DTTB Policy and Regulatory Framework
Kingdom of Tonga

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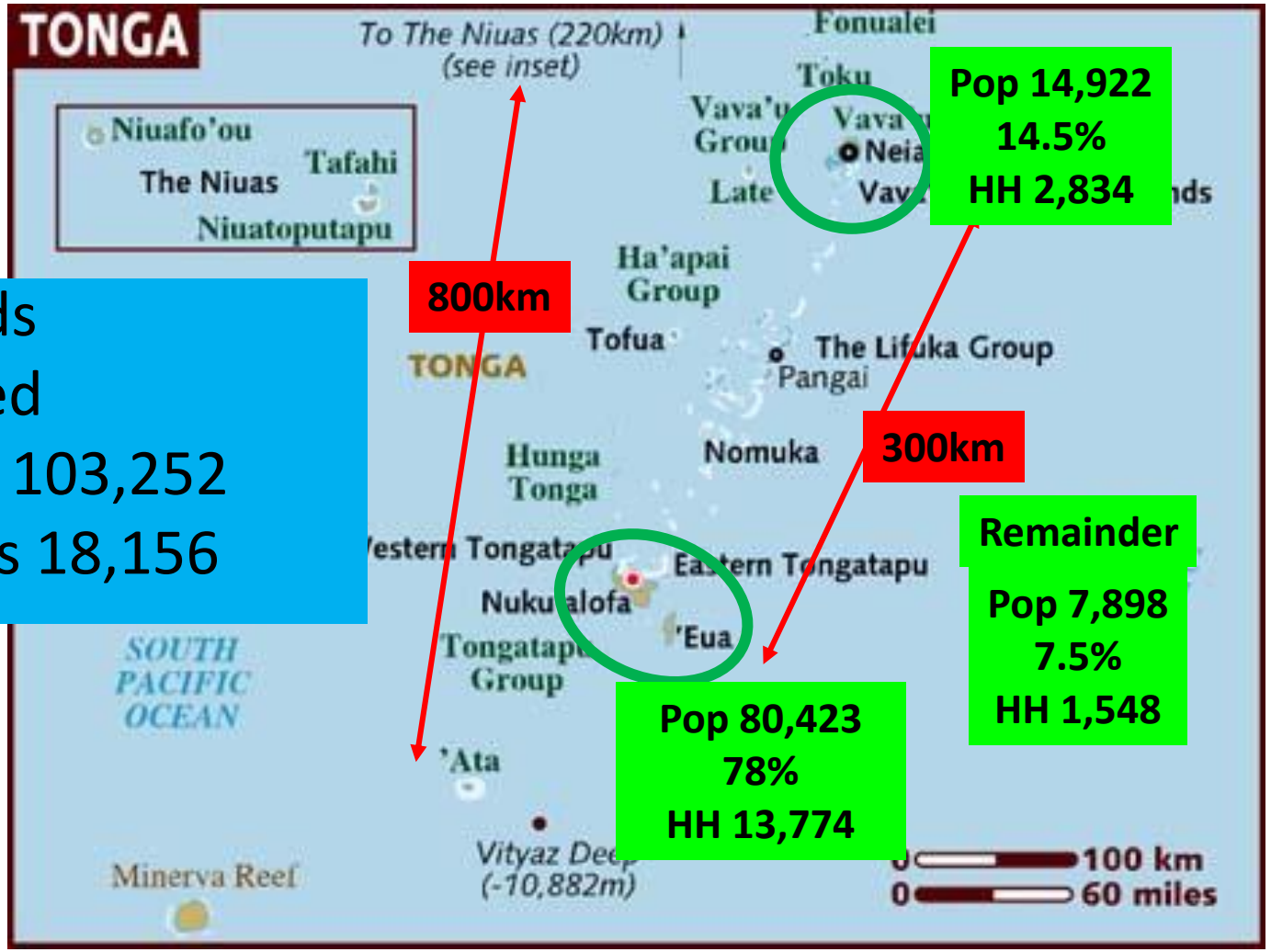
Outline

