SmartSDR™ for Windows v1.2.17

Release Notes

July 2, 2014

SmartSDR for Windows v1.2.17 is a release intended for use with the FLEX-6300™, FLEX-6500™, FLEX-6700R™ and FLEX-6700™ software defined radios.

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IMPORTANT: Please read this document in its entirety before installing the new release of SmartSDR for Windows.

Details on the software changes in SmartSDR v1.2.17 are listed below along with installation instructions and guides to help with any problems encountered. As always, please share your feedback and experiences via the FlexRadio Community (community.flexradio.com).

SmartSDR for Windows v1.2.17 New Features and Updates

Please refer to the release specific information for SmartSDR v1.2.17 below for a detailed listing of enhancements, changes and defect corrections.

Important Release Details

- If you have SmartSDR CAT v1.2.10 or earlier installed on your PC, make sure to uninstall SmartSDR CAT and reboot your PC before installing SmartSDR v1.2.17.

- Please report any defects found in this software by submitting a support ticket report to: http://helpdesk.flexradio.com. This will help us properly track the issues and interact with you directly if further information for testing is needed. Thanks in advance!

Recommendations for Using SmartSDR Features

1. There are two indicator components of the microphone or input Level meter to show the actual audio input level. The leftmost component is a solid bar indicating the average input level and the smaller box-like component further to the right of the average input level bar is the peak level indicator. The Level meter indicator bars also utilize three colors to visually indicate the input level range. Signals up to -10 dB are shown in green. Signals levels between -10 and 0 dB are shown in yellow. Any signal level that is greater than 0 dB is shown in red.

   When setting up your microphone audio for optimal modulation, adjust the input gain so that the peak level indicator is peaking just BELOW the 0 dB on voice peaks. It is very important that your peak level indicator not exceed 0 dB (turn red) at any time. A red peak level indicator indicates over-driven or “clipped” input audio levels resulting in audio distortion. The input ALC is active, but excessive input signal levels will result in input signals that can exceed 0 dB. If you see the peak level indicator turn red at any time, turn down your audio input gain until you no longer see the peak level indicator turn red.

2. SmartSDR has completely re-engineered the audio compressor as a voice processor indicated by the PROC button which has four (4) level settings; Off, Normal, DX and DX+. It is recommended that you always use the Voice Processor at the Normal setting when operating phone. Setting the Voice Processor to the DX or DX+ setting incrementally increases your talk power or “punch” without incurring significant audio distortion. One optimal use for the DX+ setting is in contests for busting pileups. DX+ is most effective if you increase the low cut TX filter to between 200-400 Hz in order to concentrate your talk power in the audio frequency range that has the greatest intelligibility.
3. After setting the microphone input level and Voice Processor as described above, enabling and setting the Downward Expander (DEXP) will increase the apparent dynamic range of your input audio by decreasing the gain during the relatively quiet times thereby moving the apparent noise floor downward. A Downward Expander is not a noise gate. A Downward Expander compares the microphone input signal level to a threshold gain level setting. When the signal level drops below this threshold setting, the downward expander decreases the input gain. A noise gate on the other hand, does not decrease the gain but switches it completely off below the threshold level.

Setting the Downward Expander (DE) is straightforward. While transmitting and listening to your audio in the headphones, enable the Downward Expander and without talking determine if you can hear background noise. If you can, adjust the DE threshold to a greater value (larger number). If you cannot hear any background noise, you can opt to adjust the Downward Expander to a lesser value (lower number) until you hear the DE “open”, then adjust the threshold to a slightly higher value until it closes. Once you have the DE set for ambient or background noise of your shack, position yourself at the mic and breathe normally. If you can hear your breath sounds in the monitor, adjust the DE threshold up slightly until your normal breath sounds are no longer heard. This setting will give you the greatest apparent audio dynamic range.

4. When using a FlexControl with SmartSDR, plug the FlexControl into the PC running SmartSDR for Windows and not the USB port on the radio.

