[:SOURce]:LFOutput:VOLTage <Voltage>

Sets the voltage of the LF output signal.

Parameters:

<Voltage> float

Range: see the data sheet: Internal modulation generator > Output voltage range

Increment: see the data sheet: resolution of output voltage setting

*RST: 1

Example: `LFO:VOLT 2 V`
sets the voltage of the LF output to 2 V.

Manual operation: See "LF Output Voltage" on page 224

6.13.7 SOURce:LIST Subsystem

This subsystem contains the commands for the List mode of the instrument.

The following settings are required to operate the instrument in List mode:

1. Create a list.
   If a list which does not exist is selected with the `:LIST:SEL` command, an empty list with the name of the selected list is created.
   ```
   SOUR1:LIST:SEL "New_list"
   ```
2. Fill the list with values.
   All list components must be of the same length. This does not apply to components of length 1. This is interpreted as if the component has the same length as the other components and as if all values are the same as the first value.
   ```
   SOUR1:LIST:FREQ 100 MHz, 110 MHz, 120 MHz...
   SOUR1:LIST:POW 2dBm, -1dBm, 0dBm...
   ```
3. Select a list.
   If a new empty file has been created with the `:LIST:SEL` command, this file is selected, otherwise an existing list must be selected before the List mode is activated.
   ```
   SOUR1:LIST:SEL "Old_list"
   ```
4. Set the dwell time.
   The dwell time determines the duration of the individual list steps.
   ```
   SOUR1:LIST:DWEL 3ms
   ```
5. Set the List mode.
   The List mode determines the way in which the list is processed. In the example the list is processed once only or repeatedly depending on the trigger setting.
   ```
   SOUR1:LIST:MODE AUTO
   ```
6. Determine the trigger.

In the example each trigger causes the list to be processed once from beginning to end.
`SOUR:LIST:TRIG:SOUR SING`

7. Activate the List mode.
   `SOUR1:FREQ:MODE LIST`
8. Trigger the list (depending on the mode).
   `SOUR1:LIST:TRIG:EXEC`
9. Deactivate the List mode.
   `SOUR1:FREQ:MODE CW`

SCPI refers to the individual lists as segments.

[:SOURce<hw>]:LIST:CATalog?

Requests a list of available lists. The individual lists are separated by commas.

The lists are stored with the fixed file extensions `*.lsw` in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`.

Return values:
<Catalog> string

Example: `MMEM:CDIR '/var/Listmode'`
selects the directory for the list mode files.
`LIST:CAT?`
queries the available lists.
Response: `'list1,list2'`
the lists `list1` and `list2` are available.

Usage: Query only

[:SOURce<hw>]:LIST:DELete <Filename>

Deletes the specified list.

The files are stored with the fixed file extensions `*.lsw` in a directory of the user's choice. The directory applicable to the command is defined with the command `MMEMory:CDIR`. To access the files in this directory, only the file name has to be given, without the path and the file extension. A path can also be specified in command `:SOUR:LIST:CAT?`, in which case the file in the specified directory is deleted.

`*RST` does not affect data lists.

Setting parameters:
<Filename> string

Example: `MMEM:CDIR '/var/Listmode'`
selects the directory for the list mode files.
`LIST:DEL 'LIST1'`
deletes the list `list1`.

Usage: Setting only

Manual operation: See "List Mode Data... - List Mode" on page 196

[:SOURce<hw>]:LIST:DELete:ALL

Deletes all lists in the selected directory.

Note: The list mode must be previously disabled to make sure that no records are selected when you set the frequency mode (`[:SOURce<hw>]:FREQuency:MODE`).

The files are stored with the fixed file extensions `*.lsw` in a directory of the user's choice. You can select the directory with the commands `:MMEMory:CDIRectory` or `[:SOURce<hw>]:LIST:CATalog?`.

`*RST` does not affect data lists.

Example: `MMEM:CDIR '/var/Listmode'`
selects the directory for the list mode files.
`FREQ:MODE SWE`
deactivates the list mode for RF output and activates the sweep mode.
`LIST:DEL:ALL`
deletes all list mode files in the selected directory.

Usage: Event

Manual operation: See "List Mode Data... - List Mode" on page 196

[:SOURce<hw>]:LIST:DEXChange:AFILe:CATalog?

Queries the available ASCII files for export or import of list mode data in the current or specified directory.

As response, you get a string containing the existing ASCII files `*.txt` or `*.csv`, separated by commas.

