

FM PROOF OF PERFORMANCE TEST

TEST DATE: 11/14/2018

CALL LETTERS: W231DV

MEASUREMENT LOCATION: RF sample port on back of GatesAir FAX 300 transmitter at the WZBK tower's FM master antenna.

Tested by:



Ira A. Wilner (WILNER ASSOCIATES)

CARRIER FREQUENCY 94.1 MHz.

CARRIER POWER .3 kW. REQUIRED HARMONIC ATTENUATION -68 dB.*

Beyond 75kHz. (43+10LOG(PWR) or -80dB.) See above*

SUMMARY OF RESULTS:

No expected mixing products were found at the measurement noise floor of -90 dB. A little bit of second harmonic at -79 dBc was found, but it is well below the required -68 dB suppression level for this TPO.

PASS= FAIL=

MEASUREMENT PROCEDURE

An Anritsu 2721B Spectrum analyzer, serial number 1114160, was set up with a span of the entire FM band (88-108 MHz) with a resolution bandwidth of 300 Hz and a video filter of 3 kHz to reduce trace noise. This permits a dynamic range of 90 dB. To facilitate precision and speed translator was unmodulated. All of the other combined translators at the site were on the air through the same master antenna.

Carrier reference for W231DV was established at the top line of the analyzer screen.

A tight tunable three cavity FM notch filter, Microwave Filter Company 6367, was then used to reduce fundamental by 50+ dB to prevent analyzer overload. RF was taken from an output sample port on rear of the translator's transmitter to determine cleanliness of the transmitter under varying conditions and to look for any RF energy coming back through the combiner towards this transmitter.

Typical sample ports have a frequency response of 3 dB per octave. Thus any spurious response will be better than measured.

The first screen shot is with the translator off air for a reference. You can see the other three translators barely above the noise, well attenuated at the output sample port of the new translator.

The second screen shot is with W231DV on air. Note there are no significant changes except for a bit higher signal on the 107.5 MHz signal which is likely stray RF coupling in the test cables.

The third screen shot shows the aircraft band which remains clean.

The fourth screen shot, RBW at 1 kHz, shows the VHF band, which is clean except for some 2nd harmonic which is well below the -68 dBc limit at this TPO.

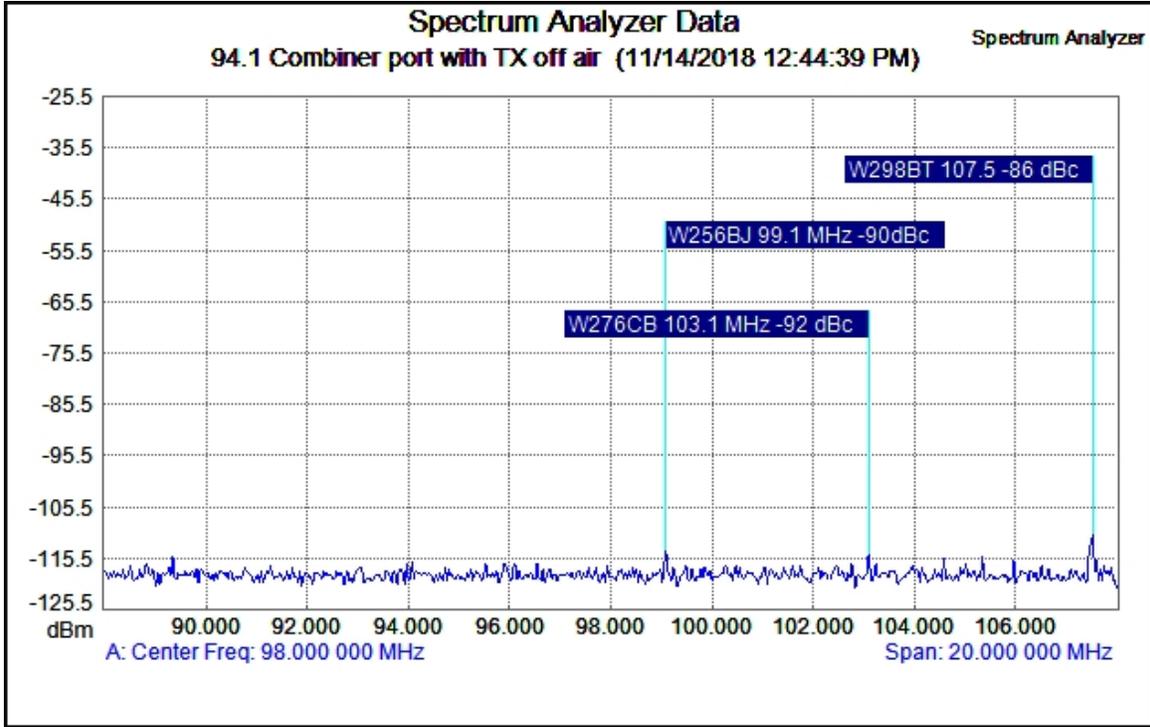
The fifth screen shot, RBW 1 kHz, covers the UHF band, which is clean. No harmonics or products appear above the analyzer noise floor at -90 dBc.

