Tek UWB
Spectral Analysis
Printed Help Document

www.tektronix.com
077-0033-02

Tektronix

Tek UWB Spectral Analysis Online Help Version 2.2.0, part number 076-0085-02.

Contacting Tektronix

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For product information, sales, service, and technical support:

- In North America, call 1-800-833-9200.
- Worldwide, visit www.tektronix.com to find contacts in your area.

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Conventions

The online help uses the following conventions:

- When steps require a sequence of selections using the software interface, the ">" delimiter marks each transition between a menu and an option. For example, File > Save.
- DUT refers to the Device Under Test.
- Three dots (...) following a menu item indicate that the menu item will open a submenu.

Updates through the Web Site

Periodic software upgrades may be available.

To check for upgrades:

1. Go to the Tektronix Web site (www.tektronix.com/software) to link to the Software Downloads page.
2. Enter the product name **Tek UWB** in the Search by keyword box to find the available software upgrades.

Introduction and Product Description

Excellent amplitude, phase flatness, and low phase noise make the DPO/DSA70000 series oscilloscopes the ideal tool for engineers designing Ultra Wideband radios used in Certified Wireless USB, Wideband Bluetooth, WiNet, and DNLA consumer and computer systems.

- Tek UWB runs on the TDS series oscilloscopes with single shot bandwidth ≥7 GHz and DPO/DSA series oscilloscopes with single shot bandwidth ≥2.5 GHz.
- Tek UWB analyzes the complexity of wideband signals that change in frequency and amplitude with time. It measures the distribution of signal power with frequency and analyzes specific signals in the presence of other traffic with time gating and packet/pulse finder within upto 200 Mpt record lengths.
- Quickly generates Power Spectral Density and Spectrogram plots from acquired data.
- Correlates the Frequency domain to Time domain with cursors linking the amplitude versus time, frequency versus time, and power versus frequency.
- The Downconvert option allows for rapid generation of baseband data for further analysis in other tools such as Tektronix RSA Vu and MATLAB.
- The WiMedia PHY Test option automatically detects all 10 Time Frequency Codes and eight data rates directly from the WiMedia RF waveforms for easy setup and analysis.
- Covers the digital down-conversion, demodulation, and analysis of all six WiMedia band groups.
- Generates plots of EVM-vs-Symbol, EVM-vs-Subcarrier, and Constellation data.
- Performs measurements outlined in the WiMedia PHY Test Spec 1.2 including EVM, cross correlation, frequency tolerance, adjacent channel power ratio, spectral mask testing, and relative power ratios.
- Report generator quickly documents the configuration information, measurement results, and plot images.

Compatibility

For information on instrument compatibility, refer to the *Optional Applications Software on Windows-Based Oscilloscopes Installation Manual* (Tektronix part number 077-0067-XX) available as a PDF on the DVD.

Requirements and Restrictions

The following are recommended for running Tek UWB:

- TDS series oscilloscopes with single shot bandwidth ≥7 GHz and DPO/DSA oscilloscopes with single shot bandwidth ≥2.5 GHz.
- Oscilloscopes with single shot bandwidth of 7 GHz or greater for WiMedia signals in band group 1. Analysis of higher band groups requires oscilloscopes with correspondingly higher bandwidths. Coverage for all six WiMedia band groups will require a single shot bandwidth of at least 14 GHz.
- Analysis of radar signals through X band and Ku band calls for real-time bandwidth beyond 16 GHz. The DSA72004 oscilloscope with single shot bandwidth of 20 GHz and deep 200 Mpts record length provides the greatest flexibility for analyzing such high speed signals.

Limitations

Proper analysis of WiMedia signals generally requires an acquisition sample rate of 20 GS/s or higher and record lengths of 1 Mpts or more. This application will not even attempt WiMedia analysis unless the sample rate is at least 250 MS/s with a record length of 100 Kpts or more.

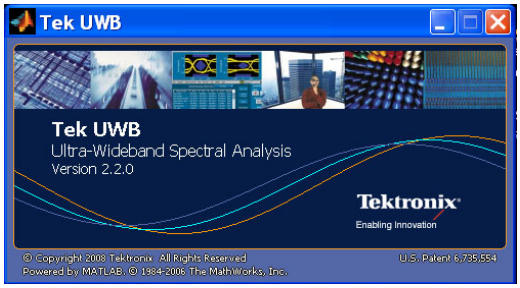
When using Tek UWB with very long captured waveforms (generally over 100 Mpts), it is possible for the application to run out of available memory with the operating system. This condition depends on the number of other applications running, the length of the waveform being analyzed, and the type of analysis that is being performed. If an out of memory error message is encountered, we recommend using the time gating feature of the oscilloscope to reduce the amount of data being analyzed. To do this, place the instrument cursors around the part of the captured waveform you want to analyze before beginning an analysis with Tek UWB.

Starting the Software

Depending on the type of oscilloscope that you have, you can start the software in one of the following ways:

- Select App > Ultra Wideband Spectral Analysis
- Select Analyze > Ultra Wideband Spectral Analysis

The following screen indicates that the software is loading.



NOTE. *Without a product license installed, Tek UWB allows five free trial sessions, after which the application will operate in a restricted mode until a valid license is provided.*

The oscilloscope displays the Tek UWB Ultra Wideband Spectral Analysis software with the analysis type set to Spectral Only.

Returning to the TekScope Application

To return to the oscilloscope application from the Ultra Wideband application, click the TekScope icon (near the lower right corner).

Returning to the Software

To return to the Ultra Wideband application, select Restore Application in the Analyze or Application menu.

Exiting the Software

To exit the software, click  on the top-right of the software window.

Application Data Files

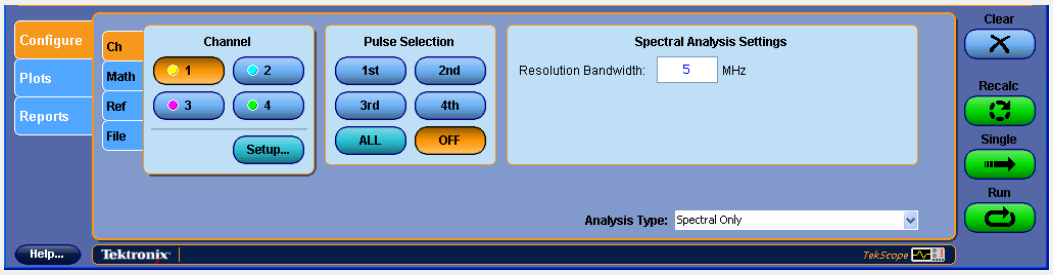
The software uses the following data files:

File name extension	Directory	Description
.wfm	C:\Program Files\TekApplications\TekUWB\Waveforms\	To store the sample waveforms.

Selecting the Analysis Type

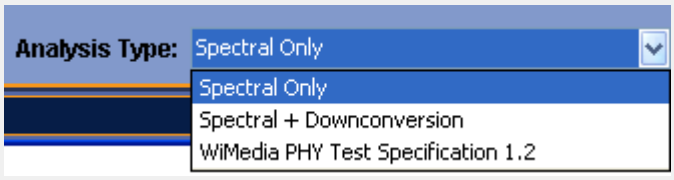
To set the analysis type for debugging radios, click the Config tab.

Config tab



Then select one of the available options in the Analysis Type: pane.

Analysis Type



`Spectral Only` (default): acquires and displays the Voltage versus Time. It calculates and displays the power spectral density (PSD). In addition, it displays the PSD data as a spectrogram, showing the harmonic content of the signal as a function of time. The resolution bandwidth used in these calculations is user-definable.

`Spectral + Downconversion`: performs the same basic analysis as the Spectral Only option. In addition, it performs a digital down-conversion step which allows you to create baseband data for further analysis in other tools such as Tektronix RSA Vu and MATLAB.

`WiMedia PHY Test Specification 1.2`: performs the same basic analysis as the Spectral Only option. In addition, it performs a full modulation analysis according to the WiMedia PHY test specification and displays three additional plots Constellation, EVM versus Symbol, and EVM versus Subcarrier.

WiMedia Analysis

Consider the following information when performing WiMedia analysis:

- You should select the appropriate band group for the signal being studied by selecting a Band Group button on the Config tab.
- This application can auto-detect the TFC of the signal. However, if problems are encountered during demodulation, you can override auto-detection by selecting the appropriate TFC in the TFC section of the user interface.
- This application can auto-detect the data rate. However, if problems are encountered during demodulation, you can override auto-detection by selecting the appropriate data rate in the Data Rate section of the user interface.
- This application can auto-detect the preamble type. However, if problems are encountered during demodulation, you can override auto-detection by selecting standard or burst.
- Payload Analysis can be set to 96 symbols as mentioned in the WiMedia test specification or All symbols.

The application displays and reports the following information:

- A Power Spectral Density analysis separated by band with ACPR, mask test, and power measurements.
- A Constellation plot and EVM analysis.
- A plot of EVM by symbol.
- A plot of EVM by subcarrier.
- An Information box (containing date, instrument setting, and similar data) includes additional information on modulation.
- A Results History.
- A report of the Modulation Analysis including the plots.

Packet Detection and Selection

This application features a packet detector, which scans the waveform and tries to identify the presence of a finite-duration signal. When multiple packets have been identified, you can select which packet to analyze using the Packet Selection buttons on the display:

- 1st, analyze first packet only
- 2nd, analyze second packet only
- 3rd, analyze third packet only
- 4th, analyze forth packet only
- All, analyze all packets in succession (100 maximum)
- Off, analyze the entire waveform ignoring packets

WiMedia Terminology

Band numbering. There are 14 bands (each 528 MHz wide) spanning the 3100 MHz to 10600 MHz UWB spectrum.

