R&S®AMS32
Release Notes
Software Version V10.60.20

The following abbreviations are used throughout this document: R&S®

R&S AMS32   **Information on the Current Version**

ROHDE & SCHWARZ

Contents

1 Information on the Current Version

1.1 Version 10.60.20

New Functionality

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..

Modified Functionality, Antenna Testing

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.

 - 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.

Improvements, Antenna Testing

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.

2 Modifications to the Documentation

The current documentation is up to date.

3 Software Update

3.1 Updating the Software

Download and expand the "EMC_AMS_10V6020.zip" file (requires password for unzip and is encrypted with WinZip 2.0 method) into a temporary folder on your hard drive.

Run the "Setup.exe" program in order to update your AMS32 installation to V10.60.20.

4 Version History

4.1 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-B90 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.

4.2 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 Singe-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 "mdBi" 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.

4.3 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.

4.4   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 trransformation was not being installed.

 - An out of date version was being installed for the NF-FF transformation utility.

4.5   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.

4.6   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

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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-NBIoT 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 openend 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 personlity, 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 snychronization before performing measurements.
- Added ACLR, OBW, SEM and Spectrum Flatness as meausrment 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 absoluute 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, FDDD14, 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 intializing 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.

4.7   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.

4.8 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 attenuaiton 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.

Maturo 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.

4.9 Version 10.35.02

New Functionality

Function
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. This is recommended for customers who are measuring their AUTs directly in far field.
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.
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. Minimum requirements for the applicable instruments: - 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
LTE eMTC testing (Option AMS32-K35): Scheduling schemes RMC and User-defined channel have been added. 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. 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. 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.
The NF-FF transformation dialog now can be minimized, so it does not remain always on top of the application GUI.
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. This referencing procedure can be started from AMS32 manually with a button in the Properties dialog. 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.
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. If defined, the value is stated in the header section of the CTIA report.

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.

4.10   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: - 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.

4.11 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.

4.12   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 con 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 >= 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 >= 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.

4.13 Version 10.01

New Functionality

Function
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. Minimum required software version for CMW-KA090 is 3.5.0. For recommended firmware versions of CMW500 and SMBV100A please refer to the CMW-KA090 documentation.
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. Minimum required software versions for CONTEST are: CONTEST GUI / BASE: V15.11 CONTEST LBS: 7.30

Modified Functionality

Function
The maximum possible channel bandwidth for Integrated Channel Power testing for passive antennas has been increased to 3 GHz.
The OTA Recalculation feature is now also taking into account the attenuation of the Generator path in passive antenna setups.
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.
The estimation of the missing time until test end for tests with theta-dependent azimuth has been improved.

Improvements

Function
Channel lists for Intermediate Sensitivity Sweeps could be wrong since AMS32 V9.26.00.
2D polar test graphics created with AMS32 V10.00 were not displayed correctly.
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.
3D graphs for TX tests displayed strange peaks for measurement values < -50 dBm.

4.14 Version 10.00

New Functionality

Function
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.   Minimum required software versions are the following: 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
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.
Added OTA testing for Bluetooth Low Energy mode.
Added spiral scan testing according to the current draft state of upcoming version 3.6 of the CTIA test plan.
Added support for SIB8/SIB16 messages during LBS testing with LTE as radio network. This feature is available with the new option AMS32-K33V.   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.
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.   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.

Modified Functionality

Function
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.
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.

Improvements

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

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.

4.15 Version 9.26

New Functionality

Function
Added support for new radio bands: LTE-FDD 32, 65, 66, 67, 252 and 255, W-CDMA 26, CDMA2000 BC2 (TACS). LTE-FDD bands 32, 67, 252 and 255 are downlink-only bands which can only be used In CA (Carrier Aggregation) setups. Bands LTE-FDD 65. 66 and 67 are not yet available in a CMW500 released firmware version. For further questions regarding these bands, please contact your local R&S dependency.
Added the possibility of controlling the height of an antenna tower at test start, in case the measurement antenna is supported by such a tower.

