ELECTRONICS RESEARCH, INC. ERI

Report Of Intermodulation Product Findings

Border Media Partners, LLC

KRIO-FM1 104.1
KLEY 95.7

May 16, 2006

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REPORT OF FINDINGS

KRIO-FM1/KLEY Border Media Partners

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Introduction: This report of findings is based on data collected at the KRIOFM1 and KLEY Border Media Partners broadcast facility located in San Antonio, TX. The report includes measurements offered as proof that the combined operations of KRIOFM1 (104.1 MHz.) and KLEY (95.7 MHz.) transmitters are in compliance with the FCC Rules and Regulations as required by the Code of Federal Regulations (CFR) Title 47 section 73.317 paragraph (b) through (d). In brief, the collection of measurements presented in this report shows that all possible third order inter-modulation (IM) products generated by this multiplex system are less than the maximum allowable level as required by section 73.317 (b) through (d). Jon Adams of Electronics Research, Inc. located in Chandler, Indiana performed the measurements summarized herein on May, 2006.

The Nature of Intermodulation Products (IM): Intermodulation products result from inadequate transmitter-to-transmitter isolation. Intermodulation products are commonly generated from radio stations operating into multiplexed facilities and congested antenna broadcast sites. The mechanics associated with the phenomenon have been well documented. When two or more transmitters are coupled to each other, new spectral components are produced by the mixing of the station frequencies in the active circuits of each transmitter. The common term used to describe this phenomenon is third order product denoted by the mathematical expression $[2(F_1)-(F_2)]$, where F_1 signifies the frequency of the transmitter that is generating the intermodulation product, and F2 signifies the frequency causing the interference.

The Multiplexed System: These measurements were taken with two FM stations operating from the combined antenna system. The KRIOFM1 and KLEY multiplexed system is fundamentally comprised of antenna, feed line and multiplexer unit. The 1183-4CP (antenna) and TB70/73 (tee combiner) multiplexer unit are products of Electronics Research, Inc, whereas the feed line is manufactured by Andrew. Refer to Exhibit B-1, for an illustration of the Broadcasting Scheme of these stations.

To accomplish the aggregation of two transmitter signals into a common antenna feed and provide transmitter-to-transmitter isolation, a multiplexing scheme consisting of a Tee Combiner was installed. Specifically, the Multiplexer utilizes one ERI Model 970-3 Bandpass filters for KLEY 95.7 transmitter and one ERI Model 973-3 Bandpass filters for KRIOFM1 104.1 transmitter. An interconnecting TEE is required to complete the multiplexer . The multiplexer, fully assembled, exhibited transmitter port-to-port isolation in excess of -75 dB. Other performance measurements, such as match, loss, group-delay, etc, revealed that the multiplexer unit was in proper working condition. Refer to Exhibit A-4 for the Combiner Specification Sheet.

The IM Investigation: Directional Couplers were placed at key locations throughout the combiner to monitor and maintain the multiplexer's performance. All couplers furnished with the system are factory calibrated and capable of delivering accurate and repeatable RF measurements. To facilitate the taking of the measurements, the coupler located at the antenna output of the multiplexed system was used. Care was taken in the selection of the measurement location to insure that the measurements would be made far removed from transmitters and any filtering used to reduce broadcast emissions. The coupler selected would normally be used for antenna reflection measurements and thus would provide greater than 40 dB directivity and a forward signal sample of -54 dB.

The forward port of the coupler was used for sampling the outgoing carrier levels and IM products. The IM sampled signal was fed by shielded cable into a Band Pass Filter where all extraneous energy was steeply attenuated. Various attenuation pads were used, when needed, on the band pass filter and/or the FIM71 to ensure an adequate signal level for measurements without overloading the measurement equipment. A Potomac Instruments FIM-71 Field Strength Receiver was employed to record the level of all signals investigated. To facilitate the selective tuning of the Receiver and Band Pass Filter a Wavetek Model 3000 signal generator was used. A Tektronix Model 2710 Spectrum Analyzer was used to measure the close in spectral attenuation of each carrier and wide band search for any anomalies that may need further investigation. See attached Exhibit B-1 for an illustration of the measurement equipment.