Band groups. There are six band groups within the UWB spectrum. Band groups 1 to 5, each consisting of three 528 MHz bands (except band group 5 which has only two bands) lie in sequence across the UWB spectrum. Band group 6 also consists of three 528 MHz bands, but it straddles the frequency space of band groups 3 and 4.

Time Frequency Codes (TFC). There are 10 hopping patterns (TFCs) defined in the WiMedia standard. Four patterns spread the coded information across three bands (Time-Frequency Interleaving or TFI). Three patterns spread the coded information across two bands (TFI2). The remaining three patterns transmit the coded information on a single band (Fixed Frequency Interleaving or FFI).

Common Phase Error (CPE). In the EVM calculation, CPE of the transmitter is corrected on a symbol-by-symbol basis.

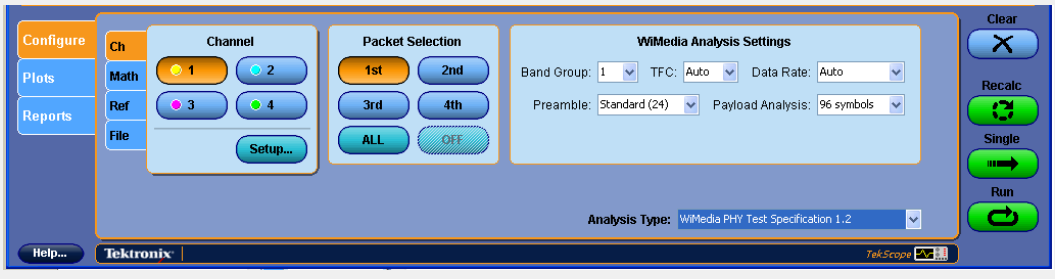
CPE filtering. CPE filtering analysis allows the EVM calculation to see the transmitter phase noise impairments.

Error Voltage Measurement (EVM) calculation. EVM is calculated over the payload of the packet only. The calculation includes initial channel estimation using the CE symbols, phase and timing estimation, and correction using the pilot tones as well as estimating the frequency offset. The phase error is estimated using pilot tones and the timing error, and common phase error is calculated. Timing error is corrected. The CPE is applied to the CPE filter. For each data and pilot subcarrier, the Euclidean distance to the closest constellation point is calculated. The RMS error is calculated using the WiMedia equation.

Selecting a Waveform for Analysis

To select the source of the measurement, click the Config tab.

Config tab



You can select the waveform source in the following ways:

Input source	Selections	Description	Default
Ch	1, 2, 3, and 4	Selects one of the four live channels as the source for acquisition.	1

Channel

In the Config tab, click the "Ch" tab to display the Channel pane.

Tek UWB acquires live signals from the channel selected.

Click Setup

Setup

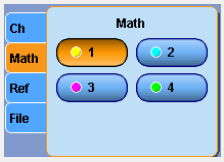
Channel Setup sets the selected channel in the oscilloscope to a default setup for Wideband RF.

The settings are reported on a pop-up window as follows and can be modified using the oscilloscope controls.

Input source	Selections	Description	Default
Math	1, 2, 3, and 4	Selects one of the four math waveforms as the source for acquisition.	1
Ref	1, 2, 3, and 4	Selects one of the four reference waveforms as the source for acquisition.	1
File	Select	Selects one or multiple files as the source of the acquisition.	N/A

Math

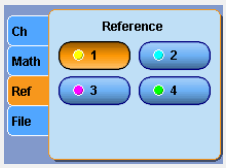
In the Config tab, click the “Math” tab to display the Math pane.



Tek UWB acquires the Math waveform from the oscilloscope.

Reference

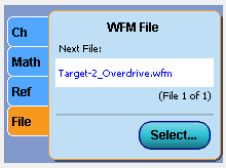
In the Config tab, click the "Ref" tab to display the Reference pane.



Tek UWB acquires the reference waveforms from the oscilloscope.

WFM File

In the Config tab, click the "File" tab to display the WFM File pane.



Select allows you to choose a `.wfm` file to be analyzed.

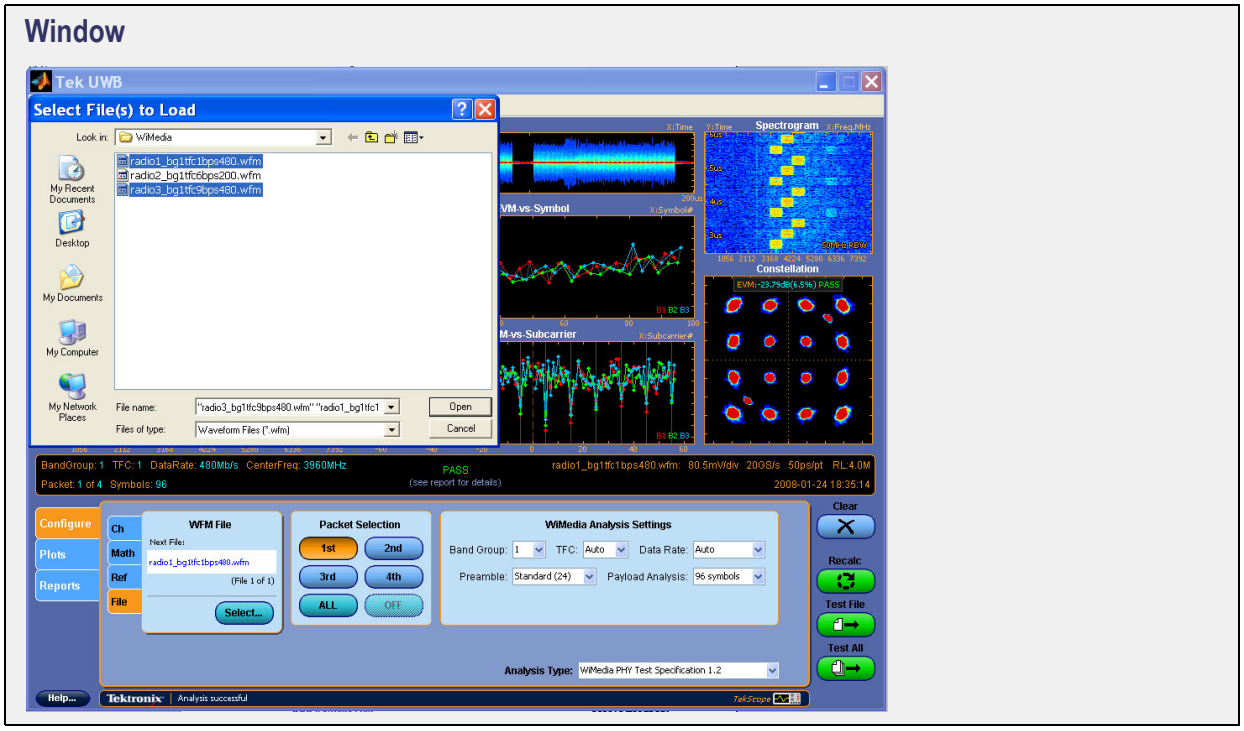
Click Select to open the "Select File(s) to Load" window.

Select one file or multiple files by using the Shift or Ctrl key with a mouse click.

Analyzing Waveform Files in Batch Mode

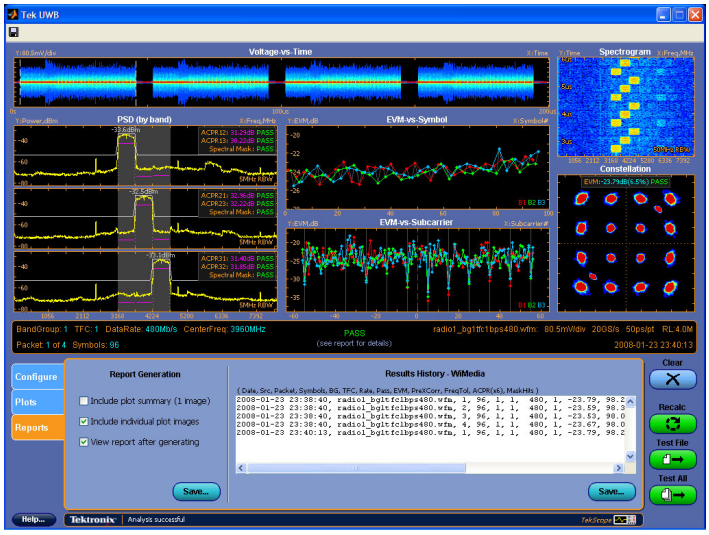
WiMedia radios operate at multiple data rates, time frequency codes, band groups, and power levels. You might need to capture 50 or more waveforms to thoroughly test your device. It may be more convenient to capture and save the waveforms in rapid succession and then analyze all the waveforms as a batch process.

