

스펙트럼 분석기

RSA500A 시리즈 휴대용 스펙트럼 분석기 데이터 시트



RSA500A 시리즈 USB 스펙트럼 분석기는 견고한 배터리 구동 패키지로 고성능 휴대용 스펙트럼 분석을 제공합니다.

주요 특징 및 장점

- 9 kHz ~ 3.0 / 7.5 / 13.6 / 18.0 GHz 주파수 범위는 광범위한 분석 요구를 충족
- 40MHz 수집 대역폭으로 순간 포착 및 벡터 분석을 위한 실시간 분석 가능
- 빠른 설정 및 감지를 위한 고속 풀 스패ن 스위프 (70 GHz / 초) 맵핑을 위한 표준 GPS / GLONASS / 바이두 수신기 게인 / 손실, 안테나 및 케이블 측정을 위한 옵션 트래킹 제너레이터
- DataVu-PC 소프트웨어로 다양한 대역폭에서 다중 장치 기록 가능
- 열악한 조건에서 사용하기 위한 Mil-Std 28800 Class 2 환경, 충격 및 진동 사양
- 확장된 현장 작업을 위한 내부 배터리
- SignalVu-PC 소프트웨어는 DPX® Spectrum / Spectrogram으로 실시간 신호 처리 기능을 제공하여 과도 및 간섭 헌팅에 소요되는 시간을 최소화
- EMC / EMI 사전 준수 및 문제 해결-CISPR 감지기, 사전 정의 된 표준, 한계 라인, 손쉬운 액세스리 설정, 주변 캡처, 장애 분석 및 보고서 생성
- 100% 인터셉트 확률의 15µsec 최소 신호 지속 시간으로 매번 처음으로 문제를 확인

- 맞춤형 프로그램 개발을 위해 포함 된 응용 프로그래밍 인터페이스
- 태블릿 PC, 캘리브레이션 키트, 어댑터 및 위상 안정 케이블을 포함한 액세스리는 간섭 사냥 및 트랜스미터 유지 보수를 위한 완벽한 현장 솔루션을 제공합니다.

응용 분야

- 범용 스펙트럼 분석
- 무선 네트워크 설치 및 유지 보수
- 스펙트럼 모니터링
- 스펙트럼 관리
- 간섭 사냥
- EMI / EMC 준수 테스트 및 문제 해결
- 스펙트럼 작업
- 방사선 위험 (RADHAZ) 테스트
- 배출 제어 (EMCON) 모니터링
- 신호 인텔리전스 (SIGINT) 모니터링

RSA500 시리즈는 시간을 절약해 드립니다.

RSA500 시리즈는 실시간 스펙트럼 분석을 제공하여 간섭을 찾기 어려운 RF 추적, RF 네트워크 유지 및 노력 기록을 유지해야 하는 스펙트럼 관리자, 간섭 사냥꾼 및 네트워크 유지 보수 담당자의 문제를 해결하도록 설계되었습니다. 시스템의 핵심은 열악한 환경에서 충실도로 40MHz 실시간 대역폭을 캡처하는 USB 기반 RF 스펙트럼 분석기입니다.

70 dB의 스퓨리어스 없는 다이내믹 레인지와 18.0 GHz의 주파수 범위로 측정 결과에 대한 높은 신뢰도로 관심 있는 모든 신호를 검사할 수 있습니다.

USB 폼 팩터는 손에 기기의 무게를 옮기고 가벼운 Windows 태블릿 또는 노트북으로 대체합니다. 무거운 스펙트럼 분석기 대신 가벼운 PC를 들고 있으면 더 빠르게 이동하고 더 오래 작업 할 수 있으며 작업을 더 빠르게 수행 할 수 있습니다.

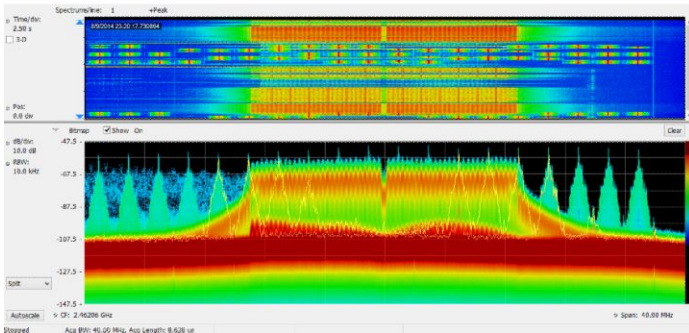
선택적인 트래킹 제너레이터는 필터, 듀플렉서 및 기타 네트워크 요소의 빠른 테스트를 위한 게인/손실 측정을 가능하게 하며 필요에 따라 VSWR, 리턴 손실, 고장 거리 및 케이블 손실의 케이블 및 안테나 측정을 추가 할 수 있습니다.

SignalVu-PC 소프트웨어는 현장에 필요한 풍부한 분석 기능을 제공합니다

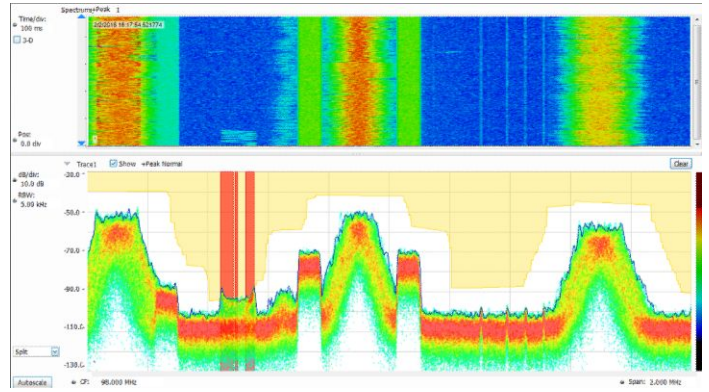
RSA500 시리즈는 Tek의 기존 스펙트럼 분석기의 기초로 사용되는 강력한 프로그램 인 SignalVu-PC와 함께 작동합니다. SignalVu-PC는 이전에 고성능 배터리 작동 솔루션에서 사용할 수 없었던 심층 분석 기능을 제공합니다. DPX® 스펙트럼 / 스펙트로 그래프의 실시간 처리가 PC에서 가능 해져 하드웨어 비용이 더욱 줄어 듭니다. 계측기에 프로그래밍 방식으로 액세스 해야 하는 고객은 SignalVu-PC 프로그래밍 방식 인터페이스를 선택하거나 풍부한 명령 및 측정 세트를 직접 제공하는 포함 된 API (응용 프로그래밍 인터페이스)를 사용할 수 있습니다. 무료 SignalVu-PC 프로그램의 기본 기능은 기본과 다릅니다. 기본 버전 측정은 다음과 같습니다.

SignalVu-PC와 결합 된 RSA500A는 고급 필드 측정을 제공합니다

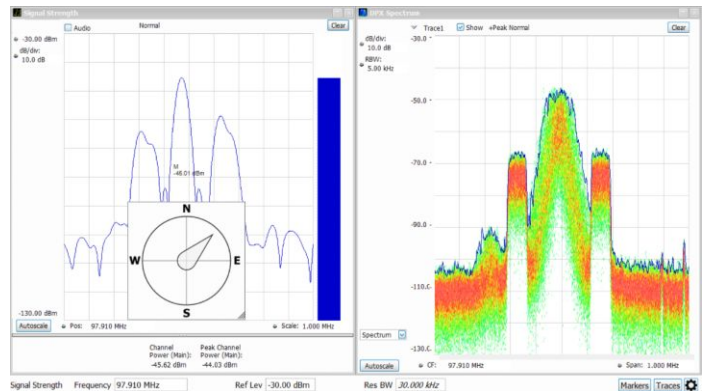
40MHz의 실시간 대역폭을 갖춘 고유 한 DPX® 스펙트럼 / 스펙트로 그래프는 간섭 또는 알려지지 않은 신호의 모든 인스턴스를 15µs까지 유지합니다. 다음 이미지는 WLAN 전송 (녹색 및 주황색)을 보여 주며 화면에서 반복되는 좁은 신호는 Bluetooth 액세스 프로브입니다. 스펙트로그램 (화면 상단)은 신호 충돌을 나타내기 위해 이러한 신호를 시간에 따라 명확하게 분리합니다.



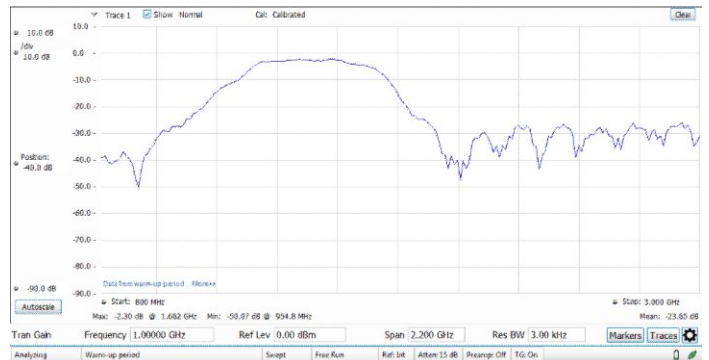
무인 마스크 모니터링으로 예기치 않은 신호를 쉽게 찾을 수 있습니다. DPX® 스펙트럼 디스플레이에서 마스크를 만들 수 있으며, 중지, 사진 저장, 획득 저장 또는 가청 경보 전송을 포함하여 모든 위반 시 수행되는 조치. 아래 그림에서 마스크 위반이 마스크에서 빨간색으로 발생하여 결과적으로 화면 그림이 저장되었습니다. 마스크 테스트는 무인 모니터링 및 기록 된 신호를 재생할 때 사용할 수 있으므로 동일한 신호에 대해 다른 위반을 테스트 할 수 있습니다.



표준 SignalVu-PC 소프트웨어를 사용하면 방향 찾기 및 신호 강도 측정이 빠르고 쉽습니다. 아래 그림에서 사용 가능한 Alaris 스마트 안테나를 사용하여 나침반은 안테나 방향을 지속적으로 모니터링 하는 반면 신호 강도 모니터는 측정을 수행하고 신호 강도의 오디오 표시를 제공합니다. SignalVu-PC의 MAP 옵션과 결합하면 신호 강도와 방향각이 선택한 맵에 자동으로 배치됩니다.



트래킹 제너레이터(RSA500의 옵션 04)는 SignalVu-PC를 통해 제어됩니다. 800MHz ~ 3GHz의 대역 통과 필터 응답이 아래에 나와 있습니다. 옵션 SV60은 복귀 손실, 케이블 손실 및 고장 거리를 추가 합니다.



SignalVu-PC 애플리케이션 별 라이선스

SignalVu-PC는 계측기에 설치하거나 계측기간에 이동하거나 PC에 연결할 수 있는 유동 라이선스로 사용할 수 있는 다양한 애플리케이션 지향 옵션을 제공합니다. 응용 분야는 다음과 같습니다.

- 범용 변조 분석 (16/32/64/256 QAM, QPSK, O-QPSK, GMSK, FSK, APSK를 포함한 27 가지 변조 유형)
- CISPR 피크, 준 피크 및 평균 검출기를 사용한 EMC / EMI 분석
- 기본 속도, 저 에너지 및 Bluetooth 5의 Bluetooth® 분석 5. 향상된 데이터 속도 지원
- 위상 1 및 위상 2 신호의 P25 분석
- 802.11a / b / g / j / p, 802.11n, 802.11ac의 WLAN 분석
- LTE™ FDD 및 TDD 기지국 (eNB) 셀 ID 및 RF 측정
- 매핑 펄스 분석
- SINAD, THD를 포함한 AM / FM / PM / 직접 오디오 측정
- 모든 도메인에서 완전한 분석을 포함하여 기록 된 파일 재생
- 신호 분류 및 조사

자세한 내용과 주문 정보는 별도의 SignalVu-PC 데이터 시트를 참조하십시오. 선택된 응용 프로그램은 다음과 같습니다. EMC / EMI - 계측기와 SignalVu-PC를 통해 EMI 사전 준수 및 진단 측정이 용이합니다.

트랜스 듀서, 안테나, 프리 앰프 및 케이블 게인 / 손실을 수정 파일에 입력하고 저장할 수 있으며 SignalVu-PC의 표준 스퍼리어스 측정 기능을 사용하여 테스트의 한계 라인을 설정할 수 있습니다. 다음 그림은 음영으로 표시된 FCC Part 15 Class A 제한에 대한 30MHz ~ 960MHz의 테스트를 보여줍니다. 파란색 추적은 주변 환경의 캡처입니다. 위반은 그래프 아래 결과 표에 기록됩니다.

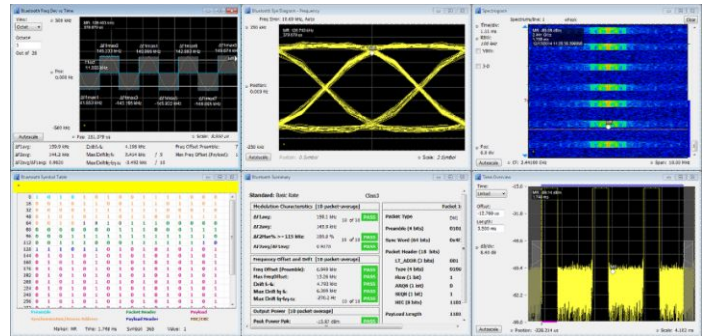
SVQP 옵션을 사용하여 CISPR 준 피크 및 평균 검출기를 추가 할 수 있습니다.

