Sefram

7817

FIELD STRENGTH METER

USER MANUAL

November 2015

Revision follow-up

Version / Date	Modified chapters	Nature of modification
2.0 / October 2015	All	Creation of the document
3.0 / November 2015		BNC adaptator suppressed

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

04 77 59 01 01

E-mail Sales department: sales@sefram.fr

E-mail After-sales: sav@sefram.fr

E-mail Technical support: support@sefram.fr

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

Web: www.sefram.fr

GUARANTEE

Your instrument is guaranteed for one year for labor and parts against any manufacturing defect and/or functioning hazard. This guarantee extends from the delivery date and ends 365 calendar days later.

In case of guarantee contract, this will cancel or replace these guarantee conditions hereabove.

The guarantee conditions by SEFRAM are available on the website www.sefram.com. The general guarantee conditions should prevail on the following conditions that they sum up.

This guarantee does not cover the result of any abnormal use, handling mistake or mistake in the storage conditions outside the defined range.

In case of application of the guarantee, the user shall return, at its own expenses, the relevant appliance to our factory:

SEFRAM Instruments & Systèmes

Service Après-vente

32, Rue Edouard MARTEL

BP 55

42009 SAINT-ETIENNE CEDEX 2

And add a description of the observed breakdown to the appliance.

The standard supplies provided with the appliance (cables, outlets…), the consumables (batteries …) and the optional supplies (suitcases…) are guaranteed for 3 months against any manufacturing defect.

Such items as a suitcase, a LCD screen or a touchpad are guaranteed only for a normal use.

The guarantee does not cover wearing, accidental breaks or consecutive to a shock or any abnormal use.

The factory options integrated to the appliance are guaranteed for the same duration as the appliance itself.

In case of replacement or repair of the product, the remaining guarantee duration shall be:

- The remaining duration of the guarantee if the appliance is still under guarantee
- If the guarantee duration is less than 90 days, the replaced part is guaranteed for 90 days

Any replacement part becomes the property of the user and the exchanged parts become the property of SEFRAM.

In case of intervention by an insurance company, the product becomes the property of the insurance company upon its exclusive request. Else, it shall remain property of the user.

The guarantee covers exclusively the materials manufactured and provided by SEFRAM.

Any intervention by the user or any third party without prior authorization by the company voids the guarantee.

The user shall be responsible for the return of its appliance to our site. Hence, it shall provide for a conditioning that shall correctly protect the appliance while shipping. It shall subscribe, at its own expenses, any insurance required for the transport.

The SEFRAM company reserves the right to refuse any product wrongly conditioned and not to take in charge any break consecutive to the transport.

Particular case of the battery: There is a Li-ion battery as a standard equipment of this appliance. It shall not be transported outside the appliance. In no case shall the user replace it. Its replacement in the factory is necessary to check the charge system and the protective securities.

What to do in case of malfunction?

In case of malfunction or for any advice for use, please contact the technical support by SEFRAM Instruments & Systèmes: 0825 56 50 50 / 2

A technician shall answer you and give you any information required to solve your problem.

What to do in case of failure?

In case of failure of your appliance, please contact the technical support: 0825 56 50 50 / 2

Some advice!

Some technical help!

SEFRAM Instruments & Systèmes commits itself to help you on the phone about the use of your appliance.

Please call or Technical Support:

04 77 59 01 01

Or e-mail:

support@sefram.fr

We thank you for your trust.

METROLOGY

The meteorological conditions of your measurement instrument are defined in the specifications of this notice. Climate and environmental conditions restrict the specifications of your Field Strength Measurer (MDC). SEFRAM checks the characteristics of each appliance one by one on an automatic bench during its manufacture. The adjustment and control are guaranteed under conditions of the ISO9001 certification by facilities in connection with the COFRAC (or equivalent in the context of ILAC reciprocity).

The specified characteristics are considered stable for a period of 12 months from the first use under normal conditions of use.

We recommend a check after 12 months and max. 24 months of use, then every 12 months after 24 months.

For any check of the characteristics, the following average climate conditions shall be maintained (23°C±3°C – 50(±20)%RH). The MDC should have been working for 0,5 hour before check.

We recommend that you have this control made by our after-sales service (Service Après-Vente) for the best service and preservation of the measuring quality of your instrument.

When a MDC returns to SEFRAM, maximum service is provided with internal updating according to the required adjustments and software updates. In case of shift in the characteristics, your instrument shall be adjusted to recover its original characteristics.

PACKAGING

The packaging of this product is fully recyclable. Its design allows the transport of your instrument under the best possible conditions. Please note that the original packaging should be additionally wrapped in case of transport by air, road or postal.

SPARE PARTS

According to the consumption law of March 17, 2014, Article L111-3 and Decree 2014-1482 of 09/12/2014, SEFRAM informs you of the availability of spare parts of products placed on the market as of March 1, 2015:

Spare parts are not available to the consumer. SEFRAM offers the supply of spare parts during repair by its service.

Consumable parts are provided according to the legislation applicable to them (case of batteries).

SEFRAM is committed to providing parts or alternatives for a period of at least 2 years beyond the warranty period.

TABLE OF CONTENTS

1 Important information

Please read carefully the following instructions before using your appliance.

1.1 Particular precautions

- Do not use the product for any other use than specified.
- Use the provided charger unit to prevent any deterioration of the appliance and guarantee its measurement characteristics.
- Do not use in a wet environment.
- Do not use in an explosive environment.
- In case of failure or for the maintenance of the appliance, only a qualified personal shall be entitled to work on it. In such a case, it is required to use Sefram spare parts.
- Do not open the appliance: risk of electric shock.
- You should use the F/F adaptor provided with your measuring instrument. Any other adaptor could damage your appliance and jeopardizes the guarantee.
- Do not use gloves, stylus or any other object on to the touchscreen. Handle the screen carefully.

1.2 Security instructions

For a correct use of the appliance, it is necessary that users abide by the security and use instructions described in this manual.

Specific warnings appear all along this manual.

In case of need, warning symbols are displayed on the appliance:

1.3 Symbols and definitions

Symbols in this manual:

 Remark: Shows important information

 Key or press zone

 Window or display zone showing up after the operation achieved

Symbols on the appliance:

Attention: Refer to the manual. Shows a risk of damage for the material connected to the instrument or to the instrument itself.

Ground: Grounded accessible parts.

Product for recycling.

1.4 Conformity and restrictions of the appliance

See chapter EC Declaration of conformity.

2 Quick start-up

2.1 Presentation of the appliance

RF connector for use with the F/F adaptor provided with the appliance.

button ON/OFF

Important keys:

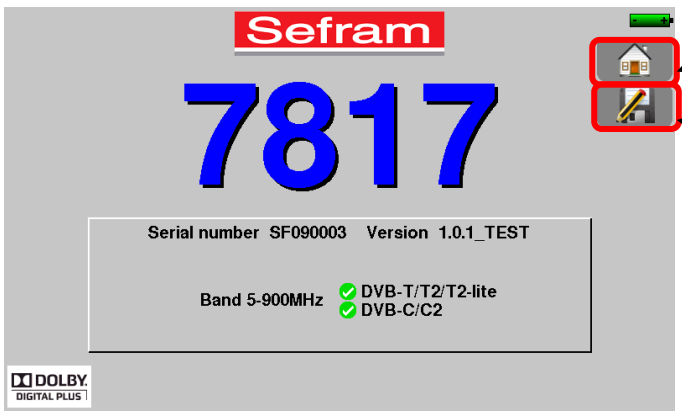
7817 is an appliance with a capacitive touchscreen. This requires a soft handling. No glove and no stylus should be used, so that the triggering should be taken into account.

You will recognize the « keys » by their dark grey color (example: the home key: )

You may also access tables by pressing lines (on white or yellow)

○	1	TNT-R2 ST-ETIENNE	E44	DVB-T/H 8M GI auto	---
○	2	TNT-R3 ST-ETIENNE	E59	DVB-T/H 8M GI auto	---
○	3	TNT-R4 ST-ETIENNE	E40	DVB-T/H 8M GI auto	---
○	4	TNT-HD ST-ETIENNE	E49	DVB-T/H 8M GI auto	---

Welcoming page:



HOME
Access to the main menu

SAVE
Access to the current page Save

	Attention : To exit a window like in this example below, press the key: 

2.2 Signal spotting

The 7817 allows spotting signals in terrestrial mode.

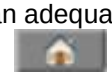
In the following chapter, we will see how to spot a signal on two types of installation:

- Checking of a terrestrial antenna (the installation has already been made).
- Installation of a terrestrial antenna.

2.2.1 Checking a terrestrial antenna

In this case, the Autoset function allows a scan of the channels that the antenna detects.

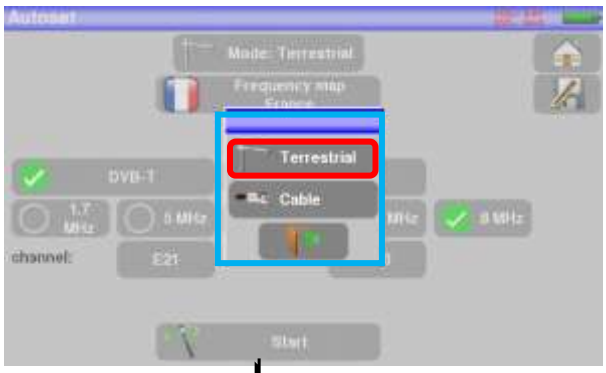
Plug the cable of your antenna to the 7817 (take care to use an adequate adaptor)

Turn your appliance on. Press the Home key 

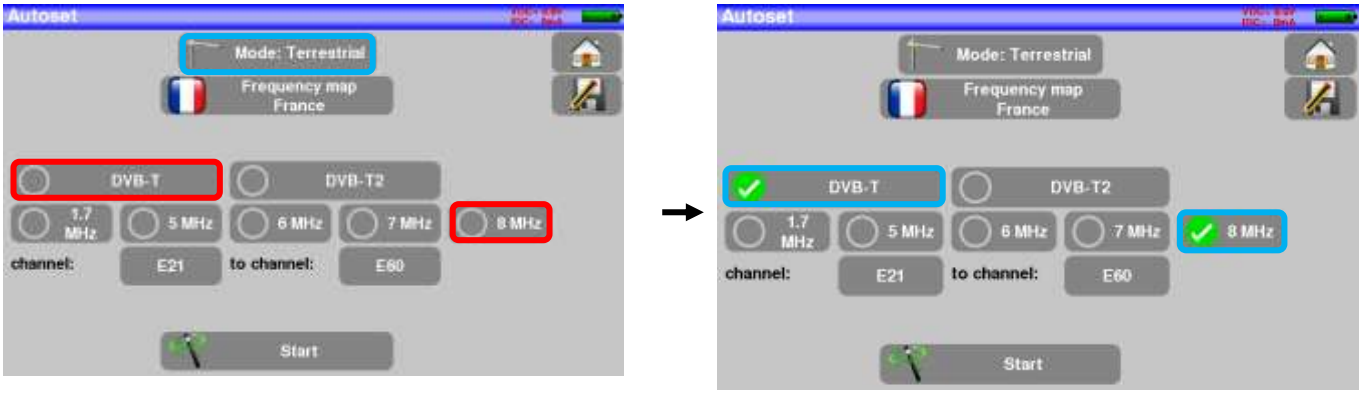
The Home page appears on screen. Press Autoset 

On this page, press Mode, Terrestrial, then select DVB-T and 8MHz (as here below)

The scan should range from the E21 to the E69 channels, frequency range Europe (you may reduce the number of channels to scan if you know the range of the emitter where the antenna points at: the scan will be faster)



p. 12



Press START. The appliance searches until the end of the scan and turns directly to the Measurement plan mode. If channels were found, the appliance makes measurements continuously (C/N-level, then BER/MER) on the detected channels. If no channel has been found, see the next chapter.

To finish, press the home measurement key  then on 

, On this new page, press Prog, select the channel that you want to display.

Check the level, the BER/MER, the TV detection and the spectrum of the signal on this page…

2.2.2 Installation of a terrestrial antenna

You have two methods to install a terrestrial antenna :

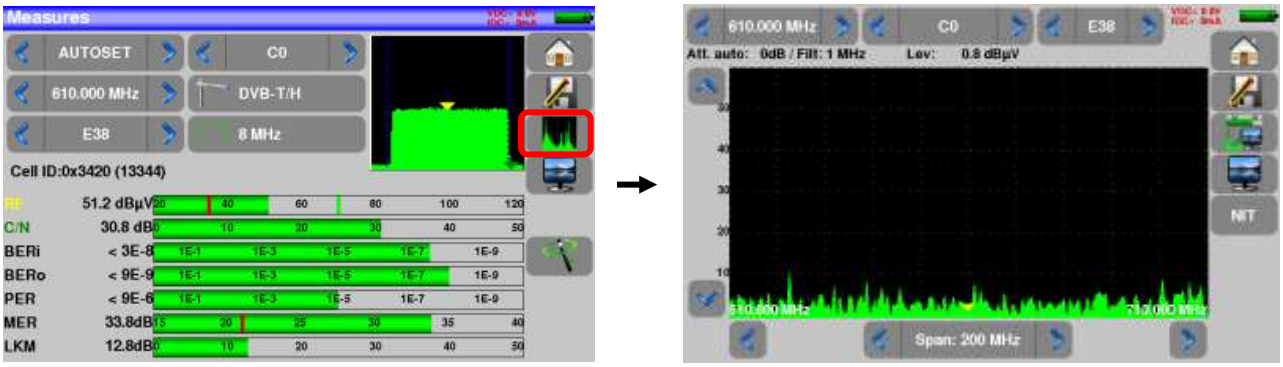
- Use of the spectrum
- Use of the antenna pointing

2.2.2.1 Use of the spectrum

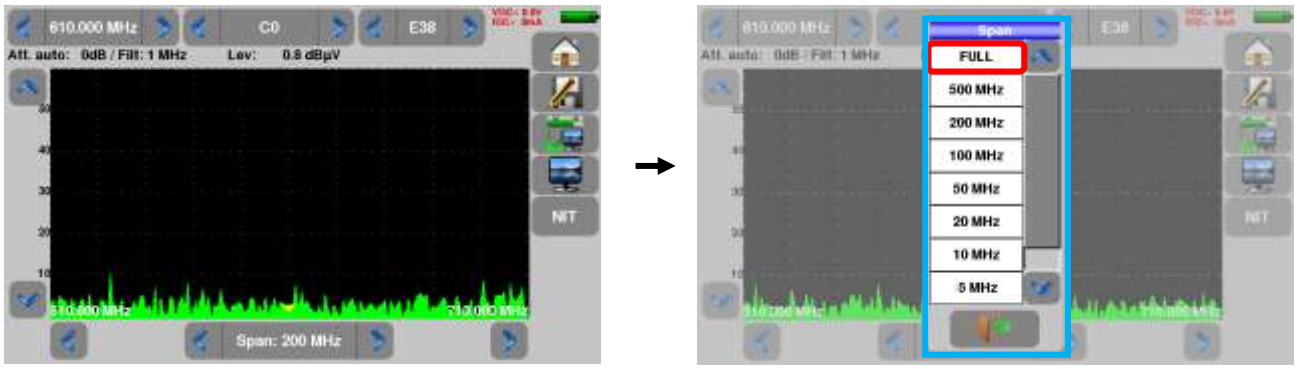
Plug the cable of your antenna to the 7817 (take care to use an adequate adaptor)

Turn your appliance on. Press the Measures-TV-Spectrum key 

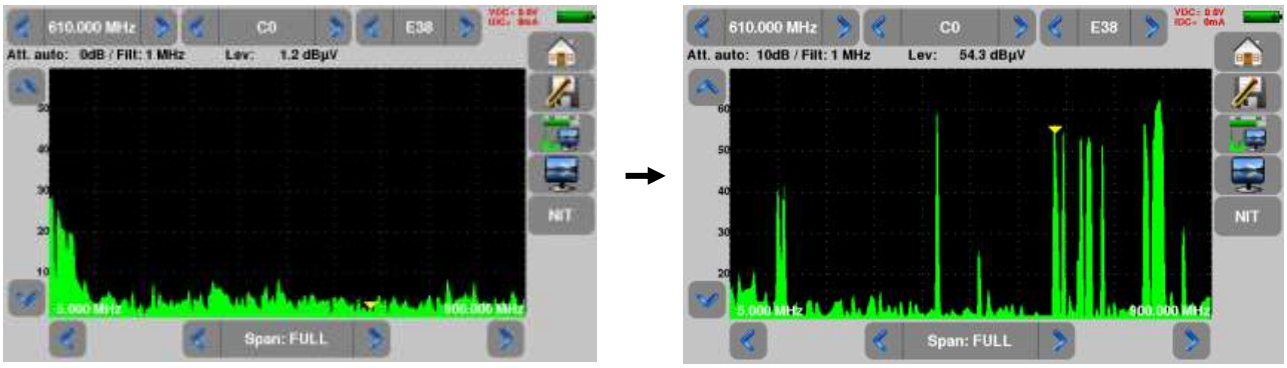
Press the Spectrum zone, access to terrestrial mode if needed



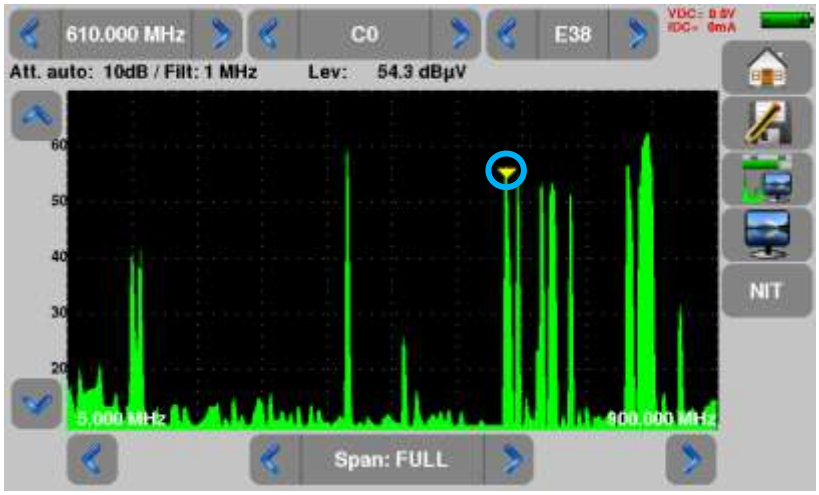
Access to full SPAN mode



Adjust the antenna to get the most powerful signal possible



Press directly the signal you want in the spectrum (the cursor moves to where you press)



Press the NIT key 

, the device find automatically all the parameters of the signal.
Once the search ended, the device displays the “Network Name” and the “Network ID”.

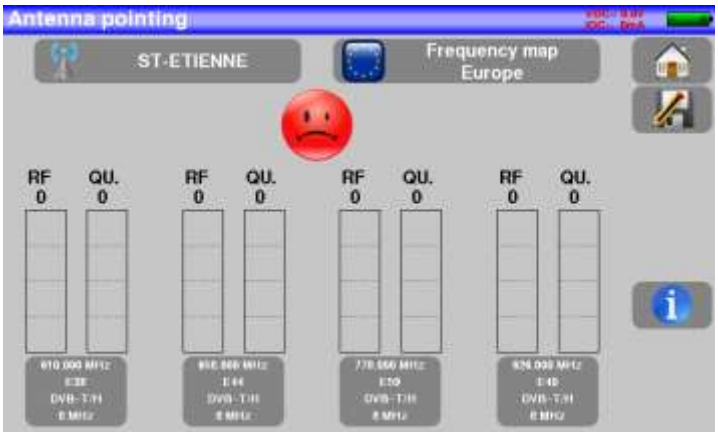
Press the Measures-TV-Spectrum key. You can now display the level, the BER/MER of the signal selected on the same page… 

2.2.2.2 Use of the Antenna pointing

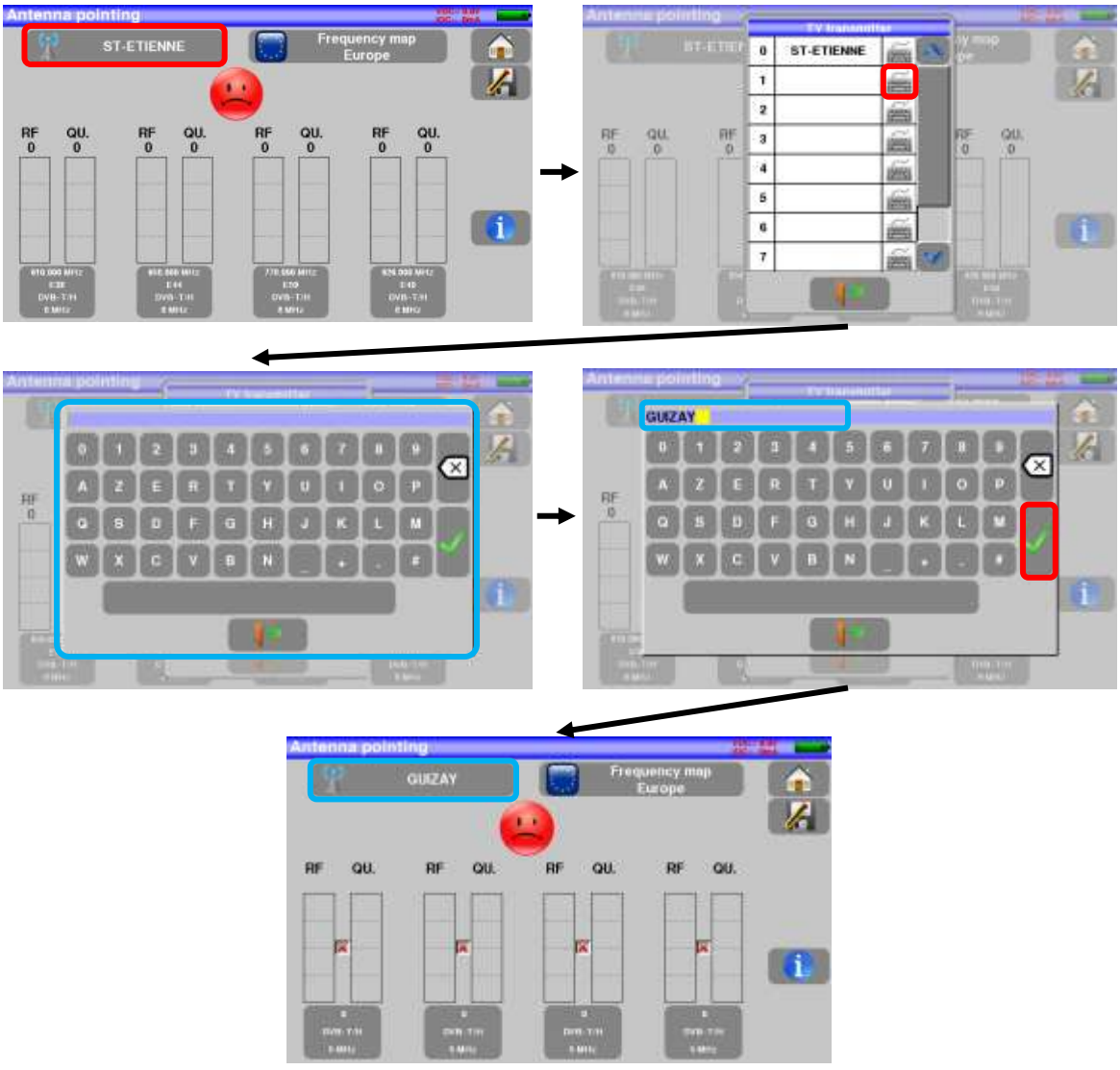
The appliance gets an “Antenna pointing” mode in order to align quickly and easily your terrestrial antenna.

