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# ENGINEERING STATEMENT

Application for License  
to Cover Construction Permit

WRTQ, Channel 217, Ocean City, New Jersey

FCC Form 302

08 October 2007

## **OVERVIEW**

The instant application is for license to cover construction permit for minor modifications to WRTQ, file number BPED-20070907ADS. The modifications authorized increase the effective radiated power in the vertical and horizontal polarization planes, with modifications to the authorized directional antenna pattern. The constructed facility fully complies with all terms of the construction permit.

The existing directional antenna, model P300-2AE/37M-1E-DA-SP manufactured by Electronics Research Inc. (ERI) continues to be used for the constructed facility. The directional antenna pattern authorized in the aforementioned construction permit allows for this existing antenna to be operated at the increased effective radiated power as authorized. That is, no change to the antenna itself has been made in constructing the authorized facility; only an increase in transmitter power output has been made to achieve the authorized ERP.

The construction permit involves no change in transmitter site, nor antenna height, and as previously stated, the previously-licensed antenna will continue to be utilized for the new facility without modification. As such, until program test authority is granted, the station will continue to operate at the licensed 10.5 kW vertical and 1.06 kW horizontal ERP, which, although in excess of the 50% of ERP limit permitted for automatic program test authority by Section 73.1620(a)(2) of the Rules, confines the 60 dBu contour entirely within the 60 dBu contour authorized under the station's existing license, BMLED-20051116ADK.

## **DIRECTIONAL ANTENNA**

The WRTQ antenna is comprised of two vertical polarization radiating elements and one horizontal polarization radiating element with a common center of radiation. Power is distributed to the radiating elements via an asymmetrical power divider to yield the correct effective radiated power in the vertical and horizontal polarization planes.

The directional antenna yields more than 85% RMS of the licensed directional antenna pattern as required by 47 CFR §73.1690(c)(2)(ii). The RMS of the authorized envelope is 0.734, and the RMS of the measured composite pattern is 0.676, or 92.1% fill.

As stated previously, the antenna used to satisfy the requirements of the construction permit is the same antennas is authorized in the existing WRTQ license. That is, no change has been made to the antenna, only the transmitter power output has increased. Although this manufacturer's report for this antenna is already on file with the Commission, as it was submitted previously when the previous license application (file number BMLED-20051116ADK) was prepared, a copy of the same report, along with the surveyor's certification and engineer's certification confirming proper orientation and installation, is included in the instant application per 47 CFR

§73.1690(c)(2)(iii). Note, however, that values specified in the manufacturer’s documentation that relate to the formerly-authorized ERP, antenna input power, and composite “envelope” pattern should be ignored; the relative field values of the measured pattern are still valid as they are irrespective of ERP or antenna input power.

The following is a tabulation of the relative field values of the authorized pattern as well as the relative field values of the measured composite pattern which demonstrates that the authorized pattern is not exceeded at any azimuth. No additional rotation needs to be applied to the pattern as tabulated below. Note that the Hpol pattern is wholly contained within the Vpol pattern, therefore the Vpol pattern can be considered the composite pattern.

<b>Azimuth (True)</b>	<b>Authorized Rel Field</b>	<b>Vpol/Composite Measured Rel Field</b>	<b>Hpol Measured Rel Field</b>	<b>Measured Vpol ERP (watts)</b>	<b>Measured Hpol ERP (watts)</b>
0	0.730	0.687	0.297	7194	1191
10	0.820	0.788	0.255	9077	878
20	1.000	0.871	0.207	13500	578
30	1.000	0.934	0.185	13500	462
40	0.975	0.975	0.185	12833	462
50	0.997	0.997	0.209	13419	590
<b>60</b>	1.000	<b>1.000</b>	0.255	13500	878
<b>70</b>	1.000	<b>1.000</b>	0.294	13500	1167
<b>80</b>	1.000	<b>1.000</b>	0.311	13500	1306
90	1.000	0.996	0.306	13500	1264
100	1.000	0.980	0.286	13500	1104
110	1.000	0.952	0.262	13500	927
120	0.920	0.913	0.250	11426	844
130	0.870	0.862	0.253	10218	864
140	0.800	0.799	0.264	8640	941
150	0.740	0.723	0.278	7393	1043
160	0.630	0.626	0.285	5358	1097
170	0.504	0.504	0.275	3429	1021
180	0.400	0.380	0.238	2160	765
190	0.318	0.260	0.178	1365	428
200	0.275	0.173	0.130	1021	228
<b>210</b>	0.260	<b>0.155</b>	0.110	913	163
220	0.266	0.188	0.121	955	198
230	0.291	0.258	0.169	1143	386
240	0.358	0.317	0.238	1730	765
250	0.451	0.338	0.282	2746	1074
260	0.500	0.343	0.291	3375	1143
270	0.500	0.358	0.276	3375	1028
280	0.500	0.382	0.249	3375	837
290	0.439	0.406	0.228	2602	702
300	0.455	0.421	0.224	2795	677

