

GPSMEAS2000 Version: 1/0/0

File Waypoints Parameters Evaluation Reset Expert About

FIXED  From GPS file example.nma (1)-GPS (2)-START MEAS STOP EXIT

NMEA  FST OK  FST NO  S/N OK  S/N NO  OFF

ALT  FST  MER  KMH  SMP  SAT  DIST  PDS  90%  AUD  OFF

200 kmh

GPS->TCPIP  
Port: 2080

Time:  
Date:

RMC GSV GSA GGA

GPS PORT

COM1  COM6  
 COM2  COM7  
 COM3  COM8  
 COM4  COM9  
 COM5

LOG GPS DATA to File

00000/00000

Distance /m AVG  
100 0

Max count for AVG  
100 0

Speed dep. samples  
100 SMP/msec

USE FILE PREFIX  
TEST

Selected RECEIVER: 12-IC1000  MEASURE SIGNAL STRENGTH

6075 FREQ./kHz TUNE RX GET AGC INIT RX SELECT RX 0 CORR/DB

Simulate DRM  DRM SOFTWARE RECEIVER

MODE:

0	AUDIO	0	SERVICE1
0	SDC	0	SERVICE2
0	FAC	0	SERVICE3
0	SYNCH	0	SERVICE4

REMOTE localhost PORT 8001

TX MARKER SET

TX MARKER SET

AREA

R=RURAL (0)  
 C=CITY (2)  
 S=SHADOW (1)  
 I=IGNORE (3)

NEXT EVENT: 1

GPSMEAS2000 Version: 1/0/0 EUSKIRCHEN LAT:50.666700 LON:6.783301 15:31 23.04.2006

# GPSMEAS2000

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## Basic functions of the software

- Facilitate Field-strength and DRM-related measurements
- GPS supported
- Mobile measurements
- Support different receivers
- Generate data that can be evaluated in excel

# Supported receivers

- EK070 IEC-BUS
- ESH3 IEC-BUS
- WINRADIO
- EK070 COM
- NRD 535 COM
- EK890 COM
- AOR7030 COM
- NRD545 COM
- AOR5000 COM
- EB200 COM
- EB200 TCPIP
- IC PCR1000 COM
- TENTEC320 COM
- DT700 RSCI UDP/COM
- FRG100
- DRT1
- DWT

## GPS support

- Any GPS using the NMEA protocol
- Connection via COM1 ... COM 9 or above
- Baudrate : 4800 bd

