Sefram

7861 7861^{HD} 7861^{HDT2}-7862 7862^{HD} 7862^{HDT2}

FIELD STRENGTH METER

USER MANUAL

May 2011 M7861001A/08

Manual modification

Date version	Page or §	Modification
January 2010 version 6		
October 2010 version 7	P2 §20.1 §11 §17	Add page Manual modification Max voltage on RF input Add « Link Margin » « Noise Margin » Add satellite measurement map (column H/V et Hi/Lo)
May 2011 version 8	§2 §3.1 §4.2 §4.5.4 §5 §6.3 §9.2 §10 §11 §12 §13 §16.6 §21	Add DVB-T2 standard Add level audio beep Add MPEG rate Add DVB-S2+ 45 MSymbols Add reset function On/Off key Add Wi-Fi 802.11 B/G/draft N specification Add constellation terrestrial and cable models HDT2 Add § 14 MER by carrier Add 24 V

Thank you for purchasing this SEFRAM product and therefore trusting our company. Our different teams (research department, production, sales department, after-sales service…) are aiming at satisfying your wishes by designing and updating very advanced appliances.

To obtain the best performance from this product please read this manual carefully.

For more information please contact our different services:

Sales department e-mail: sales@sefram.fr

After-sales service e-mail: sav@sefram.fr

Technical support e-mail: support@sefram.fr

Fax: +33 (0)4 77 57 23 23

Website: www.sefram.fr

Sefram
INSTRUMENTS & SYSTEMES

GARANTEE

Your instrument is guaranteed for two years in parts and work time against any default of manufacture and/or contingencies in the functioning. This guaranty starts at the date of delivery and ends 730 calendar days later.
If the appliance is subject to a guaranty contract, this contract cancels and replaces the above mentioned conditions of guaranty.
This guaranty does not include any fault of use and/or error of handling.

In case of use of the guaranty, the user must send back, with its expenses, the concerned appliance to our factory:

SEFRAM Instruments & Systèmes
Service Après-vente
32, rue Edouard MARTEL
BP 55
42009 SAINT-ETIENNE CEDEX 2

The accessory items furnished as standard with the appliance (cables, plugs…), consumable items (battery…) and the optional accessory items (bag, case…) are guaranteed for 3 months against any default of manufacture.

The warranty does not apply to LCD, pouch, keypad, etc. Please check our warranty conditions with our sales department. The warranty does not apply when the instrument is shocked.

The factory options in the appliance are guaranteed for the same time as the appliance.

Customer is responsible of shipping back the instrument to the factory. Special care must be taken in the packaging of the instrument to be sure that it will not be damaged during transportation. All necessary insurance must be taken by the customer.

SEFRAM can reject any instrument damaged.

hat to do in case of malfunction?
In case of malfunction or for any problem of use, please join the technical assistance by SEFRAM Instruments & Systems.
A technician will take your call in charge and will give you any necessary information to solve your problem.

hat to do in case of crash?
In case of crash of the appliance, please join our after-sales service.

Some advice?
Some technical help required?

SEFRAM Instruments & Systems commits itself to help you by phone for the use of your appliance.
Please phone:

(00 33) 825 56 50 50 Technical help for products

or send an e- mail to:

support@sefram.fr

1 IMPORTANT INFORMATION

Please read carefully the following instructions before using your appliance.

1.1 Precautions

- Do not use your appliance for any other use that it is described in the manual.
- Use the charger block provided to avoid any deterioration of the appliance and to protect its measurement characteristics.
- Do not use in a wet environment.
- Do not use in an explosive environment.
- In case of defect or for the maintenance of the appliance, please contact our service department.
- Do not open the appliance, risk of electric shock.
- You must use the BNC/F adaptor supplied with the TV Meter. Using another adaptor may damage the instrument and will not be covered by the guarantee.

1.2 Safety instructions

For a correct use of the appliance, you have to respect the safety instructions and directions for use described in this manual.

Specific warnings are provided all along this user manual.

You can also find caution symbols on the appliance:

1.3 Symbols and definitions

Symbols appearing in this manual:

Remark: indicates important information.

Symbols appearing on the appliance:

Caution: see user manual. Indicates a risk of deterioration for the equipment connected to the appliance or for the appliance itself.

Ground: accessible parts connected to the appliance's metallic chassis.

Product to be recycled.

1.4 Conformity and appliance limits

See chapter « Declaration of CE conformity ».

2 Quick start guide

Field strength meter 786X

So much easier to use with the AUTOSET key!

Important keys:

: AUTOSET

: SPECTRUM

: LNB-DiSEqC

: PARAMETERS

: MEASUREMENTS

: TV

I want to work:

In terrestrial mode

In satellite mode

In any case, the AUTOSET key guides you! ! !

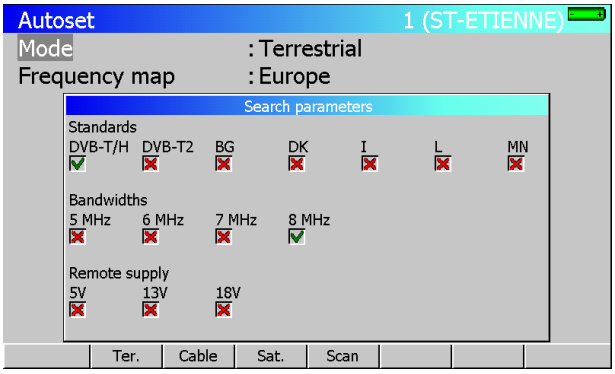
AUTOSET:

This mode permits to perform an **automatic setup search** and to inform the current place.

	Caution This function will replace all previous information (**Programs**) in the **Places** (list of **Programs**). Before starting the search of channels, select an empty **Place**; see chapter 6 « **Configuration of places** ».

Caution: Your antenna or your dish must be correctly positioned before you press the AUTOSET key. (Please see CHECKSATELLITE to see how you can correctly position a dish).

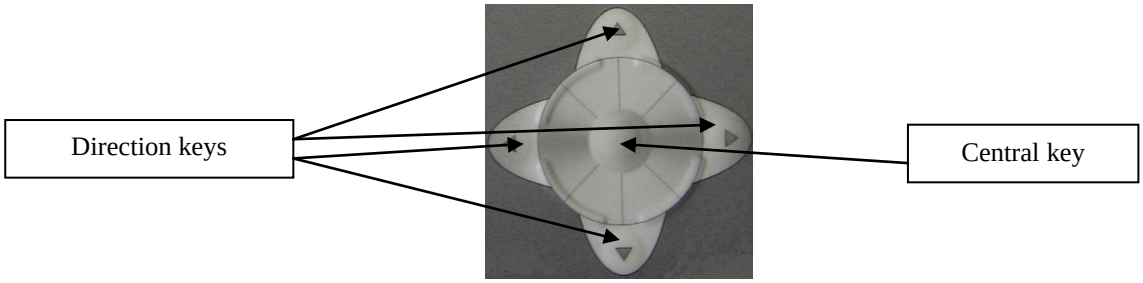
1/ press the AUTOSET key:



2/ select mode (**Terrestrial, Satellite or Cable**) according to your search. The frequencies map (in terrestrial or cable mode) is already preselected according to your country.

If you need to, you can change the frequencies map by selecting « frequencies map ».

3/ the direction keys (up/down and left/right) permit to move in the parameters table. The central key permit to confirm / cancel a parameter.

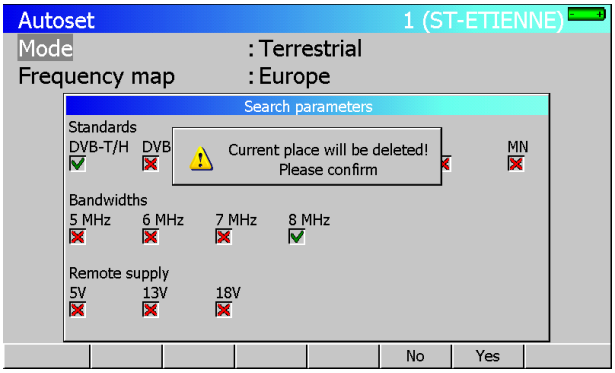


➔ Active parameter

➔ Non active parameter

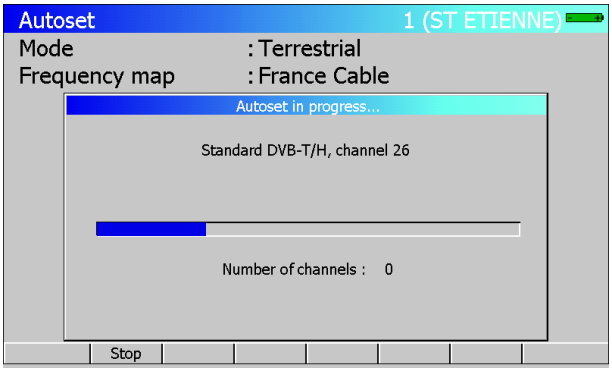
4/ when you have correctly informed the table, press the « **Scan** » key to launch search.

5/ a warning message indicates that the current place will be erased. The current place will be replaced then by the found setups. Press "**Yes**" for the following message:

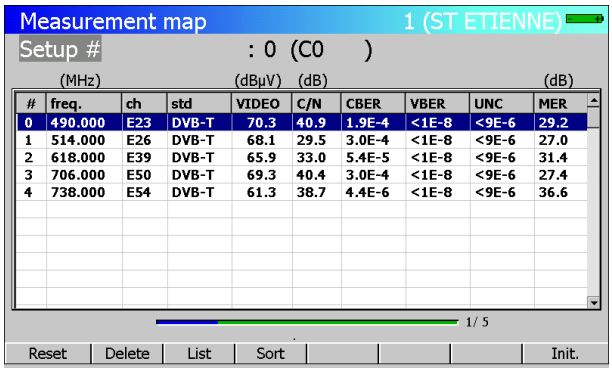


6/ the Autoset is in progress:

Caution: this operation can take a few minutes!



7/ once the search is completed, the appliance automatically goes to the Measurement Map mode. It displays different measurements (Level, MER…) for the found setups.



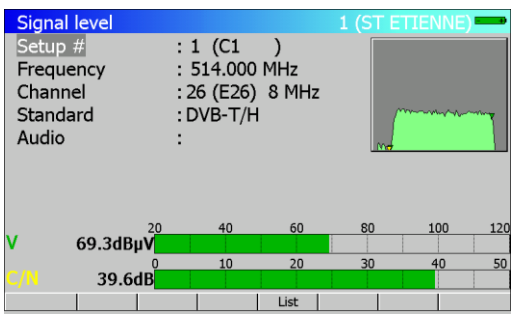
The current place is now correctly informed with the found setups!

Level measurement

This function permits to perform a level measurement on a setup.

1/ Press the  key to access to the LEVEL measurement function.

2/ select a setup number (among the setups found before) by using the sensitive wheel or by using the alphanumerical keyboard. (line "Setup #")



The level is indicated on a bargraphe. A mini-spectrum is also displayed on this page.

	In terrestrial band, for a user socket the level must lie : - between 50 and 66 dBµV in FM - between 35 and 70 dBµV in DVB-T/H or DVB-T2 - between 57 and 74 dBµV in any other case. In satellite band, for a user socket the level must lie : - between 47 and 77 dBµV.

TV:

Once the setup is selected in the LEVEL measurement page, press the key: 

A few seconds later, the screen displays a TV picture.

	If the screen is still black and the « **conditional access** » message is indicated, the channel is encrypted. You can : -insert the subscription card (if you have subscribed to this channel). -or change Service by pressing the Serv key. -or change setup number (LEVEL Measurement or by pressing OSD).

CheckSat:

1/ Go to the **PARAMETERS** page by pressing the key:

- Select the "satellite" **frequency bandwidth**.

2/ connect the dish to the appliance.

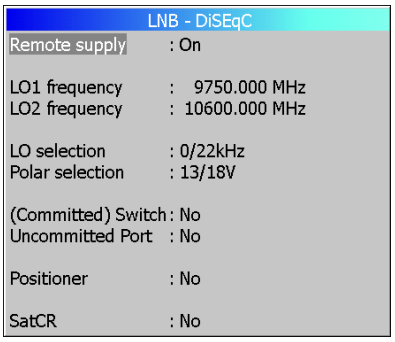
3/ Confirm remote supply by pressing the key: DiSEqC

- Then press « **ON** ».

The « **VDC** » LED on the front panel flashes.

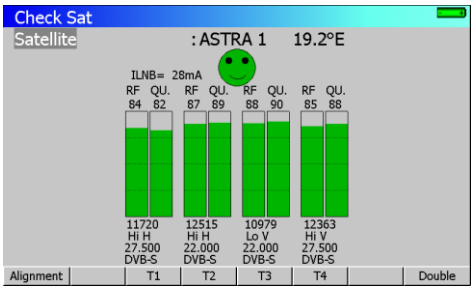
Please check the « LNB-DiSEqC » setup is compliant to your system.

To align a dish antenna with universal (standard) LNB, parameters must be:



4/ to access to the CheckSat mode, press twice the SPECTRUM key:

(The appliance has already a list of preselected satellites. See user manual for more information.)



5/ select the satellite that you want to check (by using the sensitive rotary wheel).

6/ slowly direct the dish until you can hear the locking melody and you get the best quality.

No transponder found → red smiley

Medium reception quality (< 50%) → orange smiley

Good reception quality (> 50%) → green smiley

Reminder: transponder = satellite channel

	Caution : **To identify a satellite correctly, the appliance must be synchronised on the 4 transponders. (Quality >0)** **However certain transponders are modified regularly. Please see the satellite's frequency map when it seems that a transponder is not working.** **Some switches or LNB work only with DiSEqC. In this case, position the band (LO) and the DiSEqC polarisation on the LNB-DiSEqC configuration page.** **(Caution: By using DiSEqC, CheckSat is slowed down).**

You can then perform an « AUTOSET » the same way as in terrestrial band.

For any additional information, please contact our technical support service:

0,15€ TTC/mn 0 825 56 50 50

E-mail: support@sefram.fr

3 Presentation

3.1 General

Field strength meters **7861** and **7862** are hand-held instruments dedicated to the installation and the maintenance of all broadcast and reception systems of analogue, digital terrestrial and digital satellite televisions.

The entire bandwidth covers from **45 MHz to 2150 MHz** (without gap). Field strength meters **7861** and **7862** permit to perform precise measurements on all analogue television standards, FM carriers and different digital standards DVB-T/H, DVB-T2, DVB-C, DVB-S, DSS and DVB-S2.

They perform **Level measurement** (peak, average and power) according to the chosen standard, on the video carrier and audio carriers (if they exist).

In the **Measurement map** function, they scan up to 100 setups simultaneously and compare them to threshold levels (min/max).

With an efficient **Error Rate** measurement (BER, MER), they permit to validate entirely DVB-T/H, DVB-C, DVB-S, DSS and DVB-S2 digital transmissions.

The **Impulse response** in DVB-T/H permits to complete this analysis.

The **fast and precise Spectrum** analysis displays subversive elements…

Displaying terrestrial and satellite TV image is also possible. Sound (FM, TV) is audible through an integrated loudspeaker.

High capacity memory (312 Kbytes) permits to store a large number of configurations, measures and spectrum curves.

Each instrument can be entirely remote controlled through USB and ETHETNET interfaces via a computer.

Designed for field measurement, all instruments are compact (2.1 kg with the battery), autonomous (pack with battery and fast charger) and are equipped with a bright colour LCD graphic display with backlight for better readability.

Model 7861 :

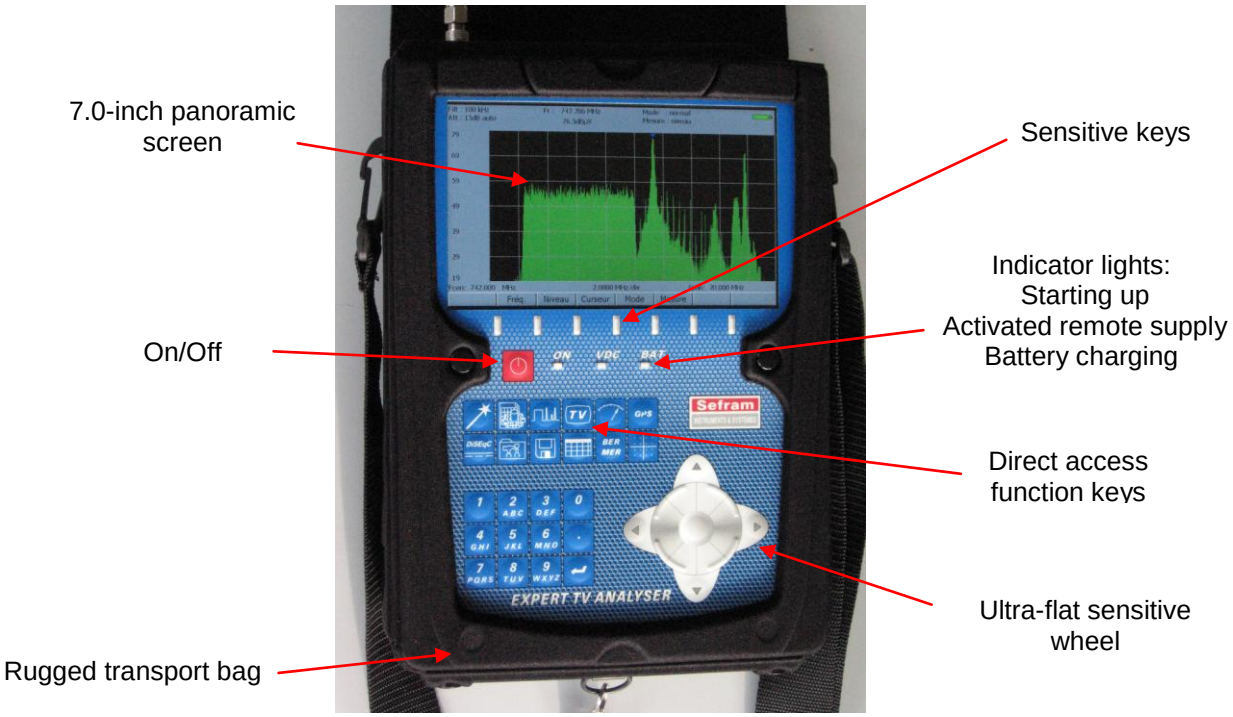
- **Terrestrial and satellite compatible**
- **Analogue and digital measurements**
- **DVB-T/H, DVB-T2 (HDT2 model), DVB-S, DVB-S2 and DSS**
- **Echoes measurement for DVB-T/H and DVB-T2 (HDT2 model)**
- **Analogue TV picture**
- **Digital picture (free to air channels)**

Model 7862 :

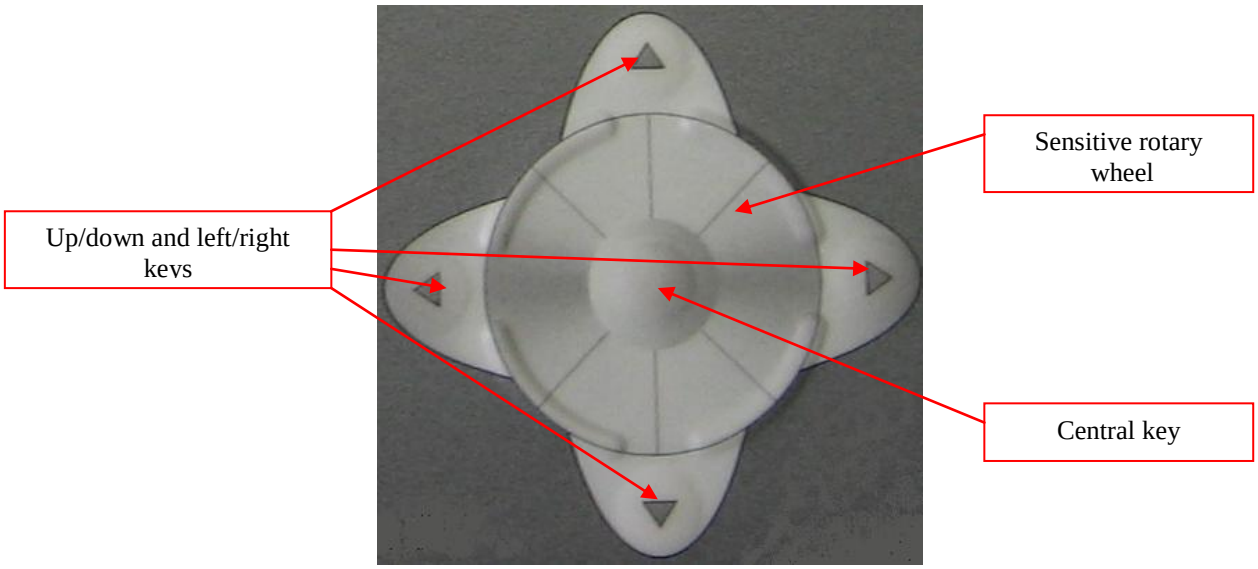
- **terrestrial and satellite compatible**
- **Analogue and digital measurements**
- **DVB-T/H, DVB-T2 (HDT2 model), DVB-S, DSS, DVB-S2, DVB-C and MCNS**
- **Echoes measurement for DVB-T/H and DVB-T2 (HDT2 model)**
- **Constellation diagram for digital satellite standards**
- **Analogue TV picture**
- **Digital picture (free to air channels and pay TV if user has a valid access card and if the encryption is supported by the instrument – please check with our sales department)**

3.2 Description

3.2.1 Front panel



The front panel is equipped with an ultra-flat sensitive wheel with direction keys. For selection keys see below.



3.2.2 Function keys

AUTOSET: Automatic mode of program search: permits to display measurement maps automatically for any type of TV reception.

PARAMETERS: Initialisation of places (Frequency band, Programs…) and choice of current place.

SPECTRUM: fast spectrum analysis; Normal CheckSat and double CheckSat (by pressing this key twice).

TV: display of analogue and digital pictures.

MEASURES:

1st key pressed: measures of level (peak, average and power)

2nd key pressed: BER/MER measures

3rd key pressed: Impulse response in DVB-T/H and DVB-T2 (HDT2 model).

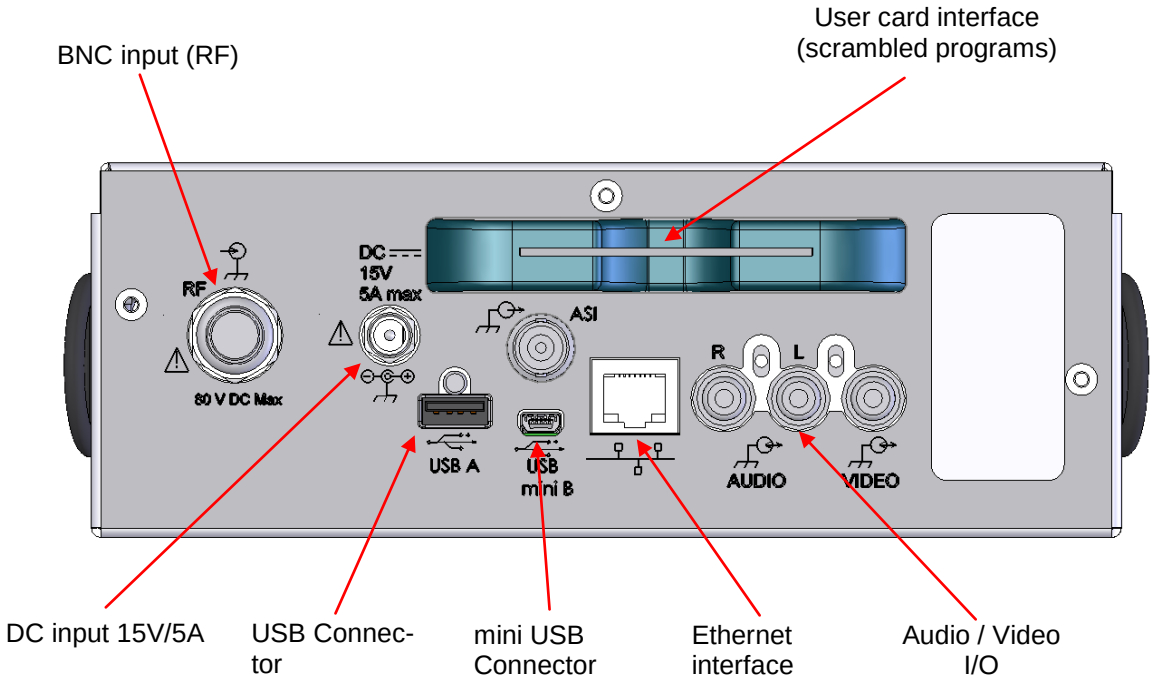
CONFIGURATION DiSEqC: On/Off remote supply, selection of bandwidth / polarisation configuration, Start up and switch or positioner configuration.

CONFIGURATION: language, date, hour, unit of measure, volume, brightness, coefficients of correction, memory space management and initialisation of the number of places used in the appliance.

SAVE / RECALL: used to store or recall measures, records and configurations.

MEASUREMENT MAP: scan of the level of 100 setups (maximum).

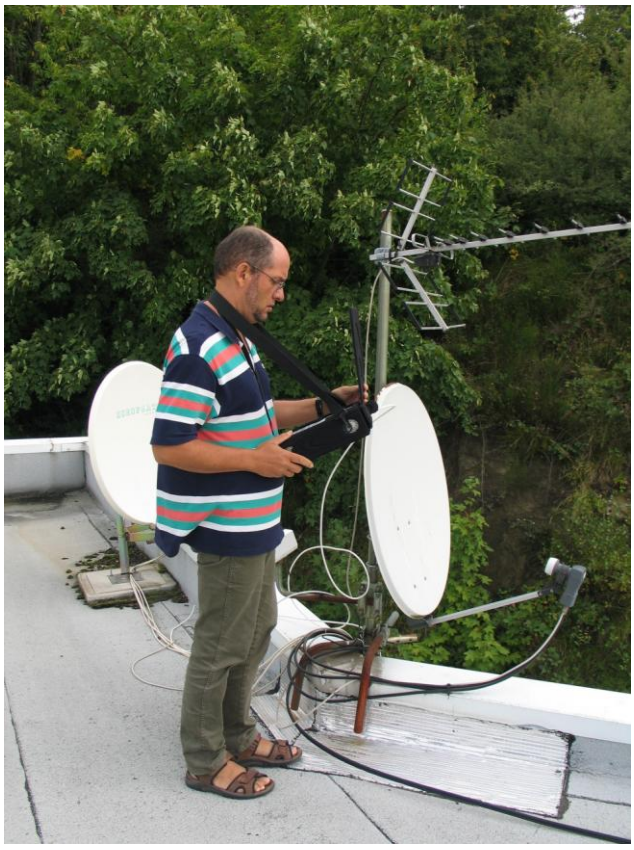
3.2.3 Connectors (upper panel)



3.2.4 Measurements input

The input for RF signal is located on the left of the upper panel.

The TV cable can go through the pouch to ease measurements and use the sun protector.



