Copernicus FICE 2024

Training on

In situ Ocean Colour Above-Water Radiometry towards Satellite Validation

Demo on measurement and data handling software TriOS MSDA_XE
Focus: export data to .mlb (HyperCP compatible)

Krista Alikas
1: University of Tartu
alikas@ut.ee

PROGRAMME OF THE EUROPEAN UNION
Copernicus Europe's eyes on Earth
IMPLEMENTED BY EUMETSAT
FRM4SOC Phase-2
fiducial reference measurements for satellite ocean colour
CNR ISMAR ISTITUTO DI SCIENZE MARINE
GODDARD EARTH SCIENCES
EUMETSAT

6-17 May 2024
Venice, Italy

frm4soc2.eumetsat.int/deliverables

PROGRAMME OF THE EUROPEAN UNION

opernicus Europe's eyes on Earth

IMPLEMENTED BY EUMETSAT

FRM4SOC Phase-2

Home About Team Events Documents Contact

fiducial reference measurements for satellite ocean colour

https://frm4soc2.eumetsat.int/deliverables

Deliverables

D-1 Project Management Plan (PMP)

D-2 Reflectance Measurement Requirements Document (RMRD)

D-3 Database to host FRMOCnet specifications, data and documentation for the OCR models as well as for individual instruments and their deployment history

D-4 FRMOCnet Database Architecture Design and User Manual document (ADUM)

D-5 OCDB Database WebUI, CLI, Python API, and Architecture Design and User Manual document

D-6 Technical Report: Measurement Procedure Document (MPROCD)

D-7 Technical Report: Complete characterisation and calibration results for FRMOCnet OCR models and re characterisation routine: an update

D-8 Technical Report: Guidelines for individual OCR full characterisation and calibration

D-9 Data Package: FRMOCnet OCR models full characterization and calibration results

Measurement Procedure for operating the TRIOS/RAMSES radiometers to obtain Fiducial Reference Measurements (MPROC)

D6. Measurement Procedure Document (MPROCD)

Table of contents

The Section 3 summarises how the MSDA_XE software is configured and prepared before a cruise and should be used in conjunction with the MSDA_XE Manuals

https://frm4soc2.eumetsat.int/sites/default/files/inline-files/FRM4SOC-2_D-06_MeasurementProcedure_v3.1_24032023_RBINS_EUMETSAT_signed.pdf

