Agilent Technologies 8922M/S GSM Test Set

Programming Reference Guide

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1

Command Guidelines

Rules and guidelines for using General Purpose Interface Bus (GPIB) programming are contained in this chapter. Chapters 3 and onwards outline each GPIB command subsystem used with the Agilent 8922M/S.

Each subsystem chapter starts with a syntax diagram followed by a simple explanation of each command within that subsystem.

Command Names

Generally all commands of greater than four characters have an alternate abbreviated form using only the upper case letters and number (if used).

Upper or lower case characters may be used for all commands.

For example, to set the amplitude of RF Generator 1, you could use any of the following commands:

```
RFGENERATOR:AMPLITUDE1 -10DBM or
RFGenerator:AMPLitude1 -10DBM
rfgenerator:amplitude1 -10DBM or
rfg:ampl1 -10DBM or
RFG:AMPL1 -10DBM
```

Programming Format Conventions

Syntax commands and returned data descriptions use the following format conventions.

Upper case letters Indicate the shortened acceptable form of a command.

Square brackets [ ], indicate that enclosed command or command parameters are optional.

Vertical bar |, indicates that one-and-only-one item separated by the vertical bar can be used at any given time. The vertical bar is read as “or.” For example, ‘A’ | ‘B’ indicates that either A or B can be chosen, but not both.

Question mark ?, indicates a query command. Most commands accept this command when it is entered immediately after the command name. The returned information (<value>) varies in format according to the type of the field.

Quoted string Fields that accept quoted string parameters will return the active choice in quotes when queried. For example if the RF generator Output was set to the RF IN/OUT parameter (RFG:OUTP “RF IN/OUT”) and the queried (RFG:OUTP?), the return would be “RF IN/OUT”.

Decimal numeric data Fields that accept decimal numeric data will return the current field value as an exponentiated decimal number.

Floating numeric data Fields that accept floating point numeric data will return the current field value as a floating point number in the current

GPIB units.

Character data Fields that accept character data (unquoted strings) will return the queried information without quotes.

Quotation marks “ ”, enclose command and string entries. Be sure to follow the correct syntax for using quotations that are specific to your basic language.

Colons :, are used to separate keywords and show hierarchical relationship.

```
”RFANalyzer:FREQuency 935 MHz”
```

A Semicolon and a Colon ;:, are used to separate two or more root level command statements on the same line.

```
”RFAN:INP ’RF IN/OUT’;:RFAN:AMPL1 —20 dBm”.
```

Semicolons ;, can also be used to condense command words on one line if the commands are equal, or of decreasing hierarchy under the keyword. (The following example is equivalent to the previous command statement, but the root level keyword :RFAN is removed by using semicolons.)

```
”RFAN:INP ’RF IN/OUT’;AMPL1 —20 dBm”
```

Commas Are used to separate multiple parameter entries.

Angle brackets < >, enclose variable items that represent user choices (parameters) to be entered.

If you have Agilent Technologies 8922M/S Option 010

If you have the Agilent 8922M/S Option 010 Multi-Band Test System, you will have access to some additional GPIB commands.

Refer to the *Agilent 8922 Multi-Band User’s Guide* for a full description of these commands. The additional commands are either part of a current subsystem or are part of the new Dual Band Control subsystem.

The *Agilent 8922 Multi-Band User’s Guide* gives a programming example of the Dual Band Control GPIB commands.

Units of Measure

Units for measurements These are implemented such that a measurement query result will be returned in the current GPIB unit.

Units for settings These are implemented such that if a unit is not sent along with the setting value, then a default GPIB unit is used.

- For example, RFGenerator:AMPLitude1 assumes dBm and RFGenerator:FREQuency assumes Hz. If a unit is sent with the setting, then this unit will be used. The GPIB unit may be changed using the units commands described later.
- Each measurement or setting description defines the allowable units for that field. When units are sent with a command, they should not be quoted.

The complete allowable set of GPIB units that setting queries or measurement queries may be returned in are:

- DB (dB), DBM (dBm), DBUV (dB micro-volt),
- DEG (degree), DIV (division),
- HZ (Hz), OHM (ohm), PCT (percent), PPM (parts-per-million),
- S (second), T (bit periods),
- V (volt), W (watts)

The complete allowable set of units that can be sent with setting commands or units that can be displayed on the front panel are:

- DB (dB), DBM (dBm), DBMW (dB milli-watt), DBUV (dB micro-volt),
- HZ (Hz), KHZ (kHz), MHZ (MHz), GHZ (GHz),
- T (bit periods), S (second), MS (milli-second), US (microsecond),
- V (volt), MV (millivolt), UV (microvolt),
- W (watts), MW (milliwatt),
- PCT (percent), PPM (parts-per-million),
- DEG (degree) DIV (division), OHM (ohm)

Measurement Subsystems

Measure Subsystem Commands

Measure commands are used to control measurements and get back the value of the displayed measurement. To get a valid measurement, the instrument must first be set up to access the desired measurement.

In most cases, this means that you must be on the screen (or set of screens) associated with the measurement. For example, to retrieve Output RF Spectrum measurement results, you must be on the Output RF Spectrum 'Main' screen or 'Trace' screen. (See the DISPlay subsystem commands.) The Trigger commands are then used to cause a measurement to occur. Once a measurement result is available it may be queried.

Syntax Diagrams

Each GPIB Subsystem chapter starts with a syntax diagram. This diagram uses a graphical format to represent the hierarchical structure of a subsystem. The diagram also indicates possible options and references to other command sets.

The following describes two graphical conventions used in the syntax diagrams.

Sp — Means a space must be used as part of the command line. For example;

```
AFAN:AIN<space>'GND'
```

: — Represents a colon in the command line.

```
AFAN:AIN 'GND'
```

Optional Commands

The following lists the optional command groups that are used with many of the GPIB Command Subsystems. The list describes the abbreviation used for each optional set and its corresponding Appendix, that gives more details of the options available.

Optional Command Abbreviation	Reference Appendix	Description
[:INUM]	Appendix A	Increment integer numeric fields
[:FNUM]	Appendix B	Floating point numeric field
[:FNUM-MOD]	Appendix C	Floating point numeric field without INCR:MODE
[:MM]	Appendix D	Measurement fields
[:MM-MOD]	Appendix E	Measurement fields without units commands
[:AVG]	Appendix F	Measurement fields that use averaging
[:MET]	Appendix G	Measurement fields that use meters
[:MULTI-B]	Appendix H	Measurement fields that use Multi Burst measurements

Examples;

RFGenerator:AMPLitude1 <real> | [:FNUM]

When this command appears in a program it can be written as follows;

```
RFG:AMPL1:UNITs? ................or
RFG:AMPL1:INCRement UP ..........or
RFG:AMPL1:INCR:MODE:LINear ......or
RFGENERATOR:AMPLITUDE1 -10DBM ...or
RFG:AMPL1:INCRement:DUNits -1DBM
```

Command Descriptions

Each command in this guide is given a description, an example of its syntax and possible options. These commands are shown as follows;

Command Name

Description This gives a brief description of what the command can be used for. Some units that can be used with the command, are also listed.

Syntax This gives the syntax for the command. Each command is listed in full, although the abbreviated version can also be used, as explained in “Command Names”.

Options These are not strictly optional parts of the command. They also list necessary parts of the command. Refer to “Programming Format Conventions” for details on what is optional and what is necessary.

Output RF Spectrum Modulation Reference Measurement Averaging

The Agilent 8922M/S makes the modulation reference measurement of the Output RF Spectrum (ORFS) due to modulation test based on a single burst measurement. If you wish to comply with the GSM Recommendation 11.10, then the following information will be of interest.

The spectrum due to modulation portion of the GSM ORFS recommendation specifies maximum levels of power, measured at given frequency offsets from the nominal carrier frequency, relative to a reference measurement at the carrier frequency. The recommendation calls for the reference measurement and all other measurements to be averaged over 200 bursts.

To get averaged ORFS due to modulation measurement results relative to an averaged reference as in GSM Recommendation 11.10, refer to the following example GPIB script:

```
!Make a single Modulation Reference measurement.
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:AVERage:STATe OFF”
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:REFerence:STATe OFF”
   OUTPUT Gpib;”TRIGger:MODE ‘SINGLE’”
   OUTPUT Gpib;”DISPlay:SCReen ORFS”
   OUTPUT Gpib;”DISPlay:ORFSpectum:VIEW ‘MAIN’”
   OUTPUT Gpib;”ORFSpectrum:MODE ‘MOD REF’”
   OUTPUT Gpib;”TRIGger:ASTate ‘ARM’”

!Make 200 modulation measurements at 0 kHz offset and average them.
!This result is the correction factor to the single Modulation
!Reference measurement done earlier.
   OUTPUT Gpib;”ORFSpectrum:MODE ‘MODULATN’”
   OUTPUT Gpib;”ORFSpectrum:FREQuency:OFFSet 0 KHZ”
   OUTPUT Gpib;”DISPlay:ORFSpectrum:VIEW ‘TRACE’”
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:AVERage:VALue 200”
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:AVERage:STATe ON”
   OUTPUT Gpib;”TRIGger:MODE ‘CONT’”
   WAIT 150

!The Agilent 8922M/S makes about 2 measurements per second.
!The Agilent 8922S must be allowed about 1600 seconds.
!This wait allows at least the needed 200 measurements
!to occur for averaging per GSM Recommendations.
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer?”
   ENTER Gpib;Correction$
   OUTPUT Gpib;”TRIGger:MODE ‘SINGLE’”
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:AVERage:STATe OFF”

!Enter the correction factor as the Reference value ( REF SET ) for the
!following measurements.
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:REFerence:VALue ”&Correction$
   OUTPUT Gpib;”MEASure:ORFSpectrum:POWer:REFerence:STATe ON”
   OUTPUT Gpib;”MEASure:RESet”

!The ORFS Modulation measurement is now ready for use.
!Do not forget to use averaging.
```

2

GPIB Tutorial and Examples

This Chapter introduces the user to automatic GSM mobile phone testing using the Agilent 8922M and Agilent 8922S GSM Test Set. GPIB (IEEE 488.2) is used in conjunction with BASIC programming exercises and example programs to illustrate the most effective techniques for efficient and high speed phone tests.

GPIB Programming Exercises

Before Starting

Power-up the Agilent 8922M/S and carry out the following checks before beginning the exercise:

- ❒ On the rear panel, the OPT 001 REF OUT should be connected with a short BNC cable to the REF IN connector.
- ❒ Use the front panel knob to select the CONFIG screen. Check the Compatible field is set to 8922M or 8922S.
- ❒ On the CONFIG screen, set the GPIB address to 14 and check the GPIB mode is set to talk&lstn.
- ❒ Connect the GPIB cable from your computer to the Agilent 8922M/S.
- ❒ Load a Test SIM (Subscriber ID Module) in the mobile.
- ❒ Connect a GSM mobile to the Agilent 8922M/S front panel RF IN/OUT connector.

Carry out the following programming exercises, check your program works after each exercise.

Exercise A - Establishing a Link

Originate a Call

Begin the program by setting the GPIB address variable Uut=714, then select commands from section “GPIB Commands Used in Exercises” to carry out the following actions:

- ❐ Preset the Agilent 8922M/S and set up the paging IMSI and external cable loss, zero the power meter.
- ❐ Page the mobile.
- ❐ Establish a program loop to wait for the mobile to answer the call.
- ❐ End the loop when the mobile answers or when too much time has elapsed.

Tips:

The BASIC REPEAT UNTIL loop is useful in this application. The loop can be used to keep checking the Agilent 8922M/S call status until the returned variable becomes equal to “CONNECTED” or a time-out counter is exceeded. Place a WAIT 1 statement inside the loop so that the Agilent 8922M/S call status is checked once per second. For more help, look at the ‘PAGE THE MOBILE AND ESTABLISH A CALL’ section of example program 1 in section “Example Programs”.

End the Call

Add additional lines to your program to end the call. Select the GPIB commands from “GPIB Commands Used in Exercises” and use the same structure as for call set up. This time, wait for the status to become equal to “INACTIVE”.

Tips:

For help, look at the “END THE CALL” section of example program 1 in section “Example Programs”.

Example B - Controlling the Mobile

Mobiles need to be tested on a variety of frequency channels (ARFCN) and transmitter power levels (TX Level). The Agilent 8922M/S uses over-the-air signalling to command the mobile to any ARFCN or TX Level. ARFCN changes can be made using channel assignments, with the signalling taking place over the GSM Fast Associated Control Channel (FACCH). TX Level changes are signalled using the GSM Slow Associated Control Channel (SACCH). The choice of FACCH or SACCH has been made by the GSM specifications.

Before extending your program to control the mobile, press the LOCAL key on the Agilent 8922M/S and manually establish a call with the mobile. In the MOBILE PHONE section of the Cell Control screen, use the knob to select TX Level. Using the arrow keys, quickly change the TX Level from 15, to 14, to 13, to 12, to 10, to 9, to 8, to 7, to 6, to 5 and back down to 15. Notice the mobile's uplink SACCH reports of TX Level in the CELL STATUS area of the screen. Notice also the Peak Power measurement in the centre of the screen. Observe the sequence of events, first you command a new TX Level, about 1 second later, the mobile changes its output power, and shortly after, confirms the new TX Level on the uplink SACCH, to be displayed on the Agilent 8922M/S.

The sequence for ARFCN changes is similar. Because channel assignments use the FACCH, the process happens more quickly. There is still a perceptible delay from the channel change being commanded, by changing the Channel value under MOBILE PHONE, to the TRAFFIC Channel value being confirmed under CELL STATUS.

TX Level Changing

Extend your program, selecting GPIB commands from section "GPIB Commands Used in Exercises", to cycle the mobile's TX Level from 5 to 15 with the following steps:

❒ Establish call as in exercise A.

❒ Set up a loop to count through the TX Levels.

❒ Command the phone to the new TX Level.

❒ Check the reported TX Level, loop until the reported value matches the programmed value, or too much time has elapsed.

❒ Repeat for the next TX Level.

❒ End call as in Exercise A.

Tips:

The BASIC FOR NEXT loop is ideal for controlling the TX Levels. For example, start the loop with FOR Txlevel = 5 TO 15 and end with NEXT Txlevel. Use a REPEAT UNTIL structure to check the reported TX Level. This time, use a delay of WAIT 0.4. For more help, look at the ‘PERFORM FAST POWER MEASUREMENTS’ section of example program 1 in section “Example Programs”.

ARFCN Changing

Once your program is working, add another FOR NEXT loop outside the Txlevel loop to change ARFCN from 1, to 63, to 124. The new program will cycle the mobile from TX Level 5 to 15 at ARFCN 1, then from 5 to 15 on ARFCN 63, then from 5 to 15 on ARFCN 124. Add a PRINT statement to display the ARFCN and TX Level.

The flow of the mobile control part of the program will be as follows:

❒ Establish call as in exercise A.

❒ Set up a loop to count through three ARFCN.

❒ Command the phone to the new ARFCN.

❒ Check the reported ARFCN, loop until the reported value matches the programmed value, or too much time has elapsed.

❒ Set up a loop to count through the TX Levels.

❒ Command the phone to the new TX Level.

❒ Check the reported TX Level, loop until the reported value matches the programmed value, or too much time has elapsed.

❒ Print the ARFCN and TX Level.

❒ Repeat for the next TX Level.

❒ Repeat for the next ARFCN.

❒ End call as in Exercise A.

Tips:

Use a REPEAT UNTIL loop as before to check for confirmation of the mobile’s channel change, this time use a WAIT 0.1 inside the loop. It may be helpful to use an array to hold the ARFCN. For example Arfcnar(1)=1, Arfcnar(2)=63, Arfcnar(3)=124, then FOR X=1 TO 3 and Arfcn=Arfcnar(X). For more help, look at the ‘PERFORM FAST POWER MEASUREMENTS’ section of example program 1 in section “Example Programs”.

Example C - Making Measurements

In this section we first add a TX Power measurement, then modulation accuracy and receiver sensitivity tests.

TX Power Measurement

TX peak power is measured using the Fast TX Carrier Power measurement. This measurement can take place in parallel with GSM signalling operations such as ARFCN or TX Level changes. TX peak power is normally displayed on the Cell Control screen. The Agilent 8922M/S RF Analyser automatically adjusts its input attenuation and gain to match the power expected from the mobile. The Expected Input power is displayed at the bottom of the Cell Control screen. This expected power provides a convenient comparison with the measured power. For a perfect mobile, the expected and measured values are the same. Select GPIB commands from section “GPIB Commands Used in Exercises” to query the measured and expected power and insert them immediately before the PRINT statement in your program. Modify the PRINT statement to display ARFCN, TX Level, Expected Power and Measured Power. The program flow should be as follows:

- ❒ Establish call as in exercise A.
- ❒ Set up a loop to count through three ARFCN.
- ❒ Command the phone to the new ARFCN.
- ❒ Check the reported ARFCN, loop until the reported value matches the programmed value, or too much time has elapsed.
- ❒ Set up a loop to count through the TX Levels.
- ❒ Command the phone to the new TX Level.
- ❒ Check the reported TX Level, loop until the reported value matches the programmed value, or too much time has elapsed.
- ❒ Query the Fast TX Carrier Power (TX Peak Power).
- ❒ Query the RF Analyser Expected Input.
- ❒ Print the ARFCN, TX Level, Expected Power, Measured TX Peak Power.
- ❒ Repeat for the next TX Level.
- ❒ Repeat for the next ARFCN.
- ❒ End call as in Exercise A.

Tips:

For help, look at the “PERFORM FAST POWER MEASUREMENT” section of example program 1.

DSP Measurements

Modulation accuracy for GSM is determined by measuring the phase and frequency error. The Agilent 8922M/S uses its DSP analyser for making this measurement. When triggered, the DSP analyser samples a single GSM TDMA burst and performs several measurements in parallel namely: peak phase error, rms. phase error, frequency error, power versus time, data bit display, burst timing and TX peak power. The DSP analyser shares measurement hardware with the Agilent 8922M/S real-time demodulator. The hardware can be switched from one mode to another, either making measurements or demodulating. The demodulator is used to decode the traffic channel and control channel data being transmitted by the mobile on the up-link. This control information includes the FACCH and SACCH used for changing ARFCN and TX Level. For this reason, different techniques are used for ARFCN and TX Level changing while performing DSP measurements.

TX Level changes are signalled on the down-link SACCH. When the level change is complete, the mobile signals the new TX Level on the up-link SACCH. The Agilent 8922M/S does not need to decode this message for the level change to operate correctly. For TX Level changes, the DSP analyser can remain configured for measurements and does not need to re-configured for demodulation. However, the up-link SACCH reports, used in our program to confirm the TX Level change, are not being demodulated and so are not available to read.

ARFCN changes are signalled using the FACCH. In order for the channel assignment to work correctly, a two-way exchange of messages has to take place between the mobile and the Agilent 8922M/S. This requires the DSP analyser to be configured for demodulation. When an ARFCN change is requested during a DSP measurement, the DSP analyser is automatically re-configured for demodulation, the channel assignment is performed, once complete, the DSP analyser is configured for measurements once more.

Single trigger mode is most suitable for DSP measurements over GPIB. ARFCN changes can be accomplished simply by programming the new ARFCN and triggering the DSP measurement. The measurement will begin only once the channel change has been completed. TX Level changes are accomplished by programming the new TX Level then triggering the DSP measurement. Since the DSP measurement takes 200 to 300 milliseconds to be initialised and sample a TDMA burst, there is a reasonable probability that in many cases the mobile will have changed level in time for the first measurement. Checking the measured TX power is close to the expected power provides confirmation that the TX Level change has been performed. If the measured power is different from the expected power, the DSP measurement can be performed up to two additional times. The time taken for three DSP measurements exceeds the time allowed for a mobile to make a TX Level change.

Select commands from section “GPIB Commands Used in Exercises” to create the following program flow:

- ❒ Select single trigger mode for DSP measurements.
- ❒ Establish call as in exercise A.
- ❒ Perform TX peak power test on channels 1, 63, 124, levels 5 to 15 with code from exercise B and C.
- ❒ Display the DSP analyser phase and frequency error screen.
- ❒ Set up a loop to count through three TX Levels: 5, 10 and 15.
- ❒ Command the phone to the new TX Level.
- ❒ Set up a loop to count through three ARFCN: 1, 63, 124.
- ❒ Command the phone to the new ARFCN.
- ❒ Trigger a DSP measurement.
- ❒ Query the peak phase error and rms. phase error.
- ❒ Query the frequency error and TX peak power.
- ❒ Query the RF analyser expected input.
- ❒ Compare measured and expected power, loop to trigger DSP measurement if they are more than 1dB different. Loop a maximum of three times.
- ❒ Print the ARFCN, TX Level, Peak and Rms. Phase Error and Frequency Error.
- ❒ Repeat for the next ARFCN.
- ❒ Repeat for the next TX Level.
- ❒ Return to the Cell Control screen.
- ❒ End call as in exercise A.

Tips:

Placing the TX Level changing loop outside the ARFCN changing loop has several benefits. The process of changing ARFCN is faster, so the program will run more quickly. The delay associated with the first ARFCN change will go in parallel with the time taken for the mobile to respond to the SACCH and change TX Level. This increases the probability of the mobile being settled on the new TX Level when the DSP measurement is performed, reducing the number of times it will need to be repeated to get a TX peak power value close to the expected value. Look at the ‘PERFORM DSP MEASUREMENTS’ section of example program 1 for more help.

Receiver Sensitivity Test

Bit Error Ratio (BER) is the primary measure of GSM receiver sensitivity. For a hand-held mobile, the residual type II BER should be less than 2.4% at -102dBm. For most mobile testing, the downlink power will be maintained at a relatively high level of around -80dBm. This level is dropped to -102dBm to perform the BER test, then increased again to -80dBm once the test is complete. When the mobile's receiver input level drops from -80 to -102dBm, its receiver AGC compensates by increasing gain. The AGC time constant varies from mobile to mobile. It can take several seconds for the receiver to adjust to the new power level and be ready for BER testing. If the level change is large and followed by a channel assignment, the mobile will often drop the call because its receiver is not able to decode the FACCH while adjusting to the reduced input power.

Select GPIB commands from "GPIB Commands Used in Exercises" to extend your program as follows:

- ❒ Select single trigger mode for DSP measurements
- ❒ Select single trigger mode for BER measurements
- ❒ Establish call as in exercise A
- ❒ Perform TX peak power test on channels 1, 63, 124, levels 5 to 15 with code from exercise B and C
- ❒ Perform DSP measurements with code from exercise C
- ❒ Display the bit error test screen
- ❒ Reduce the RF Generator power to -102dBm
- ❒ Wait 2 seconds for the mobile's AGC to settle
- ❒ Set up a loop to count through three ARFCN: 1, 63, 124
- ❒ Command the phone to the new ARFCN
- ❒ Trigger a BER measurement
- ❒ Query the BER
- ❒ Repeat for the next ARFCN
- ❒ Increase the RF Generator power to -80dBm
- ❒ Return to the Cell Control screen
- ❒ End call as in exercise A

Tips:

Experiment with shorter AGC settling times, notice the reported BER increase. Try increasing the RF Generator power to -40dBm at the start of the program and removing the wait statement. Does the phone drop the call? The required delay depends on the mobile and the size of the level change. Look at the mobile's SACCH reports of RXQual and RXLev. Consider modifying your program to use these reports to decide when the mobile's AGC has settled. Look at the "PERFORM BIT ERROR MEASUREMENTS" section of example program 1 for more help.

Example D - Adding Robustness

There are several additions which can be made to your program to increase its robustness:

- ❒ Check input power falls within +/-3dB specified analyser range
- ❒ Check DSP measurement status
- ❒ Check for Agilent 8922M/S error logs
- ❒ Provide a time-out for any measurements which do not complete

These checks add little value to a program designed to test phones which are known to meet specification. In many cases the mobile being tested will be out of specification, the phone may fail to produce a burst at the correct power and frequency for the DSP analyser. If the measurement has been triggered, and no input signal is provided, an GPIB time-out offers a convenient method for dissarming the DSP trigger and continuing the program. If the mobile's TX power falls outside +/-3dB of the expected value, measurement results may not be valid. If the DSP analyser has not been able to find a good signal, or synchronise to the burst midamble, the status message will warn of the problem. Dropped calls and other problems are logged by the Agilent 8922M/S in an error message stack. The messages can be queried to provide an indication of where problems have occurred during test execution.

Read through example program 1 and look at the way the GPIB commands in "GPIB Commands Used in Exercises" have been used to add robustness. Look for the “ERROR AND TIMEOUT HANDLING” part of the program and the sections making DSP measurements.

Example E - Faster Testing

Load and run example program 1, then program 2, then program 3, or look at the test times tabulated in section 4 for the Agilent 8922M. The three programs are configured to perform an identical list of tests, yet their test times are different. This is achieved using various techniques.

Example program 1 does use some techniques to improve speed:

- ❐ The complete set of DSP measurements are performed in parallel.
- ❐ TX peak power measurements are made in parallel with DSP measurements.
- ❐ Additional TX peak power measurements are made using the Fast TX Carrier Power measurement. Points covered during the DSP test are not repeated.
- ❐ Loops are chosen to minimise the number of mobile TX level changes.
- ❐ No fixed delays are used.
- ❐ RXQual, RXLev and TX Timing error are checked in parallel with bit error ratio.
- ❐ Results are printed after testing is complete.

Example program 2 adds some additional time saving techniques:

- ❐ A hopped call is used for TX measurements to reduce channel changing time.
- ❐ Measured power is used to determine when the mobile TX Level has settled rather than waiting for uplink SACCH report.

Example program 3 uses the Agilent 8922M/S Aux RF Out port to simulate a mobile operating in a test mode. Mobiles controlled in test modes react much faster to channel and TX Level change commands.

- ❒ Delays associated with the GSM SACCH and FACCH are removed.
- ❒ Measurements are made with no signalling overhead time.

The time savings made in programs 2 and 3 have been almost completely during the TX part of the test. Improving the RX bit error ratio test time would speed-up each of the programs. As TX test times reduce, RX tests appear to take up a larger percentage of the overall test time. Techniques for improving RX measurement times include:

- ❒ Take RXQual as a first indication of receiver performance. Perform bit error test only if RX Qual is poor.
- ❒ Reduce the number of bits being tested and reduce the signal level from -102dBm to a lower level. This will increase the number of bit errors in the reduced measurement period to maintain a statistically valid test.
- ❒ Look for zero bit errors at -102dBm over a reduced number of bits. Use a longer measurement only if bit errors are detected.

GPIB Commands Used in Exercises

Commands used in exercise A:

Preset the instrument

```
OUTPUT Uut;"*RST"
```

Set the paging IMSI

```
OUTPUT Uut;"MSINFO:PAGING:IMSI '001012345678901'"
```

Enter an external cable loss offset of 1dB

```
OUTPUT Uut;"CONF:OFL:RFIN ";-1
```

Set external loss offset mode on

```
OUTPUT Uut;"CONF:OFL:MODE 'ON'"
```

Zero the power meter

```
OUTPUT Uut;"CW:PMZERO"
```

Page the mobile

```
OUTPUT Uut;"CELL:CALL:ORIGINATE"
```

Query the call status

```
OUTPUT Uut;"CELL:CALL:STATUS:STATE?"
ENTER Uut;Status$
```

End the call

```
OUTPUT Uut;"CELL:CALL:END"
```

Commands used in exercise B:

Program the mobile TX Level

```
OUTPUT Uut;"CELL:MS:TLEV";Txlevel
```

Query the mobile's reported TX Lev

```
OUTPUT Uut;"MEAS:CELL:SACCH:TLEV?"
ENTER Uut;Sacchtxlev
```

Prgram the mobile's Traffic Channel ARFCN

```
OUTPUT Uut;"CELL:CALL:TCH:ARFCN ";Arfcn
```

Query the reported ARFCN

```
OUTPUT Uut;"CELL:CALL:STAT:TCH:ARFCN?"
ENTER Uut;Faccharfcn
```

Commands used in exercise C:

Query Fast TX Carrier Power (TX Peak Power)

```
OUTPUT Uut;”MEAS:FTCP:POW?”
ENTER Uut;Txpkpwr
```

Query RF Analyzer Expected Input Amplitude

```
OUTPUT Uut;”RFAN:AMPL1?”
ENTER Uut;Exppwr
```

Set the DSP Analyzer to single trigger mode

```
OUTPUT Uut;”TRIG:MODE ‘SINGLE’”
```

Display the DSP Analyzer (default sub-screen is phase and frequency error)

```
OUTPUT Uut;”DISP DSP”
```

Trigger a DSP measurement

```
OUTPUT Uut;”TRIG:AST ‘ARM’”
```

Querry the rms phase error

```
OUTPUT Uut;”MEASURE:DSPANALYZER:PHASE:ERROR:RMS?”
ENTER Uut;Rmsphase
```

Query peak phase error

```
OUTPUT Uut;”MEASURE:DSPANALYZER:PHASE:ERROR:PEAK?”
ENTER Uut;Pkphase
```

Query frequency error

```
OUTPUT Uut;”MEASURE:DSPANALYZER:PHASE:ERROR:FREQUENCY?”
ENTER Uut;Freqerr
```

Query TX peak power

```
OUTPUT Uut;”MEASURE:DSPANALYZER:PTCP?”
ENTER Uut;Txpkpwer
```

Display the Cell Control screen

```
OUTPUT Uut;”DISP CELL1”
```

Set single trigger mode for bit error measurements

```
OUTPUT Uut;”TRIG:BET ‘SINGLE’”
```

Display the bit error test screen

```
OUTPUT Uut;”DISP:SCR BER1”
```

Program the RF Generator power

```
OUTPUT Uut;”RFG:AMPL1 “;Berpower
```

Trigger a bit error measurement

```
OUTPUT Uut;”TRIG:BET:MODE ‘RUN’”
```

Query the completed bit error test result

```
OUTPUT Uut;"MEAS:BET:BERR:RATIO1?"
ENTER Uut;Berppm
```

Reset the SACCH reports

```
OUTPUT Uut;"MEAS:CELL:SACCH:RESET"
```

Query the RXQual report (-1 returned if no report yet)

```
OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RQU?"
ENTER Uut;Rxqual
```

Commands used in exercise D:

```
OUTPUT Uut;"MEASURE:DSPANALYZER:SSTATUS?"
ENTER Uut;Sstatus$
```

Check for logged Agilent 8922M/S system errors

```
OUTPUT Uut;"SYSTEM:ERROR?"
ENTER Uut;Systemerr$
```

Example Programs

Speed Comparison

Using the Agilent 8922M GSM MS Test Set			
	Program 1	Program 2	Program 3
Time for testing	85.5 sec.	42.7 sec.	64.6 sec.[a]
Time for call clear down	1.1 sec.	1.1 sec.	1.1 sec.

a.Some time overhead was incurred because the Agilent 8922M was being used to emulate a mobile in test mode. Reduced test times would be possible if the instrument was only performing measurements.

Test List

Tx Tests		
	ARFCN	**Tx Levels**
Tx Power	1, 65, 124	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
Peak and rms phase error	1, 65, 124	5, 10, 15
Frequency error	1, 65, 124	5, 10, 15
Power versus time	1, 65, 124	5, 10, 15
Rx Tests		
	ARFCN	**Downlink Power**
Residual Type II BER 10,000 bits[a]	1, 65, 124	-102 dBm
Rx Qual Rx Lev	1, 65, 124	-102 dBm
MS Timing	1, 65, 124	-102 dBm

a.Up to four BER measurements can be performed in parallel with no added test time.

Sample Output

```
Answer call when mobile rings
Results from Fast Power Measurement
ARFCN     TXLEV     POWER dBm
 1         6         31.87
 1         7         29.95
 1         8         27.77
 1         9         25.81
 1         11        20.21
 1         12        18.21
 1         13        16.24
 1         14        14.3
 65        6         31.51
 65        7         29.63
 65        8         27.54
 65        9         25.59
 65        11        20.01
 65        12        20.04
 65        13        18.05
 65        14        16.01
 124       6         31.1
 124       7         29.32
 124       8         27.33
 124       9         25.37
 124       11        21.5
 124       12        19.85
 124       13        17.85
 124       14        15.77

Results from Power, Power vs Time & Modulation Measurements

ARFCN     TXLEV     POWER dBm    Pk & RMS PHASE   FREQ ERROR   MASK
 1         5         33.69        10.89     4.554     1.8        “Passed”
 1         10        23.76        10.14     4.362     36         “Passed”
 1         15        14.27        11.84     4.636     .6         “Passed”
 65        5         33.35        11.39     4.29     -2.4        “Passed”
 65        10        23.57        11.3      4.444     18.3       “Passed”
 65        15        14.12        14.22     4.741    -2.3        “Passed”
 124       5         32.89        14.68     4.636     30.9       “Passed”
 124       10        23.36        14.41     4.911    -18.1       “Passed”
 124       15        13.81        11.95     4.905    -20         “Passed”

Results from BER Test

ARFCN     Downlink dBm   BER1%   RxQual  RxLev       TIMERR
 1          -102       .03945    0         8          0
 65         -102       .2251     0         8          0
 124        -102       .1157     0         9          .25

Time for phone to camp and answer page:  11.21  Seconds.
Time for testing                      :  46.52  Seconds.
Time for call clear down              :  2.05  Seconds.


No Errors
Would you like to test again? (y or n)
```

Program 1

```
10    !RE-STORE “PROG1”
20    !RE-SAVE “PROG1:,1404”
30    !=====================================================================
40    !
50    !Example program 1
60    !
70    !Introductory GPIB techniques for measuring a GSM900 mobile using the 
Agilent 8922S and M
80    !GSM MS Test Sets.  The program measures Tx power, power vs time, phase and fre-
quency
90    !error, bit error ratio, timing error, Rx Lev and Rx Qual
100   !
110   !(c) Agilent Technologies 1996
120   !
130   !Rev 1.0
140   !I R HP QMD 7.9.94
150   !Slightly modified by C B 24.1.96 - Changed F/H to M/S throughout
160   
!===========================================================================
170   !
180   DIM Berpwr(5)               !Downlink power levels in dBm for bit error test
190   DIM Berarfcn(125)           !ARFCN to perform bit error test on
200   DIM Dsppwr(15)              !Mobile Tx power levels for DSP test
210   DIM Dsparfcn(124)           !ARFCN to perform DSP test on
220   DIM Fparfcn(124)            !ARFCN to perform fast power test on
230   DIM Fppwr(15)               !Mobile Tx power levels for fast power test
240   DIM Message$(30)[100]       !Output strings
250   DIM Error$(50)[100]         !Error message strings
260   DIM Err$[100]               !Internally used temporary error string
270   DIM Rmspher(50,50)          !Measurement results from rms phase error, dimen-
sions(ARFCN,TXLEVEL)
280   DIM Pkpher(50,50)           !Measurement results from peak phase error
290   DIM Frer(50,50)             !Measurement results from freq error
300   DIM Slpwr(50,50)           !Measurement results from DSP analyzer power measure-
ment
310   DIM Txtim(50,50)            !Tx timing error measurement results
320   DIM Fpwrmeas(50,50)         !Measurement results from fast power
330   DIM Ber1(50,50)             !Bit error test measurement results, dimen-
sions(ARFCN,Downlink Power)
340   DIM Clock(5)                !Test Times
350   DIM Mask$(50,50)[10]        !Power versus time limit mask specification
360   DIM Rxqual(50,50)           !RxQual measurement results, dimensions(ARFCN,Down-
link Power)
370   DIM Rxlev(50,50)            !RxLev measurement results
380   DIM Null(50,50)             !Empty array
390   DIM Nullst$(50,50)[50]      !Empty string array
400   !
410 !=======================================================
420   !
430   !GENERAL MEASUREMENT SET UP SPECIFIED
440   !
450   Uut=714                     GPIB address of Agilent 8922M/S
460   Extloss=-1                  !Loss of cable linking 8922 to mobile (loss=-xdB)
470   Bchpwr=-80                  !BCCH power level in dBm
480   Imsi$=”’001012345678901’”   !Paging IMSI of mobile’s test SIM
490   Timeouttime=20              !The GPIB timeout in seconds
500   Leveltol=1                 !Level threshold to indicate Tx Lev settling for DSP 
measurement
510   !
520 !===========================================================================
530   !
540   !MEASUREMENT POINTS ARE DEFINED IN THIS SECTION
```

```
550   !
560   !Bit error ratio test
570   !
580   Numberpwr=1                 !The number of downlink power levels for bit error
test
590   Berpwr(1)=-102             !The power level in dBm of the first downlink power.
Etc....
600   Bits1=10000                 !The number of bits to test at each ARFCN/Power com-
bination
610   Numberarfcn=3               !The number of ARFCN for bit error test
620   Berarfcn(1)=1               !The value of the first ARFCN. Etc....
630   Berarfcn(2)=65
640   Berarfcn(3)=124
650   !
660   !DSP measurememnts
670   !
680   Numdsppwr=3                 !The number of mobile TX Levels for DSP test
690   Dsppwr(1)=5                 !The value of the first TX Level. Etc...
700   Dsppwr(2)=10
710   Dsppwr(3)=15
720   Numdsparfcn=3               !The number of ARFCN for DSP test
730   Dsparfcn(1)=1               !The value of the first ARFCN. Etc....
740   Dsparfcn(2)=65
750   Dsparfcn(3)=124
760   !
770   !Fast Power measurements
780   !
790   Numfppwr=8                  !The number of mobile TX Levels for fast power test
800   Fppwr(1)=6                  !The value of the first TX Level. Etc....
810   Fppwr(2)=7
820   Fppwr(3)=8
830   Fppwr(4)=9
840   Fppwr(5)=11
850   Fppwr(6)=12
860   Fppwr(7)=13
870   Fppwr(8)=14
880   Numfparfcn=3                !The number of ARFCN for fast power test
890   Fparfcn(1)=1                !The value of the first ARFCN. Etc...
900   Fparfcn(2)=65
910   Fparfcn(3)=124
920   !
930   !===========================================================================
940   !
950   !PRINT MESSAGES ARE DEFINED BELOW
960   !
970   Message$(1)="Answer call when mobile rings"
980   Message$(2)="Would you like to test again? (y or n)"
990   Message$(3)="Results from Fast Power Measurement"
1000  Message$(4)="ARFCN    TXLEV    POWER dBm"
1010  Message$(5)="Results from Power, Power vs Time & Modulation Measurements"
1020  Message$(6)="ARFCN    TXLEV    POWER dBm   Pk & RMS PHASE   FREQ ERROR   MASK"
1030  Message$(7)="Results from BER Test"
1040  Message$(8)="ARFCN    Downlink dBm   BER1%   RxQual  RxLev       TIMERR"
1050  Message$(9)=" Seconds."
1060  Message$(10)="Time for phone to camp and answer page: "
1070  Message$(11)="Time for testing                       : "
1080  Message$(12)="Time for call clear down               : "
1090  !
1100  Emptyst$="@"
1110  Empty=-999
1120  Nullst$(1,1)=Emptyst$
1130  Null(1,1)=Empty
1140  !
1150
!==================================================================================
1160  !
1170  !ERROR AND TIMEOUT HANDLING
1180  !
```

```
1190  Busport=INT(Uut/100)                          !Get the GPIB port code from Uut
address
1200  CLEAR Busport                               !Clear bus from any aborted previous
commands
1210  Timeinit$="yes"                              !Set a flag so timeout code is not
executed first pass
1220  ON TIMEOUT Busport,Timeouttime GOTO Timeflag                !Establish goto flag
for HPIB timeouts
1230 Timeflag:IF Timeinit$<>"yes" THEN              !After a timeout, execution comes
here
1240    OFF TIMEOUT Busport
1250    CLEAR Busport                               !Clear any half done commands
1260    OUTPUT Uut;"TRIG:AST 'disarm'"              !Dissarm the DSP trigger
1270   CALL Sub_syserror(Uut,Error$(*),Errcount)   !Gather any error message from the
Agilent 8922M/S
1280    PRINT "Measurement Timed Out. Ending Test"
1290    IF Errcount=0 THEN
1300      Errcount=1
1310      Error$(1)="No errors recorded"
1320    END IF
1330    FOR X=1 TO Errcount                         !Print error messages
1340      PRINT Error$(X)
1350    NEXT X
1360    STOP                                      !Execution stops here after critical
errors
1370  ELSE
1380    Timeinit$="no"                             !Reset flag so next time, it must
be a real timeout
1390  END IF
1400  Errcount=0
1410  CALL Sub_syserror(Uut,Error$(*),Errcount)      !Clear any old errors from
Agilent 8922M/S before the
1420  Errcount=0                                    !test begins
1430  !
1440
!==================================================================================
1450  !
1460  !PRESET THE Agilent 8922M/S AND SET IT TO THE CORRECT COMPATIBILITY MODE  (exe-
cuted once only)
1470  !
1480  !
1490  OUTPUT Uut;"*RST"                             !Preset the Agilent 8922M/S
1500  OUTPUT Uut;"CONF:COMP?"                      !Check compatability mode and set
to F or H
1510  ENTER Uut;Product$
1520  IF Product$<>"""8922S""" AND Product$<>"""8922M""" THEN
1530    IF Product$="""8922E""" THEN OUTPUT Uut;"CONF:COMP '8922S'"
1540    IF Product$="""8922G""" THEN OUTPUT Uut;"CONF:COMP '8922M'"
1550    OUTPUT Uut;"*RST"                           !A preset is needed after compat-
ability change
1560  END IF
1570  CALL Sub_syserror(Uut,Error$(*),Errcount)      !Check for any errors logged by
HP 8922M/S
1580  !
1590  !==================================================================================
1600  !
1610  !SET THE Agilent 8922M/S INITIAL CONDITIONS  (executed once only)
1620  !
1630  !
1640  OUTPUT Uut;"MSINFO:PAGING:IMSI "&Imsi$         !Set the paging IMSI
1650  OUTPUT Uut;"CONF:OFL:RFIN ";Extloss           !Set the external cable loss
1660  OUTPUT Uut;"CELL:CALL:TCH:ARFCN ";Dsparfcn(1)  !Set the ARFCN to the first
expected test point
1670  OUTPUT Uut;"CELL:MS:TLEV ";Dsppwr(1)           !Set the mobile Tx Level to the
first test point
1680  OUTPUT Uut;"CONF:OFL:MODE 'ON'"               !Turn external offset mode ON to
use cable loss
1690  OUTPUT Uut;"CW:PMZERO"                        !Zero the power meter
```

```
1700  OUTPUT Uut;"RFG:AMPL1 ";Bchpwr               !Set the downlink power for normal
signalling
1710  OUTPUT Uut;"TRIG:MODE 'SINGLE'"              !Set the DSP meas trigger to single
trig mode
1720  OUTPUT Uut;"TRIG:BET 'SINGLE'"               !Set bit error meas trigger to sin-
gle trig mode
1730  OUTPUT Uut;"BET:BITS1 ";Bits1                !Set the number of bits to be mea-
sured for bit error
1740  OUTPUT Uut;"DISP:SCR DSP"                     !Display the DSP amplitude main
screen to enter limits
1750  OUTPUT Uut;"DISP:SCR:DSP:VIEW 'AMPL MAIN'"    !for power versus time mask
1760  DATA -40,-28,-18,-10,0,180,360,542.769,547.769,552.769,560.769,570.769 !Mask
corner times in us
1770  DATA -36,-30,-6,4,1,1,1,1,1,-6,-30,-36                              !Upper
limits in dB
1780  DATA -60,-60,-60,-60,-1,-1,-1,-1,-60,-60,-60,-60                    !Lower lim-
its in dB
1790  FOR X=1 TO 12
1800    READ Masktim                                          !Reas corner times
from DATA statement
1810    Masktim=Masktim/1.E+6                                 !Convert seconds
1820    Num$=VAL$(X)                                          !Convert index to
string for GPIB
1830    OUTPUT Uut;"DSP:AMPL:"&"time"&Num$&" ";Masktim        !Output marker times
1840  NEXT X
1850  FOR X=1 TO 12
1860    READ Maskup                                       !Read and output upper
limits
1870    Num$=VAL$(X)
1880    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":HLIM ";Maskup
1890    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":HLIM:STATE ON"
1900  NEXT X
1910  FOR X=1 TO 12
1920    READ Masklo                                       !Read and output lower
limits
1930    Num$=VAL$(X)
1940    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":LLIM ";Masklo
1950    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":LLIM:STATE ON"
1960  NEXT X
1970  !
1980
!================================================================================
1990  !
2000  !ESTABLISH A LOOP TO BE EXECUTED EACH TIME A MOBILE IS TESTED
2010  !
2020  !
2030  Run$="yes"                                              !Flag for REPEAT loop
2040  REPEAT
2050    Clock(1)=TIMEDATE                                     !Start a test time
clock for call set up
2060  !
2070  !================================================================================
2080  !
2090  !PAGE THE MOBILE AND ESTABLISH A CALL
2100  !
2110  !
2120    OUTPUT Uut;"DISP:SCR CELL1"                           !Display the cell
control screen
2130    PRINT Message$(1)                                     !Output answer call
message
2140    OUTPUT Uut;"CELL:CALL:ORIGINATE"                      !Page mobile
Agilent 8922M/S org call
2150    Time=0                                            !Set counter for mobile
to answer
2160    Maxtime=100
2170    REPEAT
2180      Time=Time+1
2190      WAIT 1
```

```
2200      OUTPUT Uut;"CELL:CALL:STATUS:STATE?"                  !Check the call status
for connected
2210       ENTER Uut;Status$
2220     UNTIL Status$="""CONNECTED""" OR Time>Maxtime
2230     IF Time>Maxtime THEN
2240       Errcount=Errcount+1
2250       Error$(Errcount)="Call could not be established"
2260       GOTO Timeflag                                            !If wait too long,
goto timeout code
2270     END IF
2280     CALL Sub_syserror(Uut,Error$(*),Errcount)                !Check for any errors
logged
2290  !
2300
!=====================================================================================
2310  !
2320     Clock(1)=TIMEDATE-Clock(1)                               !End call set up timer
2330     Clock(2)=TIMEDATE                                      !Start measurement timer
2340  !
2350
!=====================================================================================
=
2360  !
2370  !PERFORM DSP MEASUREMENTS
2380  !
2390     OUTPUT Uut;"DISP DSP"                                      !Return to the DSP
amplitude main screen
2400     FOR Txcount=1 TO Numdsppwr                                 !Outer loop for Tx
levels
2410       Txlev=Dsppwr(Txcount)                                !Get Tx level from array
2420       OUTPUT Uut;"CELL:MS:TLEV";Txlev                         !Program mobile's Tx
level
2430       FOR Arcount=1 TO Numdsparfcn                            !Inner loop for ARFCN
2440         Arfcn=Dsparfcn(Arcount)                               !Get ARFCN from array
2450         OUTPUT Uut;"CELL:CALL:TCH:ARFCN ";Arfcn                 !Program link ARFCN
2460         Count=0                                                 !Establish counter
for repeat measurements
2470         REPEAT                                                 !May need to repeat
if mobile not settled
2480           OUTPUT Uut;"TRIG:AST 'ARM'"                         !Arm the DSP measure-
ment
2490           OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:RMS?"   !Read all the DSP
results: rms phase error
2500           ENTER Uut;Rmspher(Arcount,Txcount)
2510  !Note: program will stick here, waiting for input if mobile fails to provide a
valid signal to trigger
2520  !      the Agilent 8922M/S.  The program will timeout.  The timeout code dissarms
the Agilent 8922M/S trigger.
2530         OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:PEAK?"  !
peak phase error
2540           ENTER Uut;Pkpher(Arcount,Txcount)
2550           OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:FRE-
QUENCY?"!                       frequency error
2560           ENTER Uut;Frer(Arcount,Txcount)
2570          OUTPUT Uut;"MEASURE:DSPANALYZER:MSUM?"            !
power versus time mask
2580           ENTER Uut;Mask$(Arcount,Txcount)
2590          OUTPUT Uut;"MEASURE:DSPANALYZER:PTCP?"            !
Tx power
2600           ENTER Uut;Slpwr(Arcount,Txcount)
2610           OUTPUT Uut;"RFAN:AMPL1?"                            !Read expected power
level to compare with
2620           ENTER Uut;Anlevel                                   !measured and +/-3dB
allowed range
2630           OUTPUT Uut;"MEASURE:DSPANALYZER:SSTATUS?"           !Check for any DSP
measurement errors
2640           ENTER Uut;Sstatus$
```

```
2650         Threedb=ABS(Anlevel-Slpwr(Arcount,Txcount))        !Calculate difference
between measured and expected
2660          Count=Count+1
2670        UNTIL Count=3 OR Threedb<Leveltol                     !Re-do DSP once if
phone fails, the mobile
2680       IF Sstatus$<>"""No Error""" OR Threedb>3 THEN        !may still be settling
after Tx Level change
2690          Err$="DSP Measurement Problem "                    !Create an error mes-
sage string
2700          IF Sstatus$<>"""No Error""" THEN Err$=Err$&Sstatus$
2710          IF Threedb>3 THEN Err$=Err$&" 3dB input range exceeded"
2720          Errcount=Errcount+1
2730          Error$(Errcount)=Err$
2740        END IF
2750      NEXT Arcount
2760    NEXT Txcount
2770    CALL Sub_syserror(Uut,Error$(*),Errcount)                 !Check for logged
errors after DSP
2780  !
2790
!===================================================================================
2800  !
2810  !PERFORM FAST POWER MEASUREMENTS
2820  !
2830    OUTPUT Uut;"DISP:SCR CELL1"                              !Display cell control
screen
2840    FOR Txcount=1 TO Numfppwr                               !Outer loop for mobile
Tx levels
2850      Txlev=Fppwr(Txcount)                                 !Get Tx level from array
2860      OUTPUT Uut;"CELL:MS:TLEV";Txlev                         !Program mobile's Tx
level
2870      Time=0                                                  !Establish a loop to
wait for phone to
2880      Maxtime=10                                              !confirm over uplink
SACCH that it has
2890      REPEAT                                                 !reached commanded Tx
level
2900        OUTPUT Uut;"MEAS:CELL:SACCH:TLEV?"                    !Read mobile's SACCH
report of Tx Level
2910        ENTER Uut;Sacchtxlev
2920        WAIT .4                                              !Pause, SACCH has low
banswidth so reports
2930        Time=Time+1                                            !update slowly
2940      UNTIL Sacchtxlev=Txlev OR Time=Maxtime                   !Check for mobile
reaching programmed Tx level
2950      IF Time=Maxtime THEN
2960        Errcount=Errcount+1
2970        Error$(Errcount)="Mobile failed to change Tx Level"    !Error if mobile
doesn't reach programmed level
2980      END IF
2990      FOR Arcount=1 TO Numfparfcn                              !Inner loop for mea-
surement ARFCN
3000        Arfcn=Fparfcn(Arcount)                                !Get ARFCN from array
3010        OUTPUT Uut;"CELL:CALL:TCH:ARFCN ";Arfcn               !Request TCH channel
assignement to new ARFCN
3020        Time=0                                                !Establish a loop to
wait for channel
3030        Maxtime=10                                          !assignment to complete
3040        REPEAT
3050          OUTPUT Uut;"CELL:CALL:STAT:TCH:ARFCN?"               !Check call status
for HP 8922M/S to see if
3060          ENTER Uut;Reparfcn                                   !mobile has reached
new channel
3070          WAIT .1                                            !Short pause. Channel
changes use FACCH which
3080          Time=Time+1                                        !is faster than SACCH
for Tx level changes
```

```
3090        UNTIL Reparfcn=Arfcn OR Time=Maxtime                  !If reported ARFCN
matches programmed ARFCN
3100        IF Time=Maxtime THEN                                  !FACCH handshake is
complete and mobile is on
3110          Errcount=Errcount+1                                 !new channel.
3120          Error$(Errcount)="Mobile failed channel assignment" !If mobile fails to
reach new channel, set an error
3130        END IF                                                !Now mobile is stable
on new Tx level and ARFCN
3140        OUTPUT Uut;"MEAS:FTCP:POW?"                           !read the peak power
meter
3150        ENTER Uut;Fpwrmeas(Arcount,Txcount)
3160        OUTPUT Uut;"RFAN:AMPL1?"                              !Read the
Agilent 8922M/S analyzer expected input level
3170        ENTER Uut;Anlevel                                     !and compare with the
measured power to check that
3180        Threedb=ABS(Anlevel-Fpwrmeas(Arcount,Txcount))        !the result is within
the allowed +/-3dB window
3190        IF Threedb>3 THEN
3200          Errcount=Errcount+1
3210          Error$(Errcount)="Fast power meas 3dB input range exceeded"
3220        END IF
3230      NEXT Arcount
3240    NEXT Txcount
3250    CALL Sub_syserror(Uut,Error$(*),Errcount)                 !Check Agilent 8922M/
S error log
3260  !
3270!================================================================================
====
3280  !
3290  !PERFORM BIT ERROR MEASUREMENTS
3300  !
3310    OUTPUT Uut;"DISP:SCR BER1"                                !Display single BER
test screen
3320    FOR Rxcount=1 TO Numberpwr                                !Outer loop for down-
link power levels
3330      Berpo=Berpwr(Rxcount)                                   !Get downlink power
level from array
3340      OUTPUT Uut;"RFG:AMPL1 ";Berpo                           !Program Agilent 8922M/
S Generator to downlink power
3350      Count=0                                                 !Establish a loop to
wait for the mobile's receiver
3360      Instance=0                                              !AGC to recover from
downlink level change.
3370      REPEAT                                                  !The mobile's reported
RXQual will indicate when
3380        OUTPUT Uut;"MEAS:CELL:SACCH:RESET"                    !the AGC has recov-
ered. Start by clearing old SACCH
3390        Count=Count+1                                         !The inner REPEAT loop
is used to check and wait
3400        Rxqualsettle=-1                                       !for the next SACCH
report from mobile.  When the
3410        Time=0                                                !Agilent 8922M/S is
waiting for a report, after a SACCH
3420        REPEAT                                                !reset it returns -1
3430          WAIT .3                                             !Pause. SACCH is a
low bandwidth channel.
3440          Time=Time+1
3450          OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RQU?"           !Read the SACCH report
from the mobile
3460          ENTER Uut;Rxqualsettle                              !-1 is returned if
Agilent 8922M/S is still waiting
3470        UNTIL Time>7 OR Rxqualsettle<>-1                      !for the report
3480        IF Rxqualsettle<=4 THEN                               !If RXQual is less
than 4, it's good enough to
3490          Instance=Instance+1                                 !continue.  The program
checks for more than
```

```
3500        ELSE                                              !3 consecutive reports
at RxQual 4 or less to
3510          Instance=0                                      !be be sure the mobile
has stabalized.  The
3520        END IF                                             !mobile may return up
to 2 reports at the old
3530      UNTIL Count>20 OR Instance>3                           !level, before it
recognizes the input level
3540      IF Count>20 OR Rxqualsettle=-1 THEN                    !change
3550        Errcount=Errcount+1                                  !If RxQual does not
stabalize, report an error
3560        Error$(Errcount)="Mobile receiver AGC did not respond to downlink level
change"
3570      END IF
3580      FOR Arcount=1 TO Numberarfcn                           !Inner loop for BER
test ARFCN
3590        Arfcn=Berarfcn(Arcount)                             !Get ARFCN from array
3600        OUTPUT Uut;"CELL:CALL:TCH:ARFCN ";Arfcn              !Request channel
assignment. Agilent 8922M/S will hold
3610        OUTPUT Uut;"TRIG:BET:MODE 'RUN'"                     !off BER test until
channel change is done. Run test.
3620        OUTPUT Uut;"MEAS:CELL:SACCH:RESET"                   !While BER test is
running, test SACCH reports
3630        Rxlev(Arcount,Rxcount)=-1                            !Clear old reports
3640        Time=0
3650        REPEAT                                               !Loop and wait for
SACCH report. -1 is returned
3660          WAIT .3                                            !when Agilent 8922M/
S is waiting for report
3670          Time=Time+1
3680          OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RLEV?"         !Read RxLev
3690          ENTER Uut;Rxlev(Arcount,Rxcount)
3700          OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RQU?"          !Read RxQual
3710          ENTER Uut;Rxqual(Arcount,Rxcount)
3720          OUTPUT Uut;"MEAS:CELL:MS:TERR?"                    !Also read uplink
timing error
3730          ENTER Uut;Txtim(Arcount,Rxcount)
3740        UNTIL Time>7 OR Rxlev(Arcount,Rxcount)<>-1           !Try again if SACCH
report not ready
3750        OUTPUT Uut;"MEAS:BET:BERR:RATIO1?"                  !Read bit error test
result
3760        ENTER Uut;Ber1(Arcount,Rxcount)
3770        Ber1(Arcount,Rxcount)=Ber1(Arcount,Rxcount)/10000     !Convert from ppm to
%
3780      NEXT Arcount
3790    NEXT Rxcount
3800    OUTPUT Uut;"RFG:AMPL1 ";Bchpwr                           !Reset downlink to
normal power
3810    CALL Sub_syserror(Uut,Error$(*),Errcount)               !Check for any logged
errors
3820  !
3830  !==========================================================================
3840  !
3850    Clock(2)=TIMEDATE-Clock(2)                            !Stop measurement timer
3860    Clock(3)=TIMEDATE                                      !Start call clearing
timer
3870  !
3880
!================================================================================
3890  !
3900  !END THE CALL
3910  !
3920    OUTPUT Uut;"DISP CELL1"                                  !Display the cell
control screen
3930    OUTPUT Uut;"CELL:CALL:END"                               !Request a call ter-
mination
3940    Time=0                                                  !Establish a loop to
wait for the mobile
```

```
3950    REPEAT                                                    !to clear the call
3960      Time=Time+1
3970      WAIT 1
3980      OUTPUT Uut;”CELL:CALL:STATUS:STATE?”                   !Check the call status
3990      ENTER Uut;Status$
4000    UNTIL Status$=”””INACTIVE””” OR Time>30                   !Call status will go
to inactive when the
4010    IF Time>30 THEN                                           !mobile has cleared
4020      Errcount=Errcount+1
4030      Error$(Errcount)=”Mobile failed to end call”            !Log an error if the
mobile fails to clear
4040      GOTO Timeflag                                          !and go to the timeout
code
4050      CALL Sub_syserror(Uut,Error$(*),Errcount)                !Check for any
Agilent 8922M/S logged errors
4060    END IF
4070    OUTPUT Uut;”CELL:CALL:TCH:ARFCN “;Dsparfcn(1)             !Reset the ARFCN and
mobile Tx level ready
4080    OUTPUT Uut;”CELL:MS:TLEV “;Dsppwr(1)                     !to begin testing the
next phone
4090
!=====================================================================================
4100  !
4110    Clock(3)=TIMEDATE-Clock(3)                              !Stop the call clearing
timer
4120  !
4130
!=====================================================================================
4140  !
4150  !PRINT MEASUREMENT RESULTS
4160  !
4170    CALL
Sub_printit(Fparfcn(*),Fppwr(*),Fpwrmeas(*),Null(*),Null(*),Null(*),Null(*),Nullst$(*
),Numfparfcn,Numfppwr,Message$(3),Message$(4),Emptyst$,Empty)
4180    CALL
Sub_printit(Dsparfcn(*),Dsppwr(*),Slpwr(*),Pkpher(*),Rmspher(*),Frer(*),Null(*),Mask$
(*),Numdsparfcn,Numdsppwr,Message$(5),Message$(6),Emptyst$,Empty)
4190    CALL
Sub_printit(Berarfcn(*),Berpwr(*),Ber1(*),Rxqual(*),Rxlev(*),Txtim(*),Null(*),Nullst$
(*),Numberarfcn,Numberpwr,Message$(7),Message$(8),Emptyst$,Empty)
4200  !
4210
!=====================================================================================
4220  !
4230  !PRINT TEST TIMES AND ERROR MESSAGES
4240  !
4250  !
4260    FOR X=1 TO 3
4270      PRINT Message$(X+9);DROUND(Clock(X),4);Message$(9)
4280    NEXT X
4290    PRINT
4300    PRINT
4310    IF Errcount=0 THEN
4320      Errcount=1
4330      Error$(1)=”No Errors”
4340    END IF
4350    FOR X=1 TO Errcount
4360      PRINT Error$(X)
4370    NEXT X
4380    Errcount=0
4390  !
4400
!==================================================================================
4410  !
4420  !LOOP IF ANOTHER PHONE IS TO BE TESTED
4430  !
4440    PRINT Message$(2)
4450    INPUT Answer$
```

```
4460    Run$=”no”
4470    IF Answer$=”Y” OR Answer$=”y” THEN Run$=”yes”
4480  UNTIL Run$<>”yes”
4490  END
4500  !
4510
!===================================================================================
4520  !SUBROUTINES BELOW
4530
!===================================================================================
4540  !
4550  !RESULTS PRINTING SUBROUTINE
4560  !
4570  SUB
Sub_printit(Result1(*),Result2(*),Result3(*),Result4(*),Result5(*),Result6(*),Result7
(*),Result8$(*),Numarfcn,Numpwr,Title$,Heading$,Emptyst$,Empty)
4580    PRINT Title$
4590    PRINT
4600    PRINT Heading$
4610    FOR Arcount=1 TO Numarfcn
4620      FOR Txcount=1 TO Numpwr
4630        PRINT Result1(Arcount),
4640        PRINT Result2(Txcount),
4650        IF Result3(1,1)<>Empty THEN PRINT DROUND(Result3(Arcount,Txcount),4),
4660        IF Result4(1,1)<>Empty THEN PRINT DROUND(Result4(Arcount,Txcount),4),
4670        IF Result5(1,1)<>Empty THEN PRINT DROUND(Result5(Arcount,Txcount),4),
4680        IF Result6(1,1)<>Empty THEN PRINT DROUND(Result6(Arcount,Txcount),4),
4690        IF Result7(1,1)<>Empty THEN PRINT DROUND(Result7(Arcount,Txcount),4),
4700        IF Result8$(1,1)<>Emptyst$ THEN PRINT Result8$(Arcount,Txcount),
4710        PRINT
4720      NEXT Txcount
4730    NEXT Arcount
4740    PRINT
4750  SUBEND
4760  !
4770  !=============================================================================
4780  !
4790  !CHECK FOR Agilent 8922M/S SYSTEM ERRORS
4800  !
4810  SUB Sub_syserror(Uut,Error$(*),Errcount)
4820    DIM Systemerror$[100]
4830    REPEAT                                        !Set up a loop to drain the
Agilent 8922M/S error stack
4840      OUTPUT Uut;”SYSTEM:ERROR?”                 !Read the last error from the
stack
4850      ENTER Uut;Systemerror$
4860      IF VAL(Systemerror$)<>0 THEN                !Code 0 indicates no error
4870        Errcount=Errcount+1                      !If not zero, add the error to
the programs error array
4880        Error$(Errcount)=Systemerror$
4890      END IF
4900    UNTIL VAL(Systemerror$)=0                    !End when all the errors have
been read
4910  SUBEND
4920  !
4930  !==============================================================================
4940  !end of program
```