Return values:
<Catalog> string

Example: `MMEM:CDIR '/var/import'`
selects the directory for the ASCII files with frequency and level value pairs.
`LIST:DEXC:AFIL:EXT TXT`
determines the extension `*.txt` for the query.
`LIST:DEXC:AFIL:CAT?`
queries the available files with extension `*.txt`.
Response: `'list1,list2'`
the ASCII files `list1.txt` and `list2.txt` are available.

Usage: Query only

[:SOURce<hw>]:LIST:DEXChange:AFILe:EXTension <Extension>

Determines the extension of the ASCII file for import or export, or to query existing files.

Parameters:
<Extension> TXT | CSV
*RST: TXT

Example: `MMEM:CDIR '/var/import'`
selects the directory for the ASCII files with frequency and level value pairs.
`LIST:DEXC:AFIL:EXT TXT`
selects ASCII files with the extension `*.txt` for the query.
`LIST:DEXC:AFIL:CAT?`
queries the available files with extension `*.txt`.
Response: `'list1,list2'`
the ASCII files `list1.txt` and `list2.txt` exist.

Manual operation: See "Extension - List Mode" on page 199

[:SOURce<hw>]:LIST:DEXChange:AFILe:SELect <Filename>

Selects the ASCII file to be imported or exported.

Parameters:
<Filename> <ascii_file_name>

Example: `LIST:DEXC:MODE IMP`
determines that ASCII files with frequency and level value pairs are imported into list mode lists.
`LIST:DEXC:AFIL:EXT TXT`
determines the extension `*.txt` for the query.
`LIST:DEXC:AFIL:CAT?`
queries the available files with extension `*.txt`.
Response: `'list1,list2'`
the ASCII files `list1.txt` and `list2.txt` exist.
`LIST:DEXC:AFIL:SEL '/var/list.csv'`
selects `list.csv` for import.
`LIST:DEXC:SEL '/var/list_imp'`
determines the destination file `list_imp`.
`LIST:DEXC:EXEC`
imports the ASCII file data into the list file.

Manual operation: See "Select ASCII Source / Destination - List Mode" on page 199

[:SOURce<hw>]:LIST:DEXChange:AFILe:SEParator:COLumn <Column>

Selects the separator between the frequency and level column of the ASCII table.

Parameters:
<Column> TABulator | SEMicolon | COMMa | SPACe
*RST: COMMa

Example: `LIST:DEXC:MODE EXP`
selects that the list is exported into an ASCII file.
`LIST:DEXC:AFIL:SEL '/var/list.csv'`
determines ASCII file list.csv as destination for the list mode list data.
`LIST:DEXC:AFIL:SEP:COL TAB`
defines a tabulator to separate the frequency and level values pairs.
`LIST:DEXC:AFIL:SEP:DEC DOT`
selects the decimal separator dot.
`LIST:DEXC:SEL '/var/list_imp'`
determines the source file list_imp for export into the ASCII file `list.csv`.
`LIST:DEXC:EXEC`
exports the list file data into the ASCII file.

Manual operation: See "Column Separator- List Mode" on page 199

[:SOURce<hw>]:LIST:DEXChange:AFILe:SEParator:DECimal <Decimal>

Sets the decimal separator used in the ASCII data between '.' (decimal point) and ',' (comma) with floating-point numerals.

Parameters:

<Decimal> DOT | COMMa
*RST: DOT

Example: see `[:SOURce<hw>]:LIST:DEXChange:AFILe:SEParator:COLumn` on page 368

Manual operation: See "Decimal Point - List Mode" on page 199

[:SOURce<hw>]:LIST:DEXChange:EXECute

Executes the import or export of the selected list file, according to the previously set transfer direction with command `[:SOURce<hw>]:LIST:DEXChange:MODE`.

Example: `LIST:DEXC:MODE IMP`
determines that ASCII files with frequency and level value pairs are imported into list mode lists.
`LIST:DEXC:AFIL:SEL '/var/list.csv'`
selects the ASCII file `list.csv` for import.
`LIST:DEXC:SEL '/var/list_imp'`
determines the destination file `list_imp`.
`LIST:DEXC:EXEC`
imports the ASCII file data into the list mode file.

Usage: Event

Manual operation: See "Import / Export - List Mode" on page 200

[:SOURce<hw>]:LIST:DEXChange:MODE <Mode>

Selects if list mode lists should be imported or exported. Depending on the selection here, the file select command defines either the source or the destination for list mode lists and ASCII files.

