NRA Series

Remote Analyzer

Command Reference Guide

Contents

1 General Information

Backus-Naur format

Symbol	Meaning
< >	Defined element
:=	Is defined as
|	Exclusive OR
{ }	Group, at least one element is required
[ ]	Optional field, can be omitted
…	Previous element(s) may be repeated
( )	Comment

Get commands

Get commands are used above all to query measurement values and settings. They always include '?' in the body of the command. Commas separate the parameters.

Syntax: <COMMAND> <?> [PARA1] , [PARA2] , [PARAn] ;

Set commands

Set commands are used to configure and control the device and are characterized by the fact that there is no question mark in the body of the command. Commas separate the parameters.

Syntax: <COMMAND> [PARA1] , [PARA2] , [PARAn] ;

Responses

Set or Get commands are always answered with a response from the device. The response includes a return code and, optionally, the requested data. A return code of 0 indicates success. A return code of 200 - 399 indicates a warning while a number of 400 or higher indicates an error. An error means the command was not accepted by the device.

Syntax [DATA1] , [DATA2] , [DATAn] , <ReturnCode> ;

Remote ON operation

Almost all the commands can only be processed by the device when it is in Remote ON mode. The REMOTE ON; command activates remote operation. Once activated, remote operation can be deactivated by the REMOTE OFF; command. The actual remote state can be checked by the help of the REMOTE?; command.

Termination and separation characters

All command parameters are separated by a ASCII comma Char <,> (decimal number: <44>).
All commands are terminated with the ASCII semicolon char <;> (decimal number: <59>).
Therefore the semicolon char <59> is not allowed to send within a command. The comma Char <44> can be included in a ASCII string marked with quotes: "SAMPLE,ASCII,STRING". In this case, the comma char does not act as a parameter separator.

USB interface parameters (USB for configuration only)

Before using the USB connection, you will have to install the USB driver. The driver makes a virtual COM port available on the target computer. Communication with the device is via this COM port, as with a normal serial interface. The default USB interface settings cannot be changed by the user.

Parameter	Setting
Bits per second	115200
Start bits	1
Data bits	8
Stop bits	1
Parity	None
Flow control	None

Network interface parameters

💡 *Applies only for devices with an Ehernet connector*

Most network parameters are user configurable. Use the "Narda Configurator" utility program for easy setup of the device network interface. The table below shows the default settings.

Parameter	Default Setting	Description
DHCP	OFF	
IP Address	192.168.128.128	
Subnet Mask	255.255.255.0	
Gateway	No default gateway	
Hostname	NRA+<DeviceName>+<DeviceSerialNumber>	
TCP port	55555	Remote communication
TCP port	80	Webserver communication
UDP port	4444	Narda device finder

Power-On self test

💡 *Applies for rackmount devices only*

If an error occurs during the self test of the device, the LED will flash red. The number of flashes indicates the type of error. The sequence of flashes is repeated three times at intervals of three seconds.

Number	Description
1	Operating System
2	Hardware
3	Memory
4	Data Logger
5	Flash

2 Return Codes

Information

Code	Description
0	command successful

Warnings

Code	Description
201	command parameter has been corrected
202	PLL unlocked

Error Codes

Code	Description
401	remote command is not implemented in the remote module
402	invalid parameter
403	invalid count of parameters
404	invalid parameter range
405	last command is not completed
406	answer time between remote module and application module is too high
407	invalid or corrupt data
408	error while accessing the hardware
409	command is not supported in this version of the application module
410	remote is not activated, please send REMOTE ON first
411	command is not supported in the selected mode
412	memory of data logger is full
413	option code is invalid
414	incompatible version
415	subindex full
416	file counter full
417	data lost
418	checksum error
419	FPGA programming error
420	path not found
421	break detected
422	low battery
423	file open error
424	data verify error
425	error while writing voice comment
426	no data available
427	program parameter error
428	frequencies of equipment do not match
429	connected equipment and device frequencies do not match
430	self test error was detected
431	datalogger reorganization required
432	mode not available

3 ASCII and BINARY Communication Details

Newline characters in ASCII communication

In ASCII communication newline characters can be sent by the device within the remote response.
The newline character can be set to CR (0x0D), LF (0x0A), CR+LF (0x0D + 0x0A) or NONE
The newline character can be changed by the REMOTE_NEWLINE command.

The device starts up with newline character CR set by default.

Newline characters are useful if the device is accessed with applications like Telnet or Matlab.

If newline characters are set and not used by the host, these characters should be ignored.

Note
Users of Linux and Terminal programs should use the CR+LF setting.

Examples

Newline character: NONE

Command	UNIT_LIST?;
Response	4,"dBm",dBm,"dBV",dBV,"dBmV",dBmV,"dBµV",dBuV,0;

Newline character: CR (default)

Command	UNIT_LIST?;
Response	4,\<CR\> "dBm",dBm,\<CR\> "dBV",dBV,\<CR\> "dBmV",dBmV,\<CR\> "dBµV",dBuV,\<CR\> 0;\<CR\>

Newline character: CR+LF

Command	UNIT_LIST?;
Response	4,\<CR\>\<LF\> "dBm",dBm,\<CR\>\<LF\> "dBV",dBV,\<CR\>\<LF\> "dBmV",dBmV,\<CR\>\<LF\> "dBµV",dBuV,\<CR\>\<LF\> 0;\<CR\>\<LF\>

Newline character: LF

Command	UNIT_LIST?;
Response	4,\<LF\> "dBm",dBm,\<LF\> "dBV",dBV,\<LF\> "dBmV",dBmV,\<LF\> "dBµV",dBuV,\<LF\> 0;\<LF\>

Data types for ASCII communication

Abbreviation	Description	Example
String	ASCII character string	"Narda"
Enum	Enumerator, defined texts	ON, on, OFF, off, ACT, act
Float	32 bit floating point number	-1.234e6, -100.1, 0, 100.1, 1.234e6
Double	64 bit floating point number	-1.234e6, -100.1, 0, 100.1, 1.234e6
Byte	8 bit whole number without sign	0, 100, 255
Word	16 bit whole number without sign	0 , 100, 65535
DWord	32 bit whole number without sign	0 , 100, 4294967295
Short	16 bit whole number with sign	-32768, -100, 0, 100, 32767
Long	32 bit whole number with sign	-2147483648, -100, 0, 100, 2147483647
Date	ASCII character string, format: dd.mm.yy	21.04.81
Time	ASCII character string, format: hh:mm:ss	10:08:59
VersionString	V[d]d.[d]d.[d]d[blankxxx]	"V0.0.0", "V99.99.99", "V1.0.1 beta1"
HEXDump	ASCII character hexadecimal dump	7F, 7f, 7FE5CCD200FF

Block Data Transfer for BINARY communication

Block transfer is suitable for large amounts of data. Each data block begins with a ASCII Header such as #42204. The first digit represents the number of valid digits of the ASCII Header. The remainder of the header indicates the number of bytes transmitted with the telegram.

The commands ending with _BINARY?; (expect FORMAT_BINARY?;) will respond with a BINARY block data response. This document describes the format of the block data transfer for each single command. The terminating character ";" is not valid for block data transfer.

Example

#42204xxxxxxxxx

Data	Description
#	This character introduces the block data transfer
4	Number of valid digits describing the data block length
2204	Number of bytes transmitted with this telegram
xxxxxxxxx	Example of BINARY data

4 Command Groups

General

BATTERY?
Queries the remaining battery capacity during battery powered operation.
CHECKSUM
Sets the checksum mode for the remote communication.
CHECKSUM?
Queries the checksum mode for the remote communication.
DATE
Sets the current date setting for the device
DATE?
Queries the current date setting for the device
DEV_ID?
Queries the device identification number.
DEV_INFO?
Queries all device information that describes the individual device.
DEV_OPTION?
Queries the options installed on the device.
DEV_RESET
Resets the device with different reset modes
ERROR?
Queries the last return code.
FORMAT_ASCII
Sets the output format of the measurement data for the remote interface.
FORMAT_ASCII?
Queries the output format of the measurement data for the remote interface.
FORMAT_BINARY
Sets the output format of the measurement data for BINARY communication.
FORMAT_BINARY?
Queries the output format of the measurement data for BINARY communication.
POWER_MODE?
Queries the way the device is being powered.
POWER_OFF
Initiates a controlled shutdown of the device.
REMOTE
Enables/Disables remote communication with the NRA.
REMOTE?
Checks communication with the NRA and queries readiness for remote operation.
REMOTE_NEWLINE
Sets the newline character(s) for the remote communication.
REMOTE_NEWLINE?
Queries the newline character(s) for the remote communication.
RETURN_CODE?
Queries the type and description of a specific return code.
RETURN_CODE_LIST?
Queries a list with type and description of all return codes.
SELFTEST?
Queries the selftest number of the power-on self tests returning error codes.
SELFTEST_DETAIL?
Queries the detailed results of all power-on self tests.
SU_STARTUP_CONFIG
Sets the startup behavior of the device.

SU_STARTUP_CONFIG?
Queries the current startup behavior of the device.
TIME
Sets the current system time of the device.
TIME?
Queries the current system time of the device.
VERSION?
Queries the versions of the current firmware modules.

Antenna and Cable

ANT_HANDLE_PREAMP
Switches the preamplifier in the antenna handle on or off.
ANT_HANDLE_PREAMP?
Queries the current state of the antenna handle preamplifier.
ANT_HANDLE_SEL?
Queries the information of the currently connected antenna handle.
ANT_HANDLE_COMPASS?
Queries the current compass data of the antenna handle.
ANT_HANDLE_BUTTON?
Queries the current state of the antenna handle push button.
ANT_LIST?
Queries a list of all currently available user defined antennas.
ANT_SEL
Selects a user defined antenna.
ANT_SEL?
Queries the information of the currently selected or connected user defined or auto antenna.
ANT_SEL_NO
Disables a selected user defined antenna.
ANT_DS
Creates a new user defined antenna and stores it in the nonvolatile memory of the device.
ANT_DS?
Queries a user defined antenna.
ANT_CLR
Deletes a user defined antenna.
ANT_CLR_ALL
Deletes all user defined antennas.
CBL_LIST?
Queries a list of all currently available user defined cables.
CBL_SEL
Selects a user defined cable.
CBL_SEL?
Queries the information of the currently selected or connected user defined or auto cable.
CBL_SEL_NO
Disables a selected user defined cable.
CBL_DS
Creates a new user defined cable and stores it in the nonvolatile memory of the device.
CBL_DS?
Queries a user defined cable.
CBL_CLR
Deletes a user defined cable.
CBL_CLR_ALL
Deletes all user defined cables.

Audio demodulation

AUDIO_MUTE
Switches audio mute on or off in Level Meter mode.
AUDIO_MUTE?
Queries the state of audio mute in Level Meter mode.
AUDIO_VOLUME
Sets the current audio demodulation volume in Level Meter mode.
AUDIO_VOLUME?
Queries the current audio demodulation volume in Level Meter mode.
AUDIO_VOLUME_LIST?
Queries the audio demodulation volume-list in Level Meter mode.
DEMOD_MODE
Sets the audio demodulation type in Level Meter mode.
DEMOD_MODE?
Queries the current audio demodulation type in Level Meter mode.
DEMOD_MODE_LIST?
Queries the currently available audio demodulation types in Level Meter mode.
DEMOD_SQUELCH
Sets the audio squelch threshold (noise suppression) in Level Meter mode.
DEMOD_SQUELCH?
Queries the current audio squelch threshold (noise suppression) in level meter mode.
DEMOD_SQUELCH_LIST?
Queries an audio squelch threshold-list (noise suppression) in level meter mode
DEMOD_BFO
Sets the BFO value (beat frequency oscillator) in level meter mode.
DEMOD_BFO?
Queries the current BFO value (beat frequency oscillator) in level meter mode.

Axis Commands

AXIS
Capability to measure each individual axis (X,Y,Z) or to measure in automatic mode RSS.
AXIS?
Queries the currently measured axis.

External Device

EXT_DEV_LIST?
Queries a list of all currently available user defined external devices.
EXT_DEV_SEL_NO
Disables a selected user defined external device.
EXT_DEV_SEL
Selects a user defined external device.
EXT_DEV_SEL?
Queries the information of the currently selected user defined external device.
EXT_DEV_DS
Creates a new user defined external device and stores it in the nonvolatile memory of the device.
EXT_DEV_DS?
Queries a user defined external device.
EXT_DEV_SWITCH
Switches the calibration set of the external device.
EXT_DEV_SWITCH?
Queries the current switch state.
EXT_DEV_CLR
Deletes a user defined external device.

EXT_DEV_CLR_ALL
Deletes all user defined external devices.

Livescreen

DISPLAY_REMOTE
Activates or deactivates the GUI remote operation mode.
DISPLAY_REMOTE?
Queries the status of the GUI remote operation mode
DISPLAY_VIEWER_INTERVAL
Sets the update interval time (refresh rate) of the Webservers Live Display Viewer.
DISPLAY_VIEWER_INTERVAL?
Queries the update interval time (refresh rate) of the Webservers Live Display Viewer.
LIVE_SCREEN?
Queries the current device display as a screenshot in PNG format.
LIVE_SCREEN_BINARY?
Queries the current device display as a screenshot in 16 bit BMP format.
LIVE_SEND_KEY
Activates an operating panel key by remote communication.
LIVE_SEND_ROT_KNOB
Activates the operating panel rotary control by remote communication.

LNB control – NRA-LNB versions only

LNB_CTRL
Switches the LNB control unit on or off.
LNB_CTRL?
Queries the state of the LNB control unit.
LNB_CTRL_BAND
Selects the low band (22kHz off) or the high band (22kHz on) for the LNB control unit.
LNB_CTRL_BAND?
Queries the band setting for the LNB control unit.
LNB_CTRL_DIAG?
Queries diagnostic information from the LNB control unit.
LNB_CTRL_POL
Selects the polarization setting for the LNB control unit.
LNB_CTRL_POL?
Queries the polarization setting for the LNB control unit.
LNB_CTRL_RESET
Resets the LNB control unit to the default settings.
LNB_CTRL_VOLTAGE_CORRECTION
Activates or deactivates the cable compensation for the LNB control unit.
LNB_CTRL_VOLTAGE_CORRECTION?
Queries the setting for the cable compensation for the LNB control unit.

Measurement

MEAS_START
(Re)starts cyclic measurement in the current operating mode.
MEAS_STOP
Stop cyclic measurement in the current operating mode.
MODE
Sets the current operating mode.
MODE?
Queries the current operating mode.
RBW_LIST?
Queries a list of the current possible RBW settings.

RESULTTYPE_RESET
Resets all measurement runs (traces) to default values as is done at the start of the measurement.

RESULTTYPE_RESET_MIN_MAX
Resets the Min and Max measurement runs (traces) to default values as is done at the start of the measurement.

RL_ATT_LIST?
Queries a list of the current possible reference level and attenuator settings (measurement range).

RL_LIST?
Queries a list of the current possible reference level settings (measurement range).

SWEEP_STATE?
Queries the status and progress of the current measurement.

UNIT
Sets the current unit setting.

UNIT?
Queries the current unit setting.

UNIT_LIST?
Queries a list of current possible unit settings (Unit).

VBW_LIST?
Queries the current possible VBW settings.

Mode Spectrum

SPECTRUM?
Queries one or more measurement runs (traces) in SPECTRUM mode.

SPECTRUM_AVG_CONFIG
Sets the current averaging method.

SPECTRUM_AVG_CONFIG?
Queries the current averaging method.

SPECTRUM_AVG_LIST?
Queries a list of the current possible averaging settings for SPECTRUM mode.

SPECTRUM_BI_VALUE?
Band Integration over Frequency.

SPECTRUM_BINARY?
Queries measurement data in SPECTRUM mode and BINARY format.

SPECTRUM_CONFIG
Sets the current measurement parameters for SPECTRUM mode.

SPECTRUM_CONFIG?
Queries the current measurement parameters for SPECTRUM mode.

SPECTRUM_DETECTOR?
Queries trace data with fixed user defined number of values in SPECTRUM mode.

SPECTRUM_DETECTOR_BINARY?
Queries BINARY trace data with fixed user defined number of values in SPECTRUM mode.

SPECTRUM_DETECTOR_LIST?
Queries the detector list for spectrum data.

SPECTRUM_FULLSPAN
Sets the frequency parameters Fcent and Fspan to select the entire frequency range of the device.

SPECTRUM_HEADER?
Queries the header information for the measured values in SPECTRUM mode.

SPECTRUM_MAX_VALUES?
Queries the maximum number of measurement points in Spectrum mode

SPECTRUM_MODE
Sets the sub mode, in Spectrum mode

SPECTRUM_MODE?
Queries the sub mode, in Spectrum mode

SPECTRUM_MRK_HIGHEST?
Queries the marker values for the highest measurement value.

SPECTRUM_MRK_IDX_VALUE?
Queries the marker values for a selected marker.

SPECTRUM_MRK_VALUE?
Queries the marker values for a specified frequency point.
SPECTRUM_PEAK_TABLE?
Queries a configurable peak table.
SPECTRUM_PEAK_TABLE_EXC?
Queries a configurable peak table with excursion.
SPECTRUM_RAW?
Queries one or more measurement runs (traces) in Spectrum mode using the RAW format and BINARY data transfer.
SPECTRUM_TRACE?
Queries one or more traces in SPECTRUM mode.
SPECTRUM_TRACE_BINARY?
Queries one or more BINARY traces in SPECTRUM mode.
SPECTRUM_TRACE_LIST?
Queries the current possible trace list in SPECTRUM mode.

Mode Multi Channel Power (MCP) (option required for NRA)

MCP?
Queries one or more measurement runs (traces) in Multi-Channel Power mode.
MCP_AVG_CONFIG
Sets the current averaging method.
MCP_AVG_CONFIG?
Queries the current averaging method.
MCP_AVG_LIST?
Queries the current possible averaging settings for Multi-Channel Power mode.
MCP_CONFIG
Sets the current measurement parameters for Multi-Channel Power mode.
MCP_CONFIG?
Queries the current measurement parameters for Multi-Channel Power mode.
MCP_MODE
Sets the sub mode in Multi-Channel Power mode
MCP_MODE?
Queries the sub mode in Multi-Channel Power mode

Mode Scope and I/Q Data (option required for IDA / NRA)

SCOPE?
Queries time domain measurement results in Scope mode for the previously defined Result Type and measurement parameters (see "SCOPE_RESULTTYPE" and "SCOPE_CONFIG").
SCOPE_BINARY?
Queries one or more measurement runs (traces) in Scope mode using the BINARY format.
SCOPE_CONFIG
Sets the current measurement parameters for Scope mode. Select Scope mode first.
SCOPE_CONFIG?
Queries the current measurement parameters in Scope mode
SCOPE_HEADER?
Queries the Header Data of measurement values in Scope mode.
SCOPE_MAX_VALUES?
Queries the maximum number of measurement points in Scope mode
SCOPE_RAW?
Queries one or more measurement runs (traces) in Scope mode using the RAW format and BINARY data transfer.
SCOPE_RESULTTYPE
Sets the desired Result Type in Scope mode. When Result Type CONDENSED is selected, measurements are expressed as intervals with Max, Avg, Min values.
SCOPE_RESULTTYPE?
Queries the current Result Type in Scope mode.

SCOPE_STATE?
Queries the current State in Scope mode.
SCOPE_TRIGGER_ARM
Sets the Trigger State to ARMED for activating the selected Trigger Mode.
SCOPE_TRIGGER_BREAK
Deactivates the selected Trigger Mode by changing the Trigger State from ARMED to WAIT_ARMING.
SCOPE_TRIGGER_CONFIG
Sets the Trigger parameters in Scope mode.
SCOPE_TRIGGER_CONFIG?
Queries the Trigger parameters in Scope mode.
SCOPE_TRIGGER_DELAY_LIST?
Queries the current possible Trigger Delay settings in Scope mode.
SCOPE_TRIGGER_LEVEL_LIST?
Queries the current possible Trigger Level settings in Scope mode.

Mode Level Meter (option required for NRA)

LEVEL?
Queries the different measurement runs (traces) that are available in Level Meter mode.
LEVEL_AVG_CONFIG
Sets the current averaging method.
LEVEL_AVG_CONFIG?
Queries the current averaging method.
LEVEL_AVG_LIST?
Queries the current possible averaging time settings for Level Meter mode.
LEVEL_CONFIG
Sets the current measurement parameters for Level Meter mode.
LEVEL_CONFIG?
Queries the current measurement parameters for Level Meter mode.

Network configuration

IP_CONFIG
Sets the IP configuration of the device. Use IP_Config_Renew to apply the new settings.
IP_CONFIG?
Queries the simple IP configuration of the device.
IP_CONFIG_ALL?
Queries the expanded IP configuration of the device.
IP_CONFIG_RENEW
Renews the IP address of the device and restarts the server with the actual settings. This closes all open connections.
IP_SERVER
Sets the new server configuration of the device. Use IP_Config_Renew to apply the new settings.
IP_SERVER?
Queries the current server configuration of the device.

Reference Input 10 MHz

RF_EXT_REF
Switches the 10 MHz reference input on or off.
RF_EXT_REF?
Queries the current state of the 10 MHz reference input.
RF_EXT_REF_LOCKED?
Queries whether an external 10 MHz signal is connected to the device.

Service Tables (channel tables)

SRV_CLR
Deletes a service table.
SRV_CLR_ALL
Deletes all service tables.
SRV_DS
Creates a service table and stores it in the nonvolatile memory of the device.
SRV_DS?
Queries a service table.
SRV_LIST?
Queries all service tables without details.
SRV_SEL
Sets the current active service table.
SRV_SEL?
Queries the current active service table.

Stream communication (option required for NRA)

IQSTREAM_ATT
Sets the Attenuator value for IQ Streaming mode without interrupting the measurement.
IQSTREAM_ATT?
Queries the current Attenuator value for IQ Streaming mode.
IQSTREAM_CONFIG
Sets the Fcent, RBW and RL settings for IQ Streaming mode.
IQSTREAM_CONFIG?
Queries the current settings for IQ Streaming mode.
IQSTREAM_FCENT
Sets Fcent for IQ Streaming mode without interrupting the measurement. An active Stream data output is not stopped by this command.
IQSTREAM_FCENT?
Queries the current Fcent setting for IQ Streaming mode.
IQSTREAM_RBW
Sets the RBW setting for IQ Streaming mode.
IQSTREAM_RBW?
Queries the current RBW setting for IQ Streaming mode.
IQSTREAM_RBW_LIST?
Queries the RBW List for IQ Streaming mode.
IQSTREAM_RL
Sets the Reference Level for IQ Streaming mode without interrupting the measurement.
IQSTREAM_RL?
Queries the current Reference Level for IQ Streaming mode.
STREAM_SETUP
Sets the protocol and connection settings for the Stream data output.
STREAM_SETUP?
Queries the connection and protocol settings for the Stream data output.
STREAM_STATE
Starts or stops the Stream data output.
STREAM_STATE?
Queries the current Stream status.

5 Command Descriptions

General

BATTERY?

💡 *Command only available for hand-held devices*

Description

Queries the remaining battery capacity during battery powered operation.

Note

The command does not provide valid responses while charging. The battery mode can be checked by using the "POWER_MODE?" command.

Command

BATTERY?;

Response

<BatState>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<BatState>	Short	Value in the range of 0 to 100 indicates the current battery capacity in percent (0 = empty, 100 = full).
<ReturnCode>	Word	Warning or error code

Example

Command	BATTERY?;
Response	100,0;

CHECKSUM

Description

Sets the checksum mode for the remote communication.

Note

If a checksum is activated, the last parameter of each response from the device will be the checksum in hexadecimal format. Checksum calculation includes all characters before the last comma.

The CRC-CCITT is used for calculation.
The CRC polynomial for the calculation is: $x^{16} + x^{12} + x^5 + 1$
The starting value for the calculation is: 0xFFFF

By default the checksum calculation is not activated for the remote communication.

Command

CHECKSUM <ChecksumMode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description	
<ChecksumMode>	Enum	OFF TRANSMIT	Checksum calculation not active. Checksum calculation for data send from device to the host.
<ReturnCode>	Word	Warning or error code	

Examples

Command	CHECKSUM TRANSMIT;
Response	0,D7A3;

Command	CHECKSUM OFF;
Response	0;

CHECKSUM?

Description

Queries the checksum mode for the remote communication.

Note

If a checksum is activated, the last parameter of each response from the device will be the checksum in hexadecimal format. Checksum calculation includes all characters before the last comma.

The CRC-CCITT (X.25, V.41, HDLC, XMODEM, Bluetooth, SD,…) is used for calculation.

The CRC polynomial for the calculation is: $x^{16} + x^{12} + x^5 + 1$

By default the checksum calculation is not activated for the remote communication.

Command

CHECKSUM?;

Response

<ChecksumMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description	
<ChecksumMode>	Enum	OFF	Checksum calculation not active.
		TRANSMIT	Checksum calculation for data send from device to the host.
<ReturnCode>	Word	Warning or error code	

Examples

Command	CHECKSUM?;
Response	TRANSMIT,0,DAFC;

Command	CHECKSUM?;
Response	OFF,0;

DATE

Description

Sets the current date setting for the device

Command

DATE <Date>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Date>	Date	dd.mm.yy
<ReturnCode>	Word	Warning or error code

Example

Command	DATE 06.07.12;
Response	0;

DATE?

Description

Queries the current date setting for the device

Command

DATE?;

Response

<Date>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Date>	Date	dd.mm.yy
<ReturnCode>	Word	Warning or error code

Example

Command	DATE?;
Response	06.07.12,0;

DEV_ID?

Description

Queries the device identification number.

Command

DEV_ID?;

Response

<DeviceID>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<DeviceID>	String	Device identification number
<ReturnCode>	Word	Warning or error code

Example

Command	DEV_ID?;
Response	"A86CECE3BB98C957",0;

DEV_INFO?

Description

Queries all device information that describes the individual device.

Note

Command also useable in "Remote OFF" mode

Command

DEV_INFO?;

Response

<ProductName>,<ProductID>,<SerialNo>,<DeviceID>,
<FirmwareVersion>,<FirmwareDate>,
<CalDate>,<NextCalDate>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<ProductName>	String	Product name (e.g. "NRA-3000")
<ProductID>	String	Production identification number
<SerialNo>	String	Serial number
<DeviceID>	String	Device identification number
<FirmwareVersion>	VersionString	Firmware version
<FirmwareDate>	Date	Firmware date
<CalDate>	Date	Date of the calibration
<NextCalDate>	Date	Recommended date for recalibration
<ReturnCode>	Word	Warning or error code

Example NRA Device

Command	DEV_INFO?;
Response	"NRA-6000","123456789","PT-0001", "A86CECE3BB98C957","V1.0.4",19.01.11,01.01.01,01.01.03,0;

Example IDA Device

Command	DEV_INFO?;
Response	"IDA-3106","RF-309","A-0009","CAA73ABB2E601226", "V1.1.0",06.08.12,16.09.09,16.09.10,0;

DEV_OPTION?

Description

Queries the options installed on the device.

Note

Options are additional measurement modes that the device is prepared for. Each device needs a separate activation code for each option, which can be purchased. The current device firmware determines whether an option is prepared and can be activated.

To check Name and State of all possible options, use Index 0 and increment the index value until the response returns UNKNOWN.

Command

DEV_OPTION? <Index>;

Response

<State>,<Name>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Index>	Word	Option index, valid values: 0 to 63
<State>	Enum	FREE (=enabled); CLOSED (=disabled); UNKNOWN
<Name>	String	Option name
<ReturnCode>	Word	Warning or error code

Example

Command	DEV_OPTION? 0;
Response	FREE,"Multi Channel Power",0;

DEV_RESET

Description

Resets the device with different reset modes

Command

DEV_RESET <ResetMode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description

<ResetMode>	Enum	MEAS
		- Resets measurement settings to factory default.
		
		APP
		- Restarts the measurement application.
		- Resets the measurement settings to startup configuration.
		- Resets the temporary settings of the device to default.
		- Closes all open TCP connections.
		
		FACTORY
		- Restarts the measurement application.
		- Resets the startup configuration to factory default.
		- Resets the network settings to factory default.
		- Resets the temporary settings of the device to default.
		- Closes all open TCP connections.
		
		REMOTE
		- Resets the settings of the following commands to their default values:
		
		  CHECKSUM; REMOTE_NEWLINE;
		  FORMAT_ASCII; FORMAT_BINARY;

<ReturnCode>	Word	Warning or error code

Example

Command	DEV_RESET APP;
Response	0;

ERROR?

Description

Queries the last return code.

Command

ERROR?;

Response

<LastReturnCode>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<LastReturnCode>	Enum	Last return code
<ReturnCode>	Word	Warning or error code for this command

Example

Command	ERROR?;
Response	401,0;

FORMAT_ASCII

Description

Sets the output format of the measurement data for the remote interface.

Note

The output format will not be stored by the device.
After restart, the Device is set to UNIT output format.

Example output strings and corresponding device internal format strings:

Parameter	Number of Digits	Format	Output string
UNIT (default)	2 for dB values	%.2f	-44.80, -9.19, 0.00
UNIT (default)	7 for IQ values	%.7G	-0.0004326085, -7.302459E-007
UNIT (default)	3 for other values	%.3E	-4.480E+001, -9.193E+000, 4.967E-008
SCIENTIFIC	2	%.2e	-4.48e+001, -9.19e+000, 4.97e-008
FIXED	3	%.3f	-44.801, -9.193, 0.000
ENGINEERING	2	%.2g	-45, -9.2, 5.0e-008

Command

FORMAT_ASCII <OutputFormat>, <Digits>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<OutputFormat>	Enum	UNIT Sets the output format to the default ASCII format: 2 digits in decimal notation for dB Values 3 digits in scientific notation for other values. SCIENTIFIC Sets the output format to scientific notation. FIXED Sets the output format to fixed decimal notation. ENGINEERING Sets the output format to a fixed number of significant digits in scientific or decimal notation.
<Digits>	Word	Range: 0 to 12 UNIT mode Parameter not used SCIENTIFIC mode Number of digits after decimal point in scientific notation FIXED mode Number of digits after decimal point in decimal notation. ENGINEERING mode Number of significant digits.
<ReturnCode>	Word	Warning or error code

Example

Command	FORMAT_ASCII UNIT,0;
Response	0;

FORMAT_ASCII?

Description

Queries the output format of the measurement data for the remote interface.

Note

The output format will not be stored by the device.
After restart, the Device is set to UNIT output format.

Command

FORMAT_ASCII?;

Response

<OutputFormat>, <Digits>, <ReturnCode>;

Parameter List

Parameter	Type	Description
<OutputFormat>	Enum	UNIT Sets the output format to the default ASCII format: 2 digits in decimal notation for dB Values 3 digits in scientific notation for other values. SCIENTIFIC Sets the output format to scientific notation. FIXED Sets the output format to fixed decimal notation. ENGINEERING Sets the output format to a fixed number of significant digits in scientific or decimal notation.
<Digits>	Word	Range: 0 to 12 UNIT mode Parameter not used SCIENTIFIC mode Number of digits after decimal point in scientific notation FIXED mode Number of digits after decimal point in decimal notation. ENGINEERING mode Number of significant digits.
<ReturnCode>	Word	Warning or error code

Examples

Command	FORMAT_ASCII?;
Response	UNIT,0,0;

Command	FORMAT_ASCII?;
Response	SCIENTIFIC,4,0;

Command	FORMAT_ASCII?;
Response	FIXED,6,0;

FORMAT_BINARY

Description

Sets the output format of the measurement data for BINARY communication.

Note

In NORMAL mode the BINARY data is sent with most significant byte first (big endian).
In SWAPPED mode the BINARY data is sent with last significant byte first (little endian)

The output format will not be stored by the device.
After restart, the Device is set to NORMAL output format.

Command

FORMAT_BINARY <OutputFormat>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<OutputFormat>	Enum	NORMAL Most significant byte first. SWAPPED Last significant byte first.
<ReturnCode>	Word	Warning or error code

Examples

Command	FORMAT_BINARY NORMAL;
Response	0;

Command	FORMAT_BINARY SWAPPED;
Response	0;

FORMAT_BINARY?

Description

Queries the output format of the measurement data for BINARY communication.

Note

In NORMAL mode the BINARY data is sent with most significant byte first (big endian).
In SWAPPED mode the BINARY data is sent with last significant byte first (little endian)

The output format will not be stored by the device.
After restart, the Device is set to NORMAL output format.

Command

FORMAT_BINARY?;

Response

<OutputFormat>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<OutputFormat>	Enum	NORMAL Most significant byte first. SWAPPED Last significant byte first.
<ReturnCode>	Word	Warning or error code

Examples

Command	FORMAT_BINARY?;
Response	NORMAL,0;

Command	FORMAT_BINARY?;
Response	SWAPPED,0;

POWER_MODE?

💡 *Command only available for hand-held devices*

Description

Queries the way the device is being powered.

Note

In case of battery powered operation the remaining capacity can be indicated by using the "BATTERY?" command.

Command

POWER_MODE?;

Response

<PowerMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description	
<PowerMode>	Enum	BATTERY	The device is powered by rechargeable batteries.
		PWR_LINE	The device is powered by external power supply.
<ReturnCode>	Word	Warning or error code	

Example

Command	POWER_MODE?;
Response	BATTERY,0;

Example

Command	POWER_MODE?;
Response	PWR_LINE,0;

POWER_OFF

Description

Initiates a controlled shutdown of the device.

