

TUTORIAL



DRM Rx for Windows
Digital Radio Mondiale (DRM) Radio App

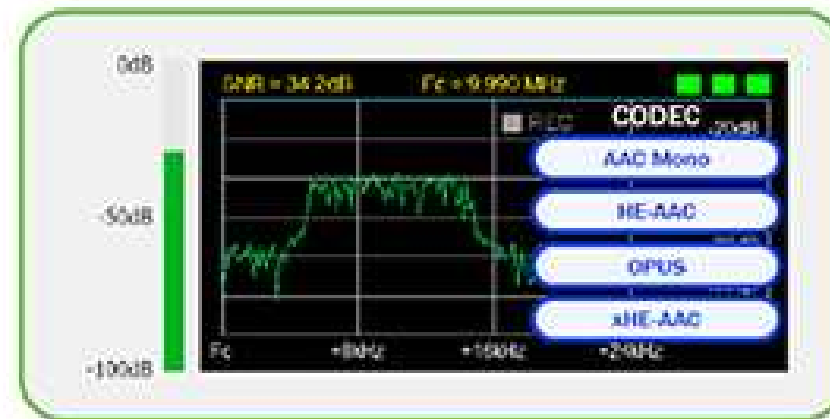
MOT Slideshow

Broadcast Website

Algorkorea

<http://www.algorkorea.com>

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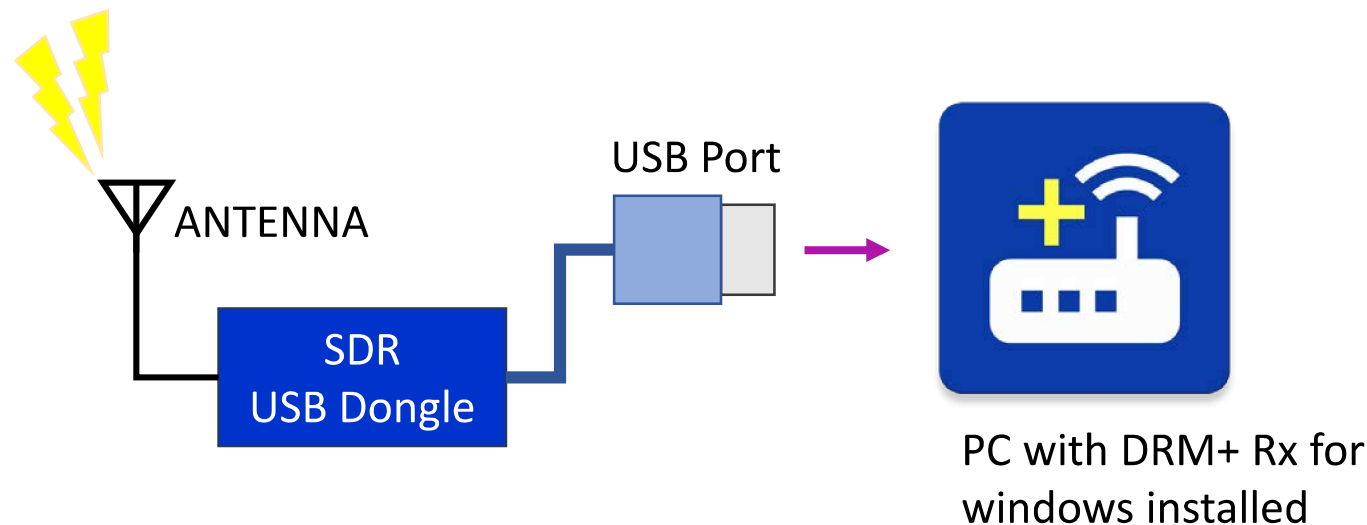


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MAY 3, 2022

DRM+ Rx for Windows

SDR Mode



DRM+ Rx for Windows allows you to connect MSi.SDR or RTL-SDR receiver dongle to PC via USB cable and decode DRM signals.

The DRM+ Rx for Windows software can decode DRM30 signals using HE-AAC, OPUS and xHE-AAC encodings. It can decode sound, metadata, slideshow, web pages and display it on the built in web browser.

In order to run DRM+ Rx, you will first need to plug your MSi.SDR or RTL-SDR receiver into the PC using a USB cable.

Please make sure the driver for the MSi SDR or RTL-SDR dongle is installed before running this program



- Select the SDR hardware connected to the computer
- If the wrong hardware button is selected, please close the program and restart it, and click the correct hardware button.

User Interface

AlgorKorea DRM+ MSi for Windows v1.0.0

0dB
-50dB

SNR = Fc = 10.000 MHz

		REC	-20dB
			-40dB
			-60dB
			-80dB
			-100dB

Fc +8kHz +16kHz +24kHz

START
STOP

☐ Use DRM WAV

SDR Frequency [Hz]
10000000

Preset 1
Preset 2
Preset 3
Preset 4
Preset 5

☐ Change Preset

Select DRM signal input channel (1) I/Q positive (0Hz IF)

Recording scheduler
No schedule.

Setting
Start Scheduler
Stop Scheduler

[16:06:59] C:/AlgorKorea/DRM4WIN/ (8)

Press Ctrl + "+" or "-" or Ctrl + mouse wheel to zoom in or out
Make sure the mouse cursor is above the multimedia screen

DRM+ MSi for Windows
Digital Radio Mondiale (DRM) Radio App

Journaline
MOT Slideshow
Broadcast Website

AlgorKorea
<http://www.algorkorea.com>

(5)

<< Back Forward >>

Tutorial

Service channels

1
2
3
4

(6)

Exit

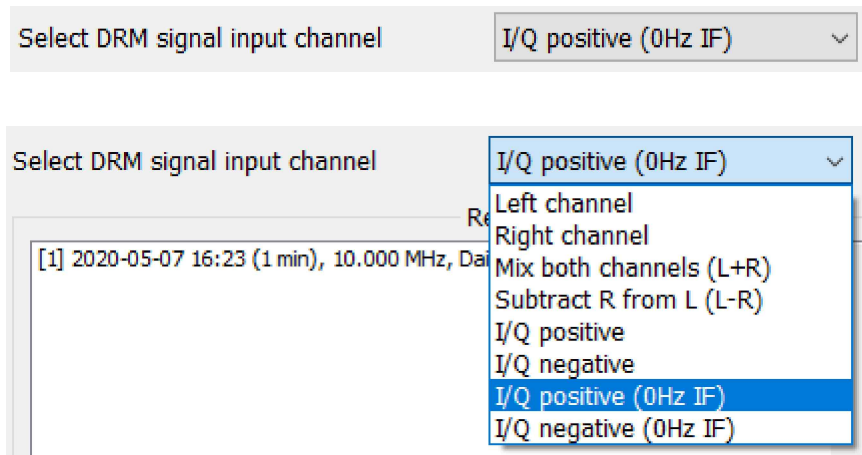
(2)

(3)

(4)

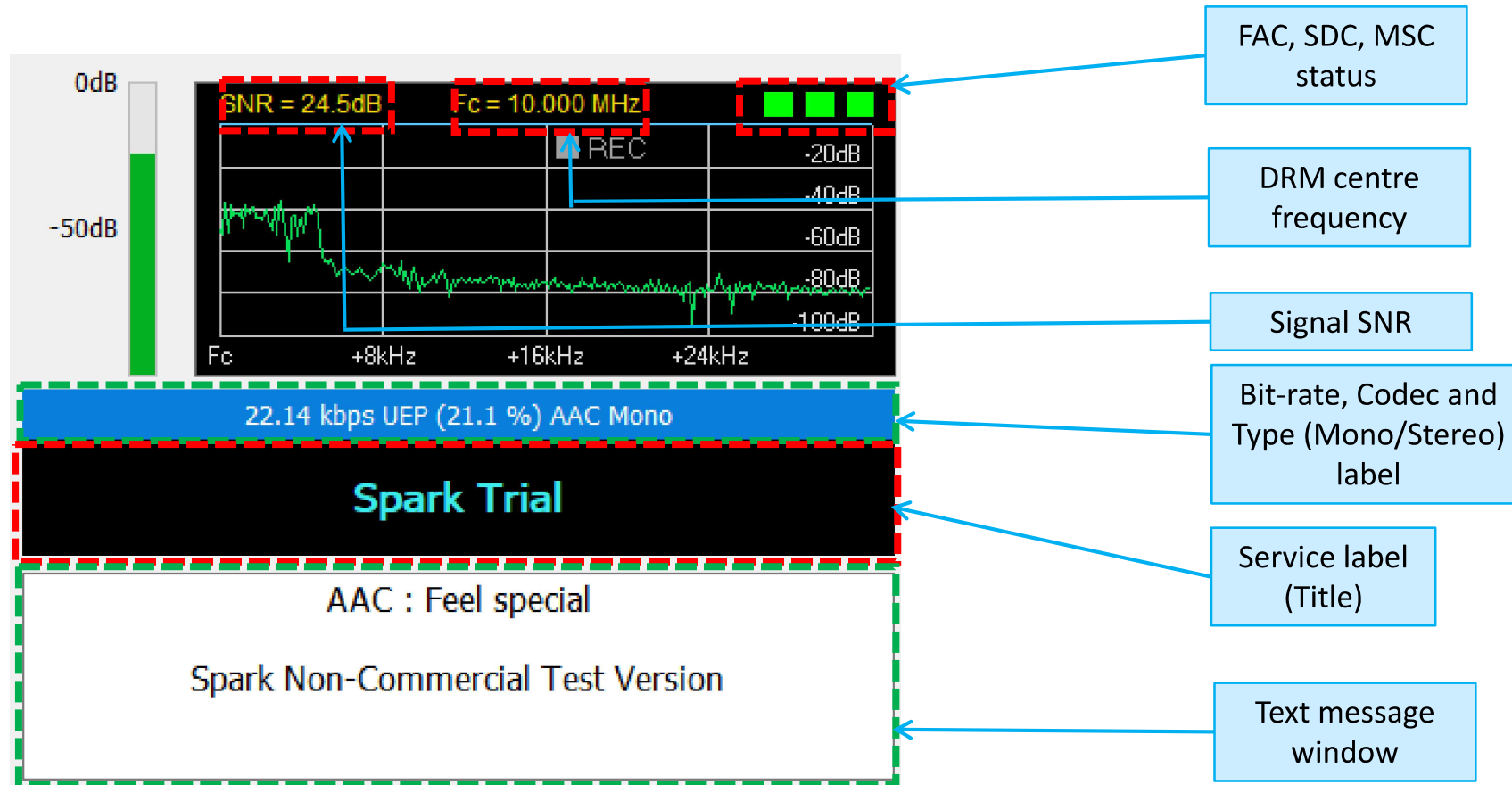
(7)

1. User interface: input channel selector



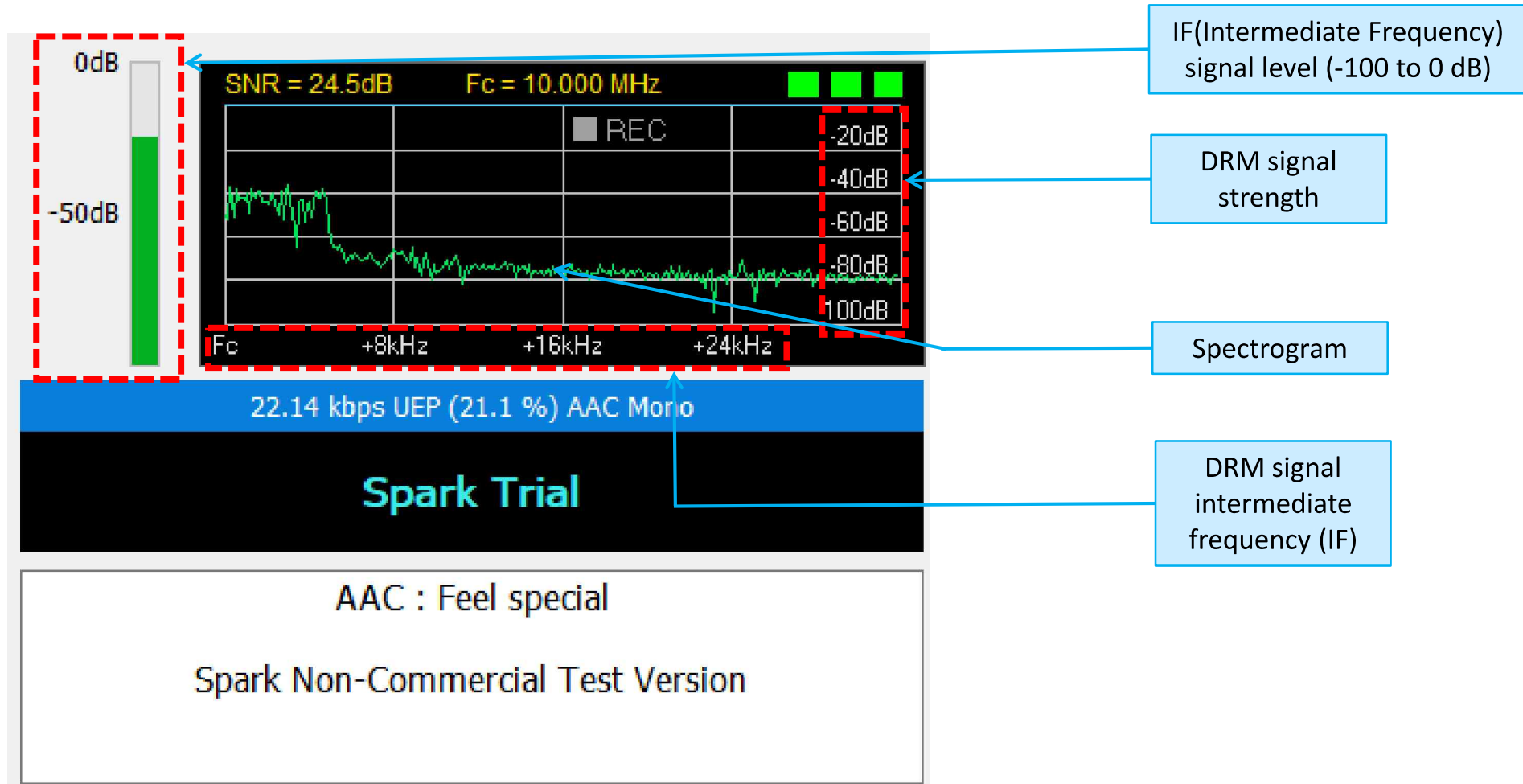
- Use this drop down menu to select input channel for the DRM signal
- The default option is I/Q positive (0 Hz IF) which assumes interleaved I and Q signals for both left and right channel
- It is recommended to use the default option for most DRM signals

