ITU/NBTC Conference on Digital Broadcasting
Digital Terrestrial Television Broadcasting (DTTB) in Thailand
12 December 2017, Bangkok, Thailand

DTTB Implement status and Lessons Learnt in Thailand

ORASRI SRIRASA
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Office of NBTC, THAILAND
Content

- Thailand Broadcasting Landscape
- Broadcasting Master Plan and Licensing Framework
- Network Planning and Monitoring (Frequency Planning, Network Rollout, Coverage Check & QoS)
- Broadcasting Service Licensing (Spectrum Auction, DTV Service Channeling)
- ASO Plan and Status
- DTV Receiver and Subsidy Program
- DSO Communication Strategies and Implementation
- Broadcasting Indicators and User Survey
National Broadcasting and Telecommunications Commission (NBTC)

Established under the “Act on Organization to Assign Radio Frequency and to Regulate the Broadcasting and Telecommunication Service, B.E. 2553 (2010)”

**NBTC mandates:**
- To license and regulate the operation of TV and radio broadcasting, radio communication, and telecommunications
- To promote free and fair competition in the industry
- To ensure universal telecommunications/broadcasting services is provided
- To promote research and development in the industry
- To protect right and liberty of the citizen and consumers from being exploited by the operators
- To maintain plurality in the provision of broadcasting
- To protect for the citizen and consumers against unfairness or the infringement of privacy, and against offensive or harmful material

New version Organization Act. (2017) has been adopted

- The NRA Organization Act of 2010*
- Telecommunications Act of 2001
- Broadcasting Act of 2008
- Radio Communications Act of 1955
Thailand TV Broadcasting Landscape: TV broadcasting timeline

History of TV Broadcasting in Thailand: 62 years

- Black & White -- 12 years - Color
  - B.E.2498 (1955) to B.E.2510
- Analog -- 46 years -- Digital
  - B.E.2556 (2013) to 2015
- Commercial

~ 22 million TV HHs in Thailand with
98% TV penetration, APAC average 84%

TV Set Penetration (%)

- Thailand
- Malaysia
- APAC
- Pakistan
- India

0 20 40 60 80 100
Thailand Broadcasting Landscape: Share Viewer

% Share Viewer Pay TV and Terrestrial: 2016

% Share Viewer Pay TV and Terrestrial: 2017
Thailand Broadcasting Landscape: Advertising Spending on Terrestrial

ADEX IN THE FIRST HALF OF 2017

<table>
<thead>
<tr>
<th>Medium</th>
<th>H1 2016</th>
<th>H1 2017 Actual</th>
<th>H1 17 vs 16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Btm.</td>
<td>%</td>
<td>Btm.</td>
</tr>
<tr>
<td>TV</td>
<td>26,027</td>
<td>41</td>
<td>22,047</td>
</tr>
<tr>
<td>Digital TV</td>
<td>10,766</td>
<td>17</td>
<td>11,159</td>
</tr>
<tr>
<td>Cab/Sat</td>
<td>1,937</td>
<td>3</td>
<td>1,820</td>
</tr>
<tr>
<td>Total TV</td>
<td>43,335</td>
<td>61</td>
<td>44,626</td>
</tr>
<tr>
<td>Radio</td>
<td>3,019</td>
<td>5</td>
<td>2,480</td>
</tr>
<tr>
<td>Newspapers</td>
<td>5,159</td>
<td>11</td>
<td>5,813</td>
</tr>
<tr>
<td>Magazines</td>
<td>1,674</td>
<td>3</td>
<td>1,670</td>
</tr>
<tr>
<td>Cinema</td>
<td>2,721</td>
<td>4</td>
<td>3,410</td>
</tr>
<tr>
<td>Outdoor</td>
<td>2,574</td>
<td>4</td>
<td>3,048</td>
</tr>
<tr>
<td>Transit</td>
<td>2,438</td>
<td>4</td>
<td>3,098</td>
</tr>
<tr>
<td>In-Store</td>
<td>343</td>
<td>1</td>
<td>483</td>
</tr>
<tr>
<td>Internet</td>
<td>4,739</td>
<td>7</td>
<td>5,800</td>
</tr>
<tr>
<td>Total</td>
<td>63,353</td>
<td>97</td>
<td>66,318</td>
</tr>
</tbody>
</table>

Source: Nielsen

Ads. Spending: Q1-2017

Analog Channels

- 100 M (USD)
- 127 M (USD)

Digital Channels

- 44.9 M (USD)
- 50.7 M (USD)
- 60.8 M (USD)

