

# R&S®ELEKTRA

## Release Notes

**Software Version V5.02**

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The software makes use of several valuable open source software packages. For information, see the "Open Source Acknowledgment" provided with the product.

The following abbreviations are used throughout this document: R&S®ELEKTRA is abbreviated as R&SELEKTRA.

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# 1 Information on the current version and history

## 1.1 New functions

The following table lists the new functions and indicates the version in which the new function was introduced:

### New function of software V5.02:

Version	Function
V5.02	EMI-/EMS-Tests: - Accessory Controls for mast and turntable support now connection to the controller device in order to support accessory movements while a test is in stop mode. This allows also for antenna parking or moving to loading position.
V5.02	EMS Test Template Editor: - In the section 'Flow Details - Data Evaluation', tab 'Data Evaluation', the additional checkbox 'Combine all loop results after measurement' to is now available to combine the loop results.
V5.02	EMS RVC Tests: - Add support to import unloaded and loaded Reverberation Chamber result tables from EMC32 instead of using ELEKTRA internal tables. Note: tables need to be available in CSV format and an additional first column containing the frequency range index (similar to ELEKTRA tables) need to be added. Also the frequency steps needs to be the same as used in the ELEKTRA RVC test.
V5.02	All tests with accessories: - The accessory controllers of antenna towers, antenna positioners, field probe positioners, turntables and slidebars inside a test have a new (connection) checkbox, enabling the user to connect to those accessories and make some accessory adjustments before or after the test. This (connection) checkbox will be disabled during test execution to prevent the user from accidentally disconnecting an accessory.
V5.02	EUT Editor: - Support for simultaneously changing content in the 'Test Information' section when multiple test steps are selected at the same time.
V5.02	Device Driver / Generators HMF25xx / Step Attenuator: - Support to use these generators in combination with a R&S RSCxx step attenuator unit, to extend the level range dynamics of the generator. The step attenuator unit can be added in the 'Details' tab of the generator and is then automatically controlled as required when a new level is programmed to the generator.
V5.02	Device Drivers / Field Probes: - Support for RADAR and Pulse measurements using Mode 4 added for Lumiloop field probes.
V5.02	Device Driver / Radio Communication Tester Handling of 2G / 3G / 4G / 5G / WLAN (all tests, including ABT): - New checkbox "Use manual connection setup without inquiry (no popup)": If checked the RCT will assume a manual connection, verify it and start testing. The popup for connection selection ("Please choose whether to connect UE and

	<p>CMW / CMX manual or automatically”) is omitted.          In case of an ABT test the ABT parameter popup will close after 15s          - New checkbox “Keep manual connection setup after test end”:          The manual connection setup will be kept after test end.</p>
V5.02	<p>EMCAN64 for AMEX:          - Vector Informatics has terminated the support of environment variables that are currently used for transferring EMS leveling information from ELEKTRA to CANoe. The new EMCAN64 release now supports to do this data exchange via system variables. Refer to the EMCAN64 documentation chapter 6 for further information on this topic.          - The logs folder location can now be set by the operator.          - EMCAN64 V5.02 works only with the current or a newer ELEKTRA release version.</p>
V5.02	<p>EMCAN Inserter Middleware:          - The EMCAN Inserter Application has now be updated to the newest PEAK library and supports now beside CAN standard mode also CAN FD mode. Refer to the EMCAN Inserter documentation for further details.</p>
V5.02	<p>Administration / Data Management / Backup:          - Support to create a backup of the central database while remote clients are still connected and working with the database.</p>
V5.02	<p>Data Tables / Test Sites:          - The table types Attenuation, Transducer Correction and Reference Calibration now support the assignment of a Test Site.</p>

#### New function of software V5.01:

Version	Function
V5.01	<p>Test Graphics / Labels:          - Support for adding custom labels to a trace of a chart and labels at limit lines via the new context menu ‘Label’.</p>
V5.01	<p>ELEMS-AMEX - Automotive / MIL-STD:          - Added support for generic inserter devices.</p>
V5.01	<p>EMS Measurement:          - Add support to measure individual field probe axes during a reference calibration (additional sensor monitoring channels).</p>
V5.01	<p>EMS Field Uniformity Evaluation:          - The field uniformity evaluation control supports now to define the list of sensor positions to be evaluated in a combination of range (e.g. “1-4”) and dedicated positions separated by comma (e.g. “1-4,5,6,7,8,9-16”).</p>
V5.01	<p>EUT Monitoring:          - The values of an EUT monitoring channel are now processed with double precision to enable monitoring of the values with higher resolution.</p>
V5.01	<p>EMI Test:          - Each frequency range supports now a range name that is also available in the report.          - Added limit and margin column to loop result tables.</p>
V5.01	<p>EMI Test Template Editor:          - A new checkbox in the header of column ‘Active’ of the list of frequency ranges allows to activate / deactivate all ranges simultaneously.</p>
V5.01	<p>Device Driver / Mast and Turntable Drivers:          - Added support for Frankonia FC02/03/05 turntable controller.          - Added support for Innco/Deisel HD100 controller for mast / turntable.          - Added support for relative speed setting in Generic Turntable driver.</p>

V5.01	<p>Device Driver / Oscilloscope Drivers:</p> <ul style="list-style-type: none"> <li>- R&amp;S RTM: support for FFT mode when used as power meter.</li> <li>- Generic: for command 'Channel Coupling' the new setting 'DC' is now available.</li> </ul>
V5.01	<p>Device Driver / RF Generators:</p> <ul style="list-style-type: none"> <li>- More waveforms for RADAR pulse tests added.</li> </ul>
V5.01	<p>Device Driver / Field Probes:</p> <ul style="list-style-type: none"> <li>- Support for Lumiloop field probes with new driver 'Lumiloop LSProbe 1.2' added. This driver supports changing of the measurement mode during the measurement and provides improved Laser on/off control. In case you are using Lumiloop field probes, please migrate your setups to this driver as we will phase out the old drivers with V5.10 release.</li> <li>- Support for PMM8053 field probe added.</li> <li>- Support to adjust the noise level for specific field probes.</li> </ul>
V5.01	<p>Device Driver / Generic Drivers:</p> <ul style="list-style-type: none"> <li>- Added support to trim whitespace from the device response before processing it via the new evaluation syntax <code>W{f t b}</code>, trimming whitespace at front (Wf), tail (Wt) or at both ends (Wb) of the response string.</li> </ul>
V5.01	<p>Reporting / EMI:</p> <ul style="list-style-type: none"> <li>- Pre-selection of separate charts for LISN lines is now supported.</li> </ul>
V5.01	<p>User Management:</p> <ul style="list-style-type: none"> <li>- The login dialog now supports a selection list of recently used names for the user name field.</li> </ul>

### New function of software V5.00:

Version	Function
V5.00	<p>ELEMC-5GS - 5G Signaling:</p> <ul style="list-style-type: none"> <li>- Support for CMX-OBT (One-Box-Tester) for firmware / CSW versions 7.20.1.x (7.20.1.155 or above).</li> <li>- EMI / EMS / CAL: Manual setup for CMX500 / CMX500-OBT.</li> <li>- Improvement of connection setup in ABT CAL: CMX500 / CMX500-OBT keeps connection after finishing test, connection can be reused for repeating ABT CAL test.</li> <li>- Added methods to remove attenuation tables of CMX500 / CMX500-OBT.</li> <li>- Added throughput in percent as measurement parameter for EMS Monitoring including CAL.</li> </ul>
V5.00	<p>EMS RVC / Rotating Tuner Reverberation Chamber Measurements:</p> <ul style="list-style-type: none"> <li>- EMS radiated setup with single tuner device (using turntable driver)</li> <li>- parallel usage of field probe and receiving antenna for calibration</li> <li>- manual field probe / receiving antenna positioning during chamber calibration</li> <li>- supported immunity tests according to standards EN 61000-4-21:2011 (annex B, D), ISO 11452-11:2010 with stepped tuner mode</li> <li>- support for unloaded / loaded chamber calibration including the required measurement evaluation with defined sensor positions in the test volume</li> <li>- support for DUT Check with comparison of loading to chamber calibration</li> <li>- support for DUT Test with qualification or susceptibility method</li> <li>- parallel measurement of field strength and received power</li> <li>- automatic loop for modulations when used with R&amp;S®ELEMS-S</li> <li>- RVC test level methods using RVC normalized max E-Field table</li> <li>- Tuner loop with individual settings per frequency range</li> <li>- reporting of chamber calibration results</li> <li>- usage of turntable drivers for tuner control</li> <li>- driver for COMTEST tuner based on Oriental controller</li> </ul>
V5.00	<p>EMS Base Licenses / Frequency Control Improvements for Interactive Measurements:</p> <ul style="list-style-type: none"> <li>- The frequency control has been refactored in order to improve the usability.</li> <li>- Stepping through the overview result table and doing a fine tuning of the current</li> </ul>

	test frequency in interactive mode is now more straight forward. For further details on this topic please refer to the manual and online help.
V5.00	EMS Radiated Measurements: - Support for antenna selector via a turntable device added.
V5.00	EMS AMEX Measurements: - In combination with an R&S RTM oscilloscope, the measurement of the amplifier output power by simultaneous measurement of voltage and current is now supported. More oscilloscopes will be supported in the next release versions.
V5.00	ELEMI-S: - Waterfall diagram in overview measurement - Interactive overview measurement where accessories are user controlled.
V5.00	ELEMI-A: - Revised Frequency Control to simplify operation. For further information on this topic please refer to the manual and online help. - Limit lines can now be used with an additional adjustable offset.
V5.00	EUT Editor: - Each test now includes a "Test Completed" property. Once this flag is set, the test becomes read-only and can no longer be modified. - Each test in an EUT is now assigned a unique Test ID (increasing number). - Tests can now be assigned directly to test plan folders in the Test Save dialog. Additional test plan subfolders may also be created here.
V5.00	Golden Template + Test Sites: - In order to minimize test-template maintenance when operating several test sites within a single lab, it is typically preferred to use a global ('golden') test-template set for all test sites. - With ELEKTRA V5.00, you can define a list of available test sites, and then associate each hardware setup with a specific test site. When using a central-database, this allows hardware setups to be created for each site using a common name. Each ELEKTRA instance, may also be associated with a single test-site. When creating a new test using a 'golden' template, ELEKTRA will use the hardware setup name and active test-site to select the correct hardware setup from the central database.. For further information on this topic please refer to the manual and online help.
V5.00	Search View: - Filter view persisted for each database item. - Filter value setting can now easily be switched on / off.
V5.00	Table Import Improvements: - Format compatibility for import of different file types like CSV or S1P has been improved.
V5.00	Report: - Landscape page orientation now supported.
V5.00	Device Driver / Field Probes: - AR FM7004: added support for multi-channel results. - Used correction tables are shown in the settings dialog. - Raditeq RadiSens: support for series 10xxx added.
V5.00	Device Driver / Generic Field Probe: - Added support for Narda NBM-520 field probe.
V5.00	Device Drivers / IO Devices - Support for BMCM USB-PIO as IO Device added (e.g. use as Interlock device). This requires also the included and updated middleware version V5.
V5.00	Device Driver / LISN: - Support for single line and multi-channel automotive LISN

V5.00	<p>Device Driver / Turntables:</p> <ul style="list-style-type: none"> <li>- Support for turntables that can turn continuously in either direction (setting range 0 to 360 deg).</li> <li>- Added support for AIP test bench turntable using DCI command interface.</li> <li>- Support for Frankonia Turntable 2 added.</li> </ul>
V5.00	<p>Device Driver / Antenna Towers:</p> <ul style="list-style-type: none"> <li>- Support for Tilt mode for Maturo FCU, Maturo NCD, Frankonia FC06.</li> <li>- Support for Frankonia Mast 2 added.</li> </ul>
V5.00	<p>Device Driver / Generic Antenna Tower:</p> <ul style="list-style-type: none"> <li>- Added support for polarization parsing when controller returns a polarization angle between 0 and 90 deg.</li> </ul>
V5.00	<p>Device Driver / Generic Drivers:</p> <ul style="list-style-type: none"> <li>- Added support for Narda EP60x field probes via Narda SB10 optical multiplexer. Therefore, the probe identifier can be set in the probe properties.</li> <li>- When in the 'Configuration' tab, 'Commands' section, an 'Optional Answer Parsing' string is entered, a new field 'Evaluation Result' shows the result of parsing the result string read from the device.</li> <li>- Support for Pulse off time added to generic RF Generator driver e.g. to support RadiTeq RF Generator.</li> </ul>
V5.00	<p>Device Driver / Network Analyzer:</p> <ul style="list-style-type: none"> <li>- Support for ZNLE added.</li> </ul>
V5.00	<p>Device Driver / Power Meter:</p> <ul style="list-style-type: none"> <li>- Support for NRP18S(N)-xx with attenuators added.</li> <li>- Support for NRP18P, 40P, 50P RF probes added.</li> </ul>
V5.00	<p>Device Driver / Radio Communication Tester:</p> <ul style="list-style-type: none"> <li>- Support for CMX OBT for 5G.</li> </ul>
V5.00	<p>Device Driver / RF Generators:</p> <ul style="list-style-type: none"> <li>- Additional waveforms for RADAR pulse testing added.</li> </ul>
V5.00	<p>Device Driver / Receivers:</p> <ul style="list-style-type: none"> <li>- Support for ESW-B1000</li> </ul>
V5.00	<p>Device Driver / Signal Path:</p> <ul style="list-style-type: none"> <li>- The UI has been improved to make adding and removing paths easier. Tooltip support now shows a preview of the attenuation correction tables used.</li> <li>- Switch unit paths are now switched in the order that they appear in the path table.</li> </ul>
V5.00	<p>Device List:</p> <ul style="list-style-type: none"> <li>- A customer specific text field called "Device ID" has been added to connect devices to customer equipment list.</li> </ul>

### New function of software V4.61:

Version	Function
V4.61	<p>EMS ABT / Audio Breakthrough Measurement:</p> <ul style="list-style-type: none"> <li>- NB/BB test for pure data connection is now supported.</li> <li>- R&amp;S CMW: ABT audio measurement for CS with RXQUAL is now supported</li> </ul>
V4.61	<p>Test Template / Actions:</p> <ul style="list-style-type: none"> <li>- 'Run Program' action now supports command line arguments</li> </ul>
V4.61	<p>EMI Test / License ELEMI-E:</p> <ul style="list-style-type: none"> <li>- When only license 'ELEMI-E' is enabled, individual correction factors for the LISN lines are now supported.</li> </ul>