To access to the “Antenna pointing” mode from the HOME page, press 

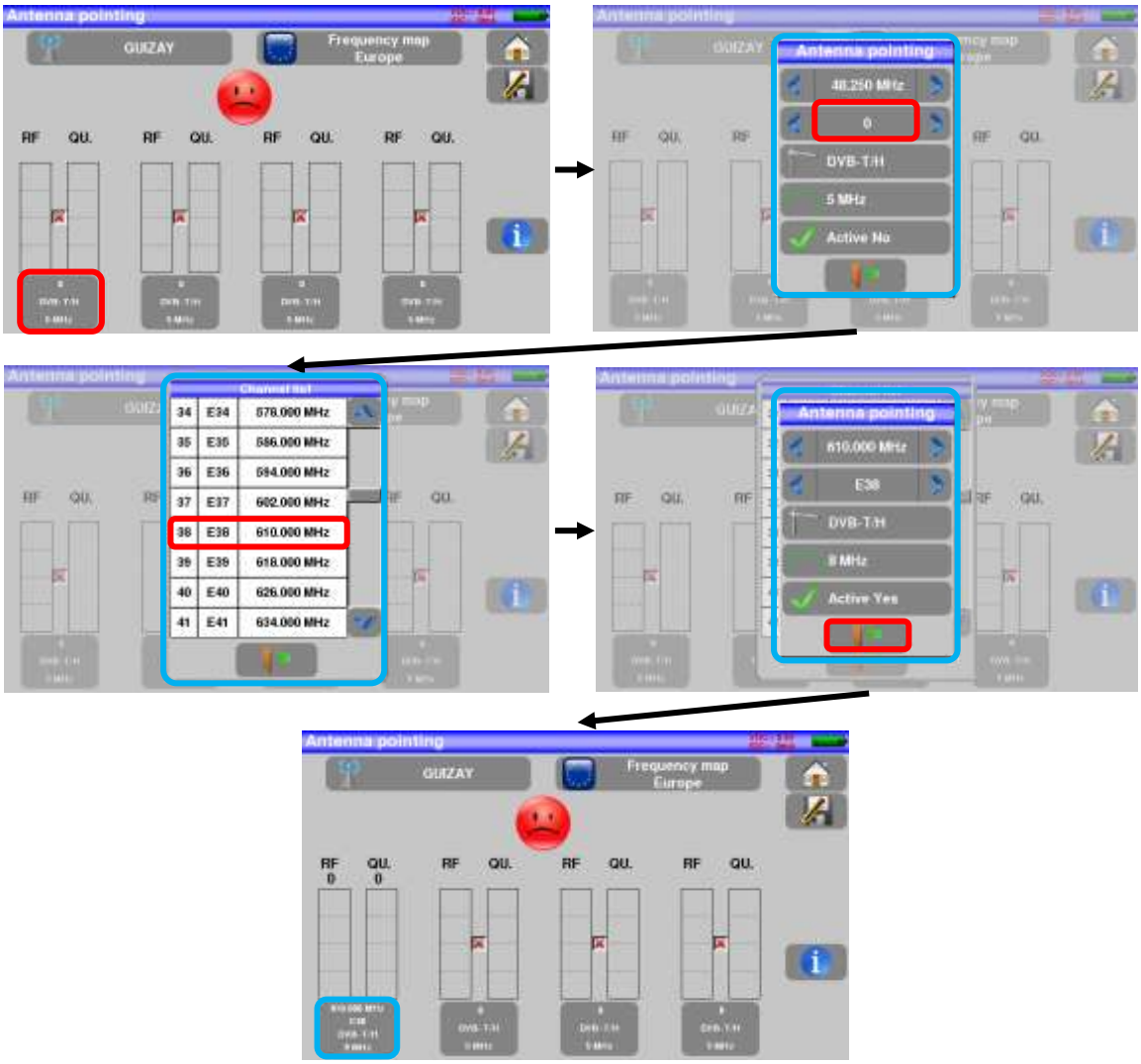
The following page appears :



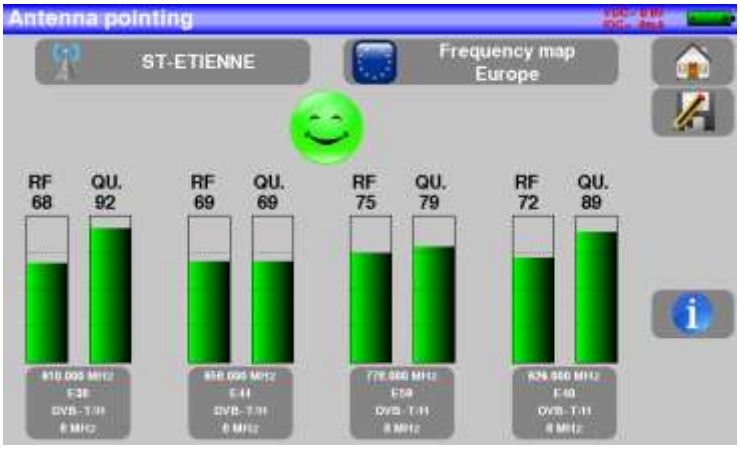
Set your emitter name :



Enter 4 frequencies of the emitter you want to check.



Slowly orientate the antenna until hearing the locking melody and getting the best quality




No transmitter found, bad reception quality → red smiley


Average reception quality (< 50%) → orange smiley


Good reception quality (> 50%) → green smiley

3 Presentation

3.1 General

- The field strength meter **7817** is an appliance designed for the installation and maintenance of any broadcasting and reception installations of analogical and digital terrestrial television channels or cable networks.

-The band ranges between **5 MHz and 900 MHz;** this allows accurate measurements on all analogical television standards, FM carrier waves and the various digital standards DVB-C/C2 and DVB-T/T2/T2Lite.

-He does **Level** measurements in average, peak and power according to the selected standard

-In **Measurement Plan** mode, they scan up to 50 setups at the same time and compare them to decision levels (min / max).

- Equipped with an efficient **Bit Error Rate** measurement (various BER, MER), they allow the full validation of digital transmissions DVB-T/T2/T2Lite and DVB-C/C2.

- Providing a **Constellation** diagram for digital standards, the detection and display of **Echoes and pre-echoes** permit to complete this analysis.

- You can display the **digital terrestrial TV** (free programs) under SD or HD.

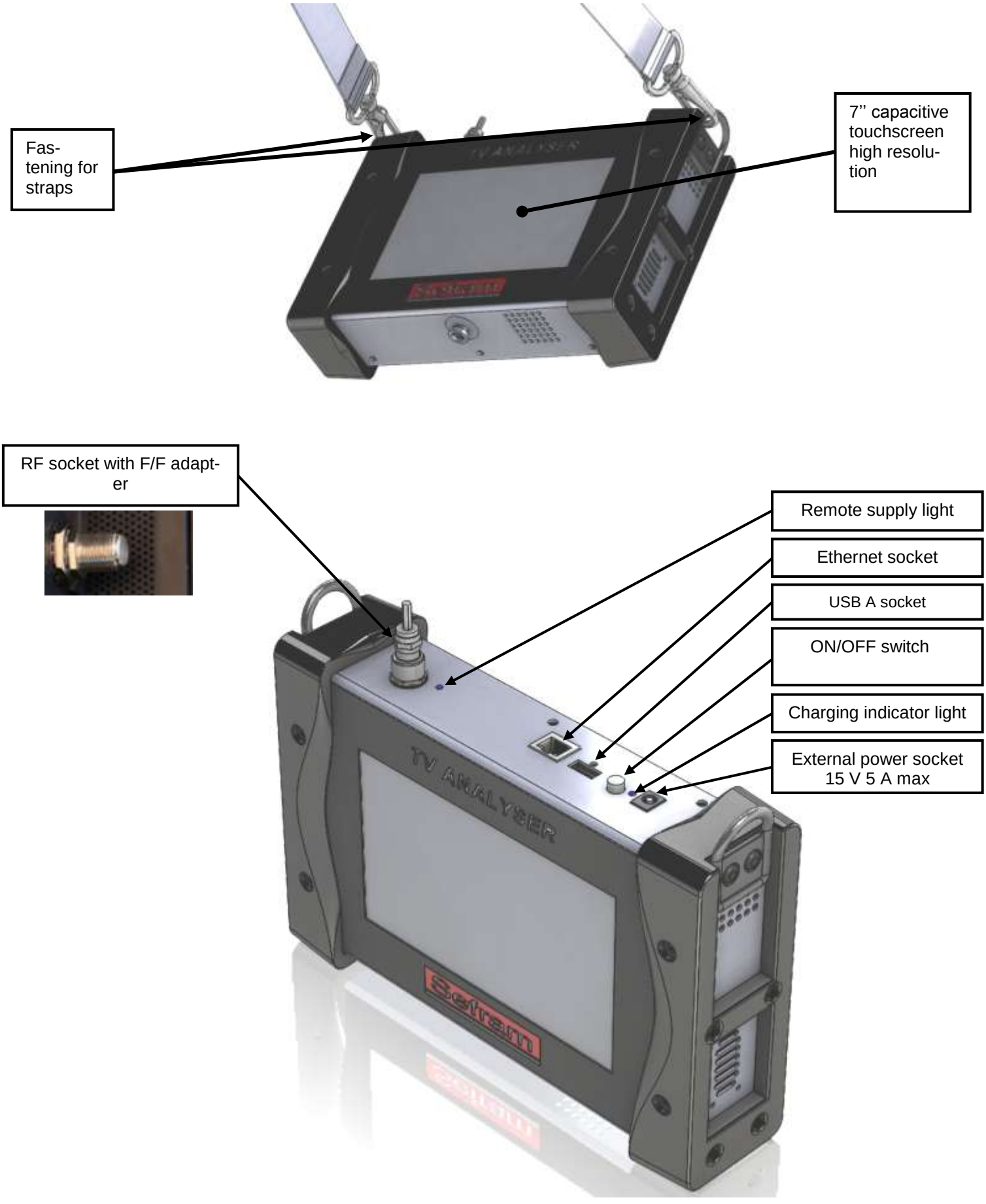
- You can hear digital sound through integrated loudspeakers.

-Designed for use on field, it is compact (less than 2 kg battery included), autonomous (battery pack and quick charger), equipped with a LCD 7'' touchscreen (capacitive).

- The high memory content allows the storage of many configurations, measurements and spectrum curves.

-**The appliance fully remote-controlled through USB and ETHERNET connections via a computer.**

3.2 Description of the appliance



4 Power-up

All the material is checked before shipment and delivered in an adapted packaging. There is no particular unpacking instruction.

The appliance is equipped with a Lithium-Ion (Li-ion) battery. It is shipped with the battery loaded.

However, if the appliance has remained idle more than one month long, check its charge state and reload if required.

4.1 Battery

	**Attention:** Any intervention on the battery requires the disassembly of the appliance and should be made by a SEFRAM technician. Use only batteries provided by SEFRAM.

Security advice:

- ➔ Do not throw into the fire or heat up the battery pack
- ➔ Do not shunt the parts of the battery: risk of explosion!
- ➔ Do not drill
- ➔ Do not disassemble the battery pack
- ➔ Do not reverse the polarities of the battery
- ➔ This battery pack includes a protective item that should not be damaged or removed
- ➔ Protect the pack from the heat while storing
- ➔ Do not damage the protective sheath of the pack
- ➔ Do not store the appliance in a vehicle under sunlight
- ➔ Used batteries are not for domestic waste; lithium batteries should be recycled.

The battery has a 200-charge-discharge cycle life or 2 years.

Advice to extend the life of your battery:

- ➔ Avoid deep discharges
- ➔ Do not store the batteries too long without using them
- ➔ Store the battery around 40% loading
- ➔ Do not fully charge or fully discharge the battery before storage.

When the battery is almost fully discharged, the appliance will warn* "Low battery*", and then will shut off after a few minutes.

4.2 Battery charge

To charge the battery inside the appliance:

- Connect the external power supply provided through the jack plug of the appliance (above)
- Connect the power supply on the mains
- The internal charger starts loading the battery; the green lamp lights up.

	Charge the device only when the device is off. Charge the device only with the provided power supply block.

The battery is 80%-loaded after 1 hour 50 minutes. The total charge is reached after 2 hours 30 minutes.

The autonomy is defined in terrestrial mode with the lighting of the screen decreased, without remote supply, interfaces not connected and sound at 10%

4.3 External power supply

The appliance works under 15V (1 A) power supply. The power supply block provided is an external power supply too. Only use the power supply block provided with the appliance. Use of another mains block could damage your appliance and would not valid the guarantee.

4.4 Turning the appliance on and off

Press the button on the right side of the appliance:

The entry page appears on screen.

The message "**Autotest: running**" is shortly displayed, and then disappears.

Pressing this button turns the appliance off.

	The ON/OFF button **lights up** when the appliance is working. Pressing the ON/OFF button for a long time **forces the shut-off** of the appliance; **proceed this way only in case of necessity.**

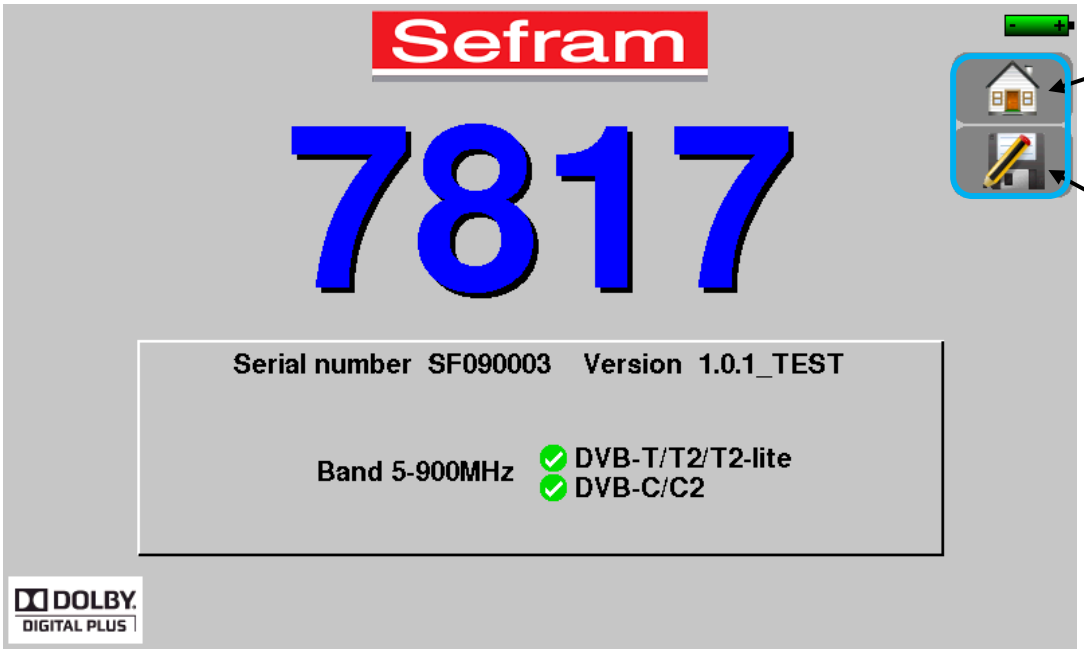
5 Man-machine interface

5.1 Content of the screen

7817 is an appliance with a capacitive touchscreen. No glove should be used. If you don't want to damage your screen, do not use any stylus or object.

You can recognize the« keys » by their dark grey frame, example the Home key: 

You can also select lines of tables.



Home

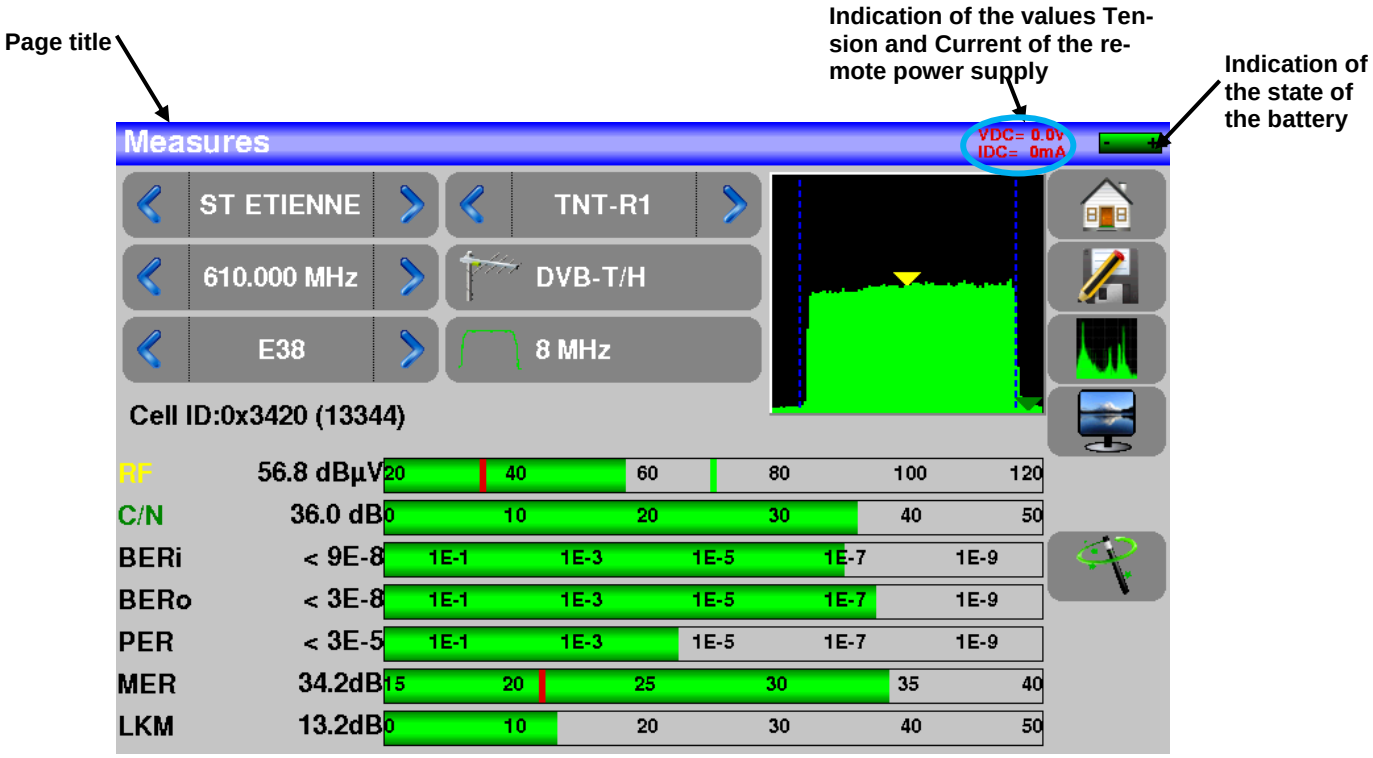
Access to the main menu page

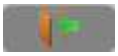
Save

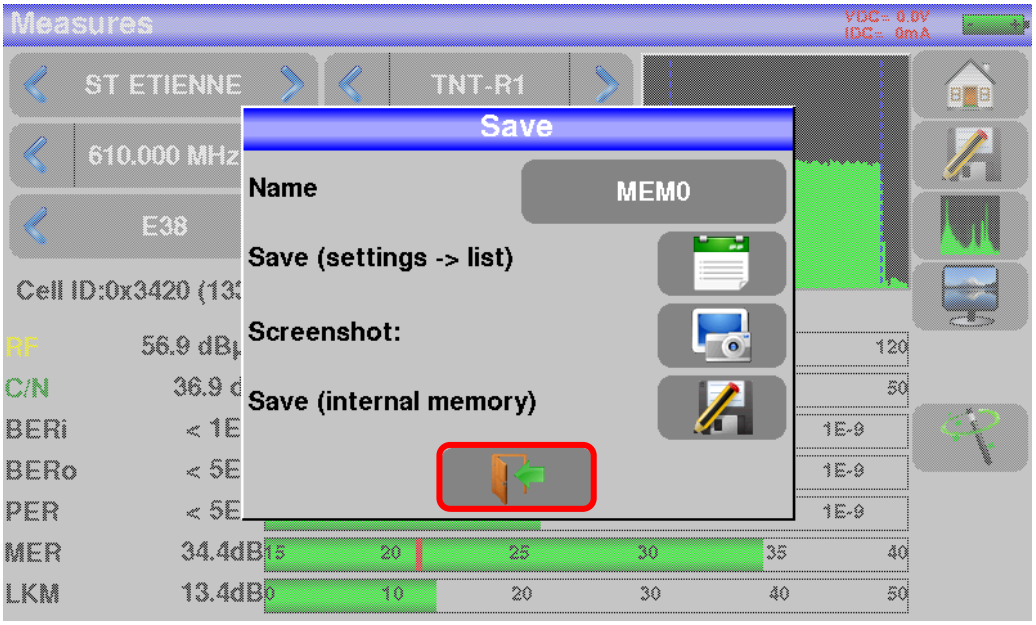
Access to the save of the current page

The Home page allows the navigation through all functions of the appliance. You will also find there the Remote supply and Measures-TV-Spectrum functions, the AUTOSET, Lists ,Library, TERRESTRIAL check, Configuration, Constellation , Echo Guard Interval and Measurement map.

On all pages is displayed the following information:

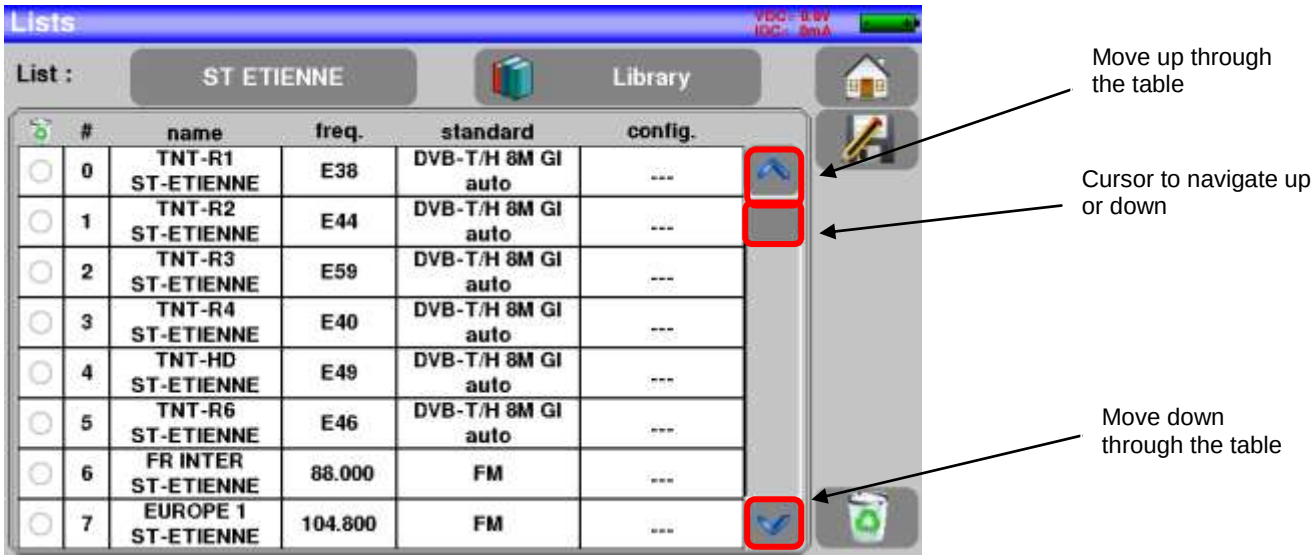


	Attention: To exit a window like this one below, you have to press the key 



To navigate through a table inside a page or a window, a vertical slide appears with arrows to move up and down the table.

