EMViewer

Software

User Manual

Saint Petersburg

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1 Introduction

This User Manual is a mandatory document for persons who operate and maintain the EMViewer Software (hereinafter EMViewer) and EM1501 Electromagnetic Acoustic Thickness Gauge (hereinafter EMAT or Device).

This manual contains basic information about the intended use of the EMViewer and instructions for using it.

Only qualified personnel who have studied the operational documentation for the following products:

- the EMViewer;
- the operating system and personal computer intended for use with the EMViewer;
- EMAT

are allowed to operate the EMViewer.

IMPORTANT

Some components or images in this user manual may differ slightly from your copy of the EMViewer. However, the principles remain the same.

2 Purpose and Conditions of Use

2.1 The EMViewer implements the following functions:

- download saved files with measurements (A-scans and C-scans) in “csv” format from the device memory;
- view and analyze uploaded A-scans and C-scans;
- generate control reports based on uploaded files;
- real-time operation with EMAT, display and adjustment of A-scan and C-scan.

Downloaded files with measurements (A-scans and C-scans) are saved in the “csv” format, they can also be viewed in Microsoft Excel or similar programs for operating with tabular data.

2.2 The EMViewer requires the MS Windows 10 operating system or its later versions.

The EMViewer communicates with the Device via USB port.

The size of the EMViewer is about 216 MB.

The name of the EMViewer executable file is “EMViewer.exe”.

3 Preparing for Work

The EMViewer is sent in an archive at the request of the EMAT user.

No installation of the EMViewer is required. To start working with the EMViewer, unzip the archive to a convenient location on your computer.

It is recommended to create a shortcut on the desktop to launch the EMViewer.

4 Operation Description

4.1 Starting the EMViewer

4.1.1 Start the EMViewer (the “EMViewer.exe” file).

While the EMViewer is loading, a window with information about the EMViewer is displayed (Figure 4.1).

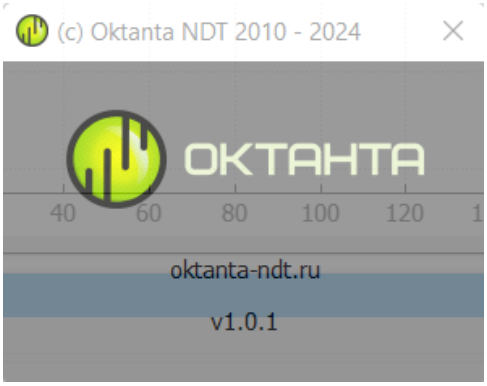


Figure 4.1 – Information about the EMViewer

After the EMViewer is loaded, the information window closes and the following windows are displayed (Figure 4.2):

- **EMViewer** – configure and manage the EMViewer (see paragraphs 4.2, 4.9, 4.10);
- **Device Manager** – manage files with A-scans and C-scans stored in the device's memory and on the computer, with the ability to download files from the device and generate control reports on the results of the inspection (see paragraphs 4.3, 4.4, 4.7);
- **A-scan** – view and analyze A-scans (see paragraphs 4.6, 4.8);
- **C scan** – view and analyze C-scans (see paragraph 4.6).

In the right part of the **EMViewer** window there is a button that returns the location and size of the windows, as well as the list of the opened windows to the original state that was after loading the EMViewer (Figure 4.2).

