Remote Emulation with the R&S®SGT100A SGMA Vector RF Source
Application Note

Products:

| R&S®SGT100A

The R&S®SGT100A SGMA Vector RF Source offers a remote emulation feature that makes it possible to control the instrument by commands other than the built-in native SCPI commands. This feature allows the user to replace signal generators, e.g. from other manufacturers, with the R&S®SGT100A without having to change the remote control code.

This application note describes how to use the remote emulation feature in general. Furthermore, it describes in detail the remote emulation for each supported instrument, limitations of the individual emulations and the remaining differences between the emulated and the original commands.

ROHDE&SCHWARZ

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1 Abbreviations

The following abbreviations are used in this application note:

- SGT   R&S®SGT100A SGMA Vector RF Source from Rohde & Schwarz
- SMATE   R&S®SMATE200A Vector Signal Generator from Rohde & Schwarz

2 Overview

Measuring instruments used in commercial test systems for applications such as testing of mobile radio base stations typically have a much longer lifespan than the test system itself. Some five to seven years of usage is normal prior to replacement. On the other hand, test systems for use in aerospace & defense applications can have a typical lifespan of 25 years or even more. If standard measuring instruments with a lifespan that is significantly less than this time frame are used in such test systems, an obvious question is how to handle maintenance, repair, calibration and even replacement of the instruments that are no longer supported by their manufacturer. Moreover, the test program sets used in such test systems are generally certified, which makes it very time-consuming and costly to modify and reaccept them.

A feasible strategy to solve this problem is the migration with new measuring instruments that emulate the discontinued instruments.

This migration approach is saves time and is cost-effective. It involves replacing obsolete measuring instruments with new ones that emulate their functionality and programming.

The requirements for the new instruments revolve around the electrical and functional features of the instruments to be emulated as well as the test programs, which ideally should not require any modifications.

To fulfill the last requirement, the SGT offers the remote emulation feature.

Remote emulation means that the SGT will understand the programming commands of the emulated instrument and also emulate the behavior as fully as possible.

Most instruments from other manufacturers in the category of the SGT are emulated by the SGT. An overview of actually implemented remote emulations is given in the following table:

| Remote emulations in the SGT			
Manufacturer	**Instrument**	**Language**	**Section**
Rohde & Schwarz	SMATE200A	SCPI	5

3 Basics

3.1 Remote Control Languages

Instruments implement different kind of remote control languages. These languages are grouped into two basic categories:

- SCPI-compatible
- Non-SCPI-compatible

Command examples				
Function	HP8642 Non-SCPI	HP8657 Non-SCPI	AF2023 SCPI	SGT SCPI
Resetting the instrument	PR	PR	*RST	*RST
Clearing the system status		CS	*CLS	*CLS
Setting the RF frequency	CW10MZ	FR10MZ	:CFRQ:VALUE 10MHZ	:FREQ 10MHZ
Setting the RF power	AP-10DB	PL-10DM	:RFLV:VALUE -10DBM	:POW -10DBM
Activating the RF output	ON	R3	:RFLV:ON	:OUTP 1

Older instruments often implement a simple, unstructured and non-SCPI-compatible language, whereas modern instruments implement usually a complex, well structured and SCPI-compatible language.
The SGT offers a solution for both kinds of languages using specialized processing units in non-SCPI-compatible languages:
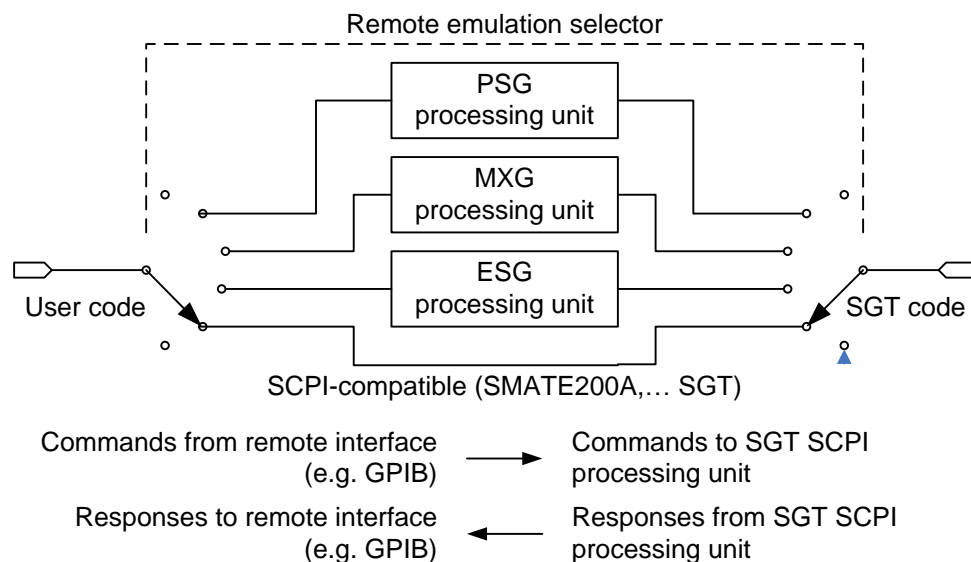
3.1.1 SCPI-Compatible Languages

Commands are routed directly from the remote interface to the SGT SCPI command processing unit; responses are routed in the reverse direction.

3.1.2 Non-SCPI-Compatible Languages

Commands are routed from the remote interface to the SGT SCPI command processing unit through a remote emulation specific processing unit; responses are routed in the reverse direction.
This specific processing unit parses the non-SCPI-compatible commands with reference to the corresponding syntax and translates them into SCPI-compatible ones. The unit also reformats the responses with respect to the requirements of the emulated instrument.

3.2 Remote Emulation Compatibility

An emulated instrument having fewer features than, or the same features as, the SGT can be replaced without special care.
However, replacing an emulated instrument having more features than the SGT or features that differ from those of the SGT requires additional care. The user must

- ensure that the SGT complies with the functional requirements
- verify that application code does not use features in the emulated instrument which are not available in the SGT

3.2.1 Command Compatibility

Most of the remote emulations in the SGT implement all commands of the original instrument. However, e.g. due to functional differences in hardware, in certain remote emulations the SGT

- does not support all commands
- does not support all parameters of a command
- implements a different behavior for a command

In the command tables of the different remote emulations, the status column gives compatibility information to a command:

Command compatibility status	
Status	**Comment**
✓	Command implementation is fully compatible.
🤚 See item n	Command implementation is not fully compatible. The implementation in the SGT • does not support the same parameter(s) as the emulated instrument does • has different functionality than the emulated instrument • reports an invalid parameter or execution error if possible
○	Command is implemented without any functionality. The implementation in the SGT • ignores setting commands • returns default value in query commands • does not report errors • does not change any operating mode of the instrument • does not change any system state of the instrument
+	Command has been added to enhance the functionality of the emulated instrument.

