

Remote Emulation with the R&S®SMA100A Signal Generator

Application Note

Products:

| R&S®SMA100A

The R&S®SMA100A signal generator 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®SMA100A 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.

Table of Contents

1	Abbreviations	4
2	Overview	5
3	Basics	7
3.1	Remote Control Languages	7
3.1.1	SCPI-Compatible Languages	8
3.1.2	Non-SCPI-Compatible Languages	8
3.2	Remote Emulation Compatibility	8
3.2.1	Command Compatibility	9
3.2.2	IDN / OPT Strings	10
3.2.3	Timing	10
3.2.4	Sweep Operation	10
3.2.5	Trigger Control	11
3.2.6	Status and Error Reporting	13
3.3	Preset / Reset	14
3.4	Power Down / Power Up	14
4	Activating a Remote Emulation	15
4.1	Manual Operation	15
4.2	Remote Operation	20
5	Emulating the Aeroflex 2023-2024	22
6	Emulating the Aeroflex 2030-2032, 2040-2042	29
7	Emulating the Agilent E4428, N5161, N5181	40
8	Emulating the Hewlett-Packard 8642	51
9	Emulating the Hewlett-Packard 8643-8645, 8664-8665	53
10	Emulating the Hewlett-Packard 8647-8648	61
11	Emulating the Hewlett-Packard 8656-8657	65
12	Emulating the Hewlett-Packard 8662-8663	67
13	Emulating the Panasonic 8303	71

14	Emulating the Racal-Dana 3102, 9087	73
15	Emulating the R&S [®] SML.....	76
16	Emulating the R&S [®] SME, R&S [®] SMT.....	85
17	Emulating the R&S [®] SMGU, R&S [®] SMHU, R&S [®] SMY.....	97
18	References.....	101
19	Ordering Information	101

1 Abbreviations

The following abbreviations are used in this application note:

- AF2023 2023 signal generator from Aeroflex / IFR / Marconi
- AF2024 2024 signal generator from Aeroflex / IFR / Marconi
- AF2030 2030 signal generator from Aeroflex / IFR / Marconi
- AF2031 2031 signal generator from Aeroflex / IFR / Marconi
- AF2032 2032 signal generator from Aeroflex / IFR / Marconi
- AF2040 2040 signal generator from Aeroflex / IFR / Marconi
- AF2041 2041 signal generator from Aeroflex / IFR / Marconi
- AF2042 2042 signal generator from Aeroflex / IFR / Marconi
- E4428 E4428 signal generator from Agilent Technologies
- HP8642 8642 signal generator from Hewlett-Packard / Agilent Technologies
- HP8643 8643 signal generator from Hewlett-Packard / Agilent Technologies
- HP8644 8644 signal generator from Hewlett-Packard / Agilent Technologies
- HP8645 8645 signal generator from Hewlett-Packard / Agilent Technologies
- HP8647 8647 signal generator from Hewlett-Packard / Agilent Technologies
- HP8648 8648 signal generator from Hewlett-Packard / Agilent Technologies
- HP8656 8656 signal generator from Hewlett-Packard / Agilent Technologies
- HP8657 8657 signal generator from Hewlett-Packard / Agilent Technologies
- HP8662 8662 signal generator from Hewlett-Packard / Agilent Technologies
- HP8663 8662 signal generator from Hewlett-Packard / Agilent Technologies
- HP8664 8664 signal generator from Hewlett-Packard / Agilent Technologies
- HP8665 8665 signal generator from Hewlett-Packard / Agilent Technologies
- N5161 N5161 signal generator from Agilent Technologies
- N5181 N5181 signal generator from Agilent Technologies
- PA8303 8303 signal generator from Panasonic
- RC3102 3102 signal generator from Racal Dana
- RC9087 9087 signal generator from Racal Dana
- SMA R&S®SMA100A signal generator from Rohde & Schwarz
- SME R&S®SME signal generator from Rohde & Schwarz
- SMGU R&S®SMGU signal generator from Rohde & Schwarz
- SMHU R&S®SMHU signal generator from Rohde & Schwarz
- SML R&S®SML signal generator from Rohde & Schwarz
- SMT R&S®SMT signal generator from Rohde & Schwarz
- SMY R&S®SMY 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 SMA offers the remote emulation feature.

Remote emulation means that the SMA 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 SMA are emulated by the SMA. An overview of actually implemented remote emulations is given in the following table:

Remote emulations in the SMA			
Manufacturer	Instrument	Language	Section
Aeroflex	AF2023	SCPI	5
	IFR		
Marconi	AF2030	SCPI	6
	AF2031		
	AF2032		
	AF2040		
	AF2041		
	AF2042		
	AF2042(ADF)		

Remote emulations in the SMA			
Manufacturer	Instrument	Language	Section
Agilent Technologies Hewlett-Packard	E4428	SCPI	7
	N5161	SCPI	7
	N5181		
	HP8642	Non-SCPI	8
	HP8643	SCPI	9
	HP8644		
	HP8645		
	HP8647	SCPI	10
	HP8648		
	HP8656	Non-SCPI	11
	HP8657		
	HP8662	Non-SCPI	12
	HP8663		
	HP8664	SCPI	9
	HP8665		
Panasonic	PA8303	Non-SCPI	13
Racal-Dana	RC3102	Non-SCPI	14
	RC9087		
Rohde & Schwarz	SME02	SCPI	16
	SME03		
	SME06		
	SMGU	Non-SCPI	17
	SMHU		
	SML01	SCPI	14
	SML02		
	SML03		
	SMT02	SCPI	16
	SMT03		
	SMT06		
	SMY01	Non-SCPI	17
	SMY02		

3 Basics

3.1 Remote Control Languages

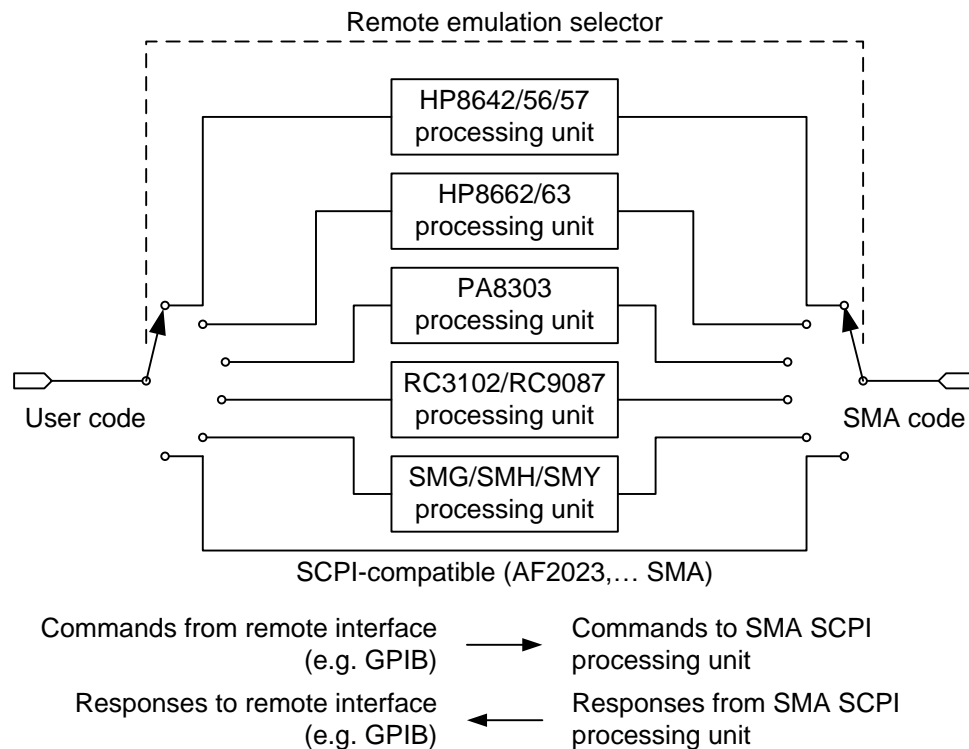
Instruments implement different kind of remote control languages. These languages are grouped into two basic categories:

- SCPI-compatible
- Non-SCPI-compatible

Command examples				
Function	HP8642 Non-SCPI	HP8657 Non-SCPI	AF2023 SCPI	SMA 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 SMA 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 SMA 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 SMA 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 SMA can be replaced without special care.

However, replacing an emulated instrument having more features than the SMA or features that differ from those of the SMA requires additional care. The user must

- ensure that the SMA complies with the functional requirements


- verify that application code does not use features in the emulated instrument which are not available in the SMA

3.2.1 Command Compatibility

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

- 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 SMA <ul style="list-style-type: none"> • 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 SMA <ul style="list-style-type: none"> • 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 is not implemented. The implementation in the SMA reports an unknown command error if possible.
+	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 SMA cannot be used as replacement for another instrument.

3.2.2 IDN / OPT Strings

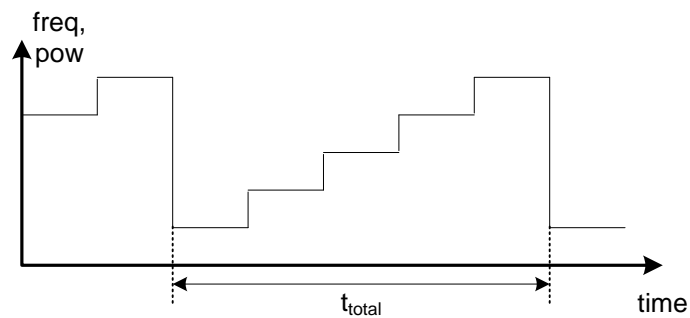
The remote emulation provides user-defined responses to *IDN? and *OPT? queries. This feature is of informational character only and has no impact on the functionality of the SMA.

3.2.3 Timing

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

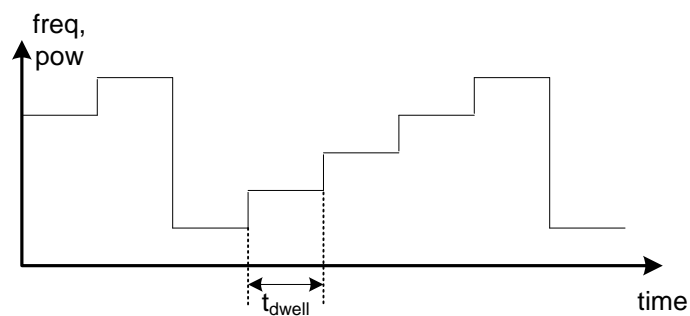
3.2.4 Sweep Operation

Some of the emulated instruments implement sweep operations with a constant total sweep time:



Changing the start, stop or steps parameter of the sweep operation does not have an impact on the total sweep time.

In the SMA, all sweep operations are based on the dwell time:



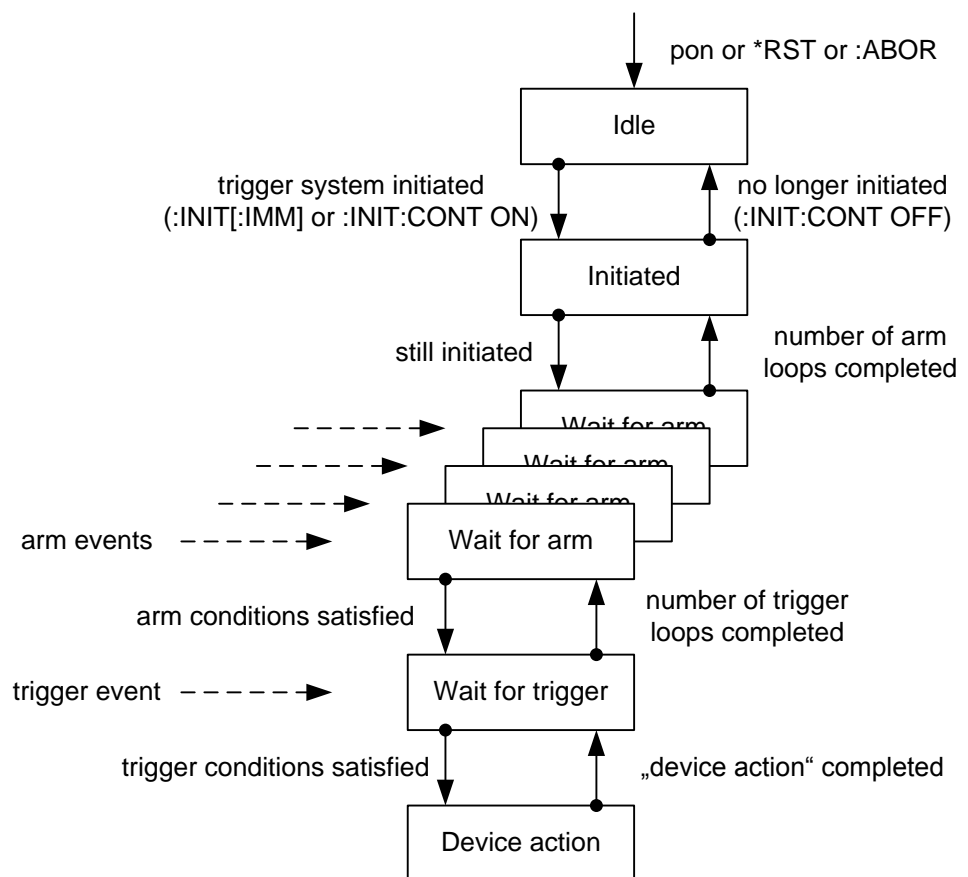
Changing the start, stop or steps parameter directly affects the total sweep time.

$$n_{steps} = \left\lceil \frac{f_{stop} - f_{start}}{f_{step}} \right\rceil + 1$$

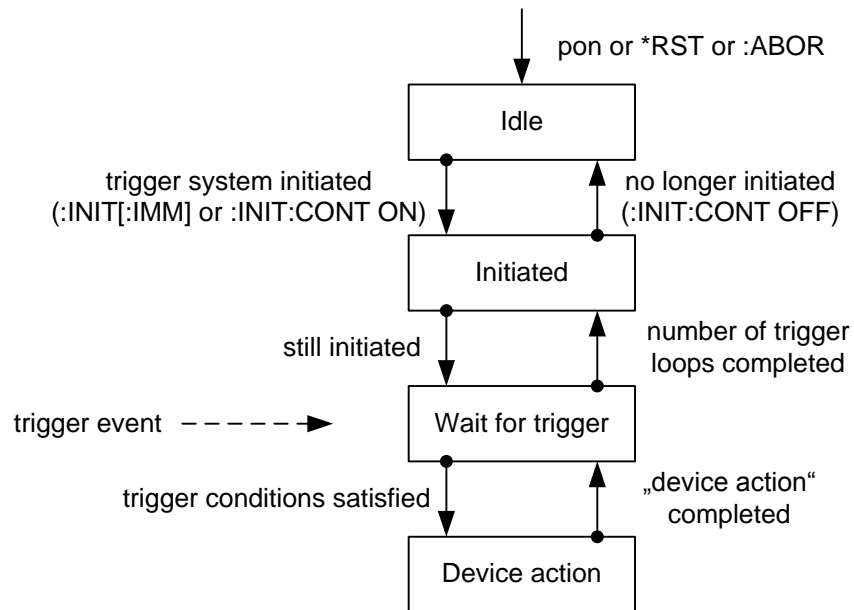
$$t_{total} = n_{steps} \cdot t_{dwell}$$

3.2.5 Trigger Control

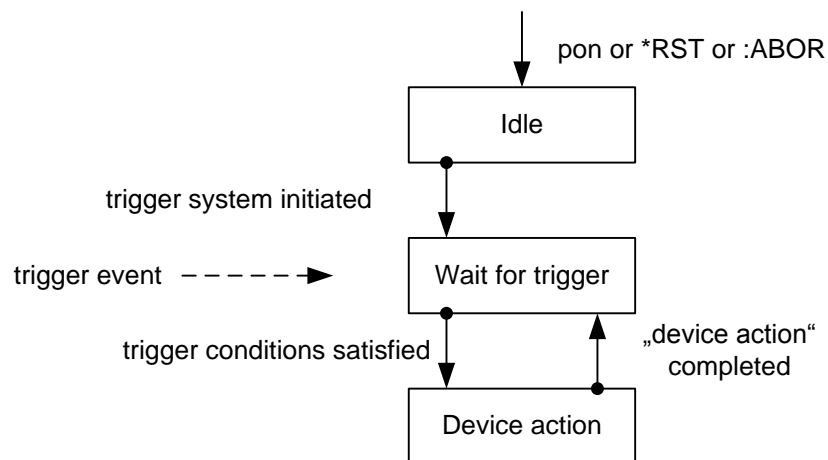
In signal generators with sweeping features, all sweep operating modes use the trigger control system. The figure below shows the SCPI trigger control system proposal:



