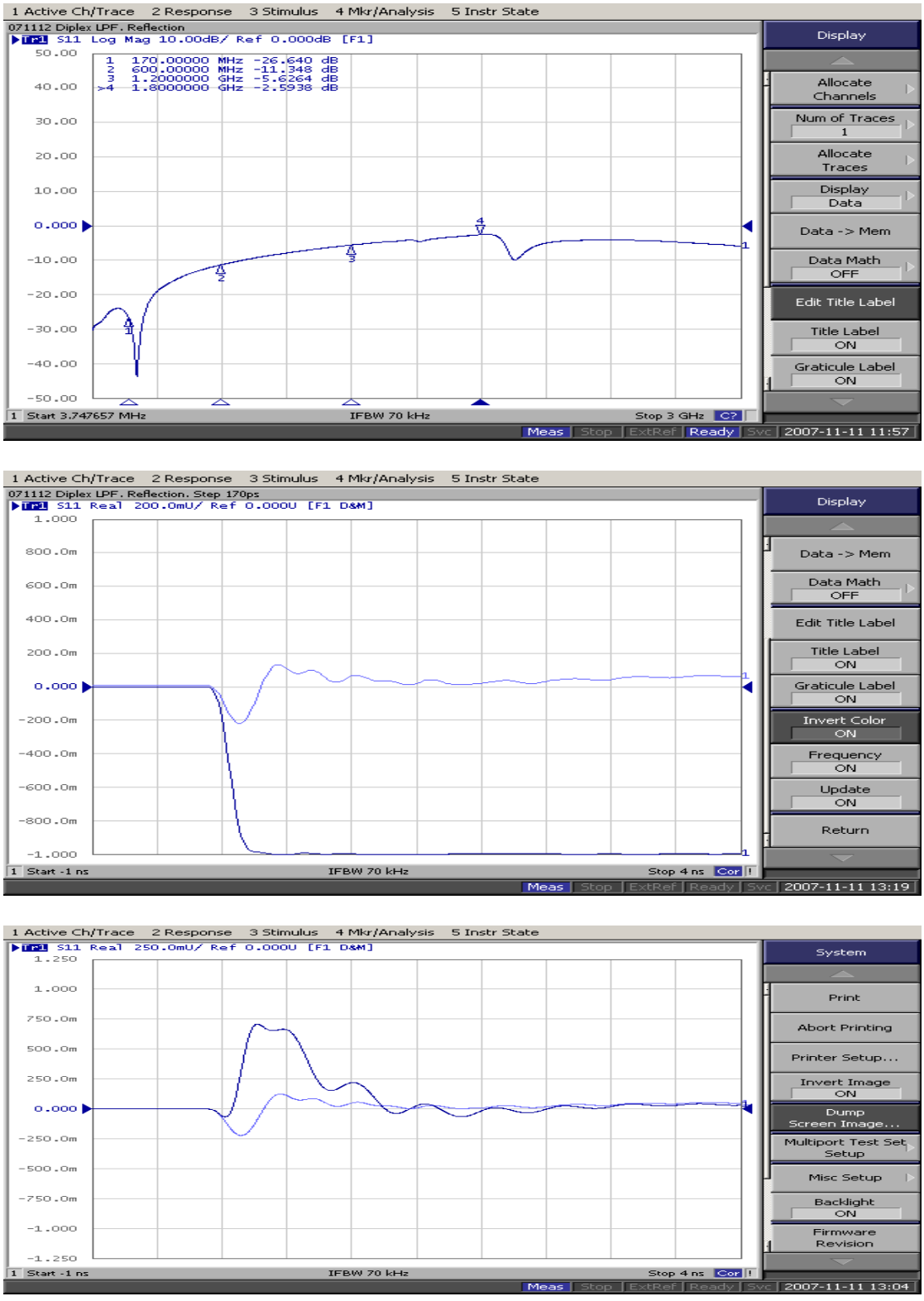

Fig. 1. The Diplexer LPF. Reflection.

Within the banwidth (170MHz), the reflection is lower than (–24)dB. At higher frequencies, it is poor due to parasitic capacitance to GND in the HPF. The reflection (a derivative) of a step 170ps is 1/5. The reflection from a LPF without a HPF (shown dark blue) is about four times bigger.