If the application software uses commands that are fully compatible, no special care has to be taken. The applications software can be used as is.
If the application software uses commands that are not fully compatible, the application software must be verified and normally also modified. If the required modifications to the application software are infeasible, the SGT cannot be used as replacement for another instrument.
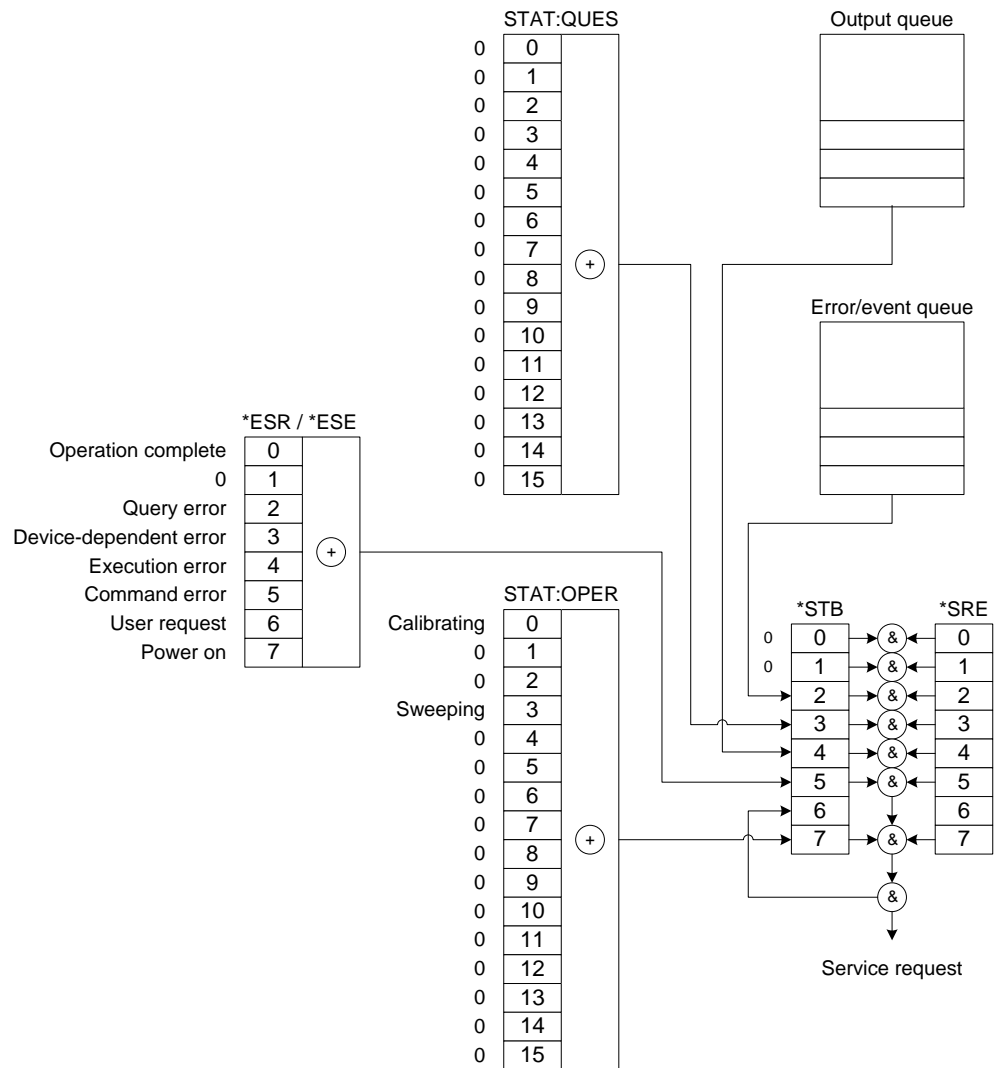
3.2.2   IDN / OPT Strings

The remote emulation provides user-defined responses to *IDN? and *OPT? queries. This feature is of informational character only and has no impact on the functionality of the SGT.

3.2.3   Timing

The remote emulation cannot provide exact timing compatibility with the emulated instrument, since timing is a hardware-related property.

3.2.4 Status and Error Reporting

The SGT implements the minimal status and error reporting system required by the SCPI proposal. The following figure shows the status and error reporting model:

STAT:QUES — Output queue

0	0
0	1
0	2
0	3
0	4
0	5
0	6
0	7
0	8
0	9
0	10
0	11
0	12
0	13
0	14
0	15

Error/event queue

*ESR / *ESE

Operation complete	0	
0	1	
Query error	2	
Device-dependent error	3	
Execution error	4	
Command error	5	
User request	6	
Power on	7	

STAT:OPER

Calibrating	0
0	1
0	2
Sweeping	3
0	4
0	5
0	6
0	7
0	8
0	9
0	10
0	11
0	12
0	13
0	14
0	15

*STB / *SRE

*STB		*SRE
0 0	&	0
0 1	&	1
2	&	2
3	&	3
4	&	4
5	&	5
6	&	6
7	&	7

Service request

Some of the emulated instruments implement a more detailed status and error reporting system. Since the additional information stored in that system is not available in the SGT, application code that uses the additional information must be changed.

3.3 Preset / Reset

Changing the remote emulation does not automatically trigger a reset operation to the instrument. Therefore it is strongly recommended to manually execute a reset to the SGT after changing the remote emulation.
To apply the default of a particular remote emulation, the user must send the corresponding command via the remote control interface, e.g. the *RST command in SCPI-compatible languages.

3.4 Power Down / Power Up

The selected remote emulation and the user-defined responses to *IDN? and *OPT? queries are saved when the instrument is switched off.
When the instrument is switched on again, it starts up with the same settings that were active before it was switched off.
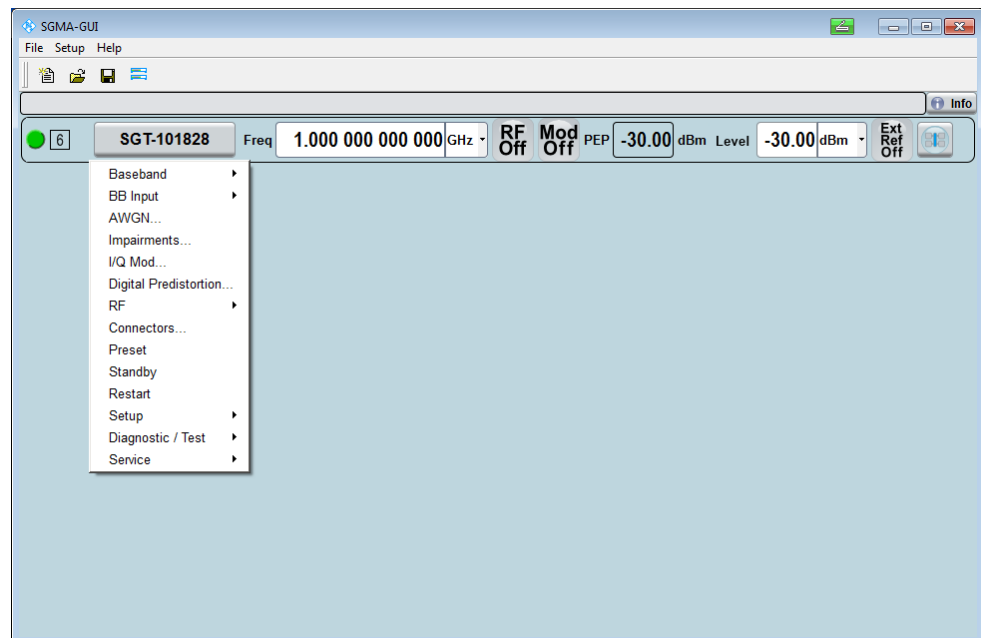
4 Activating a Remote Emulation

