



NorDig T report

NorDig Excom meeting 28 January 2014 Stockholm, Sweden

Report from NorDig Technical group:

- Ongoing work and info from members & relevant other standards
 - *NorDig T and subgroups work & planning*
 - *Info (basic) relevant standards*
- Specifications – status and progress new specifications
 - *Unified IRD specification v2.5 (planned March 2014, originally end of 2013, delay 3 Month)*
 - *list of proposals/issues needing Excom guidance/decision*
 - *Test specification v2.4.x (v2.4.0 ready to publish if approved by Excom)*
 - *Rules of Operation v2.x (planned final draft end of 2013)*
- Specific issues (NorDig T subgroups)
 - *Accessibility icons*
 - *List of Countries using NorDig (outside NorDig members)*

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NorDig T report - Work and subgroups

NorDig Excom meeting 28 January 2014

Overview

NorDig T – active

NorDig T subgroups – status

- *Video – dormant*
- *Audio – active (Johan Lindroos, SVT. Preparing proposals for IRD, RoO and Test specs)*
- *Test – active (Test spec v2.4)*
- *RoO – active (RoO v2.x)*
- *Accessibility – active (Investigation)*
- *PVR/API – active (testing, maintenance/correction)*
- *CA/CI+/Sec – dormant (CI+ v1.3, CI+ v1.4)*
- *SSU – planned new group, to review SSU*

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NorDig T report - Work and subgroups

NorDig Excom meeting 28 January 2014

Organisation and status

NorDig T – Per Tullstedt, Teracom

NorDig T subgroups – status

- Video – *dormant*
- Audio – *Johan Lindraos, SVT, preparing proposals related to audio for IRD, RoO and Test specs*
- Test – *Pasi Toiva, Labwise, drafting test spec*
- RoO – *Des Mac Giolla an Chloig, RTÉNL, drafting RoO spec*
- Accessibility – *Kjell Norberg NRK fr 2014 (replacing Peter Mølsted, DR) preparing proposals related to accessibility (audio, video, subtitling, menus...) for IRD, RoO and Test specs*
- PVR/API – *Erik Vold NRK fr 2014 (replacing Peter Mølsted, DR) preparing proposals related to PVR and API (HbbTV) for IRD, RoO and Test specs. Investigations DRM alt, test model/process. Creating complementing HbbTV Test streams*
- CA/CI+/Sec – *dormant (CI+ v1.3, CI+ v1.4)*
- SSU – *started end 2013 (no chair), reviewing SSU requirements for IRD spec*

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NorDig T report - Work and subgroups

NorDig Excom meeting 28 January 2014

Summary activities during 2013

NorDig T – *~12-14 active participants/members (mix of members+observers, ~25-30 total incl passive), 9 meetings 2013, main activity: NorDig IRD, Test and RoO spec update, test process, NorDig HbbTV setup, general info exchange.*

NorDig T subgroups – status

- Video – *dormant, monitored by NorDig T*
- Audio – *~15 participants/members (mix of members+observers), 1 meetings 2013 (but working together w Accessibility), main activity: prepare proposals related to audio for IRD, RoO and Test specs*
- Test – *~Y participants/members, X meetings 2013 (also getting inputs HbbTV testing from API group), main activity: drafting Test spec, v2.4.0 final draft ready final approval/publication, now working w v2.4.1*
- RoO – *~15 participants/members (mix of members+observers), 1 meetings 2013 (but getting inputs from other subgroups), main activity: updating/drafting RoO spec*
- Accessibility – *~16 participants/members (mix of members+observers), ~8 meetings 2013, main activity: prepare proposals related to accessibility (audio, video, subtitling, menus...) for IRD, RoO and Test specs*
- PVR/API – *~22 participants/members (mix of members+observers), ~10 meetings 2013, main activity: prepare proposals HbbTV requirements and TV Recorder ("light PVR") for IRD, RoO and Test specs. Investigations DRM alt, test model/process. Creating complementing HbbTV Test streams. Started a smaller "expert subgroup" inside the subgroup for creating test cases, another 5-6 meetings so far.*
- CA/CI+/Sec – *dormant, monitored by NorDig T (CI+ v1.3, CI+ v1.4)*
- SSU – *~9 participants/members (mix of members+observers), ~4 (telco) meetings 2013, main activity: prepare proposal for update/review SSU requirements for IRD spec*

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NorDig T report - Meeting calendar 2014

NorDig Excom meeting 28 January 2014

NorDig T meeting calendar 2014:

- Tue 14 Jan 2014
 - Wee 19 Mar 2014
 - Tue 13 May 2014
 - Tue 17 June 2014
 - Thu 4 Sep 2014
 - Tue 28 Oct 2014
 - Tue 2 Dec 2014
- *NorDig Excom meeting calendar 2014: 28 Jan, 26-27 May, 30 Sep.*

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NorDig T report - short info standards

NorDig Excom meeting 28 January 2014

Short info about news/progress relevant Standards – NorDig members interest?

Video & Audio (NorDig IRD v2.4: MPEG2 + MPEG4)

- MPEG-H HEVC and UHDTV – DVB subset/additions still under development
- (MPEG-H Audio still very early)

CI+ (NorDig IRD v2.4 CI+ v1.2, now new NorDig IRD v2.5 CI+ v1.3)

- CI+ v1.4 (2xTS in/out, IPTV) DVB final draft/blue book Oct 2013, ETSI prel spring 2014 (?)
- CI+ LLP (Limited Liability Partnership) will now define for CI+ logo when and how CI+ v1.4 will be required (guess approx 18 month from now)

HbbTV (NorDig IRD v2.4 HbbTV v1.5 aka ETSI TS 102796 v1.2.1)

- Working w v2.0 that might incl HTML5 etc
- Working w Test suits for v1.0/v1.5 (NorDig contribute/propose)
- HbbTV Logo licensing (Aug 2013)

I/O interfaces etc

- HDMI v2.0 for UHDTV (4k, 10bit, 50/60Hz, but old colors and dynamics, Sep 2013)

Accessibility

- ITU (Focus group) has specified some basics for Talking TV set

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NorDig T report - Overview specification work

NorDig Excom meeting 28 January 2014

Overview NorDig T drafting specification work :

