

# KYLZ-FM2 Spurious Emissions Report

Spirit Hill - Provo, Utah

On the afternoon of April 3, 2009 equipment performance measurements were made for broadcast booster station KYLZ-FM2 permit No. **BNPFTB-20081009AFP**

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).

KYLZ-FM2 (104.7 MHz) is one of six stations sharing a master antenna system at the Spirit Hill Communications site located in Provo, 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 KYLZ-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. <sup>1</sup>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 KYLZ-FM2.

With consideration to the KYLZ-FM2 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,



Scot W. Mathews  
Consultant Engineer

Simmons Media Group

AN940

Serial # 1009

200.0

104.70

9

104.7 Provo w/o mod

dBm

kHz/Div

MHz

kHz Res

04/03/2009 14:45:47

0

-10

-20

-30

-40

-50

-60

-70

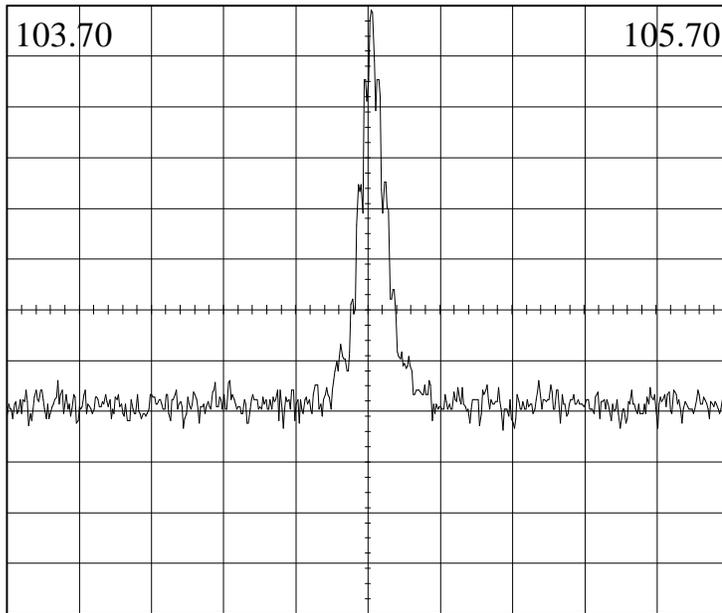
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 104.71

Peak Level: -.63

Simmons Media Group

AN940

Serial # 1009

200.0

104.70

9

104.7 Provo w mod

kHz/Div

MHz

kHz Res

04/03/2009 14:48:25

dBm

0

-10

-20

-30

-40

-50

-60

-70

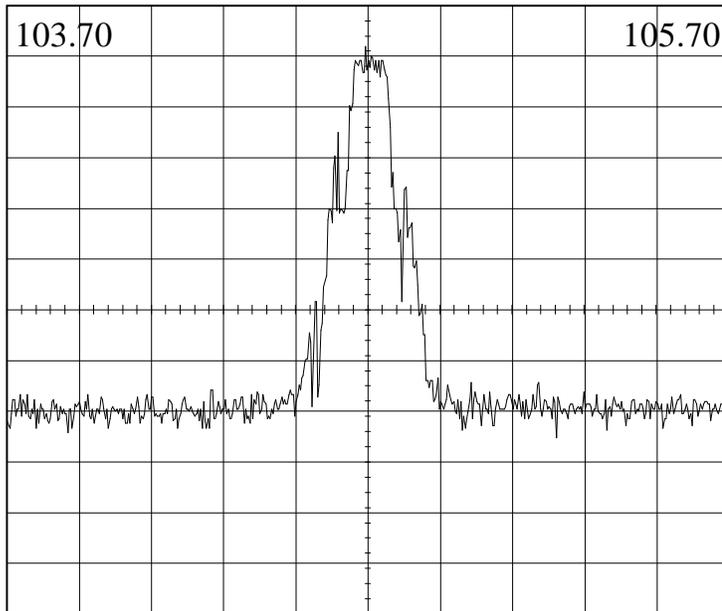
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 104.694

