FIELD MEASUREMENT REPORT
RF EMISSION MEASUREMENTS

- FM AUXILIARY SITE COMBINER & ANTENNA SYSTEM -
SPECTRUM ANALYZER RF EMISSION MEASUREMENTS

SUPPORTING REQUIREMENTS SPECIFIED IN
FCC CONSTRUCTION PERMIT FILE#

0000158173 / KHFM 95.5MHz
0000158164 / KLVO 97.7MHz
0000158163 / KKSS 97.3MHz
0000158159 / KABG 98.5MHz
0000158161 / KKRG 105.1MHz

SITE:
SANDIA CREST
ALBUQUERQUE, NM

PREPARED FOR:
AGM NEVADA, LLC.
THE AMERICAN GENERAL MEDIA FOUNDATION

MAY 30, 2022

SUBMITTED BY:
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MEASUREMENTS AND TABULATED DATA

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INTRODUCTION AND SCOPE OF WORK

RJ Communications, Inc. with offices at 10026 2nd Street in Albuquerque, NM was requested by AGM Nevada, LLC. to perform the required measurements to show compliance with the provisions 73.317 of the Rules governing FM Broadcast Stations and FM translators operating at transmitter powers of greater than 10 watts.

These measurements were taken at the combiner output directly feeding the common antenna/transmission system input for combined FM AUX Operation of stations KHFM(95.5MHz) and KLVO(97.7MHz) at 6.1 watts ERP and stations KKSS(97.3MHz), KABG(98.5MHz) and KKRG(105.1MHz) each operating at 47 Watts ERP.

This multiplexed system is fundamentally comprised of antenna, feedline and Nicom TFSD star-point five channel combiner unit.

This report includes measurements offered as proof that the combined operations of FM AUX station operation for KHFM(95.5MHz), KLVO(97.7), KKSS(97.3MHz), KABG(98.5MHz) and KKRG(105.1MHz) are in compliance with the Code of Federal Regulations (CFG) Title 47 section 73.317 and supports special operating conditions as specified in the Construction Permits.

The data contained in this report is based on field measurements or observations by the undersigned as acquired on May 29, 2022 during the hours of 20:00 and 22:50 MDT.

MEASUREMENT TEST EQUIPMENT AND PROCEDURES

MEASUREMENT TEST EQUIPMENT USED:

HEWLETT PACKARD 8594E SPECTRUM ANALYZER / S#3911A08672
DIRECTIONAL COUPLER COMTEC C-DC2A23/2F-B018 CHARACTERIZED COUPLER
CUSTOM TUNEABLE 88MHz-108MHz FM BAND REJECT FILTER / S# RJC-FMREJ1
CUSTOM 88-108MHz BAND REJECT FILTER / S# RJC-FMREJ1
COAXIAL MEASUREMENT TEST CABLE / 10 FEET THERMAX RG400
INMET 10DB ATTENUATOR 9070-10 / S#64684
MATLAB ACQUISITION SOFTWARE / HPIB/GPIB COMPUTER/ANALYZER INTERFACE

MEASUREMENT PROCEDURES:

The Narda directional coupler was placed the output of the multiplexed FM combiner system and preceding the transmission/antenna system input.

The forward port of the directional coupler was used for sampling the outgoing carriers and intermodulation products present. Attenuator pads were used, as required, in conjunction with filters to prevent overload of measurements equipment. Attenuation of these passive measurement devices, if used, is indicated as correction factors in the tabulated data and calculations.

The five AUX transmitters for stations KHFM(95.5MHz), KKSS(97.3MHz), KLVO(97.7MHz), KABG(98.5MHz), KKRG(105.1) were simultaneously operated into the combiner and antenna system at power levels required to achieve each stations respective authorized ERP.

Initial measurement was performed to establish carrier reference levels to which all subsequent mix product measurements contained in this report are to be compared.

Measurements, relative to the station reference carrier level, were then made at all third order intermodulation mixing products as calculated by the mathematical expression $[2(F1)-(F2)]$ where F1 signifies transmitter generating the IM product, and F2 signifies frequency causing the interference. These calculated mix products are presented in Table 1.

Tabulated results of the measurements on each calculated IM frequency were recorded and listed in Table 2. A status flag of a PASS or FAIL condition is indicated at each frequency as determined by meeting the minimum dBc attenuation required. At instances, where energy from other carriers was found present but not generated by this multiplexed system, a PASS*/Local/C indication is given.

SUMMARY

The RF spectral emissions present at the multiplexed output of the American General Media transmitter combiner system for FM Auxiliary stations for KHFM(95.5MHz), KKSS(97.3MHz), KLVO(97.7MHz), KABG(98.5MHz), KKRG(105.1) were found to be in FCC compliance with the requirements of Section 73.317 paragraph (b) through (d) of the FCC Rules and Regulations on this date May 30, 2022.