No modulation measurements were made since this translator cannot have program audio until the previous translator is disassociated with its former AM station.

W231DV Measurement

Wilner Associates

Prepared for: **Monadnock Broadcasting Group**



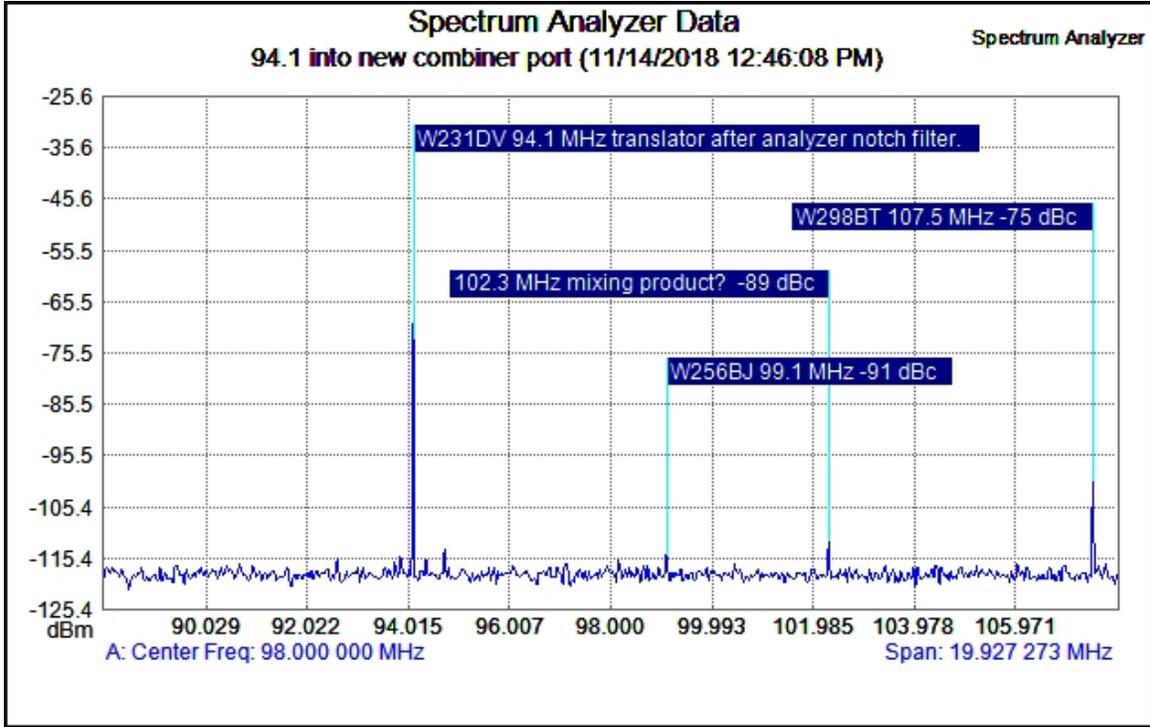
Measurement Summary			
Trace A data		VBW	3.0 kHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	98.000 000 MHz
Min Sweep Time	0.001 S	Start Frequency	88.000 000 MHz
Reference Level Offset	0 dB	Stop Frequency	108.000 000 MHz
Input Attenuation	0.0 dB	Frequency Span	20.000 000 MHz
RBW	300.0 Hz	Reference Level	-25.500 dBm

