

R&S®SMCVB-K155

AM/FM/RDS

User Manual



1179101202
Version 05

ROHDE & SCHWARZ
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This document describes the following software options:

- R&S®SMCVB-K155 AM/FM/RDS (1434.3719.xx)

This manual describes firmware version FW 5.20.043.xx and later of the R&S®SMCV100B.

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The following abbreviations are used throughout this manual: R&S®SMCV100B is abbreviated as R&S SMCVB, R&S®WinIQSIM2 is abbreviated as R&S WinIQSIM2

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1 Welcome to the AM/FM/RDS option

The R&S SMCVB-K155 is a firmware application that adds functionality to generate signals in accordance with the AM/FM/RDS digital standards.

The R&S SMCVB-K155 option features:

- Audio AM broadcast signal generation
- Audio FM broadcast signal generation
- Audio FM **RDS/RBDS** signal generation

This user manual contains a description of the functionality that the application provides, including remote control operation.

All functions not discussed in this manual are the same as in the base unit and are described in the R&S SMCV100B user manual. The latest version is available at:

www.rohde-schwarz.com/manual/SMCV100B

Installation

You can find detailed installation instructions in the delivery of the option or in the R&S SMCV100B service manual.

1.1 Accessing the AM/FM/RDS dialog

To open the dialog with AM/FM/RDS settings

- In the block diagram of the R&S SMCV100B, select "Baseband > AM/FM/RDS".

A dialog box opens that displays the provided general settings.

The signal generation is not started immediately. To start signal generation with the default settings, select "State > On".

1.2 What's new

This manual describes firmware version FW 5.20.043.xx and later of the R&S®SMCV100B.

Compared to the previous version, there are editorial changes only.

1.3 Documentation overview

This section provides an overview of the R&S SMCV100B user documentation. Unless specified otherwise, you find the documents 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 software makes use of several valuable open source software packages. An 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

1.3.9 Videos

Find various videos on Rohde & Schwarz products and test and measurement topics on YouTube: <https://www.youtube.com/@RohdeundSchwarz>

1.4 Scope



Tasks (in manual or remote operation) that are also performed in the base unit in the same way are not described here.

In particular, it includes:

- Managing settings and data lists, like saving and loading settings, creating and accessing data lists, or accessing files in a particular directory.
- Information on regular trigger, marker and clock signals and filter settings, if appropriate.
- General instrument configuration, such as checking the system configuration, configuring networks and remote operation
- Using the common status registers

For a description of such tasks, see the R&S SMCV100B user manual.

1.5 Notes on screenshots

When describing the functions of the product, we use sample screenshots. These screenshots are meant to illustrate as many as possible of the provided functions and possible interdependencies between parameters. The shown values may not represent realistic usage scenarios.

The screenshots usually show a fully equipped product, that is: with all options installed. Thus, some functions shown in the screenshots may not be available in your particular product configuration.

2 About the AM/FM/RDS option

Use the AM/FM/RDS coder option to generate broadcast signals in [FM](#) and [AM](#).

In FM, you can generate a mono or a stereo signal. For stereo signals generated according to the multiplex method, an [RDS](#) coder is available and is used to code fixed data. Many parameters can be changed over wide setting ranges. See [Chapter 4, "Audio FM configuration and settings"](#), on page 18.

In AM, you can generate amplitude modulated signals. See [Chapter 3, "Audio AM configuration and settings"](#), on page 12.

To generate an audio FM broadcast signal

1. Select "Baseband > Audio FM > State > On".
2. Select "RF > RF Level > State > On".

To generate an audio AM broadcast signal

1. Select "Baseband > Audio AM > State > On".
2. Select "RF > RF Level > State > On".

2.1 Required options

The equipment layout for generating AM/FM/RDS signals includes:

- Base unit
- Option Enable Broadcast Standard (R&S SMCVB-K519)
- Option AM/FM/RDS (R&S SMCVB-K155)

3 Audio AM configuration and settings

Access:

- ▶ Select "Baseband > Audio AM".

This section provides an overview on the [AM](#) settings.

The remote commands required to define these settings are described in [Chapter 6.1, "Audio AM commands"](#), on page 58.

How to: "[To generate an audio AM broadcast signal](#)" on page 11

Settings:

| | |
|---|----|
| • General settings | 12 |
| • AM modulator settings | 13 |

3.1 General settings

Access:

- ▶ Select "Baseband > Audio AM > Audio AM".



The tab provides functionality for calling default settings, save and recall settings.

Settings:

| | |
|--------------------------------------|----|
| State | 12 |
| Set To Default | 12 |
| Save/Recall | 13 |

State

Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:AM:STATe](#) on page 58

Set To Default

Calls the default settings. The values of the main parameters are listed in the following table.

| Parameter | Value |
|-----------|--------------------------------------|
| State | Not affected by the "Set to Default" |

Remote command:

[\[:SOURce<hw>\]:BB:RADio:AM:PRESet](#) on page 58

Save/Recall

Accesses the "Save/Recall" dialog, that is the standard instrument function for saving and recalling the complete dialog-related settings in a file. The provided navigation possibilities in the dialog are self-explanatory.

The settings are saved in a file with predefined extension. You can define the filename and the directory, in that you want to save the file.

See also, chapter "File and Data Management" in the R&S SMCV100B user manual.

Remote command:

[\[:SOURce<hw>\]:BB:RADio:AM:SETTing:CATalog](#) on page 58

[\[:SOURce<hw>\]:BB:RADio:AM:SETTing:DELeTe](#) on page 59

[\[:SOURce<hw>\]:BB:RADio:AM:SETTing:LOAD](#) on page 59

[\[:SOURce<hw>\]:BB:RADio:AM:SETTing:STORe](#) on page 59

3.2 AM modulator settings

Access:

- Select "Baseband > Audio AM > AM Modulator".

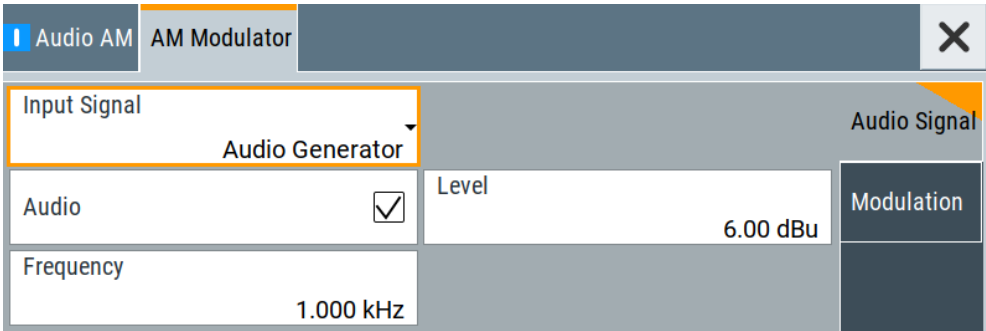
The dialog provides settings necessary to configure the AM modulator.

Settings:

- [Audio signal settings](#)..... 14
- [Modulation settings](#)..... 17

3.2.1 Audio signal settings

- Access:
- ▶ Select "AM Modulator > Audio Signal".



The tab provides input and audio settings of the signal, that is fed into the AM modulator.

Settings:

| | |
|-------------------------|----|
| Input Signal..... | 14 |
| Audio..... | 14 |
| Frequency..... | 15 |
| Level..... | 15 |
| Load File..... | 15 |
| L Predefined Files..... | 15 |
| Attenuation..... | 16 |
| Source..... | 16 |

Input Signal

Sets the audio source for the AM modulator signal.

- "External" Uses an external audio signal input at the "User 2" connector. The audio source is fixed to "Source > S/PDIF".
- "Audio Generator" Uses an internal audio generator as the signal source. You can enable the audio channel, set the audio level and set the audio frequency.
- "Audio Player" Uses a file, that is saved to the memory of the R&S SMCV100B. You can load a file, set the audio channel and set the attenuation. See "Load File" on page 15.
- "Off" Disables the audio source for the AM modulator.

Remote command:
[:SOURce<hw>]:BB:RADio:AM:INPut on page 61

Audio

Requires "Input Signal > Audio Generator/Audio Player".
Enables or disables the audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:AM:AUDio:AF` on page 61

Frequency

Requires "Input Signal > Audio Generator".

Sets the frequency.

Remote command:

`[:SOURce<hw>] :BB:RADio:AM:AUDGen:FRQ` on page 60

Level

Requires "Input Signal > Audio Generator/Audio Player".

Sets the level.

The nominal level, at which the modulation depth adjusts to the nominal modulation depth, is 6 dBu. If the level is set to 6 dBu, the generated modulation depth corresponds to the set value.

Remote command:

`[:SOURce<hw>] :BB:RADio:AM:AUDGen:LEV` on page 60

Load File

Requires "Input Signal > Audio Player".

Provides access to the standard "File Select" function of the instrument. The provided navigation possibilities in the dialog are self-explanatory.

See also, chapter "File and Data Management" in the R&S SMCV100B User Manual.

You can load files with extension `*.wav` and `*.wv`. If loaded, the name of the file is displayed next to the button.

Remote command:

`[:SOURce<hw>] :BB:RADio:AM:APLayer:LIBRary:CATalog` on page 60

`[:SOURce<hw>] :BB:RADio:AM:APLayer:LIBRary:SElect` on page 60

Predefined Files ← Load File

The tab list predefined files and displays information on the file. For an overview, see the table below.

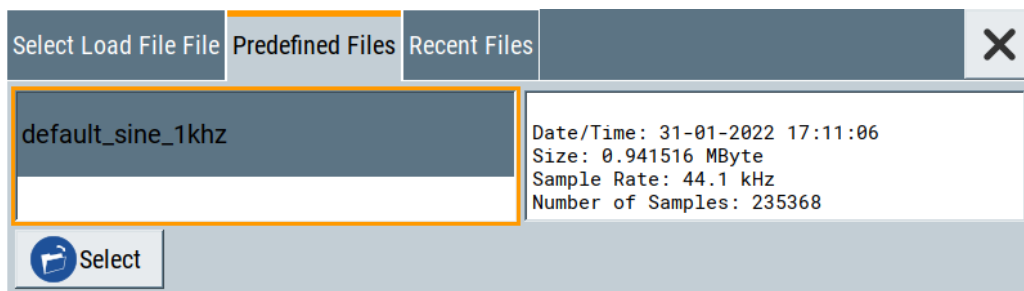
Table 3-1: File information

| File information | Remark |
|-------------------|--|
| Date | Format: <dd-mm-yyyy> |
| Time | Format: <hh:mm:ss> |
| Size | File size in Mbyte, Increment: 0.00001 Mbyte |
| Sample rate | Supported sample rates: 44.1 kHz and 48 kHz |
| Number of samples | - |

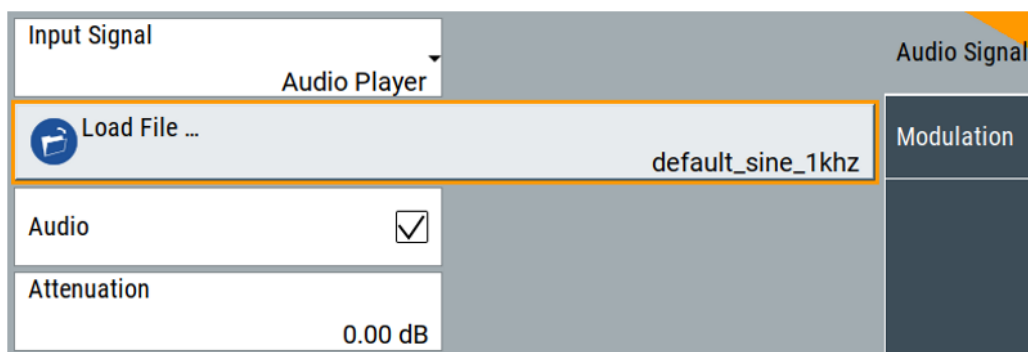
Example: Loading a predefined file

Select "Load File > Predefined Files" and select the audio file `default_sine_1khz.wav` in the list.

Information on the file is displayed on the right panel. See also [Table 3-1](#).



To load the file, click "Select". The file is displayed on the "Load File" button.



Attenuation

Requires "Input Signal > Audio Player".

Sets the attenuation.

Remote command:

`[:SOURCE<hw>] :BB:RADio:AM:APLayer:ATT` on page 59

Source

Requires "Input Signal > External".

Displays the audio source, that is fixed to [S/PDIF](#).

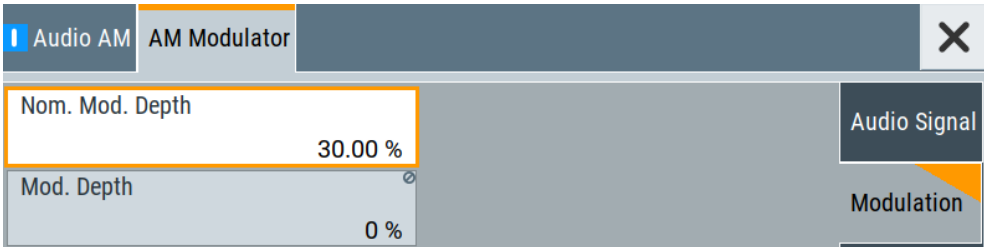
Remote command:

`[:SOURCE<hw>] :BB:RADio:AM:SOURce` on page 62

3.2.2 Modulation settings

Access:

► Select "AM Modulator > Modulation".



The tab provides AM modulation settings.

Settings:

| | |
|----------------------|----|
| Nom. Mod. Depth..... | 17 |
| Mod. Depth..... | 17 |

Nom. Mod. Depth
Sets the nominal modulation depth.
The depth denotes the referenced depth and depends on the input signal, see ["Input Signal"](#) on page 14.
Remote command:
`[:SOURce<hw>] :BB:RADio:AM:DEPTh` on page 61

Mod. Depth
Displays the modulation depth.
Remote command:
`[:SOURce<hw>] :BB:RADio:AM:MODulation:DEPTh?` on page 61

4 Audio FM configuration and settings

Access:

► Select "Baseband > Audio FM".

This section provides an overview on the [FM](#) and [RDS](#) settings. The variety of settings depends on whether the FM mode. For "Mode > Stereo", you can further specify left and the right channel settings, see "[Mode](#)" on page 26.

The remote commands required to define these settings are described in [Chapter 6, "Remote-control commands"](#), on page 57.

How to: "[To generate an audio FM broadcast signal](#)" on page 11

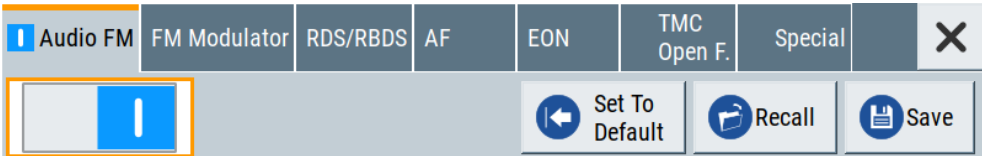
Settings:

| | |
|--|----|
| • General settings | 18 |
| • FM modulator settings | 19 |
| • RDS/RBDS settings | 27 |
| • AF settings | 34 |
| • EON settings | 39 |
| • TMC / open format settings | 46 |
| • DARC settings | 53 |
| • Special settings | 54 |

4.1 General settings

Access:

► Select "Baseband > Audio FM > Audio FM".



The tab provides functionality for calling default settings, save and recall settings.

Settings:

| | |
|--------------------------------------|----|
| State | 18 |
| Set To Default | 19 |
| Save/Recall | 19 |

State

Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Remote command:
[:SOURce<hw>]:BB:RADio:FM:STATe on page 63

Set To Default
Calls the default settings. The values of the main parameters are listed in the following table.

| Parameter | Value |
|-----------|--------------------------------------|
| State | Not affected by the "Set to Default" |

Remote command:
[:SOURce<hw>]:BB:RADio:FM:PRESet on page 62

Save/Recall
Accesses the "Save/Recall" dialog, that is the standard instrument function for saving and recalling the complete dialog-related settings in a file. The provided navigation possibilities in the dialog are self-explanatory.

The settings are saved in a file with predefined extension. You can define the filename and the directory, in that you want to save the file.

See also, chapter "File and Data Management" in the R&S SMCV100B user manual.