EMC 사전 규정 준수 솔루션은 EMCVU 옵션으로 추가 할 수 있습니다. 많은 사전 정의 된 한계선을 지원합니다. 또한 원 버튼 푸시로 권장 안테나, LISN 및 기타 EMC 액세스리를 쉽게 설정할 수 있는 마법사가 추가되었습니다. 새로운 EMC-EMI 디스플레이를 사용하는 경우 시간이 많이 소요되는 준 침투를 장애시에만 적용하여 테스트를 가속화 할 수 있습니다. 이 디스플레이는 또한 푸시 버튼 주변 측정을 제공합니다. 검사 도구를 사용하면 관심있는 주파수를 로컬로 측정하여 스캔 할 필요가 없습니다.

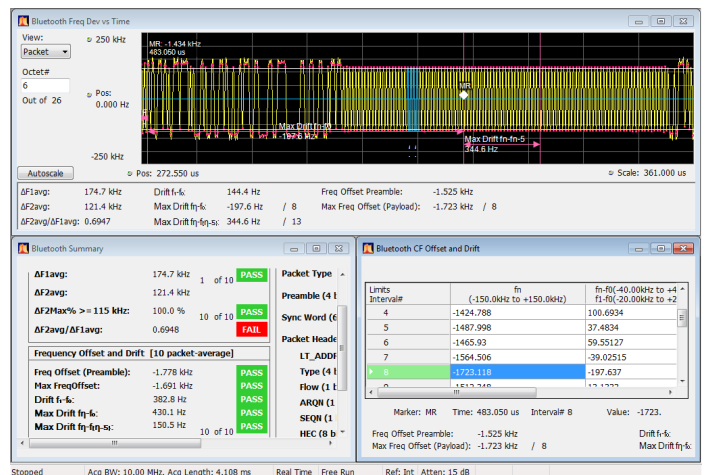


Bluetooth - 시간, 주파수 및 변조 영역에서 Bluetooth SIG 표준베이스 송신기 RF 측정에 도움이 되는 두 가지 새로운 옵션이 추가되었습니다. 옵션 SV27은 RF.TS.4.2.0 및 RF-PHY.TS에 의해 정의된 기본 속도 및 저 에너지 송신기 측정을 지원합니다.

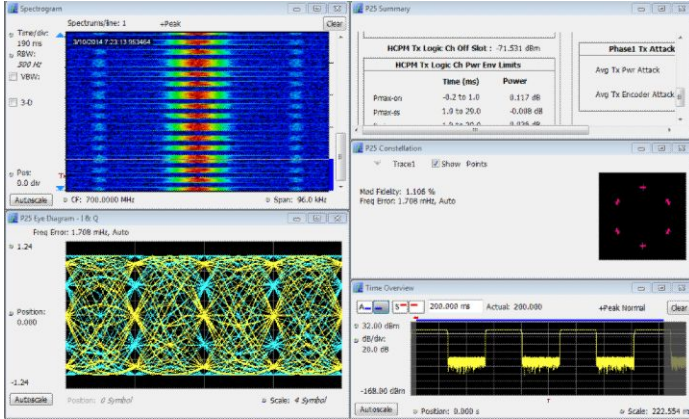
4.2.0 시험 규격. 또한 Enhanced Data Rate 패키지에 대한 심볼 정보를 복조 및 제공합니다. 옵션 SV31은 Bluetooth 5 표준 (LE 1M, LE 2M, LE Coded) 및 핵심 사양에 정의된 측정을 지원합니다. 두 옵션 모두 전송된 물리 계층 데이터를 디코딩하고 명확한 식별을 위해 심볼 테이블에서 패킷 필드를 색상으로 인코딩합니다.



합격 / 불합격 결과에는 사용자 정의 가능한 한계가 제공됩니다. 아래 측정은 편차 대 시간, 주파수 오프셋 및 드리프트 및 합격 / 불합격 결과가 있는 측정 요약을 보여줍니다.



APCO 25 – SignalVu-PC 애플리케이션 SV26을 사용하면 APCO P25 신호에서 표준 기반의 송신기 상태를 신속하게 확인할 수 있습니다. 다음 이미지는 TIA-102 표준 사양에 따라 송신기 전력, 변조 및 주파수 측정을 수행하는 동안 스펙트로그램의 이상에 대해 모니터링 되는 Phase II HCPM 신호를 보여줍니다.

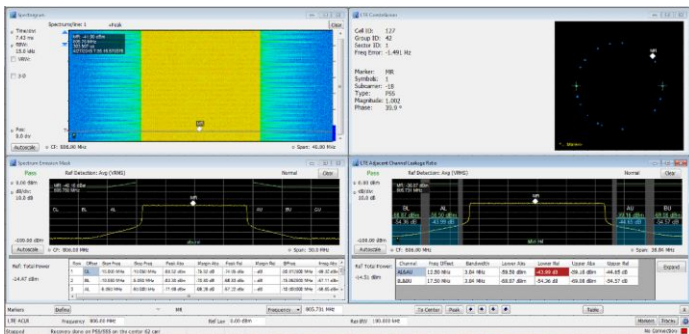


LTE – Application SV28을 사용하면 다음과 같은 LTE 기지국 송신기 측정이 가능합니다.

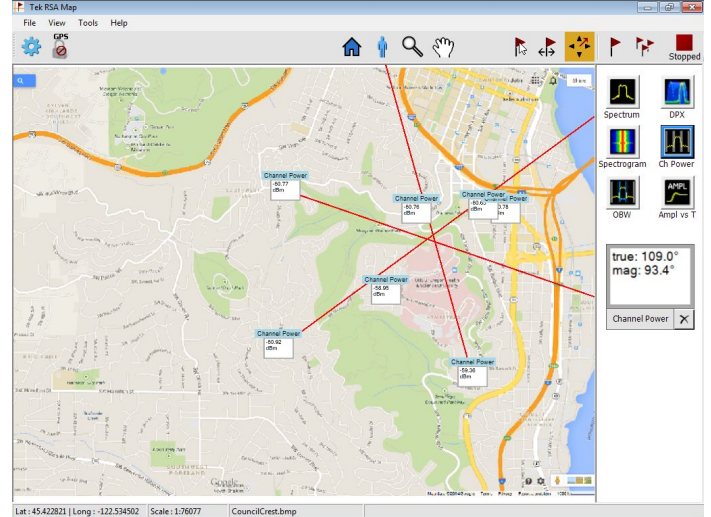
- 셀 ID 채널 전력
- 점유 대역폭
- 인접 채널 누설 률 (ACLR)
- 스펙트럼 방출 마스크 (SEM)
- TDD의 송신기 전원 끄기
- 기준 신호 (RS) 전력

측정은 3GPP TS 버전 12.5의 정의를 따르며 피코 셀 및 펌토셀을 포함한 모든 기지국 범주를 지원합니다. 통과 / 실패 정보가 보고 되고 모든 채널 대역폭이 지원됩니다. 셀 ID 사전 설정은 별자리 다이어그램에 기본 동기화 신호 (PSS) 및 보조 동기화 신호 (SSS)를 표시합니다. 주파수 오류도 제공합니다.

아래 그림은 셀 ID / 별자리, 스펙트럼 방출 마스크 및 ACLR 측정과 결합 된 스펙트로그램 디스플레이를 사용한 스펙트럼 모니터링을 보여줍니다.

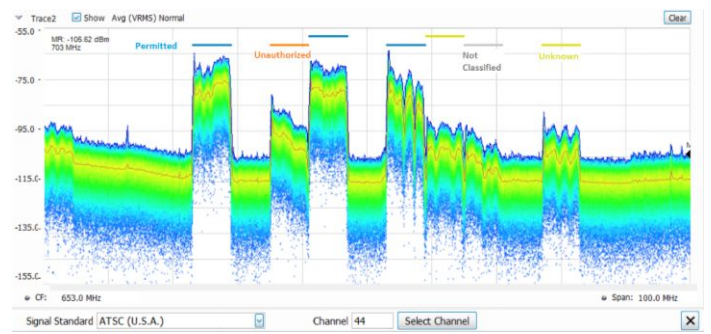


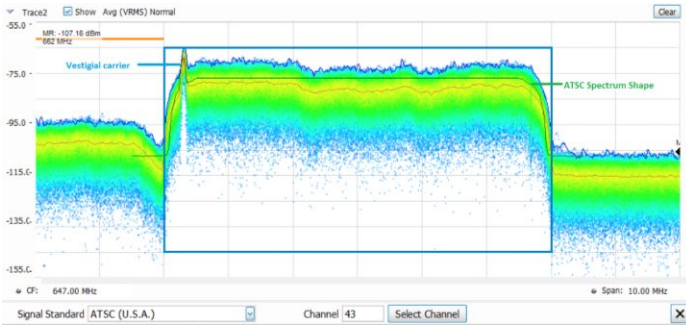
매핑 – SignalVu-PC MAP 어플리케이션은 간섭 헌팅 및 위치 분석을 가능하게 합니다. 방향을 나타내기 위해 매핑 된 측정에 선 또는 화살표를 그리거나 자동화 된 방위 배치와 함께 사용 가능한 Alaris 스마트 안테나를 사용할 수 있는 방위 함수를 사용하여 간섭을 찾습니다.



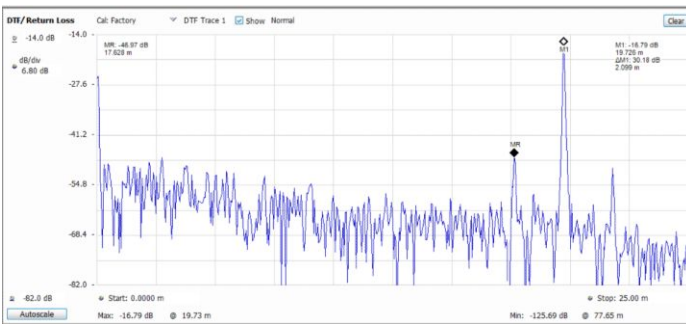
신호 조사 / 분류 – 애플리케이션 SV54를 통해 전문가 시스템 안내를 통해 신호를 분류 할 수 있습니다. 관심 있는 스펙트럼 영역을 빠르게 생성하여 사용자가 신호를 효율적으로 식별하고 정렬 할 수 있습니다. 스펙트럼 프로파일 마스크는 트레이스 위에 겹칠 때 신호 형태 안내를 제공하는 한편 빠른 분류를 위해 주파수, 대역폭 및 채널 번호가 표시됩니다. WLAN, GSM, W-CDMA, CDMA, Bluetooth 표준 및 향상된 데이터 속도, LTE FDD 및 TDD, ATSC 및 기타 신호를 빠르고 간단하게 식별 할 수 있습니다.

H500 / RSA2500 신호 데이터베이스 라이브러리에서 데이터베이스를 가져 와서 새로운 소프트웨어 기반으로 쉽게 전환 할 수 있습니다. 일반적인 신호 조사는 다음과 같습니다. 설문 조사는 TV 방송 대역의 일부이며 각 지역의 색상 막대로 표시된대로 7 개의 지역이 허용됨, 알 수 없음 또는 승인되지 않은 것으로 선언되었습니다. 세부 그림에서 단일 영역이 선택 되었으며 이 영역을 ATSC 비디오 신호로 선언 했으므로 ATSC 신호의 스펙트럼 마스크가 해당 영역에 겹쳐 표시됩니다. 신호는 신호의 아래쪽에 있는 흔적 반송파를 포함하여 스펙트럼 마스크와 밀접하게 일치하며 ATSC 방송의 특성입니다.

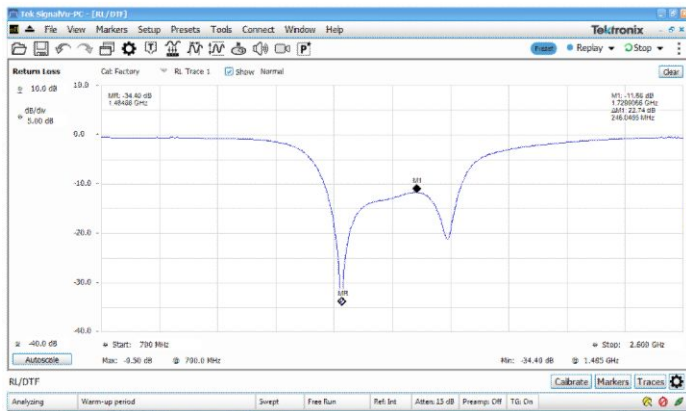




복귀 손실 / VSWR, 고장 거리, 케이블 손실 – 유지 보수 및 문제 해결 작업을 쉽게 수행합니다. 옵션 04 트래킹 제너레이터가 장착된 애플리케이션 라이선스 SV60xx-SVPC가 포함된 RSA500A 시리즈는 케이블, 장치 및 안테나에서 1 포트 측정을 수행합니다.