Modified Functionality

Function
When measuring uplink power with the CMW500 on CDMA2000 or 1xEV-DO, the trigger for the Multi Evaluation application is now configured to be the applicable super-frame trigger.
Estimated TRP values are now also displayed is the power is measured with the CMW500.
Calculation of the linearized results for RSS-based has been simplified.
LBS testing: The measurement loop for recording the C/No pattern for the second polarization now starts at the test start position
In conducted testing for CDMA and 1xEV-DO, the radio link can now configured with the help of the driver dialog. This includes parameters like e.g. Service Option, Radio Configuration, etc.
2D plots can now also be generated in active (mobile phone) tests
The CTIA report now states if the attenuation correction has been averaged according to CTIA standard, section G.22

Improvements

Function
LTE-FDD channels were not set correctly for TRP
When trying to program LTE bands FDD10, FDD20 or FDD30, an error related to missing option KS525 could appear
Phase values were not read out correctly from ZNB
ICD value was not reset when changing channel in LBS ICD testing for A-GLONASS
TX and RX channels were inverted for Bluetooth

Function
Ripple Test was not working with EMCO positioners
RAT channel and frequency data were wrong in report for conducted A-GPS testing
CTIA reports were generated for all frequencies measured during the test instead of only for low/mid/high channels.
Peak-Gain trace was not displayed again in the Efficiency graph when re-opening a saved test
Axial Ratio evaluation was not working for 2D (single plane) tests
Active ECC measurement was not running in virtual mode (simulation)

4.16 Version 9.25

New Functionality

Function
Added Near-Field-Far-Field Transformation capabilities for Passive Antenna measurements. These require the new option AMS32-K50. Additionally, full Probe Correction is available with the new option AMS32-K51.
Added the possibility of performing a full test with a Single Point Offset Measurement based on a reference test in the same frequency range ("Generic SPOM"). A check box for activating this feature and a box for selecting the reference test have been added to the "Test New" dialog.
Added the possibility of correcting the system path attenuation by averaging across the full channel width of the signal. This allows compensating for the Measurement Uncertainty contribution according to CTIA test plan section G.22. A new check box has been added to the OTA Options, section "Test Control" for activating this feature.
Added the possibility of switching an additional signal path at test start and test end. New path selections boxes have been added to the General Settings in the OTA test template.
Added the possibility of resetting the Communication Tester before starting the test. A check box has been added to a new tab "Test Execution" in the "Test New" dialog.
Added polarization setting to the Load Position. New control elements have been added to the General Settings in the OTA test template.
Added pre-amplifier control for TRP measurements with spectrum analyzer. A new check box has been added to the Measurement Settings in the OTA test template.
GSM and GPRS TRP tests with a spectrum analyzer: The sweep time on the analyzer will now be set automatically to match the number of expected uplink bursts.
TRP tests on radio networks with bursted TDD transmission schemes (GSM with (E)GPRS, TD-LTE, TD-SCDMA): Added the possibility of using the external hardware trigger from the CMW500 for triggering the spectrum analyzer or the NRP2 power meter. This needs to be enabled with the help of new check boxes that have been added to the Properties dialogs of the respective Communication Tester drivers. If external hardware triggers are enabled, the NRP2 is set to use the Timeslot Average mode; timeslot length, exclusion ranges and trigger delay are set to appropriate values automatically.
Added support for VNA measurements with external mixers, in a special configuration. New dialog elements have been added to the Settings dialog that can be opened for configuration in the Passive Antenna section of the applicable Hardware Setup.
Added the possibility of configuring conducted WLAN tests according to CWG standard. New button has been added to the OTA Conducted dialog, in both the " Power" and the "Sensitivity" tabs.
Added support for LTE-U band, for the moment only as SCC in a CA setup. Requires the new option AMS32-K30A and the CMW option CMW-KS525. A new tab "LTE User Band" has been added to the OTA Options dialog, with control elements for activating and configuring the LTE U-band. The tab will only be visible if option AMS32-K30A is available.
Added support for LTE Additional Spectrum Emission (ASEM) values up to NS_24. New entries have been added in the ASEM selection box in the Settings dialog of the CMW-LTE driver.
Added support for all LTE Uplink RMCs available in CMW500 firmware V3.2.82. New entries have been added in the corresponding selection boxes in the Settings dialog of the CMW-LTE driver.