Some of the emulated instruments implement a simplified trigger control system:



Other emulated instruments and also the SMA implement the trigger control system shown in the following figure:

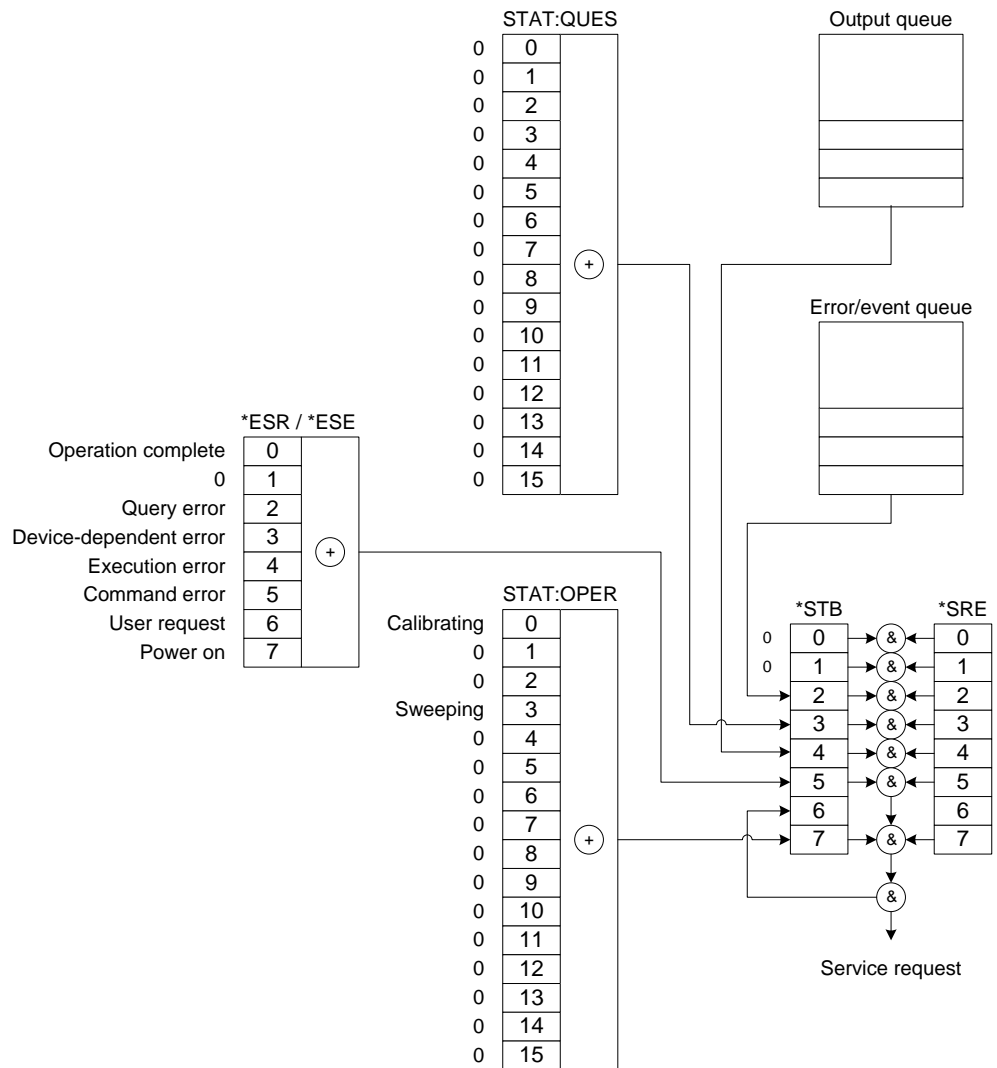


The main difference between the emulated instrument's and the SMA's trigger control system is that there is no "Initiated" state in the SMA. The SMA implementation assumes that the trigger system is initiated automatically in the "Idle" state. As a result, any sweep operation in the SMA, once activated, can only be controlled by internal or external trigger events.

This has an important impact on the user application. Application code that requires an "Initiated" state in the trigger control system must be adapted.

3.2.6 Status and Error Reporting

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



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 SMA, 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 SMA 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.

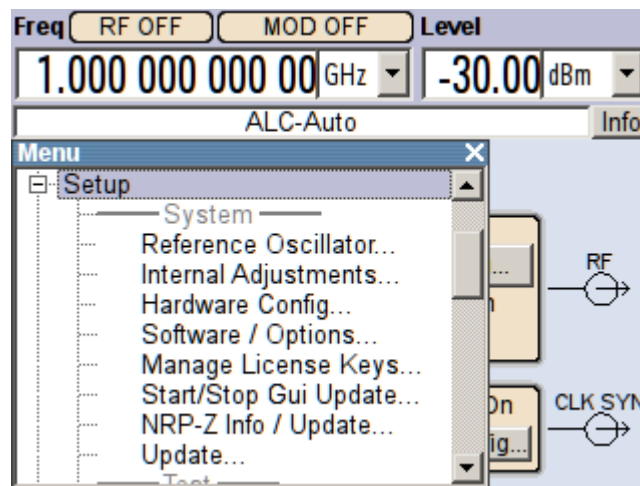
4 Activating a Remote Emulation

In order to use a specific remote emulation, it must first be activated by the user. Activation is done either

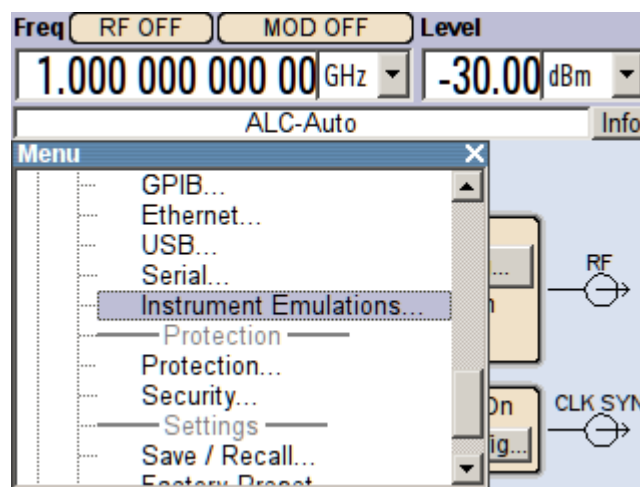
- manually using the SMA front panel
- remotely using SCPI commands

4.1 Manual Operation

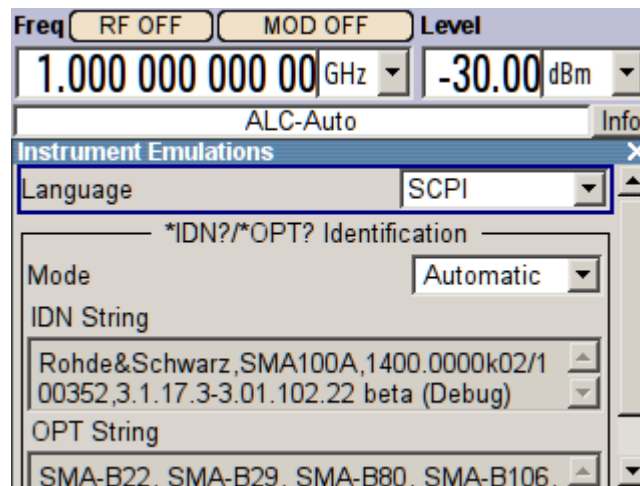
On the SMA front panel, press the SETUP key to open the Menu tree:



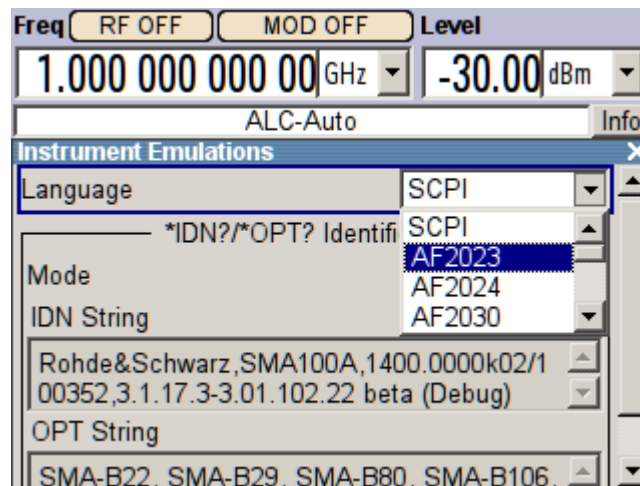
In the Menu tree, select Instrument Emulations... and open the Instrument Emulations dialog:



In the Instrument Emulations dialog, set up the remote emulation specific parameters:

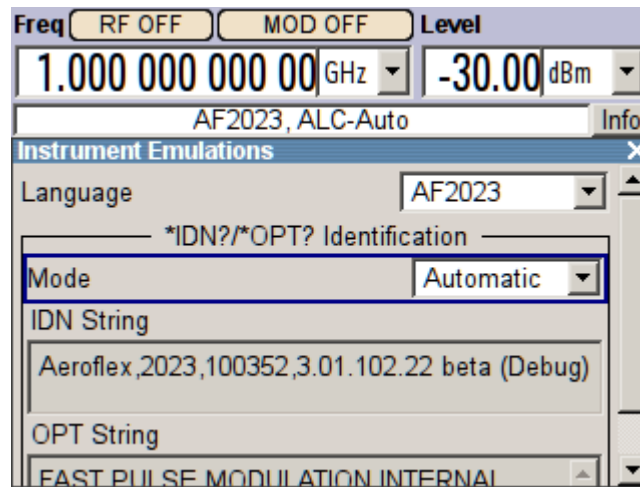


Select the Language and open the drop-down list. Pick an item from the list and confirm the selection:

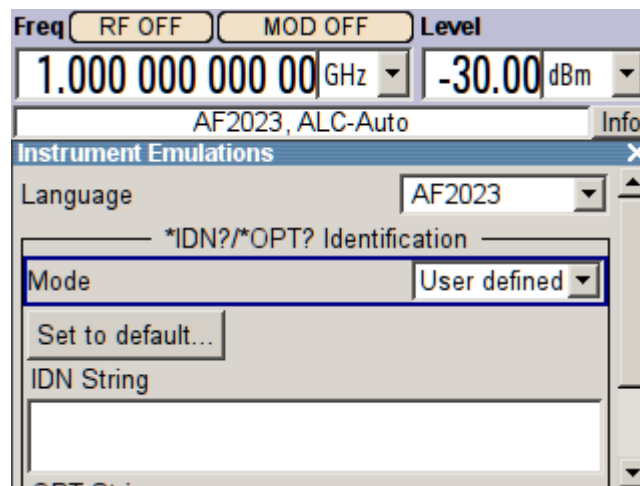


Select the Mode and open the drop-down list. Pick either “Automatic” or “User defined” from the list and confirm the selection.

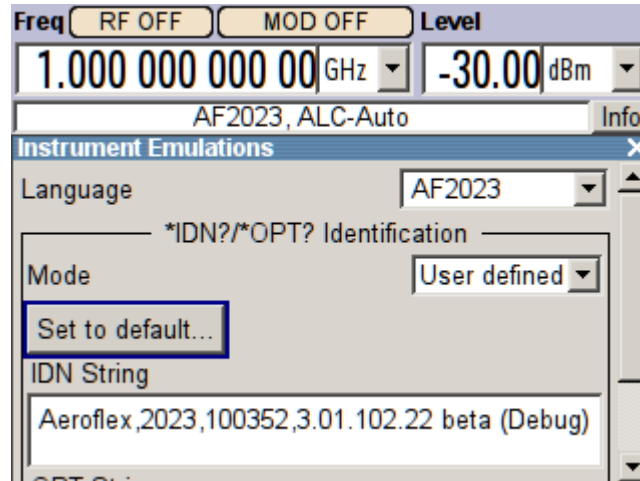
In “Automatic” mode, the response text to *IDN? and *OPT? queries is generated by the signal generator itself.



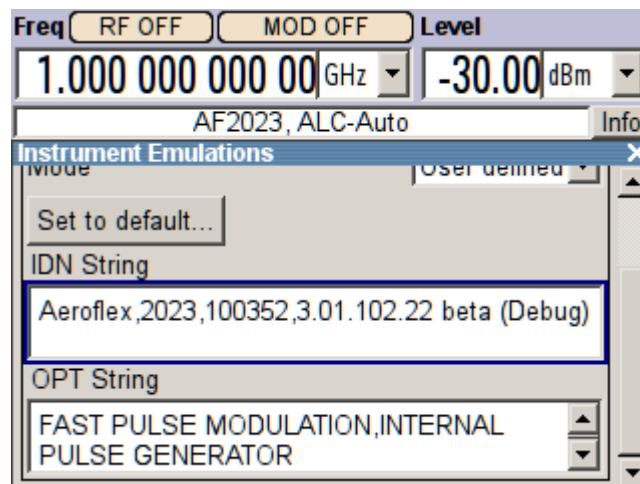
In “User defined” mode, the response text to *IDN? and *OPT? queries must be entered in the corresponding IDN string and/or OPT string text boxes:



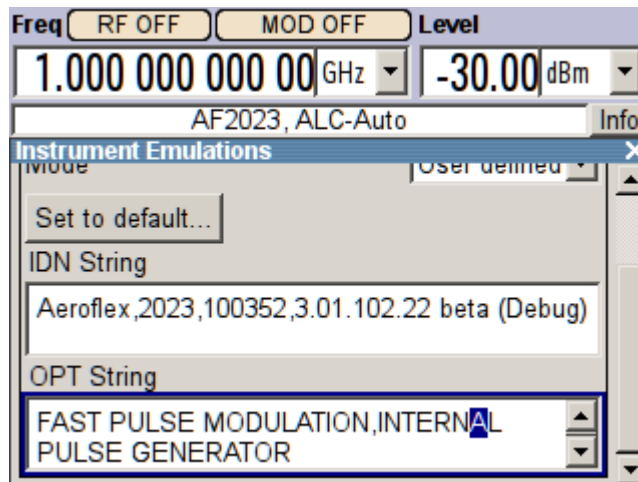
In “User defined” mode, press the “Set to default...” button to preset the corresponding IDN string and/or OPT string text boxes with the default settings from the selected remote emulation:



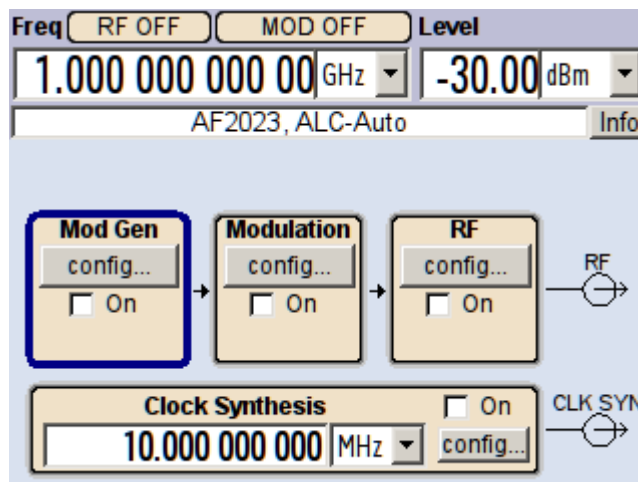
Then select the IDN String text box and edit the response text to *IDN? queries. When finished, confirm the text:



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 and verify the selected remote emulation on the SMA front panel:



4.2 Remote Operation

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

When the SMA 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>	<p>Sets the state of the identification mode.</p> <p>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.</p> <p>If the identification mode is set to AUTO, the factory default setting is returned on a *IDN? query or an *OPT? query.</p> <p>The value range of character-type parameter <value> is</p> <ul style="list-style-type: none"> • AUTO • USER
:SYSTem:IDENt?	Gets the state of the identification mode.
:SYSTem:IDN <value>	<p>Sets the user-defined response to an *IDN? query.</p> <p>The string-type parameter <value> allows up to 128 characters. The parameter has to be enclosed in single or double quotes.</p>
:SYSTem:IDN?	Gets the user-defined response to an *IDN? query.
:SYSTem:OPT <value>	<p>Sets the user-defined response to a *OPT? query.</p> <p>The string-type parameter <value> allows up to 128 characters. The parameter has to be enclosed in single or double quotes.</p>
:SYSTem:OPT?	Gets the user-defined response to a *OPT? query.

