



Broadcast Sciences LLC

1465 Horseshoe Trail
Malvern, Pennsylvania 19355

610.917.3000
www.broadsci.com

ENGINEERING STATEMENT

Application for Construction Permit

for

Minor Modification

to

WRTI, Channel 211, Philadelphia, Pennsylvania

FCC Form 340

OVERVIEW

The instant application proposes to modify existing non-commercial FM stations WRTI, channel 211B, as follows:

1. Relocate to a transmitter site located 0.27 km from the existing site. Both the existing and proposed transmitter sites are located within the same “tower farm” which hosts the majority of broadcast FM and television stations serving the Philadelphia metropolitan area. The tower at the proposed site is an existing structure. The addition of the proposed antenna will not increase the overall height of the structure.
2. Increase the antenna center of radiation above ground level from 300m to 346m.
3. Increase the antenna center of radiation above mean sea level from 374m to 435m.
4. Increase the antenna height above average terrain from 308m to 371m.
5. Decrease effective radiated power in both horizontal and vertical polarization planes. As a class B station operating in Zone I, the class contour distance maximum is 52 km per 47 CFR §73.211(b)(1). As the proposed height above average terrain of 371 meters exceeds the class reference height of 150 meters, the maximum effective radiated power is reduced accordingly to maintain a 1 mV/m contour distance of 52 km as required by 47 CFR §73.211(b)(2). At 371 meters, an effective radiated power of 7.721 kW produces the requisite 52 km reference distance. When rounded to the nearest 0.1 kW per 47 CFR §73.212, this value becomes 7.7 kW. This value was computed using the “FMpower” calculator made available on the Internet by the Audio Bureau.
6. Modify the directional antenna pattern. The modified antenna pattern, when analyzed at the proposed antenna height and effective radiated power, provides the requisite protection to co-channel and adjacent-channel stations as required to avoid prohibited contour overlap, or to avoid increasing the area of overlap with respect to stations where overlap already exists.

The proposed modifications qualify as minor changes.

DATA SOURCES AND CALCULATIONS

Computer-generated analyses contained in the instant application were produced using the software package ComStudy Pro v.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. Data for existing facilities, construction permits, and pending applications was obtained from the Commission’s current databases as acquired and distributed by Radiosoft.

All comparative exhibits, including contour plots, involving the existing WRTI facility are based on the station’s licensed parameters, file number BLED-19881223KC. As the existing facility operates with beamtilt, contours for the existing facility are based on the maximum effective radiated power in any elevation plane per 47 CFR §73.509(c)(3).

DIRECTIONAL ANTENNA PATTERN

The following is a tabulation of the relative field values for the proposed directional antenna. Also included in the tabulation is a value, expressed in decibels, of the ratio of each relative field value to the succeeding azimuth’s relative field value in order to demonstrate that the pattern does not exceed the 2 dB per 10 degree variation limit imposed by 47 CFR §73.316(b)(2) as referenced by §73.510(a). No additional rotation needs to be applied to the pattern as tabulated below.

Azimuth (True)	Relative Field	Variation (dB)	ERP (dBkW)	ERP (watts)
0	0.841	-1.5	7.36	5446
10	1.000	0.0	8.86	7700
20	1.000	0.0	8.86	7700
30	1.000	0.0	8.86	7700
40	1.000	0.0	8.86	7700
50	1.000	0.0	8.86	7700
60	1.000	0.0	8.86	7700
70	1.000	0.0	8.86	7700
80	1.000	0.0	8.86	7700
90	1.000	0.0	8.86	7700
100	1.000	0.0	8.86	7700
110	1.000	0.0	8.86	7700
120	1.000	0.0	8.86	7700
130	1.000	0.0	8.86	7700
140	1.000	0.0	8.86	7700
150	1.000	0.0	8.86	7700
160	1.000	0.0	8.86	7700
170	1.000	0.0	8.86	7700
180	1.000	1.3	8.86	7700
190	0.860	2.0	7.55	5695
200	0.683	2.0	5.55	3592
210	0.543	1.7	3.56	2270
220	0.444	0.8	1.81	1518
230	0.405	-1.5	1.01	1263
240	0.484	-2.0	2.56	1804
250	0.609	-2.0	4.56	2856

