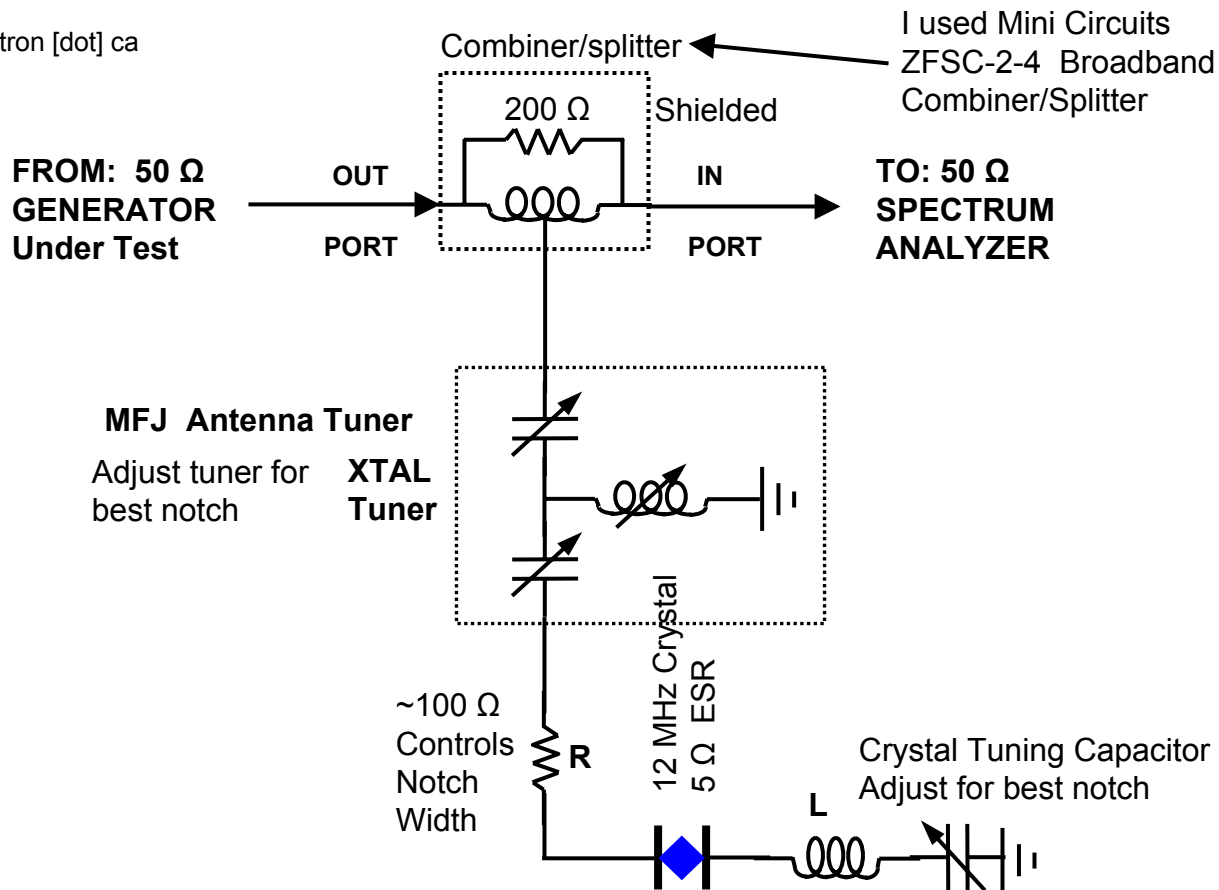


A SIMPLE CRYSTAL NOTCH CIRCUIT FOR NOISE MEASUREMENTS

Jacques Audet
 VE2AZX
 jacaudet [at] videotron [dot] ca

