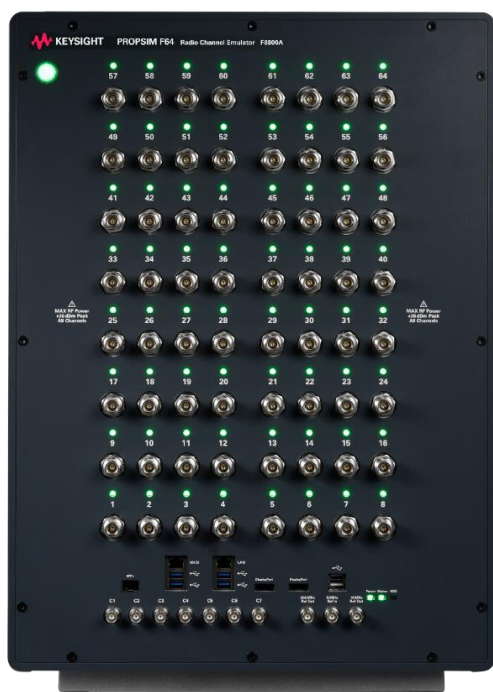


PROPSIM F64

Radio Channel Emulator F8800A



End-to-End Real-World Performance Testing in the Lab

PROPSIM F64 is a versatile multi-channel radio channel emulation solution that enables users to emulate field test conditions in a laboratory environment for software and hardware testing of radio network systems, mobile devices, WLAN, MESH/MANET type of radios, satellites and RF sensor systems.

It is used to perform wireless industry benchmarking of devices and base stations across the entire product creation workflow – from research, development, to acceptance and field performance optimization.



Industry-leading mobile device, modem and network equipment manufacturers use Keysight's PROPSIM F64 radio channel emulator to

- Integrate new 5G NR and 4G LTE product features
- Verify new hardware and software releases in a 24/7 automated test environment

Tier-1 mobile operators use PROPSIM F64 to validate 5G NR and LTE-A devices and base stations.

Unique capabilities in PROPSIM F64 enable users to validate a wide range of RF and mmWave applications in the aerospace, avionics, satellite and defense industries.



The PROPSIM F64 emulates dynamic radio channels between transmitters and receivers and is thus independent of system technology or signal modulations. Its capabilities are designed for end-to-end realistic and repeatable real-world performance testing of 5G multi-mode devices and base stations in the laboratory to accelerate successful 5G rollouts.

Key capabilities and features (standard and optional)

Capability/Feature	
RF ports in single unit	Up to 64 TRX ports (N-female)
	Shipping 8, 16, 24, 32, 40, 48, 56, 64 TRX port configurations
	Bi-directional and uni-directional fading supported
MIMO fading channels in single unit	Up to 1024 digital channels
MIMO and massive MIMO emulation	Single unit
	<ul style="list-style-type: none"> MIMO multiple 2x2bi, 4x2bi, 4x4bi, 8x2bi, 8x4bi, 8x8bi. Full Antenna Array Sampling Massive MIMO testing 16x8bi 16x16bi, 32x16bi for complete base station MU-MIMO TM9 UE feedback and uplink SRS based massive MIMO scheduler/beamformer testing Simplified Partial Antenna Array Sampling Massive MIMO testing with external RF analog combiner/phase shifter matrix. Multi-User, Multi-RAT and Handover mobility focused UE and base station testing. Antenna Array column/row combination and Virtual Probe/Key-hole- channel channel emulation configurations are supported.
	Multiple unit
	<ul style="list-style-type: none"> Full Antenna Array Sampling 64x4bi, 64x8bi, 64x16bi, 128x4bi, 128x8bi, 128x16bi
Frequency range	450 MHz to 6 GHz
	With E7770A: 6 to 12 GHz
	With M1740A: 24.25 GHz to 29.5 GHz, 37 GHz to 43.5 GHz
Connectivity Options	RF cabled connectivity
	Over the Air (OTA) connectivity chambers
Instantaneous signal BW	Up to 100/160 MHz with 64 TRX
	Up to 300 MHz with 32 TRX
	Up to 400 MHz with 16 TRX + 16TRX BW up to 160 MHz
	Up to 900 MHz with 8 TRX + 16TRX BW up to 160 MHz
	Up to 1200 MHz with 8 TRX
LTE/5G NR Carrier Aggregation support	Contiguous up to 1200 MHz (TDD or FDD). Non-contiguous up to 32 CA bands
Independent RF local oscillators	Up to 32
Frequency conversion e.g. from band A to band B	Yes. Requires minimum two RFLOs

