Automotive Test Solutions

Mobile Connectivity - Enabled
# Automotive Test Solutions

The complexities of the modern automobile continue to increase with more and more technology being added from communications to safety. These systems add cost and reliability issues which must be addressed in the early stages and throughout the vehicle's life.

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<th>Safety and Driver Aids</th>
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<td>From an eCall tester based on a complete network simulator and a software tool simulating Public Safety Answering Points (PSAP), GPS modules, on-board sensors and radar systems aiming to protect and aid the driver Anritsu has a solution for all onboard safety systems. GPS, GNSS, eCall, TPMS, RKE, FMCW, ERA-GLONASS</td>
<td>Wireless technologies have acquired importance during the last decade in the automotive industry, making the experience of driving safer and more comfortable. All these wireless standards, including mobile, short range wireless and navigation, help to keep the driver connected. LTE/2G/3G/4G, Bluetooth, WiFi, AM/FM/DAB/RDS</td>
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<td>The automotive industry is constantly increasing the presence of technology in vehicles. In excess of a hundred separate control units will be part of the future car, generating more and more applications for informing and entertaining the passengers. Ethernet, CAN, Optical Fibres, RF cables &amp; connectors</td>
<td>ITS (Intelligent Transport Systems) refers to a variety of communication systems inside or outside the vehicle. In the connected car environment, there are several sensors that are communicating with other vehicles and the road, including lanes and signals. V2V, V2X, Car 2 Car, M2M</td>
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<td>Anritsu offers a full set of instruments for electromagnetic compatibility (EMC), where different technologies are simultaneously operating in public frequency bands ensuring EMC is an important requirement. OTA, EMC, EMI, Interference Hunting</td>
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Wireless Connectivity

Wireless technologies have acquired increasing importance during the last decade in the automotive industry, making the experience of driving easier, safer and more comfortable. All these wireless standards, including mobile, short range wireless and navigation, help to keep the driver connected everywhere, while broadcast technologies are now utilized to keep all of the car occupants connected and entertained.

Besides FM/AM radio, today’s vehicle incorporates digital radio (DAB) as well as video broadcasting, including DVB and ISDB standards. Anritsu’s portfolio allows testing of these technologies at all stages of product development, from R&D to production, providing dedicated solutions and universal wireless testers that will ensure your products comply with the latest specification.

MD8475A Signalling Testers
- Supports multimode terminals and all cellular standards, including LTE (2x2 MIMO), LTE-Advanced (Carrier Aggregation).
- SmartStudio GUI supports easy setup of test environments and functional tests.
- Automated mobile terminal verification testing with test sequences.
- Built-in PC with control and application server functions reduces benchtop footprint.

The MD8475A is an all-in-one base station simulator supporting LTE, LTE-Advanced, WCDMA/HSPA/HSUPA Evolution/DC-HSDPA, GSM/EGPRS, CDMA2000 1X/1XEV-DO Rev. A. and TD-SCDMA/TD-HSPA. It supports services as eCall, IMS, VoLTE, off-load tests and call-processing tests for smartphones which are now present on vehicles. In addition, the time required to configure a test environment is greatly reduced by the easy-to-use GUI-based SmartStudio software, as well as supplied test sequences for automatic remote control of the GUI. All this will make vehicle testing easy, quick and reliable.

MT8870A Universal Wireless Tester
- Designed for mass production of wireless modules, it operates in a non-signalling environment for minimum test time per unit.
- Supports all wireless standards, including cellular, SRW, navigation and broadcast.
- Modular design with up to 16 high performance RF ports in one small chassis.
- Built-in signal generator and signal analyser on each module. Wide frequency range from 10 MHz to 6 GHz and 160 MHz measurement bandwidth for 802.11ac, LTE-Advanced and future standards.

Anritsu’s MT8870A Universal Wireless Test Set is the best solution for testing at R&D and production stages of all wireless standards: cellular (2G, 3G, LTE, LTE-Advanced), SRW (802.11x, Bluetooth and ZigBee), navigation (GPS, GLONASS and Beidou) and broadcast technologies (AM/FM radio, DBV and ISDB standards). It is ideal not only for production, where it can make fast measurements, including calibration, validation and 3GPP tests, but it also includes CombiView which is ideal for R&D and troubleshooting. And it is prepared for future standards due without additional hardware improvements, thanks to its wide frequency operating range and 160 MHz measurement bandwidth.

