



Operation Manual

TSW500CATV

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Summary

1. Introduction	4
1.1 TSW500CATV Characteristics	4
1.2 Technical Specifications	4
2. Characteristics	5
2.1 Keyboard.....	5
2.2 Battery.....	6
3. Equipment Initial Operation	7
3.1 Setting the Equipment.....	7
3.1.1 System Configuration	7
3.1.2 Date/time Configuration	8
3.1.3 Channel Configuration.....	8
3.1.4 Line-Up Update	9
3.1.5 Ingress Configuration.....	10
4. Tests.....	11
4.1 Channel Test	11
4.2 Frequency Test.....	14
4.3 Tilt.....	14
4.4 Full Scan	15
4.5 Ingress Test.....	16
4.6 Voltmeter	16
5. Software Update	17

1. Introduction

The TSW500CATV is an equipment for measurements of signals cable TV quickly and efficiently. It gets information on the channels of the carriers and has a spectral scan mode; it detects the presence of interference beats as well as the amplitude of the carrier. The equipment allows the power measurement of QAM signals, constellation diagram, measurements of pre and post BER and MER and a voltmeter. The TSW500CATV has a plastic shield that makes it resistant to impact; it is lightweight and has a simple and practical keyboard that makes possible the operation with only one hand.

1.1 TSW500CATV Characteristics

The TSW500CATV is a portable equipment protected by a plastic enclosure, it is operated through a keyboard and a liquid crystal display, besides it has an LED to indicate the battery charge. The equipment is powered by an internal battery pack must be charged using the original source.

The following tests may be done:

- Channel test;
- Frequency test;
- Tilt;
- Full Scan;
- Ingress Test;
- Voltmeter.

1.2 Technical Specifications

- **Frequency**
 - Frequency Range: 5 MHz to 1 GHz
 - Channel Level measurement range: 48 to 1000 MHz
 - Level tuning Resolution: 10 KHz
 - Channel bandwidth Annex A: 8 MHz
 - Channel bandwidth Annex B/C: 6 MHz
- **Channel type**
 - Analog TV: TV
 - Digital TV: 256 QAM
- **Analog measurements**
 - Types of video: ITU B /D/ G/ H/ I/ K/ M/ N NCTA Systems
 - Types of audio: FM, simple audio
 - Resolution Band Width: 60 KHz
 - Measuring Resolution: 0,1dB
 - Display Range: - 50dBmV to + 60 dBmV
 - Accuracy: $\pm 1,5$ dB at 25°C; $\pm 2,5$ dB in extreme temperatures
 - Input impedance: 75 Ω
- **Digital measurements**
 - Measuring bandwidth: 6,0 to 8,0 MHz
 - Measuring Resolution: 0,1 dB
 - Display Range: - 45 to + 50 dBmV
 - Accuracy: $\pm 2,0$ dB at 25°C; $\pm 3,0$ dB in extreme temperatures

- **QAM Measurements**
 - Coding: ITU J.83 Annex A (DVB-C); ITU J.83 Annex C
 - Modulation types: Annex A: QAM 64, 128, 256; Annex C: QAM 64, 128, 256
 - MER Display range: 21 to >39 dB (QAM 64); 24 to >39 dB (QAM 128); 28 to >39 dB (QAM 256)
 - MER Resolution: 0,1 dB
 - BER Pre-FEC minimum: e^{-3} to e^{-9}
 - BER Post-FEC minimum: e^{-3} to e^{-9}
- **Voltmeter**
 - Voltage: 1 Vdc until 100 Vdc.