1. In the Config tab, click File.
2. Click Select to open the "Select File(s) to Load" window.



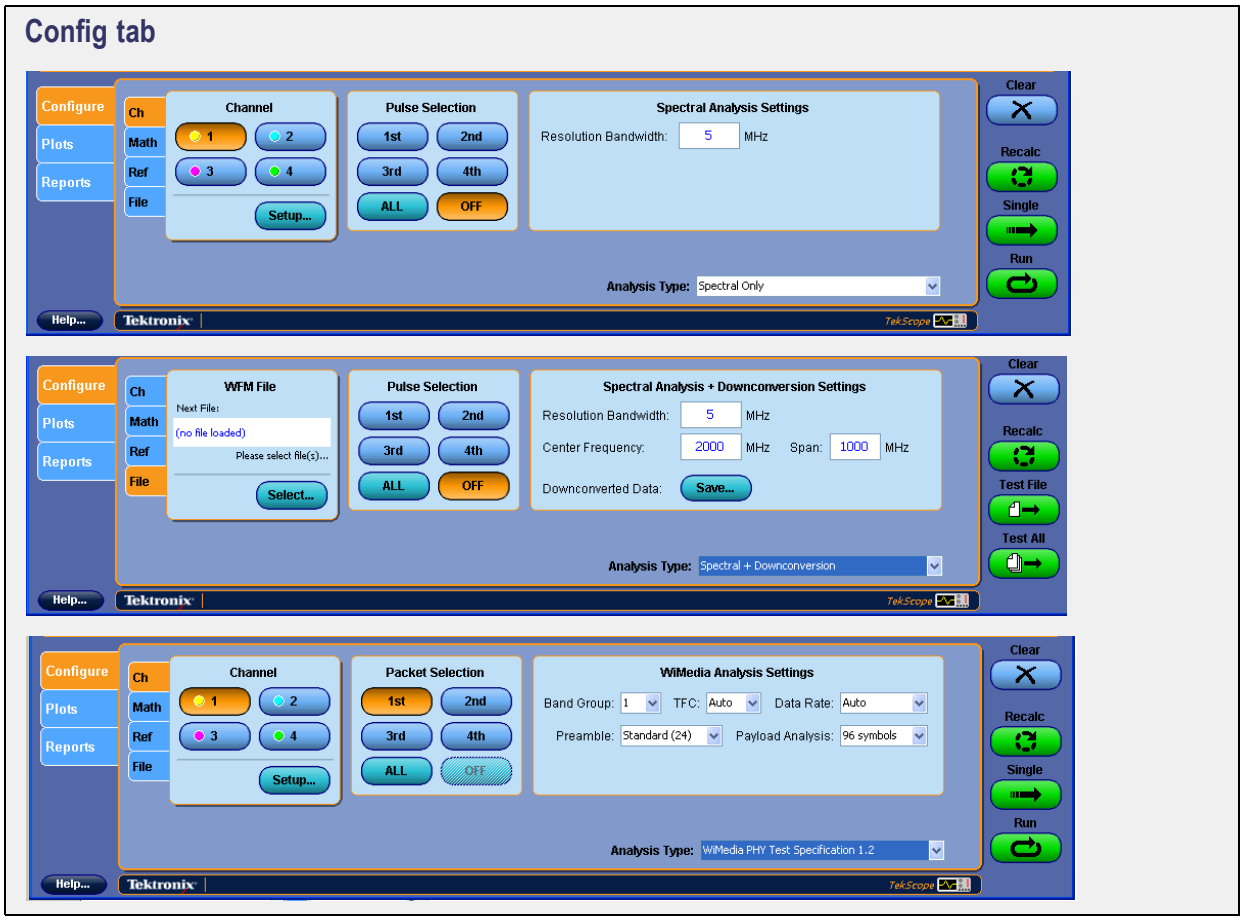
3. Select a file or multiple files by using the Shift or Ctrl key with a mouse click.
4. Click Test All to sequence through and process all the selected waveforms without stopping. Tek UWB will analyze all waveforms, and will return Analysis successful as the status. Click Test File to process the next file in the list and then halt. This allows files to be processed one at a time, but without the need to reopen the file selection dialog box every time.

5. To see the result summarized for the sequence of waveforms, click the Reports tab.

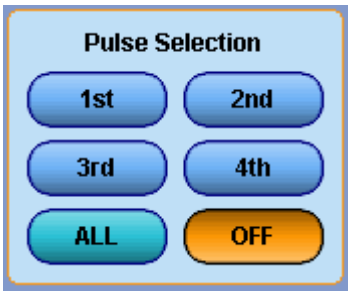


Selecting the Pulse/Packet

This application features a pulse/packet detector which scans the waveform and tries to identify the presence of a finite-duration signal within the captured data. When pulses are detected, you can select which ones to analyze in lieu of processing the entire waveform. These controls are found on the Config tab.



In the Pulse Selection pane, click one of the available selections.



- 1st: Analyze first pulse only
- 2nd: Analyze second pulse only
- 3rd: Analyze third pulse only
- 4th: Analyze fourth pulse only
- ALL: Analyze all pulses in succession (100 max)
- OFF: Analyze entire waveform (no pulse detection)

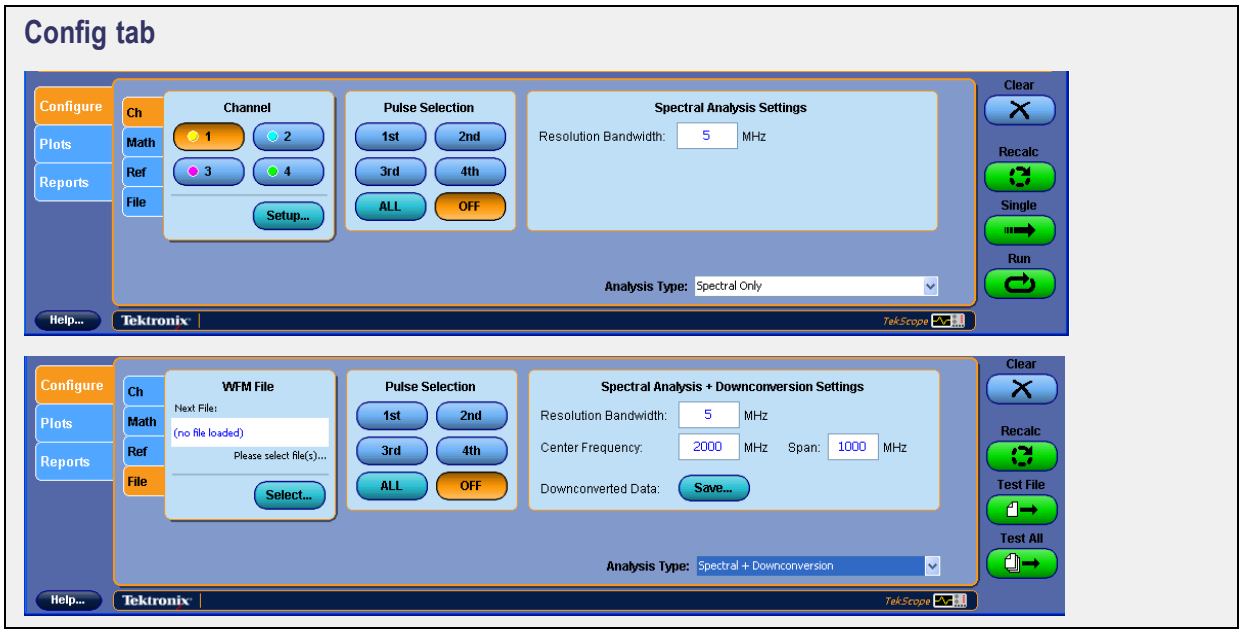
The default selection is "OFF" for Spectral Analysis and "1st" for WiMedia Analysis.

NOTE. *When performing WiMedia analysis, the pulses are referred to as "packets".*

NOTE. *For finer control over the portion of data used during analysis, you can also utilize the instrument cursors in Tektronix oscilloscope. In the Tektronix oscilloscope display, place the cursors around the part of the waveform desired and then recapture the data with Tek UWB.*

Setting the Resolution Bandwidth

When performing Spectral Analysis, the resolution bandwidth used for the power spectral density and spectrogram plots is user-definable. This control is found on the Config tab.



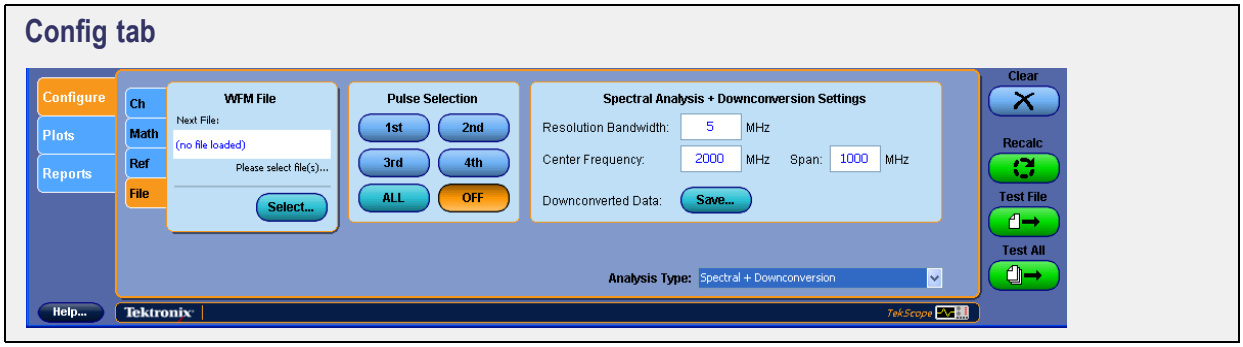
Enter a desired resolution bandwidth in the following field:

The default selection is 5 MHz.

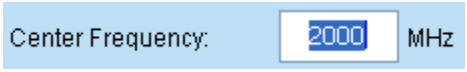
NOTE. *This control is not available when performing WiMedia analysis. During WiMedia analysis, the resolution bandwidth is always fixed at 5 MHz for PSD plots, and 50 MHz for Spectrogram plots.*

Setting the Center Frequency

When using the Downconversion option, you will want to specify a center frequency for the analysis. This control is found on the Config tab.