260	0.767	-1.2	6.56	4530
270	0.880	-0.5	7.75	5963
280	0.933	-0.6	8.26	6703
290	1.000	0.0	8.86	7700
300	1.000	1.2	8.86	7700
310	0.870	2.0	7.66	5828
320	0.691	2.0	5.65	3677
330	0.549	0.3	3.66	2321
340	0.530	-2.0	3.35	2163
350	0.668	-2.0	5.36	3436
0	0.841		7.36	5446

Maxima: 1.000 relative field, 10 to 170 degrees , 290 to 300 degrees

Minima: 0.405 relative field at 230 degrees

The maximum-to-minimum ratio of the directional antenna pattern is 7.9 dB, thereby complying with the 15 dB maximum allowed by 47 CFR §73.510(b).

INTERMEDIATE FREQUENCY (IF) INTERFERENCE

The proposed facility meets the minimum distance separation requirements for intermediate frequency (IF) interference protection set forth 47 CFR §73.207(b)(1) as required by §73.507(c) with respect to stations separated by 10.6 or 10.8 MHz. The closest IF-separated station is WLEV, channel 264B (100.7 MHz), Allentown, Pennsylvania at a distance of 60.7 km from the proposed facility. The minimum separation required is 20 km for class B-to-class B analysis, therefore the proposed facility complies with this rule section.

PROTECTION OF NEARBY AM BROADCAST FACILITIES

Standard broadcast station WNWR, 1540 kHz, is the only AM station located within the 3.2 km radius specified in 47 CFR §73.316(e). The proposed antenna will be mounted to an existing tower, antenna structure registration number 1231524, located 0.51 km from the WNWR directional array. The proposed antenna will be directly mounted, both physically and electrically, to the existing tower, and not extending its height, thereby not altering the structure from an electrical standpoint with respect to WNWR. Furthermore, the feedline associated with the proposed antenna will be attached to, and electrically bonded to, the existing tower at regular intervals, thereby eliminating any potential adverse affects with respect to WNWR. As such, it is believed that there will be no potential impact to the operation of WNWR, nor its directional antenna pattern. It should also be noted that numerous other TV and FM stations have constructed their facilities on the proposed tower since the tower was constructed in November, 2003, and there have been no indications of adverse impact to WNWR in doing so.

IMPACT TO NEARBY FM AND TV BROADCAST FACILITIES

The proposed facility will be co-located with a number of other FM and TV broadcast stations:

Station	Channel	Status
WXTU(FM)	223B	Auxiliary antenna construction permit
WYSP(FM)	231B	Licensed
WRDW-FM	243B	Construction permit
WOGL(FM)	251B	Licensed
WOGL(FM)	251B	License, auxiliary antenna
WPPZ-FM	280A	Licensed
WPPZ-FM	280A	Construction permit, auxiliary antenna
WCAU(TV)	10	Licensed
WTSD-CA	14	Licensed
WTSD-CA	14	Application pending
WCAU(TV)	10	Construction permit, auxiliary antenna
WGTW(DT)	27	Licensed
NEW (LD)	30	Short-form application pending
WPPX(DT)	31	Licensed
WPSG(DT)	32	Licensed
WZPA-LP	33	Licensed
WYBE(DT)	34	Licensed
WYBE(TV)	35	Licensed
WNAI-LP	41	Licensed
WPHL-DT	54	Licensed
WUVP-TV	65	Licensed
WUVP-DT	66	Licensed
WCAU-DT	67	Licensed

47 CFR §73.316(d) requires an analysis of the expected impact, if any, to any other TV or FM facilities in the immediate vicinity. The proposed facility’s antenna will be located at a height on the tower at which there are no other FM or TV antennae. Due to the vertical radiation characteristics of broadcast TV and FM antennae, other antennae mounted beyond the near field elsewhere on the common tower structure, particularly those not located at the same height, will have no measurable effect on the antenna’s performance or radiation characteristics. Although no adverse impact to existing facilities is expected, the licensee acknowledges its responsibilities, including ensuring spectral purity is not degraded by intermodulation products between the proposed facility’s and the other co-located TV and FM stations’ emissions.

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 fifteen 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 twelve years. My other qualifications are a matter of record with the Commission.



Jeff DePolo
President, Broadcast Sciences LLC