Remote command:
[:SOURce<hw>]:BB:RADio:FM:SETTing:CATalog on page 63
[:SOURce<hw>]:BB:RADio:FM:SETTing:DELeTe on page 63
[:SOURce<hw>]:BB:RADio:FM:SETTing:LOAD on page 63
[:SOURce<hw>]:BB:RADio:FM:SETTing:STORe on page 63

4.2 FM modulator settings

- Access:
- Select "Baseband > Audio FM > FM Modulator".

The dialog provides access to settings necessary to configure the input signal and the FM modulator.
- Settings:
- Audio signal settings..... 20
 - Modulation settings..... 25

4.2.1 Audio signal settings

Access:

- Select "FM Modulator > Audio Signal".

| Audio FM | | FM Modulator | RDS/RBDS | AF | EON | TMC Open F. | Special | X |
|--------------|--|-------------------------------------|----------|----|-----|-------------|---------|---|
| Input Signal | | Audio Generator | | | | | | |
| AF Mode | | L | | | | | | |
| Audio Left | | Audio Right | | | | | | |
| Audio | | <input checked="" type="checkbox"/> | | | | | | |
| Level | | 6.00 dBu | | | | | | |
| Frequency | | 1.000 kHz | | | | | | |

The tab provides input and audio settings of the signal, that is fed into the FM modulator.

Settings:

| | |
|-------------------------|----|
| Input Signal..... | 20 |
| AF Mode..... | 21 |
| Audio Left..... | 21 |
| L Audio..... | 21 |
| L Level..... | 22 |
| L Frequency..... | 22 |
| L Attenuation..... | 22 |
| Audio Right..... | 22 |
| L Audio..... | 23 |
| L Level..... | 23 |
| L Frequency..... | 23 |
| L Attenuation..... | 23 |
| Load File..... | 24 |
| L Predefined Files..... | 24 |
| Source..... | 25 |

Input Signal

Sets the audio source for the FM modulator signal.

- "External" Uses an external audio signal input at the "User 2" connector.
 The audio source is fixed to "Source > S/PDIF".

"Audio Generator"

Uses an internal audio generator as the signal source.
You can enable the audio channel, set the audio level and set the audio frequency for mono and stereo modulation mode.

"Audio Player"

Uses a file, that is saved to the memory of the R&S SMCV100B.
You can load a file, set the audio channel and set the attenuation.
See ["Load File"](#) on page 24.

"Off"

Disables the audio source for the FM modulator.

Remote command:

[\[:SOURce<hw>\]:BB:RADio:FM:INPut](#) on page 67

AF Mode

Requires "Input Signal > Audio Generator" and "Modulation > Mode > Stereo".

Sets the relationship of the two audio channels with respect to each other.

"L"

Only the audio signal from the left audio channel is processed further.
The right audio channel is ignored.

"R"

Only the audio signal from the right audio channel is processed further.
The left audio channel is ignored.

"L = R"

The audio signal for the left and right channel is identical. Only the audio signal of the left channel is used, the audio signal of the right channel is ignored. Therefore, only the settings for the left channel are available.

As a result, the stereo signal $(L-R)/2$ disappears as upper and lower sideband around the suppressed 38 kHz carrier.

"L = -R"

The phase of the audio signal for the left and right channel is offset by 180 degrees. Only the audio signal of the left channel is used, the audio signal of the right channel is ignored. Therefore, only the settings for the left channel are available.

As a result, the mono signal $(L+R)/2$ disappears in the frequency range up to 15 kHz.

"L ≠ R"

The audio signals from the left and right audio channel are processed according to the coding standard for a stereo multiplex signal.

Remote command:

[\[:SOURce<hw>\]:BB:RADio:FM:AUDio:MODE](#) on page 66

Audio Left

Displaying the panel requires "Modulation > Mode > Stereo".

The panel groups level and frequency parameters of the left audio channel. The description of the parameters also applies for "Mode > Mono", since the left audio channel is the mono audio channel.

Audio ← Audio Left

Enables or disables the audio channel.

You can enable 1 or 2 audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", enable left or right audio channel separately.

- If "Modulation > Mode > Mono", enable the audio channel, that is the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDio:AF1` on page 65

`[:SOURce<hw>] :BB:RADio:FM:AUDio:AF2` on page 65

Level ← Audio Left

Requires "Input Signal > Audio Generator".

Sets the level.

The nominal level, at which the modulation depth adjusts to the nominal modulation depth, is 6 dBu. If the level is set to 6 dBu, the generated modulation depth corresponds to the set value.

You can set levels for one or two audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", set left or right audio levels separately.
- If "Modulation > Mode > Mono", set the level related to the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:LEV1` on page 65

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:LEV2` on page 65

Frequency ← Audio Left

Requires "Input Signal > Audio Generator".

Sets the frequency.

You can set frequencies for one or two audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", set left or right audio frequencies separately.
- If "Modulation > Mode > Mono", set the frequency related to the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:FRQ1` on page 65

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:FRQ2` on page 65

Attenuation ← Audio Left

Requires "Input Signal > Audio Player".

Sets the attenuation.

You can set the attenuation for one or two audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", set left or right attenuations separately.
- If "Modulation > Mode > Mono", set the attenuation related to the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:APLayer:ATT1` on page 64

`[:SOURce<hw>] :BB:RADio:FM:APLayer:ATT2` on page 64

Audio Right

Displaying the panel requires "Modulation > Mode > Stereo".

The panel groups level and frequency parameters of the right audio channel.

Audio ← Audio Right

Enables or disables the audio channel.

You can enable 1 or 2 audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", enable left or right audio channel separately.
- If "Modulation > Mode > Mono", enable the audio channel, that is the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDio:AF1` on page 65

`[:SOURce<hw>] :BB:RADio:FM:AUDio:AF2` on page 65

Level ← Audio Right

Requires "Input Signal > Audio Generator".

Sets the level.

The nominal level, at which the modulation depth adjusts to the nominal modulation depth, is 6 dBu. If the level is set to 6 dBu, the generated modulation depth corresponds to the set value.

You can set levels for one or two audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", set left or right audio levels separately.
- If "Modulation > Mode > Mono", set the level related to the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:LEV1` on page 65

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:LEV2` on page 65

Frequency ← Audio Right

Requires "Input Signal > Audio Generator".

Sets the frequency.

You can set frequencies for one or two audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", set left or right audio frequencies separately.
- If "Modulation > Mode > Mono", set the frequency related to the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:FRQ1` on page 65

`[:SOURce<hw>] :BB:RADio:FM:AUDGen:FRQ2` on page 65

Attenuation ← Audio Right

Requires "Input Signal > Audio Player".

Sets the attenuation.

You can set the attenuation for one or two audio channels depending on the modulation mode:

- If "Modulation > Mode > Stereo", set left or right attenuations separately.
- If "Modulation > Mode > Mono", set the attenuation related to the left audio channel.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:APLayer:ATT1` on page 64

`[:SOURce<hw>] :BB:RADio:FM:APLayer:ATT2` on page 64

Load File

Requires "Input Signal > Audio Player".

Provides access to the standard "File Select" function of the instrument. The provided navigation possibilities in the dialog are self-explanatory.

See also, chapter "File and Data Management" in the R&S SMCV100B User Manual.

You can load files with extension *.wav and *.wav. If loaded, the name of the file is displayed next to the button.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:APLayer:LIBRary:CATalog on page 64

[:SOURce<hw>] :BB:RADio:FM:APLayer:LIBRary:SElect on page 65

Predefined Files ← Load File

The tab list predefined files and displays information on the file. For an overview, see the table below.

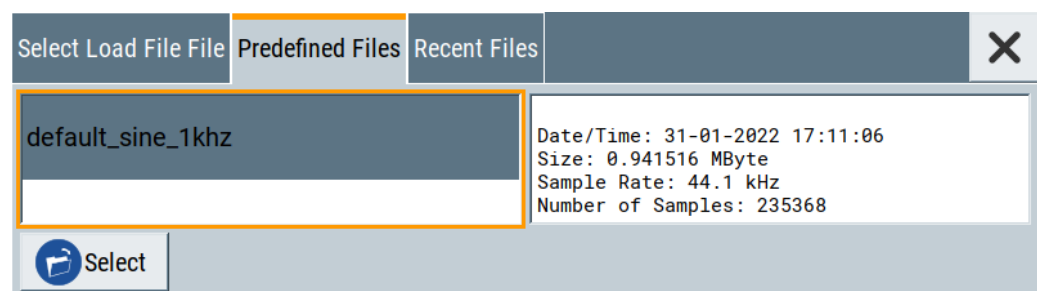
Table 4-1: File information

| File information | Remark |
|-------------------|--|
| Date | Format: <dd-mm-yyyy> |
| Time | Format: <hh:mm:ss> |
| Size | File size in Mbyte, Increment: 0.00001 Mbyte |
| Sample rate | Supported sample rates: 44.1 kHz and 48 kHz |
| Number of samples | - |

Example: Loading a predefined file

Select "Load File > Predefined Files" and select the audio file default_sine_1khz.wav in the list.

Information on the file is displayed on the right panel. See also [Table 3-1](#).



To load the file, click "Select". The file is displayed on the "Load File" button.

Input Signal

Audio Player

Load File ...

default_sine_1khz

Audio

☒

Attenuation

0.00 dB

Audio Signal

Modulation

Source
 Requires "Input Signal > External".
 Displays the audio source, that is fixed to S/PDIF.
 Remote command:
[\[:SOURce<hw>\]:BB:RADio:FM:AUDio:SOURce?](#) on page 66

4.2.2 Modulation settings

Access:

- ▶ Select "FM Modulator > Modulation".

Audio FM

FM Modulator

RDS/RBDS

AF

EON

TMC / Open F.

Special

X

Mode

Stereo

Preemphasis

50 µs

RDS/RBDS

☒

DARC

☐

Nom. Freq. Dev. Audio

40.000 kHz

Freq. Dev. Audio

41.93 kHz

Freq. Dev. RDS

2.00 kHz

Freq. Dev. Pilot

6.75 kHz

Audio Signal

Modulation

The tab provides FM modulation settings.

Settings:

| | |
|-----------------------|----|
| Mode | 26 |
| Preemphasis | 26 |
| Nom. Freq. Dev. Audio | 26 |
| Freq. Dev. Audio | 26 |
| Freq. Dev. Pilot | 26 |
| RDS/RBDS | 27 |

| | |
|----------------------|----|
| Freq. Dev. RDS..... | 27 |
| DARC..... | 27 |
| Freq. Dev. DARC..... | 27 |

Mode

Sets the **FM** mode.

- "Stereo" Feeds a stereo signal to the modulator according to the multiplex method with:
- Pilot tone: 19 kHz tone. You can disable the pilot tone and set the pilot deviation. See "**Pilot**" on page 54 and "**Freq. Dev. Pilot**" on page 26.
 - **RDS**: 57 kHz, see "**RDS/RBDS**" on page 27.
- "Mono" Feeds a mono signal to the modulator with band limitation 15 kHz.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:MODE` on page 67

Preemphasis

Sets the preemphasis factor for the signal to noise ratio improvement.

To improve the SNR, the technique boosts high-frequency components at the modulator and reduces them at the demodulator.

Example:

The level increase at an input frequency of 15 kHz and a pre-emphasis of 50 μ s is 13.66 dB. At a pre-emphasis of 75 μ s, the SNR is 17.07 dB.

The audio input level for audio generator and audio player therefore needs to be reduced in line with the pre-emphasis.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDio:PREemphasis` on page 66

Nom. Freq. Dev. Audio

Defines the signal deviation, that is the deviation only caused by the audio signals.

The nominal deviation is 6 dBu.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDio:NDEVIation` on page 66

Freq. Dev. Audio

Displays the actual frequency deviation.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:AUDio:DEVIation?` on page 65

Freq. Dev. Pilot

Defines the resulting 19 kHz frequency deviation of the pilot tone irrespective of the audio signals.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:PILot:DEVIation` on page 68

RDS/RBDS

Requires "Mode > Stereo".

Enables/disables [RDS/RBDS](#).

If enabled, adds a 57 kHz RDS signal to the multiplex signal in accordance with the specification [EN 62106](#).

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS\[:STATe\]](#) on page 70

Freq. Dev. RDS

Requires "Mode > Stereo" and "RDS/RBDS > On".

Defines the resulting frequency deviation of the radio data system irrespective of the audio signals.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:DEViation](#) on page 68

DARC

Requires "Mode > Stereo".

Enables/disables [DARC](#).

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:DARC\[:STATe\]](#) on page 87

Freq. Dev. DARC

Requires "Mode > Stereo" and "DARC > On".

Sets the DARC frequency deviation.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:DARC:DEViation](#) on page 87

4.3 RDS/RBDS settings

Requires "Baseband > Audio FM > FM Modulator > Mode > Stereo" and "Baseband > Audio FM > FM Modulator > RDS/RBDS > On".

Access:

- Select "Baseband > Audio FM > RDS/RBDS".

The dialog provides general, [MS](#), [DI](#) and [CT RDS/RBDS](#) settings.

The integrated [RDS](#) coder provides a versatile and flexible means of generating an RDS data stream. It enables data for all the important group types to be entered as menu inputs.

For group types provided for ODA, see [Chapter 4.6.2, "Open format settings"](#), on page 51. You can define the data content of blocks 2, 3 and 4 using hexadecimal input. The all-purpose input design means that there is no need to distinguish between RDS and RBDS.

Settings:

- [General settings](#).....28
- [MS/DI/CT settings](#).....32

4.3.1 General settings

Access:

- Select "RDS/RBDS > General".

| | | | | | | | |
|----------------|--------------|--------------------------|------|-----|--------------------------|---------|----------|
| Audio FM | FM Modulator | RDS/RBDS | AF | EON | TMC / Open F. | Special | X |
| Group Sequence | | 0B,2A | PI | | FFFF | | General |
| PS | | R&S SMCV | TP | | <input type="checkbox"/> | | MS/DI/CT |
| TA | | <input type="checkbox"/> | PTY | | 0 | | |
| MS | | Music | PTYN | | | | |
| RT | | Rohde & Schwarz | | | | | |

The tab provides general settings necessary to configure the RDS.

Settings:

| | |
|--------------------------------------|----|
| Group Sequence | 28 |
| PI | 29 |
| PS | 29 |
| TP | 30 |
| TA | 30 |
| PTY | 30 |
| PTYN | 30 |
| RT | 31 |
| MS | 31 |

Group Sequence

Defines the group sequence, that specifies the order of groups.

The group sequence is mandatory within the RDS data. The input field accepts up to 38 groups. A group consists of a group number and a version ("0A" to "15B"). Separate groups by setting a comma or a space.

If you enter a group number without specifying version A or B, the software adds version A automatically.

The RDS/RBDS transmission rate is approximately 11.4 group types per second. For this reason, the repetition rate per time unit is determined decisively from the group sequence inputs.

Note: Settings on the "RDS/RBDS" tab only take effect, if you enter the related group in the group sequence.

Once the entered groups have been fully transmitted, the group sequence is repeated.

| | |
|-------|---|
| "4A" | Requires "MS/DI/CT > CT > On". Reserved group. Inserts the current CT automatically at each full minute. |
| "14B" | Reserved group for appropriate EON setting. The group is automatically sent 8 times. For more information, see specification EN 62106 . |
| "15A" | Reserved group for ODA . |
| "15B" | Reserved group for appropriate setting. The group is automatically sent 8 times. For more information, see specification EN 62106 . |

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:GRoup:SEquence](#) on page 68

PI

Sets the program identification, that is a 16-bit value in hexadecimal representation.

The usage differs for RDS and RBDS operation:

- RDS: The **PI** consists of a code enabling the receiver to distinguish between countries and regions in that the same program is transmitted, and the programs themselves.
It 16-bit value comprises the country code (bit 15 to bit 12), the program type (bit 11 to bit 8) and the program reference number (bit 7 to bit 0).
- RBDS: In North America, the program identification code is used differently. In part, the broadcasting stations define the program identification code themselves.
The **PI** is transmitted in each group type. For A group types, the **PI** is transmitted in block 1. For B group types, it is transmitted in block 1 and block 3.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:PI](#) on page 69

PS

Sets the program service name.

Group types "0A" or "0B" transmit the **PS** in addition to the **PI**. The **PS** is transmitted in block 4 in both version A and version B.

You can enter an 8-character PS code, e.g. "R&S SMCV". For allowed character sets, see [Figure A-1](#).