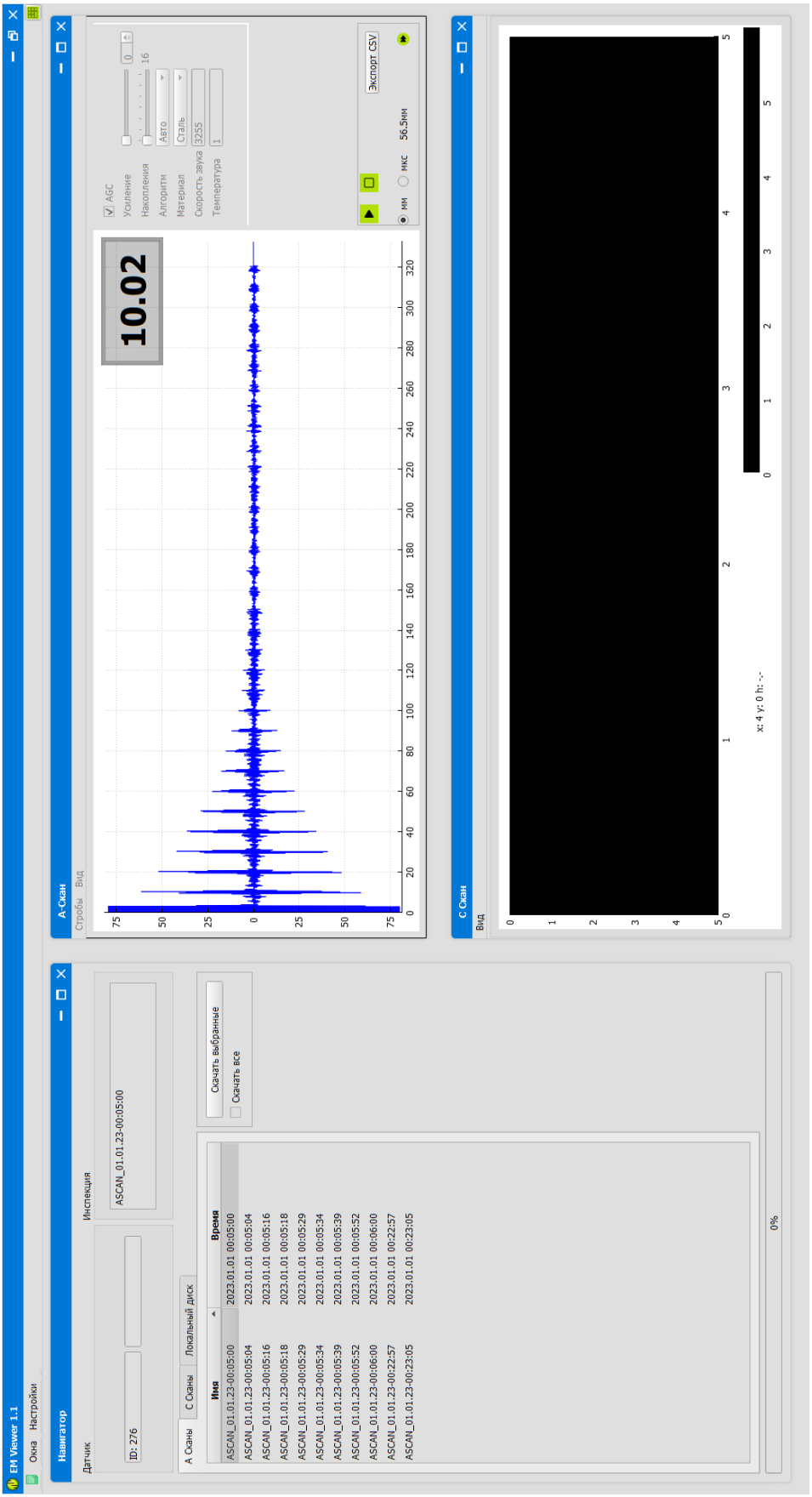


Figure 4.2 – The EMViewer appearance

4.2 Setting up the EMViewer

4.2.1 Set the list of displayed windows (**Device Manager**, **A-scan**, **C scan**) in the **Windows** menu of the **EMViewer** window: the flag is set – the window is displayed, the flag is cleared – the window is closed.

4.2.2 Select the interface language (Russian or English) and the theme (light or dark) in the **Settings** menu of the **EMViewer** window. After changing these settings, click **OK** in the window that opens. The EMViewer will restart automatically.

4.2.3 Configure the report parameters by selecting the **Report configuration** item in the **Settings** menu of the **EMViewer** window. The **Report configuration** window will open.

4.2.4 Enter the operator's last name, organization name, address and click **Save**.

4.3 Connecting the Device

After connecting the EMAT to the computer via a USB cable and turning on the EMAT, the EMViewer automatically detects the device.

The following information is displayed in the **Device Manager** window:

- the serial number of the connected EMAT in the **Device** field;

- information about A-scans and C-scans saved in the device (if any) in the **A scans** and **C scans** tabs, respectively.

