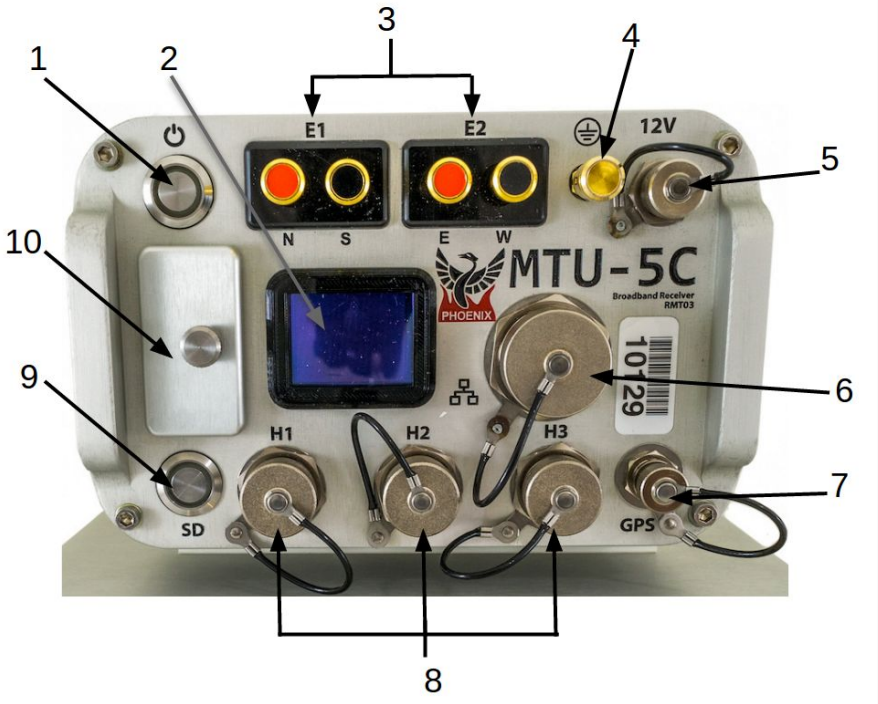
MTU-5C Quick Start Guide for MT

PHOENIX GEOPHYSICS

Version: 250310 ID: DAA19



Components	
1	Power/Record button and indicator
2	Display
3	E1 (Ex) electrode connectors E2 (Ey) electrode connectors
4	Ground electrode connector
5	12V DC power input
6	LAN connector
7	GPS antenna connector
8	H1 (Hx) magnetic sensor connector H2 (Hy) magnetic sensor connector H3 (Hz) magnetic sensor connector
9	SD card button and indicator
10	SD card slot and cover

Calibration - Config Files

Perform the Receiver and Sensors calibrations at start of each installation layout, to ensure the instruments are measuring correctly. Calibration verify the working state of the equipment and helps to improve the quality of the records and the reliability of the measurements.

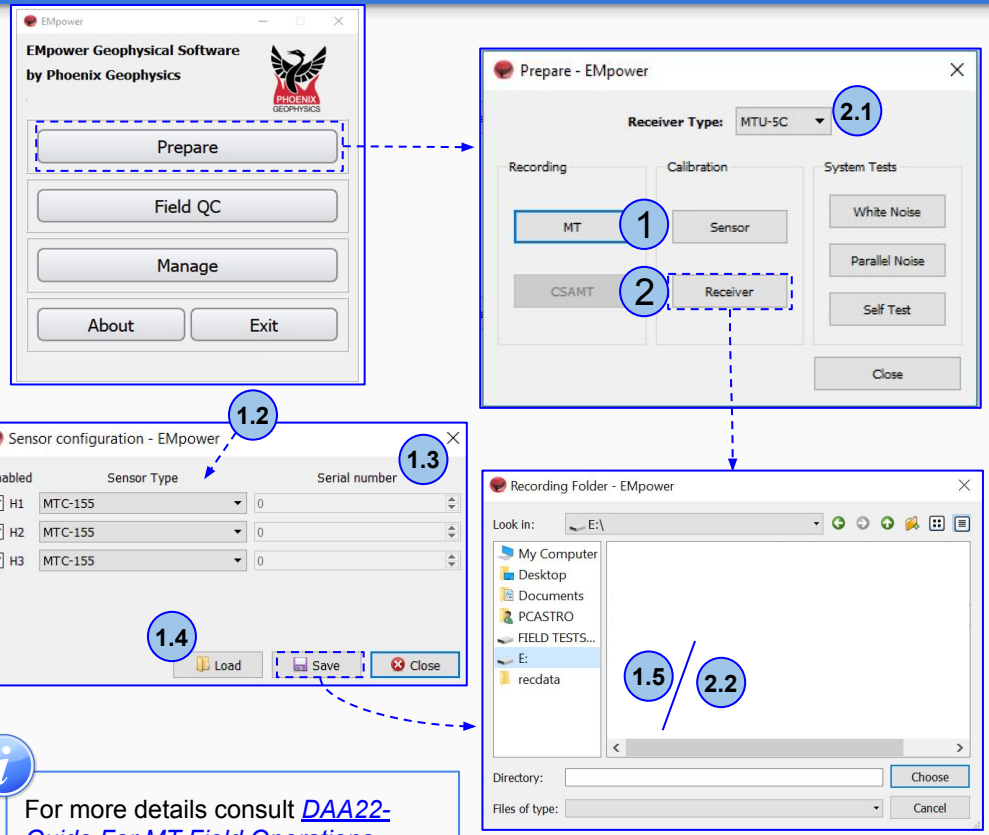
Open **EMpower** and select the **Prepare** module

1. Sensor

- **1.1.** Click the Sensor button and choose the magnetic channels that will be used
- **1.2.** Select the **Sensor Type**
- **1.3.** Type the **Serial number**, *(not needed for MTC-155/MTC-185 sensors)*
- **1.4.** Or **Load** it from a previous config file
- **1.5.** **Save** the configuration file (config.json) in the SD card *(see page 7)*

2. Receiver

- **2.1.** Select the **Receiver Type and** click the **Receiver** button
- **2.2.** **Save** the configuration file (config.json) in the root folder of the SD card *(see page 7)*