5. The waterfall spectrum display has an automatic black level setting (on by default) which in most cases properly adjusts the background color or black level for the display’s zoom factor and the relative noise floor of the band you are viewing. However, you can manually adjust the Waterfall display’s setting to allow for the display of weak signals at or near the noise floor. If the black level is set too low, many of the "in the noise" FFT bins will always be zero, regardless of the display gain setting. To achieve an ideal setting for adjusting the waterfall black level, do the following:

- Turn the display gain level to maximum
- Adjust the waterfall black level to a point where the waterfall is primarily white, but there are approximately 2-5% black areas displayed.
- Turn the display gain down until the background is deep blue.

This ensures that weak signals in the noise will be seen.
Features, Enhancements and Corrected Defects

All Features, Enhancements and Corrected Defects since SmartSDR v1.2.17:

SmartSDR for Windows:

- #149 CAT: SmartSDR CAT Installer now integrated into main SmartSDR Installer
- #323 CAT: Fixed ZZPC command when issued a value of 000
- #330 CAT: Slice A/B now automatically created if necessary on Set commands
- DE1988 CAT: Fixed ZZNL command
- #106 FLEX-6300: Fixed erratic SWR readings when transmitting
- #299 FLEX-6300: Fixed wrong number of channels showing for Slice DAX and IQ DAX channels
- #301 Added "Move Slice here" right-click option for off-screen slices
- #327 Fixed antenna being overwritten when switching TX Slices
- #319 Fixed XIT indicator and TX filter not being displayed properly
- #315 Fixed UHE when dragging a Panadapter
- #317 Fixed menu text-box values not taking effect after leaving focus
- #332 Lowered default AGC-off level
- #302 Fixed voltage error message appearing when radio is properly shut down
- DE2022 Fixed creating a slice with a right-click not working with no Active Slice
- DE2000 Frequency calibration options now disabled when GPS is installed
- DE2024 Fixed mouse scroll wheel tuning on certain frequencies
- DE2027 Fixed issue that could cause small spurs when in wide mode
- DE1655 Fixed several issues with wide bandwidth tuning for slices and Panadapters
- DE2021 Fixed boundary issues with display tuning
- US2208 Fixed a QSK relay issue for the FLEX-6300
- DE2007 Fixed low power output when in CW mode
- DE1906 Fixed front panel LED being solid before radio is available on startup
- DE1976 Fixed long power down sequence when shutting the radio down
- DE1986 Fixed Slice mode not cloning correctly on Slice creation
- DE866 Fixed front panel display message for under voltage error
- DE1980 Fixed audio bleed-through of MIC and BAL/LINE when the ACC input is selected
- DE1975 Modified voltage safety shutdown behavior to prevent unnecessary shutdowns
- US2195 Modified regions to support new 6m band for Greece and 60m band for Spain
- DE1978 Fixed older radio software reporting incorrect model number
- DE1974 FlexControl window now limited to a single instance
- DE1958 Fixed UHE when waterfall is minimized
- DE1981 Fixed certain characters not being shown on front panel display correctly
- DE1994 Fixed UHE when radio model is selected in chooser before radio is connected
- DE1995 DAX: Fixed incorrect DAX IQ rates being shown for the FLEX-6300
- DE1567 DAX: Control panel now opens when double clicking on the taskbar icon
- DE1496 API: CW and SSB monitor level now split.
- US2155 API: Added Active Slice functionality to the Radio class
Known Issues, Caveats and Limitations

1. It is highly recommended that the radio is cold rebooted by turning the radio off, removing power from the radio momentarily and then turning the radio back on again after the software update is completed to ensure a complete reset of all internal radio processors.

2. SmartSDR utilizes setting persistence. If you get into a situation where the radio will not boot or you cannot open the maximum number of Panadapters or slice receivers, resetting the persistence database will usually resolve the issue. Reset the Persistence database by powering off the radio. For the FLEX-6700/FLEX-6500/FLEX-6700R, while pressing and holding the “OK” button on the front of the radio momentarily press and release the radio’s power button. You will see a radio console message that says “Reverting to factory settings” and a countdown timer starting at 5. Keep pressing the OK button until the display counts down to 0 and the Calibrating message is displayed. For the FLEX-6300, simply hold the Power button while powering on for 5 seconds until the LED changes color.

3. The DAX Control Panel may lose its connection to the radio. If this happens, right click on the DAX Control Panel to stop the application and then restart DAX Control Panel. The DAX Control Panel executable can be found Windows Start Menu in the FlexRadio Systems \SmartSDR v1.2.17 folder.

