R&S®SMATE200A
Vector Signal Generator
Release Notes
Firmware Version 2.20.360.142

The following abbreviations are used throughout this document:
R&S®SMATE200A is abbreviated as R&S SMATE200A.

Table of Contents

1 Information on the Current Version and History

1.1 Version 2.20.360.142

Released : July 2012

Fixed Issues

Sometimes ALC problems with pulsed I/Q signals; fixed	10242
ARB: problems with "corrupt" data lists; fixed	10225
W3gpp: GUI problems with DLIST in downlink channel table; fixed	10171
AWGN: correlation between path A and B in MIMO cases; fixed	

Release Notes for 3GPP-FDD

- The PCPCH message part was incorrect for user equipments 2 to 4. Fixed.
- The "Scheduling List" dialog could make the user interface freeze for up to a minute if a large number of frames was displayed. Fixed.

1.2 Version 2.20.360.68

Released : March 2012

Fixed Issues

ARB : Memory overflow when loading > 100 different waveforms	10069
General : instruments without AWGN option K62 may have wrong RF level	10060

1.3 Version 2.20.360.54

Released : February 2012

New Functionality

- SMATE-K85 LTE Release 10 (Advanced)

- SMATE-K87 1xEV-DO Rev. B

Modified Functionality (general)

- GSM : slot attenuation extended to 70 dB

- Service : Counter for high power relay implemented

Fixed Issues

Command SOUR:IQ:OUTP:EXT:LOG:TYPE SSI28 not working	10033
Command BB:C2K:LINK Forward/Reverse not working	10013
Chinese online help shows some strange characters	9992

Release Notes for LTE/EUTRA can be found in the separate document SMx_K55_K69_K81_K84_K85_Release_Notes.pdf

Release Notes for 3GPP-FDD

General : Increased the dynamic range for dynamic power control to 60 dB if the power step size is at least 1 dB.

HSUPA Uplink: Selection between LEVATT and USER 1 connectors for HARQ Feeback.

1.4   Version 2.20.230.131

Released : December 2011

Known Issue

Firmware Update by GPIB requires a manual reboot after installation.

Fixed Issues

ARB/multi segment : Append button missing	9945
Patch Dll (OrgLayer.dll) from V2.20.230.58 now integrated in the package	9946
ESR Bit 6 is set when going to LOCAL	9549
All digital modulations: Armed trigger is ignored in rare cases	9905

Release Notes for LTE/EUTRA can be found in the separate document SMx_K55_K69_K81_K84_Release_Notes.pdf

1.5   Version 2.20.230.58

Released : July 2011

New Functionality

- SMU-K84 (LTE Release 9)

- SMU-K86 (IEEE 802.11 AC)

Modified Functionality

- LXI-Webserver : VNC viewer integrated

- Remote : Emulation of other instruments possible changing *IDN? and *OPT? responses

- GSM : Support of VAMOS (AQPSK) modulation

- ARB/multi carrier : arbitrary carrier spacing possible

- Custom DigMod : support of APCO25(8PSK)

- Support of RF frequency multipliers

- GSM : extended range for trigger delay

Fixed Issues

Changing slope for baseband trigger and clock without effect	9265
Adjustment of complete path B not possible with only one baseband option and installed K55	9409
Some help issues	9465
Error message "SYNEX (B) 10MHz Loop unlocked"	9671
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Release Notes for LTE/EUTRA can be found in the separate document SMx_K55_K69_K81_K84_Release_Notes.pdf

Release Notes for 3GPP-FDD

New Features

- General Uplink:
  - Instead of specifying the level of the total signal (i.e. the average power), it is possible now to specify the level during specific parts of the signal, like e.g. during the PRACH message part or during the first slot with active DPCCH by specifying a "level reference".
  - The scheduling of uplink signals now can be visualized in a "scheduling list".
- HSDPA Downlink:
  - The leveling for H-Set fixed reference channels was simplified by introducing the possibility of configuring the total HS-PDSCH power.
- HSPA+ Downlink:
  - The modulation and number of HS-PDSCH channelization codes in H-Set fixed reference channels now can be randomly varied over time, as needed for type 3i enhanced performance requirements tests.
  - The generation of the "other user's channels" (OCNS) for type 3i enhanced performance requirements tests is possible now.

Changed Features

- General Uplink:
  - The 1024 chips delay of the uplink signal can be switched off now, if needed.
- HSDPA Uplink:
  - The scheduling of HS-DPCCH transmissions now is possible in a more flexible way.
  - Real time generation of the HS-DPCCH channel now is possible also in case the HS-DPCCH is scheduled by the HS-DPCCH scheduling table.
- HSUPA Uplink:
  - The generation of E-DPDCH channels now can be restricted to the I or Q branch, if needed.

- The scheduling of E-DCH packets now is possible in a more flexible way. The former DTX patterns have been replaced by an E-DCH scheduling table. This does not apply for E-DCH fixed reference channels (FRCs) with enabled HARQ Simulation.
  - The E-DPCCH and E-DPDCH channels now are generated in real time if UL-DTX or dynamic power control is activated.
  - HSPA+ Uplink:
    - UL-DTX now is possible also for other channels than DPCCH. The configuration of two UL-DTX cycles is possible and all dependencies between the transmissions of the channels are taken into account, in line with 3GPP TS 25.214.
    - Now dynamic power control is possible also in combination with UL-DTX. The application of externally received power control commands is made in compliance with 3GPP TS 25.214; UL-DPCCH gaps are taken into account.
    - Real time generation of the HS-DPCCH channel now is possible also if the HS-DPCCH contains HSPA+ content.

Fixed Issues

- General
  - The code allocation for compressed mode method SF/2 was incorrect.
- General Uplink
  - The PCPCH Channel Coding was not working correctly.
  - Data sources were read out at the wrong positions in case of uplink compressed mode method SF/2.
- General Downlink:
  - In certain cases the TFCI state of DPCH channels was configured to be off (DTX) after selecting a reference measurement channel.

The generation of AICH and AP-AICH channels was incorrect.

1.6 Version 2.10.111.189

Released : Feb 2011

Modified Functionality

- A complete list of changed for LTE can be found in the separate document SMx_K55_K69_Release_Notes.pdf

- 3GPP-FDD: Updated test model "TS34121_R8_Table_C_11_1_3_Subtest5" according to the changes in 3GPP TS 34.121 version 8.8.0.