1. User interface: DRM text and information



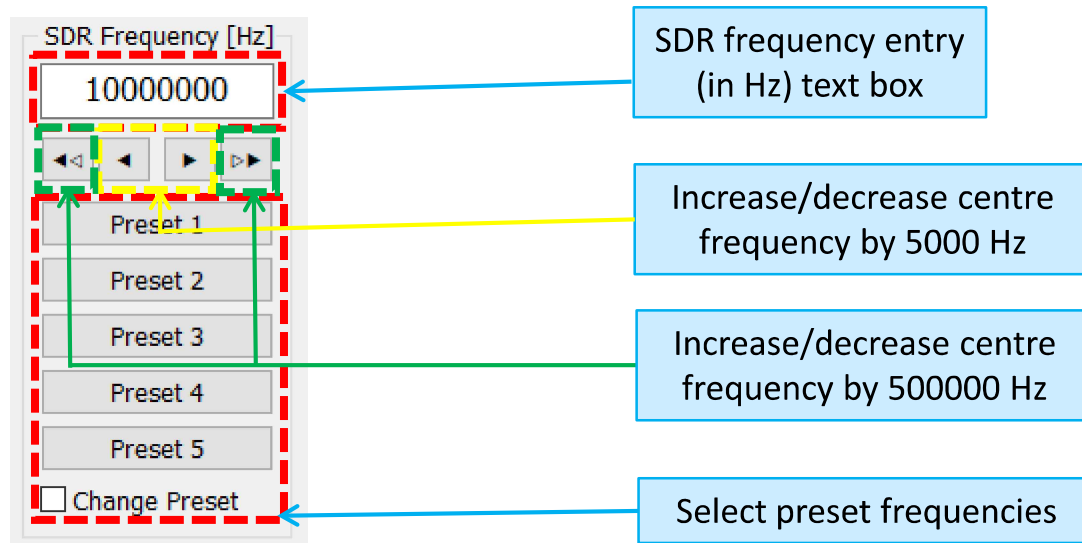
- Bit rate, codec and type information are visible in DRM is correctly decoded
- Service label (title) and text message are displayed if available
- FAC, SDC, MSC status lights change to green colour if they are properly decoded

2. User interface: spectrogram



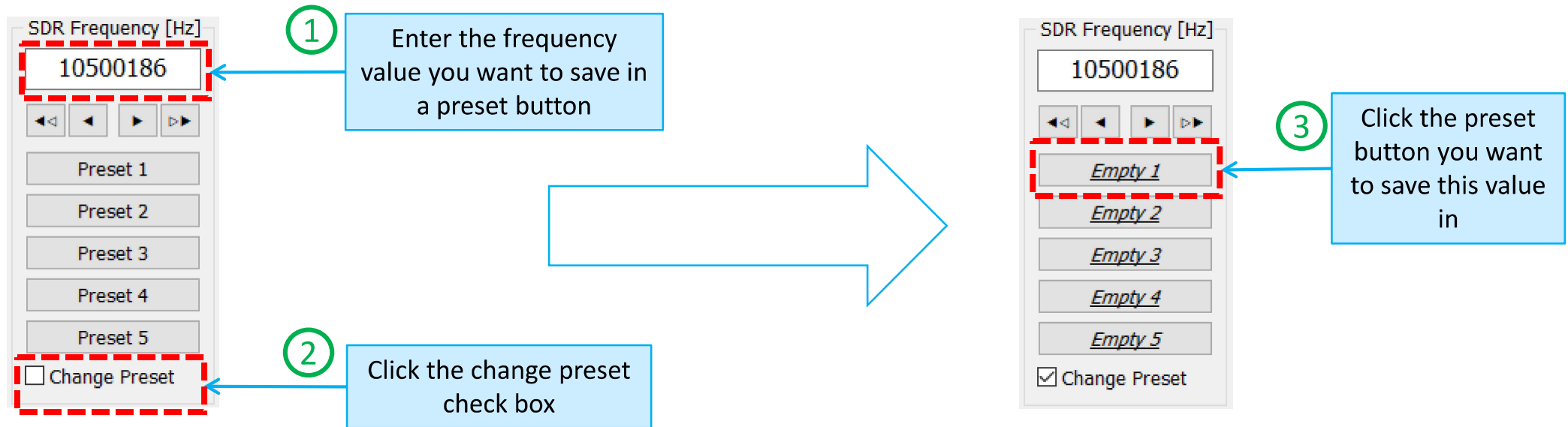
- The graph of the spectrogram shows the detected RF signal
- Shape of the graph can be used to determine if DRM signal has been detected by the antenna

3. User interface: set SDR frequency (manual)



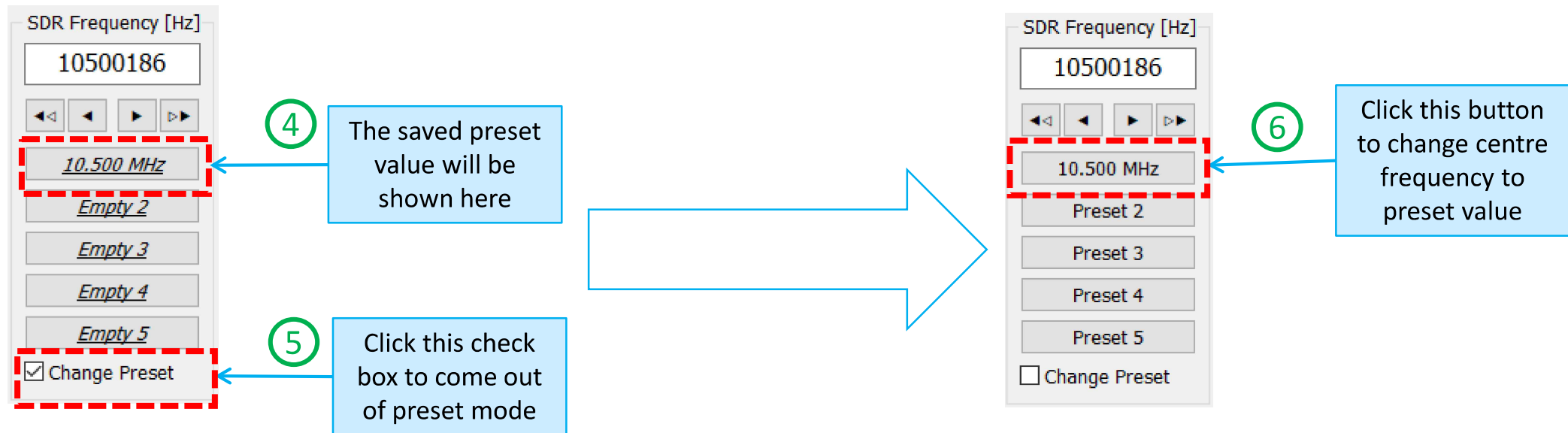
- You can set the SDR centre frequency by directly entering the desired value in the text box (range: 500000 Hz – 28800000 Hz)
- Click the ▶ button to increase and ◀ button to decrease the centre frequency by 5000 Hz (5 kHz)
- Click the ▶▶ button to increase and ◀◀ button to decrease the centre frequency by 500000 Hz (500 kHz)
- Use one of the Preset buttons to set centre frequency to a preset value
- Above figure shows that no preset buttons have been set

3. User interface: set SDR frequency (preset)



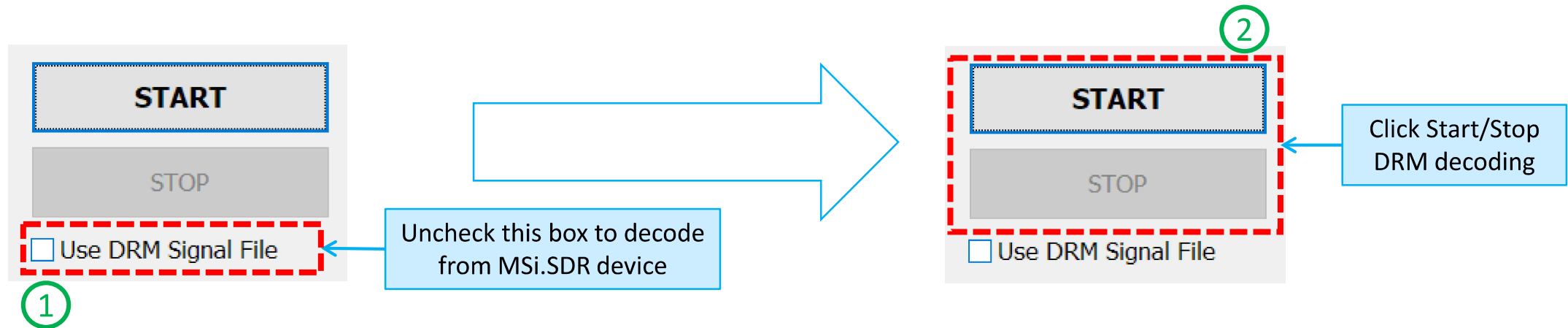
- To save a frequency to a preset button:
- Enter the frequency value you want to save in the text box
- Click the change preset check box
- Click the present button where you can to save this value. If the preset button is not empty this will erase the previous preset value and save the new one

3. User interface: set SDR frequency (preset)



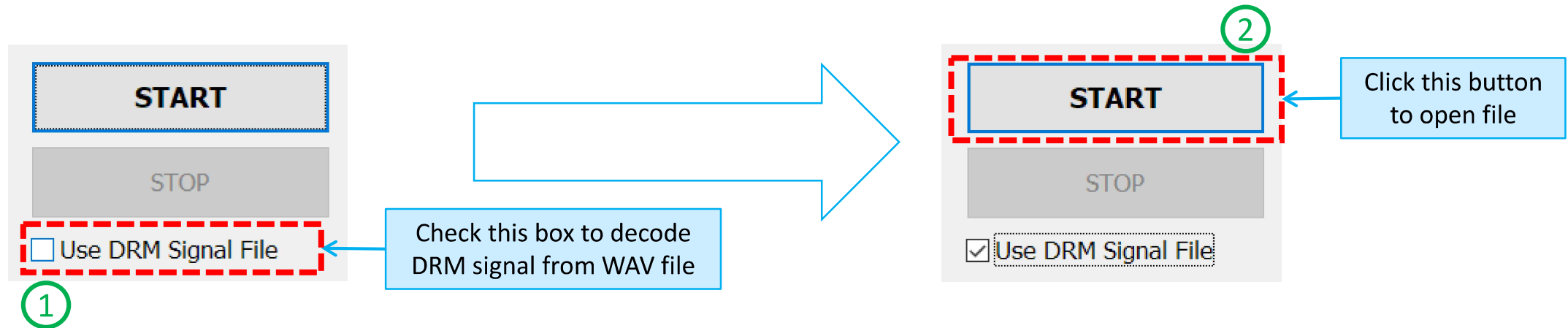
- Uncheck the Change preset check box to come out of preset mode
- The current frequency is now saved in the preset button
- Click the preset button to set centre frequency to this preset value
- The new preset value will be available even if you exit and restart the program

