



NorDig T report to Excom

NorDig Excom meeting 8th October 2020 (webinar/Teams)



NorDig ExCom agenda 8th October 2020:

Place: Webinar due to covid-19

Early/preliminary report back from NorDig Excom

Marked as "Excom" in blue text is outcome from this Excom meeting (decision, comments, tasks, feedback etc)

NorDig T (Per Tullstedt) extra report back from NorDig Excom meeting, mainly NorDig T related issues, not the official NorDig Excom report (which will come from our Excom secretary)

1. Agenda and report from previous meeting
2. Organizational matters
 - 2.1. Membership situation
 - 2.2. Finance matters, budget
 - 2.3. Organizational matters
3. **Report from NorDig/T** (Per T/NorDig T)
 - 3.1 Progress report
 - 3.2 NorDig **Rules of Operation new version v3.1.1 for Excom to approve**, slide 3 and DRAFT proposal
 - 3.3 NorDig IRD spec
 - video: dHDR (dynamic metadata HDR), see slide 4-5 and Annex E and F
 - audio: clarification NGA/AC-4 and SI f supplementary audio, see slide 6
 - 3.4 NorDig EPG exchange file format, slide 7 informative
4. Report from Industry
5. Reports from members, DVB and other
6. Any other business
 - 6.1 Proposals of special topics for spring 2021 meeting
 - 6.2 HbbTV update from members
7. Date and place for the meetings in 2020/21

Green Text: text highlighted for Excom (waiting Excom decision/approval)

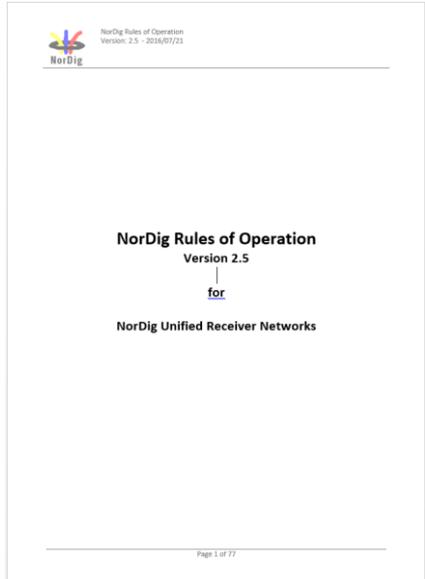
- Rules of Operation
 - Latest published: NorDig RoO v2.5 (published October 2016)
 - Update RoO to v3.1.1,
 - New draft proposal v3.1.1 draft010 now ready, all major parts updated (cross-ref and minor typos remains)
 - Excom directive: change layout to same as IRD spec, most important content for RoO shall be items necessary to avoid misbehavior in IRDs.
 - Excom Oct 2020: OK continue finalise RoOv3.1.1d010 (cross ref, typos, ref) as current proposed content. HbbTV additions for pre-testing, contacts w manufactures etc is pushed for next version. NorDig T task to propose a new draft RoO “v3.1.2” to next Excom meeting in March 2021 (among thing to incl additions HbbTV part at reasonable level).
- Unified IRD specification
 - Latest published: NorDig IRD spec v3.1.1 (published September 2019)
 - Future version/updates:
 - Maintenance – buglist (removal HFR excel dual PID, update ref spec espec very old CA, typos etc)
 - Video dHDR (dynamic metadata HDR) – drafting text proposal, prepared for whenever next IRD spec version is issued. NorDig T has not agreed, has now two text drafts, see slide 4-5;
 - Draft008 - draft common drafted mostly agreed within whole NorDig T group and
 - Draft011 - one new draft from Samsung mainly supported by Sony
 - Audio NGA/AC-4 update/correction – adding clarifications and missing options, see slide 6
 - New draft not yet stable, among thing waits Excom decision for dHDR, could be ready in 1-2month.
 - Excom Oct 2020: dHDR, task for NorDig T to continue draft from d008, make more clear that dHDR is not required/mandatory, the dHDR text shall be clear. (Draft011 not seen clear enough).
 - Excom Oct2020: AP for NorDig T to prepare a new NorDig IRD spec “v3.1.2” (w buglist + dHDR + Audio) for coming Excom March 2021.
- Test Plan – *up to date*
 - Latest published: NorDig Test Plan v3.1.1 (published September 2019) + Test streams [NGA/AC-4 + old LTE interference stream]
 - Next version – not started (no items reported, some typos identified)
 - Industry kindly asks for TTML reference test streams
- EPG/EIT exchange file format
 - Latest published: NorDig Metadata Exchange format specification v1.3, Guidelines v1.3 and Genre list v1.1
- Website and admin - *no changes*
- Excom Oct 2020: AP for NorDig T to propose update of NorDig T mandates for period 2021-2022 to next Excom meeting

Members of RoO Group: Nicholas Frame TP Vision, Kari Eriksson Sony, Richard Moreton Samsung, Guillaume KHW Samsung, Johan Lindroos SVT, Jonas Rödén Dolby, Schreiner, Stephan Dolby, Per Tullstedt Teracom, Kjell Norberg NRK, Juha Joki SofiaDigital and Peter Mølsted Chairman (deputy for Des Mac Giolla an Chloig) etc.

NorDig RoO spec update to v3.1.1 (to same version as IRD and Test Plan)

The new RoO specification from ver. 2.5 to ver. 3.1.1 is a **major** update and now in line with IRD spec. v. 3.1.1.

- Status draft010 October 2020 – finally ready for Excom approval
 - All chapters reviewed and updated
 - Old PVR parts proposed to be omitted/moved to Annex (PVR)
 - Old Tuning and Navigation text moved to Annex C for future work
 - Draft now agreed and stable within NorDig T
 - Expect new update “v3.1.2” to spring or autumn 2021 (some parts in new v3.1.1, like SSU, good enough for now but could be improved plus basic description of the main common blocks for transmission and review more Annex C into SI).
 - Remains: minor (cross-ref, typos and update of spec references CA)
- Excom Oct 2020: OK, continue finalise RoO v3.1.1 d010 (correct cross ref, typos, ref) as current proposed content (i.e. do not incl Samsung’s proposed changes for HbbTV). Target to finalise final draft within 3-5weeks. When ready send to Excom (e-mail) for a 2w silent approval, if no (major) comment then OK to publish new version.
- Excom Oct 2020: HbbTV additions for pre-testing, contacts w manufactures etc is pushed for next version.
- Excom Oct 2020: NorDig T task to propose a new draft RoO “v3.1.2” to next Excom meeting in March 2021 (among thing to incl additions HbbTV part at reasonable level and above proposed items).



