

# R&S® Pulse Sequencer DFS

## Software

### Release Notes

### Software Version 2.0

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# 1 Information on Current Version and History

## 1.1 Version 2.0

Released: Mai 2020

### New Functionality

Topic
Added SCPI recorder feature for recording corresponding SCPI commands from GUI interactions
Added clipping level feature to limit signal power to a certain threshold instead of aborting the calculation if the generators upper limit was violated
Reworked several GUI dialogs to improve usability and make things easier to understand
Improved calculation times with random IPM profiles by 400%
Added support for SMW-B144 RF option
Added support for new 1xxx SMW RF options
Increased maximum value for poly chirp coefficients to -1e32 to +1e32
Added visualization of RAM usage for all signal generators when calculating signals
Changed folder names to human readable format when uploading signals to the generator

### Fixed Issues

Topic
ETSI 301893 2.1.1 Signal 5 Mixed PRF 2/3: Difference between PRF1 & PRF3 is bounded by 20 Hz and 50 Hz
ETSI 301893 2.1.1 Signal 6 mixed PRF 2/3: Difference between PRF1 & PRF3 is bounded by 80 Hz and 400 Hz
ETSI 301893 2.1.1 Signal 5 Off-channel-CAC: New scenario dedicated for wideband devices such as SMW/B9
Changed signal generator configuration order in order to suppress unwanted RF Signals before the final trigger
Fixed installer bundle. Last version 1.10 expected R&S Visa installation and aborted installation if not present
Level changes in single sequence scenarios required re calculation
Copying imported waveforms from one repository to another did not work correctly
Internal pulse modulator did only work for ASCII markers (less than 64 transitions) and not for binary markers (More than 64 transitions)
Fixed combo box behavior. Double click was needed to activate them
Timeout for sanitizing operation was too short which could lead to timeout errors
Settings for FTP block size transmission were empty
Unpinned widows could not be displayed full screen
SCPI for IPM source type was not working. Missing limits as well
When using setups with multiple signal generators an error message was thrown if one of them did not have a signal assigned to it
Rise and fall time markers did not work with multi segment waveform signal generation

Internal pulse modulator cannot be used for multi segment waveforms
Scroll Buttons for Tab Widgets where broken
Progress during FTP upload was missing
FTP transmissions could not be aborted by the user
Aborting a waveform upload did not reset the volatile storage resulting the SW to think, that the waveform was uploaded
SCPIs for clearing the interleaved results and query the volatile status where missing
SCPI INST:COUNT? Always returned 1, no matter how many signal generators where in the setup
Tooltips of numeric edits where not updated regarding their min and max values
Repository manager discard was not working anymore
SCPI connection was not completely closed when closing the application which caused the program thread to remain active
Clarified error message when trying to create a profile from a connected instrument when no physical instrument was present

## 1.2 Version 1.10

Released: October 2019

### New Functionality

Topic
Added MIC standard 07_2019 update
Migrated the Pulse Sequencer DFS software to 64 Bit to ease memory requirements
Added SMW-K545 "RF Ports Alignment" support for hardware setups
Added SMW Master/Slave trigger support for hardware setups
Added SMW LO coupling support for hardware setups
Improved performance of waveform viewers by 350%
Improved all waveform based calculations by 350%
Added RAM buffer setting for faster ARB waveform calculations without buffering to the HDD
Improved table editing. Excel like operation
Markers can now be generated from MOP plugins
Added R&S Visa installer to Pulse Sequencer installer
Added pre pulse and post pulse markers for pulses
Added undock functionality for MDI windows to support multiple screens
Repositories are now saved prior to exporting to prevent empty or incomplete archive files

### Fixed Issues

Topic
Fixed missing conditional formatting in several DFS reporting spreadsheets
Fixed minimum PRI check based on pulse timing parameters. Previously only the pulse width was taken into account and no rise and fall times were considered
Fixed timing preview of pulse for 10/50/90 modes
MSK MOP was not working
Unavailable instrument paths could be selected for signal generation
Fixed zoom in waveform preview. Sometimes the mouse wheel did not trigger a zoom event
Fixed Pos1 key behavior in numeric edits. An unnecessary space character was inserted
Fixed hidden/trapped windows due to dragging them outside the visible area or by changing the size of the main window
Clear workspace action in wizard did not work
Fixed ALC configuration in the SMBV100B generator to prevent unwanted measurement pulses
Erroneous SCPI queries caused a VISA timeout, because no response was send
SCENario:LOCalized:MOVement:WAYPoint could lead to crash if called with wrong parameters