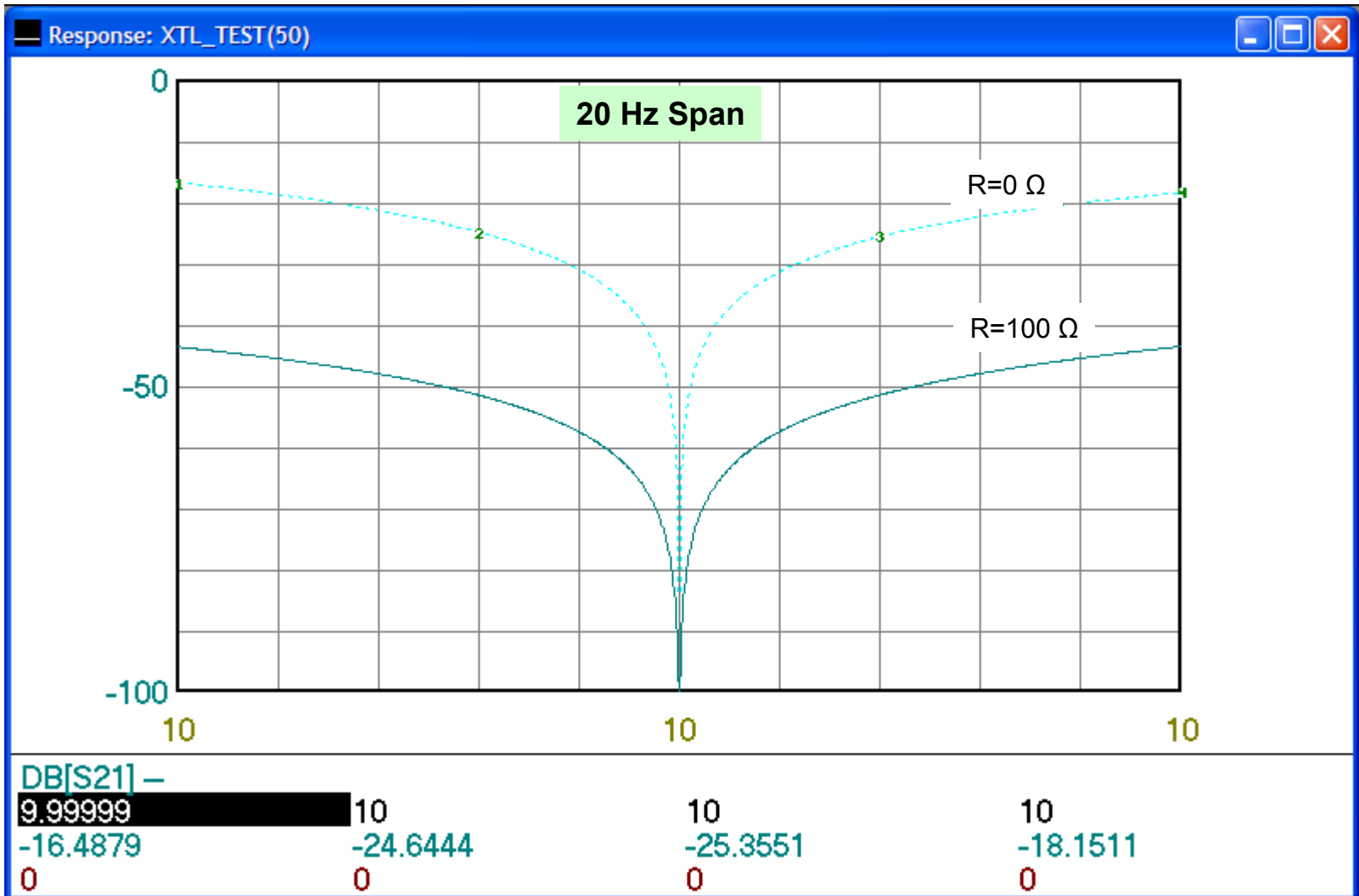


References:

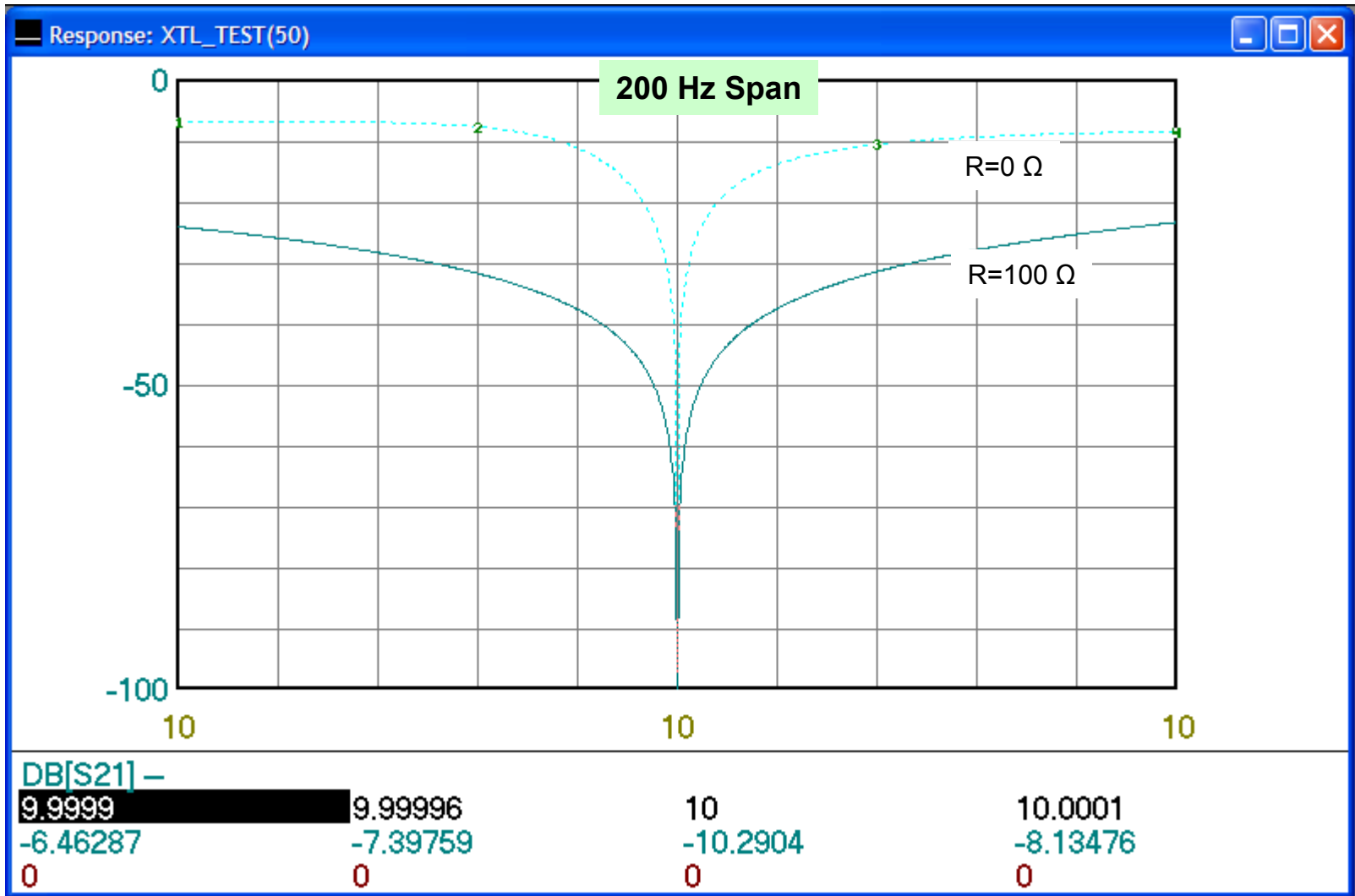
Oscillator Noise Evaluation with a crystal Notch Filter by Wes Hayward, W7ZOI QEX July/August 2008