4. User interface: Start/Stop DRM decoding



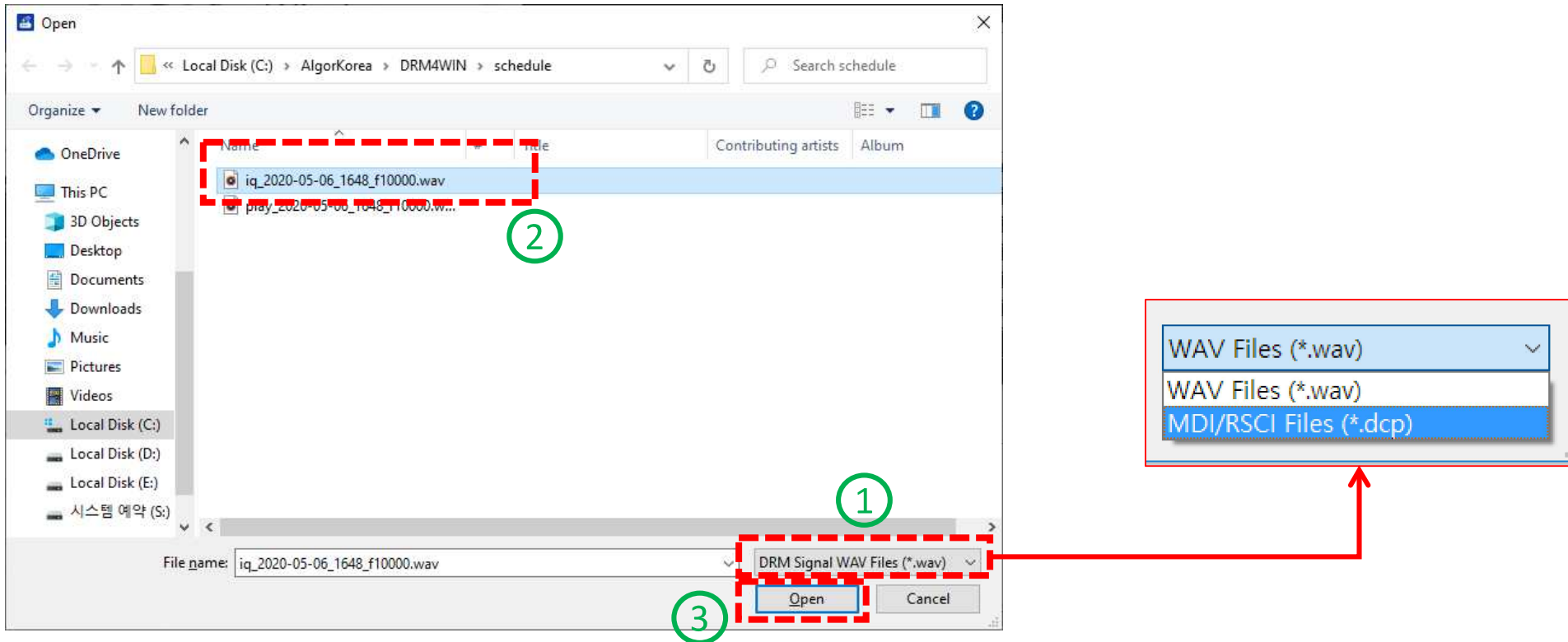
- Make sure MSI SDR is properly connected to the PC first, before starting DRM decoding
- If SDR dongle is not connected, the DRM+ Rx for Windows applications will display and error message and close
- If this happens please check the MSI SDR physical connection and restart the program
- Click the Start button to start decoding DRM signal
- While RF signal is being decoded, click the Stop button to stop decoding

4. User interface: DRM decoding from file



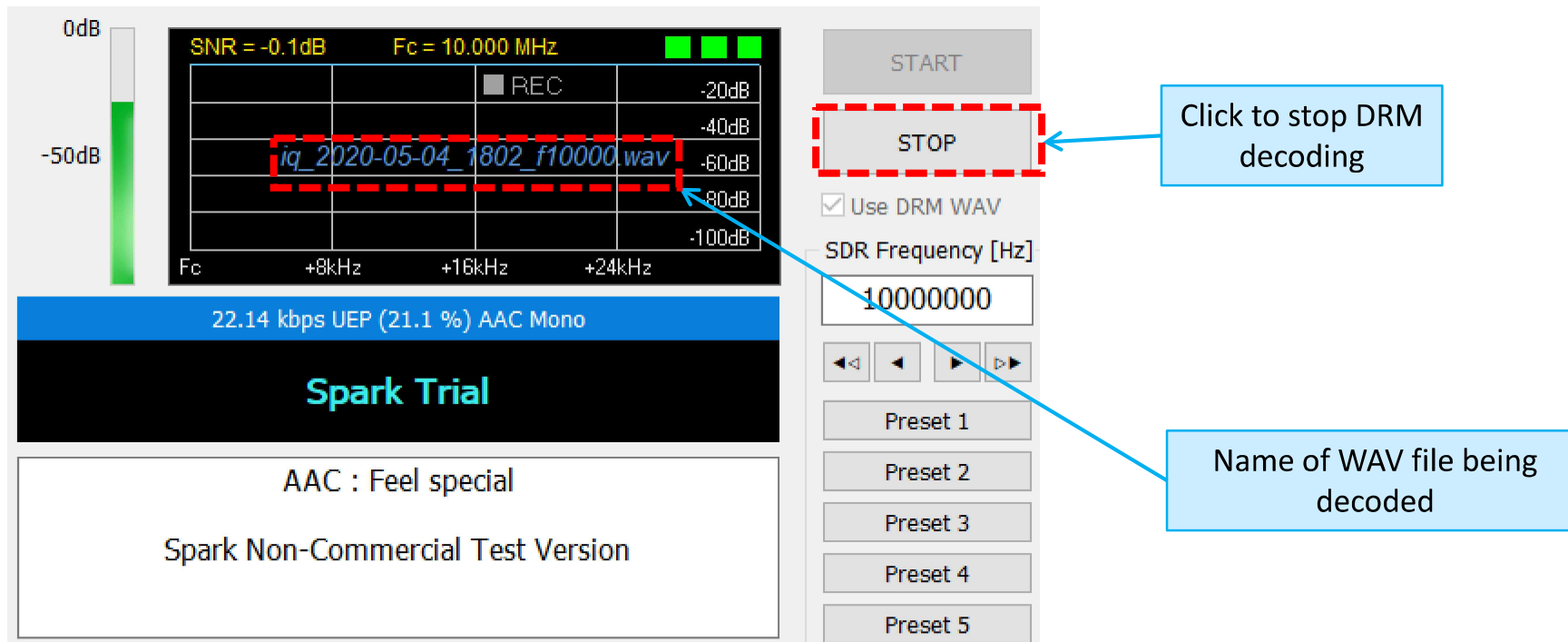
- To decode DRM signals from a WAV or DCP file, select the Use DRM Signal File check box
- This check box cannot be clicked if the software is currently decoding DRM signal
- Click the start button to select the WAV file

4. User interface: DRM decoding from file



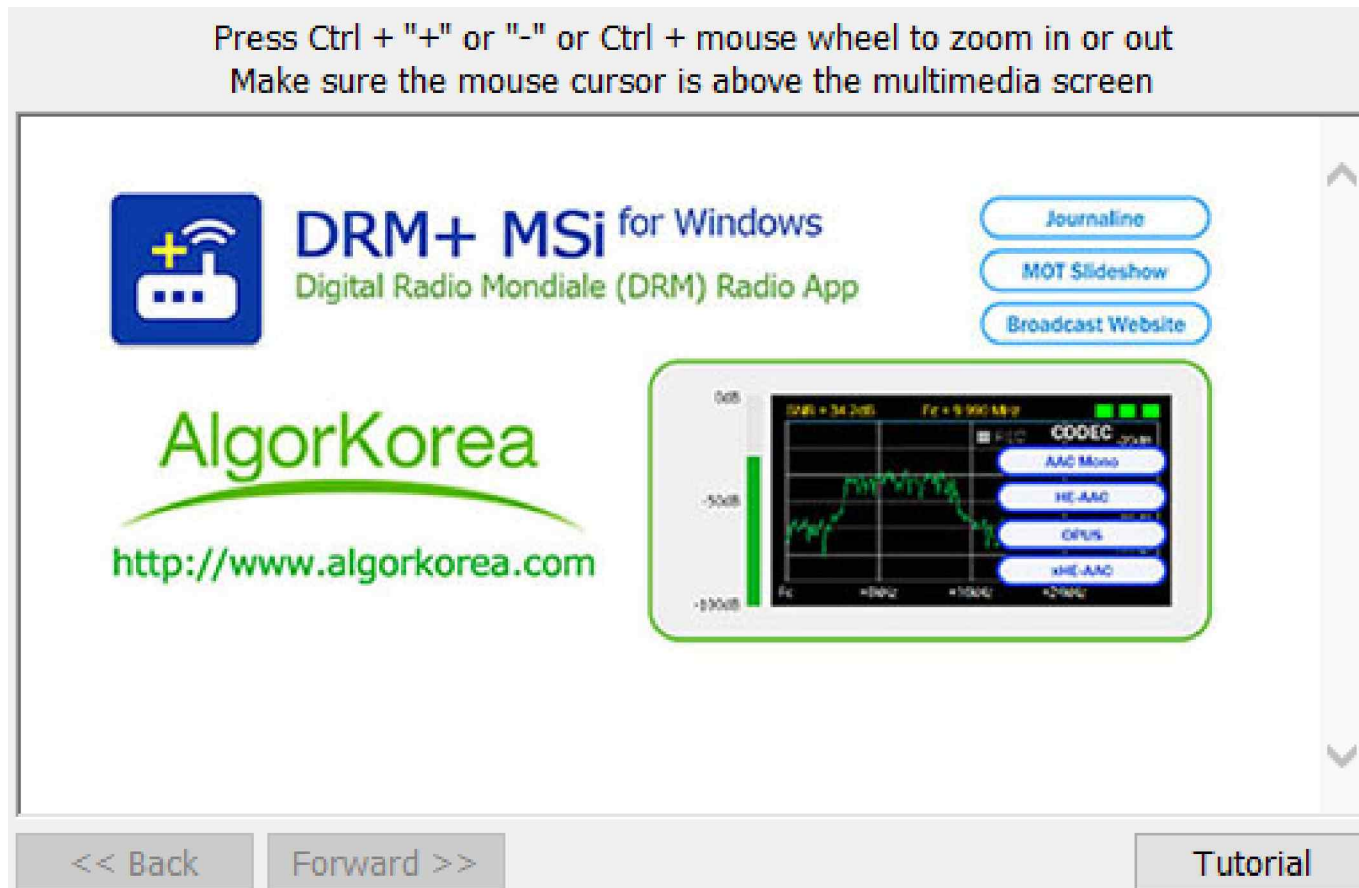
- ① Select whether you want to decode WAV (48kHz/16bit/Stereo) or DCP file (MDI/RSCI format)
- ② Select the WAV or DCP file that you want to decode and click Open
- ③ If the selected file has correct DRM information the software will start DRM decoding

4. User interface: DRM decoding from file



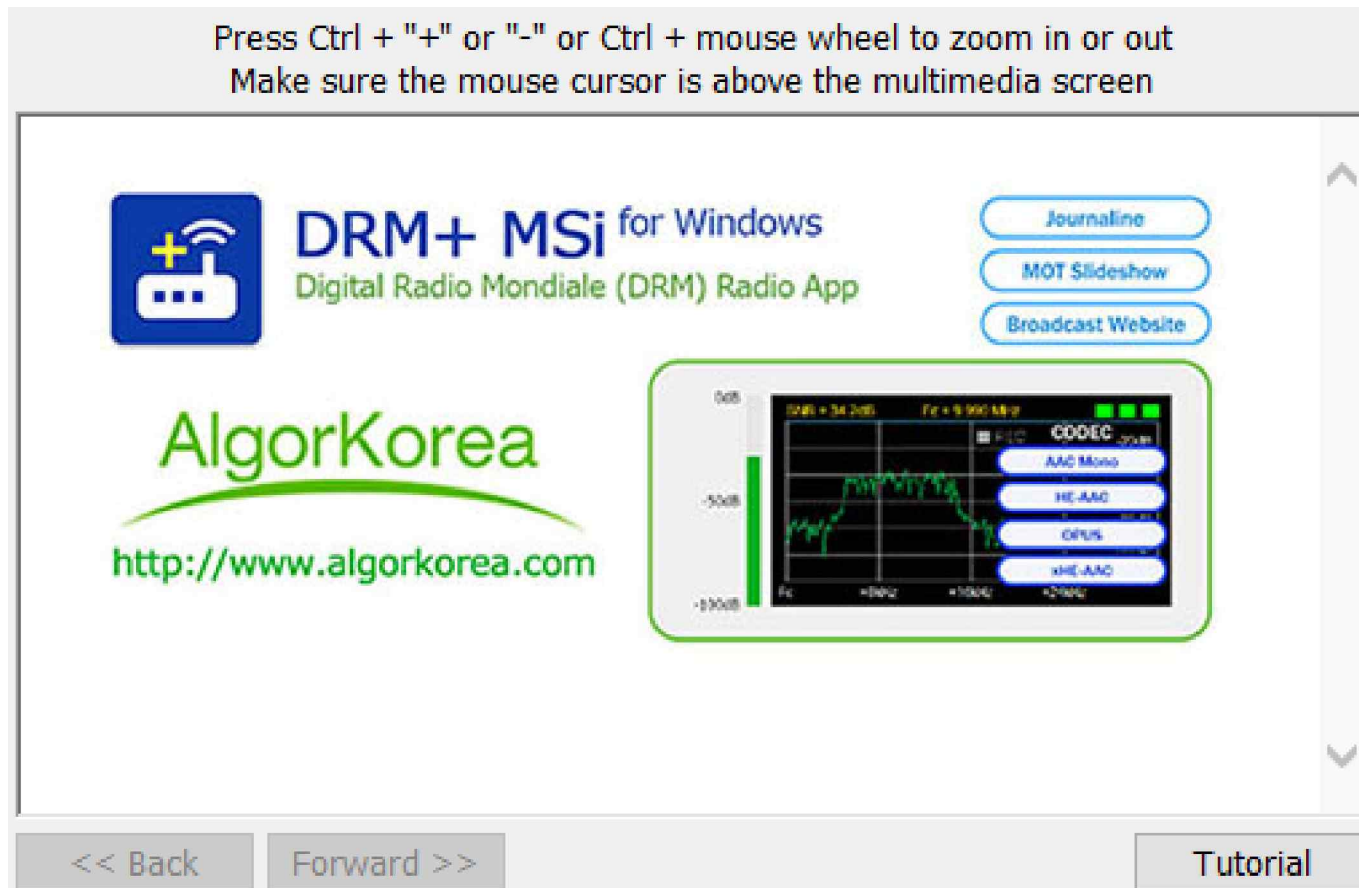
- Spectrogram is not displayed when decoding DRM from a selected file
- If signal level, FAC, SDC, MSC status, bit rate, codec and type label, service label and DRM text message are displayed as shown above
- Multimedia objects (slide show images, web pages, etc), if present, are displayed in the multimedia screen