% Terrestrial TV Advertising Spending

Source: Nielsen

Note: Cab/Sat Channels Only
Last Update January 09, 2017

Jan17 Feb-17 Mar-17
National Digital Broadcasting Plan: Broadcasting Master Plan and Digital Economy Plan


The first Thailand Broadcasting Master Plan (2012-2016, extended)
Strategy No. 6 Transition from Analog to Digital Broadcasting

Thailand Digital Economy and Society Development Plan (2016-2018)
Strategy No. 1 Develop digital infrastructure
Target: Deploying Digital TV and Digital Radio broadcasting services cover nationwide, providing Digital Radio broadcasting services with in 3 years
## DSO Roadmap (Broadcasting Master Plan#1: 2012-2016)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DSO-TV Plan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital TV Licensing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting Digital TV broadcasting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infra-sharing methodology + Database</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D measures for Digital TV receiver</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning and Implementing DTV receiver subsidy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planning and Implementing Digital Communication (ASO communication is on going)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1st Broadcasting Master Plan has been extended until the 2nd master plan will be adopted

80%+ of households can reach Digital TV
Broadcasting Licensing Scheme

Licensing status (as of Oct 2017)

- DTTB Network: 5 licenses
- DTTB Services: 23 licenses (Business 22, Public 1)
- Satellite and Cable TV: 615 licenses
- Network operators: N 38, R 60, L 314 licenses
- Facility operators: 7 licenses

Must Carry rule is applied for DTTB Business service and Public Services-National level, Must Have: 7 programs
Policy on DTV technology
- DVB-T2 was selected for DTV transmission standard
- Resolution is HD and SD are applied.

Frequency Planning Basic Approach:
- Frequency Range: UHF 510 – 790 MHz
- Bandwidth: 8 MHz
- Frequency Channel: Channel 26 – 60
- Service Area: 39 service areas
- Number of Main sites: 39 sites
- 5MUXs (5 frequency channels) per Service Area
- 6th MUX is reserved for community services
- Infrastructure sharing between all MUXs
- Each main site will be MFN with others.
- Each main site and its additional sites will be SFN.
- Compatibility between Digital-Digital and Digital-Analog
- FX reception coverage target is 95% of households

<table>
<thead>
<tr>
<th>DVB-T2 Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFT size</td>
<td>16K extended</td>
</tr>
<tr>
<td>Guard Interval</td>
<td>19/128</td>
</tr>
<tr>
<td>Modulation</td>
<td>64-QAM</td>
</tr>
<tr>
<td>Code Rate</td>
<td>3/5</td>
</tr>
</tbody>
</table>

39 Local Service Areas (77 provinces)
DTTB Network Licensing and Roll-out Obligation

Network Licensing

- Issued 5 DTTB Network Licenses for 4 Network Providers (PRD 1, RTA 2, MCOT1, TPBS1) in Jun 2013, all agreed to share common facilities e.g. towers, antennas, combiners
- Currently, 39 main sites and additional sites implemented cover 95% HHs coverage

Network Rollout Obligation

- Network Rollout Obligation: 95% HHs coverage within 4 years: 39 main sites + 129 additional Sites (168 sites in total)

<table>
<thead>
<tr>
<th>Year</th>
<th>HH Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50% in Jun 2014 (11 mil. HH)</td>
</tr>
<tr>
<td>2</td>
<td>80% in Jun 2015 (17.6 mil. HHs)</td>
</tr>
<tr>
<td>3</td>
<td>90% in Jun 2016 (19.8 mil. HHs)</td>
</tr>
<tr>
<td>4</td>
<td>95% in Jun 2017 (22 mil. HH)</td>
</tr>
</tbody>
</table>

- Portable indoor reception mode in Municipality areas
- 20% of MUX Capacity for Community TV service

Network Quality

- Service Availability: >= 99.98%
- Coverage audit and signal measurement
DTTB network coverage auditing and signal measurement

DTTB Network Coverage (as of May 2017)

Template signal measurement

<table>
<thead>
<tr>
<th>Mux 1</th>
<th>Mux 2</th>
<th>Mux 3</th>
<th>Mux 4</th>
<th>Mux 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality (0,1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power (dBm)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C/N (dB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MER (dB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBER</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NBTC
DTTB network coverage auditing and signal measurement

Signal measurement at DTTB Station/field

Assist people to receive DTV signal
DTV Coverage Checker: DTV Service Area

Web Application and Mobile Application (iOS/Android)
- Name/Location of Transmitter, Distance, Ant Direction
- Coverage, Network Deployment Status, MUX and Frequency Channel information
- Getting feedback/report problem areas
**DTV Services Licensing : Spectrum Auction**