In order to use a specific remote emulation, it must first be activated by the user. Activation is done either
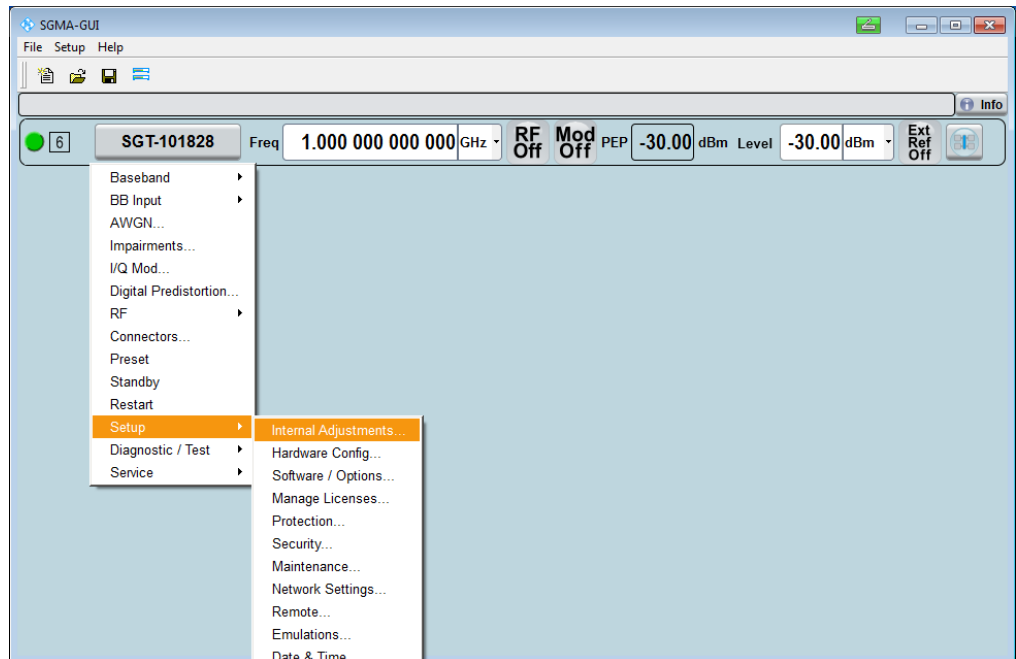
- manually using the SGMA-GUI application
- remotely using SCPI commands

4.1 Manual Operation

In the SGMA-GUI application, press the SGT button to open the Menu tree:

In the Menu tree, select Setup to open the Setup Menu tree:

In the Setup Menu tree, select Emulations… and open the Emulations dialog to set up the remote emulation specific parameters:
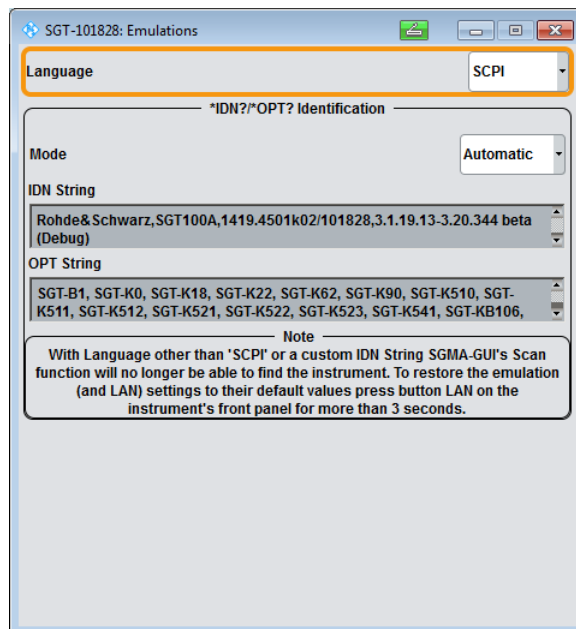
Select the Language and open the drop-down list. Pick an item from the list and confirm the selection:
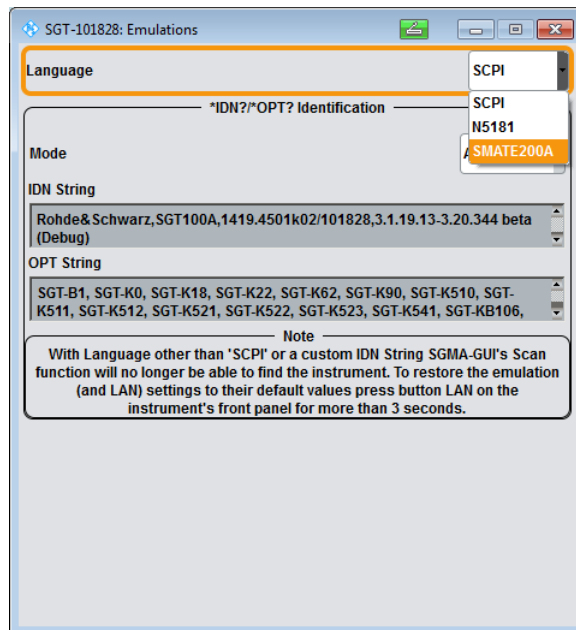
Select the Mode and open the drop-down list. Pick either "Automatic" or "User defined" from the list and confirm the selection:
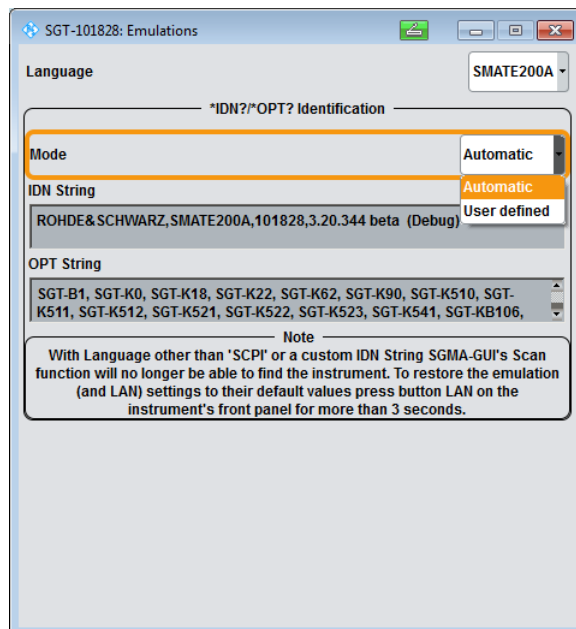
In "Automatic" mode, the response text to *IDN? and *OPT? queries is generated by the signal generator itself.
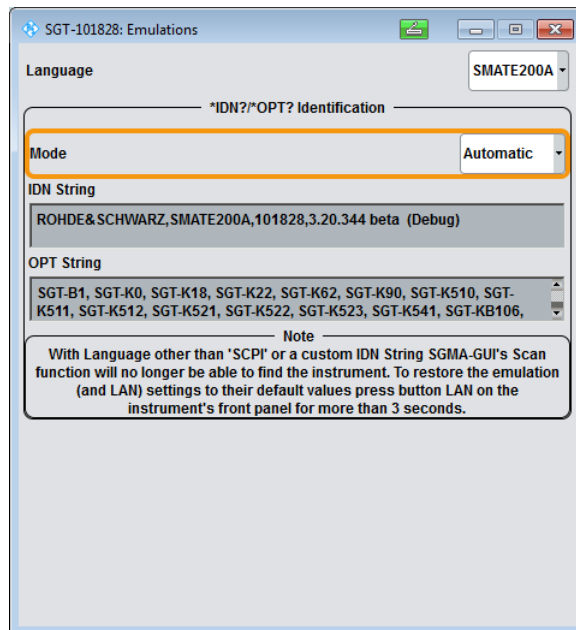
In "User defined" mode, the response text to *IDN? and *OPT? queries must be entered in the corresponding IDN string and/or OPT string text boxes:
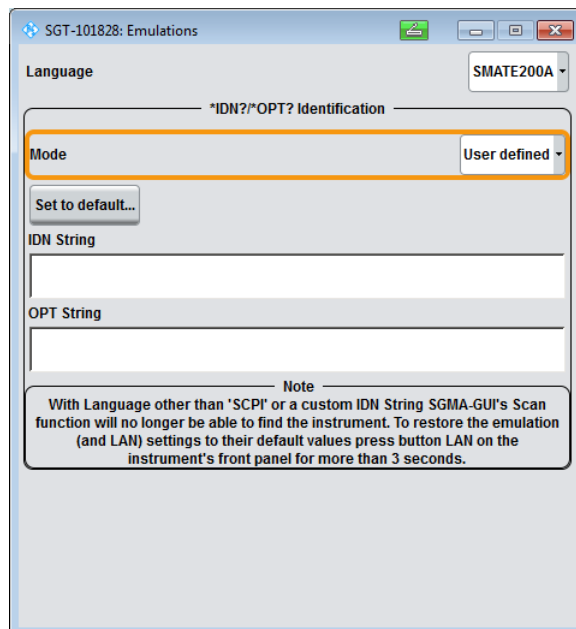
In "User defined" mode, press the "Set to default…" button to preset the corresponding IDN string and/or OPT string text boxes with the default settings from the selected remote emulation:
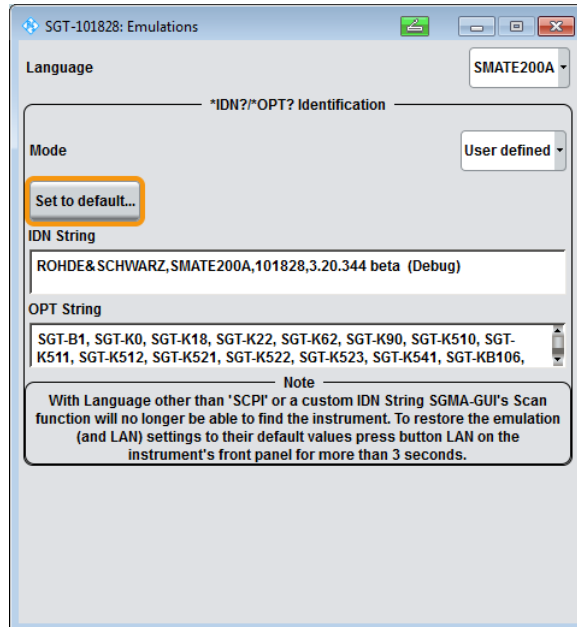
Then select the IDN String text box and edit the response text to *IDN? queries. When finished, confirm the text:
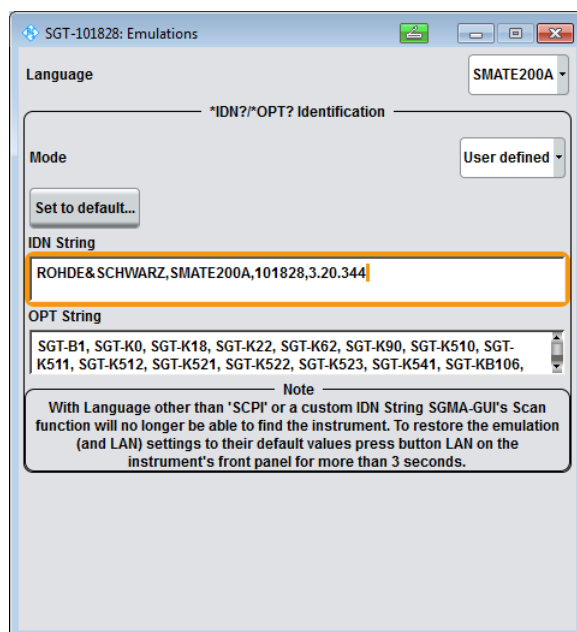
Finally select the OPT String text box and edit the response text to *OPT? queries. When finished, confirm the text:
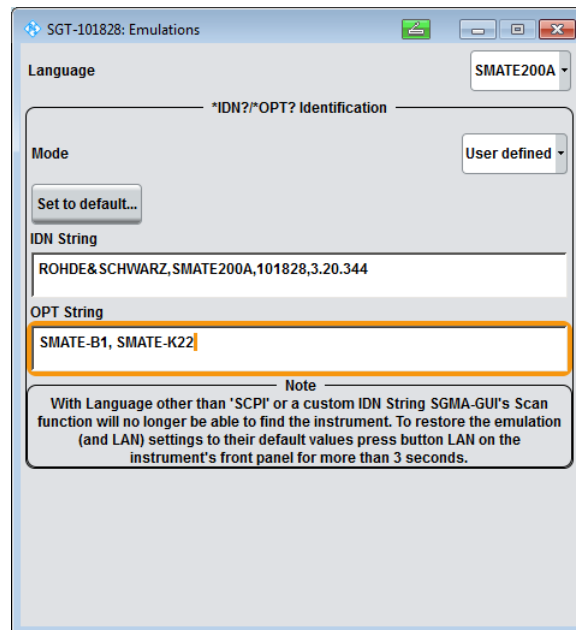
Exit the Instrument Emulations dialog by pressing the ESC key.