- Rules of Operation v2.x (target: ~~End 2013~~ delayed March/April/May 2014)
- Unified IRD specification v2.5 (target: ~~End 2013~~ delayed March/April 2014)
- Test specification v2.4
 - v2.4.0 (target: ~~Sep/Oct 2013~~, final draft Dec/Jan 2014, ready for approval by Excom)
 - V2.4.1/(v2.5) incl test for PVR crids, HbbTV etc (work started)
- HbbTV
 - Test cases (both NorDig and HbbTV test specs), under progress, NRK supervising, Sofia Digital consulting for writing test cases (partly paid by NorDig and partly by NRK) (target March 2014)
 - Test model proposal (based on HbbTV standard + NorDig additions), stated in NorDig Test spec(?)
 - Logo, marketing (no NorDig specific, no other than HbbTV standard)
 - DRM (investigating slowly DRM license model, no progress to report)

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NorDig T report - planning coming period

NorDig Excom meeting 28 January 2014

Overview NorDig T group planning 2014 (incl subgroups):

- No new planned activities for 2014 (yet), i.e. no planning yet for IRD v2.6 etc
- First finalizing specifications (spring 2014):
 - IRD v2.5
 - RoO v2.4/2.5
 - Test v2.4.1
 - HbbTV test cases
- Inputs from Excom(?)
 - (Last NorDig Excom discussed future of NorDig, among other listed: Common Testing , IPTV, WebTV/SmartTV/ConnectedTV , CA/DRM/Device Control , Technical development, International, Networking/exchange experience , What is TV in the future? Radio)

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NorDig T report - Unified IRD v2.5 (1/3)

NorDig Excom meeting 28 January 2014

NorDig Unified IRD specification v2.5 - Target: **March/April 2014**. Proposed content/changes:

- General maintain and update (e.g. define grace period)
- Front-End
 - DVB-S/-S2: correction for left handle circular
 - DVB-T2: **mandate** for all terrestrial IRDs (already mandatory for Ireland, Denmark*, Sweden and Finland)
 - Excom Sept 2013: OK to prepare for this text change, RiksTV needs to investigate if they can accept having an exception.
 - DVB-T/-T2: T2 Lite (Teracom/Boxer for Denmark, some interest from Digita for Finland)
 - DVB-T/-T2: remove PAL (immunity against analogue PAL signals)
 - Excom Sept 2013 : 800MHz/ch61-69, NRK wanted to reduce scanning area for terrestrial receivers to not require search ch61-69. However this could be issues in smaller cable network that re-distr terrestrial in cable networks as DVB-T/-T2. Conclusion was to follow DTG D-book and DigitalEurope E-book.
 - IPTV ? (ComHem shown some interest to review/update=
- CA/Security
 - CI+ change minimum from CI+ v1.2 to v1.3
- Audio
 - loudness, sample freq, default metadata, HE.AAC over HDMI/SPDIF
 - audio prio for Supplementary audio and its separate volume control
 - dynamic language signalised in PSI/SI (Finland YLE case)
 - Long time lip sync
- Subtitling
 - Clarifications language not matching and temporary settings

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NorDig T report - Unified IRD v2.5 (2/3)

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- SI
 - Target region descriptor
 - Logical Channel Descriptor v1, go back to mandatory
 - Sami?
 - Excom Sept 2013 : members investigate if they really plan to use Sami (text strings (EPG), extra audio track and extra subtitling track), if so then incl Sami.
- HbbTV
 - general review/update/correction,
 - HbbTV org Test Suits
 - DRM? Should we incl anything (only proposal is Marlin &/or PlayReady)
- PVR - **TV recorder or not**
 - TV Recorder ("PVR Lite" for iDTVs), "single tuner" (record and view same service).
 - Mandate from Excom was to draft *TV Recorder* that supports all NorDig PVR features and requirements, except watch one service and record another/two tuners (i.e. series recording w TVA crids, accurate recording, split recordings, complete recording/playback, auto conflict handling, security).
 - Industry/several observers has complained about complexity (TVA crids) and asks for a "super-light PVR", should we lower TV Recorder even more
 - *Future CI+ v1.4 with multiple MPEG-2 TS in/out, could enable iDTV to become a full PVR and with external HDD (USB)*
 - Excom Sept 2013 : keep current mandate, investigate with iDTV manufactures what they exactly wants to reduce/remove from current PVR requirements (more than two tuners)
 - **New:** NorDig T investigating interest for TV Recorder (both a light and super-light alt) so far low interest, see separate slides ahead.

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NorDig T report - Unified IRD v2.5 (3/3)

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- SSU review
 - investigate adv profile, update notification via broadcast, review complete text
- Customer Support
 - investigation and proposals for common/similar support menu
 - Surveillance of connected IRDs (e.g. via TR69 or similar)
- User Preference settings
 - Accessibility settings, collect all these settings and make easy to find
- Guidelines wordings and translations (new proposed annex)
 - Not mandatory, only guidelines to help IRD manufactures

See detail list of points for v2.5 at end of presentation

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TV Recorder: light or superlight requirements?

NorDig Excom meeting 28 January 2014

NorDig T: TV Recorder questionnaire: [Answers](#) (only 4 answers so far, 3x iDTV manufactures + 1x Member)

NorDig T Members and manufactures view of minimum requirements for NorDig "TV Recorder"

- Do you see interest for a *TV Recorder* profile? **NO, not so much, some, OK**

If NorDig should introduce TV Recorder, should then a *TV recorder* be:

- "Light" PVR? **NO, NO, "NO", ?**
- "Superlight" PVR? **YES, YES, YES, ?**

If NorDig *TV Recorder* should be a smaller subset, i.e. "super-light":

- Which NorDig PVR features/requirements should then be included as mandatory?
- One example of Superlight requirements compared to full PVR requirements are listed in coming slides (see one page overview list of functions or a 3-pages of more detailed list of functions)
- Please comment/change according to your view what then shall/needs to be included in this "Superlight" version of TV recorder! (By purpose I have in this list incl some question marks where at least I found it is of extra interest to get your view)
- if TV Recorder requirements is reduced to a *superlight* version, could/should then it become mandatory for all IRDs with some recording functions? Ie otherwise they have to de-activate this function. **NO, NO, NO (low cost IRD full service recording etc too complex), depends on IRD/chipset manufactures possibilities**
- **Q to Excom, Should we continue with TV Recorder or? If so guidelines what should be incl?**

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TV Recorder: Main functional overview NorDig Excom meeting 28 January 2014