Spectrum auction for business broadcasting service license National Level-on 26-27 Dec2013 : 24 Business licenses (4 Categories)

<table>
<thead>
<tr>
<th>Category</th>
<th>Licenses</th>
<th>Reserve Price</th>
<th>Total Bidding Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kids &amp; Family</td>
<td>3</td>
<td>140 MB</td>
<td>1,974 MB</td>
</tr>
<tr>
<td>News and Documentary</td>
<td>7</td>
<td>220 MB</td>
<td>9,238 MB</td>
</tr>
<tr>
<td>SD-General</td>
<td>7</td>
<td>380 MB</td>
<td>15,950 MB</td>
</tr>
<tr>
<td>HD-General</td>
<td>7</td>
<td>1,510 MB</td>
<td>23,700 MB</td>
</tr>
<tr>
<td><strong>Total 24 Business Service licenses</strong></td>
<td><strong>72</strong></td>
<td><strong>9,600 MB</strong></td>
<td><strong>50,862 MB</strong></td>
</tr>
</tbody>
</table>

Auction Results 50,862 MB ($1,589 million)

(Rate: $1=32 Thai Baht @Dec2013)
DTTB Services Channeling: 48 Channels

Public: Ch 1-12

1 13 16 17 18 19 20 21 22
2 14 24 25 26 27 28 29
3 15 23 20 26 27 26
10 37 38 39 40 41 42 43 44

Business: Ch13-36

Kids/Youth & Family Channels 13-15

General Channels (SD) 23-29

Community TV: ch 37 to 48 reserved in each service area
* Now Ch1-3 are simulcast channels

Public Channels 1-12

General Channels (HD) 30-36

News /Info Channels 16-22

Public: Ch 1-12

Business: Ch13-36

Kids/Youth & Family Channels 13-15

General Channels (SD) 23-29

Community TV: ch 37 to 48 reserved in each service area
* Now Ch1-3 are simulcast channels

Public Channels 1-12

General Channels (HD) 30-36

News /Info Channels 16-22
Public Services Channels

Simulcast

1. CH 5
2. NBT
3. TPBS

TPBS (MOU)

5. Knowledge, Education, Science, Technology and Environment
6. Religion, Art & Culture, Agriculture and Occupational Development and promotion
7. Health Sanitation Sport and promoting quality of people life
8. State Security
9. Public Safety
10. Strengthen the well understanding between government and citizen. Also, Strengthen the well understanding between parliament and citizen
11. Advocating in term of the contributing and educating population about democratic form of government with the King as Head of State
12. Servicing an beneficial information to disability persons or less opportunity persons.

Ref: NBC resolution #. 12/2013
ASO Plan and Status: Thailand

- **ASO Plan:** 5 ATV channels (Ch5, Ch7, Ch11, Ch9, TPBS) plan to switch off all ATV site in mid of 2018. (Ch3 and Ch7, concession agreement in 2020, 2023).
- **ASO Starting:** Analog switch off has been started since Dec 2015, 50 ATV sites were switch off as of Nov 2017.
- The MUX6th is reserved for Community TV which is available after switch off ATV.

<table>
<thead>
<tr>
<th>ATV Channel</th>
<th>ASO Plan (2015-2018)</th>
<th>ATV Sites</th>
<th>Switch Off status (as of Nov 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch5</td>
<td>2018</td>
<td>41</td>
<td>5</td>
</tr>
<tr>
<td>Ch7</td>
<td>2018</td>
<td>37</td>
<td>4</td>
</tr>
<tr>
<td>Ch9</td>
<td>2018</td>
<td>36</td>
<td>-</td>
</tr>
<tr>
<td>Ch11</td>
<td>2017</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>TPBS</td>
<td>2018</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>Ch3</td>
<td>Concession 2020</td>
<td>33</td>
<td>-</td>
</tr>
</tbody>
</table>
## ASO Dates of ASP beneficiary countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Year Launch</th>
<th>DTTB</th>
<th>ASO</th>
<th>Revised or year of possibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td></td>
<td>DVB-T, DVB-T2, DTMB</td>
<td>2020</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Mongolia</td>
<td>2014</td>
<td>DVB-T2</td>
<td>05/10/2015</td>
<td>Completed</td>
</tr>
<tr>
<td>Fiji</td>
<td>2015</td>
<td>DVB-T2</td>
<td>2018</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td>DVB-T2</td>
<td>2018</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Kiribati</td>
<td></td>
<td>ND</td>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>Lao P.D.R.</td>
<td></td>
<td>DVB-T, DTMB</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Maldives</td>
<td></td>
<td>DVB-T2, ISDB-T</td>
<td>2020</td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td>2013</td>
<td>DVB-T2</td>
<td>2020</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Micronesia</td>
<td></td>
<td>ND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>2014</td>
<td>DVB-T2</td>
<td>2020</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Nauru</td>
<td></td>
<td>ND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal (Republic of)</td>
<td></td>
<td>DVB-T2</td>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td>ISDB-T</td>
<td>2018</td>
<td></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>2014</td>
<td>DVB-T2</td>
<td>2017</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Samoa</td>
<td>2014</td>
<td>DVB-T2</td>
<td>2018</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td></td>
<td>DVB-T2, ISDB-T</td>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>Timor-Leste</td>
<td></td>
<td>ND</td>
<td>2024</td>
<td></td>
</tr>
<tr>
<td>Tonga</td>
<td>2015</td>
<td>DVB-T2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vanuatu</td>
<td>2016</td>
<td>DVB-T2</td>
<td>2017</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>