6. Post-acquisition preparation of data for processing

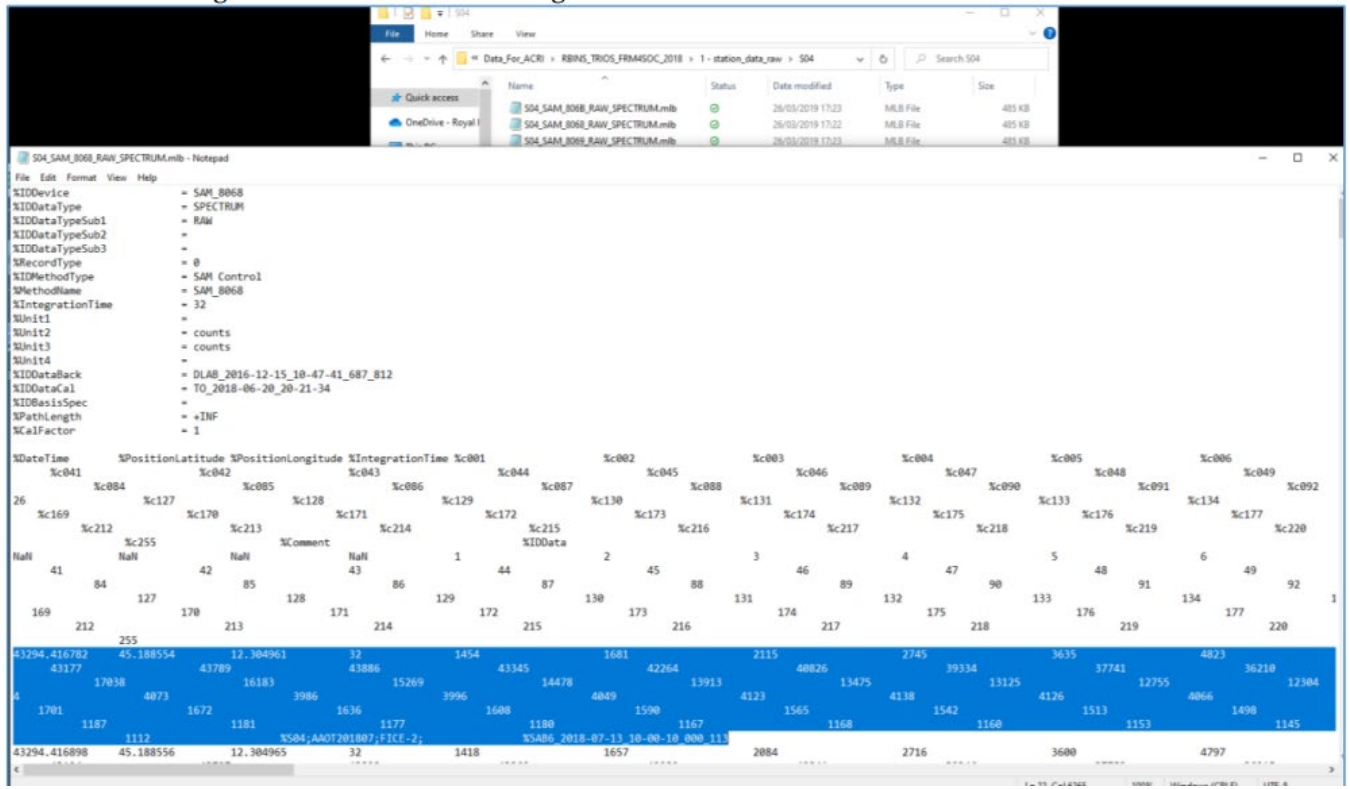
6.1 Radiometer data extraction

After the collection of data, it can be exported with MSDA_XE for HyperCP compatible format.

Extraction will give a raw data file in ASCII format and containing digital counts for each of the 3 radiometers (Ed, Ld, Lu) and for each station selected for processing.

Each data file contains

- a header of typically 18 rows
  - starting with “%” and containing instrument serial number and other metadata
- one column header row
  - starting with “%DateTime”
- and then one row of data for each acquired scan.



Each row of data contains the following (meta)data values separated by spaces:

- Datetime in Julian Day with 6 decimal places (approximately 0.1s)
- Latitude in decimal degrees North (as measured by the GPS)
- Longitude in decimal degrees East (as measured by the GPS)
- Integration Time in ms
- 255 data values as digital counts (corresponding to the 255 pixel detectors of the spectrometer, of which typically the last 18 are dark pixels used for dark correction)
- 2 training text comments each starting with “%”

- To obtain these data files, data is extracted using MSDA-XE as follows:
- EXPORT RAW files from the database (DB_Sender table obtained from Database>Data command) for each sensor separately

