

R&S®AMS32

Release Notes

Software Version V11.20.00

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Contents

1	Information on the Current Version	3
1.1	Version 11.20.00.....	3
2	Software Update	8
2.1	Updating the Software.....	8
3	Version History	9
3.1	Version 11.10.00.....	9
3.2	Version 11.00.10.....	13
3.3	Version 11.00.00.....	14
3.4	Version 10.60.20.....	17
3.5	Version 10.60.10.....	19
3.6	Version 10.60.00.....	20
3.7	Version 10.59.00.....	25
3.8	Version 10.55.00.....	26
3.9	Version 10.50.10.....	27
3.10	Version 10.50.00.....	30
3.11	Version 10.40.10.....	34
3.12	Version 10.40.....	36
3.13	Version 10.35.02.....	40
3.14	Version 10.30.....	42
3.15	Version 10.28.....	43
3.16	Version 10.20.....	45
3.17	Version 10.01.....	48
3.18	Version 10.00.....	49
4	Customer Support	51

1 Information on the Current Version

1.1 Version 11.20.00

New Functionality

Release of options AMS32-K50G and AMS32-K50P (NF-FF Transformation considering arbitrary ground or PEC ground).

Both options add new capabilities to the NF-FF Transformation. AMS32-K50P adds PEC (Perfectly Conducting Ground), AMS32-K50G adds Arbitrary Ground. Both can either be corrected for during the transformation, or can be added in a second transformation step to the original free-space data.

The arbitrary ground shall be characterized by the ground material's dielectric permittivity factor ϵ , which can be entered as a constant or as a function of frequency.

Pre-requisite: Option AMS32-K50 must be active.

Release of option AMS32-K59N (Phase measurements with NRQ6)

The option implements measuring relative phase in addition to signal level with one or more NRQ6, in the operating frequency range of the NRQ6, i.e. up to 6 GHz. The phase reference can either be one NRQ6 connected to a reference antenna turning with the DUT, or the measurement at the first position. This second case is only applicable if the phase of the DUT signal is highly stable and does not drift during the whole test.

This first release of AMS32-K59N supports measuring MCCW (multi-carrier CW) signals only.

Pre-requisite: NRQ6 firmware 02.20.20072802 or later, options NRQ6-K1 and NRQ6-K3 must be installed on each NRQ6 involved used for the test.

AMS32-K25

Added support for WiFi 6E testing, based on WLAN 802.11ax.

Pre-requisites: CMW500 with two TRX boards, firmware BASE V3.8.11, WLAN Signaling V3.8.20 or later; Frequency extender CMW-Z800A

AMS32-K37L

Added A-GALILEO testing.

The testing is implemented as SPOM (Single Point Offset Measurement), re-using the main A-GPS pattern, as required by the CTIA OTA test plan, version 4.0.

Minimum required version for the LBS-Server on the CMW500: 12.20.3

Driver for SMW200A

The driver now supports setups with a SMW200A and a frequency extender FE50TDR, up to 50 GHz.

Driver for ATS1800C positioner

Added support for the feed switcher, both automatic and manual. Feed switcher usage is to be configured in the Properties dialog of the corresponding antenna.

The driver now switches on the system power when setting to physical mode.

Added a new driver for the ATS800R positioning system.

Added a new driver for NSI-2000 positioning systems.

Pre-requisites: NSI-2000 software V4.14.40 must be installed on the PC. Option AMS32-K60 must be available.

Modified Functionality, General

3D Graphic

The default view angle can now be modified. This is possible in the OTA Options dialog, tab "3D Graphics", or directly from the 3D graphics' "User View Angle" dialog.

Reporting

TRP unit in the 3D graphic and in the OTA result section of the CTIA report now is consistent with the test setup: dBm for EIRP measurements, dB(i) for gain measurements.

Path Calibration

Path calibration with frequency conversion is now also working with mode "Attenuation".

Modified Functionality, OTA Testing

AMS32-K25

Added the possibility of activating DirtyTx for Bluetooth LE in normal signaling mode (CMW-KS601).

WLAN TRP testing: the RX Frame Trigger is now programmed with the same bandwidth and data rate as configured for the signaling.

WLAN Power measurement timeout can now be programmed in the Properties of the CMW-WLAN driver.

AMS32-K29 / -K30

Extended the radio channel range for band LTE FDD66 when used as SCC in TIS tests, so that the DL-only part is available too now.

AMS32-K35

For TRP tests with a spectrum analyzer on LTE Cat. M1 half-duplex or NB-IoT, measurement mode "Zero-Span Trace Analysis" is now available.

The trigger offset on the spectrum analyzer can be configured in the Measurement Settings section of the Test Template.

The Video BW on the spectrum analyzer is now programmed to be 1 MHz for NB-IoT, in line with the CTIA OTA test plan.

User-defined Communication Tester

Can be used without calling an external application for every measurement. In that case, the customer needs to make sure to start an application continuously evaluating the sync file.

Supports testing several frequencies now.

Can now be used in TRP tests as well. Please note that in this case just the frequency information will be passed, the EIRP measurement will still be done by AMS32.

Evaluates error feedback now.

Modified Functionality, Antenna Testing

OTA Test Template, main dialog

Extended possibilities are available for configuring the graphical live display during tests with VNA:

- It is possible to select for which frequencies polar graphs shall appear during the test. All selected graphics will be added to a report created based on an AMS32 Report Setup.

- It is possible to display a constant limit line with a configurable value in the polar graphs.

- It is possible to show the average of all measured values at the end of the test.

- A dedicated button labelled "Graphic Extensions" has been added to the main template dialog. Clicking this button opens a sub-dialog for configuring the new parameters.

Modified Functionality, Antenna Testing

OTA test Template, Loop Settings

In the case of tests with a VNA with a ZC90 frequency extender, the priority order of the single loops is more flexible, polarization can be configured with lowest priority.

When configuring a spiral scan with Hardware Trigger, the elevation step size is automatically set to the same value as the azimuth step size and cannot be modified.

OTA Test Template, Measurement Settings

In a newly created template with VNA, phase measurements are enabled by default.

Antenna Testing

In stepped-continuous tests the VNA is not re-initialized at the start of each azimuth turn any more.

Live polar graphs are now rescaled after every azimuth turn in stepped-continuous tests.

The "Efficiency-PeakGain" result table now includes columns with the peak gain for each polarization, as well as columns showing the position at which the peak gain was identified.

OTA Visualization

Peak gain and peak realized gain can now be visualized for each single polarization.

Reflection Coefficients can now be visualized. This is the same functionality as clicking on the "Check Reflection Coefficients" button in the Gain calculation, but using the file saved to the test when performing the Gain calculation. This allows displaying these files, even if the original files are not available any more at their previous location.

Changing GUI control selections now re-initializes other controls, especially the frequency list, only when needed. This makes the GUI much more responsive.

Circular polarization and Luwig3 can now be selected only if phase data are available and both polarizations have been measured.

Visualizing a peak quantity over frequency takes some time because the all applicable measurement result files need to be scanned. In order to avoid the same delays for other peak quantities, all of them are evaluated at once, and the data written to dedicated result files. Visualizing other peak quantities then works without delay.

Removed the "NF Visualization" tab: Moved the GUI controls for visualizing the results of a near-field calculation to the "OTA Visualization" tab, and moved the GUI controls for configuring the near field E-field calculation to the "Post Processing" tab. Also, it is now possible to select more than one frequency at a time for performing the calculation.

NF-FF Transformation

Folder selection for the "Reference Antenna" in the Gain Calculation now starts at the PC's root folder instead of the AMS32 "Tests" folder.

Aborting a file selection with Cancel now does not clear the existing file information.

Speed of Gain Calculation has been improved.

S-Parameter utility

It is now possible to display the S parameters graphically. This applies to both the S parameters currently being measured, as well as to files (csv or Touchstone format) saved earlier.

Pattern Aggregation utility

It is now possible to select around which axis (X or Y) the DUT has been rotated between the tests for the two hemispheres. The rotation is considered when aggregating the partial patterns to a total one.

AMS32-ATS

ATS QZ Verification procedure now also displays graphics for the phase results.

The message box asking to position the reference antenna now contains graphical information showing the test positions and the polarizations, in order to assist the user.

It is now possible to create a new subfolder when saving the results.

The tabular result display now refreshes immediately after the measurement.

Modified Functionality, Antenna Testing

New VNA test capabilities

A new frequency converting mode "Harmonic Mixers" is available now.

It is now possible to use the rear IF input ports of the ZNA.

Setups with Active Frequency Multipliers are supported now.

The VNA driver's Properties dialog has been completely reworked, especially concerning the GUI controls for selecting and configuring setups for frequency converting measurements: A dedicated tab now contains these GUI controls; the frequency extender hardware in use can explicitly be selected where applicable, key parameters are then automatically configured to fixed values where applicable.

Improvements, OTA Testing

AMS32-K25

TIS tests on Bluetooth LE with Advertiser packets are starting correctly now.

Pattern type "Pseudo Random" is now programmed correctly to the CMW500 for WLAN TIS tests.

AMS32-K35

BLER measurements for NB-IoT with higher number of samples are now waiting long enough for the measurement to finish.

AMS32-PK2x

If any of the bundle options AMS32-PK2x and option AMS32-K35 are both active, the LTE radio band to test is not fixed to Cat. M1 anymore.

SPOT testing

Starting a TIS SPOT based on a TRP tests now always works correctly.

Improvements, Antenna Testing

AMS32-K50

TRP calculation on NF-FF transformed data is now using the positioning step sizes of the transformed data, and not the step size used for acquiring the raw measurement data.

The start of the transformation is now working reliably for all frequencies also on fast PCs.

AMS32-K55

Input data for the phase center evaluation are now retrieved from the correct folder in the case of existing tests which had previously been saved.

Antenna testing

The result files generated during the test for live display in a stepped-continuous test now are filled correctly, also in the case of starting at an elevation greater than 0 deg.

Attenuation values for the generator path are now saved to the test setup file correctly.

The Efficiency graph included in a report based on an AMS32 Report Setup now shows the correct data.

Antenna testing with CMP200 in stepped-continuous mode

The filter type and bandwidth now can be configured as planned in the Measurement Settings section of the Test Template, and the filters are programmed correctly on the instrument.

When the "Reset instrument at test start" box is checked in the Properties of the CMP200 power meter driver, the generator of the instrument is not switched off at test start anymore.

The measured data can now be correctly displayed in the OTA Visualization.

Improvements, Antenna Testing

OTA Visualization

TRP is not calculated any more in case of single cut tests.

Fixed an issue with TRP calculation for Clenshaw-Curtis and Gauss-Legendre quadratures for small step sizes.

