

R&S®TMU9

UHF medium power TV transmitters

Solution for Low Power TV Stations

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Rohde & Schwarz USA

Account Manager – Broadcasting transmitter

Rohde & Schwarz – In Brief

I Overview

- I Established in 1933 in Germany
- I Financially stable, family-owned business
- I ~60 subsidiaries in over 70 countries
- I \$2.3B revenue (FY11/12, July-June)
- I 8,800 employees worldwide

I Rohde & Schwarz USA Inc.

- I 35+ years in US
- I Over 400 US employees
- I US-based:
 - Service & Calibration facility
 - Technical Customer Support Center (free, live telephone support)
 - Systems integration
 - R&D for US-specific applications
 - 24/7 Transmitter Support
 - Local application engineer support

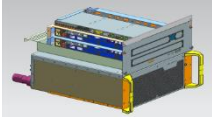







*Rohde & Schwarz Headquarters
Munich, Germany*



R&S Transmitters and more

ATSC Overview

TMU9/1	TMU9/2	TMU9/3	TMU9/4	TMU9/5
 <p data-bbox="117 715 353 753">300 - 570 W</p>	 <p data-bbox="519 715 680 753">1,140 W</p>	 <p data-bbox="884 715 1045 753">1,710 W</p>	 <p data-bbox="1246 715 1406 753">2,280 W</p>	 <p data-bbox="1611 715 1771 753">2,850 W</p>
<p data-bbox="189 793 285 832">SLX</p>				
<p data-bbox="142 876 343 932"><i>Low Power and Translator</i></p>  <p data-bbox="123 1218 343 1256">3 W – 150 W</p>				

R&S[®]TMU9 - Main benefits

I **Efficient**

- I Up to 42%, highest power efficiency on the market

I **Powerful**

- I Output power that meets your TPO requirements

I **Affordable**

- I Top-edge technology transmitter at a price you can afford

I **Always on the Air**

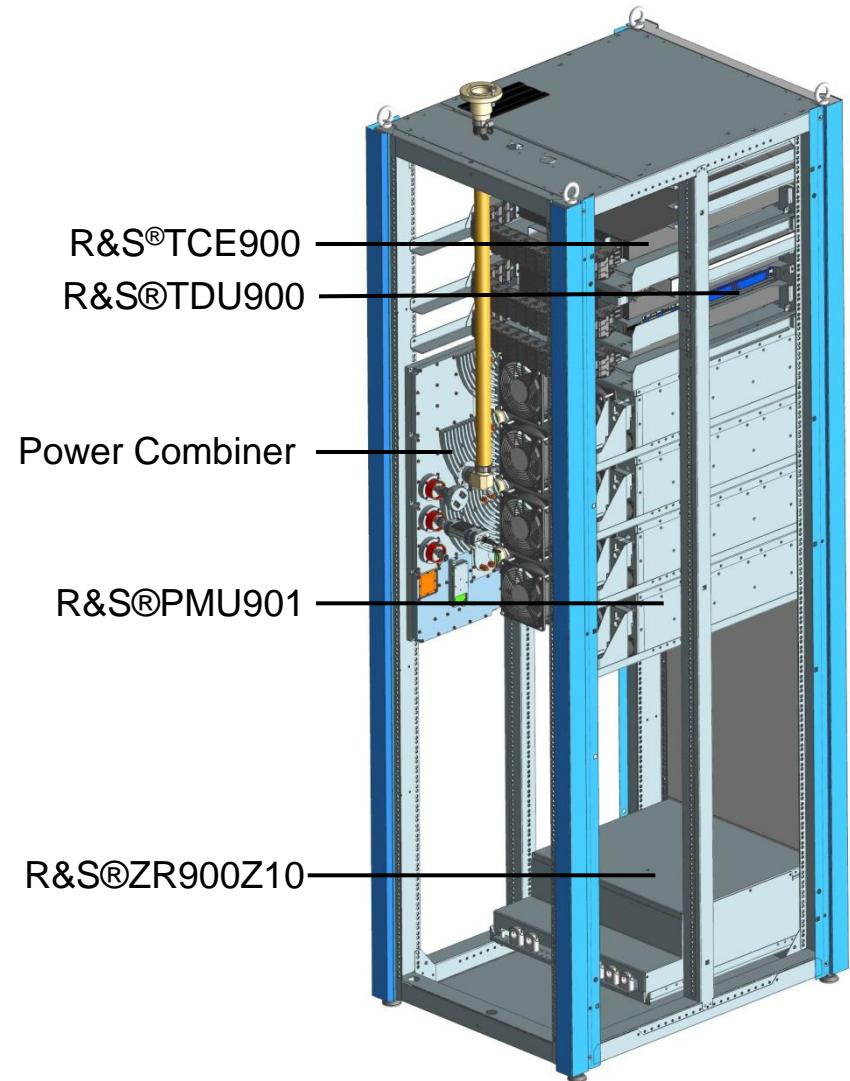
- I Redundancy is the key in the TMU9 design for a reliable transmitter