Note: Not all receivers can display the full character set. For an overview of the displayed information, see [Table A-1](#) and [Table A-2](#).

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:PS](#) on page 69

TP

Enable/disables the traffic program flag.

A program carries regular traffic reports and is identified by the **TP** bit. It specifies, that **TA** is set, if a traffic announcement occurs. The information is transmitted in block 2 of each group.

If enabled, the "TA" can identify traffic announcements.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:TP [:STATe]` on page 70

TA

Enables/disables the traffic announcement flag.

If enabled, transmits the **TA** in block 2 of group types "0A", "0B" and "15B" to identify a traffic announcement.

If the TA is set or reset, group type "15B" is transmitted 8 times to guarantee transmission, even if difficult reception conditions are present.

Table 4-2: Implication of TP/TA combinations

| TP | TA | Implication |
|-------|-------|--|
| "Off" | "Off" | The program contains no traffic program. |
| "Off" | "On" | The program points to EON on a transmitter with traffic program. Required setting for EON. |
| "On" | "Off" | The program provides a TP and sets TA to 1, if a traffic announcement occurs. |
| "On" | "On" | A regular traffic announcement is indicated. |

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:TA` on page 70

PTY

Sets the program type.

The program type refers to the transmission content identifier and is transmitted in block 2 of each group type. 32 possible program types are defined (0 to 31). After entering the number, the assigned program type is displayed.

For RDS and RBDS, different group types are available, see [Table A-1](#) and [Table A-2](#).

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:PTY` on page 69

PTYN

Sets the program type name.

The **PTYN** allows you to specify the **PTY**. For example, for RDS "PTY > 4" implies a "Sport" program, that you can further specify by "Football".

PTYN is optional and is transmitted in group type "10A", blocks 3 and 4. PTYN is only transmitted if group type "10A" is specified in "Group Sequence".

You can enter an 8-character PTYN. For allowed character sets, see [Figure A-1](#).

Note: Not all receivers can display the full character set. For an overview of the displayed information, see [Table A-1](#) and [Table A-2](#).

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:PTYN](#) on page 69

RT

Sets the radio text.

RT comprises data messages transmitted in the following group types:

- Group type "2A": Up to 64 characters transmitted in blocks 3 and 4
- Group type "2B": Up to 32 characters transmitted in block 4

Use characters as shown in [Figure A-1](#). It takes 16 group types "2A" to transmit 64 characters (eight characters per group type). Transmission can take time, if there are several group types specified in "Group Sequence".

Further input inverts the A/B text flag in group type "2A" block 1 or "2B" block 2, signaling to the receiver that another RT is being carried. Sending the RT requires group type "2A" or "2B" specified in "Group Sequence".

If more than 32 characters are entered and group type "2B" is specified under "Group Sequence", the radio text is transmitted as far as the 32nd character and the rest of the characters are ignored. An error message is displayed.

Note: Not all receivers can display the full character set. For an overview of the displayed information, see [Table A-1](#) and [Table A-2](#).

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:RT](#) on page 70

MS

Identifies if the transmission contains music or speech.

Use the **MS** flag to actuate different volume settings in the receiver depending on the MS. The flag is transmitted in group types "0A", "0B" and "15B". Also, set "Group Sequence > 0A,0B" to transmit MS information via group types "0A" and "0B".

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:MS](#) on page 69

4.3.2 MS/DI/CT settings

Access:

- Select "RDS/RBDS > MS/DI/CT".

| | | | | | | | |
|----------------|--------------|--------------------------|-------------------|-----|--------------------------|----------|---|
| Audio FM | FM Modulator | RDS/RBDS | AF | EON | TMC / Open F. | Special | X |
| DI Dynamic PTY | | <input type="checkbox"/> | DI Compressed | | <input type="checkbox"/> | General | |
| DI Art. Head | | <input type="checkbox"/> | DI Stereo | | <input type="checkbox"/> | MS/DI/CT | |
| CT | | <input type="checkbox"/> | CT Offset [HH:MM] | | 00:00:00 | | |

The tab provides settings necessary to configure decoder identification and clock time parameters.

Settings:

| | |
|---------------------|----|
| DI Dynamic PTY..... | 32 |
| DI Compressed..... | 32 |
| DI Art. Head..... | 33 |
| DI Stereo..... | 33 |
| CT..... | 33 |
| CT Offset..... | 33 |

DI Dynamic PTY

Enables/disables dynamic **PTY** decoder identification.

For **DI**, the functionality allows dynamic toggling of the **PTY** of the current program or the program referenced via **EON** in group type "14A", variant 13.

DI is transmitted in group types "0A", "0B" and "15B". Also, set "Group Sequence > 0A,0B" to transmit MS information via group types "0A" and "0B".

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:DI:DYNamic on page 72

DI Compressed

Enables/disables compressed decoder identification.

For **DI**, the functionality allows transmission with compressed content. The content belongs to the current program or the program referenced via **EON** in group type "14A", variant 13.

DI is transmitted in group types "0A", "0B" and "15B". Also, set "Group Sequence > 0A,0B" to transmit MS information via group types "0A" and "0B".

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:DI:COMPressed on page 71

DI Art. Head

Enables/disables "artificial head" decoder identification.

For **DI**, the functionality uses artificial head or dummy head transmission of the program. The program denotes the current program or the program referenced via **EON** in group type "14A", variant 13.

DI is transmitted in group types "0A", "0B" and "15B". Also, set "Group Sequence > 0A,0B" to transmit MS information via group types "0A" and "0B".

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:DI:ARTificial` on page 71

DI Stereo

Enables/disables stereo decoder identification.

For **DI**, the functionality uses mono or stereo transmission of the program. The program denotes the current program or the program referenced via **EON** in group type "14A", variant 13.

DI is transmitted in group types "0A", "0B" and "15B". Also, set "Group Sequence > 0A,0B" to transmit MS information via group types "0A" and "0B".

"On" Stereo transmission

"Off" Mono transmission

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:DI:STEReo` on page 72

CT

Enables/disables the clock time and date information.

The time and date are transmitted in universal time coordinated format (UTC) together with the local offset, and in modified Julian day format (MJD).

CT information is transmitted every full minute. For this purpose, the RDS/RBDS coder deduces date and time information and the set time zone from the operating system time.

For testing, change the **CT** by setting the "CT Offset".

"On" Transmits time information in group type "4A".

"Off" Group type "4A" is not transmitted.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:CT` on page 71

CT Offset

Sets the clock time offset.

For certain test transmissions, you can add an offset to the set system time and time zone. Adding the **CT** offset can be useful for transmissions of certain events on the **TMC** and for setting their duration.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:CTOffset` on page 71

4.4 AF settings

Requires "Baseband > Audio FM > FM Modulator > Mode > Stereo" and "Baseband > Audio FM > FM Modulator > RDS/RBDS > On".

Access:

- Select "Baseband > Audio FM > AF".

| Audio FM | FM Modulator | RDS/RBDS | AF | EON | TMC Open F. | DARC | Special | X | | | | | | | | | | |
|---|--------------|----------|----|--|-------------|------|---------|---|------|------|------|------|------|------|------|------|------|------|
| <div>AF Method</div> <div>Num. of Frequencies</div> | | | | <div>Frequency / MHz</div> <table border="1"> <tbody> <tr> <td>AF 1</td> <td>87.6</td> </tr> <tr> <td>AF 2</td> <td>89.2</td> </tr> <tr> <td>AF 3</td> <td>90.3</td> </tr> <tr> <td>AF 4</td> <td>91.4</td> </tr> <tr> <td>AF 5</td> <td>92.5</td> </tr> </tbody> </table> | | | | | AF 1 | 87.6 | AF 2 | 89.2 | AF 3 | 90.3 | AF 4 | 91.4 | AF 5 | 92.5 |
| AF 1 | 87.6 | | | | | | | | | | | | | | | | | |
| AF 2 | 89.2 | | | | | | | | | | | | | | | | | |
| AF 3 | 90.3 | | | | | | | | | | | | | | | | | |
| AF 4 | 91.4 | | | | | | | | | | | | | | | | | |
| AF 5 | 92.5 | | | | | | | | | | | | | | | | | |

The tab provides settings necessary to configure alternative frequencies list (AF) parameters.

AF gives information about which transmitters are broadcasting the same program in the same or adjacent reception areas. Af also enables receivers with a corresponding memory to reduce switchover times to another transmitter difficult reception conditions.

Settings:

| | |
|----------------------------|----|
| AF Method..... | 34 |
| Num. of Frequencies..... | 36 |
| Frequency table..... | 37 |
| L Frequency..... | 37 |
| Num. of Lists..... | 37 |
| Select Editlist..... | 37 |
| Num. of Frequencies..... | 37 |
| Tuning Frequency..... | 38 |
| Frequency Order table..... | 38 |
| L Frequency..... | 38 |
| L Order..... | 38 |

AF Method

Sets the AF method.

For RDS/RBDS, two methods exist to transmit the AF.

"A"

A list can specify up to 25 entries referenced to the transmission frequency. The list includes the frequencies in the same transmitter network that are carrying the same program and are located within a certain geographical area.

The frequencies are transmitted using group type "0A".

The actual number of frequencies, follows, is sent first, and then the alternative frequencies. Every frequency is transmitted with the aid of an 8-bit code, see [Table A-3](#) and [Table A-4](#).

Frequencies from the [LW](#) and [MW](#) bands are not supported.

Example: Applying method A

5 frequencies are transmitted as alternatives to the current transmission frequency.

3 groups of group type "0A" are needed for this information.

| | | |
|-------------------|-----|-----|
| 1st group type 0A | #5 | AF1 |
| 2nd group type 0A | AF2 | AF3 |
| 3rd group type 0A | AF5 | AF5 |

"B"

Alternative frequencies are transmitted using method B in the following cases:

- The transmitter and its associated repeaters have more than 25 alternative frequencies.
- Several local regions have different program content.

In such cases, the respective alternative frequencies are transmitted as alternatives to several transmission frequencies. Frequency information is transmitted in the form of frequency pairs, giving the set transmission frequency and the associated alternative frequency in each case.

The sequence of the frequencies is important in this method. Sometimes the higher frequency is transmitted first, which refers to a frequency having the same program content (ascending). If the lower frequency is transmitted first, a regional variant using the alternative frequency is being transmitted (descending).

Frequencies from the [LW](#) and [MW](#) bands are not supported.

Example: Applying method B

A list containing 5 different alternative frequencies is transmitted using method B.

Block 3 of the first group type "0A" specifies the number of frequencies that follow and the transmission frequency to which the alternative frequencies are referenced. The number of frequencies to follow is therefore 11.

| | | |
|-------------------|-------|-------|
| 1st group type 0A | #11 | 89.3 |
| 2nd group type 0A | 89.3 | 99.5 |
| 3rd group type 0A | 89.3 | 101.7 |
| 4th group type 0A | 88.8 | 89.3 |
| 5th group type 0A | 102.6 | 89.3 |
| 6th group type 0A | 89.3 | 89.0 |

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:METHod](#) on page 73

Num. of Frequencies

Requires "AF Method > A".

Defines the number of alternative frequencies.

You can transmit a maximum of 26 code words including the information on the number of frequencies that follow, before the transmission is repeated.

"0"

Code `0xE0CD` is transmitted in block 3 of group "0A". `E0` means that no alternative frequencies are available, see [Table A-3](#) and [Table A-4](#). `CD` is a "filler code".

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:A:NUMBer](#) on page 73

Frequency table

Displays alternative frequency number AF <num> and frequency of up to 26 alternative frequencies in a table using AF method A.

The number of lines in the frequency table corresponds to the set number of frequencies, see ["Num. of Frequencies"](#) on page 36.

Frequencies from the [LW](#) and [MW](#) bands are not supported.

Note: If you use the rotary knob to change an alternative frequency, an ENTER is transmitted with every list item. The mechanism causes unwanted frequency information to be transmitted.

If using the rotary knob remains your preferred input method, remove group type "0A" from the group sequence beforehand.

Frequency ← Frequency table

Sets the frequency of the corresponding AF number.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:A:FREQuency<ch>?](#) on page 73

Num. of Lists

Requires "AF Method > B".

Defines the number of lists of frequencies used for method B. You can set maximum five lists.

"0" Code 0xE0CD is transmitted in block 3 of group "0A". E0 means that no alternative frequencies are available, see [Table A-3](#) and [Table A-4](#). CD is a "filler code".

Select Editlist

Selects the list, that is displayed in the "Frequency | Order" table, see ["Frequency Order table"](#) on page 38.

Num. of Frequencies

Defines the number of individual frequencies for each list of up to five lists. In method B, transmission is not identified in the RDS coder.

The receiver is able to recognize this method by the tuning frequency contained in each frequency pair, see ["Tuning Frequency"](#) on page 38.

"0" The list is ignored.

"12" A maximum of 26 code words is transmitted, including the information on the tuning frequency and the number of frequencies that follow, before the transmission is repeated.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:B:LIST1:NUMBer](#) on page 74

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:B:LIST2:NUMBer](#) on page 74

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:B:LIST3:NUMBer](#) on page 74

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:B:LIST4:NUMBer](#) on page 74

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:AF:B:LIST5:NUMBer](#) on page 74

Tuning Frequency

Defines the tuning frequency. The specified tuning frequency is transmitted to form a frequency pair with each entered frequency.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST1:TFrequency on page 75
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST2:TFrequency on page 75
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST3:TFrequency on page 75
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST4:TFrequency on page 75
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST5:TFrequency on page 75

Frequency Order table

For the selected list, displays alternative frequency number AF <num>, frequency and order using AF method B.

The number of lines in the frequency table corresponds to the set number of frequencies, see ["Num. of Frequencies"](#) on page 37.

The table also indicates whether the specified alternative frequency carries a different regional program.

Frequency ← Frequency Order table

Sets the frequency of the corresponding AF number of the selected list, see ["Select Editlist"](#) on page 37.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST1:FREQuency<ch> on page 74
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST2:FREQuency<ch> on page 74
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST3:FREQuency<ch> on page 74
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST4:FREQuency<ch> on page 74
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST5:FREQuency<ch>?

on page 74

Order ← Frequency Order table

Sets the frequency order of the corresponding AF number of the selected list, see ["Select Editlist"](#) on page 37.

"Asc." Ascending order, the same program is carried.

"Desc." Descending order, the alternative frequency points to a program that has regional variants.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST1:DESC<ch> on page 73
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST2:DESC<ch> on page 73
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST3:DESC<ch> on page 73
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST4:DESC<ch> on page 73
 [:SOURce<hw>] :BB:RADio:FM:RDS:AF:B:LIST5:DESC<ch> on page 73

4.5 EON settings

Access:

- Select "Baseband > Audio FM > EON".

The dialog provides enhanced other network settings.

EON-related information is used to update information saved in the receiver about programs other than the program being received (if other networks are enabled).

In addition to the alternative frequencies, program name, traffic program identification and traffic announcement identification, you can also transmit the program type and program contribution identification for all the other program chains.

Reference to each respective program is provided by the associated PI. The link information enables the receiver to handle several program chains as a single chain during shared program times.

Settings:

- [General settings](#).....39
- [Method settings](#).....43

4.5.1 General settings

Access:

- Select "EON > General".

| | | | | | | | |
|----------|--------------------------|-----------|--------------------------|---------|----------------|---------|---|
| Audio FM | FM Modulator | RDS/RBDS | AF | EON | TMC Open F. | Special | ✕ |
| EON PI | | EON PS | | General | | | |
| FFFF | | Program 1 | | | | | |
| EON TP | <input type="checkbox"/> | EON TA | <input type="checkbox"/> | Method | | | |
| EON LA | <input type="checkbox"/> | EON EG | <input type="checkbox"/> | | | | |
| EON ILS | <input type="checkbox"/> | EON LSN | 0 | | | | |
| EON PTY | 0 | EON PIN | 0 | | | | |

The tab provides settings necessary to configure general EON settings.

Settings:

| | |
|--------------|----|
| EON PI..... | 40 |
| EON PS..... | 40 |
| EON TP..... | 40 |
| EON TA..... | 40 |
| EON LA..... | 41 |
| EON EG..... | 41 |
| EON ILS..... | 41 |
| EON LSN..... | 42 |
| EON PTY..... | 42 |
| EON PIN..... | 42 |

EON PI

Sets the enhanced other network program identification.