Commands to modify remote emulation relevant settings	
Command	Comment
:SYSTem:LANGuage <value>	<p>Activates the remote emulation to be used for further communications.</p> <p>The value range of the string-type parameter <value> is:</p> <ul style="list-style-type: none"> • "AF2023", "AF2024" • "AF2030", "AF2031", "AF2032", "AF2040", "AF2041", "AF2042", "AF2042(ADF)" • "E4428", "N5161", "N5181" • "HP8642" • "HP8643", "HP8643", "HP8644", "HP8664", "HP8665" • "HP8647", "HP8648" • "HP8656", "HP8657" • "HP8662", "HP8663" • "PC8303" • "RC3102", "RC9087" • "SME02", "SME03", "SME06", "SMT02", "SMT03", "SMT06" • "SMGU", "SMHU", "SMY01", "SMY02" • "SML01", "SML02", "SML03" • "EXIT" <p>Attention:</p> <p>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.</p> <p>Therefore, this command must be the one and only command in a program message unit.</p> <p>After sending this command, a delay of two seconds must be applied to the application software before the next command is sent.</p> <p>The parameter value "EXIT" must be used to return to the native SCPI command set of the instrument.</p>
: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 Aeroflex 2023-2024



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? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*ESR? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*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.	✋
*OPC *OPC?	✓
*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.	✋
*RST	✓
*SRE value *SRE? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*STB? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*TRG	✓
*TST?	✓
*WAI	✓

Device-specific functions	
Command syntax	Status
AM[1][:DEPTH] value	✓

Device-specific functions	
Command syntax	Status
AM[1]:DN	✓
AM[1]:EXTAC	✓
AM[1]:EXTALC	○
AM[1]:EXTDC	✓
AM[1]:INC value	✓
AM[1]:INT	✓
AM[1]:MODF[:VALUE] value	✓
AM[1]:MODF:DN	✓
AM[1]:MODF:INC value	✓
AM[1]:MODF:PHASE value	○
AM[1]:MODF:RETN	✓
AM[1]:MODF:SIN	✓
AM[1]:MODF:SQR	✓
AM[1]:MODF:TRI	○
AM[1]:MODF:UP	✓
AM[1]:MODF:XFER	✓
AM[1]:OFF	✓
AM[1]:ON	✓
AM[1]:RETN	✓
AM[1]:UP	✓
AM[1]:XFER	✓
AM[1]?	✓
BLANK OFF	✓
BLANK ON	✓
BLANK?	✓
CCR?	○
CFRQ[:VALUE] value	✓
CFRQ:DN	✓
CFRQ:INC value	✓
CFRQ:MODE	✓
CFRQ:PHASE value	✓
CFRQ:RETN	✓
CFRQ:START	✓

Device-specific functions	
Command syntax	Status
CFRQ:STOP	✓
CFRQ:TIME	✓
CFRQ:UP	✓
CFRQ:XFER	✓
CFRQ?	✓
CSE value CSE?	○
CSR?	○
DCFMNL	✓
ERROR? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	
FM[1][:DEVN] value	✓
FM[1]:DN	✓
FM[1]:EXTAC	✓
FM[1]:EXTALC	○
FM[1]:EXTDC	✓
FM[1]:INC value	✓
FM[1]:INT	✓
FM[1]:MODF[:VALUE] value	✓
FM[1]:MODF:DN	✓
FM[1]:MODF:INC value	✓
FM[1]:MODF:PHASE value	○
FM[1]:MODF:RETN	✓
FM[1]:MODF:SIN	✓
FM[1]:MODF:SQR	✓
FM[1]:MODF:TRI	○
FM[1]:MODF:UP	✓
FM[1]:MODF:XFER	✓
FM[1]:OFF	✓
FM[1]:ON	✓
FM[1]:RETN	✓
FM[1]:UP	✓

Device-specific functions	
Command syntax	Status
FM[1]:XFER	✓
FM[1]?	✓
FSTD value Remark: INT, EXT10DIR are supported.	
FSTD?	✓
GPIB value	✓
HCR?	○
HSE value HSE?	○
HSR?	○
KLOCK	✓
KUNLOCK	✓
MODE value Remark: Only the following mode combinations are supported: AM1 FM1 PM1 PULSE AM1, FM1 AM1, PM1 PULSE,FM1 PULSE,PM1 PULSE, FM1 PULSE, PM1	
MODE?	✓
MOD:OFF	✓
MOD:ON	✓
MOD?	✓
OPER?	✓
OUTPUT:DISABLE	○
OUTPUT:ENABLE	○
PM[1]:[DEVN] value	✓
PM[1]:DN	✓
PM[1]:EXTAC	✓

Device-specific functions	
Command syntax	Status
PM[1]:EXTALC	○
PM[1]:EXTDC	✓
PM[1]:INC value	✓
PM[1]:INT	✓
PM[1]:MODF[:VALUE] value	✓
PM[1]:MODF:DN	✓
PM[1]:MODF:INC value	✓
PM[1]:MODF:PHASE value	○
PM[1]:MODF:RETN	✓
PM[1]:MODF:SIN	✓
PM[1]:MODF:SQR	✓
PM[1]:MODF:TRI	○
PM[1]:MODF:UP	✓
PM[1]:MODF:XFER	✓
PM[1]:OFF	✓
PM[1]:ON	✓
PM[1]:RETN	✓
PM[1]:UP	✓
PM[1]:XFER	✓
PM[1]?	✓
PULSE:EXT	✓
PULSE:INT	✓
PULSE::MODF[:VALUE] value	✓
PULSE:OFF	✓
PULSE:ON	✓
PULSE?	✓
RFLV[:VALUE] value	✓
RFLV:DN	✓
RFLV:INC value	✓
RFLV:LIMIT:DISABLE	✓
RFLV:LIMIT:ENABLE	✓
RFLV:LIMIT[:VALUE] value	✓
RFLV:LIMIT:SAVE	○

Device-specific functions	
Command syntax	Status
RFLV:OFF	✓
RFLV:OFFS:DISABLE	✓
RFLV:OFFS:ENABLE	✓
RFLV:OFFS:SAVE	○
RFLV:OFFS:VALUE value	✓
RFLV:ON	✓
RFLV:RETN	✓
RFLV:TYPE value	✓
RFLV:UNITS value	✓
RFLV:UP	✓
RFLV:XFER	✓
RFLV?	✓
RFLV:LIMIT?	✓
RFLV:OFFS?	✓
SCR?	○
SSE value SSE?	○
SSR?	○
SWEEP:CFRQ:INC value	✓
SWEEP:CFRQ:LOGINC value	✓
SWEEP:CFRQ:START value	✓
SWEEP:CFRQ:STOP value	✓
SWEEP:CFRQ:TIME value	✓
SWEEP:CONT Remark: Identical to SWEEP:GO.	✋
SWEEP:DN	✓
SWEEP:GO	✓
SWEEP:HALT	✓
SWEEP:MODE value	✓
SWEEP:RESET	✓
SWEEP:TRIG value Remark: OFF, START, STEP are supported.	✋



Device-specific functions	
Command syntax	Status
SWEEP:TYPE value	✓
SWEEP:UP	✓
SWEEP:XFER	○
SWEEP?	✓
SWEEP:CFRQ?	✓


6 Emulating the Aeroflex 2030-2032, 2040-2042

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? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*ESR? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*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.	✋
*OPC *OPC?	✓
*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.	✋
*RST	✓
*SRE value *SRE? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*STB? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*TRG	✓
*TST?	✓
*WAI	✓

Device-specific functions	
Command syntax	Status
AM[1][:DEPTH] value	✓
AM[1]:DN	✓
AM[1]:EXT1AC	✓
AM[1]:EXT1DC	✓
AM[1]:INC value	✓
AM[1]:INTF1	✓
AM[1]:INTF2	✓
AM[1]:INTF3	✓
AM[1]:INTF4	✓
AM[1]:INTF5	✓
AM[1]:INTF6	✓
AM[1]:OFF	✓
AM[1]:ON	✓
AM[1]:RETN	✓
AM[1]:UP	✓
AM[1]:XFER	✓
AM[1]?	✓
BLANK value Remark: 0, 1, 4 are supported.	✋
BACKL:ON	✓
BACKL:OFF	✓
CFRQ[:VALUE] value	✓
CFRQ:DN	✓
CFRQ:INC value	✓
CFRQ:PHASE value	✓
CFRQ:RETN	✓
CFRQ:UP	✓
CFRQ:XFER	✓
CFRQ?	✓
CCR?	○
CSE value CSE?	○


Device-specific functions	
Command syntax	Status
CSR?	○
DATE?	✓
DCFMNL	✓
ELAPSED?	✓
ERROR? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	
FM[1][:DEVN] value	✓
FM[1]:DN	✓
FM[1]:EXT1AC	✓
FM[1]:EXT1DC	✓
FM[1]:INC value	✓
FM[1]:INTF1	✓
FM[1]:INTF2	✓
FM[1]:INTF3	✓
FM[1]:INTF4	✓
FM[1]:INTF5	✓
FM[1]:INTF6	✓
FM[1]:OFF	✓
FM[1]:ON	✓
FM[1]:RETN	✓
FM[1]:UP	✓
FM[1]:XFER	✓
FM[1]?	✓
FSTD value Remark: INT10 , EXT5, EXT10 are supported.	
FSTD?	✓
HCR?	○
HSE value HSE?	○
HSR?	○

Device-specific functions	
Command syntax	Status
IMODE value Remark: NORMAL, SWEEPER are supported.	
INTF1 2 3 4 5 6[:FREQ] value	✓
INTF1 2 3 4 5 6:CTC1	○
INTF1 2 3 4 5 6:CTC2	○
INTF1 2 3 4 5 6:DN	✓
INTF1 2 3 4 5 6:INC value	✓
INTF1 2 3 4 5 6:PHASE value	○
INTF1 2 3 4 5 6:SIN	✓
INTF1 2 3 4 5 6:SQU	✓
INTF1 2 3 4 5 6:RETN	○
INTF1 2 3 4 5 6:TEMP	○
INTF1 2 3 4 5 6:TRI	○
INTF1 2 3 4 5 6:UP	✓
INTF1 2 3 4 5 6:USER	○
INTF1 2 3 4 5 6:XFER	✓
INTF1 2 3 4 5 6?	✓
KLOCK	✓
KUNLOCK	✓
LF:ON	✓
LF:OFF	✓
LF?	✓
LFGF[:VALUE] value	✓
LFGF:DN	✓
LFGF:INC value	✓
LFGF:RETN	✓
LFGF:SIN	✓
LFGF:SQU	✓
LFGF:TRI	○
LFGF:UP	✓
LFGF:XFER	✓
LFGF?	✓

Device-specific functions	
Command syntax	Status
LFGL[:VALUE] value	✓
LFGL:DN	✓
LFGL:INC value	✓
LFGL:RETN	✓
LFGL:UNITS value Remark: V, MV, UV are not supported.	✋
LFGL:UP	✓
LFGL:XFER	✓
LFGL?	✓
MODE value Remark: Only the following mode combinations are supported: AM1 FM1 PM1 PULSE AM1, FM1 AM1, PM1 PULSE,FM1 PULSE,PM1	✋
MODE?	✓
MOD:OFF	✓
MOD:ON Remark: Re-enables previously enabled analogous modulations.	✋
MOD?	✓
OPER?	✓
PGEN:DELAY value	✓
PGEN:D_DELAY value	✓
PGEN:RATE value	✓
PGEN:SOURCE value	✓
PGEN:STATE value	✓
PGEN:TRIGGER value	✓
PGEN:WIDTH value	✓
PM[1][:DEVN] value	✓

Device-specific functions	
Command syntax	Status
PM[1]:DN	✓
PM[1]:EXT1AC	✓
PM[1]:EXT1DC	✓
PM[1]:INC value	✓
PM[1]:INTF1	✓
PM[1]:INTF2	✓
PM[1]:INTF3	✓
PM[1]:INTF4	✓
PM[1]:INTF5	✓
PM[1]:INTF6	✓
PM[1]:OFF	✓
PM[1]:ON	✓
PM[1]:RETN	✓
PM[1]:UP	✓
PM[1]:XFER	✓
PM[1]?	✓
PULSE:CAL:ENABLE	○
PULSE:CAL:DISABLE	○
PULSE:OFF	✓
PULSE:ON	✓
PULSE?	✓
PULSE:CAL?	○
RFLV[:VALUE] value	✓
RFLV:DN	✓
RFLV:HYST:DISABLE	○
RFLV:HYST:ENABLE	○
RFLV:INC value	✓
RFLV:LIMIT[:VALUE] value	✓
RFLV:LIMIT:DISABLE	✓
RFLV:LIMIT:ENABLE	✓
RFLV:LIMIT:SAVE	○
RFLV:OFF	✓
RFLV:OFFS:DISABLE	✓

Device-specific functions	
Command syntax	Status
RFLV:OFFS:ENABLE	✓
RFLV:OFFS:OFF	✓
RFLV:OFFS:ON	✓
RFLV:OFFS:SAVE	○
RFLV:OFFS:VALUE value	✓
RFLV:ON	✓
RFLV:RETN	✓
RFLV:TYPE value	✓
RFLV:UNITS value	✓
RFLV:UP	✓
RFLV:XFER	✓
RFLV?	✓
RFLV:HYST?	○
RFLV:LIMIT?	✓
RFLV:OFFS?	✓
SCR?	○
SSE value SSE?	○
SSR?	○
SWEEP:CALC	○
SWEEP:CFRQ:STARTvalue	✓
SWEEP:CFRQ:STEP value	✓
SWEEP:CFRQ:STOP value	✓
SWEEP:CFRQ:TIME value	✓
SWEEP:CONT Remark: Identical to SWEEP:GO.	✋
SWEEP:GO	✓
SWEEP:HALT	✓
SWEEP:INTF:STARTvalue	✓
SWEEP:INTF:STEP value	✓
SWEEP:INTF:STOP value	✓
SWEEP:INTF:TIME value	✓

Device-specific functions	
Command syntax	Status
SWEEP:LFGF:STARTvalue	✓
SWEEP:LFGF:STEP value	✓
SWEEP:LFGF:STOP value	✓
SWEEP:LFGF:TIME value	✓
SWEEP:MODE value	✓
SWEEP:RESET	✓
SWEEP:RFLV:STARTvalue	✓
SWEEP:RFLV:STEP value	✓
SWEEP:RFLV:STOP value	✓
SWEEP:RFLV:TIME value	✓
SWEEP:TYPE value Remark: CFRQ, RFLV, LFGF, INTF1, INTF2, INTF3, INTF4, INTF5, INTF6 are supported.	
SWEEP?	✓
SWEEP:CFRQ?	✓
SWEEP:INTF?	✓
SWEEP:LFGF?	✓
SWEEP:RFLV?	✓
SWEEP?	✓
TIME?	✓

The following table shows the current implementation status of additional commands, if options SMA-K25 and SMA-K26 are installed. Commands not shown in these table are not supported.