Device Summary			
Serial Number	1114160	Model	MS2721B
Base Ver.	V5.71	Options	20
App Ver.	V5.73	Date	11/14/2018 12=44=39 PM

W231DV Measurement

Wilner Associates

Prepared for: **Monadnock Broadcasting Group**



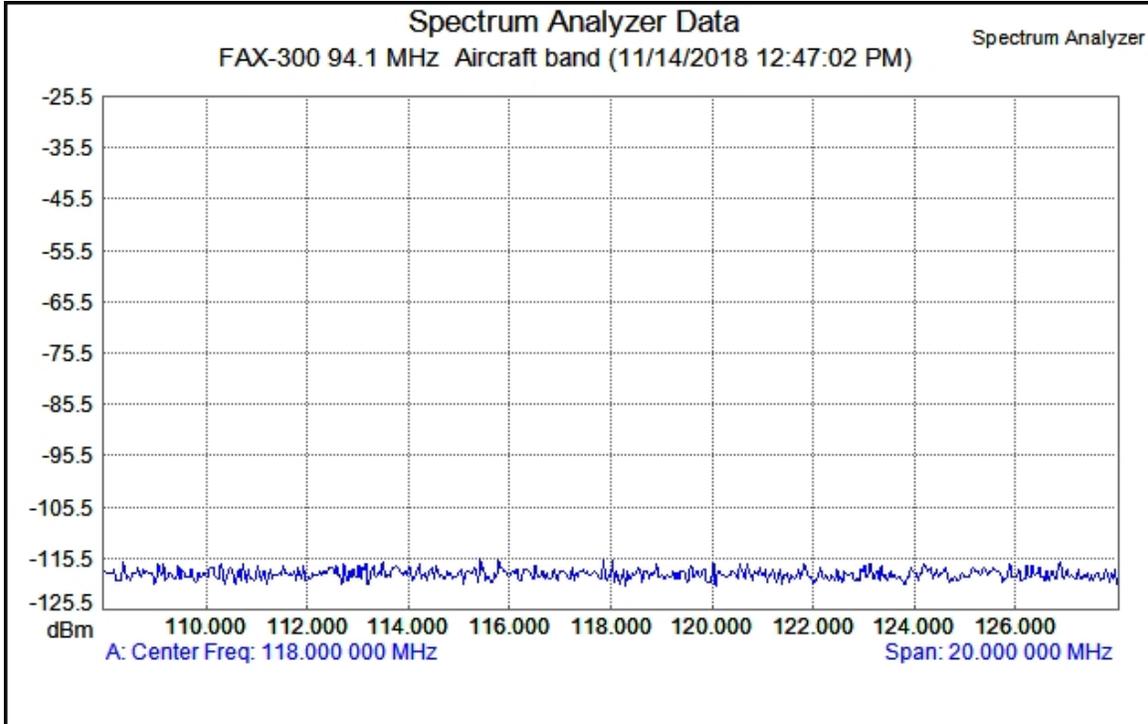
Measurement Summary			
Trace A data		VBW	3.0 kHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	98.000 000 MHz
Min Sweep Time	0.001 S	Start Frequency	88.000 000 MHz
Reference Level Offset	0 dB	Stop Frequency	108.000 000 MHz
Input Attenuation	0.0 dB	Frequency Span	20.000 000 MHz
RBW	300.0 Hz	Reference Level	-25.600 dBm

