

SPIRENT C2K-ATS

C2K-ATS Minimum Performance Test Option

Spirent's C2K-ATS is the leading automated solution for testing wireless 1X and EV-DO Rev. 0/Rev. A/Rev. B handsets and terminal devices. C2K-ATS' complete automation, ease of use and accuracy make it the platform of choice for the world's most successful operators and manufacturers.

APPLICATIONS

- Product Development
- Design Verification
- Product Qualification
- Conformance/Compliance Test
- Competitive Analysis
- Performance Analysis

The Minimum Performance Test option for Spirent's C2K-ATS system comprehensively automates test cases from CDMA Minimum Performance standards like TIA-98 (aka 3GPP2 C.S0011), TIA-866 / C.S0033 and TIA-866A / C.S0033A for 1X and EV-DO mobile devices.

The C2K-ATS Minimum Performance Test option is built on a long history of Spirent's industry-leading automated solutions for parametric RF performance testing.

BENEFITS

- *Better products* – C2K-ATS helps fine-tune designs and enhance product quality
- *Better use of human resources* – Complete automation ensures 24/7 testing without manpower constraints
- *Fewer post-deployment issues* – Flexibility and automation allow thorough breakpoint analysis under a wide variety of conditions
- *Faster time to market* – Automatic test case configuration streamlines the testing process
- *Efficient asset usage* – The Minimum Performance Test option leverages the same C2K-ATS platform used for testing 1X and EV-DO. The C2K-ATS is also the platform for a clean upgrade path to LTE testing



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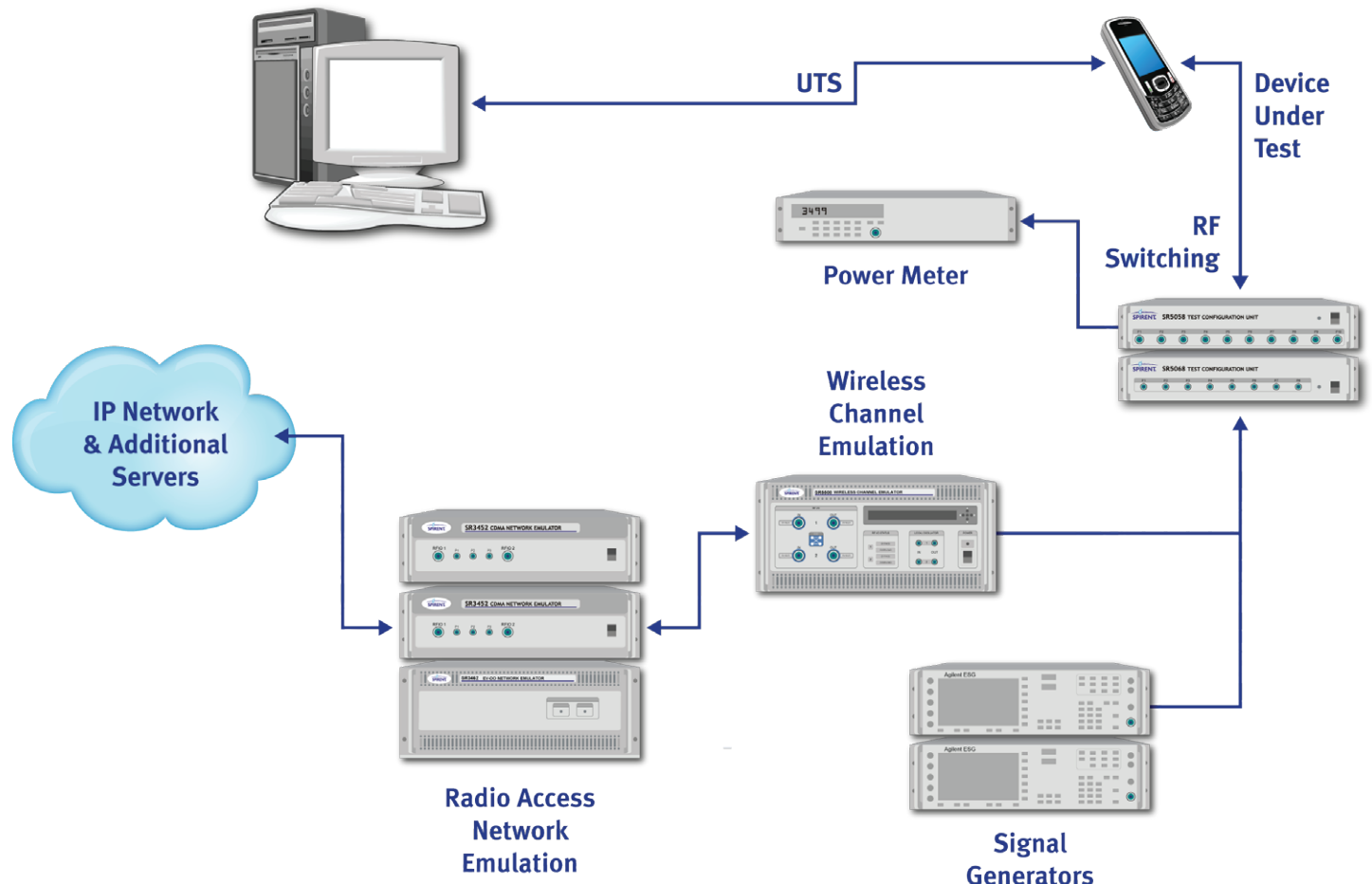
C2K-ATS Minimum Performance Test Option