The **PI** code of the referenced transmitter is transmitted in group type "14A", block 4. The PI code comprises a 16-bit value in hexadecimal representation.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:PI on page 76

EON PS

Sets the enhanced other network program service name.

The **PS** is transmitted in group type "14A". For 8 characters, group type "14A" must be transmitted 4 times. For allowed character sets, see [Figure A-1](#).

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:PS on page 77

EON TP

Enables the enhanced other network traffic program.

If enabled, traffic announcements can be identified by "EON TA", see ["EON TA"](#) on page 40.

An [EON TP](#), carrying regular traffic reports, is identified by the traffic program bit. It specifies that the [TA](#) is set, if a traffic announcement occurs.

The information is transmitted in group type "14A", block 2.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:TP on page 78

EON TA

Enables the enhanced other network traffic announcement.

If enabled, transmits the traffic announcement flag in block 3, variant 13 of group type "14A" to identify a traffic announcement of an EON referenced program.

If the traffic announcement flag is set or reset, group type "14B" is transmitted 8 times to guarantee transmission, even if difficult reception conditions are present.

Note: For [EON](#), the signaling for the [TP](#) must be disabled and the [TA](#) must be enabled. For details on implication of TP/TA combinations, see [Table 4-2](#).

Remote command:

[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:Ta on page 77

EON LA

Enables the enhanced other network linkage actuator.

"On" Transmits the linkage actuator bit in block 3, variant 12 of group "14A". This bit informs the receiver that the program chain identified by the **PI** (enabled) in block 4 of group type "14A" is linked to the program combination referenced by the **LSN**.

"Off" Displays a possible future link.

Remote command:

[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:LA on page 76

EON EG

Enables the enhanced other network extended generic indicator.

If enabled, the **EG** informs the receiver, that the program chain identified by the **PI** (enabled) in block 4 of group type "14A" belongs to a group of related program chains. These groups have interlinked services, but do not necessarily carry the same program.

Remote command:

[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:EG on page 76

EON ILS

Enables the enhanced other network international linkage set indicator.

"On" Informs the receiver that an international link exists.

| Usage | Bit allocation in Block 3 | | | | | | | | | | | | | | | |
|--------------------|---------------------------|-----------------|-----------------|-----------------|--------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Group type 14A | b ₁₅ | b ₁₄ | b ₁₃ | b ₁₂ | b ₁₁ | b ₁₀ | b ₉ | b ₈ | b ₇ | b ₆ | b ₅ | b ₄ | b ₃ | b ₂ | b ₁ | b ₀ |
| International Link | LA | EG | X | 1 | Linkage Set Number (LSN) | | | | | | | | | | | |
| | | | | | CI | | | | | | LI | | | | | |

Figure 4-1: Structure of variant 12 of block 3 in group type 14A for international linkage

For of an international linkage, the **LSN** must contain two elements.

- The **CI**: Bits b₁₁ to b₈ in block 3 must carry the country code of 1 or 2 participating countries.
- The **LI** - international linkage set number: Bits b₇ to b₀ are used to link program chains internationally.

"Off" National linkage.

| Usage | Bit allocation in Block 3 | | | | | | | | | | | | | | | |
|----------------|---------------------------|-----------------|-----------------|-----------------|--------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Group type 14A | b ₁₅ | b ₁₄ | b ₁₃ | b ₁₂ | b ₁₁ | b ₁₀ | b ₉ | b ₈ | b ₇ | b ₆ | b ₅ | b ₄ | b ₃ | b ₂ | b ₁ | b ₀ |
| National Link | LA | EG | X | 0 | Linkage Set Number (LSN) | | | | | | | | | | | |

Figure 4-2: Structure of variant 12 of block 3 in group type 14A for national linkage

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:ILS on page 76

EON LSN

Sets the enhanced other network linkage set number.

The **LSN** is used to interlink two or more programs nationally or internationally. The LSN comprises a 12-bit value in hexadecimal representation. The LSN code is transmitted in block 3, variant 12 of group type "14A".

- "000" Used to indicate an error situation in which two or more programs with "EON LSN" = "000" are not linked to one another.
- "#000" If the programs that are intended to be linked to a group are identical, "LA" is enabled (if "LA" = "On") or on standby (if "LA" = "Off"), depending on the status of the linkage actuator, see also "EON LA" on page 41.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:LSN on page 76

EON PTY

Sets the enhanced other network program type.

The content identifier for the **EON** program transmission is called the program type and is transmitted in group type "14A", block 3, variant 13.

A total of 32 possible program types (0 to 31) are defined. After entering the appropriate number, the assigned program type is displayed. For **RDS** and **RBDS** different group types are available, see [Table A-1](#) and [Table A-2](#).

- "31" Reserved for an alarm identifier. Any input that is not within the range is rejected.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:PTY on page 77

EON PIN

Sets the enhanced other network program item number.

The **PIN** code specifies the planned day, hour and minute for the start of the EON program transmission, as published by the broadcaster. The **PIN** comprises 16-bit number in hexadecimal representation as in [Table 4-3](#).

Table 4-3: Format

| | | | | | | | | | | | | | | | |
|-------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D | D | D | D | D | H | H | H | H | H | M | M | M | M | M | M |
| D = day, H = hour, M = minute | | | | | | | | | | | | | | | |

If you want to send an invalid PIN, set at least the day information bits DDDDD to zero.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:EON:PIN on page 77

4.5.2 Method settings

Access:

- Select "EON > Method".

| Audio FM | FM Modulator | RDS/RBDS | AF | EON | TMC Open F. | Special | X |
|---------------------|--------------|----------|----|-----------------|-------------|---------|--------|
| EON AF Method | | | | Frequency / MHz | General | | |
| Num. of Frequencies | | | | 5 | AF 1 | 88.3 | Method |
| | | | | AF 2 | 99.0 | | |
| | | | | AF 3 | 101.5 | | |
| | | | | AF 4 | 102.6 | | |
| | | | | AF 5 | 103.7 | | |

The tab provides settings necessary to configure **EON** alternative frequencies list parameters.

Settings:

| | |
|--------------------------|----|
| EON AF Method..... | 43 |
| Num. of Frequencies..... | 44 |
| Frequency table..... | 44 |
| L Frequency..... | 45 |
| Num. of Frequencies..... | 45 |
| Tuning Frequency..... | 45 |
| Frequency table..... | 45 |
| L Frequency..... | 45 |

EON AF Method

Sets the AF method in an enhanced other network.

The alternative frequencies table gives information about the transmission frequencies belonging to the program identification code in group type "14A", block 4.

Similar to alternative frequencies in the tuning network, for EON exist two methods for transmitting the alternative frequencies.

Frequencies from the **LW** and **MW** bands are not supported.

- "A" Yo can specify up to 25 frequencies referenced to the transmission frequency. The frequencies are transmitted with group type "14A", block 3, variant 4. The coding method is the same as for the alternative frequencies in group type "0A".
Specify number of frequencies and frequency values using EON AF method A. See ["Num. of Frequencies"](#) on page 44 and ["Frequency table"](#) on page 44.
- "Mapped Freq." Similar to method B for coding the alternative frequencies in group type "0A", a frequency pair is transmitted. Up to 4 frequency pairs are transmitted in group type "14A", block 3, variants 5 to 8. The first frequency (bit 15 to bit 8) corresponds to the transmission frequency of the transmitter with the PI code in block 1. The second frequency (bit 7 to bit 0) corresponds to the transmission frequency of the EON service.
However, there is no sequence of lower and higher frequencies for specifying local differences.
Variant 9 of group type "14A", block 3, with frequency codes from the MW and LW bands, is not supported.
Specify number of frequencies, tuning frequency and mapped frequency values using EON AF method "Mapped Freq.". See ["Num. of Frequencies"](#) on page 45, ["Tuning Frequency"](#) on page 45 and ["Frequency table"](#) on page 45.

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:EON:AF:METHod](#) on page 79

Num. of Frequencies

Requires "EON AF Method > A".

Defines the number of alternative frequencies.

You can transmit a maximum of 26 code words including the information on the number of frequencies that follow, before the transmission is repeated. Enter frequency values in the frequency table, see ["Frequency table"](#) on page 44.

- "0" Code 0xE0CD is transmitted in block 3 of group "0A". E0 means that no alternative frequencies are available, see [Table A-3](#) and [Table A-4](#). CD is a "filler code".

Remote command:

[\[:SOURCE<hw>\]:BB:RADio:FM:RDS:EON:AF:A:NUMBer](#) on page 78

Frequency table

Requires "EON AF Method > A".

Displays alternative frequency number AF <num> and frequency of up to 25 frequencies referenced to the transmission frequency. The table includes the frequencies in the same EON transmitter network that are carrying the same program and are located within a certain geographical area.

The table includes the frequencies in the same EON transmitter network that are carrying the same program and are located within a certain geographical area.

The number of lines in the frequency table corresponds to the set number of frequencies, see ["Num. of Frequencies"](#) on page 44.

The frequencies are transmitted with group type "14A", block 3, variant 4. The coding method is the same as for the alternative frequencies in group type "0A".

Frequency ← Frequency table

Requires "EON AF Method > A".

Sets the frequency of the corresponding EON AF number for method A.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:AF:A:FREQuency<ch>` on page 78

Num. of Frequencies

Requires "EON AF Method > Mapped Freq.".

Defines the number of alternative frequencies.

"0" Variants 5 to 8 are not transmitted in group type "14A", block 3.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:AF:B:FREQuency<ch>` on page 78

Tuning Frequency

Requires "EON AF Method > Mapped Freq.".

Defines the tuning frequency. The specified tuning frequency is transmitted to form a frequency pair with each entered frequency.

Defines the tuning frequency.

The specified tuning frequency is transmitted to form a frequency pair with each frequency entered.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:AF:B:TFRQuency` on page 79

Frequency table

Requires "EON AF Method > Mapped Freq.".

Displays alternative frequency number and frequency of up to 26 alternative frequencies in a table.

The number of lines in the frequency table corresponds to the set number of frequencies, see "[Num. of Frequencies](#)" on page 44.

Frequency ← Frequency table

Requires "EON AF Method > Mapped Freq.".

Sets the frequency of the corresponding EON AF number for AF mapped frequency method.

Frequencies from the [LW](#) and [MW](#) bands are not supported.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM:RDS:EON:AF:A:FREQuency<ch>` on page 78

4.6 TMC / open format settings

- Access:
- ▶ Select "Baseband > Audio FM > TMC / Open F.".

The dialog provides settings necessary to configure traffic message channel parameters and open format parameters for [ODA](#).
- Settings:
- [TMC settings](#).....46
 - [Open format settings](#).....51

4.6.1 TMC settings

Access:

- ▶ Select "TMC / Open F. > TMC".

The tab provides [TMC](#) settings.

Use the settings to send traffic messages as single group messages or multi group messages.

A single group message is transmitted in one group type "8A", a multi group message needs up to 5 group types "8A". It can take up to 6 group types "8A" to transmit the tuning information.

TMC transmission is announced in group type "3A". We recommend that you send group type "3A" at regular intervals.

TMC data messages are coded as specified in [EN ISO 14819-1](#).

Settings:

| | |
|----------------------------------|----|
| TMC..... | 47 |
| Block 3 table..... | 47 |
| Num. of 8A Groups (Hex)..... | 48 |
| Block 2 Block 3 Block 4..... | 48 |
| Apply..... | 50 |
| Discard..... | 50 |

TMC

Enables the traffic message channel.

- "On" The data you entered is accepted.
- "Off" The behavior depends on "Open Format", see ["Open Format"](#) on page 51:
- "Open Format > On": If the "Group Sequence" includes group types "3A" and "8A", the last 5 bits of block 2, as well as blocks 3 and 4, are filled up with zeros.
 - "Open Format > Off": You can edit the group types "3A" and "8A" without restriction.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:RDS:TMC [:STATe]` on page 81

Block 3 table

The settings in the table take effect, if "TMC > Off".

The table contains rows "Group 3A Var. 00" and "Group 3A Var. 01". Both parameters comprise 16-bit values in hexadecimal representation.

In principle, group "3A" is sent in turn with variant 0 and variant 1. The input data is held in block 3, see [Table 4-4](#) and following sections.

The last 5 bits of block 2 are transmitted with the group application code "10000".

Block 4 of this group type is stuffed with 0xCD46. This code tells the receiver that the following group types 8A contain TMC information.

Table 4-4: Contents of group 3A, block 3, variant 0

| Y15 | Y14 | Y13 | Y12 | Y11 – Y6 | Y5 | Y4 | Y3 | Y2 | Y1 | Y0 |
|-----|-----|-----|-----|----------|-----|-----|----|----|----|----|
| 0 | 0 | X | X | LTN | AFI | M=0 | I | N | R | U |

Table 4-5: Contents of group 3A, block 3, variant 1

| Y15 | Y14 | Y13 - Y12 | Y11 – Y6 | Y5 - Y4 | Y3 - Y2 | Y1 - Y0 |
|-----|-----|-----------|----------|---------|---------|---------|
| 0 | 1 | G | SID | X | X | X |

Table 4-6: Parameters in block 3 and their meaning

| Parameter | Description | Possible values |
|-----------|---------------------------------------|---|
| LTN | Location table number | 6 bits, see EN ISO 14819-3 |
| AFI | Alternative frequency indicator | 1: All the frequencies in a transmitter network with the same PI carry the same RDS TMC service. 0: Not all the frequencies in a transmitter network with the same PI carry the same RDS TMC service. |
| M | Transmission mode | 0: Basic mode; Y5 to Y0 of variant 1 are irrelevant. 1: Enhanced mode; transmission of group types "8A" is linked to fixed times (not supported). |
| I | International (INTER-ROAD) | |
| N | National | |
| R | Regional | |
| U | Urban | |
| G | Gap parameter | 00: At least 3 non-8A groups between 2 "8A" group types 01: At least 5 non-8A groups between 2 "8A" group types 10: At least 8 non-8A groups between 2 "8A" group types 11: At least 11 non-8A groups between 2 "8A" group types |
| SID | Service identifier of the TMC service | |

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:G3A:VAR<ch>` on page 80

Num. of 8A Groups (Hex)

Defines the number of **TMC** A8 groups.

The number comprises the total number of group types "8A" contained in blocks 2, 3 and 4, see "[Block 2](#) | [Block 3](#) | [Block 4](#)" on page 48.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:G8A:NUMBer` on page 81

Block 2 | Block 3 | Block 4

Defines the content of group types "8A".

It can hold 3 types of information.

- Single group message
Short traffic messages can be transmitted with a group type "8A".
Bit 3, block 2, in the group type "8A" is set to 1.
The single group message is identified by X4 = 0, X3 = 1.

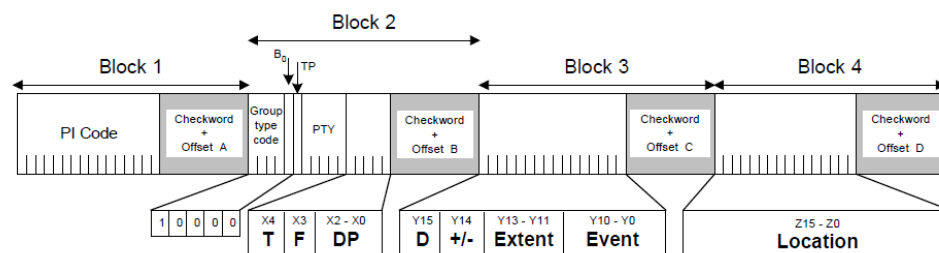


Figure 4-3: TMC group type 8A: single group message

T = 0 = Indicates a user message
 F = 1 = Indicates a single group message
 DP = Duration and persistence value
 D = 0 = Indicates that no diversion recommended
 D = 1 = Indicates a recommended diversion
 +/- = 0 = Indicates the positive direction
 +/- = 1 = Indicates the negative direction

- **Multi group message**

Longer traffic messages need several group types "8A" for the traffic information. A distinction is made between the 1st, 2nd, 3rd, 4th or 5th group type "8A". The 1st group is identified by X4 = 0, X3 = 0, Y15 = 1.