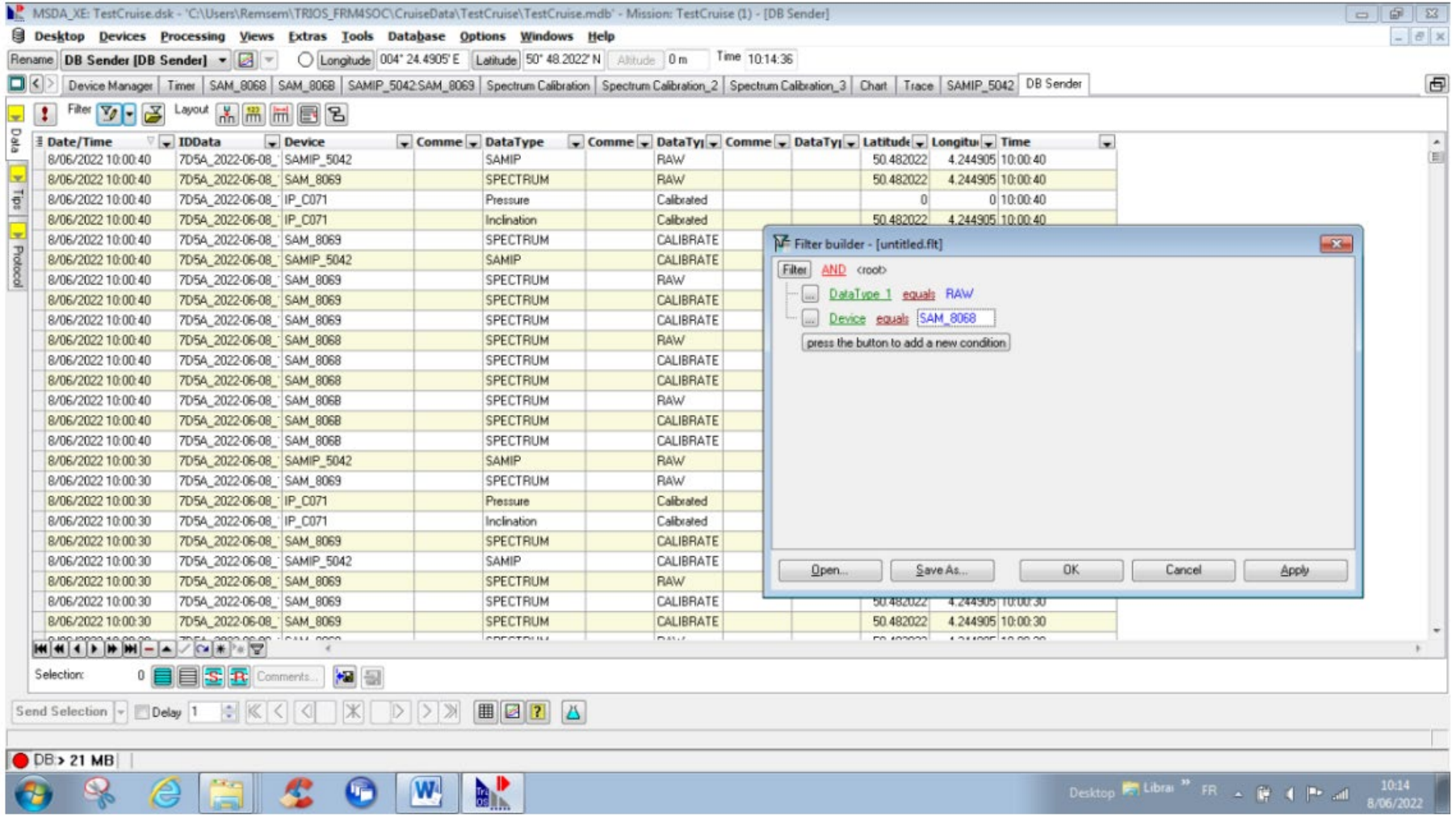


Figure 34 Screenshot preparing export of data showing data filter options for one radiometer.

1) Use the filters:

a) For the radiometers

1. Data Type_1: RAW
2. Device (select a sensor each time): SAM_8068 then SAM_806B then SAM_8069 [adapt to actual device Serial Numbers]

b) For the inclinometer use filters:

1. Device: IPc071 [adapt to actual device Serial Number]
2. DataType: Inclination

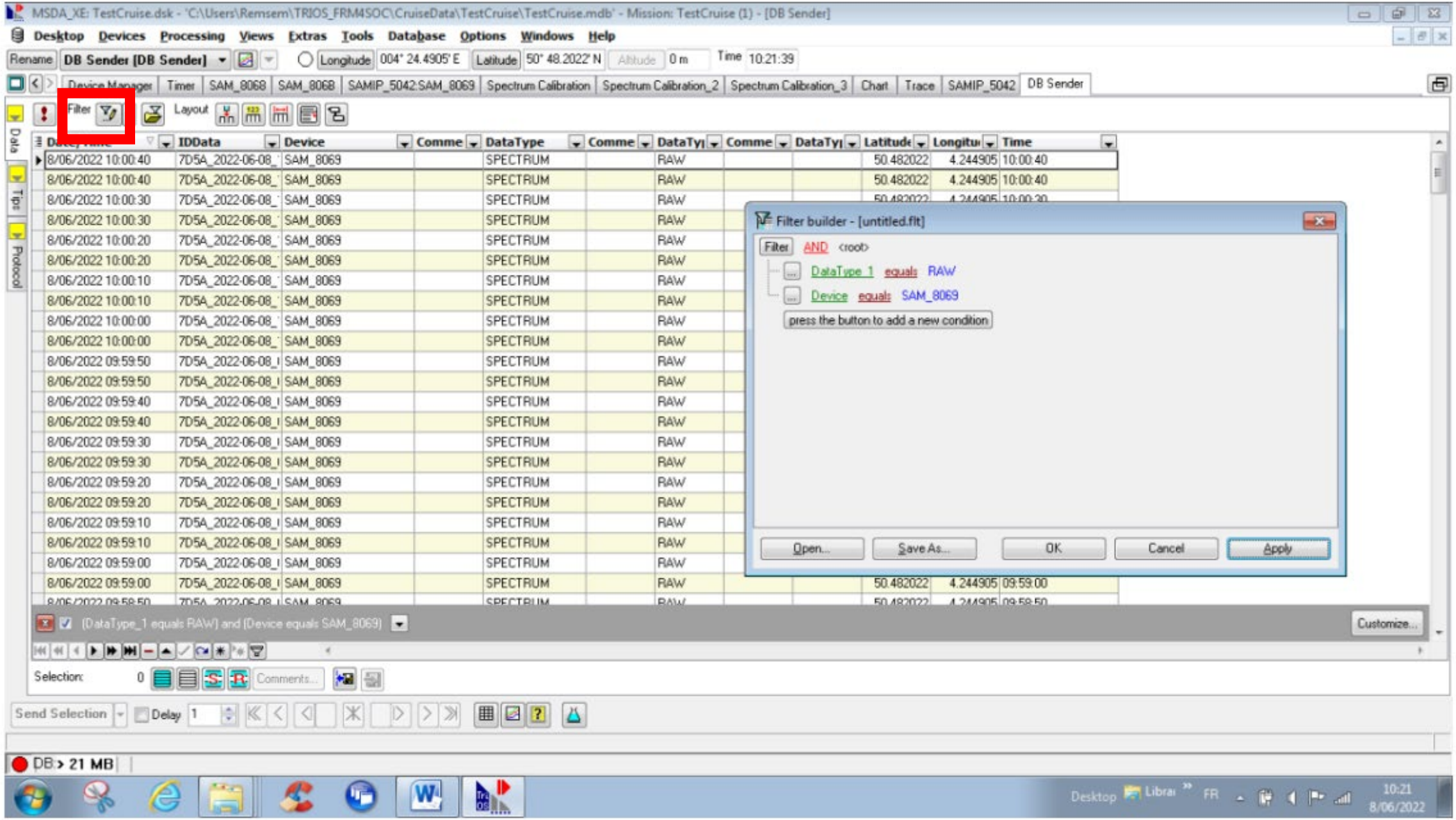


Figure 36 Screenshot preparing export of data showing data filter options for a second radiometer.