For more details consult *DAA22-Guide For MT Field Operations*

Configuration Creator

1. Click **Prepare** and select the **Receiver Type** as **MTU-5C** and click the **MT** button

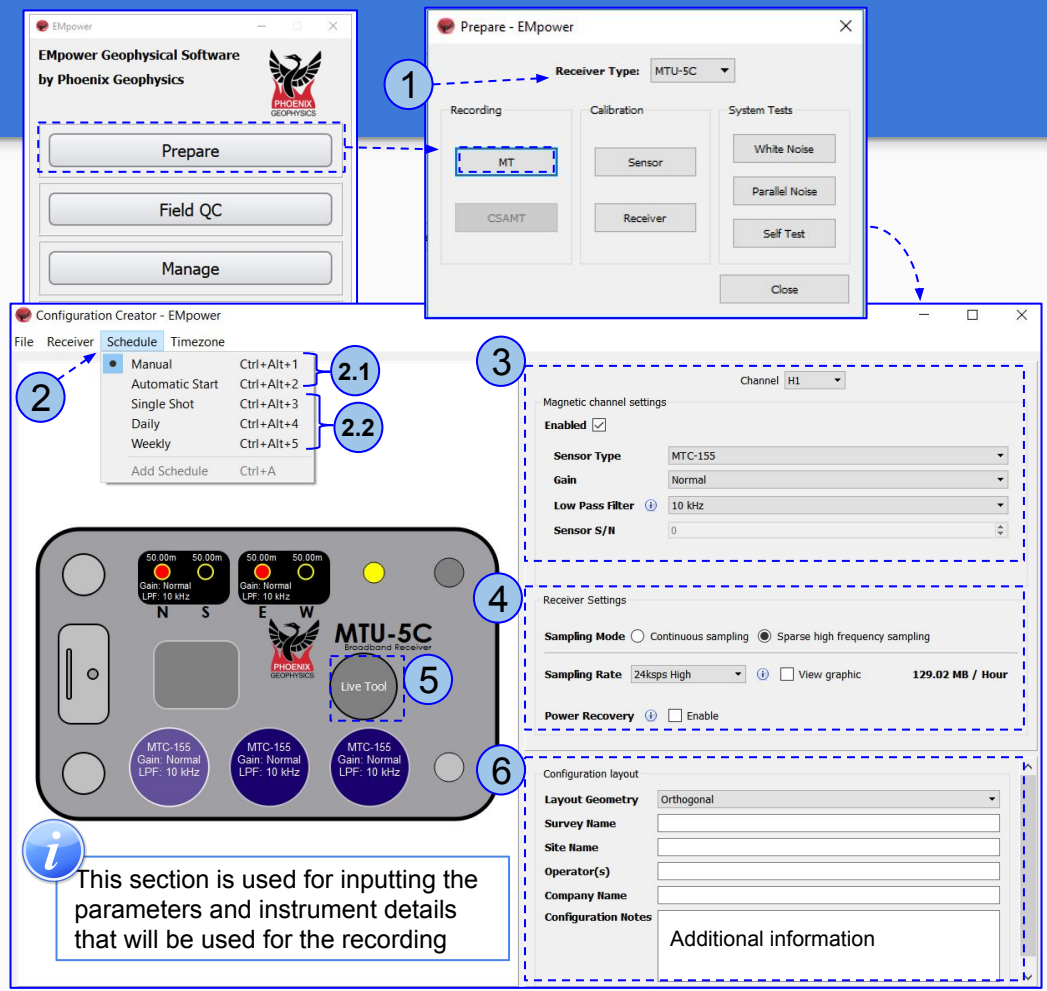
2. Select the **Schedule**
   - 2.1. **Manual** or **Automatic Start**
   - 2.2. For a specific schedule, select **Single Shot**, **Daily** or **Weekly**, and set the desired time and date, and **Save**
     - To add additional schedules, select **Add Schedule** and define the additional times and/or dates and **Save**

3. Define the **Channel Settings** *(See pages 5,6)*

4. Define the **Receiver Settings**
   - **Sampling Mode**
     - *Continuous Sampling (Applicable to research studies)*
     - *Sparse high frequency sampling (See Frequency sampling page)*
   - **Sampling Rate**
   - **Power Recovery** *(consult the Power Recovery manuals)*