VNA driver

Data readout in case of spiral scan tests with small step sizes is now working.

Data readout speed has been improved for continuous measurements in general.

Spectrum Analyzer driver

LO Power control for frequency conversion with the FSW is now working.

NRPM driver

When testing with two NRPM-OTA units connected to the same base unit, the measurements are now done simultaneously if configured.

2 Software Update

2.1 Updating the Software

Download and expand (unzip) the file “EMC_AMS_WMS32_11V20.zip” to a temporary folder on your hard drive.

Run the “Setup.exe” program in order to update your EMC32 installation to V11.20.00.

IMPORTANT

The Service and Maintenance option AMS32-K90 is mandatory for running AMS32 from V11.00 on, and entitles the user to receive upgrades during one year after the purchase. Thus do not install V11.10 if these options are not available. Please contact your R&S Sales Engineer for further information.

3 Version History

3.1 Version 11.10.00

New Functionality

Release of option AMS32-ATS (CATR Quiet Zone Verification)

This option implements the necessary measurements and algorithms for verifying the Quiet Zone of a CATR (Compact Antenna Test Range) chamber, e.g. the R&S ATS1800C.

We recommend to do the verification with a VNA, as measured phase data are available which allow a better resolution for the validation. However, the verification can also be done with a CMP200.

AMS32-ATS can be used as standalone tool. In that case, AMS32 will start off normally, but no OTA tests can be created or loaded, the functionality will be limited to system configuration, path calibration and this CATR validation.

Release of option AMS32-K58D (Dual SMW support)

This option supports setups for antenna measurements with NR signals with two SMW200A. Two configurations are possible

- Master-slave: In this case both SMW200A are coupled and generate a NR multi-carrier signal over an aggregate bandwidth of > 1 GHz. Please refer to the SMW200A manual for details on master-slave operation

- Default: In this case, both SMW200As are driven individually, generating two NR signals at different frequencies.

Minimum required firmware for the SMW200A: 4.70.026.51

Pre-requisite: Option AMS32-K58 must be active.

The AMS32 implementation relies on loading setup files stored on the instruments configuring the NR signal(s) as required.

Tests with CMP200 in List Mode and with external Hardware Trigger are now supported. This allows to conduct tests in stepped-continuous mode, with the corresponding massive time saving.

Minimum required firmware for the CMP200: 2020.6.0.13

Modified Functionality, General

Table Merge Tool

The default folder for the merged table now is the same folder where the source tables are located.

OTA Options

It is now possible to configure the string to be included in the report for unit "degree". This is for addressing the fact that the 'o' character cannot be displayed correctly on PCs with Asian language, leading to missing line headers in the CTIA report.

Modified Functionality, OTA Testing

AMS32-K29 / -K30

- Added band LTE FDD85

- During TRP tests, the TBSI was reverting to 6 by default. Now the TBSI configured for link setup is kept during the test.

Modified Functionality, OTA Testing

AMS32-K37L

Uplink TBSI can now be configured for the LTE link setup for A-GNSS testing.

AMS32-K58

- For tests with the CMP200 as CW power meter, the Gaussian bandwidth can now be seamlessly configured in the range from 1 kHz to 10 MHz
- For tests with the CMP200 as measurement instrument for NR signal demodulation, the NR channel bandwidth can now be configured.

TRP tests with NRQ6 on TDD signals

The Trigger-to-Noise parameter is now available for configuration in the test template. The NRQ6 trigger level is programmed accordingly.

OTA Options

Added possibility of using Clenshaw-Curtis weights for calculating integral quantities (TRP, NHPRP, etc.)

Modified Functionality, Antenna Testing

AMS2-K49

"ffnormc" (normalization factor of the NF-FF transformation) can now be visualized as a function of frequency.

AMS32-K50

Mesh creation for the transformation has been enhanced, making the mesh smoother and allowing for finer intermediate scaling, based on the target length of the triangle sides.

EMC32-K11

When a running test sequence is aborted, results of NF-FF transformation completed during this sequence are not discarded any more.

OTA Options

Phase values can now be retrieved and saved unwrapped. A corresponding element has been added to the OTA Options dialog.

On reloading a test, the 2D polar plots documenting the measurement progress during a running test, are not loaded any more in order to save time.

VNA Driver

The time required for retrieving the data in tests with hardware trigger has been noticeably reduced.

NRQ6 Driver

Added the possibility of configuring attenuation and bandwidth from the Hardware Setup and the Path Calibration Setup

Limited the minimum aperture time to 10 ms

SMW200A Driver

When generating a NR 5G signal, the Phase Compensation frequency for the Test Model is now set.

Modified Functionality, Antenna Testing

ATS1800C Driver

Two new compatibility modes can now be activated in the driver's Properties dialog for the azimuth rotation axis:

- Compatibility to WPTC and ATS1000. If activated, the movement and position reference will be changed so that the coordinate system and the resulting pattern matches the one of the R&S WPTC and ATS1000 chambers.
- Alignment of the angles displayed in the ATS1800C WebGui to AMS32.

Improvements, General

CTIA Report

Date and time stamp of the report creation was missing.

Improvements, OTA Testing

AMS32-K29 / -K30

In LTE TIS tests in band FDD13, RB allocation schemes were wrong, and no attenuation values were stated in the CTIA report.

AMS32-K37L

- Duplex mode TDD was not set correctly.
- Conducted testing was missing the initialization of some parameters.

Directly loading Sim Card information data in the Test New dialog was not working.

Improvements, Antenna Testing

AMS32-K48

It was not possible to configure using the Hardware Trigger in the case of RX measurements with a FSW.

AMS32-K49

The weights for advanced integration schemes were wrongly calculated when the test was not executed up to the maximum elevation.

AMS32-K50

- The pre-inversion utility could get stuck due to timing effects.
- In Gain Calculation, the 1 Hz frequency shift for separating the frequency ranges of the reference antennas was not always taken into account correctly.

EMC32-K11

Configuring a Test Sequence Template for NF-FF transforming a series of tests could fail if the \Tests folder was located on another driver than the default data.

OTA Test Template

- Some parameters in the "NF-FF Transformation" settings section were not saved correctly to the test template.
- When creating a new test template for measurements with a VNA, clicking on the "NF-FF Transformation" button opened the "Additional Measurements" dialog. The effect was gone after saving the template once and re-opening.

Improvements, Antenna Testing

Tests configured as single-point measurements at the pole could not be re-opened under certain circumstances.

Path Attenuation values for the generator path were not documented correctly.

OTA Reporting

- Efficiency and Peak Gain calculation was wrong for tests using the CMP200 as power meter.
- A wrong unit "dB" instead of "dBm" was displayed in the 3D graphic in case of active DUT tests with FSW, with no setup file being loaded on the FSW.

CMP200 Drivers

Default VISA identifier was empty when adding the driver to the Device List.

3.2 Version 11.00.10

New Functionality

Modified Functionality, Antenna Testing

When opening an existing antenna test, the default 2D polar graphs are not loaded any more.

AMS32-K50

- Changed a label in the GUI for Nastran file creation, showing the minimum suggested edge resolution.
- Step sizes in the mesh triangulation for spherical Nastran files are now rounded to the second decimal.

Improvements, Antenna Testing

AMS32-K49

- Avoided the attempt to evaluate $\log(0)$ in certain cases of TRP integration.
- Corrected weight factor calculations for different integration methods in case the elevation range stops before 180 deg.

AMS32-K50

- The values of some parameters in the OTA Test Template, NF-FF Transformation section, were not saved correctly.
- The pre-inversion utility could abort with a "File not found" error on slow PCs.
- Corrected the interpolation at the first frequency for reference antenna radiation efficiency calculation.

3.3 Version 11.00.00

New Functionality

Release of option AMS32-K80.

This option supports the generation of machine-readable reports according to the current state of the draft for CTIA Test Plan 4.0.

Release of option AMS32-K90.

This option is the Service and Maintenance option for AMS32. It is required for running AMS32 from V11.00 on, and entitles the user to receive upgrades for free during one year after the purchase.

Please contact your R&S Sales Engineer for further information.

AMS32-K25

Added support for WLAN 802.11ax. Only SISO signaling mode is supported.

Modified Functionality, General

OTA Options

The unit of the efficiency trace in the "Efficiency_PeakGain" graph can now be configured. Possible values are dB or %. When selecting %, the peak gain cannot be displayed any more, as all traces in one graph need to have the same unit.

Driver for maturo antenna booms

Added the possibility of moving the boom in inverse direction, that is, to negative angles.

Modified Functionality, OTA Testing

AMS32-K29 / -K30

Added the possibility of monitoring the DTX value during LTE Sensitivity tests. For each phase of the levelling, a DTX limit can be specified. If this limit is exceeded, the software gives the user the possibility of reacting accordingly.

AMS32-K37

Added a flag in the Properties dialog for configuring whether the basic initial configuration shall be performed each time at test start or only once after starting AMS32.

Modified Functionality, Antenna Testing

AMS32-K48

In stepped-continuous test with hardware trigger, the measured data are now displayed in a 2D polar graph after each azimuth turn is completed.

AMS32-K49

Antenna visualization capabilities now include circular polarization gain.

AMS32-K50

- Enhanced performance of Nastran file creation. Triangle coverage is now smoother and the process is faster.

Modified Functionality, Antenna Testing

- Optimized test file management for tests with NF-FF transformed data. The data of previous transformations are not copied to the temporary test folder any more, and remain in the main \Tests folder. This makes test loading and saving much faster.
- Increased the speed of NF-FF transformation for certain configurations.

AMS32-K53

The final resolution of the SWE transformation can be configured down to 0.02 degree now. Attention! At step sizes below 0.1 degree, transformation time and file sizes increase fastly. Please expect major delays compared step sizes available until now.

AMS32-K58

Enhancements in ACLR measurements when testing antennas with modulated signals:

- The values measured in all four adjacent channels are saved to individual measurement files.
- TRP is calculated for each adjacent channel and printed to the CTIA report format.

OTA Options

Added the possibility of padding not measured parts of an antenna pattern with a configurable fixed value. This is useful especially for the case of directive patterns (beams), where major parts of the pattern may be of no or less interest.

Path Calibration

Enhanced path calibration with the CMP200. The intermediate frequency range not covered by the instrument is skipped during the calibration.

Device Drivers

- SMW200A driver: Option SMW-B144 is now identified, enabling operation up to 44 GHz.
- FSW driver: Loading setups was only working correctly for setups stored in a specific folder. Now the setups stored in the default folder can also be loaded.
- CMP200 drivers: The drivers now also support the CW and non-signaling capabilities of the CMX500, to the same extent as implemented for the CMP200.

Improvements, OTA Testing

TRP calculation could lead to wrong results for single cut pattern with constant phi and theta up to 360 degree.

