

# **KBMG-FM2 Spurious Emissions Report**

Ensign Peak - Salt Lake City, Utah

On the morning of April 1<sup>st</sup>, 2009 equipment performance measurements were made for broadcast booster station KBMG-FM2 permit No. BPFTB-20081007AAR

This Engineering evaluation report and RF proof of performance measurements were prepared in support of the operation of the specified transmitting system herein as to comply with 47 C.F.R. Section 73.317 (b) through 73.317 (d).

KBMG-FM2 (106.1 MHz) is one of six stations sharing a master antenna system at the Ensign Peak Communications site located in Salt Lake City, Utah. The outputs of the six stations are combined using a constant impedance balanced bandpass filter combining system Model RCCC-29A – 0.8 designed and fabricated by Jampro antenna Systems of Sacramento, CA

Measurements were made while all stations broadcast programming material. All stations were operating into the combined antenna system at the full permitted power during measurements.

In the case of the KBMG-FM2 transmission system, the measurement equipment was feed by a directional coupler at the combined output. Measurements were made on the station's carrier frequency for reference purposes and to look at occupied bandwidth for any spurious emissions. The use of the IFR AN940 Serial Number 1009 spectrum analyzer within current calibration was used to make all measurements. The assigned carrier frequency level was recorded. All other harmonic intermodulation products or spurious emission levels were referenced to this initial carrier frequency reference level with a noise floor of -78 dBC. The radio spectrum from 50 MHz up to the stations 10<sup>th</sup> carrier frequency harmonic was tuned to look for any unusual emissions.

A set of Trilithic bandpass filters model VF-40003 Serial #200514038 was used to reduce the effects of multi signal mixing in the IFR AN940 analyzer; all insertion losses have been accounted for to reflect accuracy in this report.

The intermodulation products measured in this study 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 the each of the combined individual stations was

subtracted one at a time from the 2X sum to find the common intermodulation product.

All of the signals noted were identified as being either signals from other stations in the combined system or ingress from other known transmitters.

No intermodulation products, spurious signals or harmonics were found that could be attributed to the operation of KBMG-FM2.

With consideration to the KBMG-FM2 Ensign Peak SLC transmission system, I believe that the station is in compliance with the requirements of 47 CFR § 73.1590 (a) & (b) and 47 CFR § 73.317 (b-d). This report and associated exhibits were prepared by me and are based on measurements made by myself. I believe them to be true and accurate to the best of my knowledge.

Respectfully submitted,

A handwritten signature in black ink that reads "Scot W. Mathews". The signature is written in a cursive, flowing style.

Scot W. Mathews  
Consultant Engineer

Simmons Media Group

AN940

Serial # 1009

200.0

106.10

9

106.1 without mod

kHz/Div

MHz

kHz Res

04/01/2009 01:48:07

dBm  
0

-10

-20

-30

-40

-50

-60

-70

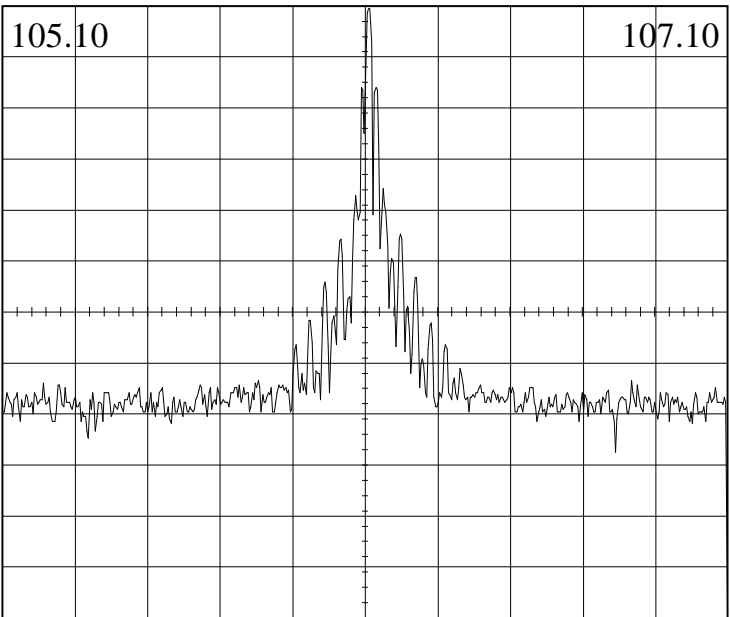
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 106.11