3.2.5 Use of the straps

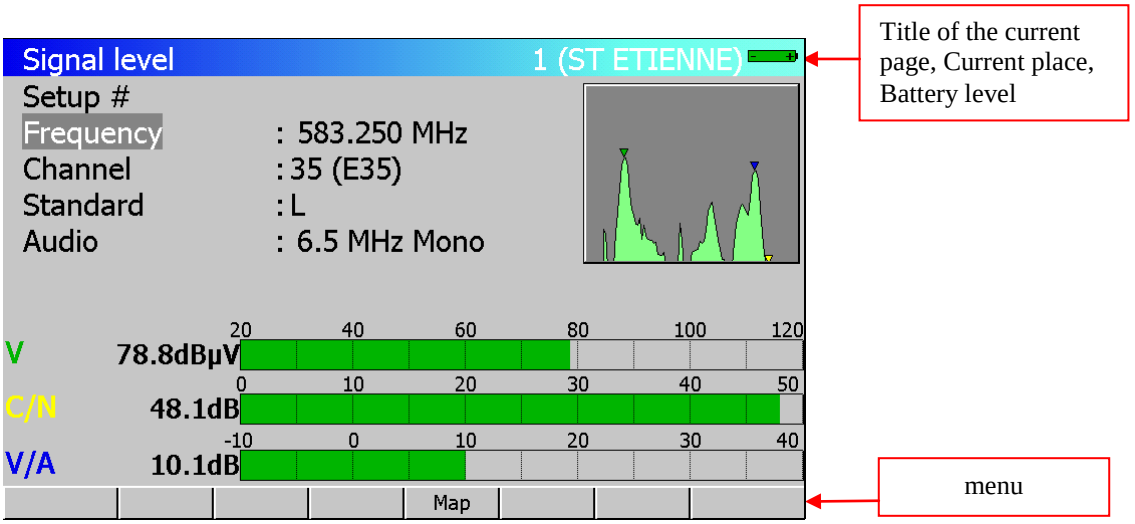
A special strap is provided and will allow you to have your hands free. This feature is very important for safety.

Thus, position the satellite dish with the hands, and at the same time, you can see the effects on the equipment.

3.2.6 Man-machine Interfacing

When a line is highlighted (reverse video), the appropriate menu is displayed.

To move from one line to another line, use the UP and DOWN keys on the front panel.

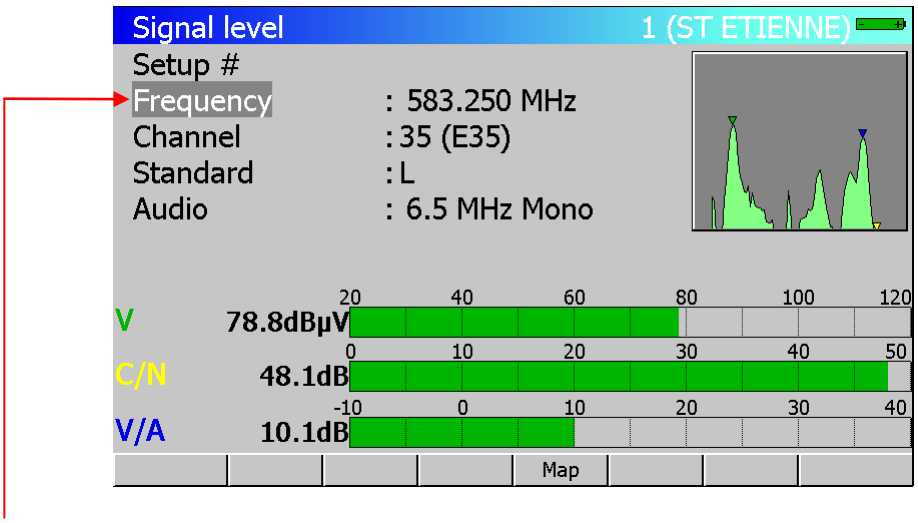


Some menus use 2 keys:

 : validation (enter)

 : cancellation and menu exit.

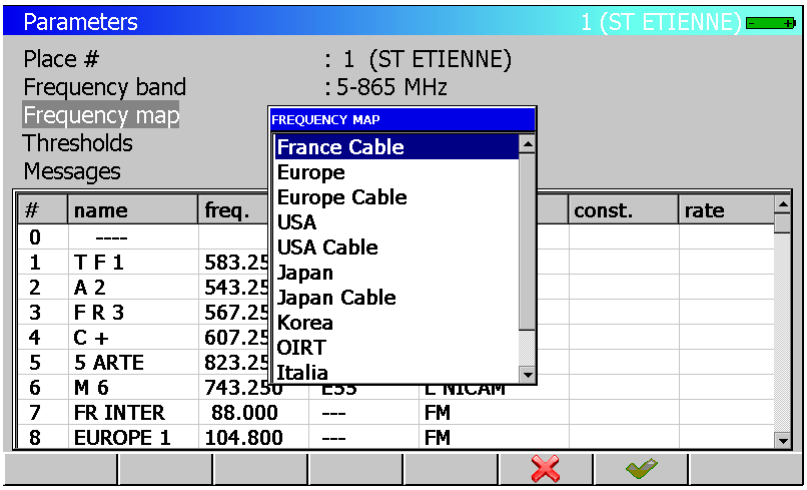
Modification of a digital value using the sensitive wheel:



When a line is highlighted (reverse video) for a numerical parameter, use the sensitive wheel to modify the value.

You can also use the directions keys right/left to change a digital value.

Choosing from a list:



Some parameters can be chosen from lists (frequency maps, Setups, Places, Channels...).

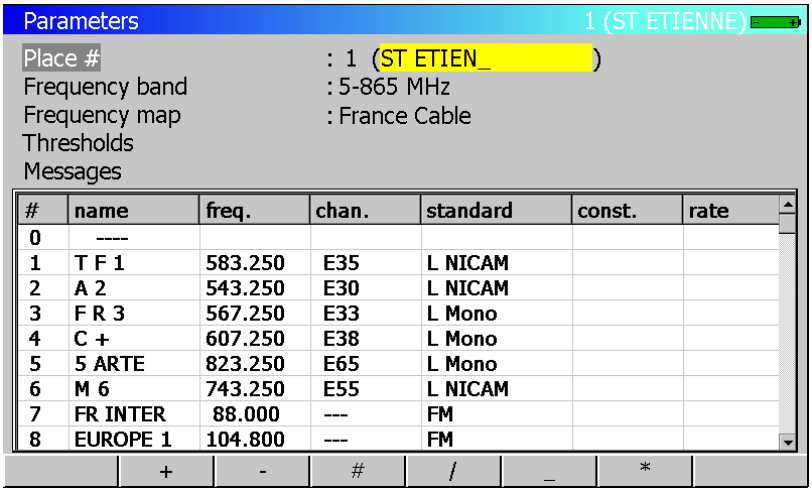
To move the reverse video, press the UP and DOWN keys on the front panel or use the sensitive wheel.

The menu shows two keys:

 : confirms your choice and erases the list.

 : cancels your choice and erases the list.

Alphanumerical data input:



For some parameters you can enter alphanumerical data from the keyboard and the menu keys +, -, #, /, _.

This action begins by pressing a key from this keyboard for numerical values (program number, frequency…) and also by pressing a menu key for texts (name of the place, name of the program…).

The data-entering field appears in colour, you can confirm your action only by pressing the ↵ key on the alphanumerical keyboard.

	**Any other** action **cancels the data input in progress.**

3.2.7 Structure of Places, Setups and Frequency band

In order to simplify the access to the memorised information on the field, the internal software uses **Places** and **Setups**.

	Places can also be created with the TR7836 transfer software and downloaded in the appliance.

A **Place** is structured as follow:

- a name (with 10 characters)
- a frequency band (Terrestrial or Satellite)
- a list of **Setups**
- a Measurement map (data logger)
- a list of thresholds (min/max for each standards)
- 6 messages of 24 characters printed on the header of the measurement ticket (printable with the TR7836 software)

A **Setup** is structured as follows:

- a name : 8 characters
- a frequency
- a standard
- a bit rate or a bandwidth and a constellation mode for digital standards and for a Satellite bandwidth setup
- status of the LNB (polarisation-band)
- an audio mode and frequency

	Selecting a **Place** on the **Parameters** screen restores automatically all the information concerning this place.

	Selecting a setup on one of the measurement screen restores automatically all the information concerning this setup.

The choice of the **Frequency band** automatically selects the standards available

- Terrestrial band 45 / 865 MHz: analogue TV standards, FM, DVB-C, DVB-T/H and DVB-T2
- Satellite band 900 / 2150 MHz: DVB-S, DSS and DVB-S2
- Wi-Fi 2.45GHz band : measure Wi-Fi signals with optional accessory (P/N 978651000)

	**Caution**: Changing a **Band** on a **Place** erases all data linked to this place (a pop up window will ask for confirmation).

All this information can be entered on the **Parameters** screen, or transferred from a computer using the **TR7836** Windows ™ software.

3.2.8 Number of places and Setups

The number of **Places** and the number of (factory) **Setups** can be chosen between:

- 10 places / 100 setups
- 20 places / 50 setups
- 50 places / 20 setups
- 100 places / 10 setups

This choice is available on the **CONFIGURATION** screen, menu “Initialisations “,

	**Caution:** Changing the number of Places and Setups will erase all information linked to all **Places** and **Setups**.

4 Operating the appliance

All our appliances are controlled before shipment and are delivered in an appropriate package. There are no particular instructions for unpacking.

The instrument is equipped with Lithium-ion (Li-ion) battery. The battery is charged before shipment.

However if the instrument is stored more than one month without being used, the battery might be discharged. Please recharge it if necessary.

4.1 Battery

	**Caution**: For any action on the battery it is required to take the appliance to pieces and this must be done by a SEFRAM technician. Only batteries provided by SEFRAM must be used.

Safety instructions:

-Do not throw to fire or warm up the battery pack.

-Do not short the battery cells: risk of explosion!

-Do not pierce

-Do not disassemble the battery pack

-Do not reverse the battery polarities

-This battery pack includes a protection component that must not be deteriorated or taken out

-Please store the pack in a cool place

-Do not deteriorate the pack's protection shaft

-Do not store the appliance in a vehicle overheated by sunbeams.

The battery has 200 charge / discharge cycles' life span (or 2 years).

Tips to make your battery last longer:

-Do not discharge deeply

-Do not store batteries for too long without using them

-Store your battery when around 40% of it is charged

-Do not completely charge or completely discharge the battery before storing it.

When your battery is almost completely discharged, the appliance will indicate « battery discharged », and it will automatically power off after a few minutes.

4.2 Charging the battery

	**Caution**: When the charger is connected to the appliance, the metallic chassis is connected to the ground of the wiring.

To charge the battery in the appliance:

- Plug the external power supply provided on the Jack plug of the appliance (see on the top).
- Plug the power supply into the main supply.

The internal charger starts charging the battery, the « BATT » orange indicator light comes on.

You can charge your appliance this way either when **it is on** or when **it is off**. Charging takes longer when the appliance is on. So to charge quickly, you need to turn your appliance off. When the battery is charged, the « BATT » LED will automatically power off.

The battery charges to 80% in one hour with quick charge (2H30 standby time). The total charge (2 hours) gives a 3-hour standby time (with 100% brightness, when power supply is on, digital picture); the « BATT » orange indicator powers off when the charge is completed.

4.3 External power supply

The appliance can be powered by an external continuous voltage power supply. The appliance works with a 15V voltage (5 amperes). The charger block provided when purchasing the appliance also serves as an external power supply.

4.4 Powering up the appliance

Press the central key on the front panel: 

The presentation screen appears on the display and the « ON » orange indicator light comes on.

The message « **Autotest: in progress** » appears for a short instant and then disappears.

	A long key press (more than 6 seconds) to force the shutdown of the device in case of locking

4.5 Connecting the appliance to a PC

The appliance has a USB interface and an ETHERNET interface that allows connecting it directly to a PC.

4.5.1 Necessary configuration

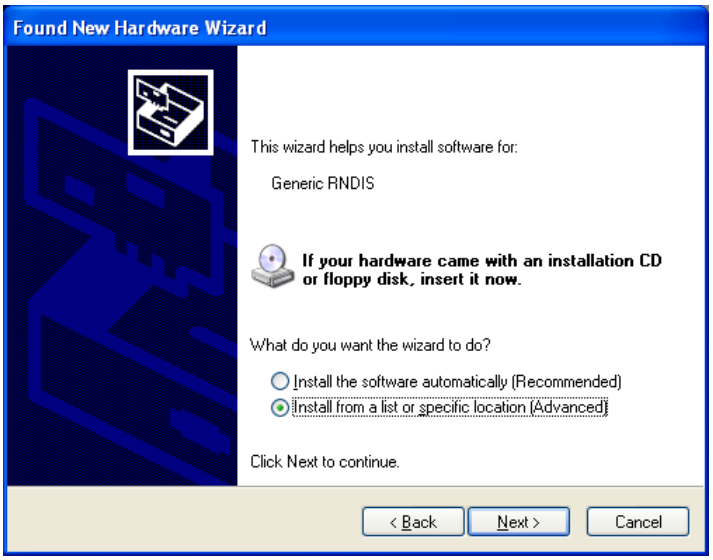
These drivers are compatible with the following operating systems: **Windows Vista™, Windows XP™, Windows Server 2003™, Windows 2000™ and Windows 7™**.

For any other operating system please contact SEFRAM technical support. Your PC must also have a free USB port.

4.5.2 USB interface, Installing the drivers

- Download the required driver (RNDIS.ZIP) (depending on your operating system) on our website (www.sefram.fr) or on theTR7836 CD.

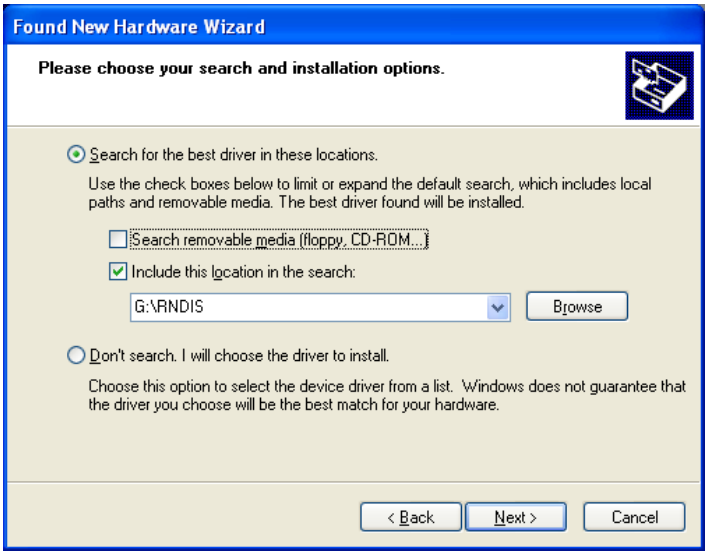
- After unzipping the drivers, connect the appliance to the PC by using a type A to mini B USB cable (available as an extra from SEFRAM under the number 978551100).
- Switch on your appliance ; the following screen is displayed :



If Windows Update is searching the driver, click on « Not this time » and on « Next ».

1) Select « Install from a list or specific location » and click on « Next ».

2) The following screen appears :

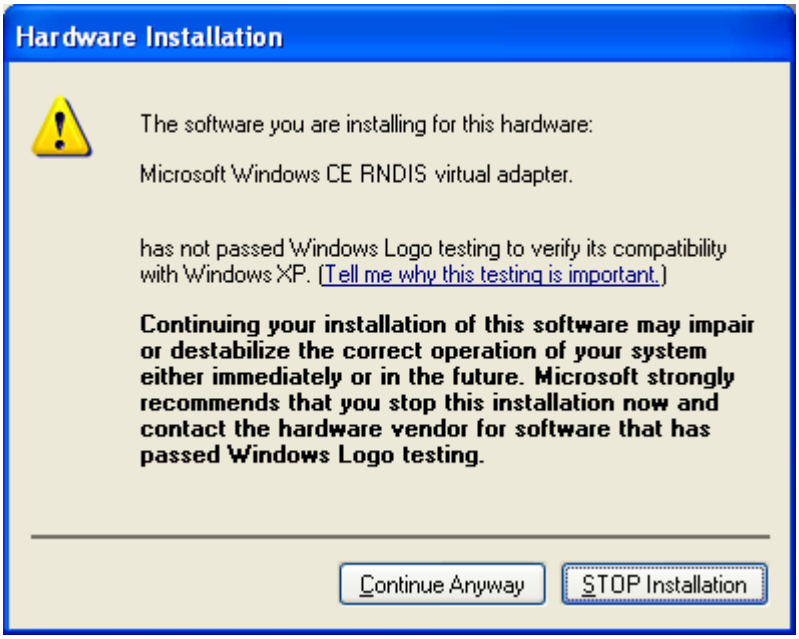


3) Tick « Search for the best driver in these locations » and « Include this location in the search ».

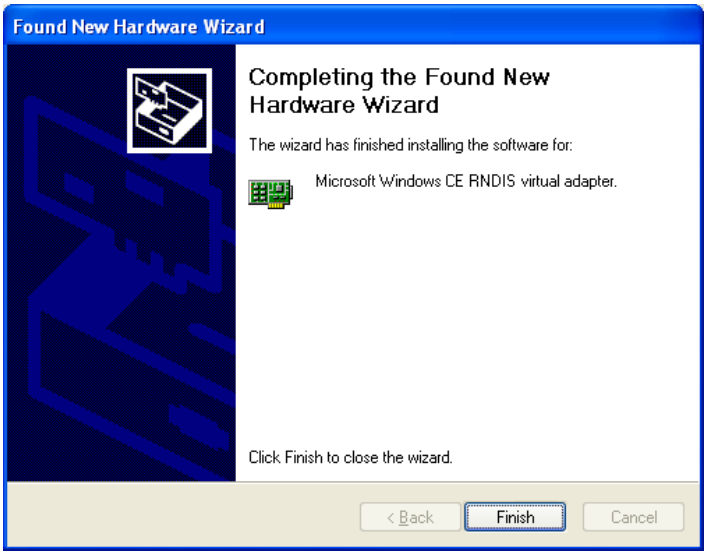
4) With the « Browse » button, select the directory to which you extracted the drivers.

5) Click on « Next »

6) Click « Continue » if the alert message is displayed. Note that the language of the message may depend of your system language and setup :



7) Click « Finish » to end the install process



4.5.3 ETHERNET interface

No driver is required to run the Ethernet interface.

Connect the TV Meter to a computer with an ETHERNET cable (crossed) (available as option with P/N 298504246. Contact our sales department).

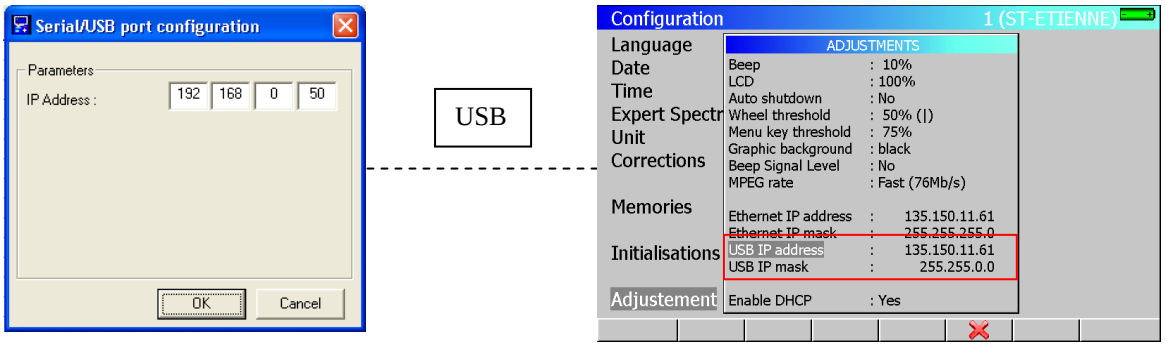
4.5.4 Remote connection

Example: using the setup and report software TR7836 on a computer

	**Caution** : To communicate, the computer must know the IP address of the TV Meter. Enter the IP address of the TV Meter in your PC software (TR7836). See chapter Configuration, line Adjustments

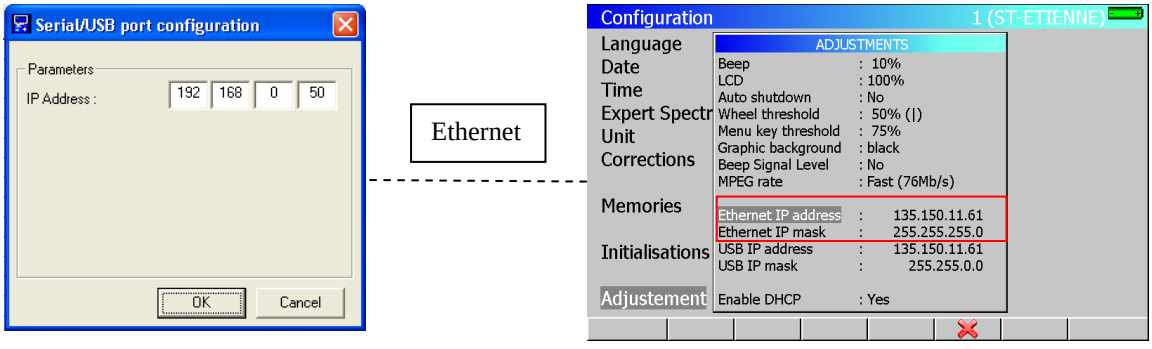
1st possibility: Connect your instrument to the computer using the **USB** interface

TR7836 — USB — 786X



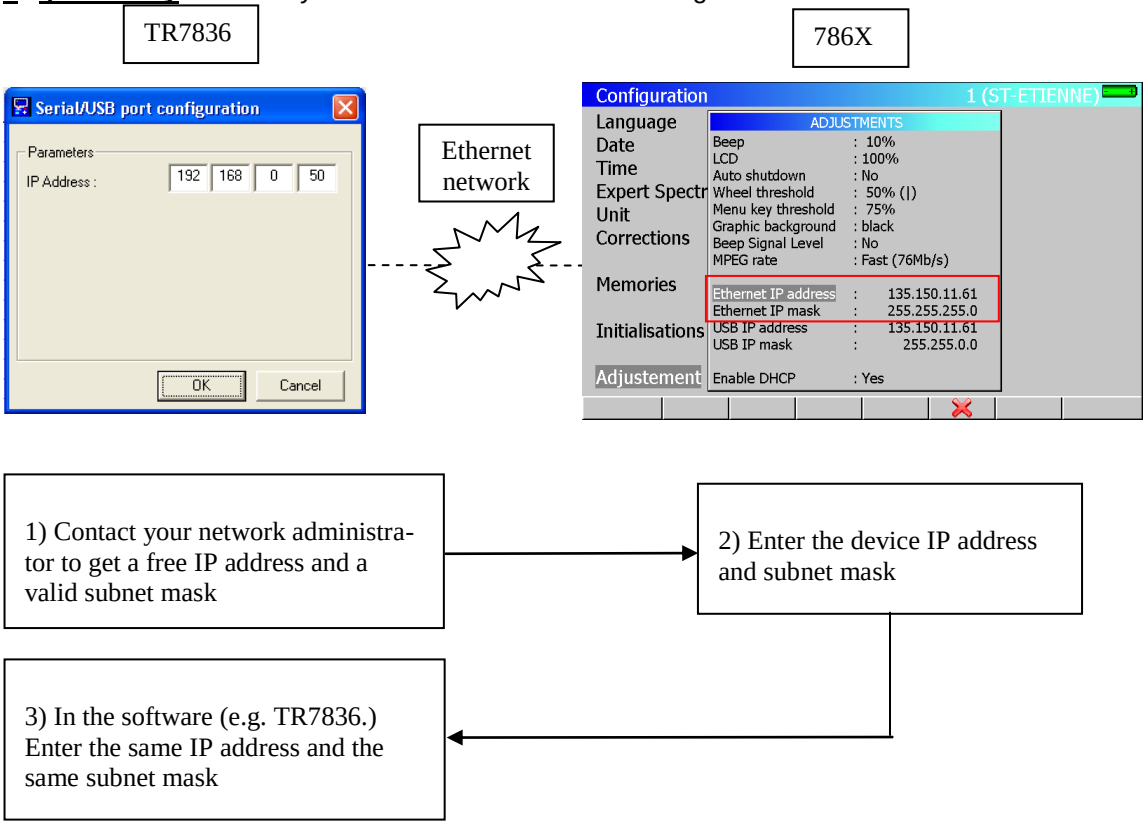
2nd possibility: Connect your instrument to the computer using the **Ethernet** interface

TR7836 — Ethernet — 786X

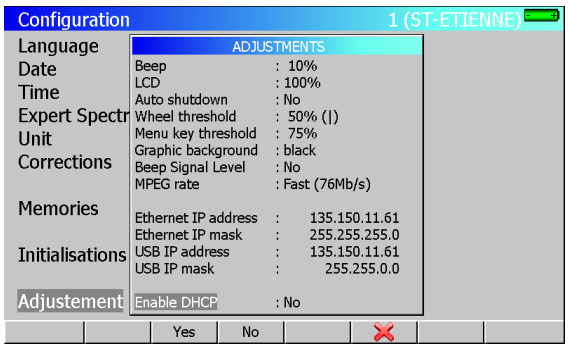


CAUTION: if your computer already used its Ethernet interface (network, modem…), you must restart your computer before connecting your TV Meter.

3rd possibility: Connect your instrument to a network using the **Ethernet** interface



Connecting your TV Meter to a network may cause problem if the DHCP server function is validated on the TV Meter.



4.6 Updating the software

The embedded software can be updated to get new features developed by SEFRAM.

- download from our web site (www.sefram.fr) , the update software **786X_vX.X.ZIP**
- Connect a USB memory stick to your computer.
- Extract the file in the USB memory stick

Verify the contents of your USB memory stick:

- Remove the USB memory stick
- Power on the instrument and check that the battery has a minimum 30% charge (if not please charge the battery before upgrading)
- Connect the USB memory stick to the TV Meter : few seconds later, the updating process need to be validate

- Move the highlighted line (reverse video) with up/down keys of the sensitive wheel, and then press the central key : the updating process is running

<u>Caution: do not power-off the instrument during firmware update</u>

- When updating is completed, disconnect the USB memory stick and restart your TV Meter.

The software is loaded in your appliance.

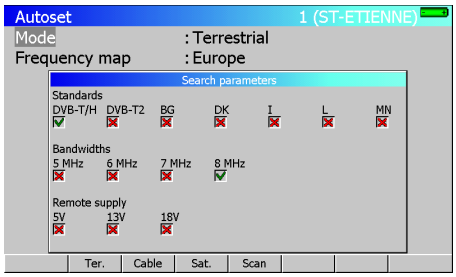
Errors messages may appear do not take account of this.

At the end of the update, turn off and then turn on the appliance.

