

Product description – Tetra Monitor v1.4

The Application is a TETRA-network coverage tool installed on an Android device connected to a TETRA terminal. It provides a an easy to use interface to collect network coverage information and the ability to export data for post processing to other commercial programs such as Excel or Google Earth.

The application is available for free trial via [Google Play](#). Features is added continuously and customers' needs is what's driving the development of the application. For more information see www.dabr.se/TETRA_Monitor.html, contact daniel.brogren@dabr.se or download the latest data sheet from our [download site](#).

Features

- Get network information including serving cell and all neighbor cells
- Getting network information at periodical time and store the information in a database
- Export and import of CSV-file
- Export network information to KML-file that can be opened in Google Earth
- Setting notes that is stored together with the network information in the CSV-file (eg. When working with indoor coverage where there are no GPS-coverage)
- Trigger SDS to be sent to a predefined ISSI when RSSI is reduced (Only for Sepura STP)
- Possibility to send AT-commands to radio
- Dump of all serial communication between radio and device
- Send SDS messages (Only for Sepura STP)

Benefits compared to PC-application

- It can be carried around to do measurements
- It have a long battery life
- It have built in GPS that can be used instead of using the radios GPS
- It have more capabilities that can be used later on for new features (e.g. sending SMS)

System requirements

Android device running Android 3.1 or later with built in GPS, 4.5" screen or larger, USB-OTG capability. One OTG-cable.

- Sepura STPXXX running V10 or later, STP USB Programming Lead (STP-cable, 300-00434001 or equivalent using FTDI USB-serial-converter)
- Airbus TH1n running V7 or later, Data cable DLR-8U (or equivalent using FTDI USB-serial-converter)

Instructions

First there will be an instruction on how setting up the system for the first time. Then there will be a section where the main functionality is described. At last the setting possibilities is mentioned.

Startup

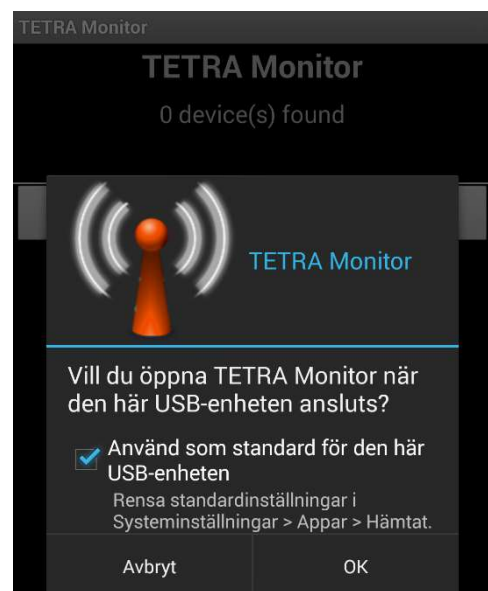
Install the application on an Android device. The requirement is that telephone should have a 4.5" screen and running Android 3.1 or later.

Connect the cables. First connect an OTG-cable to the Android device and the data-cable to the OTG-cable and the Radio.

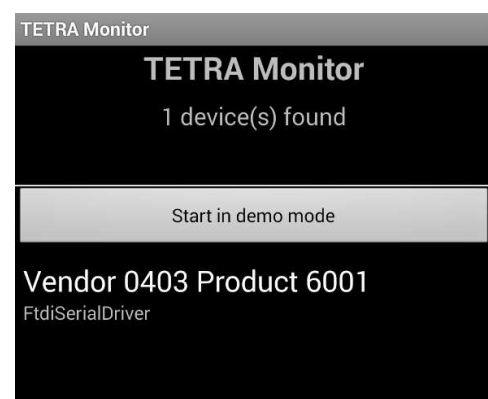


Start the application by clicking the icon. The first time the application starts you will be asked to give permission to use the USB.

NOTE! For some devices there will be a crash when the application is starting up. This is a known issue in Android and there is no reason to send a report.