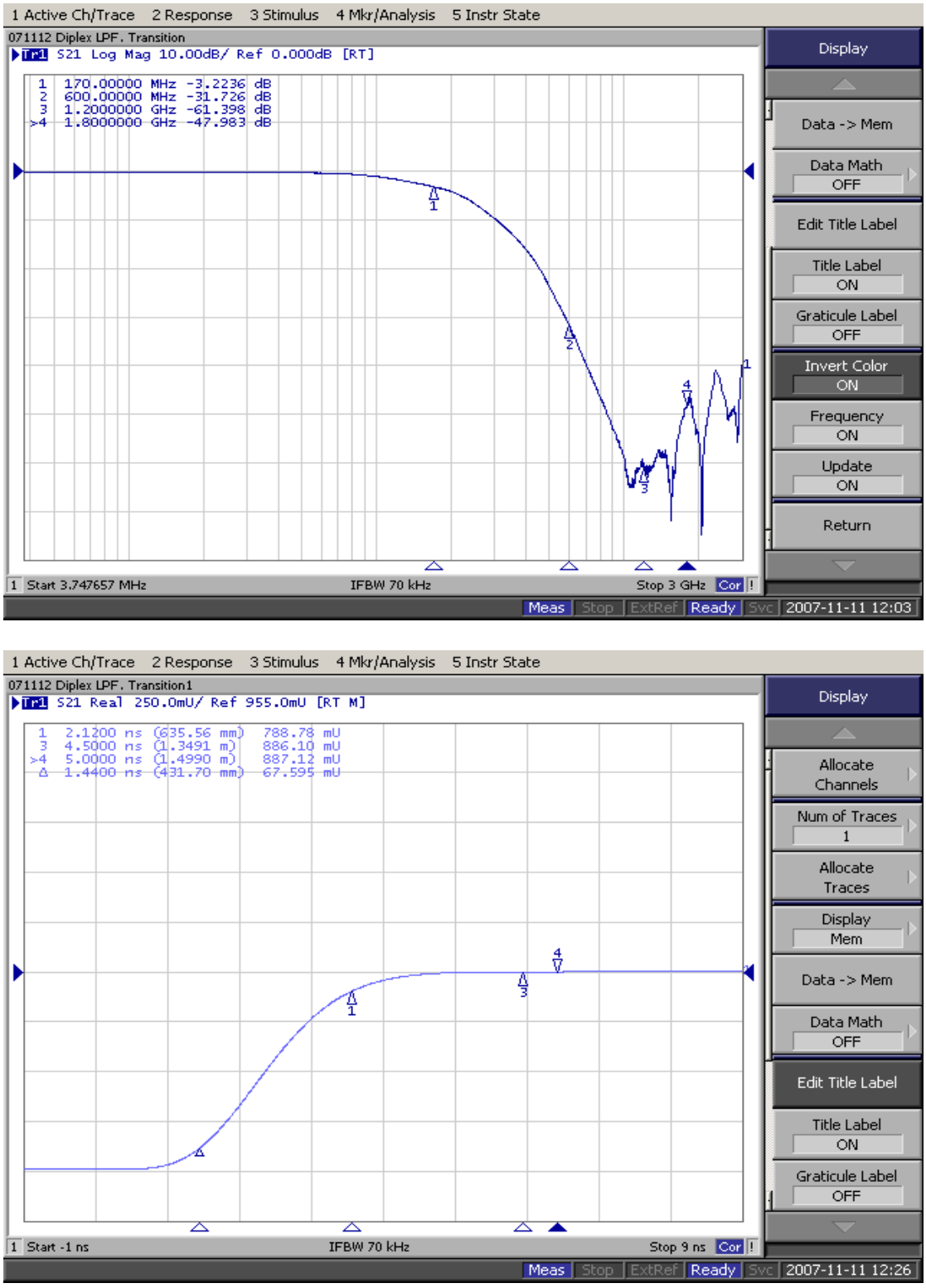

Fig. 2. The Diplexer LPF. The bandwidth and step response.

