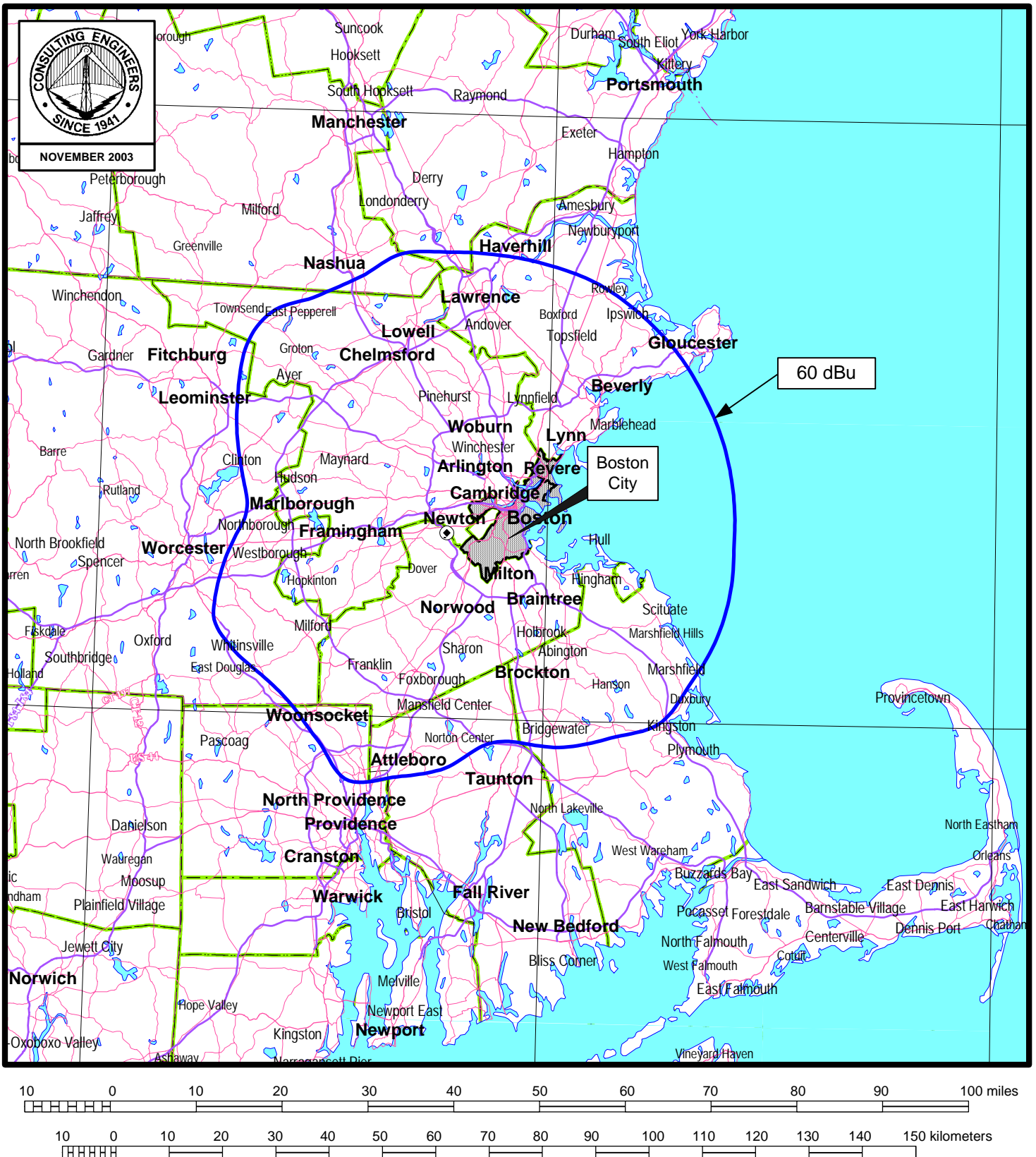
**TABULATION OF PROPOSED DIRECTIONAL
ANTENNA PATTERN ENVELOPE**

Azimuth Deg. T	Relative Field	ERP kW	Azimuth Deg. T	Relative Field	ERP kW
0	1.000	12.00	180	0.631	4.78
10	1.000	12.00	190	0.759	6.91
20	1.000	12.00	200	0.891	9.53
30	1.000	12.00	210	0.708	6.01
40	1.000	12.00	220	0.603	4.36
50	1.000	12.00	230	0.603	4.36
60	1.000	12.00	240	0.676	5.49
70	1.000	12.00	250	0.708	6.01
80	1.000	12.00	260	0.562	3.79
90	1.000	12.00	270	0.447	2.39
100	1.000	12.00	280	0.447	2.39
110	1.000	12.00	290	0.562	3.79
120	1.000	12.00	300	0.708	6.01
130	1.000	12.00	310	0.891	9.53
140	0.794	7.57	320	1.000	12.00
150	0.631	4.78	330	0.871	9.10
160	0.501	3.01	340	0.891	9.53
170	0.501	3.01	350	1.000	12.00

Additional Bearings:

197	0.891	9.53
217	0.603	4.36
235	0.603	4.36
246	0.776	7.23
315	1.000	12.00
324	1.000	12.00
335	0.871	9.10
345	0.944	10.70

Figure 2



PREDICTED 60 dBu COVERAGE CONTOUR

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WCS(FM) New London, NH