Note

The hardware remains powered on after shutdown.
The actual settings of the device will be lost after the POWER_OFF command.

The device has to be turned on locally using the power switch after it has been shutdown by the POWER_OFF command. There is no way to boot up remotely!

Command

POWER_OFF;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	POWER_OFF;
Response	0;

REMOTE

Description

Enables/Disables remote communication with the NRA.

Note

"REMOTE ON" is the condition required for utilizing remote access through all device interfaces.

If the response to the REMOTE command includes an error code, there may be a system error which can be analyzed by the SELFTEST command.

By default, the device is in REMOTE ON mode after start-up.

Command

REMOTE <Status>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Status>	Enum	ON = Enables remote operation mode OFF = Disables remote operation mode
<ReturnCode>	Word	Warning or error code

Example

Command	REMOTE ON;
Response	0;

REMOTE?

Description

Checks communication with the NRA and queries readiness for remote operation.

Note

"REMOTE ON" is the condition required for utilizing remote access through all device interfaces.

If the response to the REMOTE command includes an error code, there may be a system error which can be analyzed by the SELFTEST command.

By default, the device is in REMOTE ON mode after start-up.

Command

REMOTE?;

Response

<Status>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Status>	Enum	ON = Remote operation mode is enabled OFF = Remote operation mode is disabled
<ReturnCode>	Word	Warning or error code

Example

Command	REMOTE?;
Response	ON,0;

REMOTE_NEWLINE

Description

Sets the newline character(s) for the remote communication.

Note

After restart the newline characters are set to <CR>

Command also useable in "Remote OFF" mode

Command

REMOTE_NEWLINE <Type>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Type>	Enum	CR Sends carriage return (0x0D) as a newline character LF Sends line feed (0x0A) as a newline character CRLF Sends carriage return and line feed (0x0D + 0x0A) NONE No newline characters will be sent
<ReturnCode>	DWord	Warning or error code

Example

Command	REMOTE_NEWLINE CR;
Response	0;

REMOTE_NEWLINE?

Description

Queries the newline character(s) for the remote communication.

Note

After restart the newline characters are set to <CR>

Command also useable in "Remote OFF" mode

Command

REMOTE_NEWLINE?;

Response

<Type>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Type>	Enum	CR Sends carriage return (0x0D) as a newline character LF Sends line feed (0x0A) as a newline character CRLF Sends carriage return and line feed (0x0D + 0x0A) NONE No newline characters will be sent
<ReturnCode>	DWord	Warning or error code

Example

Command	REMOTE_NEWLINE?;
Response	CR,0;

RETURN_CODE?

Description

Queries the type and description of a specific return code.

Note

This command can be used to implement text messages in the remote application.

Command

RETURN_CODE? <Code>;

Response

<Code>,<Type>,<Description>,<ReturnCode>;

Parameter List

Parameter	Type	Description	
<Code>	Word	Warning or error code to be described	
<Type>	Enum	INFO	The return type is an information code
		WARNING	The return type is a warning code
		ERROR	The return type is an error code
<Description>	String	Textual description of the return code	
<ReturnCode>	Word	Warning or error code	

Examples

Command	RETURN_CODE? 0;
Response	0,INFO,"Command successful.",0;

Command	RETURN_CODE? 201;
Response	201,WARNING,"Command parameter has been corrected.",0;

Command	RETURN_CODE? 401;
Response	401,ERROR,"Remote command is not implemented in the remote module.",0;

RETURN_CODE_LIST?

Description

Queries a list with type and description of all return codes.

Note

This command can be used to implement text messages in the remote application.

Command

RETURN_CODE_LIST?;

Response

<NoOfElements>, [<Code>, <Type>,<Description>,] <ReturnCode>;

Parameter List

Parameter	Type	Description	
<NoOfElements>	Word	Number of list elements	
<Code>	Word	Warning or error code to be described	
<Type>	Enum	INFO WARNING ERROR	The return type is an information code The return type is a warning code The return type is an error code
<Description>	String	Textual description of the return code	
<ReturnCode>	Word	Warning or error code	

Example

Command	RETURN_CODE_LIST?;
Response	34, 0,INFO,"Command successful.", 201,WARNING,"Command parameter has been corrected.", 401,ERROR,"Remote command is not implemented in the remote module.", 402,ERROR,"Invalid parameter.", … 431,ERROR,"Datalogger reorganization required.", 432,ERROR,"Mode not available.", 0;

SELFTEST?

Description

Queries the selftest number of the power-on self tests returning error codes.

Note

Command also useable in "Remote OFF" mode

Command

SELFTEST?;

Response

<NumberOfTests>, [<SelftestNumber>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfTests>	Word	Number of test(s) passed
<SelftestNumber>	Word	Selftest Number
<ReturnCode>	Word	Warning or error code

Examples

Command	SELFTEST?;
Response	0,0;

Command	SELFTEST?;
Response	1,2,0;

SELFTEST_DETAIL?

Description
Queries the detailed results of all power-on self tests.

Note
Command also useable in "Remote OFF" mode

Command
SELFTEST_DETAIL?;

Response
<NumberOfTests>, [<SelftestNumber>,<NameOfTest>,<StepOfTest>,<StateOfTest>,
<CommentOfTest>,<ErrorOfTest>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfTests>	Word	Number of test(s) passed
<SelftestNumber>	Word	Selftest Number
<NameOfTest>	String	Name of the test
<StepOfTest>	String	Step of the test
<StateOfTest>	String	State of the test
<CommentOfTest>	String	Comment of the test
<ErrorOfTest>	Word	Error code of the test
<ReturnCode>	Word	Warning or error code

Example NRA

Command	SELFTEST_DETAIL?;
Response	4, 1,"Operating System:","Ready","OK","V1.6.3",0, 2,"Hardware Check:","Ready","OK","",0, 3,"Memory Check:","Ready","OK","",0, 5,"Flash Check:","Ready","OK","Free: 98 %",0, 0;

Example IDA

Command	SELFTEST_DETAIL?;
Response	6, 1,"Operating System:","Ready","OK","V1.8.1",0, 2,"Hardware Check:","Ready","OK","",0, 3,"Memory Check:","Ready","OK","",0, 4,"Data Logger:","Ready","OK","",0, 5,"Flash Check:","Ready","OK","Free: 75 %",0, 6,"Battery:","Ready","OK","External Power",0, 0;

SU_STARTUP_CONFIG

Description

Sets the startup behavior of the device.

Note

The configuration includes the measurement mode and the particular set parameters.

Command

SU_STARTUP_CONFIG <StartupMode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<StartupMode>	Enum	USER: Stores and uses the current settings as startup configuration. FACTORY: Uses the standard factory settings as startup configuration
<ReturnCode>	Word	Warning or error code

Example

Command	SU_STARTUP_CONFIG USER;
Response	0;

Command	SU_STARTUP_CONFIG FACTORY;
Response	0;

SU_STARTUP_CONFIG?

Description
Queries the current startup behavior of the device.

Command
SU_STARTUP_CONFIG?;

Response
<StartupMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<StartupMode>	Enum	USER: User defined startup settings. FACTORY: Factory settings.
<ReturnCode>	Word	Warning or error code

Example

Command	SU_STARTUP_CONFIG?;
Response	USER,0;

Command	SU_STARTUP_CONFIG?;
Response	FACTORY,0;

TIME

Description

Sets the current system time of the device.

Command

TIME <Time>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Time>	Time	hh:mm:ss
<ReturnCode>	Word	Warning or error code

Example

Command	TIME 15:16:16;
Response	0;

TIME?

Description

Queries the current system time of the device.

Command

TIME?;

Response

<Time>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Time>	Time	hh:mm:ss
<ReturnCode>	Word	Warning or error code

Example

Command	TIME?;
Response	15:16:16,0;

VERSION?

Description

Queries the versions of the current firmware modules.

Note

You can query the current RF-Board version by using the parameter "RF" (VERSION? RF). If you are using a device with an older firmware version, the response will be error code "404". This is also an indicator for the RF-Board 1.

Command

VERSION? <ModuleType>;

Response

<FW Version>,<ReturnCode>;

Parameter List

Parameter	Type	Description	
<ModuleType>	Enum	APP	Application Firmware
		BL	Bootloader
		OS	Operating System
		RF	RF-Board Version
<FW Version>	VersionString	"V0.0.0" to "V99.99.99"	

Examples

Command	VERSION? APP;
Response	"V1.0.4",0;

Command	VERSION? BL;
Response	"V1.0.7",0;

Command	VERSION? OS;
Response	"V1.6.3",0;

Command	VERSION? RF;
Response	"1",0;

Antenna and Cable

ANT_HANDLE_PREAMP

💡 *Command only available for devices with an antenna connector*

Description

Switches the preamplifier in the antenna handle on or off.

Note

Switching the preamplifier on or off could affect the current Reference Level (Attenuator).

Command

ANT_HANDLE_PREAMP <SwitchState>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<SwitchState>	Enum	ON: Switches on the preamplifier in the antenna handle OFF: Switches off the preamplifier in the antenna handle (default state after connecting)
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_HANDLE_PREAMP ON;
Response	0;

ANT_HANDLE_PREAMP?

> 💡 *Command only available for devices with an antenna connector*

Description

Queries the current state of the antenna handle preamplifier.

Command

ANT_HANDLE_PREAMP?;

Response

<SwitchState>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<SwitchState>	Enum	ON: The preamplifier in the antenna handle is switched on OFF: The preamplifier in the antenna handle is switched off (default state after connecting)
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_HANDLE_PREAMP?;
Response	ON,0;

ANT_HANDLE_SEL?

💡 *Command only available for devices with an antenna connector*

Description

Queries the information of the currently connected antenna handle.

Command

ANT_HANDLE_SEL?;

Response

<DataSource>,
[<LongName>,<ShortName>,<FminOn>,<FmaxOn>,<FminOff>,<FmaxOff>,<AntennaID>,
<AntennaPol>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<DataSource>	Enum	AUTO: An antenna handle is connected NO: No antenna handle is connected
<LongName>	String	Long Name of the antenna handle, up to 35 characters
<ShortName>	String	Short Name of the antenna handle, up to 10 characters
<FminOn>	String	Start frequency of the antenna handle (Preamp = ON)
<FmaxOn>	String	Stop frequency of the antenna handle (Preamp = ON)
<FminOff>	String	Start frequency of the antenna handle (Preamp = OFF)
<FmaxOff>	String	Stop frequency of the antenna handle (Preamp = OFF)
<AntennaID>	Short	0=None, 3=Antenna Adapter, all others=Narda Antennas
<AntennaPol>	Enum	HORIZONTAL, VERTICAL
<ReturnCode>	Word	Warning or error code

Example: Antenna Handle

Command	ANT_HANDLE_SEL?;
Response	AUTO,"Active Antenna Handle","AntHandle","9 kHz","6 GHz","9 kHz","6 GHz",3,HORIZONTAL,0;

Example: No Antenna Handle

Command	ANT_HANDLE_SEL?;
Response	NO,0;

ANT_HANDLE_COMPASS?

💡 *Command only available for devices with an antenna connector*

Description

Queries the current compass data of the antenna handle.

Command

ANT_HANDLE_COMPASS?;

Response

<Azimuth>,<Elevation>,<Roll>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Azimuth>	Float	Angle of the azimuth. From 0°… 360°
<Elevation>	Float	Angle of the elevation. Right angle = 0°. Moving up the handle, positive values from 0°… +90° Moving down the handle, negative values from 0°…-90°
<Roll>	Float	Angle of the roll factor. Right angle = 0°. Turning right the handle, positive values from 0°… +180° Turning left the handle, negative values from 0°… -180°
<ReturnCode>	Word	Warning or error code

Example: Antenna Handle Compass

Command	ANT_HANDLE_COMPASS?;
Response	344.3,30.3,-28.5,0;

ANT_HANDLE_BUTTON?

> 💡 *Command only available for devices with an antenna connector*

Description

Queries the current state of the antenna handle push button.

Command

ANT_HANDLE_BUTTON?;

Response

<ButtonPressed>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<ButtonPressed>	Enum	TRUE or FALSE; True if push button is pressed, false if not.
<ReturnCode>	Word	Warning or error code

Example: Antenna Handle

Command	ANT_HANDLE_BUTTON?;
Response	TRUE,0;

Command	ANT_HANDLE_BUTTON?;
Response	FALSE,0;

ANT_LIST?

Description

Queries a list of all currently available user defined antennas.

Command

ANT_LIST?;

Response

<NumberOfElements>,[<LongName>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Short	Number of subsequent items
<LongName>	String	Long Name of each currently available user defined antenna, up to 35 characters
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_LIST?;
Response	5, "Double-Ridged Horn Antenna 3106", "Conical Dipole Antenna PCD8250", "Double-Rigded Horn Antenna 3115", "LogPER_Antenna_LP-03_0.8-6GHz", "LogPER_Schwarzbeck-Antenna_USL_9143", 0;

ANT_SEL

Description

Selects a user defined antenna.

Note

Narda auto (directional) antennas are detected automatically and cannot be manually selected.
The selection of a user antenna is always possible when no antenna handle is connected or when the antenna adapter is connected to the antenna handle.
The selection of a user antenna might lead to an adjustment of the frequency range of the device.

Command

ANT_SEL <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<LongName>	String	Long Name of the user defined antenna, up to 35 characters
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_SEL "Double-Ridged Horn Antenna 3106";
Response	0;

ANT_SEL?

Description

Queries the information of the currently selected or connected user defined or auto antenna.

Command

ANT_SEL?;

Response

<DataSource>, [<LongName>,<ShortName>,<Fmin>,<Fmax>,<Property>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<DataSource>	Enum	AUTO: A Narda auto (directional) antenna is selected USER: A user antenna is selected NO: No antenna is selected
<LongName>	String	Long Name of the selected antenna, up to 35 characters
<ShortName>	String	Short Name of the antenna, up to 10 characters
<Fmin>	String	Start frequency of the antenna
<Fmax>	String	Stop frequency of the antenna
<Property>	Enum	E-FIELD, H-FIELD, CURRENT, E&H-FIELD, UNKNOWN
<ReturnCode>	Word	Warning or error code

Example: Narda Auto-Antenna

Command	ANT_SEL?;
Response	AUTO,"Dir. Antenna 20 - 250 MHz","DirAnt 1","20 MHz","250 MHz",E&H-FIELD,0;

Example: No Antenna

Command	ANT_SEL?;
Response	NO,0;

ANT_SEL_NO

Description

Disables a selected user defined antenna.

Note

Narda auto (directional) antennas are detected automatically and cannot be manually deselected.

Command

ANT_SEL_NO;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_SEL_NO;
Response	0;

ANT_DS

Description

Creates a new user defined antenna and stores it in the nonvolatile memory of the device.

Command

ANT_DS < ShortName>,<LongName>,<Manufacturer>,<DeviceName>,<Model>,<SerialNo>,
<CalDate>,<Fmin>,<Fmax>,<Property>,<MNOL>,<Channels>,<nCal>,[<CalFreq>,<CalValue>];

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ShortName>	String	Abbreviated name for the antenna, up to 10 chr
<LongName>	String	Long Name of the antenna and used for selection, up to 35 chr
<Manufacturer>	String	Manufacturer's name, up to 15 chr
<DeviceName>	String	Antenna name, up to 15 chr
<Model>	String	Model, up to 15 chr
<SerialNo>	String	Serial number of the antenna, up to 15 chr
<CalDate>	Date	Calibration date of the antenna, DD.MM.YY
<Fmin>	String	Lower frequency limit of the antenna, up to 15 chr [Hz]
<Fmax>	String	Upper frequency limit of the antenna, up to 15 chr [Hz]
<Property>	Enum	Antenna measurement property: [E-FIELD, H-FIELD, CURRENT, E&H-FIELD]
<MNOL>	Float	Maximum nominal output level of the antenna. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Reference Level selection accordingly. [dBm]
<Channels>	Enum	CH1 (single axis, for user defined antennas), CH3 (three axis antenna, reserved for Narda Antennas)
<nCal>	Short	Number of calibration points from 2 to 200
<CalFreq>	Double	List of antenna calibration points, must be ascending order [Hz]
<CalValue>	Float	Calibration value [dB/m or dBA/V]; dBA/V if Property = CURRENT
<ReturnCode>	Word	Warning or error code

Example

Command	ant_ds
	"LP-03",
	"LogPER_Antenna_LP-03_0.8-6GHz",
	"Narda - PMM",
	"Log Per LP-03",
	"LP-03",
	"000WE90602",
	15.09.09,
	"800 MHz",
	"6 GHz",
	E-FIELD,20,1CH,
	15,
	700000000,26.5,
	800000000,23.75,
	1400000000,27.5,
	2000000000,30,
	2100000000,30.6,
	2200000000,32.5,
	2400000000,33.4,
	3800000000,36.2,
	4000000000,36.3,
	5200000000,39.7,
	5400000000,39.6,
	5600000000,40,
	5800000000,41.2,
	6000000000,41.7,
	6100000000,41.3,;
Response	0;

ANT_DS?

Description

Queries a user defined antenna.

Note

Long name of the antenna is for selection.

Command

ANT_DS? <LongName>;

Response

< ShortName>,<LongName>,<Manufacturer>,<DeviceName>,<Model>,<SerialNo>,
<CalDate>,<Fmin>,<Fmax>,<Property>,<MNOL>,<Channels>,<nCal>,[<CalFreq>,<CalValue>],
<ReturnCode>;

Parameter List

Parameter	Type	Description
<ShortName>	String	Abbreviated name for the antenna, up to 10 chr
<LongName>	String	Long Name of the antenna and used for selection, up to 35 chr
<Manufacturer>	String	Manufacturer's name, up to 15 chr
<DeviceName>	String	Antenna name, up to 15 chr
<Model>	String	Model, up to 15 chr
<SerialNo>	String	Serial number of the antenna, up to 15 chr
<CalDate>	Date	Calibration date of the antenna
<Fmin>	String	Lower frequency limit of the antenna, up to 15 chr [Hz]
<Fmax>	String	Upper frequency limit of the antenna, up to 15 chr [Hz]
<Property>	Enum	Antenna measurement property: [E-FIELD, H-FIELD, CURRENT, E&H-FIELD]
<MNOL>	Float	Maximum nominal output level of the antenna. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Reference Level selection accordingly. [dBm]
<Channels>	Enum	CH1 (single axis), CH3 (three axis antenna)
<nCal>	Short	Number of calibration points from 2 to 200
<CalFreq>	Double	List of antenna calibration points, must be ascending order [Hz]
<CalValue>	Float	Calibration value [dB/m or dBA/V]; dBA/V if Property = CURRENT
<ReturnCode>	Word	Warning or error code

Example

Command	Ant_ds? "LogPER_Antenna_LP-03_0.8-6GHz";
Response	"LP-03","LogPER_Antenna_LP-03_0.8-6GHz", "Narda - PMM","Log Per LP-03","LP-03", "000WE90602",15.09.09,"800 MHz","6 GHz",E-FIELD,20,1CH, 15, 700000000,26.5, 800000000,23.75, 1400000000,27.5, 2000000000,30, 2100000000,30.6, 2200000000,32.5, 2400000000,33.4, 3800000000,36.2, 4000000000,36.3, 5200000000,39.7, 5400000000,39.6, 5600000000,40, 5800000000,41.2, 6000000000,41.7, 6100000000,41.3, 0;

ANT_CLR

Description

Deletes a user defined antenna.

Command

ANT_CLR <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<LongName>	String	Long Name of a specific antenna, up to 35 chr
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_CLR "my_longname";
Response	0;

ANT_CLR_ALL

Description

Deletes all user defined antennas.

Command

ANT_CLR_ALL;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	ANT_CLR_ALL;
Response	0;

CBL_LIST?

Description

Queries a list of all currently available user defined cables.

Command

CBL_LIST?;

Response

<NumberOfElements>,[<LongName>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Short	Number of subsequent items
<LongName>	String	Long Name of each currently available user defined cable, up to 35 characters
<ReturnCode>	Word	Warning or error code

Example

Command	CBL_LIST?;
Response	2,
	"ENVIRONFLEX 400 Length 1.5m",
	"ENVIRONFLEX 400 Length 5m",
	0;

CBL_SEL

Description

Selects a user defined cable.

Note

Narda auto cables are detected automatically and cannot be manually selected.
The selection of a user cable might lead to an adjustment of the frequency range of the device.

Command

CBL_SEL <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<LongName>	String	Long Name of user defined cable, up to 35 characters
<ReturnCode>	Word	Warning or error code

Example

Command	CBL_SEL "ENVIRONFLEX 400 Length 1.5m";
Response	0;

CBL_SEL?

Description

Queries the information of the currently selected or connected user defined or auto cable.

Command

CBL_SEL?;

Response

<DataSource>, [<LongName>,<ShortName>,<Fmin>,<Fmax>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<DataSource>	Enum	AUTO: A Narda auto cable is selected USER: A user cable is selected NO: No cable is selected
<LongName>	String	Long Name of the cable, up to 35 characters
<ShortName>	String	Short Name of the cable, up to 10 characters
<Fmin>	String	Start frequency of the cable
<Fmax>	String	Stop frequency of the cable
<ReturnCode>	Word	Warning or error code

Example: Narda Auto-Kabel

Command	CBL_SEL?;
Response	AUTO," RF-cable SRM - N 50 Ohms - 1.5 m","SRM 1.5 m","9 kHz","6 GHz",0;

Example: No Kabel

Command	CBL_SEL?;
Response	NO,0;

CBL_SEL_NO

Description

Disables a selected user defined cable.

Note

Narda auto cables are detected automatically and cannot be manually deselected.

Command

CBL_SEL_NO;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	CBL_SEL_NO;
Response	0;

CBL_DS

Description

Creates a new user defined cable and stores it in the nonvolatile memory of the device.

Command

CBL_DS < ShortName>,<LongName>,<Manufacturer>,<DeviceName>,<Model>,<SerialNo>,
<CalDate>,<Fmin>,<Fmax>,<nCal>,[<CalFreq>,<CalValue>];

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ShortName>	String	Abbreviated name for the cable, up to 10 chr
<LongName>	String	Long Name of the cable and used for selection, up to 35 chr
<Manufacturer>	String	Manufacturer's name, up to 15 chr
<DeviceName>	String	Cable name, up to 15 chr
<Model>	String	Model, up to 15 chr
<SerialNo>	String	Serial number of the cable, up to 15 chr
<CalDate>	Date	Calibration date of the cable
<Fmin>	String	Lower frequency limit of the cable, up to 15 chr [Hz]
<Fmax>	String	Upper frequency limit of the cable, up to 15 chr [Hz]
<nCal>	Short	Number of calibration points from 2 to 200
<CalFreq>	Double	List of cable calibration points, must be ascending order [Hz]
<CalValue>	Float	Calibration value [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	cbl_ds
	"EF400 5m","ENVIRONFLEX 400 Length 5m",
	"H+S","EF","EF400",
	"",03.05.04,"100 kHz","3 GHz",
	41,
	100000,0.03,
	1000000,0.09,
	10000000,0.27,
	20000000,0.38,
	30000000,0.47,
	50000000,0.61,
	80000000,0.77,
	100000000,0.86,
	150000000,1.06,
	200000000,1.22,
	250000000,1.37,
	300000000,1.5,
	350000000,1.63,
	400000000,1.74,
	433000000,1.82,
	500000000,1.96,
	600000000,2.15,
	700000000,2.33,
	800000000,2.49,
	900000000,2.65,
	1000000000,2.8,
	1100000000,2.95,
	1200000000,3.08,
	1300000000,3.22,
	1400000000,3.34,
	1500000000,3.47,
	1600000000,3.59,
	1700000000,3.7,
	1800000000,3.82,
	1900000000,3.93,
	2000000000,4.04,
	2100000000,4.14,
	2200000000,4.25,
	2300000000,4.35,
	2400000000,4.45,
	2500000000,4.55,
	2600000000,4.64,
	2700000000,4.74,
	2800000000,4.83,
	2900000000,4.92,
	3000000000,5.01,;
Response	0;

CBL_DS?

Description

Queries a user defined cable.

Note

Long name of the cable is used for selection.

Command

CBL_DS? <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ShortName>	String	Abbreviated name for the cable, up to 10 chr
<LongName>	String	Long Name of the cable and used for selection, up to 35 chr
<Manufacturer>	String	Manufacturer's name, up to 15 chr
<DeviceName>	String	Cable name, up to 15 chr
<Model>	String	Model, up to 15 chr
<SerialNo>	String	Serial number of the cable, up to 15 chr
<CalDate>	Date	Calibration date of the cable
<Fmin>	String	Lower frequency limit of the cable, up to 15 chr [Hz]
<Fmax>	String	Upper frequency limit of the cable, up to 15 chr [Hz]
<nCal>	Short	Number of calibration points from 2 to 200
<CalFreq>	Double	List of cable calibration points, must be ascending order [Hz]
<CalValue>	Float	Calibration value [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	cbl_ds? "ENVIRONFLEX 400 Length 5m";
Response	"EF400 5m","ENVIRONFLEX 400 Length 5m", "H+S","EF","EF400", "",03.05.04,"100 kHz","3 GHz", 41, 100000,0.03, 1000000,0.09, 10000000,0.27, 20000000,0.38, 30000000,0.47, 50000000,0.61, 80000000,0.77, 100000000,0.86, 150000000,1.06, 200000000,1.22, 250000000,1.37, 300000000,1.5, 350000000,1.63, 400000000,1.74, 433000000,1.82, 500000000,1.96, 600000000,2.15, 700000000,2.33, 800000000,2.49, 900000000,2.65, 1000000000,2.8, 1100000000,2.95, 1200000000,3.08, 1300000000,3.22, 1400000000,3.34, 1500000000,3.47, 1600000000,3.59, 1700000000,3.7, 1800000000,3.82, 1900000000,3.93, 2000000000,4.04, 2100000000,4.14, 2200000000,4.25, 2300000000,4.35, 2400000000,4.45, 2500000000,4.55, 2600000000,4.64, 2700000000,4.74, 2800000000,4.83, 2900000000,4.92, 3000000000,5.01, 0;

CBL_CLR

Description

Deletes a user defined cable.

Command

CBL_CLR <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<LongName>	String	Long Name of a user defined cable, up to 35 chr
<ReturnCode>	Word	Warning or error code

Example

Command	CBL_CLR "my_longname";
Response	0;

CBL_CLR_ALL

Description

Deletes all user defined cables.

Command

CBL_CLR_ALL;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	CBL_CLR_ALL;
Response	0;

Audio demodulation

AUDIO_MUTE

> 💡 *Command only available for devices with speaker / headphone jack*

Description

Switches audio mute on or off in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Command

AUDIO_MUTE <MuteValue>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<MuteValue>	Enum	ON, OFF
<ReturnCode>	Word	Warning or error code

Example

Command	AUDIO_MUTE ON;
Response	0;

AUDIO_MUTE?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the state of audio mute in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Command

AUDIO_MUTE?;

Response

<MuteValue>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<MuteValue>	Enum	ON, OFF
<ReturnCode>	Word	Warning or error code

Example

Command	AUDIO_MUTE?;
Response	ON,0;

AUDIO_VOLUME

💡 *Command only available for devices with speaker / headphone jack*

Description

Sets the current audio demodulation volume in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Command

AUDIO_VOLUME <VolumeValue>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<VolumeValue>	DWord	-33,-30,-27,-24,-21,-18,-15,-12,-9,-6,-3,0,3,6 [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	AUDIO_VOLUME 0;
Response	0;

AUDIO_VOLUME?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the current audio demodulation volume in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Command

AUDIO_VOLUME?;

Response

<VolumeValue>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<VolumeValue>	DWord	-33,-30,-27,-24,-21,-18,-15,-12,-9,-6,-3,0,3,6 [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	AUDIO_VOLUME?;
Response	0,0;

AUDIO_VOLUME_LIST?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the audio demodulation volume-list in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Command

AUDIO_VOLUME_LIST?;

Response

<NumberOfElements>, [<DisplayStringPercent>, <VolumeValue>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayStringPercent>	String	Audio volume in Percent
<VolumeValue>	DWord	Relative audio volume value [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	AUDIO_VOLUME_LIST?;
Response	14,
	"100 %",6,
	"71 %",3,
	"50 %",0,
	"36 %",-3,
	"25 %",-6,
	"18 %",-9,
	"12.5 %",-12,
	"9 %",-15,
	"6.3 %",-18,
	"4.5 %",-21,
	"3.2 %",-24,
	"2.25 %",-27,
	"1.6 %",-30,
	"1.1 %",-33,
	0;

DEMOD_MODE

> 💡 *Command only available for devices with speaker / headphone jack*

Description

Sets the audio demodulation type in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.
Available demodulation types depends on the RBW (CBW for IDA2) setting in Level Meter mode.
Demodulation while using axis mode RSS (automatic mode) is not provided.
The command DEMOD_MODE_LIST? queries a list of currently available demodulation types.

Command

DEMOD_MODE <DemodMode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<DemodMode>	Enum	OFF,FM,AM,USB,LSB,CW
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_MODE FM;
Response	0;

DEMOD_MODE?

> 💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the current audio demodulation type in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.
Available demodulation types depends on the RBW (CBW for IDA2) setting in Level Meter mode.
Demodulation while using axis mode RSS (automatic mode) is not provided.
The command DEMOD_MODE_LIST? queries a list of currently available demodulation types.

Command

DEMOD_MODE?;

Response

<DemodMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<DemodMode>	Enum	OFF,FM,AM,USB,LSB,CW
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_MODE?;
Response	FM,0;

DEMOD_MODE_LIST?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the currently available audio demodulation types in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.
Available demodulation types depends on the RBW (CBW for IDA2) setting in Level Meter mode.
Demodulation while using axis mode RSS (automatic mode) is not provided.

Command

DEMOD_MODE_LIST?;

Response

<NumberOfElements>,[<DemodMode>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Short	Number of subsequent items
<DemodMode>	Enum	OFF,FM,AM,USB,LSB,CW
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_MODE_LIST?;
Response	6, OFF, FM, AM, CW, LSB, USB, 0;

DEMOD_SQUELCH

💡 *Command only available for devices with speaker / headphone jack*

Description

Sets the audio squelch threshold (noise suppression) in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.
You can set a squelch threshold when one of the following demodulation types is selected:
AM, CW, LSB, USB. Setting squeslsh in FM mode has no impacts.
The squelch value is given relatively to the input reference level in "dB".
Absolute squelch value [Unit] = RL [Unit] + squelch [dB].

Command

DEMOD_SQUELCH <SquelchValue>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<SquelchValue>	Short	0 = Squelch OFF Squelch level relative to RL, -40…-120 [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_SQUELCH -40;
Response	0;

DEMOD_SQUELCH?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the current audio squelch threshold (noise suppression) in level meter mode.

Note

Level Meter mode must be selected as the current operating mode.
You can set a squelch threshold when one of the following demodulation types is selected: AM, CW, LSB, USB.
The squelch value is given relatively to the input reference level in "dB".
Absolute squelch value [Unit] = RL [Unit] + squelch [dB].

Command

DEMOD_SQUELCH?;

Response

<SquelchValue>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<SquelchValue>	Short	0 = Squelch OFF Squelch level relative to RL, -40…-120 [dB]
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_SQUELCH?;
Response	-40,0;

DEMOD_SQUELCH_LIST?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries an audio squelch threshold-list (noise suppression) in level meter mode

Note

Level Meter mode must be selected as the current operating mode.

Command

DEMOD_SQUELCH_LIST?;

Response

<NumberOfElements>, [<DisplayStringRel>, <DisplayStringAbs>, <ValueRel>, <ValueAbs>,]
<ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayStringRel>	String	Relative value [dB] of the squelch level and unit as string
<DisplayStringAbs>	String	Absolute value of the squelch level and unit as string
<ValueRel>	Short	Relative squelch level value [dB]
<ValueAbs>,	Double	Absolute squelch level value [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_SQUELCH_LIST?;
Response	82,
	"OFF","OFF",0,0,
	"RL-40 dB","-70 dBm",-40,-69.96,
	"RL-41 dB","-71 dBm",-41,-70.96,
	"RL-42 dB","-72 dBm",-42,-71.96,
	"RL-43 dB","-73 dBm",-43,-72.96,
	"RL-44 dB","-74 dBm",-44,-73.96,
	…
	"RL-114 dB","-144 dBm",-114,-143.96,
	"RL-115 dB","-145 dBm",-115,-144.96,
	"RL-116 dB","-146 dBm",-116,-145.96,
	"RL-117 dB","-147 dBm",-117,-146.96,
	"RL-118 dB","-148 dBm",-118,-147.96,
	"RL-119 dB","-149 dBm",-119,-148.96,
	"RL-120 dB","-150 dBm",-120,-149.96,
	0;

DEMOD_BFO

💡 *Command only available for devices with speaker / headphone jack*

Description

Sets the BFO value (beat frequency oscillator) in level meter mode.

Note

Level Meter mode must be selected as the current operating mode.
You can set the BFO when one of the following demodulation types is selected: LSB, USB. Setting BFO in other modes (AM, FM, CW) has no impacts.

