

R&S[®]SMCVB-KS16

DRM Streams

User Manual



1179270202
Version 01

ROHDE & SCHWARZ
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This document describes the following software options:

- R&S®SMCVB-KS16 DRM Streams (1434.5134.xx)

© 2020 Rohde & Schwarz GmbH & Co. KG

Mühlhofstr. 15, 81671 München, Germany

Phone: +49 89 41 29 - 0

Email: info@rohde-schwarz.com

Internet: www.rohde-schwarz.com

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1179.2702.02 | Version 01 | R&S®SMCVB-KS16

The following abbreviations are used throughout this manual: R&S®SMCV100B is abbreviated as R&S SMCV100B.

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1 Welcome to the R&S SMCVB-KS16 Option

The R&S SMCVB-KS16 is a stream library that provides stream files in accordance with the DRM digital standard.

This user manual contains a reference description of the functionality that the stream library provides. All functions not discussed in this manual are described in the R&S SMCV100B user manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMCV100B

1.1 Key Features

The R&S SMCVB-KS16 features:

- Numerous stream files in accordance with DRM digital standard
- Streaming of high-quality video contents
- Streaming of high-quality audio contents
- Efficient use with dedicated streams

1.2 Installation

You can find detailed installation instructions in the supplement document of the R&S SMCV100B user manual and in the R&S SMCV100B user manual describing firmware versions later than FW 4.70.176.xx of the R&S SMCV100B.

1.3 Documentation Overview

This section provides an overview of the R&S SMCV100B user documentation. Unless specified otherwise, you find the documents on the R&S SMCV100B product page at:

www.rohde-schwarz.com/manual/smcv100b

1.3.1 Getting Started Manual

Introduces the R&S SMCV100B and describes how to set up and start working with the product. Includes basic operations, typical measurement examples, and general information, e.g. safety instructions, etc. A printed version is delivered with the instrument.

1.3.2 User Manuals and Help

Separate manuals for the base unit and the software options are provided for download:

- **Base unit manual**
Contains the description of all instrument modes and functions. It also provides an introduction to remote control, a complete description of the remote control commands with programming examples, and information on maintenance, instrument interfaces and error messages. Includes the contents of the getting started manual.
- **Software option manual**
Contains the description of the specific functions of an option. Basic information on operating the R&S SMCV100B is not included.

The contents of the user manuals are available as help in the R&S SMCV100B. The help offers quick, context-sensitive access to the complete information for the base unit and the software options.

All user manuals are also available for download or for immediate display on the Internet.

1.3.3 Service Manual

Describes the performance test for checking compliance with rated specifications, firmware update, troubleshooting, adjustments, installing options and maintenance.

The service manual is available for registered users on the global Rohde & Schwarz information system (GLORIS):

<https://gloris.rohde-schwarz.com>

1.3.4 Instrument Security Procedures

Deals with security issues when working with the R&S SMCV100B in secure areas. It is available for download on the Internet.

1.3.5 Printed Safety Instructions

Provides safety information in many languages. The printed document is delivered with the product.

1.3.6 Data Sheets and Brochures

The data sheet contains the technical specifications of the R&S SMCV100B. It also lists the options and their order numbers and optional accessories.

The brochure provides an overview of the instrument and deals with the specific characteristics.

See www.rohde-schwarz.com/brochure-datasheet/smcv100b

1.3.7 Release Notes and Open Source Acknowledgment (OSA)

The release notes list new features, improvements and known issues of the current firmware version, and describe the firmware installation.

The open-source acknowledgment document provides verbatim license texts of the used open source software.

See www.rohde-schwarz.com/firmware/smcv100b

1.3.8 Application Notes, Application Cards, White Papers, etc.

These documents deal with special applications or background information on particular topics.

See www.rohde-schwarz.com/application/smcv100b

2 DRM Stream Files

The DRM stream library (R&S LIB-K60) contains DCP files for basic test purposes and DRM testing according to ETSI EN 303 345-5 v0.0.5.