CH 215A 0.25 KW 91 M
60 dBu F(50,50)
40 dBu F(50,10)

WLMW(FM) Manchester, NH
CH 214A 0.015 KW-DA 265 M
60 dBu F(50,50)
54 dBu F(50,10)

(FM) Station Winchendon, MA
CH 216A 0.155 KW 63 M
60 dBu F(50,50)
54 dBu F(50,10)

WBVC(FM) Pomfret, CT
CH 216A 0.1 KW 88 M
60 dBu F(50,50)
54 dBu F(50,10)

WCNI(FM) New London, CT
CH 215A 2 KW 57 M
60 dBu F(50,50)
40 dBu F(50,10)

ALLOCATION STUDY

RADIO STATION WBUR-FM
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CH 215B 12 KW (MAX-DA) 305 M

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

Proposed WBUR-FM Boston, MA
CH 215B 12 KW-DA 305 M
60 dBu F(50,50)
54 dBu F(50,10)
40 dBu F(50,10)

WWTE(FM) Wellfleet, MA
CH 214A 1 KW-DA 47 M
60 dBu F(50,50)
54 dBu F(50,10)

WKKL(FM) West Barnstable, MA
CH 214A 0.205 KW 38 M
60 dBu F(50,50)
54 dBu F(50,10)

WSMU-FM North Dartmouth, MA
CH 216A 1.2 KW 91 M
60 dBu F(50,50)
54 dBu F(50,10)

WJHD(FM) Portsmouth, RI
CH 214A 0.36 KW 24 M
60 dBu F(50,50)
54 dBu F(50,10)