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

Tonga Overview

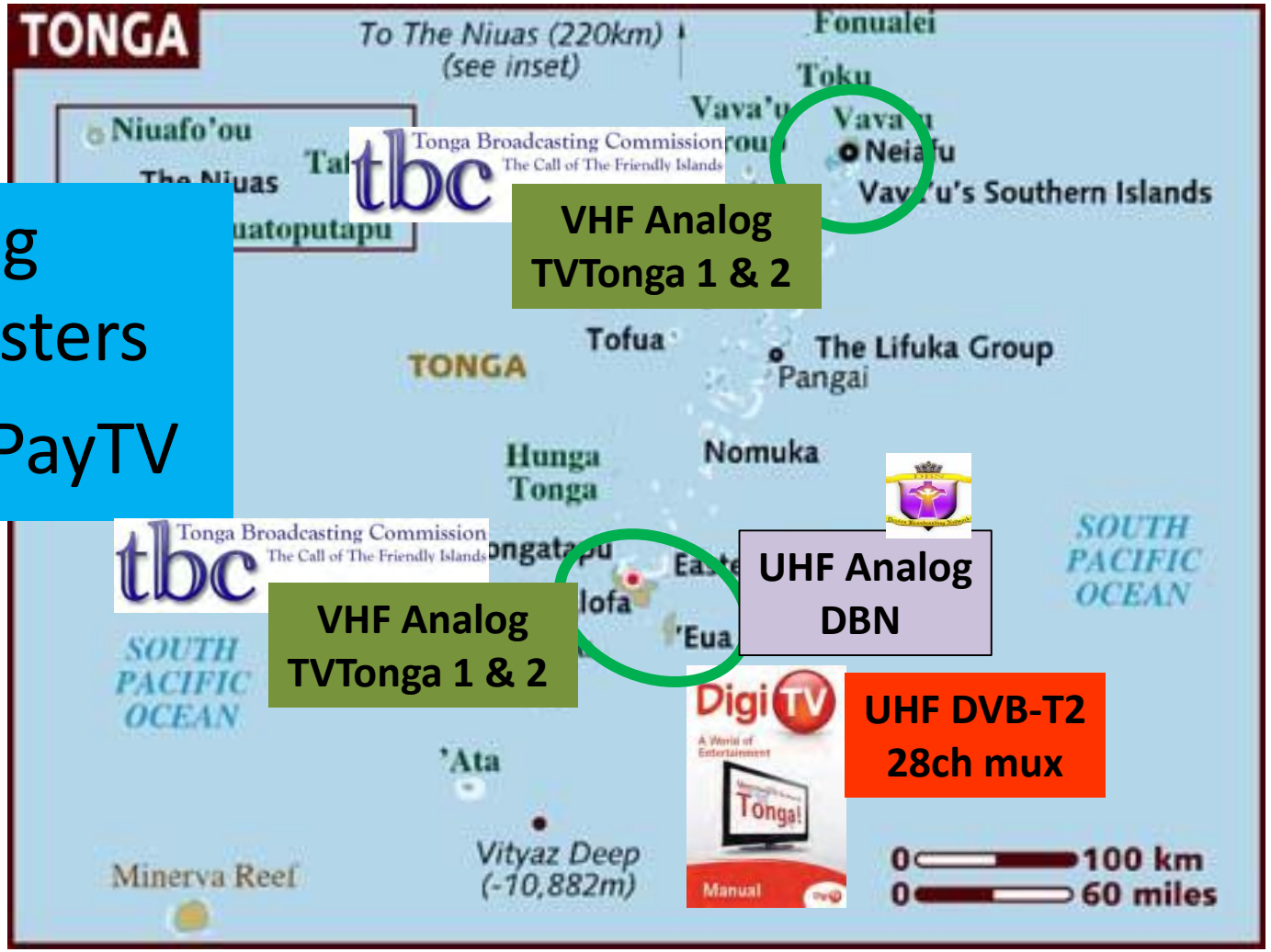
- ~177 islands
- 52 inhabited
- Population 103,252
- Households 18,156



