Grund Technical Solutions, Inc.
370 South Abbott Ave, Milpitas, CA 95035
Tel: 408-216-8364
support@grundtech.com

Superior ESD Testing Solutions

Wave Appraise – Quick Start Guide

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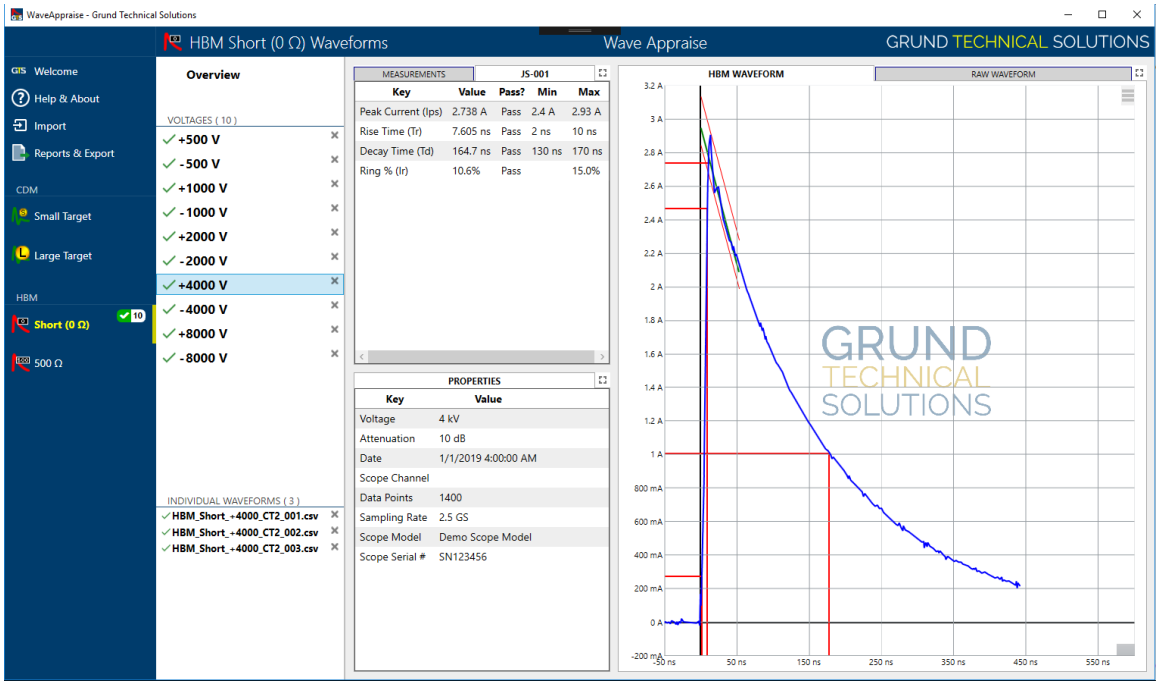
What is Wave Appraise?

Wave Appraise is a modern, efficient tool for analyzing HBM and CDM waveforms from virtually any source. It will tell you if your HBM or CDM waveforms pass JS-001/JS-002 using open-source verifiable calculations. You can import multiple waveforms together as a batch, and generate reports as pictures, CSV, or PDF.



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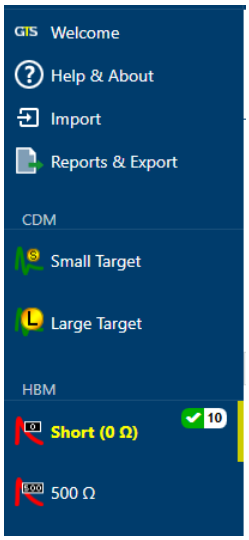
Navigation



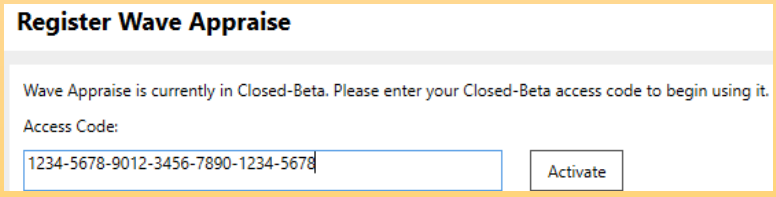
Navigate around Wave Appraise by clicking a section on the blue navigation bar.

- **Welcome** – Shown when launched. Has the latest news from GTS
- **Help & About** – Read documentation and manage your license
- **Import** – Helps you import your raw waveform files for analysis
- **Reports & Export** – Shows different ways to export your analyzed waveforms
- **Waveforms** (**CDM**, **HBM**) –

  Shows the analysis for waveforms you've imported. Notification bubbles next to each indicate how many are passing or failing.

Getting Started

Wave Appraise requires a license key, which is free with registration. You will be prompted for your activation code (dashes required) the first time you run Wave Appraise. Internet access is required for activation.



SAMPLE DATA - Navigate to the **Welcome** section and click a Sample Data button for HBM or CDM.

IMPORT YOUR DATA - Refer to the **Import** section of this document.

