Spectrum for Television Broadcasting
and IMT 700 MHz in Thailand

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Broadcasting Technology and Engineering Bureau
Office of the NBTC

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Topics

- Digital Terrestrial Television in Thailand: Overview
- Frequency Planning and Frequency Utilization for Analogue and Digital Terrestrial Television in Thailand
- Steps to Release 470 MHz for Digital TV and 700 MHz for IMT in Thailand
- Challenges
Digital Terrestrial Television in Thailand:
Overview
Current Digital TV Networks

4 Network Operators operating 5 Digital TV Networks

Public Relation Department (PRD)
1 network license (Multiplex#1)

Royal Thai Army Radio and Television
2 network licenses (Multiplex#2 and #5)

MCOT
1 network license (Multiplex#3)

Thai PBS
1 network license (Multiplex#4)

1 Network = 1 Multiplex = Using 1 Radio Frequency per area
Current Status of Multiplexes and TV Programs

Current: 26 TV Program being broadcasted in DTT Platform (by 5 MUXs) as of March 2016
- 22 Commercial Programs *
- 4 Public Programs

Target: 48 TV Program (6 MUXs)
- 24 Commercial Programs
- 12 Public Programs
- 12 Community Programs

* 2 Commercial Program Licenses were withdrawn.
Digital TV Coverage and Rollout Plan

Phase 1
(Apr’13 – Jun’14)

Phase 2
(Jun’14 – Jun’15)

Phase 3
(Jun’15 – Jun’16)

Phase 4
(Jun’16 – Jun’17)

11 main sites
1 additional sites

28 main sites
7 additional sites

0 main sites
37 additional sites

0 main sites
84 additional sites

50%
80%
90%
95%

168 sites

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Frequency Planning and Frequency Utilization for Analogue and Digital Terrestrial Television in Thailand
DTT Coverage in Thailand from 39 main sites and 129 additional sites

- Frequency Range: UHF 510 – 790 MHz
- Bandwidth: 8 MHz
- Frequency Channel: Channel 26 - 60
- Service Area: 39 service areas
- 5 MUXs (5 frequency channels) per Service Area
- MUX#6 will be available after Analog Switched-Off
- MUX#6 is reserved for community services
- Infrastructure sharing between all MUXs

Results from the frequency planning and coverage prediction tools
Frequency Planning Tools for Digital Terrestrial Television

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Analogue Television

Digital Television for 6 MUXs

In Thailand, the band 470 – 510 MHz (Channel 21 – 25) is used for telecom service. So, it is necessary to use the band 700 MHz for digital terrestrial television, especially during the transition period.
Steps to Release 470 MHz for Digital TV and 700 MHz for IMT in Thailand
Steps to Release 470 MHz for Digital TV
and 700 MHz for IMT in Thailand

1. After ASO: Existing ATV Broadcasters and Concession
2. Refarming 470-510 MHz -> Broadcasting service
3. Relocate the frequencies for wireless microphone
4. DTT Frequency Re-Planning and Frequency Re-Stacking
5. Implementation in actual network and re-scan the receiver

Current

Future

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Analogue Switch-Off (ASO) Plan

• There are 6 Analogue TV Broadcasters in Thailand.
• Thailand has started ASO in 2015. Two TPBS Analogue TV Stations had been switched off on December 1, 2015.
• The ASO completion of each Analogue TV Broadcasters is as shown below:

<table>
<thead>
<tr>
<th>Network</th>
<th>Date</th>
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<tbody>
<tr>
<td>NBT</td>
<td>31 Dec 2017</td>
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<tr>
<td>TPBS</td>
<td>16 Jun 2018</td>
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<tr>
<td>MCOT</td>
<td>16 Jul 2018</td>
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<tr>
<td>RTA TV5</td>
<td>16 Jun 2018</td>
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<tr>
<td>Channel 7</td>
<td>16 Jun 2018</td>
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<tr>
<td>Channel 3</td>
<td>25 Mar 2020 (end of concession)</td>
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### Steps to Release 470 MHz for Digital TV and 700 MHz for IMT in Thailand

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<tbody>
<tr>
<td>Digital Terrestrial Television Rollout (Target is 95% of households in 2017)</td>
<td>50%</td>
<td>80%</td>
<td>90%</td>
<td>95%</td>
<td></td>
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<tr>
<td>Analogue Switch-Off: ASO (There are 6 analogue tv broadcasters)</td>
<td>TPBS</td>
<td>TPBS</td>
<td>TPBS</td>
<td>TV5</td>
<td>CH7</td>
<td>NBT</td>
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<tr>
<td>Spectrum re-farming for the band 470-510 MHz and re-allocate to broadcasting service</td>
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<tr>
<td>RF Re-planning for Digital Terrestrial Television in the band 470-698 MHz</td>
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<td>Re-locate the frequencies for wireless microphone</td>
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<tr>
<td>- Re-tune the frequency at the transmitter site</td>
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<td>- Communicate to viewers to re-scan their set-top box or TV set</td>
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<tr>
<td>- Release 700 MHz for IMT</td>
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According to the concession, BEC (Channel 3) will switch off their analogue television in 2020. However, their ASO plan can be shifted earlier depending on the negotiation and the legal process.
Challenges
To keep the DTV coverage requirement of 95% households, the frequency planning for 6 MUXs is much more difficult with less frequency channels.

ASO cannot be completed before the end of concession, unless both sides reach agreement.

DTV receiving antennas (especially the old models in Thailand) were not designed for the frequency range 470-510 MHz.

To re-configure or replace the transmitting equipment of DTV:

- It will affect to the services. Thus, the broadcasters need to minimize the downtime or provide the redundant system.
- There is a cost for broadcasters to do so. The sufficient and reasonable compensation is required. (NBTC is conducting a study to evaluate the compensation for spectrum users in the re-farming process.)

To re-scan the STB and iDTV after frequency re-stacking, the DTV viewers might be confused. So, the communication plan has to be well-prepared and jointly implemented by relevant parties.
Challenges (2)

- Finding the suitable frequency ranges for wireless microphone is very challenging (technical constraints, existing spectrum usage, time to market, and economy of scale). The grace period is required for the wireless microphone makers/users.

- Potential interference:
  - IMT vs DTV: Guardband and technical specification (OOB) for IMT UE are needed.
  - IMT vs Wireless Microphone: NBTC needs to ensure that Wireless Microphone in the band 794 – 803 MHz is no longer exist.

- Several NBTC Notifications have to be developed and published to facilitate this entire process:
  - Frequency Relocation Process for 470 – 510 MHz
  - Frequency Plan for Digital TV in the band 470 – 694 MHz
  - Criteria for Digital TV Broadcasters to obtain the compensation in the frequency restacking process
  - Frequency Relocation Process for Wireless Microphone in the band 794 - 806 MHz
  - Frequency Plan for IMT 700 MHz
  - Technical Specification for IMT 700 MHz Base station and User Equipment
  - Spectrum Licensing Rules for IMT 700 MHz
  - ... and so on.
Thank you

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