Peak Level: -.31

# Simmons Media Group

AN940

Serial # 1009

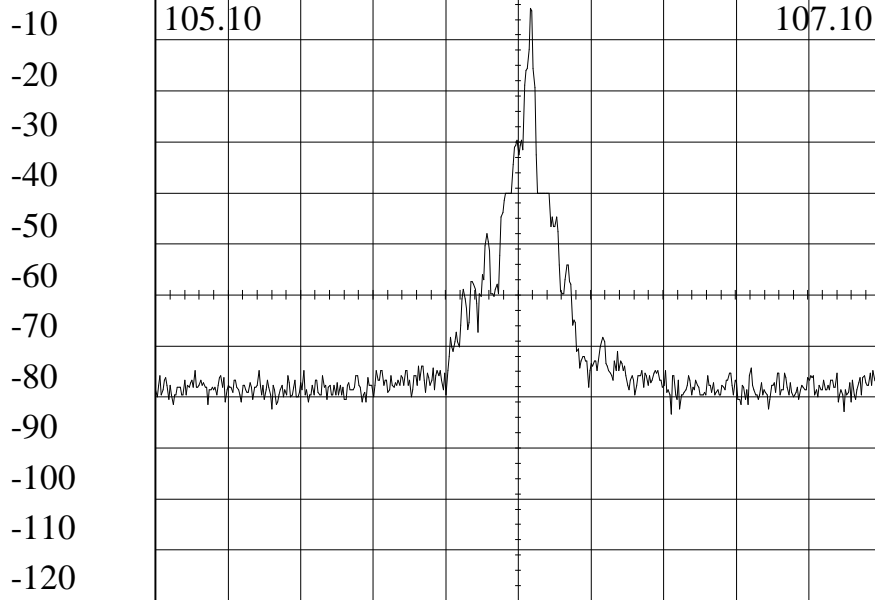
dBm  
0

200.0  
kHz/Div

106.10  
MHz

9  
kHz Res

106.1 with mod  
04/01/2009 01:49:52



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 106.1341

Peak Level: -2.51

Simmons Media Group

AN940

Serial # 1009

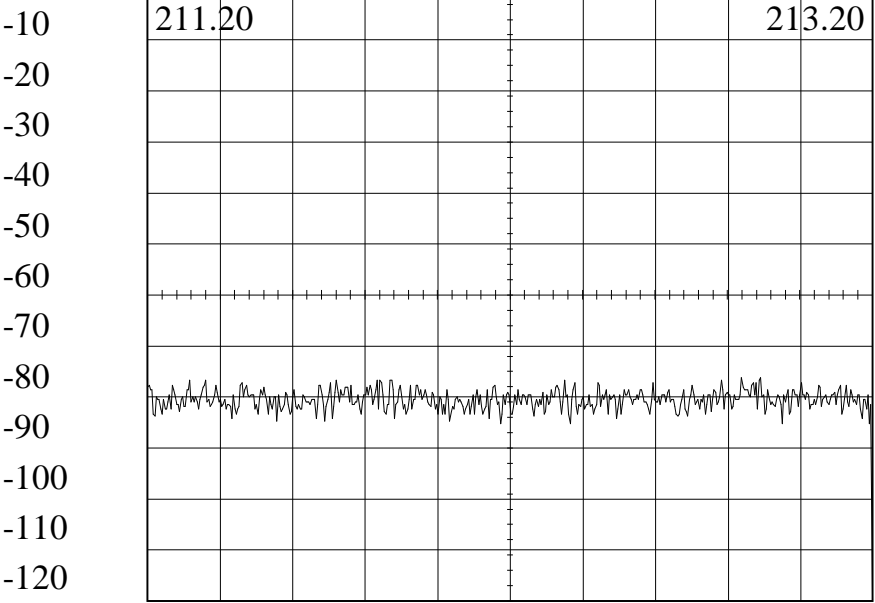
dBm  
0

200.0  
kHz/Div

212.20  
MHz

9  
kHz Res

106.1 2nd order  
04/01/2009 01:50:44



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 212.8393

Peak Level: -50.82