MG3710A Vector Signal Generator
- Vector Signal Generator supporting frequencies of 100 kHz to 2.7/4.6 GHz.
- Built-in wideband (160 MHz/120 MHz) baseband signal generator.
- Dual RF (Optional) provides two independent RF outputs.
- Dual Waveform Memory (Optional) enables two independently modulated signals per RF Output.

The Vector Signal Generator MG3710A is a best-of-class, multi-function, signal generator with excellent RF and baseband performance that can be used to test performance on all in-vehicle broadcast technologies including FM+RDS, AM, DAB, DVB and ISDB standards among others. The MG3710A features wideband vector modulation and offers built-in baseband waveform generation with large-capacity memory to ensure maximum versatility. It supports all key mobile communications and wireless LAN standards, and it also has the exceptional performance required for emerging and proprietary wireless communications technologies.

MT8860C WLAN Test Set
- Integrated test set for 802.11b/g/a/n transmitter and receiver measurements.
- “Network” mode - tests devices using standard WLAN protocols to establish a connection to the DUT.
- “Direct” mode - tests WLAN devices with the support of test mode software from the silicon supplier.
- LANLook software for instrument configuration and results display.
- CombiTest software for production test requirements.

Anritsu's MT8860C WLAN Test Set is an all-in-one solution supporting all cellular standards available on a vehicle, including LTE-A, LTE, 3G and 2G technologies. It is a high-end instrument for RF measurements, which makes it ideal for all stages of product development, not only for R&D but also at production due to its non-call processing mode, reducing test times to optimise cost per unit.

MS2830A Spectrum Analyzer
- 9 kHz to 26.5/43 GHz frequency range.
- For wideband down-converter, built-in 1 GHz IF output band.
- Best-of-class wide dynamic range over 6 GHz.
- Supports Noise Figure and BER measurement.
- Excellent eco-friendly product with low power consumption of 190 VA min.

Anritsu’s MS2830A spectrum and signal analyzer is the best option for in-vehicle testing of 2G, 3G, LTE and LTE-Advanced signals. It supports measurement of modulation and Tx characteristics, including adjacent channel leakage power and spectrum mask as well as spurious measurements requiring a wide dynamic range. The capture and replay function can be used to better compare the real world effects with simulated designs and performance, which will ensure the product quality.

MT8820C Radio Communications Analyzer
- RF tests for LTE-Advanced DL CA and LTE terminals and other.
- Non-call processing mode for fast RF measurements.
- Excellent operability cuts test and maintenance times on manufacturing lines.

The MT8820C is an all-in-one solution supporting all cellular standards available on a vehicle, including LTE-A, LTE, 3G and 2G technologies. It is a high-end instrument for RF measurements, which makes it ideal for all stages of product development, not only for R&D but also at production due to its non-call processing mode, reducing test times to optimise cost per unit.

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**Safety and Driver Aids**

Aiming to ensure safety and the quickest responses from emergency services in the event of a traffic accident, an emergency call (eCall) made automatically by an involved car could save millions of lives. As soon as on-board sensors (e.g. the airbag sensors) register a serious accident, the car will automatically dial the standard emergency phone number and send vital information including location and speed. Once that vital information is transmitted, a voice channel will be established between the call centre operator and the passengers to check their status.

Anritsu offers an eCall tester based on a complete network simulator and a software tool simulating Public Safety Answering Points (PSAP). GPS modules, on-board sensors and radar systems aiming to protect and aid the driver can be tested using Anritsu’s Spectrum Analyzers, Signal Generators or Universal Wireless Testers.

**ME7838A VectorStar Vector Network Analyzer**

- The VectorStar ME7838 Series broadband VNA offers the widest available single frequency sweep from 70 kHz to 110, 125, and 145 GHz with mmWave bands to 1.1 THz.
- Industry-best calibration and measurement stability: 0.1 dB vs 0.6 dB over 24 hrs.
- All versions support the 3744a-Rx receiver for noise figure measurements to 125 GHz.
- Compact, lightweight mmWave modules (0.6 lb vs 7+ lbs and 1/50 the volume) offer low cost installation on smaller probe stations.

**MT8870A Universal Wireless Tester**

- Designed for high volume smartphones, tablets and wireless modules manufacturing test applications.
- Modular design with up to 16 high performance RF ports in one small chassis, to minimize test time and ensure an efficient cost per tested unit.
- Built-in signal generator and signal analyzer on each module.