4.2 Remote Operation

When the SGT uses a non-SCPI-compatible language, the remote emulation cannot be changed remotely. The emulation needs to be changed manually.

When the SGT uses an SCPI-compatible language, use the following commands to modify the remote emulation parameters:

Commands to modify remote emulation relevant settings	
Command	**Comment**
:SYSTem:IDENt <value>	Sets the state of the identification mode.
	If the identification mode is set to USER, the value provided with the command :SYSTem:IDN <value> is returned on an *IDN? query and the value provided with the command :SYSTem:OPT <value> is returned on *OPT? query.
	If the identification mode is set to AUTO, the factory default setting is returned on a *IDN? query or an *OPT? query.
	The value range of character-type parameter <value> is
	• AUTO
	• USER
:SYSTem:IDENt?	Gets the state of the identification mode.
:SYSTem:IDN <value>	Sets the user-defined response to an *IDN? query.
	The string-type parameter <value> allows up to 128 characters. The parameter has to be enclosed in single or double quotes.
:SYSTem:IDN?	Gets the user-defined response to an *IDN? query.
:SYSTem:OPT <value>	Sets the user-defined response to a *OPT? query.
	The string-type parameter <value> allows up to 128 characters. The parameter has to be enclosed in single or double quotes.
:SYSTem:OPT?	Gets the user-defined response to a *OPT? query.
:SYSTem:LANGuage <value>	Activates the remote emulation to be used for further communications.
	The value range of the string-type parameter <value> is:
	• "SMATE200A"
	• "EXIT"
	Attention:
	The remote emulation is changed immediately after parsing this command. Succeeding commands such as *WAI, *OPC or *OPC? are not allowed, since these commands may not be a part of the newly selected command set.
	Therefore, this command must be the one and only command in a program message unit.
	After sending this command, a delay of two seconds must be applied to the application software before the next command is sent.
	The parameter value "EXIT" must be used to return to the native SCPI command set of the instrument.

Commands to modify remote emulation relevant settings	
Command	**Comment**
:SYSTem:LANGuage?	Gets the current active remote emulation.

Note:

The upper-case and lower-case notation serves to distinguish between the long and the short form of a command. The instrument itself does not distinguish between upper-case and lower-case notation.

5 Emulating the R&S®SMATE200A

The following tables show the current implementation status of each command.
Commands not shown in these tables are not supported.