# Simmons Media Group

AN940

Serial # 1009

200.0

318.30

9

106.1 3rd order

kHz/Div

MHz

kHz Res

04/01/2009 01:51:44

dBm

0

-10

-20

-30

-40

-50

-60

-70

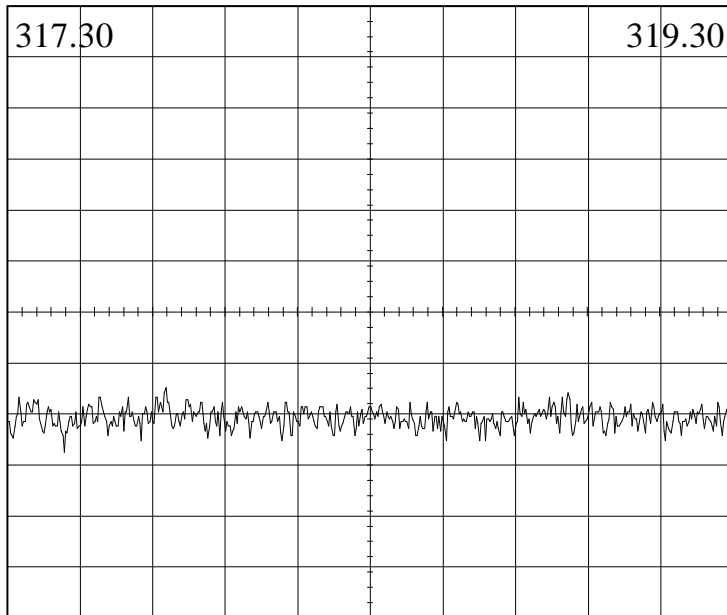
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 317.7369

Peak Level: -49.88

# Simmons Media Group

AN940

Serial # 1009

200.0

424.40

9

106.1 4th order

kHz/Div

MHz

kHz Res

04/01/2009 01:52:58

dBm  
0

-10

-20

-30

-40

-50

-60

-70

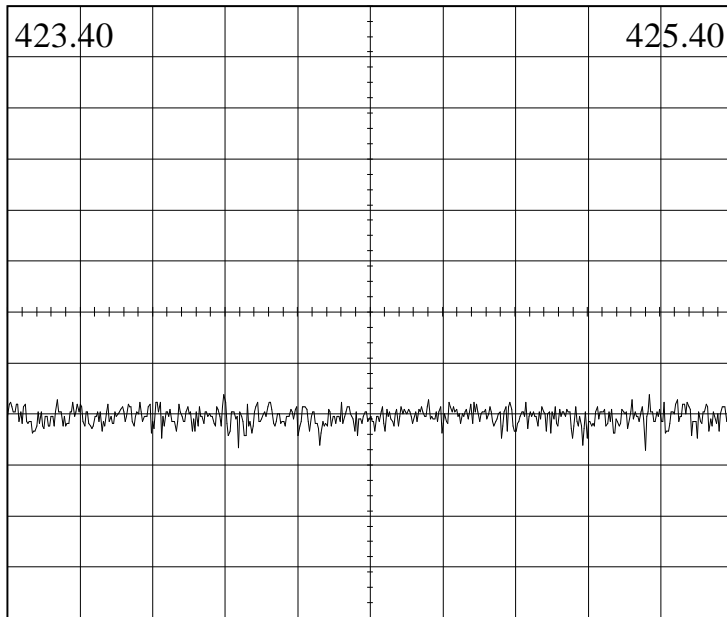
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 423.9972