The MT8820C supports high-speed batch measurements of RF TRx characteristics and call connection tests for 2G/3G/4G mobile modules that could be integrated into the car’s communication system. MT8820C is also extremely suited to Over-the-Air (OTA) environments for EMC testing, being perfectly applicable in automotive, where the chassis effect over the multiple antennas integrated in the car must comply with strict regulations.

**MG3710A Vector Signal Generator**

- Vector Signal Generator supporting frequencies of 100 kHz to 2.7/4/6 GHz.
- Built-in wideband (160 MHz/120 MHz) baseband signal generator.
- Dual RF (Optional) provides two independent RF outputs.
- Dual Waveform Memory (Optional) enables two independently modulated signals per RF Output.

MG3710A can be used as an Arbitrary Waveform Generator, totally flexible for simulating GNSS signals (i.e. GPS, GLONASS), perfect for driver-aid systems development. Its dual RF option makes it easy to implement complex test scenarios that would normally require multiple synchronized signal generators, such as:

- Wanted + Interference Signals for Receiver Blocking Testing
- Wanted + Two CW Tones for Receiver Intermodulation Testing
- Wanted + Delayed Signals for Multipath Testing

**MS2830A Spectrum Analyzer**

- 9 kHz to 26.5/43 GHz frequency range; 43 GHz max.
- 100 kHz to 2.7/4/6 GHz.
- Vector Signal Generator supporting frequencies of 100 kHz to 2.7/4/6 GHz.
- Built-in wideband (160 MHz/120 MHz) baseband signal generator.
- Dual RF (Optional) provides two independent RF outputs.
- Dual Waveform Memory (Optional) enables two independently modulated signals per RF Output.

MS2830A Spectrum Analyzer is a multi-application tool for Automotive Industry. The system uses a built-in vector signal generator to reproduce captured actual signals. These captured pulse signals and noise are analyzed using the flexible VSA function supporting Spectrum, Power vs. Time, and Frequency vs. Time displays. In addition, spectrum performance can be checked intuitively using the Spectrogram display showing frequency, time, and power on one screen to troubleshoot and develop car wireless equipment, such as RKE and TPMS, using FSK signals. The characteristics of time-shifted signals, such as DSRC and IEEE802.11p used for car-to-car and road-to-car communications, can be measured using analysis tools like MATLAB.

**MD8475A Signalling Testers**

- Supports multimode terminals
- LTE (2x2 MIMO), LTE-Advanced (Carrier Aggregation), W-CDMA/HSPA/HSPA Evolution/DC-HSDPA, GSM/EGPRS, CDMA2000 1X/1xEV-DO Rev. A, TD-SCDMA/TD-HSDPA
- SmartStudio GUI supports easy setup of test environments and functional tests.
- Supports 2-cell test environment, including Inter-RAT Cell Reselection, Redirection, Cell Change, CS Fallback, etc.
- eCall tester can be reliably integrated with the platform.
- Built-in PC with control and application server functions reduces benchtop footprint.
- Automated mobile terminal verification testing with test sequences.

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In-Vehicle Networks

The Automotive Industry is constantly increasing the presence of technology in-vehicles. With sometime more than a hundred separate control units in the modern vehicle, all generating more and more applications for informing and entertaining the passengers. All these devices, connected with each other, are constantly sending data to central computers or displays. Anritsu’s OTDR and GigE analyzers are used for ensuring the high transmission rates in all points of the in-vehicle network.

Anritsu’s Site Master and Vector Network Analyzers will easily check the proper continuity of cables and connectors.

MT9090A Network Master uOTDR
- High-end OTDR performance in a pocket-size package.
- Exclusive, integrated launch fiber provides accurate initial connector measurement without external devices.
- Bluetooth, Wi-Fi and Ethernet connectivity.
- Complete PON testing through splitters up to 1 x 64.
- High resolution and extremely short deadzones ensure thorough short fiber evaluation.
- Complete fiber maintenance tool including optical power meter and visible source “red light”.

Anritsu MT9090 uOTDR is the right answer for testing the growing optical elements that form part of the car’s communication and infotainment systems. The increasing amount of optical sensors in cars will require uncountable checks of optical cables, connectors or splitters. Anritsu MT9090 uOTDR is the easiest and most comprehensive means of completing these tests.

