

GLOBAL REGULATORY TESTING DAY

-BBA POWER AMPLIFIER FAMILY

-TEST RECEIVER FAMILY ESX

-EMC SOFTWARE ELEKTRA

RSTW- AE Technical Manager
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ROHDE & SCHWARZ

Make ideas real



COMPANY RESTRICTED

ANGENDA

- ▶ BBA Power Amplifier Family Introduction
- ▶ Test Receiver Family ESX Introduction
- ▶ EMC Software ELEKTRA Introduction
- ▶ Q&A

BBA POWER AMPLIFIER FAMILY

-WHY AMPLIFIERS FROM R&S?

- ▶ The R&S broadband amplifiers are being developed, tested and produced by the same engineering team as the broadcast transmitters
- ▶ The R&S broadband amplifiers are being developed, tested and produced by the same engineering team as the broadcast transmitters
- ▶ R&S has a strong broadcast division:
 - R&S delivered the first commercial FM broadcast transmitter in Europe in 1949
 - Current R&S solid state TV and sound broadcast transmitters deliver more than 100kW RF power (~1MW peak)
 - Several thousand have been delivered over the years, many of them liquid cooled
 - Manufactured in our own plants with superior manufacturing depth; from precision mechanical engineering and machining to printed board production and final assembly
- ▶ The R&S broadband amplifiers are being developed, tested and produced by the same engineering team as the broadcast transmitters



BBA POWER AMPLIFIER FAMILY

-R&S 106 KW LIQUID COOLED UHF* TRANSMITTER ON TOP OF FREEDOM TOWER



BBA POWER AMPLIFIER FAMILY

- PRODUCT FAMILY R&S® BBL200 “THE QUIET POWER PACK FOR EMC AND RESEARCH”



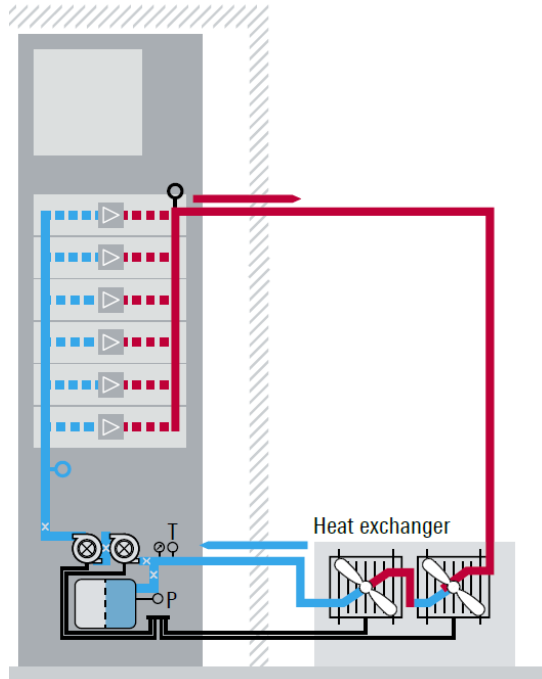
R&S®BBL200

- ▶ 9 kHz to 250 MHz, RF power up to 10.000W
- ▶ Liquid cooled Class A amplifiers
- ▶ Extremely robust against mismatch: Delivers about 50% of rated output power into an open or short for as long as necessary, i.e. 5 kW in case of a 10 kW amp.
- ▶ 3 kW with new rack size of 31HU

Frequency Band	Power Classes
A 9 kHz to 225 MHz	3.000 W, 5.000 W, 10.000 W
A 9 kHz to 250 MHz	3.000 W, 10.000 W

BBA POWER AMPLIFIER FAMILY

- PRODUCT FAMILY R&S® BBL200 “THE QUIET POWER PACK FOR EMC AND RESEARCH”



- ▶ Liquid-cooled, compact and quiet
- ▶ Closed cooling loop
- ▶ Pumps, expansion tank and amplifier components in one rack
- ▶ Cooling liquid is Antifrogen® (Glycol/Water mix)
- ▶ Compact liquid-air-heat exchanger can be located outside the amplifier room or outdoor



Amplifier BBL200	Dimension H x B x T in mm	Power consumption	Weight
A3000	558 x 1080 x 400	350 W	50 kg
A5000	875 x 925 x 600	810 W	108 kg
A10000	1125 x 2050 x 600	3 kW	280 kg

BBA POWER AMPLIFIER FAMILY

- PRODUCT FAMILY R&S® BBA150 "THE EMC SPECIALIST"



R&S®BBA150

- ▶ 4 kHz to 6 GHz, RF power up to 3000 W
- ▶ Nominal output power at VSWR 6:1
- ▶ High linear Class A amplifiers
- ▶ Air cooled

Frequency Band	Power Classes
A 9 kHz to 250 MHz	125 W, 160 W, 200 W, 400 W, 700 W, 1300 W, 2500 W
AB 4 kHz to 400 MHz	75 W, 125 W, 160 W, 200 W, 350 W, 600 W
BC 80 MHz to 1 GHz	70 W, 125 W, 160 W, 250 W, 500 W, 1.000 W, 1250 W, 1500 W, 2000 W, 3000 W
D 690 MHz to 3.2 GHz	30 W, 60 W, 110 W, 200 W, 400 W, 800 W
E 2.5 GHz to 6.0 GHz	15 W, 30 W, 60 W, 100 W, 200 W, 400 W

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BBA POWER AMPLIFIER FAMILY

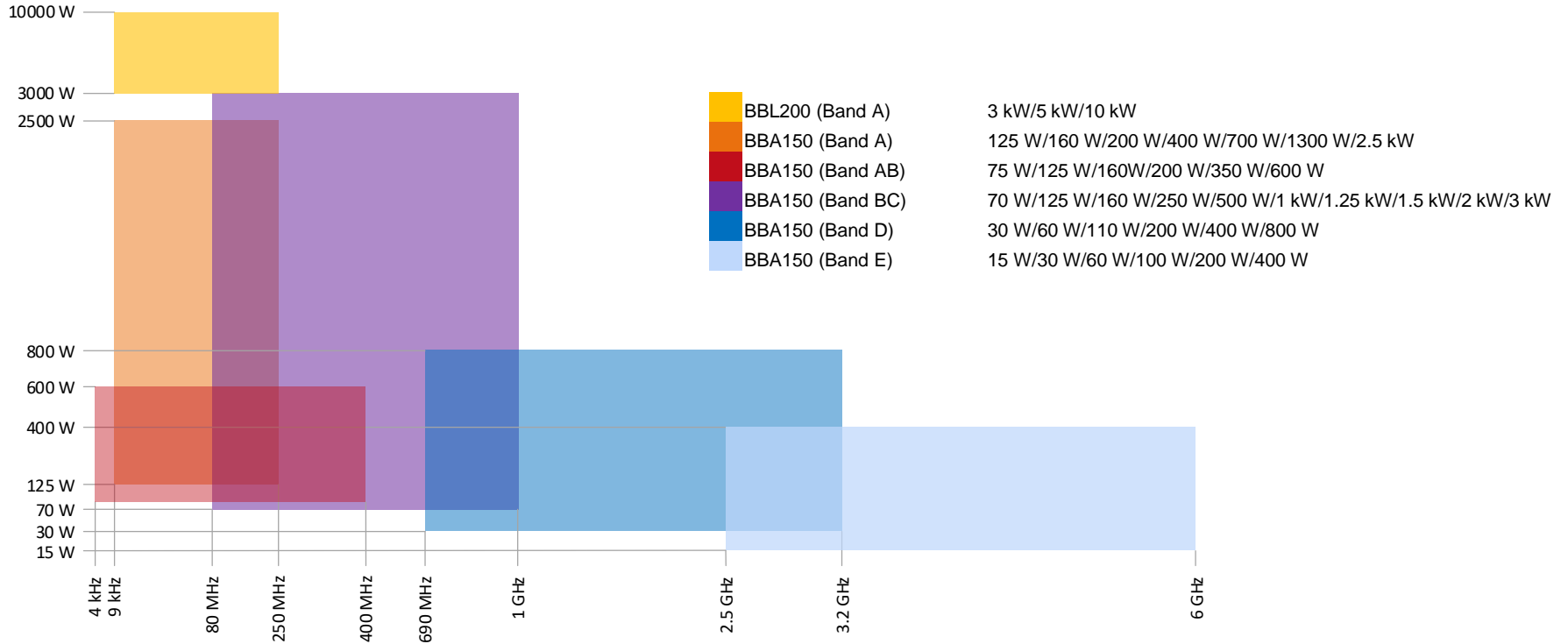
- PRODUCT FAMILY R&S® BBA150 AND THEIR KEY FACTS – DUAL / TWIN BAND BBA150

- ▶ Definitions:
 - **Dual Band**: Two different frequency bands in one box, one of them is in use at a time
 - **Twin Band**: Two identical frequency bands and power classes in one box, both of them can be used simultaneously
- ▶ Applications for twin band:
 - PIM (two tone) testing
 - Test of many DUTs in parallel (QA tests) where rack space is an issue
- ▶ Available power classes in one 4 HU box will be:
 - Up to 2 x 200 W in Band A (9 kHz – 250 MHz)
 - Up to 2 x 250 W in Band BC (80 MHz – 1 GHz)
 - Up to 2 x 110 W in Band D (690 MHz – 3,2 GHz)
 - Up to 2 x 100 W in Band E (2,5 GHz – 6 GHz)