4. In some situations the FlexControl will choose a COM port that has already been assigned by a virtual COM port or other device. It may be necessary to move the FlexControl to a different COM port and disconnect/reconnect the FlexControl to resolve this issue.

5. When switching bands to 2m or 4m, it may be necessary to change the frequency of the transmit slice before transmit works properly. DE1419

6. There is a known issue where SmartSDR is not always able to change to the 2m band if 2 Panadapters are open. This will be fixed in a future release. DE1735
SmartSDR for Windows Installation Information

SmartSDR Software Installation Recommendations and Guidelines

Please read all of the following guidelines and follow the recommendations to ensure a trouble free upgrade of your software defined radio to SmartSDR v1.2.17.

1. The minimum recommended CPU for SmartSDR v1.2.17 and greater is an Intel Core 2 Duo or an AMD Athlon 64 X2 and greater. Lesser processors may not perform adequately when showing multiple displays or full screen spectrum/waterfall displays.

2. The minimum version of Windows supported by SmartSDR v1.2.17 is Windows Vista Service Pack 2 (SP2). The SmartSDR v1.2.17 Installer will automatically detect your current Windows version and will notify you if it does not meet the minimum operating system requirements. SmartSDR will allow for installation on Windows XP SP3 with a warning that Windows XP is no longer supported by Microsoft or FlexRadio Systems. Upgrading XP to a Microsoft supported operating systems is recommended. If your Windows XP PC has not been upgraded to SP3, you must do so before installing SmartSDR v1.2.17. See Minimum Windows and .NET Requirements below for obtaining the Windows XP SP3 software update.

3. SmartSDR™ for Windows is a WPF (Windows Presentation Foundation) application which utilizes a video card’s graphics processing unit (GPU) for optimal performance rendering the spectrum displays. If your video card does not fully support hardware graphics acceleration or DirectX 9 and greater, then SmartSDR™ for Windows will revert to using the PC's CPU for rendering the displays. This will consume more CPU than running with a video card that has sufficient hardware accelerated graphics capabilities. A high-end “gaming” type video card is not required for running SmartSDR for Windows. Please see the HelpDesk article What is important in choosing a Video Graphics Card? for additional information on graphics card recommendations.

Minimum Windows and .NET Requirements

SmartSDR v1.2.17 is a Windows 64 and 32-bit .NET Framework application designed to operate on Windows XP SP3, Vista, Windows 7 and Windows 8. The .NET Framework 4.0 Client Profile is required.

If you need to install Service Pack 3 (SP3) for Windows XP, install it before installing the .NET Framework 4.0 Client Profile. The easiest method for obtaining it is to use the Windows Update service. An optional update method is to download the XP SP3 update software via the Internet directly from Microsoft using this web link: http://www.microsoft.com/en-us/download/details.aspx?id=24. Note this is a very large download (~316 MB) which may take over an hour to download using slower Internet connections.

If you need to install the .NET Framework 4.0 Client Profile, the SmartSDR v1.2.17 Installer will automatically install it from the SmartSDR Installation CD or attempt to download the necessary software from the Internet if the CD is not available. Alternately, you can download it directly from Microsoft using this web link before installing SmartSDR for Windows. http://www.microsoft.com/en-us/download/details.aspx?id=17113
FLEX-6000 Software Update/Modification Procedure

Preparing for the FLEX-6000 Software Upgrade

Before operating a new or different version of SmartSDR for Windows with your FLEX-6000, shut down any programs (clients) that can communicate with the radio. This includes SmartSDR CAT and DAX. To ensure that all client connections have been terminated, it is best to power cycle the radio first using the front panel power button.

It is highly recommended that the radio is “cold” booted by turning the radio off using the power button, removing all DC power from the radio momentarily then turning the radio back on again before and immediately after the software update to ensure a complete upgrade.

When running SmartSDR for Windows a software version validation check occurs to ensure that any FLEX-6000 available for selection from the Radio Chooser is running the required software. If the FLEX-6000 is not running the required software, an upgrade (or downgrade if you are using a previous version) will be required. This is the case when running a new version of SmartSDR for Windows for the first time with your FLEX-6000 or running an older version of SmartSDR for Windows.