Source: ITU DSO Database
DTV Receiver: Specification
Mandating DTV Receivers

- DVB-T2 Receiver (including Set-top-box and integrated Digital TV) has to comply with NBTC’s DVB-T2 Receiver Specification Edition 2012 and 2013 (Amendment).
- Draft of ASEAN Common Specification and specifications from ASEAN countries has been used as a baseline during developing the above specification.

**ASEAN Digital Broadcasting (ADB) initiative to develop common specifications for DVB-T2 receivers**

- Self Conformance scheme: Submit test reports to conform and to eligible for conformance Mandating the Digital Receivers sticker and Digital TV Mascot & Logo

![Post Regulate](PostRegulate.png)
![MarCom](MarCom.png)
![NBTC ID and DTV Ready Label](IDLabel.png)
![Registration Process and get Approval from NBTC](Approval.png)
![Submit Reports](SubmitReports.png)
## DTT Receiver Type Approval Sticker

### DTT Receiver Type Approval Sticker

<table>
<thead>
<tr>
<th>Type</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017* (as of Nov)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDTV</td>
<td>218,992</td>
<td>1,734,973</td>
<td>3,468,820</td>
<td>3,721,361</td>
<td>2,351,592</td>
<td>11,495,738</td>
</tr>
<tr>
<td>Set-Top-Box</td>
<td>323,885</td>
<td>13,833,709</td>
<td>2,642,060</td>
<td>79,864</td>
<td>344,417</td>
<td>17,223,935</td>
</tr>
<tr>
<td>Set-Top-Box (car)</td>
<td>-</td>
<td>18,009</td>
<td>27,925</td>
<td>14,970</td>
<td>7,100</td>
<td>68,004</td>
</tr>
<tr>
<td>Mobile</td>
<td>-</td>
<td>1,268,600</td>
<td>150,750</td>
<td>18,000</td>
<td>-</td>
<td>1,437,350</td>
</tr>
<tr>
<td>Portable DVD/TV</td>
<td>-</td>
<td>8,200</td>
<td>17,500</td>
<td>15,500</td>
<td>-</td>
<td>41,200</td>
</tr>
</tbody>
</table>

*Source: NBTC*

*Portable: Tablet, WIFI, DTV Receiver in Car, Hotspot, Smart Phone with built-in DVB-T2 tuner*
**DTV Coupon Subsidy Program**

**DVB-T2 Receiver Coupon Program**

- NBTC set a coupon program as a subsidy measure and distribute cash coupon to every households in Thailand, the subsidy budget for 22.9 million households comes from revenue of Spectrum auction for DTTB Services to support Digital TV Switch-over.
- National Council for Peace and Order (NCPO) Committee approved to utilize some parts of the revenue from auction for DTT Receiver Subsidy Program
- The reserve price portion (15,190 million Bath) from the broadcasting frequency auction was allocated for the program.
- Digital TV coupons worth THB 690 ($20) for digital TV receivers delivered since October 10, 2014.
- The coupon can be used for Digital Set-Top-Box and iDTV Set with built-in tuners
DTV Coupon Program-Subsidy Campaign

- First Phase, 13.57 million coupons were distributed to eligible HHs in 77 provinces with redemption rate 64% or 8.7 million coupons were activated. (as of Jan 2016)