Parameters:

<Mode> IMPort | EXPort

*RST: IMPort

Example: `LIST:DEXC:MODE IMP`
selects that ASCII files with frequency and level value pairs are imported and transferred into list mode lists.
`LIST:DEXC:AFIL:SEL '/var/list.csv'`
selects that ASCII file `list.csv` is imported.
`LIST:DEXC:SEL '/var/list_imp'`
selects that the ASCII file `list.csv` is imported into list mode list `list_imp`.

Manual operation: See "Mode - List Mode" on page 199

[:SOURce<hw>]:LIST:DEXChange:SELect <Filename>

Selects the list mode list to be imported or exported.

The list mode files are stored with the fixed file extensions `*.lsw` in a directory of the user's choice. The directory applicable to the commands is defined with the command `MMEMory:CDIR`. A path can also be specified in command `SOUR:LIST:DEXC:SEL`, in which case the files are stored or loaded in the specified directory.

Parameters:

<Filename> <list_name>

Example: `LIST:DEXC:MODE IMP`
selects that ASCII files with frequency and level value pairs are imported and transferred into list mode lists.
`LIST:DEXC:AFIL:SEL '/var/list.csv'`
selects that ASCII file `list.csv` is imported.
`LIST:DEXC:SEL '/var/list_imp'`
selects that the ASCII file `list.csv` is imported into list mode list `list_imp`.

Manual operation: See "Select Destination / Source - List Mode" on page 200

[:SOURce<hw>]:LIST:DWELl <Dwell>

Sets the dwell time. The R&S SMB generates the signal with the frequency / power value pairs of each list entry for that particular period.

Parameters:

<Dwell> float

Range: 7E-4 to 100
Increment: 1E-4
*RST: 15E-3

Example: `LIST:DWELl 15`
retains each setting in the list for 15 ms.

Manual operation: See "Dwell Time - List Mode" on page 195

[:SOURce<hw>]:LIST:FREE?

Queries on the free storage space for list mode lists.

Return values:

<Free> integer

Range: 0 to INT_MAX
*RST: 0

Example: `LIST:FREE?`

Usage: Query only

Response: `2147483647;1`

[:SOURce<hw>]:LIST:FREQuency <Frequency>

Fills the `FREQuency` column of the selected list with data.

`*RST` does not affect data lists.

Parameters:

<Frequency> <Frequency#1>{, <Frequency#2>, ...} | block data

The data can be given either as a list of numbers (list can be of any length and list entries must be separated by commas) or as binary block data. When block data is transferred, 8 bytes are always interpreted as a floating-point number with double accuracy (see `:FORMat[:DATA]` on page 298).

Range: 300 kHz to RFmax

Example: `LIST:SEL '/var/list3'`
selects `list3` for editing. The R&S SMB generates a new file automatically, if it does not exist yet.
`SOUR:LIST:FREQ 1.4GHz, 1.3GHz, 1.2GHz,...`
specifies the frequency values in list3. If the list already contains data, it is overwritten.

Manual operation: See "Edit List Mode Data... - List Mode" on page 197

[:SOURce<hw>]:LIST:FREQuency:POINts?

The command queries the length (in points) of the `FREQuency` component of the selected list.

Return values:

<Points> integer

Range: 0 to INT_MAX
*RST: 0

Example: `LIST:SEL '/var/list3'`
selects `list3` for editing. The R&S SMB creates a new file automatically, if it does not exist yet.
`LIST:FREQ:POIN?`
queries the number of frequency values in the list
`Response: 327`

Usage: Query only

[:SOURce<hw>]:LIST:INDex <Index>

Sets the list index in step mode (`LIST:MODE STEP`).

After the trigger signal the frequency and level settings of the selected index are processed in List mode.

Parameters:

<Index> integer

*RST: 0

Example: `LIST:SEL '/var/list3'`
selects `list3` for use in List mode.
`FREQ:MODE LIST`
activates List mode. `List3` is processed.
`LIST:MODE STEP`
selects manual, step-by-step processing of the list.
`LIST:IND 5`
the frequency/level value pair with index 5 is executed.
`TRIG:LIST:SOUR SING`
selects triggering by means of the single trigger. The list is executed once.
`SOUR:LIST:TRIG:EXEC`
triggers the processing of the selected list.

Manual operation: See "Current Index - List Mode" on page 196

[:SOURce<hw>]:LIST:INDex:STARt <Start>

Sets the start index of the index range which defines a subgroup of frequency/level value pairs in the current list. Only the values in the set index range (`:LIST:INDex:STARt ... :LIST:INDex:STOP`) are processed in List mode.