2.1 Basic Folder

The files in this folder are for basic test purposes. There is one file for each allowed combination of robustness mode and channel bandwidth.

All files in this folder have the same audio content with a variation of the coding parameters.

Naming conventions

The main broadcasting parameters are coded in the file name.

- <robustness mode>
'A', 'B', 'C', 'D' or 'E' depending on the robustness mode.
- <channel bandwidth>
Channel bandwidth in kHz coded as two digits.
 - '04' for 4.5 kHz
 - '05' for 5 kHz
 - '09' for 9 kHz
 - '10' for 10 kHz
 - '18' for 18 kHz
 - '20' for 20 kHz
 - '100' for 100 kHz
- '_M'
For main service channel (MSC)
- <constellation of MSC cells>
 - '16' for 16 QAM
 - '64' for 64 QAM
 - '64I' for 64 QAM hierarchical on I
 - '64Q' for 64 QAM hierarchical on I and Q
- <interleaver depth>
 - 'S' for short interleaving (in robustness modes A to D) or for standard interleaving (in robustness mode E)
 - 'L' for long interleaving (in robustness modes A to D)
- <protection level of MSC>
One to three digits out of '0', '1', '2' and '3', depending on constellation, hierarchical modulation and equal error protection (EEP) or unequal error protection (UEP).
In non-hierarchical modulation, the first digit refers to the higher protected part (HPP) and the second digit, if any, refers to the lower protected part (LPP).
In hierarchical modulation, the first digit refers to the very strongly protected part (VSPP), the second digit refers to the higher protected part (HPP) and the third digit, if any, refers to the lower protected part (LPP).

- **_S**
For service description channel (SDC)
- **<constellation of SDC cells>**
 - '4' for 4 QAM
 - '16' for 16 QAM
- **.DCP_C**
Extension of the encrypted files

Example for naming conventions: A04_M64S1_S4.DCP_C

Robustness mode: A

Channel bandwidth: 4.5 kHz

Constellation of MSC cells: 64 QAM

Interleaver depth: short (= 400 ms)

Protection level of MSC: 1

Constellation of SDC cells: 4 QAM

2.1.1 Robustness Mode A

2.1.1.1 A04_M64S3_S16

Table 2-1: Main broadcasting parameters

Play length	10 min
Robustness mode	A
Channel bandwidth	4.5 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=3
SDC constellation	16-QAM

Table 2-2: Service parameters

Parameter	Service #0
DRM service label	"DRM Service A"
Service ID	0x1001 (4097)
Program type	Serious classical (14)
Language	German
Country	Germany

Table 2-3: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	14740 bps

2.1.1.2 A05_M64S2_S4

Table 2-4: Main broadcasting parameters

Play length	10 min
Robustness mode	A
Channel bandwidth	5 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=2
SDC constellation	4-QAM

Table 2-5: Service parameters

Parameter	Service #0
DRM service label	"DRM Service A"
Service ID	0x1001 (4097)
Program type	Serious classical (14)
Language	German
Country	Germany

Table 2-6: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	15040 bps

2.1.1.3 A09_M64L0_S4

Table 2-7: Main broadcasting parameters

Play length	10 min
Robustness mode	A
Channel bandwidth	9 kHz
MSC constellation	64-QAM
Interleaver depth	2 s
MSC protection level	EEP, PL=0
SDC constellation	4-QAM

Table 2-8: Service parameters

Parameter	Service #0
DRM service label	"DRM Service A"
Service ID	0x1001 (4097)
Program type	Serious classical (14)
Language	German
Country	Germany

Table 2-9: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	19680 bps

2.1.1.4 A10_M16L1_S4

Table 2-10: Main broadcasting parameters

Play length	10 min
Robustness mode	A
Channel bandwidth	10 kHz
MSC constellation	16-QAM
Interleaver depth	2 s

