IMPLEMENTING OF DIGITAL BROADCASTING SERVICES IN THAILAND

3 MAY 2017, BANGKOK, THAILAND

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Digital Broadcasting Bureau, Office of NBTC, THAILAND
Content

- Thailand Broadcasting Landscape
- Broadcasting Master Plan and Licensing Framework
- DTT Frequency Planning and Network Rollout Plan
- Spectrum Auction for Digital TV
- DTTB Service Channeling
- ASO Plan and Status
- DTV Receiver and Subsidy Program
- DSO Communication
- DTT Lesson Learn and Challenges
- Contribution documents to ITU-D SG1 Question8/1
- NBTC/ITU collaboration on Digital Broadcasting Projects
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 service 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
Thailand Broadcasting Landscape: Broadcasting Market Industry

History of TV Broadcasting in Thailand: 60 years

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

Share viewer (YE2016): Terrestrial 84%, Cable & Satellite 16%
More than 90% Ads. Spending on terrestrial TV

TV Set Penetration (%)
Thailand Broadcasting Landscape:
Share Viewer and Advertising Spending on Terrestrial

% Terrestrial TV Advertising Spending

Source: Nielsen
Remark: 28 Cable/Sat Channels Only
Last Update: January 09, 2017

% Share Viewer on Terrestrial: 2016

Source: Nielson
Last Update: April 10, 2017

Ads. Spending: Q1-2017

Analog Channels

Digital Channels

Source: Nielson
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, having Digital TV network cover nationwide within 1 year, an providing Digital Radio broadcasting services with in 3 years
# DSO Roadmap (Broadcasting Master Plan #1: 2012-2016)

<table>
<thead>
<tr>
<th>Year 1 (2012)</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5 (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DSO-TV Plan</strong></td>
<td></td>
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<tr>
<td>Digital TV Licensing</td>
<td></td>
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<tr>
<td>Starting Digital TV broadcasting</td>
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<td></td>
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<tr>
<td>Infra-sharing methodology + Database</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<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</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>80%+ of households can reach Digital TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Year 1 (2012)**: Planning and Implementing Digital Communication
- **Year 2**: Starting Digital TV broadcasting
- **Year 3**: Infra-sharing methodology + Database
- **Year 4**: R&D measures for Digital TV receiver
- **Year 5 (2016)**: 80%+ of households can reach Digital TV

### Notes
- Digital TV Licensing
- Starting Digital TV broadcasting
- Infra-sharing methodology + Database
- R&D measures for Digital TV receiver
- Planning and Implementing DTV receiver subsidy
- Planning and Implementing Digital Communication
- 80%+ of households can reach Digital TV
Broadcasting Licensing Scheme

Must Carry rule is applied for DTV Business and Public Services—National level
Must Have Rule: 7 programs/event
**DTTB Frequency Planning**

- **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
- **5 MUXs** (5 frequency channels) per Service Area
- **6th MUX** is reserved for community services
- **Infrastructure sharing between all MUXs**

**Frequency Planning Basic Approach:**
- 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

**Policy on DTV technology**
- DVB-T2 was selected for DTV transmission standard
- Resolution is HD and SD are applied.

**DTTB Frequency Planning**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FFT size</td>
<td>16K extended</td>
</tr>
<tr>
<td>Guard Internal</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>
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
- 39 main sites and 99 additional sites implemented cover *91.7% HHs* coverage (as of Apr 2017)

<table>
<thead>
<tr>
<th>Public Relation Department (PRD)</th>
<th>1 network license</th>
</tr>
</thead>
<tbody>
<tr>
<td>Royal Thai Army</td>
<td>2 network licenses</td>
</tr>
<tr>
<td>MCOT</td>
<td>1 network license</td>
</tr>
<tr>
<td>Thai PBS</td>
<td>1 network license</td>
</tr>
</tbody>
</table>

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

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

**DTTB Network Quality**

Service Availability: 99.98%

Network Coverage Check: Regular audit
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

<table>
<thead>
<tr>
<th>Category</th>
<th>Licenses</th>
<th>Reserve Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kids &amp; Family</td>
<td>3</td>
<td>140 MB</td>
</tr>
<tr>
<td>News and Documentary</td>
<td>7</td>
<td>220 MB</td>
</tr>
<tr>
<td>SD-General</td>
<td>7</td>
<td>380 MB</td>
</tr>
<tr>
<td>HD-General</td>
<td>7</td>
<td>1510 MB</td>
</tr>
</tbody>
</table>