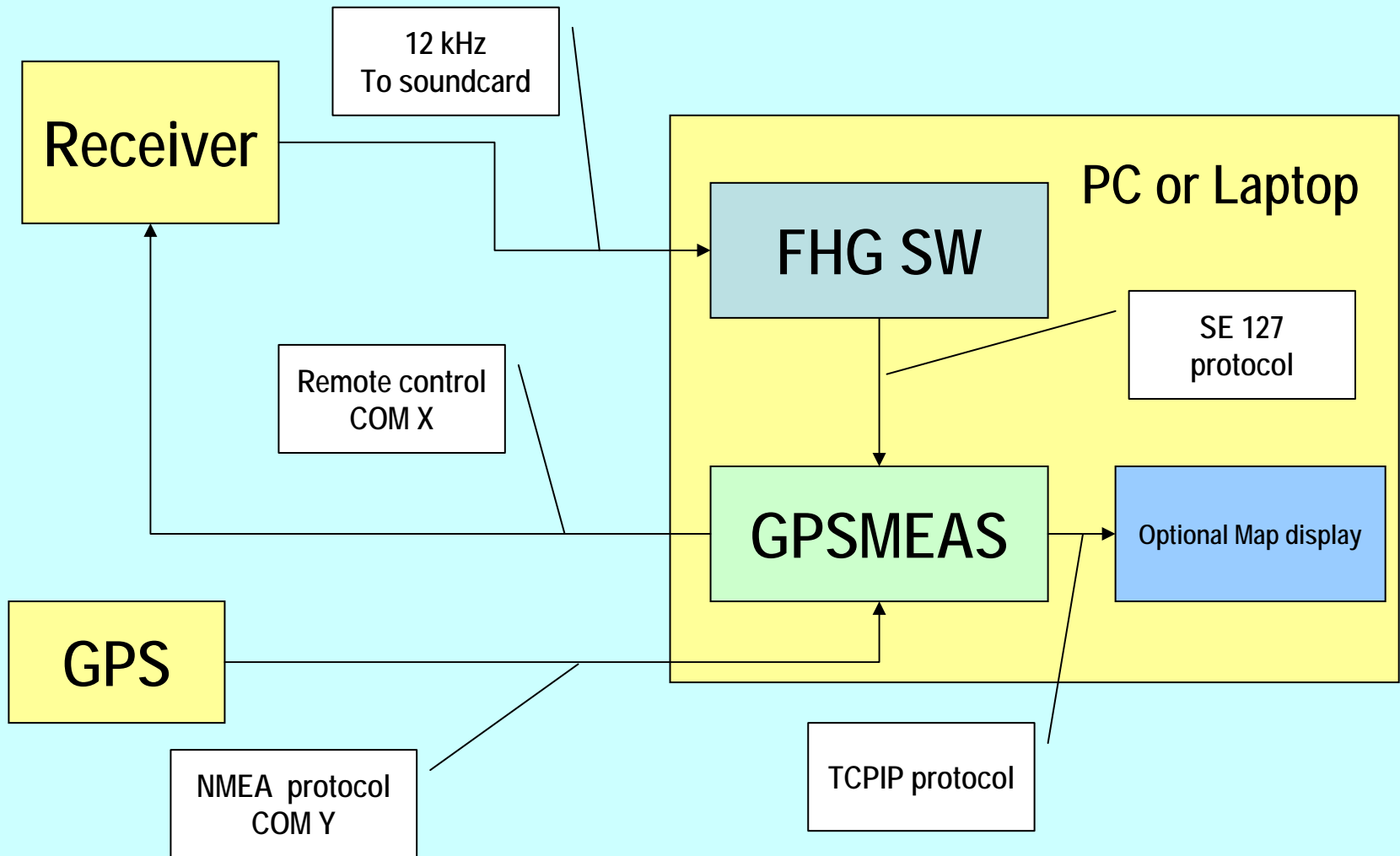
## DRM support

- evaluation of basic parameters from SE127 protocol
- Service 1 .. Service 4
- SNR
- SYNC
- FAC
- SDC
- AUDIO availability

# Outputs

- The measurements are stored into an CSV file that can be imported into EXCEL
- 3 files:
  - Single measurements (CSV) stores every single measured data
  - Average measurements(CSV) Stores the average over the distance travelled
  - NMEA log stores the GPS data of the whole tour
- 3 files
  - Distribution of FST
  - Distribution of SNR
  - Distribution FST and SNR in one file

# General Measurement Setup



# Basic operation of GPSMEAS2000

The screenshot shows the GPSMEAS2000 software interface. At the top, the title bar reads "GPSMEAS2000 Version: 1/ 0/ 0". Below it are menu options: File, Waypoints, Parameters, Evaluation, Reset, Expert, About. A toolbar contains buttons for "FIXED", "From GPS file" (with a text field containing "example.nma"), "(1)-GPS", "(2)-START MEAS", "STOP", and "EXIT".

The main interface is divided into several sections:

- GPS STATUS:** A red bar at the top left showing "NO FIX" and "WAITING FOR FIX". Below it are fields for "Lat:" (with "??") and "Lon:". A "Track:" window shows a circular compass rose with a yellow track line.
- Parameters:** A central panel with various settings:
  - Distance /m AVG: 100, 0
  - Max count for AVG: 100, 0
  - Speed dep. samples: 100 SMP/msec
  - USE FILE PREFIX: TEST
- GPS->TCPIP:** A red-bordered panel on the right for network configuration:
  - Port: 2080
  - Time and Date fields
  - GPS PORT selection: COM1 through COM9, with COM2 selected.
  - LOG GPS DATA to File: checked
- TX MARKER SET:** A green-bordered panel at the bottom right for area classification:
  - AREA: R=RURAL (0), C=CITY (2), S=SHADOW (1), I=IGNORE (3)
  - NEXT EVENT: 1
- Other sections:** "Selected RECEIVER: 2-IC1000", "6075 FREQ./MHz", "DRM SOFTWARE", and a table of services (SERVICE1-4) with checkboxes.