Program 2

```
10    !RE-STORE “PROG2”
20    !RE-SAVE “PROG2:,1404”
30    !======================================================================
40    !
50    !Example program 2
60    !
70    !Advanced GPIB techniques for measuring a GSM900 mobile using the Agilent 8922S
and M
80    !GSM MS Test Sets.  The program measures Tx power, power vs time, phase and fre-
quency
90    !error, bit error ratio, timing error, Rx Lev and Rx Qual.  A hopping TCH is used
100   !to minimize channel change time. Power measurements are used to indicate when
the mobile
110   !has settled after a Tx Level change
120   !
130   !(c) Agilent Technologies 1996
140   !
150   !Rev 1.0
160   !I R HP QMD 7.9.94
170   !Slightly modified by C B 24.1.96 - Changed F/H to M/S throughout
180   !=========================================================================
190   !
200   DIM Berpwr(5)               !Downlink power levels in dBm for bit error test
210   DIM Berarfcn(125)           !ARFCN to perform bit error test on
220   DIM Dsppwr(15)              !Mobile Tx power levels for DSP test
230   DIM Dsparfcn(124)           !ARFCN to perform DSP test on
240   DIM Fparfcn(124)            !ARFCN to perform fast power test on
250   DIM Fppwr(15)               !Mobile Tx power levels for fast power test
260   DIM Message$(30)[100]       !Output strings
270   DIM Error$(50)[100]         !Error message strings
280   DIM Err$[100]               !Internally used temporary error string
290   DIM Rmspher(50,50)          !Measurement results from rms phase error, dimen-
sions(ARFCN,TXLEVEL)
300   DIM Pkpher(50,50)           !Measurement results from peak phase error
310   DIM Frer(50,50)             !Measurement results from freq error
320   DIM Slpwr(50,50)            !Measurement results from DSP analyzer power measure-
ment
330   DIM Txtim(50,50)            !Tx timing error measurement results
340   DIM Fpwrmeas(50,50)         !Measurement results from fast power
350   DIM Ber1(50,50)             !Bit error test measurement results, dimen-
sions(ARFCN,Downlink Power)
360   DIM Clock(5)                !Test Times
370   DIM Mask$(50,50)[10]        !Power versus time limit mask specification
380   DIM Rxqual(50,50)           !RxQual measurement results, dimensions(ARFCN,Down-
link Power)
390   DIM Rxlev(50,50)            !RxLev measurement results
400   DIM Null(50,50)             !Empty array
410   DIM Nullst$(50,50)[50]      !Empty string array
420   DIM Ca$[124]                !String for CA (Cell Allocation) table, used for hop-
ping call
430   DIM Ma$[63]                 !String for MA (Mobile Allocation) table, used for
hopping call
440   !
450   !===================================================================
460   !
470   !GENERAL MEASUREMENT SET UP SPECIFIED
480   !
490   Uut=714                     !GPIB address of Agilent 8922M/S
500   Extloss=-1                  !Loss of cable linking 8922 to mobile (loss=-xdB)
510   Bchpwr=-80                  !BCCH power level in dBm
520   Imsi$=”’001012345678901’”   !Paging IMSI of mobile’s test SIM
530   Timeouttime=30              !The GPIB timeout in seconds
```

```
540   Leveltol=1                  !Power tolerence to indicate TX Level has settled
after change (dB)
550   Fpthreshold=.3             !Power tolerence for fast power measurement after ana-
lyzer channel change (dB)
560   !
570   !======================================================================
580   !
590   !MEASUREMENT POINTS ARE DEFINED IN THIS SECTION
600   !
610   !Bit error ratio test
620   !
630   Numberpwr=1                 !The number of downlink power levels for bit error
test
640   Berpwr(1)=-102             !The power level in dBm of the first downlink power.
Etc....
650   Bits1=10000                 !The number of bits to test at each ARFCN/Power com-
bination
660   Numberarfcn=3               !The number of ARFCN for bit error test
670   Berarfcn(1)=1               !The value of the first ARFCN. Etc....
680   Berarfcn(2)=65
690   Berarfcn(3)=124
700   !
710   !
720   !NOTE: with hopping call method used in this program, no two ARFCN in either DSP
or Fast Power
730   !      should be placed too close together.  Closely spaced ARFCN will allow
unwanted energy to
740   !      to fall within the Agilent 8922M/S IF bandwidth and RF rise trigger on the
wrong timeslot.
750   !      Expect DSP FM Errors if this happens.
760   !
770   !DSP measurememnts
780   !
790   Numdsppwr=3                 !The number of mobile TX Levels for DSP test
800   Dsppwr(1)=5                 !The value of the first TX Level. Etc...
810   Dsppwr(2)=10
820   Dsppwr(3)=15
830   Numdsparfcn=3               !The number of ARFCN for DSP test
840   Dsparfcn(1)=1               !The value of the first ARFCN. Etc....
850   Dsparfcn(2)=65
860   Dsparfcn(3)=124
870   !
880   !Fast Power measurements
890   !
900   Numfppwr=8                  !The number of mobile TX Levels for fast power test
910   Fppwr(1)=6                  !The value of the first TX Level. Etc....
920   Fppwr(2)=7
930   Fppwr(3)=8
940   Fppwr(4)=9
950   Fppwr(5)=11
960   Fppwr(6)=12
970   Fppwr(7)=13
980   Fppwr(8)=14
990   Numfparfcn=3                !The number of ARFCN for fast power test
1000  Fparfcn(1)=1                !The value of the first ARFCN. Etc...
1010  Fparfcn(2)=65
1020  Fparfcn(3)=124
1030  !
1040  !=========================================================================
1050  !
1060  !PRINT MESSAGES ARE DEFINED BELOW
1070  !
1080  Message$(1)="Answer call when mobile rings"
1090  Message$(2)="Would you like to test again? (y or n)"
1100  Message$(3)="Results from Fast Power Measurement"
1110  Message$(4)="ARFCN    TXLEV    POWER dBm"
1120  Message$(5)="Results from Power, Power vs Time & Modulation Measurements"
1130  Message$(6)="ARFCN    TXLEV    POWER dBm   Pk & RMS PHASE   FREQ ERROR   MASK"
```

```
1140  Message$(7)=”Results from BER Test”
1150  Message$(8)=”ARFCN    Downlink dBm   BER1%   RxQual  RxLev       TIMERR”
1160  Message$(9)=” Seconds.”
1170  Message$(10)=”Time for phone to camp and answer page: “
1180  Message$(11)=”Time for testing                        : “
1190  Message$(12)=”Time for call clear down                : “
1200  !
1210  Emptyst$=”@”
1220  Empty=-999
1230  Nullst$(1,1)=Emptyst$
1240  Null(1,1)=Empty
1250  !
1260  !==========================================================================
1270  !
1280  !ERROR AND TIMEOUT HANDLING
1290  !
1300  Busport=INT(Uut/100)                          !Get the GPIB port code from Uut
address
1310  CLEAR Busport                                !Clear bus from any aborted previous
commands
1320  Timeinit$=”yes”                              !Set a flag so timeout code is not
executed first pass
1330  ON TIMEOUT Busport,Timeouttime GOTO Timeflag                !Establish goto flag
for HPIB timeouts
1340 Timeflag:IF Timeinit$<>”yes” THEN             !After a timeout, execution comes
here
1350    OFF TIMEOUT Busport
1360    CLEAR Busport                               !Clear any half done commands
1370    OUTPUT Uut;”TRIG:AST ‘disarm’”              !Dissarm the DSP trigger
1380   CALL Sub_syserror(Uut,Error$(*),Errcount)   !Gather any error message from the
Agilent 8922M/S
1390    PRINT “Measurement Timed Out. Ending Test”
1400    IF Errcount=0 THEN
1410      Errcount=1
1420      Error$(1)=”No errors recorded”
1430    END IF
1440    FOR X=1 TO Errcount                         !Print error messages
1450      PRINT Error$(X)
1460    NEXT X
1470    STOP                                      !Execution stops here after critical
errors
1480  ELSE
1490    Timeinit$=”no”                             !Reset flag so next time, it must
be a real timeout
1500  END IF
1510  Errcount=0
1520  CALL Sub_syserror(Uut,Error$(*),Errcount)      !Clear any old errors from
Agilent 8922M/S before the
1530  Errcount=0                                    !test begins
1540  !
1550  !===========================================================================
1560  !
1570  !PRESET THE HP 8922M/S AND SET IT TO THE CORRECT COMPATIBILITY MODE  (executed
once only)
1580  !
1590  !
1600  OUTPUT Uut;”*RST”                             !Preset the Agilent 8922M/S
1610  OUTPUT Uut;”CONF:COMP?”                     !Check compatability mode and set
to M or S
1620  ENTER Uut;Product$
1630  IF Product$<>”””8922S””” AND Product$<>”””8922M””” THEN
1640    IF Product$=”””8922E””” THEN OUTPUT Uut;”CONF:COMP ‘8922S’”
1650    IF Product$=”””8922G””” THEN OUTPUT Uut;”CONF:COMP ‘8922M’”
1660    OUTPUT Uut;”*RST”                           !A preset is needed after compat-
ability change
1670  END IF
1680  CALL Sub_syserror(Uut,Error$(*),Errcount)      !Check for any errors logged by
Agilent 8922M/S
```

```
1690  !
1700
!================================================================================
1710  !
1720  !CREATE CA AND MA TABLES FOR HOPPED TCH   (executed once only)
1730  !
1740  !
1750  OUTPUT Uut;”DISP:SCR CCON”                       !Display the cell config screen
1760  OUTPUT Uut;”CCON:STATE ‘settable’”            !Take the cell down to edit CA and
MA tables
1770  Mano=0                                           !Count for number of MA entries
1780  Ca$=””                                           !String will be used for CA table
1790  FOR X=1 TO 124                                   !Count through 124 possible ARFCN
1800    Bit$=”0”                                   !Set CA table entry initially to zero
1810    FOR Y=1 TO Numfparfcn                          !Check all fast power ARFCN for
ARFCN X
1820      IF Fparfcn(Y)=X THEN Bit$=”1”                !If ARFCN = X make this CA entry
a one
1830    NEXT Y
1840    FOR Y=1 TO Numdsparfcn                         !Similarly check DSP ARFCN
1850      IF Dsparfcn(Y)=X THEN Bit$=”1”
1860    NEXT Y
1870    Ca$=Ca$&Bit$                                   !Add this digit to CA string
1880    IF Bit$=”1” THEN Mano=Mano+1                   !If the entry is one, there will
need to be an MA entry
1890  NEXT X
1900  FOR X=1 TO 63                                    !Count through the MA table
1910    Bit$=”0”                                       !Initial value for MA digit X
1920    IF Mano>0 THEN Bit$=”1”                        !Place the same nomber of 1s in
the MA as in the CA
1930    Mano=Mano-1
1940    Ma$=Ma$&Bit$
1950  NEXT X
1960  OUTPUT Uut;”CCON:CA “&”’”&Ca$&”’”                !Output the CA and MA tables
1970  OUTPUT Uut;”CCON:MA1 “&”’”&Ma$&”’”
1980  OUTPUT Uut;”CCON:MA2 “&”’”&Ma$&”’”
1990  OUTPUT Uut;”DISP:SCR CELL1”                     !Display the cell control screen,
and select +
2000  OUTPUT Uut;”CELL:MODE ‘ACTIVE CELL +’”        !mode for hopped call. Mode change
activates cell
2010  !
2020  !
2030  !==========================================================================
2040  !
2050  !SET THE Agilent 8922M/S INITIAL CONDITIONS  (executed once only)
2060  !
2070  !
2080  OUTPUT Uut;”MSINFO:PAGING:IMSI “&Imsi$          !Set the paging IMSI
2090  OUTPUT Uut;”CONF:OFL:RFIN “;Extloss             !Set the external cable loss
2100  OUTPUT Uut;”CELL:CALL:TCH:ARFCN “;Dsparfcn(1)  !Set the ARFCN to the first
expected test point
2110  OUTPUT Uut;”CELL:MS:TLEV “;Dsppwr(1)            !Set the mobile Tx Level to the
first test point
2120  OUTPUT Uut;”CONF:OFL:MODE ‘ON’”                 !Turn external offset mode ON to
use cable loss
2130  OUTPUT Uut;”CW:PMZERO”                          !Zero the power meter
2140  OUTPUT Uut;”RFG:AMPL1 “;Bchpwr                 !Set the downlink power for normal
signalling
2150  OUTPUT Uut;”TRIG:MODE ‘SINGLE’”              !Set the DSP meas trigger to single
trig mode
2160  OUTPUT Uut;”TRIG:BET ‘SINGLE’”                !Set bit error meas trigger to sin-
gle trig mode
2170  OUTPUT Uut;”BET:BITS1 “;Bits1                  !Set the number of bits to be mea-
sured for bit error
2180  OUTPUT Uut;”DISP:SCR DSP”                       !Display the DSP amplitude main
screen to enter limits
2190  OUTPUT Uut;”DISP:SCR:DSP:VIEW ‘AMPL MAIN’”     !for power versus time mask
```

```
2200  DATA -40,-28,-18,-10,0,180,360,542.769,547.769,552.769,560.769,570.769 !Mask
corner times in us
2210  DATA -36,-30,-6,4,1,1,1,1,1,-6,-30,-36                                !Upper
limits in dB
2220  DATA -60,-60,-60,-60,-1,-1,-1,-1,-60,-60,-60,-60                    !Lower lim-
its in dB
2230  FOR X=1 TO 12
2240    READ Masktim                                                   !Reas corner times
from DATA statement
2250    Masktim=Masktim/1.E+6                                          !Convert seconds
2260    Num$=VAL$(X)                                                   !Convert index to
string for HPIB
2270    OUTPUT Uut;”DSP:AMPL:”&”time”&Num$&” “;Masktim                 !Output marker times
2280  NEXT X
2290  FOR X=1 TO 12
2300    READ Maskup                                                 !Read and output upper
limits
2310    Num$=VAL$(X)
2320    OUTPUT Uut;”MEAS:DSP:AMPL:”&”AMPL”&Num$&”:HLIM “;Maskup
2330    OUTPUT Uut;”MEAS:DSP:AMPL:”&”AMPL”&Num$&”:HLIM:STATE ON”
2340  NEXT X
2350  FOR X=1 TO 12
2360    READ Masklo                                                 !Read and output lower
limits
2370    Num$=VAL$(X)
2380    OUTPUT Uut;”MEAS:DSP:AMPL:”&”AMPL”&Num$&”:LLIM “;Masklo
2390    OUTPUT Uut;”MEAS:DSP:AMPL:”&”AMPL”&Num$&”:LLIM:STATE ON”
2400  NEXT X
2410  !
2420
!==================================================================================
2430  !
2440  !ESTABLISH A LOOP TO BE EXECUTED EACH TIME A MOBILE IS TESTED
2450  !
2460  !
2470  Run$=”yes”                                                      !Flag for REPEAT loop
2480  REPEAT
2490    Clock(1)=TIMEDATE                                              !Start a test time
clock for call set up
2500  !
2510
!==================================================================================
2520  !
2530  !PAGE THE MOBILE AND ESTABLISH A CALL
2540  !
2550  !
2560    OUTPUT Uut;”DISP:SCR CELL1”                                    !Display the cell
control screen
2570    PRINT Message$(1)                                              !Output answer call
message
2580    OUTPUT Uut;”CELL:TCH1:MODE ‘hopped’”                           !Set the TCH to hop
mode
2590    OUTPUT Uut;”CELL:CALL:ORIGINATE”                               !Page mobile
Agilent 8922M/S org call
2600    Time=0                                                     !Set counter for mobile
to answer
2610    Maxtime=100
2620    REPEAT
2630      Time=Time+1
2640      WAIT 1
2650     OUTPUT Uut;”CELL:CALL:STATUS:STATE?”                       !Check the call status
for connected
2660      ENTER Uut;Status$
2670    UNTIL Status$=”””CONNECTED””” OR Time>Maxtime
2680    IF Time>Maxtime THEN
2690      Errcount=Errcount+1
2700      Error$(Errcount)=”Call could not be established”
```

```
2710      GOTO Timeflag                                           !If wait too long,
goto timeout code
2720    END IF
2730  !
2740
!==================================================================================
2750  !
2760    Clock(1)=TIMEDATE-Clock(1)                              !End call set up timer
2770    Clock(2)=TIMEDATE                                     !Start measurement timer
2780  !
2790
!==================================================================================
2800  !
2810  !UNCOUPLE Agilent 8922M/S RF ANALYZER FROM GSM BASE STATION EMULATOR
2820  !
2830    OUTPUT Uut;"CELL:MS:TADV:MODE 'manual'"                   !Fix timing advance
at 0 so 8922 doesn't auto adjust
2840    OUTPUT Uut;"TRIG:DDEM:AST 'disarm'"                       !Disable the uplink
demodulator
2850    OUTPUT Uut;"HOPC:RFAN:AST 'disarm'"                     !Stop the RF Analyzer
from hopping
2860    OUTPUT Uut;"HOPC:RFAN:MODE 'non-hop'"
2870    OUTPUT Uut;"TRIG:SOUR  'rf rise'"                       !Trigger measurements
from RF rise, when  the
2880    OUTPUT Uut;"TRIG:DEL 0"                                  !signal falls within
the IF bandwidth
2890  !
2900
!==================================================================================
2910  !
2920  !PERFORM DSP MEASUREMENTS
2930  !
2940    OUTPUT Uut;"DISP DSP"                                     !Return to the DSP
amplitude main screen
2950    FOR Txcount=1 TO Numdsppwr                                !Outer loop for Tx
levels
2960      Txlev=Dsppwr(Txcount)                               !Get Tx level from array
2970      OUTPUT Uut;"CELL:MS:TLEV";Txlev                        !Program mobile's Tx
level
2980      Txlevchange$="true"
2990      FOR Arcount=1 TO Numdsparfcn                           !Inner loop for ARFCN
3000        Arfcn=Dsparfcn(Arcount)                              !Get ARFCN from array
3010        Freq=(890+Arfcn*.2)*1000000                          !Calculate ARFCN fre-
quency
3020        OUTPUT Uut;"RFAN:FREQ ";Freq                        !Tune the RF Analyzer
to select individual ARFCN
3030        Count=0                                               !Establish counter
for repeat measurements
3040        REPEAT                                               !May need to repeat
if mobile not settled
3050          OUTPUT Uut;"TRIG:AST 'ARM'"                        !Arm the DSP measure-
ment
3060          OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:RMS?"   !Read all the DSP
results: rms phase error
3070          ENTER Uut;Rmspher(Arcount,Txcount)
3080  !Note: program will stick here, waiting for input if mobile fails to provide a
valid signal to trigger
3090  !      the Agilent 8922M/S.  The program will timeout.  The timeout code dissarms
the Agilent 8922M/S trigger.
3100        OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:PEAK?"  !
peak phase error
3110          ENTER Uut;Pkpher(Arcount,Txcount)
3120          OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:FRE-
QUENCY?"!                   frequency error
3130          ENTER Uut;Frer(Arcount,Txcount)
3140        OUTPUT Uut;"MEASURE:DSPANALYZER:MSUM?"            !
power versus time mask
3150          ENTER Uut;Mask$(Arcount,Txcount)
```

```
3160        OUTPUT Uut;"MEASURE:DSPANALYZER:PTCP?"            !
Tx power
3170         ENTER Uut;Slpwr(Arcount,Txcount)
3180         OUTPUT Uut;"RFAN:AMPL1?"                          !Read expected power
level to compare with
3190         ENTER Uut;Anlevel                                 !measured and +/-3dB
allowed range
3200         OUTPUT Uut;"MEASURE:DSPANALYZER:SSTATUS?"          !Check for any DSP
measurement errors
3210         ENTER Uut;Sstatus$
3220        Threedb=ABS(Anlevel-Slpwr(Arcount,Txcount))        !Calculate difference
between measured and expected
3230         Count=Count+1
3240       UNTIL Count=3 OR Threedb<Leveltol OR Txlevchange$="false" !Re-do DSP once
if phone fails, the mobile
3250      IF Sstatus$<>"""No Error""" OR Threedb>3 THEN        !may still be settling
after Tx Level change
3260         Err$="DSP Measurement Problem "                   !Create an error mes-
sage string
3270         IF Sstatus$<>"""No Error""" THEN Err$=Err$&Sstatus$
3280         IF Threedb>3 THEN Err$=Err$&" 3dB input range exceeded"
3290         Errcount=Errcount+1
3300         Error$(Errcount)=Err$
3310       END IF
3320       Txlevchange$="false"
3330     NEXT Arcount
3340   NEXT Txcount
3350  !
3360
!==================================================================================
3370  !
3380  !PERFORM FAST POWER MEASUREMENTS
3390  !
3400   OUTPUT Uut;"DISP:SCR CELL1"                             !Display cell control
screen
3410   FOR Txcount=Numfppwr TO 1 STEP -1                       !Outer loop for mobile
Tx levels
3420     Txlev=Fppwr(Txcount)                                 !Get Tx level from array
3430     OUTPUT Uut;"CELL:MS:TLEV";Txlev                         !Program mobile's Tx
level
3440     Txlevchange$="true"
3450     FOR Arcount=1 TO Numfparfcn                             !Inner loop for ARFCN
3460       Arfcn=Fparfcn(Arcount)                                !Get ARFCN from array
3470       Freq=(890+Arfcn*.2)*1000000                           !Calculate frequency
from ARFCN
3480       OUTPUT Uut;"RFAN:FREQ ";Freq                           !Tune analyzer fre-
quency
3490       Txlevcount=0                                          !Count for Tx Level
settling
3500       REPEAT                                               !Loop while mobile Tx
Level settles
3510         Count=0                                             !Count for inner loop
3520         Fastpower1=0                                         !Swap variable for
fast power measurement
3530         REPEAT                                               !Loop untill value
stabalizes after analyzer
3540           Fastpower2=Fastpower1                              !tuning.
3550           OUTPUT Uut;"MEAS:FTCP:POW?"                       !read the peak power
meter
3560           ENTER Uut;Fastpower1
3570          Deltapower=ABS(Fastpower1-Fastpower2)           !Look for change since
last measurement
3580           Count=Count+1                                      !Though away 4 old
readings (in Agilent 8922M/S
3590         UNTIL (Count>4 AND Deltapower<Fpthreshold) OR Count>10 !measurement
pipline) then look for settled
3600         IF Count>10 THEN                                     !value on new mea-
surement ARFCN. If it never
```

```
3610          Errcount=Errcount+1                            !settles note an error
3620           Error$(Errcount)="Mobile's output power did not settle within
'Fpthreshold' limits"
3630          END IF
3640          Fpwrmeas(Arcount,Txcount)=(Fastpower1+Fastpower2)/2 !Average last two
good readings
3650          OUTPUT Uut;"RFAN:AMPL1?"                          !Read the
Agilent 8922M/S analyzer expected input level
3660          ENTER Uut;Anlevel                               !and compare with the
measured power to check that
3670         Threedb=ABS(Anlevel-Fpwrmeas(Arcount,Txcount))     !the result is within
the allowed +/-3dB window
3680          Txlevcount=Txlevcount+1
3690        UNTIL Threedb<Leveltol OR Txlevcount>10 OR Txlevchange$="false"
3700        IF Threedb>3 THEN
3710          Errcount=Errcount+1
3720          Error$(Errcount)="Fast power meas 3dB input range exceeded"
3730        END IF
3740        Txlevchange$="false"
3750      NEXT Arcount
3760    NEXT Txcount
3770  !
3780
!==================================================================================
3790  !
3800  !RE-COUPLE Agilent 8922M/S RF ANALYZER TO BASE STATION EMULATOR
3810  !
3820    OUTPUT Uut;"TRIG:DEL 473.4T"                            !Set approx three
timeslot delay for internal
3830    OUTPUT Uut;"TRIG:SOUR  'ext demod'"                     !downlink trigger,
and select downlink trigger
3840    OUTPUT Uut;"HOPC:RFAN:MODE 'hop'"                     !Set analyzer back to
hopping mode
3850    OUTPUT Uut;"HOPC:RFAN:AST 'arm'"                        !Re-enable hopping
3860    OUTPUT Uut;"TRIG:DDEM:AST 'arm'"                      !Re-enable the uplink
demodulator
3870    OUTPUT Uut;"CELL:MS:TADV:MODE 'auto'"                   !Return to default
timing advance mode
3880  !
3890
!==================================================================================
3900  !
3910  !PERFORM BIT ERROR MEASUREMENTS
3920  !                                                   !Note: 4 BER measurements
can be made in parallel
3930    OUTPUT Uut;"DISP:SCR BER1"                              !Display single BER
test screen
3940    OUTPUT Uut;"CELL:TCH1:MODE 'single'"                    !Return to non-hop
TCH. Next channel change executes FACCH
3950    FOR Rxcount=1 TO Numberpwr                             !Outer loop for down-
link power levels
3960      Berpo=Berpwr(Rxcount)                                 !Get downlink power
level from array
3970      OUTPUT Uut;"RFG:AMPL1 ";Berpo                      !Program Agilent 8922M/
S Generator to downlink power
3980      Count=0                                              !Establish a loop to
wait for the mobile's receiver
3990      Instance=0                                           !AGC to recover from
downlink level change.
4000      REPEAT                                              !The mobile's reported
RXQual will indicate when
4010        OUTPUT Uut;"MEAS:CELL:SACCH:RESET"                  !the AGC has recov-
ered. Start by clearing old SACCH
4020        Count=Count+1                                     !The inner REPEAT loop
is used to check and wait
4030        Rxqualsettle=-1                                     !for the next SACCH
report from mobile.  When the
```

```
4040        Time=0                                                   !Agilent 8922M/S is
waiting for a report, after a SACCH
4050        REPEAT                                                   !reset it returns -1
4060          WAIT .3                                                !Pause. SACCH is a
low bandwidth channel.
4070          Time=Time+1
4080         OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RQU?"            !Read the SACCH report
from the mobile
4090          ENTER Uut;Rxqualsettle                                 !-1 is returned if
Agilent 8922M/S is still waiting
4100        UNTIL Time>7 OR Rxqualsettle<>-1                         !for the report
4110        IF Rxqualsettle<=4 THEN                                  !If RxQual is less
than 4, it's good enough to
4120         Instance=Instance+1                                   !continue.  The program
checks for more than
4130        ELSE                                                   !3 consecutive reports
at RxQual 4 or less to
4140         Instance=0                                            !be be sure the mobile
has stabalized.  The
4150        END IF                                                  !mobile may return up
to 2 reports at the old
4160      UNTIL Count>20 OR Instance>3                               !level, before it
recognizes the input level
4170      IF Count>20 OR Rxqualsettle=-1 THEN                        !change
4180        Errcount=Errcount+1                                      !If RxQual does not
stabalize, report an error
4190        Error$(Errcount)="Mobile receiver AGC did not respond to downlink level
change"
4200      END IF
4210      FOR Arcount=1 TO Numberarfcn                               !Inner loop for BER
test ARFCN
4220        Arfcn=Berarfcn(Arcount)                                 !Get ARFCN from array
4230        OUTPUT Uut;"CELL:CALL:TCH:ARFCN ";Arfcn                  !Request channel
assignment. Agilllent 8922M/S will hold
4240        OUTPUT Uut;"TRIG:BET:MODE 'RUN'"                         !off BER test until
channel change is done. Run test.
4250        OUTPUT Uut;"MEAS:CELL:SACCH:RESET"                       !While BER test is
running, test SACCH reports
4260        Rxlev(Arcount,Rxcount)=-1                                !Clear old reports
4270        Time=0
4280        REPEAT                                                   !Loop and wait for
SACCH report. -1 is returned
4290          WAIT .3                                                !when HP 8922M/S is
waiting for report
4300          Time=Time+1
4310          OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RLEV?"             !Read RxLev
4320          ENTER Uut;Rxlev(Arcount,Rxcount)
4330          OUTPUT Uut;"MEAS:CELL:SACCH:PARTIAL:RQU?"              !Read RxQual
4340          ENTER Uut;Rxqual(Arcount,Rxcount)
4350          OUTPUT Uut;"MEAS:CELL:MS:TERR?"                        !Also read uplink
timing error
4360          ENTER Uut;Txtim(Arcount,Rxcount)
4370        UNTIL Time>7 OR Rxlev(Arcount,Rxcount)<>-1               !Try again if SACCH
report not ready
4380        OUTPUT Uut;"MEAS:BET:BERR:RATIO1?"                      !Read bit error test
result
4390        ENTER Uut;Ber1(Arcount,Rxcount)
4400        Ber1(Arcount,Rxcount)=Ber1(Arcount,Rxcount)/10000       !Convert from ppm to
%
4410      NEXT Arcount
4420    NEXT Rxcount
4430    OUTPUT Uut;"RFG:AMPL1 ";Bchpwr                               !Reset downlink to
normal power
4440  !
4450
!===============================================================================
4460  !
4470    Clock(2)=TIMEDATE-Clock(2)                                 !Stop measurement timer
```

```
4480    Clock(3)=TIMEDATE                                        !Start call clearing
timer
4490  !
4500
!================================================================================
4510  !
4520  !END THE CALL
4530  !
4540    OUTPUT Uut;”DISP CELL1”                                   !Display the cell
control screen
4550    OUTPUT Uut;”CELL:CALL:END”                                !Request a call ter-
mination
4560    Time=0                                                   !Establish a loop to
wait for the mobile
4570    REPEAT                                                    !to clear the call
4580      Time=Time+1
4590      WAIT 1
4600      OUTPUT Uut;”CELL:CALL:STATUS:STATE?”                   !Check the call status
4610      ENTER Uut;Status$
4620    UNTIL Status$=”””INACTIVE””” OR Time>30                  !Call status will go
to inactive when the
4630    IF Time>30 THEN                                           !mobile has cleared
4640      Errcount=Errcount+1
4650      Error$(Errcount)=”Mobile failed to end call”           !Log an error if the
mobile fails to clear
4660      GOTO Timeflag                                         !and go to the timeout
code
4670      CALL Sub_syserror(Uut,Error$(*),Errcount)               !Check for any
Agilent 8922M/S logged errors
4680    END IF
4690    OUTPUT Uut;”CELL:CALL:TCH:ARFCN “;Dsparfcn(1)            !Reset the ARFCN and
mobile Tx level ready
4700    OUTPUT Uut;”CELL:MS:TLEV “;Dsppwr(1)                     !to begin testing the
next phone
4710
!===================================================================================
4720  !
4730    Clock(3)=TIMEDATE-Clock(3)                             !Stop the call clearing
timer
4740  !
4750
!====================================================================================
4760  !
4770  !PRINT MEASUREMENT RESULTS
4780  !
4790    CALL
Sub_printit(Fparfcn(*),Fppwr(*),Fpwrmeas(*),Null(*),Null(*),Null(*),Null(*),Nullst$(*
),Numfparfcn,Numfppwr,Message$(3),Message$(4),Emptyst$,Empty)
4800    CALL
Sub_printit(Dsparfcn(*),Dsppwr(*),Slpwr(*),Pkpher(*),Rmspher(*),Frer(*),Null(*),Mask$
(*),Numdsparfcn,Numdsppwr,Message$(5),Message$(6),Emptyst$,Empty)
4810    CALL
Sub_printit(Berarfcn(*),Berpwr(*),Ber1(*),Rxqual(*),Rxlev(*),Txtim(*),Null(*),Nullst$
(*),Numberarfcn,Numberpwr,Message$(7),Message$(8),Emptyst$,Empty)
4820  !
4830
!====================================================================================
4840  !
4850  !PRINT TEST TIMES AND ERROR MESSAGES
4860  !
4870  !
4880    FOR X=1 TO 3
4890      PRINT Message$(X+9);DROUND(Clock(X),4);Message$(9)
4900    NEXT X
4910    PRINT
4920    PRINT
4930    IF Errcount=0 THEN
4940      Errcount=1
```

```
4950      Error$(1)=”No Errors”
4960    END IF
4970    FOR X=1 TO Errcount
4980      PRINT Error$(X)
4990    NEXT X
5000    Errcount=0
5010  !
5020
!=================================================================================
5030  !
5040  !LOOP IF ANOTHER PHONE IS TO BE TESTED
5050  !
5060    PRINT Message$(2)
5070    INPUT Answer$
5080    Run$=”no”
5090    IF Answer$=”Y” OR Answer$=”y” THEN Run$=”yes”
5100  UNTIL Run$<>”yes”
5110  END
5120  !
5130
!===================================================================================
5140  !SUBROUTINES BELOW
5150
!===================================================================================
5160  !
5170  !RESULTS PRINTING SUBROUTINE
5180  !
5190  SUB
Sub_printit(Result1(*),Result2(*),Result3(*),Result4(*),Result5(*),Result6(*),Result7
(*),Result8$(*),Numarfcn,Numpwr,Title$,Heading$,Emptyst$,Empty)
5200    PRINT Title$
5210    PRINT
5220    PRINT Heading$
5230    FOR Arcount=1 TO Numarfcn
5240      FOR Txcount=1 TO Numpwr
5250        PRINT Result1(Arcount),
5260        PRINT Result2(Txcount),
5270        IF Result3(1,1)<>Empty THEN PRINT DROUND(Result3(Arcount,Txcount),4),
5280        IF Result4(1,1)<>Empty THEN PRINT DROUND(Result4(Arcount,Txcount),4),
5290        IF Result5(1,1)<>Empty THEN PRINT DROUND(Result5(Arcount,Txcount),4),
5300        IF Result6(1,1)<>Empty THEN PRINT DROUND(Result6(Arcount,Txcount),4),
5310        IF Result7(1,1)<>Empty THEN PRINT DROUND(Result7(Arcount,Txcount),4),
5320        IF Result8$(1,1)<>Emptyst$ THEN PRINT Result8$(Arcount,Txcount),
5330        PRINT
5340      NEXT Txcount
5350    NEXT Arcount
5360    PRINT
5370  SUBEND
5380  !
5390  !=============================================================================
5400  !
5410  !CHECK FOR Agilent 8922M/S SYSTEM ERRORS
5420  !
5430  SUB Sub_syserror(Uut,Error$(*),Errcount)
5440    DIM Systemerror$[100]
5450    REPEAT                                          !Set up a loop to drain the
Agilent 8922M/S error stack
5460      OUTPUT Uut;”SYSTEM:ERROR?”                    !Read the last error from the
stack
5470      ENTER Uut;Systemerror$
5480      IF VAL(Systemerror$)<>0 THEN                  !Code 0 indicates no error
5490        Errcount=Errcount+1                         !If not zero, add the error to
the programs error array
5500        Error$(Errcount)=Systemerror$
5510      END IF
5520    UNTIL VAL(Systemerror$)=0                       !End when all the errors have
been read
5530  SUBEND
```

```
5540  !
5550  !============================================================================
5560  !end of program
```

Program 3

```
0    !RE-STORE "PROG3"
20    !RE-SAVE "PROG3:,1404"
30    !========================================================================
40    !
50    !Example program 3
60    !
70    !GPIB program to demonstrate techniques for measuring a GSM mobile opperating in
test mode using
80    !the Agilent 8922M and S GSM MS Test Sets.  The program uses the Agilent 8922M/S
Aux RF Out port to simulate
90    !the test mode mobile.  In all other respects, the Agilent 8922M/S is configured
to measure a mobile
100   !without the use of over-the-air signalling.  The program measures: Tx power,
power versus time,
110   !phase and frequency error and bit error ratio.
120   !
130   !(c) Agilent Technologies 1996
140   !
150   !Rev 1.0
160   !I R HP QMD 7.9.94
170   !Slightly modified by C B 24.1.96 - Changed F/H to M/S throughout
180   !===========================================================================
190   !
200   DIM Berpwr(5)               !Downlink power levels in dBm for bit error test
210   DIM Berarfcn(125)           !ARFCN to perform bit error test on
220   DIM Dsppwr(15)              !Mobile Tx power levels for DSP test
230   DIM Dsparfcn(124)           !ARFCN to perform DSP test on
240   DIM Fparfcn(124)            !ARFCN to perform fast power test on
250   DIM Fppwr(15)               !Mobile Tx power levels for fast power test
260   DIM Message$(30)[100]       !Output strings
270   DIM Error$(50)[100]         !Error message strings
280   DIM Err$[100]               !Internally used temporary error string
290   DIM Rmspher(50,50)          !Measurement results from rms phase error, dimen-
sions(ARFCN,TXLEVEL)
300   DIM Pkpher(50,50)           !Measurement results from peak phase error
310   DIM Frer(50,50)             !Measurement results from freq error
320   DIM Slpwr(50,50)           !Measurement results from DSP analyzer power measure-
ment
330   DIM Txtim(50,50)            !Tx timing error measurement results
340   DIM Fpwrmeas(50,50)         !Measurement results from fast power
350   DIM Ber1(50,50)             !Bit error test measurement results, dimen-
sions(ARFCN,Downlink Power)
360   DIM Clock(5)                !Test Times
370   DIM Mask$(50,50)[10]        !Power versus time limit mask specification
380   DIM Rxqual(50,50)           !RxQual measurement results, dimensions(ARFCN,Down-
link Power)
390   DIM Rxlev(50,50)            !RxLev measurement results
400   DIM Null(50,50)             !Empty array
410   DIM Nullst$(50,50)[50]      !Empty string array
420   DIM Ca$[124]               !String for CA (Cell Allocation) table, used for hop-
ping call
430   DIM Ma$[63]                 !String for MA (Mobile Allocation) table, used for
hopping call
440   !
450   !=====================================================================
460   !
```

```
470   !GENERAL MEASUREMENT SET UP SPECIFIED
480   !
490   Uut=714                      !GPIB address of Agilent 8922M/S
500   Extloss=-.5                  !Loss of cable linking 8922 to mobile (loss=-xdB)
510   Bchpwr=-80                   !BCCH power level in dBm
520   Timeouttime=20               !The GPIB timeout in seconds
530   Leveltol=1                   !Power tolerence to indicate TX Level has settled
after change (dB)
540   Fpthreshold=.3             !Power tolerence for fast power measurement after ana-
lyzer channel change (dB)
550   !
560   !======================================================================
570   !
580   !MEASUREMENT POINTS ARE DEFINED IN THIS SECTION
590   !
600   !Bit error ratio test
610   !
620   Numberpwr=1                  !The number of downlink power levels for bit error
test
630   Berpwr(1)=-102              !The power level in dBm of the first downlink power.
Etc....
640   Bits1=10000                  !The number of bits to test at each ARFCN/Power com-
bination
650   Numberarfcn=3                !The number of ARFCN for bit error test
660   Berarfcn(1)=1                !The value of the first ARFCN. Etc....
670   Berarfcn(2)=65
680   Berarfcn(3)=124
690   !
700   !
710   !DSP measurememnts
720   !
730   Numdsppwr=3                  !The number of mobile TX Levels for DSP test
740   Dsppwr(1)=5                  !The value of the first TX Level. Etc...
750   Dsppwr(2)=10
760   Dsppwr(3)=15
770   Numdsparfcn=3                !The number of ARFCN for DSP test
780   Dsparfcn(1)=1                !The value of the first ARFCN. Etc....
790   Dsparfcn(2)=65
800   Dsparfcn(3)=124
810   !
820   !Fast Power measurements
830   !
840   Numfppwr=8                   !The number of mobile TX Levels for fast power test
850   Fppwr(1)=6                   !The value of the first TX Level. Etc....
860   Fppwr(2)=7
870   Fppwr(3)=8
880   Fppwr(4)=9
890   Fppwr(5)=11
900   Fppwr(6)=12
910   Fppwr(7)=13
920   Fppwr(8)=14
930   Numfparfcn=3                 !The number of ARFCN for fast power test
940   Fparfcn(1)=1                 !The value of the first ARFCN. Etc...
950   Fparfcn(2)=65
960   Fparfcn(3)=124
970   !
980   !=========================================================================
990   !
1000  !PRINT MESSAGES ARE DEFINED BELOW
1010  !
1020  Message$(1)="Answer call when mobile rings"
1030  Message$(2)="Would you like to test again? (y or n)"
1040  Message$(3)="Results from Fast Power Measurement"
1050  Message$(4)="ARFCN    TXLEV    POWER dBm"
1060  Message$(5)="Results from Power, Power vs Time & Modulation Measurements"
1070  Message$(6)="ARFCN    TXLEV    POWER dBm   Pk & RMS PHASE   FREQ ERROR   MASK"
1080  Message$(7)="Results from BER Test"
1090  Message$(8)="ARFCN    Downlink dBm   BER1%   RxQual  RxLev      TIMERR"
```

```
1100  Message$(9)=" Seconds."
1110  Message$(10)="Time for phone to camp and answer page: "
1120  Message$(11)="Time for testing                       : "
1130  Message$(12)="Time for call clear down               : "
1140  !
1150  Emptyst$="@"
1160  Empty=-999
1170  Nullst$(1,1)=Emptyst$
1180  Null(1,1)=Empty
1190  !
1200  !=========================================================================
1210  !
1220  !ERROR AND TIMEOUT HANDLING
1230  !
1240  Busport=INT(Uut/100)                         !Get the GPIB port code from Uut
address
1250  CLEAR Busport                              !Clear bus from any aborted previous
commands
1260  Timeinit$="yes"                              !Set a flag so timeout code is not
executed first pass
1270  ON TIMEOUT Busport,Timeouttime GOTO Timeflag                !Establish goto flag
for GPIB timeouts
1280 Timeflag:IF Timeinit$<>"yes" THEN             !After a timeout, execution comes
here
1290    OFF TIMEOUT Busport
1300    CLEAR Busport                              !Clear any half done commands
1310    OUTPUT Uut;"TRIG:AST 'disarm'"              !Dissarm the DSP trigger
1320   CALL Sub_syserror(Uut,Error$(*),Errcount)   !Gather any error message from the
Agilent 8922M/S
1330    PRINT "Measurement Timed Out. Ending Test"
1340    IF Errcount=0 THEN
1350      Errcount=1
1360      Error$(1)="No errors recorded"
1370    END IF
1380    FOR X=1 TO Errcount                        !Print error messages
1390      PRINT Error$(X)
1400    NEXT X
1410   STOP                                    !Execution stops here after critical
errors
1420  ELSE
1430    Timeinit$="no"                             !Reset flag so next time, it must
be a real timeout
1440  END IF
1450  Errcount=0
1460  CALL Sub_syserror(Uut,Error$(*),Errcount)      !Clear any old errors from
Agilent 8922M/S before the
1470  Errcount=0                                 !test begins
1480  !
1490  !==========================================================================
1500  !
1510  !PRESET THE Agilent 8922M/S AND SET IT TO THE CORRECT COMPATIBILITY MODE  (exe-
cuted once only)
1520  !
1530  !
1540  OUTPUT Uut;"*RST"                          !Preset the Agilent 8922M/S
1550  OUTPUT Uut;"CONF:COMP?"                    !Check compatability mode and set
to F or H
1560  ENTER Uut;Product$
1570  IF Product$<>"""8922S""" AND Product$<>"""8922M""" THEN
1580    IF Product$="""8922E""" THEN OUTPUT Uut;"CONF:COMP '8922S'"
1590    IF Product$="""8922G""" THEN OUTPUT Uut;"CONF:COMP '8922M'"
1600    OUTPUT Uut;"*RST"                          !A preset is needed after compat-
ability change
1610  END IF
1620  CALL Sub_syserror(Uut,Error$(*),Errcount)      !Check for any errors logged by
Agilent 8922M/S
1630  !
```

```
1640
!===============================================================================
1650  !
1660  !SELECT Agilent 8922M/S OPPERATING MODE TO SUITE MOBILES IN TEST MODE (executed
once only)
1670  !
1680  OUTPUT Uut;"CELL:MODE 'TEST MODE'"            !Select Test Mode opperation
1690  !
1700  !
1710  !===========================================================================
1720  !
1730  !SET THE Agilent 8922M/S INITIAL CONDITIONS  (executed once only)
1740  !
1750  !
1760  OUTPUT Uut;"CONF:OFL:RFIN ";Extloss            !Set the external cable loss
1770  OUTPUT Uut;"CONF:OFL:MODE 'ON'"               !Turn external offset mode ON to
use cable loss
1780  OUTPUT Uut;"CW:PMZERO"                         !Zero the power meter
1790  OUTPUT Uut;"RFG:AMPL1 ";Bchpwr               !Set the downlink power for normal
signalling
1800  OUTPUT Uut;"TRIG:MODE 'SINGLE'"             !Set the DSP meas trigger to single
trig mode
1810  OUTPUT Uut;"TRIG:BET 'SINGLE'"               !Set bit error meas trigger to sin-
gle trig mode
1820  OUTPUT Uut;"BET:BITS1 ";Bits1                 !Set the number of bits to be mea-
sured for bit error
1830  OUTPUT Uut;"DISP:SCR DSP"                     !Display the DSP amplitude main
screen to enter limits
1840  OUTPUT Uut;"DISP:SCR:DSP:VIEW 'AMPL MAIN'"     !for power versus time mask
1850  DATA -40,-28,-18,-10,0,180,360,542.769,547.769,552.769,560.769,570.769 !Mask
corner times in us
1860  DATA -36,-30,-6,4,1,1,1,1,1,-6,-30,-36                              !Upper
limits in dB
1870  DATA -60,-60,-60,-60,-1,-1,-1,-1,-60,-60,-60,-60                    !Lower lim-
its in dB
1880  FOR X=1 TO 12
1890    READ Masktim                                            !Reas corner times
from DATA statement
1900    Masktim=Masktim/1.E+6                                   !Convert seconds
1910    Num$=VAL$(X)                                            !Convert index to
string for GPIB
1920    OUTPUT Uut;"DSP:AMPL:"&"time"&Num$&" ";Masktim           !Output marker times
1930  NEXT X
1940  FOR X=1 TO 12
1950    READ Maskup                                           !Read and output upper
limits
1960    Num$=VAL$(X)
1970    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":HLIM ";Maskup
1980    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":HLIM:STATE ON"
1990  NEXT X
2000  FOR X=1 TO 12
2010    READ Masklo                                           !Read and output lower
limits
2020    Num$=VAL$(X)
2030    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":LLIM ";Masklo
2040    OUTPUT Uut;"MEAS:DSP:AMPL:"&"AMPL"&Num$&":LLIM:STATE ON"
2050  NEXT X
2060  !
2070
!================================================================================
2080  !
2090  !CALL SUBROUTINE ASKING USER TO MAKE APROPRIATE CABLE CONNECTIONS
2100  !
2110  CALL Sub_trickmobile(Uut,"CABLE",0,0,Trickfreq,0)          !Ask user to connect
Agilent 8922M/S ports to
2120  !                                                          !emulate a mobile in
test mode
2130  !
```

```
2140
!===============================================================================
2150  !
2160  !ESTABLISH A LOOP TO BE EXECUTED EACH TIME A MOBILE IS TESTED
2170  !
2180  !
2190  Run$="yes"                                                  !Flag for REPEAT loop
2200  REPEAT
2210    Clock(1)=TIMEDATE                                          !Start a test time
clock for call set up
2220  !
2230
!===============================================================================
2240  !
2250  !ACTIVATE THE MOBILE IN TEST MODE
2260  !
2270    CALL Sub_trickmobile(Uut,"TXON",Dsparfcn(1),Dsppwr(1),Trickfreq,Extloss)
!Activate the test mode mobile
2280  !
2290
!=================================================================================
2300  !
2310    Clock(1)=TIMEDATE-Clock(1)                                !End call set up timer
2320    Clock(2)=TIMEDATE                                       !Start measurement timer
2330  !
2340
!=================================================================================
2350  !
2360  !PERFORM DSP MEASUREMENTS
2370  !
2380    OUTPUT Uut;"DISP DSP"                                      !Return to the DSP
amplitude main screen
2390    FOR Txcount=1 TO Numdsppwr                                 !Outer loop for Tx
levels
2400      Txlev=Dsppwr(Txcount)                                 !Get Tx level from array
2410      OUTPUT Uut;"CELL:MS:TLEV";Txlev                         !Adjust Analyzer to
correct power for mobile
2420      CALL Sub_trickmobile(Uut,"TXLEV",0,Txlev,Trickfreq,Extloss) !Command test
mode mobile to new Tx Level
2430      Txlevchange$="true"
2440      FOR Arcount=1 TO Numdsparfcn                              !Inner loop for ARFCN
2450        Arfcn=Dsparfcn(Arcount)                                 !Get ARFCN from array
2460        Freq=(890+Arfcn*.2)*1000000                             !Calculate ARFCN fre-
quency
2470        CALL Sub_trickmobile(Uut,"ARFCN",Arfcn,0,Freq,Extloss) !Command test mode
mobile to new ARFCN
2480        OUTPUT Uut;"RFAN:FREQ ";Freq                           !Tune Analyzer to
correct frequency
2490        Count=0                                                !Establish counter
for repeat measurements
2500        REPEAT                                                !May need to repeat
if mobile not settled
2510          OUTPUT Uut;"TRIG:AST 'ARM'"                            !Arm the DSP measure-
ment
2520          OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:RMS?"   !Read all the DSP
results: rms phase error
2530          ENTER Uut;Rmspher(Arcount,Txcount)
2540  !Note: program will stick here, waiting for input if mobile fails to provide a
valid signal to trigger
2550  !      the HP 8922M/S.  The program will timeout.  The timeout code dissarms the
Agilent 8922M/S trigger.
2560        OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:PEAK?"  !
peak phase error
2570          ENTER Uut;Pkpher(Arcount,Txcount)
2580          OUTPUT Uut;"MEASURE:DSPANALYZER:PHASE:ERROR:FRE-
QUENCY?"!                    frequency error
2590          ENTER Uut;Frer(Arcount,Txcount)
```

```
2600         OUTPUT Uut;"MEASURE:DSPANALYZER:MSUM?"            !
power versus time mask
2610          ENTER Uut;Mask$(Arcount,Txcount)
2620         OUTPUT Uut;"MEASURE:DSPANALYZER:PTCP?"            !
Tx power
2630          ENTER Uut;Slpwr(Arcount,Txcount)
2640          OUTPUT Uut;"RFAN:AMPL1?"                         !Read expected power
level to compare with
2650          ENTER Uut;Anlevel                                !measured and +/-3dB
allowed range
2660          OUTPUT Uut;"MEASURE:DSPANALYZER:SSTATUS?"         !Check for any DSP
measurement errors
2670          ENTER Uut;Sstatus$
2680         Threedb=ABS(Anlevel-Slpwr(Arcount,Txcount))        !Calculate difference
between measured and expected
2690          Count=Count+1
2700        UNTIL Count=3 OR Threedb<Leveltol OR Txlevchange$="false" !Re-do DSP once
if phone fails, the mobile
2710       IF Sstatus$<>"""No Error""" OR Threedb>3 THEN        !may still be settling
after Tx Level change
2720          Err$="DSP Measurement Problem "                  !Create an error mes-
sage string
2730          IF Sstatus$<>"""No Error""" THEN Err$=Err$&Sstatus$
2740          IF Threedb>3 THEN Err$=Err$&" 3dB input range exceeded"
2750          Errcount=Errcount+1
2760          Error$(Errcount)=Err$
2770        END IF
2780        Txlevchange$="false"
2790      NEXT Arcount
2800    NEXT Txcount
2810  !
2820
!================================================================================
2830  !
2840  !PERFORM FAST POWER MEASUREMENTS
2850  !
2860    OUTPUT Uut;"DISP:SCR CELL1"                            !Display cell control
screen
2870    FOR Txcount=Numfppwr TO 1 STEP -1                      !Outer loop for mobile
Tx levels@@@@
2880      Txlev=Fppwr(Txcount)                                !Get Tx level from array
2890      OUTPUT Uut;"CELL:MS:TLEV";Txlev                       !Adjust analyzer to
correct expected power
2900      CALL Sub_trickmobile(Uut,"TXLEV",0,Txlev,Trickfreq,Extloss) !Command test
mode mobile to new T Level
2910      Txlevchange$="true"
2920      FOR Arcount=1 TO Numfparfcn                          !Inner loop for ARFCN
2930        Arfcn=Fparfcn(Arcount)                             !Get ARFCN from array
2940        Freq=(890+Arfcn*.2)*1000000                        !Calculate frequency
from ARFCN
2950        CALL Sub_trickmobile(Uut,"ARFCN",Arfcn,0,Freq,Extloss) !Command test mode
mobile to new ARFCN
2960        OUTPUT Uut;"RFAN:FREQ ";Freq                        !Tune analyzer fre-
quency
2970        Txlevcount=0                                        !Count for Tx Level
settling
2980        REPEAT                                             !Loop while mobile Tx
Level settles
2990          Count=0                                          !Count for inner loop
3000          Fastpower1=0                                      !Swap variable for
fast power measurement
3010          REPEAT                                            !Loop untill value
stabalizes after analyzer
3020            Fastpower2=Fastpower1                           !tuning.
3030            OUTPUT Uut;"MEAS:FTCP:POW?"                    !read the peak power
meter
3040            ENTER Uut;Fastpower1
```

```
3050          Deltapower=ABS(Fastpower1-Fastpower2)           !Look for change since
last measurement
3060            Count=Count+1                                    !Though away 4 old
readings (in Agilent 8922M/S
3070          UNTIL (Count>4 AND Deltapower<Fpthreshold) OR Count>10 !measuremement
pipline) then look for settled
3080          IF Count>10 THEN                                   !value on new mea-
surement ARFCN. If it never
3090           Errcount=Errcount+1                             !settles note an error
3100            Error$(Errcount)="Mobile's output power did not settle within
'Fpthreshold' limits"
3110          END IF
3120          Fpwrmeas(Arcount,Txcount)=(Fastpower1+Fastpower2)/2 !Average last two
good readings
3130          OUTPUT Uut;"RFAN:AMPL1?"                           !Read the
Agilent 8922M/S analyzer expected input level
3140          ENTER Uut;Anlevel                                !and compare with the
measured power to check that
3150         Threedb=ABS(Anlevel-Fpwrmeas(Arcount,Txcount))     !the result is within
the allowed +/-3dB window
3160          Txlevcount=Txlevcount+1
3170        UNTIL Threedb<Leveltol OR Txlevcount>10 OR Txlevchange$="false"
3180        IF Threedb>3 THEN
3190          Errcount=Errcount+1
3200          Error$(Errcount)="Fast power meas 3dB input range exceeded"
3210        END IF
3220        Txlevchange$="false"
3230      NEXT Arcount
3240    NEXT Txcount
3250  !
3260
!==================================================================================
3270  !
3280  !PERFORM BIT ERROR MEASUREMENTS
3290  !                                                    !Note: 4 BER measurements
can be made in parallel
3300    OUTPUT Uut;"DISP:SCR BER1"                               !Display single BER
test screen
3310    FOR Rxcount=1 TO Numberpwr                              !Outer loop for down-
link power levels
3320      Berpo=Berpwr(Rxcount)                                  !Get downlink power
level from array
3330      OUTPUT Uut;"RFG:AMPL1 ";Berpo                    !Program Agilent 8922M/
S Generator to downlink power
3340      FOR Arcount=1 TO Numberarfcn                           !Inner loop for BER
test ARFCN
3350        Arfcn=Berarfcn(Arcount)                             !Get ARFCN from array
3360        Freq=(890+Arfcn*.2)*1000000                         !Calculate frequency
from ARFCN
3370        CALL Sub_trickmobile(Uut,"ARFCN",Arfcn,0,Freq,Extloss) !Command test mode
mobile to new ARFCN
3380        OUTPUT Uut;"RFAN:FREQ ";Freq                         !Tune analyzer fre-
quency
3390        OUTPUT Uut;"TRIG:BET:MODE 'RUN'"                     !off BER test until
channel change is done. Run test.
3400        OUTPUT Uut;"MEAS:BET:BERR:RATIO1?"                  !Read bit error test
result
3410        ENTER Uut;Ber1(Arcount,Rxcount)
3420       Ber1(Arcount,Rxcount)=Ber1(Arcount,Rxcount)/10000     !Convert from ppm to
%
3430      NEXT Arcount
3440    NEXT Rxcount
3450    OUTPUT Uut;"RFG:AMPL1 ";Bchpwr                           !Reset downlink to
normal power
3460  !
3470
!================================================================================
3480  !
```

```
3490    Clock(2)=TIMEDATE-Clock(2)                                !Stop measurement timer
3500    Clock(3)=TIMEDATE                                           !Start call clearing
timer
3510  !
3520
!=================================================================================
3530  !
3540  !END THE CALL
3550  !
3560    CALL Sub_trickmobile(Uut,”TXOFF”,0,0,Trickfreq,0)         !Dissable the test
mode mobile
3570    CALL Sub_syserror(Uut,Error$(*),Errcount)                 !Check for any
Agilent 8922M/S logged errors
3580  !
3590  !
3600
!====================================================================================
3610  !
3620    Clock(3)=TIMEDATE-Clock(3)                               !Stop the call clearing
timer
3630  !
3640
!=====================================================================================
3650  !
3660  !PRINT MEASUREMENT RESULTS
3670  !
3680    CALL
Sub_printit(Fparfcn(*),Fppwr(*),Fpwrmeas(*),Null(*),Null(*),Null(*),Null(*),Nullst$(*
),Numfparfcn,Numfppwr,Message$(3),Message$(4),Emptyst$,Empty)
3690    CALL
Sub_printit(Dsparfcn(*),Dsppwr(*),Slpwr(*),Pkpher(*),Rmspher(*),Frer(*),Null(*),Mask$
(*),Numdsparfcn,Numdsppwr,Message$(5),Message$(6),Emptyst$,Empty)
3700    CALL
Sub_printit(Berarfcn(*),Berpwr(*),Ber1(*),Rxqual(*),Rxlev(*),Txtim(*),Null(*),Nullst$
(*),Numberarfcn,Numberpwr,Message$(7),Message$(8),Emptyst$,Empty)
3710  !
3720
!=====================================================================================
3730  !
3740  !PRINT TEST TIMES AND ERROR MESSAGES
3750  !
3760  !
3770    FOR X=1 TO 3
3780      PRINT Message$(X+9);DROUND(Clock(X),4);Message$(9)
3790    NEXT X
3800    PRINT
3810    PRINT
3820    IF Errcount=0 THEN
3830      Errcount=1
3840      Error$(1)=”No Errors”
3850    END IF
3860    FOR X=1 TO Errcount
3870      PRINT Error$(X)
3880    NEXT X
3890    Errcount=0
3900  !
3910
!===================================================================================
3920  !
3930  !LOOP IF ANOTHER PHONE IS TO BE TESTED
3940  !
3950    PRINT Message$(2)
3960    INPUT Answer$
3970    Run$=”no”
3980    IF Answer$=”Y” OR Answer$=”y” THEN Run$=”yes”
3990  UNTIL Run$<>”yes”
4000  END
4010  !
```

```
4020
!===================================================================================
4030  !SUBROUTINES BELOW
4040
!===================================================================================
4050  !
4060  !RESULTS PRINTING SUBROUTINE
4070  !
4080  SUB
Sub_printit(Result1(*),Result2(*),Result3(*),Result4(*),Result5(*),Result6(*),Result7
(*),Result8$(*),Numarfcn,Numpwr,Title$,Heading$,Emptyst$,Empty)
4090    PRINT Title$
4100    PRINT
4110    PRINT Heading$
4120    FOR Arcount=1 TO Numarfcn
4130      FOR Txcount=1 TO Numpwr
4140        PRINT Result1(Arcount),
4150        PRINT Result2(Txcount),
4160        IF Result3(1,1)<>Empty THEN PRINT DROUND(Result3(Arcount,Txcount),4),
4170        IF Result4(1,1)<>Empty THEN PRINT DROUND(Result4(Arcount,Txcount),4),
4180        IF Result5(1,1)<>Empty THEN PRINT DROUND(Result5(Arcount,Txcount),4),
4190        IF Result6(1,1)<>Empty THEN PRINT DROUND(Result6(Arcount,Txcount),4),
4200        IF Result7(1,1)<>Empty THEN PRINT DROUND(Result7(Arcount,Txcount),4),
4210        IF Result8$(1,1)<>Emptyst$ THEN PRINT Result8$(Arcount,Txcount),
4220        PRINT
4230      NEXT Txcount
4240    NEXT Arcount
4250    PRINT
4260  SUBEND
4270  !
4280  !============================================================================
4290  !
4300  !CHECK FOR Agilent 8922M/S SYSTEM ERRORS
4310  !
4320  SUB Sub_syserror(Uut,Error$(*),Errcount)
4330    DIM Systemerror$[100]
4340    REPEAT                                          !Set up a loop to drain the
Agilent 8922M/S error stack
4350     OUTPUT Uut;”SYSTEM:ERROR?”                   !Read the last error from the
stack
4360      ENTER Uut;Systemerror$
4370      IF VAL(Systemerror$)<>0 THEN                  !Code 0 indicates no error
4380        Errcount=Errcount+1                       !If not zero, add the error to
the programs error array
4390        Error$(Errcount)=Systemerror$
4400      END IF
4410    UNTIL VAL(Systemerror$)=0                      !End when all the errors have
been read
4420  SUBEND
4430  !
4440  !=============================================================================
4450  !
4460  !CONFIGURE THE Agilent 8922M/S AUX RF OUT PORT TO EMULATE A MOBILE IN TEST MODE
4470  !
4480  !This subroutine uses unsupported HP-IB commands to ‘trick’ the Agilent 8922M/S
into opperating as if
4490  !a test mode mobile was connected.  The Aux RF Out port is configured to emulate
the mobile.
4500  !Replacing this subroutine with one to control a real GSM mobile would allow the
program to be
4510  !used in a real application
4520  !
4530  SUB Sub_trickmobile(Uut,Func$,Arfcn,Txlev,Trickfreq,Extloss)
4540    Trickfreq=(935+Arfcn*.2)*1000000                !Adjust the uplink frequency
to equal the downlink
4550    Trickloss=Extloss+(2*Txlev)-43+7                !Adjust the ext loss to simu-
late Tx Level changes
```

```
4560    IF Func$=”TXON” THEN                                !These commands configure the
generator to begin
4570      OUTPUT Uut;”RFG:AMPL2 7DBM”                        !emulating the mobile
4580      OUTPUT Uut;”RFG:OUTP ‘AUX RFOUT’”
4590      OUTPUT Uut;”CONF:OFL:RFIN “;Trickloss
4600      OUTPUT Uut;”CELL:CALL:TCH:ARFCN “;Arfcn
4610      OUTPUT Uut;”CELL:CALL:TCH:TSL 2”
4620      OUTPUT Uut;”CELL:CALL:ORIGINATE”
4630      OUTPUT Uut;”SERV:LATCH:SEL ‘g_pulse_start_trig’”
4640      OUTPUT Uut;”SERV:LATCH:VALUE 1431”
4650      OUTPUT Uut;”SERV:LATCH:SEL ‘g_pulse_stop_trig’”
4660      OUTPUT Uut;”SERV:LATCH:VALUE 1281”
4670      OUTPUT Uut;”SERV:LATCH:SEL ‘g_tx_slot’”
4680      OUTPUT Uut;”SERV:LATCH:VALUE 5”
4690      OUTPUT Uut;”SERV:LATCH:SEL ‘g_mux_a_cntl’”
4700      OUTPUT Uut;”SERV:LATCH:VALUE 75”
4710      OUTPUT Uut;”SERV:LATCH:SEL ‘g_hop_to_bch’”
4720      OUTPUT Uut;”SERV:LATCH:VALUE 1536”
4730      OUTPUT Uut;”RFG:MOD:PULS ‘EXT’”
4740    END IF
4750    IF Func$=”ARFCN” THEN                              !These commands simulate a chan-
nel change by
4760      OUTPUT Uut;”CELL:CALL:TCH:ARFCN “;Arfcn       !re-tuning the generator
4770      OUTPUT Uut;”SERV:LATCH:SEL ‘g_tx_slot’”
4780      OUTPUT Uut;”SERV:LATCH:VALUE 5”
4790      OUTPUT Uut;”SERV:LATCH:SEL ‘g_mux_a_cntl’”
4800      OUTPUT Uut;”SERV:LATCH:VALUE 75”
4810      OUTPUT Uut;”SERV:LATCH:SEL ‘g_hop_to_bch’”
4820      OUTPUT Uut;”SERV:LATCH:VALUE 1536”
4830    END IF
4840    IF Func$=”TXLEV” THEN                               !These commands simulate a Tx
Level Change
4850      OUTPUT Uut;”CONF:OFL:RFIN “;Trickloss
4860    END IF
4870    IF Func$=”TXOFF” THEN                               !Dissable the TCH to simulate
turning the
4880      OUTPUT Uut;”CELL:CALL:END”                       !mobile off
4890    END IF
4900    IF Func$=”CABLE” THEN
4910      PRINT
4920      PRINT “Connect a short cable from the Agilent 8922M/S AUX RF OUT”
4930      PRINT “to the RF IN/OUT port”
4940      PRINT
4950      PRINT “Cycle instrument power when testing is complete”
4960      PRINT
4970      PRINT “Press Return when ready”
4980      PRINT
4990      INPUT Dummy$
5000    END IF
5010  SUBEND
5020  !
5030  !============================================================
5040  !end of program
```

Transient Settling Times

The following transient settling (wait times) should be considered when executing GPIB programs from an external controller or using the built-in IBASIC controller to execute programs.

NOTE

During query loops (especially for IBASIC applications), it is recommended to use a WAIT statement like WAIT Delta_t, where Delta_t is user defined (i.e. WAIT 0.5 ! wait 0.5 seconds).