V4.61	<p>Device Driver / LISN, Triple Loop, GTEM, IO Device Drivers:</p> <ul style="list-style-type: none"> <li>- If one of these devices is controlled remotely, a waiting time after switching the signal source can now be set in the 'Details' tab.</li> </ul>
V4.61	<p>Device Driver / Network Analyzer Driver:</p> <ul style="list-style-type: none"> <li>- Support for model R&amp;S ZNB43.</li> </ul>
V4.61	<p>Device Driver / Receiver Driver:</p> <ul style="list-style-type: none"> <li>- The receiver driver now supports in the "Spectrum Analyzer" operating mode the sweep time setting 'Auto'.</li> </ul>
V4.61	<p>Device Driver / Generator Driver:</p> <ul style="list-style-type: none"> <li>- The generator driver now supports for R&amp;S SMBV models the 'Pulse Train' option K27, if installed on the generator.</li> </ul>
V4.61	<p>Device Drivers / USB Interface:</p> <ul style="list-style-type: none"> <li>- When connecting devices via the USB interface, the device drivers now support the explicit setting of the manufacturer ID in the VISA identifier by prefixing the manufacturer ID followed by two colons in front of the product ID.</li> </ul>
V4.61	<p>Device Drivers / Field Probe driver:</p> <ul style="list-style-type: none"> <li>- Support for Raditeq field probes RSS10xx series based on RadiCenter plugin LPS1001A.</li> <li>- Support for AR FL80xxx field probes based on IF8000 interface unit.</li> <li>- For the Wave Control SMP2 model, the field probe driver now supports free setting of the baud rate in order to also support the connection via the optional fiber optic interface with its higher baud rate.</li> </ul>

#### New function of software V4.60:

Version	Function
V4.60	<p>ELEMC-ATB – 'EUT Test Bench Extension' (new article)</p> <ul style="list-style-type: none"> <li>- Device drivers for EUT Monitoring and EMI accessory control with test bench system (E-Motor test bench).</li> <li>- Test flow synchronization with test bench for EMS and EMI tests.</li> <li>- Data synchronization between test bench software and R&amp;S®ELEKTRA EMC test software (tables, graphics).</li> <li>- EMI Overview Measurement on a complete test bench test cycle with finding the maximum emission by varying selected test bench parameters like speed, torque or operation mode of the e-motor.</li> <li>- EMS Test with keeping the worst-case deviation for all active parameters during the full dwell time.</li> </ul>
V4.60	<p>ELEMC-5GS - 5G Signaling:</p> <ul style="list-style-type: none"> <li>- Support for FR2 SA (standalone) mode.</li> </ul>
V4.60	<p>ELEMI-A:</p> <ul style="list-style-type: none"> <li>- Support of combination of graphics per range and separate antenna measurement.</li> </ul>
V4.60	<p>EMS – EUT Monitoring:</p> <ul style="list-style-type: none"> <li>- Support of frequency dependent limit line alternative to constant NoGo threshold.</li> <li>- Support of Reference Value for measurement result evaluation.</li> <li>- Support for setting Y-axis scaling to default LOG mode</li> </ul>
V4.60	<p>EMS Test Report:</p> <ul style="list-style-type: none"> <li>- A new checkbox 'Exclude row(s) without results' is available for the 'Overview', evaluation and merged tables in order to exclude rows without results from printing in the report.</li> </ul>
V4.60	<p>EMS Test / EMI Test:</p> <ul style="list-style-type: none"> <li>- The default arrangement of the test graphics can now be selected in tab</li> </ul>



	'Graphics' of Administration / Settings / Graphics with setting 'Default Arrangement of Test Graphics'.
V4.60	EMI Test / Maximization: - The Maximization step now supports continuous height and azimuth movement of the accessories.
V4.60	Test Template View: - A new control 'Open test configuration' allows now to create a new test not only directly from the test template with preconfigured settings, but also via the 'New Test' dialog which lets you configure the test settings (like selecting another EUT Monitoring template).
V4.60	Device Driver / Field Probes Driver: - Support for Wavecontrol SMP2 field probe - Support for virtual driver 'Combined Field Probe' to combine up to 4 single channel field probe sensors to a logical 4 channel instrument in order to calculate the average value.
V4.60	Device Driver / Oscilloscope Driver: - Acquisition mode 'Mask Test' is now supported for oscilloscope models R&S RTM 3002 and R&S RTM 3004.
V4.60	Device Driver / Network Analyzer Driver: - Support for R&S ZNH handheld vector network analyzer
V4.60	Device Driver / Generic CAN Inserter: - Support for application to insert EMS Test Level information into the CAN data stream. (Application Note available on request.)
V4.60	Device Driver / Generic Monitoring Driver: - Device communication via USB interface is now supported.
V4.60	Device Driver / Power Meter Driver: - R&S NRP two path RF probes NRP-Z211 and NRP-Z212 are now supported.
V4.60	Device Driver / Receiver Driver: - For RSE measurements, the receiver driver now supports automatic level adjustment via the preamplifier and the step attenuator of the R&S OSP-B155G hardware option of the R&S OSP switch unit.
V4.60	Device Driver / Remote Action Device: - In the 'Configuration' tab, 'Commands' section, the labels of the generic commands 'Action x' / 'Query x' can now be changed to better express the meaning of the commands assigned to them.
V4.60	Migration: - Added migration of EMC32 EMS MIL-STD CS103/104/105 templates.

### New function of software V4.51:

Version	Function
V4.51	Device Driver / Receiver driver: - For R&S receiver models FPL, the desired sweep type (Sweep, FFT, Auto) can now be set in the test template editor. - For R&S receiver models ESW, ESU, at input 2, the attenuation can now be set to 0 dB, with the pulse limiter being switched off automatically, if needed. A warning is displayed when the pulse limiter is switched off automatically.
V4.51	Device Driver: - Support for Narda NBM-550 field probe. - R&S UPP/UPV driver supports now unit dBFS for digital inputs.

- V4.51 Import of Reference Calibration tables from .CSV file:
- When importing a Reference Calibration table from a .CSV file, the test level units V and V/m are now supported.

### New function of software V4.50:

Version	Function
V4.50	<p>ELEMC-5GS - 5G Signaling:</p> <ul style="list-style-type: none"> <li>- Support of R&amp;S CMX500 Software version CSW 6.110.x / 6.120.x.</li> <li>- Special connection mode without no Resource Blocks for DL, control only.</li> </ul>
V4.50	<p>ELEMS-AMEX - Automotive / MIL-STD:</p> <ul style="list-style-type: none"> <li>- Support for generating 5G FR1 EMS test signals using R&amp;S SMM100A or R&amp;S SMW200A Vector Signal Generator in combination with R&amp;S NRQ6 RF Power Meter</li> </ul>
V4.50	<p>ELEMS-ABT - ABT Measurement &amp; Audio Analyzer drivers:</p> <ul style="list-style-type: none"> <li>- R&amp;S UPV: support of SINAD and THD measurement, digital inputs.</li> <li>- R&amp;S UPP: support of SINAD and THD measurement, digital inputs.</li> <li>- MCD: support of SINAD and THD measurement.</li> <li>- Audio Precision: support for device model APx517.</li> </ul>
V4.50	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Field Uniformity Evaluation now supports the calculation of the averaged field strength of 4 and more sensor positions according to ISO 11451-2 or comparable.</li> </ul>
V4.50	<p>Device Drivers:</p> <ul style="list-style-type: none"> <li>- R&amp;S SMW200: selection of output 1 or 2 is now supported.</li> <li>- R&amp;S SMA/B/C RF generators support now selection of modulation waveform shape between Sine and Square.</li> <li>- R&amp;S ZNL Network analyzer is now supported.</li> <li>- Receivers support setting of external reference.</li> <li>- Support for CPI TWT amplifiers using TN-ETHERNET-1 protocol.</li> <li>- R&amp;S RF probes via USB or NRX/NRP: sensor information is now added to the detailed device report.</li> <li>- Support for emtest CWS500N2 using ELEMC-DRV Generic Drivers.</li> <li>- Raditeq field sensor with 4 plug-in modules is now supported.</li> </ul>
V4.50	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- Reusing overview measurements from a main test for further tests with different limit lines is now supported.</li> <li>- Rename of LISN line labels is now supported.</li> </ul>
V4.50	<p>RSE - Wireless Measurements in mm-Wave Frequency Range:</p> <ul style="list-style-type: none"> <li>- Improved management / support for external mixers.</li> <li>- Support for measurement bandwidth 100 MHz and 200 MHz.</li> </ul>
V4.50	<p>EMI / EMS Measurements:</p> <ul style="list-style-type: none"> <li>- Check EUT State Action using remote device driver is now supported.</li> </ul>
V4.50	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- Support for adding a graphics with different zoom settings to the report.</li> </ul>
V4.50	<p>Device Drivers / Generic Generator Driver</p> <ul style="list-style-type: none"> <li>- Communication protocol HiSLIP is supported.</li> <li>- In the 'Configuration' tab, 'Parameters' section, the new device parameters 'Use PULM Period' and 'PULM Period Unit' are now available to support special use cases.</li> <li>When 'Use PULM Period' is set to 'Yes', then a pulse frequency to be set at the generator is first converted to its corresponding pulse period which is then used to program the generator.</li> </ul>

**New function of software V4.42:**

Version	Function
V4.42	EMI / EMS Test: - When restarting an open test and a message box is shown that the measurement results will be cleared on test start, the clearing can now be skipped by clicking the new 'Ignore' button.
V4.42	Device Drivers / Mast and Turntable Controllers: - Support for Innco CO3000 controller with FW >= V1.03.29, to read also the tilt mast state from the controller.

**New function of software V4.41:**

Version	Function
V4.41	Device Drivers / Radio Communication Tester Driver: - The CMX driver now supports in the 'NR Scheduling' and 'LTE Scheduling' settings for custom scheduling settings (checkbox 'Default Scheduling' unticked) with the new checkbox 'No RBs for Downlink', to disable the creation of RBs for the downlink.

**New function of software V4.40:**

Version	Function
V4.40	ELEMS-ABT – 'EMS Audio Breakthrough Measurements Extension' (new article) - Support for Audio Analyzer R&S UPV, R&S CMW Audio Board and MCD Elektronik Audio Analyzer as EMS EUT Monitoring devices. - Support for Audio Breakthrough Calibration according to ETSI 301 489-52. - Support for Audio Breakthrough EMS Test with optional NB/BB Evaluation according to ETSI 301 489-52 for cellular technologies (5G, 4G, 3G, 2G). Radio Communication Test option is required.
V4.40	ELEMC-5GS - 5G Signaling - Support for resource block assignment and modulation scheme (RMC) - TDD switching for FR2 TDD connections (only 1 remote radio head necessary) - Support for VoLTE (NSA) and VoNR (SA) - Support of R&S CMX500 Software version CSW 6.90.xx equal or higher than 6.90.59 - Support for CSWL * Support for 2G/3G/4G/BT/BTLe/WiFi
V4.40	ELEMS-C345 – 'EMS MIL-STD CS103/104/105 Extension' (new article) - Support of EMS tests on receiver ports according to sections CS103/104/105 of MIL-STD 461 E/F/G - Support for primary and secondary RF generator and EUT stimulus generator
V4.40	ELEMC-REM – 'Remote Control Interface Extension' (new article) - Allows external applications to remotely control an EMI/EMS/CAL test. - Supports remote stop, start, pause, resume, open, saving of tests. - Supports fetching of live measurement results
V4.40	ELEMC-TLA – 'Test List Automation' - Support for actions to be defined in the test plan on start and end of a test step.
V4.40	EMS Measurements (ELEMS-C, -R) - EUT Monitoring: Support to combine charts of same unit - Amplifier Test: support of selection to measure P1dB, P2dB or P3dB.
V4.40	EMS Automotive Measurements (ELEMS-AMEX) - EUT Monitoring, EMCAN64: Support for No-go evaluation of Environment

	<p>Variables</p> <ul style="list-style-type: none"> <li>- Support for ISO 7637 Test Pulse-A with R&amp;S HMF2550</li> <li>- Support for dual modulation AM+PULM with R&amp;S SMA100, R&amp;S SMB100, SMM100 and R&amp;S SMCV.</li> <li>- RADAR waveforms: detailed waveform parameters are now added to the report.</li> </ul>
V4.40	<p><b>New Actions</b></p> <ul style="list-style-type: none"> <li>- Set RF Generator to a defined setup (not frequency tracking)</li> <li>- Send Remote command via Generic Monitoring driver</li> </ul>
V4.40	<p>Support for the following devices:</p> <p><b>Generators</b></p> <ul style="list-style-type: none"> <li>- Support for R&amp;S SMM100A Vector Signal Generator</li> </ul> <p><b>Oscilloscopes</b></p> <ul style="list-style-type: none"> <li>- Support for R&amp;S RTO6x Series</li> </ul> <p><b>Receivers</b></p> <ul style="list-style-type: none"> <li>- Support for R&amp;S FSVR7/13/30/40 Real-time spectrum analyzer models</li> <li>- Auto Ranging – support for smaller steps than 10 dB (depending on model)</li> </ul> <p><b>Antenna Towers</b></p> <ul style="list-style-type: none"> <li>- Incco CO3000 support for reading tilt parameters (requires newer firmware)</li> </ul> <p><b>Slidebars</b></p> <ul style="list-style-type: none"> <li>- Support for Maturio MCU Slidebar</li> </ul> <p><b>Switch Unit</b></p> <ul style="list-style-type: none"> <li>- Support for ADAM device as switch unit</li> </ul>
V4.40	<p><b>Migration Tool:</b></p> <ul style="list-style-type: none"> <li>- Added migration of EMC32 EMI test templates of several subfolders.</li> <li>- Added migration of EMC32 EUT monitoring templates</li> </ul>
V4.40	<p><b>Device Drivers / Amplifier BBA Driver</b></p> <ul style="list-style-type: none"> <li>- Support for amplifier firmware V4.30 to improve stability in device communication.</li> </ul>
V4.40	<p><b>EMS Test Template Editor:</b></p> <ul style="list-style-type: none"> <li>- When in a 'Anechoic Chamber' test the test method 'Reference Calibration' is selected, an additional 'Data evaluation' can now be enabled in the 'Measurement Flow' section. In the section "Flow Details - Data Evaluation", tab "Data Evaluation", loop parameters are then available for combining and displaying the results.</li> </ul>
V4.40	<p><b>Device Drivers / Network Analyzer Driver</b></p> <ul style="list-style-type: none"> <li>- Communication protocol HiSLIP is supported.</li> </ul>
V4.40	<p><b>Device Drivers / Generic Antenna Tower Driver</b></p> <ul style="list-style-type: none"> <li>- In the 'Configuration' tab, 'Parameters' section, the new device parameter 'Is Antenna Stand' is now available to better support antenna masts that are only antenna stands.</li> </ul>
V4.40	<p><b>Device Drivers / Generic Driver</b></p> <ul style="list-style-type: none"> <li>- In the 'Configuration' tab, 'Parameters' section, the new device parameter 'SCPI Command Separator' is now available to enable an individual separator that differs from the standard semicolon(';') to support (multi-line) commands that use the semicolon as part of the command string.</li> </ul>

## 1.2 Modified functions

The following table lists the modified functions and indicates the version in which the modification was carried out:

### Modifications of software V5.02:

since	Function
V5.02	<p>EMI Test Template:</p> <ul style="list-style-type: none"> <li>- In Receiver settings, 'Spectrum Analyzer' mode, the field 'Reference Level' is no longer restricted in upper value. If the set level is not supported by the device when programmed, the maximum possible value is automatically detected and used instead on the device. In case of an adaptation, the adapted value is then shown in the settings.</li> </ul>
V5.02	<p>EMI Test / System Check:</p> <ul style="list-style-type: none"> <li>- When in the test template a hardware setup with a configured system check part is used, but system check is not enabled in the template, the devices associated with the system check will no longer be validated.</li> <li>- When using the system check with the 'Direct Connection' setting, a new checkbox is now available to select whether the RX transducer correction should be included when calculating the TX generator level.</li> </ul>
V5.02	<p>EMI Test / Using separate charts for H/V:</p> <ul style="list-style-type: none"> <li>- Re-running the test will overwrite the existing result tables.</li> </ul>
V5.02	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When creating / running an EMI test, limit lines for all globally activated detectors are now displayed in the measurement chart when used in activated frequency ranges that contain data for those detectors.</li> <li>- When using function 'Set Reference' via the context menu of result tables, the name of the created reference object now contains the timestamp when creating the reference object.</li> <li>- The overwrite warning on re-running a test is no longer shown, if the overview trace was set as reference before the new measurement is started.</li> </ul>
V5.02	<p>EMS/EMI Tests:</p> <ul style="list-style-type: none"> <li>- When using separate antenna measurement, only the devices used by the frequency ranges of the active antenna in the test flow control are checked in the communication check.</li> </ul>
V5.02	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When Modulation Sequence is active, only the user defined modulation name is used for result table names.</li> <li>- EMS ABT measurement: communication link to mobile can optionally be kept at test end.</li> <li>- Susceptibility Mode: while the frequency scanning is paused, no threshold evaluation is done.</li> <li>- Interactive Measurement: when changing a frequency range, the current test level is persisted as long as the level limit is not exceeded.</li> </ul>
V5.02	<p>EMS / EUT Monitoring Test Template:</p> <ul style="list-style-type: none"> <li>- In EMS Accessory Settings, the loop parameter 'User Defined' can now be set to a higher priority than Frequency.</li> <li>- Not active EUT Monitoring channels are not added to the report.</li> </ul>
V5.02	<p>CAL Test:</p> <ul style="list-style-type: none"> <li>- When running a calibration and saving the resulting calibration table data, an overwrite warning is now displayed if the target table already exists.</li> </ul>
V5.02	<p>Device Driver / Antennas:</p> <ul style="list-style-type: none"> <li>- When using an IO Device for the polarization control of an antenna configured</li> </ul>

in the hardware setup of a test, its current polarization state is now automatically read via the driver and will be used as the initial state when starting a test run.

V5.02	<p>Device Drivers / Mast and Turntable Controller:</p> <ul style="list-style-type: none"> <li>- Frankonia FC05 Turntable: maximum azimuth range extended to +/-400 deg. Logical values 1-10 of movement speed are converted to the range 1-30 when programmed to the device.</li> <li>- Maturu MCU: timing for setting a new height was improved.</li> </ul>
V5.02	<p>Device Drivers / Amplifiers:</p> <ul style="list-style-type: none"> <li>- R&amp;S BBA130/150: the power on/off buttons in the test dialog are now disabled since this function is not supported by the amplifier.</li> </ul>
V5.02	<p>Device Drivers / RF Generators:</p> <ul style="list-style-type: none"> <li>- R&amp;S SMCV100: frequency range is extended down to 4 kHz.</li> <li>- The Generic RF Generator driver supports now 'V' as level unit.</li> <li>- R&amp;S SMR without attenuator: sending a command to set the attenuator to AUTO mode is now removed to avoid a device missing option error message.</li> <li>- R&amp;S SMF100A: support for LF generator 1 as AM source has been added.</li> </ul>
V5.02	<p>Device Driver / Field Probes:</p> <ul style="list-style-type: none"> <li>- AR-FL70xx / FL80xx: the minimum frequency has been extended to 10 kHz for newly added devices.</li> <li>- Lumiloop: the laser status is now evaluated on starting a test.</li> </ul>
V5.02	<p>Device Driver / Power Meters / NRX + NRP probes:</p> <ul style="list-style-type: none"> <li>- The averaging count for PULM continuous signals has been extended in order to improve the accuracy of the measurement result.</li> </ul>
V5.02	<p>Device Drivers / Switch Unit BBA:</p> <ul style="list-style-type: none"> <li>- Support for older BBA150 FW 2.65 added.</li> </ul>
V5.02	<p>Device Drivers / Generic Switch Unit:</p> <ul style="list-style-type: none"> <li>- A command string length of up to 960 characters is now supported.</li> </ul>
V5.02	<p>Device Drivers / Generic Monitoring Driver:</p> <ul style="list-style-type: none"> <li>- The result evaluation parameter to 'Remove Header Characters' has been now replaced by the standard evaluation for Generic Drivers. This allows now beside deleting header characters also to split the result by a character and take result x as measurement result, e.g. '2@;2', remove first two characters, split by ';' and take result with index 2 (starting at index 1).</li> </ul>
V5.02	<p>Device Drivers / Generic Oscilloscope:</p> <ul style="list-style-type: none"> <li>- The generic oscilloscope driver supports now in configuration of command 'Channel Bandwidth' the additional bandwidth settings 150/250/300MHz. If you do not want to use a specific bandwidth, leaving the command string blank will hide that bandwidth from the list of available bandwidths displayed in the drop-down box in the oscilloscope settings.</li> </ul>
V5.02	<p>Device Drivers / General - Connection Tab</p> <ul style="list-style-type: none"> <li>- The selection for network card index has been removed since it is not required.</li> <li>- Using ETX as end character will automatically add STX as first command string parameter.</li> </ul>
V5.02	<p>Search Views / Tests:</p> <ul style="list-style-type: none"> <li>- In view 'Tests', for the selected test, the date of the last test run is now shown in the 'Details' section.</li> </ul>
V5.02	<p>Data Exchange Interface – ELEM-DEX:</p> <ul style="list-style-type: none"> <li>- Endpoints to retrieve test related data return now additional fields.</li> </ul>
V5.02	<p>Notification of data changes:</p> <ul style="list-style-type: none"> <li>- When a tab is activated in the user interface that displays data that has been changed in another tab (or via an remote client), this change and reloading of</li> </ul>

	the data is no longer notified with a modal dialog, but is only displayed in the status bar.
V5.02	PC Memory: - Usage of PC system memory has been improved.

### Modifications of software V5.01:

since	Function
V5.01	UI Performance: - UI performance has been improved for databases with a large number of tests and EUTs.
V5.01	PC Memory: - Usage of PC system memory has been improved.
V5.01	Configuration Wizard: - Template for ISO11452-8 standard have been updated and do no longer use oscilloscope devices as power meters. - Update and extension of EMI standard data, primarily for automotive applications..
V5.01	EUT Editor: - Expanding / collapsing of folders is now supported not only by clicking in the icon area. - Drag and drop of multiple selections of test steps is now supported. - Copying a folder with all test steps adds the folder name to the test step names. - When a folder in the test plan is renamed, all test steps contained in that folder whose names begin with the folder name as a prefix receive the same prefix rename. - The message box showing that the EUT is updated now automatically fades away after some time.
V5.01	EUT / Saving a Test: - When saving a test, the test can now be saved with a name that already exists in the EUT, allowing direct overwriting of an existing test step in the EUT.
V5.01	Test Template Editors: - EMS Editor behavior on adding new frequency ranges has been improved. - EUT Monitoring editor now allows to set the upper and lower limit for NoGo on 'Outside Limit Range' to identical values.
V5.01	Table Editor: - Section of table cells via keyboard (including shortcuts) improved.
V5.01	Search Views: - Additional column 'TestSite' is now displayed in view 'Tests'. - Improvements to searching by keywords and searching within tags assigned to items.
V5.01	EMS Susceptibility Measurement: - The layout of the Critical Points table has been extended as follows: a) first level column containing the threshold level has now got this name. b) columns for the Target Test Level and Margin (difference Target Test Level and Threshold Level) have been added. c) column with the monitoring result value for the threshold level has been renamed to NoGo / Go value and is showing the monitoring result with unit and higher resolution.
V5.01	EMS Evaluation: - Loop parameter charts for Polarization loop will show for EMS Application set to "Commercial (IEC)" a combined H+V chart, while separate H/V charts will be shown for "Automotive/MIL-STD".

	<p>EMS Antenna Port Test:</p> <ul style="list-style-type: none"> <li>- The specific parameter settings for the excluded band has been removed since the excluded band table is now enabled for user defined settings.</li> <li>- The frequency calculation equation for GEN 2 is now fixed to <math>(f_0 + f_1) / 2</math>.</li> <li>- Monitoring of the Sensor Level for EUT Generator is now supported even if the EUT Generator is not active.</li> <li>- The f2 result table column is now populated already when creating the test.</li> <li>- When using additional charts for RF generator 2 containing the test levels, the sensor level or the generator level of RF generator 2 over the generator 2 frequency will now be shown.</li> </ul> <p>In order to activate this feature for existing test templates, change in the 'Specific Data' tab the 'Test Standard' selection box temporary to another standard and back to force the update. If the update is successful, only one User Evaluation System Monitoring channel is shown in the test template.</p> <ul style="list-style-type: none"> <li>- The leveling algorithm has been modified to increase the RF generator level 2 accuracy.</li> <li>- For the definition of the test level of a frequency range, from this version onwards, only the test level mode setting "Level Table defined by Limit Line" is supported.</li> </ul>
V5.01	<p>EMS ABT Measurements:</p> <ul style="list-style-type: none"> <li>- The NB / BB frequency shift for GSM tests has been changed from 200/400 kHz to 400/500 kHz to be aligned with the ETSI standard.</li> <li>- Check for normalization tables in "Audio Breakthrough Calibration" removed.</li> <li>- Revised implementation: <ul style="list-style-type: none"> <li>- All NB/BB measurements give extensive feedback in the "TestFlow.txt" log.</li> <li>- Improved feedback for manual setup of voice calls.</li> <li>CMX does ask for channel bandwidth in case of manually setup connections.</li> </ul> </li> <li>- User Manual updated</li> </ul>
V5.01	<p>EMS Reverberation Chamber:</p> <ul style="list-style-type: none"> <li>- Using 'Separate Antenna' feature is now supported for EUT Test as well.</li> </ul>
V5.01	<p>EMS / EMI Test:</p> <ul style="list-style-type: none"> <li>- Support to automatically remove the gaps between sections of subranges in traces of a measurement graphic.</li> </ul> <p>This function can be enabled via the new Checkbox 'Auto-connect adjacent frequency range sections in a trace' in tab 'Graphics Settings' section 'General Settings' of the test template.</p> <ul style="list-style-type: none"> <li>- When a results table is copied within the test, the table will no longer automatically open in the table section of the test.</li> </ul>
V5.01	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- Now only measurement traces and limit lines of active detectors and frequency ranges are added to the measurement charts to avoid unnecessary traces.</li> </ul>
V5.01	<p>EMI Test / Graphics Auto Scaling:</p> <ul style="list-style-type: none"> <li>- When a R&amp;S ESW with activated notch filters is used as a receiver device in the measurement setup and a measurement graphic is automatically scaled, the autoscaling algorithm no longer takes the very low levels in the notch range into account, which leads to a better visual result.</li> </ul>
V5.01	<p>Test Graphics / Spectrogram</p> <ul style="list-style-type: none"> <li>- Lin/log scaling of the Spectrogram graphic x-axes has been improved.</li> <li>- Usability of Spectrogram graphic has been improved.</li> </ul>
V5.01	<p>Test Graphics / Auto Scaling:</p> <ul style="list-style-type: none"> <li>- Adding a new trace to an existing chart with traces will not trigger the auto scaling.</li> </ul>
V5.01	<p>Test Graphics / EMI Charts:</p> <ul style="list-style-type: none"> <li>- Default trace color for MaxPk detector is changed to darker color in order to improve the contrast for worker traces with few frequency points. In order to get this new color schema, reset the trace colors to default style.</li> </ul>



V5.01	<p>Device Drivers:</p> <ul style="list-style-type: none"> <li>- R&amp;S CMX OBT driver now requires installed firmware 7.40.0.255. BLER measurement improved.</li> <li>- R&amp;S AdVISE driver now sends the test level information with the same unit as selected for the Test Level system monitoring channel.</li> <li>- Default communication port of Frankonia controller is now changed to 2055.</li> <li>- R&amp;S HMF25xx supports now serial interface (includes USB via virtual COM port).</li> </ul>
V5.01	<p>Device Driver / Field Probes:</p> <ul style="list-style-type: none"> <li>- Narda EP60x field probe driver supports now setting of speed filter. Check your existing test templates and save them with recommended F4 speed setting.</li> <li>- EMCenter field probe drivers supports now probes up to 40 GHz.</li> <li>- From this version onwards, the driver for the Narda EP60x supports switching the internal frequency correction on / off. Please adapt your settings in the driver properties accordingly.</li> <li>- Support for EMCenter with two new drivers, one for battery powered and one for laser-power probes. Please update to the new drivers in case you are using an older driver.</li> <li>- FM7004 field probe: only the active channels (1 to max. defined channels) are now queried during the measurement.</li> </ul>
V5.01	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- When in a report template the 'Test Template' component is selected, the comment column of the frequency range table is now also shown in this table in the report.</li> </ul>
V5.01	<p>Central Database:</p> <ul style="list-style-type: none"> <li>- Users of other roles than 'admin' can now also log-in to the ELEKTRA instance running as central data base server.</li> <li>- It is no longer necessary to assign an individual instance name to a remote client. A unique instance name is now automatically assigned when a client connects to the central database.</li> </ul>
V5.01	<p>Data Exchange Interface – ELEM-DEX:</p> <ul style="list-style-type: none"> <li>- Endpoints to retrieve test related data return now additional fields.</li> <li>- Added support for reading additional tables displayed in section 'Test Content' of a test.</li> </ul>
V5.01	<p>Beta versions:</p> <ul style="list-style-type: none"> <li>- The validity period to install a beta version is now extended to 90 days.</li> </ul>

### Modifications of software V5.00:

since	Function
V5.00	<p>EMS Test Template:</p> <ul style="list-style-type: none"> <li>- "EMC Standard" selection box has been renamed to "EMS Application". Also the "Generic Standard" entry is removed and handled now by "Commercial (IEC)".</li> <li>- The range table shows now a line number and each range supports a comment field similar to EMI Test Templates.</li> <li>- Additional Sensor Channels table is now show to extend in case of Anechoic Chamber measurement the Sensor Level system monitoring channel for further field probe channel or axis system monitoring channels.</li> </ul>
V5.00	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When in a BCI test the levelling mode on 'Sensor' is used with activated 'Power Level Limitation', a measured sensor level below noise level generates now only a warning message and the test run continues.</li> <li>- The limits for Sensor Level Limitation by value have been extended to <math>\pm 200</math>.</li> <li>- EMCAN: channel name validation rule added to check that the channel name is identical to the selected monitoring parameter.</li> </ul>

