

Option Menu #52 PSQM Director and Option Menu #53 PSQM Responder on the Sage 930A-L3, 930i, and 935AT

PSQM Purchase Option

Sage 93X Model	PSQM Purchase Option
Sage 930A-L3	Option 930A71
Sage 930i	Option 930i-71
Sage 935AT	Option 935AT-541

PSQM Option Description

PSQM stands for Perceptual Speech Quality Measurement. It is an ITU-T P.861 [1] recommended objective method of estimating the subjective quality of voice-band speech codecs. The PSQM algorithm is used to measure the distortion experienced by a speech signal when transmitting through various codecs and transmission media. It differs from the signal-to-noise type of measurement in that the distortion is not measured in the normal physical domain (time or frequency domain, for example). Instead, the distortion is measured in an 'internal psychoacoustic domain' to mimic the sound perception of human subjects (phone users) in real-life situations so that the measured distortion can be easily correlated with human perceptions. This is done by converting the physical-domain signals into the perceptually meaningful psychoacoustic domain through a series of nonlinear processings such as time-frequency mapping, frequency warping, intensity warping, loudness scaling, asymmetric masking and cognitive modeling, etc. Sage Instruments has implemented the PSQM algorithm in a test line format, where a complete PSQM test is performed in both the Near to Far and the Far to Near directions.

PSQM Option Menu Access

Option Menu #52 PSQM Director

The Near End function is accessed in option menu #52. It places a call to the PSQM Far End Responder, conducts the test and reports the results back to the user.

Option Menu #53 PSQM Responder

The Far End function is accessed in Option Menu 53. It waits for an incoming call from the PSQM Director. When an incoming call is detected it answers and sends a test progress tone. The Director will then initiate a test. When the test is complete the responder will hang up and await another call.

Performing the Perceptual Speech Quality Measurement



Select a Trunk Type

Set up and perform the PSQM Test at any two access points along the network. The Sage 93X units must be properly configured to the circuit type found at the chosen access points.

- 1 Press the Trunk Type function key to display the trunk type screen.
- 2 Select the appropriate trunk type.
- 3 Connect the phone line to the appropriate jacks. Refer to trunk type section of the manual for details.
- 4 This is a good time to manually confirm that a call can be placed by the near end unit and answered by the far end unit. Use send and measure tone in each direction to confirm talk path.

NOTE The set-up steps that follow are an example. The actual screens may differ depending on chosen Trunk Type.

Near End Setup

To set up the **PSQM director**:

- 1 Press the **Option Menu** function key.
- 2 Use the **Up/Down Arrow** keys to scroll through the option menus, **OR** select **52** using the **numeric keypad** and press the **Option Menu** function key. The display reads:

OPTION MENU #: 52 PSQM DIRECTOR											
▼	▲	◀	▶	K1	K2	K3	K4				

- 3 Press **ENT** or any softkey (**K1-K4**). The display reads:

PSQM DIRECTOR				TEST		SETUP		RESULTS	
▼	▲	◀	▶	K1	K2	K3	K4		

- 4 Press **K3** under **SETUP**. The display reads:

PSQM SETTINGS:				DEFAULT		CHANGE		EXIT	
▼	▲	◀	▶	K1	K2	K3	K4		

- 5 Press **K2** under **DEFAULT** to accept the factory defaults, or press **K3** under **CHANGE** to select new settings. If you press **K3**, the display reads:

DURATION: 10s				TALK-SPEED: MEDIUM				MORE			
▼	▲	◀	▶	K1	K2	K3	K4				

- 6 Use the **numeric keypad** to change the duration of the active voice segment. The actual test time will be the selected duration times 2 plus some overhead.

- Valid test durations are between **1 and 16 secs**. The default is **10 sec**.

- 7 Press **K3** to select a talk speed.

- Valid talk speeds are **SLOW, MEDIUM and FAST**. The default is **MEDIUM**.

- 8 Press **K4** under **MORE**. The display reads:

GENDER: MALE				REPEAT: NO				MORE			
▼	▲	◀	▶	K1	K2	K3	K4				

- 9 Press **K1** under **MALE** to toggle between MALE and FEMALE.

- The default is male.

- 10 Press **K3** under **NO** to toggle between No REPEAT and REPEAT Mode

- When repeat mode is set to **NO**, the unit will conduct only one PSQM test per call. The default is **NO**.
- When repeat mode is set to **YES**, the unit will conduct the PSQM test repetitively until the call is abandoned or the user presses a function key.

- 11 Press **K4** under **MORE** to advance to next set up screen. The display reads:

SET TLP:				0dB				USER				-2dB			
▼	▲	◀	▶	K1	K2	K3	K4								

- 12 Press **K2** to select 0dB, **K3** under USER to define a new TLP, or **K4** to select a -2 dB TLP. If you select **K3** under USER, the display reads:

SEND: +0.0dBm				RECV: +0.0dBm				EXIT			
▼	▲	◀	▶	K1	K2	K3	K4				

- 13 Press **K1** to change the SEND TLP or **K3** to change the RECV TLP.

- 14 Use the **Numeric Keypad** to enter the desired TLP.

- A valid SEND TLP is between -30 dBm and +10 dBm. The default is 0 dBm.
- A valid RECV TLP is between -30 dBm and +10 dBm. The default is 0 dBm.

Far End Setup

To set up the **PSQM Responder**:

- 1 Press the **Option Menu** function key.
- 2 Use the **Up/Down Arrow** keys to scroll through the option menus, **OR** select **53** using the **numeric keypad** and press the **Option Menu** function key. The display reads:

OPTION MENU #: 53 FAR PSQM RESPONDER											
▼	▲	◀	▶	K1	K2	K3	K4				

- 3 Press **Ent** or any soft key (**K1 - K4**) to enter option.