5. **Ethernet port** *(consult the Remote Networking manuals)*

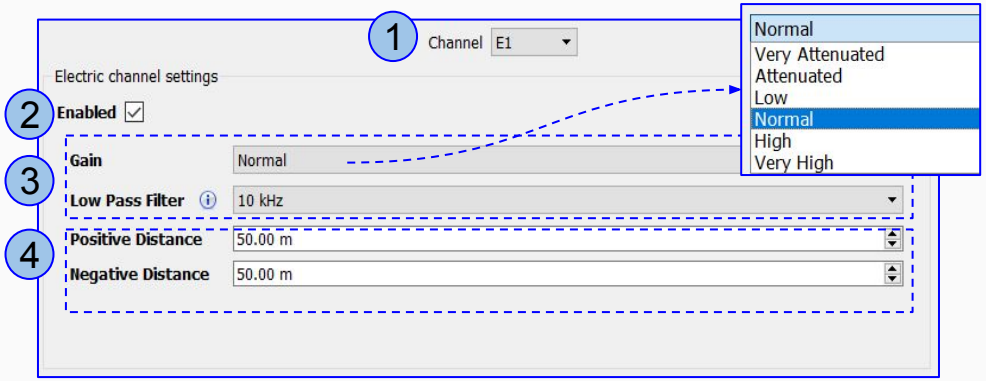
6. **Configuration Layout**



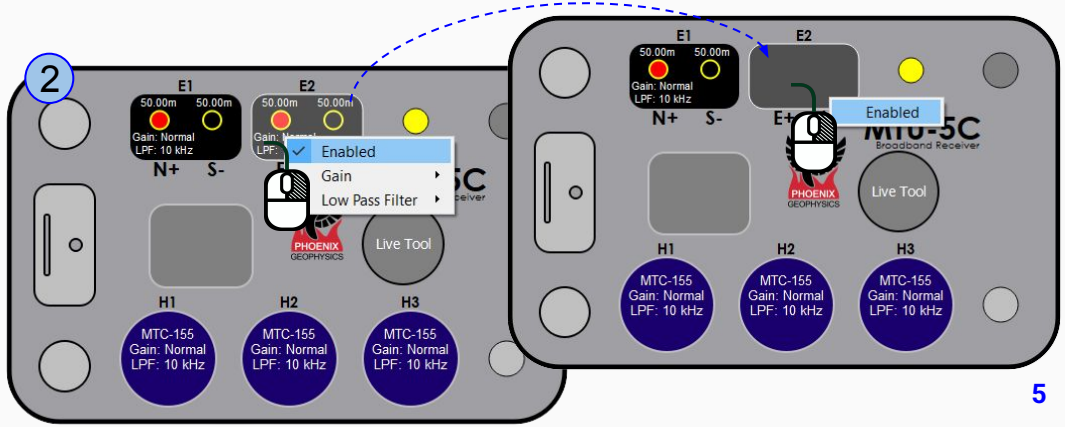
To use the magnetic sensor data from a different recording or use a remote reference, all recordings **must** have a matching Sampling Mode and Sampling Rates. Otherwise, EMpower will not allow to process data using borrowed channels or remote reference

Electric Channel Settings

1. Select the **Electric** channel
2. Enable **or Disable** channel(s)
   - Disable channels that you do not plan to use during the recording. This will save space on the SD card.
3. Select the desired **Gain** and **Low Pass Filter**
   - For most applications, Normal Gain and 10 kHz LPF are best
4. Type **distances to the electrodes** of this channel if known
   - If not, they will need to be corrected later before data processing



Some settings can be configured by using the right-click menu



Magnetic Channel Settings

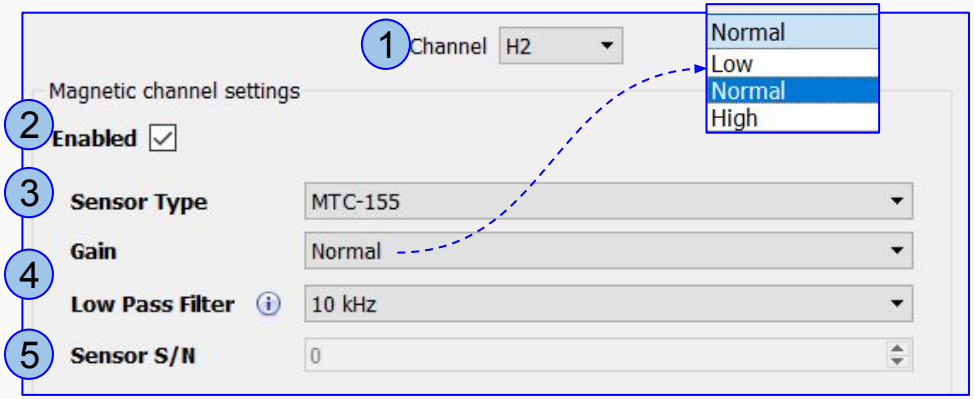
1. Select a **Magnetic** channel

2. Enable or Disable channel(s)
- Disable channels that not plan to use during the recording. This will save space on the SD card.

3. Select the correct **Sensor Type**
- If the sensor type is incorrect in the configuration file, the receiver will display a warning message. However, the recording will not be interrupted

4. Select the desired **Gain** and **LPF**
- For most broadband applications with MTC-100 series sensors, Normal Gain and 10 kHz LPF are best

5. Type the **Serial Number** of the sensor if required
- There is no need to type serial number for sensors MTC-155/MTC-185, since it will be automatically detected by the receiver.
- For older sensors, type the serial number of each sensor. If you don't know this information in advance, keep field notes to add this information later, after the recording is imported into EMpower



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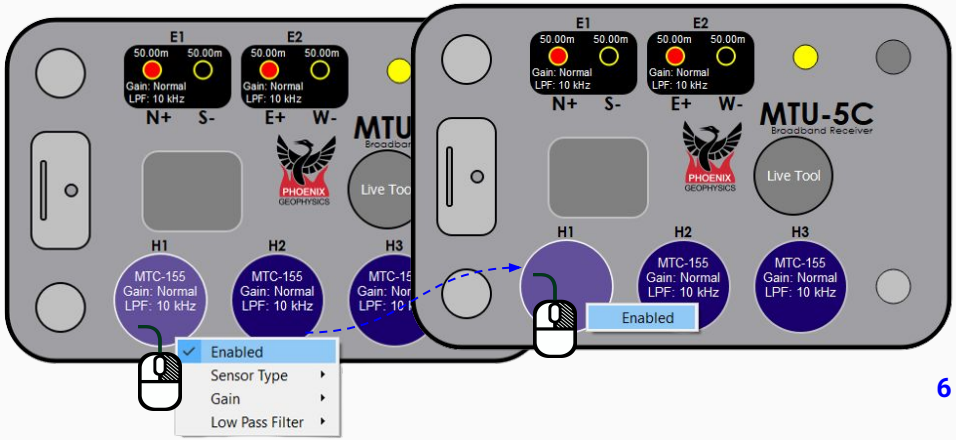


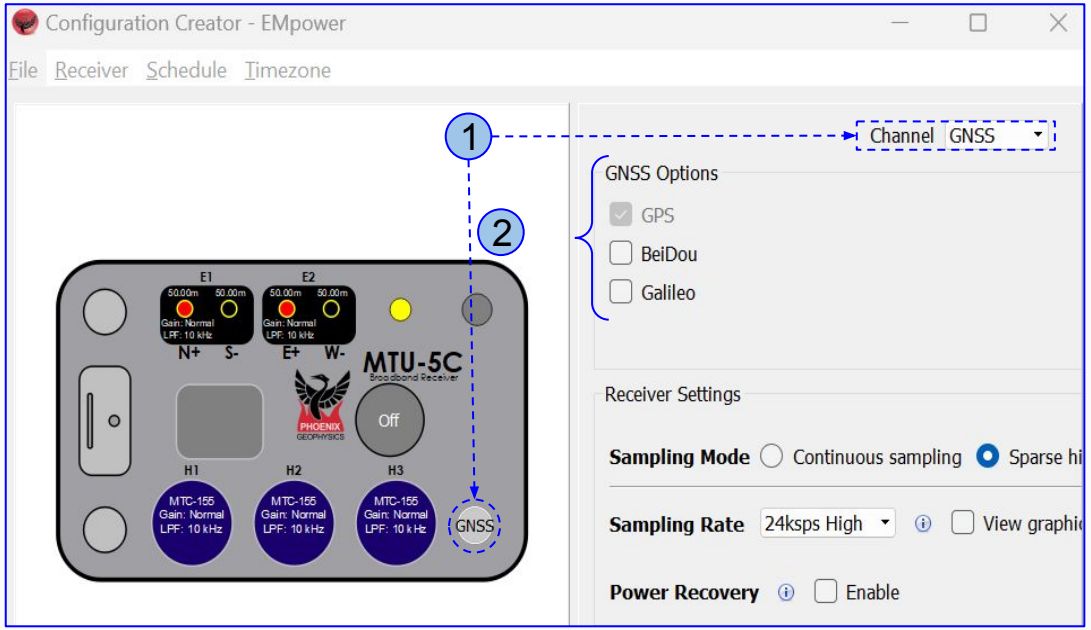
Using Multi-constellation GNSS satellites

