

KWKD FM-1 Bountiful, UT

Spurious Emissions Report

On the evening of November 1, 2003, equipment performance measurements were made for radio booster station KWKD FM-1 Bountiful, UT. These measurements were made as a condition of Construction Permit BNPFTB-20030131ACD.

KWKD FM-1 (102.3 MHz) is one of three stations sharing a master antenna system at the Summerwood Communications site located in Bountiful, Utah. The outputs of the three stations are combined using a constant impedance balanced bandpass filter combining system Model RCCC - 29A - 0.8 designed and fabricated by Jampro Antenna Systems in Sacramento, CA.

Measurements were made while all stations broadcast programming material. KWKD FM-1 operates stereophonically and has no subsidiary communications services. All stations were operating into the combined antenna system at the full permitted power during the measurements. Section 73.317 (b) and (c) require that all signals between 120 and 240 kHz removed from the carrier be attenuated below the level of the carrier by at least 25 dB, all signals between 240 kHz and 600 kHz removed from the carrier be attenuated by at least 35 dB below the level of the carrier, and that all signals greater than 600 kHz removed from the carrier be attenuated by at least 80 dB below the level of the carrier.

Three sets of measurements were made to assure compliance with these requirements. The first measurement looked at the spectrum between -600 kHz and +600 kHz, relative to the carrier frequency, in order to assess the station's occupied bandwidth under modulation. The second measurement looked at the spectrum from -1 MHz to -600 kHz and +600 kHz to +1 MHz, relative to the carrier frequency, to look for near-in inter-modulation products. The third measurement scanned the spectrum from 9 kHz to 1 GHz in order to detect any out-of-band inter-modulation products or harmonics. All measurements were taken with an IFR AN940 Spectrum Analyzer, serial number 1009, within current calibration (certificate of calibration is attached).

To measure the occupied bandwidth, the spectrum analyzer was set to 102.3 MHz center frequency, 200 kHz/div span, 3 kHz resolution bandwidth, 20 dB of attenuation, and 10 kHz video filtering. This results in a measurement noise floor of approximately -84 dBm. An unmodulated carrier was used to establish the reference point at the top of the screen. The analyzer was, then, placed in peak hold mode and modulation was once again applied. After 10 minutes of data collection, the following data was collected:

KWKD FM-1 Carrier Frequency = 102.3 MHz

FREQUENCY	SIGNAL	DIFFERENCE	REQUIRED	COMPLY
Carrier +0 kHz	-38 dBm	0 dB down	n/a	yes
Carrier -120 kHz	-76 dBm	38 dB down	25 dB down	yes
Carrier +120 kHz	-70 dBm	32 dB down	25 dB down	yes
Carrier -240 kHz	-84 dBm	46 dB down	35 dB down	yes
Carrier +240 kHz	-84 dBm	46 dB down	35 dB down	yes
Carrier -600 kHz	-84 dBm	46 dB down	80 dB down	yes
Carrier +600 kHz	-84 dBm	46 dB down	80 dB down	yes*
Noise Floor:	-84 dBm	46 dB down	80 dB down	yes*

*Please note: Due to the lack of signal, it was impossible to establish a signal to noise difference of 80 dB down.

It can be clearly seen from this data that the occupied bandwidth of KWKD lies well within the prescribed limits between -600 kHz and +600 kHz, relative to the carrier frequency.

To make the second set of measurements, the analyzer was once again placed in peak hold mode, data collected for ten minutes, and data from the resulting spectrum was examined. The signal that appeared 800 kHz below the KWKD FM-1 carrier was identified as KEGA FM-6 Bountiful, UT, which is also part of the antenna system. The signal that appeared 400 kHz below the KWKD FM-1 carrier was identified as KKAT Ogden, UT. The signal that appeared 400 kHz above the KWKD FM-1 carrier was identified as KQMB Midvale, UT. Other than these signals, there are no signals above the prescribed emissions limit.

To measure spurious signals and harmonics, the spectrum analyzer was set to 2 MHz/div span, 10 kHz resolution bandwidth, 20 dB of attenuation, and 10 kHz video filtering. The analyzer was initially set at 10 MHz center frequency and the incremented successively by 20 MHz to scan the spectrum from 9 kHz to 1 GHz. Any signals that were greater than -80 dBm were noted. Upon completion of the scan, each noted signal was compared to a list of known transmitters in the area and the analyzer was used to demodulate the signal. All of the signals noted were identified as being either the other station in the combined system or ingress from other known transmitters. No inter-modulation products, spurious signals, or harmonics were found that could be attributed to the operation of KWKD FM1.

In light of the above measurements, I believe that KWKD is in full compliance with the requirements of Section 73.317 (a-d). This report was prepared by me, and is based on measurements made by myself. To the best of my knowledge, all statements made herein

are true and reflect the actual facts of the matter. My qualifications are a matter of record with the Commission.

Respectfully submitted:

A handwritten signature in black ink, appearing to read 'Kevin Terry', written over a horizontal line.

Kevin Terry, Director of Engineering



IFR
10200 West York Street
Wichita, Kansas 67215
(316) 522-4981



CERTIFICATE OF CALIBRATION

Certificate:	25312	Customer:	SIMMONS RADIO GROUP 515 S. 700 EAST SUITE 1C SALT LAKE CITY, UT
Manufacturer:	IFR		
Model:	940		84102
Description:	AN-940		
Serial No:	1009		
Calibration Date:	11-Aug-2003	Temperature:	23.2 C
Cal Due Date:	11-Aug-2004	Humidity:	40.0 %
Accessories:			

INSTRUMENT CONDITION:

Pre-Calibration Description: OUT OF TOLERANCE

Post-Calibration Description: IN TOLERANCE

IFR Certifies that at the time of calibration the above instrument was calibrated in accordance with applicable IFR procedures. The calibration was performed using standards whose accuracy are traceable to the National Institute of Standards and Technology, derived from accepted values of natural physical constants, or derived by the ratio type of self-calibration techniques. The supporting calibration system complies with ANSI/NCSL Z540-1-1994. This certificate shall not be reproduced, except in full, without the written approval of the calibration facility.

STEPHEN D FOREMAN
Calibrated By

STEPHEN D FOREMAN
Certified By

Brad L. Schuen ^{VS}
Authorized Signature