NorDig Rules of Operation
 Version 2.5
 for
NorDig Unified Receiver Networks

Page 1 of 77

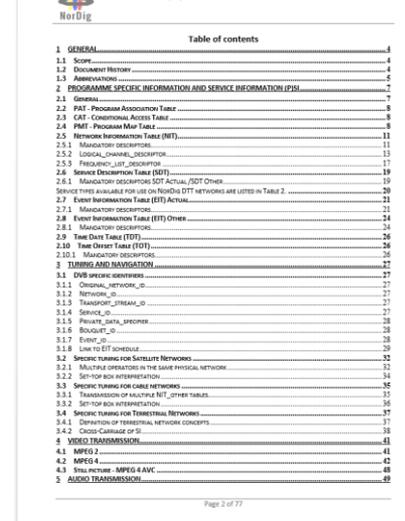


Table of contents	
1	GENERAL
1.1	Scope
1.2	Document history
1.3	Abbreviations
2	PROGRAMME SPECIFIC INFORMATION AND SERVICE INFORMATION (PSI)
2.1	General
2.2	PSI - Program Association Table
2.3	CAI - Conditional Access Table
2.4	PMI - Program Map Table
2.5	Network Information Table (NIT)
2.5.1	Manufacturer description
2.5.2	Logical channel description
2.5.3	Frequency list description
2.6	Service Description Table (SDT)
2.6.1	Manufacturer description SDT Actual/SDT Other
SERVICE TYPES AVAILABLE FOR USE ON NORDIG DTT NETWORKS ARE LISTED IN TABLE 2	
2.7	Event Information Table (EIT) Actual
2.7.1	Manufacturer description
2.8	Event Information Table (EIT) Other
2.8.1	Manufacturer description
2.9	Time Data Table (TDT)
2.9.1	Time Data Table (TDT) Other
2.10	Time Data Table (TDT) Other
2.10.1	Manufacturer description
3	TUNING AND NAVIGATION
3.1	DVB-PSIP SERVICES
3.1.1	Original network ID
3.1.2	Network ID
3.1.3	Transport stream ID
3.1.4	Service ID
3.1.5	Private data specifier
3.1.6	Bouquet ID
3.1.7	Event ID
3.1.8	Link to EIT schedule
3.2	Specific tuning for Satellite Networks
3.2.1	MULTIPLE OPERATOR IN THE SAME PHYSICAL NETWORK
3.2.2	Set-top box interpretation
3.3	Specific tuning for Cable Networks
3.3.1	TRANSMISSION OF MULTIPLE NIT OTHER TABLES
3.3.2	Set-top box interpretation
3.4	Specific tuning for Terrestrial Networks
3.4.1	Definition of terrestrial network concepts
3.4.2	Circle Causage of SI
4	VIDEO TRANSMISSION
4.1	MPEG 2
4.2	MPEG 4
4.3	Still picture - MPEG 4 AVC
5	AUDIO TRANSMISSION

Page 2 of 77

Dynamic metadata HighDynamicRange (dHDR) – status report



- *NorDig Excom decided Oct 2019*
 - *at present time Public Service Broadcasters has no concrete plans and low interest for dHDR*
 - *decision to not mandate dHDR (and then no need to make a selection of one of the 3 DVB's dHDR technologies)*
 - *decide to add into next NorDig IRD spec if dHDR is used then signaling shall be as DVB specified and IRDs shall not be disturbed by formats not supported. AP for NorDig T to prepare proposal,*
 - *however this item is not seen as important to trigger any immediate release of new spec, instead item to be incl whenever next release is released*
- **NorDig T/video – status dHDR (two draft alternatives)**
 - Draft008 – drafting inside main NorDig T group, reached a more or less acceptable & stable text proposal for NorDig IRD + RoO specs in May 2020 (at least Per T/chair understanding).
 - draft008 includes some few technical parts to explain impl details and that IRDs not supporting dHDR shall not be disturbed, more or less same level of details as for other NorDig optional items, [see Annex E](#)
 - Alt proposal draft011: Samsung with support of Sony has late sent in a completely new draft in Sep 2020 (first version was sent in mid June but due to e-mail problem it was not received by Per T before Sep 2020). This alternative proposal has not been agreed in NorDig T group, changes - much of that what the group earlier has been drafted together, mainly supported by Samsung and Sony.
 - Alt draft011 tries to reduce text to an absolute minimum (dHDR not included & IRD not to be disturbed), [see Annex F](#)
- NorDig T has now two text alternatives, not reached full agreement inside whole NorDig T working group
- Other TV set manufactures (LG, Panasonic, TP Vision) has stated that they can accept either alternatives.
- **Excom Oct 2020: dHDR, task for NorDig T to continue draft from d008, update and make more clear that dHDR is not required/mandatory, however the dHDR text shall be clear (as d008).**
- **Excom Oct 2020: Draft011 not seen clear enough, (some Industry/Samsung arguments was discussed).**
- **Excom Oct2020: AP for NorDig T to prepare a new NorDig IRD spec “v3.1.2” (w buglist + dHDR + Audio) for coming Excom March 2021.**

