



From TV to cross-media

The media industry has undergone monumental change. Today's marketplace is characterized by fragmented audiences who have access to a myriad of content options across multiple platforms. To empower media owners and advertisers in navigating the media landscape, our strategy is to connect Denmark's cross-media measurement capabilities into a cohesive framework to measure a client's audiences.

Measurement of viewers

Nielsen's Cross-Media framework measures content and advertising across all formats and all devices in this new media landscape. It delivers comparable and consistent metrics across content and advertising at all audience access points, providing a more inclusive currency that enables our clients to take action from measurement insights to improved programme schedule and advertising campaign planning. Consistent and comparable metrics empower clients to optimize their cross-media media mix to reach their audiences. For the Measurement of viewers (MOV) in Denmark, our cross-media solution is underpinned by four pillars:

1. **Single Source Panel** to measure audiences on TV and other receiving devices, across all platforms using Nano and Streaming Meters installed in 1,750 households
2. **Census with Nielsen SDK** integrated in all participating streaming services to provide census level measurement for the tagged content and ads
3. Enrichment of the Panel Data by **integrating the Census data** for all streaming devices measured in the panel to produce and deliver complete Single Source Panel data
4. **Virtual expansion** of the complete panel data using the latest Nielsen's machine learning algorithm to provide daily audience data aligned with the census measurement

Building and maintaining a panel

The **Establishment Survey** is the first step to set up any audience measurement service. Its quality is of utmost importance as it determines the universe of the measured environment. This large scale, tailor-made survey, is used both as a source of universe estimates and as the first stage in determining the panel composition.



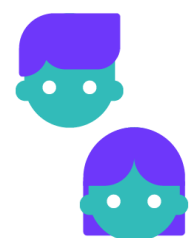
The Establishment Survey represents the resident population of Denmark living in private households. There are no restrictions on language, religion or ethnic origin. Each interview is conducted via CATI with a person at least 18 years old. The **Recruitment Survey** is carried out along with the Establishment Survey in order to provide extra addresses for recruitment.

The Single Source Panel with a **total sample size of 1,750 households** will be recruited and installed. Any audience measurement requires representativeness of recruited households, which ensures that the individual sample of all household members in the selected panel homes is a representative population sample. The panel will represent individuals 3+ residing in Denmark.



Prior to the digital age, the measurement was limited to households with working TV sets and the answer, to which home can be labeled a TV household, was straightforward. Now in the **Panel Design** we have to consider that a significant part of the population is also using other receiving devices for TV viewing via streaming as well as the fact that many people have made the decision to use their TV sets for watching the content delivered over-the-top and not via traditional TV distribution.

Field Technicians are the face of the measurement service in the panel households and critical to the accuracy and efficiency of the proposed solution. They perform the meter installation for each qualified viewing device and configure according to the measurement specifications. The Field Technicians also explain the installation process, how the meters work as well as instruct the households how to use the equipment installed in their homes.



One key aspect of the Nielsen TV meters is its simplicity, specifically the **ease of installation**. It reduces installation complexity as much as possible, while monitoring devices with a clean minimalist approach easy for panellists to accept. The Nielsen Streaming Meter is easy to install and does not require changes to be made to the panellists' home network. The installation can also be performed using an app on the Technician's mobile device.

Incentives are a very important consideration when evaluating a high quality, representative panel. The amount and type of incentives may vary by individuals. A variety of options for **rewarding the panel** are considered to gain wide acceptance from the population.



Once installed, our **Panel Quality Control** team will be monitoring performance and compliance of panel households and individual panelists to ensure they are participating properly and willingly. Our operational processes incorporate extensive quality checks and subsequent remedies to ensure the viewing and streaming data produced and reported is of the highest quality. Twice a year coincidental checks will be carried out with each household with the purpose of comparing respondent claims made at the time of the survey with the viewing data that has been collected.



Recurring surveys about the lifestyle of the panelists will be submitted to the panelists on a regular basis. It will cover panelist consumer behaviors and habits, interests, priorities, attitudes etc. This **Lifestyle Survey** is administered to all adult panel members 16+ every two years and populated quarterly for panelists with missing responses.