1 Each of the following operations requires checking that a certain state has been reached before continuing with other GPIB commands:

a) Ending a Call. Wait for CELL CONTROL Call Status to be 'INACTIVE'and then check for Call Status RR to be 'BCCH'.

```
OUTPUT 714;"CELL:CALL:END"
REPEAT
  WAIT Delta_t
  OUTPUT 714;"CELL:CALL:STATUS:STATE?"    ! Query the Call Status
  ENTER 714;Query$
UNTIL Query$="""INACTIVE"""
IF (Query$="""INACTIVE""")
   REPEAT
     WAIT Delta_t
     OUTPUT 714;"CELL:CALL:STAT:RR?"     ! Query the RR Call Status
     ENTER 714;Query$
   UNTIL Query$="""BCCH"""
END IF
```

b) Originating a Call. Must wait for CELL CONTROL Call Status to be 'CONNECTED':

```
OUTPUT 714;"CELL:CALL:ORIG"
! Answer call when the mobile rings
REPEAT
  WAIT Delta_t
  OUTPUT 714;"CELL:CALL:STATUS:STATE?"    ! Query the Call Status
  ENTER 714;Query$
UNTIL Query$="""CONNECTED"""
```

c) Setting the Agilent 8922M/S to an Activated state. Must wait for the CELL CONTROL Signaling (RR) Call Status to be ’BCCH’.

```
OUTPUT 714;”DISP CCON”
OUTPUT 714;”CCON:STAT ’ACTIVATED’”
DISP ”Waiting for HP 8922M/S to provide BCCH. . .”
REPEAT
  WAIT Delta_t
  OUTPUT 714;”CELL:CALL:STAT:RR?”     ! Query the RR Call Status
  ENTER 714;Query$
UNTIL Query$=”””BCCH”””
```

d) Setting the Agilent 8922M/S back to a Settable state. Must wait for the field to change its state.

```
OUTPUT 714;”CCON:STAT ’SETTABLE’”
REPEAT
  WAIT Delta_t
  OUTPUT 714;”CCON:STAT?”     ! Query the Cell Configure state
  ENTER 714;Query$
UNTIL Query$=”””SETTABLE”””
```

e) Doing a PRESET (*RST). Must make sure the call is ended (See (a)).

f) Running a Bit Error Test measurement. Must wait for STOP after a RUN is executed to query any measurement results.

```
    OUTPUT 714;”DISP BET”
    OUTPUT 714;”TRIG:BET:MODE ’RUN’”
    REPEAT
      WAIT Delta_t
      OUTPUT 714;”TRIG:BET:MODE?”     ! Query the Bit Error Test
Trigger mode
      ENTER 714;Query$
    UNTIL Query$=”””STOP”””
```

g) Querying measurements in SINGLE or CONT (continous) mode. Refer to the section for querying measurements through GPIB.

2. The following operations may affect how much wait time is needed between GPIB or IBASIC commands.

a) IBASIC operation - especially tight query loops

b) Continuous measurements

i. DSP Analyzer - Phase, Amplitude and Data Bits measurements
ii. Output RF Spectrum measurements Option 006 only
iii. Pulse On/Off Ratio measurements Option 006 only
iv. Spectrum Analyzer measurements Option 006 only
v. Oscilloscope measurements
vi. CW measurements
vii. AF Analyzer measurements

c) Signaling operations:

i. SACCH measurements
ii. Intercell Handovers
iii. Intracell Handovers
iv. Trace views are active

3. When performing the following operations, include a wait statement for a maximum of the period of time given, before issuing the next command.

a) Executing Loopback functions - loopback on and off: 1 second

```
 OUTPUT 714,"CELL:AUD:LOOP:OFF"  ! loopback off
     WAIT 1

 OUTPUT 714,"CELL:AUD:LOOP:FE"   ! on with frame erasure
     WAIT 1

 OUTPUT 714,"CELL:AUD:LOOP:NOFE" ! on without frame erasure
     WAIT 1
```

b) Changing Audio Speech Configurations to 'ECHO': 0.5 second

```
OUTPUT 714,"CELL:AUD:SPE:CONF  'ECHO'
     WAIT 0.5
```

c) Changing Audio Speech Configurations to 'PRBS': 2 seconds

```
OUTPUT 714,"CELL:AUD:SPE:CONF  'PRBS'
     WAIT 2
```

d) Setting the MS TX power Level: 1 second

```
OUTPUT 714,"CELL:MS:TLEV 7"
     WAIT 1
```

e) Arming DSP Analyzer, Output RF Spectrum or Pulse On/Off measurements in Single mode from IBASIC - after sending the Arm command wait approximately 5 seconds.

```
OUTPUT 714,"TRIG:ASTate 'ARM'"
    WAIT 5
```

f) IMEI Request: 10 seconds

```
OUTPUT 714,"MSIN:MS:IMEI:REQ"
  - WAIT 10
```

g) TMSI Reallocation: Query TMSI value (should change within 10 seconds)

i. Read TMSI string **`OUTPUT 714,"MSIN:PAG:TMSI?"`**

ii. Send TMSI Reallocation command **`OUTPUT 714,"MSIN:PAG:TMSI:REAL"`**

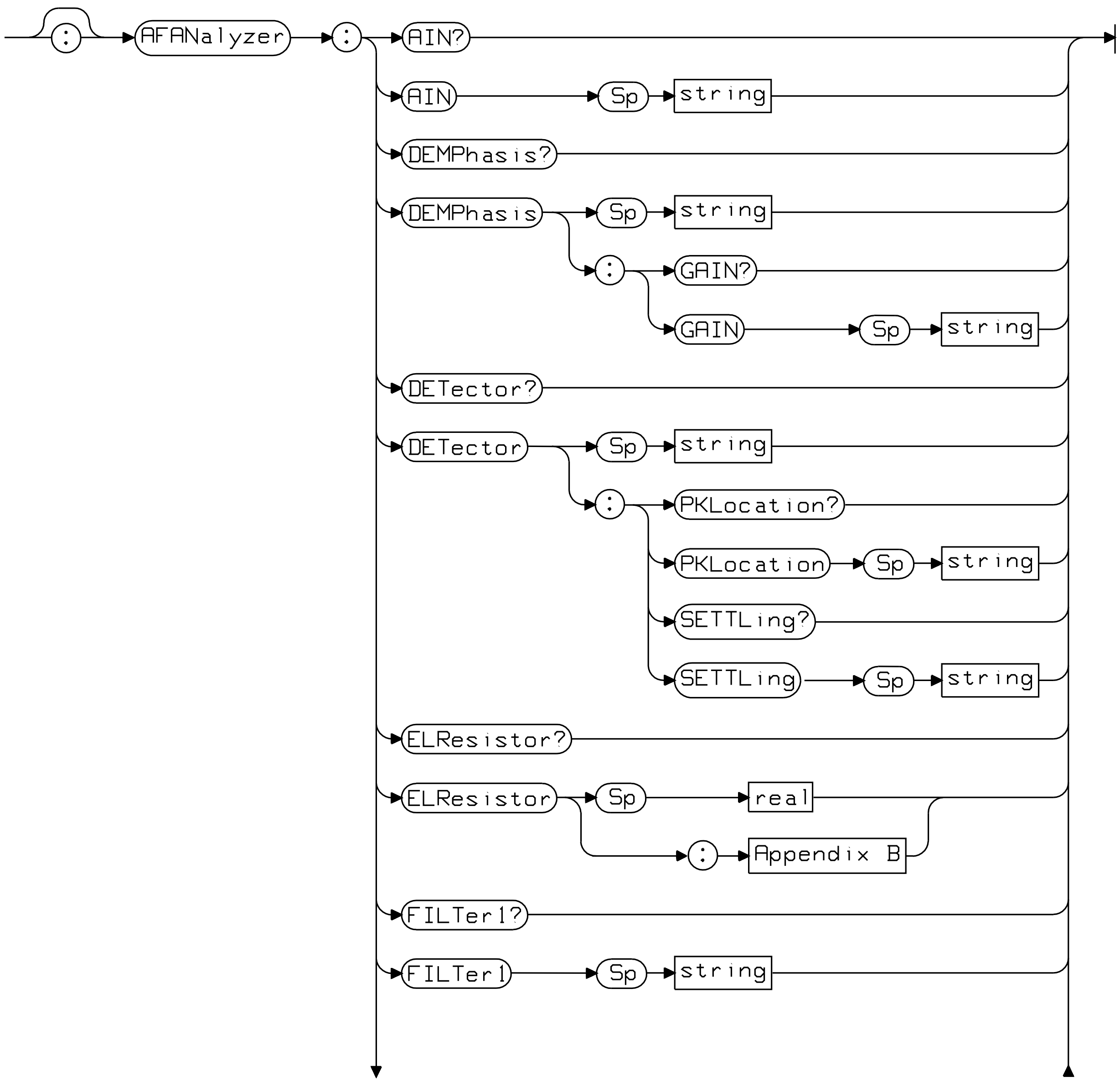
iii. Wait until **`OUTPUT 714,"MSIN:PAG:TMSI?"`** returns a new string

1 10 seconds maximum

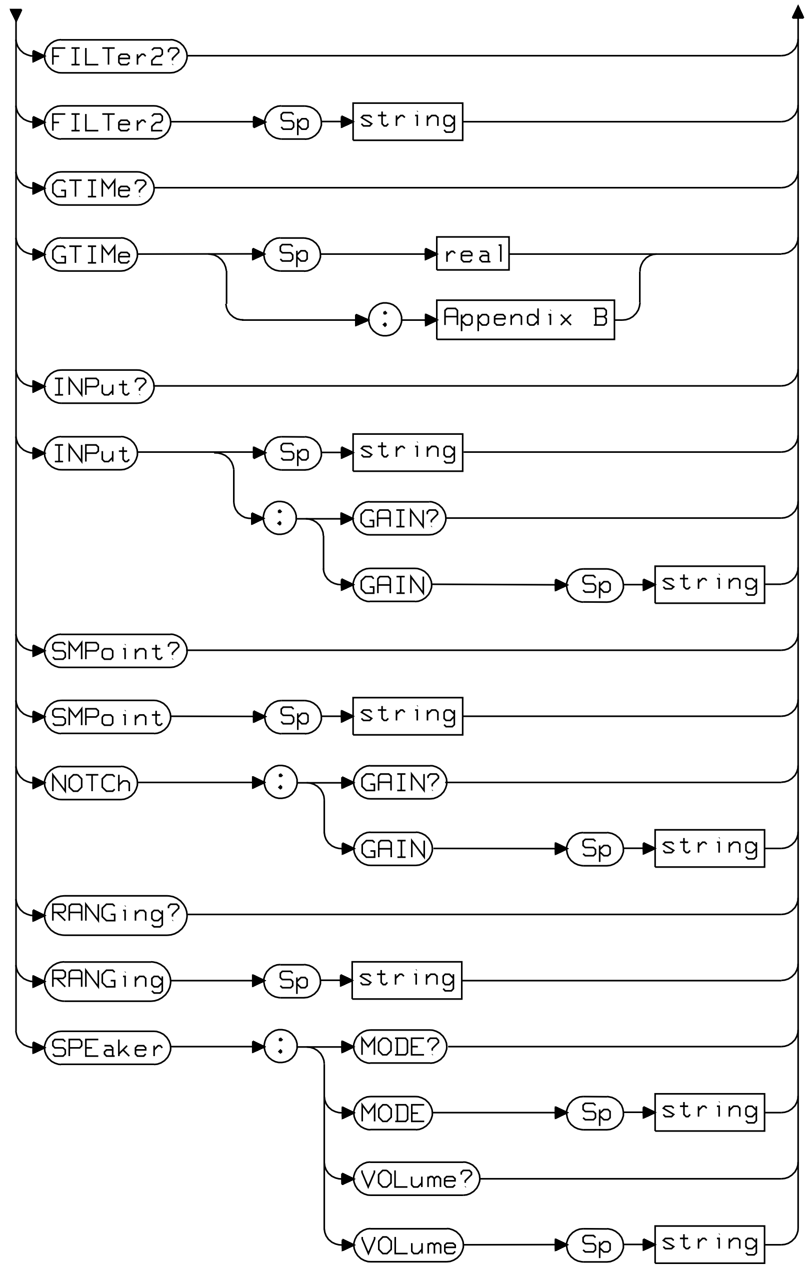
We expect users, operating remotely, to make measurements in single mode, mainly for speed reasons. However, if you operate in continuous (CONT) measurement mode and you change a parameter that affects the measurement result, then (at a maximum) the third measurement result queried will be an outcome of the new setup and not the previous setup.

3

AF Analyzer Subsystem



Continued Over


FILTer2?
FILTer2
Sp
string
GTIMe?
GTIMe
Sp
real
:
Appendix B
INPut?
INPut
Sp
string
:
GAIN?
GAIN
Sp
string
SMPoint?
SMPoint
Sp
string
NOTCh
:
GAIN?
GAIN
Sp
string
RANGing?
RANGing
Sp
string
SPEaker
:
MODE?
MODE
Sp
string
VOLume?
VOLume
Sp
string

AIN

Description Selects/queries the state of the front panel AUDIO IN LO BNC connector. FLOAT means AUDIO IN LO will be used to generate floating input signal (that is NOT referenced to a common ground signal). GND means AUDIO IN LO will be connected to a common ground signal

Syntax AFANalyzer:AIN?

AFANalyzer:AIN <string>

Options ‘FLOAT’ | ‘GND’

DEMPhasis

Description Selects/queries the AF ANalyzer DE-EMPhasis state.

Syntax AFANalyzer:DEMPhasis?

AFANalyzer:DEMPhasis <string>

Options ’750 US’ | ’OFF’

DEMPhasis:GAIN

Description Selects/queries the DE-EMPhasis GAIN selection. Typically, this is selected automatically, based on audio level.

Syntax AFANalyzer:DEMPhasis:GAIN?

AFANalyzer:DEMPhasis:GAIN <string>

Options ’0 DB’ | ’10 DB’ | ’20 DB’ | ’30 DB’

DETector

Description Selects/queries the AF Analyzer Detector which is used for all AF Analyzer measurements.

Syntax AFANalyzer:DETector?

AFANalyzer:DETector <string>

Options ’RMS’ | ’PK+’ | ’PK-’ | ’PK+-/2’ | ’PK+-MAX’ |

’PK+ HOLD’ | ’PK- HOLD’ | ’PK+-/2 HD’ | ’PK+-MX HD’

DETector:PKLocation

Description Selects/queries the PeaK DETector Location.

Syntax AFANalyzer:DETector:PKLocation?

AFANalyzer:DETector:PKLocation <string>

Options ’FILTERS’ | ’DE-EMP’

DETector:SETTling

Description Selects/queries the DETector SETTling mode.

Syntax AFANalyzer:DETector:SETTling?

AFANalyzer:DETector:SETTling <string>

Options ‘SLOW’ | ‘FAST’

Where;

- SLOW is useful for low frequency audio measurements.
- FAST is useful for higher frequency audio measurements.

ELResistor

Description Sets/queries the External Load Resistor assumed for measuring watts of power into an external load resistor. Default GPIB and display unit is Ohms.

Syntax AFANalyzer:ELResistor?

AFANalyzer:ELResistor <real [units]> | [:FNUM]

Options Refer Appendix B.

FILTer1

Description Selects/queries the AF Analyzer Filter 1.

Syntax AFANalyzer:FILTer1?

AFAN:FILT1?

AFANalyzer:FILTer1 <string>

AFAN:FILT1 <string>

Options ‘20HZ HPF’ | ’50HZ HPF’ | ’300HZ HPF’

FILTer2

Description Selects/queries the AF Analyzer Filter 2.

Syntax AFANalyzer:FILTer2?

AFAN:FILT2?

AFAN:FILT2 <string>

AFANalyzer:FILTer2 <string>

Options ’300HZ LPF’ | ’3KHZ LPF’ | ’15KHZ LPF’| ’>99KHZ LP’

GTIMe

Description Sets/queries the AF ANalyzer Gate TIMe (AF Cnt Gate).

Default GPIB unit is seconds (S).

Default display unit is milli-seconds (MS).

Syntax AFANalyzer:GTIMe?

AFANalyzer:GTIMe <real [units]> | [:FNUM]

Options Refer Appendix B.

INPut

Description Selects/queries the AF ANalyzer INPut. This selection determines what signal is to be measured by the AF ANalyzer as well as for the oscilloscope.

Syntax AFANalyzer:INPut?

AFANalyzer:INPut <string>

Options ’SCOPE IN’ | ’FM DEMOD’ | ’PLS DEMOD’ | ’AUDIO IN’ |

’AUDIO OUT’| ’AM MOD IN’ | ’SPEECH IN’ |

’SPEECHOUT’

INPut:GAIN

Description Selects/queries the INPut GAIN. This is typically selected automatically based on audio level.

Syntax AFANalyzer:INPut:GAIN?

AFANalyzer:INPut:GAIN <string>

Options ’0 DB’ | ’20 DB’ | ’40 DB’

SMPoint

Description Selects/queries the Scope Measurement Point. This selection determines where in the hardware block diagram the oscilloscope is making the desired measurement.

Syntax AFANalyzer:SMPoint?

AFANalyzer:SMPoint <string>

Options ’DE-EMP’ | ’FILTERS’ | ’INPUT’ | ’NOTCH’

NOTCh:GAIN

Description Selects/queries the NOTCh GAIN. This is typically selected automatically based on audio level.

Syntax AFANalyzer:NOTCh:GAIN?

AFANalyzer:NOTCh:GAIN <string>

Options ’0 DB’ | ’10 DB’ | ’20 DB’ | ’30 DB’ | ’40 DB’

RANGing

Description Selects/queries the RANGing (Gain Cntl) STATe.

Syntax AFANalyzer:RANGing?

AFANalyzer:RANGing <string>

Options ’AUTO’ | ’HOLD’

Where;

- AUTO results in gain selections being made automatically based on audio level.
- HOLD causes all gain selections to maintain their present state for either manual selection or until AUTO is selected.

SPEaker:MODE

Description Selects/queries the SPEaker ALC MODE.

Syntax AFANalyzer:SPEaker:MODE?

AFANalyzer:SPEaker:MODE <string>

Options ’ON’ | ’OFF’

NOTE This command is not available for the Agilent 8922S.

SPEaker:VOLume

Description Selects/queries the SPEaker VOLume.

Syntax AFANalyzer:SPEaker:VOLume?

AFANalyzer:SPEaker:VOLume <string>

Options ’POT’ | ’OFF’

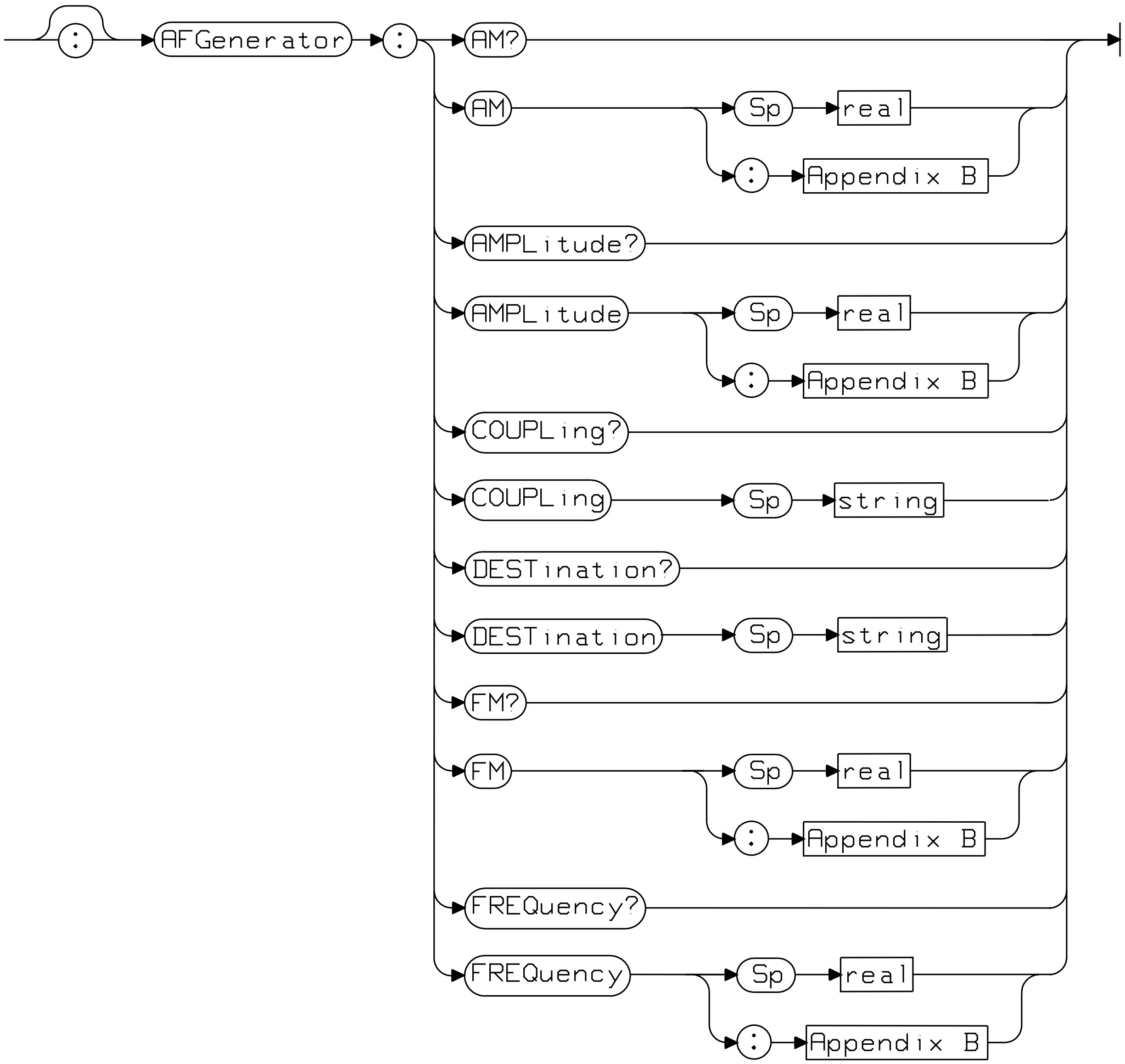
Where;

- POT means the SPEaker VOLume is controlled via the front panel VOLUME control.
- OFF means the SPEaker VOLume is turned off, independent of the front panel VOLUME control.

NOTE This command is not available for the Agilent 8922S.

4

AF Generator Subsystem


:
AFGenerator
:
AM?
AM
Sp
real
:
Appendix B
AMPLitude?
AMPLitude
Sp
real
:
Appendix B
COUPLing?
COUPLing
Sp
string
DESTination?
DESTination
Sp
string
FM?
FM
Sp
real
:
Appendix B
FREQuency?
FREQuency
Sp
real
:
Appendix B

AMPLitude

Description Sets/queries the AF Generator Audio Output AMPLitude, which will be present at the front panel AUDIO OUT connector.

GPIB unit is Volts.

Display units are V and mV.

Default display unit is mV.

Syntax AFGenerator:AMPLitude?

AFGenerator:AMPLitude <integer [units]> | [:FNUM]

Options Refer to Appendix B.

COUPling

Description Selects/queries the AF Generator Audio Output COUPling

Syntax AFGenerator:COUPling?

AFGenerator:COUPling <string>

Options 'AC' | 'DC'

FREQuency

Description Sets/queries the AF Generator Audio Output, which will be present at the front panel AUDIO OUT connector.

Default GPIB unit is HZ.

Default display unit is KHZ.

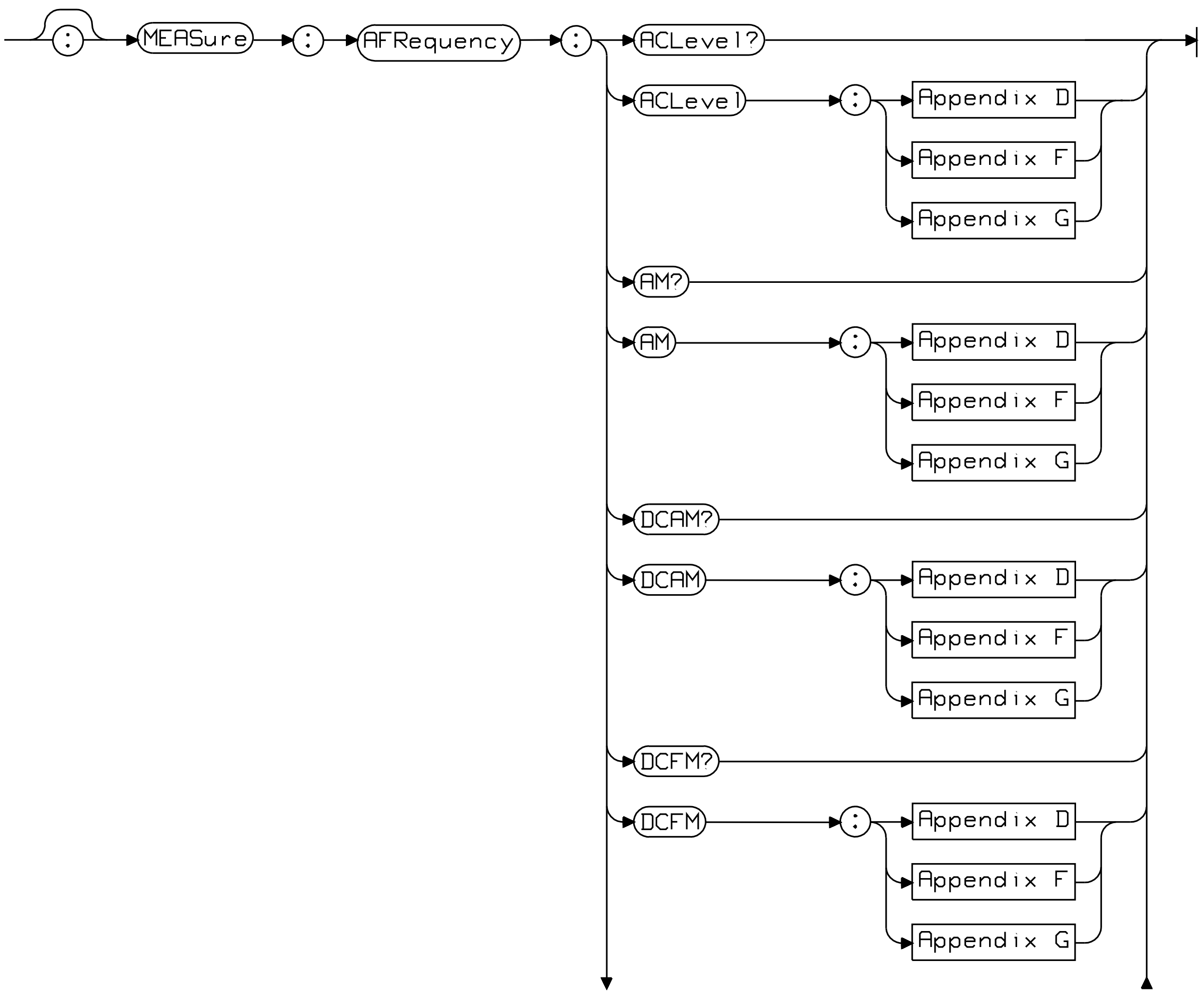
Syntax AFGenerator:FREQuency?

AFGenerator:FREQuency <integer [units]> | [:FNUM]

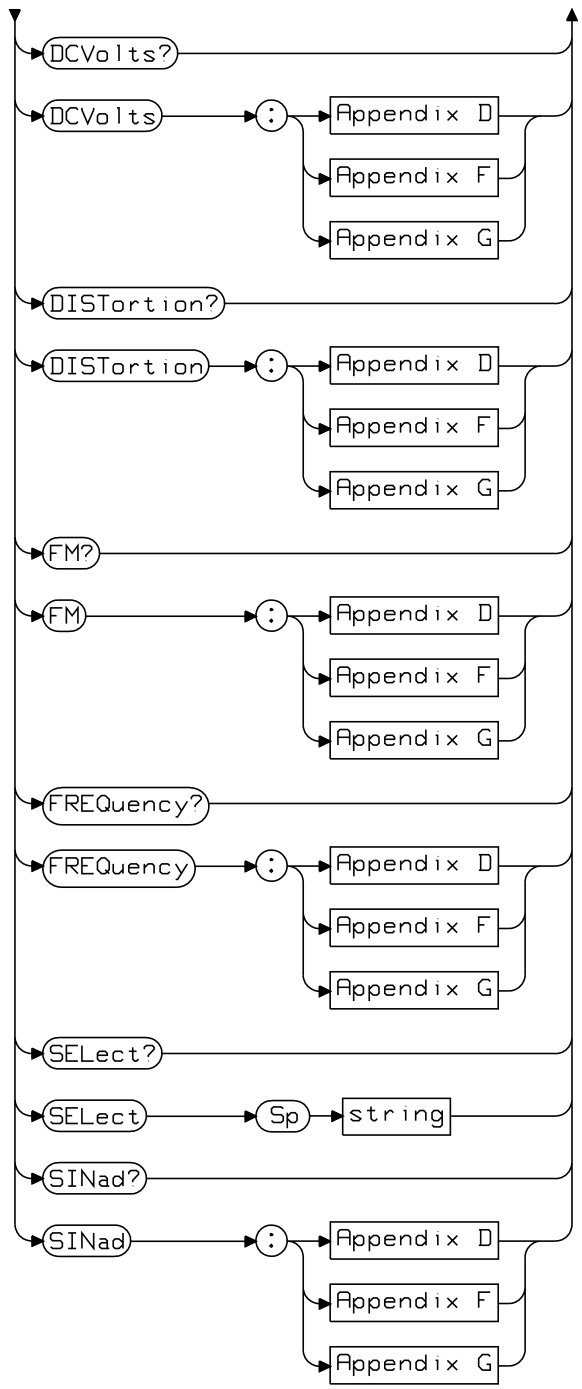
Options Refer to Appendix B.

5

Audio Frequency Commands (Measure Subsystem)



Continued Over


DCVolts?
DCVolts
:
Appendix D
Appendix F
Appendix G
DISTortion?
DISTortion
FM?
FM
FREQuency?
FREQuency
SELect?
SELect
Sp
string
SINad?
SINad

ACLevel

Description Sets the AC Level MEASurement attributes.

GPIB unit is V.

Display units are dBm, V, mV, uV, dBuV, W; default unit is V.

Queries the AC Level MEASurement result for AF Analyzer inputs.

(AFAN:INP) that are in units of AC level.

Syntax MEASure:AFRequency:ACLevel?

MEASure:AFRequency:ACLevel[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

AM

Description Sets the AM Depth MEASurement attributes. Queries the AM Depth MEASurement result for AF Analyzer inputs (AFAN:INP) that are units of percent.

GPIB unit is %(PCT).

Display units are %(PCT).

Syntax MEASure:AFRequency:AM?

MEASure:AFRequency:AM[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

DCAM

Description Sets the DC AM Level MEASurement attributes. Queries the DC Level MEASurement result for AF Analyzer inputs (AFAN:INP) that are units of percent.

GPIB unit is %(PCT).

Display units are %(PCT).

Syntax MEASure:AFRequency:DCAM?

MEASure:AFRequency:DCAM[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

DCFM

Description Sets the DC FM Level MEASurement attributes. Queries the DC Level MEASurement result for AF Analyzer inputs (AFAN:INP) that are units of Hertz.

GPIB unit is HZ.

Display units are KHZ, HZ; default unit is HZ.

Syntax MEASure:AFRequency:DCFM?

MEASure:AFRequency:DCFM[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

DCVolts

Description Sets the DC Volts MEASurement attributes. Queries the DC Volts MEASurement result for AF Analyzer inputs (AFAN:INP) that are units of DC Volts.

GPIB unit is V.

Display units are dBm, V, mV, uV, dBuV, W; default unit is V.

Syntax MEASure:AFRequency:DCVolts?

MEASure:AFRequency:DCVolts[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

DISTortion

Description Sets the DISTortion MEASurement attributes. Queries the DISTortion MEASurement result.

GPIB and Display units are dB and percent (PCT).

Default HP-IB and display unit is PCT.

Syntax MEASure:AFRequency:DISTortion?

MEASure:AFRequency:DISTortion[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

FM

Description Sets the FM deviation MEASurement attributes. Queries the FM deviation MEASurement result for FM DEMOD AF Analyzer.

GPIB unit is HZ.

Display units are kHZ, HZ; default unit is HZ.

Syntax MEASure:AFRequency:FM?

MEASure:AFRequency:FM[:MM] | [:AVG] | [:MET]

Options. Refer to Appendices D, F and G

FREQuency

Description Sets the Audio FREQuency MEASurement attributes. Queries the Audio FREQuency MEASurement result.

GPIB unit is HZ.

Display units are KHZ, HZ; default unit is HZ.

Syntax MEASure:AFRequency:FREQuency?

MEASure:AFRequency:FREQuency[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

SELect

Description Selects/queries the Audio FRequency SELected measurement. NOTE: to get valid measurements for DC AM, DC FM and DC Volts, this filed must be set to ’DC LEVEL’ and the AF Analyzer Input (AFAN:INP) is set to look at an AM, FM, or voltage source (respectively).

Syntax MEASure:AFRequency:SELect?

MEASure:AFRequency:SELect <string>

Options ’AF FREQ’ | ’DC LEVEL’ | ’DISTN’ | ’SINAD’

SINad

Description Sets the SINad MEASurement attributes. Queries the SINad MEASurement result.

GPIB and Display units are dB and percent (PCT)

Default GPIB and Display unit is dB

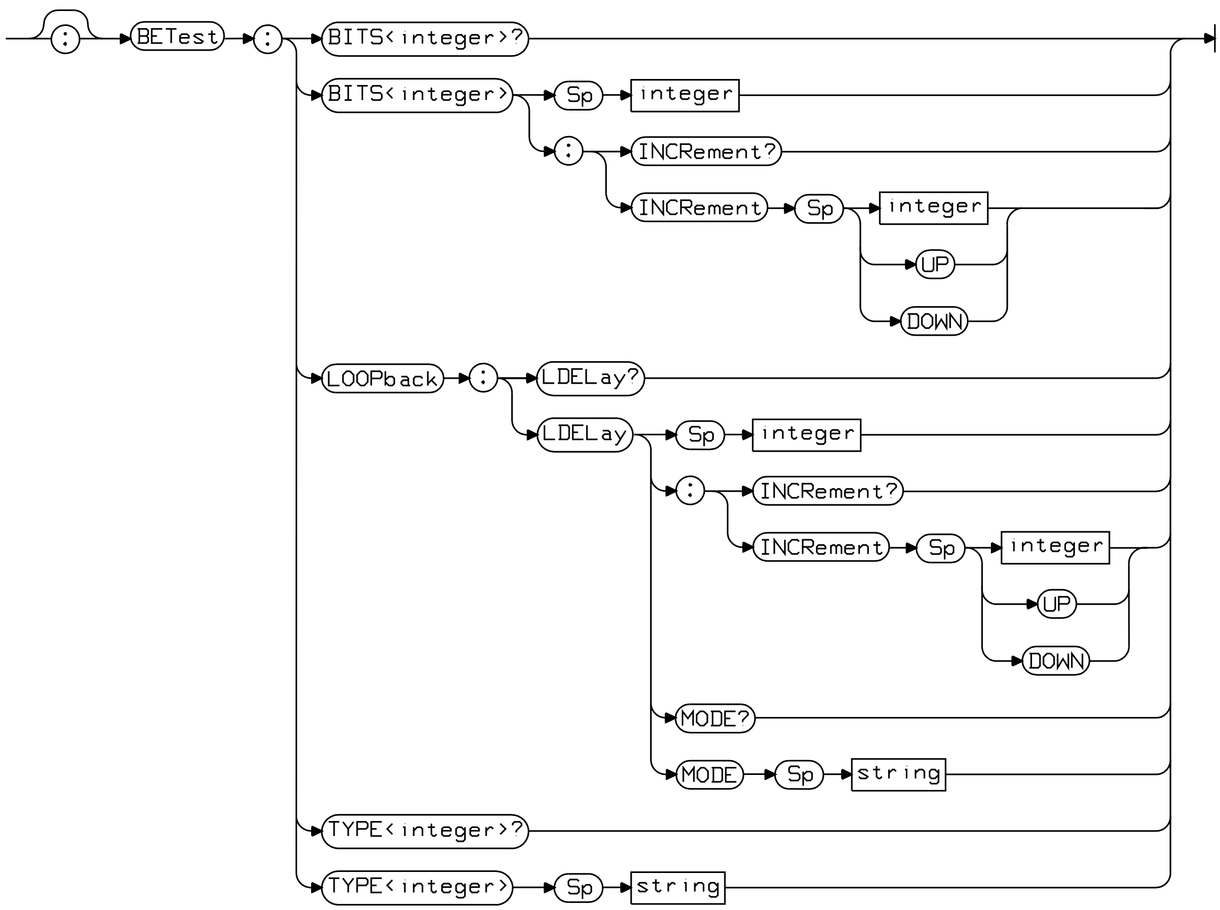
Syntax MEASure:AFRequency:SINad?

MEASure:AFRequency:SINad[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

6

Bit Error Test Subsystem


:
BETest
:
BITS<integer>?
BITS<integer>
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
LOOPback
:
LDELay?
LDELay
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
MODE?
MODE
Sp
string
TYPE<integer>?
TYPE<integer>
Sp
string

BITS

Description Sets/queries the number of BITS to test to make this Bit Error Test measurement complete.

Syntax BETest:BITS<n>?

BETest:BITS<n> <integer> | [:INUM]

Options Where <n>= 1 through 4.

Refer to Appendix A.

LOOPback:LDELay

Description Sets/queries the Loop DELay. This is the number of speech frames to be assumed for loopback. delay. This affects how and when bit error test measurement bit patterns are compared.

Syntax BETest:LOOPback:LDELay?

BETest:LOOPback:LDELay <integer> | [:INUM]

Options Refer to Appendix A.

LOOPback:LDELay:MODE

Description Sets/queries the Loop DELay MODE.

Syntax BETest:LOOPback:LDELay:MODE?

BETest:LOOPback:LDELay:MODE <string>

Options ’AUTO’ | ’MANUAL’

Where;

- AUTO automatically sets LDELay (above) once when the measurement is started. This is a timing calibration action.
- MANUAL means the Loop DELay is controlled manually via the :LDELay command.

TYPE

Description Selects/queries the Bit Error Test measurement TYPE. This defines the Bit Error Test measurement TYPE for each of the four available Bit Error Test measurements.

Syntax BETest:TYPE<n>?

BETest:TYPE<n> <string>

Options ’TYPEI’ | ’RESTYPEI’ | ’TYPEIA’ | ’RESTYPEIA’ |

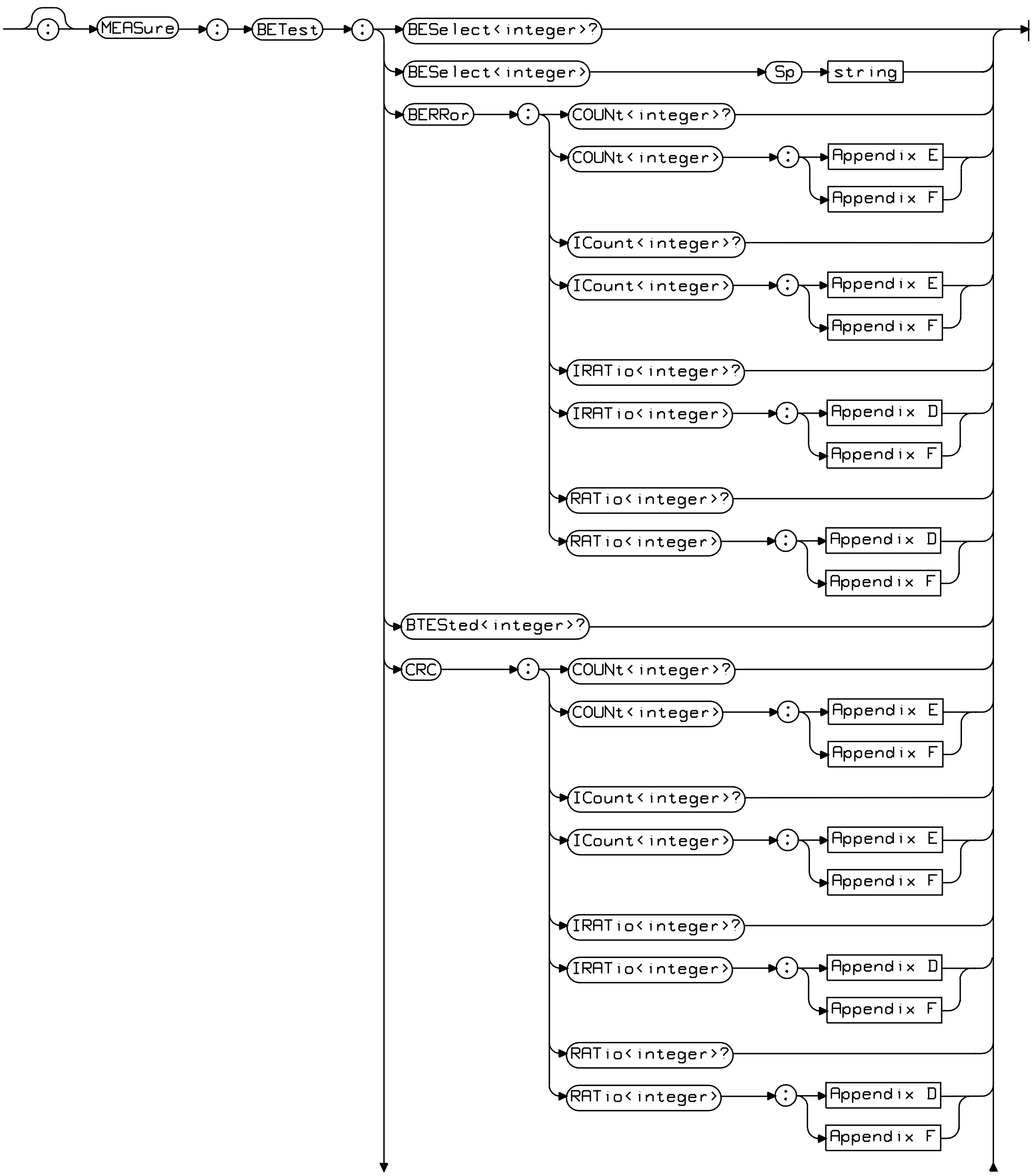
’TYPEII’ | ’RESTYPEII’ | ’TYPEIB’ | ’RESTYPEIB’ |

’ALLFS’ | ’RESALLFS’ | ’OFF’

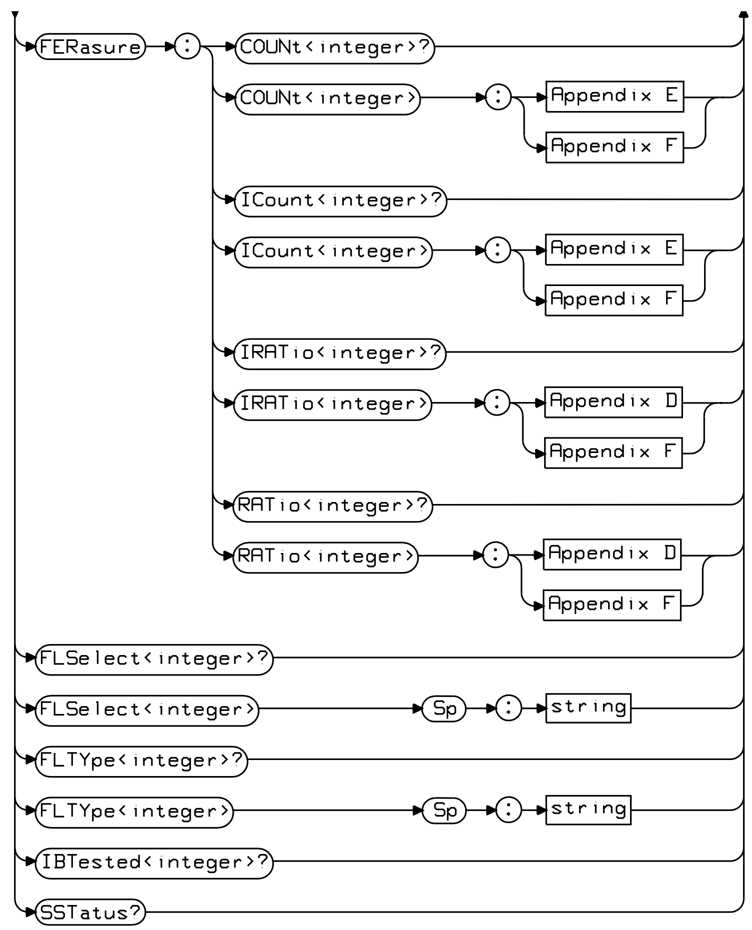
Where <n>= 1 through 4.

7

Bit Error Test Commands (Measure Subsystem)



Continued Over


FERasure
:
COUNt<integer>?
COUNt<integer>
Appendix E
Appendix F
ICount<integer>?
ICount<integer>
IRATio<integer>?
IRATio<integer>
Appendix D
RATio<integer>?
RATio<integer>
FLSelect<integer>?
FLSelect<integer>
Sp
string
FLTYpe<integer>?
FLTYpe<integer>
IBTested<integer>?
SSTatus?

BESelect

Description Selects/queries the Bit Error SELected Bit Error Test measurement to display (BE Ratio, BE Count) for the given measurement number n,

Syntax MEASure:BETest:BESelect<n>?

MEASure:BETest:BESelect<n> <string>

Options 'BE COUNT' | 'BE RATIO'

where <n> = 1..4.

BERRor:COUNt

Description Sets the Bit ERRor COUNt MEASurement attributes. Queries the Bit ERRor COUNt (completed),

Syntax MEASure:BETest:BERRor:COUNt<n>?

MEASure:BETest:BERRor:COUNt<n>[:MM_MOD] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices E and F.

BERRor:ICOunt

Description Sets the Bit ERRor Intermediate COunt MEASurement attributes. Queries the Bit ERRor COunt (completed).

NOTE: This can only be queried when in the state

TRIGger:BETest:MODE 'RUN'

Syntax MEASure:BETest:BERRor:ICOUNt<n>?

MEASure:BETest:BERRor:ICOUNt<n>[:MM-MOD] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices E and F.

BERRor:IRATio

Description Sets CRC Intermediate RATio MEASurement attributes. Queries the CRC Intermediate RATio

GPIB units are % (PCT), PPM;

default unit is PPM.

Display units are % (PCT), PPM;

default unit is PPM.

NOTE: This can only be queried when in the state

TRIGger:BETest:MODE ‘RUN’

Syntax MEASure:BETest:BERRor:IRATio<n>?

MEASure:BETest:BERRor:IRATio<n>[:MM] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices D and F.

BERRor:RATio

Description Sets Bit Error RATio MEASurement attributes. Queries the Bit ERRor RATio

GPIB units are % (PCT), PPM;

default unit is PPM.

Display units are % (PCT), PPM;

default unit is PPM.

Syntax MEASure:BETest:BERRor:RATio<n>?

MEASure:BETest:BERRor:RATio<n>[:MM] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices D and F.

BTESted

Description Queries the number of Bits TESted for the completed Bit ERRor Test measurements

Syntax MEASure:BETest:BTESted<n>?

Options where <n> = 1..4.

CRC:COUNt

Description Sets the CRC COUNt MEASurement attributes. Queries the CRC COUNt (completed),

Syntax MEASure:BETest:CRC:COUNt<n>?

MEASure:BETest:CRC:COUNt<n>[:MM-MOD] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices E and F.

CRC:ICOunt

Description Sets the CRC Intermediate COunt MEASurement attributes. Queries the CRC Intermediate COunt (completed).

NOTE: This can only be queried when in the state

TRIGger:BETest:MODE 'RUN'

Syntax MEASure:BETest:CRC:ICOunt<n>?

MEASure:BETest:CRC:ICOunt<n>[:MM-MOD] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices E and F.

CRC:IRATio

Description Sets CRC Intermediate RATio MEASurement attributes. Queries the CRC Intermediate RATio

GPIB units are % (PCT), PPM; default unit is PPM.

Display units are % (PCT), PPM; default unit is PPM.

NOTE: This can only be queried when in the state

TRIGger:BETest:MODE 'RUN'

Syntax MEASure:BETest:CRC:IRATio<n>?

MEASure:BETest:CRC:IRATio<n>[:MM] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices D and F.

CRC:RATio

Description Sets CRC RATio MEASurement attributes. Queries the CRC RATio (completed).

Syntax MEASure:BETest:CRC:RATio<n>?

MEASure:BETest:CRC:RATio<n>[:MM] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices D and F.

FERasure:COUNt

Description Sets the Frame ERasure COUNt MEASurement attributes. Queries the CRC COUNt (completed),

Syntax MEASure:BETest:FERasure:COUNt<n>?

MEASure:BETest:FERasure:COUNt<n>[:MM-MOD] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices E and F.

FERasure:ICOunt

Description Sets the Frame ERasure Intermediate COunt MEASurement attributes. Queries the Frame ERasure Intermediate COunt.

NOTE: This can only be queried when in the state

TRIGger:BETest:MODE 'RUN'

Syntax MEASure:BETest:FERasure:ICOunt<n>?

MEASure:BETest:FERasure:ICOunt<n>[:MM-MOD] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices E and F.

FERasure:IRATio

Description Sets Frame ERasure Intermediate RATio MEASurement attributes. Queries the Frame ERasure Intermediate RATio

GPIB units are % (PCT), PPM; default unit is PPM.

Display units are % (PCT), PPM; default unit is PPM.

NOTE This can only be queried when in the state: TRIGger:BETest:MODE ‘RUN’

Syntax MEASure:BETest:FERasure:IRATio<n>?

MEASure:BETest:FERasure:IRATio<n>[:MM] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices D and F.

FERasure:RATio

Description Sets Frame ERasure RATio MEASurement attributes. Queries the Frame ERasure RATio(completed).

GPIB units are % (PCT), PPM; default unit is PPM.

Display units are % (PCT), PPM; default unit is PPM.

NOTE This can only be queried when in the state: TRIGger:BETest:MODE ‘RUN’

Syntax MEASure:BETest:FERasure:RATio<n>?

MEASure:BETest:FERasure:RATio<n>[:MM] | [:AVG]

Options where <n> = 1..4.

Refer to Appendices D and F.

FLSelect

Description Selects/queries the Frame Loss Selected Bit Error Test measurement to display (Count or Ratio) for the given Frame Loss TYpe (FE or CRC).

Syntax MEASure:BETest:FLSelect<n>?

MEASure:BETest:FLSelect<n> <string>

Options ‘COUNT’ | ‘RATIO’

where <n> = 1..4.

FLTYpe

Description Selects/queries the Frame Loss Selected Bit Error Test measurement to display (Count or Ratio) for the given Frame Loss Select (Count or Ration) for the given measurement number.

Syntax MEASure:BETest:FLTYpe<n>?

MEASure:BETest:FLTYpe<n> <string>

Options ‘FE’ | ‘CRC’

where <n> = 1..4.

IBTested

Description Queries the number of Bits Tested for the Intermediate Bit Error Test measurements.

NOTE This can only be queried when in the state: TRIGger:BETest:MODE ‘RUN’

Syntax MEASure:BETest:IBTested<n>?

Options where <n> = 1..4.

SSTatus

Description Queries the Bit Error Test SYNC STatus. Will return ’NO ERROR’ or ’BAD SYNC’. This field will only be updated when the demod arm state goes from ”DISARM” to ”ARM.” This is the same as DDEMod:SYNC:SSTatus.

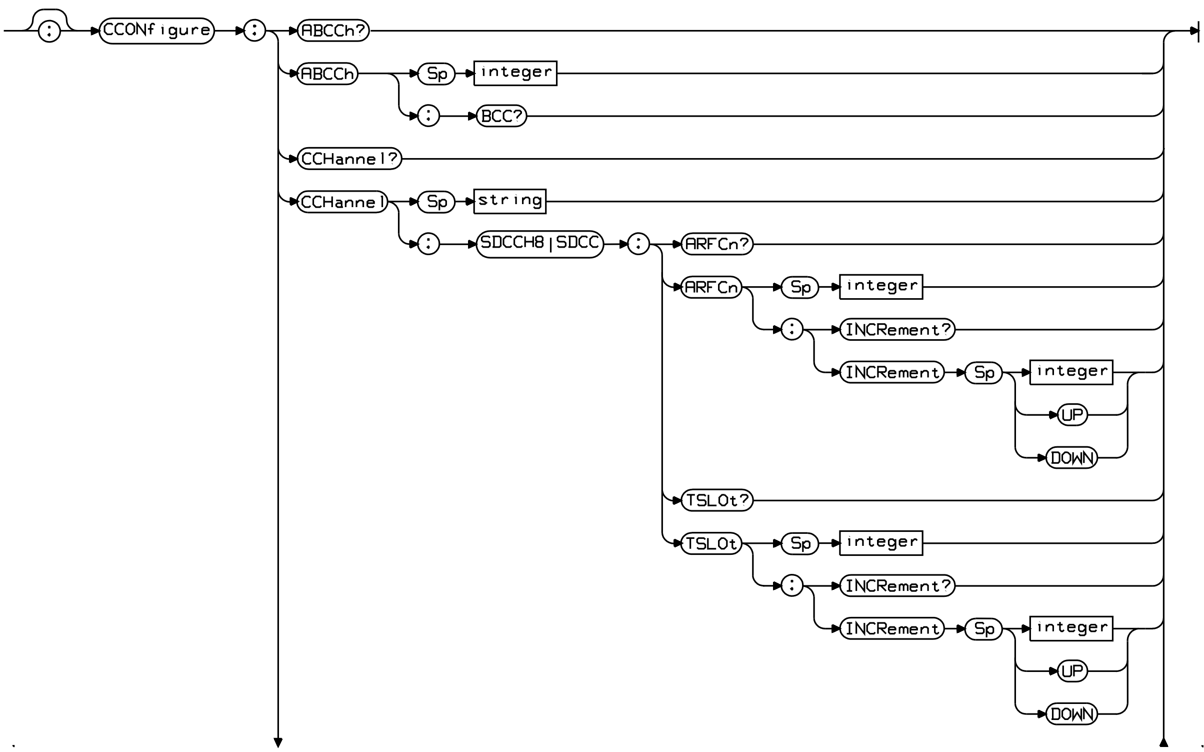
Syntax MEASure:BETest:SSTatus?

Options Not Applicable

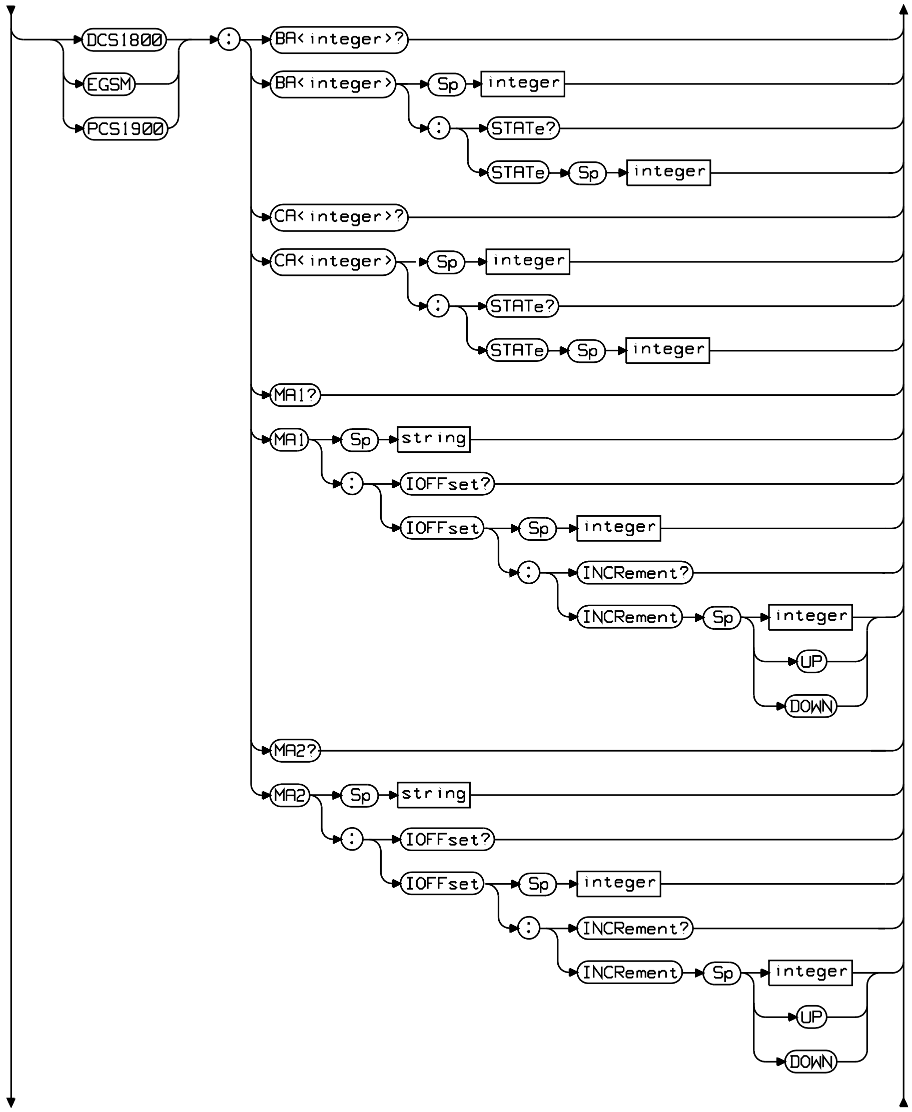
8

Cell Configuration Subsystem

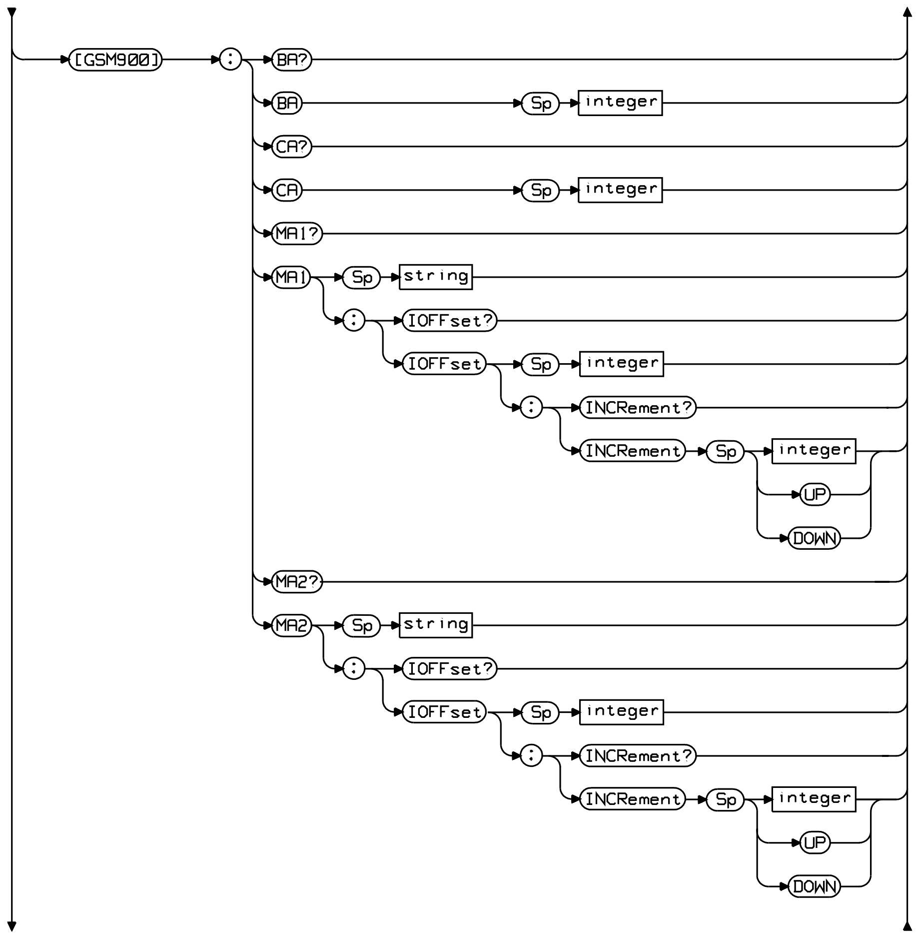
NOTE If you have the Agilent 8922M/S Option 010 Multi-Band Test System, you will have access to additional GPIB commands. These commands are used when working with dual band mobiles. For a full description of these additional commands and their syntax, refer to the *Agilent 8922 Multi-Band User's Guide*.



Continued Over



Continued Over



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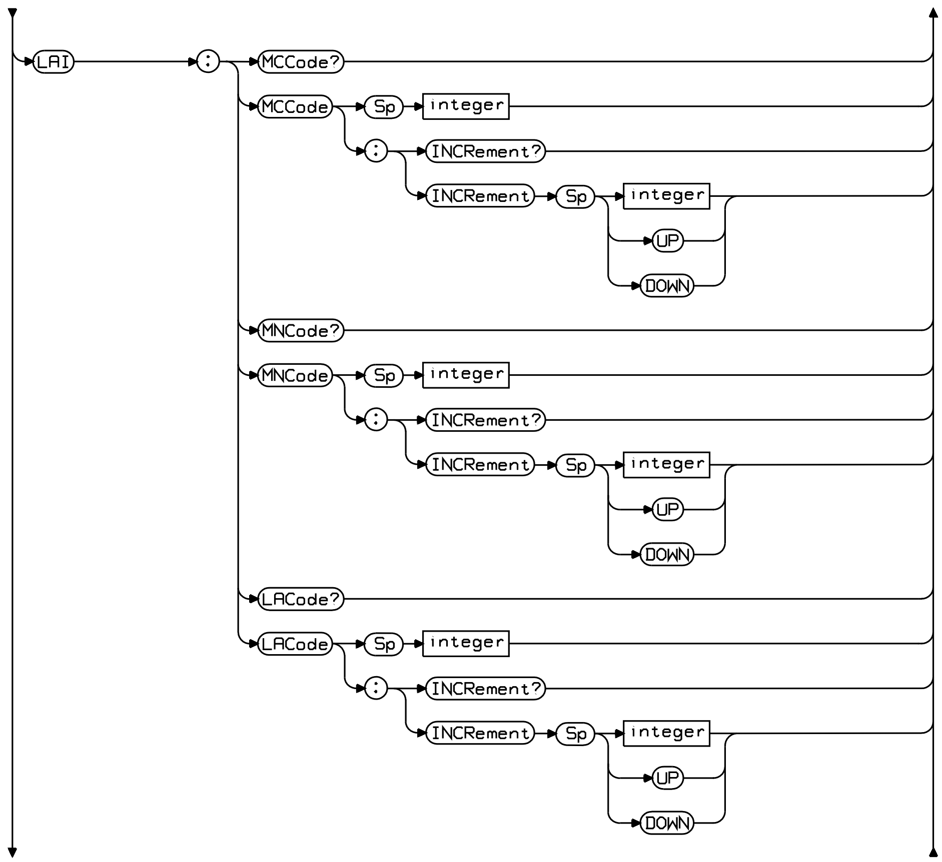

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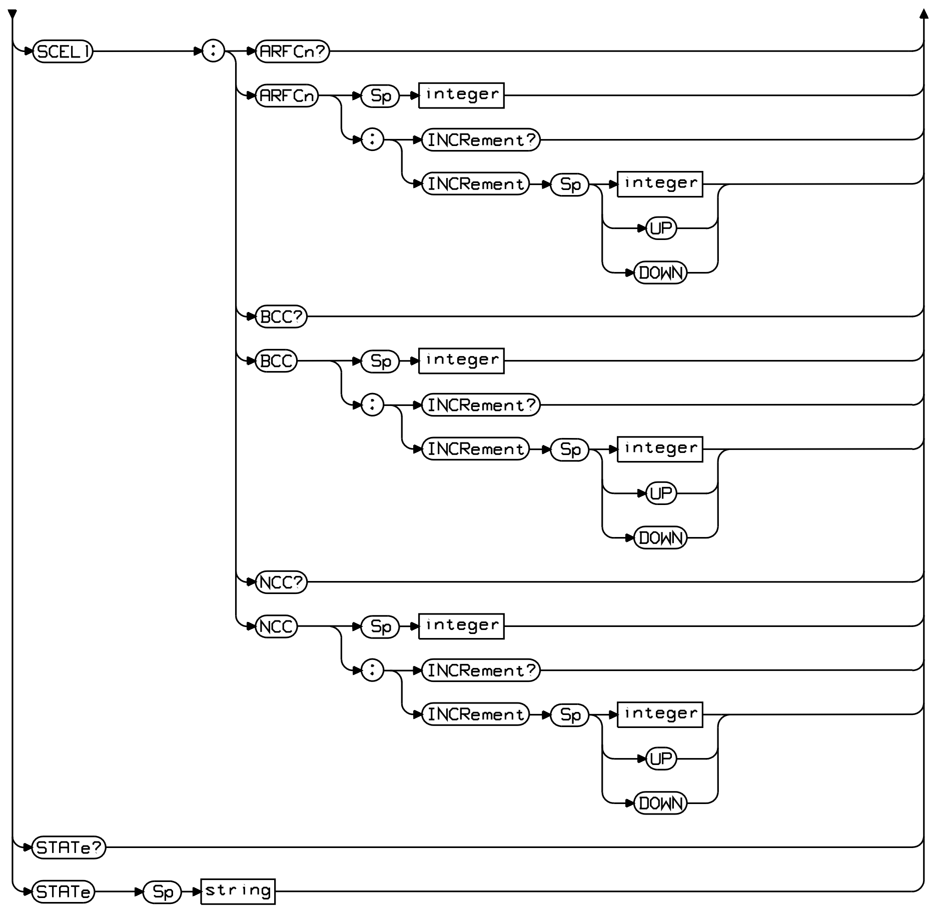
SCELl
:
ARFCn?
ARFCn
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
BCC?
BCC
Sp
integer
:
INCRement?
INCRement
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integer
UP
DOWN
NCC?
NCC
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
STATe?
STATe
Sp
string

ABCCh

Description Selects/queries the Auxiliary BCCH. This defines the state of the auxiliary BCCH data and clock outputs.