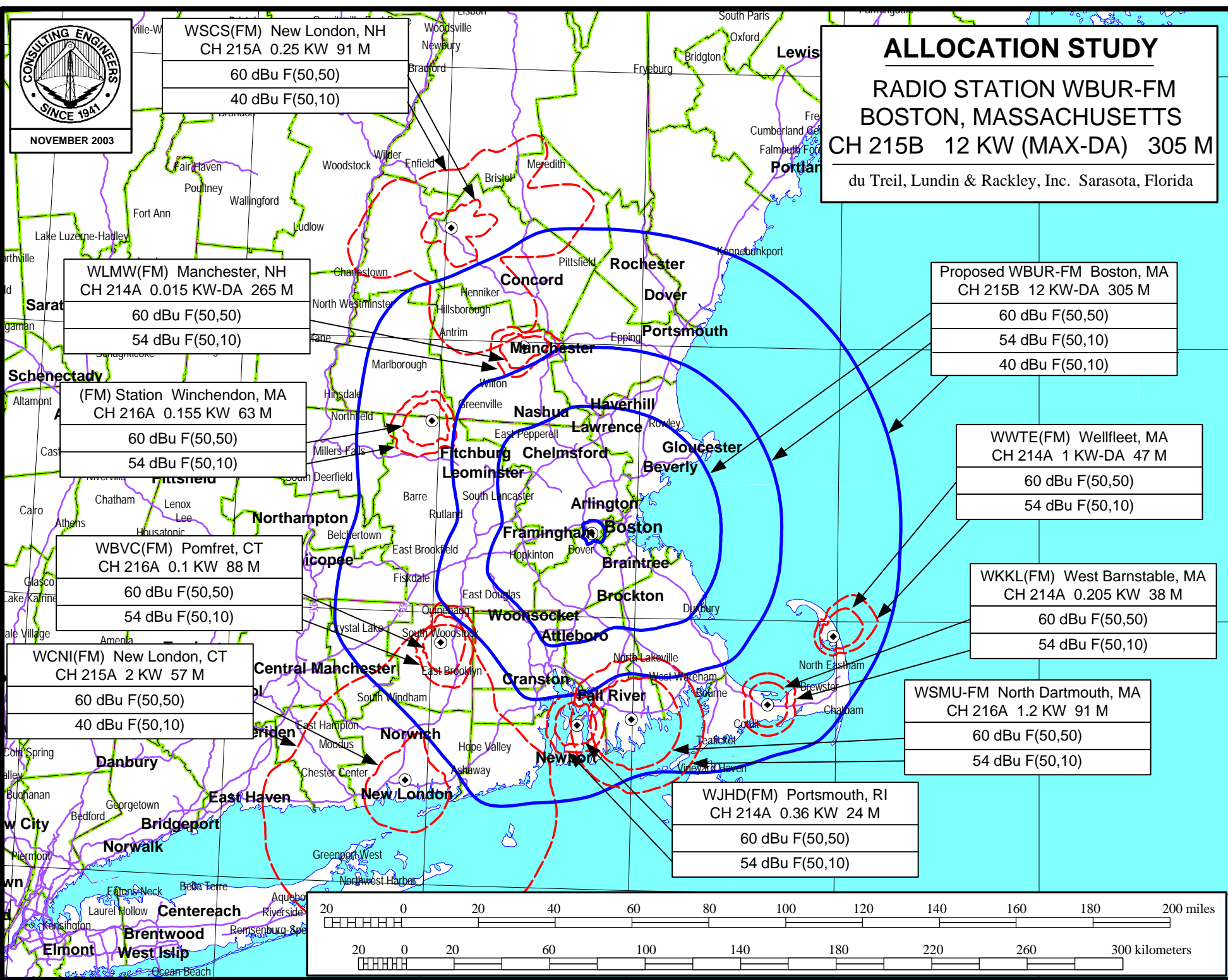


Figure 3
Sheet 1 of 4



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WJUL(FM) Lowell, MA
CH 218A 1.4 KW-DA 63 M

60 dBu F(50,50)

100 dBu F(50,10)

WICN(FM) LIC Worcester, MA
CH 211B1 8.1 KW-DA 113 M

60 dBu F(50,50)

100 dBu F(50,10)

WICN(FM) APP Worcester, MA
CH 213B 8.1 KW-DA 113 M

60 dBu F(50,50)

100 dBu F(50,10)

WCUW(FM) Worcester, MA
CH 217A 0.63 KW-DA 44 M

60 dBu F(50,50)

100 dBu F(50,10)

WDJM-FM Framingham, MA
CH 217A 0.1 KW 27 M

60 dBu F(50,50)

100 dBu F(50,10)

WMLN-FM Milton, MA
CH 218A 0.17 KW-DA 29 M

60 dBu F(50,50)

100 dBu F(50,10)

WDOM(FM) Providence, RI
CH 217A 0.125 KW 40 M

60 dBu F(50,50)

100 dBu F(50,10)

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(FM) Station Haverhill, MA
CH 213A 0.1 KW 15 M

60 dBu F(50,50)

100 dBu F(50,10)

WMFO(FM) Medford, MA
CH 218A 0.125 KW-DA 41 M

60 dBu F(50,50)

100 dBu F(50,10)

Proposed WBUR-FM Boston, MA
CH 215B 12 KW-DA 305 M

60 dBu F(50,50)

100 dBu F(50,10)

WSHL-FM Easton, MA
CH 217A 0.1 KW-DA 20 M

60 dBu F(50,50)

100 dBu F(50,10)

WSMA(FM) Scituate, MA
CH 213B1 21.6 KW-DA 88 M

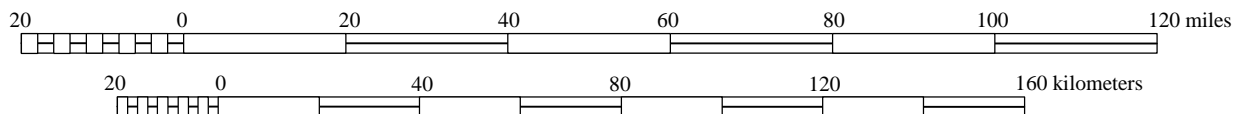
60 dBu F(50,50)