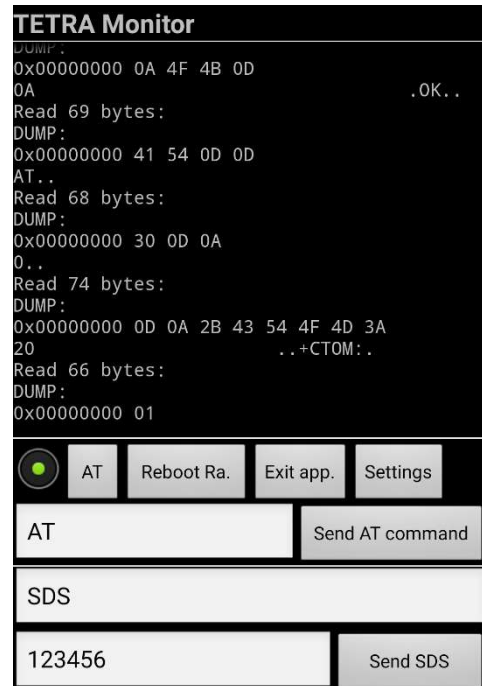
If you want to work offline or don't have a data-cable connected to the device, click "**Start in offline mode**". If you have data-cable connected click the Serial-USB-driver that corresponds to your data-cable. In this case the "**Vendor 0403 Product 6001, FtdiSerialDriver**".



Main window

AT-commands

1. The green dot should be lit in the left side of the window near the “AT- check” button. If not, click the “Exit app.” and restart the application.
2. In the top of the screen there is a HEX-dump of all communication between the radio and the device.
3. “AT – Check” sends an “AT” to radio and the answer should be “OK”. This is the best way to check if communication between Radio and Android device is working. If this is not working try to restart the Radio by clicking “Restart Ra.”
4. “Restart Ra” restarts the radio.
5. “Settings” opens the settings menu.
6. “Exit app.” Closes the application and shuts down all background activity. Do this when you are not using the application any more, it saves battery. Otherwise the app will still be running in the background.
7. In the “AT”-textfield you can write any AT-command and send it to the radio with the “Send AT command”-button.

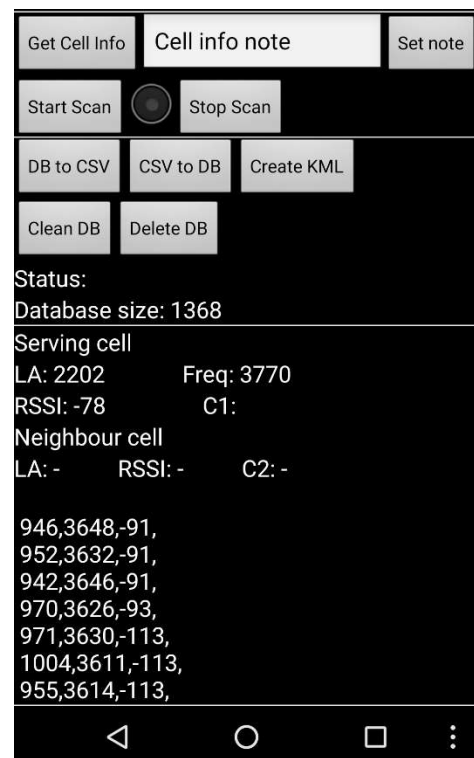


SDS-interface

8. The “SDS”-textfield is used to write a SDS that can be send by clicking the “Send SDS”-button. The “123456”-textfield is where the ISSI-number should be. There is no support for MSISDN at this moment and there is no possibility to receive SDS in the device. This is not supported for Airbus terminals.

Cell information - interface

9. “Get Cell Info” fetches the network information from the Radio and presents it in the app. It also saves the information in an internal SQL-database.
10. An additional information can be stored in the database together with the cell information by changing the “Cell info note”-textfield and then click the “Set note”-button. The note will be attached to all measurements after the button is pressed. One example is the use when indoor and there is no GPS-coverage, each time the operator passes a door he writes down the door name in the “Cellinfo note”-textfield and then press “Set note”, he can then easily see in the CSV-file which measurements corresponds to which door in the building.
11. By clicking the “Start Scan”-button a periodically update of the cell information is done. Stop the scan by pressing the “Stop Scan”-button.



