



Aircraft Geometric Height Measurement Element (AGHME) Constellations

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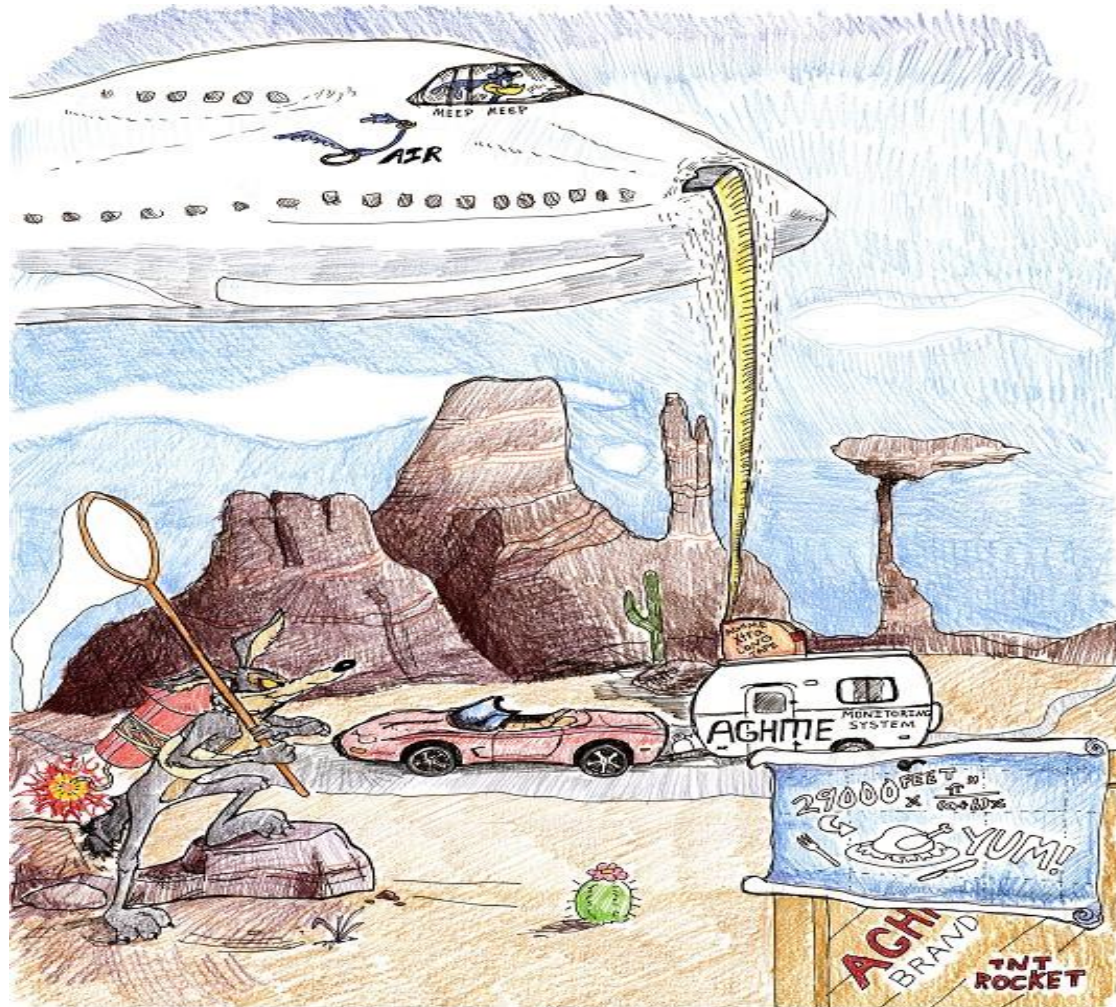


