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ENGINEERING STATEMENT

Application to Modify License

(Auxiliary Antenna)

FCC Form 302-FM

WRTI, Channel 211B

Philadelphia, Pennsylvania

27 September 2010

OVERVIEW

The instant application for license is for an auxiliary antenna for non-commercial educational FM broadcast station WRTI. The applicant requests that this application for license be processed pursuant to the provisions of 47 CFR §73.1675(c) with respect to using a formerly-licensed main facility as an auxiliary facility. The formerly-licensed main facility is file number BLED-19881223KC. This application is being submitted simultaneously with an application for license to cover construction permit for the new WRTI main antenna (construction permit file number BPED-20070824AGY).

In compliance with the requisites detailed in §73.1675(c)(1), the auxiliary antenna radiation center is the same as the licensed facility's, the auxiliary facility will operate on the same channel as the licensed main facility, and the auxiliary facility complies with §73.1675(a) with regard to not extending beyond the 1.0 mV/m (60 dBu) contour of the presently-licensed main facility.

DATA SOURCES AND CALCULATIONS

Computer-generated analyses contained in the instant application were produced using the software package *ComStudy Pro* version 2.2 by Radiosoft. The ComStudy package uses 3-second and 30-second linearly-interpolated terrain data in accordance with 47 CFR §73.312(d). Contour plots contained in exhibits in the instant application were likewise generated by ComStudy which utilizes algorithms that faithfully reproduce the F(50,50) and F(50,10) curves of 47 CFR §73.333 figures 1 and 1a. Unless otherwise stated, all contour plots were generated with 5 degree azimuth intervals. Data for existing facilities, construction permits, and pending applications was obtained from the Commission's current databases as acquired and distributed by Radiosoft.

DIRECTIONAL ANTENNA

The antenna being repurposed for use as an auxiliary antenna for WRTI is the existing Dielectric model DCR-M6BF. This is a 6-bay side-mounted antenna with one wavelength inter-bay spacing. No changes to the antenna, nor currently-licensed directional pattern, will be made. The antenna center of radiation will remain at its current location, 300 meters above ground level.

EFFECTIVE RADIATED POWER AND DISTANCE TO CONTOURS

The auxiliary facility will operate with a maximum directional effective radiated power (ERP) of 11.0 kilowatts (10.6 kilowatts without beamtilt) in the horizontal polarization plane and 9.7 kilowatts (9.3 kilowatts without beamtilt) in the vertical polarization plane. At the antenna center of radiation proposed, this ERP yields a 1 mV/m (60 dBu) contour which remains within the 60 dBu contour of the WRTI main facility at all azimuths (see Figure 1). A tabulation of the distance to the 1 mV/m contour for both the main and proposed auxiliary facilities is shown in Table 1. The calculated difference (delta) between the distance to the 60 dBu contour for the main and proposed auxiliary facilities is also included in that tabulation, with positive delta values indicating the main contour extends further than the auxiliary contour. Note that all distance values were rounded to the nearest 0.1 km in the interest of brevity. As none of the delta values are negative, the 60 dBu contour of the proposed auxiliary facility is wholly contained within the 60 dBu contour of the main facility, therefore complying with 47 CFR §73.1675(a)(1)(ii).

TRANSMITTER POWER OUTPUT

The effective radiated power to be authorized is 11.0 kW in the horizontal polarization and 9.7 kW in the horizontal polarization plane. The transmission line is 320 meters of Cablewave HCC-158-50J semi-rigid air-dielectric coaxial cable. This transmission line has a loss of 0.656 dB per 100m¹ for a net loss of 2.10 dB. This equates to a transmission line efficiency of 61.7%. The antenna exhibits a power gain of 7.71 in horizontal polarization plane and 6.80 in the vertical polarization plane².

The transmitter power output (TPO) required to achieve the authorized ERP is verified as follows:

	<u>HORIZONTAL</u>	<u>VERTICAL</u>
Transmitter Power Output (kW):	2.32	2.32
Transmission Line Efficiency:	× 0.617	× 0.617
Antenna Gain:	× <u>7.71</u>	× <u>6.80</u>
Authorized ERP (kW):	11.0	9.7

Rounding 2.32 kW to the nearest 0.05 kilowatt as required per 47 CFR §73.212(a), **the licensed transmitter output power shall be 2.3 kW** to produce the requisite ERP in both polarization planes.