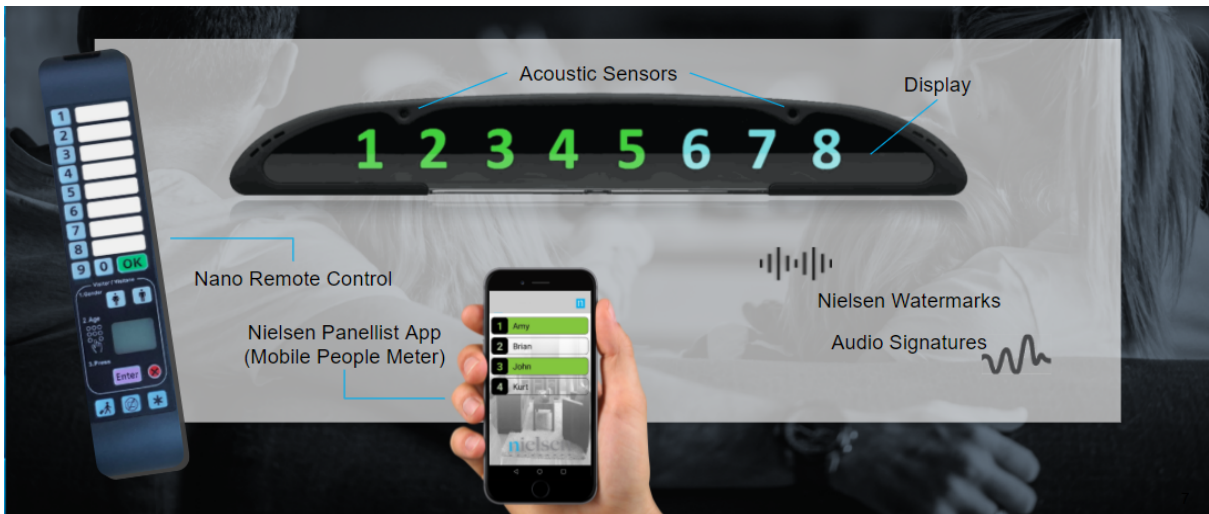
Measurement technology

For the Measurement of Viewers in Denmark we will use the best measurement technology. **Nano People Meter and Nielsen Streaming Meter** represent the latest meter generation optimized for a single source panel-based measurement. For the measurement at the census level **Nielsen SDK** can be easily integrated into participating streaming services to measure all in-home and out-of-home streaming across all devices for all tagged content.

Nano People Meter

A Nano People Meter is required to be installed on each TV set in the panel household to collect audio signatures, watermarks and infrared remote detections used to identify content and source. A typical setup includes Nano Meter Unit (an electronic device designed for monitoring TV sets by means of either microphone or line detection of audio signatures and watermarks). USB Cable (used to connect directly to the TV set for power and for the TV On/Off detection), an external power supply (if USB connection is not available) and Bluetooth Wireless CTSA (used to detect TV On/Off status).

The Nano Meter unit is the Central Processing Unit of the metering solution. In effect, it is a small computer capable of measuring content and individuals, communicating with the central processing system. All installed Nano Meters will be equipped with a Nano Remote Control for registering the viewers of each measured TV set.



Nielsen Streaming Meter

For panel households using broadband at home, the Nielsen Streaming Meter is installed along with the Nano Meter to identify the streaming activity, device and the streaming service. The meter monitors internet traffic enabling the collection of video streaming activities. Apart from streaming via CTV (Smart TV and Connected TV devices), the meter also captures streaming activities on other receiving devices such as personal computers, tablets and smartphones.

One of the key features of the Nielsen Streaming Meter is that the whole measurement is done passively alongside the household's router without interfering with its performance. For CTV the Streaming Meter also provides a valuable input into source detection on the Nano Meter

- **Measurement:** Meters outgoing and incoming IP traffic and parses internet metadata to identify (high bandwidth) streaming activity
- **Metering Considerations:**
 - Passive solution, non-intrusive to the panelist
 - Monitors internet connected devices at home
- **Ethernet Monitor (EPT):** Allows to monitor wired IP traffic via Ethernet pass-thru tap
- **Remote Maintenance:** using Qterics

Content identification

A central aspect of the detection and crediting of linear TV broadcast is the deployment of Nielsen's proprietary audio watermarking technologies. Our technology supports TV currency measurement in the US to ensure the highest quality measurement available. The advantage of watermarking is that it allows for direct detection of specific channels and is particularly effective in crediting the correct channel when the same content has been simulcast on multiple stations.

The process requires audio encoding of the linear TV content in real-time and requires client collaboration to deploy the encoding platform within their work flow. In the case of TV viewing the Nano People Meters are able to decode watermarks inserted by the broadcasters for the measured channels and pass them to the collection and crediting systems to be processed.