- NorDig T/video – dHDR two draft alternatives (draft008/AnnexE and draft011/AnnexF):
 - **Draft008** – the draft that has been developed inside NorDig T group during Oct’19 to May’20, much time and discussions has been spent to find a balance between not adding too much text or requirements but some/enough to ensure if implemented. NOT favouring any of the three dHDR technologies. Proposal might not be perfect for all TV manufactures, but as Per T/chair understood it (May2020) it was then more or less acceptable for all participants, ie almost agreed and stable status. (Mainly been Sony mentioned that they would prefer to not mention dHDR at all).
 - Most in NorDig T except Samsung+Sony either support or can accept this draft.
 - **Draft011** – new input from Samsung Sep2020 (June 2020) supported by Sony. Changes most of previous agreed/acceptable text proposal for dHDR and goes back to almost an earlier proposal that was not agreed inside NorDig T. Motivation for their all changes of previous draft and why so late has according to them been:
 - Issue for manufacturers (technical overload, expectations, costs, no commercial interest), confusions for viewers & broadcasters, little interest for dHDR, broadcasters can already start into dHDR in current proposal. (however no motivation why they were so late with this proposal, Samsung’s representative says he new into NorDig work since April/May).
 - Samsung+Sony support this draft. TP Vision, LG and Panasonic are neutral to both alternatives and can accept either of the drafts (008 or 011).
- Comments from the others in the NorDig T group for this Samsung+Sony draft011:
 - Draft is not clear and needs more clarifications
 - Draft includes “This specification does not include requirements for...” which is not common for NorDig
 - Weak motivations for removing all the earlier drafted text parts (Samsung mainly refers to that the text have been in “opposition to ExCom request”)
 - Disturbance in NorDig T group to come so very late with a proposal tearing up all earlier work and discussions and starting from square 1 again.

NorDig IRD specification – Audio

- TV manufactures (Samsung and LG) has identified and asked questions around some missing corner cases related to audio stream selection.
 - Audio Prioritisation inside the NGA Audio PID/stream , cases related to PMT APD signalling and inband ac4_toc signaling.
 - (legacy a.codec) Supplementary Audio, if broadcaster/network do not transmit according to DVB/Nordig recommendation (i.e. do not incl suppl_audio_descriptor) and
- NorDig T/Audio has drafted
 - clarification for NGA prio
 - clarification for Supplem. Audio handling if some signaling is missing and
 - (Annex) flowchart guide for Audio prio
- Draft agreed & stable within NorDig T/Audio (ready for next IRD spec release)
- [Excom Oct 2020: no comments/disagreement](#)

NorDig EPG group and Event exchange file format:

- *Keep TV Anytime spec up to date*
- *Updated of guidelines*
- *Work to promote / help impl and use of NorDig EPG/event file format*
- Open workshop 2nd Oct 2020 (webinar)
- Last period,
 - Genre list w translations (v1.1 incl missed translation to Irish),
 - Exchange implementation experience of NorDig TV Anytime
 - Discussion of using EPG data to help with audience measurement and how to generate ids.
- Status of implementation and use of NorDig common EPG/Event metadata exchange format, done or in process: NRK, TV2DK, TV2NO, DR, TDC, Red Bee Media, SimpleTV, SVT and Teracom.
- Excom: noted

NorDig Unified IRD spec future – next version (“v3.1.2”) proposals:

- General
 - Bug list - a few number of listed items,
- Video:
 - Dynamic HDR, text draft (optional, IRD shall not be disturbed, if used then according w DVB)
- Audio:
 - NGA/AC-4 prio & supplementary audio signaling clarifications
- CA/CP/Security
 - DVB CSA/CommonScramblingAlgoritm update “DVB” references (ETSI/SISVEL now custodian)
 - CommonInterface v2 (USB), still monitoring status, [members interest?](#)
- Audio – none
- Subtitling – none
- HbbTV
 - Include new Errata#1 (still under investigation)
- FrontEnd – none
- SSU - none
- PSI/SI, menus etc...
- Others?

Excom Oct2020: OK (Per T note: Clv2 is not decided to be incl in IRD spec, just monitor members interest)

- DVB CI v2 (USB)
- DVB-I
- DVB TA (Target Advertising)
 - From March 2020 meeting:
 - NorDig T has received a Liaison letter 19th Feb 2020 from HbbTV informing NorDig about the completion of HbbTV specification for targeted advertising (TA), in co-operation with DVB (HbbTV defines API in IRD, DVB defines broadcast signalling and returning advert from broadband (Ads) server).
 - TA an optional extension to HbbTV that enables replacing of broadcast content (e.g. adverts) with broadband-delivered content (e.g. ads that are targeted to a particular consumer or group of consumers).
 - BUT this DVB+HbbTV TA tool could also be used for a more non-commercial uses such as switching from national to regional/local content and back again.
 - Some IRD/TV manufacturers says they require (commercial) agreement between a broadcaster and a manufacturer when used for commercial purposes (i.e. TA for commercial TV services).
 - IRD/TV Manufactures reports that it is another thing for non-commercial purposes like public service using this for regional/local insertion.
 - However DVB+HbbTV TA technology has implementation cost for IRD
 - Together with HbbTV watermark could potentially make it work also for STB solution (i.e. for cases w non-HbbTV STBs connected via HDMI to a HbbTV TV set)
 - Oct 2020 – nothing new to report



NorDig T report – NorDig countries/networks

NorDig Excom meeting 8th October 2020 (webinar/Teams)

List of Countries using NorDig specifications (outside NorDig members), Nothing new to report, same as last meeting (same as previous report).

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).

Country / Network	Status
Turkey DTT	Confirmed via Vestel
Several eastern Europe countries	Indications, not confirmed
Malaysia (<i>blue copy</i>)	Digita
German DTT (Media broadcast/TDF)	Based on/reference to NorDig IRD
Georgia DTT	Based on/reference to NorDig IRD (v2.2)
French DTT/FAVN ??	Based on/reference to NorDig IRD v??
Italien DTT + Satellite	Partly based on/reference to NorDig IRD (v2.5, RF), partly own requirements (e.g. SI)
Poland DTT	Might be based on/reference to NorDig IRD
Croatia	Based on/reference to NorDig IRD v??

END presentation NorDig-T report

After here some detailed informative slides

ANNEX

- Annex A: NorDig T mandates 2019-2020 - informative
- Annex B: NorDig T meeting calendar 2020 - informative
- Annex C: NorDig T subgroups – informative
- Annex D: dynamic HDR (presentation from Excom Oct2019 meeting) – informative
- Annex E: draft008 dynamic HDR, text proposals for NorDig IRD spec (main parts), main NorDig T group's drafting Oct'19 to May'20
- Annex F: draft011 dynamic HDR, Samsung's text proposals for NorDig IRD spec (main parts), supported by Sony Sep'20.