- Phase 2: NCPO/Prime Minister approved a proposal from the Office of NBTC to subsidize DTV receiver for 4 groups of households as the follows:
  - Eligible householders of the first lot which did not receive coupons and those coupons were returned to the Office of NBTC by Thailand Post Company.
  - Any Household having house registration document and householder after 16 Sep 2014
  - Any households with a house but doesn’t have a householder
  - Any households with temporary house registration document
- There are additional 3.8 million HHs can get Set-Top-Box, redemption during Mar-Dec 2017.
- As of Nov 2017, Approximately 1 million HHs redeemed.
- Easy to get Set-Top-Box at convenient store, retail shop, or register at Post by using Citizen ID.
DSO Communication Strategy and Implementation

DSO Communication strategy

- Communicate on various channels; TV, Radio, SMS, Newspaper, On-Line and Social Media (https://www.facebook.com/digitaltv.nbtc), DTV Web site (http://digital.nbtc.go.th), Events & Exhibitions, DTV Road show
- Create media and national message and handbook for promoting DSO
- Implementing Coverage Checker on web and Mobile/Tablet Applications
- Build community, local administration to promote DTV
- Cooperate with Universities, Network Operators, DTV manufactures to support customer on DTV installation
- Cooperate with DTV broadcasters, telecom operators to promote DTV
- Encourage high rise building (apartment, condominium) to install DTV antenna
- Project DTV4All, All4DTV

DSO Commutation Implementation: Integrated marketing communications (IMC)
DSO Communication

DTV Mascot “Nong Doo Dee”

DTV Song  https://www.youtube.com/watch?v=mCVSPaIA8oc

Mass Communication on TV/Radio
DSO Communication

Music Video
“Change”

TVC
“DTV Switch over”

TVC
“How... Digital TV”

DTV Informative & Advertorial Scoops

DTV Info graphic
How to install DTV receiver
DSO Communication
Promoting and Educating Digital TV

Roadshow

DTV Troop

DTV events
DSO Communication
Promoting and Educating Digital TV: Social Media

Website
http://digital nbtc.go.th

Facebook
(https://www.facebook.com/digitaltv.nbtc),

Youtube

Intragram

Website: www nbtc.go.th, digital nbtc.go.th
Youtube Channel: digital nbtc
Facebook: www.facebook.com/digitaltv nbtc
DSO Communication
Promoting and Educating Digital TV

Print medias

Project DTV4all, all4DTV

Handbook: DTV Installation

Project DTV4all, all4DTV: Social Media Communication (Viral), more than 100 viral clips of influencers and celebrities talking about the digital broadcasting transition spreading via Facebook, Instagram, Youtube etc.
DSO Communication
Cooperate with university, technical college

MOU with Vocational universities in every provinces to support customer on TV installation

DTV Technical Training to technician
DSO Communication
Cooperate with Government agencies

MOU with Royal Thai Army (Network Operator) to build DTV demo set in public local service centers

Governor Monthly update
Customer Support

Call Center 7 days, 24 hrs

Mobile App.Call Center

DTV Guide App: DTV Program

Various Call Center Channels
• Phone to Hot line 1200
• Walk-in
• Social Media: FB, youtube
• Website/ Chat/ Web form
• Email
• Fax
• Government Call Center (GCC 1111)
• NBTC sectors/Branch office

• Mobile application has been launched in Apr 2015.
• Receive customer complaint with mark location, capable to attach photo/VDO
• Topics raised via application, 90% is information inquiry on DTV, 4G Auctions, and prepaid SIM register, 10% is complaints.
Support disability people (PWDs)

The Equality for Disability People

Closed Caption  Sign Language  Audio Description
Contribution documents to ITU-D SG1 Question 8/1

ITU-D Study Group 1: Question 8/1
Examination of strategies and methods of migration from analogue to digital terrestrial broadcasting and implementation of new services

Thailand Case Study:
Transition to Digital Terrestrial Television Broadcasting
Document SG1RGQ/227(Rev.1)-E

Digital Terrestrial Television in Thailand:
Frequency planning and technical aspects
Document SG1RGQ/218-E
Lesson Learned on DSO transition in Thailand
(Country Case Study)

Set up trial
- Trial on the DTT system at the early transition before fully commercial launch was important to test the whole system and trial broadcasting markets.