Enter a desired center frequency in the following field:

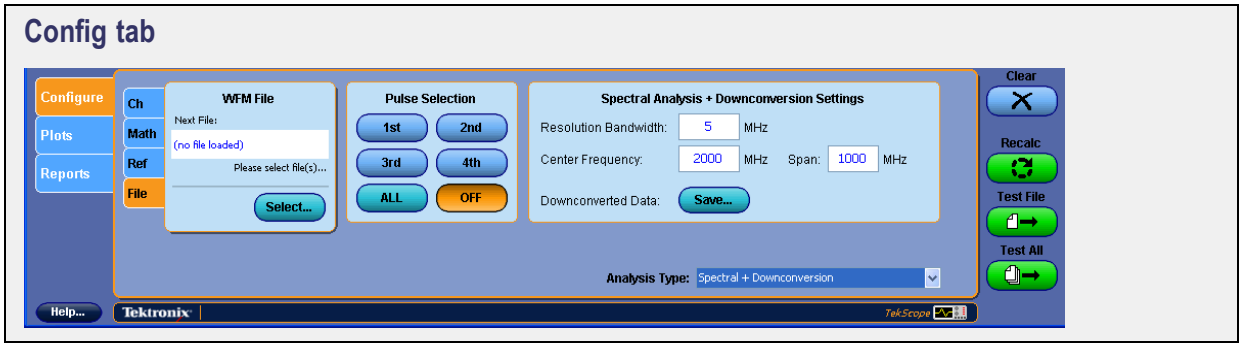


The default selection is 2000 MHz.

NOTE. *This control is available only when the analysis type is Spectral + Downconversion.*

Setting the Span

When using the Downconversion option, you will want to specify a frequency span for the analysis. This control is found on the Config tab.



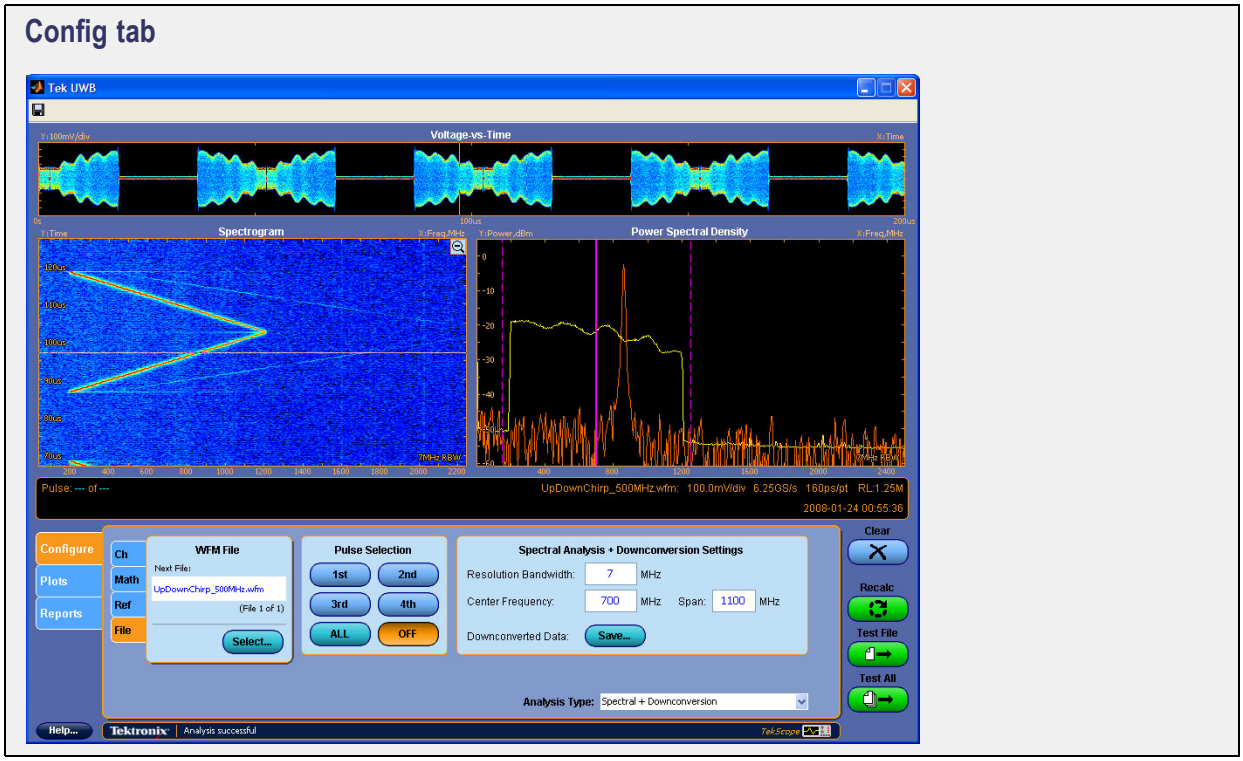
Enter a desired frequency span in the following field:

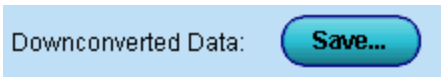
The default selection is 1000 MHz.

NOTE. *This control is available only when the analysis type is Spectral + Downconversion.*

Saving the Downconverted Data

After setting an appropriate center frequency and span, downconversion of the acquired data may be performed. These controls are found on the Config tab.



Click 

in the Spectral Analysis + Downconversion Settings pane. You can save the data in either `.iqt` or `.mat` format.

The `.iqt` file is a binary format compatible with the Tektronix RSA Vu software.

The `.mat` file is a binary format used by MATLAB..

The data in the files is the downconverted IQ data generated according to the values specified for the center frequency and span.

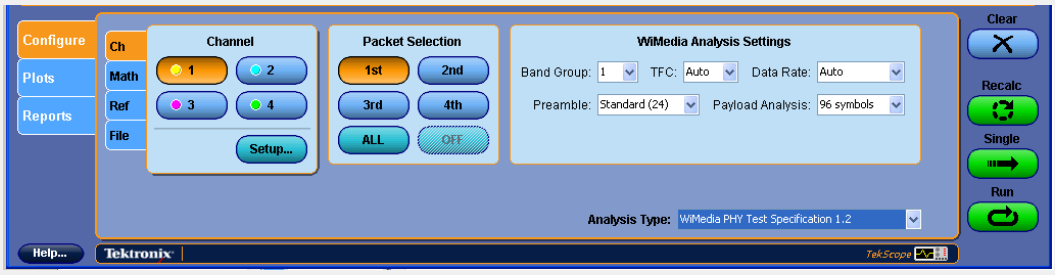
NOTE. *This control is only available when the analysis type is Spectral + Downconversion.*

Setting the Band Group

Six WiMedia band groups fill the Ultra Wideband spectrum from 3.1 GHz to 10.6 GHz.

To set the band group to perform the analysis, click the Config tab.

Config tab



NOTE. *The Band Group control is available only when performing WiMedia analysis.*

In the WiMedia Analysis Settings pane, select one of the available selections from the Band Group list.

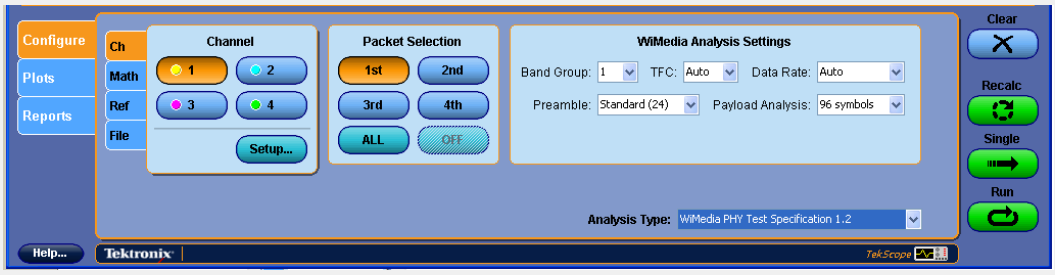
The default selection is 1.

Setting the Time Frequency Codes

To set the Time Frequency Codes to perform the analysis, click the Config tab.

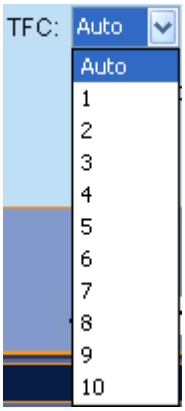
NOTE. *Manual selection of TFC is necessary only if problems are encountered in demodulation.*

Config tab



NOTE. *The TFC control is available only when performing WiMedia analysis.*

In the WiMedia Analysis Settings pane, select one of the available selections from the TFC list.



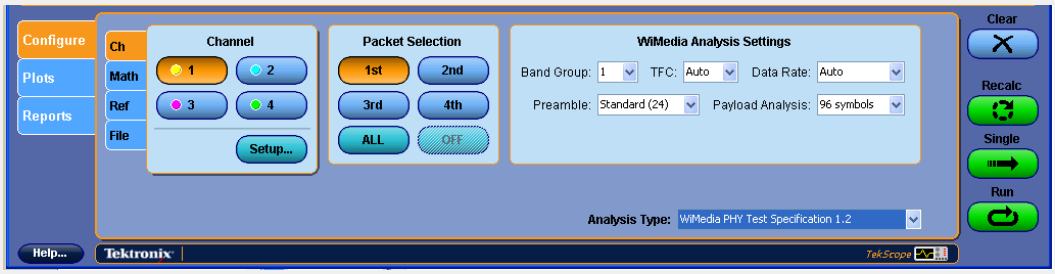
The default selection is Auto.

Setting the Data Rate

To set the Data Rate to perform the analysis, click the Config tab.

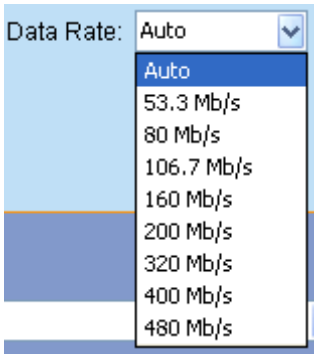
NOTE. *Manual selection of Data Rate is necessary only if problems are encountered in demodulation.*

Config tab



NOTE. *The Data Rate control is available only when performing the WiMedia analysis.*

In the WiMedia Analysis Settings pane, select one of the available selections from the Data Rate list.