HP RF & Microwave Phase Noise Measurement Seminar

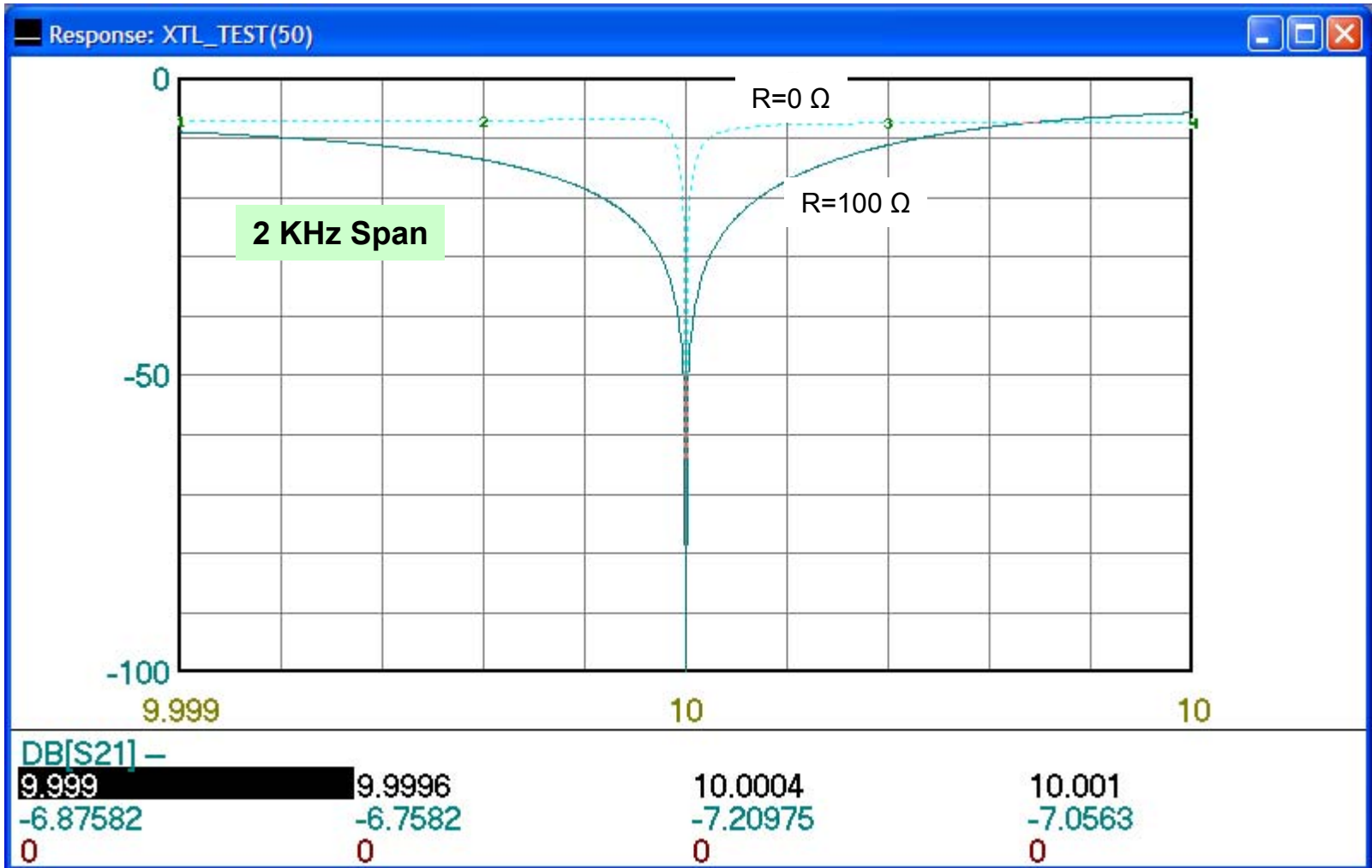
SIMULATIONS



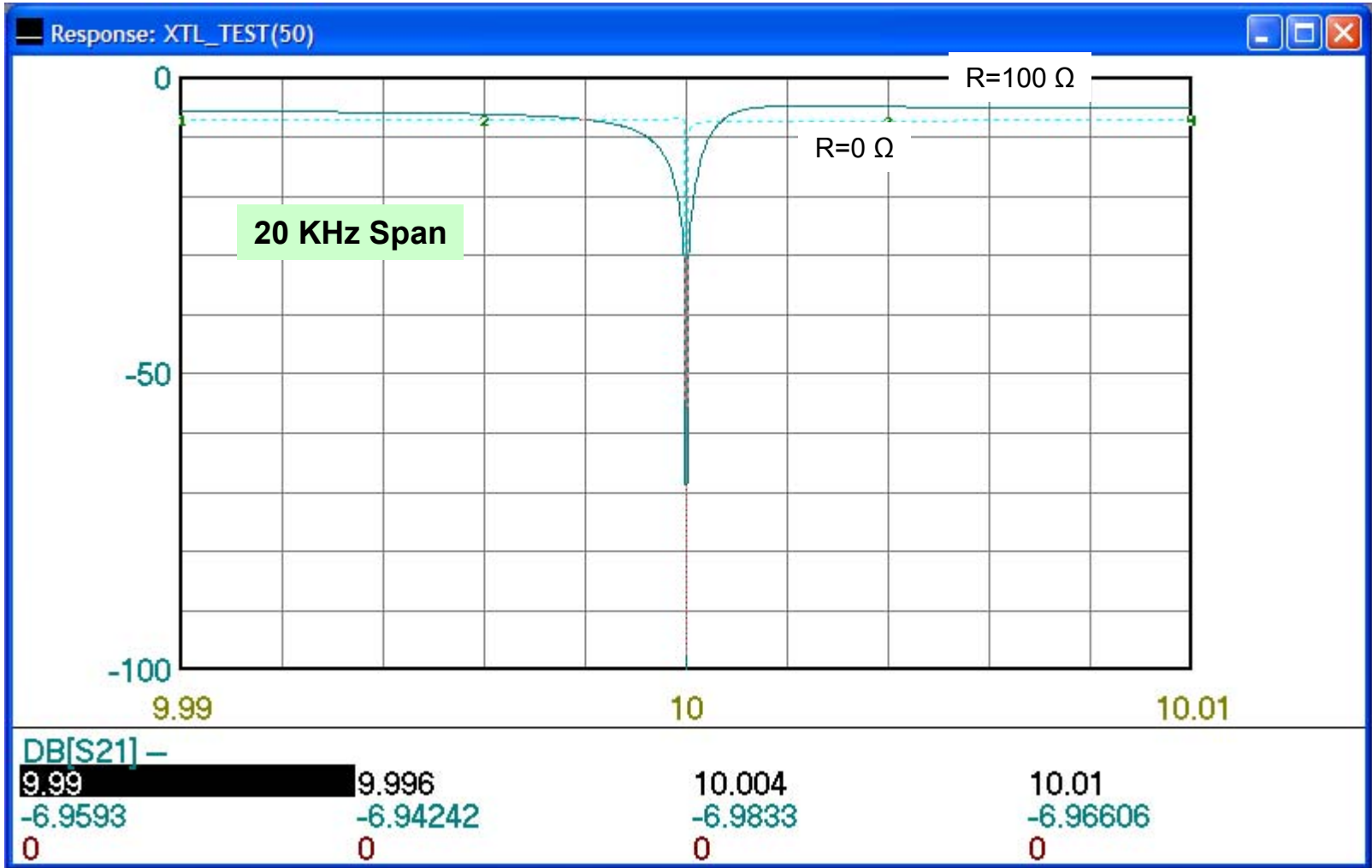
SIMULATIONS



SIMULATIONS



SIMULATIONS

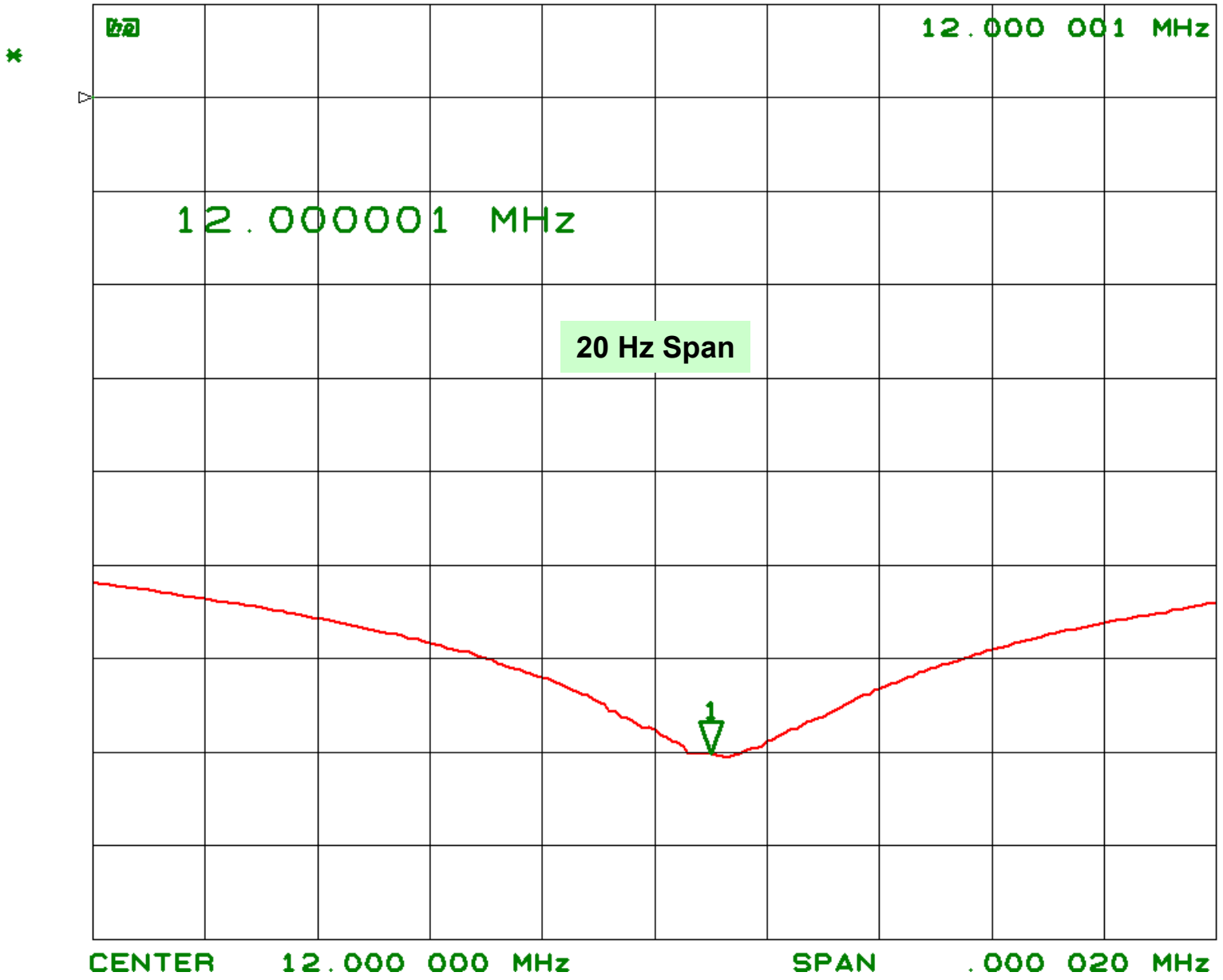


NOTCH MEASUREMENTS