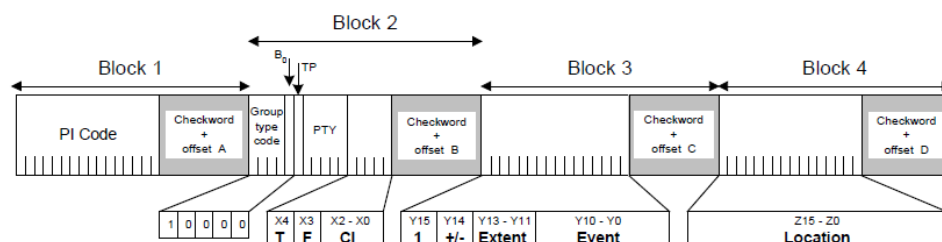


Figure 4-4: TMC group type 8A: multi group message, first group

T = 0 = Indicates a user message
 F = 0 = Indicates a multi group message
 CI = Continuity index for distinguishing between the individual messages
 +/- = 0 = Indicates the positive direction
 +/- = 1 = Indicates the negative direction

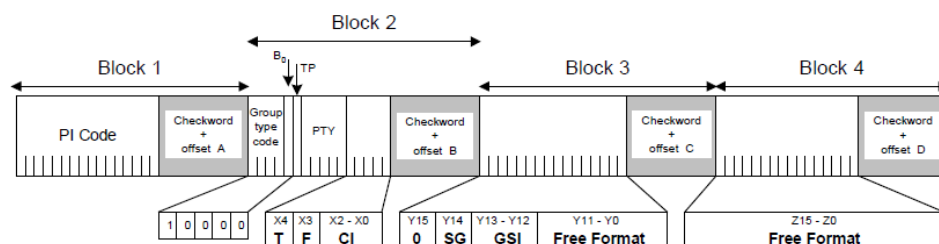


Figure 4-5: TMC group type 8A: multi group message, second and subsequent groups

T = 0 = Indicates a user message
 F = 0 = Indicates a multi group message
 CI = Continuity index for distinguishing between the individual messages

SG = 0 = Indicates the 3rd, 4th or 5th group
 SG = 1 = Indicates the 2nd group
 GSI = Group sequence value

- Tuning information

This feature is not for transmitting the content of traffic messages. Instead it carries general information about the TMC service, such as the service provider name, the associated program identification, the assigned frequency and various system parameters.

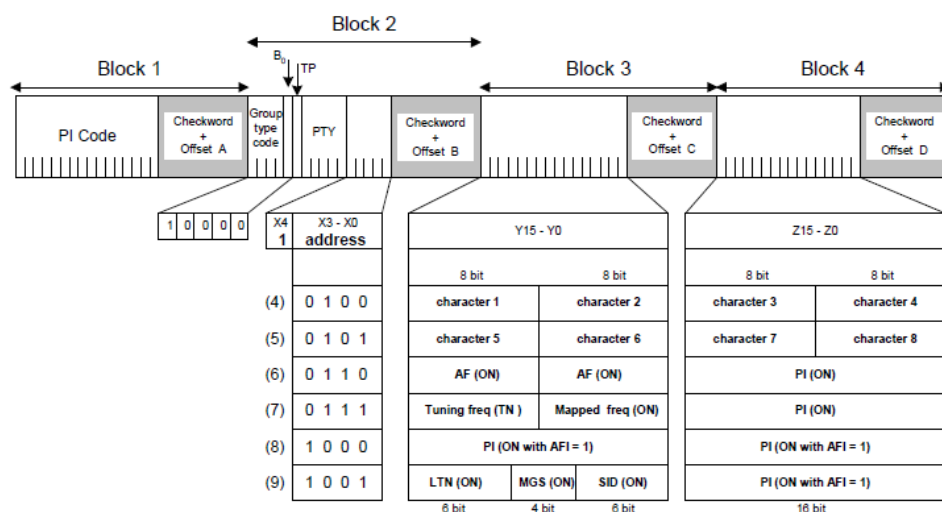


Figure 4-6: TMC group type 8A: tuning information

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK2 on page 80

[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK3a on page 80

[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK4 on page 81

Apply

Sends the TMC message.

Since it takes a certain amount of time to send a TMC message, during the transmission process, an hourglass symbol ⌚ is displayed left from the subtab name and the "Apply" button.

When using remote control, it is particularly important to know whether a message that has been entered has yet been transmitted and when a new TMC message can be sent.

If the group types "3A" and "8A" are not included in the "Group Sequence", an error message is displayed. The transmission stops until the group types "3A" and "8A" have been entered.

Remote command:

[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:APPLY on page 80

[:SOURce<hw>] :BB:RADio:FM:RDS:TMC:READY? on page 81

Discard

Discards the configured group type 8A settings.

Discarding triggers a reset of the following parameters:

- "Num. of 8A Groups (Hex)", see ["Num. of 8A Groups \(Hex\)"](#) on page 48.
- "Block 2 | Block 3 | Block 4", see ["Block 2 | Block 3 | Block 4"](#) on page 48

Remote command:
n.a.

4.6.2 Open format settings

Access:

► Select "TMC / Open F. > Open F." "System > L1".

| | Block 2 | Block 3 | Block 4 |
|----------|---------|---------|---------|
| Group 1A | 0 | 0 | 0 |
| Group 1B | 0 | - | 0 |
| Group 3A | 0 | 0 | 0 |

The tab provides settings necessary to configure open format parameters for [ODA](#).

Settings:

| | |
|---|----|
| Open Format | 51 |
| Block 2 Block 3 Block 4 | 52 |
| Apply | 52 |
| Discard | 52 |

Open Format

Enables the open format.

- "On" Sends the data entered in the "Block 2 | Block 3 | Block 4" table, see ["Block 2 | Block 3 | Block 4"](#) on page 52.
- "Off" Stuffs the group types with zeros. Stuffing is performed for group types specified in "Group Sequence", see ["Group Sequence"](#) on page 28.

Remote command:
[\[:SOURce<hw>\]:BB:RADio:FM:RDS:OPF\[:STATe\]](#) on page 82

Block 2 | Block 3 | Block 4

Contains all group types specified in the [RDS/RBDS](#) group sequence.

See ["Group Sequence"](#) on page 28.

In A group types, blocks 2, 3 and 4 can be described using hexadecimal data. In block 2, last 5 bits are used; in blocks 3 and 4, 16 bits are used.

In B group types, block 3 cannot be described, because in the group types the program identification is automatically entered.

If "TMC > Off", you can only edit the group types "3A" and "8A".

After entering the desired data, press "Apply".

"Block 2" column 8-bit value in hexadecimal representation.

"Block 3" column Only available for group types A. 16-bit value in hexadecimal representation.

"Block 4" column 16-bit value in hexadecimal representation.

Remote command:

Block 2 commands:

[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G1A:BLOCK2](#) on page 83 to [\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G15A:BLOCK2](#) on page 83
[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G1B:BLOCK2](#) on page 83 to [\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G13B:BLOCK2](#) on page 83

Block 3 commands:

[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G1A:BLOCK3](#) on page 84 to [\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G15A:BLOCK3](#) on page 84
[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G1B:BLOCK3?](#) on page 84 to [\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G13B:BLOCK3?](#) on page 85

Block 4 commands:

[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G1A:BLOCK4](#) on page 85 to [\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G15A:BLOCK4](#) on page 86
[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G1B:BLOCK4](#) on page 86 to [\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:G13B:BLOCK4](#) on page 86

Apply

If group types are part of the "Group Sequence", clicking "Apply" triggers transmission start.

Remote command:

[\[:SOURCE<hw>\]:BB:RADIO:FM:RDS:OPF:APPLY](#) on page 82

Discard

Discards the configured group type 8A settings.

Discarding triggers a reset of the parameters in table "Block 2 | Block 3 | Block 4", see ["Block 2 | Block 3 | Block 4"](#) on page 52.

Remote command:

n.a.

4.7 DARC settings

Requires "Baseband > Audio FM > FM Modulator > Mode > Stereo" and "Baseband > Audio FM > FM Modulator > DARC" "> On".

Access:

- Select "Baseband > Audio FM > DARC".

The dialog provides **DARC** settings.

Settings:

| | |
|---------------------|----|
| Information..... | 53 |
| Data BIC 1/2/3..... | 53 |

Information

Sets the information type, that is transmitted for DARC operation in line with specification **EN 300 751**.

- | | |
|--------|--|
| "Off" | No information type transmitted. |
| "PRBS" | PRBS data |
| "Data" | Data as specified in "Data BIC 1/2/3". |

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:DARC:INformation` on page 87

Data BIC 1/2/3

Specifies data for block identification codes 1 to 3.

Example:

- "Data BIC 1 = Rohde & Schwarz"
- "Data BIC 2 = Signal Generator"
- "Data BIC 1 = SMCV100B"

Remote command:

`[:SOURce<hw>] :BB:RADio:FM:DARC:BIC<ch>` on page 86


4.8 Special settings

Access:


► Select "Baseband > Audio FM > Special".

| | | | | | | | | |
|---|--------------|----------|----|-----|-------------|------|---------|---|
| Audio FM | FM Modulator | RDS/RBDS | AF | EON | TMC Open F. | DARC | Special | X |
| Special Settings <input type="checkbox"/> | | | | | | | | |
| Pilot <input checked="" type="checkbox"/> | | | | | | | | |
| Phase Offset Pilot 0.0 deg | | | | | | | | |
| Phase Offset RDS 0.0 deg | | | | | | | | |

The tab provides settings, that differ from the specification of the broadcast standard.



Settings different from the broadcast standard can be useful for research and development. Applying these settings requires "Special Settings > On".

If you set a parameter different from the specification, the warning icon  is displayed to the left of the parameter.

Settings:

| | |
|-------------------------|----|
| Special Settings..... | 54 |
| Pilot..... | 54 |
| Phase Offset Pilot..... | 54 |
| Phase Offset RDS..... | 55 |

Special Settings

Enables/disables special settings.

The setting allows you to switch between standard-compliant and user-defined channel coding.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM[:SPECial]:SETTings[:STATe]` on page 88

Pilot

Enables/disables the 19 kHz pilot tone.

Remote command:

`[:SOURCE<hw>] :BB:RADio:FM[:SPECial]:PILot[:STATe]` on page 88

Phase Offset Pilot

Sets the phase offset of the 19 kHz pilot tone.

Applying the phase offset requires "Pilot > On". The offset is applied relative to the suppressed 38 kHz carrier with an accuracy of 0.1 deg.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM[:SPECial]:PILot:PHASe` on page 87

Phase Offset RDS

Sets the phase offset of the suppressed 57 kHz **RDS** carrier.

Applying the phase offset requires "FM Modulator > Modulation > RDS/RBDS > On". The offset is applied relative to the suppressed 38 kHz carrier with an accuracy of 0.1 deg.

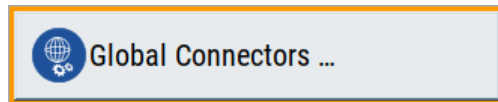
The reference point is the 19 kHz pilot tone with a phase shift setting of 0.0 deg.

Remote command:

`[:SOURce<hw>] :BB:RADio:FM[:SPECial]:RDS:PHASe` on page 88

5 Global connector settings

The "Input Signal" dialog, the "Trigger/Marker/Clock" dialog and "Trigger In", "Marker" and "Clock" tabs in "Baseband > ARB/Custom Digital Mod" configuration dialogs provide quick access to the related connector settings. Click the "Global Connectors" button to access the settings.



See also chapter "Global connector settings" in the user manual.

6 Remote-control commands

The following commands are required to generate signals with the AM/FM/RDS option in a remote environment. We assume that the R&S SMCV100B has already been set up for remote operation in a network as described in the R&S SMCV100B documentation. A knowledge about the remote control operation and the SCPI command syntax are assumed.



Conventions used in SCPI command descriptions

For a description of the conventions used in the remote command descriptions, see section "Remote-Control Commands" in the R&S SMCV100B user manual.

Common suffixes

The following common suffixes are used in the remote commands:

| Suffix | Value range | Description |
|------------|-------------|----------------------------|
| SOURce<hw> | 1 | Available baseband signals |

Programming examples

This description provides simple programming examples. The purpose of the examples is to present **all** commands for a given task. In real applications, one would rather reduce the examples to an appropriate subset of commands.

The programming examples have been tested with a software tool which provides an environment for the development and execution of remote tests. To keep the example as simple as possible, only the "clean" SCPI syntax elements are reported. Non-executable command lines (e.g. comments) start with two // characters.

At the beginning of the most remote control program, an instrument preset/reset is recommended to set the instrument to a definite state. The commands *RST and SYSTem:PRESet are equivalent for this purpose. *CLS also resets the status registers and clears the output buffer.

The following commands specific to the AM/FM/RDS are described here:

| | |
|---|----|
| • Audio AM commands | 58 |
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| • FM RDS general commands | 68 |
| • FM RDS CT/DI commands | 71 |
| • FM RDS AF method commands | 72 |
| • FM RDS EON commands | 75 |
| • FM RDS TMC commands | 79 |
| • FM RDS OPF commands | 81 |
| • DARC commands | 86 |
| • FM special commands | 87 |

6.1 Audio AM commands

- [General commands](#).....58
- [Modulation commands](#).....59

6.1.1 General commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:AM:PRESet | 58 |
| [:SOURce<hw>]:BB:RADio:AM:STATe | 58 |
| [:SOURce<hw>]:BB:RADio:AM:SETTing:CATalog | 58 |
| [:SOURce<hw>]:BB:RADio:AM:SETTing:DELeTe | 59 |
| [:SOURce<hw>]:BB:RADio:AM:SETTing:LOAD | 59 |
| [:SOURce<hw>]:BB:RADio:AM:SETTing:STORe | 59 |

[\[:SOURce<hw>\]:BB:RADio:AM:PRESet](#)

Sets the parameters of the digital standard to their default values (*RST values specified for the commands).

Not affected is the state set with the command

`SOURce<hw>:BB:AM|FM|FM:RDS:STATe`.

Usage: Event

Manual operation: See ["Set To Default"](#) on page 12

[\[:SOURce<hw>\]:BB:RADio:AM:STATe <State>](#)

Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Parameters:

`<State>` 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See ["State"](#) on page 12

[\[:SOURce<hw>\]:BB:RADio:AM:SETTing:CATalog](#)

Queries the files with settings in the default directory. Listed are files with the file extension *.am/fm/rds.

Return values:

`<AmCat>` <filename1>,<filename2>,...
 Returns a string of filenames separated by commas.

Manual operation: See ["Save/Recall"](#) on page 13

[:SOURce<hw>]:BB:RADio:AM:SETTing:DELeTe <AmDel>

Deletes the selected file from the default or the specified directory. Deleted are files with extension *.am/fm/rds.

Setting parameters:

<AmDel> "<filename>"
 Filename or complete file path; file extension can be omitted

Usage: Setting only

Manual operation: See ["Save/Recall"](#) on page 13

[:SOURce<hw>]:BB:RADio:AM:SETTing:LOAD <AmRcl>

Loads the selected file from the default or the specified directory. Loaded are files with extension *.am/fm/rds.

Parameters:

<AmRcl> "<filename>"
 Filename or complete file path; file extension can be omitted

Manual operation: See ["Save/Recall"](#) on page 13

[:SOURce<hw>]:BB:RADio:AM:SETTing:STORe <AmSav>

Saves the current settings into the selected file; the file extension (*.am/fm/rds) is assigned automatically.

Parameters:

<AmSav> "<filename>"
 Filename or complete file path

Manual operation: See ["Save/Recall"](#) on page 13

6.1.2 Modulation commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:AM:APLayer:ATT..... | 59 |
| [:SOURce<hw>]:BB:RADio:AM:APLayer:LIBRary:CATalog..... | 60 |
| [:SOURce<hw>]:BB:RADio:AM:APLayer:LIBRary:SElect..... | 60 |
| [:SOURce<hw>]:BB:RADio:AM:AUDGen:FRQ..... | 60 |
| [:SOURce<hw>]:BB:RADio:AM:AUDGen:LEV..... | 60 |
| [:SOURce<hw>]:BB:RADio:AM:AUDio:AF..... | 61 |
| [:SOURce<hw>]:BB:RADio:AM:DEPT..... | 61 |
| [:SOURce<hw>]:BB:RADio:AM:INPut..... | 61 |
| [:SOURce<hw>]:BB:RADio:AM:MODulation:DEPT..... | 61 |
| [:SOURce<hw>]:BB:RADio:AM:SOURce..... | 62 |

[:SOURce<hw>]:BB:RADio:AM:APLayer:ATT <Attenuation>

Sets the attenuation.