5. User interface: Multimedia screen



- The multimedia screen will display multimedia objects in the DRM signal, if they are present
- This includes slideshow images and broadcast website
- If there are no multimedia objects in the DRM signal, this screen will display a default image

5. User interface: Multimedia screen



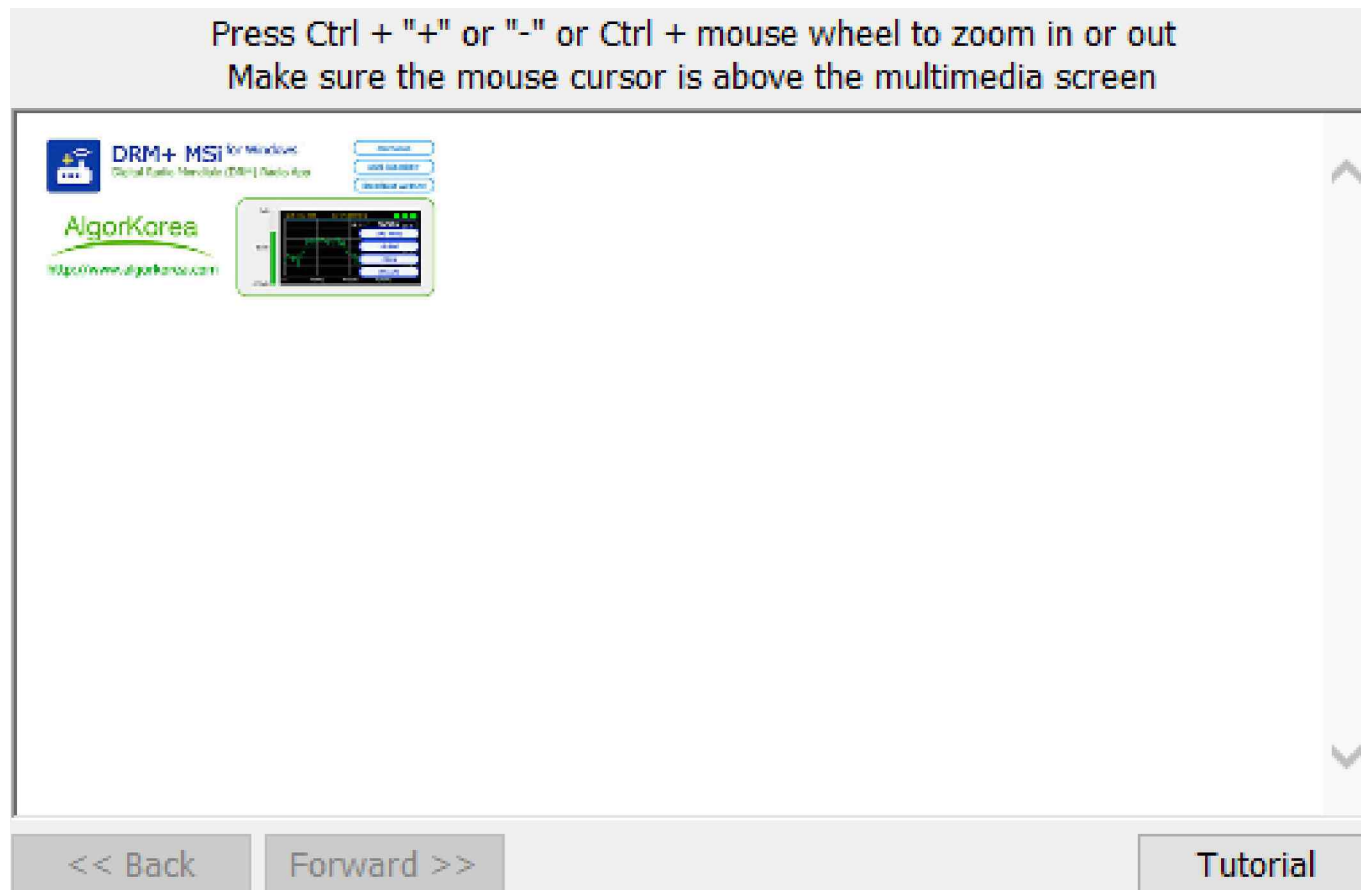
- Click on the multimedia screen and press Ctrl+"+" key on the keyboard to zoom in and enlarge the image in the multimedia screen
- Press Ctrl+"-" key to zoom out of the image on the multimedia screen
- Alternatively, click the multimedia screen and with the cursor on the multimedia screen, press Ctrl on the keyboard and move the mouse wheel up or down to zoom in or out

5. User interface: Multimedia screen



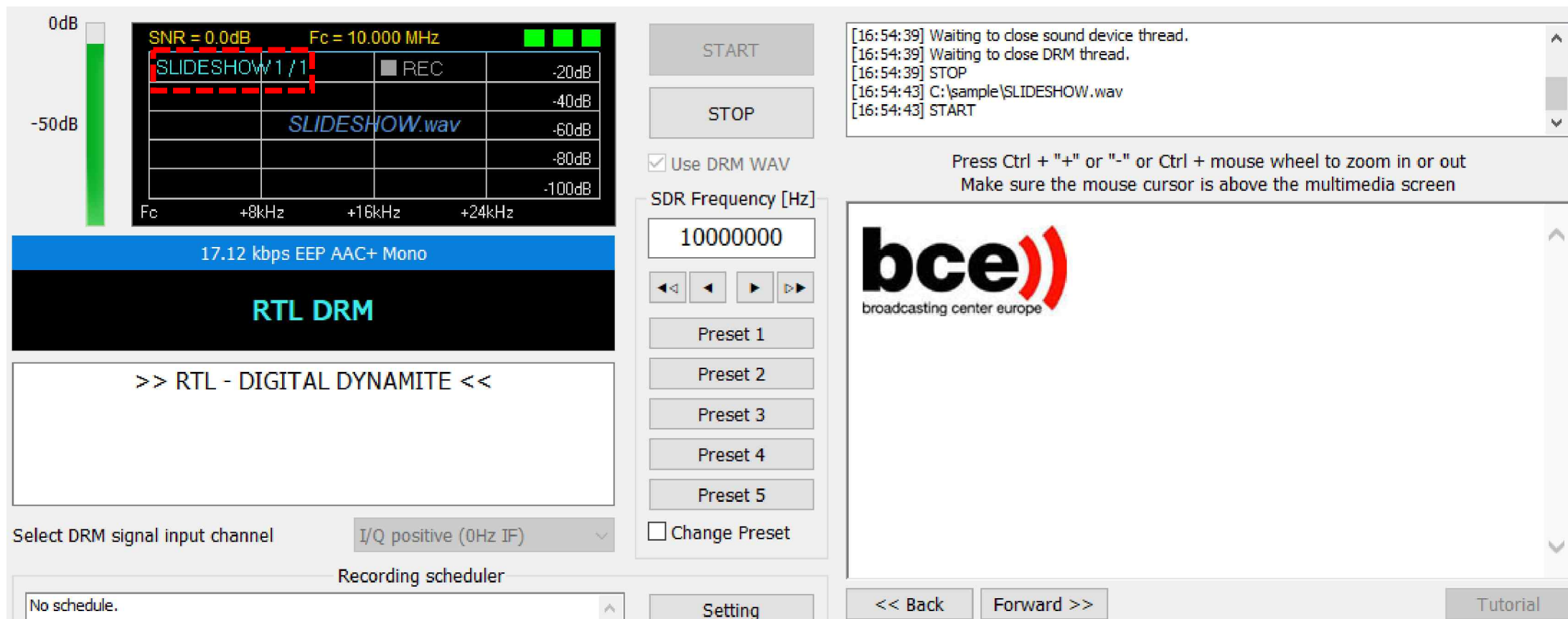
- Zooming in to the multimedia screen content

5. User interface: Multimedia screen



- Zooming out of the multimedia screen contents

5. User interface: Multimedia screen



- When displaying slideshow images, the number of images that have been decoded is displayed in the spectrogram box

5. User interface: Multimedia screen

0dB
-50dB

SNR = 0.0dB Fc = 10.000 MHz

SLIDESHOW 2 / 2	REC	-20dB
		-40dB
SLIDESHOW.wav		-60dB
		-80dB
		-100dB

Fc +8kHz +16kHz +24kHz

17.12 kbps EEP AAC+ Mono

RTL DRM

Please do not hesitate to send your reception reports to:
drm@rtl.com

Select DRM signal input channel I/Q positive (0Hz IF)

Recording scheduler
No schedule.

START
STOP

☒ Use DRM WAV

SDR Frequency [Hz]
10000000

◀◀ ◀ ▶ ▶▶

Preset 1
Preset 2
Preset 3
Preset 4
Preset 5

☐ Change Preset

[16:54:39] Waiting to close sound device thread.
[16:54:39] Waiting to close DRM thread.
[16:54:39] STOP
[16:54:43] C:\sample\SLIDESHOW.wav
[16:54:43] START

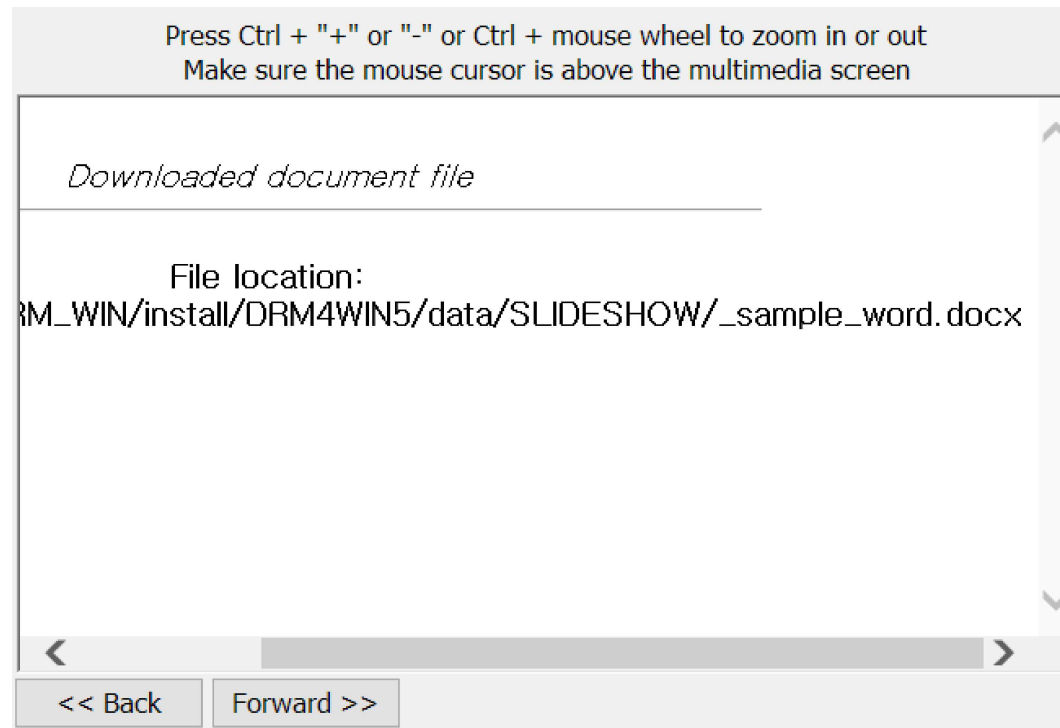
Press Ctrl + "+" or "-" or Ctrl + mouse wheel to zoom in or out
Make sure the mouse cursor is above the multimedia screen

<< Back Forward >>

Tutorial

- Press the << Back and Forward >> buttons to view the slideshow images decoded up to this point. The serial number of the current image on the multimedia screen can be viewed in the spectrogram box

