ROHDE&SCHWARZ

LTE/EUTRA

SMBV-K55
SMBV-K84
SMBV-K85

Release Notes

FW 2.20.360.114

Table of Contents

1 Scope

This document describes the changes of the functionality provided by the SMBV-K55 (EUTRA/LTE), the SMBV-K84 (LTE Release 9) and the SMBV-K85 (LTE-A / Release 10) options since the released version 2.05.269.110.

2 Version 2.20.360.114

2.1 Compatibility

- All supported features are in line with 3GPP Release 10, i.e. the following official 3GPP specifications are implemented:
    - TS36.211 v.10.3.0
    - TS36.212 v.10.3.0
    - TS36.213 v.10.3.0
- This version is compatible with R&S FSV-K100/-K101/-K102 and R&S FSQ-K100/-K101/-K102/-K104/K105 EUTRA PC-Software release 2.7.

2.2 New Features SMBV-K55

2.2.1 General

- New filter optimization "Best EVM (no upsampling)".

2.2.2 Downlink

- "Resolve Conflicts" functionality in DCI table: CCE Indices of DCI items are re-assigned automatically depending on the configured "Search Space" to resolve mapping conflicts.
- Content of DCI items updated to release 10 (CSI Request, Resource Allocation Type,…)
- New selection for DCI search space: "Common" and "UE-specific"

2.3 New Features SMBV-K85

2.3.1 General

- First version with SMBV-K85 support.

2.3.2 Downlink

- Support of Carrier Aggregation inclusive cross-carrier scheduling
- Support of DCI "Carrier Indicator Field"

2.3.3 Uplink

- Support of simultaneous transmission of PUSCH and PUCCH in a UE
- Support of PUSCH allocations with two resource block sets according to resource allocation type 1 (multi-cluster PUSCH)
- Support of PUCCH format 3
- Individual selection of 3GPP release (8/9 or 10) for each simulated UE.

2.4 Changes and Fixed Issues

2.4.1 General

- In the Test Case Wizard, the default value of the Cell ID of the wanted signal was changed to 150. Note that old SAVE/RECALL files that use the former default value 0 have to be created again by the new firmware version.

2.4.2 Downlink

- The mapping of PRS subframes in cases where N_PRS is larger than the number of contiguous downlink subframes available (e.g. in some TDD scenarios) is now in accordance with 3GPP, i.e. the allocated PRS subframes are counted and all further DL subframes are used until the number N_PRS is reached. The sequence of subframes may be interrupted by other kind of subframes.
- Interpretation of MBSFN "Allocation value" was incorrect for TDD mode. Fixed.
- Interpretation of MBSFN PMCH scheduling period was incorrect. Fixed.
- In some cases the sequence used for MBSFN reference signals was incorrect. Fixed.
- In some cases the MCS for common DCI was not determined correctly in "Auto/DCI" PDSCH scheduling mode. Fixed.
- TDD: Length of special subframes in case of extended CP was too long for configurations 1,2,3,5,6

2.4.3 Uplink

- Now the "Number of configurable uplink subframes" can be configured individually for the different simulated UEs and in case of UEs that are configured for release 10 (needs the option SMBV-K85) it also can be set independently for the PUCCH and PUSCH subframe configurations.
  Note that if the instrument is configured by remote control (SCPI), all required "Number of configurable uplink subframes" have to be set before the individual subframe configurations are modified, otherwise the subframe configuration modifications might be lost if the "Number of configurable uplink subframes" are changed afterwards.

2.5 Open Issues

2.5.1 General

- SAVE/RECALL is only supported for FW versions from version 2.15.085.78 on, i.e. RECALL of settings files generated with older FW versions is not supported
- Improved On/Off ratio for TDD is not supported in combination with "ACP-optimized" filter.
- The LTE Test Case Wizard currently sets up automatically the test cases according to release 8 of 3GPP TS 36.141.The possibility of automatically setting up the test cases that are different in release 9 or 10 of 3GPP TS 36.141 will be added in a later version.

2.5.2 Uplink

- The LTE release 9 feature "Aperiodic SRS" will be supported by the SMBV-K84 in a later version.
- The LTE release 10 features "Uplink MIMO" and "Uplink Carrier Aggregation" will be supported by the SMBV-K85 in a later version.