Device Summary			
Serial Number	1114160	Model	MS2721B
Base Ver.	V5.71	Options	20
App Ver.	V5.73	Date	11/14/2018 12=46=08 PM

W231DV Measurement

Wilner Associates

Prepared for: **Monadnock Broadcasting Group**



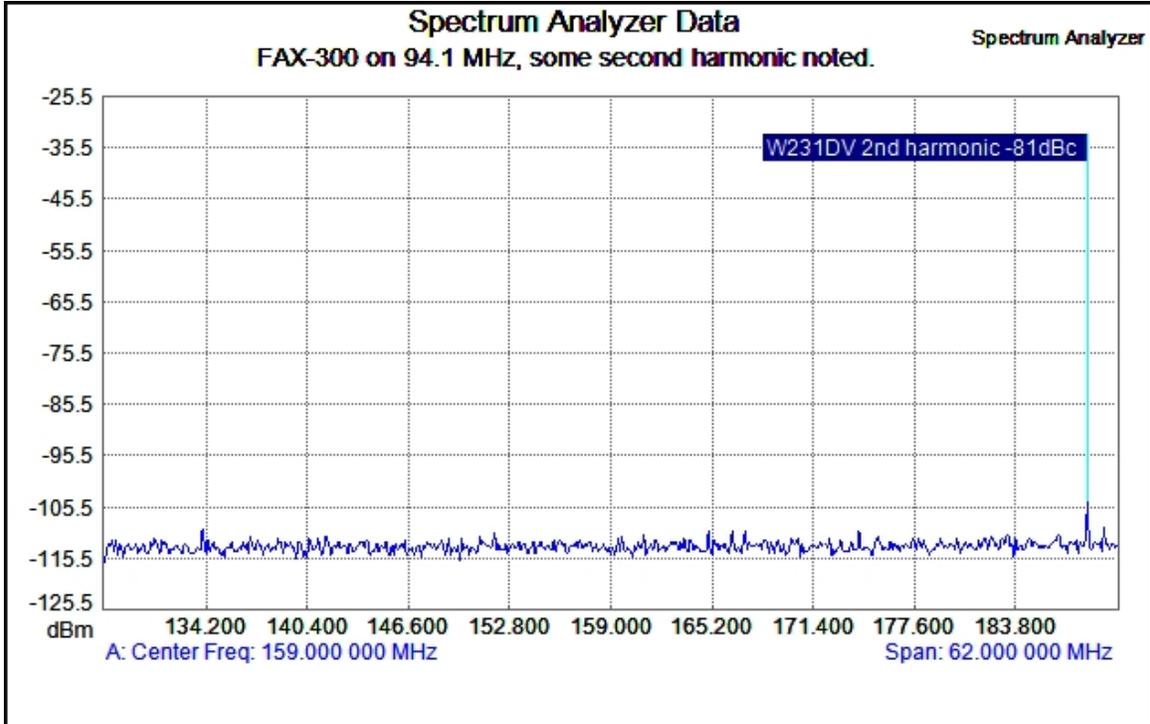
Measurement Summary			
Trace A data		VBW	3.0 kHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	118.000 000 MHz
Min Sweep Time	0.001 S	Start Frequency	108.000 000 MHz
Reference Level Offset	0 dB	Stop Frequency	128.000 000 MHz
Input Attenuation	0.0 dB	Frequency Span	20.000 000 MHz
RBW	300.0 Hz	Reference Level	-25.500 dBm

Device Summary			
Serial Number	1114160	Model	MS2721B
Base Ver.	V5.71	Options	20
App Ver.	V5.73	Date	11/14/2018 12=47=02 PM

