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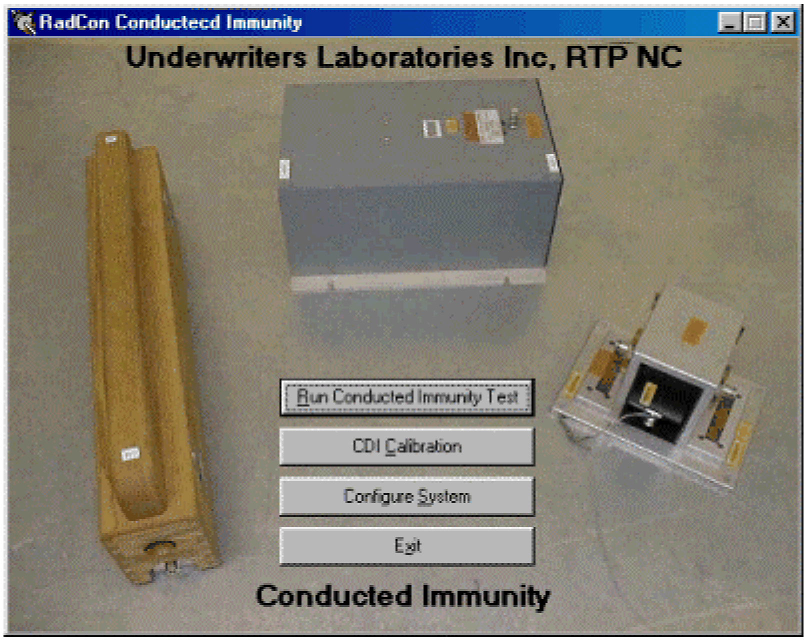
Radcon RF Immunity

Welcome



RadCon is a program used to perform RF conducted immunity tests to various test standards, including IEC1000-4-6, ENV50141 and Bellcore GR1089.

A variety of test methods may be used, including signal-generator value substitution, forward power leveled, and net power leveled methods. In addition, the induced level can be monitored during a test for reporting purposes and optionally used to limit over-testing.

Getting Started

First, you must specify the equipment to be used. This includes instruments as well as factor files .

Then, you must run a calibration .

After a calibration has been performed, tests may be run.

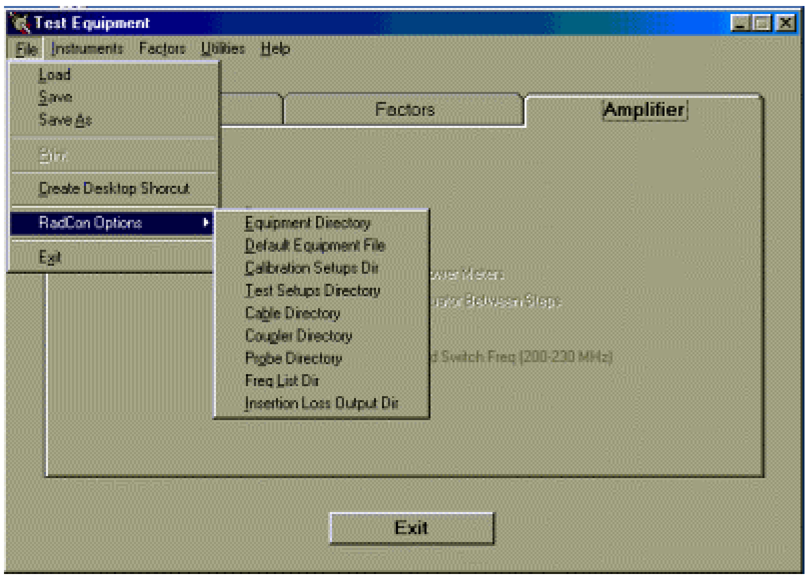
Go through the various screens and familiarize yourself with each. Also, read through the documentation.

System Configuration

Configuring equipment

The System Configuration function may be selected from the opening screen by clicking on the “Configure System” button. From there, the instruments may be selected, device factors may be selected or edited, instrument commands may be defined, and insertion loss verifications may be performed.

RadCon Options



Under the test equipment configuration window, click on “File” and select “RadCon Options”. Various default directories may be defined here, as well as the default equipment setup file.

Creating Startup Icon

One of the strong points of RadCon is the flexibility of being able to select options such that many different types of tests can be run. Once the options have been selected, the particular options can be saved to a file for later re-use. However, it would also be nice just to click on a desktop icon and have RadCon run with the proper equipment and test setup files automatically loaded so the operator only has to click “start” to begin testing. The “Create Desktop Shortcut” function, located under “Configuration>File” menu, will create a desktop icon that will do just that.

Under the file menu in the test equipment definition window, click on “Create Desktop Shortcut”. You will have to select the equipment setup file and test setup file to use. (They must have been previously saved). An Icon will be created on the windows desktop that, when double-clicked, will start RadCon with the desired equipment file and test setup file already loaded, and jump directly to the test setup window. Here, all the options for the given test can be reviewed before starting a test.

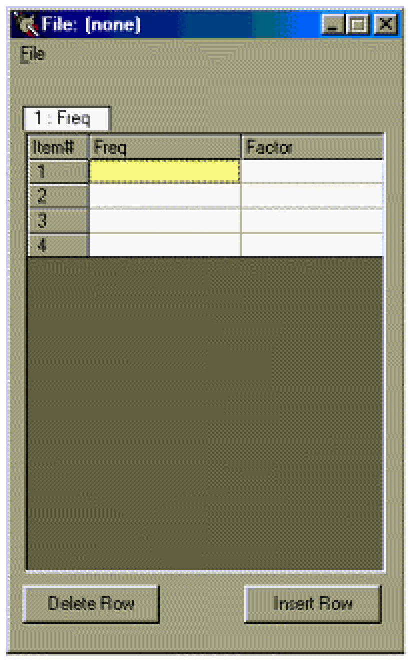
Once created, it is suggested that the icon be moved to a special test folder.

Saving Equipment Setup

Once all the equipment has been configured and selected in the Test Equipment window, it should be saved to disk. You may also define the file as the default to be automatically loaded when RadCon is executed.

Editing Factors

Factor files are used by the software to adjust readings taken by instruments to correct for insertion loss (cables), coupling factors (directional couplers), or to convert measurements from one unit to another (for instance, dBuV to dBuA for current measurement probes).



From the main screen, click on “Configure System” then click on the menu item “factors” and select from the pull-down menu the type of file you wish to edit. A form will pop-up that allows factors to be entered.

Default file extensions for the different file types used by the software are:

.FAC for directional couplers .

.PRB for measurement probes .

.LEV for test level .

.LOS for cable loss files.