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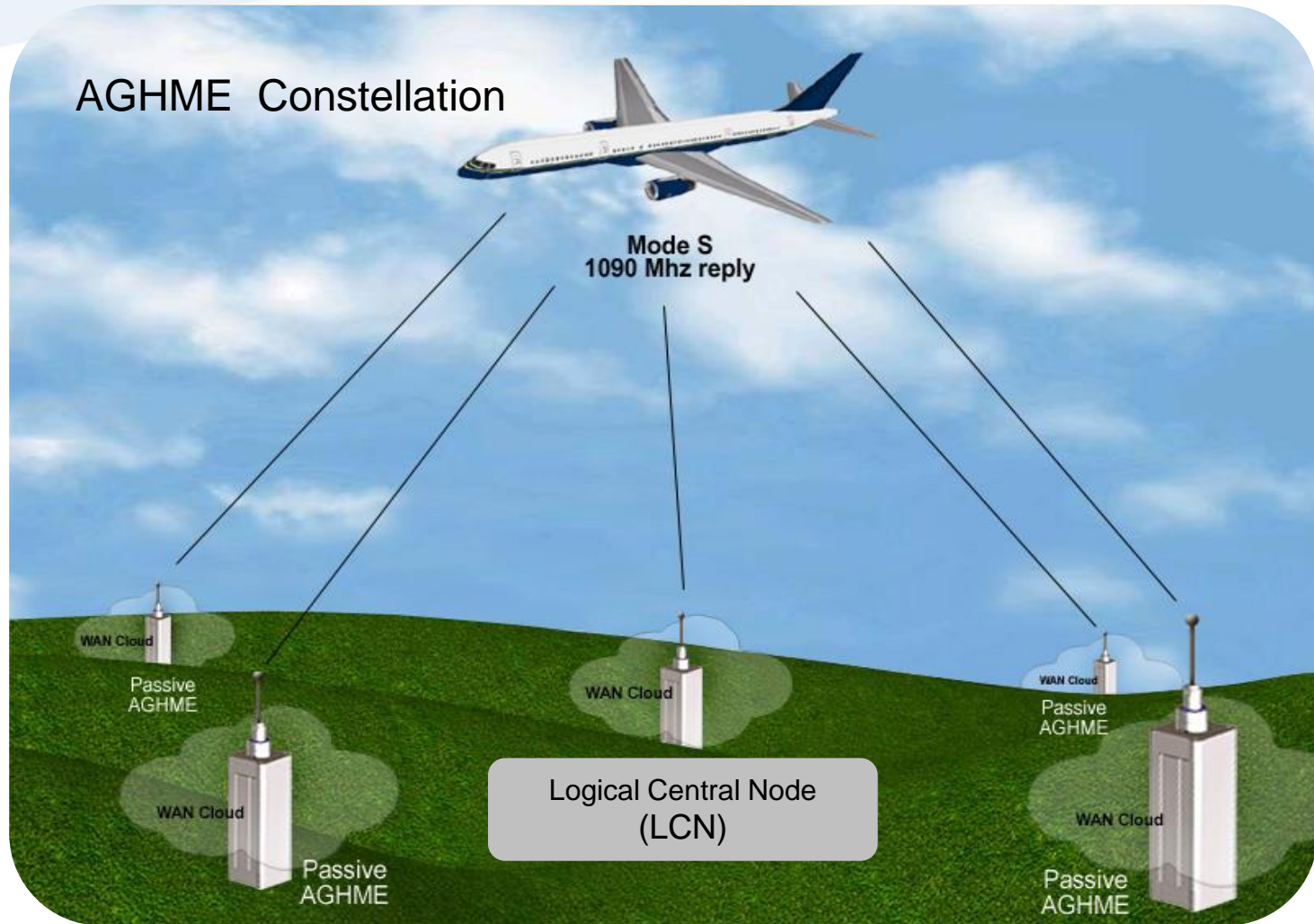
Federal Aviation
Administration