The bandwidth is 170MHz. At 600MHz, (–32)dB. At 1200MHz, about (–60)dB. At 1800MHz, about (–50)dB. The rise time is 2.1ns.

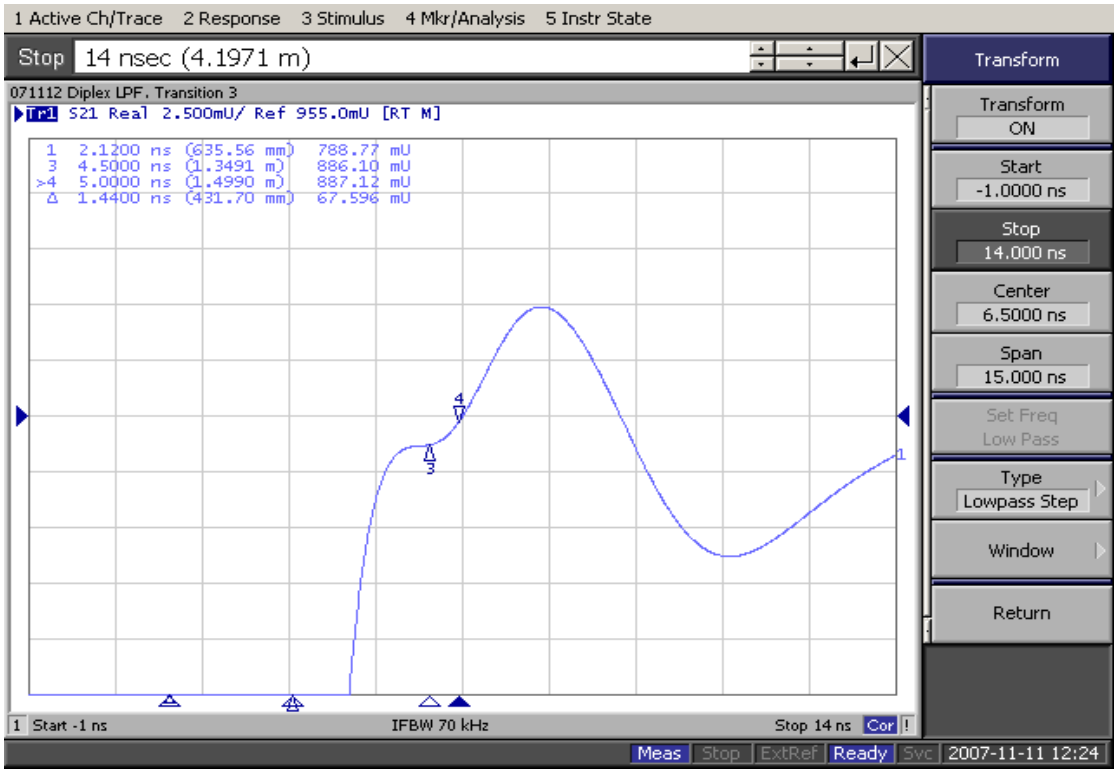

Fig. 3. The Diplexer LPF. Zoom of the step response.

One division is 0.25%. The ripple is lower than ±1%. An inherent ripple of three cell Gaussian filter plus a ripple due to spread of component values.

Fig. 4. A low noise AD8000. Gain = +4. The bandwidth and compression points.

The bandwidths for three input levels: (–15)dBm purple, 0dBm red, (+5)dBm green. A small signal bandwidth is about 500MHz. The compression points for four frequencies: 100MHz blue, 200MHz red, 300MHz green, 400MHz purple.

