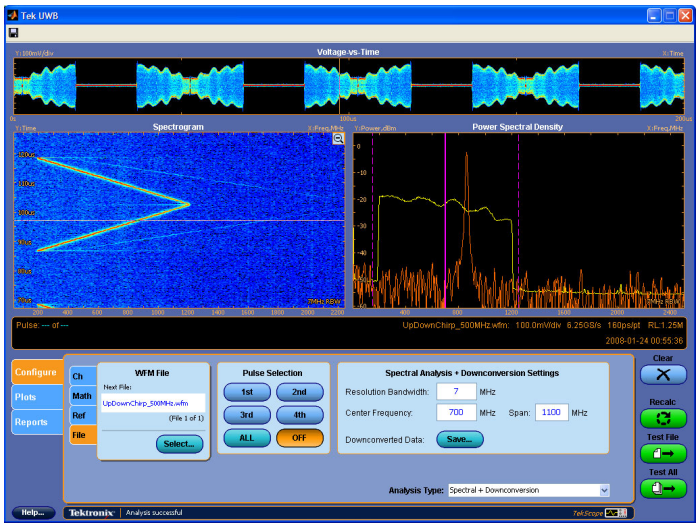
Ultra-Wideband Spectral Analysis Essentials

TDS/DPO/DSA Series Data Sheet



Spectral + Down Conversion Analysis Mode: Ultra-Wideband Radar LFM "Chirp"

Features & Benefits

- Eliminate Frustrating Searches. Isolate Specific Signals in the Presence of Other Traffic Using Pinpoint Triggers, Time Gating Cursors, and Pulse Finder within up to 200 Mpt Record Lengths
- Capture and Visualize RF Waveforms, Digital Down Convert and Export Baseband Data for Further Analysis in Other Tools such as RSAVu and MATLAB*1
- Visualize and Debug Waveforms Quickly with a Wide Array of Plots: Spectrograms, Power Spectral Density, Voltage-vs-Time
- Analyze How Complex Wideband Signals Change Frequency and Amplitude with Time using Real-time Spectrograms Spanning 20 GHz
- Measure How Signal Power is Distributed with Frequency using Power Spectral Density Plots to 20 GHz
- Correlate Frequency and Time Domains with Cursors Linking Amplitude vs Time, Frequency vs Time and Power vs Frequency Displays
- Analyze Analog Modulation Types and Radar Pulses Using Standard RSAVu
- Analyze Digital Modulation Types with RSAVu Opt. 21 Advanced Measurement Suite
- Document Configuration Information and Plot Images Using Integrated Report Generator

Applications

- Ultra-Wideband Communications
- Ultra-Wideband Radar and Satellite Communications
- Advanced Analog and Digital Modulation
- Modulated High Speed Serial Electrical and Optical

Easy to Use Ultra-Wideband Spectral Analysis Essentials for Performance Real-Time Oscilloscopes

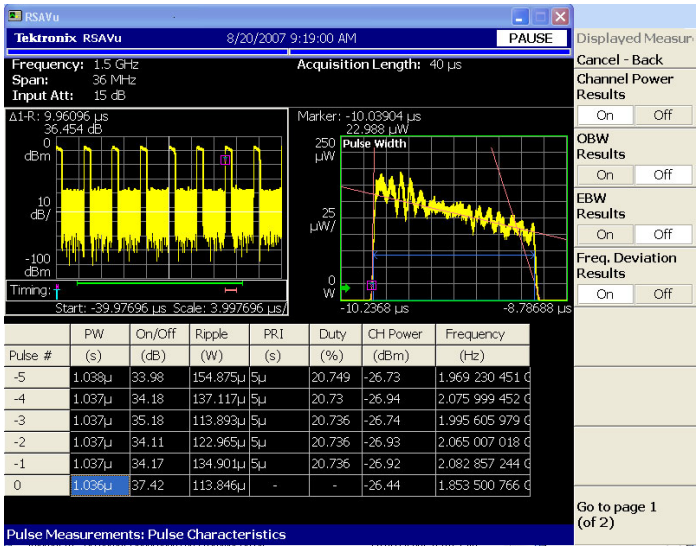
Analysis and verification of Ultra-Wideband microwave, optical and electrical signals require more real-time bandwidth and capture time than is possible with spectrum analyzer-based solutions. Supporting acquisitions up to 200 Mpts at 50 GS/s on four simultaneous channels, the DSA/DPO70000 Series oscilloscopes provide an ideal platform for working with these signals. The DPO7000 supports acquisitions up to 100 Mpts at 40 GS/s on four simultaneous channels.

