



DTTB Policy and Regulatory Framework

Papua New Guinea

Kingdom of Tonga

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Director : BroadSpectrum Consultants

Chair : Australian Radiocommunications Study Group 6 (Broadcasting)

25th August 2015

Incorporating country backgrounds by Kila Aluvula (PNG) and Mr Andrew (Anitelu) Toimoana (Tonga)

BroadSpectrum Consultants Pty Ltd

Specialists in Broadcast and RF Spectrum © 2015

Papua New Guinea



- Population 7.4 million
- 22 Provinces (4 Regions)
- 80% of population in rural areas
- Port Moresby, Capital City
 - 343,000 population (2011)

VHF Television Operators (Aug 2015)

- VHF - Four (4) Operators
 - Commercial FTA – EMTV
 - Commercial PAY – Digicel
 - Public FTA – Kundu2
 - Religious FTA – 3ABN



ITU Roadmap (2012)

- ITU Expert – Colin Knowles
 - PNG National Roadmap Team
- Roadmap endorsed by Government
 - Three (3) FTA Operators to migrate to Digital
 - DVB-T2 Standard, MPEG4 Compression
- Establishment of PMO Office to drive migration
 - Pending
- ASO December 2017

DVB-T2
MPEG 4





Digital Terrestrial Television Broadcasting

- VHF Band III for *FTA/PayTV*
 - Channels 2 to 8
 - 7MHz
 - EMTV Ch4, Kundu2 Ch2, 3ABN Ch6
 - Digicel allocated Ch5 & Ch7
- UHF Band IV & V for *PayTV*
 - Channels 21 to 45
 - 8 MHz BW
- Digital Dividend
 - 696MHz – 806MHz (Region 3)



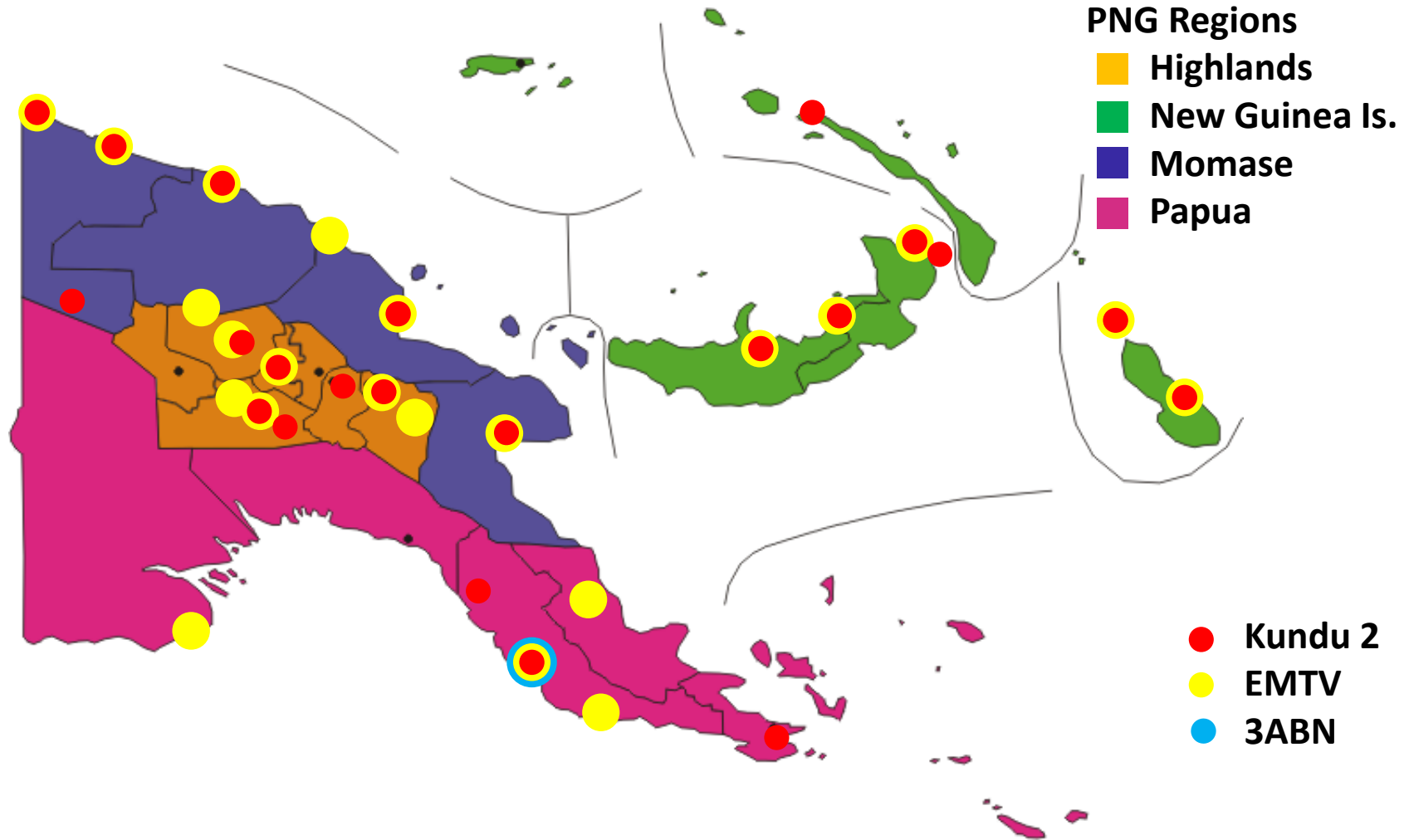
- VHF Ch 5 and 7
- DVB T2
- DigiPlay Service
 - K149 STB (US\$49)
 - 29 Programs
 - 1 FTA and 3 Free to View
 - 28 encrypted
- Over 25,000 subscribers
- Subscription via mobile phones
 - Premium Packs: US\$3 for 1 day, US\$13 for 7 days and US\$35 for 30 days
- Direct to Home (DTH) for remote areas