Device-specific functions	
Command syntax	Status
MODE value ILS VOR DME	✓
MODE?	✓
VOR[:DEPTH] value	✓
VOR:INC value	✓
VOR:UP	✓
VOR:DN	✓

Device-specific functions	
Command syntax	Status
VOR:RETN	✓
VOR:XFER	✓
VOR?	✓
VOR:DEVN	✓
VOR:DEVN?	✓
SUB[:DEPTH] value	✓
SUB:INC value	✓
SUB:UP	✓
SUB:DN	✓
SUB:RETN	✓
SUB:XFER	✓
SUB?	✓
SUB:DEVN	✓
SUB:DEVN?	✓
REF[:DEPTH] value	✓
REF:INC value	✓
REF:UP	✓
REF:DN	✓
REF:RETN	✓
REF:XFER	✓
REF?	✓
BEARFR[:VALUE] value	✓
BEARFR:INC value	✓
BEARFR:UP	✓
BEARFR:DN	✓
BEARFR:XFER	✓
BEARFR:RETN	✓
BEARTO[:VALUE] value	✓
BEARTO:INC value	✓
BEARTO:UP	✓
BEARTO:DN	✓
BEARTO:XFER	✓
BEARTO:RETN	✓

Device-specific functions	
Command syntax	Status
BEAR?	✓
VORF[:VALUE] value	✓
VORF:INC value	✓
VORF:UP	✓
VORF:DN	✓
VORF:RETN	✓
VORF:XFER	✓
VORF?	✓
SDM[:DEPTH] value	✓
SDM:INC value	✓
SDM:UP	✓
SDM:DN	✓
SDM:RETN	✓
SDM:XFER	✓
SDM?	✓
SDM:PHASE value	✓
SDM:PHASE?	✓
DDM90 DDM150[:DEPTH] value	✓
DDM90 DDM150:INC value	✓
DDM90 DDM150:UP	✓
DDM90 DDM150:DN	✓
DDM90 DDM150:RETN	✓
DDM90 DDM150:XFER	✓
DDM?	✓
SUPPRESS:TONE90	✓
SUPPRESS:TONE150	✓
SUPPRESS:NONE	✓
SUPPRESS?	✓
ILSF[:VALUE] value	✓
ILSF:INC value	✓
ILSF:UP	✓
ILSF:DN	✓
ILSF:RETN	✓

Device-specific functions	
Command syntax	Status
ILSF:XFER	✓
ILSF?	✓
DME:TRIGGER value	✓
DME:PPS value	✓
DME:WIDTH value	✓
DME:RISE value	✓
DME:FALL value	✓
DME:RATE value	✓
DME?	✓

7 Emulating the Agilent E4428, N5161, N5181

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? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*ESR? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*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.	✋
*OPC *OPC?	✓
*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.	✋
*RST	✓
*SRE value *SRE? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*STB? Remark: Layout of ESE register corresponds to Rohde & Schwarz signal generator.	✋
*TRG	✓
*TST?	✓
*WAI	✓






Device-specific functions	
Command syntax	Status
ABORt	✓
CALibration:DCFM	✓
CALibration:IQ:FULL	✓
DISPlay:ANNotation:AMPLitude[:STATe] value DISPlay:ANNotation:AMPLitude[:STATe]?	✓
DISPlay:ANNotation:FREQuency[:STATe] value DISPlay:ANNotation:FREQuency[:STATe]?	✓
DISPlay:REMote value DISPlay:REMote?	✓
INITiate:CONTInuous[:ALL] value INITiate:CONTInuous[:ALL]?	○
INITiate:IMMEDIATE[:ALL]	○
MEMory:CATalog[:ALL]?	✓
MEMory:CATalog:LIST?	✓
MEMory:CATalog:ULFT?	✓
MEMory:COpy[:NAME] value, value	✓
MEMory:DATA value,value MEMory:DATA? value	✓
MEMory:DATA:UNPRotected value, value MEMory:DATA:UNPRotected? Value Remark: Implementation identical to MEMory:DATA[?].	
MEMory:DELeTe:ALL	✓
MEMory:DELeTe:LIST	✓
MEMory:DELeTe[:NAME] value	✓
MEMory:DELeTe:ULFT	✓
MEMory:FREE[:ALL]	✓
MEMory:LOAD:LIST value	✓
MEMory:MOVE	✓
MEMory:STORE:LIST value	✓
MMEMory:CATalog[:ALL]? value	✓
MMEMory:COpy value, value	✓
MMEMory:DATA value, value MMEMory:DATA? value	✓
MMEMory:DELeTe[:NAME] value	✓



Device-specific functions	
Command syntax	Status
MMEMory:LOAD:LIST value	✓
MMEMory:LOAD:MOVE value, value	✓
MMEMory:STORe:LIST value	✓
OUTPut:MODulation[:STATe] value OUTPut:MODulation[:STATe]?	✓
OUTPut[:STATe] value OUTPut[:STATe]?	✓
[SOURce:]AM[1] [:DEPth][:LINear] value [SOURce:]AM[1] [:DEPth][:LINear]?	✓
[SOURce:]AM[1] [:DEPth]:STEP[:INCRement] value [SOURce:]AM[1] [:DEPth]:STEP[:INCRement]?	✓
[SOURce:]AM[1]:EXTernal[1]:COUPling value [SOURce:]AM[1]:EXTernal[1]:COUPling?	✓
[SOURce:]AM[1]:INTernal[1]:FREQUency value [SOURce:]AM[1]:INTernal[1]:FREQUency?	✓
[SOURce:]AM[1]:INTernal[1]:FREQUency:STEP[:INCRement] value [SOURce:]AM[1]:INTernal[1]:FREQUency:STEP[:INCRement]?	✓
[SOURce:]AM[1]:INTernal[1]:FUNCTion:SHAPE value [SOURce:]AM[1]:INTernal[1]:FUNCTion:SHAPE? Remark: SINE is supported.	✋
[SOURce:]AM[1]:INTernal[1]:SWEep:TIME value [SOURce:]AM[1]:INTernal[1]:SWEep:TIME? Remark: Dwell time is assumed.	✋
[SOURce:]AM[1]:INTernal[1]:SWEep:TRIGger value [SOURce:]AM[1]:INTernal[1]:SWEep:TRIGger? Remark: BUS, EXTernal, IMMEDIATE are supported.	✋
[SOURce:]AM[1]:SOURce value [SOURce:]AM[1]:SOURce? Remark: EXTernal[1], INTernal[1] are supported.	✋
[SOURce:]AM[1]:STATe value [SOURce:]AM[1]:STATe?	✓
[SOURce:]CORRection:FLATness:LOAD value	✓

Device-specific functions	
Command syntax	Status
[SOURce:]CORRection:FLATness:PAIR value, value {value, value} [SOURce:]CORRection:FLATness:PAIR?	✓
[SOURce:]CORRection:FLATness:POINts?	✓
[SOURce:]CORRection:FLATness:PRESet	✓
[SOURce:]CORRection:FLATness:STORe value	✓
[SOURce:]CORRection[:STATe] value [SOURce:]CORRection[:STATe]?	✓
[SOURce:]FM[1][:DEViation] value [SOURce:]FM[1][:DEViation]? Remark: DOWN, MINImum, Numeric, UP are supported.	✋
[SOURce:]FM[1][:DEViation]:STEP[:INCRement] value [SOURce:]FM[1][:DEViation]:STEP[:INCRement]?	✓
[SOURce:]FM[1]2:EXTernal[12:COUPling value [SOURce:]FM[1]2:EXTernal[1]:COUPling?	✓
[SOURce:]FM[1]:INTernal[1]:FREQUency value [SOURce:]FM[1]:INTernal[1]:FREQUency?	✓
[SOURce:]FM[1]:INTernal[1]:FREQUency:STEP[:INCRement] value [SOURce:]FM[1]:INTernal[1]:FREQUency:STEP[:INCRement]?	✓
[SOURce:]FM[1]:INTernal[1]:FUNCTion:SHAPE value [SOURce:]FM[1]:INTernal[1]:FUNCTion:SHAPE? Remark: SINE is supported.	✋
[SOURce:]FM[1]:INTernal[1]:SWEep:TIME value [SOURce:]FM[1]:INTernal[1]:SWEep:TIME? Remark: Dwell time is assumed.	✋
[SOURce:]FM[1]:INTernal[1]:SWEep:TRIGger value [SOURce:]FM[1]:INTernal[1]:SWEep:TRIGger? Remark: BUS, EXTernal, IMMEDIATE are supported.	✋
[SOURce:]FM[1]:SOURce value [SOURce:]FM[1]:SOURce? Remark: EXTernal[1], INTernal[1] are supported.	✋
[SOURce:]FM[1]:STATe value [SOURce:]FM[1]:STATe?	✓





Device-specific functions	
Command syntax	Status
[SOURce:]FREQuency[:CW] value [SOURce:]FREQuency[:CW]?	✓
[SOURce:]FREQuency[:CW]:STEP[:INCRement] value [SOURce:]FREQuency[:CW]:STEP[:INCRement]?	✓
[SOURce:]FREQuency:FIXed value [SOURce:]FREQuency:FIXed?	✓
[SOURce:]FREQuency:MODE [SOURce:]FREQuency:MODE?	✓
[SOURce:]FREQuency:OFFSet value [SOURce:]FREQuency:OFFSet?	✓
[SOURce:]FREQuency:OFFSet:STATe value [SOURce:]FREQuency:OFFSet:STATe?	✓
[SOURce:]FREQuency:REFerence value [SOURce:]FREQuency:REFerence?	✓
[SOURce:]FREQuency:REFerence:STATe value [SOURce:]FREQuency:REFerence:STATe?	✓
[SOURce:]FREQuency:STARt value [SOURce:]FREQuency:STARt?	✓
[SOURce:]FREQuency:STOP value [SOURce:]FREQuency:STOP?	✓
[SOURce:]LFOutput:AMPLitude value [SOURce:]LFOutput:AMPLitude?	✓
[SOURce:]LFOutput:FUNCTion[1]:FREQuency value [SOURce:]LFOutput:FUNCTion[1]:FREQuency?	✓
[SOURce:]LFOutput:FUNCTion[1]:FREQuency:STEP[:INCRement] value [SOURce:]LFOutput:FUNCTion[1]:FREQuency:STEP[:INCRement]?	✓
[SOURce:]LFOutput:FUNCTion[1]:PERiod value [SOURce:]LFOutput:FUNCTion[1]:PERiod?	✓
[SOURce:]LFOutput:FUNCTion[1]:PERiod:STEP[:INCRement] value [SOURce:]LFOutput:FUNCTion[1]:PERiod:STEP[:INCRement]?	✓
[SOURce:]LFOutput:FUNCTion[1]:PWIDth value [SOURce:]LFOutput:FUNCTion[1]:PWIDth?	✓
[SOURce:]LFOutput:FUNCTion[1]:PWIDth:STEP[:INCRement] value [SOURce:]LFOutput:FUNCTion[1]:PWIDth:STEP[:INCRement]?	✓

Device-specific functions	
Command syntax	Status
[SOURce:]LFOutput:FUNCTion[1]:SHAPE value [SOURce:]LFOutput:FUNCTion[1]:SHAPE? Remark: SINE is supported.	
[SOURce:]LFOutput:FUNCTion[1]:SWEep:TRIGger value [SOURce:]LFOutput:FUNCTion[1]:SWEep:TRIGger? Remark: BUS, EXTERNAL, IMMEDIATE are supported.	
[SOURce:]LFOutput:FUNCTion[1]:SOURce value [SOURce:]LFOutput:FUNCTion[1]:SOURce? Remark: INTERNAL[1] is supported.	
[SOURce:]LFOutput:FUNCTion[1]:STATE value [SOURce:]LFOutput:FUNCTion[1]:STATE?	✓
[SOURce:]LIST:DIRection?	○
[SOURce:]LIST:DWELI value {,value} [SOURce:]LIST:DWELI? Remark: First parameter value is evaluated, rest is ignored.	
[SOURce:]LIST:DWELI:POINts?	✓
[SOURce:]LIST:DWELI:TYPE value [SOURce:]LIST:DWELI:TYPE?	✓
[SOURce:]LIST:FREQuency value {,value} [SOURce:]LIST:FREQuency?	✓
[SOURce:]LIST:FREQuency:POINts?	✓
[SOURce:]LIST:MODE value [SOURce:]LIST:MODE?	✓
[SOURce:]LIST:POWer value {,value} [SOURce:]LIST:POWer?	✓
[SOURce:]LIST:POWer:POINts?	✓
[SOURce:]LIST:TYPE value [SOURce:]LIST:TYPE?	✓
[SOURce:]LIST:TYPE:LIST:INITialize:FSTep	✓
[SOURce:]LIST:TYPE:LIST:INITialize:PREset	✓
[SOURce:]PHASe[:ADJust] value [SOURce:]PHASe[:ADJust]?	✓
[SOURce:]PHASe:REFerence	✓

Device-specific functions	
Command syntax	Status
[SOURce:]PM[1][:DEViation] value [SOURce:]PM[1][:DEViation]? Remark: DOWN, MINImum, Numeric, UP are supported.	
[SOURce:]PM[1][:DEViation]:STEP[:INCRement] value [SOURce:]PM[1][:DEViation]:STEP[:INCRement]?	✓
[SOURce:]PM[1]:EXTernal[1]:COUPling value [SOURce:]PM[1]:EXTernal[1]:COUPling?	✓
[SOURce:]PM[1]:INTernal[1]:FREQUency value [SOURce:]PM[1]:INTernal[1]:FREQUency?	✓
[SOURce:]PM[1]:INTernal[1]:FREQUency:STEP[:INCRement] value [SOURce:]PM[1]:INTernal[1]:FREQUency:STEP[:INCRement]?	✓
[SOURce:]PM[1]:INTernal[1]:FUNCTion:SHAPE value [SOURce:]PM[1]:INTernal[1]:FUNCTion:SHAPE? Remark: SINE is supported.	
[SOURce:]PM[1]:INTernal[1]:SWEep:TIME value [SOURce:]PM[1]:INTernal[1]:SWEep:TIME? Remark: Dwell time is assumed.	
[SOURce:]PM[1]:INTernal[1]:SWEep:TRIGger value [SOURce:]PM[1]:INTernal[1]:SWEep:TRIGger? Remark: BUS, EXTernal, IMMEDIATE are supported.	
[SOURce:]PM[1]:SOURce value [SOURce:]PM[1]:SOURce? Remark: EXTernal[1], INTernal[1] are supported.	
[SOURce:]FM[1]:STATe value [SOURce:]FM[1]:STATe?	✓
[SOURce:]POWer:ALC[:STATe] value [SOURce:]POWer:ALC[:STATe]?	✓
[SOURce:]POWer:ATTenuation value [SOURce:]POWer:ATTenuation?	✓
[SOURce:]POWer:ATTenuation:AUTO value [SOURce:]POWer:ATTenuation:AUTO?	✓
[SOURce:]POWer[:LEVel][:IMMEDIATE][:AMPLitude] value [SOURce:]POWer[:LEVel][:IMMEDIATE][:AMPLitude]?	✓





Device-specific functions	
Command syntax	Status
[SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]:STEP[:INCRement] value [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]:STEP[:INCRement]?	✓
[SOURce:]POWer[:LEVel][:IMMediate]:OFFSet value [SOURce:]POWer[:LEVel][:IMMediate]:OFFSet?	✓
[SOURce:]POWer:MODE value [SOURce:]POWer:MODE?	✓
[SOURce:]POWer:REFerence value [SOURce:]POWer:REFerence?	✓
[SOURce:]POWer:REFerence:STATe value [SOURce:]POWer:REFerence:STATe?	✓
[SOURce:]POWer:STARt value [SOURce:]POWer:STARt?	✓
[SOURce:]POWer:STOP value [SOURce:]POWer:STOP?	✓
[SOURce:]PULM:EXTernal:POLarity value [SOURce:]PULM:EXTernal:POLarity?	✓
[SOURce:]PULM:INTernal[1]:FREQuency value [SOURce:]PULM:INTernal[1]:FREQuency?	✓
[SOURce:]PULM:INTernal[1]:FREQuency:STEP[:INCRement] value [SOURce:]PULM:INTernal[1]:FREQuency:STEP[:INCRement]?	✓
[SOURce:]PULM:INTernal[1]:FUNctioN:SHAPE value [SOURce:]PULM:INTernal[1]:FUNctioN:SHAPE? Remark: SQUare is supported.	
[SOURce:]PULM:INTernal[1]:PERiod value [SOURce:]PULM:INTernal[1]:PERiod?	✓
[SOURce:]PULM:INTernal[1]:PERiod:STEP[:INCRement] value [SOURce:]PULM:INTernal[1]:PERiod:STEP[:INCRement]?	✓
[SOURce:]PULM:INTernal[1]:PWIDth value [SOURce:]PULM:INTernal[1]:PWIDth?	✓
[SOURce:]PULM:INTernal[1]:PWIDth:STEP[:INCRement] value [SOURce:]PULM:INTernal[1]:PWIDth:STEP[:INCRement]?	✓
[SOURce:]PULM:INTernal[1]:SOURce value [SOURce:]PULM:INTernal[1]:SOURce? Remark: EXTernal[1], INTernal are supported.	

