MICROPHONE EVALUATION REPORT

Evaluation of the Plantronics Savi 440 wireless microphone with Dragon NaturallySpeaking speech recognition software

About the Plantronics Savi 440

The Plantronics Savi 440 appears to be the successor to the excellent Plantronics Savi 430 wireless microphone. The headset portion has been completely redesigned and is now very light and sleek looking. This headset retains the same hinged USB adapter that came with the Savi 430.

Note that this is not a Bluetooth microphone and you cannot use it to take calls with your mobile phone.

Plantronics claim that the Savi 440 is the lightest headset on the market. It is part of Plantronics' pioneering portable DECT range. It comes with the flexibility of three different wearing styles and it has a 120 metre wireless range so you can roam freely around the office and multitask. It comes with hot swappable batteries which can be changed mid-conversation, enabling unlimited talk time, and Plantronics say that it also features outstanding sound quality with natural-sounding DSP and wideband audio. Plantronics are positioning the Savi 440 wireless headset for users in campus-like business environments, using a laptop for voice calls and multimedia. Up to four different Savi headsets can be connected to the same call.

The following tests were done on 24th and 25th October, 2011

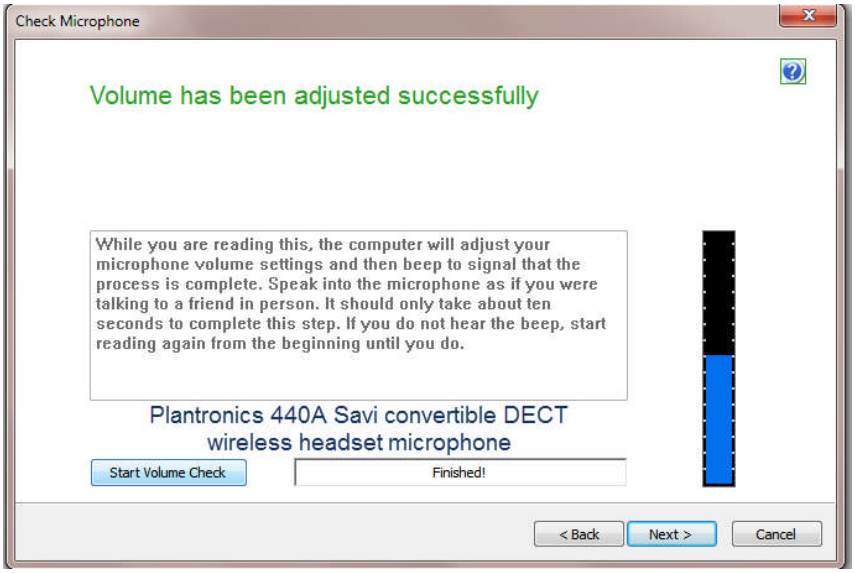
Setup

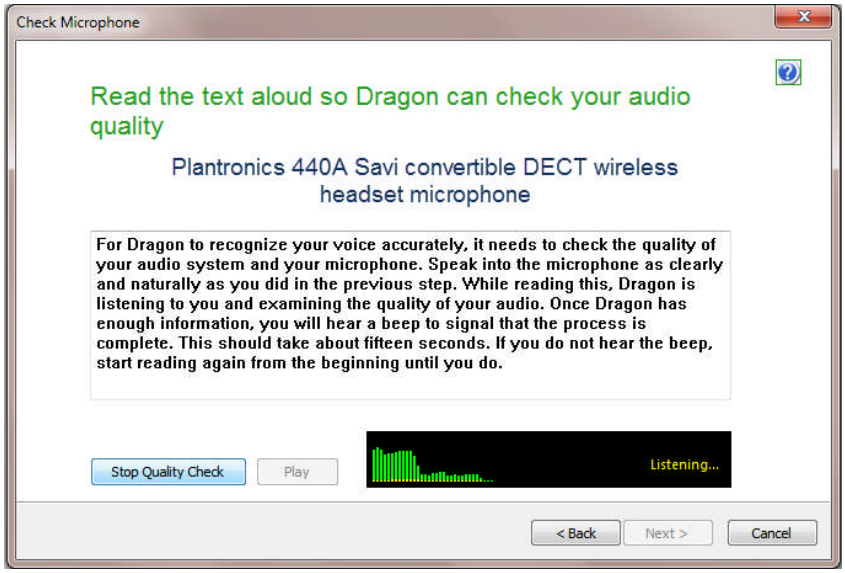
- Model tested - Plantronics Savi 440A Convertible DECT wireless headset microphone, part number 83359-02. **This was the non- Microsoft office Communicator (non - MOC) version**, with "over the head" wearing style – note that the MOC version will only work when Microsoft Office Communicator is installed on the PC. As we found out, the MOC version will simply not work with Dragon NaturallySpeaking if Microsoft Office Communicator is not installed.
- The tip of microphone boom was approximately 2 thumbs' gap from the corner of the mouth
- Dragon NaturallySpeaking version - Professional 11.5
- PC specification - Windows 7 64 bit with 2 Ghz dual core processor and 4 Gb RAM
- Testing was carried out immediately after creating a new speech profile after reading one "easy reading" training text
- Dictated "The Rainbow Passage" into Microsoft Word 2010

Firstly, a dedicated speech profile in Dragon NaturallySpeaking was created for the new microphone by reading the "Talking to Your Computer" easy reading enrolment text. The following are some

screen shots from the audio setup wizard process in creating our speech profile in Dragon NaturallySpeaking.