MSC protection level	EEP, PL=1
SDC constellation	4-QAM

Table 2-11: Service parameters

Parameter	Service #0
DRM service label	"DRM Service A"
Service ID	0x1001 (4097)
Program type	Serious classical (14)
Language	German
Country	Germany

Table 2-12: Service parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	24 kHz
Bit rate	18440 bps

Table 2-13: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	24 kHz
Bit rate	18440 bps

2.1.1.5 A18_M64S0_S4

Table 2-14: Main broadcasting parameters

Play length	10 min
Robustness mode	A
Channel bandwidth	18 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms

MSC protection level	EEP, PL=0
SDC constellation	4-QAM

Table 2-15: Service parameters

Parameter	Service #0
DRM service label	"DRM Service A"
Service ID	0x1001 (4097)
Program type	Serious classical (14)
Language	German
Country	Germany

Table 2-16: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	stereo
SBR	enabled
Sampling rate	24 kHz
Bit rate	40920 bps

2.1.1.6 A20_M64S0_S16

Table 2-17: Main broadcasting parameters

Play length	10 min
Robustness mode	A
Channel bandwidth	20 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=0
SDC constellation	16-QAM

Table 2-18: Service parameters

Parameter	Service #0
DRM service label	"DRM Service A"
Service ID	0x1001 (4097)
Program type	Serious classical (14)

Language	German
Country	Germany

Table 2-19: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	stereo
SBR	enabled
Sampling rate	24 kHz
Bit rate	45840 bps

2.1.2 Robustness Mode B

2.1.2.1 B04_M64L3_S16

Table 2-20: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	4.5 kHz
MSC constellation	64-QAM
Interleaver depth	2 s
MSC protection level	EEP, PL=3
SDC constellation	16-QAM

Table 2-21: Service parameters

Parameter	Service #0
DRM service label	"DRM Service B"
Service ID	0x1001 (4097)
Program type	News (1)
Language	English
Country	United Kingdom

Table 2-22: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS

Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	12 kHz
Bit rate	11300 bps

2.1.2.2 B05_M64S3_S4

Table 2-23: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	5 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=3
SDC constellation	4-QAM

Table 2-24: Service parameters

Parameter	Service #0
DRM service label	"DRM Service B"
Service ID	0x1001 (4097)
Program type	News (1)
Language	English
Country	United Kingdom

Table 2-25: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	12 kHz
Bit rate	12980 bps

2.1.2.3 B09_M64L2_S4

Table 2-26: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	9 kHz
MSC constellation	64-QAM
Interleaver depth	2 s
MSC protection level	EEP, PL=2
SDC constellation	4-QAM

Table 2-27: Service parameters

Parameter	Service #0
DRM service label	"DRM Service B"
Service ID	0x1001 (4097)
Program type	News (1)
Language	English
Country	United Kingdom

Table 2-28: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	21720 bps

2.1.2.4 B10_M64L0_S16

Table 2-29: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	10 kHz
MSC constellation	64-QAM
Interleaver depth	2 s

MSC protection level	EEP, PL=0
SDC constellation	16-QAM

Table 2-30: Service parameters

Parameter	Service #0
DRM service label	"DRM Service B"
Service ID	0x1001 (4097)
Program type	News (1)
Language	English
Country	United Kingdom

Table 2-31: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	17460 bps

2.1.2.5 B18_M16S0_S16

Table 2-32: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	18 kHz
MSC constellation	16-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=0
SDC constellation	16-QAM

Table 2-33: Service parameters

Parameter	Service #0
DRM service label	"DRM Service B"
Service ID	0x1001 (4097)
Program type	News (1)

Language	English
Country	United Kingdom

Table 2-34: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	21200 bps

2.1.2.6 B20_M16L1_S16

Table 2-35: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	20 kHz
MSC constellation	16-QAM
Interleaver depth	2 s
MSC protection level	EEP, PL=1
SDC constellation	16-QAM