4.4 Downloading Data Stored in the Device

4.4.1 Open the **A scans** or **C scans** tab of the **Device Manager** window.

4.4.2 If necessary, select the required lines in the open tab.

4.4.3 To download all files specified in the open tab, check **Select all**.

4.4.4 Click **Download selected**. Wait until the files are downloaded: the progress bar at the bottom of the **Device Manager** window will turn completely green and display "**100%**" (Figure 4.3).

The files are saved in the “csv” format in the “storage” folder, which is located in the program folder, and are displayed in the **Local Storage** tab of the **Device Manager** window (Figure 4.3).

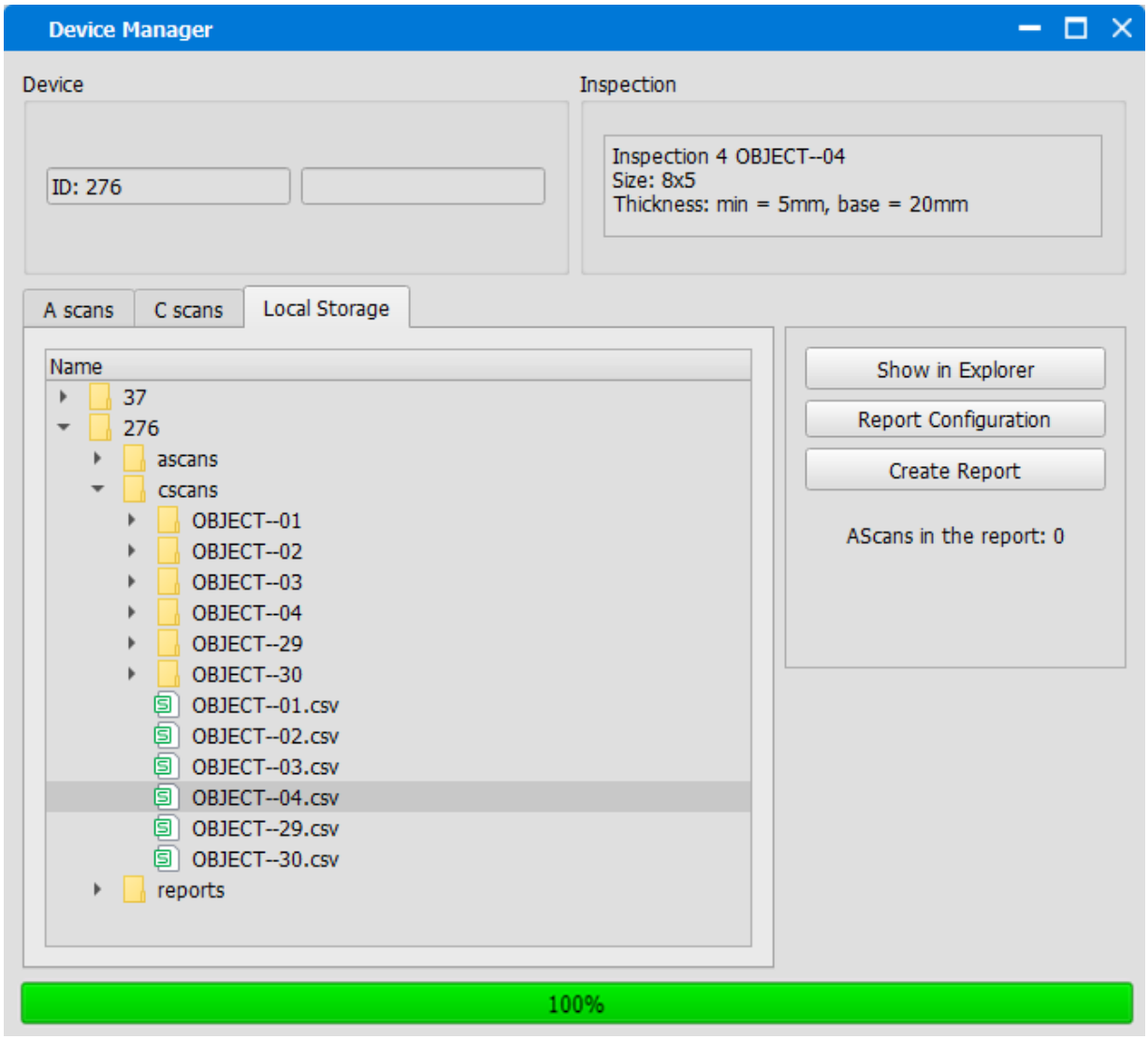


Figure 4.3 – The **Local Storage** tab of the **Device manager** window

4.4.5 If necessary, select a folder, A-scan or C-scan in the **Local Storage** tab of the **Device Manager** window and click **Show in Explorer**. The EMViewer will open the selected folder/folder with the selected file in Explorer.

