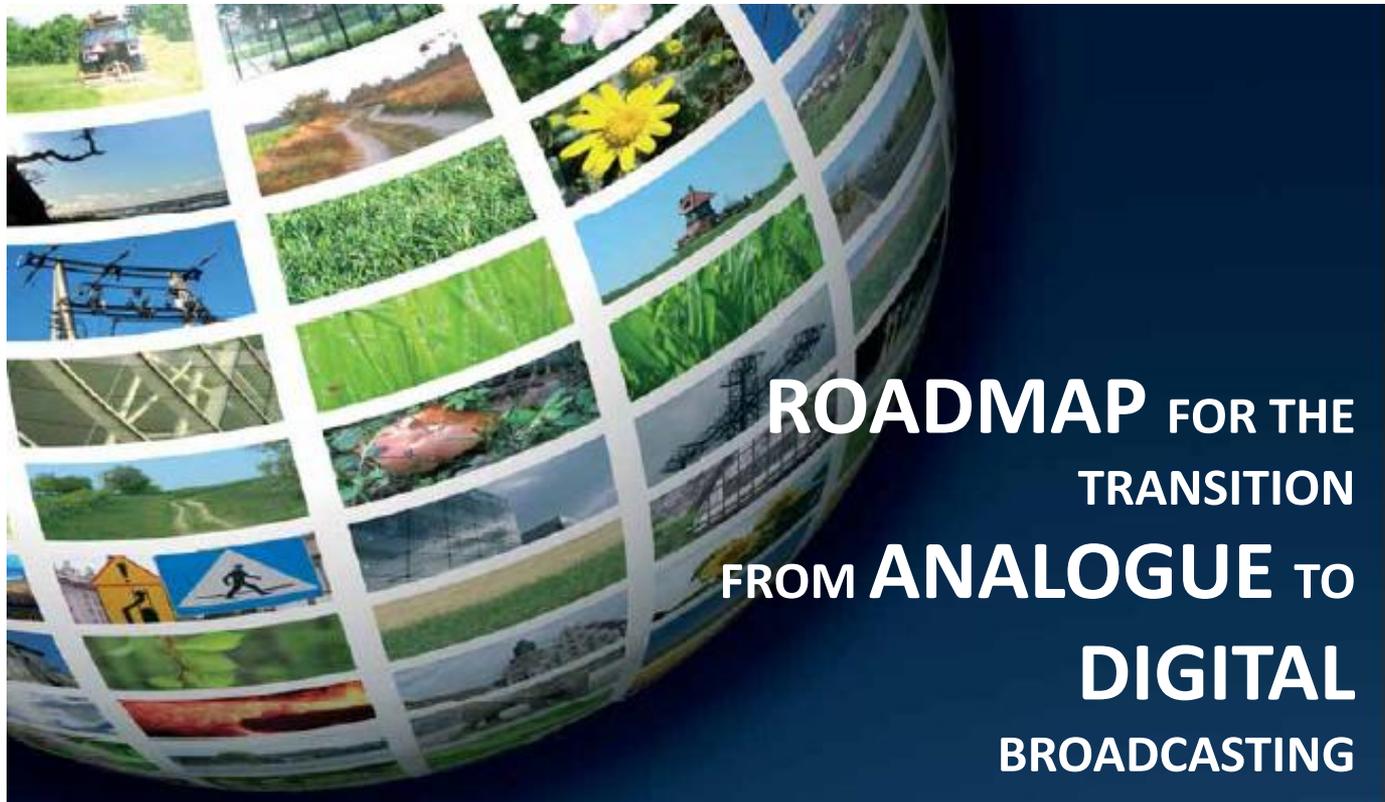


INTERNATIONAL TELECOMMUNICATION UNION



ROADMAP FOR THE TRANSITION FROM ANALOGUE TO DIGITAL BROADCASTING

Digital radio market & roadmap

Peter Walop

