Televes®

H30 EVOLUTION

EN **DVB Meter / Analyser with digital processing**

Instruction Manual

Refs. 593501, 593502, 593503, 593504, 593505

H30 EVOLUTION®

Index

Safety requirements

- **Product inspection**
  - Inspect the equipment for shipping damage. Should any damage be discovered, immediately file a claim with the carrier.
- **Read and Follow All Instructions**
  - All the safety and operating instructions should be read prior to and followed while operating this product.
- **Do not obstruct the ventilation slots**
- **Cleaning**
  - Follow the cleaning instructions contained in the Maintenance section of this manual.
- **Attachments**
  - Do not use attachments that are not approved by the product manufacturer.
- **Water and Moisture**
  - This product is splash water resistant but is not submersible.
  - Do not place objects filled with liquids on or near the meter, such as glasses.
- **Power Sources**
  - This product should be operated only from the type of power source specified (12VDC - 2A).
  - Ensure that the voltage applied to the power connector does not exceed 15V. Higher voltages could damage the equipment
  - Maximun consumed current: 2A
- **Grounding or Polarization**
  - Do not bypass or defeat electrical plug polarization or grounding. Doing so will violate the warranty and may pose a risk of fire or electrocution.
- **Wire Protection**
  - Ensure all connected wiring is routed correctly to avoid damage including pinching, excessive bends, or compression.
- **Electrical Supply, Grounding, and Surge Protection**
  - Ensure that all local or national electrical codes are followed.
- **Power Lines**
  - Always use caution and avoid operating this or any connected equipment near uninsulated power lines or any other hazards.

- **Servicing**
  - There are no user serviceable parts except the battery. Do not attempt to service this product or remove covers other than the battery cover. Refer all servicing to qualified service personnel. Follow the instructions in this manual when replacing the battery.
- **Heat**
  - The product should be situated away from heat sources such as radiators, heat registers, stoves, or other products that produce heat.
  - Do not place naked flame sources on the meter, such as lighted candles.
- **Maximum current consumed by the meter: 2A**
- **Battery**
  - Battery must be replaced by qualified personnel, following the steps mentioned in the corresponding section.
  - If the battery is replaced, the new one must have the same features, because there is risk of explotion. Furthermore, the new battery must be approved by the manufacturer. Otherwise, the company is not responsible for damages caused to the meter.
  - Battery features:
    Li-Ion
    2600mAh 7.26V 19 Wh

Symbols and safety labels

Recycle or dispose of used electronic devices properly.

Remove the battery from the equipment following the instructions given in this manual and dispose it properly

Replace the batteries only with the same type.

Overview

Introducing the H30Evolution.

New from Televes, a go-to meter designed with the needs of a DVB installer in mind.

The **H30Evolution** is a light weight, rugged unit, packed with all the features needed to install and troubleshoot a television system using DVB-S/S2, DVB-T/T2, DVB-C (Annex A/C) and QAM (Annex B) digital modulation as well as analog signals.

Available for the first time in such a portable and affordable package, its real time digital processing engine gives the installers a great precision measurements needed in today's fulfilment environment.

Key Features

- **User friendly**, handheld DVB meter.

- Complete portfolio of Analog/Digital measurements with easy-to-read **pass/fail indicators**.

- **Quick and easy to use interface** with features such as Channel measurements, System Scans, Constellation Diagram, Spectrum Analyzer, Echoes, Datalogger, and more.

- Rugged, light weight, fully automatic, fast, and accurate.

- **Easy updates**.

- **1 GHz spectrum range** with selectable span.

- **PASS/FAIL Indicators**: Icons indicate if a measurement is good, bad, or in the warning zone for quick and easy status checks. Reduce installer entry errors and improve decision making.

- LNB powering, and SCR and DiSEqC parameters setup

- MPEG image visualization

General Specifications

Display	2.8"TFT 400 x 240 full colour
Weight	510g (12.12lb)
Dimensions	175 x 100 x 52 mm / 6.9 x 3.9 x 2 in (H x W x D)
Power Source	Input: 100-240V~ 50-60Hz Output: 12VDC, 2A
Battery	LiIon smart battery (7.2VDC, 2300mAh)
Operating Time	Up to 4 hours
Operating Temperature	23ºF to 104ºF (-5ºC to 45ºC)
Storage Temperature	-4ºF to 158ºF (-20ºC to 70ºC)
Humidity	5% to 95% non-condensing
Ruggedness	Survives 1 m (3 ft) drop to concrete on all sides
Communication Interfaces	USB 2.0 to download Datalogs and software updates
Storage	400 MB (internal) for measurements
Power up time	< 10 seconds

Technical Specifications

Frequency	
Range	50 - 880 MHz and 950 - 2400 MHz
Resolution	125 kHz
Tuning	Frequency or channel
Input	
Impedance	75Ω F-type connector
Spectrum Analyzer	
Span	5, 10, 20, 50, 100, 200, 500 and Full span
Scale	5 and 10 dB/div
Hold mode	✔
Auto and manual reference level	✔
Digital Measurements DVB-T (ref.593501, 593502, 593504 and opc.593231)	
MPEG image	✔
Modulations	CFDM (QPSK, 16QAM, 64QAM)
Power	45-110dBuV (25-120dBuV opt.593235)
CBER	9.9E-2 - 1.0E-6
VBER	1.0E-3 - 1.0E-8
MER	Up to 35dB
C/N	Up to 40dB
Echoes	✔
Constellation	✔
Digital Measurements DVB-T2 (ref.593502, 593504 and opc.593232)	
MPEG image	✔
Modulations	COFDM (QPSK, 16QAM, 64QAM and 256QAM)
Power	45-110dBuV (25-120dBuV opt.593235)
LDPCBER	9.9E-2 - 1.0E-6 (Pre LDPCBER)
BCHBER	1.0E-3 - 1.0E-8 (Pre BCHBER or Post LDPCBER)
Link Margin	Up to 30dB
MER	Up to 35dB
C/N	Up to 40dB
Echoes	✔
Constellation	✔
Digital Measurements DVB-C (ref.593303, 593304 and opc.593233)	
MPEG image	✔
Modulations	16QAM, 32QAM, 64QAM, 128QAM and 256QAM
Power	45-110dBuV (25-120dBuV opt.593235)
CBER	1.2E-2 - 1.0E-8
MER	Up to 38dB
C/N	Up to 40dB
Constellation	✔
Digital Measurements QAM-B [ITU J.83-B] (ref.593360)	
MPEG image	✔
Modulations	64QAM and 256QAM

Power	45-110dBuV (25-120dBuV opt.593235)
Pre-BER y Post-BER	1.0E-3 - 1.0E-8
MER	Up to 38dB
C/N	Up to 40dB
Constellation	✔
Digital Measurements (DVB-S)	
MPEG image	✔
Power	45-110dBuV (25-120dBuV opt.593235)
CBER	9.9E-2 - 1.0E-6
VBER	1.0E-4 - 1.0E-8
MER	Up to 20dB
C/N	Up to 20dB
Constellation	✔
Digital Measurements (DVB-S2)	
MPEG image	✔
Modulations	QPSK, 8PSK
Power	45-110dBuV (25-120dBuV opt.593235)
Link Margin	Up to 10dB
MER	Up to 20dB
LDPCBER	9.9E-2 - 1.0E-6 (Pre LDPCBER)
BCHBER	9.9E-2 - 1.0E-8 (Pre BCHBER or Post LDPCBER)
Constellation	✔
Analog Measurements	
Level	25 - 125dBuV
V/A	✔
C/N	Up to 45dB
Features	
Terrestrial channel plans	CCIR, CCIR + LTE, OIRT, KBW, FCC, DAB, SIM
Satellite channel plans	68E INTEL C, 68E INTEL, 42E TURK, 39E HELLAS, 33E EUTEL, 28E EUTEL, 28E ASTRA, 26E BADR, 25E EUTEL, 23E ASTRA, 21E EUTEL, 19E ASTRA, 16E EUTEL, 13E HOTB, 10E EUTEL C, 10 EUTEL, 9E EUTEL, 7E EUTEL, 4E ASTRA, 1W THOR5, 1W THOR6, 5W EUTELC, 5W EUTEL, 7W NILE, 30W HISPA, 48W AMZC, 48W AMAZ, SIM.
User channel plans	✔
Units	dBuV, dBmV, dBm
Preamp powering	13, 18, 24Vdc (max. current 475, 370, 140mA)
LNB powering	13, 18Vdc (max. current 475, 370mA)
LNB tone	22KHz
SCR(EN50494)|dCSS (EN 50607)	✔ | Opt.593234
DiSEqC	✔
Wi-Fi Analyser	Opt. 593250
Video Camera	Opt. 593236
IPTV Analyser	Opt. 593251
HEVC visualization	Opt. 593232

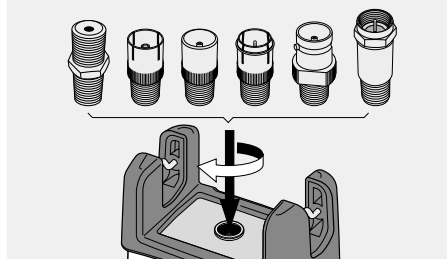Specifications are subject to change without notice.

Description of equipment components

Connectors and controls
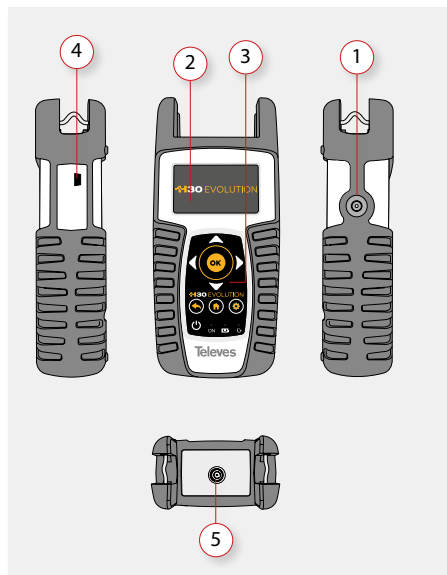
1. External power connector (12VDC).

2. LCD display.

3. Keyboard and LED indicators

4. Ethernet connector

5. RF F-connector (see options below).

F-connector options

Keyboard

1. ⏻ **Device On/Off button**: To turn the equipment off, press and hold for approximately 3 seconds.

2. ◀ BACK **Back button**: Return to the previous menu or close a parameter entry window.

3. 🏠 HOME **Home button**: Return to the main menu.

4. **Navigation buttons**: Used to scroll through options.

5. **OK** **OK Button**: To confirm selection.

6. ⚙ SETUP **Setup button**: Parameter window for the current function.

7. **LED Powering**: Indicates if the equipment is powering an external load.

8. **LED Charging Battery**: LED flashes while the battery is charging.