The downloaded files can be viewed in Microsoft Excel or similar programs for operating with tabular data.

4.5 Deleting Data Stored in the Device

4.5.1 Open the **A scans** or **C scans** tab of the **Device Manager** window.

4.5.2 If necessary, select the files that need to be deleted in the open tab.

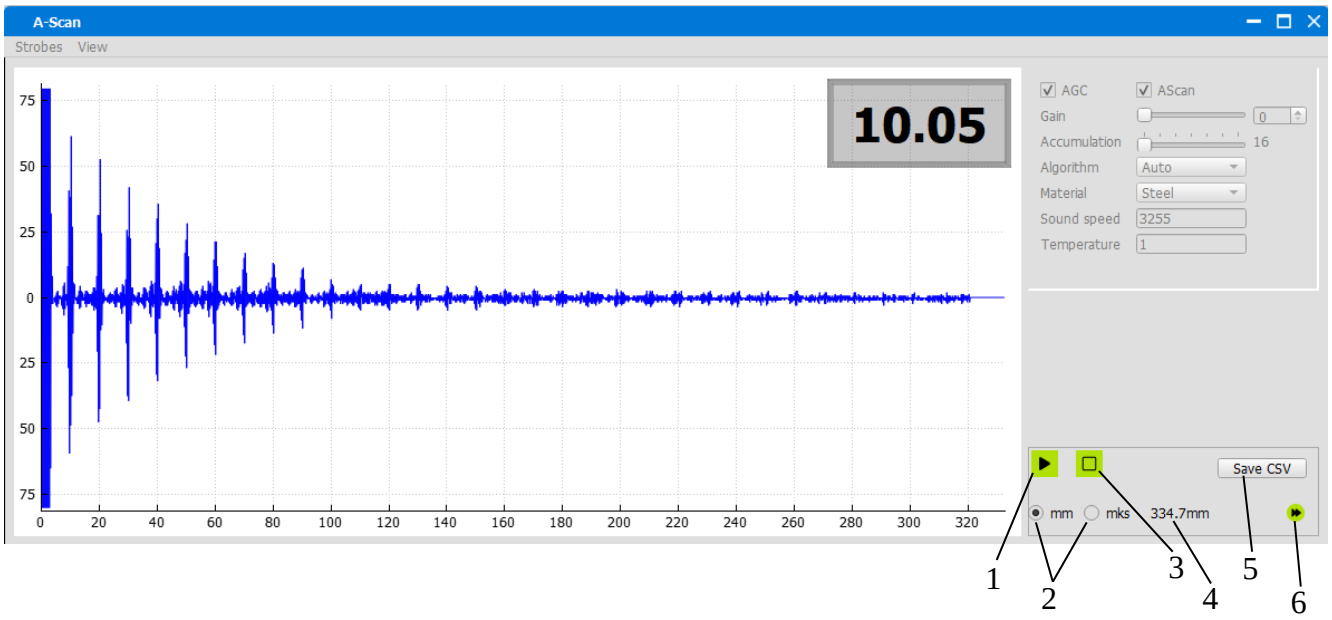
4.5.3 Right-click on the files selected in 4.5.2 or on the file that needs to be deleted.

4.5.4 In the menu that opens, click **Delete**. Wait until the files are deleted: the progress bar at the bottom of the **Device Manager** window will turn completely green and display "**100%**" (Figure 4.3).