Device-specific functions	
Command syntax	Status
[SOURce:]PULM:INTernal[1]:STATe value [SOURce:]PULM:INTernal[1]:STATe?	✓
[SOURce:]ROSCillator:SOURce value [SOURce:]ROSCillator:SOURce?	✓
[SOURce:]SWEep:DWELl value [SOURce:]SWEep:DWELl?	✓
[SOURce:]SWEep:POINts value [SOURce:]SWEep:POINts?	✓
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?	✓
SYSTem:CAPability?	○
SYSTem:COMMunicate:GPIB:ADDRess value SYSTem:COMMunicate:GPIB:ADDRess?	✓
SYSTem:COMMunicate:GTLocal	✓
SYSTem:COMMunicate:LAN:CONFig value SYSTem:COMMunicate:LAN:CONFig?	✓
SYSTem:COMMunicate:LAN:GATeway value SYSTem:COMMunicate:LAN:GATeway?	✓
SYSTem:COMMunicate:LAN:HOSTname value SYSTem:COMMunicate:LAN:HOSTname?	✓

Device-specific functions	
Command syntax	Status
SYSTem:COMMunicate:LAN:IP value SYSTem:COMMunicate:LAN:IP?	✓
SYSTem:COMMunicate:LAN:SUBNet value SYSTem:COMMunicate:LAN:SUBNet?	✓
SYSTem:COMMunicate:SERial:BAUD value SYSTem:COMMunicate:SERial:BAUD?	✓
SYSTem:DATE value SYSTem:DATE?	✓
SYSTem:ERRor:CODE[:NEXT]? Remark: Returns the original error code of the Rohde & Schwarz signal generator.	
SYSTem:ERRor[:NEXT]? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	
SYSTem:IDN value SYSTem:IDN?	✓
SYSTem:OPT value SYSTem:OPT?	✓
SYSTem:PDOWN	✓
SYSTem:PRESet	✓
SYSTem:PRESet:ALL	✓
SYSTem:SECurity:DISPlay value SYSTem:SECurity:DISPlay?	✓
SYSTem:TIME value SYSTem:TIME?	✓
SYSTem:VERSion?	✓
TRIGger[:SEQuence][:IMMediate]	✓
TRIGger[:SEQuence]:SLOPe value TRIGger[:SEQuence]:SLOPe?	✓
TRIGger[:SEQuence]:SOURce value TRIGger[:SEQuence]:SOURce? Remark: BUS, EXTeRnal, IMMediate are supported.	
UNIT:POWer value UNIT:POWer? Remark: DB, DBM, DBV, DBMV, DBUV, V, MV, UV are supported.	

8 Emulating the Hewlett-Packard 8642



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


Device-specific functions	
Command syntax	Status
AA value Remark: Units DB, DM, DU, MV, VL are supported.	
AB value Remark: Units DB, DM, DU, MV, VL are supported.	
AM value	✓
AP value Remark: Units DB, DM, DU, MV, VL are supported.	
BA	✓
BD	✓
DN	✓
EMOF	✓
EMON	✓
FA value	✓
FB value	✓
FM value	✓
FR value	✓
IP	✓
IS value Remark: HZ, GZ, KZ, MZ, DB are supported.	
MF value	✓
ML value	✓
NT	✓
OF	✓
ON	✓
PM value	✓
PL	✓
RA value	✓

Device-specific functions	
Command syntax	Status
RF value	✓
XA	✓
XD	✓
UP	✓


9 Emulating the Hewlett-Packard 8643-8645, 8664-8665



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.	
*OPC *OPC?	✓
*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
AM:COUPling value AM:COUPling? Remark: AC, DC are supported.	
AM[:DEPTh] value AM[:DEPTh]?	✓

Device-specific functions	
Command syntax	Status
AM[:DEPT]h]:STEP[:INCRement] value AM[:DEPT]h]:STEP[:INCRement]?	○
AM:FREQUency value AM:FREQUency?	✓
AM:FREQUency:STEP[:INCRement] value AM:FREQUency:STEP[:INCRement]?	○
AM:SOURce value AM:SOURce?	✓
AM:STATe value AM:STATe?	✓
AMPLitude[:OUT]:ATTenuation:AUTO value AMPLitude[:OUT]:ATTenuation:AUTO?	✓
AMPLitude[:OUT]:GAIN value AMPLitude[:OUT]:GAIN?	✓
AMPLitude[:OUT][:LEVel] value AMPLitude[:OUT][:LEVel]?	✓
AMPLitude[:OUT][:LEVel]:STEP[:INCRement] value AMPLitude[:OUT][:LEVel]:STEP[:INCRement]?	✓
AMPLitude[:OUT][:LEVel]:STEP:UNIT value AMPLitude[:OUT][:LEVel]:STEP:UNIT?	✓
AMPLitude[:OUT]:STATe value AMPLitude[:OUT]:STATe?	✓
AMPLitude[:OUT]:ULIMit value AMPLitude[:OUT]:ULIMit?	✓
AMPLitude[:OUT]:UNIT value AMPLitude[:OUT]:UNIT?	✓
AMPLitude:SOURce:ATTenuation:AUTO value AMPLitude:SOURce:ATTenuation:AUTO?	✓
AMPLitude:SOURce:GAIN value AMPLitude:SOURce:GAIN?	✓
AMPLitude:SOURce[:LEVel] value AMPLitude:SOURce[:LEVel]?	✓
AMPLitude:SOURce[:LEVel]:STEP[:INCRement] value AMPLitude:SOURce[:LEVel]:STEP[:INCRement]?	✓
AMPLitude:SOURce[:LEVel]:STEP:UNIT value AMPLitude:SOURce[:LEVel]:STEP:UNIT?	✓

Device-specific functions	
Command syntax	Status
AMPLitude:SOURce:STATe value AMPLitude:SOURce:STATe?	✓
AMPLitude:SOURce:UNIT value AMPLitude:SOURce:UNIT?	✓
CALibration:ALL?	✓
DISPlay:ANNotation[:ALL] value DISPlay:ANNotation[:ALL]?	✓
DISPlay:ANNotation:AMPLitude value DISPlay:ANNotation:AMPLitude?	✓
DISPlay:ANNotation:FREQuency value DISPlay:ANNotation:FREQuency?	✓
DISPlay:STATe value DISPlay:STATe?	✓
FM:COUPling value FM:COUPling? Remark: AC, DC are supported.	
FM[:DEViation] value FM[:DEViation]?	✓
FM[:DEViation]:STEP[:INCRement] value FM[:DEViation]:STEP[:INCRement]?	○
FM:FREQuency value FM:FREQuency?	✓
FM:FREQuency:STEP[:INCRement] value FM:FREQuency:STEP[:INCRement]?	○
FM:SOURce value FM:SOURce?	✓
FM:STATe value FM:STATe?	✓
FREQuency:CENTer value FREQuency:CENTer?	✓
FREQuency:CENTer:STEP[:INCRement] value FREQuency:CENTer:STEP[:INCRement]?	✓
FREQuency[:CW] value FREQuency[:CW]?	✓
FREQuency[:CW]:STEP[:INCRement] value FREQuency[:CW]:STEP[:INCRement]?	✓

Device-specific functions	
Command syntax	Status
FREQuency:INSTantaneous?	✓
FREQuency:MANual value FREQuency:MANual?	✓
FREQuency:MODE value FREQuency:MODE? Remark: Handling of INITialize and TRIGger is different.	
FREQuency:MULTplier value FREQuency:MULTplier?	✓
FREQuency:OFFSet value FREQuency:OFFSet?	✓
FREQuency:SPAN value FREQuency:SPAN?	✓
FREQuency:SPAN:STEP[:INCRement] value FREQuency:SPAN:STEP[:INCRement]?	✓
FREQuency:STARt value FREQuency:STARt?	✓
FREQuency:STARt:STEP[:INCRement] value FREQuency:STARt:STEP[:INCRement]?	✓
FREQuency:STOP value FREQuency:STOP?	✓
FREQuency:STOP:STEP[:INCRement] value FREQuency:STOP:STEP[:INCRement]?	✓
INITialize:ABORt Remark: Handling of INITialize and TRIGger is different.	
INITialize[:IMMediate] Remark: Handling of INITialize and TRIGger is different.	
INITialize:MODE value INITialize:MODE? Remark: Handling of INITialize and TRIGger is different.	
INITialize:STATe value INITialize:STATe? Remark: Handling of INITialize and TRIGger is different.	

Device-specific functions	
Command syntax	Status
LFSOURCE:FREQUENCY[1] value LFSOURCE:FREQUENCY[1]?	✓
LFSOURCE:FREQUENCY[1]:STEP[:INCRement] value LFSOURCE:FREQUENCY[1]:STEP[:INCRement]?	○
LFSOURCE:LEVEL[1]value LFSOURCE:LEVEL[1]?	✓
LFSOURCE:LEVEL[1]:STEP[:INCRement] value LFSOURCE:LEVEL[1]:STEP[:INCRement]?	○
LFSOURCE:STATE[1] value LFSOURCE:STATE[1]?	✓
LFSOURCE:WAVEform[1] value LFSOURCE:WAVEform[1]?	
Remark: SINE, SQUARE are supported.	
MODulation[:STATE] value MODulation[:STATE]?	✓
PHASe[:ADJust] value PHASe[:ADJust]?	✓
PHASe[:ADJust]:STEP[:INCRement] value PHASe[:ADJust]:STEP[:INCRement]?	○
PHASe:REFERENCE	✓
PM:COUPling value PM:COUPling?	
Remark: AC, DC are supported.	
PM[:DEViation] value PM[:DEViation]?	✓
PM[:DEViation]:STEP[:INCRement] value PM[:DEViation]:STEP[:INCRement]?	○
PM:FREQUency value PM:FREQUency?	✓
PM:FREQUency:STEP[:INCRement] value PM:FREQUency:STEP[:INCRement]?	○
PM:SOURce value PM:SOURce?	✓
PM:STATE value PM:STATE?	✓

Device-specific functions	
Command syntax	Status
POWer[:OUT]:ATTenuation:AUTO value POWer[:OUT]:ATTenuation:AUTO?	✓
POWer[:OUT]:GAIN value POWer[:OUT]:GAIN?	✓
POWer[:OUT][:LEVel] value POWer[:OUT][:LEVel]?	✓
POWer[:OUT][:LEVel]:STEP[:INCRement] value POWer[:OUT][:LEVel]:STEP[:INCRement]?	✓
POWer[:OUT][:LEVel]:STEP:UNIT value POWer[:OUT][:LEVel]:STEP:UNIT?	✓
POWer[:OUT]:STATe value POWer[:OUT]:STATe?	✓
POWer[:OUT]:ULIMit value POWer[:OUT]:ULIMit?	✓
POWer[:OUT]:UNIT value POWer[:OUT]:UNIT?	✓
POWer:SOURce:ATTenuation:AUTO value POWer:SOURce:ATTenuation:AUTO?	✓
POWer:SOURce:GAIN value POWer:SOURce:GAIN?	✓
POWer:SOURce[:LEVel] value POWer:SOURce[:LEVel]?	✓
POWer:SOURce[:LEVel]:STEP[:INCRement] value POWer:SOURce[:LEVel]:STEP[:INCRement]?	✓
POWer:SOURce[:LEVel]:STEP:UNIT value POWer:SOURce[:LEVel]:STEP:UNIT?	✓
POWer:SOURce:STATe value POWer:SOURce:STATe?	✓
POWer:SOURce:UNIT value POWer:SOURce:UNIT?	✓
PULSe:DELay value PULSe:DELay?	✓
PULSe:DELay:STEP[:INCRement] value PULSe:DELay:STEP[:INCRement]?	○
PULSe:FREQuency value PULSe:FREQuency?	✓

Device-specific functions	
Command syntax	Status
PULSe:FREQuency:STEP[:INCRement] value PULSe:FREQuency:STEP[:INCRement]?	○
PULSe:SLOPe value PULSe:SLOPe ? Remark: POSitive, NEGative are supported.	✋
PULSe:SOURce value PULSe:SOURce? Remark: INTernal, EXTernal are supported.	✋
PULSe[:STATe] value PULSe[:STATe]?	✓
PULSe:WIDTh value PULSe:WIDTh?	✓
PULSe:WIDTh:STEP[:INCRement] value PULSe:WIDTh:STEP[:INCRement]?	○
ROSCillator:CALibration value ROSCillator:CALibration?	✓
ROSCillator:CALibration:STEP[:INCRement] value ROSCillator:CALibration:STEP[:INCRement]?	○
ROSCillator:SOURce value ROSCillator:SOURce?	✓
STATus[:DEVice]:CONDition? Remark: Bit 2 is supported.	✋
STATus[:DEVice]:ENABle value STATus[:DEVice]:CONDition? Remark: Bit 2 is supported.	✋
STATus[:DEVice][:EVENT]? Remark: Bit 2 is supported.	✋
STATus[:DEVice]:NTRansition? Remark: Bit 2 is supported.	✋
STATus[:DEVice]:PTRansition? Remark: Bit 2 is supported.	✋

Device-specific functions	
Command syntax	Status
SWEep[:FREQuency]:MODE value SWEep[:FREQuency]:MODE?	✓
SWEep[:FREQuency]:SPACing value SWEep[:FREQuency]:SPACing?	✓
SWEep[:FREQuency]:TIME value SWEep[:FREQuency]:TIME? Remark: Numeric items 1-2-5-10 are supported. Sweep time is divided into dwell time and count.	✋
SWEep[:FREQuency]:TIME:STEP[:INCRement]?	○
SWEep[:FREQuency]:TIME:STEP:MODE?	✓
SYSTem:ERRor? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	✋
TSWeep	✓





10 Emulating the Hewlett-Packard 8647-8648



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

IEEE488.2 functions	
Status	Command syntax
*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.	✋
*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[,value] Remark: Optional part is not supported.	✋
*RST	✓
*SAV value[,value] Remark: Optional part is not supported.	✋
*SRE value *SRE?	✓
*STB?	✓
*TST?	✓
*WAI	✓

Device-specific functions	
Command syntax	Status
OUTPut[:STATe] value OUTPut[:STATe]?	✓




Device-specific functions	
Command syntax	Status
[SOURce:]AM[:DEPT] value [SOURce:]AM[:DEPT]?	✓
[SOURce:]AM:EXTernal:COUPling value [SOURce:]AM:EXTernal:COUPling?	✓
[SOURce:]AM:INTernal[1]:FREQuency value [SOURce:]AM:INTernal[1]:FREQuency?	✓
[SOURce:]AM:INTernal2:FREQuency value [SOURce:]AM:INTernal2:FREQuency? Remark: Internal2 is identical to Internal[1].	✋
[SOURce:]AM:INTernal2:FUNCTion:SHAPE value [SOURce:]AM:INTernal2:FUNCTion:SHAPE? Remark: SINe and SQUare are supported.	✋
[SOURce:]AM:SOURce value [SOURce:]AM:SOURce? Remark: Internal2 is identical to Internal[1].	✋
[SOURce:]AM:STATe value [SOURce:]AM:STATe?	✓
[SOURce:]CAL:DCFM Remark: The elimination process takes about 10 s.	✋
[SOURce:]FM[:DEVIation] value [SOURce:]FM[:DEVIation]?	✓
[SOURce:]FM:EXTernal:COUPling value [SOURce:]FM:EXTernal:COUPling?	✓
[SOURce:]FM:INTernal[1]:FREQuency value [SOURce:]FM:INTernal[1]:FREQuency?	✓
[SOURce:]FM:INTernal2:FREQuency value [SOURce:]FM:INTernal2:FREQuency? Remark: Internal2 is identical to Internal[1].	✋
[SOURce:]FM:INTernal2:FUNCTion:SHAPE value. [SOURce:]FM:INTernal2:FUNCTion:SHAPE? Remark: SINe and SQUare are supported.	✋