12. To export the database to a CSV file click the “**DB to CSV**”-button. The file is stored in the device /TetraMonitor/monitor<#>.txt where # is the number of the file. An import from CSV can also be done by clicking the “**CSV to DB**”. The application will check for a file called /TetraMonitor/monitor0.txt and append that information to the current database.
13. The “**Create KML**”-button generates a KML-file from the information in the database. The KML-file can be opened in e.g. Google Earth. The file is stored in /TetraMonitor/monitor<#>.kml.
14. The “**Clean DB**”-button removes all measurements that have the same location (and frequency) and saves the latest measurement. It can save a lot of space and reduce the time for creating CSV- and KML-files. By clicking the “**Delete DB**” the entire database is removed.

Settings

Click the three small dots in the bottom right corner of the screen to enter the settings menu.

Create KML

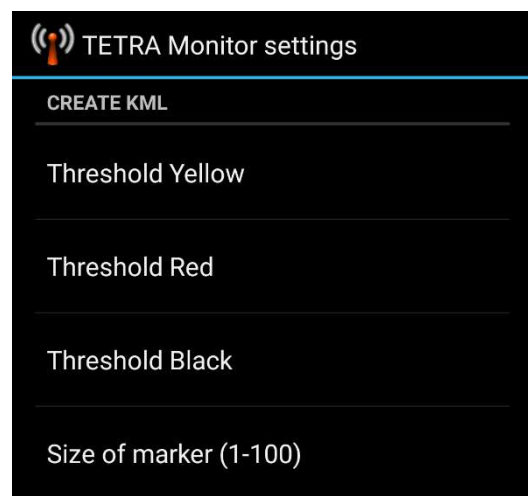
The **thresholds** for the color can be adjusted when creating the KML-file. The default values are:

Threshold Yellow: -80dBm

Threshold Red: -100dBm

Threshold Black: -126dBm

Size of marker [10]. This function changes the size of the marker when creating the kml-file.

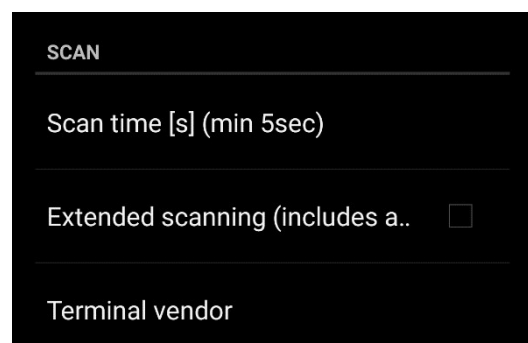


Scan

Scan time defines the periodicity of the cell information. The minimum is 5 seconds since the radio will not update its cell information more often. When doing long measurements the amount of data can be large if having a too short periodicity. The default value is 10s.

Extended scanning controls if all neighbor cells will be stored in the database. It also controls if extended KML-file should be created or not.

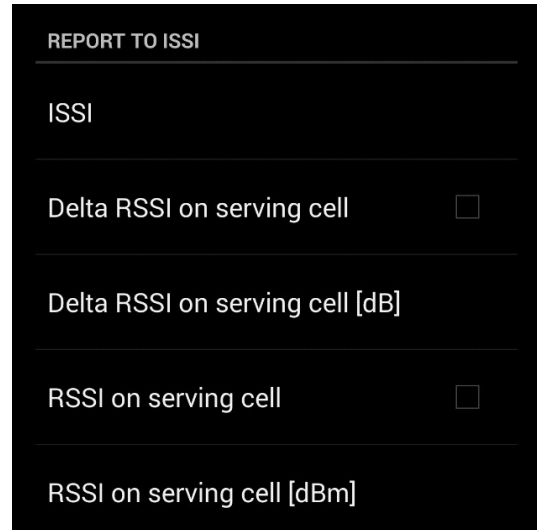
Terminal vendor sets the terminal type that is being used. After this has been changed the application has to be restarted.