At the bottom, a status bar displays: "GPSMEAS2000 Version: 1/ 0/ 0", "EUSKIRCHEN", "LAT:50.666700", "LON:6.783301", "15:31", and "23.04.2006".

Annotations with arrows point to specific features:

- Track window:** Points to the circular track display.
- Graph window:** Points to the track display area.
- GPS information:** Points to the GPS status and coordinate fields.
- GPS COM-Port selection:** Points to the COM port selection options.
- Interactive area: Classify area Set markers:** Points to the TX MARKER SET panel.

# Receiver and DRM settings

The screenshot shows a software interface with the following elements and callouts:

- Enter frequency to tune the receiver:** Points to the frequency input field containing "6075".
- Read fieldstrength (once):** Points to the "GET ASD" button.
- Init the receiver:** Points to the "INIT RX" button.
- Enable Field-strength measurements:** Points to the "MEASURE SIGNAL STRENGTH" checkbox, which is checked.
- Tune the receiver:** Points to the "TUNE RX" button.
- Select the receiver:** Points to the "SELECT RX" button.
- DRM SNR display:** Points to the "AUDIO" status indicator.
- DRM flags indicating state:** Points to the "SERVICE1" through "SERVICE4" status indicators.
- Port settings for FHG SW radio:** Points to the "REMOTE" and "PORT" fields, which are set to "localhost" and "8001" respectively.
- Enable DRM measurements:** Points to the "DRM SOFTWARE RECEIVER" checkbox, which is checked.

The interface also includes a "Simulate DRM" checkbox (unchecked) and a "MODE:" section with several empty input fields.

# Parameter settings

The screenshot shows a menu with several sections:

- Top section: A display showing "00000/00000".
- Green section: A checked checkbox labeled "Distance /m.AVG", followed by a numeric field set to "100" and a field set to "0".
- Yellow section: A checked checkbox labeled "Max count for AVG", followed by a numeric field set to "100" and a field set to "0".
- Cyan section: An unchecked checkbox labeled "Speed dep. samples", followed by a numeric field set to "100" and the text "SMP/msec".
- Bottom section: A checked checkbox labeled "USE FILE PREFIX" and a text input field containing "TEST".

Callout boxes point to various elements:

- Top right: "Enable the equal distance measurements" points to the "Distance /m.AVG" checkbox.
- Middle right: "Enable the maximum count to average measurements" points to the "Max count for AVG" checkbox.
- Bottom right: "Enable the speed dependant sampling rate of the measurements" points to the "Speed dep. samples" checkbox.
- Left side (top): "Enable the file prefix" points to the "USE FILE PREFIX" checkbox.
- Left side (bottom): "Enter the file prefix" points to the "TEST" text field.

Enable the equal distance measurements

Enable the maximum count to average measurements

Enable the speed dependant sampling rate of the measurements

Enable the file prefix

Enter the file prefix

# Information during measurements

No of averaged measurements stored

The screenshot shows a configuration window with several sections:

- Top section (white background):** A display showing "00000/00000".
- Green section:** Contains a checked checkbox for "Distance /m AVG", a numeric input set to "100", and a numeric input set to "0".
- Yellow section:** Contains a checked checkbox for "Max count for AVG", a numeric input set to "100", and a numeric input set to "0".
- Cyan section:** Contains an unchecked checkbox for "Speed dep. samples", a numeric input set to "100", and the label "SMP/msec".
- Bottom section (grey background):** Contains a checked checkbox for "USE FILE PREFIX" and a text input field containing "TEST".

