



**Service that adds value**

- ▶ Worldwide
- ▶ Local and personalized
- ▶ Customized and flexible
- ▶ Uncompromising quality
- ▶ Long-term dependability

**Rohde & Schwarz**  
 The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, monitoring and network testing. Founded more than 80 years ago, the independent company which is headquartered in Munich, Germany, has an extensive sales and service network with locations in more than 70 countries.

**Sustainable product design**

- ▶ Environmental compatibility and eco-footprint
- ▶ Energy efficiency and low emissions
- ▶ Longevity and optimized total cost of ownership

Certified Quality Management  
**ISO 9001**

Certified Environmental Management  
**ISO 14001**

**Rohde & Schwarz customer support**  
[www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support)



R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG  
 Trade names are trademarks of the owners  
 PD 5215.4623.32 | Version 02.00 | June 2020  
 Radio user experience should not be a game of chance  
 Data without tolerance limits is not binding | Subject to change  
 © 2020 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany

**Ensured quality of service**  
 Thanks to continuous control of transmitter's key performance indicators ensuring a constant signal quality over years of transmitter operation.

**Prepared for the future**  
 By providing security for permanent energy cost savings over the transmitters' entire life thanks to the R&S Efficiency Optimization feature.

**Architecture focused on long product life**  
 Thanks to a proven platform with premium RF components and a highly advanced thermal design.

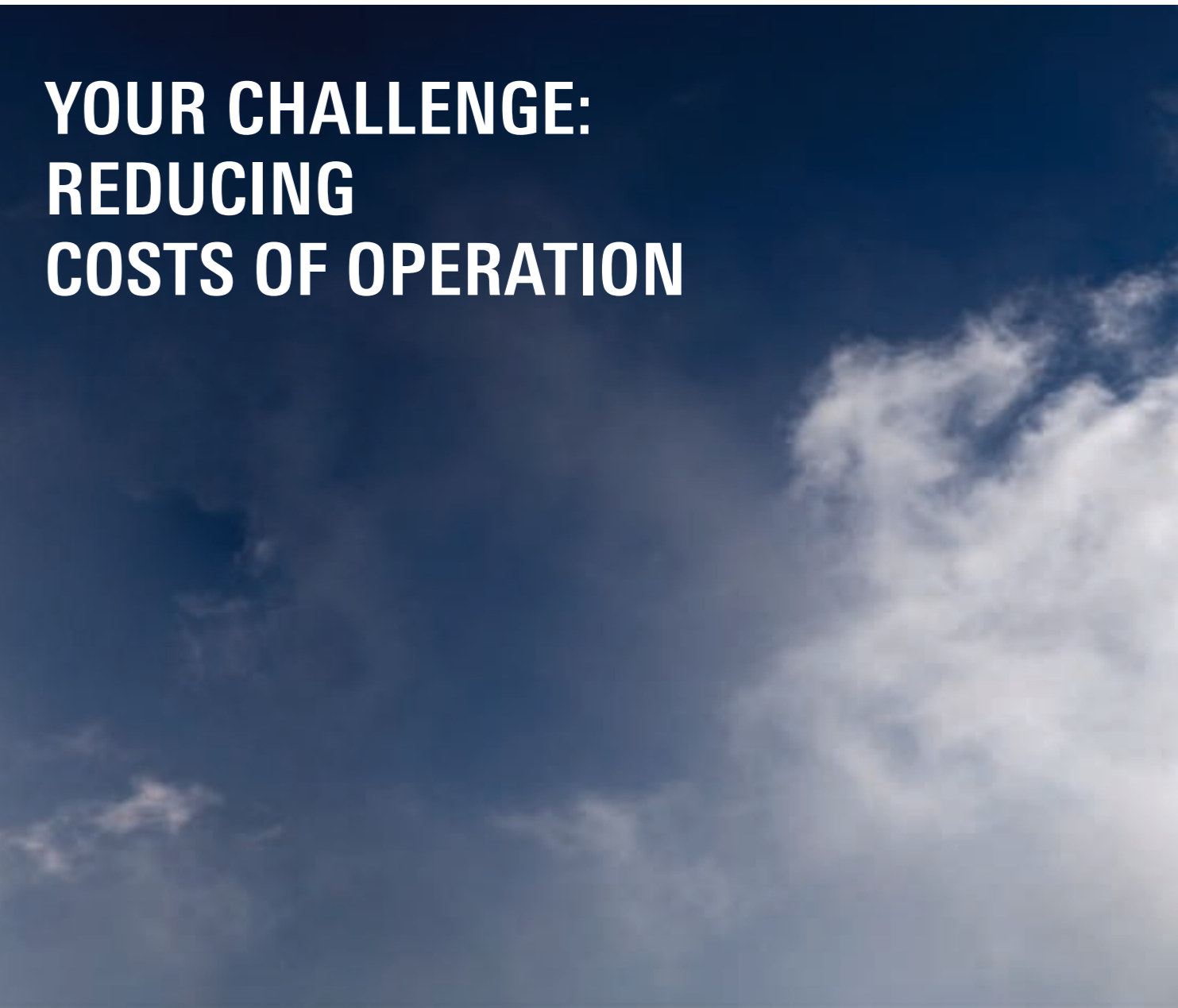
**Extremely high DAB+ transmitter efficiency**  
 Up to 50% energy efficiency even at the edges of frequency bands.