9. **LED Power ON**: Illuminated when the equipment is on.

Power supply

A DC adapter is provided to power and charge the meter. Plug the adapter into a properly grounded electrical supply and the power connector on the side of the unit.
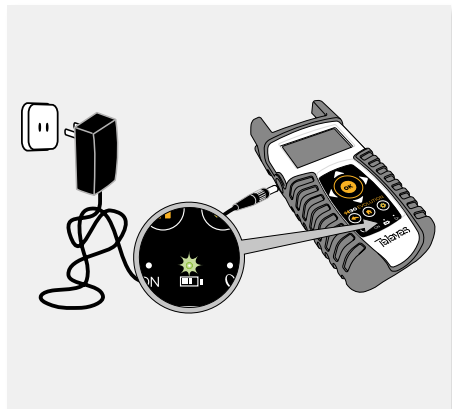
When external power is supplied, the battery management system automatically controls the charging process.

A battery icon indicates the charge status of the battery.

When the battery is fully charged, the battery icon is completely filled. As the battery discharges, the amount the icon is filled decreases in steps.

The icon shows 5 states representing the approximate battery charge:

- Battery charge less than 5%.

- Battery charge between 5% and 25%.

- Battery charge between 25% and 50%.

- Battery charge between 50% and 75%.

- Battery charge greater than 75%.

From a fully discharged state, a full charge takes approximately 8 hours and a 3 hour charge will provide approximately a 75% charge.

The charge management system will detect various conditions preventing charging, such as a battery that is over a safe temperature.

About battery

Important:

If the meter detects a shortcircuit or over consumption, and it is not connected to the power supply, it automatically shuts down.

To turn it on again, it is necessary that it is connected to tyeh power supply.

To maximize battery life:

▸ Avoid fully discharging the battery.

▸ The battery should always be charged with the battery pack attached to the device and using the supplied DC adapter or applying a constant voltage within the specified range (12-15VDC).

▸ For long term storage, keep the unit at room temperature, or about 25º C. Start with a charged battery and re-charge the battery every 2 to 3 months.

Battery replacement:

It is recommended that the replacement of the battery is carried out by qualified personnel following the following instructions:

▸ Disconnect the meter from the power supply:
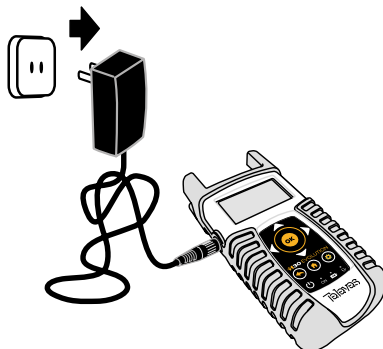
▶ Turn the H30Evolution off

OFF: > 3 sec.

▶ Remove the screws from the backside
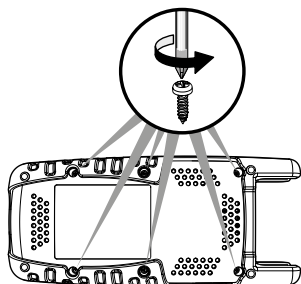
▶ Open the back cover
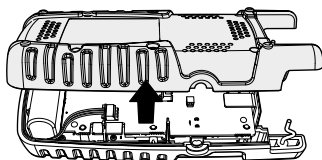
▶ The battery is located at the bottom of the meter. Carefully remove the connector from the power board, and then remove the battery

▶ Place the new battery and then connect it to the power board

▶ Replace the back cover of the meter. Make sure that the cable is not trapped between the two covers

▶ Replace the screws of the back cover

Before starting

The first time you tunr your H30Evolution on, please follow the next steps for a proper configuration:

1.- Select the language using ⬆⬇ and OK

```
        Welcome


        English
        Español        ⌄
```

2.- Select the geographical area, so the proper channel plans will be enabled:

```
    Select your zone


        Europe
      Middle East
    North East Africa    ⌄
```
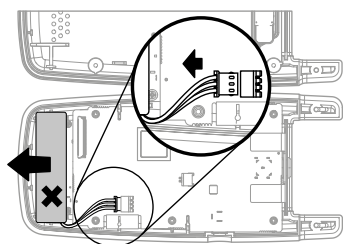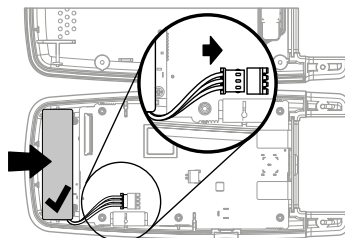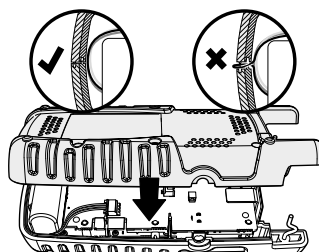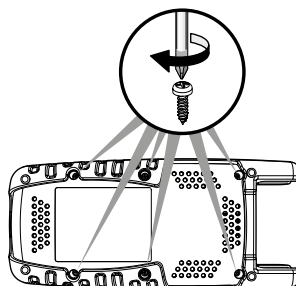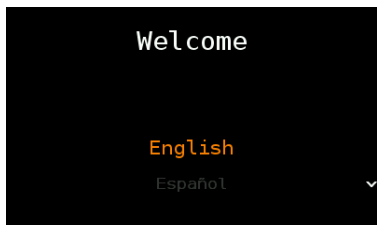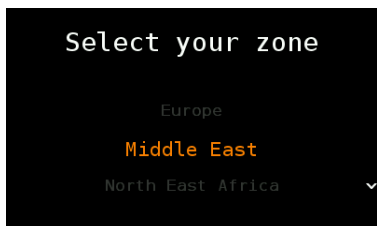
2.- Register you H30Evolution:

2.1.- Read the QR code using your mobile phone or tablet. Or enter the web url shown at the botton of the screen in the address bar of your computer:

```
        Register on website
        Press OK to continue
         or Back to cancel

http://h30series.televes.com/register/2bJZyk6x
```

2.2.- Register your H30Evolution in our web. Once the process is completed, you will get a PIN code. Enter the PIN in your H30Evolution:

```
            Enter Pin

            0000

http://www.qsertet.com/2052ykzt
```
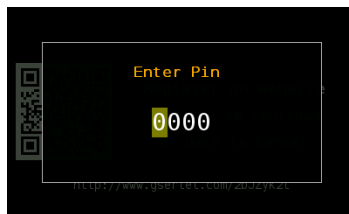
2.3.- If the PIN is OK, you have finished the registration process.

NOTE: Options 593234 (dCSS) and 593235 (Extended terrestrial input level range) will be activated automatically in your H30Evolution whenever you register it within 30 days after you turn it on for the first time.

Product operation

1. Channel Info

Analog and digital channels are very different in terms of signal content and power distribution and thus require the advanced SLM techniques provided in the Televes **H30Evolution**.

In analog mode, video and audio levels, V/A and Carrier to Noise (C/N) are measured.

In digital mode measurements depend on the modulation:

DVB-S: Power, C/N, MER, CBER, VBER

DVB-S2: Power, C/N, MER, LDPCBER, BCHBER

DVB-T (Ref. 593301, 593302, 593304 and Opt. 593231): Power, C/N, MER, CBER, VBER

DVB-T2 (Ref. 593302, 593304 and Opt. 593232): Power, C/N, Link Margin, LDPCBER, BCHBER

DVB-C (Ref. 593303, 593304 and Opt. 593233): Power, C/N, CBER, MER

QAM-B [ITU j.83-B] (Ref. 593360): Power, C/N, CBER, MER

1.1. Main window
Below is a capture of a Channel Info window with a brief explanation of its features.

Channel
Change using

Frequency

Channel plan

```
Channel Info    FCC STD        01:52AM
CH 60
786.0000 MHz
  Power   -2.8 dBmV
  C/N     41.6   dB
  MER     34.4   dB
  CBER    <1.0E-8
                         Power
```
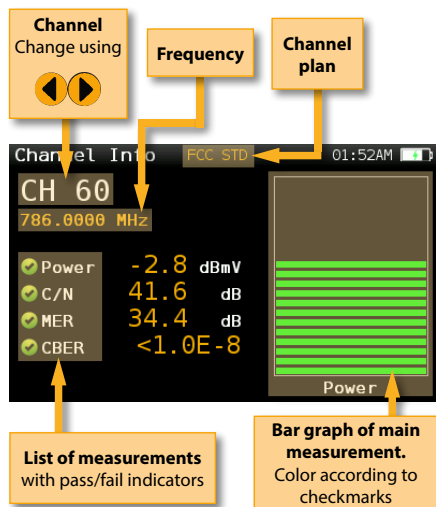
List of measurements
with pass/fail indicators

Bar graph of main measurement.
Color according to checkmarks

1.2. Setup

Press [SETUP] to change the Channel Info options.


```
Channel Info - Setup        07:39PM
  Tuning          Channel
  A/D             Digital
  Parameters
  Save datalog       SAVE
```

- **Band:** Terrestrial/Satellite
- **Plan**: Selects the channel plan
- **Powering**: Selects the LNB powering
- **DiSEqC (only satellite band)**: Selects DiSEqC parameter (Sat A, sat B, sat C, sat D)
- **SCR (only satellite band)**: Selects the SCR parameters (multiswitch, standard and slots) When a slot is enabled (for example slot 3, freq. 1210MHz), the meter will tune into the slof frequency (1210MHz) and will set the slot with the meter parameters: frequency, band

(powering), and DiSEqC. In addition, a SCR icon will be shown in the bar at the top (SCR3) to indicate thar the slot is enabled.

While the slot is enabled, all the setting changes of the meter, will be applied to the currently slot (SCR3).

- **Tuning**: Channel, Frequency
- **A/D**: Auto, Analog, Digital.
- **Save datalog**: Saves the current scan measurements. You can see the datalogs using the remote control application.

2. Spectrum

Real-time processing speeds ensure capture of any fast, intermittent plant impairments.

Due to the accuracy and level of detail provided by this spectrum analyzer, the **H30Evolution** is the ideal tool for identifying and locating noise, interference, ingress and other waveforms that may be affecting cable services quality.

2.1. Main window
Below is a capture of a Spectrum window with a brief explanation of its features:

Selected channel
Change using

Span
User can change it using
(+) or OK (–)


```
Spectrum          Span: 25MHz       01:49AM
CH 60                                        0
786.0000 MHz
  Pwr    dBmV
       -1.7                                -20
  C/N     dB
       38.9
                                           -40
```

List of measurements
with pass/fail indicators

Reference level Change

2.2. Setup

Press 🔆 SETUP to change Spectrum options.

```
Spectrum - Setup            S 09:06 [TV]
    Band                    Sat    ●
    Powering                Off    ●
    DiSEqC                  Off    ●
    SCR                            ●
    Aim antenna              On    ●
    Span                 200MHz    ●
              ∨
```

- **Band:** Terrestrial/Satellite

- **Plan**: Selects the channel plan

- **Powering**: Selects the LNB powering

- **DiSEqC (only satellite band)**: Selects DiSEqC parameter (Sat A, sat B, sat C, sat D)

- **SCR (only satellite band)**: Selects the SCR parameters (multiswitch, standard and slots) While a slot is enabled (for example slot 3, freq. 1210MHz), the meter will tune into the slof frequency (1210MHz) and will set the slot with the meter parameters: frequency, band (powering), and DiSEqC. In addition, a SCR icon will be shown in the bar at the top (SCR3) to indicate thar the slot is enabled.