Upgrading the FLEX-6000 Software

If an available FLEX-6000 requires a software modification, an indication is shown in the Radio Chooser. The FLEX-6000 radio icon will display a yellow Upgrade "status dot" rather than the green Available status dot. After selecting a FLEX-6000 from the Radio Chooser that requires a software modification, the Update info screen is displayed on the right side of the Radio Chooser window. Click the yellow Update button to start the upgrade process. This may take several minutes to complete.

Do not close SmartSDR for Windows, disconnect the network connection or power off the FLEX-6000 during the software modification process. Leave the SmartSDR for Windows application running for status update messages. The "Available" status prompt will be shown after the software modification has successfully completed indicating the radio is ready to use.

Transferring the radio software from the client PC to the FLEX-6000 is the first step of the software modification process. This stage of the software modification process takes usually less than a minute and is indicated by the SmartSDR for Windows progress bar starting to move towards the right along with the FLEX-6000 console LED display showing "Updating Software" and the power button LED turning purple.

After the FLEX-6000 upgrade software package has been successfully transferred, the FLEX-6000 will reboot and may show several different status messages on the console LED, such as "Calibrating" and "Updating Software" during the software modification process. The radio may reboot several times depending on the software components being updated. During one stage of the software modification process, the chassis fans may momentarily operate at full speed. Do not be alarmed, as this behavior is normal.
When the software modification process is complete, the FLEX-6000 console display will show the model number of your radio. At this time you should see the FLEX-6000 show up in the SmartSDR for Windows radio chooser window with the green "Available" status dot. Double click on the FLEX-6000 icon to begin using the radio.

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SmartSDR CAT Upgrade Procedure

SmartSDR CAT is automatically installed on your computer with SmartSDR for Windows by default. It is no longer an optional or separately installed FLEX-6000 radio client application.

The SmartSDR CAT user experience has been enhanced by eliminating the requirement to manually uninstall previous versions of SmartSDR CAT, install the newer version and re-create your virtual serial port configuration with every upgrade of SmartSDR for Windows. The SmartSDR for Windows installer now manages the virtual serial port driver (FlexRadio Systems FlexVSP) and the SmartSDR CAT application separately, only upgrading required components when necessary.

In order to take advantage of this new convenience you must manually uninstall the older version of SmartSDR CAT so the new version will install correctly. **This action only needs to be done once.** Once you have properly installed SmartSDR CAT v1.2.11 or greater, the SmartSDR CAT application will be automatically upgraded without any manual user intervention.

If you have SmartSDR CAT v1.2.10 or earlier installed on your PC, make sure to **uninstall** SmartSDR CAT using the **Uninstalling SmartSDR CAT prior to SmartSDR v1.2.11** instructions listed below and **reboot** your PC before installing SmartSDR v1.2.17 or greater.

**Uninstalling SmartSDR CAT 1.2.11 or Greater**

The SmartSDR CAT application component is uninstalled automatically when you run the SmartSDR for Windows uninstaller. However the virtual serial port driver, **FlexRadio Systems FlexVSP** must be uninstalled manually using the procedure listed below.

1. Close the **SmartSDR CAT** application and any programs that connect to the FLEX-6000 via CAT including DDUtil.
2. Open the **Windows Control Panel** and select **Uninstall a Program**
3. Look for the **FlexRadio Systems FlexVSP** program entry and right click on it to display the Uninstall menu.

```
<table>
<thead>
<tr>
<th>FlexRadio Systems FlexVSP</th>
<th>Publisher</th>
<th>Version</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>FlexRadio Systems</td>
<td></td>
<td>2.7.2</td>
<td>38.2 MB</td>
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</table>

Uninstall or change a program
To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.
```

4. Left click on the Uninstall option.
5. Answer **Yes** to the prompt “Are you sure you want to uninstall SmartSDR CAT” as shown below.
6. The Windows Installer *Preparing to Remove* dialog box is displayed as shown below.

![Preparing to Remove dialog box]

7. If you receive a prompt to “Automatically close applications and attempt to restart them after setup is complete”, click on **OK** to continue. See image below.

![Windows Installer dialog box]

8. A progress dialog box will be displayed as shown below as the FlexRadio Systems FlexVSP driver is being uninstalled.
9. After SmartSDR CAT has finished uninstalling, manually reboot your PC if not prompted to do so.