Command

DEMOD_BFO <BfoValue>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<BfoValue>	Double	-20.0 … +20.0 [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_BFO 10.0;
Response	0;

DEMOD_BFO?

💡 *Command only available for devices with speaker / headphone jack*

Description

Queries the current BFO value (beat frequency oscillator) in level meter mode.

Note

Level Meter mode must be selected as the current operating mode.
You can set the BFO when one of the following demodulation types is selected: LSB, USB.

Command

DEMOD_BFO?;

Response

<BfoValue>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<BfoValue>	Double	-20.0 … +20.0 [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	DEMOD_BFO?;
Response	10,0;

Axis Commands

AXIS

💡 *Command only available for NRA in combination with "Ant-Ctrl" option*

Description

Capability to measure each individual axis (X,Y,Z) or to measure in automatic mode RSS.

Note

RSS mode switches automatically between X,Y,Z to measure independent of direction and polarization. Single mode is for single axis antennas. Audio demodulation and I/Q stream is not provided in RSS mode as well as using ACT in Scope and I/Q mode. In this case device will switchover from RSS mode to X,Y or Z. RSS mode will lead to sweeptime changes because of sequential measuring of each axis.For setting X,Y, Z or RSS a 3-axis Narda antenna is required.

Command

AXIS <AxisPara>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<AxisPara>	Enum	X Y Z SINGLE (standard startup setting for single axis antenna) RSS (automatic mode – standard startup setting for 3-axis Narda antennas)
<ReturnCode>	Word	Warning or error code

Example

Command	AXIS X;
Response	0;

Command	AXIS Y;
Response	0;

Command	AXIS Z;
Response	0;

Command	AXIS SINGLE;
Response	0;

Command	AXIS RSS;
Response	0;

AXIS?

💡 *Command only available for NRA in combination with "Ant-Ctrl" option*

Description

Queries the currently measured axis.

Command

AXIS?;

Response

<AxisPara>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<AxisPara>	Enum	X Y Z SINGLE (standard startup setting for single axis antenna) RSS (automatic mode – standard startup setting for 3-axis Narda antennas)
<ReturnCode>	Word	Warning or error code

Example

Command	AXIS?
Response	X, 0;

Command	AXIS?
Response	Y, 0;

Command	AXIS?
Response	Z, 0;

Command	AXIS?
Response	SINGLE, 0;

Command	AXIS?
Response	RSS, 0;

External Device

EXT_DEV_LIST?

Description
Queries a list of all currently available user defined external devices.

Command
EXT_DEV_LIST?;

Response
<NumberOfElements>,[<LongName>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Short	Number of subsequent items
<LongName>	String	Long Name of each currently available external device, up to 35 characters
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_LIST?;
Response	1, "Fixed Coaxial Attenuator (N) 10dB", 0;

EXT_DEV_SEL_NO

Description

Disables a selected user defined external device.

Command

EXT_DEV_SEL_NO;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_SEL_NO;
Response	0

EXT_DEV_SEL

Description

Selects a user defined external device.

Command

EXT_DEV_SEL <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<LongName>	String	Long Name of the user defined external device, up to 35 characters
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_SEL " LongName"
Response	0;

EXT_DEV_SEL?

Description

Queries the information of the currently selected user defined external device.

Command

EXT_DEV_SEL?;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<DataSource>	Enum	USER: A user defined external device is selected NO: No external device is selected
<LongName>	String	Long Name of the external device, up to 35 characters
<ShortName>	String	Short Name of the external device, up to 10 characters
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_SEL?
Response	USER,"Fixed Coaxial Attenuator (N) 10dB","Att.10dB",0;

Example: No ext. device

Command	EXT_DEV_SEL?;
Response	NO,0;

EXT_DEV_DS

Description

Creates a new user defined external device and stores it in the nonvolatile memory of the device.

Command

EXT_DEV_DS < ShortName>,<LongName>,<Manufacturer>,<DeviceName>,<Model>,<SerialNo>,
<CalDate>,<ExtDeviceType>,<Switchable>,<Fmin_ON>,<Fmax_ON>,<MNOL_ON>,<nCal_ON>,
[<CalFreq_ON>,<CalValue_ON>];

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ShortName>	String	Abbreviated name for the external device, up to 10 chr
<LongName>	String	Long Name of the external device and used for selection, up to 35 chr
<Manufacturer>	String	Manufacturer's name, up to 15 chr
<DeviceName>	String	External device name, up to 15 chr
<Model>	String	Model, up to 15 chr
<SerialNo>	String	Serial number of the external device, up to 15 chr
<CalDate>	Date	Calibration date of the external device
<ExtDeviceType>	Enum	ANT_HANDLE, FILTER, ATTENUATOR, PREAMP
<Switchable>	Enum	YES or NO, designed for external devices with two different states. Able to switch between two different calibration sets.
<Fmin_ON>	String	Lower frequency limit of the external device, up to 15 chr [Hz]
<Fmax_ON>	String	Upper frequency limit of the external device, up to 15 chr [Hz]
<MNOL_ON>	Float	Maximum nominal output level of the ext. device. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Reference Level selection accordingly. [dBm]
<nCal_ON>	Short	Number of calibration points from 2 to 100
<CalFreq_ON>	Double	List of external device calibration points, must be in ascending order [Hz]
<CalValue_ON>	Float	Calibration value [dB]
<ReturnCode>	Word	Warning or error code

Optional parameters if Switchable = YES		
Parameter	Type	Description
<Fmin_OFF>	String	Lower frequency limit of the external device, up to 15 chr [Hz]
<Fmax_OFF>	String	Upper frequency limit of the external device, up to 15 chr [Hz]
<MNOL_OFF>	Float	Maximum nominal output level of the ext. device. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Reference Level selection accordingly. [dBm]
<nCal_OFF>	Short	Number of calibration points from 2 to 100
<CalFreq_OFF>	Double	List of external device calibration points, must be in ascending order [Hz]
<CalValue_OFF>	Float	Calibration value [dB]

Example

Command	EXT_DEV_DS "Att.10dB", "Fixed Coaxial Attenuator (N) 10dB", "Narda", "Attenuator 10dB", "Dummy", "0001", 28.09.11, ATTENUATOR, NO, "9 kHz", "6 GHz", 33,4, 9000,10.01, 1000000000,10.05, 3000000000,10.12, 6000000000,10.25,
Response	0;

EXT_DEV_DS?

Description

Queries a user defined external device.

Note

Long name of the external device is for selection.

Command

EXT_DEV_DS? <LongName>;

Response

EXT_DEV_DS? < ShortName>,<LongName>,<Manufacturer>,<DeviceName>,<Model>,<SerialNo>, <CalDate>,<ExtDeviceType>,<Switchable>,<Fmin_ON/OFF>,<Fmax_ON/OFF>,<MNOL_ON/OFF>, <nCa_ON/OFF>,[<CalFreq_ON/OFF>,<CalValue_ON/OFF>];<ReturnCode>;

Parameter List

Parameter	Type	Description
<ShortName>	String	Abbreviated name for the external device, up to 10 chr
<LongName>	String	Long Name of the external device and used for selection, up to 35 chr
<Manufacturer>	String	Manufacturer's name, up to 15 chr
<DeviceName>	String	External device name, up to 15 chr
<Model>	String	Model, up to 15 chr
<SerialNo>	String	Serial number of the external device, up to 15 chr
<CalDate>	Date	Calibration date of the external device
<ExtDeviceType>	Enum	ANT_HANDLE, FILTER, ATTENUATOR, PREAMP
<Switchable>	Enum	YES or NO, designed for external devices with two different states. Able to switch between two different calibration sets.
<Fmin_ON>	String	Lower frequency limit of the external device, up to 15 chr [Hz]
<Fmax_ON>	String	Upper frequency limit of the external device, up to 15 chr [Hz]
<MNOL_ON>	Float	Maximum nominal output level of the ext. device. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Reference Level selection accordingly. [dBm]
<nCal_ON>	Short	Number of calibration points from 2 to 100
<CalFreq_ON>	Double	List of external device calibration points, must be in ascending order [Hz]
<CalValue_ON>	Float	Calibration value [dB]
<ReturnCode>	Word	Warning or error code

Optional parameters if Switchable = YES		
Parameter	Type	Description
<Fmin_OFF>	String	Lower frequency limit of the external device, up to 15 chr [Hz]
<Fmax_OFF>	String	Upper frequency limit of the external device, up to 15 chr [Hz]
<MNOL_OFF>	Float	Maximum nominal output level of the ext. device. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Reference Level selection accordingly. [dBm]
<nCal_OFF>	Short	Number of calibration points from 2 to 100
<CalFreq_OFF>	Double	List of external device calibration points, must be in ascending order [Hz]
<CalValue_OFF>	Float	Calibration value [dB]

Additional parameters if Switchable = YES		
Parameter	Type	Description
<Fmin_OFF>	String	Lower frequency limit of the antenna, up to 15 chr [Hz]
<Fmax_OFF>	String	Upper frequency limit of the antenna, up to 15 chr [Hz]
<MNOL_OFF>	Float	Maximum nominal output level of the ext. device. Entering this parameter prevents the device from being overdriven, avoiding the resulting measurement error. The device restricts the Measurement Range selection accordingly If you do not enter a value in this field, a default value will be set. [dBm]
<nCal_OFF>	Short	Number of calibration points from 2 to 100
<CalFreq_OFF>	Double	List of antenna calibration points, must be in ascending order [Hz]
<CalValue_OFF>	Float	Calibration value [dB]

Example

Command	EXT_DEV_DS? "Fixed Coaxial Attenuator (N) 10dB";
Response	"Att.10dB", "Fixed Coaxial Attenuator (N) 10dB", "Narda","Attenuator 10dB", "Dummy", "0001", 28.09.11, ATTENUATOR, NO, "9 kHz", "6 GHz", 33,4, 9000,10.01, 1000000000,10.05, 3000000000,10.12, 6000000000,10.25, 0;

EXT_DEV_SWITCH

Description

Switches the calibration set of the external device.

Note

Designed for external devices with two different states. Able to switch between two different calibration sets accordingly to the state (active/passive) of the external device.

Command

EXT_DEV_SWITCH <SwitchState>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<SwitchState>	Enum	ON OFF (default state after selecting)
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_SWITCH ON;
Response	0;

Command	EXT_DEV_SWITCH OFF;
Response	0;

EXT_DEV_SWITCH?

Description

Queries the current switch state.

Command

EXT_DEV_SWITCH?;

Response

<SwitchState>

Parameter List

Parameter	Type	Description
<SwitchState>	Enum	ON or OFF
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_SWITCH?;
Response	ON,0;

EXT_DEV_CLR

Description

Deletes a user defined external device.

Command

EXT_DEV_CLR <LongName>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<LongName>	String	Long Name of the external device, up to 35 chr.
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_CLR "my_longname";
Response	0;

EXT_DEV_CLR_ALL

Description
Deletes all user defined external devices.

Command
EXT_DV_CLR_ALL;

Response
<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	EXT_DEV_CLR_ALL;
Response	0;

Livescreen

DISPLAY_REMOTE

Description

Activates or deactivates the GUI remote operation mode.

Note

This mode provides additional graphical representation of the current settings and results even in "Remote OFF" state.

Command

DISPLAY_REMOTE <Status>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Status>	Enum	ON = Enables GUI remote operation mode OFF = Disables GUI remote operation mode
<ReturnCode>	Word	Warning or error code

Example

Command	DISPLAY_REMOTE ON;
Response	0;

DISPLAY_REMOTE?

Description

Queries the status of the GUI remote operation mode

Command

DISPLAY_REMOTE?;

Response

<Status>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Status>	Enum	ON = GUI remote operation mode enabled OFF = GUI remote operation mode disabled
<ReturnCode>	Word	Warning or error code

Example

Command	DISPLAY_REMOTE?;
Response	ON,0;

DISPLAY_VIEWER_INTERVAL

💡 *Command only available for devices with an Ethernet connector*

Description

Sets the update interval time (refresh rate) of the Webservers Live Display Viewer.

Note

This command can also be used to disable the Viewer. The default interval value after power-up is "0 ms". The update interval time setting is volatile, and must be re-established each time the device is switched on.
The HTML Display Viewer reduces the measurement speed of the device and should be turned off if not needed.

Command

DISPLAY_VIEWER_INTERVAL <Interval>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Interval>	Word	Time interval in ms, 0 ms to disable remote GUI or >=1000 ms to enable remote GUI.
<ReturnCode>	Word	Warning or error code

Example

Command	DISPLAY_VIEWER_INTERVAL 2000;
Response	0;

DISPLAY_VIEWER_INTERVAL?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the update interval time (refresh rate) of the Webservers Live Display Viewer.

Command

DISPLAY_VIEWER_INTERVAL?;

Response

<Interval>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Interval>	Word	Time interval in ms
<ReturnCode>	Word	Warning or error code

Example

Command	DISPLAY_VIEWER_INTERVAL?;
Response	2000,0;

LIVE_SCREEN?

Description

Queries the current device display as a screenshot in PNG format.

Note

Individual values are themselves represented by binary numbers in the range 0-255 (0x00 – 0xFF). The values are transmitted in ASCII-HEX-Dump.

Example: the value 0x89 is transmitted as '8' '9', and the associated HEX representation is 0x38 0x39.

The complete and consistent quantity of all values can be converted back into binary data so that the device display can be shown straightaway on a monitor as a PNG file.

Command also useable in "Remote OFF" mode

Command

LIVE_SCREEN? <Blocksize>;

Response

<NumberOfBytes>, [<BinaryValue>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<Blocksize>	DWord	Number of binary bytes per line (block-wise transfer) 0 no vertical format up to 65533 binary bytes per line
<NumberOfBytes>	DWord	Number of binary bytes (before conversion to HEX)
<BinaryValue>	HEXDump	Binary bytes as HEX strings
<ReturnCode>	Word	Warning or error code

Example

Command	LIVE_SCREEN? 32;
Response	15325, 89504E470D0A1A0A0000000D494844520000032000001E00802000000D2659E A20000000173524742400AECE1CE90000000467414D410000B18F0BFC61050000 00206348524D00007A26000080840000FA00000080E8000075300000EA600000 3A98000017709CBA513C00003B5B49444154785EEDDD5D92AC38B268E13C733F A3E96B751ECA6C4FA3EFE319C21DC6BED146354D01925C801480BEB47CA88A14 … … F65601E43E043A8C3278BAF89B607DFEC7573B027FFCE38FDFBF7FB7EB5FCFF3 6686A2290191DC14EFD439C8207720D06188C123F9B3FC7F6D66DF0820800002 08208000021712F8FFB8E0519A6C7BCEB70000000049454E44AE426082 ,0;

LIVE_SCREEN_BINARY?

Description

Queries the current device display as a screenshot in 16 bit BMP format.

Note

The values are represented by binary bytes with a range 0-255 (0x00 – 0xFF).
The values are transmitted as BINARY block data.

The complete and consistent quantity of all values can be converted back into binary data so that the device display can be shown straightaway on a monitor as a BMP file.

Command also useable in "Remote OFF" mode

Command

LIVE_SCREEN_BINARY? <Typ>;

Response

<AsciiHeader> [BinaryValue]

Parameter List

Parameter	Description
<AsciiHeader>	ASCII header for block data transfer.
<Typ>	ALL = Complete device screen of the device AUTO = Complete screen or the measurement screen MEAS_ONLY = Measurement screen of the device MEAS_PARAM = Measurement screen including status information
[BinaryValue]	Array of binary bytes representing screenshot data.

Hexdump: FORMAT_BINARY NORMAL

Command	4c 49 56 45 5f 53 43 52 45 45 4e 5f 42 49 4e 41	LIVE_SCREEN_BINA
	52 59 3f 20 41 4c 4c 3b	RY? ALL;
Response	23 36 37 36 38 30 36 36 42 4d 42 94 11 00 00 00	#6768066 …
	00 00 42 00 00 00 28 00 00 00 20 03 00 00 e0 01	
	00 00 01 00 10 00 03 00 00 00 00 b8 0b 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 f8	
	00 00 e0 07 00 00 1f 00 00 00 18 c6 18 c6 18 c6	
	18 c6 18 c6 18 c6 18 c6 18 c6 18 c6 18 c6 18 c6	
	18 c6 18 c6 18 c6 18 c6 18 c6 18 c6 18 c6 18 c6	
	18 c6 18 c6 18 c6 18 c6 18 c6 18 c6 18 c6 18 c6	
	…	

LIVE_SEND_KEY

Description

Activates an operating panel key by remote communication.

Note

Command also useable in "Remote OFF" mode

Command

LIVE_SEND_KEY <Key>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description	
<Key>	Enum	HSK1	horizontal soft key 1, (HSK1 … HSK6, from left to right)
		VSK1	vertical soft key 1, (VSK1 … VSK6, top down)
		0	number key 0, (keys 0 …9)
		DOT	decimal point
		MENU	function key MENU
		OK	function key OK
		ESC	function key ESC
		SAVE	function key SAVE
		HOLD	function key HOLD
		LEFT	arrow key <
		RIGHT	arrow key >
		ON_OFF	function key ON/OFF
<ReturnCode>	Word	Warning or error code	

Example

Command	LIVE_SEND_KEY HSK1;
Response	0;

LIVE_SEND_ROT_KNOB

Description

Activates the operating panel rotary control by remote communication.

Note

Command also useable in "Remote OFF" mode

Command

LIVE_SEND_ROT_KNOB <Steps>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Steps>	Short	Counter-clockwise rotation decrements (-1 to -20) or clockwise rotation increments (1 to 20)
<ReturnCode>	Word	Warning or error code

Example

Command	LIVE_SEND_ROT_KNOB -5;
Response	0;

LNB control – NRA-LNB versions only

LNB_CTRL

> 💡 *Command only available for devices with an LNB control unit*

Description

Switches the LNB control unit on or off.

Command

LNB_CTRL <Power>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Power>	Enum	ON = Switches on the LNB control unit OFF = Switches off the LNB control unit
<ReturnCode>	DWord	Warning or error code

Examples

Command	LNB_CTRL ON;
Response	0;

Command	LNB_ CTRL OFF;
Response	0;

LNB_CTRL?

💡 *Command only available for devices with an LNB control unit*

Description

Queries the state of the LNB control unit.

Command

LNB_CTRL?;

Response

<Power>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Power>	Enum	ON = The LNB control is switched on OFF = The LNB control is switched off
<ReturnCode>	DWord	Warning or error code

Example

Command	LNB_CTRL?;
Response	ON,0;

LNB_CTRL_BAND

💡 *Command only available for devices with an LNB control unit*

Description

Selects the low band (22kHz off) or the high band (22kHz on) for the LNB control unit.

Command

LNB_CTRL_BAND <Band>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Band>	Enum	LOW = Selects LNB low band (22kHz off) HIGH = Selects LNB high band (22kHz on)
<ReturnCode>	DWord	Warning or error code

Examples

Command	LNB_CTRL_BAND LOW;
Response	0;

Command	LNB_CTRL_BAND HIGH;
Response	0;

LNB_CTRL_BAND?

💡 *Command only available for devices with an LNB control unit*

Description

Queries the band setting for the LNB control unit.

Command

LNB_CTRL_BAND?;

Response

<Band>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Band>	Enum	LOW = LNB low band selected (22kHz off) HIGH = LNB high band selected (22kHz on)
<ReturnCode>	DWord	Warning or error code

Example

Command	LNB_CTRL_BAND?;
Response	LOW,0;

LNB_CTRL_DIAG?

💡 *Command only available for devices with an LNB control unit*

Description

Queries diagnostic information from the LNB control unit.

Note

The current overload flag is set if a current limit is exceeded or a short-circuit is detected.

The thermal overload flag is set after the inner temperature of the LNB control unit exceeds approximately 150 °C. The flag is set low, after the inner temperature of the LNB control unit is below approximately 135 °C.

It is recommended, that the diagnostic information is queried periodically. After an overload event, it is recommended to do a reset of the LNB control unit.

Command

LNB_CTRL_DIAG?;

Response

<CurrentOVL>,<ThermalOVL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<CurrentOVL>	Enum	NO = Current overload Flag is not set YES = Current overload Flag is set
<ThermalOVL>	Enum	NO = Thermal overload Flag is not set YES = Thermal overload Flag is set
<ReturnCode>	DWord	Warning or error code

Example

Command	LNB_CTRL_DIAG?;
Response	NO,NO,0;

LNB_CTRL_POL

💡 *Command only available for devices with an LNB control unit*

Description

Selects the polarization setting for the LNB control unit.

Note

With polarization = vertical, the output voltage of the LNB control unit is set to 13.4 volts.
With polarization = horizontal, the output voltage of the LNB control unit is set to 18.5 volts.

Command

LNB_CTRL_POL <Polarization>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Polarization>	Enum	HORIZONTAL = Selects LNB horizontal polarization VERTICAL = Selects LNB vertical polarization
<ReturnCode>	DWord	Warning or error code

Examples

Command	LNB_CTRL_POL HORIZONTAL;
Response	0;

Command	LNB_CTRL_POL VERTICAL;
Response	0;

LNB_CTRL_POL?

💡 *Command only available for devices with an LNB control unit*

Description

Queries the polarization setting for the LNB control unit.

Note

With polarization = vertical, the output voltage of the LNB control unit is set to 13.4 volts.
With polarization = horizontal, the output voltage of the LNB control unit is set to 18.5 volts.

Command

LNB_CTRL_POL?;

Response

<Polarization>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Polarization>	Enum	HORIZONTAL = LNB horizontal polarization selected VERTICAL = LNB vertical polarization selected
<ReturnCode>	DWord	Warning or error code

Example

Command	LNB_CTRL_POL?;
Response	HORIZONTAL,0;

LNB_CTRL_RESET

💡 *Command only available for devices with an LNB control unit*

Description
Resets the LNB control unit to the default settings.

Note
The LNB Reset Settings are as follows:

Power = OFF
Band = High
Polarization = Vertical
Cable Compensation = OFF

Command
LNB_CTRL_RESET;

Response
<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	DWord	Warning or error code

Example

Command	LNB_CTRL_RESET;
Response	0;

LNB_CTRL_VOLTAGE_CORRECTION

💡 *Command only available for devices with an LNB control unit*

Description

Activates or deactivates the cable compensation for the LNB control unit.

Note

This command can be used to compensate a voltage drop caused by a long coaxial cable between the LNB control unit and the LNB.

If LNB_CTRL_VOLTAGE_CORRECTION is activated, the output voltages of the LNB control unit are as follows:

With polarization = vertical, the output voltage of the LNB control unit is set to 14.4 volts.
With polarization = horizontal, the output voltage of the LNB control unit is set to 19.5 volts.

Command

LNB_CTRL_VOLTAGE_CORRECTION <Correction>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Correction>	Enum	ON = Activates the cable compensation OFF = Deactivates the cable compensation
<ReturnCode>	DWord	Warning or error code

Examples

Command	LNB_CTRL_VOLTAGE_CORRECTION ON;
Response	0;

Command	LNB_CTRL_VOLTAGE_CORRECTION OFF;
Response	0;

LNB_CTRL_VOLTAGE_CORRECTION?

💡 *Command only available for devices with an LNB control unit*

Description

Queries the setting for the cable compensation for the LNB control unit.

Note

If LNB_CTRL_VOLTAGE_CORRECTION is activated, the output voltages of the LNB control unit are as follows:

With polarization = vertical, the output voltage of the LNB control unit is set to 14.4 volts.
With polarization = horizontal, the output voltage of the LNB control unit is set to 19.5 volts.

Command

LNB_CTRL_VOLTAGE_CORRECTION?;

Response

<Correction>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Correction>	Enum	ON = Cable compensation activated OFF = Cable compensation deactivated
<ReturnCode>	DWord	Warning or error code

Example

Command	LNB_CTRL_VOLTAGE_CORRECTION?;
Response	OFF,0;

Measurement

MEAS_START

Description

(Re)starts cyclic measurement in the current operating mode.

Note

This command is not necessary for nomal operation. It can be used to restart the measurement process.
By default, cyclic measurement is performed after device start-up and measurement configuration.
This command resets all measurement runs (traces) as done at the start of the measurement.
(see RESULTTYPE_RESET).

Command

MEAS_START;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	MEAS_START;
Response	0;

MEAS_STOP

Description

Stop cyclic measurement in the current operating mode.

Note

This command is not necessary for nomal operation. It can be used to stop the measurement process. By default, cyclic measurement is performed after device start-up and measurement configuration.

Command

MEAS_STOP;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	MEAS_STOP;
Response	0;

MODE

Description

Sets the current operating mode.

Note

The standard mode is SPECTRUM.
Some modes are optional and can be selected only if they are enabled on the device. Otherwise the code 432 ("mode not available") will be returned.

Options can be subsequently ordered and enabled by activation code.

Command

MODE <Mode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Mode>	Enum	SPECTRUM MCP (Option required for NRA) LEVEL (Option required for NRA) SCOPE (Option required for IDA / NRA) IQSTREAM (Option required for IDA / NRA)
<ReturnCode>	Word	Warning or error code

Examples

Command	MODE SPECTRUM;
Response	0;

Command	MODE MCP;
Response	0;

Command	MODE LEVEL;
Response	0;

Command	MODE SCOPE;
Response	0;

Command	MODE IQSTREAM;
Response	0;

MODE?

Description

Queries the current operating mode.

Command

MODE?;

Response

<Mode>,<ReturnCode>,

Parameter List

Parameter	Type	Description
<Mode>	Enum	SPECTRUM MCP LEVEL SCOPE IQSTREAM IQ_ANALYZER (IDA, read only) DIRECTION (IDA, read only)
<ReturnCode>	Word	Warning or error code

Example

Command	MODE?;
Response	SPECTRUM,0;

RBW_LIST?

Description

Queries a list of the current possible RBW settings.

Note

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Note for IDA

In Remote operation there's no differentiation between RBW and CBW. All commands are using the term "RBW". For manual operation you'll find the term "CBW" for the steep channel filters used in Level Meter and Scope Mode. Both terms have the same meaning in remote operation.

Command

RBW_LIST?

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Resolution bandwidth RBW and unit as string
<Value>	Double	Resolution bandwidth RBW as value [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	RBW_LIST?;
Response	7, "20 MHz",20000000, "10 MHz",10000000, "5 MHz",5000000, "3 MHz",3000000, "2 MHz",2000000, "1 MHz",1000000, "500 kHz",500000, 0;

RESULTTYPE_RESET

Description

Resets all measurement runs (traces) to default values as is done at the start of the measurement.

Command

RESULTTYPE_RESET;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	RESULTTYPE_RESET;
Response	0;

RESULTTYPE_RESET_MIN_MAX

Description

Resets the Min and Max measurement runs (traces) to default values as is done at the start of the measurement.

Command

RESULTTYPE_RESET_MIN_MAX;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	RESULTTYPE_RESET_MIN_MAX;
Response	0;

RL_ATT_LIST?

Description

Queries a list of the current possible reference level and attenuator settings (measurement range).

Note

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

RL_ATT_LIST?;

Response

<NumberOfElements>, [<DisplayStringRL>, <DisplayStringAtt>, <ValueRL>,<ValueAtt>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayStringRL>	String	Reference level (measurement range) and unit as string
<DisplayStringAtt>	String	Attenuator and unit as string
<ValueRL>	Float	Reference level as value [Unit]
<ValueAtt>	Float	Attenuator as value [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	RL_ATT_LIST?;
Response	51,
	"20 dBm","50 dB",20,50,
	"19 dBm","49 dB",19,49,
	"18 dBm","48 dB",18,48,
	"17 dBm","47 dB",17,47,
	"16 dBm","46 dB",16,46,
	"15 dBm","45 dB",15,45,
	"14 dBm","44 dB",14,44,
	…
	…
	"-24 dBm","6 dB",-24,6,
	"-25 dBm","5 dB",-25,5,
	"-26 dBm","4 dB",-26,4,
	"-27 dBm","3 dB",-27,3,
	"-28 dBm","2 dB",-28,2,
	"-29 dBm","1 dB",-29,1,
	"-30 dBm","0 dB",-30,0,
	0;

RL_LIST?

Description

Queries a list of the current possible reference level settings (measurement range).

Note

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

RL_LIST?;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Reference level (measurement range) and unit as string
<Value>	Float	Reference level as value [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	RL_LIST?;
Response	51, "20 dBm",20, "19 dBm",19, "18 dBm",18, "17 dBm",17, "16 dBm",16, "15 dBm",15, "14 dBm",14, … … "-26 dBm",-26, "-27 dBm",-27, "-28 dBm",-28, "-29 dBm",-29, "-30 dBm",-30, 0;

SWEEP_STATE?

Description

Queries the status and progress of the current measurement.

Note

The parameter <SweepCounter> can be used to detect the start of a new measurement so that the measured values can be requested only when required.

The parameter <SweepProgress> should only be used for graphical purposes and not for synchronizing the request of measurement values.

Command

SWEEP_STATE?;

Response

<SweepCounter>,<SweepTime>,<SweepProgress>,<AVGProgress>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<SweepCounter>	DWord	Number of sweeps performed
<SweepTime>	DWord	Sweep Time [ms]
<SweepProgress>	Word	0 – 100 [%] Progress of the current sweep
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<ReturnCode>	Word	Warning or error code

Example

Command	SWEEP_STATE?;
Response	2576,38,100,54,0;

UNIT

Description

Sets the current unit setting.

Command

UNIT <Unit>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Unit>	Enum	Measurement results can be displayed in one of the following units: -With no antenna connected: dBm, dBV, dBmV, dBuV -With antenna connected (additional): dBV/m, dBmV/m, dBuV/m, dBA/m, V/m, A/m, W/m^2, W/cm^2 Units for Scope (I/Q) -With no antenna connected: V -With antenna connected (additional): V/m, A/m
<ReturnCode>	Word	

Example

Command	UNIT dBm;
Response	0;

UNIT?

Description

Queries the current unit setting.

Command

UNIT?;

Response

<Unit>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Unit>	Enum	Measurement results can be displayed in one of the following units: -With no antenna connected: dBm, dBV, dBmV, dBuV -With antenna connected (additional): dBV/m, dBmV/m, dBuV/m, dBA/m, V/m, A/m, W/m^2, W/cm^2 Units for Scope (I/Q) -With no antenna connected: V -With antenna connected (additional): V/m, A/m
<ReturnCode>	Word	Warning or error code

Example

Command	UNIT?;
Response	dBm,0;

UNIT_LIST?

Description

Queries a list of current possible unit settings (Unit).

Note

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

UNIT_LIST?;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Unit as a string
<Value>	Enum	-With no antenna connected: dBm, dBV, dBmV, dBuV -With antenna connected (additional): dBV/m, dBmV/m, dBuV/m, dBA/m, V/m, A/m, W/m^2, W/cm^2 Units for Scope (I/Q) -With no antenna connected: V -With antenna connected (additional): V/m, A/m
<ReturnCode>	Word	Warning or error code

Example without antenna connected

Command	UNIT_LIST?;
Response	4, "dBm",dBm, "dBV",dBV, "dBmV",dBmV, "dBµV",dBuV, 0;

Example with antenna connected

Command	UNIT_LIST?;
Response	12, "dBm",dBm, "dBV",dBV, "dBmV",dBmV, "dBµV",dBuV, "dBV/m",dBV/m, "dBmV/m",dBmV/m, "dBµV/m",dBuV/m, "dBA/m",dBA/m, "V/m",V/m, "A/m",A/m, "W/m²",W/m^2, "W/cm²",W/cm^2, 0;

VBW_LIST?

Description

Queries the current possible VBW settings.

Note

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

VBW_LIST?;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Video bandwidth and unit as string
<Value>	Double	Video bandwidth as value [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	VBW_LIST?;
Response	9,
	"1 MHz",1000000,
	"500 kHz",500000,
	"300 kHz",300000,
	"200 kHz",200000,
	"100 kHz",100000,
	"50 kHz",50000,
	"30 kHz",30000,
	"20 kHz",20000,
	"10 kHz",10000,
	0;

Mode Spectrum

SPECTRUM?

💡 *The SPECTRUM? command is obsolete, it is recommended to instead use the command SPECTRUM_TRACE?*

Description

Queries one or more measurement runs (traces) in SPECTRUM mode.

Note

Spectrum mode must be selected as the current operating mode.
A measurement run is the number of all the measurement values determined during a measurement cycle (sweep).