KEY FEATURES

- Single turn-key system for parametric performance analysis of CDMA2000 1X and EV-DO Rev. 0/Rev. A/Rev. B mobile devices
- Pre-defined test suites for TIA-98/C.S0011, TIA-866/C.S0033, TIA-866-A/C.S0033-A and TIA-866-B/C.S0033-B
- Automatic performance characterization determines mobile performance breakpoints
- Powerful test executive automates the test process
- Intuitive GUI provides full control over test parameters
- Integrated data collection and results reporting
- Receive Diversity testing ensures compliance to operator specifications as well as subscriber satisfaction with the tested device

SYSTEM ARCHITECTURE

- C2K-ATS is a complete solution consisting of both hardware and software components.
- Application-specific test executive software configures all system components, executes test procedures, collects test results, and generates reports.
- AirAccess® 1xPLUS emulates an entire 1X and EV-DO network, including core network data components.
- The SR5500 Wireless Channel Emulator (with AWGN option) provides channel impairments enabling evaluation of real-world performance characteristics in a lab environment. Universal Diagnostic Monitor (UDM) adds thorough logging and control of 1X and EV-DO messaging and provides a useful debug/analysis tool.
- The Spirent Test Configuration Unit (TCU) hardware automatically re-configures RF test cases. The combination of TCU hardware and UDM software makes C2K-ATS the most automated wireless test system available.



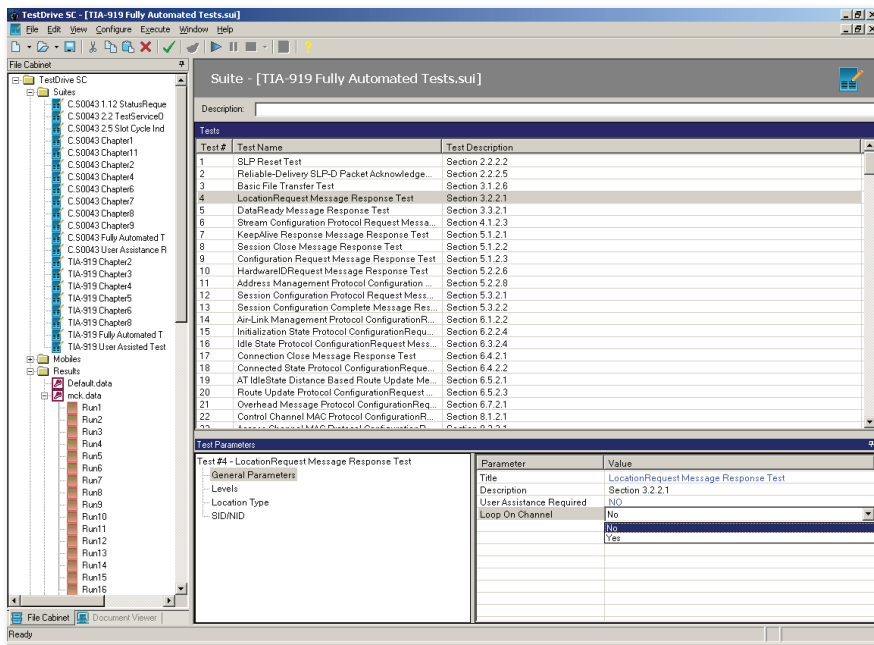
Spirent's C2K-ATS is a flexible, expandable system for automating key device testing.