2) Select all and Export using Masks:

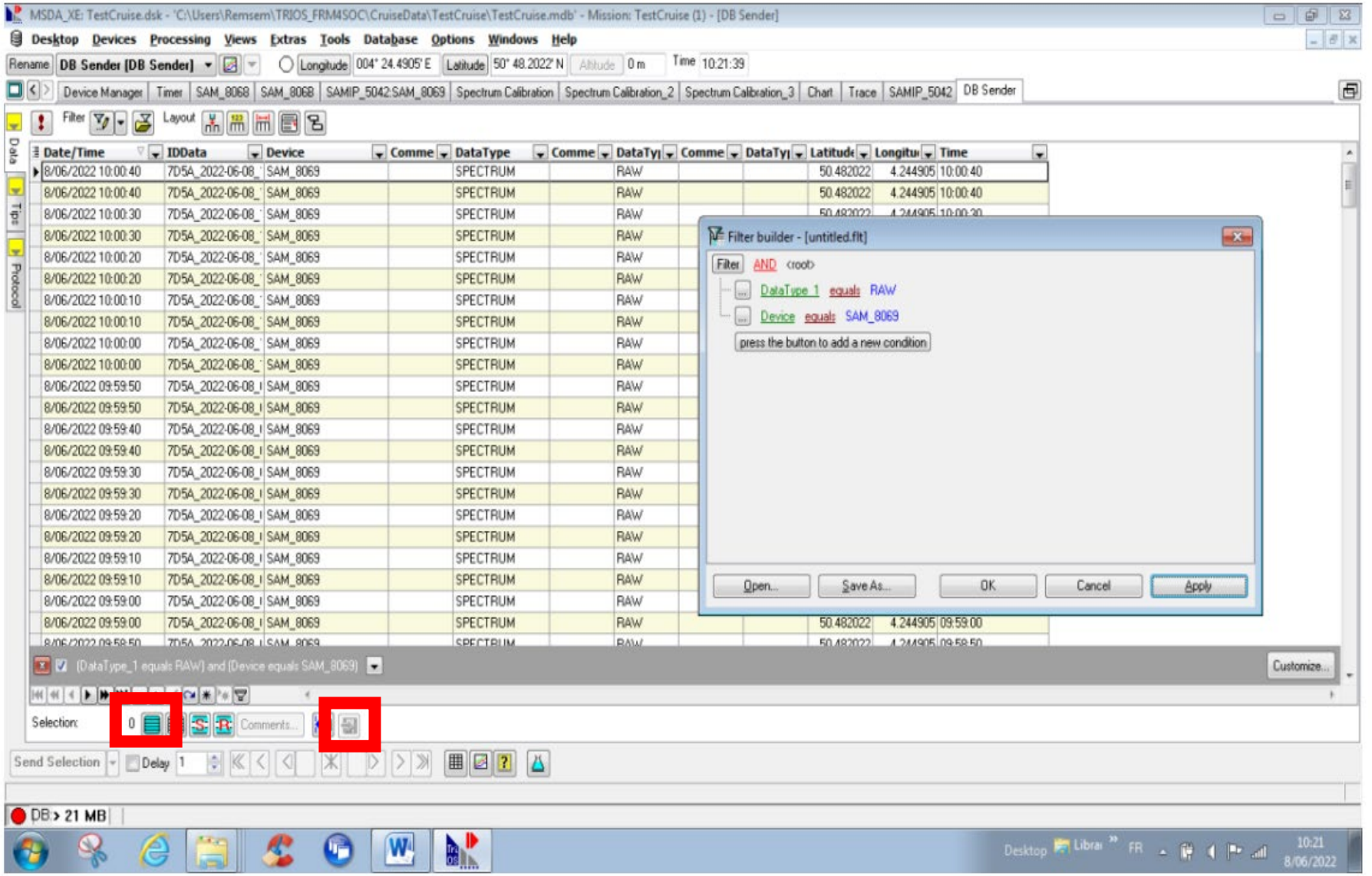


Figure 36 Screenshot preparing export of data showing data filter options for a second radiometer.