2. Characteristics

2.1 Keyboard

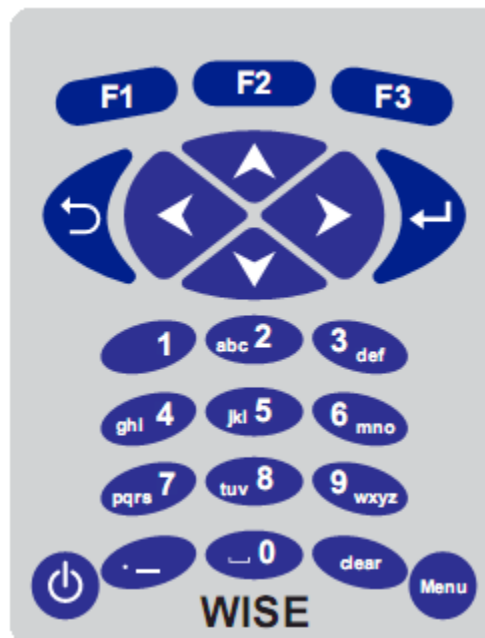








Figure 2.1: TSW500CATV Keyboard.

The TSW500CATV keyboard has a key diversity to facilitate your operation:

-  Power Button;
-  Go to the main menu;
-  Function of these keys dependent on the screen displayed. The label displayed in the lower line, right above the keys; defines these functions;
-  Begins the test, select the desired test/mode;
-  Return to the previously screen;
-  Used for navigating the cursors on the screen and changing the option pointed to by the cursor.

2.2 Battery

The TSW500CATV is powered by Li-ion batteries. It is important to remember that even with the appliance turned off the battery will suffer discharge (up to 30% per month) and it is recommended to recharge the equipment at least once a month.

When the TSW500CATV internal battery need to recharging, the equipment should be connected to provided power supply (input: 90 to 240 VAC/60 Hz) by means of the input connector, located on the side of it.

During battery charge, the user may monitor to see if it is fully charged by checking the status of the "IN CHARGE" LED at the front panel display. If the LED is red; means that the battery is currently being charged. If the LED turns green; means that the battery has achieved its maximum charge capacity. The TSW500CATV, then, remains powered by the loader so that after disconnection or power failure, the batteries will be with full load. Charge time from the battery fully discharged is 4 hours, and it lasts about 6 hours of continuous use.

If the battery is not charged up to its maximum capacity, the TSW500CATV operating time will be reduced.

To avoid power line interferences that may alter the test results, it is wise to avoid connecting or disconnecting the TSW500CATV battery charger whenever a test is in progress.

The TSW500CATV has a battery manager that reports on the load situation shown in the upper right corner of each screen.

Note: The TSW500CATV must only be charged with the provided power supply. Otherwise, Wise cannot be held responsible for unit damage and diminished battery life.

3. Equipment Initial Operation

When the equipment is turned on, with a charged battery, the first screen is the main screen. On this screen, it is possible to choose the type of testing that will be done: Channel test, Frequency test, Tilt, Full Scan, Ingress Test and Voltmeter.

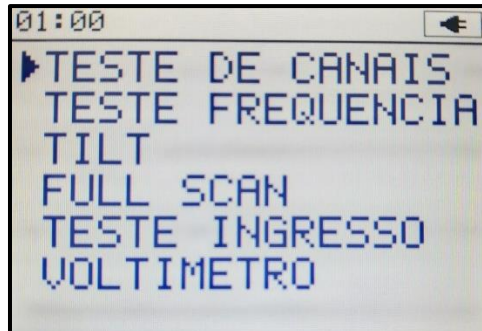


Figure 3.1: TSW500CATV Menu.

The choice is made using the move keys  and . To start the desired test press .

3.1 Setting the equipment

Press the key  to enter in the settings of TSW500CATV, use the keys ,  and  to choose the options.

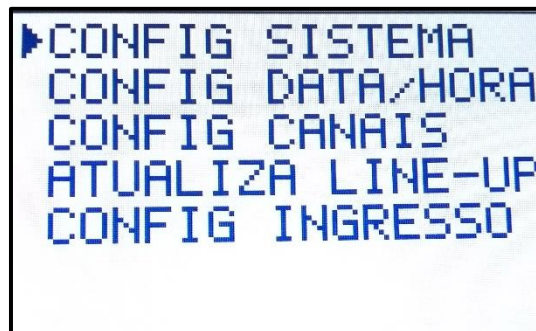


Figure 3.2: Setup Options screen.