Device-specific functions	
Command syntax	Status
[SOURce:]FM:SOURce value [SOURce:]FM:SOURce? Remark: Internal2 is identical to Internal[1].	
[SOURce:]FM:STATe value [SOURce:]FM:STATe?	✓
[SOURce:]FREQuency[:CW] value [SOURce:]FREQuency[:CW]?	✓
[SOURce:]FREQuency:FIXed value [SOURce:]FREQuency:FIXed?	✓
[SOURce:]FREQuency:REFerence value [SOURce:]FREQuency:REFerence?	✓
[SOURce:]FREQuency:REFerence:STATe value [SOURce:]FREQuency:REFerence:STATe?	✓
[SOURce:]PM[:DEViation] value [SOURce:]PM[:DEViation]?	✓
[SOURce:]PM:EXTernal:COUPling value [SOURce:]PM:EXTernal:COUPling?	✓
[SOURce:]PM:INTernal[1]:FREQuency value [SOURce:]PM:INTernal[1]:FREQuency?	✓
[SOURce:]PM:INTernal2:FREQuency value [SOURce:]PM:INTernal2:FREQuency? Remark: Internal2 is identical to Internal[1].	
[SOURce:]PM:INTernal2:FUNction:SHAPE value [SOURce:]PM:INTernal2:FUNction:SHAPE? Remark: SINe and SQUare are supported.	
[SOURce:]PM:SOURce value [SOURce:]PM:SOURce? Remark: Internal2 is identical to Internal[1].	
[SOURce:]PM:STATe value [SOURce:]PM:STATe?	✓
[SOURce:]POWER:ATTenuation:AUTO value [SOURce:]POWER:ATTenuation:AUTO?	✓
[SOURce:]POWER[:LEVel][:IMMEDIATE][:AMPLitude] value [SOURce:]POWER[:LEVel][:IMMEDIATE][:AMPLitude]?	✓

Device-specific functions	
Command syntax	Status
[SOURce:]POWer:REFerence value [SOURce:]POWer:REFerence?	✓
[SOURce:]POWer:REFerence:STATe value [SOURce:]POWer:REFerence:STATe?	✓
[SOURce:]PULM:STATe value [SOURce:]PULM:STATe?	✓
STATus:OPERation[:EVENT]?	✓
STATus: OPERation:CONDition?	✓
STATus: OPERation:ENABle value STATus: OPERation:ENABle?	✓
STATus:QUEStionalbe[:EVENT]?	✓
STATus: QUEStionalbe:CONDition?	✓
STATus: QUEStionalbe:ENABle value STATus: QUEStionalbe:ENABle?	✓
SYSTem:ERRor? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	
SYSTem:LANGuage value SYSTem:LANGuage? Remark: On select, only "EXIT" is supported (to return to the instrument's native SCPI language). On query, always "SCPI" is returned.	
SYSTem:VERSion?	✓

11 Emulating the Hewlett-Packard 8656-8657






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

Device-specific functions	
Command syntax	Status
AM value	✓
AO value	✓
AP value Remark: Units DM, DF, DBVL, DBMV, DBUV, DBEMVL, DBEMMV, DBEMUV, VL, MV, UV, EMVL, EMMV, EMUV are supported.	
DN	✓
FM value	✓
FR value	✓
IP	✓
IS numeric	✓
PD	✓
PI	✓
PF	✓
PM	✓
R0	✓
R1	✓
R2	✓
R3	✓
R5	✓
RC value Remark: The contents of the registers 0 to 9 are NOT persistent and are lost when power is switched off or when leaving the emulation mode.	
RL value Remark: The contents of the registers 0 to 9 are NOT persistent and are lost when power is switched off or when leaving the emulation mode.	
RP	✓
S1	✓
S2	✓

Device-specific functions	
Command syntax	Status
S3	✓
S4	✓
S5 value	✓
UP	✓
SV value Remark: The contents of the registers 0 to 9 are NOT persistent and are lost when power is switched off or when leaving the emulation mode.	
ST value Remark: The contents of the registers 0 to 9 are NOT persistent and are lost when power is switched off or when leaving the emulation mode.	




12 Emulating the Hewlett-Packard 8662-8663

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

Device-specific functions	
Command syntax	Status
A0	✓
AO	✓
AP value	✓
AM value	✓
AS	✗
BL value	✗
BLAP value Remark: value = 00, 81, 85, 86 are supported	
BP	✗
CT value Remark: T1, T2 and T3 are not supported.	
DN	✓
F0	✓
FA value Remark: Special functions 40 and 41 have no effect.	
FB value Remark: Special functions 40 and 41 have no effect.	
FM value	✓
FS value Remark: Special functions 40 and 41 have no effect.	
FO	✓
FR value	✓
IS value	✓
L1	✗
L2	✗
M0	✓


Device-specific functions	
Command syntax	Status
M1	✓
M2	✓
M3	✓
M4	✓
MF value	✓
MO	✓
MS	✓
N1 Remark: Special functions 40 and 41 have no effect.	✋
N2 Remark: Special functions 40 and 41 have no effect.	✋
N3 Remark: Special functions 40 and 41 have no effect.	✋
N4 Remark: Special functions 40 and 41 have no effect.	✋
N5 Remark: Special functions 40 and 41 have no effect.	✋
PL	✓
PM value	✓
R1	✗
R2	✗
R3	✗
R4	✗
R5	✗
RC value Remark: Storage is not persistent and will be lost when power down.	✋
RD	✗
RM	✗
RU	✗


Device-specific functions	
Command syntax	Status
SQ	✘
SP value Remark: value = 00, 81, 85, 86 are supported	✋
SS value ... value	✘
ST value Remark: Storage is not persistent and will be lost when power down.	✋
T1	✘
T2	✘
T3	✘
T4	✓
T5	✓
TR	✓
UP	✓
W1 Remark: Special functions 40 and 41 have no effect.	✋
W2 Remark: Special functions 40 and 41 have no effect.	✋
W3 Remark: Special functions 40 and 41 have no effect.	✋
W4 Remark: Special functions 40 and 41 have no effect.	✋
X1 value	✘
X2 value	✘
X3 value	✘
X4 value	✘
X5 value	✘
X6	✘
X7	✘

Device-specific functions	
Command syntax	Status
Y0 Remark: Implementation identical to W1.	
Y1 Remark: Implementation identical to W3.	
Y2 Remark: Implementation identical to W3.	
Y3	✓
@1	✗
@2	✗
@3	✗

13 Emulating the Panasonic 8303



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

Device-specific functions	
Command syntax	Status
AFA value	✓
AFF value	✓
AM value	✓
AP value	✓
AS	✗
DM	✗
DR	✗
EA value	✓
EF value	✓
EM	✗
FM value	✓
FR value	✓
LE value	✓
MO	✓
MS	✗
NT value	✓
PL	✗
PR	✗
P1	✗
P2	✗
QG	✓
RC value Remark: The contents of the registers 0 to 99 are NOT persistent and are lost when power is switched off or when leaving the emulation mode.	
TM	✗
TO value	✓




Device-specific functions	
Command syntax	Status
ST value Remark: The contents of the registers 0 to 99 are NOT persistent and are lost when power is switched off or when leaving the emulation mode.	

14 Emulating the Racal-Dana 3102, 9087

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



Device-specific functions	
Command syntax	Status
AD	✓
AM value	✓
AP value	✓
AR value	✓
AS value	✓
AU	✓
CE	✓
DG value	✗
FD	✓
FM value	✓
FQ value	✓
FR value	✓
FS value	✓
FU	✓
GS0 Remark: RF output is restored to the state before entering standby mode.	
GS1 Remark: Remark: Standby is simulated, RF output is turned off.	
HM value	✓
ID	✓
IN0	✗
IN1	✗
IN2	✗
IN3	✗
IN4	✗
IN5	✓
IP	✓

Device-specific functions	
Command syntax	Status
IS	✓
LM1	✗
LM2	✗
MA0	✓
MA1 Remark: AM can be combined with FM and HM, but not with PM.	✋
MA2	✓
MA3	✓
MA4	✓
MA5	✓
ME	✓
MF0	✓
MF1 Remark: FM can be combined with AM and PM, but not with HM.	✋
MF2	✓
MF3	✓
MF4	✓
MF5	✓
MH0	✓
MH1 Remark: HM can be combined with AM and PM, but not with FM.	✋
MH2	✓
MH3	✓
MH4	✓
MH5	✓
MI	✓
MP0	✓
MP1 Remark: PM can be combined with FM and HM, but not with AM.	✋
MP2	✓
MP3	✓

Device-specific functions	
Command syntax	Status
MP4	✘
MP5	✓
MR value Remark: RC3102 allows up to 100 value specifications. Specified register locations are subsequently recalled. SM* allows exactly one register location, which is recalled immediately.	
MRME value Remark: Storage is not persistent and will be lost when power down.	
MS value Remark: Storage is not persistent and will be lost when power down.	
OP0	✓
OP1	✓
PM	✓
RM1	✘
RM2	✘
RS value	✘
SF value	✘
WY	✘
@9	✘
@A	✘


15 Emulating the R&S®SML


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.	
*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
ABORt[:SWEep]	✓
CALibration[:ALL]?	✓
CALibration:FMOffset[:MEASure]?	✓
CALibration:ROSCillator[:DATA]? value	✓
DIAGnostic:INFO:CCOunt:POWer?	✓
DIAGnostic:INFO:OTIME?	✓




Device-specific functions	
Command syntax	Status
DIAGnostic:INFO:SDATe?	✓
DISPlay:ANNotation[:ALL] value DISPlay:ANNotation[:ALL]?	✓
DISPlay:ANNotation:AMPLitude value DISPlay:ANNotation:AMPLitude?	✓
DISPlay:ANNotation:FREQuency value DISPlay:ANNotation:FREQuency?	✓
MEMory:NSTATes?	✓
OUTPut[1]:AMODe value OUTPut[1]:AMODe?	✓
OUTPut[1][:STATe] value OUTPut1[:STATe]?	✓
OUTPut2[:STATe] value OUTPut2[:STATe]?	✓
OUTPut[1][:STATe]:PON value OUTPut[1][:STATe]:PON?	✓
OUTPut2:VOLTagE value OUTPut2:VOLTagE?	✓
[SOURce:]AM[:DEPTH] value [SOURce:]AM[:DEPTH]?	✓
[SOURce:]AM:EXTernal:COUPling value [SOURce:]AM:EXTernal:COUPling?	✓
[SOURce:]AM:INTernal:FREQuency value [SOURce:]AM:INTernal:FREQuency? value	✓
[SOURce:]AM:SOURce value [SOURce:]AM:SOURce?	✓
[SOURce:]AM:STATe value [SOURce:]AM:STATe?	✓
[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:DELeTe value	✓





Device-specific functions	
Command syntax	Status
[SOURce:]CORRection:CSET:DELeTe:ALL	✓
[SOURce:]CORRection:CSET:FREE?	✓
[SOURce:]CORRection:CSET[:SElect] value [SOURce:]CORRection:CSET[:SElect]?	✓
[SOURce:]CORRection[:STATe] value [SOURce:]CORRection[:STATe]?	✓
[SOURce:]FM[:DEVIation] value [SOURce:]FM[:DEVIation]?	✓
[SOURce:]FM:EXTernal:COUPling value [SOURce:]FM:EXTernal:COUPling?	✓
[SOURce:]FM:INTernal:FREQuency value [SOURce:]FM:INTernal:FREQuency?	✓
[SOURce:]FM:SOURce value [SOURce:]FM:SOURce?	✓
[SOURce:]FM:STATe value [SOURce:]FM:STATe?	✓
[SOURce:]FREQuency:CENTer value [SOURce:]FREQuency:CENTer?	✓
[SOURce:]FREQuency[:CW] value [SOURce:]FREQuency[:CW]?	✓
[SOURce:]FREQuency:FIXed value [SOURce:]FREQuency:FIXed?	✓
[SOURce:]FREQuency:MANual value Remark: Sets and limits actual RF frequency to sweep range.	
[SOURce:]FREQuency:MODE value [SOURce:]FREQuency:MODE?	✓
[SOURce:]FREQuency:OFFSet value [SOURce:]FREQuency:OFFSet?	✓
[SOURce:]FREQuency:RCL value [SOURce:]FREQuency:RCL?	✓
[SOURce:]FREQuency:SPAN value [SOURce:]FREQuency:SPAN?	✓
[SOURce:]FREQuency:STARt value [SOURce:]FREQuency:STARt?	✓
[SOURce:]FREQuency:STEP[:INCRement] value [SOURce:]FREQuency:STEP[:INCRement]?	✓

Device-specific functions	
Command syntax	Status
[SOURce:]FREQuency:STOP value [SOURce:]FREQuency:STOP?	✓
[SOURce:]MODulation[:ALL]:STATe value [SOURce:]MODulation[:ALL]:STATe?	✓
[SOURce:]PHASe value [SOURce:]PHASe?	✓
[SOURce:]PHASe:REFerence	✓
[SOURce:]PHASe:STEP value [SOURce:]PHASe:STEP?	✓
[SOURce:]PM[:DEViation] value [SOURce:]PM[:DEViation]?	✓
[SOURce:]PM:EXTernal:COUPling value [SOURce:]PM:EXTernal:COUPling?	✓
[SOURce:]PM:INTernal:FREQuency value [SOURce:]PM:INTernal:FREQuency?	✓
[SOURce:]PM:SOURce value [SOURce:]PM:SOURce?	✓
[SOURce:]PM:STATe value [SOURce:]PM:STATe?	✓
[SOURce:]POWer:ALC:STATe value [SOURce:]POWer:ALC:STATe?	✓
[SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude] value [SOURce:]POWer[:LEVel][:IMMediate][:AMPLitude]?	✓
[SOURce:]POWer[:LEVel][:IMMediate]:OFFSet value [SOURce:]POWer[:LEVel][:IMMediate]:OFFSet?	✓
[SOURce:]POWer:LIMit[:AMPLitude] value [SOURce:]POWer:LIMit[:AMPLitude]?	✓
[SOURce:]POWer:MANual value Remark: Sets and limits actual RF level to sweep range.	
[SOURce:]POWer:MODE value [SOURce:]POWer:MODE?	✓
[SOURce:]POWer:RCL value [SOURce:]POWer:RCL?	✓
[SOURce:]POWer:STARt value [SOURce:]POWer:STARt?	✓

Device-specific functions	
Command syntax	Status
[SOURce:]POWer:STEP[:INCRement] value [SOURce:]POWer:STEP[:INCRement]?	✓
[SOURce:]POWer:STOP value [SOURce:]POWer:STOP?	✓
[SOURce:]PULM:POLarity? Remark: In external mode only.	
[SOURce:]PULM:SOURce value [SOURce:]PULM:SOURce?	✓
[SOURce:]PULM:STATe value [SOURce:]PULM:STATe?	✓
[SOURce:]PULSe:DELay value [SOURce:]PULSe:DELay?	✓
[SOURce:]PULSe:DOUBle:DELay value [SOURce:]PULSe:DOUBle:DELay?	✓
[SOURce:]PULSe:DOUBle:STATe value [SOURce:]PULSe:DOUBle:STATe?	✓
[SOURce:]PULSe:PERiod value [SOURce:]PULSe:PERiod?	✓
[SOURce:]PULSe:WIDTh value [SOURce:]PULSe:WIDTh	✓
[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?	✓
[SOURce:]STEReo:ARI:BK[:CODE] value [SOURce:]STEReo:ARI:BK[:CODE]?	✓
[SOURce:]STEReo:ARI[:DEViation] value [SOURce:]STEReo:ARI[:DEViation]?	✓
[SOURce:]STEReo:ARI:STATe value [SOURce:]STEReo:ARI:STATe?	✓
[SOURce:]STEReo:ARI:TYPE value [SOURce:]STEReo:ARI:TYPE?	✓
[SOURce:]STEReo:ARI:TYPE:STATe value [SOURce:]STEReo:ARI:TYPE:STATe?	✓