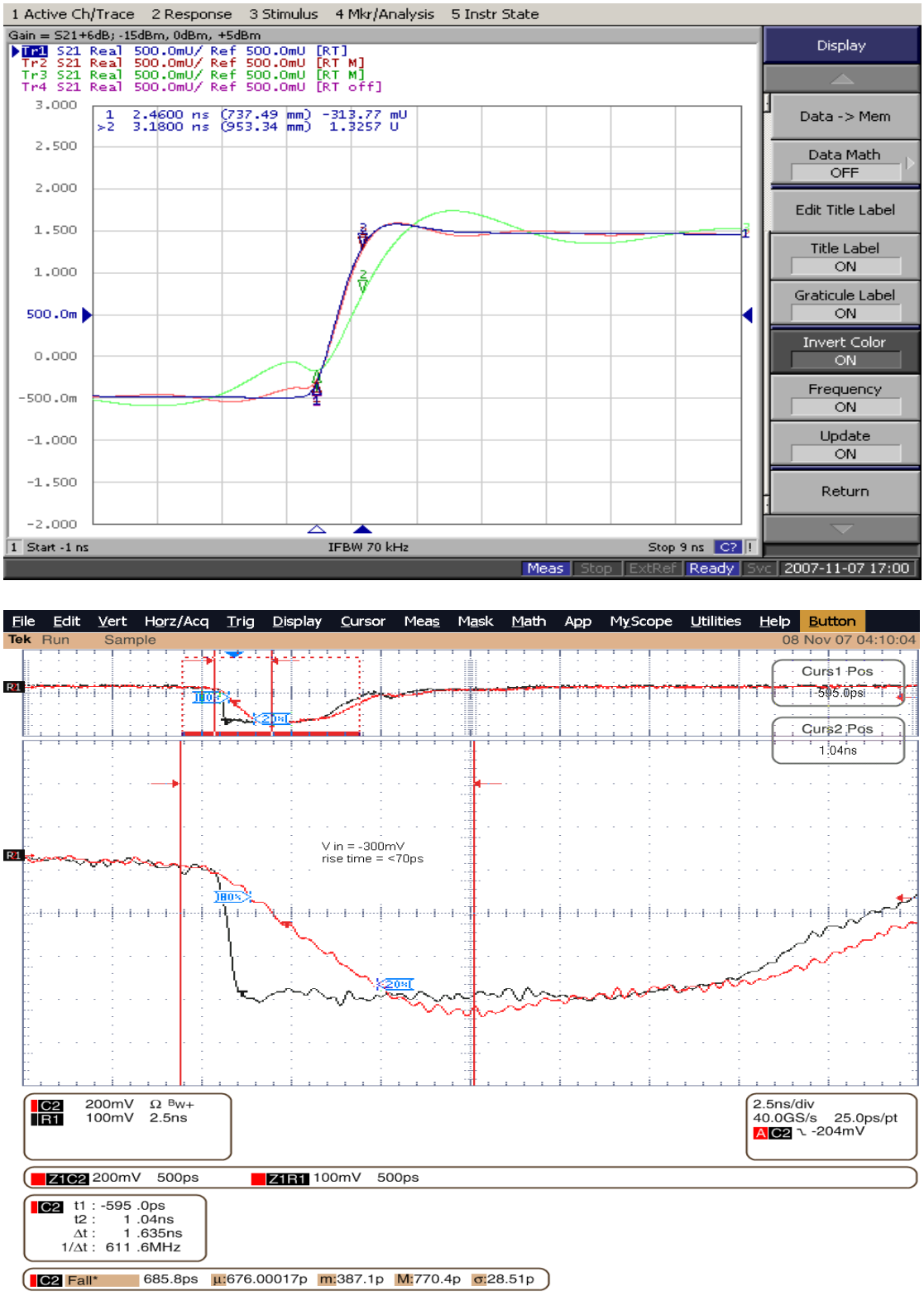

Fig. 5. A low noise AD8000. Gain = +4. The step response.

The step response for three input levels: (–15)dBm blue, 0dBm red, (+5)dBm green. At a high level, a feedthrough is seen.
The rise time for (–15)dBm is lower than 700ps. The oscillogram shows a 1.2V 690ps response to a 70ps step from a pulse generator. Same overshot is seen.