WAY FORWARD

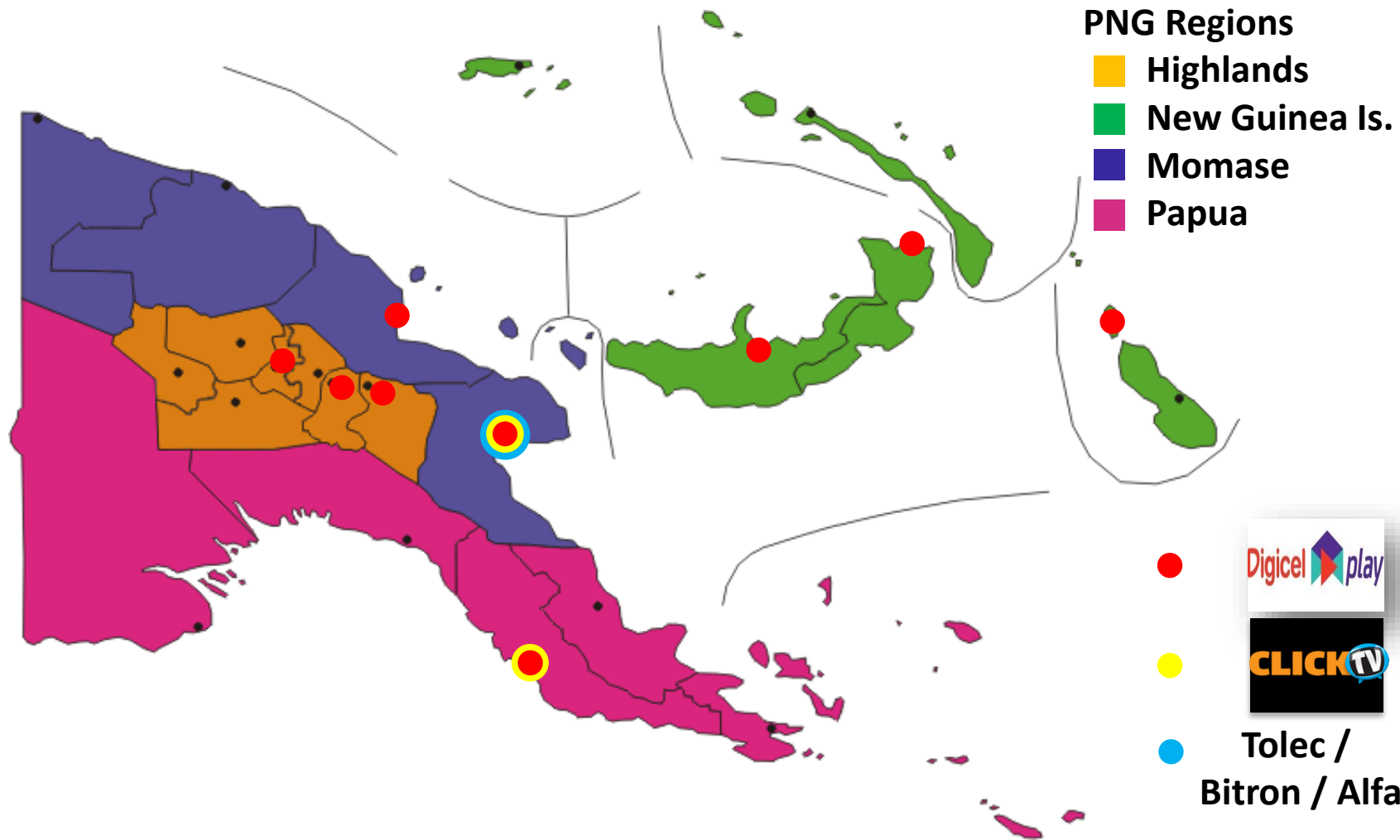
ITU Visit – Port Moresby (Aug 2015)

- ITU representatives – Ms. Sirareet Bunnag and Mr. Andrew King
- Invitation by regulator NICTA
- Audience with FTA/PayTV broadcasting operators
- Recommendations