NorDig T: TV Recorder questionnaire: main feature to be incl

NorDig PVR feature requirements		Crids	PVR PVR O	TV Recorder		All IRDs Comments
Profile – overall				Light O	Superlight M?	O
General	EPG/ESG 8day guide		M	M	M	
General	Security/anti-piracy (local storage, interfaces...)		M*	M*	M*	M*
Recording	Automatic conflict handling		M	M	M	
Recording	Basic requirement (30 Mbps, SD/HD/radio, via EPG, manual, full service)		M	M	M	
Recording	Accurate Recording		M	M	M	
Recording	Back-to-back recording		M	M	M?	
Recording	Timeshift recording		M	M	M?	
Recording	Split Recordings		M	M	M?	
Recording	Simulcast (SD<->HD, regional versions)	crids	M	M	M?	
Recording	Series recording (TVA crids)	crids	M	M	O?	
Database	91 days of recordings and previous recordings	crids	M	M	O?	
Recording	Simultaneous recording ("two tuners")		M	O	O	
Recording	Alternative instance, Recommended events	crids	O	O	O	
Recording	Safe margins, Late Recording		O	O	O	
Xtra features	Trailer booking/Promotional Linking	crids	O	O	O	
Xtra features	NorDig Broadcast Record Lists	crids	O	O	O	
Playback	Playback – basic, trick, full service, lipsync)		M	M	M	
Playback	Simultaneous recording and playback		M	M	M	

More detailed list functions and complete questionnaire at the end of this presentation

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* NorDig standard security requirements, unless relevant network/operator specifies something else for that Network.



NorDig T report – Test specification NorDig Excom meeting 28 January 2014

Test specification (subgroup active)

approx 1 step/yr behind IRD spec

- **Test spec v2.4.0** (based on IRD spec v2.4 – now ready to be published)
 - Several smaller typo and minor corrections made (last comment beg Jan 2014, fall in SQL formula)
 - Final version now ready
- **Test spec v2.4.1** (based on IRD spec v2.4)
 - Target ~~end 2013~~ mid 2014
 - PVR crids, broadcast record list
 - HbbTV test cases and procedure
- **Future Test spec v2.5**
 - Test cases for new in IRD v2.5
 - Plan for the future to make test setup for several test cases where possible same or more similar to make it easier to test
 - Consider to "minimize" some of the RF test cases
 - Missing audio/video test cases (e.g. metadata, video crop etc.) to be considered

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NorDig T report – RoO specification

NorDig Excom meeting 28 January 2014

Rules of Operation (same as Sept 2013 meeting)

- **RoO spec v2.4**
 - Target: ~~final draft end of 2013~~ March-May 2014
 - Plan to have same structure to be same as IRD spec
 - Inputs all subgroups (video, audio, PVR/API, accessibility)
 - Guidelines (complementing DVB guidelines)
 - Recommend broadcast settings (to reduce differences between NorDig networks)
 - Recommend broadcast levels (video, audio etc)
 - examples
 - Specific info related to different NorDig members networks/platforms

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NorDig T report – API HbbTV

NorDig Excom meeting 28 January 2014

API - HbbTV:

- HbbTV organisation has 20 Aug 2013 released a Logo Licensing To Consumer Devices
 - Approx fee 3kEUR one time and 1kEUR/yr (similar as HD Ready)
 - IRD has to fulfil current spec and current available test suit (which today refers to HbbTV v1.0)
 - [NorDig do not require/mention any HbbTV Logo \(similar as DVB and CI+\), as Excom Sept 2013.](#)
- Test cases for the NorDig HbbTV additions – goal is to incl as many as possible in HbbTV standard test suits (some few most likely NorDig has to incl in NorDig Test spec)
 - Sofia Digital consulting to NRK/NorDig for the main writing
- NorDig Testing/approval model proposal
 - base it on HbbTV Test Suits,
 - Manufacture *shall/should* be able to present test report/results if not HbbTV certificate/logo (?)
 - Should NorDig require tests has to be performed within a HbbTV Registered Test Centers?
- DRM
 - No NorDig DRM
 - If DRM, only proposal: Marlin & Microsoft PlayReady (same as FRA, GER, ESP...)

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NorDig T report - CA/CI+/Sec
NorDig Excom meeting 28 January 2014

NorDig informative, NorDig T monitor and report of DVB activities related to CA/CI+/Sec (from Sept 2013, nothing new to report now) Jan 2014:

DVB Common Interface Plus:

- v1.3 published Jan 2011,
 - CI Plus LLP mandates CI+ v1.3 since Sep 2012 to get approval/logo
- v1.4 (DVB blue book) IP connection & multiple streams (watch and record)
 - DVB press release v1.4 at IBC 2013-09-13, now "blue book" (send to ETSI to standardize)
 - Multiple streams (watch and record)
 - IP connection: enable IPTV to be delivered directly to the television, without the need of a set-top box. Support of multicast and MPEG DASH etc. API MHP or HbbTV. Big interest from IPTV operators to see opportunity to use this interface in iDTVs and no longer forced to use STB solutions.
- v1.5 (DVB now "re-starts" this work), form factor & second screen control.
 - Form factor is planned to be changed from the expensive PCMCIA to something else.
 - One of the top candidates for the coming CI form factor is USB3
 - Assumption that with USB3 the CAM will be so cheap that "smartcard" expected to be integrated with the CAM (i.e. no smartcard interface). This means that the complete USB3-CAM is to be of the type "use-and-through-away".

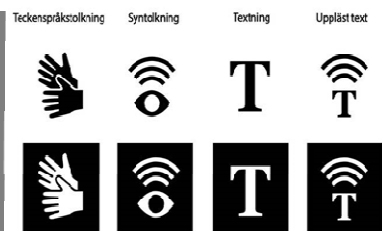
NorDig T report – Accessibility icons
NorDig Excom meeting 28 January 2014

Both SVT&TV4 and DR&TV2&NRK has during 2H2013 developed icons for Accessibility services

Icons for accessibility services:

- [=] Subtitles
- [o] Audio subtitles
- [..] Audio description
- [<] Visual signing

DR&TV2&NRK



SVT&TV4

UK using 3rd set of simple icons e.g. [AD,S], [AD,S,SL], [S] etc used at the end of text strings (event descriptions)



List of Countries using NorDig specifications (outside NorDig members), Several IRD manufactures and other mentions that several other territories and DVB networks refers or uses NorDig as basis for their IRD specs (especially “newer” networks). Among reasons seems open spec and content (T2, HbbTV, subtitling etc).