AGHME Constellation



FAA

AGHME Prototype



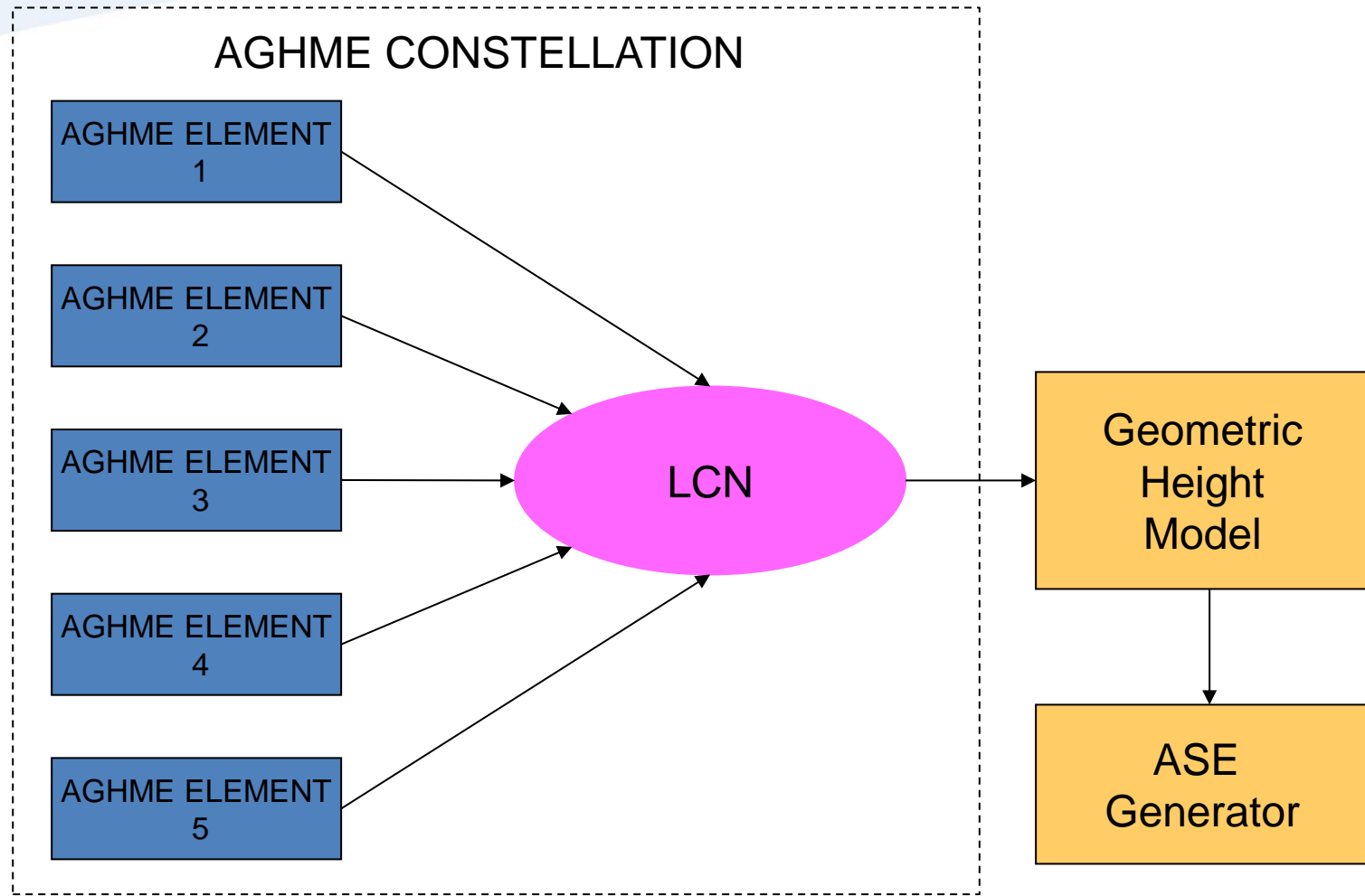
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NextGEN

Multi-lateration Functionality

- Timestamp difference of arrival time of common signal from airframe
- Algorithm to produce “matched set” of timestamps to input into geometric height model
- Geometric heights converted into pressure altitudes via Tech Center developed process
- Compute final “ASE” of airframe

Total System Flow



AGHME Constellation

- Proven system design
- Running in the field 24/7 operation
- Rugged and reliable
- Perfect in-field laboratory to monitor and experiment with ADS-B issues

Time Standard

- Standards Provide 10 MHz Reference
- GPS Receiver Timing Solution
 - ✦ Real-Time Solution
 - ✦ Better fits a large scale model
- Unique solution
 - ✦ Use WAAS geosync satellite for timing solution
 - Live implementation of Commonview solution