Grund Technical Solutions, Inc. 370 South Abbott Ave, Milpitas, CA 95035
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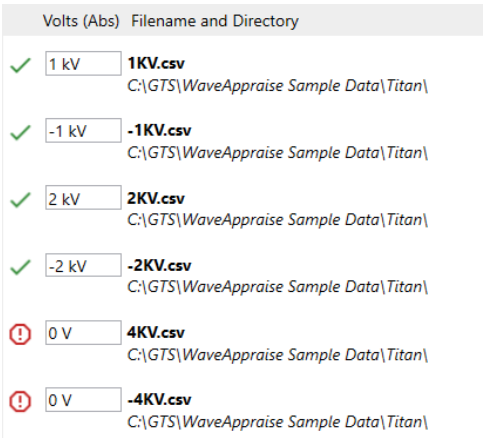
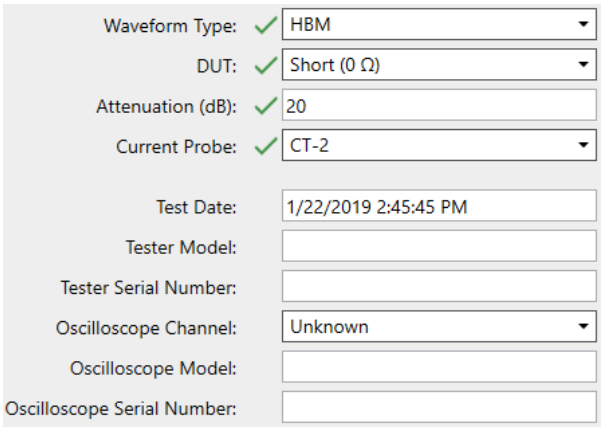
Import

Wave Appraise can import data from a variety of sources including text and CSV files from oscilloscopes.

1. Navigate to the **Import** section, then click the button **Open Waveforms From Files…**
2. Select the waveform(s) you wish to import. You can select more than one.
    a. *Multiple waveforms of the same voltage will automatically be averaged together.*
3. Valid waveform files will be listed. Type in the Voltage for each waveform
    a. *Don't worry about polarity, Wave Appraise automatically determines positive/negative*



4. Provide required details about the waveforms being imported:



   a. **Waveform Type** – Choose **CDM** or **HBM**
   b. **DUT** – For **CDM** choose **Large/Small**, for **HBM** choose **0Ω/500Ω**
   c. **Attenuation (dB)** – Enter the attenuator value (dB) that was placed on front of the oscilloscope, or 0 if none used.
   d. **Current Probe** (HBM only) – Choose the current probe that was used to record data:
      i. **CT-1** – Tektronix CT-1 current probe or equivalent (5 mV/mA)
      ii. **CT-2** – Tektronix CT-2 current probe or equivalent (1 mV/mA)
      iii. **Ground-Current** – Current signal terminated in the oscilloscope (applies to GTS PurePulse equipment)
   e. ***Sampling Rate* (Gigasamples)** – (Only visible if required) If the raw waveform data does not contain time (X) values, you will need to provide the sampling rate in Gigasamples per second.
      i. Sampling Rate = #DataPoints / ΔTime
      ii. Example: 800 DataPoints per division, 80ns per division = 10 GS

5. (Optional) Provide extra details about the waveforms:
   a. **Test Date**
   b. **Tester Model**
   c. **Tester Serial Number**
   d. **Oscilloscope Channel**
   e. **Oscilloscope Model**
   f. **Oscilloscope Serial Number**

6. Click **Finish Importing** to begin analyzing the waveforms.

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Analyzing Waveforms

When you finish importing waveforms, you'll automatically be shown the analysis.

1. Voltages are listed here. When a **voltage** is selected, the analysis represents the **average** of all waveforms with matching voltage.
2. Individual waveforms that make up the average for a given voltage are shown here. When an **individual waveform** is selected, the analysis represents just that single waveform.
3. Waveform with analysis markup is shown here. You can click the **Raw Waveform** tab to see the original waveform as received from the oscilloscope.
4. Measurements and pass/fail outcome are shown here. Click the standard tab (JS-001/JS-002) to see the min/max criteria for passing.
5. Properties about the waveform are shown here.
6. Click **Overview** to see the waveforms of all the voltages overlaid together.
7. The selected section is highlighted with yellow, and a pass/fail bubble shows you how many voltages passed or failed at a glance.