Peak Level: -5.33

Simmons Media Group

AN940

Serial # 1009

200.0

209.40

9

104.7 Pro. 2nd order

dBm

kHz/Div

MHz

kHz Res

04/03/2009 14:50:17

0

-10

-20

-30

-40

-50

-60

-70

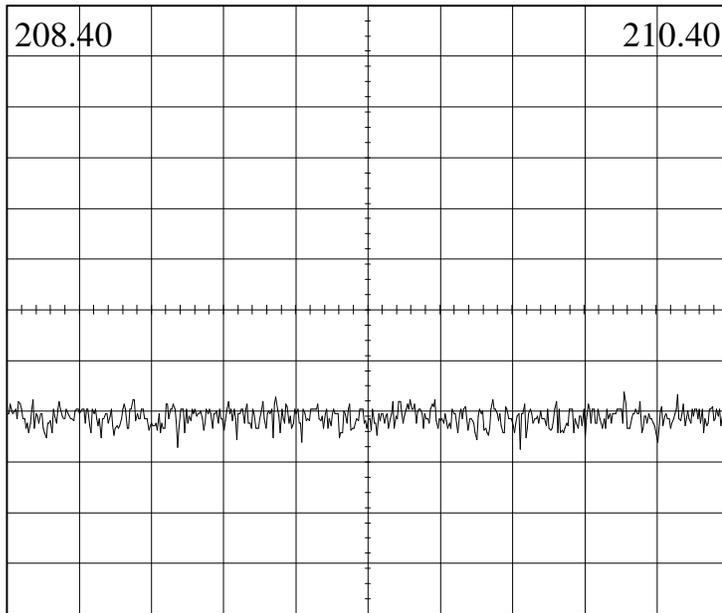
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 210.1114

Peak Level: -50.82

Simmons Media Group

AN940

Serial # 1009

200.0

314.10

9

104.7 Pro. 3rd order

kHz/Div

MHz

kHz Res

04/03/2009 14:52:28

dBm

0

-10

-20

-30

-40

-50

-60

-70

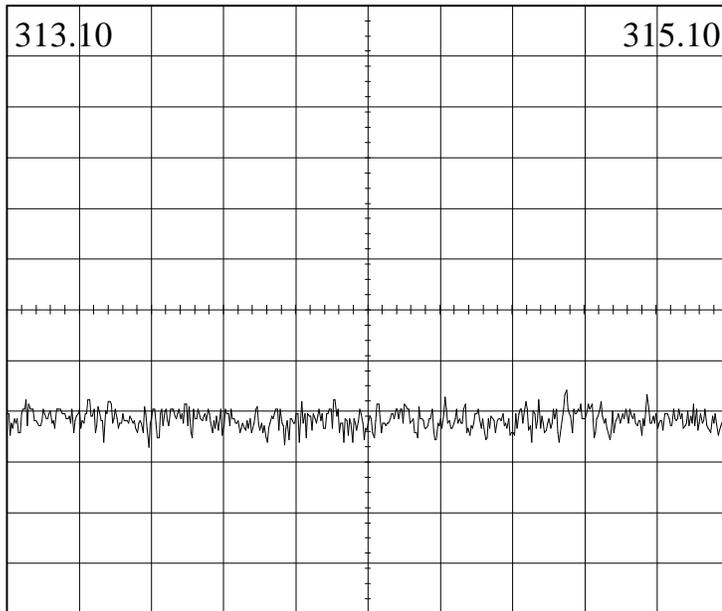
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 314.6511