배럴과 연장 케이블이 삽입된 케이블의 리턴 손실 대 거리. M2 (17.638m, MR)의 지점은 배럴 커넥터이고 19.725m의 M1으로 표시된 지점은 케이블의 끝입니다.

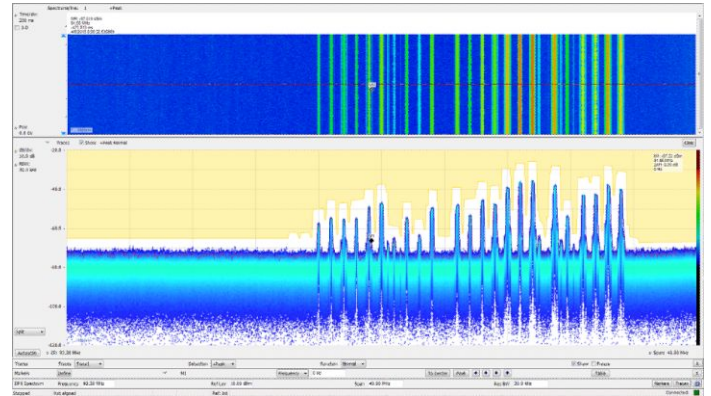


700MHz에서 2.6GHz로 측정된 대역 통과 필터의 반사 손실. 마커는 1.48GHz (-34.4dB 리턴 손실) 및 1.73GHz (-11.68dB 리턴 손실)로 배치되어 필터 통과 대역에서 최고 및 불량 일치를 나타냅니다. 재생 – 응용 프로그램 SV56, 기록된 신호 재생은 기록된 데이터를 검토하는 책상에서 스펙트럼 위반을 보고 기다리는 시간을 분 단위로 줄일 수 있습니다.

기록 길이는 저장 매체 크기에 의해서만 제한되며 기록은 SignalVu-PC에 포함된 기본 기능입니다. SignalVu-PC 어플리케이션 SV56 (재생)을 통해 DPX 스펙트로그램을 포함한 모든 SignalVu-PC 측정으로 완벽한 분석이 가능합니다. 재생하는 동안 최소 신호 지속 시간 사양이 유지됩니다. AM / FM 오디오 복조를 수행할 수 있습니다. 가변 범위, 해상도 대역폭, 분석 길이 및 대역폭을 모두 사용할 수 있습니다. 비프 음, 정지, 추적 저장, 사진 저장 및 데이터 저장을 포함한 마스크 위반에 대한 조치를 통해 기록된 신호에 대해 주파수 마스크 테스트를 수행할 수 있습니다.

관심 신호의 반복 검사를 위해 재생 부분을 선택하고 반복할 수 있습니다.

검토 시간을 줄이기 위해 재생을 건너 뛰거나 시간 간격을 삽입할 수 있습니다. 실제 이벤트와의 상관 관계를 위해 기록의 클럭 시간이 스펙트로그램 마커에 표시됩니다. 아래 그림에서 92.3 MHz의 중심 주파수에서 FM 신호를 듣는 동시에 스펙트럼 위반을 감지하기 위해 마스크를 적용하여 FM 대역을 재생하고 있습니다.

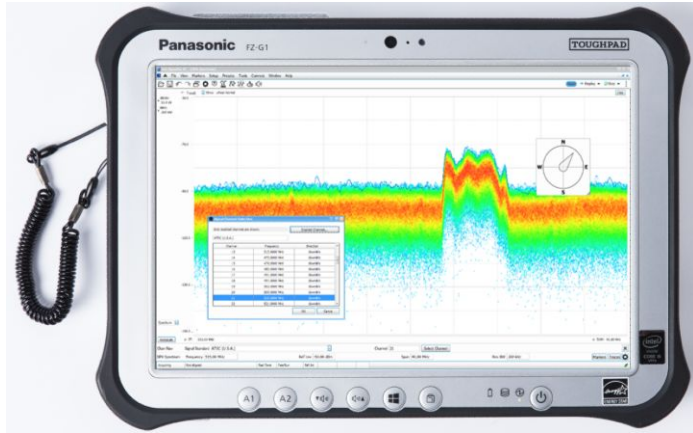


다중 기기 기록 및 대용량 기록 분석을 위한 DataVu-PC

DataVu-PC 소프트웨어는 독립적인 설정으로 두 개의 스펙트럼 분석기를 동시에 제어할 수 있습니다. 이를 통해 계측기 범위의 모든 주파수에서 최대 40MHz 대역폭으로 기록하면서 넓은 범위를 모니터링할 수 있습니다. DataVu-PC는 일단 기록되면 진폭 및 주파수 마스크 특성을 기반으로 관심 있는 신호를 찾아 표시할 수 있으므로 긴 기록을 수동으로 검사할 필요가 없습니다. 펄스 측정은 최대 2,000,000 펄스에서 가능합니다.

USB 스펙트럼 분석 기용 인스트루먼트 컨트롤러

현장 작업을 위해서는 완벽한 솔루션을 위해서는 기기 작동, 기록 보관 및 통신을 위한 Windows 태블릿 또는 랩탑이 필요합니다. 텍트로닉스는 RSA500 시리즈를 제어하고 독립형 장치로 Panasonic FZ-G1 태블릿 컴퓨터를 권장합니다.



Panasonic FZ-G1 태블릿 컴퓨터는 별도로 판매되며 <https://na.panasonic.com/us/computers-tablets-handhelds/tablets/tablets/toughbook-g1> 및 다양한 타사 공급 업체에서 Panasonic에서 구입할 수 있습니다. . 텍트로닉스는 성능, 휴대성 및 견고한 폼 팩터로 인해 FZ-G1을 다른 태블릿 보다 권장하며 모든 USB RSA 제품과 함께 작동하도록 테스트되었습니다.

주요 사양, 기기 컨트롤러

- Windows 10 Pro 64 비트 운영 체제
- 인텔® 코어 TM i5-6300U vPro™ 2.4-3.0 GHz 프로세서
- 8GB RAM
- 256GB 솔리드 스테이트 드라이브
- 10.1 인치 (25.6cm) 일광 판독 가능 화면
- 10 포인트 Multi Touch + 디지털라이저 화면 및 펜 인터페이스 포함
- USB 3.0 + HDMI 포트, 두 번째 USB 포트
- 위성 GPS가 포함 된 Wi-Fi, Bluetooth® 및 4G LTE 멀티 캐리어 모바일 광대역
- MIL-STD-810G 인증 (4 '낙하, 충격, 진동, 비, 먼지, 모래, 고도, 동결 / 해동, 고온 / 저온, 온도 충격, 습도, 폭발성 대기)
- IP65 인증 밀폐 전천후 설계
- 통합 마이크
- 통합 스피커

- 화면 및 버튼 볼륨 및 음소거 컨트롤
- 배터리 팩 핫 스왑을 위한 통합 배터리 백업
- 비즈니스 클래스 지원 3 년 보증 (해당 지역의 Panasonic에서 제공)

간섭 사냥을 위한 스마트 안테나

텍트로닉스는 방향 찾기 및 간섭 찾기 애플리케이션을 위한 USB 나침반이 내장 된 Alaris DFA-0047 1 스마트 안테나를 제공합니다. 안테나에 대한 자세한 내용은 Alaris를 검색하여 Tek.com의 Alaris 데이터 시트를 참조하십시오. 기능 및 사양 요약은 다음과 같습니다.

- 주파수 범위 : 20 MHz – 8.5 GHz
 - 9 kHz-20 MHz 확장 가능 (0.3m 루프 안테나), 주문 DFA0047-01
- 한 손으로 조작 할 수있는 트리거 제어 기능:
 - 프리 앰프 켜기 / 끄기
 - 밴드 스위치
 - MAP 옵션이있는 SignalVu-PC로 측정하려면 푸시
- 긴 간섭 사냥 세션에서 쉽게 사용할 수 있도록 표준 팔걸이 확장
- 운송 케이스 이용 가능



Alaris 방향 찾기 스마트 안테나.

¹ Alaris antenna is available in limited geographies. See ordering information for details.

교정 키트, 위상 안정화 케이블, 어댑터, 안테나 및 기타 액세서리

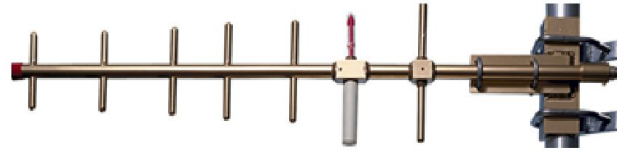
텍트로닉스는 현장 테스트를 위한 완벽한 솔루션을 위해 쇼핑을 단순화 할 수 있는 다양한 액세서리를 제공합니다. 자세한 내용은 주문 정보 섹션을 참조하십시오.



1 포트 측정을 위한 교정 키트



케이블 및 안테나 측정을 위한 Tektronix의 위상 안정화 케이블



간접 사냥용 안테나



RSA56RACK은 랙마운트 애플리케이션을 위해 하나의 RSA500A를 수용합니다.



소프트 케이스 PN 016-2109-01은 모든 RSA500A에 기본으로 제공되며 장치, 태블릿 PC 및 액세서리를 위한 공간이 있습니다.



RSA500TRANSIT 케이스는 소프트 케이스, 태블릿 PC, 전원 공급 장치 및 액세서리에 기기를 넣을 공간이 있습니다.

Specifications

All specifications are guaranteed unless noted otherwise. All specifications apply to all models unless noted otherwise.

Frequency

Frequency range

RSA503A	9 kHz to 3 GHz
RSA507A	9 kHz to 7.5 GHz
RSA513A	9 kHz to 13.6 GHz
RSA518A	9 kHz to 18.0 GHz

Frequency marker readout accuracy	$\pm(\text{RE} \times \text{MF} + 0.001 \times \text{Span}) \text{ Hz}$
	RE: Reference Frequency Error
	MF: Marker Frequency [Hz]

Reference frequency accuracy

Initial accuracy at Cal (30 min warm-up)	$\pm 1 \times 10^{-6}$
First year aging, typical	$\pm 1 \times 10^{-6}$ (1 year)
Cumulative error (Initial accuracy + temperature + aging), typical	3×10^{-6} (1 year)
Temperature drift	$\pm 0.9 \times 10^{-6}$ (-10 to 60 °C)
External reference input	BNC connector, 50 Ω nominal
External reference input frequency	Every 1 MHz from 1 to 20 MHz plus the following: 1.2288 MHz, 2.048 MHz, 2.4576 MHz, 4.8 MHz, 4.9152 MHz, 9.8304 MHz, 13 MHz, and 19.6608 MHz.
	The spurious level on the input signal must be less than -80 dBc within 100 kHz offset to avoid on-screen spurious.
External reference input range	$\pm 5 \text{ ppm}$
External reference input level	-10 to +10 dBm

GNSS

Accuracy, when locked to GNSS² $\pm 0.025 \text{ ppm}^3$

GNSS Trained Accuracy, when GNSS antenna is disconnected^{4, 5} $\pm 0.025 \text{ ppm}^6$
 $\pm 0.08 \text{ ppm}^7$

RF input

RF input

RF Input Impedance 50Ω

RF VSWR (RF Attn = 20 dB), typical < 1.2 (10 MHz to 3 GHz)
 < 1.5 (>3 GHz to 7.5 GHz)
 < 1.9 (>7.5 GHz to 18 GHz)

RF VSWR preamp ON, typical < 1.5 (10 MHz to 6 GHz, RF ATT=10 dB, preamp on)
 < 1.7 (> 6 GHz to 7.5 GHz, RF ATT=10 dB, preamp on)
 < 1.9 (>7.5 GHz to 18 GHz, RF ATT = 10 dB, preamp ON)

Maximum RF input level

Maximum DC voltage $\pm 40 \text{ V}$ (RF input)

Maximum safe input power $+33 \text{ dBm}$ (RF input, 10 MHz to 18.0 GHz, RF Attn $\geq 20 \text{ dB}$)
 $+13 \text{ dBm}$ (RF input, 9 kHz to 10 MHz, RF Attn $\geq 20 \text{ dB}$)
 $+20 \text{ dBm}$ (RF input, RF Attn $< 20 \text{ dB}$)

Maximum safe input power (Preamp On) $+33 \text{ dBm}$ (RF input, 10 MHz to 18.0 GHz, RF Attn $\geq 20 \text{ dB}$)
 $+13 \text{ dBm}$ (RF input, 9 kHz to 10 MHz, RF Attn $\geq 20 \text{ dB}$)
 $+20 \text{ dBm}$ (RF input, RF Attn $< 20 \text{ dB}$)

Maximum measurable input power $+30 \text{ dBm}$ (RF input, $\geq 10 \text{ MHz}$ to Fmax, RF ATT Auto)
 $+20 \text{ dBm}$ (RF input, $< 10 \text{ MHz}$, RF ATT Auto)

Input RF attenuator 0 dB to 51 dB (1 dB step)

² Tested using GPS system.