This feature is available only in the new MTU-5C Data Share receivers. In addition to using the GPS satellite constellation, the new model can also utilize the Global Navigation Satellite System or GNSS.

The MTU-5C Data Share supports BeiDou and Galileo in addition to GPS, ensuring highly accurate positioning.

To configure the receiver to use other constellations beside GPS:

1. Select the **GNSS** configuration page by clicking in the GNSS connector
2. Choose the **GNSS** to activate
   - GPS *(always active)*
   - BeiDou
   - Galileo



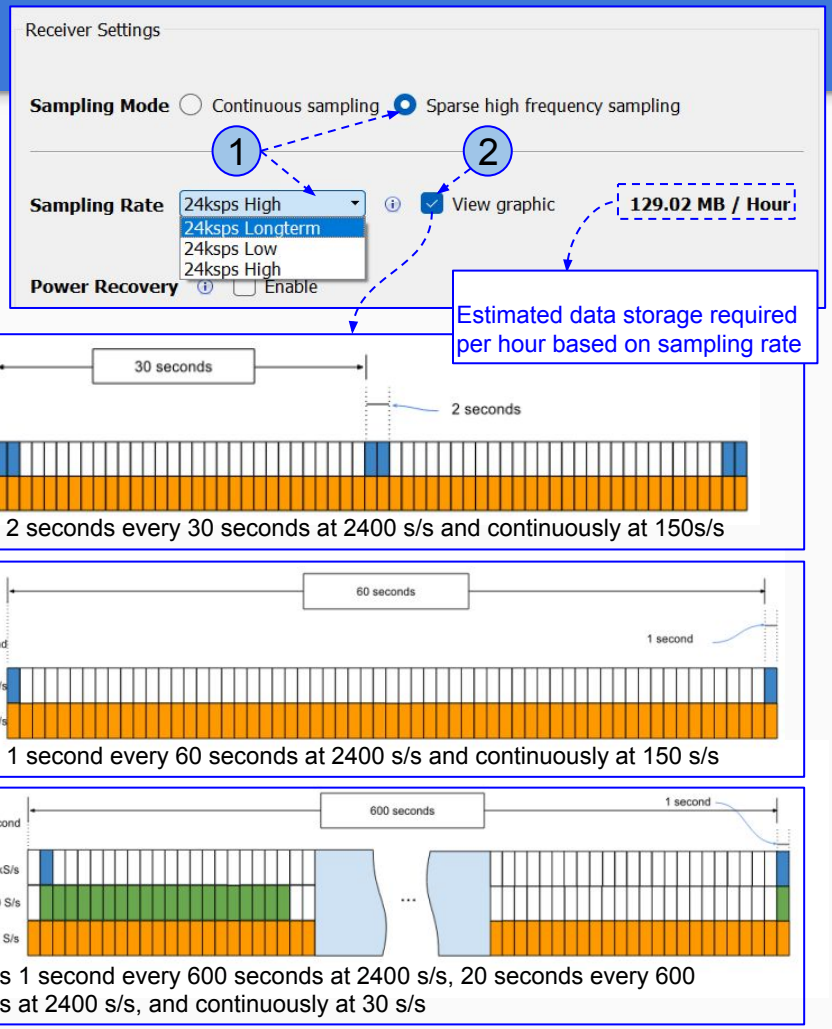
**To check which constellations were tracked during the recording process, please consult the manual EMpower Data Management under Recording Details*

For more details about the Data share feature consult the *DAA37 MTU-5C Data Share System Guide*

Frequency Sampling- MT acquisition

Sparse high frequency sampling combined with varying **Sampling Rates** is used for common industrial applications such as oil and gas exploration, geothermal exploration, reservoir monitoring, and geotechnical studies.

1. Select **Sparse high frequency sampling** and choose the **Sampling Rate**
2. Enable the **View graphic** to visualize on the left side how the Sampling Rate options work
   - **2.1. 24 ksps High,** use this option for environments with varying or moderate noise levels *(overnight recordings)*
   - **2.2. 24 ksps Low**, use this option for areas where noise levels are consistently low *(overnight recordings)*
   - **2.3.** For remote sites requiring extensive recordings, use the **24 ksps Longterm** option to enable weekly or monthly log recordings while minimizing SD card space usage **Recommended for working with network remote access.*



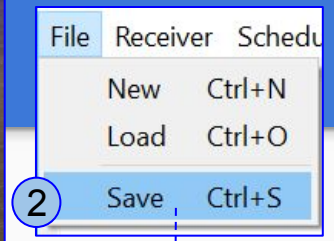
Saving a Configuration File

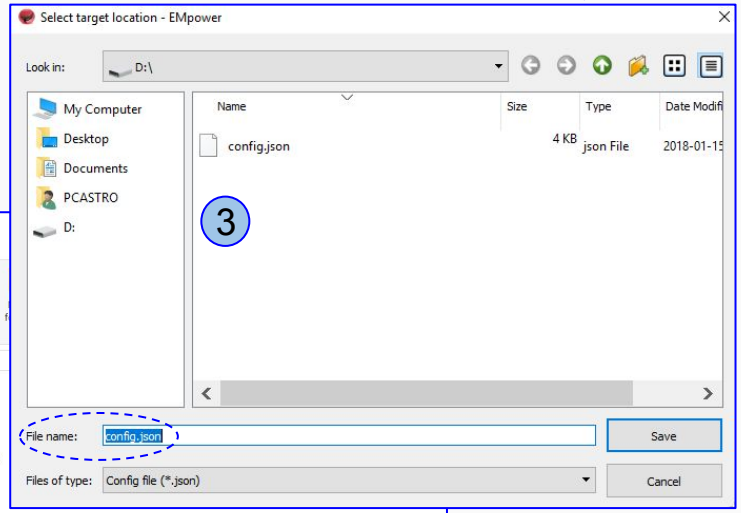
1. Insert the SD Card
- The computer must be equipped with an SD card slot or use a USB card reader