MT1000A Network Master Pro
- All-in-one field transport tester – supports testing from 1.5 Mbps to 10 Gbps.
- Optical Transport Networks (OTN) installation and maintenance.
- Carrier Class Ethernet installation and troubleshooting.
- Powerful Storage Area Networking (SAN) testing UPDATED.
- Quick and easy testing of SDH/SONET and PDH/DSn networks.
- Testing of client signals mapped into OTN.
- Easy and intuitive GUI.
- Dual port at all rates.
- WLAN/Bluetooth/LAN connectivity.
- PDF and XML report generation for documentation of test results.
- Remote operation and remote control (scripting).

Today’s in-vehicle communication networks are becoming more and more sophisticated as new technologies like OTN and Ethernet are being fully deployed alongside the entire car. The Network Master Pro MT1000A redesigns the direction of future test platforms by bringing these network test requirements to a portable device, making it the ideal tool for field testing.

MS46122A USB Vector Network Analyzer
- World’s first series of compact VNAs from 1MHz to 40 GHz for cost-effective measurements.
- PC control takes advantage of external computer processing power and functionality.
- Compact 1U high package for efficient use of bench and rack space.
- Time domain with time gating option grants easier and faster fault identification.

Anritsu Shockline Compact VNA MS46122A is the smallest, most advanced 2-port VNA in the world. The series benefits from patented shock line VNA-on-chip technology, which simplifies the internal VNA architecture at high frequencies, reduces instrument cost, and enhances accuracy and measurement repeatability. All the members of the MS46122A series are low cost full-reversing 2-port VNAs aimed at RF and microwave applications in manufacturing, engineering and education. With 220 microseconds per point sweep speed and better than 100 dB dynamic range they are extremely suitable for a wide variety of device test applications in the Automotive Industry, such as cable, connectors, antenna or radar.

MT9090A Gigabit Ethernet Analyzer
- Versatile, purpose-built solution for Gigabit Ethernet field testing.
- Comprehensive Ethernet testing for installation, maintenance and troubleshooting.
- Ping test, traceroute test and Electrical cable diagnostics.
- Two ports simultaneously work for shortening multiple ports installation, including pass through test and in-line monitoring test.
- Option for automated (TU-T Y.1564 testing, simultaneously testing of multiple traffic streams emulating real world networks.
- Option for automated RFC 2544 testing.
- Test Automator simplifies operation and ensure proper set-up.
- Channel Stats option identifies error streams, top talkers and network attack.
- Service disruption time measurement to test the performance of realtime applications like voIP and IPTV.

For installation, commissioning and quality verification the Network Master Gigabit Ethernet tester provides powerful and flexible traffic generation capabilities, allowing you to easily test the in-vehicle network under various conditions, including generation of VLAN traffic. The instrument also provides facilities for BER testing of the lines, performance statistics and quality evaluation.

S331E Handheld Spectrum Analyzer
- Cable and Antenna Analyzer: 2 MHz - 4 GHz
- Return Loss, VSWR, Cable Loss, Distance-To-Fault, Smith Chart, 1-Port Phase
- Field proven design: Four-hour battery life, rugged, compact, lightweight, daylight viewable display
- USB connectivity, built-in touch screen keyboard
- Intuitive menu-driven touch screen user interface

Anritsu S331E SiteMaster Compact Handheld Cable and Antenna Analyzer can complete sweeps quickly, perform calibrations instantly, and implement fast trace naming while in the field. Ideal product for Cable & Antenna Installation and Maintenance in the automotive industry. Insertion Loss , 2-port measurements of Amplifiers, diplexers, diplexers or filters , Phase Matching Cables and Antenna Tuning are relevant applications fitting into the upcoming in-vehicle networks.
Intelligent Transport System

ITS (Intelligent Transport Systems) refers to all types of communication inside or outside the vehicle. In the connected car environment, there are several sensors that are communicating with other vehicles and the road, including lanes and signals. Current applications, known as Car2Car, V2V or V2x include radar and eCall, but this will increase in the next few years as vehicles will be equipped with a higher number of sensors and driver aids.

Anritsu offers a complete set of instruments and compact software solutions to make M2M testing easy and in line with ITS standards, as well as 802.11p.

### MD8475A Signalling Tester
- Supports multimode terminals and all cellular standards, including LTE (2x2 MIMO), LTE-Advanced (Carrier Aggregation).
- SmartStudio GUI supports easy setup of test environments and functional tests.
- Automated mobile terminal verification testing with test sequences.
- Built-in PC with control and application server functions reduces benchtop footprint.