Command

SPECTRUM? <Trace>;

Response

<SweepCounter>,<SweepTime>,<AVGProgress>,<NoOfSpatialAVG>,<Fmin>,<df>,<NoOfTraces>,
[<ActTrace>,<Overdriven>,<NoOfValues>, [<Value>,]] <ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	Sets the desired traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values ALL All traces in the order noted above
<SweepCounter>	DWord	Number of sweeps performed
<SweepTime>	DWord	Sweep Time [ms]
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	0 – 999 999 Number of sweeps used for spatial averaging
<Fmin>	Double	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	Frequency steps (resolution) of the FFT [Hz]
<NoOfTraces>	Word	Number of traces, 1 - 6
<ActTrace>	Enum	Actual trace ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<Overdriven>	Enum	YES, NO; Yes, if at least one trace exceeded the range limit. Overdriven results may have a very high uncertainty.
<NoOfValues>	DWord	Number of measurement values per trace. 21…632891 values are possible. (NRA) 21…27517 values are possible. (IDA)
<Value>	Float	Measurement result [Unit]. Very low results in logarithmic units are represented by "-999" (negative infinity).
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM? ACT;
Response	2946,37,100,0,1500000000,5000000,1, ACT,NO,21, -39.15,-42.65,-38.01,-50.29,-40.12,-39.91,-37.98,-32.33,-37.17,-36.31,-40.04,-43.39,-36.40,-35.99,-51.26,-36.75,-35.99,-40.29,-35.68,-33.77,-38.14, 0;

Command	SPECTRUM? ALL;
Response	8058,36,100,0,1500000000,5000000,6,
	ACT,NO,21,
	-36.77,-30.52,-43.30,-41.15,-35.68,-42.16,-34.77,-34.81,-39.91,-51.26,-43.05,-41.96,-37.74,-37.17,-43.39,-37.62,-37.98,-39.22,-36.63,-44.73,-37.03,
	AVG,NO,21,
	-37.05,-33.94,-37.64,-37.18,-38.44,-36.16,-37.08,-34.53,-39.58,-38.15,-37.61,-36.56,-37.02,-37.42,-38.41,-36.63,-38.04,-35.27,-37.85,-37.07,-36.65,
	MAX,NO,21,
	-25.43,-24.80,-26.48,-27.38,-26.06,-26.78,-27.03,-26.51,-26.56,-25.84,-25.48,-25.62,-25.32,-26.66,-25.28,-25.97,-26.53,-26.96,-26.62,-27.06,-26.73,
	MAX_AVG,NO,21,
	-30.63,-29.67,-30.72,-31.29,-30.81,-30.85,-31.24,-30.14,-30.65,-30.98,-30.04,-30.67,-30.27,-30.93,-30.64,-31.11,-30.88,-31.12,-31.14,-31.24,-30.91,
	MIN,NO,21,
	-999.00,
	MIN_AVG,NO,21,
	-42.62,-42.29,-43.21,-42.54,-42.28,-42.62,-42.17,-45.02,-42.37,-43.46,-42.56,-42.36,-42.68,-42.93,-42.32,-43.27,-42.81,-42.46,-42.14,-43.23,-42.60,
	0;

SPECTRUM_AVG_CONFIG

Description

Sets the current averaging method.

Note

SPECTRUM mode has 2 averaging methods:

- Average over a number of individual measurements (Number)
- Average over a time period (Time)

There is one setting parameter for each method, which is selected from a basic set of values.

Command

SPECTRUM_AVG_CONFIG <AvgMode>,<AvgNumber>,<AvgTime>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgMode>	Enum	NUMBER: Average over a number of individual measurements TIME: Average over a time period (in seconds)
<AvgNumber>	DWord	Number of averaging samples: 4, 8, 16, 32, 64, 128, 256
<AvgTime>	DWord	Time [s]: 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900, 960, 1020, 1080, 1140, 1200, 1260, 1320, 1380, 1440, 1500, 1560, 1620, 1680, 1740, 1800
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_AVG_CONFIG NUMBER,64,240;
Response	0;

Command	SPECTRUM_AVG_CONFIG TIME,4,180;
Response	0;

SPECTRUM_AVG_CONFIG?

Description

Queries the current averaging method.

Note

SPECTRUM mode has 2 averaging methods:

- Average over a number of individual measurements (Number)
- Average over a time period (Time)

There is one setting parameter for each method, which is selected from a basic set of values.

Command

SPECTRUM_AVG_CONFIG?;

Response

<AvgMode>,<AvgNumber>,<AvgTime>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgMode>	Enum	NUMBER: Average over a number of individual measurements TIME: Average over a time period (in seconds)
<AvgNumber>	DWord	Number of averaging samples: 4, 8, 16, 32, 64, 128, 256
<AvgTime>	DWord	Time [s]: 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900, 960, 1020, 1080, 1140, 1200, 1260, 1320, 1380, 1440, 1500, 1560, 1620, 1680, 1740, 1800
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_AVG_CONFIG?;
Response	NUMBER,64,240,0;

Command	SPECTRUM_AVG_CONFIG?;
Response	TIME,4,180,0;

SPECTRUM_AVG_LIST?

Description

Queries a list of the current possible averaging settings for SPECTRUM mode.

Note

SPECTRUM mode has 2 averaging methods:

- Average over a number of individual measurements (Number)
- Average over a time period (Time)

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

SPECTRUM_AVG_LIST? <AvgMode>;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgMode>	Enum	NUMBER: Average over a number of individual measurements TIME: Average over a time period (in seconds)
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Averaging parameter as string including the unit
<Value>	Float	Averaging parameter as a numerical value
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_AVG_LIST? NUMBER;
Response	7, "4",4, "8",8, "16",16, "32",32, "64",64, "128",128, "256",256, 0;

SPECTRUM_BI_VALUE?

Description

Band Integration over Frequency.

Note

Spectrum mode must be selected as the current operating mode.
The spectral power level is integrated over a selected frequency band.

The following conditions apply:

- The band limits must lie within the range Fmin to Fmax of the current measurement setting
- Bandwidth $\Delta f \geq 4*RBW$, $\Delta f = Fhigh - Flow$, RBW according to the current measurement setting

Command

SPECTRUM_BI_VALUE? <FLow>,<FHigh>,<Trace>;

Response

<SumValue>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<FLow>	Double	Lower limit of the frequency band [Hz]
<FHigh>	Double	Upper limit of the frequency band [Hz]
<Trace>	Enum	Trace selected for integration ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<SumValue>	Float	Total power within the frequency band
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_BI_VALUE? 1500000000,1600000000,ACT;
Response	-29.37981,0;

SPECTRUM_BINARY?

💡 *The SPECTRUM_BINARY? command is obsolete, it is recommended to instead use the command SPECTRUM_TRACE_BINARY?*

Description

Queries measurement data in SPECTRUM mode and BINARY format.

Note

Number of trace calculation: SizeOfBlock / sizeof(float) with sizeof(float) = 4

Command

SPECTRUM_BINARY? <Trace>;

Response

<AsciiHeader>
<Endian> <DataID> <DataVersion> <Reserved> <NumberOfBlock> <SizeOfBlock> <Reserved>
<Fmin> <df> <Unit> <Flags> <SweepCounter> <SweepTime> <AVGProgress> <NoOfSpatialAVG>
<FillBytes> [ACT] [AVG] [MIN] [MIN_AVG] [MAX] [MAX_AVG] [ALL]

Hexdump: FORMAT_BINARY NORMAL

Command	73 70 65 63 74 72 75 6d 5f 62 69 6e 61 72 79 3f 20 61 63 74 3b	spectrum_binary? act;
Response	23 33 32 31 32 4d 53 42 46 01 02 00 01 00 00 00 00 00 00 00 15 00 00 00 04 00 00 00 00 41 cc 50 ce 88 00 00 00 40 59 6e 6a aa aa aa ab 00 02 00 00 00 00 6a d1 00 00 00 16 00 64 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 c2 b5 50 ea c2 b1 f4 e5 c2 af ce 9a c2 ad bf 5c c2 ac c8 b4 c2 ad 48 30 c2 af cc 0e c2 b3 8c 3c c2 b7 71 94 c2 ba 60 4c c2 bc 80 2a c2 bd 27 3a c2 bb 7e b7 c2 ba ff 22 c2 bb 9f 8a c2 be 88 7a c2 c2 1f e7 c2 c4 d9 82 c2 c3 b3 16 c2 c0 da ac c2 bc 06 25	#3212 …

Parameter List

Parameter	Type	Description
<Trace>	Enum	Sets the desired traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values ALL All traces in the order noted above

Parameter List (Response)

Parameter	Type	Bytes	Description
<AsciiHeader>	---	---	ASCII header for block data transfer
<Endian>	DWord	4	Identification if the byte order is swapped or not 0x4D534246 = Most Significant Byte First 0x4C534246 = Last Significant Byte First
<DataID>	Word	2	Identification of the telegram data type 0x0101 = ALL, 0x0102 = ACT 0x0103 = AVG, 0x0104 = MIN 0x0105 = MIN_AVG, 0x0106 = MAX 0x0107 = MAX_AVG
<DataVersion>	Word	2	BINARY protocol version Actual Version of Spectrum protocol = 0x0001
<Reserved>	---	4	Reserved for later use
<NumberOfBlock>	DWord	4	Number of records (values)
<SizeOfBlock>	DWord	4	Size of a single record
<Reserved>	---	4	Reserved for later use
<Fmin>	Double	8	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	8	Frequency steps (resolution) of the FFT [Hz]
<Unit>	Word	2	Units of measurement data 0x0002 = dBm, 0x0003 = dBV, 0x0004 = dBmV, 0x0005 = dBµV Units with antenna connected 0x0006 = dBV/m,　　　0x0007 = dBmV/m, 0x0008 = dBµV/m,　　　0x0009 = dBA/m, 0x000A = V/m,　　　　0x000B = A/m, 0x000C = W/m²,　　　　0x000D = mW/cm², Units reserved for future use 0x0001 = dB,　　　　0x000E = %, 0x000F = dBA,　　　　0x0010 = A, 0x0011 = V
<Flags>	Word	2	Flags representing the device status 0x0001 = Overdriven Flag
<SweepCounter>	DWord	4	Number of sweeps performed
<SweepTime>	DWord	4	Sweep Time [ms]
<AVGProgress>	DWord	4	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	4	0 – 999 999 Number of sweeps used for spatial averaging
<FillBytes>	---	68	Fill bytes to get a fixed BINARY header size. The total header size is 128 bytes without the leading ASCII Header. Reserved for later use.

Parameter	Type	Description
[ACT]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: ACT ACT ACT … Very low results in logarithmic units are represented by "-999".
[AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: AVG AVG AVG … Very low results in logarithmic units are represented by "-999".
[MIN]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MIN MIN MIN … Very low results in logarithmic units are represented by "-999".
[MIN_AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MIN_AVG MIN_AVG MIN_AVG … Very low results in logarithmic units are represented by "-999".
[MAX]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MAX MAX MAX … Very low results in logarithmic units are represented by "-999".
[MAX_AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MAX_AVG MAX_AVG MAX_AVG … Very low results in logarithmic units are represented by "-999".
[ALL]	Float	Array of binary floating point data with [n] = 21...632891 (NRA) Array of binary floating point data with [n] = 21...27517 (IDA) Alignment: ACT AVG MIN MIN_AVG MAX MAX_AVG … Very low results in logarithmic units are represented by "-999".

SPECTRUM_CONFIG

Description

Sets the current measurement parameters for SPECTRUM mode.

Note

Spectrum mode must be selected as the current operating mode.

Command

SPECTRUM_CONFIG <Fcent>,<Fspan>,<RBW>,<VBWMode>,<VBW>,<RL>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<Fspan>	Double	Frequency span [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<VBWMode>	Enum	Video filter: ON, OFF;
<VBW>	Double	Video filter bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example (Unit=dBm)

Command	SPECTRUM_CONFIG 1550000000,100000000,1000000,OFF,20000,0;
Response	0;

SPECTRUM_CONFIG?

Description

Queries the current measurement parameters for SPECTRUM mode.

Note

Spectrum mode must be selected as the current operating mode.

Command

SPECTRUM_CONFIG?;

Response

<Fcent>,<Fspan>,<RBW>,<VBWMode>,<VBW>,<RL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<Fspan>	Double	Frequency span [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<VBWMode>	Enum	Video filter: ON, OFF;
<VBW>	Double	Video filter bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_CONFIG?;
Response	1550000000,100000000,1000000,OFF,20000,0,0;

SPECTRUM_DETECTOR?

Description

Queries trace data with fixed user defined number of values in SPECTRUM mode.

Note

Spectrum must be selected as the current operating mode.
The detector calculation is done just before the data output.

This command is helpful if there is a slow remote connection or fixed number of values is necessary.

Number of maximal Detector Traces (Number of Traces * Number of Detector) is limited to 16

Command

SPECTRUM_DETECTOR? <NoOfTraces>,[Trace],<NoOfDetectors>,[Detector,] <NoOfValues>;

Response

<SweepCounter>,<SweepTime>,<AVGProgress>,<NoOfSpatialAVG>,<Fmin>,<df>,
<NoOfDetectorTraces>,[<DetectorTrace>,<Overdriven>,<NoOfValues>, [Value,]] <ReturnCode>;

Parameter List:

Parameter	Type	Description
<NoOfTraces>	Word	Number of traces, 1 – 6
[Trace]	Enum	Sets the selected traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values
<NoOfDetectors>	Word	Number of selected detectors, 1 - 3
[Detector]	Enum	Sets the selected detectors: RMS RMS detector result PLUS_PEAK +Peak detector result MINUS_PEAK -Peak detector result
<NoOfValues>	DWord	User defined number of measurement values per detector trace. 21…27517 values are possible.

Parameter	Type	Description
<SweepCounter>	DWord	Number of sweeps performed
<SweepTime>	DWord	Sweep Time [ms]
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	0 – 999 999 Number of sweeps used for spatial averaging
<Fmin>	Double	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	Frequency steps (resolution) of the FFT [Hz]
<NoOfDetectorTraces>	Word	Number traces of multiplied with number of detectors, 1 - 16
<DetectorTrace>	Enum	Detector Trace: ACT_RMS, AVG_RMS, MIN_RMS, MIN_AVG_RMS, MAX_RMS, MAX_AVG_RMS, ACT_MINUS_PEAK, AVG_MINUS_PEAK, MIN_MINUS_PEAK, MIN_AVG_MINUS_PEAK, MAX_MINUS_PEAK, MAX_AVG_MINUS_PEAK, ACT_PLUS_PEAK, AVG_PLUS_PEAK, MIN_PLUS_PEAK, MIN_AVG_PLUS_PEAK, MAX_PLUS_PEAK, MAX_AVG_PLUS_PEAK
<Overdriven>	Enum	YES, NO; Yes, if at least one trace exceeded the range limit. Overdriven results may have a very high uncertainty.
<NoOfValues>	DWord	User defined number of measurement values per detector trace. 21…27517 values are possible.
[Value]	Float	Measurement result [Unit]. Very low results in logarithmic units are represented by "-999" (negative infinity).
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_DETECTOR? 1,ACT,1,RMS,33;
Response	841,10,100,0,85000000,937500,1, ACT_RMS,NO,33, -56.36,-51.47,-51.91,-53.93,-58.43,-55.29,-52.51,-57.29,-58.11,-55.72,-54.97,-53.68,- 57.35,-56.81,-53.85,-57.19,-57.12,-55.81,-55.42,-55.20,-53.50,-53.51,-56.40,-57.31,- 56.28,-55.95,-59.22,-57.60,-53.09,-57.67,-54.40,-56.73,-54.83, 0;

SPECTRUM_DETECTOR_BINARY?

Description

Queries BINARY trace data with fixed user defined number of values in SPECTRUM mode.

Note

Spectrum mode must be selected as the current operating mode.

The detector calculation is done just before the data output.

This command is helpful if there is a slow remote connection or fixed number of values is necessary.

Number of maximal Detector Traces (Number of Traces * Number of Detector) is limited to 16
Number of Traces Calculation: SizeOfBlock / sizeof(float) with sizeof(float) = 4

Command

SPECTRUM_DETECTOR_BINARY?
<NoOfTraces>,[Trace],<NoOfDetectors>,[Detector],<NoOfValues>;

Response

<AsciiHeader>
<Endian> <DataID> <DataVersion> <Reserved> <NumberOfBlock> <SizeOfBlock> <Reserved>
<Fmin> <df> <Unit> <Flags> <SweepCounter> <SweepTime> <AVGProgress> <NoOfSpatialAVG>
[DetectorTraceOrderList] <FillBytes> [ACT_RMS] [ACT_PLUS_PEAK] [ACT_MINUS_PEAK] [..]

Hexdump: FORMAT_BINARY NORMAL

Command	53 50 45 43 54 52 55 4d 5f 44 45 54 45 43 54 4f	SPECTRUM_DETECTO
	52 5f 42 49 4e 41 52 59 3f 20 31 2c 41 43 54 2c	R_BINARY? 1,ACT,
	31 2c 52 4d 53 2c 32 31 3b	1,RMS,21;
Response	23 33 32 31 32 4d 53 42 46 04 00 00 02 00 00 00	#3212 …
	00 00 00 00 15 00 00 00 04 00 00 00 00 41 de 97	
	e8 9d 00 00 00 40 49 00 00 00 00 00 00 00 02 00	
	00 00 02 39 11 00 00 00 1b 00 00 00 64 00 00 00	
	00 04 02 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 c2 c0 57 6c c2 c2 d3 fa c2 b5 3d	
	d2 c2 b0 fc 68 c2 b3 54 e9 c2 b8 1f e0 c2 bc d3	
	0f c2 ce bd 98 c2 bb e2 fa c2 bb 67 4e c2 bc b1	
	2c c2 b3 88 62 c2 ac fe a0 c2 aa dc 31 c2 aa e4	
	82 c2 ac f1 48 c2 b3 c8 f7 c2 bd 29 8e c2 b9 3e	
	c2 c2 b7 2a fa c2 b9 d8 9b	

Parameter List

Parameter	Type	Description
<NoOfTraces>	Word	Number of traces, 1 – 6
[Trace]	Enum	Sets the selected traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values
<NoOfDetectors>	Word	Number of selected detectors, 1 - 3
[Detector]	Enum	Sets the selected detectors: RMS RMS detector result PLUS_PEAK +Peak detector result MINUS_PEAK -Peak detector result
<NoOfValues>	DWord	User defined number of measurement values per detector trace. 21…27517 values are possible.

Parameter List (Response)

Parameter	Type	Bytes	Description
<AsciiHeader>	---	---	ASCII header for block data transfer
<Endian>	DWord	4	Identification if the byte order is swapped or not 0x4D534246 = Most Significant Byte First 0x4C534246 = Last Significant Byte First
<DataID>	Word	2	Identification of the telegram data type 0x0400 = Spectrum Detector
<DataVersion>	Word	2	BINARY protocol version Actual Version of Spectrum trace protocol = 0x0002
<Reserved>	---	4	Reserved for later use
<NumberOfBlock>	DWord	4	Number of records (values)
<SizeOfBlock>	DWord	4	Size of a single record
<Reserved>	---	4	Reserved for later use
<Fmin>	Double	8	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	8	Frequency steps (resolution) of the FFT [Hz]
<Unit>	Word	2	Units of measurement data 0x0002 = dBm, 0x0003 = dBV, 0x0004 = dBmV, 0x0005 = dBµV Units with antenna connected 0x0006 = dBV/m, 0x0007 = dBmV/m, 0x0008 = dBµV/m, 0x0009 = dBA/m, 0x000A = V/m, 0x000B = A/m, 0x000C = W/m², 0x000D = mW/cm², Units reserved for future use 0x0001 = dB, 0x000E = %, 0x000F = dBA, 0x0010 = A, 0x0011 = V

<Flags>	Word	2	Flags representing the device status 0x0001 = Overdriven Flag
<SweepCounter>	DWord	4	Number of sweeps performed
<SweepTime>	DWord	4	Sweep Time [ms]
<AVGProgress>	DWord	4	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	4	0 – 999 999 Number of sweeps used for spatial averaging
[DetectorTraceOrderList]	16x Word	32	This Array of IDs represents the order of the following binary detector traces. Possible IDs are: 0x0402 = ACT_RMS, 0x0403 = AVG_RMS, 0x0404 = MIN_RMS, 0x0405 = MIN_AVG_RMS, 0x0406 = MAX_RMS, 0x0407 = MAX_AVG_RMS, 0x0408 = ACT_MINUS_PEAK, 0x0409 = AVG_MINUS_PEAK, 0x040A = MIN_MINUS_PEAK, 0x040B = MIN_AVG_MINUS_PEAK, 0x040C = MAX_MINUS_PEAK, 0x040D = MAX_AVG_MINUS_PEAK, 0x040E = ACT_PLUS_PEAK, 0x040F = AVG_PLUS_PEAK, 0x0410 = MIN_PLUS_PEAK, 0x0411 = MIN_AVG_PLUS_PEAK, 0x0412 = MAX_PLUS_PEAK, 0x0413 = MAX_AVG_PLUS_PEAK, 0x0000 = End of List Marker
<FillBytes>	---	36	Fill bytes to get a fixed BINARY header size. The total header size is 128 bytes without the leading ASCII Header. Reserved for later use.

Single detector selection

Parameter	Type	Description
[ACT_RMS]	Float	Array of 1x 4 byte floating point data. Number of records: 21…27517 Alignment: ACT_RMS ACT_RMS ACT_RMS … Very low results in logarithmic units are represented by "-999".
[ACT_PLUS_PEAK]	Float	Array of 1x 4 byte floating point data. Number of records: 21…27517 Alignment: ACT_PLUS_PEAK ACT_PLUS_PEAK … Very low results in logarithmic units are represented by "-999".
[ACT_MINUS_PEAK]	Float	Array of 1x 4 byte floating point data. Number of records: 21…27517 Alignment: ACT_MINUS_PEAK ACT_MINUS_PEAK … Very low results in logarithmic units are represented by "-999".

Multi detector selection

Parameter	Type	Description
[ACT_RMS] [ACT_PLUS_PEAK] [ACT_MINUS_PEAK]	Float	Array of 3x 4 byte floating point data. Number of records: 21…27517 Alignment: ACT_RMS ACT_PLUS_PEAK ACT_MINUS_PEAK … Very low results in logarithmic units are represented by "-999".

SPECTRUM_DETECTOR_LIST?

Description

Queries the detector list for spectrum data.

Note

The detectors in this list can be used as selection for the SPECTRUM_DETECTOR?; and SPECTRUM_DETECTOR_BINARY?; commands.

Command

SPECTRUM_DETECTOR_LIST?;

Response

<NoOfDetectors>, [Detector,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NoOfDetectors>	Word	Number of selectable detectors
[Detector]	Enum	RMS RMS detector PLUS_PEAK +Peak detector MINUS_PEAK -Peak detector
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_DETECTOR_LIST?;
Response	3,RMS,PLUS_PEAK,MINUS_PEAK,0;

SPECTRUM_FULLSPAN

Description

Sets the frequency parameters Fcent and Fspan to select the entire frequency range of the device.

Note

RBW and VBW settings will be adjusted to the next valid value if the current setting does not match.

Command

SPECTRUM_FULLSPAN;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_FULLSPAN;
Response	0;

SPECTRUM_HEADER?

Description

Queries the header information for the measured values in SPECTRUM mode.

Note

This command provides additional information useful for result evaluation and presentation.

Command

SPECTRUM_HEADER? <Trace>;

Response

<SweepCounter>,<SweepTime>,<AVGProgress>,<NoOfSpatialAVG>,<Fmin>,<df>,<NoOfTraces>, <ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	Sets the desired traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values ALL All traces in the order noted above
<SweepCounter>	DWord	Number of sweeps performed
<SweepTime>	DWord	Sweep Time [ms]
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	0 – 999 999 Number of sweeps used for spatial averaging
<Fmin>	Double	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	Frequency steps (resolution) of the FFT [Hz]
<NoOfTraces>	Word	Number of traces, 1 - 6
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_HEADER? ACT;
Response	46,437,5,0,9000,250000,1,0;

Command	SPECTRUM_HEADER? ALL;
Response	301,435,36,0,9000,250000,6,0;

SPECTRUM_MAX_VALUES?

Description

Queries the maximum number of measurement points in Spectrum mode

Command

SPECTRUM_MAX_VALUES?;

Response

<NoOfValues>, <ReturnCode>;

Parameter List

Parameter	Type	Description
<NoOfValues>	DWord	Maximal Number of measurement values per trace. 632891 (NRA) 27517 (IDA)
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_MAX_VALUES?;
Response	27517,0;

SPECTRUM_MODE

Description

Sets the sub mode, in Spectrum mode

Note

The measurement time can be significantly longer in the SPECTROGRAM sub mode

Command

SPECTRUM_MODE <MeasMode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<MeasMode>	Enum	SPECTRUM_ONLY
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_MODE SPECTRUM_ONLY;
Response	0;

SPECTRUM_MODE?

Description

Queries the sub mode, in Spectrum mode

Note

The measurement time can be significantly longer in the SPECTROGRAM sub mode.

Command

SPECTRUM_MODE?;

Response

<MeasMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<MeasMode>	Enum	SPECTRUM_ONLY, SPECTROGRAM (IDA, read only)
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_MODE?;
Response	SPECTRUM_ONLY,0;

SPECTRUM_MRK_HIGHEST?

Description

Queries the marker values for the highest measurement value.

Note

This command is only available in SPECTRUM mode.

Command

SPECTRUM_MRK_HIGHEST? <Trace>;

Response

<Frequency>,<Value>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<Frequency>	Double	Marker frequency [Hz]
<Value>	Float	Marker value [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_MRK_HIGHEST? ACT;
Response	1580000000,-33.68924,0;

SPECTRUM_MRK_IDX_VALUE?

Description

Queries the marker values for a selected marker.

Note

This command is only available in Spectrum mode.

The marker is selected by means of an index starting with 0.
The index describes a BIN (single measured value) in the spectrum.
21 to 632981 BINs may be present depending on the current measurement settings.
The actual number of BINs can be determined using the <NoOfValues> parameter in the SPECTRUM? query.

The relation between marker frequency and index is defined in the following formula (use the SPECTRUM? query to determine <Fmin> and <df>):

<Frequency> = <Fmin> + (<Index> * <df>)

Command

SPECTRUM_MRK_IDX_VALUE? <Index>,<Trace>;

Response

<Frequency>,<Value>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Index>	DWord	Index of the marker
<Trace>	Enum	ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<Frequency>	Double	Marker frequency [Hz]
<Value>	Float	Marker value [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_MRK_IDX_VALUE? 3,ACT;
Response	1515000000,-48.2472,0;

SPECTRUM_MRK_VALUE?

Description

Queries the marker values for a specified frequency point.

Note

This command is only available in Spectrum mode.

The discrete resolution of the spectrum means that the marker closest to the specified frequency point will be selected.

Command

SPECTRUM_MRK_VALUE? <FrequencySet>,<Trace>;

Response

<FrequencyGet>,<Value>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<FrequencySet>	Double	Desired frequency [Hz]
<Trace>	Enum	ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<FrequencyGet>	Double	Real marker frequency [Hz]
<Value>	Float	Marker value [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_MRK_VALUE? 1550000000,ACT;
Response	1550000000,-47.98391,0;

SPECTRUM_PEAK_TABLE?

Description

Queries a configurable peak table.

Note

This command is only available in Spectrum mode.

Command

SPECTRUM_PEAK_TABLE?
<NoOfPeaksSet>,<Trace>,<EvaluatePeakThreshold>,<PeakThreshold>;

Response

<NoOfPeaksGet>, [<Frequency>,<Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NoOfPeaksSet>	Word	Sets the maximum number of peaks for the peak table. 1 - 50 peaks
<Trace>	Enum	ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<EvaluatePeakThreshold>	Enum	ON, OFF
<PeakThreshold>	Float	Signal threshold for peak recognition default: 0 [Unit] for linear units default: -200 [Unit] for logarithmic units
<NoOfPeaksGet>	Word	Number of recognized peaks
<Frequency>	Double	Frequency of a peak [Hz]
<Value>	Float	Level of a peak [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_PEAK_TABLE? 8,ACT,ON,-60;
Response	8, 1595231749.51,-36.83402, 1525000000,-37.7842, 1583047423.02,-38.64394, 1512402178.71,-38.69695, 1553851190.77,-38.85493, 1535000000,-40.37614, 1545000000,-40.79449, 1563396306.54,-46.03093, 0;

SPECTRUM_PEAK_TABLE_EXC?

Description

Queries a configurable peak table with excursion.

Note

This command is only available in Spectrum mode.

Command

SPECTRUM_PEAK_TABLE_EXC?
<NoOfPeaksSet>,<Trace>,<EvaluatePeakThreshold>,<PeakThreshold>,<EvaluatePeakContrast>,
<PeakContrast>;

Response

<NoOfPeaksGet>, [<Frequency>,<Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NoOfPeaksSet>	Word	Sets the maximum number of peaks for the peak table. 1 - 50 peaks
<Trace>	Enum	ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<EvaluatePeakThreshold>	Enum	ON, OFF
<PeakThreshold>	Float	Signal threshold for peak recognition default: 0 [Unit] for linear units default: -200 [Unit] for logarithmic units
<EvaluatePeakContrast>	Enum	ON, OFF
<PeakContrast>	Float	Signal contrast for peak recognition 0…20 dB
<NoOfPeaksGet>	Word	Number of recognized peaks
<Frequency>	Double	Frequency of a peak [Hz]
<Value>	Float	Level of a peak [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	SPECTRUM_PEAK_TABLE_EXC? 8,ACT,OFF,0,ON,10;
Response	8, 97705916.2862,-52.4374, 104808206.952,-55.192, 105699118.482,-57.82082, 102305756.951,-61.69502, 94704779.465,-62.47497, 92224158.5006,-64.32042, 103095044.165,-65.63362, 101300636.441,-66.63588, 0;

SPECTRUM_RAW?

Description

Queries one or more measurement runs (traces) in Spectrum mode using the RAW format and BINARY data transfer.

Command

SPECTRUM_RAW? <Trace>;

Response

<AsciiHeader> [ACT] [AVG] [MIN] [MIN_AVG] [MAX] [MAX_AVG] [ALL]

Hexdump: FORMAT_BINARY NORMAL

Command	73 70 65 63 74 72 75 6d 5f 72 61 77 3f 20 61 63 74 3b	spectrum_raw? Ac t;
Response	23 32 38 34 c2 cf 64 52 c2 d9 bb e6 c2 c6 da b2 c2 ca 1c 9e c2 cb 70 d2 c2 c0 22 84 c2 cd 75 84 c2 cb 16 d2 c2 c7 66 78 c2 d0 93 9e c2 ce 17 4c c2 d2 f5 3c c2 c1 96 43 c2 c2 12 95 c2 d2 eb 70 c2 bb cb 38 c2 bf 67 c4 c2 ce de ec c2 be 31 f0 c2 c6 a7 42 c2 b9 6a 85	#284 …

Parameter List

Parameter	Type	Description
<Trace>	Enum	Sets the desired traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values ALL All traces in the order noted above

Parameter	Type	Description
<AsciiHeader>	---	ASCII header for block data transfer
[ACT]	Float	Array of 1x 4 byte floating point data. Number of records: 21…632891 (NRA) Number of records: 21…27517 (IDA) Alignment: ACT ACT ACT … Very low results in logarithmic units are represented by "-999".
[AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21…632891 (NRA) Number of records: 21…27517 (IDA) Alignment: AVG AVG AVG … Very low results in logarithmic units are represented by "-999".
[MIN]	Float	Array of 1x 4 byte floating point data. Number of records: 21…632891 (NRA) Number of records: 21…27517 (IDA) Alignment: MIN MIN MIN … Very low results in logarithmic units are represented by "-999".
[MIN_AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21…632891 (NRA) Number of records: 21…27517 (IDA) Alignment: MIN_AVG MIN_AVG MIN_AVG … Very low results in logarithmic units are represented by "-999".
[MAX]	Float	Array of 1x 4 byte floating point data. Number of records: 21…632891 (NRA) Number of records: 21…27517 (IDA) Alignment: MAX MAX MAX … Very low results in logarithmic units are represented by "-999".
[MIN_AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21…632891 (NRA) Number of records: 21…27517 (IDA) Alignment: MAX_AVG MAX_AVG MAX_AVG … Very low results in logarithmic units are represented by "-999".
[ALL]	Float	Array of binary floating point data with [n] = 21…632891 (NRA) Array of binary floating point data with [n] = 21…27517 (IDA) Alignment: ACT AVG MIN MIN_AVG MAX MAX_AVG … Very low results in logarithmic units are represented by "-999".

SPECTRUM_TRACE?

Description

Queries one or more traces in SPECTRUM mode.

Note

Spectrum mode must be selected as the current operating mode.
A trace is the number of all the measurement values determined during a measurement cycle (sweep).