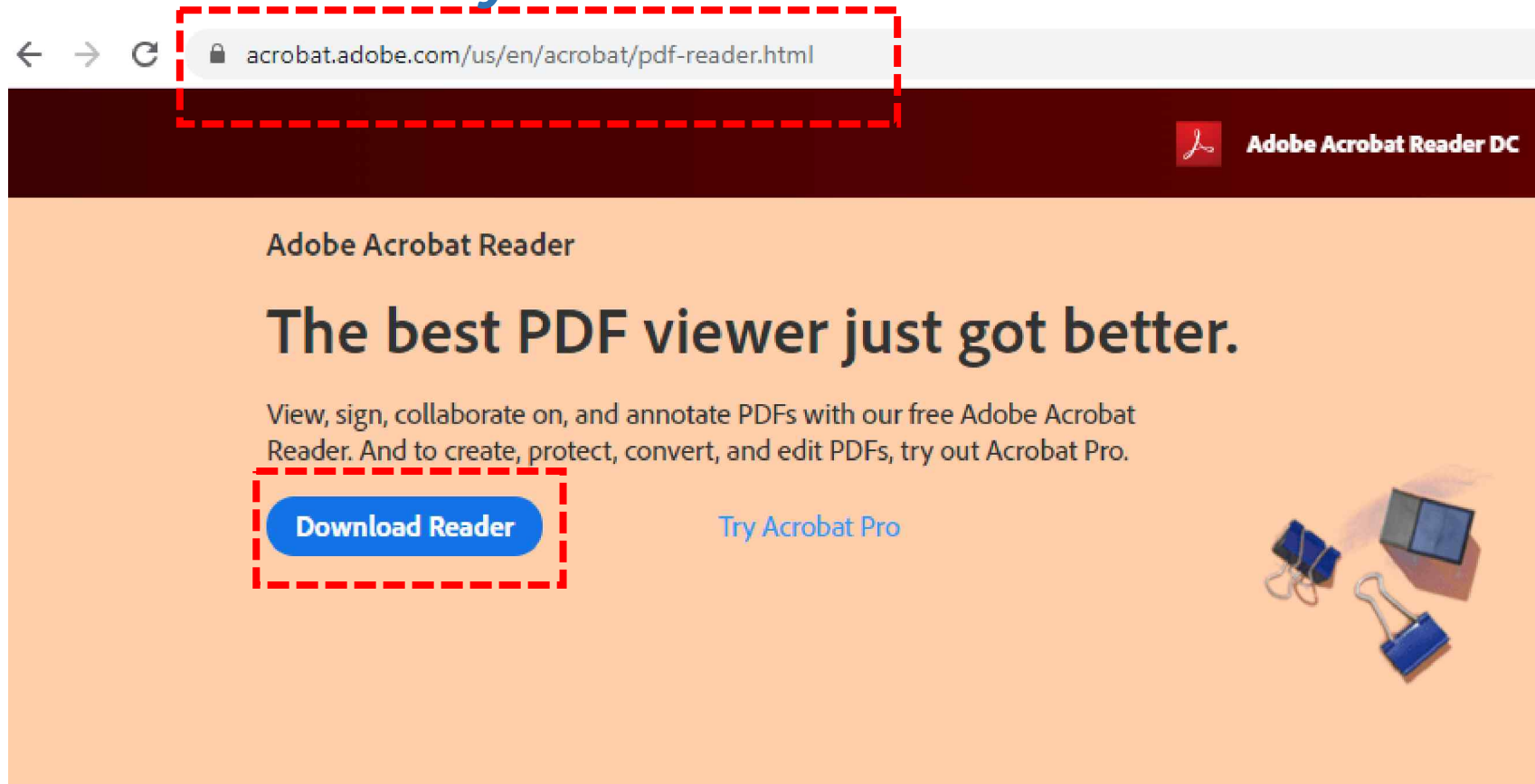
5. User interface: Multimedia screen



Example : Received Microsoft WORD file (.doc/*.docx)*

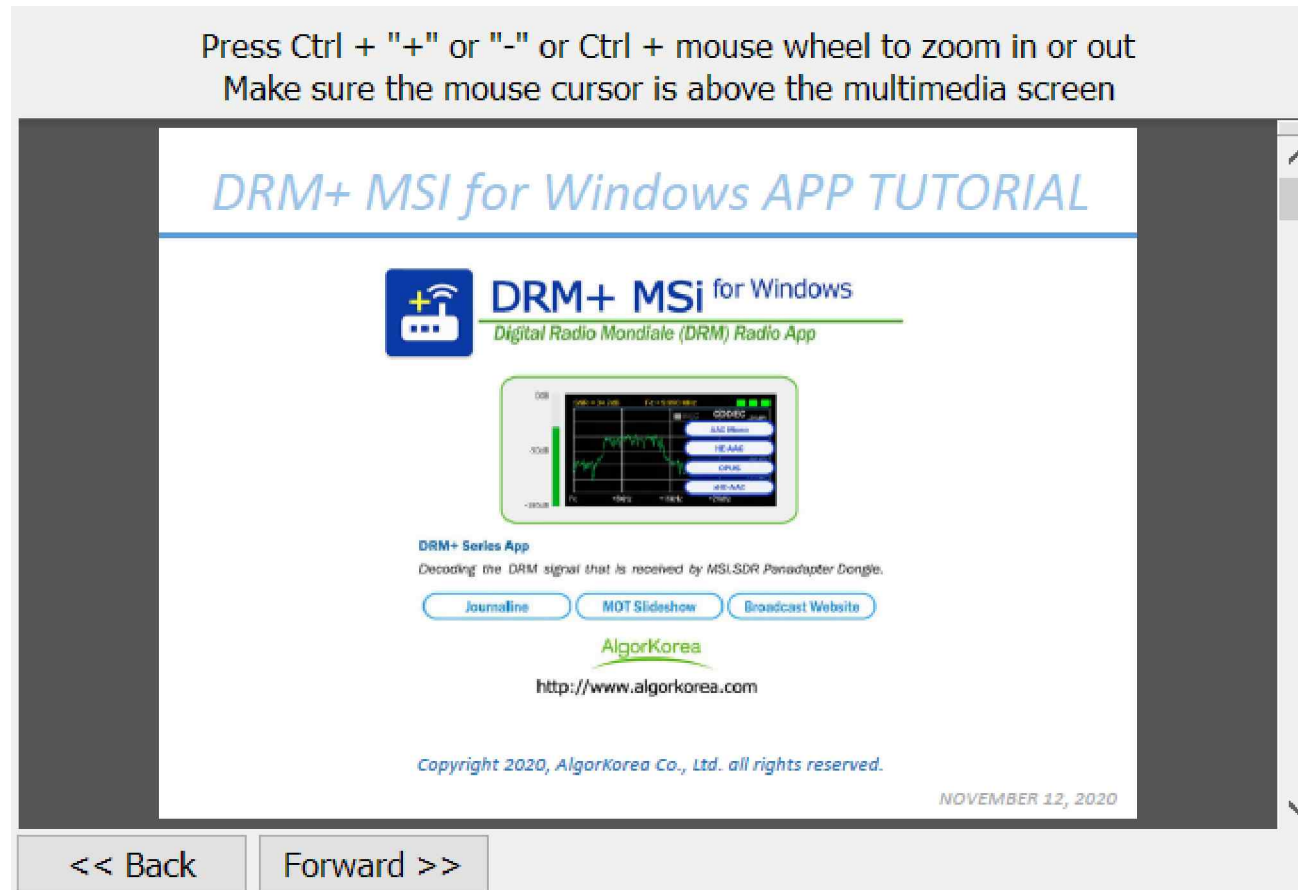
- DRM slideshow broadcast contains images or document files (Text or Microsoft Word)
- Microsoft Word documents are not displayed in the multimedia screen, and only their save locations on the your storage are shown
- If a tutorial pdf file cannot be displayed (for example, illegal DRM data or adobe acrobat reader not installed), you need to install adobe acrobat reader to view them in the multimedia screen.

5. User interface: Multimedia screen



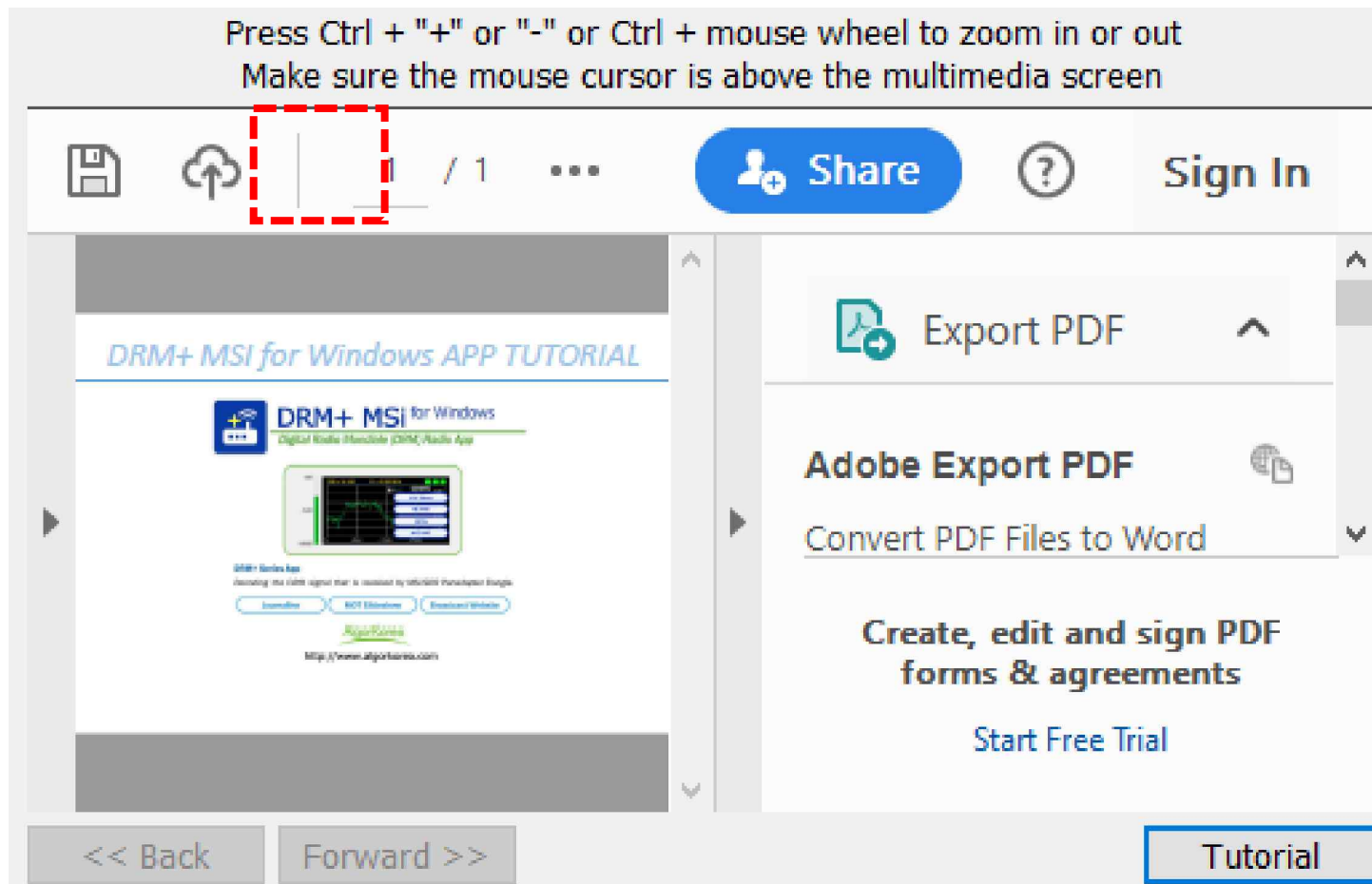
- Go to acrobat.adobe.com/us/en/acrobat/pdf-reader.html to download the latest version of acrobat reader

5. User interface: Multimedia screen



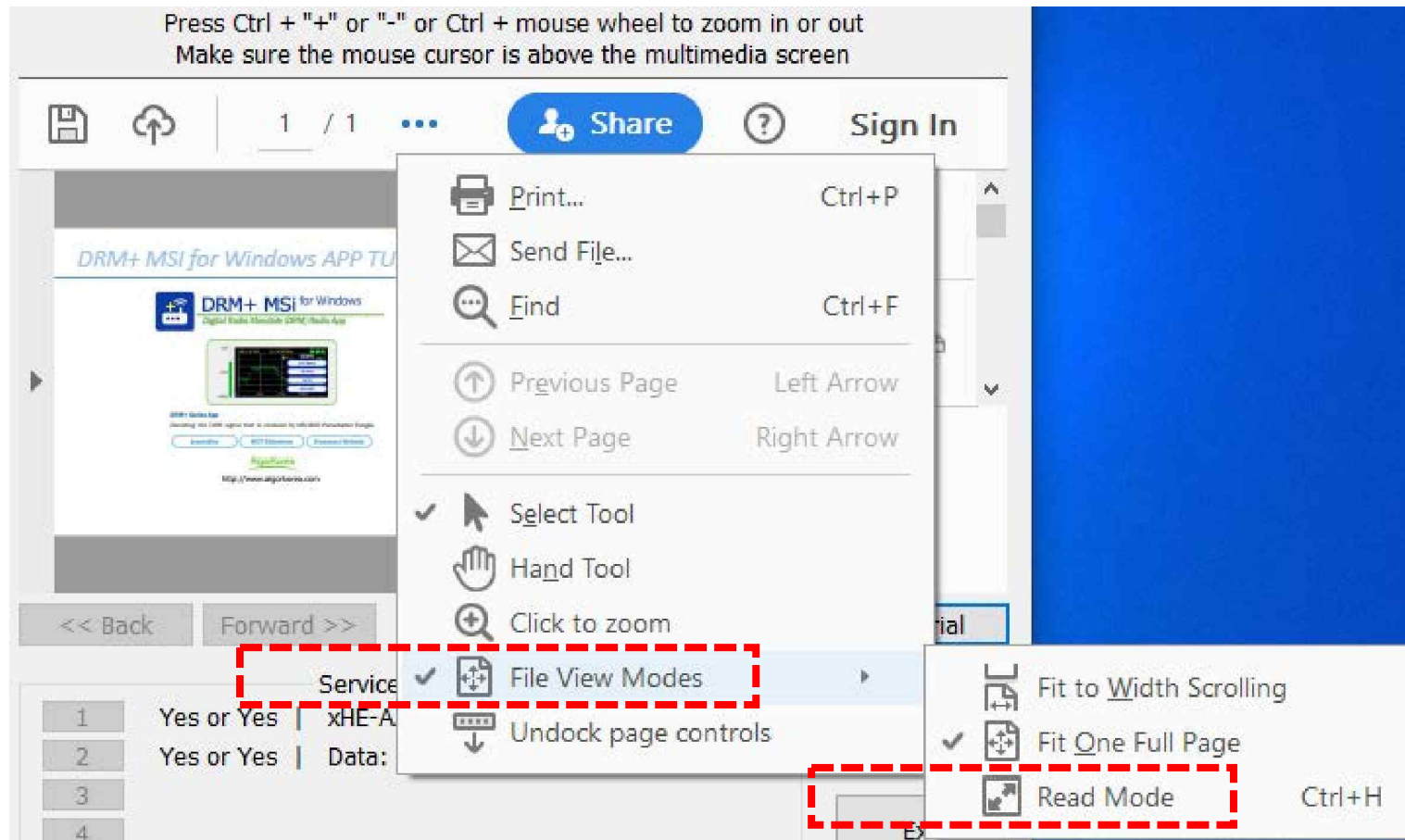
- If adobe acrobat reader is properly installed, pdf files can also be viewed on the multimedia screen

