



RLS-2100 Radio Link Simulator



OVERVIEW

The Square Peg Communications Inc. RLS-2100 Radio Link Simulator supports hardware-in-the-loop physical layer and end-to-end network performance testing of wideband satellite and terrestrial radio communications systems.

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

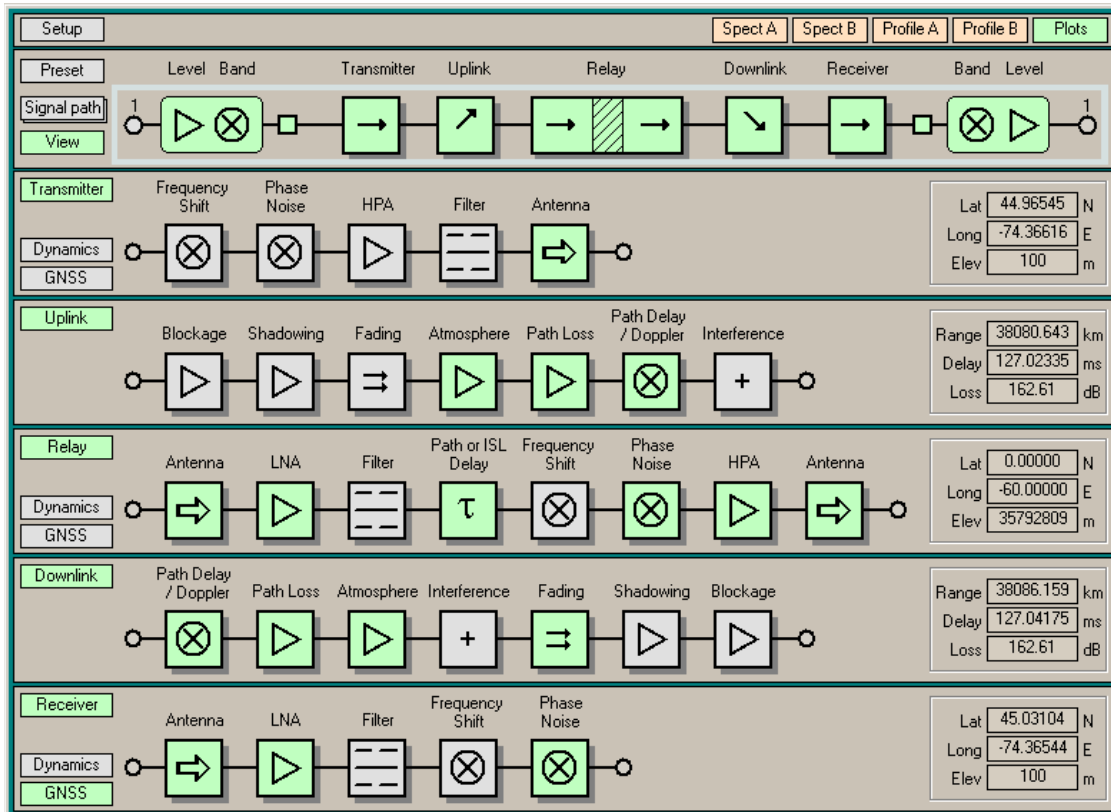
All stations (Transmitter, Satellite/Relay, Receiver) can be in motion, with the affected simulation parameters updated dynamically. The RLS-2100 includes integrated real-time multi-satellite orbit calculation and display for modelling LEO, MEO, HEO, GEO, and mixed satellite constellations. Dual independent 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.

SPECIFICATIONS

FUNCTIONAL CAPABILITIES

Channels	1 x 1200 MHz or 2 x 600 MHz or 4 x 300 MHz or 4 x 150 MHz
Frequency	700 to 2100 MHz (independent input/output)
Input level	-40 to +16 dBm
Output level	-40 to -10 dBm
Impairments	<ul style="list-style-type: none"> ▪ Path delay (fixed or position-based) ▪ Doppler (fixed or motion-based) ▪ Additive wideband noise ▪ Phase noise density (spectrum, level) ▪ Phase noise discrete (level, frequency offset) ▪ Interference (type, level, frequency) ▪ Multi-tap fading (model, bandwidth, C/M ratio, differential delay/Doppler) ▪ Blockage and shadowing ▪ Antenna gain pattern ▪ Antenna phase and amplitude jumps (probability distribution, interval) ▪ Atmospheric effects ▪ HPA non-linearity ▪ Frequency response
Other capabilities	<ul style="list-style-type: none"> ▪ Orbital dynamics (LEO/MEO/HEO/GEO) ▪ Terrestrial/aeronautical station dynamics ▪ Antenna dynamics ▪ Dual independent GNSS simulators ▪ Station dynamics display ▪ Signal spectrum and power profile displays ▪ Link parameter graphical displays (range, path delay, path loss, Doppler, Doppler rate)



SYSTEM VIEW OF RADIO LINK SIMULATOR (SINGLE CHANNEL)

GPS SIMULATOR

Independent positions	2
Satellites	Up to 8
Connector	N(F)
Impedance	50 ohms nominal
Frequency	1575.42 MHz (GPS L1)
Level	-90 to -50 dBm

ADDITIONAL CAPABILITIES

Cooperative units	4
Remote control	Ethernet
Station position output	Ethernet ARINC 429
Antenna pointing input	Ethernet Serial
Antenna emulation	OpenAMIP
Spectral display	2 independent
Power profile display	2 independent
Reference mode	Internal External Disciplined

MONITOR & CONTROL INTERFACES

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

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)	≈ 1.5 A rms at 115 VAC
Operating temperature	10°C to 35°C
Operating humidity	20% to 75% relative humidity, non-condensing
Regulatory	FCC, CE and RoHS compliant Safety: EN61010-1 Emissions & immunity: EN61326-1 Class A



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