Function
Added TIS estimation functionality, in line with the existing TRP estimation. This is also possible for RSS-based tests, but in this case requires a single point EIS measurement at test start. A check box for activating this feature has been added to the new tab "Test Execution" in the "Test New" dialog.
Added the possibility of doing CA de-sense tests for TD-LTE. The corresponding entries are now available in the Additional Measurements in the OTA test template.
Added control of a second antenna arm to ripple-based path calibration. The additional arm will automatically be controlled if configured in the System tab of the OTA Options dialog.
CTIA reports can now also be generated in case only one polarization has been tested.

Modified Functionality

Function
OTA template, Measurement Settings for TIS: The level step for starting a phase in the levelling process can now be negative relative to the result of the previous phase.
TRP tests: If a measurement fails, the user can now select whether he wants to retry measuring at the same position, continue at the next position or stop the test.
Extended the consistency check for RSS-based tests. It is now possible to perform a statistical evaluation on a configurable number of RSS measurements at the reference level and at the best position after completing the pattern acquisition. A new check box and a new field for configuring the associated number of measurements have been added to the Measurement Settings in the OTA test template.
The Stop button in the dialog appearing when a lost call is re-established is now working more reliably.
The Pause button in the main test control bar is now working during RSIC measuements.
VNA driver: The R&S ZVA67 can now be used up to 70 GHz.
3D graphics: Added auto-scaling to the next multiple of 5 dB, in addition to the existing auto-scaling to the next multiple of 10 dB

Improvements

Function
RSS-Based TIS tests were not running for TD-SCDMA.
Corrected a wrong entry in the channel list for RSIC tests in band LTE-FDD 12.
RSIC tests for LTE were not working if the CMW500 did not contain a DAU.
RSIC tests according to CTIA: The margin figure was not set to 0 if the TIS of the reference channel was worse than the limit.
Relative sweeps could cause an "Index out of range" error under certain conditions.

Function
Conducted A-GPS and LBS tests were not running since V9.20.01.
3D graphics: Interpolation setting was not taken into account when creating the report
LTE driver: CMW output power could be set incorrectly when using 15 MHz channel bandwidth.
LTE driver: In TD-LTE CA setups, the SCC band was displayed incorrectly when reloading the template.
VNA driver: 1 MHz bandwidth setting was not saved when configured in the settings.
CMW driver for CDMA/EVDO: For EVDO, a command could be sent to the CDMA signaling application
CMW driver for CDMA/EVDO: SID and NID were not programmed if SID was configured to be 0.
CMW driver for CDMA/EVDO: Early pass/fail statistical testing was not activated since V9.20.
LBS driver: Uplink channel for band FDD30 was wrong.

4.17 Version 9.21

New Functionality

Function
Added Ripple-based Chamber Range Calibration for reducing the Measurement Uncertainty associated to the range attenuation.
Added generating an external trigger output at the CMW500 TRIG A connector for W-LAN and TD-LTE TRP tests. At the same time, the spectrum analyzer used for power measurements in set to external trigger. In the case of W-LAN, the trigger is generated when receiving a RX frame and is always activated. In the case of TD-LTE, the functionality needs to be enabled with the help of a check box in the driver's Properties, and the trigger is generated when starting a signaling frame.
More mobile properties are queried at test start and automatically included in the report:: UE Power Class for GSM and WCDMA, and UE Category in the case of LTE.
CMW-GSM driver: Added a new check box "Set PMax as a function of radio band". This will set PMax parameter depending on the currently active band in order to avoid problems that have been experienced in some cases with PMax=0 for GSM1900. Attention! Activating this box may lead to the software actively releasing the call when a handoff to another band is requested.
CMW-GSM driver: Added a new check box "Check for band support and power class" to the Properties dialog. This will check if the DUT supports the band configured in the template, based on the UE Capabilities indication on the CMW500.
Added a new check box "Use statistics according to TIA-916 for threshold evaluation" to the Measurement Settings dialog for A-GPS TIS tests using CDMA as radio networks. If checked, the statistics according to TIA-916 based on code phases will be used for the threshold evaluation (default until now). If not checked, then the statistics according to GSM/W-CDMA, based on position errors only, tests will be used.