5. User interface: Multimedia screen



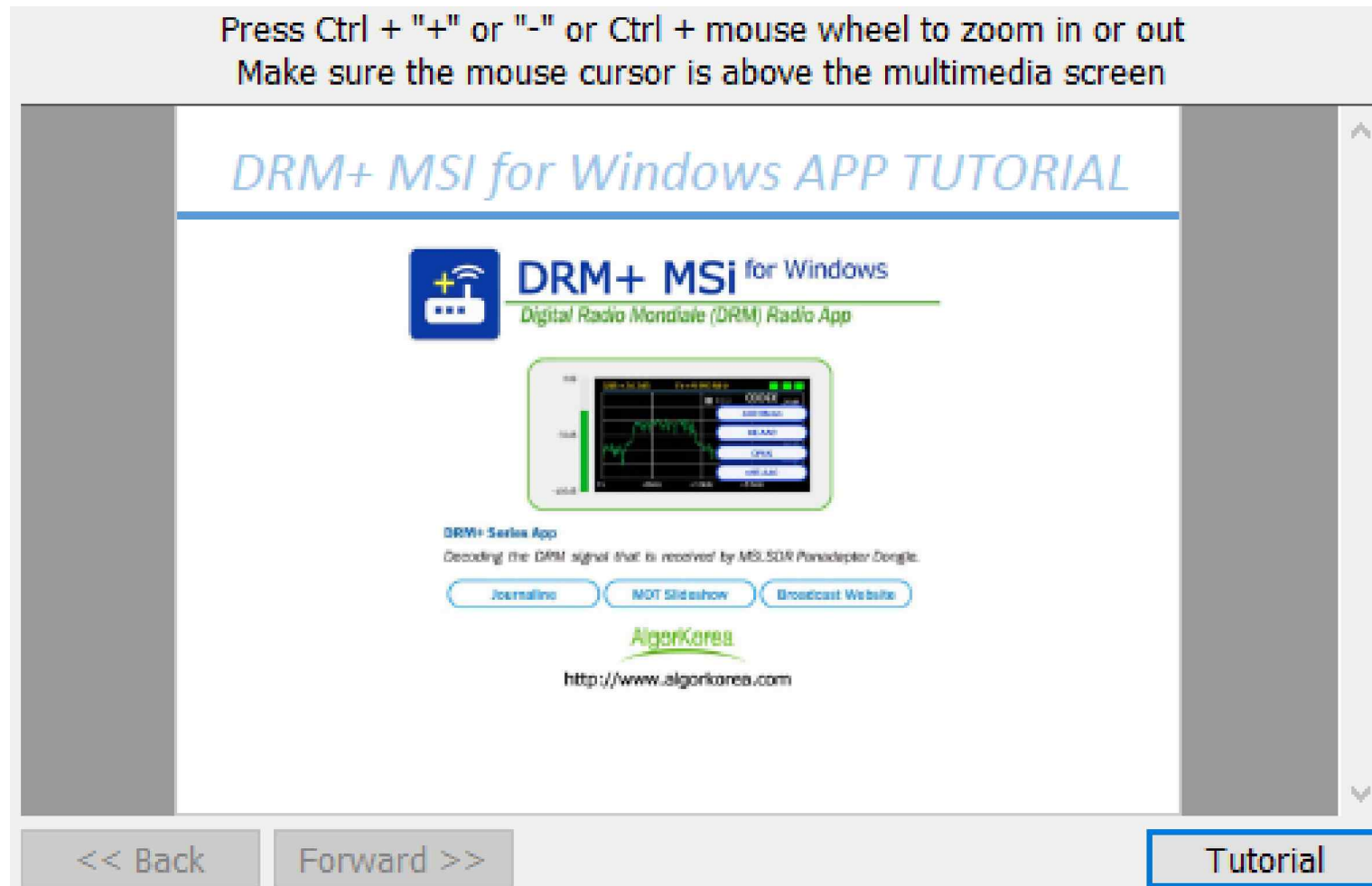
- In some versions of acrobat reader (for example, the free adobe acrobat reader DC), opening the same pdf file twice on the multimedia screen can cause a toolbar and some extra options to appear as shown above
- To remove these, click on the three dots shown above

5. User interface: Multimedia screen



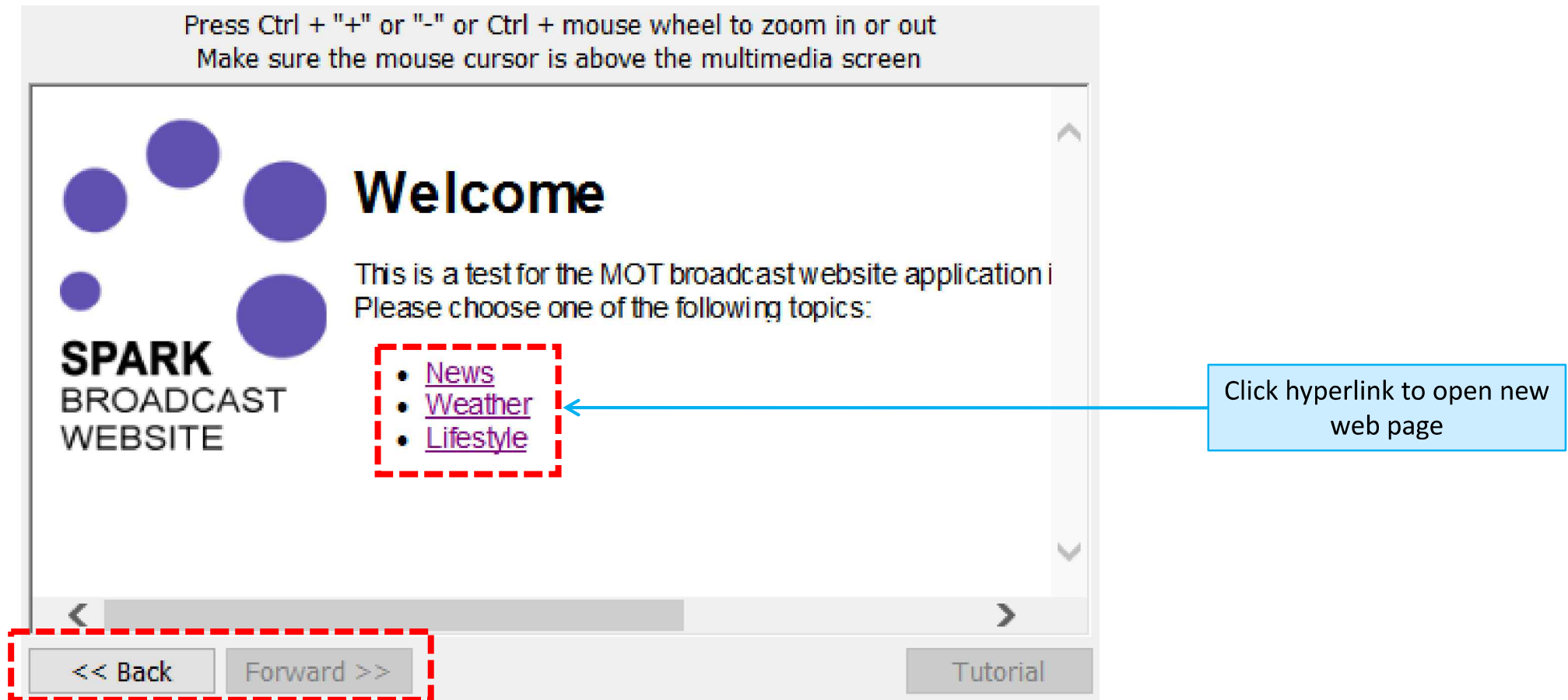
- On the menu that appears, click on File View Modes
- On the sub menu click on Read Mode

5. User interface: Multimedia screen



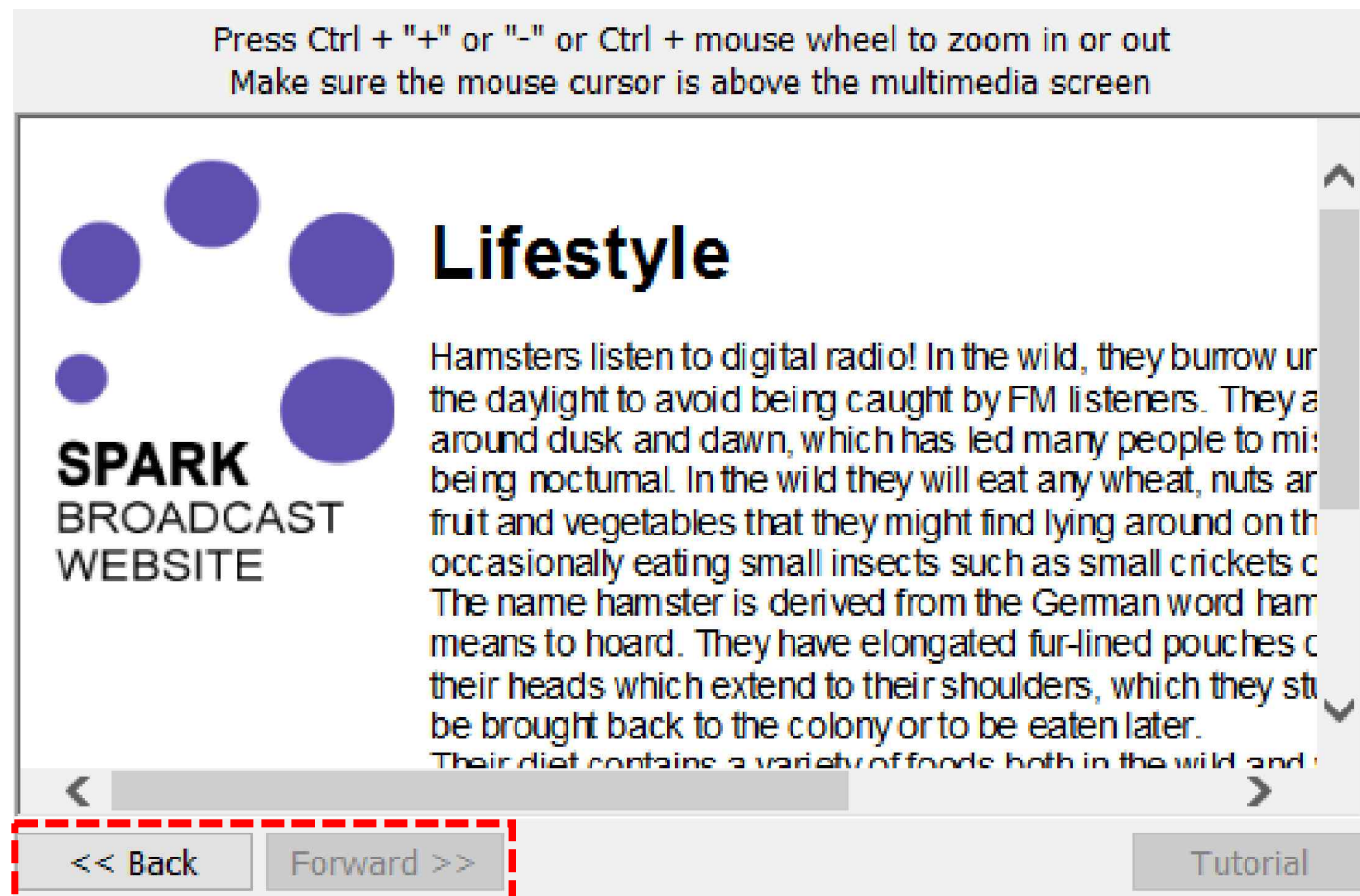
- The toolbar and extra option panel will disappear and the pdf file can be viewed on the entire multimedia screen