  While the slot is enabled, all the setting changes of the meter, will be applied to the currently slot (SCR3).

- **Aim antenna**: Emits a modular audible signal with frequency directly proportional to signal level in the spectrum trace relativo to reference level. It is recommended to set the reference level manually, as well as to select the span to include a frequency range wide enough.
  The audible signal becomes continuous when the signal leves is close to the reference level. Then it is necessary to increase the reference level to get a more accurate adjustment.

  This is a useful feature to point antennas without having to look at the display

- **Span**: 5MHz, 10MHz 20MHz, 50MHz, 100MHz, 200MHz, 500MHz, Full.

  Set the span of the spectrum. To easily change the span, use the **OK** Button to decrease the span and the Back Button to increase the span.

- **Ref. Level:** Select the reference level of the spectrum graph

- **dB/div**: 5 dB/div, 10 dB/div

- **Tuning**: Channel, Frequency

- **A/D**: Auto, Analog, Digital.

- **C/N:** ON, OFF. Shows/Hides the C/N measure.

- **Hold:** ON/OFF. Shows/hides the maximum graph

- **Save datalog**: Saves the current scan measurements. You can see the datalogs using the remote control application.

3. MPEG

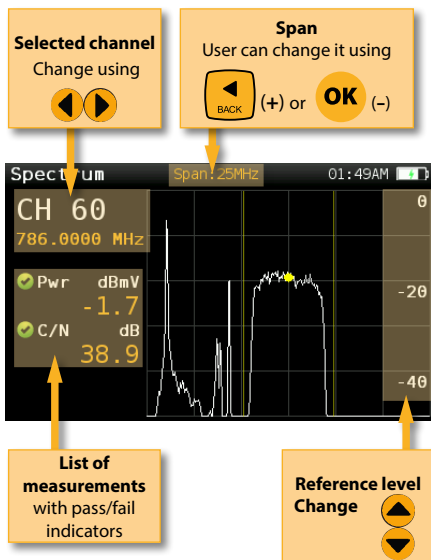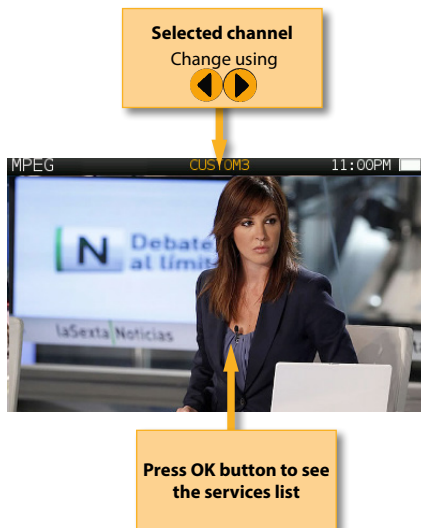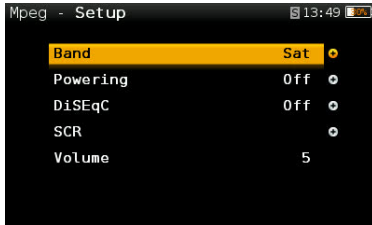The **H30Evolution**'s MPEG feature will show the image of the selected service.

3.1. Main window
Below is a capture of a MPEG Info window with a brief explanation of its features:

Selected channel
Change using
◀ ▶

Press OK button to see the services list

1.2. Setup

Press ⚙️ SETUP to change the Channel Info options.

```
Mpeg - Setup                    13:49
    Band                     Sat
    Powering                 Off
    DiSEqC                   Off
    SCR
    Volume                   5
```

- **- Band:** Terrestrial/Satellite
- **- Plan**: Selects the channel plan
- **- Powering**: Selects the LNB powering
- **- DiSEqC (only satellite band)**: Selects DiSEqC parameter (Sat A, sat B, sat C, sat D)
- **- SCR (only satellite band)**: Selects the SCR parameters (multiswitch, standard and slots) When a slot is enabled (for example slot 3, freq. 1210MHz), the meter will tune into the slof frequency (1210MHz) and will set the slot with the meter parameters: frequency, band (powering), and DiSEqC. In addition, a SCR icon will be shown in the bar at the top (SCR3) to indicate thar the slot is enabled.

  While the slot is enabled, all the setting changes of the meter, will be applied to the currently slot (SCR3).
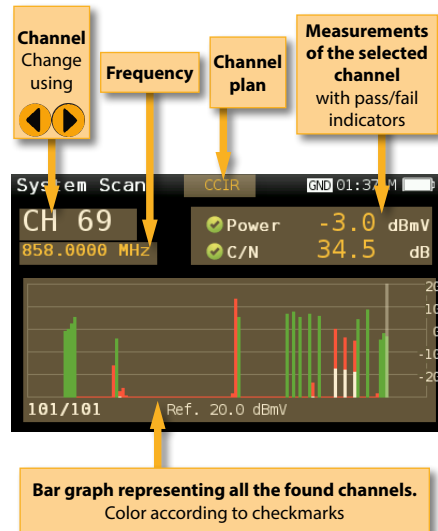
- **- Volume**

4. System Scan

This function scans the selected channel plan and detects every existing analog and digital channel in real time to determine the overall frequency response of the system.

The scan measurement leverages the location based thresholds to clearly show whether or not signal levels comply with the cable system's specifications with their green, yellow and red bars. This gives an easy-to-understand real-time view of the system, including the BER and MER values of the selected channel.
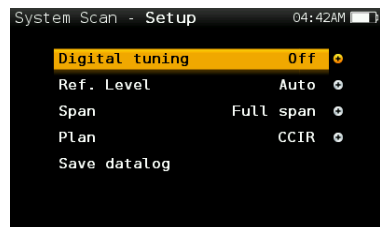
4.1. Main window

Below is a capture of a System Scan window with a brief explanation of its features:

Channel Change using ◁ ▷

Frequency

Channel plan

Measurements of the selected channel with pass/fail indicators

```
System Scan        CCIR        GND 01:37 M
CH 69            ● Power    -3.0  dBmV
858.0000 MHZ     ● C/N       34.5   dB
                                        20
                                        10
                                        0
                                        -10
                                        -20
101/101    Ref. 20.0 dBmV
```

Bar graph representing all the found channels. Color according to checkmarks

4.2. Setup

Press ⚙️ SETUP to change the System Scan options.

```
System Scan - Setup          04:42AM
    Digital tuning           Off
    Ref. Level               Auto
    Span               Full span
    Plan                     CCIR
    Save datalog
```
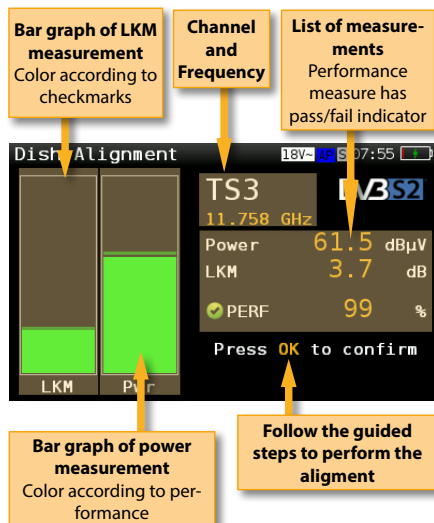
- **- Band:** Terr, Sat
- **- Plan**: Selects the channel plan
- **- Powering**: Selects the LNB powering
- **- DiSEqC (only satellite band)**: Selects DiSEqC parameter (Sat A, sat B, sat C, sat D)
- **- SCR (only satellite band)**: Selects the SCR parameters (multiswitch, standard and slots) When a slot is enabled (for example slot 3,

freq. 1210MHz), the meter will tune into the slof frequency (1210MHz) and will set the slot with the meter parameters: frequency, band (powering), and DiSEqC. In addition, a SCR icon will be shown in the bar at the top (SCR3) to indicate thar the slot is enabled.

While the slot is enabled, all the setting changes of the meter, will be applied to the currently slot (SCR3).

- **Digital tuning:** If it is ON, allows to see MER and CBER measurements when a digital channel is selected and the user presses Ok button.

- **Span:** Select the number of channels showed in the bar graph

- **Ref. Level:** Select the reference level of the bar graph

- **Save datalog:** Saves the current scan measurements. You can see the datalogs using the remote control application
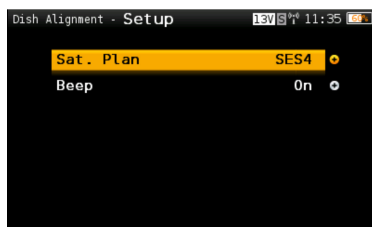
5. Dish Alignment

This feature helps the installer to align the dish.

The **performance measurement** is the quotient between the current LKM value and the maximum one. When the performance indicator is green, the dish is aligned.

5.1. Main window

Below is a capture of the Dish Alignment window with a brief explanation of its features.

Bar graph of LKM measurement
Color according to checkmarks

Channel and Frequency

List of measure-ments
Performance measure has pass/fail indicator

Bar graph of power measurement
Color according to per-formance

Follow the guided steps to perform the aligment

5.2. Setup

Press [SETUP] to change the Dish Alignment options.

- **Sat Plan:** Allows the user to select the satellite plan he wants to align the dish to.
- **Beep**: ON/OFF. If ON is selected, the H30Evolution emits a sound whose frequency increases as the performance measurement increases.

6. Satellite Test

This function checks that the input signal corresponds to the selected satellite, and at the same time checks the proper reception of the selected transponders (from 1 to 4 transponders). To do that, the meter performs all the measurements on those transponders.
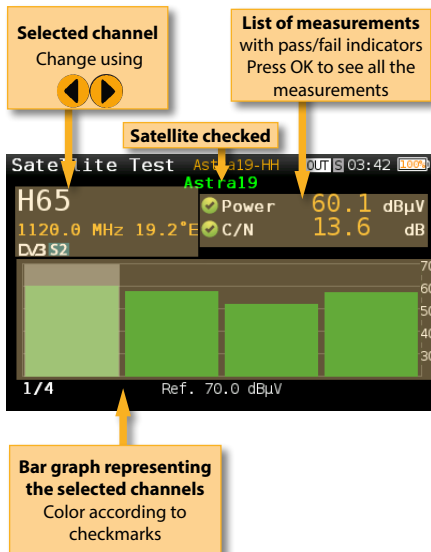
First of all the user must select the channel plan of the satellite towards which the antenna is oriented.