Fixed Issues

LTE : only one out of two installed options K81 used	9920
Drive C:\ is filling up due to internal debug trace files	9202
3GPP-FDD: Closed loop HARQ feedback	9123
- The feedback timing was corrected. This can cause the need of recalibration of the additional user delay.	
- Sometimes the packets were sent with the wrong redundancy version in case of RSN 3 (only for 2 ms TTI length)	
3GPP-FDD: Bugfix for the uplink FRC transport block size (only for "User" FRCs with 2ms TTI size and an E-TFCI of 127)	9124

APCO Coding could be combined with 8FSK and 16FSK	9138
Internal adjustment may overrule calibration value for reference oscillator	9111
AWGN: noise only mode not working with digital baseband output	9066
Listmode not working correctly with external I/Q modulation	9065

1.7 Version 2.10.111.153

Released : Nov 2010

New Functionality

- SMU-K81 (LTE logfile generation)

Modified Functionality

- A complete list of changed for LTE can be found in the separate document SMx_K55_K69_Release_Notes.pdf

- Module support : newest release 7 of B9/B10/B11 supported

- New icon at desktop and tray bar to ease returning from remote desktop

- ARB sequencing : several improvements

- 3GPP-FDD : all supported features are in line with release 9 of the 3GPP specifications.

Fixed Issues

CW/Modulation switching using control lists not working reliably at lower symbol rates	8969
1xEVDO : sporadic overdriving in base band domain (spectral regrowth)	8903
Blockdiagram : AWGN block not displayed correctly if no B9/B10/B11 is installed	8855
3GPP-FDD (HARQ feedback) : The feedback timing was corrected. This can cause the need of recalibration of the additional user delay. Sometimes the packets were sent with the wrong redundancy version in case of RSN 3 (only for 2 ms TTI length)	8888
FM-Stereo : instabilities using audio source LFGEN	8695
B90 : problems with two path instruments with only one B2x below 200 MHz	8655
LTE : preset causes memory leak which may lead to crash	8565

1.8 Version 2.10.111.116

Released : May 2010

Modified Functionality

Fading: fading HST now available in MIMO2x2

Fixed Issues

Multi segment info file: creating file via SCPI results in empty MARKER tags and file is not loadable; fixed	8264
Multi segment / playlist: several improvements	
WLanN: Armed trigger not working in coupled mode; fixed	8279
1xEVDO:DL table not editable; fixed	8280
GSM/EDGE: data and control list not selectable; fixed	8286
Multi segment waveforms: marker not considered; fixed	8296
ARB: Create Test Signal creates error message "file not found"; fixed	8297
Fading: Sometimes error message "DSP don#t get enough data"; fixed	8306
I/Q settings: parameter Baseband Gain not in save/recall; fixed	8307
TETRA: filter selection not correct and can cause a system hang up; fixed	8341
Baseband connection test failed with fading type FineDelay30	8390
1xEVDO: crest factor not reproduceable when switch state on; fixed	8488
1xEVDO: memory leak when switching state to off; fixed	8493

1.9 Version 2.10.111.53

Released: Feb 2010

New Functionality

- SMATE-K68 (Tetra 2)

- SMATE-K69 (LTE closed loop BS test)

- NRP-Z power sensors : Info and update dialog (from Setup)

- ARB : Sequencing with play lists

Modified Functionality

- *RST / **PRESET** key has been speeded up

- ARB/multi segment mode : several improvements (single trigger with different clock rates)

- ARB/multi carrier mode : support of clipping

- External triggering: choice between "sync to external trigger" (with skipping first samples, default) and outputting from first sample (new).

- All digital standards: setups can now be saved in differential format

- Optimized file dialog (tree view)

- Sweep : new mode "Extern Start/stop"

- Custom Dig Mod : new modulation AQPSK

- AWGN : C/N range extended to +40 dB

- Head panel (Frequency, level and status information) renewed

- Internal Graphics can be controlles remotely (eg. SOUR:BB:GRAP:SMAR:STAT ON;SOUR:BB:GRAP:STAT ON)

- 3GPP-FDD: Uplink Signaling (in HS-DPCCH channel) for DC-HSDPA.

- Bluetooth : Upgraded to Core Specification 4.0 and added Lowe Energy Enhancements

- Several enhancements for LTE/EUTRA (see separate release notes)

Fixed Issues

*RST during manual **PRESET** or vice versa may lead to crash	6487
Search function in online help improved	6637
Leading "0" is network addresses removed (LXI- and Ethernet dialog)	6692
Lost focus in edit field validates entry	7383
Setting range for I/Q impairments limited to 10% (formerly 50%)	7796
Custom Dig Mod : Formula for calculating modulation index has been corrected to m = (max-min)/(max+min).	7952
Marker info missing when generating waveform from digital modulation signal	7971
B90: sometimes error message appears during adjustment	7989
Custom Dig Mod : several minor problems with CList editor and documentation	8022
I/Q impairments/Optimization mode: changed I/Q bandwidth ignored	8121
TD-SCDMA: remote commands BB:TDSCdma:UP:CELL1:SLOT1:PRAC:MSG:DATA:PATT and BB:TDSCdma:UP:CELL:ENH:DCH:HSUPA:BPAYload? Not working	8123 8124
SCPI: octal pattern (eg. Using with data sources) not working	8129
Wimax : IE "TLV Encoded information for the overall channel" ("Frame Duration Code", "Frame Number") missing	8233

1.10 Version 2.05.269.101

Released: Oct 2009

Fixed Issues

Sometimes an error message "DSP: unknown command" appears at first switching on a digital standard: fixed	7920
Sometimes error messages occurs from modulation coder DSP and at last "Zero signal measured" -> "Modulation coder output deacivated.." and no output signal is available (more often with GPS); fixed	7919
AWGN doesn't work correctly in V2.05.269.xx (with DacBoard 1141.8090.xx only); fixed	7918
Blanking of output signal improved (now as few as possible)	7818
ARB: Same Segment + Single Trigger: Sequence Length Unit = Samples does not work correctly; fixed	7816

1.11 Version 2.05.269.83

Released: July 2009

Fixed Issues

*tst? returns always 1 (=error): fixed	7760
List mode: error message while learning list: fixed	7752

1.12 Version 2.05.269.77

Released: May 2009

New Functionality

- SMATE-K58 (Sirius)

- SMATE-K352 (Playback of HD Radio streams)

Modified Functionality

- List mode :
  - Max value of dwell time increased
  - The mode STEP now can be remote controlled:

- [:SOURce]:LIST:INDex <nr>   addresses the specified index

- [:SOURce]:LIST:TRIGger:EXEC   executes a single list step

- Accelerated operation of LTE and Wimax

- Frequency Offset has been extended to 67 GHz

- Factory preset resets computer name

- Suppression of test signal when performing local I/Q modulator adjustment (CAL:IQM:LOC?)

