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SR5500 Wireless Channel Emulator

The most complete & efficient solution available on the market for accurately testing wireless receivers



Spirent's channel emulator experts have been delivering state-of-the-art RF channel emulators since the early 1990's. Today, the SR5500 Wireless Channel Emulator is the most complete and efficient solution available on the market for accurately testing wireless receivers designed for E-UTRA (LTE), HSPA, HSPA+, EV-DO, WLAN and WiMAX.

The SR5500 Wireless Channel Emulator uses unmatched technology to optimise performance of wireless receivers, accelerating time to market and minimising post-deployment issues. The emulator replicates real-world spatial channel conditions, making it possible to not only meet industry-standard testing requirements, but to also isolate performance issues early in the development and design verification cycle.

The SR5500 re-creates realistic RF fading channel required for testing radio receivers, including Multiple-Input, Multiple Output (MIMO) scenarios. Additive White Gaussian Noise (AWGN) further enhances the real-world conditions emulated by the SR5500. Spirent's SR5500 is also unique; it's the only channel emulator available that can be used as a real-time channel emulator, a Virtual Drive Test station (via Spirent's exclusive Dynamic Environment Emulation, or DEE), or a data-playback emulator (using Spirent's Fading Lab). And only the SR5500 offers dynamic correlation testing so you know how a receiver will react while it's in motion. All these features are based on over 15 years of feedback from Spirent customers, making the SR5500 the most evolved channel emulator on the market.

Benefits

Spirent's SR5500 offers users a number of benefits which are unique in the marketplace. Together these benefits position the SR5500 as the most flexible, accurate and efficient piece of wireless receiver test equipment available: Benefits include:

SR5500 Wireless Channel Emulator Benefits



MODULARITY AND SCALABILITY

- As the industry's only truly modular solution, by using the SR5500 you can be sure of maximising the return on your test equipment investment
- With a platform that goes beyond scalability your return on test equipment investment is maximised with the SR5500

CONFIDENCE IN TEST RESULTS

- The industry's cleanest channel and most statistically accurate fading lead to the most dependable and repeatable test results

EFFICIENT SETUP WITH LESS CHANCE OF ERROR

- Preconfigured fading models are ready to run
- An intuitive interface minimizes errors and decreases the chance of erroneous results

REAL WORLD EMULATION

- With features exclusive to Spirent like DEE and Fading Lab, the SR5500 brings the real-world to your lab like no other product

Features

The SR5500 is packed with user focused features - brought together these make the SR5500 the wireless testing product of choice:

SR5500 Wireless Channel Emulator Features



- The SR5500 emulates wideband radio channel characteristics such as time-varying multi-path delay spread, fast fading, shadow fading and channel loss for advanced receiver implementations using diversity, beamforming and MIMO.
- The SR5500's full modularity lets you deploy a single advanced system or multiple MIMO test stands based on your changing requirements.
- Optional configurations let you stick to your budget without risk. Systems are always fully upgradeable to our most powerful modular configuration.
- Spirent's exclusive Fading Lab lets you create a repeatable RF environment from data sets, whether captured on channel-sounding equipment or generated in software.
- An advanced fading engine ensures accurate testing of sophisticated technologies like E-UTRA (LTE), HSPA, HSPA+, EV-DO, WLAN and WiMAX.
- Spirent's exclusive DEE gives you the flexibility to quickly and easily turn simple spreadsheets into complex RF scenarios ready to use for testing.

Specification

Depending on whether there is hardware or software involved, the specifications listed will vary slightly.

RF Inputs	2 (inter-unit synchronization allows up to 8)
RF Outputs	2 (inter-unit synchronization allows up to 8)
Digital Channels	2 per unit (expandable to 8 with MIMO Option)
RF Configurations	SISO, SIMO, MISO, MIMO (2x2, 2x4, 4x2, 4x4, uni- or bi-directional), and Beamforming
Bandwidth	26 MHz
RF Input	Frequency Range: 400 – 2700 MHz (w/ 6-GHz-EX option): 3300 – 3850 MHz, 4100 – 6000 MHz Level Range: +5 to -32 dBm @ 400 to 2700 MHz (w/ 6-GHz-EX option): -5 to -32 dBm @ 3300 to 3850 MHz (w/ 6-GHz-EX option): -5 to -32 dBm @ 4100 to 6000 MHz Level Resolution: 0.1 dB Damage Level: > +20 dBm
Input Power Meter	Continuous mode RF Burst-triggering mode for gated signals Settable duty cycle mode
RF Output level	Range: -30 to -110 dBm @ 400 to 2700 MHz

