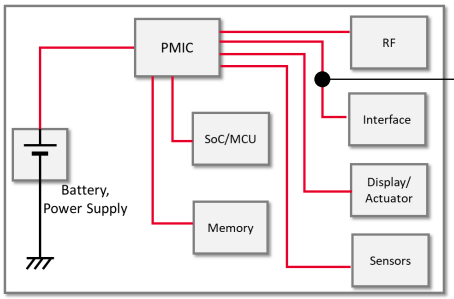
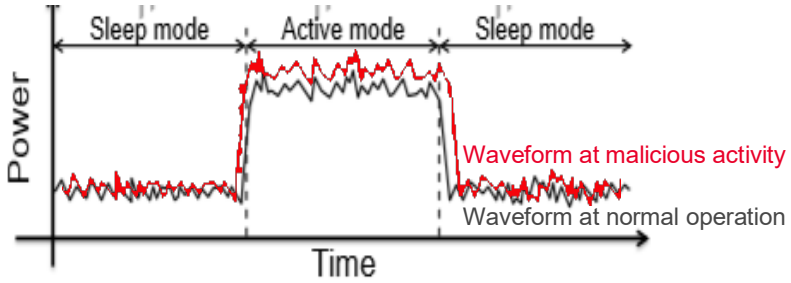
Accelerate HW Trojan Detection Technology Development for Robust IoT

Development of technology and tools for detecting HW Trojans is in demand

- HW security risks are increasing with the spread of IoT devices
  - HW Trojan is a malware that can be triggered to leak information or cause denial of service attack (behave like a time-bomb)
  - HW Trojan can be embedded in the supply chain by malicious third parties due to increasing the outsourcing of LSI and FPGA design and manufacturing
  - It can be a serious problem in the fields related to human life such as autonomous driving



IoT device circuit



Current profile measurement

Challenges of HW Trojan detection technology development

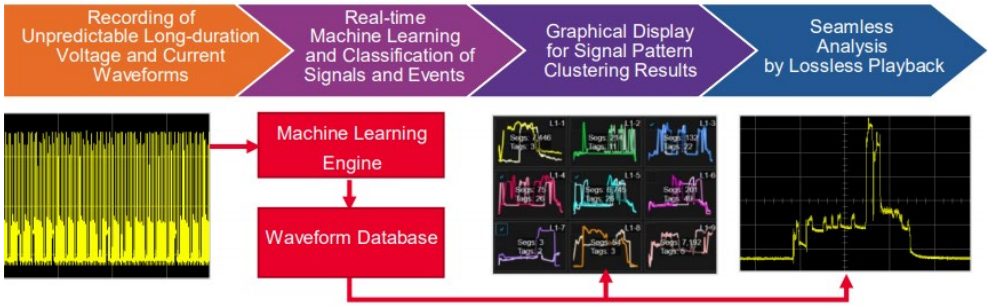
Challenges	Needs	Problems using conventional oscilloscopes
Difficult to capture rare anomaly signals of malicious operation.	Long duration measurements without interruption to capture rare anomaly signals.	Can miss rare anomaly signals. • Limited measurement time by limited memory depth. • Dead time by intermittent triggered measurements.
Difficult to distinguish slight differences in the current and/or voltage waveforms between normal and anomaly signals.	Precision current and/or voltage measurements with wide bandwidth, high sampling rate, high dynamic range and high sensitivity to distinguish small differences between normal and anomaly signals.	Insufficient to distinguish small differences. • Limited dynamic range and sensitivity.
Time-consuming to find rare anomaly signals from extensive amount of data.	Data analysis function that quickly and easily identify and analyze intermittent anomalous signals from tremendous data.	Time-consuming to identify and analyze rare anomaly signals from tremendous data. • No such analysis functions. • Manual operation takes a large amount of time.

Learn more at: www.keysight.com

KEYSIGHT TECHNOLOGIES

Keysight CX3300A Device Current Waveform Analyzer and the Anomalous Waveform Analytics solve these challenges

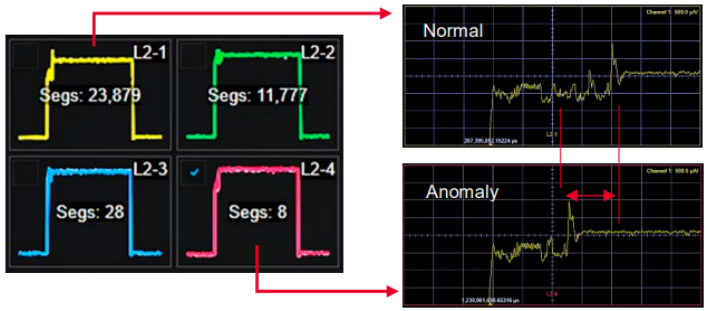
- CX3300A can capture rare anomaly signals and measure subtle differences between normal and anomalous signals precisely thanks to the excellent performance.
  - Long duration measurement up to 100 hours with 10 MSa/s sampling rate
  - Wide bandwidth up to 200 MHz
  - High-resolution at 14-bit / 16-bit
  - Low noise with high sensitivity from sub nA and sub uV
- Anomalous Waveform Analytics quickly detects and analyzes anomalous signals in the current and voltage waveform data exceeding a terabyte that are not possible by manual analysis.



Anomalous Waveform Analytics (Embedded in the CX3300A)

CX3300A Device Current Waveform Analyzer

- HW Trojan detection example
  - Automatic detection and classification of 35 anomalous waveforms (appearance rate < 0.1%) from > 35,000 waveforms (30 min data)
  - The CX3300A's excellent low-noise performance and high-precision measurement measure subtle differences that are buried in oscilloscopes



Summary

- CX3300A is the all-in-one measurement and analysis solution integrating high bandwidth, high sampling rate, high sensitivity and long duration measurement recording with waveform analytics to reveal accurate current and voltage waveforms.
- CX3300A and the Anomalous Waveform Analytics accelerate HW Trojan detection technology development for secure IoT world.

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