5. User interface: Multimedia screen



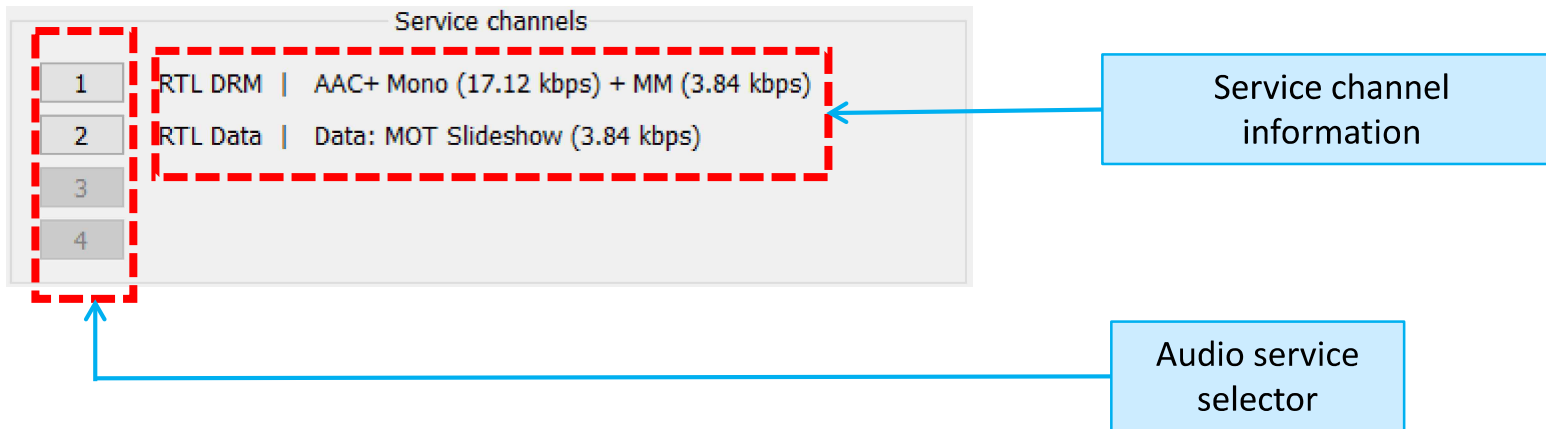
- When decoding broadcast website DRM signals, only the << Back button is available
- The multimedia screen display will be automatically updated if the contents of the web page changes
- Click on a hyperlink to open a new webpage

5. User interface: Multimedia screen



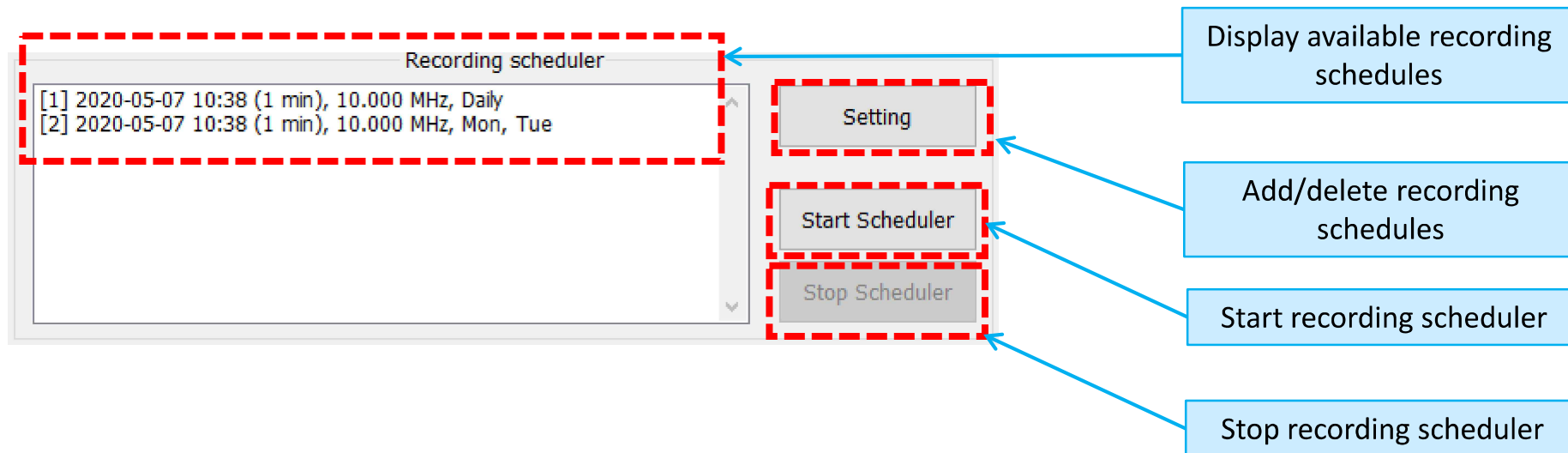
- Click the back button to return to previous page

6. User interface: Service channels



- Use audio service selector buttons to choose a different audio service in the DRM signal , if available
- Click on a selector button to choose that service channel
- For example, the image shown above has 2 service channels
 - Channel 1 contains audio information
 - Channel 2 contains slideshow image information
- Information about audio service channel can be seen next to it's audio service selector button

7. User interface: Recording scheduler



- This option can be used to record DRM signals at a specified day and time
- In addition to decoding and playing DRM signals, if the scheduler is started the software will save the raw DRM signal along with decoded WAV file in the disk
- Click setting button to open a new window to add/delete recording schedules

7. User interface: Setting for scheduler

The screenshot shows a 'Setting for Scheduler' dialog box with a title bar and a close button. The main area is titled 'Schedule 1'. It contains several controls: a time picker for 'AM 11:09', a frequency spinner for '10.000 MHz', a 'Center Frequency' spinner for '10000000 Hz', and a 'Recording Duration' spinner for '30'. There are also checkboxes for 'Week-Day(s)' (Mon, Tue, Wed, Thu, Fri, Sat, Sun) and 'Use Auto Playback'. On the right side, there are buttons for 'Add', 'Delete', 'Save', and 'Cancel'. Blue arrows point from text boxes on the right to specific UI elements: 'Recording time: hour of day' points to the hour part of the time picker; 'Recording time: minute' points to the minute part of the time picker; 'Change recording duration' points to the 'Recording Duration' spinner; 'Change recording centre frequency' points to the 'Center Frequency' spinner; and 'Recording centre frequency' points to the '10.000 MHz' text.

Setting for Scheduler

Schedule 1

☐ Week-Day(s)

☐ Mon ☐ Tue ☐ Wed ☒ Thu ☐ Fri ☐ Sat ☐ Sun

☐ Use Auto Playback

AM 11:09

10.000 MHz

Center Frequency 10000000 Hz

Recording Duration 30

Add

Delete

Save

Cancel

Recording time: hour of day

Recording time: minute

Change recording duration

Change recording centre frequency

Recording centre frequency

- Click on the hour setting and either type it in or click on the up and down arrows to the right to increase or decrease the hour of day to start recording (range: 00 AM - 23 PM)
- Click on the minute setting and either type it in or click on the up and down arrow to the right to increase or decrease the minute at which to start recording (range: 00 - 59)
- Set the recording centre frequency by either typing it in (in Hz) or clicking the up and down arrow buttons on the Centre frequency spinner box (range: 500000 - 28800000)
- Set the duration you want to record for by typing it in (in minutes) or clicking the up and down arrows on the Recording Duration spinner box (range: 0 – 180)

7. User interface: Setting for scheduler

Setting for Scheduler

Schedule 1

☐ Week-Day(s)

☐ Mon ☐ Tue ☐ Wed ☒ Thu ☐ Fri ☐ Sat ☐ Sun

☐ Use Auto Playback

Center Frequency 10000000 Hz

Recording Duration 30

AM 11 : 09

10.000 MHz

Add

Delete

Save

Cancel

Days of the current week

Current day (today)

- To start recording at a later time today, select the desired time to start recording, select centre frequency and recording duration and click Add button

7. User interface: Setting for scheduler

The screenshot shows the 'Setting for Scheduler' dialog box. It has a title bar with a close button (X). The main area is titled 'Schedule 1'. It contains several controls: a time picker (1) showing 'PM 13:24', a frequency input (2) showing '10.000 MHz', a 'Week-Day(s)' section with checkboxes for Mon, Tue, Wed, Thu (checked), Fri, Sat, and Sun, a 'Use Auto Playback' checkbox, a 'Center Frequency' input (3) showing '10000000 Hz', and a 'Recording Duration' input (4) showing '1'. Below these is a list box (6) containing one entry: '[1] 2020-05-07 13:24 (REC: 1 min), 10.000 MHz, Daily'. To the right of the list box are three buttons: 'Add' (5), 'Delete', and 'Save' (7). At the bottom right is a 'Cancel' button.

- Eg: to add a recording schedule at a later time today:
 - Set the desired hour and minute
 - Select desired centre frequency for the SDR
 - Select desired recording duration in minutes
 - Click Add button
 - The new recording schedule will be displayed
 - Click Save

7. User interface: Setting for scheduler

Setting for Scheduler

1 2

PM 13:26

10.000 MHz

Schedule 2

5 ☒ Week-Day(s)

6 ☐ Mon ☐ Tue ☐ Wed ☒ Thu ☒ Fri ☒ Sat ☐ Sun

3 ☐ Use Auto Playback

4 Center Frequency 10000000 Hz

Recording Duration 1

8

7 Add

Delete

9 Save

Cancel

[1] 2020-05-07 13:24 (REC: 1 min), 10.000 MHz, Daily

[2] 2020-05-07 13:26 (REC: 1 min), 10.000 MHz, Thu, Fri, Sat

- Eg: to add recording schedule to other days of the week:
 - Set the desired hour and minute
 - Select desired centre frequency for the SDR
 - Select desired recording duration in minutes
 - Click the Week-days check box
 - Check all the days of the week where you want to schedule DRM recording
 - Click Add button to add the recording schedule
 - The new recording schedule will be displayed
 - Click Save

7. User interface: Setting for scheduler

Setting for Scheduler

1 2

PM 14:02

10.000 MHz

Schedule 1

5 ☒ Week-Day(s)

6 ☐ Mon ☐ Tue ☐ Wed ☒ Thu ☒ Fri ☒ Sat ☐ Sun

7 ☒ Use Auto Playback

3 Center Frequency 10000000 Hz

4 Recording Duration 1

9 1] <Auto Playback> 14:02 (REC: 1 min), 10.000 MHz, Thu, Fri, Sat

8 Add

Delete

10 Save

Cancel

- Eg: Run the recording scheduler everyweek
 - Set the desired hour and minute
 - Select desired centre frequency for the SDR
 - Select desired recording duration in minutes
 - Click the Week-days check box
 - Check all the days of the week where you want to schedule DRM recording
 - Click the Use Auto Playback check box. This will enable the recording scheduler at the same time every week
 - Click Add button to add the recording schedule
 - The new recording schedule will be displayed

7. User interface: Setting for scheduler

Setting for Scheduler ×

Schedule 2

PM 14 : 12

10.000 MHz

☒ Week-Day(s)
☐ Mon ☐ Tue ☐ Wed ☒ Thu ☒ Fri ☒ Sat ☐ Sun
☐ Use Auto Playback
Center Frequency Hz Recording Duration

[1] 2020-05-07 14:08 (REC: 1 min), 10.000 MHz, Daily
[2] 2020-05-07 14:12 (REC: 1 min), 10.000 MHz, Thu, Fri, Sat
[3] <Auto Playback> 14:15 (REC: 1 min), 10.000 MHz, Thu, Fri, Sat

