TECHNICAL REQUIREMENTS FOR USING SIMPLITV BRAND FOR TERRESTRIAL SETTOPBOXES

Published by
simpli services GmbH & Co KG
AUSTRIA

Version 3.1 - 05.01.2017

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Document History

Date	Version	Comment
29.03.2013	1.0	First release
06.11.2015	2.0	Updated Region frequencies in chapter 14.
03.11.2016	3.0 (DRAFT)	Added or modified following requirements: 2.3 Display 2.5 Antenna Power Supply and short circuit handling 2.6 USB 2.7 Digital Audio S/PDIF Interfaces 2.8 Digital Audio Video Interface (HDMI) 3 Tuning and Scanning Procedure (added requirements for FTI, LCN, LCN collision handling, Best Server, Channel lists, automatic channel list update, Dynamic PSI & SI processing, selection of ORF2 regional variant) 5 Software/Middleware requirements (added minimum requirements for EPG, Main Menu, service selection list, info banner, Service list manager, Teletext 5.9 Manual OTA Update (requirements for performing software update via local download (USB) and OTA has been added
05.01.2017	3.1	Final version including feedback from CE industry: • Paragraph 5. "Power consumption" now reference to Nordig requirements on "Energy efficiency" • Paragraph 2.4: added requirement for RCU keys

1 TECHNICAL MINIMUM REQUIREMENTS

The Receiver shall be compliant to the Technical Minimum Requirements provided by ORS comm / Austria [1].

2 HARDWARE REQUIREMENTS

The Receiver shall be compliant to the Technical Minimum Requirements provided by ORS comm / Austria [1] – chapter 3. In addition to these requirements the following paragraphs shall apply.

2.1 Power Consumption

The receiver shall be designed according to NorDig [5] requirements on Energy Efficiency.

2.2 Power Switch

The Receiver should have a power switch. In the case the power switch is "off", the Receiver shall be physically disconnected from any power supply.

2.3 Display

The receiver shall have at minimum a LED indicator to show the operational status of the receiver:
Green LED: shall indicate that the receiver is in operational mode
Red LED: shall indicate that the receiver is in standby or deep standby mode.

The Receiver should have a Display showing the actual program number. When a display is implemented than it shall follow these logical steps:
- Operational mode: Display shall show the program number of the actual tuned service (either TV or radio)
- Standby mode: Display shall show the actual time (hh:mm)
- Deep standby mode: The Display shall remain black.

2.4 Remote Control Unit (RCU)

The Remote Control Unit shall work properly with the Receiver in a range as shown in the following drawing.

Minimum 10m at straight line
Minimum 8m at degree conical
Refer to the below drawing
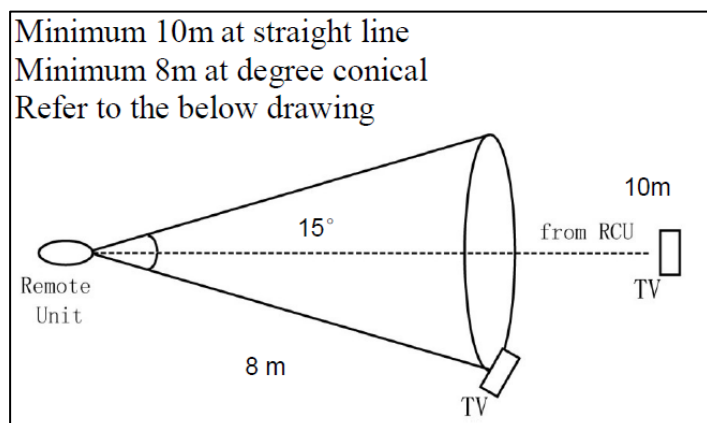
The RCU shall implement the following keys:

Key	function
Power	Power on/off device
Number keys 0-9	
TXT	Open Teletext viewer
MENU	Open device user menu
OK	To confirm selections.
Left-Right-Up-Down	
BACK/EXIT	Go one step back in hierarchy
TV/R	Toggle between radio and TV services
Vol Up/Down	
Channel Up/Down	
EPG	Open/close EGP viewer
Info	Present service information

The RCU should implement the following keys:

Key	function
FAV	Open favorite channel list
List	
Zapping key	Return to previous watched channel
Sub	Select available subtitles components
Audio	select available audio components
System message key	Show Irdeto message inbox

If not provided by dedicated buttons the functions shall be easy accessible via OSD.