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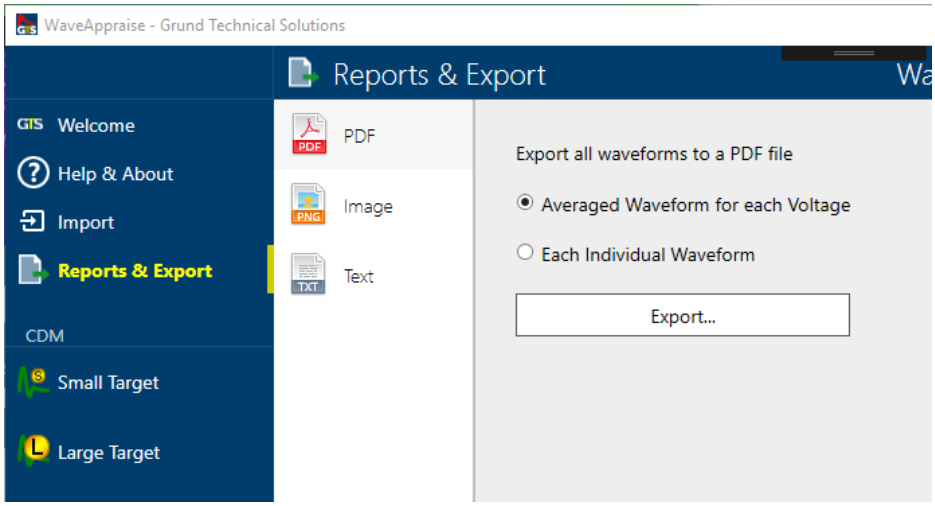
Reports & Export



You can export your data as pictures, CSV, or PDF.

1. Navigate to the **Reports & Export** section
2. Select an export format
3. Choose to export the averaged or individual waveforms
4. Click Export…, then choose a save location
5. It may take a few minutes to export a large number of waveforms.

Integration with Maestro

Maestro is the software that powers GTS' Scorpion CDM and PurePulse TLP/HBM tools. With Maestro you can automatically push the validation data to Wave Appraise, saving you time and eliminating errors during data import.

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Revision History – Quick Start Guide

2019-09-10

- Updated for release with Wave Appraise v1.1

2019-01-22

- Initial version – created for release with Wave Appraise v0.4

Revision History – Wave Appraise

v1.2 September 26, 2019

- Importing data points with identical time values (due to rounding) is now handled better
- HBM 0-Ohm now handles truncated waveforms better when calculating decay time
- PDF report now contains filenames and paths of each waveform
- Registering WaveAppraise automatically starts the 90-day premium trial now

v1.1 September 10, 2019

- Voltage parsing tuning
- XML export now saves as ".wavex" but is actually a zip file
- XML export tuning

v1.0 (Public Release) August 20, 2019

- Voltage is parsed from filename automatically (Premium feature)
- Rigol oscilloscope CSV files with multiple channels now imports
- Properties of imported waveforms can now be edited
- Error log zip archive can now be generated
- Non-english CSV parsing now handles culture better
- PDF export tuning

v0.10 (Closed-Beta) June 4, 2019

- HBM 0-Ohm Peak-Current derivation offset time is now adjustable
- HBM 0-Ohm find second peak options added
- Importing waveform speed improvements
- XML export tuning
- Premium Trial and Premium Subscription license types added

v0.9 (Closed-Beta) April 3, 2019

- Settings section added (at bottom left)
- Averaged waveforms that are skewed are now corrected so data points average correctly
- Removing an individual waveform now causes pass/fail to be re-evaluated
- Export to PDF includes a summary page at the beginning
- Export to PDF or Text now has an option to automatically open the exported file (default: yes)
- Export to PDF individual wfms now shows correct wfm (it repeated the averaged wfm before)
- The default HBM noise cutoff time changed to -15ns

v0.8 (Closed-Beta) March 18, 2019

- All standard-specific calculations have been released as open source in ESDWaveformVerifier.dll
- Calculating HBM decay time uses an Exponential Fit to reduce noise
- Export to PDF values can be formatted with custom numeric formats. Default is two decimal places
- Expor to PDF formatting and placeholders fixed

v0.7.3 (Closed-Beta) February 21, 2019

- Importing Maestro waveform captured with Ground-Terminated waveforms now imports correctly
- Importing Rigol Oscilloscope CSV format implemented
- CDM import parameters are now un-hidden correctly while importing waveforms
- Current Probe type added to HBM properties
- HBM 500-Ohm no longer incorrectly uses HBM 0-Ohm measurements
- CDM capacitance and total charge added (Preliminary version, may not be accurate)
- Export to XML implemented
- Import from WaveAppraise-formatted XML implemented (extension .wavex)
- Logging filename scheme changed to a unique timestamp to accommodate multiple instances
- Mismatched current probe type when calculating average waveform is now scaled before averaging
- Export to PDF filename now has “Average” or “Individual” inserted by default
- Exporting now remembers the last save location
- Tester Model and Serial Number added to the properties UI
- Oscilloscope Cal Due Date, Operator properties added to the UI and input fields
- When importing data that is “complete from source” such as Maestro, it no longer populates empty default values incorrectly
- Import section now keyboard focuses on the import button, then moves to the first voltage textbox
- Version number added to the titlebar
- Export to PDF now contains rudimentary measurements and properties
- Range-shifting waveform math bug fixed
- [Experimental] HBM 0-Ohm noise reduction for Ring % calculation

v0.6 (Closed-Beta) (2019-01-24)

- Opening CSV data from additional Tektronix models added

- Opening waveforms shows a comment about success/fail when opening
- Current Probe choice has more detail about them

v0.5 (Closed-Beta) (2019-01-22)

- Initial Closed-Beta release