To move faster, you can slide a cursor with your fingers.

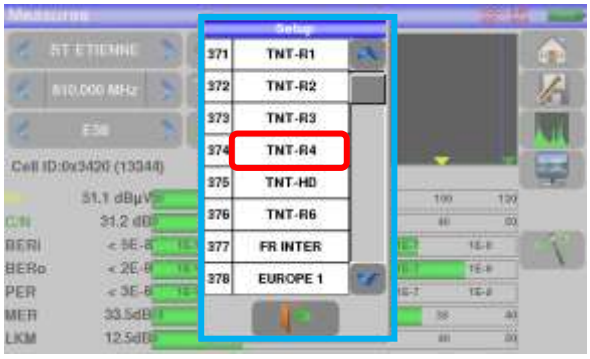


5.2 Changing name or value

5.2.1 Changing inside a table

You can select a setup in the table. In this case, you can validate a setup by pressing the line you want to display.

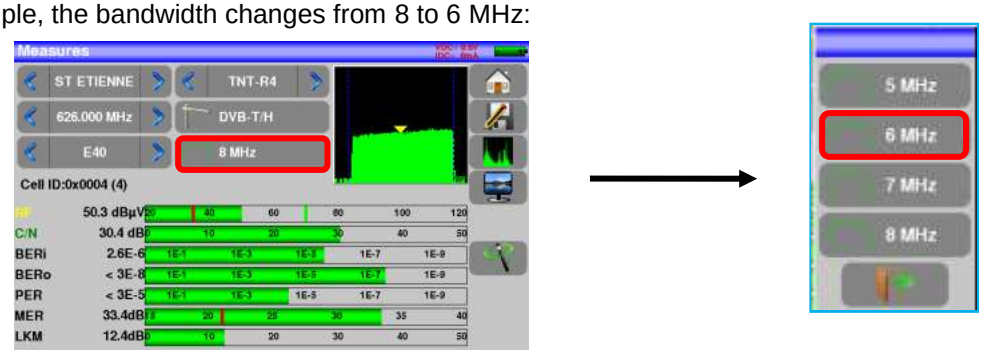
In this example, you change from the TNT-R1 setup to the TNT-R4 in the Measure page:

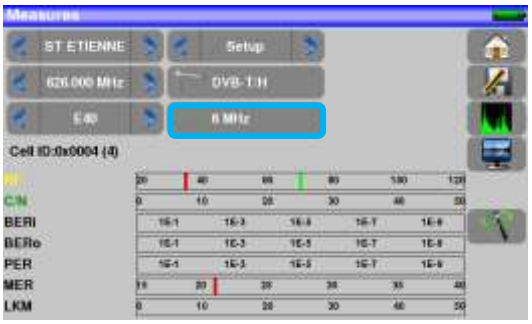


5.2.2 Change with selection

When pressing a key, you may have a window with multiple choices. You only have to press the value you want to validate it, the  key allows you to cancel and exit this window, like in the example below:

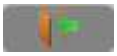
In this example, the bandwidth changes from 8 to 6 MHz:





5.2.3 Change with virtual keyboard

If you want to enter a name of a number, a window appears with a numeric keypad and a virtual AZERTY keypad:

In this keyboard appear keys  to erase,  to valid the selected value and the  key to cancel and exit from this window.

5.3 Lists of measurements and setup library

In order to make easier the recall of data on field, the appliance uses 20 measurement lists of each 50 lines and 1000 setups.

A setup corresponds to a terrestrial or cable emission.

Example of list (the background of the table is white)

#	name	freq.	standard	config.
371	TNT-R1 ST-ETIENNE	E38	DVB-T/H 8M GI auto	---
372	TNT-R2 ST-ETIENNE	E44	DVB-T/H 8M GI auto	---
373	TNT-R3 ST-ETIENNE	E59	DVB-T/H 8M GI auto	---
374	TNT-R4 ST-ETIENNE	E40	DVB-T/H 8M GI auto	---
375	TNT-HD ST-ETIENNE	E49	DVB-T/H 8M GI auto	---
376	TNT-R6 ST-ETIENNE	E46	DVB-T/H 8M GI auto	---
377	FR INTER ST-ETIENNE	88.000	FM	---
378	EUROPE 1 ST-ETIENNE	104.800	FM	---

Example of library (the background of the table is yellow)

#	name	freq.	standard
0	TNT-R1 ST-ETIENNE	E38	DVB-T/H 8M GI auto
1	TNT-R2 ST-ETIENNE	E44	DVB-T/H 8M GI auto
2	TNT-R3 ST-ETIENNE	E59	DVB-T/H 8M GI auto
3	TNT-R4 ST-ETIENNE	E40	DVB-T/H 8M GI auto
4	TNT-HD ST-ETIENNE	E49	DVB-T/H 8M GI auto
5	TNT-R6 ST-ETIENNE	E46	DVB-T/H 8M GI auto
6	FR INTER ST-ETIENNE	88.000	FM
7	EUROPE 1 ST-ETIENNE	104.800	FM

The same setup may be used in several measurement lists.

If a parameter of a setup changes, for example a modification of frequency or standard, only the setup inside the library should be updated.

A list of measurements is made of:

- a list name in 10 characters
- 50 lines including each:
    - a setup number corresponding to the setup list

A setup is made of:

- a setup name in 8 characters
- an emitter name in 10 characters
- a frequency
- a channel number in terrestrial or cable mode
- a frequency map in terrestrial or cable mode
- a standard
- an analogical mono stereo or NICAM mode in terrestrial or cable mode
- a constellation type 64QAM 256QAM under DVB-C
- a bandwidth 5, 6, 7 or 8 MHz under DVB-T and DVB-T2
- a symbol rate under DVB-C.

According to the terrestrial or cable mode and to the standard, some parameters have no influence.

The emitter name may distinguish two distinct emitters, example TF1 Fourvière and TF1 Chambéry.

Frequency and channel number are equivalent: a valid channel number has priority over a frequency.

The frequency map parameter associated with the setup allows frontiersmen to keep on using channel numbers.

	Selecting a list in the **Lists** page automatically recalls all information associated with this list.

	Selecting a **Setup** on a measurement page automatically recalls all information associated with this setup.

6 AUTOSET mode

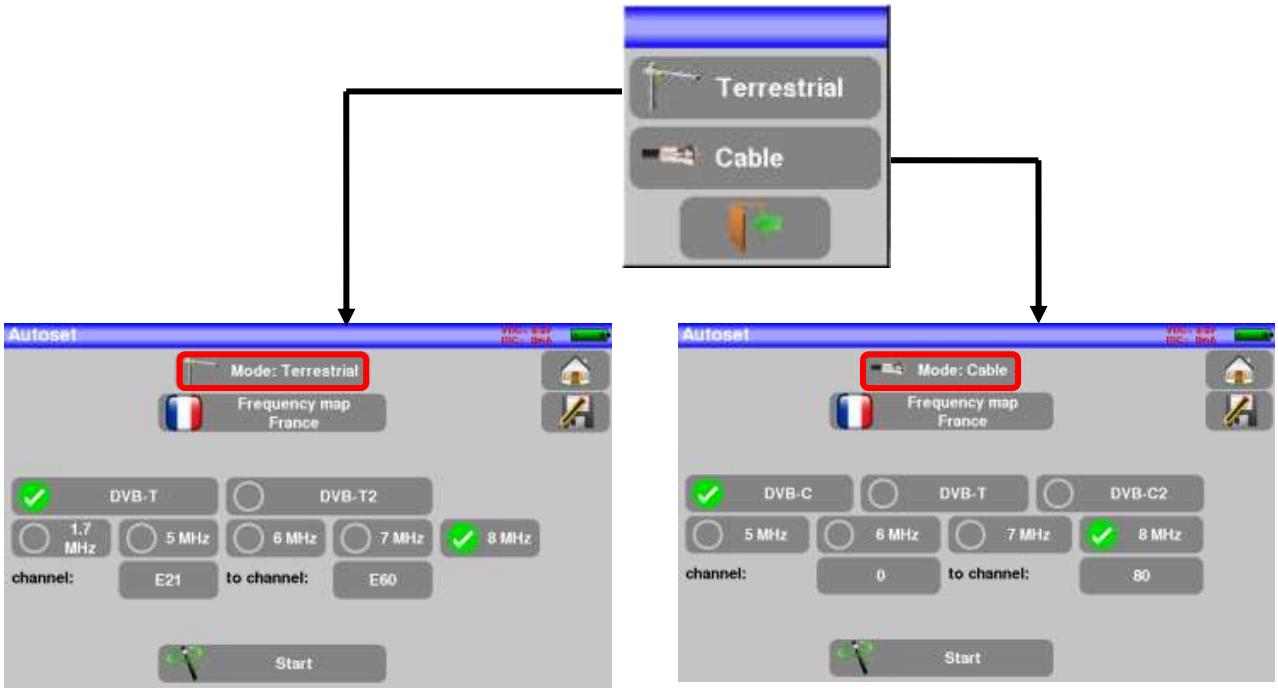
	Attention: The Autoset channel research is only possible when at least one list is empty with enough place in the library

This mode allows an **automatic research of setups** and to provide information about the current place.

You can access it through the key 

on page Home.

The displayed lines on this page depend on the selected **Frequency band**. The key before the Mode line allows you to select between terrestrial or cable mode:



Once the mode selected, the keys of the various parameters activate or deactivate each option.

A green check shows that the parameter is included in the research. If there is no green check, the parameter will not be taken into account for the research.

Active research parameter

Inactive research parameter

	Attention: The more you select options, the longer is the research.

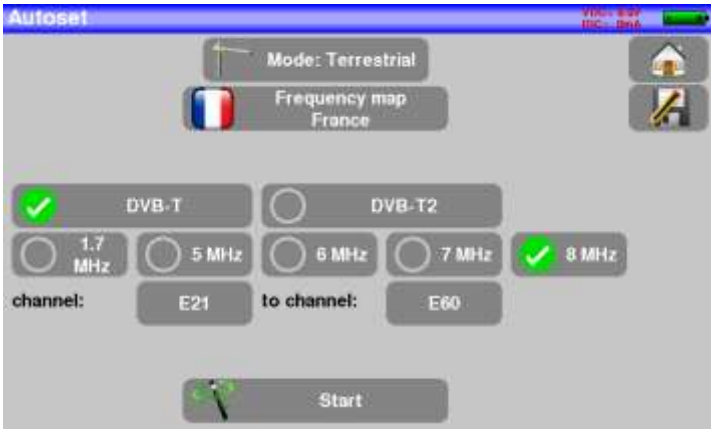
6.1 Terrestrial mode

This mode allows automatic research on the **terrestrial** frequency band.

The table allows the selection of:

- Standards
- Channel widths
- The channel range of the research (i.e. 21 to 60).

  The goal is to make researches shorter by defining at best the settings (example: in France, no DVB-T2, band width 8MHz first channel 21, last channel 60)



6.2 Cable Mode

This mode allows automatic research on the **cable** frequency band.

The table allows the selection of:

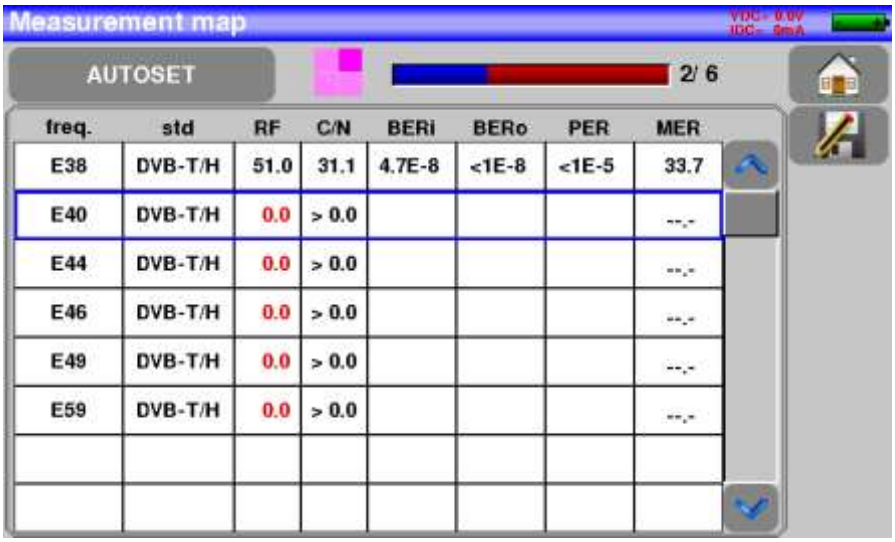
- Standards
- Channel widths
- The search range of channels

6.3 «START » menu key

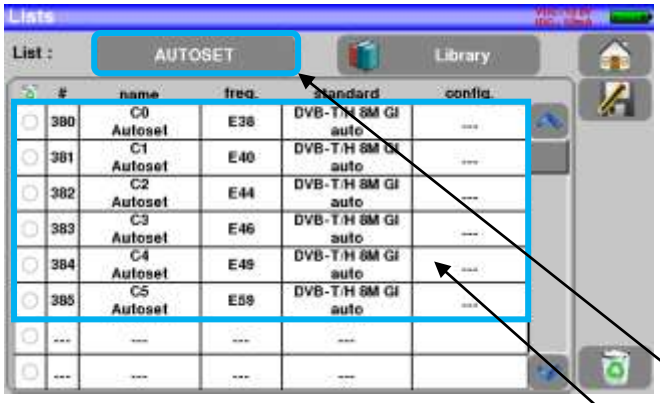
No matter which mode is selected, press the “**START**” key when the table is filled to launch the research.

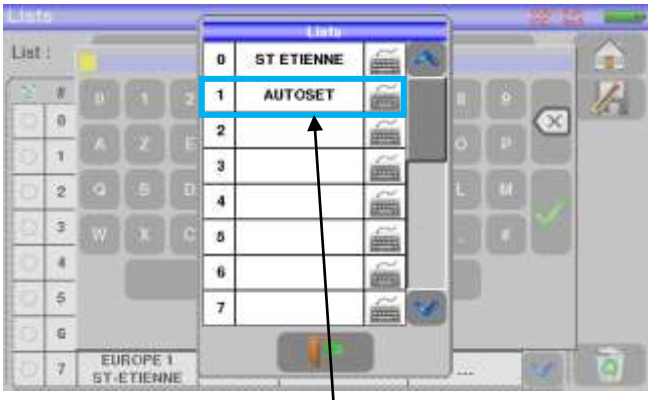
Pressing “**Stop**” will abort the research.

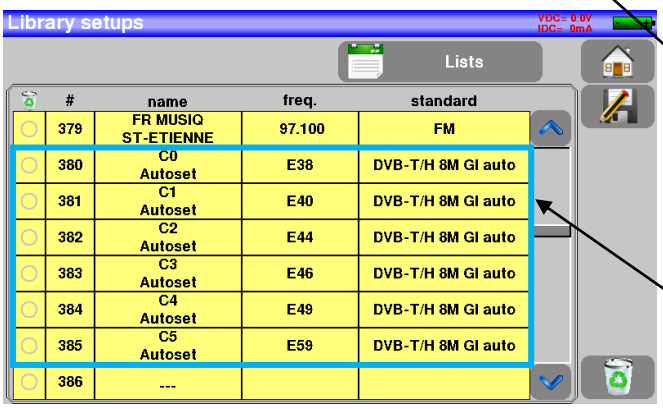
When the research is done or if the user aborted it, the appliance turns automatically to the **Measurement map** function.



Any detected channel will be registered into the first empty list (automatically renamed AUTOSET) **and** into the fist available setups of the library, starting from the end of the table.







The new list is created in the first available list

The default name of the new list is AUTOSET

New found channels are added one by one into the new list

New found channels are added one by one into the first available setups of the library, starting from the end of the table

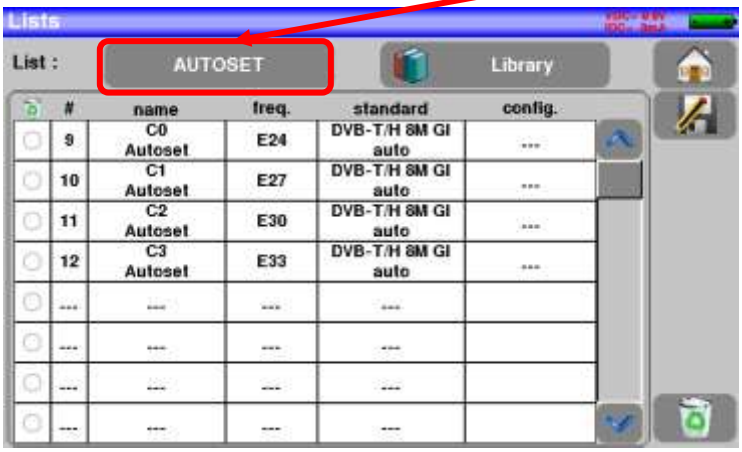
7 Measurement lists

7.1 The list page

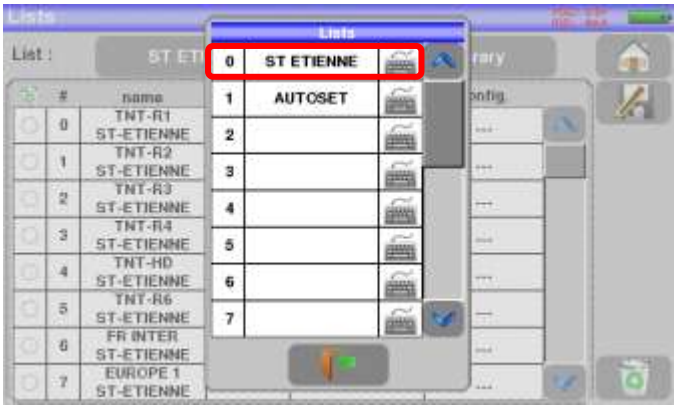
In this page, you can select the list where you will work on measurements.

Pressing Home  then Lists-Library  gives you access to the **Lists** function:

Lists are ranked from 0 to 19. To select the one you want, press the following key. Lists are displayed. Press the one you want:

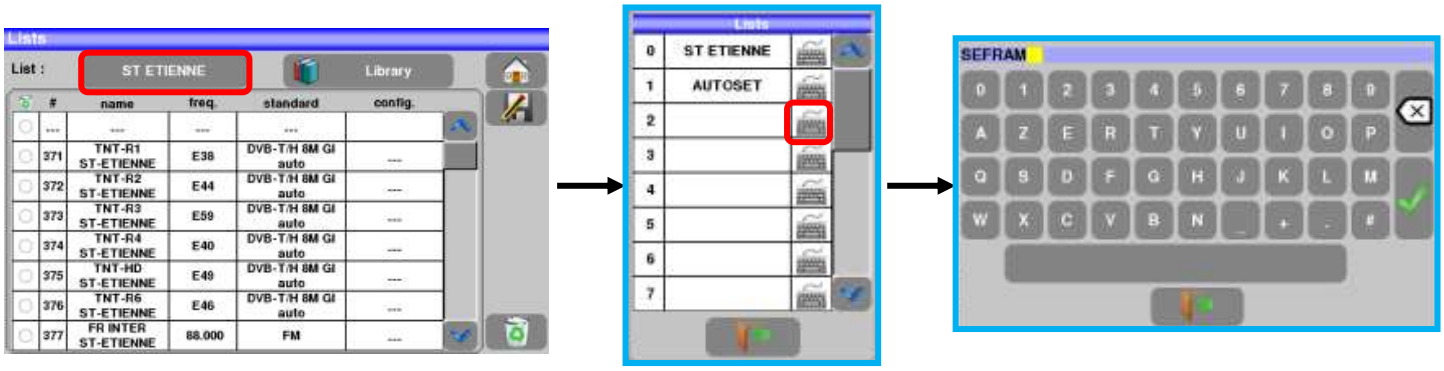


In this example, we selected ST ETIENNE.

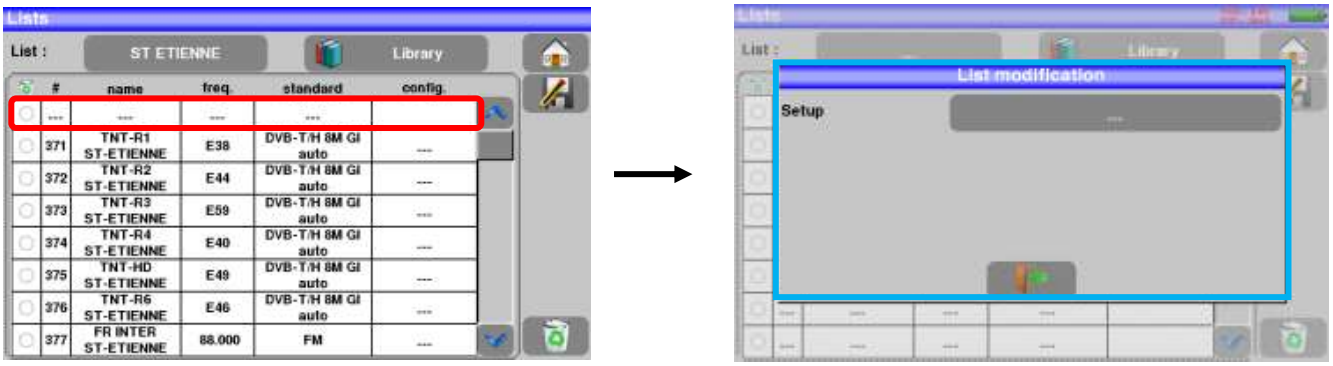


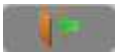
7.2 Modification of a list

To change the name of the list of ST ETIENNE, you must push on its name, then on the symbol of the key-pad. A virtual keypad shows up. Type the new name (SEFRAM in our example).