Tab: Matlab Serial Data

Sub-tab (left): Masks

Directory: C:\Users\MyUserName\TRIOS\CruiseData\ThisCruise\

Mask: ${Comment0}_${IDDevice}_${DataType1}_${DataType}

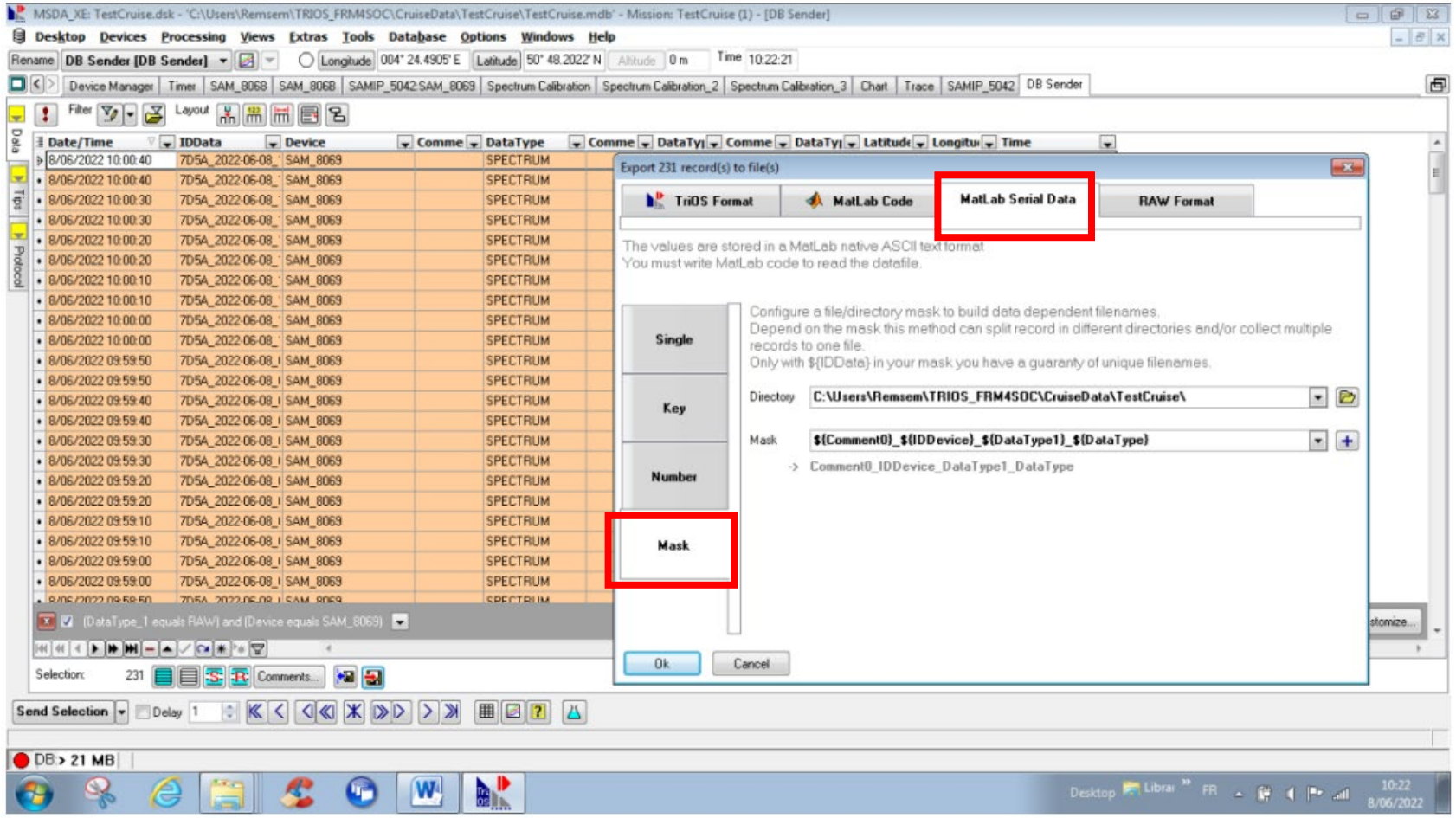


Figure 37 Screenshot while exporting data from one radiometer – showing output filename setting.