The MD8475A is an all-in-one base station simulator supporting all cellular standards and M2M specific applications. It supports services such as eCall, IMS, VoLTE, off-load tests and call-processing tests for smartphones which are now present on vehicles. In addition, the time required to configure a test environment is greatly reduced by the easy-to-use GUI-based SmartStudio software, as well as supplied test sequences for automatic remote control of the GUI. All this will make M2M testing easy, quick and reliable.

### MS2830A Spectrum Analyzer
- 9 kHz to 26.5/43 GHz frequency range.
- For wideband down-converter; built-in 1 GHz IF output band.
- Best-of-class wide dynamic range over 6 GHz.
- Supports Noise Figure and BER measurement.
- Excellent eco-friendly product with low power consumption of 190 VA min.

Anritsu’s MS2830A spectrum and signal analyzer can be used for testing of 2G, 3G, LTE and LTE-Advanced signals on a vehicle-to-vehicle or vehicle-to-x test environment. It supports measurement of modulation and Tx characteristics, including adjacent channel leakage power and spectrum mask as well as spurious measurements requiring a wide dynamic range. The capture and replay function can be used to better compare the real world effects with simulated designs and performance, which will ensure the product quality.

### MT8870A Universal Wireless Tester
- Designed for mass production of wireless modules, it operates in a non-signalling environment for minimum test time per unit.
- Supports all wireless standards, including cellular, SRW, navigation and broadcast.
- Modular design with up to 16 high performance RF ports in one small chassis.
- Built-in signal generator and signal analyser on each module. Wide frequency range from 10 MHz to 6 GHz and 160 MHz measurement bandwidth for 802.11ac, LTE-Advanced and future standards.

Anritsu’s MT8870A Universal Wireless Test Set is the best solution for testing at R&D and production stages of all M2M, V2V, V2x technologies. It is ideal not only for production, where it can make fast measurements, including calibration, validation and tests according to the relevant standards, but it also includes CombiView which is ideal for R&D and troubleshooting. And it is prepared for future standards due without additional hardware improvements, thanks to its wide frequency operating range and 160 MHz measurement bandwidth.
Spectrum Master MS2720T is a multifunctional tool ideal for EMC/EMI testing in automotive environments. From Transmitter Spectrum Analysis to Received Signal Analysis, where location and identification of in-band interference and out-of-band spurious signals need to be tested, MS2720T is ideal. Also perfect for Signal Strength Mapping in order to determine the most suitable location for antennas in the car or AM & FM analog proofing measurements. The two-port front end with tracking generator function allows the measurement of filters, attenuators, amplifiers and cables inside the car.

Electromagnetic Interference

Anritsu offers a full set of instruments for electromagnetic compatibility (EMC). Where different technologies are simultaneously operating in public frequency bands thorough EMC and EMI testing are of vital importance.

Electromagnetic interference (EMI) testing is a must before launching a product into the real wireless world. Spectrum Analyzers, near field probes and handhelds from Anritsu will ensure your product is compatible with the standards.

MS2720T Series Handheld Spectrum Analyzer
- Five options offering 9 kHz to 9, 13, 20, 32 & 43 GHz.
- Internal Atomic Clock option for the ultimate in handheld frequency accuracy.
- Tracking Generator up to 20 GHz.

MS2711E Series Handheld Spectrum Analyzer
- Spectrum Analyzer: 9 kHz to 3 GHz.
- Interference Analyzer with Interference Mapping.
- High Accuracy Power Meter.
- Channel Scanner, GPS, AM/FM/PM Analyzer.
- Tracking Generator: 500 kHz to 3.0 GHz.
- Field-proven design: Three-hour battery life, rugged, compact, lightweight, daylight viewable display.

The MT8820C supports high-speed batch measurements of RF TRx characteristics and call connection tests for 2G/3G/4G mobile modules that could be integrated into the car’s communication system. MT8820C is also extremely suited to Over-the-Air (OTA) environments for EMC testing, being perfectly applicable in automotive, where the chassis effect over the multiple antennas integrated in the car must comply with strict regulations.

Anritsu MS2830A Spectrum Analyzer supports measurements of Tx characteristics, including adjacent channel leakage power, spectrum mask, and frequency counter, as well as spurious measurements requiring a wide dynamic range. MS2830A offers an EMI measurement detection mode and RBW configurations used for CISPR standards.
Specifications are subject to change without notice.