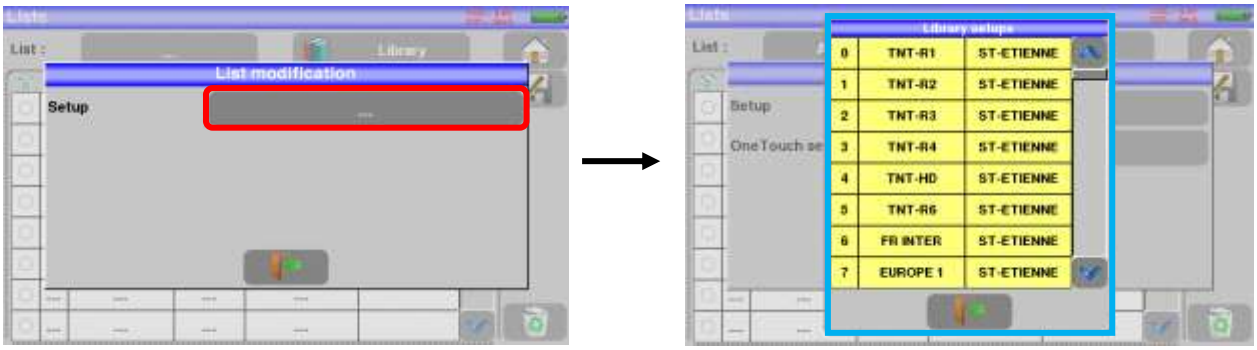


To add a setup to the list, select the line. A window shows up:

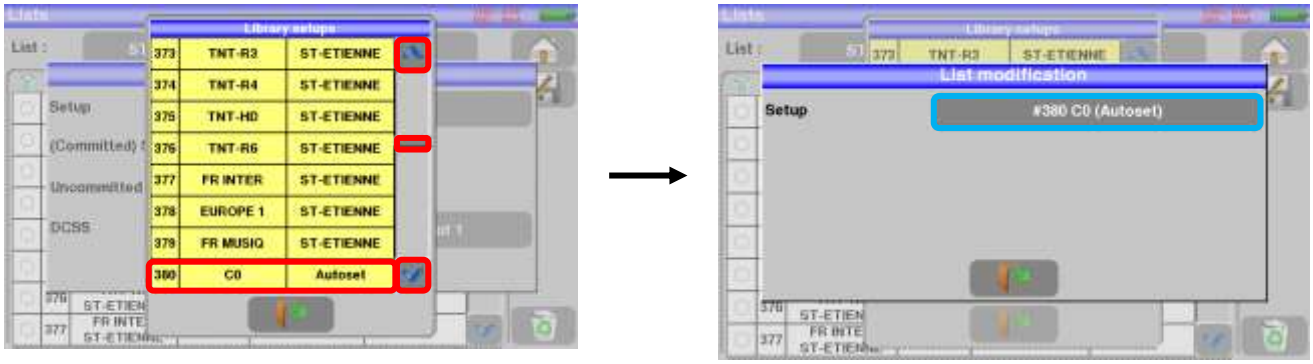


	Attention: If the line contains a setup, it shall be erased. To cancel, press: 

By pressing the key before Setup, you disclose the available setups from the library (you cannot create a setup from a list; to create a setup, see Setup creation or modification in the library):



Scroll the list up or down to find the setup you want to add to your list. Press the line you want:



The setup is now in the list:

You may erase the setup from the list by pressing the check to the left of the setup or to the setups you have to delete. Then click the basket  and select the deletion of the selected setup:

You can also delete the totality of a list by pressing directly on the basket  then by selecting 

.

8 Setup library

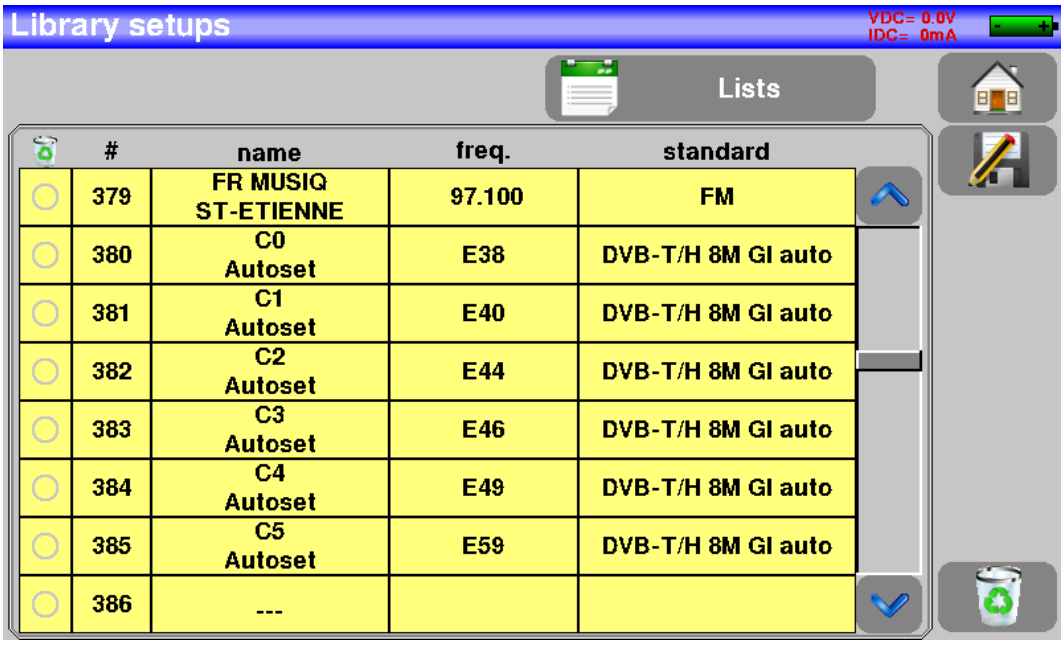
8.1 The library page

By pressing Home  then Lists-Library 

, you can access the Lists function.

From there, you can access the Library by pressing the key 

.

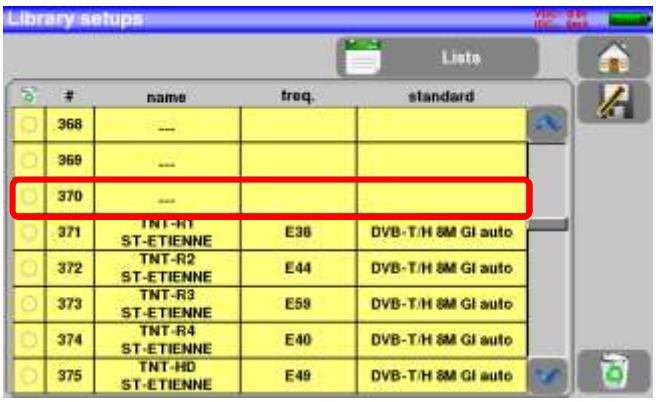


#	name	freq.	standard
379	FR MUSIQ ST-ETIENNE	97.100	FM
380	C0 Autoset	E38	DVB-T/H 8M GI auto
381	C1 Autoset	E40	DVB-T/H 8M GI auto
382	C2 Autoset	E44	DVB-T/H 8M GI auto
383	C3 Autoset	E46	DVB-T/H 8M GI auto
384	C4 Autoset	E49	DVB-T/H 8M GI auto
385	C5 Autoset	E59	DVB-T/H 8M GI auto
386	---		

8.2 Creation or modification of setups in the library

To create or change a setup in the library, you have to select a line in the table. A window pops up:

	**Attention:** If the line contains a setup, it will be erased. To cancel, press: 

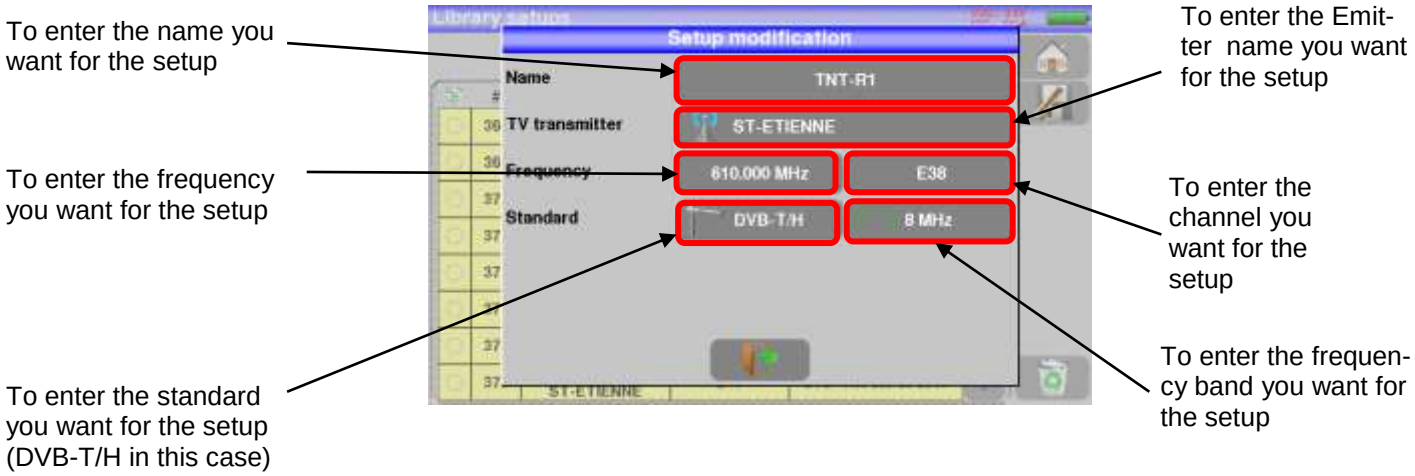


You may erase the setup from the list by pressing the check to the left of the setup or to the setups you have to delete. Then click the basket  and select the deletion of the selected setup:

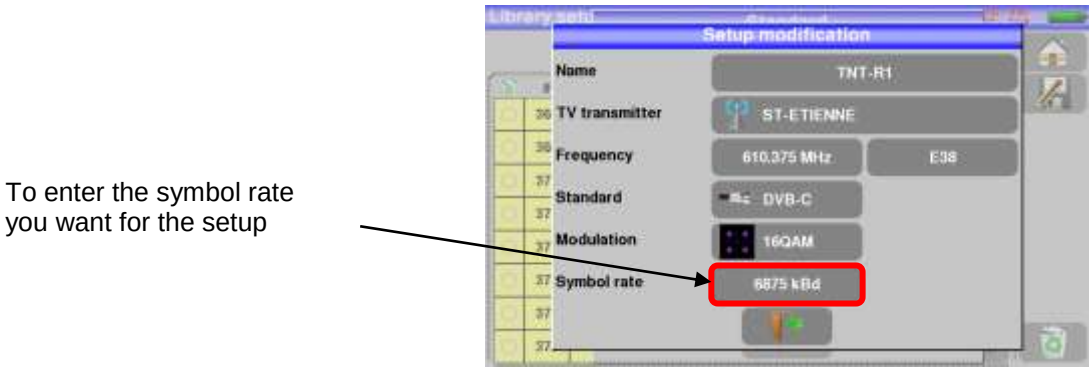
From this window, you can create a terrestrial or cable setup.
To proceed, see chapter 5 Man-machine interface

- **Terrestrial setup:**

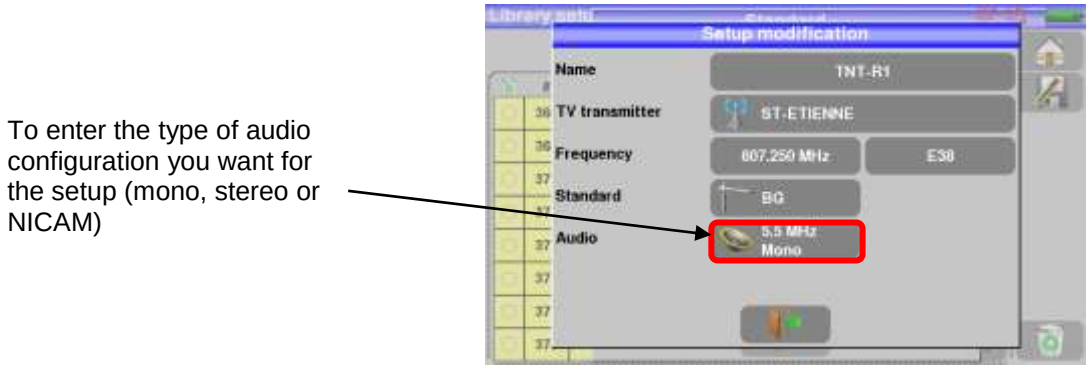
Under standard DVB-T/H DVB-T2



Under standard DVB-C / DVB-C2



In terrestrial analogical standard (L, BG, DK, I and MN)

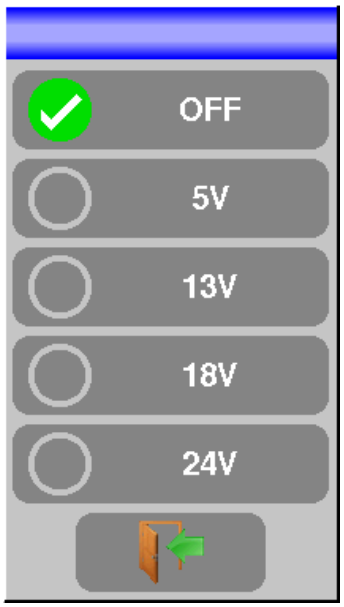


9 Remote supply

In order to enable or disable Remote supply, push on 

on Home page.

This window appears :



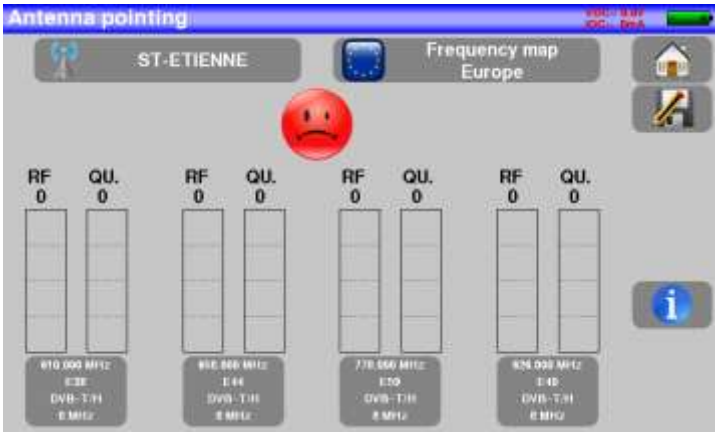
You can select the desired voltage by pushing on the correct button.

Go out by pushing:

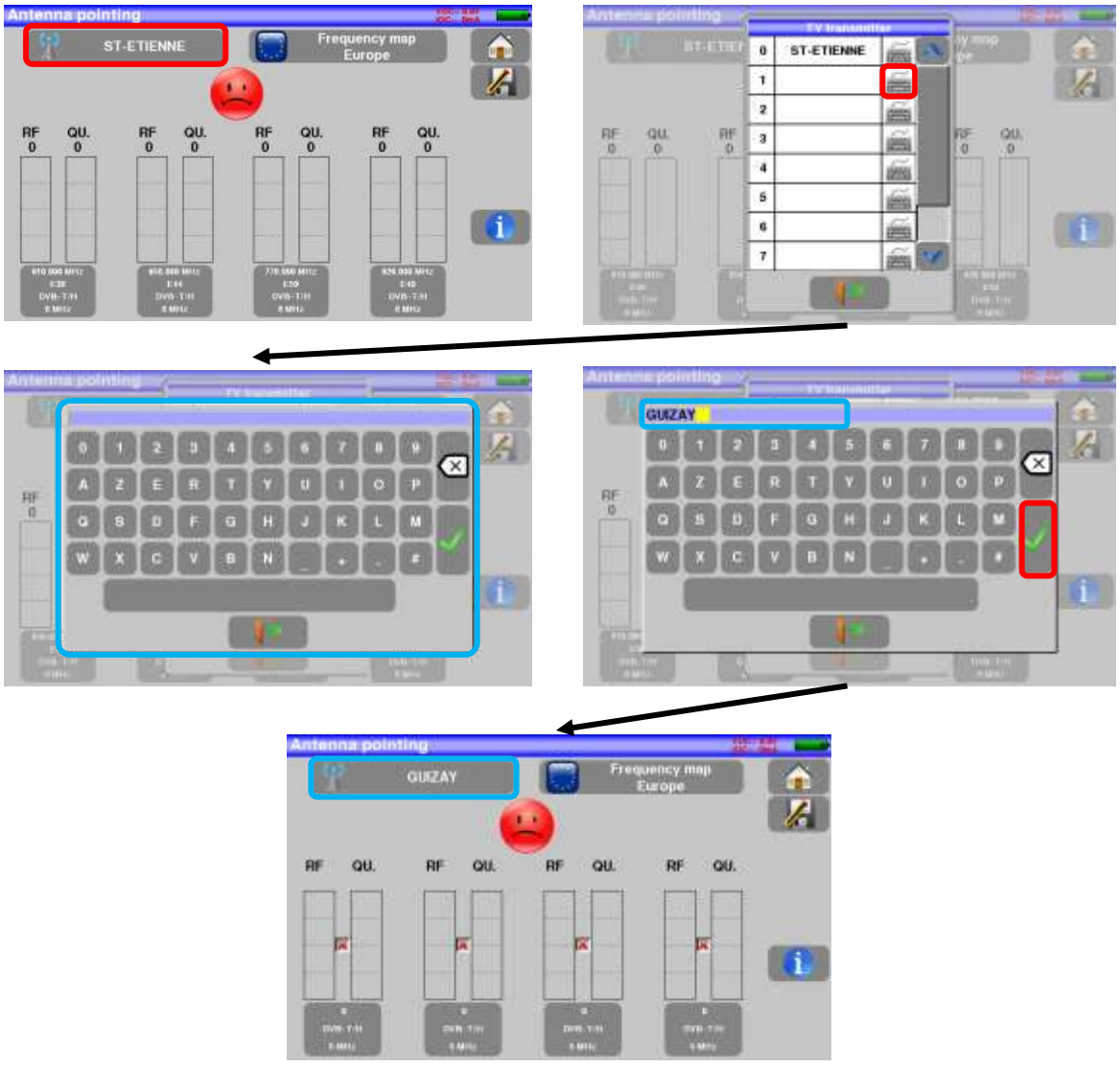
10 TERRESTRIAL check

To access to the menu terrestrial check from Home page, press 

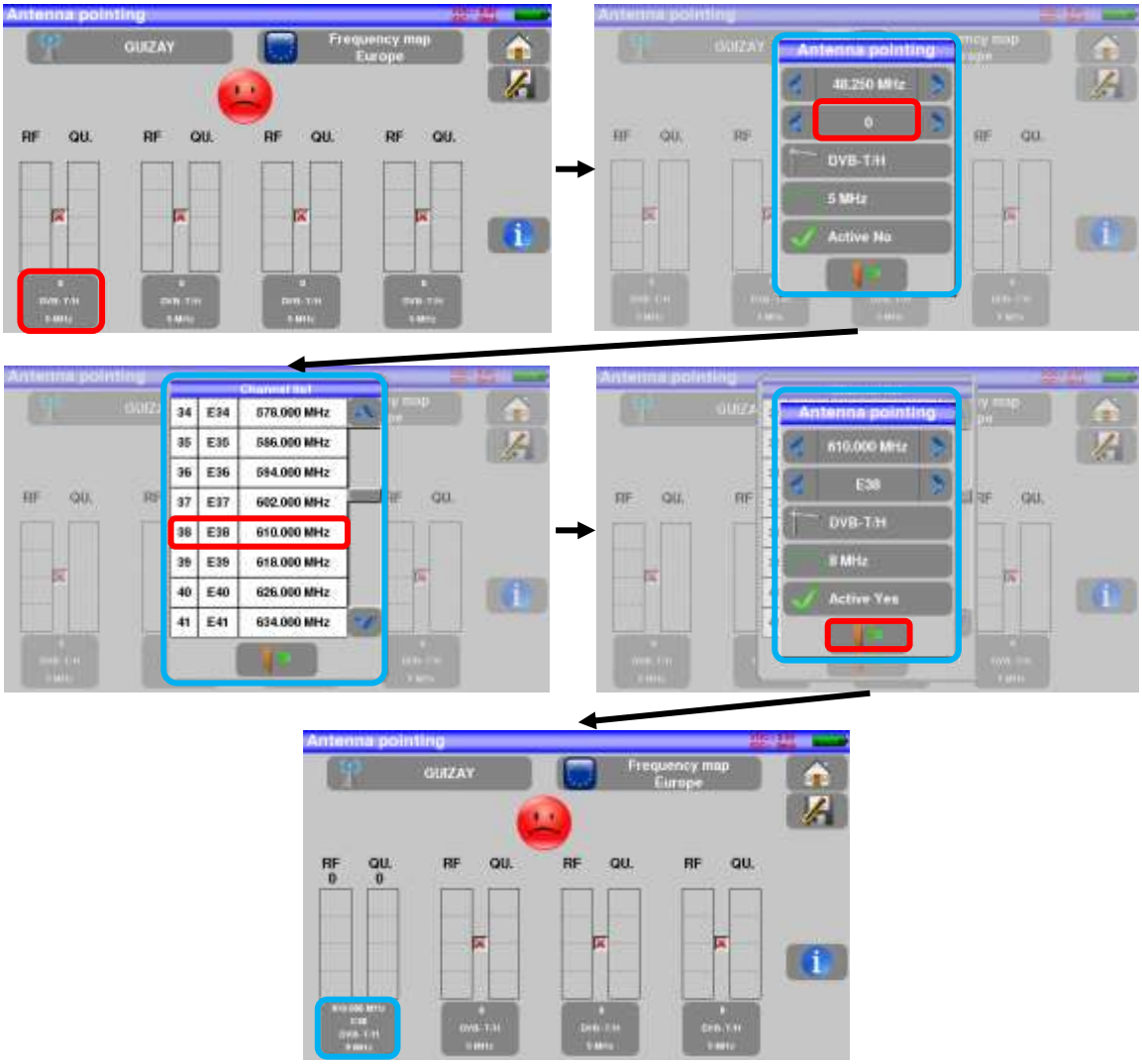
The following page appears:



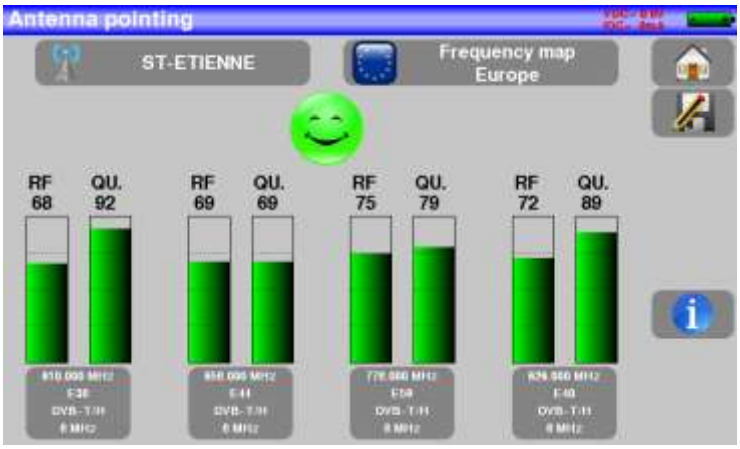
Set up your check:



Enter 4 frequencies or channels of the transmitter you try to check.



Once you informed the 4 channels, slowly orientate the antenna until hearing the locking melody and getting the best quality.