22 September 2014

Agenda

Topics

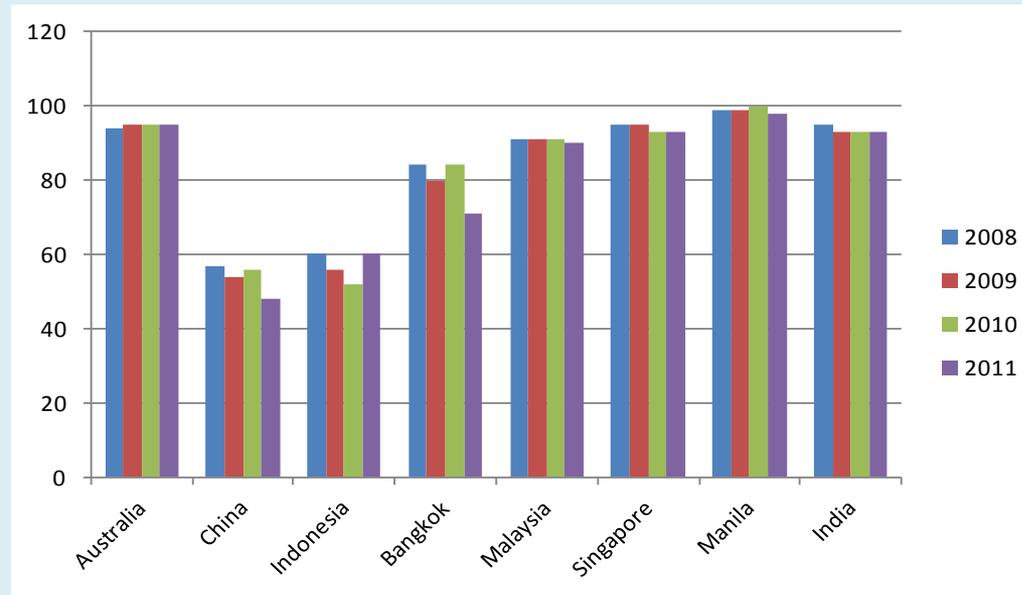
1. Thai radio market trends
2. Digital radio specifics
3. Leading markets
4. Key technology choices
5. Digital radio roadmap

