



Digital TV testing services: reference cases

A White Paper from Testronic Labs

1 Introduction

It is essential for the digital television industry that consumers get trouble free equipment. The combination of different Integrated Receiver Decoder (IRD) Hardware / Middleware / Software, TV sets, Conditional Access system, PSI/SI, System Software Updates, Electronic Programming/Service Guide, and other software elements in the home can cause major problems for the TV viewer of which the broadcasters and suppliers are often not aware. This paper illustrates the testing services Testronic Labs can provide for the digital television industry through the use of two reference cases.

Testronic Labs services are IRD centric and are focussed on the IRD at "system level" and the entire "end-to-end system" of the broadcaster's distribution chain as experienced via the IRD.

1.1 Test environment

1.1.1 Testronic Labs environment

Testronic Labs uses an elaborate Digital TV infrastructure to operate its testing services. On one side Testronic Labs uses a fully configurable digital TV head-end to recreate the broadcaster's own situation as much as possible. On the other side, Testronic Labs uses predefined digital head-end settings to fully exercise the IRD. In order to verify interoperability in the living room, Testronic Labs has an extensive range of different TV-sets and Consumer Electronic peripherals to exercise the IRD.

1.1.2 Broadcaster environment

In order to achieve a complete testing strategy, a segment of the testing needs to be performed at the broadcaster's site (on staging and live network).

1.2 Conclusion

Over the years Testronic Laboratories has accumulated a lot of experience working with broadcasters and IRD providers. With our assistance broadcasters have released more stable platforms, with the ability to fix errors at an early stage. We made sure that the broadcaster's end user's experience is what broadcasters want them to get. This improved customer satisfaction and retention, limits the numbers of annoyed users and churn, improves revenue per user, encourages sell-in of new services, improves the broadcaster's own Return on Investment.

In addition, the results of these tests have the potential to provide an excellent indication of what to expect when launching a release in the field and the risks connected to this.





2 Reference Case - iNDi

2.1 Project

iNDi is a Belgian cable operator which covers a large part of the Flemish region. In 2006, the company launched an ambitious project to offer digital television to the Flemish customer in High Definition. For this project, ADB was selected as set-top box supplier for the delivery of two IRD platforms: a HD Receiver and a HD Recorder (PVR).

2.2 Objective of Testronic Labs

Testronic Labs worked with iNDi to assist in hardware and software acceptance of both IRD platforms. In order to maintain service levels, Testronic Labs was involved in setting up the test plan, test case development and the test environment. Testronic Labs advised iNDi also on the use of adequate tools for efficient requirements/testcase management and error management.

2.3 Test coverage

For this project Testronic Labs focused on the following testing topics:

- TV Compatibility
- Audio and Video Output use cases
- PSI/SI testing

2.3.1 TV Compatibility

During the iNDi project, the main concern in the TV compatibility test surrounded HDMI interoperability between the IRD's and the different TV-sets. Our service has led to a more stable platform and the ability to detect numerous errors at an early stage. In addition, the results of these tests have the potential to provide an excellent indication of what to expect when launching a release in the field and the risks connected to this.

2.3.2 Audio and video output use cases

Considerable attention was given to the audio and video output use cases. By making use of the Testronic Labs Digital TV head-end with dedicated test streams, in combination with the available live network, the capability of the IRD's was verified to play out different types of video and audio formats, focussing on High Definition formats. Examples of test topics are the correct playback of HD content (720p, 1080i), decoding of the MPEG-2, MPEG-4 stream, playback of Dolby digital and PCM audio, widescreen, signalling and different aspect ratios.

2.3.3 PSI/SI testing

These tests were not only executed at Testronic Labs premises, but also at the customer's site. Test consultants were assigned to analyze software acceptance at the broadcaster site.

This paper concerns tests, which require the presence of a live network, or high priority tests as there is the System Software Update, Dynamic Channel Management, Logical Channel Numbering, System Stability, the EPG application, PSI/SI related tests etc.





2.3.4 Other testing topics

Further aspects of testing concerned test case development and execution of recording functionality, time shifting, application and user interface and video/audio quality assurance, while aiming for a test coverage as complete as possible.

3 Reference Case - Unitymedia

3.1 Project

Unitymedia is the second largest cable-based supplier of telecommunication services in Germany. Headquartered in Cologne, it operates in Hesse and North Rhine-Westphalia. In addition to analogue cable services, Unitymedia is a leading provider of integrated triple play services (telephony, internet and digital TV)

3.2 Objective of Testronic Labs

Unitymedia selected Testronic Labs to assist in defining a testing approach, setting up a test plan, test case development and test execution concerning software acceptance for the launch of different types of Standard Definition IRD's ("zapperboxes"). For this project Unitymedia preferred that Testronic Labs tested only at the broadcaster's site.

3.3 Test coverage

Testronic Labs focused on different aspects of IRD testing: application testing, channel scan, subtitle handling, teletext, favorite lists etc...

Special attention was paid to tests relating to System Software Update, Dynamic Channel Management, Logical Channel Numbering, verifying service quality and output use cases.

Due to strict German regulation, the handling of the parental rating was treated with an exceptional level of importance. This led to thorough testing of EIT data, Conditional Access, EPG and timer functionality.

Part of testing concerns more specific aspects such as PMT switching, multi-feed, bouquets and customer information messages.

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Please also see the two sided leaflet from Testronic Labs "Have You Got a Problem?" and our white papers on technical subjects available on our web site including "Faults With Digital Television Equipment in the Home"