3.1.1 System Configuration

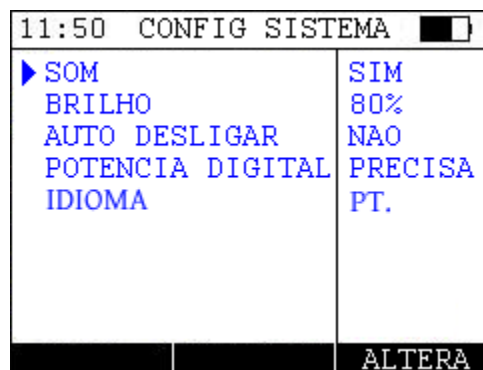


Figure 3.3: System Setup screen.

Use the keys or enter to change the following options:

- **Sound**
YES to connect and NOT to turn the sound off.
- **Contrast**
Change the screen contrast, varies from 5 to 100.
- **Auto turn off**
The options of auto power off are 5, 10, 15 e 20 minutes, or disable.
- **Digital Power**
The fast digital power test is carried out in less than a second with an error of 1 dBmV. In the NEEDS parameter, the test takes approximately 10 seconds with an error of 0.1 dBmV.
- **Language**
The options are EN. (English) and PT. (Portuguese)

3.1.2 Date/Time Configuration

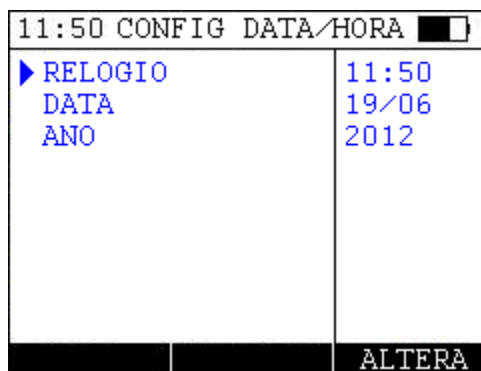







Figure 3.4: setting the date and time.






- **Clock**
Change the clock to 24 hour format. Use the directional keys to change the digits and press **F3** to confirm.
- **Date**
Changes the date, day and month. Use the directional keys to change the digits and press **F3** to confirm.
- **Year**
Changes the year. Use the directional keys  and  to increase or decrease.

3.1.3 Channel Configuration

This screen contains a list with the name and type of the channels, to change some channel choice with the directional keys  and  and press **F3**. Back to press .

11:50 CONFIG CANAIS		
CN	NOME	TIPO
▶ 2	VAGO	VAGO
3	VAGO	VAGO
4	VAGO	VAGO
5	HISTORY	ANALOGICO
6	TV	ANALOGICO
7	SENADO	ANALOGICO
8	COMUNIT.	ANALOGICO
9	ASSEMBLE	ANALOGICO
		ALTERA

Figure 3.5: Line up of channels.

On the screen, use the Keys  and  to choose the feature you want to change and use ,  or **F3** to change. When you finish the changes just out by pressing  or **F3** to confirm the choice.





11:50 CONFIG CANAIS	
▶ NUMERO	84
NOME	TS-24
TIPO	DIGITAL
QAM	256QAM
PADRAO	J.83C
F. CENTRAL(MHz)	585.00
BANDA (KHz)	6000
SYMB. RATE (KS/s)	5217
VOLTA	ALTERA

(a) Channel Editing.

11:50	
Escolha o novo valor para:	
NOME	
WAGO	
↑	
Seta para CIMA/BAIXO muda o caracter.	
Seta para ESQUERDA/DIREITA muda a posicao do cursor.	
CANCELA	CONFIRMA

(b) The name of the channel.

Figure 3.6: Editing of the features of the chat rooms.