³ For use to a stability of $\pm 0.025 \text{ ppm}$, the unit should be powered on continuously for 2 to 5 days after initial unpacking.

⁴ Tested using GPS system.

⁵ For 24 hours continuous operation within temperature limits (see footnotes 5 and 6) after GNSS training. Refer to cumulative error specification if operating in GNSS trained mode beyond 24 hours since last training.

⁶ For less than 3 °C ambient temperature change after training.

⁷ For less than 10 °C ambient temperature change after training.

Sweep speed

Full span sweep speed, typical mean ⁸	70 GHz/sec (RBW = 1 MHz)
	60 GHz/sec (RBW = 100 kHz)
	15.7 GHz/sec (RBW = 10 kHz)
	1.7 GHz/sec (RBW = 1 kHz)

Tuning step time via API ≤1 ms

Amplitude and RF**Amplitude and RF flatness**

Reference level setting range -170 dBm to +40 dBm, 0.1 dB step, (Standard RF input)

Frequency response at 18 °C to 28 °C (At 10 dB RF Attenuator Setting)

Amplitude accuracy at all center frequencies

Center frequency range	18 °C to 28 °C
9 kHz ≤ 3.0 GHz	±0.8 dB
> 3 to 7.5 GHz (RSA507A)	±1.5 dB
>7.5 GHz to 13.6 GHz (RSA513A/RSA518A)	±1.55 dB
>13.6 GHz to 18.0 GHz (RSA518A)	±1.55 dB

Amplitude Accuracy at All Center Frequencies - Preamp ON (18 °C to 28 °C , 10 dB RF Attenuator)

Center frequency range	18 °C to 28 °C
200 kHz to ≤3.0 GHz	±1.0 dB
> 3 GHz to 7.5 GHz	±1.75 dB
>7.5 GHz to 13.6 GHz	±2.0 dB
>13.6 GHz to 18.0 GHz	±2.0 dB

Preamp gain

27 dB at 2 GHz
 21 dB at 6 GHz (RSA507A)
 25 dB at 10 GHz (RSA513A)
 25 dB at 15 GHz (RSA518A)

Channel response (amplitude and phase deviation), typical

For these specifications, use a flat top window for maximum CW amplitude verification accuracy with the RF attenuator setting at 10 dB.

Characteristic		Description		
Measurement center frequency	Span	Amplitude flatness, typical	Amplitude flatness, RMS, typical	Phase linearity, RMS, typical
9 kHz to 40 MHz	≤40 MHz ⁹	±1.0 dB	0.60 dB	
>40 MHz to 4.0 GHz	≤20 MHz	±0.10 dB	0.08 dB	0.3°
>4 GHz to 7.5 GHz	≤20 MHz	±0.35 dB	0.20 dB	0.7°
>7.5 GHz to 13.6 GHz	≤20 MHz	±0.35 dB	0.20 dB	0.7°
>13.6 GHz to 18.0 GHz	≤20 MHz	±0.35 dB	0.20 dB	0.7°
>40 MHz to 4 GHz	≤40 MHz	±0.35 dB	0.14 dB	0.8°
>4 GHz to 7.5 GHz	≤40 MHz	±0.40 dB	0.20 dB	1.0°
>7.5 GHz to 13.6 GHz	≤40 MHz	±0.60 dB	0.40 dB	1.5°
>13.6 GHz to 18.0 GHz	≤40 MHz	±0.60 dB	0.40 dB	1.5°

⁸ Measured using a Dell Latitude E5540, i7, Windows®7 Pro. Spectrum display is only measurement on screen.

⁹ Span extents cannot exceed lower frequency limit of the instrument

Trigger

Trigger/Sync input, typical	<p>Voltage range: TTL, 0.0 V to 5.0 V</p> <p>Trigger level (Schmitt trigger):</p> <p>Positive-going threshold voltage: 1.6 V min, 2.1 V max</p> <p>Negative-going threshold voltage: 1.0 V min., 1.35 V max</p> <p>Impedance: 10 k ohms with schottky clamps to 0 V, +3.4 V</p>
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External trigger timing uncertainty	<p>>20 MHz to 40 MHz acquisition bandwidth: ± 250 ns</p> <p>Uncertainty increases as acquisition bandwidth is decreased.</p>
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Power trigger

Power trigger, typical	<p>Range: 0 dB to -50 dB from reference level, for trigger levels > 30 dB above the noise floor.</p> <p>Type: Rising or falling edge</p> <p>Trigger re-arm time: ≤ 100 usec</p>
Power trigger position timing uncertainty	<p>>20 MHz to 40 MHz acquisition bandwidth: ± 250 ns</p> <p>Uncertainty increases as acquisition bandwidth is decreased.</p>
Power trigger level accuracy	<p>± 1.5 dB for CW signal at tuned center frequency for trigger levels > 30 dB above the noise floor.</p> <p>This specification is in addition to the overall amplitude accuracy uncertainty for SA mode.</p>

Noise and distortion

3rd Order IM intercept (TOI)	+14 dBm at 2.130 GHz
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3rd Order IM intercept (TOI), Preamp off, typical	<p>+17 dBm (9 kHz to 25 MHz)</p> <p>+15 dBm (25 MHz to 3 GHz)</p> <p>+15 dBm (3 GHz to 4 GHz, RSA507A)</p> <p>+10 dBm (4 GHz to 7.5 GHz, RSA507A)</p> <p>+15 dBm (7.5 GHz to Max CF GHz, RSA513A/RSA518A)</p>
Preamp on, typical	<p>-20 dBm (9 kHz to 25 MHz)</p> <p>-15 dBm (25 MHz to 3 GHz)</p> <p>-15 dBm (3 GHz to 4 GHz, RSA507A)</p> <p>-20 dBm (4 GHz to 7.5 GHz, RSA507A)</p> <p>-15 dBm (7.5 GHz to Max CF, RSA513A/RSA518A)</p>

3rd Order Inter-modulation distortion	<p>-78 dBc at 2.130 GHz</p> <p>Each signal level -25 dBm at the RF input. 2 MHz tone separation. Attenuator = 0, Reference level = -20 dBm.</p>
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Noise and distortion**3rd Order inter-modulation distortion****Preamp off, typical**

< -70 dBc (10 kHz to 25 MHz)
 < -80 dBc (25 MHz to 3 GHz)
 < -80 dBc (3 GHz to 4 GHz, RSA507A)
 < -70 dBc (4 GHz to 7.5 GHz, RSA507A)
 < -80 dBc (7.5 GHz to Max CF, RSA513A/RSA518A)

Each signal level -25 dBm at the RF input. 2 MHz tone separation. Attenuator = 0, Reference level = -20 dBm.

Preamp on, typical

< -70 dBc (9 kHz to 25 MHz)
 < -80 dBc (25 MHz to 3 GHz)
 < -80 dBc (3 GHz to 4 GHz, RSA507A)
 < -70 dBc (4 GHz to 7.5GHz, RSA507A)
 < -80 dBc (7.5 GHz to Max CF, RSA513A/RSA518A)

Each signal level -55 dBm at the RF input. 2 MHz tone separation. Attenuator = 0, Reference level = -50 dBm.

2nd Harmonic distortion, typical**2nd Harmonic distortion**

< -75 dBc (40 MHz to 1.5 GHz)
 < -75 dBc (1.5 GHz to 3.75 GHz, RSA507A)
 < -75 dBc (3.75 GHz to 6.8 GHz, RSA513A)
 < -75 dBc (6.8 GHz to 9 GHz, RSA518A)

2nd Harmonic distortion, Preamp on

< - 60 dBc (40 MHz to 15.9 GHz), input frequency

2nd Harmonic distortion intercept (SHI)

+35 dBm (40 MHz to 1.5 GHz)
 +35 dBm (1.5 GHz to 9 GHz)

2nd Harmonic distortion intercept (SHI), Preamp on

+5 dBm (40 MHz to 15.9 GHz), input frequency

Noise and distortion

Displayed average noise level (DANL)

(Normalized to 1 Hz RBW, with log-average detector)

For the RSA503A and RSA507A:

Frequency range	Preamp on	Preamp on, typical	Preamp off, typical
500 kHz to 1 MHz	-138 dBm/Hz	-145 dBm/Hz	-130 dBm/Hz
1 MHz to 25 MHz	-153 dBm/Hz	-158 dBm/Hz	-130 dBm/Hz
>25 MHz to 1 GHz	-161 dBm/Hz	-164 dBm/Hz	-141 dBm/Hz
>1 GHz to 2 GHz	-159 dBm/Hz	-162 dBm/Hz	-141 dBm/Hz
>2 GHz to 3 GHz	-156 dBm/Hz	-159 dBm/Hz	-138 dBm/Hz
>3 GHz to 4 GHz, RSA507A	-153 dBm/Hz	-156 dBm/Hz	-138 dBm/Hz
>4 GHz to 6 GHz, RSA507A	-159 dBm/Hz	-162 dBm/Hz	-147 dBm/Hz
>6 GHz to 7.5 GHz, RSA507A	-155 dBm/Hz	-158 dBm/Hz	-145 dBm/Hz

For the RSA513A and RSA518A:

Frequency range	Preamp on	Preamp on, typical
500 kHz to 1 MHz	-138 dBm/Hz	-145 dBm/Hz
1 MHz to 25 MHz	-153 dBm/Hz	-158 dBm/Hz
>25 MHz to 1 GHz	-158 dBm/Hz	-161 dBm/Hz
>1 GHz to 2 GHz	-156 dBm/Hz	-159 dBm/Hz
>2 GHz to 2.75 GHz	-153 dBm/Hz	-157 dBm/Hz
>2.75 GHz to 4 GHz	-149 dBm/Hz	-152 dBm/Hz
>4 GHz to 6 GHz	-155 dBm/Hz	-159 dBm/Hz
>6 GHz to 7.5 GHz	-151 dBm/Hz	-155 dBm/Hz
>7.5 GHz to 14 GHz	-161 dBm/Hz	-165 dBm/Hz
>14 GHz to 14.8 GHz	-159 dBm/Hz	-165 dBm/Hz
>14.8 GHz to 15.2 GHz	-157 dBm/Hz	-161 dBm/Hz
>15.2 GHz to 17.65 GHz	-159 dBm/Hz	-165 dBm/Hz
>17.65 GHz to 18.0 GHz	-157 dBm/Hz	-161 dBm/Hz

Phase noise

Phase noise

Offset	10 kHz	100 kHz	1 MHz
1 GHz CF	-94 dBc/Hz	-94 dBc/Hz	-116 dBc/Hz
10 MHz, typical (RSA503A, RSA507A)	-120 dBc/Hz	-124 dBc/Hz	-124 dBc/Hz
1 GHz CF (typical)	-97 dBc/Hz	-98 dBc/Hz	-121 dBc/Hz
2 GHz CF (typical)	-96 dBc/Hz	-97 dBc/Hz	-120 dBc/Hz
6 GHz CF, typical (RSA507A)	-94 dBc/Hz	-96 dBc/Hz	-120 dBc/Hz
10 GHz, typical (RSA513A, RSA518A)	-89 dBc/Hz	-90 dBc/Hz	-113 dBc/Hz
15 GHz, typical (RSA513A, RSA518A)	-86 dBc/Hz	-87 dBc/Hz	-110 dBc/Hz

Spurious response

Residual spurious response (Reference = -30 dBm, RBW = 1 kHz)	<p><-75 dBm (500 kHz to 60 MHz), typical</p> <p>< -85 dBm (>60 MHz to 80 MHz), typical</p> <p><-100 dBm (>80 MHz to Max CF), typical</p> <p>(Exceptions: <-90 dBm (13.78 GHz to 13.94 GHz))</p>	
Spurious response with Signal (Image suppression)	<p>< -65 dBc (for RSA513/518A) (10 kHz to Max CF, Ref= -20 dBm, Atten = 10 dB, RF input Level = -20 dBm, RBW = 10 Hz)</p> <p>< -63 dBc (for RSA503A/507A) (10 kHz to Max CF, Ref= -20 dBm, Atten = 10 dB, RF input Level = -20 dBm, RBW = 10 Hz)</p>	
Spurious response with signal at CF	Offset ≥ 1 MHz	
	Frequency	Span ≤40 MHz, swept spans >40 MHz
		Typical
	1 MHz - 100 MHz	--
	100 MHz - 3 GHz	-72 dBc
	3 GHz - 7.5 GHz (RSA507A)	-72 dBc
	7.5 GHz to 13.6 GHz (RSA513A/RSA518A)	-72 dBc
	13.6 GHz to 18.0 GHz (RSA518A)	-72 dBc
		-75 dBc
Spurious response with signal at CF	(150 kHz ≤ offset <1 MHz, Span=2 MHz):	
	Frequency	Typical
	1 MHz - 100 MHz	-70 dBc
	100 MHz - 3 GHz	-70 dBc
	3 GHz - 7.5 GHz (RSA507A)	-70 dBc
	7.5 GHz - 13.6 GHz (RSA513A/RSA518A)	-64 dBc
	13.6 GHz - 18.0 GHz (RSA518A)	-64 dBc
Spurious response with signal at other than CF, typical	Frequency	Span ≤40 MHz, swept spans >40 MHz
	1 MHz – 25 MHz (LF Band)	-73 dBc
	25 MHz – 3 GHz	-73 dBc
	3 GHz – 7.5 GHz (RSA507A)	-73 dBc
	7.5 GHz - 13.6 GHz (RSA513A/RSA518A)	-73 dBc
	13.6 GHz - 18.0 GHz (RSA518A)	-73 dBc
Spurious response with signal at half-IF¹⁰	<p>< -75 dBc, (CF: 30 MHz to Max CF, Ref = -20 dBm, Atten = 10 dB, RBW = 10 Hz, Span = 10 kHz)</p> <p>Signal frequency = 2310 MHz, RF input level = -20 dBm</p>	
Local oscillator feed-through to input connector, typical	<p>< -70 dBm, preamp off.</p> <p>< -90 dBm, preamp on.</p> <p>Attenuator = 10 dB.</p>	

¹⁰ This is an input signal at half of the IF frequency.