Add

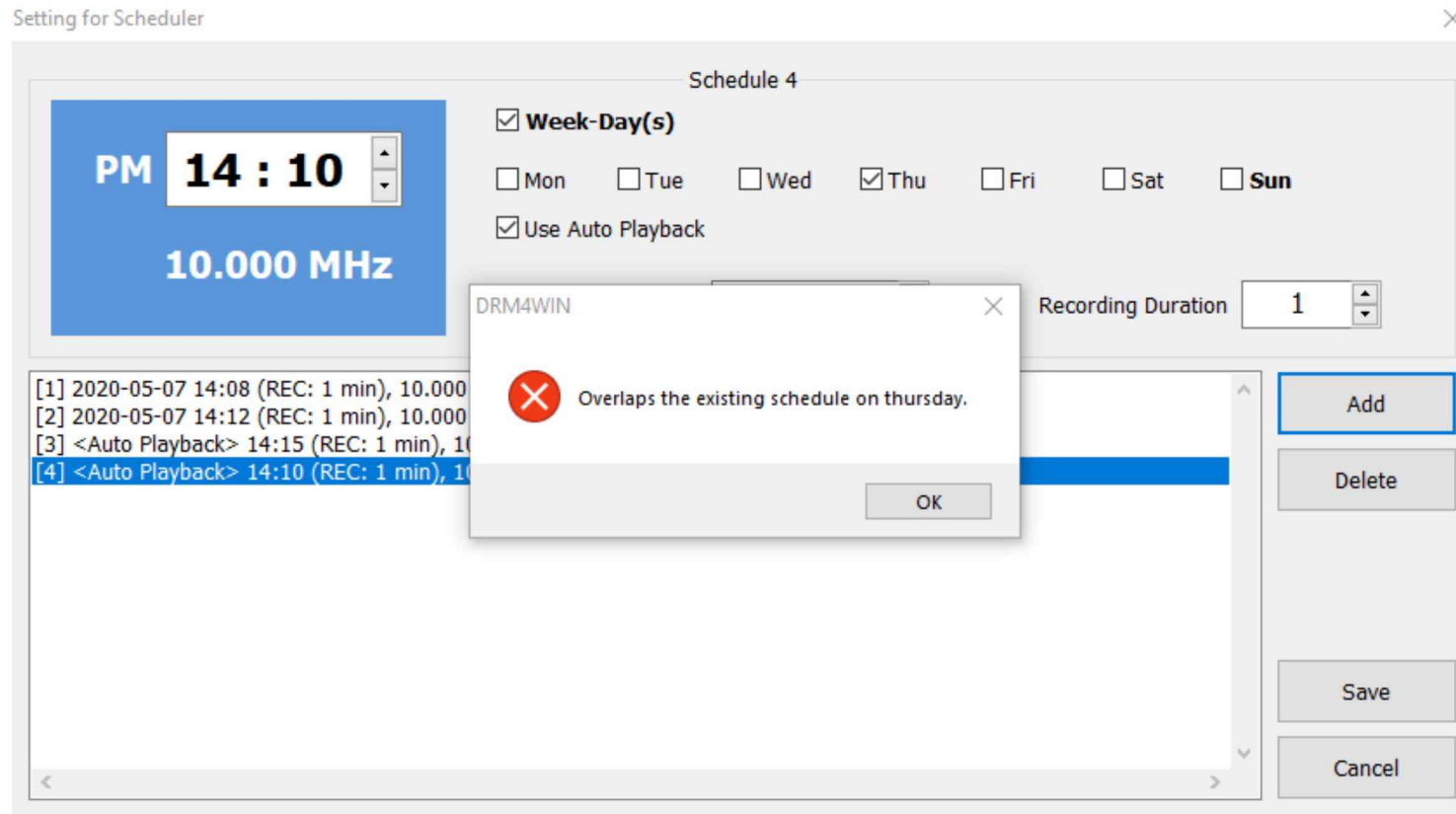
Delete

Save

Cancel

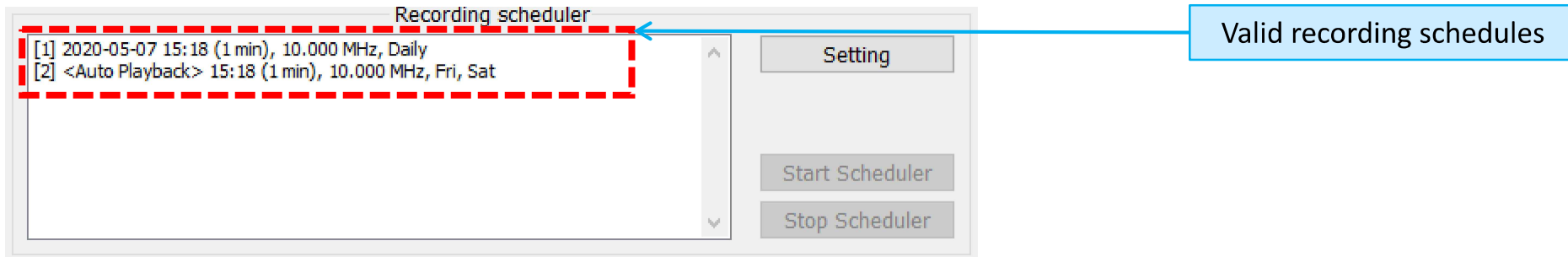
- Eg: To delete a recording scheduler:
 - Select the recording scheduler you want to delete
 - Click the delete button
 - Click Save

7. User interface: Setting for scheduler



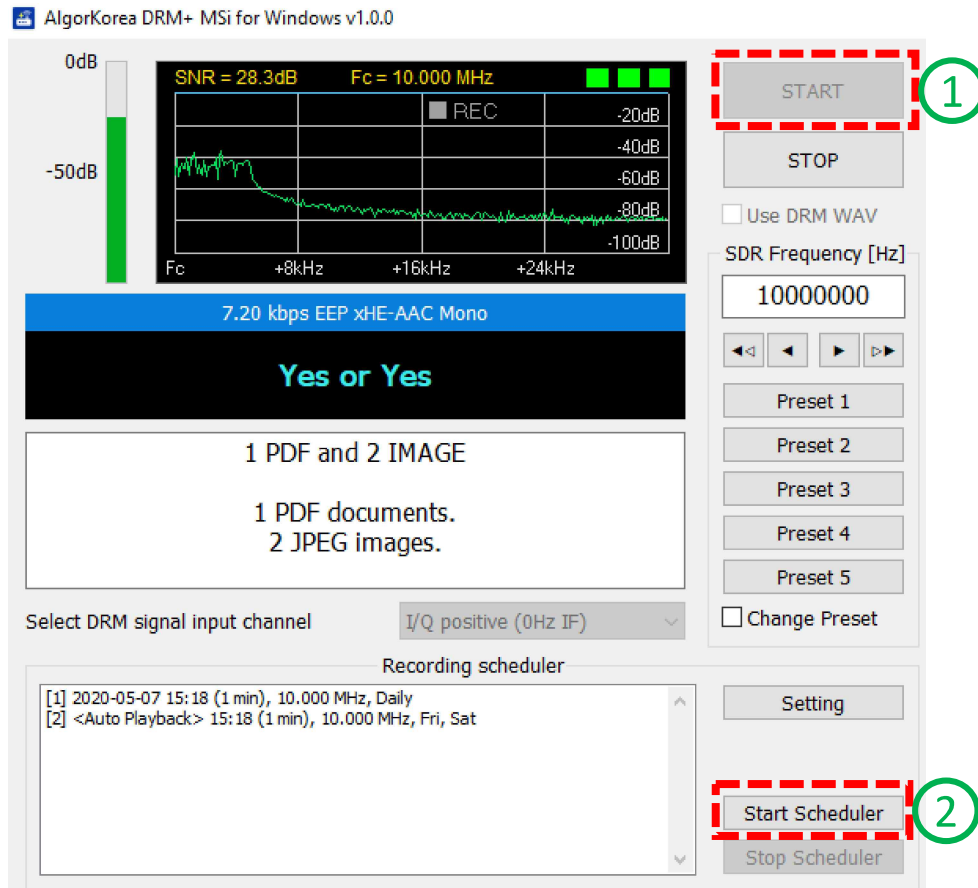
- If an invalid recording schedule is created (eg, one recording schedule overlaps with another) then an error message with an explanation will be shown when you press the Add button
- The recording scheduler is not created until the Save button is pressed. Hence please don't forget to press the Save button at the end.

7. User interface: Setting for scheduler



- Valid recording schedules will be displayed on the recording schedule panel
- Eg: In this figure
 - Schedule [1] will start recording on date 2020-05-07 at time 15:18 and will record for 1 minute
 - Schedule [2] will start recording at time 15:18 on Friday and Saturday every week and will record for 1 minute

7. User interface: Start/Stop scheduler



- Recording scheduler can only be started while the DRM+ Rx for Windows application is in DRM decoding mode
- Hence first click the start button first, then click the Start Scheduler button
- The scheduler will not actually start recording at the specified time if the Start Scheduler button is not pressed

7. User interface: Start/Stop scheduler

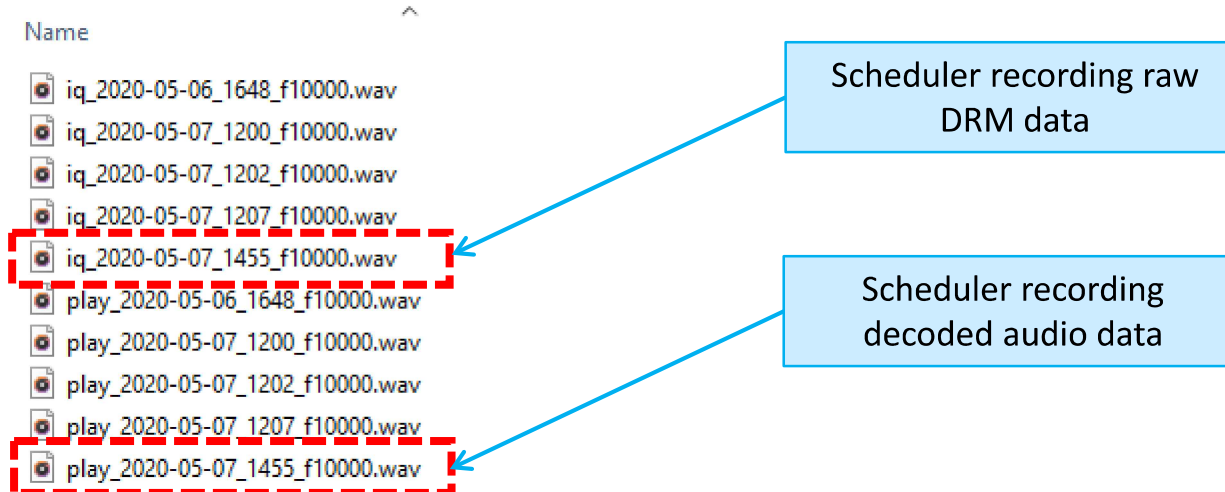
The screenshot shows the AlgorKorea DRM+ MSI for Windows v1.0.0 interface. Key elements include:

- Spectrogram:** Displays SNR = 33.0dB, Fc = 10.000 MHz, and a red REC symbol indicating recording status.
- Buttons:** START and STOP buttons are visible. The STOP button is highlighted with a green dashed box and an annotation: "DRM decoding cannot be stopped while the scheduler is running".
- SDR Frequency:** Set to 10000000 Hz.
- Preset Buttons:** Preset 1 through Preset 5.
- Recording Scheduler:** A list showing a scheduled recording: "[1] 2020-05-07 14:55 (1 min), 10.000 MHz, Daily". This list is highlighted with a red dashed box and an annotation: "Recording schedule time and duration".
- Start/Stop Scheduler Buttons:** Located at the bottom right, with the Stop Scheduler button highlighted by a red dashed box and an annotation: "Click this button to stop the recording scheduler".

- If the scheduler is started, at the specified time it will start recording the incoming DRM signal and the decoded audio to files
- The recording status is indicated by the red REC symbol in the spectrogram (this symbol is grey in colour when not recording)
- Recording will automatically stop after the specified duration (1 min in this example)
- Click Stop Scheduler button to stop the scheduler. DRM decoding cannot be stopped while the recording scheduler is running

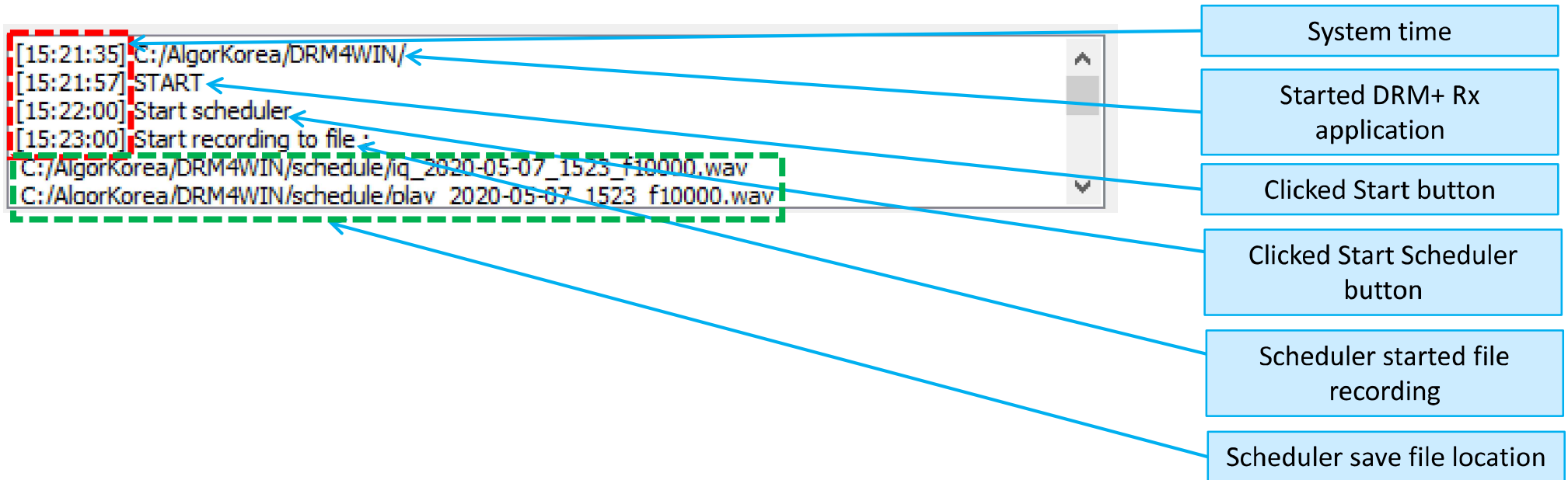
7. User interface: Scheduler files

is PC > Local Disk (C:) > AlgorKorea > DRM4WIN > schedule



- The files recorded by the scheduler are in the schedule subfolder of the DRM+ Rx for Windows program's install folder
- The default location is at C:\AlgorKorea\DRM4WIN\schedule
- The file generated by a particular scheduler can be recognized by the file name
- For example, for the scheduler shown in the previous page (2020-05-07 14:55 (1 min))
 - iq_2020-05-07_1455_f10000.wav – this is the file containing the raw DRM signal
 - play_2020-05-07_1455_f10000.wav – this is the file containing the decoded audio output
- The f10000 indicates 10000 kHz (SDR centre frequency)
- If no or illegal DRM signals are detected at the scheduled time, the software will generate 44 byte WAV files only containing WAV data

8. User interface: Log console



- The log console displays major operations performed in the DRM+ Rx for Windows software
- It also displays the system time when the operation was performed
- The console is mainly for providing detailed information for the user