Device-specific functions	
Command syntax	Status
[SOURce:]STEReo:AUDio[:FREQuency] value [SOURce:]STEReo:AUDio[:FREQuency]?	✓
[SOURce:]STEReo:AUDio:MODE value [SOURce:]STEReo:AUDio:MODE?	✓
[SOURce:]STEReo:AUDio:PREemphasis value [SOURce:]STEReo:AUDio:PREemphasis? Remark: 50us, 75us are supported.	
[SOURce:]STEReo:AUDio:PREemphasis:STATe value [SOURce:]STEReo:AUDio:PREemphasis:STATe?	✓
[SOURce:]STEReo[:DEViation] value [SOURce:]STEReo[:DEViation]?	✓
[SOURce:]STEReo:PILot[:DEViation] value [SOURce:]STEReo:PILot[:DEViation]?	✓
[SOURce:]STEReo:PILot:PHASe value [SOURce:]STEReo:PILot:PHASe?	✓
[SOURce:]STEReo:PILot:STATe value [SOURce:]STEReo:PILot:STATe?	✓
[SOURce:]STEReo:RDS:DATaset value [SOURce:]STEReo:RDS:DATaset?	✓
[SOURce:]STEReo:RDS[:DEViation] value [SOURce:]STEReo:RDS[:DEViation]?	✓
[SOURce:]STEReo:RDS:STATe value [SOURce:]STEReo:RDS:STATe?	✓
[SOURce:]STEReo:RDS:TRAFfic:PROGram:STATe value [SOURce:]STEReo:RDS:TRAFfic:PROGram:STATe?	✓
[SOURce:]STEReo:RDS:TRAFfic:ANNouncement:STATe value [SOURce:]STEReo:RDS:TRAFfic:ANNouncement:STATe?	✓
[SOURce:]STEReo:SOURce value [SOURce:]STEReo:SOURce?	✓
[SOURce:]STEReo[:STATe] value [SOURce:]STEReo[:STATe]?	✓
[SOURce:]SWEep[:FREQuency]:DWELI value [SOURce:]SWEep[:FREQuency]:DWELI?	✓



Device-specific functions	
Command syntax	Status
[SOURce:]SWEep[:FREQuency]:MODE value [SOURce:]SWEep[:FREQuency]:MODE? Remark: AUTO, MANual are supported.	
[SOURce:]SWEep[:FREQuency]:RUNNing?	✓
[SOURce:]SWEep[:FREQuency]:SPACing value [SOURce:]SWEep[:FREQuency]:SPACing?	✓
[SOURce:]SWEep[:FREQuency]:STEP[:LINear] value [SOURce:]SWEep[:FREQuency]:STEP[:LINear]?	✓
[SOURce:]SWEep[:FREQuency]:STEP:LOGarithmic value [SOURce:]SWEep[:FREQuency]:STEP:LOGarithmic?	✓
[SOURce:]SWEep:POWer:DWELI value [SOURce:]SWEep:POWer:DWELI?	✓
[SOURce:]SWEep:POWer:MODE value [SOURce:]SWEep:POWer:MODE? Remark: AUTO, MANual are supported.	
[SOURce:]SWEep:POWer:RUNNing?	✓
[SOURce:]SWEep:POWer:SPACing value [SOURce:]SWEep:POWer:SPACing?	✓
[SOURce:]SWEep:POWer:STEP:LOGarithmic value [SOURce:]SWEep:POWer:STEP:LOGarithmic?	✓
SOURce2:FREQuency[:CW] value SOURce2:FREQuency[:CW]?	✓
SOURce2:FREQuency:FIXed value SOURce2:FREQuency:FIXed?	✓
SOURce2:FREQuency:MANual value Remark: Sets and limits actual LF frequency to sweep range.	
SOURce2:FREQuency:MODE value SOURce2:FREQuency:MODE?	✓
SOURce2:FREQuency:STARt value SOURce2:FREQuency:STARt?	✓
SOURce2:FREQuency:STOP value SOURce2:FREQuency:STOP?	✓
SOURce2:SWEep[:FREQuency]:DWELI value SOURce2:SWEep[:FREQuency]:DWELI?	✓

Device-specific functions	
Command syntax	Status
SOURce2:SWEEp[:FREQuency]:MODE value SOURce2:SWEEp[:FREQuency]:MODE? Remark: AUTO, MANual are supported.	
SOURce2:SWEEp[:FREQuency]:RUNNing?	✓
SOURce2:SWEEp[:FREQuency]:SPACing value SOURce2:SWEEp[:FREQuency]:SPACing?	✓
SOURce2:SWEEp[:FREQuency]:STEP[:LINear] value SOURce2:SWEEp[:FREQuency]:STEP[:LINear]?	✓
SOURce2:SWEEp[:FREQuency]:STEP:LOGarithmic value SOURce2:SWEEp[:FREQuency]:STEP:LOGarithmic?	✓
STATus:PRESet	✓
STATus:QUEue[:NEXT]?	✓
SYSTem:COMMunicate:GPIB[:SELF]:ADDRes value SYSTem:COMMunicate:GPIB[:SELF]:ADDRes?	✓
SYSTem:DISPlay:UPDate[:STATe] value SYSTem:DISPlay:UPDate[:STATe]?	✓
SYSTem:ERRor? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	
SYSTem:PRESet Remark: Implementation is identical to common command *RST.	
SYSTem:SECurity[:STATe] value SYSTem:SECurity[:STATe]?	✓
SYSTem:SERRor?	✓
SYSTem:VERSion?	✓
TRIGger:PULSe:EGATed:POLarity value TRIGger:PULSe:EGATed:POLarity?	✓
TRIGger:PULSe:SLOPe value TRIGger:PULSe:SLOPe?	✓
TRIGger:PULSe:SOURce value TRIGger:PULSe:SOURce? Remark: AUTO, EGATe, EXTeRnal are supported.	
TRIGger[1] [:SWEEp][:IMMediate]	✓
TRIGger2[:SWEEp][:IMMediate]	✓

Device-specific functions	
Command syntax	Status
TRIGger[1] [:SWEep]:SOURce value TRIGger[1][:SWEep]:SOURce?	✓
TRIGger2[:SWEep]:SOURce value TRIGger2[:SWEep]:SOURce?	✓
UNIT:POWer value UNIT:POWer?	✓





16 Emulating the R&S®SME, R&S®SMT






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.	
*OPC *OPC?.	✓
*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
ABORt[:SWEp]	✓
CALibration:FM:Offset?	✓
CALibration:LEVel:STATe value CALibration:LEVel:STATe?	✓
CALibration:ROSCillator[:DATA] value CALibration:ROSCillator[:DATA]?	✓
DIAGnostic:INFO:CCOunt:POWer?	✓


Device-specific functions	
Command syntax	Status
DIAGnostic:INFO:OTIME?	✓
DIAGnostic:INFO:SDATE?	✓
DISPlay:ANNotation[:ALL] value DISPlay:ANNotation[:ALL]?	✓
DISPlay:ANNotation:AMPLitude value DISPlay:ANNotation:AMPLitude?	✓
DISPlay:ANNotation:FREQuency value DISPlay:ANNotation:FREQuency?	✓
FORMat[:DATA] value FORMat[:DATA]?	✓
MEMory:NStates?	✓
OUTPut[1]:AMODE value OUTPut[1]:AMODE?	✓
OUTPut[1]:IMPedance?	✓
OUTPut[1][:STATE] value OUTPut[1][:STATE]?	✓
OUTPut2[:STATE] value OUTPut2[:STATE]?	✓
OUTPut[1][:STATE]:PON value OUTPut[1][:STATE]:PON?	✓
OUTPut2:VOLTage value OUTPut2:VOLTage?	✓
[SOURce[1]:]AM[:DEPTh] value [SOURce[1]:]AM[:DEPTh]?	✓
[SOURce[1]:]AM:EXTernal:COUPling value [SOURce[1]:]AM:EXTernal:COUPling?	✓
[SOURce[1]:]AM:INTernal[1]:FREQuency value [SOURce[1]:]AM:INTernal[1]:FREQuency? value	✓
[SOURce[1]:]AM:INTernal2:FREQuency value [SOURce[1]:]AM:INTernal2:FREQuency? value Remark: INTernal2 is mapped to INTernal[1].	✋
[SOURce[1]:]AM:SOURce value [SOURce[1]:]AM:SOURce? Remark: INTernal2 is mapped to INTernal[1].	✋


Device-specific functions	
Command syntax	Status
[SOURce[1]:]AM:STATe value [SOURce[1]:]AM:STATe?	✓
[SOURce[1]:]CORRection:CSET:CATalog?	✓
[SOURce[1]:]CORRection:CSET:DATA:FREQUency value [SOURce[1]:]CORRection:CSET:DATA:FREQUency?	✓
[SOURce[1]:]CORRection:CSET:DATA:POWer value [SOURce[1]:]CORRection:CSET:DATA:POWer?	✓
[SOURce[1]:]CORRection:CSET:DELeTe value	✓
[SOURce[1]:]CORRection:CSET[:SELeCt] value [SOURce[1]:]CORRection:CSET[:SELeCt]?	✓
[SOURce[1]:]CORRection[:STATe] value [SOURce[1]:]CORRection[:STATe]?	✓
[SOURce[1]:]FM[1][:DEVIation] value [SOURce[1]:]FM[1] [:DEVIation]?	✓
[SOURce[1]:]FM2[:DEVIation] value [SOURce[1]:]FM2[:DEVIation]?	
Remark: FM2 is mapped to FM[1].	
[SOURce[1]:]FM[1]:EXTErnal[1]:COUPling value [SOURce[1]:]FM[1]:EXTErnal[1]:COUPling?	✓
[SOURce[1]:]FM[1]:EXTErnal2:COUPling value [SOURce[1]:]FM[1]:EXTErnal2:COUPling?	
Remark: EXTErnal2 is mapped to EXTErnal[1].	
[SOURce[1]:]FM2:EXTErnal[1]:COUPling value [SOURce[1]:]FM2:EXTErnal[1]:COUPling?	
Remark: FM2 is mapped to FM[1].	
[SOURce[1]:]FM2:EXTErnal2:COUPling value [SOURce[1]:]FM2:EXTErnal2:COUPling?	
Remark: FM2 is mapped to FM[1]. EXTErnal2 is mapped to EXTErnal[1].	
[SOURce[1]:]FM[1]:INTernAl:FREQUency value [SOURce[1]:]FM[1]:INTernAl:FREQUency?	✓

Device-specific functions	
Command syntax	Status
[SOURce[1]:]FM2:INTernal:FREQuency value [SOURce[1]:]FM2:INTernal:FREQuency? Remark: FM2 is mapped to FM[1].	
[SOURce[1]:]FM[1]:SOURce value [SOURce[1]:]FM[1]:SOURce? Remark: EXTernal2 is mapped to EXTernal[1].	
[SOURce[1]:]FM2:SOURce value [SOURce[1]:]FM2:SOURce? Remark: FM2 is mapped to FM[1]. EXTernal2 is mapped to EXTernal[1].	
[SOURce:]FM[1]:STATe value [SOURce:]FM[1]:STATe?	✓
[SOURce:]FM2:STATe value [SOURce:]FM2:STATe? Remark: FM2 is mapped to FM[1].	
[SOURce[1]:]FREQuency:CENTer value [SOURce[1]:]FREQuency:CENTer?	✓
[SOURce[1]:]FREQuency[:CW] value [SOURce[1]:]FREQuency[:CW]?	✓
[SOURce[1]:]FREQuency[:CW]:RCL value [SOURce[1]:]FREQuency[:CW]:RCL?	✓
[SOURce[1]:]FREQuency:FIXed value [SOURce[1]:]FREQuency:FIXed?	✓
[SOURce[1]:]FREQuency:FIXed:RCL value [SOURce[1]:]FREQuency:FIXed:RCL?	✓
[SOURce[1]:]FREQuency:MANual value Remark: Sets and limits actual RF frequency to sweep range.	
[SOURce[1]:]FREQuency:MODE value [SOURce[1]:]FREQuency:MODE?	✓
[SOURce[1]:]FREQuency:OFFSet value [SOURce[1]:]FREQuency:OFFSet?	✓
[SOURce[1]:]FREQuency:SPAN value [SOURce[1]:]FREQuency:SPAN?	✓

Device-specific functions	
Command syntax	Status
[SOURce[1]:]FREQuency:STARt value [SOURce[1]:]FREQuency:STARt?	✓
[SOURce[1]:]FREQuency:STEP[:INCRement] value [SOURce[1]:]FREQuency:STEP[:INCRement]?	✓
[SOURce[1]:]FREQuency:STOP value [SOURce[1]:]FREQuency:STOP?	✓
[SOURce[1]:]MODulation[:ALL]:STATe value [SOURce[1]:] MODulation[:ALL]:STATe?	+
[SOURce[1]:]PHASe[:ADJust] value [SOURce[1]:]PHASe[:ADJust]?	✓
[SOURce[1]:]PHASe:REFerence	✓
[SOURce[1]:]PM[1][:DEViation] value [SOURce[1]:]PM[1] [:DEViation]?	✓
[SOURce[1]:]PM2[:DEViation] value [SOURce[1]:]PM2[:DEViation]?	
Remark: PM2 is mapped to PM[1].	
[SOURce[1]:]PM[1]:EXTernal[1]:COUPling value [SOURce[1]:]PM[1]:EXTernal[1]:COUPling?	✓
[SOURce[1]:]PM[1]:EXTernal2:COUPling value [SOURce[1]:]PM[1]:EXTernal2:COUPling?	
Remark: EXTernal2 is mapped to EXTernal[1].	
[SOURce[1]:]PM2:EXTernal[1]:COUPling value [SOURce[1]:]PM2:EXTernal[1]:COUPling?	
Remark: PM2 is mapped to PM[1].	
[SOURce[1]:]PM2:EXTernal2:COUPling value [SOURce[1]:]PM2:EXTernal2:COUPling?	
Remark: PM2 is mapped to PM[1]. EXTernal2 is mapped to EXTernal[1].	
[SOURce[1]:]PM[1]:INTernal:FREQuency value [SOURce[1]:]PM[1]:INTernal:FREQuency?	✓
[SOURce[1]:]PM2:INTernal:FREQuency value [SOURce[1]:]PM2:INTernal:FREQuency?	
Remark: PM2 is mapped to PM[1].	