4.6 Viewing Saved A-scans and C-scans

After selecting a line with an A-scan or C-scan file in any of the tabs of the **Device Manager** window, the measurement results will be displayed on the right side of the screen:

- if A-scan is selected, it (together with the measured thickness) will be displayed in the **A-scan** window (Figure 4.4);



1 – start operating with the EMAT in real time
2 – select units for the horizontal axis in the A-scan display area
3 – stop operating with the EMAT in real time
4 – current cursor position in the A-scan display area
5 – save the open file with A-scan in the “csv” format to the “storage” folder located in the program folder. The name of the saved file will be displayed under the button, the saved file will be displayed in the **Local Storage** tab of the **Device Manager** window
6 – collapse the settings area located in the right part of the **A-scan** window

Figure 4.4 – **A-scan** window (viewing the saved file)

Notes

1 When operating with saved files, it is recommended to collapse the settings area located in the right part of the **A-scan** window by clicking . To expand the settings area, click in the upper right corner of the **A-scan** window.

2 To scale the A-scan display area, place the cursor at the desired point of the display area, press and hold the left mouse button and select the desired section of the A-scan, then release the mouse button.

3 To return to displaying the entire A-scan display area, double-click on a free space of the display area.

- if C-scan is selected, the **C scan** window will display a matrix of measurements indicating the measured thicknesses and the **A-scan** window display A-scan for the cell selected in the **C scan** window (Figure 4.5).

Figure 4.5 – **C-scan** window (viewing the saved file)

Note – If necessary, customize the C-scan view by turning the smoothing function on/off in the **View** menu of the **C scan** window.

4.7 Creating Control Report

4.7.1 Select the required C-scan in the **C scans** or **Local Storage** tab of the **Device Manager** window.

4.7.2 If necessary, click **Report configuration**. In the **Report configuration** window enter the operator's last name, organization name, address and click **Save**.

4.7.3 In the **C scan** window, right-click to select the cells whose A-scans you want to add to the report. The cells will be marked with .

Note – To remove the selection of the cell in the **C scan** window, right-click on the marked cell again. The corresponding A-scan will not be added to the report.

4.7.4 Click **Create report** in the **Device Manager** window. The EMViewer will perform the following actions:

- save the control report a control report in the “pdf” and “html” formats in the “storage” folder, which is located in the program folder;

- display reports in the **Local Storage** tab of the **Device Manager** window (Figure 4.3);

- open the **Report path** information window, where the path to the report file and its name are indicated.

4.7.5 In the **Report path** window, click **OK** to close the window or **Open report** to open the report (in “pdf” format).

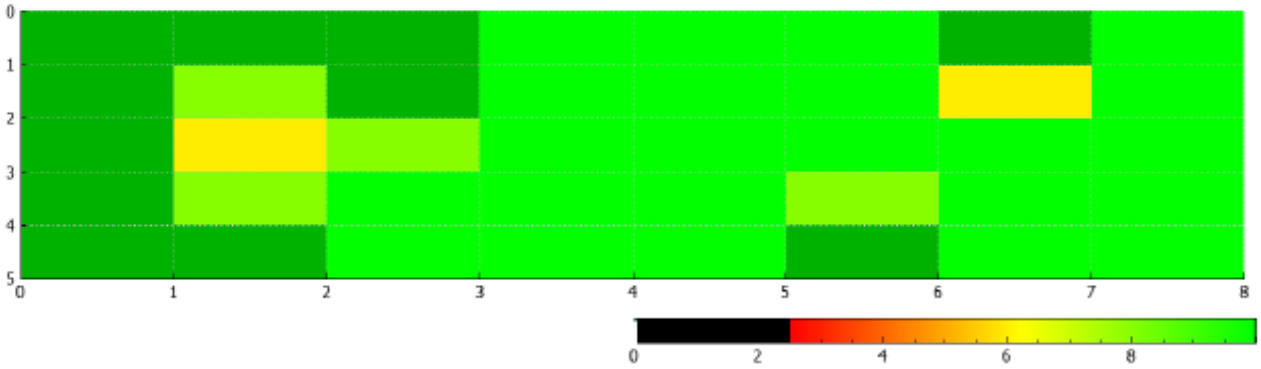
4.7.6 If necessary, you can select the report folder or report file in the **Local Storage** tab of the **Device Manager** window and click **Show in Explorer**. The EMViewer will open the selected folder/folder with the selected file in Explorer.