The Additional Measurements section in the OTA Test Template was disabled in case of LTE tests, if only the bundle options AMS32-PK20 or AMS32-PK25 were active.

Improvements, Antenna Testing

AMS32-K48

- When measuring both polarizations with a VNA simultaneously in RX mode, with one polarization using primed measurement quantities, the path correction for this primed signal offset in frequency was done at the nominal base frequency. This could lead to not negligible offsets in phase results.
- Raw data were not saved in case of stepped-continuous tests with hardware trigger, if the flag "Save result files after every measurement" was not checked in the OTA Options.

AMS32-K50

Efficiency files obtained from Gain Calculation were sorted wrongly, not by increasing frequency values.

Improvements, Antenna Testing

When checking the box "Define test positions with a file" in the Loop Settings of the OTA Test Template, display of the contents of the dialog could be wrong.

The data and the format of the export file for NF-FF transformed data in StarLab format were wrong. Additionally, the number of digits after the period for the data has been decreased to 2 to reduce the size of the files.

Improvements in the Remaining Time indication for spiral scan and when using a file for defining the test positions.

VNA driver

Test with harmonic mixers in D band (110-170 GHz) aborted with a "Frequency out of range" error.

3.4 Version 10.60.20

Modified Functionality, General

Message box on iKey dongle disconnection

- Added time and date stamp
- Disconnection event is logged to the error log file
- Dialog is now modeless

Driver for maturo antenna booms

Added the possibility of moving the boom in inverse direction, that is, to negative angles.

Modified Functionality, OTA Testing

AMS32-K30 / -K30A

- OTA Test Template, Loop Settings:
 - * Aligned default channels for band FDD66 per CTIA test plan.
 - * Enabled DL-only part of band FDD66 for radio channel selection, if configured as SCC.
- OTA Test Template, Additional Measurements:
 - * The button is now available for LTE tests also in case only options AMS32-PK20 or AMS32-PK25 are enabled.
 - * Always allow selecting an SCC2 band for LAA LUD testing.
- In LTE TRP tests, the UL TBSI does not revert anymore to default value 6.
- In LTE LAA LUD tests, the channel bandwidth is now set per CTIA test plan.

AMS32-K35

- OTA Test Template, Measurement Settings for LTE Cat-M1 and NB-IoT:
 - * Added measurement mode "Zero Span Trace Analysis".
 - * Spectrum analyzer trigger offset is now configurable.
- Video Bandwidth is set to 1 MHz when testing TRP for NB-IoT, in line with the CTIA test plan.

AMS32-K37L

- For Cat-M1 in band FDD13, set default RB allocation per CTIA test plan.
- Corrected channel range for band FDD71.

Modified Functionality, Antenna Testing

AMS32-K48

OTA Hardware Setup: The Hardware Trigger can now be activated for Antenna Measurements in RX mode with FSW/SMW..

AMS32-K58

- OTA Test Template, Measurement Settings with CMP200: If any quantity is selected in the "Active Measurements" tab, allow configuring the NR channel bandwidth, and do not display the parameters for CW power measurement.
- OTA Test Template, Measurement Settings, "Active Measurements" tab: Added a network selection "<none>". Selecting this entry leads to measuring EIRP with the normal RF spectrum analysis function.

Spectrum Analyzer driver

- Do not set link direction for 5G NR demodulation if a setup file is loaded.

Modified Functionality, Antenna Testing

- Activate external trigger from Power Insertion Unit also in case of Active DUT with no arbitrary waveform file generated from an SMW. Make sure to select any Radio Standard different from "none" in the "Active Measurements" tab in the "Measurement Settings" of the OTA Test Template in this case.

NRPM-OTA driver

Made sure units do measure simultaneously if applicable.

Improvements, OTA Testing**AMS32-K25**

- CMW-BT driver: Avoid sending commands exclusive to option CMW-KS600 if the option is not available
- CMW-WLAN driver: Data pattern "Pseudo Random" was not programmed for PER measurements.

AMS32-K30

Corrected internal data format for TIS tests in band FDD13, fixing issues with RB allocation setting and reporting.

AMS32-K37L

In conducted LTE A-GNSS tests with the OTA Enabler, configure the driver completely on startup. This solves issues with 20 dB level offset, LBS Server stopping to work, wrong OTA scenario, superfluous display of CDMA statistics.

Improvements, Antenna Testing**AMS32-K48**

- Testing in stepped-continuous mode with a single polarization could lead to an error 4009.
- Raw data were not saved in case of stepped-continuous tests with hardware trigger, if the flag "Save result files after every measurement" was not checked in the OTA Options.

AMS32-K49

- Avoided calculating TRP in dBm if the linear power sum is 0 mW.
- Corrected calculation of the weights for Gauss-Legendre, Clenshaw-Curtis and Jacobian quadratures; the maximum configured elevation value is used and not 180 deg.

AMS32-K50

- The pre-inversion utility could abort with a "File not found" error on slow PCs.
- Made sure that a transformation has started before proceeding to start the next one.
- Efficiency files obtained from Gain Calculation were sorted wrongly, not by increasing frequency values.

AMS32-K54

If "Measure poles only once" is checked in the OTA Options, the *.nfd file used as input for the DUT Offset Correction is now constructed creating rows for all azimuth entries at 0 deg elevation, with the same measured value.

AMS32-K58

Efficiency and PeakGain figures were incorrect for tests with CMP200 under certain circumstances.

VNA driver

Test with harmonic mixers in D band (110-170 GHz) aborted with a "Frequency out of range" error.

3.5 Version 10.60.10

New Functionality

Modified Functionality, Antenna Testing

VNA driver:

- Extended the frequency range when using the frequency converter for V band up to 80 GHz.
- Always use Trigger Input A for the ZNA family, even if option ZNA-B91 is installed.

OSP-N driver:

- Force re-scan on module B153B when switching the driver to physical mode.

Improvements, OTA Testing

A runtime error 4091 could happen when testing TRP with a spectrum analyzer.

CTIA report generation failed for TIS test in classical (not RSS-based) mode.

Re-opening the General Settings section of a test template for W-CDMA using the CMU200 was displaying a wrong radio network selection.

Channel selection was disabled for Bluetooth in the Loop Settings section of the test template.

Improvements, Antenna Testing

AMS32-K50:

- Automatic creation of several Nastran was using unreasonably high resolution factors.
- Pre-transformation was not working with newly created Nastran files.

3.6 Version 10.60.00

New Functionality

Release of option AMS32-K37F.

This option supports multi-frequency A-GNSS measurements as described in the relevant contributions to the CTIA OTA Test Plan rev. 4.0: Acquisition and linearization of a 3D C/No pattern for a mixed scenario with A-GPS L1+L5 signals; calculation of the "Average 3D C/No" figure of merit.

For R&D purposes, it is also possible to perform a Sensitivity Search on the A-GPS L5 signal in a mixed L1+L5 scenario, according to the original proposal by CTIA, ultimately discarded for the final version of the Test Plan.

A R&S SMBV100B Vector Signal Generator is required for generating mixed L1+L5 A-GPS scenarios. Required options: SMBVB-K44, SMBVB-K134, SMBVB-K137. Minimum required firmware version: 4.60.112.22.

AMS32-K37L:

Added A-GNSS testing on LTE Cat.M1 devices, according to CTIA OTA Test Plan rev. 3.9. Option CMW-KS590 is required on the CMW500 in addition to standard LTE A-GNSS testing.

Added a new driver for the R&S CMP200.

Option AMS32-K58 is required for using this driver.

Functional extent:

- Generation of CW signals and replay of arbitrary wave files
- Measurement of CW signals with General Power Meter and FFT Spectrum
- Measurement of modulated signals (5G NR uplink): EVM, ACLR, OBW, etc.

Added a new driver for the positioner of the R&S ATS1800C and ATS1500 CATR chambers.

Added a new utility for merging two tests if each of them contains the data for one hemisphere. This is useful for systems in which the elevation positioner (antenna boom) range is limited to a maximum of 90 degree. The utility can be called from the main menu entry "Test >> OTA Pattern Aggregation...".

Modified Functionality, General

Signal Path Calibration:

- It is now possible to configure a position for the two positioner axes.
- Adapted the Calibration Sequencer to be more flexible for calibrating paths with different reference antennas in different frequency ranges: It is now possible to modify the frequency range of the calibration process in the sequence editor; attenuation tables will not be overwritten, but frequency ranges will be merged to existing tables.

OTA Options for 3D graphs: Added the possibility of defining a default scale with fixed minimum and maximum values.

Attenuation tables can now be selected from sub-folders of \System\Correction Tables\Attenuation.

Modified Functionality, OTA Testing

AMS32-K34: Adapted the criterion for outlier measurements in GPS standalone testing in line with CTIA OTA Test Plan rev. 3.9.

AMS32-K35:

- Adapted NB-IoT testing to the changes per CTIA OTA Test Plan rev. 3.9.

AMS32-K36:

- TIS measurements for BT Low Energy can now be configured and performed per CTIA OTA Test Plan rev. 4.0, with a "Fast PER" test for the pattern measurement and a Single-Point Offset Measurement for the final Sensitivity and TIS.

Added the possibility of testing Low Transmit Duty Cycle devices according to the CTIA OTA Test Plan. This mode can be selected in the "Test New" dialog when creating a new test.

Added the possibility of displaying the throughput in units of Mbps (additionally to %) in the case of Sensitivity tests with constant power.

Ripple Test: The new default frequency covering the A-GPS L5 band has been added.

Modified Functionality, Antenna Testing

Hardware Setup:

- Added the possibility of configuring a new type of setup, in which a power insertion unit detects a TDD burst coming from the DUT, and triggers the FSW to measure that burst. This is used to improve system sensitivity, as the FSW alone may be too insensitive for detecting the TDD burst in all cases.

OTA Test Template, Loop Settings section:

- It is now possible to define arbitrary measurement positions with the help of a file instead of having to define loops over azimuth and elevation.
- All frequencies entered in the measurement frequency list can now be selected at once pressing CTRL+A keys.

OTA Test Template, Measurement Settings section:

- Extended and improved consistency of tab "DUT IF Clock" in case of measurements with a VNA.

OTA Test Template, Additional Measurements section:

- It is now possible to select a saved instrument setup or a test model (for LTE and 5G NR) for loading on the FSW.

Dual Receiver antenna tests: Added the possibility of measuring wave quantity ratios.

In stepped-continuous tests, the result files are now saved after every azimuth turn, if the checkbox "Save result files after every measurement" in the OTA Options dialog is checked,

For tests configured with a position file instead of with azimuth and elevation loops, the positioners are now moved simultaneously when changing position.