Command

SPECTRUM_TRACE? <NoOfTraces>,[Trace,];

Response

<SweepCounter>,<SweepTime>,<AVGProgress>,<NoOfSpatialAVG>,<Fmin>,<df>,<NoOfTraces>,
[<Trace>,<Overdriven>,<NoOfValues>, [Value,]] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NoOfTraces>	Word	Number of traces, 1 - 6
[Trace]	Enum	Sets the selected traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values (NRA) MIN Minimum value MIN_AVG Minimum of the averaged values (NRA)
<SweepCounter>	DWord	Number of sweeps performed
<SweepTime>	DWord	Sweep Time [ms]
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	0 – 999 999 Number of sweeps used for spatial averaging
<Fmin>	Double	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	Frequency steps (resolution) of the FFT [Hz]
<Overdriven>	Enum	YES, NO; Yes, if at least one trace exceeded the range limit. Overdriven results may have a very high uncertainty.
<NoOfValues>	DWord	Number of measurement values per trace. 21...632891 values are possible. (NRA) 21...27517 values are possible. (IDA)
[Value]	Float	Measurement result [Unit]. Very low results in logarithmic units are represented by "-999" (negative infinity).
<ReturnCode>	Word	Warning or error code

Examples

Command	SPECTRUM_TRACE? 1,ACT;
Response	810,133,100,0,9000,10000000,1, ACT,NO,101, -70.89,-68.48,-67.57,-65.77,-65.39,-69.80,-76.23,-65.90,-55.35,-54.76,-56.86,-50.91,-57.82,-75.17,-86.14,-70.86,-75.13,-71.41,-82.23,-62.27,-62.49,-58.52,-62.08,-71.08,-68.70,-57.67,-66.21,-59.53,-55.90,-63.22,-63.08,-64.02,-54.52,-61.63,-70.68,-74.98,-64.33,-59.97,-61.31,-60.95,-68.20,-61.85,-62.27,-61.81,-75.30,-80.79,-75.02,-79.60,-76.51,-84.33,-83.80,-74.92,-83.47,-79.90,-79.81,-90.25,-76.96,-84.57,-77.54,-70.47,-78.67,-75.35,-83.50,-68.22,-68.39,-70.29,-80.17,-66.51,-76.77,-80.63,-74.80,-72.07,-71.60,-79.23,-76.20,-70.01,-69.95,-70.12,-73.02,-77.72,-73.71,-77.54,-84.52,-81.69,-84.00,-82.62,-74.92,-70.75,-70.50,-83.26,-77.54,-77.72,-60.51,-72.45,-58.64,-50.41,-65.88,-61.50,-86.06,-87.11,-84.17, 0;

Command	SPECTRUM_TRACE? 2,MIN,MAX;
Response	197,149,100,0,9000,10000000,2, MIN,NO,101, -86.06,-79.66,-86.61,-83.77,-85.00,-97.98,-88.64,-90.38,-80.82,-71.66,-75.84,-79.81,-84.52,-89.91,-96.14,-95.24,-100.29,-90.25,-93.39,-81.99,-80.06,-87.71,-85.69,-85.94,-103.30,-87.37,-89.61,-85.80,-91.26,-78.69,-91.72,-84.01,-71.82,-85.24,-88.44,-87.62,-84.16,-84.16,-84.30,-84.16,-88.33,-88.56,-83.44,-78.75,-94.97,-97.74,-110.29,-103.30,-93.30,-94.61,-103.30,-107.28,-999.00,-107.28,-103.30,-110.29,-100.29,-110.29,-104.27,-96.31,-100.75,-110.29,-103.30,-78.08,-80.35,-81.47,-94.61,-93.76,-97.98,-101.26,-92.44,-93.30,-88.56,-97.98,-104.27,-110.29,-97.28,-97.98,-100.75,-101.26,-101.26,-100.29,-107.28,-107.28,-95.66,-104.27,-100.29,-103.30,-98.25,-94.61,-100.75,-96.31,-91.96,-74.00,-89.91,-78.18,-80.35,-104.27,-104.27,-999.00,-103.30, MAX,NO,101, -49.75,-50.46,-48.21,-47.73,-49.80,-53.19,-54.85,-49.41,-48.34,-45.26,-44.30,-41.97,-43.41,-43.11,-42.44,-47.93,-48.90,-44.90,-52.50,-49.94,-47.44,-49.16,-51.28,-50.72,-45.34,-46.54,-48.83,-43.45,-44.37,-50.14,-50.49,-54.16,-55.61,-53.96,-52.33,-49.27,-50.67,-54.74,-51.33,-50.99,-51.52,-52.42,-56.63,-58.99,-64.54,-68.23,-69.48,-66.90,-66.09,-68.55,-70.38,-66.90,-69.86,-71.70,-71.91,-72.70,-72.22,-72.79,-72.25,-67.80,-66.01,-68.51,-69.27,-65.11,-62.35,-63.93,-62.74,-63.91,-64.91,-62.51,-67.94,-64.34,-64.01,-65.04,-67.88,-64.98,-63.71,-66.20,-69.95,-69.31,-68.93,-70.69,-73.13,-72.43,-73.34,-69.93,-68.67,-66.78,-65.16,-57.73,-41.47,-38.52,-47.90,-44.07,-45.36,-47.20,-49.13,-54.98,-68.66,-73.83,-72.72, 0;

SPECTRUM_TRACE_BINARY?

Description

Queries one or more BINARY traces in SPECTRUM mode.

Note

Number of Traces Calculation: SizeOfBlock / sizeof(float) with sizeof(float) = 4

Command

SPECTRUM_TRACE_BINARY? <NoOfTraces>,[Trace,];

Response

<AsciiHeader>
<Endian> <DataID> <DataVersion> <Reserved> <NumberOfBlock> <SizeOfBlock> <Reserved>
<Fmin> <df> <Unit> <Flags> <SweepCounter> <SweepTime> <AVGProgress> <NoOfSpatialAVG>
[TraceOrderList] <FillBytes> [ACT] [AVG] [MAX] [MAX_AVG] [MIN] [MIN_AVG]

Hexdump: FORMAT_BINARY NORMAL

Command	53 50 45 43 54 52 55 4d 5f 54 52 41 43 45 5f 42	SPECTRUM_TRACE_B
	49 4e 41 52 59 3f 20 31 2c 41 43 54 3b	INARY? 1,ACT;
Response	23 33 32 31 32 4d 53 42 46 03 00 00 02 00 00 00	#3212 …
	00 00 00 00 15 00 00 00 04 00 00 00 00 41 de 97	
	e8 9d 00 00 00 40 49 6e 6a aa aa aa ab 00 02 00	
	00 00 02 70 62 00 00 00 1b 00 00 00 64 00 00 00	
	00 03 02 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 c2 ae 5e a7 c2 a8 d1 1c c2 aa 59	
	91 c2 b3 ec 8c c2 b5 75 5b c2 b6 e5 76 c2 cd 2c	
	e0 c2 b3 43 c6 c2 b4 1d 4b c2 b8 0d 2e c2 b3 9c	
	a2 c2 b1 f7 ae c2 ac 78 1e c2 a9 20 32 c2 a9 89	
	04 c2 ac 68 32 c2 b3 98 d6 c2 bf 21 ca c2 b6 0b	
	f4 c2 b0 d7 b4 c2 b4 5a ec	

Parameter List

Parameter	Type	Description
<NoOfTraces>	Word	Number of traces, 1 - 6
[Trace]	Enum	Sets the selected traces: ACT　　　　　Actual value AVG　　　　　Averaged value MAX　　　　　Maximum value MAX_AVG　　Maximum of the averaged values MIN　　　　　Minimum value MIN_AVG　　Minimum of the averaged values

Parameter List (Response)

Parameter	Type	Bytes	Description
<AsciiHeader>	---	---	ASCII header for block data transfer
<Endian>	DWord	4	Identification if the byte order is swapped or not 0x4D534246 = Most Significant Byte First 0x4C534246 = Last Significant Byte First
<DataID>	Word	2	Identification of the telegram data type 0x0300 = Spectrum Trace
<DataVersion>	Word	2	BINARY protocol version Actual Version of Spectrum trace protocol = 0x0002
<Reserved>	---	4	Reserved for later use
<NumberOfBlock>	DWord	4	Number of records (values)
<SizeOfBlock>	DWord	4	Size of a single record
<Reserved>	---	4	Reserved for later use
<Fmin>	Double	8	Lower limit of the frequency range F_{min} [Hz]
<df>	Double	8	Frequency steps (resolution) of the FFT [Hz]
<Unit>	Word	2	Units of measurement data 0x0002 = dBm, 0x0003 = dBV, 0x0004 = dBmV, 0x0005 = dBµV Units with antenna connected 0x0006 = dBV/m, 0x0007 = dBmV/m, 0x0008 = dBµV/m, 0x0009 = dBA/m, 0x000A = V/m, 0x000B = A/m, 0x000C = W/m², 0x000D = mW/cm², Units reserved for future use 0x0001 = dB, 0x000E = %, 0x000F = dBA, 0x0010 = A, 0x0011 = V
<Flags>	Word	2	Flags representing the device status 0x0001 = Overdriven Flag
<SweepCounter>	DWord	4	Number of sweeps performed
<SweepTime>	DWord	4	Sweep Time [ms]
<AVGProgress>	DWord	4	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	4	0 – 999 999 Number of sweeps used for spatial averaging
[TraceOrderList]	16xWord	32	This Array of Trace IDs represents the order of the following binary traces. Possible Trace IDs are: 0x0302 = ACT, 0x0303 = AVG, 0x0304 = MIN, 0x0305 = MIN_AVG, 0x0306 = MAX, 0x0307 = MAX_AVG, 0x0000 = End of List Marker
<FillBytes>	---	36	Fill bytes to get a fixed BINARY header size. The total header size is 128 bytes without the leading ASCII Header. Reserved for later use.

Single trace selection

Parameter	Type	Description
[ACT]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: ACT ACT ACT … Very low results in logarithmic units are represented by "-999".
[AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: AVG AVG AVG … Very low results in logarithmic units are represented by "-999".
[MAX]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MAX MAX MAX … Very low results in logarithmic units are represented by "-999".
[MAX_AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MAX_AVG MAX_AVG MAX_AVG … Very low results in logarithmic units are represented by "-999".
[MIN]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MIN MIN MIN … Very low results in logarithmic units are represented by "-999".
[MIN_AVG]	Float	Array of 1x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MIN_AVG MIN_AVG MIN_AVG … Very low results in logarithmic units are represented by "-999".

Multi trace selection

Parameter	Type	Description
[MIN] [MAX]	Float	Array of 2x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: MIN MAX MIN MAX MIN MAX … Very low results in logarithmic units are represented by "-999".
[ACT] [AVG] [MIN] [MAX]	Float	Array of 4x 4 byte floating point data. Number of records: 21...632891 (NRA) Number of records: 21...27517 (IDA) Alignment: ACT AVG MIN MAX … Very low results in logarithmic units are represented by "-999".

SPECTRUM_TRACE_LIST?

Description

Queries the current possible trace list in SPECTRUM mode.

Note

The traces in this list can be used as selection for the SPECTRUM_TRACE?; and
SPECTRUM_TRACE_BINARY?; commands.

Command

SPECTRUM_TRACE_LIST?;

Response

<NoOfTraces>, [Trace,] <ReturnCode>;

Parameter List

Parameter	Type	Description	
<NoOfTraces>	Word	Number of selectable traces	
[Trace]	Enum	ACT	Actual value
		AVG	Averaged value
		MAX	Maximum value
		MAX_AVG	Maximum of the averaged values
		MIN	Minimum value
		MIN_AVG	Minimum of the averaged values
<ReturnCode>	Word	Warning or error code	

Example

Command	SPECTRUM_TRACE_LIST?;
Response	6,ACT,AVG,MAX,MAX_AVG,MIN,MIN_AVG,0;

Mode Multi Channel Power (MCP) (option required for NRA)

MCP?

Description

Queries one or more measurement runs (traces) in Multi-Channel Power mode.

Note

Multi-Channel Power must be selected as the current operating mode.
Traces can only be queried when the device is in "Detailed" table view mode. "Condensed" table view mode is not supported in remote operation.

All measurements in MCP mode are related to the currently selected Service Table (see SRV_SEL?). The selection of a Service Table is mandatory because it contains the necessary parameters of the up to 500 different channels which can be defined in a single Service Table. Each channel is named by its Service Name <ServName>.

Command

MCP? <Trace>;

Response

<SweepCounter>,<SweepTime>,<AVGProgress>,<NoOfSpatialAVG>,
<Others>,<RBWMode>,<NoOfTraces>,
[<ActTrace>,<Overdriven>,<TotalValue>,<TotalNoiseFlag>,<OthersValue>,<OthersNoiseFlag>,
<NoOfValues>, [<Value>,<NoiseFlag>,<ServName>,<RBW>,<Fmin>,<Fmax>,]] <ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	Sets the desired traces: ACT Actual value AVG Averaged value MAX Maximum value MAX_AVG Maximum of the averaged values MIN Minimum value MIN_AVG Minimum of the averaged values ALL All traces
<SweepCounter>	DWord	Number of sweeps performed, 0 – 999 999 Device setting changes will reset the counter to „0".
<SweepTime>	DWord	Current sweep time [ms]
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	0 – 999 999 Number of sweeps used for spatial averaging
<Others>	Enum	ON The power level of gaps between the channels is measured OFF The power level of gaps between the channels is ignored
<RBWMode>	Enum	Channel (Service) dependent RBW settings: MANUAL All channels will be measured using the same RBW.

		AUTO Each channel will be measured using a dedicated and automatically determined RBW setting. INDIVIDUAL Each channel will be measured using a dedicated and manually defined RBW setting. Only available for <Others> = OFF
<NoOfTraces>	Word	Number of traces, 1 - 6
<ActTrace>	Enum	Actual trace ACT, AVG, MAX, MAX_AVG, MIN, MIN_AVG
<Overdriven>	Enum	YES, NO; Yes, if at least one trace exceeded the range limit. Overdriven results may have a very high uncertainty.
<TotalValue>	Float	Total power level [Unit] for the frequency bands of all channels (services)
<TotalNoiseFlag>	Enum	Noise flag related to the total power of all channels: UNCHECKED When Noise Suppression is OFF LOW Result is below the reference noise level OK Result is equal or above the reference noise level
<OthersValue>	Float	Power level [Unit] of the frequency gaps between the channels
<OthersNoiseFlag>	Enum	Nose flag related to the power level of the gaps (Others): UNCHECKED, LOW, OK see above <TotalNoiseFlag>
<NoOfValues>	DWord	Number of measurement values per trace
<Value>	Float	Power level [Unit] of the channel (service). Very low results in logarithmic units are represented by "-999" (negative infinity).
<NoiseFlag>	Enum	Noise flag related to a specific channel (service): UNCHECKED When Noise Suppression is OFF LOW Result is below the reference noise level OK Result is equal or above the reference noise level
<ServName>	String	Name of the channel (service)
<RBW>	Double	Resolution bandwidth [Hz] being used for this channel (service)
<Fmin>	Double	Lower frequency of the channel (service) [Hz]
<Fmax>	Double	Upper frequency of the channel (service) [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	MCP? ACT;
Response	62,115,100,0,ON,AUTO,1, ACT,NO,-47.54,UNCHECKED,-50.59,UNCHECKED,2, -63.66,UNCHECKED,"SrvA",2000000,10000000,20000000, -50.72,UNCHECKED,"SrvB",2000000,100000000,200000000, 0;

MCP_AVG_CONFIG

Description

Sets the current averaging method.

Note

Multi-Channel Power mode has two averaging methods:

- Average over a number of individual measurements (Number)
- Average over a time period (Time)

There is one setting parameter for each method, which is selected from a basic set of values.

Command

MCP_AVG_CONFIG <AvgMode>,<AvgNumber>,<AvgTime>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgMode>	Enum	NUMBER TIME
<AvgNumber>	DWord	Number of averaging samples: 4, 8, 16, 32, 64, 128, 256
<AvgTime>	DWord	Time [s]: 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900, 960, 1020, 1080, 1140, 1200, 1260, 1320, 1380, 1440, 1500, 1560, 1620, 1680, 1740, 1800
<ReturnCode>	Word	Warning or error code

Examples

Command	MCP_AVG_CONFIG NUMBER,64,240;
Response	0;

Command	MCP_AVG_CONFIG TIME,4,180;
Response	0;

MCP_AVG_CONFIG?

Description

Queries the current averaging method.

Note

Multi-Channel Power mode has two averaging methods:

- Average over a number of individual measurements (Number)
- Average over a time period (Time)

There is one setting parameter for each method, which is selected from a basic set of values.

Command

MCP_AVG_CONFIG?;

Response

<AvgMode>,<AvgNumber>,<AvgTime>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgMode>	Enum	NUMBER TIME
<AvgNumber>	DWord	Number of averaging samples: 4, 8, 16, 32, 64, 128, 256
<AvgTime>	DWord	Time [s]: 60, 120, 180, 240, 300, 360, 420, 480, 540, 600, 660, 720, 780, 840, 900, 960, 1020, 1080, 1140, 1200, 1260, 1320, 1380, 1440, 1500, 1560, 1620, 1680, 1740, 1800
<ReturnCode>	Word	Warning or error code

Examples

Command	MCP_AVG_CONFIG?;
Response	TIME,4,180,0;

Command	MCP_AVG_CONFIG?;
Response	NUMBER,64,240,0;

MCP_AVG_LIST?

Description

Queries the current possible averaging settings for Multi-Channel Power mode.

Note

Multi-Channel Power mode has two averaging methods:

- Average over a number of individual measurements (Number)
- Average over a time period (Time)

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

MCP_AVG_LIST? <AvgMode>;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgMode>	Enum	NUMBER: Average over a number of individual measurements TIME: Average over a time period (in seconds)
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Averaging parameter as string including the unit
<Value>	Float	Averaging parameter as a numerical value
<ReturnCode>	Word	Warning or error code

Example

Command	MCP_AVG_LIST? NUMBER;
Response	7, "4",4, "8",8, "16",16, "32",32, "64",64, "128",128, "256",256, 0;

MCP_CONFIG

Description
Sets the current measurement parameters for Multi-Channel Power mode.

Note
Multi-Channel Power must be selected as the current operating mode.

Command
MCP_CONFIG <Others>,<RBWMode>,<RBW>,<RL>;

Response
<ReturnCode>;

Parameter List

Parameter	Type	Description
<Others>	Enum	ON The power level of gaps between the channels is measured OFF The power level of gaps between the channels is ignored
<RBWMode>	Enum	Channel (Service) dependent RBW settings: MANUAL All channels will be measured using the same RBW. AUTO Each channel will be measured using a dedicated and automatically determined RBW setting. INDIVIDUAL Each channel will be measured using a dedicated and manually defined RBW setting. Only available for <Others> = OFF
<RBW>	Double	Resolution bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example (Unit=dBm)

Command	MCP_CONFIG OFF,INDIVIDUAL,1000000,-30;
Response	0;

MCP_CONFIG?

Description

Queries the current measurement parameters for Multi-Channel Power mode.

Note

Multi-Channel Power must be selected as the current operating mode.

Command

MCP_CONFIG?;

Response

<Others>,<RBWMode>,<RBW>,<RL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Others>	Enum	ON The power level of gaps between the channels is measured OFF The power level of gaps between the channels is ignored
<RBWMode>	Enum	Channel (Service) dependent RBW settings: MANUAL All channels will be measured using the same RBW. AUTO Each channel will be measured using a dedicated and automatically determined RBW setting. INDIVIDUAL Each channel will be measured using a dedicated and manually defined RBW setting. Only available for <Others> = OFF
<RBW>	Double	Resolution bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	MCP_CONFIG?;
Response	OFF,INDIVIDUAL,1000000,-30,0;

MCP_MODE

Description

Sets the sub mode in Multi-Channel Power mode

Note

Querying of measurement data is not possible in sub mode CONDENSED

Command

MCP_MODE <MeasMode>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<MeasMode>	Enum	DETAILED
<ReturnCode>	Word	Warning or error code

Examples

Command	MCP_MODE DETAILED;
Response	0;

MCP_MODE?

Description

Queries the sub mode in Multi-Channel Power mode

Note

Querying of measurement data is not possible in sub mode CONDENSED

Command

MCP_MODE?;

Response

<MeasMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<MeasMode>	Enum	DETAILED CONDENSED (read only)
<ReturnCode>	Word	Warning or error code

Examples

Command	MCP_MODE?;
Response	DETAILED,0;

Mode Scope and I/Q Data (option required for IDA / NRA)

SCOPE?

Description

Queries time domain measurement results in Scope mode for the previously defined Result Type and measurement parameters (see "SCOPE_RESULTTYPE" and "SCOPE_CONFIG").

Note for IDA

When Result Type CONDENSED is selected, measurements are expressed as intervals with Max, Avg, Min values. This corresponds to the +Peak, RMS, -Peak detectors in Long-Time Scope when IDA is operated manually.

In Remote operation there's no differentiation between RBW and CBW. All commands are using the term "RBW". For manual operation you'll find the term "CBW" for the steep channel filters used in Level Meter and Scope Mode. Both terms have the same meaning in remote operation.

Result Type	ACTUAL (High Resolution)	CONDENSED (Long Time)	IQ, I, Q
Time Resolution	= 1/RBW	>= 8/RBW	=1/RBW
Sweep Time	16/RBW…16000/RBW	16…4000*TimeRes	16/RBW…250000/RBW
Traces	16/RBW…250000/RBW	16 …62500*TimeRes	16/RBW…250000/RBW
	ACT	MAX, AVG, MIN	I, Q

Command

SCOPE?;

Response

<CurrentValues>,<MaxValues>,<CompletedRuns>,<TriggerCounter>,
<TriggerMode>,<TriggerState>,<GaplessMode>,<TimeRes>,<NoOfTraces>,
[<Trace>,<Overdriven>,<NoOfValues>, [<Value>,]] <ReturnCode>;

Parameter List

Parameter	Type	Description
<CurrentValues>	DWord	Counter of values in current sweep
<MaxValues>	DWord	Counter of values available if sweep is completed.
<CompletedRuns>	DWord	Counter of completed sweeps
<TriggerCounter>	DWord	Counter of trigger events
<TriggerMode>	Enum	FREE_RUN No trigger function USER Trigger to be started by user TIME Trigger is timer controlled SINGLE Frozen display after the first valid event MULTI The display is frozen after each valid event
<TriggerState>	Enum	NO, WAIT_ARMING, ARMED, TRIGGERED, WAIT_NEXT_TRIGGER, STOPPED
<GaplessMode>	Enum	ON = Gapless data acquisition OFF = Interrupted data acquisition
<TimeRes>	Double	Time resolution [s]
<NoOfTraces>	Word	Number of traces, 1 - 3
<Trace>	Enum	Trace identification: ACT, MAX, AVG, MIN, I, Q
<Overdriven>	Enum	YES, NO Yes, if at least one trace exceeded the range limit. Overdriven results may have a very high uncertainty.
<NoOfValues>	DWord	Number of measurement values per trace
<Value>	Float	Measurement value [Unit]. Very low results in logarithmic units are represented by "-999" (negative infinity).
<ReturnCode>	Word	Warning or error code

Examples

Command	SCOPE?;
Response	10,17,3734,0,FREE_RUN,NO,ON,1E-005,1, ACT,NO,17, -61.51,-61.45,-61.36,-61.48,-61.68,-61.29,-61.32,-61.48,-61.25,-61.63,-61.41,-61.28,-61.41,-61.33,-61.53,-61.40,-61.38, 0;

Command	SCOPE?;
Response	14,17,1746,0,FREE_RUN,NO,ON,8E-005,3, MAX,NO,17, -68.77,-62.65,-60.73,-60.71,-60.97,-60.98,-61.11,-61.11,-61.10,-61.06,-61.22,-61.07,-61.19,-61.21,-61.19,-60.85,-60.86, AVG,NO,17, -74.46,-64.08,-61.25,-60.90,-61.11,-61.18,-61.23,-61.28,-61.28,-61.18,-61.36,-61.28,-61.40,-61.35,-61.27,-61.10,-60.90, MIN,NO,17, -88.67,-66.80,-62.04,-61.04,-61.25,-61.31,-61.40,-61.44,-61.62,-61.27,-61.56,-61.45,-61.60,-61.54,-61.38,-61.27,-60.98, 0;

Command	SCOPE?;
Response	70,129,4794,0,FREE_RUN,NO,ON,2.5E-005,2, I,NO,17, 1.978E-003,1.958E-003,1.931E-003,1.903E-003,1.872E-003,1.840E-003,1.812E-003,1.772E-003,1.734E-003,1.698E-003,1.660E-003,1.619E-003,1.581E-003,1.536E-003,1.492E-003,1.445E-003,1.400E-003, Q,NO,17, 8.420E-004,8.967E-004,9.528E-004,1.003E-003,1.061E-003,1.112E-003,1.165E-003,1.221E-003,1.270E-003,1.321E-003,1.369E-003,1.416E-003,1.460E-003,1.506E-003,1.548E-003,1.594E-003,1.633E-003, 0;

SCOPE_BINARY?

Description

Queries one or more measurement runs (traces) in Scope mode using the BINARY format.

Note

Number of trace calculation: SizeOfBlock / sizeof(float) with sizeof(float) = 4

Command

SCOPE_BINARY?;

Response

<AsciiHeader>
<Endian> <DataID> <DataVersion> <Reserved> <NumberOfBlock> <SizeOfBlock> <Reserved>
<TimeRes> <Unit> <Flags> <CurrentValues> <MaxValues> <CompletedRuns> <TriggerCounter>
<TriggerMode>,<TriggerState> <FillBytes> [ACTUAL] [CONDENSED] [IQ] [I] [Q]

Hexdump: FORMAT_BINARY NORMAL

Command	53 43 4f 50 45 5f 42 49 4e 41 52 59 3f 3b	SCOPE BINARY?;
Response	23 33 31 39 36 4d 53 42 46 02 01 00 01 00 00 00	#3196 …
	00 00 00 00 11 00 00 00 04 00 00 00 00 3e fa 36	
	e2 eb 1c 43 2d 00 02 00 02 00 00 00 09 00 00 00	
	11 00 01 d7 87 00 00 00 00 05 00 01 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00	
	00 00 00 00 00 c4 79 c0 00 c2 bc 89 1d c2 d0 89	
	1c c2 ce 98 f0 c2 c8 93 aa c2 c0 9e 34 c2 dc 93	
	aa c2 ca 83 d6 c2 ce 98 f0 c2 ce 98 f0 c2 d0 89	
	1c c2 ce 98 f0 c2 d0 89 1c c2 ce 98 f0 c2 c8 93	
	aa c2 d6 8e 64 c2 bc 89 1d	

Parameter List (Response)

Parameter	Type	Bytes	Description
<AsciiHeader>	---	---	ASCII header for block data transfer
<Endian>	DWord	4	Identification if the byte order is swapped or not 0x4D534246 = Most Significant Byte First 0x4C534246 = Last Significant Byte First
<DataID>	Word	2	Identification of the telegram data type 0x0201 = Scope Actual, 0x0202 = Scope Condensed 0x0203 = Scope IQ, 0x0204 = Scope I, 0x0205 = Scope Q
<DataVersion>	Word	2	BINARY protocol version Actual version of Scope protocol = 0x0001
<Reserved>	---	4	Reserved for later use
<NumberOfBlock>	DWord	4	Number of records (values)
<SizeOfBlock>	DWord	4	Size of a single record
<Reserved>	---	4	Reserved for later use
<TimeRes>	Double	8	Time resolution [s]
<Unit>	Word	2	Units of measurement data 0x0002 = dBm, 0x0003 = dBV, 0x0004 = dBmV, 0x0005 = dBµV 0x0011 = V Units with antenna connected 0x0006 = dBV/m, 0x0007 = dBmV/m 0x0008 = dBµV/m, 0x0009 = dBA/m, 0x000A = V/m, 0x000B = A/m, 0x000C = W/m², 0x000D = mW/cm² Units reserved for future use 0x0001 = dB, 0x000E = %, 0x000F = dBA, 0x0010 = A
<Flags>	Word	2	Flags representing the device status 0x0001 = Overdriven Flag 0x0002 = Gapless Measurement Flag
<CurrentValues>	DWord	4	Counter of values in current sweep
<MaxValues>	DWord	4	Counter of values available if sweep is completed.
<CompletedRuns>	DWord	4	Counter of completed sweeps
<TriggerCounter>	DWord	4	Counter of trigger events
<TriggerMode>	Word	2	Number representing the trigger mode 0x0000 = No, 0x0001 = Free Run, 0x0002 = User Trigger, 0x0003 = Time Trigger, 0x0004 = Single Trigger, 0x0005 = Multi Run
<TriggerState>	Word	2	Number representing the trigger state 0x0000 = No, 0x0001 = Wait Arming, 0x0002 = Armed, 0x0003 = Triggered, 0x0004 = Stopped, 0x0005 = Wait next Trigger
<FillBytes>	---	72	Fill bytes to get a fixed BINARY header size. The total header size is 128 bytes without the leading ASCII Header. Reserved for later use.

Parameter	Type	Description
[ACTUAL]	Float	Array of 1x 4 byte floating point data. Number of records: 17 … 250002 Alignment: ACT ACT ACT … Very low results in logarithmic units are represented by "-999".
[CONDENSED]	Float	Array of 3x 4 byte floating point data. Number of records: 17 … 62502 Alignment: MAX AVG MIN MAX AVG MIN … Very low results in logarithmic units are represented by "-999".
[IQ]	Float	Array of 2x 4byte floating point data. Number of records: 17 … 250002 Alignment: I Q I Q I Q … Very low results in logarithmic units are represented by "-999".
[I]	Float	Array of 1x 4 byte floating point data. Number of records: 17 … 250002 Alignment: I I I … Very low results in logarithmic units are represented by "-999".
[Q]	Float	Array of 1x 4 byte floating point data. Number of records: 17 … 250002 Alignment: Q Q Q … Very low results in logarithmic units are represented by "-999".

SCOPE_CONFIG

Description
Sets the current measurement parameters for Scope mode. Select Scope mode first.

Note
Scope mode must be selected as the current operating mode.
IDA
In Remote operation there's no differentiation between RBW and CBW. All commands are using the term "RBW". For manual operation you'll find the term "CBW" for the steep channel filters used in Level Meter and Scope Mode. Both terms have the same meaning in remote operation.

Command
SCOPE_CONFIG <Fcent>,<RBW>,<VBWMode>,<VBW>,<SweepTime>,<TimeRes>,<RL>;

Response
<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<VBWMode>	Enum	Video filter: ON, OFF;
<VBW>	Double	Video bandwidth [Hz]
<SweepTime>	Double	Sweep time [s]
<TimeRes>	Double	Time resolution [s]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example: SCOPE_RESULTTYPE ACTUAL (Unit=dBm)

Command	SCOPE_CONFIG 26995000,40000,OFF,400,0.1,2.5E-005,0;
Response	0;

SCOPE_CONFIG?

Description

Queries the current measurement parameters in Scope mode

Note for IDA

In Remote operation there's no differentiation between RBW and CBW. All commands are using the term "RBW". For manual operation you'll find the term "CBW" for the steep channel filters used in Level Meter and Scope Mode. Both terms have the same meaning in remote operation

Command

SCOPE_CONFIG?;

Response

<Fcent>,<RBW>,<VBWMode>,<VBW>,<SweepTime>,<TimeRes>,<RL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<VBWMode>	Enum	Video filter: ON, OFF;
<VBW>	Double	Video bandwidth [Hz]
<SweepTime>	Double	Sweep time [s]
<TimeRes>	Double	Time resolution [s]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example: SCOPE_RESULTTYPE ACTUAL

Command	SCOPE_CONFIG?;
Response	26995000,40000,OFF,400,0.1,2.5E-005,0,0;

SCOPE_HEADER?

Description

Queries the Header Data of measurement values in Scope mode.

Note

This command provides additional information useful for result evaluation and presentation.

Command

SCOPE_HEADER?;

Response

<CurrentValues>,<MaxValues>,<CompletedRuns>,<TriggerCounter>,
<TriggerMode>,<TriggerState>,<GaplessMode>,<TimeRes>,<NoOfTraces>,
<ReturnCode>;

Parameter List

Parameter	Type	Description
<CurrentValues>	DWord	Counter of values in current sweep
<MaxValues>	DWord	Counter of values available if sweep is completed.
<CompletedRuns>	DWord	Counter of completed sweeps
<TriggerCounter>	DWord	Counter of trigger events
<TriggerMode>	Enum	FREE_RUN No trigger function USER Trigger to be started by user TIME Trigger is timer controlled SINGLE Frozen display after the first valid event MULTI The display is frozen after each valid event
<TriggerState>	Enum	NO, WAIT_ARMING, ARMED, TRIGGERED, WAIT_NEXT_TRIGGER, STOPPED
<GaplessMode>	Enum	ON = Gapless data acquisition OFF = Interrupted data acquisition
<TimeRes>	Double	Time resolution [s]
<NoOfTraces>	Word	Number of traces, 1 - 3
<ReturnCode>	Word	Warning or error code

Example

Command	SCOPE_HEADER?;
Response	11857,16001,47,0,FREE_RUN,NO,ON,1E-005,1,0;

SCOPE_MAX_VALUES?

Description

Queries the maximum number of measurement points in Scope mode

Command

SCOPE_MAX_VALUES? <Trace>;

Response

<NoOfValues>, <ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	ACTUAL, CONDENSED, IQ, I, Q
<NoOfValues>	DWord	Maximal Number of measurement values per trace. ACTUAL: 250002 CONDENSED: 62502 IQ, I, Q: 250002
<ReturnCode>	Word	Warning or error code

Examples

Command	SCOPE_MAX_VALUES? IQ;
Response	250002,0;

SCOPE_RAW?

Description

Queries one or more measurement runs (traces) in Scope mode using the RAW format and BINARY data transfer.

Note

Very low results in logarithmic units are represented by "-999" (negative infinity).