R&S®TMU9 - Main components

I Main system components

- I R&S®TCE900 – Exciter
- I R&S®PMU901 - Amplifier
- I Power Combiner
- I R&S®ZR900Z10 - Main Distribution
- I R&S®TDU900 (optional) – Touch Display



R&S®TCE900 – Exciter

- I **R&S®TCE900 incorporates Exciter and System Control unit**
 - I Standard adaptive digital equalization
 - I Remote control, secure web browser, SNMP monitoring
 - I SMPTE310, ASI and IP inputs
 - I ATSC Mobile DTV (A/153) ready [Option]
 - I A/110b SFN ready [Option]
 - I Internal GPS reference [Option]
 - I Less Spare parts: Usage of one base unit for exciter and control
 - I Less maintenance



R&S®PMU901 – Amplifier

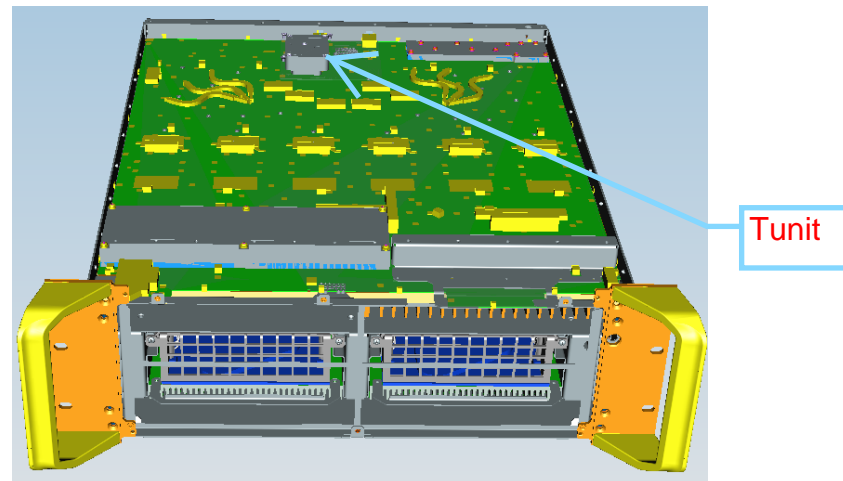
I Efficient Amplifier Layout

- I Power density of 570 W per amplifier
- I 6 final stage transistors
- I Redundant Fans
- I 1 single phase power supply 3 kW, passively cooled
- I Dust filter
- I 2nd power supply for 1+1 redundancy (option)
- I Enhanced efficiency mode Doherty (option)



Smart Doherty amplifier technology

- ❑ **Amplifier consists of a base unit and one Tunit**
- ❑ **The base unit is always broadband**
- ❑ **The Tunit defines operation mode:**
 - ❑ Normal mode – Ave. 25% efficiency
 - ❑ Doherty mode – Ave. 40% efficiency, band selective
 - ❑ Each Tunit can be used in normal mode in case of channel change



How Much Money Can You \$ave?

I An example:

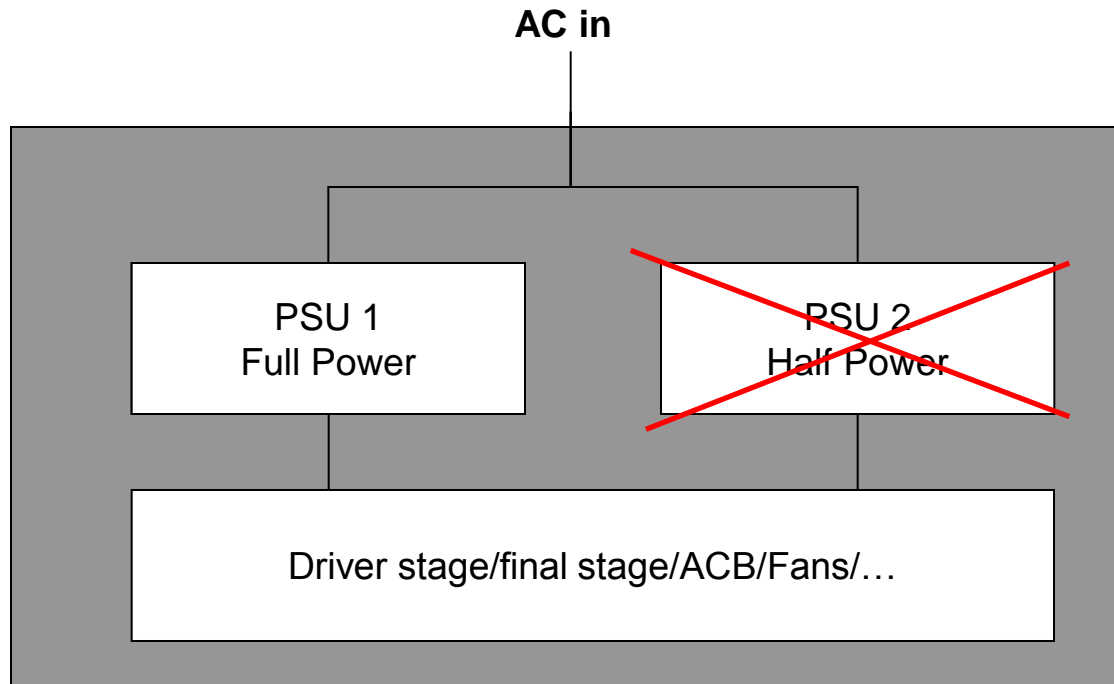
- I Transmitter output power: 2 kW
- I Lifetime of transmitter: 15 years
- I Assumed energy cost: \$0.10 /kWh



	Average transmitter	R&S [®] TMU9 with Doherty option
Efficiency	20%	40%
Energy costs	\$131,400	\$65,700
Energy cost savings over 15 years:		\$65,700
Energy cost savings per year:		~\$4,380



1:1 Power Supply Redundancy



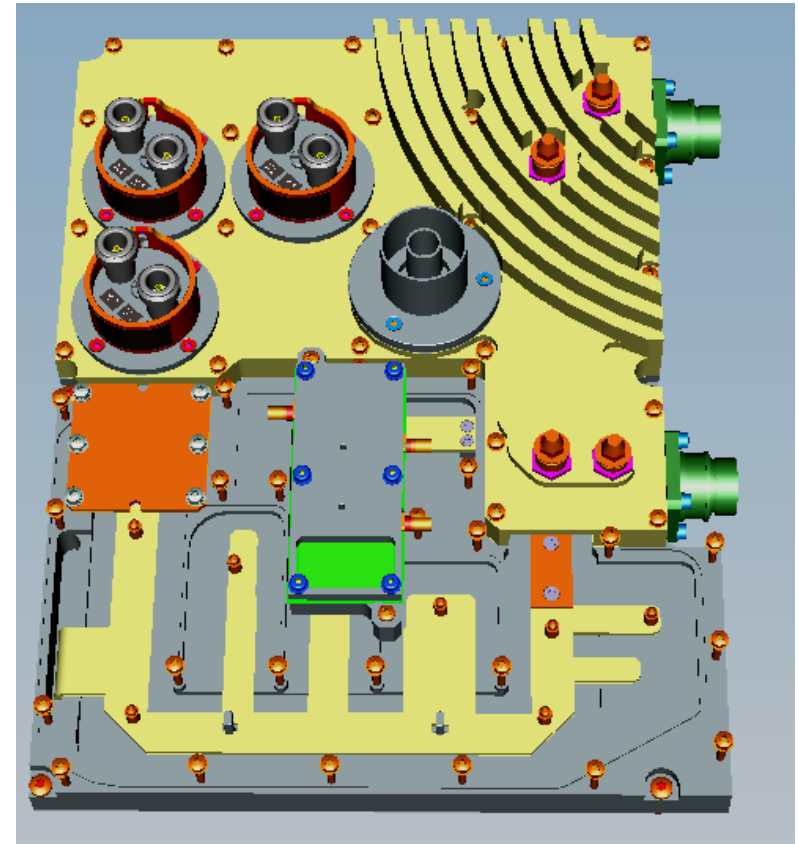
- I Full 1:1 power supply redundancy, no power drop in case of PSU failure
- I Hot pluggable
- I Low maintenance costs due to higher MTBF

Power Combiner

I Integrated 6 in 1 concept:

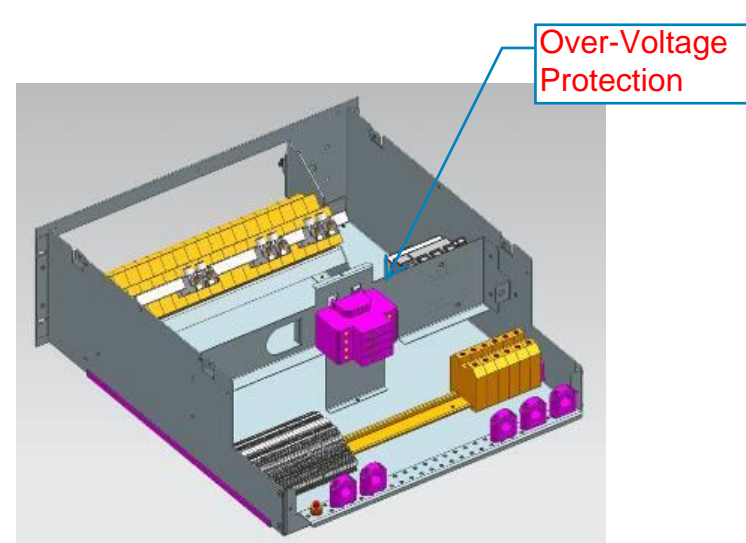
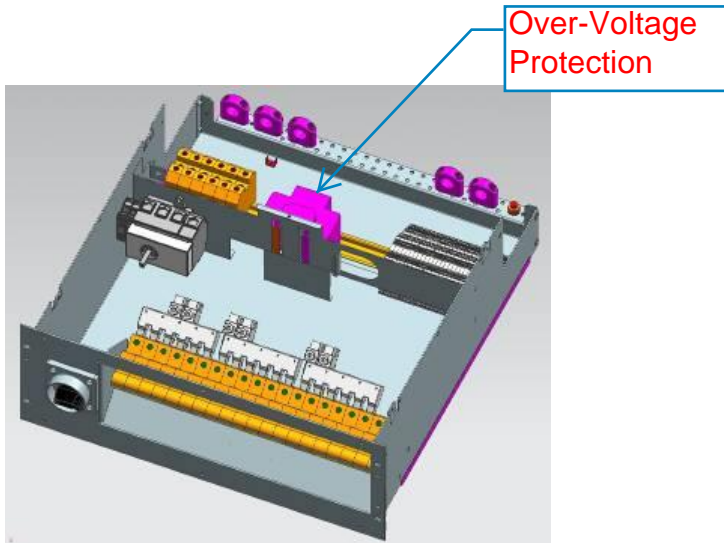
1. Coupling unit
2. Input splitter
3. Harmonic Filter (frequency band selective)
4. Lightning protection
5. Measuring couplers
6. Absorbing resistor

I Low loss through integration of harmonic filter and combiner in one device



Mains Distribution Boards

- ❑ **240V L1/L2/PE, grounded midpoint**
- ❑ **Space savings through compact layout, only 4 rack units**
- ❑ **High availability through**
 - ❑ Over-voltage protection
 - ❑ Monitoring of the over-voltage available [option]
 - ❑ Each unit in the rack has its own fuse



Option Exhaust Air Kit

I Exhaust air kit for guided air-out

- I Mounted instead of rear door
- I Pressure controlled
- I Two fans
- I Temperature monitoring
- I Air ducting adaptation to station ducting

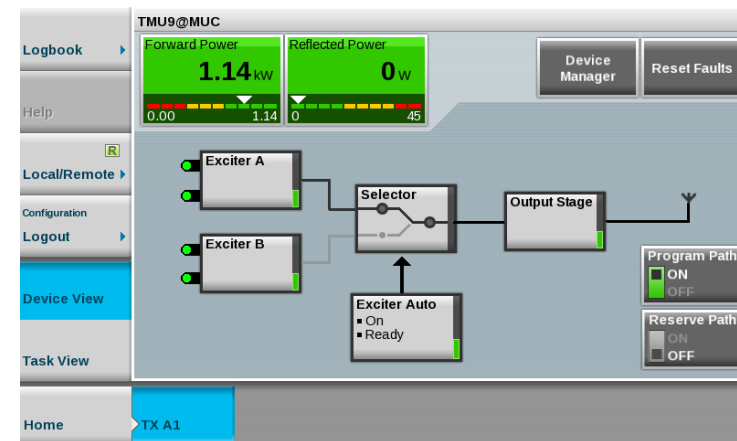
Three 1 KW ATSC
Transmitters in a Single
Cabinet!



R&S®TMU9, 3 x 1.14 kW, ducted air

Local and Remote Control

- I **Local Control via IP port**
- I **Remote Control via IP connectivity**
- I **Local Control via TDU900 – Touch screen Display Unit [Option]**
 - I Retractable to save space
- I **Remote control via SNMP agent using your existing NMS [Option]**
- I **Remote Control via R&S BC-NETSTATE [Option with additional software. Includes Alarming system]**



Key Benefits of R&S[®]TMU9

- ✓ **Efficient**
- ✓ **Powerful**
- ✓ **Affordable**
- ✓ **Always On The Air**