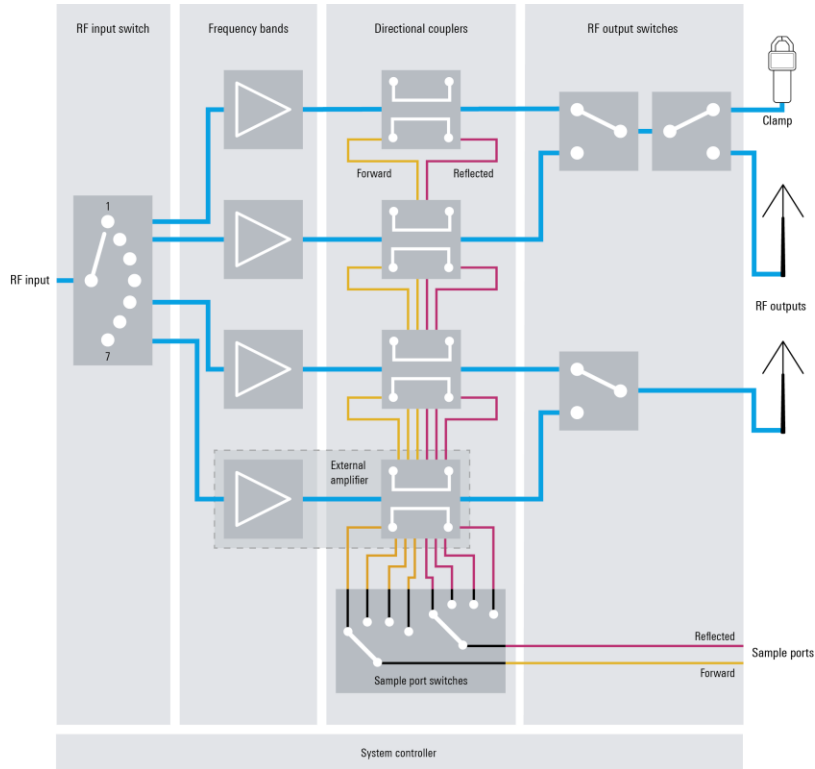
BBA POWER AMPLIFIER FAMILY

- COMBINATION OF R&S® BBA150 AND R&S® BBL200



BBA POWER AMPLIFIER FAMILY

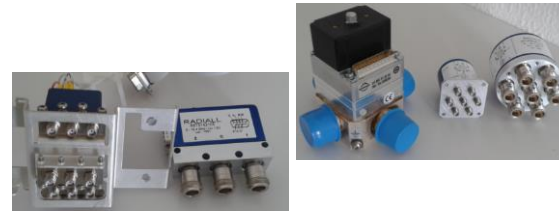
- SWITCHING OF FREQUENCY BANDS TO DIFFERENT LOADS



Options available

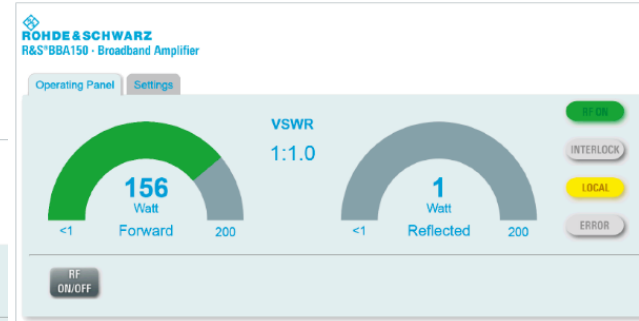
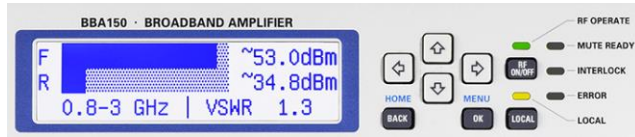
- RF input switch (1:2, 1:6)
- RF output switches (versions 2:1, 6:1, 2:2 and 1:2, cascadable)
- Sample port switch (2:1, 6:1)
- External amplifier integration (third party amplifier)
- System controller

Compact amplifier systems



BBA POWER AMPLIFIER FAMILY

- USER INTERFACES - LOCAL CONTROL OR WEBGUI



- ▶ User interface, directly on the instrument itself or via PC and standard web browser
- ▶ Downloadable status log book etc.
- ▶ Gain is adjustable in 0.1dB steps and the menu can be locked for easy adjustment

BBA POWER AMPLIFIER FAMILY

-USER INTERFACES - REMOTE CONTROL OPTIONS

- ▶ Interfaces for integration into any system:

	GPIB	Ethernet	Fibre Optic
BBA150	Option B101	✓	Option B105
BBL200	Option B101	✓	Option B105



- ▶ Large number of SCPI like remote control commands for automated workflows
- ▶ DHCP server and DHCP client feature via Ethernet for easy network integration
- ▶ For optical Ethernet and USB, standard converters to LAN can be used
- ▶ All R&S broadband amplifiers families have the same command set and work together with R&S[®]EMC32 & ELEKTRA

BBA POWER AMPLIFIER FAMILY

- PRODUCT FAMILY R&S® BBA130 "THE TUNABLE AMPLIFIER FOR DVT & PVT (& EMC)"



R&S® BBA130

- ▶ 80 MHz to 6 GHz, RF power up to 13.000 W
- ▶ Two adjustable parameters:
 - ▶ operating class A / AB,
 - ▶ output power mode
- ▶ Air cooled



Frequency Band	Power Classes
BC 80 MHz to 1 GHz	100 W, 180 W, 240 W, 350 W, 750 W, 1.500 W, 1800 W, 2100 W, 2700 W, 4200 W, 6500 W, 9500 W, 13000 W
D 690 MHz to 3.2 GHz	45 W, 90 W, 160 W, 300 W, 600 W, 1200 W
E 2.5 GHz to 6.0 GHz	22 W, 45 W, 90 W, 150 W, 280 W, 550 W export restricted

- I Frequency bands and output power can be combined flexible as needed in **DUAL** band and **TWIN** band solutions
- I Upgradeable in output power and/or frequency bands



BBA POWER AMPLIFIER FAMILY

- FOR DEVICE AND PRODUCT VALIDATION TESTS (& EMC) !

- ▶ Different test requirements need different amplifier properties, for example:
 - High linearity for intermodulation and peak-to-average-ratio tests
 - High power for slam and burn-in tests
 - Robustness against mismatch due to badly matched device under test



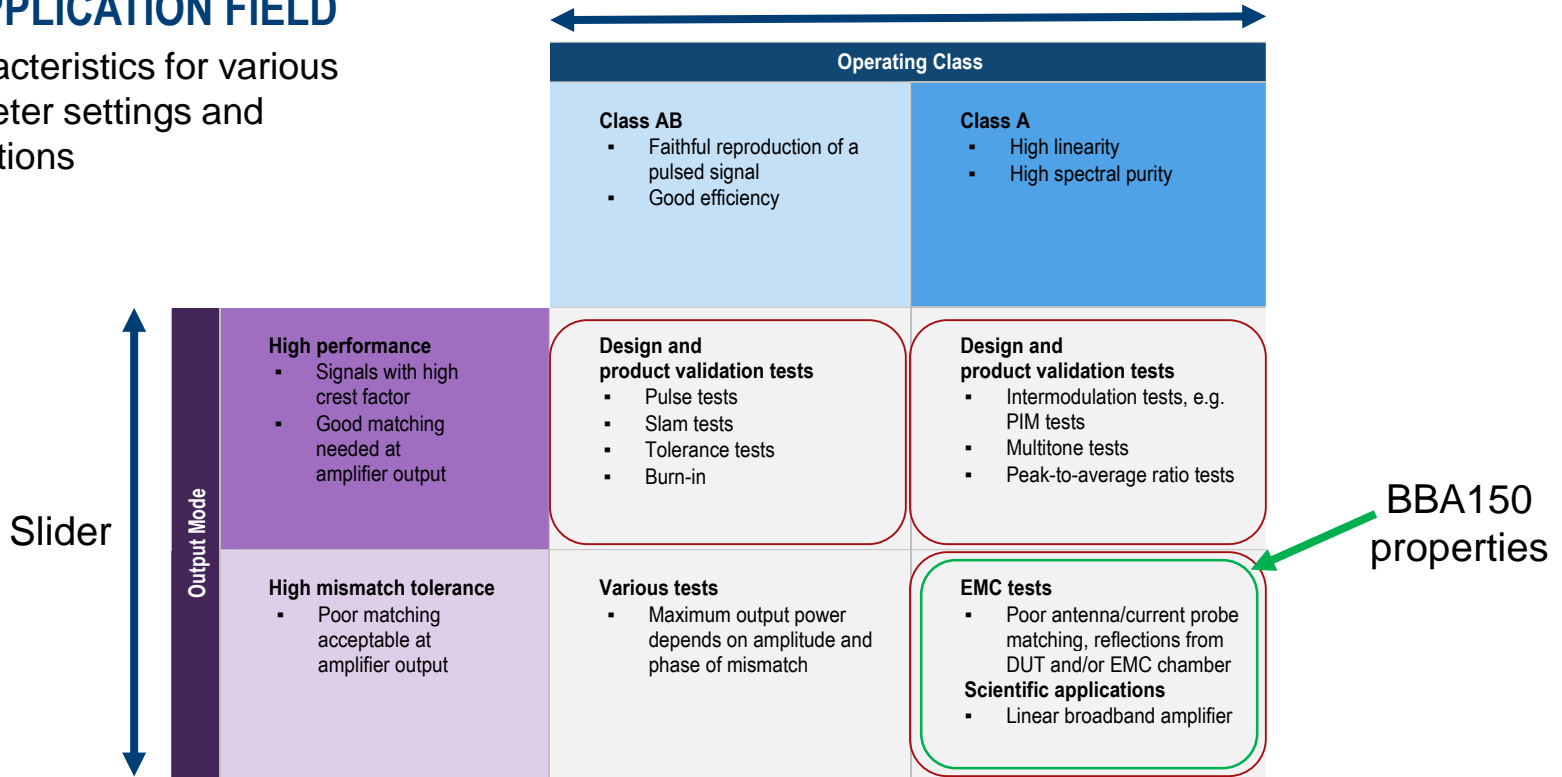
- ▶ To cope with the different requirements the BBA130 offers **two user adjustable parameters**:
 - 1) Adjustable bias point between class A and class AB
 - 2) Choice between high output power and high tolerance against mismatch at the output.
 - The user can adjust these parameters during operation!



