

Functionality testing of automotive infotainment devices

Automotive Infotainment Testing



Challenges

Modern day vehicle interactivity takes place on the centrally placed touchscreen head unit display (HUD) on the car dashboard. Infotainment systems have become a central hub for a wide range of vehicular functionality.

These systems provide driver entertainment and information by integrating different functions. Examples include in-vehicle connectivity with wireless devices (e.g. Bluetooth® or WLAN hotspot for audio and smartphones) and connecting with external communications, transmission, radio and satellite network providers.

All of this is on top of a multitude of multimedia that include analog AM/FM radio, digital radio, analog/digital TV, GPS data for navigational systems, communications services (over 3G, 4G or WLAN) and digital satellite audio reception.

Your task

To serve their customer base, automakers and Tier 1s must test and validate all systems and functions to ensure safety, IP connection security and performance. Since the car is moving, the infotainment system has to deal with complex and variable fading scenarios. Functionality of the communications and broadcast features needs to be tested in a simulated real-world environment in the lab.

Different regional standards drive up the complexity of compliance and the need for sophisticated designs to allow seamless functionality. Additionally, infotainment system software is developed and changed frequently as more features are implemented. A key task for the development teams is to ensure that software changes do not adversely affect other functions.

Rohde & Schwarz solution

Rohde & Schwarz offers state-of-the-art test and measurement instruments for performing comprehensive and accurate functionality tests on infotainment devices. The proposed solution includes the R&S®CMW500 wideband radio communication tester, the R&S®BTC broadcast test center and the R&S®SMBV100A vector signal generator. The instruments may be used in combination or individually.

The R&S®BTC is used to generate audio and video signals such as AM, FM, DAB/DAB+, HD Radio™, DVB-T/DVB-T2, ATSC, CMMB and SiriusXM Radio. The R&S®CMW500 is used to generate Bluetooth®, WLAN, WCDMA/HSPA and LTE radio signals. The R&S®SMBV100A simulates GNSS signals such as GPS, GLONASS, BeiDou and Galileo. By combining the R&S®CMW500 and the R&S®SMBV100A, Rohde & Schwarz offers a compact solution for automated, reliable and reproducible end-to-end conformance tests on eCall/ERA-GLONASS modules independent of the real-world network.

The output ports of the test instruments are connected directly or via DC blocker to the antenna ports of the DUT. Typically, the Bluetooth® and WLAN antennas on the DUT are not accessible. The Bluetooth® and WLAN signaling from the R&S®CMW can be fed over the air

using an appropriate antenna. The same applies if testing should include any peripheral active antennas or filter subsystems. To perform video or audio quality testing, the DUT's HDMI™ or analog output connects to the R&S®BTC for detailed audio and video analysis.

R&S®CMW500 wideband radio communication tester

- ▮ Continuous frequency range up to 6 GHz
- ▮ Internal fading simulation
- ▮ Multi-technology solution
 - GSM/(E)GPRS
 - WCDMA/HSPA/HSPA+
 - LTE-A (FDD, TDD)
 - CDMA2000® 1xEV-DO Rev A, Rev B
 - TD-SCDMA
 - IP connection security analysis
 - WLAN, Bluetooth®
 - In-device coexistence test with other technologies
 - In-band, interstandard and international roaming handoff