Syntax CCONfigure:ABCCh?

CCONfigure:ABCCh <string>

Options ‘OFF’ | ‘ADJACENT’

Where;

- OFF means the auxiliary BCCH is deactivated.
- ADJACENT means the auxiliary BCCH outputs are intended to be used to generate an adjacent cell BCCH (using an external 0.3 GMSK RF Generator).

ABCCh:BCC

Description Queries the Auxiliary Base station Colour Code

Syntax CCONfigure:ABCCh:BCC?

Options Not Applicable.

CCHannel

Description Selects/queries the type of Control CHannel to be used.

Syntax CCONfigure:CCHannel?

CCONfigure:CCHannel <string>

Options ’SD/4’ | ’SD/8’ | ’FA’ | ’SD/4+FA’

Where;

- SD/4 means the SDCCH shares the same physical channel as the BCCH.
- SD/8 means the SDCCH is separate from the BCCH and is on a physical channel specified by the user.
- FA is the same as SD/8, except the TCH1 configuration is used in ’signaling only’ mode instead of using the SDCCH channel.
- SD/4 + FA is the same as SD/4, except the TCH1 configuration is used in ’signaling only’ mode instead of using the SDCCH channel.

CCHannel:SDCCH8:ARFCn

Description Sets/queries the Control CHannel ARFCN (Absolute Radio Frequency Channel Number) for the SDCCH/8.

This is used only when CCON:CCH is ’SD/8’.

Syntax CCONfigure:CCHannel:SDCCH8:ARFCn?

CCONfigure:CCHannel:SDCCH8:ARFCn <integer> | [:INUM]

Options Refer to Appendix A.

CCHannel:SDCCH8:TSLot

Description Sets/queries the Control CHannel ARFCn (Absolute Radio Frequency Channel Number) for the SDCCH8.

Syntax CCONfigure:CCHannel:SDCCH8:TSLot?

CCONfigure:CCHannel:SDCCH8:TSLot <integer> | [:INUM]

Options Refer to Appendix A.

BA

Description Sets/queries the Broadcast control channel Allocation. Entries in BA table must be in contiguous ascending order. The allocation must begin at BA1 and continue through BA<n>. Unallocated entries are turned off.

Where <n> = the highest number allocated in the range 1 to 16.

Syntax CCONfigure:DCS1800 | PCS1900 | EGSM:BA<n>?

CCONfigure:DCS1800 | PCS1900 | EGSM:BA<n> <integer>

Options 512 to 885 for DCS1800

0 to 124 | 975 to 1023 for EGSM

512 to 810 for PCS1900

Where <n> = 1 to 16

CA

Description Sets/queries the Cell Allocation.

Entries in CA table must be in contiguous ascending order. The allocation must begin at CA1 and continue through CA<m>. Unallocated entries are turned off.

Where <m> = the highest number allocated in the range 1 to 16.

Syntax CCONfigure:DCS1800 | PCS1900 | EGSM:CA<n>?

CCONfigure:DCS1800 | PCS1900 | EGSM:CA<n> <integer>

Options 512 to 885 for DCS1800

0 to 124 | 975 to 1023 for EGSM

512 to 810 for PCS1900

Where <n> = 1 to 16

MA1

Description Sets/queries the Mobile Allocation 1.

This is a binary string representing which CA ARFCNs will be in Mobile Allocation number 1. This defines which of the first 16 entries in the CA will be part of the sequential hop sequence for MA1.

Syntax CCONfigure:DCS1800 | PCS1900 | EGSM:MA1?

CCONfigure:DCS1800 | PCS1900 | EGSM:MA1 <quoted string>

Options Not Applicable.

NOTE All 16 entries must be input.

MA1:IOFFset

Description Sets/queries the Mobile Allocation 1 Index Offset. This defines where the hop sequence starts for MA1.

Syntax CCONfigure:DCS1800 | PCS1900 | EGSM:MA1:IOFFset?

CCONfigure:DCS1800 | PCS1900 | EGSM:MA1:IOFFset <integer> | [:INUM]

Options Refer to Appendix A.

MA2

Description Sets/queries the Mobile Allocation 2.

This is a binary string representing which CA ARFCNs will be in Mobile Allocation number 2. This defines which of the first 16 entries in the CA will be part of the sequential hop sequence for MA2.

Syntax CCONfigure:DCS1800 | PCS1900 | EGSM:MA2?

CCONfigure:DCS1800 | PCS1900 | EGSM:MA2 <quoted string>

Options Not Applicable.

NOTE All 16 entries must be input.

MA2:IOFFset

Description Sets/queries the Mobile Allocation 2 Index Offset. This defines where the hop sequence starts for MA2.

Syntax CCONfigure:DCS1800 | PCS1900 | EGSM:MA1:IOFFset?

CCONfigure:DCS1800 | PCS1900 | EGSM:MA1:IOFFset <integer> | [:INUM]

Options Refer to Appendix A.

[:GSM900]:BA

Description Sets/queries the Broadcast control channel Allocation. This is a binary string representing which ARFCNs are in the BCCH Allocation. A ’1’ in the first entry represents the existence of ARFCN 1.

Syntax CCONfigure[:GSM900]:BA?

CCONfigure[:GSM900]:BA <integer>

Options Quoted string.

NOTE All 124 entries must be input.

[:GSM900]:CA

Description Sets/queries the Cell Allocation.

This is a binary string representing which ARFCNs are in the Cell Allocation. A ’1’ in the first entry represents the existence of ARFCN 1.

Syntax CCONfigure[:GSM900]:CA?

CCONfigure[:GSM900]:CA <integer>

Options Quoted string.

NOTE All 124 entries must be input.

[:GSM900]:MA1

Description Sets/queries the Mobile Allocation 1.

This is a binary string representing which CA ARFCNs will be in Mobile Allocation number 1. This defines which of the first 64 entries of 1’s in the CA will be part of the sequential hop sequence for MA1.

Syntax CCONfigure[:GSM900]:MA1?

CCONfigure[:GSM900]:MA1 <quoted string>

Options Not Applicable.

NOTE All 64 entries must be input.

[:GSM900]:MA1:IOFFset

Description Sets/queries the Mobile Allocation 1 Index Offset. This defines where the hop sequence starts for MA1.

Syntax CCONfigure[:GSM900]:MA1:IOFFset?

CCONfigure[:GSM900]:MA1:IOFFset <integer> | [:INUM]

Options Refer to Appendix A.

[:GSM900]:MA2

Description Sets/queries the Mobile Allocation 2.

This is a binary string representing which CA ARFCNs will be in Mobile Allocation number 2. This defines which of the first 64 entries of 1's in the CA will be part of the sequential hop sequence for MA2.

Syntax CCONfigure[:GSM900]:MA2?

CCONfigure[:GSM900]:MA2 <quoted string>

Options Not Applicable.

NOTE All 64 entries must be input.

[:GSM900]:MA2:IOFFset

Description Sets/queries the Mobile Allocation 2 Index Offset. This defines where the hop sequence starts for MA1.

Syntax CCONfigure[:GSM900]:MA2:IOFFset?

CCONfigure[:GSM900]:MA2:IOFFset <integer> | [:INUM]

Options Refer to Appendix A.

NOTE All 64 entries must be input.

LAI:MCCode

Description Sets/queries the Mobile Country Code (3 decimal digits).

Syntax CCONfigure:LAI:MCCode?

CCONfigure:LAI:MCCode <integer> | [:INUM]

Options Refer to Appendix A.

LAI:MNCode

Description Sets/queries the Mobile Area Code (2 decimal digits).

Syntax CCONfigure:LAI:MNCode?

CCONfigure:LAI:MNCode <integer> | [:INUM]

Options Refer to Appendix A.

LAI:LACode

Description Sets/queries the Mobile Area Code.

Syntax CCONfigure:LAI:LACode?

CCONfigure:LAI:LACode <integer> | [:INUM]

Options Refer to Appendix A.

SCELl:ARFCn

Description Sets/queries the Serving Cell ARFCn.

Syntax CCONfigure:SCELl:ARFCn?

CCONfigure:SCELl:ARFCn <integer> | [:INUM]

Options Refer to Appendix A.

SCELl:BCC

Description Sets/queries the Serving Cell Base Station Colour.

Syntax CCONfigure:SCELl:BCC?

CCONfigure:SCELl:BCC <integer> | [:INUM]

Options Refer to Appendix A.

SCELl:NCC

Description Sets/queries the Serving Cell Network Colour Code.

Syntax CCONfigure:SCELl:NCC?

CCONfigure:SCELl:NCC <integer> | [:INUM]

Options Refer to Appendix A.

STATe

Description Selects/queries the Cell CONfiguration STATe.

Syntax CCONfigure:STATe?

CCONfigure:STATe <string>

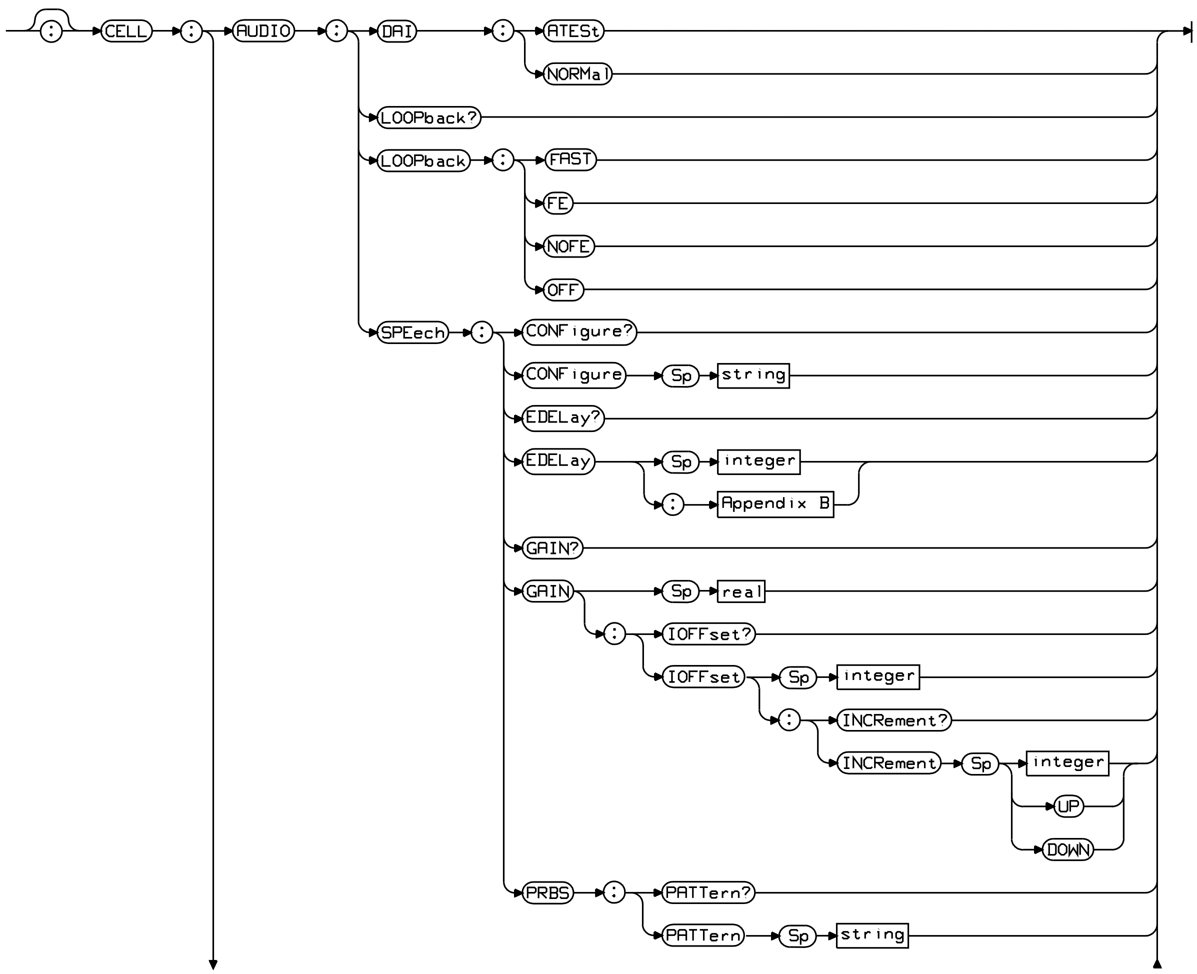
Options ‘SETTABLE’ | ‘ACTIVATED’

Where;

- SETTABLE means that all Cell Configuration settings can be changed and that the signaling state will be ”None”. An active call will be automatically terminated in this state.
- ACTIVATED means that all Cell Configuration settings are ”frozen” and the signaling state will be at least ”BCCH”. This state will not be allowed if the settings on the CCON (Cell Config) screen are not compatible.

9

Cell Control Subsystem



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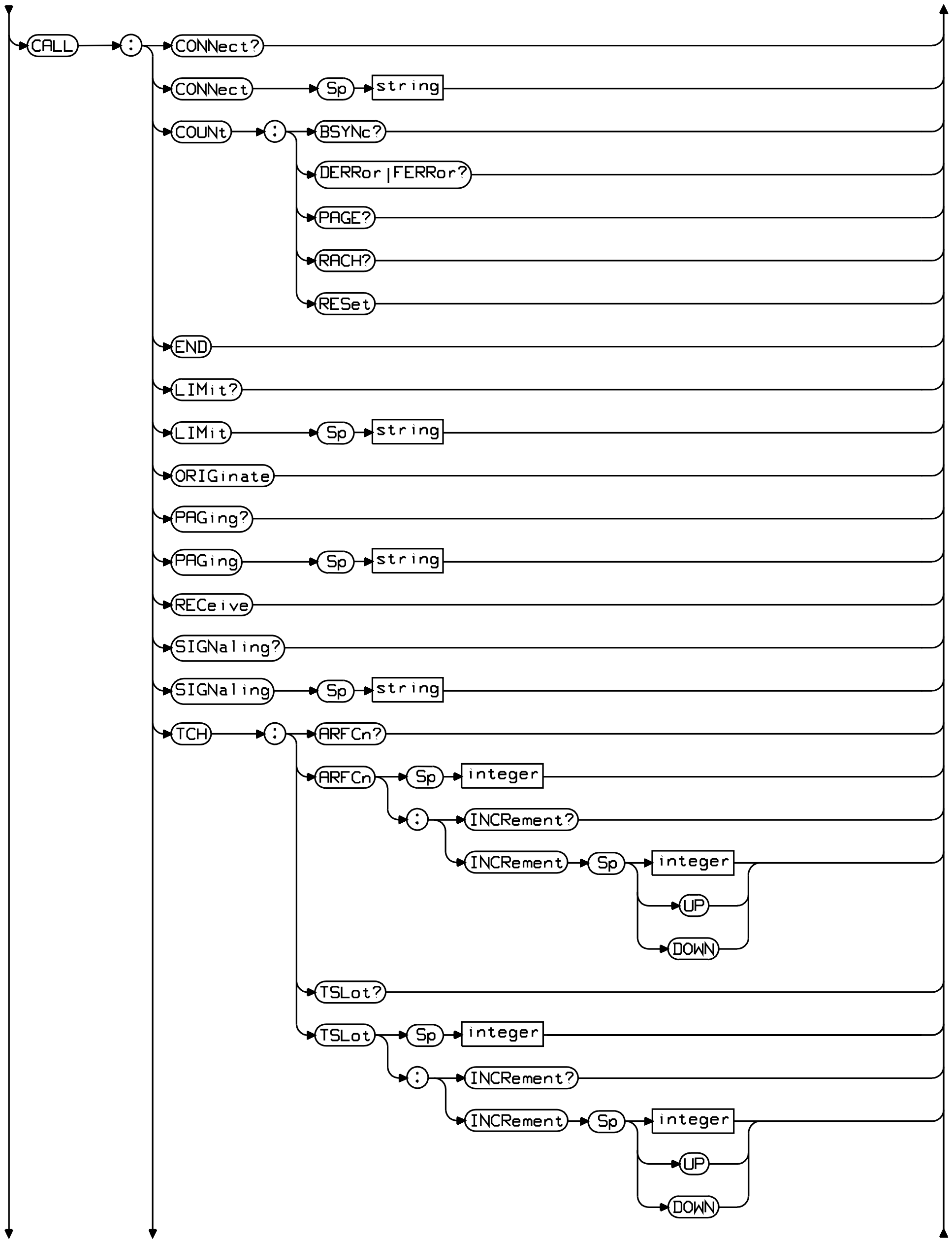

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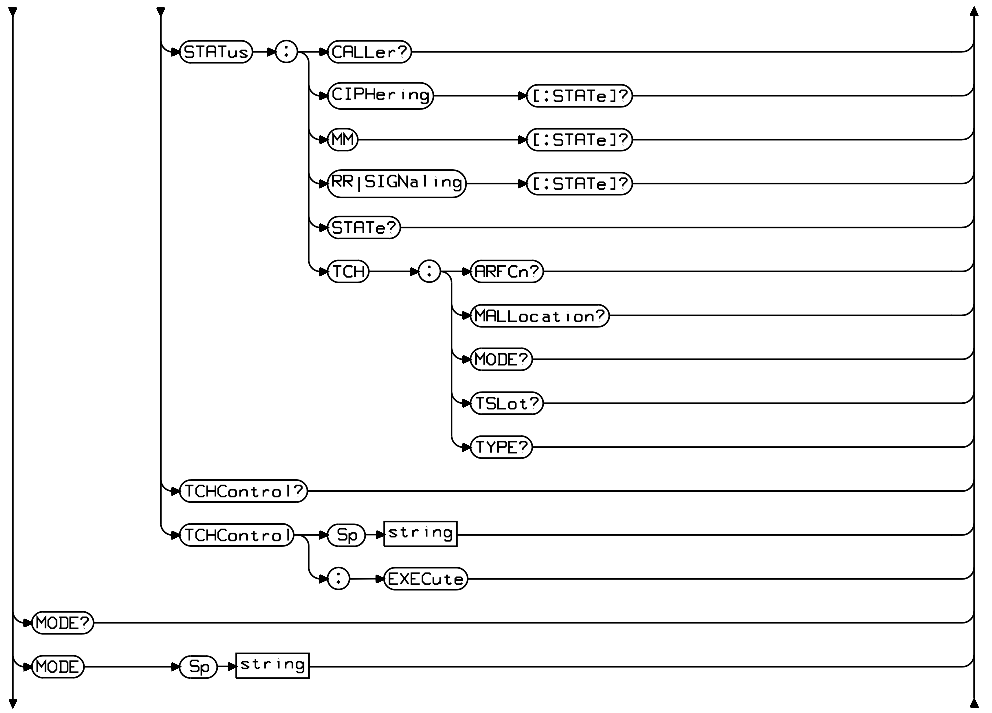

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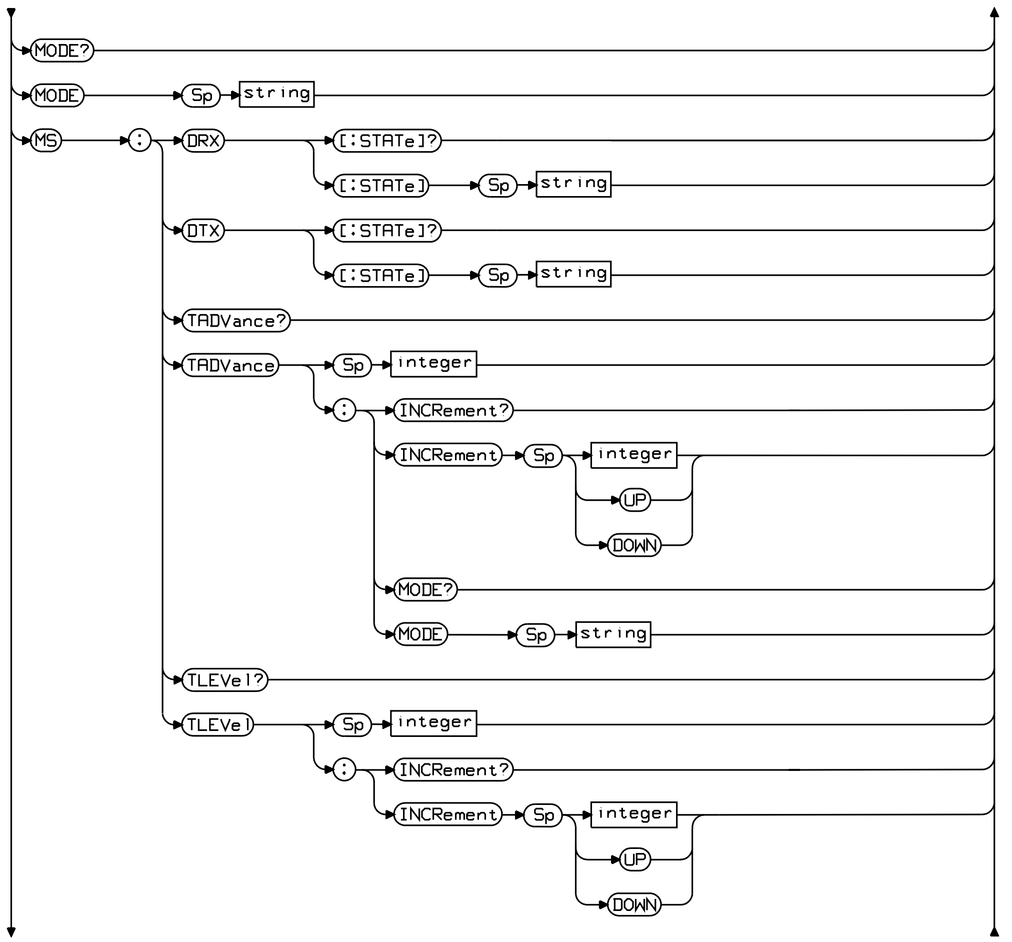

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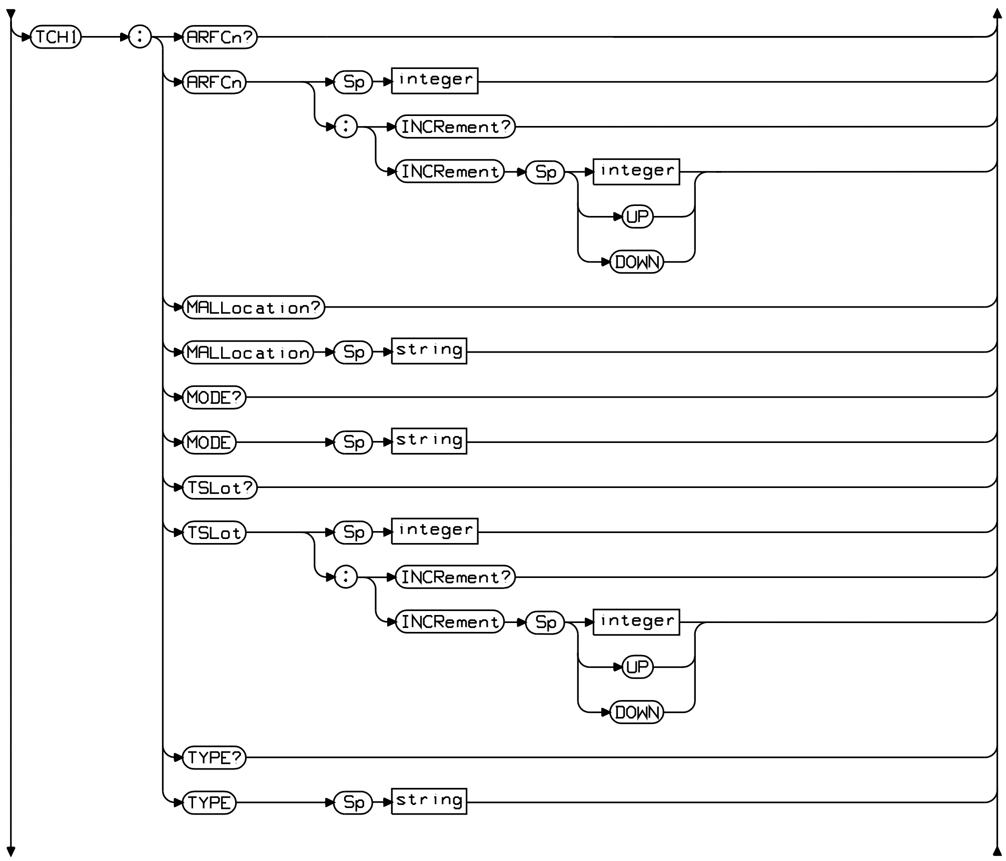

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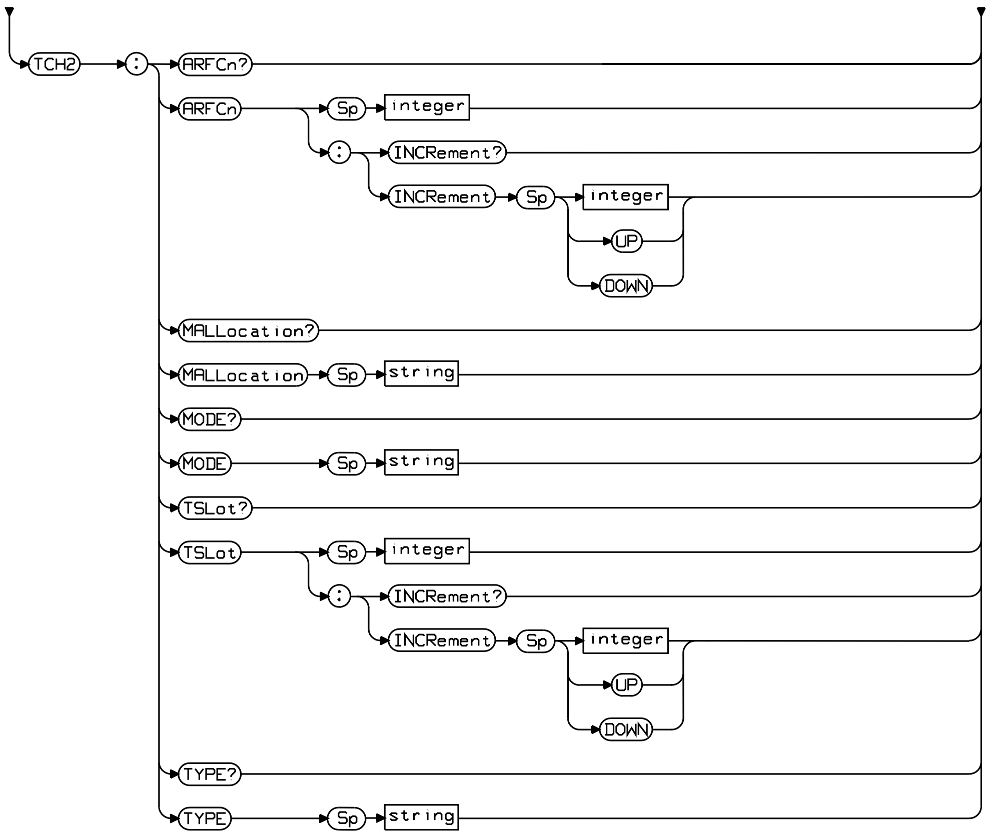

TCH2
:
ARFCn?
ARFCn
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
MALLocation?
MALLocation
Sp
string
MODE?
MODE
Sp
string
TSLot?
TSLot
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
TYPE?
TYPE
Sp
string

AUDio:DAI:ATESt

Description This selects the DAI (Digital Audio Interface) Audio Test mode.

Syntax CELL:AUDio:DAI:ATESt

Options Not Applicable.

AUDio:DAI:NORMal

Description This selects the DAI (Digital Audio Interface) Normal mode.

Syntax CELL:AUDio:DAI:NORMal

Options Not Applicable.

AUDio:LOOPback

Description Queries the Audio Loopback Commands.

Syntax CELL:AUDio:LOOPback?

Options Not Applicable.

AUDio:LOOPback:FAST

Description Tells the Mobile to go into Fast Loopback mode.

Syntax CELL:AUDio:LOOPback:FAST

Options Not Applicable.

AUDio:LOOPback:FE

Description Turns MS Loopback on with Frame Erasure.

Syntax CELL:AUDio:LOOPback:FE

Options Not Applicable.

AUDio:LOOPback:OFF

Description Turns MS Loopback OFF.

Syntax CELL:AUDio:LOOPback:OFF

Options Not Applicable.

AUDio:LOOPback:NOFE

Description Turns MS Loopback on with NO Frame Erasure.

Syntax CELL:AUDio:LOOPback:NOFE

Options Not Applicable

AUDio:SPEech:CONFigure

Description Selects/queries the speech configuration.

NOTE This has couplings with DC AM.

Syntax CELL:AUDio:SPEech:CONFigure?

CELL:AUDio:SPEech:CONFigure <string>

Options ’NONE’ | ’UNCOND’ | ’COND’ | ’ECHO’ | ’PRBS’

Where;

- NONE means that speech (hardware) is deactivated.
- UNCOND means that speech will be unconditioned (that is not amplifiable).
- COND means that speech will be conditioned (i.e., amplifiable).
- ECHO means that speech (hardware) will be put into an ”echo” mode, where we will echo back to the MS whatever we received, with a settable echo delay (time).
- PRBS means that speech (hardware) is outputting a pseudo random binary sequence.

NOTE NONE, UNCOND, COND are not available in the Agilent 8922S.

AUDio:SPEech:EDELay

Description Selects/queries the speech Echo delay.

This is the delay time for the ECHO speech mode. This only applies when CELL:AUD:SPE:CONF is ECHO.

Default GPIB and display unit is seconds (S).

Syntax CELL:AUDio:SPEech:EDELay?

CELL:AUDio:SPEech:EDELay <integer [units]> | [:FNUM]

Options Refer to Appendix B.

AUDio:SPEech:GAIN

Description Sets/queries the speech GAIN (unitless).

This is the speech gain for the conditioned speech mode. This only applies when CELL:AUD:SPE:CONF is CONDitioned.

Syntax CELL:AUDio:SPEech:GAIN?

CELL:AUDio:SPEech:GAIN <real [units]> | [:INUM]

Options Refer to Appendix A.

NOTE This feature is not available in the Agilent 8922S.

AUDio:SPEech:PRBS:PATTern

Description Sets/queries the speech PRBS pattern.

This is the pattern for the PRBS speech. This only applies when CELL:AUD:SPE:CONF is PRBS.

Syntax CELL:AUDio:SPEech:PRBS:PATTern?

CELL:AUDio:SPEech:PRBS:PATTern <string>

Options ’CCITT-15’ | ’CCITT-23’ | ’0’ | ’1’ | ’01’ | ’10’

CALL:CONNect

Description Selects/queries the connect (mode).

Syntax CELL:CALL:CONNect?

CELL:CALL:CONNect <string>

Options ‘AUTO’ | ‘MANUAL’

Where;

- AUTO means that we will automatically attempt to connect to an MS-initiated call.
- MANUAL means that you must use CELL:CALL:RECeive to receive an MS-initiated call.

CALL:COUNt:BSYNc

Description Count of Bad syncs detected during this call or since COUNt:RESet.

NOTE It is normal to detect Bad SYNcs during call setup.

Syntax CELL:CALL:COUNt:BSYNc?

Options Not Applicable.

CALL:COUNt:DERRor | FERRor

Description COUNt of Decoding ERRors detected during this call or since COUNt:RESet.

NOTE It is normal to detect Decode ERRors during call setup.

Syntax CELL:CALL:COUNt:DERRor | FERRor?

Options Not Applicable.

CALL:COUNt:PAGE

Description COUNt of PAGEs made during this call or since COUNt:RESet.

Syntax CELL:CALL:COUNt:PAGE?

Options Not Applicable.

CALL:COUNt:RACH

Description COUNt of RACHs received during this call or since COUNt:RESet.

Syntax CELL:CALL:COUNt:RACH?

Options Not Applicable.

CALL:COUNt:RESet

Description RESets all CALL COUNts to zero.

Syntax CELL:CALL:COUNt:RESet

Options Not Applicable.

CALL:END

Description Executes an END (i.e., terminate) CALL.

This terminates a call in progress and is the same as selecting the END CALL front panel hardkey.

Syntax CELL:CALL:END

Options Not Applicable.

CALL:LIMit

Description Selects/queries the CALL control LIMit.

This affects how far a call will be allowed to get, which is useful when making measurements on transient states while setting up a call.

Syntax CELL:CALL:LIMit?

CELL:CALL:LIMit <string>

Options ’BCCH’ | ’DCCH’ | ’TCH’

CALL:ORIGinate

Description Executes an ORIGinate (i.e., make) a CALL.

This attempts a BS originated (MS terminated) call and is the same as selecting the ORG CALL front-panel hardkey.

Syntax CELL:CALL:ORIGinate

Options Not Applicable.

CALL:PAGing

Description Selects/queries the PAGing Mode.

Syntax CELL:CALL:PAGing?

CELL:CALL:PAGing <string>

Options 'CONT' | 'SINGLE'

Where;

- CONT means continuous pages will occur when attempting to make a BS-originated call.
- SINGLE means that just one page will occur when attempting to make a BS-originated call.

CALL:RECeive

Description Executes RECeive (i.e., connect to) a CALL.

This connects the call ('answers the phone') and is the same as selecting the RCV CALL front-panel hardkey.

Syntax CELL:CALL:RECeive

Options Not Applicable.

CALL:SIGNaling

Description Selects / queries the amount of signaling performed by the Agilent 8922M/S.

Syntax CELL:CALL:SIGNaling?

CELL:CALL:SIGNaling <string>

Options ’NORMAL’ | ’LIMITED’

Where;

- NORMAL signaling mode uses all the normal GSM messages to change the channel configuration.
- LIMITED specifies that the Agilent 8922M/S should perform an operation with a limited amount of signaling. The user can therefore achieve the ’force TCH’ capability by merely pressing the ORG CALL front-panel hardkey.

CALL:TCH:ARFCn

Description Selects/queries the current traffic channel ARFCn for the current call.

Syntax CELL:CALL:TCH:ARFCn?

CELL:CALL:TCH:ARFCn <integer> | [:INUM]

Options Refer to Appendix A.

CALL:TCH:TSLot

Description Selects/queries the current traffic channel timeslot for the current call.

Syntax CELL:CALL:TCH:TSLot?

CELL:CALL:TCH:TSLot <integer> | [:INUM]

Options Refer to Appendix A.

CALL:STATus:CALLer

Description Returns ’BS’, ’MS’, or ’--’. Indicates who originated the call in progress. ’--’ indicates that the Call STatus is inactive.

Syntax CELL:CALL:STATus:CALLer?

Options Not Applicable.

CALL:STATus:CIPHering[:STATe]

Description Queries the CIPHering STATe.

Syntax CELL:CALL:STATus:CIPHering[:STATe]?

Options Returned as ‘ON’ or ‘OFF’

CALL:STATus:MM[:STATe]

Description Queries the Mobility Management (layer) STATe.

Syntax CELL:CALL:STATus:MM[:STATe]?

Options Returns state of the Mobility Management protocol layer as;

’LOC UPD’ | ’IDENT’ | ’AUTH’ | ’TMSI’ |

’INACTIVE’ | ’ACTIVE’

Where;

- LOC UPD means the MM sub-layer has received a Location Update Request from the MS.
- IDENT means the MM sub-layer has initiated the Identification common procedure and is waiting for the MS to respond.
- AUTH means the MM sub-layer has initiated the Authentication common procedure and is waiting for the MS to respond.
- TMSI means the MM sub-layer has initiated the TMSI reallocation common procedure and is waiting for the MS to respond.
- INACTIVE means there are no MM-connections between the Agilent 8922M/S and the MS.
- ACTIVE means an MM-connection exists between the Agilent 8922M/S and the MS, and may be used to transfer CC messages.

CALL:STATus:RR[:STATe]

Description Queries the Radio Source STATe.

Syntax CELL:CALL:STATus:RR[:STATe]?

Options Returns state of signaling as;

’BCCH’ | ’DCCH’ | ’TCH1’ | ’TCH2’ | ’NONE’

Where;

- BCCH means idle on a Broadcast Control CHannel.
- DCCH means on a Dedicated Control CHannel.
- TCH1 means on a Traffic CHannel as defined by TCH1 settings.
- TCH2 means on a Traffic CHannel as defined by TCH2 settings.
- NONE means that the signaling state is totally undefined.

CALL:STATus:STATe

Description Queries the CALL Status STATe.

Syntax CELL:CALL:STATus:STATe?

Options Returns state of the CALL as;

’SETUP REQUEST’ | ’PROCEEDING’ | ’ALERTING’ |

’SETUP CONFIRM’ | ’CONNECTED’ | ’INACTIVE’

CALL:STATus:TCH:ARFCn

Description Queries the current Traffic CHannel ARFCn. This applies if TCH:MODE is ‘SINGLE’.

Syntax CELL:CALL:STATus:TCH:ARFCn?

Options Not Applicable.

CALL:STATus:TCH:MALLocation

Description Queries the current Traffic CHannel Mobile ALLocation as 'MA1' or 'MA2'. This applies if TCH:MODE is 'HOPPED'.

Syntax CELL:CALL:STATus:TCH:MALLocation?

Options Not Applicable.

CALL:STATus:TCH:MODE

Description Queries the current Traffic CHannel Mode as 'HOPPED' or 'SINGLE'.

Syntax CELL:CALL:STATus:TCH:MODE?

Options Returns state as;

'HOPPED' | 'SINGLE'

Where;

- HOPPED means that the current Traffic CHannel is a hopped traffic channel.
- SINGLE means that the current Traffic CHannel is a non-hopped traffic channel (i.e., a single ARFCN).

CALL:STATus:TCH:TSLot

Description Queries the current Traffic CHannel Timeslot.

Syntax CELL:CALL:STATus:TCH:TSLot?

Options Not Applicable.

CALL:STATus:TCH:TYPE

Description Queries the current Traffic CHannel TYPE.

Syntax CELL:CALL:STATus:TCH:TYPE?

Options Not Applicable.

CALL:TCHControl

Description Sets/queries the TCH Control selection.

Syntax CELL:CALL:TCHControl?

CELL:CALL:TCHControl <string>

Options ’TCH1 HO’ | ’TCH2 HO’ |

’TCH1 ASGN’ | ’TCH2 ASGN’

Where;

- TCH1 HO means upon execution, cause an intracell HandOver to TCH1 based on the CELL:TCH1 selections.
- TCH2 HO means upon execution, cause an intracell HandOver to TCH2. based on the CELL:TCH2 selections.
- TCH1 ASGN means upon execution, do a traffic channel assignment based on the CELL:TCH1 selections.
- TCH2 ASGN means upon execution, do a traffic channel assignment based on the CELL:TCH2 selections.

CALL:TCHControl:EXECute

Description EXECutes the TCH Control selection.

Syntax CELL:CALL:TCHControl:EXECute

Options Not Applicable.

MODE

Description Selects/queries the Operating Mode of Agilent 8922M/S.

Syntax CELL:MODE?

CELL:MODE <string>

Options ’ACTIVE CELL’ | ’TEST MODE’ |

’CW GENERATOR’ | ’ACTIVE CELL +’ |

’TEST MODE +’ | ’CW GENERATOR +’

MS:DRX[:STATe]

Description Selects/queries the Discontinuous RX (receiver) STATe.

Syntax CELL:MS:DRX[:STATe]?

CELL:MS:DRX[:STATe] <string>

Options ’ON’ | ’OFF’

MS:DTX[:STATe]

Description Selects/queries the Discontinuous TX (transmission) STATe.

Syntax CELL:MS:DTX[:STATe]?

CELL:MS:DTX[:STATe] <string>

Options ’ON’ | ’OFF’

MS:TADVance

Description Selects/queries the MS’s Timing ADVance (setting).

Syntax CELL:MS:TADVance?

CELL:MS:TADVance <integer> | [:INUM]

Options Refer to Appendix A.

MS:TADVance:MODE

Description Selects/queries the MS’s Timing ADVance (setting) MODE.

Syntax CELL:MS:TADVanceMODE?

CELL:MS:TADVance:MODE <string>

Options ‘AUTO’ | ‘MANUAL’

Where;

- AUTO means we will automatically adjust the MS’s timing advance setting in real time to keep bit zero aligned.
- MANUAL means the TADVance setting will directly set the MS’s timing advance setting.

MS:TLEVel

Description Selects/queries the MS's TX (transmitter) power LEVel.

Syntax CELL:MS:TLEVel?

CELL:MS:TLEVel <integer> | [:INUM]

Options Refer to Appendix A.

TCH1 or TCH2:ARFCn

Description Selects/queries the Traffic CHannel 1 or 2 ARFCn. This applies if TCH1:MODE or TCH2:MODE is 'SINGLE'.

Syntax CELL:TCH1 | TCH2:ARFCn?

CELL:TCH1 | TCH2:ARFCn <integer> | [:INUM]

Options Refer to Appendix A.

TCH1 or TCH2:MALLocation

Description Queries the Traffic CHannel 1 or 2 Mobile ALLocation. This applies if TCH1:MODE or TCH2:MODE is 'HOPPED'.

Syntax CELL:TCH1 | TCH2:MALLocation?

CELL:TCH1 | TCH2:MALLocation <string>

Options 'MA1' | 'MA2'

TCH1 or TCH2:MODE

Description Selects/queries the Traffic CHannel 1 or 2 Mode.

Syntax CELL:TCH1 | TCH2:MODE?

CELL:TCH1 | TCH2:MODE <string>

Options 'HOPPED' | 'SINGLE'

Where;

- HOPPED means that TCH1 will be hopped traffic channel.
- SINGLE means that TCH1 will be a non-hopped traffic channel (i.e., a single ARFCN).

TCH1 or TCH2:TSLot

Description Sets/queries the Traffic CHannel Timeslot.

Syntax CELL:TCH1 | TCH2:TSLot?

CELL:TCH1 | TCH2:TSLot <integer> | [:INUM]

Options Refer to Appendix A.

TCH1 or TCH2:TYPE

Description Selects/queries the Traffic CHannel 1 or 2 TYPE.

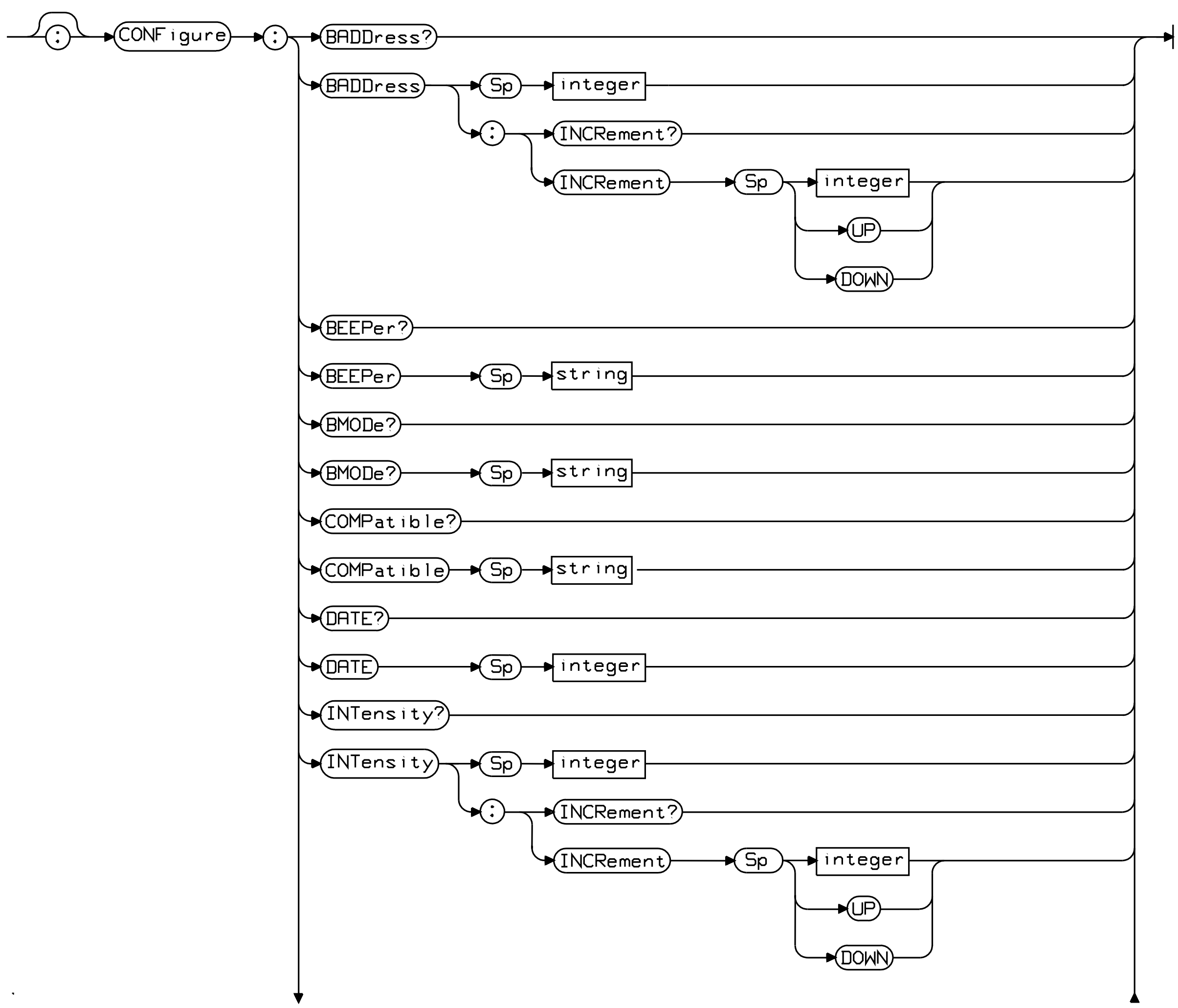
Syntax CELL:TCH1 | TCH2:TYPE?

CELL:TCH1 | TCH2:TYPE <string>

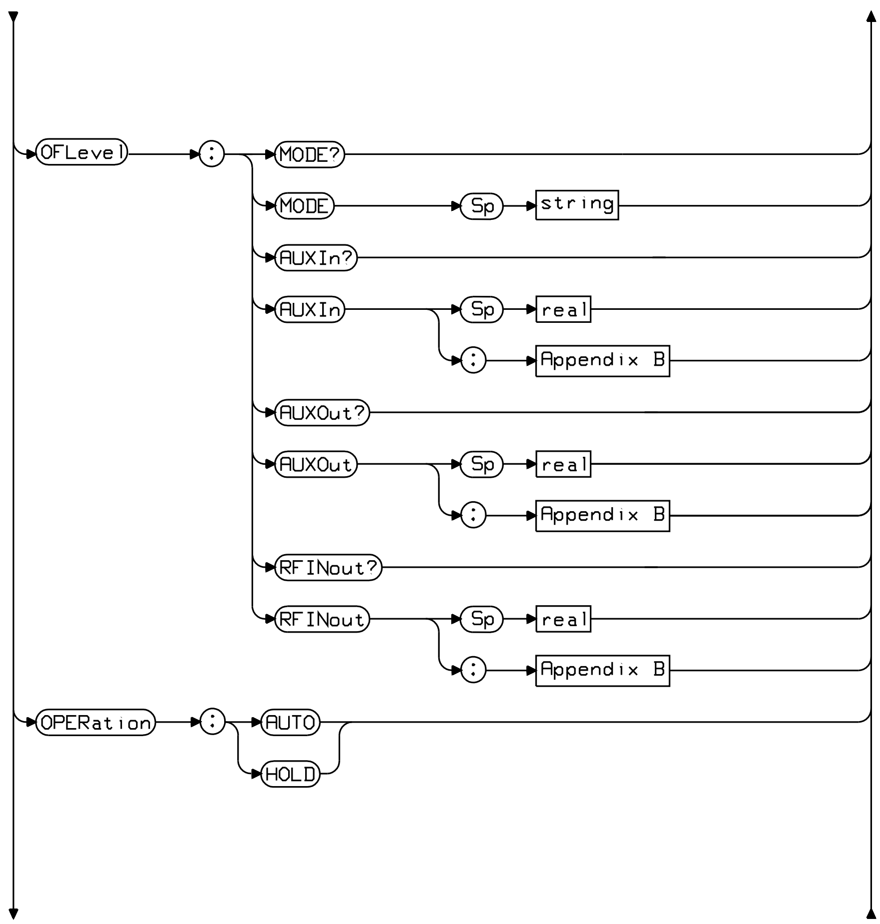
Options ‘FS’

10

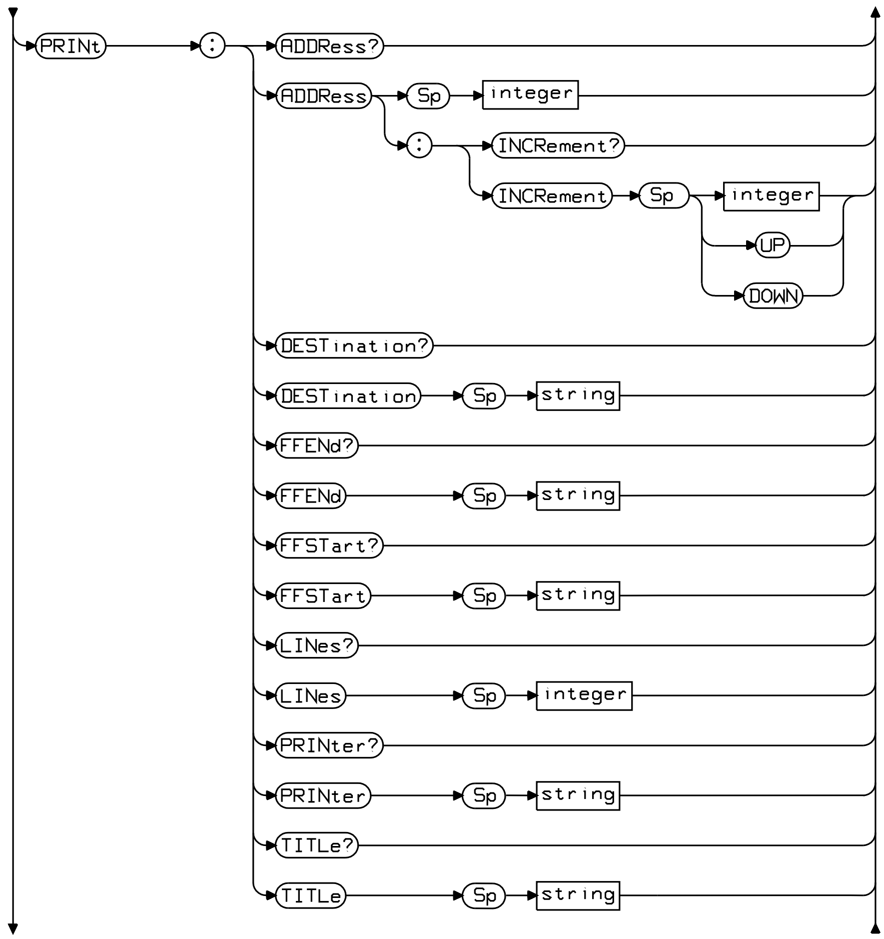
Configure Subsystem



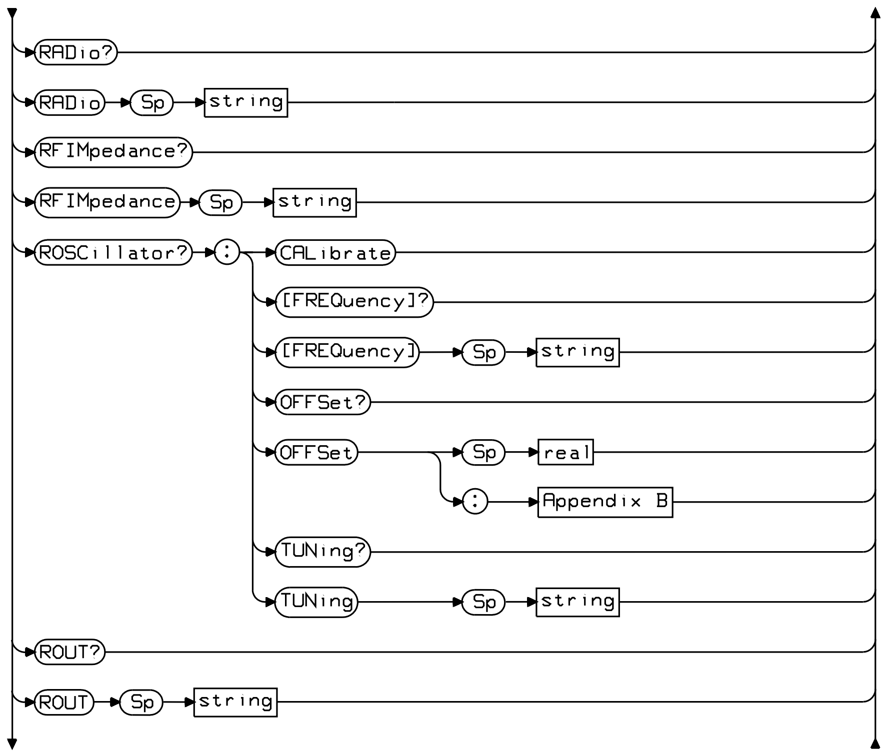
Continued Over



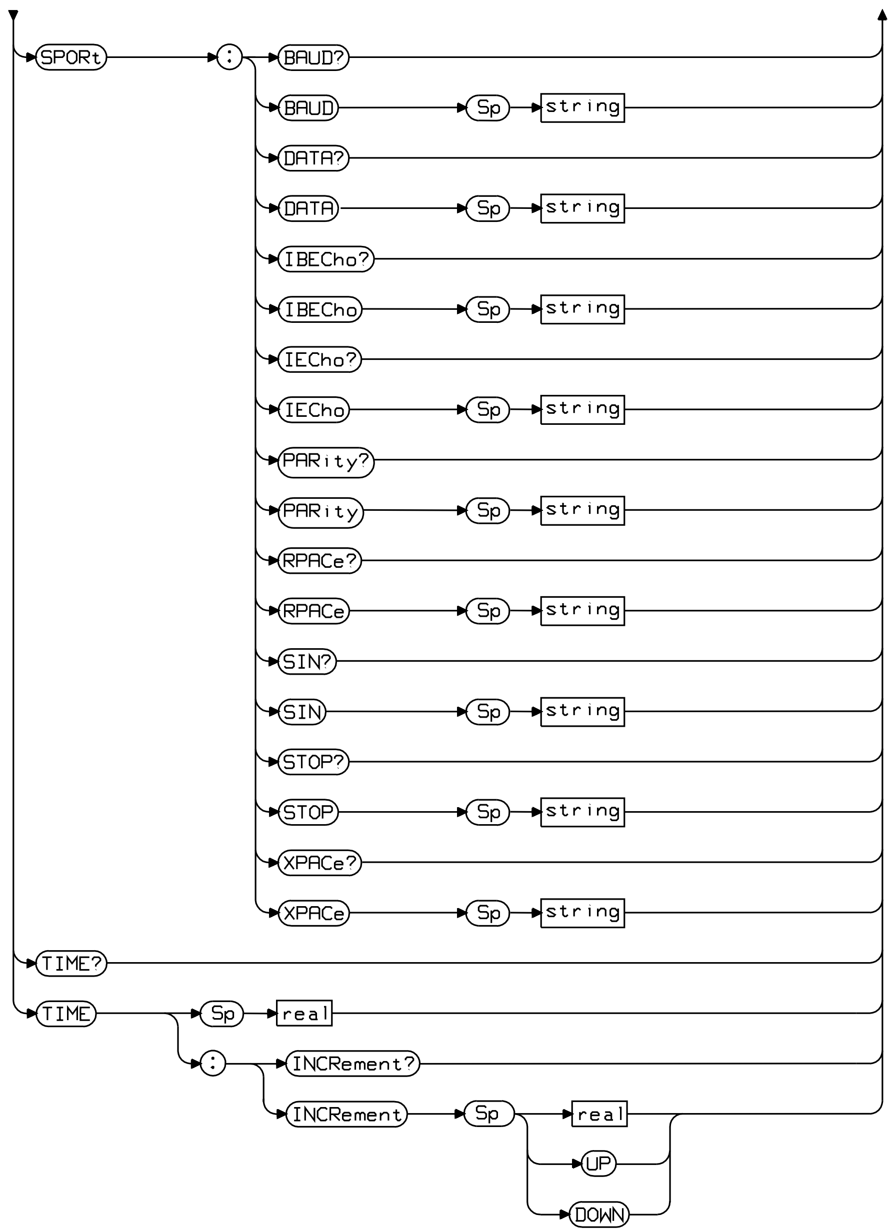
Continued Over



Continued Over



Continued Over


SPORt
:
BAUD?
BAUD
Sp
string
DATA?
DATA
IBECho?
IBECho
IECho?
IECho
PARity?
PARity
RPACe?
RPACe
SIN?
SIN
STOP?
STOP
XPACe?
XPACe
TIME?
TIME
real
INCRement?
INCRement
UP
DOWN

BADDress

Description Sets/queries the GPIB Bus Address.

Syntax CONFigure:BADDress?

CONFigure:BADDress <integer> | [:INUM]

Options Where <integer>=0 through 30

Refer to Appendix A.

BEEPer

Description Selects/Queries the audio BEEPer volume

Syntax CONFigure:BEEPer?

CONFigure:BEEPer <string>

Options ‘OFF’ | ‘QUIET’ | ‘LOUD’

BMODe

Description Selects/Queries the GPIB operating MODe.

Syntax CONFigure:BMODe?

CONFigure:BMODe <string>

Options ‘CONTROL’ | ‘TALK&LSTN’

Where;

- CONTROL is used to control external instruments using the Agilent 8922M/S.
- TALK&LSTN is used for ”normal” GPIB operation.

COMPatible

Description This command toggles the Agilent 8922M/S to an Agilent 8922G/E emulation. This enables backward compatibility of programs and instrument functionality.

Syntax CONFigure:COMPatible?

CONFigure:COMPatible <string>

Options ‘8922E’ | ‘8922S’ (Agilent 8922S only)

or

‘8922G’ | ‘8922M’ (Agilent 8922M only)

DATE

Description Sets/queries the current DATE for the internal clock

Syntax CONFigure:DATE?

CONFigure:DATE <integer> | [:INUM]

Options Refer to Appendix A.

Format = yymmdd

INTensity

Description Sets/queries the screen INTensity

Syntax CONFigure:INTensity?

CONFigure:INTensity <integer> | [:INUM]

Options Where <integer>=1 (very dim) through to 8 (bright)

Refer to Appendix A.

OFLevel:MODE

Description Selects/queries the RF OFfset level MODE

Syntax CONFigure:OFLevel:MODE?

CONFigure:OFLevel:MODE <string>

Options ‘ON’ | ‘OFF’

OFLevel:AUXin

Description Sets/queries the RF OFfset Level at the AUX RF In port. In effect when OFLevel:MODE ‘ON’ is selected.

Valid unit is dB.

Syntax CONFigure:OFLevel:AUXin?

CONFigure:OFLevel:AUXin <real> | [:FNUM]

Options Refer to Appendix B.

Maximum 100

OFLevel:AUXout

Description Sets/queries the RF OFfset Level at the AUX RF Out port. In effect when OFLevel:MODE ‘ON’ is selected.

Valid unit is dB.

Syntax CONFigure:OFLevel:AUXout?

CONFigure:OFLevel:AUXout <real> | [:FNUM]

Options Refer to Appendix B.

Maximum 100

OFLevel:RFINout

Description Sets/queries the RF OFfset Level at the RF IN/out port. In effect when OFLevel:MODE ‘ON’ is selected.

Valid unit is dB.

Syntax CONFigure:OFLevel:AUXout?

CONFigure:OFLevel:AUXout <real> | [:FNUM]

Options Refer to Appendix B.

Maximum 100

OPERation:AUTO

Description Enables several auto-ranging routines, providing automatic adjustment of the affected settings. Turns the RF Analyzer attenuator hold setting to AUTO.

(SANalyzer:ATTenuator:MODE 'AUTO')

Turns the AF Analyzer gain cntl to AUTO.

(AFANalyzer:RANGing 'AUTO')

Syntax CONFigure:OPERation:AUTO

Options Not applicable.

OPERation:HOLD

Description Disables several auto-ranging routines, requiring manual adjustment of the affected settings.

Turns the RF Analyzer attenuator hold setting to HOLD.

(SANalyzer:ATTenuator:MODE 'HOLD')

Turns the AF Analyzer gain cntl to HOLD.

(AFANalyzer:RANGing 'HOLD')

Syntax CONFigure:OPERation:HOLD

Options Not applicable.

PRINt:ADDRess

Description Sets/queries the GPIB ADDRess of the PRINter connected.

Syntax CONFigure:PRINt:ADDRess?

CONFigure:PRINt:ADDRess <integer> | [:INUM]

Options Refer to Appendix A.

PRINt:DESTination

Description Selects/queries the PRINter DESTination (port).

Syntax CONFigure:PRINt:DESTination?

CONFigure:PRINt:DESTination <string>

Options ’SERIAL’ | ’HPIB’ | ‘PARALLEL’

PRINt:FFENd

Description Selects/queries a form feed at the end of the pint out.

Syntax CONFigure:PRINt:FFENd?

CONFigure:PRINt:FFENd <string>

Options ‘YES’ | ‘NO’

PRINt:FFSTart

Description Selects/queries a form feed at the start of the print out.

Syntax CONFigure:PRINt:FFSTart?

CONFigure:PRINt:FFSTart <string>

Options ‘YES’ | ‘NO’

PRINt:LINes

Description Selects/queries the number of lines to be printed per page.

Syntax CONFigure:PRINt:LINes?

CONFigure:PRINt:LINes <integer>

Options Not applicable.

PRINt:PRINter

Description Selects/queries the printer type connected

Syntax CONFigure:PRINt:PRINter?

CONFigure:PRINt:PRINter <string>

Options ’DESKJET’ | ’EPSON FX-80’ | ’EPSON LQ-850’ |

’LASERJET’ | ’PAINTJET’ | ’QUIETJET’ | ’THINKJET’

PRINt:TITle

Description Enters/queries a string to be printed at the top of all screen printouts.

Syntax CONFigure:PRINt:TITle?

CONFigure:PRINt:TITle <quoted string>

Options Not applicable.

RADio

Description Selects/queries the RADio type mode of operation.

Syntax CONFigure:RADio?

CONFigure:RADio <string>

Options ’GSM900’ | ’DCS1800’ | ’E-GSM’ | ’PCS1900’

RFIMpedance

Description Selects/queries whether RF voltages should be expressed as the voltage across a 50 OHM load or the open circuit voltage (EMF).

Syntax CONFigure:RFIMpedance?

CONFigure:RFIMpedance <string>

Options ‘50 OHM’ | ‘EMF’

ROSCillator:CALibrate

Description Executes a calibration cycle for the reference.

Syntax CONFigure:ROSCillator:CALibrate

Options Not applicable.

ROSCillator[:FREQuency]

Description Selects/queries the expected external Reference OSCillator FREQuency. This frequency will be locked to when an external reference is connected.

Syntax CONFigure:ROSCillator[:FREQuency]?

CONFigure:ROSCillator[:FREQuency] <string>

Options ’13 MHZ’ | ’10 MHZ’ | ’5 MHZ’ | ’2 MHZ’ | ’1 MHZ’

ROSCillator:OFFset

Description Sets/queries the Reference OSCillator tuning OFFSet. In affect when ROSC:TUN ’TUNABLE’ is selected. Default GPIB and display unit is PPM.

Syntax CONFigure:ROSCillator:OFFset?

CONFigure:ROSCillator:OFFset <real> | [:FNUM]

Options Refer to Appendix B.

ROSCillator:TUNing

Description Selects/queries the Reference OSCillator tuning MODE.

Syntax CONFigure:ROSCillator:TUNing?