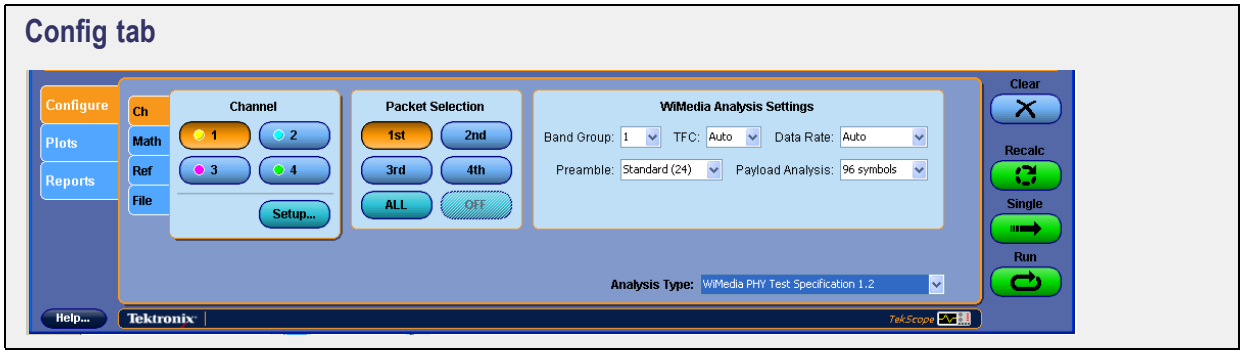


The default selection is Auto.

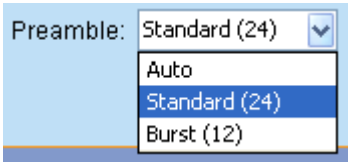
Setting the Preamble Type

WiMedia radios are required to support both standard and burst preamble length. A standard preamble has 24 symbols and a burst preamble has 12 symbols. Normally the preamble type is read automatically from the transmitted signal.

To set the preamble type to perform the analysis, click the Config tab.



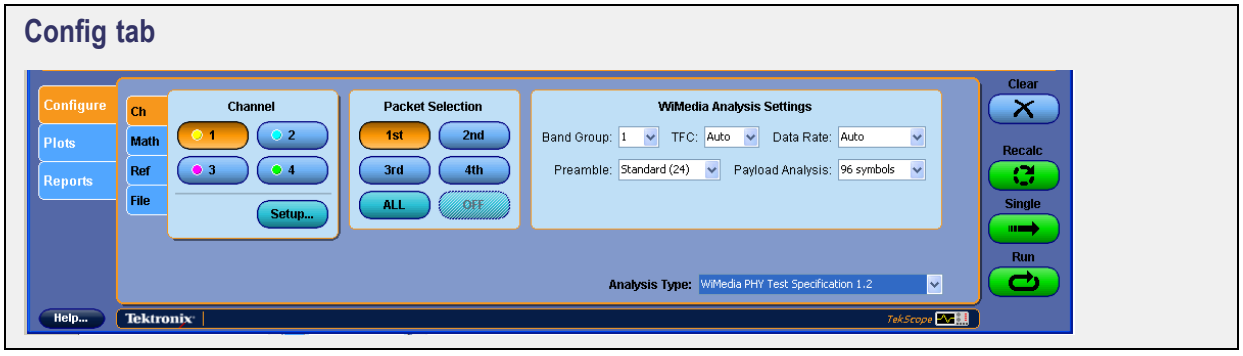
In the WiMedia Analysis Settings pane, select one of the available selections from the Preamble list.



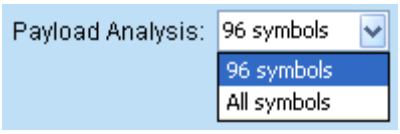
The default is Standard (24).

Setting the Payload Length

To set the payload length to perform the analysis, click the Config tab.



In the WiMedia Analysis Settings pane, select one of the available selections from the Payload Analysis list.



The default is 96 symbols which limits the analysis to the first 96 symbols.

Analyzing the Waveform

Click Single or Run in the software to perform an analysis. The analysis depends on the state of the source. Select a control in the configuration as follows:

Option	Live channel	Reference channel	File
For live channel and reference channel options  For File Option 	The software acquires and analyzes the selected channel.	The software acquires and analyzes the selected reference channel.	The software acquires and analyzes the selected channel, reference, or file. If one file is selected, the behavior is the same as the reference waveform input. If multiple files (for example three waveforms) are selected, and you click Test File, the first waveform is loaded and analyzed (shows File 1 of 3 in the WFM File pane) and then the second waveform is loaded. When you click the Test File again, the second waveform is loaded and analyzed (shows File 2 of 3 in the WFM File pane) and then the third waveform is loaded. When you click the Test File again, the third waveform is loaded and analyzed (shows File 3 of 3 in the WFM File pane) and then the first waveform is loaded.
For live channel and reference channel options  For File Option  more information	The software sequentially acquires and analyzes the selected channel and logs results in the results window.	The software sequentially acquires and analyzes the selected reference and logs results in the results window.	The software acquires and analyzes all the selected files from the source directory. The software logs the results in the results window and stops.

To run a full analysis on an already acquired waveform, click  . This is useful when you want to change the analysis settings.

To stop all the software activity immediately and regain control, click  .

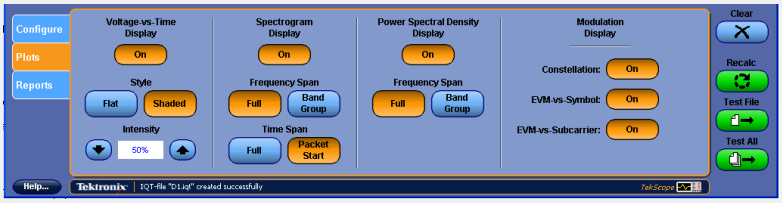
To clear all data from the Results window, click the button 

.

Voltage Versus Time

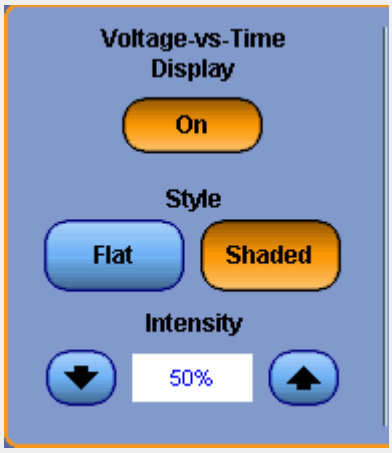
To control the visibility of the Voltage versus Time plot, click the Plots tab.

Plots tab



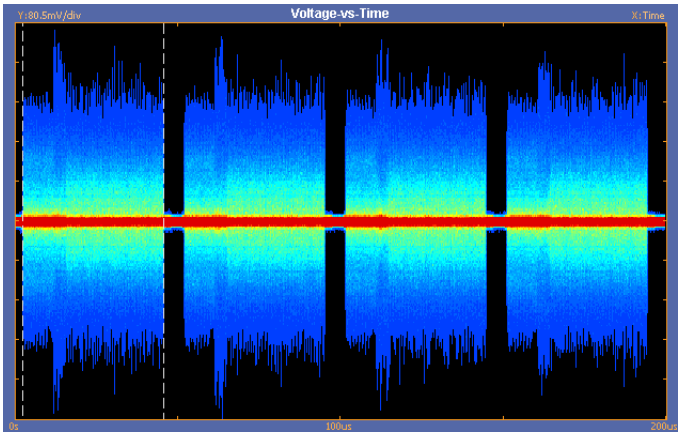
In the Voltage-vs-Time Display pane, click the On/Off button. From the pane, you can also select the display style for the data, as well as the intensity for the shaded style.

Voltage-vs-Time Display pane



NOTE. *The shaded style is effective only when capturing integer data types, such as those obtained from live CH inputs (or unprocessed REF and WFM files). Waveforms which have been processed using oscilloscope MATH are often converted to float and therefore do not allow shaded styling.*

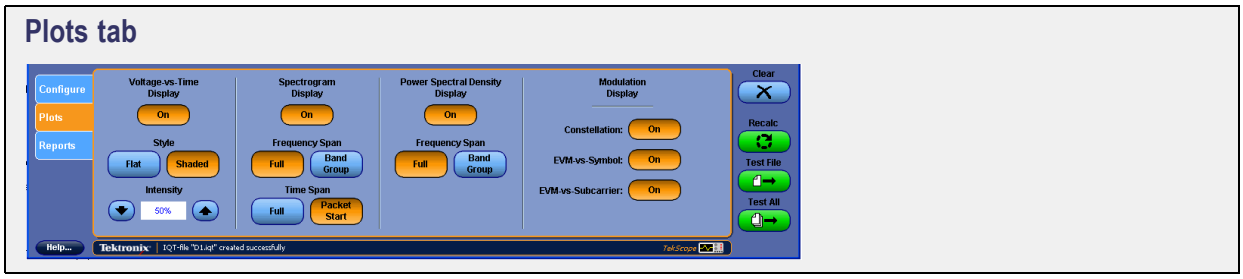
The following diagram shows a Voltage-vs-Time plot:



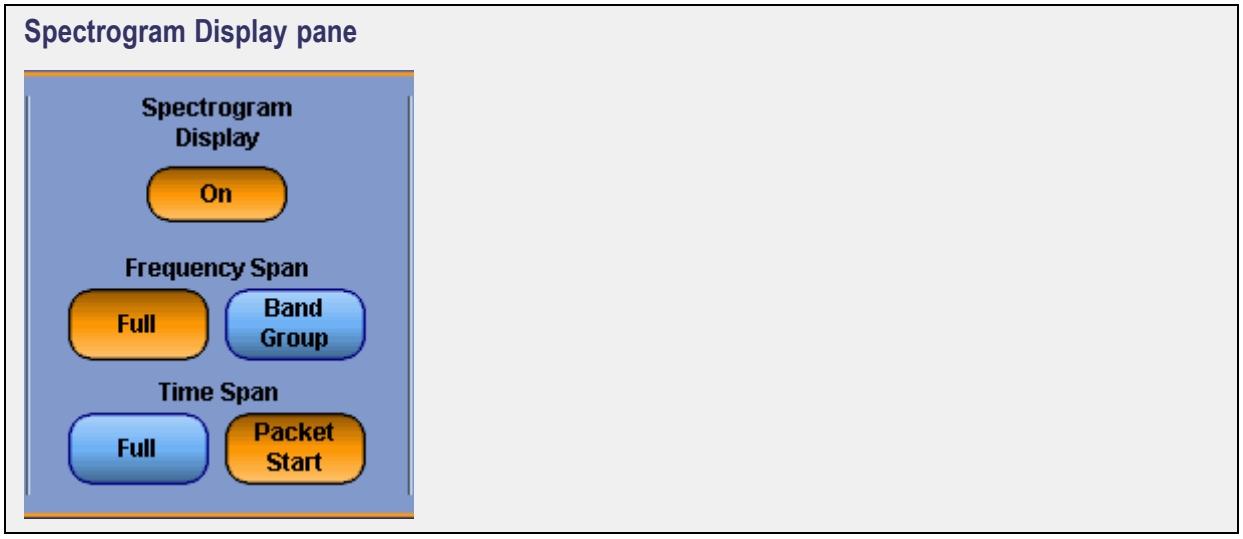
If the styling is set to shaded, the voltage versus time data is displayed as a temperature graded display similar to WfmDB mode in the oscilloscope. Cursors are used within the plot to highlight the packet that is being analyzed.

Spectrogram

To control the visibility of the Spectrogram plot, click the Plots tab.

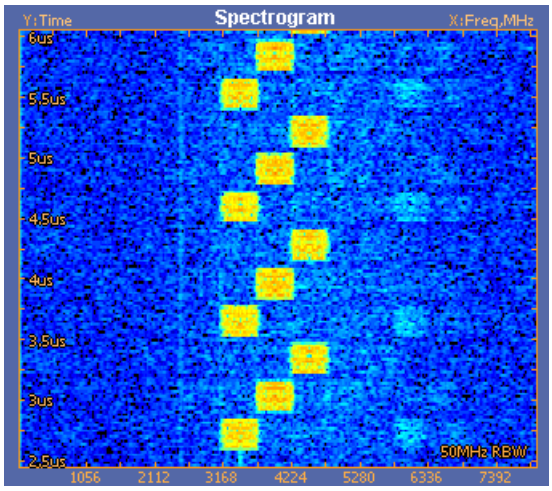


In the Spectrogram Display pane, click the On/Off button. From the pane, you can also select the default frequency and time spans of the plot.



NOTE. *The Frequency Span and Time Span options are available only when performing the WiMedia analysis.*

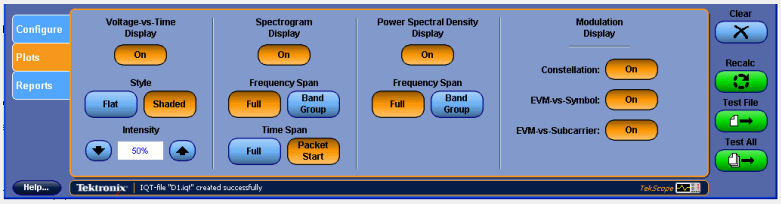
The following diagram shows a Spectrogram plot:



Power Spectral Density

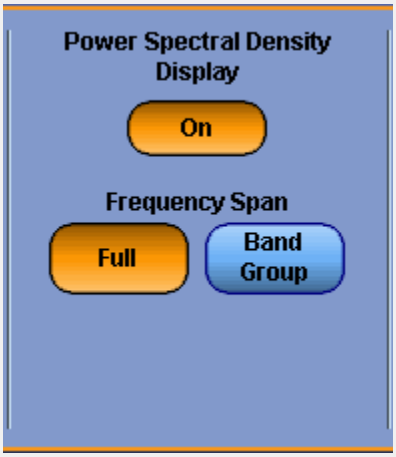
To control the visibility of the Power Spectral Density plot, click the Plots tab.

Plots tab



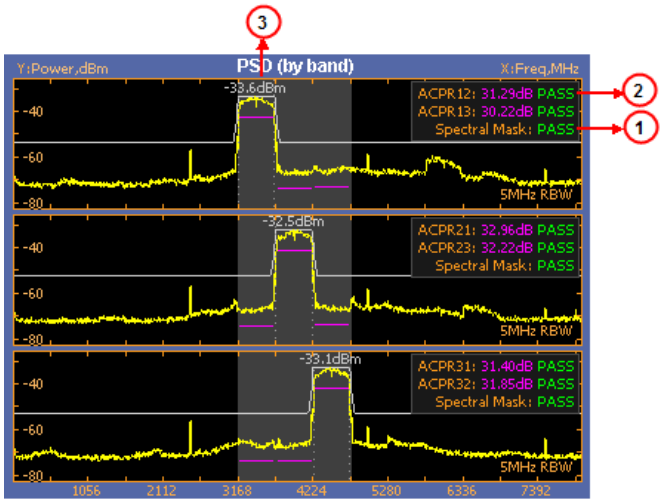
In the Power Spectral Density Display pane, click the On/Off button. From the pane, you can also select the default frequency span of the plot.

Power Spectral Density Display pane



NOTE. *The Frequency Span option is available only when performing the WiMedia analysis.*

The following diagram shows a Power Spectral Density plot:



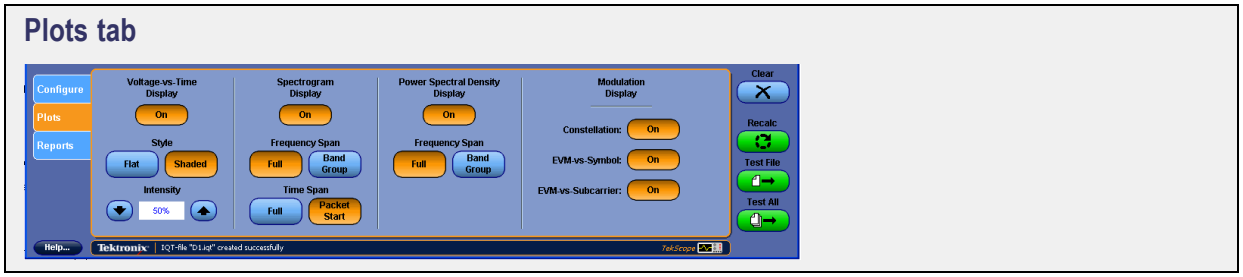
The legend displays the following when doing WiMedia analysis:

1. Spectral Mask with Pass/Fail status
2. Two ACPR Measurements with Pass/Fail status in each band
3. Power Spectral Density Measurements in each band

Constellation

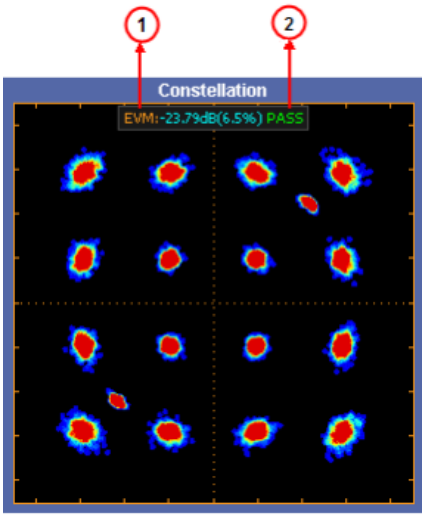
NOTE. *The Constellation Display is available when performing the WiMedia analysis.*

To control the visibility of the Constellation plot, click the Plots tab.



In the Modulation Display pane, click the On/Off button for Constellation.

The following diagram shows a Constellation plot:



The legend displays the following information:

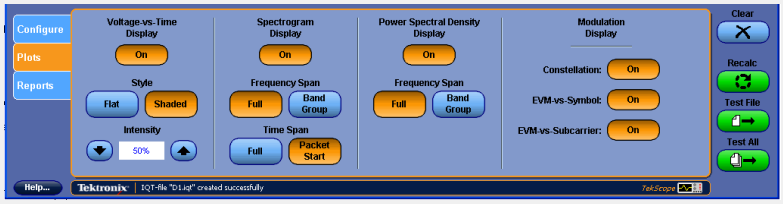
1. EVM of the packet being analyzed in dB and %
2. Pass/Fail limits on EVM according to the WiMedia PHY test spec

EVM Versus Symbol

NOTE. *This option is available when performing the WiMedia analysis.*

To control the visibility of the plot, click the Plots tab.