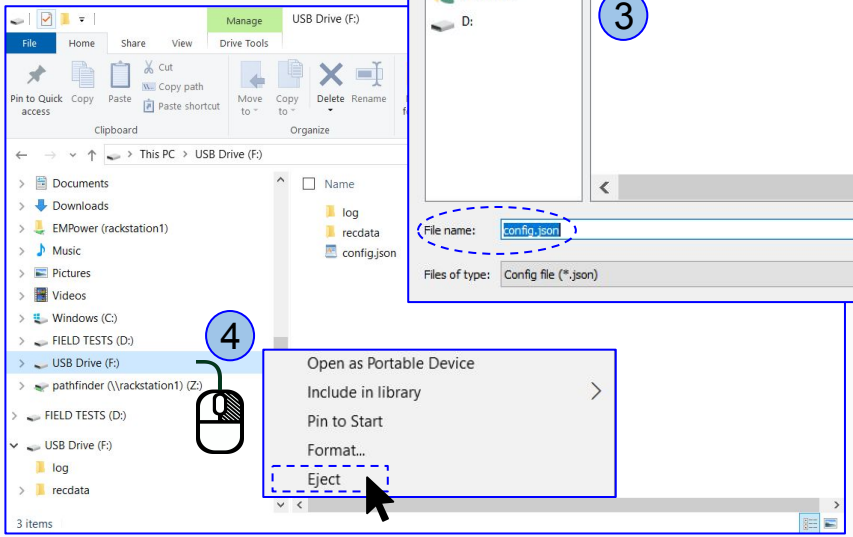
2. Click the **File** menu
- Save or **Ctrl+S**
- Select the SD card
- **EMpower** will automatically create the file **“config.json”**

3. Save the configuration file *(**config.json**)* in the root folder of the **SD card**

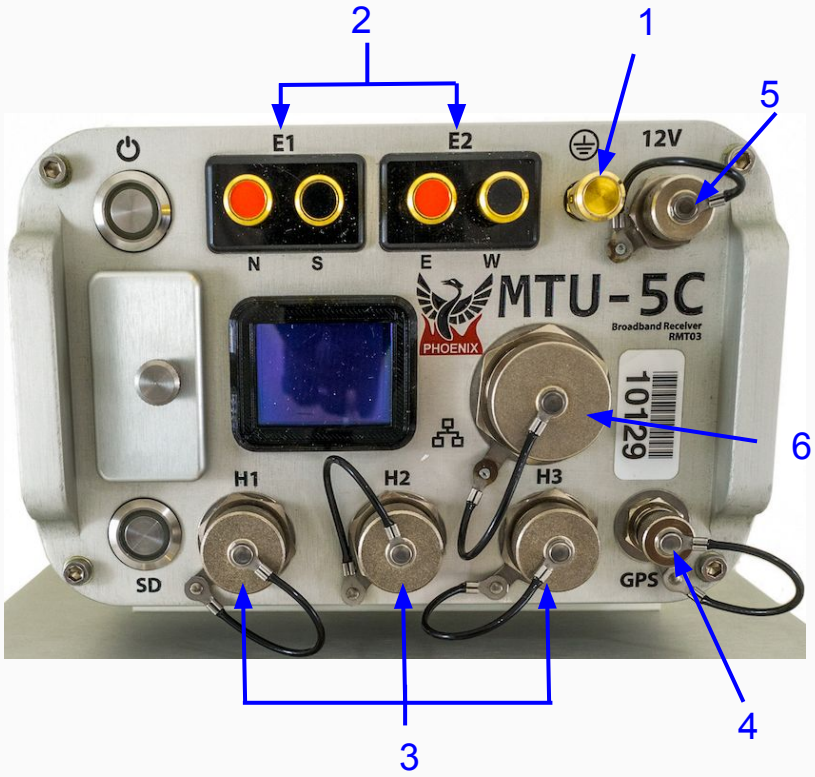
4. Open the file explorer
- Right click **SD card** drive
- **Select Eject option**
- **Pull out the SD Card**







MTU-5C Connections



Start by connecting:

1. Ground electrode
2. Electrodes to channel **E1**(Ex) (N+, S-) and channel **E2**(Ey) (E+, W-)
3. Magnetic sensors to channels **H1**(Hx), **H2**(Hy) and **H3**(Hz)
4. GPS antenna
5. 12V DC Power Source
6. Network connector

In the field, it is often most efficient to connect the components to the receiver following the order on the right

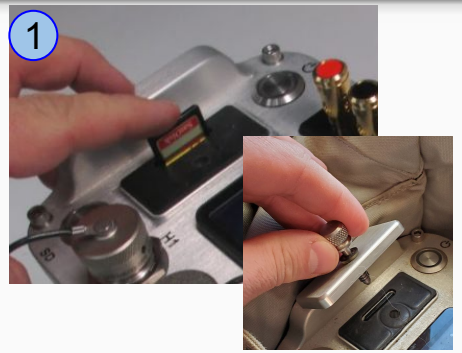
Start the Recording

Before starting a recording, execute the calibration of the receiver and sensors to verify the operating status of the equipment and ensure the quality of the recordings and the reliability of the measurements.