In the name edit screen use the numeric keys or the directional  and  to exchange letters and  and  to change the cursor position. Press **F2** to switch the character type. A maximum of 8 characters is allowed. Press **F3** to confirm and **F1** to cancel the editing at any time.

3.1.4 Line-Up Update

IMPORTANT: Never connect the USB cable and the coax at the same time, it can generate from malfunctions until destruction of equipment.

There is in the TSW500CATV the option to create and update the line-up of channels through the software, can be downloaded on the website of **Wise Telecommunications industry** (www.wi.com.br). You need the **Windows .NET Framework**, download the same can be done so much for this link in bold as windows update.

Using the program is simple, just click 2 times the executable (lineup.exe) and the following screen will appear:

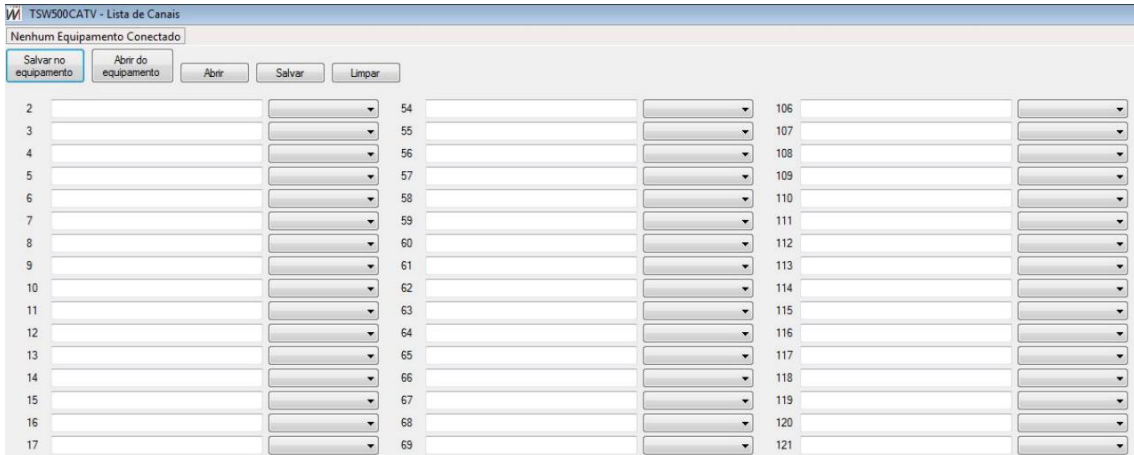
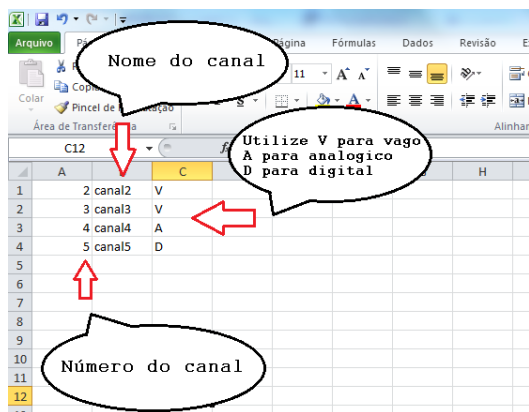


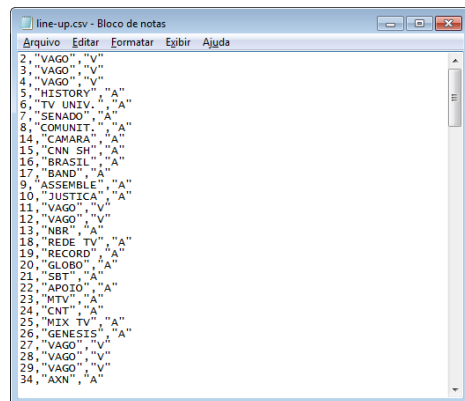
Figure 3.7: Main screen of the software line-up update.

