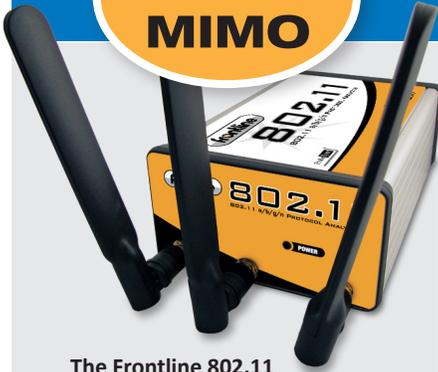# 3x3 MIMO

frontline 802.11

802.11 a/b/g/n Protocol Analyzer

The Frontline 802.11 Protocol Analyzer includes powerful Frontline software and the 802.11 a/b/g/n hardware interface.

Key Features and Benefits

- **3x3 MIMO (3 streams)**

- **Get the Data You Need**
  Fewer dropped packets with our built-in ~250GB buffer

- **Trust the Data You Get**
  Get exact timing information for each packet - the Frontline 802.11 provides reliable and accurate timestamps for all packets

- **Coexistence Packets in Lock-Step**
  In tandem with the Frontline Sodera or BPA 600, the coexistence window combines 802.11 and Bluetooth 4.0+HS packets into one view with precise timestamp synchronization using Frontline's ProbeSync technology

- **Up-to-the-Minute Decodes Means Thorough Analysis**
  Analyze devices using the spectrum of 802.11 protocols - 802.11 a/b/g/n support means you don't have to wonder if an 802.11 protocol is supported

The Frontline 802.11 protocol analyzer lets you passively capture wireless traffic like never before, and stands as the **first 3x3 MIMO Bluetooth® coexistence solution on the market**. No other device available today provides the precision, reliability, or capacity to gather wireless data better than the Frontline 802.11 protocol analyzer.

The sheer volume of 802.11 data flowing between devices can be staggering, but gone are the days when you missed or dropped large numbers of packets because your analyzer simply couldn't keep up with the amount of data flowing through the air. Frontline has met the challenge head-on by building into the Frontline 802.11 analyzer a staggering ~250GB data buffer.
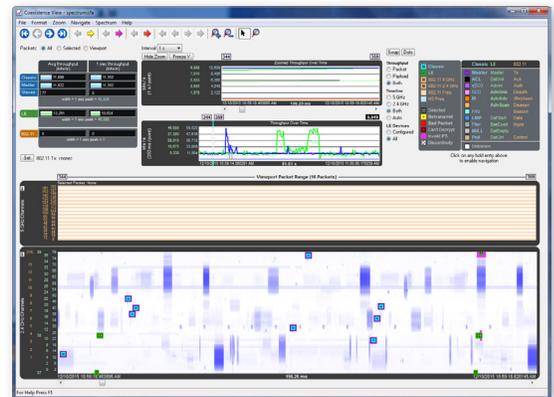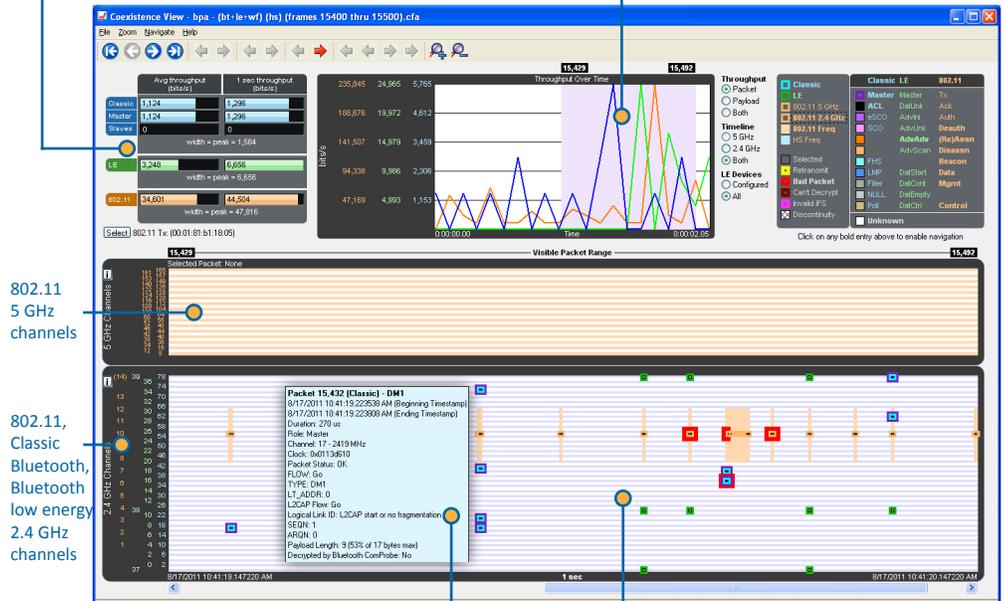
Bluetooth Coexistence

The analysis of 802.11 and Bluetooth data packets in one view is possibly one of the most challenging tasks for wireless device developers. Capturing the precise timing, size, and frequency of each and every packet is essential to successfully developing and debugging devices using both technologies, and until now has been, at best, an elusive objective.

- Massive buffer - fewer dropped packets
- 3x3 MIMO (3 streams)
- Precise packet synchronization with Bluetooth data with the Frontline Sodera
- Improved coexistence view
- Spectrum analysis

Either as a stand-alone 802.11 or in combination with the Frontline Sodera or BPA 600, the Frontline 802.11 is the precise and comprehensive analysis tool you need for 802.11 and Bluetooth over 802.11 wireless communications.