Peak Level: -50.82

Simmons Media Group

AN940

Serial # 1009

200.0

530.50

9

106.1 5th order

kHz/Div

MHz

kHz Res

04/01/2009 01:53:42

dBm  
0

-10

-20

-30

-40

-50

-60

-70

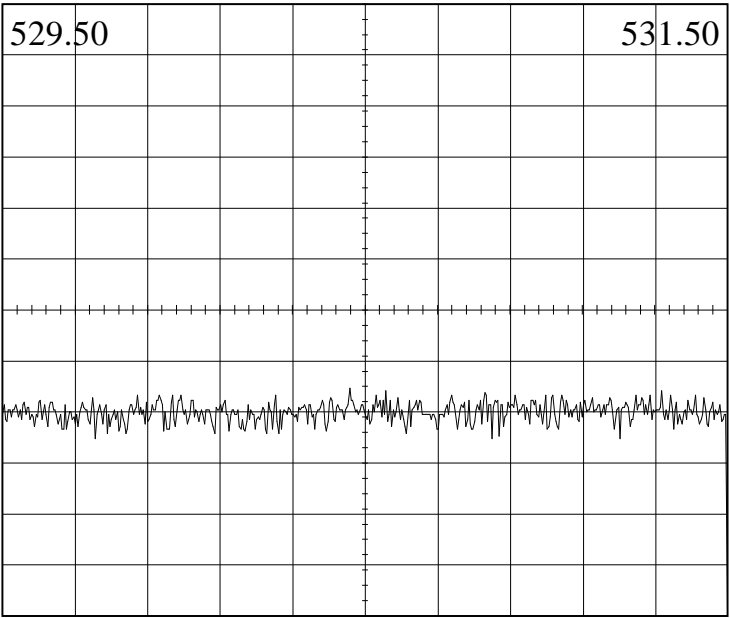
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 530.4579

Peak Level: -50.2



Simmons Media Group

AN940

Serial # 1009

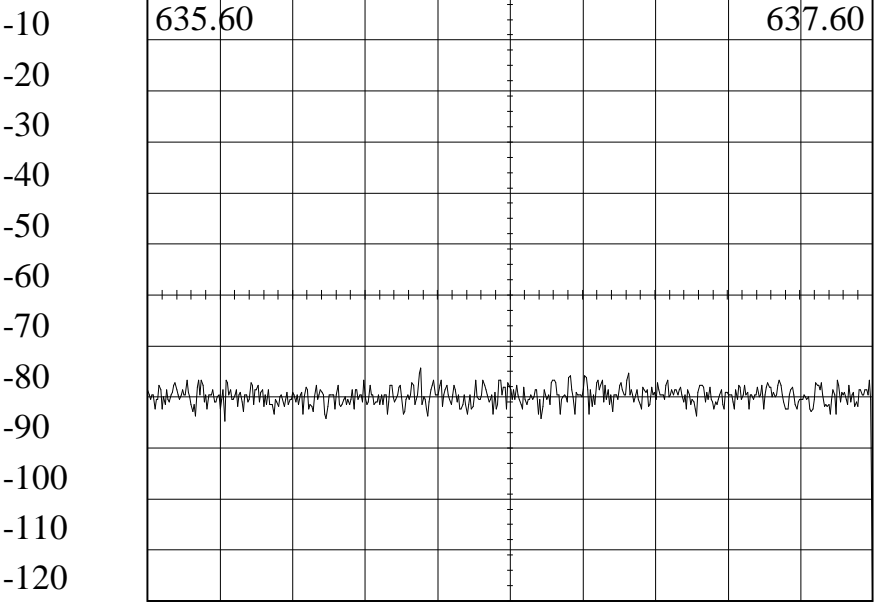
dBm  
0

200.0  
kHz/Div

636.60  
MHz

9  
kHz Res

106.1 6th order  
04/01/2009 01:54:17



30 dB Attn      Gen --- dBm      20 mSecs  
0 dB IF Gain      Video Filter: 1 kHz  
Peak Freq: 636.3535      Peak Level: -49.57

# Simmons Media Group

AN940

Serial # 1009

200.0

742.70

9

106.1 7th order

kHz/Div

MHz

kHz Res

04/01/2009 01:55:30

dBm

0

-10

-20

-30

-40

-50

-60

-70

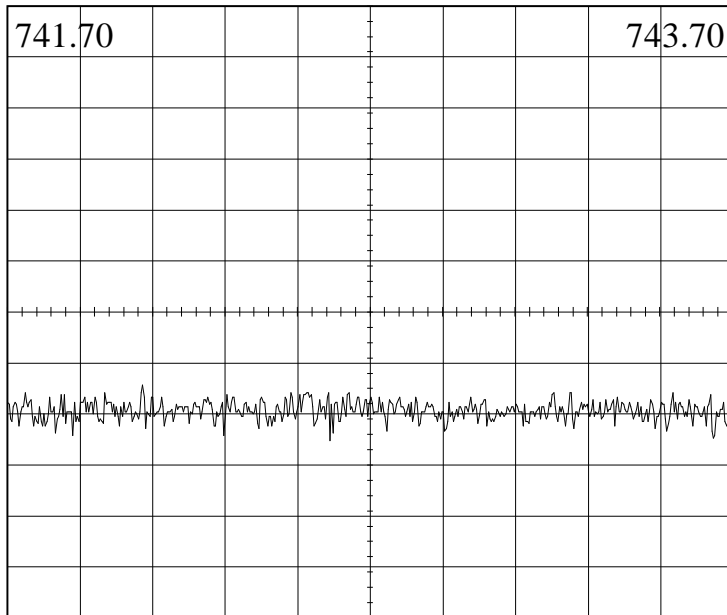
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 742.0727