- Phase offset : extension of range (-999.99 deg to 999.99 deg)

- Adjustment uses external reference if activated

- List mode : dwell time extended to 100 s

- User correction : warning when leaving frequency limits

- Instrument can be shut down remotely using SYSTem:SHUTdown

- Booting speeded up by typ. 20 s

- New filter Lowpass (EVM optimized) useful for WLAN and other OFDM standards

Fixed Issues

Possible hangup after fast changing digital standards remotely : fixed	7681
GSM : some parameters missing after recalling a setup : fixed	7520

SRQ handling over VXI11 delayed by 200 ms : fixed	7423
Signal of Marker 4 (output at User connector) corrupt : fixed	7566
List mode : sporadic errors when switching between several lists very fast : fixed	7550
List mode : Reset did not work with mode step : fixed	7468

EUTRA/LTE

Downlink

- TDD special subframes: automatic adjustment of parameters is now fully supported

Uplink

- PUSCH allocations are now displayed correctly in the time plan for frequency hopping type.
- PUCCH allocations and PUCCH region is displayed in the time plan.
- PRACH is displayed in the time plan.

3GPP-FDD

New Features

- HSUPA / HSPA+ Uplink
    - o Fixed reference channels (FRC): Transport block size and channel allocation now is user configurable (User-FRC).
    - o Uplink test models according to TS34.121 tables C.10.1.4, C.11.1.3, C.11.1.4
- HSPA+ Uplink
    - o Uplink DPCCH slot format 4
    - o UL-DTX mode for CPC simulation ("DPCCH Gating")
- HSPA+ Downlink
    - o F-DPCH slot formats 1 to 9 ("Enhanced F-DPCH")
    - o Fixed reference channel H-Set 12 for Dual Cell HSDPA tests ("DC-HSDPA")
    - o Downlink test models for Home base station tests ("Home NodeB")

Changes

- Support for old release 4 uplink DPCCH slot formats 4 and 5 is discontinued.

Problems eliminated

- Uplink compressed mode: The configuration of TG pattern 2 was not recognized correctly.

Wimax

New features
- 2 Antenna STC modes (Matrix A and B) for AMC2x3
- Power offset of Baseband B
- MIMO UL Basic IE added to UL-MAP

Bugfixes

- Fixed bug in HARQ CRC
- Fixed pilot carrier bug for 4 Antenna STC modes
- Fixed dedicated pilot flag in DL-MAP for PUSC

GPS

- Unlimited Play-Time.
- Satellite Elevation Mask made configurable (2.5, 5, 7.5 and 10°).
- Satellite Handover (Based on Optimal Availabilty Algorithms) in AUTO SV UPDATE Mode.
- Ephemeris Projection in (AUTO SV Modes) overcoming the 2 hours Ephemeris validity Problem.
- 3GPP2 (CDMA2000) Test Scenarios available.
- Sensitivity Assistance Data (CDMA2000) available.
- SPOT view (Satellite/Receiver View, HDOP, PDOP, Next Handover Query...).

1.13 Version 2.05.222.34

Released: Jan 2009

Fixed Issues

WiMax: Restore settings from a two channel device to a one channel device causes a crash if coupled mode was switched on; fixed	7328
Marker signals are delayed to the IQ signals (only V2.05.222.24 affected): fixed	7373
Menu SETUP: entry "Reference oscillator" missing (only V2.05.222.24 affected): fixed	7389
RF output with (all) IQ modulations: level is up to 6 dB too low (only V2.05.222.24 affected): fixed	7402

1.14 Version 2.05.222.24

Released: Nov 2008

New Functionality

- SMATE-K41 (GSM EDGE +)
- SMATE-K60 (Bluetooth)

Modified Functionality

- RF can be optionally blanked when external reference is missing

- Chinese online help now available

- Internal adjustment uses external reference oscillator if selected and connected

- List mode (sub mode STEP) is now also available with SCPI triggering

- New command [:SOURce[1|2]]:SWEep[:FREQuency]:RUNNing? to poll sweep state

- 1xEVDO (SMx-K47) : Forward/Downlink is now generated in realtime with immediate signal update
  and uninterrupted output at parameter changes.

Fixed Issues

Phase Offset was set to 0° after triggering : fixed	5746
ARB Multi Segment: Marker signal faulty with trigger mode Single/Next Trigger: fixed	6660
Custom Digital Modulation : bits of data editor are hard to read : fixed	6965
GPS : critical database error occurred after loading setup : fixed	7025

EUTRA/LTE

Compatibility

- All supported features are in line with the following official 3GPP specifications:
    - TS36.211 v.8.3.0
    - TS36.212 v.8.3.0
    - TS36.213 v.8.3.0

- This version of the SMx-K55 is compatible with R&S FSV-K100/-K101/-K102 and R&S FSQ-K100/-K101/-K102/-K104/K105 EUTRA PC-Software.

General Features

- New specific LTE filter for enhanced ACLR performance. Depending on the user's requirement, the filter can be selected as optimized for EVM (Default) or optimized for ACP.

- Time Domain Windowing for uplink and downlink is supported. Note that Time Domain Windowing in the downlink will degrade EVM substantially, due to the definition of the EVM in 3GPP.

- Enhanced Test Models (36.141) are supported by means of setup files

Downlink

- Support of TDD

- PHICH: The configurable ACK/NACK pattern (8 bits for normal CP, 4 bits for extended CP) for one PHICH group now consists of '1','0' and '-' (DTX).

Uplink

- Update to 3GPP version 8.3.0 (PUCCH, PUSCH).

- n_PRS updated to version 8.3.0

- Support of PRACH

Changes and Bug fixes

Downlink

- Initialization of PRS generator (X2) is selectable between v.8.2.0 and v.8.3.0 (default). This has an effect on the reference signals, scrambling and PHICH mapping. N_c will be fixed to 1600 as defined in 3GPP in case of v.8.3.0.

- Control region for PDCCH extended to 4 symbols in case of small channel bandwidths (< 10RBs).

- Scrambling can be activated individually for PCFICH and PDCCH

- Power levels can be set individually for PCFICH, PHICH and PDCCH. Power setting for PHICH is applied to every single ACK/NACK BPSK symbol. Normalization of a PHICH group (not yet defined in 3GPP) can be achieved herewith.

- Bug fix: PHICH mapping in case of extended cyclic prefix.

- Normalization for transmit diversity as defined in 36.211 added.

- Added dependencies for "User"-PDSCH allocations: all user allocations use the same settings for modulation, pre-coding, scrambling and channel coding.

- Bug fix: scrambling for PBCH

Uplink

- PUSCH frequency hopping type 2 adjusted to v.8.3.0.

- DRS group and sequence hopping adjusted to v.8.3.0.

- Position of PUSCH DRS in case of extended cyclic prefix changed from 4th symbol to 3rd symbol in slot.

- Bug fix: PUCCH mapping to resource blocks.

- Bug fix: scrambling for PUSCH in case channel coding is activated.