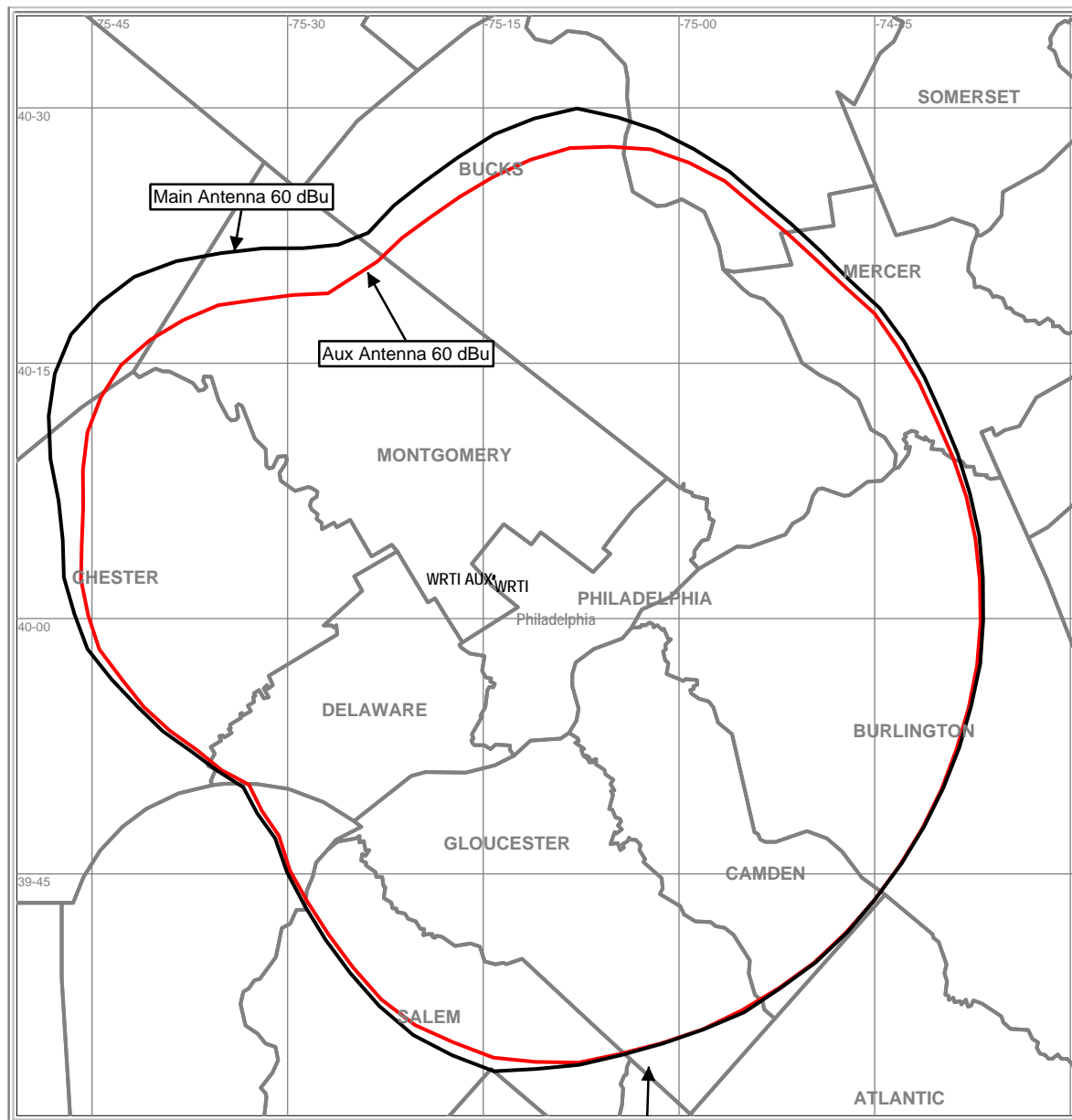
^{1,2} manufacturers' specifications

AZ	MAIN	AUX	DELTA
0	48.1	43.7	4.4
5	50.0	45.8	4.2
10	51.7	47.6	4.1
15	51.7	48.7	3.0
20	51.6	49.7	1.9
25	51.3	50.0	1.3
30	50.9	50.0	0.9
35	50.3	49.4	0.9
40	50.1	49.3	0.8
45	50.1	49.3	0.8
50	50.3	49.6	0.7
55	51.0	50.4	0.6
60	51.3	50.6	0.7
65	51.5	50.9	0.6
70	51.7	51.1	0.6
75	52.1	51.6	0.5
80	52.5	52.2	0.3
85	53.0	52.6	0.4
90	53.2	52.9	0.3
95	53.5	53.2	0.3
100	53.8	53.5	0.3
105	53.8	53.6	0.2
110	54.0	53.7	0.3
115	54.1	53.9	0.2
120	54.2	54.0	0.2
125	54.3	54.2	0.1
130	54.4	54.3	0.1
135	54.7	54.4	0.3
140	54.8	54.5	0.3
145	54.7	54.4	0.3
150	54.8	54.2	0.6
155	54.4	54.1	0.3
160	54.1	53.8	0.3
165	53.9	53.5	0.4
170	54.0	53.5	0.5
175	53.8	52.8	1.0

AZ	MAIN	AUX	DELTA
180	53.9	52.2	1.7
185	52.4	50.7	1.7
190	50.7	49.4	1.3
195	48.4	47.4	1.0
200	46.0	45.0	1.0
205	43.6	42.7	0.9
210	41.4	40.6	0.8
215	39.3	38.8	0.5
220	37.2	36.5	0.7
225	36.5	35.7	0.8
230	35.7	34.8	0.9
235	36.8	36.2	0.6
240	38.1	37.3	0.8
245	39.8	39.0	0.8
250	41.3	40.6	0.7
255	43.1	41.9	1.2
260	44.9	43.6	1.3
265	45.8	44.3	1.5
270	46.8	44.9	1.9
275	47.0	44.9	2.1
280	48.0	45.3	2.7
285	49.8	46.2	3.6
290	51.4	46.9	4.5
295	52.5	47.0	5.5
300	52.9	46.6	6.3
305	52.1	45.4	6.7
310	50.8	43.9	6.9
315	48.6	42.2	6.4
320	46.0	39.7	6.3
325	43.6	37.7	5.9
330	41.2	35.9	5.3
335	39.8	36.2	3.6
340	39.8	36.7	3.1
345	41.8	38.4	3.4
350	43.6	39.9	3.7
355	45.7	41.7	4.0

TABLE 1 – Distance to 1 mV/m (60 dBu) contours, Main and Auxiliary Facilities

FIGURE 1 - Main and Auxiliary Facility 60 dBu Contours



ENVIRONMENTAL STATEMENT