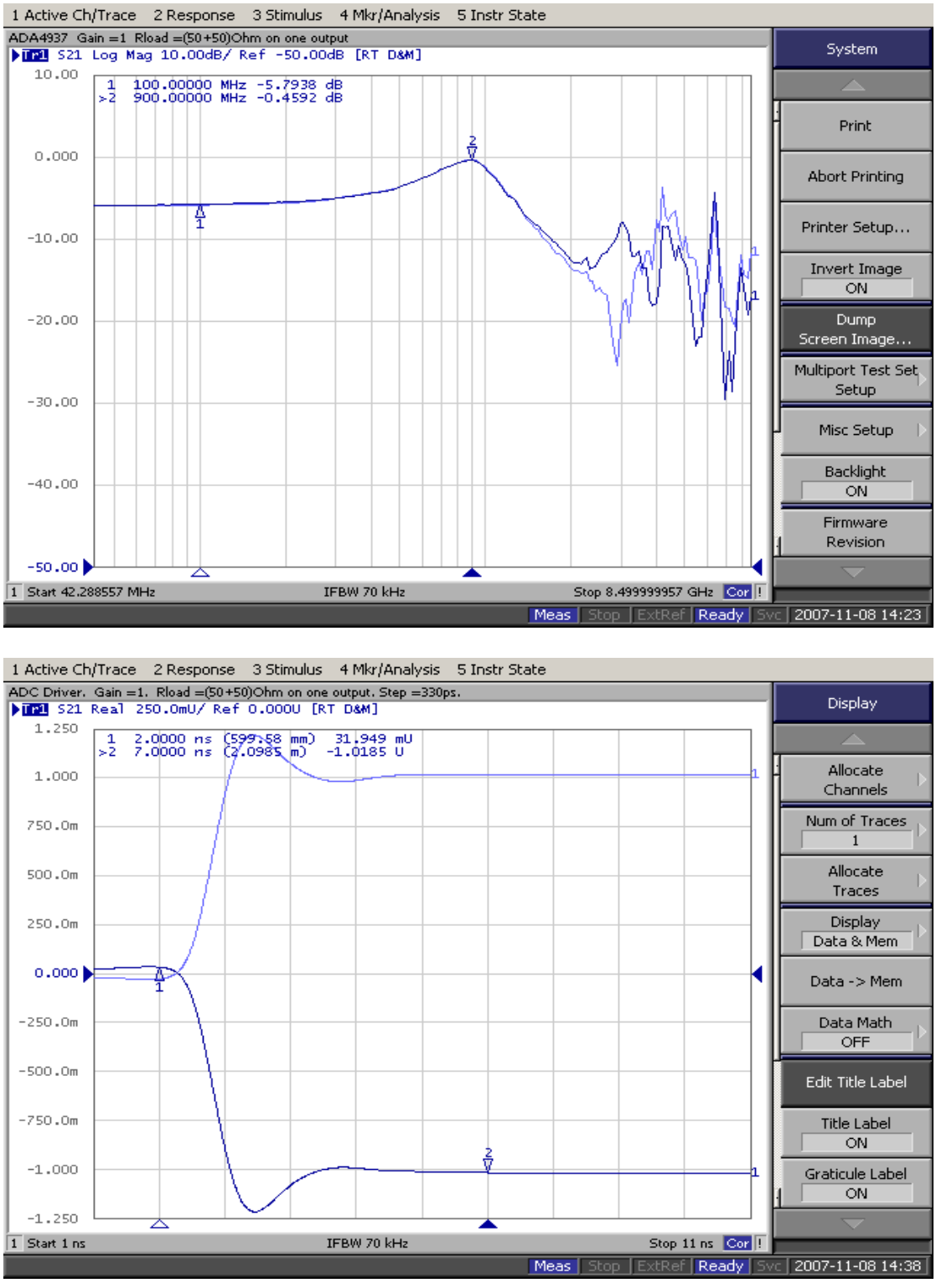

Fig. 6. A differential amplifier ADA4936-1. A single-ended to differential Gain = ±0.5. The bandwidth and step responses.

The bandwidth is about 1600MHz. Piking at 900MHz. A large feedthrough above 2000MHz. The step response about 400ps has a significant overshot.