First list:

Country / Network	Status
Turkey DTT	Confirmed via Vestel
Several eastern Europe countries	Indications, not confirmed



END presentation
NorDig-T report

After here some detailed informative slides



NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date_description
General	2012-11-20 Kari Eriksson (Sony) – clarification around NorDig's grace periods.
1.5 and Annex I	Include in introduction a better description what NorDig's date for grace periods refer to. 2013-01-08 NRK (Ingve Bjerknes):
3 FrontEnd	Update reference list in Annex H. Include relevant listed specs from Annex H into section 1.5. 2013-05-02 (from Sony, John Wilson), RF input connector for cable and terrester IRDs – current reference IEC 60169 withdrawn.
3.3.2.2 and 3.4.6	"There are references to an IEC 60169-2 connector which seems to be withdrawn. I looked up the references in other documents like the Dbook which use 61169-2 instead...".
3.2.8	2012-11-27 (NorDig T meeting):
Satellite Performance	DVB-S & -S2 Performance "The NorDig IRD shall provide QEF reception for the maximum C/N (Es/No) ratios that are specified in Table 3.2", strange wording with 'maximum'. Maybe change to "The NorDig IRD shall at least provide QEF reception for the maximum required C/N (Es/No) ratios that are specified in Table 3.2" or similar – action for v2.5 or later. 2013-09-09, input from Sony; DVB-S Inconsistent with Unified spec because it uses Eb/No instead of Es/No and the actual performance requirement is different. DVB-S2 Incorrect. It uses the ideal ETSI spec Es/No figures which don't include an implementation loss. It also specifies 16/32APSK which many consumer demodulators don't support.
3.3.5.2 Cable,	2013-01-07 ComHem (Marina Andersson): Cenelec EN 50083-7 seems to have been replaced by Cenelec EN 60728-1. 2013-09-09, input from Sony; Impact to the technical requirement?
3.4	2013-10-24, Marina investigates if new spec introduce any new requirements 2013 January (from NorDig T meeting), Teracom and Digita see interest in add optional requirements for DVB T2 Lite (for example include that DVB-T2 IRD is not disturbed by any mixed signals T2 Base and T2 Lite)
3.4 DVB-T2	2013-05-15 (from Teracom), change DVB-T2 to mandatory for all DVB-T/-T2 receivers
3.4 PAL	2013-05-15 (from Teracom), change immunity against analogue PAL signals from mandatory to optional (and then maybe in v2.6 remove completely the requirements). All members have done their ASO. By the end of 2013 mainly Finland will have neighbors still broadcasting analogue TV (Russia). Perform test for this is very time consuming. 2013-09-09, input from Sony; DTG removed all but one test case.

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NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date_description
3.4.4.4 Installation mode: Automatic Search, best service and SI chapter	Nov/Dec 2011, Proposed by Petri Hyvärinen, Teracom, during v2.3 update (draft 06), but was missed when sent to Excom (draft 04), with following comment; This section is more logical to this text. Changed to shall requirement because of request from operator. Agreed 2011-09-21 to change should req. Inclusion of following text after 3 rd paragraph (but depends on if target region descriptor is included): "If two or several services (same original_network_id, transport_stream_id, but different service_id) request the same service list position signaled in LCN (logical channel number) in LCD, IRD shall use in addition to LCN the TRD, target_region_descriptor, if signaled." Proposal of also including Target Region descriptor into SI chapter.
3.4.4.7.2	2013-09-09, input from Sony; Requirement should be same as on D-Book. 2013-06-03 (from Teracom), Requirement "The absolute accuracy of the C/N value shall be of ± 1 dB for C/N values of 17 dB to 27 dB at the IRD RF signal input." missing in this chapter. 2013-09-09, input from Sony; It is not necessary to copy the sentence from 3.4.4.7.1(DVB-T). But we can agree if copying will make sense. 2013-10-24 OK from Sony. SQL formula may need a modification. Specified SQL=100 is independent of the received BER. Basically C/N can be high with high BER resulting to SQL value 100.
3.4.7	2013-06-03 (from Teracom), Current text: "The RF signals should be passed from RFin to RFout independently from the status of the NorDig IRD (operational or stand by), so that connected equipment (e.g. TV set) can operate even if the NorDig IRD is in stand by. The NorDig IRD, when equipped with RF bypass, should include user setting to disable or enable the RF bypass gain in stand-by mode." Compare to receivers fulfilling the EU requirement for maximum power consumption in standby mode. Result is that RF bypass will attenuate the RF signal when IRD is in standby mode and other receivers in chain connected to same RF signal may lose the reception. Proposal to make GUI functionality more stringent.
3.4.10	2013-06-03 (from Teracom), Review (decrease) the number of DVB-T2 modes for performance requirements.
3.4.10.6	2013-06-03 (from Teracom), Proposal to remove this chapter. (Immunity to "analogue" signals in Other Channels)

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NorDig T report – IRD v2.5 detailed revision list

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Chapter	date, description
3.4.10.8	2013-06-03 (from Teracom), Proposal to remove this chapter. (Immunity to Co-Channel Interference From Analogue TV Signals)
3.4.10.11	2013-06-03 (from Teracom), Current text: "For a specific echo attenuation the required C/N shall have approximately the same value, independent of the actual delay length. The deviation in required C/N from the median value shall be less than 1 dB, for any echo length from 1.95 µs up to 0.95 times guard interval length." This requirement has been criticized by chip manufactures because it affects to the best achieved performance negatively. Removing of the requirement is not possible because that would allow very bad performance in general. Increasing the deviation is a solution but perhaps not the best alternative. Perhaps best would be to define a maximum C/N vs echo level vs echo delay. Drawback is that it results to huge table and there is lot work to do. Proposal ? 2013-09-09, input from Sony: We are interested in what type of performance is degraded. 2013-01-15, (from NorDig T meeting), EBU R128 mainly for RoO, but anything related to IRD requirements needed?
Loudness 6 or 16 (?)	2013-10-24 (NorDig T meeting), investigate mode A and B, do we need to add any text for that.
New Annex Menu wordings	2013-01-15, (from NorDig T meeting, audio group), review guidelines for wording in menus, e.g. do not use word "analogue" for stereo PCM.
6.2 Audio, Audio Formats	2013-10-24 (NorDig T meeting), common annex with Accessibility recommendations and in the future also for other parts. 2013-01-08 NRK (Ingve Bjerknes): 6.2, Page 67, fifth section: "It shall be possible to control the audio level on the outputs primarily used for TV viewing (TV SCART and HDMI) with the remote control unit and buttons on the front panel (if present)". In Tech 3444 (3344?) it is explicitly recommended not to implement it like that since this may lead to codec specific loudness jumps.
6.2.3 HE-AAC	2013-01-15, (from NorDig T meeting, audio group), DVB/ETSI TS 101 154 has added two modes; Presentation Mode 1 and Presentation Mode 2, review if NorDig IRD requirements needs to be updated.
DVB presentation mode 1 & 2	2013-10-24 (NorDig T meeting), might be applicable for also MPEG1 L.II audio codec (for AC3/E-AC3 likely already taken care of). Might be postpone to v2.6.
6.2.3.2 HE-AAC, default downmix	2013-01-15, (from NorDig T meeting), review default metadata values for HE-AAC bitstreams without metadata (espec Downmix parameters). 2013-09-09, input from Sony: Any proposal available? RoO group need to define metadata rules. 2013-10-24 (NorDig T meeting), proposal is to use DVB recommendations TS101154 C.5.2.8.



NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date, description
6.2.3.3 HE-AAC over HDMI	2013-01-15, (from NorDig T meeting, audio group), review text (note 1 in 6.2.3.3) of Pass-through of native (AAC) over HDMI output. Investigate if HDMI and/or SPDIF interface has specified this yet. 2013-09-09, input from Sony: Carriage of MPEG-4 AAC over SPDIF is defined in IEC-61937-11. Carriage of MPEG-4 AAC over HDMI is being defined in HDMI v2.0 spec, draft just approved. Need long grace period. 2013-09-26 NorDigT meeting, if only in HDMI v2.0 (then rewrite or remove in NorDig) 2013-12-13 Update note for AAC over HDMI to reference to HDMI and keep as optional. HDMI over SPDIF is not included in NorDig (not as mandatory, not even as optional), propose to not incl this.
6.3 Audio, Multichannel Audio	2013-01-08 NRK (Ingve Bjerknes): 6.3 third section: There should be stated that «The default down-mix format shall be L/Ro». Our experience is that L/Rt down-mix may cause problem with some encoder/receiver combinations.
6.4 Audio prio	2013-01-15, (from NorDig T meeting, audio group), in order to minimize differences in NorDig platforms of the basic requirements listed in NorDig IRD spec, here Finland DVB-T and DVB-C requirements has override NorDig audio prio and changes the order of audio prio (NorDig: 1st language 2nd Audio type etc while Finland 1st Audio type 2nd Language etc). This has been made to ensure that Supplementary audio is not selected in IRDs even when normal audio's language does not match any of the preferred audio language IRD's user preference settings. 2013-09-09, input from Sony: IRD spec v2.4 requirements should have been already implemented. Major change of audio spec would be major task for industry. <interpret Sony would if possible really like to avoid changing again IRD spec related to audio prio>
6.6 Audio output Formats	2013-01-15, (from NorDig T meeting, audio group), review if text ch 6.6 can be improved.
6.6 Audio, Audi Output formats and Annex G	2013-01-08 NRK (Ingve Bjerknes): 6.6 table 6.3: In column 3 (When Multichannel mode is selected), the two lower rows (E-AC-3 and HE-AAC multichannel) should have a third option for HDMI: «Decoded Linear PCM». LPCM is supported by HDMI. Transcoding degrades the audio quality (theoretical) and introduce more delay, so LPCM is a relevant alternative. Annex G: See the comments as for 6.6.
6.7.2	2013-10-24 (NorDig T meeting) OK to be included also in the table (already included in codec requirement chapters). 2013-06-03 (from Teracom), Is this section really needed? It contains redundant information to 6.2.x sections. Perhaps possible to combine 6.7.2 and 6.2.x sections.
6.8	2013-06-03 (from Teracom), Is dual channel needed? 2013-06-18 (NorDig T meeting), Some Finnish cable networks still using this for their rebroadcast of satellite signals of children channels 2013-09-26 NorDig T meeting, remove the requirement from NorDig, Finnish FICOM will add this if needed for CableReady



NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date, description
6.9 clean audio	2013-09-25 (input from NorDig Accessibility group), Reviewing completely our NorDig Clean Audio concept, no NorDig member uses this as specified today. Investigates what DTG, DigitalEurope and DVB has done and are doing in this field.
6.10 Audio, Supplem audio and/or 12.6 SI PMT	2013-01-09, (from Teracom/Boxer/PlusTV) proposal for correction for Audio receiver mixing of visual impaired. IRD requirement should be complemented so that receiver mixing is triggered only when language code is matching between "normal" and visual impaired audio stream.
6.10.3.5 Suppl audio, volume control	2013-01-15, (from NorDig T meeting, audio group), Review separate volume control for mixing level of supplementary audio for receiver mixing (some receiver only allow adjusting supplementary audio up to same level as main/normal audio and do not support adjusting supplementary audio louder than the main/normal audio).
6.10.3.5 receiver mixing	2013-09-09, input from Sony; D-book says following: "Providing the means for the user to adjust the relative volume of description passages is an essential receiver requirement." " "AD_fade_byte: takes values between 0x00 (representing no fade of the main programme sound) and 0xFF (representing a full fade). Over the range 0x00 to 0xFE one lsb represents a step in attenuation of the programme sound of approximately 0.3 dB giving a range of about 77 dB. The fade value of 0xFF represents no programme sound at all (i.e. mute)."
6.7.1. and 6.11 Lip sync	2013-01-15, (from NorDig T meeting, audio group), review lip sync requirements for long viewing time and test cases.
6.13 Audio, Loudness level	2013-10-24 (NorDig T meeting), should be tested for all support audio codecs for the IRD. 2013-01-08 NRK (Ingve Bjerknes): 6.13 / 6.13.3: There are no indication to how dBFS is measured, whether it is True Peak, Quasi Peak, DialNorm or anything else. 2013-09-09, input from Sony; Just refer to UBU R128?