Internal RF band combination into single RF TRX port	Up to 8 RF bands. Removes need to use external RF plumbing
Fading paths per fading channel	Up to 48
Minimum delay	Minimum 2.5 μ s
Maximum delay	Up 600 ms ¹
Doppler emulation	Up to \pm 1.5 MHz ¹
Test setup calibration	Integrated test setup amplitude and phase calibration
	No need for external VNA instrument
Programmable and synchronous Interference sources	CW and AWGN
	LTE ¹ and NR ¹ waveforms
IQ data recording	Simultaneous uplink and downlink IQ data capturing ¹
Input power measurement	Automatic input level setting. Continuous and RF burst-triggering
Uplink and downlink separation	Integrated uplink and downlink separation
User definable input/output ports	User-defined active connector settings
Remote control	ATE SCPI commands. PROPSIM plugin for The Keysight Test Automation on PathWave (TAP)
	Ethernet
Other interfaces	10 MHz reference IN and OUT
	HW trigger port for emulation start/stop
	Synchronization ports for multiple PROPSIM hardware units
PROPSIM software and channel models	PROPSIM Standard Tools software includes 3GPP 5G NR, LTE, WCDMA and GSM TDL channel models for FR1 and FR2 testing
	PROPSIM GCM 5G Tool software
	<ul style="list-style-type: none"> • Test models for 5G NR FR1 and FR2 testing
	<ul style="list-style-type: none"> • Supports 3GPP TR38.901, TR36.873, CDL, WINNER and SCME, UMi, UMa models
	<ul style="list-style-type: none"> • Support Ray-tracing data import
	<ul style="list-style-type: none"> • 3D Antenna parameter inclusion in to channel model
	<ul style="list-style-type: none"> • Custom test topology creation for massive MIMO, Device- to-Device, V2X
	<ul style="list-style-type: none"> • MIMO OTA channel models (CTIA/3GPP/CCSA MIMO OTA models). RTS MIMO OTA
	PROPSIM WLAN Tool software includes 802.11n/ac/ax channel models
	VDT Toolset for RF field to lab test scenarios. 5G NR, LTE, WCDMA, GSM
High-Speed Train channel model pack (mobile network operator test plan)	
Massive MIMO BTS channel model pack (mobile network operator test plan)	

Fast fading profiles	PROPSIM Standard Tools software: Constant, Rayleigh, Rice, Nakagami, Lognormal, Suzuki, Pure Doppler, flat, rounded, Gaussian, Jakes, Butterworth, user-defined, and CIR data from 3rd party simulation tools
	Each digital channel can be set for independent fading profile (delay, doppler, amplitude, correlation)
Pathloss/Shadowing	PROPSIM Standard Tools software with Shadowing option
	<ul style="list-style-type: none"> • Each TRX channel independently, 100 dB dynamic range
	<ul style="list-style-type: none"> • Each digital fading channel independently, 60 dB dynamic range
Delay profiles	PROPSIM Standard Tools software: Constant, sliding delay, 3GPP birth-death, 3GPP sliding delay group, user-defined, delay profiles from 3rd party simulation tools, ray-tracing applications
	Each digital fading channel has independent delay setting
Antenna topologies, channel emulation configurations	Fully configurable, single or multiple independent or coherent MIMO, MISO, SIMO, SISO, MANET/mesh, carrier aggregation, relaying transmission test topologies. 5G NR NSA/SA deployment topologies

1. Planned capability in future software release, may require additional option/license for operation.

RF Characteristics

RF levels and linearity across 450 MHz to 6 GHz	
RF input level	+35 dBm, peak
RF output level	+5 dBm, peak
RF input/output resolution	0.1 dB
RF output gain setting range	+5...-100 dB
RF output level accuracy	< ± 0.5 dB
Output noise floor output level ≤ -40 dBm	< -168 dBm/Hz
EVM	< -45 dB RMS, 5G NR 100/400 MHz, 256 QAM, 3.5 GHz
	< -45 dB RMS, 802.11ax 160MHz, 1024 QAM, 5.9 GHz
Crosstalk between TRX ports	< -100 dB
VSWR all RF ports	450 MHz to 700 MHz < 1.5
	> 700 MHz to 2 GHz < 1.3
	> 2 GHz to 6 GHz < 1.5

Ordering Information

Product	Description
F8800A-xxx, F8800ARF1	PROPSIM F64 Hardware configurations and options
F8800Axxx	PROPSIM Standard Tools Software applications and options
F9860Axxx	Geometric Channel Modeling Tool and options
F9870Axxx	WLAN 802.11ax/ac software tool and options
F9340Axxx	Virtual Drive Testing Toolset (field-to-lab) and options.
F9809A	MIMO OTA Test Model pack
F9510A	Massive MIMO RF combiner set

For detailed product configuration items and product support services please contact your sales representative for options and pricing.

Keysight 5G Solutions

Keysight's industry-first 5G end-to-end design and test solutions enable the mobile industry to accelerate 5G product design development from the physical layer to the application layer and across the entire workflow from simulation, design, and verification to manufacturing, deployment, and optimization.

Keysight offers common software and hardware platforms compliant to the latest 3GPP standards, enabling the ecosystem to quickly and accurately validate 5G chipsets, devices, base stations and networks, as well as emulate subscriber behavior scenarios. Additional information about Keysight's 5G solutions is available at www.keysight.com/find/5G.

- For more information about Keysight's PathWave, visit www.keysight.com/find/pathwave.
- For more information on the M1740A mmWave transceiver, visit www.keysight.com/find/m1740a.
- For more information on the E7770A CIU, visit www.keysight.com/find/e7770a.

Keysight's 5G Network Emulation Solutions leverage the E7515B UXM 5G Wireless Test Platform (www.keysight.com/find/e7515b) and include:

- 5G Protocol R&D Toolset: www.keysight.com/find/5g-protocol
- 5G RF DVT Toolset: www.keysight.com/find/5g-rf
- 5G Protocol Conformance Toolset:
www.keysight.com/find/5g-protocol-conformance
- 5G RF/RRM Conformance Toolset: www.keysight.com/find/5g-rf-conformance

Learn more at: www.keysight.com

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at:

www.keysight.com/find/contactus

