

ENGINEERING EXHIBIT

Application for Station License

IHM LICENSES, LLC

WILM Wilmington, DE

April 4, 2024

1450 kHz / 1KW ND/U

Table of Contents

Section 1 – Summary

Section 2 – Harmonic, Intermodulation and Spurious Measurements

Section 3 – Diplexer information

Section 4 – Environmental (RF Radiation) Statement

Section 5 – Ground System

Summary

This exhibit supports an application to cover construction permit BP-20230228AAF to relocate WILM(AM), Wilmington, Delaware, Facility ID 16438. This exhibit satisfies special conditions one and two as outlined in the construction permit.

Per the construction permit, WILM will use the same non-directional antenna system as co-owned WWTX(AM), Facility ID 14373. This tower was recently replaced with one of similar height and utilizes a folded unipole skirt with a grounded base. WWTX will be filing a 302 for its change in tower and base impedance before or concurrently with this instant application.

Impedance measurements were conducted with a Hewlett-Packard Model 8753E vector network analyzer with external coupler in a calibrated measurement system.

Program test authority is respectfully requested.

A handwritten signature in black ink, appearing to read "Michael Guidotti", with a stylized flourish at the end.

Michael Guidotti

Harmonic, Intermodulation and Spurious Measurements

WILM FAC ID 16438 Wilmington DE

WWTX FAC ID 14373 Wilmington DE

With both stations operating at full authorized power, A Potomac FIM41 field intensity meter and a Rigol DSA815-TG spectrum analyzer were used to search for any harmonic or spurious emissions. The meter was swept throughout its range and specific harmonic and intermodulation frequencies were measured. These measurements were taken at the Kalmar Nyckel Foundation located at 1124 E 7th St., in the guest parking lot located on the north side of 7th street. The distance to the tower is 0.83KM.

Measurements were made between 12:00N and 1:00PM on April 4, 2024.

The measured field for WILM was 340mV/m and for WWTX it was 475mV/m. Specific measurements falling within the frequency range of the field strength meter that was employed were recorded and listed in Table 1. It is noted that the required attenuation for WILM operating at 1KW is 73dBc, and for WWTX operating at 2.5KW it is 77dBc.

AM Mask measurements were also made using the spectrum analyzer.

The measurements confirm that any spurious emissions from the collocated stations are below the levels specified by section 73.44 of the FCC rules.

Table 1 - WILM / WWTX Spurious and Intermodulation Measurements

Product	Frequency KHz	Measured Field Level mV/m	Reference Level mV/m		Attenuation Below Carrier	
			1450kHz	1290kHz	1450kHz	1290kHz
Fundamental WILM	1450	340			-73dB	-77dB
Fundamental WWTX	1290	470			Required	Required
(2 X 1290) - 1450	1130	0.055	340	470	-75.8	-78.6
(2 X 1450) - 1290	1610	0.065	340	470	-74.4	-77.2
3 X (1450) - (2 X 1290)	1770	0.01	340	470	-90.6	-93.4
(3 X 1290) - 1450	2420	0.01	340	470	-90.6	-93.4
(2 X 1290)	2580	0.045	340	470	-77.6	-80.4
1450 + 1290	2740	0.028	340	470	-81.7	-84.5
(2 X 1450)	2900	0.017	340	470	-86.0	-88.8
(3 X 1450) - 1290	3060	0.01	340	470	-90.6	-93.4
(3 X 1290)	3870	0.024	340	470	-83.0	-85.8
1450 + (2 X 1290)	4030	0.025	340	470	-82.7	-85.5
(2 X 1450) + 1290	4190	0.01	340	470	-90.6	-93.4
(3 X 1450)	4350	0.018	340	470	-85.5	-88.3