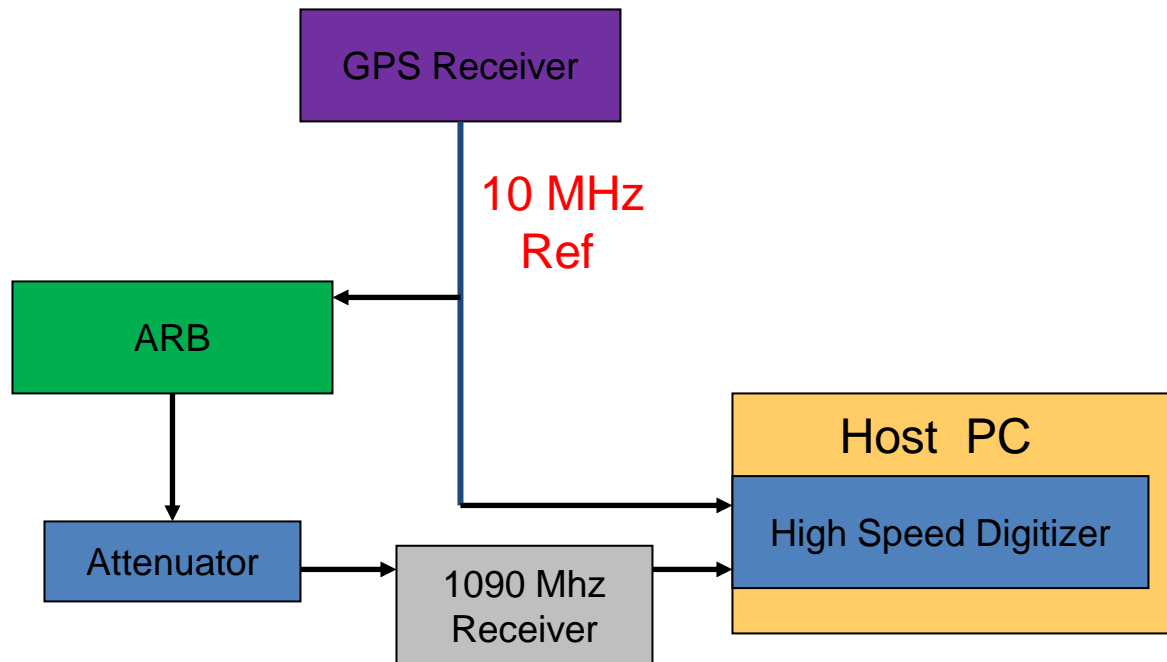
AGHME Time Specifications

- 2 nanosecond resolution
- 5 nanosecond accuracy

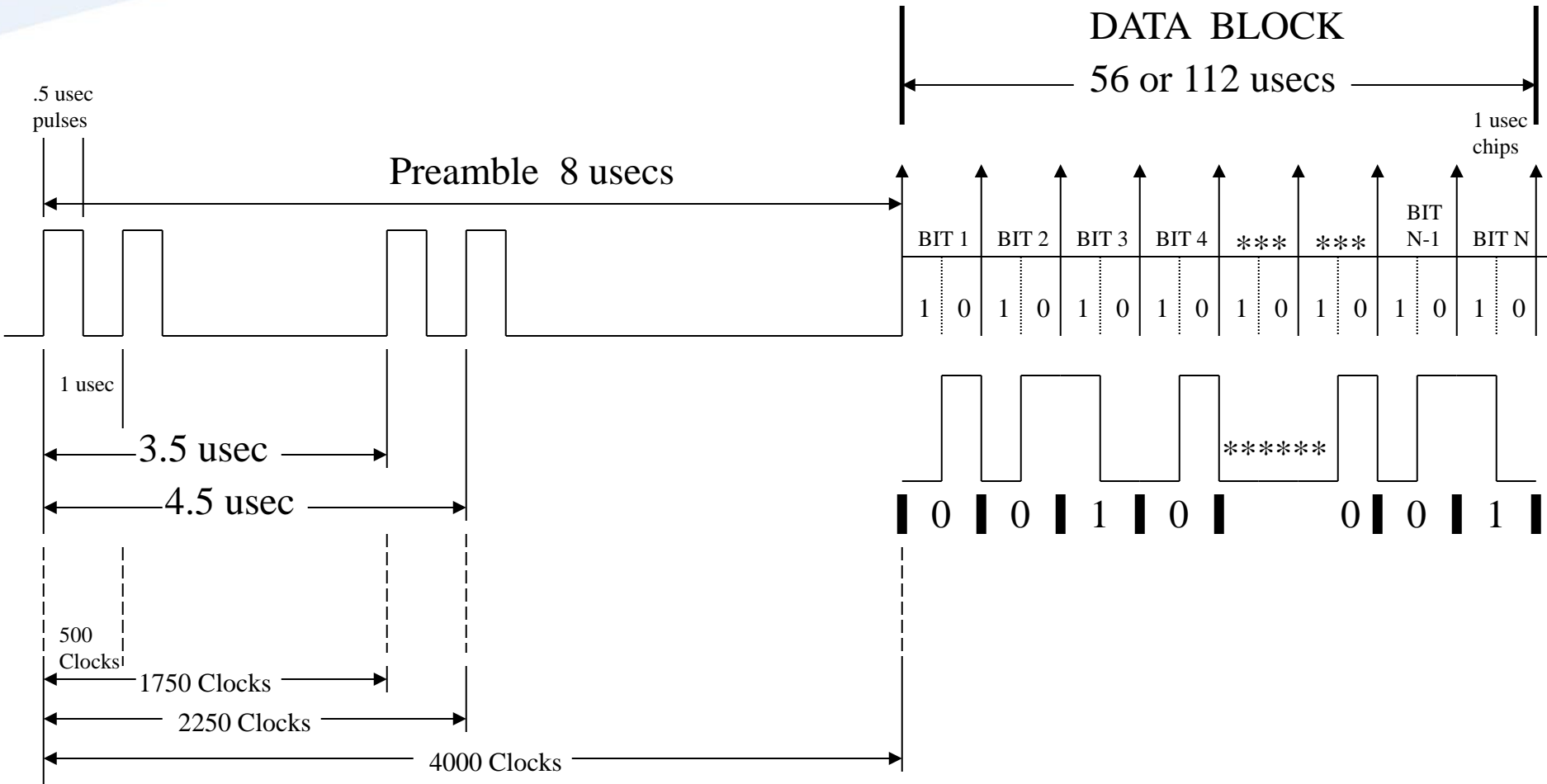
Receipt Time Analysis

- Highly accurate timestamp tool
 - ✦ Point on rising edge of P1 (Shotgun blast)
 - 3 db down from pulse average amplitude
- Software that analyzes .5 Gbytes of data for 1 sec
 - ✦ Classic
 - Detect preamble (8 usec 4 pulse set)
 - Decode Mode S message by chip analysis
 - Mode S Reception time is rising edge of P1
 - ✦ Known time relationship between P1, P2, P3, and P4 of preamble
 - ✦ Allows normalizing pulses and take average of 4 pulses