BBA POWER AMPLIFIER FAMILY

- BBA130-APPLICATION FIELD

Amplifier characteristics for various control parameter settings and typical applications



BBA POWER AMPLIFIER FAMILY

- PRODUCT FAMILY R&S® BBA300 “THE INTELLIGENT CUSTOMIZABLE AMPLIFIER FOR DVT & PVT (& EMC)”



BBA300-CDE180

R&S® BBA300

- ▶ Option keys for adjustable parameters (like BBA130)
 - ▶ operating class A / AB,
 - ▶ output power mode
- ▶ Improved HF parameters
 - high linearity
 - outstanding harmonic performance
- excellent noise characteristics
- ▶ Air cooled

Frequency Band	Power Classes
DE 1 GHz to 6 GHz	15 W, 25 W, 50 W, 90 W*, 180 W, 300 W*
CDE 380 MHz to 6 GHz	15 W, 25 W, 50 W, 90 W* 180 W, 300 W*

* 90 W available in Q1 2023, 300 W in Q4 2023

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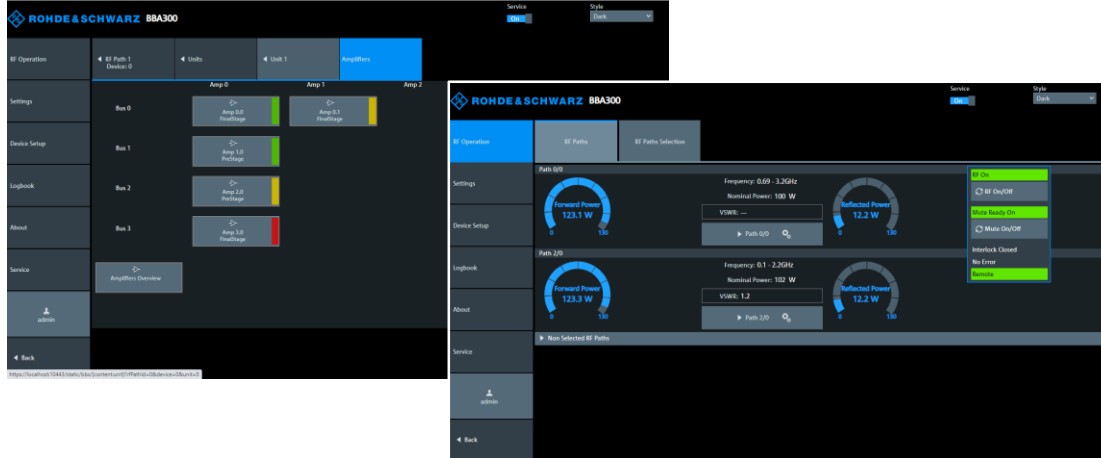
BBA300-CDE300



BBA POWER AMPLIFIER FAMILY

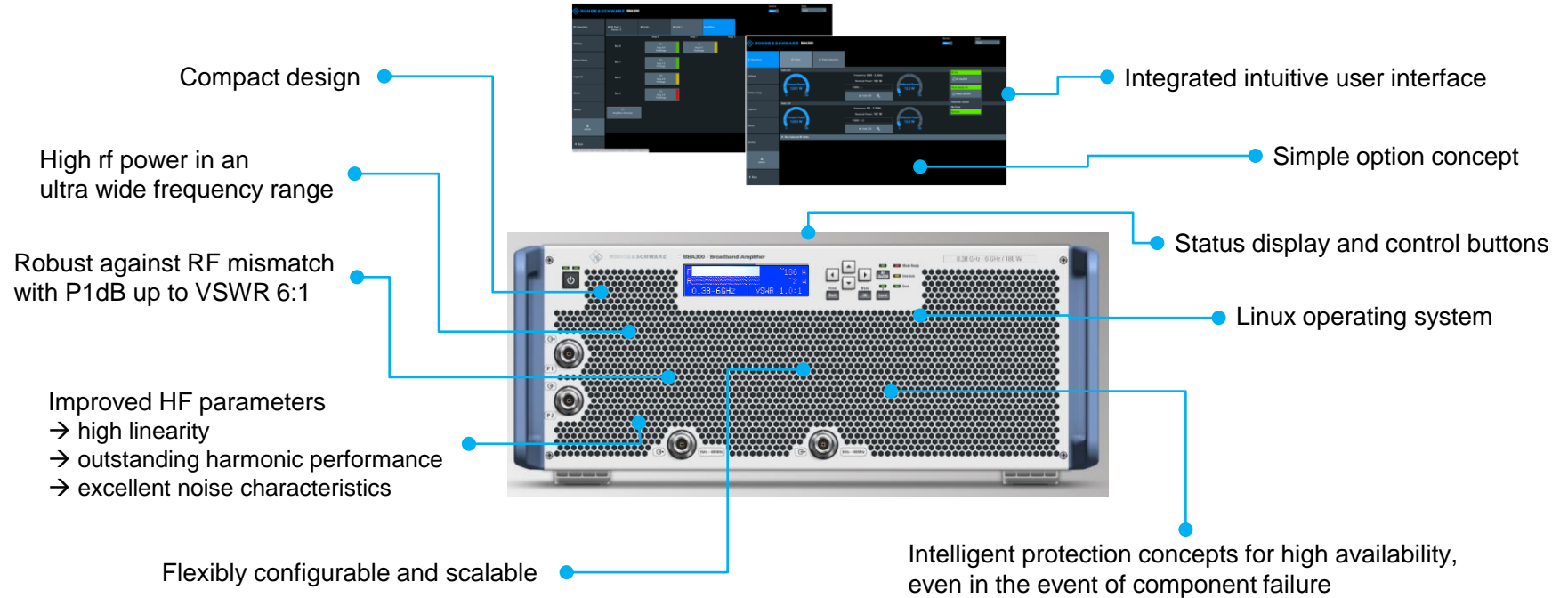
- OVERALL PRODUCT INFORMATION OF BBA300-FAMILY

- ▶ New software platform supports:
 - role-based, user-friendly operation,
 - WebGUI and the new 10" touch panel (SCP).
 - OptionKeys to enable additional functions (e.g. high power mode, adjustment of operation point and others)



BBA POWER AMPLIFIER FAMILY

- OVERALL PRODUCT INFORMATION OF BBA300-FAMILY

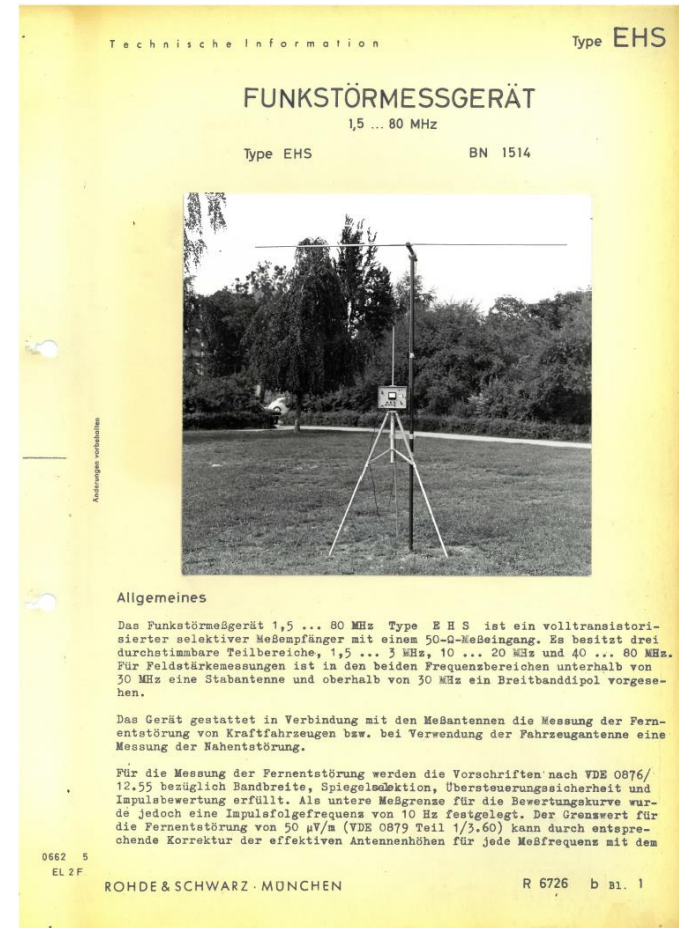


TEST RECEIVER FAMILY ESX

- ROHDE & SCHWARZ HISTORY IN EMC

- ▶ EHS EMI Test Receiver from 1962
 - 1.5 to 80 MHz
 - Quasi peak detector

- ▶ 60 years of innovation in EMI testing and continuously evolving



TEST RECEIVER FAMILY ESX

- DIFFERENT EMC APPLICATION



Commercial / Wireless



Aerospace & Defense



Automotive

TEST RECEIVER FAMILY ESX

-PRODUCT FAMILY INTRODUCTION

Compliance



ESW

High-end compliant EMI receiver with maximum measurement speed, HF performance and applications up to 44 GHz



ESR

Compliance receiver for more speed, insight and intelligence with in-depth real-time spectrum analysis up to 26.5 GHz

Pre-Compliance



ESRP

Precompliance measurements – fast and straightforward with preselection for excellent performance up to 7 GHz