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NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date, description
7 Subtitling	2013-06-17, (from Marina Andersson, ComHem) We often have discussions with STB vendors and IDTV manufacturers regarding how to prioritize subtitling languages. Our view is that if none of the languages that the customer has chosen as primary and secondary language, then the STB/IDTV shall not show any subtitling at all. Many vendors choose to show the first language in the list in case primary and secondary language is not available. One example is Discovery which has Swedish subtitling embedded in the video. Discovery broadcasts Norwegian, Danish and Finnish subtitling tracks. Assume the customer has chosen Swedish as primary language and English as secondary language. In that case we expect the STB/IDTV to not show any other tracks. Otherwise the result will be e.g. Norwegian subtitling on top of the Swedish embedded subtitling. It can also be expected future cases with a foreign language broadcasted and no Swedish/English subtitling. It is not clearly stated in the NorDig spec how the STB/IDTV shall handle this situation and it would therefore be valuable to clarify how to handle subtitling prioritizing in future versions of the specification. 2013-06-18 (NorDig T meeting), proposal to add "requirement"/clarification about that IRD shall not display subtitling if language do not match user preference settings. (For audio is the opposite, IRD shall always decode some audio even if no audio stream match user preference settings).
9.2 CI	2013-01-15, (from NorDig T meeting), review to change from today's CI+ v1.2 to CI+ v1.3 (to be in line with LLP organization approval). Text proposal for IRD spec has been sent out for comments 2013-05-15, support from ComHem and Teracom, so far disagreements (2013-09-19).
10 SSU review completely	2013-01-15, (from NorDig T meeting), review SSU. Especial IDTV manufactures are coming more and more with really huge file size for OTA (some manufactures has now reach file size of over 300MB and this becomes challenging for ployout reasonable fast in several networks).

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NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date, description
10 SSU for CAM	<p>2012-11-15, (Nicolas Stefanelli, Neotion),</p> <p>Review SSU requirements for CI+ CAM.</p> <p>"In the case of IRDs with CIP- CAM, the IRD shall also support to update the System Software on the CIP-CAM when such software is broadcast. In this case there could be two software images. The IRD shall inform the user whether there is an IRD update or CIP-CAM update. All requirements in this chapter apply to NorDig IRDs. Requirements for download functions in the CIPCAM are defined in the CI Plus specification [68]."</p> <p>My questions are:</p> <ul style="list-style-type: none"> - "All requirements in this chapter apply to NorDig IRDs " I understand that the CI Plus CAM doesn't need to be compliant with DVB SSU enhanced (even it is mandatory from January 2012). Do you confirm ? - "The IRD shall inform the user whether there is an IRD update or CIP-CAM update" There is no existing mechanism (CI resource for example) for the IRD (iDTV or STB) to inform the CI Plus CAM there is and CI Plus CAM software update available in the air. What does the standard mean ? <p>2013-09-09, input from Sony; There is no defined method in CI+ for CAM updates. They can use proprietary CAS solutions as well as standard SSU.</p> <p>For the second part, TV cannot detect any CAM update due to obvious reasons (which method they are using, what their OUI is, etc) thus we cannot inform user directly. As part of the CI+ standard, CAM should show MMI and ask user consent before continuing any update. This should be adequate and any additional message (that could be put on by TV once CAM Upg resource is opened – not 100% reliable) is unnecessary.</p>
11.4 zapping time	<p>2013-02-19, (from Sony, Kari Eriksson), "Evaluation of section 11.4 Zapping Time for TV Services" review if IRD spec need to precise even more test conditions for these requirements or if requirement need to be changed.</p> <p>2013-09-09, input from Sony; Currently test labs use live signals for Zapping time test. This is not ideal solution, specific test TS would be better. Need to include PTS-PCR requirement to the spec.</p> <p>2013-10-24 (NorDig T meeting) incl MPEG4, case should not need HDMI re-handshake. Remember that old/slow CAM can have quite some impact on zapping time. Remove analogue.</p> <p>2013-12-05 (NorDig T meeting) specify so that it is from pressing RC key to new video appear and define that IRD manufacture shall state fastest alternative (P+, key number, channel list etc).</p>

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NorDig T report – IRD v2.5 detailed revision list

NorDig Excom meeting 28 January 2014

Chapter	date, description
12	<p>2013-04-10 (from Digital-TV-Labs), typo chapter numbering:</p> <ul style="list-style-type: none"> 12.1.1 Country and Language Codes within PSI/SI, should have number 12.1.8 12.6.1 - ISO 639 language descriptor, should have number 12.2.4 12.6.2 - AC-3 descriptor, should have number 12.2.5 12.6.3 - Enhanced AC-3 descriptor, should have number 12.2.6 <p>and so on to end of section 12.6</p>
12.1.8 language code	<p>2013-05-27 (from NRK, Ingve Bjerknes), change language code for Sami from optional/recommended to mandatory (since Sami is an official language in several Nordic countries)</p> <p>2013-09-26 NorDig-T meeting, Excom will investigate if this is really necessary (and for what (audio/subtitling/text_strings). If not any use-case then wait with this.</p> <p>2013-09-26 NorDig-T meeting, Des propose to remove "gle" (since with have already another code for Gaelic "iri"), OK for all others :-)</p> <p>2013-10-24 (NorDig T meeting), seems like 'iri' is not longer incl in ISO639-2 (only 'gle'), double check before removing one of them.</p>
12.2.1 and 12.2.9, SI NIT, LCDv1	<p>2013-01-07 ComHem (Marina Andersson) supported by Teracom:</p> <p>For Com Hem it is important that NorDig LCD version 1 is mandatory. Com Hem still uses LCD v.1 and it will create major problems if this version is omitted. Version 1 is not present at all in table 12.7.</p>
12.3.3 CA SDT	Review
13.3.2 SI	<p>2013-02-19, (from Sony, Kari Eriksson), SI EIT, review requirements for events without description and name ("empty event").</p> <p>Sony: Investigate if NorDig could "allow use of information text instead of displaying empty field when EIT data is not broadcasted Maybe agree informative text which would be allowed to be used?"</p> <p>2013-09-09, input from Sony; Remove the text "If information is missing (i.e. not included in the transmission) the ESG shall not display an error message" from section 13.3.2, it's not necessary as EIT section is already very detailed and it's difficult to have text which would cover all allowed situations.</p> <p>2013-10-24 (NorDig T meeting), maybe include recommended text strings in the common Annex for common wordings.</p>
14	<p>2013-06-03 (from Teracom), Add requirement for two tuner's IRDs that they doesn't affect to RF performance negatively, with other words, all tuners fulfill the chapter 3 requirements.</p> <p>2013-09-09, input from Sony; tests should not be extended, already quite complex test.</p>



NorDig T report – IRD v2.5 detailed revision list NorDig Excom meeting 28 January 2014

Chapter	date, description
14	2013-09-10 (Pasi T, Labwise), better description what it means with a "two tuners" PVRs (ie watch one and record another service), especially related to PayTV (scrambled) services (should we reference to PayTV operators or?).
16.1	2012-10-23 (during NorDig T meeting),
16.x	Proposal to incl user preference requirements for IRD with digital audio output to incl setting for stereo mode and multichannel mode. 2013-09-25 (input from NorDig Accessibility group),
16.x or new Annex	UI, common menus and easy settings for accessibility services. 2013-09-25 (input from NorDig Accessibility group),
16.x?	UI, recommended wordings (incl translations) for accessibility and audio settings. 2013-09-25 (input from NorDig Accessibility group),
Annex B	Talking TV sets, proposal of recommending usage of the new IEC 62731:2013, that specifies the text-to-speech functionality for a (broadcast) receiver with a text-to-speech system. 2013-06-03 (from Jeppe Tanderup Kristensen, DANISH BUSINESS AUTHORITY)
	Equations are not consistent with requirements for DVB-T/T2 in chapter 3.4. 2013-09-09, input from Sony; The echo spec should not become tougher by changing this. We would like to know why he suggested equations are not consistent to Chapter 3.4..