100 dBu F(50,10)

WBIM-FM Bridgewater, MA
CH 218A 0.18 KW-DA 22 M

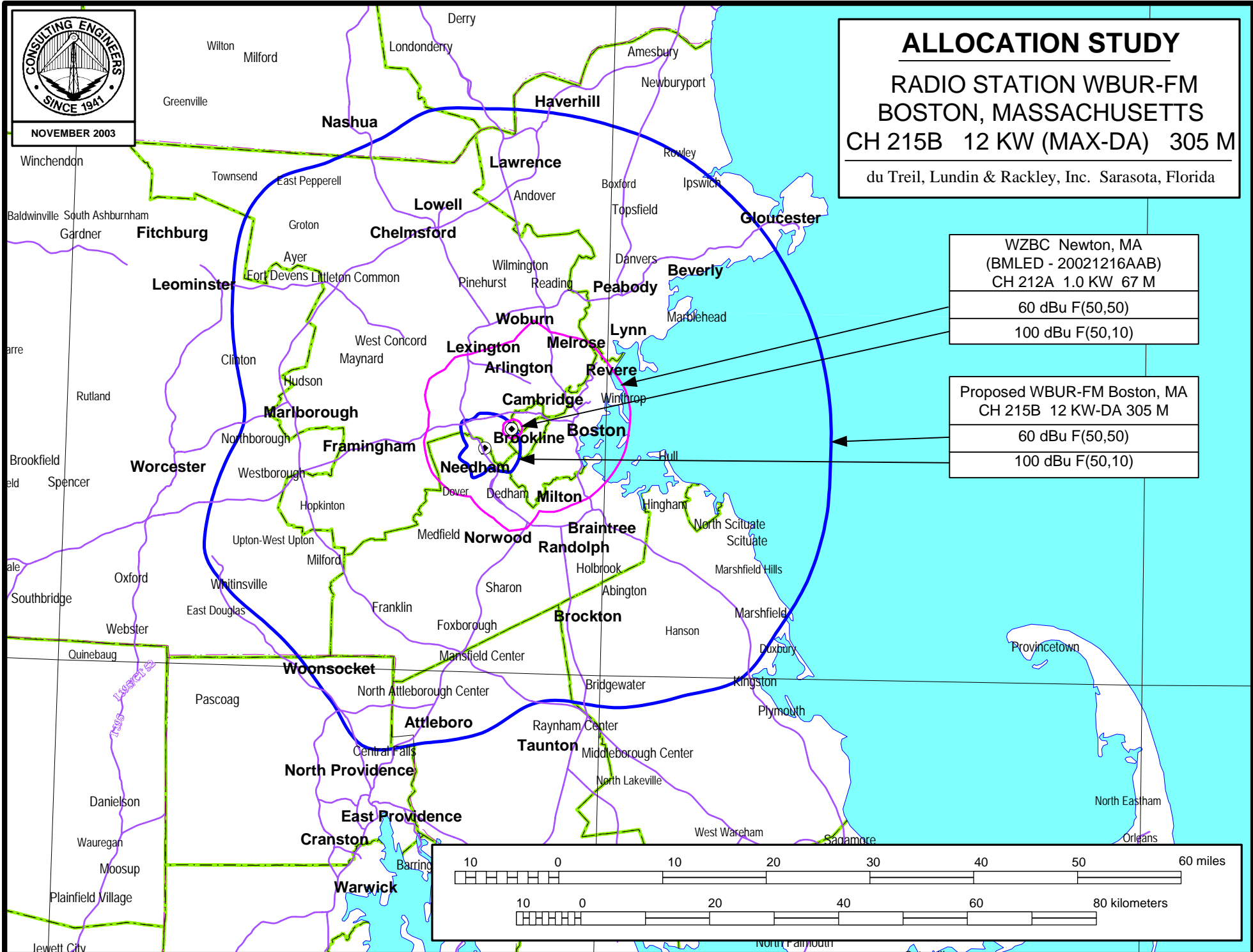
60 dBu F(50,50)