Report to ISSI

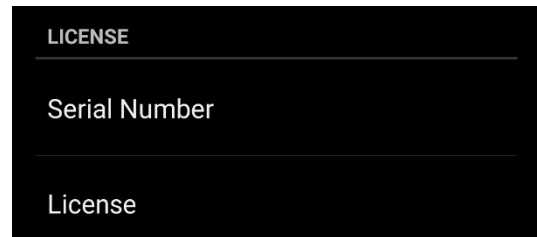
The application can be configured in a way so that it sends a SDS to a predefined ISSI if the RSSI is changed. It can be useful for stationary scanning in network when there is a suspected time changing jammer. Only one SDS will be sent no matter how the RSSI is changed. Stop/Start scan have to be performed in order to start the function again. Not supported on Airbus terminal.

1. "ISSI" sets the ISSI-number to where the SDS is sent.
2. "Delta RSSI..." Sets if the SDS should be triggered if RSSI is changed from previous value.
3. "Delta RSSI... [dB]" sets how big different it should be between two measurements before sending an SDS.
4. "RSSI on serving ..." Sets if the SDS should be triggered at a certain RSSI.
5. "RSSI on serving ... [dBm]" Sets at what dBm the SDS should be triggered.



License

To be able to use the full functionality of the Tetra Monitor the correct license key have to be inserted the application. Please check your serial number under "Serial number" and send that information to daniel.brogren@dabr.se. You will now retrieve a license key that should be inserted under "License" in the button of the settings screen.



The limitation when not using a correct license are:

- Database limited to 20 posts
- Not allowed to send SDS.
- Not allowed to start scan.
- Not allowed to delete database. (database can still be deleted by clear data in Android settings)

Output files

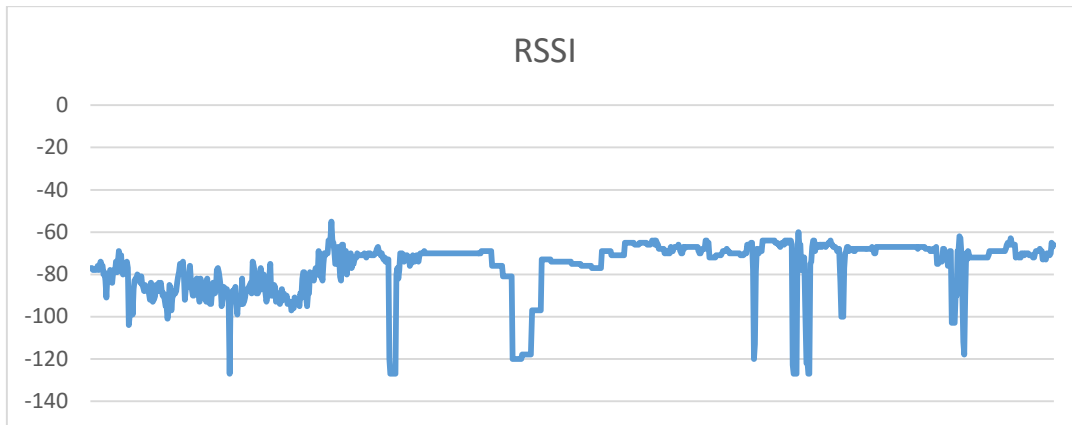
NOTE!!! Creating files from database and importing data from file to database can take several seconds or minutes depending on how much data is processed.

CSV-file

The created CSV-file is located in /TetraMonitor/monitor<#>.txt. It can be opened in a text editor or in Excel. The file is also used to import data to another Tetra Monitor Device by using the "CSV to DB" function. The file contains of the following columns. The C-value is not stored for Airbus terminals.

<LA>,<Freq>,<RSSI>,<C1><Lat>,<Lng>,<CellInfoNote>,<Time>,<SC/FN/NC>

By opening the file in Excel there is the possibility to plot the values in the way that is suited, e.g. plotting the RSSI. By using the Excel filter functionality there is the possibility to filter on freq/LA/serving cell or any other information.