2.5 Antenna Power Supply

The IRD shall implement antenna power supply and short circuit detection as specified in [1] chapter 3.2.3.3. In additional following paragraph shall apply

By default the antenna power supply shall be enabled. The receiver shall implement an option to deactivate the antenna power supply as part of the FTI procedure and by a function implemented in the receiver system settings.
If the user deactivates the power supply it shall remain off all time even after reboot or power cycle of the receiver.

2.5.1 Antenna power short circuit handling

The receiver shall implement a function to detect a short circuit on the antenna connector.

When short circuit is detected at any time during operation than:
1. Deactivate antenna power supply.
2. Display system message "Antenna short circuit detection" on Top of OSD so that user can read it.
3. Notification dialog message shall disappear when user acknowledge the message (eg. when RCU button is pressed or software button is accepted)
4. User shall be able to proceed FTI or any other normal operation after system message is accepted
5. On next receiver power cycle or reboot (also from standby) the receiver shall check short circuit again and in case no short circuit detected it shall reactivate the power supply.

2.6   USB

The Receiver should have one or more USB Ports. The USB Port(s) shall be placed on the back- and / or front panel of the Receiver.
The USB connector shall be compliant to USB Specification Version 2 [2] or higher.
The USB Port shall supply power to connected USB devices. The power supplied shall have a minimum of 500 mA / 5 V DC.
In case the receiver supports Wifi connectivity via a Wifi-Dongle and PVR ready functionality the receiver should provide a second USB port for PVR recording.

2.7   Digital Audio S/PDIF Interfaces

The receiver shall have a digital audio S/PDIF output (electrical RCA or optical TOSLINK connector) capable of carrying transcoded audio bitstreams and decoded stereo PCM audio. The receiver menu function shall provide an option to select either bitstream or PCM audio on this interface.

2.8   Digital Audio Video Interface (HDMI)

The Receiver shall be compliant to the Technical Minimum Requirements provided by ORS comm / Austria [1] – chapter 3.1.2.1. In addition to these requirements the receiver menu function shall provide an option to select either bitstream or PCM audio on this interface.

3   TUNING AND SCANNING PROCEDURE

3.1   FTI (First Time Installation)

The initial set up routine shall be started immediately after the first activation of the receiver. If the initial setup routine is interrupted the receiver shall execute the first time installation routine again after reboot until the procedure is finished successfully.

The first time installation routine shall include at minimum following items:
• Menu language selection (German, English are the minimum requirement)
• Aspect ratio (e.g 4:3, 16:9) for video output interfaces
• HDMI resolution (Automatic, other supported resolutions shall be selectable)
• Antenna power <on/off> selection

- Region selection (see table 1 below): The user shall be able to select the region. The corresponding reference channel will be tuned automatically.
- Signal strength and quality indicator bar (%) for selected region/channel: These indicator bars shall be updated frequently to assist the user to optimize the reception quality.
- Network settings (in case the receiver is capable to connect to internet services)
- Tuning profile "simpliTV"

Region selection shall be implemented according to below table *1:

Region	Channel
Wien & Umgebung	K36
St. Pölten & Umgebung	K38
Wr.Neustadt,Eisenstadt	K36
Graz & Umgebung	K47
Bruck/Mur & Umgebung	K47
Schladming & Umgebung	K40
Linz & Umgebung	K41
Salzburg & Umgebung	K47
Kärnten Ost	K46
Kärnten West	K48
Innsbruck & Umgebung	K37
Lienz & Umgebung	K35
Landeck,Reutte Umgeb.	K32
Vorarlberg	K31

Table 1: Region selection
*1: Prior to implementation it is highly recommended to consolidate with ORS as this list might change in the process of digital switch over to DVB-T2 in Austria

The reference signal strength and quality indicator bar shall be derived from following table and shall be frequently updated according to the current signal reception condition. The bars shall also follow the color schema depicted below.