Parameters:

<Attenuation> float
 Range: 0 to 30
 Increment: 0.01
 *RST: 0

Manual operation: See "[Attenuation](#)" on page 16

[:SOURce<hw>]:BB:RADio:AM:APLayer:LIBRARY:CATalog

Queries the files with settings in the default directory. Listed are files with the file extension *.wav and *.wav.

Manual operation: See "[Load File](#)" on page 15

[:SOURce<hw>]:BB:RADio:AM:APLayer:LIBRARY:SElect <SEL>

Selects the audio file. If no file of the specified name exists, an error message is displayed. You can select files with the file extension *.wav and *.wav.

Parameters:

<SEL> string
 Filename or complete file path; file extension can be omitted

Manual operation: See "[Load File](#)" on page 15

[:SOURce<hw>]:BB:RADio:AM:AUDGen:FRQ <Freq>

Sets the frequency.

Parameters:

<Freq> float
 Range: 0.03 to 15
 Increment: 0.001
 *RST: 1
 Default unit: kHz

Manual operation: See "[Frequency](#)" on page 15

[:SOURce<hw>]:BB:RADio:AM:AUDGen:LEV <Level>

Sets the level.

Parameters:

<Level> float
 Range: -60 to 12
 Increment: 0.01
 *RST: 6
 Default unit: dBu

Manual operation: See "[Level](#)" on page 15

[:SOURce<hw>]:BB:RADio:AM:AUDio:AF <Audio>

Enables or disables the audio channel.

Parameters:

<Audio> 1 | ON | 0 | OFF
 *RST: 1

Manual operation: See ["Audio"](#) on page 14

[:SOURce<hw>]:BB:RADio:AM:DEPTh <Depth>

Sets the nominal modulation depth.

Parameters:

<Depth> float
 Range: 0 to 100
 Increment: 0.01
 *RST: 30

Manual operation: See ["Nom. Mod. Depth"](#) on page 17

[:SOURce<hw>]:BB:RADio:AM:INPut <Input>

Sets the audio source for the AM modulator signal.

Parameters:

<Input> EXternal | AGENerator | APLayer | OFF

EXternal

Uses an external audio signal input at the "User 2" connector.
 The audio source is fixed to "Source > S/PDIF", see [\[:SOURce<hw>\]:BB:RADio:AM:SOURce](#) on page 62.

AGENerator

Uses an internal audio generator as the signal source.

APLayer

Uses an audio player file, that is saved to the memory of the R&S SMCV100B.

OFF

Disables the audio source for the AM modulator.

*RST: AGENerator

Manual operation: See ["Input Signal"](#) on page 14

[:SOURce<hw>]:BB:RADio:AM:MODulation:DEPTh?

Displays the modulation depth.

Return values:

<ModDepth> integer
 Range: 0 to 100
 *RST: 30

Usage: Query only

Manual operation: See "Mod. Depth" on page 17

[:SOURce<hw>]:BB:RADio:AM:SOURce <Source>

Queries the audio source.

Parameters:

<Source> SPDif
 S/PDIF is fixed.
 *RST: SPDif

Manual operation: See "Source" on page 16

6.2 Audio FM commands

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6.2.1 General commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:PRESet | 62 |
| [:SOURce<hw>]:BB:RADio:FM:STATe | 63 |
| [:SOURce<hw>]:BB:RADio:FM:SETTing:CATalog | 63 |
| [:SOURce<hw>]:BB:RADio:FM:SETTing:DELeTe | 63 |
| [:SOURce<hw>]:BB:RADio:FM:SETTing:LOAD | 63 |
| [:SOURce<hw>]:BB:RADio:FM:SETTing:STORE | 63 |

[:SOURce<hw>]:BB:RADio:FM:PRESet

Sets the parameters of the digital standard to their default values (*RST values specified for the commands).

Not affected is the state set with the command

SOURce<hw>:BB:AM|FM|FM:RDS:STATe.

Usage: Event

Manual operation: See "Set To Default" on page 19

[:SOURce<hw>]:BB:RADio:FM:STATe <State>

Activates the standard and deactivates all the other digital standards and digital modulation modes in the same path.

Parameters:

<State> 1 | ON | 0 | OFF
*RST: 0

Manual operation: See "[State](#)" on page 18

[:SOURce<hw>]:BB:RADio:FM:SETTing:CATalog <FmCat>

Queries the files with settings in the default directory. Listed are files with the file extension *.am/fm/rds.

Return values:

<FmCat> <filename1>,<filename2>,...
Returns a string of filenames separated by commas.

Manual operation: See "[Save/Recall](#)" on page 19

[:SOURce<hw>]:BB:RADio:FM:SETTing:DELeTe <FMDel>

Deletes the selected file from the default or the specified directory. Deleted are files with extension *.am/fm/rds.

Setting parameters:

<FMDel> "<filename>"
Filename or complete file path; file extension can be omitted

Usage: Setting only

Manual operation: See "[Save/Recall](#)" on page 19

[:SOURce<hw>]:BB:RADio:FM:SETTing:LOAD <FmRcl>

Loads the selected file from the default or the specified directory. Loaded are files with extension *.am/fm/rds.

Parameters:

<FmRcl> "<filename>"
Filename or complete file path; file extension can be omitted

Manual operation: See "[Save/Recall](#)" on page 19

[:SOURce<hw>]:BB:RADio:FM:SETTing:STORe <FmSav>

Saves the current settings into the selected file; the file extension (*.am/fm/rds) is assigned automatically.

Parameters:

<FmSav> "<filename>"
 Filename or complete file path

Manual operation: See ["Save/Recall"](#) on page 19

6.2.2 Modulation commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:APLayer:ATT1 | 64 |
| [:SOURce<hw>]:BB:RADio:FM:APLayer:ATT2 | 64 |
| [:SOURce<hw>]:BB:RADio:FM:APLayer:LIBRary:CATalog | 64 |
| [:SOURce<hw>]:BB:RADio:FM:APLayer:LIBRary:SElect | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDGen:FRQ1 | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDGen:FRQ2 | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDGen:LEV1 | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDGen:LEV2 | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:AF1 | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:AF2 | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:DEViation? | 65 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:MODE | 66 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:NDEViation | 66 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:PREemphasis | 66 |
| [:SOURce<hw>]:BB:RADio:FM:AUDio:SOURce? | 66 |
| [:SOURce<hw>]:BB:RADio:FM:INPut | 67 |
| [:SOURce<hw>]:BB:RADio:FM:MODE | 67 |
| [:SOURce<hw>]:BB:RADio:FM:PILot:DEViation | 68 |

[\[:SOURce<hw>\]:BB:RADio:FM:APLayer:ATT1 <ATTL>](#)

[\[:SOURce<hw>\]:BB:RADio:FM:APLayer:ATT2 <ATTR>](#)

Sets the attenuation.

Parameters:

<ATTR> float
 Range: 0 to 30
 Increment: 0.01
 *RST: 0
 Default unit: dB

Manual operation: See ["Attenuation"](#) on page 22

[\[:SOURce<hw>\]:BB:RADio:FM:APLayer:LIBRary:CATalog](#)

Queries the files with settings in the default directory. Listed are files with the file extension *.wav and *.wav.

Manual operation: See ["Load File"](#) on page 24

[:SOURce<hw>]:BB:RADio:FM:APLayer:LIBRary:SElect <SEL>

Selects the audio file. If no file of the specified name exists, an error message is displayed. You can select files with the file extension *.wav and *.wav.

Parameters:

<SEL> string
 Filename or complete file path; file extension can be omitted

Manual operation: See ["Load File"](#) on page 24

[:SOURce<hw>]:BB:RADio:FM:AUDGen:FRQ1 <FreqL>

[:SOURce<hw>]:BB:RADio:FM:AUDGen:FRQ2 <FreqR>

Sets the frequency.

Parameters:

<FreqR> integer
 Range: 30 to 15000
 *RST: 1000
 Default unit: Hz

Manual operation: See ["Frequency"](#) on page 22

[:SOURce<hw>]:BB:RADio:FM:AUDGen:LEV1 <LevelL>

[:SOURce<hw>]:BB:RADio:FM:AUDGen:LEV2 <LevelR>

Sets the level.

Parameters:

<LevelR> float
 Range: -60 to 12
 Increment: 0.01
 *RST: 6
 Default unit: dBu

Manual operation: See ["Level"](#) on page 22

[:SOURce<hw>]:BB:RADio:FM:AUDio:AF1 <AudioL>

[:SOURce<hw>]:BB:RADio:FM:AUDio:AF2 <AudioR>

Enables or disables the audio channel.

Parameters:

<AudioR> 1 | ON | 0 | OFF
 *RST: 1

Manual operation: See ["Audio"](#) on page 21

[:SOURce<hw>]:BB:RADio:FM:AUDio:DEViation?

Queries the actual frequency deviation.

Return values:

<FreqDevAudio> float
 Range: 0 to 999.99
 Increment: 0.01
 *RST: 0
 Default unit: kHz

Usage: Query only

Manual operation: See "[Freq. Dev. Audio](#)" on page 26

[:SOURce<hw>]:BB:RADio:FM:AUDio:MODE <AFMode>

Sets the relationship of the two audio channels with respect to each other.

Parameters:

<AFMode> LEFT | RIGHT | RELeft | REMLeft | RNELeft
 *RST: LEFT

Manual operation: See "[AF Mode](#)" on page 21

[:SOURce<hw>]:BB:RADio:FM:AUDio:NDEViation <MonFreqDevAudio>

Defines the signal deviation, that is the deviation only caused by the audio signals.

Parameters:

<MonFreqDevAudio> float
 Range: 0 to 100
 Increment: 0.001
 *RST: 40
 Default unit: kHz

Manual operation: See "[Nom. Freq. Dev. Audio](#)" on page 26

[:SOURce<hw>]:BB:RADio:FM:AUDio:PREemphasis <Preemphasis>

Sets the preemphasis factor for the signal to noise ratio improvement.

Parameters:

<Preemphasis> OFF | D50us | D75us
 *RST: D50us

Manual operation: See "[Preemphasis](#)" on page 26

[:SOURce<hw>]:BB:RADio:FM:AUDio:SOURce?

Queries the audio source.

Return values:

<Source> SPDif
[S/PDIF](#) is fixed.
 *RST: SPDif

Usage: Query only

Manual operation: See "[Source](#)" on page 25

[:SOURce<hw>]:BB:RADio:FM:INPut <Input>

Sets the audio source for the FM modulator signal.

Parameters:

<Input> EXTERNAL | AGENerator | APLayer | OFF

EXTERNAL
 Uses an external audio signal input at the "User 2" connector.
 The audio source is fixed to "Source > S/PDIF", see [:
[SOURce<hw>\]:BB:RADio:FM:AUDio:SOURce?](#) on page 66.

AGENerator
 Uses an internal audio generator as the signal source.

APLayer
 Uses an audio player file, that is saved to the memory of the
 R&S SMCV100B.

OFF
 Disables the audio source for the FM modulator.
 *RST: AGENerator

<Input> OFF | APLayer | AGENerator | EXTERNAL
 *RST: AGENerator

Manual operation: See "[Input Signal](#)" on page 20

[:SOURce<hw>]:BB:RADio:FM:MODE <Mode>

Sets the [FM](#) mode.

Parameters:

<Mode> MONO | STEReo

MONO
 Feeds a mono signal to the modulator with band limitation
 15 kHz.

STEReo
 Feeds a stereo signal to the modulator.
 *RST: STEReo

Manual operation: See "[Mode](#)" on page 26

[[:SOURce<hw>]:BB:RADio:FM:PILot:DEVIation <FreqDevPilot>

Defines the resulting 19 kHz frequency deviation of the pilot tone irrespective of the audio signals.

Parameters:

<FreqDevPilot> float
 Range: 0 to 15
 Increment: 0.01
 *RST: 6.75
 Default unit: kHz

Manual operation: See ["Freq. Dev. Pilot"](#) on page 26

6.3 FM RDS general commands

| | |
|--|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:DEVIation | 68 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:GROUp:SEQuence | 68 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:MS | 69 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:PI | 69 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:PS | 69 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:PTY | 69 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:PTYN | 69 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:RT | 70 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TA | 70 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TP[:STATe] | 70 |
| [:SOURce<hw>]:BB:RADio:FM:RDS[:STATe] | 70 |

[[:SOURce<hw>]:BB:RADio:FM:RDS:DEVIation <FreqDevRDS>

Defines the resulting frequency deviation of the radio data system irrespective of the audio signals.

Parameters:

<FreqDevRDS> float
 Range: 0 to 10
 Increment: 0.01
 *RST: 2
 Default unit: kHz

Manual operation: See ["Freq. Dev. RDS"](#) on page 27

[[:SOURce<hw>]:BB:RADio:FM:RDS:GROUp:SEQuence <GroupSequence>**Parameters:**

<GroupSequence> string

Manual operation: See ["Group Sequence"](#) on page 28

[:SOURce<hw>]:BB:RADio:FM:RDS:MS <MS>

Identifies if the transmission contains music or speech.

Parameters:

<MS> MUSic | SPEech
 *RST: MUSic

Manual operation: See "[MS](#)" on page 31

[:SOURce<hw>]:BB:RADio:FM:RDS:PI <PI>

Sets the program identification, that is a 16-bit value in hexadecimal representation.

Parameters:

<PI> integer
 Range: #H0000 to #HFFFF
 *RST: #HFFFF

Manual operation: See "[PI](#)" on page 29

[:SOURce<hw>]:BB:RADio:FM:RDS:PS <PS>

Sets the program service name.

Parameters:

<PS> string
 Up to eight characters in ASCII format, see [Figure A-1](#).
 *RST: "R&S SMCV"

Example: SOURce1:BB:RADio:FM:RDS:PS?
 // Response: "R&S SMCV"

Manual operation: See "[PS](#)" on page 29

[:SOURce<hw>]:BB:RADio:FM:RDS:PTY <PTY>

Sets the program type.

Parameters:

<PTY> integer
 Range: 0 to 31
 *RST: 0

Manual operation: See "[PTY](#)" on page 30

[:SOURce<hw>]:BB:RADio:FM:RDS:PTYN <PTYN>

Sets the program type name.

Parameters:

<PTYN> string
Up to eight characters in ASCII format, see [Figure A-1](#).

Example:

SOURce1:BB:RADio:FM:RDS:PTYN Football
Sets the program type name "Football".

Manual operation: See ["PTYN"](#) on page 30

[:SOURce<hw>]:BB:RADio:FM:RDS:RT <RT>

Sets the radio text.

Parameters:

<RT> string
*RST: "Rohde & Schwarz"
Up to 64 characters in ASCII format, see [Figure A-1](#).

Manual operation: See ["RT"](#) on page 31

[:SOURce<hw>]:BB:RADio:FM:RDS:TA <TA>

Enables/disables the traffic announcement flag.

Parameters:

<TA> 1 | ON | 0 | OFF
*RST: 0

Manual operation: See ["TA"](#) on page 30

[:SOURce<hw>]:BB:RADio:FM:RDS:TP[:STATe] <TP>

Enable/disables the traffic program flag.

Parameters:

<TP> 1 | ON | 0 | OFF
*RST: 0

Manual operation: See ["TP"](#) on page 30

[:SOURce<hw>]:BB:RADio:FM:RDS[:STATe] <RDSSState>

Enables/disables [RDS/RBDS](#).

Parameters:

<RDSSState> 1 | ON | 0 | OFF
*RST: 1

Manual operation: See ["RDS/RBDS"](#) on page 27

6.4 FM RDS CT/DI commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:CT | 71 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:CTOffset | 71 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:DI:ARTificial | 71 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:DI:COMPressed | 71 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:DI:DYNamic | 72 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:DI:STEReo | 72 |

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:CT](#) <CT>

Enables/disables the clock time and date information.

Parameters:

<CT> 1 | ON | 0 | OFF
*RST: 0

Manual operation: See ["CT"](#) on page 33

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:CTOffset](#) <CtOffset>

Sets the clock time offset.

Parameters:

<CtOffset> string
Range: 00:00 to 99:59
Increment: 00:01
*RST: 00:00

Example: `SOURce1:BB:RADio:FM:RDS:CTOffset 01:23:45`
Sets a time offset of 1 hour, 23 minutes and 45 seconds to the [CT](#).