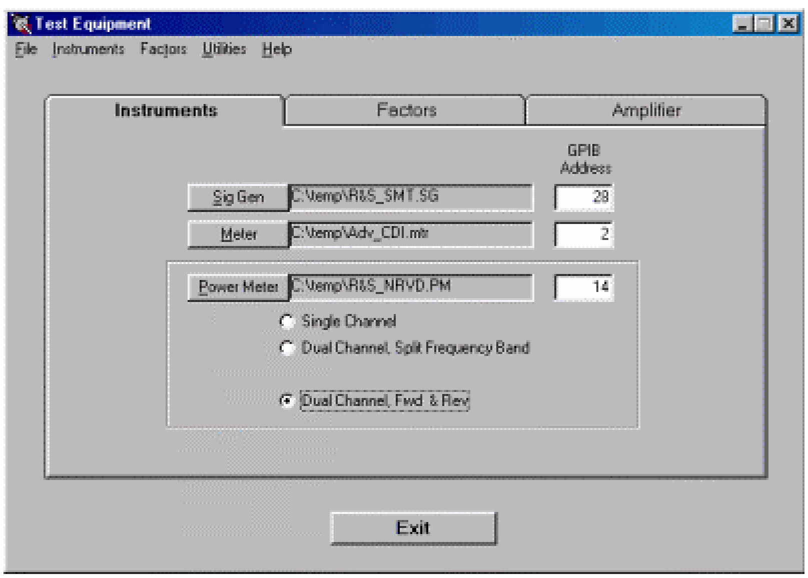
Insertion Loss

The Insertion Loss utility is a means by which the loss associated with a device may be measured. It is a frequency-stepped method where the signal generator outputs a given level at a given frequency and measures the signal. One measurement is taken directly, and then another measurement is taken with the device inserted in the system. A comparison is made between the direct and inserted readings, which gives the loss for the device.

The start and stop frequencies and the frequency step size may be entered, or optionally a frequency list may be used to tell the software at which frequencies measurements are to be taken. The signal generator output level may also be entered. Care must be taken when measuring non-passive devices such as pre-amps or amplifiers. The gain of pre-amps may be measured but care must be taken not to over-drive the input and cause saturation of the amp. Care must be taken to insure that the dynamic range of the measurement device not be exceeded.

Instruments

Selecting Instruments



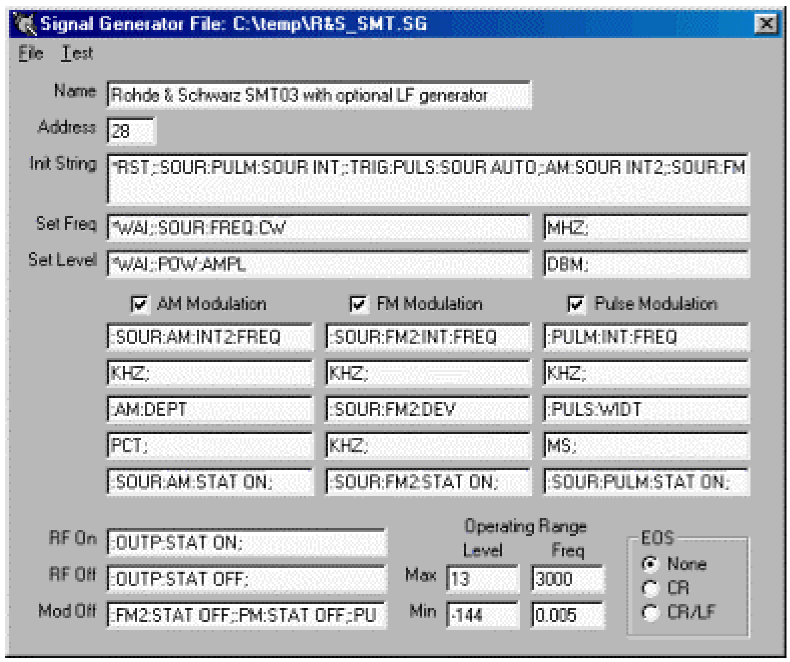
On the “Test Equipment” form, click on the “Instruments” tab. Clicking on the “SigGen”, “Meter”, or “Power Meter” buttons allows the selection of instrument files which define the GPIB commands used to control various instruments. An instrument file will already contain a GPIB address, but that default value may be changed after the file is loaded by simply typing the address into the text box next to the associated filename.

The Power Meter instrument has some additional configuration. A power meter may be single or dual channel, and a dual-channel power meter may be configured for a split band setup (for now, this only works with the IFI CMX amp). This is where channel A is forward power for the lower band, and channel B is forward power for the upper band.

If an instrument file does not already exist, it may be programmed in using the instrument definition utility.

Defining Instruments

New instruments may be utilized without having to recompile the program or wait for a programmer to create new drivers or DLLs. WARNING: This must be done very carefully to insure proper operation of all the instrument functions. The possibility exists that equipment may be damaged if this is not done properly! A complete validation of the definition file should be performed to insure the instrument is performing as desired. If you don't know how to properly control the instrument manually, don't even try to create instrument files.



To define a new instrument, select "Configure System" from the opening screen, then select "instruments" from the menu bar at the top of the form, then select "define". The signal generator, meter, and power-meter functions may be defined. It is suggested that an existing configuration be examined to gain insight into how the commands should be entered. Most instruments today adhere (sometimes loosely) to the SCPI standard, which means most commands between instruments will be similar if not identical. Refer to the particular instrument's documentation. Tool-tips exist for many of the text boxes on the definition forms, which will give some insight into what each textbox does.

Factors

Cable Loss

Cable loss is just that – loss of some part of a signal from one end of a cable to the other. The cable-loss file is a way for the software to adjust the readings taken to compensate for this loss. The cable-loss file is in the form of frequency and value, with the frequency in MHz and the loss in dB. A positive number indicates a loss.

Directional Couplers

A directional coupler is used to measure the power transfer through a transmission line such as a coax cable.

A “directional” coupler has directivity such that the signal from the measurement port will be proportional to the power flowing in one direction. In most cases a directional coupler will be used to measure the forward power from an amplifier. A dual-directional coupler will also have a measurement port for the power flowing in the reverse direction to indicate the power being reflected back from the terminating device.

The coupling factor is the ratio of the input power to the power at the measurement port, expressed in dB. When measuring power, the coupling factor must be added to the measured value to determine the actual power travelling down the transmission line. Generally, couplers will have a coupling factor that range from 20 to 60 dB.

Ideally, a directional coupler’s coupling factor is flat throughout its usable frequency range. However, every directional coupler has some small amount of deviation from its designed coupling factor. The coupling factors may be entered, saved to a file, and then later selected for use by the program.

The factors are entered in the form of frequency-loss. The loss value is always positive, and in terms of dB. The frequency is always in terms of MHz.

Amplifier Factors

The Amplifier Factor File is not used at this time. Its future intended purpose is to allow the program to determine what the maximum signal generator value should be used for a desired forward power level. This is to protect any equipment from being damaged and also to insure that the amp is not driven into its non-linear region.

