R&S® ATSI100
Infotainment Test System
Fast and extensive tests in automobile production
R&S®ATSI100
Infotainment Test System
At a glance

The R&S®ATSI100 system generates every test signal separately in application-specific modules. Each module contains all components needed for signal generation and amplification.

Due to the robust design, the modules meet the rigorous standards in automobile production. The R&S®ATSI100 module frames provide easy slot-in installation and power supply for up to eleven modules.

The modular concept allows the installation of the modules close to the test environment (e.g. test cabin, production line). This largely avoids time-consuming and fault-prone laying of RF cables in the production area.

Testing at all stages of production
Different test strategies at all stages of the production process are supported:
- Component pretesting by the supplier (“100% strategy”)
- Conventional testing of the finished vehicle on the assembly line or in the test chamber
- Testing of vehicle modules prior to installation (e.g. loudspeakers in the door module, keyless entry)
- Mobile testing with handheld measuring equipment via radio interface

Test signals for all purposes
The R&S®ATSI100 covers a wide range of modern standards used in infotainment:
- AM, FM generator
- DAB repeater
- PAL/NTSC TV generator
- DVB-T repeater
- GPS repeater
- Loudspeaker test
- Audio analysis
- Keyless entry test (ISM)

The monitor module allows most signals to be monitored by means of sensor antennas.

Key facts
- Remote control via LAN
- Onboard power amplification
- Selftest functionality
- Radiated signal survey
- Module configuration software
- Hot-swapping capability
- Interface to process control systems
- Future-ready and economical enhancement
R&S®ATSI100 Infotainment Test System

Benefits and key features

Remote control via LAN
Every R&S®ATSI100 module is equipped with an Ethernet LAN interface. The modules can therefore be installed exactly where the individual test signals are needed – and still be remote-controlled and monitored from a central control PC via a standard LAN connection.

This ideally meets the requirements of the automobile industry.

Onboard power amplification
The RF power amplification included in every module ensures high output levels. As there is no need for additional external amplifiers, antennas can be connected directly to the module.

Selftest functionality
Built-in test equipment (BITE) is very important for reliable testing. Therefore, the internal operating state of each module is permanently checked by selftest routines. Malfunctions are reported to the system controller via the LAN connection.

Radiated signal survey
In addition to continuous internal selftesting, all radiated test and environmental signals are analyzed on the air interface using the R&S®ATSI100 monitor module and sensor antennas. Any RF level variation can instantly be detected and compensated by readjusting the output level of the affected module. This closed-loop control ensures the integrity of the entire system.

Module configuration software
As standard, every R&S®ATSI100 module comes with its specific module configuration software. With this intuitive graphical user interface, the modules can be operated using a static configuration. Only a Microsoft Windows based PC as well as a LAN connection between the PC and the R&S®ATSI100 module are required.

Hot-swapping capability
In case of a failure, a defective module can easily be replaced by a spare module without interrupting the rest of the R&S®ATSI100 system. The previous configuration can be written to the new module by the R&S®ATSI100 software.

Interface to process control systems
For easy integration of the R&S®ATSI100 system into the production process control system, the R&S®ATSI-K1 to R&S®ATSI-K12 options offer the appropriate interfaces.

Future-ready and economical enhancement
Upcoming broadcasting standards can be easily integrated into the infotainment test by adding a specific function module.

As a quality assurance system, the R&S®ATSI100 can provide identical test conditions and thus yield comparable test results on different production lines and at different sites.

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## Hardware modules

### Modules of the R&S®ATSI100 infotainment test system: housing

<table>
<thead>
<tr>
<th>Module Name</th>
<th>Description</th>
<th>Specifications in brief</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;S®ATSI-MF Module Frame</td>
<td>19” housing with six vertical units for holding the circuit power pack and backplane as well as a variable arrangement for holding a maximum of eleven R&amp;S®ATSI modules.</td>
<td>Circuit power pack for power supply</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Primary: 100 V to 240 V AC, 50 Hz to 60 Hz</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Secondary: +5 V, +12 V, –12 V DC</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Backplane for distributing the power supply voltages (+5 V, +12 V, –12 V) to the individual R&amp;S®ATSI modules</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 HU, two-slot model available</td>
</tr>
</tbody>
</table>

### Modules of the R&S®ATSI100 infotainment test system: RF generators

#### R&S®ATSI-AM AM Generator

**For AM radio tests**
The R&S®ATSI-AM generator enhances the R&S®ATSI100 infotainment test system with the capability to perform AM radio tests. The generator module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**
- Frequency range: 50 kHz to 30 MHz
- Frequency resolution: 1 Hz
- Level range: −30 dBm to +23 dBm
- Level accuracy better than 1 dB
- Integrated modulation generator: 20 Hz to 20 kHz
- External modulation input

#### R&S®ATSI-FM FM Generator

**For FM radio tests**
The R&S®ATSI-FM generator enhances the R&S®ATSI100 infotainment test system with the capability to perform FM radio tests. The generator module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**
- Frequency range: 76 MHz to 108 MHz
- Output level: –80 dBm to +20 dBm
- Internal modulation generator: 20 Hz to 15 kHz
- External modulation input
- Stereo option
- RDS option