Modified Functionality

Function
LTE Carrier Aggregation Coexistence testing has been reworked and extended. It is now possible to add the second LTE carrier as PCC or SCC. Additionally, the connection parameters of the second carrier can be configured. On the other hand, LTE CA Coexistence tests are not possible any more if the basic test already was done on a CA setup.
CDMA cell band channel list for RSIC tests is now always generated in line with the CTIA test plan, and not only if the "Fix settings according to standard" box was checked.
LTE A-GPS tests: If the sensitivity search does not conclude correctly, raise an error to notify the user and do not calculate TIS.
Several extensions including additional pieces of information in the report.
Several GUI extensions and modifications.

Improvements

Function
GPRS TIS tests were not working with the CMU200 in V9.20.
GPRS SPOM TIS tests were yielding wrong values.
Spiral scan tests with VNA were not working in V9.20.
ECC calculation for passive antenna tests was wrong.
Maturo NCD turntable controller control with GPIB was not working in V9.20.
RSIC tests in band LTE-FDD4 were not done in line with CTIA test plan.
Radio configuration was not set correctly in case of 1xRTT SPOM tests.

Function
OTA Options: The setting configuring the polarization naming could be overwritten in V9.20.
AMS32 was hanging in virtual mode when switching the antenna polarization with an antenna tower.
Fixed several GUI problems in V9.20.

4.18 Version 9.20

New Functionality

Function
Added automatic readout of DUT identification. The following is read out after establishing the radio link: - IMEI for GSM, W-CDMA, LTE and TD-SCDMA - MEID for CDMA2K and 1xEVDO - MAC Address for WLAN - Bluetooth Address for Bluetooth The identification is included in the general information header of the report.
Added a new Options dialog for defining parameters related to the DUT or the test SIM card in use. Several different parameter sets can be configured and saved. One of these sets can be selected in the EUT Information editor or when creating a new test. The following parameters can be defined: - For GSM and W-CDMA: MCC and MNC - For LTE, the same plus additionally OPc Key and Secret Key - For CDMA2K: System ID, Network ID and registration channels for all supported band classes - For 1xEVDO: System ID, EVDO Sector ID, EVDO Network Revision and registration channels If a parameter set is selected in a test, the parameters will be programmed to the Communication Tester, in order to support easier link setup.
Added the GPRS C-Value as measurement quantity. This can be used for implementing RSS-based Sensitivity tests for (E)-GPRS, and in the case of (E)-GPRS Sensitivity tests with constant downlink power.
Added support for LTE Throughput testing. This consists of recording a 3D pattern of the throughput with constant downlink power, and a suitable evaluation including a 3D graph of the average throughput over both polarizations. No TIS related figures of merit are calculated.
Added remote control for the additional Communication Tester generating the de-sense radio signal in De-Sense testing.
Added two new drivers CMW-GPRF and CMW-GPRF PwrMtr that implement control of the CMW500's General Purpose RF Generator and Measurement applications. With the help of these, it is now possible to perform System Calibration and Passive Antenna tests with the CMW500 as standalone instrument.
Added support for mobile phone type testing of DUTs with a proprietary radio link, for which no Communication Tester instrument driver is available. For configuring such tests, select the new entry "<user defined>" from the list of available communication testers in the Hardware Setup. The user will get a notification for setting up the radio link manually. Sensitivity threshold evaluation needs to be implemented in an external software, to be developed by the customer; value exchange with AMS32 will be through a file.
Added support for special channels in band WCDMA 19.
CMW for (A)-GPS driver: - Several new configuration items have been added to the driver dialog. - Added FDD7 and FDD30 and changed parameters for band FDD12, according to CTIA test plan V3.4 - CONTEST Versions 11.22 and 14.01 are now supported
CMW-LTE driver: PDCCH Aggregation levels are now programmed in line with the requirements by the 3GPP standard and the CTIA test plan. CMW LTE Signaling firmware V3.2.82 or later is required.
In the case of Passive Antenna tests, it is now possible to generate a graph of the axial ratio, calculated from the circular polarization components, over frequency. There will be one trace for each spatial position at which measurement values have been acquired. Spatial positions to display can be selected by the user.
A new antenna type DST-B210 can be configured in the Properties of the antenna driver. When selecting such an antenna in the Hardware Setup, the connectors of the antenna icon are now labeled "FB" and "LR", according to the labelling on the DST200.
For RSS-based Sensitivity tests, the quantity to be displayed in the 3D graphics can now be selected.