NorDig T – mandates & items for period 2019-2020 - *Excom approved March 2019*

- General: Keep IRD, RoO and Test Plan in line with each other
- RoO
 - Maintain and update NorDig RoO - focus for 2019 RoO v3.1.x
 - (Excom Oct 2018) changing layout to same as IRD spec, focus for RoO on items necessary to avoid misbehavior in IRDs.
- Test and Test plan
 - Maintain and update NorDig Test plan to match IRD spec
 - Review and where possible combine similar test cases to make it easier and faster to test
 - “minimize” redundant test cases if possible without compromising with test quality, to speed up time for verification testing.
 - Update and improve test cases
- NorDig Unified IRD spec
 - Maintain and update NorDig IRD specification
 - debugging, references to international standards and specifications are up to date)
 - NorDig IRD spec update - investigate HEVC dynamic HDR
 - Other items (listed since earlier):
 - Review and improve IRD’s auto update for network changes?
 - Handle mix of broadcast and OTT in same channel list? (similar to or based upon DVB-I)

continue NorDig mandates & items for period 2019-2020

- Video, audio, subtitling
 - **Video** codec: NorDig's first subset of HEVC (DVB's UHD, HDR&WCG, SFR), incl video processing and I/O (HDMI).
 - **New Video** codec: monitor/investigate issues with adding HEVC dHDR support, check with Industry, make proposal
 - **New Video** codec: If Excom decide, propose tech requirements for dynamic HDR
 - **Video**: Secure good IRD implementation for mixing/blending of SDR content (HbbTV, menus, subtitling) on top of HDR video.
 - **Audio** NGA (Dolby AC-4), monitor DVB and Dolby specifications and recommendations
 - **Audio**: monitor evolution immersive audio and object based audio.
 - **Audio**: if it is possible supports with tests and trials of NGA audio (both basic NGA and more advanced NGA).
 - **Subtitling**: monitor DVB specifications (TXT subt, DVB Subt, TTML).
 - **HbbTV**: Investigate use and mandate of new codes (HEVC and NGA) for (HEVC) HbbTV/Hybrid IRDs.

continue NorDig mandates & items for period 2019-2020

- HbbTV
 - NorDig HbbTV test and test cases:
 - Maintain NorDig developed test cases. Propose new test cases to be developed if needed.
 - NorDig HbbTV IRD requirements:
 - Maintain and update HbbTV requirements
 - Monitor and report HbbTV spec development and usage.
 - Investigate additional HbbTV feature and requirements that are of interest for NorDig members (to be confirmed by –T and Excom before detailed proposal and any incl into IRD spec).
 - Investigate DVB-TA watermarking, impact V/A and possibility to use for STB solutions where STB do not support HbbTV (STB bypass)
 - HbbTV implementation:
 - Monitor and report HbbTV implementation in NorDig networks and other networks,
 - Monitor and report implementation status on IRD side
 - Monitor and discuss experience and issues/problems with launching HbbTV services
 - HbbTV DRM
 - Monitor HbbTV DRM
 - Review security requirements

continue NorDig mandates & items for period 2019-2020

- Accessibility
 - Work with harmonization of broadcast and better describe current broadcast for IRD manufactures
 - Subtitling, propose updates and new IRD requirements both for normal and hard-of-hearing subtitling.
 - Create document explaining the work of the group, (which ExCom members to pass this to their internal accessibility teams). Gather information from accessibility groups and broadcasters to understand what their pain points are.
 - Set up a best practice workshop with broadcasters, manufacturers and distributors
 - Investigate the implications for streaming services on accessibility
 - HbbTV for Accessibility services – investigate how HbbTV can be used for Accessibility and if needed propose changes to IRD and RoO requirements
 - Investigate benefits with NGA for accessibility.
- CA and CI
 - monitor and report Cplus LLP (CI+ v1.4 and v2.0) and DVB work (CI+ v2.0 etc) within these topics to NorDig Excom and Technical group.
 - Review security requirements
- EPG/Event exchange file format:
 - Promote use for NorDig members for example via open workshops to support promoting and implementation of NorDig TVA format.
 - Maintain NorDig specification of common EPG/Event exchange file format and Guidelines, to be inline with TA Anytime specs
 - Common solution and recommendations about unique program ID's.
 - Translation of genres between Nordic and Irish language and English.
 - Transform NorDig TVA XML schemas to JSON and developing guidelines for using TVA with JSON (on request from developers)

NorDig T (main group) meeting calendar 2020:

- NorDig T, #1, Thu 28th January 2020, webinar, 10:00-12:00 CET
- NorDig T, #2, Tue 25th February 2020, webinar, 10:00-12:00 CET
Informative: Excom 5th March 2020
- NorDig T, #3, Tue 31st March 2020, webinar, 10:00-12:00 CET
- NorDig T, #4, Tue 26th May 2020, webinar, 10:00-12:00 CET,
- NorDig T, #5, Tue 1st Sep 2020, webinar, 10:00-12:00 CET
- NorDig T, #6, Tue 29th Sep 2020, webinar, 10:00-12:00 CET.
Informative: Excom 8th October 2020
- NorDig T, #7, Thu 27th October 2020, webinar, 10:00-12:00 CET
- NorDig T, #8, Tue 1st December 2020, webinar, 10:00-12:00 CET.



