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Boonton's Wi-Fi 6 Solutions: Extended Measurement Duration

Capturing RF power measurements of an entire Wi-Fi data stream over an extended period can uncover critical waveform anomalies that may have otherwise gone unnoticed in tighter measurement windows. For example, this approach can catch amplifier power droop due to waveform degradation from excessive heat dissipation. Long data capture can also reveal momentary signal dropout, as well as inconsistent spaces between successive pulses. Boonton's real-time USB RF power sensors armed with Real-Time Power Processing (RTPP) technology work along with the RTP Measurement Buffer Mode Application to deliver industry-leading performance and measurement duration for Wi-Fi testing.

Real-Time Power Processing

Conventional signal processing methods capture numerous samples along a waveform until a trace can be recreated on a display. Acquisition stops while converting the acquired samples into a trace of the waveform, processed in sequential steps. Once complete, the new measurements cycle resumes, but not after waiting a detrimental amount of time. Overall, standard power meters and USB sensors often suffer from lengthy gaps between triggered sweeps, which can miss critical intermittent signal phenomenon (see Figure 1). Additionally, frequently capturing data points runs the risk of straining a sensor's memory capacity to the point of buffer overflow, which can limit the observation window to typically under 1 second.

RTPP keeps pace with signal acquisition by performing vital processing steps nearly simultaneously. Computational overhead and buffer size constraints are eliminated, which at the same time removes the need to stop acquisition for trace processing. This incredible feat is achieved by uniting a dedicated acquisition engine, hardware trigger, integrated sample buffer, and a real-time optimized parallel processing architecture. In the end, RTPP technology delivers gap-free signal acquisition that virtually guarantees intermittent signal phenomena will be reliably captured and analyzed.

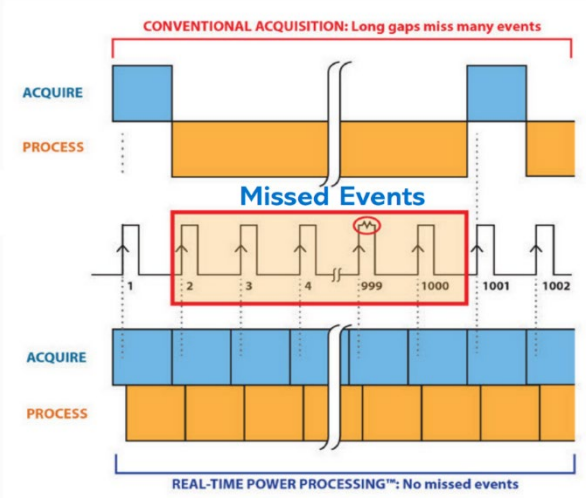
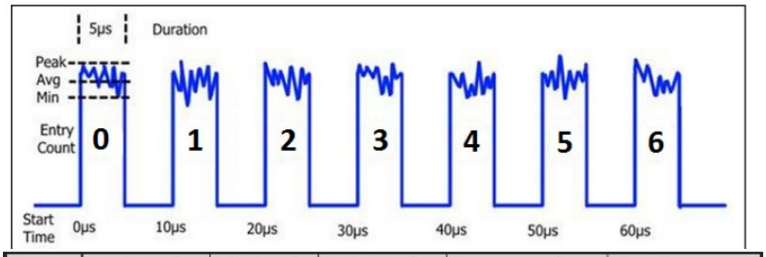


Figure 1: Gap-free RTPP catches key events that gap-prone conventional acquisition may miss.

RTP Measurement Buffer Mode Application

The RTP Measurement Buffer Mode Application harnesses the RTPP technology of Boonton's RTP4000 and RTP5000 series of real-time power sensors in a convenient utility, providing a vendor-supplied means for taking power measurements over very long periods of time. The software controls one or multiple sensors that deliver 100,000 measurements per second and analyzes the input signal during user-defined intervals of interest. A single data record containing peak, average, and minimum power, as well as the start time and measurement duration is returned for each pulse, burst, or event in virtually real time (see Figure 2).



Entry Count	Interval Start	Interval Duration	Interval Average	Interval Minimum	Interval Peak
0	0.00 us	5.01 us	-0.043 dBm	-39.042 dBm	8.826 dBm
1	9.99 us	5.00 us	-0.006 dBm	-38.431 dBm	8.827 dBm
2	19.99 us	5.01 us	0.039 dBm	-41.549 dBm	9.742 dBm
3	30.00 us	5.00 us	0.017 dBm	-38.551 dBm	9.802 dBm
4	40.01 us	5.00 us	0.022 dBm	-40.699 dBm	9.477 dBm
5	49.99 us	5.00 us	-0.020 dBm	-39.706 dBm	8.102 dBm
6	60.00 us	5.00 us	0.036 dBm	-37.803 dBm	9.750 dBm

Figure 2: An example seven-pulse waveform and its resultant data returned by the RTP Measurement Buffer Mode Application.

Non-relevant information outside the packet interval is discarded, which removes timely downloading and post-processing of sizeable sample buffers from the equation. Therefore, data transfer drastically reduces compared to alternative methods, enabling prolonged data capture from a nearly unlimited number of consecutive Wi-Fi packets to catch crucial waveform events, as depicted in Figure 3.

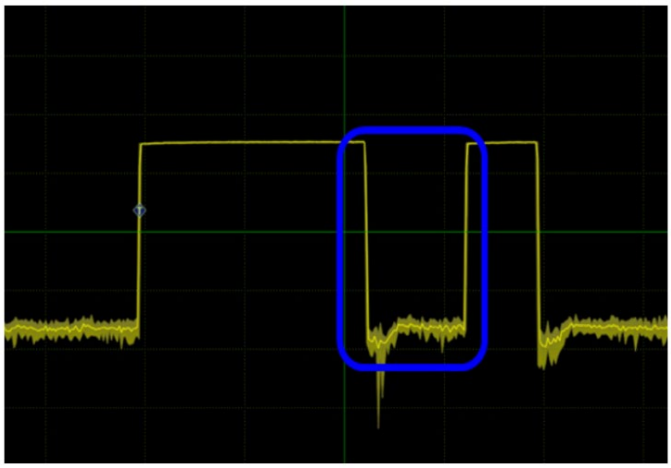


Figure 3: RTPP and its superior capabilities identify a signal dropout.

The RTP Measurement Buffer Mode Application's extended measurement window is just one functionality that supports the enhanced abilities of today's Wi-Fi chipsets and devices. In particular, the software can be independently employed on multiple channels for characterization of MIMO Wi-Fi architectures using Boonton's Synchronized Independent Gate Mode, to make measurements on multiple sensors with a common time base.

Expanding Measurement Windows for Wi-Fi 6 Characterization

Wi-Fi 6 is anticipated to offer greater network efficiency, increased battery life of client devices, and better operation in dense environments, among other improvements. Boonton's USB RF power sensors with RTPP technology work with its specially designed, complementary software to deliver the measurement windows and speeds needed for accurate Wi-Fi 6 characterization. Boonton offers a vast variety of additional Wi-Fi 6 testing solutions, including ample video bandwidth (VBW), crest factor and statistical measurements, packet time gating, and synchronized multi-channel measurements. To read up on everything Boonton has to offer to enable the latest wireless standard, please visit www.boonton.com.