Peak Level: -50.51

Simmons Media Group

AN940

Serial # 1009

200.0

418.80

9

104.7 Pro. 4th order

kHz/Div

MHz

kHz Res

04/03/2009 14:56:03

dBm

0

-10

-20

-30

-40

-50

-60

-70

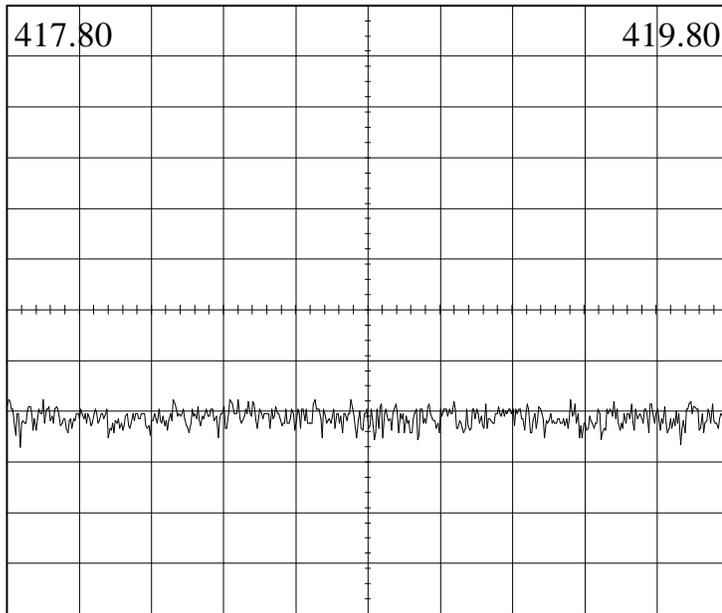
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 417.804

Peak Level: -51.76

Simmons Media Group

AN940

Serial # 1009

200.0

523.50

9

104.7 Pro. 5th order

kHz/Div

MHz

kHz Res

04/03/2009 14:57:44

dBm

0

-10

-20

-30

-40

-50

-60

-70

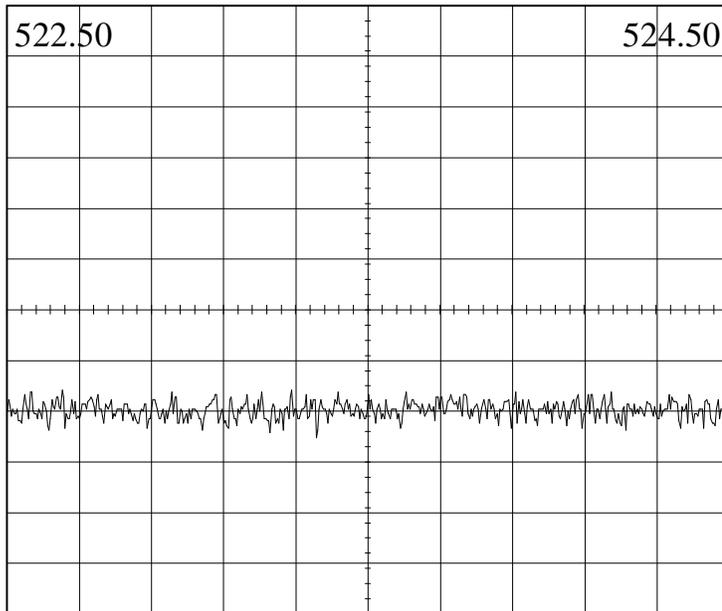
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 522.6523

Peak Level: -50.51

Simmons Media Group

AN940

Serial # 1009

200.0

628.20

9

104.7 Pro. 6th order

kHz/Div

MHz

kHz Res

04/03/2009 14:59:25

dBm

0

-10

-20

-30

-40

-50

-60

-70

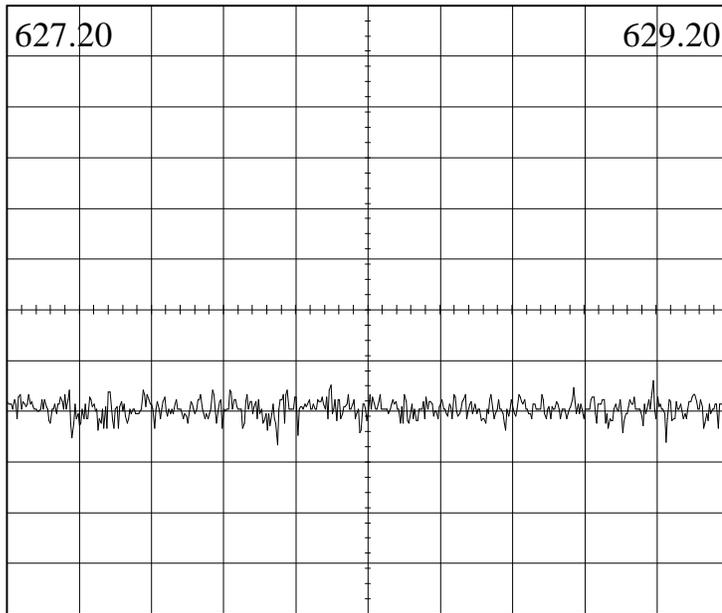
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 628.9916