As the modified facility results in a decrease in the effective radiated power, and the will only be used as an auxiliary facility operating only when the main WRTI antenna cannot be used, the net effect will be an overall decrease in the level of radiofrequency energy in the vicinity of the antenna site. As the facility has already demonstrated compliance with radiofrequency exposure limits at the higher (former main antenna) power levels, a detailed analysis is not warranted herein.

As there will be no changes to the antenna, antenna tower, or anything else at the transmitter site aside from a reduction in power, there will be no other environmental impact. The antenna site is not in a sensitive environmental area. The instant application has no other significant environmental impact. As such, the constructed facility does not require further analysis under 47 CFR §1.1307, and is therefore excluded from further processing per 47 CFR §1.1306.

CERTIFICATION

I, Jeff DePolo, certify that the engineering portion of the instant application, including all associated exhibits, was prepared by Broadcast Sciences LLC on behalf of the applicant, Temple University of the Commonwealth System of Higher Education. The data and exhibits contained therein were generated by me or under my direct supervision. The information, calculations, and analyses provided are true and accurate to the best of my knowledge and belief. I have been employed in the broadcast and wireless communications field for over eighteen years, during which time I have prepared numerous applications deemed acceptable to the Federal Communications Commission. I, and Broadcast Sciences, have served as the applicant's engineering consultants for the past fifteen years. My other qualifications are a matter of record with the Commission.

A handwritten signature in black ink, appearing to read "J. DePolo", is positioned above the printed name and title.

Jeff DePolo, President/Senior Engineer
Broadcast Sciences LLC