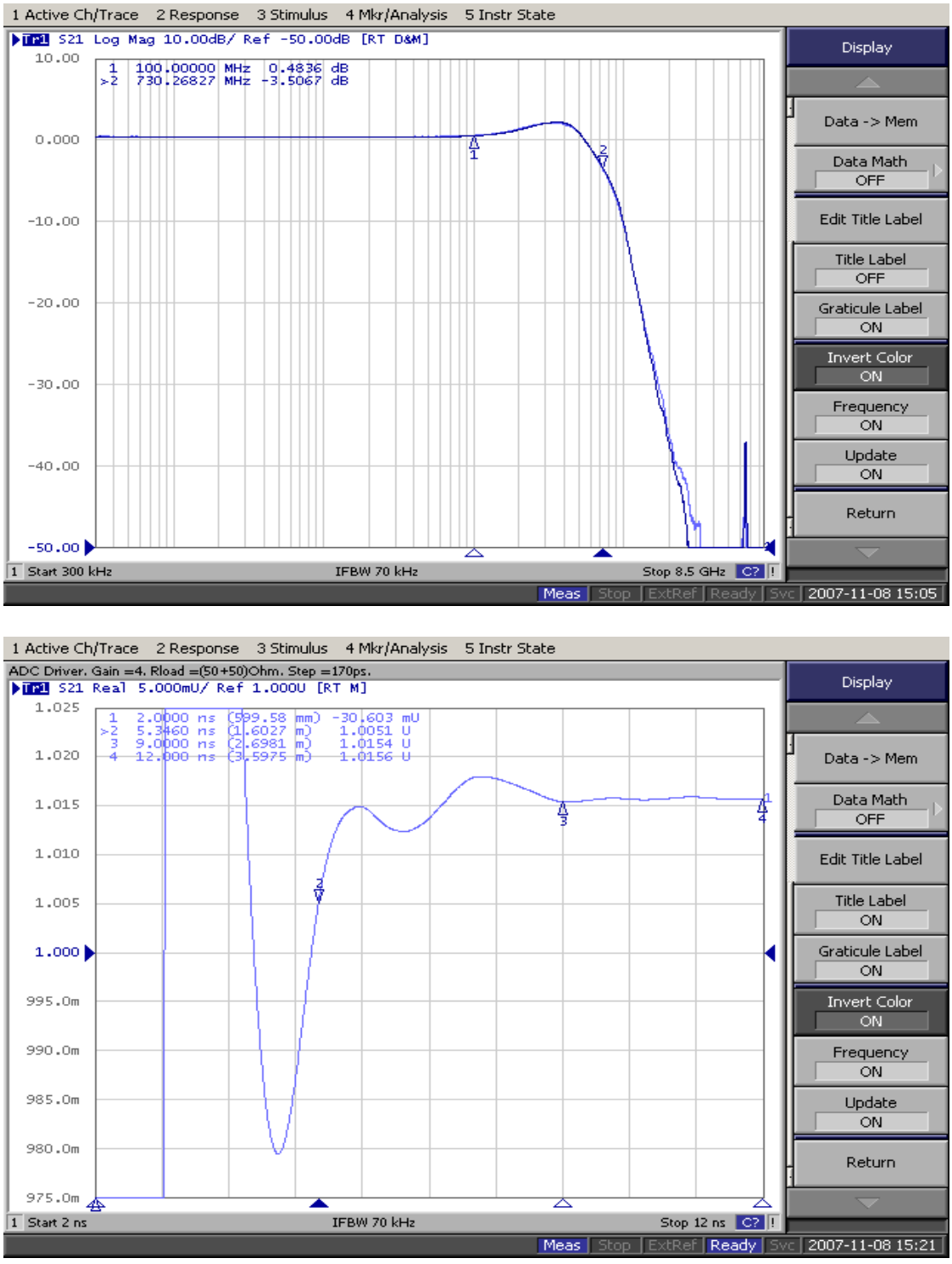

Fig. 7. AD8000 + ADA4936-1. A single-ended to differential Gain = ±2. The bandwidth and zoom of the step response.

The bandwidth is about 700MHz. Still piking, at 400MHz. The feedthrough is (–40)dB.
The step response comes to (–60)dB at 9ns (one division is 0.5%).