*For more details consult *DAA22- Guide For MT Field Operations*

1. Insert the **SD card** and close the cap
2. To turn on the receiver, press the **Power** button briefly, wait until both **LEDs** are solid blue
   - **2.1. LED** pattern for **Automatic Start** recording
3. If the schedule type was configured as **Manual,** press the **Power** button briefly and release to start recording

1



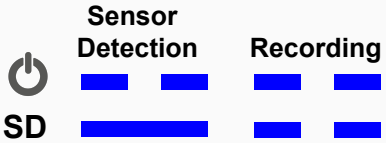
**For any problems with the SD Card, check the DAA24 System Troubleshooting manual*

The receiver auto-detects serial and model for magnetic sensors of the new generation (MTC-155/185). The information about the sensor is updated on the receiver screen only at power on and right after each recording starts.

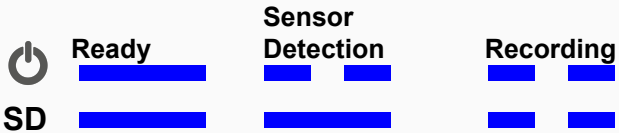
2 Briefly press and release the power button

2.1 ***Automatic Start***

The recording starts automatically according to the schedule



3 Briefly press and release the power button



Indicators

Slow, equal pulses

Solid color / Off

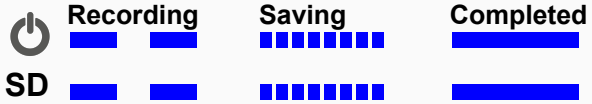
Stopping a recording

1. Press the **Power** button briefly and release to stop recording
   - Wait until both **LEDs** are steady blue
2. Turn off the receiver by pressing the **Power** button for a few seconds, until the **LEDs** will flash red
   - Wait until both **LEDs** turn off
3. Eject the **SD card**
   - Press the **SD card** and release, pull the **SD card**

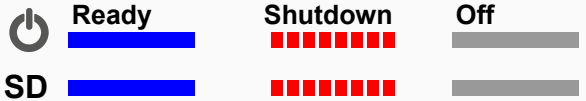
Indicators

▪▪▪▪▪▪▪▪ *Rapid, equal pulses*
▬▬▬▬▬ *Solid color / Off*

1 Press the **Power** button briefly and release



2 Keep pressing the power button 3 sec and release



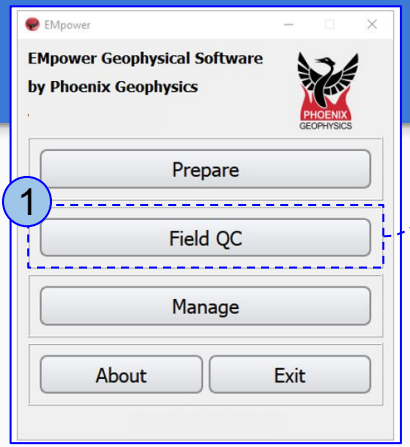
Importing and Field QC

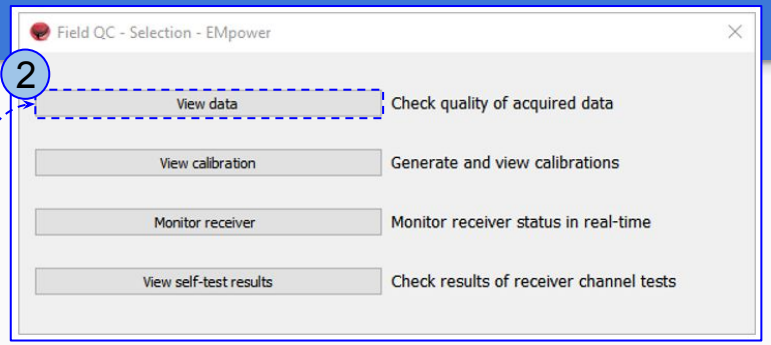
1. Click the **Field QC** button

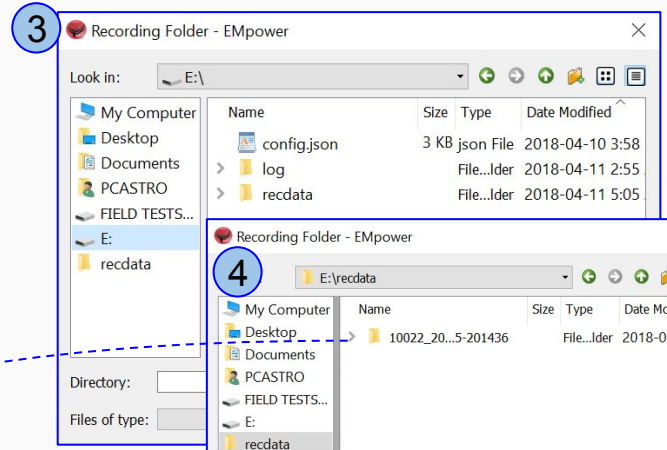
2. Select **View data**

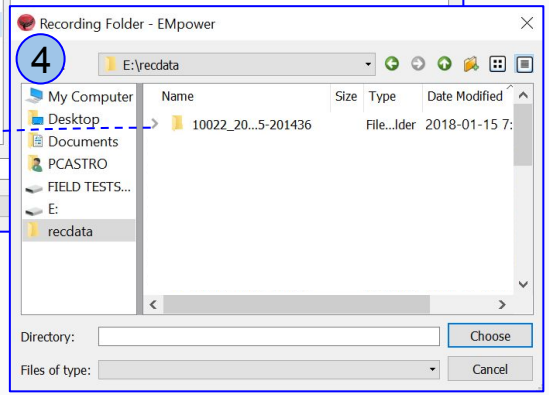
3. Select the **SD card**
- The recording creates two folders, **log** and **recdata**

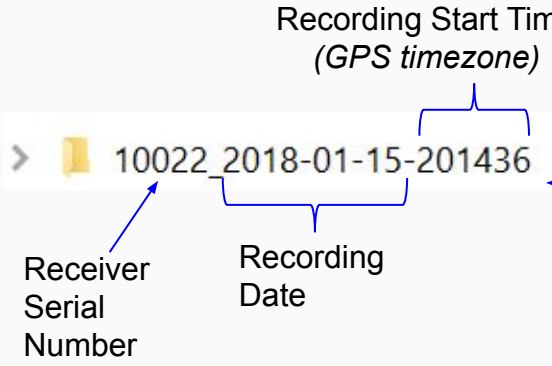
4. Open the **recdata** folder
- Select the recording file
- Click **Choose**