In the software you can create your own list, open it to one or more equipments that are connected or open or save a list of/to some other location. When you open or save the file to/from multiple equipment a new screen will appear asking to what equipment you want to open/save. There is the **ALL** option in the option **Save on equipment** to upgrade equipment at the same time.

Remembering that the line-up file is a .csv file (comma delimited file), which can be created in excel or in note block of the following modes:



(a) CSV file in excel.



(b) CSV files in Notepad.

Figure 3.8: CSV file creation modes.

3.1.5 Ingress Configuration

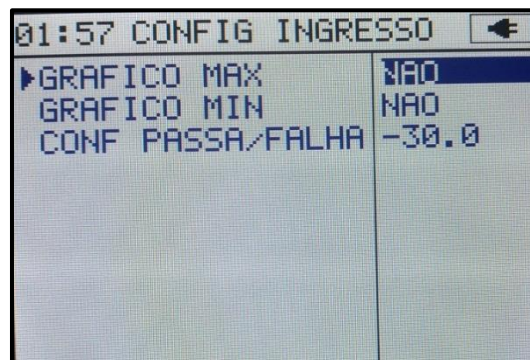

















Figure 3.9: Ingress Test Setup screen.

- **Maximum Hold:** Function responsible for holding the highest values on the screen. Use the , ,  or **F3** to change the option for YES or NO.
- **Minimum Hold:** Function responsible for holding the smaller values on the screen. Use the , ,  or **F3** to change the option for YES or NO.
- **Pass/Fail Configuration:** Function responsible for setting up the value of the matter failed. Use the , ,  or **F3** to change the value of the channel and the alphanumeric keys to enter the new value.

4. Tests

4.1 Channel Test

Channel Test screen always starts showing the measures of the last channel selected. To change the channel just enter the channel number with the number keys, or use the key  and  or press **F1** to enter the channel screen. This screen use the directional keys  and  to change the digits and  and  to change the cursor position.

Press **F3** to confirm the selected channel.

The channels test there are two types of channels: digital and analog. Different parameters will appear in the case of an analogue or digital channel to be chosen. You can also choose to show the measures or information about the selected channel, press **F3** to change the preview type.

11:50 TESTE DE CANAIS		
TIPO	ANALOGICO	
CANAL	34	
NOME	ASN	
FREQ VIDEO	283.25 MHz	
FREQ AUDIO	287.75 MHz	
POT. VIDEO	+3.0 dBmV	
POT. AUDIO	-11.0 dBmV	
DIFERENCA	14.0 dBmV	
CANAL	ESPECTRO	INFO

(a) Measures of the analog channel.

11:50 TESTE DE CANAIS		
CN 50 FOX	ANALOGICO	
FREQ 381.00MHz		
VIDEO M	COR PAL_NTSC	
AUDIO RVSD	DEMODO SIF	
CN LOCK	LOCKED	
CN VALIDO	SIM	
AFC	10 MHz	
VIDEO SNR	56 dB	
RSSI	-69 dBm	
CANAL	ESPECTRO	MEDIDAS

(b) Analog channel Information.

11:50	
Escolha o novo valor para:	
Canal	
037	
↑	
8833 para DV47440 muda numero.	
5634 para ESQUERDA/DIRITA muda a posicao do cursor.	
CANCELA	CONFIRMA

(c) Channel choice.

Figure 4.1: Test channels.

Analog channel

The channel test captures the signal and calculates the difference between the audio and video carriers. On this screen, you can choose the channel. In addition, the following parameters can be viewed:

- **Type**
Analogue or Digital.
- **Channel**
Channel number.
- **Name**
Name of the channel.
- **Video Freq.**

- Is the frequency of the video carrier.
- **Audio Freq Range**
Is the frequency of the audio carrier.
- **Pot. Video**
Is the power of the video carrier.
- **Pot. Audio**
Is the power of audio carrier.
- **Difference**
Difference between the video and audio carrier. The value will be in green (good) and Red (bad sign).

