

## Spectrum Emission Compliance

Tests were conducted on November 19th, 2016 at the Manistee, MI translator site. The construction permit covers translators W299CB and W219DK which share a common transmit antenna and Telewave combiner. These translators share the same transmitter building with WMTE-FM. Compliance with 47 C.F.R. parts 73.317(b) thru 73.317(d) is demonstrated with these tests.

### Method for gathering data

The two transmitters are connected to a Telewave transmitter combiner at the correct input ports. A Bird model 43 Wattmeter was inserted between the Telewave combiner output and the common transmitter antenna. Both transmitters were set to their respective operating powers. A -50dB sampling plug was inserted into the Bird Wattmeter. A 50 Ohm BNC cable was connected between and sampler output and the input of a Tektronix module 2710 spectrum analyzer. The photos were taken using a Kodak camera and TEK camera hood attachment, about 4 inches from the analyzer display.

Figure 1 shows the 91.7 Mhz carrier of W219DK and the 107.7 Mhz carrier of W299CB. This display also shows reception of 100 KW FM station WIAA at 88.7 Mhz to the left of the 91.7 carrier. The WIAA 100KW carrier at 88.7 MHz is 44 KM from the translator site and is -69 dB below the 91.7 Mhz carrier used as the reference carrier. Two additional carriers, WMLQ, 97.7 MHz & WMTE-FM, 101.5 MHz co-exist at the same location. These carriers are -48 & -49 dB below the 91.7 MHz reference carrier. Modulation levels for both translator transmitters were adjusted according to the factory calibrated deviation indicators.

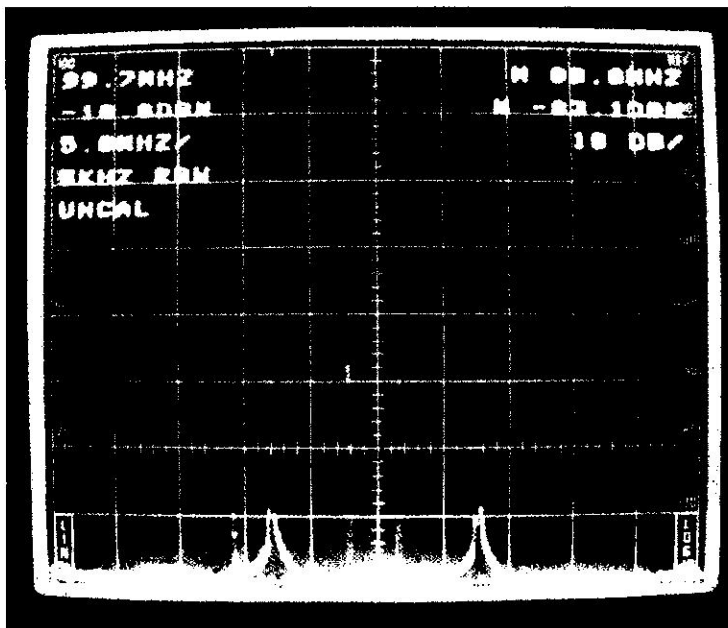


Figure 1

Note no spurious emissions are indicated.

Figure 2 shows the modulation of the W299CB carrier. I drew in the FCC modulation mask lines to show modulation level is within requirements.

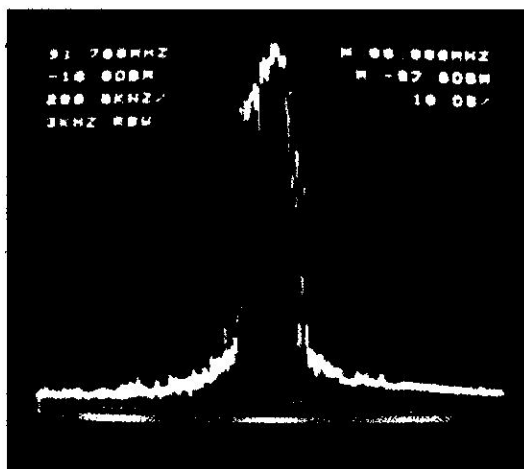


Figure 2

Figure 3 shows the modulation of the W219DK carrier. I drew in the FCC modulation mask lines to show the modulation level is within requirements.

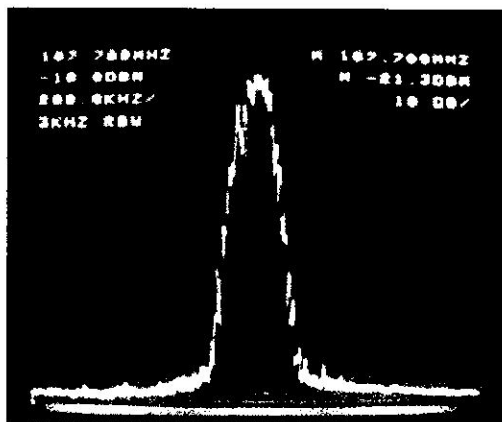


Figure 3

## Summary of Spectrum Emission Compliance

Please note that the power levels are identical for the two translators. The reference carrier of 91.7 Mhz is (.019 KW) and the 107.7 Mhz carrier is (.019 KW). The Telewave cavities were VSWR trimmed below 2 Watts for both translators.

After discounting the WIAA FM carrier at 88.7 Mhz, the WMLQ-FM carrier at 97.7 MHz and the WMTE-FM carrier at 101.5 MHz, figure 1 clearly shows no spurious emissions from the combined carriers of W224CA and W285DY as measured on November 19th, 2016.


## Certification

I hereby certify that I hold FCC Lifetime General Radiotelephone license PG-GB-002000 with Ship Radar endorsement dated November 17, 1994. I received my first Radio Telephone First Class license May 2nd, 1973. I have been Chief Radio operator at WMUS AM-FM Muskegon, MI, WJML AM-FM Petosky, MI, WBAP/KSCS Fort Worth-

Dallas, TX, KTNQ/KLVE, Los Angeles, CA, and was Project Manager for the WINS-AM transmitter plant compliance project. I also was CE at WCBS AM-FM, New York.

I am also a member of the SBE.

I also certify that I made the actual measurements in this Report of Compliance and prepared these documents myself. All work preparing this report was done using good engineering practice.

  
Robert R. Moore Jr.  
Nov 19th, 2016

Addendum: Telewave set-up data & photo of combiner system



November 20, 2016

**TELEWAVE                      Diplexer set-up, model M105-90-2TSP, serial 10389**

Filter 1,	91.7 MHz	tuning stub height is	3 1/16"
Filter 2,	91.7 MHz	tuning stub height is	2 15/16"
Filter 1,	107.7 MHz	tuning stub height is	8 13/16"
Filter 2,	107.7 MHz	tuning stub height is	8 12/16"

The above measurements were made with a Westcott steel ruler resting on the filter base to the top of the stubs cap nut.

Measured rejection of 107.7 MHz at the 91.7 MHz port is -71dB.

Measured rejection of 91.7 MHz at the 107.7 MHz port is -75dB.

Initial set-up of the Diplexer was done with a HP 8656 signal generator and a TEK 492 spectrum analyzer as the receiver outlined in the TELEWAVE set-up instructions.

Final VSWR measurements were made using a B.E. FX-30 FM exciter as the signal generator. Forward power was adjusted for 30 watts on both frequencies. Reflected power was then minimized on both 91.7 & 107.7 MHz.

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