Modified Functionality

Function
General rework of the OTA Test Template editor: - For most radio networks, the Communication Settings button now opens the dialog of the selected instrument driver. - The following buttons have disappeared: Relative Sensitivity, Relative Power, De-Sense (Co-Existence). Instead, a new button "Additional Measurements" has been added. In the associated sub-dialog, the user can configure a list of relative and co-existence tests to be done after the basic 3D pattern acquisition. The sequence in which to execute these tests can freely be defined, and some additional configuration possibilities have been added.
Measurement Settings sub-dialog: The Pattern Normalization test phase can now be used in the case of (E)-GPRS Sensitivity tests.
The GUI elements for controlling a possible MIMO antenna during SISO tests have been moved from the General Settings sub-dialog of the test template to the OTA Options dialog, so one configuration is applicable to all tests.
LTE Carrier Aggregation testing: - It is now possible to configure a full TIS test on a CA setup with any band as SCC. - Complete rework of the GUI. CA parameters are now fully defined in the CMW-LTE device driver dialog (Communication Settings in the test template).
Default test parameters for WLAN have been aligned with the current state of the CWG test plan draft.
RSIC for LTE: Reference channels for band FDD4 have been aligned with revision 3.2.3 of the CTIA test plan.
The estimated instantaneous efficiency is now displayed for Radiated Power too. Up to now, it was only displayed in the case of Passive Antenna tests. Also, a Cartesian graph is now generated, showing the estimated instantaneous efficiency for all test frequencies, in addition to the text display of those values for the low, mid and high frequencies.
OTA Recalculation has been extended to RSS-based tests. It also can now be applied to tests including a Relative Sensitivity sweep at Intermediate Channels, although the results for this sweep can not be re-calculated; the user has to explicitly acknowledge this fact.
Changes to MIMO OTA Decomposition Evaluation: - Both averaging on throughput and on inverse downlink are now performed by default. - Decomposition calculation is now always performed on the average for all traces over constellations. The possibility of applying the decomposition algorithm offset to each single constellation has been skipped.
CMW-LTE driver: In the case of MIMO testing, the relative power levels of all downlink code channels are now set according to the requirements being discussed in CTIA. As a consequence, it is not necessary any more to use DFL files on the CMW for configuring a MIMO OTA test.
CMW-WLAN driver: - The Packet Generator now is not switched on until the radio link has been established. - Added additional signaling modes: Wi-Fi Direct, Hotspot 2.0 and IBSS (ad-hoc) - The GUI control elements for configuring the uplink power measurement have been moved from the Properties dialog to the Measurement tab of the Settings dialog. Thus, the uplink power measurement can now be configured in the test template (Communication Settings) instead of the Device List.
CBT driver: Power measurements on Bluetooth devices have been added.
All CMW drivers: The instrument is not set to remote any more when opening the Communication Settings sub-dialog of the OTA Test Template.
1xEVDO Communication Tester drivers: - Set test application to FWD only, instead of FWD & REV - Always read out the external attenuation values from the instrument when evaluating the downlink level.
If a MIMO antenna boom was present in the Device List, but set to virtual mode, the software would still try to move it in SISO tests. This is not the case any more.