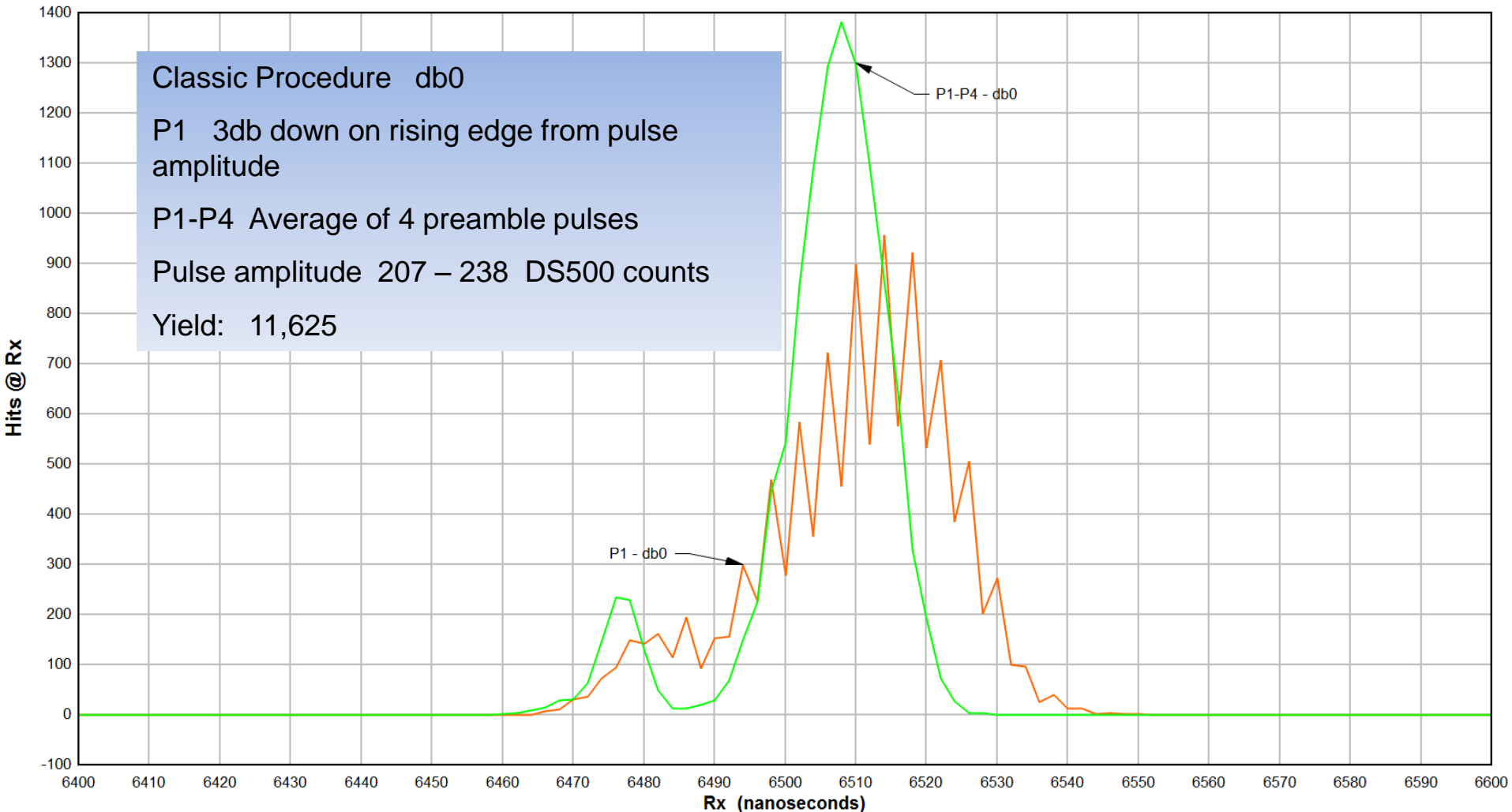
Bench Test Setup



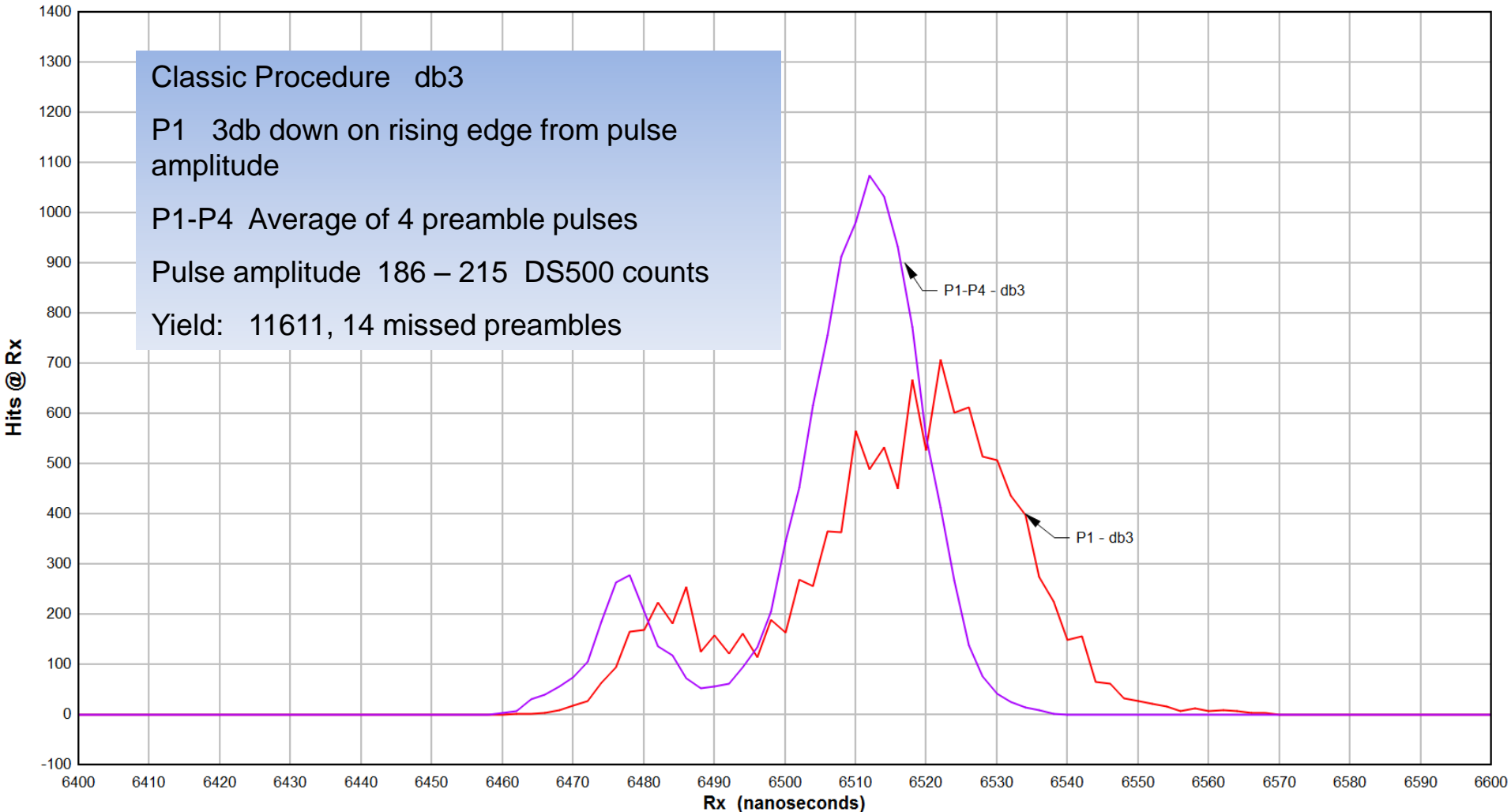