No of single measurements

Current distance since last average (meters)

Current count of measurements for average

Sample interval in mSec, when activated

# Enter/modify waypoints

Select Waypoint  Zoom WPTs

13 Loaded

NO	LAT	LON	NAME	RTE
1	50.903365	7.180692	ROESRAD	0
2	50.903676	6.959351	DW KOELN	0
3	50.80582	6.814235	HOME	3
4	51.588825	3.726978	ROOMPOT	0
5	50.933298	6.366701	JUELICH	0
6	50.633299	6.950001	RHEINBACH	0
7	50.666698	6.783301	EUSKIRCHEN	0
8	50.8807	7.116834	KOELN BONN AIRPORT	0

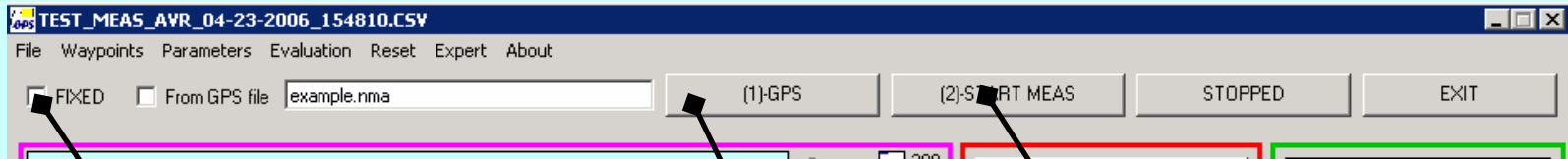
DISPLAY ONLY POINT    NAME ON MAP    NUMBER ON MAP

DELETE SELECTED   ADD NEW WTP   USE SELECTED   EXIT

Use the selected  
waypoint as  
transmitter location



# Start of measurements



Select fixed or  
mobile  
operations

Start GPS unit  
first

Start  
measurements  
second

# Running measurements

The screenshot displays a software interface for running measurements. At the top, there are radio buttons for NMEA, FST OK, FST NO, S/N OK, S/N NO, and OFF. Below this, a status bar shows MNEA FILE, FIX, SATS OK, and Sats: 7. The main display area is divided into several sections:

- Position and Track:** Lat: 050.892870N, Lon: 047200E, Track: 209/204, Alt: 048 (065).
- Compass:** A circular compass showing the heading of the car (indicated by a black arrow) and the heading towards the transmitter (indicated by a red arrow labeled TX).
- Signal Strength Graph:** A red line graph showing signal strength over time. A callout box labeled "Heading towards transmitter" points to the graph.
- Control Panels:** On the right, there is a "GPS->TCPIP" panel with a Port field set to 2080, Time: 14:48:41 GMT, and Date: 04-06-02. Below it is a "Speed of car" panel with a scale from 0 to 200 kmh. A callout box labeled "Speed of car" points to this panel.
- Receiver Settings:** A panel showing "Selected RECEIVER: 12-IC1000", "INIT RX OK", and "MEASURE SIGNAL STRENGTH" checked. It includes fields for frequency (48.00) and "FREQ. /kHz" (6075), and buttons for "TUNE RX" and "GET AGC". A callout box labeled "MER history" points to this panel.
- DRM Settings:** A panel with "Simulate DRM" checked and "DRM SOFTWARE RECEIVER" checked. It includes a field for "22.77" and a "MODE:" section with a list of services (SERVICE1-4) and their status (0/1).
- Remote Settings:** A panel with "REMOTE" set to localhost and "PORT" set to 8001.

