北京星河亮点技术股份有限公司
Beijing StarPoint Technology Co., Ltd.

SP9500 5G Test System

Product Overview

SP9500 5G test system is the leading conformance test solution in the world, designed for 5G FR1 terminal devices. This solution covers all RCT/PCT/RRM conformance test on GCF/PTCRB. Besides, SP9500 5G test system can also support China Type Approval Test, CE/FCC/MIC test and Carrier Acceptance Conformance Test by only upgrading the license.

SP9500 5G test system fully supports the 5G FR1 terminal device conformance test requirements specified in 3GPP TS38.521-1/38.521-3/38.521-4/38.533/38.523-1/34.229-5, including RF Conformance Test, RRM Conformance Test and Protocol Conformance Test.

The integrated tests for 5G terminal devices cover all scenarios on each layer protocol stack under 5G FR1 NSA and SA, including terminal RF transmitter/receiver characteristics test, demodulation performance test, cell reselection test, handover criteria, and function test such as procedure and performance test, thereby providing comprehensive test and analysis for 5G terminal devices.

In addition, SP9500 5G test system can be extended to support other tests including power consumption test and throughput test, making SP9500 5G test system the one-stop solution to address numerous scenario requirements for 5G terminal device test.

SP9500 5G test system can be widely used in all stages of the lifecycle of 5G terminal device industry. The application scenarios cover chipset/module R&D test, regression test, type approval test, carrier acceptance test, manufacture verification test, product quality surveillance test, international certification test, etc.

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星河亮点 StarPoint

Highlights

- ✓ **Dedicated on 5G terminal device test**
- ✓ **Stable and mature SW/HW platform**
- ✓ **Leading status in global certification progress**
- ✓ **Excellent R&D capability**
- ✓ **Fully applied by upstream enterprises**
- ✓ **Fast and efficient testing procedure**
- ✓ **Friendly user interface for great user experience**

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Test Solutions

RF Conformance Test (RCT)

The 5G terminal device RF conformance test is defined by the 3GPP TS38.521-1, TS38.521-3, 38.521-4. It is used to verify whether the radio performance of the DUT and the algorithms related to the physical layer meet the standard specifications.

SP9500-RCT fully supports the 3GPP FR1 NSA/SA RF conformance test and the transmitter/receiver characteristics test, including test cases of maximum output power, output power dynamic, transmit signal quality, output RF spectrum emissions, reference sensitivity, maximum input level, adjacent channel selectivity, blocking and spurious response, intermodulation characteristics, etc.

Protocol Conformance Test（PCT)

The 5G terminal device protocol conformance test is defined by the 3GPP TS38.523-1/34.229-5. It is used to verify whether the relevant functions of each layer of the terminal protocol stack under test meet the standard specifications.

SP9500-PCT fully supports the 3GPP FR1 NSA/SA protocol conformance test items, including Idle/Inactive/Connected Mode Operations test(only applicable for SA), Layer 2 (MAC, RLC, PDCP) test, RRC test, NAS test, session test, IMS test, etc.

Radio Resource Management Conformance Test（RRM)

The 5G terminal device RRM conformance test is defined by the 3GPP TS38.533. It is used to verify whether the wireless resource management performance of the DUT meet the standard specifications.

SP9500-RRM fully supports the 3GPP FR1 NSA/SA RRM conformance test items, including Idle Mode Operations test(only applicable for SA), RRC_CONNECTED state test, cell search/selection/re-selection test, service scheming test, time delay and signaling characteristics test, and wireless link monitor test, etc.

Note: For RCT/PCT/RRM test case list, please refer to the function list.