**New built-in performance analysis**  
 Instant performance feedback by self-monitoring.

DAB+ solution from Rohde & Schwarz

# RADIO USER EXPERIENCE SHOULD NOT BE A GAME OF CHANCE

**ROHDE & SCHWARZ**  
 Make ideas real



## YOUR CHALLENGE: REDUCING COSTS OF OPERATION

In countries where DAB+ networks are established, radio transmitter network operators are obliged to operate the DAB+ networks parallel to the existing FM networks. At the same time, the main challenges for network operators nowadays are related to operating costs: costs for ensuring service quality, costs due to the limited lifetime of equipment and penalties for service downtimes. Rising expenses for energy and personnel make this challenge even tougher for them. Reducing these costs is and will remain one of the primary challenges for network operators.

Reliability is an absolute requirement. If an FM transmitter fails, then exactly one radio program in the reception area of this system is affected. In contrast, DAB+ broadcasts several radio stations in a multiplex, and a failure becomes

more dramatic. All stations transmitted in the multiplex are losing listeners and thus advertising revenues. In turn, the network operator has to pay penalties. So DAB+ transmitters simply need to work without creating problems and drawing much attention. Plus, they need to be highly cost-optimized.

This challenge fuels the engineering creativity of Rohde & Schwarz. Anticipating our customers' expectations for DAB+ transmitter features and functionalities, the new products offer unique innovations that meet your challenges as network operators by combining excellent energy efficiency and very high availability with low service and maintenance and low space requirements.

PD 5215.4623.32 | Version 02.00 | P1/P1 | 14

# A PIONEER IN RADIO TRANSMISSION DRIVING THE FUTURE

Most terrestrial transmitter networks around the world have been upgraded to digital transmission technology. Transmitters from us as the Munich based market leader have earned the reputation of being the most advanced, energy-efficient transmitters on the market and account for a large share of nationwide installations on all continents. We are also one of the world's leading manufacturers of electronic T&M and communications equipment. Network operators use this equipment to successfully install, maintain and optimize broadcast networks.

Rohde & Schwarz has a long tradition in radio transmission. We designed and manufactured Europe's first operational FM transmitter in 1949 and were delivering radio transmitters ever since. Later, we introduced DAB transmitters in

1995 and even supported the development of the DAB standard. And today, hundreds of DAB+ transmitters of the latest R&S®Tx9 generation are in operation.

With the R&S®TLV9, R&S®TMV9evo and the R&S®THV9evo, you as DAB+ network operators can rely on a very long transmitter lifetime. R&S transmitters are based on a proven platform on which thousands of radio and TV transmitters are in operation all around the world and prove their reliability every day.

Designing and producing quality radio transmitters for more than 70 years, Rohde & Schwarz has been a key driver of radio technology.

**Rohde & Schwarz – Real passion for Radio.**



## R&S®THV9evo transmitter

The unique DAB+ high-power transmitter family comes with the market leading liquid-cooling system and ensures trouble-free operation during its lifetime.

- ▶ **Liquid cooled**
- ▶ **Up to 30 kW**
- ▶ **Unique Rohde & Schwarz Doherty technology – up to 50% energy efficiency**



## R&S®TMV9evo transmitter

The new DAB+ medium-power transmitter stands for simplicity and endurance. DAB+ transmission has never been as effortless and cost efficient.

- ▶ **Air cooled**
- ▶ **Up to 4.3 kW**
- ▶ **Unique Rohde & Schwarz Doherty technology – up to 50% energy efficiency**



## R&S®TLV9 transmitter

The new DAB+ low power transmitter embodies robust design, minimum footprint and is future-proof. DAB+ transmission has never been as straightforward as with the R&S®TLV9.