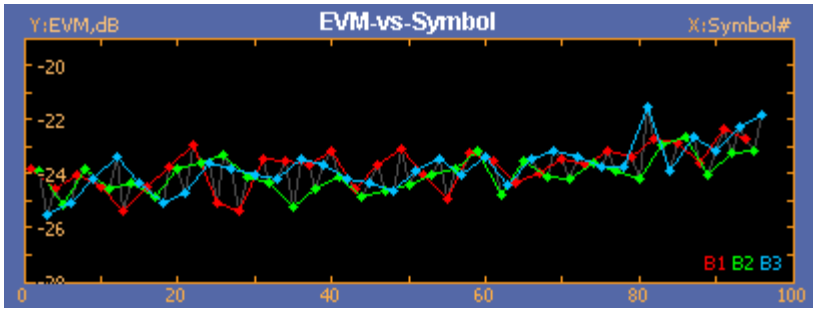
Plots tab



In the Modulation Display pane, click the On/Off button for EVM-vs-Symbol.

Modulation Display pane

The software will adjust the visibility of the EVM-vs-Symbol plot accordingly. The traces are color coded by band so that EVM differences between bands are observed more easily.

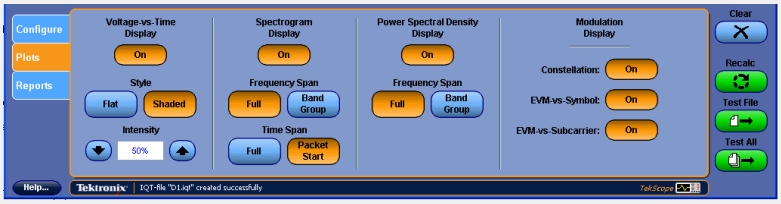


EVM Versus Subcarrier

NOTE. *This option is available when performing the WiMedia analysis.*

To control the visibility of the plot, click the Plots tab.

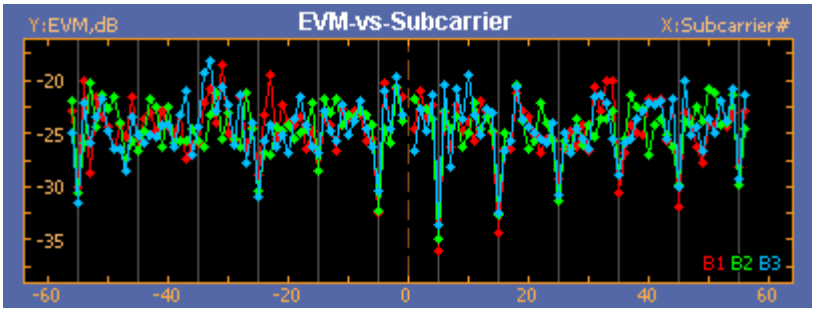
Plots tab



In the Modulation Display pane, click the On/Off button for EVM-vs-Subcarrier.

Modulation Display pane

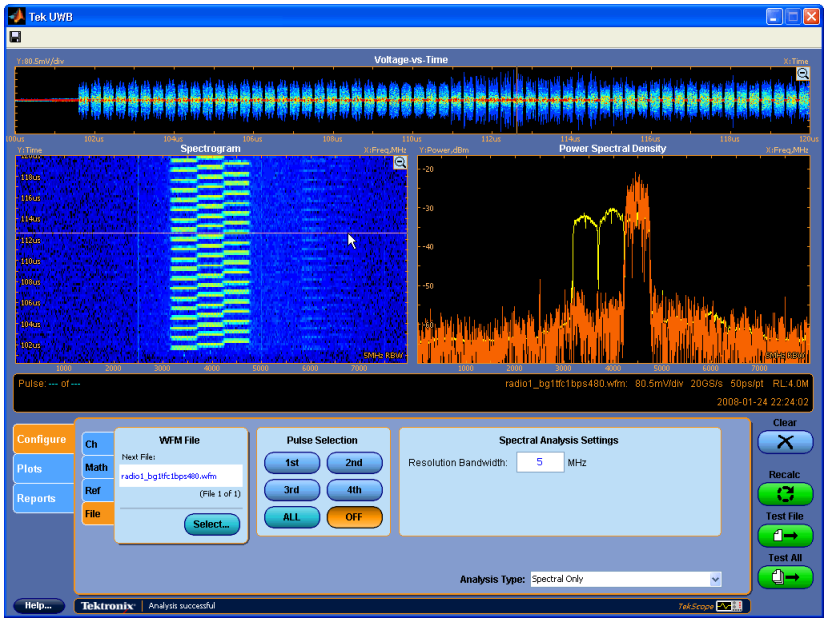
The software will adjust the visibility of the EVM-vs-Subcarrier plot accordingly. The traces are color coded by band so that EVM differences between bands are more easily observed.



Using Plot Cursors

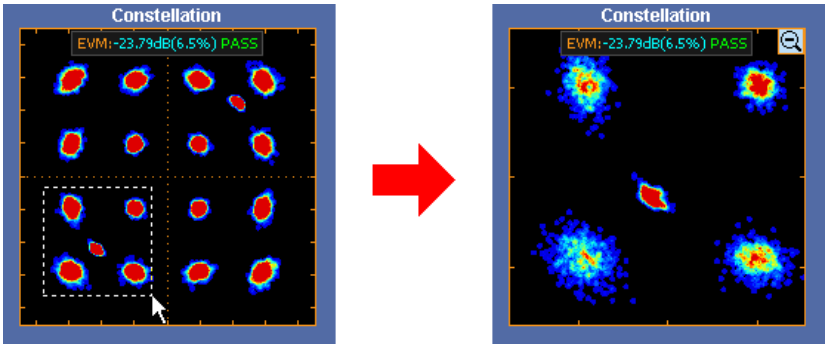
Whenever the mouse cursor is placed over either the Voltage vs. Time display or the Spectrogram display, the cursor's position in time is indicated with a time marker (bright line) in both displays simultaneously. The time marker dynamically tracks the mouse position, showing that the two plots correspond. For the Spectral Only and Spectral + Downconversion analysis modes, the Power Spectral Density (PSD) corresponding to the current marker position is also dynamically updated in the PSD display, in orange.

The time marker automatically disappears when the cursor is no longer over the Voltage vs. Time or Spectrogram display.



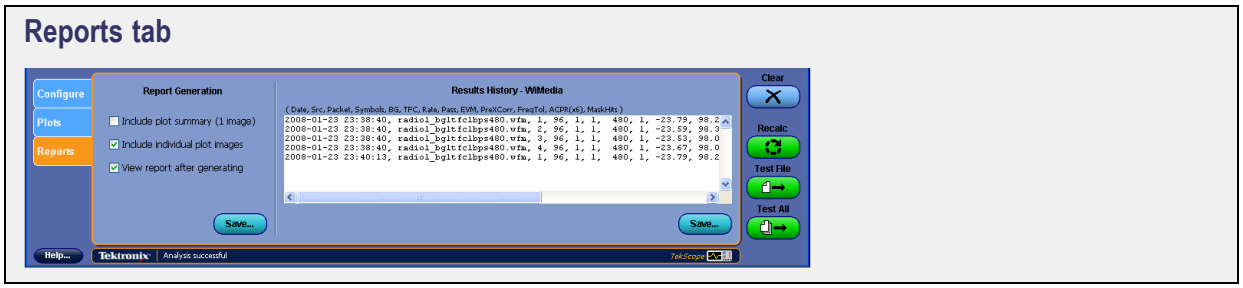
Using Plot Zoom

Within each plot window, you can define a zoom box using the mouse or oscilloscope touch screen. To zoom in, click and drag to select a zoom area. The plot displays the signal in greater detail and a magnifying glass icon appears in the top right corner to signify that the plot has been zoomed. Single-click without dragging or single-click on the magnifying glass to return to the previous view. Double-click to return to full view. The zoom box is shown in white on the left side of the following image:



Listing Window Data

To view the results, click the Reports tab.

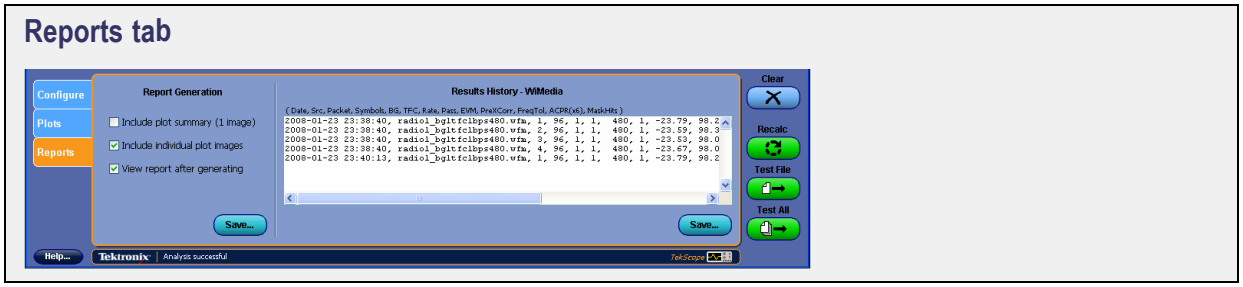


In the Results History - WiMedia pane, the results are displayed.

The software provides a listing of the time and date of the test, the source (channel, reference, math, or file) analyzed, the band group of the RF signal analyzed, the Time Frequency Code of the signal, cross correlation, frequency offset, and measurement results including the Pass/Fail Status.

Saving the Results in .csv Format

To save or export results, click the Reports tab.