V5.00	<p>EMS Test MIL-STD 461 CS103/4/ Antenna Port Tests:</p> <ul style="list-style-type: none"> <li>- The setting of the EUT test level for the 2<sup>nd</sup> interferer and the EUT Stimulus 3<sup>rd</sup> generator is now generated based on the measured sensor levels. This improves the level accuracy.</li> </ul>
V5.00	<p>EMI Test Template Editor / Adjustment Settings / Maximization Settings:</p> <ul style="list-style-type: none"> <li>- In section 'Flow details – Adjustment' the settings to be used for the measurement can be selected in the 'Adjustment Settings'. The default setting is now 'Settings (Zoom)'.</li> <li>- In section 'Flow details – Maximization' the settings to be used for the measurement can be selected in the 'Maximization Settings'. The default setting is now 'Settings (Zoom)'.</li> </ul>
V5.00	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When creating a graphic from a (final) result table in a test, the 'Attachments' column, which was sometimes erroneously offered in the selection dialog, is no longer displayed.</li> </ul>
V5.00	<p>R&amp;S ELEKTRA Application Server (Central Database Server):</p> <ul style="list-style-type: none"> <li>- Improved long-term stability and diagnostic functions.</li> </ul>
V5.00	<p>Import:</p> <ul style="list-style-type: none"> <li>- When importing a 'golden' test template, the import mode 'overwrite' is now used as default for the contained limit lines.</li> </ul>
V5.00	<p>Test Automation:</p> <ul style="list-style-type: none"> <li>- Support EMS Test Automation using Manual Amplifier.</li> </ul>
V5.00	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- When a logo is configured in a report template at right hand side in the header or footer section, the logo is now also right-aligned at that position in the rendered report.</li> <li>- When exporting a Report from the EUT view, the name proposed as the file name is now the test name (and same as when exporting from the open test).</li> </ul>
V5.00	<p>Device Driver / Amplifiers:</p> <ul style="list-style-type: none"> <li>- Setting of the termination character is now available for the Generic Amplifier driver.</li> </ul>
V5.00	<p>Device Drivers / Field Probes:</p> <ul style="list-style-type: none"> <li>- Switch off time for Narda EP60x probes extended to 30 minutes.</li> <li>- Narda EP6xx: support for field probe base address change for operation via SB-10 multiplexer added.</li> <li>- Raditeq RadiSens devices are consolidated to the 20xx driver for all corresponding probe models. Addition the setting of the measurement speed is now supported.</li> <li>- The header name of the linearity correction table has been improved to clearly indicate that in this column the delta between the expected and measured field strength has to be added. Additional an extrapolation to 0 V/m is done automatically and needs not to be added to the table.</li> </ul>
V5.00	<p>Device Drivers / Generic Field Probes:</p> <ul style="list-style-type: none"> <li>- The generic field probe driver now also supports the end char setting 'CR LF'.</li> </ul>
V5.00	<p>Device Drivers / Generic Monitoring Driver:</p> <ul style="list-style-type: none"> <li>- The measurement result string is now first parsed for system commands like 'WAIT' or 'RFOFF' before doing further result string evaluation defined in the driver "Measurement Result Queries" tab (delete header characters, string for '0').</li> </ul>
V5.00	<p>Device Drivers: RF Generators</p> <ul style="list-style-type: none"> <li>- VSG available in EMS base licenses for analog modulations.</li> <li>- R&amp;S SMB100B: switching back to Attenuator AUTO mode to improve device performance. Update to FW 5.10.121.40 is highly recommended.</li> <li>- R&amp;S SMT driver now maintains a level reserve of 6 dB to the maximum level when doing AM Test in order not to exceed the level range.</li> <li>- R&amp;S SMB100B driver now supports frequencies down to 8kHz.</li> </ul>

	<ul style="list-style-type: none"> <li>- R&amp;S SMT driver now maintains a level reserve of 6 dB to the maximum level when doing AM Test in order not to exceed the level range.</li> </ul>
V5.00	<p>Device Drivers / Mast and Turntables:</p> <ul style="list-style-type: none"> <li>- Generic Antenna Tower and Generic Switch Unit support now usage of the device driver sharing the same VISA resource in one test.</li> <li>- Support for R&amp;S RST and RSM devices added.</li> </ul>
V5.00	<p>Device Drivers / Power Meters:</p> <ul style="list-style-type: none"> <li>- When a test run ends, the driver now sends an additional 'device clear' message to the instrument before disconnecting.</li> </ul>
V5.00	<p>Device Drivers / Radio Communication Tester:</p> <ul style="list-style-type: none"> <li>- Support for monitoring quantity 'Throughput in percent' for R&amp;S CMX added.</li> </ul>
V5.00	<p>Device Drivers / System Control:</p> <ul style="list-style-type: none"> <li>- More than one system control driver instances can now be added to the device list. For switch action on ELEKTRA start up and shutdown the driver marked as favorite is used. During a test the driver assigned to the hardware setup is used.</li> </ul>
V5.00	<p>Beta versions:</p> <ul style="list-style-type: none"> <li>- The period until the beta versions expire is now 180 days.</li> </ul>

#### Modifications of software V4.61:

since	Function
V4.61	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Validation rule added to output a warning when amplifier saturation check is activated in a field uniformity measurement added (measurement time extension).</li> <li>- EMS Tests using R&amp;S NRX with NRP-Z81 RF probes for leveling with AM modulation on. The aperture time setting of the power meter is now synchronized with the modulation frequency to improve the measured signal accuracy.</li> <li>- ABT Measurement: support for setting up the communication link manually with the R&amp;S CMW500.</li> <li>- ABT Measurement: support for just setting up the communication link with the R&amp;S CM500 without doing a measurement on the CMW.</li> <li>- Using an IO Device as GTEM positioner is now supported for EMS tests.</li> <li>- Susceptibility Method: when the target test level cannot be reached due to forward power limitation unnecessary test level steps are now skipped.</li> </ul>
V4.61	<p>EMS Measurement + System Control:</p> <ul style="list-style-type: none"> <li>- Added support for RF ON/OFF trigger actions.</li> </ul>
V4.61	<p>EMS – EUT Monitoring:</p> <ul style="list-style-type: none"> <li>- Validation rule added to check for Audio Analyzer primary / secondary channel setting.</li> <li>- Audio Analyzer now forces "Trigger before Dwell Time" start setting.</li> </ul>
V4.61	<p>EMI Test Template:</p> <ul style="list-style-type: none"> <li>- In Receiver settings, the field 'Time per Point' has been renamed to 'Meas. Time' to conform to the wording of result tables and the report.</li> </ul>
V4.61	<p>EMI Test / RSE Measurement:</p> <ul style="list-style-type: none"> <li>- The warning message shown sometimes in Receiver 'Settings (Final)' for field 'Points' has been improved to better indicate suitable settings for an optimized burst evaluation.</li> </ul>
V4.61	<p>EMI Test / Receiver Protection:</p> <ul style="list-style-type: none"> <li>- When 'Auto' attenuation is used in the Receiver settings, the intermediate step of 10 dB attenuation included when switching is now only used when required.</li> </ul>

	CAL Test:
V4.61	<ul style="list-style-type: none"> <li>- The calibration measurement now supports results tables with up to 20,000 measuring points.</li> <li>- The attenuation and normalization tables are now stored in a storage-optimized format in which for tables with more than 1000 rows the measurement points with a difference of less than 0.05 dB in level or 0.05 deg in phase to their neighbors are removed to save space and to improve performance.</li> </ul>
V4.61	<p>ABT CAL:</p> <ul style="list-style-type: none"> <li>- Measurement time of calibration measurement improved.</li> <li>- Support of downlink reference measurement with optional acoustic calibrator.</li> <li>- The communication link is now persisted until the test is closed.</li> <li>- The communication link can now be optional setup manually.</li> </ul> <p>ABT Measurement:</p> <ul style="list-style-type: none"> <li>- RXQUAL measurement for GSM ABT has been improved to avoid unintended sound disturbance.</li> </ul>
V4.61	EUT Editor:
	<ul style="list-style-type: none"> <li>- ABT calibration results are now added to the EUT report section if used.</li> </ul>
V4.61	<p>Device Drivers / Network Analyzer Driver:</p> <ul style="list-style-type: none"> <li>- Supported frequency range of R&amp;S ZNB20 adapted according to the datasheet.</li> </ul>
V4.61	<p>Device Drivers / Generator driver:</p> <ul style="list-style-type: none"> <li>- R&amp;S SMB100B: Level setting is now back from ALC Table Mode to ALC Auto Mode.</li> <li>- R&amp;S SMA100A: Pulse Modulation is now supported with the base model.</li> <li>- R&amp;S SMB100B: FW version 4.90.049.62 or higher is now mandatory.</li> </ul>
V4.61	<p>Device Drivers / Mast and Turntable Controller:</p> <ul style="list-style-type: none"> <li>- Maturo NCD: tilt mast support has been improved.</li> <li>- Frankonia Turntable: maximum azimuth range extended to +/-200 deg.</li> </ul>
V4.61	<p>Device Drivers:</p> <ul style="list-style-type: none"> <li>- Add support for USB interface for generic drivers (RF Generator, Power Meter, Amplifier, Scope).</li> <li>- Raditeq field probe: change filter from 3 to 10.</li> <li>- R&amp;S CMW: support for WCDMA packet switched.</li> <li>- R&amp;S CWM: throughput in percent is now supported for LTE.</li> <li>- R&amp;S CMW: connection from RMC to RHSPa changed for WCDMA.</li> </ul>
V4.61	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- The Report Logo selection for the report now also supports files in PNG format.</li> </ul>
V4.61	<p>User Interface:</p> <ul style="list-style-type: none"> <li>- Units with 'μ' character like 'dBμV' can now be entered also with 'u' instead of 'μ'.</li> </ul>
V4.61	<p>Configuration Wizard:</p> <ul style="list-style-type: none"> <li>- ABT Measurement templates have been updated.</li> </ul>

### Modifications of software V4.60:

since	Function
V4.60	<p>EMI RSE Test:</p> <ul style="list-style-type: none"> <li>- The 100 MHz detector function uses now the antenna and cable factor correction for the individual frequencies before the integration step instead of using the center frequency correction after the integration step.</li> </ul>
V4.60	<p>EMI Test / EMS Test:</p> <ul style="list-style-type: none"> <li>- The user interface of the frequency control in the test has been modified to improve usability. See user manual for more details.</li> </ul>

	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- By default the data evaluation charts are now updated after each loop completion (e.g. modulation loop, polarization loop) while this was done in the previous version only after the complete measurement.</li> </ul>
V4.60	<p>The new checkbox 'Merge results after each accessory loop' in the 'Data Evaluation' section of an EMS test template allows to set this behavior.</p> <ul style="list-style-type: none"> <li>- Reporting: adding of local reference calibration tables to the report is now supported.</li> <li>- The power limit for closed loop BCI tests (typically defined by the reference calibration table) is now adapted for the peak conservation detector when a modulation sequence is activated during the EUT Testing in addition.</li> </ul>
V4.60	<p>Calibration Test Template:</p> <ul style="list-style-type: none"> <li>- When a new attenuation table is selected in a calibration template, the minimum/maximum frequency of the template is now only adapted if the frequency range of the selected table is narrower than the currently set minimum/maximum frequency of the template.</li> </ul>
V4.60	<p>EUT Monitoring:</p> <ul style="list-style-type: none"> <li>- EMS Level Information are now forwarded to EUT Monitoring with the same detector as used in the Test Level channel.</li> <li>- Charts containing more than one channel traces are using now different trace styles.</li> <li>- In the test template channel settings, 'Options' tab, the checkbox 'Set as primary graphic for combined channels' was removed.</li> </ul>
V4.60	<p>Administration / Settings:</p> <ul style="list-style-type: none"> <li>- The various settings tabs in the 'Administration' menu are now grouped under the new 'Settings' node for a better overview.</li> </ul>
V4.60	<p>Administration / Data Management / Database:</p> <ul style="list-style-type: none"> <li>- The configuration to work with a central database has been simplified. See chapter 4.12.1.2 Database in the user manual for more details.</li> </ul>
V4.60	<p>Device Driver / Amplifier BBA150 driver:</p> <ul style="list-style-type: none"> <li>- Support for firmware V4.40 of R&amp;S BBA150.</li> </ul>
V4.60	<p>Device Driver / Power Meter drivers:</p> <ul style="list-style-type: none"> <li>- R&amp;S NRX driver now checks also for change of connected probes in terms of the serial number.</li> </ul>
V4.60	<p>Device Driver / Video Inserter:</p> <ul style="list-style-type: none"> <li>- The device category 'Video Inserter' has been renamed to 'Generic Inserter' and now also includes 'Generic CAN Inserter'.</li> </ul>
V4.60	<p>Device Driver / SMxx RF Generator Driver:</p> <ul style="list-style-type: none"> <li>- Programming of the modulation parameters to the device has been improved to avoid conflicts depending on the firmware installed on the device.</li> </ul>

#### Modifications of software V4.52:

since	Function
V4.52	<p>Beta versions:</p> <ul style="list-style-type: none"> <li>- The expiration date of a beta version is now displayed in the title bar after the version number.</li> </ul>

#### Modifications of software V4.51:

since	Function
V4.51	<p>EMI Test Template:</p> <ul style="list-style-type: none"> <li>- For function 'Repeat Measurement' option 'By Device', the selection option</li> </ul>

'Video' of the 'Averaging Mode' has been renamed to 'Logarithmic' to better match the terminology used on the receiver device.

V4.51	EMI Test / Data Reduction: - The content of section 'Data Reduction' of the 'TestFlow.txt' (available in 'Test Content' section of the 'Test Components' pane) now also shows intermediate reduction results for better understanding of the final critical points.
V4.51	EMS Test: - Various improvements for supporting ISO7637-4 testing (including HMF2550 RF Generator driver). - EMS Test Level and Antenna Forward Power are now forwarded to external applications using the same detector as in System Monitoring. - The default tolerance interval for the leveling has been changed to [0 .. +0.4 dB] in newly created test templates. - Antenna Port: Improved combiner icon in hardware setup scheme.
V4.51	Calibration Test Template: - When calibrating the attenuation table of a signal path the frequency range of the selected table is used for frequency range checking and not the signal path range.
V4.51	EUT Test Plan / EMS test template: - For a planned test step, the dwell time in the test step parameters can now be changed if the same dwell time is used throughout the assigned EMS test template.
V4.51	Import of Test Templates: - If only the option "Create new" (without the option "Use existing") is offered when importing a test template that already exists in the database, the reason for this is now more precisely stated in the import log.
V4.51	Device Drivers / Oscilloscope drivers: - The layout of the oscilloscope settings has been changed to better visualize the function of synchronizing the channel settings with the 'Use these settings for all channels' checkbox.
V4.51	Device Drivers / Audio Analyzer drivers: - The parsing of measurement results for digital input measurements has been improved for devices R&S UPV, UPP. - MCD adaptation for audio analyzer middleware improved.
V4.51	Device Drivers / AR amplifier driver SG / A series: - Added missing command for PowerOn.
V4.51	Device Drivers / ETS HI6x05 Field Probe Driver: - Changed the timing when connecting to the device to improve the stability of the communication.
V4.51	Device Drivers / EMCO2090 Mast and Turntable Controller: - The accuracy when reading the position and considering the tolerance has been improved to one decimal place.