C/N	BER	SQI	UI_Quality	Signal status
25	0	100	100	LOCK
24,5	0	100	100	LOCK
24	0	100	100	LOCK
23,5	0	100	100	LOCK
23	0	100	100	LOCK
22,5	0	100	100	LOCK
22	0	100	100	LOCK
21,5	0	100	100	LOCK
21	0	100	100	LOCK
20,5	0	98	98	LOCK
20	0	94	94	LOCK
19,5	0	91	91	LOCK
19	0	88	88	LOCK
18,5	0	85	85	LOCK
18	0	80	80	LOCK
17,5	0	75	75	LOCK
17	0	72	72	LOCK
16,5	0	69	69	LOCK
16	0	66	66	LOCK
15,5	0	30	30	LOCK
15	0	23	23	LOCK
14,5	0	18	18	LOCK
14	0	12	16	LOCK
13,5	0	6	13	LOCK
13	44	2	11	Bad Signal
12,5	6071	0	10	NO Video Signal

Table 2: Reference values for signal strength and quality indicator bar

3.2 Tuning procedure

The receiver shall apply LCN has specified in chapter 3.2.1. Channel Search time over the complete spectrum shall be shorter than five minutes.

3.2.1 simpliTV LCN

The Receiver shall provide basic LCN functionality as described in [5]. The descriptor tag of this simpliTV LCN is set to 0x83.
The original network ID (ONID) for ORS is 8232 (0x2028).
The name of the simpliTV LCN tuning profile shall be "simpliTV". The name of the corresponding channel list after the tuning procedure has been finished shall be "simpliTV"

3.2.1.1 LCN collision handling

In case a service with ORS ONID has same LCN number as a service previously found the service shall be listed after last valid LCN service in service list.

3.2.1.2 Services without LCN

Services without LCN originating from ORS network (ONID 8232, 0x2028) shall be placed after last valid LCN service

3.2.1.3 Foreign services

Foreign services (ONID NOT 8232, 0x2028) with and without LCN shall be placed on a program number larger than 400. This means that the LCN information of these multiplexers shall be ignored.

3.3　　　　Best Server

A specified procedure is required in order to select, the best received service if a service is able to be received simultaneously from several transmitters. A service is defined equal if ON_id, TS_id and S_id are the same based on reception quality (i.e. received signal strength and signal quality) at the receiver input.
The selection procedure shall be implemented according to NorDig [5] – Annex D and chapter 3.4.4.4.

For the sake of clarity double services found during channel scanning procedure or by PMT update shall not duplicate in service lists.

3.4　　　　Channel lists

After channel search has been completed the receiver should provide separate lists for TV and radio services.
For each category (TV/Radio) the receiver should offer two lists:
- Main service list which can't be changed by the user (simpliTV service list) and
- Second service list that can be modified by the user via a receiver menu function (delete services from list, move, add services per manual search). After full channel search procedure the second list shall be a copy of the main service list.

In addition to the required service lists the receiver might implement additional favorite program lists which may also be modified by the user.

The receiver shall always select the service list and service that has been active before user switched receiver to standby

3.4.1　　　　Selection of regional services

The receiver shall offer a function to select a regional variant of ORF2 HD (e.g ORF2W HD, ORF2N HD, etc.) during FTI or at any later time when a channel search is initiated by the user. When the user is requested to select a variant the receivers UI shall offer a signal quality and strength indicator bar so that the user can easily judge the quality of the selected regional variant.
Each regional variant has an unique serviceID and LCN number. If more than one variant of ORF2 HD has been found during channel scan procedure the variant selected by the user shall be exchanged with the variant on program place #2.

Example:
After channel search following variants are available.
```
LCN #   Service
2       ORF2W HD
9       ORF2N HD
49      ORF2B HD
```

User selects "ORF2B HD" as preferred regional variant.
```
LCN #   Service
2       ORF2B HD
9       ORF2N HD
49      ORF2W HD
```

The receiver shall preserve this manual change of the LCN even in case of PMT update or manual channel search procedure.

3.5　　　Automatic channel list update

The receiver should implement a function for automatic service list update in Standby mode at a time defined by the user and/or when receiver is switched to standby mode. The default setting for this function shall be "on" but the receiver menu shall offer an option to deactivate this function.
If update function is provided and enabled by the user the receiver shall search on all MUXs for service update. Services added to multiplexes shall be stored to the main service list according to their desired LCN position and at the end of the user defined service list (second service list).