TEST EXECUTIVE SOFTWARE

- C2K-ATS Minimum Performance testing is controlled by one of two software test executives designed to meet the particular needs of the technology.
- TASKIT/C2K software manages and runs test suites (software modules) designed for 1X handset testing. Each suite runs with no additional configuration to automate test cases per 1X test specifications.
- The TestDrive/EV-DO executive performs the same functions in automating parametric testing for EV-DO devices.
- Both TASKIT and TestDrive provide solid automation of standards-based testing, while also enabling creation of customized test programs. By integrating total control over the emulated network, the RF interface, and the device under test (DUT), these test executives ensure that testing is complete, accurate and resource-effective.
- C2K-ATS test executives also manage the results databases, and can automatically generate test reports in a variety of industry-standard formats.

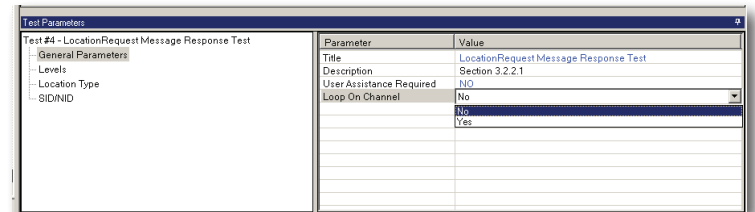
TEST SUITES

- The test suites used by TASKIT/C2K and TestDrive are software modules designed to target specific areas of testing. Spirent also offers software bundles designed to address the most common test requirements. Please contact your Spirent Regional Sales Manager for further details.



BEYOND CONFORMANCE

- In addition to providing standard test cases, Spirent’s test executive software exposes key test parameters to enable the customization of test conditions. While the system implements test cases drawn directly from the specifications, it also offers the flexibility to tailor testing and gather more focused results.
- Adjusted-parameter tests, swept-parameter testing, and “breakpoint” testing can be set up quickly, providing value at every stage of the product lifecycle from prototyping to post-deployment investigations.



Test parameters can be modified for custom test development.

COMPREHENSIVE TEST RESULTS

- C2K-ATS makes collecting, organizing, and formatting data into meaningful reports quick and easy. Results are automatically stored using the Microsoft Jet database file format, the same format used by MS Access. This file format allows the use of high-level languages such as Visual Basic for post-processing analysis, trend analysis, and historical tracking of a specific device.
- Once a suite of tests is run, analysis of results can begin a few mouse clicks later. The test executive quickly processes raw results into a professional report in industry-standard formats like Adobe Acrobat, Microsoft Excel, or Microsoft Word. Low-level messaging is automatically logged so if issues arise, the process of investigation has already begun. Based on the test case type, the test executive intelligently elects to log messages using the AirAccess message logging feature or Spirent's innovative Universal Diagnostic Monitor (UDM).

RECEIVE DIVERSITY TESTING

- C2K-ATS uses Spirent's best-in-class SR5500 Wireless Channel Emulator to provide a comprehensive and accurate RF environment for Receive Diversity testing. C2K-ATS offers Receive Diversity test cases based on industry-standard EV-DO Minimum Performance tests, allowing you to verify and quantify demodulation, sensitivity and more for EV-DO Rev. 0 and Rev. A devices.
- Now the step forward to multiple-antenna technologies can be made with the confidence that only comes from thorough testing.