Table 2-36: Service parameters

Parameter	Service #0
DRM service label	"DRM Service B"
Service ID	0x1001 (4097)
Program type	News (1)
Language	English
Country	United Kingdom

Table 2-37: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv1
Audio mode	stereo
SBR	enabled

Sampling rate	24 kHz
Bit rate	29800 bps

2.1.3 Robustness Mode C

2.1.3.1 C10_M16L1_S4

Table 2-38: Main broadcasting parameters

Play length	10 min
Robustness mode	C
Channel bandwidth	10 kHz
MSC constellation	16-QAM
Interleaver depth	2 s
MSC protection level	EEP, PL=1
SDC constellation	4-QAM

Table 2-39: Service parameters

Parameter	Service #0
DRM service label	"DRM Service C"
Service ID	0x1001 (4097)
Program type	Culture (7)
Language	Hindi
Country	India

Table 2-40: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	12 kHz
Bit rate	11480 bps

2.1.3.2 C20_M16L0_S16

Table 2-41: Main broadcasting parameters

Play length	10 min
Robustness mode	C
Channel bandwidth	20 kHz
MSC constellation	16-QAM
Interleaver depth	2 s
MSC protection level	EEP, PL=0
SDC constellation	16-QAM

Table 2-42: Service parameters

Parameter	Service #0
DRM service label	"DRM Service C"
Service ID	0x1001 (4097)
Program type	Culture (7)
Language	Hindi
Country	India

Table 2-43: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	HE-AACv2
Audio mode	parametric stereo
SBR	enabled
Sampling rate	24 kHz
Bit rate	19300 bps

2.1.4 Robustness Mode D

2.1.4.1 D10_M64S2_S16

Table 2-44: Main broadcasting parameters

Play length	10 min
Robustness mode	D
Channel bandwidth	10 kHz
MSC constellation	64-QAM

Interleaver depth	400 ms
MSC protection level	EEP, PL=2
SDC constellation	16 QAM

Table 2-45: Service parameters

Parameter	Service #0
DRM service label	"DRM Service D"
Service ID	0x1001 (4097)
Program type	Information (3)
Language	French
Country	France

Table 2-46: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	12 kHz
Bit rate	12960 bps

2.1.4.2 D20_M16S1_S4

Table 2-47: Main broadcasting parameters

Play length	10 min
Robustness mode	D
Channel bandwidth	20 kHz
MSC constellation	16-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=1
SDC constellation	4-QAM

Table 2-48: Service parameters

Parameter	Service #0
DRM service label	"DRM Service D"
Service ID	0x1001 (4097)
Program type	Information (3)

Language	French
Country	France

Table 2-49: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	24 kHz
Bit rate	16240 bps

2.1.5 Robustness Mode E

2.1.5.1 E100_M16S0_S4

Table 2-50: Main broadcasting parameters

Play length	10 min
Robustness mode	E
Channel bandwidth	100 kHz
MSC constellation	16-QAM
Interleaver depth	600 ms
MSC protection level	EEP, PL=0
SDC constellation	4-QAM, code rate 0.5

Table 2-51: Service parameters

Parameter	Service #0
DRM service label	"DRM Service E"
Service ID	0x1001 (4097)
Program type	Rock Music (11)
Language	Chinese
Country	China

Table 2-52: Audio parameters

Parameter	Service #0
Audio signal	1 kHz sine wave, -6 dBFS

Audio coding	AAC
Audio mode	stereo
SBR	disabled
Sampling rate	48 kHz
Bit rate	99360 bps

2.2 EN 303 345 DRM Testing Folder

This folder contains 6 stream files for DRM testing according to ETSI EN 303 345-5 v0.0.5. Table 1 in the standard defines the required parameters. The files are categorized into two groups, wanted and unwanted signals. This category, combined with the frequency band from the table, is used to build the filenames. Examples: LFMF_wanted.DCP_C, HF_unwanted.DCP_C.