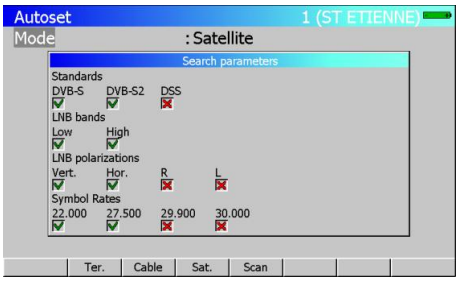
5 AUTOSET Mode

This mode permits to perform an **automatic program search** and to inform the current place. To access this mode, press the key:

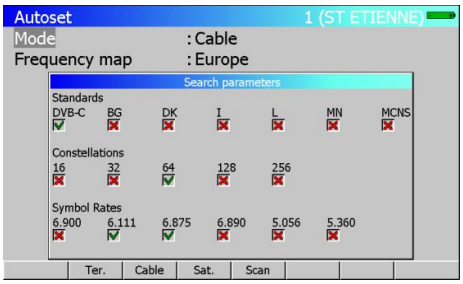
The lines displayed on this page depend on the wanted **frequency bandwidth** (line MODE):



Terrestrial Mode



Satellite **Mode**



Cable Mode

After you have chosen a mode, use the up/down and left/right keys to move in the table. **The central key** on the sensitive wheel permits to confirm or to cancel an option.

A red cross shows the parameters that are not taken into account in searching. A green tick shows that a parameter is taken into account.

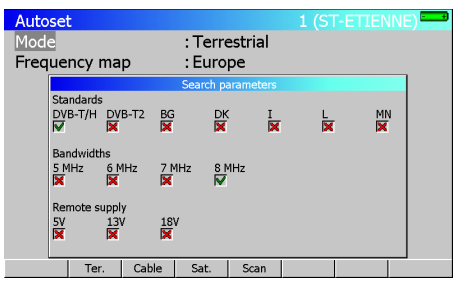
 ➔ Active parameter

 ➔ Non active parameter

Please remember that the more standards are selected, longer will be the search time.

5.1 Terrestrial Mode

This mode permits automatic search on the **terrestrial** frequency bandwidth.

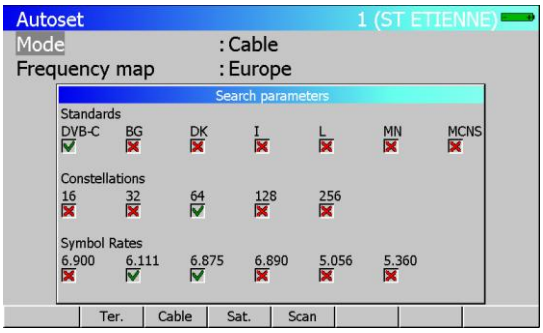


The table permits to choose:

- Standards
- Bandwidths
- Remote supply

5.2 Cable Mode

This mode permits automatic search on the **cable** frequency bandwidth.

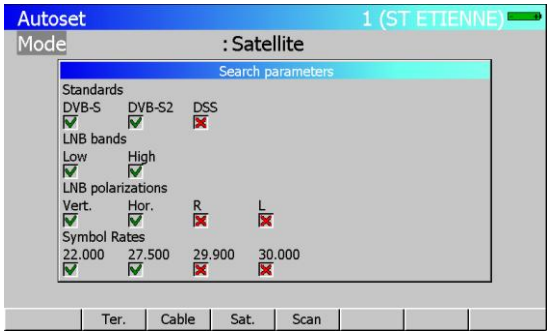


The table permits to choose:

- Standards
- Constellations
- Symbol rates

5.3 Satellite Mode

This mode permits automatic search on the **satellite** frequency bandwidth.



The table permits to choose:

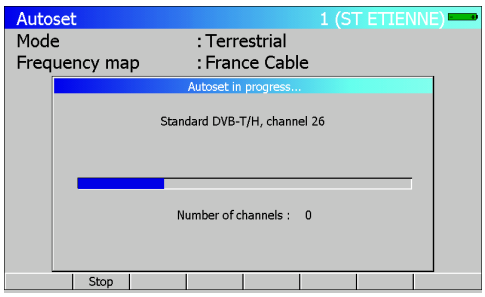
- Standards
- LNB bands
- LNB polarisations
- Symbol rates

5.4 « Scan » menu key

When you have correctly informed the table, click on the « scan » key to launch search.

	A warning message indicates that the current place will be erased. If you want to keep the current place, modify the place number in the Parameters page.

Pressing **YES** deletes the current place. It will be filled with the new values of the found programs. The screen below shows the progressing search:



When search is in progress, pressing « **Stop** » interrupts the search.

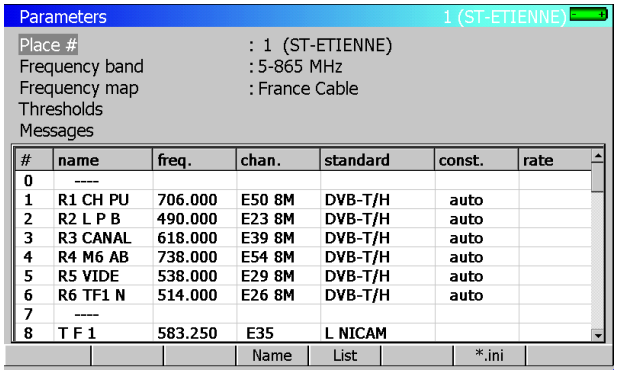
The appliance goes automatically to the **Measurement Map** mode when search is completed or when the user stops search.

6 Configuration of Places

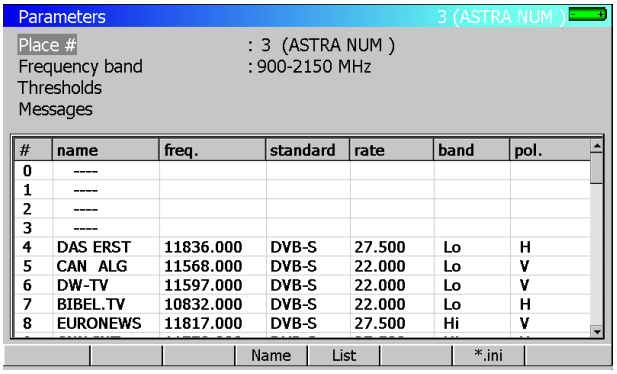
Pressing the  key permits to access the **PARAMETERS** function:

- Initialisation of the data included in each Place
- Initialisation of the data included in each Setup
- Choice of a Place among n places during a measurement session

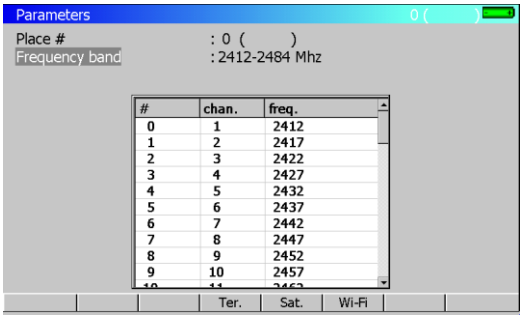
The lines displayed on the page below depend on the **Frequency bandwidth** selected for this place.



Terrestrial Band 45 - 865 MHz



Satellite Band 900 - 2150 MHz



Wi-Fi band

6.1 Parameters

➢ Selecting a place

This choice can be made through a **Place** number (sensitive wheel or keyboard) or through the list of Places.

Menu keys:

- **Name** : Place name input (10 characters maxi)
- **List:** Choice of the current Place among the list of Places.

➢ Selecting a Frequency bandwidth for a Place

Menu keys:

- **Ter**. : terrestrial 45 -865 MHz with all standards of terrestrial TV
- **Sat**. : satellite 900 - 2150 MHz with all standards of satellite TV
- **Wi-Fi** : Wi-Fi 2412 - 2484 MHz (option)

➢ Modification of **Thresholds** (min. /maxi) for each standard.

Menu keys:

- **Modif**. : displays the list of Thresholds for modification

  To move on this menu use the direction keys. To modify a **Threshold** use the sensitive wheel.

  Press a function key to complete the modification.

➢ Modification of the **Headers** (that can be used with the TR7836 software).

Menu keys:

- **Modif**. : displays the list of Messages for modification

  To move on this menu use the direction keys. Data input starts by pressing a key on the alphanumerical keyboard.

- **Yes/No :** validates the printing of each message

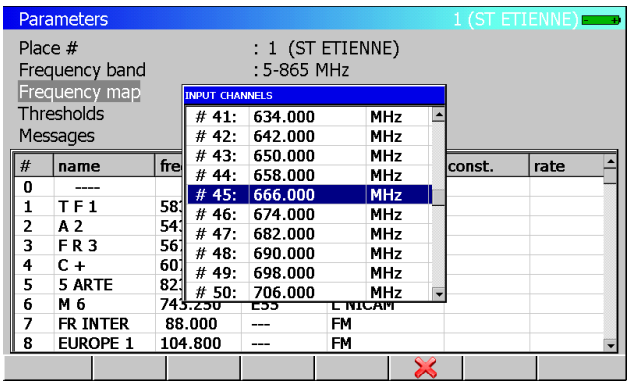
  Press any function key to complete modification.

➢ Choice of the **Frequencies Map** used in the instrument (Terrestrial Band only).

Menu keys:

- **Modif**. : displays the list of channels for modification
- **List** : displays the list of the frequency map predefined in the instrument

To change the frequency map: press the sensitive key « Change » to enter your own information (channels)



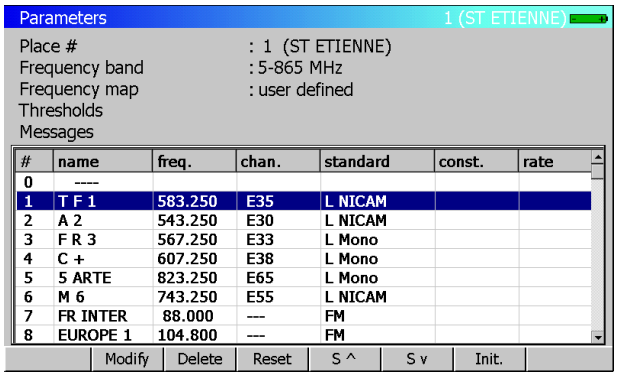
The **Frequency** of each **Channel** can be modified either by using the rotary wheel or by the keypad.

The **Frequencies Map** will be named '**User defined**'.

	It is necessary to choose the frequencies map corresponding to the area where the instrument is used so that you have the right correspondence frequency / channel. **Caution :** A change in a Frequency map will erase a possible plan **'User defined'** previously used. There is only one possible frequency <-> channel correspondence.

6.2 Setup list

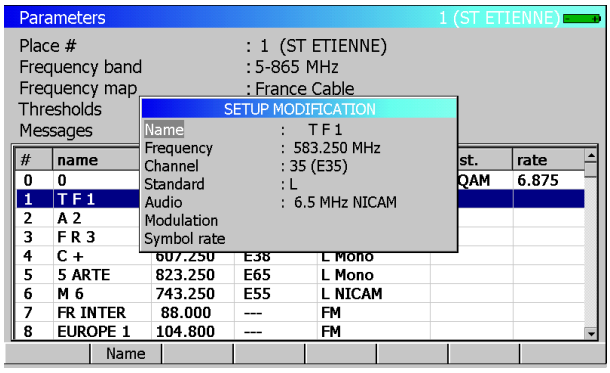
List of all **Setups** included in the current **Place**.



Menu keys:

- **Modif** : data input in a Setup
- **Delete**. : to delete information for a Setup
- **Reset** : to erase all Setups
- **S ^** : to move the selected setup to the line above
- **S v** : to move the selected setup to the line below
- **Init :** initialisation of all Setups
  - from the Frequency Map on Terrestrial band (one Channel per setup)
  - with 14,5MHz step from 10714 MHz on Satellite Band

Pressing **'Modif'** key in the setup list will display all the information concerning the setup for modification.



Press the direction keys to access the parameters of the **Setup**.

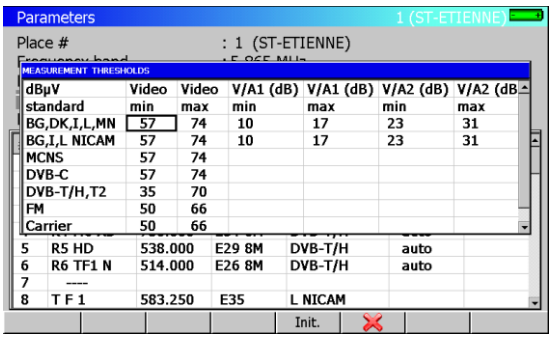
Each line corresponds to an initialisation menu of the parameter concerned in the **Setup**.

Each **Setup** is described according to its structure (see chapter 2) that depends on the **Frequency band** chosen for the **Place**.

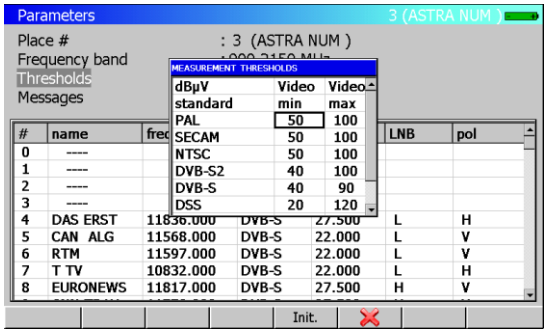
Press any function key to complete modification.

6.3 Thresholds

To change the **Threshold** (min / max).



Terrestrial Band



Satellite Band

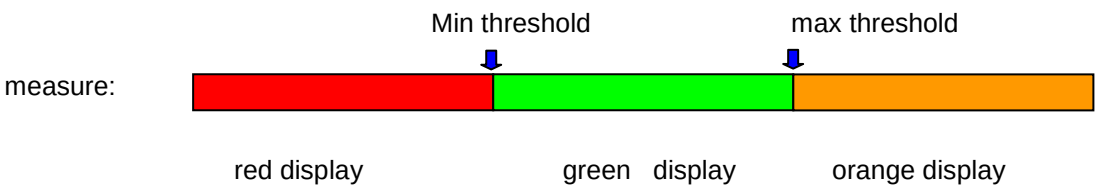
Use the arrow to move into the table.

To change a **Threshold**, use the rotary sensitive encoder.

Pressing « **Init** » will reset all level to their default values: in dBµV

Standard	Min	Max
Analogue terrestrial	57	74
DVB-C, MCNS	57	74
DVB-T/H, DVB-T2	35	70
FM, carrier	50	66
Analogue satellite	47	77
DVB-S, DSS	47	77
DVB-S2	47	77

Thresholds are used in « Level / Power » and « Measurement Map » functions:



6.4 Import « *.ini » file

What is an « *.ini » file?

An « *.ini » file contains place's parameters (terrestrial or satellite). File's data can be imported in the place's program table using a USB stick.

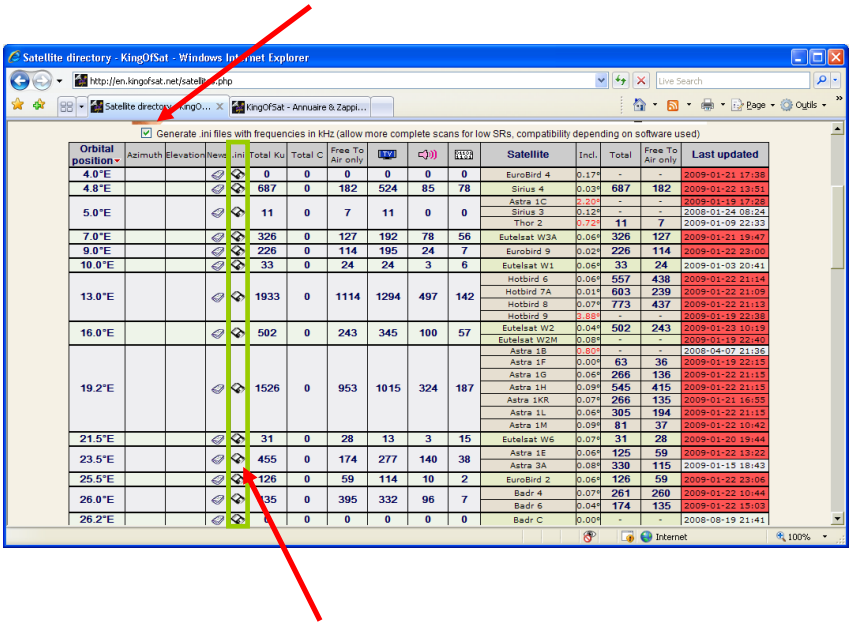
Where can be found « *.ini » files?

European satellite « *.ini » files can be downloaded at http://en.kingofsat.net/, in the directory called « Satellite Directory » (http://en.kingofsat.net/satellites.php). These files are updated regularly: So it's advised to go on this website to get the latest information.

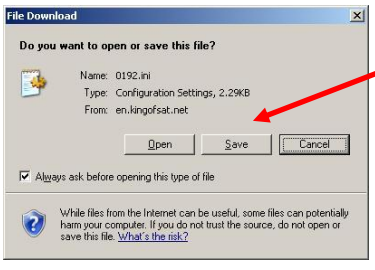
How to process?

Click on the following link http://en.kingofsat.net/satellites.php to access the website.

It's advised to fill this tick box to get a better accuracy of the frequencies

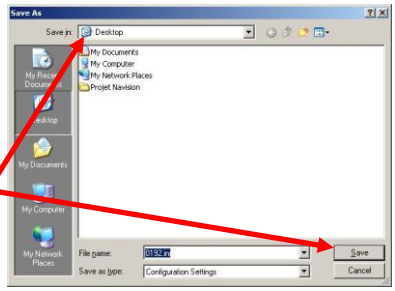


For example, to download Astra 23.5°E « *.ini » file, click here.



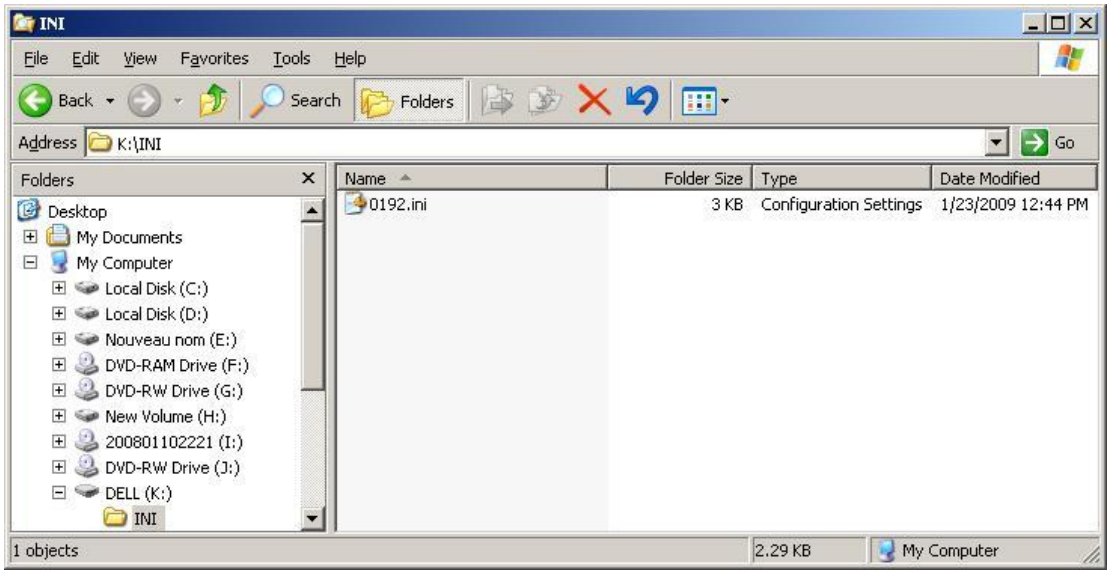
Then click on « *Save* ».

Select the destination directory and then, click on « *Save* ».

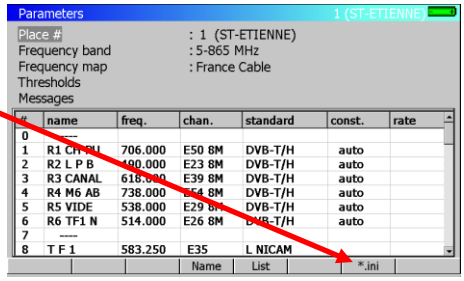


	Note: The file which contains data for Astra 23,5°E is called « **0235.INI** », the file for Astra 19,2°E would be called « **0192.INI** », etc.

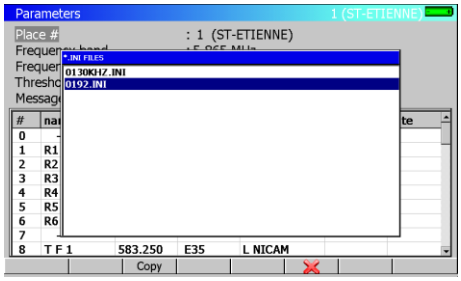
Then copy « *.ini » files in a directory called « INI », which is located at the root of a USB stick:



Put the USB stick in your equipment and press the « *.ini » button.

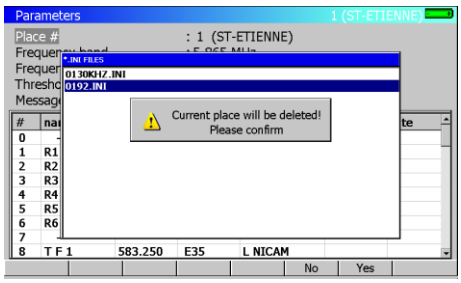


Select the file to be copied using up and down keys and then, press the « Copy » button.



Warning: the « *.ini » file will be copied on the current place.

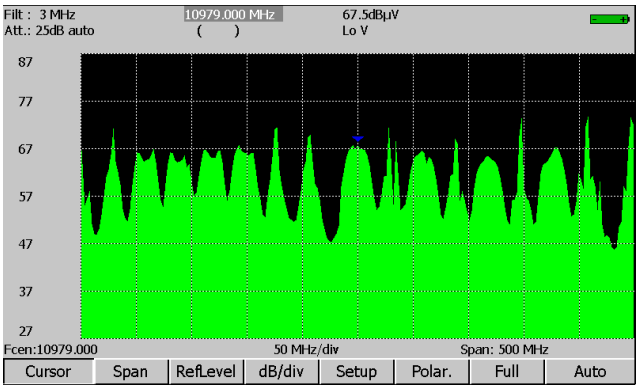
Press « Yes » to fill the current place with the « *.ini » file (if not, the operation will be cancelled).



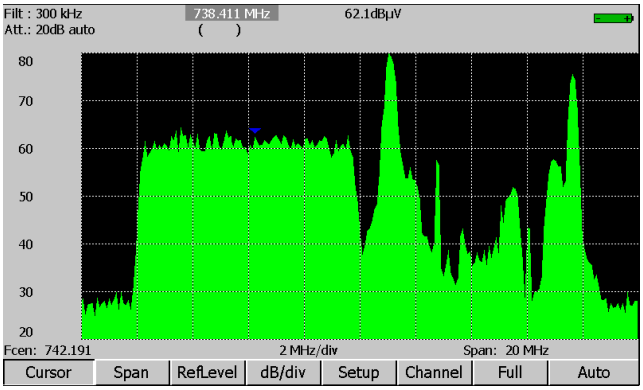
7 Spectrum Analyser

Pressing the  key gives access to the **SPECTRUM ANALYZER** function:

- Graphic representation of frequency / amplitude for signals present at the instrument input



Satellite Mode



Terrestrial Mode

7.1 Menu keys parameters

The modifiable parameters are the following:

- **Cursor** : Fast positioning of the cursor
- **Span** : Frequency span around the central frequency
- **RefLevel** : Reference level (scale of amplitudes maximum value)
- **dB/div** : Step of the amplitudes scale 5 dB or 10 dB
- **Setup**: Pressing this key permit to switch from one setup to another by using the sensitive wheel.
- **Polar:** Change of polarisation (horizontal, vertical, right, left) (satellite mode).
- **Channel**: Pressing this key permit to switch from one channel to another by using the sensitive wheel (terrestrial mode).
- **Full**: Full span mode that permits to have a maximum frequency span.
- **Auto** : Automatic reference level

The measurement cursor can be moved by using the sensitive wheel or the direction keys (RIGHT and LEFT).

The input attenuator automatically positions itself according to the Reference level.

The filter automatically positions itself according to the « span ».

7.2 Satellite identification

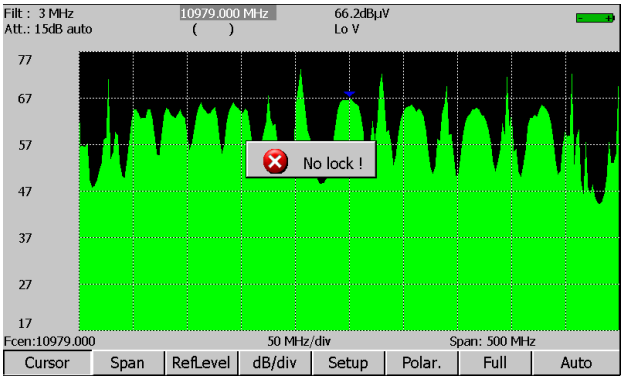
In spectrum mode for satellite band, pressing the Autoset key 

will valid the automatic recognition of the satellite by reading information of the MPEG NIT.

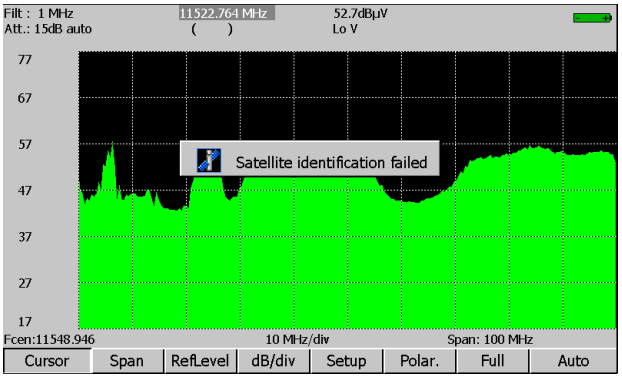
The recognition is made in several steps:

- The software try to identify a digital transponder close to the cursor
- The software try to be locked, using various symbol rates in DVB-S, DSS et DVB-S2
- When locked, the software waits for the MPEG NIT information
- It displays : satellite name, position, Network Name et Network ID

Messages are displayed if problem:



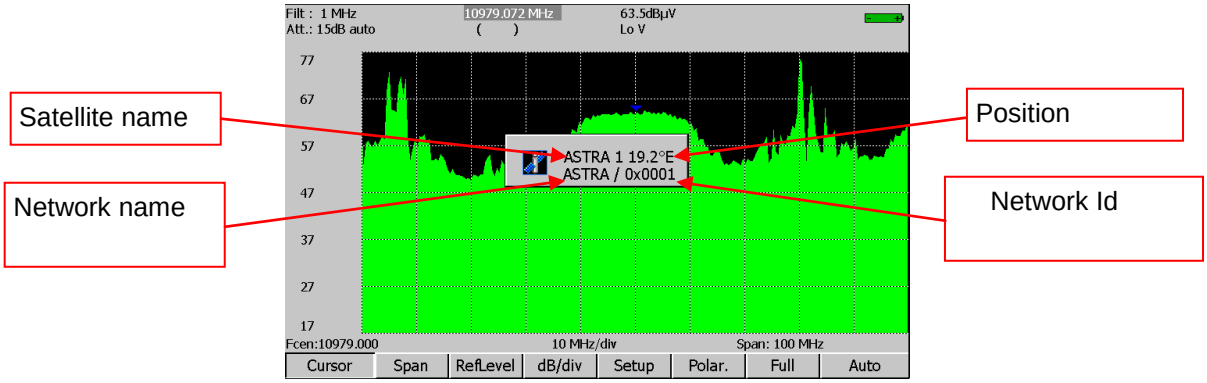
➔ Impossible to lock: wrong frequency, wrong symbol rate, wrong standard…



➔ Impossible to identify satellite: no valid NIT information, unlocked…

	Many broadcasting companies does not give correct MPEG NIT information Information displayed may have errors.