3 Version 2.20.230.115.1

- No change regarding SMBV-K55/-K84 since version 2.20.230.115.

4 Version 2.20.230.115

4.1 Compatibility

- All supported features are in line with 3GPP Release 9, i.e. the following official 3GPP specifications are implemented:
    - TS36.211 v.9.1.0
    - TS36.212 v.9.3.0
    - TS36.213 v.9.3.0
- This version of the SMBV-K55 is compatible with R&S FSV-K100/-K101/-K102 and R&S FSQ-K100/-K101/-K102/-K104/K105 EUTRA PC-Software release 2.6.

4.2 Changes and Fixed Issues

4.2.1 Downlink

- FW sometimes crashed in the area of MIMO testing (in case of Tx-Diversity for PHICH). Fixed.

4.3 Open Issues

4.3.1 General

- SAVE/RECALL is only supported for FW versions from version 2.15.085.78 on, i.e. RECALL of settings files generated with older FW versions is not supported
- Improved On/Off ratio for TDD is not supported in combination with "ACP-optimized" filter.

5 Version 2.20.160.89

5.1 Compatibility

- All supported features are in line with 3GPP Release 9, i.e. the following official 3GPP specifications are implemented:
    - TS36.211 v.9.1.0
    - TS36.212 v.9.3.0
    - TS36.213 v.9.3.0
- This version of the SMBV-K55 is compatible with R&S FSV-K100/-K101/-K102 and R&S FSQ-K100/-K101/-K102/-K104/K105 EUTRA PC-Software release 2.6.

5.2 New Features SMBV-K55

5.2.1 Downlink

- Selection of UE category and automatically determined "IR Soft Buffer Size" for FEC chain.

5.3 New Features SMBV-K84

5.3.1 General

- First version with SMBV-K84 support.

5.3.2 Downlink

- Support of PRS (Positioning Reference Signals)
- Support of MBSFN (Multi-media broadcast over a single frequency network)
- Support of "Transmission mode 8" (Dual-layer beamforming)

5.4 Changes and fixed issues

5.4.1 General

- The allowed value range for the ARB sequence length was wrong in case "Best ACP" or "Best ACP (Narrow)" filter optimization types were used. This is now fixed.

5.4.2 Uplink

- A PUCCH format 1/1a/1b transmission was not shortened correctly in cell specific SRS subframes under certain circumstances. This is now fixed.

5.5 Open Issues

5.5.1 General

- SAVE/RECALL is only supported for FW versions from version 2.15.085.78 on, i.e. RECALL of settings files generated with older FW versions is not supported
- Improved On/Off ratio for TDD is not supported in combination with "ACP-optimized" filter.

6 Version 2.20.160.51

6.1 Compatibility

- All supported features are in line with 3GPP Release 8, i.e. the following official 3GPP specifications are implemented:
  - TS36.211 v.8.9.0
  - TS36.212 v.8.8.0
  - TS36.213 v.8.8.0
- This version of the SMBV-K55 is compatible with R&S FSV-K100/-K101/-K102 and R&S FSQ-K100/-K101/-K102/-K104/K105 EUTRA PC-Software release 2.6.

6.2 New Features SMBV-K55

6.2.1 General

- New filter type "Best ACP (Narrow)"
- Support of the "Test case wizard"

6.3 Changes and fixed issues

6.3.1 General

- For filter type "Best ACP", the set "Trigger external delay" and "Marker delay" in samples were referring to twice the actual selected LTE sample rate, resulting in only half the delay of what was intended by the user. This is now fixed.
- For filter type "Best ACP", the duration for the single trigger in samples was referring to twice the actual selected sample rate, resulting in only half the duration of what was intended by the user. This is now fixed.

- Depending on the selected filter type, an external clock rate different from the actual selected LTE sample rate might be required, therefore the expected clock rate is displayed.

