

KLEIN BROADCAST ENGINEERING, L.L.C.

dedicated to improving the science and technology of radio & television communications

ENGINEERING / EVALUATION REPORT

**EQUIPMENT PERFORMANCE MEASUREMENTS
FM RF PROOF OF PERFORMANCE
HUTTON BROADCASTING, L.L.C.
K Q B A – FM1
(FCC FACILITY ID# 123369)
FM CHANNEL 298 / 107.5mHz.
SANTA FE, NEW MEXICO
FM BOOSTER STATION TRANSMISSION FACILITY**

INTRODUCTION and ENGINEERING STATEMENT

This Engineering Evaluation Report, RF Proof of Performance Measurements, was prepared in support of certification of the operations of the specified transmitting systems herein as being in compliance with 47 C.F.R. Section 73.1590 of the Rules and Regulations of the Federal Communications Commission and in compliance with 47 C.F.R. 73.317 of the Rules and Regulations of the Federal Communications Commission.

In the case of the KQBA-FM1 Transmission System, the measurement equipment was set up according to Good Engineering Practice. The calibration of the Tektronix 2795 Spectrum Analyzer was checked according to the manufacturer's instructions. The point of measurement in the system was a Bird Electronics directional coupler at the output port of an eight section FM combiner.

INTRODUCTION and ENGINEERING STATEMENT cont'd page two: KQBA-FM1

Measurements were made on the station's carrier frequency for reference purposes and to look at occupied bandwidth for any unusual spurious emission. The assigned carrier frequency reference level was recorded and photographed. All other harmonic, intermodulation product or spurious emission levels were referenced to this initial carrier frequency reference level. The radio spectrum from 50mHz. up to this station's 10th carrier frequency harmonic was tuned to look for any unusual emissions. Any deviation from the FCC prescribed limits will be noted in this report.

The intermodulation products measured in this report were calculated as the common $2 \times A - B =$ Intermodulation product. As in the case herein the carrier frequency of the station under test was multiplied times 2 and then the carrier frequency of each of the combined individual stations was subtracted one at a time from the 2X sum to find the common intermodulation product.

No unusual spurious emissions, carrier frequency harmonics or intermodulation products were noted on the Transmission System for Station KQBA-FM1. Harmonic products were measured up to and including the 10th order. The spectrum analyzer measurements were adjusted by a factor of -6dB per octave as prescribed by Good Engineering Practice. The measurement levels found in this report have been adjusted by this octave factor.

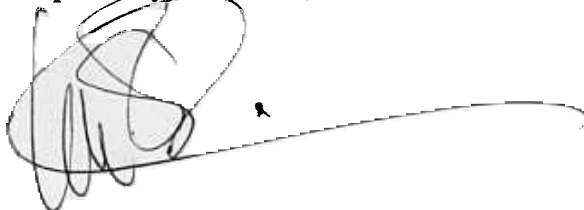
INTRODUCTION and ENGINEERING STATEMENT cont'd page three: KQBA-FM1

The input amplifiers of the spectrum analyzer were protected from overload by using a calibrated set of tunable band-pass filters that cover the radio spectrum from 50mHz to 1.4GHz. This practice prevents level compression and false readings from occurring by keeping the input amplifiers of the spectrum analyzer in their linear range of operation. This measurement set up is common to Good Engineering Standards and Practice. All cables used in the test set up were RG-223 or RG-400 double shielded coaxial cables to insure no stray fields were induced into the measurement cables.

Unless otherwise noted the FM transmission system under test and documented in this report complied with all the provisions of 47 C.F.R. Section 73.317 of the Rules and Regulations of the Federal Communications Commission.

The measurements found herein were made on November 12, 2005 between the hours of 1:45pm M.S.T. and 5:50pm M.S.T.

Respectfully submitted,

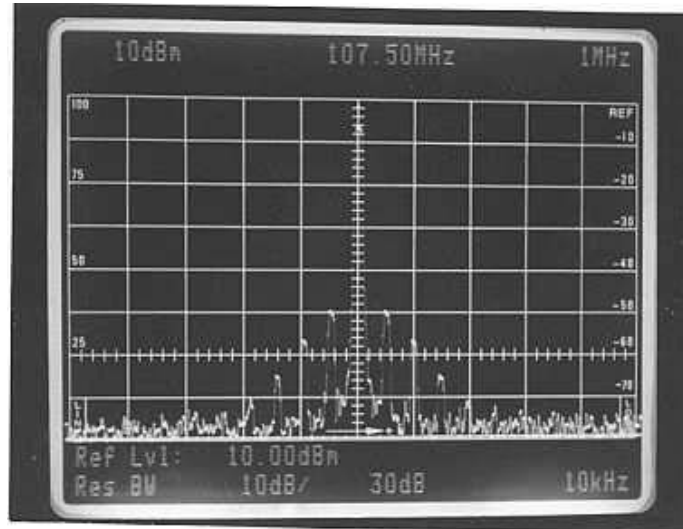
A handwritten signature in black ink, appearing to read 'Elliott Kurt Klein', with a long horizontal flourish extending to the right.