Parameters:

<Start> integer

Range: 0 to list length
*RST: 0

Example: `LIST:SEL '/var/list3'`
selects `list3` for use in List mode.
`LIST:IND:STAR 25`
sets 25 as start index of the index range.
`LIST:IND:STOP 49`
sets 49 as stop index of the index range.
`FREQ:MODE LIST`
activates List mode. The frequency/level value pairs from index 25 to index 49 in list3 are processed. All other entries of the list are ignored.

Manual operation: See "List Range In - List Mode" on page 198

[:SOURce<hw>]:LIST:INDex:STOP <Stop>

Sets the stop index of the index range which defines a subgroup of frequency/level value pairs in the current list. Only the values in the set index range (`:LIST:INDex:STARt ... :LIST:INDex:STOP`) are processed in list mode.

Parameters:

<Stop> integer

Range: 0 to list length
*RST: 0

Example: see `[:SOURce<hw>]:LIST:INDex:STARt` on page 372

Manual operation: See "List Range In - List Mode" on page 198

[:SOURce<hw>]:LIST:LEARn

Learns the selected list to determine the hardware setting for all list entries. The results are saved with the list. When the list is activated the first time, these settings are calculated automatically.

Example: `LIST:SEL '/var/list3'`
selects list file. The file is created if it does not yet exist.
`LIST:LEAR`
starts learning of the hardware setting for `list3` and stores the setting.

Usage: Event

Manual operation: See "Learn List Mode Data... - List Mode" on page 196

[:SOURce<hw>]:LIST:MODE <Mode>

Selects how the list is to be processed (similar to `SOURce:SWEep:MODE`).

Parameters:

<Mode> AUTO | STEP

AUTO
Each trigger event triggers a complete list cycle. Possible trigger settings for `:LIST:TRIGger:SOURce` are `AUTO`, `SINGle` and `EXT`.

STEP
Each trigger event triggers only one step in the list processing cycle. The list is processed in ascending order.

*RST: AUTO

Example: `LIST:MODE STEP`
selects step-by-step processing of the list.

Manual operation: See "Mode - List Mode" on page 194

[:SOURce<hw>]:LIST:POWer <Power>

Fills the `Level` part of the selected list with data.

`*RST` does not affect data lists.

Parameters:

<Power> <Power#1>{, <Power#2>, ...} | block data

The data can be given either as a list of numbers (list can be of any length and list entries must be separated by commas) or as binary block data. When block data is transferred, 8 bytes are always interpreted as a floating-point number with double accuracy (see `:FORMat[:DATA]` on page 298).

Range: Minimum level to Maximum level
Default unit: dBm

Example: `LIST:SEL '/var/list3'`
selects `list3` for editing. The R&S SMB generates a new file automatically, if it does not exist yet.
`LIST:POW 0dBm, 2dBm, 2dBm, 3dBm,..`
specifies the level values in `list3`. The number of level values must correspond to the number of frequency values. The previous data is overwritten.

Manual operation: See "Edit List Mode Data... - List Mode" on page 197

[:SOURce<hw>]:LIST:POWer:POINts?

Queries the length (in points) of the LEVel part of the selected list.

Return values:

<Points> integer

Range: 0 to INT_MAX
*RST: 0

Example: `LIST:SEL '/var/list3'`
selects `list3` for editing. The R&S SMB generates a new file automatically, if it does not exist yet.
`LIST:POW:POIN?`
queries the number of levels in the list file
Response: `327`

Usage: Query only

[:SOURce<hw>]:LIST:RESet

Resets the list to the starting point.

Example: `LIST:RES`
resets the list to the starting point.

Usage: Event

Manual operation: See "Reset - List Mode" on page 195

[:SOURce<hw>]:LIST:SELect <Filename>

Selects the specified list. If a new list is to be created, the name can be entered here. The list is created if it does not yet exist. The list selected here is available for the further processing steps (editing) and is used in the instrument when the list mode is activated.

The files are stored with the fixed file extensions `*.lsw` in a directory of the user's choice. The directory applicable to the command is defined with the command `MMEMory:CDIR`. A path can also be specified in which case the list mode file in the specified directory is selected.

`*RST` does not affect data lists.

Parameters:

<Filename> '<list name>'

Example: `LIST:SEL '/var/list3'`
selects `list3` for editing.

Manual operation: See "List Mode Data... - List Mode" on page 196

[:SOURce<hw>]:LIST:TRIGger:EXECute

Starts the processing of a list in list mode. It corresponds to the manual-control command "Execute Single."