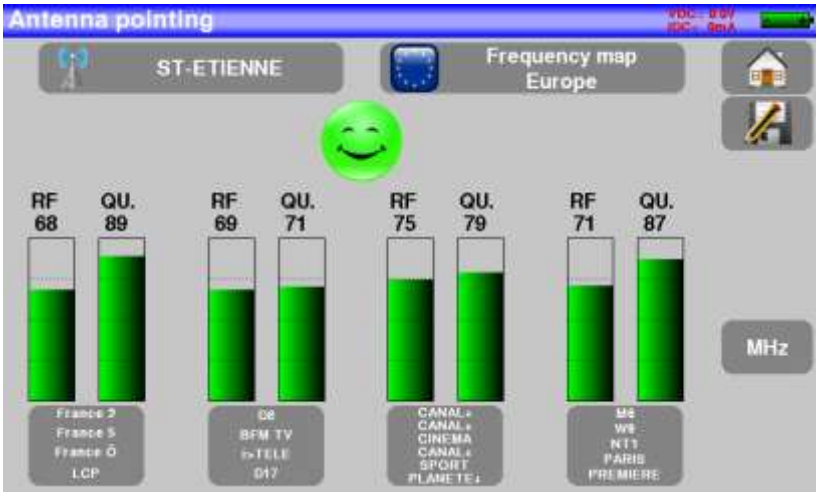


No found transponder → red smiley

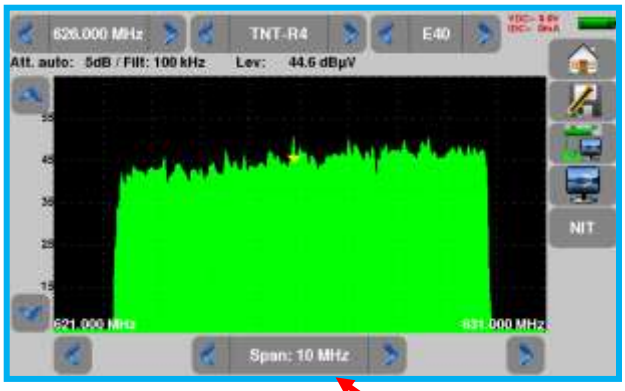
Average reception quality (< 50%) → orange smiley

Good reception quality (> 50%) → green smiley

Press  key permits to list the services distributed on the multiplex:

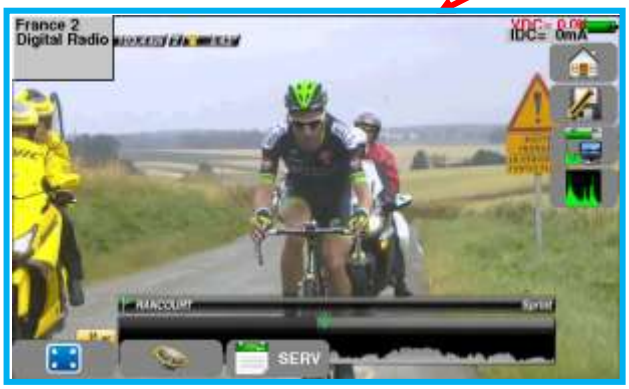


11 The Measures-TV-Spectrum page



SPECTRUM
mode full screen

TV
mode



Autolock :
Automatic search of setup

12 Measures (MEASURES-TV-SPECTRUM)

Pressing the MEASURE zone gives access to the **MEASURES** function.

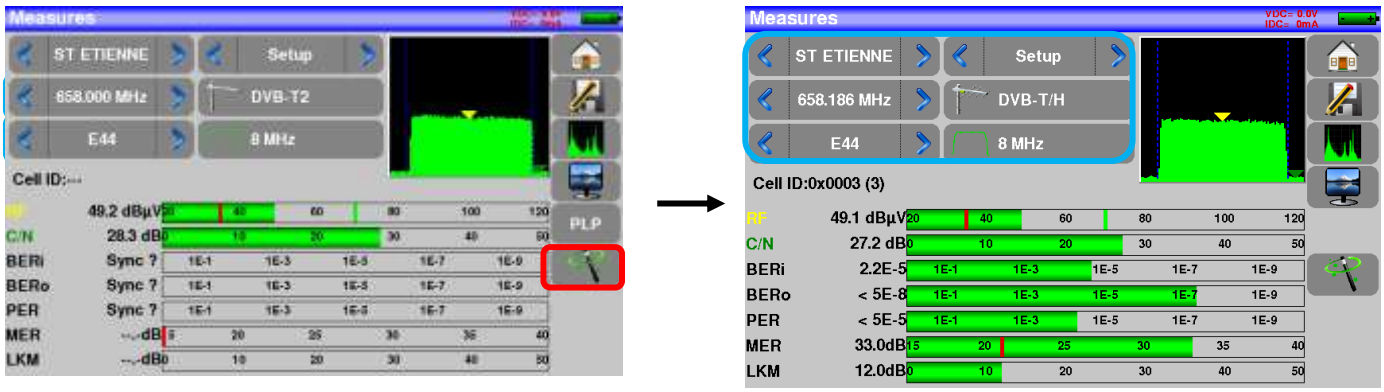
In this page, you can either perform measurements on a memorized program in the current list (see chapter « Measurement list »), or change parameters manually, or use the AutoLock function

12.1 Autolock function

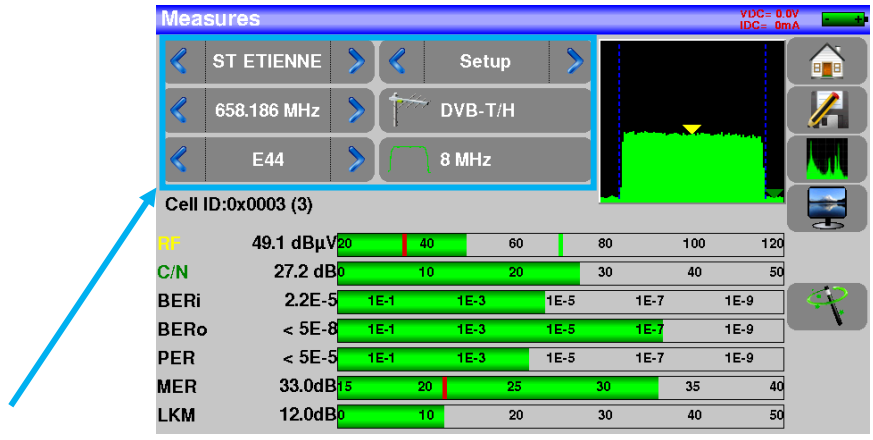
This function is design to lock on a digital signal (terrestrial or cable)

You just have to enter the frequency or the channel (for terrestrial), then press AutoLock, The instrument will find automatically in few seconds the digital standard, the modulation type and all other parameters of the signal.

Example for terrestrial, channel 38 (frequency 610MHz):



12.2 Modification of parameters



The various parameters are:

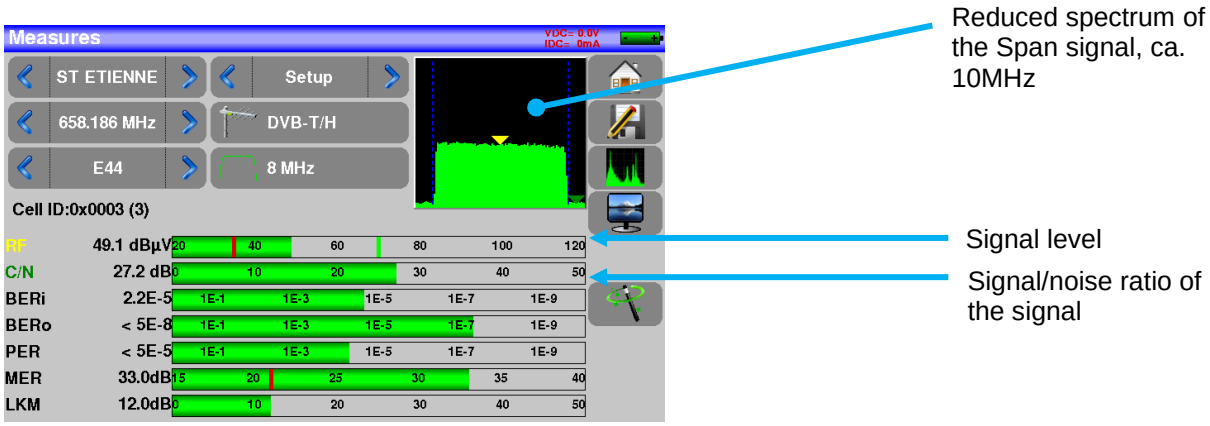
- The name of the setup (selection on the active list)
- The frequency
- The standard and bandwidth for DVB-T/H and DVB-T2
- The corresponding channel number for terrestrial and cable mode
- The symbol rate for cable
- The audio mode for the analogical TV.

12.3 Level measurements

You can measure levels at a specific frequency with a detection matching the standard.

	In terrestrial band, for an user socket, the level should be: - between 50 and 66 dBµV under FM - between 35 and 70 dBµV under DVB-T/H, DVB-T2 - between 57 and 74 dBµV in any other case

Example in terrestrial mode:



	The best is to be the closest possible of the green bar without exceeding it. For the MER measure, the value must be superior to the mini threshold.

The appliance makes different measurements according to the current **standard**.

The other possible measurements are:

- **Average** measurement
- **Peak** measurement
- **Power** measurement.

12.4 Terrestrial band

The appliance automatically makes level measurements on the **Video carrier wave.**

The following table sums up the measurement types and the frequencies of the audio carrier waves for each standard:

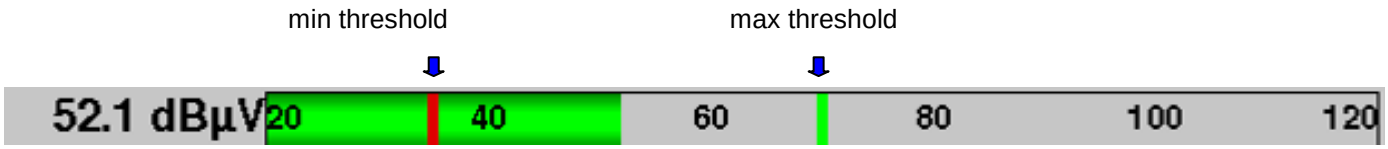
Standard	**Video carrier**	**Measure**	**Sound carrier**		
			Mono	stéréo	NICAM
BG	negative, AM	peak	FM 5.5 MHz	FM 5.74 MHz	DQPSK 5.85 MHz
DK	negative, AM	peak	FM 6.5 MHz	FM 6.258 MHz	DQPSK 5.85 MHz
I	positive, AM	peak	FM 6.0 MHz		DQPSK 6.552 MHz
L	positive, AM	peak	AM 6.5 MHz		DQPSK 5.85 MHz
MN	negative, AM	peak	FM 4.5 MHz	FM 4.72 MHz	
DVB-C	digital	power			
DVB-T/H	digital	power			
DVB-T2	digital	power			
DAB/DAB+	numérique	power			
FM	FM	average			
Carrier	not modulated	average			

The appliance displays the level of the **Video** carrier wave and the **C/N** ratio.

12.5 Thresholds

Predefined thresholds are used to assess if the measurement is pertinent.

Standard	Min	Max
Terrestrial analog TV	57	74
DVB-C/C2	57	74
DVB-T/T2	35	70
DAB-DAB+	35	70
FM, Carrier	50	66



12.6 Digital measurements

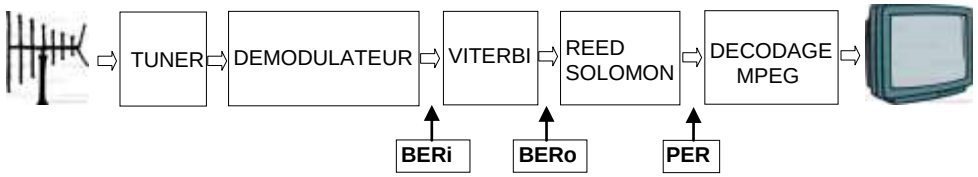
In digital measurement mode, in addition to the **RF** level and to the **C/N** here above, the appliance also displays the various **BER** (Bit Error Rate), the **PER** (Packet Error Rate) and the **MER** (Modulation Error Ratio) under **DVB-T/T2/T2Lite and DVB-C/C2.**

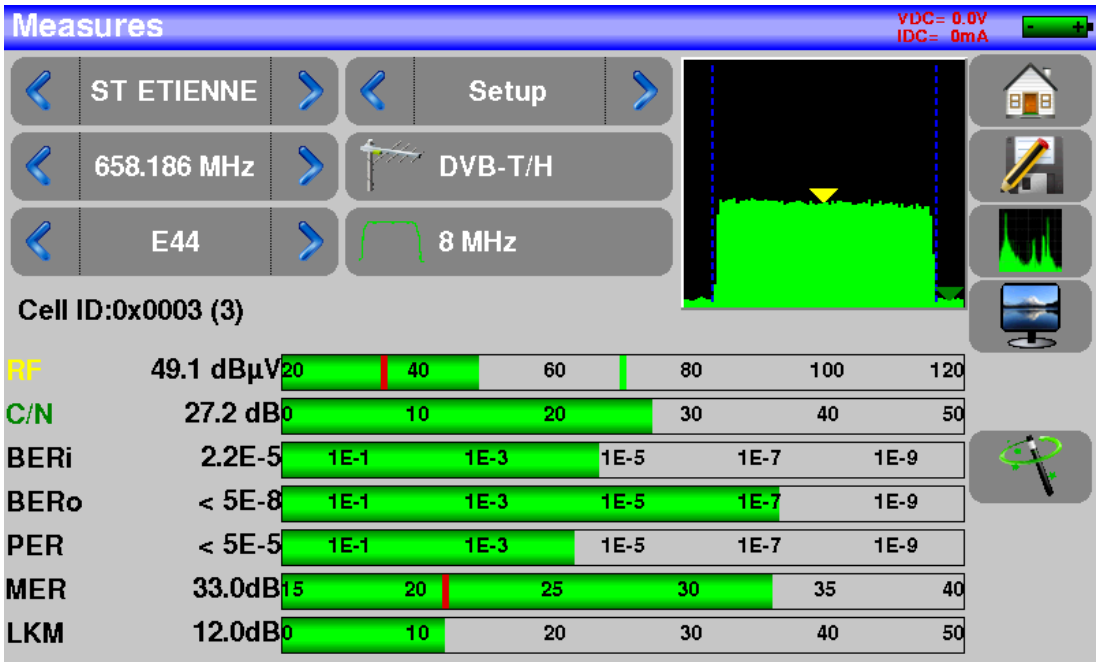
You also get the **LKM:x.xdB** (Link Margin) specification.
This expression in dB is the difference between the measured MER and the limit MER before disconnection of the image: **it's the security available before disconnection**.

	"Sync ?" displayed on screen means that the signal is absent or unlocked; check its presence, the modulation parameters, the presence of remote power if needed.

	The sign **<** before a value or error rate shows that there is no error but that 10^{-X} bits have been tested (i.e. $<10^{-8}$ means that 10^{8} bits have been tested).

12.7 DVB-T/H





Display of the measures of:

- **BERi**: error rate before Viterbi
- **BERo**: error rate after Viterbi
- **PER**: error rate after Reed Solomon (error rate packet)
- **MER**: modulation error rate
- **LKM**: noise margin (Link Margin)

BERx: 'bits' error rate

Ratio between the number of false bits / number of transmitted bits during the measurement time

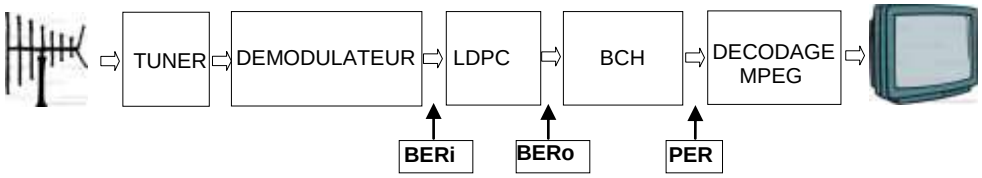
PER: 'paquets' error rate

Ratio between the number of false packets / number of transmitted packets during the measurement time

Recall: Under DVB-T/H, a packet is made of 204 octets; a packet is "false" if it includes more than 8 wrong octets (correction by Reed Solomon coding).

Display of the value of Cell ID from the diffuser and specific to the emitter.

12.8 DVB-T2 /T2 Lite



Display of the measures of:

- **BERi**: error rate before LDPC
- **BERo**: error rate after LDPC
- **PER**: error rate after BCH (lost packets)
- **MER**: modulation error rate
- **LKM**: noise margin (Link Margin)

Recall:

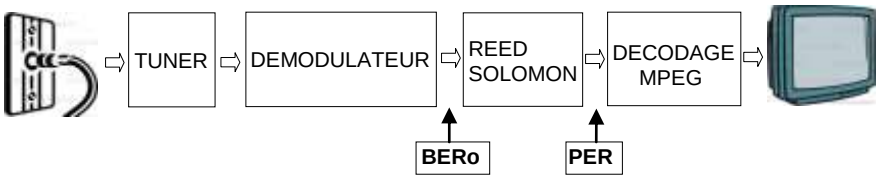
LDPC: Low Density Parity Check

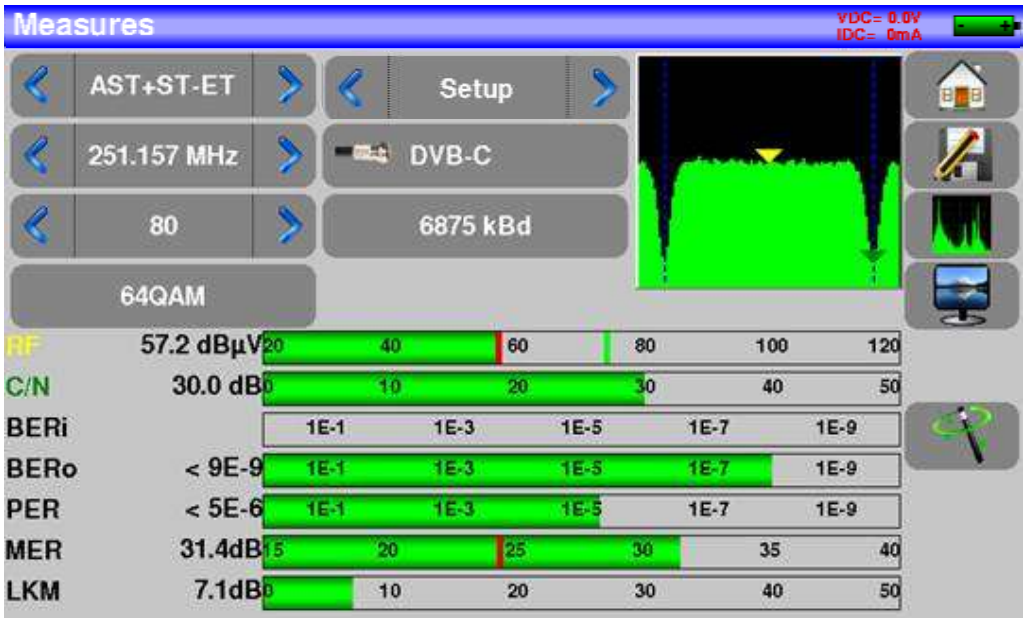
BCH: Bose Chauhuri Houquenohem

The concatenation Viterbi + Reed Solomon of the correction of DVB-T/H has been replaced by the concatenation LDPC + BCH under DVB-T2.

Display of the values of Cell_ID from the diffuser and specific to the emitter.

12.9 DVB-C





Display of the measures of:

- **BERo**: error rate before Reed Solomon
- **PER**: error rate after Reed Solomon (error rate packet)
- **MER**: modulation error rate
- **LKM**: Noise margin (Link Margin)

BERo: error rate 'bits'

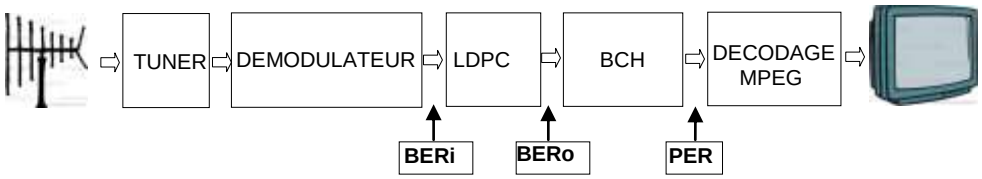
Ratio between the number of false bits / number of transmitted bits during the measurement time

PER: error rate 'packets'

Ratio between the number of false packets / number of transmitted packets during the measurement time

Recall: Under DVB-C, a packet is made of 204 bites; a packet is "false" if it includes more than 8 wrong octets (correction by Reed Solomon coding).

12.10 DVB-C2



Display of the measures of:

- **BERi**: error rate before LDPC
- **BERo**: error rate after LDPC
- **PER**: error rate after BCH (lost packets)
- **MER**: modulation error rate
- **LKM**: noise margin (Link Margin)

Recall:

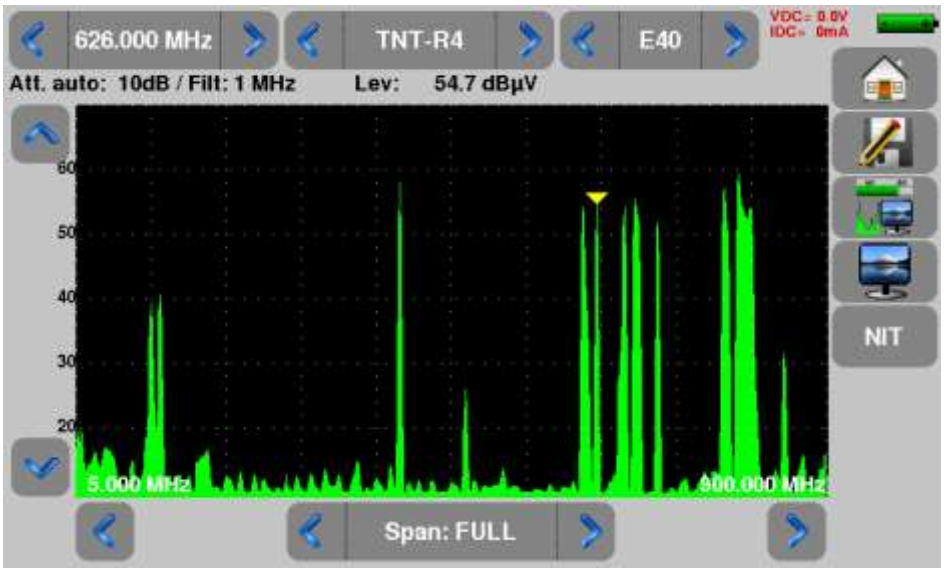
LDPC: Low Density Parity Check

BCH: Bose Chauhuri Houquenohem

- **Active PLP and Data slice**

13 Spectrum analyser

Pressing SPECTRUM gives access to the **SPECTRUM ANALYSER function.** (graphical representation frequency / amplitude of the present signals in the input of the device)



The input attenuator is automatically tuned according to the level of the signals measured.

Filters are automatically selected according to the « Span ».

The filter used is displayed on the upper left corner.

Parameters of the spectrum are:

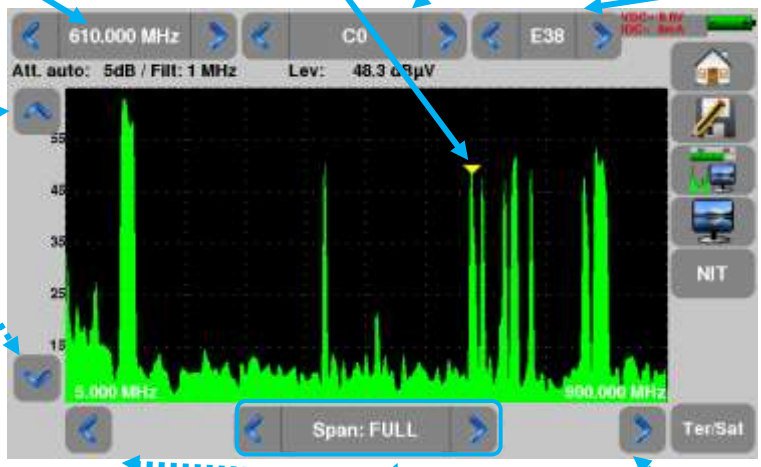
Frequency: value of the frequency where the cursor is, user can enter a frequency value, or increase – decrease the frequency with <> keys

Cursor: simply press the area where you want to move or set the cursor

List: you can select a Program (in the current list)

Channel: use a channel for the spectrum (in terrestrial mode).

