Abstract: An improved apparatus for testing and calibrating analog television signal, digital terrestrial or satellite television signal, adapted to verify the quality of the broadcast received by the television set (16) of a user, comprising electronic means in communication with each other, adapted to acquire and/or receive parameters of the signals received by the television set (16) and used by a single operator.
ENHANCED DEVICE FOR TESTING AND CALIBRATING A TELEVISION SIGNAL

DESCRIPTION
The present invention relates to an enhanced and improved apparatus for testing and calibrating analog television signal, digital terrestrial television signal or satellite television signal.

More in particular, the present invention relates to an apparatus for testing and calibrating television signals, adapted to verify the quality of the broadcast received by the television set of a user.

It is commonly known that the television signal, being it of the analog type, digital terrestrial type or satellite digital type reaches the television set and/or the decoder through a receiver system, typically consisting of one or more aerials placed on the roof of the building. Furthermore, the television signal from the receiving system gets through a signal coupling and mixing system, a signal amplifier system, an in-building signal distribution system and an in-house signal distribution system. As a result, both upon first installation and during normal operation of the system, this television signal can be affected by quality degradation or noise caused by improper aerial orientation, wrong setting of receiving parameters, signal losses in the path from the aerial to the television set or other signal distribution system anomalies.

These problems are solved by the installer of the receiver system, who tests the quality of the received signals at certain key points of the system, in relation to the signal/channel to be configured therein and performs the required calibration.

With prior art techniques and means, the solution of this television signal receiving problems requires the presence of two technicians or operators; a first operators shall remain within the user's house at a critical measuring point, which can possibly be the television set of the final user, while a second operator is on the roof of the building and orients the aerial and/or adjusts the parameters of the receiver system (levels, filtering, etc.), according to the information received from the operator within the house.

Such arrangement implies considerable drawbacks.
A drawback of the traditional apparatus for testing and calibrating television signals is that they require the presence of two technicians or operators as described above.
A further drawback associated with the use of traditional apparatus is that the operator on the roof has no clear perception of what happens at the television set, and only follows the directions imparted by the operator next to the television set.

Another drawback of traditional apparatus is that their calibration of television signals, whether the latter are of analog type, digital terrestrial type or satellite type, is always inaccurate and time-consuming.

A further drawback of traditional apparatus is that, even when signal testing and calibration are performed by one operator, for cost-reduction purposes, such operator shall first carry out the pointing process and/or relevant adjustments of system parameters by verifying signal quality directly downstream from the equipment for mixing and amplifying the signals received by the aerial system, which is generally located in the garret of the building, and then he shall test proper reception of configured signals/channels in the houses of some users. However this would make it difficult to find an optimal configuration for the system, because any problems encountered, for instance, at a user socket, might be only corrected by attempt, at locations away from the place in which anomalies occur, which involves considerable time consumption and no direct instantaneous perception of the effects that any change to the system and/or to its configuration may cause on the signal receiving point affected by the above anomalies.

The present invention has the object of obviating the above drawbacks.

More particularly, the present invention has the object of providing an improved apparatus for testing and calibrating television signal which allows a single technician on the roof of the building or in any other appropriate position, to test and calibrate the signals designed to be received by a television set placed in the user's house or at critical points of the system (such as floor distributors).

A further object of the present invention is to provide an apparatus adapted to allow the operator, positioned on the roof (or elsewhere), who performs signal calibration, to sense or have a clear perception of what is displayed by the television set of the user.

A further object of the present invention is to provide an apparatus that affords accurate adjustment of analog television signal, digital terrestrial television signal or satellite television signal in short times and at low costs.

A further object of the present invention is to provide an improved apparatus for testing and calibrating the television signal adapted to ensure high resistance and reliability in time and can be manufactured in an easy manner and at low cost.
These and other objects are fulfilled by the improved apparatus for testing and calibrating analog television signal, digital terrestrial or satellite television signal according to the present invention, which comprises electronic means in communication with each other, adapted to acquire and/or receive parameters of the signals received by the television set and used by a single operator.