Improvements

Function
RSS-based TIS tests did not work with theta-dependent azimuth. This has been corrected.
For Single-Point-Offset-Measurements tests on 1xEV-DO (offset to CDMA2000), the RF ports were not switched correctly when using the CMU200. This has been corrected.
Pole extrapolation in 3D graphs was not working. This has been corrected.
LTE: Handovers were resetting the ASEM to NS_01. This has been corrected.
UMTS: Programming bands 19 to 21 with the CMW driver was not working. This has been corrected.
TDSCDMA: Power measurements with the CMW500 were not working. This has been corrected.
LTE LBS testing: Under certain circumstances, the LTE radio channel number for ICD tests would be set to 0. This has been corrected.
Under certain circumstances, a runtime error could appear when opening the OTA Accessories dialog. This has been corrected.
CMW-WLAN driver: The following issues have been corrected: - When adding two instances of the driver to the Device List, values for some settings in the Properties could not be set independently for each entry. - The Supported Data Rates were not always programmed as configured in the dialog. - Unnecessary transitory programming of external attenuations with default values.
The following has been corrected for LTE CA testing: - All parameters in the setup are now saved correctly. - Best point of the pattern now is found correctly. - Power meter is now triggered correctly for the Radiated Power CA de-sense - CA degradation is now calculated correctly for RSS-based Sensitivity tests - Some superfluous remote commands are now avoided
Under certain circumstances the linearization in RSS-based tests could hang in an endless loop. This has been corrected.
Conducted tests on LTE: If starting the measurement directly after opening the dialog, without changing the radio band selection first, would lead to testing on wrong radio channels. This has been corrected.
Several GUI corrections

4.19 Version 9.15

New Functionality

Function
Added basic setups for LTE Carrier Aggregation, including full TIS test on band FDD 29 and de-sense type TIS/TRP tests according to Verizon Wireless test plan
Added possibility of using a second (MIMO) Measurement Antenna allowing faster TRP tests with four NRP-Zxx power sensors
Extensions to Passive Antenna tests: - instantaneous efficiency for low/mid/high frequencies is now estimated and displayed during the test - added new evaluation function allowing to plot the total measured power for the three main antenna planes (XY, XZ, YZ) in one polar graph
Extensions to AMS32-K33 (LBS tests according to CTIA/3GPP): - added support for RRLP protocol - added new items to configuration dialog (Communication Settings): SSL activation, SUPL INIT method - additional parameters from Measurement Settings are taken into account: Downlink level (3D pattern and ICD), Number of measurements to average (pattern and linearization), Level Step Size, Confidence Level and Number of measurements (Threshold Search) - added ICD testing - added support for RF-LBS Versions 1.51 and 1.60
New driver CMW-BT for Bluetooth Signaling application on the CMW500 (basic signaling, according to options CMW-KS600, CMW-KS610)
Extensions to CMW-LTE driver: - added configuration of integrity algorithm
Extensions to CMW-WLAN driver: - dynamic adaptation of Expected PEP during the test - configuration of Supported Data Rates - configuration of Packet Generator - configuration of Country Code settings - possibility of performing a PER measurement for checking whether the link is still present
Extensions to CMW-GSM driver: - added support for Auto Slot Configuration in €GPRS
Extensions to VNA driver: - added segmented sweep for old R&S VNA models (ZVC, ZVRE, ZVM, ZVK) - added possibility to configure Auto Sweep Time - added possibility to skip warning about missing calibration completely

Modified Functionality

Function
Availability of all referenced attenuation tables is now checked at test start. If any table is not present, the test aborts with a suitable error message
Linearization in RSS-based TIS tests: Measured values are now checked for consistency
Radiated power sweep at one position now does not sweep through the whole band but only measures at the radio channels selected in the Loop Settings
The CMW500 is now set to local mode as soon as the test ends, and not when exiting measurement mode. This way, multiple remote/local transitions can be avoided
Instruments are set to local mode when pressing the Pause button
Added special intermediate channels to WCDMA band 2
New Measurement Settings dialog: changed GUI for selecting Actions on Measurement Error and Loss of Link

Function
Improved default initialization of test template in case of creating a new template or when changing the Hardware Setup or the Radio Network in the General Settings
When using two antenna booms simultaneously, the minimum separation between them now is limited by what is configured to the positioning controller
NRP driver: Changes in setup when several power sensors are measuring in parallel, in order to handle situations more efficiently when not all sensors are able to trigger
CMU and CMW-GSM drivers: Default GPRS Gamma value for GSM 850 now corresponds to a maximum uplink power of 33 dBm
CMW-LTE driver: Scheduling type "User Defined" is not available any more for TIS tests
Driver for maturo NCD positioning controller: Adapted to newest firmware with "CX" command
CMW-TDSCDMA driver: RLC mode is now set to "Acknowledged"
Removed all references to ECC according to Verizon test plan from GUI and report
Csv and txt files now contain all final Figures of Merit , also for RSS-based TIS tests
Several minor changes to GUI