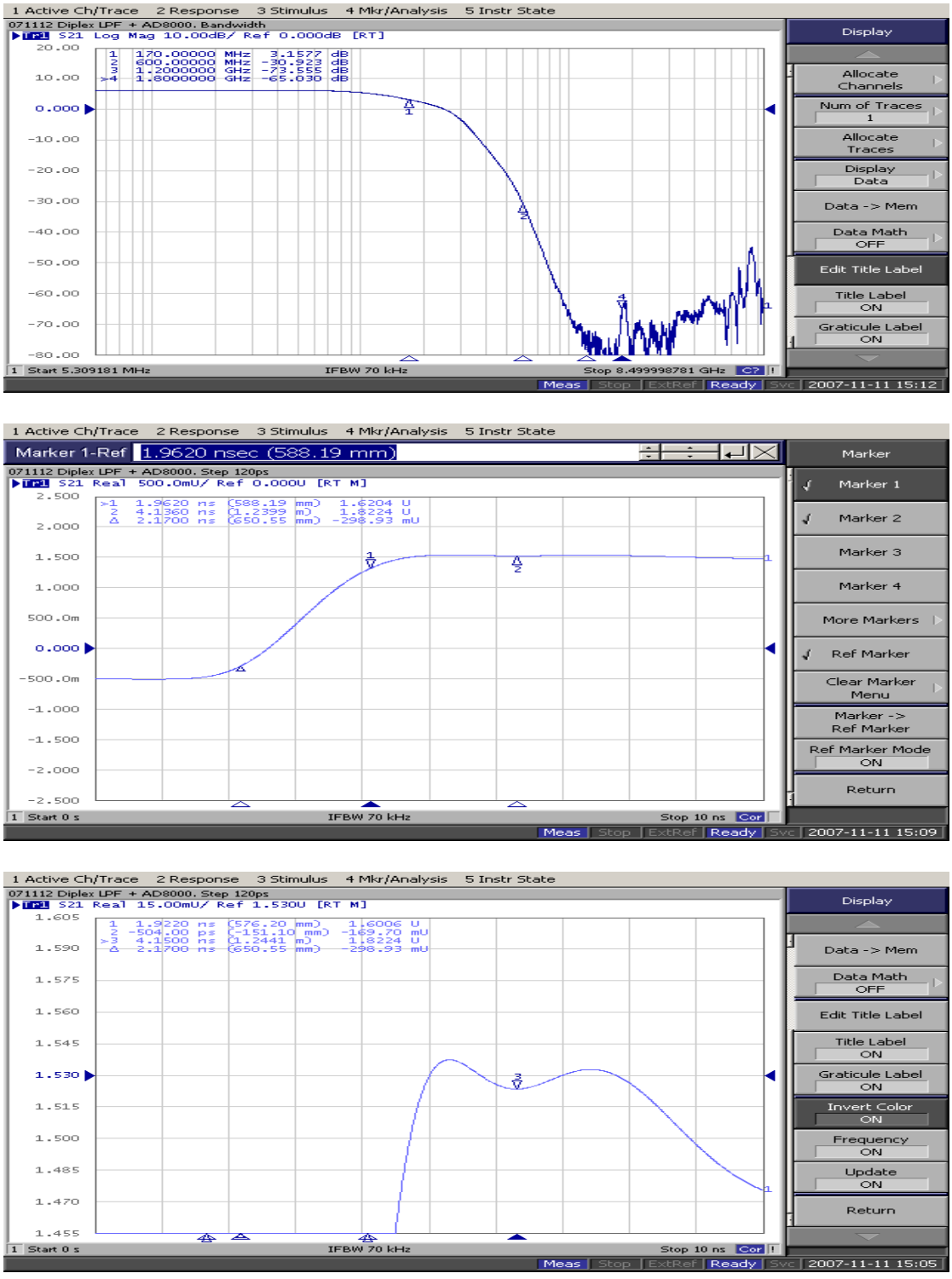

Fig. 8. A Driver for a single-ended ADC: Diplexer LPF + AD8000. The Gain = 4. The bandwidth and step response.

The bandwidth is the LPF bandwidth 170MHz. At the first harmonic 600MHz, (–36)dB. At 1200MHz, (–80)dB. At 1800MHz, (–70)dB.

For a input pulse 5ns, at about 4ns there is a plateau about ±1ns, where the ripple is lower than ±0.5% (one division is 0.75%). The marker 3 is put there where the measurement point should be set.