Peak Level: -49.57

Simmons Media Group

AN940

Serial # 1009

200.0

848.80

9

106.1 8th order

kHz/Div

MHz

kHz Res

04/01/2009 01:56:23

dBm  
0

-10

-20

-30

-40

-50

-60

-70

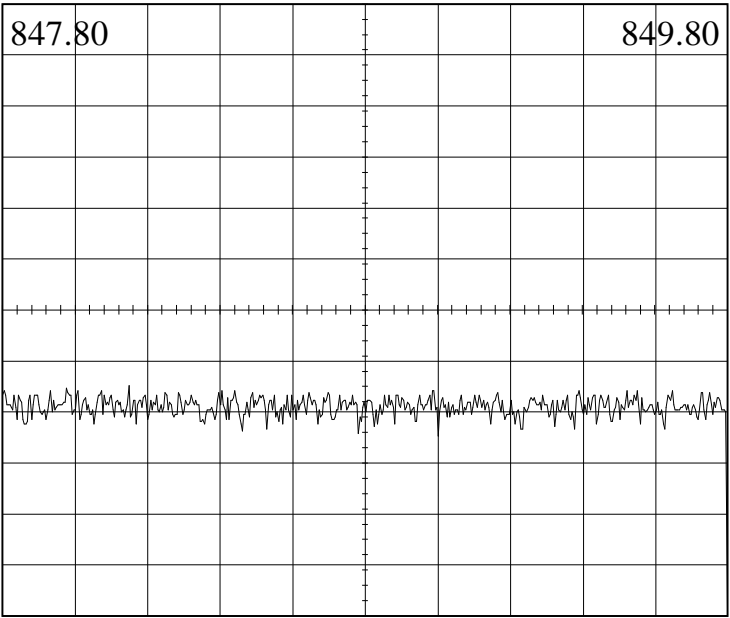
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 848.1487

Peak Level: -49.88

Simmons Media Group

AN940

Serial # 1009

dBm  
0

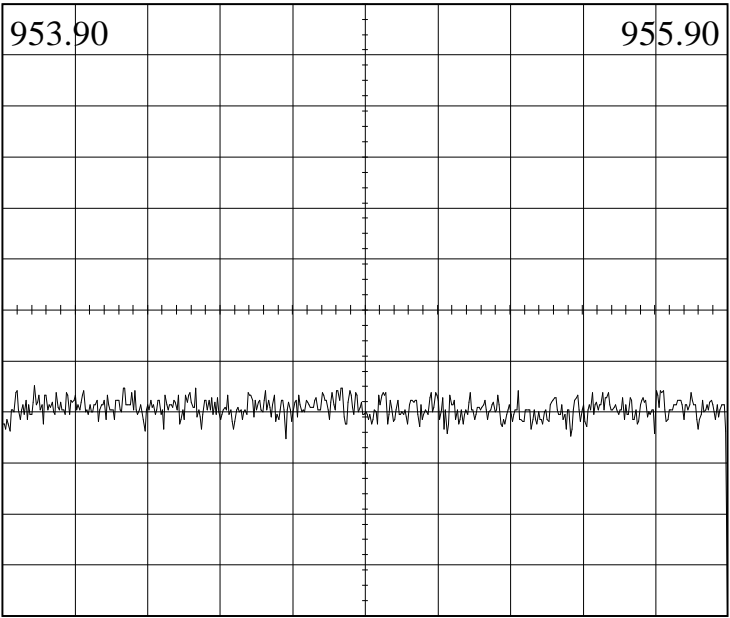
200.0  
kHz/Div

954.90  
MHz

9  
kHz Res

106.1 9th order  
04/01/2009 01:57:07

-10  
-20  
-30  
-40  
-50  
-60  
-70  
-80  
-90  
-100  
-110  
-120



30 dB Attn      Gen --- dBm      20 mSecs  
0 dB IF Gain      Video Filter: 1 kHz  
Peak Freq: 953.9882      Peak Level: -49.88