Improvements

Function
GSM TRP testing on multiple bands with CMW500: PCL was not changed after inter-band handoff
TD-SCDMA TRP tests with power meter: Power meter was not set to Burst Average measurement mode
WLAN testing with new Measurement Settings: Packet interval parameter was not set as configured
CDMA TIS testing with new Measurement Settings: the starting level for the final Pattern Normalization phase was not set as configured
GSM TIS testing with classical method (not RSS-based), using the new Measurement Settings and the CMU200 was not working
SPOM was not working with RSS-based TIS tests.
SPOM and ICS tests with the new Measurement Settings were not using the configured parameters but the default values
ICS tests were not working for LTE-FDD band 7
Result file names for ICS test in (E)GPRS were not generated correctly
(E)GPRS test mode was not set as configured in SPOM tests
Passive Antenna testing: Graphs and tables created during evaluation steps after the measurement were not saved correctly to the test.
OTA Recalculation did not save the names of the new attenuation files in case these had changed
CTIA Report was aborted for RSS-based tests if linearization table was missing
Minor GUI corrections

4.20 Version 9.12

New Functionality

Function
Added conducted (A)-GPS testing with driver "CMU for GPS" (interface to CMU-K90 CA).
OTA test template editor: Second antenna of a MIMO system can be controlled to make sure that it does not interfere with the test. Possibilities: Park the antenna at a certain position, or keep it at a constant offset to the main antenna.
Ripple Test: Positioner can be moved continuously now
Ripple Test: Second antenna of a MIMO system can be controlled to make sure it does not interfere with the test. Possibilities: Park the antenna at a certain position, or keep it at a constant offset to the main antenna.

Modified Functionality

Function
Changed the channel list for Intermediate Channel Sensitivity tests in CDMA and 1xEV-DO cellular bands, to match CTIA test plan V3.2.2.
Changed default test channels and RB allocation schemes LTE bands 26 and 41, to match CTIA test plan V3.2.2.
All Communication Tester drivers: RF connectors and external RF attenuations are programmed at test start even if link is already established.
All CMW drivers: Improved handling of local/remote transitions with BASE firmware V3.2.20.
All CMW drivers: Extended the configuration of external attenuation. Different values can now be entered for two different frequency ranges.
CMW-LTE driver: Added support for several RMC's, especially the one with 15 RBs in the uplink for 10 MHz bandwidth, which is required by the CTIA test plan.
CMW-LTE driver: Extended the Properties dialog with a dedicated tab for Active Complex RSSI reporting. In this tab, added the possibility to configure the CMW to accept multiple default bearers; two IP addresses can now be defined for the UE, if communication does not work for the first one, the second one is used automatically.
CMW-WLAN driver: The Packet Generator is enabled in ICMP mode with 1ms packet interval and 1024 bytes payload for all TRP tests (not only for those in which the CMW is used for measuring the power). Also, external Trigger output A is configured to be serviced by the WLAN Rx Frame Trigger.

Improvements

Function
TRP tests on LTE UE's: Result files were generated with wrong names in case more than one radio channel was tested at a time. The test was aborted with an error.
Intermediate Channel Sensitivity test according to CTIA test plan V3.2 was not working directly after concluding the TIS pattern acquisition if this was an RSS-based test.
OTA test template editor, Report Settings: Clicking the file selection button for the standard report template opened the wrong folder.
CMW-GSM driver: Testing in band E-GSM900 led to a wrong "Band handover failed" message.
Driver for RF generators SMA100A, SMB100A, SMBV100A, SMC100A, SMF100A, SMJ100A, SMU200A: Setting physical mode failed with newer versions of the R&S VXI driver on 64 bit Operating Systems due to a missing registry entry.

5 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.

Up-to-date information and upgrades

To keep your instrument up-to-date and to be informed about new application notes related to your instrument, please send an e-mail to the Customer Support Center stating your instrument and your wish. We will take care that you will get the right information.

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