Command

SCOPE_RAW?;

Response

<AsciiHeader> [ACTUAL] [CONDENSED] [IQ] [I] [Q]

Parameter List

Parameter	Type	Description
<AsciiHeader>	-	ASCII header for block data transfer.
[ACTUAL]	Float	Array of 1x 4 byte floating point data. Number of records: 17 … 250002 Alignment: ACT ACT ACT …
[CONDENSED]	Float	Array of 3x 4 byte floating point data. Number of records: 17 … 62502 Alignment: MAX AVG MIN MAX AVG MIN …
[IQ]	Float	Array of 2x 4byte floating point data. Number of records: 17 … 250002 Alignment: I Q I Q I Q …
[I]	Float	Array of 1x 4 byte floating point data. Number of records: 17 … 250002 Alignment: I I I …
[Q]	Float	Array of 1x 4 byte floating point data. Number of records: 17 … 250002 Alignment: Q Q Q …

Hexdump: FORMAT_BINARY NORMAL

Command	73 63 6f 70 65 5f 72 61 77 3f 3b	scope_raw?;
Response	23 32 36 38 c2 d6 8e 64 c2 c8 93 aa c2 d0 89 1c	#268 …
	c2 dc 93 aa c2 d0 89 1c c2 c8 93 aa c2 dc 93 aa	
	c4 79 c0 00 c2 dc 93 aa c2 c2 8e 63 c2 dc 93 aa	
	c2 ce 98 f0 c2 c2 8e 63 c2 dc 93 aa c2 c6 4c 44	
	c2 d6 8e 64 c2 d0 89 1c	

SCOPE_RESULTTYPE

Description

Sets the desired Result Type in Scope mode. When Result Type CONDENSED is selected, measurements are expressed as intervals with Max, Avg, Min values.

Note for IDA

This corresponds to the +Peak, RMS, -Peak detectors in Long-Time Scope when IDA is operated manually.

Result Type	ACTUAL (High Resolution)	CONDENSED (Long Time)	IQ, I, Q
Time Resolution	= 1/RBW	>= 8/RBW	=1/RBW
Sweep Time	16/RBW…250000/RBW	16 …62500*TimeRes	16/RBW…250000/RBW
Traces	ACT	MAX, AVG, MIN	I, Q

Command

SCOPE_RESULTTYPE <Trace>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	ACTUAL, CONDENSED, IQ, I, Q
<ReturnCode>	Word	Warning or error code

Examples

Command	SCOPE_RESULTTYPE IQ;
Response	0;

Command	SCOPE_RESULTTYPE ACTUAL;
Response	0;

SCOPE_RESULTTYPE?

Description

Queries the current Result Type in Scope mode.

Command

SCOPE_RESULTTYPE?;

Response

<Trace>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	ACTUAL, CONDENSED, IQ, I, Q
<ReturnCode>	Word	Warning or error code

Example

Command	SCOPE_RESULTTYPE?;
Response	ACTUAL, 0;

SCOPE_STATE?

Description

Queries the current State in Scope mode.

Command

SCOPE_STATE?;

Response

<CurrentValues>,<MaxValues>,<CompletedRuns>,<TriggerCounter>,
<TriggerMode>,<TriggerState>,<GaplessMode>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<CurrentValues>	DWord	Counter of values in current sweep
<MaxValues>	DWord	Counter of values available if sweep is completed.
<CompletedRuns>	DWord	Counter of completed sweeps
<TriggerCounter>	DWord	Counter of trigger events
<TriggerMode>	Enum	FREE_RUN No trigger function USER Trigger to be started by user TIME Trigger is timer controlled SINGLE Frozen display after the first valid event MULTI The display is frozen after each valid event
<TriggerState>	Enum	NO, WAIT_ARMING, ARMED, TRIGGERED, WAIT_NEXT_TRIGGER, STOPPED
<GaplessMode>	Enum	ON = Gapless data acquisition OFF = Interrupted data acquisition
<ReturnCode>	Word	Warning or error code

Examples

Command	SCOPE_STATE?;
Response	70,129,4794,0,FREE_RUN,NO,ON,0;

Command	SCOPE_STATE?;
Response	0,12502,12,1,SINGLE,STOPPED,OFF,0;

Command	SCOPE_STATE?;
Response	0,12502,24,6,MULTI,WAIT_NEXT_TRIGGER,OFF,0;

Command	SCOPE_STATE?;
Response	0,12502,1,1,USER,STOPPED,OFF,0;

Command	SCOPE_STATE?;
Response	0,12502,26,1,TIME,STOPPED,OFF,0;

SCOPE_TRIGGER_ARM

Description

Sets the Trigger State to ARMED for activating the selected Trigger Mode.

Command

SCOPE_TRIGGER_ARM;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	SCOPE_TRIGGER_ARM;
Response	0;

SCOPE_TRIGGER_BREAK

Description

Deactivates the selected Trigger Mode by changing the Trigger State from ARMED to WAIT_ARMING.

Command

SCOPE_TRIGGER_BREAK;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	SCOPE_TRIGGER_BREAK;
Response	0;

SCOPE_TRIGGER_CONFIG

Description

Sets the Trigger parameters in Scope mode.

Note

The Trigger Level is given relatively to the input Reference Level.in "dB"
Absolute Trigger Level [Unit] = RL [Unit] + TriggerLevel [dB]

The Trigger Delay is given relatively to the Sweep Time in "%".
Absolute Delay [s] = Sweep Time [s] * Delay [%]

Use the commands Scope_Config or SCOPE_TRIGGER_LEVEL_LIST to get the current RL value.

Changing the Reference Level will also change the absolute value of the Trigger Level.
Changing the Sweep Time will also change the absolute value of the Delay.

Command

SCOPE_TRIGGER_CONFIG <TriggerMode>,<TriggerLevel>,<Slope>,<Delay>,<Date>,<Time>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description	
<TriggerMode>	Enum	FREE_RUN	No trigger function
		USER	Trigger to be started by user
		TIME	Trigger is timer controlled
		SINGLE	Frozen display after the first valid event
		MULTI	The display is frozen after each valid event
<TriggerLevel>	Float	Trigger level relative to RL, 0 to -120 [dB]	
<Slope>	Enum	Trigger slope:	
		POSITIV	Rising edge
		NEGATIV	Falling edge
<Delay>	Float	Trigger delay, -90 to +200 [%] in steps of 10 [%]	
<Date>	Date	dd.mm.yy	
<Time>	Time	hh:mm:ss	
<ReturnCode>	Word	Warning or error code	

Examples

Command	SCOPE_TRIGGER_CONFIG FREE_RUN,0,POSITIV,-10,01.01.01,00:00:00;
Response	0;

Command	SCOPE_TRIGGER_CONFIG SINGLE,-49,POSITIV,-10,01.01.01,00:00:00;
Response	0;

SCOPE_TRIGGER_CONFIG?

Description

Queries the Trigger parameters in Scope mode.

Note

The Trigger Level is given relatively to the input Reference Level.in "dB"
Absolute Trigger Level [Unit] = RL [Unit] + TriggerLevel [dB]

The Trigger Delay is given relatively to the Sweep Time in "%".
Absolute Delay [s] = Sweep Time [s] * Delay [%]

Use the commands Scope_Config or SCOPE_TRIGGER_LEVEL_LIST to get the current RL value.

Changing the Reference Level will also change the absolute value of the Trigger Level.
Changing the Sweep Time will also change the absolute value of the Delay.

Command

SCOPE_TRIGGER_CONFIG?;

Response

<TriggerMode>,<TriggerLevel>,<Slope>,<Delay>,<Date>,<Time>,<ReturnCode>;

Parameter List

Parameter	Type	Description	
<TriggerMode>	Enum	FREE_RUN	No trigger function
		USER	Trigger to be started by user
		TIME	Trigger is timer controlled
		SINGLE	Frozen display after the first valid event
		MULTI	The display is frozen after each valid event
<TriggerLevel>	Float	Trigger level relative to RL, 0 to -120 [dB]	
<Slope>	Enum	Trigger slope:	
		POSITIV	Rising edge
		NEGATIV	Falling edge
<Delay>	Float	Trigger delay, -90 to +200 [%] in steps of 10 [%]	
<Date>	Date	dd.mm.yy	
<Time>	Time	hh:mm:ss	
<ReturnCode>	Word	Warning or error code	

Example

Command	SCOPE_TRIGGER_CONFIG?;
Response	SINGLE,-49,POSITIV,-10,01.01.01,00:00:00,0;

SCOPE_TRIGGER_DELAY_LIST?

Description

Queries the current possible Trigger Delay settings in Scope mode.

Command

SCOPE_TRIGGER_DELAY_LIST?;

Response

<NumberOfElements>, [<DisplayStringRel>, <DisplayStringAbs>, <ValueRel>, <ValueAbs>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayStringRel>	String	Relative value [%] of the delay time and unit as string
<DisplayStringAbs>	String	Absolute value of the delay time and unit as string
<ValueRel>	Double	Relative delay value [%]
<ValueAbs>	Double	Absolute delay value in current time unit
<ReturnCode>	Word	Warning or error code

Example

Command	SCOPE_TRIGGER_DELAY_LIST?
Response	30, "-90 %","90.000 ms",-90,0.09, "-80 %","80.000 ms",-80,0.08, "-70 %","70.000 ms",-70,0.07, "-60 %","60.000 ms",-60,0.06, "-50 %","50.000 ms",-50,0.05, "-40 %","40.000 ms",-40,0.04, "-30 %","30.000 ms",-30,0.03, "-20 %","20.000 ms",-20,0.02, "-10 %","10.000 ms",-10,0.01, "0 %","0 s",0,-0, "10 %","-10.000 ms",10,-0.01, "20 %","-20.000 ms",20,-0.02, … "190 %","-190.000 ms",190,-0.19, "200 %","-200.000 ms",200,-0.2, 0;

SCOPE_TRIGGER_LEVEL_LIST?

Description

Queries the current possible Trigger Level settings in Scope mode.

Command

SCOPE_TRIGGER_LEVEL_LIST?;

Response

<NumberOfElements>, [<DisplayStringRel>, <DisplayStringAbs>, <ValueRel>, <ValueAbs>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayStringRel>	String	Relative value [dB] of the trigger level and unit as string
<DisplayStringAbs>	String	Absolute value of the trigger level and unit as string
<ValueRel>	Double	Relative trigger level value [dB]
<ValueAbs>,	Double	Absolute trigger level value in current unit
<ReturnCode>	Word	Warning or error code

Example

Command	SCOPE_TRIGGER_LEVEL_LIST?
Response	121,
	"RL+0 dB","-30 dBm",0,-30,
	"RL-1 dB","-31 dBm",-1,-31,
	"RL-2 dB","-32 dBm",-2,-32,
	"RL-3 dB","-33 dBm",-3,-33,
	"RL-4 dB","-34 dBm",-4,-34,
	"RL-5 dB","-35 dBm",-5,-35,
	"RL-6 dB","-36 dBm",-6,-36,
	"RL-7 dB","-37 dBm",-7,-37,
	"RL-8 dB","-38 dBm",-8,-38,
	"RL-9 dB","-39 dBm",-9,-39,
	"RL-10 dB","-40 dBm",-10,-40,
	"RL-11 dB","-41 dBm",-11,-41,
	"RL-12 dB","-42 dBm",-12,-42,
	…
	"RL-117 dB","-147 dBm",-117,-147,
	"RL-118 dB","-148 dBm",-118,-148,
	"RL-119 dB","-149 dBm",-119,-149,
	"RL-120 dB","-150 dBm",-120,-150,
	0;

Mode Level Meter (option required for NRA)

LEVEL?

Description

Queries the different measurement runs (traces) that are available in Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Command

LEVEL? <Trace>;

Response

<SweepCounter>,<AVGProgress>,<NoOfSpatialAVG>,<NoOfTraces>,
[<Trace>,<Overdriven>,<NoiseFlag>,<Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<Trace>	Enum	RMS, MAX_RMS, PEAK, MAX_PEAK, ALL
<SweepCounter>	DWord	Number of sweeps performed
<AVGProgress>	Word	0 – 100 [%] Progress of averaging
<NoOfSpatialAVG>	DWord	0 – 999 999 Number of sweeps used for spatial averaging
<NoOfTraces>	Word	Number of traces
<Overdriven>	Enum	YES, NO; Yes, if at least one trace exceeded the range limit. Overdriven results may have a very high uncertainty.
<NoiseFlag>	Enum	UNCHECKED Result has not been compared with noise level LOW Result is below the noise level OK Result is equal or above the noise level
<Value>	Float	Measurement result [Unit]. Very low results in logarithmic units are represented by "-999" (negative infinity).
<ReturnCode>	Word	Warning or error code

Examples

Command	LEVEL? RMS;
Response	60,100,0,1, RMS,NO,UNCHECKED,-62.99961, 0;

Command	LEVEL? ALL;
Response	473,100,0,4, RMS,NO,UNCHECKED,-62.99, MAX_RMS,NO,UNCHECKED,-62.96, PEAK,NO,UNCHECKED,-51.69, MAX_PEAK,NO,UNCHECKED,-50.46, 0;

LEVEL_AVG_CONFIG

Description

Sets the current averaging method.

Note

Level Meter mode has 1 averaging method:

- Average over a time period (Time)

Command

LEVEL_AVG_CONFIG <AvgTime>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgTime>	Float	Time [s]: 0.12, 0.24, 0.48, 0.96, 1.2, 2.4, 3.6, 6, 12, 18, 30 ,60, 120, 180, 300, 360, 600, 900, 1200, 1800
<ReturnCode>	Word	Warning or error code

Example

Command	LEVEL_AVG_CONFIG 2.4;
Response	0;

LEVEL_AVG_CONFIG?

Description

Queries the current averaging method.

Note

Level Meter mode has 1 averaging method:

- Average over a time period (Time)

Command

LEVEL_AVG_CONFIG?;

Response

<AvgTime>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<AvgTime>	Float	Time [s]: 0.12, 0.24, 0.48, 0.96, 1.2, 2.4, 3.6, 6, 12, 18, 30 ,60, 120, 180, 300, 360, 600, 900, 1200, 1800
<ReturnCode>	Word	Warning or error code

Example

Command	LEVEL_AVG_CONFIG?;
Response	2.4,0;

LEVEL_AVG_LIST?

Description

Queries the current possible averaging time settings for Level Meter mode.

Note

Level Meter mode has 1 averaging method:

- Average over a time period (Time)

The requested list reflects all the possible settings and guarantees consistency with the other device settings. The <DisplayString> parameter can be used in the application to ensure the same appearance as in the device (e.g. in List boxes). The <Value> parameter is a numerical value, which can be transmitted to the device in order to apply the corresponding setting.

Command

LEVEL_AVG_LIST?;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	Averaging time and its unit as string (in „s" or „min")
<Value>	Float	Averaging time as value [s]
<ReturnCode>	Word	Warning or error code

Example

Command	LEVEL_AVG_LIST?;
Response	18,
	"0.48 s",0.48,
	"0.96 s",0.96,
	"1.2 s",1.2,
	"2.4 s",2.4,
	"3.6 s",3.6,
	"6 s",6,
	"12 s",12,
	"18 s",18,
	"30 s",30,
	"1 min",60,
	"2 min",120,
	"3 min",180,
	"5 min",300,
	"6 min",360,
	"10 min",600,
	"15 min",900,
	"20 min",1200,
	"30 min",1800,
	0;

LEVEL_CONFIG

Description

Sets the current measurement parameters for Level Meter mode.

Note

Level Meter mode must be selected as the current operating mode.

Note for IDA

In Remote operation there's no differentiation between RBW and CBW. All commands are using the term "RBW". For manual operation you'll find the term "CBW" for the steep channel filters used in Level Meter and Scope Mode. Both terms have the same meaning in remote operation.

Command

LEVEL_CONFIG <Fcent>,<RBW>,<VBWMode>,<VBW>,<RL>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<VBWMode>	Enum	Video filter: ON, OFF;)
<VBW>	Double	Video filter bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example (Unit=dBm)

Command	LEVEL_CONFIG 10000000,250000,OFF,50000,0;
Response	0;

LEVEL_CONFIG?

Description
Queries the current measurement parameters for Level Meter mode.

Note
Level Meter mode must be selected as the current operating mode.

Note for IDA
In Remote operation there's no differentiation between RBW and CBW. All commands are using the term "RBW". For manual operation you'll find the term "CBW" for the steep channel filters used in Level Meter and Scope Mode. Both terms have the same meaning in remote operation.

Command
LEVEL_CONFIG?;

Response
<Fcent>,<RBW>,<VBWMode>,<VBW>,<RL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<VBWMode>	Enum	Video filter: ON, OFF;
<VBW>	Double	Video filter bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	LEVEL_CONFIG?;
Response	1000000,250000,OFF,50000,0,0;

Network configuration

IP_CONFIG

💡 *Command only available for devices with an Ethernet connector*

Description

Sets the IP configuration of the device. Use IP_Config_Renew to apply the new settings.

Command

IP_CONFIG <DHCP>,<IPAddress>,<SubnetMask>,<Gateway>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<DHCP>	Enum	ON = DHCP is active (Dynamic Host Configuration Protocol) OFF = DHCP is not active (static IP address)
<IPAddress>	String	IP-Address of the device; Format: ###.###.###.###
<SubnetMask>	String	Subnet mask of the device; Format: ###.###.###.###
<Gateway>	String	Gateway; Format: ###.###.###.### Empty String: "" = No default gateway
<ReturnCode>	Word	Warning or error code

Examples

Dynamic IP Address (DHCP)

Command	IP_CONFIG ON, "", "","";
Response	0;

Static IP Address

Command	IP_CONFIG OFF,"192.168.128.128","255.255.255.0","";
Response	0;

IP_CONFIG?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the simple IP configuration of the device.

Command

IP_CONFIG?;

Response

<DHCP>,<IPAddress>,<SubnetMask>,<Gateway>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<DHCP>	Enum	ON = DHCP is active (Dynamic Host Configuration Protocol) OFF = DHCP is not active
<IPAddress>	String	IP-Address of the device; Format: ###.###.###.###
<SubnetMask>	String	Subnet mask of the device; Format: ###.###.###.###
<Gateway>	String	Gateway; Format: ###.###.###.### Empty String: "" = No default gateway
<ReturnCode>	Word	Warning or error code

Example

Command	IP_CONFIG?;
Response	OFF,"192.168.128.128","255.255.255.0","",0;

IP_CONFIG_ALL?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the expanded IP configuration of the device.

Command

IP_CONFIG_ALL?;

Response

<Hostname>,<Adapter>,<MacAddress>,<DHCP>,<IPAddress>,<SubnetMask>,<Gateway>,
<ReturnCode>;

Parameter List

Parameter	Type	Description
<Hostname>	String	Network alias name of the device
<Adapter>	String	Name of the network adapter
<MacAddress>	String	MAC address of the device
<DHCP>	Enum	ON = DHCP is active (Dynamic Host Configuration Protocol) OFF = DHCP is not active
<IPAddress>	String	IP-Address of the device; Format: ###.###.###.###
<SubnetMask>	String	Subnet mask of the device; Format: ###.###.###.###
<Gateway>	String	Gateway; Format: ###.###.###.### Empty String: "" = No default gateway
<ReturnCode>	Word	Warning or error code

Example

Command	IP_CONFIG_ALL?;
Response	"NRA320301PT0001","SMSC91181","00-50-C2-AD-1D-E7", OFF,"192.168.128.128","255.255.255.0","",0;

IP_CONFIG_RENEW

💡 *Command only available for devices with an Ethernet connector*

Description

Renews the IP address of the device and restarts the server with the actual settings.
This closes all open connections.

Command

IP_CONFIG_RENEW;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	IP_CONFIG_RENEW;
Response	0;

IP_SERVER

💡 *Command only available for devices with an Ethernet connector*

Description

Sets the new server configuration of the device. Use IP_Config_Renew to apply the new settings.

Note

To avoid synchronization problems with client applications, only one client (the master) is allowed to change device settings.

Command

IP_SERVER <Type>,<Port>,<Clients>,<SocketMode>,<SocketTimeout>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Type>	Enum	REMOTE = remote channel
<Port>	Word	Listening port of the server
<Clients>	Word	Maximum number of allowed clients (see note above) The maximum number of allowed clients is limited to 4
<SocketMode>	Enum	Server behavior for new clients: DYN = Existing socket will be closed by a new client STAT = New client denied when socket is occupied
<SocketTimeout>	Word	Socket timeout 0 = Socket without timeout 1 - 60 = Socket timeout [s]
<ReturnCode>	Word	Warning or error code

Example

Command	IP_SERVER REMOTE,55555,1,DYN,0;
Response	0;

IP_SERVER?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the current server configuration of the device.

Note

To avoid synchronization problems with client applications, only one client (the master) is allowed to change device settings.

Command

IP_SERVER? <Type>;

Response

<Type>,<Port>,<Clients>,<SocketMode>,<SocketTimeout>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Type>	Enum	REMOTE = remote channel
<Port>	Word	Listening port of the server
<Clients>	Word	Maximum number of allowed clients (see note above) The maximum number of allowed clients is limited to 4
<SocketMode>	Enum	Server behavior for new clients: DYN = Existing socket will be closed by a new client STAT = New client denied when socket is occupied
<SocketTimeout>	Word	Socket timeout 0 = Socket without timeout 1 - 60 = Socket timeout [s]
<ReturnCode>	Word	Warning or error code

Example

Command	IP_SERVER? REMOTE;
Response	REMOTE,55555,1,DYN,0,0;

Reference Input 10 MHz

💡 *Command only available for devices with 10 MHz reference input*

RF_EXT_REF

Description

Switches the 10 MHz reference input on or off.

Note

If the 10 MHz input is on, ensure that an external 10 MHz signal is connected to avoid measurement errors.

Command

RF_EXT_REF <EnableState>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<EnableState>	Enum	ON OFF (standard startup setting)
<ReturnCode>	Word	Warning or error code (Warning 202 if ext. Ref = ON and not locked)

Example

Command	RF_EXT_REF ON;
Response	0;

Command	RF_EXT_REF OFF;
Response	0;

RF_EXT_REF?

💡 *Command only available for devices with 10 MHz reference input*

Description

Queries the current state of the 10 MHz reference input.

Command

RF_EXT_REF?;

Response

<EnableState>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<EnableState>	Enum	ON,OFF
<ReturnCode>	Word	Warning or error code (Warning 202 if ext. Ref = ON and not locked)

Example

Command	RF_EXT_REF?;
Response	ON,0;

Command	RF_EXT_REF?;
Response	OFF,0;

RF_EXT_REF_LOCKED?

💡 *Command only available for devices with 10 MHz reference input*

Description

Queries whether an external 10 MHz signal is connected to the device.

Command

RF_EXT_REF_LOCKED?;

Response

<LockedState>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<LockedState>	Enum	TRUE (10 MHz signal is connected) FALSE (10 MHz signal is not connected or RF_EXT_REF = OFF)
<ReturnCode>	Word	Warning or error code

Example

Command	RF_EXT_REF_LOCKED?;
Response	TRUE,0;

Command	RF_EXT_REF_LOCKED?;
Response	FALSE,0;

Service Tables (channel tables)

SRV_CLR

Description

Deletes a service table.

Command

SRV_CLR <ServTabLong>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ServTabLong>	String	Long Name of the channel (service) table, up to 35 chr
<ReturnCode>	Word	Warning or error code

Example

Command	SRV_CLR "my_longname";
Response	0;

SRV_CLR_ALL

Description

Deletes all service tables.

Command

SRV_CLR_ALL;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ReturnCode>	Word	Warning or error code

Example

Command	SRV_CLR_ALL;
Response	0;

SRV_DS

Description

Creates a service table and stores it in the nonvolatile memory of the device.

Note

A Service Table is mandatory for using the Multi-Channel Power mode as all MCP measurements are related to the currently selected Service Table (see SRV_SEL?).
It contains the necessary parameters of the up to 500 different channels which can be defined in a single Service Table. Each channel is named by its Service Name (ServName).

The following rules apply for creating a Service Table:

Fhigh - Flow >= 40 Hz   (minimum channel width of 40 Hz)

Flow[n+1] >= Fhigh[n]   (channels must be sorted from low to high without overlapping)

RBW max < ((Fhigh - Flow) /4)   (RBW to be less than a quarter of the channel width)

To simplify the creation of Service Tables, Narda provides a suitable configuration program.

Command

SRV_DS <ServTabShort>,<ServTabLong>,
<NoOfServices>, [<Flow>,<Fhigh>,<RBW>,<ServName>,];

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ServTabShort>	String	Short Name of the channel (service) table, up to 15 chr
<ServTabLong>	String	Long Name of the channel (service) table, up to 35 chr
<NoOfServices>	Word	Number of channels (services), 1 - 500
<Flow>	Double	Lower frequency limit of the channel (service), [Hz]
<Fhigh>	Double	Upper frequency limit of the channel (service), [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<ServName>	String	Name of the channel (service) , up to 15 chr
<ReturnCode>	Word	Warning or error code

Examples

Command	SRV_DS "my_shortname","my_longname",2, 10000000,20000000,2000000,"SrvA", 100000000,200000000,20000000,"SrvB";
Response	0;

Command	SRV_DS "EU Full Band","Europe Full Band",17, 47000000,68000000,5000000,"TV Band I", 87500000,108000000,200000,"FM-Radio", 137000000,165000000,3000000,"Mid Wave", 165000000,174000000,2000000,"Paging", 174000000,230000000,5000000,"BandIII (DVB-T)", 467450000,468300000,200000,"Trains", 470000000,790000000,10000000,"BandIV (DVB-T)", 790000000,862000000,5000000,"BandV (DAB)", 876000000,880000000,500000,"GSM-R", 890000000,960000000,500000,"GSM 900", 1452000000,1492000000,5000000,"L-Band (DAB)", 1710000000,1880000000,500000,"GSM 1800", 1880000000,1900000000,3000000,"DECT", 1900000000,2025000000,5000000,"UMTS-TDD", 2110000000,2170000000,5000000,"UMTS DL", 2400000000,2483500000,20000000,"W-LAN", 2483500000,2500000000,3000000,"ISM";
Response	0;

SRV_DS?

Description

Queries a service table.

Command

SRV_DS? <ServTabLongReq>;

Response

<ServTabShort>,<ServTabLong>,
<NoOfServices>, [<Flow>,<Fhigh>,<RBW>,<ServName>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<ServTabLongReq>	String	Requested Long Name of the channel (service) table, up to 35 chr
<ServTabShort>	String	Short Name of the channel (service) table, up to 15 chr
<ServTabLong>	String	Long Name of the channel (service) table, up to 35 chr
<NoOfServices>	Word	Number of channels (services), 1 - 500
<Flow>	Double	Lower frequency limit of the channel (service), [Hz]
<Fhigh>	Double	Upper frequency limit of the channel (service), [Hz]
<RBW>	Double	Resolution bandwidth [Hz]
<ServName>	String	Name of the channel (service) , up to 15 chr
<ReturnCode>	Word	Warning or error code

Example

Command	SRV_DS? "Europe Full Band";
Response	"EU Full Band","Europe Full Band",
	17,
	47000000,68000000,5000000,"TV Band I",
	87500000,108000000,200000,"FM-Radio",
	137000000,165000000,3000000,"Mid Wave",
	165000000,174000000,2000000,"Paging",
	174000000,230000000,5000000,"BandIII (DVB-T)",
	467450000,468300000,200000,"Trains",
	470000000,790000000,10000000,"BandIV (DVB-T)",
	790000000,862000000,5000000,"BandV (DAB)",
	876000000,880000000,500000,"GSM-R",
	890000000,960000000,500000,"GSM 900",
	1452000000,1492000000,5000000,"L-Band (DAB)",
	1710000000,1880000000,500000,"GSM 1800",
	1880000000,1900000000,3000000,"DECT",
	1900000000,2025000000,5000000,"UMTS-TDD",
	2110000000,2170000000,5000000,"UMTS DL",
	2400000000,2483500000,20000000,"W-LAN",
	2483500000,2500000000,3000000,"ISM",
	0;

SRV_LIST?

Description

Queries all service tables without details.

Command

SRV_LIST?;

Response

<NumberOfElements>, [<ServTabLong>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Total number of channel (service) tables available
<ServTabLong>	String	Long Name of the channel (service) table, up to 35 chr
<ReturnCode>	Word	Warning or error code

Example

Command	SRV_LIST?;
Response	26,
	"Ex. Airport Radar",
	"China_Overview",
	"EN50492:2008_Annex_A_no_PMR+A.Radio",
	"Europe Full Band",
	"Europe GSM 900+1800+UMTS",
	"Europe UMTS W-CDMA 3GPP/FDD",
	"Ex.Cellular GSM 850+1900",
	"Ex.DECT Channels",
	"Ex.Digital Cordless Phones Overview",
	"Ex.ISM Band 2.4 GHz",
	"Ex.TETRA",
	"Ex.WLAN 2.4 GHz",
	"Germany alle Funkdienste",
	"Germany Broadcast Overview",
	"Germany Channels GSM-900 Downlink",
	"Germany Ex. FM Radio Narda Pful.",
	"Germany GSM1800",
	"Germany Mobilfunkbetreiber",
	"Germany UMTS",
	"Japan+Korea Mobile Phone Services ",
	"Österreich Funkdienste",
	"Österreich GSM-1800",
	"Österreich GSM-900",
	"Österreich UMTS",
	"Swisscom",
	"USA FCC Frequencies",
	0;

SRV_SEL

Description

Sets the current active service table.

Command

SRV_SEL <ServTabLong>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<ServTabLong>	String	Long Name of the channel (service) table, up to 35 chr
<ReturnCode>	Word	Warning or error code

Example

Command	SRV_SEL "Europe Full Band";
Response	0;

SRV_SEL?

Description

Queries the current active service table.

Command

SRV_SEL?;

Response

<ServTabLong>,<ServTabShort>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<ServTabLong>	String	Long Name of the channel (service) table, up to 35 chr
<ServTabShort>	String	Short Name of the channel (service) table, up to 15 chr
<ReturnCode>	Word	Warning or error code

Example

Command	SRV_SEL?;
Response	"Europe Full Band","EU Full Band",0;

Stream communication (option required for NRA)

IQSTREAM_ATT

> 💡 *Command only available for devices with an Ethernet connector*

Description

Sets the Attenuator value for IQ Streaming mode without interrupting the measurement.

Note

The Attenuator value is coupled to the Reference Level.
An active Stream data output is not stopped by this command.

Command

IQSTREAM_ATT <Attenuator>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Attenuator>	Float	Attenuator value 0dB…50dB
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_ATT 50;
Response	0;

IQSTREAM_ATT?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the current Attenuator value for IQ Streaming mode.

Note

The Attenuator value is coupled to the Reference Level.

Command

IQSTREAM_ATT?;

Response

<Attenuator>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Attenuator>	Float	Attenuator value 0dB…50dB
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_ATT?;
Response	50,0;

IQSTREAM_CONFIG

💡 *Command only available for devices with an Ethernet connector*

Description

Sets the Fcent, RBW and RL settings for IQ Streaming mode.

Note

This command restarts the measurement and resynchronizes the timestamp.

An active Stream data output is not stopped by this command.

Command

STREAM_CONFIG <Fcent>,<RBW>,<RL>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<RBW>	Double	Channel bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example (Unit=V)

Command	IQSTREAM_CONFIG 97700000,100000,0.008;
Response	0;

IQSTREAM_CONFIG?

💡 *Command only available for devices with an Ethernet connector*

Description
Queries the current settings for IQ Streaming mode.

Command
STREAM_CONFIG?;

Response
<Fcent>,<RBW>,<RL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<RBW>	Double	Channel bandwidth [Hz]
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_CONFIG?;
Response	97700000,100000,0.008,0;

IQSTREAM_FCENT

💡 *Command only available for devices with an Ethernet connector*

Description

Sets Fcent for IQ Streaming mode without interrupting the measurement.

Note

An active Stream data output is not stopped by this command.

Command

IQSTREAM_FCENT <FCent>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_FCENT 97700000;
Response	0;

IQSTREAM_FCENT?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the current Fcent setting for IQ Streaming mode.

Command

IQSTREAM_FCENT?;

Response

<FCent>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Fcent>	Double	Center frequency [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_FCENT?;
Response	97700000,0;

IQSTREAM_RBW

💡 *Command only available for devices with an Ethernet connector*

Description
Sets the RBW setting for IQ Streaming mode.

Note
This command restarts the measurement and resynchronizes the timestamp.
An active Stream data output is not stopped by this command.

Command
IQSTREAM_RBW <RBW>;

Response
<ReturnCode>;

Parameter List

Parameter	Type	Description
<RBW>	Double	Channel bandwidth [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_RBW 100000;
Response	0;

IQSTREAM_RBW?

> 💡 *Command only available for devices with an Ethernet connector*

Description

Queries the current RBW setting for IQ Streaming mode.

Command

IQSTREAM_RBW?;

Response

<RBW>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<RBW>	Double	Channel bandwidth [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_RBW?;
Response	100000,0;

IQSTREAM_RBW_LIST?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the RBW List for IQ Streaming mode.

Command

IQSTREAM_RBW_LIST?;

Response

<NumberOfElements>, [<DisplayString>, <Value>,] <ReturnCode>;

Parameter List

Parameter	Type	Description
<NumberOfElements>	Word	Number of subsequent items
<DisplayString>	String	RBW and unit as string
<Value>	Float	RBW as value [Hz]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_RBW_LIST?;
Response	37,
	"400 kHz",400000,
	"320 kHz",320000,
	"250 kHz",250000,
	"200 kHz",200000,
	"160 kHz",160000,
	"125 kHz",125000,
	"100 kHz",100000,
	…
	"1 kHz",1000,
	"800 Hz",800,
	"640 Hz",640,
	"500 Hz",500,
	"400 Hz",400,
	"320 Hz",320,
	"250 Hz",250,
	"200 Hz",200,
	"160 Hz",160,
	"125 Hz",125,
	"100 Hz",100,
	0;

IQSTREAM_RL

💡 *Command only available for devices with an Ethernet connector*

Description

Sets the Reference Level for IQ Streaming mode without interrupting the measurement.