Mode S Format



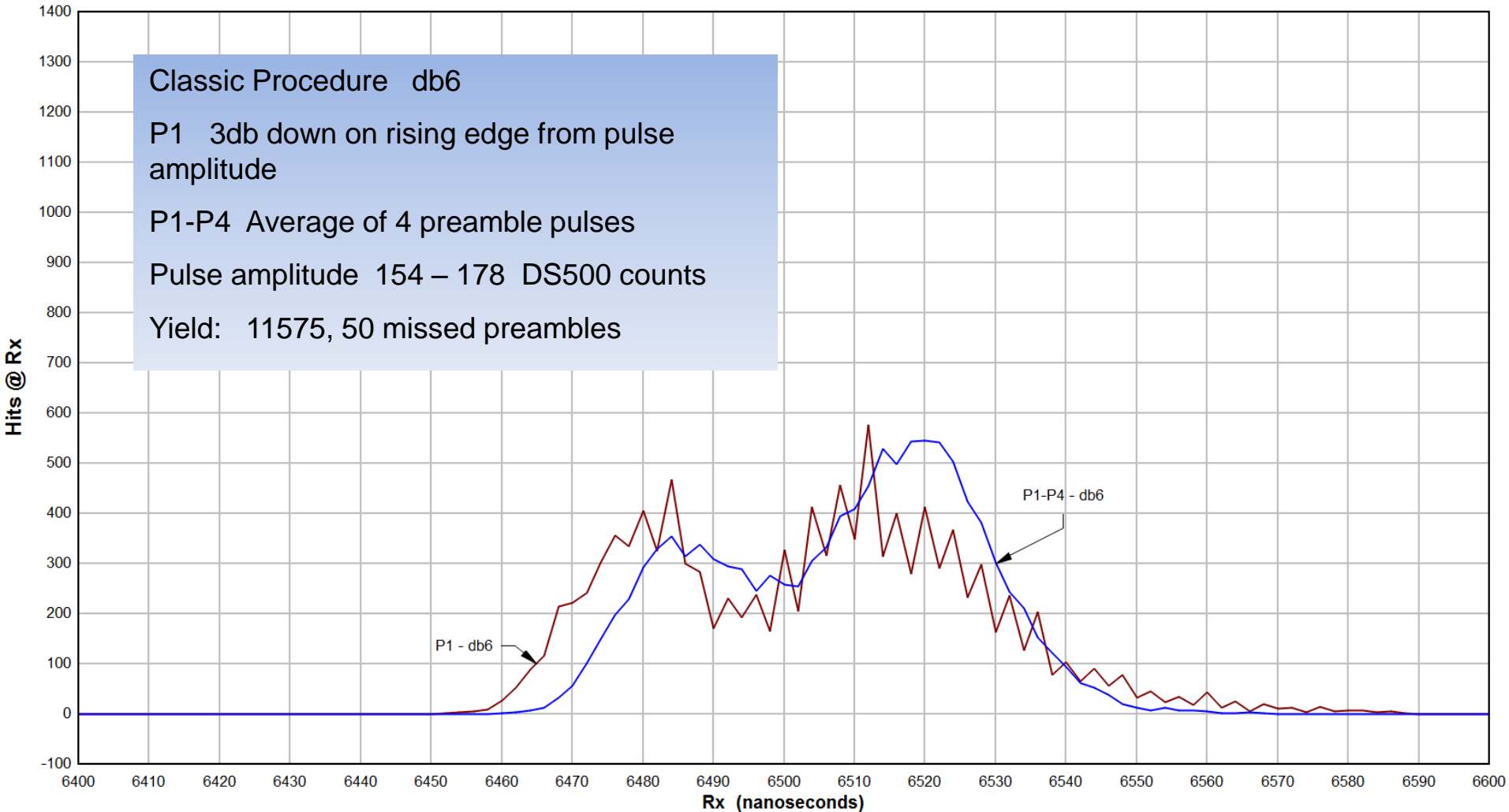
Receipt Time Analysis



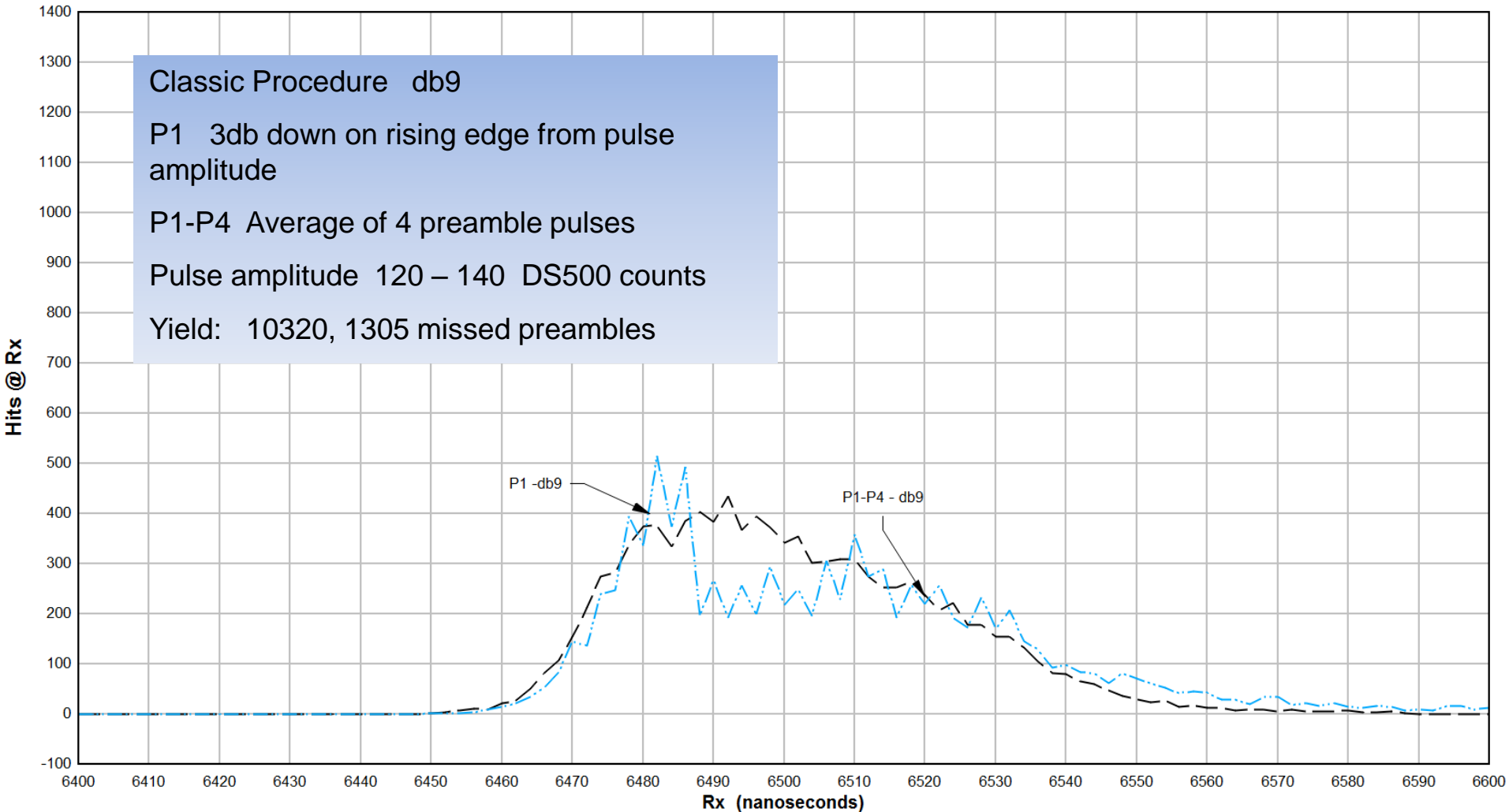
Receipt Time Analysis



Receipt Time Analysis



Receipt Time Analysis



Receipt Time Analysis