NF-FF transformation dialog: AUT Size definitions are now consistently expressed as radius in all cases.

Speed improvements in NF-FF transformation with FIAFTA and in Gain calculation.

Modified Functionality, Antenna Testing

The two check boxes in the OTA Options dialog for activating and configuring pattern padding before NF-FF transformation with FIAFTA have been merged to a single one.

Added new algorithms for calculating the integral (TRP or efficiency) on antenna patterns. The new methods are as discussed in 3GPP standardization for 5G NR FR2 (directional beam patterns): Clenshaw-Curtis and Jacobian matrices.

The algorithm to use for pattern integration is configurable in the OTA Options dialog. Previously implemented algorithms (classical sin(theta) weighting per CTIA, Gauss-Legendre) are available as well.

Note that this applies to antenna measurements only. For mobile phone testing according to CTIA, classical sin(theta) weighting remains the only method.

When re-creating the csv table from the "OTA Analysis" dialog, an additional table is now created with the far-field data, in case a NF-FF transformation has taken place.

OTA Visualization:

- Added a new evaluation feature for rotating a pattern. Typical application is to rotate a directional pattern (beam) so that the beam direction matches the +Z axis in order to obtain the corresponding phi=constant or theta=constant cuts.
- Grouped all evaluation functionalities to be performed after pattern acquisition into a new tab "Ota Post-Processing", which is available in both the "OTA Analysis" and the "NF-FF Transformation" dialogs. The following evaluation utilities can be called:

- * Antenna Gain calculation
- * DUT Offset Correction (option AMS32-K54)
- * 3D rotation of the pattern
- * DUT Phase Center evaluation (option AMS32-K55)

All of these can be performed on the raw measurement data or on NF-FF transformed data (option AMS32-K50 or AMS32-K53 required).

The main menu entries for DUT Offset Correction and DUT Phase Center evaluation have disappeared.

- Added the possibility of displaying Directivity for the raw measurement data before NF-FF transformation

EMC32-K974 (remote control of AMS32): Extended the interface in order to allow for loading existing tests and performing a NF-FF transformation.

SMW driver: Options SMW-B140N and SMW-B144 are identified now, allowing operation up to 40 GHz.

Improvements, OTA Testing

AMS32-K25: BT EDR setups are now programmed correctly.

AMS32-K29/-K30:

- Creating a test in which the LTE power was measured with the CMW, and EVM was selected to be additionally measured, aborted with an error.
- Coexistence tests with a CMW500 equipped with SUA do not lead to resource conflicts any more. SUA2 is used for the interfering RAT (LTE or WLAN).
- For bands FDD30 and FDD70, the correct RB allocations are now saved when deleting default channels from the selection list.

AMS32-K30A:

- LTE setups with 4CC CA were not programmed correctly if one single CMW500 was used instead of a FLExx setup.
- Made sure that channel list is now complete when configuring band FDD66 as SCC in a CA setup.

Improvements, OTA Testing

AMS32-K37L:

- RB allocations are now set correctly for the Sensitivity test in bands FDD13 and FDD14.
- Made sure to use the correct SUPL Version (2.0).

Sensitivity Sweep and Relative Sensitivity (RSIC) according to the CTIA Test Plan are working again for RSS-based tests.

Under certain circumstances, uplink power level was not set to maximum for RSIC tests.

Spiral scan was not working if a second Antenna Boom was present in the Device List in virtual mode.

Made sure 3D graph is generated in case of Sensitivity test with constant power in TM2 MIMO mode.

The software does not hang any more when clicking on "Cancel" in the configuration dialog for plotting the main cuts from the "OTA Analysis" dialog.

Improvements, Antenna Testing

Made sure that antenna measurements with NRP power meters are working again.

Corrected the remaining time indication in stepped-continuous tests with hardware trigger.

Dual Receiver antenna tests:

- Made sure spiral scan works correctly.
- Made sure VNA outputs are switched on as required.

Improvement in TRP calculation with Gauss-Legendre weights.

Made sure the Phase Center Evaluation utility does not abort with an error for frequencies with non-zero digits in the kHz range.

Ota Visualization:

- 2D polar plots displaying EVM in dB were showing the data with inverted sign.
- Made sure that the unit selectable for "Realized Gain" is always correct.
- Made sure unit "mBi" is not displayed any more in marker labels in 2D plots.
- Made sure patterns with azimuth range < 360 deg are displayed correctly.
- Avoid a division by zero when visualizing electric or magnetic currents.

The CDF evaluation algorithm was not working if the tests to be evaluated were located in a folder more than one level below the \Tests root folder.

Under certain circumstances the DUT Offset Correction utility was not working if Probe Correction was activated.

In rare cases, the positioner movement returning to zero position at test end could time out.

FSW driver:

- Conversion loss correction tables (configurable in the driver's Properties dialog In case frequency conversion with the help of external mixers is active) are now loaded correctly.
- Made sure the pre-amplifier is switched if configured in all cases.
- Made sure tests in RX mode are working.

Improvements, Antenna Testing

VNA driver:

- Made sure that the message box informing that no calibration is loaded does appear only once at test start in a stepped-continuous test, and not before each azimuth turn.
- Made sure setup files are displayed and loaded correctly for all models.

3.7 Version 10.59.00

New Functionality

Release of option AMS32-K52U.

This option supports the use of NASTRAN files created by the customer for NF-FF transformation with FIAFTA and for displaying NF quantities.

Functional extent of option AMS32-K52 has consequently been reduced to NASTRAN files generated with AMS32 only. Option AMS32-K52U includes option AMS32-K52.

Release of option AMS32-K54.

This option implements the possibility of correcting a measured antenna pattern for a known position offset between the AUT and the center of rotation of the measurement system.

Release of option AMS32-K55.

This option implements the possibility of calculating the phase center offset of a measured pattern relative to the center of rotation of the measurement system.

Added the possibility of performing an evaluation of the aggregate spherical coverage of a group of single tests. The overall result is a CDF trace over level.

Modified Functionality

AMS32-K35, LTE Cat. M1:

- Added possibility for configuring Half-Duplex or Full-Duplex FDD transmission.
- TIS testing: Switch RB allocations in the DL according to the CTIA test plan.
- TIS testing: Made sure all necessary result files and graphics are generated for band FDD13, in which the same channel is tested with different RB allocations in the DL.
- Report: Print the RB allocations in a format traceable to the specifications in the CTIA test plan.

Vector Network Analyzer driver: Added support for ZNA family.

SMW200 driver: Added the possibility to keep the RF signal ON at test end.

3.8 Version 10.55.00

New Functionality

Release of option AMS32-K60. This option supports system calibration and verification, as well as DUT tests with the R&S PWC200.

Modified Functionality

AMS32-K35:

- Both the bandwidth corresponding to the real RB allocation, as well as the full bandwidth of the LTE channel are now stated in the report.
- In the OTA Test Template, Loop Settings section, the frequencies listed for TIS testing are the real test frequencies (center of the RB allocation), and not the center frequencies of the LTE channel.

AMS32-K25:

- Added the possibility of configuring the trigger offset for WLAN TRP tests with a spectrum analyzer.
- Added a fast mode for link establishment, that avoids repeated inquiries.

AMS32-K37x: The software now checks for the availability of the corresponding option before loading the instrument drivers to the Device List.

AMS32-K57: Added a new "dual mixer" mode for frequency conversion tests with a ZVA.

Improvements, OTA Testing

AMS32-K35: Channel lists for NB-IoT were initialized incorrectly.

AMS32-K30A: For LTE CA setups, channels were not set correctly if two CC were in the same band.

Improvements, Antenna Testing

Always save correct values to "Efficiency_PeakGain" file. Not all values were correct in case of tests measuring absolute levels.

AMS32-K58:

- Always set the correct level on the SMW200A
- Test with active modulated LTE signal was not working if only ACLR was selected, but not EVM.
- Channel bandwidth for 5G NR is now set correctly.

AMS32-K51: Corrected a bug that could lead to wrong normalization of the probe files.

AMS32-K50:

- One file needed for running the NF-FF transformation was not being installed.
- An out of date version was being installed for the NF-FF transformation utility.

3.9 Version 10.50.10

New Functionality

AMS32-K58:

- Antenna Testing, evaluation on beam peak after pattern measurement: Added a new mode for searching the peak, based on aggregate EIRP instead of single polarization EIRP. If this mode is selected, beam peak quantities are measured for both polarizations.

Modified Functionality, OTA Testing

AMS32-K22:

- (E)-GPRS TIS testing: Linearization for RSS-based test aborted after first measurement.

AMS32-K25:

- W-LAN TRP testing: Added the possibility of configuring the trigger offset on the spectrum analyzer.
- W-LAN TRP testing: Added the possibility of performing a PER measurement for checking the link state.
- W-LAN TIS testing: Added an improved link state check based on counting the failed PER measurements.

AMS32-K29/-K30:

- Conducted testing: Adapted radio link setup in order to avoid unnecessary channel handovers and bandwidth setting.
- It is now possible to switch off or configure the alpha factor for the Advanced PRACH Uplink Power Control. Please ask R&S for details if required.

AMS32-K30A:

- OTA test execution, 2CC CA tests for LTE: Do not change channels automatically if only one channel is configured to be tested.
- Scheduling modes other than RMC can now be used for the PCC in LTE CA setups.

AMS32-K35:

- OTA test template, section Loop Settings, TIS testing for LTE Cat. M1: Display the channel frequencies as the center of the allocated RBs and not as the center of the channel.
- Reporting for LTE Cat. M1: Both the occupied bandwidth (corresponding to the real RB allocation) and the basic LTE channel bandwidth are now stated in the report.
- Reporting for LTE Cat. M1: The NB index for the RB allocation is now stated in the report in all cases.

AMS32-K37:

- Increased the measurement timeout in order to align with the OTA LBS Enabler.
- Added the OTA Enabler driver to the Conducted testing utility.

Maturo NCD Turntable driver:

- Added the possibility for configuring the Logical Unit Number (LUN) of the second turntable.
- Added the possibility of configuring a fixed position offset. This makes it possible e.g. to test with azimuth turntables in the range of -180 to +180 degrees.

Modified Functionality, Antenna Testing

AMS32-K58:

- Measurements on active AUTs: The EIRP is now measured with the demodulation personality of the spectrum analyzer instead of with the standard RF spectrum instrument. Please make sure to select the correct radio network (and hence the correct demodulation personality) in the Measurement Settings.

Reporting:

- Reports could only be generated for 9 frequencies at a time. Now it is possible to select any number of channels, 3D graph generation is managed accordingly, and all reports are generated correctly.
- Do not refer Max. EIRP figures to the input level.