Fxx-K54

Precompliance EMI measurement application on spectrum analyzers addressing CISPR requirements



EPL

Compact, cost-effective test receiver with same interface as ESW up to 30MHz

Tempest



FSWT26

Top notch test receiver with outstanding performance by narrow preselection for wideband TEMPEST measurements

Accessories



ELEKTRA

Automation software for EMC measurements with analysis and reporting

EMI Accessories



TEST RECEIVER FAMILY ESX

-COMPLIANCE RECEIVERS

- ▶ Receivers compliant to latest international EMI standard CISPR 16-1-1 **Edition 4**
 - Specified **6 dB bandwidths**, **detectors** (Quasi-Peak, CISPR-Average, RMS-Average)
 - High **dynamic range** required
 - Repetition frequency of pulses down to single pulse
 - Measurement Applications (**Click Rate**, **(Multi) APD**, **Bargraph**)
 - **Limit Line** checking and **Transducer correction**

R&S ESW



R&S ESR



TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER



Highlights

- ▶ **Sensitivity:** Built-in preamplifier, optional LNA and notch filters
- ▶ **Speed:** Unique time-domain scan with parallel CISPR detectors
- ▶ **Usability:** Big high resolution touch screen
- ▶ **MultiView:** All needed measurements in one display

High-end compliance receiver based on proven FSW platform

- ▶ 1 Hz to 8 / 26.5 / 44 GHz
- ▶ All relevant standards from commercial to military
- ▶ Best HF performance receiver and spectrum analyzer in one device



TEST RECEIVER FAMILY ESX

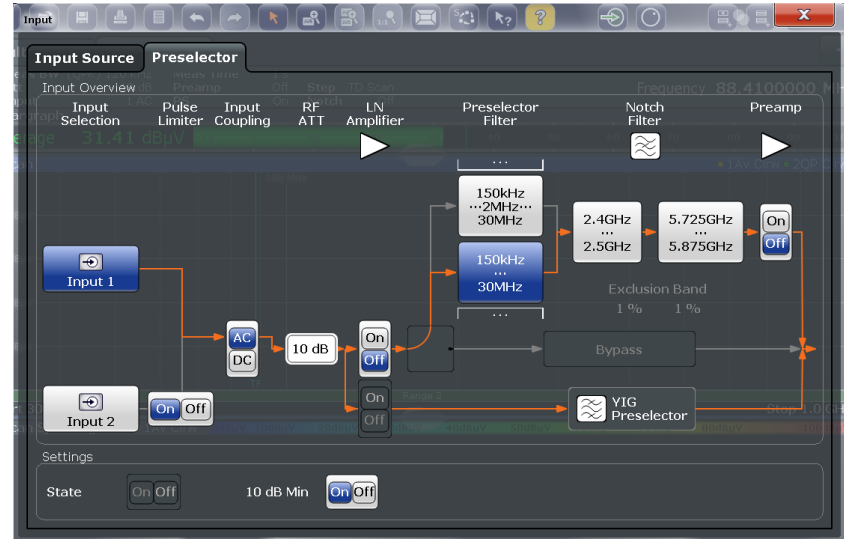
- R&S®ESW EMI TEST RECEIVER

- Superior RF Performance
- Intuitive Graphical User Interface
- Ultra Fast Time Domain Scan
- Real-Time Spectrum Analysis

TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER PERFORMANCE

- ▶ High dynamic range and sensitivity
 - 1 dB compression point: **+15 dBm**
(< 3 GHz, Presel., Preamp and LNA off)
 - Third-order intercept point (TOI): **> 20 dBm**
(< 1 GHz, Presel., Preamp and LNA off)
 - Displayed average noise level (DANL): **< -149 dBm**
(Between 1 MHz and 1 GHz, Presel., Preamp and LNA off)
 - Very low spurious responses: **< -110 dBm**
(1 MHz - 8.9 GHz)
- ▶ Preselection and notch filters
 - **2.4 - 2.5 GHz** and **5.725 - 5.875 GHz**
for ISM band suppression



TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER PERFORMANCE

- ▶ **Automotive radar testing**

- e.g. 77 GHz

- ▶ **A&D applications** analyzing interferer

- 110 GHz or higher

- ▶ **FCC compliance test**

- Measurement up to 5th order harmonics
- Up to 200 GHz for carrier frequency above 30 GHz

- ▶ **R&S ESW-B21 & FS-Zxx harmonic mixers extend**

the frequency coverage of the ESW26 / 44 up to 500 GHz.



ESW-B21



EMI Test Receiver ESW26/44



FS-Zxx



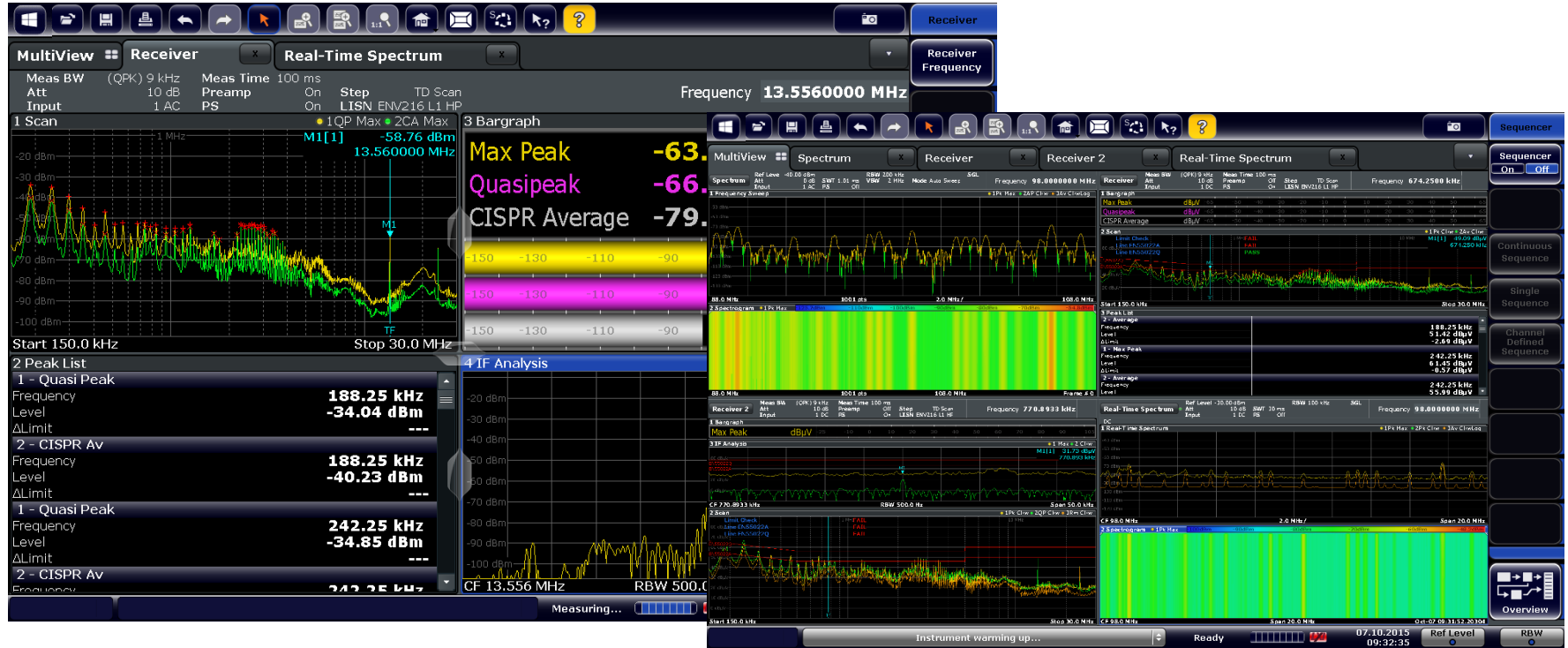
TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER

- I Superior RF Performance
- I Intuitive Graphical User Interface
- I Ultra Fast Time Domain Scan
- I Real-Time Spectrum Analysis

TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER_CUSTOMIZED MULTI-VIEW



TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER INTUITIVE GRAPHICAL USER INTERFACE

► Test Automation Overview Block Diagram

1. Scan table

- Customizable frequency ranges
- Measurement time
- Resolution Bandwidths (RBW)

2. Peak Search

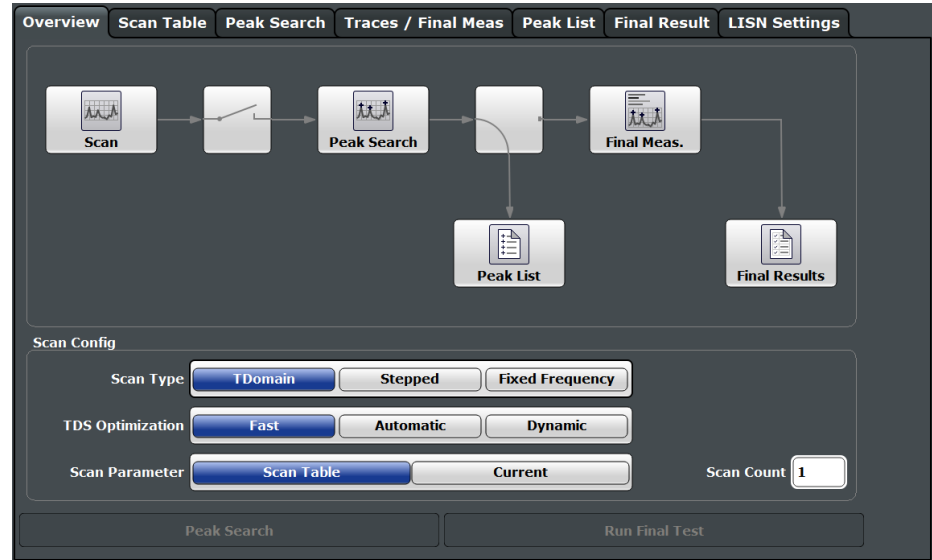
- Record to Peak List
- Choose Limit Line according to standard