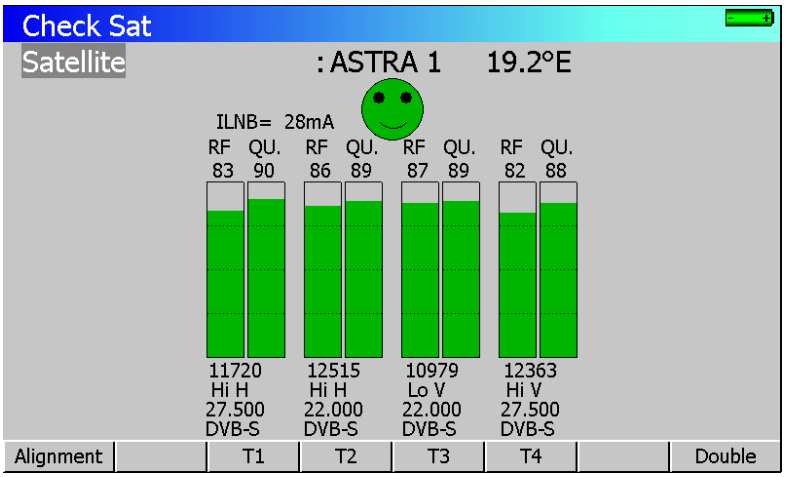
At the end of the process, the satellite information is displayed:



8 Check satellite for Single and Double LNB

	In Satellite band only. The check satellite mode allows a fast alignment of satellite dish by the initial choice of the satellite to be received.

Pressing the key twice gives access to the CHECKSAT function when the current Place is in satellite band.



The appliance has 30 pre-programmed satellite orbital positions in storage.
Each satellite possesses 4 transponders.

The TV Meter is supplied with 9 satellites installed (factory recovery)

8.1 SeframSat software

8.1.1 Installation

You can download the SeframSat software on our website (www.sefram.fr).

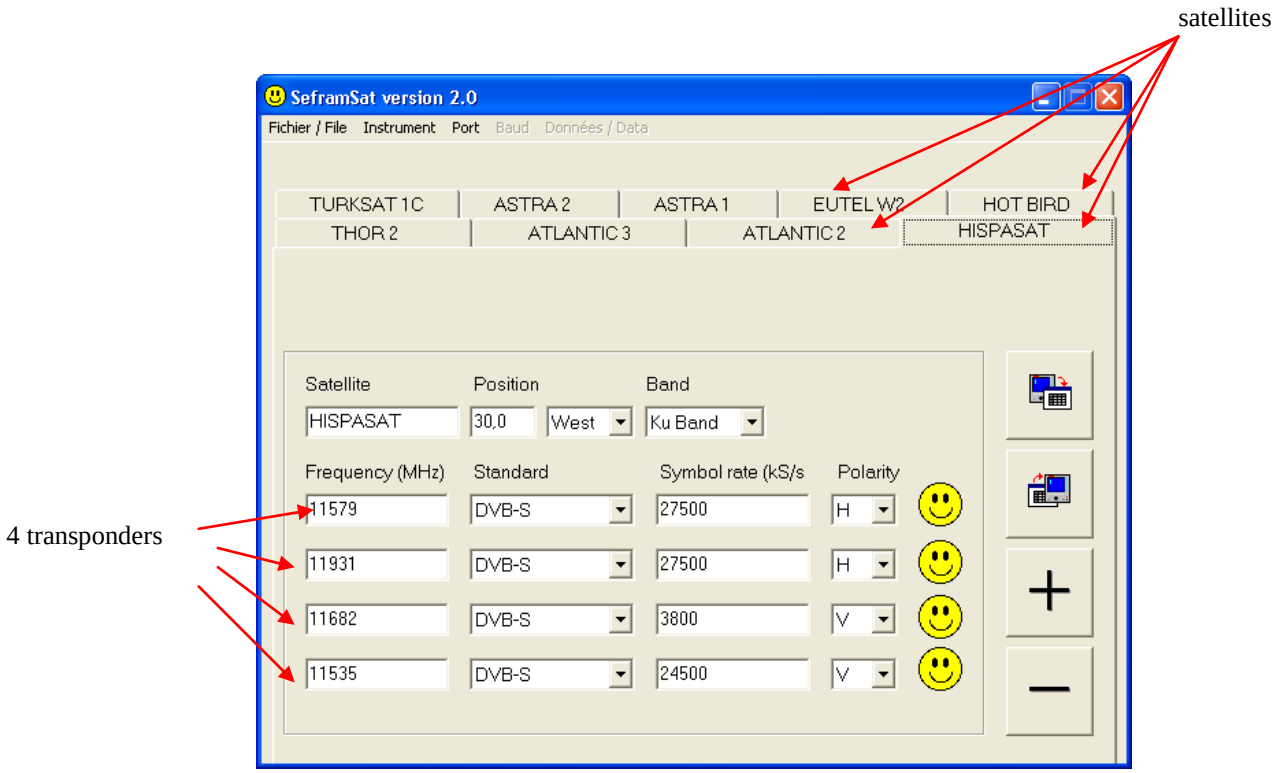
SeframSat software permits to inform correctly one or several satellites.
Each satellite is characterised by 4 transponders.

- Double-click on setup.exe file to install the software on your PC.

- Launch **SeframSat** software (Start→Programs→SeframSat).

By default, the software is delivered with a valid satellite list installed in the SeframSat installation directory.

Example: how to open « europe.sat » file:



Every satellite is characterised by:

- **its name**
- **its position**
- **its band (C or Ku)**
- **4 transponders**

Every transponder is characterised by:

- **a frequency**
- **a standard**
- **a Symbol rate**
- **a polarity**

8.1.2 How to use SeframSat

Set **SeframSat** software depending on the appliance you are using:

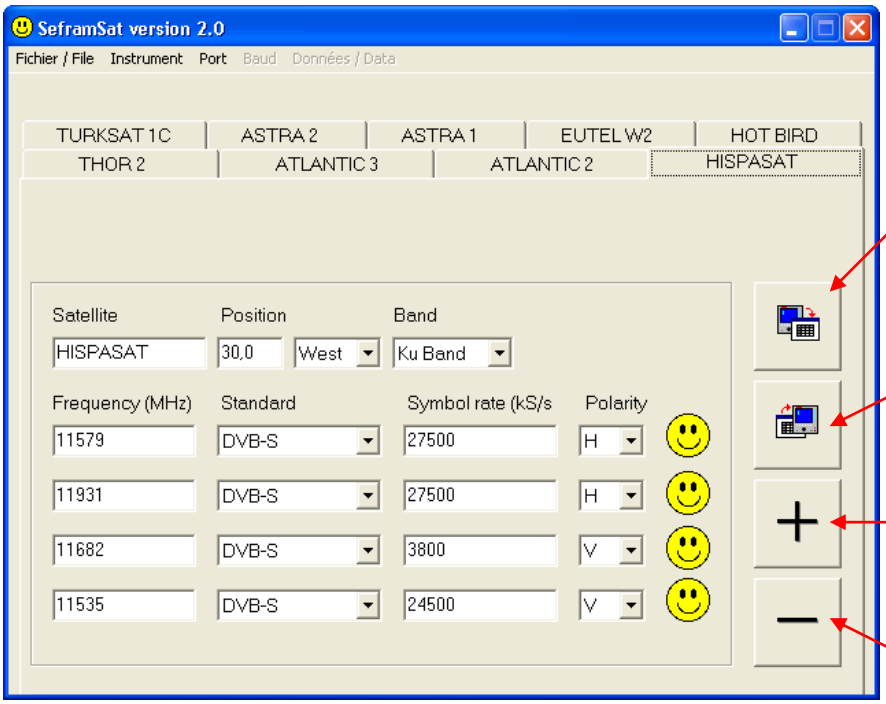
➔ « **Instruments** » permits to choose the target appliance.

➔ « **TCPIP** » permits to choose the address of the appliance (see paragraph « Connecting the appliance to a PC »).

The different controls permitted by SeframSat are:

➔ « **File** » then « **Open** » permits to open a *.sat that includes a satellite list.

➔ « **File** » then « **Save** » permits to save all the defined satellites.



Sends the list of satellites contained in the appliance to SeframSat software.

Sends the list of satellites contained in SeframSat software to the appliance.

Addition of a satellite to the current map.

Deletes the selected satellite from the current map.

SeframSat permits to characterise completely one or several satellites: each parameter can be modified either directly by keyboarding its value or by selecting from a drop-down list.

Example: *How to send the « europe.sat » file to the 7855 appliance.*

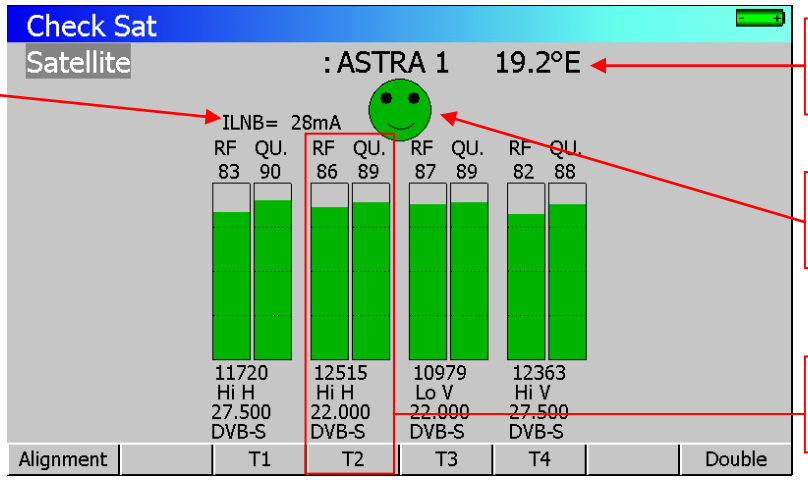
-Click on « instrument » and tick « 7851-7856 »

-Click on « port » and select the right COM port.

-Click on « file-> open » and search for the « europe.sat » file.

-Click on  to transmit the satellite list to the appliance.

8.2 CheckSat mode interface

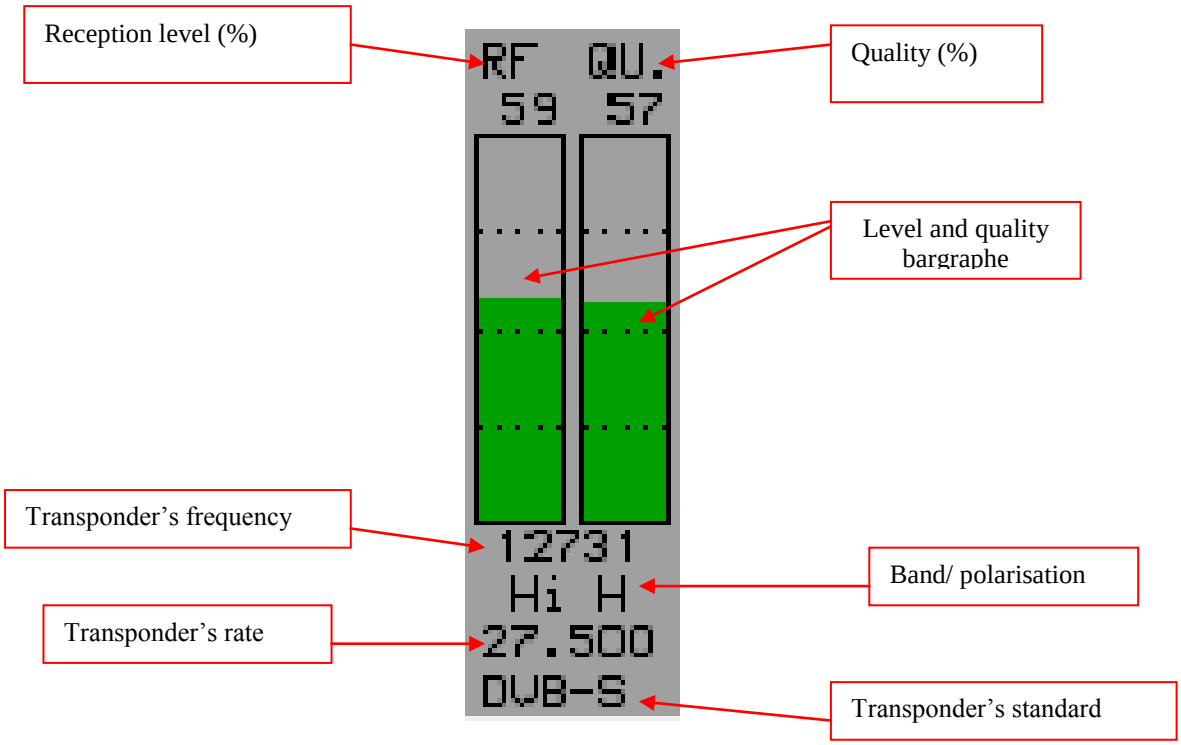


LNB power supply current

Satellite's name + Position

Overall quality smiley

Transponder 2 information



8.3 CheckSat single LNB

Permits to direct a dish towards a satellite.

Menu keys:

- Alignment : Dish alignment parameters calculation

T1 | T2 | T3 | T4

: Modification of parameters for transponder 1, 2, 3 or 4.

- Double : Double CheckSat mode.

8.3.1 CheckSat information

Operating mode:

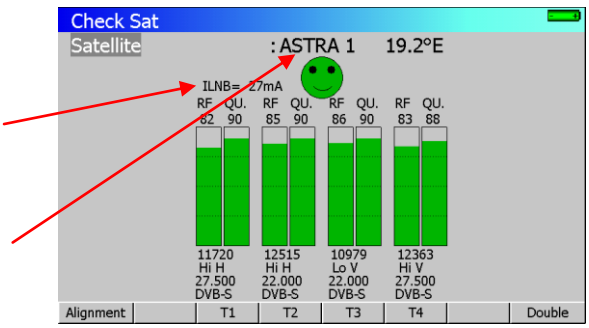
1/ Set your TV Meter in **Satellite Mode**: (see chapter « **Places Parameters** »)

2/ connect the dish towards the appliance and turn it on.

3/ Validate remote supply:

-The « VDC » LED on the front panel flashes.

-Check the LNB remote supply (approximately 200 mA).



4/ Check satellite:

- Select the satellite to be checked from the list (by using the rotary wheel).

5/ slowly connect the dish until you get the maximum of level and you can hear the locking melody.

6/ adjust the LNB to get the best quality (against polarisation).

You can hear a melody when the first transponder is found and then you can hear beeps. These beeps are becoming shorter when quality increases.

If the appliance is not synchronised on any transponder the smiley is red.

If the appliance is synchronised and if the reception quality is average the smiley is orange.

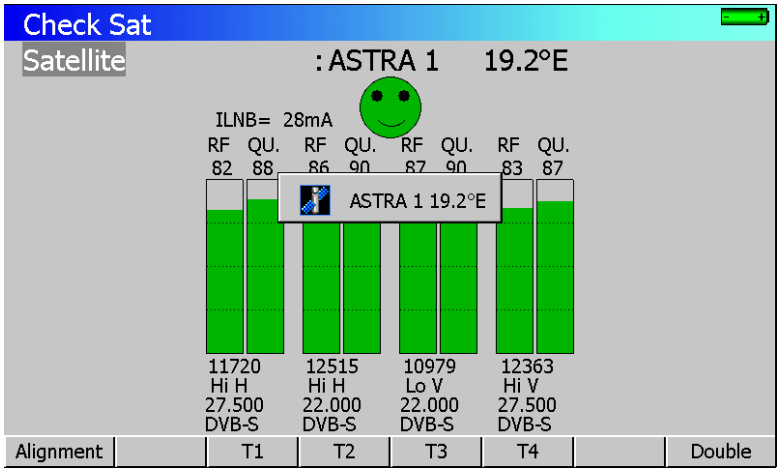
If the appliance is synchronised and if the reception quality is good the smiley is green.

	Caution: To identify correctly a satellite, the appliance must be synchronised on the 4 transponders. **However certain transponders are modified regularly. Please see the satellite's frequency map when some transponders are lost.** **Some switches or LNB work only with DiSEqC. In this case, position the LO and the DiSEqC polarisation on the LNB-DiSEqC configuration page. (Caution: By using DiSEqC, CheckSat is slowed down).**

8.3.2 Checking the satellite

You can verify that the satellite pointing is correct by pressing 

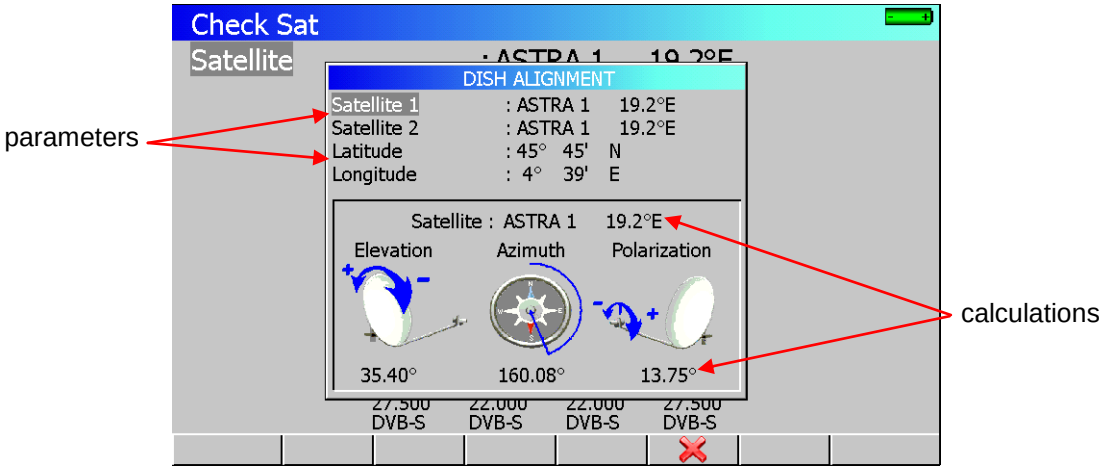
The device will then search the table MPEG NIT on one of the 4 transponders and displays the name of the satellite:



	Warning: **The name displayed depends on the contents of the table MPEG NIT.** **Some broadcasters do not provide information (or poorly) this table.** **The information displayed may be incorrect.**

8.3.3 Alignment of the dish

Pressing the sensitive key "**Alignment**" under the screen is used to calculate values Elevation, Azimuth and Polarization (LNB skew) of your dish:



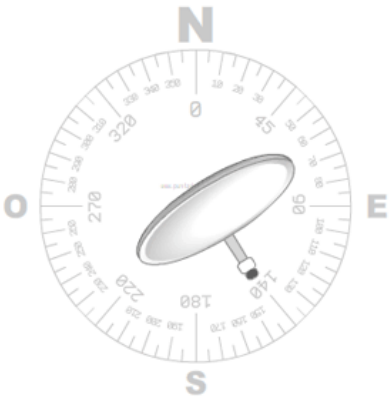
Parameters:

- Satellite 1 : satellite pointer; 1st satellite on a multi-head dish
- Satellite 2 : 2nd satellite dish on a multi-head
- Latitude : latitude of your current location
- Longitude : longitude of your current location

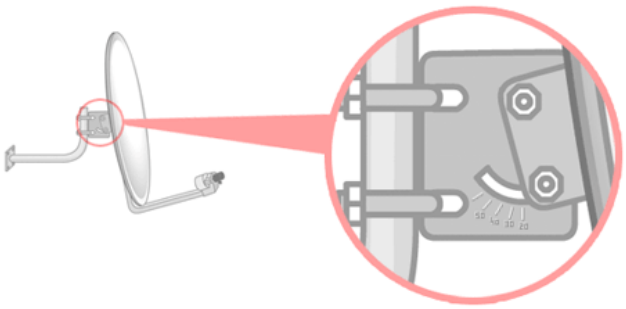
Calculations:

- Satellite : satellite point closest to the middle position between Satellite1 and Satellite2
- Elevation : inclination of the parabola
- Azimuth : horizontal position of the parable in relation to North
- Polarization : rotation of the LNB from the vertical (skew)

Azimuth
That is the position of the dish on a horizontal plane relative to the north. Measured in degrees.

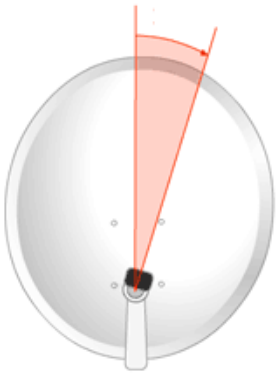


Elevation
It is the inclination with which the beam arrives from the satellite signal up to your antenna. Measured in degrees and using what is marked on the support of the dish.



Polarization

This is the rotation that must be the LNB from the vertical soil. It is measured in degrees.

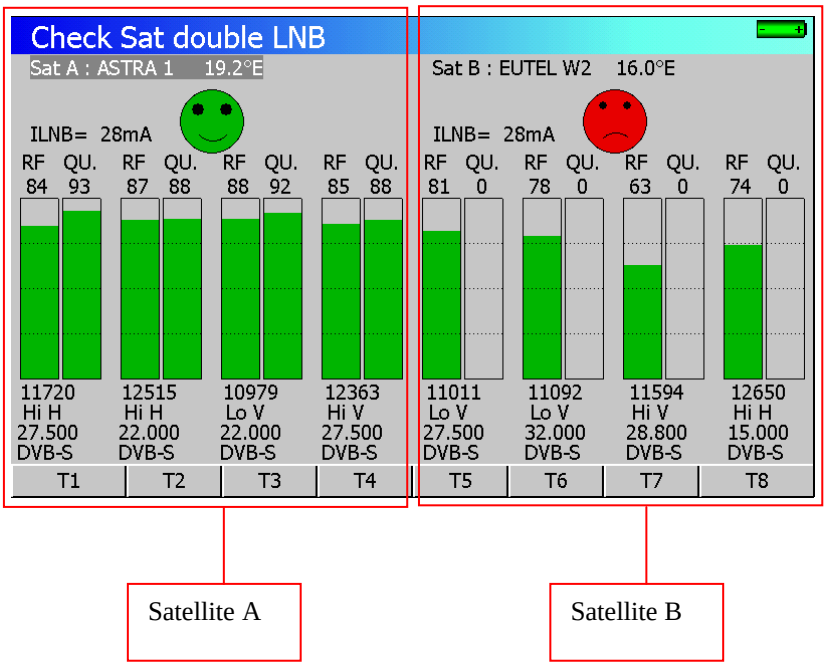


To calculate the parameters of a simple head dish, enter the same satellite to point to the settings '**Satellite 1**' and '**Satellite 2'**.

	Note: **The list of satellites available for this calculation is the same list used in Check Sat.** **Use the software SeframSat to change it (addition / removal of satellites).**

8.4 CheckSat double LNB

This mode permits to direct a double LNB by checking 4 transponders on your 2 chosen satellites.
It works the same way as the normal CheckSat Mode.



Satellite A is on the left side of the screen and Satellite B is on the right side.

Menu keys:

- T1 | T2 | T3 | T4 : Modification of parameters for Satellite A's transponder 1, 2, 3 or 4.
- T5 | T6 | T7 | T8 : Modification of parameters for Satellite B's transponder 1, 2, 3 or 4.

The left/right direction keys permit to switch from Satellite A to Satellite B and vice versa.

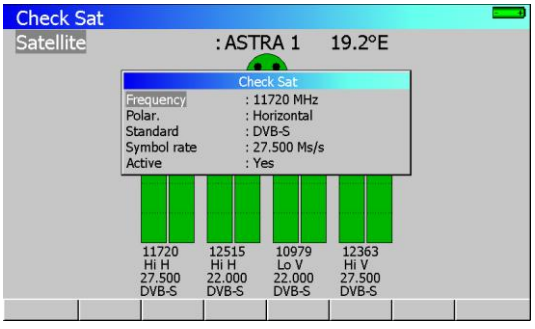
The sensitive wheel permits to modify the current satellite (change of satellite according to the list sent by SeframSat software).

To exit from this mode, press any function key.

8.5 Modification of a transponder's parameters

Pressing one of the Tx keys permits to modify the transponder associated with the number x:

T1→Modification of transponder 1 associated with satellite A.
T2→ Modification of transponder 2 associated with satellite A.
T3→ Modification of transponder 3 associated with satellite A.
T4→ Modification of transponder 4 associated with satellite A.
T5→ Modification of transponder 1 associated with satellite B.
T6→ Modification of transponder 2 associated with satellite B.
T7→ Modification of transponder 3 associated with satellite B.
T8→ Modification of transponder 4 associated with satellite B.



For every line there is a different menu:

Click on the key  to go back to normal or double CheckSat.

	Activating or deactivating a transponder permits to accelerate the search for active transponders.

	Please, choose transponders with high rate in order to get a fast alignment of satellite dish.

9 Image and Sound

Pressing the TV key gives access to the **IMAGE AND SOUND** function.

9.1 Analogue TV

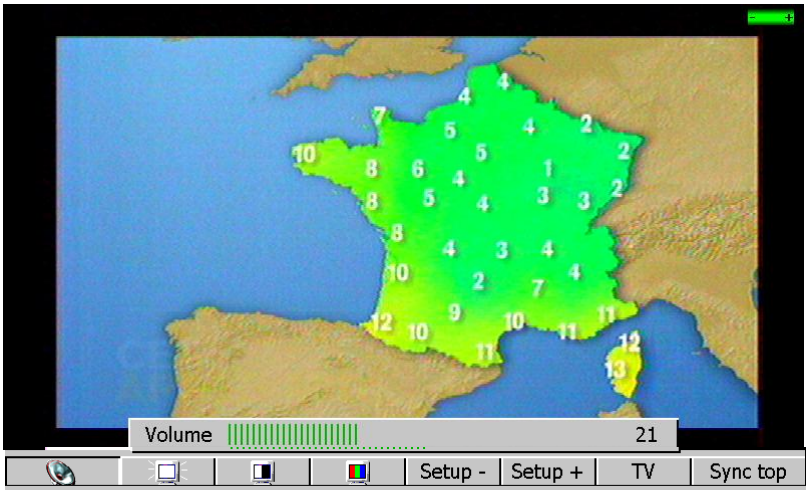
- Display of terrestrial analogue images.
- FM radios.
- Sound, brightness, colour, contrast controls.
- Direct modification of the current setup.
- Full screen mode, external video signal display.
- Display of the sync signal.