The data contained in this report is based on field measurements or observations by the undersigned, on the dates and times indicated in the report.

This report and preparation of all technical information contained within were performed by or under the direct supervision of Robert C. Ramseyer of RJ Communications, Inc. with offices located in Albuquerque, NM.

May 30, 2022

Respectfully Submitted,
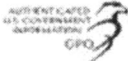
Robert C. Ramseyer
Electrical Engineer

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Table 1 - Calculated Third Order Intermodulation Products in MHz.

	F1	F2				
		95.5	97.3	97.7	98.5	105.1
KHFM 95.5 MHz	95.5	0	93.7	93.3	92.5	85.9
KKSS 97.3 MHz	97.3	99.1	0	96.9	96.1	89.5
KLVO 97.7 MHz	97.7	99.9	98.1	0	96.9	90.3
KABG 98.5 MHz	98.5	101.5	99.7	99.3	0	91.9
KKRG 105.1 MHz	105.1	114.7	112.9	112.5	111.7	0

Table 2 – Third Order Intermodulation Tabulated Measurement Data

Station / FM AU Site	ERP Watts	TPO Watts	Required I.M. Attenuation dB/c			
KHFM(FM) 95.5MHz	ERP = 6.1 Watts	TPO = 18 Watts	Required Attenuation= (-55.5dBc)			
KLVO(FM) 97.7MHz	ERP = 6.1 Watts	TPO = 18 Watts	Required Attenuation= (-55.5dBc)			
KTUM(FM) 107.1MHz	ERP = 47 Watts	TPO = 142 Watts	Required Attenuation= (-64.5dBc)			
KABG(FM) 98.5MHz	ERP = 47 Watts	TPO = 142 Watts	Required Attenuation= (-64.5dBc)			
KKRG(FM) 105.1MHz	ERP = 47 Watts	TPO = 142 Watts	Required Attenuation= (-64.5dBc)			

WHERE: I.M. Level (dBm) = [(I.M. Measured) - (I.M. Filter Loss)] Absolute value refernced as (dBm)

I.M. (dBc) = [(I.M. Measured - I.M. Filter Loss) - (F1CarrRef - F1FilterLoss)] Relative to F1 Ref. Carrier referenced as (dBc)

[(2xF1)-(F2)] Calculated TOI Product MHz	F1 Transmit MHz	F2 Interfering MHz	F1 Measured CARR Ref. dBm	I.M. Measured Level dBm	Filter Loss Measurement Filter Loss dB	I.M. Normalized Level dBm	I.M. Required Atten. dBc	I.M. Refernced to Carrier dBc	(>=0) = PASS I.M. Delta Margin dB (+/-)	Measurement Notes	PASS/FAIL PASS/(Local/C)
85.9	95.5	105.1	3.26	-65.05	0	-65.05	-55.5	-68.31	12.81		PASS
89.5	97.3	105.1	10.38	-62.30	0	-62.3	-64.5	-72.68	8.18		PASS
90.3	97.7	105.1	3.15	-70.00	0	-70	-64.5	-73.15	8.65		PASS
91.9	98.5	105.1	9.78	-63.30	0	-63.3	-64.5	-73.08	8.58		PASS
92.5	95.5	98.5	3.26	-64.75	0	-64.75	-55.5	-68.01	12.51		PASS
93.3	95.5	97.7	3.26	-52.00	0	-52	-55.5	-55.26	-0.24	*Local/C 93.3	PASS/*Local C
93.7	95.5	97.3	3.26	-62.28	0	-62.28	-55.5	-65.54	10.04		PASS
95.5	95.5	95.5	3.26	3.26	0	3.26	-55.5	0	REF	Reference 95.5	PASS
96.1	97.3	98.5	10.38	-55.07	0	-55.07	-64.5	-65.45	0.95		PASS
96.9	97.3	97.7	10.38	-56.00	0	-56	-55.5	-66.38	10.88		PASS
96.9	97.7	98.5	3.15	-56.00	0	-56	-64.5	-59.15	-5.35	*Local/C 96.9	PASS/*Local C
97.3	97.3	97.3	10.38	10.38	0	10.38	-64.5	0	REF	Reference 97.3	PASS
97.7	97.7	97.7	3.15	3.15	0	3.15	-64.5	0	REF	Reference 97.7	PASS
98.1	97.7	97.3	3.15	-53.00	0	-53	-55.5	-56.15	0.65		PASS
98.5	98.5	98.5	9.78	9.78	0	9.78	-64.5	0	REF	Reference 98.5	PASS
99.1	97.3	95.5	10.38	-64.14	0	-64.14	-64.5	-74.52	10.02		PASS
99.3	98.5	97.7	9.78	-57.00	0	-57	-65.5	-66.78	1.28		PASS
99.7	98.5	97.3	9.78	-54.83	0	-54.83	-64.5	-64.61	0.11		PASS
99.9	97.7	95.5	3.15	-70.00	0	-70	-64.5	-73.15	8.65		PASS
101.5	98.5	95.5	9.78	-66.05	0	-66.05	-64.5	-75.83	11.33		PASS
105.1	105.1	105.1	10.67	10.67	0	10.67	-64.5	0	REF	Reference 105.1	PASS
111.7	105.1	98.5	10.67	-65.30	0	-65.3	-64.5	-75.97	11.47		PASS
112.5	105.1	97.7	10.67	-63.40	0	-63.4	-64.5	-74.07	9.57		PASS
112.9	105.1	97.3	10.67	-65.20	0	-65.2	-64.5	-75.87	11.37		PASS
114.7	105.1	95.5	10.67	-65.09	0	-65.09	-65.5	-75.76	10.26		PASS