3. Final Measurement

- Interactive Mode

4. Final Results

- Report generation



TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER

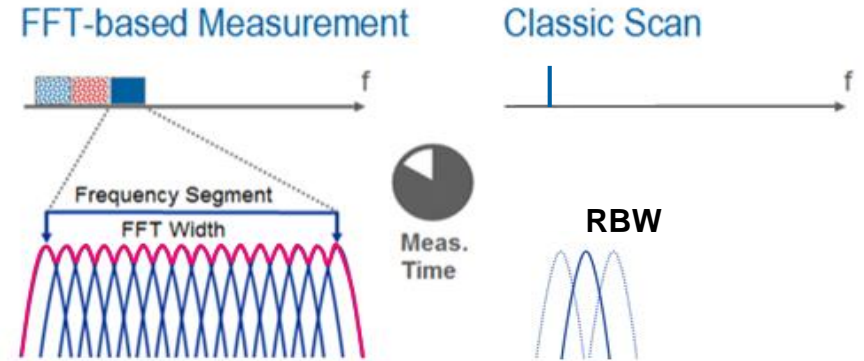
- I Superior RF Performance
- I Intuitive Graphical User Interface
- I Ultra Fast Time Domain Scan
- I Real-Time Spectrum Analysis

TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER TIME DOMAIN SCAN FUNCTION

- ▶ Rohde & Schwarz was the lead manufacturer in the Tri Services Working Group on the integration of Time Domain Scan within MIL-STD-461G
- ▶ Conducted band (150 kHz – 30 MHz) fits in **one** FFT analysis BW
- ▶ Perform QP & CISPR Avg in real-time on the conducted band

FFT is faster by numbers of magnitude than the classic scan



TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER TIME DOMAIN SCAN FUNCTION

Frequency Band	RBW	Detector	Dwell Time	ESR	ESW	Stepped Scan
30 Hz - 1 kHz	10 Hz	Peak	1 s	1.42 s	1.42 s	137 s
1 kHz - 10 kHz	100 Hz			1.06 s	1.06 s	13 s
10 kHz - 150 kHz	1 kHz			1.01 s	1.01 s	7 s
150 kHz - 10 MHz	10 kHz			1.02 s	1.02 s	39 s
10 MHz - 30 MHz			150 ms	0.17 s	0.17 s	79 s
30 MHz - 1 GHz	100 kHz			7.7 s	4.0 s	6 min
1 GHz - 18 GHz	1 MHz		15 ms	26.4 s	8.9 s	11 min
18 GHz - 40 GHz				14.5 s	14 min	

TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER

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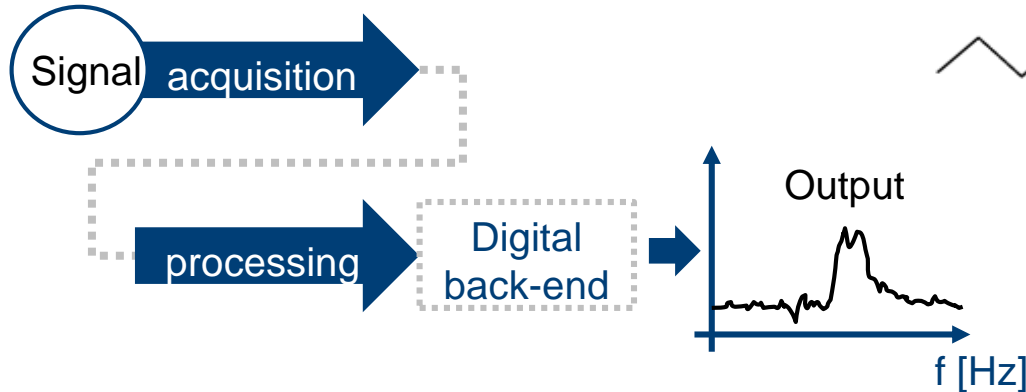
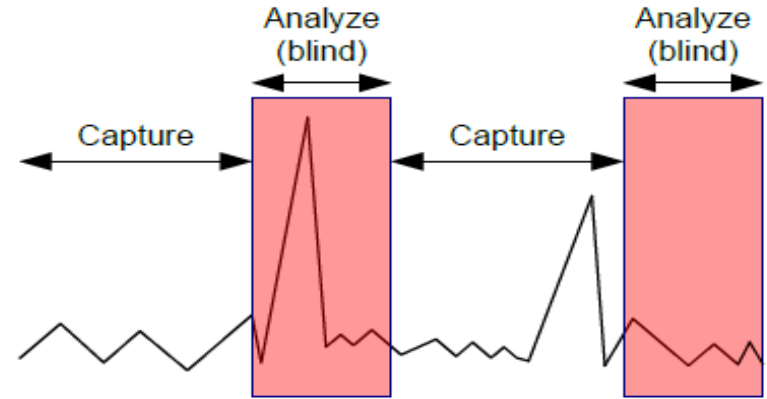
TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER: REAL TIME SPECTRUM

- ▶ Data acquisition and processing **in parallel** with **80 MHz bandwidth**



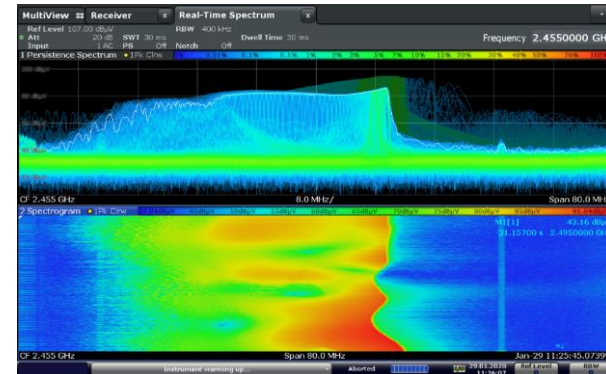
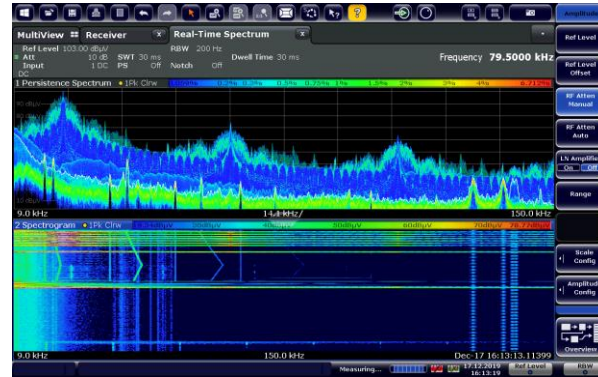
- ▶ Measurement without blind time
 - Fully gapless
 - Resolves even shortest pulses



TEST RECEIVER FAMILY ESX

- R&S®ESW EMI TEST RECEIVER: REAL TIME SPECTRUM

- ▶ **Detect complex signals at first**
- ▶ **Persistence mode**
 - Shows probability of amplitude appearance with colors. Signals with different behavior in time become visible even if hidden behind broadband interferers
- ▶ **Spectrum mode**
 - Displays behavior of traces in time for easy identification of drifting or pulsed signals



1 GHZ

BANDWIDTH EXTENSION FOR THE MARKET-LEADING EMI TEST RECEIVER

The new bandwidth extension option not only allows to speed up measurements of CISPR band C&D in real-time as one single frequency segment of 970 MHz bandwidth, but also enables greater insights and more in-depth interference analysis. With the instrument achieving never seen measurement speeds, even with quasi-peak detector, the saved time enables an increased measurement time per frequency segment. This achieves an even higher probability of intercept for sporadic emissions.

Find our more: www.rohde-schwarz.com/ESW-wideband-extension

TEST RECEIVER FAMILY ESX

-NEWS UPDATED INFO

970 MHz FFT bandwidth

- 120 kHz RBW
- 30 MHz – 1 GHz (CISPR Band C&D)

Real-time

Gapless measurements in receiver spectrogram

Quasi-peak

Simultaneous measurement of CISPR detectors at full bandwidth

Pulse resolution < 10 Hz - Fully compliant in CISPR Band D (300 MHz - 1 GHz)

TEST RECEIVER FAMILY ESX

-NEWS UPDATED INFO

970 MHz
FFT bandwidth

R&S®ESW-B1000

350 MHz
FFT bandwidth

R&S®ESW-B350

Options retrofittable in service center for all facelift ESW (serial number ≥ 103000)

ESW Facelift
(S/N ≥ 103000)



Old ESW
(S/N < 103000)

TEST RECEIVER FAMILY ESX

-NEWS UPDATED INFO

Commercial Standards			MIL-STD-461		
Frequency range	Resolution bandwidth	Max. FFT bandwidth	Frequency range	Measurement bandwidth	Max FFT bandwidth
CISPR Band A 9 kHz to 150 kHz	200 Hz	full band	30 Hz to 1 kHz	10 Hz	full band
CISPR Band B 150 kHz to 30 MHz	9 kHz		1 kHz to 10 kHz	100 Hz	
CISPR Band C and D 30 MHz to 1 GHz	120 kHz	970 MHz with ESW-B1000/R 350 MHz with ESW-B350/R	10 kHz to 150 kHz	1 kHz	
CISPR Band E 1 GHz to 8 GHz	1 MHz	450 MHz with ESW-B1000/R 350 MHz with ESW-B350/R	150 kHz to 30 MHz	10 kHz	970 MHz with ESW-B1000/R 350 MHz with ESW-B350/R
CISPR Band E 8 GHz to 18 GHz	1 MHz	25 MHz The bandwidth is limited by the YIG-filter.	30 MHz to 1 GHz	100 kHz	450 MHz with ESW-B1000/R 350 MHz with ESW-B350/R
			1 GHz to 8 GHz	1 MHz	25 MHz The bandwidth is limited by the YIG-filter.
			8 GHz to 44 GHz	1 MHz	