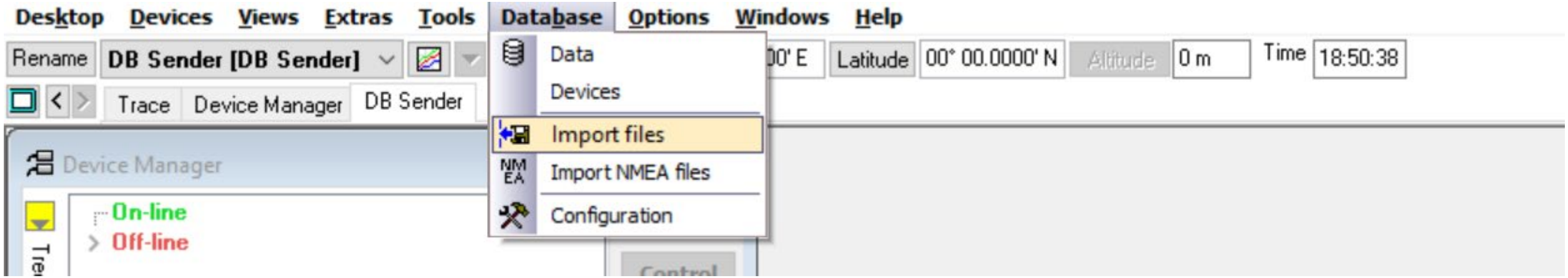
- In this way for each sensor one file for each station is created.
- Example:

StationName_SAM_8068_RAW_SPECTRUM.mlb
StationName_SAM_806B_RAW_SPECTRUM.mlb
StationName_SAM_8069_RAW_SPECTRUM.mlb

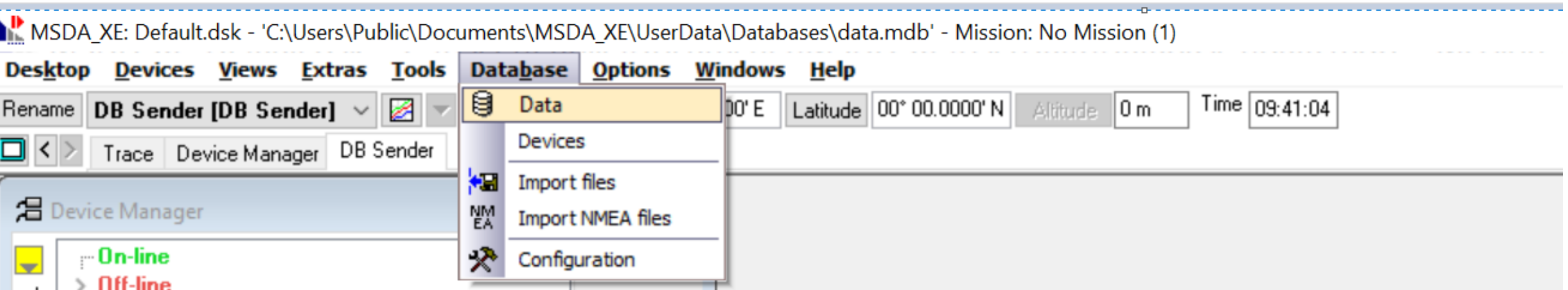
- Hands-on exercise to export TriOS RAMSES data to .mlb (HyperCP compatible) with MSDA_XE software.
- Input data from the Baltic Sea (8th July 2023, GMT 7:03 – 7:09:50, every 10 s)
  - SAM_8166 – Ld
  - SAM_8595 – Lu
  - SAM_8329 – Ed

Name	Date modified	Type	Size
SAM_8166_Spectrum_RAW_2023-07-08_07-01-...	08.07.2023 07:02	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-02-...	08.07.2023 07:02	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-02-...	08.07.2023 07:02	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03-...	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03-...	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03-...	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03-...	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03-...	08.07.2023 07:03	DAT File	5 KB
SAM_8166_Spectrum_RAW_2023-07-08_07-03-...	08.07.2023 07:03	DAT File	5 KB