#### Modifications of software V4.50:

since	Function
V4.50	EMS Test: - When running an EMS test with two frequency ranges and the 2nd range is measured before the 1st range, the already measured results are no longer deleted on measuring the 1 <sup>st</sup> range.
V4.50	EMS Test: - Level Sweep is now paused when the EUT Failure Evaluation dialog is active.

V4.50	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Report: BCI / CDN: only devices actively used during the test are reported in the hardware setup section.</li> </ul>
V4.50	<p>Device Drivers:</p> <ul style="list-style-type: none"> <li>- The Vector Signal Generator models SMCV100 and SGT100 can now be used with the EMS Base licenses (ELEMS-C and ELEMS-R).</li> </ul>
V4.50	<p>Device Drivers / Generator driver SMB100B:</p> <ul style="list-style-type: none"> <li>- Command sequence for programming the output level has been optimized for a more robust internal gain control.</li> </ul>
V4.50	<p>Device Drivers / R&amp;S SMxxx RF Generators:</p> <ul style="list-style-type: none"> <li>- The pulse generator output is now activated after setting new pulse parameters to avoid any settings conflict.</li> </ul>

### Modifications of software V4.42:

since	Function
V4.42	<p>Data Exchange Interface with Central Database:</p> <ul style="list-style-type: none"> <li>- When using ELEKTRA in a configuration with a central database, the DEX interface (REST API) can now be used on all client instances (not only on the central database client instance).</li> </ul>
V4.42	<p>Administration / User Admin:</p> <ul style="list-style-type: none"> <li>- Users with a role with disabled "Create Device" permission are now no longer able to copy devices (because they can't save them either).</li> </ul>
V4.42	<p>EMS Test Template:</p> <ul style="list-style-type: none"> <li>- When adding a new frequency range to the template, the current test level unit and modulation setting is now reused and only reset if really necessary.</li> </ul>
V4.42	<p>Search View / Tests:</p> <ul style="list-style-type: none"> <li>- The 'Name' field of a test only supports 120 characters. If a longer text is entered in this field, a corresponding warning message is now shown and the name cannot be saved.</li> <li>- When tests are detected that are not assigned to an EUT, a corresponding warning message is now shown and the associated tests are displayed in red in the list.</li> </ul> <p>Such tests can be reassigned to the EUT by clicking in the 'EUT' column and selecting the desired EUT. If the test cannot be reassigned due to ambiguous test or test step names, the corresponding names must first be corrected in the Search View / Tests and / or the EUT test plan editor.</p>
V4.42	<p>Search View / Test Templates:</p> <ul style="list-style-type: none"> <li>- The text in the 'Description' field of the 'Details' section only supports 240 characters. If a longer text is entered in this field, a corresponding warning message is now shown (since longer text is automatically truncated when saved).</li> </ul>
V4.42	<p>EUT Monitoring:</p> <ul style="list-style-type: none"> <li>- When using individual channels of the same oscilloscope in multiple EUT monitoring channels at a time, there is a new checkbox on the 'Measurement Parameters' tab of the oscilloscope settings to the left side of the label 'Horizontal'.</li> </ul> <p>If this checkbox is checked in an EUT monitoring channel, the horizontal settings of that channel are also used for the other channels and the label text changes to 'Horizontal (all channels)'. The other channels inherit that settings which is indicated by disabling their settings and changing the label text to 'Horizontal (inherited)'.</p>

V4.42	Device Drivers / Amplifier driver BONN / AR: - The command set used for BONN and AR amplifier models can partly now be edited to allow model specific adaptations if needed.
V4.42	Device Drivers / Generic Amplifier driver: - When the power of the amplifier is switched via the driver, the amplifier is now automatically switched on in addition, if not already on.
V4.42	Device Drivers / Generator families SML, SMR: - Command sequence to program the PULM modulation settings to the generator device has been improved.
V4.42	Device Drivers / Generator families SMR: - Command sequence to control SMRxx models without an RF attenuator option has been improved.
V4.42	Device Drivers / Generator families SML, SMR: - SCPI command sequence sent to the generator for setting PULM modulation has been improved.
V4.42	Device Driver / Maturio NCD/FCU Turntable Driver: - A positioning tolerance down to 0.5 degree is now supported.
V4.42	Remote operation via remote desktop connection: - Stability has been improved when using the ELEKTRA user interface via a Windows remote desktop connection.
V4.42	EMS Test / Leveling: - When leveling is started upwards in a new frequency range, the leveling will now stop with a message when the sensor level exceeds the target level but the forward power is still below the amplifier noise level.
V4.42	EMS Test Template: - A default Reference Calibration name is now required for radiated tests when a polarization loop with only one polarization is selected.
V4.42	Graphics / Auto-scaling: - The default value for the y-axis auto-scaling in Administration / Graphics Settings / Grid has been changed to disabled.
V4.42	Device Driver / Field Probe AR FL70XX: - The usage for frequencies up to 60 GHz is now supported.
V4.42	Device Driver / EMCO 2090 Turntable Driver: - A positioning tolerance down to 0.5 degree is now supported.
V4.42	Device Driver / SMxx RF Generator Driver: - Programming of the PULM modulation parameters to the device has been improved to avoid setting conflicts depending on previous settings.
V4.42	Device Driver / BBxxx Amplifier Driver: - The timing when programming the band switching has been improved (waiting time was sometimes too short depending on the amplifier system).

#### Modifications of software V4.41:

Version	Function
V4.41	EMS Test Template Editor: - Opening an EMS template containing a large number of EUT monitoring channels is now significantly faster.



V4.41	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When a message box is shown during a test run due to a 'Notify' action, waiting for the 'RF OFF' state has been improved for cases where the user clicks 'Continue' immediately.</li> </ul>
V4.41	<p>Graphics / Auto-scaling:</p> <ul style="list-style-type: none"> <li>- When using the y-axis auto-scaling, in addition to the measurement data, the limit lines shown in a graphic are now also taken into account for the calculation of the displayed section.</li> </ul>
V4.41	<p>Device Driver / Power Meter NRP</p> <ul style="list-style-type: none"> <li>- When establishing a connection to the device, the checkbox 'Cal. Valid until' is now no longer automatically filled with the calibration data read from the power meter and ticked.</li> </ul>
V4.41	<p>Generic Device Drivers:</p> <ul style="list-style-type: none"> <li>- When in the 'Configuration' tab, 'Commands' section, multiple command lines are entered for a logical command in field 'SCPI Command String', the execution mode set for that logical command is now applied as set for each command line separately.</li> </ul>

#### Modifications of software V4.40:

Version	Function
V4.40	<p>ELEMS-R / Field Uniformity Analysis according to EN 61000-4-3:2020:</p> <ul style="list-style-type: none"> <li>- When 5 sensor points are evaluated, all 5 points are now considered.</li> </ul>
V4.40	<p>ELEMI-5GFC / mm-Wave Measurement Method:</p> <ul style="list-style-type: none"> <li>- The final 2-/3-cut measurement is now independent of the EUT dimensions done with 15 deg steps for Theta and Phi. Therefore, the TRP value is increased with the proposed 1 dB TRP Sparsity Factor correction.</li> </ul>
V4.40	<p>Administration / User Admin</p> <ul style="list-style-type: none"> <li>- Support for User Management is now available also with licenses ELEMI-A / ELEMS-C / ELEMS-R</li> </ul>
V4.40	<p>ELEMC-REP – Report Customization Extension</p> <ul style="list-style-type: none"> <li>- The Report Customization Extension can now be used also with licenses ELEMI-A / ELEMS-C / ELEMS-R</li> </ul>
V4.40	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When an EMS test is stopped by a message box action, the RF power of the amplifier is also switched off</li> </ul>
V4.40	<p>EMI/EMS Test:</p> <ul style="list-style-type: none"> <li>- The content of the 'TestFlow.txt' (available in 'Test Content' section of the 'Test Components' pane) is no longer reset when a test is run again in order to keep the information about all test runs.</li> </ul>
V4.40	<p>Device Drivers / ESW Receiver Driver:</p> <ul style="list-style-type: none"> <li>- When using the measurement bandwidth 1Hz, a start frequency of 1Hz is now supported</li> </ul>
V4.40	<p>Device Drivers / AR A Type 1 Amplifier driver:</p> <ul style="list-style-type: none"> <li>- The command set has been optimized</li> <li>- Editing of commands is now supported</li> </ul>
V4.40	<p>Device Drivers / Generic Switch Unit driver:</p> <ul style="list-style-type: none"> <li>- In tab 'Details', it is now supported to define a path also with a series of</li> </ul>

commands by entering multiple lines in the input cell with one command per line.

V4.40	Device Drivers / Generic Antenna Tower Driver Generic Turntable Driver Generic Slidebar Driver - These drivers are now included in license ELEM1-A. A separate license ELEM1-DRV is no longer needed.
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V4.40	Device Drivers / Generic Antenna Tower Driver Generic Turntable Driver - These drivers are now included in license ELEM1-R. A separate license ELEM1-DRV is no longer needed.
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## 1.3 Improvements

The following tables list the improvements and indicate since which version the issue could be observed:

### Improvements of software V5.02:

Since	Function
V5.01	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When exporting an EMI test containing a spectrogram graphics and re-importing that test, sometimes the imported test can no longer be started and an error message stating "Object reference not set..." could be shown. This issue is solved.</li> <li>- The limit and margin columns of 'Loop Result' tables of an EMI test were sometimes not calculated. This issue is solved.</li> </ul>
V5.00	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When an EMI test was saved, then closed and reopened, or saved with a different name using 'Save As' and kept open (or closed and reopened), after restarting the test, the newly measured results were not correctly shown in the overview result table / graphics, if the old measurement results had not been explicitly cleared before the restart. This issue is solved.</li> <li>- Duplicated polarization was displayed when creating a test. This issue is solved.</li> </ul>
V4.30	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When running a test using option 'Separate graphics for the H/V polarizations' in the test template, in some cases, the results measured for one polarization were displayed in the chart for the other polarization. This issue is solved.</li> </ul>
V4.00	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When an EMI test has been performed and a report has been generated, sometimes after deleting the results and re-running the still open test, the traces of the new measurement are not shown in a newly rendered report and are only visible after saving and reopening the test. This issue is solved.</li> </ul>
V4.50	<p>EMI Test / Report using external templates:</p> <ul style="list-style-type: none"> <li>- When an EMI test has been performed and a report in Word .docx format has been generated (with license ELEMC-REP) via function 'Generate report using external templates' and component 'EMI Graphics' was selected, contained loop result graphics were not properly rendered and missing in the generated report. This issue is solved.</li> </ul>
V5.00	<p>EMI Test Template:</p> <ul style="list-style-type: none"> <li>- Speed for mast height setting was not stored. This issue is solved.</li> </ul>
V5.01	<p>EMS / EMI Test:</p> <ul style="list-style-type: none"> <li>- When a saved test using device based actions (e.g. 'Set Generator') is reopened and started, sometimes a validation error stating 'device does not exist or is invalid' was shown and the test could not be started. This issue is solved.</li> </ul>
V3.20	<p>EMI / EMS Test:</p> <ul style="list-style-type: none"> <li>- When in an EMI Test the order or colors of traces were changed and the test was saved, the changes in trace properties were sometimes lost after reopening the test. This issue is solved.</li> </ul>
V5.01	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- A saved test using a modulation loop cannot be opened again. This issue is solved.</li> <li>- When running an EMS Reference Calibration with leveling on transducer net power a sensor level system monitoring channel is required. This issue is solved.</li> <li>- Critical Points table when running Susceptibility Method: threshold level column</li> </ul>

	<p>name may be wrong when opening an existing test. This issue is solved.</p> <ul style="list-style-type: none"> <li>- Susceptibility Measurement: when using Peak Conservation the modulation offset was not considered in the margin calculation. This issue is solved.</li> </ul>
V5.00	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Leveling start procedure improved when sensor returns 0 V/m.</li> <li>- Amplifier Gain table was not created when running an amplifier test with ELEMS-S and an anechoic chamber schema. This issue is solved.</li> <li>- Level shift was not applied during a modulation sequence on frequency change. This issue is solved.</li> <li>- When trying to run a test from a migrated test template (created with an older version of ELEKTRA), the validation for the antenna device partly shows an incorrect type error message and the test cannot be started. This issue is solved.</li> <li>- Loop result data were lost when the test was stopped due to a communication error. This issue is solved.</li> <li>- Test level or dwell time from the New Test dialog were not always modified in the newly generated test. This issue is solved.</li> </ul>
V5.00	<p>EMS Test with EUT Monitoring:</p> <ul style="list-style-type: none"> <li>- Various improvements when the EUT monitoring template is modified within a test, e.g. adding or removing a channel. We highly recommend not to use the IGNORE function in this case but RESET the measurement result.</li> <li>- The frequency range checking for using the receiver as monitoring device with a fixed frequency setting has been improved.</li> </ul>
V4.60	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When running a harmonics measurement having the higher harmonics enabled in the setup, sometimes many invalid 'Interpolation' error messages could be shown in sequence and the measurement can no longer be operated. This issue is solved.</li> </ul>
V4.50	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- The power limitation is now using the set Power Conversion Impedance. This issue is solved.</li> </ul>
V5.01	<p>EMS ABT Measurements:</p> <ul style="list-style-type: none"> <li>- During ABT Cal, when ABT test with CMW audio board and AF is applied at port 2, sometimes the test run hangs at uplink cal and handsfree test stages. This issue is solved.</li> </ul>
V5.01	<p>EMS Field Uniformity Evaluation:</p> <ul style="list-style-type: none"> <li>- The antenna forward power values in the generated result table are showing wrongly converted values when the unit "dBm" is used. This issue is solved.</li> </ul>
V5.00	<p>EMS Field Uniformity Evaluation:</p> <ul style="list-style-type: none"> <li>- FU Evaluation was not possible when a frequency range was disabled. This issue is solved.</li> </ul>
V5.00	<p>EMS RVC Test:</p> <ul style="list-style-type: none"> <li>- The Insertion Loss system monitoring channel was not updated. This issue is solved.</li> <li>- The tuner position is not always added with correct values to the result table. This issue is solved.</li> <li>- A validation rule has been added to check whether the used field probe is supported for RVC measurement (simultaneous measurement of all axes).</li> </ul>
V5.00	<p>EMS Test Step Editor:</p> <ul style="list-style-type: none"> <li>- Dwell time and test level were not reliably transferred into the test. This issue is solved.</li> </ul>
V5.01	<p>EMS Test Template Editor:</p> <ul style="list-style-type: none"> <li>- Additional sensor settings table may show to small columns. This issue is solved.</li> </ul>
V5.00	<p>EMS Test Template Editor:</p> <ul style="list-style-type: none"> <li>- When modulation sequence is active and a frequency range is copied the</li> </ul>