Manual operation: See ["CT Offset"](#) on page 33

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:DI:ARTificial](#) <DiArtificial>

Enables/disables "artificial head" decoder identification.

Parameters:

<DiArtificial> 1 | ON | 0 | OFF
*RST: 0

Manual operation: See ["DI Art. Head"](#) on page 33

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:DI:COMPressed](#) <DiCompressed>

Enables/disables compressed decoder identification.

Parameters:

<DiCompressed> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See ["DI Compressed"](#) on page 32

[:SOURce<hw>]:BB:RADio:FM:RDS:DI:DYNamic <DiDynamic>

Enables/disables dynamic [PTY](#) decoder identification.

Parameters:

<DiDynamic> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See ["DI Dynamic PTY"](#) on page 32

[:SOURce<hw>]:BB:RADio:FM:RDS:DI:STEReo <DiStereo>

Enables/disables stereo decoder identification.

Parameters:

<DiStereo> 1 | ON | 0 | OFF
ON
 Stereo transmission
OFF
 Mono transmission
 *RST: 0

Manual operation: See ["DI Stereo"](#) on page 33

6.5 FM RDS AF method commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:METHod | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:A:FREQuency<ch>? | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:A:NUMBer | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:DESC<ch> | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:DESC<ch> | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:DESC<ch> | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:DESC<ch> | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:DESC<ch> | 73 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:FREQuency<ch> | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:FREQuency<ch> | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:FREQuency<ch> | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:FREQuency<ch> | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:FREQuency<ch>? | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:NUMBer | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:NUMBer | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:NUMBer | 74 |

| | |
|--|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:NUMBer..... | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:NUMBer..... | 74 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:TFRequency..... | 75 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:TFRequency..... | 75 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:TFRequency..... | 75 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:TFRequency..... | 75 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:TFRequency..... | 75 |

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:METHod <AFMethod>](#)

Parameters:

<AFMethod> B | A
 *RST: A

Manual operation: See "[AF Method](#)" on page 34

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:A:FREQuency<ch>? <AFFreqA>](#)

Sets the alternative frequencies in AF method A.

Suffix:

<ch> 1 to 25
 Selects the alternative frequency.

Parameters:

<AFFreqA> float
 Range: 87.6 to 107.9
 Increment: 0.1
 *RST: MHz

Manual operation: See "[Frequency](#)" on page 37

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:A:NUMBer <AFNumFreqA>](#)

Defines the number of alternative frequencies.

Parameters:

<AFNumFreqA> integer
 Range: 0 to 25
 *RST: 0

Manual operation: See "[Num. of Frequencies](#)" on page 36

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:B:LIST1:DESC<ch> <AfList1Order>](#)
[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:B:LIST2:DESC<ch> <AfList2Order>](#)
[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:B:LIST3:DESC<ch> <AfList3Order>](#)
[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:B:LIST4:DESC<ch> <AfList4Order>](#)
[\[:SOURce<hw>\]:BB:RADio:FM:RDS:AF:B:LIST5:DESC<ch> <AfList5Order>](#)

Sets the frequency order of the corresponding [AF](#) number of the selected list.

Suffix:

LIST<ch> 1 to 5
Select the list.

DESC<ch> 1 to 12
Selects the [AF](#) number.

Parameters:

<AfList5Order> ASC | DESC

ASC

Ascending order, the same program is carried.

DESC

Descending order, the alternative frequency points to a program that has regional variants.

*RST: ASC

Manual operation: See "[Order](#)" on page 38

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:FREQUency<ch> <AfList1Freq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:FREQUency<ch> <AfList2Freq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:FREQUency<ch> <AfList3Freq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:FREQUency<ch> <AfList4Freq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:FREQUency<ch>? <AfList5Freq>
```

Sets an alternative frequency of a list in AF method B.

Suffix:

LIST<ch> 1 to 5
Select the list.

FREQUency<ch> 1 to 12
Selects the [AF](#) number.

Parameters:

<AfList5Freq> float
Range: 87.6 to 107.9
Increment: 0.1
*RST: 87.6
Default unit: MHz

Manual operation: See "[Frequency](#)" on page 38

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:NUMBer <AfBList1NoFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:NUMBer <AfBList2NoFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:NUMBer <AfBList3NoFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:NUMBer <AfBList4NoFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:NUMBer <AfBList5NoFreq>
```

Sets the number of frequencies of a list in AF method B.

Suffix:

LIST<ch> 1 to 5
Select the list.

Parameters:

<AfBList5NoFreq> integer
Range: 0 to 12
*RST: 0

Manual operation: See ["Num. of Frequencies"](#) on page 37

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST1:TFRequency <AfList1TunFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST2:TFRequency <AfList2TunFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST3:TFRequency <AfList3TunFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST4:TFRequency <AfList4TunFreq>
[:SOURce<hw>]:BB:RADio:FM:RDS:AF:B:LIST5:TFRequency <AfList5TunFreq>
```

Sets the tuning frequency of a list in AF method B.

Suffix:

LIST<ch> 1 to 5
Selects the list.

Parameters:

<AfList5TunFreq> float
Range: 87.6 to 107.9
Increment: 0.1
*RST: 87.6
Default unit: MHz

Manual operation: See ["Tuning Frequency"](#) on page 38

6.6 FM RDS EON commands

- [General commands](#).....75
- [Method commands](#).....78

6.6.1 General commands

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:EON:EG.....76
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:ILS.....76
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:LA.....76
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:LSN.....76
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PI.....76
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PIN.....77
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PS.....77
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PTY.....77
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:Ta.....77
[:SOURce<hw>]:BB:RADio:FM:RDS:EON:TP.....78
```

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:EG <EonEG>

Enables the enhanced other network extended generic indicator.

Parameters:

<EonEG> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See "EON EG" on page 41

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:ILS <EonILS>

Enables the enhanced other network international linkage set indicator.

Parameters:

<EonILS> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See "EON ILS" on page 41

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:LA <EonLA>

Enables the enhanced other network linkage actuator.

Parameters:

<EonLA> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See "EON LA" on page 41

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:LSN <EonLSN>

Sets the enhanced other network linkage set number.

The LSN comprises a 12-bit value in decimal representation.

Parameters:

<EonLSN> integer
 Range: 0 to 4095
 *RST: 0

Manual operation: See "EON LSN" on page 42

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PI <EonPI>

Sets the enhanced other network program identification.

Parameters:

<EonPI> integer
 Range: 0 to 65535
 *RST: 65535

Example: `SOURce1:BB:RADio:FM:RDS:EON:PI 53539`
Sets an **EON PI** of 0xD123 in hexadecimal representation.

Manual operation: See "**EON PI**" on page 40

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PIN <EonPIN>

Sets the enhanced other network program item number.

Parameters:

<EonPIN> integer
Range: 0 to 65535
*RST: 0

Example: `SOURce1:BB:RADio:FM:RDS:EON:PIN 2688`
Sets an EON PIN to to day = 1, hour = 10, minute = 0.

Manual operation: See "**EON PIN**" on page 42

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PS <EonPS>

Sets the enhanced other network program service name.

Parameters:

<EonPS> string
*RST: "Program1"

Manual operation: See "**EON PS**" on page 40

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:PTY <EonPTY>

Sets the enhanced other network program type.

Parameters:

<EonPTY> integer
Range: 0 to 31
*RST: 0

Manual operation: See "**EON PTY**" on page 42

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:Ta <EonTA>

Enables the enhanced other network traffic announcement.

Parameters:

<EonTA> 1 | ON | 0 | OFF
*RST: 0

Manual operation: See "**EON TA**" on page 40

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:TP <EonTP>

Enables the enhanced other network traffic program.

Parameters:

<EonTP> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See "EON TP" on page 40

6.6.2 Method commands

| | |
|--|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:A:FREQuency<ch>..... | 78 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:A:NUMBer..... | 78 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:B:FREQuency<ch>..... | 78 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:B:NUMBer..... | 79 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:B:TFRQuency..... | 79 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:METHod..... | 79 |

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:A:FREQuency<ch> <EonAFAFreq>

Sets the alternative frequencies in EON, AF method A.

Suffix:

<ch> 1 to 25
 Selects the alternative frequency.

Parameters:

<EonAFAFreq> float
 Range: 87.6 to 107.9
 Increment: 0.1
 *RST: 87.6
 Default unit: MHz

Manual operation: See "Frequency" on page 45
 See "Frequency" on page 45

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:A:NUMBer <EonAFANumFreq>

Defines the number of alternative frequencies.

Parameters:

<EonAFANumFreq> integer
 Range: 0 to 25
 *RST: 0

Manual operation: See "Num. of Frequencies" on page 44

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:B:FREQuency<ch> <EonAFBFreq>

Sets the alternative frequencies in EON for AF mapped frequencies method.

Suffix:

<ch> 1 to 25
Selects the alternative frequency.

Parameters:

<EonAFBFreq> float
Range: 87.6 to 107.9
Increment: 0.1
*RST: 87.6
Default unit: MHz

Manual operation: See ["Num. of Frequencies"](#) on page 45

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:B:NUMBer <EonAFBNumFreq>

Parameters:

<EonAFBNumFreq> integer
Range: 0 to 4
*RST: 0

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:B:TFRrequency <EonAFTFreq>

Sets the tuning frequency of [EON](#) in AF mapped frequencies method.

Parameters:

<EonAFTFreq> float
Range: 87.6 to 107.9
Increment: 0.1
*RST: 87.6
Default unit: MHz

Manual operation: See ["Tuning Frequency"](#) on page 45

[:SOURce<hw>]:BB:RADio:FM:RDS:EON:AF:METHod <EonAFMethod>

Parameters:

<EonAFMethod> MAPF | A
*RST: A

Manual operation: See ["EON AF Method"](#) on page 43

6.7 FM RDS TMC commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:APPLY | 80 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G3A:VAR<ch> | 80 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK2 | 80 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK3a | 80 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK4 | 81 |

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A:NUMBer..... | 81 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC:READy?..... | 81 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:TMC[:STATe]..... | 81 |

`[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:APPLy`

Parameters:

`<TMCAppl>` select
 *RST: 0

Manual operation: See ["Apply"](#) on page 50

`[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G3A:VAR<ch> <G3AVar>`

Sets the traffic message channel 3A group variants.

Suffix:

`<ch>` 1 to 2
 Selects the group type variant.

Parameters:

`<G3AVar>` integer
 Range: 0 to 65535
 *RST: 0

Manual operation: See ["Block 3 table"](#) on page 47

`[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK2 <G8ABlk2>`

Parameters:

`<G8ABlk2>` integer
 Range: 0 to 31
 *RST: 0

Manual operation: See ["Block 2 | Block 3 | Block 4"](#) on page 48

`[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK3a <GA8Blk3>`

Parameters:

`<GA8Blk3>` integer
 Range: 0 to 65535
 *RST: 0

Manual operation: See ["Block 2 | Block 3 | Block 4"](#) on page 48

[[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A<ch>:BLOCK4 <G8ABlk4>

Parameters:

<G8ABlk4> integer
 Range: 0 to 65535
 *RST: 0

Manual operation: See "[Block 2](#) | [Block 3](#) | [Block 4](#)" on page 48

[[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:G8A:NUMBER <G8ANo>

Defines the number of [TMC](#) A8 groups.

Parameters:

<G8ANo> integer
 Range: 1 to 6
 *RST: 1

Manual operation: See "[Num. of 8A Groups \(Hex\)](#)" on page 48

[[:SOURce<hw>]:BB:RADio:FM:RDS:TMC:READY?

Return values:

<TMCReady> 1 | ON | 0 | OFF
 *RST: 0

Usage: Query only

Manual operation: See "[Apply](#)" on page 50

[[:SOURce<hw>]:BB:RADio:FM:RDS:TMC[:STATe] <TMCState>

Enables the traffic message channel.

Parameters:

<TMCState> 1 | ON | 0 | OFF
 *RST: 0

Manual operation: See "[TMC](#)" on page 47

6.8 FM RDS OPF commands

| | |
|--|----|
| • General commands | 82 |
| • Block 2 commands | 82 |
| • Block 3 commands | 83 |
| • Block 4 commands | 85 |

6.8.1 General commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF[:STATe] | 82 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:APPLy | 82 |

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:OPF\[:STATe\]](#) <OpenFormatState>

Enables the open format.

Parameters:

<OpenFormatState> 1 | ON | 0 | OFF

*RST: 0

Manual operation: See ["Open Format"](#) on page 51

[\[:SOURce<hw>\]:BB:RADio:FM:RDS:OPF:APPLy](#)

Triggers transmission of open format data.

Manual operation: See ["Apply"](#) on page 52

6.8.2 Block 2 commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:GA:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G15A:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G4B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G10B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12B:BLOCK2 | 83 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13B:BLOCK2 | 83 |

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:GA:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13A:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G15A:BLOCK2 <OFG1ABlk2>
```

Sets block 2 of the open format group types A.

Parameters:

```
<OFG1ABlk2>      integer
                  Range:    0 to 31
                  *RST:     0
```

Manual operation: See "[Block 2](#) | [Block 3](#) | [Block 4](#)" on page 52

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G4B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G10B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12B:BLOCK2 <OFG1ABlk2>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13B:BLOCK2 <OFG1ABlk2>
```

Sets block 2 of the open format group types B.

Parameters:

```
<OFG1ABlk2>      integer
                  Range:    0 to 31
                  *RST:     0
```

Manual operation: See "[Block 2](#) | [Block 3](#) | [Block 4](#)" on page 52

6.8.3 Block 3 commands

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:GA:BLOCK3.....84
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1A:BLOCK3.....84
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3A:BLOCK3.....84
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5A:BLOCK3.....84
```

| | |
|--|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G15A:BLOCK3 | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G4B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8B:BLOCK3? | 84 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9B:BLOCK3? | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G10B:BLOCK3? | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11B:BLOCK3? | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12B:BLOCK3? | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13B:BLOCK3? | 85 |

```

[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:GA:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13A:BLOCK3 <OpenFormatBlk3>
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G15A:BLOCK3 <OpenFormatBlk3>

```

Sets block 3 of the open format group types A.

Parameters:

```

<OpenFormatBlk3> integer
                    Range:    0 to 65535
                    *RST:    0

```

Manual operation: See ["Block 2 | Block 3 | Block 4"](#) on page 52

```

[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1B:BLOCK3?
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3B:BLOCK3?
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G4B:BLOCK3?
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5B:BLOCK3?
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6B:BLOCK3?
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7B:BLOCK3?
[:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8B:BLOCK3?

```

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9B:BLOCK3?
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G10B:BLOCK3?
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11B:BLOCK3?
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12B:BLOCK3?
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13B:BLOCK3?
```

Sets block 3 of the open format group types B.

Return values:

```
<OpenFormatBlk3> integer
Range:           0 to 65535
*RST:            0
```

Usage: Query only

Manual operation: See "Block 2 | Block 3 | Block 4" on page 52

6.8.4 Block 4 commands

| | |
|---|----|
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:GA:BLOCK4..... | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1A:BLOCK4..... | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3A:BLOCK4..... | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5A:BLOCK4..... | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6A:BLOCK4..... | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7A:BLOCK4..... | 85 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8A:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9A:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11A:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12A:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13A:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G15A:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G4B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G10B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12B:BLOCK4..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13B:BLOCK4..... | 86 |

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:GA:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7A:BLOCK4 <OpenFormatBlk4>
```

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13A:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G15A:BLOCK4 <OpenFormatBlk4>
```

Sets block 4 of the open format group types A.

Parameters:

```
<OpenFormatBlk4>  integer
                    Range:    0 to 65535
                    *RST:    0
```

Manual operation: See "[Block 2](#) | [Block 3](#) | [Block 4](#)" on page 52

```
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G1B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G3B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G4B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G5B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G6B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G7B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G8B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G9B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G10B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G11B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G12B:BLOCK4 <OpenFormatBlk4>
[ :SOURce<hw>]:BB:RADio:FM:RDS:OPF:G13B:BLOCK4 <OpenFormatBlk4>
```

Sets block 4 of the open format group types B.