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System Configuration Guide

Hardware

Order Code	Module	Description	Applicable Test Category
9500_H001	SP9500 Basic Hardware Platform	Basic hardware platform of SP9500 all product forms including instrument chassis and internal accessories, basic board cards, etc. It needs to cooperate with the control and switching unit, and baseband/RF processing unit. The platform provides 1 main control unit installation slot and 5 baseband / RF processing unit installation slots.	PCT/RCT/RRM
9500_H002	SP9500 Control & Switch Unit	The core control board and data center of SP9500 has high-performance computing, high-speed switching capabilities and pre-installed operating system. It also provides UI control/display interface, synchronous interface of the complete machine, high-speed communication interface. It is required for all product forms.	PCT/RCT/RRM
9500_H003	SP9500 Baseband Unit	Each baseband processing unit can simulate muitiple 5G cells / carriers or multiple LTE cells / carriers.	PCT/RCT/RRM
9500_H004	SP9500 Sub6G Radio Frequency Unit	Each RF processing unit provides 4 independent RF channels with a frequency range of 100MHz~6GHz.	PCT/RCT/RRM
9500_H051	RFS500-FE RF switching box	Used for RF conformance test, providing radio frequency signal extraction and access link for the spectrum analyzer and signal generator in the system which satisfies multi-antenna terminal test	RCT
9500_H052	RFS500-CU combiner box	Used for RF, protocol and RRM conformance test, etc.; Provide flexible air interface combining and switching matrix for multi-antenna terminal	PCT/RCT/RRM
9500_H053	RFS500-Filter filter box	Used for RF conformance test as well as CTA RF test and provide basic filter path	RCT
9500_H061	Spectrum Analyzer	Used for RF test items such as spurious and inter-modulation, etc.	RCT
9500_H062	Signal Generator	Used for RF test items such as inter-modulation, blocking, spurious response, etc.	RCT
9500_H063	DC power supply	Provide DC power supply for the tested terminals, and can also be used for terminal power consumption test	PCT/RCT/RRM (Optional)
9500_H070 9500_H080	System Server PC 37U standard	Used for data storage, storing logs, receiving and sending AT commands, etc. 37U standard cabinet specially for terminal test system (2	PCT/RCT/RRM RCT

	cabinet	pieces)	
9500_H101	SP9500 accessory set I	SP9500 basic accessories: RF adapter, keyboard, mouse, display, etc.	PCT/RCT/RRM
9500_H102	SP9500 accessory set II	Conformance test accessories: RF cables, KVM,Router.etc.	PCT/RCT/RRM
9500_H103	SP9500 accessory set III	Including dedicated RF cables, BNC cables, connectors, loads, etc.	RCT
9500_H104	SP9500 accessory set IV	RCT test specific accessories: Including System nameplate, panel, cable tray, meter bracket, equipment tray, special drawer, etc.	RCT
9500_H151	5G standard test USIM card	The standard USIM card that meets the requirements of the 3GPP specification; Applicable to most 5G terminal test scenarios.	PCT/RCT/RRM
9500_H152	5G PCT special USIM card set	USIM that applicable to 3GPP38.523-1 special test cases which require special parameters configuration for protocol conformance test	PCT

Software

Order Code	Module	Description	Applicable Test Category
9500_SW-001	SP9500 platform master control software	It is the basic framework and user interface software of SP9500. Responsible for the initialization, real-time control, information exchange between modules, test log and test report management of all software/hardware in the instrument, and provide abundant remote control interface to the outside world. It is required in all SP9500 series products.	PCT/RCT/RRM
9500_SW-002	NR R15 communication protocol software_part I	Providing the basic 5G R15 physical layer and protocol stack functions to meet the application scenarios requirements including signaling processing of 5G system such as broadcasting, random access, registering, paging, establishment of reference measurement channel and so on.	PCT/RCT/RRM
9500_SW-003	NR R15 communication protocol software_part II	Extention of the protocol software part I, providing more comprehensive 5G R15 protocol stack and testing extension functions, including complex signalling interaction, abnormal procedure simulation, protocol stack piling, baseband channel fading and performance test, applied in PCT, RCT, RRM and other testing occasions.	PCT/RCT/RRM