30 Aug 2008 17:02:51

CH1 S₂₁ log MAG 10 dB/ REF 0 dB

1: -70.223 dB



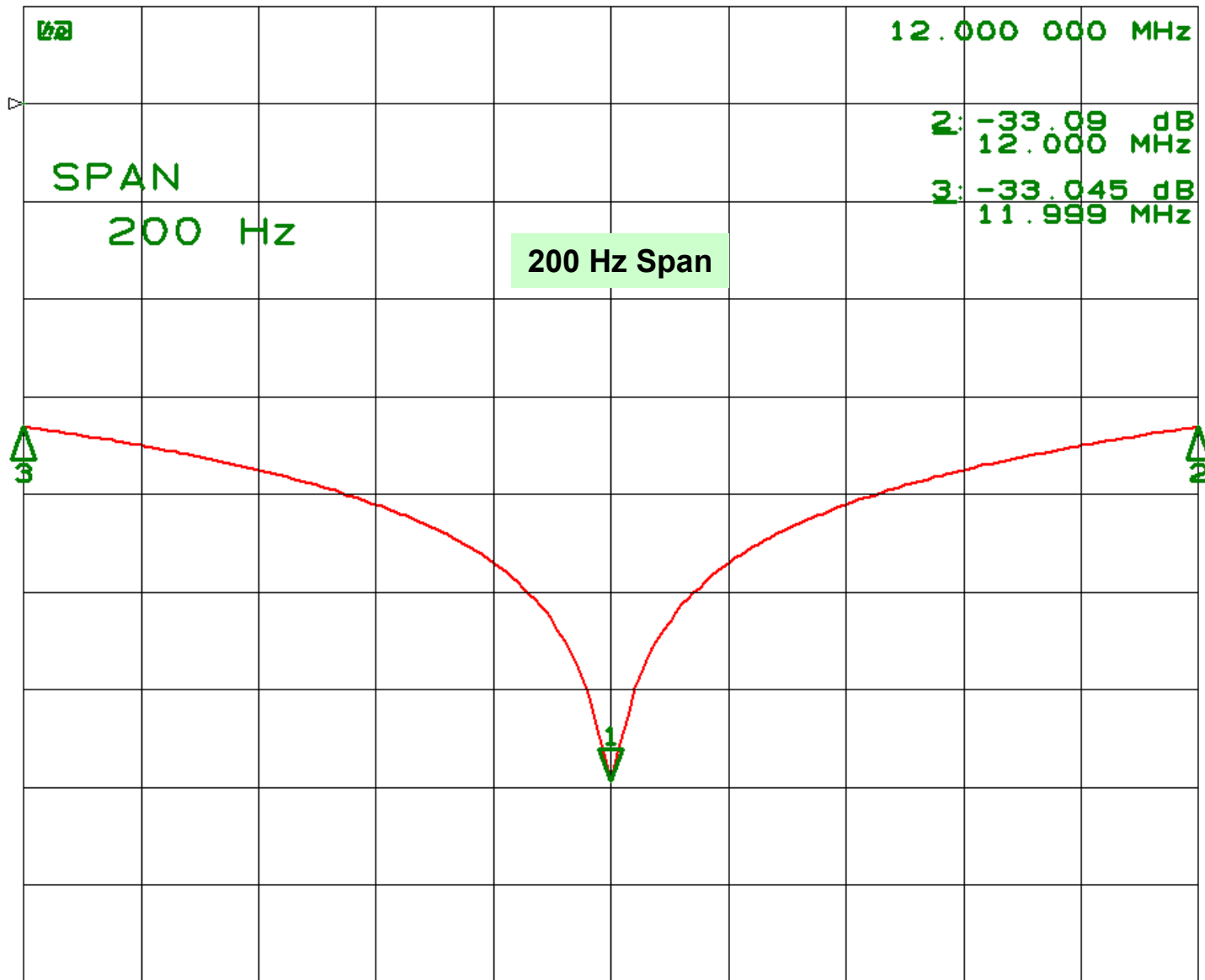
NOTCH MEASUREMENTS

30 Aug 2008 17:05:30

CH1 S₂₁ log MAG

10 dB/ REF 0 dB

1: -69.394 dB



CENTER . 12.000 000 MHz

SPAN . .000 200 MHz