Probe

Important: The probe factors are for a current measuring probe used to measure the actual induced current during a test. The probe factors here have NOTHING to do with a probe used to inject the signal.

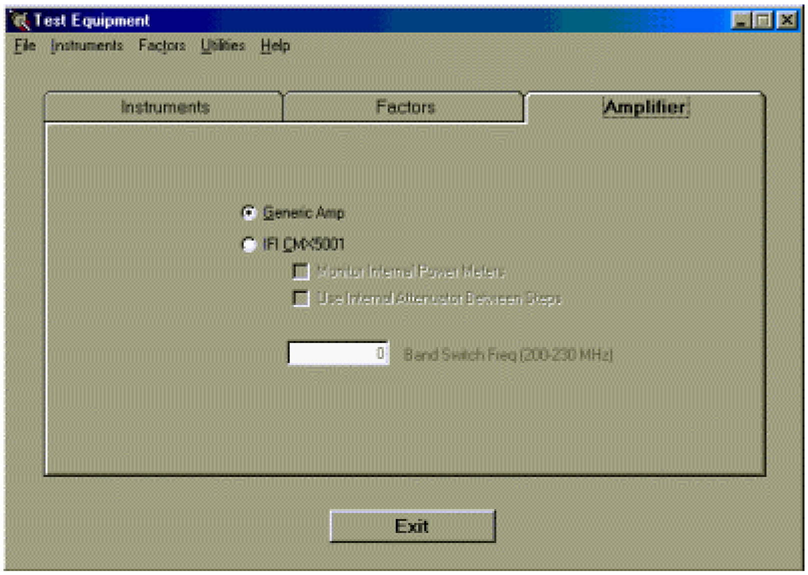
The factors are entered in the form of frequency-value. The loss value is in terms of dB. If the probe data reports the factors as dB(ohms) or transfer impedance then the values should be negated. Most probes have a very pronounced frequency response curve, and the lowest frequency should have the highest (positive or least negative) number. The frequency is always in terms of MHz.

The software will always ADD the probe factor and cable losses to the meter reading to correct the raw dBuv reading into dBuA.

Amplifier

Amplifier

For now, the only selections for Amplifier are IFI CMX5001 and Generic.



If “Generic” is selected, then all control of the amp must be done manually.

If “IFI CMX5001” is selected, then the bandswitching of the amp is done automatically. In addition, the internal power meters will be read by the software for informational purposes only. The resolution of the internal power meters are such that the readings are not of much use, particularly at low power levels.

The bandswitch frequency may be selected anywhere from 200 to 230 MHz. When a calibration is done with the bandswitch frequency at a given frequency, then any test that is performed using that calibration file must have the same bandswitch frequency selected in the system configuration. It is suggested that one frequency be selected when the software is first configured, and then left alone.

Calibration

Calibration

A Calibration is where a given test setup (signal generator, amplifier, cable, attenuator, and coupling device) are connected and the software determines how much signal to generate to achieve a desired test level.

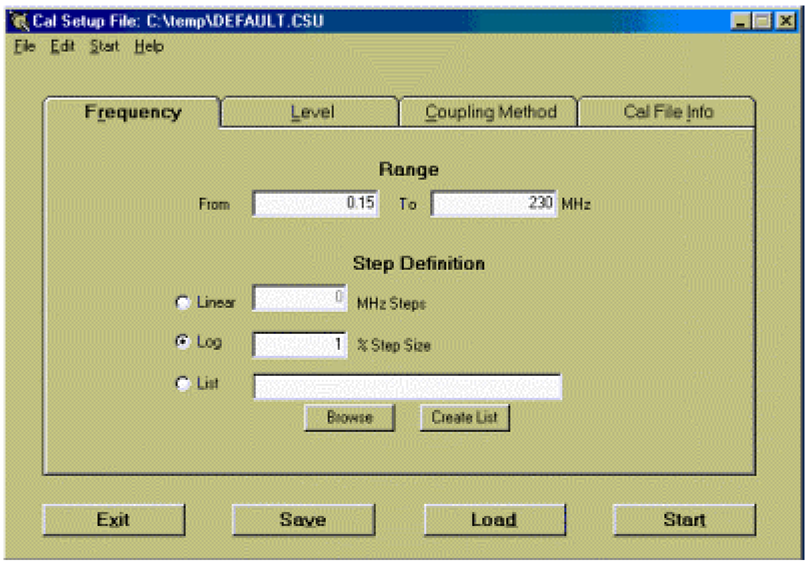
For instance, A 3v test done to IEC1000-4-6 must be performed on a product, using a two-wire CDN and a 50w XYZ amp. Before this test can be performed, the software needs to know how much signal to apply to achieve a 3v test level. Everything is connected together as it would be during a test, except instead of connecting the CDN to the product, the CDN is connected to a measurement device through an appropriate calibration fixture. A calibration is performed by the software, stepping the signal generator level up until the 3v level is achieved. Once the value is recorded, the software steps up to the next frequency and repeats the process. If a power meter and directional coupler are configured, the software will optionally record the forward power necessary to achieve the test level.

A calibration must be performed for each coupling device to be used, and for each amplifier that may be used. Care must be taken to insure everything is correctly connected, otherwise it may be possible to output too much power and destroy some component in the system (usually the coupling device).

Once all of the information has been entered for a particular calibration, this information can be saved to a file for subsequent calibration runs.

See also: CDN Cal , BCI Cal , EM-Clamp Cal , Level Calculations .

Calibration, Frequency



Enter the frequency range to run the calibration, in MHz.

Select one of the following frequency step methods:

Log. Steps up in frequency with the step size being in percentage.

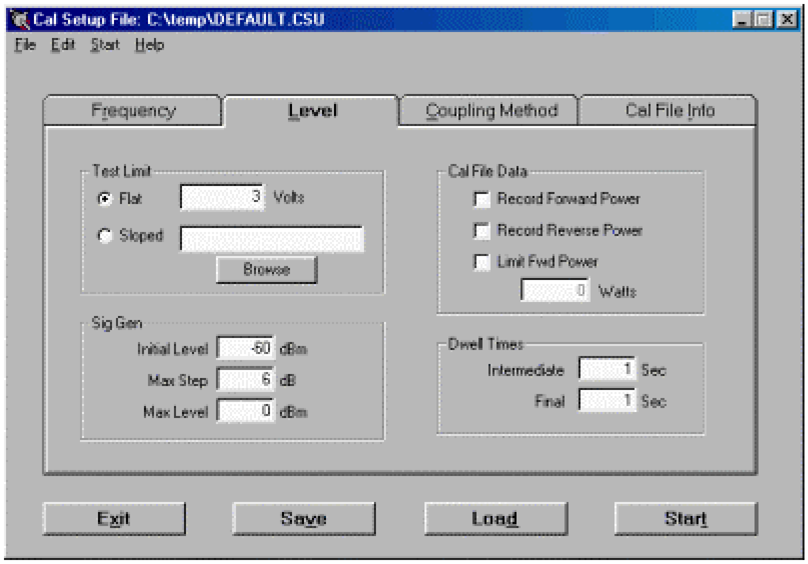
Linear. Steps up in frequency with the step size in MHz.