3GPP-FDD

New Features
- HSPA+ Downlink
    - fixed reference channel H-Set 11
- HSPA+ Uplink
    - 4PAM modulation for E-DPDCH channels
    - fixed reference channel FRC 8
    - HS-DPCCH signaling for UEs in MIMO mode

Changes
- H-Sets: Now up to 8 HARQ processes are possible (up to 16 for MIMO).
- H-Sets: Now longer redundancy version sequences for HARQ simulation are possible.

Problems eliminated
- H-Sets with HARQ simulation: Now the transport block size is signaled only at initial transmissions (in HS-SCCH types 1 and 3).
- The TPC bits in the F-DPCH channel were always 0 – fixed.

Wimax

New features
- Moving Offset mode for Chase HARQ (RCT test 9.1.24)
- Sub-DL-UL Maps
- Included Ack Disable flag for HARQ subbursts

Bugfixes
- Fixed available modulation and coding selections for Chase HARQ
- Fixed incorrect sounding carrier allocations

1.15 Version 2.05.104.56

Released: Aug 2008

Fixed Issues

Under rare conditions the guaranteed maximum level could not be reached: fixed	6899

1.16 Version 2.05.104.54

Released: Aug 2008

New Functionality

- SMATE-B90 (LO sync board for MIMO)

Modified Functionality

- XM-Radio : frame counter implemented

Fixed Issues

Custom Digital modulation : bit clock now used falling slope with external data and symbol clock	6627
GSM : Instrument crashes using external retrigger mode : fixed	6754
Remote control : transfer fails if character 0x0A is in first block of binary data : fixed	6783

1.17 Version 2.05.104.33

Released: June 2008

New Functionality

- SMATE-K57 (FM stereo)

- SMATE-K59 (HSPA+)

● Support of new synthesizer SSYN (1141.4220)

Modified Functionality

● Software update in one file and over LAN

● LXI Class C including web server

● Sophisticated hardcopy function

● Factory preset, standard Preset/*RST does not reset reference oscillator or power on state (level)

● Several layouts of external keyboards supported

● All windows can be resized in height using <REARR> button

● Busy display for Preset/Save/Recall and switching digital standards

● Custom Digital Modulation : support of QAM128, several improvements of data list editor

● All sweeps support now shapes sawtooth and triangle

● Phase continuous frequency setting

● Setting times for level/frequency reduced by typ. 150 µs

● Display of NRP-Z81 peak power

Fixed Issues

Several hyperlinks in online help not working : fixed	5323
Level sweep without dropouts : fixed	6533
Trigger not stored in multisegment waveform : fixed	6589
Several bugs with multi segment waveform : fixed	5205
ARB file selection dialog improved (tool tipp with all comments) : fixed	5884
DigMod: Pure Gauss parameter not accessible from SCPI : fixed	6168
Several small changes in user manual / online help : fixed	6334
DigMod: 16QAM Edge not properly working : fixed	6434

EUTRA/LTE

Compatibility

● All supported features are in line with the following official 3GPP specifications unless not revised by the according CRs listed below:
  ○ TS36.211 v.8.2.0
  ○ TS36.212 v.8.2.0
  ○ TS36.213 v.8.2.0
● The following CRs are implemented:
  ○ R1-081248: PRS sequence generation for downlink reference signal
  ○ R1-081518: Draft CR on Correction of the number of subcarriers in PUSCH transform precoding
  ○ R1-081520: Draft CR on Correction of PUCCH resource index for PUCCH format 2
  ○ R1-081576: Correction of the number of subcarriers in PUSCH precoding

- o R1-081577: Correction of PHICH mapping
- o R1-081578: Correction of PUCCH resource index for PUCCH format 2
- The Downlink of this version of the SMx-K55 is compatible with FSQ-SW LTE K100/K101/K102 Version 2.2 BETA 3

General Features

- Updated bandwidth definitions 1.4MHz and 3MHz (previously supported by user defined settings)
- Support of User Filter: user-defined TX-filter can be generated (e.g. by means of R&S FiltWiz) and then uploaded to the SMx-K55.

Downlink

- Full support of P-SYNC, S_SYNC and DL Reference Signal derived from CELL ID
- Supports channel coding for PDSCH
- Support channel coding for PBCH
- Supports scrambling for PDSCH and PBCH
- Full MIMO and Transmit Diversity support (all precoding and CDD formats)
- Support of PCFICH
- Support of PHICH
- Support of PDCCH: An arbitraray bit stream (PN9, data list, pattern...) is used by the SMx-K55 (can be uploaded from external if needed), and PDCCH processing starts with "scrambling" (see 36.211, 6.8.2). The next steps of PDCCH are performed as defined in 36.211. The user is responsible for the content of the several PDCCHs (see 36.212, 5.3.3.1 DCI Formats) and the multiplexing of them. SMx-K55 does the scrambling, layer mapping, precoding and RE mapping including permutation and cyclic shifting.

Uplink

- Support of new definitions of reference signal sequences
- Update on demodulation and sounding reference signals
- Support of group and sequence hopping
- Supports channel coding for PUSCH including multiplexing of data and control information
- Supports scrambling of PUSCH
- Support of all PUCCH formats

3GPP-FDD

New Features

- HSPA+
  - higher order modulation: downlink 64QAM
  - CPC: HS-SCCH less operation
  - MIMO support
  - new H-Sets 7-9 (3GPP Rel.7)
- new H-Set 10 (3GPP Rel. 8)
- more flexibility in the H-Set configuration („User" – H-Set)
- The user gets support by the user interface for selecting the right ARB sequence length when generating H-Set signals.
- For H-Sets, the (least necessary) UE-category is displayed.
- third OCNS-Mode „HSDPA 2" (according to TS 25.101)
- E-AGCH: now with user coding

Bugfixes / Changes

- Computationally expensive realtime-signals (e.g. RMC384 or H-Set3) were sporadically shifted in time after retrigger: fixed.
- Conflicts between H-Sets and OCNS in the channel configuration are avoided now.
- When switching off the OCNS-Mode, the OCNS-Channel state is switched off now (in previous releases the channels were only converted to normal DPCHs, but with state on).
- When generating H-Set 6, the database was read out at the wrong positions: fixed.
- HARQ-Feedback:
  - Immediately after retrigger, the packets were sent with random retransmission sequence number (RSN): fixed.
  - When changing from one RSN to another, the last 1024 chips of the old packet were sent already with the new RSN: fixed.