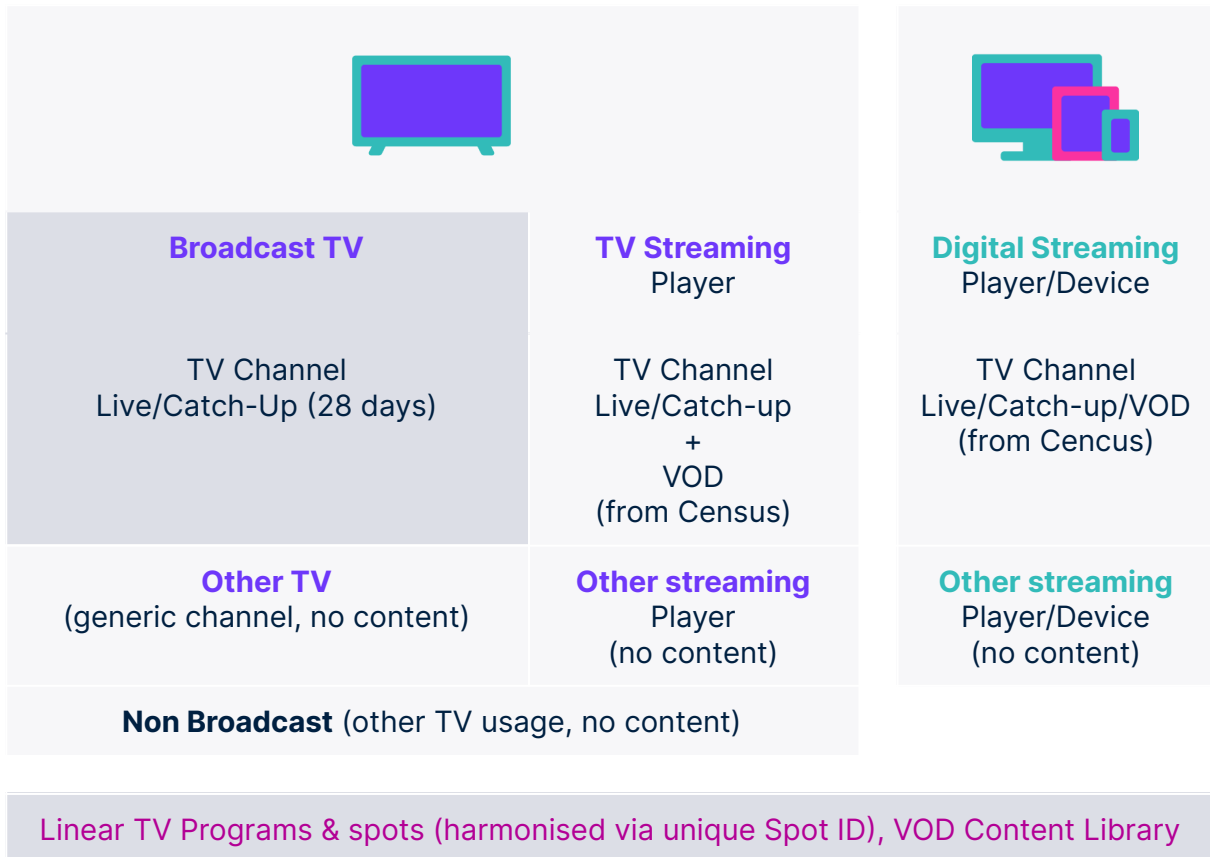
In addition to the watermarks, audio matching based on audio signatures (audio fingerprints) will be also used to identify the content being viewed on TV sets. Nielsen proprietary audio signature technology is used to match viewing collected from the Nano Meters against a reference library. Special Reference Sites will be established to capture broadcast signals for all channels to be measured. In this way, Nielsen's crediting systems are able to match the channel being viewed on the TV, whether it is being viewed Live or as Catch-Up.

What you receive

Nielsen configures the viewing data export process to publish the daily data files according to the reporting day definition, data delivery timetable and reporting cycle. Each daily file will cover the viewing data for 24 hours from 2 AM until 2 AM (Danish time) on the following day. The released data will include Live viewing and Catch-Up identified on a playback day up to 28 days after broadcast as well as Viewing on Demand (VOD) as identified through the Census solution.

In the client software it will be possible to calculate key audience metrics: Reach, Rating, Share, Average Viewing Time, etc. All information needed for calculating these metrics will be stored in the released daily viewing data, program and spot logs and content libraries. Audiences will be reported according to both Viewing and Broadcast Time. Additionally, Content IDs will be used to consolidate the reported VOD viewing with Live and Catch-Up viewing for the same content.

Nielsen will release **Preliminary Overnight Data** no later than 9:00 AM on working days. The released data will contain: Live and Catch-Up viewing of the measured linear TV channels via traditional broadcast TV reception or via streaming services on all screens, Viewing on Demand (VOD) reported at the content level as well as overall streaming activity including also streaming service which will not be measured with the Nielsen SDK.



Nielsen will also use machine learning algorithms to bring together the Panel and Census data. The delivery of the daily integrated **Cross Media** dataset will be initiated later in 2021. The data will be released on weekday afternoons. The start date will be announced in January 2021.

Nielsen maintains responsibility for authoring and maintaining all specifications for the published data files, including amendments, release notes and change control documentation history. Nielsen provides authorised users representing the parties of the Contracting Authority easy access to these along with relevant documents.