UNIVERSAL DIAGNOSTIC MONITOR (UDM)

- Spirent pioneered test automation by developing the Universal Diagnostic Monitor (UDM), based on the Spirent's Universal Test Suite (UTS) drive platform. UDM automates control of mobile devices during testing, and also captures and logs message data from the device under test. Unlike chipset-specific diagnostic solutions, each UTS driver is device-specific to support many brands and models of mobile devices.
- UDM/UTS also enables rapid test configuration by automatically interrogating the network settings of the device under test and setting corresponding test parameters. This greatly simplifies test setup by eliminating the need to manually enter mobile device settings such as NID, SID, Channel Number, and Band Class. UTS also captures key mobile device identity data such as ESN, Model Name, Hardware Version, and Software Version, then saves that data with automatically collected test results.
- With UDM, C2K-ATS automates mobile control. There's no need for user intervention when placing mobile-originated calls, significantly reducing test time. The resulting closed-loop automated test system can capture both messaging and device measurements to display real-time mobile device performance parameters during test execution.

TECHNICAL SPECIFICATIONS

HARDWARE	
SR5500 Wireless Channel Emulator	
RF Channels	2 (Expandable to 8 under a single interface)
Bandwidth	26 MHz
RF Input	Frequency Range: 400 – 2700 MHz Level Range: 0 to -30 dBm
RF Input (with 6-GHz Option)	Frequency Range: 400 – 2700 MHz, 3350 – 3850 MHz, 4100 – 6000 MHz Level Range (0.1 dB resolution): 0 to -30 dBm @ 400 to 2700 MHz -10 to -30 dBm @ 3350 to 3850 MHz -10 to -30 dBm @ 4100 to 6000 MHz
RF Output	Level Range (0.1 dB resolution): -30 to -110 dBm
RF Output (with 6-GHz Option)	Level Range (0.1 dB resolution): -30 to -110 dBm @ 400 to 2700 MHz -40 to -80 dBm @ 3350 to 3850 MHz -40 to -80 dBm @ 4100 to 6000 MHz
Independent Paths	24
Relative Path Delay	0 – 2000 ms, 0.1 ns resolution
Relative Path Loss	0 – 32 dB
Dynamic Power Delay Profiles	Birth-death, Sliding (moving propagation)
DEE-Controllable Parameters	State duration, channel output level, path delay, path status (on/off), relative path loss
Fading	Types: Rayleigh, Rician, freq shift, phase shift Doppler Range: 0.01 – 2000 Hz, 0.01 Hz resolution Repetition Interval: >1700 hours Relative Phase between Paths: 0 – 360 degrees, 0.1 degree resolution Rician K-factor: -30 to +30 dB
AWGN (optional)	C/N Ratio: -30 to +30 dB (dependent on O/P level) Bandwidth: 26, 13, 6.5, 3.25, 1.625 MHz Fidelity: Meets or exceeds all 3GPP, 3GPP2 and WLAN requirements Sequence Duration: >2 hours

TECHNICAL SPECIFICATIONS (CONT'D)

HARDWARE	
AirAccess CDMA Network Emulator	
Pilot Relative Level	-63.0 to -0.1 dB (0.1 dB res)
Sync Relative Level	-63.0 to -0.1 dB (0.1 dB res)
Paging Relative Level	-63.0 to -0.1 dB (0.1 dB res)
QPCH Relative Level	-63.0 to -0.1 dB (0.1 dB res)
FCH Relative Level	-63.0 to -0.1 dB (0.1 dB res)
SCH Relative Level	-63.0 to -0.1 dB (0.1 dB res)
OCNS Walsh Code Length	Fixed to 64
OCNS Relative Level Range	Calculated automatically from the relative levels of the other code channels to provide a composite power level that is equal to the programmed sector power
CDMA Modulation	Modulation Type: 1X: Parallel BPSK for Pilot, Sync and Paging channels; Complex QPSK for FHS and SCH channels EV-DO: QPSK, 8-PSK, 16-QAM
Independent RF Carriers	1 RF output per SR3452 V2
Frequency	Frequency Range: Band Class 0 (869 MHz to 894 MHz) Band Class 1 (1930 MHz to 1990 MHz) Band Class 3 (832 MHz to 869 MHz) Band Class 4 (1840 MHz to 1870 MHz) Band Class 5 (421 MHz to 494 MHz) Band Class 6 (2110 MHz to 2170 MHz) Frequency Resolution: 500 Hz Frequency Setting: By channel number
Amplitude	RF Output Level Range: -100 dBm/1.23 MHz to -38 dBm/1.23 MHz RF Output Level Resolution: 0.1 dB <i>Absolute Output Level Accuracy: ±1 dB</i>
CDMA Modulation Quality	Residual Rho > 0.99

Italicized specifications are typical, not guaranteed parameters.