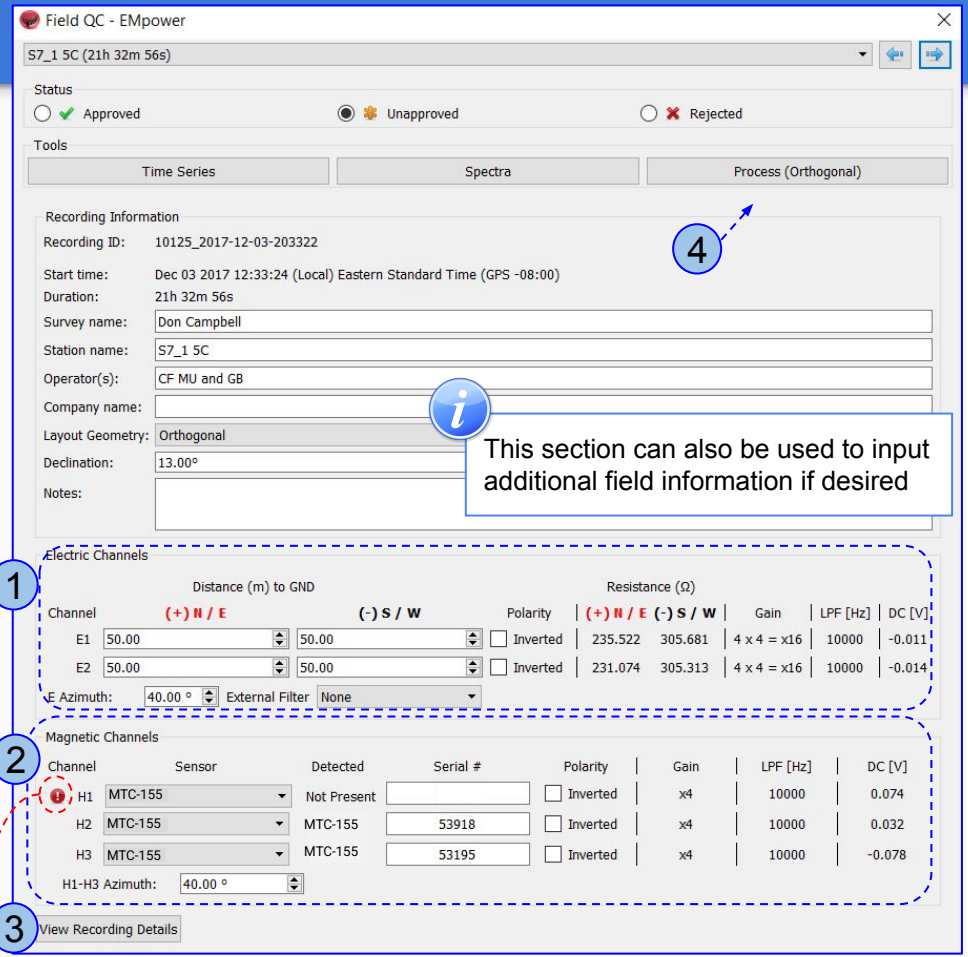






Field QC

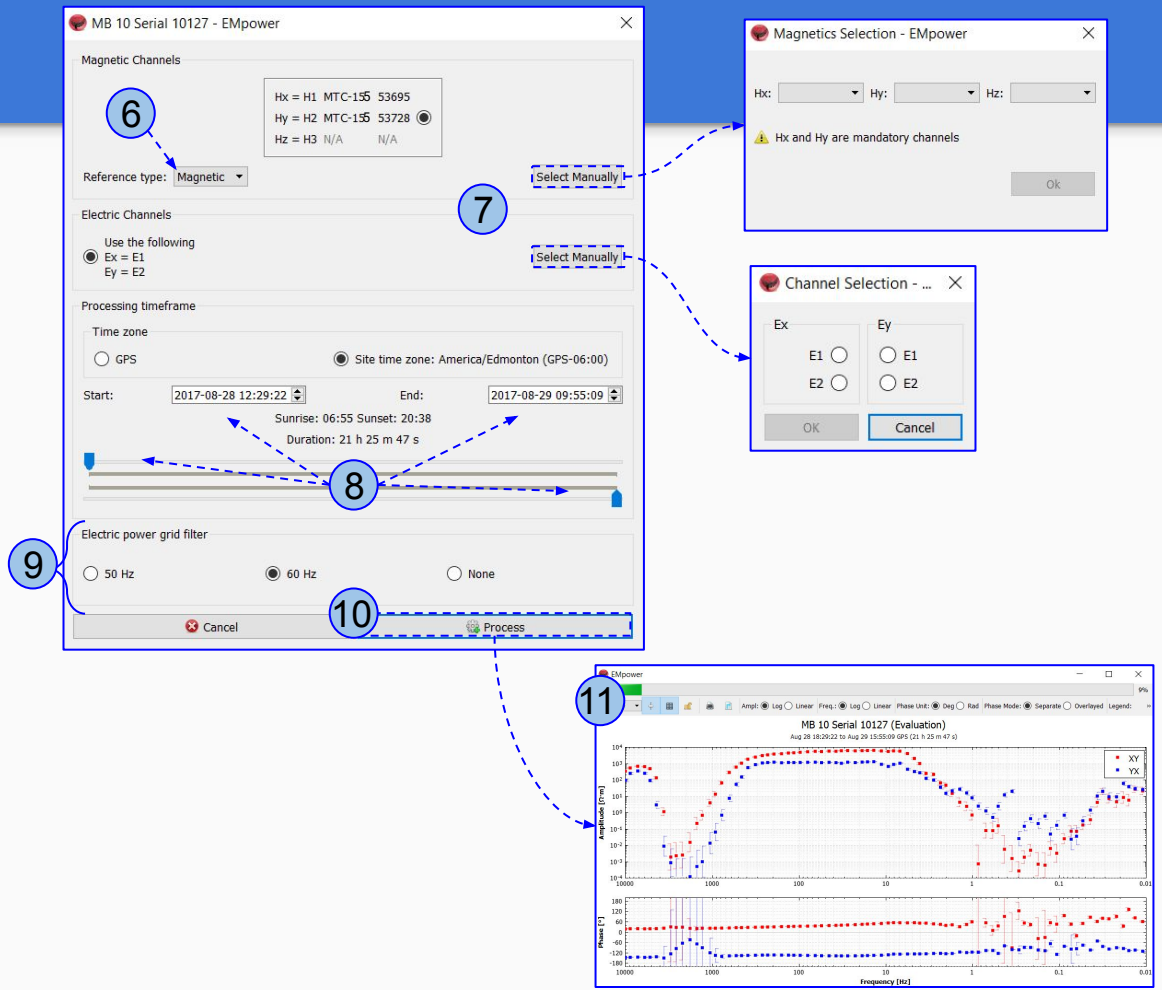
1. Review the **Recording Information**
2. Review the Electrode **Resistance** values and make the necessary corrections
   - Electrode **Distance (m) to GND**
   - **Polarity**
   - **E Azimuth**
   - **External Filter**
3. Ensure that the magnetic sensors were detected and make the necessary corrections
   - **Serial #**
   - **Polarity**
   - **H1-H3 Azimuth**
   - **H4-H6 Azimuth**
4. **View Recording Details** *(see page 14)*
5. After reviewing the information, **Process** the data