Wimax

- CSTD (Cyclic Delay Diversity)
- Coupled Baseband Modes (Baseband B is controlled from Baseband A for STC configurations)
- Transmit Diversity with 4 antennas
- Band AMC modes for 2x3 AMC
- Band bitmap for sounding
- Additional user definable power boosting for each zone
- Time Plan displays inactive zones in grey (such as SISO zones on Antenna 1)
- Multiple PDUs per burst
- DCD and UCD added for OFMD mode
- UL-MAP and DL-MAP in one burst for OFDM mode

1.18   Version 2.04.303.32

Released: April 2008

Fixed Issues

Sometimes the device does not shut down correctly : fixed   6424

Sporadic bit errors in GSM and 3GPP FDD signal generation (problem was observed only in combination with UNICOD version > 6.00): fixed

1.19   Version 2.04.303.31

Released: Feb 2008

New Functionality

- SMATE-K65 : Assisted GPS

Fixed Issues

Sporadic extension of setting times for level and frequency : fixed	6273
Wrong display of AWGN values in display mode baseband : fixed	6290

1.20   Version 2.04.303.17

Released: Dec 2007

Fixed Issues

Support of multilevel user correction protected with a registry key; feature now available for all	6196
WiMAX: OFDMA: Predefined settings not available	6200
AM: Sometimes an error message "..output unlevelled" occurred when using AM with low deviation	6206

1.21   Version 2.04.303.16

Released: Oct 2007

New Functionality

- SMATE-K47 : 1xEVDO Rev. A

- SMATE-K53 : T-DMB / DAB

Fixed Issues

XM-Radio. No markers in physical layer mode "Terrestrial A" and "Terrestrial B"	5834
IEEE 802.16 WiMAX: system crash possible when changing from uplink to downlink, standard is active and predefined settings are used	6000
IEEE 802.11 n: Indikator „MOD OFF" does not disappear when this standard is activated	6042

1.22   Version 2.04.303.03

Released: Aug 2007

New Functionality

- SMATE-K54 : IEEE 802.11n (WlanN)

Fixed Issues

CDMA2000: new default setting (one channel switch to ON to avoid error messages when setting state to ON)	5263
Sometimes a system crash occurs when toggling LEVEL/DIAGRAM buttons	5353

very often

WiMax:

- Subchannel rotation fixed for uplink PUSC zones including FastFeedback and Ranging bursts

- Fix in uplink AMC2x3 mode

- STC Matrix B mode fixed	5355
ARB: sine generator: error message when using sine generator immediately after switching on EUTRA (SMATE-K55)	5356
Custom Digital Modulation: List editor: system crash when using "goto"-command	5385
FM: source is "INTERNAL + EXTERNAL": sensitivity not visible in dialog	5433
W3GPP: Enhanced channel 11: selecting "config data" shows no reaction (menu don't open)	5542
ARB: Loading AMIQ/SMIQ waveforms sometimes causes an error message	5597
SCPI: all return values of "…:stat?" is OFF/ON instead of 0/1 (bug in V2.04.202 only)	5610
Custom Digital Modulation: "user filter" doesn't work in path B	5655
CDMA2000: "Set To Default" resets settings in path A and B (not the selected path only!)	5751
W3GPP: error message when selecting "PRACH Preamble only" with trigger mode "Armed Auto external"	5801
W3GPP: copy BS1 to BS2 doesn't copy all relevant parameters	5802
WLAN: when setting state to ON the filter settings are always the default one, not the displayed one!	5816
AWGN: Doesn't work if no option B9/10/11 (bug in V2.04.202 only)	5833
GSM: Recall doesn't set the frames	5882
WLAN: sequence length not limited correctly	5894
CDMA2000: unknown exception when using predefined settings RC4 with frame length = 80 ms	5930

WiMAX

- Corrigendum2/D4 compatibility
- Uplink Sounding
- Added Zone_Switch_IE in DL-MAP
- Mixed STC Matrix A and B configuration within the same zone
- CID_Switch_IE inclusion in DL-MAP can be toggled
- Added Collaborative Spacial Multiplexing in uplink

1.23 Version 2.04.202

Released: April 2007

Fixed Issues

- Sometimes at startup an error message occures „… unicod SDRAM …"; only with V2.04.201

1.24 Version 2.04.201

Released: March 2007

New Functionality

- SMATE-K55 : EUTRA/LTE

- SMATE-K56 : XM-Radio

- SMATE-K6   : Support of external Pulse Sequencer Software

Modified Functionality

- TD-SCDMA : Predefined Settings / Testmodels

- NRP power sensors : persistent power display in block diagram

- List mode : level setting without interruption/blanking

- ARB Multi segment : several improvements / bugfixes

- Armed/Triggered state visible in block diagram

- Security Menu : possibility to switch off USB port and LAN for file transfer

- New optimization mode "high quality" to reduce modulation frequency response

3GPP

- 3GPP HSDPA H-SET6 Extensions

- 3GPP HSUPA Extensions (E-DPDCH with new symbol rates 15ksps and 30 ksps, separate channel powers possible, HARQ State)

WiMAX

- HARQ

- Offline Filter

- AMC 2x3

- Fast Feedback Bursts

- Dedicated Pilots for AMC 2x3 and PUSC

- Switchable Subchannel Rotation for Uplink PUSC

- DCD and UCD Bursts

- New modulation QAM 5/6

- Extension of DL-MAP (CID-SWITCH-IE, bursts of all zones, MAC Header and CRC on, …)

Enhancements of noise

- AWGN : Extended S/N Range -50 dB to +30 dB

Fixed Issues

ARB test sine signals : some remote commands not working	4376
CustomDigMod/FSK : envelope not constant with root cosine filter and some roll-off factors	4763
ARB sequence length : maximum depending on ARB size	4815
3GPP FDD : Save waveform not working for uplink	4850
WLAN : predefined frames not working correctly	4903
WiMax/3GPP : clipping not working correctly	4907
WiMax : output power not correct when using more than 15 frames	4913
Save/Recall : 'exclude frequency" and "exclude level" without impact	5109
Data lists exceeding 256 Mbyte cannot be loaded to B9	5161

1.25 Version 2.02.170

Released: Feb 2007

Fixed Issues

Error message "I/Q out level is below minimum..." with option SMATE-B16	4866
Error messages while graphic is running and trigger mode is armed	4885
Sometimes trigger input 1 and 2 does not work immediately after power on	5069
MCCW: spectrum not perfect with 3 or 15 carriers	5087
Sometimes a system crash happens at power on	5151
Error message „General plugin error" in GSM after PRESET and :BB:GSM:MODE SINGLE	5197
:syst:time xx,xx,xx and :syst:date xx,xx,xx doesn't work anymore	5272
Sometimes system hangup while doubleclicking menu points (e.g.GPIB or Ethenet)	5280

1.26 Version 2.02.145

Released: Nov 2006

Modified Functionality

● Improvement of the level adjustment (new internal adjustment "level attenuation")

Fixed Issues

GUI: Sometimes GUI is frozen after PRESET (you cannot open any new window in the application after PRESET)	4884
GUI: Some menus have an unnecessary horizontal scroll bar (bug in V2.02.130 only)	
Menu SETUP-HARDWARE CONFIG: memory leak caused system hang up	5025
Testcase Wizard: error message "Fader Insertion Loss Limit Exceeded; value set to limit" when using test case 8.4 with antenna diversity ON	5034