Overview - informative

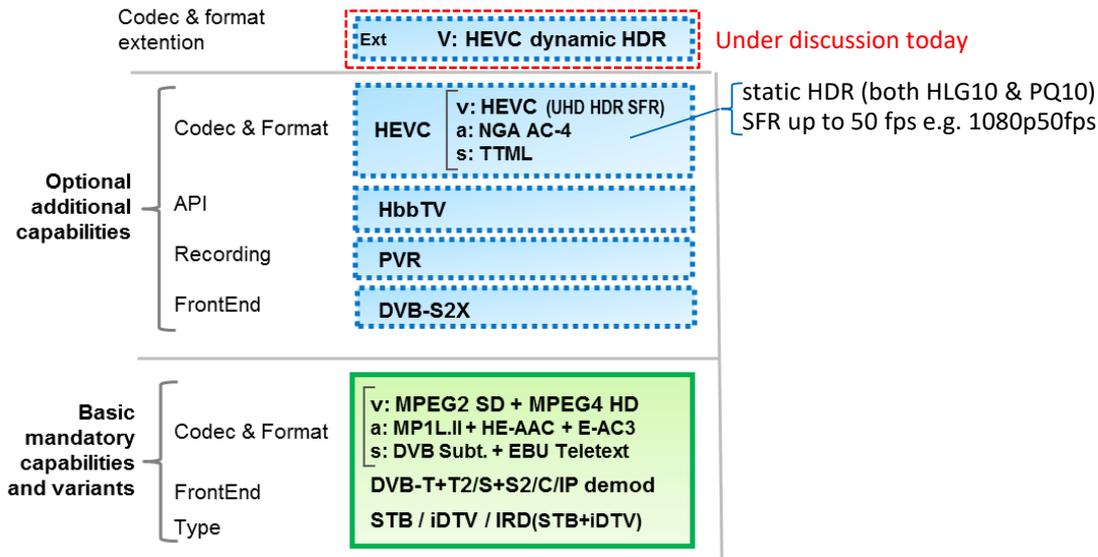
group – status - chairman

NorDig T – *active* – *Per Tullstedt, Teracom*

NorDig T subgroups – status

- Audio – *active* – *Johan Lindroos, SVT*
- Test – *active* – *Pasi Toiva, Labwise*
- RoO – *Des Mac Giolla an Chloig, RTÉNL and Peter Mølsted consultant (NorDig tech secretary)*
- Accessibility – *dormant* – *Kjell Norberg, NRK*
- API/PVR – *active* – *Erik Vold, NRK*
- EPG/Event exchange metadata – *active* - *Peter Mølsted, consultant (NorDig tech secretary)*
- SSU – *within NorDig T*
- CA/CI+/Sec – *within NorDig T*
- Video – *within NorDig T (been active for v3.1.1 now dormant)*

- Background: Dynamic metadata HighDynamicRange (dHDR) and HighFrameRate (HFR):
 - As earlier NorDig based upon DVB spec, only variants inside coming DVB specs is relevant here.
 - *Excom meeting March2019:*
 - *HFR: low interest right now to introduce -> postponed*
 - *dHDR: interest but Excom to investigate members concrete interest and demands,*
 - *dHDR: technical group study more, too early to start drafting, commercial requirement should be updated (old commercial requirements used for HEVC&NGA)*



Dynamic metadata HDR (dHDR)

- DVB dHDR status: spec finalized, DVB/ETSI spec published, DVB prepare reference streams f dHDR
- (OTT) DASH dHDR status: under publication prel w 3 month ETSI spec
- DVB has included 3 dHDR technologies/formats, all HDR **PQ10** based:
 - Technicolor/Philips SL-HDR2 (ETSI TS 103 433-2, SMPTE ST 2094-20 Philips & 2094-30 Technicolor formats)
 - Samsung HDR10+ (SMPTE ST 2094-40)
 - Dolby Vision (ETSI TS 103 572, SMPTE ST 2094-10)

(Note: all three dHDR candidates been present in NorDig-T/video subgroup meetings)
- All 3 dHDR formats are backward compatible for static HDR/PQ10 IRDs to receive and display (up to broadcaster/colourist to ensure performance for static HDR HEVC IRDs).
- Work ongoing in ETSI (JTC broadcast group) led by Technicolor/Philips to add dynamic metadata with HLG (SL-HDR3). Dolby mention already support but not promoted (since DVB so far been for PQ).
- dHDR bandwidth
 - All formats has low extra capacity (in magnitude of 100kbps or less, could be as low as 10-15kbps per format)
 - supports of “simulcast” several dHDR metadata formats for one and the same video stream in (DVB requirement, so far not yet tested)
- Conversion possible from HLG to PQ dHDR within same format
- Conversion from one dHDR format to another, could harm “artistic intension” from colourist, content owner/broadcasters may not allow this, no “approved” method today -> “risk” that Broadcasters (often part of its content is external from different content owners) will broadcast different formats depending on content origin

Dynamic metadata HDR (dHDR)

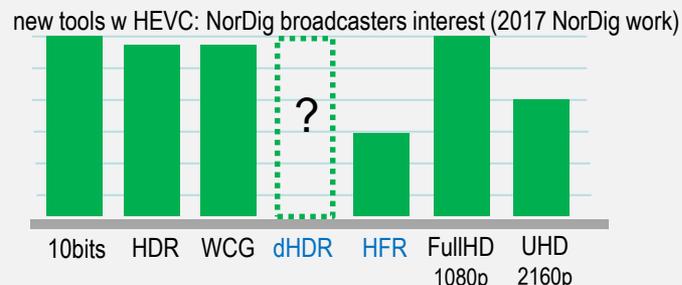
- NorDig-T/video group has not (yet) compared the 3 formats (pros&cons, relative efficiency, IPR costs...).
- Service plans in Europe dHDR
 - already used in some OTT/Online streaming services and available in some TV sets, even if it might not yet implemented as DVB signalling for dHDRs.
 - OTT: already on-air (including Netflix, Amazon, AppleTV+, Disney+)
 - Broadcast: no info, several considering, live broadcast trials been made in France, Spain, FIFA World Cup
 - PayTV: several operators (e.g. Orange, Canal+, SFR) for VOD/OTT
 - French DTT discuss to draft optional dHDR (all 3 formats) and IRD shall not be disturb by format not supported
 - (DTG no discussion/action/planning yet around broadcast HEVC nor dHDR)
 - (SVT tests HDR for OTT/SVT Play: "SVT Testbild" at SVT Play)

Note, we can not expect that current dHDR impl on TV sets will work for broadcast usage or DVB DASH streaming.

From NorDig 2017 work, HEVC

Figure: data from NorDig T/video HEVC study 2017 and questionnaire.