Parameters:

```
<OpenFormatBlk4>  integer
                    Range:    0 to 65535
                    *RST:    0
```

Manual operation: See "[Block 2](#) | [Block 3](#) | [Block 4](#)" on page 52

6.9 DARC commands

| | |
|--|----|
| [:SOURce<hw>]:BB:RADio:FM:DARC:BIC<ch>..... | 86 |
| [:SOURce<hw>]:BB:RADio:FM:DARC:DEViAtion..... | 87 |
| [:SOURce<hw>]:BB:RADio:FM:DARC:INFormation..... | 87 |
| [:SOURce<hw>]:BB:RADio:FM:DARC[:STATe]..... | 87 |

```
[ :SOURce<hw>]:BB:RADio:FM:DARC:BIC<ch> <DarcBIC>
```

Specifies data for block identification codes 1 to 3.

Suffix:

<ch> BIC 1 to 3

Parameters:

<DarcBIC> string

Manual operation: See "Data BIC 1/2/3" on page 53**[:SOURce<hw>]:BB:RADio:FM:DARC:DEVIation <FreqDevDarc>****Parameters:**

<FreqDevDarc> float
 Range: 0 to 10
 Increment: 0.01
 *RST: 7.50

Manual operation: See "Freq. Dev. DARC" on page 27**[:SOURce<hw>]:BB:RADio:FM:DARC:INFormation <DarcInf>****Parameters:**

<DarcInf> OFF | PRBS | DATA
 *RST: OFF

Manual operation: See "Information" on page 53**[:SOURce<hw>]:BB:RADio:FM:DARC[:STATe] <Darc>****Parameters:**

<Darc> 1 | ON | 0 | OFF
 *RST: 1

Manual operation: See "DARC" on page 27

6.10 FM special commands

| | |
|--|----|
| [:SOURce<hw>]:BB:RADio:FM[:SPECial]:PILot:PHASe..... | 87 |
| [:SOURce<hw>]:BB:RADio:FM[:SPECial]:PILot[:STATe]..... | 88 |
| [:SOURce<hw>]:BB:RADio:FM[:SPECial]:SETTings[:STATe]..... | 88 |
| [:SOURce<hw>]:BB:RADio:FM[:SPECial]:RDS:PHASe..... | 88 |

[:SOURce<hw>]:BB:RADio:FM[:SPECial]:PILot:PHASe <OffsetPilot>

Sets the phase offset of the 19 kHz pilot tone.

Parameters:

<OffsetPilot> float
 Range: -180 to 180
 Increment: 0.1
 *RST: 0

Manual operation: See ["Phase Offset Pilot"](#) on page 54

[:SOURce<hw>]:BB:RADio:FM[:SPECial]:PILot[:STATe] <Pilot>

Enables/disables the 19 kHz pilot tone.

Parameters:

<Pilot> 1 | ON | 0 | OFF
 *RST: 1

Manual operation: See ["Pilot"](#) on page 54

[:SOURce<hw>]:BB:RADio:FM[:SPECial]:SETTings[:STATe] <SpecialSettings>

Enables/disables special settings.

The setting allows you to switch between standard-compliant and user-defined channel coding.

Parameters:

<SpecialSettings> 1 | ON | 0 | OFF
 *RST: n.a. (no preset. default: 0)

Manual operation: See ["Special Settings"](#) on page 54

[:SOURce<hw>]:BB:RADio:FM[:SPECial]:RDS:PHASe <OffsetRDS>

Sets the phase offset of the suppressed 57 kHz [RDS](#) carrier.

Parameters:

<OffsetRDS> float
 Range: -180 to 180
 Increment: 0.1
 *RST: 0

Manual operation: See ["Phase Offset RDS"](#) on page 55

Annex

A RDS data entry information

Some FM signal parameters require specific data entries. This chapter provides the necessary information.

- To define names, e.g. of a **PS**, or to enter an **RT**, use the character set as in [Figure A-1](#).
- For RDS/RBDS, program type codes and their associated names are listed in the following tables: [Table A-1](#), [Table A-2](#)
- For RDS and RBDS, the frequency coding for alternative frequencies is listed in the following tables: [Table A-3](#), [Table A-4](#)

| | | | | | | | | | | | | | | | | | | |
|----|----|----|----|----|-------|---|---|---|---|---|----|----|----|---|---|---|---|---|
| | | | | b7 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | |
| | | | | b6 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | |
| | | | | b5 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | |
| | | | | b4 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | |
| b3 | b2 | b1 | b0 | 2 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 0 | 0 | 0 | 0 | 0 | SPACE | 0 | @ | P | | p | á | â | ª | º | À | Á | Â | ã |
| 0 | 0 | 0 | 1 | 1 | ! | 1 | A | Q | a | q | à | ä | α | ´ | Ä | Å | Ä | å |
| 0 | 0 | 1 | 0 | 2 | " | 2 | B | R | b | r | é | ê | © | ´ | Ê | Ë | Æ | æ |
| 0 | 0 | 1 | 1 | 3 | # | 3 | C | S | c | s | è | ë | % | ´ | Ê | Ë | œ | œ |
| 0 | 1 | 0 | 0 | 4 | ¤ | 4 | D | T | d | t | í | î | £ | ± | Í | Î | ÿ | ÿ |
| 0 | 1 | 0 | 1 | 5 | % | 5 | E | U | e | u | ì | ï | ě | £ | Í | Î | Ý | ý |
| 0 | 1 | 1 | 0 | 6 | & | 6 | F | V | f | v | ó | ô | ñ | ñ | Ó | Ô | Õ | ö |
| 0 | 1 | 1 | 1 | 7 | ' | 7 | G | W | g | w | ò | õ | õ | û | Ô | Õ | Ø | ø |
| 1 | 0 | 0 | 0 | 8 | (| 8 | H | X | h | x | ù | û | π | μ | Ú | Û | þ | þ |
| 1 | 0 | 0 | 1 | 9 |) | 9 | I | Y | i | y | ú | ü | € | ç | Ü | Ü | Ð | ñ |
| 1 | 0 | 1 | 0 | A | * | : | J | Z | j | z | N | ñ | £ | ÷ | Ř | ř | Ř | ř |
| 1 | 0 | 1 | 1 | B | + | ; | K | [| k | { | Ç | ç | \$ | ° | Č | č | C | č |
| 1 | 1 | 0 | 0 | C | , | < | L | \ | l | | Š | š | ← | ¼ | S | š | S | š |
| 1 | 1 | 0 | 1 | D | - | = | M |] | m | } | ß | ğ | ↑ | ½ | Z | ž | Z | ž |
| 1 | 1 | 1 | 0 | E | . | > | N | — | n | — | ı | ı | → | ¾ | Đ | đ | Đ | đ |
| 1 | 1 | 1 | 1 | F | / | ? | O | _ | o | _ | IJ | ij | ↓ | § | Ł | ł | Ł | ł |

Figure A-1: Character sets for names

Table A-1: Program type codes for RDS

| No. | Code | Program type | 8-character display | 16-character display |
|-----|-------|----------------------|---------------------|----------------------|
| 0 | 00000 | No type or undefined | None | None |
| 1 | 00001 | News | News | News |
| 2 | 00010 | Current affairs | Affairs | Current Affairs |
| 3 | 00011 | Information | Info | Information |
| 4 | 00100 | Sport | Sport | Sport |
| 5 | 00101 | Education | Educate | Education |
| 6 | 00110 | Drama | Drama | Drama |
| 7 | 00111 | Culture | Culture | Cultures |

| No. | Code | Program type | 8-character display | 16-character display |
|-----|-------|----------------------|---------------------|----------------------|
| 8 | 01000 | Science | Science | Science |
| 9 | 01001 | Varied | Varied | Varied Speech |
| 10 | 01010 | Pop music | Pop M | Pop Music |
| 11 | 01011 | Rock music | Rock M | Rock Music |
| 12 | 01100 | Easy listening music | Easy M | Easy Listening |
| 13 | 01101 | Light classical | Light M | Light Classics M |
| 14 | 01110 | Serious classical | Classics | Serious Classics |
| 15 | 01111 | Other music | Other M | Other Music |
| 16 | 10000 | Weather | Weather | Weather & Metr |
| 17 | 10001 | Finance | Finance | Finance |
| 18 | 10010 | Children's programs | Children | Children's Progs |
| 19 | 10011 | Social affairs | Social | Social Affairs |
| 20 | 10100 | Religion | Religion | Religion |
| 21 | 10101 | Phone in | Phone In | Phone In |
| 22 | 10110 | Travel | Travel | Travel & Touring |
| 23 | 10111 | Leisure | Leisure | Leisure & Hobby |
| 24 | 11000 | Jazz music | Jazz | Jazz Music |
| 25 | 11001 | Country music | Country | Country Music |
| 26 | 11010 | National music | National M | National Music |
| 27 | 11011 | Oldies music | Oldies | Oldies Music |
| 28 | 11100 | Folk music | Folk M | Folk Music |
| 29 | 11101 | Documentary | Document | Documentary |
| 30 | 11110 | Alarm test | TEST | Alarm Test |
| 31 | 11111 | Alarm | Alarm ! | Alarm - Alarm ! |

Table A-2: Program type codes for RBDS

| No. | Code | Program type | 8-character display | 16-character display |
|-----|------|----------------------|---------------------|----------------------|
| 0 | 0 | No type or undefined | None | None |
| 1 | 1 | News | News | News |
| 2 | 10 | Information | Inform | Information |
| 3 | 11 | Sports | Sports | Sports |
| 4 | 100 | Talk | Talk | Talk |
| 5 | 101 | Rock | Rock | Rock |
| 6 | 110 | Classic rock | Cls_Rock | Classic_Rock |

| No. | Code | Program type | 8-character display | 16-character display |
|-------|----------------|-----------------------|---------------------|----------------------|
| 7 | 111 | Adult hits | Adlt_Hit | Adult_Hits |
| 8 | 1000 | Soft rock | Soft_Rck | Soft_Rock |
| 9 | 1001 | Top 40 | Top_40 | Top_40 |
| 10 | 1010 | Country | Country | Country |
| 11 | 1011 | Oldies | Oldies | Oldies |
| 12 | 1100 | Soft | Soft | Soft |
| 13 | 1101 | Nostalgia | Nostalgia | Nostalgia |
| 14 | 1110 | Jazz | Jazz | Jazz |
| 15 | 1111 | Classical | Classicl | Classical |
| 16 | 10000 | Rhythm and blues | R_&_B | Rhythm_and_Blues |
| 17 | 10001 | Soft rhythm and blues | Soft_R&B | Soft_R_&_B |
| 18 | 10010 | Foreign language | Language | Foreign_Language |
| 19 | 10011 | Religious music | Rel_Music | Religious_Music |
| 20 | 10100 | Religious talk | Rel_Talk | Religious_Talk |
| 21 | 10101 | Personality | Persnlty | Personality |
| 22 | 10110 | Public | Public | Public |
| 23 | 10111 | College | College | College |
| 24-28 | 11000 to 11100 | Unassigned | | |
| 29 | 11101 | Weather | Weather | Weather |
| 30 | 11110 | Emergency test | Test | Emergency_Test |
| 31 | 11111 | Emergency | ALERT ! | ALERT!_ALERT! |

Table A-3: VHF code table

| Number | Binary code | Carrier frequency |
|--------|-------------|-------------------|
| 0 | 0000 0000 | Not to be used |
| 1 | 0000 0001 | 87.6 MHz |
| 2 | 0000 0010 | 87.7 MHz |
| : | : | : |
| 204 | 1100 1100 | 107.9 MHz |

Table A-4: Special meanings code table

| Number | Binary code | Special meaning |
|--------|-------------|-----------------|
| 0 | 0000 0000 | Not to be used |
| 205 | 1100 1101 | Filler code |

| Number | Binary code | Special meaning |
|--------|-------------|----------------------------|
| 206 | 1100 1110 | Not assigned |
| : | : | : |
| 223 | 1101 1111 | Not assigned |
| 224 | 1110 0000 | No AF exists |
| 225 | 1110 0001 | 1 AF follows |
| : | : | : |
| 249 | 1111 1001 | 25 AFs follow |
| 250 | 1111 1010 | An LF/MF frequency follows |
| 251 | 1111 1011 | Not assigned |
| : | : | : |
| 255 | 1111 1111 | Not assigned |

Glossary: Abbreviations

A

AF: Alternative Frequencies list

AM: Amplitude Modulation

B

BIC: Block Identification Code

C

CI: Country Identifier

CT: Clock Time and date

D

DARC: Data Radio Channel
See [EN 300 751](#).

DI: Decoder Identification

E

EG: Extended Generic indicator

EON: Enhanced Other Networks information

F

FM: Frequency Modulation

I

ILS: International Linkage Set

L

LA: Linkage Actuator

LI: Linkage Identifier

LSN: Linkage Set Number

LW: Long Wave

M

MS: Music Speech switch

MW: Medium Wave

O

ODA: Open Data Applications

P

PI: Program Identification

PIN: Program Item Number

PRBS: Pseudo-Random Bit Sequence

PS: Program Service name

PTY: Program Type

PTYI: Dynamic Program Type Indicator

PTYN: Program Type Name

R

RBDS: Radio Broadcast Data System

RDS: Radio Data System

RT: Radio Text

S

S/PDIF: Sony/Philips Digital Interface

SNR: Signal to Noise Ratio

T

TA: Traffic Announcement flag

TMC: Traffic Message Channel

TP: Traffic Program flag

Glossary: Specifications

E

EN 300 751: Radio broadcasting systems; Data Radio Channel (DARC); System for wireless infotainment forwarding and teledistribution
https://www.etsi.org/deliver/etsi_en/300700_300799/300751/

EN 62106: Specification of the radio data system (RDS) for VHF/FM sound broadcasting in the frequency range from 87,5 to 108,0 MHz

EN ISO 14819-1: Intelligent transport systems — Traffic and travel information messages via traffic message coding — Part 1: Coding protocol for Radio Data System — Traffic Message Channel (RDS-TMC) using ALERT-C

List of commands

| | |
|--|----|
| [SOURce<hw>]:BB:RADio:AM:APLayer:ATT..... | 59 |
| [SOURce<hw>]:BB:RADio:AM:APLayer:LIBRARY:CATalog..... | 60 |
| [SOURce<hw>]:BB:RADio:AM:APLayer:LIBRARY:SElect..... | 60 |
| [SOURce<hw>]:BB:RADio:AM:AUDGen:FRQ..... | 60 |
| [SOURce<hw>]:BB:RADio:AM:AUDGen:LEV..... | 60 |
| [SOURce<hw>]:BB:RADio:AM:AUDio:AF..... | 61 |
| [SOURce<hw>]:BB:RADio:AM:DEPTh..... | 61 |
| [SOURce<hw>]:BB:RADio:AM:INPut..... | 61 |
| [SOURce<hw>]:BB:RADio:AM:MODulation:DEPTh?..... | 61 |
| [SOURce<hw>]:BB:RADio:AM:PRESet..... | 58 |
| [SOURce<hw>]:BB:RADio:AM:SETTing:CATalog..... | 58 |
| [SOURce<hw>]:BB:RADio:AM:SETTing:DElete..... | 59 |
| [SOURce<hw>]:BB:RADio:AM:SETTing:LOAD..... | 59 |
| [SOURce<hw>]:BB:RADio:AM:SETTing:STORe..... | 59 |
| [SOURce<hw>]:BB:RADio:AM:SOURce..... | 62 |
| [SOURce<hw>]:BB:RADio:AM:STATe..... | 58 |
| [SOURce<hw>]:BB:RADio:FM:APLayer:ATT1..... | 64 |
| [SOURce<hw>]:BB:RADio:FM:APLayer:ATT2..... | 64 |
| [SOURce<hw>]:BB:RADio:FM:APLayer:LIBRARY:CATalog..... | 64 |
| [SOURce<hw>]:BB:RADio:FM:APLayer:LIBRARY:SElect..... | 65 |
| [SOURce<hw>]:BB:RADio:FM:AUDGen:FRQ1..... | 65 |
| [SOURce<hw>]:BB:RADio:FM:AUDGen:FRQ2..... | 65 |
| [SOURce<hw>]:BB:RADio:FM:AUDGen:LEV1..... | 65 |
| [SOURce<hw>]:BB:RADio:FM:AUDGen:LEV2..... | 65 |
| [SOURce<hw>]:BB:RADio:FM:AUDio:AF1..... | 65 |
| [SOURce<hw>]:BB:RADio:FM:AUDio:AF2..... | 65 |
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