Throughput graphs for average, 1 second and over time

802.11 5 GHz channels

802.11, Classic Bluetooth, Bluetooth low energy 2.4 GHz channels

Tooltips with comprehensive packet details

802.11, Classic Bluetooth and Bluetooth low energy packets in a single view

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Everywhere**you**look™

Specifications

- Supports IEEE 802.11 a/b/g/n specifications
- Features 3x3 MIMO technology
- Supports WEP and AES-CCN (i.e. WPA2 PSK) decryption
- Supports 2.4 and 5.0 GHz bands
- 802.11n (High Throughput) MCS: 0 to 15
- 20 and 40 MHz channel widths
- Short guard interval support for both 20 MHz and 40 MHz channels
- Supports data rates of up to 216.7 Mbps for 20 MHz channels and 450 Mbps for 40 MHz channels
- Frame encoding: BCC (Default for 802.11), LDPC (Option for 802.11n)
- Max AMPDU size: 65,535 bytes
- **Bus Type:**
  USB 2.0 Type B, compatible with USB1.1
- **Operating Frequencies:**
  2.412GHz – 2.4835 GHz
  5.15 - 5.85 GHz
- **Power:**
  AC Adapter supplied. The output of the adapter is 12Vdc, 2.5A
- **Dimensions:**
  6.563" X 4.055" X 2.087"
  167mm X 103mm X 53mm
- **Temperature**:
  0° to 30° Celsius
  32° to 86° Fahrenheit
- **Humidity:**
  Operating: 10% to 90% RH (noncondensing)
- **Receive Sensitivity**
  802.11a: -68dBm ±2dBm@54Mbps
  802.11b: -85dBm ±2dBm@11Mbps
  802.11g: -68dBm ±2dBm@54Mbps
  802.11gn HT20: -68dBm ±2dBm@MCS7
  802.11gn HT40: -68dBm ±2dBm@MCS7
  802.11an HT20: -68dBm ±2dBm@MCS7
  802.11an HT40: -68dBm ±2dBm@MCS7
- **Modulation**
  802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
  802.11b: DSSS (DBPSK, DQPSK, CCK)
  802.11g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)
  802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM)

The Frontline 802.11 Hardware Interface

The Frontline 802.11 Protocol Analyzer includes the portable and robust 802.11 3x3 a/b/g/n hardware interface, which supports connectivity to 802.11 wireless communications.

The 802.11 a/b/g/n hardware interface is one member of an extensive arsenal of technology-specific hardware interfaces, all functioning with the powerful Frontline software. This modular approach allows greater flexibility in protocol analysis and debugging, and provides comprehensive views over virtually any combination of protocols.
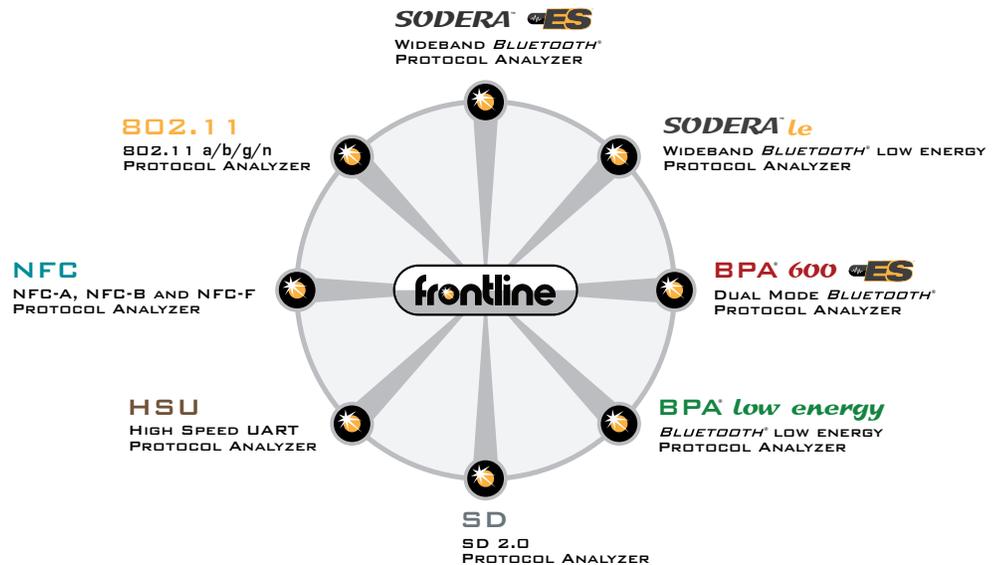
Supported Configurations

- OS Supported: Windows 7, 8 and 10
- USB Port: USB 2.0 or USB 3.0 High-Speed

Minimum System Requirements

- Processor: Core i5 processor at 2.7 GHz
- RAM: 4 GB
- Free Hard Disk Space: 20 GB

SODERA ES
WIDEBAND *BLUETOOTH* PROTOCOL ANALYZER

802.11
802.11 a/b/g/n PROTOCOL ANALYZER

SODERA le
WIDEBAND *BLUETOOTH* LOW ENERGY PROTOCOL ANALYZER

NFC
NFC-A, NFC-B AND NFC-F PROTOCOL ANALYZER

BPA 600 ES
DUAL MODE *BLUETOOTH* PROTOCOL ANALYZER

HSU
HIGH SPEED UART PROTOCOL ANALYZER

BPA low energy
BLUETOOTH LOW ENERGY PROTOCOL ANALYZER

SD
SD 2.0 PROTOCOL ANALYZER

frontline

The Frontline Modular Approach

Frontline software is at the core of Frontline protocol analysis, allowing technology-specific hardware interfaces to work individually or in combination with other hardware interfaces. This modular approach gives the developer or analyst the widest possible range of scenarios for debugging complex communications.

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