TEST RECEIVER FAMILY ESX

-NEWS UPDATED INFO

CISPR 16-1-1:2014 ED3.2	CISPR 16-1-1:2015 ED4	CISPR 16-1-1:2019 ED5
R&S®ESW	R&S®ESW	R&S®ESW
R&S®ESR	R&S®ESR	R&S®ESR
R&S®ESU	R&S®ESU	R&S®ESU
R&S®ESCI		
R&S®ESIB		

TEST RECEIVER FAMILY ESX

-NEWS UPDATED INFO

CISPR 16-1-1:2014 ED3.2	CISPR 16-1-1:2015 ED4	CISPR 16-1-1:2019 ED5
CISPR 11:2015 (ED6)	CISPR 14:2016 (ED6) CISPR 14:2020 (ED7)	IEC 61000-6-3:2020
<i>CISPR 12:2007 (ED6) refers to 16-1-1:2006</i>	CISPR 15:2018 (ED9)	IEC 61000-6-8:2020
	CISPR 25:2016 (ED4)	CISPR 25:2021 (ED5)
ANSI C63.2:2016 / FCC	CISPR 32:2019 (ED2.1)	
	CISPR 36:2020 (ED1)	
	IEC 61000-6-4:2018	

TEST RECEIVER FAMILY EPL

-NEWS UPDATED INFO

- ▶ CISPR 16-1-1 compliant
- ▶ 5 kHz – 30 MHz, targeting conducted EMI measurement applications
- ▶ Includes
 - Preselection
 - Time domain scan
 - Input protection
 - Spectrum analysis
- ▶ Several options like
 - Internal tracking generator
 - Battery operation
 - DC input



TEST RECEIVER FAMILY EPL

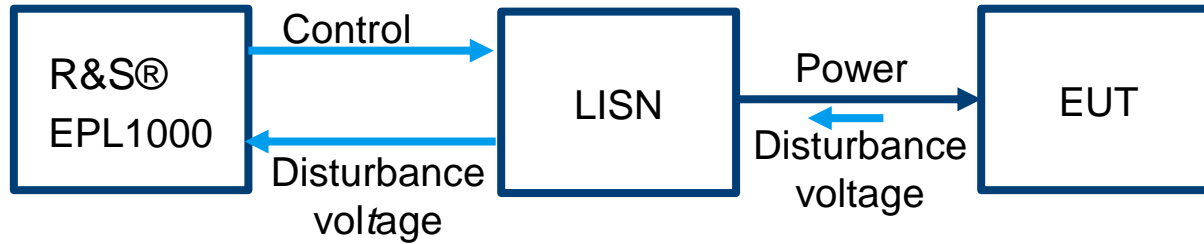
-NEWS UPDATED INFO

- ▶ Input Protection
- ▶ Preselection
- ▶ CISPR bandwidths and detectors
- ▶ MIL-STD-461 bandwidths
- ▶ 1 dB attenuation steps
- ▶ Preamplifier
- ▶ Autoranging
- ▶ Limit line library
- ▶ Report generation



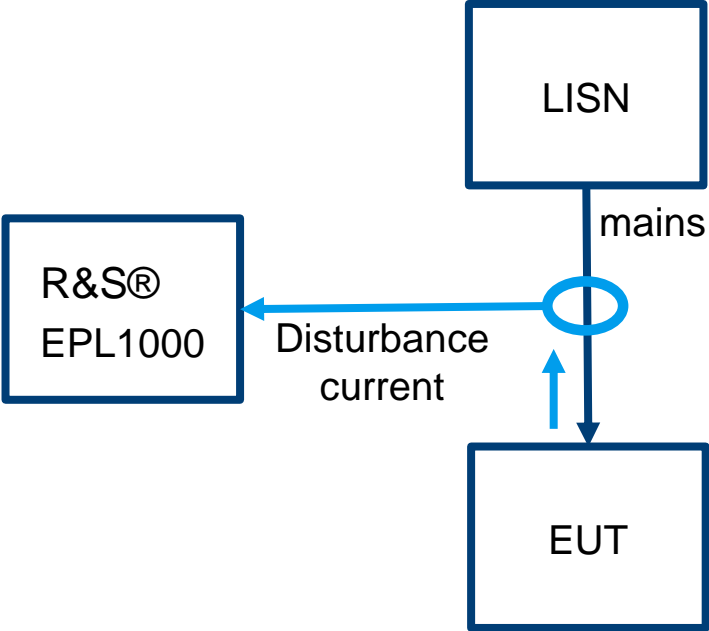
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-NEWS UPDATED INFO



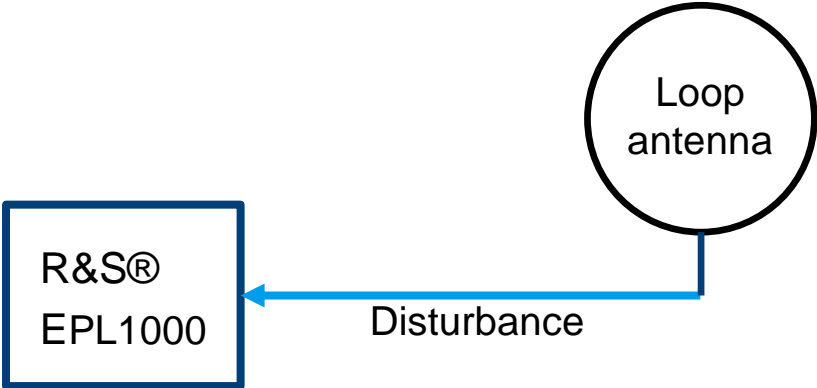
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-NEWS UPDATED INFO



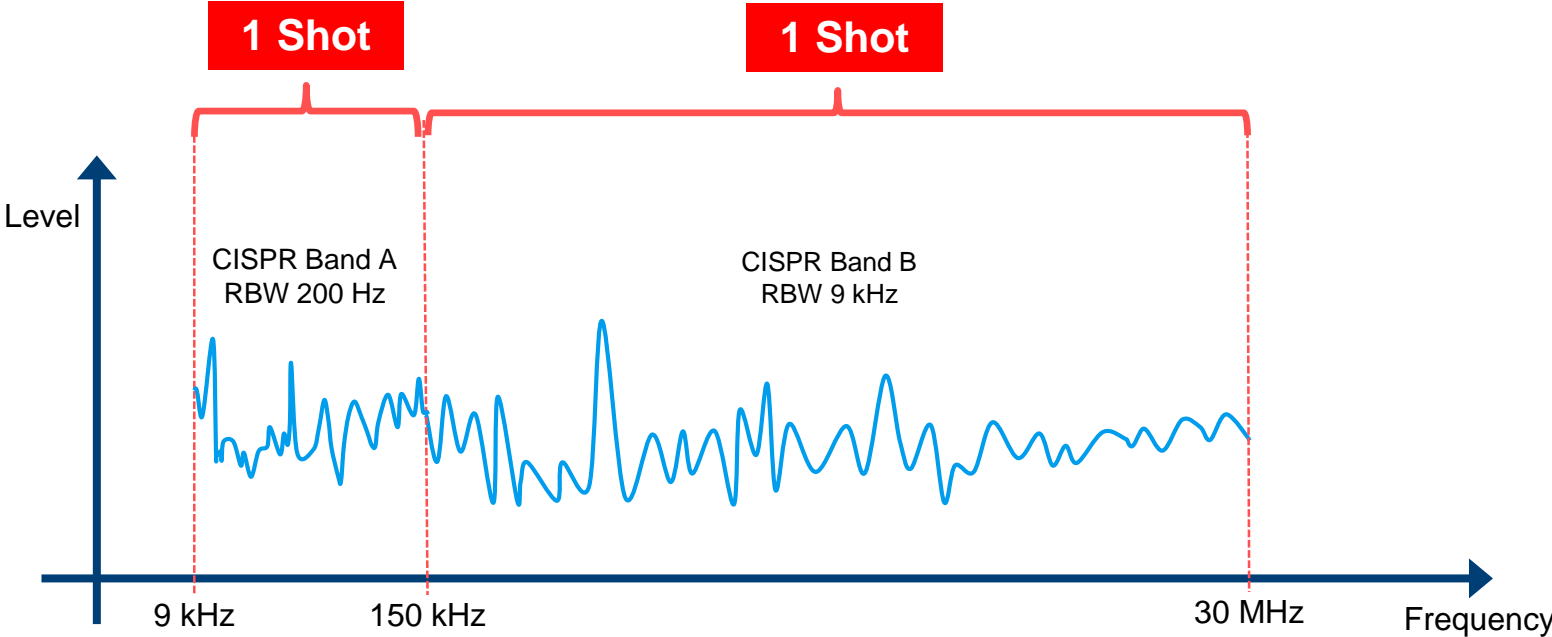
TEST RECEIVER FAMILY EPL

-NEWS UPDATED INFO



TEST RECEIVER FAMILY EPL

-NEWS UPDATED INFO



EMC SOFTWARE ELEKTRA

- ▶ Swift and reliable measurement of electromagnetic disturbances
 - The R&S®ELEKTRA EMC test software is a solution that controls complete EMC systems and automates measurements on equipment under test (EUT) that is being tested for emissions (EMI) and immunity (EMS) compliance.