The appearance and content of the control report are shown in Figure 4.6.

Report №20

Control date	01.01.23-00:23:24
Control result	No defects were found.
Operator:	Operator
Company	Org11
Address	Object
Nominal thickness, mm	20
Minimal thickness, mm	5

Surface thickness map (CScan).



Thickness measurements by cells (mm)

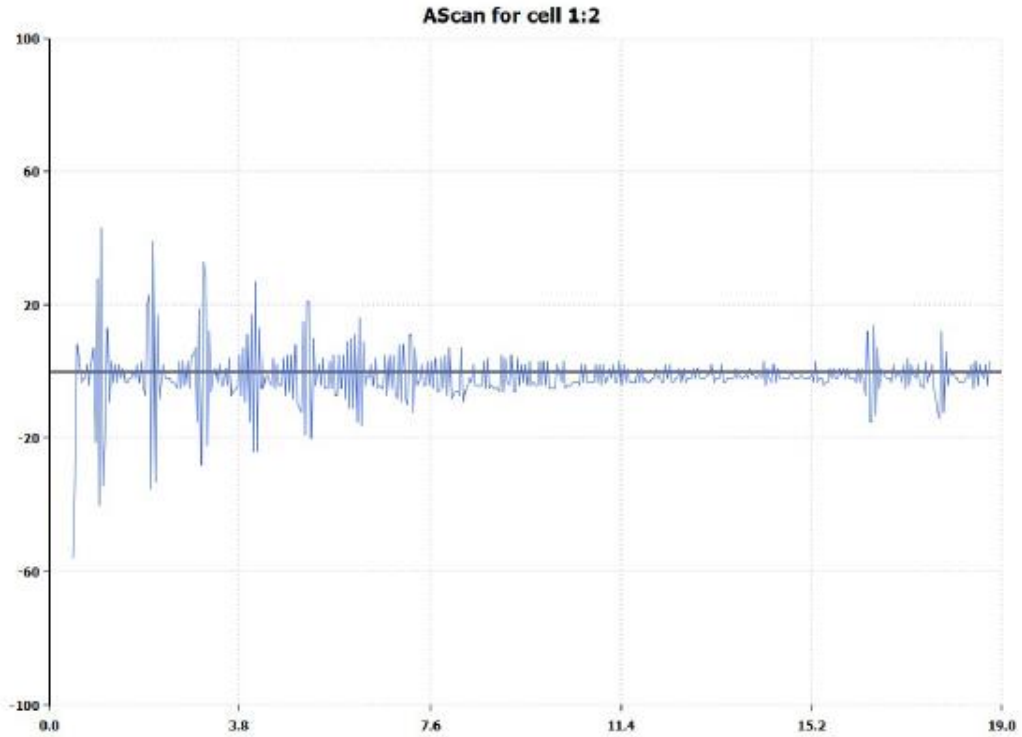
№	1	2	3	4	5	6	7	8
1	10.01	10.01	10.01	10	10	10	10.01	10
2	10.01	8.03	10.01	10	10	10	6.02	10
3	10.01	6.02	8.04	10	10	10	10	10
4	10.01	8.04	10	10	10	8.04	10	10
5	10.01	10.01	10	10	10	10.01	10	10