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

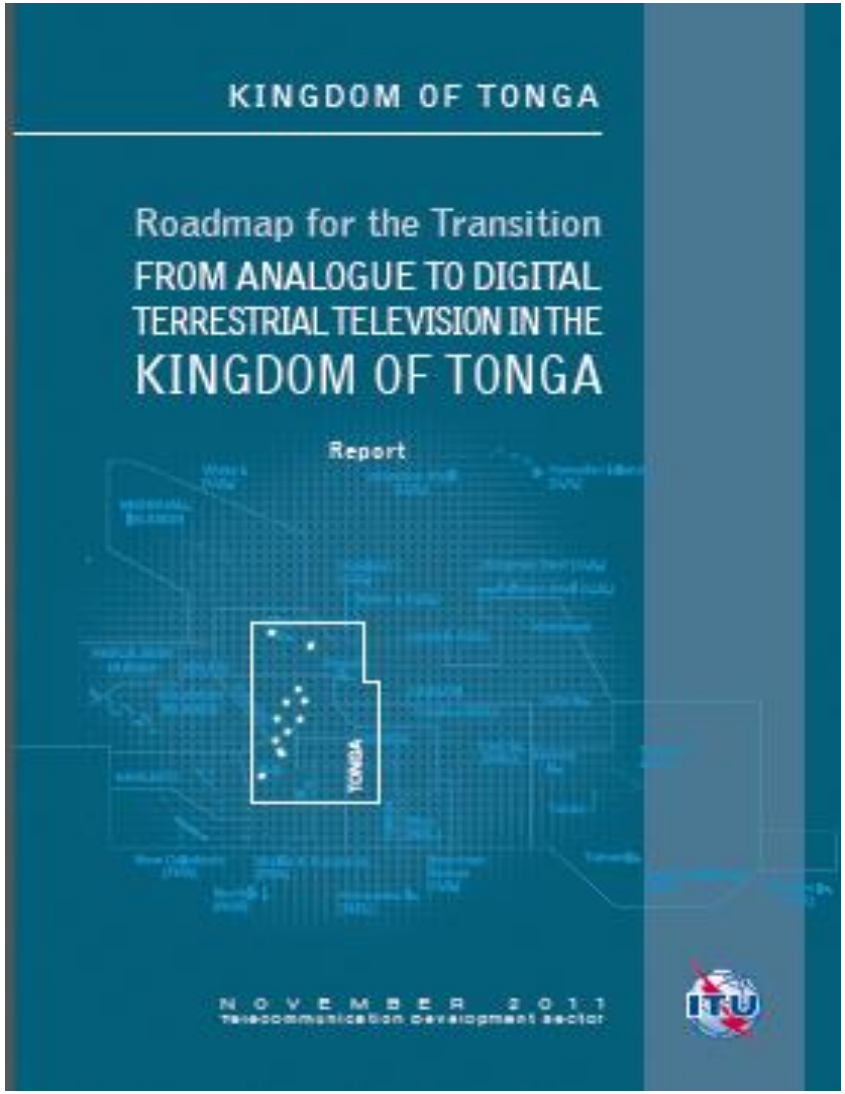
- Christian Broadcasting Station
- Funded by donations
- 1 UHF analogue TV channel
- 60m guyed mast
- 1kW transmitter
- No standby facilities

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

Roadmap Policy Outcomes (2)

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

Roadmap Policy Outcomes (4)