Peak Level: -49.25

Simmons Media Group

AN940

Serial # 1009

200.0

732.90

9

104.7 Pro. 7th order

kHz/Div

MHz

kHz Res

04/03/2009 15:00:54

dBm

0

-10

-20

-30

-40

-50

-60

-70

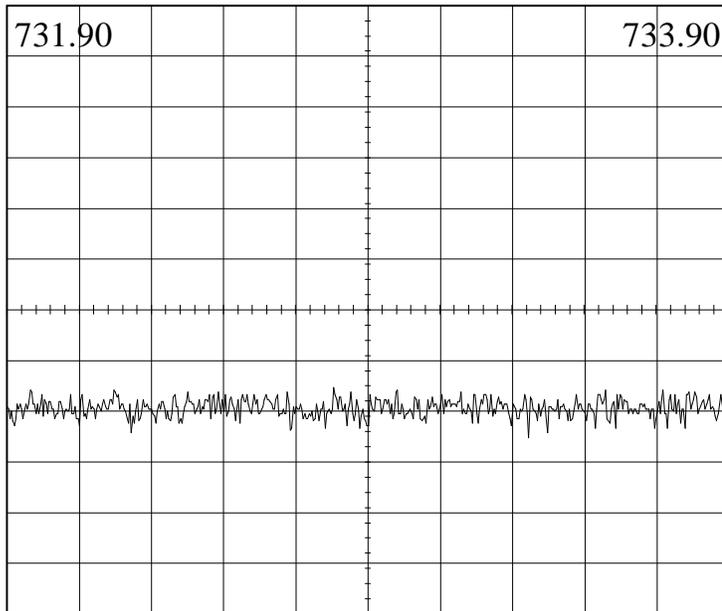
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 732.8058

Peak Level: -50.2

Simmons Media Group

AN940

Serial # 1009

200.0

837.60

9

104.7 Pro. 8th order

kHz/Div

MHz

kHz Res

04/03/2009 15:01:45

dBm

0

-10

-20

-30

-40

-50

-60

-70

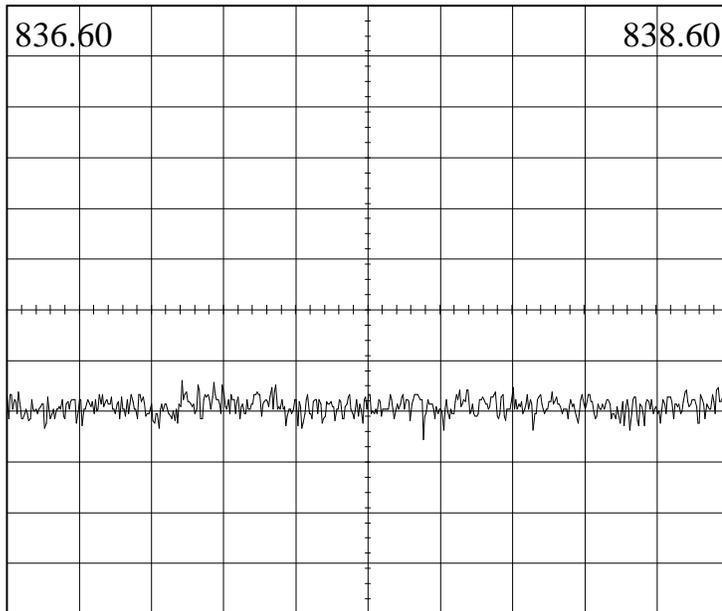
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 837.085