Menu keys:

- : Setting of the volume with the sensitive wheel.
- : Setting of the brightness with the sensitive wheel.
- : Setting of the contrast with the sensitive wheel.
- : Setting of the colour saturation with the sensitive wheel.
- Setup - | Setup + Modification of the number of the currently displayed program.
- TV : Full screen mode, or external video.
- Sync top : Display of sync signal.

9.1.1 Volume and screen settings

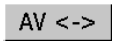
Pressing one of the volume or screen setting keys makes a bargraphe appear.
The sensitive wheel permits to increase or decrease the volume depending on the direction of rotation.



9.1.2 Full Screen Mode

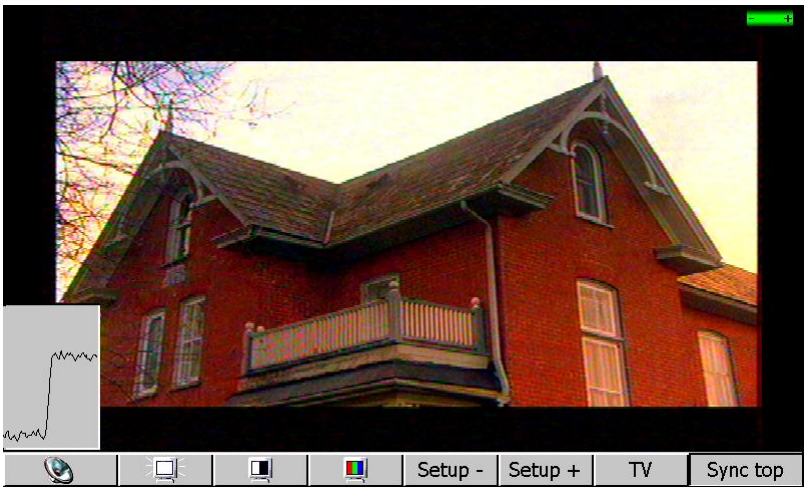
The different full screen modes are described below:

Menu keys:

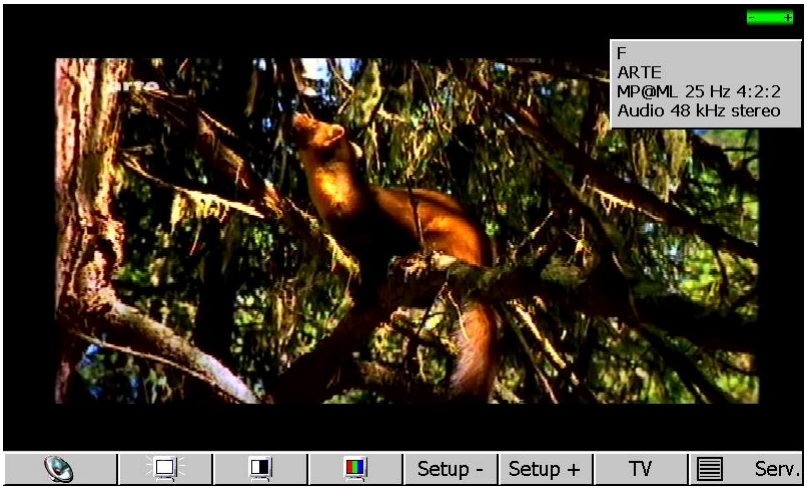
-  : full screen mode
-  : display the TV picture as big as possible
-  : picture source (internal or external);
  If external, displays the signal of input video connector

9.1.3 Top Sync signal

The Top Sync signal (vertical) is inlaid in the picture below.



9.2 DIGITAL TV



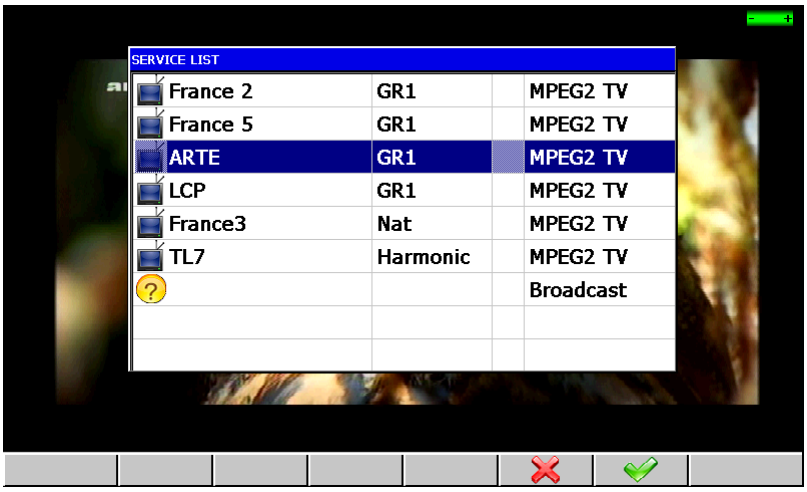
- MPEG DVB-T/H, DVB-T2, DVB-S, DSS, DVB-S2, DVB-C.
- Choice of the MPEG service.

Menu keys:

- : Setting of the volume with the sensitive wheel.
- : Setting of the brightness with the sensitive wheel.
- : Setting of the contrast with the sensitive wheel.
- : Setting of the colour saturation with the sensitive wheel.
- Setup - | Setup + Modification of the number of the currently displayed program.
- TV : Full screen mode, or external video.
- Serv. : Services display.

9.2.1 Services list

Get and display the Services included in the MPEG multiplex.



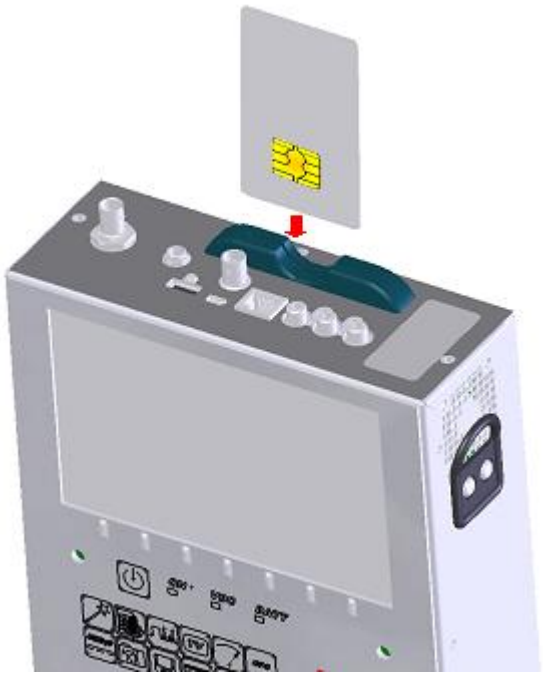
Choice of the service with the sensitive wheel or with the up/down direction keys.

Setting the service with the key  .

Cancelling with the key 

9.2.2 Access rights / access card

Please find the access card at the back of the appliance (option according to appliance type).



When displaying an encrypted channel, the processor checks if there is a user card and if the encryption mode is compatible.

9.2.3 Sound

The instrument is able to demodulate sound of analogue TV for the systems:

BG, DK, I, L, MN and also FM audio

The instrument is able to decode digital sound for the following coding systems:

MPEG-1 L1/L2

For the HD version

AAC	Advanced Audio Coding	License Via Licensing
HE-AAC	High Efficiency AAC	License Via Licensing
Dolby Digital		License Dolby®
Dolby Digital Plus		License Dolby®

Manufactured under license from Dolby Laboratories
Dolby and the double-D symbol are trademarks of Dolby Laboratories

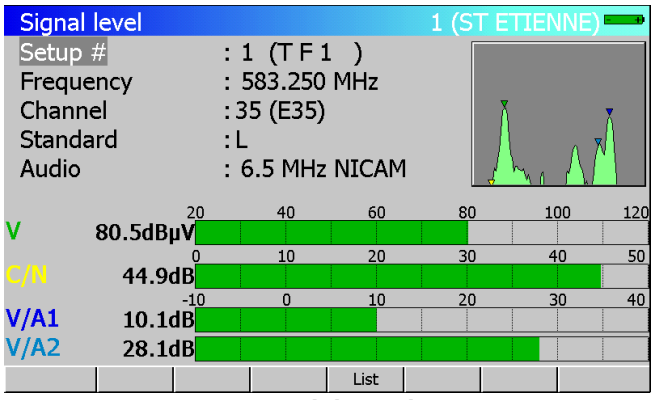
10 Level / power measurement

Press the  key to access to the **LEVEL MEASUREMENT** function:

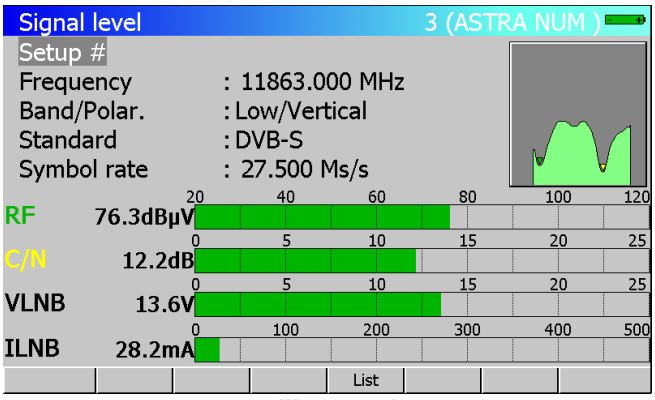
- Perform a level measurement for a specified frequency with detection and a filter appropriate to standard.
- A hearing aid is available to find the maximum reception without seeing the device.

In terrestrial band, for a user socket the level must lie :
- **between 50 and 66 dBµV in FM**
- **between 35 and 70 dBµV in DVB-T/H and DVB-T2**
- **between 57 and 74 dBµV in any other case.**

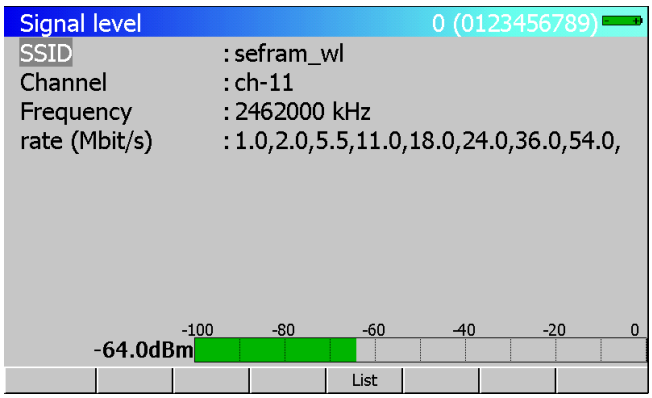
In satellite band, for a user socket the level must lie :
- **between 47 and 77 dBµV.**



Terrestrial Band



Satellite Band



Wi-Fi band

10.1 Parameters

Every menu depends on the parameter in reverse video.

The different parameters are:

10.1.1 Terrestrial band

- **Setup #: Selected setup.**
  Allows user to select **Programs** in the selected Place.
  This choice can be made by using the sensitive wheel, the keyboard or the list of Setups.

- **Frequency:** Selected frequency**.**
  You can change the selected frequency by using the sensitive wheel, the keyboard or the frequencies Map.
  Menu keys:
  - ✓ **Map:** choice of a frequency in the frequencies Map

- **Channel :** Selected channel (in terrestrial band only)
  This choice can be made by using the sensitive wheel, the keyboard or the frequencies Map.
  Menu keys:
  - ✓ **5 MHz, 6 MHz**, **7 MHz**, **8 MHz**: choice of the DVB-T/H, DVB-T2 bandwidth.
  - ✓ **Map:** choice of the **Channel** in the Frequencies Map.

- **Standard:** Selected standard**.**
  This choice is made by using the menu keys (they show all the available standards).
  Menu keys:
  - ✓ All available standards on the Terrestrial Band.

- **Audio**: Selected audio Mode.
  This choice is made by using the menu keys (they show all the available Modes).
  In Terrestrial Band:
  - ✓ **Mono, Stereo and NICAM**

10.1.2 Satellite band

- **Setup #: Selected setup.**
  Select in the **Programs** list of the **Place**.
  This choice can be made by using the sensitive wheel, the keyboard or the list of Setups.

- **Frequency:** Selected frequency**.**
  You can change the selected frequency by using the sensitive wheel or the keyboard.

- **Band / Polar.** : Choice of **Bandwidth** and LNB **polarisation** (Local Oscillator)
  Bandwidth:
  - ✓ **Low** : set the LNB on LO1
  - ✓ **High** : set the LNB on LO2

This choice is made accordingly to the type of LNB that you have selected in PARAMETERS page (Function key LNB-DiSEqC).

	Caution: All information concerning LNB and positioner is transferred through the remote supply; 22 kHz modulation or DiSEqC is combined with the DC supply generated by the appliance.

Polarisation:

- ✓ **Vert.:**LNB Polarisation is switched to Vertical mode.
- ✓ **Hor.:** LNB Polarisation is switched to Horizontal mode.
- ✓ **Right:** LNB Polarisation is switched to Right mode.
- ✓ **Left:** LNB Polarisation is switched to Left mode.

This choice is made accordingly to the type of LNB that you have selected in PARAMETERS page, line LNB-DiSEqC.

- **Standard:** Selected standard**.**
  This choice is made by using the menu keys (they show all the available standards).
  Menu keys:
  - ✓ All available standards on the Satellite Band.

- **Symbol rate: symbol rate of the selected program**.
  Values can be changed with keyboard or encoder.

10.1.3 Wi-Fi band

- **SSID Service Set Identifier** : network name
- **Channel :** Wi-Fi channel
- **Frequency :** channel frequency
- **Symbol rate :** possible symbol rate of the network

	Please remove the Wi-Fi adapter when you do not need it **It decreases the battery life and slows down the operations**

10.2 Measurements according to Standard

The appliance performs various measurements depending on the selected standard.
The possible measurements are as follows: Average measure, Peak measure and Power measure.

10.2.1 Terrestrial Band

The appliance automatically performs level measurements on **Video Carrier** and on 1 or 2 Audio **Carriers (depending** of the selected audio mode).

The table below shows the different types of measures and the audio carrier's frequencies for each Standard.

standard	video carrier	measure	audio carriers		
			Mono	stereo	NICAM
BG	negative, AM	peak	FM 5,5 MHz	FM 5,74 MHz	DQPSK 5,85 MHz
DK	negative, AM	peak	FM 6,5 MHz	FM 6,258 MHz	DQPSK 5,85 MHz
I	positive, AM	peak	FM 6,0 MHz		DQPSK 6.552 MHz
L	positive, AM	peak	AM 6,5 MHz		DQPSK 5.85 MHz
MN	negative, AM	peak	FM 4,5 MHz	FM 4,72 MHz	
DVB-C	digital	power			
MCNS	digital	power			
DVB-T/H, T2	digital	power			
FM	FM	average			
Carrier	Non modulated	average			

The appliance shows the **video** carrier level, the **video-audio** ratio(s) and the **C/N** ratio.

The display is made of 1 to 4 measures and bargraphe.

The **audio** carriers are always measured in **Average** measure.

10.2.2 Satellite Band

standard	video carrier	measure
PAL	FM	peak
SECAM	FM	peak
NTSC	FM	peak
DVB-S	Digital	power
DSS	Digital	power
DVB-S2	Digital	power

10.2.3 Wi-Fi Band

Measure the level in dBm received with the Wi-Fi adapter

11 Error rate measurement

To access to the error rate measurement function, press twice the  LEVEL function key.

The displayed measures are **BER** (Bit Error Rate), **UNC** (Uncorrected Packets) and **MER** (Modulation Error Rate) in **DVB-T/H, DVB-C, DVB-S or DSS**.

In **DVB-T2**, **LDPC, BCH, FER** and **MER** are displayed.

In **DVB-S2**, **LDPC, BCH, PER** and **MER** are displayed.

It is also displayed **NM:x.xdB** (Noise Margin for terrestrial channel) and **LKM:x.xdB** (Link Margin for satellite transponders)

This indicates in dB the difference between the measured MER and the limit MER before picture freeze: it is the margin we have before picture problem.

Bargraphes for error rates use colours to differentiate values:
- GREEN : correct bit error rates
- ORANGE : VBER (or BER) > **1^{E}-4** (QEF : quasi error free) with no lost packet
- RED: lost packets (UNC).

You can access to these measurements if one of the following standards is in progress in the **LEVEL MEASUREMENT** page:

- ✓ DVB-S, DSS
- ✓ DVB-S2
- ✓ DVB-T/H
- ✓ DVB-C MCNS

11.1 Parameters

The number and the meaning of the displayed parameters depend on the **Standard** selected.

The **Setup, Frequency, Channel, LNB Band** and **LNB Polarisation** parameters are the same as in the **LEVEL MEASUREMENT** screen (see chapter « Level / power measurement »).

The **Frequency** parameter also gives access to:

- A "**Scan+**" and "**Scan-**" function that searches for channels for the current standard.
- And in Satellite band, functions linked to the "**Posit.**" Positioner (if there is a positioner) :
  - **< West:** moves the dish westwards.
  - **East >:** moves the dish eastwards.
  - **Stop:** no move.
  - **Store**: saves the current position in the current position number.
  - **Calcul.** : Recalculation order of the positioner's other positions.

A long press on the "**<West** "and "East**>** "keys launches a continuous movement.

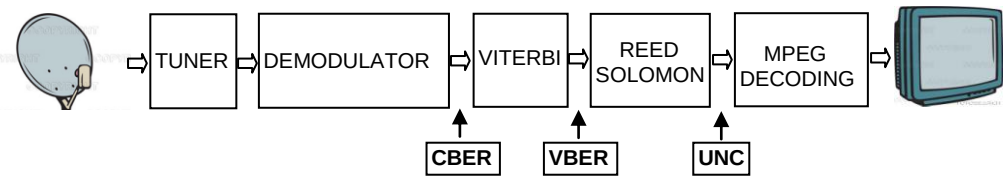
Press "Stop" to stop this action.

The other parameters depend on the type of digital standard **DVB-S, DVB-S2, DSS, DVB-T/H** or **DVB-C**.

	"Sync?" shows that the signal is missing or non-locked, check that the signal and the remote supply are not missing, the modulation parameters and the LNB and DiSEqC parameters in satellite band.

	The **"<"** sign precedes an error rate value when there is no error (for example when the error rate is lower than 1^{E-8}).

11.2 DVB-S, DSS



Display of the following measures:

- **CBER** : error rate before Viterbi (estimated)
- **VBER** : error rate after Viterbi
- **UNC** : error rate after Reed Solomon (lost packets)
- **MER** : modulation error rate

XBER: 'bit' error rate

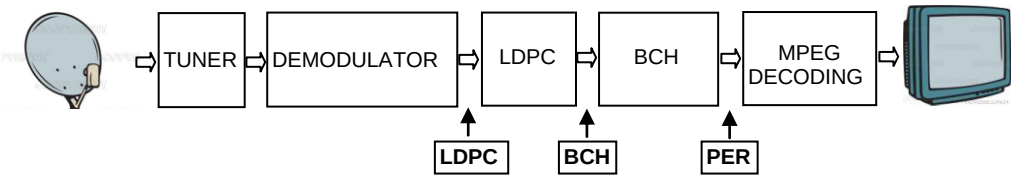
Number of wrong bits / number of transmitted bits ratio during measuring time.

UNC: 'packet' error rate

Number of wrong packets / number of transmitted packets ratio during measuring time.

Note: A QPSK (DVB-S) packet is made of 204 bytes; a packet is 'wrong' if it has more than 8 wrong bytes (correction with Reed Solomon coding). In DSS, a packet is made of 146 bytes.

11.3 DVB-S2



Display of the following measures:

- **LDPC** : error rate before LDPC
- **BCH** : error rate after LDPC
- **PER** : error rate after BCH (lost packets)
- **MER** : modulation error rate

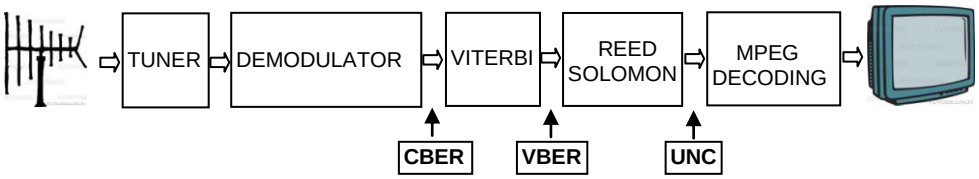
Note:

LDPC: low-density parity check

BCH: Bose Chauhuri Houquenohem

The Viterbi + Reed Solomon concatenation of the correction of the DVB-S is replaced in DVB-S2 by the LDPC and BCH concatenation.

11.4 DVB-T/H



Display of the following measures:

- **CBER** : error rate before Viterbi
- **VBER** : error rate after Viterbi
- **UNC** : error rate after Reed Solomon (lost packets)
- **MER** : modulation error rate

XBER: 'bit' error rate

Number of wrong bits / number of transmitted bits ratio during measuring time.

UNC: 'packet' error rate

Number of wrong packets / number of transmitted packets ratio during measuring time.

Note: a DVB-T/H packet is made of 204 bytes; a packet is 'wrong' if it has more than 8 wrong bytes (correction with Reed Solomon coding).

Parameters:

- **Modulation** : Type of detected **Modulation**

  Automatically displays:

  - ✓ The number of carriers (2K / 8 K)
  - ✓ The constellation (QPSK, 16QAM, 64QAM)
  - ✓ The guard interval (1/32, 1/16, 1/8, ¼ auto or not)
  - ✓ The Viterbi rate (1/2, 2/3, 3/4, 5/6, 7/8)
  - ✓ The spectral inversion of the signal

In case of hierarchical modulation use the HP and LP keys to select the stream to be measured.

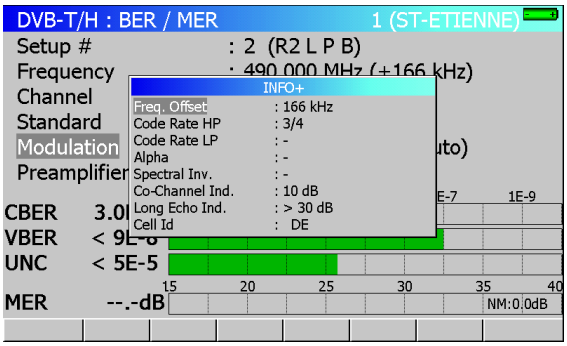
In case of bad reception or co-frequency analogue channel the guard interval can be set to manual

- **Preamplifier**: switch ON the internal preamplifier.

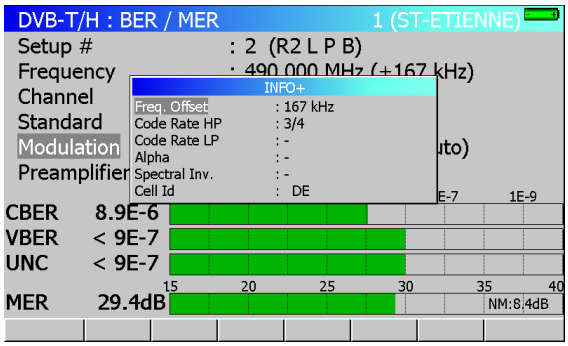
☝	Use the preamplifier only if signal level is **< 40 dBµV**. If signal level is **> 60 dBµV, errors due to saturation, interferences may occur**.

The Info+ menu key (parameter modulation) gives access to the following additional information:

- the frequency offset
- the HP stream's Viterbi rate
- the LP stream's Viterbi rate
- the hierarchical mode level
- the spectral inversion of the signal
- the presence and relative level of a co-frequent analogue channel (except HDT2 models)
- the presence and relative levels of echoes out of the guard rate (except HDT2 models
- the cell identifier

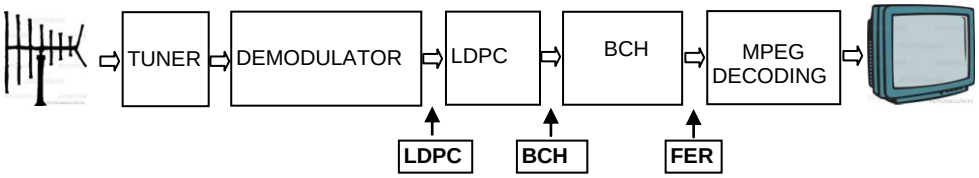


7861 7861HD 7862 7862HD



7861HDT2 7862HDT2

11.5 DVB-T2 (HDT2 models)



Display of the following measures:

- **LDPC** : error rate before LDPC
- **BCH** : error rate after LDPC
- **FER** : frame error rate, error rate after BCH (lost packets)
- **MER** : modulation error rate

Note:

LDPC: low-density parity check

BCH: Bose Chauhuri Houquenohem

The Viterbi + Reed Solomon concatenation of the correction of the DVB-S is replaced in DVB-S2 by the LDPC and BCH concatenation.

Parameters:

- **Modulation** : Type of detected **Modulation**

  Automatically displays:

  - ✓ The number of carriers (1k, 2k, 4k, 8k, 16k, 32k)
  - ✓ The extended bandwidth or not
  - ✓ The constellation QPSK, 16QAM, 64QAM, 256QAM)
  - ✓ The guard interval (1/128,1/32, 1/16, 19/128, 1/8, 19/256, 1/4)
  - ✓ The Viterbi rate (1/2, 3/5, 2/3, 3/4, 4/5, 5/6)

The spectral inversion of the signal

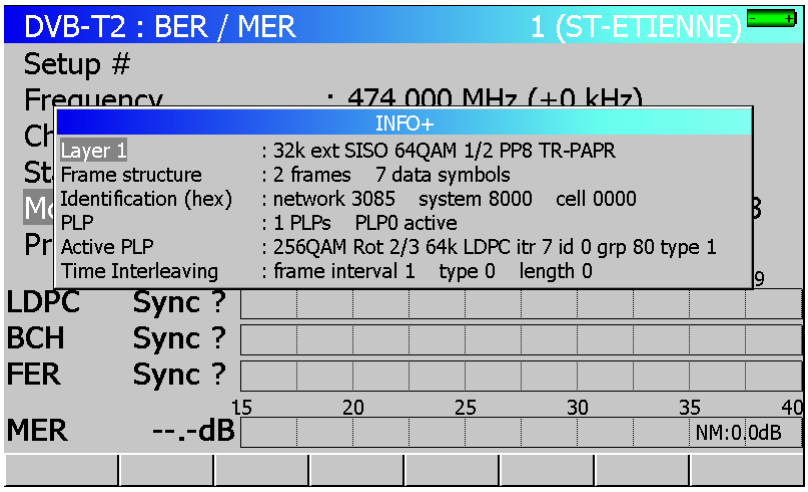
In case of multi-PLP modulation use PLP - PLP + keys to select the stream to be measured.

- **Preamplifier**: switch ON the internal preamplifier.

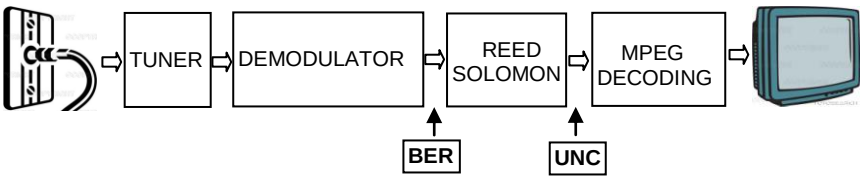
	Use the preamplifier only if signal level is **< 40 dBµV**. If signal level is **> 60 dBµV, errors due to saturation, interferences may occur**.