Acquisition

IF bandwidth	40 MHz.
A/D converter	14 bits, 112 Ms/s.
Real-Time IF Acquisition Data	112 Ms/s, 16-bit integer samples.

ACLR

ACLR for 3GPP Down Link, 1 DPCH (2130 MHz)	-57 dB (Adjacent Channel)
	-68 dB w/Noise Correction (Adjacent Channel)
	-57 dB (First Alternate Channel)
	-69 dB w/Noise Correction (First Adjacent Channel)
ACLR LTE	-58 dB (Adjacent Channel)
	-61 dB w/Noise Correction (Adjacent Channel)
	-61 dB (First Alternate Channel)
	-63 dB w/Noise Correction (First Adjacent Channel)

GPS location

Format	GPS/GLONASS/BeiDou
GPS antenna power	3 V, 100 mA maximum
Time to first fix, maximum	Lock time ranges from 2 sec (hot) to 46 sec (cold start). -130 dBm input signal power.
Horizontal position accuracy	GPS: 2.6 m Glonass: 2.6 m BeiDou: 10.2 m GPS + Glonass: 2.6 m GPS + BeiDou: 2.6 m Test conditions: 24 hr. static, -130 dBm, full power

Tracking generator (Option 04)

Tracking Generator (Option 04)	
Frequency range	10 MHz to 3 GHz (RSA503) 10 MHz to 7.5 GHz (RSA507A/513A/518A)
Sweep speed, typical mean	0.192 sec/sweep, 101 points, 50 kHz RBW, 980 to 1020 MHz sweep (1.9 mS per point) Measured using a Dell Latitude E5540, i7, Windows®7 Pro. Transmission Gain display is only measurement on screen.
Frequency resolution	100 Hz
TG output connector	N type
VSWR	< 1.8:1, 10 MHz to 7.5 GHz, -20 dBm output level
Maximum output power	-3 dBm, 10 MHz to 7.5 GHz
Output power level setting range	40 dB, 10 MHz to 7.5 GHz
Output power level step size	1 dB, 10 MHz to 7.5 GHz

Tracking generator (Option 04)

Output power level step size accuracy	± 0.5 dB
Harmonics	< -22 dBc, ≥20 MHz
Non-harmonic spurious	< -30 dBc; spurious < 2 GHz from TG output frequency < -25 dBc; spurious ≥ 2 GHz from TG output frequency
Reverse power without damage	40 Vdc, +20 dBm RF

SignalVu-PC standard measurements and performance**Measurements included.**

General signal analysis	
Spectrum analyzer	Spans from 1 kHz to 18.0 GHz Three traces plus math and spectrogram trace Five markers with power, relative power, integrated power, power density and dBc/Hz functions
DPX Spectrum/Spectrogram	Real time display of spectrum with 100% probability of intercept of up to 15 µsec signals in up to 40 MHz span
Amplitude, frequency, phase vs. time, RF I and Q vs. time	Basic vector analysis functions
Time Overview/Navigator	Enables easy setting of acquisition and analysis times for deep analysis in multiple domains
Spectrogram	Analyze and re-analyze your signal with a 2-D or 3-D waterfall display
AM/FM listening	Hear, and record to file, FM and AM signals
Analog modulation analysis	
AM, FM, PM analysis	Measures key AM, FM, PM parameters
RF measurements	
Spurious measurement	User-defined limit lines and regions provide automatic spectrum violation testing across the entire range of the instrument. Four traces can be saved and recalled; CISPR Quasi-Peak and Average detectors available with option SVQP.
Spectrum emission mask	User-defined or standards-specific masks
Occupied Bandwidth	Measures 99% power, -xdB down points
Channel Power and ACLR	Variable channel and adjacent/alternate channel parameters
MCPR	Sophisticated, flexible multi-channel power measurements
CCDF	Complementary Cumulative Distribution Function plots the statistical variations in signal level

SignalVu-PC/RSA507A key characteristics

Maximum span	40 MHz real-time
	9 kHz - 3 GHz swept (RSA503A)
	9 kHz - 7.5 GHz swept (RSA507A)
	9 kHz - 13.6 GHz swept (RSA513A)
	9 kHz - 18.0 GHz swept (RSA518A)
Maximum acquisition time	2.0 s

SignalVu-PC standard measurements and performance

Minimum IQ resolution	17.9 ns (acquisition BW = 40 MHz)
Tuning Tables	Tables that present frequency selection in the form of standards-based channels are available for the following. Cellular standards families: AMPS, NADC, NMT-450, PDC, GSM, CDMA, CDMA-2000, 1xEV-DO WCDMA, TD-SCDMA, LTE, WiMax Unlicensed short range: 802.11a/b/j/g/p/n/ac, Bluetooth Cordless phone: DECT, PHS Broadcast: AM, FM, ATSC, DVBT/H, NTSC Mobile radio, pagers, other: GMRS/FRS, iDEN, FLEX, P25, PWT, SMR, WiMax

DPX spectrum display

Spectrum processing rate (RBW = auto, trace length 801)	≤10,000 spectrums per second
DPX bitmap resolution	201 pixels vertical x 801 pixels horizontal
DPX Spectrogram minimum time resolution ¹¹	1 ms ≤10,000 per second (span independent)
Marker information	Amplitude, frequency, signal density
Minimum signal duration for 100% probability of intercept (POI), typical	15 μs up to 40 MHz span
Span range (continuous processing)	1 kHz to 40 MHz
Span range (swept)	Up to maximum frequency range of instrument
Dwell time per step	50 ms to 100 s
Trace processing	Color-graded bitmap, +Peak, -Peak, average
Trace length	801, 2401, 4001, 10401
RBW range	1 kHz to 4.99 MHz

DPX spectrogram display

Trace detection	+Peak, -Peak, Average(V _{RMS})
Trace length, memory depth	801 (60,000 traces) 2401 (20,000 traces) 4001 (12,000 traces)
Time resolution per line	1 ms to 6400 s, user selectable

Spectrum and Spurious display

Traces	Three traces + 1 math trace + 1 trace from spectrogram for Spectrum display; four traces for Spurious display
Trace functions	Normal, Average (VRMS), Max Hold, Min Hold, Average of Logs
Detector	Average (VRMS), Average (of logs), CISPR peak, +Peak, Sample for Spectrum only -Peak; when Option SVQP is enabled, CISPR Quasi Peak and Average
Spectrum trace length	801, 2401, 4001, 8001, 10401, 16001, 32001, and 64001 points
RBW range	1.18 Hz to 8 MHz for Spectrum display

¹¹ Due to the non-deterministic execution time of programs running under the Microsoft Windows™ OS, this specification may not be met when the host PC is heavily loaded with other processing tasks.

SignalVu-PC standard measurements and performance

Analog modulation analysis (standard)

AM demodulation accuracy, typical	±2%
	0 dBm input at center, carrier frequency 1 GHz, 1 kHz/5 kHz input/modulated frequency, 10% to 60% modulation depth
	0 dBm input power level, reference level = 10 dBm, Atten=Auto
FM demodulation accuracy, typical	±1% of span
	0 dBm input at center, carrier frequency 1 GHz, 400 Hz/1 kHz input/modulated frequency
	0 dBm input power level, reference level = 10 dBm, Atten=Auto
PM demodulation accuracy, typical	±3% of measurement bandwidth
	0 dBm input at center, carrier frequency 1 GHz, 1 kHz/5 kHz input/modulated frequency
	0 dBm input power level, reference level = 10 dBm, Atten=Auto

SignalVu-PC applications performance summary

AM/FM/PM and direct audio measurement (SVAXx-SVPC)

Carrier frequency range (for modulation and audio measurements)	(1/2 × audio analysis bandwidth) to maximum input frequency
Maximum audio frequency span	10 MHz
FM measurements (Mod. index >0.1)	Carrier Power, Carrier Frequency Error, Audio Frequency, Deviation (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation Distortion, S/N, Total Harmonic Distortion, Total Non-harmonic Distortion, Hum and Noise
AM measurements	Carrier Power, Audio Frequency, Modulation Depth (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation Distortion, S/N, Total Harmonic Distortion, Total Non-harmonic Distortion, Hum and Noise

SignalVu-PC applications performance summary

PM measurements Carrier Power, Carrier Frequency Error, Audio Frequency, Deviation (+Peak, -Peak, Peak-Peak/2, RMS), SINAD, Modulation Distortion, S/N, Total Harmonic Distortion, Total Non-harmonic Distortion, Hum and Noise

Audio filters Low pass, kHz: 0.3, 3, 15, 30, 80, 300, and user-entered up to 0.9 × audio bandwidth

High pass, Hz: 20, 50, 300, 400, and user-entered up to 0.9 × audio bandwidth

Standard: CCITT, C-Message

De-emphasis (us): 25, 50, 75, 750, and user-entered

File: User-supplied .TXT or .CSV file of amplitude/frequency pairs. Maximum 1000 pairs

Performance characteristics, typical	Conditions: Unless otherwise stated, performance is given for: Modulation rate = 5 kHz AM depth: 50% PM deviation 0.628 Radians			
	FM	AM	PM	Conditions
Carrier Power accuracy	Refer to instrument amplitude accuracy			
Carrier Frequency accuracy	± 0.5 Hz + (transmitter frequency × ref. freq. error)	Refer to instrument frequency accuracy	± 0.2 Hz + (transmitter frequency × ref. freq. error)	FM deviation: 5 kHz / 100 kHz
Depth of Modulation accuracy	NA	± 0.2%+(0.01 * measured value)	NA	Rate: 5 kHz Depth: 50%
Deviation accuracy	± (1% × (rate + deviation))+50 Hz)	NA	± 100% * (0.01 + (measured rate/1 MHz))	FM deviation: 100 kHz
Rate accuracy	± 0.2 Hz	± 0.2 Hz	± 0.2 Hz	FM deviation: 5 kHz / 100 kHz
Residual THD	0.10%	0.16%	0.1%	FM Deviation: 5 kHz / 100 kHz Rate: 1 kHz
Residual SINAD	43 dB	56 dB	40 dB	FM deviation 5 kHz FM deviation 100 kHz Rate: 1 kHz

APCO P25 Measurements Application (SV26xx-SVPC)

Measurements RF output power, operating frequency accuracy, modulation emission spectrum, unwanted emissions spurious, adjacent channel power ratio, frequency deviation, modulation fidelity, frequency error, eye diagram, symbol table, symbol rate accuracy, transmitter power and encoder attack time, transmitter throughput delay, frequency deviation vs. time, power vs. time, transient frequency behavior, HCPM transmitter logical channel peak adjacent channel power ratio, HCPM transmitter logical channel off slot power, HCPM transmitter logical channel power envelope, HCPM transmitter logical channel time alignment, cross-correlated markers

Modulation fidelity, typical C4FM ≤ 1.0%
HCPM ≤ 0.5%
HDQPSK ≤ 0.25%
Input signal level is optimized for best modulation fidelity.

Bluetooth Measurements Application (SV27xx-SVPC and SV31xx-SVPC)

Supported standards Bluetooth® 4.2 Basic Rate, Bluetooth® 4.2 Low Energy, Bluetooth® 4.2 Enhanced Data Rate. Bluetooth® 5 when SV31 is enabled.