List. Use frequencies in a list file (ascii).

If running in List mode, only the frequencies in the list file that are in the range specified by the from/to values will be used.

Click the “Browse” button to select a list file to use. Click on “Create List” to pull up a frequency list creation utility. From there, an existing list file may be loaded and then more frequencies manually added.

Calibration, Level



This window allows all items pertaining to levels to be selected.

Test Limit

Select the test limit method, either "Flat" or "Sloped".

"Flat" is used for a test level that is constant throughout the frequency range being calibrated. "Sloped" is for a test level that varies through the frequency range, such as the GR1089 test.

"Browse" allows the selection of the test-level file to be used.

The level must always be in terms of Volts. If a test spec if for some other unit, such as dBuA, it must be converted to Volts.

Signal generator.

The "initial level" is the starting signal generator level. The level will be ramped up until the required signal is measured by the measurement device (meter). The "Max Step" is the maximum step size used to increase the level before taking another measurement. The "Max Level" is the highest signal generator value to be used. This is for protection of the equipment being used, in case something is not properly connected.

Cal File Data.

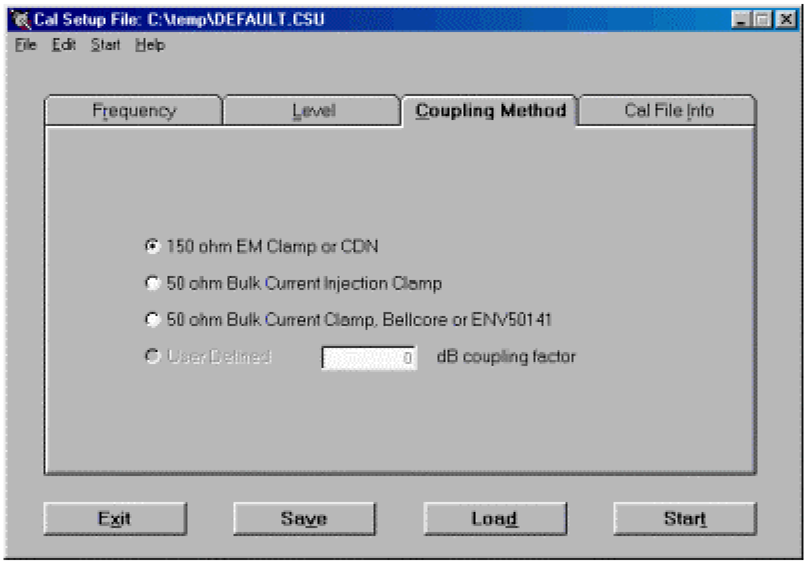
Select the information required in the calibration file. Some test specifications require power levels to be recorded so they may be repeated during the test. If a test spec requires "Net power" then both forward and reverse power should be recorded.

The "Limit Fwd Power" is another option that may be used to protect the equipment. Checking this box requires a power level to be entered which will not be exceeded during the calibration.

Dwell Times

For now, only the "Final" value is used. Enter a value (in seconds) that allows sufficient time for all the instruments to settle.

Calibration, Coupling Method



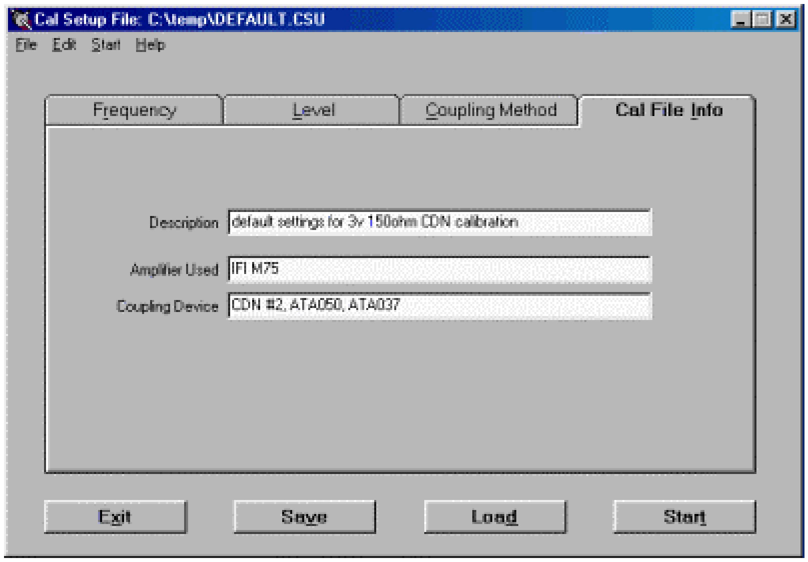
Select the type of coupling device used.

The difference between the selection are as follows:

150 ohm CDNs and EM-Clamps (as specified in standards like IEC 1000-4-6 and ENV50141) are almost always calibrated with measuring devices that have a 50 ohm characteristic impedance. A 150 to 50 ohm converter (essentially a 100 ohm resistor in series) must be used to match the impedance. The measuring device sees only 1/3 of the signal being measured due to the voltage divider effect of the series resistor. 1/3 voltage in terms of dB is approximately 9.5 dB. In addition, since the standard specifies the test level for an open circuit, terminating the circuit at its characteristic impedance will reduce the level to half, which equates to a 6 dB decrease. So, for a 150 ohm device, a total of 15.5 dB of signal loss occurs.

The two type of 50 ohm bulk-current clamp selection are due to differences between how test levels are specified in different test standards. IEC 1000-4-6 specifies that the 6 dB coupling factor be applied, due to the reason stated above. However, ENV50141 does not make this allowance as per the specific example given in the standard. Also, other test specifications do NOT specify the test level for open circuits, so the 6 dB criteria does not apply.

Calibration File Information



This is text that is used strictly for informational purposes in the calibration file. Detailed information about the equipment used should be entered here. For the coupling device, type in the device as well as the cable and any attenuator used between the amp and the coupling device.

