SQUARE PEG
COMMUNICATIONS

RLS-2100
Radio Link Simulator

Enabling the future of connectivity

Square Peg's RLS-2100 Radio Link Simulator provides a critical edge to ensure next-generation communications solutions are accurate, capable and ready for deployment. The RLS-2100 supports hardware-in-the-loop physical layer and end-to-end network performance testing for wideband satellite, aeronautical, terrestrial radio, 5G NTN, hybrid satellite/terrestrial, D2D, and more.

Industry-first capabilities and features

The simulated signal paths include the RF characteristics of the transmitter, uplink, satellite/relay, downlink, and receiver, with realistic modelling of characteristics such as path delay, Doppler and fading. A touch-screen or key-board/mouse user interface allows real-world scenarios to be mapped directly to the applicable elements in the signal paths.

All stations (Transmitter, Satellite/Relay, Receiver) can be in motion, with the affected simulation link parameters updated dynamically. The RLS-2100 includes integrated real-time multi-satellite orbit calculation and display for modelling LEO, MEO, HEO, GEO and mixed satellite constel-lations. Routes can be specified for mobile platforms such as vehicles, ships, aircraft, UAVs, HAPs or rockets. Dual in-dependent integrated GNSS simulators can provide station position to user equipment.

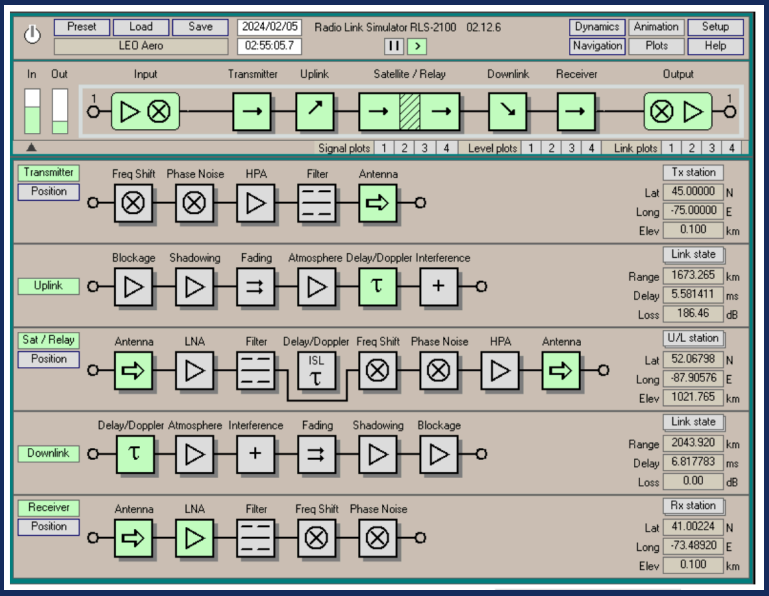
Graphical displays of signal spectrum, signal power profile, station positions, and link parameters facilitate verification of test setups and allow simple visualization of the effects of the applied impairments.

FUNCTIONAL CAPABILITIES

Channels	2 x 1200 or 1000 MHz, or 4 x 600, 500, 400, 300, 200, 150 or 100 MHz
Frequency (independent input/output)	140 to 2450 MHz Opt: 5G FR1 (400 to 7125 MHz) Opt: 5G FR2 (10.7 to 31 GHz), with ext. converter
Input level	–40 dBm rms min, +16 dBm max total peak
Output level	–40 dBm rms min, +3 dBm max total peak
Models	Satellite, Terrestrial, Aero and hybrids
Impairments	• Path loss, delay and Doppler (fixed, position-based or user file) • Additive wideband noise • Phase noise density (spectrum, level) • Phase noise discrete (level, frequency offset) • Interference (type, level, frequency) • Multipath fading (model, bandwidth, C/M ratio, differential delay/Doppler) • Blockage, shadowing • Antenna gain pattern • Antenna phase and amplitude jumps (probability distribution, interval) • HPA non-linearity • Phase and amplitude frequency response • Atmospheric effects including ITU rain fading • 5G fading and path loss models
Other capabilities	• Orbital dynamics (LEO/MEO/HEO/GEO) • Terrestrial/aeronautical station dynamics • Dual independent GNSS simulators

SYSTEM VIEW OF RADIO LINK SIMULATOR

(SINGLE CHANNEL)



GPS SIMULATOR

Physical ch.	2, derived from station positions
Channel types	SMA(F)
	50 ohms nominal
	1575.42 MHz (GPS L1)
	–90 to –50 dBm

MONITOR & CONTROL INTERFACES

Sync and 1 pps	TTL, configurable as input or output
Reference	100 MHz internal, external or disciplined
Ethernet	10/100/1000 Base T
Serial	RS-232/422/485
USB	USB 2.0, USB 3.0
Video	DisplayPort, HDMI, VGA

ADDITIONAL CAPABILITIES

Cooperative units	8 (up to 32 channels total)
Remote control	Ethernet, via Python API
Station position output	Ethernet, ARINC 429
External time synchronization	NTP, 1 pps (NMEA, API)
Ephemeris output	Ethernet
Antenna emulation	OpenAMIP or custom
Visualization	Orbit and route animation
Spectral display	4 independent plots, at input or output
Power profile display	4 independent plots, at input or output
Link parameter display	4 independent plots of range, loss, delay, delay rate, Doppler or Doppler rate, for uplink, downlink, ISL or composite path

MECHANICAL/ENVIRONMENTAL

Form factor	19” / 2.5U rack mount
Size (with bumpers)	L 51 cm x W 51.75 cm x H 12.07 cm L 20 in x W 20.38 in x H 4.75 in
Weight	» 7 kg (15 lb)
Power connector	IEC 320 male
Voltage	100-240 VAC, 50/60 Hz
Current (typical)	» 1.8 A rms at 115 VAC
Operating temperature	10°C to 35°C
Operating humidity	20% to 75% relative humidity, non-condensing
Regulatory	ICES, FCC, CE and RoHS compliant Safety: EN61010-1 Emissions & immunity: EN 55011 Class A, EN61326-1 Class A, FCC part 15 subpart B. ICES-003

Square Peg Communications Inc.
4017 Carling Avenue, Suite 200
Ottawa, ON, Canada K2K 2A3

Tel + 1 613 271 0044
Fax+ 1 613 271 3007
sales@squarepeg.ca

Feb. 2026