DTTB Network Rollout
- Sharing infrastructure and facilities
- Ensuring that network rollout, network coverage an network quality of every MUXs are ready to provide broadcasting service the same period for fair competition.
- Regular network quality monitoring
- Setting proper Service Availability, faster recovery, redundancy system/location should be well planned in network design in the first place.
- Utilize existing antenna system and site facilities of existing network operators

Must Carry Rule
- NBTC enforced the rule of 'must carry' for the commercial and public service broadcasters to commence broadcasting DTV content from day one on satellite and cable TV which already cover more than 70% audiences in Thailand to increase DTV eye balls.
Lesson Learned on DSO transition in Thailand
(Country Case Study)

Digital TV Subsidy Program
- Collaboration between the agencies who distribute the set-top-box coupons
- DTV Coupon should be distributed to areas whereas DTTB signal covered.
- DTV coupon value should be enough to cover a qualified set top box with necessary accessories to receive signal
- Proper training for the STB installers prior to distribution of coupon and STB

Receivers
- Collaboration with Vocational school and network operators to help people on STB Receiver Installation, also set up advisory group to support installation.
- Develop application or tool to help the people to equip and tilt the antenna correctly like ‘DTV Service Area’
- Having variety of receiver types like portable DTV Receivers e.g. smartphone, tablet, or portable.
- Selecting proper antennas type and model for Set-Top-Box is important to receive signal well.
- Set up advisory group either by dedicated group or volunteer group to support installation.

Collaboration
- Collaboration with industry: ATV and DTV broadcasters, DTTB network operators, manufacturers, retailers
- Collaboration with government agencies and public agencies in national and local level are also key factors to drive a success of digital transition.
Lesson Learned on DSO transition in Thailand

DSO Communication
- Mass communication to public, simply key message
- Getting engagement from government agencies in state and local level, public and relevant organization.
- Social media Communication such facebook, youtube, twitter

Audience Measurement: Rating of Television Broadcasting
- Rating survey should be conducted to cover all broadcasting platforms including digital platform (i.e. internet) to have real broadcasting rating and user behavior.

Call Center and Information to Support Customer
- Cooperation with DTTB network operators to help people on installation the DTTB receivers, and also build confidence on DTTB network quality.

Capacity Building
- Continuous organizing capacity building on Digital Broadcasting technical, regulation aspects, content development
ITU-D Study Group 1: Question 8/1
(study period 2014-2017)

ITU-D Study Group 1: Question 8/1
Examination of strategies and methods of migration from analogue to digital terrestrial broadcasting and implementation of new services

Final Report Question 8/1 Document 1/419-E

- CHAPTER 1 – Best practices to accelerate the transition from analogue to digital television broadcasting and bridge the Digital Divide with the deployment of new services
- CHAPTER 2 – Communication strategies to accelerate the process of public awareness about digital broadcasting
- CHAPTER 3 – Spectrum issues related to the Analogue Switch-Off process
- CHAPTER 4 – Use of released spectrum and implement new services and applications
- CHAPTER 5 – Countries case studies on transition to digital broadcasting and the use of the digital dividend frequency bands
ITU-D Study Group1: Question 8/1
Proposed next Study Period

Examination of strategies and methods of migration from analogue to digital terrestrial broadcasting and implementation of new services

Future of Question 8/1 – topics of study

- **Broaden the scope of the question** not restricting it to Analogue to Digital Television Broadcasting:
  - Evolution of the Digital Transition in Broadcasting [DVB-T to DVB-T2, SD to HD, MPEG2 to MPEG4, etc.];
  - Digital Radio (Sound) Broadcasting.

- **Use of the released spectrum** to new services and applications, including collection of case studies and best practice:
  - Bridging the digital divide;
  - Development of rural communications.

- Collection of best practices and countries’ experiences on **interference mitigation** between broadcasting and new services;

- **Implementation of new services and applications**:
  - Community and Regional TV on DTV;
  - New Broadcasting Services: 3D, 4K, 8K, etc.; multimedia/interactive services; mobile television.

- **Economic aspects** of the deployment of new broadcasting services and applications:
  - Deployment costs.

- **Impact of other television distribution platforms** (IPTV, Cable, Satellite, etc.) on terrestrial broadcasting market.
ITU-D Study Group1: Question 8/1
(study period 2014-2017)

ITU-D Study Group1: Question 8/1
Examination of strategies and methods of migration from analogue to digital terrestrial broadcasting and implementation of new services


- CHAPTER 1 – Communication planning to accelerate the process of public awareness about digital broadcasting
- CHAPTER 2 – Information Campaigns for the general public
- CHAPTER 3 - Media Communication Campaign
- CHAPTER 4 - Communication strategies targeted low income population

Reference / Contribution from Brazil, German, Hungary, Netherland, Niger, Russia, Serbia and Thailand
ITU-D Study Group1: Question 8/1
(study period 2014-2017)


Chapter 1: Communication planning to accelerate the process of public awareness about digital broadcasting

Brazil

Hungary

Thailand

Niger

Reference / Contribution from Brazil, Germany, Hungary, Netherlands, Niger, Russia, Serbia and Thailand
Project: Develop Broadcasting Indicators and User Survey