CONFigure:ROSCillator:TUNing <string>

Options ’TUNABLE’ | ’NORMAL’

Where;

- TUNABLE means the reference can be tuned by the value given for ROSC:OFFSet.
- NORMAL means the reference can lock to an external reference selected by :ROSC[:FREQ] or if no external reference is connected then the reference will be free-running.

ROUT

Description Selects/queries the OPT 001 REF OUT that appears on the rear panel.

Syntax CONFigure:ROUT?

CONFigure:ROUT <string>

Options ‘ON’ | ‘OFF’

Where

- ON means turn on the reference.
- OFF means turn off the reference (timebase oven still kept warm).

SPORt:BAUD

Description Selects/queries the BAUD rate for serial communication when using the rear panel Serial PORt.

Syntax CONFigure:SPORt:BAUD?

CONFigure:SPORt:BAUD <string>

Options ’300’ | ’600’ | ’1200’ | ’2400’ | ’4800’ | ’9600’ | ’19200’

SPORt:DATA

Description Selects/queries the DATA length - the number of bits used for each word of serial data when using the Serial PORt.

Syntax CONFigure:SPORt:DATA?

CONFigure:SPORt:DATA <string>

Options ‘7 BITS’ | ‘8 BITS’

SPORt:IBECho

Description Selects/queries the Serial PORt RS-232 input IBasic. ECHo state as On or Off - enable/disable screen and error message echoing from IBASIC.

Syntax CONFigure:SPORt:IBECHo?

CONFigure:SPORt:IBECHo <string>

Options ‘ON’ | ‘OFF’

SPORt:PARity

Description Selects/queries the Serial PORt PARity bits setting.

Syntax CONFigure:SPORt:PARity?

CONFigure:SPORt:PARity <string>

Options ’NONE’ | ’ODD’ | ’EVEN’ | ’ALWAYS 1’ | ’ALWAYS 0’

SPORt:RPACe

Description Selects/queries the Serial PORt PACe when Receiving serial data.

Syntax CONFigure:SPORt:RPACe?

CONFigure:SPORt:RPACe <string>

Options ’XON/XOFF’ | ’NONE’

Where;

- XON/XOFF lets the instrument ’talk’ to the transmitting device to alter the rate of the data being sent.
- NONE disable the XON/XOFF function.

SPORt:SIN

Description Selects/queries the Serial PORt RS-232 Serial INput.

Syntax CONFigure:SPORt:SIN?

CONFigure:SPORt:SIN <string>

Options ’INST’ | ’IBASIC’

Where;

- INST configures the serial port to connect to an external RS-232 terminal or computer.
- IBASIC is used to allow the IBASIC controller to read the serial port.

SPORt:STOP

Description Selects/queries the STOP length - the number of stop bits used when using the Serial PORt.

Syntax CONFigure:SPORt:STOP

CONFigure:SPORt:STOP <string>

Options ‘1 BIT’ | ‘2 BITS’

SPORt:XPACe

Description Selects/queries the Serial PORt PACe when transmitting (TX) serial data.

Syntax CONFigure:SPORt:XPACe?

CONFigure:SPORt:XPACe <string>

Options ’XON/XOFF’ | ’NONE’

Where;

- XON/XOFF lets the receiving device ’talk’ to the instrument to alter the rate of the data being sent.
- NONE disable the XON/XOFF function.

TIME

Description Sets/queries the TIME of day for the instruments clock.

Syntax CONFigure:TIME?

CONFigure:TIME <real> | [:INUM]

Options Refer to Appendix A.

Format = HH.MM in 24 Hour format.

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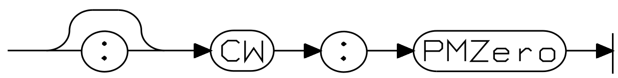
CW Subsystem



PMZero

Description Zeroes the Power Meter in order to make calibrated CW Power measurements. Note: The user should disconnect the input signal when selecting this. This command is the same as DSP:AMPL:PMZero.

Syntax CW:PMZero

Options Not Applicable.

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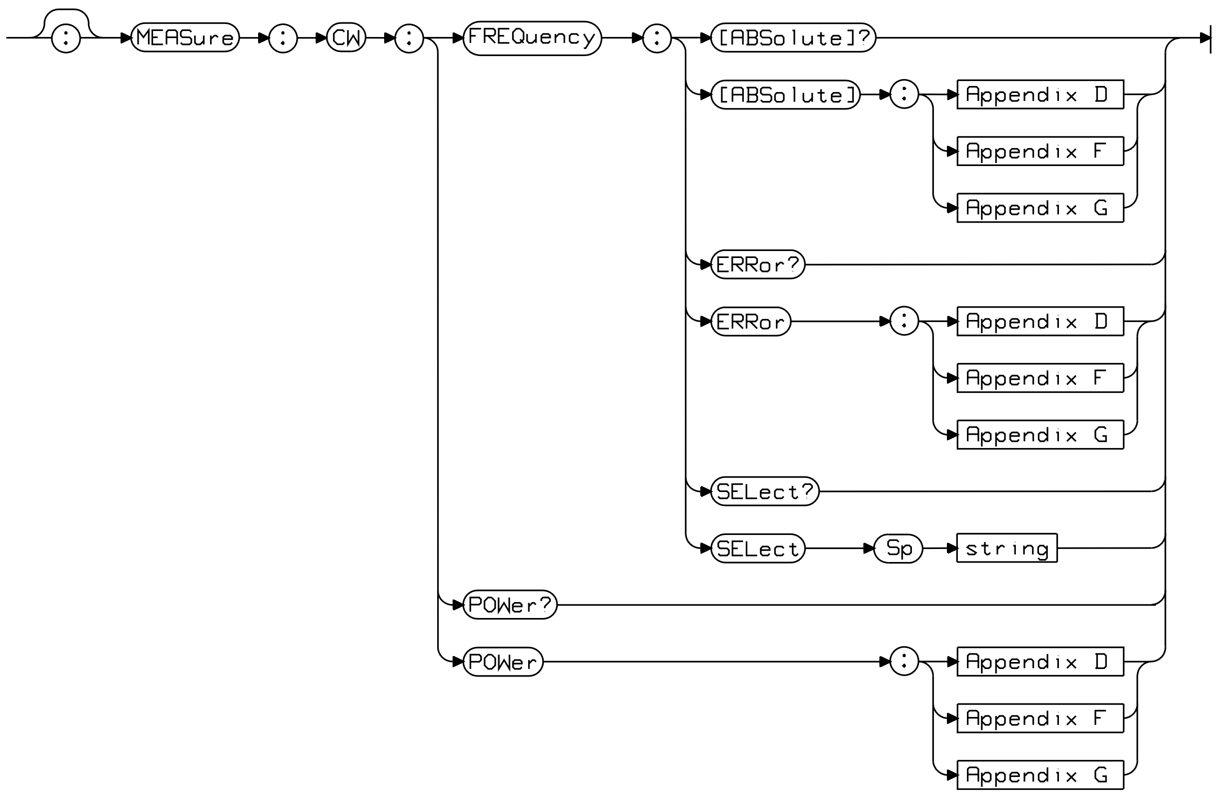
CW Commands (Measure Subsystem)


:
MEASure
:
CW
:
FREQuency
:
[ABSolute]?
[ABSolute]
:
Appendix D
Appendix F
Appendix G
ERRor?
ERRor
:
Appendix D
Appendix F
Appendix G
SELect?
SELect
Sp
string
POWer?
POWer
:
Appendix D
Appendix F
Appendix G

FREQuency[:ABSolute]

Description Sets the CW ABSolute FREQuency MEASurement attributes.Queries the CW ABSolute FREQuency MEASurement result.

GPIB unit is HZ.

Display units are GHZ, MHZ, KHZ, HZ;

default unit is MHZ.

Syntax MEASure:CW:FREQuency[:ABSolute]?

MEASure:CW:FREQuency[:ABSolute][:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

FREQuency:ERRor

Description Sets/queries the CW FREQuency ERRor MEASurement attributes.

GPIB unit is HZ.

Display units are GHZ, MHZ, KHZ, HZ;

default unit is MHZ.

Syntax MEASure:CW:FREQuency:ERRor?

MEASure:CW:FREQuency:ERRor[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

FREQuency:SELect

Description Selects/queries the CW FREQ SELected measurement to display.

Syntax MEASure:CW:FREQuency:SELect?

MEASure:CW:FREQuency:SELect <string>

Options ‘CW FREQ’ | ‘ CWFREQERR’

POWer

Description Sets the CW POWer MEASurement attributes. Queries the CW POWer MEASurement result.

NOTE: This is only valid for RFAN:INP of 'RF IN/OUT'.

GPIB unit is V.

Display units are dBm, V, mv, uv, dBuv, W;

default unit is dBm.

Syntax MEASure:CW:POWer?

MEASure:CW:POWer[:MM] | [:AVG] | [:MET]

Options Refer to Appendices D, F and G.

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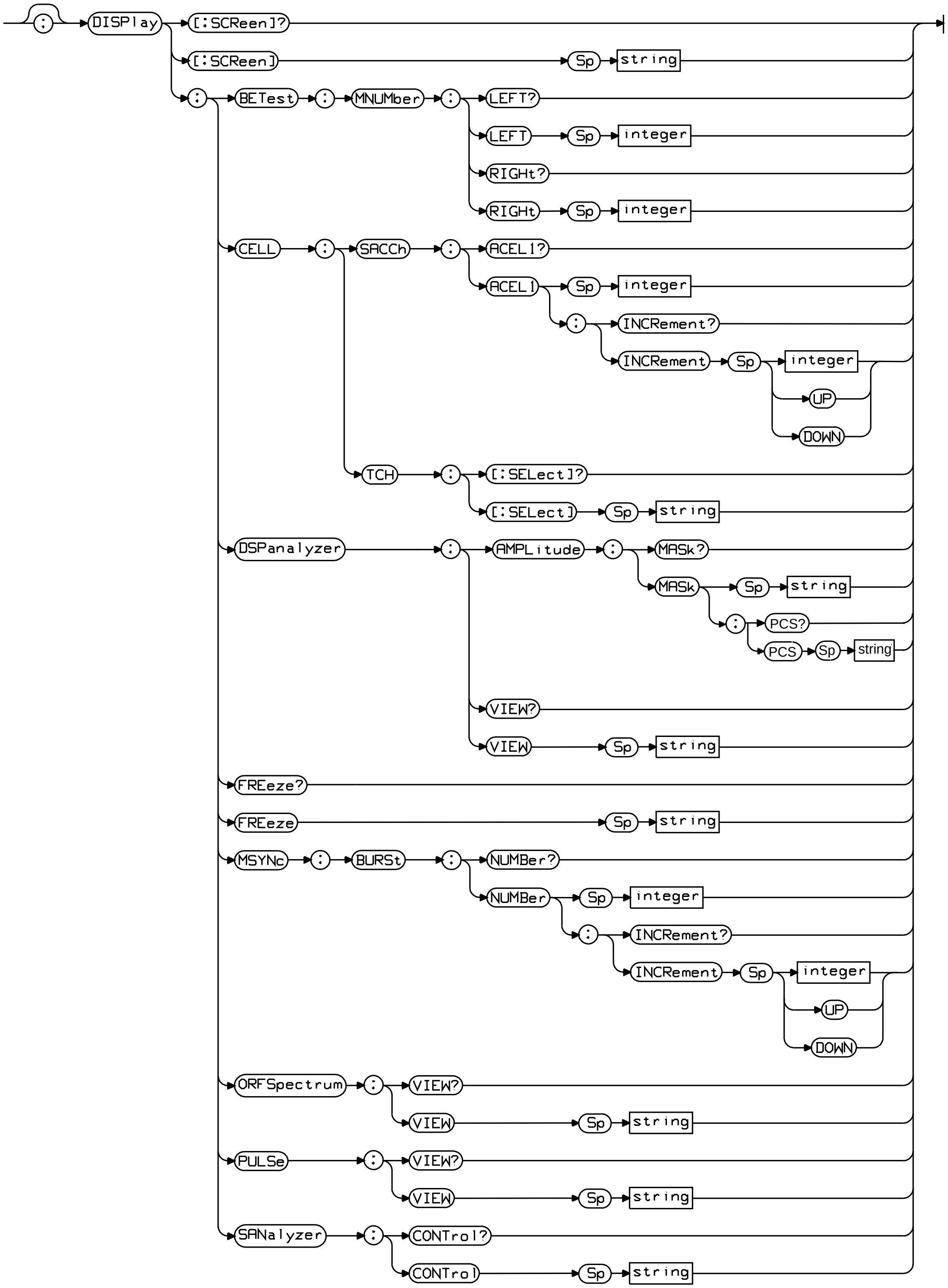
DISPlay Subsystem

NOTE

If you have the Agilent 8922M/S Option 010 Multi-Band Test System, you will have access to additional GPIB commands. These commands are used when working with dual band mobiles. For a full description of these additional commands and their syntax, refer to the *Agilent 8922 Multi-Band User's Guide*.


:
DISPlay
[:SCReen]?
[:SCReen]
Sp
string
:
BETest
:
MNUMber
:
LEFT?
LEFT
Sp
integer
RIGHt?
RIGHt
Sp
integer
CELL
:
SACCh
:
ACELl?
ACELl
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
TCH
:
[:SELect]?
[:SELect]
Sp
string
DSPanalyzer
:
AMPLitude
:
MASk?
MASk
Sp
string
:
PCS?
PCS
Sp
string
VIEW?
VIEW
Sp
string
FREeze?
FREeze
Sp
string
MSYNc
:
BURSt
:
NUMBer?
NUMBer
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
ORFSpectrum
:
VIEW?
VIEW
Sp
string
PULSe
:
VIEW?
VIEW
Sp
string
SANalyzer
:
CONTrol?
CONTrol
Sp
string

[:SCReen]

Description Selects/queries the screen to activate, display and perform any necessary screen transitional functionality.

Syntax DISPlay[:SCReen]?

DISPlay[:SCReen] <enumerated type / string>

Options AFANalyzer | BER | BER1 | BER2 | CELL | CELL1 | CELL2 | CCONfigure | CONFigure | CWAFanalyzer | CWANalyzer | DDEMod | DSPanalyzer | IOConfigure | FBER | FTCPower | HELP | HOPControl | LOGGing | MESSages | MSYNc | MSINfo | ORFSpectrum | OSCilloscope | PULSe | RFANalyzer | RFGenerator | SANalyzer | SERVice | SMSCb | TCONfigure | TESTs | TFReq | TSPec | TSEQ | TPAR | TIB

BETest:MNUMber:LEFT

Description Selects/queries the Bit Error Test Measurement NUMber to DISplay on the LEFT side of the screen.

Syntax DISPlay:BETest:MNUMber:LEFT?

DISPlay:BETest:MNUMber:LEFT <string>

Options ‘1’ | ‘3’

BETest:MNUMber:RIGHt

Description Selects/queries the Bit Error Test Measurement NUMber to DISplay on the RIGHt side of the screen.

Syntax DISPlay:BETest:MNUMber:RIGHt?

DISPlay:BETest:MNUMber:RIGHt <string>

Options ‘2’ | ‘4’

CELL:SACCh:ACEL1

Description Selects/queries the SACCH Adjacent Cell measurements to DISPlay.

Syntax DISPlay:CELL:SACCh:ACEL1?

DISPlay:CELL:SACCh:ACEL1 <integer> | [:INUM]

Options Refer to Appendix A.

CELL:TCH[:SELect]

Description Selects/queries which TCH parameters to display on the Cell Control screen.

Syntax DISPlay:CELL:TCH[:SELect]?

DISPlay:CELL:TCH[:SELect] <string>

Options ‘TCH1’ | ‘TCH2’

DSPanalyzer:AMPLitude:MASK

Description Selects/queries whether the DSP analyzer AMPLitude MASK should be DISPlayed on the ’AMPL MID’, ’AMPL RISE’ and ’AMPL FALL’ screen VIEWs.

Syntax DISPlay:DSPanalyzer:AMPLitude:MASK?

DISPlay:DSPanalyzer:AMPLitude:MASK <string>

Options ‘ON’ | ‘OFF

DSPanalyzer:AMPLitude:MASK:PCS

Description This command is for use only with the 83220A/E GSM Test Set. It selects/queries whether the DSP analyzer AMPLitude MASK in PCS 1900 mode should be off, the old ETSI Phase 1 mask (narrow) or the new ETSI Phase II mask (relaxed).

Syntax DISPlay:DSPanalyzer:AMPLitude:MASK:PCS?

DISPlay:DSPanalyzer:AMPLitude:MASK:PCS <string>

Options ‘OFF”|’NARROW’|’RELAX’

NOTE The DISPlay:DSPanalyzer:AMPlitude:MASK <string> command has the following effect on the PCS1900 PvT mask for the two values of <string>.

‘OFF’ turns the mask off
‘ON’ sets the mask to the default value NARROW

DSPanalyzer:VIEW

Description Selects/queries the VIEW to be selected when DISPlay:SCReen DSPanalyzer is selected.

Syntax DISPlay:DSPanalyzer:VIEW?

DISPlay:DSPanalyzer:VIEW <string>

Options ’PHASEMAIN’ | ’PHASE ERR’ | ’AMPL MAIN’ |

’AMPL MID’ | ’AMPL RISE’ | ’AMPL FALL’ | ’DATA BITS’

FREeze

Description

Screen freezing prevents the Agilent 8922M/S from updating the display when running tests. The measurement mode changes as before. This will enable tests to run more quickly.

When screen freezing is turned off, the display reverts to the last screen selected by the test code. This is true for both manual and remote operation.

Syntax

DISPlay:FREeze?

DISPlay:FREeze <string>

Options

‘ON’ | ‘OFF’

NOTE

It is recommended that you select ‘ON’ from the Configure screen.
That is; `DISPlay:SCReen ‘CONF’`

MSYNc:BURSt:NUMBer

Description

Sets/queries the MSYNc BURSt NUMBer to be displayed when the MEAS SYNC screen is displayed.

Syntax

DISPlay:MSYNc:BURSt:NUMBer?

DISPlay:MSYNc:BURSt:NUMBer <integer> | [:INUM]

Options

Refer to Appendix A.

ORFSpectrum:VIEW

Description

Selects/queries the Output RF Spectrum VIEW to be selected when DISPlay:SCReen ORFSpectrum is selected.

Syntax

DISPlay:ORFSpectrum:VIEW?

DISPlay:ORFSpectrum:VIEW <string>

Options

‘TRACE’ | ‘MAIN’

PULSe:VIEW

Description Selects/queries the PULSe On/Off VIEW to be selected when DISPlay:SCReen PULSe is selected.

Syntax DISPlay:PULSe:VIEW?

DISPlay:PULSe:VIEW <string>

Options ‘FALL’ | ‘MAIN’ | ‘RISE’

SANalyzer:CONTrol

Description CONTrols the Spectrum ANalyzer views - various fields will appear on the trace screen based on the CONTrol selection.

Syntax DISPlay:SANalyzer:CONTrol?

DISPlay:SANalyzer:CONTrol <string>

Options ’MAIN’ | ’RF GEN’ | ’MARKER’ | ’AUXILIARY’

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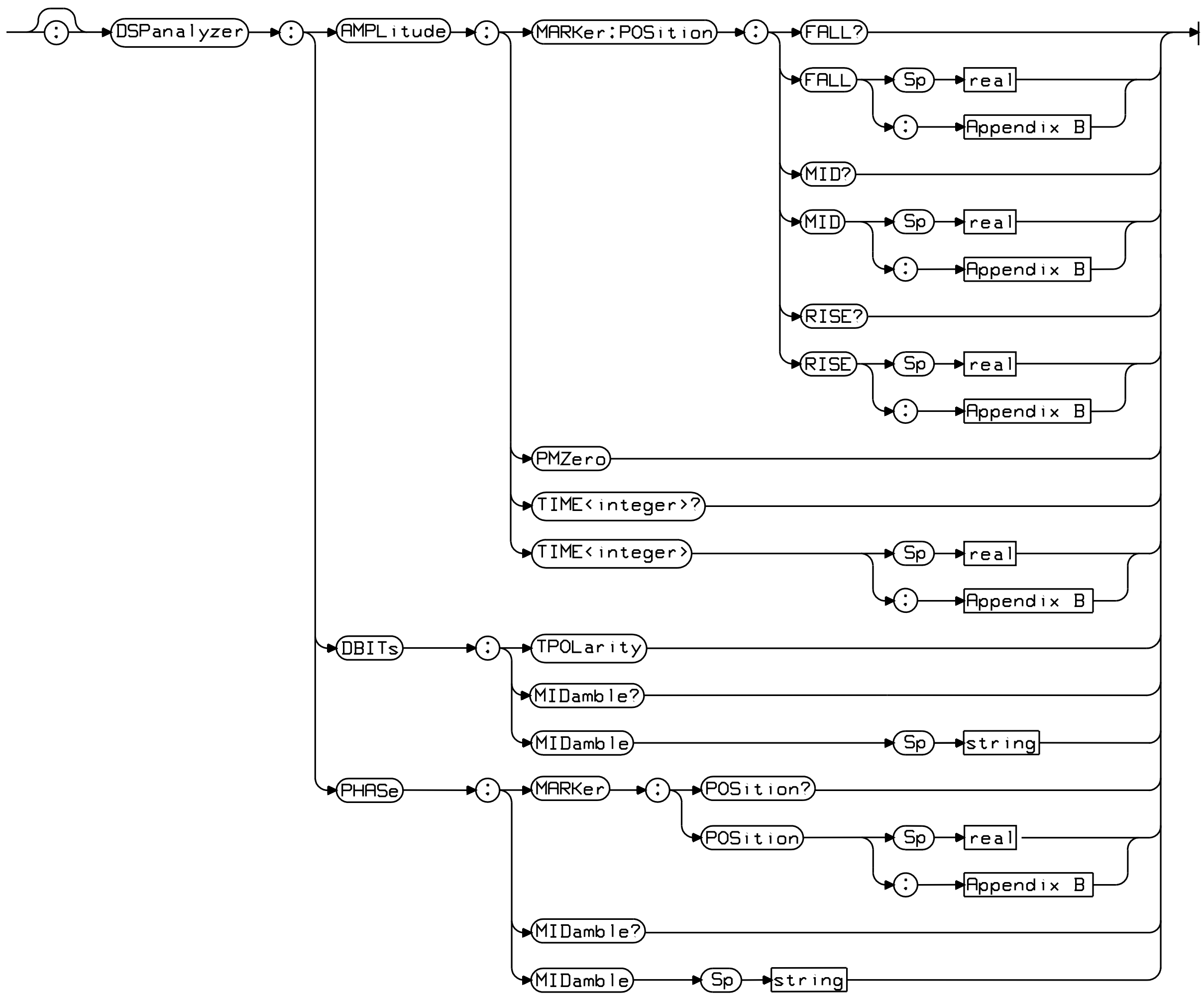
DSP Analyzer Subsystem


:
DSPanalyzer
:
AMPLitude
:
MARKer:POSition
:
FALL?
FALL
Sp
real
:
Appendix B
MID?
MID
RISE?
RISE
PMZero
TIME<integer>?
TIME<integer>
DBITs
TPOLarity
MIDamble?
MIDamble
string
PHASe
MARKer
POSition?
POSition

AMPLitude:MARKer:POSition:FALL

Description Sets/queries the AMPLitude MARKer FALL trace position setting. The value is given in units of divisions from the left side of the FALL trace (144 Bit Periods (T) to 156 Bit Periods (T) = 6 divisions).

Syntax DSPanalyzer:AMPLitude:MARKer:POSition:FALL?

DSPanalyzer:AMPLitude:MARKer:POSition:FALL <real> | [:FNUM]

Options Refer to Appendix B.

AMPLitude:MARKer:POSition:MID

Description Sets/queries the AMPLitude MARKer MID trace position setting. The value is given in units of divisions from the left side of the MID trace (-10 Bit Periods (T) to 160 Bit Periods (T) = 8.5 divisions).

Syntax DSPanalyzer:AMPLitude:MARKer:POSition:MID?

DSPanalyzer:AMPLitude:MARKer:POSition:MID <real> | [:FNUM]

Options Refer to Appendix B.

AMPLitude:MARKer:POSition:RISE

Description Sets/queries the AMPLitude MARKer RISE trace position setting. The value is given in units of divisions from the left side of the RISE trace (-8 Bit Periods (T) to 4 Bit Periods (T) = 6 divisions).

Syntax DSPanalyzer:AMPLitude:MARKer:POSition:RISE?

DSPanalyzer:AMPLitude:MARKer:POSition:RISE <real> | [:FNUM]

Options Refer to Appendix B.

AMPLitude:PMZero

Description Zeroes the Power Meter in order to make calibrated Average TX Power measurements. Note: The user should disconnect the input signal when selecting this. This field is the same as CW:PMZero.

Syntax DSPanalyzer:AMPLitude:PMZero

Options Not Applicable.

AMPLitude:TIME

Description Sets/queries the TIME to make amplitude measurements.

GPIB units are seconds (S), bit periods (T).

Default GPIB unit is seconds (S).

Default display unit is micro-seconds (US).

Syntax DSPanalyzer:AMPLitude:TIME<n>?

DSPanalyzer:AMPLitude:TIME<n> <real>

Options Refer Appendix B.

n=1 through 12

DBITs:TPOLarity

Description Toggles the POLarity of the Data BITs for the current measurement.

Syntax DSPanalyzer:DBITs:TPOLarity

Options Not Applicable.

PHASe:MARKer:POSition

Description Sets/queries the PHASe MARKer POSition setting. The value is given in units of divisions from the left side of the trace (0 to 14.7 divisions).

Syntax DSPanalyzer:PHASe:MARKer:POSition?

DSPanalyzer:PHASe:MARKer:POSition <real> | [:FNUM]

Options Refer appendix B.

PHASe:MIDamble

Description Selects/queries the MIDamble to use for DSP analyzer phase displays as the actual measured midamble or the midamble that the user expects to use.

Syntax DSPanalyzer:PHASe:MIDamble?

DSPanalyzer:PHASe:MIDamble <string>

Options ‘MEASURED’ | ‘EXPECTED’

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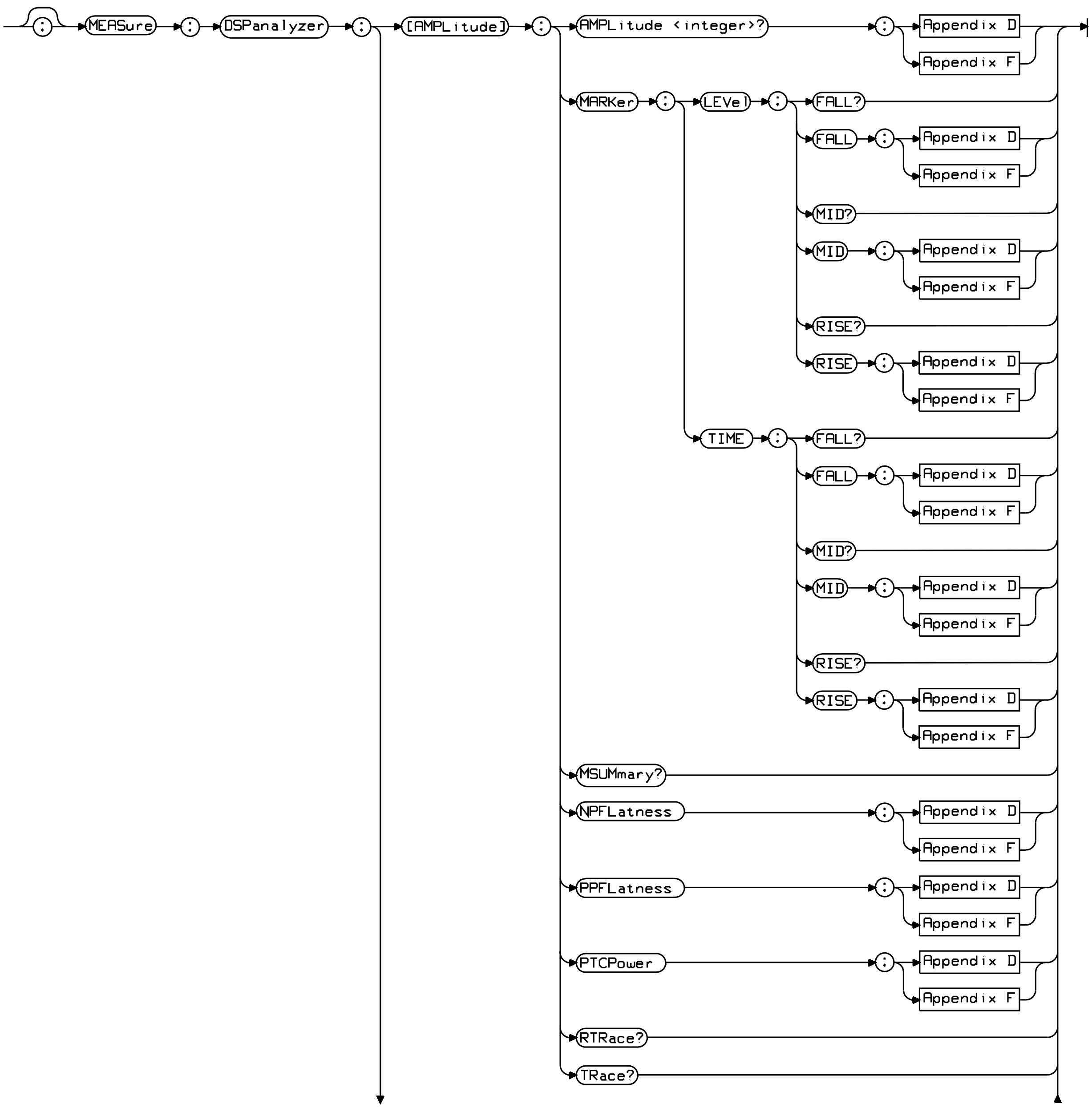
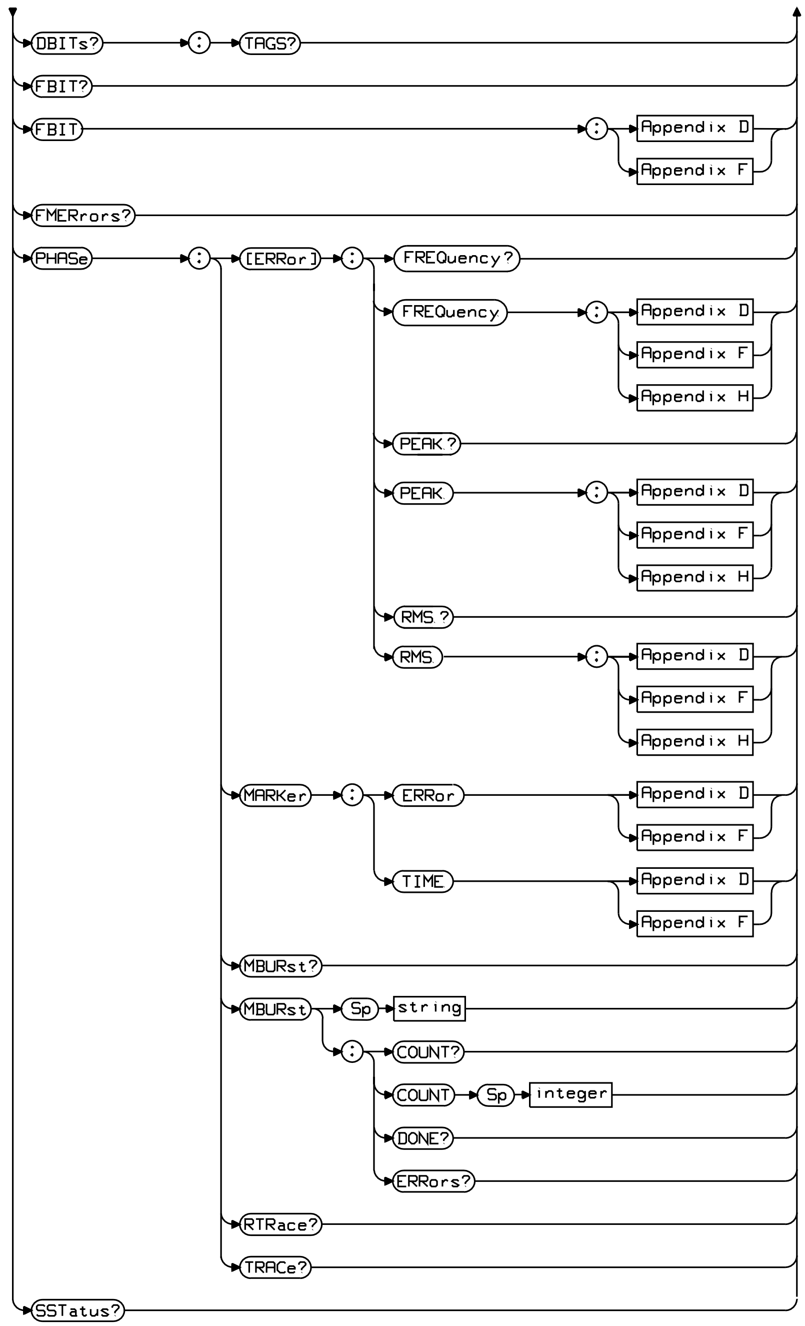
DSP Analyzer Commands (Measure Subsystem)



Continued Over


DBITs?
:
TAGS?
FBIT?
FBIT
:
Appendix D
Appendix F
FMERrors?
PHASe
:
[ERRor]
:
FREQuency?
FREQuency
:
Appendix D
Appendix F
Appendix H
PEAK?
PEAK
:
Appendix D
Appendix F
Appendix H
RMS?
RMS
:
Appendix D
Appendix F
Appendix H
MARKer
:
ERRor
Appendix D
Appendix F
TIME
Appendix D
Appendix F
MBURst?
MBURst
Sp
string
:
COUNT?
COUNT
Sp
integer
DONE?
ERRors?
RTRace?
TRACe?
SSTatus?

[:AMPLitude]:AMPLitude

Description Sets the AMPLitude measurement attributes. Queries the AMPLitude measurement result based on the DSP:AMPL:TIME<n> setting.

Syntax MEASure:DSPanalyzer[:AMPLitude]:AMPLitude<n>?

MEASure:DSPanalyzer[:AMPLitude]:AMPLitude<n>[:MM] | [:AVG]

Options Refer to Appendices D and F.

Where n= 1 through 12

[:AMPLitude]:MARKer:LEVEL:FALL

Description Sets/queries the AMPLitude MARKer FALL trace attributes.

Queries the AMPLitude MARKer FALL trace level which is relative amplitude data. This value is a function of the fall trace marker position set/queried by DSP:AMPL:MARK:POS:FALL. This is only valid when on IMPORTANT: The user MUST be on the Amplitude Fall screen to query this result (DISP:DSP:VIEW 'AMPL FALL').

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:DSPanalyzer[:AMPLitude]:MARKer:LEVel:FALL?

MEASure:DSPanalyzer[:AMPLitude]:MARKer:LEVel:FALL[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:MARKer:LEVEL:MID

Description Sets/queries the AMPLitude MARKer MID trace attributes.

Queries the AMPLitude MARKer MID trace level which is relative amplitude data. This value is a function of the mid trace marker position set/queried by DSP:AMPL:MARK:POS:MID. This is only valid when on IMPORTANT: The user MUST be on the Amplitude MID screen to query this result (DISP:DSP:VIEW ’AMPL MID’).

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:DSPanalyzer[:AMPLitude]:MARKer:LEVel:MID?

MEASure:DSPanalyzer[:AMPLitude]:MARKer:LEVel:MID[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:MARKer:LEVEL:RISE

Description Sets/queries the AMPLitude MARKer RISE trace attributes.

Queries the AMPLitude MARKer RISE trace level which is relative amplitude data. This value is a function of the rise trace marker position set/queried by DSP:AMPL:MARK:POS:RISE. This is only valid when on IMPORTANT: The user MUST be on the Amplitude RISE screen to query this result (DISP:DSP:VIEW ’AMPL RISE’).

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:DSPanalyzer[:AMPLitude]:MARKer:LEVel:RISE?

MEASure:DSPanalyzer[:AMPLitude]:MARKer:LEVel:RISE[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:MARKer:TIME:FALL

Description Sets/queries the MARKer FALL trace TIME attributes.

Queries the MARKer FALL trace TIME which is the marker's position relative to the last bit in the measured burst. This value is a function of the fall trace marker position set or queried by DSP:AMPL:MARK:POS:FALL.

IMPORTANT: The user MUST be on the Amplitude Fall screen to query this result (DISP:DSP:VIEW 'AMPL FALL').

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:DSPanalyzer[:AMPLitude]:MARKer:TIME:FALL?

MEASure:DSPanalyzer[:AMPLitude]:MARKer:TIME:FALL[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:MARKer:TIME:MID

Description Sets/queries the MARKer MID trace TIME attributes.

Queries the MARKer MID trace TIME which is the marker's position relative to bit zero in the measured burst. This value is a function of the mid trace marker position set or queried by DSP:AMPL:MARK:POS:RISE.

IMPORTANT: The user MUST be on the Amplitude MID screen to query this result (DISP:DSP:VIEW 'AMPL MID').

GP-IB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:DSPanalyzer[:AMPLitude]:MARKer:TIME:MID?

MEASure:DSPanalyzer[:AMPLitude]:MARKer:TIME:MID[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:MARKer:TIME:RISE

Description Sets/queries the MARKer RISE trace TIME attributes.

Queries the MARKer RISE trace TIME which is the marker's position relative to bit zero in the measured burst. This value is a function of the rise trace marker position set or queried by DSP:AMPL:MARK:POS:RISE.

IMPORTANT: The user MUST be on the Amplitude RISE screen to query this result (DISP:DSP:VIEW 'AMPL RISE').

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:DSPanalyzer[:AMPLitude]:MARKer:TIME:RISE?

MEASure:DSPanalyzer[:AMPLitude]:MARKer:TIME:RISE[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:MSUMmary

Description Queries the AMPLitude Measurement SUMmary.

IMPORTANT: The user MUST be on the Amplitude Summary (Ampl Main) screen to query this result (DISP:DSP:VIEW 'AMPL MAIN').

Syntax MEASure:DSPanalyzer[:AMPLitude]:MSUMmary?

Options Query returns; 'PASSED', 'FAILED' or '- - - -'.

Where;

- '- - - -' means that the MSUMmary results are currently indeterminate.
- 'PASSED' means that all of the following are true after an amplitude measurement completes:

  a) Each AMPLitude measurement (AMPL<1> through AMPL<12>), does NOT exceed its HI LO limits OR is OFF.
  b) Pk+ Flatness does NOT exceed its HI LO limits OR Pk+ Flatness measurement is OFF. (PPFLatness).
  c) Pk- Flatness does NOT exceed its HI LO limits OR Pk- Flatness measurement is OFF. (NPFLatness) AND for each of the above (a-c) that is ON it must have a valid measurement result (i.e. not '- - - -').

[:AMPLitude]:NPFLatness

Description Queries the Negative Peak FLatness measurement result. This is the most negative amplitude in dB relative to the average power over the useful bits in the measured burst.

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:DSPanalyzer[:AMPLitude]:NPFLatness?

MEASure:DSPanalyzer[:AMPLitude]:NPFLatness[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:PPFLatness

Description Queries the Positive Peak FLatness measurement result. This is the most positive amplitude in dB relative to the average power over the useful bits in the measured burst.

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:DSPanalyzer[:AMPLitude]:PPFLatness?

MEASure:DSPanalyzer[:AMPLitude]:PPFLatness[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:PTCPower

Description Queries the Peak Transmitter Carrier Power measurement result. This is the average power over the useful bits in the measured burst.

GPIB unit is dBm, W;

default unit is dBm.

Display unit is dBm, V, mV, uV, dBuV, W;

default unit is dBm.

Syntax MEASure:DSPanalyzer[:AMPLitude]:PTCPower?

MEASure:DSPanalyzer[:AMPLitude]:PTCPower[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:AMPLitude]:TRACe

Description Returns the DSP Analyzer AMPLitude TRACe measured data length (integer), time reference (floating point), and the floating point TRACe AMPLitude data array for the given length separated by commas.

Syntax MEASure:DSPanalyzer[:AMPLitude]:TRACe?

Options Not Applicable.

DBITs

Description Queries the demodulated Data BITs returned for the current measurements made.

Syntax MEASure:DSPanalyzer:DBITs?

Options Not Applicable.

DBITs:TAGS

Description Queries the TAGS for each of the Data BITs.

Syntax MEASure:DSPanalyzer:DBITs:TAGS?

Options Returns ‘M’ or ‘-’

Where;

- ‘M’ = Midamble bit.
- ‘-’ = RF level error.

FBIT

Description Sets/queries the position of the First (useful) BIT attributes.

Queries the position of the First (useful) BIT in time relative to when the DSP measurement trigger occurred.

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:DSPanalyzer:FBIT?

MEASure:DSPanalyzer:FBIT[:MM] | [:AVG]

Options Refer to Appendices D and F.

FMERrors

Description A query of number of FM ERrors returns the number of FM demodulated bits different from the best bit match (of the demodulated burst bits) to the selected midamble before differential decoding for the current DSP measurement. This is only valid for MSYN:SYNC:MODE 'MIDAMBLE'.

Syntax MEASure:DSPanalyzer:FMERrors?

Options Not Applicable.

PHASe[:ERRor]:FREQuency

Description Queries the FREQuency ERRor MEASurement result. This is the slope of the average phase over the useful bits in the measured burst.

GPIB unit is HZ.

Display units are HZ, kHZ;

default unit is HZ.

Syntax MEASure:DSPanalyzer:PHASe[:ERRor]:FREQuency?

MEASure:DSPanalyzer:PHASe[:ERRor]:FREQuency[:MM] | [:AVG] | [:MULTI-B]

Options Refer to Appendices D, F and H.

PHASe[:ERRor]:PEAK

Description Queries the PEAK PHASe ERRor MEASurement result over the useful bits in the measured burst.

GPIB unit is degrees.

Syntax MEASure:DSPanalyzer:PHASe[:ERRor]:PEAK?

MEASure:DSPanalyzer:PHASe[:ERRor]:PEAK:MM?

MEASure:DSPanalyzer:PHASe[:ERRor]:PEAK:AVG?

MEASure:DSPanalyzer:PHASe[:ERRor]:PEAK:MULTI-B?

Options Refer to Appendices D, F and H.

PHASe[:ERRor]:RMS

Description Queries the RMS PHASe ERRor MEASurement result over the useful bits in the measured burst.

GPIB unit is degrees.

Display unit is degrees.

Syntax MEASure:DSPanalyzer:PHASe[:ERRor]:RMS?

MEASure:DSPanalyzer:PHASe[:ERRor]:RMS:MM?

MEASure:DSPanalyzer:PHASe[:ERRor]:RMS::AVG?

MEASure:DSPanalyzer:PHASe[:ERRor]:RMS::MULTI-B?

Options Refer to Appendices D, F and H.

PHASe:MARKer:ERRor

Description Queries the PHASe ERRor measurement result. This is the y-axis MARKer position of the phase error. This value is a function of the marker position set or queried by DSP:PHAS:MARK:POS.

IMPORTANT: The user MUST be on the Phase Err screen to query this result (DISP:DSP:VIEW 'PHASE ERR').

GPIB unit is degrees.

Display unit is degrees.

Syntax MEASure:DSPanalyzer:PHASe:MARKer:ERRor[:MM] | [:AVG]

Options Refer to Appendices D and F.

PHASe:MARKer:TIME

Description Queries the MARKer TIMe which is the marker's position relative to bit zero in the measured burst. This value is a function of the marker position set or queried by DSP:PHAS:MARK:POS.

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

IMPORTANT: The user MUST be on the Phase Err screen to query this result (DISP:DSP:VIEW 'PHASE ERR').

Syntax MEASure:DSPanalyzer:PHASe:MARKer:TIME?

MEASure:DSPanalyzer:PHASe:MARKer:TIME[:MM] | [:AVG]

Options Refer to Appendices D and F.

PHASe:MBURst

Description Selects/queries state of multi-burst measurement.

Syntax PHASe:MBURst?

MEASure:DSPanalyzer:PHASe:MBURst <string>

Options 'ON' | 'OFF'

PHASe:MBURst:COUNt

Description Sets the number of bursts to be measured. Queries the number of bursts being measured. If multi-burst is OFF, the returned value is undefined.

Syntax MEASure:DSPanalyzer:PHASe:MBURst:COUNt?

MEASure:DSPanalyzer:PHASe:MBURst:COUNt <integer>

Options Where the integer number is 1 to 999, with a default value of 10.

PHASe:MBURst:DONE

Description Queries the number of bursts measured so far. If no measurement is in progress, the number of bursts measured in the previous measurement, is returned.

Syntax MEASure:DSPanalyzer:PHASe:MBURst:DONE?

Options Not Applicable.

PHASe:MBURst:ERRors

Description Queries the number of errors during the burst measurement. If no measurement is in progress, the number of errors in the previous measurement, is returned.

Syntax MEASure:DSPanalyzer:PHASe:MBURst:ERRors?

Options Not Applicable.

PHASe:TRACe

Description Returns the DSP Analyzer PHASe TRACe measured data length(integer), and the floating point PHASe AMPLitude data array for the given length separated by commas.

Syntax MEASure:DSPanalyzer:PHASe:TRACe?

Options Not Applicable.

SSTatus

Description Queries the Sync STatus for the current DSP measurement.

Syntax MEASure:DSPanalyzer:SSTatus?

Options Returns one of the following states;

'No Error' | 'ShortBurst' | 'Level Late' | 'LevelShort' |

'FM Error' | 'Low Level' | 'Math Error' | 'RF Ovrload'.

The message return priority (highest to lowest) is as follows:

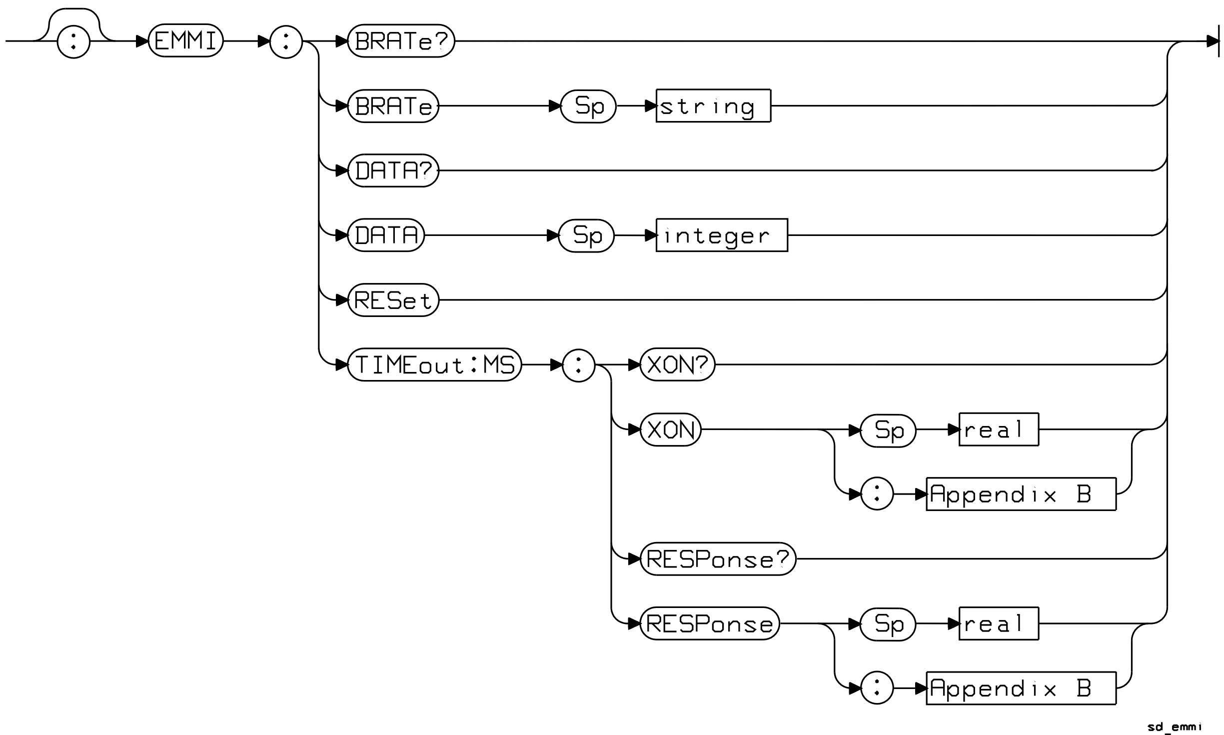
- Math Error
- RF Ovrload | Low Level
- FM Error
- ShortBurst | Level Late | LevelShort
- No Error

The above defined as;

- ShortBurst - amplitude envelope not long enough for the selected burst length.
- RF Ovrload - the DSP Analyzer sampler hardware overloaded during sampling.
- FM Error - at least one FM error was detected during the Midamble (or User Defined Sync Pattern) portion of the selected burst (only possible for MSYN:SYNC:MODE 'MIDAMBLE')
- Level Late - amplitude of the burst did not rise until after the first few bits were received.
- Level Short - amplitude of the burst fell before the last few bits were received.
- Low Level - DSP Analyzer RF level never got high enough to make a valid measurement.
- Math Error - DSP Analyzer math-related error occurred.
- No Error - no error occurred in synchronizing to the selected burst.

16

EMMI Subsystem (Agilent 8922M Only)


:
EMMI
:
BRATe?
BRATe
Sp
string
DATA?
DATA
Sp
integer
RESet
TIMEout:MS
:
XON?
XON
Sp
real
:
Appendix B
RESPonse?
RESPonse
Sp
real
:
Appendix B
sd_emmi

BRATe

Description Selects/queries EMMI part Baud RATe.

Syntax EMMI:BRATe?

EMMI:BRATe <string>

Options ”600” | ”1200” | ”2400” | ”4800” | ”9600”

DATA?

Description Returns a response message sent by the mobile station. Response messages are stored in a message in a message buffer in the Agilent 8922M.

Syntax EMMI:DATA?

Options This EMMI DATA is in the form:

```
num-decimal-digits/num-data-chars/emmi-hex-data
(no spaces)
```

Where;

- num-decimal-digits: (range: 1 through 3) The number of characters following to be interpreted as num-data-chars.
- num-data-chars: (range: 0 through 510) The number of data characters that will follow. NOTE: This must be an even number since every two characters will represent one byte of hex data.
- emmi-hex-data: Hex character data. Each pair of characters represents one byte of EMMI hex data.

The user can do the following:

- Read all the messages in the message buffer by sending EMMI:DATA? commands until #10 is returned. (Messages are read first-in-first-out.)
- Clear the message buffer by sending EMMI:RESet.

DATA <data entry>

Description Writes the DATA to the EMMI port.

Syntax EMMI:DATA <data entry>

Options This EMMI DATA is in the form:

```
num-decimal-digits/num-data-chars/emmi-hex-data
(no spaces)
```

Where;

- num-decimal-digits: (range: 1 through 3) The number of characters following to be interpreted as num-data-chars.
- num-data-chars: (range: 0 through 510) The number of data characters that will follow. NOTE: This must be an even number since every two characters will represent one byte of hex data.
- emmi-hex-data: Hex character data. Each pair of characters represents one byte of EMMI hex data.

When the data write is complete, a status bit will be set that reflects what happened with the EMMI data. See the Status Subsystem for EMMI.

RESet

Description EMMI RESet clears out transmit and receive (message) buffers and sends XON (ready to receive) frame to the mobile station.

Syntax EMMI:RESet

Options Not applicable.

TIMEout:MS:XON

Description Sets/queries the EMMI TIMEout (time limit) allowed for the mobile to send XON. This adjusts a timer that provides the time delay needed when the EMMI bus is attempting to send a message before the MS or the Agilent 8922M are ready. If the XON timeout expires, then the STATus:EMMI:EVENt? will return a 4 (XON timeout exceeded).

Default GPIB and display unit is seconds (S).

Syntax EMMI:TIMEout:MS:XON?

EMMI:TIMEout:MS:XON <real> | [:FNUM]

Options Refer to Appendix B.

TIMEout:MS:RESPonse

Description Sets/queries the EMMI TIMEout (time limit) allowed for the mobile stations' RESPonse (For example; to send an ACK or NAK to the Agilent 8922M). If the response timeout expires, then the STATus:EMMI:EVENt? will return an 8 (response timeout exceeded).

Default GPIB and display unit is seconds (S).

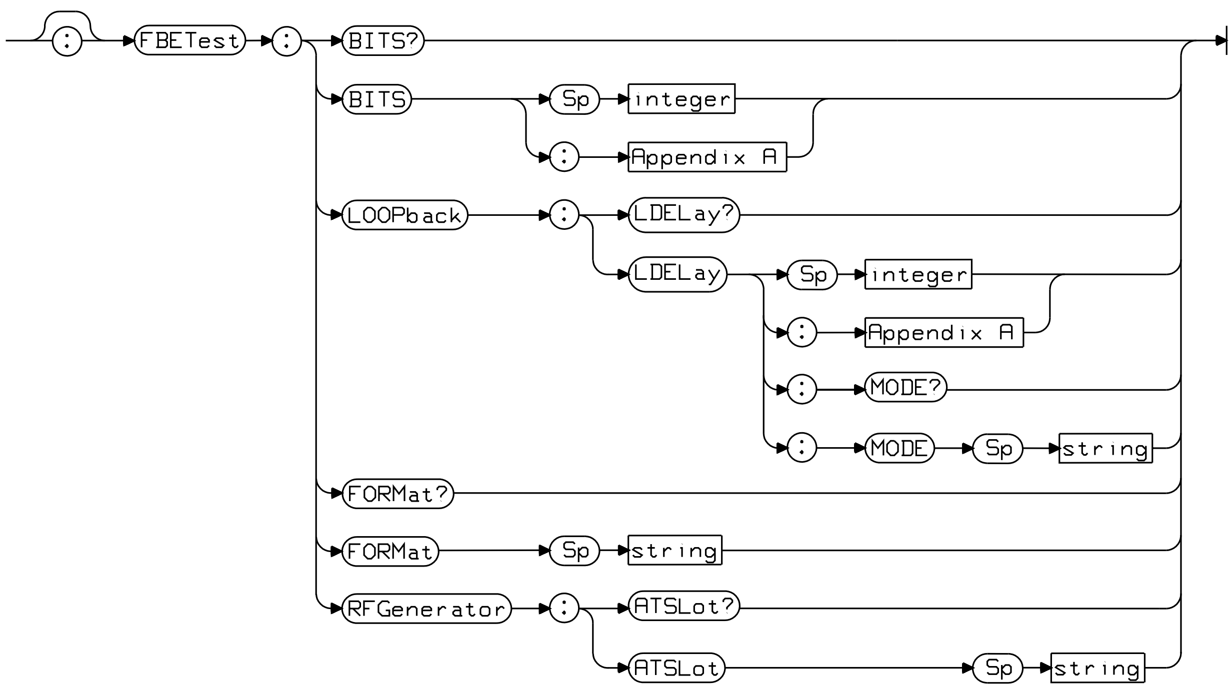
Syntax EMMI:TIMEout:MS:RESPonse?

EMMI:TIMEout:MS:RESPonse <real> | [:FNUM]

Options Refer to Appendix B.

17

Fast Bit Error Test


:
FBETest
:
BITS?
BITS
Sp
integer
:
Appendix A
LOOPback
:
LDELay?
LDELay
Sp
integer
:
Appendix A
:
MODE?
:
MODE
Sp
string
FORMat?
FORMat
Sp
string
RFGenerator
:
ATSLot?
ATSLot
Sp
string

BITS

Description Sets/Queries the number of bits used during a measurement.

Syntax FBETest:BITS?

FBETest:BITS <integer> | [:INUM]

Options Refer to Appendix A.

LOOPback:LDELay

Description Sets/Queries the loopback delay.

Syntax FBETest:LOOPback:LDELay?

FBETest:LOOPback:LDELay <integer> | [:INUM]

Options Refer to Appendix A.

The integer value being 0 to 26.

LOOPback:LDELay:MODE

Description Sets/Queries the loopback delay mode.

Syntax FBETest:LOOPback:LDELay:MODE?

FBETest:LOOPback:LDELay:MODE <string>

Options Where;

- AUTO automatically sets LDELay (above) once when the measurement is started. This is a timing calibration action.
- MANUAL means the Loop DELay is controlled manually via the :LDELay command.

FORMat

Description Sets/Queries the data format to be Random Speach Frames or Random Bursts.

Syntax FBETest:FORMat?

FBETest:FORMat <string>

Options Not Applicable.

RFGenerator:ATSLot

Description Sets/Queries the automatic pulse modulation for the adjacent timeslots of the base station generated signal.

Syntax FBETest:RFGenerator:ATSLot?

FBETest:RFGenerator:ATSLot <string>

Options ‘OFF’ | ‘+30DB’

Where **+30DB** automatically pulses the adjacent timeslots 30 dB higher than the RF generator amplitude setting.

The entire preceding timeslot is 30 dB higher. The first few bits for the following timeslot are 30 dB higher. The remainder of the following timeslot is pulsed off.

OFF makes all timeslots the same amplitude.

NOTE This field is not featured in the Agilent 8922S.

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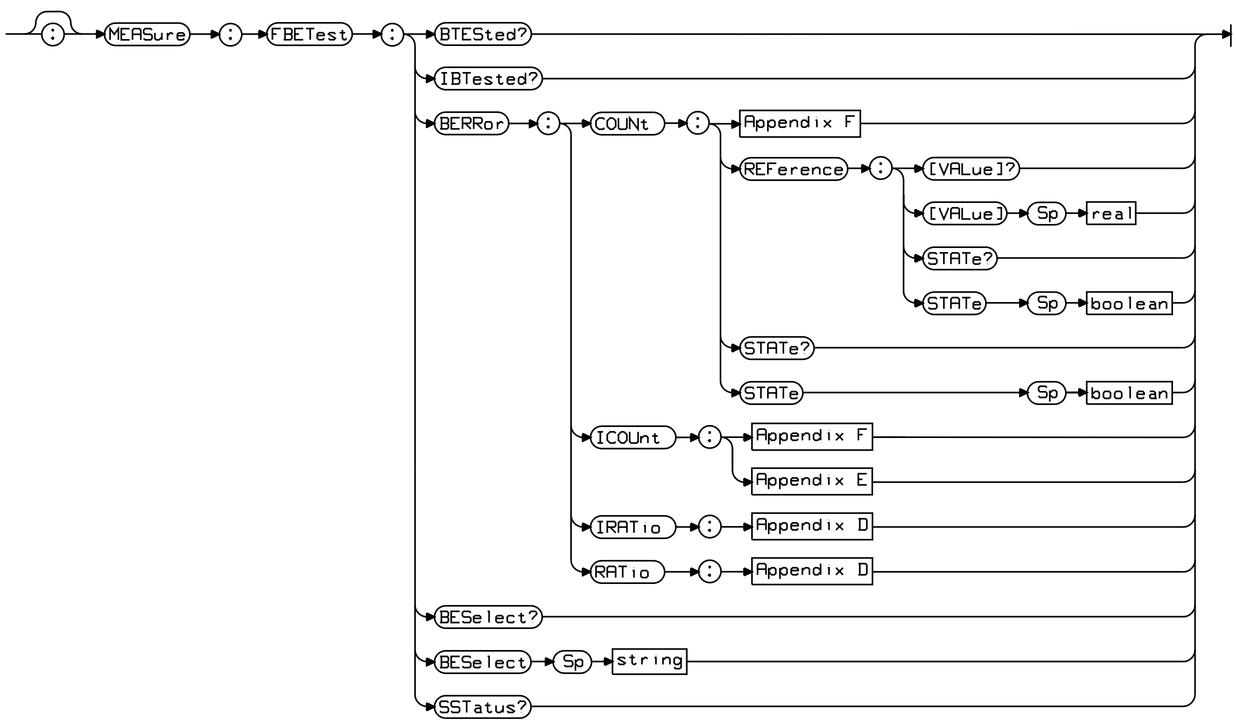
Fast Bit Error Test (Measure Subsystem)


:
MEASure
:
FBETest
:
BTESted?
IBTested?
BERRor
:
COUNt
:
Appendix F
REFerence
:
[VALue]?
[VALue]
Sp
real
STATe?
STATe
Sp
boolean
STATe?
STATe
Sp
boolean
ICOUnt
:
Appendix F
Appendix E
IRATio
:
Appendix D
RATio
:
Appendix D
BESelect?
BESelect
Sp
string
SSTatus?

BTESted

Description Queries the number of Bits TESted for the completed Bit Error Test measurements.

Syntax MEASure:FBETest:BTESted?

Options Not Applicable.

IBTested

Description Queries the number of Bits TESted for the Intermediate Bit Error Test measurements.

NOTE: This can only be queried when in the state TRIGger:BETest:MODE ‘RUN’.

Syntax MEASure:FBETest:IBTested?

Options Not Applicable.

BERRor:COUNt

Description Queries the Bit ERRor COUNt (completed).

Syntax MEASure:FBETest:BERRor:COUNt?

MEASure:FBETest:BERRor:COUNt[:AVG]

Options Refer to Appendix F.

BERRor:ICOUnt

Description Queries the Bit ERRor Intermediate COunt.

NOTE This can only be queried when in the state TRIGger:BETest:MODE ‘RUN’.

Syntax MEASure:FBETest:BERRor:ICOUnt?

MEASure:FBETest:BERRor:ICOUnt[:MM-MOD] | [:AVG]

Options Refer to Appendices E and F.

BERRor:IRATio

Description Queries the Bit ERRor Intermediate RATio.

NOTE This can only be queried when in the state TRIGger:BETest:MODE ‘RUN’.

Syntax MEASure:FBETest:BERRor:IRATio?

MEASure:FBETest:BERRor:IRATio[:MM]

Options Refer to Appendix D.

BERRor:RATio

Description Queries the Bit ERRor RATio (completed).

Syntax MEASure:FBETest:BERRor:RATio?

MEASure:FBETest:BERRor:RATio[:MM]

Options Refer to Appendix D.

BESelect

Description Selects/queries the Bit ERRor SELected Bit Error Test measurement to display (BE Ratio, BE Count) for the given measurement cycle.

Syntax MEASure:FBETest:BESelect?

MEASure:FBETest:BESelect <string>

Options ‘BE COUNT’ | ‘BE RATIO’

SSTatus

Description Queries the Bit Error Test SYNC STatus. Will return ’NO ERROR’ or ’BAD SYNC’. This field will only be updated when the demod arm state goes from ”DISARM” to ”ARM.” This is the same as DDEMod:SYNC:SSTatus.

Syntax MEASure:FBETest:SSTatus?

Options Not Applicable

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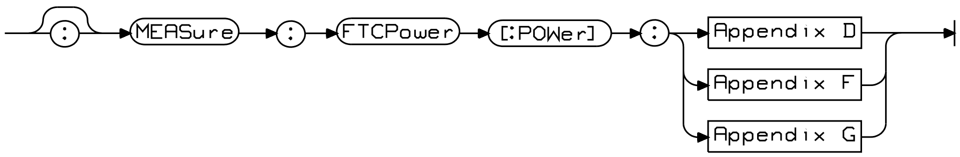
Fast TX Carrier Power (Measure Subsystem)



FTCPower[:POWer]

Description Queries the Fast Transmitter Carrier Power MEASurement result. This is only valid for RFAN:INP of 'RF IN/OUT'.

GPIB units are dBm, W;

default unit is dBm.

Display units are dBm, V, mV, uV, dBuV, W;

default unit is dBm.