Note about FullHD, refers to as sub-resolution UHD BT2020



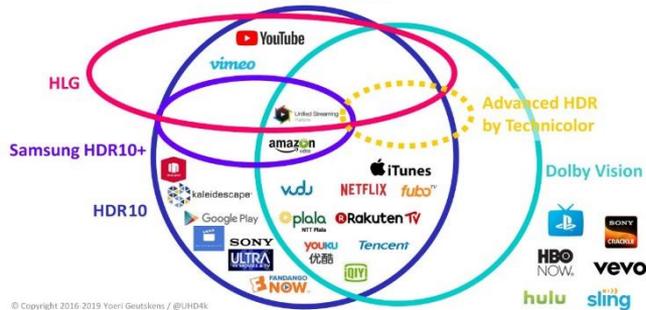
- Members view (broadcasters and operators)
 - SVT, DR & NRK:
 - dHDR, right now more interest than HFR and UHD,
 - dHDR could make big difference espec for drama production,
 - dHDR roll-out could for example be first via OTT streaming and later within broadcast,
 - dHDR too early today to select one of the formats,
 - dHDR could accept that this would be optional tool for IRD (initially), (but big interest among broadcasters for dHDR than NorDig should mandate dHDR w grace period)
 - HFR_{100fps} could accept wait and revisit topic later, a bit challenging to produce right now
 - backward compatibility is of interest.
 - interesting TV format: 1080p50fps dHDR
 - SVT/Lars typical future production could be: drama 2160p25fps dHDR and sports/general 1080p100fps SDR/HDR.
 - DR:
 - Difficult for PSB to choose exclude viewers due to only select one dHDR tech
 - As DR understand it today: Static HDR not as big step for viewers to SDR compared to dHDR, (main interest is for 1080p50, than UHD and HFR/100fps)
 - Test streams: some interest to collect test streams
 - TDC: follow broadcasters, CD: some interest depends upon broadcasters
 - Preferebly if Nordic & Irish broadcasters could agree upon a common dHDR format (for production). Propose to make a study around dHDR to find a common dHDR among broadcasters.
 - If dHDR format, then the decision of which dHDR format should be done productions side and not on the IRD side

- Industry view
 - dHDR, most TV manufacture prefer dHDR is optional feature in NorDig.
 - dHDR, if NorDig would add dHDR (as mandatory), than most manufactures request only one dHDR format and not require all 3 formats, similar NGA
 - Samsung, TP Vision prefer markets decide themselves (i.e. not specified a single dHDR technology in NorDig, e.g. that NorDig add IRD not to be disturb by dHDR not supported)
 - dHDR already in some TV sets, already used for some services, smaller step than HFR
 - dHDR, manufactures asks for service plans/roll-out plans from broadcaster to consider this.
 - NorDig should collect from members/broadcasters and regular present/provide service plans and intensions to the Industry.
 - (Sony) With all improvement in video processing and display in new modern TV sets, reduces the diff betw sHDR and dHDR
 - DVB during IBC <https://www.ibt.org/tech-advances/dvb-unveils-new-specification-for-hdr-dynamic-mapping/4092.article>

- dHDR formats taken from <https://www.flatpanelshd.com/focus.php?subaction=showfull&id=1559638820>

Video streaming services

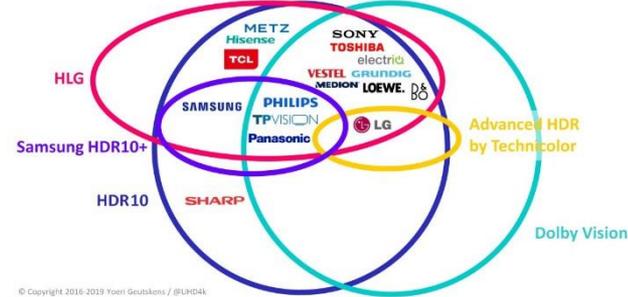
HDR ecosystem June 2019



© Copyright 2016-2019 Yoeri Geutskens / @UHD4k

TV makers / brands Europe

HDR ecosystem June 2019



© Copyright 2016-2019 Yoeri Geutskens / @UHD4k

NorDig/Per T note:
TV sets today in general do not impl all 3 formats (some impl two, some other one format)