In the Results History - WiMedia pane, click 

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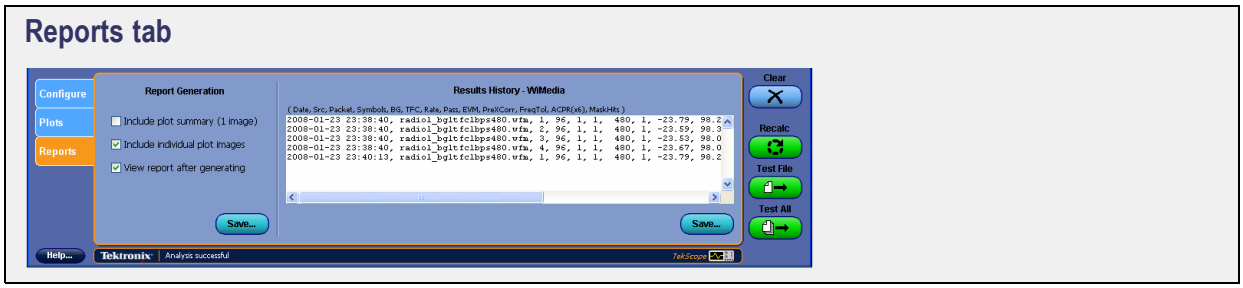
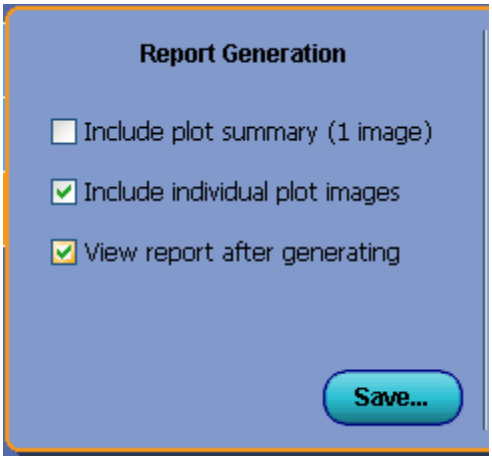
The results are in `.csv` format so that they can easily be imported into the Microsoft Access database used by the WiMedia PHY group at the compliance workshop.

Generating and Saving Reports

To generate a report after running the analysis, click the Reports tab.



In the Report Generation pane, select the appropriate options to control the format of the report.



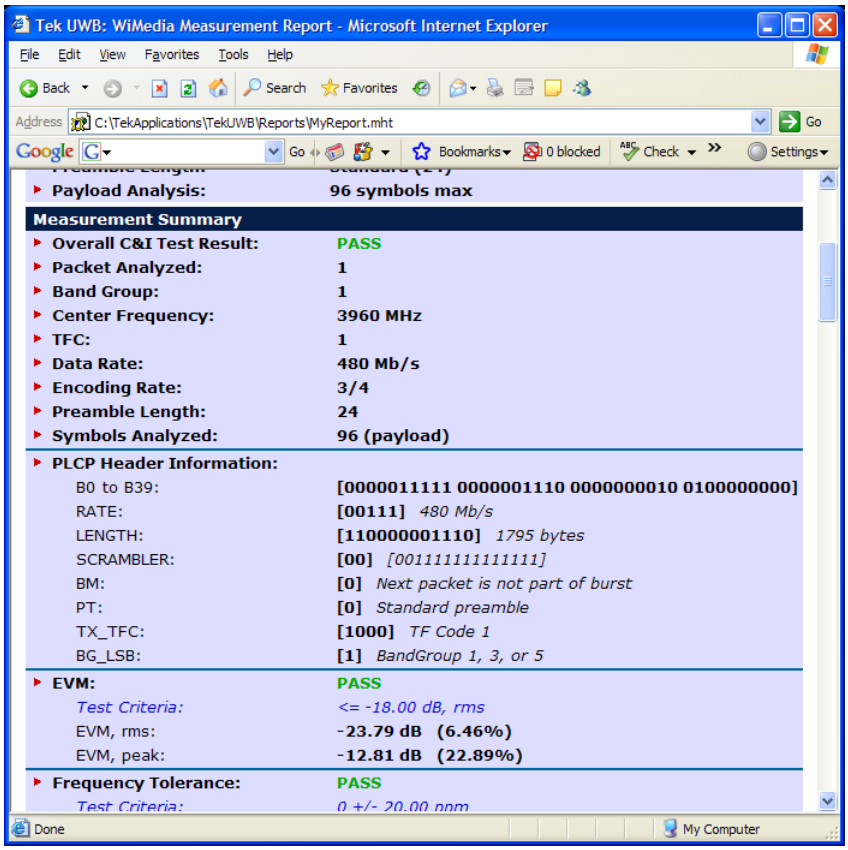
The software provides the option to include or exclude the plot summary and the individual plot images. It also provides the option to view the report in a browser window as soon as it is generated.

To create and save the report, click the button 

.

You can save the generated reports of the measurements in either `.htm` or `.mht` format. The .mht format, also known as html archive format, saves all the text and image data in a single file. This is recommended for convenience and data integrity.

The software provides the details of the configuration, measurement summary, modulation results from each analysis, plot summary, and the supported individual plot images for the selected analysis type in the report file.



Clearing All the Results

To clear all data from the results window, click the button 

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Capturing Live WiMedia RF

NOTE. *The oscilloscope must be set to 20 GS/s or greater for live capture of WiMedia RF.*

Generating the RF Signal

Equipment required. DPO/DSA70804 or greater, keyboard and mouse, AWG7102 with option 6 (20 GS /s) or WiMediaUWB radio, SMA cable, and Tekconnect SMA.

Load UWB waveform. UWB waveforms captured on the TDS6154C for playback on AWG7102 with option 6 are available at www.tektronix.com.

1. Search using the keyword WiMedia.
2. Select AWG7102 WiMedia Radio Waveforms.
3. Load the file onto the AWG7102.
4. Open UWB WiMedia.awg on the AWG7102.
5. Press Run on the AWG7102.
6. Press the Ch1 On button and interleave “On”. Be sure the timing tab shows 20 GS/s on the AWG7102.
7. Connect Ch1 on the AWG7102 to Ch1 on the DPO70000 using an SMA cable or connect the antenna of the Tek UWB radio to Ch1 of the DPO70000 with an SMA cable.

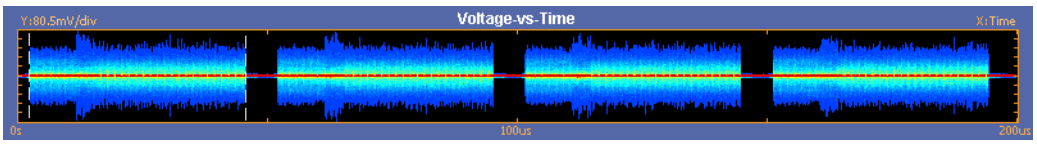
Capturing a Live RF Signal

Launch Tek UWB.

1. Select Ultra-Wideband Spectral Analysis in the DPO/DSA70000 Analyze menu.
2. Press the TekScope icon on the Ultra Wideband display to return to the oscilloscope display.

Set up the DPO70804 to Capture the UWB Waveform.

1. Set the vertical sensitivity to capture the RF waveform at about 90% of full scale. Usually this requires setting variable gain in the DPO70000 vertical setup. In the following figure, it is set to 50 mV/div.
2. In the display menu, set the temperature color grading of the record view palette to see the information in this complex RF waveform.



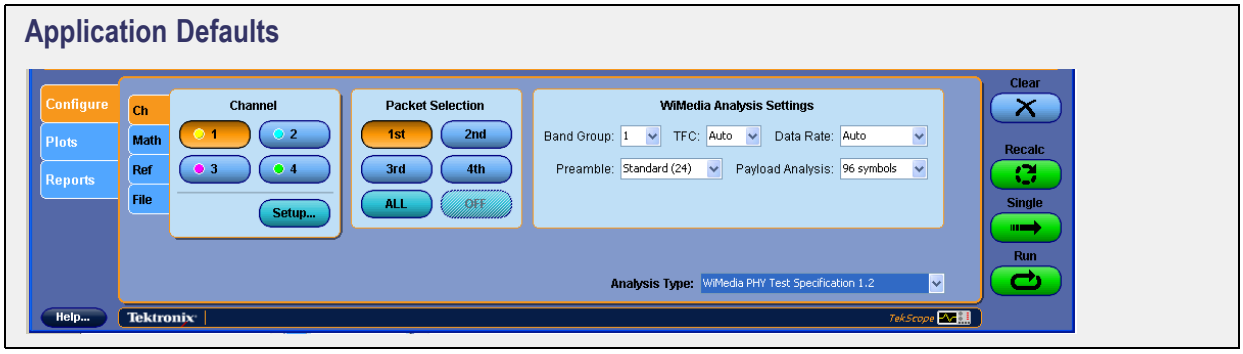
The packets are captured here at 25 GS/s, 10 µs/div, and 2.5 Mpts. The packet length in this example is about 40 µs.

Set Trigger Holdoff for a Stable Display with Continuous Transmission. If the radio or AWG7102 is in a mode to transmit continuously with default trigger holdoff by time, the display will be unstable. In this example, since the packet length is about 45 µs, setting trigger holdoff by time to about 50 µs, a little longer than the packet length, gives a stable display on the continuous RF waveform. If the packet length is varying from packet to packet, use single sequence or set up Pinpoint trigger to capture a specific packet length.

Or use Single sequence trigger. Real Time measurements are made from a single acquisition. A single shot, Single sequence, acquisition does not require trigger holdoff by time to be increased.

Adjust the Trigger Position. Adjust the trigger position so that the acquired record starts with a full packet. If the record starts in the middle of a packet, the software will have to search through the data in the packet with a correlation function to find the beginning of the header. By triggering on the beginning of a packet, analysis time is decreased.

Use Restore Application to go to Tek UWB. The application defaults to Ch1, Band Group 1, and analyzes the first captured packet. If you want to analyze another or all captured packets, change the selection.



To capture a waveform, click Single. Click Run and the last waveform acquired will be processed continuously.

The results of the analysis are in the results menu and may be saved and exported.

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