- **Total Bidding Price**: 1,974 MB
- **Total Bidding Price**: 9,238 MB
- **Total Bidding Price**: 15,950 MB
- **Total Bidding Price**: 23,700 MB

**Total 24 Business Service licenses**

(Reserve Price $ 474 million)

**Auction Results 50,862 MB**

($ 1,589 million)

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

Kids/Youth & Family Channels 13-15

General Channels (SD) 23-29

General Channels (HD) 30-36

Public Channels 1-12

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

News / Info Channels 16-22
Public Service Licensing Process

1. CH 5
2. NBT
3. TPBS

Type 1

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

Type 2

8. State Security
9. Public Safety

Type 3

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:** 4 ATV channels (Ch5, 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, **34 ATV sites** were switch off as of Mar 2017.
- **The MUX6th** is reserved for Community TV, available after TPBS 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 Mar 2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ch5</td>
<td>2015</td>
<td>41</td>
<td>5</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>Dec 2015-2018</td>
<td>52</td>
<td>28</td>
</tr>
<tr>
<td>Ch3</td>
<td>Concession 2020</td>
<td>33</td>
<td>-</td>
</tr>
<tr>
<td>Ch7</td>
<td>Concession 2023</td>
<td>37</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>2017</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>2017</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>2017</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Vanuatu</td>
<td>2016</td>
<td>DVB-T2</td>
<td>2017</td>
<td>Ongoing</td>
</tr>
</tbody>
</table>
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
# DTV Receiver: Type Approval Sticker

## Digital TT Receiver Type Approval

<table>
<thead>
<tr>
<th>Year</th>
<th>STB (DVB-T2)</th>
<th>iDTVD</th>
<th>Portable</th>
<th>Total (Models)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>147</td>
<td>238</td>
<td>45</td>
<td>430</td>
</tr>
<tr>
<td>2015</td>
<td>10</td>
<td>159</td>
<td>20</td>
<td>189</td>
</tr>
<tr>
<td>Jan-Jun2016</td>
<td>2</td>
<td>277</td>
<td>12</td>
<td>291</td>
</tr>
</tbody>
</table>

## Total DTT Receiver sticker

<table>
<thead>
<tr>
<th>Year</th>
<th>STB (DVB-T2)</th>
<th>iDTVD</th>
<th>Portable</th>
<th>Total (units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>13,221,429</td>
<td>1,632,592</td>
<td>2,577,189</td>
<td>17,431,210</td>
</tr>
<tr>
<td>2015</td>
<td>2,316,960</td>
<td>2,758,263</td>
<td>165,045</td>
<td>5,240,268</td>
</tr>
<tr>
<td>Jan-Jun2016</td>
<td>21,601</td>
<td>1,977,520</td>
<td>24,200</td>
<td>2,023,321</td>
</tr>
</tbody>
</table>

*EXCHANGE RATE 35 THB PER US $*
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.
Coupon Status (as of 31 Jan 2016)
First lot, 13.57 million coupons were distributed to eligible HHs in 77 provinces with redemption rate 64% or 8.7 million coupons were activated.

- 2nd Lot, NCPO/Prime Minister approved a proposal from the Office of NBTC to subsidize DTV receiver by coupons 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 household with a house but doesn’t has a householder
  - Any household with temporary house registration document

- Distribute to 3.8 million HHs in Q1/2017, Redeem until Sep 2017
DSO Communication

DTTB Communication strategy

- Communicate on various channels; TV, Radio, SMS, Newspaper, On-Line and Social Media ([https://www.facebook.com/digitaltv.nbtc](https://www.facebook.com/digitaltv.nbtc)), DTV Web site ([http://digital.nbtc.go.th](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, support disabilities people
DSO Communication

DTV Mascot “Nong Doo Dee”

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

Mass Communication on TV/Radio
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

Line
DSO Communication
Promoting and Educating Digital TV

Print medias

Project DTV4all, all4DTV

Handbook: DTV Installation

Project DTV4all, all4DTV: Social Media Communication (Viral) with supporting from Super star, Singers, famous people
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 center