To scan the spectrum just press **F2**, the equipment will scan the channel looking for data and showing with a graphic on the screen. So the spectrum is fully traversed press **F3** to use a marker to show the power in the marker frequency, use the key keys **←** and **→** to move the marker.

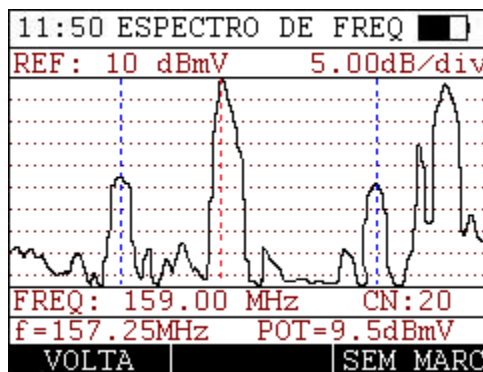


Figure 4.2: Spectrum screen with marker.

Canal Digital

The screen is the main for digital channels.

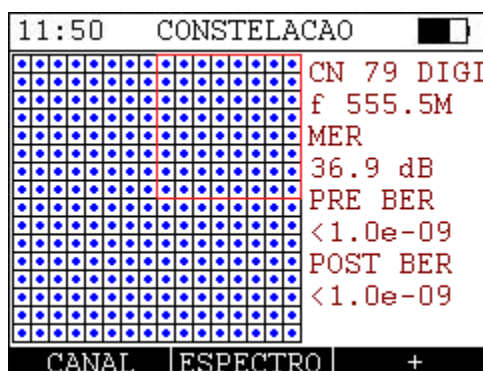
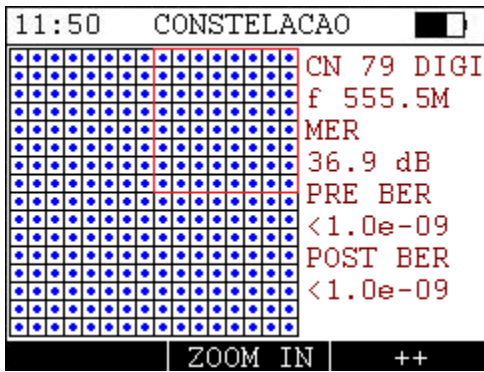


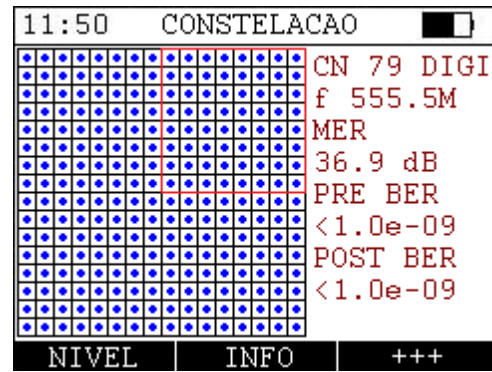
Figure 4.3: QAM constellation screen.

Within the constellation screen press **↑**, **↓**, or **F1** to change the channel, **F2** to show the spectrum of the channel and **F3** to mark a selection screen (marked in red) to access the zoom. Use the key keys to move the marker.

Within the screen with the spectrum press **F3** to use a marker to show the marker frequency power. Use the key keys **←** and **→** to move the marker.



(a) QAM Constellation with zoom option.



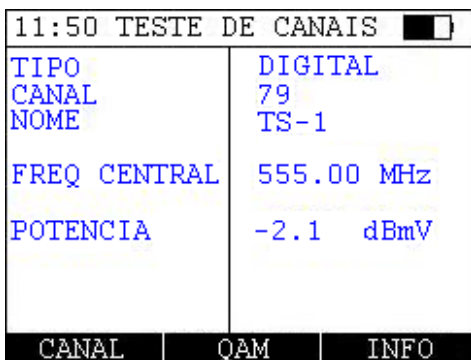
(b) Zoom and level Options.

