DTTB Policy and Regulatory Framework
Kingdom of Tonga

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Outline

• Country Profile
• Broadcast Overview
• ITU-D Roadmap Mission 2011
  – Policy Outcomes
• ITU-D Roadmap Review 2015
  – Changes
  – Resultant Policy Changes
  – Recommendations
• Conclusions
Tonga Overview

- ~177 islands
- 52 inhabited
- Population 103,252
- Households 18,156

Source: Kingdom of Tonga, Tonga 2011 Census of Population and Housing
TV Broadcasting Overview

• 3 Existing Broadcasters
• 2 FTA 1 PayTV
Tonga Broadcasting Commission

- Government Owned
- Funded by commercial airtime
- 2 VHF TV analogue TV channels
- 40m towers
- 500W transmitters
- Standby Genset
Doulos Broadcasting Network

- Christian Broadcasting Station
- Funded by donations
- 1 UHF analogue TV channel
- 60m guyed mast
- 1kW transmitter
- No standby facilities
DigiTV

- TV service of DigiCel (Tonga) Ltd
- Commercial Pay TV operation
- 1 UHF channel DVB-T2 modulation with 28 channels – 3 services unencrypted
- 45m tower, standby facilities
- DigiCel Group implementing satellite Pay TV service in Pacific
DTT Roadmap

- ITU Mission to Tonga
- National Roadmap
  Team developed
- Report November 2011
**Roadmap Policy Outcomes (1)**

2.1 – TECHNOLOGY STANDARDS REGULATION
- Both SDTV & HDTV capabilities are required by the regulator
- DVB-T is the transmission standard for Tonga DTTB
- H.264 (MPEG 4 Part 10) is the compression standard for Tonga DTTB
- FTA Services are to be unencrypted - conditional access use for other content is left to market forces
- API use is left to market forces

2.2 – LICENSING FRAMEWORK
- Broadcaster/content aggregator licence
- Multiplex (both FTA and PayTV) licence
- Distribution network (satellite, terrestrial, fibre, etc) licence
- Any one company could hold all three licenses

2.5 – ASSIGNMENT PROCEDURES
- Existing analogue FTA broadcasters have priority for issuing DTTB licenses
2.6 – LICENSE TERMS & CONDITIONS
   – The number of potential DTTB multiplexes will be limited by regulation
   – A single licensee could hold licenses for both PayTV and FTA DTTB

2.7 – LOCAL PERMITS (BUILDING & PLANNING)
   – Where Government regulation obliges one or more DTTB participants to share multiplex and/or distribution network assets, relevant Government licenses will include rules to ensure fairness for all participants

2.8 – MEDIA PERMITS & AUTHORISATIONS
   – FTA DTTB licenses will include obligations to observe cultural and other Tongan community values

2.12 – LAW ENFORCEMENT & EXECUTION
   – A single Government agency is intended for the co-ordination, monitoring and enforcement of the National Spectrum Plan, and the various DTTB and related licenses and permits that will be created, however these responsibilities are distributed across a number of departments currently
Roadmap Policy Outcomes (3)

2.14 – TRANSITION MODELS
- DTTB for Tongatapu and Vava’u will be phased in construction and ASO will be phased.
- National digital television coverage is a goal but for beyond ASO.
- ASO proposed as 15th June 2014 (currently 15 June 2015).
- ASO duration is one year.

2.15 – ORGANISATIONAL STRUCTURE & ENTITIES
- The NRT will continue to function throughout the ASO process.
- The Ministry of Information and Communications will chair NRT meetings.
3.2 – CUSTOMER PROPOSITION

– The DTTB Universal Service will be defined by Government
– The Universal Service will be ‘branded’ (similar to Freeview NZ)
– The Universal Service will at least utilise the embedded EPG of standard set-top-boxes
– The Universal Service will NOT include a return path due to cost
– The Universal Service may create direct connectivity with one or more payTV platforms due to market forces (ie sharing set-top-boxes etc)
– The Universal Service will provide more channels or services than the status quo analogue television market
– One or more broadcasters might introduce HDTV services
– Portable and mobile reception capabilities are a part of the planned DTTB communications strategy
Initial Cost Estimates

• Transmission
  – One Headend
  – Estimate based on scaling a European example
  – Capex EUR 2.1m (USD 2.4m) Opex EUR 300k p.a. (USD 345k)

• Reception
  – Set-top boxes estimated at USD 45 – 50 each ex factory
  – Country Purchase estimated USD 585k

• Total cost ~USD 3m
Progress...

• Unfortunately not much. Overcoming the funding hurdle has proven insurmountable for a formal transition to DTTB.

• But, technology has evolved, pricing has come down and DigiTV (for commercial reasons) have converted to DVB-T2.

