

SPURIOUS RADIATION MEASUREMENTS MADE ON WATERLOO IOWA TOWER OF COLOFF MEDIA INVOLVING STATIONS KCVM 93.5 MHZ, K286CI 105.1 MHZ AND K293CH 106.5.

This site contains 3 separate FM transmitters. The KCVM transmitter operates with an ERP of 11kw from a 4 bay $\frac{1}{2}$ wave spaced antenna at the top of the tower. Below that is a 3 bay Bext antenna which is also half wave spaced which is used for K286CI and K293CH both of which have an ERP of 250 watts. Half wave antennas were chosen to reduce coupling between the two antenna systems consequently reduce any chance of a mix occurring in the transmitters final amplifier. Also, both K286CI and K293CH have two pass/notch cavity filters on their outputs to eliminate RF from the other transmitters entering their output stages. With the antennas chosen and the cavity filters it was expected that there would be no mixing in any of the transmitters involved.

Measurements were made on 11/27/2018 7:20am-11:00am at two locations using an IFR FM/AM 1200 test set/spectrum analyzer with a switchable RF attenuator and a dipole antenna. The measurements were made at two separate locations. At the site itself ,in the transmitter building and at a location approximately 1km east of the tower. The following frequencies were specifically checked as they are all produced by sum and differences between 93.5, 105.1 and 106.5 mHz.

103.7 mHz
107.9 mHz
81.9 mHz
80.5 mHz
116.7 mHz
119.5 mHz

At the transmitter site, both the K286CI and the K293CH signals were adjusted by use of the attenuator to full scale on the analyzer which is -30db. Then the frequencies were tuned on the analyzer and the attenuator switched out and signal level read off the attenuator setting and the resultant display on the analyzer.

103.7	-100db or 70 db below the main carriers of the 2 translators
107.9	unreadable as KFMW is a 100kw station a few km away on this frequency
81.9	-116 db or 86 db below the main carriers of the 2 translators-
80.5	no signals detected
116.7	-115 db or 85 db below main carriers of the 2 translators a mix of K286CI and KFMW audio
119.5	no signals detected

A complete scan of all frequencies between 70 mHz and 120 mHz showed no other spurs that can be attributed to either KCVM, K286CI or K293CH.

After these measurements were made a $\frac{1}{4}$ wave open stub was made using RG214 coaxial cable cut to length for 103.7 and installed on the K286CI transmitter output with a T connector. This took the mix at 103.7 down to -112 db or 82 db below the main carrier of the 2 translators.

After this the test equipment was moved to a location about 1km east of the tower, the parking lot for the Cattle Congress facility and measured here with the dipole antenna toward the tower. At this location, no spurious signals were received. On the 103.7 mHz frequency a good signal was received from KLKK Clear Lake Iowa approximately 70 miles distant with no interference from K286CI or K293CH or KCVM. On 107.9 mHz , the local station KFMW dominates 107.7 to 108.1. Again, in

tuning the range of 70 mHz to 120 mHz at this location there were no spurious signals that could be attributed to KCVM, K286CI or K293CH.

With these measurements made, we are certain that the three transmitters are performing within specifications however with 3 transmitters this close and 3 other high power FM transmitters within a few km there could be mixes produced in other equipment of which we have no control.

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