Measurements Peak Power, Average Power, Adjacent Channel Power or InBand Emission mask, -20 dB Bandwidth, Frequency Error, Modulation Characteristics including ΔF1avg (11110000), ΔF2avg (10101010), ΔF2 > 115 kHz, ΔF2/ΔF1 ratio, frequency deviation vs. time with packet and octet level measurement information, Carrier Frequency f0, Frequency Offset (Preamble and Payload), Max Frequency Offset, Frequency Drift f1-f0, Max Drift Rate fn-f0 and fn-fn-5, Center Frequency Offset Table and Frequency Drift table, color-coded Symbol table, Packet header decoding information, eye diagram, constellation diagram

SignalVu-PC applications performance summary

Output power (BR and LE), typical mean	Supported measurements: Average power, peak power Level uncertainty: refer to instrument amplitude and flatness specification Measurement range: signal level > -70 dBm
Modulation characteristics, typical mean	Supported measurements: ΔF_{1avg} , ΔF_{2avg} , $\Delta F_{2avg}/\Delta F_{1avg}$, $\Delta F_{2max\%} \geq 115\text{kHz}$ (basic rate), $\Delta F_{2max\%} \geq 115\text{kHz}$ (low energy) Deviation range: ± 280 kHz Deviation uncertainty (at 0 dBm): <2 kHz ¹² + instrument frequency uncertainty (basic rate) <3 kHz ¹² + instrument frequency uncertainty (low energy) Measurement range: Nominal channel frequency ± 100 kHz
Initial Carrier Frequency Tolerance (ICFT) (BR and LE), typical mean	Measurement uncertainty (at 0 dBm): <1 kHz ¹³ + instrument frequency uncertainty Measurement range: Nominal channel frequency ± 100 kHz
Carrier Frequency Drift (BR and LE), typical mean	Supported measurements: Max freq. offset, drift $f_1 - f_0$, max drift $f_n - f_0$, max drift $f_n - f_{n-5}$ (BR and LE 50 μs) Measurement uncertainty: <1 kHz + instrument frequency uncertainty Measurement range: Nominal channel frequency ± 100 kHz
In-band emissions (ACPR) (BR and LE)	Level uncertainty: refer to instrument amplitude and flatness specification
General purpose digital modulation analysis (SVMxx-SVPC)	
Modulation formats	BPSK, QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM, $\pi/2$ DBPSK, DQPSK, $\pi/4$ DQPSK, D8PSK, D16PSK, SBPSK, OQPSK, SOQPSK, 16-APSK, 32-APSK, MSK, GFSK, CPM, 2FSK, 4FSK, 8FSK, 16FSK, C4FM
Analysis period	Up to 163,500 samples
Measurement filter	Root Raised Cosine, Raised Cosine, Gaussian, Rectangular, IS-95 TX_MEA, IS-95 Base TXEQ_MEA, None
Reference Filter	Gaussian, Raised Cosine, Rectangular, IS-95 REF, None
Filter rolloff factor	α : 0.001 to 1, in 0.001 steps
Measurements	Constellation, Demod I&Q vs. Time, Error Vector Magnitude (EVM) vs. Time, Eye Diagram, Frequency Deviation vs. Time, Magnitude Error vs. Time, Phase Error vs. Time, Signal Quality, Symbol Table, Trellis Diagram
Maximum symbol rate	240 M symbols/s Modulated signal must be contained entirely within the acquisition bandwidth
Adaptive equalizer	Linear, Decision-Directed, Feed-Forward (FIR) equalizer with coefficient adaptation and adjustable convergence rate. Supports modulation types BPSK, QPSK, OQPSK, DQPSK, $\pi/2$ DBPSK, $\pi/4$ DQPSK, 8PSK, D8SPK, D16PSK, 16/32/64/128/256-QAM, 16/32-APSK
QPSK Residual EVM (center frequency = 2 GHz), typical mean	0.6 % (100 kHz symbol rate) 0.8 % (1 MHz symbol rate) 0.8 % (10 MHz symbol rate) 0.8 % (30 MHz symbol rate) 400 symbols measurement length, 20 Averages, normalization reference = maximum symbol magnitude
256 QAM Residual EVM (center frequency = 2 GHz), typical mean	0.6 % (10 MHz symbol rate) 0.7 % (30 MHz symbol rate) 400 symbols measurement length, 20 Averages, normalization reference = maximum symbol magnitude

¹² At nominal power level of 0 dBm

¹³ At nominal power level of 0 dBm

SignalVu-PC applications performance summary

LTE Downlink RF measurements (SV28xx-SVPC)

Standard Supported	3GPP TS 36.141 Version 12.5
Frame Format supported	FDD and TDD
Measurements and Displays Supported	Adjacent Channel Leakage Ratio (ACLR), Spectrum Emission Mask (SEM), Channel Power, Occupied Bandwidth, Power vs. Time showing Transmitter OFF power for TDD signals and LTE constellation diagram for Primary Synchronization Signal and Secondary Synchronization Signal with Cell ID, Group ID, Sector ID, RS (Reference Signal) Power and Frequency Error.
ACLR with E-UTRA bands (typical, with noise correction)	1st Adjacent Channel 60 dB (RSA507A) 2nd Adjacent Channel 62 dB (RSA507A)

Mapping (MAPxx-SVPC)

Supported map types	Pitney Bowes MapInfo (*.mif), Bitmap (*.bmp), Open Street Maps (.osm)
Saved measurement results	Measurement data files (exported results)
Map file used for the measurements	Google Earth KMZ file
Recallable results files (trace and setup files)	MapInfo-compatible MIF/MID files

Pulse measurements (SVPxx-SVPC)

Measurements (nominal)	Pulse-Ogram™ waterfall display of multiple segmented captures, with amplitude vs time and spectrum of each pulse. Pulse frequency, Delta Frequency, Average on power, Peak power, Average transmitted power, Pulse width, Rise time, Fall time, Repetition interval (seconds), Repetition interval (Hz), Duty factor (%), Duty factor (ratio), Ripple (dB), Ripple (%), Droop (dB), Droop (%), Overshoot (dB), Overshoot (%), Pulse- Ref Pulse frequency difference, Pulse- Ref Pulse phase difference, Pulse-Pulse frequency difference, Pulse- Pulse phase difference, RMS frequency error, Max frequency error, RMS phase error, Max phase error, Frequency deviation, Phase deviation, Impulse response (dB), Impulse response (time), Time stamp.
Minimum pulse width for detection, typical	150 ns
Average ON power at 18 °C to 28 °C, typical	±0.4 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
Duty factor, typical	±0.2% of reading For pulses of 450 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
Average transmitted power, typical	±0.5 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
Peak pulse power, typical	±1.2 dB + absolute amplitude accuracy For pulses of 300 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB
Pulse width, typical	±0.25% of reading For pulses of 450 ns width or greater, duty cycles of .5 to .001, and S/N ratio ≥ 30 dB

Playback of recorded signals (SV56)

Playback file type	R3F recorded by RSA306, RSA500, or RSA600
Recorded file bandwidth	40 MHz

SignalVu-PC applications performance summary

File playback controls	General: Play, stop, exit playback Location: Begin/end points of playback settable from 0-100% Skip: Defined skip size from 73 μ s up to 99% of file size Live rate: Plays back at 1:1 rate to recording time Loop control: Play once, or loop continuously
Memory requirement	Recording of signals requires storage with write rates of 300 MB/sec. Playback of recorded files at live rates requires storage with read rates of 300 MB/sec.

WLAN Measurements, 802.11a/b/g/j/p (SV23xx-SVPC)

Measurements	WLAN power vs. time; WLAN symbol table; WLAN constellation; spectrum emission mask; error vector magnitude (EVM) vs. symbol (or time), vs. subcarrier (or frequency); mag error vs symbol (or time), vs. subcarrier (or frequency); phase error vs symbol (or time), vs. subcarrier (or frequency); channel frequency response vs. symbol (or time), vs. subcarrier (or frequency); spectral flatness vs. symbol (or time), vs. subcarrier (or frequency)
Residual EVM - 802.11a/g/j /p (OFDM), 64-QAM, typical	2.4 GHz, 20 MHz BW: -39 dB 5.8 GHz, 20 MHz BW: -38 dB Input signal level optimized for best EVM, average of 20 bursts, ≥ 16 symbols each
Residual EVM - 802.11b, CCK-11, typical	2.4 GHz, 11 Mbps: 1.3 % Input signal level optimized for best EVM, average of 1,000 chips, BT = .61

WLAN Measurements 802.11n (SV24xx-SVPC)

Measurements	WLAN power vs. time; WLAN symbol table; WLAN constellation; spectrum emission mask; error vector magnitude (EVM) vs. symbol (or time), vs. subcarrier (or frequency); mag error vs symbol (or time), vs. subcarrier (or frequency); phase error vs symbol (or time), vs. subcarrier (or frequency); channel frequency response vs. symbol (or time), vs. subcarrier (or frequency); spectral flatness vs. symbol (or time), vs. subcarrier (or frequency)
EVM performance - 802.11n, 64-QAM, typical	2.4 GHz, 40 MHz BW: -38 dB 5.8 GHz, 40 MHz BW: -38 dB Input signal level optimized for best EVM, average of 20 bursts, ≥ 16 symbols each

WLAN Measurements 802.11ac (SV25xx-SVPC)

Measurements	WLAN power vs. time; WLAN symbol table; WLAN constellation; spectrum emission mask; error vector magnitude (EVM) vs. symbol (or time), vs. subcarrier (or frequency); mag error vs symbol (or time), vs. subcarrier (or frequency); phase error vs symbol (or time), vs. subcarrier (or frequency); channel frequency response vs. symbol (or time), vs. subcarrier (or frequency); spectral flatness vs. symbol (or time), vs. subcarrier (or frequency)
EVM performance - 802.11ac, 256-QAM, typical	5.8 GHz, 40 MHz BW : -38 dB Input signal level optimized for best EVM, average of 20 bursts, ≥ 16 symbols each

EMC pre-compliance and troubleshooting (EMCVUxx-SVPC)

Standards	EN55011, EN55012, EN55013, EN55014, EN55015, EN55025, EN55032, EN60601, DEF STAN, FCC Part 15, FCC Part18, MIL-STD 461G
Features	EMC-EMI display, Wizard to setup accessories and limit lines, Inspect, Harmonic Markers, Level Target, Compare Traces, Measure Ambient, Report generation, Re-measure Spot
Detectors	+Peak, Avg, Avg (of logs), Avg (VRMS), CISPR QuasiPeak, CISPR Peak, CISPR Average, CISPR Average of Logs, MIL +Peak, DEF STAN Avg, DEF STAN Peak
Limit lines	Up to 3 Limit Lines with corresponding margins
Resolution BW	Set per standard or user definable
Dwell time	Set per standard or user definable
Report format	PDF, HTML, MHT,RTF, XLSX, Image File format

SignalVu-PC applications performance summary

Accessory type	Antenna, Near Field Probe, Cable, Amplifier, Limiter, Attenuator, Filter, Other
Correction format	Gain/Loss Constant, Gain/loss table, Antenna Factor
Traces	Save/recall up to 5 traces, Math trace (trace1 minus trace2), Ambient trace

Return Loss, Distance-to-Fault, and Cable Loss measurements

Measurements	Return Loss, Cable Loss, Distance-to-Fault (DTF)
Frequency range	10 MHz to 3 GHz (RSA503A) 10 MHz to 7.5 GHz (RSA507A/513A/518A)
Sweep speed ¹⁴	5 ms/point, Return Loss measurement 5 ms/point, Distance-to-Fault measurement 5 ms/point, Cable Loss measurement
Frequency resolution	500 Hz
Return Loss measurement error	Return Loss of 0 to 15 dB: ±0.5 dB Return Loss of 15 to 25 dB: ±1.5 dB Return Loss of 25 to 35 dB: ±4.0 dB
Return Loss measurement error at 14 dB Return Loss	±1.5 dB from 10 MHz to 6.8 GHz ±3.0 dB from 6.8 GHz to 7.5 GHz
Return Loss measurement range	50 dB
Interference immunity	Return Loss Measurement Error within specifications for the following conditions: +5 dBm interferer power within 800 kHz of measurement point +5 dBm interferer power more than 800 kHz away from measurement point (High power test level. Interferer not included in accuracy assessment.)
Distance-to-Fault range	1500 m or 15 dB one-way cable loss capable, user defined Maximum range is a function of the cable velocity factor and the frequency step size as follows: $\text{Range} = \left(\frac{V_p \times c}{2} \right) \times \left(\frac{N - 1}{F_{\text{stop}} - F_{\text{start}}} \right)$ Where: V _p = Cable velocity factor relative to the speed of light c = Speed of light (m/s) F _{start} = Sweep start frequency (Hz) F _{stop} = Sweep stop frequency (Hz) N = number of sweep points
Distance-to-Fault resolution	RSA503A, (RG-58Vp=0.66): 0.03 m (User Definable) RSA507A, (RG-58Vp=0.66): 0.01 m (User Definable) Minimum resolution is a function of the cable velocity factor and the frequency step size as follows: $\text{Resolution} = \left(\frac{V_p \times c}{2} \right) \times \left(\frac{1}{F_{\text{stop}} - F_{\text{start}}} \right)$ or $\text{Resolution} = \left(\frac{\text{Range}}{N - 1} \right)$

¹⁴ 201 point sweep Measured using a Panasonic Toughpad FZ-G1, Intel® Core™ i5-5300U 2.3GHz Processor, 8GB RAM, 256GB SSD, Windows®7 Pro. Return Loss, Cable Loss, or Distance-to-Fault display is the only measurement on screen.