The construction and operation features of the improved apparatus for testing and calibrating analog television signal, digital terrestrial or satellite digital television signal of the present invention may be understood more clearly from the following detailed description, in which reference is made to the annexed drawing, which shows a preferred non-limiting embodiment thereof and in which:

Figure 1 is a schematic view of the use of the improved apparatus of the present invention for testing and calibrating analog television signal, digital terrestrial or satellite television signal.

Referring to the above figure, the improved apparatus for testing and calibrating analog television signal, digital terrestrial or satellite digital television signal of the present invention comprises a measuring and transmitting device 12, which is connected by the operator to aerial socket 14 of the room in which the television set 16 is located and to the television set itself. Device 12 can and is designed to perform signal measurements at its inputs.

A receiver or collector device 18 is placed on the roof of the building and is connected to control unit 20 of an aerial 22.

Control unit 20 is connected to the aerial 22 and television set 16 via coaxial cable 24 of the existing system being installed.

When the operator has to carry out the test and the subsequent calibration of the television signal after connecting transmitter device 12 to socket 14 and television set 16, he/she will go onto the roof of the building or other suitable place and disconnect coaxial cable 24 from control unit 20 to connect it to collector 18.

Thus a signal communication channel is established between the room with television set 16 and the place in which the operator and collector 18 are located.

Measuring and transmitting device 12 which, as mentioned above, is connected to socket 14 of aerial 22 and to television set 16, transmits a plurality of parameters and measurements related to the type of signal received by the television set to the collector 18. Connection is established on an available frequency, automatically selected and configured.
by the two devices (transmitting device 12 and collector 18) communicating with each other, in order to guarantee an optimized transmission and absence of interference for the users connected to the receiver system.

Collector 18 is further connected to a mobile device or terminal (not shown), which allows the operator to display the images and/or measurements transmitted by device 12 to device 18, and to control device 12, also with the aim of testing various signal frequencies in order to carry out a prompt calibration of the whole system with reference to the single user socket or to another critical point of the system.

The connection between collector 18 and the mobile terminal is of mono or bidirectional type and is established by a traditional cable or by a radiowave transmission, possibly using public telephony systems such as GSM (Global System for Mobile Communications), UMTS (Universal Mobile Telecommunications System) or any other mobile telephony standard, or WI-FI (Wireless Fidelity) or Bluetooth systems; the frequency of transmissions between collector 18 and the mobile terminal is selected in view of avoiding interferences with the frequency of the signals transmitted by transmitting device 12 to collector 18 and with proper operation of the receiver system being serviced by the operator.

The parameters transmitted by transmitting device 12 to collector 18 are sent to the mobile terminal, wherefore the operator can have a clear perception of how signal is displayed on television set 16.

The operator who read a series of numbers corresponding to what is acquired by transmitting device 12 on the mobile terminal, carries out the test of the analog signal, digital terrestrial or satellite signal testing, amongst other things, various frequencies and consequently carries out the pointing of the aerial system and any appropriate adjustment in controller 20 for optimal calibration of the receiver and signal distribution systems.

In an alternative embodiment, the mobile terminal is equipped with a video display, allowing the operator to display the images transmitted by device 12, which correspond to the images actually displayed on television set 16; this allows the operator to carry out accurate adjustment and calibration of television signal.