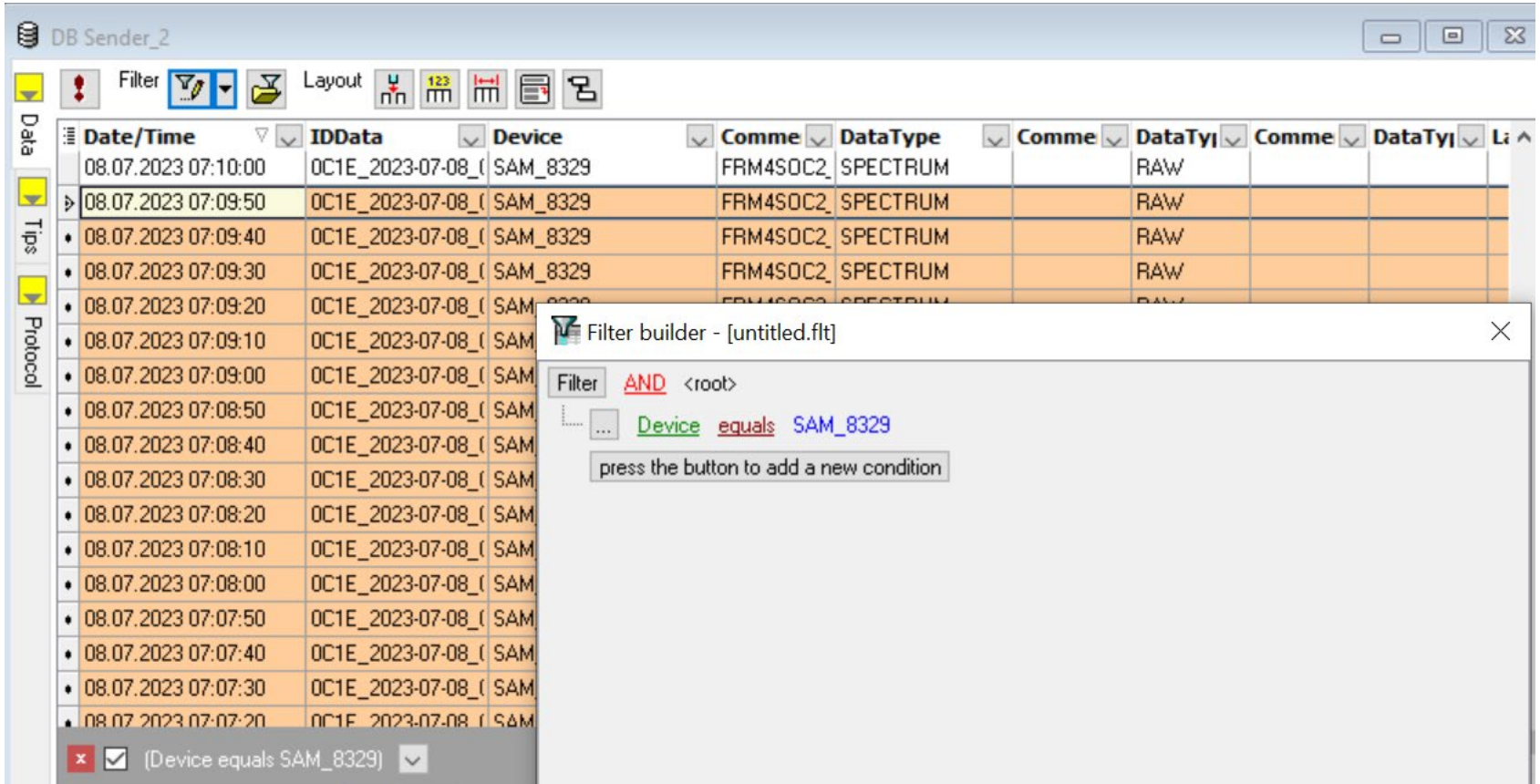
- Import test dataset:
  - Database → Import files



- Open the dataset



- Use **Filter** to specify the **Device** and export data for all three sensors separately



- Under **MatLab Serial Data**, choose **Mask** tab
  - Specify the output Directory
  - Add Mask
- Repeat it for two other sensors