Input and output ports

Inputs, outputs, and interfaces

RF input	RSA503A/507A: N type, female RSA513A/518A: N type, female (ships standard with this connector) RSA513A/518A: Planar Crown, 50 Ω. Users can select this connector instead of the N type in order to select the connector that best fits their applications. (Users can use adapters compatible with the planar crown that best fits their application.)
External frequency reference input	BNC, female
Trigger/Sync input	BNC, female
Tracking Generator Source Output	N type, female
GPS Antenna	SMA, female
USB Device Port	USB 3.0 – Type A
USB Status LED	LED, dual color red/green LED states: Steady Red: USB power applied, or resetting Steady Green: Initialized, ready for use Blinking Green: Transferring data to host
Battery Status LED	LED, green LED states: Blinking Green: External power connected, charging battery Off – no external power connected or battery fully charged

Installation requirements

Maximum power dissipation (fully loaded)	15 W maximum. Maximum line current is 0.2 A at 90 V line.
Surge current	2 A peak maximum, at 25 °C (77 °F) for ≤ 5 line cycles, after the product has been turned off for at least 30 seconds.
Cooling clearance	Bottom, top 25.4 mm (1.0 in.) Sides 25.4 mm (1.0 in.) Rear: 25.4 mm (1.0 in.)
External DC input	
Voltage	18 V
Voltage range limits	Operation: +12.0 V to +19.95 V Battery Charging: +17.5 V to +19.95 V
Connector type	2.5mm male Center conductor: positive Outer conductor: negative
AC Adapter Output	18 V ± 5%, 5 A (90 W max) Center conductor: positive Outer conductor: negative

Installation requirements

Battery

Nominal voltage	14.4 V
Nominal capacity	6140 mAh
Battery technology	Li-Ion, Smart Battery compatible with SMBus interface.
Battery operational life	4 hours of continuous operation per battery
Battery operating temperature	Operating (discharge) ¹⁵ : -10 °C to +45 °C (14 °F to 113 °F) ¹⁶ Charging: 0 °C to 45 °C (32 °F to 113 °F)
Battery storage life	2 years at +20 °C (68 °F) nominal Max storage duration between recharge: 10 months @ +20 °C (68 °F)

Physical characteristics

Physical characteristics

Height	67.3 mm (2.65 in)
Width	299.1 mm (11.78 in)
Depth	271.3 mm (10.68 in)
Net weight	RSA503A/507A: 2.54 kg (5.6 pounds) without battery 2.99 kg (6.6 pounds) with battery RSA513A/518A: 3.40 kg (7.5 pounds) without battery 3.85 kg (8.5 pounds) with battery

Environmental and safety

Temperature

Without battery installed	Operating: -10 °C to +55 °C (+14 °F to +131 °F) Non-operating: -51 °C to +71 °C (-60 °F to +160 °F)
With battery installed	Operating (discharge) ¹⁵ : -10 °C to +45 °C (+14 °F to +113 °F) ¹⁶ Charging: 0 °C to 45 °C (32 °F to +113 °F)

Humidity

Without battery Installed	MIL-PRF-28800F Class 2 Operating: 5% to 95±5%RH (relative humidity) in the temperature range of +10 °C to 30 °C (+50 °F to 86 °F) 5% to 75±5% RH above +30 °C to 40 °C (+86 °F to 104 °F) 5% to 45±5% RH above +40 °C up to +55 °C (+86 °F to +131 °F) <10 °C (+50 °F) humidity is uncontrolled; non-condensing
With battery Installed	Operating: 5% to 95% RH (relative humidity) in the temperature range of +10 °C to 30 °C (+14 °F to +86 °F) 5% to 45% RH above +30 °C to 50 °C (+86 °F to 122 °F) <10 °C (+50 °F) humidity is uncontrolled; non-condensing

Altitude

Operating	Up to 5000 m (16,404 ft.)
Non-operating	Up to 15240 m (50,000 ft.)

¹⁵ Operation at -10 °C may require turning on the unit at room temperature first.

¹⁶ Varies per discharge current and heat dissipation characteristics; actual limit may be lower.

Environmental and safety

Exposure

Splash-Proof test, operating and non-operating	No potential of shock hazard after exposure to non-operating Splash Proof Test per IEC529, level IP52
Dust resistance test, operating and non-operating	Test method per IEC529, level IP52, test conditions 13.4 and 13.5.
Salt exposure test, structural parts	Standard MIL-STD-810, Method 509.1, Procedure 1

Dynamics

Vibration

Operating	Tektronix Class 2 Random Vibration Test at 2.66 GRMS: 5-500 Hz, 3 Axes at 10 min/axis
Non-Operating	MIL-PRF-28800F Class 2 0.030 g ² /Hz., 10 500 Hz, 30 minutes per axis, 3 axes (90 minutes total)

Shock

Operating	Test method per Military Standard MIL-PRF-28800F 1-4
Non-Operating	Exceeds the requirements of Military Standard MIL-PRF-28800F

Handling and transit

Bench handling, operating	MIL-PRF-28800F Class 2
Transit drop, non-operating	MIL-PRF-28800F Class 2
Free-Fall drop, non-operating	32 inches

Ordering information

Instrument models

RSA503A: USB real time spectrum analyzer, 9 kHz - 3.0 GHz, 40 MHz acquisition bandwidth

RSA507A: USB real time spectrum analyzer, 9 kHz - 7.5 GHz, 40 MHz acquisition bandwidth

RSA513A: USB real time spectrum analyzer, 9 kHz - 13.6 GHz, 40 MHz acquisition bandwidth

RSA518A: USB real time spectrum analyzer, 9 kHz - 18.0 GHz, 40 MHz acquisition bandwidth

The RSA500 series instruments require a PC with Windows 7, Windows 8/8.1, or Windows 10, 64-bit operating system and a USB 3.0 connection. 8 GB RAM and 20 GB free drive space is required for installation of SignalVu-PC. For full performance of the real time features of the RSA500, an Intel Core i7 4th generation processor is required. Processors of lower performance can be used, with reduced real-time performance. Storage of streaming data requires that the PC be equipped with a drive capable of streaming storage rates of 300 MB/sec.

Includes: USB 3.0 cable (2 M), A-A connection, screw lock, shoulder strap, carrying case (with room for unit, tablet, accessories), quick-start manual (printed), connector covers, WFM200BA Li-Ion rechargeable battery pack, WFM200BA Li-Ion battery pack instructions (printed), AC power adapter, power cord (see power plug options), USB memory device with SignalVu-PC, API and documentation files. A GPS antenna is not included with the instrument. See Accessories for available GPS antennas.

Instrument options

Option	Description
Option 04	Tracking generator: 10 MHz to 3 GHz (RSA503A) 10 MHz to 7.5 GHz (RSA507A, RSA513A, RSA518A)

Options

RSA500A power plug options

Opt. A0	North America power plug (115 V, 60 Hz)
Opt. A1	Universal Euro power plug (220 V, 50 Hz)
Opt. A2	United Kingdom power plug (240 V, 50 Hz)
Opt. A3	Australia power plug (240 V, 50 Hz)
Opt. A4	North America power plug (240 V, 50 Hz)
Opt. A5	Switzerland power plug (220 V, 50 Hz)
Opt. A6	Japan power plug (100 V, 50/60 Hz)
Opt. A10	China power plug (50 Hz)
Opt. A11	India power plug (50 Hz)
Opt. A12	Brazil power plug (60 Hz)
Opt. A99	No power cord

Language options for the RSA500

Opt. L0	English manual
Opt. L1	French manual
Opt. L2	Italian manual

Opt. L3	German manual
Opt. L4	Spanish manual
Opt. L5	Japanese manual
Opt. L6	Portuguese manual
Opt. L7	Simplified Chinese manual
Opt. L8	Traditional Chinese manual
Opt. L9	Korean manual
Opt. L10	Russian manual

RSA500A service options

Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
Opt. D1	Calibration Data Report
Opt. D3	Calibration Data Report 3 Years (with Opt. C3)
Opt. D5	Calibration Data Report 5 Years (with Opt. C5)
Opt. R5	Repair Service 5 Years (including warranty)

Warranty

- RSA500 series warranty: 3 years.
- Alaris DF-A0047 antenna: 1-year warranty, provided by Alaris in South Africa. Service and calibration provided by Alaris.

Tablet

Tablets ordered separately The Panasonic FZ-G1 Toughbook tablet controller is recommended for use with the RSA500 series for portable field applications. The Windows 10 version of the tablet is available for purchase from Panasonic at <https://na.panasonic.com/us/computers-tablets-handhelds/tablets/tablets/toughbook-g1> and other third party Web sites.

Licenses

Licenses

A variety of optional, licensed applications are available for purchase for SignalVu-PC. These licenses can be associated with and stored on either your PC or any RSA300 series, RSA500 series, RSA600 series, and RSA7100A spectrum analyzers. Licenses can be purchased as an option to your hardware or separately as a Node-locked or a Floating license.

Contact your local Tektronix Account Manager to purchase a license. If your purchased license is not ordered as an option to your instrument, you will receive an email with a list of the applications purchased and the URL to the Tektronix Product License Web page, where you will create an account and can then manage your licenses using the Tektronix Asset Management System (AMS): <http://www.tek.com/products/product-license>.

AMS provides an inventory of the license(s) in your account. It enables you to check out or check in a license and view the history of licenses.

Optional applications are enabled by one of the following license types.

License type	Description
Node locked license (NL) purchased as an option to your instrument	This license is initially assigned to a specific host id, which can be either a PC or an instrument. It can be reassociated to either a PC or another spectrum analyzer two times using Tek AMS. When associated with an instrument, this license is factory-installed on that instrument at the time of manufacture. It will be recognized by any PC operating with SignalVu-PC when the instrument is connected. However, the licensed application is deactivated from the PC if the licensed instrument is disconnected. This is the most common form of licensing, as it simplifies management of your applications.
Node locked license (NL) purchased separately	This license is initially assigned to a specific host id, which can be either a PC or an instrument. It can be reassociated to either a PC or instrument two times using Tek AMS. This license is delivered via email and is associated with either your PC or with an instrument when you install the license. This license should be purchased when you want your license to stay on your PC, or if you have an existing USB instrument on which you would like to install a license.
Floating license(FL) purchased separately	This license can be moved between different host ids, which can be either PCs or instruments. It can be reassociated to different PCs or instruments an unlimited number of times using Tek AMS. This license is delivered via email and is associated with either your PC or with an instrument when you install the license. This is the most flexible license and is recommended in applications where the license needs to be moved frequently.

SignalVu-PC application-specific modules

The following SignalVu-PC license options are available.

Application license	Description
SVANL-SVPC	AM/FM/PM/Direct Audio Analysis - Node Locked License
SVAFL-SVPC	AM/FM/PM/Direct Audio Analysis - Floating License
SVTNL-SVPC	Settling Time (frequency and phase) measurements - Node Locked License
SVTFL-SVPC	Settling Time (frequency and phase) measurements - Floating License
SVMNL-SVPC	General Purpose Modulation Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SVMFL-SVPC	General Purpose Modulation Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO- Floating License
SVPNL-SVPC	Pulse Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SVPFL-SVPC	Pulse Analysis to work with analyzer of acquisition bandwidth <= 40 MHz or MDO- Floating License
SVONL-SVPC	Flexible OFDM Analysis - Node Locked License
SVOFL-SVPC	Flexible OFDM Analysis - Floating License
SV23NL-SVPC	WLAN 802.11a/b/g/j/p measurement - Node Locked License
SV23FL-SVPC	WLAN 802.11a/b/g/j/p measurement - Floating License
SV24NL-SVPC	WLAN 802.11n measurement (requires SV23) - Node Locked License
SV24FL-SVPC	WLAN 802.11n measurement (requires SV23) - Floating License
SV25NL-SVPC	WLAN 802.11ac measurement to work with analyzer of acquisition bandwidth <= 40 MHz (requires SV23 and SV24) or MDO - Node Locked License
SV25FL-SVPC	WLAN 802.11ac measurement to work with analyzer of acquisition bandwidth <= 40 MHz (requires SV23 and SV24) or MDO - Floating License
SV26NL-SVPC	APCO P25 measurement - Node Locked License
SV26FL-SVPC	APCO P25 measurement - Floating License
SV27NL-SVPC	Bluetooth measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SV27FL-SVPC	Bluetooth measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO- Floating License

Application license	Description
SV31NL-SVPC	Bluetooth 5 measurements (requires SV27) - Node Locked License
SV31FL-SVPC	Bluetooth 5 measurements (requires SV27) - Floating License
MAPNL-SVPC	Mapping - Node Locked License
MAPFL-SVPC	Mapping - Floating License
SV56NL-SVPC	Playback of recorded files - Node Locked License
SV56FL-SVPC	Playback of recorded files - Floating License
CONNL-SVPC	SignalVu-PC connection to the MDO4000B series mixed-domain oscilloscopes - Node Locked License
CONFL-SVPC	SignalVu-PC connection to the MDO4000B series mixed-domain oscilloscopes - Floating License
SV2CNL-SVPC	WLAN 802.11a/b/g/j/p/n/ac and live link to MDO4000B to work with analyzer of acquisition bandwidth <= 40 MHz - Node Locked License
SV2CFL-SVPC	WLAN 802.11a/b/g/j/p/n/ac and live link to MDO4000B to work with analyzer of acquisition bandwidth <= 40 MHz - Floating License
SV28NL-SVPC	LTE Downlink RF measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Node Locked License
SV28FL-SVPC	LTE Downlink RF measurement to work with analyzer of acquisition bandwidth <= 40 MHz or MDO - Floating License
SV54NL-SVPC	Signal survey and classification - Node Locked License
SV54FL-SVPC	Signal survey and classification - Floating License
SV60NL-SVPC	Return loss, distance to fault, VSWR, cable loss - Node Locked License (requires Option 04 on RSA500A/600A)
SV60FL-SVPC	Return loss, distance to fault, VSWR, cable loss - Floating License (requires Option 04 on RSA500A/600A)
SV30NL-SVPC	WiGig 802.11ad measurements - Node Locked License (only for offline analysis)
SV30FL-SVPC	WiGig 802.11ad measurements - Floating License (only for offline analysis)
EMCVUNL-SVPC	EMC pre-compliance and troubleshooting (includes EMI CISPR detectors) - Node Locked License
EMCVUFL-SVPC	EMC pre-compliance and troubleshooting (includes EMI CISPR detectors) - Floating License
SVQPNL-SVPC	EMI CISPR detectors - Node Locked License
SVQPFL-SVPC	EMI CISPR detectors - Floating License
EDUFL-SVPC	Education-only version of all modules for SignalVu-PC - Floating License

Recommended accessories

Tektronix offers a wide variety of adapters, attenuators, cables, impedance converters, antennas and other accessories for the RSA500A series.