DPX® and pinpoint triggers help you quickly discover and capture the time and amplitude variations of live data. Time gating cursors on the scope and an integrated pulse finder in the application help isolate specific signals in the presence of other traffic. Real-time spectrograms spanning the full single-shot bandwidth of the instrument quickly visualize the frequency content of any signal as a function of time. A user-definable resolution bandwidth allows the spectral displays to be optimized for the signal being studied.

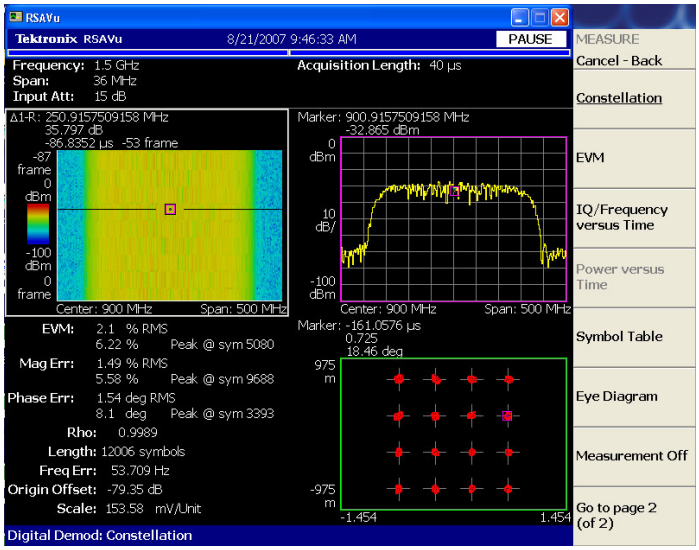
Digital Down Conversion of captured RF data is fast and easy using visual cues from the Power Spectral Density display. The downconverted frequency span of interest, to 20 GHz real time, may be exported for further analysis in tools such as RSAVu and MATLAB*1.

*1 Powered by MATLAB® software. MATLAB® is a registered trademark of The MathWorks, Inc.

Tektronix®



Tektronix RSAVu Pulse Parameter Measurements of Ultra-Wideband LFM Chirp Captured by DSA70000.



DSA70000 waveform, RSAVu Opt. 21 Advanced Measurement Suite Software

RSAVu Analysis of the Ultra-Wideband Waveform

Ultra-Wideband microwave including X band and Ku band is directly captured with the DPO/DSA72004 oscilloscope and may be analyzed using Tektronix RSAVu.

RSAVu offers the same demodulation and analysis capabilities included on the RSA3408 software option suite. Analysis includes pulse parameters, frequency, phase and amplitude vs. time in the free RSAVu base software. Analog Modulation Analysis includes IQ vs. Time, AM Depth, FM Deviation, PM and Pulse Spectrum. Time Analysis includes IQ vs Time, Power vs. Time, Frequency vs. Time, CCDF and Crest Factor. Pulse Analysis includes Pulse Width, Peak Power, Ripple, Pulse Repetition Interval, Duty Cycle, Pulse-to Pulse Phase, Frequency Deviation, Channel Power, OWB, and EWB.

RSAVu Digital Modulation Analysis of the Ultra-Wideband Waveform

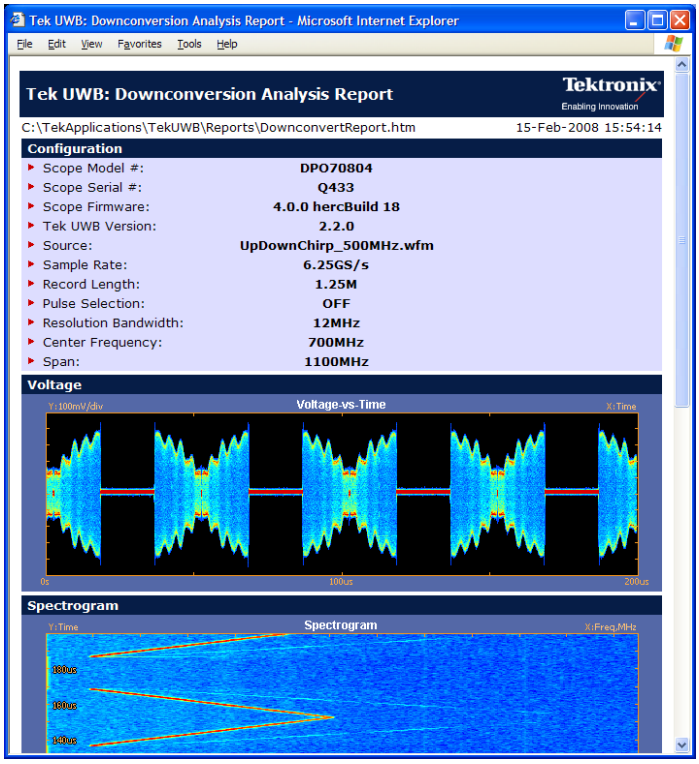
Digitally modulated Ultra-Wideband microwave, electrical and optical waveforms captured with the DPO/DSA70000 may be analyzed with RSAVu Opt. 21 Advanced Measurement Suite. The suite includes a very complete set of measurements and displays similar to the RSA3000 Series Real-Time Spectrum Analyzer.