Governor Monthly update
Customer Support

Call Center 7 days, 24 hrs

Mobile App. Call Center

DTV Guide

Various Call Center Channels
• Phone to Hot line 1200
• Walk-in
• Social Media
• Web 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.
Lesson Learned

**DTTB Network Rollout**
- Sharing infrastructure and facilities
- Ensuring that network rollout, network coverage and 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

**Digital Communication**
- Mass communication to public, simply key message
- Getting engagement from government agencies in state and local level, public and relevant organization.
- On-Line Communication such as facebook, youtube, twitter, line applications

**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.
Lesson Learned

**Must Carry**
- 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.

**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.

**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.

**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.

**Supporting Fund**
- During transition, DSO programme project should get enough supporting fund for successful promoting and supporting. In Thailand, Broadcasting and Telecommunications Research and Development Fund for the Public Interest (BTFP) was established by funding from annual fee with certain revenue shared by each business broadcasters.
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 SG1/Q1/RGQ/227/Rev.1-E

Digital Terrestrial Television in Thailand: Frequency planning and technical aspects
Document SG1/Q1/RGQ/228-E
NBTC/ITU Digital Broadcasting Project: Community TV

- **NBTC Organization Act:**
  - 20% of spectrum reserved for non-commercial public/citizen usage.
  - Spectrum reserved for non-commercial public/citizen usage will be implemented after the Digital Switch Over.

- **NBTC/ITU collaboration on project:** Development of a Framework for Introducing Community TV Broadcasting Services in Thailand
  - **Country Case Studies** covering Policy and regulation, Technology, Content, Measures for promoting services, Issues/challenges/opportunities and lessons learned
  - **Develop Framework** for introducing Community TV Broadcasting Services in Thailand, Policy and regulation, Technology, Licensing framework, Measures for promoting the service
  - **Guidelines/recommendations** for setting up a trial of Community TV Broadcasting Services in Thailand
  - Capacity Building: Workshop/Conference, focus group treatment
NBTC/ITU Digital Broadcasting Project: Community TV
Development of a Framework for Introducing Community TV Broadcasting Services in Thailand

- Community TV Broadcasting Case Studies
- Framework for Deploying Community Television Broadcasting Services in Thailand
- Guidelines for Community TV Broadcasting Service Trial in Thailand

Community TV Capacity Building: Focus Group/ National Seminar

Project: Community TV Prototype (2017-2018)

https://broadcast.nbtc.go.th/data/academic/file/600300000003.pdf
http://itu.int/go/ctv2016
NBTC/ITU Digital Broadcasting Project: Digital Radio

NBTC/ITU joint Project on Roadmap Development for Digital Terrestrial Radio Roll-out in Thailand

- Digital Radio Roadmap in Thailand
- Digital Radio Services Requirement
- DAB+ Network Architecture and Cost Model
- International Benchmarks for DAB+ Digital Radio Deployment (UK, Norway, Switzerland, Australia)
- Deployment Strategies for Digital Radio Services in Thailand
- Practical Guideline for Digital Radio Trial in Thailand
- Practical Guideline for Digital Radio Auction in Thailand


https://broadcast.nbtc.go.th/data/academic/file/58010000002.pdf
Radio Broadcasting Landscapes in Thailand: Incumbent Radio Broadcasters

- **Main Broadcasters**: 506*
  - AM 193
  - FM 313
- **Trial Broadcasters**: 4378*
  - Business 3390
  - Public 764
  - Community 224

Current Thai National Frequency Plan:
- LF Band (AM Long Wave) – 30 to 300 kHz;
- MF Band (AM Medium Wave) – 300 to 3000 kHz;
- HF Band (AM Short Wave) – 3 to 30 MHz;
- VHF Band I (Television Band I) - 47 to 68 MHz;
- VHF Band II (FM Radio Band) – 87 to 108 MHz;
- VHF Band III (Television Band III) – 174 to 230 MHz; (currently used for ATV)
- UHF Band IV and V (Television Band IV and V) – 470 to 854 MHz
- UHF L-Band – 1452 to 1492 MHz.