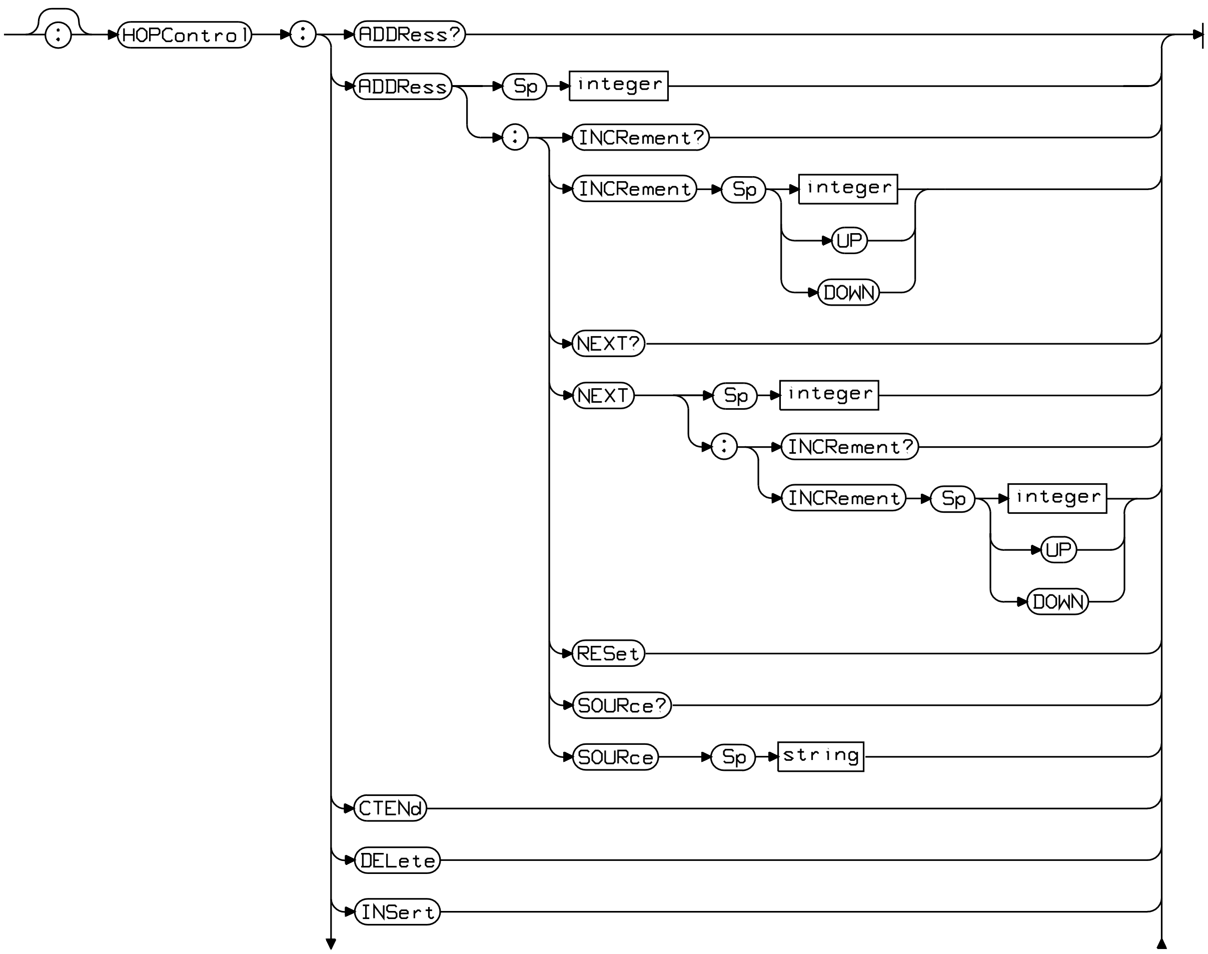
Syntax MEASure:FTCPower[:POWer]?

MEASure:FTCPower[:POWer][:MM] | [:AVG] | [:MET]

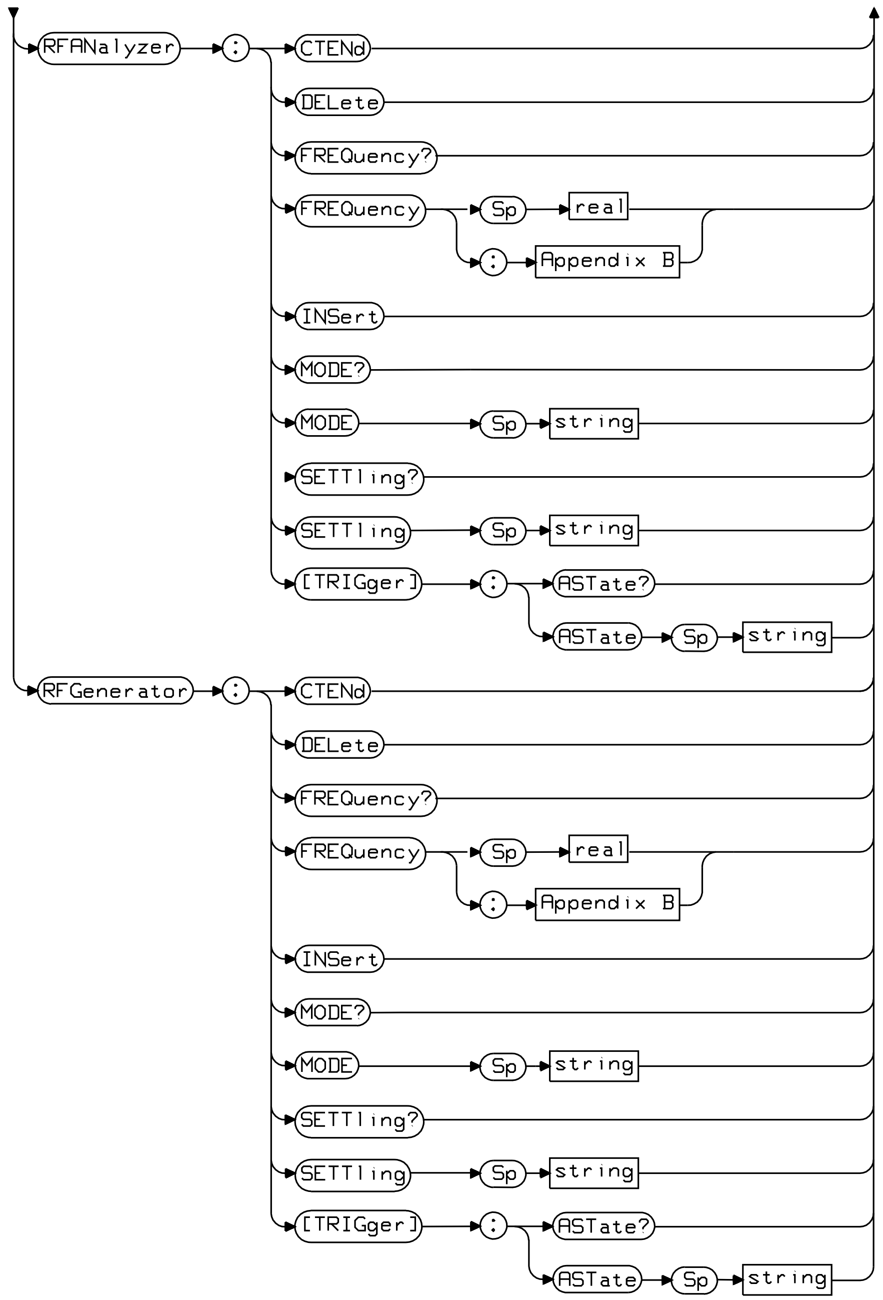
Options Refer to Appendices D, F and G.

20

Hop Control Subsystem



Continued Over


RFANalyzer
:
CTENd
DELete
FREQuency?
FREQuency
Sp
real
:
Appendix B
INSert
MODE?
MODE
Sp
string
SETTling?
SETTling
Sp
string
[TRIGger]
:
ASTate?
ASTate
Sp
string
RFGenerator
:
CTENd
DELete
FREQuency?
FREQuency
Sp
real
:
Appendix B
INSert
MODE?
MODE
Sp
string
SETTling?
SETTling
Sp
string
[TRIGger]
:
ASTate?
ASTate
Sp
string

ADDRess

Description Sets/queries the ADDRess for entering hop frequencies into the hop tables and for entering the next frequency for HOPC:ADDR:SOUR:INT mode.

Syntax HOPControl:ADDRess?

HOPControl:ADDRess <integer>? | [:INUM]

Options Refer to Appendix A.

ADDRess:NEXT

Description Sets/queries the NEXT HOP ADDRess to hop to. This is used when HOPC:ADDR:SOUR is 'INT' to make looped internal sequences.

Syntax HOPControl:ADDRess:NEXT?

HOPControl:ADDRess:NEXT <integer> | [:INUM]

Options Refer to Appendix A.

ADDRess:RESet

Description RESets the internal sequence hop address register to zero.

Syntax HOPControl:ADDRess:RESet

Options Not applicable.

ADDRess:SOURce

Description Selects/queries the HOP Control ADDRess SOURce.

Syntax HOPControl:ADDRess:SOURce?

HOPControl:ADDRess:SOURce <string>

Options 'SEQ' | 'EXT'

Where;

- SEQ hopping mode causes the hop control address to come from a hop sequence address register. Hop addresses are automatically sequenced based on next settings.
- EXT hopping mode causes the hop control address to come from external lines.

CTENd

Description This Clear To ENd command replaces the RF ANalyzer hop frequency entry and the RF Generator hop frequency entry at HOPC:ADDRess, and all hop frequency entries after them, with 0 MHz.

For example; the hop frequency entry at HOPC:ADDRess, HOPC:ADDRess + 1, ... up to entry 2047 are replaced with 0 MHz.

HOPC:ADDR:NEXT values are set to ADDRess+1 modulo 2048 starting at ADDRess.

Syntax HOPControl:CTENd

Options Not applicable.

DELete

Description This DELetes the RF ANalyzer hop frequency entry and the RF Generator hop frequency entry at HOPC:ADDRess. All other RF ANalyzer and RF Generator hop frequency entries move down by one address. Entry 2047 in the hop table is replaced with 0 MHz.

Syntax HOPControl:DELete

Options Not applicable.

INSert

Description This INSerts an entry of 0 MHz into the RF ANalyzer hop table and the RF Generator hop table. All other entries move down one address. Entry 2047 in the RF ANalyzer hop table and the RF Generator hop table is lost.

Syntax HOPControl:INSert

Options Not applicable.

RFANalyzer or RFGenerator:CTENd

Description This Clear To ENd command replaces the RF ANalyzer hop frequency entry at HOPC:ADDRess, and all hop frequency entries after it, with 0 MHz.

For example;, the hop frequency entry at HOPC:ADDRess, HOPC:ADDRess + 1, ... up to entry 2047 are replaced with 0 MHz

Syntax HOPControl:RFANalyzer:CTENd

HOPControl:RFGenerator:CTENd

Options Not applicable.

RFANalyzer or RFGenerator:DELete

Description This DELetes the RF ANalyzer hop frequency entry at HOPC:ADDRess. All other RF ANalyzer hop frequency entries move down by one address. Entry 2047 in the hop table is replaced with 0 MHz.

Syntax HOPControl:RFANalyzer:DELete

HOPControl:RFGenerator:DELete

Options Not applicable.

RFANalyzer or RFGenerator:FREQuency

Description Set/queries the RF ANalyzer or RF Generator hop FREQuency entry at HOPC:ADDRess.

Default GPIB unit is HZ.

Default display unit is MHZ.

Syntax HOPControl:RFANalyzer:FREQuency?

HOPControl:RFGenerator:FREQuency?

HOPControl:RFANalyzer:FREQuency <real> | [:FNUM]

HOPControl:RFGenerator:FREQuency <real> | [:FNUM]

Options Refer to Appendix B.

RFANalyzer or RFGenerator:INSert

Description This INSerts an entry of 0 MHz into the RF ANalyzer or RF Generator hop table. All other entries move down one address. The last entry in the RF ANalyzer or RF Generator hop table is lost.

Syntax HOPControl:RFANalyzer:INSert

HOPControl:RFGenerator:INSert

Options Not applicable.

RFANalyzer or RFGenerator:MODE

Description Selects/queries the RF ANalyzer or RF Generator hop MODE.

Syntax HOPControl:RFANalyzer:MODE?

HOPControl:RFGenerator:MODE?

HOPControl:RFANalyzer:MODE <string>

HOPControl:RFGenerator:MODE <string>

Options ‘NON-HOP’ | ‘HOP’

RFANalyzer or RFGenerator:SETTling

Description Selects/queries the RF ANalyzer or RF Generator hop SETTling.

Syntax HOPControl:RFANalyzer:SETTling?

HOPControl:RFGenerator:SETTling?

HOPControl:RFANalyzer:SETTling <string>

HOPControl:RFGenerator:SETTling <string>

Options ‘NORMAL’ | ‘LARGEHOPS’

Where;

- NORMAL should be used for small hops.
- LARGEHOPS should be used for large hops (~ >75 MHz).

RFANalyzer or RFGenerator[:TRIGger]:ASTate

Description Selects/queries the RF ANalyzer or RF Generator hop TRIGger Arm STate.

Syntax HOPControl:RFANalyzer[:TRIGger]:ASTate?

HOPControl:RFGenerator[:TRIGger]:ASTate?

HOPControl:RFANalyzer[:TRIGger]:ASTate <string>

HOPControl:RFGenerator[:TRIGger]:ASTate <string>

Options ‘ARM’ | ‘DISARM’

21

IEEE 488.2 Common Commands

IEEE 488.2 mandates the use of some common commands. These commands have a special syntax (beginning with a *), which is not legal for other commands. The common commands control some of the basic instrument functions:

- Instrument identification and reset
- Status reading and clearing
- Receiving and processing of commands and queries by the instrument

*CLS (Clear Status)

Description The *CLS (clear status) common command clears the status data structures, including the device defined error queue. This command also aborts the *OPC. If the *CLS command immediately follows a PROGRAM MESSAGE TERMINATOR, the output and the MAV (message available) bit will be cleared.

Syntax *CLS

Example OUTPUT 714;”*CLS”

*ESE (Event Status Enable)

Description The *ESE command sets the Standard Event Status Enable Register bits. The Standard Event Status Enable Register contains a mask value for the bits to be enabled in the Standard Event Status Register. A “one” in the Standard Event Status Enable Register will enable the corresponding bit in the Standard Event Status Register, a logic zero will disable the bit. The *ESE query returns the contents of the Standard Event Status Enable Register.

Command Syntax *ESE? <mask>

Where <mask> = 0 to 255

Example

In this example,the *ESE 1 command will enable the OPC (operation complete) bit 6 of the Standard Event Status Enable Register.

OUTPUT 714;”*ESE 1”

Query Syntax *ESE?

Returned Format

<mask><NL>

Where <mask> = 0 to 255

Example

OUTPUT 714;”*ESE?”

ENTER 714;Event

PRINT Event

*ESR? (Event Status Register)

Description The *ESR? query returns the contents of the Standard Event Status Register.

NOTE Reading the Standard Event Status Register clears the contents of the register.

Query Syntax: *ESR?

Returned Format

<status><NL>

Where <status> = 0 to 255

Example

```
OUTPUT 714;"*ESR?"
ENTER 714;Event
PRINT Event
```

When you read the Event Status Register, the value returned is the total bit weights of all bits that are true at the time you read the byte.

*IDN? (Identification Number)

Description

The *IDN? query allows the instrument to identify itself. It returns the string:

"Hewlett-Packard,8922M,0,X.UU.VV"

X.UU.VV = the firmware revision of this instrument.

An *IDN? query must be the last query in a message. Any queries after the *IDN? query in this program message will be ignored.

Query Syntax

*IDN?

Returned Format

Hewlett-Packard,8922M,0,X.UU.VV<NL>

Example

```
DIM Id$[100]
OUTPUT 714;"*IDN?"
ENTER 714;Id$
PRINT Id$
```

*OPC (Operation Complete)

Description

The *OPC (operation complete) command will cause the instrument to set the operation complete bit in the Standard Event Status Register only when all pending operations are complete. The *OPC? query places an ASCII “1” in the output queue when all pending device operations are complete. There is a one second minimum delay between the query and the response. A pending operation in the Agilent 8922M or Agilent 8922S is any measurement which is armed but not complete. When in remote operation with repetitive triggering all measurements, apart from BER, are self-arming. When in remote operation with single triggering all measurements, apart from BER, are armed by sending the **`TRIGger[:IMMediate]`** command or *TRG. The BER measurement is armed by sending the **`TRIGger:BETest:RUN`** command.

Command Syntax *OPC

Example

```
OUTPUT 714;"*OPC"
```

Query Syntax *OPC?

Returned Format

1<NL>

Example

```
OUTPUT 714;"*OPC?"
ENTER 714;Op
PRINT Op
```

*OPT?

Description

The *OPT? query will return a string containing the instrument options that are installed. Returns a “0” for any options that are not installed. Available options are

```
“SPECTRUM ANALYZER”, “LOW POWER RF ATTEN”,“CIPHERING”,
“HP83220A”, ”HP83220E”, “ELECTRONIC ATTEN”.
```

Query Syntax

*OPT?

Return Syntax

Where <string> = “0,0,0,0,0,0” with no options installed

Example

Here are two examples of possible return strings for a fully loaded instrument.

```
“SPECTRUM ANALYZER,LOW POWER
RF ATTEN,CIPHERING,HP83220A,0,ELECTRONIC ATTEN”.
```

```
“SPECTRUM ANALYZER,LOW POWER
RF ATTEN,CIPHERING,HP83220E,0,ELECTRONIC ATTEN”.
```

```
DIM Value$[100]
OUTPUT 714;”*OPT?”
ENTER 714;Value$
PRINT Value$
```

*RCL (Recall)

Description The *RCL command restores the state of the instrument from the specified internal save/recall register. An instrument setup must have been stored previously in the specified register. Registers 0 through 99 are general purpose and can be used with the *SAV command.

Command Syntax *RCL <rcl_register>

Where <rcl_register> = 0 through 99 though the total number of registers used may be limited by the amount of memory available.

Example

```
OUTPUT 714;"*RCL 75"
```

An instrument state stored using [REGister:]SAVE may be recalled using *RCL or [REGister:]RECall. If the [REGister:]SAVE uses an alphanumeric string as the register name, the *RCL command will not work. *RCL only works with registers named using an integer from 0 through 99.

IMPORTANT The following fields do not participate in Save/Recall, and will be set according to the recalled state of the operating mode (Active Cell | Test Mode | CW Generator).

- Cell Config - Settable| | Activated
- Dig Demod Arm State - Arm | Disarm
- DSP Meas - Trig Source
- DSP Meas - Trig Delay
- Demod Arm State - Arm | Disarm
- Meas Arm State - Arm | Disarm
- Meas Sync - Single | Cont
- Bit Error Test - Run | Stop
- Bit Error Test MS Loopback Loop Delay mode - Manual | Auto
- Hop Control RF Generator - Arm | Disarm
- Hop Control RF Analyzer - Arm | Disarm
- Hop Control RF Generator - Non-Hop | Hop
- Hop Control RF Analyzer - Non-Hop | Hop
- None of the CONFigure commands except :RADio, :ROSCillator:OFFSet, ROSCillator:TUNing, and :PRINt:TITLe participate in Save/Recall, and will instead remain at their last setting.

*RST (Reset)

Description The *RST command places the instrument in a known state.

Command Syntax *RST

Example

```
OUTPUT 714;"*RST"
```

*SAV (Save)

Description The *SAV command stores the current state of the instrument in an internal save register. The data parameter is the number of the save register where the data will be saved. Internal registers 0 through 99 are valid for this command. The total number of registers which can be saved is limited by the number of settings which differ from their preset condition and the memory available.

Command Syntax *SAV <number>

Where <number> = 0 through 99

Example

```
OUTPUT 714;"*SAV 85"
```

The [REGister:]RECall command may be used to return the instrument to the state at which the instrument was saved using *SAV. The [REGister:]RECall must use the same integer to return to this state. Strings are not accepted.

*SRE (Service Request Enable)

The *SRE command sets the Service Request Enable Register bits. The Service Request Enable Register contains a mask value for the bits to be enabled in the Status Byte Register. A logic one in the Service Request Enable Register will enable the corresponding bit in the Status Byte Register, a logic zero will disable the bit.

The *SRE query returns the current setting.

Command Syntax *SRE <mask>

Where <mask> = 0 through 255

Example

```
OUTPUT 714;"*SRE 16"
```

NOTE This example enables a service request to be generated when a message is available in the output queue. When a message is available, the MAV bit will be high.

Query Syntax *SRE?

<mask><NL>

Where <mask> = sum of all the bits that are set, 0 through 255.

Example

```
OUTPUT 714;"*SRE?"
ENTER 714;Value
PRINT Value
```

*STB? (Status Byte)

Description The *STB? query returns the current value of the instrument's status byte. The RQS (request service) bit is reported on bit 6. The RQS indicates whether or not the device has at least one reason for requesting service.

Query Syntax *STB?

<value><NL>

Where <value> = 0 through 255

Example

```
OUTPUT 714;"*STB?"
ENTER 714;Value
PRINT Value
```

*TST? (Test)

Description The *TST query causes the instrument to perform a self-test. The result of the test will be placed in the output queue.

NOTE Prior to sending this command, all front panel inputs must be disconnected.

A zero indicates the test passed and a non-zero value indicates the test failed.

Command Syntax *TST?

Returned Format

<result><NL>

Where <result> = 0 or a non-zero value.

0 indicates the test has passed.

Non-zero indicates the test has failed.

*WAI (Wait)

The *WAI command pauses the instrument, preventing it from executing any further GPIB commands or queries until no operations are pending.

Command Syntax *WAI

Example

```
OUTPUT 714;"MEAS:PATTERN 'Facc'"
OUTPUT 714;"TRIG:MODE:RETRIGGER SINGLE"
OUTPUT 714;"*TRG"
OUTPUT 714;"*WAI"
```

! The following command will not execute until the trigger has occurred

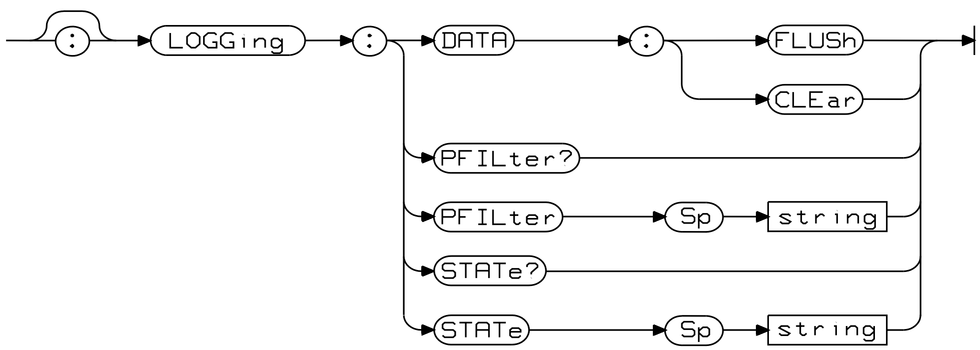
! and is a valid measurement result.

```
OUTPUT 714;"MEAS:RF:FREQ:ACC?"
ENTER 714;Freq_acc
PRINT Freq_acc
```

22

LOGGing Subsystem

Logging commands are used to control protocol logging through the Protocol Logging interface on the rear panel.


:
LOGGing
:
DATA
:
FLUSh
CLEar
PFILter?
PFILter
Sp
string
STATe?
STATe
Sp
string

DATA:FLUSh

Description FLUSh the LOGGing DATA - empties the contents of the log into an output stream to the external monitoring device. Note, the data will not be cleared.

Syntax LOGGing:DATA:FLUSh

Options Not Applicable

DATA:CLEar

Description Clears the LOGGing DATA.

Syntax LOGGing:DATA:CLEar

Options Not Applicable

PFILter

Description Selects/queries the Pass FILter used when data is logged.

Syntax LOGGing:PFILter?

LOGGing:PFILter <string>

Options ’NETWKONLY’ | ’+DATALINK’ | ’+SERVICE’

Where;

- NETWKONLY means log peer-to-peer messages between the network layers.
- +DATALINK means NETWKONLY plus log peer-to-peer messages between the between the data link layers.
- +SERVICE means NETWKONLY plus DATALINK plus log inter-layer messages and intra-layer service request and response messages.

STATe

Description Selects/queries the current LOGGing STATe

Syntax LOGGing:STATe?

LOGGing:STATe <string>

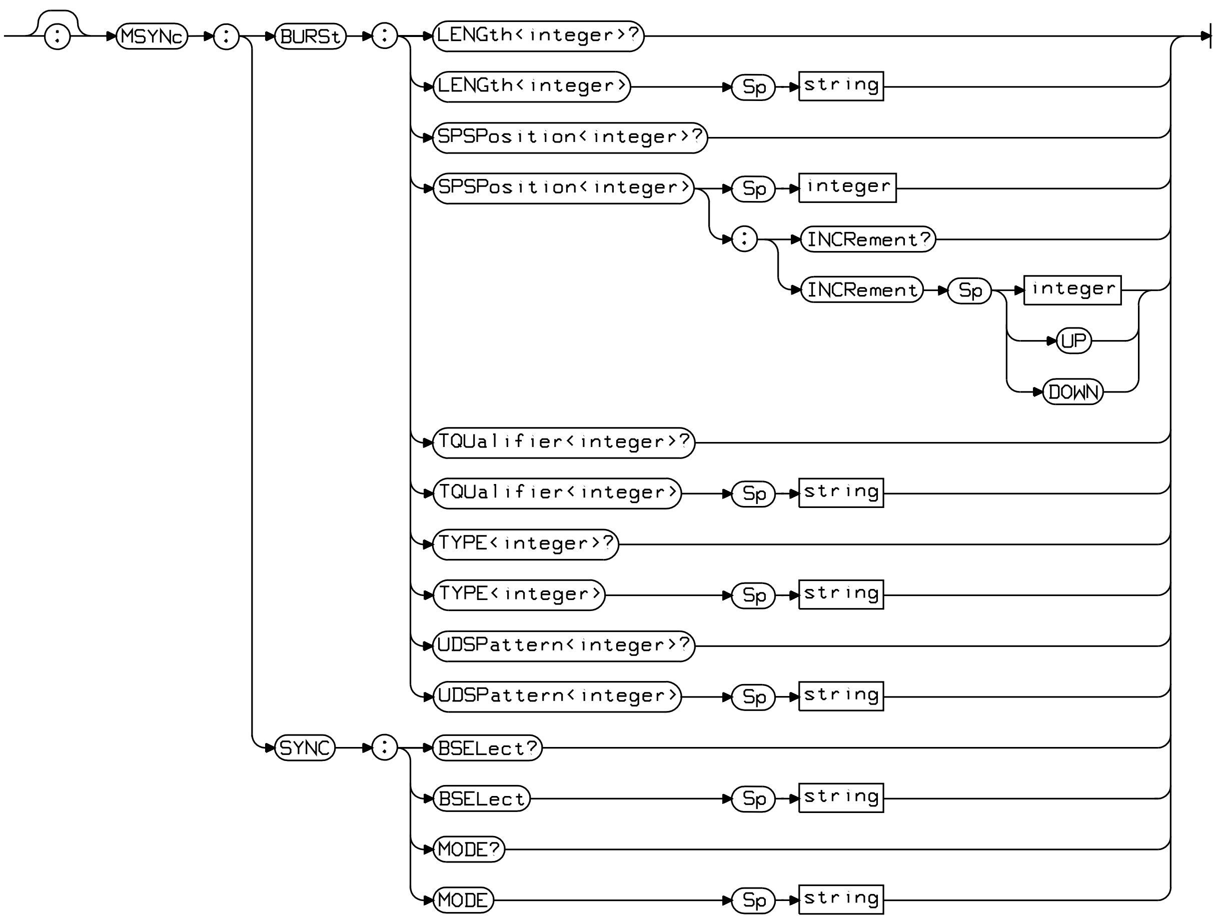
Options ’LOG’ | ’PAUSE’

Where;

- LOG indicates that data is being logged.
- PAUSE indicates that data is temporarily not being logged.

23

Measurement Sync Subsystem


:
MSYNc
:
BURSt
:
LENGth<integer>?
LENGth<integer>
Sp
string
SPSPosition<integer>?
SPSPosition<integer>
Sp
integer
:
INCRement?
INCRement
Sp
integer
UP
DOWN
TQUalifier<integer>?
TQUalifier<integer>
Sp
string
TYPE<integer>?
TYPE<integer>
Sp
string
UDSPattern<integer>?
UDSPattern<integer>
Sp
string
SYNC
:
BSELect?
BSELect
Sp
string
MODE?
MODE
Sp
string

BURSt:LENGth

Description Selects/queries the MSYNc user-defined BURSt LENGth for the selected burst number

Syntax MSYNc:BURSt:LENGth<n>?

MSYNc:BURSt:LENGth<n> <string>?

Options where <n> = 0 to 3.

‘87’ | ‘147’

BURSt:SPSPosition

Description Sets/queries the MSYNc user-defined Sync Pattern Start Position for the selected burst number

Syntax MSYNc:BURSt:SPSPosition<n>?

MSYNc:BURSt:SPSPosition<n> <integer> | [:INUM]

Options where <n> = 0 to 3.

Refer to Appendix A.

BURSt:TQUalifier

Description Selects/queries the Trigger QUalifier for the selected burst number

Note: this selects the trigger qualifier for both

MSYNc:BURSt:TQU<n> and DDEMod:BURSt:TQU<n>.

Syntax MSYNc:BURSt:TQUalifier<n>?

MSYNc:BURSt:TQUalifier<n> <string>

Options where <n> = 0 to 3.

’NORMAL’ | ’RF POWER’

Where;

- NORMAL means no trigger qualifier.
- RF POWER means ’rearm for another trigger if RF POWER never came up’.

BURSt:TYPE

Description Selects/queries the MSYNc BURSt TYPE for the selected burst number

Note: this selects the type for both MSYN:BURSt:TYPE<n> and DDEMod:BURSt:TYPE<n>.

Syntax MSYNc:BURSt:TYPE<n>?

MSYNc:BURSt:TYPE<n> <string>

Options where <n> = 0 to 3.

’TSC0’ | ’TSC1’ | ’TSC2’ | ’TSC3’ |

’TSC4’ | ’TSC5’ | ’TSC6’ | ’TSC7’ |

’RACH’ | ’SCH’ | ’FCH’ | ’USER DEF’

BURSt:UDSPattern

Description Sets/queries the MSYNc User Defined Sync Pattern definition for the selected burst number

Syntax MSYNc:BURSt:UDSPattern<n>?

MSYNc:BURSt:UDSPattern<n> <quoted string>

Options where <n> = 0 to 3.

SYNC:BSELect

Description Selects/queries the burst selection to synchronize measurements to.

Syntax MSYNc:SYNC:BSELect?

MSYNc:SYNC:BSELect <string>

Options ’0’ | ’1’ | ’2’ | ’3’ | ’EXT’

Where;

- 0 means always sync to burst number 0.
- 1 means always sync to burst number 1.
- 2 means always sync to burst number 2.
- 3 means always sync to burst number 3.
- EXT means use external signals to decide which burst number to sync to.

SYNC:MODE

Description Selects/queries the SYNC MODE algorithm that is used to determine the location of the demodulated data bits in the measured burst.

Syntax MSYNc:SYNC:MODE?

MSYNc:SYNC:MODE <string>

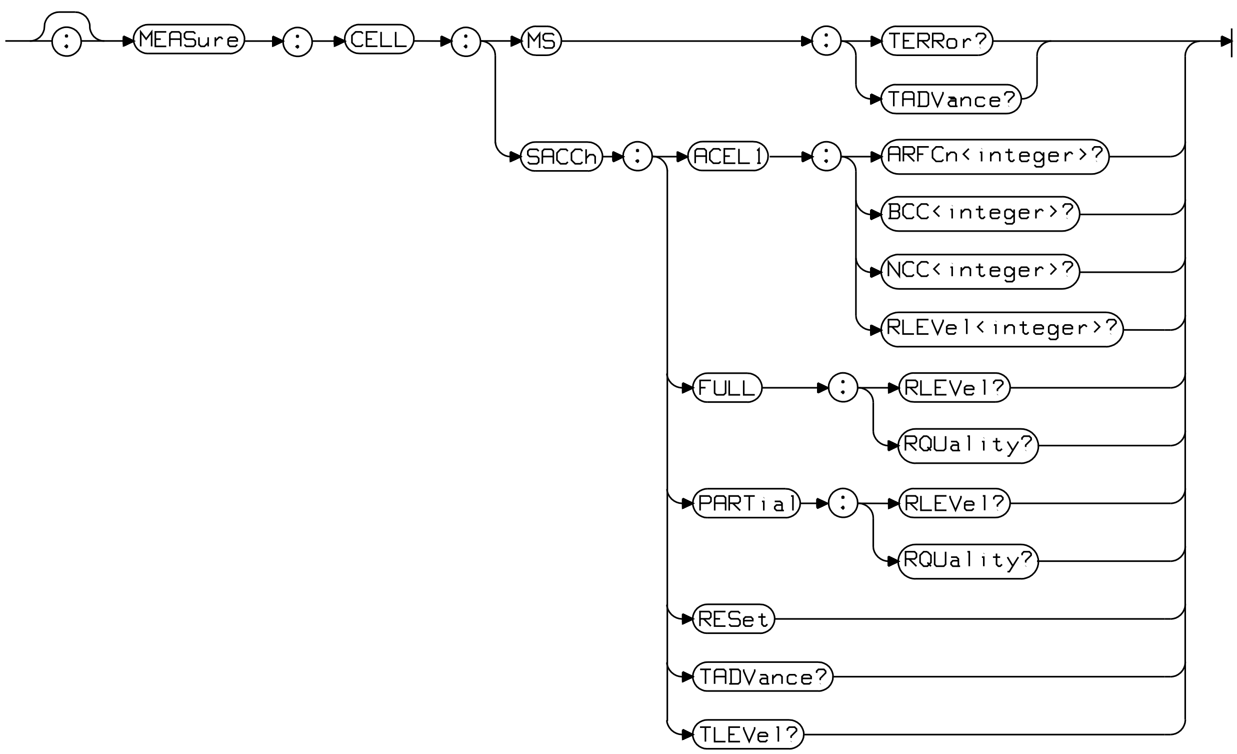
Options ’MIDAMBLE’ | ’AMPLITUDE’

Where;

- MIDAMBLE means sync using the best bit match of the demodulated data bits to the selected midamble or user-defined sync pattern.
- AMPLITUDE means sync by centering the burst in the detected amplitude envelope.

24

Mobile Station Commands (Measure Subsystem)


:
MEASure
:
CELL
:
MS
:
TERRor?
TADVance?
SACCh
:
ACELl
:
ARFCn<integer>?
BCC<integer>?
NCC<integer>?
RLEVel<integer>?
FULL
:
RLEVel?
RQUality?
PARTial
:
RLEVel?
RQUality?
RESet
TADVance?
TLEVel?

MS:TERRor

Description Queries the Mobile Station Timing Error actually Measured by the Agilent 8922M/S.

Syntax MEASure:CELL:MS:TERRor?

Options Not Applicable.

MS:TADVance

Description Queries the Mobile Station Timing Advance actually Measured by the Agilent 8922M/S.

Syntax MEASure:CELL:MS:TADVance?

Options Not Applicable.

SACCh:ACEL1:ARFCn

Description Queries the Adjacent Cell ARFCn.

Syntax MEASure:CELL:SACCh:ACEL1:ARFCn<n>?

Options Where n=1 through 6

SACCh:ACEL1:BCC

Description Queries the Adjacent Cell (BSIC) Base Station Colour Code.

Syntax MEASure:CELL:SACCh:ACEL1:BCC<n>?

Options Where n=1 through 6

SACCh:ACEL1:NCC

Description Queries the Adjacent Cell (BSIC) Network Colour Code.

Syntax MEASure:CELL:SACCh:ACEL1:NCC<n>?

Options Where n=1 through 6

SACCh:ACEL1:RLEVel

Description Queries the Adjacent Cell RX Level.

Syntax MEASure:CELL:SACCh:ACEL1:RLEVel<n>?

Options Where n=1 through 6

SACCh:FULL:RLEVel

Description Queries the Full RX Level (serving cell).

Syntax MEASure:CELL:SACCh:FULL:RLEVel?

Options Not Applicable.

SACCh:FULL:RQUality

Description Queries the Full RX Quality (serving cell).

Syntax MEASure:CELL:SACCh:FULL:RQUality?

Options Not Applicable.

SACCh:PARTial:RLEVel

Description Queries the Partial RX Level (serving cell).

Syntax MEASure:CELL:SACCh:PARTial:RLEVel?

Options Not Applicable.

SACCh:PARTial:RQUality

Description Queries the Partial RX Quality (serving cell).

Syntax MEASure:CELL:SACCh:PARTial:RQUality?

Options Not Applicable.

SACCh:RESet

Description RESets the SACCH measurement results.

Syntax MEASure:CELL:SACCh:RESet

Options Not Applicable.

SACCh:TADVance

Description Queries the SACCH Timing Advance reported by the Mobile Station.

Syntax MEASure:CELL:SACCh:TADVance?

Options Not Applicable.

SACCh:TLEVel

Description Queries the SACCH TX Level reported by the Mobile Station.

Syntax MEASure:CELL:SACCh:TLEVel?

Options Not Applicable.

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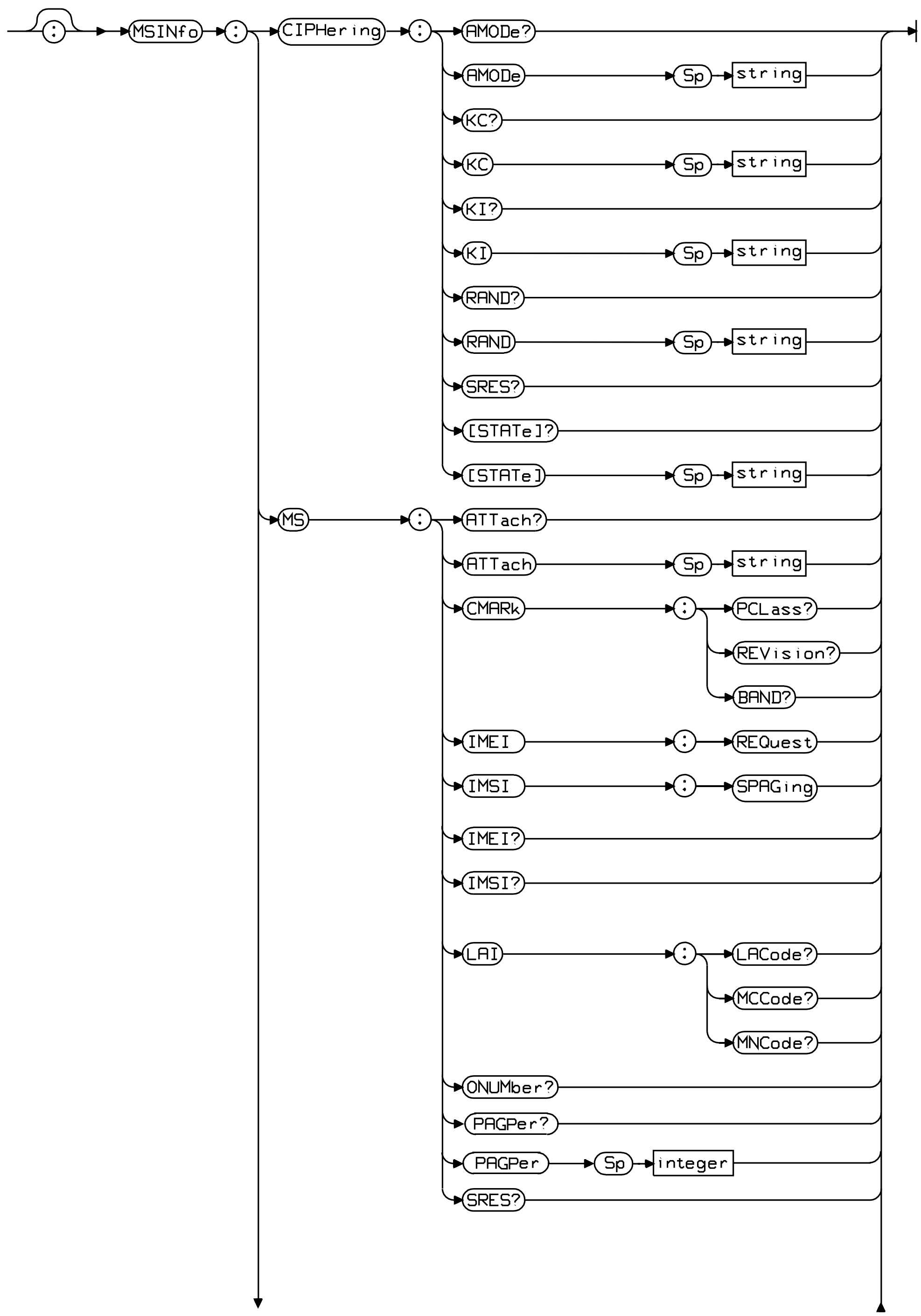
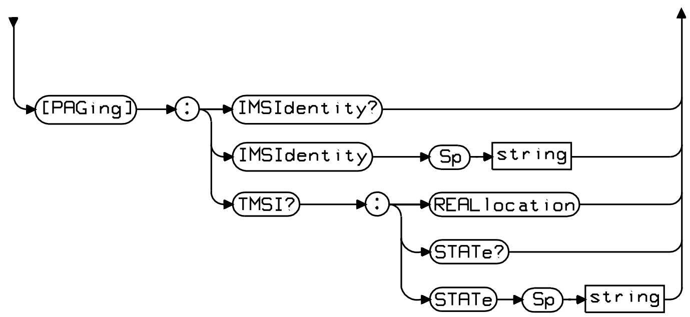
MS Information Subsystem

NOTE

If you have the Agilent 8922M/S Option 010 Multi-Band Test System, you will have access to additional GPIB commands. These commands are used when working with dual band mobiles. For a full description of these additional commands and their syntax, refer to the *Agilent 8922 Multi-Band User's Guide*.


:
MSINfo
:
CIPHering
:
AMODe?
AMODe
Sp
string
KC?
KC
Sp
string
KI?
KI
Sp
string
RAND?
RAND
Sp
string
SRES?
[STATe]?
[STATe]
Sp
string
MS
:
ATTach?
ATTach
Sp
string
CMARk
:
PCLass?
REVision?
BAND?
IMEI
:
REQuest
IMSI
:
SPAGing
IMEI?
IMSI?
LAI
:
LACode?
MCCode?
MNCode?
ONUMber?
PAGPer?
PAGPer
Sp
integer
SRES?



CIPHering:AMODe

Description Selects/queries the CIPhering Authentication MODe.

Syntax MSINfo:CIPHering:AMODe?

MSINfo:CIPHering:AMODe <string>

Options 'FULL-54' | 'FULL-64' | 'PARTIAL' | 'NONE'

Where;

- FULL-54 means that the user need only provide the Authentication Key (KI). Only the first 54 bits of the Authentication Key will be used, and the 10 least-significant-bits will be unused.
- FULL-64 means that the user need only provide the Authentication Key (KI). The entire 64 bits of the Authentication Key will be used.
- PARTIAL means that the Ciphering Key (KC) and a random number (RAND) is needed.
- NONE means that no authentication will take place.

CIPHering:KC

Description Sets/queries the Ciphering Key (KC).

Syntax MSINfo:CIPHering:KC?

MSINfo:CIPHering:KC <quoted string>

Options Quoted string representing a hexadecimal (64 bit) value.

CIPHering:KI

Description Sets/queries the Authentication Key (KI).

Syntax MSINfo:CIPHering:KI?

MSINfo:CIPHering:KI <quoted string>

Options Quoted string representing a hexadecimal (128 bit) value.

CIPHering:RAND

Description Sets/queries the RAND value (random number).

Syntax MSINfo:CIPHering:RAND?

MSINfo:CIPHering:RAND <quoted string>

Options Quoted string representing a hexadecimal (128 bit) value.

CIPHering:SRES

Description Queries the BS SRES (Signed RESponse to RAND).

Syntax MSINfo:CIPHering:SRES?

MSINfo:CIPHering:SRES <quoted string>

Options This is a quoted string representing a 32 bit hexadecimal.

CIPHering[:STATe]

Description Selects/queries the CIPHering (encryption) STATe of the MS and BS for the next call made.

Syntax MSINfo:CIPHering[:STATe]?

MSINfo:CIPHering[:STATe] <string>

Options ’OFF’ | ’DISABLED’ | ’ENABLED’

Where;

- OFF means no ciphering and don’t send out the ciphering signaling.
- DISABLED means send out the ciphering signaling, but select ciphering disabled.
- ENABLED means enable ciphering - this is only allowed if the Ciphering Option is installed (see *OPT?).

MS:ATTach

Description Selects/queries the IMSI attach/detach mode.

Syntax MSINfo:MS:ATTach?

MSINfo:MS:ATTach <string>

Options ’ON’ | ’OFF’

Where;

- When attach is set to ON the MS will automatically perform a location update after camping to the BCH, regardless of whether the cell attributes are the same as those stored by the MS. This allows a quick functional test to be performed on the MS before performing a call.
- The default is OFF.

MS:CMARk:PCLass?

Description Queries the Class MARk Power CLass - comes from the MS when a call is made.

Syntax MSINfo:MS:CMARk:PCLass?

Options Not Applicable.

MS:CMARk:REVision?

Description Queries the value encoded in the revision level bits of the MS.

Syntax MSINfo:MS:CMARk:REVision?

Options Not Applicable.

MS:CMARk:BAND?

Description Queries the value encoded in the frequency capability bits of the MS.

Syntax MSINfo:MS:CMARk:BAND?

Options Not Applicable.

MS:IMEI:REQuest

Description Fetches the International Mobile Equipment Identity from the MS. A call must be in place.

Syntax MSINfo:MS:IMEI:REQuest

Options Not options.

MS:IMEI?

Description Queries the MS International Mobile Equipment Identity. An IMEI:REQest must have been made before this query can be carried out.

Syntax MSINfo:MS:IMEI? <quoted string>

Options This is quoted string of up to 15 decimal digits.

MS:IMSI:SPAGing

Description Sets the PAGing IMSI - copies the MS's IMSI (MS:IMSI) to the MS's Paging IMSI ([:PAGing]:IMSI).

Syntax MSINfo:MS:IMSI:SPAGing

Options No Options

MS:IMSI?

Description Queries the MS's International Mobile Subscriber Identity.

Syntax MSINfo:MS:IMSI? <quoted string>

Options This is quoted string of up to 15 decimal digits.

MS:LAI:LACode?

Description Queries the Location Area Code portion of the last LAI.

Syntax MSINfo:MS:LAI:LACode?

Options Not Applicable.

MS:LAI:MCCode?

Description Queries the Mobile Country Code portion of the last LAI.

Syntax MSINfo:MS:MCCode?

Options Not Applicable.

MS:LAI:MNCode?

Description Queries the Mobile Network Code portion of the last LAI.

Syntax MSINfo:MS:MNCode?

Options Not Applicable.

MS:ONUMber?

Description Queries the MS Originated NUMber.

Syntax MSINfo:MS:ONUMber?

Options This quoted string represents up to 20-digit decimal number representing the party number the MS was calling for an MS-initiated call. The field will show a leading '+' if this is an international call.

MS:PAGPer

Description Sets/queries the paging period parameter in the broadcast control channel.

Syntax MSINfo:MS:PAGPer?

MSINfo:MS:PAGPer <integer>

Options Where integer = 2 through 9.

MS:SRES?

Description Queries the MS SRES (MS Signed RESponse to RAND).

Syntax MSINfo:MS:SRES?

Options This is a quoted string representing a 32 bit hexadecimal.

[:PAGing]:IMSIdentity

Description Sets/queries the MS's PAGing IMSI (International Mobile Subscriber Identity).

Syntax MSINfo[:PAGing]:IMSIdentity?

MSINfo[:PAGing]:IMSIdentity <quoted string>

Options This is a quoted string representing up to 15 decimal digits.

[:PAGing]:TMSI:REALlocation

Description Queries the TMSI (Temporary Subscriber Identity) value.

REALocates a new TMSI value based on generating a random number.

Syntax MSINfo[:PAGing]:TMSI:REALlocation

Options Not Applicable.

[:PAGing]:TMSI:STATe

Description Selects/queries whether to use the TMSI value when the next call is made.

Syntax MSINfo[:PAGing]:TMSI:STATe?

MSINfo[:PAGing]:TMSI:STATe <string>

Options ‘ON’ | ’OFF’

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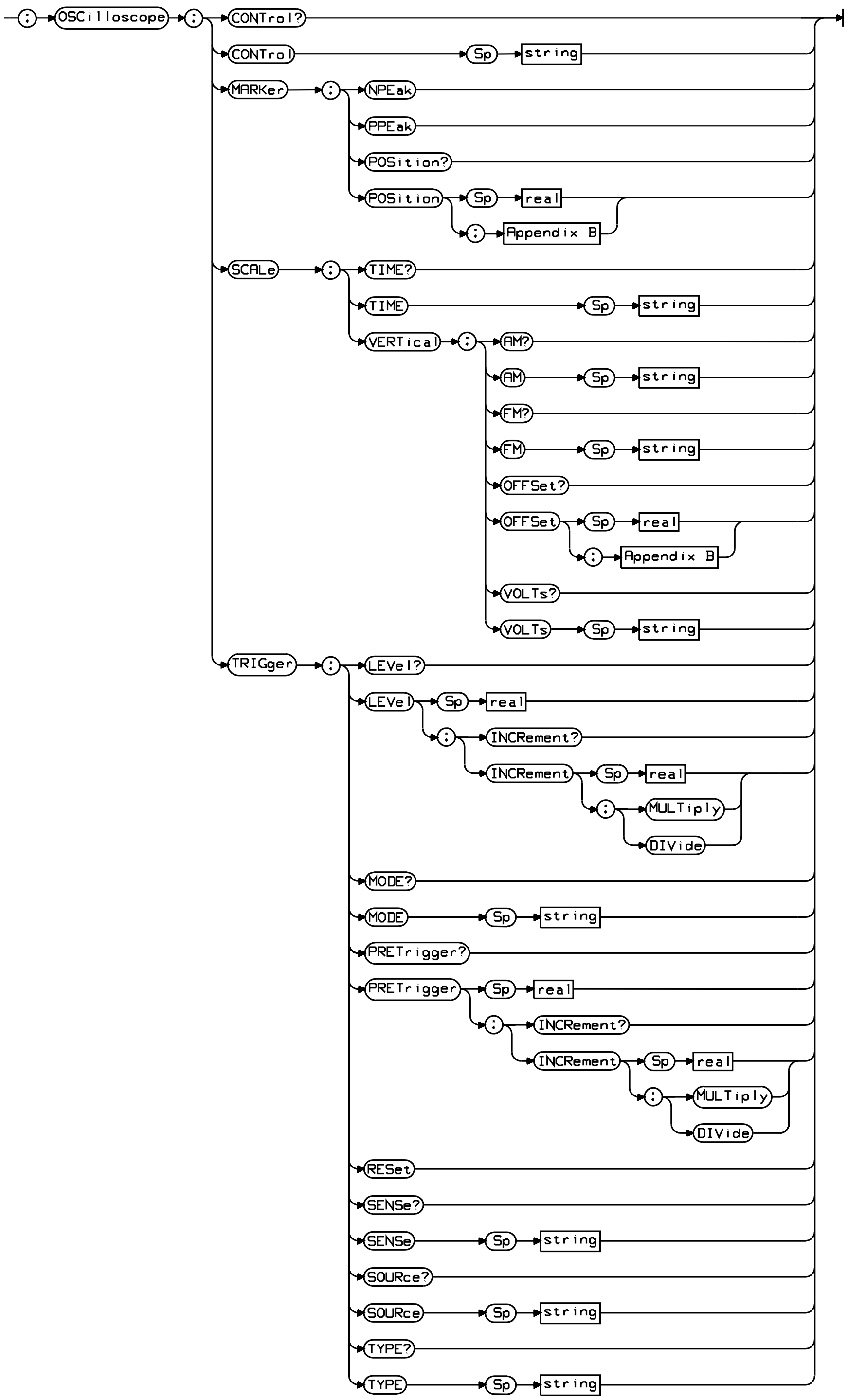
OSCilloscope Subsystem


:
OSCilloscope
:
CONTrol?
CONTrol
Sp
string
MARKer
:
NPEak
PPEak
POSition?
POSition
Sp
real
:
Appendix B
SCALe
:
TIME?
TIME
Sp
string
VERTical
:
AM?
AM
Sp
string
FM?
FM
Sp
string
OFFSet?
OFFSet
Sp
real
:
Appendix B
VOLTs?
VOLTs
Sp
string
TRIGger
:
LEVel?
LEVel
Sp
real
:
INCRement?
INCRement
Sp
real
:
MULTiply
DIVide
MODE?
MODE
Sp
string
PRETrigger?
PRETrigger
Sp
real
:
INCRement?
INCRement
Sp
real
:
MULTiply
DIVide
RESet
SENSe?
SENSe
Sp
string
SOURce?
SOURce
Sp
string
TYPE?
TYPE
Sp
string

CONTrol

Description Selects/queries the OSCilloscope CONTrols - various fields will appear based on the CONTrol selection.

Syntax OSCilloscope:CONTrol?

OSCilloscope:CONTrol <string>

Options ’MAIN’ | ’TRIGGER’ | ’MARKER’

MARKer:NPEak

Description Causes the OSCilloscope MARKer to move to the lowest Negative PEak displayed.

Syntax OSCilloscope:MARKer:NPEak

Options Not Applicable.

MARKer:PPEak

Description Causes the OSCilloscope MARKer to move to the highest Positive PEak displayed.

Syntax OSCilloscope:MARKer:PPEak

Options Not Applicable.

MARKer:POSition

Description Sets/queries the MARKer POSition. This is the number of divisions from the left side of the graticule to the marker.

Syntax OSCilloscope:MARKer:POSition?

OSCilloscope:MARKer:POSition <real> | [:FNUM]

Options Refer to Appendix B.

SCALe:TIME

Description Selects/queries the horizontal sweep time per division.

Syntax OSCilloscope:SCALe:TIME?

OSCilloscope:SCALe:TIME <string>

Options ’200 ms’ | ’100 ms’ | ’50 ms’ | ’20 ms’ |

’10 ms’ | ’5 ms’ | ’2 ms’ | ’1 ms’, |

’500 us’ | ’200 us’ | ’100 us’ | ’50 us’ |

’20 us’ | ’10 us’ | ’5 us’ | ’2 us’ |

’1 us’

SCALe:VERTical:AM

Description Selects/queries the VERTical amplitude per division for AF Analyzer input selections (AFAN:INP) that have AM units of Percent.

Syntax OSCilloscope:SCALe:VERTical:AM?

OSCilloscope:SCALe:VERTical:AM <string>

Options ’50 %’ | ’20 %’ | ’10 %’ | ’5 %’ |

’2 %’ | ’1 %’ | ’0.5 %’ | ’0.2 %’ |

’0.1 %’ | ’0.05 %’

SCALe:VERTical:FM

Description Selects/queries the VERTical amplitude per division for AF Analyzer input selections (AFAN:INP) that have FM units of Hertz.

Syntax OSCilloscope:SCALe:VERTical:FM?

OSCilloscope:SCALe:VERTical:FM <string>

Options ’50 kHz’ | ’20 kHz’ | ’10 kHz’ | ’5 kHz’ |

’2 kHz’ | ’1 kHz’ | ’500 Hz’ | ’200 Hz’ |

’100 Hz’ | ’50 Hz’ | ’20 Hz’ | ’10 Hz’

SCALe:VERTical:OFFSet

Description Sets/queries the number of divisions that the displayed signal is VERTically OFFSet above the Oscilloscope's fixed center line.

Syntax OSCilloscope:SCALe:VERTical:OFFSet?

OSCilloscope:SCALe:VERTical:OFFSet <real> | [:FNUM]

Options Refer to Appendix B.

SCALe:VERTical:VOLTs

Description Selects/queries the VERTical amplitude per division for AF Analyzer input selections (AFAN:INP) that have units of VOLTs.

Syntax OSCilloscope:SCALe:VERTical:VOLTs?

OSCilloscope:SCALe:VERTical:VOLTs <string>

Options ’20 V’ | ’10 V’ | ’5 V’ | ’2 V’ | ’1 V’ |

500 mV’ | ’200 mV’ | ’100 mV’ | ’50 mV’ |

‘20 mV’ | ’10 mV’ | ’5 mV’ | ’2 mV’ |

’1 mV’ | ’500 uV’ | ’200 uV’ | ’100 uV’ |

’50 uV’ | ’20 uV’

TRIGger:LEVel

Description Sets/queries the TRIGger LEVel. This only applies when TRIGger:SOURce is ’Scope Lvl’. The TRIGger LEVel is indicated by small pointers that appear on each side of the graticule. GPIB units is DIV.

Example: ”OSC:TRIG:LEV 2 DIV” set the oscilloscope trigger to 2 divisions above the horizontal axis.

Syntax OSCilloscope:TRIGger:LEVel?

OSCilloscope:TRIGger:LEVel <real> | [:INUM]

Options Refer to Appendix A.

TRIGger:MODE

Description Selects/queries how measurements are armed to accept a trigger.

IMPORTANT This command will set the trigger mode when in Local mode, it is overridden by TRIGger:MODE:RETRigger REPetitive | SINGle when in Remote mode.

Syntax OSCilloscope:TRIGger:MODE?

OSCilloscope:TRIGger:MODE <string>

Options 'CONT' | 'SINGLE'

Where;

- CONT means that the oscilloscope is continuously armed to accept a trigger.
- SINGLE means that the oscilloscope is armed to accept a trigger each time that TRIGger:RESet is selected.

TRIGger:PRETrigger

Description Sets/queries the PRETrigger value. This is the number of divisions previous to the trigger point.

Syntax OSCilloscope:TRIGger:PRETrigger?

OSCilloscope:TRIGger:PRETrigger <real> | [:INUM]

Options Refer to Appendix A.

TRIGger:RESet

Description Arms a measurement when TRIGger:MODE 'SINGLE' is selected or when TRIGger:MODE:RETRigger SINGle is selected.

Syntax OSCilloscope:TRIGger:RESet

Options Not Applicable.

TRIGger:SENSe

Description Selects/queries whether TRIGgering occurs on the positive-going (POS) or negative-going(NEG) trigger signal.

Syntax OSCilloscope:TRIGger:SENSe?

OSCilloscope:TRIGger:SENSe <string>

Options ’POS’ | ’NEG’

TRIGger:SOURce

Description Selects/queries the Oscilloscope TRIGger SOURce.

Syntax OSCilloscope:TRIGger:SOURce?

OSCilloscope:TRIGger:SOURce <string>

Options ’SCOPE LVL’ | ’EXTERNAL’

- SCOPE LVL means that the input signal level is used for triggering.
- EXTERNAL means that the front panel MEASURE TRIGGER IN is used for triggering.

TRIGger:TYPE

Description Selects/queries the Oscilloscope TRIGger TYPE.

Syntax OSCilloscope:TRIGger:TYPE?

OSCilloscope:TRIGger:TYPE <string>

Options ’AUTO’ | ’NORM’

- AUTO means automatically trigger a sweep is a triggering signal is not detected within about 50 ms of the last trigger.
- NORM means that a specific triggering signal is required before triggering.

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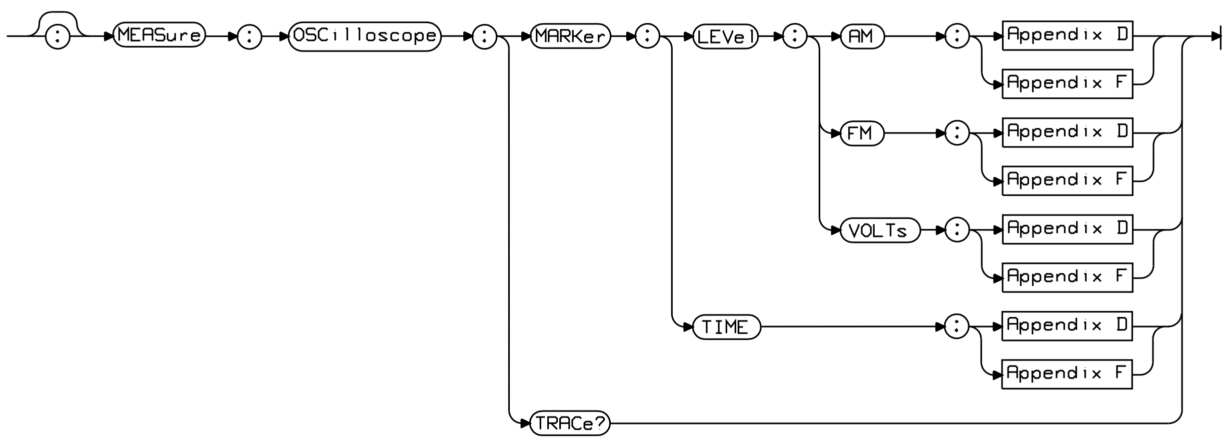
Oscilloscope Commands (Measure Subsystem)


:
MEASure
:
OSCilloscope
:
MARKer
:
LEVel
:
AM
:
Appendix D
Appendix F
FM
:
Appendix D
Appendix F
VOLTs
:
Appendix D
Appendix F
TIME
:
Appendix D
Appendix F
TRACe?

MARKer:LEVel:AM

Description Queries the MARKer LEVel which is the signal level of the current marker position for AF Analyzer input selections (AFAN:INP) that have AM units of Percent. This value is a function of the marker position set or queried by OSC:MARK:POS.

GPIB unit is Percent (PCT);

Display unit is Percent (PCT).

Syntax MEASure:OSCilloscope:MARKer:LEVel:AM?]

MEASure:OSCilloscope:MARKer:LEVel:AM[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:LEVel:FM

Description Queries the MARKer LEVel which is the signal level of the current marker position for AF Analyzer input selections (AFAN:INP) that have FM units of Hertz. This value is a function of the marker position set or queried by OSC:MARK:POS.

GPIB units are HZ, kHZ;

Display units are kHZ.

Syntax MEASure:OSCilloscope:MARKer:LEVel:FM?]

MEASure:OSCilloscope:MARKer:LEVel:FM[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:LEVel:VOLTs

Description Queries the MARKer LEVel which is the signal level of the current marker position for AF Analyzer input selections (AFAN:INP) that have units of VOLTs. This value is a function of the marker position set or queried by OSC:MARK:POS.

GPIB unit is Volts (V);

Display units are V, mV

default unit is V.

Syntax MEASure:OSCilloscope:MARKer:LEVel:VOLTs?]

MEASure:OSCilloscope:MARKer:LEVel:VOLTs[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:TIME

Description Queries the MARKer TIME MEASurement which time elapsed from the trigger point to the current marker position. This value is a function of the marker position set or queried by OSC:MARK:POS.

GPIB unit is seconds (S);

Display units are S, MS;

default unit is MS.

Syntax MEASure:OSCilloscope:MARKer:TIME?

MEASure:OSCilloscope:MARKer:TIME[:MM] | [:AVG]

Options Refer to Appendices D and F.

TRACe

Description Queries the oscilloscope TRACe MEASurement result.

Syntax MEASure:OSCilloscope:TRACe?

Options Not Applicable.

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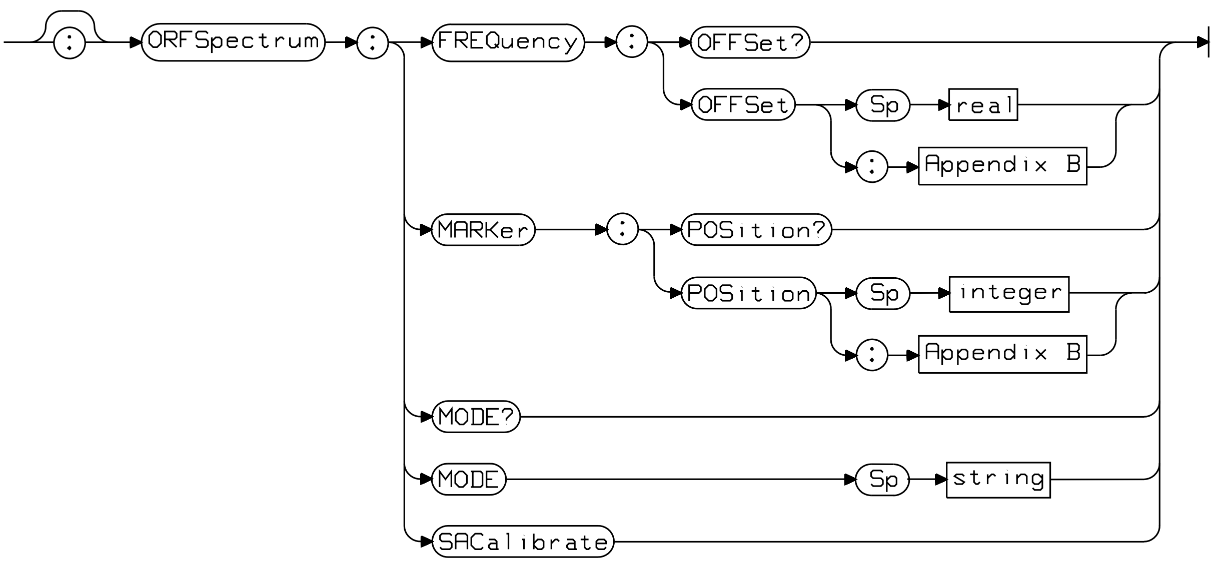
Output RF Spectrum Subsystem


:
ORFSpectrum
:
FREQuency
:
OFFSet?
OFFSet
Sp
real
:
Appendix B
MARKer
:
POSition?
POSition
Sp
integer
:
Appendix B
MODE?
MODE
Sp
string
SACalibrate

FREQuency:OFFSet

Description Sets/queries the Output RF Spectrum FREQuency OFFSet setting. This field is only used when not making reference measurements. The offset is automatically set to 0.0 kHz when MODE is set to either RAMP REF or MOD REF.