Improvements, OTA Testing

AMS32-K29/-K30:

- OTA test template, section OTA Loop Settings, TRP testing for LTE: Initialize default RB allocations in bands FDD66 and FDD71 in line with the CTIA test plan. Correct available channel numbers for bands TDD45 and TDD48.

AMS32-K30A:

- Corrected the automatic channel change for 2CC CA setups.
- Band TDD46 was not set up correctly when used as SCC.

AMS32-K35:

- OTA test template, section OTA Loop Settings: Display correct channel lists for NB-IoT.
- Corrected RB allocation for LTE Cat. M1 tests with 5 MHz channel bandwidth.

Ripple Test: Selected bandwidth was not programmed to the VNA; 1 kHz was always used.

Recovered GPIB interface for the NRP power meter driver.

DST200 positioner driver: Fixed occasional problems with Homing on Windows 10 PCs.

Conducted testing: Selecting an arbitrary channel was not always working correctly.

Improvements, Antenna Testing

AMS32-K50:

- File libmmd.dll was missing in the installer.
- Old versions of the NF-FF transformation programs were installed.

AMS32-K58:

- Measurements with modulated signals: Adjust the level after activating the demodulation personality.
- Measurements with modulated signals: Test was not working for LTE is only ACLR was selected.
- Measurements with modulated signals: Bandwidth was not set correctly for 5G NR.

Antenna Measurements in Active Mode (no RF generator): Save measurement results correctly.

No 3D graphics could be generated for Antenna Measurements if options AMS32-K49, AMS32-K50 and AMS32-K53 were all missing.

Improvements, Antenna Testing

Save correct values to "Efficiency_PeakGain" file in the case of measuring absolute power levels.

Loading probe data: Corrected a bug leading to wrong normalization of the probe files.

3.10 Version 10.50.00

New Functionality

Release of option AMS32-K30L, OTA tests in band LTE TDD46. This option supports OTA testing for band LTE TDD46 as required by the CTIA test plan V3.8.1, section 6.21, including the new LAA Un-Licensed Degradation (LUD) test.

The following CMW options are required: CMW-KS550, CMW-KS510, CMW-KS512, CMW-KS514

Minimum required firmware versions for the CMW are: BASE 3.7.10, LTE Signalling V3.7.50

Release of option AMS32-K36, OTA tests on Bluetooth Low Energy devices. This option supports OTA tests BT LE devices according to the CTIA test plan V3.9 (not yet released, draft status), that is, measurements on Advertiser Packets.

Additionally, this option supports OTA tests on BT LE devices with the full signalling option implemented on the CMW.

The following CMW options are required: CMW-S100H (MUA), CMW-B500I (SUA, for LE Signalling), CMW-KM611, CMW-KD611 (for Advertiser Packets), CMW-KS601 (for LE Signalling)

Minimum required firmware versions for CMW500 are: BASE V3.7.10, Bluetooth

Release of option AMS32-K37M, MBS tests with the R&S OTA Enabler for LTE. This option supports MBS OTA testing as required by CTIA test plan V3.8.1, section 6.8. A new device driver CMW-MBS can be added to the Device List if this option is active.

The following CMW options are required: CMW-KT570, CMW-KT577, CMW-KT591, CMW-KVS628, CMW-KAA10 and the LTE signaling options (CMW-KS500, CMW-KS510, CMW-KS550).

Other pre-requisites are a DAU (CMW-B450D) with applicable firmware options CMW-KA100 and CMW-KA150 (optional).

Minimum required firmware versions are:

- CMW500: BASE 3.7.10, DAU 3.7.20, LTE Signalling V3.7.30.
- SMBV100A: 3.50.082.47

Added a new utility for recording S parameters with the help of a VNA. Results can be saved in csv and in s1p (Touchstone) format. This feature is not linked to any specific option.

Support for R&S NRX Power Meter. Minimum required FW is V2.20.

Modified Functionality, General

Several GUI changes improving logical consistency and usability

Modified Functionality, OTA Testing

Extended contents and usage of the SIM Card dialog (Extras >> Options >> Mobile SIM Cards/Networks. Added parameters "Default IMSI" and "Milenage" (only for LTE).

SIM Card parameters are now also used together with the A-GPS drivers (CMW-KA090, CMW-OtaLbsEnabler, CMW-MBS)

AMS32-K35: Extended the CMW-NB IoT driver in order to support new features added to the CMW500 until firmware V3.7.40. Most important is the introduction of variable sub-carrier spacing (3.75 kHz or 15 kHz).

AMS32-K37:

- Extended the selection of available RF ports in the driver for the OTA LBS Enabler. A second RF frontend on the CMW500 can now be used too.
- Changed the behaviour of the OTA LBS Enabler driver in case a test is started with the UE already attached to the LTE cell. In this case, the CMW500 is not fully initialized, but only briefly switched off an

Modified Functionality, OTA Testing

on again for synchronizing to the SMBV100A. Re-attachment should be immediate. This does not apply to the first test after starting AMS32. In this case, the CMW500 always needs to be completely reprogrammed.

AMS32-K28, AMS32-K37: The Auto Test protocol window, which shows logging information during the run of A-GNSS tests, is now opened automatically at test start.

AMS32-K30/-K30A:

- In LTE tests with CA setups, the channels in the aggregated bands now are changed together with the channel in the main band to test, according to the CTIA OTA Test Plan.
- Made sure the "High Power" checkbox is displayed for TRP tests in bands FDD14 and TDD41.
- Extended the list of available channels for band FDD70, in order to include the DL only part (up to 68585).

Modified Functionality, Antenna Testing

AMS32-K58:

- When doing post-pattern measurements on the beam peak, the result values of the measured quantities are now saved to additional columns in the "Efficiency_PeakGain" result table.
- In the case of ACLR, the values of all four adjacent channels are saved to this table, instead of just the highest one.
- It is now possible to perform the post-pattern measurements on the beam peak several times in a row, with different bandwidths or signal setups on the SMW200A.
- Added auto level adjustment before measuring demodulated parameters
- When testing with 5G NR with one of the pre-defined test models on the SMW200A, a corresponding allocation file will be loaded on the FSW NR personality, if available.
- If the checkbox for not resetting the instrument on test start is checked in the Properties of the FSW driver, the 5G NR demodulation personality option is not reset at test start either.
- When measuring EVM for 5G NR, wait for signal synchronization before performing measurements.
- Added ACLR, OBW, SEM and Spectrum Flatness as measurement quantities for 5G NR
- In the case that an NR 5G pre-defined test model is loaded on the SMW, a corresponding setup file can be loaded on the FSW. For enabling this feature, an entry is necessary in a configuration file. Please contact R&S for the FSW setups and details on the configuration entry.
- Option SMW-K140N is now identified, in addition to option SMW-K140, enabling frequency range up to 40 GHz.
- Option SMW-K144 (5G NR) is now identified.

AMS32-K50/-K53:

- A new version of the FIAFTA algorithm is included, leading to a significant improvement in transformation speed. (The exact time needed for the transformation depends on the frequency, the DUT size, and the characteristics of the measured pattern itself.)
- Some important results of the transformation are now saved to a dedicated file, and are reloaded from there instead of analyzing all result files when re-opening the dialog or when performing Gain Calculation.
- For AMS32-K50, it is now possible to truncate the measured NF data before starting the transformation, in order to account for e.g. high reflections from a metallic DUT support.
- Reworked the function loading measurement probe correction data in order to take into account different polarization naming schemes. Made sure loading probe data for SWE works also in absence of data for FIAFTA.

AMS32-K49:

- Two new quantities have been added for visualization of 2D plots over frequency: Peak Gain and Peak Realized Gain.
- Up to 21 different line format and color combinations are now generated automatically for 2D plots

Modified Functionality, Antenna Testing

The remaining time indication in the main progress bar, which was missing for tests with a VNA with continuously moving azimuth positioner, is now visible again.

When measuring with an FSW in spectrogram mode, use RMS detector.

VNA Configuration:

- Loading setups on a VNA is now always possible. Until now, this needed option AMS32-K50 to be active.
- Using external mixers for frequency conversion tests now requires option AMS32-K57.

It is now possible to limit the output level in the Measurement Settings section of the test template with the help of an undocumented entry in a configuration file. Please contact R&S for details.

Added a new option to the OTA Options dialog allowing to hide the additional selections for extended AUT coefficients in the Gain Calculation.

Extension to Test Sequence:

- Selecting an EUT Information file for an OTA test in a sequence now adds this file to the test it was configured for.
- It is now possible to select which transformation shall be performed in a test sequence, in case both are enabled.

Reporting of antenna tests:

- The software now takes into account whether the measurement quantity is a relative or an absolute level, and reports the measurement values accordingly, in units of dB or dBm.
- The default report is now automatically re-generated if only post-pattern measurements are executed.

Extension to the Flip Test:

- Priorities are now set in a more sensitive order for making the test as fast as possible
- Phase unwrapping works correctly now

Improvements, OTA Testing

Corrected a bug that would lead to TRP tests being aborted at test start with an error #4091.

AMS32-K30A: Corrected the settings dialog for CA setups with bands FDD70 or FDD71 as PCC.

Creating a test template for a user defined Communication Tester could lead to incorrect error messages about missing channel definition.

Conducted testing: Channel numbers and RB allocations were incorrect for LTE bands in which only one channel needs to be tested in three RB allocation schemes (FDD13, FDD14, FDD17 (only TIS), FDD30)

3D graphics: Extrapolation (closing the pattern at the bottom) was not working correctly if the last theta value was not in the stepping scheme for the theta axis, e.g. if last theta = 170 deg with 15 deg step size.

Improvements, Antenna Testing

Spiral scan test templates were sometimes loaded incorrectly.

Changing the test template in an existing test with hardware trigger was reloading the test incorrectly.

Improvements, Antenna Testing

RX mode testing: Corrected the check whether the selected signal paths (namely the configured attenuation tables) covered the measurement frequencies.

AMS32-K57:

Tests with Frequency Conversion: When measuring relative quantities (e.g. $b2/a1$), make sure to refer the source signal to the source frequency.

Made sure the correct signal path is switched in case of tests with VNA and hardware trigger, if only horizontal polarization is tested

AMS32-K49:

- Bugfix for Ludwig3 visualization
- After deleting a trace in a 2D graphic, this trace would reappear when adding another trace to the same graphic. This has been corrected.
- Corrected a bug that could make the software hang under certain circumstances when clicking on the button "Check Reflection Coefficients".

AMS32-K50: Made sure that NF equivalent current distribution is correctly displayed in the 3D graph.

AMS32-K58:

- Avoided a spurious error "User correction outside its valid range" appearing on the SMW200A when initializing the test.
- Fixed a bug in SMW200A remote control when loading 5G NR uplink test model

The 3D graphic's User Scale dialog does not invert the sign of values any more for graphs generated from the "OTA Visualization" tab.

