



LIBERTY is a software-defined, FPGA-based RF test platform built on COTS Keysight PXIe/AXIe modular hardware. It delivers gapless, phase-coherent, multi-channel record, playback, spectrum analysis, and antenna measurement from 10 kHz to 40 GHz. One software-defined architecture replaces stacks of fixed-function instruments across EW/EMSO, SATCOM, 5G/6G, radar, and antenna test programs.



PLATFORM SPECIFICATIONS AT A GLANCE

40 GHz

FREQUENCY COVERAGE

1 GHz

IBW / CHANNEL

16 ch

COHERENT
CHANNELS

≤0.5 ps

INTER-CHANNEL
SKEW

>1 hr

RF RECORD &
PLAYBACK / ch

VARIANTS

ONE ARCHITECTURE · FIVE MISSION ROLES

VARIANT	MISSION ROLE	KEY SPECIFICATIONS
Multi-Channel RF Record / Playback (LIBERTY RF Record/Playback)	Wideband, Phase-Coherent, Gapless RF Record & RF Playback	1 GHz IBW Phase-coherent Gapless capture
Multi-Channel Real-Time Signal Monitoring & Analysis (LIBERTY MC-RTSA)	Multi-Channel Real-Time Spectrum Analyzer with RF Record	1 GHz IBW 128 ns T _{MIN} >1 hr record/ch Advanced triggering
Antenna Measurement System (LIBERTY AMS)	Multi-Channel Antenna Measurement System Range Backend	Real-time RT-NFFF Multi-probe capture Retrofits MVG / NSI-MI / ETS-Lindgren
LIBERTY ATS	Automatic Test System — Benchtop & Drop-in	30+ firmware personas Drop-in ATE replacement
LIBERTY EW	Configurable & Cognitive EW Validation	Sub-10 μs closed-loop AI/ML adaptive replay · multi-emitter · DRFM-class response

WHAT LIBERTY SOLVES

Missed LPI & transient signals

128 ns T_{min} and gapless FPGA processing — 100% probability of intercept for signals ≥128 ns.

Sequential multi-channel test

Parallel phase-coherent channels compress multi-beam AESA, MIMO, and EW validation into practical timelines.

Antenna range modernization

LIBERTY AMS retrofits existing chambers with real-time RT-NFFF and no range rebuild required.

Non-deterministic EW replay

≤10 μs closed-loop deterministic replay with sub-10 ps coherence for true hardware-in-the-loop validation.

Fragmented multi-vendor racks

30+ firmware personas on one PXIe/AXIe chassis replace 20–30 discrete instruments, reducing lifecycle cost 40–60%.