The warning icon indicates that something might be wrong with the recording, review the recording information and make necessary changes if needed. Hover mouse pointer over the warning icon for more information.

Processing MT Data

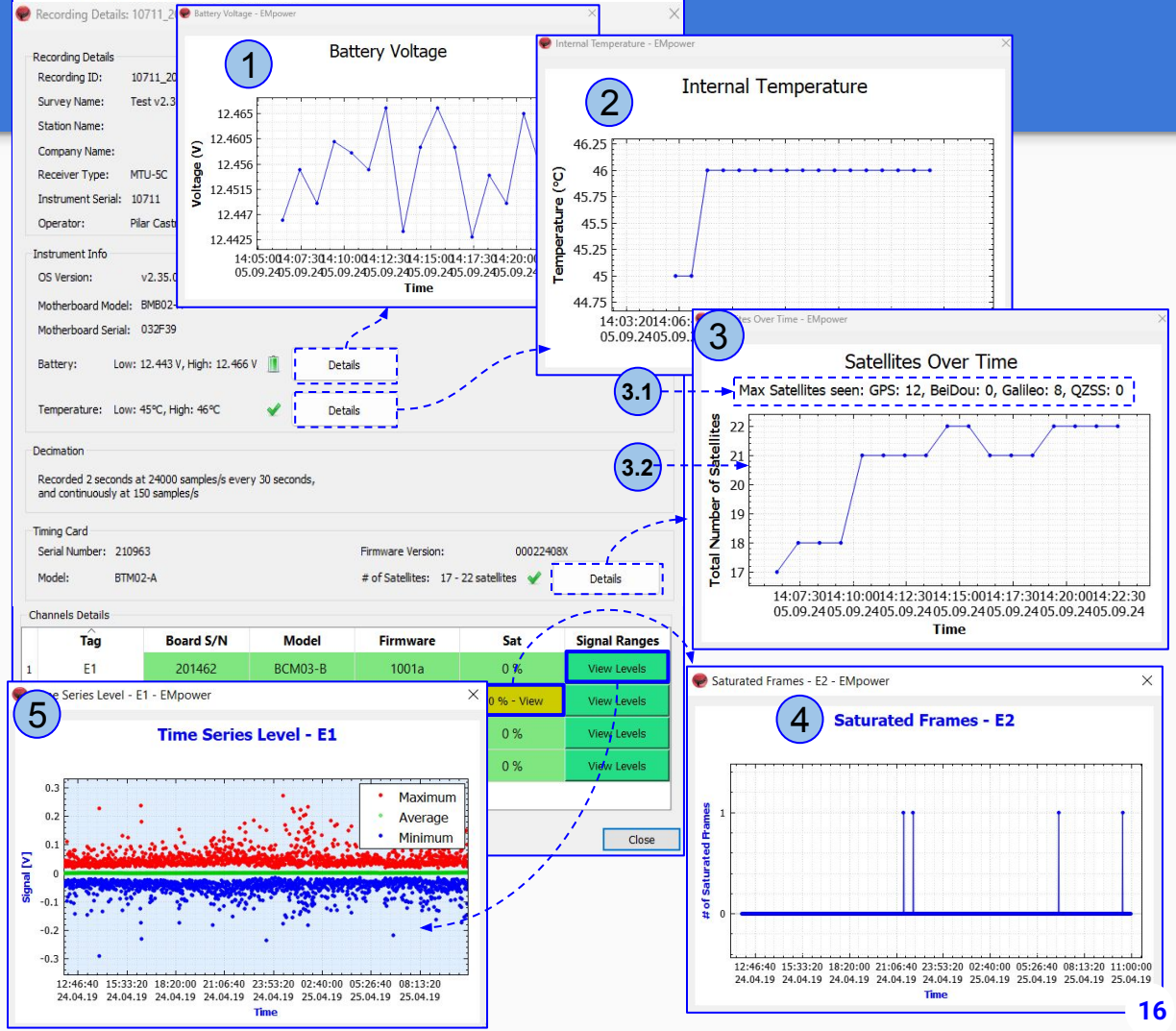
6. Select the local **Reference type** for the channels
7. Select the channels **Manually** button to choose specific channels, this can be done for both magnetic and electric channels
8. Define the segment of time series to be processed, select the **Start** and **End** date/time, or use the arrows to define the time period
9. Select **the electric power grid filter** that corresponds to the frequency carried by the power lines in the survey area *(50Hz, 60Hz, or None)*
10. Click the **Process** button
11. A live display of the resistivity curve will appear after a few seconds



Recording Details

Ensure the following levels are within acceptable limits

1. **Battery Voltage**
2. **Internal Temperature**
3. **Number of Satellites**
   - 3.1. **Max Satellites Seen** shows the highest number of satellites tracked for each constellation since power on and until the end of the corresponding recording.
   - 3.2. The **Satellites Over Time** plot shows the number of satellites being tracked throughout the recording process, and updates every minute.
4. **Saturated Frames**
   - If saturation is not close to ~0%, review the channel configuration, the gain might be too high,or there could be artificial noise at the site
5. **Time Series Level**



Technical Support Contact

Please check out the FAQs
https://phoenixgeophysics.freshdesk.com/
Or email us at: *support@phoenix-geophysics.com*