Peak Level: -49.25

Simmons Media Group

AN940

Serial # 1009

200.0

942.30

9

104.7 Pro. 9th order

kHz/Div

MHz

kHz Res

04/03/2009 15:03:22

dBm

0

-10

-20

-30

-40

-50

-60

-70

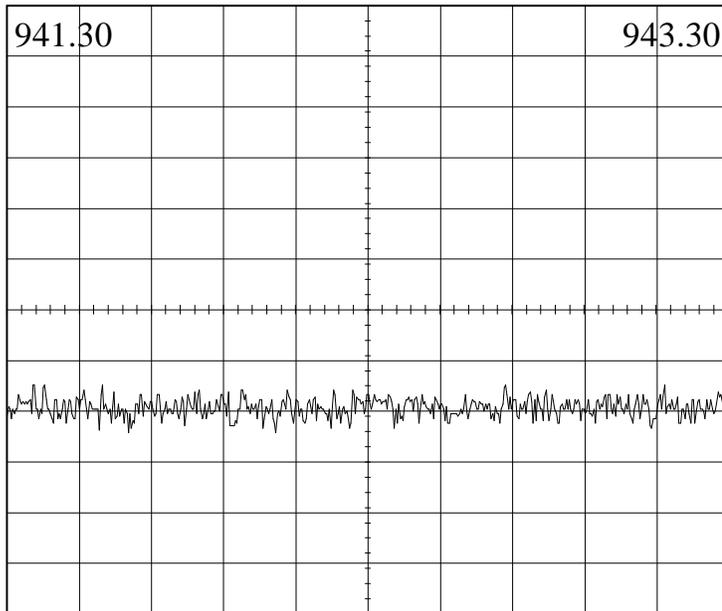
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 941.3721

Peak Level: -49.88

Simmons Media Group

AN940

Serial # 1009

200.0

1.047

9

104.7 Pro.10th order

dBm

kHz/Div

GHz

kHz Res

04/03/2009 15:04:47

0

-10

-20

-30

-40

-50

-60

-70

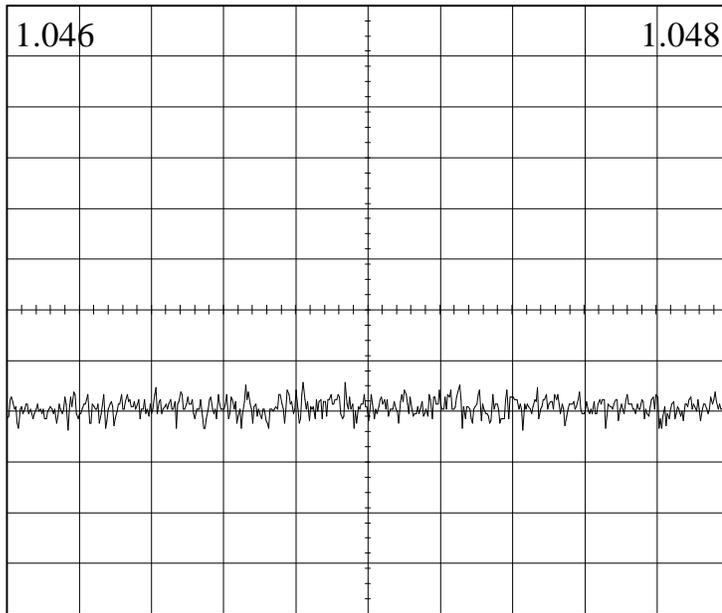
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 1046.8216