6.3.2 Downlink

- For a selected "Number of configurable subframes" that is smaller than the number of generated frames, the subframe configurations were used cyclically only for 40 subframes. After that, the used configuration sequence was restarting from the beginning. This is now fixed, the subframe configurations are now selected cyclically for the whole generated signal.
- Auto/DCI mode: Automatically generated allocations based on DCI formats with global RNTIs (P-RNTI, SI-RNTI, RA_RNTI) now always use QPSK as modulation scheme (as defined in 3GPP TS 36.213).
- DCI formats with global RNTIs (P-RNTI, SI-RNTI, RA_RNTI) now can only be mapped to PDCCH format 2 and 3.
- Mapping of VRBs of distributed type to PRBs in "Auto/DCI" scheduling mode was wrong. Fixed.
- Maximum allowed RB index for VRBs of distributed type was too small. Fixed.
- Default value as well as the maximum allowed value for the "IR Soft Buffer Size" was increased to 3667200.

6.3.3 Uplink

- Bugfix for SRS frequency hopping.
- Bugfix for SRS MaxUpPts.
- In case PRACH format 4 is only active in a frame different than the first frame, the beginning part of the preamble was cut off. Fixed.

6.4 Open Issues

6.4.1 General

- SAVE/RECALL is only supported for FW versions from version 2.15.085.78 on, i.e. RECALL of settings files generated with older FW versions is not supported
- Improved On/Off ratio for TDD is not supported in combination with "ACP-optimized" filter.

7 Version 2.15.085.78

7.1 Compatibility

- All supported features are in line with 3GPP Release 8 (April 2010), i.e. the following official 3GPP specifications are implemented:
  - TS36.211 v.8.9.0
  - TS36.212 v.8.8.0
  - TS36.213 v.8.8.0
- This version of the SMBV-K55 is compatible with R&S FSV-K100/-K101/-K102 and R&S FSQ-K100/-K101/-K102/-K104/K105 EUTRA PC-Software version 2.5 Beta 4

7.2 New Features SMBV-K55

7.2.1 General

- The FFT size can be freely selected for all bandwidth definitions under the following constraints:

- o For a specific BW, all FFT sizes (128,256,512,1024,2048) are applicable as long as the size is bigger than the number of occupied sub-carriers.
  - o For 15MHz, the DFT size of 1536 is applicable along with a FFT size of 2048.
- Configuration of up to four frames in downlink and uplink
- Improved On/Off ratio for TDD (required for PvT measurements together with FSQ)
- More flexibility in setting the appropriate power for Up- and Downlink. Please refer to the online manual for more details ("R&S Signal Generator Specific Information -> Power Setting").

7.2.2 Downlink

- Per default PBCH now uses real coded data (MIB including SFN).
- The PBCH ratio rho_B/rho_A can be freely set.
- Virtual resource blocks of distributed type are fully supported for both "Manual" and "Auto/DCI" PDSCH scheduling mode.
- Beamforming by means of PDSCH Transmission Mode 7 is supported.
- PDCCH with full configuration of DCI (all DCI formats are supported)
- New PDSCH Scheduling Mode "Auto/DCI" (automatic DCI/PDCCH->PDSCH):

  There are two ways to configure and schedule the different PDSCH allocations inside the frame allocation table:
  - *Auto / DCI: The allocations are configured automatically according to the PDCCH DCIs*
  - *Manual: There is no linking between the PDCCH DCIs and the PDSCHs. The PDSCHs have to be set manually (default mode).*

  The parameter PDSCH Scheduling can be found in the "General Dl Settings" menu.

  Note: *In order to ensure that the generated LTE signal is fully 3GPP compliant, in "Auto/DCI" mode, some flexibility of the K55, especially regarding the power settings is locked:*
  - *The "Reference Signal Power" is set to 0dB and can not be changed.*
  - *The PDSCH power of the allocations is set to the value specified in the "Configure User" dialog and can not be adjusted in the "Frame Allocation Table.*
  Note: *In "Auto/DCI" mode some parameters in the frame allocation table are locked and can only be modified by reconfiguring the according DCI. Switching from "Auto/DCI" mode to "Manual" unlocks all parameters without changing any set values. However, switching from "Manual" to "Auto/DCI" mode means that first a "Reset Frame" is performed (**all settings are lost**), and then for all active PDCCH DCIs appropriate PDSCH allocations are configured.*

- E-Utra Test Models for TDD
- Name of selected E-Utra Test Model is displayed in GUI until any parameter is changed.
- Number of PHICH groups can be set individually for each subframe or globally by means of parameter Ng (according to 3GPP TS36.211, 6.9.).
- Power of PHICH can be set individually for every single PHICH in every PHICH group.
- Auto Search Space for PDCCH/DCIs: Position of PDCCH/DCI by means of "Start CCE-Index" can either be set arbitrary or is limited to valid configurations according to the UE-specific search-space.

