



- Audio Processing
- RDS Encoding
- Radio All in One
- Signal Monitoring
- Test & Measurement



# NAVIGATOR DVB

## DVB MEASUREMENT NAVIGATOR DVB-T / DVB-H

**NAVIGATOR DVB-T / DVB-H is a measurement device with a professional DVB-H receiver.**

### Range of applications:

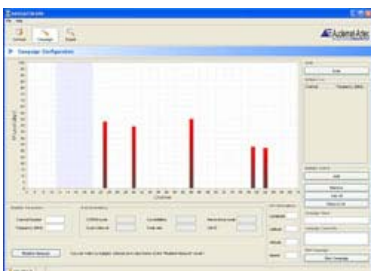
#### Mobile measurement campaigns in a vehicle with :

- GPS positioning
- Recording of data (measurement and content) while driving
- Mapping representation of the campaign afterwards

#### Mobile measurement campaigns indoor or outdoor, walking :

- Position (GPS or manual) of the measurement
- Content monitoring and display (including encrypted channels)\*
- Recording of data (measurement and content)
- Mapped representation of the campaign (including on scanned maps or drawings)

\*Option



### Measurement

The NAVIGATOR DVB-T/H has been designed to perform mobile measurement campaigns for DVB-T and DVB-H networks. This handheld equipment can be used either when moving in a vehicle, at normal speed or by a pedestrian (indoor or outdoor).

The campaign can be dedicated to a single channel (frequency) or for multichannel at the same time.

The measurement functionalities of the NAVIGATOR DVB-T/H include **standard modules** :

- Full RF Module
- Standard MPEG-T Module

and two optional software modules\*:

- Full MPEG-T Module
- MPEG-H Module

\* NOTE : The NAVIGATOR DVB-T/H can be upgraded with an optional software module at any time without any hardware modification.

The **main functionalities** for measuring are the following:

- Real time measurement with value displayed simultaneously (for DVBT/H standard measurement module)
- Real time measurement with values available for display after processing (for DVB-T MPEG analysis and DVB-H analysis modules)
- Recording of measurement data on the NAVIGATOR DVB-T/H equipment
- Automatic GPS position display and recording on the NAVIGATOR DVBT/H equipment

### Standard modules

#### Full RF Module

##### RF parameters:

- RF level
- Carrier / Noise

##### Modulation parameters:

- Modulation Error Rate (MER)
- Bit Error Rate (BER) after Viterbi
- Packet Error Rate (PER)
- Constellation diagram (graphical representation)

##### DVB-T presence:

- AGC
- Carrier sync alarm (OFDM sync error)
- TPS (OFDM sync loss)
- Viterbi

##### SFN parameters

- Channel impulse response

##### Transmission parameters

- Cell ID (0-65535)
- COFDM Mode (2k/8k)
- Guard interval (1/32 - 1/16 - 1/8 - 1/4)
- Constellation (QPSK 19 QAM 64 QAM)
- Code rate (1/2 - 2/3 - 3/4 - 5/6 - 7/8)

#### Standard MPEG-T Module:

##### TR 101290:

- 1st priority: TS Sync Loss, Sync byte error, PAT (Program Allocation table) error and PMT (Program Map Table) error
- 2nd Priority: Transport error, CRC error, PCR (Program Clock reference), CAT (Conditional Access Table) error
- 3rd Priority: NIT (Network Information Table) error/actual error/other error

##### Others:

- "Service availability"
- "Service degradation"
- "Service Impairments"

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## Optional modules

### Full MPEG-T Module

#### TR 101290:

- 1st priority: TS Sync Loss, Sync byte error, PAT (Program Allocation Table) error and PMT (Program Map Table) error
- 2nd Priority: Transport error, CRC error, PCR (Program Clock reference), CAT (Conditional Access Table) error and PTS error
- 3rd Priority: NIT (Network Information Table), Unreferenced PID, SI repetition error, Buffer error (1)
- SDT :- error (1), actual error (1), other error (1)
- EIT: error (1), actual error (1), other error (1), PF error
- RST error (1) : TDT error (1) / Empty buffer error (1) / Data delay error (1)