1.27   Version 2.02.130

Released: Sept 2006

New Functionality

- Support of new main board with FMR7 (first version)

- New menu SETUP – UPDATE for updating internal FPGA

Fixed Issues

Custom Digital Modulation: *.vam files couldn't be selected via IEEE bus	4270
Custom Digital Modulation: symbol rate not accessible via GUI	4845
Option SMATE-B16: error message "I/Q out level is below minimum for 'optimize I/Q signals for RF output' enabled" sometimes doesn't disappear (V2.02.116 only)	4866

1.28   Version 2.02.116

Released: Aug 2006

New Functionality

- Support of SMATE-B9 - Baseband with ARB(128Msamples)

- Digital standard DVB (SMATE-K52)

- Digital standard TD-SCDMA with two options
  SMATE-K50 (basic functions)
  SMATE-K51 (Enhanced BS/MS test)

- Digital standard SMATE-K45 (3GPP FDD HSUPA)

- Support of NRP-Zxx power sensors (power viewer and user correction)

Modified Functionality

- Support of hardware IO-Leitungen: RF OFF (PIF fpga version 5.10 or higher required)

- New menu for FPGA update (SETUP-UPDATE)

- Internal adjustment: reference frequency mode not changed to "internal" during internal adjustment

- GPIB channel address: now saved immediately to support hard power off

- 3GPP Power Control: new marker mode "Dynamic Power Control" for marker 4

- "Generate Waveform File" for all digital standards (for multi carrier/ multi segment)

- Support of user filter files generated with R&S FiltWiz

- Import of list mode and user correction data from CSV and TXT files

- WiMAX (SMATE-K49) : several extensions including WiBro and multi zones

- 3GPP FDD (SMATE-K43) : parameter range of BER / BLER extended to 50%, 3 power steps for HS-DPCCH

- Setup menu : Display of instruments TCPIP address and BIOS version

- list mode : frequency and level display dotted when list mode running

- SCPI: Error Queue entries with path indication A/B

- phase modulation: unit rad and degree supported (attention: default is rad now!)

Fixed Issues

Renaming files with MMEM:MOVE did not work	2875
Eye diagram did not work correctly	3417
Save/Recall with :MMEM:LOAD:STAT / :MMEM:STOR:STAT not working	3473
sporadic crashes when handling big ARB waveforms	4026
inconsistent block diagram in REMOTE state	4029
GSM/EDGE:'Recall Predefined Frame' cannot copy to frame 2	4074
Custom Digital Modulation: ASK: graphic for 'Modulation Settings' empty	4131
SCPI commands for ARB multi segment SOUR:BB:ARB:WSEG: missing	4210
sporadic erros in output signal when I/Q graphic is running	4214
ARB Multi Segment: Recall GUI Problem	4623
Multi Carrier: "Division by zero" if all carriers are switched off	4639
ARB: tag "clock rate": precision too low	4708
List mode: system hang up while editing via "Insert Range…"	4713
System crash while switching off incompatible modulations internally	4748

1.29 Version 1.40.21

Released: April 2006

Fixed Issues

- WLAN: save/recall not possible if CDMA2000 and 3GPP FDD is not available

- Bugfix with new calibration data from level (RFM V2.0; internal use only)

1.30 Version 1.40.20

Released: March 2006

Fixed Issues

- "DSP communication error" sometimes occurs (only in V1.40.19); fixed

- Bugfix with new calibration data from level (RFM V2.0; internal use only)

1.31　Version 1.40.19

Released: Feb 2006

Modified Functionality

- New level calibration for factory purposes supported

- Improvement of settling time with IQ modulation on

Fixed Issues

- In rare cases the level adjustment failed with error "DACIF…"; fixed

1.32　Version 1.40.13

Released: Nov 2005

New Functionality

- Generation of HSDPA H-Sets (SMATE-K44)

- Support of WiMAX OFDMA mode (SMATE-K49)

- Support of ARB multi carrier

- Support of parameter variation with mouse wheel

Modified Functionality

- UCOR level range extended to 100 dB

- Several improvements of file dialog

- Several improvements of AWGN dialog (SMATE-K62)

Fixed Issues

List-Mode : dwell time of first step not correct	2703
Custom DigMod : support of CW switching incorrect	2966
:SYST:SERR? does not respond "no error" if everything is ok	3225
Changing the remote interface VXI11 <->GPIB causes crash of instrument	3360
ARB: no independent sine test signal output possible on path A/B	3365
Pulse modulation deactivates digital modulation	3687
Internal graphics stopps when both paths are triggered by marker 1	3699
3GPP FDD : TFCI setting of S-CCPCH not allowed	3716
List mode : online help missing	3849
FM external impedance only switchable if FM is ON	3870
Setups of older firmware versions cannot be read	3877
Power-on-preset not working	3879
All standards : units of single trigger duration harmonized	3892
Input of values with leading floating point (eg. ".5") not supported	3906
Pop-ups not operable without mouse (eg. ARB multi segment)	3911

Multi carrier/SCPI : unit [dB] not accepted	3938
Sweep : Attenuator switches in fixed mode (occasionally)	3966
Power Up/Down (RF level) not supported by remote interface	3973
All standards / SCPI : instrument crashs when pattern length exeeds 32	3987
3GPP FDD : Update problem when changing UE4 paramaters with active addional Ues	3992
WLAN : given RF level not referred to burst power	4012
Multi carrier : Set To Default does not reset output signal	4015
Custom DigMod : symbol rate remains unchanged after recall	4066
CDMA2000 : SCPI command BB:C2K:MSTation1:CHANnel1:DATA:RATE not working	4088
3GPP FDD : progress bar missing after fast parameter change (occasionally)	4094
Some standards : pattern editor not operable after leaving with ESC before	4096
All standards : trigger delay ignored when trigger source is other baseband	4117
WLAN : chip rate can be set to 100 MHz (fixed:limited to 40 MHz)	4132
Range of level in attenuator fixed mode wrong (occasionally)	4138
Displayed baseband signal level wrong with AWGN	4174
Sometimes no baseband signal with external clock and internal trigger	4176
:swe:res:all does not work	4195

1.33 Version 1.35.13

Released: Aug 2005

Modified Functionality

● Loading from setups from elder versions improved

Fixed Issues

● In rare cases the message "Device key missing" at start of the instrument occurs; fixed

1.34 Version 1.35.10

Released: July 2005

New Functionality

● Support of digital standard SMATE-K44 (GPS)

● Support of digital standard SMATE-K48 (WLAN IEEE 802.11 (a/b/g))

● Support of digital standard SMATE-K49 (WiMax IEEE 802.16 (d))

● phase offset available in baseband block menu

● Custom digital modulation: display type of modulation directly in the baseband block