Prior to recording measurements, all pertinent broadcasting equipment including Transmitters, Multiplexer, Feed Line and Antenna were adjusted to optimal performance. Also, it was confirmed before taking any measurements that all stations of concern were operating at their full licensed power level. From the equipment setup described above, the relative output signal level of each stations forward carrier was made. The resulting signal levels of these measurements are listed in Table 1, column labeled "Adjusted Level". This level will be used as the reference level for possible IM products of each carrier and was necessary to confirm that no significant levels of spurious energy, referenced to each carrier, were present from any transmitter operating from the multiplexed system.

Table 1 - Carrier Reference Levels.

Carrier Frequency (MHz)	Pad One (dB)	Bandpass Filter Loss (dB)	Full Scale Range (dBμ)	Scale Reading (dB)	**Adjusted Level (dBμ)**	Notes
KRIO (104.1)	6	-	120	-3.1	**122.9**	
KLEY (95.7)	6	-	120	-9.8	**116.2**	

Predictable third-order products due to system harmonics mixed with all on-site interfering frequencies that could be generated from the multiplexed system are calculated and listed in Table 2.

Table 2 - Third order Products.

	Carrier Frequency (MHz)	
Interfering Frequency (MHz)	**KRIO-FM1 104.1**	**KLEY 95.7**
KRIO 104.1	**---**	**104.1**
KLEY 95.7	**95.7**	**—**

Using the equipment previously described the IM product measurements were recorded and are listed in Table 3. The signal levels referenced to the carriers are calculated and listed in the column labeled "Level Referenced to Carrier".

Table 3 Intermodulation Measurements

Product Frequency (MHz)	Carrier Frequency (MHz)	Interfering Frequency (MHz)	Pad (dB)	Bandpass Filter Loss (dB)	Full Scale Range (dBµ)	Scale reading (dB)	Adjusted Level (dBµ)	Carrier Reference Level (dBµ) (See Table 1)	**Level Referenced to Carrier (dB)**	Notes *
87.3	95.7	104.1	6	6.4	20	<-20	12.4	116.2	**-103.8**	
112.5	104.1	95.7	6	6.2	20	<-20	12.2	122.9	**-110.7**	

*** NOTES**

The Spectrum Analyzer was used to check the close in spectral attenuation of the carrier to confirm the operation of the transmitter is in compliance with Sections (b) and (c) of the FCC Rules and Regulations.

As a final proof of the systems IM Product performance, a wide band search was undertaken using the Spectrum Analyzer. The purpose for this measurement was to look for suspicious anomalies that may warrant further investigation. My search ranged the complete frequency span of the receiver and resulted in no additional investigations.

Conclusion: Based upon my observations and measurements taken May, 2006 as summarized in this document, I, Jon Adams, find the subject system- specifically the transmitter and filter system for the operation of KRIO/KLEY into the antenna to be in proper working order. Furthermore, based on the measured data, it is my opinion that there is no inter-modulation products in excess of 80 dB below carrier levels generated from or within the station operating on the installed system. Based on this recorded data, I conclude that KRIO/KLEY is in compliance with the requirements of Section 73.317 paragraph (b) through (d) of the FCC Rules and Regulations.

Respectfully submitted,
Electronics Research, Inc.

Jon Adams

By Jon Adams Field Technician

State of Maine)
) SS:
County of Cumberland)

AFFIDAVIT

I, Jon Adams, hereby declare that the following statements are true and correct to the best of my knowledge and belief:

1.) I am a Field Technician for Electronics Research, Inc ("ERI ") I am familiar with and have assisted in the design, manufacturing and installation of FM Antennas and FM Filters with ERI.

2.) I have either prepared and/or directly supervised the preparation of all technical information contained in this Report of Findings and to my knowledge to be accurate and true.

3.) ERI has been requested by Border Media Partners, LLC, on behalf of radio station KRIO/KLEY in San Antonia to prepare this report of findings.

Jon Adams

Jon Adams; Field Technician

Subscribed and sworn to before me on this
16th day of May 2006

Beth A LaSalle

Beth A LaSalle; Notary Public
My commission expires May 5, 2012