Simmons Media Group

AN940

Serial # 1009

dBm  
0

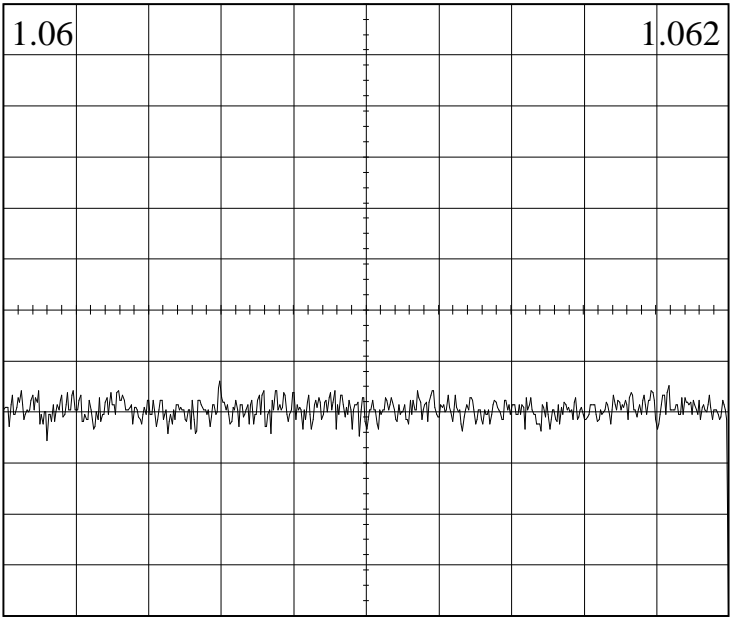
200.0  
kHz/Div

1.061  
GHz

9  
kHz Res

106.1 10th order  
04/01/2009 01:58:55

-10  
-20  
-30  
-40  
-50  
-60  
-70  
-80  
-90  
-100  
-110  
-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 1060.5972

Peak Level: -49.25

Simmons Media Group

AN940

Serial # 1009

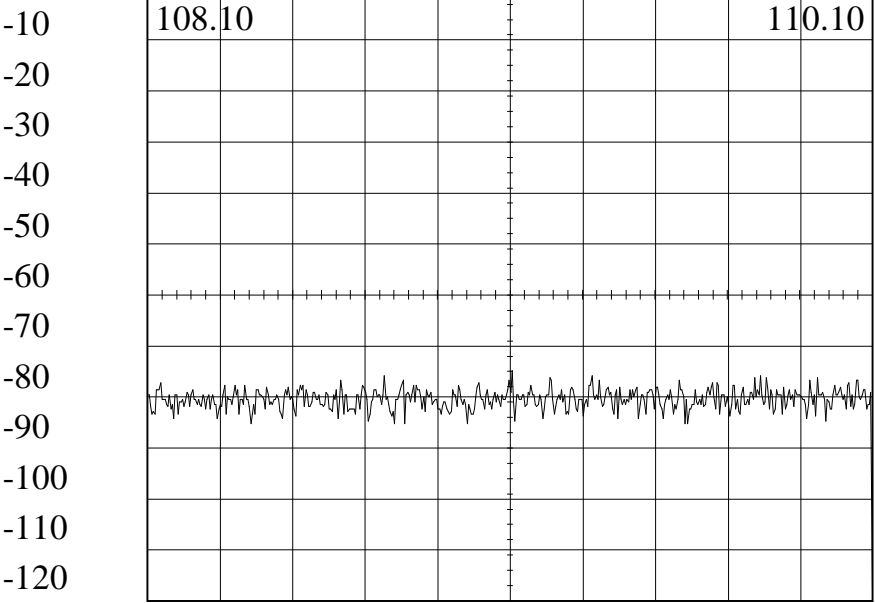
dBm  
0

200.0  
kHz/Div

109.10  
MHz

9  
kHz Res

106.1 IM with 103.1  
04/01/2009 02:00:50



30 dB Attn      Gen --- dBm      20 mSecs  
0 dB IF Gain      Video Filter: 1 kHz  
Peak Freq: 109.106      Peak Level: -49.88