Figure 4.4: QAM constellation Options.

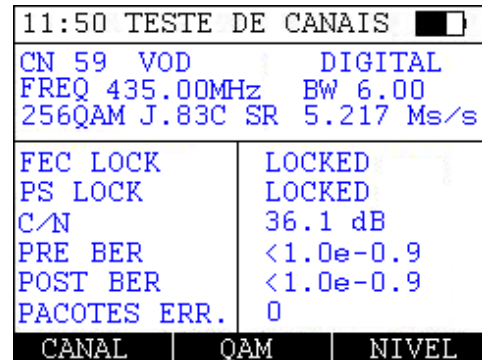
Pressing F3 in zoom screen above you can access a menu with two new information options, press **F1** to access the level and **F2** to channel information, press **F3** to return to the home menu.

On the top of the screen the channel data can be viewed, in sequence, the channel number, name and type, frequency, bandwidth, modulation, standard used and modulation rate (measured in symbols per second).

- **FEC LOCK**



(a) Level of the digital channel.



(b) Digital channel information.

Figure 4.5: Digital channel Test.

When in lock is with Forward Error Correction enabled.

- **PS LOCK**
When in lock is with Packet Synchronization enabled.
- **BER PRE**
Bit error rate before the correction made by the tuner.
- **BER POST**
Bit error rate after the correction made by the tuner.
- **ERR PACKAGES.**
Number of packets wrong.
- **POWER**
Carrier power.

4.2 Frequency Test

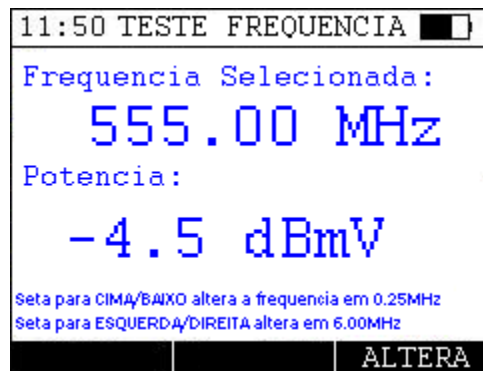


Figure 4.6: Test frequency.

The Frequency test shows the power frequency at the frequency choose. To change the frequency use the and to increase or decrease the frequency in 0.25 MHz or and to increase or decrease the frequency in 6 MHz. It is possible to press the button and use the keys , , and to choose a new frequency. After chosen the frequency press to select.

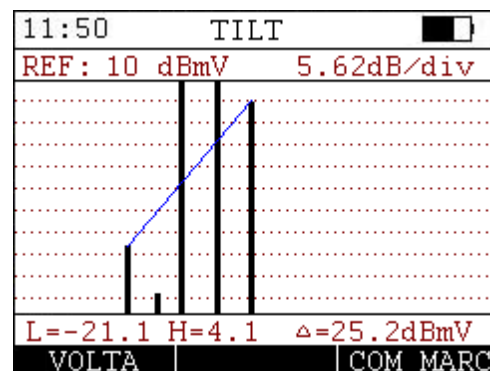
4.3 Tilt

The Tilt is a function that calculates a line between the largest and the smallest frequency of channels chosen. On the following screen keys , and are used to mark and unmark the chosen channels, navigation between them is made using the keys and . It is necessary a minimum of 2 channels to start the calculation, and you can choose a maximum of 15 channels. To start press .

CN	NOME	FREQ	TILT
▶ 2	VAGO	55.25	✓
3	VAGO	61.25	✓
4	VAGO	67.25	
5	HISTORY	77.25	
6	TV	83.25	✓
7	SENADO	175.25	✓
8	COMUNIT.	181.25	

PRESSIONE F3 P/ INICIAR
 FILTRO | LISTA | INICIA

(a) Tilt channels selection.