Reference level: can be modified with up-down arrows



Frequency range: can be changed using the arrows

Span : frequency span around the center frequency

14 Image and Sound

Pressing the TV zone gives access to the **TV** function.

14.1 Digital TV

The name of the service and its main characteristics are displayed on top left of the screen.

- 720x576i: picture resolution 720 pixels / line, 576 lines, interlace
- 25 Hz: frame frequency
- MPEG-2: picture compression
- Video Rate 4.106 Mbits/s : instantaneous binary rate of the service
- Audio MPEG Layer II: sound compression

On this page, there are 3 keys at the bottom of the screen; they will be described in the next chapters

14.2 Full screen mode

Pressing the key  displays the image in full screen; only remain the battery level and the intensity + voltage of the remote power supply:

To exit, you only have to touch the screen anywhere.

14.3 Audio

To set the volume, press  an adjustment bar shows up:

The instrument can decode the following digital sound formats:

MPEG-1 L1/L2		
AAC	Advanced Audio Coding	License Via Licensing
HE-AAC	High Efficiency AAC	License Via Licensing
Dolby Digital		License Dolby®
Dolby Digital Plus		License Dolby®

Made under **licence** by **Dolby** laboratories.

Dolby and the double-D symbol are trademarks of **Dolby Laboratories**

14.4 Table of services

Pressing 

gives access to the list of services:

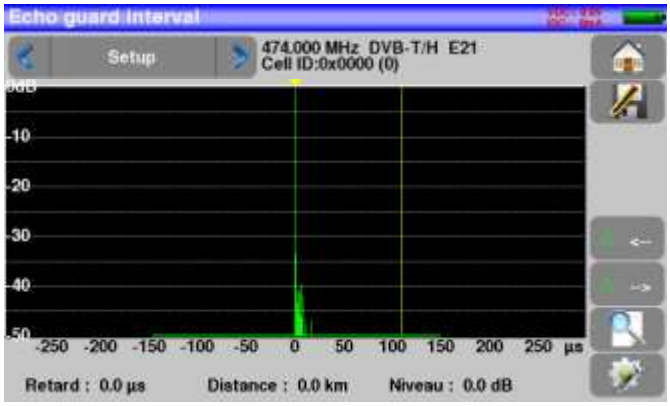
This function allows selecting the channel you want to display. You only have to press the line you want.

15 Echo / Guard interval

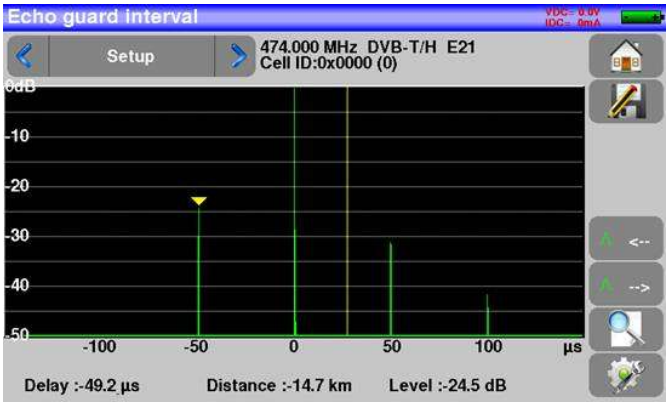
	Available only for DVBT/H, DVB-T2 or DVB-C2 standards.

Pressing 

allows you to access to **Echo Guard interval measurement.**



Signal without echo



Signal with echoes and pre-echoes

Pressing  changes the horizontal scale (distance).

Horizontal scale can be set in µs, km or miles by pressing 

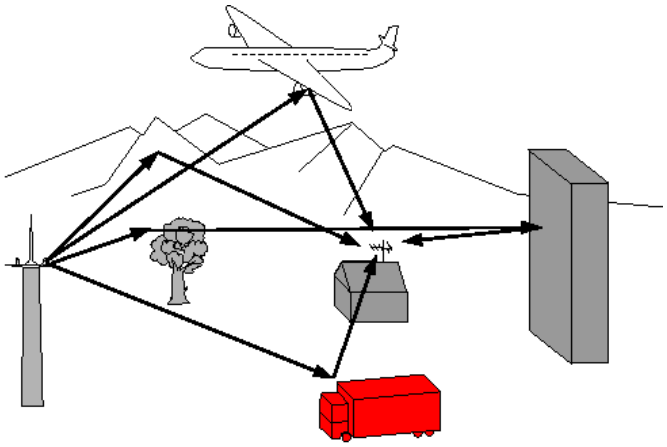
Moving measurement arrow  can be done by screen touch, or by automatic search keys 

and  .

The end of the guard interval is displayed with a yellow line.

Reminder :

Remember: In terrestrial TV broadcasting, the received signal on the antenna comes from several possible ways: the **echoes**.



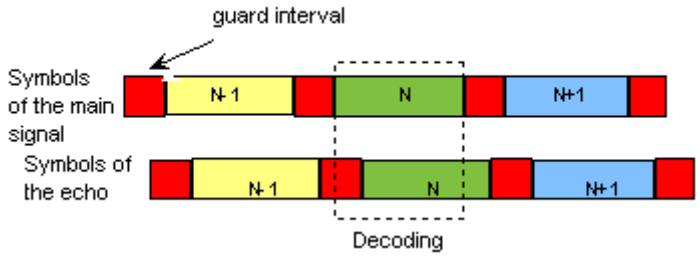
In digital TV DVB-T/H and DVB-T2, these echoes may help or degrade the image according to the time delay between the various signals that reach the antenna.

The broadcasting norms DVB-T and DVB-T2 define a modulation parameter called "**guard interval**" where echoes won't disturb the reception.

The transmission of digital data (**Symbol**) is interrupted during the **guard interval**.

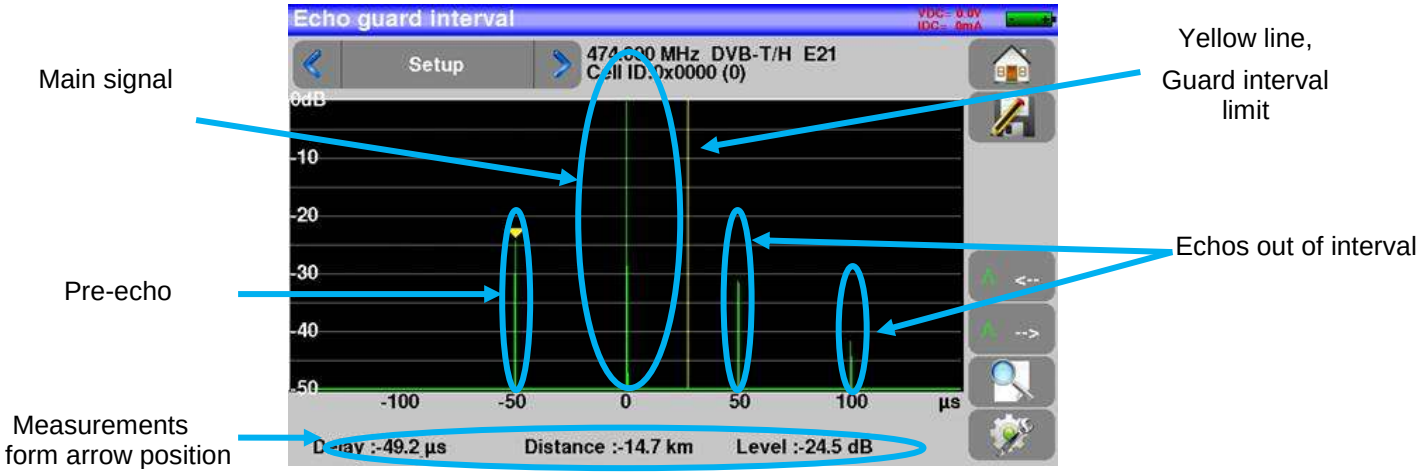
A delayed (or advanced) symbol of any **shorter** duration than the guard interval will not disturb the reception.

A delayed (or advanced) symbol of any **longer** duration than the guard interval will disturb the reception.



You have to reduce the level of reception of the echoes by orienting the antenna or by selecting a more directive antenna.

The **Echo** function of the appliance enables you to display possible **echoes** that disturb the received signal.



Relative amplitude in dB and delay in µs (distance in km) from the main signal (0 pulse) can be measured.

The yellow line represents the end of the guard interval.

Echoes and pre-echoes (pulses) above the yellow line disturb the signal and must be reduced as much as possible.

The echoes (pulses) beyond this line disturb the reception and must be as weak as possible.

☝	Attention: a high amplitude echo pulse within the guard interval will also disturb the signal quality.

16 Constellation

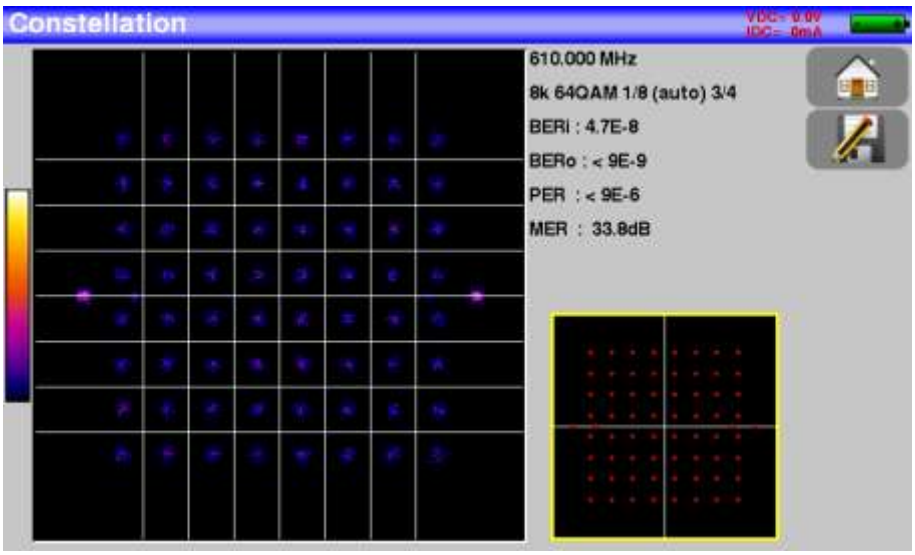
The 

key gives you access to the **CONSTELLATION** function.

These measures are available if one of these standards is running in the **LEVEL MEASUREMENT** page.

- DVB-T/H
- DVB-T2
- DVB-C
- DVB-C2

The appliance displays the **Constellation** of the current signal.



The information displayed on the right of the **Constellation diagram** is:

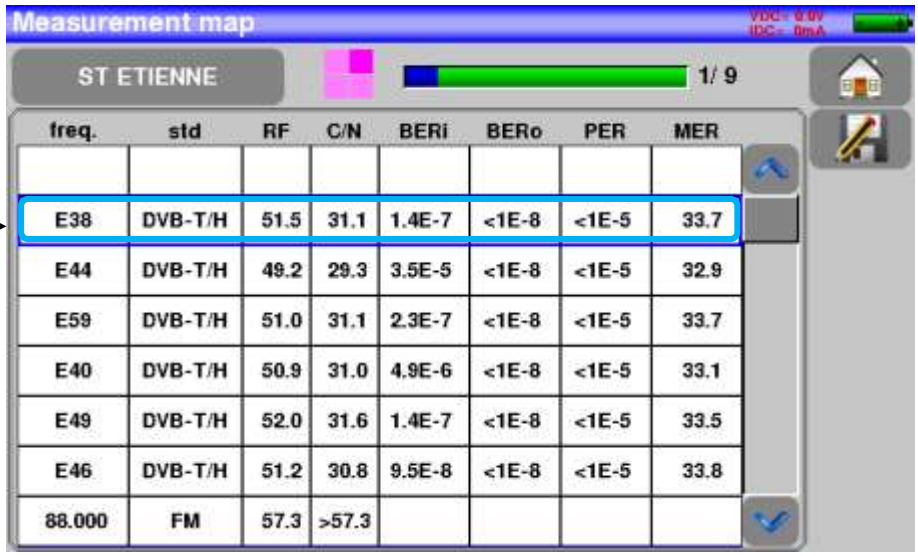
- current frequency
- modulation
- constellation
- symbol rate
- error rate and MER

17 Measurement map

To access the **MEASUREMENT MAP** function, press Home then Measurement map:

It is an automatic level and error rate measurement of the setups in the measurement list with labeling of the levels beyond tolerance.

Measurement result for channel 38 under DVB-T/H →



freq.	std	RF	C/N	BERi	BERo	PER	MER
E38	DVB-T/H	51.5	31.1	1.4E-7	<1E-8	<1E-5	33.7
E44	DVB-T/H	49.2	29.3	3.5E-5	<1E-8	<1E-5	32.9
E59	DVB-T/H	51.0	31.1	2.3E-7	<1E-8	<1E-5	33.7
E40	DVB-T/H	50.9	31.0	4.9E-6	<1E-8	<1E-5	33.1
E49	DVB-T/H	52.0	31.6	1.4E-7	<1E-8	<1E-5	33.5
E46	DVB-T/H	51.2	30.8	9.5E-8	<1E-8	<1E-5	33.8
88.000	FM	57.3	>57.3				

BERi, **BERo** and **PER** are generic terms (frequently used)

BERi = BER in = inner BER
first BER treated by the demodulator (BER channel, CBER, LDPC)
BERo = BER out = outer BER
last BER treated by the demodulator (BER Viterbi, VBER, BCH)
PER = packet error rate
non-proofread packet, lost packet, wrong packet (UNC, PER)

Important:

A bargraph above the Measurement map allows you to track the evolution of the scan.

The background color of this bargraph shows you that a complete scan has been made (for a save, for example):

- **red**: the measurement map has not been totally scanned yet

green: the measurement map has been totally scanned

17.1 Out of tolerance values

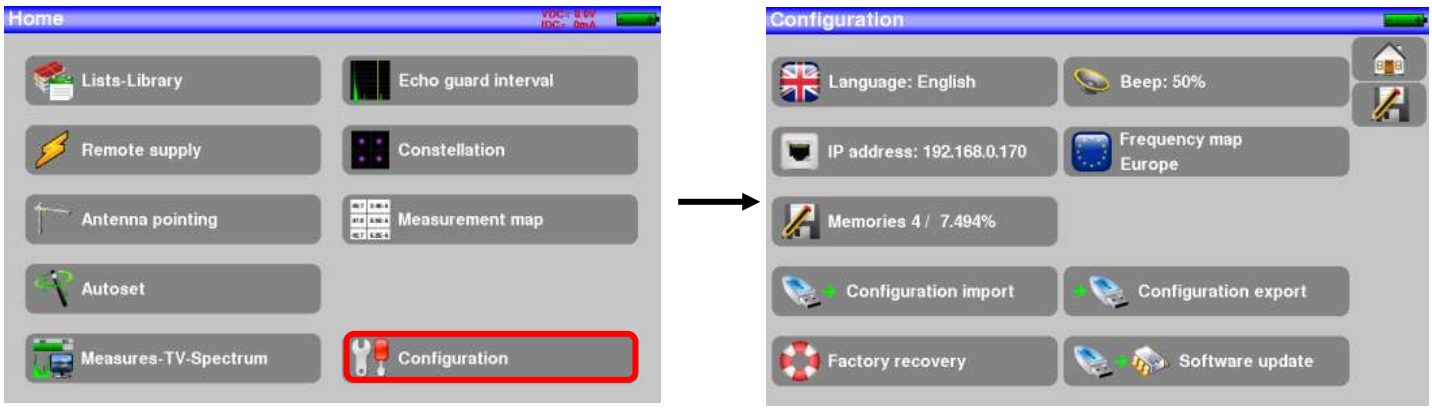
The digital values are colored according to the **Thresholds** before decision

- **red** for values less than **Threshold min**
- **orange** for values more than **Threshold max**

freq.	std	RF	C/N	BERI	BERo	PER	MER
E38	DVB-T/H	58.9	39.0	<5E-8	<1E-8	<1E-5	35.0
E44	DVB-T/H	59.1	39.2	<5E-8	<1E-8	<1E-5	35.3
E59	DVB-T/H	60.4	39.4	<5E-8	<1E-8	<1E-5	34.7
E40	DVB-T/H	59.7	39.3	4.2E-7	<1E-8	<1E-5	35.0
E49	DVB-T/H	53.2	33.3	4.7E-8	<1E-8	<1E-5	32.5
E46	DVB-T/H	58.0	38.1	4.2E-7	<1E-8	<1E-5	34.0

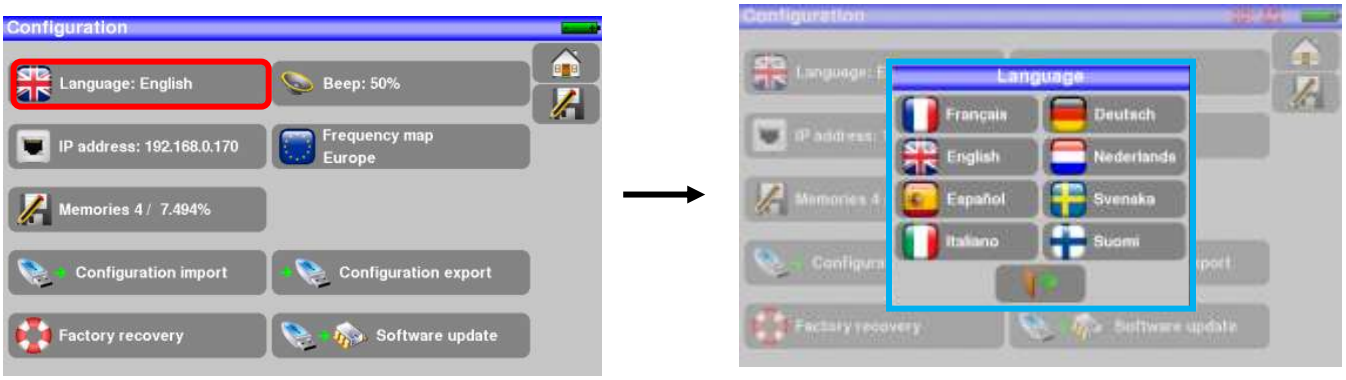
18 Configuration

For configuration, go to the Home page, then Configuration



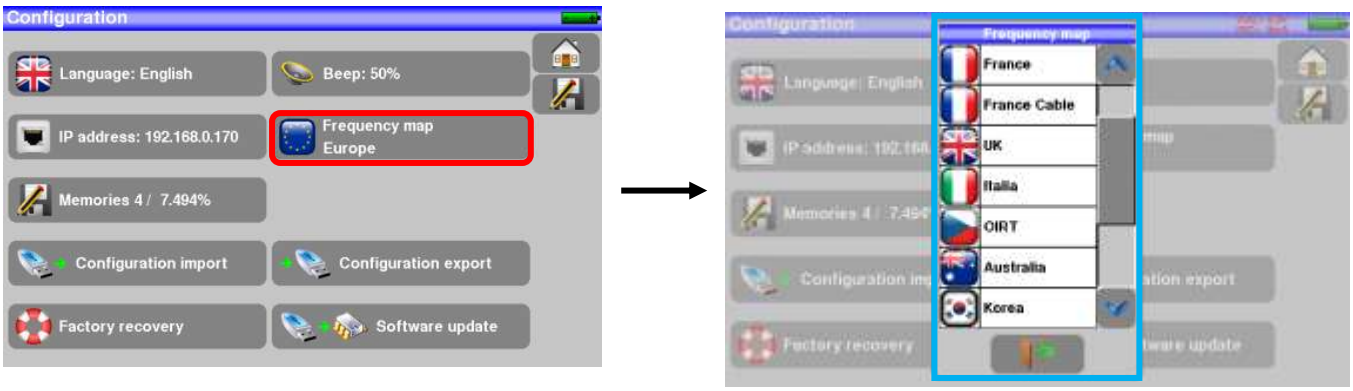
18.1 Language

You can select your language by pressing the « flag » (below). Press the flag corresponding to your language:



18.2 Frequency map

This key allows you to select the terrestrial frequency map of the appliance:



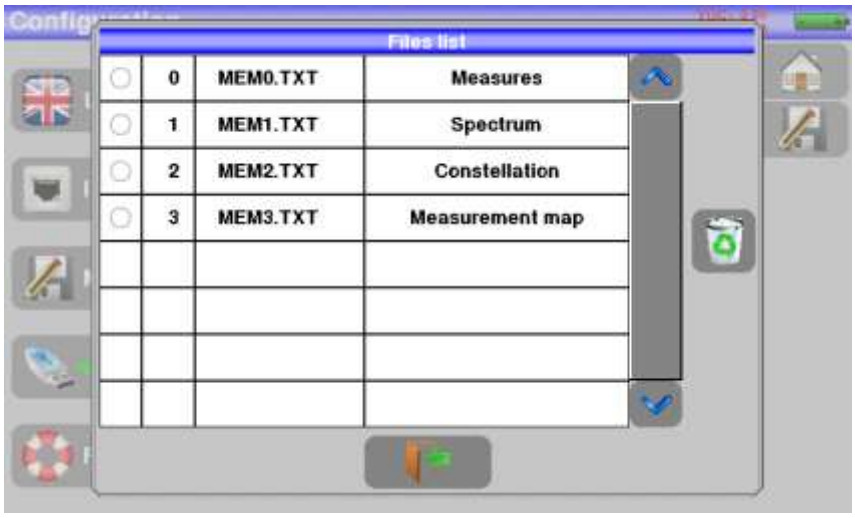
18.3 Memories

To save a picture or any other feature, see chapter Save

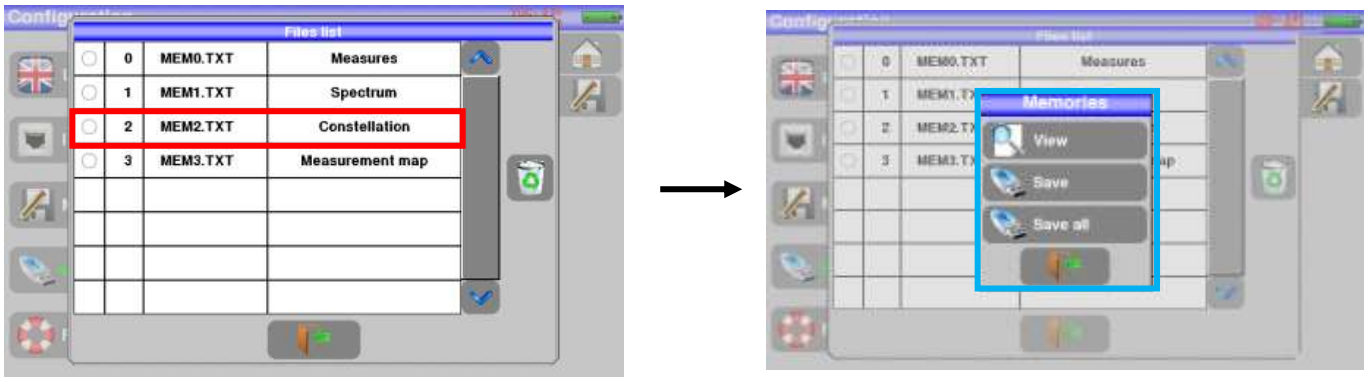
The number of saved file and their memory size are displayed.