1. Country Case Benchmarking
   - DSO Plan, Best Practice, Successful criteria, supporting measure, lesson learned

2. Design Broadcasting Indicator
   - Review existing indicators: Thailand, UN, Regulators
   - Designed Broadcasting indicators

3. Cost Base Analysis
   - Cost Base Analysis for Digital Radio
   - Impact to stakeholders in each sector

4. User Survey
   - Survey 6,200 HHs, 44 provinces
   - Reachable and User Behavior on TV and Radio Broadcasting

รายงานฉบับสมบูรณ์ โครงการวิจัยตัวชี้วัดและการสำรวจภาวะเข้าถึงบริการโทรทัศน์และบริการกระจายเสียง
https://broadcast.nbtc.go.th/data/academic/file/600400000003.pdf
### Project: Develop Broadcasting Indicator and User Survey

**TV Broadcasting User Survey Result**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Survey Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Number of Households with TV</td>
<td>20,433,430</td>
</tr>
<tr>
<td>Number of Households with Digital TV</td>
<td>9,540,172</td>
</tr>
<tr>
<td>Number of Households with Analog TV</td>
<td>14,458,675</td>
</tr>
<tr>
<td>2. Number of Households with DVB-T2 STB</td>
<td>7,056,303</td>
</tr>
<tr>
<td>3. Number of TV per Household</td>
<td>1.50</td>
</tr>
<tr>
<td>Number of Digital TV per Household</td>
<td>0.55</td>
</tr>
<tr>
<td>Number of Digital TV per Household</td>
<td>0.96</td>
</tr>
<tr>
<td>4. Number of DVB T2 STB per Household</td>
<td>0.37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Survey Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. % of Household with TV</td>
<td>95.8</td>
</tr>
<tr>
<td>% of Household with Digital TV</td>
<td>44.7</td>
</tr>
<tr>
<td>% of Household with Analog TV</td>
<td>67.8</td>
</tr>
<tr>
<td>6. % of Household with DVB T2 STB</td>
<td>33.1</td>
</tr>
<tr>
<td>7. % of Household viewing digital TV (all platforms)</td>
<td>84.9</td>
</tr>
<tr>
<td>% of Household viewing Terrestrial digital TV</td>
<td>42.6</td>
</tr>
<tr>
<td>% of Household viewing satellite TV</td>
<td>63.9</td>
</tr>
<tr>
<td>% of Household viewing IPTV</td>
<td>14.9</td>
</tr>
<tr>
<td>% of Household viewing digital cable TV</td>
<td>24.3</td>
</tr>
<tr>
<td>8. % of Household with viewing TV Online</td>
<td>32.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Survey Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. % of Household with viewing analog cable TV</td>
<td>9.6</td>
</tr>
<tr>
<td>10. % of Household with viewing only Terrestrial TV</td>
<td>12.1</td>
</tr>
<tr>
<td>% of Household with viewing only Terrestrial digital TV</td>
<td>6.6</td>
</tr>
<tr>
<td>% of Household with viewing only Terrestrial analog TV</td>
<td>4.2</td>
</tr>
<tr>
<td>11. % of Household with viewing free satellite TV</td>
<td>54.8</td>
</tr>
<tr>
<td>12. Number of Households with subscribe cable TV</td>
<td>7,229,445</td>
</tr>
<tr>
<td>13. Number of Households with subscribe satellite TV</td>
<td>2,779,405</td>
</tr>
<tr>
<td>14. Number of Households with IPTV</td>
<td>3,184,423</td>
</tr>
<tr>
<td>15. Number of Households with subscribe TV</td>
<td>42.1</td>
</tr>
<tr>
<td>% of Household with viewing cable TV</td>
<td>33.9</td>
</tr>
<tr>
<td>% of Household with viewing subscribe satellite TV</td>
<td>13.0</td>
</tr>
<tr>
<td>% of Household with viewing IPTV</td>
<td>14.9</td>
</tr>
</tbody>
</table>
**Project: Develop Broadcasting Indicator and User Survey**

**TV Broadcasting User Survey Result**

<table>
<thead>
<tr>
<th>TV Indicator</th>
<th>Survey Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. % of population aged 6+ who watch TV</td>
<td>98.65</td>
</tr>
<tr>
<td>2. % of population aged 6+ who watch TV weekly</td>
<td>96.54</td>
</tr>
<tr>
<td>3. Average time spent watching TV per day (mins.)</td>
<td>122</td>
</tr>
<tr>
<td>4. Average time spent watching Live TV per day (mins)</td>
<td>128</td>
</tr>
<tr>
<td>5. Average time spent watching Time-shifted TV per day</td>
<td>95</td>
</tr>
</tbody>
</table>
| 6. Average time spent watching TV by day part | 06.01 - 12.00 = 100  
12.01 - 18.00 = 111  
18.01 - 23.00 = 151  
23.01 - 06.00 = 86 |
NBTC/ITU Digital Broadcasting Project: Mobile TV