EMC SOFTWARE ELEKTRA

-KEY FEATURE AND BENEFIT

Plan

Execute

Analyse

Report

- Migrate your data
- Manage EUTs
- Use test template library
- Configure tests easily
- Simulate before run

- Control R&S and other instruments
- Automate tests
- Interactive/automated
- Work in parallel
- Keep the overview

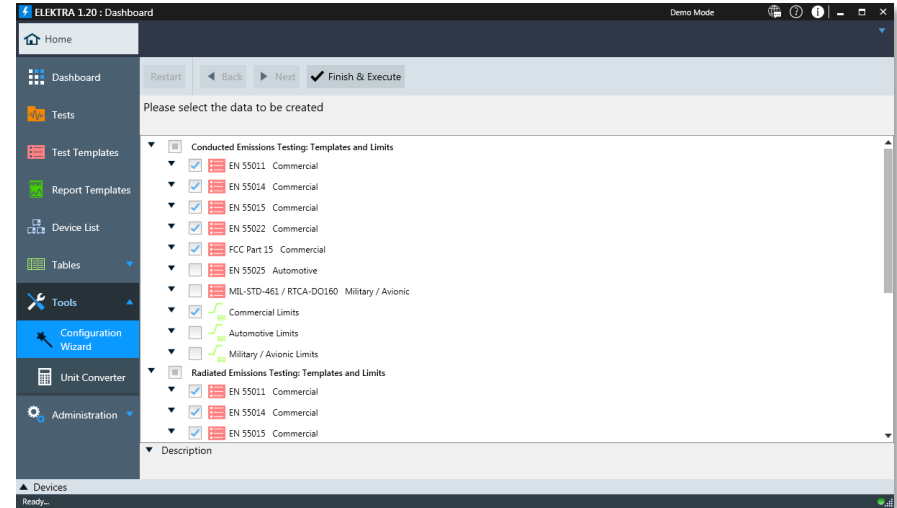
- Critical points analysis
automatic/manual
- Refine critical points

- Customize charts
- Customize report
- Add multiple tests to report
- Opt. post process in ext. word processor

EMC SOFTWARE ELEKTRA

-KEY FEATURE AND BENEFIT

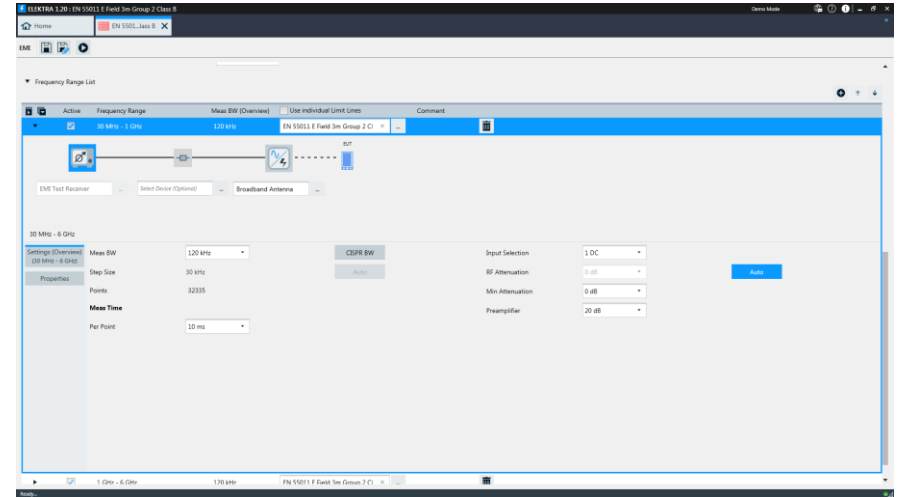
- ▶ Predefined templates, transducer factors, and limit lines
- ▶ Templates are editable, no need to start from scratch! Simply exchange used equipment and cal. data
- ▶ Automatically detect connected instruments



EMC SOFTWARE ELEKTRA

-KEY FEATURE AND BENEFIT

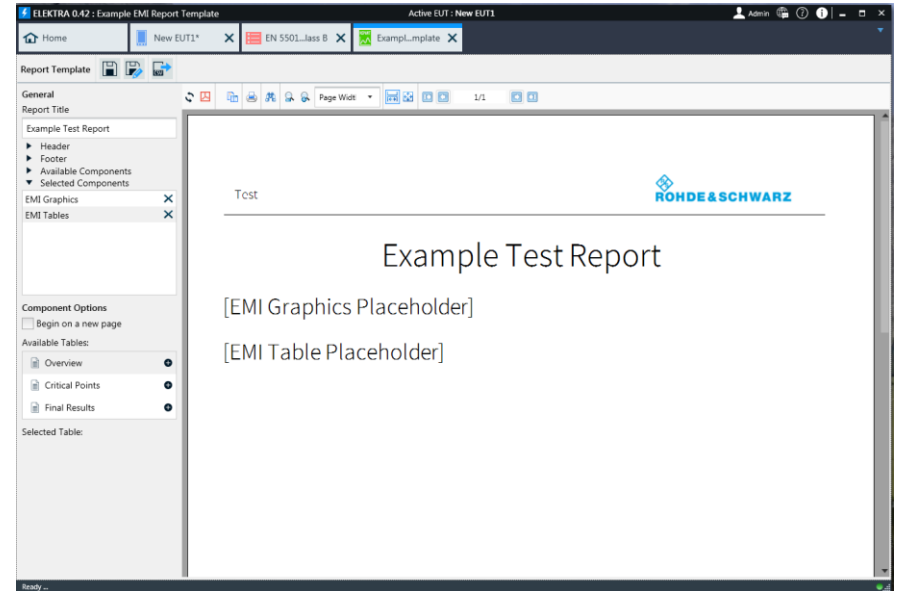
- ▶ Most of the settings are available from multiple tabs
- ▶ No need to switch back and forth from device list to template and hardware setup.
- ▶ Forgot to define a limit line? Just create it from the test template tab, without window-hopping



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-KEY FEATURE AND BENEFIT

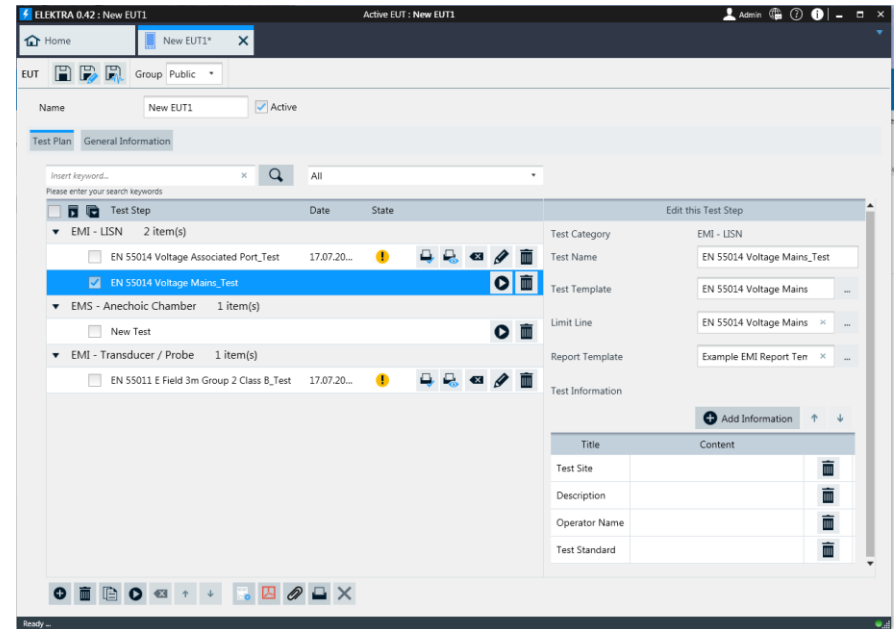
- ▶ Pin frequently used items to dashboard for convenient access
- ▶ Or use the powerful search function
 - Phrases
 - Frequency ranges
- ▶ Open multiple tabs to compare test templates, tests, prepare reports...even while waiting for a test to finish.



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-KEY FEATURE AND BENEFIT

- ▶ Define a list of tests to be executed for multiple EUTs
- ▶ See status of test results
- ▶ Easily create reports with results from multiple tests, post process in MS Word



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-EMC STANDARD OVERVIEW

EMI & EMS



Commercial



Aerospace & Defense



Automotive



Wireless/RSE & ABT

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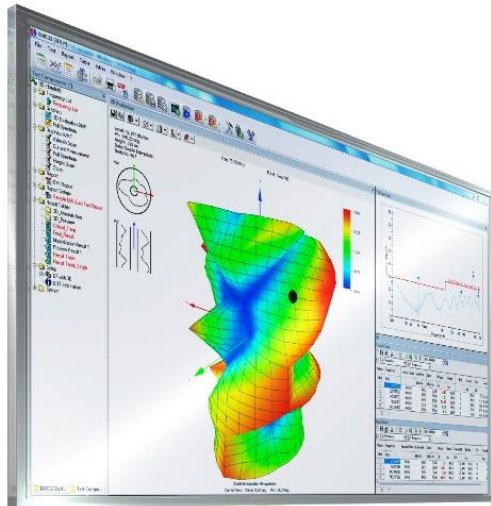
-EMC STANDARD OVERVIEW