Run Calibration

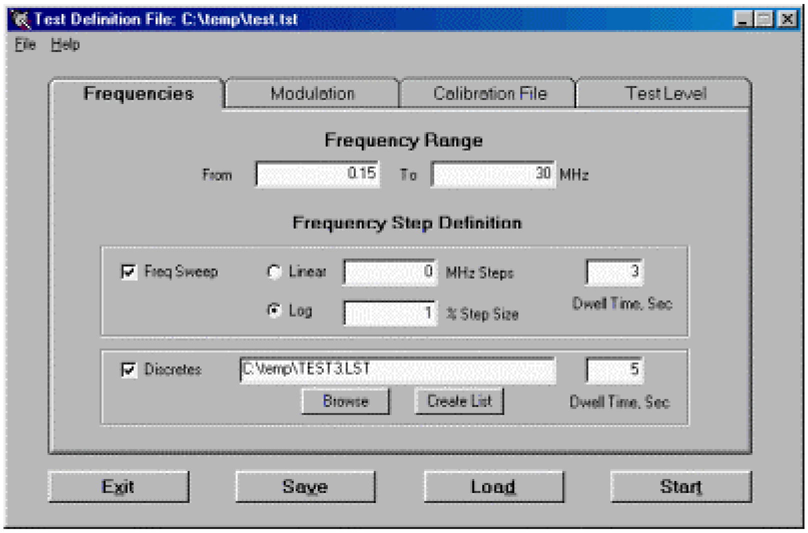
This window is where the calibration will actually be performed. The various parameters will be displayed during the calibration. After the calibration has finished, be sure to save the data collected to a file.

Tests

Defining Tests

Test Definitions: Frequencies

Enter the frequency range of the test.



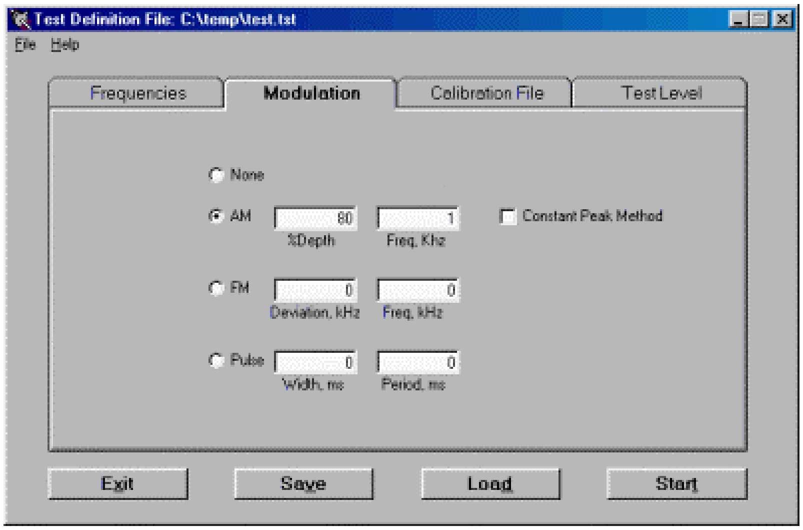
Select the “Frequency Sweep” if a swept frequency test is to be performed. (Swept in this case is actually a sweep done with stepped frequency). Specify linear or log type sweeps, as well as a step size.

Select “Discretes” if a frequency list will be used. Click on “Browse” to select a frequency file to use, or click on “Create List” to create a list file to use. Under the list creation option, an external file may be loaded at any time during the process in which case the frequencies in the file will be added to the ones already entered. If frequencies in the file exist that are outside the range specified, they will not be tested.

If both “Frequency Sweep” and “Discretes” are checked, both will be run simultaneously. The resulting frequencies will be merged and sorted. A separate dwell time may be specified for each one.

See also: Modulation , Cal File , Test Level .

Test Definitions: Modulation



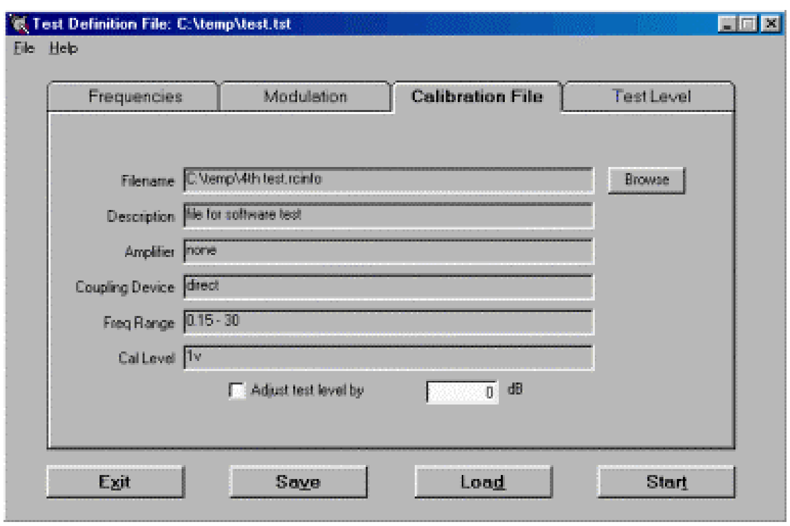
Select the modulation type to be used.

Amplitude Modulation has an additional parameter – Constant Peak. Some test standards specify that the peak of the modulation envelope must equal the CW calibration level. Selecting the "Constant Peak" option for this type of test.

For constant-peak tests, the signal generator and power levels that will be used for leveling will be adjusted accordingly. For constant peak tests that use power (either forward or net power) a power meter with averaging power sensors must be used.

See also: Frequencies, Cal File , Test Level .

Test Definitions: Calibration File



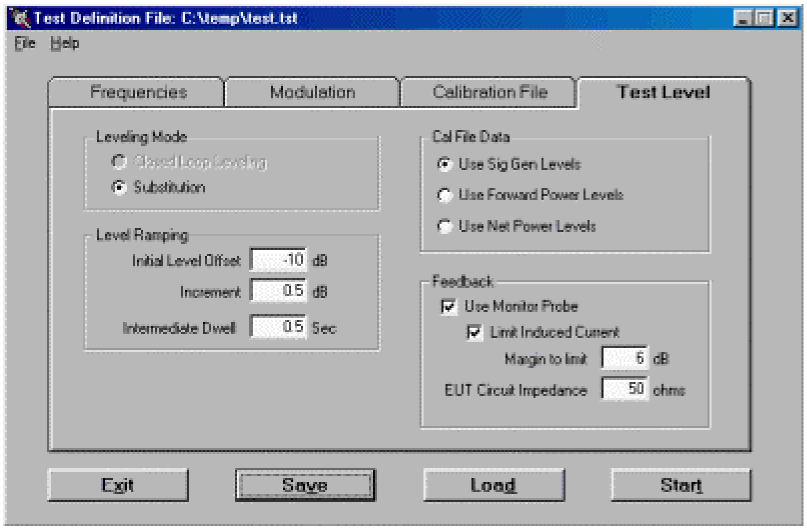
Select the calibration file by clicking the "Browse" button. The information contained in the calibration file will be displayed for verification.

Select "Adjust Test Level By" and enter a number (in dB, negative only) to run a test at a level lower than that specified in the calibration file.