Installing SmartSDR CAT

The **SmartSDR CAT** application is installed at the same time as SmartSDR for Windows. Manually installing SmartSDR CAT is no longer required.

1. During the Installation of SmartSDR for Windows process you may see the following informational dialog box as the FlexRadio Systems FlexVSP virtual serial port driver is installing. It may take a few minutes for the FlexVSP drivers to completely install. Please do not press the Cancel button if it appears that the installation has stopped as this will cause CAT not to function properly.

2. When SmartSDR for Windows finishes installing and configuring the FlexRadio Systems FlexVSP software component, the SmartSDR for Windows installer will complete the remaining installation tasks.

Refer to the SmartSDR CAT user Guide for a detailed explanation how to interface third-party CAT enabled application to a FLEX-6000 Signature Series SDR.
Uninstalling SmartSDR CAT prior to SmartSDR v1.2.11

1. Close the SmartSDR CAT application and any programs that connect to the FLEX-6000 via CAT including DDUtil.
2. Open the Windows Control Panel and select Uninstall a Program
3. Look for the SmartSDR CAT, CAT_32 or CAT_64 program entries and right click on it to display the Uninstall menu
4. Left click on the Uninstall option.
5. Answer Yes to the prompt “Are you sure you want to uninstall SmartSDR CAT”
6. SmartSDR CAT will begin to uninstall.
7. If you receive a prompt to “Automatically close applications and attempt to restart them after setup is complete”, click on OK to continue. See image below.
8. After SmartSDR CAT has finished uninstalling, reboot your PC.
Obtaining Technical Support

If you encounter any issues installing or operating SmartSDR v1.2.17 with FlexRadio Systems’ Signature Series software defined radios, please use our on-line Community (http://community.flexradio.com) for to query for information about SmartSDR and the FLEX-6000. If you are unable to find an answer to your issue on the Community, contact FlexRadio Systems technical support by opening a HelpDesk support ticket on-line at http://helpdesk.flexradio.com or by phone at +1 (512) 535-4713 extension #2. Please leave a voice mail message if you don’t get an answer as all of our engineers are probably busy on existing calls.

**Hours of Operation:** Our Technical Support engineers are available Monday – Friday from 9:00am-5:30pm Central Time. If you call after business hours, on a holiday or weekend, please leave a detailed message and we will return your call during regular business hours in the order it was received.

You may always post a question or report a problem on the Community or submit a HelpDesk support ticket at any time.

If you need assistance using the Community, please refer to the community topic “How to use the FlexRadio Systems Support Community”.

If you need assistance opening a HelpDesk ticket, please refer to the HelpDesk Assistance Center home page for step-by-step instructions.

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**SmartSDR Documentation**

A detailed and cumulative changelog.txt file along with other ancillary documentation can be found in the Documentation folder under the FlexRadio Systems Windows Start menu for SmartSDR v1.2.17

**SmartSDR for Windows Software User’s Guide**


**FLEX-6000 Signature Series Hardware Reference Manual**


**FLEX-6000 Signature Series Quick Start Guide**

The most current FLEX-6000 Signature Series SDR Quick Start Guide (QSG) in PDF format is available for download from the FlexRadio Systems web site using this direct URL:


**SmartSDR CAT User Guide**

The most current SmartSDR CAT User Guide is available for download from the FlexRadio Systems web site using this direct URL:

**SmartSDR Troubleshooting Tips**

In the event that you encounter problems running SmartSDR for Windows, please use the following troubleshooting tips

**FLEX-6000 Does Not Show Up in the Radio Chooser**

If the FLEX-6000 does not show up in the Radio Chooser, the most probable fault is network related. There are several network components that can be at fault.

**Physical Layer Issues**

After connecting your FLEX-6000 to either a network router, an Ethernet switch or directly connected to your PC, check to make sure the FLEX-6000 is properly connected at the network physical layer.