Then the user must select the transponders on which you want to carry out the measurements (see Setup section of this function).

The information necessary to verify the satellite is extracted from these channels, and the measurements of the selected transponders are displayed.
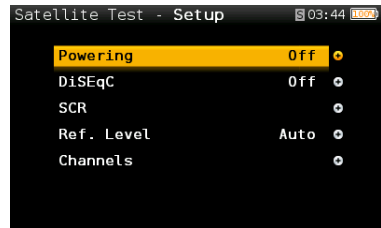
6.1. Main window

Below is a capture of a Satellite Test window with a brief explanation of its features:

Selected channel
Change using

List of measurements
with pass/fail indicators
Press OK to see all the measurements

Satellite checked

Bar graph representing the selected channels
Color according to checkmarks

6.2. Setup

Press [SETUP] to change the Ssatellite Test options.

- **Powering:** Select the powering of the LNB if needed.
- **DiSEqC:** Select the SAT of the DiSEqC command.
- **SCR (only satellite band)**: Selects the SCR parameters (multiswitch, standard and slots) When a slot is enabled (for example slot 3, freq. 1210MHz), the meter will tune into the slof frequency (1210MHz) and will set the slot with the meter parameters: frequency, band (powering), and DiSEqC. In addition, a SCR icon will be shown in the bar at the top (SCR3) to indicate thar the slot is enabled. While the slot is enabled, all the setting changes of the meter, will be applied to the currently slot (SCR3).
- **Ref. Level:** Select the reference level of the bar graph.
- **Channels:** Select the number of channels as well as the channels from the channel plan.

7. Learning plan

Analyzes the input signal to the meter and automatically detects all channels.

This feature automatically identifies the channels as either analog or digital and performs measurements on each.

A bar graph is displayed with the height representing the power for digital channels and the level of the video carrier for the analog channels.
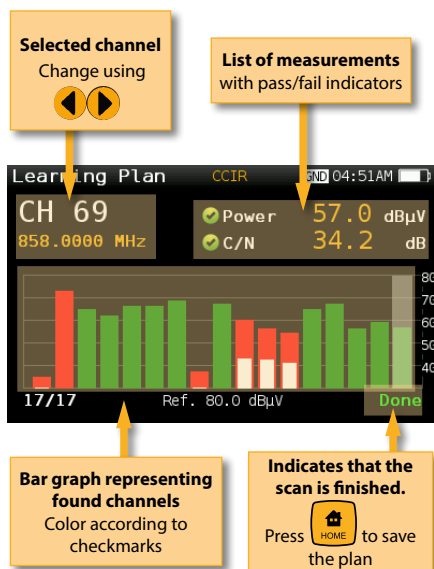
The measurements made for analog channels are

video carrier level and V/A. For digital channels the measurements are power and C/N.

The analog channels will have an extra, smaller white bar indicating the level of the audio carrier.

7.1. Main window
Below is a capture of a Learning Plan window with a brief explanation of its features:

Selected channel
Change using

List of measurements
with pass/fail indicators

Learning Plan   CCIR   GND 04:51AM
CH 69
858.0000 MHz
Power 57.0 dBµV
C/N   34.2 dB
17/17   Ref. 80.0 dBµV   Done

Bar graph representing found channels
Color according to checkmarks

Indicates that the scan is finished.
Press HOME to save the plan

diagram should display a clean dot indicating a perfect signal.

The **H30Evolution**'s real time constellation, allows the installer to assess the size and shape of the build up of dots indicative of problems which contribute to bit errors leading to service disruption

8.1. Main window

Below is a capture of a Constellation window with a brief explanation of its features:

Selected channel
Change using

Modulation

Constellation   QAM64 6108   01:56AM
CH 60
786.0000 MHz
Pwr   8.3 dBmV
C/N   41.5 dB
MER   36.0 dB
CBER   1.0E-8

List of measurements
with pass/fail indicators

Constellation diagram

8. Constellation

Digital video often does not show signal impairment until it is too late due to the small margin between acceptable quality and failure.

Constellation diagrams are an indispensable tool to help detect the presence of noise, phase jitter, interference, and gain compression, all of which impact overall signal quality and thus reduce Modulation Error Ratio (MER).
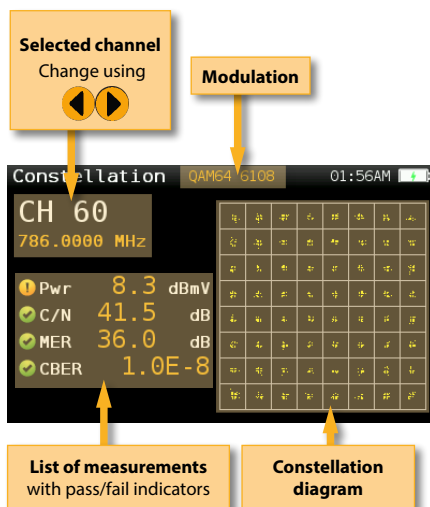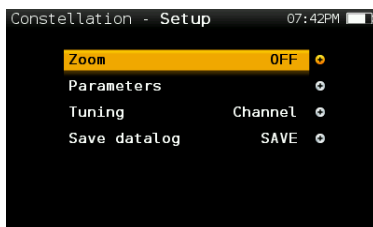
Ideally, each of the symbols in a constellation

8.2. Setup

Press SETUP to change Constellation options.

Constellation - Setup   07:42PM
Zoom   OFF
Parameters
Tuning   Channel
Save datalog   SAVE

- **Band**: Terr, Sat
- **Plan**: Selects the channel plan
- **Powering:** Select the powering of the LNB if needed.
- **DiSEqC:** Select the SAT of the DiSEqC command.
- **SCR (only satellite band)**: Selects the SCR parameters (multiswitch, standard and slots) When a slot is enabled (for example slot 3, freq. 1210MHz), the meter will tune into the slof frequency (1210MHz) and will set the slot with the meter parameters: frequency, band (powering), and DiSEqC. In addition, a SCR icon will be shown in the bar at the top (SCR3) to indicate thar the slot is enabled. While the slot is enabled, all the setting changes of the meter, will be applied to the currently slot (SCR3).
- **Zoom**: OFF, 1st, 2nd, 3rd, 4th. Select a quadrant of the constellation to be represented for more detailed view. Select Zoom OFF for the full constellation.
- **Tuning**: Channel, Frequency
- **Save datalog**: Saves the current constellation measurements. You can see the datalogs using the remote control application.
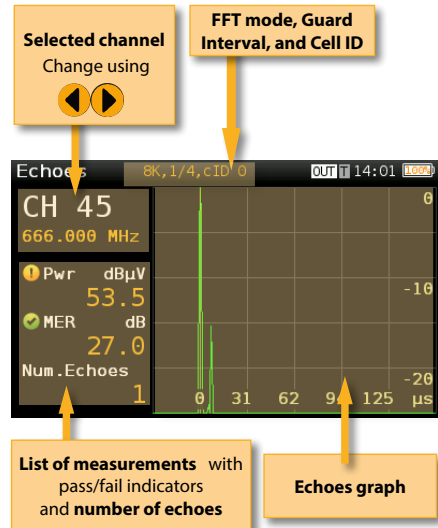
9. Echoes

It is important to check that no echoes can cause problems in the reception of DVB-T and DVB-T2 signals.

This feature you allows to visualize the echoes of the received signal, helping the installer to minimize them as much as possible for optimal signal reception.

In addition to the echoes graph, this function shows the channel power and MER measurements, as well as the FFT mode, the guard interval, and the Cell ID.
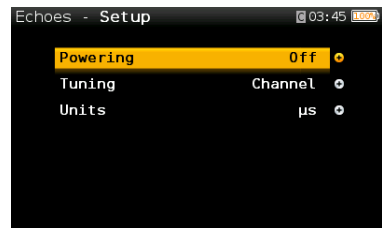
9.1. Main window

Below is a capture of a Ecos window with a brief explanation of its features:

Selected channel Change using

FFT mode, Guard Interval, and Cell ID

List of measurements with pass/fail indicators and **number of echoes**

Echoes graph

8.2. Setup

Press [SETUP] to change Echoes options.

- **Powering**: Off, 13V, 18V, 24V.
- **Tuning**: Channel, Frequency
- **Units**: us, Km

10. Video Camera (opt. 593236)

This feature allows the H30Evolution meters to have an analog video and audio input using an external USB 2.0 adapter, with capability to digitize the analog input signals.

It is specifically aimed for installation and maintenance of analog video surveillance systems.

The supported interface is composite RCA (S-VHS).

The input video formats that can be displayed are the following:
• NTSC: 720x480 @ 30fps
• PAL: 720x576 @ 25fps

To run the feature you just have to connect the input signal to the adaptor provided with the H30Evolution, making sure that the adaptor is connected to the USB input of the meter. If there is something wrong, the next screen will be shown:


```
Camera                    12:13
        Please connect USB adapter
```
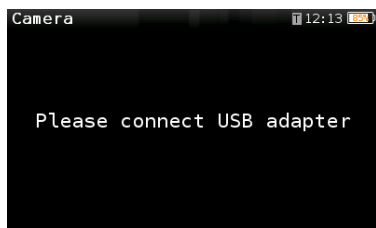
10.1. Main window
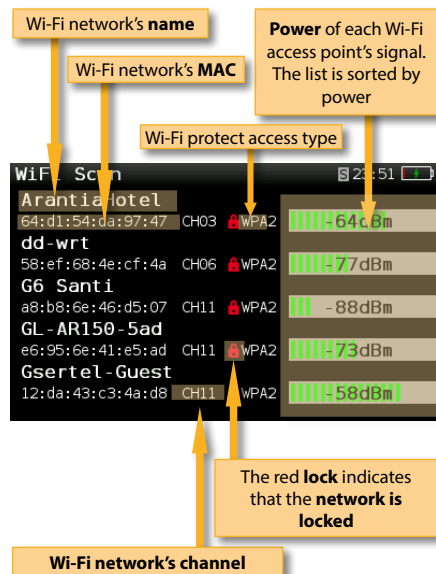
Below is a capture of a Camera window:
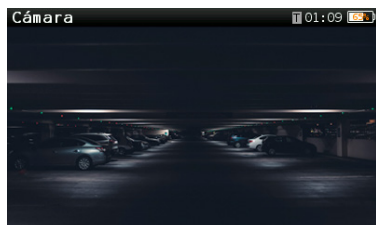
11. Wi-Fi Scan

Analyzes the Wi-Fi band and automatically detects all the Wi-Fi networks, as well as their names and the power of the access point's signal.