See also: Modulation , Test Level , Frequencies

Test Definitions: Test Level

Enter the parameters to define how the test level is to be achieved during a test.



For now, the only option for leveling mode is “substitution”. Real-time leveling is a future addition.

For level ramping, the initial level offset will be used to decrease the signal generator level before stepping in frequency. A value of 0 means the level will not be reduced between frequencies. (A value of 0 is only valid if not using forward power or monitor-probe feedback). For “increment” type a value (in dB) that will be the maximum amount to increase the level in any one step. For “Intermediate Dwell” enter a value (in seconds) to wait for instruments to settle before taking readings.

For Cal File Data, select the type of leveling method to use, either SigGen values, forward power, or net power. Please note that if forward power or net power methods are selected, the calibration file that was selected must include this information for a test to be run. It is suggested that calibrations be done with a power meter recording both forward and reverse power, if possible, which will allow the resulting cal file to be used for any of the three leveling methods. If “Net Power” is selected please note that, during level ramping, only the forward power will be measured until the forward power exceeds the net power recorded in the cal file, then the reverse power reading will be taken until the test level is achieved. This is to help speed up the level ramping process. (The net-power will always be less than the forward power).

For Feedback, select whether or not to use a monitoring probe, and optionally select whether to limit the induced current based on the monitor probe data. If the “Limit induced current” option is not selected then the induced reading will simply be recorded in the test run data. If you do decide to limit the induced current, you may specify a “margin to limit” to allow a certain amount of over or under testing. For instance, Bellcore GR1089 specifies limiting the induced current to 6 dB over the test specification. A positive number will over-test, a negative number will under-test. You must also specify an EUT circuit impedance, based on the standard being tested to. For instance, IEC 1000-4-6 specifies a 150 ohm impedance. The value entered will be used to convert the current reading into a voltage level as required, or to determine the max current based on the test level.

See also: Modulation , Cal File , Frequencies .

Running Tests

Running Tests

Glad you made it this far.

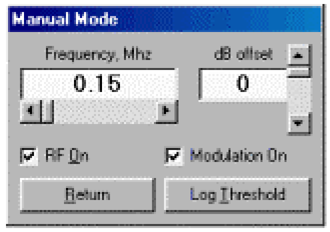
This part is relatively simple. Once you have defined how a test is to be run in the test definition window (and saved the test definition file!) you can click on "Start" to go to the test-run window.

Actually, there will be two windows. One window is where the test progress and results are displayed, and the other is a small window with three buttons: Start or Halt, Manual, and Exit. (The small window will always stay on top even if another form or program has the focus).

On the main window, the "Test Level", "Current Reading" and "Forward Power" can have the displayed units changed either before or during a test. These can be accessed either by the "Units" pull-down menu, or by right-clicking on the appropriate item to be changed.

At the bottom of the window, the frequency range, number of frequencies to be tested, minutes remaining and elapsed time will be displayed. Before the test is started, the "Min Remaining" is an estimate based on the number of frequencies, dwell time, and level-stepping parameters. The actual time will probably be longer due to instrument and ramping delays. This time will be updated during a test run. After a few frequencies have been tested, this time will more accurately reflect the remaining time. Also at the bottom of the window, a progress bar will show how far along the test has progressed. Please note that once the Manual Mode has been invoked, these values will not be accurate.

On the smaller form, clicking on "Start" starts the test. The "Start" button will change to a "Halt" button. Clicking on "Halt will halt the test, and the button will change back to a "Start" button. (Neat how that works….). Clicking on "Manual" pulls up another small window (after the level ramping at the present frequency has finished) for operating in the "Manual" mode.



Once in the Manual mode, the frequency can be varied, as well as the test level. (Note: you may only vary the frequency through the range that has already been tested. However, if the test was run all the way through to the finish and another test run started without exiting the test run window, you may immediately enter the manual mode and go through the entire frequency range). The test level can be varied up and down, although you may not go above the test level that was actually achieved during the normal level ramping. Once a pass/fail threshold has been determined, clicking on “Threshold” will record the frequency and level as well as any comments. After the test is finished, all of the test run data may be printed or, optionally, just the threshold data.

If level ramping is used, then the first item to meet the leveling criteria will be highlighted. In the boxes at the top of the window, the text will be in red. In the data grid, the text will have two asterisks.

Conducted Immunity Calibrations

Overview

Conducted Immunity Calibrations can be a confusing task. This document is intended to supplement the appropriate test standard and will attempt to make the calibration task less confusing by explaining how each type of calibration is to be performed. Calibrating different devices, such as CDNs (coupler-decoupler networks), BCI (bulk-current injection) probes and EM-Clamps will be explained.

Level Calculations

Depending on the test specification and injection method, a calculation or adjustment in the measured level must be made.

For IEC 1000-4-6 calibrations, the measured level might have two factors to be added to the measured level. First, the measured level will be half (-6dB) the actual level since the test level is specified as an open circuit voltage. (Terminating a circuit at its characteristic impedance will cause the voltage to be reduced to half of its open-circuit voltage.) Also, if using 150-50 ohm adapters, the measured level will be 1/3, or 9.5 dB less than the actual level due to the voltage divider effect of the adapters. So, for a CDN or EM-Clamp calibration, the measured level will be -15.5dB from the specified test level.

For BCI tests to IEC 1000-4-6, the 6dB adjustment for open-circuit voltage still applies. However, for most other standards, there is no adjustment made to the calibration voltage (or current) value.

Refer to the appropriate standards for details of the calibration process.

Calibration Data

Typically, the data collected during a CDN or EM-Clamp calibration would be a table of frequency and signal-generator levels, and optionally the forward-power levels.

The BCI calibration might also include a reverse-power reading at each frequency, for test specifications that call for Net-Power type tests.

During the actual test, these levels would be played back. The forward power, if collected during the calibration, could be used to adjust the level at each frequency to insure the most accurate testing, particularly when interpolations between the calibration frequencies must be performed.

For Net-Power type tests, the reverse-power is subtracted from the forward power to determine the net-power. If the impedance of the circuit being tested is substantially different than the 50 ohms system (100-ohm loop) used to perform the calibration, some of the injected power will be seen as reflected or reverse power. The net-power method attempts to compensate for this by increasing the forward power until the net-power is equal to the level recorded during the calibration.

CDN

CDN Calibration Overview

There are different types of CDNs, including Mains , Balanced Pairs , Coax , and Shielded Data Lines .

"CDN" stands for Coupler-Decoupler Network. The function of injecting the signal (coupling) is combined with the function of isolating the auxiliary equipment (de-coupling).