	(w/ 6-GHz-EX option): -35 to -110 dBm @ 3300 to 3850 MHz (w/ 6-GHz-EX option): -40 to -80 dBm @ 4100 to 6000 MHz Resolution: 0.1 dB Accuracy: +/-1 dB
Residual EVM	Better than -36 dB typical per sub-carrier, measured at -50 dBm output power; actual value depends upon signal format, symbol rate, etc.
RF Port VSWR	Better than 1.5:1
Independent Paths	up to 24 paths per channel (384 total paths)
Relative Path Delay	0 – 2000 µs, 0.1 ns resolution
Relative Path Loss	0 – 32 dB
Dynamic Power Delay Profiles	○ Birth-death, Sliding (moving propagation) ○ Supports dynamic change of path number, relative power and delay ○ High-Speed Train (HST) profiles
Dynamic Environment Emulation	Controllable Parameters State duration, channel output level, AWGN on/off, C/N, path on/off, relative power and delay, LOS AoA, K factor, frequency shift, Doppler velocity, MIMO branch phase and power imbalance. Channel Model Update Rate 100 times per second Mode MIMO, dual and single channel mode; RX and TX diversity modes Triggering Triggered Play, Free Run
Standards-Based Models	LTE, WiMAX, UMTS, CDMA2000®, WLAN, GSM, and pre-standard models available from Customer Service Center
Other Models	SCM, SCME, WINNER and WINNER-II models
Fading Engine Type	Real-time generation of fading environment
Fading	Types: Rayleigh, Rician, freq shift, phase shift Fading Velocity: 0.1 to 2398.33 km/h @ 900 MHz; Resolution of 0.1 km/h Repetition Interval: > 24 hours Relative Phase: 0 – 360 degrees, 0.1 degree resolution Rician K factor: -30 to +30 dB Level Crossing Rate (LCR) Accuracy: < * 2.5% deviation from theoretical LCR curve of the simulated vehicle velocity Fading Power Spectrum: Classical 6 dB, Flat, Classical 3 dB, Rounded, Rounded 12 dB Correlation: Envelope and Component; Complex correlation is included with MIMO option
Log-Normal Fading	○ Fading Rate: 0.00 to 20.00 Hz ○ Standard Deviation: 0 to 12 dB
MIMO Option	Modes Baseline 2x2 Modularly expandable to uni/bi-directional 2x4, 4x2, 4x4
AWGN - option	○ C/N Ratio: -30 to +32 dB ○ Accuracy: +/-0.1 dB for -20 to 15 dB ratios ○ Bandwidth: 26, 13, 6.5, 3.25, 1.625 MHz ○ Fidelity: Meets or exceeds all 3GPP, 3GPP2, WLAN, WiMAX, and LTE requirements

	○ Sequence Duration: > 2 hours ○ Settable Modes: C/N, C/No, Eb/No
Fading Data Playback - option	Playback data can be collected (via a channel sounder) or synthesized in software
Control Interface	Ethernet or GPIB
Other	10 MHz internal reference accuracy: 1 ppm, can be locked to external reference AC Power: 250 watts typical steady state, 45 watt maximum additional for 6 GHz Option Dimensions: 19-inch rack mountable Height/Width/Depth 8.75”/16.88”/21” (22.22 cm/42.88 cm/53.34 cm) Weight: 65 pounds (29.5 kg)

Documents

Virtual Drive Test Conversion Tool Datasheet

Now capturing, saving and “playing back” RF environment drive test data is easier than ever with Spirent’s Virtual Drive Test - Conversion Tool (VDT-CT).

SR5500 Wireless Channel Emulator Datasheet

The SR5500 re-creates RF fading and interference effects for testing wireless receivers. An advanced fading engine ensures accurate testing of sophisticated technologies like HSPA, HSPA+, EV-DO, E-UTRA (LTE), UMB, WLAN and WiMAX.

Technical note: Using DEE for Handover Testing

This Technical Note demonstrates the application of Dynamic Environment Emulation(DEE) to handover tests for wireless technologies; such as 3GPP (3rd Generation Partner Project) and WiMAX (Wireless Interoperability for Microwave Access).

Education & Implementation Services Datasheet

Spirent Education & Implementation Services help you utilize all of the Spirent product’s rich testing features to their full capability.

LTE Testing Brochure

Long Term Evolution (LTE) technology supports the next generation of mobile services. Moving far beyond basic voice and texting, LTE also enables wireless broadband access.

White Papers

Beneath the Tip of the Iceberg - What you should know before deploying LTE devices

Read about the potential pitfalls when deploying LTE devices on new networks and how testing is critical.

White Paper 100 - Correlation-Based Spatial Channel Modeling

The subject of this paper is Correlation-based Modeling, an alternate to the path-based SCM approach used in spatial channel modeling. Recently, correlation-based spatial channel models have become popular because of their simple mathematical form and ease of modeling.

White Paper 101 - Fading Basics

Radio technologies have undergone increasingly rapid evolutionary changes in the recent past. The first cellular phones used narrow-band FM modulation, which was soon replaced by digital modulation in second & third generation devices.

White Paper - Path-Based Spatial Channel Modeling

This white paper explains the industry-standard path-based Spatial Channel Model (SCM) used for evaluating multiple-antenna systems and algorithms.

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