There are two different screens to display the information: List and Map.

11.1. List view

Wi-Fi network's **name**

Wi-Fi network's **MAC**

Power of each Wi-Fi access point's signal. The list is sorted by power

Wi-Fi protect access type

The red **lock** indicates that the **network is locked**

Wi-Fi network's channel

```
WiFi Scan                    21:51
Arantia Hotel
64:d1:54:da:97:47  CH03  WPA2  -64dBm
dd-wrt
58:ef:68:4e:cf:4a  CH06  WPA2  -77dBm
G6 Santi
a8:b8:6e:46:d5:07  CH11  WPA2  -88dBm
GL-AR150-5ad
e6:95:6e:41:e5:ad  CH11  WPA2  -73dBm
Gsertel-Guest
12:da:43:c3:4a:d8  CH11  WPA2  -58dBm
```

You can go through the list using and select one of the Wi-Fi networks to display it separately.

If a Wi-Fi network has multiple access points, you will see several networks with the same name. If you select one of them, you will separately all the access points of that network. The first one in the list is the one you are connected to, which is the one that has more signal power at that point.

11.2. Map view

Graph showing the wifi networks. Each triangle represents a network. The height of the triangle represents the power of the access point signal.
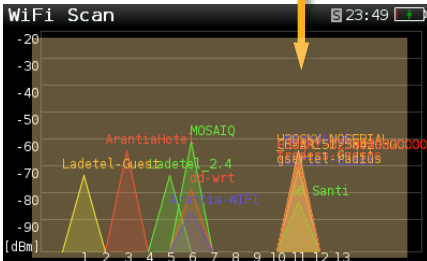
11.3. Setup

Press [SETUP] to change the Wi-Fi Scan options.

- **Band:** Terrestrial/Satellite

- **Mode**: Selects between Map or List View

- **Sort:** Only in List View mode. Allows to select how to sort the Wi-Fi list: name, level, or channels

- **Screen capture:** Captures the current screen and saves it as a .png image. You can see the captures using the remote control application

12. IPTV

This menu provides the necessary measurements and parameters to guarantee a correct reception of IPTV services.

12.1. IPTV functions
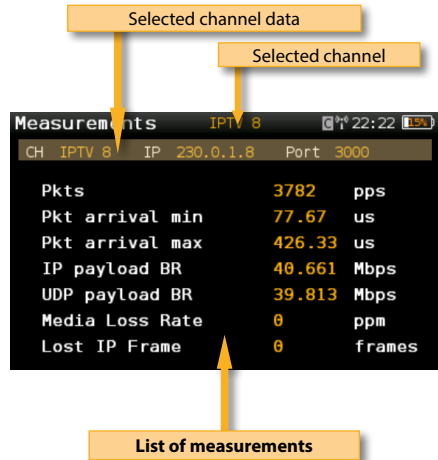
To achieve this, this menu has three functions:

12.1.1. Measurements

This function shows all the necessary measurements of the selected IPTV channel.

12.1.1.1. Main Window

Below is a capture of a IPTV Measurements window with a brief explanation of its feature:

Selected channel data

Selected channel

List of measurements

12.1.1.2. Setup

Press [SETUP] to change IPTV Measurements options.

- **Channels**: Allows to change the selected IPTV channel.

- Save Datalog: Saves the current IPTV measurements. You can see the datalogs using the remote control application.
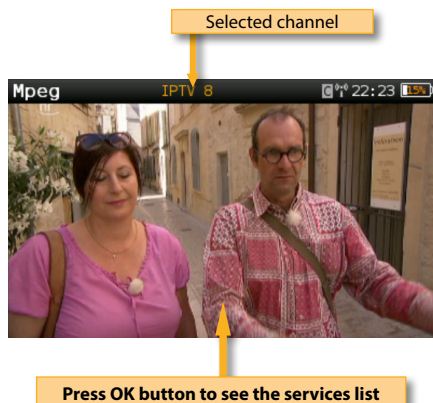
12.1.2. MPEG

Using this function you can see the MPEG image.

12.1.2.1. Main Window

Below is a capture of a IPTV MPEG window with a brief explanation of its feature:

Selected channel

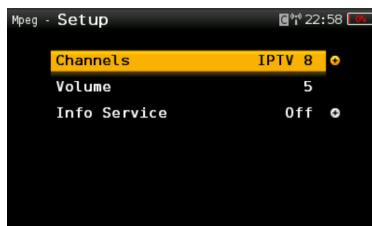Press OK button to see the services list

If you press the OK button, the services list will be shown, so you can change the selected service easily:

12.1.2.2. Setup

Press to change IPTV MPEG options.

- **Channels**: Allows to change the selected IPTV channel.
- **Volume**
- **Info Service**: Shows/Hides the service information overlapped to the image:

12.1.3. Services

This function shows the parameters and the bitrates of the selected channel services.

11.1.3.1. Main Window

Below is a capture of a IPTV Services window with a brief explanation of its feature:

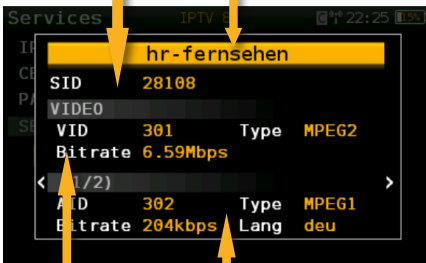Selected channel parameters

Selected channel

List of services and bitrates.

Press   OK   to select a service

Once you have selected a service, press OK to see all the parameters and bitrates of the audio and video:

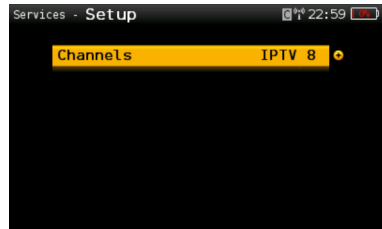Selected service ID

Selected service name

Video ID, Video Type and bitrate

Audio ID, Audio Type, bitrate and language.

Press   to select other Audio

12.1.3.2. Setup

Press [SETUP] to change IPTV Services options.

- **Channels**: Allows to change the selected IPTV channel.

12.1. IPTV Setup
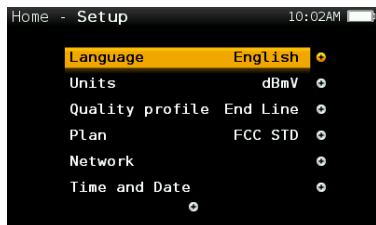
Press [SETUP] to change IPTV options.

- **Channels**: Allows to change the selected IPTV channel.
- **Edit channel:** Allows to edit the IP and the Porto of the selected channel.

13. Setup

Change main configuration settings:

```
Home - Setup                    10:02AM
    Language           English   o
    Units                 dBmV   o
    Quality profile  End Line    o
    Plan               FCC STD   o
    Network                      o
    Time and Date                o
                      o
```

- **Band**: Terr, Sat
- **Ter. Network:** Aerial, Cable
- **Terr Plan**: FCC STD, FCC RETURN, FCC IRC, FCC HRC, FCC OFFAIR, CCIR, and customers plans
- **Sat Plan**: F68E INTEL C, 68E INTEL, 42E TURK, 39E HELLAS, 33E EUTEL, 28E EUTEL, 28E ASTRA, 26E BADR, 25E EUTEL, 23E ASTRA, 21E EUTEL, 19E ASTRA, 16E EUTEL, 13E HOTB, 10E EUTEL C, 10 EUTEL, 9E EUTEL, 7E EUTEL, 4E ASTRA, 1W THOR5, 1W THOR6, 5W EUTELC, 5W EUTEL, 7W NILE, 30W HISPA, 48W AMZC, 48W AMAZ, SIM, and customers plans
- **Sat. Freq.:** IF, real Freq.
- **Sat. LNB:** Universal, C Band, Other.

  If Other is selected, you must enter the frequency.

- **Restore Powering**: On/Off. When you turn your H30FLEX on, the meter will set the last LNB configuration automatically whenever this parameter is On.
- **Language**: English, Español.
- **Units**: dBµV, dBmV, dBm
- **Quality profiles**: Trunk, Tap, End Line, Ground.

  Different thresholds are available for different testing locations.

- **Analog Standard:** Selects the standard for the analog channels and changes automatically the audio carrier to a value according to the selected standard.

- **Audio Carrier:** 4.5 MHz, 5.5 MHz, 6.0 MHz, 6.5 MHz.
- **Volume**
- **Network:**

    Setup: Manual, Auto

    When Setup Manual is selected, the user must set the gateway.

    IP.

    When Setup Manual is selected, the user must set the IP.

    DNS.

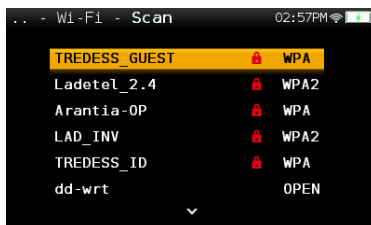   When Setup Manual is selected, the user must set the DNS.

    Gateway.

- **Wi-Fi:** Allows to connect the H30 to a Wi-Fi network.

    Wi-Fi: On, Off

    Mode: AP (Access Point), Client

    Scan: When Wi-Fi is turned on and the selected mode is Client, it shows a list of all the found Wi-Fi networks.

```
.. - Wi-Fi - Scan               02:57PM
    TREDESS_GUEST           🔒  WPA
    Ladetel_2.4             🔒  WPA2
    Arantia-OP              🔒  WPA
    LAD_INV                 🔒  WPA2
    TREDESS_ID              🔒  WPA
    dd-wrt                      OPEN
                  ⌄
```

As you can see in the image above, the listo shows the name of the Wi-Fi networks and indicates if the network is open or restricted, as well as the protection access type.

To access to a restricted network, you must enter the password using ⊙ and OK

To verify the password, find a red square behind the last character of the password and press OK

- **Time and Date**:

    Set current time (hour and minutes) and

date (day of the month, month and year).