* Local Station Carrier

§73.317   **47 CFR Ch. I (10-1-11 Edition)**

(ix)(A) For a station authorized pursuant to §73.215 or Sec. §73.509, a showing that the root mean square (RMS) of the measured composite antenna pattern (encompassing both the horizontally and vertically polarized radiation components (in relative field)) is at least 85 percent of the RMS of the authorized composite directional antenna pattern (in relative field). The RMS value, for a composite antenna pattern specified in relative field values, may be determined from the following formula:

RMS=the square root of:

[(relative field value 1)² + (relative field value 2)² +....+ (last relative field value)²]

total number of relative field values

(B) where the relative field values are taken from at least 36 evenly spaced radials for the entire 360 degrees of azimuth. The application for license must also demonstrate that coverage of the community of license by the 70 dBu contour is maintained for stations authorized pursuant to §73.215 on Channels 221 through 300, as required by §73.315(a), while noncommercial educational stations operating on Channels 201 through 220 must show that the 60 dBu contour covers at least a portion of the community of license.

(d) Applications proposing the use of FM transmitting antennas in the immediate vicinity (i.e. 60 meters or less) of other FM or TV broadcast antennas must include a showing as to the expected effect, if any, of such approximate operation.

(e) Where an FM licensee or permittee proposes to mount its antenna on an AM antenna tower, or locate within 3.2 km of an AM antenna tower, the FM licensee or permittee must comply with §73.1692.

[28 FR 13623, Dec. 14, 1963, as amended at 34 FR 14222, Sept. 10, 1969; 37 FR 25841, Dec. 5, 1972; 43 FR 33738, Nov. 17, 1978; 48 FR 29508, June 27, 1983; 51 FR 17028, May 8, 1986; 54 FR 9804, Mar. 8, 1989; 56 FR 57294, Nov. 8, 1991; 62 FR 51056, Sept. 30, 1997; 63 FR 70047, Dec. 18, 1998]

§73.317 FM transmission system requirements.

(a) FM broadcast stations employing transmitters authorized after January 1, 1960, must maintain the bandwidth occupied by their emissions in accordance with the specification detailed below. FM broadcast stations employing transmitters installed or type accepted before January 1, 1960, must achieve the highest degree of compliance with these specifications practicable with their existing equipment. In either case, should harmful interference to other authorized stations occur, the licensee shall correct the problem promptly or cease operation.

(b) Any emission appearing on a frequency removed from the carrier by between 120 kHz and 240 kHz inclusive must be attenuated at least 25 dB below the level of the unmodulated carrier. Compliance with this requirement will be deemed to show the occupied bandwidth to be 240 kHz or less.

(c) Any emission appearing on a frequency removed from the carrier by more than 240 kHz and up to and including 600 kHz must be attenuated at least 35 dB below the level of the unmodulated carrier.

(d) Any emission appearing on a frequency removed from the carrier by more than 600 kHz must be attenuated at least 43 + 10 Log₁₀ (Power, in watts) dB below the level of the unmodulated carrier, or 80 dB, whichever is the lesser attenuation.

(e) Preemphasis shall not be greater than the impedance-frequency characteristics of a series inductance resistance network having a time constant of 75 microseconds. (See upper curve of Figure 2 of §73.333.)

[51 FR 17028, May 8, 1986]

§73.318 FM blanketing interference.

Areas adjacent to the transmitting antenna that receive a signal with a strength of 115 dBu (562 mV/m) or greater will be assumed to be blanketed. In determining the blanketed area, the 115 dBu contour is determined by calculating the inverse distance field using the effective radiated power of the maximum radiated lobe of the antenna without considering its vertical radiation pattern or height. For directional antennas, the effective radiated power in the pertinent bearing shall be used.

(a) The distance to the 115 dBu contour is determined using the following equation:

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