Modified Functionality

- Custom digital modulation – Modulation Type -Variable FSK: 4/8/16FSK with free selectable deviations available now

- Custom digital modulation: display type of modulation directly in the baseband block

- „User Marker / Aux I/O Settings …" now directly in menu "Trigger/Marker"

- separate "*rst" for path A and B possible via :SOURce<HW>:PRESet and DEVice:PRESet

- Digital standard 3GPP FDD: Channel Coding - Transport Channel: max value of "Transport Blocks" now 24

- GSM/EDGE: External Clock: trigger delay and trigger inhibit available

Fixed Issues

- I/Q impairments: user settings lost when switching baseband state to off and on again; fixed

- SCPI order „ :freq? min|max" and „:pow? min|max" does not work; fixed

- Editing a bit pattern: in very rare cases the system crashes while editing the pattern; fixed

- In some cases the tooltip lost the units; fixed

- File dialog: sometimes two lines are highlighted and/or no focus; fixed

- Digital standard 3GPP FDD: sometimes no marker output at first start; fixed

- Digital standard 3GPP FDD: unnecessary info messages when selecting "Set To Default" or "Recall 3GPP FDD Settings"; fixed

- Custom digital modulation: error message using modulation 4FSK with coding GSM; fixed (now no selection of coding GSM with modulation 4FSK allowed)

- GSM/EDGE: switching to external clock produces an error message "settings conflict .."; fixed

- Sometimes no min/max check while changing parameters via rotary knob; fixed

- No capitals with external keyboard possible (i.e. file dialog); fixed

- CList editor: cursor left/right has no function; fixed (now: same functionality as rotary knob)

- Sweep: setting a new frequency in mode STEP results in a wrong output frequency (always max value of step mode); fixed

- Sweep: mode STEP: variation with rotary knob works til min/max is reached, then no further variation possible; fixed

1.35 Version 1.35.06

Fixed Issues

- Setup not ok for option GPS (file missing); fixed

1.36 Version 1.35.05

New Functionality

- Support of digital standard SMATE-K44 (GPS)

- Support of digital standard SMATE-K48 (WLAN IEEE 802.11 (a/b/g))

- Support of digital standard SMATE-K49 (WiMax IEEE 802.16 (d))

- 3GPP FDD "Test Case Wizard…" (according to TS25.141)

- Support of option Differential I/Q Out (Option SMATE-B16)

- Custom digital modulation – Modulation Type -Variable FSK: 4/8/16FSK with free selectable deviations available now

- phase offset available in baseband block menu

- Custom digital modulation: display type of modulation directly in the baseband block

Modified Functionality

- „User Marker / Aux I/O Settings …" now directly in menu "Trigger/Marker"

- New: separate "*rst" for path A and B possible via :SOURce<HW>:PRESet and DEVice:PRESet

- Digital standard 3GPP FDD: Channel Coding - Transport Channel: max value of "Transport Blocks" now 24

- New: GSM/EDGE: External trigger source "external clock" added including trigger delay and trigger inhibit

- Improvement in I/Q calibration (better side band suppression)

- New: AWGN: mode "CW Interferer" and reference mode

Fixed Issues

- SCPI order „ :freq? min|max" and „:pow? min|max" does not work; fixed

- Editing a bit pattern: in very rare cases the system crashes while editing the pattern; fixed

- In some cases the tooltip lost the units; fixed

- File dialog: sometimes two lines are highlighted and/or no focus; fixed

- Digital standard 3GPP FDD: sometimes no marker output at first start; fixed

- Digital standard 3GPP FDD: unnecessary info messages when selecting "Set To Default" or "Recall 3GPP FDD Settings"; fixed

- Custom digital modulation: error message using modulation FSK with coding GSM; fixed (now no selection of coding GSM with modulation FSK allowed)

- Sometimes no min/max check while changing parameters via cursor up/down; fixed

- No capitals with external keyboard possible (i.e. file dialog); fixed

- CList editor: cursor left/right has no function; fixed (now: same functionality as rotary knob)

- Sweep: setting a new frequency in mode STEP results in a wrong output frequency (always max value of step mode); fixed

- Sweep: mode STEP: variation with rotary knob works til min/max is reached, then no further variation possible; fixed

- GSM/EDGE: Editing the slot defined marker results in a system crash; fixed

- List mode with high power option: max value for power is now 30 dB (not 20 dB); fixed

- Error messages from DAC-Board occurred in devices without baseband source; fixed

- Internal: setting of operation time and power on count possible for service purposes

- 3GPP FDD and MCCW: Trigger in: external trigger delay does not work; fixed

- 3GPP FDD: power setting of uplink HS-DPCCH has no effect; fixed

- Common: loading of ARB waveforms accelerated

1.37 Version 1.30.08

First Release March 2005

2 Firmware Update

ATTENTION ⚠	It is strongly recommended to do **no firmware downgrade** below the version the device was delivered originally (this is the version you can see if you select "Factory Default" starting with Backup/Recovery).

This R&S SMU firmware revision consists of only one file:

SMATE200A_2.20.360.142.exe

There are two possible ways to update your instrument:

Local Firmware Update

The firmware update is performed directly on the instrument, typically using an USB memory stick. Mouse and keyboard have to be connected to the instrument. For instruments without front panel display (like the SMATE) an external monitor is required too.The appropriate VGA plug is located on the rear panel.

The front panel keys like **PRESET** or **SETUP** can be emulated performing a right-click on the block diagram.

See Chapter 2.1 for details.

Remote Firmware Update

Alternatively the firmware update can be performed over LAN or SCPI from an external PC (running Windows XP). Connect the instrument via LAN or SCPI to the PC and run the firmware update from the PC.

See Chapter 2.2 for details.

|	
ATTENTION ⚠	**Important Note for updating without SP2:** Please contact your local R&S service department in order to update your instrument. Alternatively the needed files and packages can be installed manually. In this case download the file SystemSetup4SignalGenerators.zip and follow the instructions given in readme.txt.

2.1 Local Firmware Update

1. **Save the current version**

    It is recommended to save the current/running version. This can be done very easily and completely intuitive with an USB keyboard and an USB mouse.

    ● Switch off the device and switch it on again. When the device is starting now you see the Bootmanager window (blue background, white field inside and a red selection line) after a short time. If you see this window press the cursor key 🔼 under the rotary knob, select **Backup/Recovery** and confirm this with pressing the key BACKSPACE on the device or Enter on the USB keyboard..