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

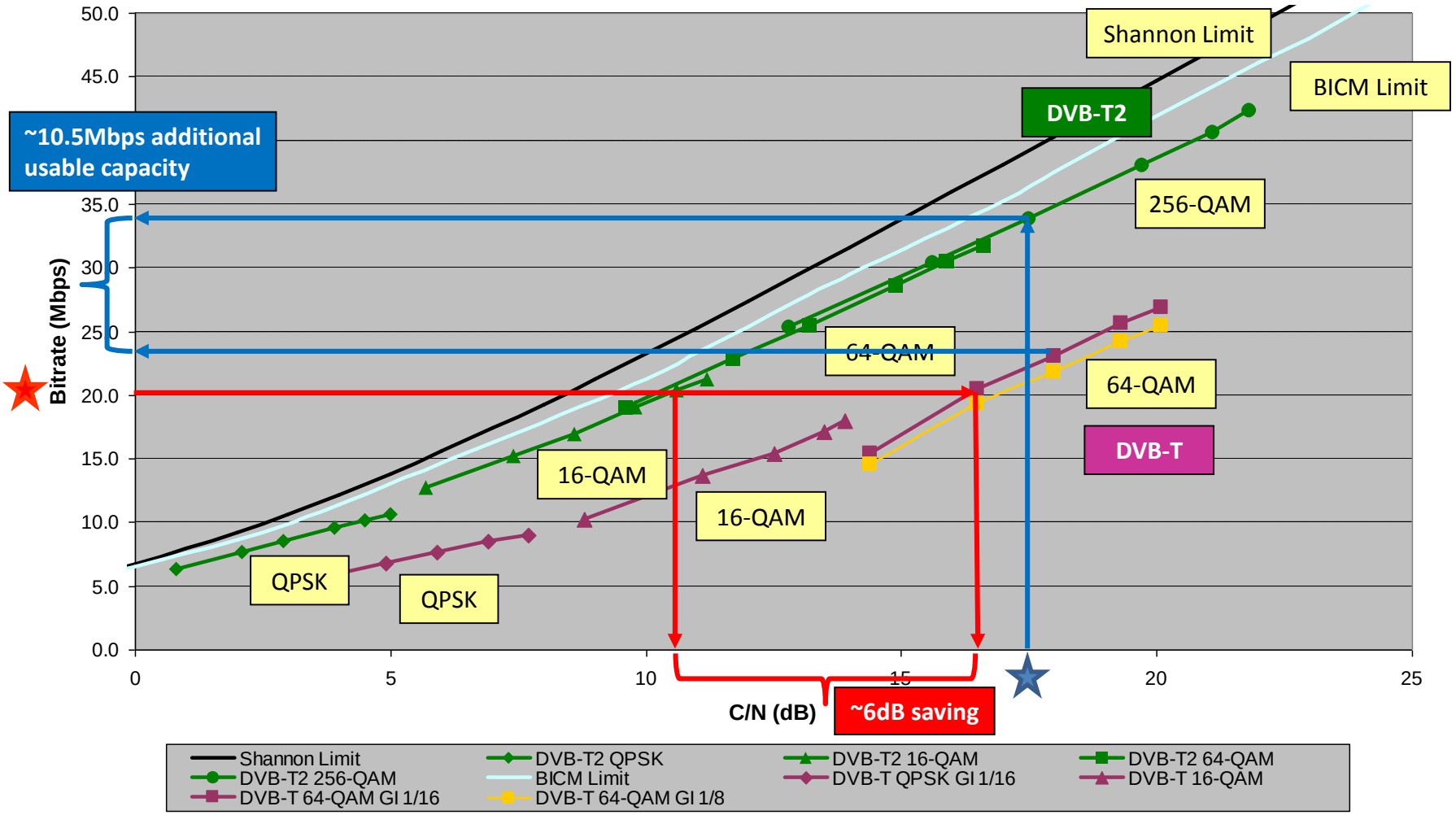
Progress…

- 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 considered to evaluate reception capability and costs