#### R&S®ATSI-ISM ISM Generator

**For tests in ISM bands**
The R&S®ATSI-ISM generator enhances the R&S®ATSI100 infotainment test system with the capability to perform tests for different applications in ISM/SRD bands (e.g. centralized door locking, auxiliary heating). The generator module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**
- Frequency ranges:
  - 310 MHz to 320 MHz
  - 431 MHz to 470 MHz
  - 862 MHz to 920 MHz
- Output power: –60 dBm to +20 dBm
- Modulation and coding: customizable

#### R&S®ATSI-ATV Analog TV Generator

**For analog TV receiver tests**
The R&S®ATSI-ATV generator enhances the R&S®ATSI100 infotainment test system with the capability to perform analog TV receiver tests. The generator module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**
- Frequency range:
  - 174 MHz to 225 MHz
  - 470 MHz to 660 MHz
- Level range: –60 dBm to +20 dBm
- TV standards: PAL B/G, NTSC M
- Internal video generator (color bar)
- External video input
- Internal audio generator
- External audio input
- SD card slot for selectable video patterns
# Modules of the R&S®ATSI100 infotainment test system: RF repeaters

## R&S®ATSI-GPS1 GPS Repeater

**For GPS receiver tests**

The R&S®ATSI-GPS1 repeater enhances the R&S®ATSI100 infotainment test system with the capability to perform GPS receiver tests inside buildings by repeating the GPS signal from an outside reference antenna. The repeater module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**

- Output frequency: 1575.42 MHz
- Overall gain (selectable): up to 80 dB
- Supply voltage for reference antenna (can be switched ON/OFF): 5 V DC
- Overvoltage protection at antenna input

## R&S®ATSI-DAB1 DAB Repeater

**For digital audio broadcasting tests**

The R&S®ATSI-DAB1 repeater enhances the R&S®ATSI100 infotainment test system with the capability to perform digital audio broadcasting tests. The repeater module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**

- Frequency range: 174 MHz to 240 MHz (band III)
- Input sensitivity: better than –70 dBm
- Output level range: –30 dBm to +20 dBm
- Level accuracy: typ. better than 2 dB

## R&S®ATSI-DVBT1 DVB-T Repeater

**For digital TV tests**

The R&S®ATSI-DVBT1 repeater enhances the R&S®ATSI100 infotainment test system with the capability to perform digital TV tests. The repeater module is simply plugged into the system rack. It is controlled via an Ethernet LAN.

**Specifications in brief**

- Frequency range: 177.5 MHz to 226.5 MHz
- Input sensitivity: better than –80 dBm
- Output level range: –80 dBm to +20 dBm

# Modules of the R&S®ATSI100 infotainment test system: monitor module

## R&S®ATSI-MON1 Monitor Module

**Accurate monitoring of transmitted signals**

The R&S®ATSI-MON1 monitor module enhances the R&S®ATSI100 infotainment test system with the capability to accurately monitor different transmitted signals. The monitor antennas and the monitor module are installed in the vicinity of the transmit antenna(s). The monitor module is controlled via an Ethernet LAN.

If multiple module frames are to be monitored, one monitor module per module frame is required.

**Specifications in brief**

- Frequency range:
  - 50 kHz to 1650 kHz
  - 76 MHz to 108 MHz
  - 170 MHz to 240 MHz
  - 470 MHz to 870 MHz
  - 1.45 GHz to 1.5 GHz
- Resolution bandwidth: adjustable
- Measurement duration: adjustable
- Level range: –90 dBm to +13 dBm
- Level accuracy: better than 1 dB
- 6 RF ports
For easy integration of the R&S®ATS100 system into the production process control system, the R&S®ATSI-K1 to R&S®ATSI-K12 options offer the appropriate interfaces. These options make it easy for the user to do the following:
- Program automatic test sequences
- Interface the master production computer system in customer-specific versions
- Get a detailed representation of the entire system that is installed in the production facility
- Evaluate the modules’ selftest and monitoring signals, allowing errors to be instantly located
- Notify the system administrator by e-mail if an error occurs
- Analyze complex test scenarios (e.g. loudspeaker tests and audio analysis)
- Configure data management for test scenarios and test parameters depending on different vehicle variants
- Connect to a common database for extremely flexible test parameter handling