- Energy:

Auto suspension

Auto shutdown

- Update firmware: See section *Firmware update*

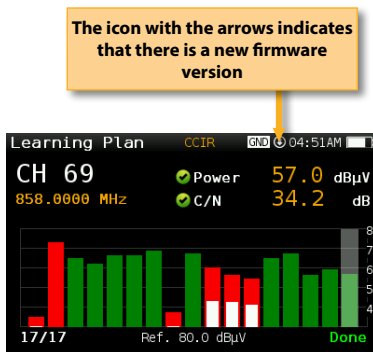**- Reset configuration:** Resets the **H30Evolution** to factory settings

- Licenses: Shows a list with all the licenses included in your H30Evolution
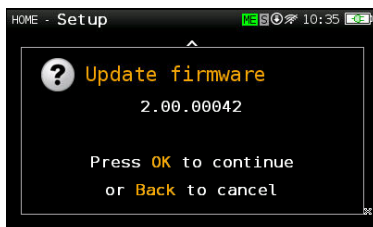
- About SW

- About HW

Firmware Update

Whenever your H30Evolution is connected to the internet, it will automatically check if there is a newer firmware version. If it is so, an arrow icon will appear at the top of the screen:

The icon with the arrows indicates that there is a new firmware version

```
Learning Plan      CCIR    GND  04:51AM
CH 69              Power    57.0 dBµV
858.0000 MHz       C/N      34.2  dB
                                        80
                                        70
                                        60
                                        50
                                        40
17/17         Ref. 80.0 dBµV      Done
```

If the user wants to update the firmware, please select function *Update firmware* in the *Setup* menu

If there is a new firmware version, a message will be displayed when the user selects this function:


```
HOME - Setup                   10:35

        Update firmware
             2.00.00042

        Press OK to continue
         or Back to cancel
```

Press OK button to automatically download and install the new firmware version.
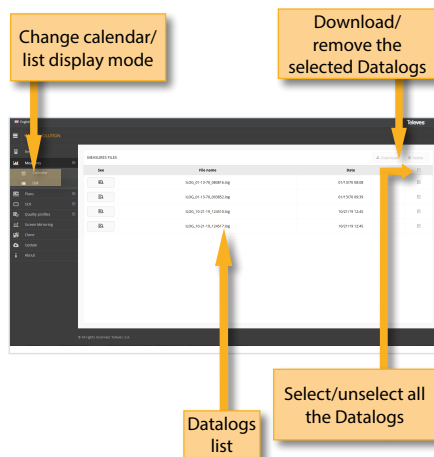
Web Application

First of all, connect your H30Evolution to the network using the Ethernet connector or the Wi-Fi interface. Then you must find out the IP of your H30Evolution (see section *11.- Setup - Network/Wi-Fi*).

Then, type your H30Evolution IP in the address bar of your web browser and press Enter.

Then you can see the home window of the **H30Evolution** web application:

Menu bar

H30Evolution info

1. Measurements

In this window, you can see all the datalogs saved in your H30Evolution. They are grouped by date in a calendar:

Change calendar/ list display mode

Month/week/ day view

Saved Datalogs

To change the display mode from calendar mode to list mode, just click on the corresponding button placed at the menu bar:

Change calendar/ list display mode

Download/ remove the selected Datalogs

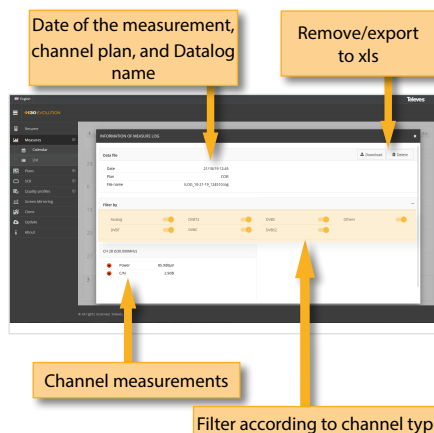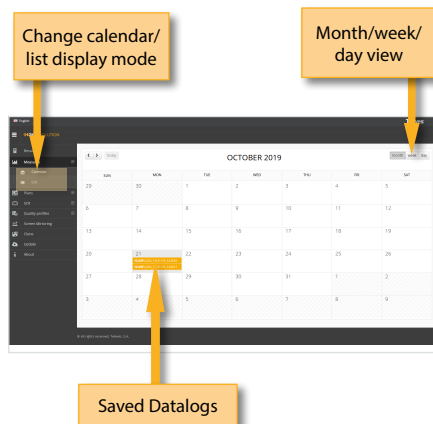Datalogs list

Select/unselect all the Datalogs

Using the buttons placed at the top right of the screen, you can remove the selected Datalogs or download them to your computer in .xls format (it will be generated a .xls file for each Datalog and they all will be downloaded together in a .zip file)

Clicking on a Datalog of the list, the measurements of that Datalog will be displayed:

Date of the measurement, channel plan, and Datalog name

Remove/export to xls

Channel measurements

Filter according to channel type

2. Plans

In this window, you can see all the channel plans of your H30Evolution.

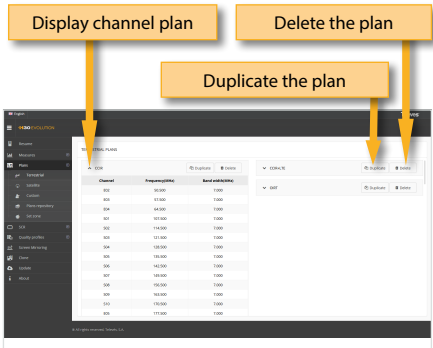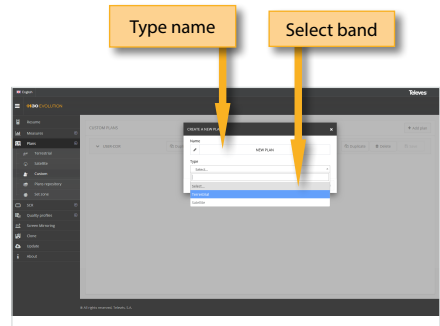### 2.1.- Terrestrial, Satellite and Customer Channel Plans

The channel plans are grouped in three categories: Terrestrial, Satellite and Customer.

The Terrestrial and Satellite channel plans are the standard channel plans of the corresponding band.

These plans can be removed from the meter, but they can not be edited. However, you can make a copy of one of them to build a new customer channel plan from it.

The duplicated plans will appear in the Customer list automatically.

Display channel plan

Duplicate the plan

Delete the plan

The customer channel plans can be edited:

Delete plan

Add new plan

Duplicate plan

Save changes in the plan and upload it to the meter

Delete selected channels

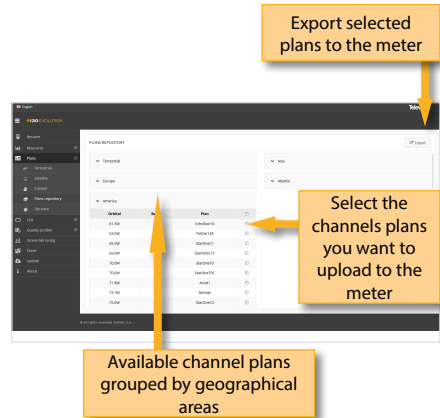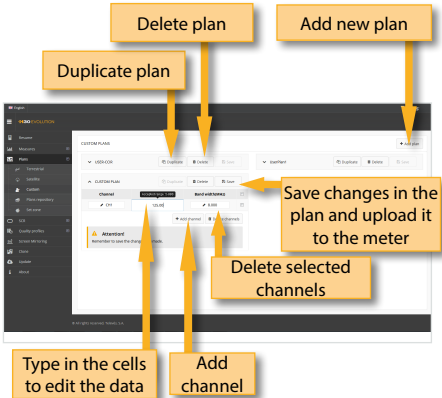Type in the cells to edit the data

Add channel

You can create a new channel plan from an existing one by clicking on the corresponding button. Or you can start from scratch, by clicking on the "New custom plan" button:

Type name

Select band

2.2.- Plans repository

The application also allows to configure the channel plans according to the geographic area you will use the meter. When you turn the meter on for the first time, you must select the languaje and then you must select the geographic area. So, the channel plans corresponding to that area will be available in your H30Evolution. But the user may add other standard channel plans corresponding to other geographic areas (this is specially helpful for those places located near the frontier between two areas). To do that, click on the "Channel plan repository" button :

Export selected plans to the meter

Select the channels plans you want to upload to the meter

Available channel plans grouped by geographical areas

The channel plans added from the repository will

be uploades to your H30Evolution, but none of the channel plans in your meter will be removed.
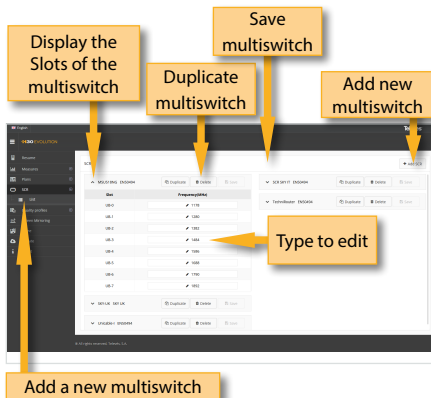
2.3.- Set zone

Using the "Set zone" button, the user can change the area of his/her meter. When you change the area, all the plans of your H30Evolution will be removed and the new channell plans corresponding to the selected area, will be upload to your meter.
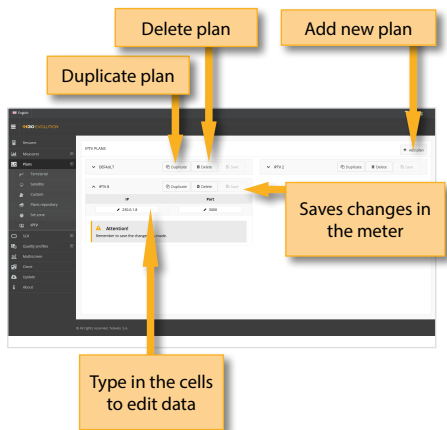
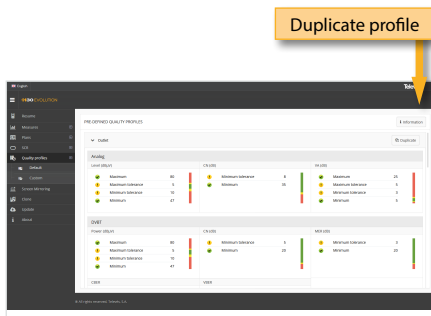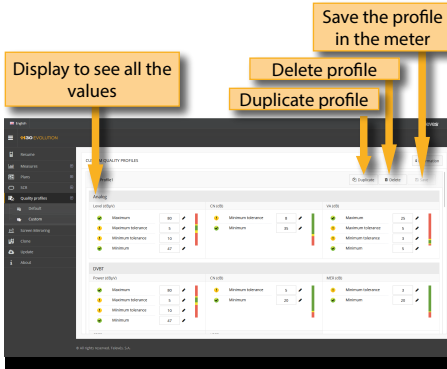**Click on the area where you will use your meter**

2.4.- IPTV

Using this function, the user can create and edit IPTV channels plans. Each channel plan has only one plan, indicating the IP address and the port for each channel:

Delete plan

Add new plan

Duplicate plan

Saves changes in the meter

Type in the cells to edit data

3. SCR

In this window, you can setup the multiswitches.

The H30Evolution includes a list of multiswitches by default, but you can add more or edit any of the existing ones.

Display the Slots of the multiswitch

Save multiswitch

Duplicate multiswitch

Add new multiswitch

Type to edit

**Add a new multiswitch**

4. Quality Profiles

Using the web application you can add new quality profiles. The H30Evolution has two pre-defined quality profiles (head-end and outlet) that can not be edited, but they can be duplicated. The duplicated quality profiles are saved in the custom quality profiles, and the custom quality profiles can be edited.