Peak Level: -49.57

Simmons Media Group

AN940

Serial # 1009

200.0

103.30

9

104.7 Pro.IM w 106.1

dBm

kHz/Div

MHz

kHz Res

04/03/2009 15:06:11

0

-10

-20

-30

-40

-50

-60

-70

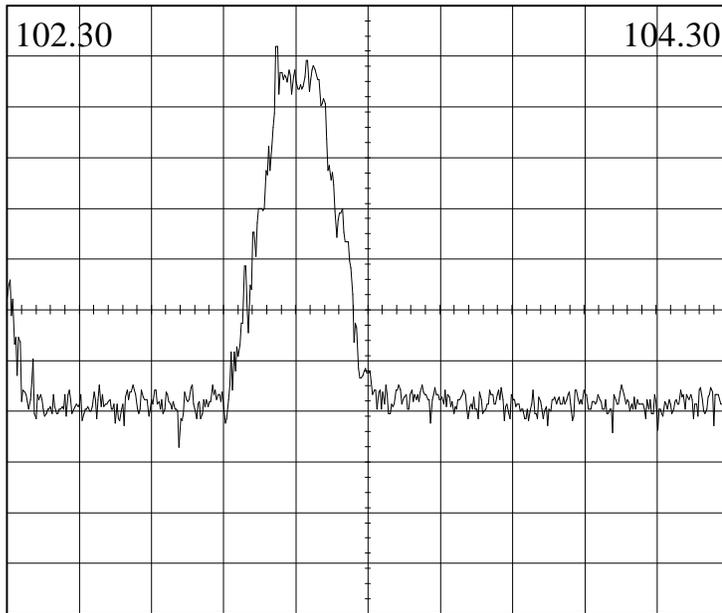
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 103.0455

Peak Level: -5.33

Simmons Media Group

AN940

Serial # 1009

200.0

106.30

9

104.7 Pro IM w 103.1

kHz/Div

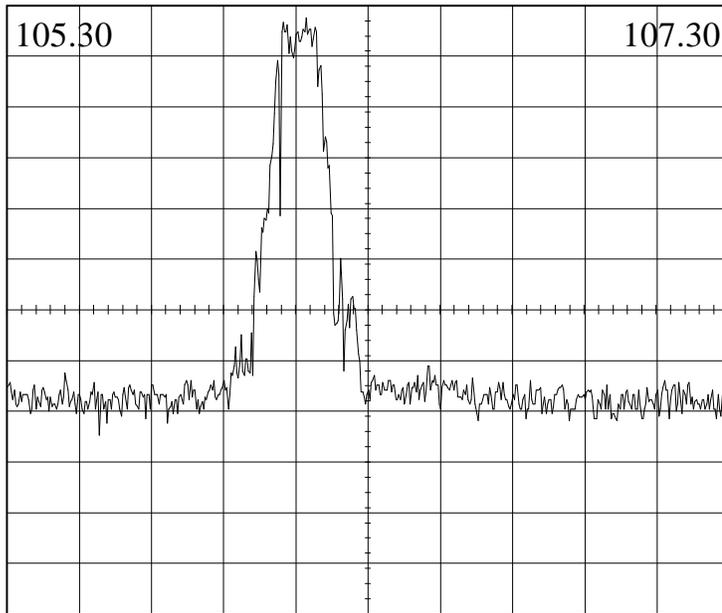
MHz

kHz Res

04/03/2009 15:07:56

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: 106.1297

Peak Level: -1.57

Simmons Media Group

AN940

Serial # 1009

200.0

107.90

9

104.7 Pro IM w 101.5

dBm

kHz/Div

MHz

kHz Res

04/03/2009 15:10:19

0

-10

-20

-30

-40

-50

-60

-70

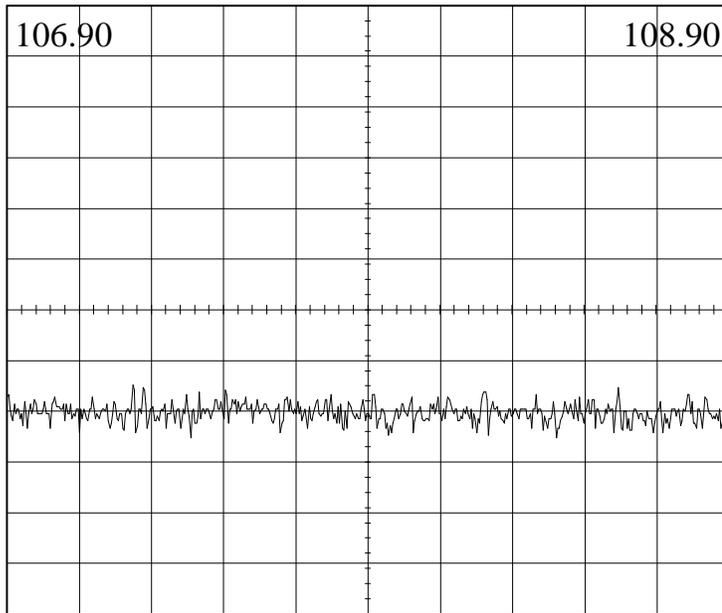
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 107.2487