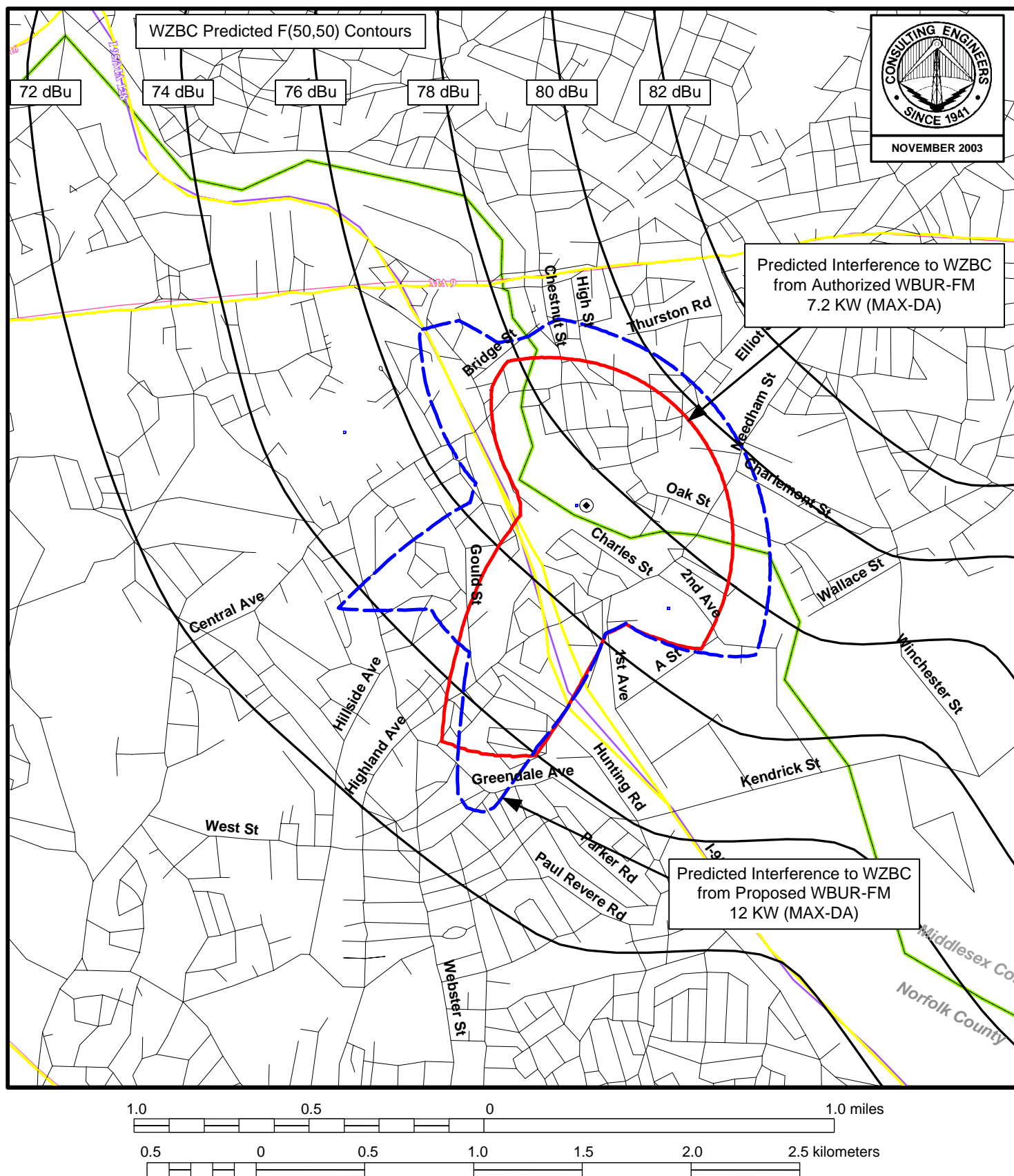
100 dBu F(50,10)