As mentioned above, transmitting device 12 sends the parameters of the signals received at the user socket or at critical points of system 16 to collector 18 via coaxial cable 24; nonetheless, if cable transmission of parameters is found to be unfeasible or inconvenient (e.g. if the coaxial cable supplied with the existing receiver system is unsuitable for this
purpose), transmitting device 12 will communicate with collector 18 by radio, either
directly or via public telephony systems (GSM, UMTS or other mobile telephony systems).
Here again, the frequency of radio transmission will be selected in view of avoiding interferences both with the signals exchanged between transmitting device 12 and collector 18 and with proper operation of the receiver system to be optimized.
In an alternative embodiment, the measuring and transmitting device 12 may communicate directly or bidirectionally the mobile terminal, using a cable or radiowave transmission, possibly using public telephony systems (GSM, UMTS or other mobile telephony standards) or WI-FI (Wireless Fidelity) or Bluetooth systems, while maintaining all the above mentioned functionalities.
The apparatus of the invention further allows the transmission of analog television signal, digital terrestrial or satellite television signal from aerial 22 to television set 16 to be tested for any loss or change; in order to carry out such test, collector 18 transmits a known signal to transmitting device 12 (in this case also acting as a receiver) connected to socket 14 of aerial 22, which device is hence capable of detecting the difference between the known signal and the actually received signal, thereby showing the operator any change introduced by the receiver system.
The above description clearly illustrates the advantages achieved by the apparatus of the invention.
The improved apparatus for testing and calibrating analog television signal, digital terrestrial or satellite signal according to the present invention advantageously allows a single technician, located on the roof of the building or in any other place thereof, to carry out testing, pointing and calibration processes on the television signal receiver system associated with the TV set in a user's house.
A further advantage of the apparatus of the invention is that it allows the operator on the roof, who performs signal calibration, to sense and/or have a clear perception of what is displayed by the television set of the user.
Further advantageous is that the apparatus of the invention affords accurate adjustment of the television signal in short times and at low costs.
Another advantage is that collector 18 also acts as a filter, by preventing the incoming signals from transmitting device 12 to interfere with aerial 22.
Further advantageous is that the communication between transmitting device 12 and collector 18, whether it is a cable or radiowave communication, creates no noise or
interference for the users or other systems within the building.
Even if the invention has been disclosed above with particular reference to one
embodiment thereof, which has been given by way of example and without limitation, a
number of changes and variants will be apparent to those skilled in the art, in the light of
the above description. Therefore, the present invention is intended to include all changes
and variants within the spirit and scope of the following claims.
CLAIMS

1. An improved apparatus for testing and calibrating analog television signal, digital terrestrial or satellite television signal, adapted to verify the quality of the broadcast received by the television set (16) of a user, characterized in that it comprises electronic means in communication with each other, adapted to acquire and/or receive parameters of the signals received by the television set (16) and used by a single operator.

2. Apparatus according to claim 1, characterized in that the electronic means in communication with each other are a measuring and transmitting device (12) and a receiver or collector device (18).

3. Apparatus according to the preceding claims, characterized in that the transmitting device (12) is connected to the socket (14) of the aerial (22) in the room in which the television set (16) is located and to the television set itself.

4. Apparatus according to one or more of the preceding claims, characterized in that the collector device (18) is placed on the roof of the building and is connected to a control unit (20) of the aerial (22).

5. Apparatus according to one or more of the preceding claims, characterized in that the transmitting device (12) and the collector (18) communicate with each other via a coaxial cable (24).

6. Apparatus according to one or more of the preceding claims, characterized in that the transmitting device (12) and the collector (18) communicate with each other by radio.

7. Apparatus according to one or more of the preceding claims, characterized in that it includes a mobile terminal connected to the collector (18).

8. Apparatus according to one or more of the preceding claims, characterized in that the connection between the collector (18) and the mobile terminal is of mono or bidirectional type.

9. Apparatus according to one or more of the preceding claims, characterized in that the connection between the collector (18) and the mobile terminal is established by a cable.

10. Apparatus according to one or more of the preceding claims, characterized in that the connection between the collector (18) and the mobile terminal is established by radio wave transmission.

11. Apparatus according to one or more of the preceding claims, characterized in that the connection between the collector (18) and the mobile terminal is established by radio wave transmission, directly or through public central units such as GSM (Global System for
Mobile Communications), UMTS (Universal Mobile Telecommunications System) (GSM, UMTS or any mobile telephony standard), Wi-Fi (Wireless Fidelity) or Bluetooth systems.

12. Apparatus according to one or more of the preceding claims, characterized in that the mobile terminal can communicate and interact with the transmitter (12), thereby obtaining from the latter data and/or audio and/or video signals in any format, directly or via the logical and/or physical interposition of the collector (18).

13. Apparatus according to one or more of the preceding claims, characterized in that the mobile terminal may require the transmitter (12) to transmit specific data and/or audio and/or video signals directly selected by the mobile terminal, to the mobile terminal and/or the collector 18, directly or via the logical and/or physical interposition of the collector (18).