Note

The Attenuator value is coupled to the Reference Level.
An active Stream data output is not stopped by this command.

Command

IQSTREAM_RL <RL>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example (Unit=V)

Command	IQSTREAM_RL 2.25;
Response	0;

IQSTREAM_RL?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the current Reference Level for IQ Streaming mode.

Note

The attenuator value is coupled to the Reference Level.

Command

IQSTREAM_RL?;

Response

<RL>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<RL>	Float	Reference level (Measurement Range) [Unit]
<ReturnCode>	Word	Warning or error code

Example

Command	IQSTREAM_RL?;
Response	2.25,0;

STREAM_SETUP

💡 *Command only available for devices with an Ethernet connector*

Description

Sets the protocol and connection settings for the Stream data output.

Note

This command stops an active Stream data output.

More information about the Stream data is given in the Stream Communication section.

Command

STREAM_SETUP <Protocol>,<IPAddress>,<Port>;

Response

<ReturnCode>;

Parameter List

Parameter	Type	Description
<Protocol>	Enum	UDP = User Datagram Protocol TCP = Transmission Control Protocol
<IPAddress>	String	IP-Address of the receiving device. Used only for UDP streaming. Format: ###.###.###.###
<Port>	Word	Listening port of the TCP stream server or destination port of the UDP stream datagrams.
<ReturnCode>	Word	Warning or error code

Examples

Command	STREAM_SETUP TCP,"",60001;
Response	0;

Command	STREAM_SETUP UDP,"192.168.128.200",60001;
Response	0;

STREAM_SETUP?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the connection and protocol settings for the Stream data output.

Note

More information about the Stream data is given in the Stream Communication section.

Command

STREAM_SETUP?;

Response

<Protocol>,<IPAddress>,<Port>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<Protocol>	Enum	UDP = User Datagram Protocol TCP = Transmission Control Protocol
<IPAddress>	String	IP-Address of the receiving device. Used only for UDP streaming. Format: ###.###.###.###
<Port>	Word	Listening port of the TCP stream server or destination port of the UDP stream datagrams.
<ReturnCode>	Word	Warning or error code

Examples

Command	STREAM_SETUP?;
Response	TCP,"",60001,0;

Command	STREAM_SETUP?;
Response	UDP,"192.168.128.200",60001,0;

STREAM_STATE

💡 *Command only available for devices with an Ethernet connector*

Description
Starts or stops the Stream data output.

Note
More information about the Stream data is given in the Stream Communication section.

Command
STREAM_STATE <StreamState>;

Response
<ReturnCode>;

Parameter List

Parameter	Type	Description
<StreamState>	Enum	ON = Stream data output is activated OFF = Stream data output is deactivated
<ReturnCode>	Word	Warning or error code

Example

Command	STREAM_STATE ON;
Response	0;

STREAM_STATE?

💡 *Command only available for devices with an Ethernet connector*

Description

Queries the current Stream status.

Note

More information about the Stream data is given in the Stream Communication section.

Command

STREAM_STATE?;

Response

<StreamState>,<ReturnCode>;

Parameter List

Parameter	Type	Description
<StreamState>	Enum	ON = Stream data output is activated OFF = Stream data output is deactivated
<ReturnCode>	Word	Warning or error code

Example

Command	STREAM_STATE?;
Response	ON,0;

6 Stream Communication

💡 *Applies only for devices with an ethernet connector*

Definitions
The following terms are used to describe the streaming communication.

Term	Explanation
Stream	A Stream consists of one or more data packets transmitted automatically one after the other.
Stream Identifier (ID)	The Stream ID determines which data packets belong to a particular Stream. Several Streams transmitted in parallel can each be uniquely identified using the Stream ID in the Header.
Data packet	A data packet is transmitted as an entity and consists of Header, Context and Data items. The Context or Data items may be empty in some cases.
Header	The Header is a defined data structure at the start of each data packet and has the same format for all Streams that are being transmitted.
Context	The Context differs from Stream to Stream and contains additional information about the data items. Example Context data: The Context of an IQ Stream contains: Sample rate, RBW, Fcent
Data item	Data items are the actual payload data in a data packet and differ in structure and number from Stream to Stream. An individual data item consists of a single value or a structure containing various values, depending on the Stream. Example data item: An IQ data item consists of the two values I and Q
Data item format	The data item format determines the basic data types (e.g. INT16, FLOAT32) that make up a data element.
Packet Counter	The Packet Counter numbers the individual data packets consecutively. This enables the receiver to determine whether all the data packets were received.
Endianness	Endianness describes the way that the bytes in the basic data types (e.g. INT16, FLOAT32) are arranged in memory. The byte arrangement for Microsoft Windows based systems is little endian.
Streamlink	The Streamlink is a data connection for transmitting a Stream.
Remotelink	The Remotelink is used to configure and control the device settings and the Stream transmitted by the device.

General information

A Stream consists of one or more data packets transmitted automatically one after the other. A data packet is transmitted as an entity and consists of Header, Context and Data items. The Context or Data items may be empty in some cases.

Example: Structure of a data packet

Header	Context	Data items

The Header is identical for all data packets in a Stream.
The Stream ID in the Header determines the size and structure of the Context and the Data items.
The Header, Context and data items are always transmitted together as a packet.

Note

Unknown packets have to be filtered out and ignored using the Header information.

Example: IQ Data packets in a Stream

| IQ			IQ			??			IQ			IQ			??		

Streamlink and Remotelink

A Remotelink and a Streamlink are used for Stream communication.
The Remotelink consists of the ASCII remote commands described in this document.
The Streamlink consists of the binary data packets for one or more Streams.
The Streamlink is configured and controlled by the Remotelink.

Example: Remotelink and Streamlink between host and device
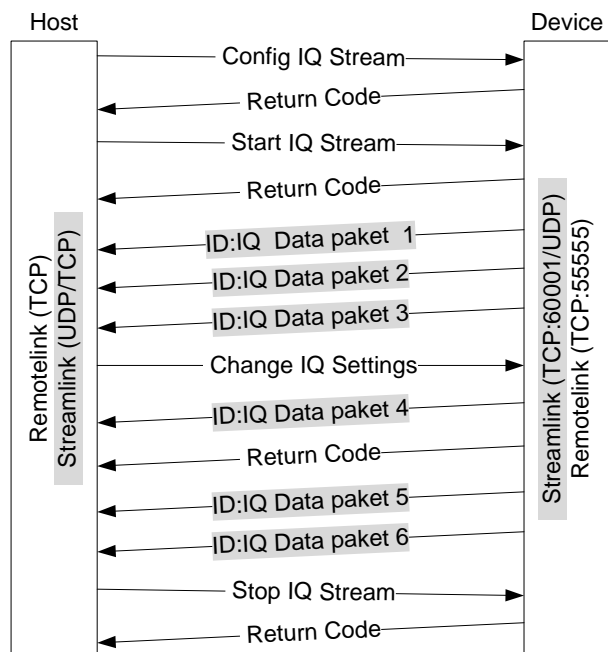
General Stream Header

Description

The Header is a defined data structure at the start of each individual data packet and has the same format for all the Streams that are being transmitted.

Together with the Stream Version, the Stream ID is used to uniquely identify the data contents. This makes it possible to implement a receiver routine that distinguishes between different Stream IDs and Stream Versions so they can be processed.

The packet counter is used to verify the transmitted data. Each data packet transmitted is numbered consecutively before it is sent. This enables the receiver to detect whether data packets have been lost or are out of sequence.

Header format

Parameter	Type	Bytes	Description
ByteOrder	Word	2	0x55AA = little endian 0xAA55 = big endian (not supported)
HeaderVersion	Word	2	Header version 0x0001 = Stream Header Version 1
StreamID	Word	2	Stream identifier 0x0001 = Stream IQ
StreamVersion	Word	2	Version for context and data items 0x0001 = Version 1 (of e.g. Stream IQ)
Reserved	Word	2	Reserved for later use
Reserved	Word	2	Reserved for later use
PacketCounter	DWord	4	Packet counter for lost packet detection
SizeOfContext	DWord	4	Number of bytes for the context data
NumberOfItems	DWord	4	Number of data items
SizeOfItem	DWord	4	Size of a single data item
Reserved	DWord	4	Reserved for later use

IQ Stream Context

Description

The IQ Stream Context is a defined data structure which is transmitted in an IQ data packet after the Header. The size of the Context structure is specified by the SizeOfContext data field in the Header.

The timestamp consists of the two data fields IntegerSeconds and FractionalSeconds.
The time is based on the device RTC (real time clock). The RTC must be set anew after every device start using remote commands (DATE; TIME;). The timestamp is synchronized with the RTC once when the IQ Stream is started and is then computed with sample accuracy for each transmitted data packet until the IQ Stream is stopped.

The EventFlags 0x00000001, 0x00000002, 0x00000004 and 0x00000008 are important for the assessment of measurement result quality. The EventFlags bit 0x00000004 is set after every parameter change and remains set until the measurement data capture function is stable again.

IQ context format

Parameter	Type	Bytes	Description
IntegerSeconds	DWord	4	Integer second part of the timestamp in UTC seconds since January 1, 1970 (without leap seconds).
FractionalSeconds	DWord	4	Nanosecond part of the timestamp to add to the second part.
EventFlags	DWord	4	0x00000001 = Indicates a ADC input Overrange 0x00000002 = Samples lost indicator 0x00000004 = Indicates measurement hardware is not settled 0x00000008 = Indicates a measurement hardware error 0x40000000 = Indicates the first packet of the stream 0x80000000 = Indicates the last packet of the stream
ChangeFlags	DWord	4	The ChangeFlags are automatically reset when measurement hardware is settled. 0x00000001 = Fcent changed 0x00000002 = RL, Attenuator changed 0x00000004 = Scale to Unit value changed
DataItemFormat	Word	2	0x0002 = INT16 0x0009 = FLOAT32
Unit	Word	2	Units for data elements multiplied with ScaleToUnit 0x0011 = V Units for later use only 0x000A = V/m 0x000B = A/m
ScaleToUnit	Float	4	Multiply data elements with this value to convert to unit
SampleRate	Float	4	IF sample rate [Hz]
RBW	Float	4	IF bandwidth [Hz]
Fcent	Double	8	Center frequency [Hz]
RL	Float	4	Reference level (Measurement Range) [Unit]
Attenuator	Float	4	Attenuator 0…50 dB
Temperature	Float	4	Degrees °C measured on RF Hardware

IQ Stream Data Items

The IQ Stream data items are a definite data structure which is transmitted in an IQ data packet after the Context.

The size of the data items' structure is defined by the NumberOfItems and SizeOfItems data fields in the header.

Depending on the RBW setting, the IQ data items are transmitted as contiguous pairs of values either in INT16 (word) format or in FLOAT32 (float) format. The number of data items in a data packet depends on the RBW and is a maximum of 2048 IQ value pairs in the particular data format.

Note

The data items are transmitted in a RAW format.
Each RAW value must be multiplied by the ScaleToUnit factor to convert the RAW value to the selected units:

Example: $I/Q_{Unit}[n] = I/Q_{RAW}[n] * ScaleToUnit$

IQ data item format: INT16 (RBW >= 40kHz)

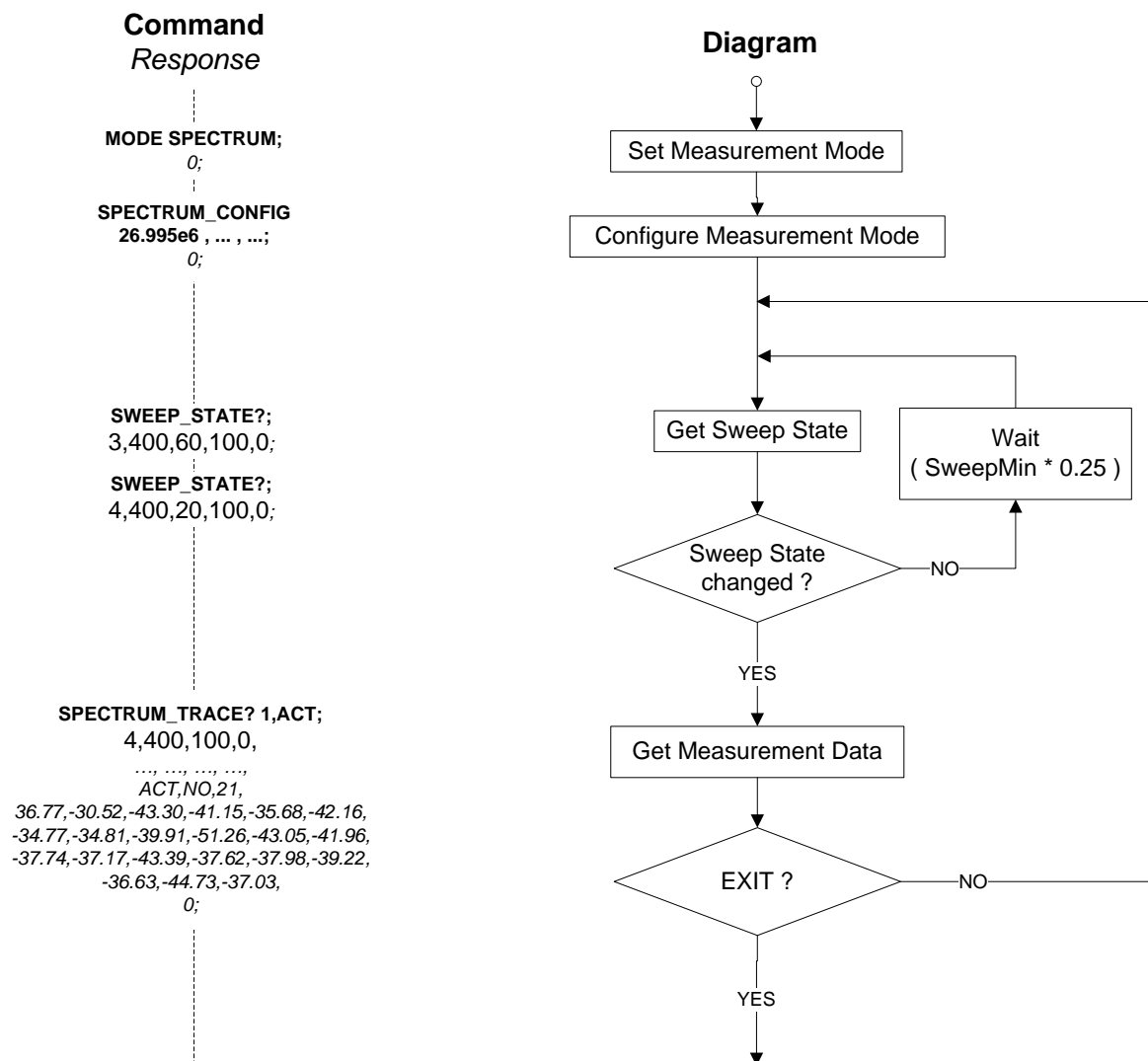| Parameter	Type	Bytes	Description
I[1]	Word	2	First in-phase data item
Q[1]	Word	2	First quadrature data item
I[2]	Word	2	Second in-phase data item
Q[2]	Word	2	Second quadrature data item
...	-	-	-
...	-	-	-
I[NumberOfItems]	Word	2	Last in-phase data item
Q[NumberOfItems]	Word	2	Last quadrature data item

IQ data item format: FLOAT32 (RBW < 40kHz)

Parameter	Type	Bytes	Description
I[1]	Float	4	First in-phase data item
Q[1]	Float	4	First quadrature data item
I[2]	Float	4	Second in-phase data item
Q[2]	Float	4	Second quadrature data item
...	-	-	-
...	-	-	-
I[NumberOfItems]	Float	4	Last in-phase data item
Q[NumberOfItems]	Float	4	Last quadrature data item

7 Programming Examples

💡 *To put the device back into default state and to avoid incomprehensible issues we highly recommend to use following commands: DEV_RESET MEAS; and DEV_RESET REMOTE; before implementing those programming examples.*

Spectrum operating mode

Command *Response*	**Diagram**
MODE SPECTRUM; *0;*	Set Measurement Mode
SPECTRUM_CONFIG **26.995e6 , ... , ...;** *0;*	Configure Measurement Mode
SWEEP_STATE?; 3,400,60,100,0*;*	Get Sweep State → Wait (SweepMin * 0.25)
SWEEP_STATE?; 4,400,20,100,0*;*	Sweep State changed ? — NO
SPECTRUM_TRACE? 1,ACT; 4,400,100,0, *…, …, …, …,* *ACT,NO,21,* *36.77,-30.52,-43.30,-41.15,-35.68,-42.16,* *-34.77,-34.81,-39.91,-51.26,-43.05,-41.96,* *-37.74,-37.17,-43.39,-37.62,-37.98,-39.22,* *-36.63,-44.73,-37.03,* *0;*	YES → Get Measurement Data → EXIT ? — NO / YES

Calculation of SweepMin:

`SweepMin` is the smallest sweep time of all measurement runs since last parameter change.
`SweepMin` should be limited between 15ms … 5000ms after each calculation.
Sweep time = 0 values must be ignored for calculation.

Multi-Channel Power operating mode

Command *Response*	**Diagram**

MODE MCP;
0;

**MCP_CONFIG
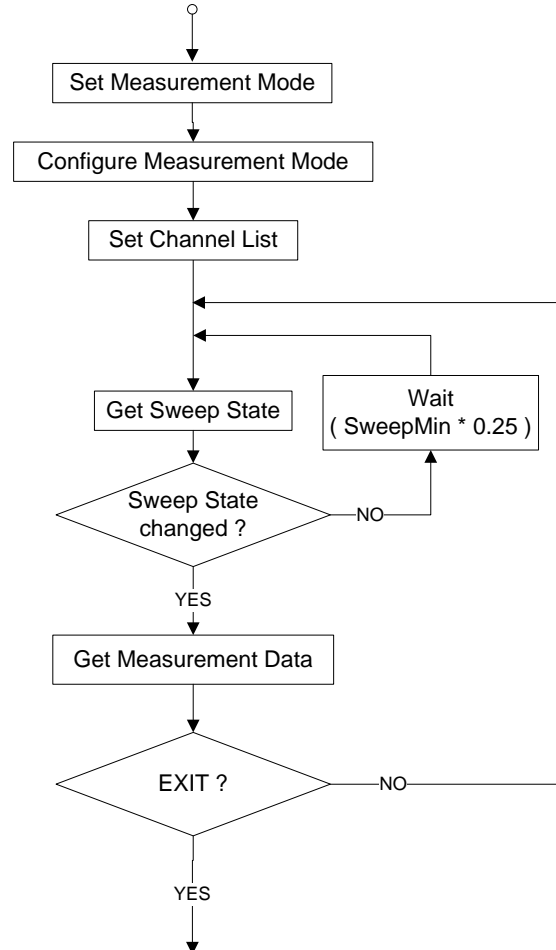ON,AUTO,200000,20;**
0;

SRV_SEL "MyTable"
0;

SWEEP_STATE?;
3,400,100,100,0;

SWEEP_STATE?;
4,400,100,100,0;

MCP? ACT;
*4,400,100,0,ON,AUTO,1,
ACT,NO,-42.15,UNCHECKED,-999.00,UNCHECKED,2,
-44.23,UNCHECKED,"Srv_0000",200000,99500000,100500000,
-46.34,UNCHECKED,"Srv_0001",200000,100500000,101500000,
0;*

Diagram flow:
Set Measurement Mode → Configure Measurement Mode → Set Channel List → Get Sweep State → Sweep State changed? — NO → Wait (SweepMin * 0.25) → (loop back to Get Sweep State) — YES → Get Measurement Data → EXIT? — NO → (loop back to Get Sweep State) — YES → (end)

Calculation of SweepMin:

SweepMin is the smallest sweep time of all measurement runs since last parameter change.

SweepMin should be limited between 15ms … 5000ms after each calculation.

Sweep time = 0 values must be ignored for calculation.
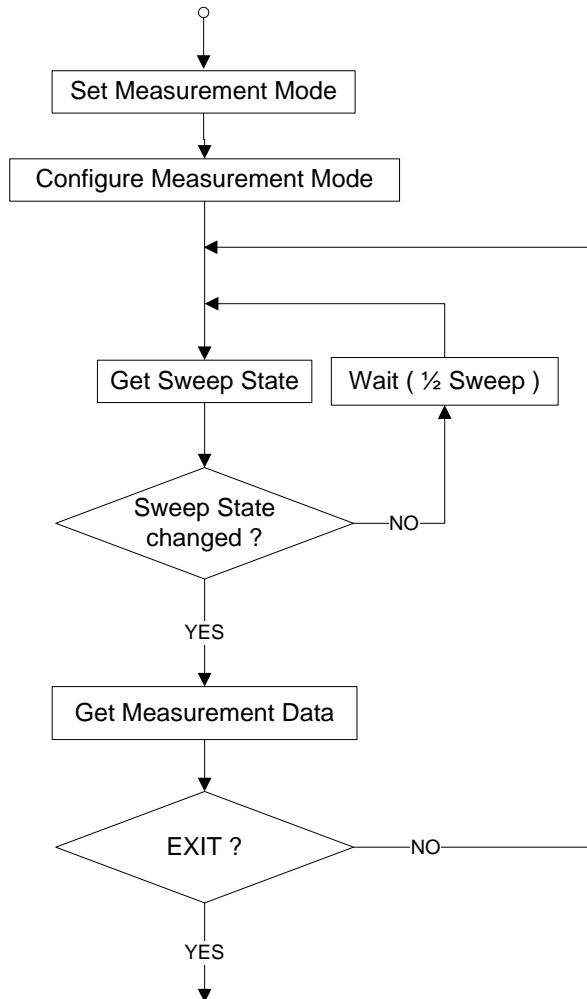
Level Meter operating mode

Command *Response*		**Diagram**

Command
Response

MODE LEVEL;
0;

LEVEL_CONFIG
26.995e6,40000,OFF,400,20
0;

SWEEP_STATE?;
3,120,0,100,0*;*

SWEEP_STATE?;
4,120,0,100,0*;*

LEVEL? ALL;
4,100,0,4,
RMS,NO,UNCHECKED,-999.00,
MAX_RMS,NO,UNCHECKED,-999.00,
PEAK,NO,UNCHECKED,-54.27,
MAX_PEAK,NO,UNCHECKED,-53.30,
0;

Diagram

Set Measurement Mode

Configure Measurement Mode

Get Sweep State → Wait (½ Sweep)

Sweep State changed ? — NO

YES

Get Measurement Data

EXIT ? — NO

YES

Scope Freerun mode

Command	**Diagram**
Response	

MODE SCOPE;
0;

SCOPE_RESULTTYPE ACTUAL;
0;

SCOPE_CONFIG
26.995e6 , ... , ...;
0;

SCOPE_TRIGGER_CONFIG
FREE_RUN , ... , ...;
0;

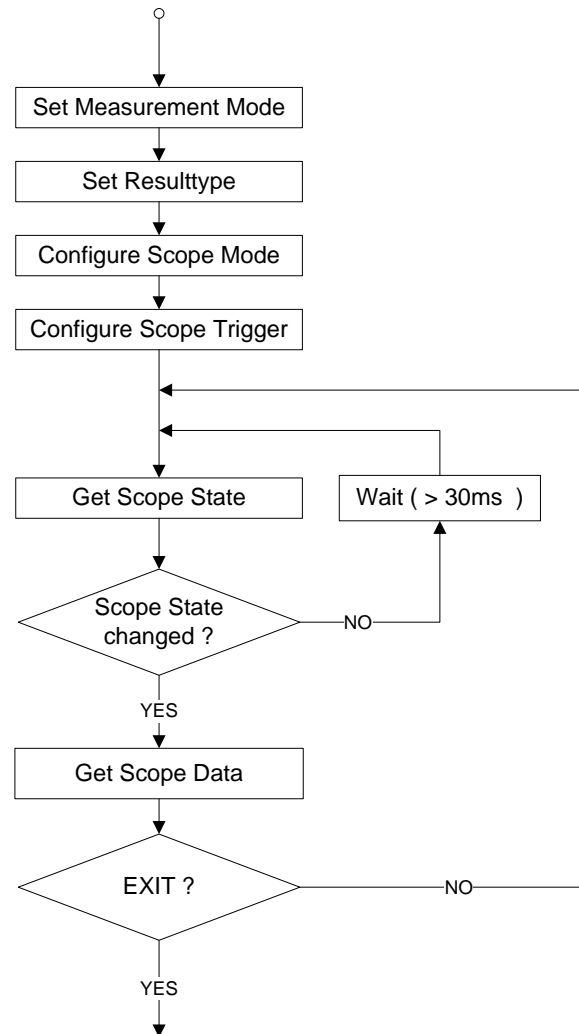**SCOPE_STATE?;**
30,40,12,0,FREE_RUN,NO,ON,0;

SCOPE_STATE?;
33,40,12,0,FREE_RUN,NO,ON,0;

SCOPE_STATE?;
36,40,12,0,FREE_RUN,NO,ON,0;

SCOPE_STATE?;
2,40,13,0,FREE_RUN,NO,ON,0;

SCOPE?;
6,40,13,0,FREE_RUN,NO,ON,
2.5E-005,1,
ACT,NO,1001,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
…, …, …, …,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
0;

Diagram:

Set Measurement Mode → Set Resulttype → Configure Scope Mode → Configure Scope Trigger → Get Scope State → Scope State changed ? → NO → Wait (> 30ms) ; YES → Get Scope Data → EXIT ? → NO ; YES

Scope Single Trigger mode

Command / *Response*	**Diagram**

Command
Response

MODE SCOPE;
0;

SCOPE_RESULTTYPE ACTUAL;
0;

SCOPE_CONFIG
26.995e6 , ... , ...;
0;

SCOPE_TRIGGER_CONFIG
SINGLE , -30 , POSITIV , ...;
0;

SCOPE_TRIGGER_ARM;
0;

SCOPE_STATE?;
30,40,0,0,SINGLE,ARMED,ON,0;

SCOPE_STATE?;
33,40,0,0,SINGLE,ARMED,ON,0;

SCOPE_STATE?;
36,40,0,0,SINGLE,TRIGGERED,ON,0;

SCOPE_STATE?;
3,40,1,1,SINGLE,STOPPED,ON,0;

SCOPE?;
8,40,1,1,SINGLE,STOPPED,ON,
2.5E-005,1,
ACT,NO,1001,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
…, …, …, …,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
0;

Diagram

○

Set Measurement Mode

Set Resulttype

Configure Scope Mode

Configure Scope Trigger

Arm Scope Trigger

Get Scope State → Wait (> 30ms)

Scope State changed ? — NO

YES

Get Scope Data

EXIT ? — NO

YES
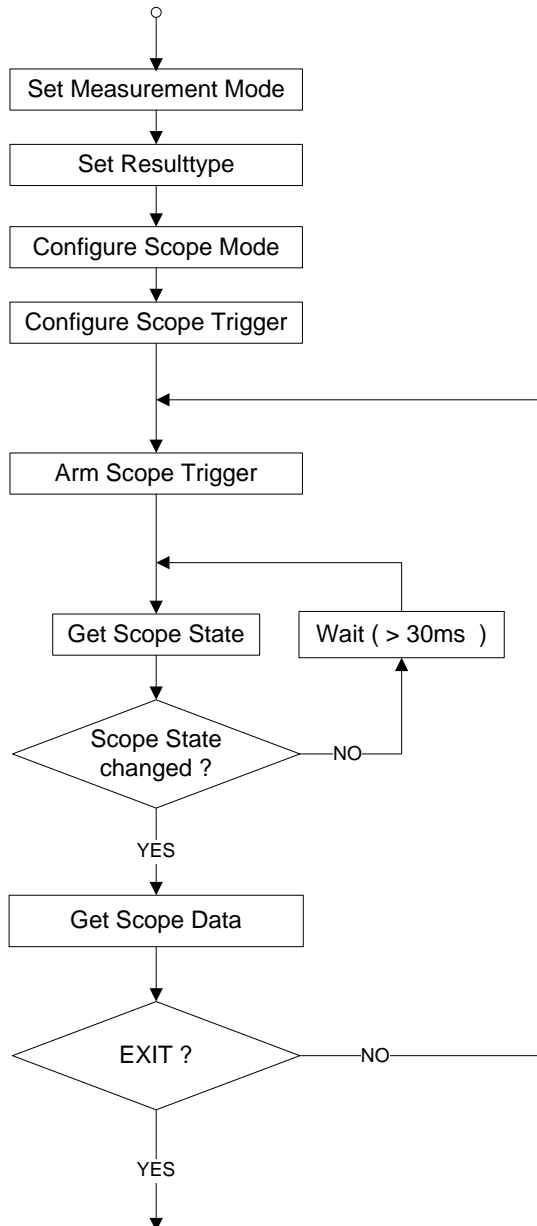
Scope Multi Trigger mode

Command	**Diagram**
Response	

MODE SCOPE;
0;

SCOPE_RESULTTYPE ACTUAL;
0;

SCOPE_CONFIG
26.995e6 , ... , ...;
0;

SCOPE_TRIGGER_CONFIG
MULTI , -30 , POSITIV , ...;
0;

SCOPE_TRIGGER_ARM;
0;

SCOPE_STATE?;
0,40,0,0,MULTI,ARMED,ON,0;

SCOPE_STATE?;
0,40,0,0,MULTI,ARMED,ON,0;

SCOPE_STATE?;
0,40,0,0,MULTI,TRIGGERED,ON,0;

SCOPE_STATE?;
0,40,1,1,MULTI,WAIT_NEXT_TRIGGER,ON,0;

SCOPE?;
0,40,1,1,MULTI,WAIT_NEXT_TRIGGER,ON,
2.5E-005,1,
ACT,NO,1001,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
..., ..., ..., ...,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
0;

Diagram (flowchart):

Set Measurement Mode → Set Resulttype → Configure Scope Mode → Configure Scope Trigger → Arm Scope Trigger → Get Scope State → Scope State changed ? — NO → Wait (> 30ms) (loops back) ; YES → Get Scope Data → EXIT ? — NO (loops back) ; YES → (exit)
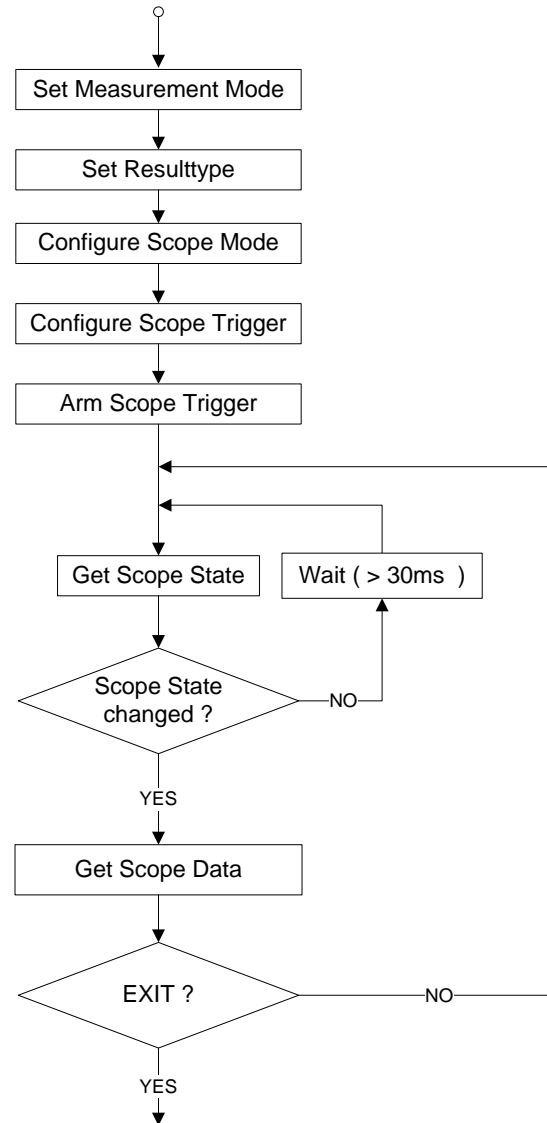
Scope User Trigger mode

Command *Response*	Diagram

Command
Response

Diagram

MODE SCOPE;
0;

SCOPE_RESULTTYPE ACTUAL;
0;

SCOPE_CONFIG
26.995e6 , ... , ...;
0;

SCOPE_TRIGGER_CONFIG
USER , -30 , POSITIV , ...;
0;

SCOPE_TRIGGER_ARM;
0;

SCOPE_STATE?;
30,40,0,0,USER,TRIGGERED,ON,0;

SCOPE_STATE?;
33,40,0,0,USER,TRIGGERED,ON,0;

SCOPE_STATE?;
36,40,0,0,USER,TRIGGERED,ON,0;

SCOPE_STATE?;
3,40,1,1,USER,STOPPED,ON,0;