9500_SW-004	LTE communication protocol software	Providing the basic LTE physical layer and protocol stack functions to meet the LTE signaling processing required in 5G NSA terminal RF test or various conformance testing scenarios.	PCT/RCT/RRM
9500_SW-101	5G R15 FR1 Terminal RF transmitter test software	Providing 5G terminal radio frequency transmitter measurement functions of power, spectrum, modulation quality, etc. functions.	RCT
9500_SW-111	5G R15 FR1 terminal data throughtput measurement software	Providing 5G terminal data throughput test function and BLER statistical function.	RCT
9500_SW-200	5G test management software	Used for managing protocol conformance testing, RF conformance testing, RRM conformance testing and other category test cases, creating and running test plans, viewing running logs, generating test reports, performing system calibration, etc.	PCT/RCT/RRM
9500_SW-210	5G R15 FR1 terminal protocol conformance test case software	Providing a set of 5G R15 FR1 terminal protocol conformance test cases defined by 3GPP 38.523-1 standard and within the GCF range	PCT
9500_SW-211	5G R15 FR1 terminal IMS conformance test case software	Providing the license of one test case of 5G R15 FR1 terminal IMS conformance test defined by 3GPP 34.229-5 standard and within the GCF range	PCT
9500_SW-220	5G R15 FR1 terminal RF conformance test case software	Providing a set of 5G R15 FR1 terminal RF conformance test cases defined by 3GPP TS 38.521-1 and TS 38.521-3 standards and within the GCF range	RCT
9500_SW-221	5G R15 FR1 terminal RF performance test case software	Providing a set of 5G R15 FR1 terminal RF performance test cases defined by 3GPP TS 38.521-4 standards and within the GCF range	RCT
9500_SW-230	5G R15 FR1 terminal RRM conformance test case software	Providing a set of 5G R15 FR1 terminal RRM conformance test cases defined by 3GPP TS 38.533 standard and within the GCF range	RRM
9500_SW-504	5G R15 FR1 terminal test supported band	Supporting one of 5G test bands applicable to GCF RCT/RRM/CTA RF/CTA RRM test software packages. Band support shall be within the range defined by GCF, PTCRB and CTA.	RCT/RRM

Specification

Weight	SP9500-5G CTS：≤34kg Spectrum Analyzer：25kg Signal Analyzer：<28kg RFS500-CU Combined Box：≤15kg RFS500-FE Switching Unit：≤15kg RFS500-Filter Unit：≤25kg DC Power Supply：≤10kg System Server PC：≤8kg Display：≤4kg Cabinet x2(37U)：≤200kg **Total （including cables and Annex）：≤400kg**
Dimensions	SP9500-5G CTS：432mm(W) x 221 mm (H) x 449 mm (D) Spectrum Analyzer：426mm(W) × 177mm (H) × 460mm(D) Signal Analyzer：435mm(W) × 178mm(H) × 498mm(D) RFS500-CU Combined Box：483mm(W) x 130mm(H) x 545mm(D) RFS500-FE Switching Unit：430mm(W) x 220mm(H) x 545mm(D) RFS500-Filter Unit：430mm(W) x 220mm(H) x 545mm(D) System Server PC：165mm(W) x 365 (H) x 300 mm (D) Cabinet x2：120cm (W) x 185cm (H) x 80cm (D) **Recommended operating space:: 200cm (W) x 200cm (H) x 250cm (D)**
Voltage and Frequency	AC: 80~264V, 45~65Hz
Frequency Range	100MHz ~ 6GHz
Rated Power	SP9500-5G CTS：1600W Spectrum Analyzer：<350W Signal Analyzer：<350W RFS500-CU Combined Box： 150W RFS500-FE Switching Unit：150W RFS500-FilterUnit：150W DC Power Supply：400W System Server PC：300W Display：40W Cabinet x2(w/ fan)：100W **Total：＜4000W**
Operating Temperature	+5°C ~ +40°C
Operating Humidty	20% ~ 80% （non-condensing）
RF Connector	SMA - type female（SP9500-5GCTS） Impedance：50Ω nominal
GUI	Windows 10