CDN Calibration Setup

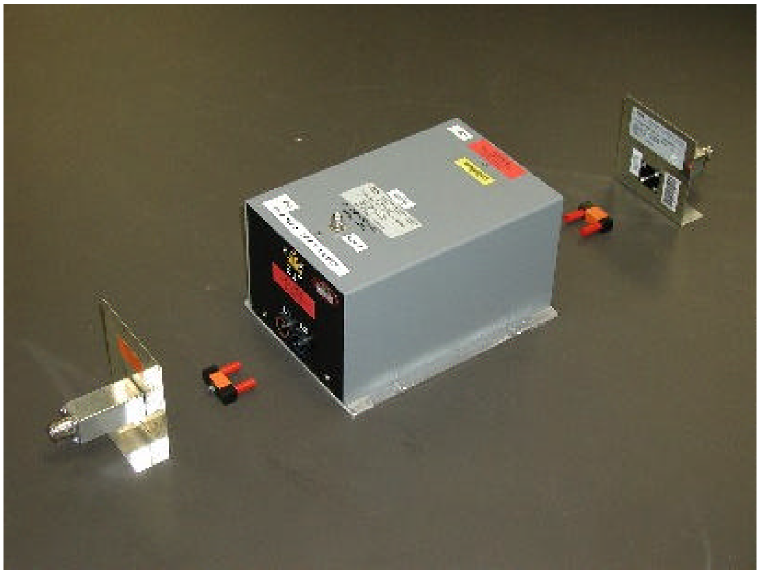
CDN calibrations must be performed on a ground-reference plane. Several components used during calibrations must be in contact with the GRP, including the CDN and both 150-50 ohm adapters.

Depending on the type of CDN being used, a shorting plug or adapter will be used to connect the CDN to a 150-50 ohm adapter.

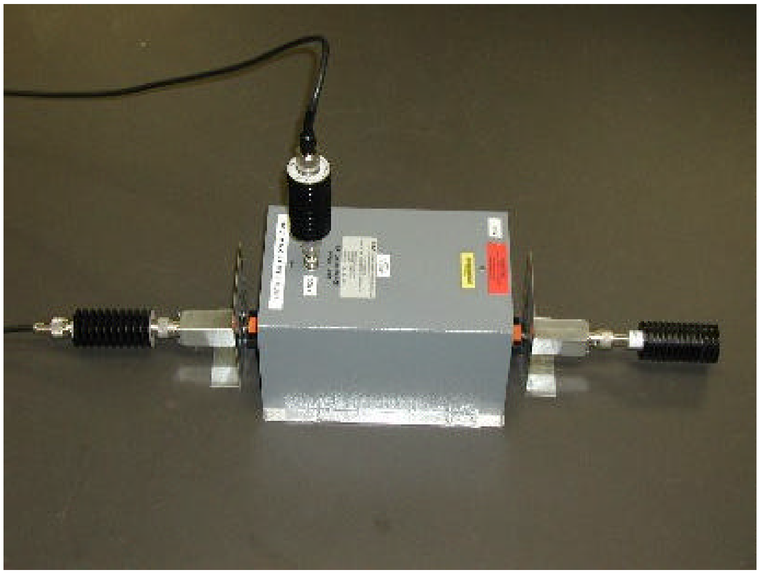
Mains-power CDNs

Mains CDN calibrations (CDN-M1, -M2, -M3, -M4 and -M5) are done by using shorting plugs to short all of the conductors together. A shorting plug is used on the EUT side as well as the AE side of the CDN. Once the shorting plugs are in place, the 150-50 ohm adapters are connected to the shorting plugs. On the AE side, a terminating load is connected. On the EUT side, a measuring device is connected through a high power attenuator. The measuring device is used to adjust the signal level until the required test level is achieved.

Below is a picture of a 2 wire CDN (-M2) and its associated shorting plugs and 150-50 ohm adapters.



Below is a CDN setup ready for calibration. Note the terminating 50-ohm load on the right side (the AE side), a 6-dB attenuator on the input (top) and the attenuator connected to the 150-50 ohm adapter on the left (EUT) side.



See also Calibration Data .

Shielded Data Lines

This calibration is identical to the Mains CDN calibration except that, instead of a shorting plug, there is an adapter that connects the CDN connector shield to the 150-50 ohm adapter . The injected signal only goes to the shield, NOT the signal conductors.

See also Calibration Data .

Coax

This calibration is identical to the Shielded Data Line calibration. The injected signal only goes to the shield, NOT the center conductor.

See also Calibration Data .

Balanced Pairs

This calibration is identical to the Mains CDN calibration. A shorting adapter is used to short the data lines together and also connect to the 150-50 ohm adapter .

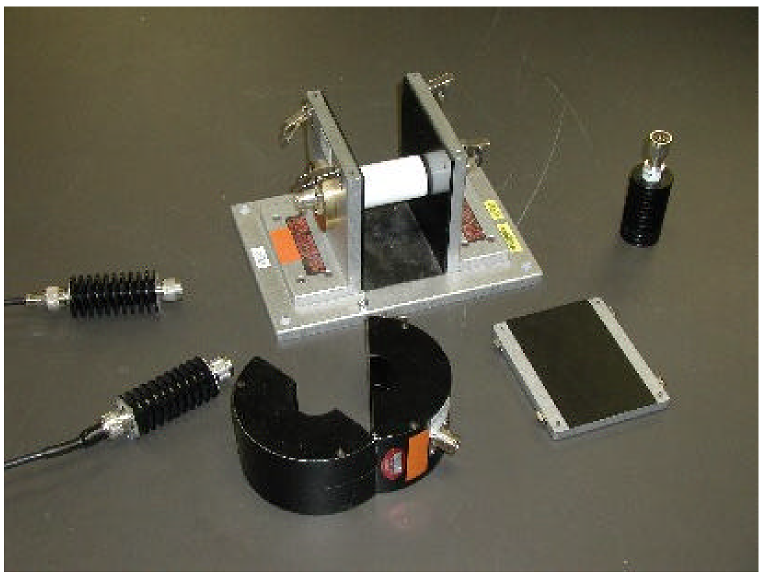
See also Calibration Data .