SOFTWARE	
TestDrive EV-DO	Test Executive software
TASKIT-C2K	Test Executive software
Universal Diagnostic Monitor	Automates control of the Device Under Test
AirAccess C2K	Software GUI for AirAccess Network Emulator(s)
TestDrive 5500	Software GUI for SR5500 Wireless Channel Emulator

ORDERING INFORMATION

SYSTEMS	
P/N C2K-CFG3-SYS-01	C2K-ATS PLATFORM CONFIG 3 (SUPPORTS 1X/EV-DO MP)
P/N C2K-CFG4-SYS-01	C2K-ATS PLATFORM CONFIG 4 (SUPPORTS 1X/EV-DO MP+1X SC)
P/N C2K-CFG5-SYS-01	C2K-ATS PLATFORM CONFIG 5 (SUPPORTS 1X/EV-DO MP & SC)
P/N C2K-CFG8-SYS-01	C2K-ATS PLATFORM CFG 8 (SUPPORTS 1X/EV-DO MP + 1X SC & LBS)
P/N C2K-CFG9-SYS-01	C2K-ATS PLATFORM CFG 9 (SUPPORTS 1X/EV-DO MP, SC & LBS)
P/N C2K-CFG3-SYS-03	C2K-ATS PLATFORM CFG 3 (SUPPORTS 1X/EV-DO MP)
P/N C2K-CFG4-SYS-03	C2K-ATS PLATFORM CFG 4 (SUPPORTS 1X/EV-DO MP+1X SC)
P/N C2K-CFG5-SYS-03	C2K-ATS PLATFORM CFG 5 (SUPPORTS 1X/EV-DO MP & SC)
P/N C2K-CFG8-SYS-04	C2K-ATS PLATFORM CFG 8 (SUPPORTS 1X/EV-DO MP,1X SC,LBS)
P/N C2K-CFG9-SYS-04	C2K-ATS PLATFORM CFG 9 (SUPPORTS 1X/EV-DO MP,SC,LBS)
P/N C2K-CFG11-SYS-03	C2K-ATS PLATFORM CFG 11 (SUPPORTS 1X/EV-DO MP/SC/DATA)
P/N C2K-CFG12-SYS-04	C2K-ATS PLATFORM CFG 12 (SUPPORTS 1X/EV-DO MP,1X SC/LBS/DATA)
P/N C2K-CFG13-SYS-04	C2K-ATS PLATFORM CFG 13 (SUPPORTS 1X/EV-DO MP/SC/LBS/DATA)

C2K-ATS adds Receive Diversity testing capability from Spirent, the world's leading RF channel emulation experts.



THE INDUSTRY STANDARD

Spirent's C2K-ATS mobile device testing platform is the world's foremost platform for automated conformance testing and performance characterization of CDMA and EV-DO mobile devices. A single system serves as an automated platform for:

- Minimum Performance testing
 - CDMA 1X, EV-DO Rev 0, Rev A, and Rev B device testing for testing compliance to C.S0011, C.S0033, C.S0033-A, and C.S0033-B specifications
 - Device performance characterization
 - “Swept parameter” testing – iterative testing with a continually varying RF parameter
 - Breakpoint identification – quantify the levels of noise, fading, interference, etc. that cause a specific connection impairment
- Signaling Conformance testing
 - C.S0031, C.S0043, C.S0060, C.S0061, C.S0073, C.S0044, C.S0062, C.S0094, C.S0038 and C.S0038A specification compliance
- Location-Based Services (Assisted GPS testing)
 - C.S0036, C.S0059 testing plus Spirent-proprietary de facto industry standards (EV-DO User Plane testing, Autonomous Mode testing, Over-the-Air testing)
- Data Performance testing
 - C.S0037 specification compliance
 - Data Throughput performance
 - Mobile IP DMU testing
 - Data Retry (“Safe for Network”) testing

C2K-ATS systems can also be upgraded to perform eHRPD and LTE device testing.

SPIRENT GLOBAL SERVICES

Spirent Global Services provides a variety of professional services, support services and education services — all focused on helping customers meet their complex testing and service assurance requirements. For more information, visit the Global Services' web site at www.spirentcom.com or contact your Spirent sales representative.

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