IEEE488.2 functions	
Command syntax	**Status**
*CLS	✔
*ESE value *ESE?	✔
*ESR?	✔
*IDN? **Remark:** If the response does not match the requirements, a user-specific response to *IDN? and *OPT? can be applied on the instrument's front panel.	🖐
*IST?	✔
*OPC *OPC? Wait for/query completion of command.	✔
*OPT? **Remark:** If the response does not match the requirements, a user-specific response to *IDN? and *OPT? can be applied on the instrument's front panel.	🖐
*RCL value	✔
*RST	✔
*SAV value	✔
*SRE value *SRE?	✔
*STB?	✔
*TST?	✔
*WAI	✔

Device-specific functions	
Command syntax	**Status**
CALibration:ALL[:MEASure]?	✔
CALibration:FREQuency[:MEASure]?	✔
CALibration:IQModulator:FULL?	✔
CALibration:IQModulator:LOCal?	✔
CALibration:LEVel[:MEASure]?	✔

Device-specific functions	
Command syntax	**Status**
CALibration:ROSCillator[:DATA]? value	✓
CLOCk:INPut:FREQuency?	✓
CLOCk:INPut:SLOPe value CLOCk:INPut:SLOPe?	✓
CLOCk:OUTPut:MODE value CLOCk:OUTPut:MODE?	✓
FORMat:BORDer value FORMat:BORDer?	✓
FORMat:SREGister value FORMat:SREGister?	✓
FORMat[:DATA] value FORMat[:DATA]?	✓
MEMory:HFRee?	✓
MMEMory:CATalog?	✓
MMEMory:CATalog:LENGth?	✓
MMEMory:CDIRectory value MMEMory:CDIRectory?	✓
MMEMory:COPY value	✓
MMEMory:DATA value MMEMory:DATA?	✓
MMEMory:DATA:UNPRotected value MMEMory:DATA:UNPRotected?	✓
MMEMory:DCATalog?	✓
MMEMory:DELete value	✓
MMEMory:LOAD:STATe value MMEMory:LOAD:STATe?	✓
MMEMory:MDIRectory value MMEMory:MDIRectory?	✓
MMEMory:MOVE value	✓
MMEMory:MSIS value MMEMory:MSIS?	✓
MMEMory:RDIRectory value MMEMory:RDIRectory?	✓
MMEMory:STORe:STATe value MMEMory:STORe:STATe?	✓

Device-specific functions	
Command syntax	**Status**
OUTPut:ALL[:STATe] value OUTPut:ALL[:STATe]?	✓
OUTPut:AFIXed:RANGe:LOWer?	✓
OUTPut:AFIXed:RANGe:UPPer?	✓
OUTPut:AMODe value OUTPut:AMODe?	✓
OUTPut [:STATe] value OUTPut[:STATe]?	✓
OUTPut[:STATe]:PON value OUTPut[:STATe]:PON?	✓
[SOURce:]AGWN:BRATe value [SOURce:]AGWN:BRATe?	✓
[SOURce:]AGWN:BWIDth value [SOURce:]AGWN:BWIDth?	✓
[SOURce:]AGWN:BWIDth:NOISe value [SOURce:]AGWN:BWIDth:NOISe?	✓
[SOURce:]AGWN:BWIDth:RATio value [SOURce:]AGWN:BWIDth:RATio?	✓
[SOURce:]AGWN:CNRatio value [SOURce:]AGWN:CNRatio?	✓
[SOURce:]AGWN:DISP:MODE value [SOURce:]AGWN:DISP:MODE?	✓
[SOURce:]AGWN:ENRatio value [SOURce:]AGWN:ENRatio?	✓
[SOURce:]AGWN:FREQuency:RESult?	✓
[SOURce:]AGWN:FREQuency:TARGet value [SOURce:]AGWN:FREQuency:TARGet?	✓
[SOURce:]AGWN:MODE value [SOURce:]AGWN:MODE?	✓
[SOURce:]AGWN:POWer:CARRier value [SOURce:]AGWN:POWer:CARRier?	✓
[SOURce:]AGWN:POWer:MODE value [SOURce:]AGWN:POWer:MODE?	✓
[SOURce:]AGWN:POWer:NOISe value [SOURce:]AGWN:POWer:NOISe?	✓
[SOURce:]AGWN:POWer:NOISe:TOTal?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]AGWN:POWer:RMODe value [SOURce:]AGWN:POWer:RMODe?	✓
[SOURce:]AGWN:POWer:SUM?	✓
[SOURce:]AGWN:POWer:SUM:PEP?	✓
[SOURce:]AGWN:STATe value [SOURce:]AGWN:STATe?	✓
[SOURce:]BB:ARBitrary:CLOCk value [SOURce:]BB:ARBitrary:CLOCk?	✓
[SOURce:]BB:ARBitrary:CLOCk:MODE value [SOURce:]BB:ARBitrary:CLOCk:MODE?	✓
[SOURce:]BB:ARBitrary:CLOCk:MULTiplier value [SOURce:]BB:ARBitrary:CLOCk:MULTiplier?	✓
[SOURce:]BB:ARBitrary:CLOCk:SOURce value [SOURce:]BB:ARBitrary:CLOCk:SOURce?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:CONFlict?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:COUNt value [SOURce:]BB:ARBitrary:MCARrier:CARRier:COUNt?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:DELay value [SOURce:]BB:ARBitrary:MCARrier:CARRier:DELay?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:FILE value [SOURce:]BB:ARBitrary:MCARrier:CARRier:FILE?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:FREQuency value [SOURce:]BB:ARBitrary:MCARrier:CARRier:FREQuency?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:MODE value [SOURce:]BB:ARBitrary:MCARrier:CARRier:MODE?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:PHASe value [SOURce:]BB:ARBitrary:MCARrier:CARRier:PHASe?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:POWer value [SOURce:]BB:ARBitrary:MCARrier:CARRier:POWer?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier:SPACing value [SOURce:]BB:ARBitrary:MCARrier:CARRier:SPACing?	✓
[SOURce:]BB:ARBitrary:MCARrier:CARRier[:STATe] value [SOURce:]BB:ARBitrary:MCARrier:CARRier[:STATe]?	✓
[SOURce:]BB:ARBitrary:MCARrier:CFACtor:MODE value [SOURce:]BB:ARBitrary:MCARrier:CFACtor:MODE?	✓
[SOURce:]BB:ARBitrary:MCARrier:CLIPping:CFACtor value [SOURce:]BB:ARBitrary:MCARrier:CLIPping:CFACtor?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]BB:ARBitrary:MCARrier:CLIPping:CUToff value [SOURce:]BB:ARBitrary:MCARrier:CLIPping:CUToff?	✓
[SOURce:]BB:ARBitrary:MCARrier:CLIPping[:STATe] value [SOURce:]BB:ARBitrary:MCARrier:CLIPping[:STATe]?	✓
[SOURce:]BB:ARBitrary:MCARrier:CLOad name	✓
[SOURce:]BB:ARBitrary:MCARrier:CLOCk?	✓
[SOURce:]BB:ARBitrary:MCARrier:CREate name	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:DELay[:STARt] value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:DELay[:STARt]?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:DELay:STEP value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:DELay:STEP?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:EXECute	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:FILE value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:FILE?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:PHASe[:STARt] value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:PHASe[:STARt]?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:PHASe:STEP value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:PHASe:STEP?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:POWer[:STARt] value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:POWer[:STARt]?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:POWer:STEP value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:POWer:STEP?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:STARt value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:STARt?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:STATe value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:STATe?	✓
[SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:STOP value [SOURce:]BB:ARBitrary:MCARrier:EDIT:CARRier:STOP?	✓
[SOURce:]BB:ARBitrary:MCARrier:OFILe value [SOURce:]BB:ARBitrary:MCARrier:OFILe?	✓
[SOURce:]BB:ARBitrary:MCARrier:POWer:REFerence value [SOURce:]BB:ARBitrary:MCARrier:POWer:REFerence?	✓
[SOURce:]BB:ARBitrary:MCARrier:PRESet	✓
[SOURce:]BB:ARBitrary:MCARrier:SAMPles?	✓
[SOURce:]BB:ARBitrary:MCARrier:SETTing:CATalog?	✓
[SOURce:]BB:ARBitrary:MCARrier:SETTing:LOAD value	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]BB:ARBitrary:MCARrier:SETTing:STORe value	✔
[SOURce:]BB:ARBitrary:MCARrier:SETTing:STORe:FAST value	✔
[SOURce:]BB:ARBitrary:MCARrier:TIME value [SOURce:]BB:ARBitrary:MCARrier:TIME?	✔
[SOURce:]BB:ARBitrary:MCARrier:TIME:MODE value [SOURce:]BB:ARBitrary:MCARrier:TIME:MODE?	✔
[SOURce:]BB:ARBitrary:PRESet	✔
[SOURce:]BB:ARBitrary:STATe value [SOURce:]BB:ARBitrary:STATe?	✔
[SOURce:]BB:ARBitrary:TRIGger:ARM:EXECute	✔
[SOURce:]BB:ARBitrary:TRIGger:DELay:UNIT value [SOURce:]BB:ARBitrary:TRIGger:DELay:UNIT?	✔
[SOURce:]BB:ARBitrary:TRIGger:EXECute	✔
[SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:SYNChronize:OUTPut value [SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:SYNChronize:OUTPut?	✔
[SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:DELay value [SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:DELay?	✔
[SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:INHibit value [SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:INHibit?	✔
[SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:RDELay value [SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:RDELay?	✔
[SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:TDELay value [SOURce:]BB:ARBitrary:TRIGger[:EXTernal]:TDELay?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:DELay value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:DELay?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:DELay:FIXed value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:DELay:FIXed?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:DELay:MAXimum?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:DELay:MINimum?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:MODE value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:MODE?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:OFFTime value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:OFFTime?	✔
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:ONTime value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:ONTime?	✔