	<ul style="list-style-type: none"> <li>modulation list for this new range was not shown in the summary row. This issue is solved.</li> <li>- Some Test Level values like 100 mA were shown with small value offset. This issue is solved.</li> <li>- The column width of System Monitoring and Test Information tables has been improved.</li> </ul>
V5.00	<p>EMS HW Setup:</p> <ul style="list-style-type: none"> <li>- FWD and REV power meter settings may be overwritten with the settings of the first frequency range when creating a new test template with this HW setup. This issue is solved.</li> </ul>
V5.00	<p>Using Test Site:</p> <ul style="list-style-type: none"> <li>- A test was running using the public HW Setup even if no HW Setup for the current Test Site was defined. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / Receiver driver:</p> <ul style="list-style-type: none"> <li>- When a R&amp;S ESW model was used as receiver device in an EMI test template, the preamplifier settings were sometimes not shown in the test template. This issue is solved.</li> </ul>
V4.00	<p>Device Drivers / Receiver driver:</p> <ul style="list-style-type: none"> <li>- When a R&amp;S FSMT model having only B23 option installed was used as receiver device in an EMI test template, a SCPI error message stating 'Data out of range' was shown during the test run. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / Generic Drivers:</p> <ul style="list-style-type: none"> <li>- Parameters for commands in the driver test panel were not correctly added to the SCPI command. This issue is solved.</li> <li>- Add support for ETX character for Generic Switch Unit.</li> </ul>
V5.00	<p>Device Drivers / RF Generators:</p> <ul style="list-style-type: none"> <li>- R&amp;S SML / SMR: added some delay on modulation on / off switching to improve level stability.</li> </ul>
V2.10	<p>Device Drivers / RF Generator SMB:</p> <ul style="list-style-type: none"> <li>- When using an R&amp;S SMB model connected via the GPIB interface as a generator device in a CAL test template, new frequencies sent to the generator during a test run were sometimes not properly set, resulting in dropouts in the measurement curve. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / Data Inserter:</p> <ul style="list-style-type: none"> <li>- Using these drivers in an EMS Test show an exception on test start. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / IO Devices:</p> <ul style="list-style-type: none"> <li>- Using the IO Device with channel / port numbers higher than 0 now works as set.</li> </ul>
V5.00	<p>Device Driver / LISN:</p> <ul style="list-style-type: none"> <li>- When single-line LISN devices as part of a multi-channel LISN device are used in the measurement setup, correction data additionally configured in the switch path of a single line LISN was partly now taken into account for final correction of the measurement values. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / Mast and Turntable Drivers:</p> <ul style="list-style-type: none"> <li>- Frankonia Mast: IP address was set back to default on reopen of the connection tab. This issue is solved.</li> </ul>
V5.00	<p>Device Driver / Radio Communication Tester CMW WLAN connection handling:</p> <ul style="list-style-type: none"> <li>- When starting a test with WLAN, the CMW was unable to create a connection between UE / DUT / EUT and CMW. This issue is solved.</li> </ul>
V4.60	<p>Device Driver / Radio Communication Tester CMW (EUT monitoring):</p> <ul style="list-style-type: none"> <li>- During EUT monitoring BLER / PER, the measured values were round to an integer value. Example: the measured value is 10.4 but in ELEKTRA it was reported as 10. This issue is solved.</li> </ul>

V5.00	<b>Device Drivers / Switch Unit:</b> - The BBA switch unit driver takes now care on the amplifier state before the band switching is done.
V5.00	<b>NI DAQ Middleware:</b> - The decimal to string conversion has been modified to Culture Invariant.
V4.40	<b>Test Graphics:</b> - When dragging a point from a trace in the overview chart into the critical point table, the record was partly inserted with an incorrect range number. This issue is solved.
V5.00	<b>Template search view:</b> - Deleting a test template with references to a large number of tests was sometimes not possible. This issue is solved.
V4.60	<b>Reporting / External Report Templates:</b> - When opening an external Word report template stored in a test via its context menu while Word is already running, it sometimes fails with Word error message 'file does not exist'. This issue is solved.
V4.42	<b>Administration / User Admin:</b> - Users with a role with enabled 'Create Device' permission were sometimes unable to copy devices. This issue is solved.
V5.00	<b>Database restore / Import of data created with older versions:</b> - After restoring a backup of an older ELEKTRA version or importing data created with an older version, sometimes the creation of reports for stored tests was not possible. This issue is solved.
V4.00	<b>Data Export:</b> - Attempting to export items for which the required license for included objects is currently not available, an error message stating "Object reference not set..." could be shown. This issue is solved.
V5.00	<b>Central Data Base:</b> - UI response time improved when changing from open tab to home tab where the device list is open.
V5.01	<b>Data Exchange Interface – ELEMC-DEX:</b> - When user management is enabled, reading the limit line tables of an EMS test via DEX partially failed and returned the error message "Object reference not set...". This issue is solved.
V4.20	<b>Table Merge Tool:</b> - When closing the table merge tool after saving the merged result tables, sometimes ELEKTRA could hang. This issue is solved.

### Improvements of software V5.01:

Since	Function
V4.20	<b>EUT Editor:</b> - When a collapsed folder of test plan was copied in the test plan, sometimes a system error message stating 'System.InvalidOperationException' was shown. This issue is solved.
V4.00	<b>Template search view:</b> - After copying an EMI test template the Test Standard column in the search view may have shown a wrong standard instead of the limit line. This issue is solved.
V4.60	<b>Test Graphics:</b> - When individual graphics are displayed in the test for measurement data filtered

	by e.g. polarization, the last measurement point of a curve was sometimes not displayed in the graphic. This issue is solved.
V4.30	<p>Test Graphics:</p> <ul style="list-style-type: none"> <li>- Changed trace colors are partly not persisted when saving a test. This issue is solved.</li> </ul>
V5.00	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When an EMS test is stopped and restarted, sometimes an exception error message stating 'Index out of range' could be shown. This issue is solved.</li> <li>- When in the test setup of an EMS test the amplifier power correction is set to mode 'Transducer' and also no FWD power meter is used, an error message stating 'Sensor level limited...' could sometimes be shown during the test run and the test was stopped. This issue is solved.</li> <li>- Using a remote device in the User Defined Loop, the driver was not connected when the test is started and the device check is done. This issue is solved.</li> </ul>
V4.60	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Frequency stepping using LOG steps in combination with a frequency list could lead to missing test frequencies. This issue is solved.</li> </ul>
V3.20	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When the test was manually executed at individual frequency points, the amplifier was sometimes not correctly switched to the corresponding band and an error message stating 'Frequency Value out of boundaries' was shown. This issue is solved.</li> </ul>
V5.00	<p>EMS Test Template Editor:</p> <ul style="list-style-type: none"> <li>- When a test template that uses the levelling mode 'Level on Substitution Method' with a configured reference calibration table is changed to mode 'Level on Sensor', which does not use a reference calibration table, the template validation incorrectly continued to check for dependency on the reference calibration table. This issue is solved.</li> </ul>
V5.00	<p>CAL Test:</p> <ul style="list-style-type: none"> <li>- During running the calibration of a signal path, only the first switch unit path of the selected signal path was switched. This issue is solved.</li> </ul>
V5.00	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- Final / Critical result traces where not shown in charts for separate LISN lines. This issue is solved.</li> <li>- Imported tests that are using additional limit lines with gaps in the table could not be opened. This issue is solved.</li> <li>- When using a R&amp;S ESU as receiver device in an EMI test, the attenuation set on the receiver during the measurement was sometimes higher than specified in the test template, which increased the noise floor. This issue is solved.</li> <li>- Result traces for measurements on LISN lines where partly not shown in charts if assigned LISN line names contain special characters. This issue is solved.</li> <li>- When opening a test created with an earlier version of ELEKTRA, an exception error message is sometimes displayed. This issue is solved.</li> </ul>
V4.20	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When using a R&amp;S FSV(A)3000 as receiver device in an EMI test, sometimes a SCPI error message stating 'Data out of range' could be shown when starting the test run. This issue is solved.</li> </ul>
V4.30	<p>EMI RSE Test:</p> <ul style="list-style-type: none"> <li>- When running an RSE test, sometimes a SCPI error message stating 'Data out of range: 'TRIGGER:HOLDOFF' could be shown during the test run. This issue is solved.</li> </ul>
V4.00	<p>Device Drivers / Receiver driver:</p> <ul style="list-style-type: none"> <li>- When a R&amp;S FSWT model was used as receiver device in an EMI test template, sometimes the preamplifier setting was not programmed to the instrument during a test run as set. This issue is solved.</li> <li>- When a R&amp;S ESPI model was used as receiver device in an EMI test</li> </ul>

	<p>template, the detectors CAV and CRMS could not be used for the final measurement. This issue is solved.</p> <ul style="list-style-type: none"> <li>- When a R&amp;S receiver model ESU was used as receiver device in an EMI test template, sometimes the attenuation setting 0 dB was not programmed to the instrument during a test run as set. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Oscilloscope driver:</p> <ul style="list-style-type: none"> <li>- R&amp;S RTM driver was sending trigger configuration command with wrong syntax. This issue is solved.</li> <li>- When trying to connect to a R&amp;S RTM oscilloscope, sometimes a SCPI error message stating 'Query interrupted' could be shown. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / Antenna Towers:</p> <ul style="list-style-type: none"> <li>- When a Maturo MCU controller is used to control the antenna mast, in some cases, an invalid SCPI command could be sent to the controller. This issue is solved.</li> </ul>
V5.00	<p>Device Drivers / Maturo FCU Controller:</p> <ul style="list-style-type: none"> <li>- Tilt set off control was not working. This issue is solved.</li> <li>- Checking whether Maturo mcApp is running when connecting the driver.</li> </ul>
V5.00	<p>Device Drivers / Generic Amplifier:</p> <ul style="list-style-type: none"> <li>- The evaluation of the amplifier state has been improved for better compatibility with different devices.</li> </ul>
V5.00	<p>Device Drivers / Generator driver:</p> <ul style="list-style-type: none"> <li>- SMA100B RF generator: the evaluation of the available high-power options has been improved.</li> <li>- SMW200A RF generator: the detection of the support for AM modulation depending on the generator hardware version has been improved.</li> </ul>
V4.00	<p>Drivers / System Control driver:</p> <ul style="list-style-type: none"> <li>- For EMS tests the system controller driver did still connect to the switching unit when running a simulated measurement. This issue is solved.</li> </ul>
V5.00	<p>System Control:</p> <ul style="list-style-type: none"> <li>- Controlling of test in progress indicator improved to set correct state when a message box is shown.</li> </ul>
V5.00	<p>Central Database:</p> <ul style="list-style-type: none"> <li>- On clients that are connected to a central database the Test Site selection dialog was not shown. This issue is solved.</li> </ul>
V5.00	<p>Database restore / Import of data created with older versions:</p> <ul style="list-style-type: none"> <li>- After restoring a backup of an older ELEKTRA version or importing data created with an older version, in rare cases the (converted) older data could not be used. This issue is solved.</li> </ul>
V5.00	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- When rendering a PDF report with ELEKTRA V5.00, the size of the generated PDF file could be very big (compared to files generated with former versions of ELEKTRA). This issue is solved.</li> <li>- If the same graphic is rendered multiple times in a report (e.g. zoomed and not zoomed), the 2<sup>nd</sup> graphic was sometimes not rendered correctly. This issue is solved.</li> </ul>
V4.00	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- The report template configuration was partly not applied as specified when rendering a preview report from test plan. This issue is solved.</li> </ul>
V2.10	<p>Log Viewer:</p> <ul style="list-style-type: none"> <li>- When a log file with a high number of lines is displayed in the log viewer and the scroll bar slider is moved to scroll through the entries, in rare cases, a system error message appears in an endless loop and the software can no longer operate normally. This issue is solved.</li> </ul>



## Improvements of software V5.00:

Since	Function
V4.30	EMI Test Template Editor: - When a copied test template is opened, sometimes an exception error message stating 'value cannot be null' could be shown. This issue is solved.
V4.60	Reporting: - Rendered graphics sometimes did not show a value for the end frequency on the axes. This issue is solved.
V4.20	EMI Test: - When using a FPH13 as receiver device in an EMI test, sometimes a SCPI error message stating 'Data out of range' could be shown when starting the test run. This issue is solved.
V4.40	External Reporting: - Graphics zoom settings were not applied. This issue is solved.
V4.61	EMI Test: - When reloading and re-running a saved EMI test, sometimes an exception error message could be shown during the test run when also the UI language has been switched since saving of the test. This issue is solved.
V4.60	EMS Test Template: - When trying to change the selected Monitoring Template via the 'Open Selection' pencil button shown within the box for the name of the monitoring template, an invalid error message stating 'Unable to find an Unknown plugin' could be shown. This issue is solved.
V4.60	Device Drivers / Combined Field Probe driver: - When a field probe device was used in parallel as part of a 'Combined Field Probe' and at the same time as a single device in a test setup, a test running with such a setup could hang. This issue is solved.
V4.60	EMS - Reporting: - Creating reports with many graphics charts does not free the used PC memory when completed. This issue is solved. - Order of EUT Monitoring channels in the report follows now the order shown in the test template.
V4.60	Migration Tool: - Gaps in EMC32 limit lines where not transferred correct. This issue is solved.
V4.00	Device Drivers / Receiver driver: - When a R&S FSWT model was used as receiver device in an EMI test template, sometimes a device communication error message stating 'Execution Error' was shown during final measurement of a test run. This issue is solved.
V2.00	Reporting: - When the concept of alternate detectors is used in a test to determine the limit values, limits of certain detectors were partly not correctly shown in the report. This issue is solved. For external report templates, the keyword 'DetectorX' is now sufficient (where X must be replaced with the number of the detector 1..4) to retrieve the relevant 'Level', 'Margin' and 'Limit' columns for the report.
V4.61	Device Drivers / Receiver driver: - When a R&S FPC model was used as receiver device in an EMI test template, the receiver partly used a different measurement step size than was defined in the test template. This issue is solved.
V2.00	Device Drivers / Receiver driver: - When a R&S ESU model equipped with option B24 was used as receiver device in an EMI test template, the LNA preamplifier of option B24 could not