General purpose RF cables

012-1738-00	Cable, 50 Ω, 40 inch, type-N(m) to type-N(M)
012-0482-00	Cable, 50 Ω, BNC (m) 3 foot (91 cm)
174-4977-00	Cable, 50 Ω, straight type-N (m) and angled type-N (m) connector, 1.6 foot (50 cm)
174-5002-00	Cable, 50 Ω, type-N (m) to type-N (m) connector, 3 foot (91 cm)

Adapters

103-0045-00	Adapter, coaxial, 50 Ω type-N(m) to type-BNC(f)
013-0410-00	Adapter, coaxial, 50 Ω type-N (f) to type-N (f)
013-0411-00	Adapter, coaxial, 50 Ω type-N (m) to type-N (f)
013-0412-00	Adapter, coaxial, 50 Ω, type-N(m) to type-N(m)
013-0402-00	Adapter, coaxial, 50 Ω type-N (m) to type-N 7/16(m)
013-0404-00	Adapter, coaxial, 50 Ω type-N(m) to type-7/16 (f)

013-0403-00	Adapter, coaxial, 50 Ω type-N(m) to type DIN 9.5(m)
013-0405-00	Adapter, coaxial, 50 Ω type-N(m) to type-DIN 9.5(f)
013-0406-00	Adapter, coaxial, 50 Ω type-N(m) to type-SMA(f)
013-0407-00	Adapter, coaxial, 50 Ω type-N(m) to type-SMA(m)
013-0408-00	Adapter, coaxial, 50 Ω type-N(m) to type-TNC(f)
013-0409-00	Adapter, coaxial, 50 Ω type-N(m) to type-TNC(m)
Attenuators and 50/75 Ω pads	
013-0422-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-BNC(f) 75 Ω
013-0413-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-BNC(m) 75 Ω
013-0415-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-F(m) 75 Ω
015-0787-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-F(f) 75 Ω
015-0788-00	Pad, 50/75 Ω, minimum loss, type-N(m) 50 Ω to type-N(f) 75 Ω
011-0222-00	Attenuator, fixed, 10 dB, 2 W, DC-8 GHz, type-N(f) to type-N(f)
011-0223-00	Attenuator, fixed, 10 dB, 2 W, DC-8 GHz, type-N(m) to type-N(f)
011-0224-00	Attenuator, fixed, 10 dB, 2 W, DC-8 GHz, type-N(m) to type-N(m)
011-0228-00	Attenuator, fixed, 3 dB, 2 W, DC-18 GHz, type-N(m) to type-N(f)
011-0225-00	Attenuator, fixed, 40 dB, 100 W, DC-3 GHz, type-N(m) to type-N(f)
011-0226-00	Attenuator, fixed, 40 dB, 50 W, DC-8.5 GHz, type-N(m) to type-N(f)
Antennas	
119-8733-00	Antenna, Active. GPS & GLONASS, magnetic mount, 5M cable, 3V, 8ma SMA connector, RG-174 Cable
119-8734-00	Antenna, Active, GPS and Beidou, magnetic mount, 5M cable, 3V, 8ma SMA connector, RG-174 Cable
DF-A0047	Directional antenna, 20-8500 MHz, with electronic compass and preamp ¹⁷
DF-A0047-01	Frequency range extension for DF-A0047 directional antenna, 9 kHz-20 MHz ¹⁷
DF-A0047-C1	DF-A0047 antenna and DF-A0047-01 extension ¹⁷
016-2107-00	Transit case for DF-A0047 and DF-A0047-01 ¹⁷
119-6594-00	Yagi antenna, 825-896 MHz forward gain (over half-wave dipole): 10 dB
119-6595-00	Yagi antenna, 895-960 MHz forward gain (over half-wave dipole): 10 dB
119-6596-00	Yagi antenna, 1850-1990 MHz forward gain (over half-wave dipole): 9.3 dB
119-6597-00	Beam antenna, 1850 to 1990 MHz
119-6970-00	Magnetic mount antenna, 824 MHz to 2170 MHz (requires adapter 103-0449-00)
Filters, probes, demonstration board	
119-7246-00	Pre-filter, general purpose, 824 MHz to 2500 MHz, type-N (f) connector
119-7426	Pre-filter, general purpose, 2400 MHz to 6200 MHz, type-N (f) connector
119-4146-00	EMCO E/H-field probes

¹⁷ Not available in China, Japan, New Zealand, Australia, Korea, Russia, Belarus, Kazakhstan

E/H field probes, lower cost alternative	Available from Beehive http://beehive-electronics.com/
RSA-DKIT	RSA Version 3 demo board with N-BNC adapter, case, antenna, instructions
011-0227-00	Bias-T, type N(m) RF, type N(f) RF+DC, BNC(f) Bias, 1 W, 0.5 A, 2.5 MHz-6 GHz
EMC accessories	
EMI-DEBUG-HWPARTS	Bundle of EMI accessories for debug (includes EMI-NF-Probe & EMI-NF-AMP)
EMI-RE-HWPARTS	Bundle of EMI accessories for radiated pre-compliance test (includes: EMI-BICON-ANT, EMI-CLP-ANT, EMI-PREAMP, EMI-TRIPOD, CABLE-5M, CABLE-1M)
EMI-BICON-ANT	25 MHz to 300 MHz Biconical antenna
EMI-CLP-ANT	300 MHz to 1 GHz Compact Log Periodic antenna
EMI-PREAMP	1 MHz to 1 GHz Preamplifier
EMI-TRIPOD	Antenna Tripod 0.8 to 1.5 m
EMI-LISN50uH-US ¹⁸	50uH AC line impedance stabilization network to test devices that use a US (United States) NEMA 5-15 power plug, 120V Max
EMI-LISN50uH-EU ¹⁸	50uH AC line impedance stabilization network to test devices that use an EU (European) Schuko CE7/4 power plug, 240V Max
EMI-LISN50uH-GB ¹⁸	50uH AC line impedance stabilization network to test devices that use a GB (Great Britain) BS1363 power plug, 240V Max
EMI-LISN5uH	5uH DC line impedance stabilization network
EMI-NF-PROBE	Near Field Probe set
EMI-TRANS-LIMIT	Transient Limiter 150 kHz to 30 MHz
CABLE-1M	Cable, 1 m
CABLE-3M	Cable, 3 m
CABLE-5M	Cable, 5 m
EMI-NF-AMP	Near Field Probe Amplifier
Chargers, Additional batteries, Cables, Cases	
RSA5600RACK	Rackmount for RSA500 and RSA600 series. Holds 1 RSA500A or 2 RSA600A models.
WFM200BA	Replacement battery pack for RSA500A series
WFM200BC	External battery charger for WFM200BA, charges two batteries
CF-LNDDC120	Lind 120 W 12-32 Volt input vehicle adapter for RSA500A series and Panasonic Tough Pad (not available in China)
016-2109-01	Additional soft carry-case with shoulder strap
174-6810-00	Additional USB 3.0 cable (2 M), A-A connection, screw lock

¹⁸ Not available in Canada

Tracking generator accessories

A variety of calibration kits and phase-stabilized cables are available for the RSA500 tracking generator when used with the optional cable and antenna measurements software.

Calibration kits can be used to improve the factory calibration of the tracking generator when equipped with application SV60-Return loss, VSWR, cable loss, and distance to fault.

These phase-stabilized cables are high performance cables that are phase-stable to ± 2 degrees at 7.5 GHz, with return loss less than -20 dB. Velocity constant is 0.78. Loss at 7.5 GHz specified to be less than -1.05 dB (0.6 m), -1.61 dB (1.0 m), -2.30 dB (1.5m) (all values nominal).

Calibration kits

CALOSLNM	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, Type-N(m), 50 ohm
CALOSLNF	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, Type-N(f), 50 ohm
CALOSLNF	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, 7/16 DIN(m)
CALOSL716F	Calibration kit, 3-in-1, open, short, load, DC to 6 GHz, 7/16 DIN(f)
CALSOLT35F	Calibration kit, 4-in-1 3.5 mm (f) short, open, load, through, 13 GHz
CALSOLT35M	Calibration kit, 4-in-1 3.5 mm (m) short, open, load, through, 13 GHz
CALSOLTNF	Calibration kit, 4-in-1 type-N (f) short, open, load, through, 9 GHz
CALSOLTNM	Calibration kit, 4-in-1 type-N (m) short, open, load, through, 9 GHz
CALSOLT716F	Calibration kit, 4-in-1 7/16 (f) short, open, load, through, 6 GHz
CALSOLT716M	Calibration kit, 4-in-1 7/16 (m) short, open, load, through, 6 GHz

Phase-stabilized cables

012-1745-00	Type-N (m) to type-N (f), 5 ft or 1.5 m
012-1746-00	Type-N(m) to type-N(m), 5 ft or 1.5 m
012-1747-00	Type-N(m) to 7/16(f), 60 cm (23.6 in.)
012-1748-00	Type-N(m) to 7/16(f), 3.28 ft or 1 m
012-1749-00	Type-N(m) to 7/16(f), 5 ft or 1.5 m
012-1750-00	Type-N(m) to 7/16(m), 3.28 ft or 1 m
012-1751-00	Type-N(m) to 7/16(m), 5 ft or 1.5 m
012-1752-00	Type-N(m) to 7/16(m), 60 cm (23.6 in.)
012-1753-00	Type-N(m) to DIN 9.5(f), 60 cm (23.6 in.)
012-1754-00	Type-N(m) to DIN 9.5(f), 3.28 ft or 1 m
012-1755-00	Type-N(m) to DIN 9.5(f), 5 ft or 1.5 m
012-1756-00	Type-N(m) to DIN 9.5(m), 3.28 ft or 1 m
012-1757-00	Type-N(m) to DIN 9.5(m), 5 ft or 1.5 m
012-1758-00	Type-N(m) to DIN 9.5(m), 60 cm (23.6 in.)
012-1759-00	Type-N(m) to TNC(f), 3.28 ft or 1 m
012-1760-00	Type-N(m) to TNC(f), 5 ft or 1.5 m
012-1761-00	Type-N(m) to TNC(f), 60 cm (23.6 in.)
012-1762-00	Type-N(m) to TNC(m), 60 cm (23.6 in.)

012-1763-00	Type-N(m) to TNC(m), 3.28 ft or 1 m
012-1764-00	Type-N(m) to TNC(m), 5 ft or 1.5 m
012-1765-00	Type-N(m) to type-N(f), 60 cm (23.6 in.)
012-1766-00	Type-N(m) to type-N(f), 3.28 ft or 1 m
012-1767-00	Type-N(m) to type-N(m), 3.28 ft or 1 m
012-1768-00	Type-N(m) to type-N(m), 60 cm (23.6 in.)
012-1769-00	Type-N(m) to type-SMA(f), 60 cm (23.6 in.)
012-1770-00	Type-N(m) to type-SMA(f), 3.28 ft or 1 m
012-1771-00	Type-N(m) to type-SMA(f), 5 ft or 1.5 m
012-1772-00	Type-N(m) to type-SMA(m) 60 cm (23.6 in.)
012-1773-00	Type-N(m) to type-SMA(m), 3.28 ft or 1 m
012-1774-00	Type-N(m) to type-SMA(m), 5 ft or 1.5 m



Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.



Product(s) complies with IEEE Standard 488.1-1987, RS-232-C, and with Tektronix Standard Codes and Formats.



Product Area Assessed: The planning, design/development and manufacture of electronic Test and Measurement instruments.

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For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.tek.com.

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