Appendix A: Frequency planning details

1. Thai radio market trends (1/6)

Thai radio trends in line with international trends

Radio Reach as Percentage of Population

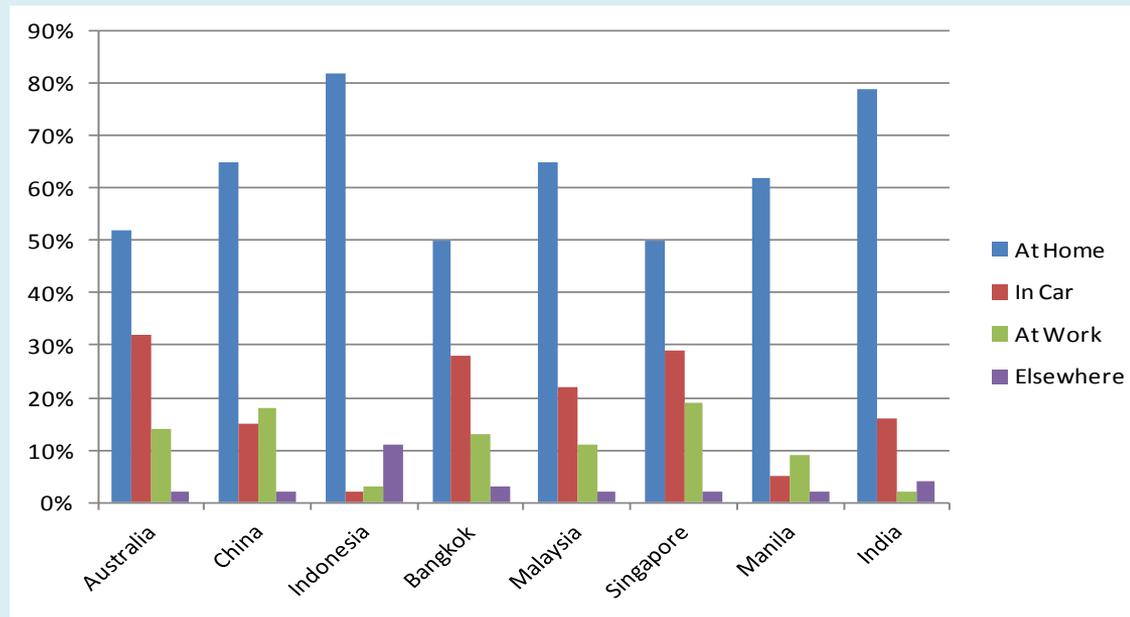


Source: AC Nielsen

1. Thai radio market trends (2/6)

Most listening at home and work. Not in the car!

Place of Radio Listening (% of all listening)

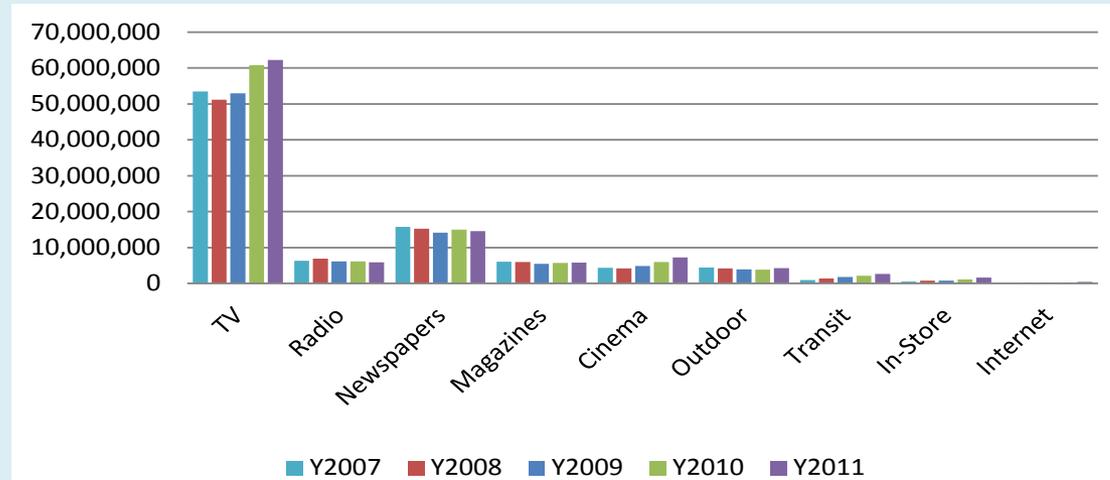


Source: AC Nielsen

1. Thai radio market trends (3/6)

Stable trend
in radio
advertising
income, no
significant
growth
expected

Media Advertising over Years (in k THB)