Default GPIB unit is HZ.

Default display unit is kHZ.

Syntax ORFSpectrum:FREQuency:OFFSet?

ORFSpectrum:FREQuency:OFFSet <real> | [:FNUM]

Options Refer to Appendix B.

MARKer:POSition

Description Sets/queries the Output RF Spectrum MARKer POSition setting. The value is given in units of divisions from the left side of the trace (0 to 10 divisions).

Syntax ORFSpectrum:MARKer:POSition?

ORFSpectrum:MARKer:POSition <integer> | [:FNUM]

Options Refer to Appendix B.

MODE

Description Selects/queries the MODE for Output RF Spectrum measurements.

Syntax ORFSpectrum:MODE?

ORFSpectrum:MODE <string>

Options ’RAMP REF’ | ’RAMPING’ |

’MOD REF’ | ’MODULATN’

Where;

- RAMP REF means make a reference measurement needed to make Output RF Spectrum due to ramping measurements.
- RAMPING means power is measured for the Output RF Spectrum during the time when the envelope is ramping up and down. (The peak value is returned within the time interval 28 us before bit 0 to 28 us after bit 147.)
- MOD REF means make a reference measurement needed to make Output RF Spectrum due to modulation measurements.
- MODULATN (modulation) means power is measured for the Output RF Spectrum during the useful bits.

SACalibrate

Description Calibrates the Spectrum Analyzer for making Output RF Spectrum or Pulse On/Off Ratio measurements. This command is only active when TRIG:MODE[:DSP] = ’SINGLE’.

Syntax ORFSpectrum:SACalibrate

Options Not Applicable.

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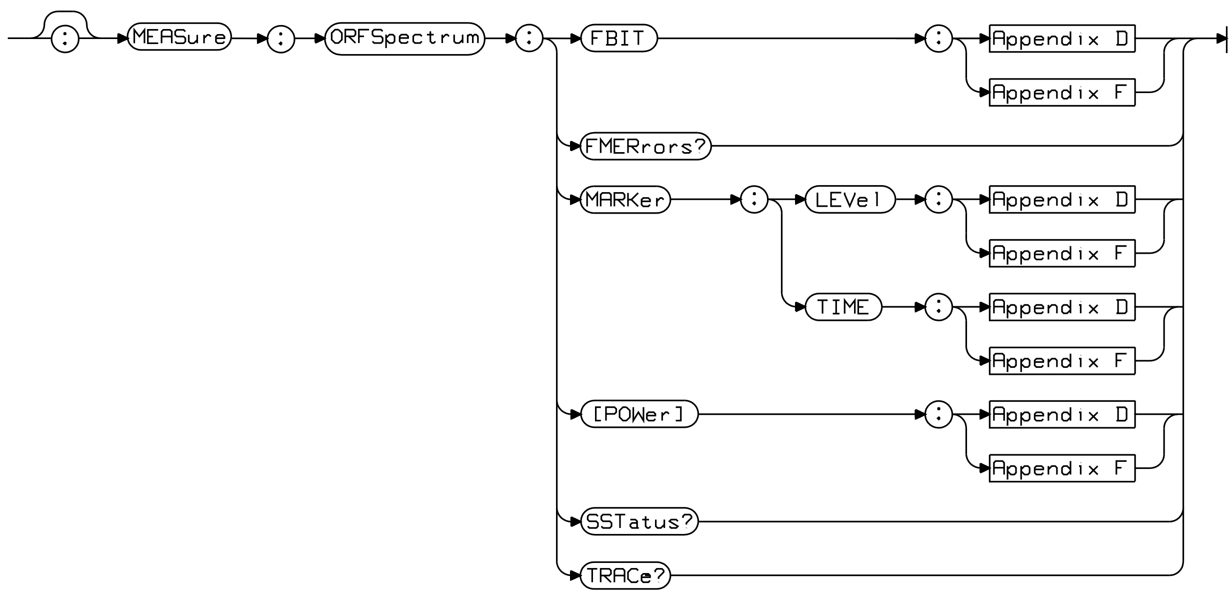
Output RF Spectrum Commands (Measure Subsystem)


:
MEASure
:
ORFSpectrum
:
FBIT
FMERrors?
MARKer
LEVel
TIME
[POWer]
SSTatus?
TRACe?
Appendix D
Appendix F

FBIT

Description Queries the position of the First (useful) BIT in time relative to when the Output RF Spectrum measurement trigger occurred.

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:ORFSpectrum:FBIT?

MEASure:ORFSpectrum:FBIT[:MM] | [:AVG]

Options Refer to Appendices D and F.

FMERrors

Description FM ERrors query returns the number of FM demodulated bits different from the best bit match (of the demodulated burst bits) to the selected midamble before differential decoding for ORFS[:POWer] measurement. This only valid for MSYN:SYNC:MODE ’MIDAMBLE’.

Syntax MEASure:ORFSpectrum:FMERrors?

Options Not Applicable.

MARKer:LEVel

Description Queries the MARKer LEVel which is relative amplitude data. This value is a function of the marker position set or queried by ORFSpectrum:MARKer:POSition. Default unit is dB relative to the average power over the useful bits in the measured burst when ORFS:FREQ was set to zero.

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:ORFSpectrum:MARKer:LEVel?]

MEASure:ORFSpectrum:MARKer:LEVel[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:TIME

Description Queries the MARKer TIME which is the marker's position relative to bit zero in the measured burst. This value is a function of the marker position set or queried by ORFS:MARK:POS.

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:ORFSpectrum:MARKer:TIME?

MEASure:ORFSpectrum:MARKer:TIME[:MM] | [:AVG]

Options Refer to Appendices D and F.

[:POWer]

Description Queries the Output Spectrum POWer MEASurement result.

Default unit is dB relative (as per GSM rec. 5.05, etc.).

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:ORFSpectrum[:POWer]?

MEASure:ORFSpectrum[:POWer][:MM] | [:AVG]

Options Refer to Appendices D and F.

SSTatus

Description Queries the Sync STatus for the current DSP measurement.

Syntax MEASure:ORFSpectrum:SSTatus?

Options Returns one of the following states;

’No Error’ | ’ShortBurst’ | ’Level Late’ | ’LevelShort’ |

’FM Error’ | ’Low Level’ | ‘Math Error’ | ’RF Ovrload’.

The message return priority (highest to lowest) is as follows:

- Math Error
- RF Ovrload | Low Level
- FM Error
- ShortBurst | Level Late | LevelShort
- No Error

The above defined as;

- ShortBurst - amplitude envelope not long enough for the selected burst length.
- RF Ovrload - the DSP Analyzer sampler hardware overloaded during sampling.
- FM Error - at least one FM error was detected during the Midamble (or User Defined Sync Pattern) portion of the selected burst (only possible for MSYN:SYNC:MODE ’MIDAMBLE’)
- Level Late - amplitude of the burst did not rise until after the first few bits were received.
- Level Short - amplitude of the burst fell before the last few bits were received.
- Low Level - DSP Analyzer RF level never got high enough to make a valid measurement.
- Math Error - DSP Analyzer math-related error occurred.
- No Error - no error occurred in synchronizing to the selected burst

TRACe

Description Queries the Output RF Spectrum MEASurement result and returns 417 floating-point numbers representing the trace.

NOTE The time between each point is 1.7 uS.

Syntax MEASure:ORFSpectrum:TRACe?

Options Not Applicable.

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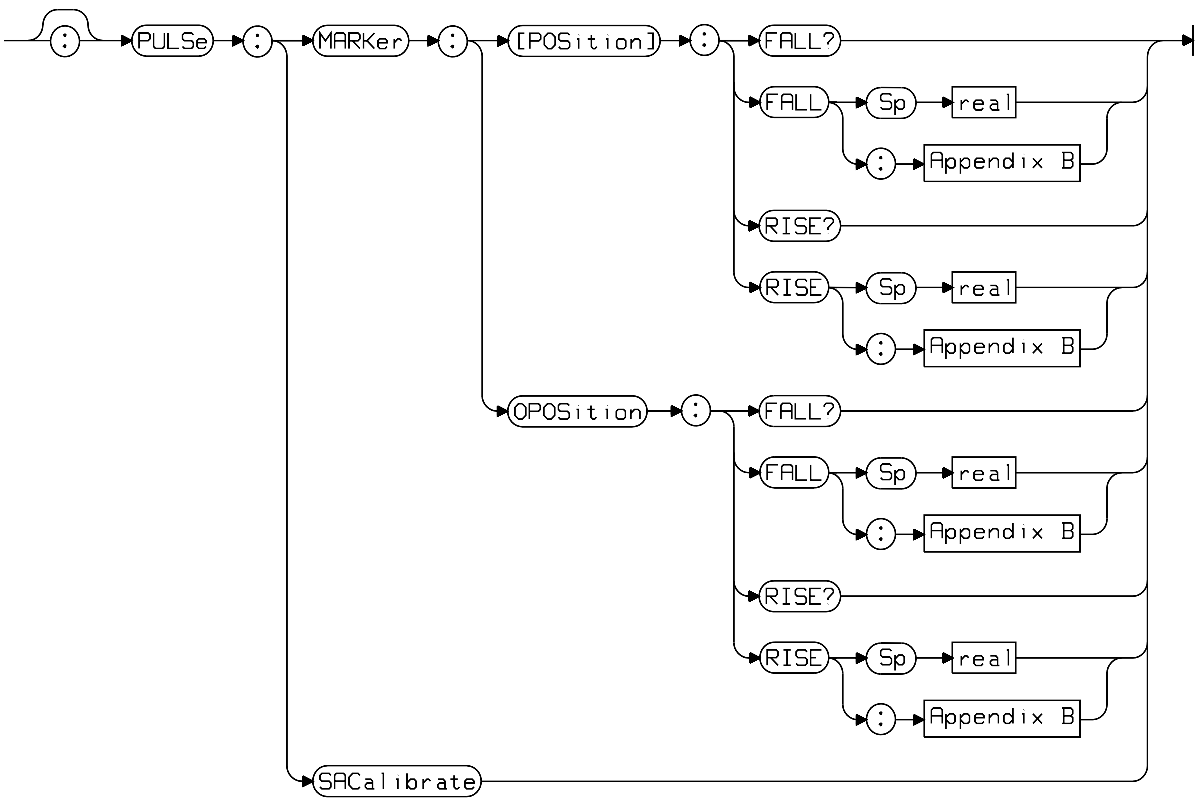
PULSe On/Off Ratio Subsystem


:
PULSe
:
MARKer
:
[POSition]
:
FALL?
FALL
Sp
real
:
Appendix B
RISE?
RISE
Sp
real
:
Appendix B
OPOSition
:
FALL?
FALL
Sp
real
:
Appendix B
RISE?
RISE
Sp
real
:
Appendix B
SACalibrate

MARKer[:POSition]:FALL

Description Sets/queries the PULSe MARKer FALL trace POSition setting. The value is given in units of divisions from the left side of the trace (0 to 10 divisions).

Syntax PULSe:MARKer[:POSition]:FALL?

PULSe:MARKer[:POSition]:FALL <real> | [:FNUM]

Options Refer to Appendix B.

MARKer[:POSition]:RISE

Description Sets/queries the PULSe MARKer RISE trace POSition setting. The value is given in units of divisions from the left side of the trace (0 to 10 divisions).

Syntax PULSe:MARKer[:POSition]:RISE?

PULSe:MARKer[:POSition]:RISE <real> | [:FNUM]

Options Refer to Appendix B.

MARKer:OPOSition:FALL

Description Sets/queries the PULSe Off POSition FALL setting. This is the time (relative to the center of the last bit) that the amplitude on the amplitude envelope will be measured. The range is 0.0 us to +56.0 us.

GPIB units are seconds (S), bit periods (T).

default unit is seconds (S),

default display unit is US (micro-second).

Syntax PULSe:MARKer:OPOSition:FALL?

PULSe:MARKer:OPOSition:FALL <real> | [:FNUM]

Options Refer to Appendix B.

MARKer:OPOSition:RISE

Description Sets/queries the PULSe Off POSition RISE setting. This is the time (relative to the center of bit zero) that the amplitude on the amplitude envelope will be measured. The range is -56.0 us to 0.0 us.

GPIB units are seconds (S), bit periods (T).

default unit is seconds (S),

default display unit is US (micro-second).

Syntax PULSe:MARKer:OPOSition:RISE?

MARKer:OPOSition:RISE <real> | [:FNUM]

Options Refer to Appendix B.

SACalibrate

Description Calibrates the Spectrum Analyzer for making Output RF Spectrum or Pulse On/Off Ratio measurements. This command is only active when TRIG:MODE[:DSP] = 'SINGLE'.

Syntax PULSe:SACalibrate

Options Not Applicable.

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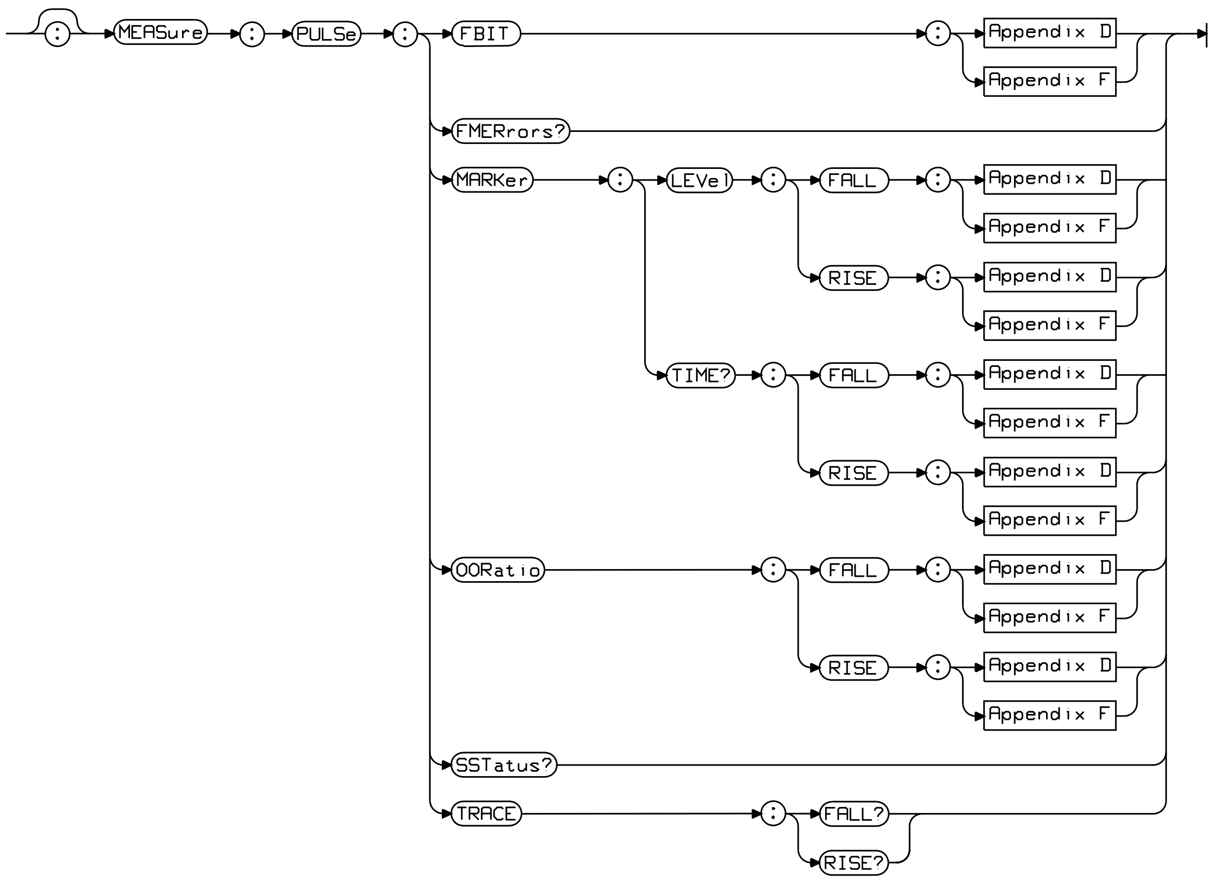
Pulse On/Off Ratio Commands (Measure Subsystem)


:
MEASure
:
PULSe
:
FBIT
FMERrors?
MARKer
LEVel
TIME?
FALL
RISE
OORatio
SSTatus?
TRACE
FALL?
RISE?
Appendix D
Appendix F

FBIT

Description Queries the position of the First (useful) BIT in time relative to when the Pulse On/Off measurement trigger occurred.

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:PULSe:FBIT?

MEASure:PULSe:FBIT[:MM] | [:AVG]

Options Refer to Appendices D and F.

FMERrors

Description FM ERrors query returns the number of FM demodulated bits different from the best bit match (of the demodulated burst bits) to the selected midamble before differential decoding for the Pulse measurement. This only valid for MSYN:SYNC:MODE 'MIDAMBLE'.

Syntax MEASure:PULSe:FMERrors?

Options Not Applicable.

MARKer:LEVel:FALL

Description Queries the FALL trace MARKer LEVel which is relative amplitude data. This value is a function of the marker position set or queried by PULS:MARK:POS:FALL.

Default unit is dB relative to the average power over the useful bits in the measured burst.

GPIB units are dB.

Display units are dB.

Syntax MEASure:PULSe:MARKer:LEVel:FALL?

MEASure:PULSe:MARKer:LEVel:FALL[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:LEVel:RISE

Description Queries the RISE trace MARKer LEVel which is relative amplitude data. This value is a function of the marker position set or queried by PULS:MARK:POS:RISE.

Default unit is dB relative to the average power over the useful bits in the measured burst.

GPIB units are dB.

Display units are dB.

Syntax MEASure:PULSe:MARKer:LEVel:RISE?

MEASure:PULSe:MARKer:LEVel:RISE[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:TIME:FALL

Description Queries the FALL trace TIME which is the marker's position relative to bit zero in the measured burst. This value is a function of the marker position set or queried by PULS:MARK:POS:FALL.

GPIB units are seconds (S), bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:PULSe:MARKer:TIME:FALL?

MEASure:PULSe:MARKer:TIME:FALL[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:TIME:RISE

Description Queries the RISE trace TIME which is the marker's position relative to bit zero in the measured burst. This value is a function of the marker position set or queried by PULS:MARK:POS:RISE.

GPIB units are seconds (S),bit periods (T);

default unit is seconds (S).

Display units are US (micro-second), T (bit periods);

default unit is US (micro-second).

Syntax MEASure:PULSe:MARKer:TIME:RISE?

MEASure:PULSe:MARKer:TIME:RISE[:MM] | [:AVG]

Options Refer to Appendices D and F.

OORatio:FALL

Description Queries the PULSe On/Off Ratio FALL trace MEASurement result.

Default units: dB relative to the average power over the useful bits in the measured burst.

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:PULSe:OORatio:FALL?

MEASure:PULSe:OORatio:FALL[:MM] | [:AVG]

Options Refer to Appendices D and F.

OORatio:RISE

Description Queries the PULSe On/Off Ratio RISE trace MEASurement result.

Default units: dB relative to the average power over the useful bits in the measured burst.

GPIB unit is dB.

Display unit is dB.

Syntax MEASure:PULSe:OORatio:RISE?

MEASure:PULSe:OORatio:RISE[:MM] | [:AVG]

Options Refer to Appendices D and F.

SSTatus

Description Queries the Sync STatus for the current DSP measurement.

Syntax MEASure:PULSe:SSTatus?

Options Returns one of the following states;

’No Error’ | ’ShortBurst’ | ’Level Late’ | ’LevelShort’ |

’FM Error’ | ’Low Level’ | ‘Math Error’ | ’RF Ovrload’.

The message return priority (highest to lowest) is as follows:

- Math Error
- RF Ovrload | Low Level
- FM Error
- ShortBurst | Level Late | LevelShort
- No Error

The above defined as;

- ShortBurst - amplitude envelope not long enough for the selected burst length.
- RF Ovrload - the DSP Analyzer sampler hardware overloaded during sampling.
- FM Error - at least one FM error was detected during the Midamble (or User Defined Sync Pattern) portion of the selected burst (only possible for MSYN:SYNC:MODE ’MIDAMBLE’)
- Level Late - amplitude of the burst did not rise until after the first few bits were received.
- Level Short - amplitude of the burst fell before the last few bits were received.
- Low Level - DSP Analyzer RF level never got high enough to make a valid measurement.
- Math Error - DSP Analyzer math-related error occurred.
- No Error - no error occurred in synchronizing to the selected burst

TRACe:FALL

Description Queries the Pulse On/Off FALL TRACe MEASurement result and returns 417 floating-point numbers representing the trace.

NOTE: the time between each point is 0.2 uS.

Syntax MEASure:PULSe:TRACe:FALL?

Options Not Applicable.

TRACe:RISE

Description Queries the Pulse On/Off RISE TRACe MEASurement result and returns 417 floating-point numbers representing the trace.

NOTE: the time between each point is 0.2 uS.

Syntax MEASure:PULSe:TRACe:RISE?

Options Not Applicable.

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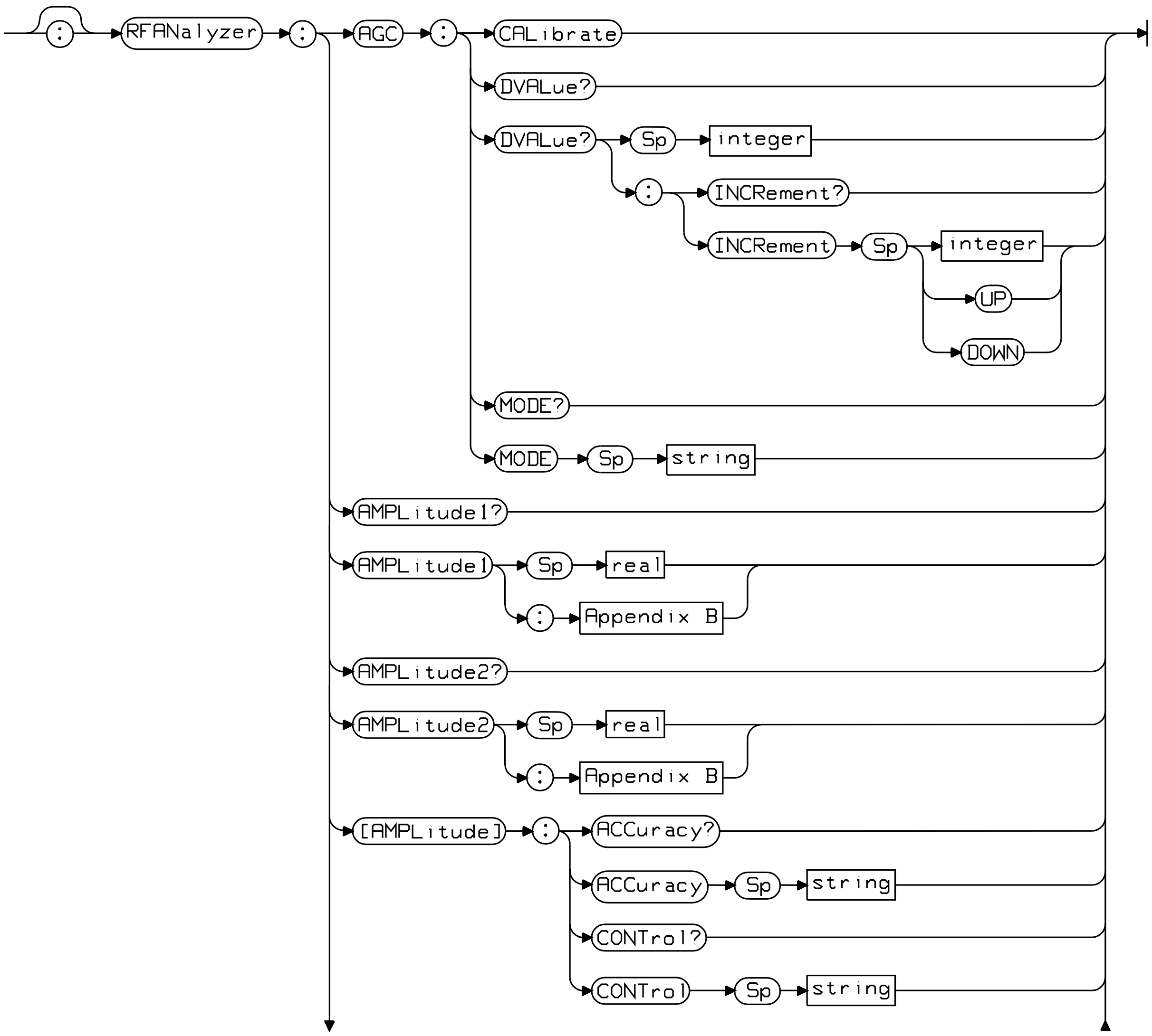
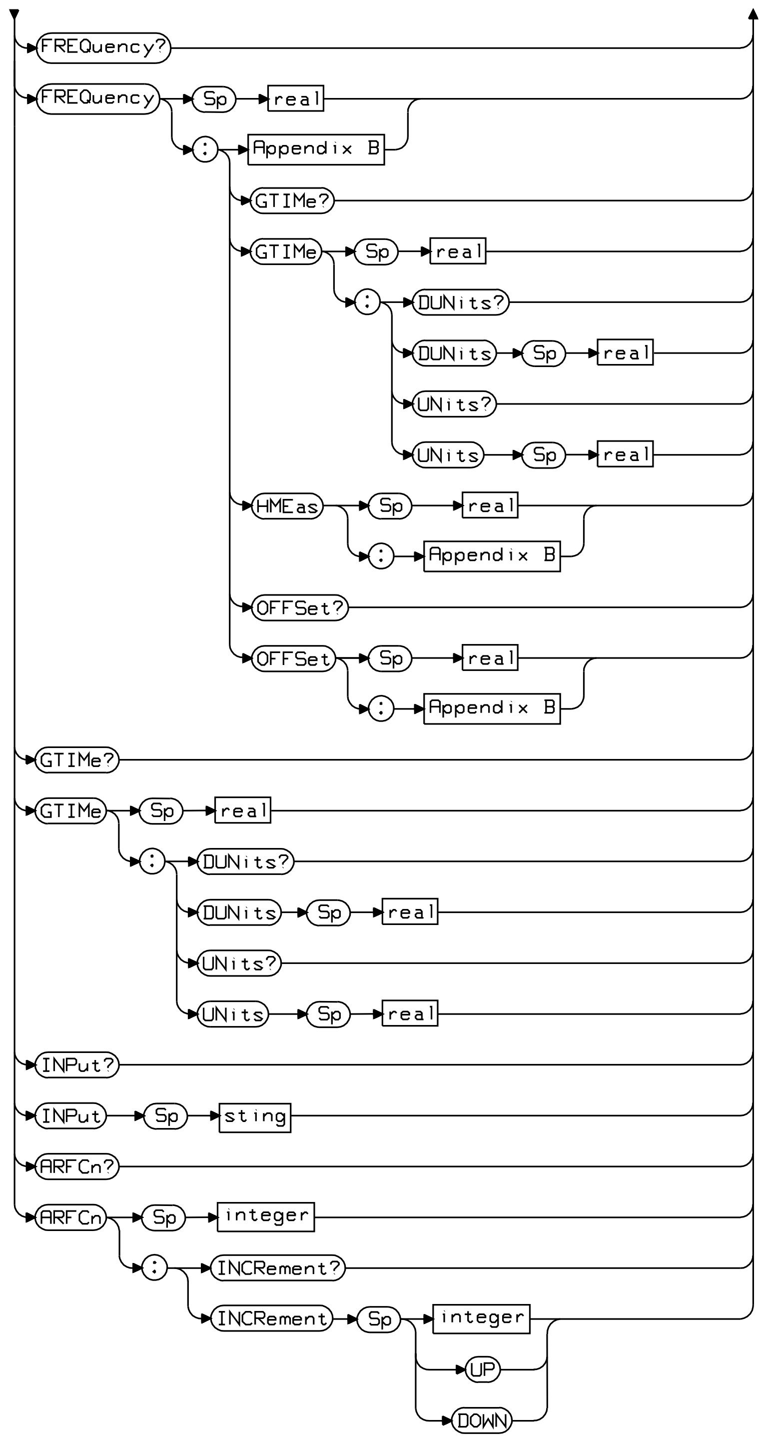
RF Analyzer Subsystem



Continued Over


FREQuency?
FREQuency
Sp
real
:
Appendix B
GTIMe?
GTIMe
DUNits?
DUNits
UNits?
UNits
HMEas
OFFSet?
OFFSet
INPut?
INPut
sting
ARFCn?
ARFCn
integer
INCRement?
INCRement
UP
DOWN

AGC:CALibrate

Description Does an open loop AGC CALibration if in FRAN:AGC:MODE ‘CLOSED’.

Syntax RFANalyzer:AGC:CALibrate

Options Not Applicable.

AGC:DVALue

Description Sets/queries the open/auto AGC DAC VAlue

Syntax RFANalyzer:AGC:DVALue?

RFANalyzer:AGC:DVALue <integer> | [:INUM]

Options Refer to Appendix A.

AGC:MODE

Description Selects/queries the AGC MODE (NORMAL is closed loop).

Syntax RFANalyzer:AGC:MODE?

RFANalyzer:AGC:MODE <string>

Options ’CLOSED’ | ’OPEN’ | ‘AUTO’

AMPLitude1

Description Sets/queries the amplitude (input level to assume) of the RF IN/OUT port. Used when RFAN:INP is ’RF IN/OUT’.

GPIB and display units are dBm, Volts (V) and Watts (W);

Default GPIB and display unit is dBm.

Syntax RFANalyzer:AMPLitude1?

RFANalyzer:AMPLitude1 <real> | [:FNUM]

Options Refer to Appendix B.

AMPLitude2

Description Sets/queries the amplitude (input level to assume) of the AUX RF IN port. Used when RFAN:INP is ’AUX RF IN’.

GPIB and display units are dBm, Volts (V) and Watts (W);

Default GPIB and display unit is dBm.

Syntax RFANalyzer:AMPLitude2?

RFANalyzer:AMPLitude2 <real> | [:FNUM]

Options Refer to Appendix B.

[:AMPLitude]:ACCuracy

Description Selects/queries the RF ANalyzer AMPLitude ACCuracy.

Syntax RFANalyzer[:AMPLitude]:ACCuracy?

RFANalyzer[:AMPLitude]:ACCuracy <string>

Options ‘+-3dB’ | ‘+-1dB’

[:AMPLitude]:CONTrol

Description Selects/queries the RFAnalyzer AMPLitude CONTrolling mechanism.

Syntax RFANalyzer[:AMPLitude]:CONTrol?

RFANalyzer[:AMPLitude]:CONTrol <string>

Options ’MS TX LEV’ | ’MANUAL’

Where;

- MS TX LEV means that the AMPLitude (RFAN:AMPL1 or RFAN:AMPL2) is set automatically based on the setting of CELL:MS:TLEVel.
- MANUAL means that the user can manually set the AMPLitude (RFAN:AMPL1 or RFAN:AMPL2)

FREQuency

Description Sets/queries the non-hop FREQuency for the RF ANalyzer.

Default GPIB unit is HZ.

Default display unit is MHZ.

Syntax RFANalyzer:FREQuency?

RFANalyzer:FREQuency <real> | [:FNUM]

Options Refer to Appendix B.

FREQuency:GTIMe

Description Sets/queries the RF ANalyzer Gate TIME (RF Cnt Gate).

Default GPIB unit is seconds (S).

Default display unit is micro-seconds (us).

Syntax RFANalyzer:FREQuency:GTIMe?

RFANalyzer:FREQuency:GTIMe <real> | [:INUM]

Options Refer to Appendix A.

FREQuency:HMEas

Description Sets the Hop Meas Frequency, which is the frequency to be assumed when making measurements while hopping.

Default GPIB unit is HZ.

Default display unit is MHZ.

Syntax RFANalyzer:FREQuency:HMEas <real> | [:FNUM]

Options Refer to Appendix B.

FREQuency:OFFSet

Description Sets/queries the Hop Frequency OFFSet for the RF ANalyzer.

Default GPIB unit is HZ.

Default display unit is MHZ.

Syntax RFANalyzer:FREQuency:OFFSet?

RFANalyzer:FREQuency:OFFSet <real> | [:FNUM]

Options Refer to Appendix B.

GTIMe

Description Sets/queries the RF ANalyzer Gate TIME (RF Cnt Gate).

Default GPIB unit is seconds (S).

Default display unit is micro-seconds (us).

Syntax RFANalyzer:GTIMe?

RFANalyzer:GTIMe <real> | [:INUM]

Options Refer to Appendix A.

INPut

Description Selects/queries the selected INPut port for the RF ANalyzer.

Syntax RFANalyzer:INPut?

RFANalyzer:INPut <string>

Options ‘RF IN/OUT’ | ‘AUX RF IN’

ARFCn

Description Selects/queries the Channel number which the RF ANalyzer will measure.

Syntax RFANalyzer:ARFCn?

RFANalyzer:ARFCn <integer> | [:INUM]

Options Refer to Appendix A.

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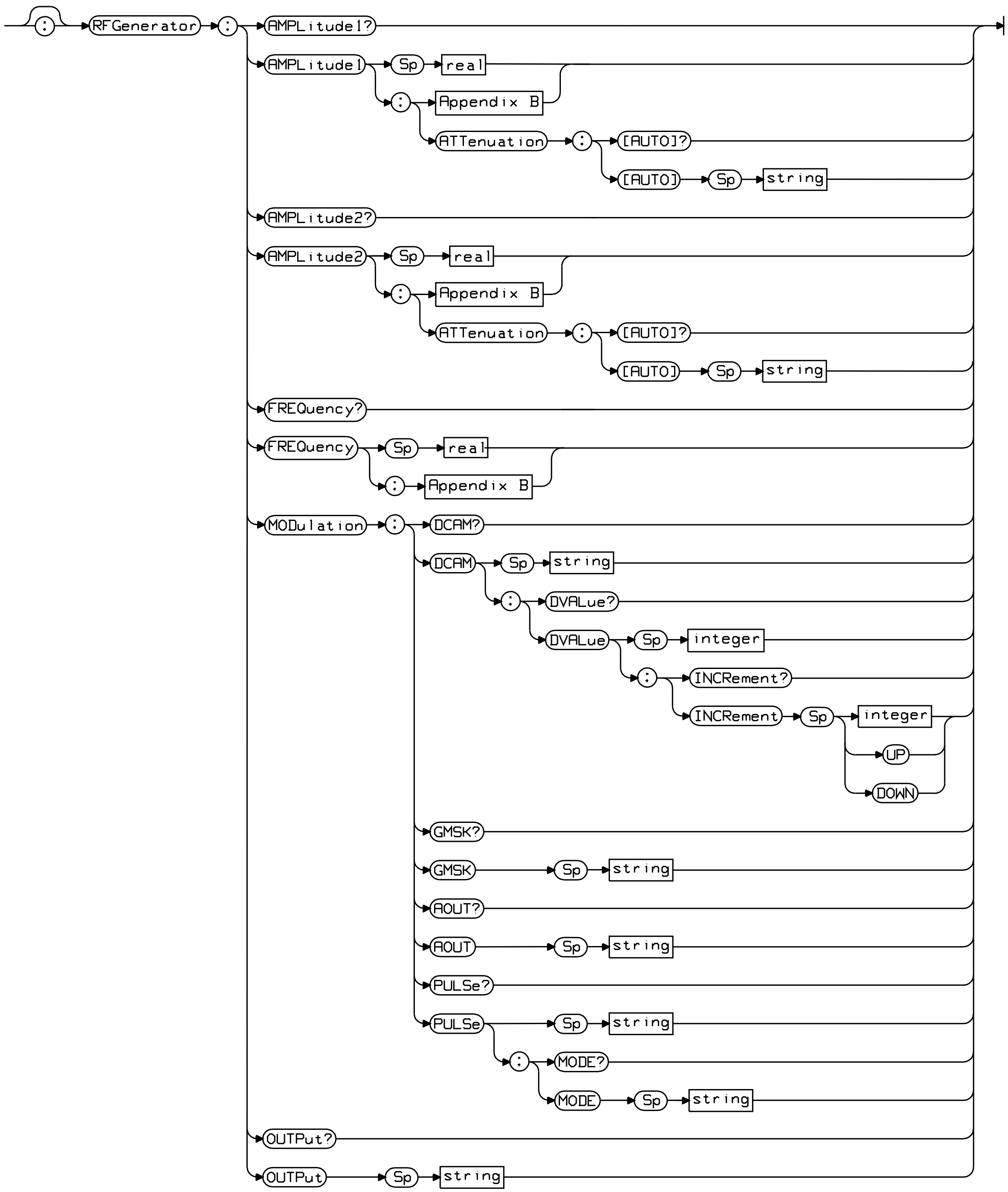
RF Generator Subsystem


:
RFGenerator
AMPLitude1?
AMPLitude1
Sp
real
Appendix B
ATTenuation
[AUTO]?
[AUTO]
string
AMPLitude2?
AMPLitude2
FREQuency?
FREQuency
MODulation
DCAM?
DCAM
DVALue?
DVALue
integer
INCRement?
INCRement
UP
DOWN
GMSK?
GMSK
AOUT?
AOUT
PULSe?
PULSe
MODE?
MODE
OUTPut?
OUTPut

AMPLitude1

Description Sets/queries the amplitude of the RF Generator when the RF IN/OUT port is selected.

GPIB and display units are dBm, Volts (V) and Watts (W); Default GPIB and display unit is dBm.

Syntax RFGenerator:AMPLitude1?

RFGenerator:AMPLitude1 <real> | [:FNUM]

Options Refer to Appendix B.

AMPLitude1:ATTenuation[:AUTO]

Description Selects the ATTenuation of the RF IN/OUT port automatically each time a change of amplitude setting occurs when ON.

Syntax RFGenerator:AMPLitude1:ATTenuation[:AUTO]?

RFGenerator:AMPLitude1:ATTenuation[:AUTO] <string>

Options ‘ON’ | ‘OFF’

AMPLitude2

Description Sets/queries the amplitude of the RF Generator when the AUX RFOUT port is selected.

GPIB and display units are dBm, Volts (V) and Watts (W); Default GPIB and display unit is dBm.

Syntax RFGenerator:AMPLitude2?

RFGenerator:AMPLitude2 <real> | [:FNUM]

Options Refer to Appendix B.

AMPLitude2:ATTenuation[:AUTO]

Description Selects the ATTenuation of the AUX RFOUT port automatically each time a change of amplitude setting occurs when ON.

Syntax RFGenerator:AMPLitude2:ATTenuation[:AUTO]?

RFGenerator:AMPLitude2:ATTenuation[:AUTO] <string>

Options ‘ON’ | ‘OFF’

FREQuency

Description Sets/queries the non-hop FREQuency of the RF Generator.

Default GPIB unit is HZ.

Default display unit is MHZ.

Syntax RFGenerator:FREQuency?

RFGenerator:FREQuency <real> | [:FNUM]

Options Refer to Appendix B.

MODulation:DCAM

Description Selects/queries the state of DC AM MODulation.

NOTE This command is not available in the Agilent 8922S.

Syntax RFGenerator:MODulation:DCAM?

RFGenerator:MODualtion:DCAM <string>

Options ’EXTERNAL’ | ’OFF’ | ’TCH LOWER’ | ’BCCHLOWER’ | ’BOTHLOWER’

Where;

- EXTERNAL means DC AM comes from an external AM input.
- OFF means no DC AM.
- TCH LOWER means the BCCH will be at the RF Level of the RF Analyzer Amplitude setting and the TCH RF Level will be lower by the dB determined by setting RFANalyzer:INPut.
- BCCHLOWER means the TCH will be at the RF Level of the RF Analyzer Amplitude setting and the TCH RF Level will be lower by the dB determined by setting RFANalyzer:INPut.
- BOTHLOWER means both the TCH and the BCCH will be lower by the dB determined by setting RFANalyzer:INPut.

MODulation:DCAM:DVALue

Description Sets/queries the DC AM DAC VALue for RFG:MODE:DCAM selected as TCH LOWER, ‘BCCHLOWER’ or ‘BOTHLOWER’.

Syntax RFGenerator:MODulation:DCAM:DVALue?

RFGenerator:MODualtion:DCAM:DVALue <integer> | [:INUM]

Options Refer to Appendix A.

MODulation:GMSK

Description Selects/queries the state of GMSK modulation.

Syntax RFGenerator:MODulation:GMSK?

RFGenerator:MODualtion:GMSK <string>

Options ’EXT’ | ’OFF’

Where;

- EXT means GMSK comes from external data and clock inputs.
- OFF means the RF output is an unmodulated carrier.

MODulation:PULSe

Description Selects/queries the state of PULSe modulation.

Syntax RFGenerator:MODulation:PULSe?

RFGenerator:MODualtion:PULSe <string>

Options ’EXT’ | ’HOP TRIG’ | ’OFF’

Where;

- EXT means PULSe modulation comes from an external (TTL) input.
- HOP TRIG means the RF output automatically pulses off (for a little while) during switching transients when an RF Generator hop trigger occurs.
- OFF means no PULSe modulation.

MODulation:PULSe:MODE

Description Selects/queries the pulse modulation level MODE.

Syntax RFGenerator:MODulation:PULSe:MODE?

RFGenerator:MODualtion:PULSe:MODE <string>

Options ’NORMAL’ | ’30 DB’

Where;

- NORMAL means pulse off will be very far down.
- 30 DB means the RF envelope will usually be 30 dB higher than the selected amplitude and can be pulsed down to the selected amplitude setting.

OUTPut

Description Selects/queries the selected OUTPut port for the RF Generator.

Syntax RFGenerator:OUTPut?

RFGenerator:OUTPut <string>

Options ’RF IN/OUT’ | ’AUX RFOUT’

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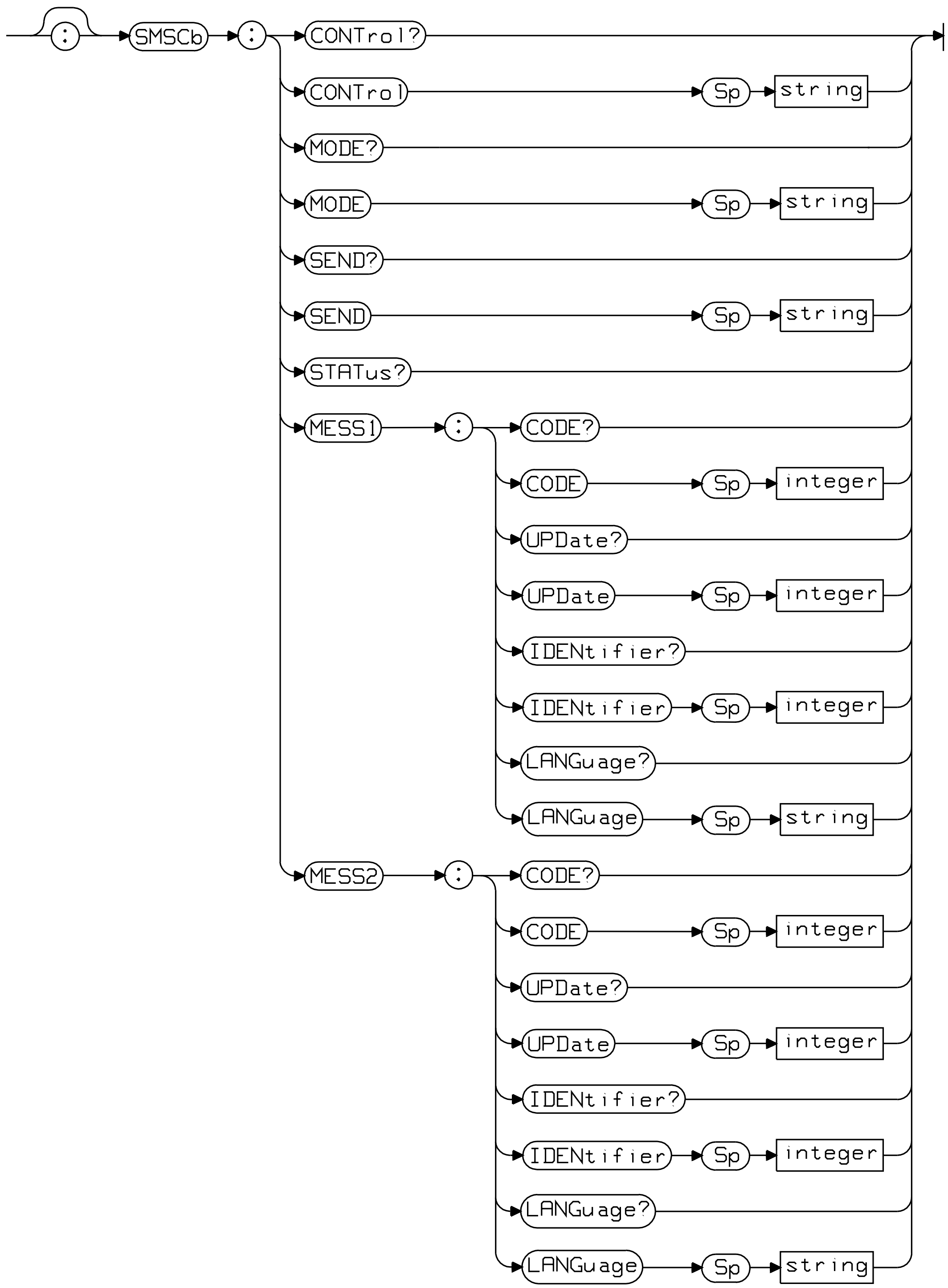
SMS Cell Broadcast Subsystem


:
SMSCb
:
CONTrol?
CONTrol
Sp
string
MODE?
MODE
Sp
string
SEND?
SEND
Sp
string
STATus?
MESS1
:
CODE?
CODE
Sp
integer
UPDate?
UPDate
Sp
integer
IDENtifier?
IDENtifier
Sp
integer
LANGuage?
LANGuage
Sp
string
MESS2
:
CODE?
CODE
Sp
integer
UPDate?
UPDate
Sp
integer
IDENtifier?
IDENtifier
Sp
integer
LANGuage?
LANGuage
Sp
string

CONTrol

Description Selects/queries whether or not the CBCH is being configured.

Syntax SMSCb:CONTrol?

SMSCb:CONTrol <string>?

Options ‘ENABLED’ | ‘DISABLED’

MODE

Description Selects/queries the Message Fields. ’ALL’ indicates that all the message attributes are editable. ’BASIC’ indicates that only the identifier attribute is editable.

Syntax SMSCb:MODE?

SMSCb:MODE <string>

Options ’BASIC’ | ’ALL’

SEND

Description Selects/queries the type of message that is being sent.

Syntax SMSCb:SEND?

SMSCb:SEND <string>

Options ’NO MESSAGE’ | ’MESSAGE 1’ | ’MESSAGE 2’ |

’MESSAGES 1 & 2’

Where;

- ’NO MESSAGE’ indicates the CBCH is sending invalid messages.
- ’MESSAGE 1’ indicates the contents of Message 1 are being sent at 60 second intervals.
- ’MESSAGE 2’ indicates the contents of Message 2 are being sent at 30 second intervals.
- ’MESSAGES 1 & 2’ alternatively sends the contents of Message 1 and Message 2, with a 60 second interval between successive messages.

STATus

Description Queries the status of the CBCH.

Syntax SMSCb:STATus?

Options Returns a value of; ’OFF’ | ’IDLE’ | ’SENDING’

Where;

- ’OFF’ indicates that a CBCH is not configured.
- ’IDLE’ indicates that invalid messages are being sent on the CBCH.
- ’SENDING’ indicates that valid messages are being sent on the CBCH.

MESS1 or MESS2:CODE

Description Selects/queries the message type.

Syntax SMSCb:MESS1 or SMSCb:MESS2:CODE?

SMSCb:MESS1 or SMSCb:MESS2:CODE <integer>

Options Where <integer>=0 through 4095.

For message 1 the default is 0.

For message 2 the default is 4095.

MESS1 or MESS2:UPDate

Description Selects/queries the revision of the message being sent.

Syntax SMSCb:MESS1 or SMSCb:MESS2:UPDate?

SMSCb:MESS1 or SMSCb:MESS2:UPDate <integer>

Options Where <integer>=0 through 15.

For message 1 the default is 0.

For message 2 the default is 15.

MESS1 or MESS2:IDENtifier

Description Selects/queries the source of the message.

Syntax SMSCb:MESS1 or SMSCb:MESS2:IDENtifier?

SMSCb:MESS1 or SMSCb:MESS2:IDENtifier <integer>

Options Where <integer>=0 through 65535.

For message 1 the default is 0.

For message 2 the default is 0.

MESS1 or MESS2:LANGuage

Description Selects/queries the data coding scheme for the message. 'DEFAULT GSM' sets the value of the data coding scheme to 0xF0.

Syntax SMSCb:MESS1 or SMSCb:MESS2:LANGuage?

SMSCb:MESS1 or SMSCb:MESS2:LANGuage <string>

Options 'GERMAN' | 'ENGLISH' | 'ITALIAN' | 'FRENCH' |

'SPANISH' | 'DUTCH' | 'SWEDISH' | 'DANISH' |

'PORTUGESE' | 'FINNISH' | 'NORWEGIAN' | 'GREEK' |

'TURKISH' | 'DEFAULT GSM'

For message 1 the default is 'ENGLISH'.

For message 2 the default is 'GERMAN'.

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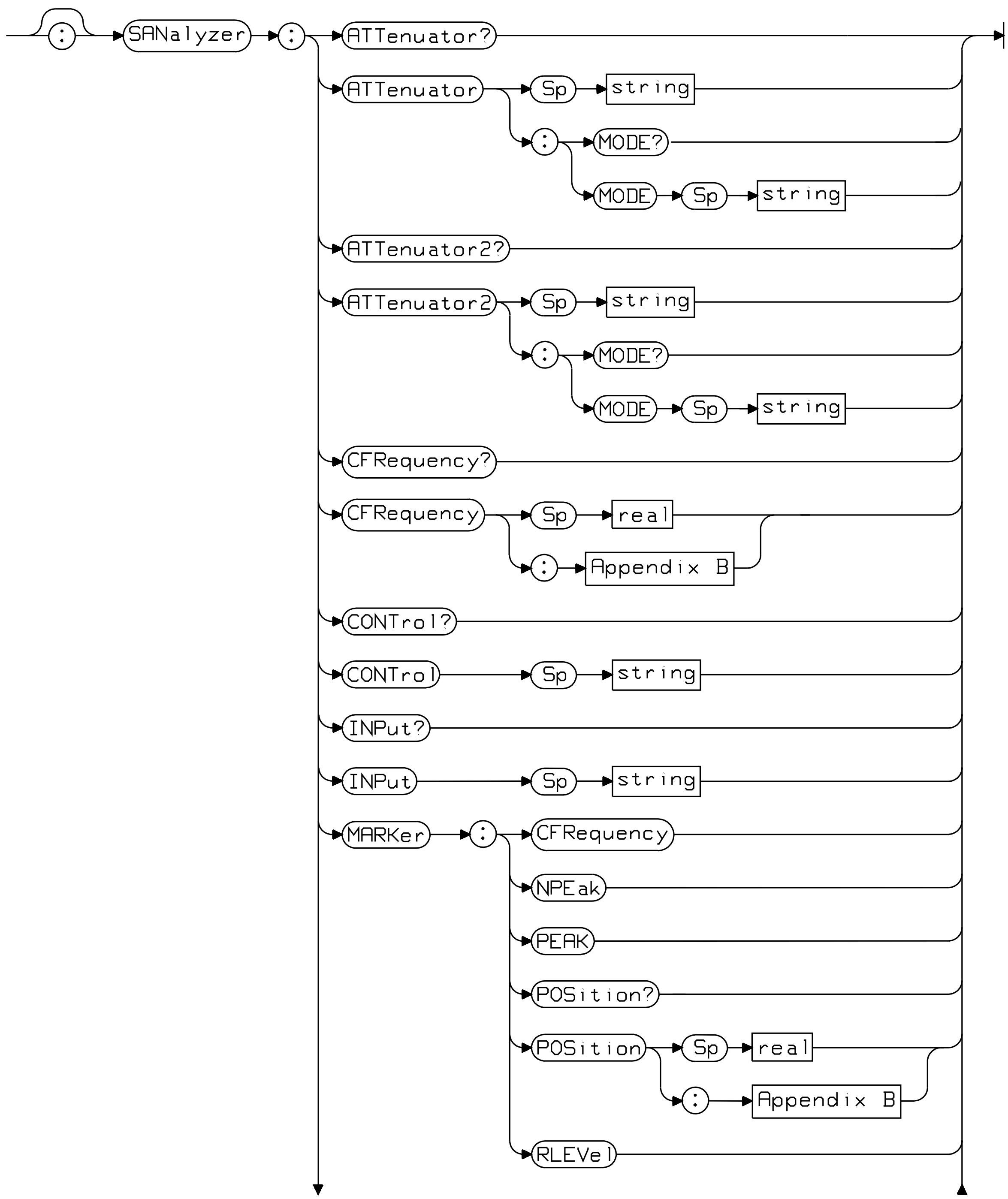
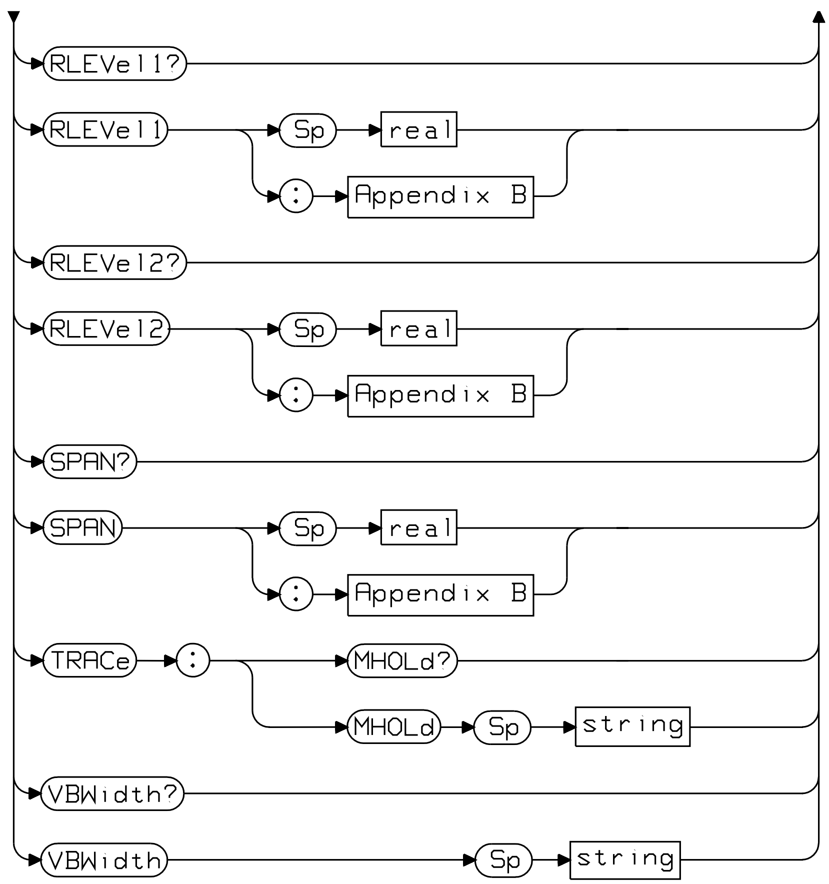
Spectrum Analyzer Subsystem



Continued Over


RLEVel1?
RLEVel1
Sp
real
:
Appendix B
RLEVel2?
RLEVel2
Sp
real
:
Appendix B
SPAN?
SPAN
Sp
real
:
Appendix B
TRACe
:
MHOLd?
MHOLd
Sp
string
VBWidth?
VBWidth
Sp
string

ATTenuator

Description Selects/queries the input ATTenuator GSM900 and EGSM900 selection. This is only valid when ATT1:MODE ’HOLD’ is selected, otherwise, automatic attenuator selection is done.

NOTE: This is only valid for CONFigure:RADio

’GSM900’ | ’EGSM’

Syntax SANalyzer:ATTenuator?

SANalyzer:ATTenuator <string>?

Options ’0 dB’ | ’10 dB’ | ’20 dB’ |

’30 dB’ | ’40 dB’

ATTenuator:MODE

Description Selects/queries the ATTenuator1 MODE selection.

Syntax SANalyzer:ATTenuator:MODE?

SANalyzer:ATTenuator:MODE <string>?

Options ’AUTO’ | ’HOLD’

ATTenuator2

Description Selects/queries the input ATTenuator DCS1800 and PCS1900 selection. This is only valid when ATT2:MODE ’HOLD’ is selected, otherwise, automatic attenuator selection is done.

NOTE: This is only valid for CONFigure:RADio

’DCS1800’ | ’PCS1900’

Syntax SANalyzer:ATTenuator2?

SANalyzer:ATTenuator2 <string>?

Options ’0 dB’ | ‘5 dB’ | ’10 dB’ | ‘15 dB’ | ’20 dB’ |

‘25 dB’ | ’30 dB’ | ’35 dB’

ATTenuator:MODE

Description Selects/queries the ATTenuator2 MODE selection.

Syntax SANalyzer:ATTenuator2:MODE?

SANalyzer:ATTenuator2:MODE <string>?

Options ’AUTO’ | ’HOLD’

CFRequency

Description Center FRequency setting (This is the same as RFA:FREQ).

Syntax SANalyzer:CFRequency?

SANalyzer:CFRequency <real>? | [:FNUM]

Options Refer to Appendix B.

MARKer:CFRequency

Description Sets MARKer and signal to Center FRequency.

Syntax SANalyzer:MARKer:CFRequency

Options Not Applicable.

MARKer:NPEak

Description Sets MARKer Next PEak.

Syntax SANalyzer:MARKer:NPEak

Options Not Applicable.

MARKer:PEAK

Description Sets MARKer PEAK.

Syntax SANalyzer:MARKer:PEAK

Options Not Applicable.

MARKer:POSition

Description Selects/queries the MARKer POSition setting.

Syntax SANalyzer:MARKer:POSition?

SANalyzer:MARKer:POSition <real> | [:FNUM]

Options Refer to Appendix B.

MARKer:RLEVel

Description Sets MARKer and signal to Reference LEVel.

Syntax SANalyzer:MARKer:RLEVel

Options Not Applicable.

RLEVel1

Description Reference LEVel for the RF IN/OUT port.

GPIB units are dBm, Volts (V) and Watts (W);

Default GPIB and display unit is dBm.

Syntax SANalyzer:RLEVel1?

SANalyzer:RLEVel1 <real> | [:FNUM]

Options Refer to Appendix B.

RLEVel2

Description Reference LEVel for the AUX RF IN port.

HP-IB units are dBm, Volts (V) and Watts (W);

Default GPIB and display unit is dBm.

Syntax SANalyzer:RLEVel2?

SANalyzer:RLEVel2 <real> | [:FNUM]

Options Refer to Appendix B.

SPAN

Description SPAN setting.

Default GPIB units HZ;

Default and display unit is MHz.

Syntax SANalyzer:SPAN?

SANalyzer:SPAN <real> | [:FNUM]

Options Refer to Appendix B.

TRACe:MHOLd

Description Selects/queries the Spectrum Analyzer Max HOLd function for the TRACe as ON or Off.

Syntax SANalyzer:TRACe:MHOLd?

SANalyzer:TRACe:MHOLd <string>

Options ‘ON’ | ‘OFF’.

VBWidth

Description Selects/queries the Video Bandwidth selection.

Syntax SANalyzer:VBWidth?

SANalyzer:VBWidth <string>

Options ‘30 kHz’ | ‘100 kHz’ | ‘1 MHz’.

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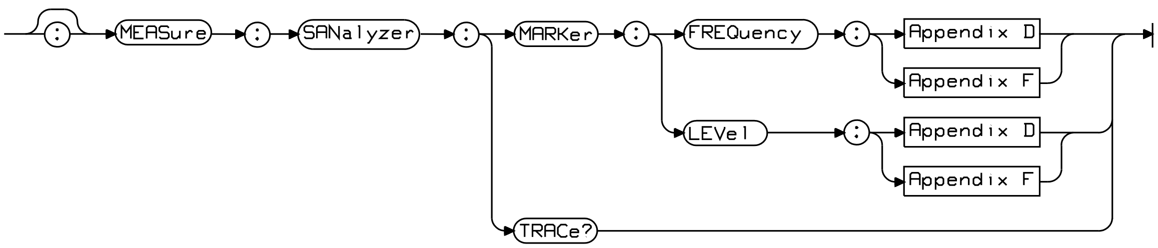
Spectrum Analyzer Commands (Measure Subsystem)


:
MEASure
:
SANalyzer
:
MARKer
:
FREQuency
:
Appendix D
Appendix F
LEVel
:
Appendix D
Appendix F
TRACe?

MARKer:FREQuency

Description Queries the MARKer FREQuency MEASurement result.

GPIB unit is HZ.

Display units are MHZ, kHZ, HZ;

Syntax MEASure:SANalyzer:MARKer:FREQuency?

MEASure:SANalyzer:MARKer:FREQuency[:MM] | [:AVG]

Options Refer to Appendices D and F.

MARKer:LEVel

Description Queries the MARKer LEVel MEASurement result.

GPIB units are dBm, W.

default unit is dBm.

Display units are dBm, W, V, dBuV;

default unit is dBm.

Syntax MEASure:SANalyzer:MARKer:LEVel?

MEASure:SANalyzer:MARKer:LEVel[:MM] | [:AVG]

Options Refer to Appendices D and F.

TRACe

Description Queries the Spectrum Analyzer TRACe MEASurement result.

Syntax MEASure:SANalyzer:TRACe?

Options Not Applicable.

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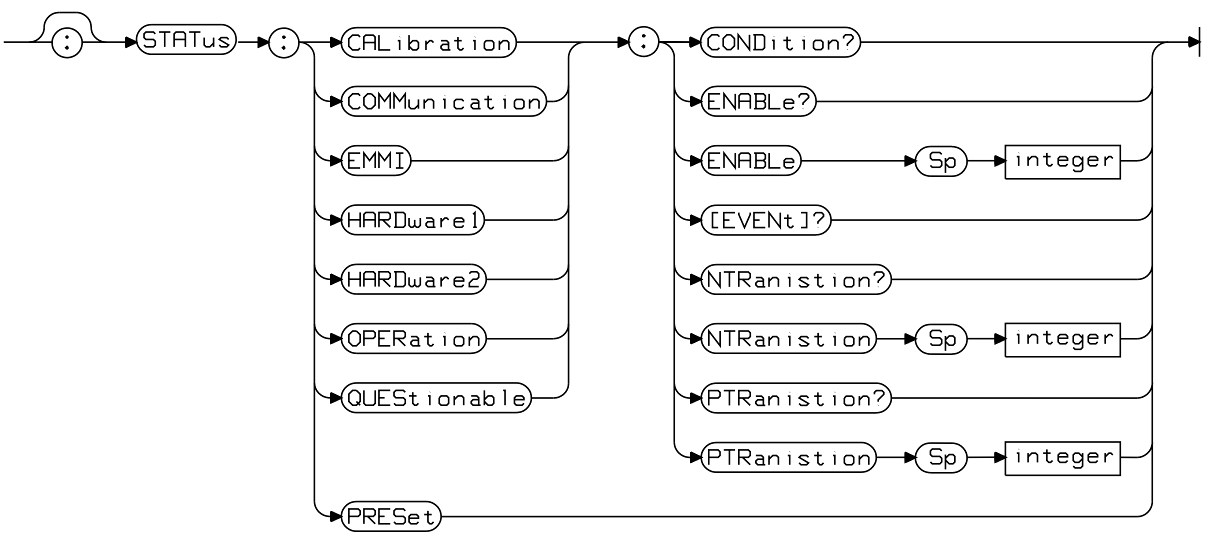
Status Subsystem


:
STATus
:
CALibration
COMMunication
EMMI
HARDware1
HARDware2
OPERation
QUEStionable
PRESet
:
CONDition?
ENABLe?
ENABLe
Sp
integer
[EVENt]?
NTRanistion?
NTRanistion
Sp
integer
PTRanistion?
PTRanistion
Sp
integer

Status Subsystem - Status Byte

The Status subsystem is used for setting and querying the various conditions of the instrument through the conditions set within the status byte. The following is a description of the states found with each of the parts within the status byte.