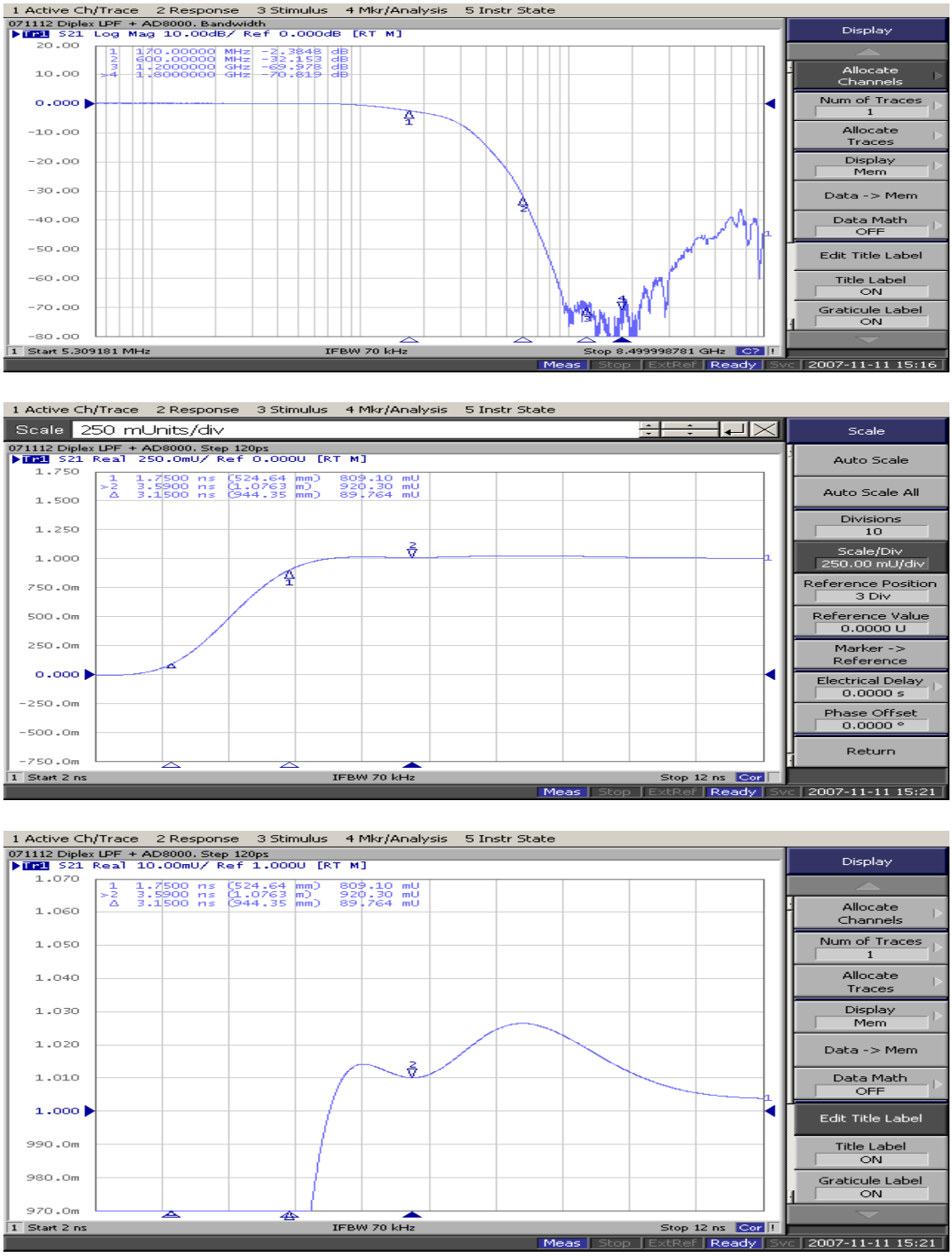

Fig. 8. A Driver for a differential ADC: Diplexer LPF + AD8000 + ADA4937-1. The Gain = ±2. The bandwidth and step response.

The bandwidth is the LPF bandwidth 170MHz. At the first harmonic 600MHz, (–32)dB; at 1200MHz, (–70)dB; at 1800MHz, (–70)dB. A capacitive feedthrough over 2000MHz.

For an input pulse 5ns, at about 4ns there is a plateau about ±1ns, where the ripple is lower than ±0.5% (one division is 1%). The marker 2 is put there where the measurement point should be set.