Aeronautical Interference in 2016: 1,541 times

*Extended right to use radio frequency for 5 years (Apr2022)

*Currently on-Air: as of 25Apr2017
Digital Radio Technologies System Choices

<table>
<thead>
<tr>
<th>Technology/System</th>
<th>Radio</th>
<th>VDO/Image</th>
<th>Radio On Mobile Devices</th>
<th>On Mobile phones/Devices</th>
<th>Frequency Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMB (DAB, DAB+)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>VHF III</td>
</tr>
<tr>
<td>DRM (DRM30, DRM+)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>LF, MF, Shortwave, FM, VHF</td>
</tr>
<tr>
<td>T-DMB</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>VHF III</td>
</tr>
<tr>
<td>ISDB-T S3</td>
<td>Yes</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>TV bands</td>
</tr>
<tr>
<td>ISDB-T MM</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>VHF III, etc.</td>
</tr>
<tr>
<td>HD-Radio (IBOC)</td>
<td>Yes</td>
<td>-</td>
<td>Yes</td>
<td>-</td>
<td>MF, FM</td>
</tr>
</tbody>
</table>

Source: ITU Project

4 transmission standards for VHF Band III (DAB+, DRM, ISDB-T, T-DMB):

- ISDB-T & T-DMB radio services are part of TV multiplex
- Thailand has opted for DVB-T2 → ISDB-T/T-DMB no option → only DAB+ and DRM are options → only for DAB+ receivers are widely available

DAB+ (ITU-R BS.1114-8) System A
VHF Band III: 174-230 MHz
### DAB+ Digital Radio Trial plan

<table>
<thead>
<tr>
<th>Item</th>
<th>5-11</th>
<th>5-11</th>
<th>5-11</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATV channels</td>
<td>5-11</td>
<td>5-11</td>
<td>5-11</td>
</tr>
<tr>
<td># Sites</td>
<td>8</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>MUX</td>
<td>1-3</td>
<td>1-3</td>
<td>1-3</td>
</tr>
<tr>
<td>SFN</td>
<td>SFN applied</td>
<td>SFN applied</td>
<td>NA</td>
</tr>
<tr>
<td>ATV protection</td>
<td>√</td>
<td>×</td>
<td>√</td>
</tr>
<tr>
<td>ATV coverage</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Pop coverage (3 MUX)</td>
<td>9,123,000 ((14%)</td>
<td>17,422,000 ((27%)</td>
<td>8,431,000 ((13%)</td>
</tr>
<tr>
<td>Pop coverage (2 MUX)</td>
<td>10,712,000 ((16%)</td>
<td>17,965,000 ((28%)</td>
<td>9,873,000 ((15%)</td>
</tr>
<tr>
<td>Pop coverage (1 MUX)</td>
<td>11,894,000 ((18%)</td>
<td>18,560,000 ((29%)</td>
<td>10,624,000 ((16%)</td>
</tr>
<tr>
<td>Total ERP / #TX (3 MUX)</td>
<td>88 kW / 23</td>
<td>240 kW / 24</td>
<td>61 kW / 15</td>
</tr>
<tr>
<td>Range ERP</td>
<td>0.1 - 10 kW</td>
<td>10 kW</td>
<td>0.1 - 10 kW</td>
</tr>
</tbody>
</table>

### Infrastructure sharing
- Multiplexers, Distribution, Towers, Antennas

### Project
- NBTC/ITU Roadmap for the Introduction of Digital Terrestrial Radio Service in Thailand
Digital Radio Broadcasting plan in Thailand: Coverage Target and Network Investment Cost

-> Set initial deployment target low (80%)

<table>
<thead>
<tr>
<th>Ref.</th>
<th># sites</th>
<th>% greenfield sites</th>
<th>Pop %</th>
<th># MUX</th>
<th># Services (64kbps)</th>
<th>Total CAPEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>200</td>
<td>15%</td>
<td>95%</td>
<td>2+0</td>
<td>36+0</td>
<td>$84,702,880</td>
</tr>
<tr>
<td>N2</td>
<td>90</td>
<td>0%</td>
<td>80%</td>
<td>2+0</td>
<td>36+0</td>
<td>$37,973,880</td>
</tr>
<tr>
<td>NL1</td>
<td>200</td>
<td>15%</td>
<td>95%</td>
<td>2+1</td>
<td>36+702</td>
<td>$146,869,070</td>
</tr>
<tr>
<td>NL2</td>
<td>90</td>
<td>0%</td>
<td>80%</td>
<td>2+1</td>
<td>36+702</td>
<td>$74,290,070</td>
</tr>
</tbody>
</table>