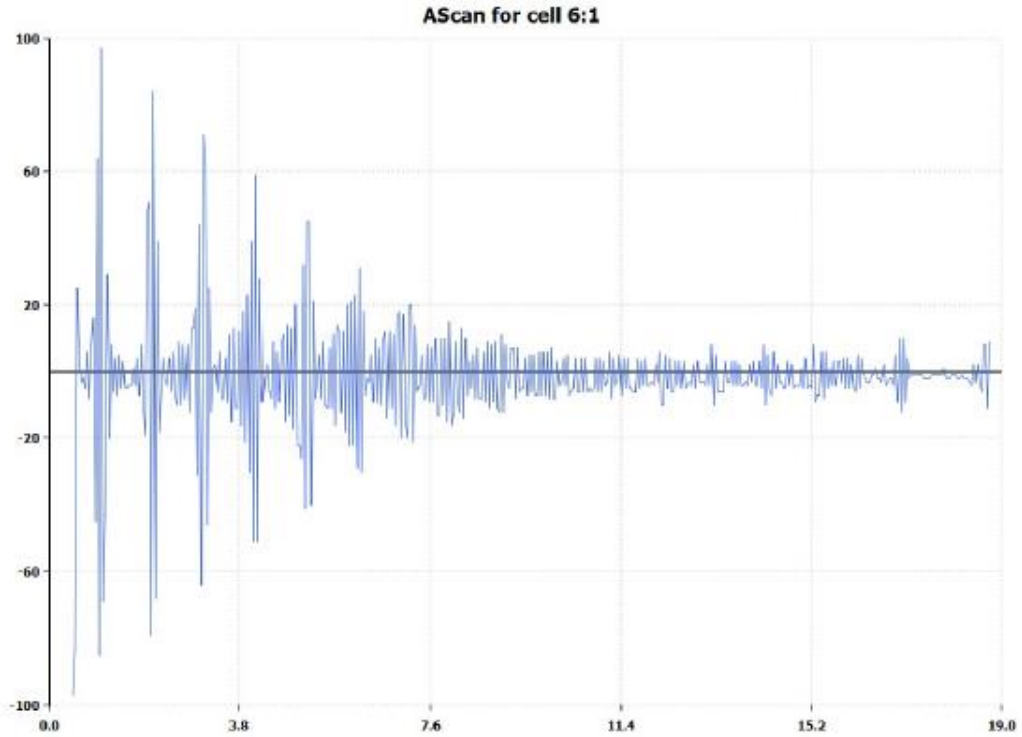
Results of the control

No defects were found. The object is fit for operation.

Operator:	
Full name:	
Certificate:	
Qualification:	
Signature:	

Figure 4.6 – Control Report (sheet 1 of 2)





Operator:	
Full name:	
Certificate:	
Qualification:	
Signature:	

Figure 4.6 – Control Report (sheet 2 of 2)

4.8 Operating with the Device in Real Time

4.8.1 Operating with the EMAT in real time is performed in the **A-scan** window.

4.8.2 To start operating with the EMAT in real time, click (Figure 4.7). The **Device Manager** window will become unavailable.

4.8.3 Configure the EMAT using the settings area located on the right side of the **A-scan** window:

- gain control: enable/disable automatic gain control (**AGC** field) and adjust gain in manual mode (**Gain** slider and field);

- select the number of averaging used in the device (**Accumulation** slider);

- select the thickness measurement algorithm (**Algorithm** drop-down list);

- select the material of the test object (**Material** drop-down list);

- enter the temperature in °C and the speed of sound in m/s for the test object (**Temperature** and **Sound speed** fields).

A detailed description of the EMAT settings is given in the EMAT User Manual.

4.8.4 After selecting the **1 strobe** or **2 strobes** algorithm and clicking on a free space in the A-scan display area, two strobes will be displayed in this area. The visibility of the strobes can also be configured using the **Strobes** menu of the **A-scan** window.