Device-specific functions	
Command syntax	Status
[SOURce[1]:]PM[1]:SOURce value [SOURce[1]:]PM[1]:SOURce? Remark: EXTernal2 is mapped to EXTernal[1].	
[SOURce[1]:]PM2:SOURce value [SOURce[1]:]PM2:SOURce? Remark: PM2 is mapped to PM[1]. EXTernal2 is mapped to EXTernal[1].	
[SOURce[1]:]PM[1]:STATe value [SOURce[1]:]PM[1]:STATe?	✓
[SOURce[1]:]PM2:STATe value [SOURce[1]:]PM2:STATe? Remark: PM2 is mapped to PM[1].	
[SOURce[1]:]POWer:ALC:STATe value [SOURce[1]:]POWer:ALC:STATe?	✓
[SOURce[1]:]POWer[:LEVel][:IMMediate][:AMPLitude] value [SOURce[1]:]POWer[:LEVel][:IMMediate][:AMPLitude]?	✓
[SOURce[1]:]POWer[:LEVel][:IMMediate]:OFFSet value [SOURce[1]:]POWer[:LEVel][:IMMediate]:OFFSet?	✓
[SOURce[1]:]POWer[:LEVel][:IMMediate]:RCL value [SOURce[1]:]POWer[:LEVel][:IMMediate]:RCL?	✓
[SOURce[1]:]POWer:LIMit[:AMPLitude] value [SOURce[1]:]POWer:LIMit[:AMPLitude]?	✓
[SOURce[1]:]POWer:MANual value Remark: Sets and limits actual RF level to sweep range.	
[SOURce[1]:]POWer:MODE value [SOURce[1]:]POWer:MODE?	✓
[SOURce[1]:]POWer:STARt value [SOURce[1]:]POWer:STARt?	✓
[SOURce[1]:]POWer:STEP[:INCRement] value [SOURce[1]:]POWer:STEP[:INCRement]?	✓
[SOURce[1]:]POWer:STOP value [SOURce[1]:]POWer:STOP?	✓


Device-specific functions	
Command syntax	Status
[SOURCE[1]:]PULM:EXTernal: IMPedance value [SOURCE[1]:]PULM:EXTernal:IMPedance? Remark: 50Ohms, 10KOhms are supported.	
[SOURCE[1]:]PULM:INTernal:FREQuency value [SOURCE[1]:]PULM:INTernal:FREQuency?	✓
[SOURCE[1]:]PULM:POLarity?	✓
[SOURCE[1]:]PULM:SOURce value [SOURCE[1]:]PULM:SOURce?	✓
[SOURCE[1]:]PULM:STATe value [SOURCE[1]:]PULM:STATe?	✓
[SOURCE[1]:]PULSe:DELay value [SOURCE[1]:]PULSe:DELay?	✓
[SOURCE[1]:]PULSe:DOUBle:DELay value [SOURCE[1]:]PULSe:DOUBle:DELay?	✓
[SOURCE[1]:]PULSe:DOUBle:STATe value [SOURCE[1]:]PULSe:DOUBle:STATe?	✓
[SOURCE[1]:]PULSe:PERiod value [SOURCE[1]:]PULSe:PERiod?	✓
[SOURCE[1]:]PULSe:WIDTh value [SOURCE[1]:]PULSe:WIDTh	✓
[SOURCE[1]:]ROSCillator[:INTernal]:ADJust[:STATe] value [SOURCE[1]:]ROSCillator[:INTernal]:ADJust[:STATe]?	✓
[SOURCE[1]:]ROSCillator[:INTernal]:ADJust:VALue value [SOURCE[1]:]ROSCillator[:INTernal]:ADJust:VALue?	✓
[SOURCE[1]:]ROSCillator:SOURce value [SOURCE[1]:]ROSCillator:SOURce?	✓
[SOURCE[1]:]STEReo:ARI:BK[:CODE] value [SOURCE[1]:]STEReo:ARI:BK[:CODE]?	✓
[SOURCE[1]:]STEReo:ARI[:DEViation] value [SOURCE[1]:]STEReo:ARI[:DEViation]?	✓
[SOURCE[1]:]STEReo:ARI:STATe value [SOURCE[1]:]STEReo:ARI:STATe?	✓
[SOURCE[1]:]STEReo:ARI:TYPE value [SOURCE[1]:]STEReo:ARI:TYPE?	✓
[SOURCE[1]:]STEReo:AUDio[:FREQuency] value [SOURCE[1]:]STEReo:AUDio[:FREQuency]?	✓

Device-specific functions	
Command syntax	Status
[SOURce[1]:]STEReo:AUDio:MODE value [SOURce[1]:]STEReo:AUDio:MODE?	✓
[SOURce[1]:]STEReo:AUDio:PREEmphasis value [SOURce[1]:]STEReo:AUDio:PREEmphasis? Remark: 50us, 75us are supported.	
[SOURce[1]:]STEReo[:]DEViation value [SOURce[:]STEReo[:]DEViation]?	✓
[SOURce[1]:]STEReo:PILot[:]DEViation value [SOURce[1]:]STEReo:PILot[:]DEViation]?	✓
[SOURce[1]:]STEReo:PILot:PHASe value [SOURce[1]:]STEReo:PILot:PHASe?	✓
[SOURce[1]:]STEReo:PILot:STATe value [SOURce[1]:]STEReo:PILot:STATe?	✓
[SOURce[1]:]STEReo[:]STATe value [SOURce[1]:]STEReo[:]STATe]?	✓
[SOURce[1]:]SWEep[:FREQUency]:DWELI value [SOURce[1]:]SWEep[:FREQUency]:DWELI?	✓
[SOURce[1]:]SWEep[:FREQUency]:MODE value [SOURce[1]:]SWEep[:FREQUency]:MODE?	✓
[SOURce[1]:]SWEep[:FREQUency]:POINTs value [SOURce[1]:]SWEep[:FREQUency]: POINTs?	✓
[SOURce[1]:]SWEep[:FREQUency]:SPACing value [SOURce[1]:]SWEep[:FREQUency]:SPACing?	✓
[SOURce[1]:]SWEep[:FREQUency]:STEP[:LINEar] value [SOURce[1]:]SWEep[:FREQUency]:STEP[:LINEar]?	✓
[SOURce[1]:]SWEep[:FREQUency]:STEP:LOGarithmic value [SOURce[1]:]SWEep[:FREQUency]:STEP:LOGarithmic?	✓
[SOURce[1]:]SWEep:POWer:DWELI value [SOURce[1]:]SWEep:POWer:DWELI?	✓
[SOURce[1]:]SWEep:POWer:MODE value [SOURce[1]:]SWEep:POWer:MODE?	✓
[SOURce[1]:]SWEep:POWer:POINTs value [SOURce[1]:]SWEep:POWer:POINTs?	✓
[SOURce[1]:]SWEep:POWer:SPACing value [SOURce[1]:]SWEep:POWer:SPACing?	✓

Device-specific functions	
Command syntax	Status
[SOURce[1]:]SWEep:POWer:STEP[:LOGarithmic] value [SOURce[1]:]SWEep:POWer:STEP[:LOGarithmic]?	✓
SOURce0:FREQuency[:CW] value SOURce0:FREQuency[:CW]? Remark: SOURce0 is mapped to SOURce2.	✋
SOURce2:FREQuency[:CW] value SOURce2:FREQuency[:CW]?	✓
SOURce0:FREQuency:FIXed value SOURce0:FREQuency:FIXed? Remark: SOURce0 is mapped to SOURce2.	✋
SOURce2:FREQuency:FIXed value SOURce2:FREQuency:FIXed?	✓
SOURce0:FREQuency:MANual value Remark: SOURce0 is mapped to SOURce2. Sets and limits actual LF frequency to sweep range.	✋
SOURce2:FREQuency:MANual value Remark: Sets and limits actual LF frequency to sweep range.	✋
SOURce0:FREQuency:MODE value SOURce0:FREQuency:MODE? Remark: SOURce0 is mapped to SOURce2.	✋
SOURce2:FREQuency:MODE value SOURce2:FREQuency:MODE?	✓
SOURce0:FREQuency:STARt value SOURce0:FREQuency:STARt? Remark: SOURce0 is mapped to SOURce2.	✋
SOURce2:FREQuency:STARt value SOURce2:FREQuency:STARt?	✓
SOURce0:FREQuency:STOP value SOURce0:FREQuency:STOP? Remark: SOURce0 is mapped to SOURce2.	✋
SOURce2:FREQuency:STOP value SOURce2:FREQuency:STOP?	✓

Device-specific functions	
Command syntax	Status
SOURce0:FUNction value SOURce0: FUNction? Remark: SOURce0 is mapped to SOURce2. SINusoid, SQUare are supported.	
SOURce2:FUNction value SOURce2: FUNction? Remark: SINusoid, SQUare are supported.	
SOURce0:SWEEp[:FREQuency]:DWELI value SOURce0:SWEEp[:FREQuency]:DWELI? Remark: SOURce0 is mapped to SOURce2.	
SOURce2:SWEEp[:FREQuency]:DWELI value SOURce2:SWEEp[:FREQuency]:DWELI?	✓
SOURce0:SWEEp[:FREQuency]:MODE value SOURce0:SWEEp[:FREQuency]:MODE? Remark: SOURce0 is mapped to SOURce2.	
SOURce2:SWEEp[:FREQuency]:MODE value SOURce2:SWEEp[:FREQuency]:MODE?	✓
SOURce0:SWEEp[:FREQuency]:POINts value SOURce0:SWEEp[:FREQuency]: POINts? Remark: SOURce0 is mapped to SOURce2.	
SOURce2:SWEEp[:FREQuency]:POINts value SOURce2:SWEEp[:FREQuency]: POINts?	✓
SOURce0:SWEEp[:FREQuency]:SPACing value SOURce0:SWEEp[:FREQuency]:SPACing? Remark: SOURce0 is mapped to SOURce2.	
SOURce2:SWEEp[:FREQuency]:SPACing value SOURce2:SWEEp[:FREQuency]:SPACing?	✓
SOURce0:SWEEp[:FREQuency]:STEP[:LINear] value SOURce0:SWEEp[:FREQuency]:STEP[:LINear]? Remark: SOURce0 is mapped to SOURce2.	
SOURce2:SWEEp[:FREQuency]:STEP[:LINear] value SOURce2:SWEEp[:FREQuency]:STEP[:LINear]?	✓

Device-specific functions	
Command syntax	Status
SOURce0:SWEep[:FREQuency]:STEP:LOGarithmic value SOURce0:SWEep[:FREQuency]:STEP:LOGarithmic? Remark: SOURce0 is mapped to SOURce2.	
SOURce2:SWEep[:FREQuency]:STEP:LOGarithmic value SOURce2: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:BEEPer:STATe value SYSTem:BEEPer:STATe?	✓
SYSTem:COMMunicate:GPIB[:SELF]:ADDRess value SYSTem:COMMunicate:GPIB[:SELF]:ADDRess?	✓
SYSTem:ERRor? Remark: Returns the original error message of the Rohde & Schwarz signal generator.	
SYSTem:KLOCK value SYSTem:KLOCK?	✓
SYSTem:LANGUage value	+
SYSTem:PRESet Remark: Implementation is identical to common command *RST.	

Device-specific functions	
Command syntax	Status
SYSTem:SECurity[:STATe] value SYSTem:SECurity[:STATe]?	✓
SYSTem:SERRor?	✓
SYSTem:VERSion?	✓
TRIGger[1]:PULSe:SOURce value TRIGger[1]:PULSe:SOURce?	✓
TRIGger[1]:PULSe:SLOPe value TRIGger[1]:PULSe:SLOPe?	✓
TRIGger[1]:SLOPe value TRIGger[1]:SLOPe? Remark: NEGative, POSitive are supported.	
TRIGger[1] [:SWEep][:IMMediate]	✓
TRIGger2[:SWEep][:IMMediate]	✓
TRIGger[1] [:SWEep]:SOURce value TRIGger[1] [:SWEep]:SOURce?	✓
TRIGger2[:SWEep]:SOURce value TRIGger2[:SWEep]:SOURce?	✓
UNIT:ANGLE value UNIT:ANGLE?	✓
UNIT:POWer value UNIT:POWer?	✓

17 Emulating the R&S®SMGU, R&S®SMHU, R&S®SMY

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.	✋
*OPC *OPC?	✓
*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 Remark: Only values in the range from 0 to 9 are supported.	✋
*RST	✓
*SAV value Remark: Only values in the range from 0 to 9 are supported.	✋
*SRE value *SRE?	✓
*STB?	✓
*TST?	✓
*WAI	✓

Device-specific functions	
Command syntax	Status
AF value AF?	✓

Device-specific functions	
Command syntax	Status
AF:OFF	✓
AF:ON	✓
AF:Var_step value AF:Var_step?	✓
ALc?	✓
ALc:Auto	○
ALc:Fixed	✓
ALc:NARrow	○
ALc:Normal	✓
ALc:WIDe	○
AM value AM?	✓
AM:Dual:Ac	✓
AM:Dual:Ac value	✓
AM:Dual:Dc	✓
AM:Dual:Dc value	✓
AM:External:Ac	✓
AM:External:Ac value	✓
AM:External:Dc	✓
AM:External:Dc value	✓
AM:Internal	✓
AM:Internal value	✓
AM:OFF	✓
AM:Var_step value AM:Var_step?	✓
Attenuator?	✓
ATtenuator:Fixed	✓
ATtenuator:Normal	✓
DECrement:AF	✓
DECrement:AM	✓
DECrement:FM	✓
DECrement:Level	✓
DECrement:PHM	✓

Device-specific functions	
Command syntax	Status
DECrement:RF	✓
FM value FM?	✓
FM:Dual:Ac	✓
FM:Dual:Ac value	✓
FM:Dual:Dc	✓
FM:Dual:Dc value	✓
FM:External:Ac	✓
FM:External:Ac value	✓
FM:External:Dc	✓
FM:External:Dc value	✓
FM:Internal	✓
FM:Internal value	✓
FM:OFF	✓
FM:Var_step value FM:Var_step?	✓
HEAder:OFF	✓
HEAder:ON	✓
INCrement:AF	✓
INCrement:AM	✓
INCrement:FM	✓
INCrement:Level	✓
INCrement:PHM	✓
INCrement:RF	✓
Level value Level?	✓
Level:Emf value Level:Emf?	✓
Level:OFF	✓
Level:ON	✓
Level:Var_step value Level:Var_step?	✓
PHM value PHM?	✓

Device-specific functions	
Command syntax	Status
PHM: Dual	✓
PHM: Dual value	✓
PHM: External	✓
PHM: External value	✓
PHM: Internal	✓
PHM: Internal value	✓
PHM: OFF	✓
PHM: Var_step value PHM: Var_step?	✓
PRReset	✓
REference_oscillator? Remark: Only the first 12 characters are valid.	✋
REference_oscillator: External Remark: Only the first 12 characters are valid.	✋
REference_oscillator: Internal Remark: Only the first 12 characters are valid.	✋
RF value RF?	✓
RF: STArt value RF: STArt?	✓
RF: STEp value RF: STEp?	✓
RF: STOp value RF: STOp?	✓
RF: Var_step value RF: Var_step?	✓
SWP?	✓
SWP: Auto	✓
SWP: OFF	✓
SWP: ON	✓
SWP: Reset	✓
Time[:RF_swp] value Time[:RF_swp]?	✓

18 References

- [1] Rohde & Schwarz, R&S®SMA100A Signal Generator Operating Manual

19 Ordering Information

Please visit the R&S®SMA100A product website for comprehensive ordering information (“Options”) at www.rohde-schwarz.com.

R&S®SMA100A	Signal Generator	
R&S®SMA-B103	9 kHz to 3 GHz with electronic attenuator	1400.0000.02
R&S®SMA-B106	9 kHz to 6 GHz with electronic attenuator	1405.0809.02
R&S®SMA-B103L	9 kHz to 3 GHz without attenuator	1405.0609.02
R&S®SMA-B106L	9 kHz to 6 GHz without attenuator	1405.1005.02
R&S®SMA-B20	FM/PM Modulator	1405.1605.02
R&S®SMA-B22	Enhanced Phase Noise Performance and FM/PM Modulator	1405.1805.02
R&S®SMA-B29	Clock Synthesizer	1400.2503.02
R&S®SMA-B46	Operating Altitude up to 4600 m	1405.1305.02
R&S®SMA-B80	Removable Mass Storage	1405.2001.02
R&S®SMA-B81	Rear Connectors	1405.2401.02
R&S®SMA-K23	High Performance Pulse Generator	1405.2801.02
R&S®SMA-K24	Multifunction Generator	1405.2901.02
R&S®SMA-K25	VOR/ILS Modulation	1405.3008.02
R&S®SMA-K26	DME Modulation	1405.3408.02
R&S®SMA-K27	Pulse Train	1405.3950.02
R&S®SMA-K28	Power Analysis	1405.3950.02

About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established more than 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

Environmental commitment

- Energy-efficient products
- Continuous improvement in environmental sustainability
- ISO 14001-certified environmental management system



Regional contact

Europe, Africa, Middle East

+49 89 4129 12345

customersupport@rohde-schwarz.com

North America

1-888-TEST-RSA (1-888-837-8772)

customer.support@rsa.rohde-schwarz.com

Latin America

+1-410-910-7988

customersupport.la@rohde-schwarz.com

Asia/Pacific

+65 65 13 04 88

customersupport.asia@rohde-schwarz.com

China

+86-800-810-8228 /+86-400-650-5896

customersupport.china@rohde-schwarz.com

This application note and the supplied programs may only be used subject to the conditions of use set forth in the download area of the Rohde & Schwarz website.

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG; Trade names are trademarks of the owners.

Rohde & Schwarz GmbH & Co. KG

Mühlhofstraße 15 | D - 81671 München

Phone + 49 89 4129 - 0 | Fax + 49 89 4129 - 13777

www.rohde-schwarz.com