Status Byte Bit Definitions

7 - Operation Status Register

6 - RQS

5 - Standard Event Status Register

4 - MAV

3 - Questionable Data/Signal Status Register

1 - Hardware 2 Status Register

0 - Hardware 1 Status Register

Hardware 1 Status Register Condition register bit definitions

7 - Communication Status Register Summary

6 - Power up tests failed

5 - Pulse On Trace RF Overload

(PULSe)

4 - Measurement Trigger too early

(DSPanalyzer, ORFSpectrum, PULSe)

3 - Measurement Trigger too late

(DSPanalyzer, ORFSpectrum, PULSe)

2 - Measurement Sync Error

(DSPanalyzer, ORFSpectrum, PULSe)

0 - Measurement armed

(DSPanalyzer, ORFSpectrum, PULSe)

Event register bit definitions

1 - Measurement Limit(s) Exceeded

8 - EMMI Status Register Event Summary

14 - OverPower Protection Tripped

Hardware 2 Status Register

Condition register bit definitions

2 - RF Frequency - change RF Gen Freq

1 - RF Src Level setting - change Ref Level, Input Port or Attenuator (if using ”Hold”).”

0 - RF Analyzer Level setting - change RF Gen Amplitude, Output Port or Atten Hold (if on).”

Questionable Data/Signal Status Register

The QUEStionable status register set contains bits which give an indication of the quality of various aspects of the signal/data.

A bit set in the condition register indicates that the data currently being acquired or generated is of questionable quality due to some condition affecting the parameter associated with that bit.

Condition register bit definitions

7 - CALibration Register Summary

Standard Event Status Register

Condition register bit definitions

5 - Command Error

4 - Execution Error

3 - Device Dependant Error

2 - Query Error

Event register bit definitions

7 - Power On Occurred

6 - User Request

1 - Request Control

0 - Operation Complete Occurred

Operation Status Register

The OPERation status register set contains conditions which are part of the instrument's normal operation.

Condition register bit definitions

14 - PROGram running

Communication Status Register

Condition register bit definitions

3 - Protocol Processor Communication Channel Failure

2 - DSP Analyzer Communication Channel Failure

1 - Hop Controller Communication Channel Failure

0 - Communication failure with Signaling Board

CALibration Status Register

Condition register bit definitions

6 - Reference calibrate failure

5 - AGC Open Loop cal failure

3 - Voltmeter Self cal failure

2 - Counter Self cal failure

1 - Sampler Self cal failure

0 - Spectrum Analyzer Self cal failure

EMMI Status Register Event register bit definitions

3 - Response timeout

2 - Mobile XON timeout

1 - NAK

0 - ACK

The STATus:EMMI:EVENt? queries the EMMI STATus buffer. When an EMMI:DATA <data entry> occurs, one of the above bits will be set. Reading the status will clear all bits, subsequently setting the EMMI status to idle. Based on the above bits, the status buffer will return one of five numbers indicating the status of the last EMMI message sent by the Agilent 8922M.

0 - There was no data sent since that last status check and there were no events to report, or the last EMMI:DATA <data entry> had improper format.

1 - A message was received and acknowledged by the mobile station. Important: this does not mean that the mobile was able to understand or perform the operation (ACK received).

2 - The Agilent 8922M attempted to send a message, but the mobile station did not receive the message intact (NAK received).

4 - EMMI data was sent, but the XON timeout expired before the acknowledge was received (EMMI:TIMEout:MS:XON).

8 - EMMI data was sent, but the Response timeout expired (EMMI:TIMEout:MS:RESPonse).

NOTE This register is not available in the Agilent 8922S.

Condition register bits will hold their state until the condition changes. Event register bits will be cleared as soon as they are read.

CONDition

Description Queries the contents of the CONDition register associated with the status structure defined in the command.

Syntax CONDition?

Options Not Applicable

ENABle

Description Sets/queries the ENABle mask which allows true conditions in the event register to be reported in the summary bit. If a bit is 1 in the enable register and its associated event bit transitions to true, a positive transition will occur in the associated summary bit.

Syntax ENABle?

ENABle <integer>

Options The integer number can be changed using :INCRement command.

[EVENt]

Description Queries the contents of the EVENt register associated with the status structure defined in the command.

Syntax [EVENt]?

Options Not Applicable

NTRanistion

Description Sets/queries the Negative TRansition filter. Setting a bit in the negative transition filter causes a 1 to 0 transition in the corresponding bit of the associated CONDition register to cause a 1 to be written in the associated bit of the corresponding EVENt register.

Syntax NTRanistion?

NTRanistion <integer>

Options The integer number can be changed using :INCRement command.

PTRanistion

Description Sets/queries the Positive TRansition filter. Setting a bit in the positive transition filter causes a 0 to 1 transition in the corresponding bit of the associated CONDition register to cause a 1 to be written in the associated bit of the corresponding EVENt register.

Syntax PTRanistion?

PTRanistion <integer>

Options The integer number can be changed using :INCRement command.

PRESet

Description PRESet configures the status data structures such that device-dependent events are reported through the status-reporting mechanism. The preset command affects only the enable register and transition filter registers. (Presets all registers except event status registers, service request enable register, event status enable register and condition register bits.)

Syntax PRESet

Options Not Applicable

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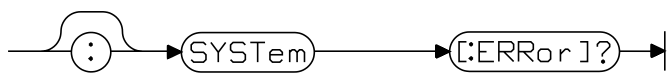
System Subsystem



SYSTem[:ERRor]

Description Queries the SYSTem ERRor queue. This returns an error number and a corresponding quoted message string separated by a comma. Once the error is queried, it is removed from the queue. If the error queue becomes full, then the earliest messages are removed.

Example: if a command parameter is given that is out of range, then SYST:ERR? will return:

-200,"Execution error;Parameter value out of range."

Syntax SYSTem[:ERRor]?

Options Not Applicable.

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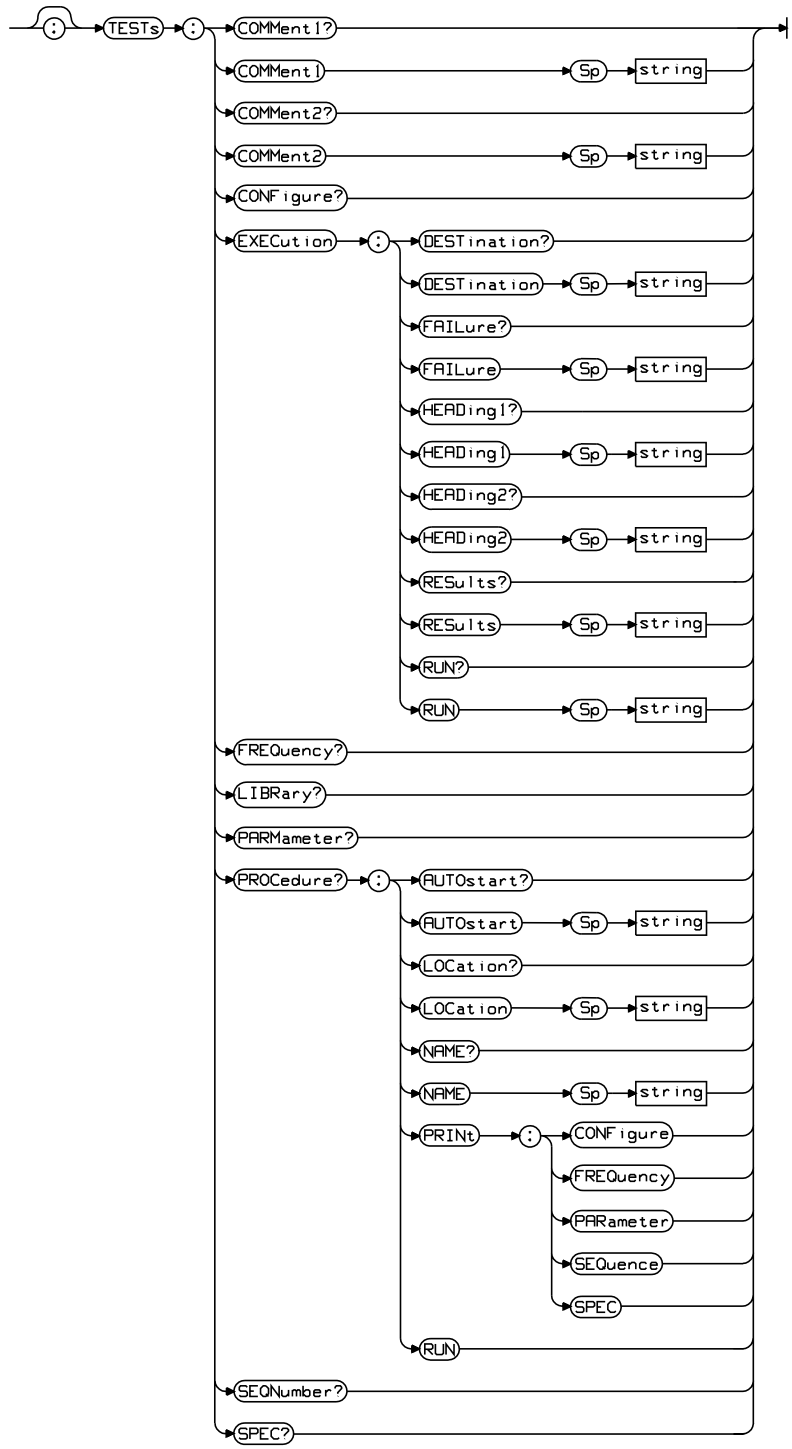
Tests Subsystem


:
TESTs
:
COMMent1?
COMMent1
Sp
string
COMMent2?
COMMent2
CONFigure?
EXECution
DESTination?
DESTination
FAILure?
FAILure
HEADing1?
HEADing1
HEADing2?
HEADing2
RESults?
RESults
RUN?
RUN
FREQuency?
LIBRary?
PARMameter?
PROCedure?
AUTOstart?
AUTOstart
LOCation?
LOCation
NAME?
NAME
PRINt
CONFigure
FREQuency
PARameter
SEQuence
SPEC
RUN
SEQNumber?
SPEC?

COMMent1

Description Sets/Queries the first line of the comment field. This field describes the test procedure file.

Syntax TESTs:COMMent1?

TEST:COMM1?

TESTs:COMMent1 <string>

TEST:COMM1 <string>

Options The string to be a quoted string of no more than 50 characters.

For example:

```
OUTPUT Uut;"TEST:COMM1 'This procedure performs
full parametric testing'"
```

COMMent2

Description Sets/Queries the second line of the comment field. This field describes the test procedure file.

Syntax TESTs:COMMent2?

TEST:COMM2?

TESTs:COMMent2 <string>

TEST:COMM2 <string>

Options The string to be a quoted string of no more than 50 characters.

For example:

```
OUTPUT Uut;"TEST:COMM2 'of GSM Mobiles'"
```

CONFigure?

Description Queries the external instrument configuration as defined in the edit configuration screen of the tests subsystem.

Syntax TESTS:CONFigure? <n>

Options Where <n> is the instrument number (inst#) and is from 1 to 14.

EXECution:DESTination

Description Sets/Queries the output destination field for the test results. The test results can be output to the CRT or printer. A printer must be correctly configured in order to get a printout.

Syntax TESTs:EXECution:DESTination?

TEST:EXEC:DEST?

TESTs:EXECution:DESTination <string>

TEST:EXEC:DEST <string>

Options ‘CRT’ | ‘PRINTER’

For Example;

```
Output Uut;”TEST:EXEC:DEST ‘PRINTER’”
Output Uut;”TEST:EXEC:DEST ‘CRT’”
```

EXECution:FAILure

Description Sets/Queries the Unit Under Test (UUT) failure mode. This allows the user to either continue or stop the test when the test results fail to meet test specified limits. When the continue option is selected, the error is listed to the printout or CRT depending on which option has previously been chosen.

Syntax TESTs:FAILure?

TEST:FAIL?

TESTs:FAILure <string>

TEST:FAIL <string>

Options ‘STOP’ | ‘CONTINUE’

Where;

STOP means that the test will stop running whenever the UUT fails to meet test specification limits.

CONTINUE means that the test will continue even though the UUT has failed to meet test specification limits.

EXECution:HEADing1

Description Sets/Queries the first line of the output heading field.

Syntax TESTs:EXECution:HEADing1?

TEST:EXEC:HEAD1?

TESTs:EXECution:HEADing1 <string>

TEST:EXEC:HEAD1 <string>

Options A quoted string of no more than 50 characters.

EXECution:HEADing2

Description Sets/Queries the second line of the output heading field.

Syntax TESTs:EXECution:HEADing2?

TEST:EXEC:HEAD2?

TESTs:EXECution:HEADing2 <string>

TEST:EXEC:HEAD1 <string>

Options A quoted string of no more than 50 characters.

EXECution:RESults

Description Sets/Queries the output results sent to the output device (CRT/Printer).

Syntax TESTs:EXECution:RESults?

TEST:EXEC:RES?

TESTs:EXECution:RESults <string>

TEST:EXEC:RES <string>

Options 'ALL' | 'FAILURES'

Where;

ALL All test results are shown on the output device (CRT and/or printer). Printouts include a "banner" listing the test conditions, measured values, lower and upper limits, and whether the test passed or failed. The **`Comment`** field is shown at the top along with any identifying information from the **`Output Heading`** field. Date, and time is also output.

FAILURE Test results are shown only when a UUT failure or software error occurs. Printouts include a "banner" listing the test conditions, measured values, and lower and upper limits of the failed test. The **`Comment`** field and any identifying information from the **`Output Heading`** field is also output.

EXECution:RUN

Description Sets/Queries the test running mode. It enables the test to be run continuously or paused after each test.

Syntax TESTs:EXECution:RUN?

TEST:EXEC:RUN?

TESTs:EXECution:RUN <string>

TEST:EXEC:RUN <string>

Options 'CONTINUOUS' | 'SINGLE STEP'

Where;

CONTINUOUS All tests run in sequence. Testing pauses only if the operator is required to interact with the UUT or Agilent 8922M/S; interaction such as changing UUT channels, changing audio level, and so forth, cause testing to pause.

SINGLE STEP The program stops running at the completion of each test. The test-system operator is prompted to select Continue to proceed with testing.

FREQuency?

Description Queries the test RX and TX frequency.

Syntax TESTs:FREQuency? <n>

TEST:FREQ? <n>

Options Where <n> is the channel number of the frequency being queried. <n> is from 1 to 50

LIBRary?

Description Queries the test library information

Syntax TESTs:LIBRary?

TEST:LIBR?

Options This query returns the following;

[NO LIB] or Current Name	Returns the current name of the Library file being used or, if no library is being used, [NO LIB] is returned.
Where From	Returns the location of the library file (for example: CARD, DISK).
Date	Returns the date when the library file was created.

PARMameter?

Description Queries the test parameters for a given parameter number.

Syntax TESTs:PARMameter? <n>

TEST:PARM? <n>

Options Where <n> is the parameter number (Parm#). <n> is from 1 to the last Parameter number defined in the test procedure.

For example;

```
OUTPUT UUT;"TEST:PARM? 5"
```

PROCedure:AUTOstart

Description Sets/Queries the autostart state. This allows the Agilent 8922M/S to go straight to the procedure menu each time the instrument is powered up, providing a Memory Card is inserted in the front panel.

Syntax TESTs:PROCedure:AUTOstart?

TEST:PROC:AUTO?

TESTs:PROCedure:AUTOstart <string>

TEST:PROC:AUTO <string>

Options ‘OFF’ | ‘ON’

PROCedure:LOCation

Description Sets/Queries the location from where the Test Procedure can be found.

Syntax TESTs:PROCedure:LOCation?

TEST:PROC:LOC?

TESTs:PROCedure:LOCation <string>

TEST:PROC:LOC <string>

Options ‘CARD’ | ‘ROM’ | ‘RAM’ | ‘DISK’

PROCedure:NAME

Description Sets/Queries the name of the test procedure to be downloaded.

Syntax TESTs:PROCedure:NAME?

TEST:PROC:NAME?

TESTs:PROCedure:NAME <string>

TEST:PROC:NAME <string>

Options The Test Procedure filename is no be more than 9 characters long.

PROCedure:PRINt:CONFigure

Description Prints out the test edit configuration to the current device selected.

Syntax TESTs:PROCedure:PRINt:CONFigure

TEST:PROC:PRIN:CONF

Options Not Applicable

PROCedure:PRINt:FREQuency

Description Prints out all the Test Procedure frequencies as defined in the Test edit frequency screen.

Syntax TESTs:PROCedure:PRINt:FREQuency

TEST:PROC:PRIN:FREQ

Options Not Applicable

PROCedure:PRINt:PARameter

Description Prints out all the Test Procedure parameters

Syntax TESTs:PROCedure:PRINt:PARameter

TEST:PROC:PRIN:PAR

Options Not Applicable

PROCedure:PRINt:SEQuence

Description Prints out all the test name descriptions for all of the Step numbers.

Syntax TESTs:PROCedure:PRINt:SEQuence

TEST:PROC:PRIN:SEQ

Options Not Applicable

PROCedure:PRINt:SPEC

Description Prints out all the Test Procedure Specifications.

Syntax TESTs:PROCedure:PRINt:SPEC

TEST:PROC:PRIN:SPEC

Options Not Applicable

PROCedure:RUN

Description Runs the current test procedure.

Syntax TESTs:PROCedure:RUN

TEST:PROC:RUN

Options Not Applicable

SEQNumber?

Description Queries the test number that has been set for a particular sequence number. This is also defined in the Test edit sequence screen.

Syntax TESTs:SEQNumber? <n>

TEST:SEQN? <n>

Options Where <n> is the Step Number (Step#). <n> is from 1 to 50

SPEC?

Description Queries the test specification limits for a given Step number.

Syntax TESTs:SPEC? <n>

TEST:SPEC? <n>

Options Where <n> is step number being queried. <n> is from 1 to the last step defined. The returned query gives the step number, specification and whether it is an Upper or Lower limit.

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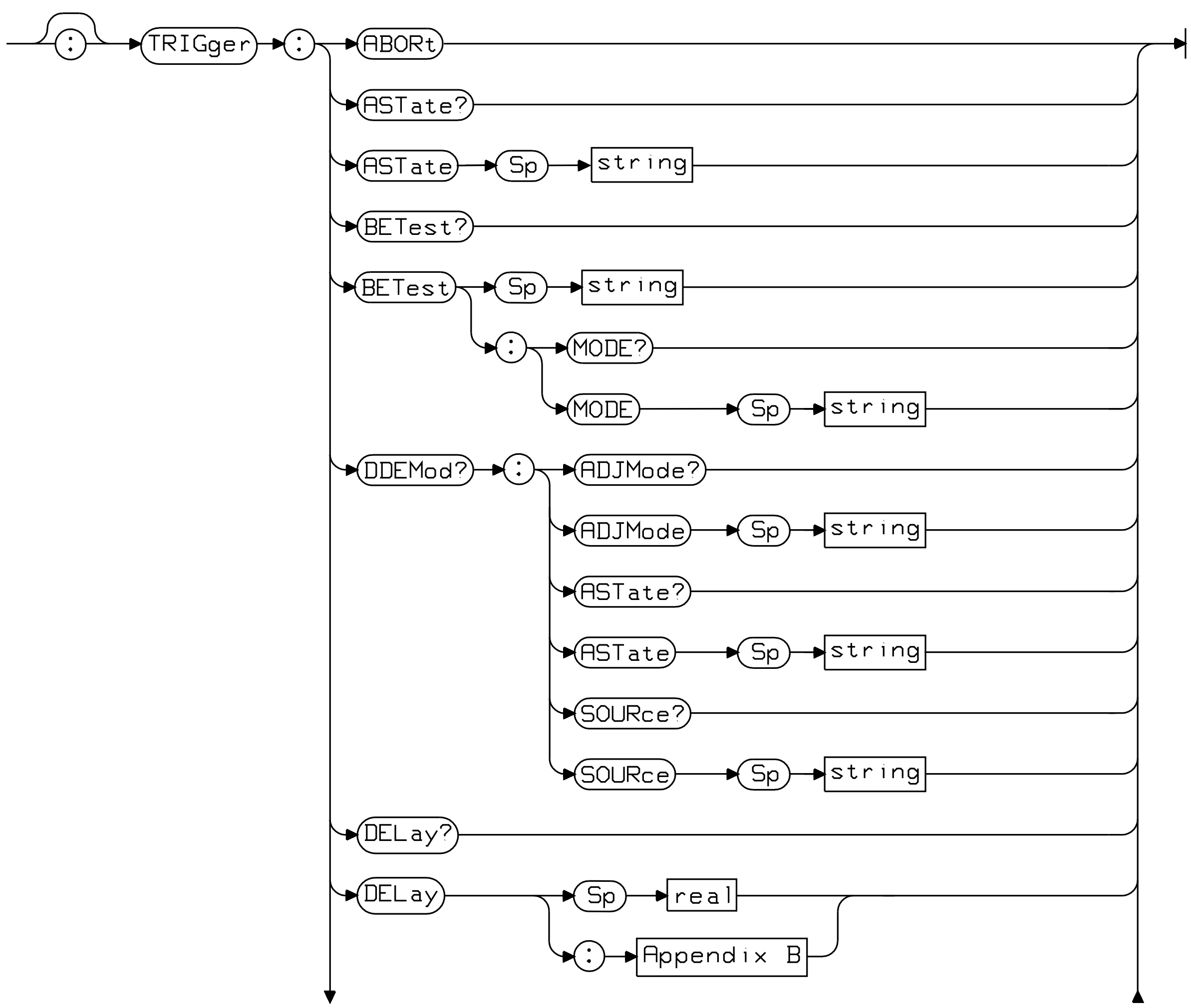
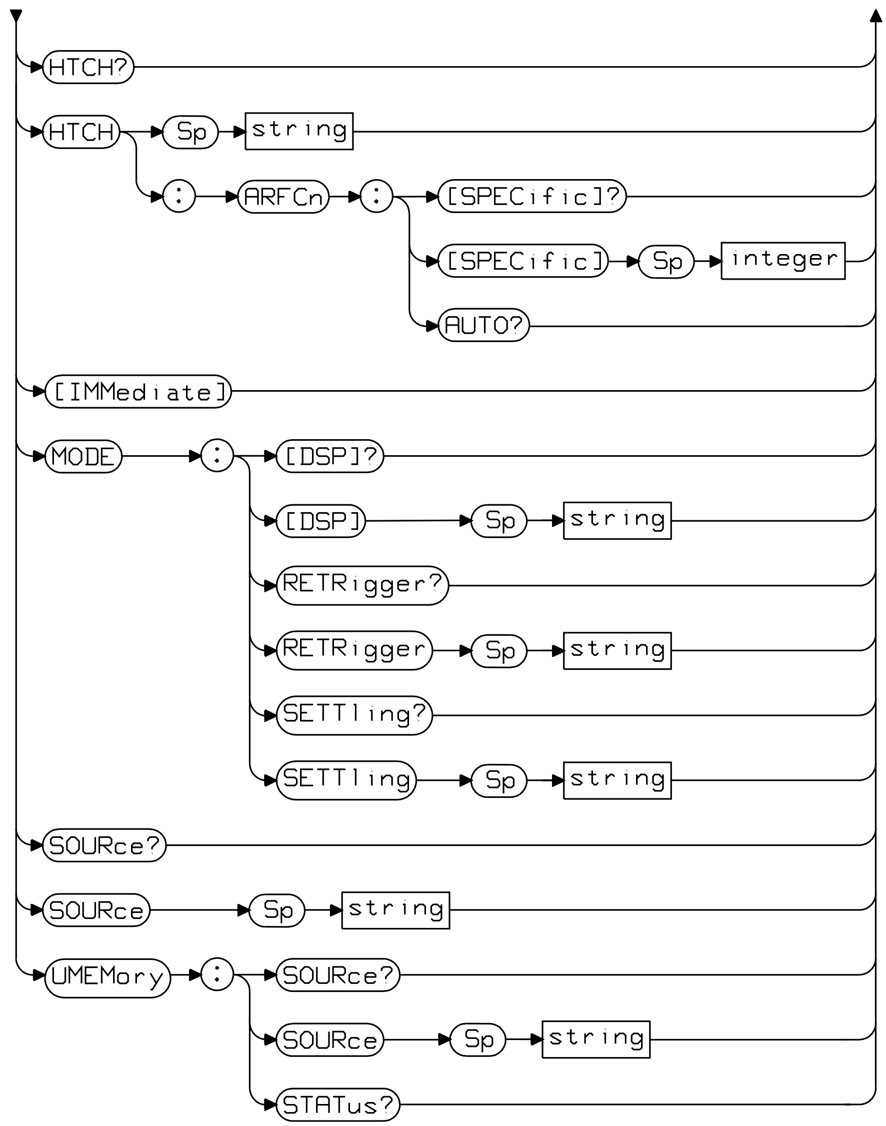
Trigger Subsystem



Continued Over


HTCH?
HTCH
Sp
string
:
ARFCn
:
[SPECific]?
[SPECific]
Sp
integer
AUTO?
[IMMediate]
MODE
:
[DSP]?
[DSP]
Sp
string
RETRigger?
RETRigger
Sp
string
SETTling?
SETTling
Sp
string
SOURce?
SOURce
Sp
string
UMEMory
:
SOURce?
SOURce
Sp
string
STATus?

ABORt

Description ABORts TRIGgering of a measurement that has been triggered using TRIGger:IMMediate.

Syntax TRIGger:ABORt

Options Not Applicable.

NOTE ABORt, [:IMMediate], and MODE are remote-only commands and apply to the following types of measurements: AF Analyzer, CW Meas, OSCilloscope, and SANalyzer.

ASTate

Description Selects/queries the Arm STate of the currently selected measurement. This command is used for all appropriate measurements listed in the MEASure subsystem.

Syntax TRIGger:ASTate?

TRIGger:ASTate <string>

Options ’ARM’ | ’DISARM’

NOTE ASTate, SOURce, MODE[:DSPanalyzer] and UMEMory apply to the following types of measurements: DSPanalyzer - Phase, Amplitude, Data Bits PULSe - Pulse On/Off Ratio ORFSpectrum - Output RF Spectrum DELay and HTCH apply to Digital Demod and Bit Error Test as well as the above measurements.

BETest

Description Selects/queries the TRIGger for Bit Error Test measurements for local operation.

Syntax TRIGger:BETest?

TRIGger:BETest <string>

Options ’SINGLE’ | ’CONT’

Where;

- SINGLE means each Bit Error Test measurement will just be made once (based on each measurement’s definition of number of bits to make the measurement over).
- CONT means make each Bit Error Test measurement continuously, repeatedly, copying Intermediate results into Complete results as one or more of the termination conditions are met.

BETest:MODE

Description Selects/queries the Bit Error Test measurement TRIGger MODE.

Syntax TRIGger:BETest:MODE?

TRIGger:BETest:MODE <string>

Options ’RUN’ | ’STOP’

Where;

- RUN initializes the Bit Error Test measurements to start and starts all Bit Error Test measurements.
- STOP Bit Error Test measurements - this is useful in aborting long Bit Error Test measurements.

DDEMod:ADJMode

Description Selects/queries the Digital DEMod TRIGger ADJust Mode. Trigger adjust mode enables the user to change TRIG:DEL even while Demod is armed. Some Demod triggers will be missed while changing trigger delay.

Syntax TRIGger:DDEMod:ADJMode?

TRIGger:DDEMod:ADJMode <string>

Options ’ENABLED’ | ’DISABLED’

DDEMod:ASTate

Description Selects/queries the Arm STate of the Digital DEMod TRIGger. Must be on digital demod, cell configuration or cell control screens to Arm Digital Demod.

Syntax TRIGger:DDEMod:ASTate?

TRIGger:DDEMod:ASTate <string>

Options ’ARM’ | ’DISARM’

DDEMod:SOURce

Description Selects/queries the Digital DEMod TRIGger SOURce.

Syntax TRIGger:DDEMod:SOURce?

TRIGger:DDEMod:SOURce <string>

Options 'EXT MEAS' | 'EXT DEMOD' | 'RF RISE'

Where;

- EXT DEMOD means Demod is triggered from an external trigger signal that is normally intended for doing Demod.
- RF RISE means the measurement is triggered automatically when a rising edge is detected on the RF envelope of the input.
- EXT MEAS means Demod is triggered from an external trigger signal that is normally intended for doing measurements.

DELay

Description Sets/queries the TRIGger DELay. This applies to measurements as well as Digital Demod.

GPIB units are seconds (S), bit periods (T).

Default GPIB unit is seconds (S).

Default display unit is bit periods (T).

Syntax TRIGger:DELay?

TRIGger:DELay <real> | [:FNUM]

Options Refer to Appendix B.

HTCH

Description Selects/queries the Hopped TCH ARFCN Trigger control. This only applies when TCH:MODE is 'HOPPED' and the Cell Configuration is 'ACTIVATED' and the radio has been assigned to a TCH channel.

Syntax TRIGger:HTCH?

TRIGger:HTCH <string>

Options 'SPECIFIC' | 'AUTO'

HTCH:ARFCn[:SPECific]

Description Sets/queries the SPECific ARFCn to use for a Hopping TCH measurement when TRIGger:TCH is set to ‘SPECific’.

Syntax TRIGger:HTCH:ARFCn[:SPECific]?

TRIGger:HTCH:ARFCn[:SPECific] <integer>

Options Not Applicable.

HTCH:ARFCn:AUTO

Description Queries the ARFCn that is being used for a Hopping TCH measurement when TRIGger:TCH is set to ’AUTO’. This value is the lowest ARFCN in the currently used MA table (MA1 or MA2).

Syntax TRIGger:HTCH:ARFCn:AUTO?

Options Not Applicable.

[:IMMediate]

Description IMMediately TRIGgers the currently active measurement.

Syntax TRIGger[:IMMediate]

Options Not Applicable.

NOTE ABORt, [:IMMediate], and MODE are remote-only commands and apply to the following types of measurements: AF Analyzer, CW Meas, OSCilloscope, and SANalyzer.

MODE[:DSP]

Description Selects/queries the DSP TRIGger MODE as SINGLE or CONTinuous. This is used for Phase, Amplitude, Output RF Spectrum, Pulse On/Off Ratio and Data Bits measurements.

Syntax TRIGger:MODE[:DSP]?

TRIGger:MODE[:DSP] <string>

Options 'SINGLE' | 'CONT'

NOTE In CONTinues mode, the user does not manually arm the instrument, but must provide a trigger in order for the measurement to complete.

NOTE This command is valid in both local and remote modes.

MODE:RETRigger

Description Selects/queries the RETRigger MODE for the currently active measurement. Default setting is REPetitive.

Syntax TRIGger:MODE:RETRigger?

TRIGger:MODE:RETRigger <string>

Options 'SINGLE' | 'REPETITIVE'

CAUTION: The remote-only command will override local triggering commands for continuous (repetitive) and single settings for AF Analyzer, CW Meas, OSCilloscope, and SANalyzer.

SOURce

Description Selects/queries the measurement TRIGger SOURce.

Syntax TRIGger:SOURce?

TRIGger:SOURce <string>

Options 'EXT MEAS' | 'EXT DEMOD' | 'RF RISE'

Where;

- EXT MEAS means the measurement is triggered from an external trigger signal that is normally intended for doing measurements.
- RF RISE means the measurement is triggered automatically when a rising edge is detected on the RF envelope of the input.
- EXT DEMOD means the measurement is triggered from an external trigger signal that is normally intended for doing demod.

UMEMory:SOURce

Description Selects/queries the USE MEM (Use MEMory) TRIGger SOURce.

Syntax TRIGger:UMEMory:SOURce?

TRIGger:UMEMory:SOURce <string>

Options 'EXTERNAL' | 'BAD SYNC'

Where;

- BAD SYNC means that the UMEMory (USE MEM) memory will be automatically filled when the Demod Sync Status changes from 'No Error' to 'Bad Sync' (DDEMod:SYNC:SSTatus?).
- EXTERNAL means that the UMEMory (USE MEM) memory will be automatically filled when an external line on the SYSTEM BUS connector on the rear panel is in a particular state when a valid demod trigger occurs.

UMEMory:STATus

Description Queries the current STAT e of the memory.

Syntax TRIGger:UMEMory:STATe?

Options Returns ’No Data’ | ’New Data’ | ’Old Data’.

Where;

- NO DATA means that the UMEMory (USE MEM) memory contains no valid data.
- NEW DATA means that the UMEMory (USE MEM) memory contains newly captured data from the most recent time demod was armed (TRIGger:DDEMod:ASTate ’ARM’) and bad synchronization occurred (midamble did not exactly match the bits in the defined midamble).
- OLD DATA means that the UMEMory (USE MEM) memory contains previously captured data from a previous time demod was armed (TRIGger:DDEMod:ASTate ’ARM’) or from a previous DSP analyzer, Output RF Spectrum or Pulse On/Off Ratio measurement (TRIGger:ASTate ’ARM’).

Appendix A - [:INUM] - Integer Numeric Fields

Optional commands that apply to Integer Numeric Entry fields.

INCRement

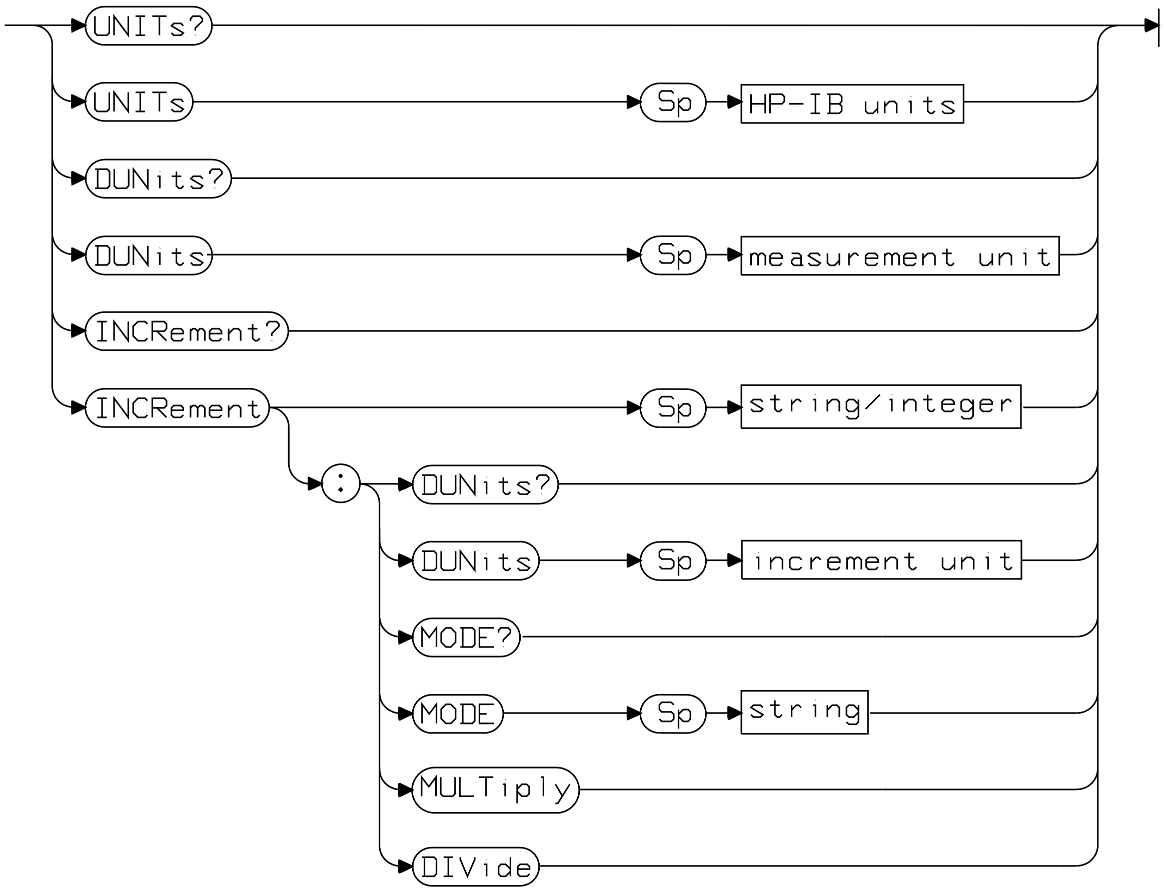
Sets and queries the field's current INCRement value.

INCRement <UP | DOWN | (value)>

INCRement <value> sets the field INCRement value. INCR UP or INCR DOWN cause the field to be modified up or down by the current INCRement value.

Appendix B - [:FNUM] - Floating Point Numeric Fields

Optional commands that apply to Floating Point Numeric Entry fields.


UNITs?
UNITs
Sp
HP-IB units
DUNits?
DUNits
Sp
measurement unit
INCRement?
INCRement
Sp
string/integer
:
DUNits?
DUNits
Sp
increment unit
MODE?
MODE
Sp
string
MULTiply
DIVide

Commands

UNITs

```
UNITs?
UNITs <GPIB unit>
```

Sets/queries the GPIB fundamental UNITs that the floating point number queries will be returned in.

DUNits

```
DUNits?
DUNits <measurement unit>
```

Sets/queries the Displayed UNits on the front panel for the given floating point number.

INCRement

```
INCRement?
```

Queries the field’s current INCRement value.

```
INCRement <UP | DOWN | (value) [units]>
```

INCRement <value> sets the field INCRement value. INCR UP or INCR DOWN cause the field to be modified up or down by the current INCRement value.

INCRement: DUNits

```
INCRement:DUNits?
INCRement:DUNits <increment unit>
```

Sets/queries the Displayed UNits on the front panel for the field’s increment setting.

INCRement: MODE

```
INCRement:MODE?
INCRement:MODE 'LINear' | 'LOGarithm'
```

Sets/queries the MODE of INCRement value to be in either LINear or LOGarithmic (displayed in dB) steps.

INCRement: MULTiply

```
INCRement:MULTiply
```

MULTiplies the INCRement value by 10.

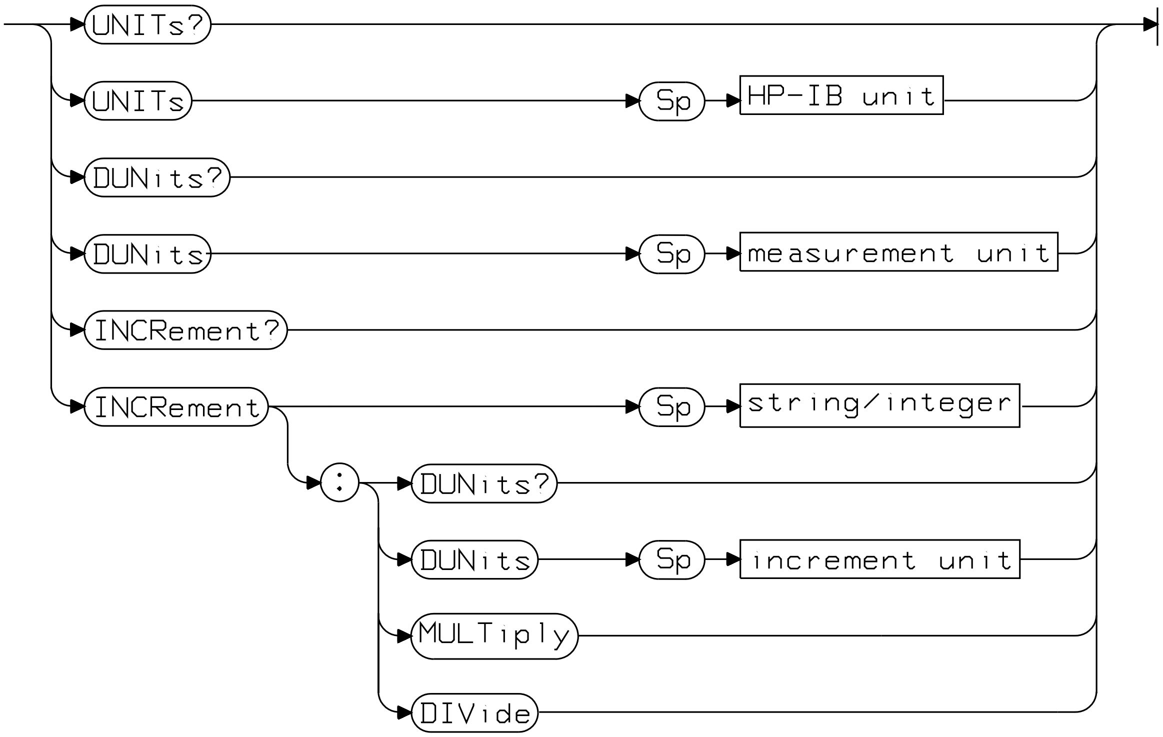
INCRement: DIVide

```
INCRement:DIVide
```

DIVides the INCRement value by 10.

Appendix C - [:FNUM-MOD] - Floating Point Numeric (less MODE)

Optional commands that apply to Floating Point Numeric Entry fields. These commands are the same as Appendix B except they do not include INCR:MODE command.


UNITs?
UNITs
Sp
HP-IB unit
DUNits?
DUNits
Sp
measurement unit
INCRement?
INCRement
Sp
string/integer
:
DUNits?
DUNits
Sp
increment unit
MULTiply
DIVide

Commands

UNITs

`UNITs?`

`UNITs <GPIB unit>`

Sets/queries the GPIB fundamental UNITs that the floating point number queries will be returned in.

DUNits

`DUNits?`

`DUNits <measurement unit>`

Sets/queries the Displayed UNits on the front panel for the given floating point number.

INCRement

`INCRement?`

Queries the field's current INCRement value.

`INCRement <UP | DOWN | (value) [units]>`

INCRement <value> sets the field INCRement value. INCR UP or INCR DOWN cause the field to be modified up or down by the current INCRement value.

INCRement: DUNits

`INCRement:DUNits?`

`INCRement:DUNits <increment unit>`

Sets/queries the Displayed UNits on the front panel for the field's increment setting.

INCRement: MULTiply

`INCRement:MULTiply`

MULTiplies the INCRement value by 10.

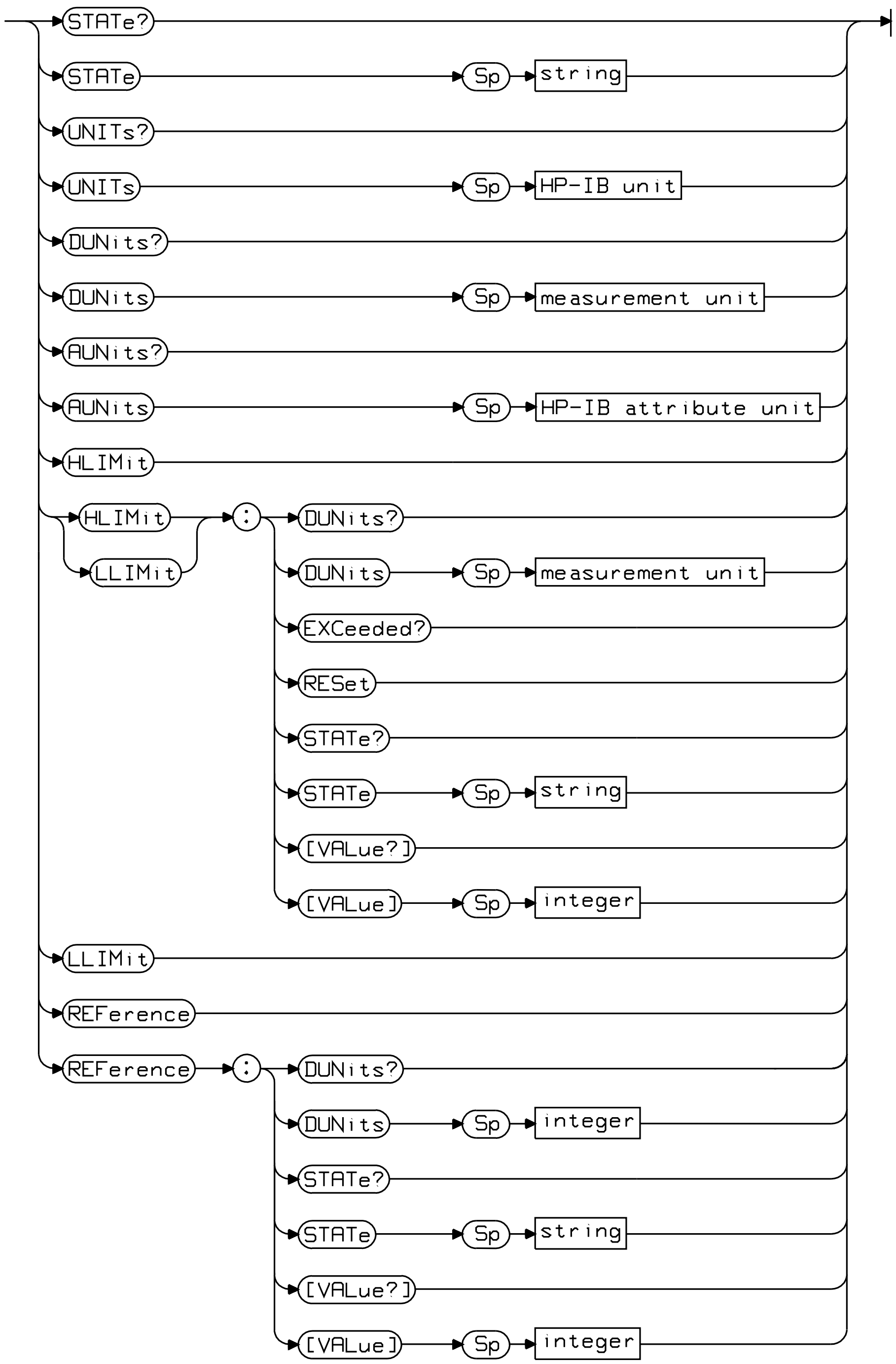
INCRement: DIVide

`INCRement:DIVide`

DIVides the INCRement value by 10.

Appendix D - [:MM] - Measurement Fields

The following list of optional commands that control Measurement field functions. These attributes are listed here in hierarchal relationship. Included are commands for state, units, low limits and high limits, and reference.


STATe?
STATe
Sp
string
UNITs?
UNITs
HP-IB unit
DUNits?
DUNits
measurement unit
AUNits?
AUNits
HP-IB attribute unit
HLIMit
LLIMit
:
EXCeeded?
RESet
[VALue?]
[VALue]
integer
REFerence

Commands

STATe

`STATe?`

`STATeON | OFF | 1 | 0`

Selects/queries the STATe of the measurement to be ON or OFF.
Note: ON = 1 and OFF = 0

UNITs

`UNITs?`

`UNITs <GPIB measurement unit>`

Sets/queries the GPIB fundamental UNITs that measurement queries will be returned in.

DUNits

`DUNits?`

`DUNits <measurement unit>`

Sets/queries the Displayed UNits on the front panel for the given measurement.

AUNits

`AUNits?`

`AUNits <GPIB attribute unit>`

Sets/queries the GPIB fundamental UNITs that measurement Attribute queries (e.g., low limit, high limit, etc.) are returned in.

HLIMit

`HLIMit`

High LIMit measurement information.

HLIMit: DUNits

`HLIMit:DUNits?`

`HLIMit:DUNits <measurement unit>`

Sets/Queries the measurement High LIMit Displayed UNits.

HLIMit: EXCeeded

`HLIMit:EXCeeded?`

Queries whether the High LIMit for the measurement was EXCeeded.

HLIMit: RESet

`HLIMit:RESet`

RESet the High LIMit exceeded state so that new limit data can be acquired.

HLIMit: STATe

`HLIMit:STATe?`

`HLIMit:STATe ON | OFF | 1 | 0`

Sets/queries the High LIMit STATe. Note: ON = 1 and OFF = 0.

HLIMit [:VALue]

`[:VALue]?`

`[:VALue] <numeric value>`

Sets/queries the measurement High LIMit VALue.

LLIMit

`LLIMit`

Low LIMit measurement information.

LLIMit: DUNits

```
LLIMit:DUNits?
LLIMit:DUNits <measurement unit>
```

Sets/Queries the measurement Low LIMit Displayed UNits.

LLIMit: EXCeeded

```
LLIMit:EXCeeded?
```

Queries whether the Low LIMit for the measurement was EXCeeded.

LLIMit: RESet

```
LLIMit:RESet
```

RESet the Low LIMit exceeded state so that new limit data can be acquired.

LLIMit: STATe

```
LLIMit:STATe?
LLIMit:STATe ON | OFF | 1 | 0
```

Sets/queries the Low LIMit STATe. Note: ON = 1 and OFF = 0.

LLIMit [:VALue]

```
[:VALue]?
[:VALue] <numeric value>
```

Sets/queries the measurement Low LIMit VALue.

REFerence

```
REFerence
```

Measurement REFerence information.

REFerence: DUNits

```
REFerence:DUNits?
REFerence:DUNits <measurement unit>
```

Sets/queries the REFerence Displayed UNits on the front panel for the given measurement.

REFerence: STATe

```
REFerence:STATe
REFerence:STATe ON | OFF | 1 | 0
```

Sets/queries the REFerence STATe. Note: ON = 1 and OFF = 0.

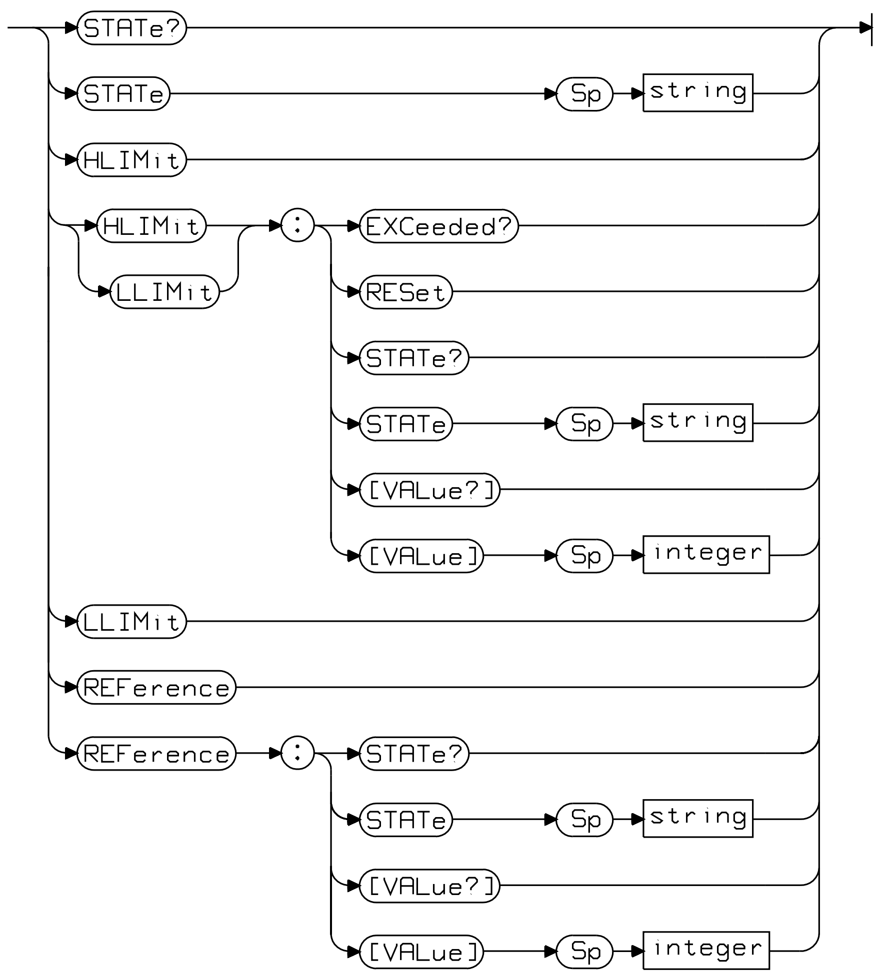
REFerence [:VALue]

```
REFerence[:VALue]?
REFerence[:VALue][<numeric value>]
```

Sets/queries the measurement REFerence VALue. If no <numeric value> is specified, then the REFerence VALue will be set to the current measurement result.

Appendix E - [:MM-MOD] - Measurement Fields (less UNITs, DUNits, AUNits)

The following list of optional commands that control Measurement field functions. These attributes are listed here in hierarchal relationship. Included are commands for state, units, low limits and high limits, and reference. These commands are the same as those for Appendix D except for UNITs, DUNits and AUNits.


STATe?
STATe
Sp
string
HLIMit
HLIMit
LLIMit
:
EXCeeded?
RESet
STATe?
STATe
Sp
string
[VALue?]
[VALue]
Sp
integer
LLIMit
REFerence
REFerence
:
STATe?
STATe
Sp
string
[VALue?]
[VALue]
Sp
integer

Commands

STATe

`STATe?`

`STATe ON | OFF | 1 | 0`

Selects/queries the STATe of the measurement to be ON or OFF.
Note: ON = 1 and OFF = 0

HLIMit

`HLIMit`

High LIMit measurement information.

HLIMit: EXCeeded

`HLIMit:EXCeeded?`

Queries whether the High LIMit for the measurement was EXCeeded.

HLIMit: RESet

`HLIMit:RESet`

RESet the High LIMit exceeded state so that new limit data can be acquired.

HLIMit: STATe

`HLIMit:STATe?`

`HLIMit:STATe ON | OFF | 1 | 0`

Sets/queries the High LIMit STATe. Note: ON = 1 and OFF = 0.

HLIMit [:VALue]

`[:VALue]?`

`[:VALue] <numeric value>`

Sets/queries the measurement High LIMit VALue.

LLIMit

`LLIMit`

Low LIMit measurement information.

LLIMit: EXCeeded

`LLIMit:EXCeeded?`

Queries whether the Low LIMit for the measurement was EXCeeded.

LLIMit: RESet

`LLIMit:RESet`

RESet the Low LIMit exceeded state so that new limit data can be acquired.

LLIMit: STATe

`LLIMit:STATe?`

`LLIMit:STATe ON | OFF | 1 | 0`

Sets/queries the Low LIMit STATe. Note: ON = 1 and OFF = 0.

LLIMit [:VALue]

`[:VALue]?`

`[:VALue] <numeric value>`

Sets/queries the measurement Low LIMit VALue.

REFerence

`REFerence`

Measurement REFerence information.

REFerence:STATe

```
REFerence:STATe?
REFerence:STATe ON | OFF | 1 | 0
```

Sets/queries the REFerence STATe. Note: ON = 1 and OFF = 0.

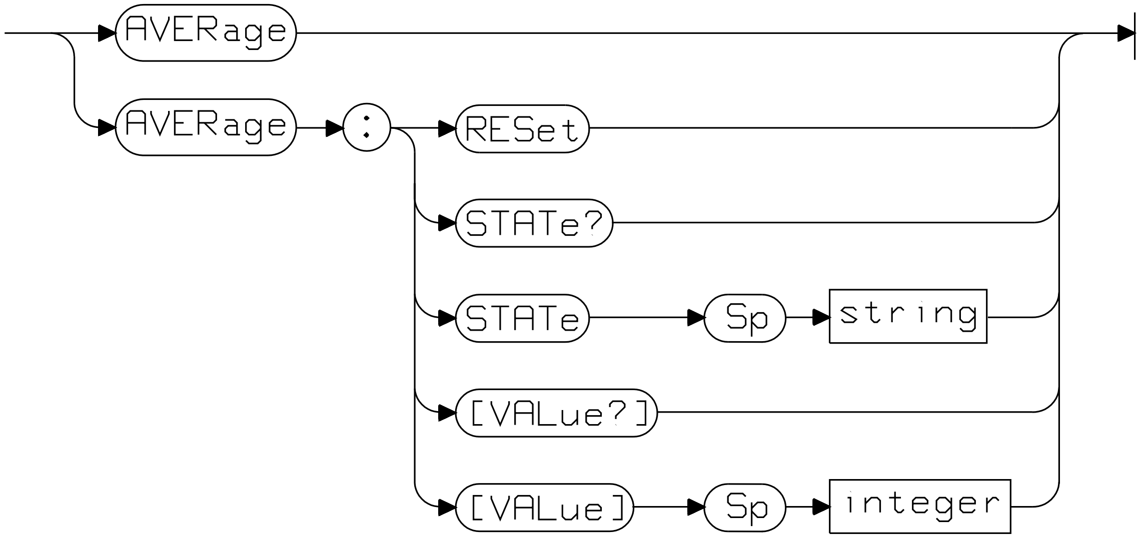
REFerence[:VALue]

```
REFerence[:VALue]?
REFerence[:VALue] [<numeric value>]
```

Sets/queries the measurement REFerence VALue. If no <numeric value> is specified, then the REFerence VALue will be set to the current measurement result.

Appendix F - [:AVG] - Measurement Fields Using Averaging

The following list of optional commands that apply to measurement fields that use averaging. These attributes are listed here in hierarchal relationship.


AVERage
AVERage
:
RESet
STATe?
STATe
Sp
string
[VALue?]
[VALue]
Sp
integer

Commands

AVERage

```
AVERage
```

MEASurement AVERage commands. NOTE : These are only useful for continuous measurements.

AVERage: RESet

```
AVERage:RESet
```

RESet the AVERaged measurement result to begin giving measurement results from the first measurement up to the number if measurements given by <measurement>:AVERage:VALue.

AVERage: STATe

```
AVERage:STATe?
AVERage:STATe ON | OFF | 1 | 0
```

Sets/queries the AVERage STATe.

Note: ON = 1 and OFF = 0.

ON allows display of the average value of the number of measurements given in <measurement>:AVERage:VALue

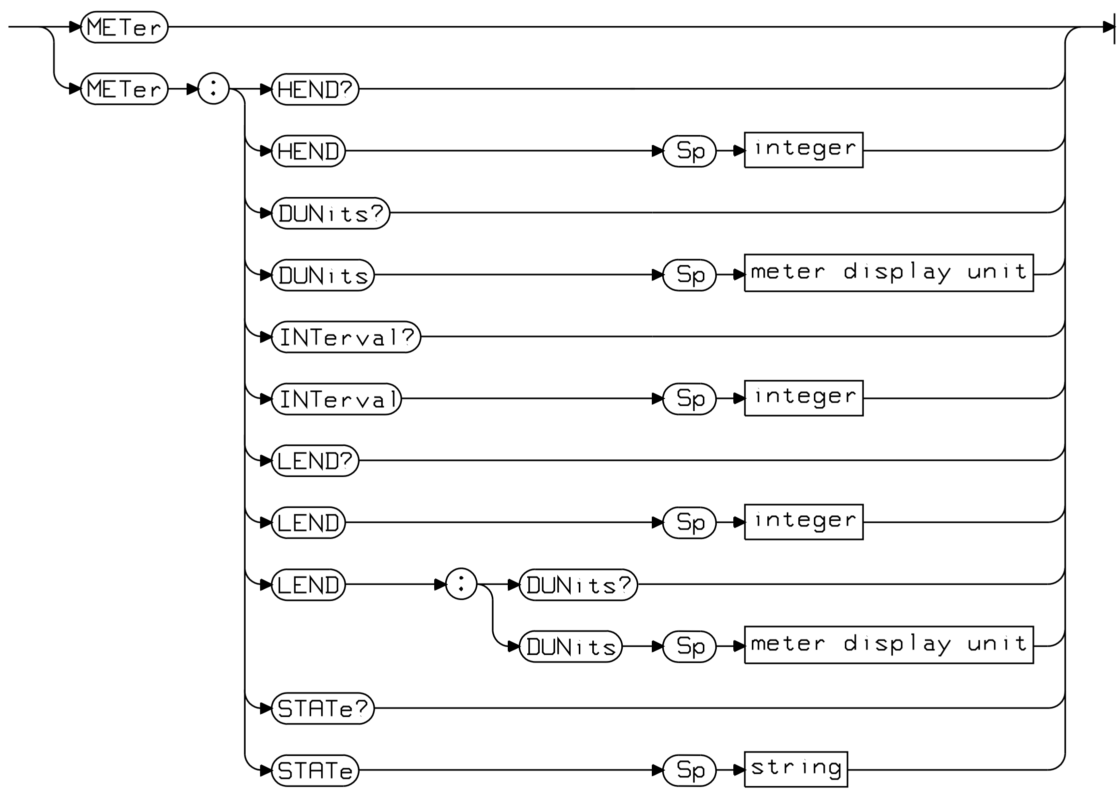
AVERage [:VALue]

```
[:VALue]?
[:VALue] <numeric value>
```

Sets/queries the number (VALue) of measurements to be used in calculating the AVERaged measurement result.

Appendix G - [:MET] - Measurement Fields Using Meters

The following is a list of optional commands that apply to measurement fields that use meters. These attributes are listed here in hierarchal relationship.


METer
METer
:
HEND?
HEND
Sp
integer
DUNits?
DUNits
Sp
meter display unit
INTerval?
INTerval
Sp
integer
LEND?
LEND
Sp
integer
LEND
:
DUNits?
DUNits
Sp
meter display unit
STATe?
STATe
Sp
string

Commands

METer

```
METer
```

METer commands. NOTE : These are only useful for continuous measurements.

**METer:
HEND**

```
METer:HEND?
METer:HEND <numeric value>
```

Sets/queries the High END value to display on the METer for the measurement.

**METer:
DUNits**

```
METer:DUNits?
METer:DUNits <meter display unit>
```

Sets/queries the measurement METer High END Displayed UNits.

**METer:
INTerval**

```
METer:INTerval?
METer:INTerval <numeric value>
```

Sets/queries the number of INTervals to display on the METer between the low end and high end for the measurement.

**METer:
LEND**

```
METer:LEND?
METer:LEND <numeric value>
```

Sets/queries the Low END value to display on the METer for the measurement.

**METer:
LEND:
DUNits**

```
METer:LEND:DUNits?
METer:LEND:DUNits <meter display unit>
```

Sets/Queries the measurement METer Low END Displayed UNits.

**METer:
STATe**

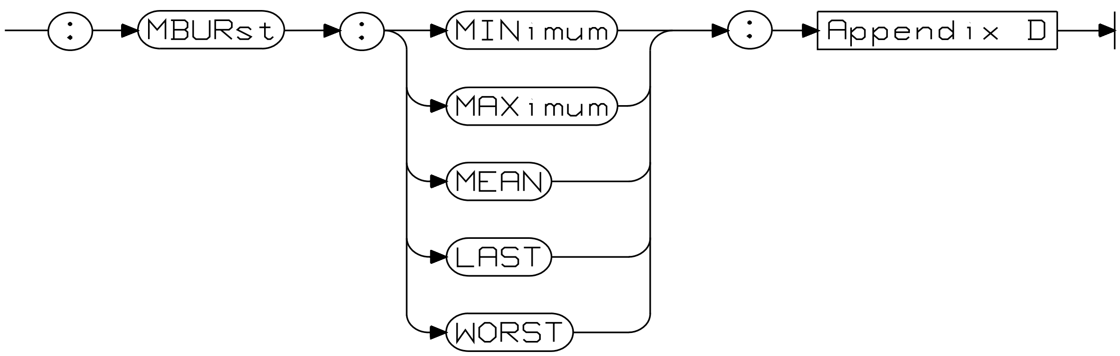
```
METer:STATe?
METer:STATe ON | OFF | 1 | 0
```

Sets/queries the METer STATe.

Note: ON = 1 and OFF = 0.

Appendix H - [:MULTI-B] - Measurement Fields Using Multi-Burst

The syntax diagram below lists the optional commands that can be used with multi-burst measurements.


:
MBURst
:
MINimum
MAXimum
MEAN
LAST
WORST
:
Appendix D

Commands

MBURst: MINimum Returns the minimum value of a measurement over the number of bursts that have been requested. The full syntax is;

```
MBURst:MINimum | [:MM]
```

MBURst: MAXimum Returns the maximum value of a measurement over the number of bursts that have been requested. The full syntax is;

```
MBURst:MAXimum | [:MM]
```

MBURst: MEAN Returns the average value of the measurement over the number of bursts that have been requested. The full syntax is;

```
MBURst:MEAN | [:MM]
```

MBURst: LAST Returns the value of the requested measurement in the last burst of the number of bursts that have been requested. The full syntax is;

```
MBURst:LAST | [:MM]
```

MBURst: WORSt Returns the highest value of the maximum and minimum values across all the bursts made during the multi-burst measurement. Note that the absolute value of the maximum and minimum values are taken (that is, negative values become positive). The full syntax is;

```
MBURst:WORSt | [:MM]
```