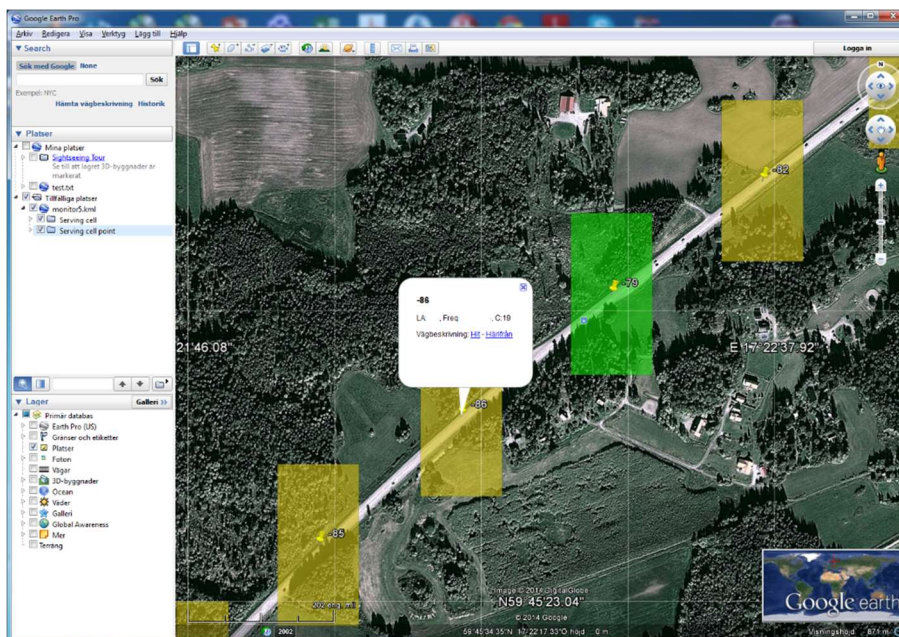
LA/Freq-file

This file contains all known LA and frequencies combinations. This shows an example on how the file can look like.

123,393.7125,
234,393.6125,
345,391.6125,

KML-file

The KML-file is stored in /TetraMonitor/monitor<#>.kml and can be open in Google Earth or any other GIS-program that uses kml-files. If the “Extended scanning” checkbox is selected in the settings menu an extended kml-file will also be created. It contains all neighbor cells and is saved in /TetraMonitor/monitorExtended<#>.kml.



File transfer

Tetra Monitor can be set up together with BtSync to be able to transfer files via WLAN/Internet in a quick and easy way. Instructions how to set it up can be found here: http://dabr.se/TETRA-Monitor-Download/BT_Sync_and_Tetra_Monitor.pdf

Benchmarking

The time to import/export can sometimes take some time. Here are some figures for a Nexus5 that can be used as a reference. Depending on the information in the DB the time to do export can vary a bit. If you are just recording the serving cell and scanning with an interval of 10s the number of posts in the DB will be 360 after 1h of scanning.

NOTE! When creating the extended KML, both standard and extended is created.

# posts in DB	DB size	CSV to DB	DB to CSV	DB to KML	DB to KML (extended)
360 [1h]	32KB	5sec	1sec	1sec	1sec
1.800 [5h]	104KB	23sec	2sec	2sec	2sec
3.600 [10h]	192KB	46sec	3sec	3sec	3sec
36.000 [100h]	1.84MB	7min 30sec	55sec	2min	2min 15sec

As noticed, when dealing with large database the import/export can take some time. Note also that there can be limitations in the number of point that can be imported in map-viewer viewer (e.g. Google Earth).

Common Issues and limitations

The OTG-serial-converter is not detected: Check so that the device have OTG-support.

The files stored on the device is not visible on my Windows computer: This is a known issue in Android and by rebooting your device the files should appear in widows. Use *MoboRobo* or any other file manager to see the file immediately. To see the files in your Android device use an Android file manager such as *ES file manager* that can be downloaded via Google Play.

Crash at startup: The first time you are running the application there might be a crash. This is a known issue in Android.

Sepura

Most command just report ERROR: The two serial ports might be switched so that on Packet Data is on the Physical port. Check in Radio Manager, Profile template - PEI Parameters – General PEI Parameters – Parameters – Serial Port Usage [8161] should be “Normal (AT on first physical port)”.

Airbus

Frequencies is strange: The frequency shown for Airbus terminals is the frequency number and not the actual frequency.

Sending SDS: Tetra Monitor is not supporting to send SDS with the Airbus terminals.

There are no AT-commands working at all: Click the “Restart Ra” and try again.