Map of FTA Broadcaster Sites

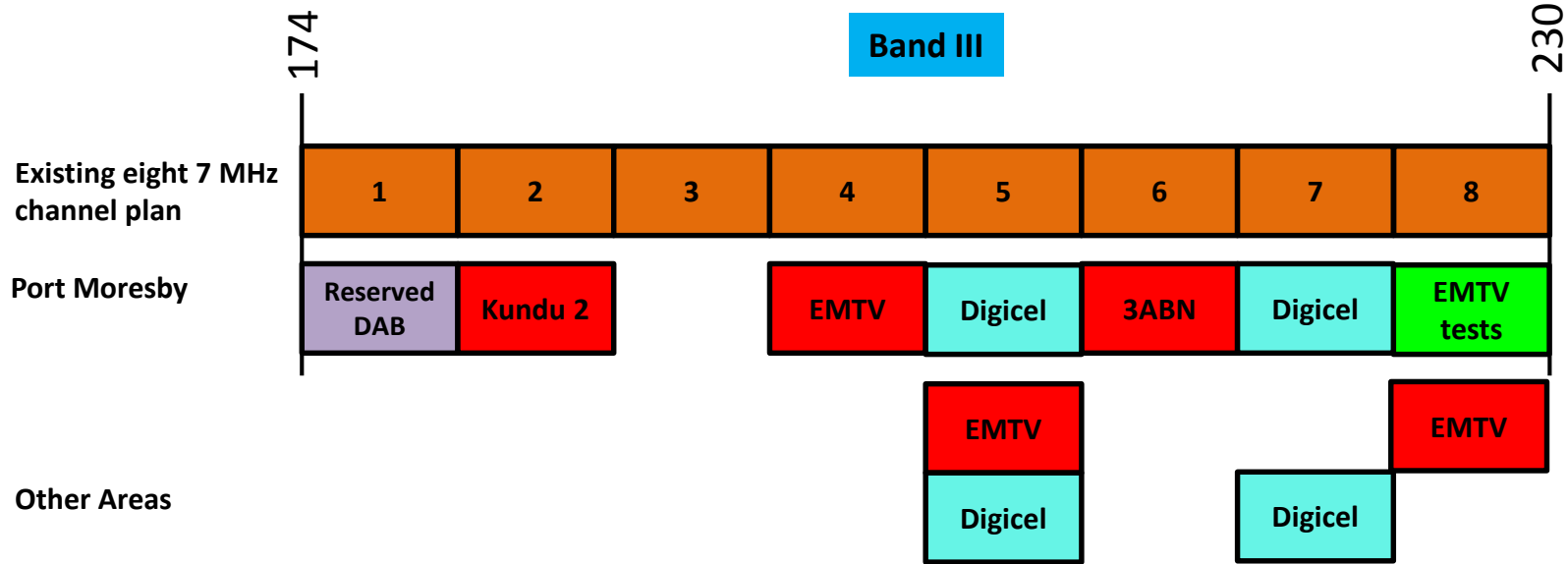


Map of Pay TV Broadcaster Sites



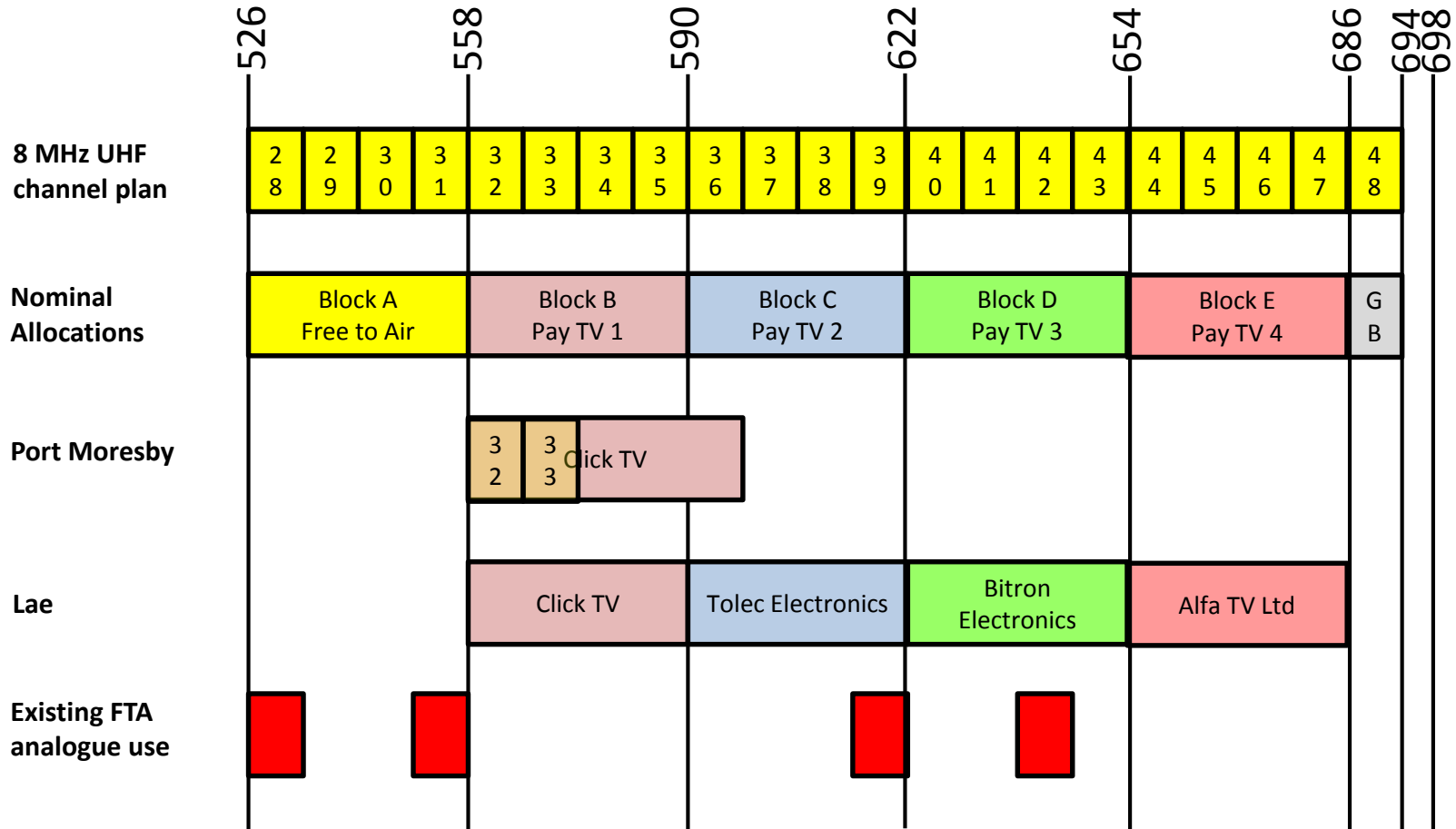


VHF Allocations





UHF Allocations



Regulation



- National Information and Communications Technology Authority
 - constituted by the *National Information and Communications Technology Act 2009*
 - Repealed *Telecommunications Act 1996* and *Radio Spectrum Act 1996*
 - Replaced PANGTEL (PNG Radiocommunications and Telecommunications Technical Authority)
 - was constituted under the *Telecommunications Act 1996*
 - Provides a regulatory framework for the long term interests of the people of PNG
 - Functions
 - Provide advice to government
 - Provide licencing and regulatory functions
 - Oversee performance of ICT operators
 - Assist Consumer and Competition Commission to investigate complaints
 - Consult with stakeholders and the public
 - Represent government in ICT international affairs
 - Act already defines Operator, Network, Applications, Content, Spectrum, Apparatus and Class licences
 - Universal Access and Service Regime
 - Other regulatory functions

Good regulatory foundation



Broadcaster Feedback



- Power Supply
 - Availability
 - Reliability
- Concern regarding Digicel
 - Regulator focus
 - Technical driver
- All plan to start digital
 - Happy to be in FTA mux
 - But who will own / operate it?