## 1.3 Version 1.9

Released: May 2019

## New Functionality

Topic
Added repository export functionality in file menu
Single sequence scenario GUI now marks the currently selected item in the drop down menu
Improved combo box behavior in tables. Selecting a different combo box with a single click is now possible. Prior the current combo box had to be closed before selecting a different one
Added checkbox to disable recalculation of sequences and collection of sequences when changing the carrier frequency

## Fixed Issues

Topic
Addition of IPM profiles affecting the same parameter did not work
Fixed bug in HW manager. Selection was lost after creating a profile from a connected instrument
Start menu link to pulse sequencer DFS executable was not working
Wideband SMW and SMBVB had wrong maximum clock rate constrain in calculations. 600MHz instead of 520MHz are allowed
Fixed bug in sequence collection scenarios if no generator profile was selected. SW gives a hint now. When creating a scenario, a generator profile is assigned per default
Calculation of overlays of imported waveforms caused an error if the overlay was smaller than the waveform length. Clock rate could not be determined
Executing a rollback repository command could cause a crash
Progress bars did not display a 100% value
Fixed bug when working with separate trigger command mode. Changing between single and continuous mode cleared the volatile storage. A recalculation was required
Fixed bug when working with separate trigger command mode. Changing between single and continuous mode cleared did not change the trigger mode in the generator when pressing the trigger button
Fixed bug in wizard. Creating a new repository did not work
Removed all dock widgets. Close operations on detached windows did no longer work
Fixed spectrogram preview in waveform viewer. Window resize did not clear the FFT data
Fixed 'insert before' and 'insert after' table operations. Index shift caused insertion at wrong pos.
Fixed potential crash when reloading a repository from mass storage
Fixed DFS reporting. End of burst pulse is no longer added to reporting excel sheet
Fixed several GUI and layout issues

## 1.4 Version 1.8

Released: February 2019

### New Functionality

Topic
Increased calculation speed for ARB based signals by 100%
Added support of waveforms for DFS repositories
Added R&S SMBV-B generator profiles in DFS repositories
Added ETSI standard update EN 301893 V2.1.1 with OFDM waveforms
Added ETSI 301893 off-channel CAC. Burst Interval Time (BIT) from 45s to 60s.
Added custom envelope support for DFS version of the Pulse Sequencer
Added buttons for expand / collapse tree operations
Increased waveform viewer performance by 300% (preview calculation times)

### Fixed Issues

Topic
Fixed bug where bandwidth checks were performed on the generators clock rate instead of its bandwidth. Signals with too high bandwidth could be calculated without error message, causing aliased signals
Fixed type 6 signal for ETSI 302 502 v2.0.8. Wrong pulse widths where used
Fixed bug in waveform viewer. Zooming out could result in a small negative start time causing an error message
Fixed bug where collection variables in sequence collection scenarios did not work
Fixed GUI bug, where IPM profiles based on variables where not selectable unless a IPM profile was created in the repository
Fixed bug where newly created generator profiles in DFS repositories did not contain the SMW-K350 option
Minimized windows were not send to the taskbar, but closed instead

## 1.5 Version 1.7

Released: September 2018

### New Functionality

Topic
Added R&SSMBV-100B generator support
Added time estimate for remaining calculation time
When importing repository archives the repository is now directly opened
Added drag and Drop support for importing repository archives
Added Drag & Drop support for opening waveform files
Added the Pulse Sequencer as default program for opening repository archive and R&S waveform files
Added keyboard shortcuts for most common actions
Added support of using internal pulse modulator in R&S SMW. No more need for external cabling.
Added repository export functionality via right mouse button smart menu in tree view

### Fixed Issues

Topic
Fixed sequence editor delay SCPI. Wrong item index caused limit violation.
MOP plugin parameters were not forwarded to reporting plugin
Fixed wrong reporting template in DFS FCC 06-96_Type 6
Fixed potential crash when using special characters in repository names
Fixed level calibration for external RFs connected via digital interfaces
Fixed calibration. Did not check for analog and digital I/Q output options SMW-K16/K17/K18/K19
Fixed bug in reporting feature. If pulses were dropped because their level was below the level threshold, they still appeared in the report with wrong TOA information
Fixed level preview in pulse dialog. Drag markers showed a 10dB offset
Fixed smart menus in all tables with single selection property. Removed multi select actions
Added message when opening repositories from previous Pulse Sequencer versions. The user can decide, if he wants to update the database.
Fixed bug in MSWV evaluation. Pulses with level below threshold were counted as segments
Added missing check and error message when trying to calculate an empty sequence
The pulse width of Barker codes was confused as the chip width in all viewers
Fixed bug where the internal clock rate of the signal generator was taken into consideration for bandwidth calculations and not the actual bandwidth
Fixed bug where all windows were initially restricted to 80% of screen size. Only after pressing the maximize button, the size could be increased to full screen
Fixed wrong pulse widths in ETSI 302 502 v2.0.8 Type 6
Added off channel testing in ETSI 301.893 (CAC, off-channel CAC)