**Elliott Kurt Klein,
Consulting Broadcast Engineer**

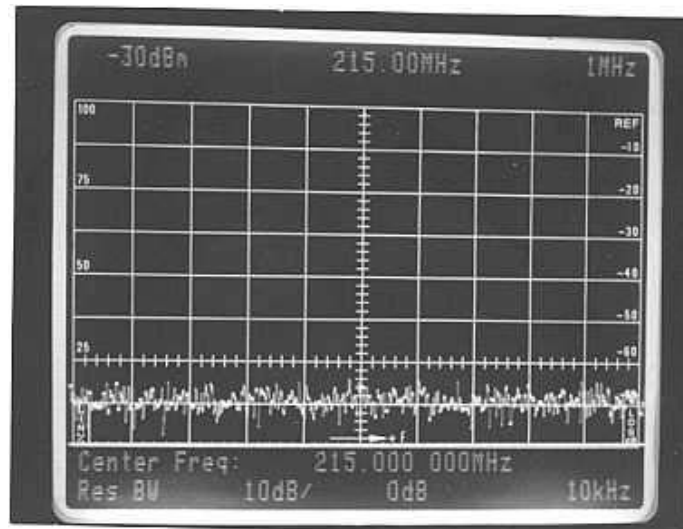
09 January 2006

TABLE of READINGS and SPECTRUM ANALYZER PHOTOGRAPHS

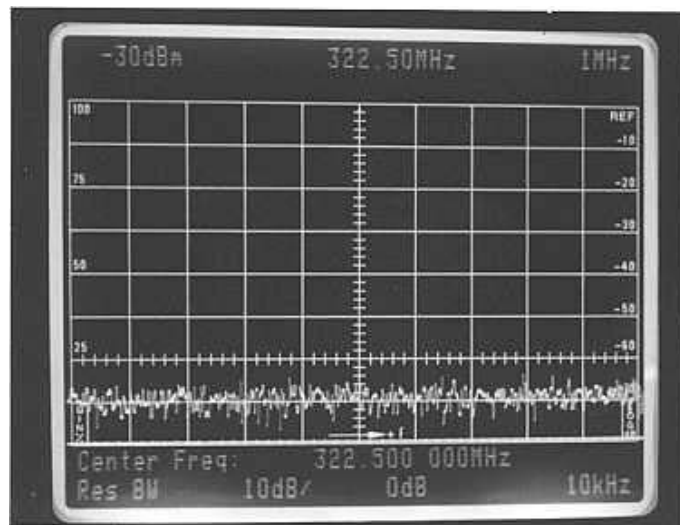
Main Transmission System Reference Level 107.5mHz. +4.0dBm



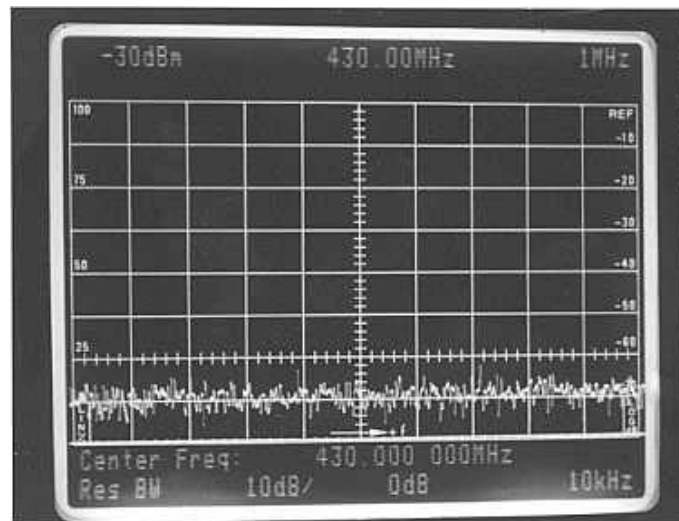
Main Transmission System 2nd Harmonic 215.0mHz. -103.0dBc