The Info+ menu key (parameter modulation) gives access to the following additional information:

- ✓ the structure of the layer 1
- ✓ the structure of the frames
- ✓ the different identifiers
- ✓ the number of PLP and the number of the selected PLP
- ✓ the structure of the PLP
- ✓ the structure of the Time Interleaving



11.6 DVB-C, MCNS



Display of the following measures:

- **BER** : error rate before Reed Solomon
- **UNC** : error rate after Reed Solomon (lost packets)
- **MER** : modulation error rate

BER: 'bit' error rate

Number of wrong bits / number of transmitted bits ratio during measuring time.

UNC: 'packet' error rate

Number of wrong packets / number of transmitted packets ratio during measuring time.

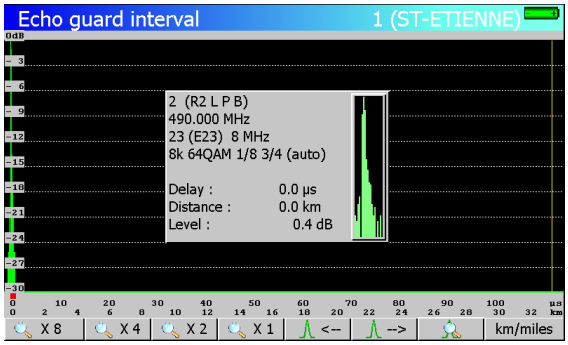
Note: A QAM (DVB-C) packet is made of 204 bytes; a packet is 'wrong' if it has more than 8 wrong bytes (correction with Reed Solomon coding).

The error rate measurement function is long if rate is low.

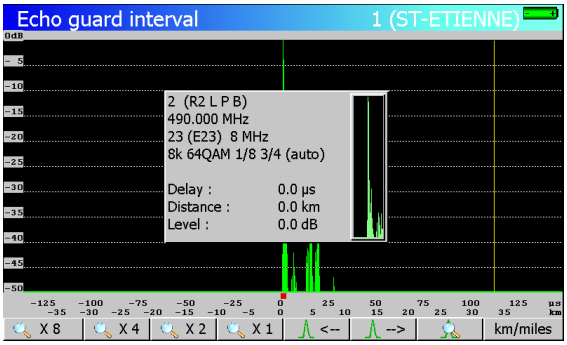
12 Impulse response (echoes)

To access to the impulse response function, press third the  LEVEL function key.

This function is available only for DVB-T and DVB-T2 standard (selected in Level function).



7861 7861HD 7862 7862HD

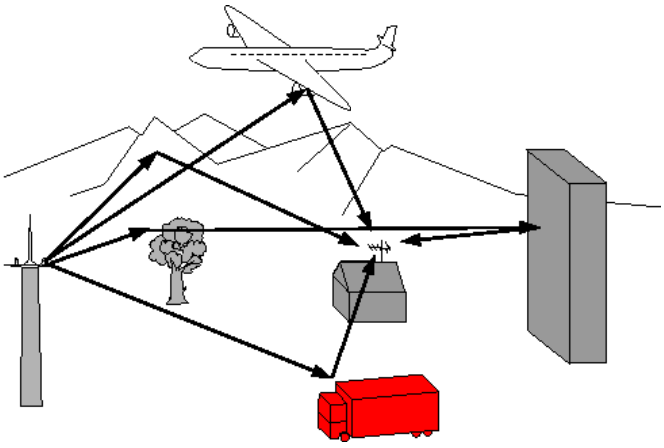


7861HDT2 7862HDT2

HDT2 models allow the visualization of pre-echoes, the dynamic is also more important.

Information:

In digital terrestrial, echoes are the result of multi path of the signal due to obstacles between the transmitter and the receiver:



In analogue TV, echoes affect the picture quality.

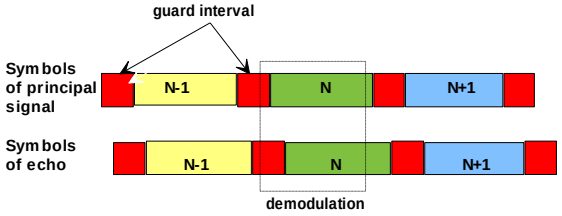
In terrestrial digital TV, echoes can affect in a different way the picture depending of the delay.

DVB-T/H and DVB-T2 standards define the guard interval. During this laps of time echoes do not affect the signal quality and the picture.

During the guard interval, the signal is not transmitted: it is a dead period (no signal)

When a symbol is delayed for **less** than the guard interval, the signal is **not affected** and the receipt is correct.

When a symbol is delayed for **more** than the guard interval, the signal is **affected** and the receipt is not correct.



Using a more directional antenna reduce the echoes.

The Impulse **response** function allows the measurement of echoes on the signal.

Relative amplitude in dB and the delay in µs (or distance in km or mile) compared to the main signal are calculated.

The yellow line shows the end of the guard interval.

Echoes above this limit affect the reception, so they must be as lowest as possible.

The wheel and arrow keys move the red cursor corresponding to the maxi-zoom window.

The maxi-zoom window allows to display, in real time, an echo and to act on the pointing of the antenna to minimize it

Push buttons make zooming possible:

- X 8 | X 4 | X 2 | X 1 : display full range or details (zoom)
- <-- | --> | : find next / previous echo, enable / disable maxi-zoom
- km/miles : select the unit (km or mile).

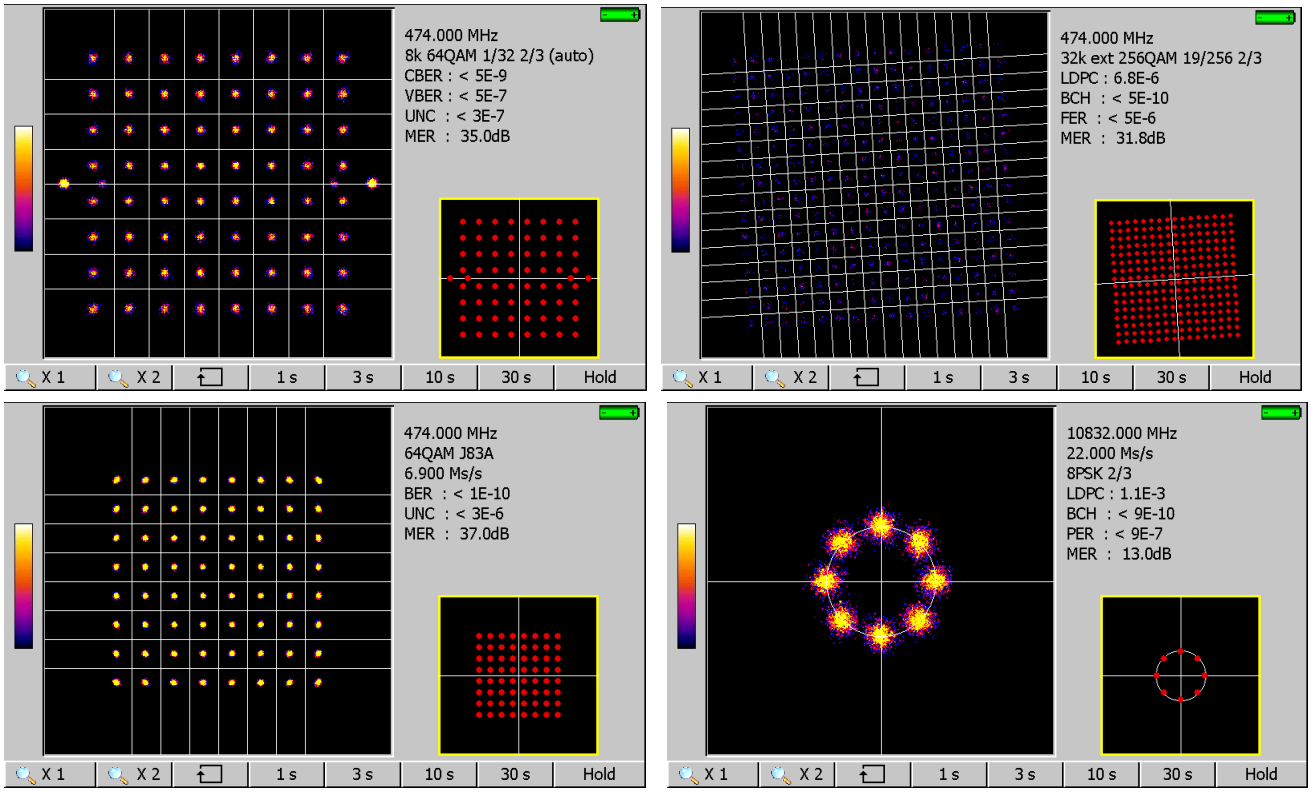
13 Constellation

To access to the constellation diagram press third the LEVEL  function key.

This function is available only for digital satellite standards (selected in Level function

For models HDT2 display of the constellation is also available for DVB-C, MCNS, DVB-T / H and DVB-T2.

The appliance displays the Constellation of the signal in progress



The information displayed on the right of the Constellation graph is the same as in ERROR RATE function:

- Current frequency
- Constellation
- Symbol rate
- Error rates and MER

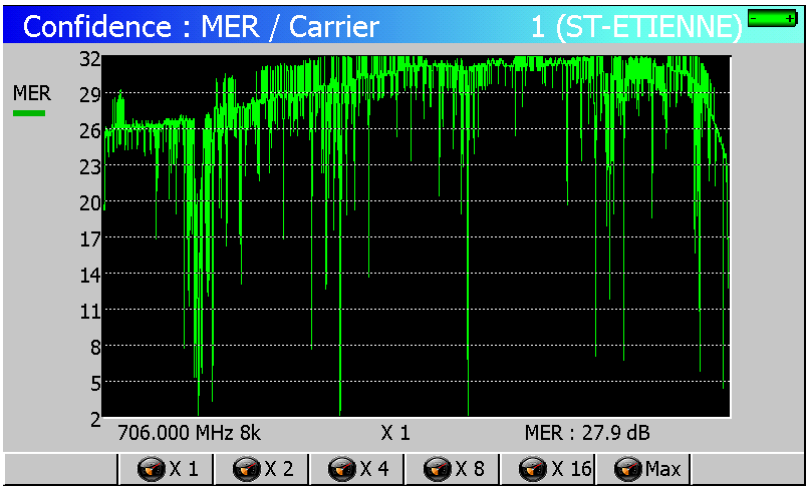
Use the menu keys to modify the Constellation display:

Use the menu keys to modify the **Constellation** display:

- X 1 | X 2 : zoom in X1 or X2
- : change of quadrant
- 1 s | 3 s | 10 s | 30 s : refreshing time
- Hold : fixed picture

14 Confidence-MER / carrier (HDT2 models)

The appliance displays **Confidence** MER/ carrier for the signal in progress.



Confidence or MER/carrier represents the confidence rate for each carrier by the **DVB-T/H** DVB-T2 demodulator.

A carrier with a low **MER** will be rejected; the transferred data is already included on other carriers (redundancy).

You can change the number of carriers used for display by using the menu keys:

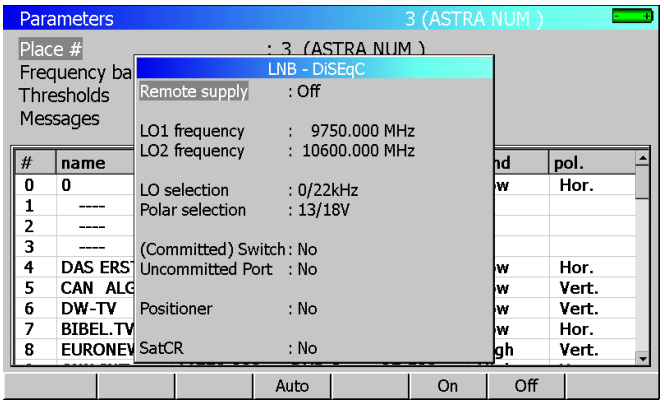
- X 1 : one in one : all carriers are used
- X 2 : one in two
- X 4 : one in four
- X 8 : one in eight
- X 16 : one in sixteen
- Max : maximum speed measured on 240 carriers only

15 LNB - DiSEqC

To access to the installation configuration press the 

function key.

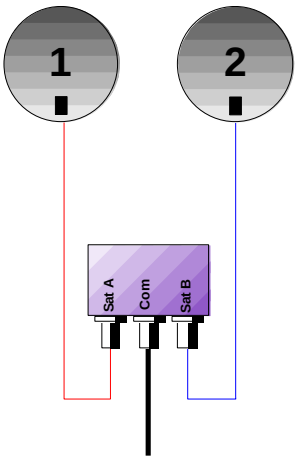
15.1 Satellite band



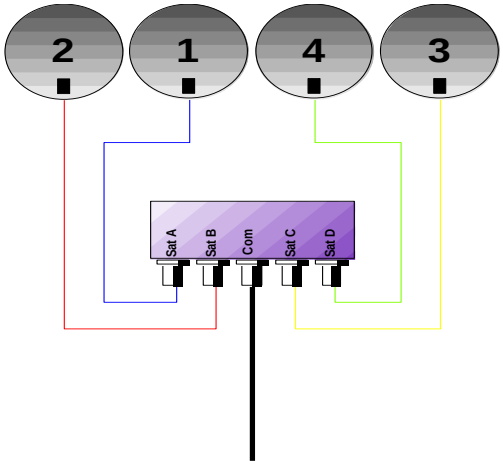
Configuration parameters:

- Remote supply : remote supply on / off
- LO1 Frequency: LO frequency LNB low band
- LO2 Frequency: LO frequency LNB high band
- LO selection : band switching on the LNB (22 kHz, ToneBurst or DiSEqC)
- Polar selection : polarisation switching on the LNB (13/18V or DiSEqC)
- Switch : type and position of switch (No, ToneBurst, 22 kHz, DiSEqC, PosA, B, C, D)
- Uncommitted : type and position of uncommitted switch (No, DiSEqC, Pos 1 to 16)
- Positioner : presence of a positioner (Yes / No)
- Satellite # : current position (from 1 to 127 positions precharged in the positioner)
- SatCR : SatCR mode (single cable distribution)

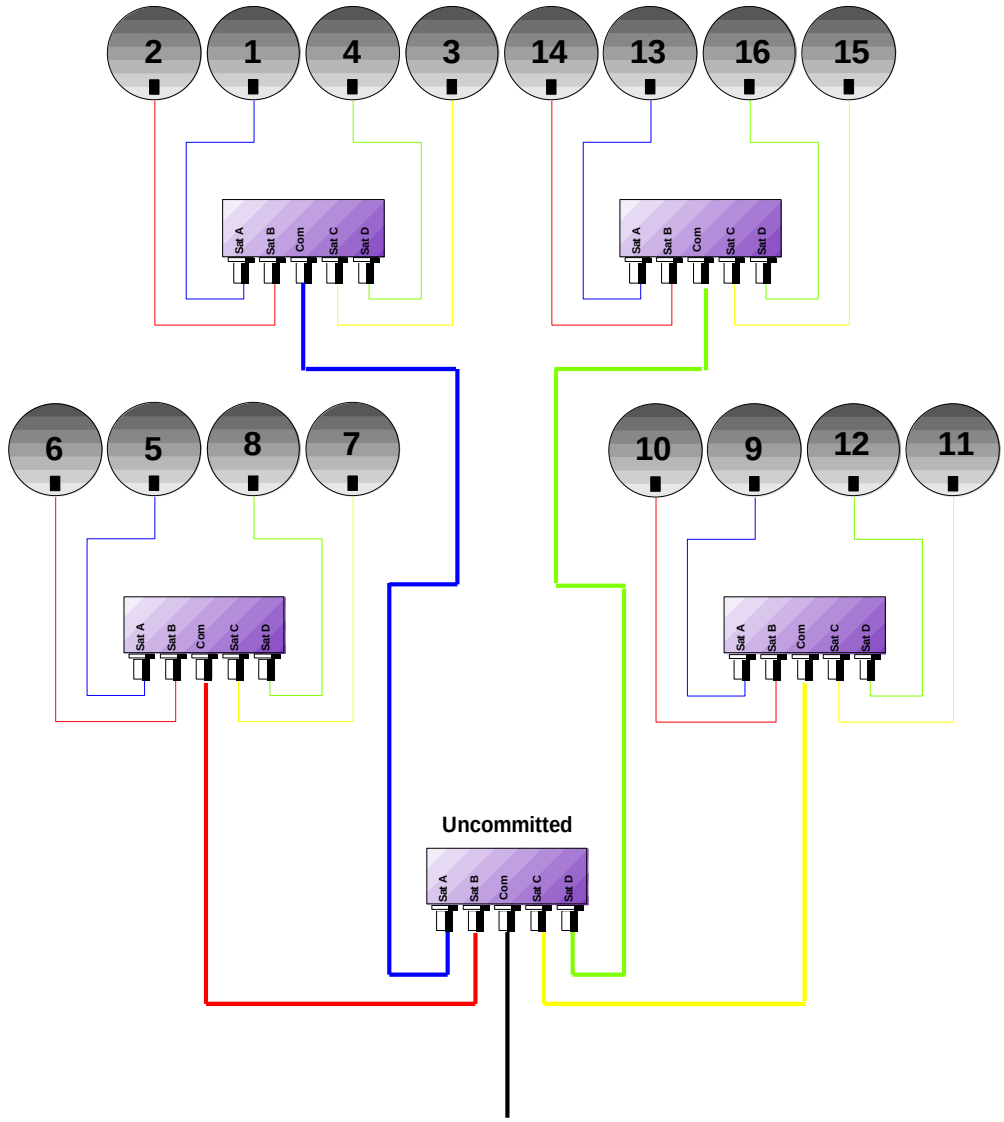
15.1.1 Switches



Switch for 2 satellites
- 22 kHz
- ToneBurst (MiniDiSEqC)



Switch for 4 satellites
- DiSEqC Committed or Uncommitted



- DiSEqC Committed or Uncommitted

Switches for 16 Satellites

✓ DiSEqC Committed + Uncommitted

	Line Switch		Line Uncommitted	
Satellite	Position	DiSEqC command	Position	DiSEqC command
1	Pos A	Option A + Position A	Pos 1	Input 1
2	Pos B	Option A + Position B	Pos 1	Input 1
3	Pos C	Option B + Position A	Pos 1	Input 1
4	Pos D	Option B + Position B	Pos 1	Input 1
5	Pos A	Option A + Position A	Pos 2	Input 2
6	Pos B	Option A + Position B	Pos 2	Input 2
7	Pos C	Option B + Position A	Pos 2	Input 2
8	Pos D	Option B + Position B	Pos 2	Input 2
9	Pos A	Option A + Position A	Pos 3	Input 3
10	Pos B	Option A + Position B	Pos 3	Input 3
11	Pos C	Option B + Position A	Pos 3	Input 3
12	Pos D	Option B + Position B	Pos 3	Input 3
13	Pos A	Option A + Position A	Pos 4	Input 4
14	Pos B	Option A + Position B	Pos 4	Input 4
15	Pos C	Option B + Position A	Pos 4	Input 4
16	Pos D	Option B + Position B	Pos 4	Input 4

15.1.2 SatCR

Description :

SatCR : Satellite Channel Router or Single Cable Distribution

Satellite signal distribution with only one coaxial cable for single-family dwelling to 8 different receivers.

Providing to several receivers full spectrum and polarizations access, required **one coaxial cable to each** receiver, and special equipments (multiple LNBs, multi-output LNBs, and multi-switch).

SatCR technology is a DiSEqC protocol extension which enables to connect several receivers **over a single coaxial cable**, making all Bands (H/L) and Polarizations (H/V) available.

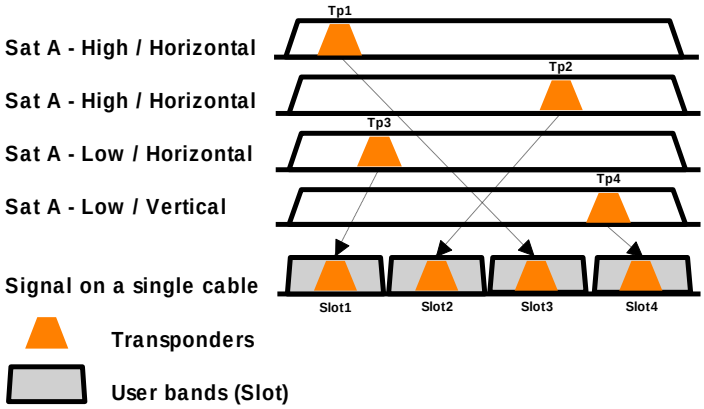
An European industry standard for distributing satellite signals over a single coaxial cable has been developed - **EN50494**.

Functioning:

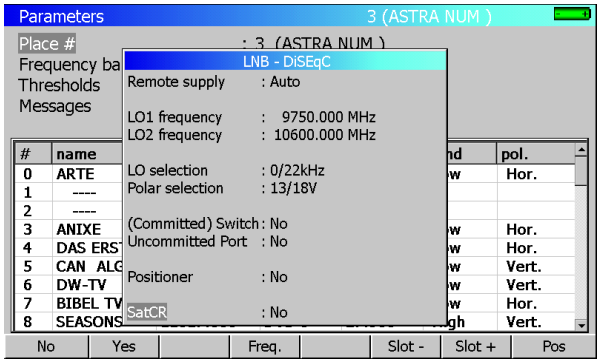
Each satellite receiver has a dedicated user band (**Slot** or **Port**) of a bandwidth approximately the same as one transponder.

The receiver asks for one transponder frequency (Ku frequency) via a DiSEqC compliant command.

A mixer in the dish-end equipment (LNB or SatCR switch) converts the received signal to the correct user band (**Slot**). The converted transponders of the various users are then combined, and sent via the single coaxial cable (up to 8 users).



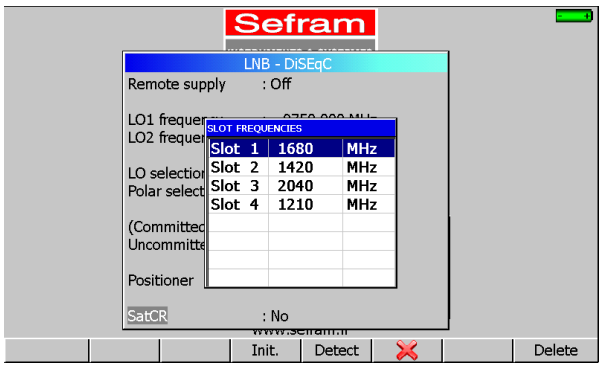
Using:



SatCR parameters:

- No/Yes : enable / disable SatCR mode
- Freq. : 8 user band centre frequencies adjustment (Slot)
- Slot-/Slot+ : active user band inside instrument (Slot 1 to 8)
- Pos switches between Pos A and Pos B satellites

Slot frequencies adjustment:

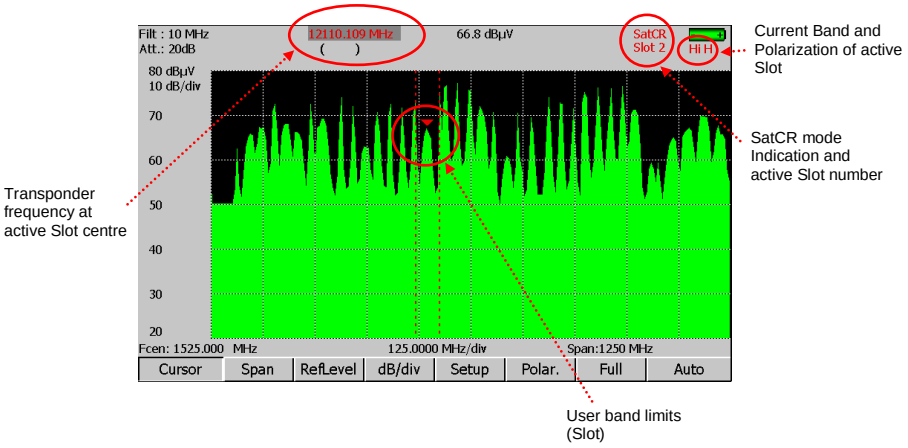


Menu keys:

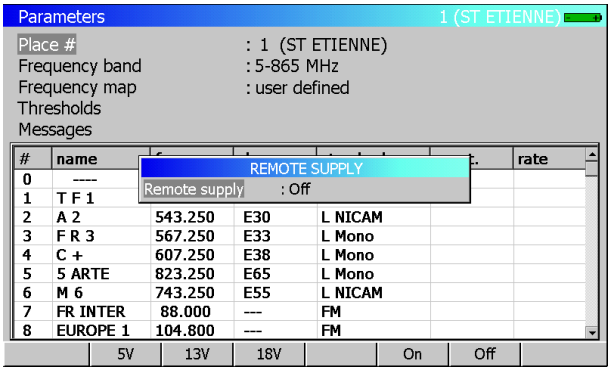
- **Init** : 8 user slots, predefined frequencies
- **Detect** : automatic detection of slots (numbering and frequencies)
- ✖ close Slot frequencies window
- **Delete** : delete one slot (highlighted one)

You can adjust manually each frequency slot with the sensitive wheel.

Indications, spectrum analyzer:



15.2 Terrestrial band



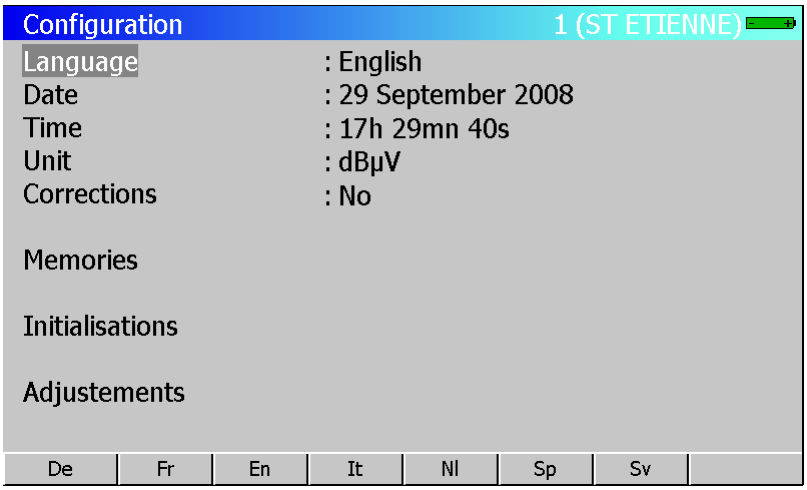
Configuration parameters:

- Remote supply: remote supply on / off.
- Selections of the remote supply voltage among 5V, 13V, 18V and 24V.

16 Configuration

To access to the appliance general CONFIGURATION, press the key: 

- ➔ language, date and time
- ➔ measurement unit,
- ➔ corrections coefficients
- ➔ memories
- ➔ initialisations
- ➔ adjustments : LCD lighting, beep volume, USB and ETHERNET interfaces



16.1 Language, date, time

To change these parameters, use the menu keys.