2.2.1 Wanted DRM Signals

2.2.1.1 LFMF_wanted

Table 2-53: Main broadcasting parameters

Play Length	10 min
Robustness mode	B
Channel bandwidth	9 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=1
SDC constellation	16-QAM

Table 2-54: Service parameters

Parameter	Service #0
DRM service label	"Sine 1 kHz"
Service ID	0x1001 (4097)
Program type	Other music
Language	English
Country	United Kingdom

Table 2-55: Audio parameters

Parameter	Service #0
Audio signal	1 kHz tone, -3 dBFS
Audio coding	AAC
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	18400 bps

2.2.1.2 HF_wanted

Table 2-56: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	10 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=1
SDC constellation	16-QAM

Table 2-57: Service parameters

Parameter	Service #0
DRM service label	"Sine 1 kHz"
Service ID	0x1001 (4097)
Program type	Other music
Language	English
Country	United Kingdom

Table 2-58: Audio parameters

Parameter	Service #0
Audio signal	1 kHz tone, -3 dBFS
Audio coding	AAC
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	20960 bps

2.2.1.3 VHF_wanted

Table 2-59: Main broadcasting parameters

Play length	10 min
Robustness mode	E
Channel bandwidth	100 kHz
MSC constellation	16-QAM
Interleaver depth	600 ms
MSC protection level	EEP, PL=2
SDC constellation	4-QAM, code rate 0.5

Table 2-60: Service parameters

Parameter	Service #0
DRM service label	"Sine 1 kHz"
Service ID	0x1001 (4097)
Program type	Other music
Language	English
Country	United Kingdom

Table 2-61: Audio parameters

Parameter	Service #0
Audio signal	1 kHz tone, -3 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled
Sampling rate	48 kHz
Bit rate	149040 bps

2.2.2 Unwanted DRM Signals

2.2.2.1 LFMF_unwanted

Table 2-62: Main broadcasting parameters

Play Length	10 min
Robustness mode	B
Channel bandwidth	9 kHz
MSC constellation	64-QAM

Interleaver depth	400 ms
MSC protection level	EEP, PL=1
SDC constellation	16-QAM

Table 2-63: Service parameters

Parameter	Service #0
DRM service label	"Sine 2 kHz"
Service ID	0x1001 (4097)
Program type	Other music
Language	English
Country	United Kingdom

Table 2-64: Audio parameters

Parameter	Service #0
Audio signal	2 kHz tone, 3 dBFS
Audio coding	AAC
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	18400 bps

2.2.2.2 HF_unwanted

Table 2-65: Main broadcasting parameters

Play length	10 min
Robustness mode	B
Channel bandwidth	10 kHz
MSC constellation	64-QAM
Interleaver depth	400 ms
MSC protection level	EEP, PL=1
SDC constellation	16-QAM

Table 2-66: Service parameters

Parameter	Service #0
DRM service label	"Sine 2 kHz"
Service ID	0x1001 (4097)
Program type	Other music

Language	English
Country	United Kingdom

Table 2-67: Audio parameters

Parameter	Service #0
Audio signal	2 kHz tone, 3 dBFS
Audio coding	AAC
Audio mode	mono
SBR	enabled
Sampling rate	24 kHz
Bit rate	20960 bps

2.2.2.3 VHF_unwanted

Table 2-68: Main broadcasting parameters

Play length	10 min
Robustness mode	E
Channel bandwidth	100 kHz
MSC constellation	16-QAM
Interleaver depth	600 ms
MSC protection level	EEP, PL=2
SDC constellation	4-QAM, code rate 0.5

Table 2-69: Service parameters

Parameter	Service #0
DRM service label	"Sine 2 kHz"
Service ID	0x1001 (4097)
Program type	Other music
Language	English
Country	United Kingdom

Table 2-70: Audio parameters

Parameter	Service #0
Audio signal	2 kHz tone, 3 dBFS
Audio coding	AAC
Audio mode	mono
SBR	disabled

Sampling rate	48 kHz
Bit rate	149040 bps

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