Heading of car

Heading towards transmitter

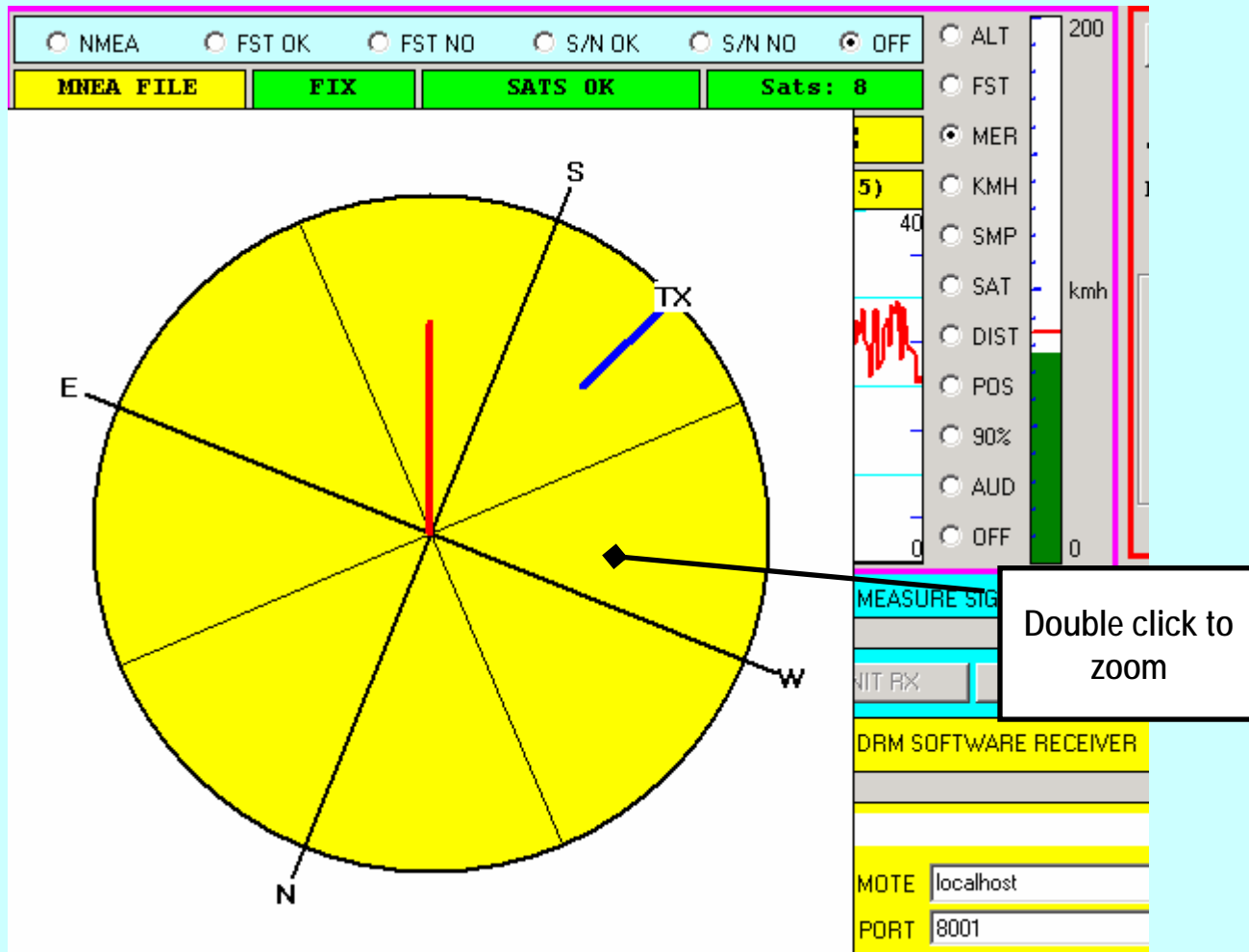
Speed of car

Show current signal strength

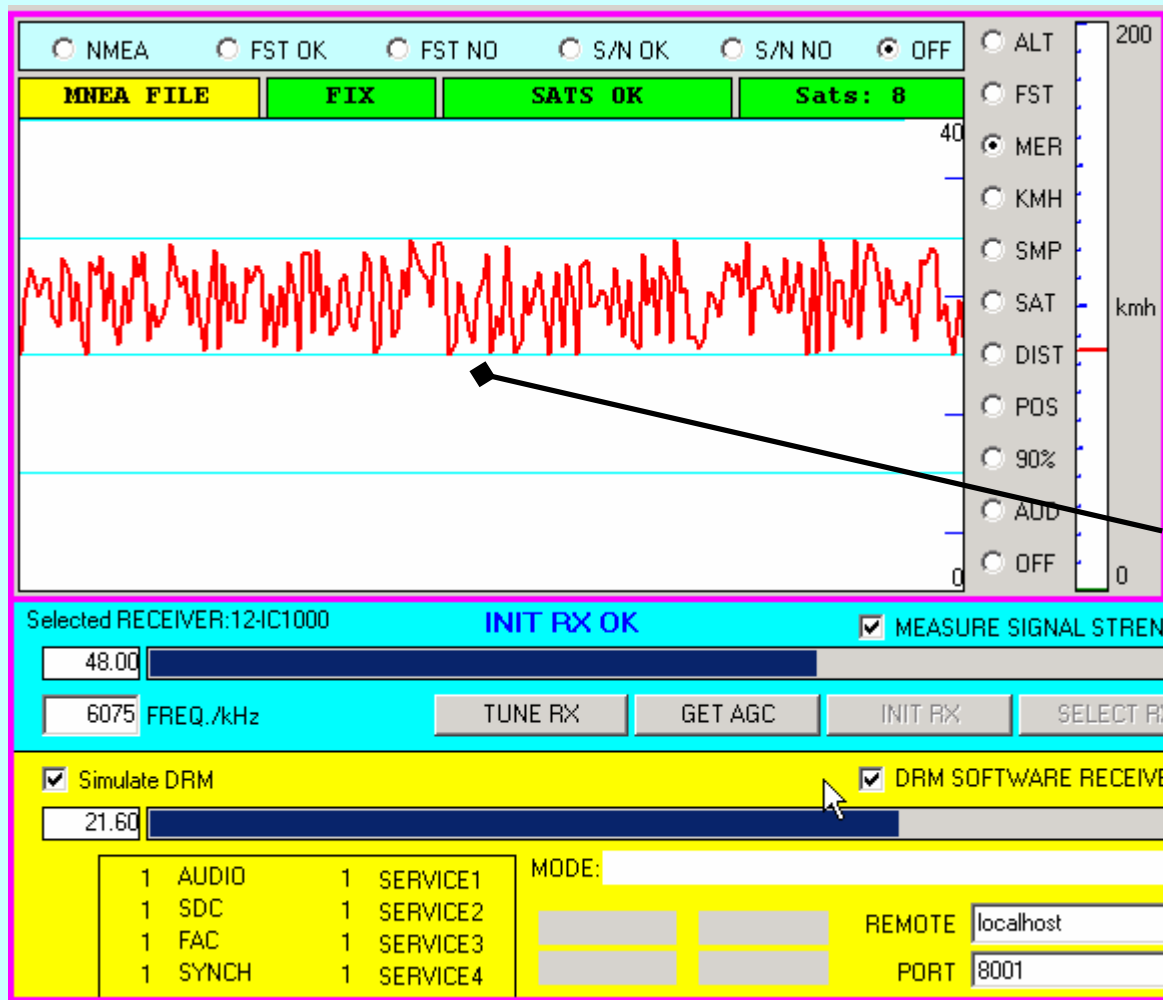
MER history

Show current MER value

# Running measurements

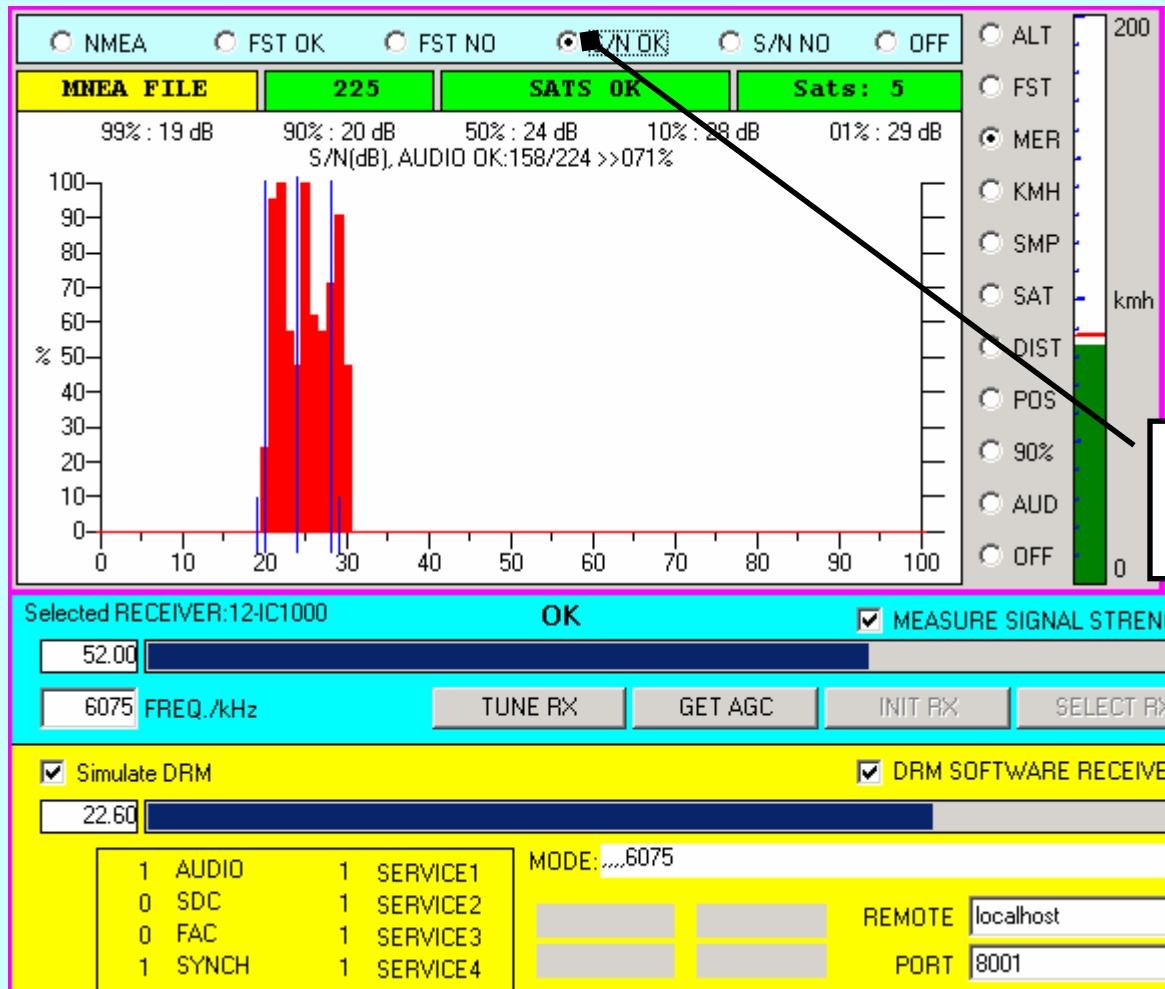


# Running measurements



Double click to zoom

# Analysis during measurements



# Analysis during measurements

Display NMEA sentences from GPS unit

NMEA  
  FST OK  
  FST NO  
  S/N OK  
  S/N NO  
  OFF

**MNEA FILE**   **608**   **SATS OK**   **Sats: 7**

```

$GPGSV,2,2,08,20,41,097.43,24,22,313,40,25,09,034,00,27,14,174,44*77
$GPRMC,150400,A,5050.368,N,00652.135,E,0.00,0.201,8.040602,000.0,W*64
$GPGGA,150400,5050.368,N,00652.135,E,1,07,1.4,133.2,M,47.3,M,*,48
$GPGSA,A,3,01,04,07,13,20,24,,27,,,,,2.1,1.4,1.6*32
$GPGSV,2,1,08,01,75,079,51,04,58,284,48,07,11,232,30,13,69,218,48*7D
$GPGSV,2,2,08,20,41,097.43,24,22,313,39,25,09,034,00,27,14,174,44*79