Movie studios' home entertainment divisions

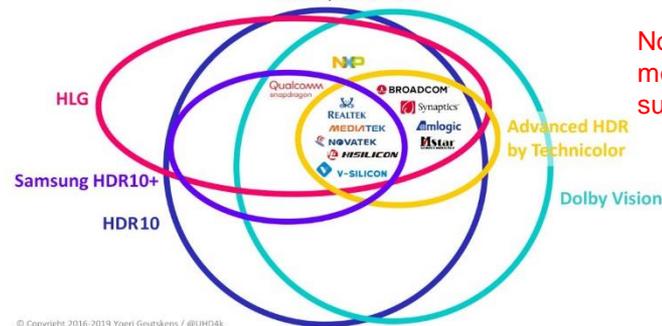
HDR ecosystem June 2019



© Copyright 2016-2019 Yoeri Geutskens / @UHD4k

Chipset makers

HDR ecosystem June 2019

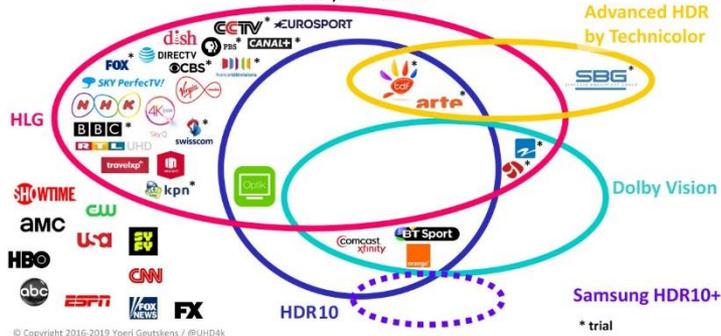


© Copyright 2016-2019 Yoeri Geutskens / @UHD4k

NorDig/Per T note:
most chipset seems to support all flavours

Broadcasters / Operators

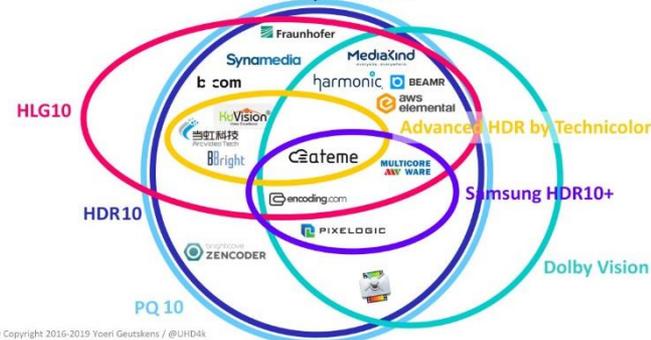
HDR ecosystem June 2019



© Copyright 2016-2019 Yoeri Geutskens / @UHD4k

Encoding vendors

HDR ecosystem June 2019



© Copyright 2016-2019 Yoeri Geutskens / @UHD4k

Summary mini-study and proposal NorDig HEVC extensions dynamic HDR:

- dHDR
 - DVB has specified three formats [Technicolor/Philips SL-HDR2, Samsung HDR10+, Dolby Vision]
 - no result f comparing, coming/already in several TV sets to some degree (not as DVB specified),
 - Service plans in Europe: OTT several, broadcast: some considering and trails
 - NorDig Broadcasters: high interest from broadcasters (for usage in some program events, like drama productions)
 - Broadcasters might need to deliver (broadcast and OTT) different dHDR for different content (due to restriction from content owners etc), therefore complex for NorDig to select only one format
 - NorDig specification today includes sHDR (HLG + PQ)
 - NorDig work around dHDR:
 - NorDig Excom will collect from members/broadcasters service plans and intensions and (regularly) present it the Industry /NorDig T (planned to be presented at Excom meeting 10th Oct 2019)
 - NorDig T/video group study more, report back in Oct 2019 (waiting Excom decision before start drafting)
 - If NorDig is interested in adding dHDR:
 - Technical evaluation among 3 candidates is expected to be TOO difficult to achieve with “correct” conclusions within NorDig (too many dependencies) in order to select ONE.
 - IF one format is to be selected, NorDig T would only be able to make a technical info gathering similar as NGA work (e.g. collect tech info, licenses etc) AND would be very difficult to come with a recommendation for a single dHDR AND would need to establish well defined criteria before
 - Alternative for selecting ONE system could be to:
 - dHDR optional, where used dHDR signaling shall be as DVB specified and that IRD shall not be disturbed by formats not supported or
 - Not mention/recommend dHDR, BUT incl that IRD shall not be disturb by formats not supported



NorDig T report - Annex D Video dynamic HDR from Excom Oct2019 meeting

NorDig Excom meeting 8th October 2020 (webinar/Teams)

Summary mini-study and proposal NorDig HEVC extensions dynamic HDR:

- dHDR

- DVB has specified three formats [Technicolor/Philips SL-HDR2, Samsung HDR10+, Dolby Vision]
- no result of comparing, coming/already in several TV sets to some degree (not as DVB specified),
- Service plans in Europe: OTT several, broadcast: some considering and trials
- NorDig Broadcasters: high interest from broadcasters (for usage in some program events, like drama productions)
- Broadcasters might need to deliver (broadcast and OTT) different dHDR for different content (due to restriction from content owners etc), therefore complex for NorDig to select only one format
- NorDig specification today includes sHDR (HLG + PQ)
- NorDig work around dHDR:
 - NorDig Excom will collect from members/broadcasters service plans and intentions and (regularly) present it to the Industry /NorDig T (planned to be presented at Excom meeting 10th Oct 2019)
 - **NorDig T/video group study more, report back in Oct 2019 (waiting Excom decision before start drafting)**
 - **If NorDig is interested in adding dHDR:**
 - **Technical evaluation among 3 candidates is expected to be TOO difficult to achieve with “correct” conclusions within NorDig (too many dependencies) in order to select ONE.**
 - **IF one format is to be selected, NorDig T would only be able to make a technical info gathering similar as NGA work (e.g. collect tech info, licenses etc) AND would be very difficult to come with a recommendation for a single dHDR AND would need to establish well defined criteria before**
 - **Alternative for selecting ONE system could be to:**
 - **dHDR optional, where used dHDR signaling shall be as DVB specified and that IRD shall not be disturbed by formats not supported or**
 - **Not mention/recommend dHDR, BUT incl that IRD shall not be disturbed by formats not supported**

Excom Oct2019 decision:

- At present time Public Service Broadcasters has no concrete plans and low interest for dHDR
- Excom decision to not mandate dHDR
- Excom decide to add into next NorDig IRD spec if dHDR is used then signaling shall be as DVB specified and IRDs shall not be disturbed by formats not supported. AP for NorDig T to prepare proposal, (however this item is not seen as important to trigger any immediate release of new spec, instead item to be incl whenever next release is released)

Extract of NorDig T group **draft008** text (main part) for dynamic metadata HDR as:

- *Not mandating dHDR + IRD not to be disturbed by dHDR not supported + When used according t DVB specs*
- **NorDig IRD spec** proposed text for dHDR (**Yellow highlight** is proposed changed/add text)
 - Ch5.1 video, General requirements,
The following clauses of ETSI TS 101 154 [26] are relevant to this specification:
5.14.4 “HEVC HDR UHD TV IRDs and Bitstreams” (1). Support for both PQ10 and HLG10 is required for the NorDig HEVC IRD. Only support of 50 Hz and 25 Hz frame rates are required for the NorDig HEVC IRD. **Support for Supplemental Enhancement Information messages carrying one or more DMI formats conforming to sub-section 5.14.4.4.3.3.4 is not required i.e. optional. Any non DMI cognisant HEVC HDR UHD TV IRD shall be able to decode and present the service, even if DMI is in the bitstream (i.e. the IRD shall not be disturbed by DMI SEI messages not supported by the IRD) Note 2: DMI refers to HDR dynamic mapping information and is information associated with one or more frames of the video content as part of a DVB service that can guide dynamic mapping, as produced in a reference viewing environment or otherwise (as defined in ETSI TS 101 154).**
 - Ch5.5 colorimetry, add at the end a note:
Note: In the case that DMI messages are included in the bitstream, the NorDig Rules of Operation require broadcasters to provide video quality from that bitstream to NorDig HEVC IRDs that do not support DMI at the level that can be expected from a bitstream that does not include DMI messages. DMI enables further enhancement of the video quality.
 - Ch5.5.1 NorDig HEVC STB colorimetry, following changes (only extracted sentences with changes):
The complete ANSI/CTA-861-G shall be taken into account, **except the “6.10 Extended InfoFrame” and “6.10.1 HDR Dynamic Metadata Extended InfoFrame”. (1)**