DVB-T vs DVB-T2



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

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

Roadmap 2011

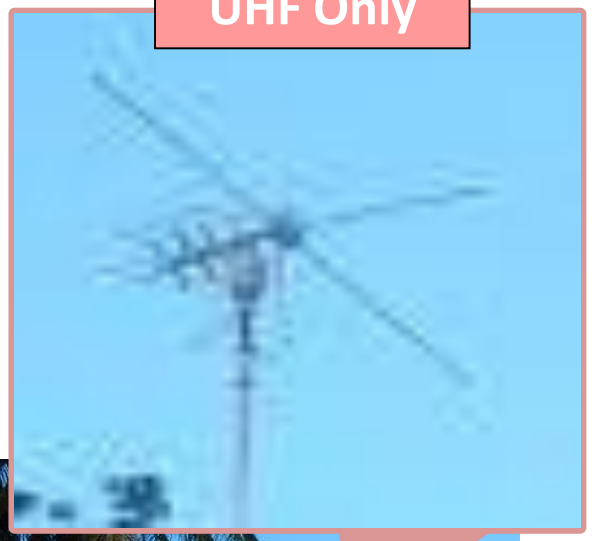
Roadmap Update 2015

Antenna Installation Status

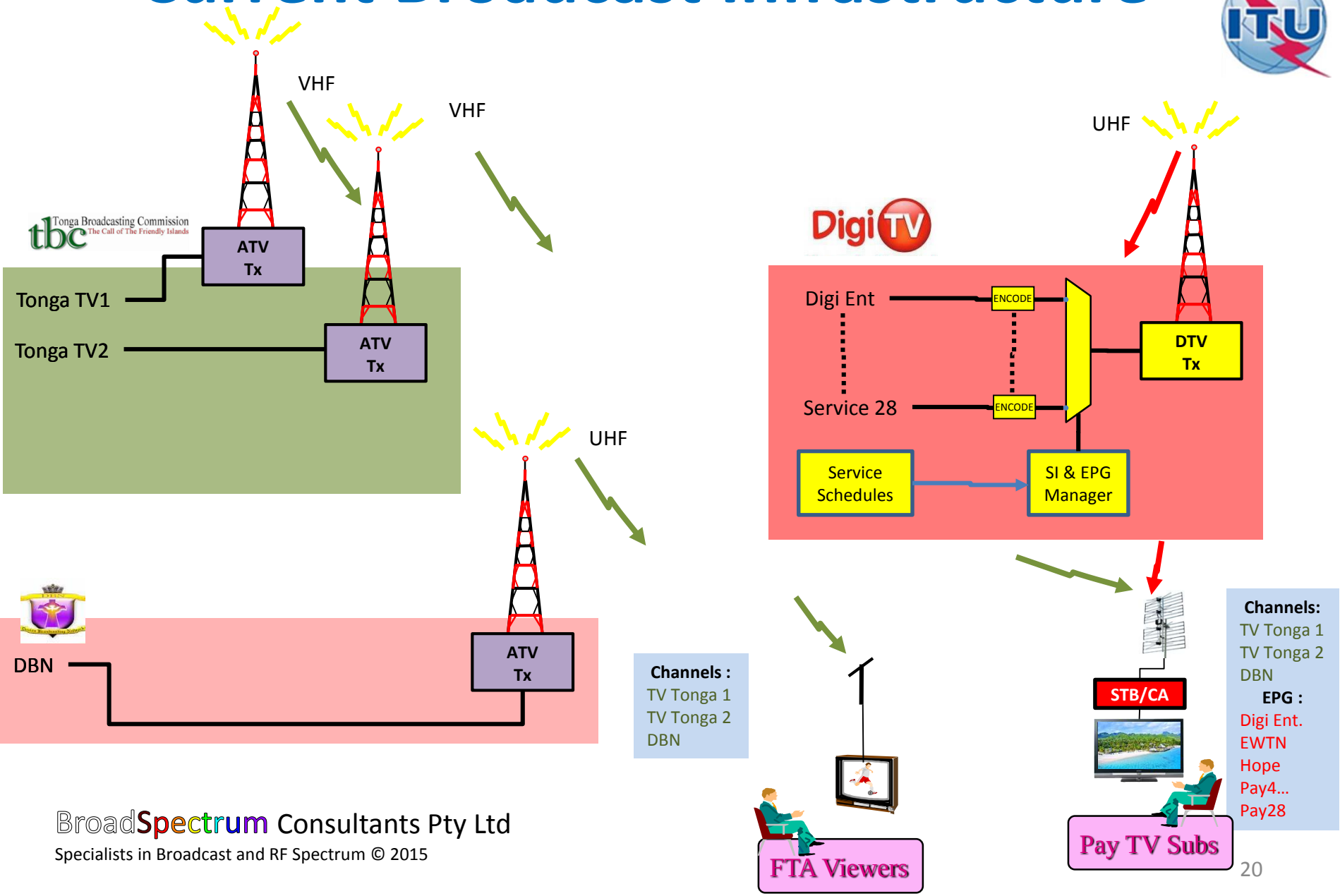
VHF/UHF Dipole

VHF only