R&S®BTC broadcast test center

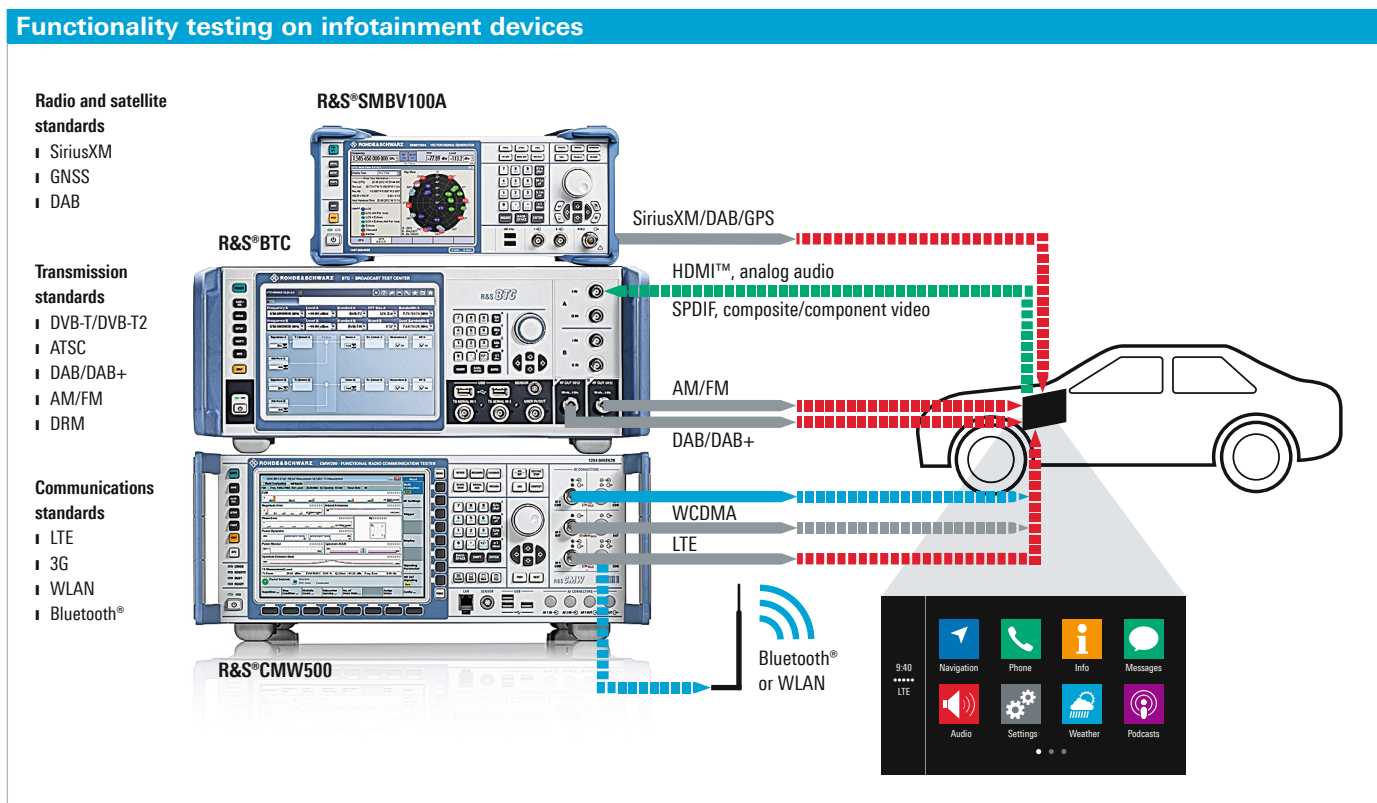
- ▮ Signal generation and DUT audio/video analysis in one instrument
- ▮ 2 RF output signal generators with frequency range up to 6 GHz
- ▮ Internal fading simulation
- ▮ HDMI™ and analog options supporting in-depth video and audio analysis
- ▮ Integrated audio player and multimedia generator
- ▮ Realtime signal generation for all global analog and digital broadcasting standards

R&S®SMBV100A vector signal generator

- ▮ Continuous signal generation up to 6 GHz
- ▮ GNSS simulator
 - GPS, GLONASS, Galileo, BeiDou and QZSS/SBAS
- ▮ Baseband generator with realtime coder and arbitrary waveform generator (optional)
- ▮ ARB-only baseband generators (optional)

See also

www.rohde-schwarz.com/appnote/1MA275



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Rohde & Schwarz GmbH & Co. KG

Europe, Africa, Middle East | +49 89 4129 12345
 North America | 1 888 TEST RSA (1 888 837 87 72)
 Latin America | +1 410 910 79 88
 Asia Pacific | +65 65 13 04 88
 China | +86 800 810 82 28 | +86 400 650 58 96
www.rohde-schwarz.com
customersupport@rohde-schwarz.com

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 PD 5215.6132.92 | Version 02.00 | February 2018 (ch)
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