$GPRMC,150402,A,5050.368,N,00652.135,E,0.00,0.201,8.040602,000.0,W*66
$GPGGA,150402,5050.368,N,00652.135,E,1,07,1.4,132.7,M,47.3,M,*,4E
$GPGSA,A,3,01,04,07,13,20,24,,27,,,,,2.1,1.4,1.6*32
$GPGSV,2,1,08,01,75,076,51,04,58,284,48,07,11,232,30,13,69,218,48*72
$GPGSV,2,2,08,20,41,097.42,24,22,313,39,25,09,034,00,27,14,174,44*78
$GPRMC,150404,A,5050.368,N,00652.135,E,0.00,0.201,8.040602,000.0,W*60
$GPGGA,150404,5050.368,N,00652.135,E,1,07,1.4,132.2,M,47.3,M,*,4C
$GPGSA,A,3,01,04,,13,20,24,,27,,,,,2.1,1.4,1.6*35
$GPGSV,2,1,08,01,75,076,51,04,58,284,48,07,11,232,30,13,69,218,48*72
$GPGSV,2,2,08,20,41,097.43,24,22,313,39,25,09,034,00,27,14,174,44*79
    
```

ALT   200  
 FST  
 MER  
 KMH  
 SMP  
 SAT   kmh  
 DIST  
 POS  
 90%  
 AUD  
 OFF   0

Selected RECEIVER: 12-IC1000   **OK**    MEASURE SIGNAL STRENGTH

48.00

6075   FREQ./kHz   TUNE RX   GET AGC   INIT RX   SELECT RX

Simulate DRM    DRM SOFTWARE RECEIVER

20.33

MODE: .....6075