When pressing this key, a pull-down menu lists the previously saved files.

The first column contains the order number of the file; the second column contains the name of the file; the last column contains the type of file: Measure, Spectrum, Measurement map…

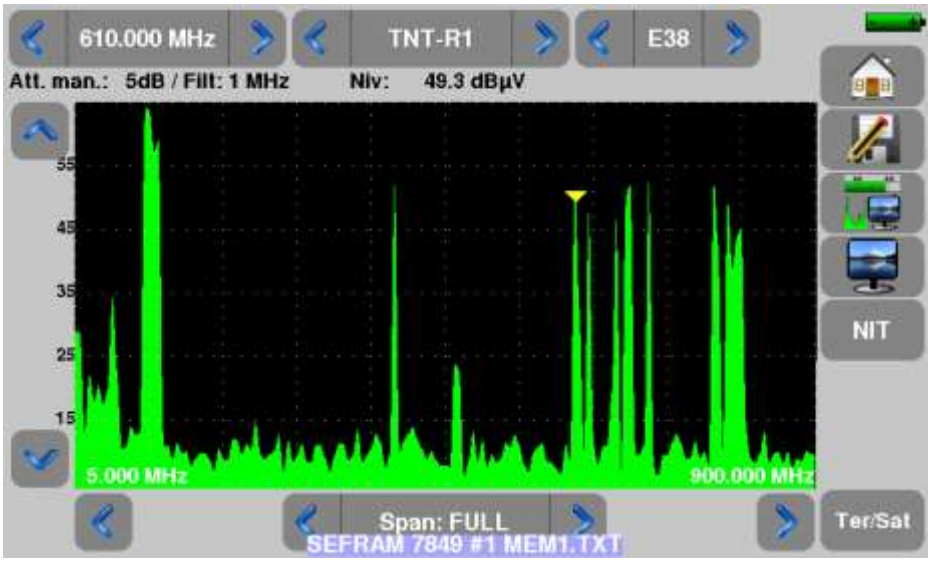


By pressing a line of the table, you open a window:



18.3.1 View

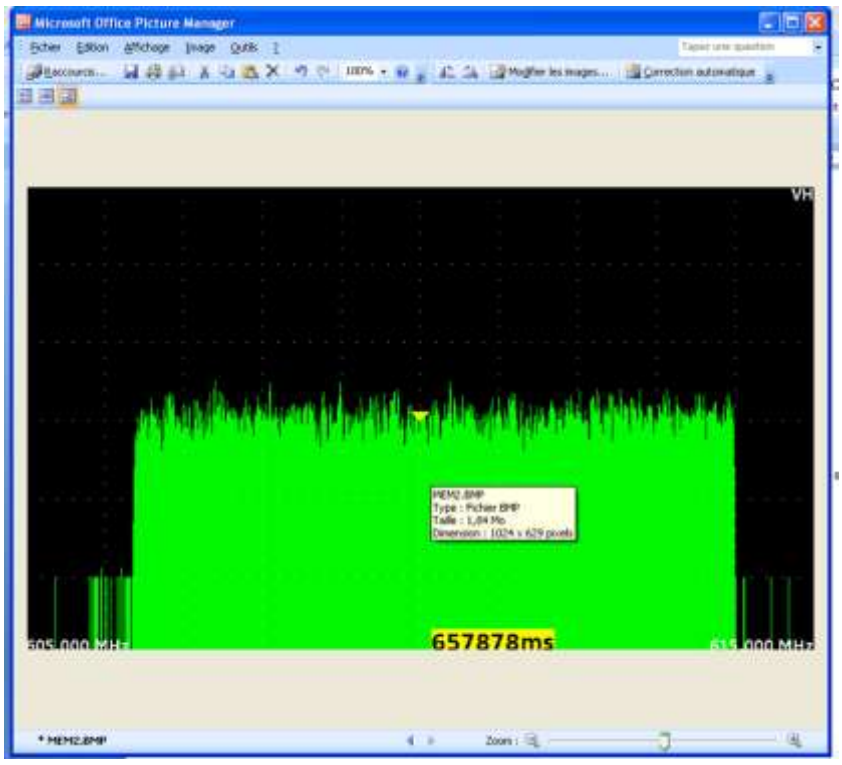
This key allows the display of the content of the file:



18.3.2 Save

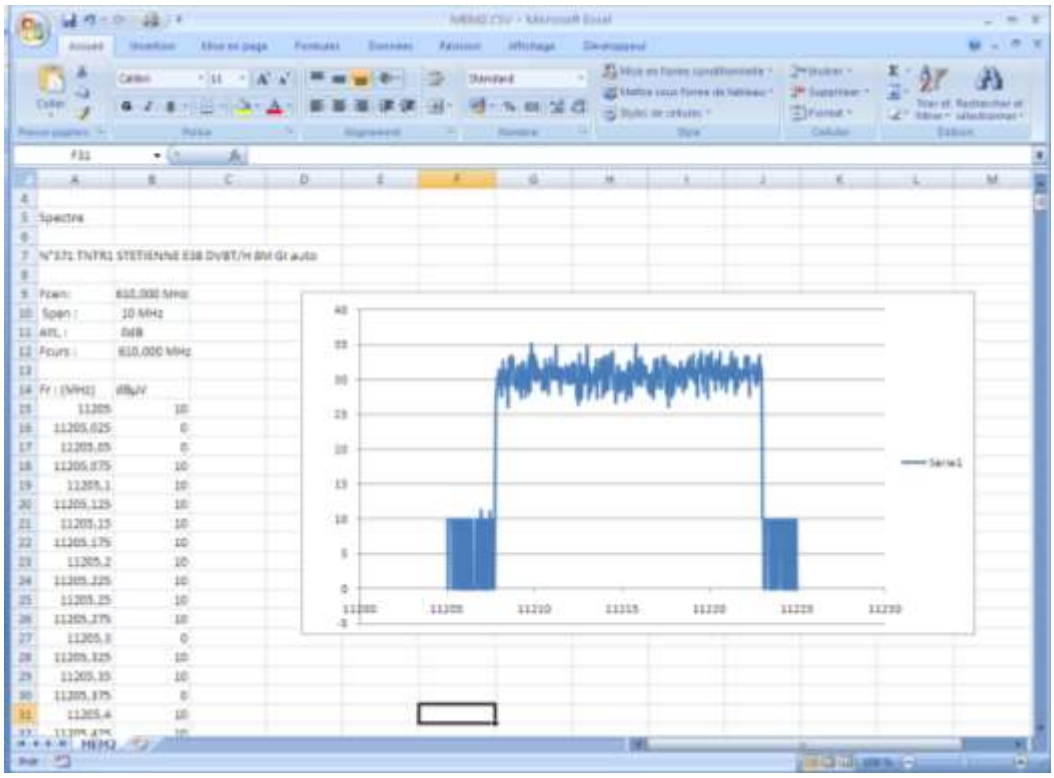
- **Save (BMP -> USB)** allows you to export the file to the USB stick under BMP format (non-compressed graph); it is useful to transfer graphs to a report in a PC computer.

Here is the BMP file of the previously displayed DVB-T/H channel, edited on PC to have the spectrum full screen.



- **Save (CSV -> USB)** allows you to export the file to the USB stick under CSV format (text file by columns separated with semicolons); it is useful to analyze values in a spreadsheet.

  Here is the spectrum here above with a curve under EXCEL™.



- **- Save all (BMP -> USB)** records all files from the appliance under BMP format into separated registers:
  - LEVEL for the level measurements
  - MAP for the measurement maps
  - SPECTRUM for the spectrum measurements
  - BER-MER for the error rate measurements
  - CONST for the constellations
  - ECHO for the echoes.

- **Save all (CSV -> USB)** also records all files from the appliance into separated registers, but under CSV format.

18.3.3 Update

See chapter Software update for more details.

18.4 Factory recovery

A complete set-up of the appliance under its FACTORY configuration, with confirmation

	Attention: In case of factory recovery, you **lose**: - the setup library - the measurement lists

18.5 Configuration import/export

You can make a backup on a USB stick of your setups/lists of your appliance by pushing « « Configuration Export ».

And you can import from a USB stick this configuration with the touch “Configuration import”. You can also update checksat/antenna pointing configuration available on SEFRAM’s website:
http://www.sefram.com/Maj_soft/Sat.csv

19 Software update

	Attention: Take care that the remaining battery life is sufficient (> 30%), else plug the appliance on the mains with the provided adapter.

You can easily update the software to get new functionalities.

The update requires an USB stick.

To achieve the update:

- Download the update file **784X_VX.X fichier zip** on our website (www.sefram.fr)
- Insert a USB stick on your PC
- Unzip the file onto the root of the memory stick
- Pull the USB stick off from your computer
- Turn your appliance on
- Go to the Home page,  press configuration 

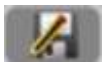
.
- Insert the USB stick into the connector of the appliance.
- Select Update: 

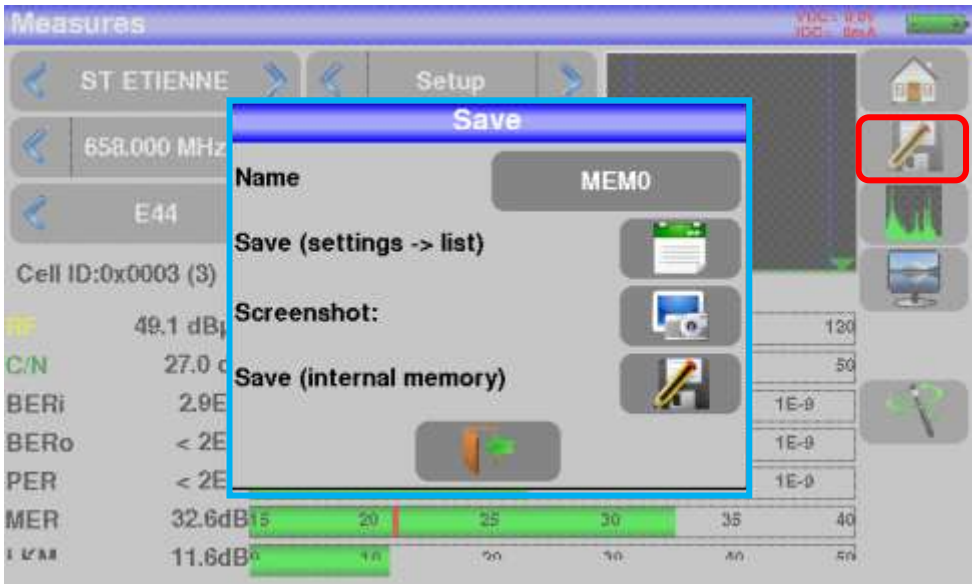
	Attention: Do not turn the appliance off while updating

The updating process lasts ca. 10 minutes. At the end of the update, the appliance asks you to restart the appliance. The software is then loaded into your appliance.

Error messages may show up: **Do not take them into account.**

20 Save

Pressing  opens a window (here, on the Measurement page):



In this window, you can save the current measurement parameters from the active list, make a screen shot to a USB stick under BMP format or make a save into internal memory.

You can rename the save file (see chapter Man-machine interface).

The default name of the save is MEM(**X+1)** (**X** is the number of saves in the appliance).

You will be suggested a save into internal memory only in the **Spectrum, Measurements, Constellation, Guard interval** and **Measurement map** pages.

	After transfer, you will be able to use the saved measures to create measurement reports on your computer (see paragraph Saves for more details).

	When you stop the appliance, it may need a few seconds to stop completely because the save on flash memory is carried out during the extinction.

21 Connection of the appliance to a PC

The appliance has an ETHERNET interface that makes it possible to connect directly to a PC.

For this type of connection, no driver is necessary.

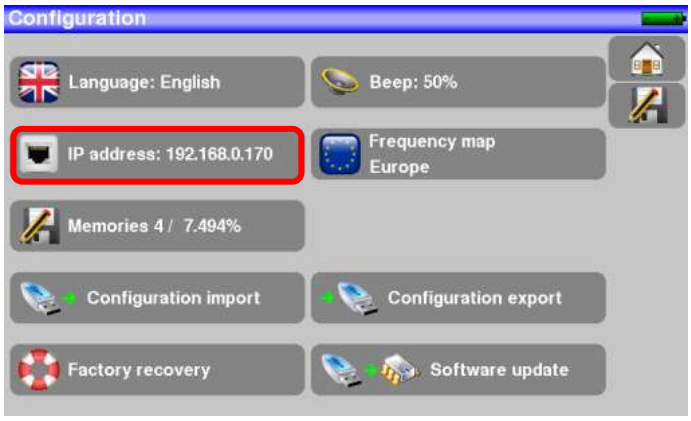
Connect your appliance to your PC by using a crossed ETHERNET cable (available in option with the number 298504246 asking SEFRAM).

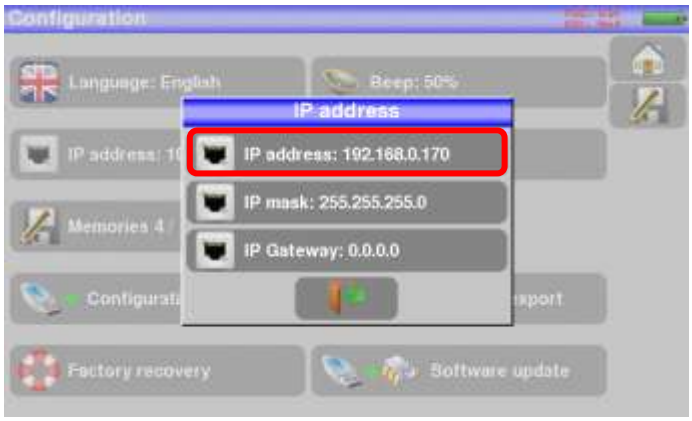
- **Configuration of the connection:**

Ethernet connection of your appliance to the PC.

To change the IP address of your appliance, press 

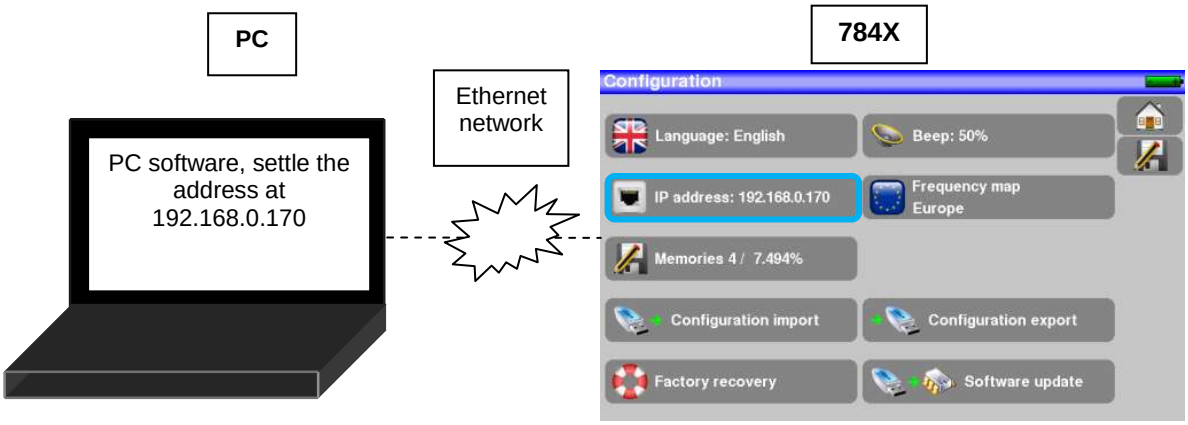
and:





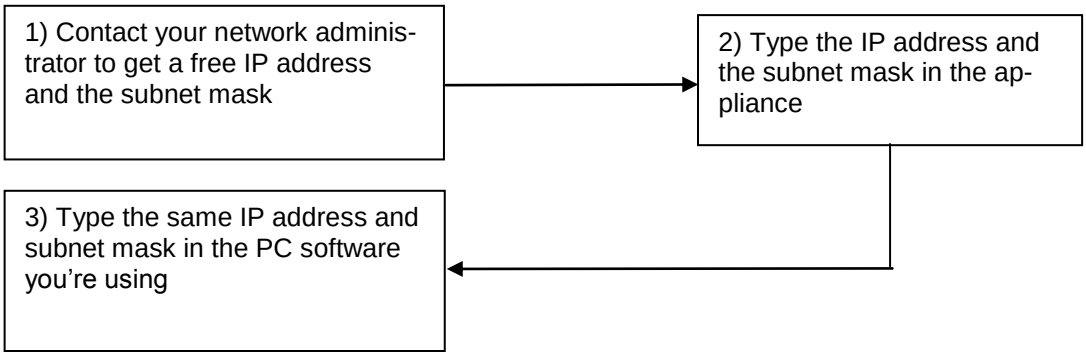
With the virtual digital keypad, type the IP address you want, then validate with ENTER

The PC software in communication with the appliance must have the same IP address as the appliance, just like in the example below:



	Attention: If the PC has already been connected to Ethernet (network, modem…), it is necessary to reboot the PC before connecting your appliance.

For the **Ethernet** connection of your appliance to a computer network, see the following scheme:



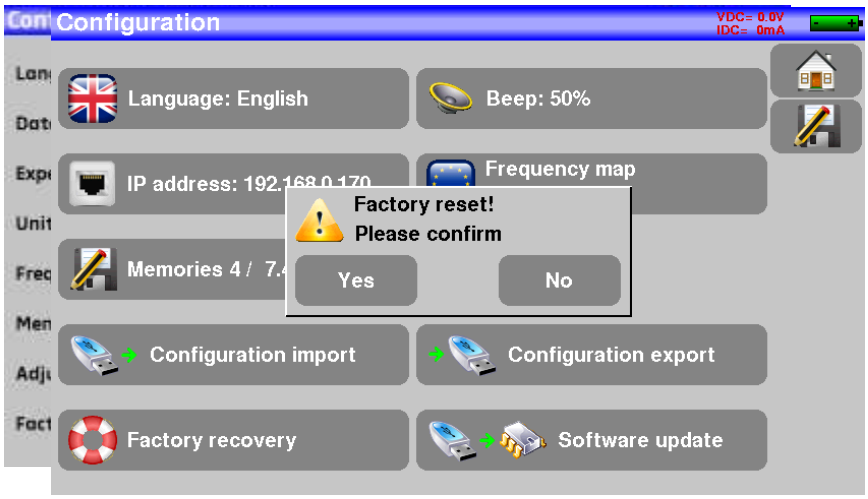
22 Displayed messages

The appliance may display messages while working.

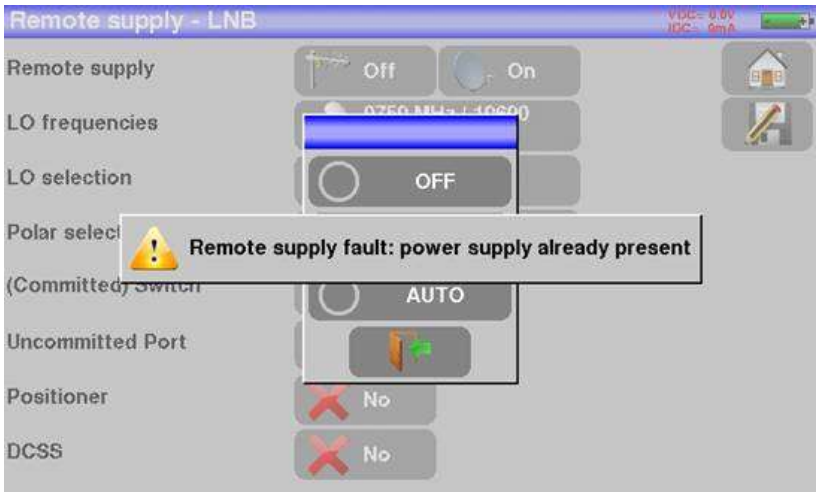
22.1 Alert messages

Low battery: the appliance is about to shut off in a few minutes.

Confirmation request for an important action.



Remote power supply issue: voltage already present or maximum current exceeded.



Messages of the same kind may show up; the pop up window is an alert; the corresponding message explains the issue.

22.2 Error messages

A message may show up at the bottom of the screen immediately after updating the software. Do not take it into account as far as it does not show up at a second start-up.

Else, or for any other problem, contact the **SEFRAM** technical support:

- **e-mail :** *support@sefram.fr*
- **Téléphone : 04 77 59 01 01**

23 Maintenance

This appliance requires some maintenance to meet its requirements and maintain its general characteristics.

	Consequences	Recommended periodicity of controls	Recommended use limit
BATTERY	Reduction of the battery life		200 charge / discharge cycles or 2 years
STRAPS	Breakdown	At each use Check the holding of the straps	
Back Light SCREEN	Reduction of visibility		1 year
Measurement setting / check	Erroneous measures	Once a year	12 months
CONNECTIONS	Erroneous measures	At any measurement	

This "advice" does not engage the responsibility of SEFRAM I.S.

It guarantees the best possible use of the characteristics and the preservation of the product.

Routine maintenance:

The basic maintenance is simply cleaning the outside of the appliance. Any other operation requires a trained personal.

Unplug the appliance before any intervention.

Do not let water flow inside the appliance: risk of electric shock.

Regularly clean the appliance under the following conditions:

- use soapy water
- never use any product containing petrol, benzene, alcohols that would attack silkscreen printings
- wipe out with a soft lint-free cloth
- use a solvent-free antistatic product to clean the screen.

RF socket :

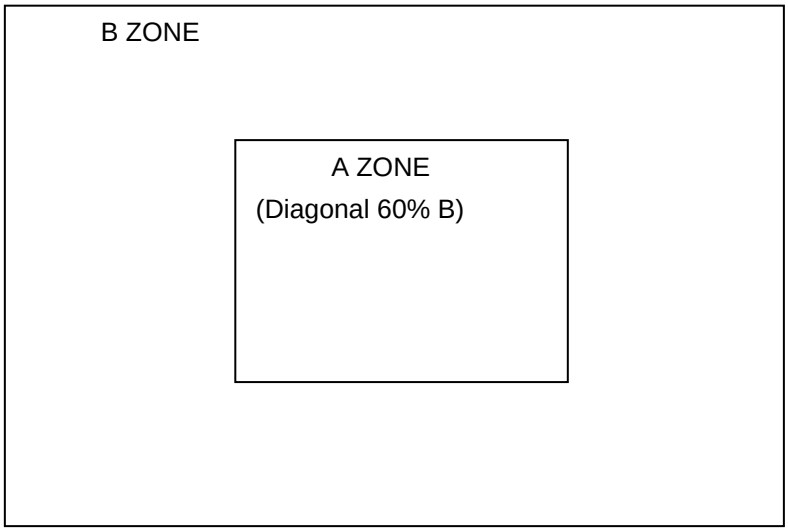
- Make sure there are **no specks of copper between the weight and the mass**.
- Replace periodically the adapter F/F, an adapter in poor condition distorts all the measures.

INFORMATION ABOUT THE LCD COLOR SCREEN WITH ACTIVE MATRIX

Your SEFRAM field strength meter is equipped with a LCD color screen with active matrix.

This screen is provided by renowned manufacturers. In the current technical conditions of manufacture, they cannot guarantee 100% good functioning pixels in the display zone. They specify a number of possible defective pixels at the surface of the screen.