Simmons Media Group

AN940

Serial # 1009

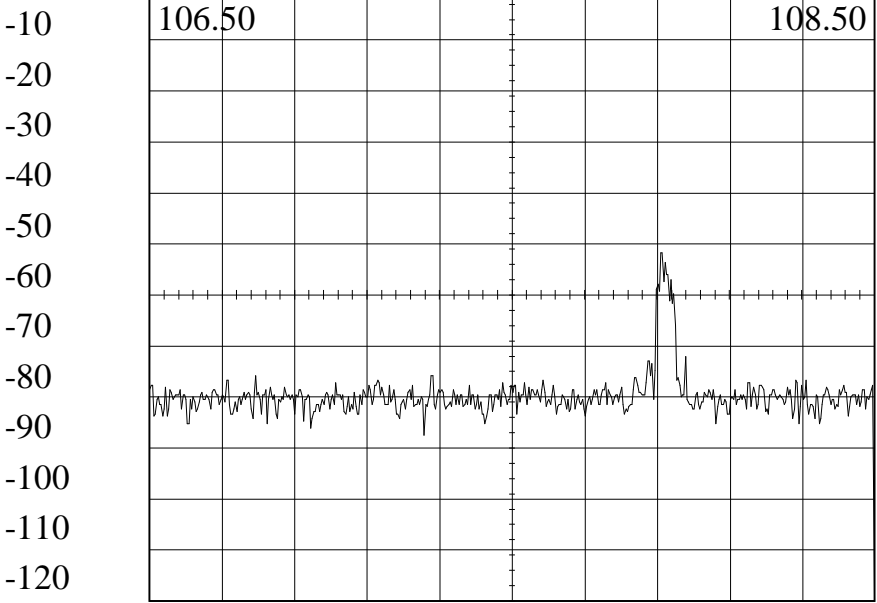
dBm  
0

200.0  
kHz/Div

107.50  
MHz

9  
kHz Res

106.1 IM with 104.7  
04/01/2009 02:01:49



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 107.9108

Peak Level: -34.51

Simmons Media Group

AN940

Serial # 1009

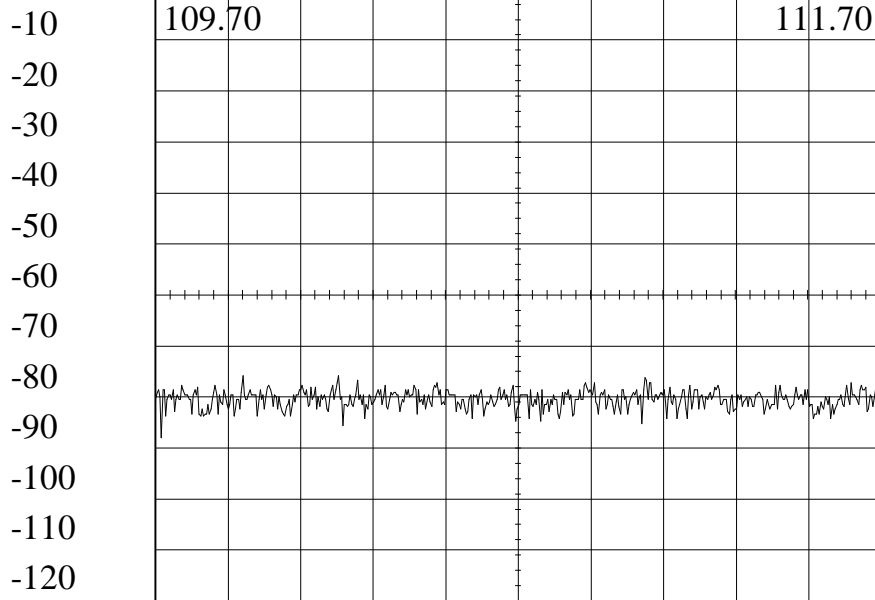
dBm  
0

200.0  
kHz/Div

110.70  
MHz

9  
kHz Res

106.1 IM with 101.5  
04/01/2009 02:02:40



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 109.9405

Peak Level: -50.51



Simmons Media Group