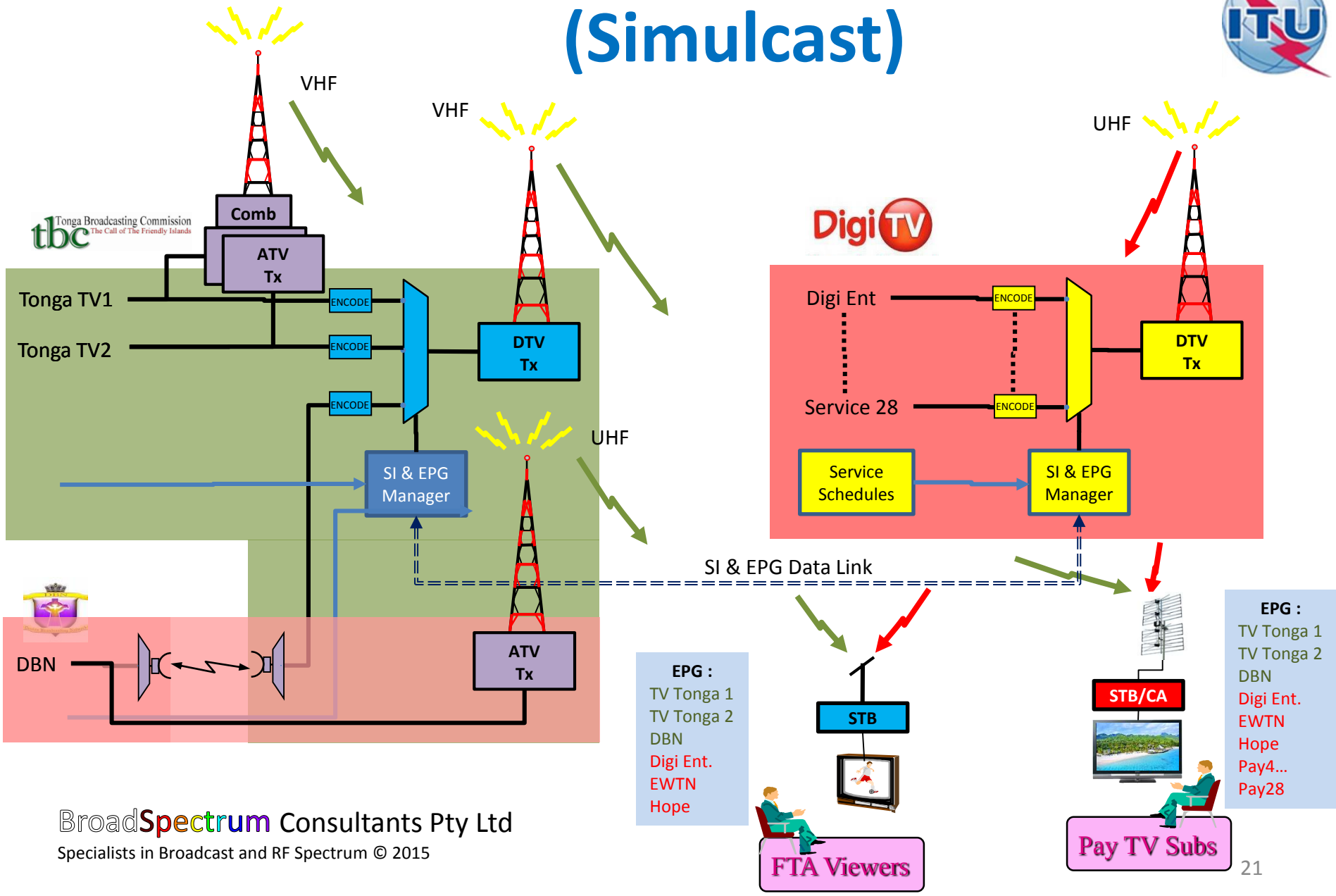
UHF Only



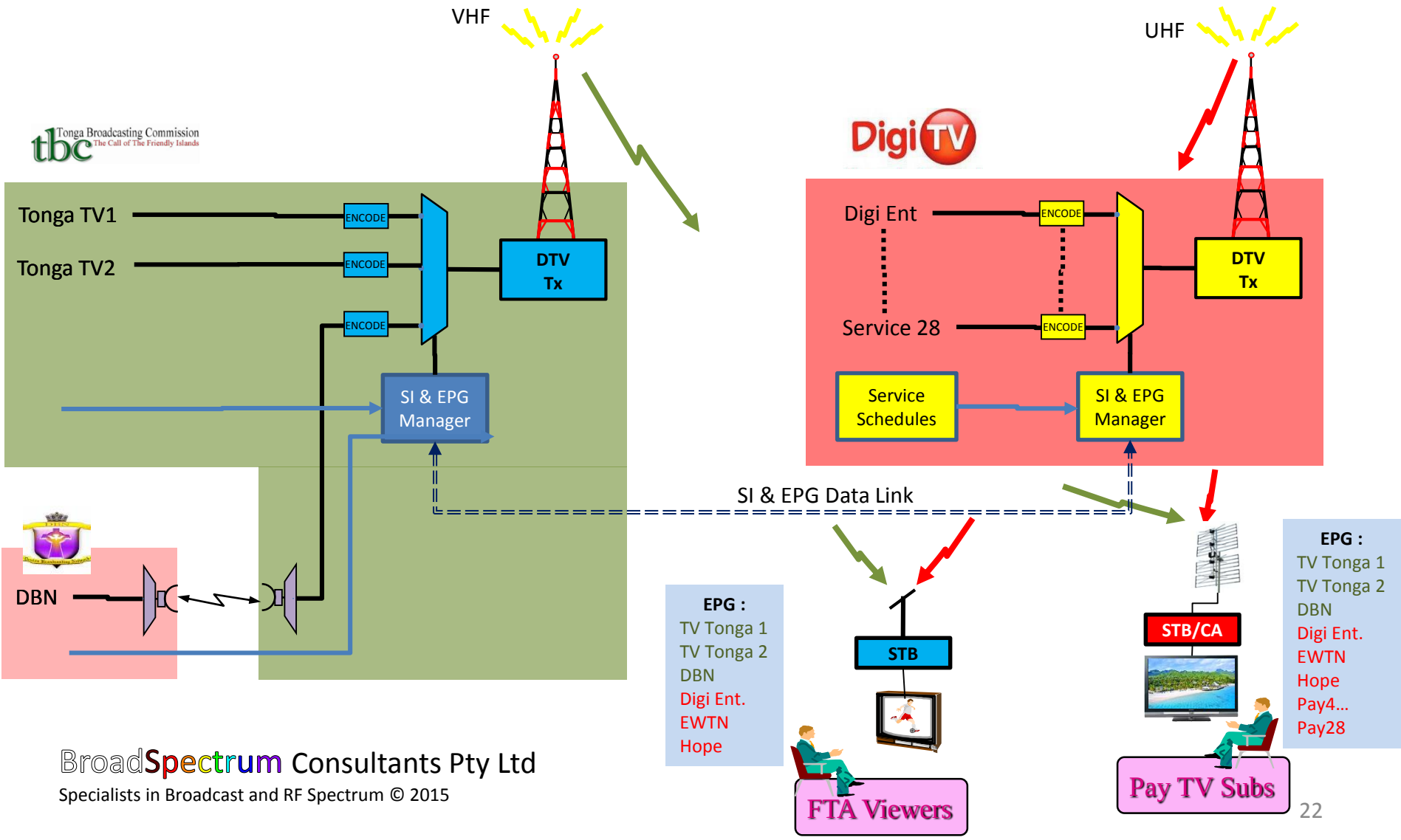
Current Broadcast Infrastructure



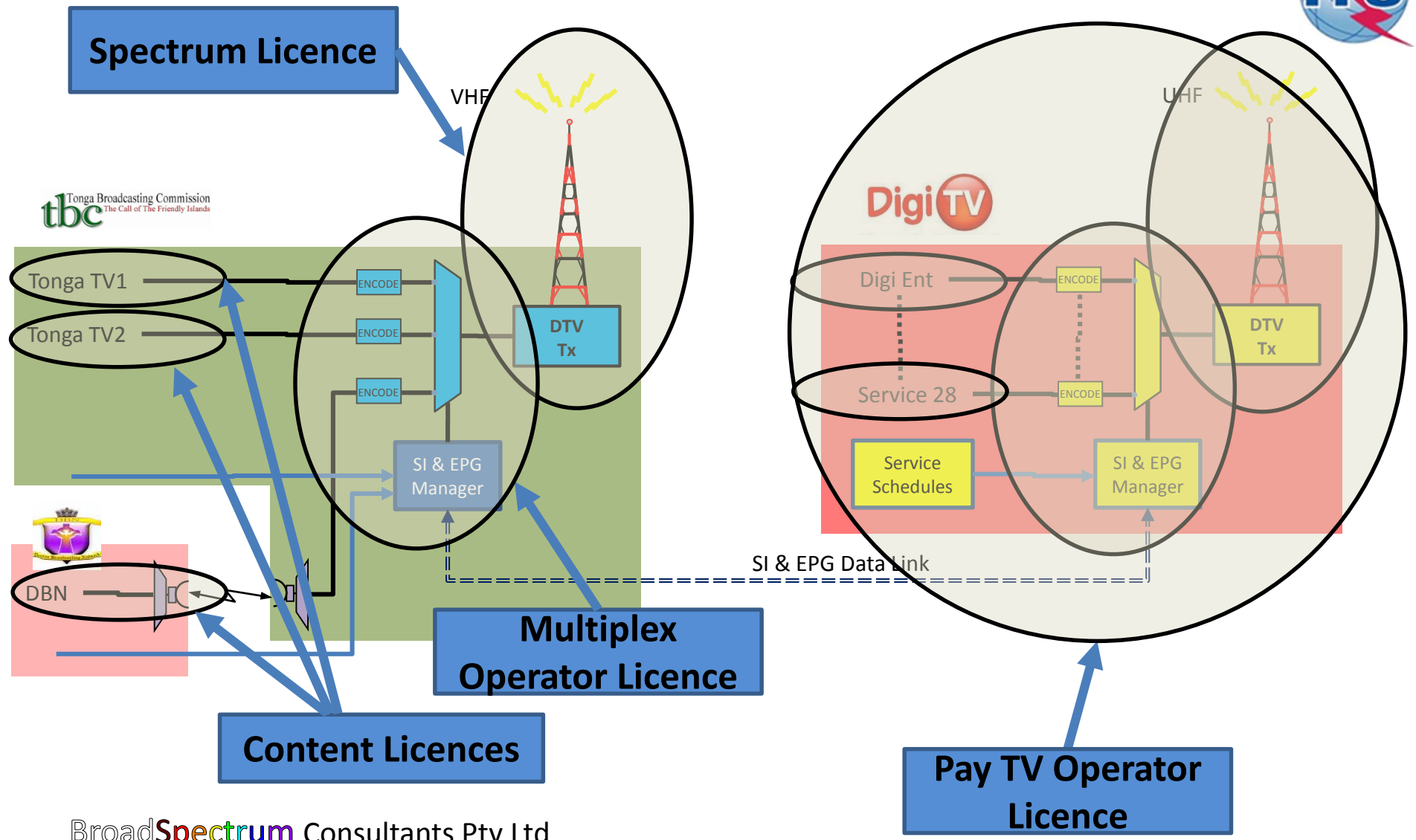
Example Digital Transition (Simulcast)



Example Digital Transition (ASO)



Licencing Options



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?