Device-specific functions	
Command syntax	**Status**
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:PATTern value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:PATTern?	✓
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:PULSe:DIVider value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:PULSe:DIVider?	✓
[SOURce:]BB:ARBitrary:TRIGger:OUTPut:PULSe:FREQuency value [SOURce:]BB:ARBitrary:TRIGger:OUTPut:PULSe:FREQuency?	✓
[SOURce:]BB:ARBitrary:TRIGger:RMODe value [SOURce:]BB:ARBitrary:TRIGger:RMODe?	✓
[SOURce:]BB:ARBitrary:TRIGger:SLENgth value [SOURce:]BB:ARBitrary:TRIGger:SLENgth?	✓
[SOURce:]BB:ARBitrary:TRIGger:SLUNit value [SOURce:]BB:ARBitrary:TRIGger:SLUNit?	✓
[SOURce:]BB:ARBitrary:TRIGger:SMODe value [SOURce:]BB:ARBitrary:TRIGger:SMODe?	✓
[SOURce:]BB:ARBitrary:TRIGger:SOURce value [SOURce:]BB:ARBitrary:TRIGger:SOURce?	✓
[SOURce:]BB:ARBitrary:TSIGnal:CIQ:CREate value	✓
[SOURce:]BB:ARBitrary:TSIGnal:CIQ:CREate:NAMed value [SOURce:]BB:ARBitrary:TSIGnal:CIQ:CREate:NAMed?	✓
[SOURce:]BB:ARBitrary:TSIGnal:CIQ:I value [SOURce:]BB:ARBitrary:TSIGnal:CIQ:I?	✓
[SOURce:]BB:ARBitrary:TSIGnal:CIQ:Q value [SOURce:]BB:ARBitrary:TSIGnal:CIQ:Q?	✓
[SOURce:]BB:ARBitrary:TSIGnal:RECTangle:AMPLitude value [SOURce:]BB:ARBitrary:TSIGnal:RECTangle:AMPLitude?	✓
[SOURce:]BB:ARBitrary:TSIGnal:RECTangle:CREate value	✓
[SOURce:]BB:ARBitrary:TSIGnal:RECTangle:CREate:NAMed value [SOURce:]BB:ARBitrary:TSIGnal:RECTangle:CREate:NAMed?	✓
[SOURce:]BB:ARBitrary:TSIGnal:RECTangle:FREQuency value [SOURce:]BB:ARBitrary:TSIGnal:RECTangle:FREQuency?	✓
[SOURce:]BB:ARBitrary:TSIGnal:RECTangle:OFFSet value [SOURce:]BB:ARBitrary:TSIGnal:RECTangle:OFFSet?	✓
[SOURce:]BB:ARBitrary:TSIGnal:RECTangle:SAMPles value [SOURce:]BB:ARBitrary:TSIGnal:RECTangle:SAMPles?	✓
[SOURce:]BB:ARBitrary:TSIGnal:SINE:CREate value	✓
[SOURce:]BB:ARBitrary:TSIGnal:SINE:CREate:NAMed value [SOURce:]BB:ARBitrary:TSIGnal:SINE:CREate:NAMed?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]BB:ARBitrary:TSIGnal:SINE:FREQuency value [SOURce:]BB:ARBitrary:TSIGnal:SINE:FREQuency?	✓
[SOURce:]BB:ARBitrary:TSIGnal:SINE:PHASe value [SOURce:]BB:ARBitrary:TSIGnal:SINE:PHASe?	✓
[SOURce:]BB:ARBitrary:TSIGnal:SINE:SAMPles value [SOURce:]BB:ARBitrary:TSIGnal:SINE:SAMPles?	✓
[SOURce:]BB:ARBitrary:WAVEform:CATalog?	✓
[SOURce:]BB:ARBitrary:WAVEform:CATalog:LENgth?	✓
[SOURce:]BB:ARBitrary:WAVEform:CLOCk value [SOURce:]BB:ARBitrary:WAVEform:CLOCk?	✓
[SOURce:]BB:ARBitrary:WAVEform:DATA value [SOURce:]BB:ARBitrary:WAVEform:DATA?	✓
[SOURce:]BB:ARBitrary:WAVEform:DELete value	✓
[SOURce:]BB:ARBitrary:WAVEform:FREE?	✓
[SOURce:]BB:ARBitrary:WAVEform:HDDStreaming:BLEVel?	✓
[SOURce:]BB:ARBitrary:WAVEform:HDDStreaming:STATe value [SOURce:]BB:ARBitrary:WAVEform:HDDStreaming:STATe?	✓
[SOURce:]BB:ARBitrary:WAVEform:POINts?	✓
[SOURce:]BB:ARBitrary:WAVEform:SELect value [SOURce:]BB:ARBitrary:WAVEform:SELect?	✓
[SOURce:]BB:ARBitrary:WAVEform:TAG?	✓
[SOURce:]BB:ARBitrary:WSEGment?	✓
[SOURce:]BB:ARBitrary:WSEGment:CLOad value	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:BLANk:APPend value	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:CATalog?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:CLOCk value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:CLOCk?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:CLOCk:MODE value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:CLOCk:MODE?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:COMMent value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:COMMent?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:DELete value	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:LEVel[:MODE] value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:LEVel[:MODE]?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:MARKer:ESEGment value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:MARKer:ESEGment?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:MARKer:FSEGment value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:MARKer:FSEGment?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:MARKer:MODE value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:MARKer:MODE?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:OFILe value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:OFILe?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:SEGment:APPend value	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:SEGment:CATalog?	✓
[SOURce:]BB:ARBitrary:WSEGment:CONFigure:SELect value [SOURce:]BB:ARBitrary:WSEGment:CONFigure:SELect?	✓
[SOURce:]BB:ARBitrary:WSEGment:CREAte value	✓
[SOURce:]BB:ARBitrary:WSEGment:NAME?	✓
[SOURce:]BB:ARBitrary:WSEGment:NEXT value [SOURce:]BB:ARBitrary:WSEGment:NEXT?	✓
[SOURce:]BB:ARBitrary:WSEGment:NEXT:EXECute	✓
[SOURce:]BB:ARBitrary:WSEGment:NEXT:SOURce?	✓
[SOURce:]BB:ARBitrary:WSEGment:SEQuence:APPend value	✓
[SOURce:]BB:ARBitrary:WSEGment:SEQuence:SELect value [SOURce:]BB:ARBitrary:WSEGment:SEQuence:SELect?	✓
[SOURce:]BB:ARBitrary[:TRIGger]:SEQuence value [SOURce:]BB:ARBitrary[:TRIGger]:SEQuence?	✓
[SOURce:]BB:CFACtor?	✓
[SOURce:]BB:FOFFset value [SOURce:]BB:FOFFset?	✓
[SOURce:]BB:IMPairment:IQRatio[:MAGNitude] value [SOURce:]BB:IMPairment:IQRatio[:MAGNitude]?	✓
[SOURce:]BB:IMPairment:LEAKage:I value [SOURce:]BB:IMPairment:LEAKage:I?	✓
[SOURce:]BB:IMPairment:LEAKage:Q value [SOURce:]BB:IMPairment:LEAKage:Q?	✓
[SOURce:]BB:IMPairment:OPTimization:MODE value [SOURce:]BB:IMPairment:OPTimization:MODE?	✓
[SOURce:]BB:IMPairment:OPTimization:STATe value [SOURce:]BB:IMPairment:OPTimization:STATe?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]BB:IMPairment:QUADrature[:ANGLe] value [SOURce:]BB:IMPairment:QUADrature[:ANGLe]?	✓
[SOURce:]BB:IMPairment:STATe value [SOURce:]BB:IMPairment:STATe?	✓
[SOURce:]BB:IQGAin value [SOURce:]BB:IQGAin?	✓
[SOURce:]BB:PGAin value [SOURce:]BB:PGAin?	✓
[SOURce:]BB:POFFset value [SOURce:]BB:POFFset?	✓
[SOURce:]BB:POWer:PEAK?	✓
[SOURce:]BB:POWer:RMS?	✓
[SOURce:]BB:PROGress:MCODer?	✓
[SOURce:]BB:PROGress:MCODer:ARBitrary:MCARrier?	✓
[SOURce:]BB:PROGress:MCODer:ARBitrary:WSEGment?	✓
[SOURce:]BB:PROGress:MCODer:DM:FILTer?	✓
[SOURce:]CORRection:CSET:CATalog?	✓
[SOURce:]CORRection:CSET:DATA:FREQuency value{,value} [SOURce:]CORRection:CSET:DATA:FREQuency?	✓
[SOURce:]CORRection:CSET:DATA:FREQuency:POINts?	✓
[SOURce:]CORRection:CSET:DATA:POWer value{,value} [SOURce:]CORRection:CSET:DATA:POWer?	✓
[SOURce:]CORRection:CSET:DATA:POWer:POINts?	✓
[SOURce:]CORRection:CSET[:SELect] value [SOURce:]CORRection:CSET[:SELect]?	✓
[SOURce:]CORRection:DEXChange:AFILe:CATalog?	✓
[SOURce:]CORRection:DEXChange:AFILe:EXTension value [SOURce:]CORRection:DEXChange:AFILe:EXTension?	✓
[SOURce:]CORRection:DEXChange:AFILe:SELect value [SOURce:]CORRection:DEXChange:AFILe:SELect?	✓
[SOURce:]CORRection:DEXChange:AFILe:SEParator:COLumn value [SOURce:]CORRection:DEXChange:AFILe:SEParator:COLumn?	✓
[SOURce:]CORRection:DEXChange:AFILe:SEParator:DECimal value [SOURce:]CORRection:DEXChange:AFILe:SEParator:DECimal?	✓
[SOURce:]CORRection:DEXChange:EXECute	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]CORRection:DEXChange:MODE value [SOURce:]CORRection:DEXChange:MODE?	✔
[SOURce:]CORRection:DEXChange:SELect value [SOURce:]CORRection:DEXChange:SELect?	✔
[SOURce:]CORRection[:STATe] value [SOURce:]CORRection[:STATe]?	✔
[SOURce:]CORRection:VALue value [SOURce:]CORRection:VALue?	✔
[SOURce:]FREQuency[:CW] value [SOURce:]FREQuency[:CW]?	✔
[SOURce:]FREQuency[:CW]:RCL value [SOURce:]FREQuency[:CW] RCL?	✔
[SOURce:]FREQuency:FIXed value [SOURce:]FREQuency:FIXed?	✔
[SOURce:]FREQuency:FIXed:RCL value [SOURce:]FREQuency:FIXed:RCL?	✔
[SOURce:]FREQuency:MODE value [SOURce:]FREQuency:MODE?	✔
[SOURce:]FREQuency:STARt value [SOURce:]FREQuency:STARt?	✔
[SOURce:]FREQuency:STEP[:INCRement] value [SOURce:]FREQuency:STEP[:INCRement]?	✔
[SOURce:]FREQuency:STOP value [SOURce:]FREQuency:STOP?	✔
[SOURce:]INPut:MODext:IMPendance value [SOURce:]INPut:MODext:IMPendance?	✔
[SOURce:]INPut:TRIGger:IMPendance value [SOURce:]INPut:TRIGger:IMPendance?	✔
[SOURce:]INPut:TRIGger:LEVel value [SOURce:]INPut:TRIGger:LEVel?	✔
[SOURce:]INPut:TRIGger:SLOPe value [SOURce:]INPut:TRIGger:SLOPe?	✔
[SOURce:]IQ:CREStfactor value [SOURce:]IQ:CREStfactor?	✔
[SOURce:]IQ:IMPairment:IQRAtio[:MAGNitude] value [SOURce:]IQ:IMPairment:IQRAtio[:MAGNitude]?	✔