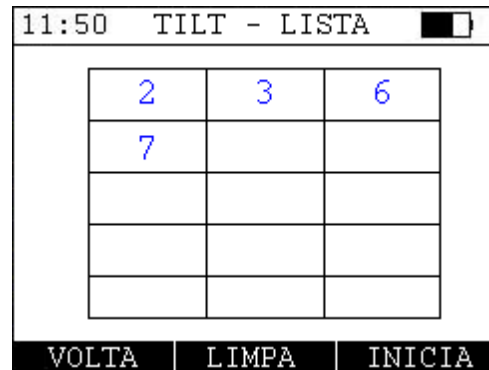
(b) Tilt graph.

Figure 4.7: Tilt screens.

To facilitate the marking of channels there is a filter button that can be accessed press . It contains a filter type of existing channels.



(a) Tilt filter.



(b) Tilt channel list.

Figure 4.8: Tilt screens.

By pressing the button **F2** it is possible to see a list with the channels selected, on this screen you can either clear the selection pressing **F2** How to start the test by pressing **F3**. To return to the selection screen press **F1**.

4.4 Full Scan

Do a scan on all channels and plots on a graph of power and frequency on the screen, The colors differentiate the types of channels: red to digital channels, green and blue to analogue channels (green for audio and blue for video) or orange and black (black for video and orange for audio) for the case of channels with a difference between the audio and video power greater than 17dBmV or less than 13dBmV. When finished it is possible score a point by pressing **F3** and moving the markup with the directional **←** and **→**. To update the graphic press **F2** and to return **F1**.

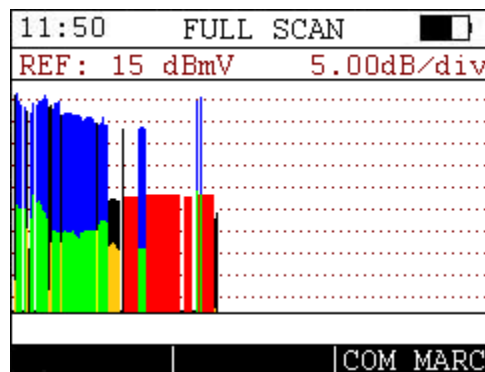







Figure 4.9: Full Scan.

4.5 Ingress Test

Performs the measurement of parameter of TV signals in a particular frequency band.



Figure 4.10: Ingress Test.

The frequencies range is 5 to 45 MHz. The directional keys  and  change the threshold shown in the lower left side along with the test results. The change of threshold restarts scanning. The directional keys  and  move the cursor. The value is shown on the lower right side. The button  restarts the test.

4.6 Voltmeter

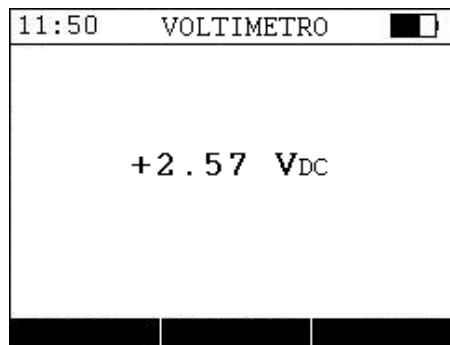


Figure 4.11: Voltmeter.

The voltmeter is used to measure DC voltage on the cable for field-testing.

5. Update of the equipment

IMPORTANT: Never connect the USB cable and the coax at the same time because this can generate from malfunctions until destruction of equipment.

To update the TSW500CATV is necessary to use the UPW updater that can be found on the website of Wise Telecommunications industry (www.wi.com.br). After installing the UPW follow these steps to update the equipment.

- Turn on the equipment by holding **F2** and pressing **⏻**. The following screen will appear:



Figure 5.1: Equipment update screen.

- Connect the equipment to a PC that is being used for the upgrade;
- Start the connection in UPW and click OK to continue.

The message "Operation Completed" will appear on the screen indicating the end of the operation. If the equipment does not automatically restart, turn off and turn on the equipment.