The SEFRAM quality service has preconditioned the mounting of the screen on your instrument to the respect of the acceptance conditions of the manufacturers.



Acceptance criteria:

Zone A (central zone): total less than 5 defective pixels, less than 3 contiguous pixels.

Zone B (total surface of the screen): less than 9 defective pixels on the whole surface of the screen, with respect of the conditions prevailing in zone A.

Is considered as defective any pixel on screen that does not light up or lights up in a different color as expected.

The contractual guarantee on your field strength measurer can be exerted only if these criteria are not met, as well at delivery as during the period of guarantee.

24 Technical specifications

24.1 Technical specifications

Technical specifications	Terrestrial band
Frequencies	
Range	5-900 MHz
Resolution	measure 50 kHz, display 1 kHz
Level measurements	
Dynamic range	20-120 dBµV (30-120 dBµV for 5-45MHz)
Noise floor level	10 dBµV typical
Units	dBµV
Accuracy	±2dB +/- 0.05dB/°C
Resolution	0,1dB
Measurement Filters	100KHz - 300 kHz - 1MHz
Standards	DVB-C/C2, DVB-T/T2/T2lite BG, DK, I, L, MN, carrier
Mesures	RF level/power, C/N
Spectrum Analyser	
Fast Mode	350 ms typ. (3 times/s)
Filters (according to span)	100kHz, 300kHz, 1 MHz
Attenuator	automatic or manual (0 to 55 dB with 5 dB step)
Dynamic range (display)	60 dB (10 dB/div)
Span	5MHz à full span 1, 2, 5 step
Pre-echos /Echos DVBT/T2	
Dynamic range	DVB-T : 50 dB, -75km +75km (8k) DVB-T2 : 50 dB, -75km +75km (8k) DVB-C2 : 50 dB, -35km +35km (4k)
Units	µs, km, miles
Constellation display	
	yes, standards DVB-T/T2, DVB-C/C2
Measurement Map	
Capacity	scanning of 50 setups maximum
Display	Texte table
TV MPEG	
Digital Multiplex (not coded)	MPEG2 SD (définition standard) MPEG4 HD (haute définition H.264)
Service table DVB-SI	SDT, LCN
Sound	MPEG-1, MPEG-2, AAC, HE AAC, Dolby® Digital, Dolby® Digital Plus

24.2 Digital measurements

DVB-T/H	
Bit Error Rate (BER)	CBER (before Viterbi BERi) VBER (after Viterbi BERo) UNC (lost packets PER) Noise margin
Modulation Error Rate(MER)	5 - 35dB
Bandwidth	6MHz, 7 MHz, 8 MHz
FFT type	2k, 8k, auto
Constellation	QPSK, 16QAM, 64QAM, auto
Viterbi rate	1/2, 2/3, 3/4, 5/6, 7/8, auto
Guard interval	auto, manual
Spectrum inversion	auto
HP/LP – PLP – Data Slice	HP/LP
Standards	ETS 300-744

DVB-T2 / T2 Lite	
Bit Error Rate (BER)	LDPC (BERi) BCH (BERo) FER (frame error PER) Noise margin
Modulation Error Rate(MER)	5 - 35dB
Bandwidth	1.7MHz, 5MHz, 6MHz, 7 MHz, 8 MHz
Mode	SISO, MISO, PLP single or multiple
FFT type	1k, 2k, 4k, 8k, 16k, 32k + extended bandwidth, auto
Constellation	QPSK, 16QAM, 64QAM, 256QAM, auto
Viterbi rate	1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 1/3, 2/5, auto
Guard Interval	auto
Spectrum inversion	auto
HP/LP – PLP – Data Slice	PLP
Standards	ETS 302-755

DVB-C J83A	
Bit Error Rate (BER)	BER (before Reed Solomon BERo) UNC (lost packets PER) Noise margin
Modulation Error Rate(MER)	20 - 40dB
Symbol Rate	1 to 7.224 Ms/s
Constellation	16QAM, 32QAM, 64QAM, 128QAM, 256QAM
Spectrum inversion	auto
Standards	ETS 300-429

DVB-C2	
Bit Error Rate (BER)	LDPC (BERi) BCH (BERo) FER (frame error PER) Noise margin
Modulation Error Rate(MER)	5 - 35dB
Symbole rate	-
Bandwidth	6MHz, 8 MHz
Mode	PLP and data slice, single or multiple
FFT type	4k
Constellation	16QAM, 64QAM, 256QAM, 1024QAM, 4096QAM, auto
Viterbi rate	2/3, 3/4, 4/5, 5/6, 8/9, 9/10

Guard interval	auto
Spectrum inversion	auto
HP/LP – PLP – Data Slice	PLP+Data Slice
Standards	ETS 302-769

24.3 Divers

Remote supply	**Terrestrial**
Voltage	5V/13V/18 V/24V 500 mA max (300mA for 24V)

Storage	
Memory	Internal on non-volatile memory, or external USB stick (not supplied)
Data saved	measurements (level, BER/MER, Measurement Maps, Spectrum,…)
Capacity	512 Ko (about 150 files)

Inputs / Outputs	
RF input	75 Ohms, F (with adaptor)
Max permitted voltage	48V RMS / 50Hz
Interfaces	USB A, USB mini B, Ethernet 10baseT (RJ45)
DC supply input	jack 5.5 mm 15 V max, 5 A max

24.4 General specifications

Display	LCD TFT 7 inch color 16/9, luminosity backlight 500 cd/m², 800x480 dots Touch capacitive
External supply	Main adaptator 110/230 VAC, with 5,5mm jack, 15 V 1 A
Battery	Batterie Li-ion 25W
Autonomy	2 hours typical, depending of use
Charging time	1,5 hour for 80% of capacity
Operating temperature	-5°C to 45°C
Storage temperature	-10°C to 60°C
EMC and safety	NF EN 61326-1(2013) et NF EN 61326-2-1(2013) (class B, basic electromagnetic environment) / NF EN 61010
Dimensions	250 x 165 x 65 mm
Weight	1,350 kg

24.5 Accessories

Supplied with: main adaptor, user's manual (CD-ROM), F/F adaptor, protective pouch (mounted) with belt and clip, transportation bag.

Optional accessories:

- Car cigar lighter adaptor: ref. 978361000
- Carrying bag 784X/781X: ref. 978481000
- Luxury backpack réf. 978751000
- Sun protector + Rain protector + coat hook ref. 978489000
- Rain protector réf. 978489500

Contact our sales department SEFRAM.

04 77 59 01 01

24.6 V, dBµV, dBmV et dBm conversion

dBµV (dBmV) is a logarithmic ratio between a measured voltage Ud and a reference voltage Ur.

The reference voltage is Ur = 1 µV (1 mV)

N = 20 log (Ud/Ur)

dBm is a logarithmic ratio between a measured power Pd and a reference power Pr.

The reference power is Pr = 1 mW into 75 ohms.

N = 10 log (Pd/Pr) with Pd = Ud2 / 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

24.7 Typical values for measurements

Values given are indicatives, minimum and maximum for good signal quality

Measurements	Level, power (dBµV)		C/N (dB)	BER	MER (dB)	modulation
	mini	maxi				
Terrestrial						
Analogue TV	57	74	> 45	-	-	-
FM	50	66	> 38	-	-	-
DAB/DAB+	35	70		BER < 2^E-4	-	2K
DVB-T/H	35	70	> 26	VBER < 2^E-4	> 26	8K, 64QAM, 1/32, 2/3
DVB-T2	35	70	> 22	FER < 2^E-7	> 22	32K, 256QAM, 1/8, 2/3
DVB-C	57	74	> 31	BER < 2^E-4	> 31	64QAM

25 Terminology

2K/8K : The number of carrier waves of the DTT channel

The **8K** mode (6817 carrier waves in the channel, including 6048 carrying useful data)
The **2K** mode (1705 carrier waves in the channel, including 1512 carrying useful data)
For the same purpose, the 8K mode allows the selection of a larger guard interval than the 2K mode, thus a better resistance to echoes

SPECTRAL ANALYSIS : Method used to highlight the characteristics of the signal. The interest of this analysis is to visualize the troublemakers as well as the shape of the signal. The spectrum analysis highlights the amplitude frequency characteristic.

FREQUENCY BAND : Continued portion of the frequency spectrum having made the object of a particular affectation (telecommunication, television, internal security…)

Exemple : UHF band → 470 to 860 MHz

BCH : Bose Chauhuri Houquenohem
Algorithm used to correct errors in transmissions of digital satellite DVB-S2 signals.

BER : Bit Error Rate
Calculation of the erroneous bits with regard to the number of transmitted bits. BER demonstrates the degradation of the digital information.

TV PACKAGE : Set of channels spread and marketed by a same operator (TPS, Cnal Satellite…)

CHANNEL : Assignment of a number to the transmission frequency of an audio video signal. TV channels receive numbers. Specific to each country.

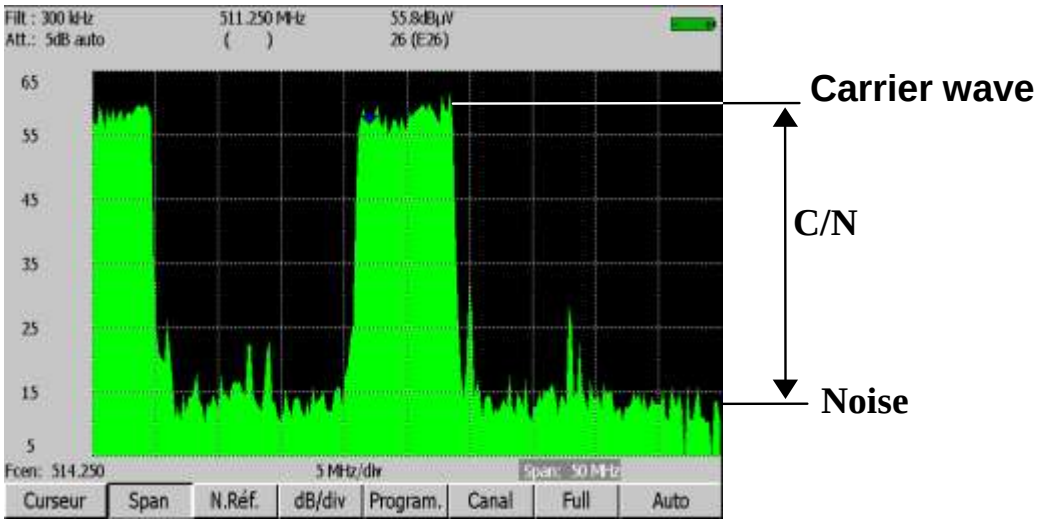
Example : from 21 to 69 for the UFH band

canal 21 = frequency 471,25 MHz

CELL ID: Cell identification
Identification of the DVB-T emitter with 4 digits in hexadecimal format, which means 65536 possibilities.

C/N : Carrier to Noise ratio

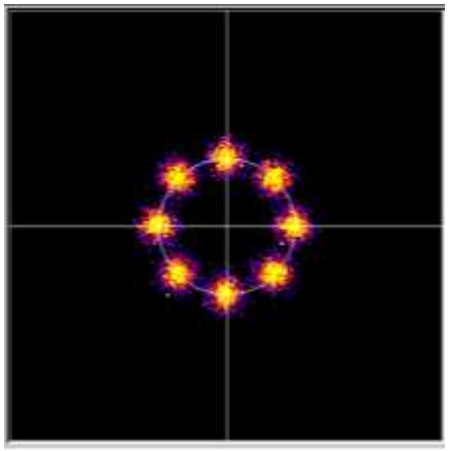
A good C/N ratio helps the quality of the pictures on the TV screen. Ratio in dB.
Caution: You have to take the ratio analysis filter width / channel into account.

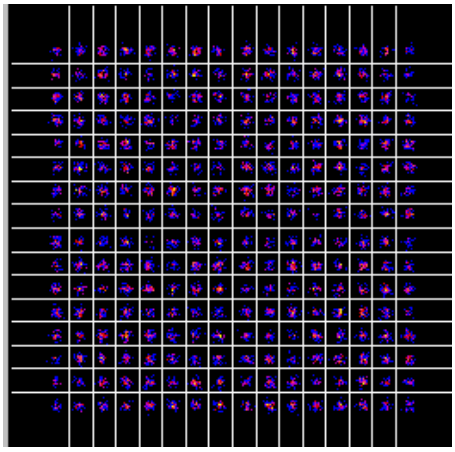


COFDM: Coded Orthogonal Frequency Division Multiplex.
Digital coding used for DTT. Its principle is to transmit information via many carrier waves (2K or 8K mode).

CONSTELLATION : Control mean for the quality of the signal by a group of points making spots on the screen of
the field meter. **The more circular and distinct the spots of the constellation, the better the quality of the
signal.** In addition, according to the shape of the spots, you can evaluate the kind of error. This function is available on field meters that enable the display of the constellation for any type of digital signal QAM, QPSK
and COFDM.

Typically:
-QAM (cable) : 64 spots (16 spots per quarter)
-COFDM (TNT) : 64 spots (16 spots per quarter)
-QPSK (Satellite) : 4 spots (1 spot per quarter)
-8PSK (Satellite) : 8 spots (on a circle)





COUNTER-POLARIZATION: Ratio between the levels received from the desired polarization and the opposed polarization (it should be as high as possible). To adjust the counter-polarization, you have to turn the head of
the dish.

DAB: Digital Audio Broadcasting.
The Digital Audio Broadcasting is a standardized audio broadcasting system (coded in COFDM).

It exists on the following bands:

L Band: 1452-1492Mhz

3 Band: 223-230Mhz

DVB-T: Broadcasting norm for the terrestrial digital television, COFDM modulation

DVB-C: Broadcasting norm for the cable digital television, QAM modulation

DVB-C2: Broadcasting norm for the cable digital television by cable (based on DVB-T2)

DVB-S: Broadcasting norm for the satellite digital television, QPSK modulation

DVB-S2: Broadcasting norm for the satellite digital television, QPSK or 8PSK modulation

DISEQC: **Di**gital **S**atellite **Eq**uipement **C**ontrol.
Control norm for the equipment of reception for satellite signals. Uses a 22kHz signal superimposed to the
remote supply voltage of the satellite dish.

FREQUENCY: Parameter that characterizes the radio-electrical wave. It is measured in “Hertz“. We

usually use
some multiples of this unit: kilohertz (kHz), megahertz (MHz), gigahertz (GHz).

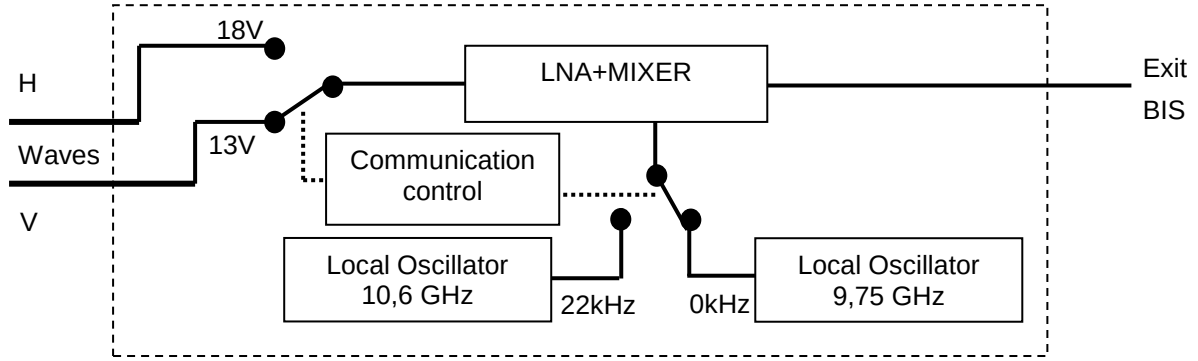
ex.: At Saint Etienne (Guizay), the TF1 frequency is 583.25 MHz

HP/LP: high/low priority → possibility to transmit 2 multiplexes under the same channel in digit format (ex.: in COFDM, we have a very robust high priority flow in QPSK; secondary flow in 16QAM)

GUARD INTERVAL: The guard interval is the time when the signal is not emitted: all signals carrying the same
information but coming from different sources (various emitters or through multiple reflections) won't disturb
each other.
Value for DTT: 1/32 (28µs), that permits echoes lower than 8.4km

ISOFREQUENCY: (or SFN: Single Frequency Network)
A DVB-T emitter network that emits on a whole region or a country at the same frequency.
→ risk of echoes outside the guard interval
→ moving reception

LNB: Low Noise Block-converter
A LNB (or universal head) is a standard converter for the analogical and digital reception of a satellite.



The reception is made on 2 low/high frequency band and 2 horizontal/vertical polarizations of the received wave.
The commutation of the band is made by a 13/18Volt voltage. The commutation of the polarization is made by a 22kHz signal superimposed to this voltage (you can also use the DiSEqC commutation for some LNB).

LDPC: Low Density Parity Checker
An algorithm used to correct errors in transmissions of digital satellite transmissions DVB-S2 signals.

NOISE MARGIN: Difference between the measured and the theoretical noise level before incorrigible errors.
Difference in dB between the measured C/N and the minimum C/N for error-free transmission.

MER: Modulation Error Ratio
Ratio in dB measuring the distance between the theoretical dot and the observed dot on a constellation quarter. You can use it to control the reception: **the higher this value, the better the image**.

Error vector

Magnitude vector (from the reference dot to the ideal dot)

MODULATION: Once the signal has been coded, it is modulated with a carrier wave for transmission.
AM (Amplitude Modulation): analogical modulation of the amplitude of the carrier wave
FM (Frequency Modulation): analogical modulation of the frequency of the carrier wave
QPSK (Quadrature Phase Shift Keying): phase digital modulation
QAM (Quadrature Amplitude Modulation): phase and amplitude digital modulation
COFDM (Coded Orthogonal Frequency Division Multiplex): phase and amplitude digital modulation on multiple carrier waves; for DTT.

MPEG : Motion Picture Expert Group
MPEG is a family of compressed digital coding formats for audio / video. The aim of MPEG coding is to hugely reduce the amount of transmitted information with as little loss as possible thanks to very complex compression algorithms.
The MPEG 2 option on the SEFRAM field meters allows you to view and control TV programs (coded under MPEG) directly on the meters.
ex.: On the Astra satellite, the EURONEWS and SPORT + channels are non-crypted and visible on the field meters.

MULTIPLEX : Set of channels broadcasted by the same operator (smaller set than a package). In DTT, a multiplex has a 24.5Mbits/s flow rate. A multiplex enables the diffusion of 6 programs in standard definition

NIT : Network Information Table – Information about the network/package
Enables the display of a description of the measured transponder. The information is sent non-coded in the data flow from the QAM, COFDM or QPSK decoder. The information items are:
- Name of the operator
- List of the transponders of the package
- Orbital position of the satellite (in Satellite mode).

OFFSET: The central frequency of a DTT channel may be shifted by ± 166.7 kHz in case of adjacent analogical channel to prevent disturbances

OL: A local oscillator that converts the frequency received from the satellite, in GHz, into an intermediary frequency that the demodulator can use, in MHz.

ex.: a 11.778 GHz frequency from the satellite passing through a 10.6 GHz OL LNB becomes a 11.778-10.600=1.178 MHz
See LNB scheme.

AUDIO AND VIDEO PID: Packet Identifier. MPEG service information.
In the digital MPEG flow, the (audio or video) packets all include a PID to get binary data from each service.

Frequency plan: There are various Frequency Plans according to places and standards. In the SEFRAM
field meters, the frequency plans are pre-programmed: they gather the most frequently used frequency bands.

Measure plan : Allows the simultaneous view of characteristics (frequencu, channel, standard…) of various programs (TF1, France2…) with location of measures except tolerance. Allows to carry out BER livel measures, for a list of programs.

PLP : (Physical Layer Pipe) from 1 to 256 channels are available in DVB-T2 to transport independent multiplexes.

POLARIZATION: Polarization of a signal from the satellite. It can be either:

linearly polarized, horizontally or vertically:

Circularly polarized to the right or the left

In ground reception, the polarization is generally horizontal (the stalks of antennas are horizontal). Some receptions in band VHF are in vertical polarization (Canal+). In this case, the stalks of the antenna are vertical.

POSITIONER: A motorized system for the rotation of a satellite dish. Positioners are operated by DiSEqC commands

QAM : Quadrature Amplitude Modulation.

This kind of modulation is used for digital transmissions (cable networks and DTT).

QPSK: Quadrature Phase Shift Keying (or 4PSK)
A kind of modulation mostly used for satellites.

8PSK : A type of modulation identical to QPSK, but with an 8-possibility (3-bit) coding. This kind of modulation enables
higher rates than QPSK and is compatible with DVB-S2.

REED-SOLOMON : An algorithm used to correct errors in digital transmissions

STANDARD : Any norm that defines the characteristics of a modulation.
Analogical standards: L, BG, DK, etc.
Digital standards:
QAM for **cable television**
QPSK, 8PSK for **satellite television**
COFDM for **terrestrial digital television**

T-DMB : A digital broadcasting system based on the DAB.
This very robust broadcasting mode for mobile applications thanks to the modulation used (DQPSK=differential QPSK). Allows the reception of digital television but also of television programs on
small-size appliances like mobile telephones or PDA

TOP DE SYNCHRO : Signal carré indiquant le début d'une trame ou d'une ligne.

TVHD : Télévision Haute Définition
En télévision standard, le nombre de lignes composant l'image va de 480(NTSC) à 576 (PAL et SECAM). Chaque ligne comprend 720 pixels. Pour comparer à l'informatique, un téléviseur correspond à une résolution SVGA 800 x 600. La proportion de l'image est de 4/3 (rapport largeur / hauteur).
En télévision HD, l'image est constituée de 1080 lignes, chacune constituée de 1920 pixels – soit un équivalent de 2M pixels.
Les téléviseurs HD ready ont une résolution minimale de 1280 par 720
Les téléviseurs Full HD ont une résolution minimale de 1920 par 1080

UNC : un-corrected packets

VIACCESS - MEDIAGUARD : Decryption systems used in Europe by many operators (TPS, Canal Satellite…).
With the Viaccess and Mediaguard options in a SEFRAM field meter and your subscription card, you will be
able to view encrypted programs on the meter.

VITERBI : An algorithm used to correct errors in digital transmissions

26 CE Declaration

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 61010-1 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 61326-1 (2013) + EN 61326-2-1 (2013).
Immunity standard EN 61326-1(2013) + EN 61326-2-1 (2013).
Standards used: EN 55011 (2009 + A1/2010) ; EN 61000-4-2 (2009) ; EN 61000-4-3 (2006+A1/2008+A2/2010) ; EN 61000-4-4 (2012) ; EN 61000-4-5 (2006) ; EN 61000-4-6 (2009)

La directive Européenne CEM 2004/108/CE :
Emission standard EN 61326-1 (2013) + EN 61326-2-1 (2013).
Immunity standard EN 61326-1(2013) + EN 61326-2-1 (2013).
Normes utilisées : EN 55011 (2009 + A1/2010) ; EN 61000-4-2 (2009) ; EN 61000-4-3 (2006+A1/2008+A2/2010) ; EN 61000-4-4 (2012) ; EN 61000-4-5 (2006) ; EN 61000-4-6 (2009)

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

Model *Type* **: 7817,7848, 7849**

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 7848**

SAINT-ETIENNE the :
September 30, 2015

Name/Position :
CLERJON/ Quality Manager