Standards	Description	EMI	EMS	
CISPR 11	Industrial, scientific and medical (ISM) radio frequency equipment – Electromagnetic disturbance characteristic	Supported	NA	Commercial
CISPR 14	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus	Supported	Supported	
CISPR 15	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	Supported	NA	
CISPR 32	Electromagnetic compatibility of multimedia equipment - Emission requirements (replaced CISPR 13 and CISPR 22), * broadcast testers with manual operation	Supported*	NA	
CISPR 35	Electromagnetic compatibility of multimedia equipment - Immunity requirements (replaces CISPR 20 and CISPR 24), * broadcast testers with manual operation	NA	Supported*	
IEC 61000-4-3	Electromagnetic compatibility (EMC)- Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	NA	Supported	
IEC 61000-4-6	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	NA	Supported	
CISPR 12	Vehicles, boats and internal combustion engine driven devices – Radio disturbance characteristic	Supported	NA	Wireless
CISPR 25	Vehicles, boats and internal combustion engines - Radio disturbance characteristics - Limits and methods of measurement for the protection of on-board receivers	Supported	NA	
ISO 11451	Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy	NA	Supported	
ISO 11452	Road vehicles - Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy	NA	Supported	
MIL STD 461	Requirements for the control of electromagnetic interference characteristics of subsystems and equipment	Supported	Supported	
ETSI/FCC	Wireless Devices for 2G,3G,4G, WLAN, BT **	Supported	Supported**	

EMC SOFTWARE ELEKTRA

-MIGRATION FROM EMC32 TO ELEKTRA

- Dedicated migration tool developed to make the transition from EMC32 to Elektra easier

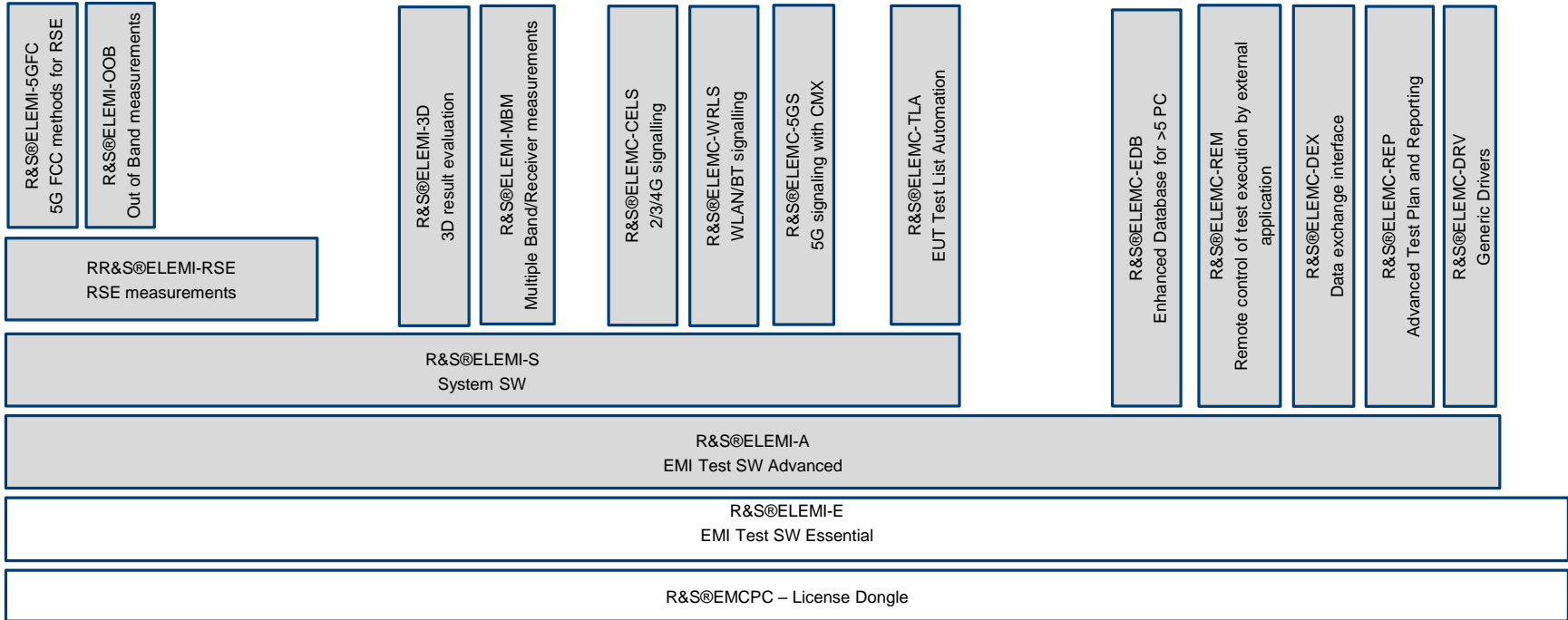


- Device list
- Correction tables
- Hardware setups
- Test templates
- Report templates
- Limit lines



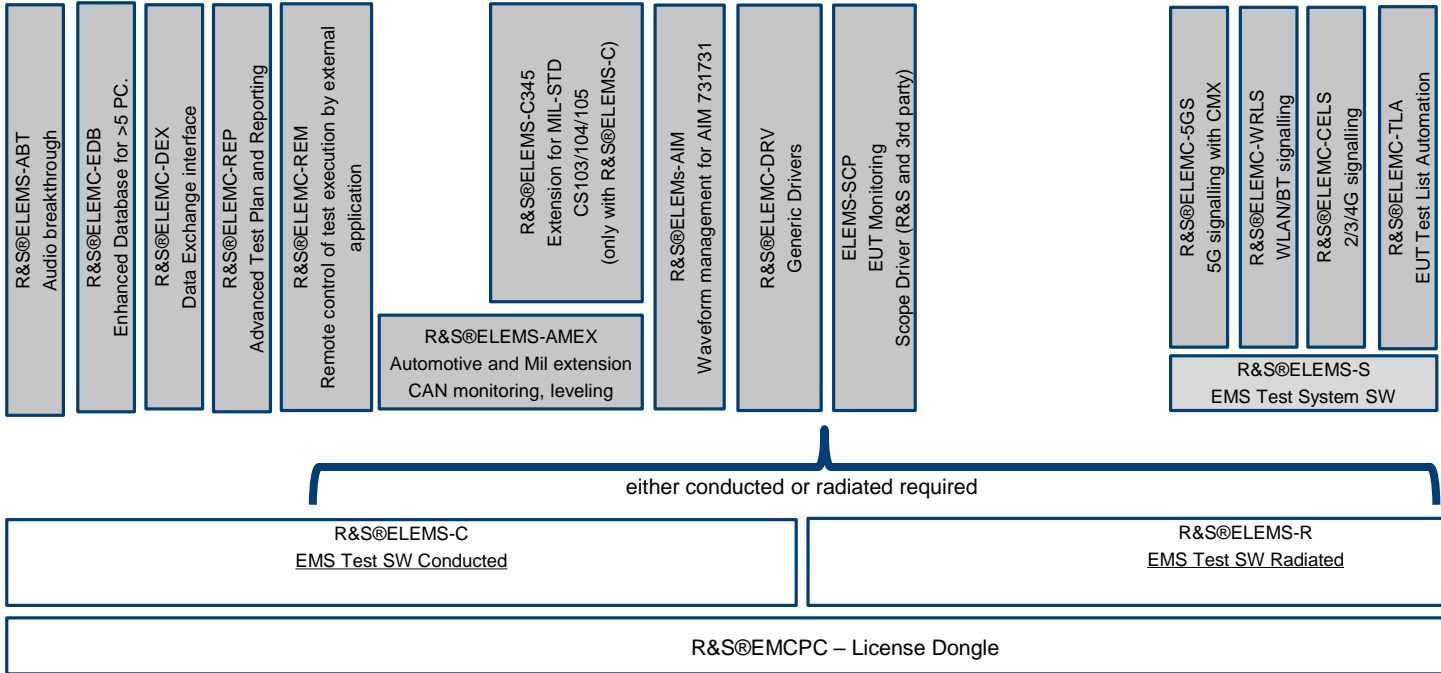
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-R&S®ELEKTRA PRODUCTS TYPE - EMI



EMC SOFTWARE ELEKTRA

-R&S®ELEKTRA PRODUCTS TYPE - EMS



EMC SOFTWARE ELEKTRA

-APPROXIMATE PRODUCT COMPARISON TO EMC32

R&S®ELEKTRA	R&S®EMC32
ELEMI-E	ES-SCAN
ELEMI-EA	EMC32-EB
ELEMI-S	EMC32-K10
ELEMS-C	EMC32-S (only conducted HW setups and templates)
ELEMS-R	EMC32-S (only radiated HW setups and templates)
ELEMS-S	EMC32-K4
ELEMC-DRV	EMC32-K7
ELEMI-3D	EMC32-K23
ELEMS-AMEX	EMC32-K1, EMCAN
ELEMI-RSE	EMC32-K2 (EMI part)
ELEMC-REP	EMC32-K84

This is an approximate comparison, not all functionalities match 1:1

EMC SOFTWARE ELEKTRA

-INTEGRATION INTO EXISTING INFRASTRUCTURE

- ▶ Efficient business process are key to performance of a test lab
 - ELEM-EDB
 - Up to 20 users sharing the same data base enable users to have consistent data on all stations, reduce administration and ensure availability of data
 - ELEM-DEX
 - Read and write data from and to other applications/data bases automatically such as
 - Create reports in other data bases
 - Create test plans in other data bases
 - Maintain assets in other data bases
 - Create statistics such as efficiency and cost calculations with data provided by ELEKTRA
 - ELEM-REM
 - Load, Start, Pause, Resume and Stop tests from any application by remote controlling ELEKTRA

EMC SOFTWARE ELEKTRA



- ▶ R&S®EPL1000 support with R&S®ELEKTRA version 4.61 (March 2023)
- ▶ ELEMI-E option for EMI measurement applications
 - Automatic measurement of different ranges and LISN lines with individual transducer factors
 - Automated calculation of field strength for 3-axes GTEM measurements

Thank you