### Modules of the R&S®ATS100 infotainment test system: software options

<table>
<thead>
<tr>
<th>Software Options</th>
<th>Description</th>
</tr>
</thead>
</table>
| **R&S®ATSI-K1 Sequence Controller** | Easy generation of test cases
- Scheduling of different test cases (e.g. start a GPS test in parallel with an FM test, followed by an AM test)
- Repeatable tests |
| **R&S®ATSI-K2 Remote Interface** | Command exchange with master process control system
- Remote commands of major process control system suppliers are interpreted
- Complete integration into customer’s control system (as a slave) by means of R&S®ATSI-K2 |
| **R&S®ATSI-K4 Loudspeaker Test** | Testing the correct installation of loudspeakers
- Frequency-selective measurement of sound pressure level (SPL)
- Generation of a multisine test signal |
| **R&S®ATSI-K5 Audio Analysis** | Identification of loudspeaker installation errors
- Detection of mechanical defects in acoustic transducers (rub and buzz detection)
- Check of the sound system’s frequency response
- Comparison with reference measurements |
| **R&S®ATSI-K7 System Configuration 1** | Easy system overview
- Shortcuts for launching the configuration software of each installed module
- Polling and display of the modules’ status information
- E-mail notification in case of malfunction (configurable)
- Handling of up to three parameters per module |
| **R&S®ATSI-K8 System Configuration 2** | Closed-loop control of all levels (with monitor module installed)
- Programmable by R&S®ATSI-K1 (sequence controller)
- Controllable by R&S®ATSI-K2 (remote interface)
- Handles up to 32 modules and unlimited parameters |
| **R&S®ATSI-K9 Database Interface** | Interface for parameter database
- Transfer of test parameters to the customer’s database (Oracle) |
| **R&S®ATSI-K10 R&S®SFE100 DAB Interface** | Integration of the R&S®SFE100 as a digital radio signal source
- Integration of the R&S®SFE100 test transmitter with the R&S®SFE100-K11 T-DMB/DAB option
- Digital audio broadcasting signal source |
| **R&S®ATSI-K11 R&S®SFE100 DVB-T Interface** | Integration of the R&S®SFE100 as a digital TV signal source
- Integration of the R&S®SFE100 test transmitter with the R&S®SFE100-K1 DVB-T/H option
- Digital video broadcasting signal source |
| **R&S®ATSI-K12 ISM Interface** | Testing of keyless entry, auxiliary heater or other customized ISM/SRD applications
- Programmable RF data telegram including header, user data and CRC block
- Selectable modulation (FSK, GFSK, ASK, OOK), coding and data bit rate
- Programmable telegram timings (pre- and post-delay), telegram repetition |
Test configuration

Block diagram of an R&S®ATSI100 test configuration

Ordering information

<table>
<thead>
<tr>
<th>Designation</th>
<th>Type</th>
<th>Order No.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardware modules</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM Generator</td>
<td>R&amp;S®ATSI-AM</td>
<td>5200.8105.02</td>
</tr>
<tr>
<td>FM Generator</td>
<td>R&amp;S®ATSI-FM</td>
<td>5200.8111.02</td>
</tr>
<tr>
<td>GPS Repeater</td>
<td>R&amp;S®ATSI-GPS1</td>
<td>5200.9653.02</td>
</tr>
<tr>
<td>ISM Generator</td>
<td>R&amp;S®ATSI-ISM</td>
<td>5200.8128.02</td>
</tr>
<tr>
<td>DAB Repeater</td>
<td>R&amp;S®ATSI-DAB1</td>
<td>5200.8134.02</td>
</tr>
<tr>
<td>Analog TV Generator</td>
<td>R&amp;S®ATSI-ATV</td>
<td>5200.9647.02</td>
</tr>
<tr>
<td>Monitor Module</td>
<td>R&amp;S®ATSI-ATV</td>
<td>5200.9682.02</td>
</tr>
<tr>
<td>DVB-T Repeater</td>
<td>R&amp;S®ATSI-DVBT1</td>
<td>5200.8140.02</td>
</tr>
<tr>
<td><strong>Software options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sequence Controller</td>
<td>R&amp;S®ATSI-K1</td>
<td>5200.9699.02</td>
</tr>
<tr>
<td>Remote Interface</td>
<td>R&amp;S®ATSI-K2</td>
<td>5200.9701.02</td>
</tr>
<tr>
<td>Loudspeaker Test</td>
<td>R&amp;S®ATSI-K4</td>
<td>5200.9724.02</td>
</tr>
<tr>
<td>Audio Analysis</td>
<td>R&amp;S®ATSI-K5</td>
<td>5200.9730.02</td>
</tr>
<tr>
<td>System Configuration 1</td>
<td>R&amp;S®ATSI-K7</td>
<td>5201.3042.02</td>
</tr>
<tr>
<td>System Configuration 2</td>
<td>R&amp;S®ATSI-K8</td>
<td>5201.3059.02</td>
</tr>
<tr>
<td>Database Interface</td>
<td>R&amp;S®ATSI-K9</td>
<td>5201.6958.02</td>
</tr>
<tr>
<td>DAB Interface to R&amp;S®SFE100</td>
<td>R&amp;S®ATSI-K10</td>
<td>5201.9192.02</td>
</tr>
<tr>
<td>DVB-T Interface to R&amp;S®SFE100</td>
<td>R&amp;S®ATSI-K11</td>
<td>5201.9205.02</td>
</tr>
<tr>
<td>ISM Interface</td>
<td>R&amp;S®ATSI-K12</td>
<td>5203.0970.02</td>
</tr>
</tbody>
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Your local Rohde & Schwarz expert will help you determine the optimum solution for your requirements. To find your nearest Rohde & Schwarz representative, visit www.sales.rohde-schwarz.com
About Rohde & Schwarz
Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment
- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system

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