Digital Establishment Issues Planning



- Regulatory Matters
 - Licencing
 - Technical: DVB-SI values
 - Separate FTA and Pay TV systems
- Define Standards
 - transmission and reception
 - services
- Project Funding

Digital Establishment Issues

Rollout



- Award Mux operator licence
- Agree coverage and cost splits
- Satellite delivery network
- Local insertion
- Other startup channels
- Receiver availability and supply chain

ASO Issues



- Nationwide ASO or Regional / Provincial ASO Schedule
- Simulcast Period or Switchover Day?
- How to maintain continuity of broadcasts during transition
- awareness and education program

**PACIFIC MEDIA PARTNERSHIP
CONFERENCE 2015**
Partnering for Broadcasting
Apia, Samoa

**Media and Communication
Challenges for Tonga**

Presented by: Andrew Toimoana



OUTLINE



- Tonga Overview
- TV Broadcasting Overview
- DTT Roadmap
- Recommendation from 2015 mission
- Revised Roadmap
- Challenges
- Conclusion



About Tonga.



Total number of Islands

• 177 Islands

Total number of inhabited Islands

• 52 Islands

Total Population

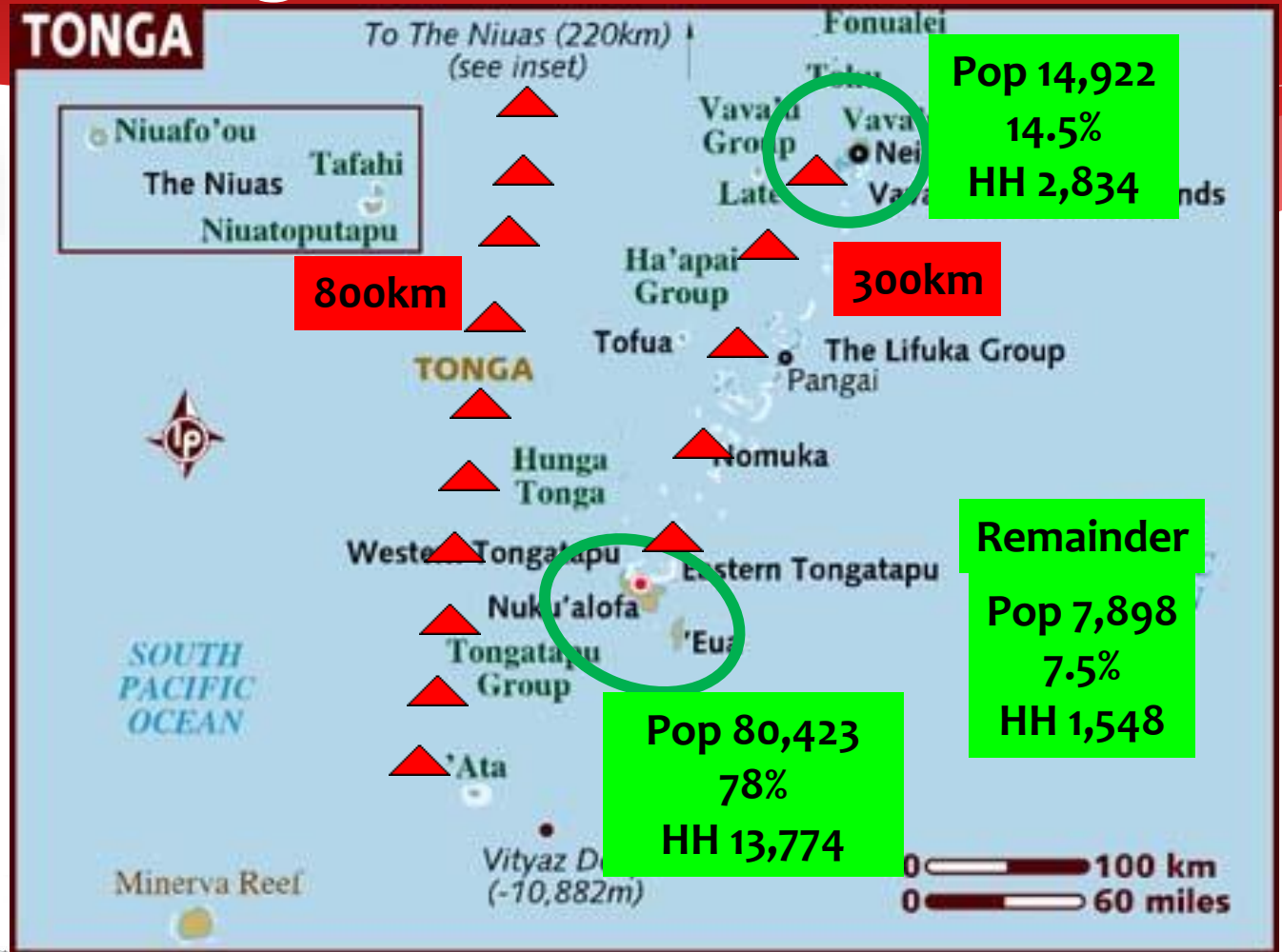
• 103,252

Total land area:

• 750 Sq Kms



Tonga Overview



Source : Kingdom of Tonga, Tonga 2011 Census of Population and Housing



TV Broadcasting Overview



- 3 Existing Broadcasters
- 2 FTA 1 Pay per view TV



Government Owned

2 VHF TV analogue TV channels

40m towers 500W , Service in Tongatapu and Vava'u



Christian Broadcasting Station -Funded by donations

1 UHF analogue TV channel

60m guyed mast 1kW transmitter, Service in Tongatapu



DigiCel (Tonga) Ltd - Commercial Pay TV operation

1 UHF channel DVB-T2 modulation with 28 channels

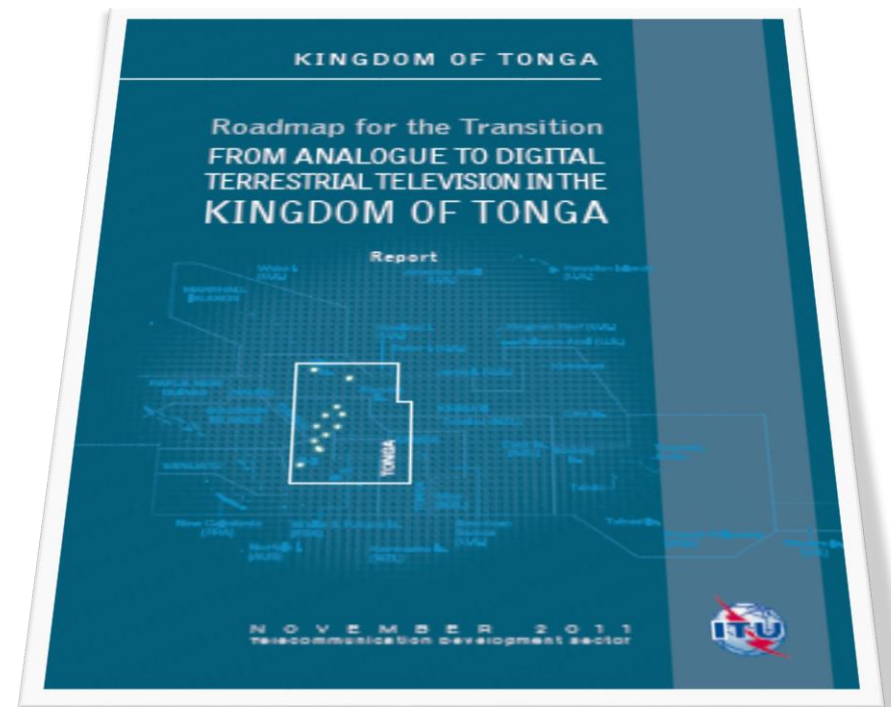
3 services unencrypted 45m tower, Service in Tongatapu.



DTT Roadmap



- * ITU Mission to Tonga in 2011
- * National Roadmap Team developed
- * Report November 2011





Thank You..
and
Malo 'Aupito...



Asia-Pacific
Broadcasting Union



Australian Government
Department of Communications



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...



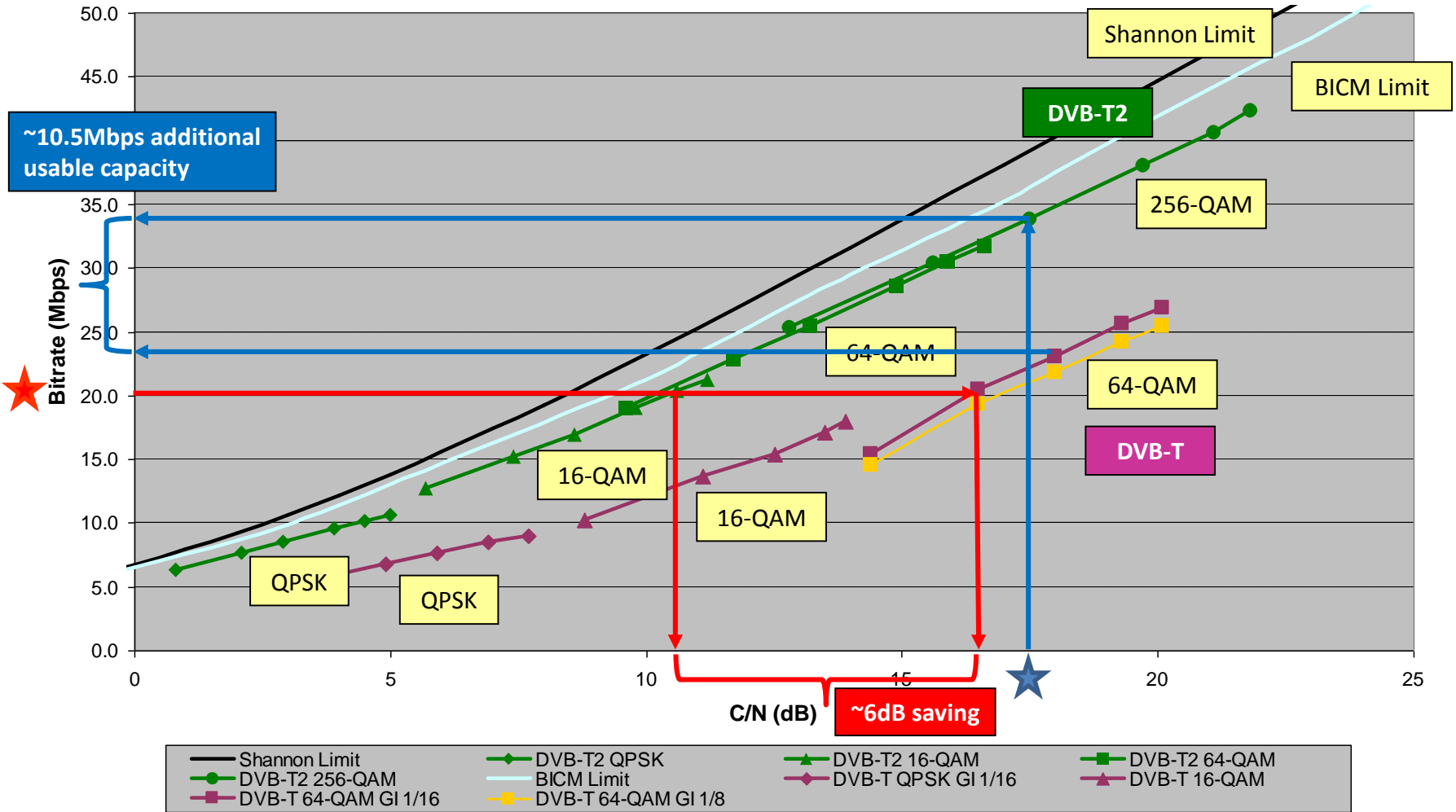
- Unfortunately not much. Overcoming the funding hurdle has proven insurmountable for a formal transition to DTTB.
- But, technology has evolved, pricing has come down and DigiTV (for commercial reasons) have converted to DVB-T2.
- In addition, TBC did receive a grant to upgrade their analogue transmitters 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