Screen shots of Audio Setup Wizard in Dragon





The above shows virtually zero electronic "noise" in the signal as demonstrated by the extremely flat yellow noise floor.

When pressing the "Play" button in this screen, voice playback quality was very clear

Word recognition accuracy testing

Once the speech profile had been created, word recognition accuracy with this microphone was assessed by dictating a 335 word piece of text called "The Rainbow Passage". This text is often used by speech recognition resellers for accuracy testing because it contains all the phonemes (word sounds) in the English language. The text was read 3 times and the average accuracy from the 3 readings was taken.

Dictation of "The Rainbow Passage" was then repeated, this time with background noise from a "Thriving Busy Office" CD (simulated office noise) in the background at high volume. The simulated office noise comprised people speaking to each other, keyboarding and telephones ringing out.

Results:-

Average of 3 readings no background noise - **98.7% accuracy.**

Average of 3 readings with background noise – **97.1% accuracy -** I feel that this is a most excellent result.

Observations

Interestingly, when I dictated with simulated office noise in the background, I was pleased to note that the yellow volume bar next to the Dragon microphone icon appeared to stay yellow showing it was not reacting to the background noise. (This compares with testing on its predecessor, the Plantronics Savi 430 wireless microphone which did cause Dragon's volume meter to react to background noise). Typically, even microphones which the manufacturers claim to be noise cancelling react such that Dragon's volume bar changes from yellow to green indicating that the microphone is picking up background noise. However, background noise was present when I issued the "play that back" command to Dragon to play back my dictation audio although it was not that pronounced.

Assessment of background noise

I made the following audio recording with the Windows 7 built in sound recorder without any background noise and then with simulated office noise from a "Thriving Busy Office" CD playing in the background. Microphone volume in Windows was set to maximum for this microphone.

Although the background noise is clearly discernible, my speech does seem to predominate. This augurs well for speech recognition accuracy.

Savi 440.wma

(Note that this WMA file is present in our original Microsoft Word document but is not available in the PDF version that we like to use on our website, as it is lost in the conversion process when we convert it with PDF Converter Professional)

Wearing style

The Savi 440 comes with three possible wearing styles:-

1. Over the head headband
2. Ear clips
3. Neckband

For speech recognition accuracy, the ideal position of the tip of the microphone boom is 1 to 2 thumbs' gap from the corner of the mouth. It was found that the over the head headband option gave the best, most comfortable fit and of all the wearing styles, was the one that best facilitated the optimum 1 to 2 thumbs' gap positioning for speech recognition.

Problems encountered

1. I found that when I plugged in the USB adapter into the PC that had been woken up from a Windows hibernation state, the display would not turn green indicating that Windows had not recognised it. Instead, it stayed red. However, on re - booting the PC and reinserting the adapter, it turned green immediately ready for connecting with the headset microphone.

2. I found that on using the product on the second day of testing, the headset soon started to beep indicating a low battery. This despite the fact that I had fully charged the headset on the first day. On reading the manual, I then realised that you are advised to put the headset into "sleep mode" when not in use. This is done by pressing the call button for 3 seconds. There is no on/off switch on the headset. I admit to finding this somewhat confusing.

Conclusions

1. Speech quality with this microphone is excellent; especially considering it is a wireless microphone! You are unable to tell that you are wearing a wireless headset as voice playback your voice from the PC matches that of the best corded headset microphones.
2. Accuracy is improved as compared to the Savi 430 wireless microphone (98.7% versus 98.2%) although it is not known if this is a statistically significant result. Accuracy in the presence of background noise is compatible (97.1% versus 96.9%).
3. Word recognition accuracy in Dragon NaturallySpeaking is excellent when there is no background noise and is still very good in the presence of background noise.
4. The Savi 440 was found to be very comfortable to wear for long periods of time with the provided headband
5. I would endorse the Savi 440 headset microphone for speech recognition use in quiet to somewhat noisy environments as we plan to use it as our wireless headset of choice when delivering speech recognition demonstrations to large groups.

Recommendations

Consideration might be given by Plantronics to making it more clear in the manual that you should put the headset into sleep mode after using it at the end of the day otherwise you may have to wait till the headset is recharged before being able to use it again, causing a delay to starting your work.

Peter Maddern
Speech Empowered Computing
25th October, 2011