16.2 Measurement unit

Menu keys:

- **dBµV** : 0 dBµV is equivalent to 1 µV
- **dBmV** : 0 dBmV is equivalent to 1 mV
- **dBm**: 0 dBm is equivalent to 274 mV: 1 mW in 75 ohm impedance.
- **V**: measurement in V, mV or µV depending on the level.

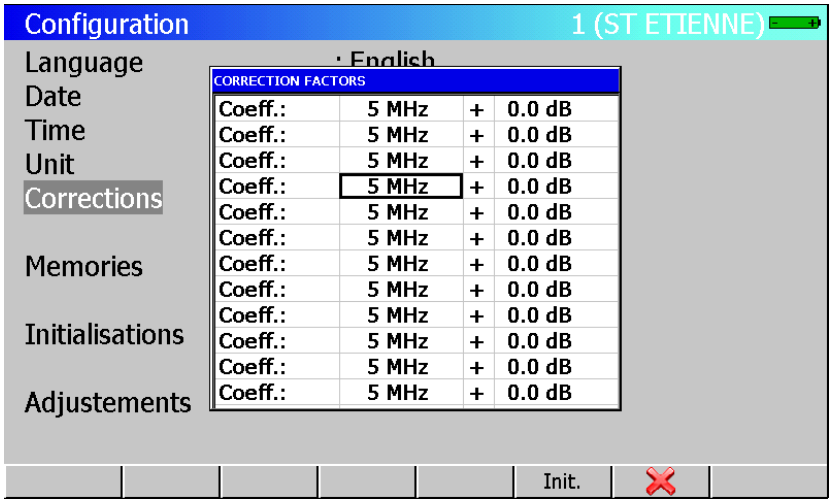
16.3 Correction coefficients

They are used to compensate for cable losses to adjust an external attenuator, amplifier or antenna.

Menu keys:

- **Modif** : list of coefficients for modification
- **Yes/No** : activates / deactivates correction

Modification of coefficients:

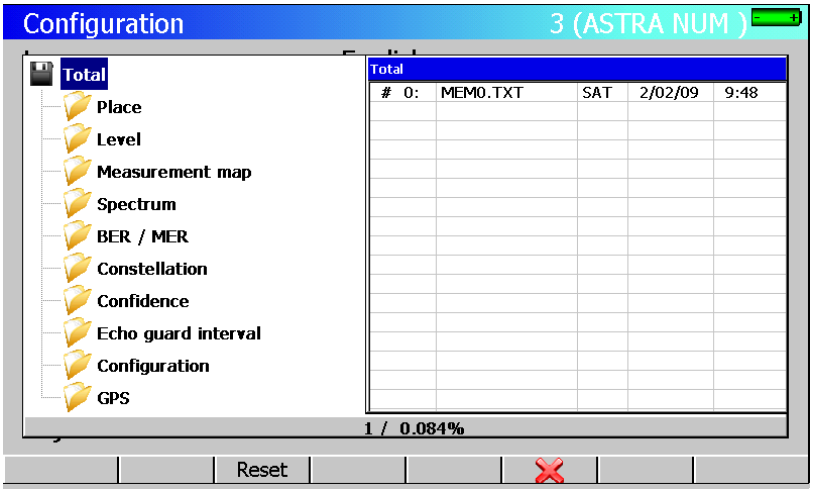


User can move the cursor with the arrows.
Changing a **Coefficient** is possible with the rotary sensitive wheel.

Pressing « **Init** » forces all coefficients at: frequency 5MHz, 0 dB correction

Coefficients act in **LEVEL MEASUREMENT** and in **MEASUREMENT MAP**.

16.4 Memories



16.4.1 Folders

Files are divided into different folders so they are easier to manage.
The number of files in every folder and the percentage they occupy appear on the right.

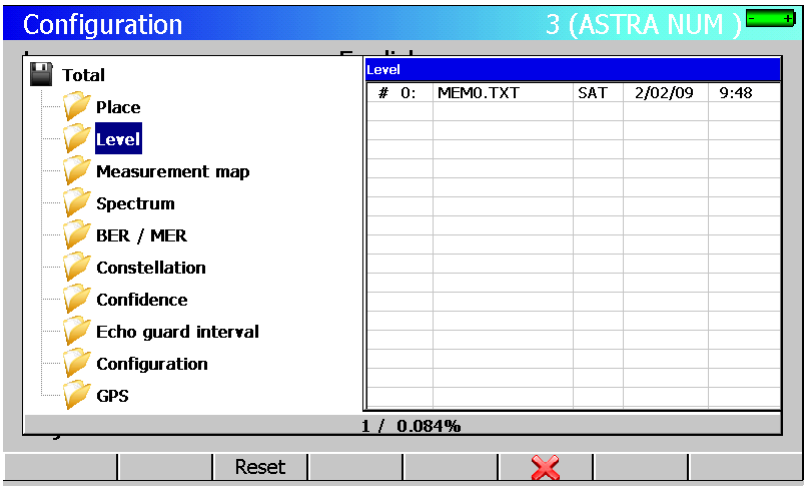
The **' TOTAL** ' folder shows the whole internal memory occupied.

Menu keys:

- **Reset** : erases the folder

16.5 File list

Use the up/down arrow to change of directories:



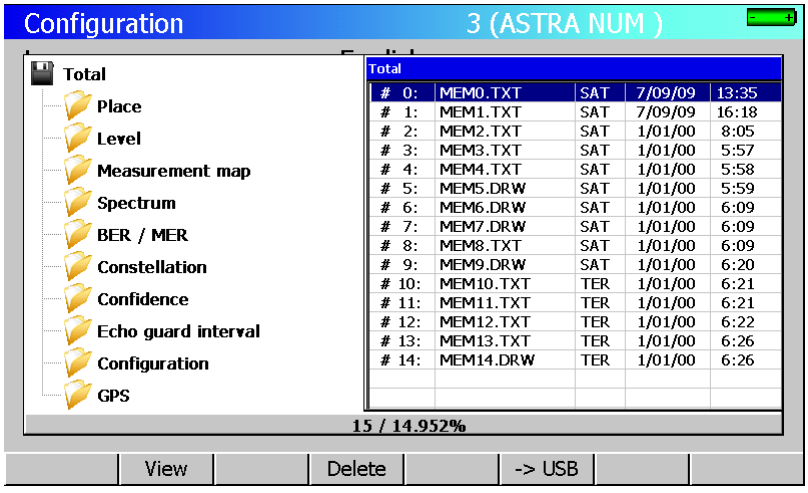
The displayed information is as follows:

- File number
- File name and extension (type)
- Frequency bandwidth where the file has been saved
- Date and time of backup

Sensitive buttons:

- **View** : displays the file selected
- **Delete** : deletes the file selected

Pressing the **right arrow** will display the list of files:



Sensitive buttons:

- **View.** : view the selected file
- **Delete** : delete the selected file
- → USB copy file to an USB memory stick (creates BMP file)

16.6 Initialisations

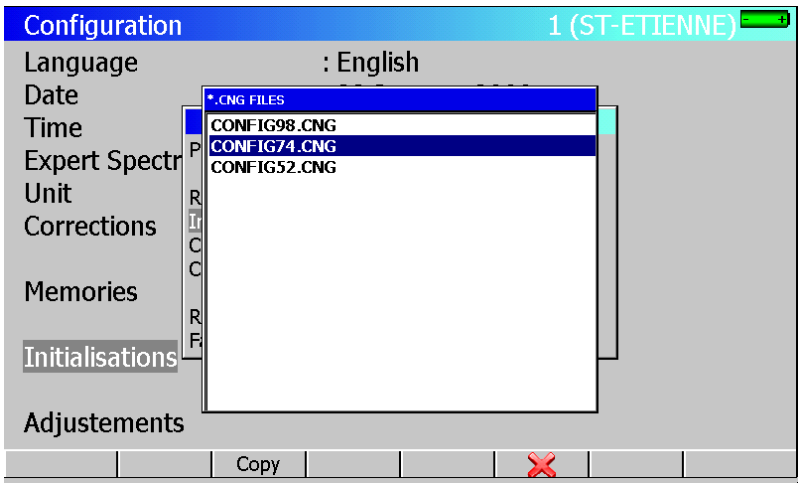
Initialisations:

- **Places nb.** : selection of the number of **Places** in the appliance
- **Reset actual place** : erases all information about the current **Place**
- **Copy channels→setups** : initialises the name of setups with ' CANAL xx '
- **Copy setups→measurement map** : copies all **Setups** in the **Measurement map**
- **Reset every place** : erases all information about all **Places**
- **Factory recovery :** reset all parameters with factory default (Places, Programs, Channels…)
- **Import/Export all configuration → USB :**

  Can send or read « *.CNG » file (equipment configuration) on a USB stick. These files can be modified with the software TR7836. The created files are called « config » + serial number of the equipment.

  This functionality allows you to backup all places of your equipment in a USB stick.

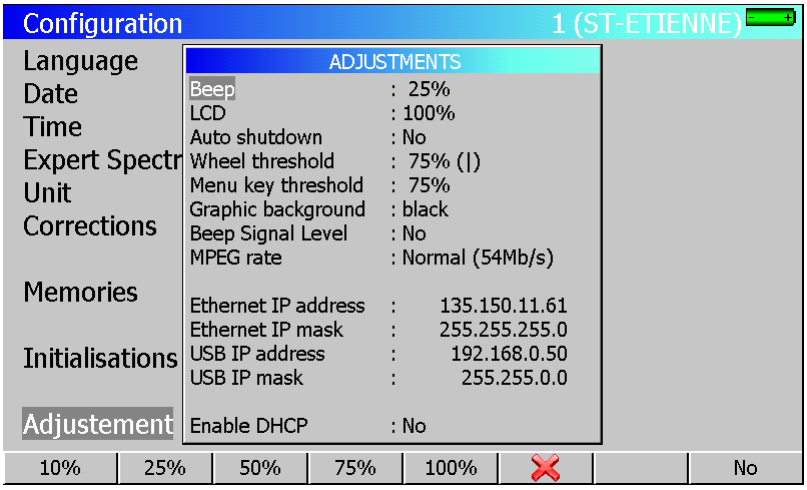
Import « *.CNG » file allows you to restore configuration of another equipment. Then, select the file to be copied and press the « Copy » key:



	Caution All these possibilities will erase the data you have entered in your TV Meter: Places, Programs, Channels …

For a better security, all these operations must be **double confirmed**.

16.7 Adjustments



Setup:

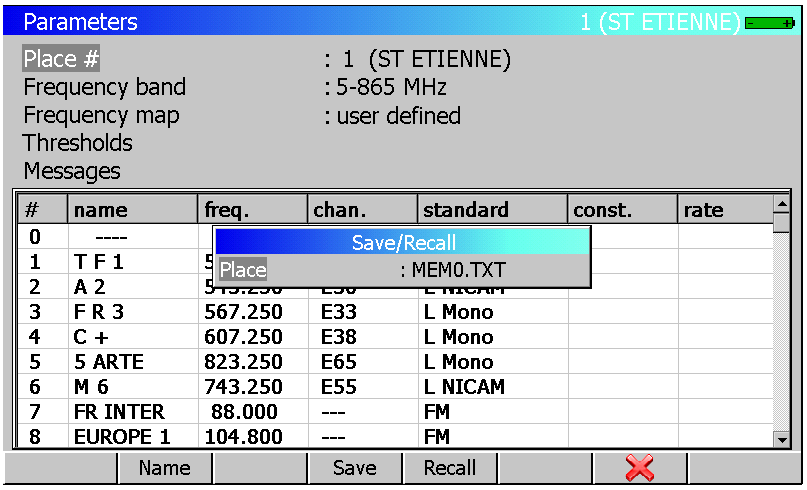
- Beep: activate an audible signal when pressing a push button
- LCD: adjust the backlight intensity of the LCD
- Wheel threshold: adjust the sensitivity of sensitive encoder
- Menu key threshold : adjust the sensitivity of push button (Menu bar of the LCD)
- Graphic background: background colour of graphs (spectrum, recordings, constellations...)
- Beep Signal Level: audible indication, the frequency of beeps varies with the level measured
- MPEG rate: Normal or Fast
- IP Ethernet Address: Ethernet, TCP/IP network address
- IP Mask Ethernet: Ethernet, mask address
- IP USB Address: USB, address network TCP/IP
- USB Mask IP: USB, mask address

Changes can be entered with numerical keyboard or menu bar.

Remark: by reducing the screen brightness, you can gain autonomy.

17 Save / Recall

To **SAVE** or **RECALL** configurations or measures, press the key.



	After transfer, the saved measures will make it possible to create measurements reports on a PC by using the TR7836 transfer software.

A pop up window is displayed over the current screen and shows a file name by default 'MEM xxx'.

Menu keys:

- **Name** : change of the file name (alphanumerical data input : 8 characters max)
- **Save** : saves
- **Recall** : recalls

17.1 Save

You can **save** directly a file by using the ' MEM xxx ' name (number auto-increment until 1000) or modify it.

After you input the file name, press the menu key' **Save** '.

Caution: Switching the appliance off may take a few seconds because information is saved on flash memory while shutting down the appliance.

17.2 Recall

You can recall directly a file by using its name or searching for it in the list of files through the ' **Dir** ' menu key.

The ' **Recall** ' menu key displays the list of files with the following characteristics:

- Files saved on the same page (Places on Parameters function, Level measurements on Level Measurement function, …)
- Files saved on the same **Frequency bandwidth** (in order not to recall the files saved on another **frequency bandwidth**)

Select the file in the displayed list, and then recall it by pressing the validation menu key.

The file is recalled and the" **Recall memory mode**" message is displayed on the menu keys.

Press a function key to quit '**Memory mode'** and to restart measurements.

17.3 Save / Recall Measurement Map

Saving the **Measurement Map** is made up of:

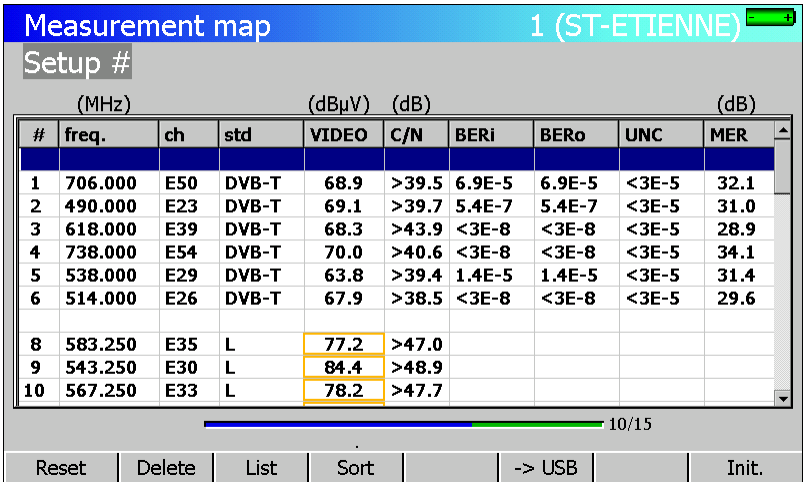
- the list of **Setups** found in the Map
- associated with the measures (V, C/N, BER, and MER).
-

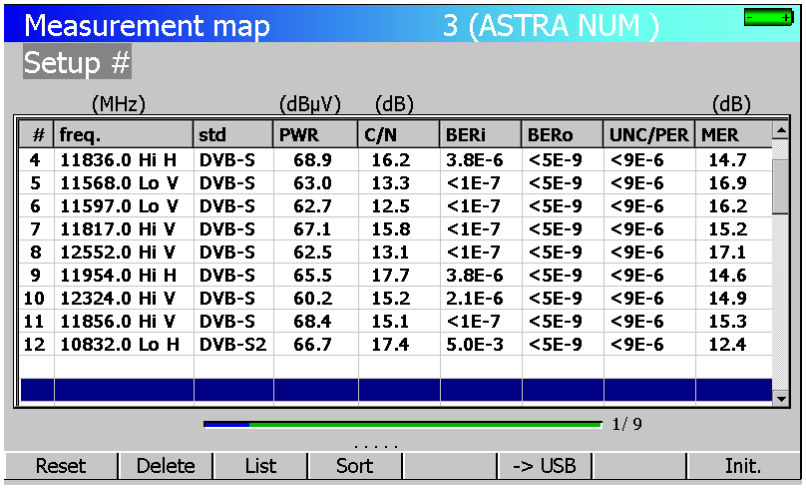
Only the numbers of Setups in the Place are saved: Frequency information, Channel and Standard are displayed in the list of Setups and the Frequency map of the current Place.

	**Caution** If you recall a Measurement Map saved under another Place or if you modify the list of Setups in the Place, the Setup - Frequency - Standard – measures correspondence will be lost! Besides, if the Measurement map for the Place has been modified, the displayed channels will not correspond to the measures.

18 Measurement map

To access to the **MESAUREMENT MAP** function, press the  key:





- automatic measurements for different setups and out of tolerance measurements.
- digital or graphical display

	BERi, **BERo** and **PER/UNC** are generic names (commonly used) **BERi** = BER in = inner BER first BER from demodulation (channel BER, CBER, LDPC) **BERo** = BER out = outer BER last BER from demodulation (Viterbi BER, VBER, BCH) **PER/UNC** = packet error rate wrong packets, lost packets, uncorrectable packets (UNC, PER)

	**Important** User can view the progress of the measurement map scanning with the bargraphe located under the table. The colour of the bargraphe indicates if a first scan is completed : - **red** : the measurement map has not been scanned - **green** : the whole measurement map has been scanned

The Level and C/N informations are updated during the first scan.
Error rates are updated during 2nd and further scans.

18.1 Entering / changing a setup number

You can select the **Setups** to be scanned by entering the Setup numbers in the **Measurement map**.
The selected line is displayed on the reverse video and is highlighted in the box" n° of the **Measurement map**.

The name and number of Setup are displayed on the first line of the page.
Enter the **Setups** to scan in the list of setups or use directly the numerical keyboard.

You can move on the **Measurement map** by using the sensitive wheel or the direction keys.

Menu keys:

- **Delete** : deletes the Setup of the box selected
- **List** : selection of a Setup from the list of Setups
- **Sort** : sorts the Setups of the Measurement map (see below)
- **Reset** : erases the whole map
- **Init.** : copies the setups into the map

18.2 Automatic sorting

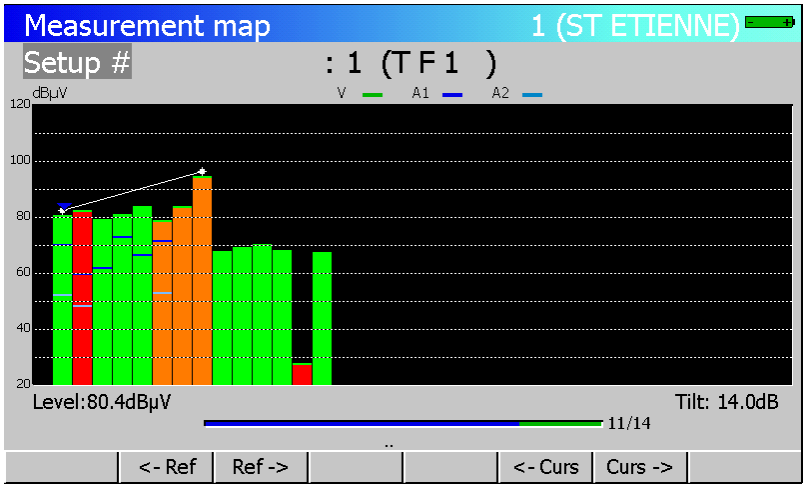
To sort the setups of the Measurement map, press the menu key **"Sort "**. They can be sorted out:

- In **ascending Setup number order**
- In **ascending frequency** order

Alternately every time you press the key.

18.3 Graphic display

By pressing twice the **MEASUREMENT MAP** function key, you can display the **Measurement map** in a graph.



It is displayed in one screen; the histogram widths are automatically fitted according to the number of **Set-ups** included in the **Measurement map**.

The blue cursor shows a **Setup** and displays its number and its name on the first line of the page.

This **Setup**'s video carrier level is displayed at the bottom on the left.

You can move the cursor by using the sensitive wheel.

A "tilt**"** measure (attenuation in the bandwidth) can be performed by moving 2 cursors with the menu keys:

- **←Ref.** : moves the tilt reference to the left
- **Ref.→** : moves the tilt reference to the right
- **←Curs.** : moves the tilt cursor to the left
- **Curs.→** : moves the tilt cursor to the right

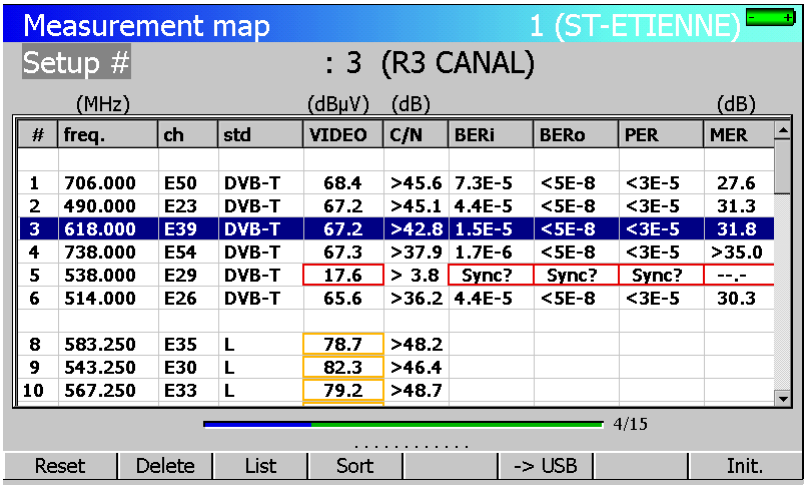
The "tilt" measure is displayed at the bottom and on the right of the page.

18.4 Out of tolerance values

Digital display:

Numerical values are displayed in colour according to the **Thresholds** programmed in **PARAMETERS**, line **Thresholds**:

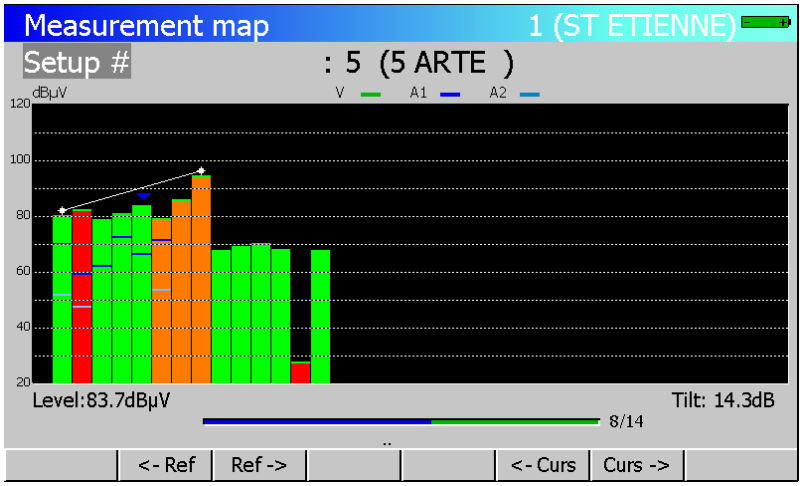
- **Red** for values under the **minimum Threshold**
- **Orange** for values over the **maximum Threshold**



Graphical display:

The histograms are displayed in colour depending on the thresholds programmed in the **PARAMETERS** page, line **Thresholds**:

- **Red** for values lower than the **minimum Threshold**
- **Green** for values between these two **Thresholds**.
- **Orange** higher than the **maximum Threshold**.

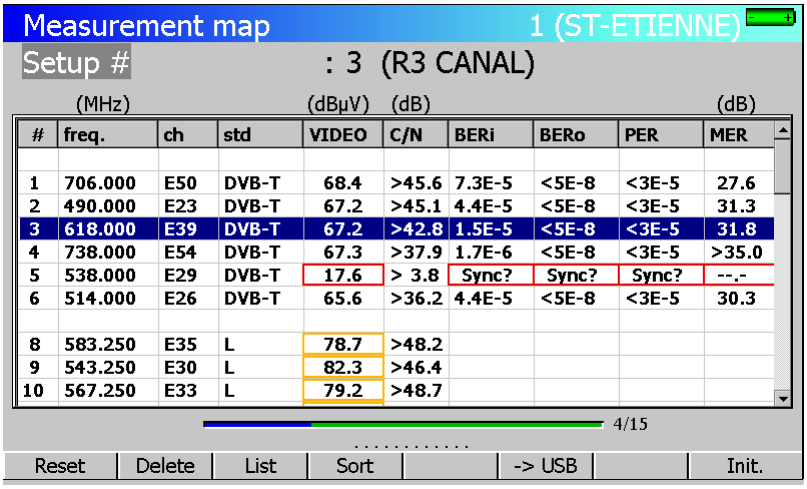


The **audio carriers**' levels are added on the associated video carrier histogram, according to the colours in the legend at the top and on the right of the page.

If one of the Audio carriers is higher than the programmed minimum or maximum Threshold, the whole histogram is displayed in red or orange.