In antenna tests with VNA, the reports and the exported csv files showed incorrect phase values for frequencies other than the middle frequency of the test.

In signal path calibration performed with Dual Polarization Auto Calibration, made sure that all paths are switched correctly.

3.11 Version 10.40.10

Important Information

Please upgrade your National Instruments VISA installation to V17.5 before using this new AMS32 release.

New Functionality

Antenna Measurements: It is now possible to define arbitrary measurement grids (e.g. a so-called "constant density" grid) with the help of a file. Please contact Rohde & Schwarz for information on how to activate and configure this feature.

Modified Functionality, General

If a MIMO antenna boom is present in the Device List, the software now tries to set it to physical mode at test start.

All parts of the Test Time Accounting in the OTA Auto Test Control panes are now saved to the *.TestSetup file at the end of the test.

Improvements in the GUI

- Hardware Setup: It was not possible to select a generator path in the "Antenna Measurement" tab of a newly created setup
- OTA Analysis dialog: Button "Evaluate Circular Polarizations" was not visible.
- 3D Graphic: For antenna tests, the User Scale dialog could show the upper and lower limits to display inverted in sign.
- 3D Graphic: The User Scale dialog now comes up with the scale values defined the last time it was used.
- 3D Graphic: Values below the minimum configured limit appeared as "needles" on the opposite side of the pattern. This has been corrected. Now such values are substituted to be identical to the lower limit.

Modified Functionality, OTA Testing

Option AMS32-K33 (LTE A-GNSS tests with CONTEST)

- Added bands FDD3 and FDD8.

Option AMS32-K37L (LTE A-GNSS tests with LBS OTA Enabler):

- Avoid that the initial configuration be executed twice.

Modified Functionality, Antenna Testing

OTA Test Template

- Only one measurement frequency can be configured for antenna tests with frequency conversion.
- For antenna tests with spectrum analyzer, the source level can now be configured down to -120 dBm.

Path Calibration

- Made sure the settings for the two instances of the VNA were identical in case of Dual Polarization Calibration for Antenna Measurements.
- Added the possibility of loading user correction files to the SMW. Option AMS32-K58 needs to be active.

FOM reporting

- As a general principle, tests with spectrum analyzer and generator now use the OTA Options entry "Show TRP in report for Antenna Measurement" for determining whether the measurement values shall be referred to the source power (if TRP is not to be printed, but Efficiency instead) or shall be the absolute measured power (if TRP is to be printed)

OTA Options

Modified Functionality, Antenna Testing

- Added a checkbox "Always generate complete csv file" to the "Antenna Measurements" tab. If checked, the csv file generated automatically at the end of the test will hold data for frequencies. Also, the "Efficiency_PeakGain" result table and graphics will be generated.

- Added a checkbox "Create result file in StarLab format" to the "Files & Report" tab. If checked, an additional result file named <TestName>.StarLab.txt will be generated at test end, presenting the measured data in the format of the StarLab test system. Please contact Rohde & Schwarz for additional information on configuration possibilities.

OTA Table Merger utility

- Added a new mode "Complex Sum" doing a complex vector addition of two or more selected tables. Pre-requisites: the frequency ranges of all tables much match; all tables must have phase data.

FSW spectrum analyzer driver

- Added control of the LO power level for antenna tests with frequency conversion
- Added the possibility to skip reset on the instrument at test start
- Refined control of the reference level setting during stepped-continuous tests
- Changed the noise floor value in order to account correctly for low power levels

Improvements, OTA Testing

A template with mobile network TD-LTE was incorrectly displayed with LTE-FDD when re-opening.

The LTE Settings dialog was initialized incorrectly if band TDD48 was selected.

Improvements, Antenna Testing

Test execution

- Stepped-continuous tests could fail if elevation stop value was not a multiple of the step size.
- In stepped-continuous tests with a spectrum analyzer, the measured levels were not referred to the source power.
- In stepped-continuous tests using spectrogram mode on the FSW, data for all traces could return the same value under certain circumstances.
- In RX mode tests with spectrum analyzer, a wrong signal path was selected for compensating the attenuation of the source signal (AUT input).
- In tests with frequency conversion the attenuation and phase values for the IF path were saved to the test file for the measurement frequency and not for the IF frequency.
- Measurement results were incorrect in tests measuring absolute wave quantities on a VNA with only one input port.
- Changing to measurement mode could lead to a wrong warning about not matching frequency ranges in case of tests in RX mode.

OTA Test Template

- The software could hang when creating new OTA test template for antenna testing with spectrum analyzer and generator.
- Selecting continuous elevation (spiral scan) could lead to wrong checks on the step size values.
- "User Waveforms" in the "Measurement Settings" section combo box was not loaded correctly.

Option AMS32-K53

- NF-FF Transformation with SWE was working incorrectly for stepped-stepped tests. If this option was present alone without option AMS32-K50, the following problems appeared:
 - Neither the "NF-FF Transformation" dialog nor the "NF-FF Transformation" button in the test template were available.
 - It was not possible to visualize transformed data in the "OTA Analysis" dialog
 - The configuration tab "OTA Parameters 2" in the Antenna driver Properties was not available.

OTA Analysis dialog

- Plotting main cuts was not working if elevation and azimuth step sizes were different.

Instrument drivers

- SMW200A: Option B120 (frequency range extension to 20 GHz) is now taken into account correctly.

3.12 Version 10.40

Important Information

Please upgrade your National Instruments VISA installation to V17.5 before using this new AMS32 release.

New Functionality

Release of option AMS32-K37, A-GNSS tests with the R&S OTA Enabler. This is a software component on the CMW500 implementing the relevant A-GNSS protocols. AMS32-K37 is the base option for A-GNSS testing with newer technologies like LTE, MBS, etc. Each technology requires an additional option AMS32-K37x.

The OTA Enabler requires the following CMW500 options: CMW-KT591, CMW-KT570, CMW-KAA10. Other pre-requisites are a DAU (CMW-B450D) with applicable firmware options CMW-KA100 and CMW-KA150 (optional).

Minimum required firmware versions are:

- SMBV100A: 3.50.082.47
- CMW500: BASE 3.7.10, DAU 3.7.20

Release of option AMS32-K37L, A-GNSS tests with the R&S OTA Enabler for LTE. This option supports the full scope of A-GNSS LTE testing as required by CTIA test plan V3.8: C-Plane and U-Plane testing, LPP and RRLP protocols, A-GPS and A-GLONASS, support for SIB8/SIB16 messaging.

The following CMW options are required: CMW-KT573 and the LTE signaling options (CMW-KS500, CMW-KS510, CMW-KS550).

Minimum required firmware version is:

- CMW500: LTE Signalling V3.7.30.

Option AMS32-K35:

Release of the second part of this option's functional scope, OTA tests on NB-IoT receivers. This implementation requires CMW500 option CMW-KS300 with the first release version 3.7.20.

Option AMS32-K58:

Added post-pattern additional measurements for pre-conformance antenna testing. The purpose is to acquire a 3D pattern of only the radiated power pattern, and to evaluate additional performance quantities like EVM, ACLR, etc. at the peak of the pattern only. This can be seen as a kind of R&D implementation of an EIRP metric as discussed in 3GPP for 5G.

Enabled option EMC32-K974 (TCP server functionality, allowing remote control of the software from a client application) for AMS32.

Added band LTE FDD71 for OTA testing.

Added the possibility of performing an automated flip test for validating the alignment between the measurement antenna and the positioning systems, especially for antenna measurement systems.

Added the possibility of automatically calculating the positioner step size necessary in order to obtain raw data with enough resolution for performing NF-FF transformation. The step size mainly depends on the dimensions of the DUT, which have to be entered for the calculation.

Path calibration for Antenna Measurement systems can now be done with frequency conversion.

Modified Functionality, General

Added checking for availability of valid attenuation data for all frequencies before starting the test. If any test frequency is not covered by the selected attenuation tables in the signal paths, the software informs the user and stops the test.

3D graphics: Changed the minimum step size to be displayed from 5 deg to 1 deg.

Path Calibration: When using a spectrum analyzer as power measuring instrument, several settings can now be configured. Until now, configuration of the RF properties of the analyzer was fixed.

Removed the many different OTA spectrum analyzer entries in the Device List. Only one device type "Ota Spectrum Analyzer" is left. Existing entries in existing installations are updated automatically.

Also, the device type cannot be selected any more in virtual mode, as the software identifies the correct type when switching to physical mode anyway.

The same is applicable to the VNA driver: Only one entry "Ota Network Analyzer" is left in the Device List, existing entries are updated automatically.

The maximum number of 3D graphics to be displayed simultaneously is now limited to ten.

Small GUI changes for better usability and clarity

Modified Functionality, OTA Testing

LTE eMTC testing (Option AMS32-K35):

- Changed default RB allocations for LTE Cat.M1 TRP testing according to the new schemes going to be effective with CTIA test plan V3.8.
- Added support for CMW500 firmware LTE signaling V3.7.30. This adds more flexibility to the RB allocation configuration in RMC and user-defined channel modes, allowing to configure RB allocations according to the new schemes in CTIA test plan V3.8
- Changed power measurement with NRP to timeslot mode with external trigger from the CMW500 signaling application.

Bluetooth testing (Option AMS32-K25):

For TRP tests, added measurement mode "Zero-Span Mean Power" for FSW and FSV families.

A-GNSS testing for LTE (Option AMS32-K33):

Added special RB allocations for sensitivity threshold evaluation for A-GNSS testing in band LTE FDD14, similar to the requirements for band FDD13, in line with upcoming CTIA test plan V3.8.

Added support for new CONTEST version: BASE 16.0, LBS 9.2

A-GNSS testing for standalone receivers (Option AMS32-K34):

Added GLONASS testing. To this purpose, the "Additional Measurements" section in the OTA test template is now enabled. This allows configuring an A-GLONASS SPOM test, but with no additional configuration items, in line with the test requirement in the CTIA testing plan.

Added the possibility of referring TIS levels for LTE (and Cat.M1) to real RB allocation, in addition to channel bandwidth (corresponding to full allocation) and single resource element (15 kHz).

New Test dialog: The conducted reference power setting is not saved anymore, so it is not made permanent.

Modified Functionality, Antenna Testing

The RF level configuration item in the Measurement Settings section of the OTA test templates now has a different meaning: It is not the output level of the RF generator any more, but the level at the DUT input connector. This is made clear by a changed description string "RF power @ DUT Input".

This means that if no power calibration file is configured to be loaded onto the instrument, the software will change the RF output level each time the test frequency changes, compensating for the frequency-dependent patch attenuation between RF generator output and DUT input connector.