Looking at the back of the FLEX-6000 at the Ethernet connection, below the connector on the left is the link state LED. It should be illuminated Yellow when the radio is powered on. If not, you do not have a physical layer connection and you should check or try the following:

- Make sure the Ethernet cable is plugged all the way in on both ends. A click should be heard when it is seated completely.
- Make sure the network router, PC or Ethernet switch is powered on before powering up the FLEX-6000.
- Most network routers and Ethernet switches will have their own link state LEDs associated with the port the FLEX-6000 is connected. Check to make sure the link state LED for the port connected to the FLEX-6000 is illuminated. If the port connected to the FLEX-6000 is blinking at a steady rate, this can indicate that the port is partitioned. Please refer to your network hardware manual for additional information
- Power cycle the FLEX-6000 to re-initialize the Ethernet port.

**Firewalls Preventing Network Access from the FLEX-6000**

The FLEX-6000 broadcasts a network discovery packet (message) that is received by SmartSDR for Windows. SmartSDR for Windows uses this information to populate the Radio Chooser. Therefore if the FLEX-6000 is not displayed in the Radio Chooser or after connecting to a FLEX-6000 there is no spectrum displayed, one reason may be that a firewall on your PC (software firewall) is preventing access. The SmartSDR for Windows Installer automatically modifies the Windows firewall to allow the FLEX-6000 discovery packet and other network traffic to pass properly, but if a third-party network security suite or virus protection package that has been installed; their firewall will most likely block access from the FLEX-6000. You may not even be aware that secondary PC level firewalls are installed on your PC, so if you experience connectivity problems, this is the first thing that needs checking.

Additionally you may have a firewall running on a network router, which is referred to as a “hardware” firewall. It too can be improperly configured that will prevent network access between the FLEX-6000 and SmartSDR for Windows.
In these cases, the action to resolve this condition is to modify the third-party firewall software to allow access from any host on your local network to SmartSDR for Windows by allowing all TCP and UDP port access to SmartSDR for Windows.

If the installed third-party software firewall is redundant, it may be disabled at your discretion. Please contact your firewall vendor for information regarding disabling or modifying the firewall for FLEX-6000 access. Below are just a few of the more popular third-party firewall products.

**Third-party Software Firewalls**

- ESET Smart Security (www.eset.com/SmartSecurity)
- Norton 360 (http://us.norton.com/360/)
- Comodo Firewall Pro (http://personalfirewall.comodo.com/)
- ZoneAlarm Free Firewall (http://www.zonealarm.com/)
- Agnitum (http://www.agnitum.com/)
- TinyWall (http://tinywall.pados.hu/)
- Online Armor Free (http://www.online-armor.com/products-online-armor-free.php)
- OutpostFree Security Suite (http://free.agnitum.com/)
- Private Firewall (http://www.privacyware.com/personal_firewall.html)
- AVS Firewall (http://www.avs4you.com/AVS-Firewall.aspx)

**MAC Address Filtering**

Some hardware firewall / router / Wireless access point products have a feature that restricts access to the network based on the connected device’s media access control (MAC) address. If this feature has been enabled, failure to add the FLEX-6000 to the permitted MAC address access control list will prevent the FLEX-6000 from showing up in the SmartSDR for Windows Radio Chooser control panel.

The MAC address of the FLEX-6000 can be determined from the Firewall’s device list.

For hardware based firewalls, resetting it to factory defaults will usually resolve the misconfiguration that is preventing network access between the FLEX-6000 and SmartSDR for Windows.
RF Spectrum Not Displayed after Selecting a FLEX-6000

After a FLEX-6000 has been selected, a default panadapter is displayed showing active RF spectrum. If no spectrum is displayed, there are several possibilities that could be causing the failure.

Low bandwidth connection between the FLEX-6000 and the PC running SmartSDR for Windows – If the PC running SmartSDR for Windows is connected to the FLEX-6000 via a wireless network connection, there is a possibility that a combination of low data streaming throughput and packet loss can result in a spectrum display that momentarily freezes or will not be displayed at all. If you experience this behavior, connect the FLEX-6000 directly to the PC via the Ethernet cable and reboot the radio when the PC is powered on. If the direct connect method resolves the problem, then the wireless network is not sufficient for connecting to the FLEX-6000.

Panadapter resource not available – If a panadapter resource is not available in the radio, it is possible that the resource has been orphaned by an abnormal close of SmartSDR for Windows. In this case, power cycling the radio will free the locked panadapter resource.
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