## 1.6 Version 1.6

Released: February 2018

### New Functionality

Topic
Added YD/T 2950-2015
Added EN 302502 V 2.0.8
Added EN 301893 V1.8.5
Added firing order to list-based IPM profiles
New page with storage locations in settings dialog
Added shortcuts for IPM assignment dialog

### Fixed Issues

Topic
Fixed EN 302502 V 1.2.1 PRF IPM for signal 2
Fixed bug related to HW setups. The pulse sequencer always tried to connect to all generators, even if they were not used in a scenario
Fixed bug where a generator profile with two basebands but only one RF caused the Pulse Sequencer to not configure the second baseband
Fixed bug, where selecting the "use pulse modulator" option in the HW management dialog did not have an effect on the instrument configuration
Fixed bug in waveform triangular IPM profile where one entry more than needed was generated
Fixed bug where the default generator profile created upon the creation of a repository could not be deleted
Fixed dialog windows for high-DPI displays
Fixed bug, where the RUN button in sequence based scenarios did not update level and frequency of the generator if value is changed after initial calculation

## 1.7 Version 1.5

Released: Mai 2017

### New Functionality

Topic
Added level calibration wizard for HW setups
Added import/export functionality for HW setups
Added x axis zoom in MOP preview
Waveform generation duration settings simplified. Auto option added

### Fixed Issues

Topic
Fixed wrong frequency scaling in pulse modulation preview
Optimized FFT preview in MOP preview
Fixed bug where pulse MOP frequency preview was limited to 200MHz
Fixed bug where changing the RF channel was not working after the signal was calculated

## 1.8 Version 1.4

Released: September 2016

### New Functionality

Topic
Added FCC KDB 905462 D02 New Rules
DFS FCC0696 - Type 5 - Standard Update
Added binomial IPM profile
Added loop variables for use in IPM profiles, enabling sequencing of sequences
Installer now checks correct VISA driver installation
Added SCPI commands for minimizing/maximizing the Pulse Sequencer GUI
Added SCPI commands for querying the Pulse Sequencer message log
Custom Pulse Envelope now also available for K-350 option
IPM profiles can now be specified based on repetitions or time

### Fixed Issues

Topic
Fixed potential crash when restoring a workspace with less repositories than the current one

## 1.9 Version 1.3

Released: March 2016

### New Functionality

Topic
Added SMW wideband generator profile with 2GHz baseband bandwidth

### Fixed Issues

Topic
Fixed spectrogram scaling error in waveform viewer
Fixed bug that showed wrong connector name in the scenario block diagram
RF B was selectable in generator profiles with only a single RF
Suppressed measurement pulse at SMU and SMJ ARB startup, which could disturb a DUT

## 1.10 Version 1.2

Released: January 2016

### DFS Specific Changes

Topic
ETSI 301893 1.7.1 reference signal added
ETSI 301893 1.7.1 end of burst pulse corrected to have zero amplitude
ETSI 301893 1.7.1 signal clock increased to 100 MHz
ETSI 301893 1.7.1 marker signals are now properly generated
ETSI 301893 1.7.1 multi PRF signals now generate the correct number of pulses
FCC0696 Type 5 waveforms size decreased to fit ARB memory and speed up calculation
FCC0696 Type 6 band limited hopping signal added
FCC0696 Type 5 SMU specific waveform added because of 96 segment limitation in SMU
FCC0696 Type 1 clock rate increased to 100 MHz (required for detection BW measurement)
FCC0696 Type 5 clock rate set to 30 MHz ensures proper chirp generation
FCC1322 Type 0 clock rate increased to 100 MHz (required for detection BW measurement)
FCC1322 Type 2-4 changed to use identical PW and PRI value for all pulses
FCC1322 Type 2-4 pulse per burst count corrected
FCC1322 Type 1 PRI values are now unique
Japan MIC W56 chirp waveform generates smaller files now
Japan MIC generator profiles updated
Japan MIC some waveform parameters corrected
Japan MIC added W56 chirp type waveform for use with SMU and SMJ
Japan MIC added W56 band limited hopping signal
DFS plugin source code added as SDK option in installer
Japanese DFS renamed from TELEC to MIC
SGT generator profile added to all DFS projects
K350 DFS option now also available for SGT100A signal generator