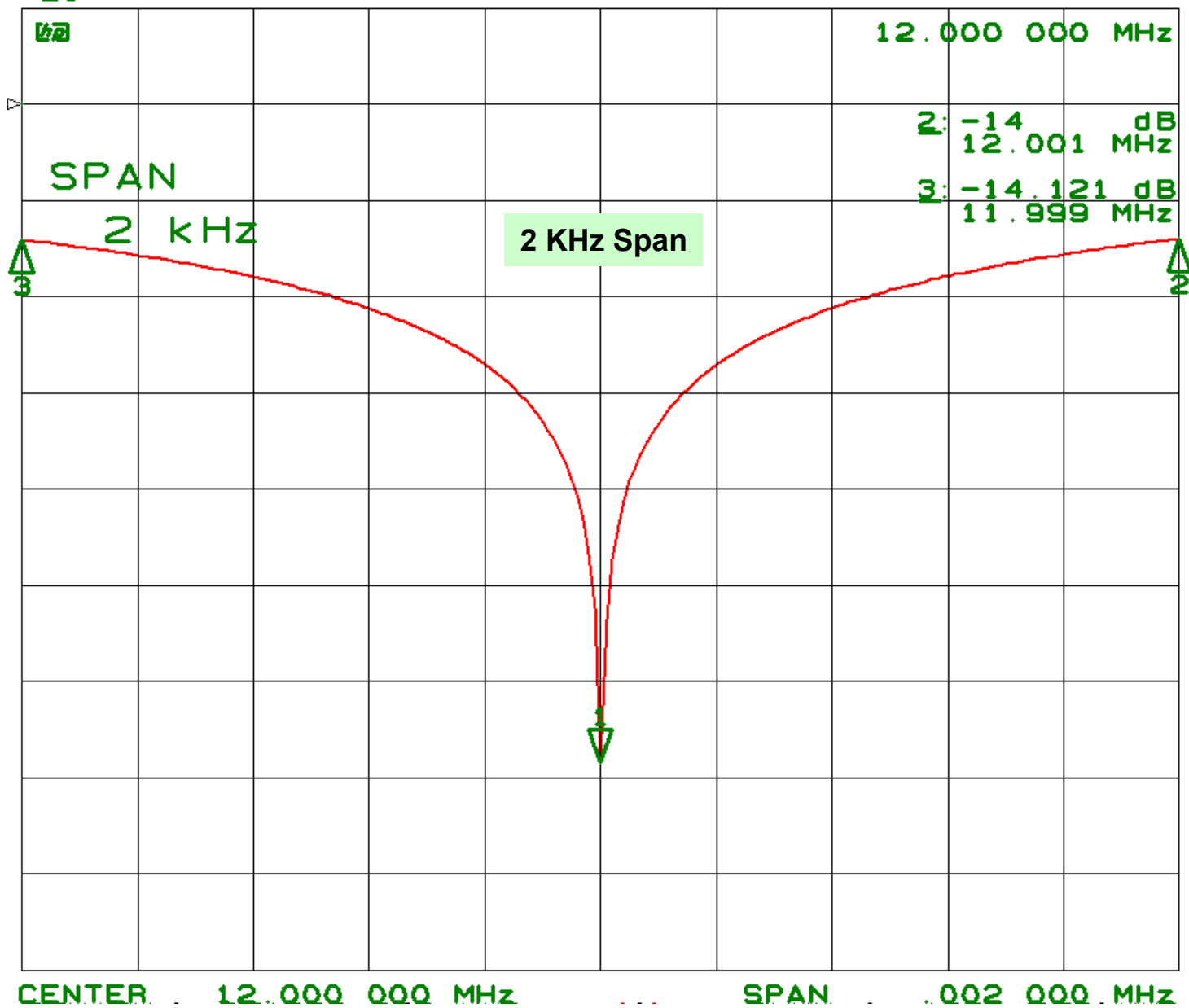
NOTCH MEASUREMENTS

30 Aug 2008 17:06:28

CH1 S₂₁ log MAG

10 dB/ REF 0 dB

1: -68.426 dB



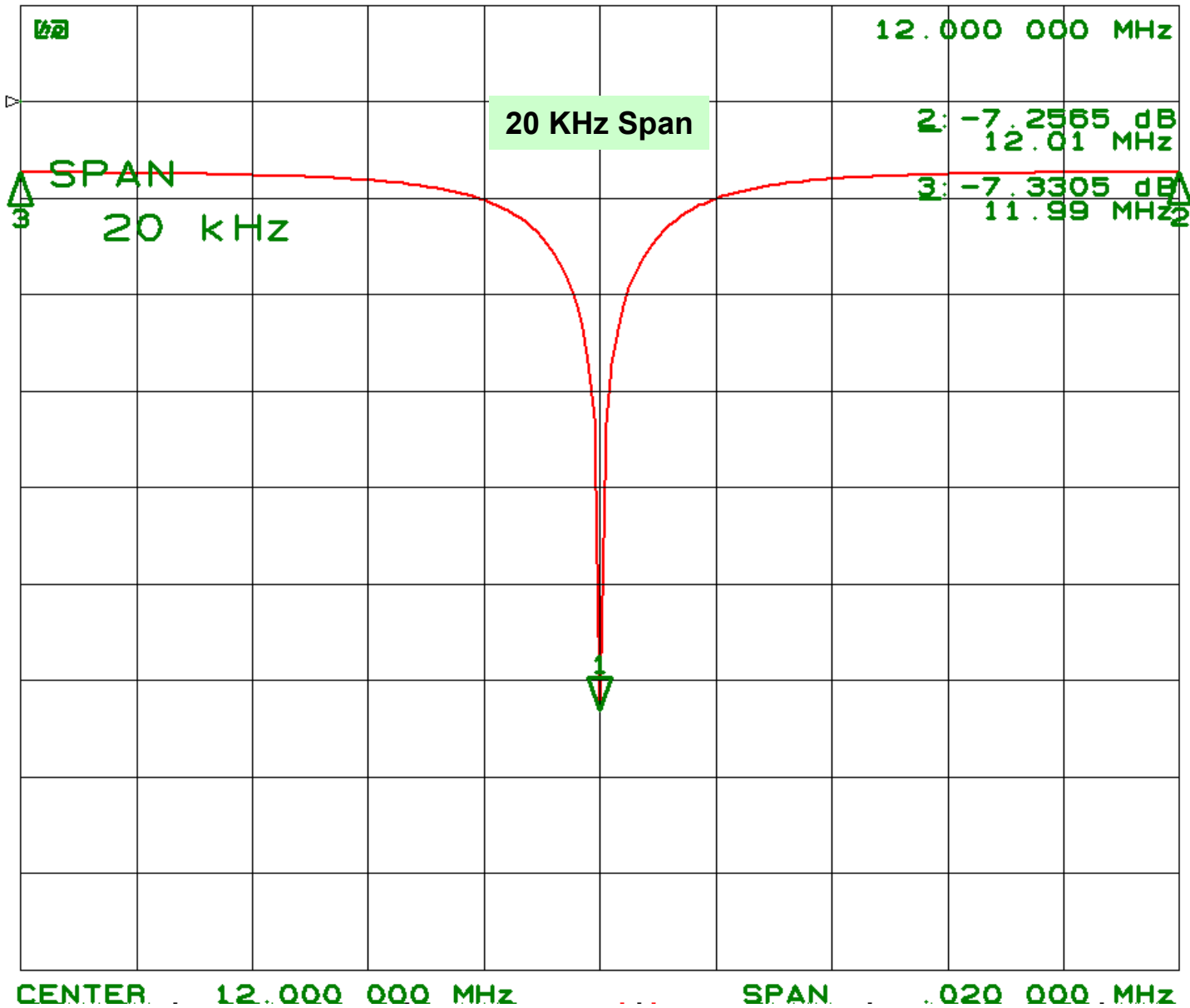
NOTCH MEASUREMENTS

30 Aug 2008 17:07:28

CH1 S₂₁ log MAG

10 dB/ REF 0 dB