    ● After a short time the recovery and backup service ist started.
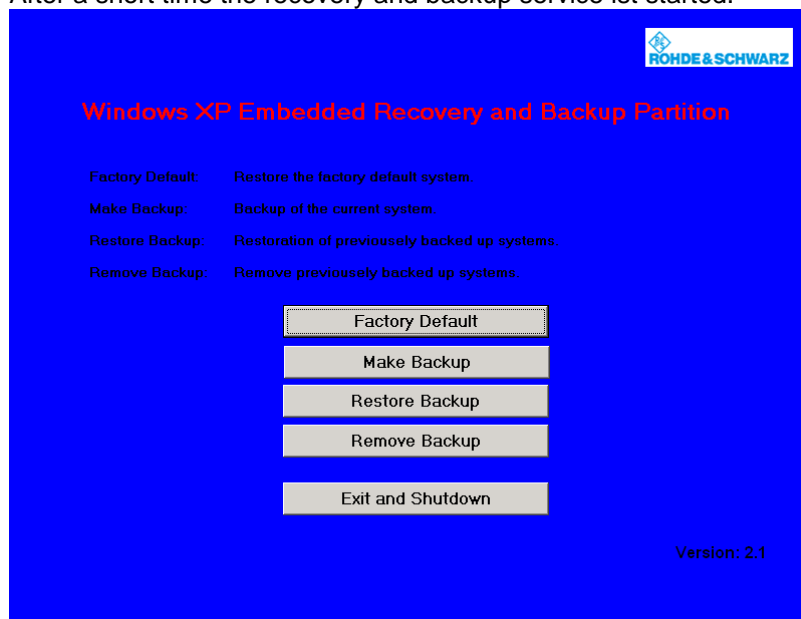
    Select   Make Backup   via mouse or keyboard. The menu disappears and the device shows you the versions of what will be stored.
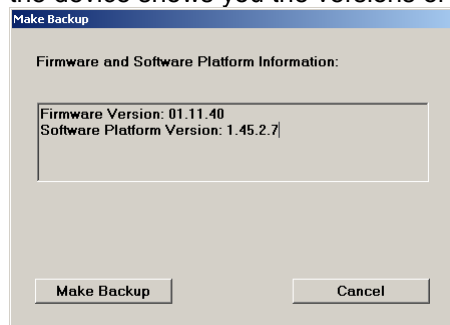
    Select   Make Backup , follow the instructions and the device starts working. The backup process takes some minutes. Please do not switch off the device, otherwise your backup may be corrupt. It's safe to switch off the device with the   Exit and Shutdown   button, when the menu is shown again.

    If you want to restore a previously saved version select **Restore Backup** in the

same way.

2. Install the new firmware version on the R&S SMATE200A

- Switch off the instrument.

- Connect the external mouse and keyboard to the USB interface.

- Switch on the instrument.

- *Access Windows XP desktop*

  Operating with the mouse

  - Wait until R&S SMATE200A firmware boot window with the progress bars appears.

  - Click on the ⬚ Abort ⬚ button in the boot window. Booting of the instrument firmware is aborted and the Windows XP desktop is displayed.

  Operation with the keyboard

  - Wait until R&S instrument firmware has booted and the application has started.

  - Press **Alt** + **F4** to close the application. The Windows XP desktop is displayed.

- *Install new firmware version*

  - Plug in the USB memory stick which contains the update file.

  - Double-click the item **SMATE200A_2.20.360.142.exe**

  - Select Next / Install and wait until installation has finished.

  - Confirm that you want to reboot the instrument in order to activate the firmware update (the instrument then restarts automatically, the USB memory stick has to be removed)

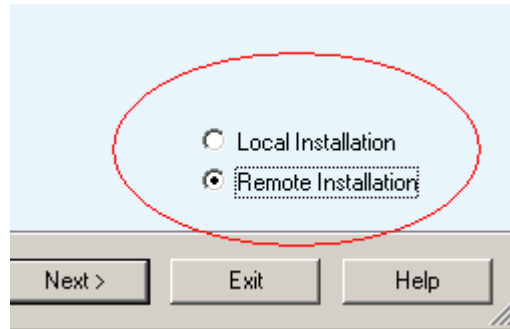**3. Execute Internal Adjustments**

  - Press the **PRESET** key on the instrument front panel.

  - Press the **SETUP** key, select **Internal Adjustments** and execute **Adjust All**.
    This process updates internal instrument adjustments and will take several minutes. Adjustments requiring external measurement equipment are not affected by the firmware update and need not to be performed.

The firmware has been updated and the installation is completed.
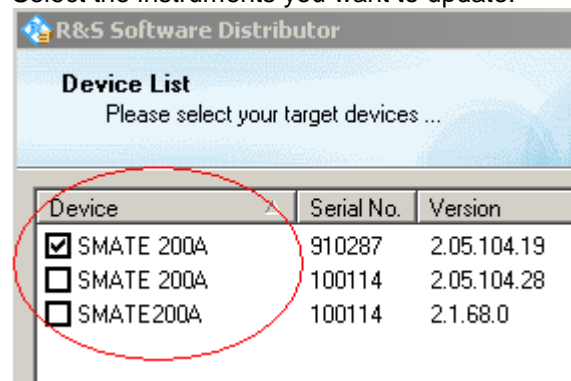
2.2 Remote Firmware Update

1. **Install firmware**

    ➢ Run **SMATE200A_2.20.360.142.exe** on your PC
    ➢ Select "Remote Installation"

    and click the button "Next>"

    ➢ After scanning SCPI and your LAN subnet all found instruments are listed.
       Select the instruments you want to update:

ATTENTION	Please be careful and check twice if you have selected the correct instruments. Depending on your company's network structure also instruments of other departments will show up!

    ➢ Additonal help will be displayed after clicking the button "Help"
    ➢ Start installation by selecting "Install"
    ➢ Confirm that you want to reboot the instrument in order to activate the
       firmware update (the instrument then restarts automatically)

2. **Execute internal adjustments**

    ➢ Press the **PRESET** key on the instrument front panel

Press the **SETUP** key, select **Internal Adjustments** and execute **Adjust All**.
This process updates internal instrument adjustments and will take several minutes.
Adjustments requiring external measurement equipment are not affected by the
firmware update and need not to be performed.

3 Open Source Acknowledgement

This instrument firmware makes use of valuable open source software packages. The most important of them are listed together with their corresponding open source license information in a separate Open Source Acknowledgement document. This document also contains the verbatim license texts and can be downloaded from www.rohde-schwarz.com.

The OpenSSL Project for use in the OpenSSL Toolkit (http://www.openssl.org/). includes cryptographic software written by Eric Young (eay@cryptsoft.com) and software written by Tim Hudson (tjh@cryptsoft.com).
LINUX® is a trademark of Linus Torvalds.

Rohde & Schwarz would like to thank the open source community for their valuable contribution to embedded computing.

4 Customer Support

Technical support – where and when you need it

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

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.

USA & Canada

Monday to Friday	(except US public holidays)
8:00 AM – 8:00 PM	Eastern Standard Time (EST)
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From outside USA	+1 410 910 7800 (opt 2)
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