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**

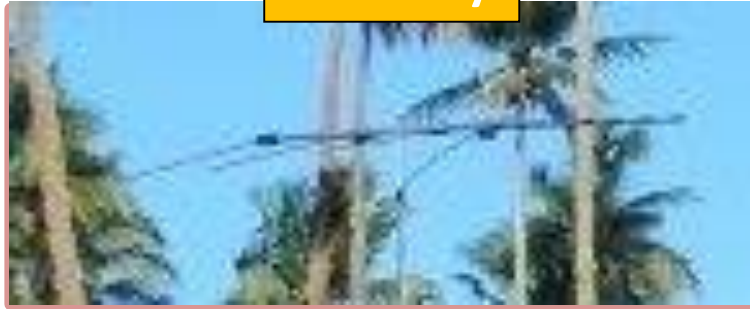
Antenna Installation Status



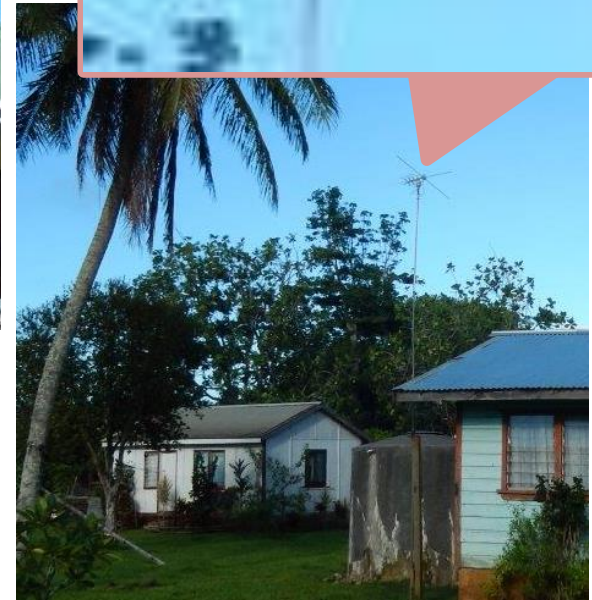
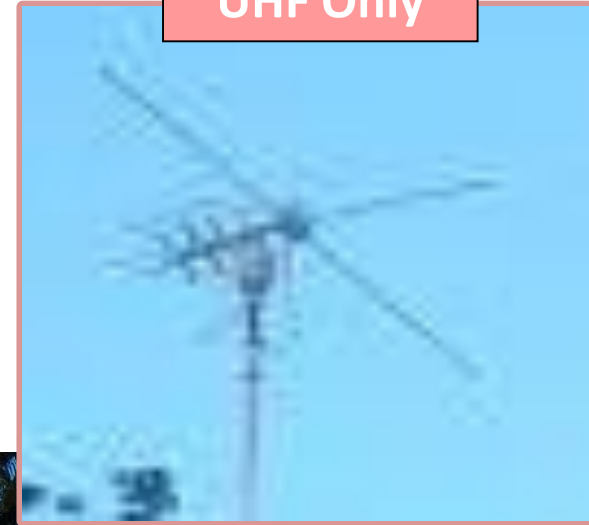
VHF/UHF Dipole



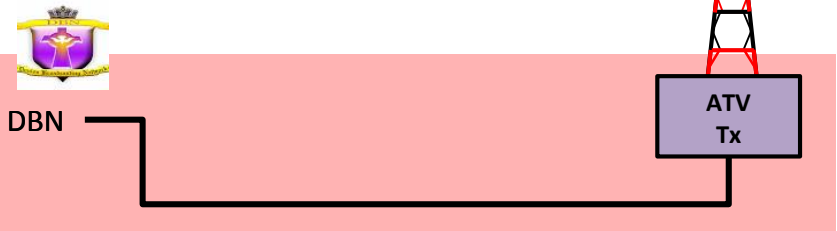
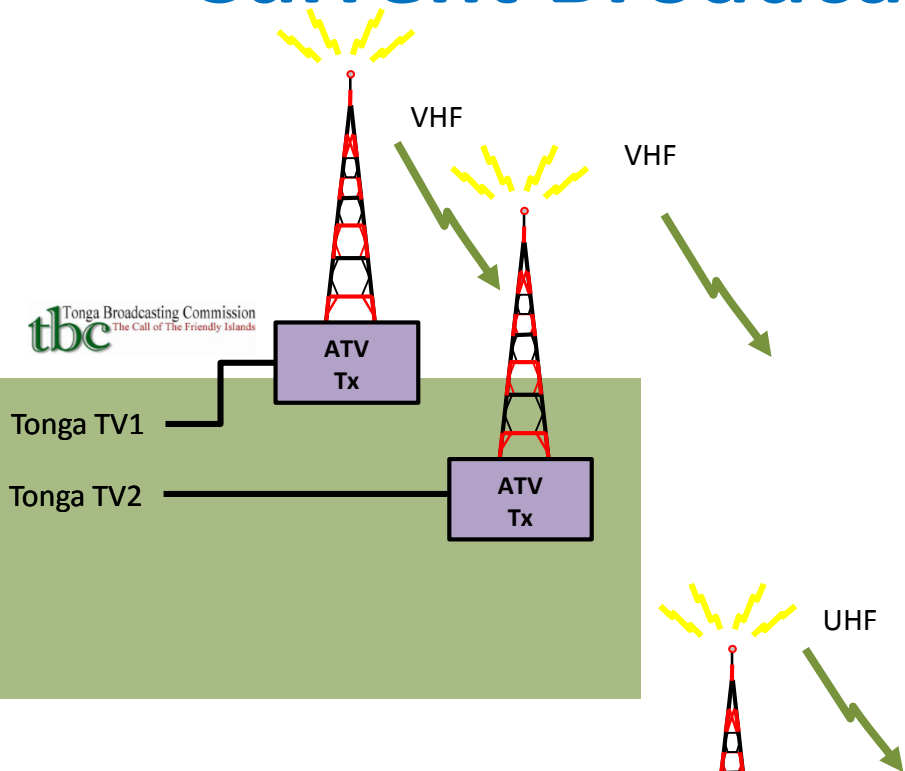
VHF only