Peak Level: -49.88

Simmons Media Group

AN940

Serial # 1009

200.0

108.70

9

104.7 Pro IM w 100.7

kHz/Div

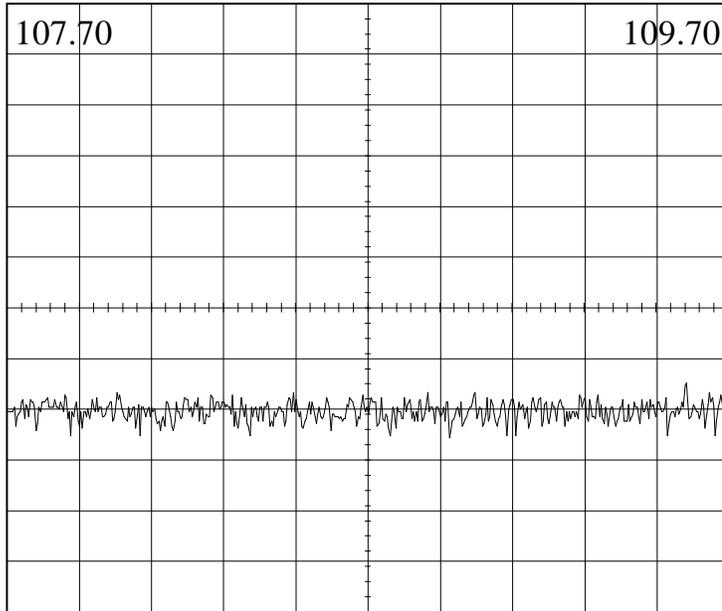
MHz

kHz Res

04/03/2009 15:12:06

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: 109.5838

Peak Level: -49.88

Simmons Media Group

AN940

Serial # 1009

200.0

111.90

9

104.7 Pro IM w 97.5

dBm

kHz/Div

MHz

kHz Res

04/03/2009 15:21:30

0

-10

-20

-30

-40

-50

-60

-70

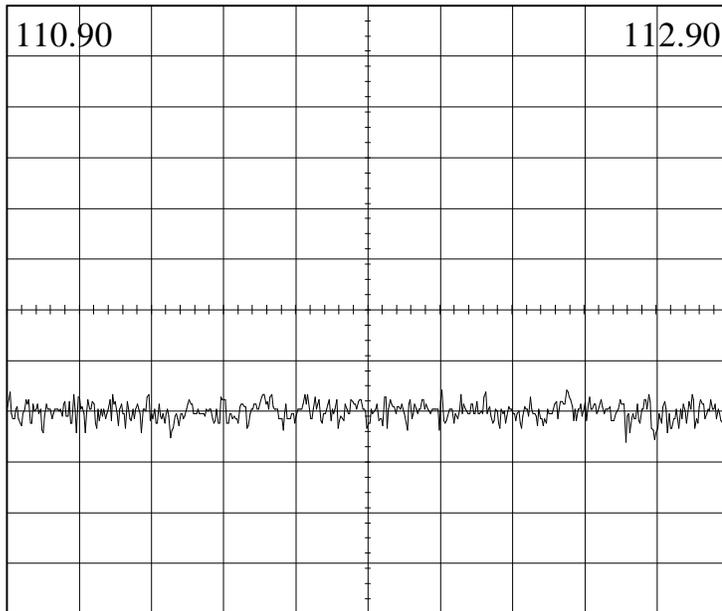
-80

-90

-100

-110

-120



30 dB Attn

Gen --- dBm

20 mSecs

0 dB IF Gain

Video Filter: 1 kHz

Peak Freq: 112.1064

Peak Level: -50.51