Device-specific functions	
Command syntax	**Status**
[SOURce:]IQ:IMPairment:LEAKage:I value [SOURce:]IQ:IMPairment:LEAKage:I?	✓
[SOURce:]IQ:IMPairment:LEAKage:Q value [SOURce:]IQ:IMPairment:LEAKage:Q?	✓
[SOURce:]IQ:IMPairment:QUADrature[:ANGLe] value [SOURce:]IQ:IMPairment:QUADrature[:ANGLe]?	✓
[SOURce:]IQ:IMPairment[:STATe] value [SOURce:]IQ:IMPairment[:STATe]?	✓
[SOURce:]IQ:OUTPut[:ANALog]:BIAS[:COUPling]:STATe value [SOURce:]IQ:OUTPut[:ANALog]:BIAS[:COUPling]:STATe?	✓
[SOURce:]IQ:OUTPut[:ANALog]:BIAS:I value [SOURce:]IQ:OUTPut[:ANALog]:BIAS:I?	✓
[SOURce:]IQ:OUTPut[:ANALog]:BIAS:Q value [SOURce:]IQ:OUTPut[:ANALog]:BIAS:Q?	✓
[SOURce:]IQ:OUTPut[:ANALog]:MODE value [SOURce:]IQ:OUTPut[:ANALog]:MODE?	✓
[SOURce:]IQ:OUTPut[:ANALog]:OFFSet:I value [SOURce:]IQ:OUTPut[:ANALog]:OFFSet:I?	✓
[SOURce:]IQ:OUTPut[:ANALog]:OFFSet:Q value [SOURce:]IQ:OUTPut[:ANALog]:OFFSet:Q?	✓
[SOURce:]IQ:OUTPut[:ANALog]:TYPE value [SOURce:]IQ:OUTPut[:ANALog]:TYPE?	✓
[SOURce:]IQ:OUTPut:LEVel value [SOURce:]IQ:OUTPut:LEVel?	✓
[SOURce:]IQ:SOURce value [SOURce:]IQ:SOURce?	✓
[SOURce:]IQ:STATe value [SOURce:]IQ:STATe?	✓
[SOURce:]IQ:SWAP[:STATe] value [SOURce:]IQ:SWAP[:STATe]?	✓
[SOURce:]IQ:WBSTate value [SOURce:]IQ:WBSTate?	✓
[SOURce:]MODulation[:ALL]:STATe value [SOURce:]MODulation[:ALL]:STATe?	✓
[SOURce:]PATH:COUNt?	✓
[SOURce:]PHASe value [SOURce:]PHASe?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]PHASe:REFerence	✓
[SOURce:]POWer:ALC:SONCe value [SOURce:]POWer:ALC:SONCe?	✓
[SOURce:]POWer:ALC[:STATe] value [SOURce:]POWer:ALC[:STATe]?	✓
[SOURce:]POWer:ATTenuation:RFOFf:MODE value [SOURce:]POWer:ATTenuation:RFOFf:MODE?	✓
[SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude] value [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]?	✓
[SOURce:]POWer[:LEVel][:IMMediate]:OFFSet value [SOURce:]POWer[:LEVel][:IMMediate]:OFFSet?	✓
[SOURce:]POWer[:LEVel][:IMMediate]:RCL value [SOURce:]POWer[:LEVel][:IMMediate]:RCL?	✓
[SOURce:]POWer:LIMit[:AMPLitude] value [SOURce:]POWer:LIMit[:AMPLitude]?	✓
[SOURce:]POWer:PEP value [SOURce:]POWer:PEP?	✓
[SOURce:]POWer:POWer value [SOURce:]POWer:POWer?	✓
[SOURce:]PRESet	✓
[SOURce:]PULM:POLarity value [SOURce:]PULM:POLarity?	✓
[SOURce:]PULM:SOURce value [SOURce:]PULM:SOURce?	✓
[SOURce:]PULM:STATe value [SOURce:]PULM:STATe?	✓
[SOURce:]ROSCillator:EXTernal:FREQuency value [SOURce:]ROSCillator:EXTernal:FREQuency?	✓
[SOURce:]ROSCillator:EXTernal:SBANdwidth value [SOURce:]ROSCillator:EXTernal:SBANdwidth?	✓
[SOURce:]ROSCillator[:INTernal]:ADJust[:STATe] value [SOURce:]ROSCillator[:INTernal]:ADJust[:STATe]?	✓
[SOURce:]ROSCillator[:INTernal]:ADJust:VALue value [SOURce:]ROSCillator[:INTernal]:ADJust:VALue?	✓
[SOURce:]ROSCillator:SOURce value [SOURce:]ROSCillator:SOURce?	✓