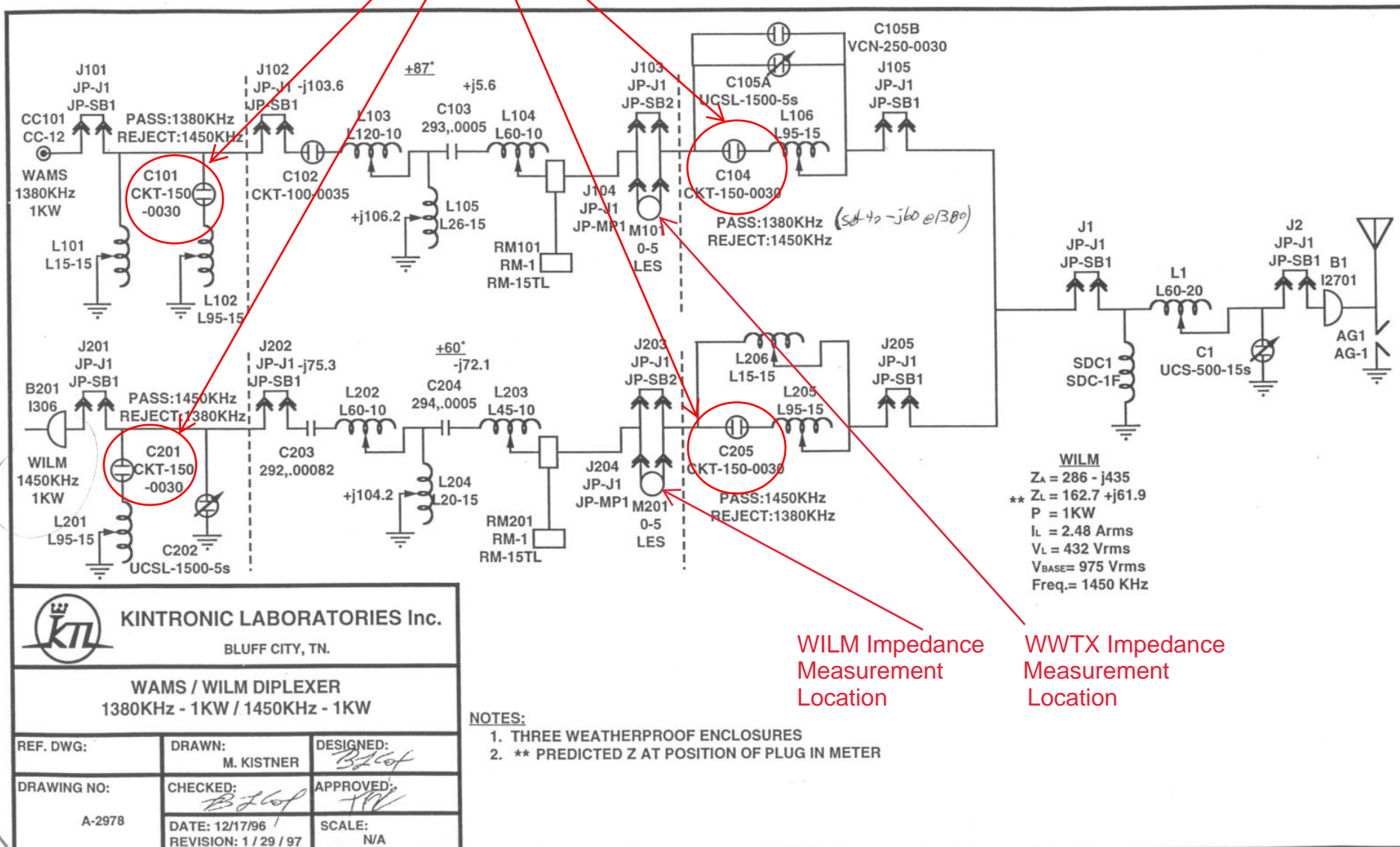
Diplexer Information

WILM and WWTX utilize a diplexer that was moved from the prior WILM site and was used by a former diplex partner. After consulting with the factory, appropriate component changes were made to the filters and adjusted for the new WWTX frequency, along with the matching networks for the new tower impedances.

The following page shows the diplexer schematic.

Diplexer Schematic - the 1380kHz input indicated below was changed to 1290kHz (WWTX)

The capacitors circled were replaced with 250pf and the filters and matching networks reset for the new frequency and tower impedance.



WILM Impedance
Measurement
Location

WWTX Impedance
Measurement
Location

Environmental Statement

The tower is surrounded by a chain-link fence with a locked gate, restricting access to any unauthorized persons. Appropriate signs have been posted on the fence warning of the radiation hazard. Based on the guidelines in Edition 97-01 Supplement A of OET bulletin 65, Edition 97-01 the applicant certifies that the distance to the fence from the radiator complies with FCC OET65 regarding human exposure to non-ionizing electromagnetic radiation.

Ground System

A new ground system has been installed and consists of 120 evenly spaced, buried, copper wire radials, 61.0 meters in length.