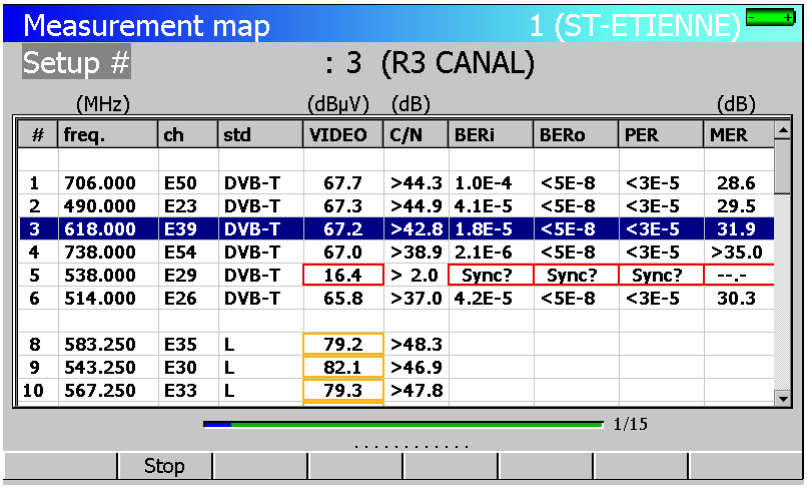
18.5 Recording on USB drive

You can store these measurements on an external USB drive
Pressing the key → USB opens a CSV file
The file name is built according to the date and time of launch
The recording takes place when all setups were scanned
The date and time are stored at this time



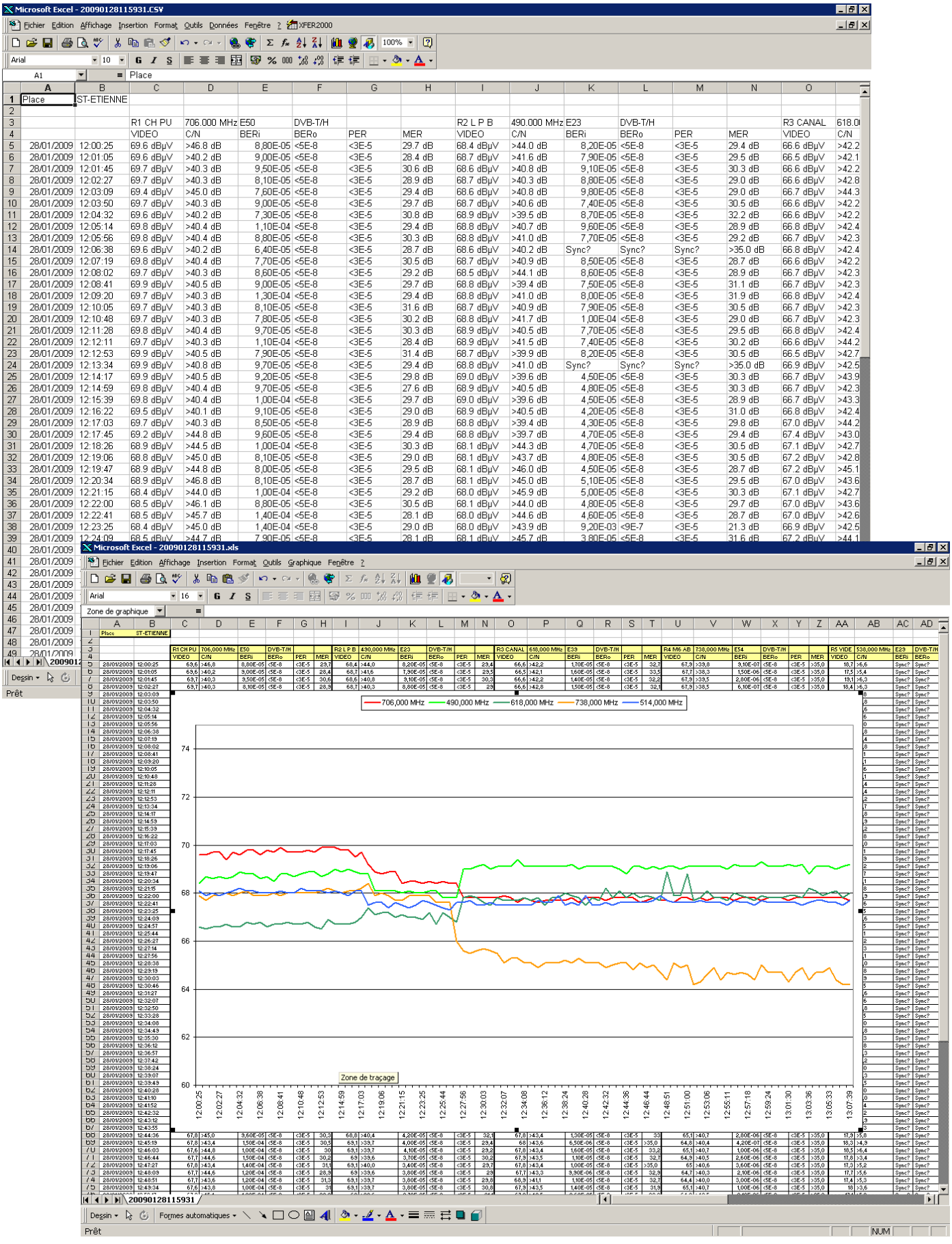
Pressing the Stop key ends the acquisition

The duration of the recording depends on the size of the USB drive (one channel measurement takes 72 bytes and lasts about 5 seconds for a digital channel)



	Do not use the USB drive that was used previously to make a software update without erasing or renaming the folder Autorun

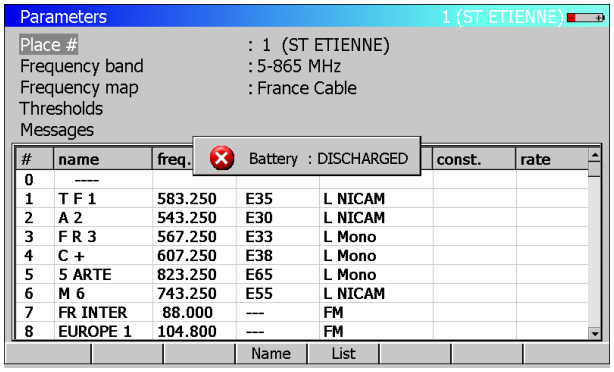
The USB drive can be extracted and inserted into a PC to use the values in a spreadsheet



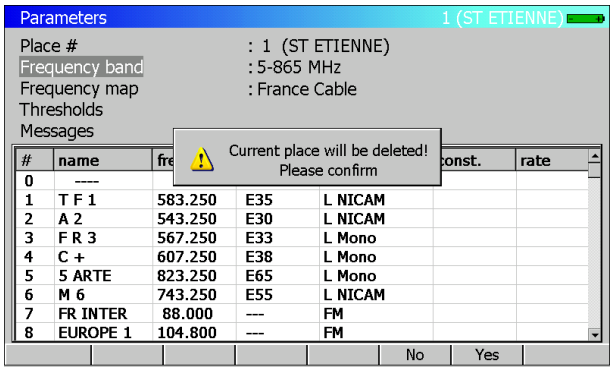
19 Messages

The appliance displays messages while it is working.

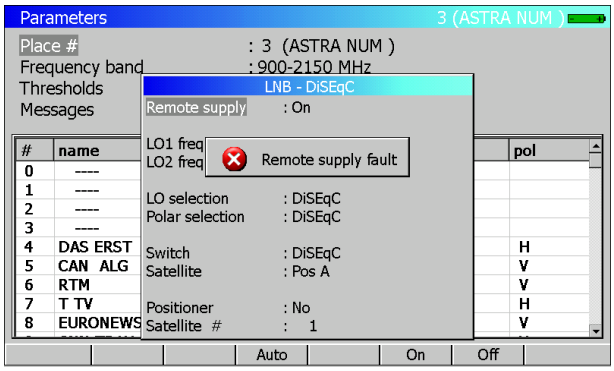
19.1 Warning messages



The battery is discharged; the appliance will automatically go off in a few minutes.

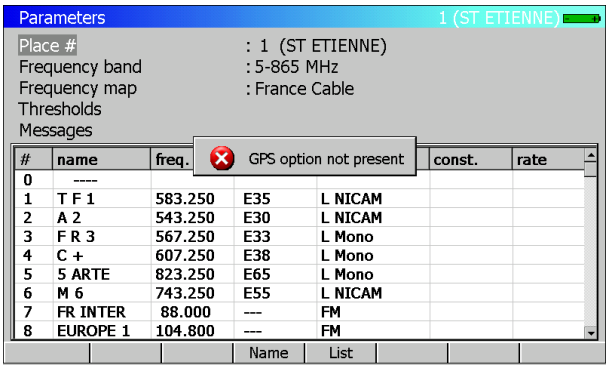


Confirmation request for important action.

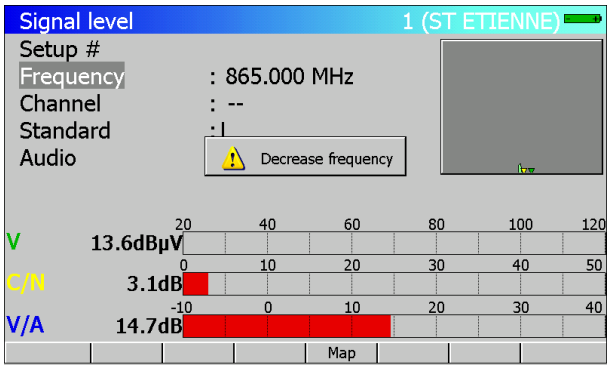


Remote supply fault: a voltage is already on the cable or current is already exceeding the maximum value.

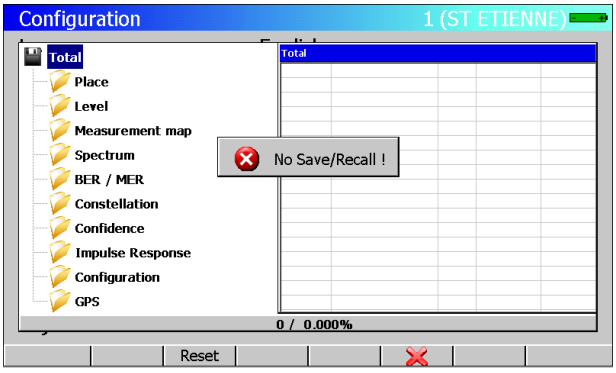
19.2 Error messages



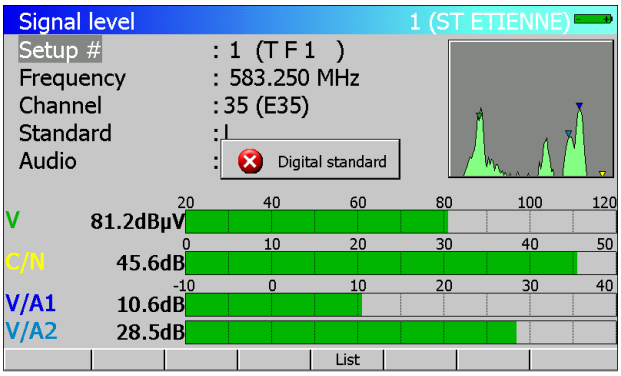
Pressing a function key that is not available in the appliance



The appliance tries to perform a level measurement out of these possibilities (for example an Audio measurement with an 865 MHz video carrier).

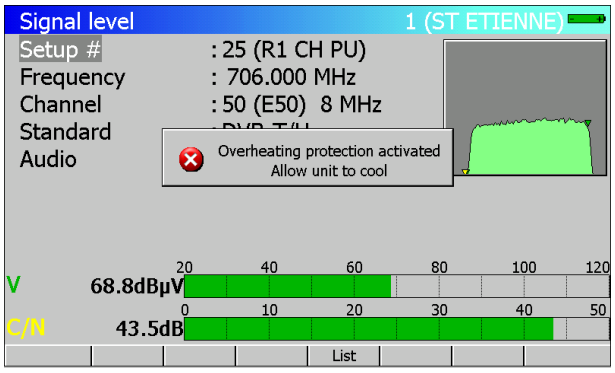


Impossible to **Save/Recall** here.

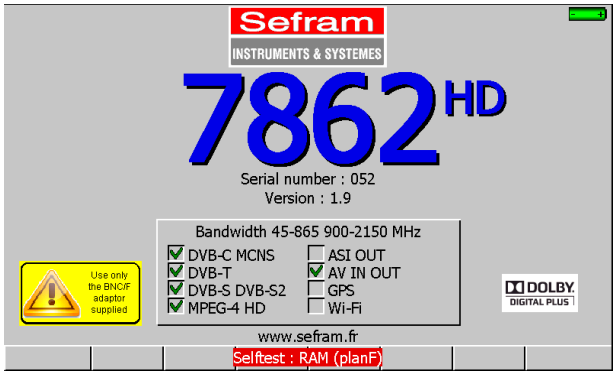


2nd press on the level key: The appliance tries to perform an error rate measurement with a **Standard** different **DVB-C, DVB-S, DVB-S2, DSS or DVB-T/H.**

19.3 Failure messages



If the internal temperature in the appliance is over 60°C: change to protection mode.



A message in red appears on the menu keys,

It may appear once after updating the software else contact SEFRAM technical support:

0.15€ TTC/mn 0 825 56 50 50

E-mail: support@sefram.fr

20 Maintenance

In order to comply with the use requirements ad in order to preserve the whole characteristics, this equipment needs a minimum of maintenance.

	Consequence	Recommended checking periodicity	Recommended limit of use
BATTERY	Reduction autonomy duration		200 cycles charge/discharge or 2 years
Protection bag	Bad protection and equipment breaking	-For each use. -check of the strap's posture.	
Backlight screen	Reduction of visual level		2 years
Metrological fitting/checking	Wrong or erroneous measures	Once a year	18 months
CONNECTIQUE	Wrong or erroneous measures	At every measure	

The manufacturer's recommendations do not commit SEFRAM I.S.'s responsibility.

They allow ensuring the best use possible of the characteristics and its preservation.

Routine maintenance:

The maintenance limits itself to the external cleaning of the equipment. The other operations require a qualified staff.

Disconnect the equipment before any intervention.

Do not let water enter in the equipment in order to avoid electric discharge risks.

Regularly clean the equipment following the instructions here under:

- use soapy water to clean it.
- Do not use any product out of petrol, benzene, alcohol (if you do so, silk-screen printings will be damaged).
- Wipe with a soft and non-pilled rag.
- use a non-static product, and a product without solvent to clean the screen.

For the bag:

- Clean it with a clean rag, and do not use water.
- Using solvents is totally forbidden.

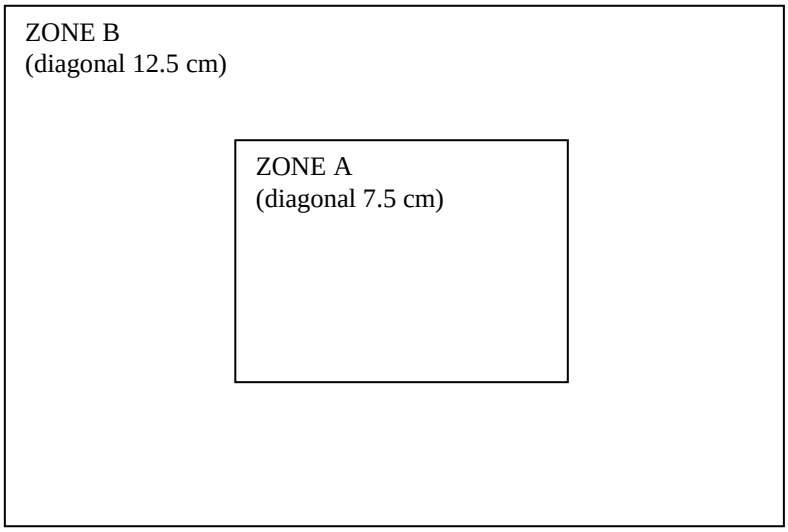
INFORMATION ABOUT LCD WITH ACTIV SCREEN MATRIX

Your SEFRAM's Field Strength Meter is equipped with a LCD active screen matrix.

This screen is supplied by several known for manufacturers. In actual technical conditions of fabrication, manufacturers are not able to insure 100% of well functioning of the pixels in display area.

They specified defective number of pixels on screen surface.

SEFRAM's quality service conditioned assembly of the screen of your instrument to the respect of acceptation conditions of these manufacturers.



Acceptation criteria:

Zone A (central area): less than 5 defective pixels and less than 3 pixels contiguous.

Zone B (total surface of the screen): less than 9 defective pixels on all display surface when zone A condition is respected.

We mean by defective pixel a screen point which stay switched off or which light on a different colour than the awaited one.

The contractual warranty is not applicable on your field strength meter if the above-defined criteria are not achieved.

As many as delivery as warranty duration.

21 Specifications

21.1 Common technical features 7861 and 7862

Frequency:

Ranges: 45 MHz to 865 MHz, terrestrial band
900 MHz à 2150 MHz, satellite band
2412 MHz à 2484 MHz, WI-FI band 802.11 B/G/draft N (option)
Only the Wi-Fi keys provided by Sefram are recognized

Resolution: measurement: 50 kHz in terrestrial band, 1 MHz in satellite band
display: 1 kHz

Level measurement:

Frequencies	45-865 MHz	900-2150 MHz
Dynamic range	20-120 dBµV	30-110 dBµV
Accuracy at 23°C +/-5°C	+/- 1 dB typical +/- 2 dB max	+/- 1 dB typical +/- 2 dB max
Accuracy From -5°C to +45°C	+/- 4 dB max	+/- 4 dB max

Unit: dBµV, dBmV, dBm or Volt

Resolution: 0.1 dB

Measurement filters: 100 kHz, 300 kHz in terrestrial band; 1MHz in satellite band.

Input: 75-ohm BNC/F

Max input level: -0,3V to 60 VDC

Standards: terrestrials B, G, D, K, I, L, M, N, FM, DVB-T/H, DVB-T2, DVB-C, MCNS
Satellites PAL, SECAM, NTSC, DVB-S2, DVB-S, DSS

Measurements: peak, average or power

Spectrum analysis:

Filters: terrestrial 100 kHz, 300 kHz and 1 MHz
satellite 1 MHz, 3 MHz and 10MHz

Input attenuator: 0 to 50 dB (step of 10 dB)

Dynamic range (display): 60 dB

Span: 0, 5, 10, 20, 50, 100, 200, 500, 1000 MHz and full band

Number of points: 350 points

Scanning speed:

Span	5	10	20	50	100	200	500	860	1000	1250	MHz
Terrestrial	130	130	130	130	140	150	200	340	-	-	ms
Satellite	-	360	360	360	370	370	370	-	380	380	ms

Measurement map (data logger):

Capacity:	scanning 100 setups max
Display:	digital, graphic
Measurement:	detection of thresholds, tilt

Storage:

Backup:	internal backup on flash memory
Data:	places, setups, frequency maps, measures, spectra, measurement maps, graphic displays
Capacity:	312 Kbytes, 1000 files max per type of data

Auxiliary inputs and outputs:

USB interface:	mini B USB
Ethernet interface:	RJ 45
Audio and video input/output:	RCA connectors
Power supply input:	5.5 mm jack, 15V max, 5 A

21.2 DVB-C

According to UIT-J.83 APPENDIX A.

Models 7862 only.

Frequencies:	46 MHz to 865 MHz
Error rate:	before Reed Solomon (BER)
	after Reed Solomon (UNC) (lost packets)
Modulation error rate:	20 to 40 dB (MER)
Rate:	1 to 7.224 Ms/s
Constellation:	16, 32, 64, 128, 256
Scan function:	in frequency, in rate

Constellation graphic display. (HDT2 models)

21.3 MCNS

According to UIT-J.83 APPENDIX B.

Models 7862 only.

Same features DVB-C but:

Constellation:	64, 256
Rate:	1 à 5.563 Ms/s

Constellation graphic display. (HDT2 models)

21.4 DVB-S, DSS

According to ETS 300-421

Frequencies:	900 MHz to 2150 MHz

Error rate:	before Viterbi (CBER)
	after Viterbi (VBER)
	after Reed Solomon (UNC) (lost packets)
Modulation error rate:	0 to 20 dB (MER)
Rate:	1 to 45 Ms/s
Modulation:	QPSK
Viterbi rate:	1/2, 2/3, 3/4, 5/6, 6/7, 7/8 (automatic)
Scan function:	in frequency, in rate

Constellation graphic display.

21.5 DVB-S2

According to ETS 302-307

Frequencies:	900 MHz to 2150 MHz
Error rate:	before LDPC
	after LDPC (BCH)
	after BCH (PER) (lost packets)
Modulation error rate:	0 to 20 dB (MER)
Rate:	QPSK 1 to 45 Ms/s, 8PSK 1 to 35 Ms/s
Modulation:	QPSK, 8PSK (automatic)
Punctuation:	QPSK: 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 (automatic)
	8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, and 9/10 (automatic)
Scan function:	in frequency, in rate

Constellation graphic display.

21.6 DVB-S2+ 45 MSymbols

According to ETS 302-307

Frequencies:	900 MHz to 2150 MHz
Error rate:	before LDPC
	after LDPC (BCH)
	after BCH (PER) (lost packets)
Modulation error rate:	0 to 20 dB (MER)
Rate:	QPSK 1 to 45 Ms/s, 8PSK 1 to 45 Ms/s
Modulation:	QPSK, 8PSK (automatic)
Punctuation:	QPSK: 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 8/9, 9/10 (automatic)
	8PSK: 3/5, 2/3, 3/4, 5/6, 8/9, and 9/10 (automatic)
Scan function:	in frequency, in rate

Constellation graphic display.

21.7 DVB-T/H

According to ETS 301-701

Frequencies:	45 MHz to 865 MHz
AFC:	+/- 167 kHz, +/- 333 kHz, +/- 500 kHz
Error rate:	before Viterbi (CBER)
	after Viterbi (VBER)
	after Reed Solomon (UNC) (lost packets)
Modulation error rate:	0 to 35 dB (MER)
Bandwidth:	5, 6, 7 or 8 MHz, 6, 7 or 8 MHz HDT2 models
Carriers:	2k / 8k (automatic, manual automatic HDT2 models)
Constellation:	16QAM, 64QAM, QPSK (automatic)
Viterbi rate:	1/2, 2/3, 3/4, 5/6, 7/8 (automatic)
Guard rate:	1/4, 1/8, 1/16, 1/32 (automatic / manual)
Scan function:	in frequency (per channels)

Graphic display of the Channel Pulse Response. (echoes)

21.8 DVB-T2

According to ETS 302-755

Frequencies:	45 MHz to 865 MHz
AFC:	+/- 167 kHz, +/- 333 kHz, +/- 500 kHz
Error rate:	before LDPC
	after LDPC (BCH)
	after BCH (FER) (lost packets)
Modulation error rate:	0 to 35 dB (MER)
Bandwidth:	5, 6, 7 or 8 MHz
Carriers:	1k, 2k, 4k, 8k, 16k, 32k (automatic)
Constellation:	QPSK, 16QAM, 64QAM, 256QAM (automatic)
Viterbi rate:	1/2, 3/5, 2/3, 3/4, 4/5, 5/6 (automatic)
Guard rate:	¼, 19/256, 1/8, 19/128, 1/16, 1/32, 1/128
Scan function:	in frequency (per channels)

Constellation graphic display. (HDT2 models)
Graphic display MER by carrier (HDT2 models).
Graphic display Channel Pulse Response (echoes).

21.9 Image and sound demodulation

Audio:	analogue sound TV AM and FM, FM radio, mono digital sound TV, MPEG2, MPEG-1 L1/L2 HD version digital sound TV, MPEG2, MPEG4 (H264), MPEG-1 L1/L2 Via Licensing AAC and HE-AAC, Dolby Digital and Dolby Digital Plus
Video:	analogue terrestrial TV for PAL, SECAM, and NTSC (on LCD screen) digital TV MPEG2 decoding depends on CAM HD version digital TV MPEG2, digital TV MPEG4 (H264) including HD TV, decoding depends on CAM
Video output:	Peak to peak level: 1 V; output impedance 75 ohms
Audio output:	about 0 dBm level; minimal charge 1 kOhm.
Video input:	CVBS, peak to peak level 1 V max
Audio input:	level 0 dBm max

21.10 Remote supply

Voltage:	5V, 13 V, 18V and 24V
Current:	500 mA max, (300 mA max @ 24V) overload protected
Mini DiSEqC:	22 kHz +/- 2 kHz, 0.6 V peak to peak +/- 0.1 V
DiSEqC generator:	standard 1.2, dish rotor control, Committed and Uncommitted switches
SatCR:	DiSEqC protocol extension, maximum 8 Slots control

21.11 Power supply – battery

External power supply:	main adapter 100/240 VAC, cable depends on the country, 5.5 mm jack, 2.1 mm hole output 15V 5 A max
Non-removable battery:	Lithium-ion 10.8 V, 6.5 Ah. (9 V when charge is completed) 200 charge/discharge cycles
Autonomy:	3-hours typical after complete charge (2 hours, appliance off) 2h30 after fast charge of 1 hour (appliance off)

21.12 Environment

LCD display:	TFT, colour, 7.0 inches (16/9°), with backlight
Operating temperature:	from -5°C to +45°C
Storage temperature:	from -10°C to +60°C
EMC and safety:	CE marked and compliant NF-EN 61326 July 1997 + A1 October 98 + A2 Edit September 2001 EN 55022 A2 edit 2003 class B autonomous device Immunity according to EN 61326-1 2006 NF-EN 61010-1 June 2001
Dimensions and weight:	about 210 x 297 x 90 mm 2.1 kg (with battery)

21.13 Accessories

The appliance is delivered with: a bag, a battery, a main adapter, and a user manual.
Optional accessories:

- kit TR7836 including the TR7836 software and the USB cable type A to mini B
- cigarette lighter power supply : reference 978361000
- F/BNC adapter : reference 213200011
- BNC/ TV (female) adapter : reference 213200010
- USB cable type A to mini B : ref.978551100
- ETHERNET cross cable : ref. 298504246
- Wi-Fi adapter : ref .978651000
- accessories bag: ref. 978656500

For more details, please contact SEFRAM sales department.

21.14 V, dBµV, dBmV and dBm conversion

dBµV (dBmV) is a logarithmic ratio between a measured voltage U_d and a reference voltage U_r.
The reference voltage is Ur = 1 µV (1 mV)
$N = 20 \log (U_d/U_r)$

dBm is a logarithmic ratio between a measured power P_d and a reference power P_r.
The reference power is Pr = 1 mW into 75 ohms.
$N = 10 \log (P_d/P_r)$ with $Pd = Ud^2 / 75$

U_d = 1 µV	N = 0 dBµV	N = - 60 dBmV	N = -108.75 dBm
U_d = 1 mV	N = 60 dBµV	N = 0 dBmV	N = -48.75 dBm
U_d = 1 V	N = 120 dBµV	N = 60 dBmV	N = 11.25 dBm

21.15 Values to be measured

Recommended values for good quality signal.

Measurements	Level, power (dBµV)		C/N (dB)	BER	MER (dB)	Modulation
	mini	maxi				
Terrestrial						
Analogue TV	57	74	> 45	-	-	-
FM	50	66	> 38	-	-	-
DVB-T	35	70	> 26	VBER < 2^{E}-4	> 26	8K, 64QAM, 1/32, 2/3
DVB-T2	35	70	> 22	PER < 1^{E}-7	> 22	32k, 256QAM, 1/8, 3/4
DVB-C, MCNS	57	74	> 31	BER < 2^{E}-4	> 31	64QAM
Satellite						
Analogue TV	47	77	> 15	-	-	-
DVB-S, DSS	47	77	> 11	VBER < 2^{E}-4	> 11	QPSK, 3/4
DVB-S2	47	77	> 8	PER < 1^{E}-7	> 8	8PSK, 2/3

DECLARATION OF CE CONFORMITY

according to EEC directives and NF EN 45014 norm

DECLARATION DE CONFORMITE CE

suivant directives CEE et norme NF EN 45014

CE

SEFRAM INSTRUMENTS & SYSTEMES
32, rue Edouard MARTEL
42009 SAINT-ETIENNE Cedex 2 (FRANCE)

Declares, that the below mentionned product complies with :
Déclare que le produit désigné ci-après est conforme à **:**

The European low voltage directive 2006/95/EEC :
La directive Européenne basse tension 2006/95/CE
NF EN 61010-031 Safety requirements for electrical equipement for measurement, control and laboratory use. Règles de sécurité pour les appareils électriques de mesurage, de régulation et de laboratoire.

The European EMC directive 2004/108/EEC :
Emission standard EN 50081-1.
Immunity standard EN 50082-1.
La directive Européenne CEM 2004/108/CE :
En émission selon NF EN 50081-1.
En immunité selon NF EN 50082-1.

Pollution degree *Degré de pollution* **: 2**

Product name *Désignation* **: Field Strengh Meter** *Mesureur de champ*

Model *Type* **: 786x**

Compliance was demonstrated in listed laboratory and record in test report number
La conformité à été démontrée dans un laboratoire reconnu et enregistrée dans le rapport numéro **RC 786x**

SAINT-ETIENNE the :
September 23, 2008

Name/Position :
TAGLIARINO / Quality Manager