SCOPE?;
6,40,1,1,USER,STOPPED,ON,
2.5E-005,1,
ACT,NO,1001,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
…, …, …, …,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
0;

Diagram:

- Set Measurement Mode
- Set Resulttype
- Configure Scope Mode
- Configure Scope Trigger
- Arm Scope Trigger
- Get Scope State → Wait (> 30ms)
- Scope State changed ? — NO
- YES
- Get Scope Data
- EXIT ? — NO
- YES
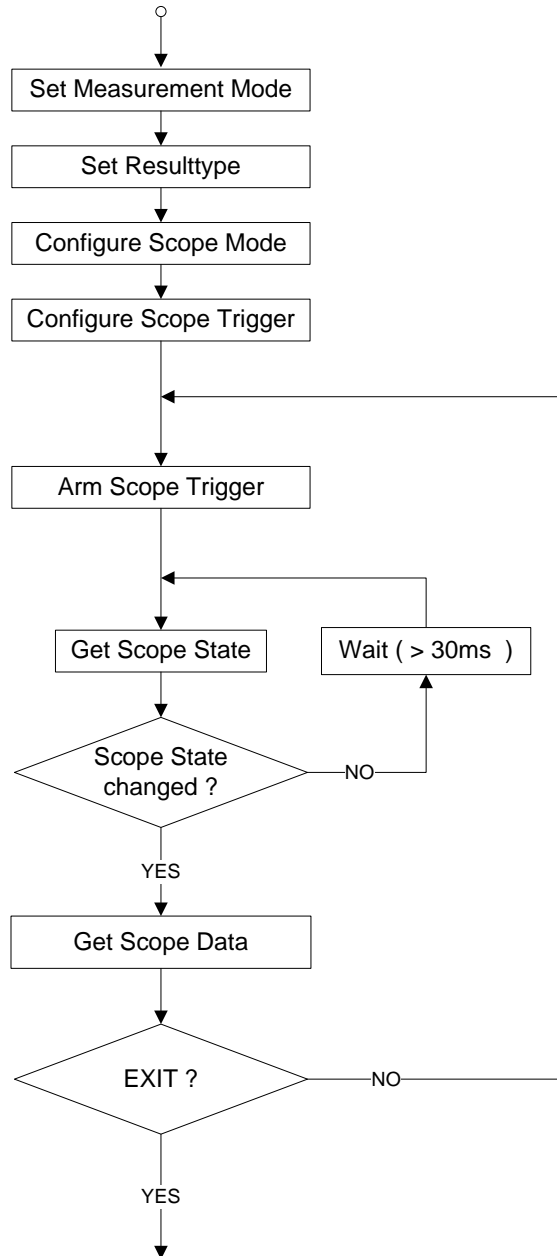
Scope Time Trigger mode

Command *Response*	**Diagram**

MODE SCOPE;
0;

SCOPE_RESULTTYPE ACTUAL;
0;

SCOPE_CONFIG
26.995e6 , ... , ...;
0;

SCOPE_TRIGGER_CONFIG
TIME , -30 , POSITIV , -10 ,
21.04.11 , 12:30:59 ;
0;

SCOPE_TRIGGER_ARM;
0;

SCOPE_STATE?;
30,40,0,0,TIME,ARMED,ON,0;

SCOPE_STATE?;
33,40,0,0,TIME,ARMED,ON,0;

SCOPE_STATE?;
36,40,0,0,TIME,TRIGGERED,ON,0;

SCOPE_STATE?;
4,40,1,1,TIME,STOPPED,ON,0;

SCOPE?;
6,40,1,1,TIME,STOPPED,ON,
2.5E-005,1,
ACT,NO,1001,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
…, …, …, …,
-110,-113,-113, -110,
-110,-113,-113, -110,
-110,-113,-113, -110,
0;

Diagram:
- Set Measurement Mode
- Set Resulttype
- Configure Scope Mode
- Configure Scope Trigger
- Arm Scope Trigger
- Get Scope State
- Wait (> 30ms)
- Scope State changed ? — NO → Wait (> 30ms)
- YES
- Get Scope Data
- EXIT ? — NO → (loop back to Configure Scope Trigger)
- YES
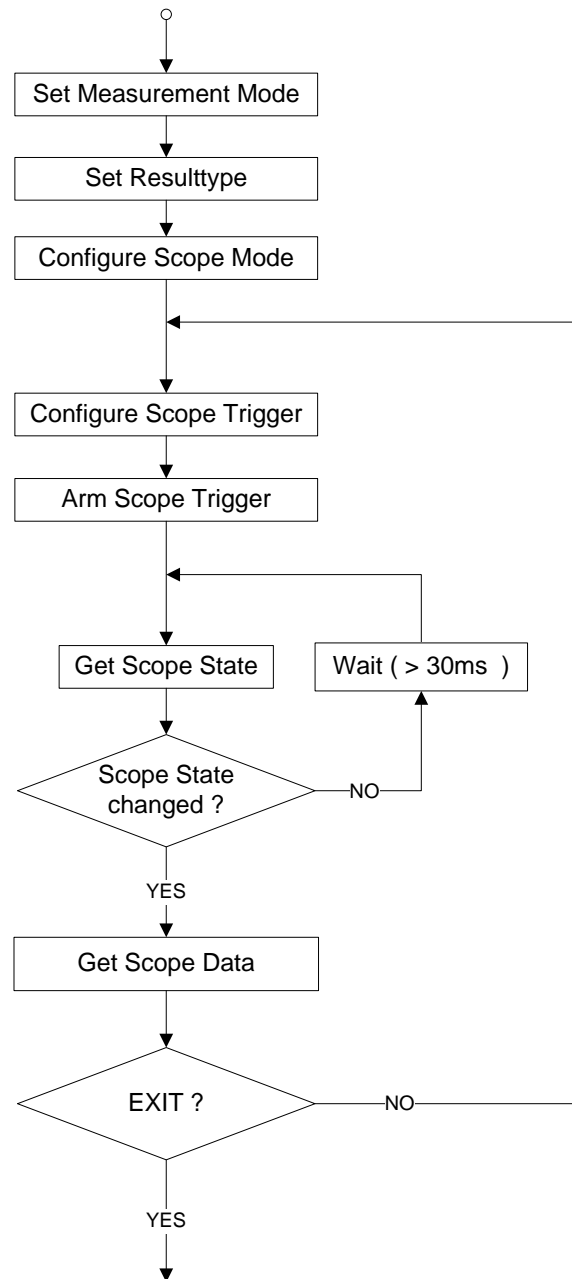
Using the LNB control feature

Command	**Diagram**
Response	

Command
Response

LNB_CTRL ON;
0;

LNB_CTRL Reset;
0;

LNB_CTRL_BAND HIGH;
0;
LNB_CTRL_POL VERTICAL;
0;
LNB_CTRL_VOLTAGE_CORRECTION OFF;
0;

LNB_CTRL_BAND?;
HIGH,0;
LNB_CTRL_POL?;
VERTICAL,0;
LNB_CTRL_VOLTAGE_CORRECTION?;
OFF,0;

LNB_CTRL_DIAG?;
NO,NO,0;

SPECTRUM? ACT;
4,400,100,0,

…, …, …, …,
ACT,NO,21,
36.77,-30.52,-43.30,-41.15,-35.68,-42.16,
-34.77,-34.81,-39.91,-51.26,-43.05,-41.96,
-37.74,-37.17,-43.39,-37.62,-37.98,-39.22,
-36.63,-44.73,-37.03,
0;

LNB_CTRL OFF;
0;

Diagram

Switch LNB-CTRL ON

Reset LNB-CTRL

Show Failure,
Retry or Exit

Configure
High/Low Band
Horizontal/Vertical Polarisation
Cable Compensation

Show Failure,
Wait >30s or Exit

Configuration correct? —— NO

YES

LNB-CTRL Diag OK? —— NO

YES

Do Measurement

Continue? —— YES

NO

Switch LNB-CTRL OFF
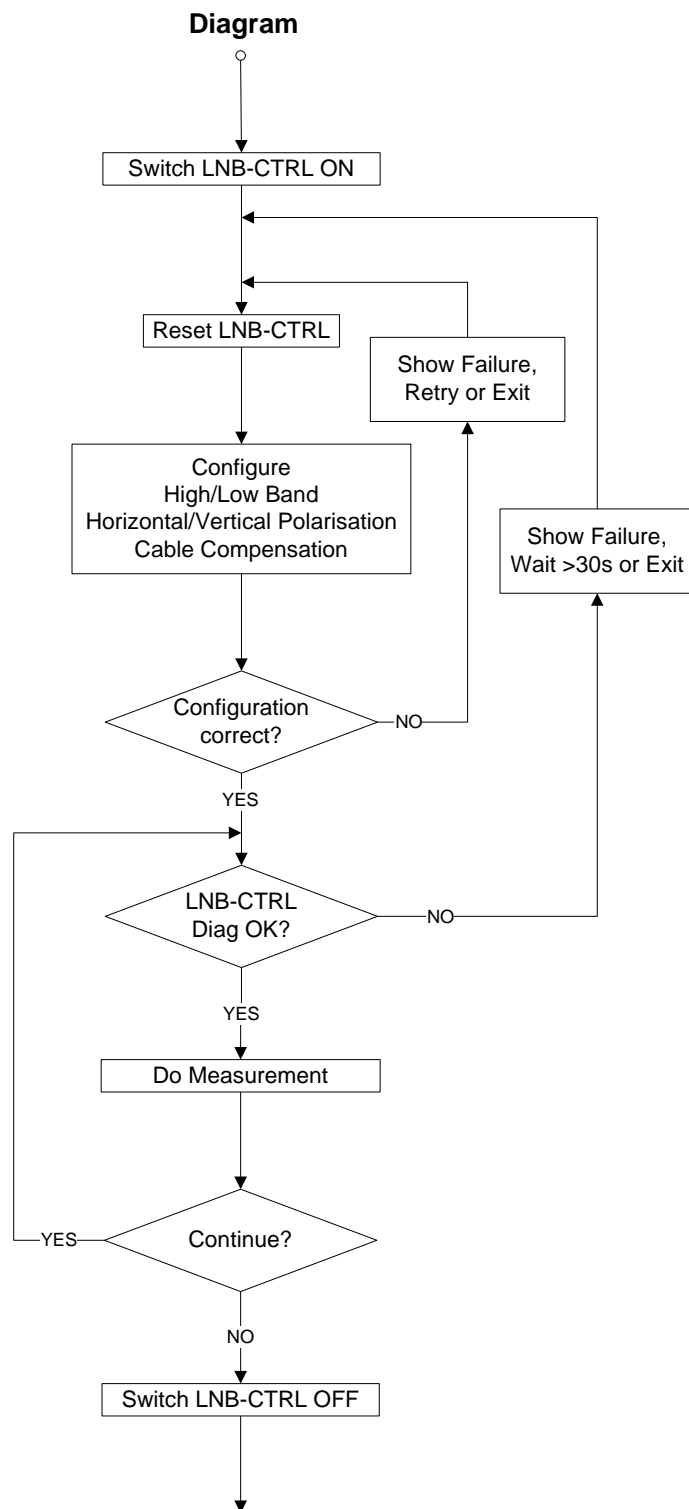
Time and date synchronization

The device system time can differ from the local time. In such cases, the device time should be synchronized with the PC clock to ensure that the measurements are time stamped correctly.

The following routine checks the date and time of the device and corrects the settings if necessary.

Command *Response*	**Diagram**

DATE?;
01.01.10,0;

Get Device Date

TIME?;
12:00:00,0;

Get Device Time

Synchronize Date ?

NO

YES

DATE 21.04.10;
0;

Set Device Date

Synchronize Time ?

NO

YES

TIME 15:31:00;
0;

Set Device Time
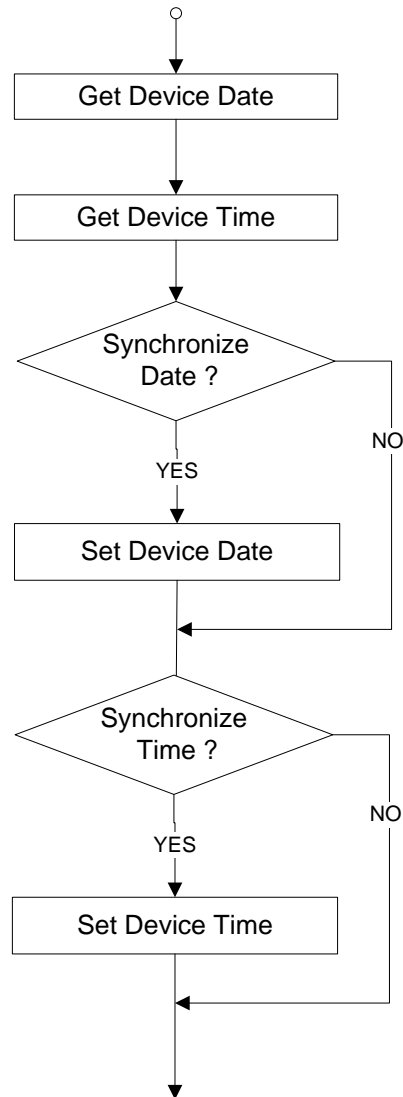
IQ Stream operating mode

Remotelink **Command** *Response*	**Diagram**	**Streamlink** *Stream packets*

DATE 17.04.13;
0;
TIME 15:31:00;
0;

Set Date and Time

STREAM_SETUP
TCP,"",60001;
0;

Setup Stream communication

MODE IQSTREAM;
0;

Set IQ Stream Mode

UNIT V;
0;

Set Stream Unit

IQSTREAM_CONFIG
97700000,100000,0.008;
0;

Config IQ Stream Mode

STREAM_STATE ON;
0;

Start Stream Output

IQ data packet 1
(first packet)

IQ data packet 2

Change Settings?

IQ data packets ...

NO

YES

IQSTREAM_FCENT
103400000;
0;

Set FCent

IQ data packet
(Fcent changed)

IQSTREAM_ATT 20;
0;

Set Attenuator

IQ data packet
(Attenuator changed)

NO

Stop Stream?

IQ data packets ...

YES

STREAM_STATE OFF;
0;

Stop Stream Output

IQ data packet N
(last packet)

8 Appendix

Synchronizing measured values with the device status

A large number of measured values can occur for certain device settings when e.g. a spectrum is queried. Synchronization with the device status (sweep state or scope state) is necessary to avoid reading the same measurement result several times.

The cycle time (how often the device status should be queried) depends on the measurement parameters and what the user wants to do with the measurement results.

The following diagrams show how the sweep time increases if the sweep state is queried with different cycle times.

Measurement as fast as possible without remote control
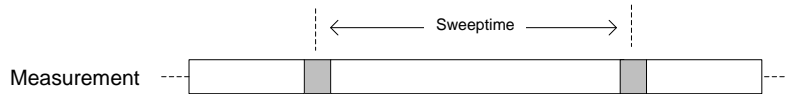
Measurement with remote control > SweepMin * 0.25
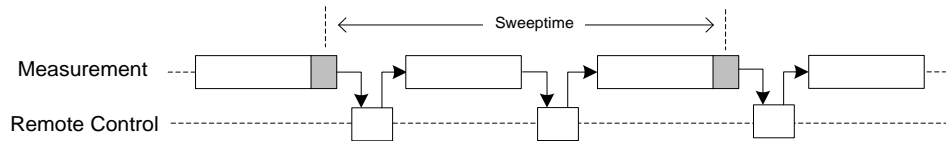
Measurement with remote control < SweepMin * 0.25
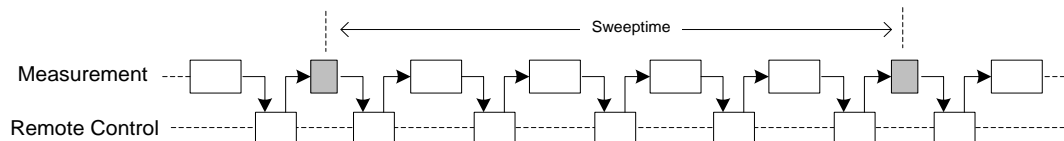
Calculation of SweepMin:

`SweepMin` is the smallest sweep time of all measurement runs since last parameter change.

`SweepMin` should be limited between 15ms … 5000ms after each calculation.

Sweep time = 0 values must be ignored for calculation.

Relationship of Spectrum mode parameters

Note

You can check the RF-board version by using the command "VERSION? RF;".

Number of BINs: (values)	BINs = 1 + ceil (FSpan / dF) ≈ 2 * FSpan / RBW
Bin limits:	21 … 632891 (NRA) 21 … 27517 (IDA)

RBW	Span Max Single FFT RF-Board 1	Span Max Single FFT RF-Board 2	Span Max NRA-6000 RX Multi FFT	Span Max IDA Multi FFT	dF ≈ RBW/2 [Hz]
10 Hz	134.2 kHz	134.2 kHz	3.090282 MHz	134.2 kHz	4.8828125
20 Hz	268.6 kHz	268.6 kHz	6.180566 MHz	268.6 kHz	9.765625
30 Hz	419.8 kHz	419.8 kHz	9.657134 MHz	419.8 kHz	15.2587890625
50 Hz	699.6 kHz	699.6 kHz	16.095224 MHz	699.6 kHz	25.4313151042
100 Hz	1.399 4 MHz	1.399 4 MHz	32.190450 MHz	1.399 4 MHz	50.8626302083
200 Hz	2.799 0 MHz	2.799 0 MHz	64.380900 MHz	2.799 0 MHz	101.725260417
300 Hz	4.198 6 MHz	4.198 6 MHz	96.571350 MHz	4.198 6 MHz	152.587890625
500 Hz	6.717 6 MHz	6.717 6 MHz	154.514160	6.717 6 MHz	244.140625
1 kHz	13.435 4 MHz	13.435 4 MHz	309.028320	13.435 4 MHz	488.28125
2 kHz	26.871 0 MHz	22.658 2 MHz	618.056640	26.871 0 MHz	976.5625
3 kHz	19.185 2 MHz	19.185 2 MHz	882.938058	38.387 2 MHz	1395.08928571
5 kHz	16.777 2 MHz	16.777 2 MHz	1.545141600	67.177 6 MHz	2441.40625
10 kHz	16.757 8 MHz	16.757 8 MHz	3.090283202	134.355 4	4882.8125
20 kHz	16.699 2 MHz	16.699 2 MHz	5.999991 GHz	268.710 8	9765.625
30 kHz	26.750 0 MHz	22.531 2 MHz	5.999991 GHz	429.937 4	15625
50 kHz	22.187 4 MHz	22.187 4 MHz	5.999991 GHz	716.562 4	26041.6666667
100 kHz	21.979 0 MHz	21.979 0 MHz	5.999991 GHz	1.433 125 GHz	52083.3333333
200 kHz	21.458 2 MHz	21.458 2 MHz	5.999991 GHz	2.866 250 GHz	104166.666667
300 kHz	15.312 4 MHz	15.312 4 MHz	5.999991 GHz	4.299 375 GHz	156250
500 kHz	24.500 0 MHz	21.500 0 MHz	5.999991 GHz	5.999991 GHz	250000
1 MHz	22.000 0 MHz	20.000 0 MHz	5.999991 GHz	5.999991 GHz	500000
2 MHz	-	-	5.999991 GHz	5.999991 GHz	1000000
3 MHz	-	-	5.999991 GHz	5.999991 GHz	1428571.42857
5 MHz	-	-	5.999991 GHz	5.999991 GHz	2500000
10 MHz	-	-	5.999991 GHz	5.999991 GHz	5000000
20 MHz	-	-	5.999991 GHz	5.999991 GHz	10000000

dF is the frequency spacing between two BINs (values) of a dataset.

Device parameter list

The device can be queried for a list of the possible settings for the RBW, VBW and RL parameters using the following command:

RBW_LIST?; IQSTREAM_RBW_LIST?; VBW_LIST?; RL_LIST?; RL_ATT_LIST?;

Note

Information about the various device models can be found in the corresponding data sheet.

Spectrum Detector Commands

The NRA measures internally using a number of measurement points (BINs) ranging from 21 up to 632891 BINs. The number of internal BINs depends on the frequency range and the selected RBW.

The Detector command adjusts the number of points (N) to a fixed value set by the user. The adjustment of the number of points is exactly to the frequency range (F_{Span}) set by the user with the SPECTRUM_CONFIG command.

The Spectrum Detector commands are:

SPECTRUM_DETECTOR?;
SPECTRUM_DETECTOR_BINARY?;
SPECTRUM_DETECTOR_LIST?:

The result is a frequency grid with point spacing $dF_{(N)}$:

$$dF_{(N)} = F_{Span} / (N-1)$$

Computation of the desired frequency grid is done either by reducing or spreading the internal BINs to the number of points N set.

Reduction occurs if BIN > N or $dF_{(BIN)} < dF_{(N)}$

Spreading occurs if BIN < N or $dF_{(BIN)} > dF_{(N)}$

Where $dF_{(BIN)} = dF_{(N)},$ the corresponding measurement points are copied one to one.

Example: Reduction with BINs = 18 and N = 9:
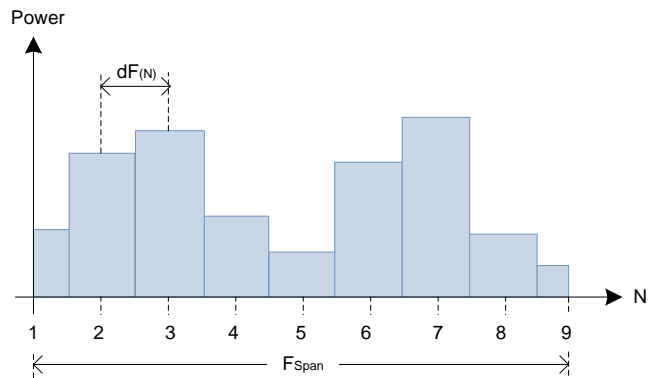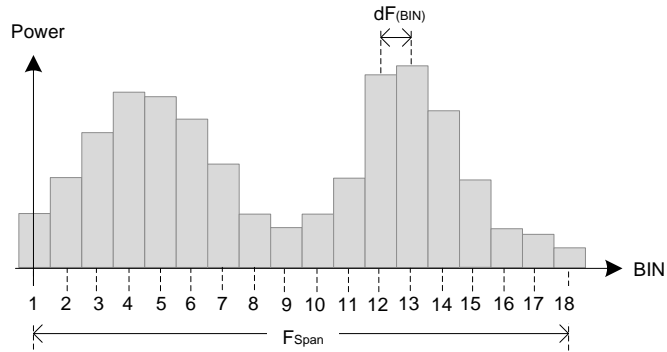
Example: Spreading with BINs = 9 and N = 18:
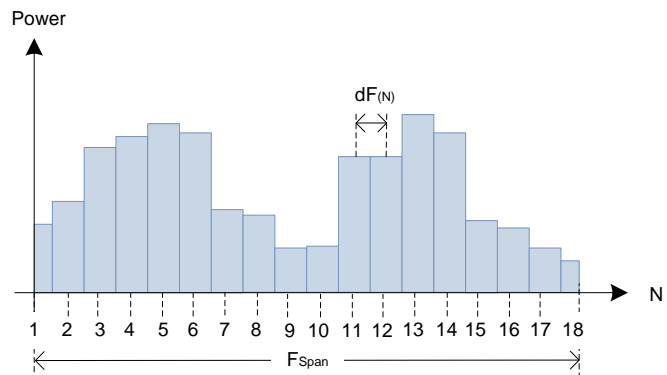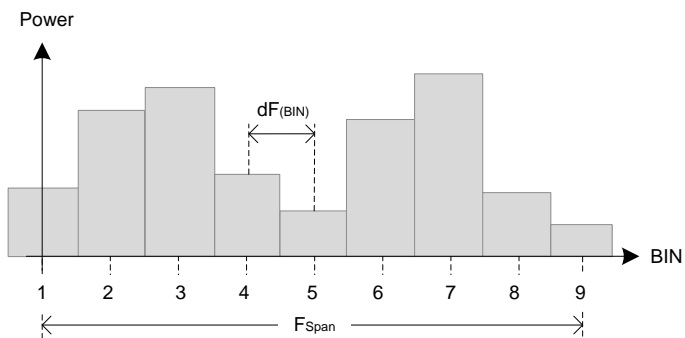
Scope State calculation

The command Scope_State? is useful to check the number of new measurement values since last query. It also provides information about consecutive results to analyze whether the available measurements are gapless, overlapping or data is lost.

The following parameters are required for this type of assessment:

Parameter	Type	Description
<CurrentValues>	DWord	Counter of values in current sweep
<MaxValues>	DWord	Counter of values available if sweep is completed
<CompletedRuns>	DWord	Counter of completed sweeps

Template for the calculations
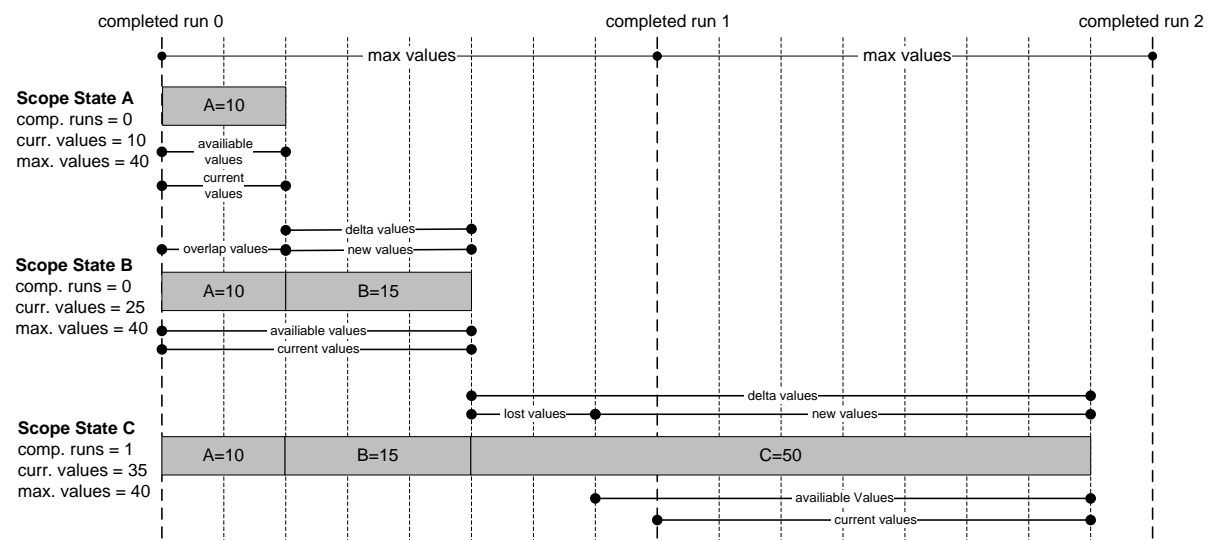
Calculation Formula

```
DeltaValues =  MaxValues * ( CompletedRunsNew – CompletedRunsOld )
               + (CurrentValuesNew – CurrentValuesOld )

if ( CompletedRunsNew == 0 )
{
  NewValues = DeltaValues
  AvailiableValues = CurrentValuesNew
  OverlapValues = CurrentValuesOld
  LostValues = 0
}
else
{
  AvailiableValues = MaxValues

  if ( DeltaValues > MaxValues )
  {
    NewValues = MaxValues
    OverlapValues =  0
    LostValues = DeltaValues - MaxValues
  }
  else
  {
    NewValues = DeltaValues
    OverlapValues = MaxValues - DeltaValues
    LostValues = 0
  }
}
```

Scope Trigger States

The trigger function in Scope mode allows you to synchronize the measurement cycle with the signal. The device will provide new measurement data continuously, at a certailn signal level or at a certain time, depending on the selected trigger mode. The command SCOPE_STATE? returns information about the current state of the measurement. Hereby it is possible to get only specifically requested measurement data from the device. The status evaluation depends on the type of trigger mode being used.

Scope Freerun

The query provides the latest available measurement values within the actual sweep time.

Scope Single Trigger

Initally the measurement is in „Freerun" mode until triggering is activated by sending the command SCOPE_TRIGGER_ARM. When activated the measurement data output stops after the first trigger event when the sweep is completed.

Scope Multi Trigger

Initally the measurement is in „Freerun" mode until triggering is activated by sending the command SCOPE_TRIGGER_ARM. When activated the measurement data output stops after the first trigger event when the sweep is completed. Each subsequent trigger event will refresh the measurement data.
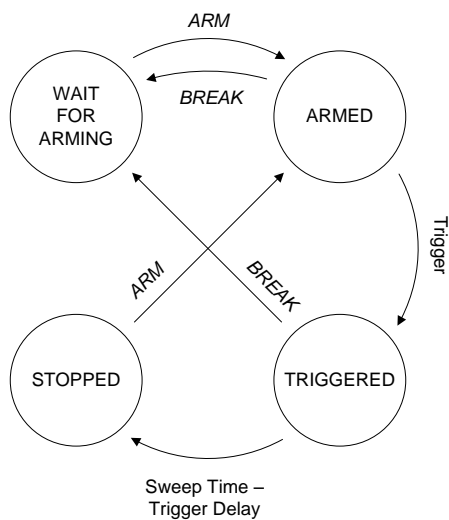
Scope User Trigger

Initally the measurement is in „Freerun" mode until triggering is activated and executed once by sending the command SCOPE_TRIGGER_ARM. Afterwards the measurement data output stops when the sweep is completed.
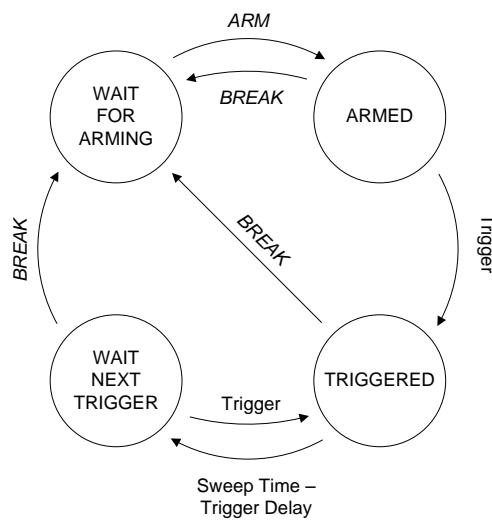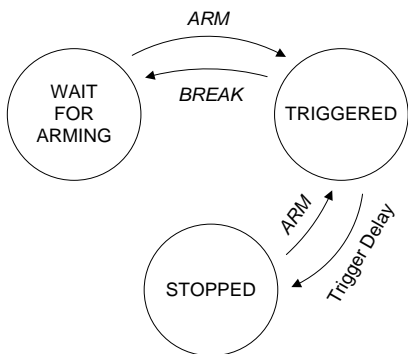
Scope Time Trigger

Initally the measurement is in „Freerun" mode until triggering is activated by sending the command SCOPE_TRIGGER_ARM. When activated the measurement data output stops after the specified trigger time has been reached and the sweep is completed.

Scope Single Trigger

Scope Multi Trigger

Scope User Trigger

Scope Time Trigger
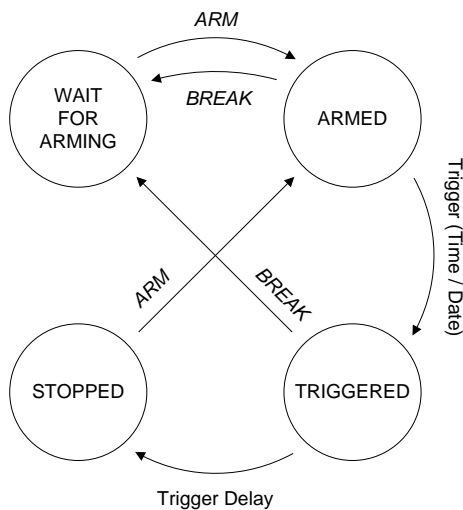
9 Glossary / Acronyms

Term	Description
CBW:	Channel bandwidth
HTML	HTML stands for HyperText Markup Language and represents a language for describing Internet pages or their elements. Internet browsers are able to interpret this language and thus display the contents of the Internet pages formatted accordingly.
HTTP	HyperText Transfer Protocol is a standard, which describes the transfer of data over a network. It is mainly used to load / transfer web pages from the World Wide Web (WWW) into a web browser.
IP address	An IP address is a unique computer network address based on the Internet protocol (IP), which is assigned to each device connected to the network (e.g. the Internet) enabling the device to be addressed and therefore accessed (similar to the house number in a postal address).
Measurement mode (sub mode):	A second level of modes/a submenu of modes
Narda auto (directional) antenna:	A Narda directional antenna; which is always automatically detected by the device
Narda auto cable:	A Narda cable; which is always automatically detected by the device
NRA	Narda Remote Analyzer
NRA Series	Series includes: NRA and NRA-RX devices
Option:	An additional measurement mode that can be enabled on the device by buying an (unlock-) code
RBW:	Resolution bandwidth
TCP port	The TCP port number is part of the device network address. It indicates the application for which the data are intended. The TCP port number is thus comparable to the name of the recipient (addressee) in the analogy of a postal address.
User antenna:	An external antenna (non-Narda antenna)
User cable:	An external cable (non-Narda antenna)
VBW:	Video bandwidth
Web application	A web application is an application that uses a web browser as its user interface, whereby the actual processing is done on the server.