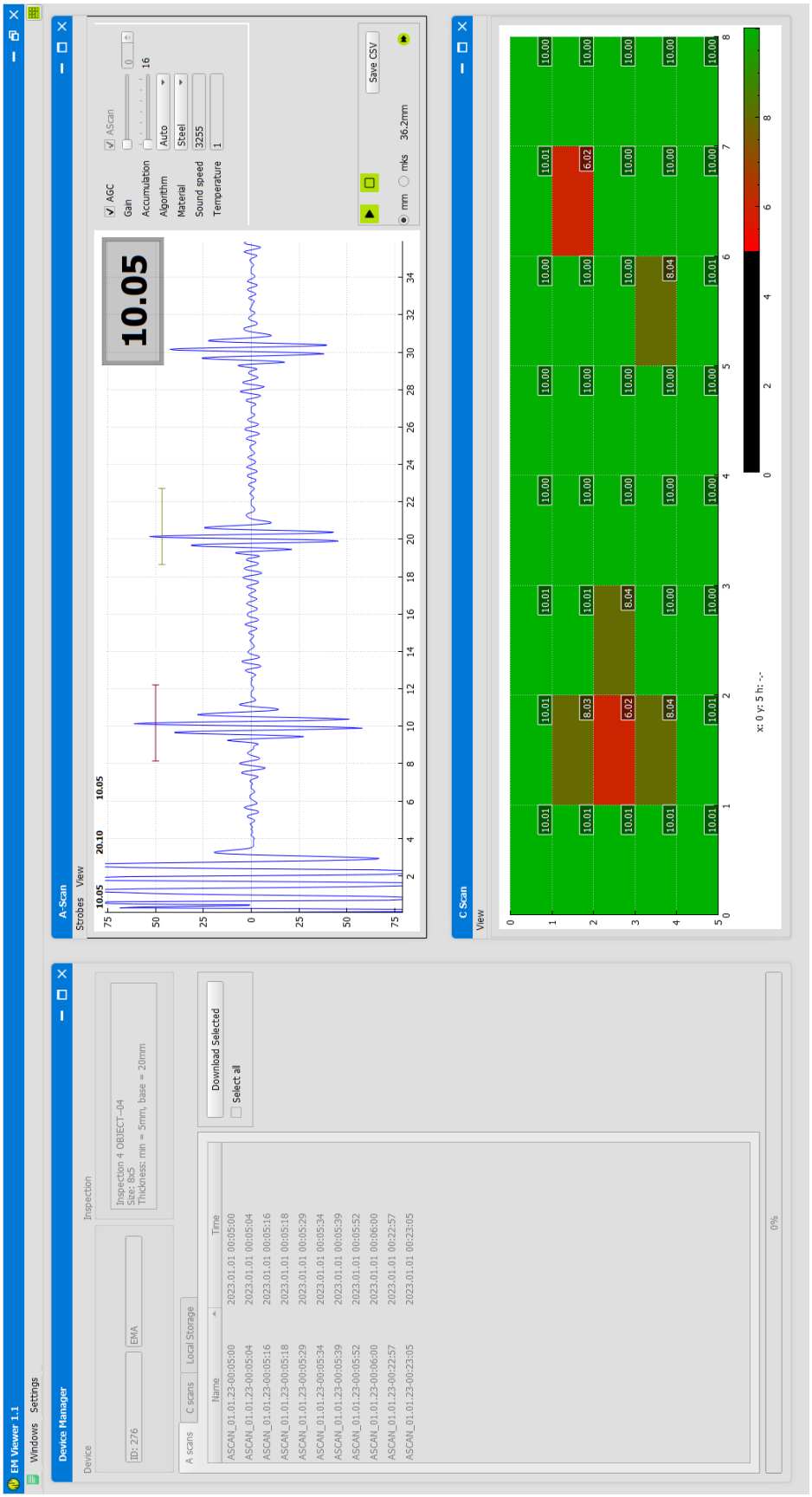


Figure 4.7 – Receiving data from the Device in real time

4.8.5 Adjust the position and length of the strobe/strobes as follows:

- to move the strobe, move the mouse cursor over it, press and hold the mouse button and move the strobe to the desired location, then release the mouse button;

- to change the strobe length, move the mouse cursor over the end of the strobe, press and hold the mouse button and increase/decrease the strobe length, then release the mouse button.

4.8.6 Select the A-scan view in the **Strobe** Menu of the **A-scan** window: the original signal, the detected signal or the filtered signal.

4.8.7 At the bottom of the settings area, select the units (mm or μs) along the horizontal axis of the A-scan display area.

4.8.8 If necessary, save the A-scan to a file in the "csv" format in the "storage" folder located in the program folder by clicking **Export CSV**. The name of the saved file will be displayed under the **Export CSV** button, the saved file will be displayed in the **Local Storage** tab of the **Device Manager** window (Figure 4.3).

4.8.9 To stop operating with the EMAT in real time, click in the **A-scan** window. The **Device Manager** window will become available.

4.9 Viewing Program Information

4.9.1 Select **About** in the (File) menu of the **EMViewer** window.

4.9.2 In the information window (Figure 4.1), read the EMViewer version. The window will close automatically.

4.10 Closing the EMViewer

4.10.1 Close the EMViewer in one of the following ways:

- click in the **EMViewer** window;

- select **Exit** in the (File) menu of the **EMViewer** window.

4.10.2 Click **Yes** in the window that opens.