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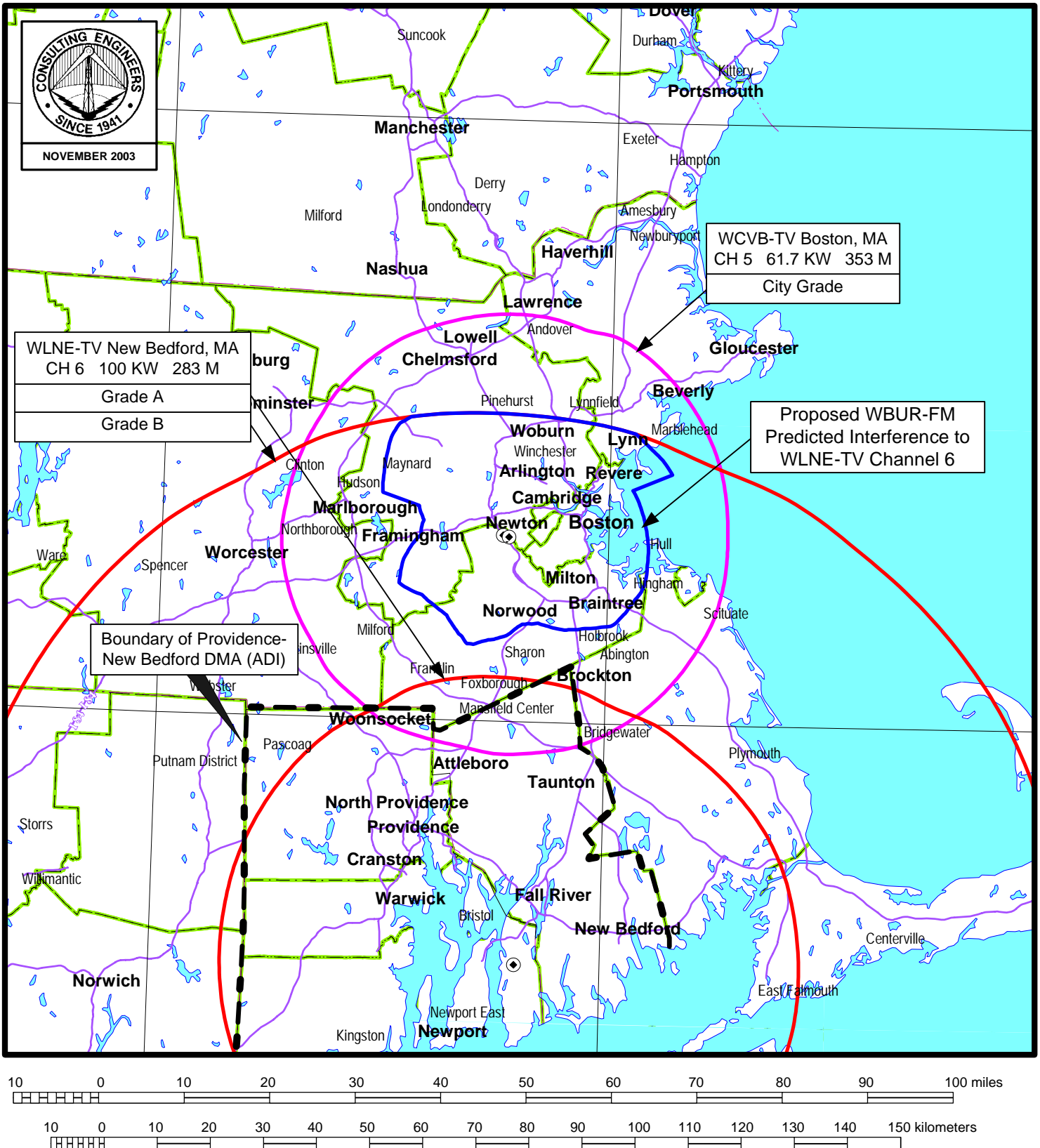


PREDICTED INTERFERENCE TO WZBC

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Figure 4



TECHNICAL EXHIBIT
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Engineering Specifications

Channel / Frequency	215B / 90.9 MHz
Site Coordinates (NAD '27)	42°18'27"North Latitude 71°13'27"West Longitude
Site elevation	30 m AMSL
Average elevation of standard eight radials, 3 to 16 km	44 m AMSL
Overall height of existing structure (ASR#1004623)	381 m AGL 411 m AMSL
Height of antenna radiation center	319 m AGL 349 m AMSL
Antenna radiation center HAAT	305 m
Transmitter	as required
Antenna	as required
Polarization	Circular
Effective radiated power (H & V)	12 kW (Max-DA)