7.2.3 Uplink

- PUSCH Coding: Support of ACK/NACK bundling
- Power ramping for PRACH is now supported.
- FRC (according to 3GPP TS 36.141) are included in the FW
- Full support of channel coded PUSCH + Uplink Control Information (UCI)

- SRS updated to v.8.7.0
- SRS for TDD
- UCI on PUSCH without UL-SCH data ("UCI only mode")
- Full support of PRACH (format 0-4) for FDD and TDD
- Flexible configuration of PRACH preambles for up to 10 frames
- Increased PRACH time shift of -100…+100 microseconds (individually configurable for each preamble)
- PUSCH frequency hopping updated to v.8.7.0

7.3 Changes and bug fixes

7.3.1 General

- The definition of "Number of configurable subframes" has changed for TDD. Please refer to the online manual for more details ("R&S Signal Generator Specific Information -> Subframes Handling in the R&S Signal Generator").

7.3.2 Downlink

- The definition of the MIMO physical channel power boosting has changed. In line with R1-101470 the EPRE is now defined on a per antenna port basis.
- If the P-/S-SYNC are transmitted from only one antenna in case of MIMO, the according resources on the other antennas are not used for any other kind of signal/channel. If the P-/S-SYNC are not transmitted at all, still the resources are blocked and therefore not used.
- DCI auto search space functionality didn't work if "Number of configurable subframes" is larger than 10. This is now fixed.
- For 4Tx-Antennas, pre-coder cycling is now supported in case CDD is activated.
- VRB of distributed type is now working properly if Tx-Diversity is activated for the according PDSCH.
- The definition of P_A and P_B (DL General Settings) is now 3GPP compliant: P_A is the power in OFDM symbols without reference symbols while P_B defines the power in OFDM symbols containing reference signals. In the last versions, the definition was the other way around.
- The parameter "P_B/P_A" was renamed to "rho_B/rho_A". For PDSCH the ratio can no longer be set arbitrary, but is set according to the new parameter "PDSCH P_B".
- Bugfix for FEC in Tx-Diversity (N_L was set incorrectly).
- The following parameters are no longer supported:
  - Individual power settings for both 1st and 2nd Reference Signals in downlink (both use the same power value now).
  - PRS Initialization according to v.8.2.0 with individual configurable Fast Forward N_c (for both Up- and Downlink).
  - Channel Coding Configuration for support of old 3GPP definitions (CRC according to R99, Rate Matcher according to v.8.0.0, disabling of Code Block and Transport Block CRC). Channel coding is performed fully compliant with 3GPP TS 36.212.
  - Old "special" resource block mapping for odd number of resource blocks according to v.8.0.0.
  - User-definable Reference Signals sequences
  - User-definable P-/S-SYNC sequences
  - User-definable SRS sequences

7.3.3 Uplink

- Bugfix for PUCCH + extended cyclic prefix.
- The PUSCH of a certain UE is only shortened in case it is transmitting a SRS or it overlaps at least partially with the global SRS bandwidth in a certain sub-frame.

- PRACH generation was revised, some minor bugs were eliminated.
- Bugfix for uplink sequence hopping
- Bugfix for SRS power offset
- Bugfix for PUCCH in subframes with extended cyclic prefix (wrong scrambling sequence was used).

7.4 Open Issues

7.4.1 General

- The current version is limited regarding the following features:
  - o SAVE/RECALL is only supported for current and for future versions, i.e. RECALL of settings files generated with older FW versions is not supported
- Improved On/Off ratio for TDD is not supported in combination with "ACP-optimized" filter.