- ▶ **Air cooled**
- ▶ **Up to 300 W**
- ▶ **Up to 30% energy efficiency**

## DAB+ transmission has never been so easy

Rohde & Schwarz is introducing a new DAB+ transmitter platform with the new R&S®TLV9 2HE air-cooled transmitter starting from 50 W, TMV9evo air-cooled transmitter starting from 350 W and the R&S®THV9evo liquid-cooled transmitter starting from 1.3 kW – all three with strong focus on smooth and reliable operation.

The newly released R&S®TLV9, R&S®TMV9evo and R&S®THV9evo directly address your challenges with their operational efficiency on any level. All three VHF transmitters stand for simplicity and endurance. DAB+ transmission has never been as straightforward and effortless as with the R&S®TLV9, R&S®TMV9evo and R&S®THV9evo.

Energy costs are minimized thanks to high energy efficiency of up to 50% and even in changing environments thanks to the R&S Efficiency Optimization feature. At the push of a button, the new Efficiency Optimization algorithm optimizes parameters for maximum efficiency even when requirements change (e.g. channel or output power level).

The transmitters' effortless operating concept reduces the costs of ensuring service quality. The transmitters provide extremely high and consistent signal quality of 35 dB MER or more over years of transmitter operation. Plus, their key performance indicators can be continuously monitored.

With this new built-in performance analysis, instant feedback of signal quality as well as current energy efficiency is available without the need of additional measuring equipment.

Engineers can simply define boundaries for operational parameters such as target shoulder distance or the warning level for a minimal desired MER. Based on that, the transmitter operates within these boundaries and feedbacks by SNMP without the need for external monitoring equipment. That is the cost-efficient basis of a high degree of automation and effortless operation.



## R&S®ETL broadcast analyzer

**The universal reference receiver for broadcast signal analysis**  
All you need for broadcast signal analysis is in one instrument. The R&S®ETL broadcast analyzer is an all-in-one solution. It combines the functionality of a TV and radio signal analyzer and a spectrum analyzer in a single instrument. Its selective RF frontend, precise SFN measurements and transmitter identification information (TII) analysis underlies its claim to be the reference in the field as well.



## R&S®NRP18T power sensor

For checking the correct output power setting of a DAB+ transmitter, we recommend the R&S NRP18T thermal power sensor of the R&S NRP family. The R&S NRP power meter sensors have long been recognized for delivering supreme precision and speed. The internal calibration test ensures reliable and stable measurements. The R&S NRP power meter sensors are available as USB sensors and can be additionally controlled via LAN. This makes the portfolio ideal for use in production, R&D and calibration labs as well as for installation and maintenance tasks.

- ▶ **Dynamic range: -35 dBm to +20 dBm**
- ▶ **Frequency range: DC to 110 GHz**
- ▶ **Control and monitoring via USB and LAN (R&S®NRPxxTN only)**
- ▶ **Outstanding performance for reference applications**
- ▶ **Excellent impedance matching**



## R&S®SFE100 test transmitter

The R&S®SFE100 is a multistandard test transmitter providing real-time coding for broadcast signals. It supports all common digital and analog TV standards and a number of audio broadcasting standards including DAB+. Its flexible customization options make the R&S®SFE100 suitable for a wide variety of applications – from production and quality assurance to simple development applications.

- ▶ **Unlimited standards in a single instrument**
- ▶ **Multistandard test transmitter**
- ▶ **Frequency range up to 2700 MHz**
- ▶ **Output power up to 27 dBm with integrated power amplifier**
- ▶ **High-precision modulator (MER typ. +43 dB)**

on long product life. Consequently, the transmitters can operate reliably at up to 45 °C at full output power over their entire lifetime.

Our transmitters also set new standards in sustainability. We have chosen a product design to reach a maximum of environmental compatibility and a minimum of eco-footprint. The high energy efficiency and low emissions reduces power consumption. The longevity of our transmitters not only preserve resources, but also optimize total cost of ownership.

It reduces infrastructure complexity and noticeably decreases operating effort for the system engineer, since complex analyses can be carried out directly on the transmitter system. Moreover, the new DAB+ transmitters reduce the noise level and thus contribute to a more comfortable working environment.

You can rely on a very long transmitter life of 15 years or more. Both the R&S®TMV9evo and R&S®THV9evo come with a highly advanced thermal design, which avoids hot spots and thermal stress for all power components. That is the key for an architecture focused