Additionally, for the SMW200A, added the possibility of loading a power calibration file, in the same line as was possible until now for VNAs.

Added the possibility of loading setups on ZNBx. Until now, this was possible only for the ZVAX family.

OTA Table Merger utility: Added the possibility to generate a result table from an existing attenuation table, inverting the sign. This can then be used in Signal Path Calibration as Normalization table.

Changes to the RTO-OTA driver:

- Trigger level in the Properties now is configurable
- Removed the choice for resetting the instrument at test start
- Made sure both measurement channels are always rescaled synchronously to the same scale
- Make sure to rescale the reference channel once at test start

When loading a V5GTF test model to the SMW200, the corresponding direction of the test signal (UL or DL) is now programmed to the FSW

Improvements, OTA Testing

RSIC tests could abort with an error message if the first error rate measurement at one frequency failed.

RB allocations for LTE Cat.M1 were stated wrongly in the default report.

CMW-LTE driver: Manual mode for Expected Uplink Power was not programmed correctly.

Improvements, Antenna Testing

Antenna tests with VNA: The Port Power Offset figure was applied to measurement data, which should not have been the case.

Antenna Measurements in RX mode with spectrum analyzer: Wrong path attenuation values were used for correcting the raw data.

Made sure that it is not possible to save empty frequency lists in the OTA test template.

Antenna tests with 2-port VNA were not working.

Corrected a bug in the check of reflection coefficients for the Gain Calculation in the NF-FF transformation dialog.

Mature turntable driver was always trying to reference the turntable at test start.

Improvements, Antenna Testing

ECC calculation for passive antennas was not working under certain conditions.

OTA recalculation on antenna tests could lead to 3D graphics being generated for every frequency.

After OTA recalculation, phase values were unwrapped. This has been corrected.

Antenna tests without hardware trigger were taking too long, because updated files were saved after every single measurement by default. Changed this default setting in the OTA Options to files not being saved.

3.13 Version 10.35.02

New Functionality

Function
<p>Release of option AMS32-K49, adding the extended visualization features implemented with option AMS32-K50 (NF-FF Transformation) to installations that do not need that option, but still would like to have the extended visualization.</p> <p>This is recommended for customers who are measuring their AUTs directly in far field.</p>
<p>Release of option AMS32-K57, implementing tests on frequency-converting AUTs. The key new feature is the ability to configure the R&S® ZVA to generate a source signal on one frequency and measure the output signal from the AUT at another frequency. Both up- and down-conversion are supported. Both Tx mode and Rx mode of the AUT are supported.</p>
<p>Release of option AMS32-K58, implementing tests on active AUTs with digital modulated signal. This includes generating digital modulated signals with an R&S® SMW200A and measuring some key parameters of the output signal, primarily the EVM, with an R&S® FSW. Both LTE and V5GTF (Verizon 5G open trial specification) are supported.</p> <p>Minimum requirements for the applicable instruments:</p> <ul style="list-style-type: none"> - SMW200A: Options SMW-K55 (LTE), SMW-K118 (V5GTF) and any pre-requisites to these options; firmware V4.15.048.29 with SP1 - FSW: Options FSW-K100 (LTE), FSW-K118 (V5GTF); firmware V2.72

Modified Functionality

Function
<p>LTE eMTC testing (Option AMS32-K35): Scheduling schemes RMC and User-defined channel have been added.</p> <p>While the eMTC Auto Mode implemented until now allows for full flexibility in the RB allocation configuration, the associated scheduling is not in line with 3GPP and CTIA.</p> <p>On the other hand, RMC and user-defined channels have certain limitations in RB allocation possibilities, so the requirements of CTIA can not be completely fulfilled, but the scheduling is in line with the standards.</p> <p>It is recommended to use CMW500 firmware V3.7.10 (LTE signaling V3.7.20) together with these new scheduling schemes. A later release will implement full flexibility in user-defined channel scheme, and this will then be the recommended one for full compliance to the standard.</p>
<p>The NF-FF transformation dialog now can be minimized, so it does not remain always on top of the application GUI.</p>
<p>With the latest firmware revision, the maturo NCD positioner has the possibility to actively start a referencing procedure, in order to find its null position if it was lost.</p> <p>This referencing procedure can be started from AMS32 manually with a button in the Properties dialog.</p> <p>Also, a new check box in the General Settings of the OTA test Template allows configuring that such a referencing shall be performed prior to starting a test with that template.</p>
<p>It is now possible to define a conducted reference power level in the Test New dialog in case of Radiated Power tests or Antenna Measurements without a VNA. All measured values will be referenced to this value, so the pattern is determined as an offset to the conducted value.</p> <p>If defined, the value is stated in the header section of the CTIA report.</p>

Improvements

Function

In the OTA Options, result file naming "according to CTIA", i. e., with polarizations named as "theta" and "phi" was ignored for System Type "conical cut".

A Path Calibration procedure could fail with a message referring to the Normalization table if no antenna correction table was selected.

Interpolating intermediate frequencies was not working in the Gain Calculation for NF-FF transformation.

In Antenna Measurements with a VNA, the phase traces were defined to have the wrong reference source port in case absolute power levels were measured.

OTA LBS testing: The test channel for band FDD66 and the RB allocation for band FDD70 did not conform to V3.7 of the CTIA test plan.

The maturo NCD positioning axes were not controlled correctly from the OTA Accessories dialog if the driver was configured to use absolute speed instead of speed levels.

3.14 Version 10.30

New Functionality

Function
Added support for LTE bands TDD45 and TDD48.
Added support for High-Power UE mode. This applies to bands FDD14 and TDD41, for which a new check box appears in the Communication Settings section of the OTE test template. If checked, AMS32 programs the CMW to signal a pMax value of 31 dB, for FDD14 or 26 dB, for TDD41.
Added additional logging during the test: <ul style="list-style-type: none">- AMS32 now saves the HW and SW versions of the instruments involved in the test to a new file in the test's \System folder. The versions saved are those listed in the Device List. This improves traceability, for example, in case an instrument temporarily substitutes another one in the system.- AMS32 now saves the UE Capabilities, as reported from the UE to the CMW500, to a new file in the test's \System folder. Currently, this is available for LTE and WCDMA.

Modified Functionality

Function
The freely configurable LTE-U user band is now available as PCC as well.
The default channels for band LTE FDD70 now are in line with CTIA Test Plan V3.7.
OTA Conducted utility: When measuring conducted power in an LTE band included in the CTIA Test Plan, the test channels and RB allocations are now set as stated in the Test Plan.
Antenna measurements with modulated signals using RTO as instrument for power measurement: The RTO driver now works reliably also in case of not loading pre-defined setup for the test.

Improvements

Function
The azimuth angle display in the OTA Auto Control pane was not changing during tests with continuously moving azimuth. This now works correctly.

3.15 Version 10.28

New Functionality

Function
Release of option AMS32-K34, implementing OTA tests on autonomous GPS receivers according to Appendix R of the upcoming version 3.7 of the CTIA test plan for Wireless Devices OTA Performance. The option supports both the acquisition sensitivity and the tracking sensitivity methods described in the applicable contributions to the test plan.
Release of option AMS32-K35, implementing OTA tests on LTE Cat. M1 receivers according to the upcoming V3.7 of the CTIA test plan. Operation of LTE Cat. M1 requires a CMW500 with option CMW-KS590 and a LTE Signaling firmware version 3.5.80.45 or higher.
Release of option AMS32-K53, implementing NF-FF transformation for Passive Antenna tests using an implementation of the spherical wave expansion algorithm.
Added support for radio bands LTE FDD68, FDD69 and FDD70. Added band FDD70 for LBS A-GNSS testing too.
NF-FF transformation for passive antenna tests: Added Axial Ratio as parameter for the Far-Field visualization. Also, added the possibility of displaying the peak position of the pattern as a function of frequency.
NF-FF transformation for passive antenna tests: In the "Gain Calculation" tab, it is now possible to select files in the Touchstone format (*.s1p) as input files for the applicable reflection coefficients. Additionally, it is possible to show a graphic displaying of the files' content for a fast overview check.
NF-FF transformation for passive antenna tests: When calling the path calibration setup from a Hardware Setup, it is now possible to activate a new mode for calibrating the two paths for both polarizations in one sequential run, with the reference probe on the DUT turntable being rotated between the two single calibration runs for re-aligning with the measurement antenna polarizations.

Modified Functionality

Function
TIS tests on LTE with CA configurations when the carrier under test is any SCCx: Adapted the GUI behaviour (Loop Settings in the OTA Auto Test Template) to the fact that channel handoffs are not implemented for SCCx.
Test on LTE with CA configurations: The settings regarding CA in the Communication Settings section of the OTA Auto Test template are now taken into account even if the "Setup Cell" box is not checked. This is especially important for TIS if the carrier under test is any SCCx, in order to read out the BER value of the correct stream.
Extended control of the W-LAN interferer in co-existence tests in order to make sure that a W-LAN PER test is always running in parallel to the main RAT's BER test.
Added the checks after completing pattern linearization (linearization result table exists, it covers not less than 10 dB level range, the measured level changes monotonically with the RAT downlink level) to active ECC tests as well.

Function
A-GNSS tests with CMW-KA090: Added support for radio configuration 3/3 for tests on CDMA2000, in order to comply with the proprietary test plan by Sprint.
Added a new flexible mode for LBS testing. Activating this mode will execute the whole C/No pattern acquisition and linearization in one single CONTEST test plan run. This is a significant improvement compared to the previous implementation, which required three separate test plan runs for the same functional range.
Default report for co-existence tests: Added a line stating the reference EIS without active interferer.
Extended the device driver for the NRPM OTA power measurement system, allowing simultaneous measurements on two sensors, in order to measure both polarizations of the test signal at a time with two sensors connected to a single base unit.
Added the possibility of configuring the CMW-Bluetooth driver to activate auto-ranging for the uplink signal.
When changing the test scenario for an LTE test, the instrument is now fully programmed with the new required settings instead of just changing the scenario and programming the other settings after re-establishing the link. This is applicable mainly when initiating a new TM2 TIS test while a SISO connection is still established.
NF-FF transformation for passive antenna tests: Increased the number of transformations that may run in parallel to 72. Additionally, the sequence in which the transformations are started has now been optimized depending on the measurement frequency, in order to make the whole process less time consuming.