1: -63.073 dB



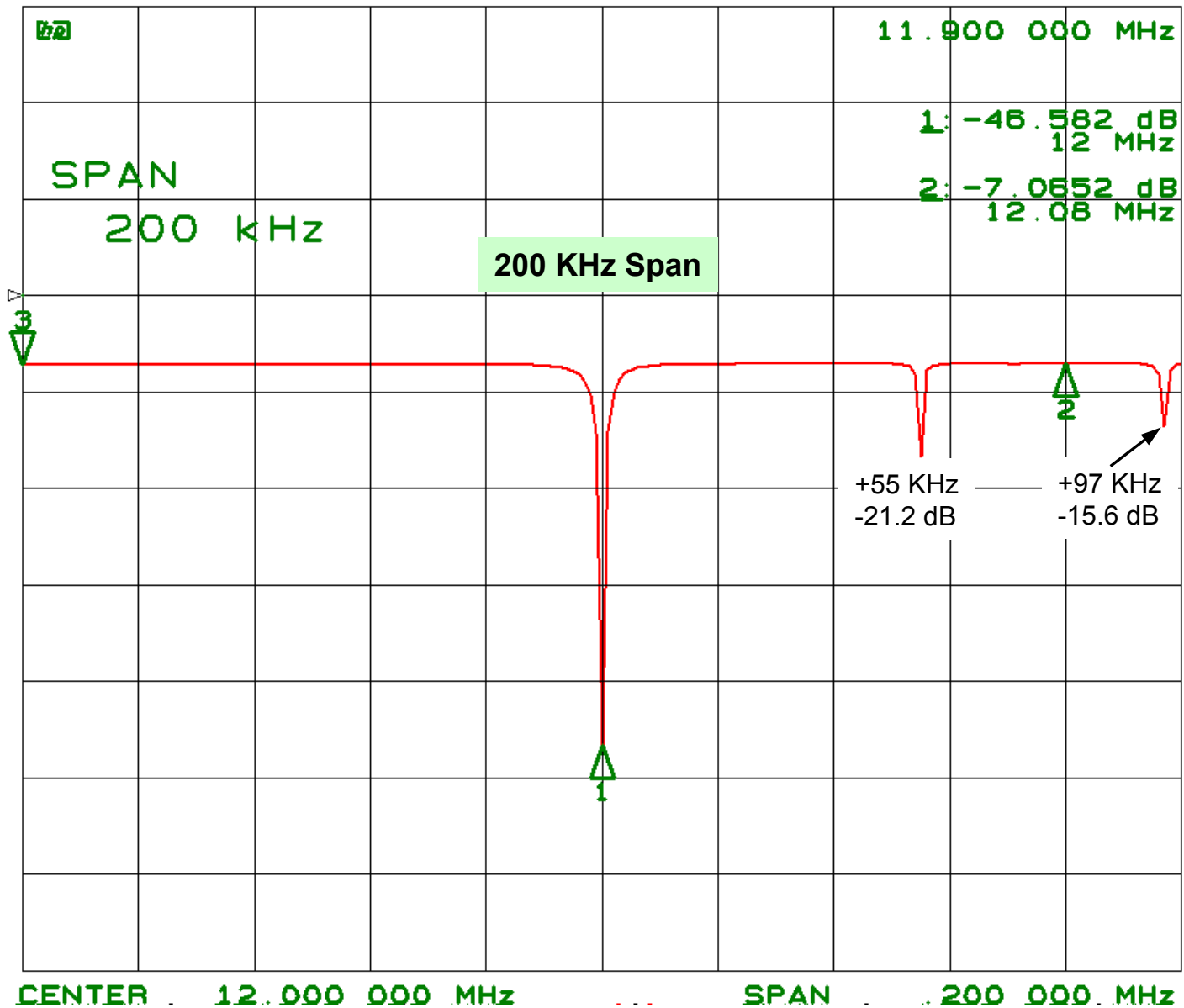
NOTCH MEASUREMENTS

30 Aug 2008 17:09:31

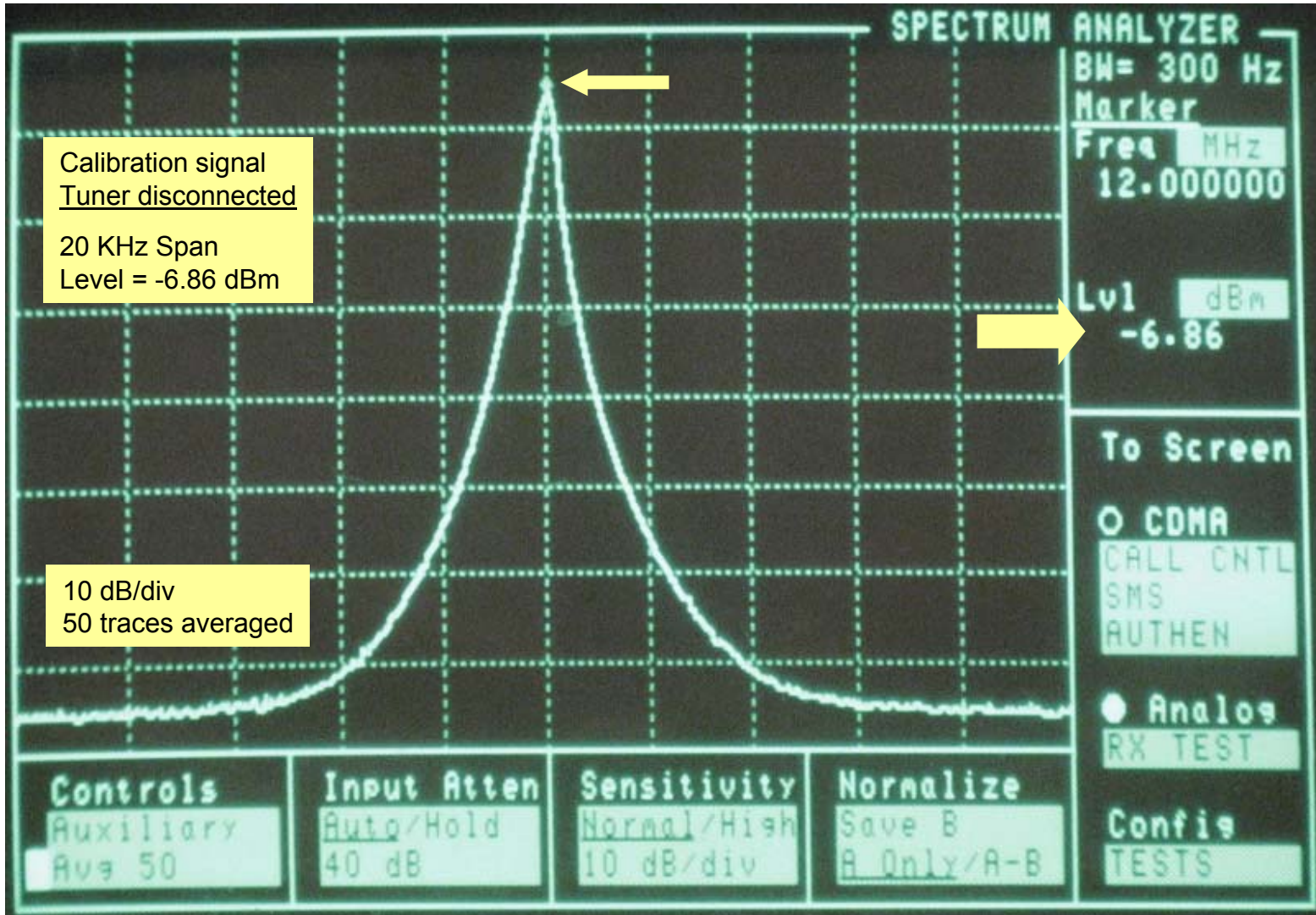
CH1 S₂₁ log MAG

10 dB/ REF 0 dB

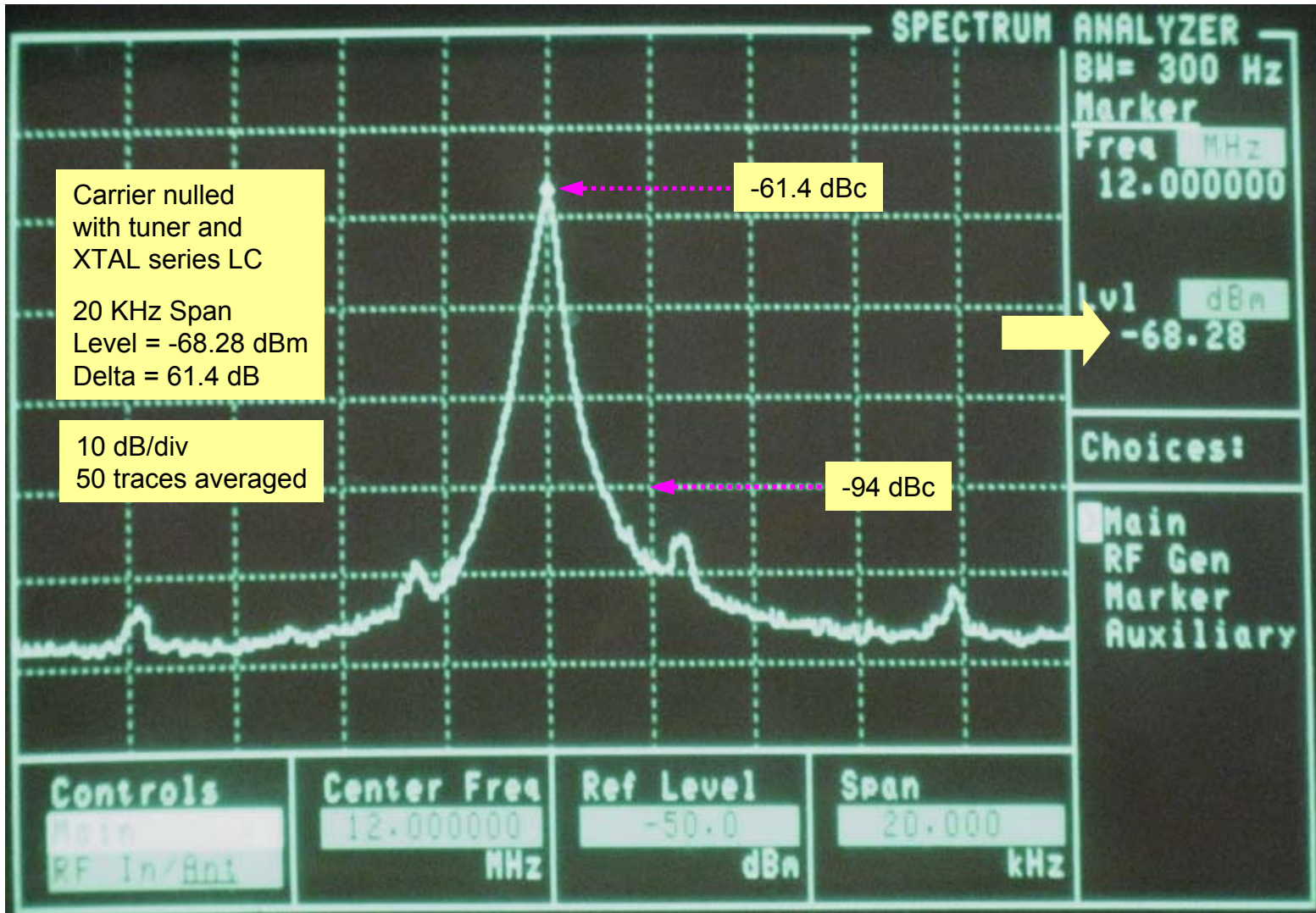
3: -7.1905 dB



MEASUREMENTS on Marconi 2019A Signal Generator (set at 0 dBm, 12.00000 MHz)



MEASUREMENTS on Marconi 2019A Signal Generator (set at 0 dBm, 12.00000 MHz)



Shows residual generator noise, after carrier has been notched by $-6.86 - (-68.28) = 61.4$ Db
 Correction at 2 KHz: add 3 dB. Effective BW = $300 \text{ Hz} \times 1.2 = 360$ or $-25.6 \text{ dB} / \text{Hz}$ Random signal Correction = $+2.5 \text{ dB}$
 Example at 2 KHz offset, graph reads $-103 \text{ dBc} + 3 - 25.6 + 2.5 = -123 \text{ dBc/Hz}$. At 10 KHz offset: -134 dBc/Hz