1	AUDIO	0	SERVICE1
1	SDC	1	SERVICE2
1	FAC	1	SERVICE3
1	SYNCH	1	SERVICE4

REMOTE   localhost  
 PORT   8001

# Marker during measurements

The screenshot shows a terminal window with the following content:

```
TX MARKER SET
205/28.298 km
AREA
R=RURAL (0)
C=CITY (2)
S=SHADOW (1)
I=IGNORE (3)
NEXT EVENT: 1
```

Callout boxes provide the following explanations:

- TX MARKER SET**: Set transmitter location to current position
- 205/28.298 km**: Azimuth and distance to Transmitter
- AREA**: Click or enter first character to mark area
- R=RURAL (0)**: Set a marker in the protocol

## Files used by GPSMEAS2000

- DEVICE%%.CAL
  - FST calibration file for the specific receiver %%
- DEVICE%%.CFG
  - Parameter file for the specific receiver %%
- RECEIVERX.CFG
  - Parameter file for receiver setup
- GPS.INI
  - Initialization file for GPS setup
- DEFAULT.GPS
  - Default initialization file for the program
- GPSPORT.PRT
  - Initialization file for TCPIP output port for GPS data
- GPS.WPT
  - File containing the waypoint coordinates

## Files used by GPSMEAS2000

- \*.NMA
  - NMEA log file containing GPS sentences
- \*.CSV
  - Comma- separated output files to be used as EXCEL-input for analysis  
\*AVR\*.CSV and \*SNG\*.CSV files are generated, \*AVR\*.CSV hold the averaged measurements according to the setting during the measurements, \*SNG\*.CSV files hold the single measurements
- \*\_FST.DST
  - Files generated by the program holding the signal strength distribution of the measurement
- \*\_SNR.DST
  - Files generated by the program holding the signal SNR distribution of the measurement
- \*\_ALL.DST
  - Files generated by the program holding FST and SNR distribution of the measurement

## Files used by GPSMEAS2000

- Output files are stored in a subdirectory defined by the measurement prefix
- The respective parameter files are also stored in the subdirectory