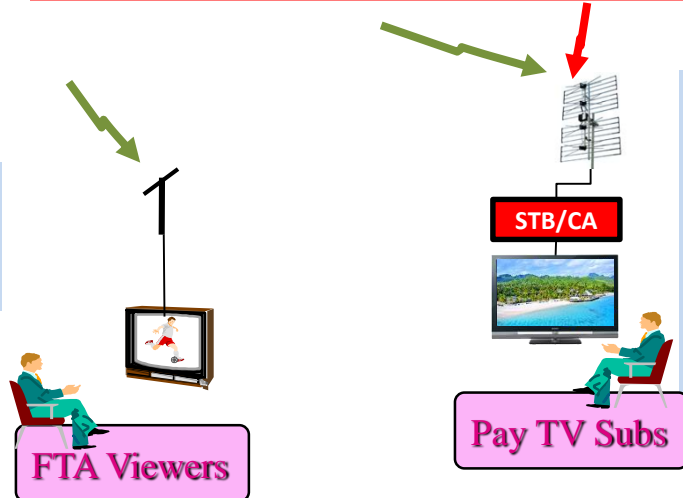
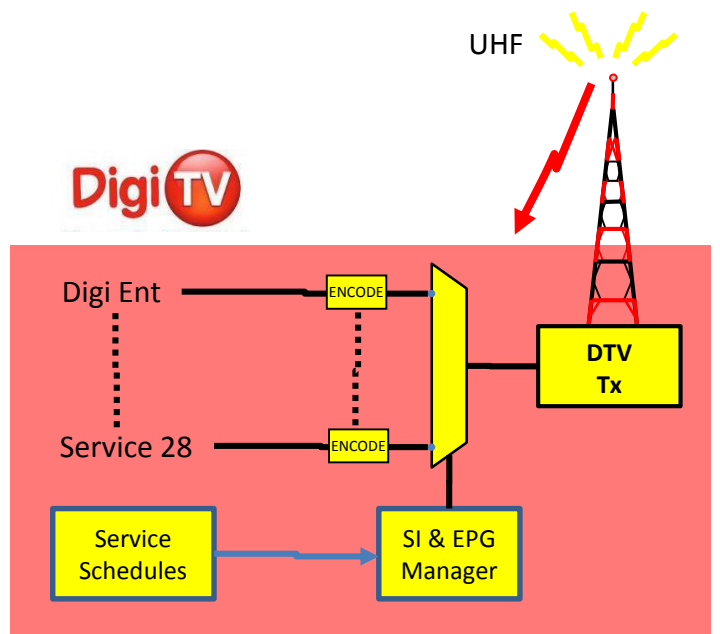
UHF Only



Current Broadcast Infrastructure

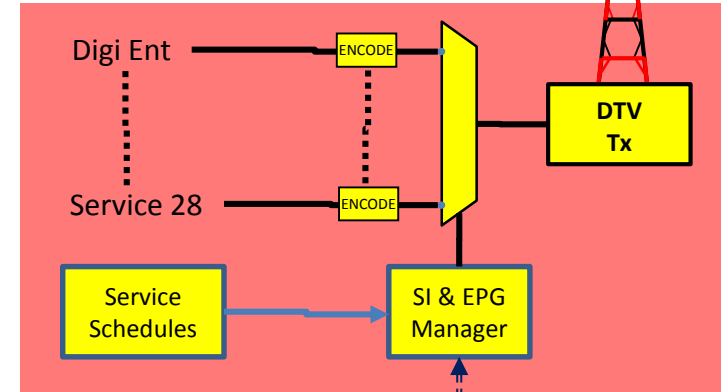
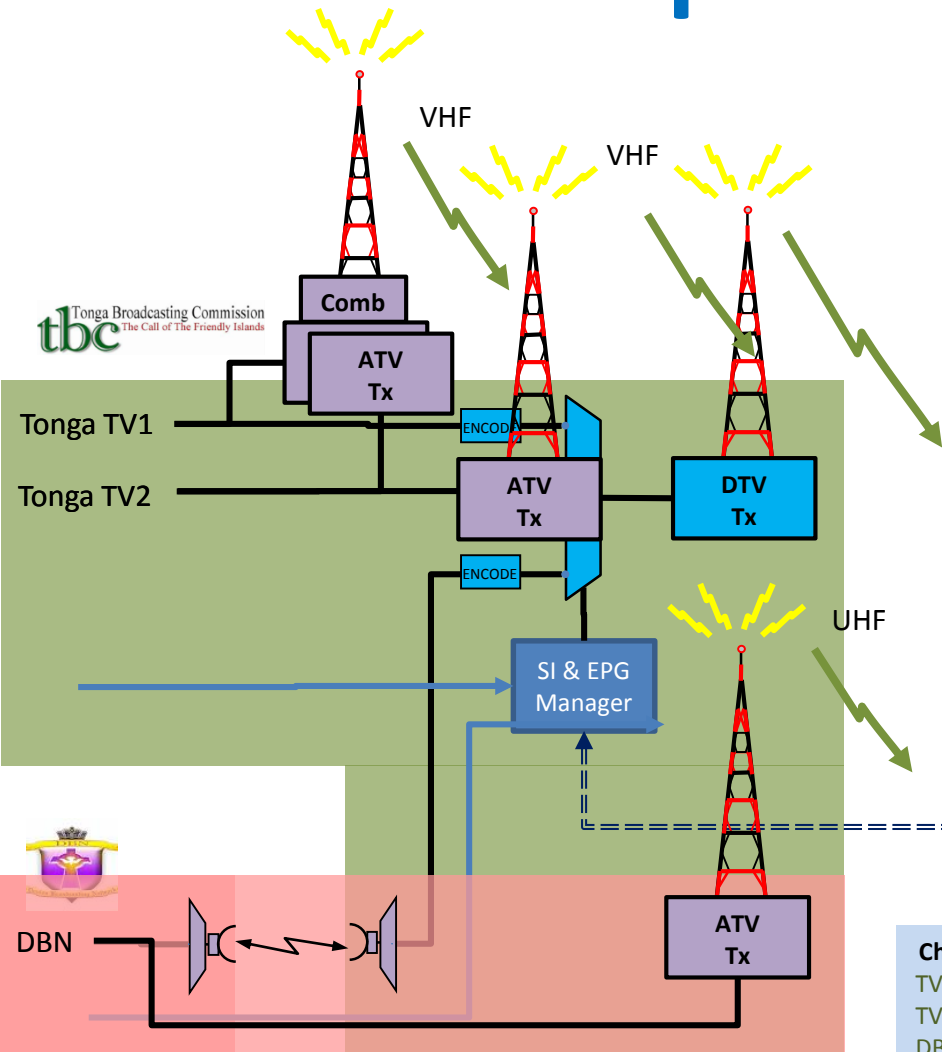