• In addition, TBC did receive a grant to upgrade their analogue transmitters and now have two independent transmission paths for TV Tonga 1 and TV Tonga 2.
Roadmap Update

• Early 2015, ITU-D undertook a further mission to Tonga to update the Roadmap.
• Primary aim was to examine ways to restart the transition; i.e. overcome the funding hurdle.
• Fortunately other changes in the previous 3 years have been favourable.
• Experience from other digital transitions was also to be considered to evaluate reception capability and costs.
DVB-T vs DVB-T2

~10.5Mbps additional usable capacity

~6dB saving
VHF vs UHF

• Commonly Used Broadcast Bands
  – VHF (Band III) 174 – 230 MHz in a 7 MHz channel plan,
  – UHF (Band IV/V) 470 - 960 MHz in either a 7 MHz or 8 MHz channel plan, noting WRC-12 many Administrations re-allocated above 694/698 MHz to other services

• Better propagation at VHF, particularly when vegetative clutter considered

• Lower transmitter power (offset by antenna gain)

• Annual power savings 36.7 MWh *

• Operationally, pays back simulcast costs in about 1 year

* Savings calculated on transmission of existing analogue TV services for Tongatapu and Vava’u
## Neighbouring Country Digital Transmission Systems

<table>
<thead>
<tr>
<th>Country</th>
<th>Australia</th>
<th>New Zealand</th>
<th>Singapore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Commenced</td>
<td>2001</td>
<td>2007</td>
<td>2013</td>
</tr>
<tr>
<td>Digital Broadcast Bands</td>
<td>VHF &amp; UHF</td>
<td>UHF</td>
<td>VHF &amp; UHF</td>
</tr>
<tr>
<td>Channel Bandwidth</td>
<td>7 MHz</td>
<td>8 MHz</td>
<td>7 MHz (VHF) &amp; 8 MHz (UHF)</td>
</tr>
<tr>
<td>Modulation System</td>
<td>DVB-T</td>
<td>DVB-T &amp; DVB-T2</td>
<td>DVB-T2</td>
</tr>
<tr>
<td>Video / Audio Coding</td>
<td>MPEG-2 / MPEG-1 Layer II</td>
<td>H.264 / AAC</td>
<td>Video : MPEG-2 &amp; H.264 Audio : MPEG-1 Layer II &amp; HE AAC</td>
</tr>
</tbody>
</table>

**Roadmap**

- **Roadmap 2011**
- **Roadmap Update 2015**
Antenna Installation Status

- **VHF/UHF Dipole**
- **VHF only**
- **UHF Only**

[Images of different types of antennas installed in residential areas]
Current Broadcast Infrastructure
Example Digital Transition (Simulcast)

- **Tonga TV1**: ATV Tx
- **Tonga TV2**: ATV Tx
- **VHF**
- **UHF**
- **SI & EPG Manager**
- **SI & EPG Data Link**
- **DBN**
- **ENCODE**
- **DECODE**

**DTV Tx**

**Digi Ent Service 28**

**SI & EPG Manager**

**UHF**

**Encode**

**付费电视**

**Pay TV Subs**

**Example Digital Transition (Simulcast)**

**EPG**: TV Tonga 1, TV Tonga 2, DBN, Digi Ent., EWTN, Hope, Pay4...

**Pay TV Subs**: STB/CA

**FTA Viewers**: STB
Example Digital Transition (ASO)
Licencing Options

- Spectrum Licence
- DTV Tx
- VHF
- Tonga TV1
- DBN
- Multiplex Operator Licence
- SI & EPG Manager
- Content Licences
- Pay TV Operator Licence
- DTV Tx
- UHF
- Digi Ent
- Service 28
- SI & EPG Manager
- SI & EPG Data Link
- SI & EPG Manager
Is Digital Affordable?

• Estimated selling price of a STB to a household is approx. USD 60.
• But Tongan households are diverse – income sources range from subsistence work, to family remittances from overseas, to wages and salaries. *Impact assessment of USD ~60 STB is key success factor for the transition to digital.*
  — Government assistance programmes may be needed
• Due to lowering technology costs, costing estimated to be USD 640k for broadcaster transmission facilities and receivers
Recommendations

• 1: To change ASO to a new date of no later than December, 2016.
• 2: That a digital transmission standard be DVB-T2 rather than DVB-T. Transmission on VHF should be preferred rather than UHF. Initial tx parameters should be set to 16 QAM modulation, Code Rate 2/3, 32K mode, guard interval 1/128 and pilot pattern PP7 to provide a bitrate of 20.107323 Mbit/s in 8MHz channel or 17.558161 Mbit/s in a 7MHz channel.
• 3: That the NRT consider 3 proposals and agree on a single solution.
• 4: That the Kingdom of Tonga Government provides seed funding for the transition on a temporary basis to minimise the costs to the nation.
• 5: The government assesses Tongan’s household’s ability to pay for set top boxes for the transition and develop time payment plans or a subsidy scheme for households with low income.
• 6: That regulatory arrangements are reviewed and licences developed for content providers and multiplex operators.
• 7: That a project manager be appointed to drive the transition process.
Conclusions

• The cost hurdle has proven too great in the past for the Kingdom of Tonga to convert to digital television

• But, Tonga may now benefit from technology change and lowering technology costs to convert and gain the benefits of digital television
  – Better quality transmission
  – More services
  – A platform to build mobile / portable services
  – Enhanced delivery of government projects and information

• Tonga has the capacity to convert, including householders, if all sectors work together for a common goal.
Thank You for your attention

Questions?