#Project NBTC/ITU Roadmap for the Introduction of Digital Terrestrial Radio Service in Thailand
User Survey on Digital Radio Receiver: Willing to Pay

39% of radio listener willing to pay digital radio receiver

Result showing that the most interesting advantage of digital radio services is emergency warning. (Refer to NBTC survey result in Q4/2016 in 6,400 HHs)

<table>
<thead>
<tr>
<th>Digital Radio Receiver</th>
<th>Market Price unit(Baht)</th>
<th>Willing to Pay (Baht)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Radio Receiver (portable, basic feature)</td>
<td>800 - 2,500</td>
<td>1,119</td>
</tr>
<tr>
<td>Digital Radio Receiver in car (Adapter)</td>
<td>2,000 - 4,000</td>
<td>2,692</td>
</tr>
<tr>
<td>Digital Radio Receiver in car (Basic feature –text scrolling )</td>
<td>4,000</td>
<td>4,552</td>
</tr>
<tr>
<td>Digital Radio Receiver in car (Color Screen, multimedia)</td>
<td>10,000</td>
<td>11,885</td>
</tr>
<tr>
<td>Digital Radio Receiver (portable-small display)</td>
<td>2,000 - 4,000</td>
<td>2,580</td>
</tr>
<tr>
<td>Digital Radio Receiver (portable-color screen Multimedia)</td>
<td>5,000 up</td>
<td>5,577</td>
</tr>
</tbody>
</table>
Way forward:
Digital Radio Broadcasting Trial plan in Thailand

- Draft Frequency Plan for Digital Radio Broadcasting Trial
  - Frequency Range: 174-230 MHz
  - Channel: Ch5-Ch12 (4 blocks per channel with bandwidth 1.536 MHz reference to ITU-R BS.1660-7
  - Concern to Analog TV compatibility (ATV protected), cross border frequency coordination, and other conditions defined by NBTC
  - Draft of Frequency plan for Digital Radio Broadcasting Trial is now process of getting approval from NBTC panel meeting, and public consultation.

Y2017

- Project: DAB+ trial in Thailand
- Review draft of Radio Broadcasting Policy paper: Radio broadcasting development Plan for Thailand
  - Policy paper: Technology, frequency management, spectrum licensing, broadcasting service licensing, digital radio trial
  - Regulatory Impact Assessment (RIA)
  - Economic and Social Impact
  - Radio Broadcasting roadmap
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 for Thailand
    - Spectrum management aspects
    - Technical and operational aspects
    - Business and regulatory aspects
    - Regulatory impact assessment
    - Conclusions, recommendations and roadmap
- **Capacity Building:** Workshop/Conference, focus group
NBTC/ITU Digital Broadcasting Project: Mobile TV
Report: Mobile Television Services Feasibility Study for Thailand

### Current situation

**Band allocation**

<table>
<thead>
<tr>
<th>CH</th>
<th>National</th>
<th>Local</th>
<th>Aero</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Future scenarios

**Option 1**

- **NATIONAL**
- **LOCAL**
- **Aero**

**Option 2**

- **NATIONAL**
- **LOCAL**
- **MTV**

**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 LOCAL** = Allocation for national and local DTTB services

### System Features

<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>
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

DSO Communication: 2014>>
Subsidy coupon #1 13.57 mHHs: Oct 2014

Start ASO Dec 2015>> 34 ATV sites switch off (as of Apr 2017)

Roadmap and Strategies Development for MTV 2015-2016

DTV Network: 95% HH coverage Subsidy Coupon#2 3.8 mHHs: Q1-2017

2017: Study OTT Regulation


Technical Standard for DTTB Receiver ver 2, 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

Community TV >>
Trial Community TV Prototype: 2017
Thank You

http://www.nbtc.go.th/
http://digital.nbtc.go.th/

orasri.sr@nbtc.go.th, orasri.sr@hotmail.com