TV Recorder: light or superlight requirements? NorDig Excom meeting 28 January 2014

NorDig T: TV Recorder questionnaire



TV Recorder: light or superlight requirements? NorDig Excom meeting 28 January 2014

NorDig T: TV Recorder questionnaire:

NorDig T Members and manufactures view of minimum requirements for NorDig "TV Recorder"

- Do you see interest for a *TV Recorder* profile (i.e. lighter requirements than full PVR only for iD TVs) within NorDig?

If NorDig should introduce TV Recorder, should then a *TV recorder* be:

- "Light" PVR – support all NorDig PVR requirements except simultaneous recording (ie require two tuners)? (Several TV manufactures complained too heavy/complex)
- "Superlight" PVR – support a smaller subset of NorDig, the most important? (TV Manufactures mainly complained about impl TV Anytime crids, Series recording etc, see compare list on next slides)

If NorDig *TV Recorder* should be a smaller subset, i.e. "super-light":

- Which NorDig PVR features/requirements should then be included as mandatory?
- One example of Superlight requirements compared to full PVR requirements are listed in coming slides (see one page overview list of functions or a 3-pages of more detailed list of functions)
- Please comment/change according to your view what then shall/needs to be included in this "Superlight" version of TV recorder! (By purpose I have in this list incl some question marks where at least I found it is of extra interest to get your view)
- if TV Recorder requirements is reduced to a *superlight* version, could/should then it become mandatory for all IRDs with some recording functions? Ie otherwise they have to de-activate this function

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TV Recorder: background info NorDig Excom meeting 28 January 2014

NorDig "TV Recorder" info:

- NorDig Excom (22 January 2013 meeting)
 - Interest from industry that NorDig open for single tuner iDTV recorders, but current NorDig PVR requirements mandates "two tuners" (more precise watch one simultaneous record another).
 - NorDig Excom preliminary positive and gave NorDig T action to prepare proposal for NorDig Unified IRD spec v2.5 (planned end 2013)
 - Wording "TV Recorder" or similar should be used for this single tuner iDTV recording capability (avoid use word "PVR Lite" in spec).
 - Initial Excom mandate to NorDig T specification work: NorDig "TV Recorder" shall then support all possible mandatory NorDig PVR requirements for single tuner IRD (ie accurate recording, series recording etc).

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TV Recorder: background info NorDig Excom meeting 28 January 2014

NorDig "TV Recorder" info:

- NorDig T group and API/PVR subgroup work under 2013:
 - First draft proposal as Excom mandate, i.e. only relaxing requirement for simultaneous recording (watch one simultaneous record another), all other requirements remained same as PVR.
 - Complains from several TV manufactures (NorDig observers) that this first *light* version for TV Recorder was too heavy (crids, database, series recording...). Not so big interest from manufacture to impl this quite complex *light* version of the TV Recorder.
 - Instead TV manufactures propose to reduce the requirements even more for this TV Recorder, like a *superlight* version of PVR.
 - TV manufactures comment was that a quite "heavy"/complex *light* version (almost full PVR) might become obsolete fast whenever TV manufacture implement CI v1.4, which with one CAM potentially make its possible to watch one service and record another (unless Operator/CAS supplier has restrictions)
 - NorDig Excom and NorDig T (September/October 2013) noted this comments from industry, but wanted to get more details of exactly which functions/requirements are proposed to be removed into any *superlight* version for the TV Recorder.
 - NorDig T decided to investigate deeper both options (*light* and *superlight* PVR requirements) for the TV Recorder, draft both options, get members and industry's view and finally let Excom decide for light or superlight or skip TV Recorder.
 - **New question then**, if TV Recorder requirements is reduced to a *superlight* version, could then it become mandatory for all IRDs with some recording functions?
 - **New question**, if *TV Recorder* is for iDTV with one tuner. Do NorDig allow an iDTV with two tuners to be a TV Recorder or does it have to impl full PVR?
 - Question from the Industry if NorDig could collect all NorDig networks security demands for recording PayTV content (i.e. can NorDig operators allow storing the DVB scrambled signal without first descrambled (before applying any local scrambling)? Can NorDig Operators allow storing on external HDD (for example if this HDD is device₃₃ binded and local scrambling protected)?



TV Recorder: Overview list of main PVR functions NorDig Excom meeting 28 January 2014

Overview list PVR main functional requirements for a TV recorder, "light" or "superlight" and what should be incl in superlight?

NorDig PVR feature requirements	Crids	PVR TV Recorder			All IRDs	Comments
		PVR	Light	Superlight		
Profile – overall		O	O	M?	O	
General EPG/ESG 8day guide		M	M	M		
General Security/anti-piracy (local storage, interfaces...)		M*	M*	M*	M*	
General Recording File System, Deletion of recordings, capacity		M	M	M		
Recording Automatic conflict handling		M	M	M		
Recording Basic requirement (30Mbps, SD/HD/radio, min length)		M	M	M		
Recording Programming via ESG/EPG		M	M	M		
Recording Manual recording		M	M	M		
Recording Full service recording		M	M	M		
Recording Accurate Recording		M	M	M		
Recording Back-to-back recording		M	M	M?		
Recording Timeshift recording		M	M	M?		
Recording TVA crids – basic usage (e.g. for re-scheduling)	crids	M	M	M?		
Recording Split Recordings	crids	M	M	M?		
Recording Simulcast (SD<->HD, regional versions)	crids	M	M	M?		
Recording Series recording (TVA crids)	crids	M	M	O?		
Database 91 days of recordings and previous recordings	crids	M	M	O?		
Recording Simultaneous recording ("two tuners")		M	O	O		Excom original
Recording Recommended events	crids	O	O	O		
Recording Alternative instance	crids	O	O	O		
Recording Recently removed recordings	crids	O	O	O		
Recording Late Recording ("continous timeshift buffer")		O	O	O		
Recording Safe margins		O	O	O		
Recording Trailer booking/Promotional Linking	crids	O	O	O		
Recording NorDig Broadcast Record Lists	crids	O	O	O		
Playback Playback – basic requirement (incl sync)		M	M	M		
Playback Playback – trick modes		M	M	M		
Playback Playback – Full service playback		M	M	M		
Playback Simultaneous recording and playback		M	M	M		