For the sake of clarity MUXs that can't be received at the time of automatic update due to temporary bad signal condition shall not cause services to disappear from service list.

3.6　　　Dynamic PSI & SI

The receiver shall implement dynamic PSI update function as specified in [1]- chapter 4.3.3. The receiver shall be able to handle changes in PSI in the PMT, CAT and PAT (e.g changes of PIDs and availability of components) in a graceful way for the user.
The receiver shall be able to manage changes in the SDT and NIT (actual).
The receiver shall be able to handle dynamic changes in the Program Map Table (PMT).

4 CA SYSTEM

4.1 Conditional Access System

The embedded CA System shall meet all requirements as specified in [1] - chapter 10.

The receiver shall be able to handle all relevant CCA specific function and especially:

- Irdeto Unique Announcements and Mail messages
- Global announcements and Mail messages
- Parental control pin code reset by headend
- Set Parental pin code by headend
- Execute new channel search procedure initiated by headend (SOSCAN/GOSCAN)

4.2 Irdeto Messages

All relevant Irdeto Messages especially those which include Hotline number shall observe all specification of [1] (CA-System Error&Status messages). The font shall support all umlauts and special characters for the German language (e.g. äöüÄÖÜ!"§$%&/()=?+*#'--- _<>^°€@,;.:).

4.3 Pre Enablement

The embedded CA System shall support Secure pre-enablement (SPE) as specified in [1] - chapter 10.2.

5 SOFTWARE/MIDDLEWARE REQUIREMENTS

5.1 EPG

The EPG should include a miniature live video of the currently tuned service.

The Receiver should provide a grid style EPG, representing information from the EIT and present/following tables of the SI of all received multiplexes.

The EPG should be formatted as a matrix: all available TV channels shall be shown in one column. Right to this column a timeline shall show the present and all succeeding program events. Every event shall be selectable. If selected, the full text information of this event shall be shown.

In case of PVR scheduled recordings should be booked via this EPG. Events for which a recording has been booked shall be indicated accordingly.

5.2 Service selection list

The channel list should be easily available to the user by a dedicated button on the remote control or a menu function.

Scrambled service shall be indicated with an "key"-symbol (the $ sign shall not be used).

When a service is highlighted in this channel list the receiver should show a progress indicator bar of the present event.

It should be easily possible to switch to other service lists within this service list view (e.g favorite lists).

It shall be possible to scroll the service list page wise.

5.3 Info Banner

The Info banner shall be displayed for a short period when the user changes service or when activated via RCU button or menu function.

The info banner shall at minimum present following information:
- Service name
- Present and following event tittle (including start time)
- Progress indicator bar for present event
- Symbols should be used to indicate:
  - Scrambled content (key symbol)
  - HD/SD
  - Picture format
  - Subtitles available
  - Teletext available
  - HbbTV available (if receiver is capable to connect to internet services)
  - Audio (Stereo, Dolby, etc.)
- Actual time and date

The RCU left and right button should be used to show present/following information of next/previous service. The "OK" button should than be used to tune to a selected service.

5.4 Service list manager

The receiver software shall include a menu function to easily manage the TV and radio service lists.

5.5 Teletext

The receiver shall support Teletext as described in [1]- chapter 9.
The RCU shall provide a dedicated button to activate the Teletext view. The same button shall be used to close the view and return to live video.
The receiver shall implement the function to automatically cycle through the available subpages as well as to manually select a dedicated subpage (in this case the automatic cycling through the subpages shall be stopped and the desired subpage shall remain on screen unless the user select "Auto" mode again).
The font used for presenting the Teletext shall be well-proportioned and character spacing and line pitch shall be in a way that the whole text is easily readable.

5.6 HbbTV

The Receiver may support HbbTV. If the receiver is able to connect to internet services it shall meet the requirements as specified in [1] – chapter 13.

5.7 PVR ready functionality

The Receiver should provide PVR functionality as described in [1] - clause 11.
The storage for recording the DVB content may be integrated in the Receiver or may be connected to the Receiver via an USB connector.

5.8 Software update

The receiver shall implement software update feature as specified in in [1] – chapter 12.