AN940

Serial # 1009

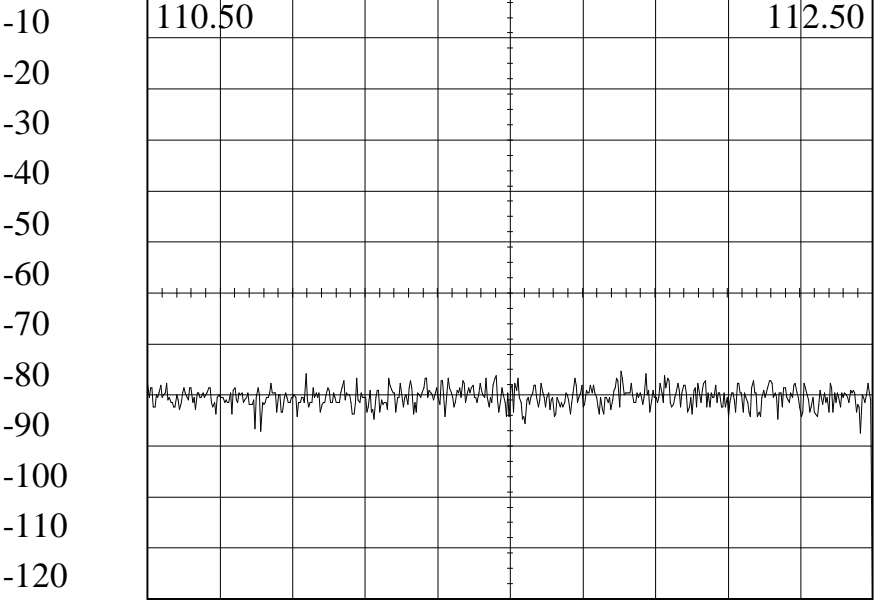
dBm  
0

200.0  
kHz/Div

111.50  
MHz

9  
kHz Res

106.1 IM with 100.7  
04/01/2009 02:03:43



30 dB Attn      Gen --- dBm      20 mSecs  
0 dB IF Gain      Video Filter: 1 kHz  
Peak Freq: 111.8066      Peak Level: -50.2

Simmons Media Group

AN940

Serial # 1009

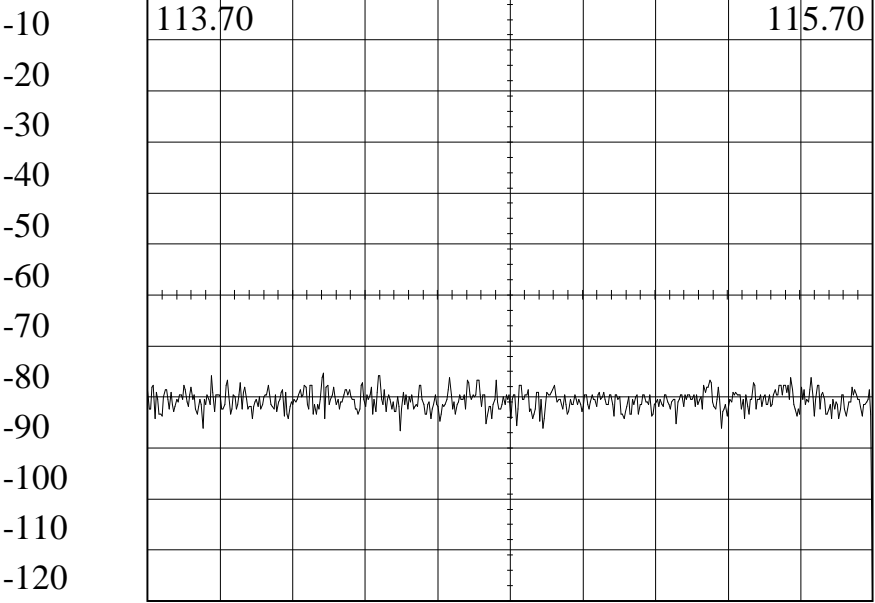
dBm  
0

200.0  
kHz/Div

114.70  
MHz

9  
kHz Res

106.1 IM with 97.5  
04/01/2009 02:05:18



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 114.185

Peak Level: -50.2