Improvements

Function
Hardware Setup for Passive Antenna test: Under certain circumstances, the software could falsely be display a warning about a missing option AMS32-K48.
OTA Auto Test Templates generated with older version were not loaded correctly with V10.20.
SPOM testing (Post Pattern Measurements section in the test template): The number of frames for the reference measurement was not saved correctly.
TIS tests in CDMA2000 were failing with theta-dependent phi.
TRP calculation in spiral scan tests according to CTIA failed in case of tests conducted with four power measurement units connected to two antenna booms.
Re-scaling the Efficiency plot in a TRP test after modifying the test template was wrong.
In LBS tests, the CONTEST log could contain a spurious error message due to a parameter value wrongly coded by AMS32. This did not affect the test run, but has been corrected anyway.

3.16 Version 10.20

New Functionality

Function
Release of option AMS32-K40, implementing MIMO OTA tests according to the Radiated Two Stage (RTS) method. Executing tests according to this method requires a CMW500 with LTE signaling and MIMO (option CMW-KS520), fitted with a Digital I/O board for external fading (option CMW-B510x/B520x), and a SMW200A with option SMW-K73 and all its pre-requisites.
First implementation of the TM2 TIS test proposed by R&S to CTIA as substitute of the standard SISO TIS test for LTE.
Mixed FDD-TDD configurations are now possible for LTE tests.
New device driver for the NRPM OTA power measurement system.
OTA tests with signaling on W-LAN 802.11ac are now supported with a CMW500 fitted with the new SUA (Signaling Unit Advanced). Additionally, option CMW-KS656 is required.

Modified Functionality

Function
Changed the CMW port definition in Hardware Setups for 3CC/4CC CA. The first output port is now labelled "EIS/TIS RF Output" in order to make clear that this port will be routed to the measurement antenna and will be associated to the CC which shall be changed during the leveling process; all other CCs will be routed to the other configured ports by order.
In the General Settings of the OTA test template now only the mobile networks supported by the communication tester can be selected.
Zero Span Trace Analysis power measurements (averaging of the central 85% of the captured burst) are now possible for W-LAN.
Integrated Channel Power measurements are now possible together with user defined communication tester selection.
The user receives a warning if he configures RSIC tests in single-channel bands like e.g. LTE FDD13.
RSS-based TIS tests: Checks are done on the results of the linearization phase to verify that at least the required 10 dB range has been tested and that linearization behavior was monotonic. If any of both conditions is not fulfilled, a message box informs the user, allowing to repeat the linearization, and a suitable note is added to the report It is now possible again to display RSS values in 3D graphs for RSS-based tests, alternatively to the interpolated EIS values.
When doing a SPOM test for LTE CA, a reference measurement in the base configuration is now done prior to the final SPOM measurement, instead of directly using the value measured during the reference test.

Function

It is now possible to do generic SPOM tests in the same LTE band with different CA configurations. Thus, a full set of result tables and reports are generated for the SPOM test, which is not the case if the SPOM measurement is done as Additional Measurement in the same test.

Also, this makes it possible to do a SPOM test with two or more carriers added to the reference configuration, which also is not possible with the CA SPOM test in the Additional Measurements.

Changed calculation of the total data for linearized RSS tests. The data now are again linearized values of the measurement data reported by the DUT, as they were originally, and not linearized EIS data; these can be found in result table "EIS_..._tot".

A-GPS tests on CDMA2K with CMW-KA090:

Changed behavior in case of protocol problems experienced with some DUTs. Instead of resetting the CMW-KA090 BASE application, AMS32 now forces a channel handoff to another radio channel and back to the test channel. This corrects the problems and is transparent to the user, just delaying the test by some seconds.

Changed the default confidence level for the final sensitivity threshold search to 90%, in line with the TIA-916 standard.

Service Option 3 is now always used for sensitivity threshold evaluation.

Changes in ICD test for (A)-GNSS results and reports:

Overall ICD result now is the highest single positive ICD value, and not the highest absolute deviation from the reference value.

The ICD result table now additionally shows the measured C/No values.

The C/No value displayed in the "Reference" column is the ICD reference value and not the one measured during pattern acquisition.

Changes in A-GNSS tests on LTE (LBS tests):

SIB8/16 support is now activated for the Sensitivity threshold search only

ICD measurements now are stopped after the required number of fixes has been completed

Improvements for avoiding situations where the linearization could be skipped

General test run stability improvements

CMW-KA090 driver: It is now possible to configure the CMW to display the signaling task screen instead of the remote log.

CMW-LBS driver:

CONTEST 15.x (LBS 7.xx) selection does not require option AMS32-K33V any more but is always available

If the AMS32 log window is not displayed, a message box can now be configured to pop up asking the user to switch on or off the DUT where needed

It is now possible to display a CONTEST log window in addition to the AMS32 log

It is now possible to configure the SIB8/16 transport method (parameter added to CONTEST LBS 7.60)

SUPL (U-Plane) related settings are not configurable any more if C-Plane protocol is selected

Available LBS Positioning Profiles are now actively configured to the CONTEST OTA DUT Service definition

CMU200 driver: It is now possible to ignore very low confidence levels for CDMA FER measurements, and consider the measured value as valid.

Spectrum Analyzer driver: It is now possible to use Channel Filters instead of Gaussian Filters for bandwidths > 10 MHz.

Improvements

Function
LTE CA setup for LTE bands \geq FDD65 were not saved correctly to the test template.
Intra-band LTE CA setups were not programmed correctly on the CMW.
TRP tests did not work for LTE bands \geq FDD65.
TIS tests on CDMA 1xRTT aborted with an error after pattern acquisition was finished.
RSS-based TIS tests: The final sensitivity threshold search was always performed, even if it had not been selected.
A-GPS tests on CDMA2K with CMW-KA090: The radio link was not handed off to the test channel, but remained in the registration channel.
OTA LBS tests with CONTEST LBS V7.3x were not working for bands $<$ FDD12.
Sensitivity Sweep was not working for Bluetooth.
In complex ECC testing, post-processing and reporting was only done for the middle radio channel instead of for all configured channels.
No 3D graphics and reports were generated for spiral scan tests.
Reports for LTE CA tests reported a wrong channel bandwidth for the PCC.
Conducted tests in CDMA2K with the CMU200 did not work.
CMW-KA090 driver was not available for conducted testing.
Howland turntable driver: The gear ratio was not saved correctly to the driver Properties.

3.17 Version 10.01

New Functionality

Function
<p>First release of the driver for remotely controlling the CMW-KA090 A-GNSS Application Software. This driver implements OTA A-GPS tests with CMW500 and SMBV100A for the legacy radio technologies GSM, W-CDMA and CDMA2000.</p> <p>Minimum required software version for CMW-KA090 is 3.5.0.</p> <p>For recommended firmware versions of CMW500 and SMBV100A please refer to the CMW-KA090 documentation.</p>
<p>Added C-Plane selection as alternative to U-Plane (SUPL) for A-GNSS tests over LTE (LBS testing) with R&S CONTEST. C-Plane testing will become mandatory with CTIA test plan V3.6.</p> <p>Minimum required software versions for CONTEST are:</p> <p>CONTEST GUI / BASE: V15.11</p> <p>CONTEST LBS: 7.30</p>

Modified Functionality

Function
<p>The maximum possible channel bandwidth for Integrated Channel Power testing for passive antennas has been increased to 3 GHz.</p>
<p>The OTA Recalculation feature is now also taking into account the attenuation of the Generator path in passive antenna setups.</p>
<p>The default report for TIS tests using the Complex RSSI measurement function on the UE now contains a new line stating the Gain Imbalance between the two UE receivers.</p>
<p>The estimation of the missing time until test end for tests with theta-dependent azimuth has been improved.</p>

Improvements

Function
<p>Channel lists for Intermediate Sensitivity Sweeps could be wrong since AMS32 V9.26.00.</p>
<p>2D polar test graphics created with AMS32 V10.00 were not displayed correctly.</p>
<p>CMW-GPRF Power Meter driver: The internal default parameters for the driver were not correct. This could make it impossible to perform conducted tests with this driver.</p>
<p>3D graphs for TX tests displayed strange peaks for measurement values < -50 dBm.</p>

3.18 Version 10.00

New Functionality

Function
<p>First release of the driver for remotely controlling the CMW-KA090 A-GNSS Application Software. This implements OTA A-GPS tests with CMW500 and SMBV100A for the legacy radio technologies GSM, W-CDMA and CDMA2000.</p> <p>Minimum required software versions are the following:</p> <p>CMW-KA090: V3.4.2 beta CMW500 BASE: V3.5.60 CMW500 GSM Signaling: V3.5.20 CMW500 WCDMA Signaling: V3.5.30 CMW500 CDMA2000 Signaling: V3.5.30 SMBV100A: V3.20.218.28.16 beta</p>
<p>First release for OTA tests on LTE CA setups with three and four downlink carriers (3CC, 4CC). The implementation is based on a CMW FLEXX architecture with two CMW500's. This feature is available with option AMS32-K30A.</p>
<p>Added OTA testing for Bluetooth Low Energy mode.</p>
<p>Added spiral scan testing according to the current draft state of upcoming version 3.6 of the CTIA test plan.</p>
<p>Added support for SIB8/SIB16 messages during LBS testing with LTE as radio network. This feature is available with the new option AMS32-K33V.</p> <p>For supporting this feature, CONTEST BASE V15.11 with LBS application V7.30 is required. Please contact your local R&S dependency for details about the required options.</p>
<p>Added support for Passive Antenna tests with the positioner triggering the VNA with a hardware trigger signal. This feature is available with the new option AMS32-K48.</p> <p>For supporting such an architecture, a specific model of positioner controller with a dedicated firmware needs to be installed. Please contact R&S for details.</p>

Modified Functionality

Function
<p>Ripple Test: Added new default frequencies in line with the current version of the CTIA test plan; extended the range for the measurement distance field.</p>
<p>In TRP tests on W-LAN, the CMW500 GPRF Power Meter application can now be used in standalone mode, on a different connector than the one(s) used for the signaling application.</p>

Improvements

Function
<p>CMW-CDMA driver: CDMA band class was not configured during for channel handoff, eventually leading to loss of link</p>

Function
CMW-LTE driver: TDD specific settings (UL/DL Configuration and Special Subframe) were not programmed correctly
The check box for activating statistical evaluation according to TIA-916 for A-GPS tests with CDMA2000 as radio network was not evaluated correctly
Bandwidth correction for LTE CA TIS tests was always done taking into account the PCC bandwidth, even if the leveling was on SCC. This affected both the correction and the reporting.
LBS testing with LTE as radio network: Under certain conditions the signal path attenuations configured in the Hardware Setup could be added to the GPS satellite level.
Passive Antenna tests: Using a Hardware setup configured to measure on polarizations simultaneously using two ports on the VNA did not work correctly with test templates configured to measure on one polarization only.

4 Customer Support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz equipment, contact one of our Customer Support Centers. A team of highly qualified engineers provides telephone support and will work with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz equipment.

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