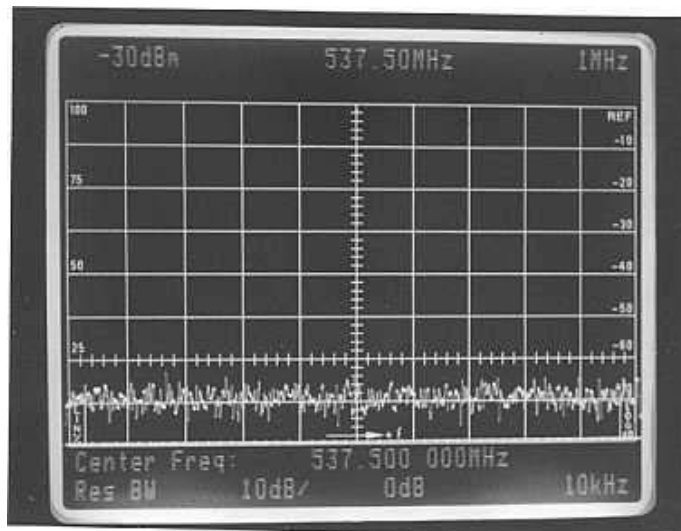
Main Transmission System 3rd Harmonic 322.5mHz. -109.0dBc



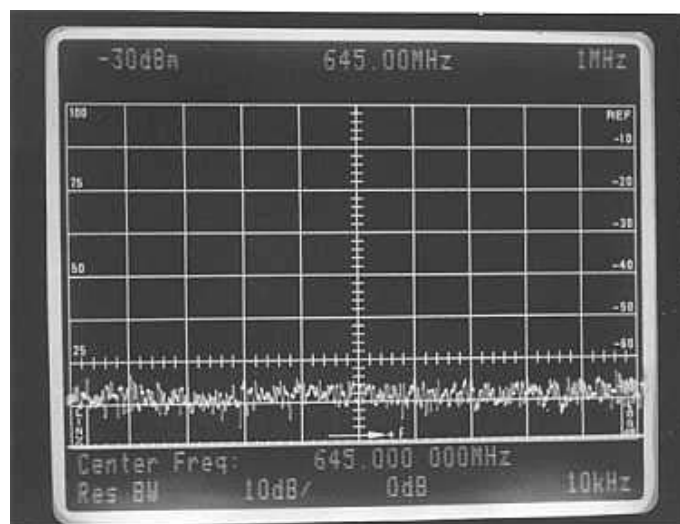
Main Transmission System 4th Harmonic 430.0mHz. -111.0dBc



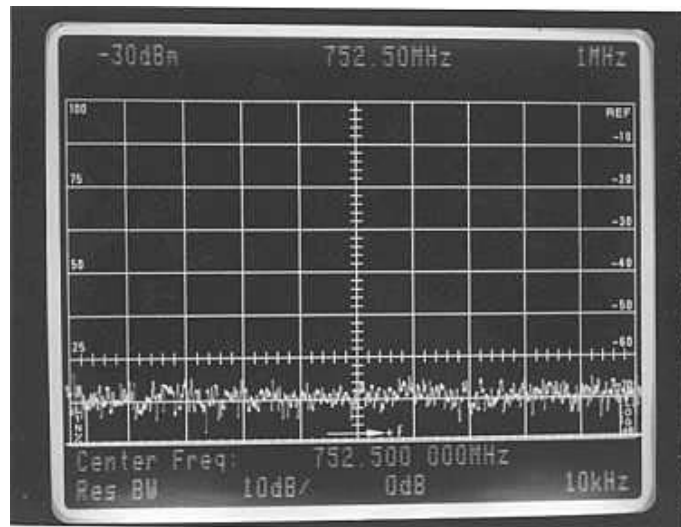
Main Transmission System 5th Harmonic 537.5mHz. -110.5dBc



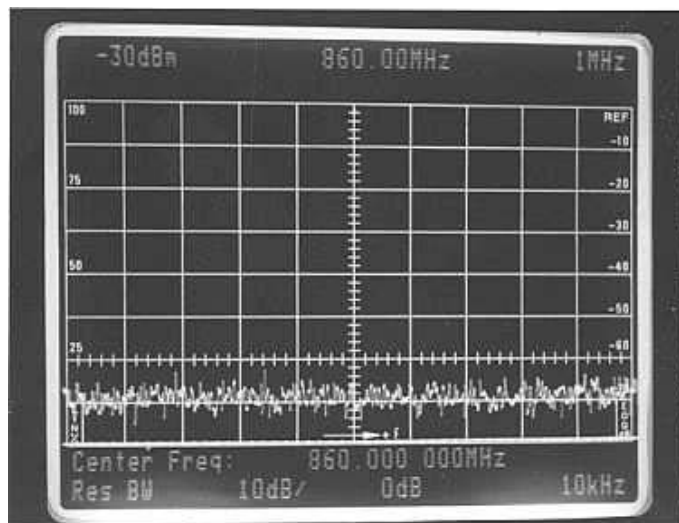
Main Transmission System 6th Harmonic 645.0mHz. -114.5dBc