- NBTC, ITU collaboration on project: *Development of a Roadmap for Mobile TV Broadcasting Deployment and Regulation in Thailand*
  - Mobile Television Services Feasibility Study for Thailand
  - Mobile Television Services Implementation Strategies and Roadmap
    - Spectrum management aspects
    - Technical and operational aspects
    - Business and regulatory aspects
    - Regulatory impact assessment
    - Conclusions, recommendations and roadmap
  - https://broadcast.nbtc.go.th/academic/?type=NTYwNTAwMDAwMDAy

- **Capacity Building**: Workshop/Conference, focus group
  - -NBTC/ITU ASP Regional Seminar on ‘Delivery Technologies and Business Models for Mobile Technologies and Multimedia Services
<table>
<thead>
<tr>
<th>System</th>
<th>In commercial operations?</th>
<th>Option for Thailand?</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-DMB/AT-DMB</td>
<td>Yes, T-DMB only. For example in Korea, Ghana &amp; China</td>
<td>Yes, VHF Band III (in-band with DAB)</td>
</tr>
<tr>
<td>ATSC-M/H (in-band system)</td>
<td>No, tested in the USA and Canada (2013)</td>
<td>No, DTTB is DVB-T2</td>
</tr>
<tr>
<td>ISDB-T 1Seg (in-band system)</td>
<td>Yes, for example in Japan, Brazil, Costa Rica &amp; Chile</td>
<td>No, DTTB is DVB-T2</td>
</tr>
<tr>
<td>ISDB-Tmm</td>
<td>No, in Japan only, to be discontinued 30 June ‘16</td>
<td>Yes?, VHF Band III</td>
</tr>
<tr>
<td>DVB-H</td>
<td>No, all DVB-H services discontinued</td>
<td>No, discontinued</td>
</tr>
<tr>
<td>DVB-T2 Lite (in-band system)</td>
<td>No, only tested, for example in the UK and Italy (2012/13)</td>
<td>Yes, VHF III, UHF IV/V (in-band with T2)</td>
</tr>
</tbody>
</table>

https://broadcast.nbtc.go.th/data/academic/file/580900000003.pdf
### Current situation

<table>
<thead>
<tr>
<th>Channel</th>
<th>VHF Band III</th>
<th>UHF Band IV/V</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-8 MHz</td>
<td>174-240 MHz</td>
<td>470-790 MHz</td>
</tr>
</tbody>
</table>

#### Band allocation

- **DRB (DAB+)**
- **National (NAT)**
- **Local (LOC)**
- **Aeronautical (Aer)**
- **Blocks**: 4 8 12 16 20 24 28 32

### Future scenarios

#### Option 1

- **National (NAT)**
- **Local (LOC)**
- **Aeronautical (Aer)**
- **Blocks**: 4 8 12 16 20 24 28 32

#### Option 2

- **National (NAT)**
- **Local (LOC)**
- **MTV (MT)**
- **Blocks**: 4 8 12 16 20 24 28 32

### Allocations

- **Aero** = Allocation for Aeronautical services (2 blocks cannot be used for DRB/MTV)
- **MTV** = Allocation for MTV services
- **National** = Allocation for National DRB services
- **Local** = Allocation for local DRB services
- **MUX National & 1 MUX** = Allocation for national and local DTDB services
Summary DSO in Thailand

- Digital TV Roadmap: Feb 2012
- DVB-T2 Standard Adopted: Jun 2012
- Digital TV Trial: Q1 2013
- Facility/Network Licensing: Jun 2013
- Start ASO Dec 2015>> 13 ATV sites switch off
- Roadmap and Strategies Development for MTV 2015-2016
- DTV Network: 95% HH coverage Subsidy Coupon #2: 2017
- Technical Standard for DTTB Receiver-ver2, Certified STB DVB-T2: Q3 2013
- Licensing of Business Broadcasting Services
  - Spectrum Auction: Dec 2013
  - On-Air: Apr 2014
- Licensing of Public Broadcast Services: 2015>> Ch 10 in 2015
  Trial Community TV Prototype: 2017
- 2017: Study OTT Regulation
Thank You

Website: www.nbtc.go.th, digital.nbtc.go.th
Youtube Channel: digitaltv.nbtc
FaceBook: www.facebook.com/digitaltv.nbtc

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