W231DV Measurement

Wilner Associates

Prepared for: **Monadnock Broadcasting Group**



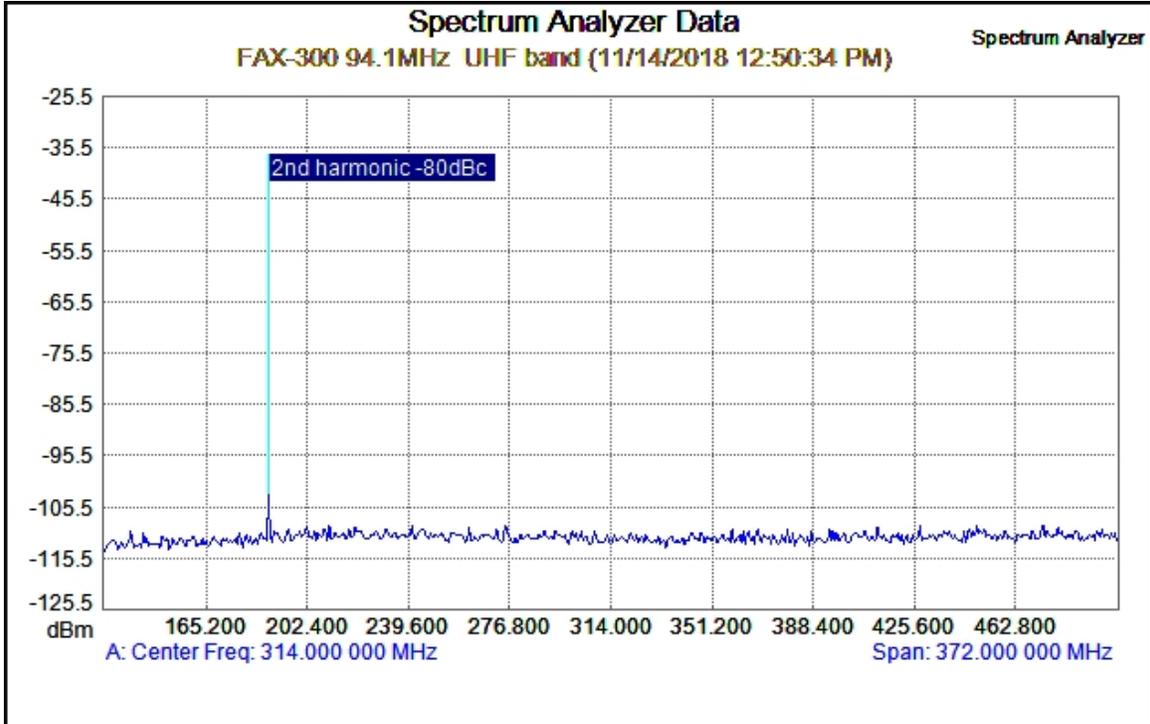
Measurement Summary			
Trace A data		VBW	3.0 kHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	159.000 000 MHz
Min Sweep Time	0.001 S	Start Frequency	128.000 000 MHz
Reference Level Offset	0 dB	Stop Frequency	190.000 000 MHz
Input Attenuation	0.0 dB	Frequency Span	62.000 000 MHz
RBW	1.0 kHz	Reference Level	-25.500 dBm

Device Summary			
Serial Number	1114160	Model	MS2721B
Base Ver.	V5.71	Options	20
App Ver.	V5.73	Date	11/14/2018 12=52=07 PM

W231DV Measurement

Wilner Associates

Prepared for: **Monadnock Broadcasting Group**



Measurement Summary			
Trace A data		VBW	3.0 kHz
Trace Mode	Normal	Detection	Peak
Preamp	OFF	Center Frequency	314.000 000 MHz
Min Sweep Time	0.001 S	Start Frequency	128.000 000 MHz
Reference Level Offset	0 dB	Stop Frequency	500.000 000 MHz
Input Attenuation	0.0 dB	Frequency Span	372.000 000 MHz
RBW	1.0 kHz	Reference Level	-25.500 dBm

Device Summary			
Serial Number	1114160	Model	MS2721B
Base Ver.	V5.71	Options	20
App Ver.	V5.73	Date	11/14/2018 12=50=34 PM