Channels :
 TV Tonga 1
 TV Tonga 2
 DBN



Channels:
 TV Tonga 1
 TV Tonga 2
 DBN
EPG :
 Digi Ent.
 EWTN
 Hope
 Pay4...
 Pay28

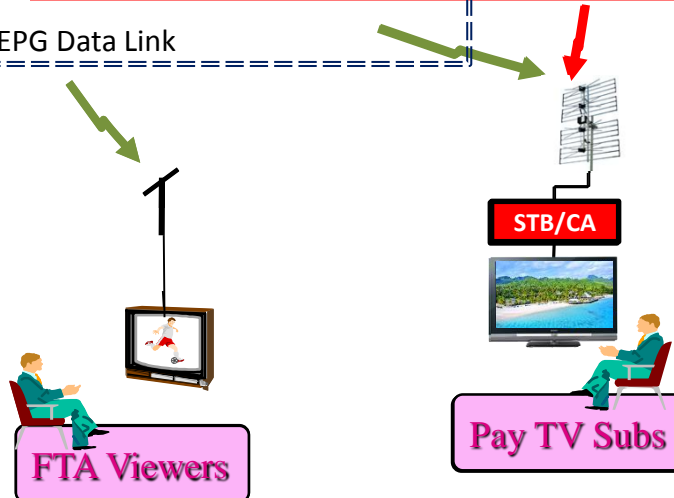
Example Digital Transition



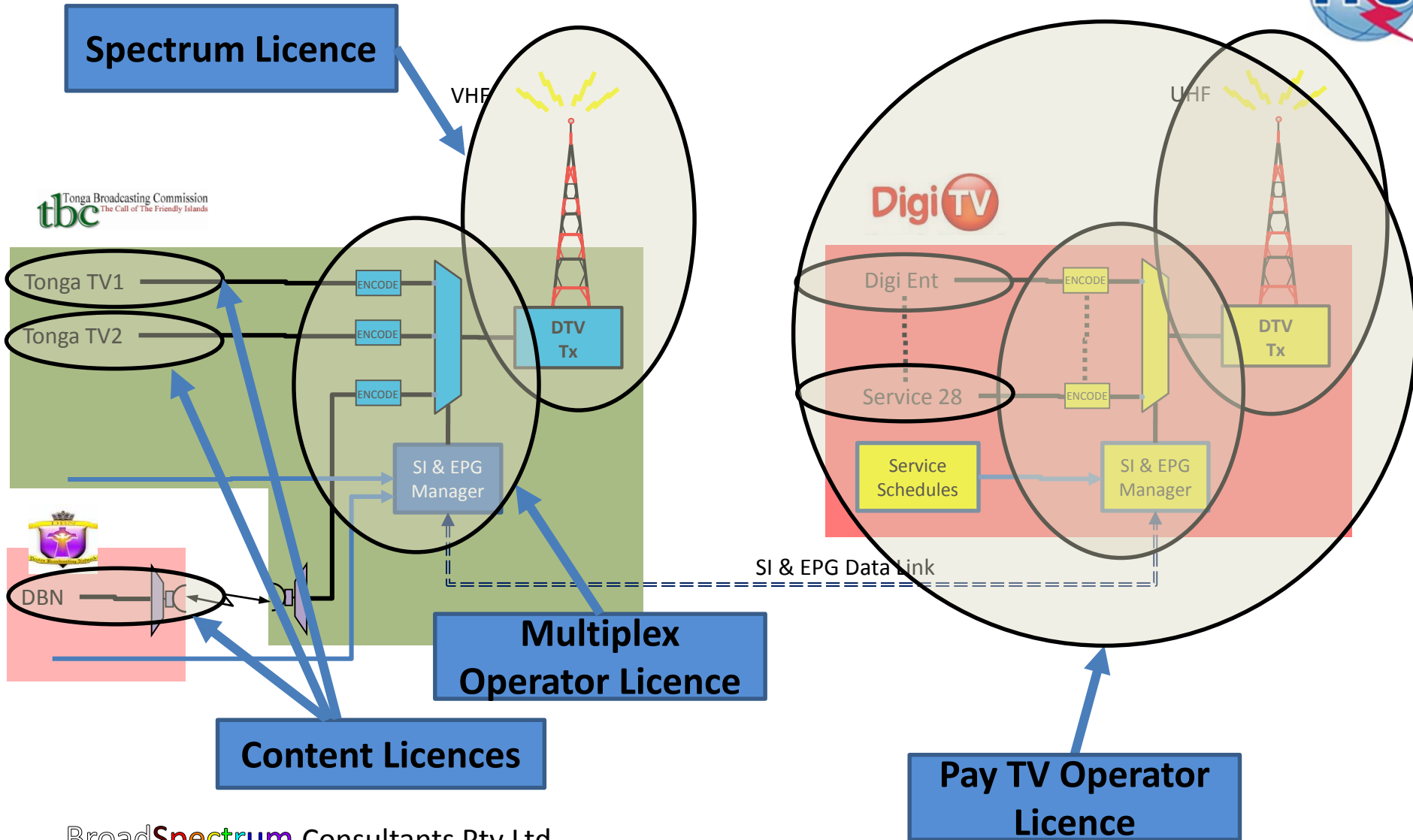
SI & EPG Data Link

Channels :
TV Tonga 1
TV Tonga 2
DBN

Channels:
TV Tonga 1
TV Tonga 2
DBN
EPG :
Digi Ent.
EWTN
Hope
Pay4...
Pay28



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.

Country Comparison



Parameter	Papua New Guinea	Kingdom of Tonga
FTA Broadcasters (analogue channels)	National (1), Commercial (1), Religious (1)	National/Commercial (2), Religious (1)
FTA Digital Structure	Single Mux	Single Mux
Muxes available	FTA & Pay TV	FTA & Pay TV
Digital Standard	DVB-T2	DVB-T2
Digital Services	On air (Pay TV)	On air(Pay TV)
Bands	VHF / UHF	VHF / UHF
Affordable (tx)	Yes	Just
Affordable (rx)	Yes, but some govt support may be needed	Likely govt support to households
ASO Date	December 2017, but may move forward	Suggested to move back to December 2016

Thank You for your attention



Questions?