Device-specific functions	
Command syntax	**Status**
[SOURce:]SWEep[:FREQuency]:DWELl value [SOURce:]SWEep[:FREQuency]:DWELl?	✓
[SOURce:]SWEep[:FREQuency]:SPACing value [SOURce:]SWEep[:FREQuency]:SPACing?	✓
[SOURce:]SWEep[:FREQuency]:STEP:LOGarithmic value [SOURce:]SWEep[:FREQuency]:STEP:LOGarithmic?	✓
STATus:OPERation:CONDition?	✓
STATus:OPERation:ENABle value STATus:OPERation:ENABle?	✓
STATus:OPERation[:EVENt]?	✓
STATus:OPERation:NTRansition value STATus:OPERation:NTRansition?	✓
STATus:OPERation:PTRansition value STATus:OPERation:PTRansition?	✓
STATus:PRESet	✓
STATus:QUEStionable:CONDition?	✓
STATus:QUEStionable:ENABle value STATus:QUEStionable:ENABle?	✓
STATus:QUEStionable[:EVENt]?	✓
STATus:QUEStionable:NTRansition value STATus:QUEStionable:NTRansition?	✓
STATus:QUEStionable:PTRansition value STATus:QUEStionable:PTRansition?	✓
STATus:QUEue[:NEXT]?	✓
SYSTem:COMMunicate:GPIB:LTERminator value SYSTem:COMMunicate:GPIB:LTERminator?	✓
SYSTem:COMMunicate:GPIB:RESource?	✓
SYSTem:COMMunicate:GPIB[:SELF]:ADDRess value SYSTem:COMMunicate:GPIB[:SELF]:ADDRess?	✓
SYSTem:COMMunicate:HISLip:RESource?	✓
SYSTem:COMMunicate:NETWork:RESource?	✓
SYSTem:COMMunicate:NETWork:RESTart	✓
SYSTem:COMMunicate:NETWork:STATus?	✓
SYSTem:COMMunicate:NETWork[:IPADdress]:DNS value SYSTem:COMMunicate:NETWork[:IPADdress]:DNS?	✓

Device-specific functions	
Command syntax	**Status**
SYSTem:COMMunicate:SOCKet:RESource?	✔
SYSTem:COMMunicate:USB:RESource?	✔
SYSTem:DATE value SYSTem:DATE?	✔
SYSTem:ERRor:ALL?	✔
SYSTem:ERRor:CODE:ALL?	✔
SYSTem:ERRor:CODE[:NEXT]?	✔
SYSTem:ERRor:COUNt?	✔
SYSTem:ERRor[:NEXT]?	✔
SYSTem:FPReset	✔
SYSTem:MMEMory:PATH:USER?	✔
SYSTem:OSYStem?	✔
SYSTem:PRESet	✔
SYSTem:PROTect[:STATe] value SYSTem:PROTect [:STATe]?	✔
SYSTem:SERRor?	✔
SYSTem:STARtup:COMPlete?	✔
SYSTem:TIME value SYSTem:TIME?	✔
SYSTem:TIME:ZONE value SYSTem:TIME:ZONE?	✔
SYSTem:TIME:ZONE:CATalog?	✔
SYSTem:VERSion?	✔
TEST:BB:CONNection?	✔
UNIT:ANGle value UNIT:ANGle?	✔
UNIT:POWer value UNIT:POWer?	✔

6 References

[1]   Rohde & Schwarz, R&S®SGT100A SGMA Vector RF Source Operating Manual

7 Ordering Information

Please visit the product websites at www.rohde-schwarz.com for comprehensive ordering information ("Options") on the following Rohde & Schwarz instruments:

- R&S®SGT100A SGMA Vector RF Source

Rohde & Schwarz

The Rohde & Schwarz electronics group offers innovative solutions in the following business fields: test and measurement, broadcast and media, secure communications, cybersecurity, radiomonitoring and radiolocation. Founded more than 80 years ago, this independent company has an extensive sales and service network and is present in more than 70 countries.

The electronics group is among the world market leaders in its established business fields. The company is headquartered in Munich, Germany. It also has regional headquarters in Singapore and Columbia, Maryland, USA, to manage its operations in these regions.

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Sustainable product design

◾ Environmental compatibility and eco-footprint

◾ Energy efficiency and low emissions

◾ Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

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