The receiver shall compare the installed software version with the version made available by OTA or USB device. If the loader sequence (LS) of the installed software is equal or higher the receiver shall not proceed with the update and shall notified the user accordingly.

5.9 Manual OTA Update

The receiver shall check for OTA updates available at each power "on" of the receiver, periodically during runtime or when triggered via a menu function.

If the receiver detects an OTA update which is signaled as "manual update" (according to Irdeto SSU mechanism) the receiver shall activate the software update menu item so that it can be manually triggered by the user.

5.9.1 Automatic OTA software download

The receiver shall check for OTA updates available at each power "on" of the receiver and periodically during runtime. If the receiver detects an OTA update which is signaled as "automatic update" (according to Irdeto SSU mechanism) the receiver shall notify the user with an on screen dialog. The user shall have the option to decline the update three times! The next time the update procedure shall start automatically!

5.10 USB Software Update

The receiver shall implement a function to update the system software via the USB interface. In case a USB device with system software is connected to the receiver the user shall be notified via an on screen dialog about the availably of the update. The user shall have the option to accept or decline the update.

5.11 Factory Reset

The user shall be able to perform a factory reset via the user menu. That reset will clear all user-settings, custom channel lists, and configuration and returns the device to the default factory stat. Please not that recorded content shall not be deleted and shall be available to the customer after device reset to factory settings.

5.12 Boot Time

Cold Start Boot time shall be shorter than 35 seconds. Cold Start Boot time means the time between turning on the power supply for the receiver and viewing a visible frame of an HDTV- or SDTV-TV channel.

Boot Time from Standby Mode shall be shorter than five seconds.

The User shall be informed of the status of the boot process via a progress bar.

5.13 Zapping Time

Zapping time shall be shorter than 2.5 seconds for unscrambled services.

Zapping time shall be shorter than 3.0 seconds for scrambled services.

Zapping Time means the time between pressing the channel-up or channel-down button on the RCU and viewing a visible frame of the selected channel.

5.14 USB Media Player

The Receiver should be able to play back media content from a connected USB stick or harddrive.
If the receiver implement a Media player than it shall support following Video, Audio and picture formats:

Fileformat	Videocodec	Audiocodec
.mpg .mpeg	MPEG1, MPEG2	MPEG Layer 1, 2, 3
.dat, .vob, .ts	MPEG2	MPEG Layer 1, 2, 3 E-AC3, AC3
.mkv	MPEG 1, MPEG 2 H.264	MPEG Layer 1, 2, 3 AAC E-AC3, AC3
.mp4, .m4v	Xvid H.264	MPEG Layer 3 AAC E-AC3, AC3
.avi	Xvid H.264	MPEG Layer 3 AAC E-AC3, AC3
.mov	H.264	PCM AAC

The Mediaplayer shall support following Music Formats:

Fileformat	Audiocodec
.mp3	MPEG Layer 1, 2, 3
.ogg	OGG Vorbis
.aac	AAC
.wav	PCM

The Mediaplayer shall support following Photo Formats:

Fileformat	Pictureformat
.jpg, .jpeg	JPEG
.bmp	Bitmap

The following trick play modes shall be supported:
- Jump to chapter
- Fast Forward 2x, 4x, 8x, 16x, 32x
- Pause

- Stop and Resume (information stored for at least 5 assets) – user shall be asked if he wants to resume at XX:XX or start from the beginning.

6 PACKAGING, BRANDING, MARKETING COLLATERALS

The Receiver, all Peripherals, Packaging and Marketing Collaterals shall observe all specifications of the Brand Book [6].

7 REFERENCES

[1]	Technical Minimum Requirements	Technical Minimum Requirements for DVB-T2 Receivers for the Austrian Market, Version 2.0
[2]	Universal Serial Bus	Universal Serial Bus (USB) Specification, Revision 2.0, April 27, 2000.
[3]	EBU Tech 3333	EBU HDTV Receiver Requirements, March 2009
[4]	CI Plus Specification v1.3.1	CI Plus Specification Minimum Version 1.3.1 available at http://www.ci-plus.com
[5]	NorDig Spec	NorDig Unified Requirements for Integrated Receiver Decoders for use in cable, satellite, terrestrial and IP-based networks, Version 2.5.1
[6]	Simpli Brand Book	Simpli Brand Book; recent version