Bulk Current Injection

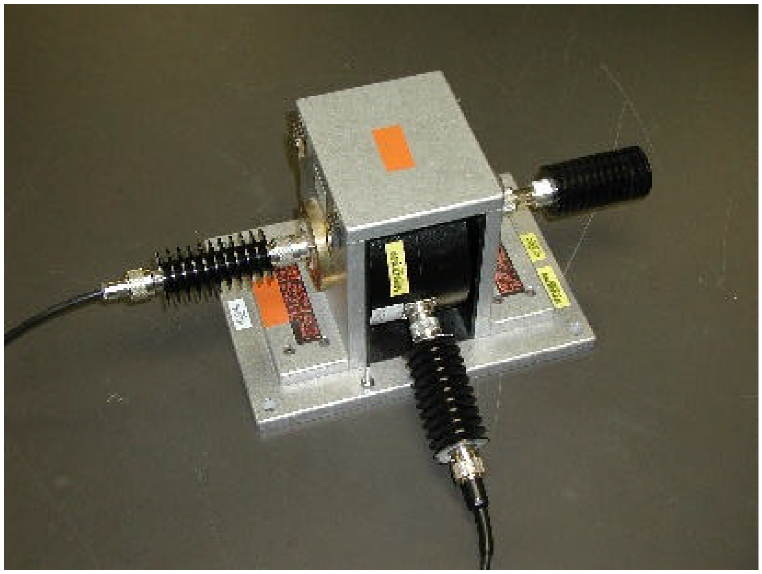
BCI Calibration

BCI, or Bulk Current Injection, is a means of coupling an interfering signal onto a circuit. The preferred method for some test specifications is to use either a CDN or an EM-Clamp . One reason is that the BCI method is non-directive which means it does not provide any isolation (de-coupling) for the auxiliary equipment. The CDN method provides the best decoupling, while the EM-Clamp provides some level of directivity or decoupling

A BCI calibration is done by placing the BCI probe into a calibration fixture. One side of the calibration fixture is connected to a measurement instrument while the other side is terminated into a 50-ohm load. Please note that the BCI clamp is usually calibrated in a 50-ohm system, while the CDNs and EM-Clamps are calibrated in a 150-ohm system.



Bulk Current Injection (BCI) probe and calibration fixture.



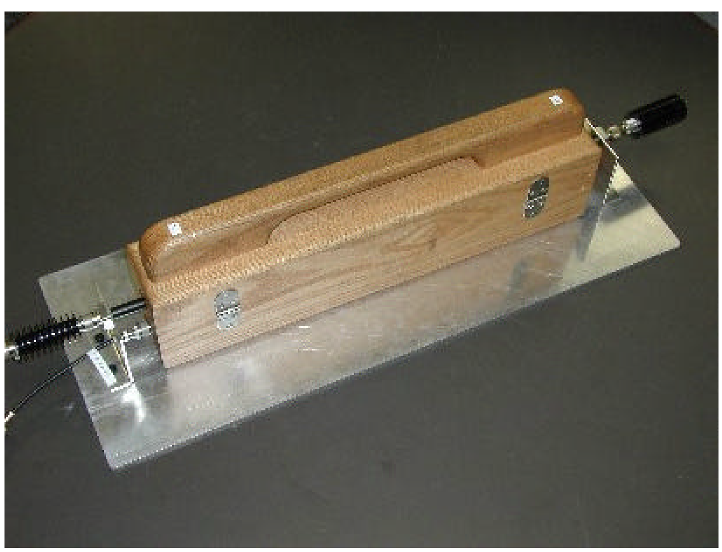
Probe setup for calibration.

See also Calibration Data .

EM-Clamp

EM-Clamp Calibration

The EM-Clamp is one method of injecting an interfering signal onto a circuit. For some standards the EM-Clamp is the preferred method for injecting onto a multi-conductor data line. The EM-Clamp calibration is very similar to the CDN calibration. The EM-Clamp is a 150-ohm device that requires 150-50 ohm adapters for calibration purposes. On the AE side, a terminating load is connected. On the EUT side, a measuring device is connected through a high power attenuator. The measuring device is used to adjust the signal level until the required test level is achieved.



EM-Clamp in calibration fixture.

See also Calibration Data .

SAE Direct Injection

Automotive Direct Injection Calibration

The Automotive Direct Injection is a special case where the injecting device (BAN) is not actually connected in the circuit during the calibration. The signal level is adjusted until the required power is measured at the end of the cable that will connect to the BAN. There is a direct connection between the center conductor of the coax cable and the lead being tested on the EUT .

Test Level

The factors are entered in the form of frequency-value.

The value is in terms of linear volts. If the test specification calls for a test limit in other terms (such as dBuV or dBuA) then the values will have to be converted before typing into the test level file.

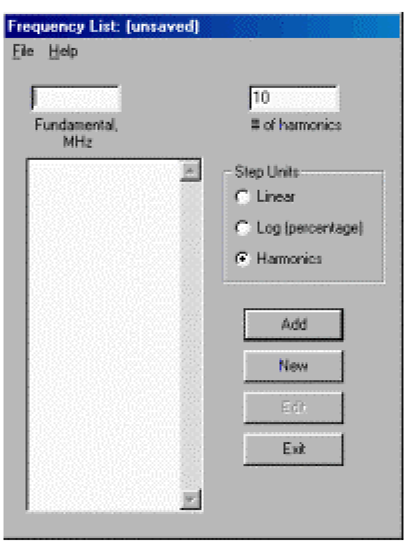
The frequency is always in terms of MHz.

Coupling Devices

Coupling devices are used to inject a signal onto a circuit. A coupling device may be a CDN (coupling/decoupling network), an EM-Clamp, or a bulk-current injection probe.

Frequency List

Several places in the program a “create list” button exists. Clicking this will take you to a frequency list creation utility.



Frequencies may be added to the list several ways. They may be loaded from a file; they may be added manually by entering a fundamental frequency and selecting the number of harmonics; they may be added by specifying a start and stop frequency and either a linear or logarithmic step size. When frequencies are added, the list will be resorted and redundant frequencies discarded. Once the list has been created, it can be saved out as a text file for later use.

A typical example of the use of this utility:

A test done to Bellcore GR1089 on a product with operating frequencies of 10, 25, and 66 MHz. GR1089 specifies testing at any EUT operating frequencies, as well as a list of special frequencies commonly used in telecom equipment. First, enter the EUT frequencies by selecting “Harmonics”, enter the EUT frequency in the “Fundamental” text box, and “1” for the number of harmonics. Click “Add” will add the frequency to the list. Do this for each EUT frequency. Then, select the “file” pull-down menu and select “add from file”. Load the GR1089 file (previously entered and saved to disk) that contains all of the GR1089 special frequencies. Once all the frequencies have been entered, save the file out naming it something reflecting the lab number or job number.

When finished, click on “Exit” and you will be prompted to save the file (if you have not already done so) and also if you want to use the list file you just created.

150-50 ohm adapter

Basically, a 100 ohm non-inductive resistor in series with a 50 ohm termination. The purpose is to maintain the 150-ohm impedance seen by the injecting device. When measuring the interfering signal level through an adapter during a calibration, the 150-50 ohm adapter, along with the 50-ohm termination, acts as a voltage divider circuit. Thus, the voltage measured by the measuring device will be 1/3 (-9.5dB in log terms) the actual value.

AE

Auxiliary Equipment. This is equipment that is needed during the test to provide a termination to the EUT, or to provide the necessary signals needed to operate the EUT.

EUT

Equipment Under Test. This is the device actually being tested for susceptibility.

BAN

Broadband Artificial Network. Used to provide isolation to auxiliary equipment. BANs are used for automotive direct-injection tests.

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