	<p>be activated. This issue is solved.</p> <ul style="list-style-type: none"> <li>- When a R&amp;S ESU model was used as receiver device in an EMI test template, in rare cases a device communication error message stating 'Query interrupted' was shown during a test run and the test was aborted. This issue is solved.</li> </ul>
V4.61	<p>Device Driver / Field Probes:</p> <ul style="list-style-type: none"> <li>- Lumiloop LS-Probe: frequency information was sent with missing unit. This issue is solved.</li> <li>- Combined Field Probe: removing of selected single field probes is now supported.</li> </ul>
V4.60	<p>Device Driver / AdvISE:</p> <ul style="list-style-type: none"> <li>- Test level is now always sent in LIN and not dB unit.</li> </ul>
V4.61	<p>Device List:</p> <ul style="list-style-type: none"> <li>- When ELEKTRA is closed, a dialog is sometimes displayed informing about unsaved devices, but no devices are marked as changed and to be saved in the device list. This issue is solved.</li> </ul>
V4.60	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Showing a user message action on a frequency range change could lead to 0 V/m measurement result table entry for the first subrange frequency. This issue is solved.</li> <li>- A test is not stopped anymore while sensor in noise when the power limitation on a reference calibration table is active.</li> </ul>
V4.60	<p>EMS Test – Antenna Port:</p> <ul style="list-style-type: none"> <li>- f0 variable for RFGEN2 frequency calculation was only initialized when EUTGEN was active. This issue is solved.</li> <li>- Measurement of sensor levels and thus the leveling was stopped when RFGEN2 was not activated. This issue is solved.</li> </ul>
V4.40	<p>Device Drivers / Receiver driver:</p> <ul style="list-style-type: none"> <li>- When a R&amp;S ESL model was used as receiver device in an EMI test template, the RMSAV and CAV detectors could not be used for the measurement. This issue is solved.</li> </ul>
V2.00	<p>Device Drivers / Receiver driver:</p> <ul style="list-style-type: none"> <li>- When a R&amp;S ESU model was used as receiver device in an EMI test template and a CISPR detector in combination with a measurement bandwidth of 1MHz was used in a frequency range higher than 1GHz in the final measurement, in some cases the measurement was not performed with the set bandwidth. This issue is solved.</li> </ul>
V4.00	<p>Administration / User Admin:</p> <ul style="list-style-type: none"> <li>- When operating the 'User Management' view, in rare cases an error message 'Process cannot access file...' could be displayed. This issue is solved.</li> </ul>
V4.00	<p>Import:</p> <ul style="list-style-type: none"> <li>- When importing the same test template multiple times, sometimes the template to be imported is not shown as 'Already Existing', instead 'Overwrite' is shown. This issue is solved.</li> </ul>
V4.00	<p>EMS FU Test:</p> <ul style="list-style-type: none"> <li>- Field Uniformity data were not saved when the first EMS frequency range was disabled. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Receiver driver:</p> <ul style="list-style-type: none"> <li>- When 'Sweep Type' was set in the test template to 'FFT' and a R&amp;S FSV(A)3000 model was used as receiver devices, sometimes sweep type 'Auto' was used instead. This issue is solved.</li> </ul>
V4.30	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- EMCAN, AdvISE driver: selected monitoring parameter could change when continuing a test while the EUT Monitoring template editor was open. This issue is solved.</li> </ul>

V4.60	Device Drivers / Field Probe driver: - Combined Field Probe: EMS test does not go to the stop state when disconnecting the probes. This issue is solved.
V4.61	ABT CAL: - R&S CMX: shut down connection after ABT test. This issue is solved.
V4.61	EMI / EMS Test Template Editors / Actions: - Query Status Action: command list was not updated when changing device. This issue is solved.

### Improvements of software V4.61:

Since	Function
V4.30	EMS Test: - When receiver devices are configured as Power Meter in an EMS hardware setup, sometimes invalid validation error messages were shown on test start. This issue is solved. - When stopping an EMS Test the system monitoring values for the current frequency may show noise values in some cases. This issue is solved.
V4.60	EMS Test: - When creating a test report before the test was saved it could happen that the measurement results were treated as inconsistent. This issue is solved. - After closing, reopening and resuming an EMS test, markers were not correctly set to the current test frequency. This issue is solved. - When attempting to start a BCI test that contains a frequency list after changing global devices/tables used in the test, the test sometimes hangs and does not start. This issue is solved. - When showing the graphics in cascade style and starting and stopping a test, the first graphics (Test Level) is now persisted as front graphics. - When using the EMC standard 'Automotive/MIL' in the test template, in rare cases the dwell time of the frequency range may not be synchronous to the dwell time displayed in the level profile. This issue is solved. - Leveling on Sensor supports now parallel usage of sensor system monitoring channel with different unit than the test level unit.
V4.60	EMS Susceptibility Test Method: - Depending on the leveling settings the test level in the mode "Start evaluation from test level of last frequency" started with a lower level than needed. This has been improved.
V4.00	EMS Report: - The detailed report of an EUT Monitoring template using EMCAN or AdvISE drivers does not show useful settings. This issue is solved.
V4.00	EMS / EMI Test: - When a test report was rendered in an EMI or EMS test, subsequent runs of that test could prompt for the measurement results to be cleared. This issue is solved.
V4.40	EMI Test: - When running a Zoom measurement in interactive mode, an error message stating 'System.OutOfMemoryException' could sometimes appear and the software had to be restarted. This issue is solved.
V4.60	EMI Test: - When the Overview 'Graphics per Range' mode was active, newly added frequency ranges were shown at the end of the Test Flow list, even if the order in the template was different. This issue is solved. - Test flow sometimes failed in Final Measurement. This issue is solved. - Antenna azimuth offset was not correctly applied during the Final Measurement. This issue is solved.

V4.51	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When Interactive Data Reduction is used during the test run and a new frequency is manually inserted into the Critical Points table by dragging and dropping a point from the graphic, the limit and margin columns in the Critical Points table remained partially empty and were not filled. This issue is solved.</li> </ul>
V4.50	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When an EMI test is created from a test template using schema 'Magnetic Field Strength (Loop Antenna + Turntable)', the created test graphic now correctly displays the y-axis unit according to the configured transducer correction unit.</li> </ul>
V4.40	<p>EUT Editor:</p> <ul style="list-style-type: none"> <li>- In the test step view of the EUT editor, changes in the test description were sometimes not persisted. This issue is solved.</li> </ul>
V4.60	<p>EUT:</p> <ul style="list-style-type: none"> <li>- Export of EUT root folders could sometimes be incomplete and not containing all tests. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Switch unit driver:</p> <ul style="list-style-type: none"> <li>- When trying to connect an R&amp;S BBA amplifier as a switch unit, ELEKTRA could hang. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Antenna devices:</p> <ul style="list-style-type: none"> <li>- When only license ELEMS-R or licenses ELEMI-E and ELEMI-A are active, newly created Antenna devices were no longer shown in the device list after restart of ELEKTRA. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Radio Communication Tester R&amp;S CMW500 driver:</p> <ul style="list-style-type: none"> <li>- WCDMA packet switched and circuit switched RMC domain are now correctly set and queried.</li> <li>- GSM RxQuality measurements now do not trigger BER measurement.</li> <li>- Measurement type 'None' has been added in measurement collections for 2G, 3G and 4G. It is now possible to select this measurement type 'None' in order to not trigger any BER measurements (useful for ABT).</li> <li>- CMW sometimes gave timeouts when loading dfl files for a different RAT. This issue is solved.</li> <li>- Now, only the connection status is queried in "None/Voice" measurement type during ABT test. Therefore, in case of a call drop during ABT measurement, an "UE lost connection" message is shown to the user and the test is stopped. Previously, noise was being measured in case of a call drop. This issue is solved..</li> </ul>
V4.60	<p>Device Drivers / Generator driver:</p> <ul style="list-style-type: none"> <li>- Invalid waveform shape commands were sent to R&amp;S SMT / SME devices. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Monitoring AdvISE, EMCAN driver:</p> <ul style="list-style-type: none"> <li>- The selected signal could appear twice in selection list. This issue is solved.</li> </ul>
V4.60	<p>Device Drivers / Field Probe drivers:</p> <ul style="list-style-type: none"> <li>- Raditeq Field Probes: driver is now using DYN filter speed setting.</li> <li>- Lumiloop Field Probes: frequency range adapted to mode selection.</li> </ul>
V4.60	<p>Device Drivers:</p> <ul style="list-style-type: none"> <li>- R&amp;S OSP: Buffer for reading long path catalog extended.</li> <li>- R&amp;S NRVD: Write / Read timing after triggering improved.</li> <li>- R&amp;S ZNH: Force Net Work Analyzer mode added and SCPI commands for setting LIN frequency stepping improved. (Note: ZNH supports only LIN stepping).</li> <li>- R&amp;S ZND: Log stepping shows now the right text field for log step width entry.</li> </ul>
V2.00	<p>Reporting:</p> <ul style="list-style-type: none"> <li>- When a Cartesian chart is rendered in the report, in rare cases, the y-axis of the rendered chart in the report has no scaling and the label is shifted inwards. This issue is solved.</li> </ul>

- The 'Normal Font' set in the global report setting was partly not applied in the rendered report. This issue is solved.

V4.20	Table Merge Tool: - When navigating the table merge tool views, text at the top of the view is sometimes overlapping and unreadable. This issue is solved.
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### Improvements of software V4.60:

Since	Function
V4.50	EMI Test: - Calculation of generator level during system check improved. - Graphics update in separate charts for H and V is now done while measuring.
V4.50	EMS Test: - When using the same device in an EMS HW setup and an action, there could be a blocking of the resource when the test is started. This issue is solved. - When using an RX antenna with a power meter or test receiver instead of a field probe the attenuation of the assigned sensor signal path is not applied correct. This issue is solved.
V4.30	EMS Test: - When saving a reference calibration table of a test as a global reference calibration table, sometimes the global table was saved with different units. This issue is solved.
V4.50	Device Driver: - R&S EMCAN64 may show wrong signal name when opening the EUT Monitoring template within a test. This issue is solved. - R&S OSP Interlock: driver settings were not in all cases stored correct in the HW template when the OSP is equipped with more than one digital input board. This issue is solved. - R&S SMT/SME/SML/SMR: some incompatible SCPI commands were sent to the device. This issue is solved.
V4.50	Administration / Data Management / Backup: - Creating a backup could fail if the PC is not connected to a network. This issue is solved.
V4.40	EMI Test: - When opening and re-running a saved EMI test with 'Run System Check' enabled, an error message could sometimes appear. This issue is solved.
V4.00	EMI Test: - When option 'Repeat Measurement' is used for the overview measurement and the test is paused and resumed during an overview measurement cycle, the subsequent repetitions / measurement cycles only repeat the part of the full frequency range that remained when resumed. This issue is solved.
V3.00	EMI Test: - When a GTEM waveguide is used in the hardware setup of a radiated EMI test and the final measurement is only performed based on a frequency list (without performing a real overview measurement), the notifications for switching the EUT axes and the result traces were sometimes not correctly displayed. This issue is solved.
V4.00	Import: - When importing a test template that contains a configured 'Run Program' action, the specified program name was not imported and saved, if that program does not exist on the import computer. This issue is solved.
V4.50	Reporting: - When rendering a test report, an invalid error message could sometimes appear

stating 'Each report item is required to have a valid, unique name'.  
This issue is solved.

### Improvements of software V4.52:

Since	Function
V4.51	EMS Test: - BCI Tests: the sensor path was not initialized correctly and thus the path attenuation was not applied. This issue is solved.
V4.50	EMS Test / EUT NoGo Panel: - EUT Qualification Mode: test level stored in the Critical Frequencies table was erroneously the test level reduced by the level shift. This issue is solved. - EUT Susceptibility Mode: the interactive susceptibility evaluation when switching to the next testing frequency has been improved.
V4.50	EMS Test / FU Evaluation: - Display of field strength values could show incorrect values if the evaluation was repeated in an existing test. The corrected reference calibration tables were not affected. This issue is solved.
V3.00	EMI Test: - When a FSW spectrum analyzer with option B24 is used as receiver device in the test setup, the preamplifier gain value is now correctly shown in the receiver settings of the test template.
V4.50	Device Driver / Raditeq Field Probes: - Raditeq Field Probe driver have been improved for compatibility to devices.
V4.30	Device Driver / Generator SMBV100B: - The set function in tab 'Functional Test' of generator SMBV100B now works correctly even if used repeatedly.

### Improvements of software V4.51:

Since	Function
V4.40	EMI Test / Data Reduction: - When in the 'Data Reduction' step an 'Acceptance Table' is used, which due to its shape is supposed to 'mask out' some frequency areas, in some cases the critical points from the masked area were still selected if they had higher levels than points in the unmasked area. This issue is solved.
V4.50	EMI Test / Actions: - Actions configured in the template for 'Frequency Range Enter' and 'Frequency Range Leave' are now executed as set also in the final measurement step.
V4.50	EMI RSE Test with MBM Measurement: - Parallel access to the CMW is now handled correct to avoid timeouts.
V4.50	EMS: - Worst Case Analysis: evaluation function has been improved to calculate the worst case accessory position per critical frequency. - Import for Reference Calibration tables improved (unit detection and column assignment). - Using logarithmic interpolation for linear units in EMS target level limit lines is now supported (use appropriate Y-scaling in System Monitoring).
V4.50	EMS Audio Breakthrough: - Mouth calibration procedure improved.

V3.20	EUT Monitoring: - When AdvISE is used as a monitoring device, the test execution sometimes hangs at test start. This issue is solved.
V4.50	EUT Monitoring: - The settings dialog did not allow individual field probe axes settings in EUT Monitoring channels. This issue is solved.
V4.00	CAL Test: - When a calibration test was imported, modified and reassigned to an EUT, an incorrect error message stating 'Test Step(s) with missing test templates detected' could be shown in the EUT editor. This issue is solved.
V3.20	CAL Test: - When a calibration test was performed with a FPC network analyzer device, an incorrect test execution error message could be shown. This issue is solved.
V4.00	CAL Test Template: - Improved formula parsing for Transducer Calibration.
V4.30	Administration / Data Management / Backup: - Backups created with ELEKTRA versions earlier than V3.10 could sometimes fail to upgrade and such backups could not be restored. This issue is solved.
V4.50	Startup / Database connection fails: - When (after successful installation) ELEKTRA 4.40 is started, in some cases an error message stating 'Database connection failed: The Type initializer ... threw an exception' is shown and the software cannot be used. This issue is solved.
V4.42	Device Drivers / LISN HM6050-2 driver: - When connecting to the HM6050-2, an exception error message is shown. This issue is solved.
V4.40	Device Drivers / Manual and BBx Amplifier driver: - Avoid Operate → Standby → Operate cycle (show message box) when external band is selected on EMS frequency range change.
V4.50	Device Drivers / NRP(2) Power Meter: - Sending an ABORT command with wrong channel index for pulse modulated signal improved.
V4.00	Device Drivers / Receiver driver: - R&S FSV3000 family: Option B8E is now evaluated correctly to determine the maximum available bandwidth.
V2.20	Device Drivers / Power Meter R&S NRPxxA(N) driver: - For probes connected via USB, the connection is now reliable disconnected on test end and thus does not block a restart of the test.
V4.50	Device Drivers / Generator driver: - R&S SMB100B: the driver uses now attenuator fixed mode to improve leveling speed and stability in combination with ALC table mode.
V4.50	Device Drivers / CPI Amplifier driver: - The active band was not properly detected. This issue is solved.