The EDID-information shall be used by the Decoder Format Converter of the NorDig HEVC STB to **determine any applicable ~~convert~~ colorimetry conversion, display mapping (if supported) or DMI message pass-through (if supported).**

Hence, the Decoder Format Converter of the NorDig HEVC STB shall output SDR video formats based on the HDR to SDR conversion methods described by the ITU (e.g. ITU-R BT.2390 [90] and operational practises in HDR television production ITU-R BT.2408 [95]) **or based on DMI (if supported).**
In Note: The latter for example via user control of overall brightness and contrast. **The initial display adaptation can be done by using DMI (if supported) Leads on how to best perform the initial display adaption is or by applying processing** derived from the conversion methods described by...
 - Ch5.6 Dynamic changes in the video stream, add at the end of section:
For NorDig HEVC IRD supporting one or more of the DMI formats, dynamic switching should be handled as described in ETSI TS 101 154 sub-section 5.14.4.4.3.3.4.2 “Dynamic switching between bitstreams with and without DMI”.
- SI chapter Ch12.3.6 Component descriptor – add into table stream and component type values for all three dHDR as Optional

Extract of NorDig T group **draft011** proposal vs **draft008** (main parts) for dynamic metadata HDR as:

- *Not mandating dHDR + IRD not to be disturbed by dHDR not supported + When used according to DVB specs*

- **NorDig IRD spec proposed text for dHDR** (Green highlighted draft011 text, yellow highlight draft008 text)

- Ch5.1 video, General requirements,

This specification does not include requirements for dynamic HDR. Any dynamic HDR metadata would be delivered to the IRD in accordance with ETSI TS 101 154 [26]. The NorDig IRD shall ignore HEVC SEI messages the IRD does not support.

The following clauses of ETSI TS 101 154 [26] are relevant to this specification:

5.14.4 “HEVC HDR UHD TV IRDs and Bitstreams” (1). Support for both PQ10 and HLG10 is required for the NorDig HEVC IRD. Only support of 50 Hz and 25 Hz frame rates are required for the NorDig HEVC IRD. Support for Supplemental Enhancement Information messages carrying one or more DMI formats conforming to sub-section 5.14.4.4.3.3.4 is not required i.e. optional. Any non DMI cognisant HEVC HDR UHD TV IRD shall be able to decode and present the service, even if DMI is in the bitstream (i.e. the IRD shall not be disturbed by DMI SEI messages not supported by the IRD) *Note 2: DMI refers to HDR dynamic mapping information and is information associated with one or more frames of the video content as part of a DVB service that can guide dynamic mapping, as produced in a reference viewing environment or otherwise (as defined in ETSI TS 101 154).*

- Ch5.5 colorimetry, add at the end a note:

Note: In the case that DMI messages are included in the bitstream, the NorDig Rules of Operation require broadcasters to provide video quality from that bitstream to NorDig HEVC IRDs that do not support DMI at the level that can be expected from a bitstream that does not include DMI messages: DMI enables further enhancement of the video quality.

- Ch5.5.1 NorDig HEVC STB colorimetry, following changes (only extracted sentences with changes):

The complete ANSI/CTA-861-G shall be taken into account, except the “6.10 Extended InfoFrame” and “6.10.1 HDR Dynamic Metadata Extended InfoFrame”. (1)

The EDID-information shall be used by the Decoder Format Converter of the NorDig HEVC STB to determine any applicable ~~convert~~ colorimetry conversion, display mapping (if supported) or DMI message pass-through (if supported).

Hence, the Decoder Format Converter of the NorDig HEVC STB shall output SDR video formats based on the HDR to SDR conversion methods described by the ITU (e.g. ITU-R BT.2390 [90] and operational practises in HDR television production ITU-R BT.2408 [95]) ~~or based on DMI (if supported).~~

In Note: The latter for example via user control of overall brightness and contrast. The initial display adaptation can be done by using DMI (if supported) ~~Leads on how to best perform the initial display adaptation is or by applying processing~~ derived from the conversion methods described by...

- Ch5.6 Dynamic changes in the video stream, add at the end of section:

For NorDig HEVC IRD supporting one or more of the DMI formats, dynamic switching should be handled as described in ETSI TS 101 154 sub-section 5.14.4.4.3.3.4.2 “Dynamic switching between bitstreams with and without DMI”.

- SI chapter Ch12.3.6 Component descriptor — add into table stream and component type values for all three dHDR as Optional

Samsung and Sony own motivation for their draft011 (why all these changes compared to earlier common draft008 and why so late) :

Why are these important issues?

- Issue for manufacturers
 - Technical overload when no technical information is required leads to technical support questions (broadcasters primarily)
 - Details lead to expectations of support by manufacturers, regardless of commercial needs - Manufacturers will be expected to support everything
 - Increased development costs
 - No commercial interest
- Issue for Broadcasters
 - Confusion when assessing the specs
 - Confusion when they might not even understand what dHDR is
 - Expectations that NorDig/Manufacturers will guide them towards dHDR, or some specific solutions, when they need to make their own evaluation
 - Currently they have reported little interest at this time.
- Issues for Consumers
 - Increased costs of IRD for no commercial reason
 - Confusion when there is no broadcast signal
- **→ There is no added benefits at this time for the consumers, broadcasters and manufacturers to include the text proposed to be removed**
- **→ Broadcasters should make the decisions to that they want to use dHDR (with their commercial priorities, and having checked that sufficient content is available to support this operation**
- **→ Broadcasters can already start introducing dHDR in their market with the current proposal**