FAR PSQM RESPONDER						ON		OFF	
▼	▲	◀	▶	K1	K2	K3	K4		

- 4 Press **K3** under **ON** to set the 935At to operate as a Far PSQM Responder **OR** press **K4** under **OFF** to disable responder function.
- 5 Press **Help** to set Far End TLP's

SET TLP:				0dB		USER		-2dB	
▼	▲	◀	▶	K1	K2	K3	K4		

- 6 Press **K2** to select 0dB, **K3** under **USER** to define a new TLP, or **K4** to select a -2 dB TLP. If you select **K3** under **USER**, the display reads:

SEND:		+0.0dBm		RECV: +0.0dBm		EXIT	
▼	▲	◀	▶	K1	K2	K3	K4

- 7 Press **K1** to change the SEND TLP or **K3** to change the RECV TLP.
- 8 Use the **Numeric Keypad** to enter the desired TLP.
 - A valid SEND TLP is between -30 dBm and +10 dBm. The default is 0 dBm.
 - A valid RECV TLP is between -30 dBm and +10 dBm. The default is 0 dBm.

Press Key under Exit. The display reads:

FAR PSQM RESPONDER					$\overline{\text{ON}}$		OFF
▼	▲	◀	▶	K1	K2	K3	K4

PSQM Test

To begin a PSQM test:

At the Near end, go to the PSQM Director main menu. The display reads:

PSQM DIRECTOR					TEST	SETUP	RESULTS
▼	▲	◀	▶	K1	K2	K3	K4

Press **K2** under TEST. The display reads:

PSQM DIRECTOR					TEST	SETUP	RESULTS
▼	▲	◀	▶	K1	K2	K3	K4

- The number most recently entered in the **DIAL/RING** mode will be displayed in place of the word **ENTER**. Press the **CLR** key to remove any previous entry, if a new access number is desired.
- 9 Press **K4** under **DTMF** to select a DTMF, DP, or MF outpulsing format.
 - 10 Use the **numeric keypad** to enter a new access number.
 - 11 Go off hook with the front panel hookswitch to begin testing. The **935AT** will seize the line, send any digits you have entered in the window, and expect the responder at the far-end to answer the call.
 - 12 Normally, you would hang up on the Director side after the test is done.

Test Results

To view test results

If repeat mode is set to **NO**, it will return to the main menu when the test is complete. If repeat mode is set to **YES**, the test will continue until you hang up or press a function key.

- 1 Press **K3** under **RESULTS** from the main menu after completing a test. If the test is successful, the display reads:

CALL COMPLETION TIME:					1.2 sec	11:20	
▼	▲	◀	▶	K1	K2	K3	K4

The display gives both the call completion time (in seconds), and the real time at which the call was completed according to the internal clock .

- 2 Press any softkey (**K1-K4**) The display reads:

FAR -> NEAR: 1.65psqm 3.96mos GAIN: 0.0dB							
▼	▲	◀	▶	K1	K2	K3	K4

The display above **K1** and **K2** shows the results as measured by the Director in both PSQM and MOS equivalent values. The result above **K4** is the **GAIN**.

- 3 Press any softkey (**K4**). The display reads:

NEAR -> FAR: 0.16psqm 4.88mos GAIN: 0.0dB							
▼	▲	◀	▶	K1	K2	K3	K4

The display above **K1** and **K2** shows the results as measured by the Responder in both PSQM and MOS equivalent values. The result above **K4** is the gain.

- 4 Press any soft key (**K4**). The display reads:

DELAY: 0.0ms							
▼	▲	◀	▶	K1	K2	K3	K4

The display shows the results for the Round Trip delay.

Press any softkey (**K1-K4**) to return to the main display.

Results Printout Format

If the **930i** is set to **PRINTER** mode under **Option Menu #: 3 REMOTE CONTROL**, or if you send an upper case **W** from a remote terminal while in **COMPUTER** mode, the results from your printer will have the following format:

**Repeat set to
"No"**

Monday 05-14-01 15:27:16
7612423 PSQM ACCESS # DTMF
-----PSQM REPORT-----
DURATION: 10S TALK-SPEED: MEDIUM
GENDER: MALE
SEND TLP: +0.0 RECV TLP: +0.0
NEAR to FAR: 1.65psqm 3.96mos -11.0dB
FAR to NEAR: 1.65psqm 3.96mos -10.8dB
DELAY: 2.7ms

**Repeat set to
"Yes" (Printer
Mode Only)**

Friday 11-09-01 14:51:40
7280994 PSQM ACCESS # DTMF
CALL COMPLETION TIME: 3.4 SEC. 14:51

----- PSQM REPORT -----
DURATION: 1s TALK-SPEED: MEDIUM
GENDER: MALE REPEAT: YES
SEND TLP: +0.0 RECV TLP: +0.0

DATE, TIME, NFPSQM, FNPSQM, NFMOS, FNMOS, NFGAIN, FNGAIN, DELAY
11-09-01, 14:52:06, 1.45, 1.43, 4.10, 4.11, -11.3, -11.2, 02.6
11-09-01, 14:52:26, 1.45, 2.41, 4.10, 3.59, -11.2, -11.2, 02.8
11-09-01, 14:52:46, 4.03, 1.43, 2.55, 4.11, -11.3, -11.3, 02.8
11-09-01, 14:53:06, 1.40, 1.39, 4.13, 4.13, -11.4, -11.3, 02.8
11-09-01, 14:53:26, 1.42, 1.34, 4.12, 4.15, -11.2, -11.1, 02.8