* NorDig standard security requirements, unless relevant network/operator specifies something else for that Network



TV Recorder: Detailed list of functions
NorDig Excom meeting 28 January 2014

Following pages incl more detailed list of PVR requirements and compare between light or superlight TV recorder profile



TV Recorder: Detailed list of functions (1/3)
NorDig Excom meeting 28 January 2014

	PVR	TV Recorder		All IRDs	Comment
		PVR	Light		
14	NorDig PVR feature requirements				
14.1	Introduction - PVR	n/a	n/a	n/a	
14.2	General - PVR	M	M	M	
14.2.1	Recording File System	M	M	M	
14.2.2	Recording capacity	M	M	M	
14.2.3	Deletion of recordings	M	M	M	
14.2.4	Failed and incomplete recordings	M	M	M	
14.2.5	Save only the last number of episodes	O	O	O	
14.2.6	File system intact after update	M	M	M	
14.2.7	Limitations in local storage, interfaces, extraction and removable media for recordings (security)	M*	M*	M*	M*
14.2.8	Disk management / de-fragmentation	M	M	M	
14.2.9	Safe margins	O	O	O	
14.2.10	NorDig Record Lists functionality	O	O	O	
14.2.10.1	Recording capacity and disk management for Record Lists	O	O	O	
14.2.10.2	Broadcast Record List Entry Point	O	O	O	
14.2.10.3	Presentation of Broadcast Record Lists	O	O	O	
14.2.10.4	Broadcast Record List Subscription and Un-subscription	O	O	O	
14.2.10.5	Presentation of Future scheduled BRL Recordings	O	O	O	
14.2.10.6	Presentation of Acquired BRL Recordings	O	O	O	
14.2.10.7	Limitations for External Media	O	O	O	
14.2.10.8	Management of Embargoed Content	O	O	O	
14.2.10.9	Management of Content Expiry	O	O	O	
14.3	PVR Recording				
14.3.1	General PVR recording	M	M	M	
14.3.2	ESG/EPG recording programming	M	M	M	
14.3.3	Series recording	M	M	O	
14.3.3.1	Series, record all episodes	M	M	O	
14.3.3.2	Series, record limited number of episodes for a series	O	O	O	
14.3.3.3	Series, only one instance/copy of each episode	O	O	O	

* NorDig standard security requirements, unless relevant network/operator specifies something else for that Network



TV Recorder: Detailed list of functions (2/3)

NorDig Excom meeting 28 January 2014

		PVR	TV Recorder			All IRDs	Comment
			PVR	Light	Superlight		
14.3.4	Split recordings	M	M	M?			
14.3.5	Recommended events	O	O	O			
14.3.6	Alternative instance	O	O	O			
14.3.7	Accurate Recording	M	M	M			
14.3.8	Simultaneous recording ("view one + rec another", "two tuners")	M	O	O		Excom original mandate	
14.3.9	Full service recording	M	M	M			
14.3.10	Trailer booking/Promotional Linking (optional)	O	O	O			
14.3.10.1	General	O	O	O			
14.3.10.2	Icon activation and deactivation	O	O	O			
14.3.10.3	Default Icon	O	O	O			
14.3.10.4	Image icon position	O	O	O			
14.3.10.5	Subtitling and display of image icon	O	O	O			
14.3.11	Back-to-back recording	M	M	M?			
14.3.12	Timeshift recording	M	M	M?			
14.3.13	Late Recording ("continous timeshift buffer")	O	O	O			
14.3.14	Manual recording	M	M	M			
14.3.15	One touch recording (OTR)	M	M	M?			
14.3.16	Automatic conflict handling	M	M	M			
14.3.16.1	Conflict during the time of programming a (individual, series or manual) recording	M	M	M			
14.3.16.2	Conflict occurring after the time of programming recording(s)	M	M	M			
14.3.17	Maximum length of recordings	M	M	M			
14.3.18	Recording of recently removed recordings	O	O	O			
14.3.19	Recording of parallel broadcast and simulcast (SD/HD, reg)	M	M	M?			

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TV Recorder: Detailed list of functions (3/3)

NorDig Excom meeting 28 January 2014

		PVR	TV Recorder			All IRDs	Comment
			Light	Superlight			
14.3.20	NorDig Record Lists recording functionality	O	O	O			
14.3.20.1	Management of Content Grouping	O	O	O			
14.3.20.2	Content Acquisition	O	O	O			
14.3.20.3	Recording List Hierarchies	O	O	O			
14.3.20.4	Management of Content Versioning	O	O	O			
14.3.20.5	Metadata Changes Post Broadcast	O	O	O			
14.3.20.6	Unresolvable PushDownloadPrograms	O	O	O			
14.3.20.7	Use of Program Information	O	O	O			
14.3.20.8	Recording Conflicts	O	O	O			
14.3.20.9	Broadcast Record List Removal	O	O	O			
14.3.20.10	Broadcast Record List Updates	O	O	O			
14.4	Playback						
14.4.1	General	M	M	M			
14.4.2	Replay/Playback – trick modes	M	M	M			
14.4.3	Relative Synchronisation	M	M	M			
14.4.4	Simultaneous recording and playback	M	M	M			
14.4.5	Full service playback	M	M	M			
14.4.6	Resume Playback	O	O	O			
14.4.7	NorDig Record Lists management and playback functionality	M*	M*	M*			
16.3	User Preferences, Reset to factory mode, PVR recording priority, SD vs HD: HD	O	O	O			
12 SI	TVA crids incl default authority (used for: unique id, alt instance, series, recommended, split rec, trailer...)	M	M	M or O?			
12 SI	Trailer booking (related content descr, related content table)	O	O	O			
12 SI	Broadcast Record List (metadata descr, metadata pointer descr, TVA XML model/stream for broadcast record list)	O	O	O			
13 EPG	PVR: 8day ESG/EPG (basic IRD min present/following)	M	M	M			

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