### Improvements of software V4.50:

since	Function
V4.42	Device Drivers / Generic Antenna Tower driver: - When a Generic Antenna Tower driver does not use the 'IsBusy' command, the position tracking for a started movement sometimes does not correctly

recognize that the target position has already been reached and times out.  
This issue is solved.

V4.30	<b>Device Drivers:</b> - R&S NRX power meter using NRP-Z81 RF probe for RADAR pulse measurement. External trigger setting when probes are connected to port C/D improved. - R&S SMxxx RF Generators: programming sequence for PULM parameters improved.
V4.30	<b>EMI Test:</b> - When using the receiver device in spectrum analyzer mode, in rare cases, the reference level set on the receiver device did not match the template settings. This issue is solved.
V4.00	<b>EMS Test / Leveling:</b> - When for the leveling a NRX power meter device is used, in some cases an incorrect exception error message stating 'External hardware trigger signal is missing' is shown. This issue is solved. - When running an EMS Test with an active level sweep and leaving the EUT Failure Mode Analysis dialog, the frequency scanning was not continued. This issue is solved.

#### Improvements of software V4.42:

since	Function
V4.20	<b>EMS Test with modulation loop:</b> - When using a modulation loop in an EMS test, the modulation loop settings were partially not reset to the correct start conditions when the test was paused/resumed or reset. This issue is solved.
V3.00	<b>EUT / Test deletion / referenced tables:</b> - When deleting an EUT (including tests), utility tables that were referenced by devices contained in the hardware setup of the deleted test (e.g. attenuation table of a signal path) were erroneously sometimes also deleted. This issue is solved.
V4.30	<b>Administration / Data Management / Backup:</b> - When using the backup/restore/compression functions for the ELEKTRA database (ELEKTRA.FDB) with a database size of more than 4 GB, the created backups could partially no longer be used. This issue is solved.
V4.00	<b>Administration / User Admin:</b> - Users with a role with disabled 'Create Device' permission are now no longer able to copy devices (because they can't save them either). - Users with a role with the 'Modify Limit Line' permission enabled were in rare cases still not able to change the limit line, instead an error message was shown. This issue is solved.
V3.20	<b>EMI Test / Frequency Control:</b> - When only a specific range is selected in the frequency control for the measurement, the measurement was still executed for all active ranges. This issue is solved.
V3.00	<b>EMI Test:</b> - When opening a test containing an empty 'Final Results' table and graphics including a marker, in some cases an incorrect exception error message stating 'Sequence contains no element' is shown. This issue is solved.



	EMS Test:
V4.20	<ul style="list-style-type: none"> <li>- When the NoGo button was manually pressed during the test run, an incorrect error message 'Frequency value out of boundaries' could be shown in some cases. This issue is solved.</li> <li>- Test level min/max traces in merged graphics of EMS susceptibility tests were now shown correctly.</li> </ul>
V4.00	<b>Device Drivers / Oscilloscope driver:</b> <ul style="list-style-type: none"> <li>- When using the oscilloscope as power meter in an EMS test setup, in some cases an unlabeled checkbox was shown in tab 'Measurement Parameters' in the region of the horizontal settings. This issue is solved.</li> </ul>
	EMI Test:
V4.30	<ul style="list-style-type: none"> <li>- When running an EMI test with activated setting 'Graphics per Range' in section 'Flow Details – Overview Measurement', the generated range specific result tables and graphics could contain in some cases data of other ranges in addition. This issue is solved.</li> </ul>
V3.00	<b>EMI Test:</b> <ul style="list-style-type: none"> <li>- When running an EMI test with multiple frequency ranges having different attenuation settings, the attenuation of the higher ranges is now always set as specified at the receiver device.</li> </ul>
	EMS Test:
V4.20	<ul style="list-style-type: none"> <li>- When running an EMS test with setup 'Anechoic Chamber' and manually set test frequency via the frequency control, in some cases an incorrect error message stating 'TG EMSTT test frequency value outside boundaries' is shown and the test run is aborted. This issue is solved.</li> </ul>
V4.00	<b>Device Drivers / Antenna driver:</b> <ul style="list-style-type: none"> <li>- When 'Use Automatic Positioner' is selected in 'Tower Control' tab of an antenna device and a positioner device is assigned; the antenna device is not shown in the references of the assigned positioner. This issue is solved.</li> </ul>
V4.40	<b>Device Drivers / LISN HM6050-2 driver:</b> <ul style="list-style-type: none"> <li>- When connecting to the HM6050-2, sometimes an exception error message is shown when the device identification was not successful. This issue is solved.</li> </ul>
V4.20	<b>Device Drivers / FSWT Receiver Driver:</b> <ul style="list-style-type: none"> <li>- The FSWT preamplifier gain setting is now programmed to the device as set in the EMI test template.</li> </ul>
V4.40	<b>Device Drivers / Generic Switch Unit driver:</b> <ul style="list-style-type: none"> <li>- When switching the paths, the configured command was not sent and an incorrect error message could be shown, stating that the given command is empty. This issue is solved.</li> </ul>
V4.40	<b>EMS Test with Generic Amplifier</b> <ul style="list-style-type: none"> <li>- When using a generic amplifier driver in a test setup, a '*CLS' command which is not contained in the devices command configuration, could be sent on test start to the device. This issue is solved.</li> </ul>
V4.30	<b>Administration / Data Management / Backup:</b> <ul style="list-style-type: none"> <li>- When attempting to de-select "Keep backup?" check box for a backup file, an incorrect error message "validationTooltip' name cannot be found' could be shown. This issue is solved.</li> </ul>
V4.30	<b>Administration / Data Management / Backup:</b> <ul style="list-style-type: none"> <li>- When compressing the database, the resulting (compressed) database file was partially unreadable and could not be used. This issue is solved.</li> </ul>

### Improvements of software V4.41:

since	Function
V3.10	EMI Test: - When running an EMI test using a turntable accessory with the 'Adjustment' measurement step, in rare cases (after exchanging the hardware setup in the test template), the azimuth loop was not executed during the Adjustment measurement. This issue is solved.
V3.00	Graphics / Marker: - When trying to use marker functions "To Next Peak" via the context menu, the marker does sometimes not move and instead the marker info shows incorrect very high frequency values. This issue is solved.
V4.40	Startup / Database connection fails: - When (after successful installation) ELEKTRA 4.40 is started, in some cases an error message stating 'Database connection failed: Your user name and password are not defined' is shown and the software cannot be used. This issue is solved.
V4.40	EMI Test: - When running an EMI test using an ESR(P) as receiver device, controlled via the GPIB interface, in some cases communication to the receiver was disrupted and an error message 'Query returned an empty data block' was shown. This issue is solved.
V3.20	EMI Test: - When using an Antenna tower of type 'Antenna Stand' in a test setup and a running test is paused, an incorrect 'Conversion not possible' error message was shown in some cases and the test was stopped. This issue is solved.
V4.20	EMI Test: - When using a generic positioning device in a test setup, an incorrect 'Position is out of supported range' error message was shown in some cases and the test was stopped. This issue is solved.
V3.20	EMI Test: - When running an EMI test using parallel measurement with two receivers and separate graphics for the polarizations H / V, the separate H and V charts could partly show the wrong measurement trace. This issue is solved.
V4.40	EMS Test: - When an EMS test is running, in rare cases the test may stop and an error message stating 'The calling thread cannot access this object' is shown. This issue is solved.
V3.00	EMS Test: - When a sensor device is used in the test setup and the same device is also configured in an EUT monitoring channel, an error message is shown stating that the device cannot be used twice even when this EUT monitoring channel is not activated. This issue is solved.
V4.32	EUT Editor: - When a test is executed for a test step and saved, in rare cases, the saved test is not associated with the EUT and does not show up as associated to this test step in the EUT editor. This issue is solved. In addition, there is now a repair option for such 'unassigned' tests when they are reassigned to the EUT to automatically assign them to the correct test step as well.

#### Improvements of software V4.40:

since	Function
V4.32	EMS Test: Susceptibility Evaluation: - Marker 2 and 3 are now synchronized.

	<ul style="list-style-type: none"> <li>- Trace colors for min / max level are applied.</li> <li>- Min test level column is filled in any condition.</li> <li>- Running only evaluation of susceptibility data is now supported.</li> </ul>
V4.00	<p>EMS Test: Susceptibility Evaluation:</p> <ul style="list-style-type: none"> <li>- When the EUT shows for a frequency a permanent 'NoGo' even if the test level is reduced to minimum, an entry is made in the Critical Points table. The column 'NoGo Value' has been renamed to 'Threshold'.</li> <li>- Critical Points table is now displayed in Test Level Merged Graphics (containing all loop conditions).</li> </ul>
V4.32	<p>EUT Test Plan Editor:</p> <ul style="list-style-type: none"> <li>- Saved Test Step update improved.</li> </ul>
V4.00	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When running an EMS test with test method 'EUT Susceptibility' using a modulation sequence in the susceptibility evaluation mode with dwell time from the active frequency range, the dwell time from the modulation sequence parameters is now correctly used.</li> </ul>
V4.00	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- For an EUT or System Monitoring channel, the chart associated with that channel now opens correctly as set in 'Display' checkbox, when creating or starting the test.</li> </ul>
V4.20	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- When an EMS test is stopped due to a too high VSWR value, the last measurement results are now shown in the overview results.</li> </ul>
V4.20	<p>EMS Test:</p> <ul style="list-style-type: none"> <li>- Test frequencies excluded by a defined excluded band are now not tested during the EMS scan.</li> <li>- The gaps in a trace for excluded frequency bands are now shown when reopening an existing test.</li> <li>- Excluded band gap frequencies, when identical to test frequencies, are now not excluded.</li> </ul>
V4.20	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- The RSE Measurement Flow takes now care on running Final Measurement steps without a defined Elevation device.</li> </ul>
V3.11	<p>Device Drivers / Generic Oscilloscope Driver:</p> <ul style="list-style-type: none"> <li>- When using a generic oscilloscope, Y-scale settings greater than 1V/div were not possible. This issue is solved.</li> </ul>
V4.20	<p>EMI Test using Slidebar:</p> <ul style="list-style-type: none"> <li>- When running an EMI test with a slidebar, the current slidebar accessory position in Measurement Flow Control was not updating during overview measurement. This issue is solved.</li> </ul>
V4.30	<p>EUT Editor:</p> <ul style="list-style-type: none"> <li>- Saving an EUT with a name containing a '/' (slash) was not possible. This issue is solved.</li> <li>- When an EUT was opened when only ELEMS-x licenses were active, an error message could be shown. This issue is solved.</li> </ul>
V4.30	<p>EMI Test:</p> <ul style="list-style-type: none"> <li>- When using option 'Separate graphics for the H/V polarizations' in the test template in combination with two or more frequency ranges that overlap, the measurement traces could sometimes show invalid peak artefacts at the frequency range borders during the measurement. This issue is solved.</li> </ul>
V4.30	<p>EUT Editor:</p> <ul style="list-style-type: none"> <li>- When a test step was copied and a test was created from the copy, changes to the test information in the created test could affect the test information of the original test step. This issue is solved.</li> </ul>

V4.20	EMS Test with Generic Oscilloscope: <ul style="list-style-type: none"><li>- When a generic oscilloscope was used in an EMS test setup as Power Meter device, an error message could be shown when running the test. This issue is solved.</li></ul>
V3.20	CAL Test: <ul style="list-style-type: none"><li>- When a calibration test using a frequency list was performed with a network analyzer device, the frequency list was programmed multiple times to the network analyzer device. This issue is solved.</li></ul>
V3.20	Device Drivers / ESW Receiver Driver: <ul style="list-style-type: none"><li>- In the EMI template, the displayed settings for the ESW preselector filter split at 2/8 MHz now correspond to the options available for the receiver model being used.</li></ul>
V4.30	Device Drivers / ETS EMSense Field Probe Driver: <ul style="list-style-type: none"><li>- Corrected command 'Read All Axis' and allowed editing.</li></ul>
V4.30	Device Drivers / Power Meter NRX with NRP-Z81: <ul style="list-style-type: none"><li>- Running a measurement via the 'Functional Check' tab in the device list has been improved.</li></ul>
V4.30	Administration / Data Management / Backup: <ul style="list-style-type: none"><li>- When copying backups from the 'Backup' folder of an older beta version to the current version the backup could not be restored. This issue is solved.</li><li>- Compressing the database file was partly not possible. This issue is solved.</li></ul>

## 1.4 Known issues

The following tables list the known issues and indicate since which version the issue could be observed:

### Known issues of software V5.02:

since	Function
V4.00	EMS Test: - After running a reference calibration with 1 frequency point only, the reference calibration table cannot be saved as global table as it needs at least two frequency points. Please run the calibration always with at least 2 points.
V5.02	EMI Test: - When using 'Separate Graphs' for the H/V polarizations in an EMI test and function 'Set Reference' is used via the context menu of H/V result tables in the content explorer, partly the reference trace created for one polarization is also shown in the chart for the other polarization.
V5.02	Reporting: - When a report is rendered in DOCX format and the generated report would contain several hundred pages, the generation process may take a long time or hang. - Traces from other tests are not shown in the charts of a summary report.
V5.02	EUT Monitoring / Audio Analyzer: - Sorting of EUT Monitoring channels using an audio analyzer should be avoided as this may result in incorrect analyzer settings or corrupt the EUT monitoring template.

## 2 Modifications to the documentation

The current documentation is up-to-date.

## 3 Software update

### Further information

- The software update file for the R&S ELEKTRA is one file including the main software version number e.g. ELEKTRASetup\_V1.20.x.exe. It will be referred as ELEKTRASetup.exe later in the text. The file can be found on Rohde & Schwarz web page.

### 3.1 Updating the software

- Go to download page [www.rohde-schwarz.com/software/elektra](http://www.rohde-schwarz.com/software/elektra).
- Click on the download link for R&S ELEKTRA.
- Save the ELEKTRASetup.exe installation file to a location on your PC for which you have access rights to.
- Double click on the downloaded file to start the installation.
- Follow the instructions on the screen.
- R&S ELEKTRA icon should now appear on the desktop.
- Double click on the R&S ELEKTRA icon to launch R&S ELEKTRA.
- A comprehensive user's manual is available in R&S ELEKTRA.
- For more information and other application notes, please go to [www.rohde-schwarz.com/product/elektra](http://www.rohde-schwarz.com/product/elektra).

## 4 Customer support

### Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

### Contact information

Contact our customer support center at [www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support) or follow this QR code:



Figure 4-1: QR code to the Rohde & Schwarz support page