DSA70000 waveform, RSAVu Opt. 21 Advanced Measurement Suite Software

Characteristic	Description
Modulation Formats	BPSK, QPSK, OQPSK, π/4 – DQPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, GMSK, GFSK, ASK, FSK, DSB-ASK, OOK, PR-ASK, SSB-ASK, Subcarrier OOK, Subcarrier BPSK, C4FM (Fixed symbol rate).
Parameter Presets	PDC, PHS, NADC, TETRA, GSM, CDPD, Bluetooth, IEEE 802.15.4 OQPSK (Zigbee)
Vector Diagram Display Format	Symbol/Locus Display, Frequency Error and OriginOffset Measurement
Constellation Diagram Display Format	Symbol Display, Frequency Error and OriginOffset Measurement
Eye Diagram Display Format	IQ/Trellis Display (1 to 16 symbols)
Error Vector Diagram Display Format	EVM, Magnitude Error, Phase Error, Waveform Quality (ρ), Frequency Error and Origin Offset Measurement
Coding Format	Miller, Modified Miller, Miller (M_2), Miller (M_4), Miller (M_8), Manchester, NRZ
Symbol Table Display Format	Binary, Octal, Hexadecimal
Signal Source Analysis	Phase Noise, Jitter, and Frequency Settling Measurement Optional analysis packages enable general purpose, WLAN and 3G standards-based analysis. RSAVu Option 21 adds General Purpose demodulation including BPSK, QPSK, OQPSK, π/4 - DQPSK, 8PSK, D8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, GMSK, GFSK, ASK, FSK, DSB-ASK, OOK, PR-ASK, SSB-ASK, Subcarrier OOK, Subcarrier BPSK.

Maximum Real-Time Frequency Span by Oscilloscope Sample Rate

Sample Rate	Real-Time Frequency Span
50 GS/s	20 GHz
40 GS/s	16 GHz
25 GS/s	10 GHz
20 GS/s	8 GHz



Generate analysis reports using integrated report generation tool

Choosing the Right Scope for the Job

Analysis of radar signals through X band and Ku band calls for real-time bandwidths 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. The DPO7000 oscilloscopes provide a cost-effective single-shot bandwidth of up to 3.5 GHz with 100 Mpts.

Ordering Information

Tektronix Ultra-Wideband Option UWBE

Option UWBE is available for all TDS real-time oscilloscopes with 7 GHz or greater single-shot bandwidth and all DPO/DSA real-time oscilloscopes 2.5 GHz or greater bandwidth.

Order Option	Description
DPO7254 UWBE	Ultra-Wideband Spectral Analysis Essentials
DPO7354 UWBE	
DPO70404 UWBE	
DSA70404 UWBE	
DPO70604 UWBE	
DSA70604 UWBE	
DPO70804 UWBE	
DSA70804 UWBE	
DPO71254 UWBE	
DSA71254 UWBE	
DPO71604 UWBE	
DSA71604 UWBE	
DPO72004 UWBE	
DSA72004 UWBE	
Upgrades	
TDS7BUP UWBE	Upgrade TDS7704B with Ultra-Wideband Spectral Analysis Essentials
TDS6BUP UWBE	Upgrade TDS6804B, TDS6124C and TDS6154C with Ultra-Wideband Spectral Analysis Essentials
DPO7UP UWBE	Upgrade DPO7254, DPO7354,DPO/DSA70000 with Ultra-Wideband Spectral Analysis Essentials

Recommended Options

For RSAVu

Opt. 21 – Advanced Measurement Suite Software

For the AWG7102 Ultra-Wideband Waveform Generator

Opt. 6 – 20 GS/s

Recommended Accessories

Tektronix Z Active Probes – Highest performance probing solutions with bandwidth enhanced to the probe tip for differential and single-ended voltage signals, because accurate design verification depends on high bandwidth access to critical signals and high-fidelity signal capture.

CE

ISO 9001 Product(s) are manufactured in ISO registered facilities.

GPIB IEEE-488 Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.

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Updated 30 October 2008

For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit **www.tektronix.com**

27 May 2009 37W-21805-0