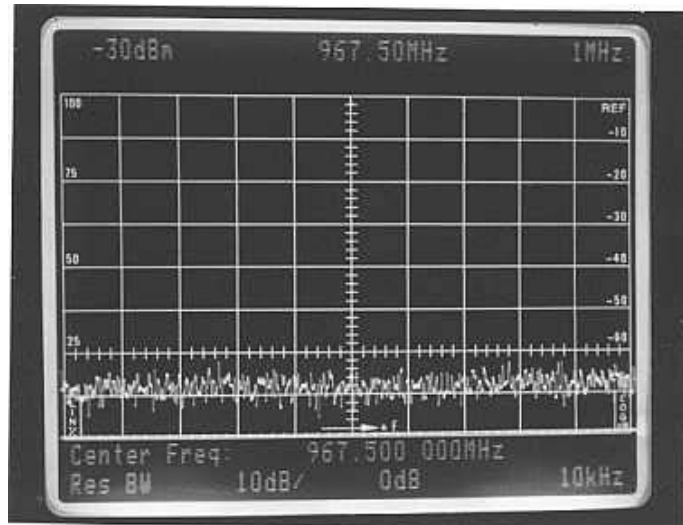
Main Transmission System 7th Harmonic 752.5mHz. -116.5dBc



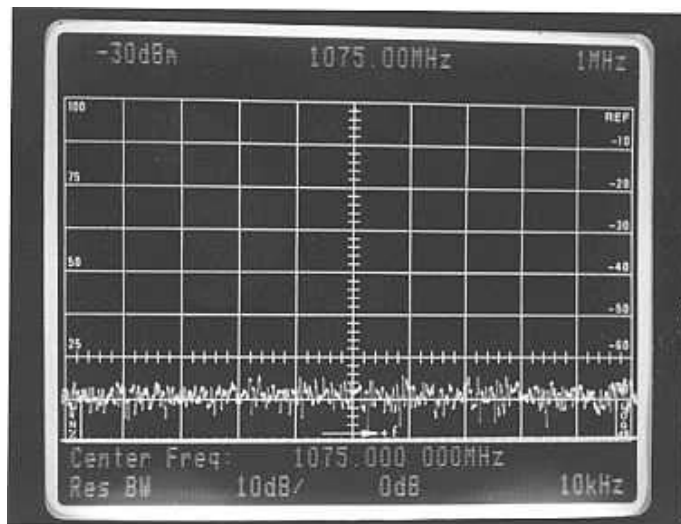
Main Transmission System 8th Harmonic 860.0mHz. -117.5dBc



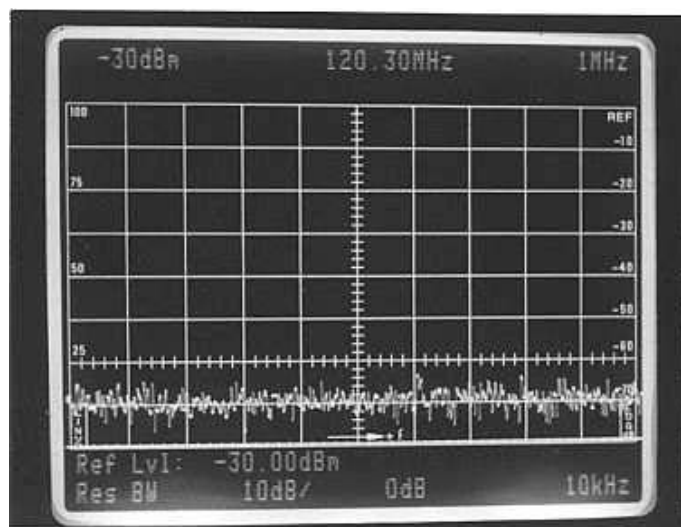
Main Transmission System 9th Harmonic 967.5mHz. -117.25dBc



Main Transmission System 10th Harmonic 1.075GHz. -120.0dBc



Measured Intermodulation Product with KBOM-FM1 94.7mHz
 $2 \times 107.5\text{mHz} - 94.7\text{mHz} = 120.3\text{mHz}$. Measured -100.5 dBc



Measurement Equipment Listing

- 1. Tektronix Spectrum Analyzer model 2795, serial #B010221, calibrated NBS tracable 21 December 2000**
- 2. Trilithic Series VF-40003, serial #9711119, Custom Tunable Band-Pass Filter set 50mHz. to 1.4gHz. calibrated 08/2005**
- 3. Tektronix C-5A Scope Camera with Polaroid 667 3000ASA Film**
- 4. Test Cables RG223 & RG-400 Double Shielded Coaxial Cable**
- 5. Hewlett-Packard RF Frequency Counter, model 53181A, serial # 3710A02728, calibrated NBS traceable, 29 October 2005**
- 6. Bird Electronics RF BNC Sniffer Slug**
- 7. Bird Electronics 2watt RF Termination -47dB return loss @ 100mHz.**