Duplicate profile

Display to see all the values

Delete profile

Save the profile in the meter

Duplicate profile

file on you computer.
Then, connect other H30Evolution where you want to copy the configuration to and select the Import feature.

Click to display the function
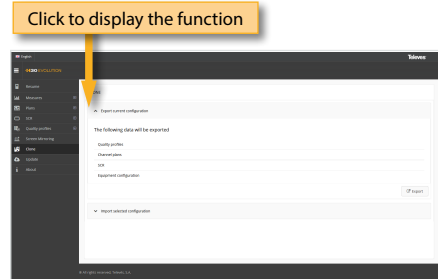
5. Multiscreen

Using this feature you can control your H30Evolution remotely. For this to work, it is necessary that the H30Evolution and the computer are connected to the same LAN.
To access to this feature you must enter the password admin in the right top part of the window. Then you will see the screen of the H30Evolution in your computer:

Click on the arrow to display menu

6. Clone

Using this feature it is very easy to have the same configuration in all your H30Evolution meters.
You only have to export the configuration of the H30Evolution that you wanto to copy, using the Export feature. So, the configuration will be saved in a

7. Update

In this section you can update the firmware of your H30Evolution, as well as install new licenses in your meter.

If you H30Evolution in connected to the internet, the system will detect automatically if your meter is already updated by clicking on "Last firmware version". If it is not, then you can download the new version and install it automatically from this menu.

If you get the update file from your distributor, you can install it in your H30Evolution by clicking on "Manually updating firmware".

Same with licenses: if your H30Evolution is connected to the internet, it will detect new purchased licenses automatically when you turn it on, and will install them automatically. But if you get the licenses from your distributor, you can install them in your device by clicking on "Add license".
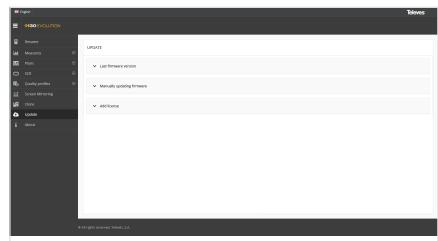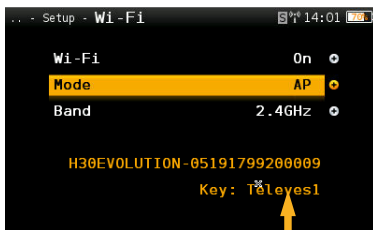
Mobile Devices App

1.- Connection between the App and the H30Evolution

You only need to have turn your H30Evolution on and follow these steps:

1.- Select *Wi-Fi* function in the *Setup* menu (see section *11.- Setup*). Select **Wi-Fi ON** and **Mode AP** (Access Point)

**Wi-Fi name and connection key are shown**

2.- Select the Settings function of your mobile device and turn Wi-Fi ON and make sure that your H30Evolution Wi-Fi is present at the networks list (the name of the Wi-Fi is "H30Evolution" followed by the serial number):

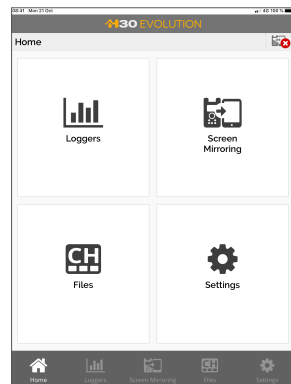**Turn your mobile device Wi-Fi ON**
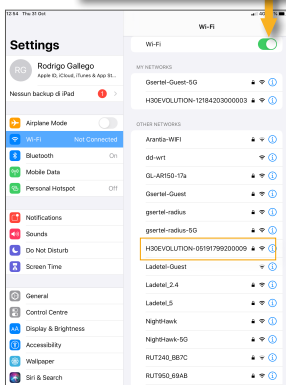
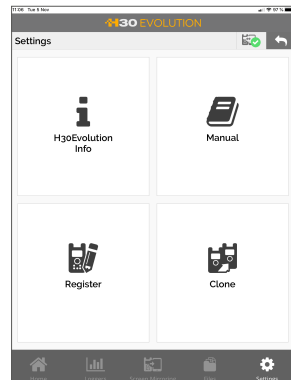3.- Select to connect to your H30Evolution Wi-

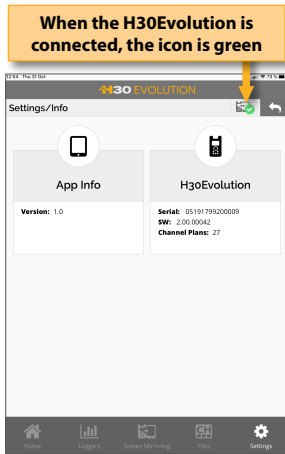Fi. Your mobile device will ask for the key, that is **Televes1:**
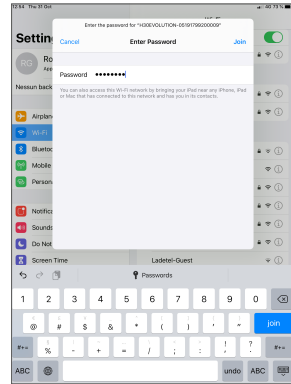
4.- Then, open the H30Evolution App. The App main screen looks like this:
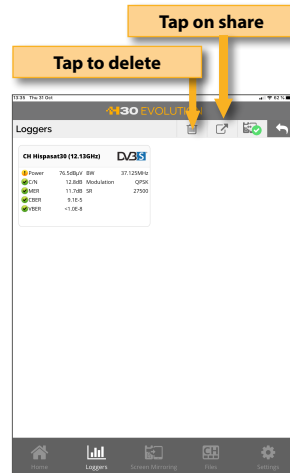

When you tap on the Settings button, you will see this screen:

Tapping on Info, the user can see the following screen:

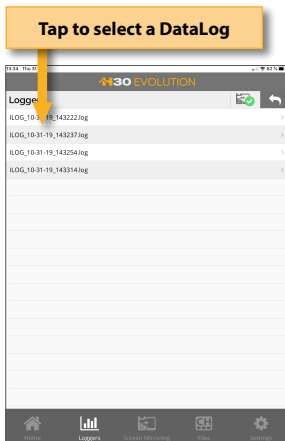When you tap on logger, the measurements in that logger will be shown:

2. Features

Once your iPad and your H30Evolution are connected, you can operate with the App using the following features:

2.1.- Loggers

This window shows the Logs saved in your H30Evolution.
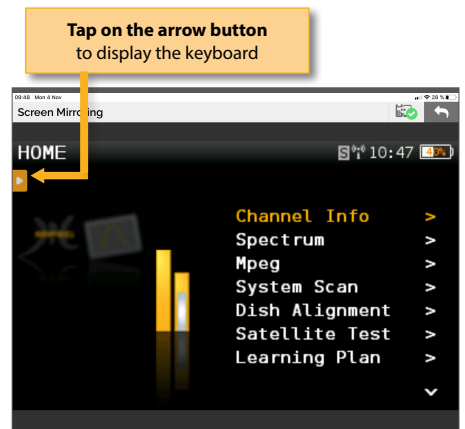
When you tap on one of these logs to select it, you will see all the measurements at the bottom of the screen.
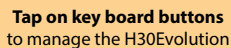

2.2.-Multiscreen

Using this feature, you can use your iPad to control remotely your H30Evolution.

Note: in the current version it is not possible to run the Wi-Fi Scan function using the Multiscreen feature.
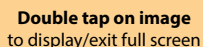

When you tap on the arrow button, the keyboard

will be displayed. Use these buttons as if they were the device's ones.

Tap on the arrow button
to hide the keyboard

Tap on key board buttons
to manage the H30Evolution

If the selected funcion is MPEG, the video is shown next to the information window:

Tap on the arrow button
to show/hide the keyboard

Double tap on image
to display/exit full screen

Note1: HEVC videos can only be displayed on tablets that support this standard, but will not be displayed on the H30Evolution.

Note2: 4K videos are not supported on the tablet or H30Evolution.

Note3: If the user selects the Video Camera function while using the multiscreen feature, the image will not be displayed in real-time.

2.3.-Files

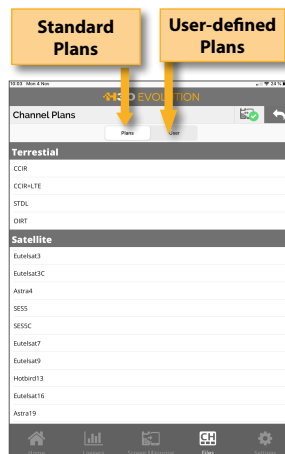This feature allows to manage channels plans, SCR files and quality profiles:
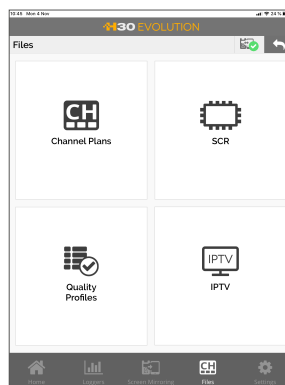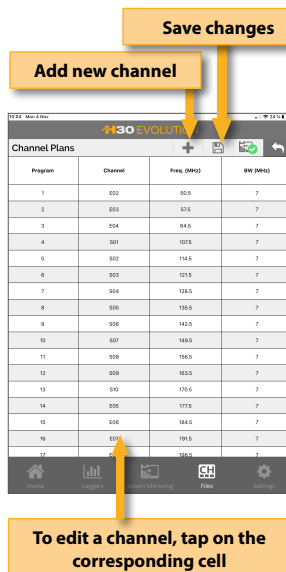

2.3.1.- Channel Plans

Using this function of the App, you can see all the channel plans of your H30Evolution, as well as add new user channel plans and edit them.
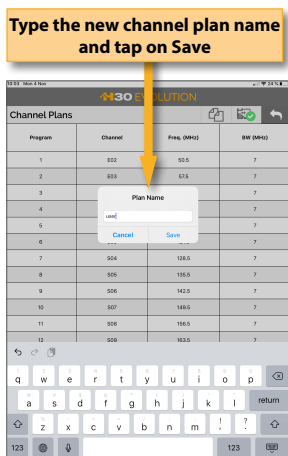The standard channel plans can not be edited.

Standard Plans

User-defined Plans

The standard plans can be cloned. When the user does this, a new channel plan is added to the User channel plans list:

Clone channel plan

Enter the new user-defined channel plan name, and it will be automatically uploaded to your H30Evolution.

Type the new channel plan name and tap on Save

The channel plans in the user-list can be edited:

Save changes

Add new channel

To edit a channel, tap on the corresponding cell

When the user adds a new channel to a plan, it will be added at the end of the table with default-value parameters (name, frequency, etc.), that the user must edit.

