FT 5531 Frequently Asked Questions:

Q: What have you improved?
A: We've improved the tolerances to the 150 ns pulse width, that now exceed ISO 7637-2:2011 Additionally, we've standardized on an accepted way of verifying the pulse width under no-load conditions that everyone can agree on. Additionally, the use of ferrites instead of inductors will result in lower voltage drop in some circumstances.

Q: Do I have to have my FT 5531 recalibrated?
A: Actually the FT 5531 has its own stored calibration values that have been set using a reference system so you shouldn't notice any deviation. However, to be absolutely correct to the letter of the regulations, yes, you are supposed to have it recalibrated.

Q: Do I have to use AutoStar 6?
A: Yes. You must use AutoStar 6.2 or above. ***Failing to use AutoStar 6.2 may result in severe damage to the FT 5531 and high-voltage power supply (HVPSU) requiring extensive repairs!***

Q: Why have you reduced the maximum voltage in many cases to 600V?
A: With the tuning of the pulse widths for loaded verification, there is more internal loss, resulting in higher peak currents and temperature, among other limitations. You still have the EUT OUT 150ns up to 800V, which is rarely necessary.

Q: How does the "unloaded" verification work now? Why did you change it?
A: Previously, the unloaded measurement was always a grey area. The automotive Pulse 3a/b has a very high bandwidth that resulted in reflections when using anything but a coaxial connection. Loaded measurements were never in question, but there were users who were able to find, randomly (not based on any real published specifications) a voltage probe that could give the recommended unloaded pulse width, but this was all just measurement uncertainty. This isn't how a proper calibration should work, and our seven, independent calibration laboratories wouldn't ever accept this: try something else and test until pass. After consultation with other members of the standards committees as well as competitors, we've decided that the consensus is to use a 1 kΩ coaxial attenuator for the "unloaded" measurement method. This is consistent with expectations of customers, in agreement with other manufacturers and laboratories and in-line with IEC 61000-4-4. We strongly recommend using the INA 5530 for best, and most repeatable results.

Q: Won't the 1 kΩ attenuator have an effect on the unloaded measurements?
A: Yes, 5% loss comes from the voltage division factor. This 5% is taken into account in the calibration.

Q: Do you trust this 1 kΩ method?
A: We were hesitant for a long time too, but in consultation with other experts and based on over a decade of experience performing this measurement method per IEC 61000-4-4, it really is the best compromise. Finally, our SCS accreditation accepts this as a valid method for ISO 17025 measurements.

Q: How are the results between the INA 5530-50 and when using an INA 5030B?
A: Very similar. The rise time may measure a little faster with the INA 5030B, but inside the measurement uncertainty. Actually our colleagues in Berlin were one of several calibration laboratories that contributed significantly to this development: Berlin being the engineering organization with the most HF experience, they kindly volunteered to build this verification kit.

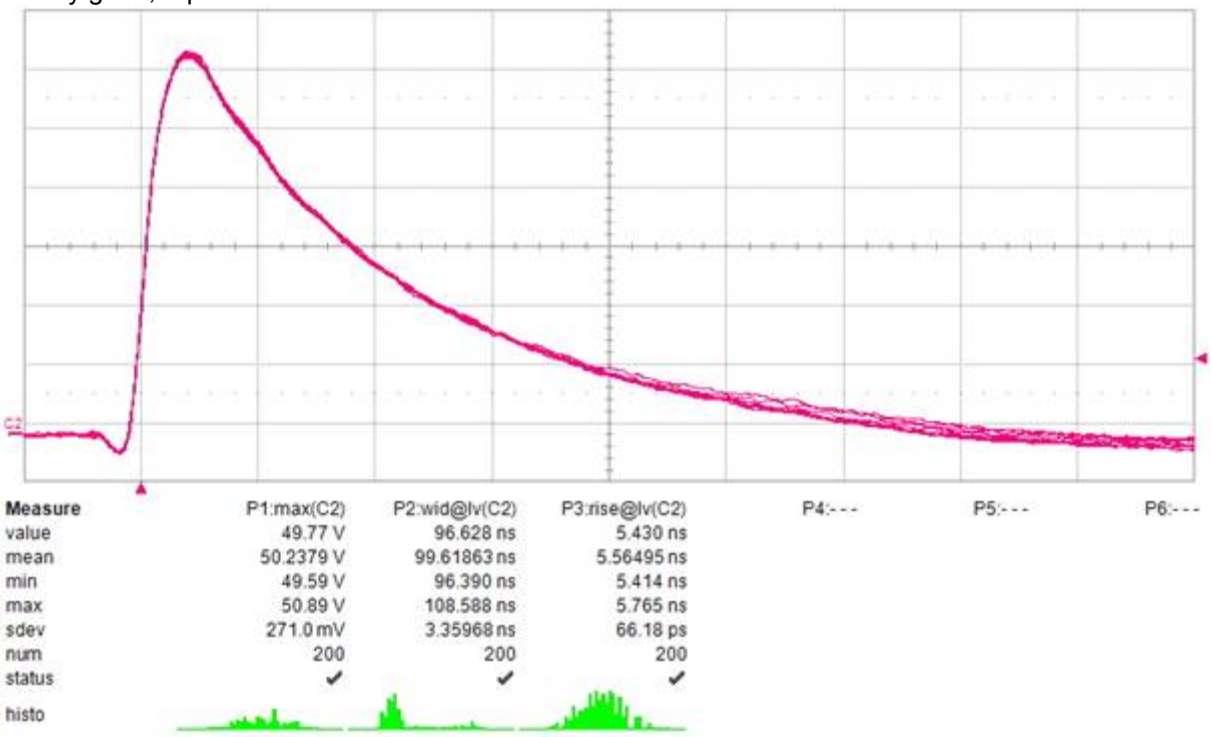
Q: Do you use an amplifier for these pulses?
A: No. All transients use a capacitive discharge into a pulse-shaping network as defined in ISO 7637-2. Teseq is very proud of its amplifiers from DC to microwave, but the rumor that we use amplifiers for transients comes from unscrupulous competitors. Anyway, it's been tried before and it doesn't work well.

Q: Can I use a 1 kΩ (or 50 Ω) resistor to do the test under load?
A: You won't get valid results. ISO 7637-2:2011 (and 2004) states,

> "For verification of test pulses 3a/3b coaxial measuring devices shall be used. The spectrum of the pulses

covers the frequency range up to 200 MHz Within this range it is difficult to use high impedance voltage
probes. The attached ground cable of the probe may cause significant ringing and may result in false
measurements. Coaxial measuring devices therefore are strictly recommended."

Q: How do the pulses look from the FT 5531 module?
A: Very good, repeatable and accurate.



(200 pulses: 100 ns, 100V, 50 Ω Load)

Q: Why do I need a new CTR 5501?
A: Linearity. We needed a new method for storing and interpreting the calibration values in the FT 5531 that only the CTR 5501 can perform.

Q: Have I been undertesting with my FT 5530?
A: No, actually the loaded results between the FT 5530 and FT 5531 are almost identical – well within the tolerance in the standard.
You would tend to get a larger pulse width unloaded with the FT 5530, even with measurement uncertainty taken into account. So, you were arguably testing a bit more severe than with the FT 5531.