#### Others:

- "Service availability"
- "Service degradation"
- "Service Impairments"
- PID et PMT bit rate
- Jitter

### MPEG-H Module

#### MPEG2 layer analysis:

- Detection of all PID's
- Detection of NULL packets
- Visualization of the DVB-H burst structure & Measurement of minimum and maximum delay for each DVB-H packet

#### MPE (Multi Protocol Encapsulated)

#### Layer analysis:

- Transport Packet(s) used, of all MPE/MPE-FEC sections and SI/PSI tables
- Clear text output of the SI/PSI tables
- Visualization of the Delta-T information.

#### IP layer analysis:

- Time reference of each received IP packet
- Source and Destination IP addresses and UDP ports

## Scanning

The NAVIGATOR DVB-T/H can perform a scan on the frequency band to automatically detect the available multiplex channels.

On each detected multiplex, a selection of specific Audio and Video PID (Packet Identity) can be made to visualize the content.

## Content visualization

The audio and video content can be listened and visualized at the same time as the real time measurement on the NAVIGATOR DVB-T/H screen.

The content can also be recorded in addition to the measurement made. The recording will include the specific displayed Video and Audio PID or the complete selected multiplex channel.

## Mapping representation

A mapping representation of the performed campaign can be obtained using the recorded GPS position.

The measurement campaign carried out with the NAVIGATOR DVB-T/H will be visualized on MapPoint for reporting. Utility software to visualize on MapInfo will also be supplied.

Scanned maps or drawings can be imported on the NAVIGATOR DVB-T/H for indoor campaigns or for areas not covered by MapPoint or MapInfo software.

## Data export

For reporting purposes the recorded measurement data can be exported on CVS format (Excel compatible).

Export of the measurement data to radio communication planning software (e.g. ATDI, LS Telecom) is available.

Therefore it is possible to compare the planning with a campaign carried out in a real broadcasting environment.

## Data import

Based on specific development, possibility to retrieve measurement data from DVB-H mobile phones.

The data retrieved being used to validate the performance of the mobile phone or to simulate the mobile TV use of the end user.

## Technical Specifications

### Mechanical

- DVB-T/H diversity receiver:
  - 2 RF inputs
  - 1 ASI input
  - 1 ASI output
- GPS receiver with antenna (external magnetic mount antenna)
- CAM\* module (optional)
- Power supply :
  - Lithium-Ion battery pack (approx. 3 hours battery life)
  - External 12 VDC
- Antenna : Delivered with 2 magnetic or fixed mount antennas
- Headphones
- Weight : 8 kgs (approximately)

\* Conditional Access Module

### Modulation

- COFDM
- QPSK, 16-QAM, 64-QAM
- FFT modes : 2K, 4K\*, 8K
- Guard interval : 1/4, 1/8, 1/16, 1/32
- FEC : 1/2, 2/3, 3/4, 5/6, 7/8

\* 4K available 2nd half of 2006

### RF inputs

- 75  $\Omega$  input impedance on N type (female connector)
- UHF (Channel 21 to 69) and VHF (Channel 5 to 12),
- 6, 7, 8 MHz bandwidths
- 166,667 kHz frequency step
- $\pm 167$  kHz or  $\pm 125$  kHz frequency offset supported (without configuration)
- -80 dBm to -20 dBm input sensitivity

### DVB-T demodulation

- Fully compliant with ETS300744
- Includes hierarchical modes
- Automatic mode detection from TPS information (even at 0dB C/N)
- Hierarchical mode
- Diversity mode

### ASI/MPEG Outputs

- Fully compliant with EN 50083-9
- 188 bytes per packet in data burst format ("continuous" mode)
- Dual outputs
- 75  $\Omega$  output impedance on BNC connector



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