When the user saves the changes, the will be automatically loaded to the H30Evolution.

To delete a channel plan, swipe to the left the corresponding line:

When the Delete button is visible, tap it to delete the channel

EN
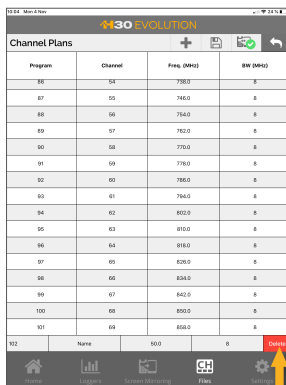
2.3.2.- SCR

This function opens a web navigator with the web page of your H30Evolution, and points directly to the SCR section. See section *3.- SCR* of the *Web Application*

2.3.3.- Quality Profile

This function opens a web navigator with the web page of your H30Evolution, and points directly to the Quality Profile section. See section *4.- Quality Profiles* of the *Web Application*.

2.3.4.- IPTV

With this function, the user can create and edit IPTV channel plans. Each plan has only one channel, indicating the IP address and the port for each channel.
To add a new IPTV plan, it is necessary to duplicate an existing IPTV plan, and then edit the data.
To delete a channel plan, swipe to the left the corresponding line, and when the "Delete" button is visible, tap it.

Duplicate plan
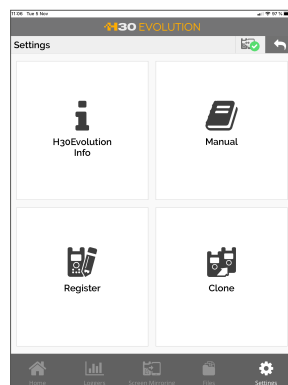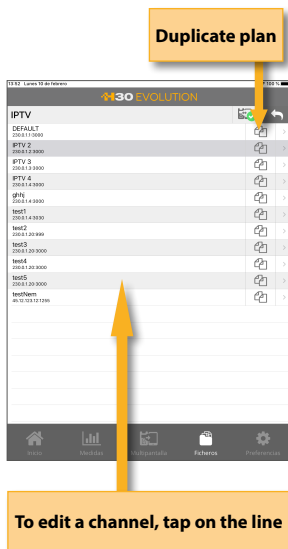

To edit a channel, tap on the line

When you tap on the line corresponding to a channel, a pop up window will apppear, allowing the user to modify the IP address and the port:

When the changes are saved, they are uploaded automatically to the H30Evolution
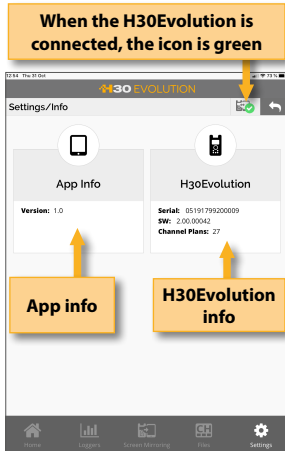
2.4.-Settings

When the user taps on Settings, the following window will be displayed:

2.4.1.- Info

Using this function of the App, the user can see the App information, as well as the H30Evolution whenever it is connected to the App.

When the H30Evolution is connected, the icon is green

App info

H30Evolution info

2.4.2.- Manual

Using this funtions, the user manual will be displayed in the App

2.4.3.- Register

The user can register his H30Evolution using this function.
The first time that you turn your H30Evolution on, it will ask you to register it. If you register your H30Evolution within 30 days, you will get two options (valued in 200€) for free.

If you press BACK, you can use your H30Evolution. If you press OK, it will begin the registration process:
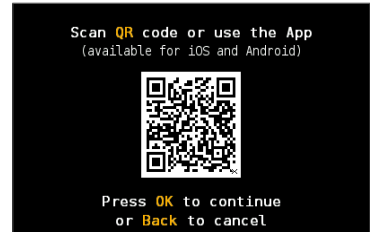
The user can choose to use his / her mobile phone to read the QR code, or use the Register function of the H30Evolution App (note, the mobile device wich the app is running on, must have access to the internet).

i)If you use your mobile phone, read the QR code using the camera. Then a web browser will be open with the Televes Meter Registration web page. Register your H30Evolution in our web. Once the process is completed, you will get a PIN code by email. Enter the PIN code in your H30Evolution:

ii) If you choose to use the app to register your H30Evolution, you first have to connect your H30Evolution with your mobile device. To do that, press BACK to leave the registration process for a moment and follow the instructions explained in the section *1.- Connection between the App and the H30Evolution*.
Then turn your H30Evolution OFF, and then ON again to start the Register process.
Select Settings->Register menu in the App.
Now you must disconnect your mobile device from your H30Evolution and connect it to the internet.
Then it will be open a web browser with the

Televes Meter Registration web page. Register your H30Evolution in our web. Once the process is completed, you will get a PIN code by email.
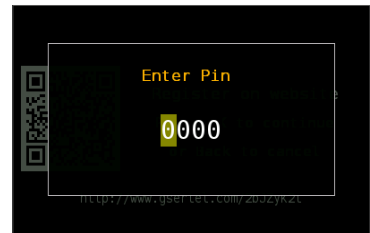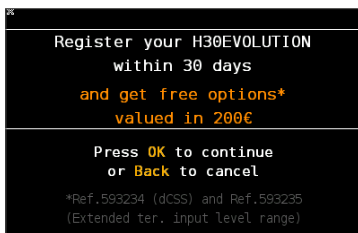Enter the PIN code in your H30Evolution:

2.4.4.- Clone

Using this feature it is very easy to have the same configuration in all your H30Evolution meters.

Make sure that the icon is green
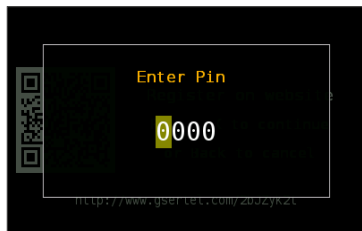
Copy the H30Evolution configuration in a file defined by the user

You only have to export the configuration of the H30Evolution that you wanto to copy, using the Export feature. So, the configuration will be saved in a file on you computer.
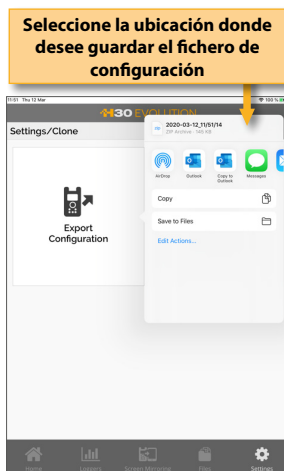
Seleccione la ubicación donde desee guardar el fichero de configuración

Then, connect other H30Evolution where you want to copy the configuration to and select the Import feature and search the configuration file in your device.

Error Messages

LOW BATTERY

Indicates that the battery is about to finish. The battery icon is red now. It is recommended to connect the meter to the external power source.

LOW BATTERY
Shutting down

Some time after the LOW BATTERY message appears (time varies depending on the functions used), it will appear this message. If the meter is not connected to the external power source, it will switch off.

BAD POWER
Unplug power source

This message appears when the meter is connected to an external power source that does not supply it the right power. Please, use only the power source provided with the **H30Evolution**.

SHORT-CIRCUIT
Check installation

This message appears when the meter detects a short-circuit at the RF input. It is recommended to check the installation to find out why the short-circuit is produced.

DC OUTPUT LIMIT EXCEED
Switch DC OUTPUT off

This message appears when the meter detects an excessive consumption from the device that is being powered. It is recommended to turn off the powering feature of the **H30Evolution.**

DC AT RF INPUT
Check installation

This message appears when the meter detects DC at the RF input that is not generated by the **H30Evolution**. It is recommended to check the installation.

Maintenance

Always disconnect the unit before cleaning. Use only a mild solution of detergent and water applied with a soft damp cloth. Dry thoroughly before use.

Do not use aromatic hydrocarbons or chlorinated solvents. These products may damage the unit.

Do not use alcohol or alcohol based products on the front panel, especially the display. These products may damage the unit.

Technical support

For any questions, contact Technical Support at www.televes.com

Before contacting Technical Support for repair, read the manual to ensure proper use and attempt to RESET the unit to clear any problems.

Repair service

Do not return the unit without first contacting Televes Technical Support.

If the unit needs to be returned, Televes will arrange for free shipping. The unit will need to be appropriately packed for shipping.

In compliance with IATA Regulations, when using our shipping service follow these instructions:

▶ Label the package.
▶ The equipment should fit as snugly as possible in the box. It is recommended to use the original packing materials.
▶ Attach the precaution label to the package.

CAUTION!

IF DAMAGED

Lithium ion battery

DO NOT LOAD OR TRANSPORT PACKAGE IF DAMAGED

For more information, call 0034 981 52 22 00

Failure to comply with these shipping requirements may result in the shipping agent rejecting the package.

Warranty

A) Televes warrants, only to the original Purchaser, all Products be free from any defect in materials or workmanship for a period of one (1) year, six (6) months for the battery, from the date of original purchase, unless otherwise specified.

(B) Televes shall, free of charge and in its sole discretion, either repair, replace with a new or factory reconditioned equivalent, or refund the purchase price of the Product(s), that has been determined by Televes to be defective in material or workmanship, subject to the limits of this warranty.

(C) This warranty excludes any inoperability resulting from:

(I) use or installation that is not in strict compliance with the written instructions and specifications;

(II) any modification or alteration performed by any third party not authorized in writing by Televes;

(III) service or repair performed by any third party not authorized in writing by Televes;

(IV) misuse, abuse, intentional harm, or lack of reasonable care;

(V) fire, ice, snow, rain, wind, water, volcano, excessive heat or cold, lightning, flood, power surge, earthquake, or any other acts of God;

(VI) war, crime, strike, riot, electro-magnetic pulse, or any other acts beyond the control of Televes;

(VII) shipping.

(D) All claims under the terms of this warranty must be made in writing, by the original Purchaser, within fourteen (14) days of the defect being known to the Purchaser. Such claims shall be accompanied by a description of any material facts related to the claimed defect and the invoice or other proof of original purchase date and price. If Televes so requests, the Purchaser shall, at Purchaser's expense, deliver the claimed Product(s) to Televes, within 14 days of the date of the return authorization. Under no circumstances shall the Product(s) be returned to Televes without a return authorization.

E) Any refund to the Purchaser, shall be limited to the purchase price of the Product(s), excluding

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DECLARAÇÃO DE CONFORMIDADE ▪ DECLARATION DE CONFORMITE
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KONFORMITÄTSERKLÄRUNG ▪ ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΣΥΜΜΟΡΦΩΣΗΣ ▪
FÖRSÄKRAN OM ÖVERENSSTÄMMELSE ▪ ДЕКЛАРАЦИЯ СООТВЕТСТВИЯ ▪
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