### New Functionality

Topic
Frequency setting in scenario dialog allows Hz precision
Added Java Script functionality to GUI
Changed restart() API in IPM plugin
Creation of Save/Recall file can be turned off under waveform generation settings in scenario
Enabled high quality I/Q modulator mode in generator
IPM Steps used with phase return value as modulo 360 value
Sequence editor now supports undo/redo functionality
Repository version increased to 2. Compatibility check added
Generator profile dialog and connection diagram now have a "Show Connector" feature
It is now possible to create a generator profile directly from the generator mapping dialog

GUI now scales automatically, when changing the DPI size of the text in the OS settings
Added SCPI command for sanitize
Loop sequence item can now define a variable which can be used for marker generation
Sequence supports phase modes (absolute, continuous, memory) for frequency hopping

### Fixed Issues

Topic
Copying sequence to other repository did not copy waveforms used as sequence items
Phase was not correctly shown in degrees in waveform viewer window
Static phase offset was not correctly applied in pulse modulation
When renaming a tree element, the item was named "Rename" by default when the field was empty
Editing the repetition count in a sequence also affected other sequences
Minimum PRI was not correctly applied in first sequence line
Long SCPI commands were truncated when copied using SCPI help copy functionality
Markers were missing when importing a waveform

## 1.11 Version 1.1

Released: April 2015

### New Functionality

Topic
Log is brought to desktop if it was located outside of the visible desktop area and an error occurs
Value range in IPM U-Distribution increased because 1000 was not enough for frequency offsets
TX/RX buffer size can now be set by the user (instrument upload/download)
Added FTP upload and new GUI settings for FTP upload
Modified LAN search to work with direct links PC <-> Instrument (no DNS in network)
Sequence block diagram is interactive. Features direct access to items as well as context menus
Pulse timing is now visualized in plot
Marker positions are now visualized in plot
Measurement line now shows delta units on y axis
Waveform viewer now also shows frequency at cursor position
New installer based on Windows Installer, fixes issues with Windows UAC and 64-bit systems
New version numbering scheme <Major>.<Minor>.<DaysSince2000>.<SecondsSinceMidnight/10>
Network scan in "ZeroConf" networks improved (host resolution omitted)
Creating a new repository from GUI also creates one SMW200 default generator profile
Creating data source from MOP also assigns the new data source automatically

### Fixed Issues

Topic
The minimum permissible PRI was wrong with 10/50/90 timing
Due to a rounding problem waveform could be too long by one PRI cycle
Sequence marker and scenario marker could not be controlled independently
Pulse ripple frequency was not evaluated in min. required clock rate
Fixed SGT profile capabilities error. Memory and bandwidth options where not recognized
IPM List Preview auto scale error
Sequence editor crashed when deleting loops with children
SMBV-B50 and SMBV B55 options where not recognized
Level and Frequency were not applied if volatile storage was already valid
Waveform viewer 'auto play' did not stop if window was minimized
Fixed update problem in instrument capabilities
Not supported instruments where shown in table for connected instruments
MOP 'Width' restriction was not correct when used with 0/100 pulse definitions
Fixed bug in sequence block diagram, which leads to quickly disappearing tooltips
Fixed problem with instrument profile generation from a connected instrument. The generator type combo box disappeared for all other profiles.
When changing the name of a tree element, it was no longer selected, causing wrong SCPI help.
Fixed bug in waveform generation. Last sample was always missing.
Fixed potential crash in sequence editor

All collections did not keep their item order on subsequent load from storage
Data source dialog was not properly set to invalid when data source got removed
BPSK MOP with automatic symbol rate did not work in preview if no data source was assigned



## 1.12 Version 1.0

Released: January 2015

## 2 Modifications to the Documentation

The current documentation is up-to-date.

## 3 Installing the Software

### 3.1 Uninstall a previous installation

To uninstall a previous version of the Pulse Sequencer software click on the Windows Start button and navigate to Settings -> Control Panel -> Add or Remove Programs. Then select the previously installed version of the Pulse Sequencer to uninstall it.

### 3.2 Install the new software version

R&S Pulse Sequencer DFS requires one of the following operating systems:

Windows 7 (64 Bit)

Windows 8 (64 Bit)

Windows 10 (64 Bit)

It is suggested to uninstall any previous version of the Pulse Sequencer DFS software before installing the new software.

In Windows Explorer double-click the installer executable 'PS-DFS-Install 2. 0.x.x.msi' and follow the instructions. Existing Pulse Sequencer installations are automatically updated. This includes example repositories provided by Rohde & Schwarz. Other user data, such as repositories or settings are not affected by the software update.

## 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.

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