310	0.562	0.426	0.235	4264	746
320	0.691	0.437	0.260	6446	913
330	0.803	0.469	0.292	8705	1151
340	0.822	0.521	0.311	9122	1306
350	0.812	0.594	0.317	8901	1357

Measured Pattern Maxima: 1.000 relative field, 60 through 80 degrees

Measured Pattern Minima: 0.155 relative field at 210 degrees

## **ENVIRONMENTAL STATEMENT**

The proposed modification has been analyzed with respect to OET Bulletin 65 Edition 97-01 entitled *Evaluating Compliance With FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields*. The instant application proposes operation of WRTQ at an antenna at height of 122 meters above ground level (AGL) with an effective radiated power (ERP) of 13.5 kilowatts in the vertical polarization plane and 1.36 kilowatts in the horizontal elevation plane. Using formula (9) in the OET bulletin, the free-space (worst-case) power density is calculated as follows:

$$S = \frac{33.4 \times \text{ERP}}{R^2}$$

$$S = \frac{33.4 \times (13500\text{V} + 1360\text{H})}{(122 - 2)^2}$$

$$S = 34.5 \mu\text{W}/\text{cm}^2$$

where: S = power density in  $\mu\text{W}/\text{cm}^2$   
ERP = power in watts (vertical and horizontal components added together)  
R = distance in meters (subtract 2m to account for height of person)

This calculation does not take into account the vertical (elevation) pattern of the antenna, and therefore represents truly a worst-case power density which assumes uniform radiation characteristics at all elevation angles, and does not take into account the true hypotenuse “slant” length at locations distanced horizontally from the tower base. Nonetheless, the resulting value,  $34.5 \mu\text{W}/\text{cm}^2$ , represents only 17.3 percent of the  $200 \mu\text{W}/\text{cm}^2$  maximum allowable exposure limit for uncontrolled access.

Co-located station WKKW operates with an effective radiated power of 50,000 watts in both the horizontal and vertical polarization planes. WKKW transmits using a Dielectric DCR series 6-bay half-wave-spaced non-directional antenna. The predicted power density at ground level for WKKW was determined via the *FM Model for Windows* software published by the Commission’s Office of Engineering and Technology. This software utilizes algorithms and data for specific antenna types, including that used by WKKW, to predict the resulting power

density. The maximum power density from WXKW experienced by a person on the ground is  $1.9 \mu\text{W}/\text{cm}^2$  at a distance of 840 meters from the base of the tower. When added to the worst-case value of  $34.5 \mu\text{W}/\text{cm}^2$  calculated above for WRTQ, the resulting value,  $36.3 \mu\text{W}/\text{cm}^2$ , represents only 18.2 percent of the  $200 \mu\text{W}/\text{cm}^2$  maximum allowable exposure limit for uncontrolled access.

There also exist several other non-broadcast transmitters operating from the WRTQ/WXKW site including Part 22 radiotelephone and cellular radiotelephone, Part 24 personal communication services, and Part 90 land mobile radio. Unlike the two FM broadcast stations, these non-broadcast transmitters, all of which are categorically excluded from routine evaluation, contribute a negligible amount to the total power density at or near ground level by virtue of their high antenna heights and low power levels.

The tower and transmitter building are closed by a chain-link fence with locking gate. The roadway leading up to the transmitter site is gated and locked. The antenna site is posted with appropriate signage warning that non-ionizing radiation in excess of the aforementioned limits may be experienced at some locations on the tower. The WRTQ transmitter, as well as other tenants' transmitters, will be reduced in power or turned off completely when workers are on the tower to avoid exposure to non-ionizing radiation in excess of the prescribed limits.

Based on the information above, it is concluded that the proposed facility is in full compliance with non-ionizing radiation exposure limits and applicable safety standards and regulations.

The proposed antenna tower, which is the same tower which currently hosts the licensed facility, i.e. it is an existing structure. There will be no change in the height of the tower. The antenna site is not in a sensitive environmental area. The instant application has no other significant environmental impact. As such, the proposed 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 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.

A handwritten signature in black ink, appearing to read "J. DePolo", written in a cursive style.

Jeff DePolo  
President, Broadcast Sciences LLC