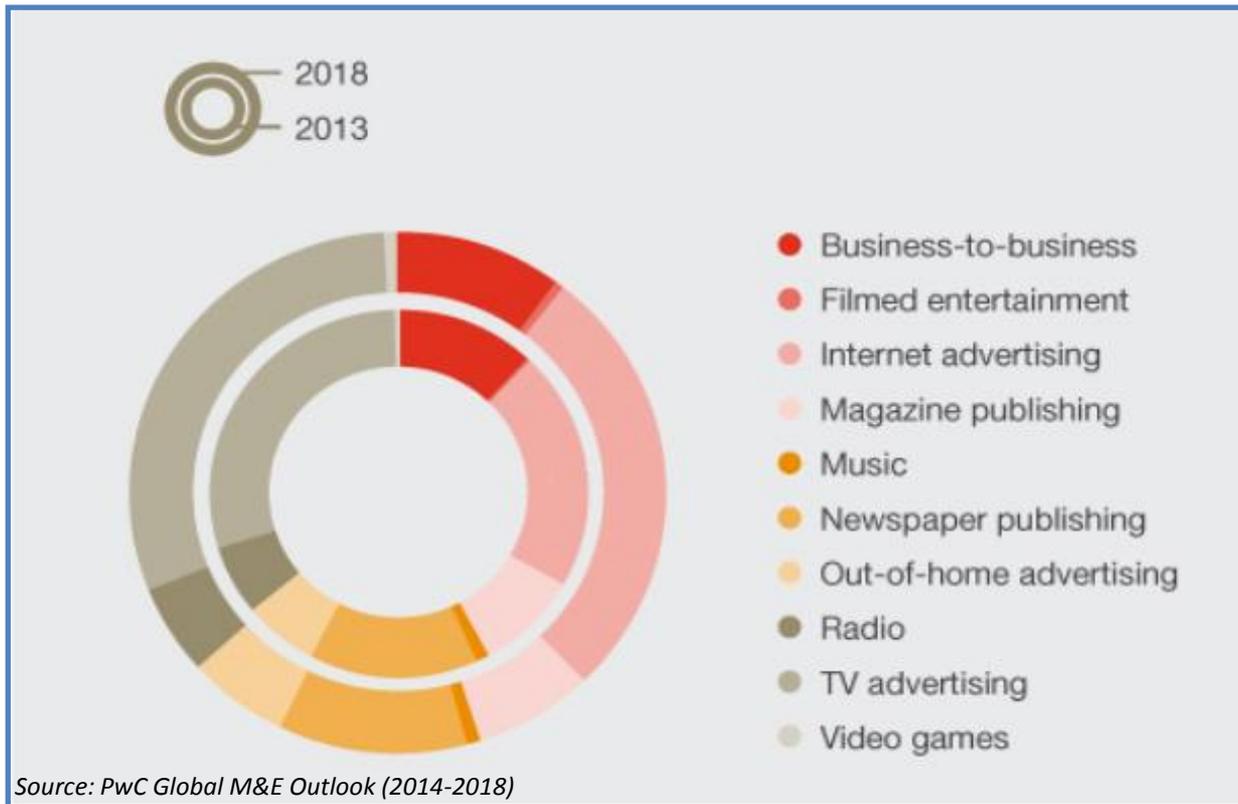
Source: NBTC

- For 2013-2017 a CAGR of 3.3% expected
 - 5.1% GDP growth expected in same period
 - Shift to Internet advertising

1. Thai radio market trends (4/6)

Proportion of Ad revenues by segment

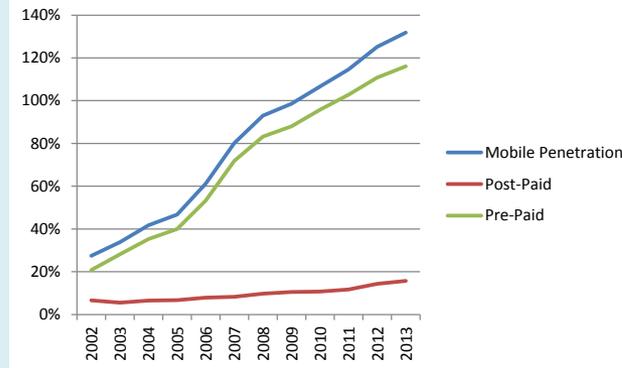
Global forecasts show stable radio Ad revenues and shift towards Internet advertising



1. Thai radio market trends (5/6)

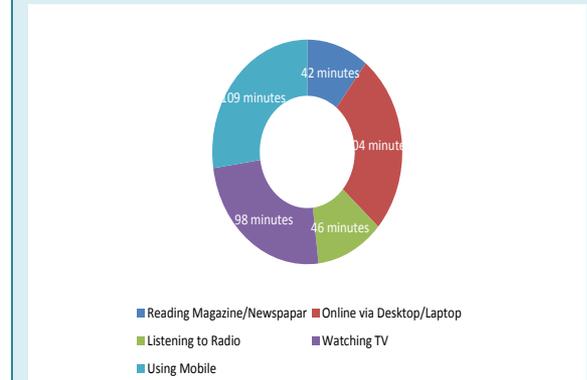
Mobile expected to be important Thai radio platform, not fixed broadband like elsewhere

Mobile Penetration



Source: NBTC

Mobile Use

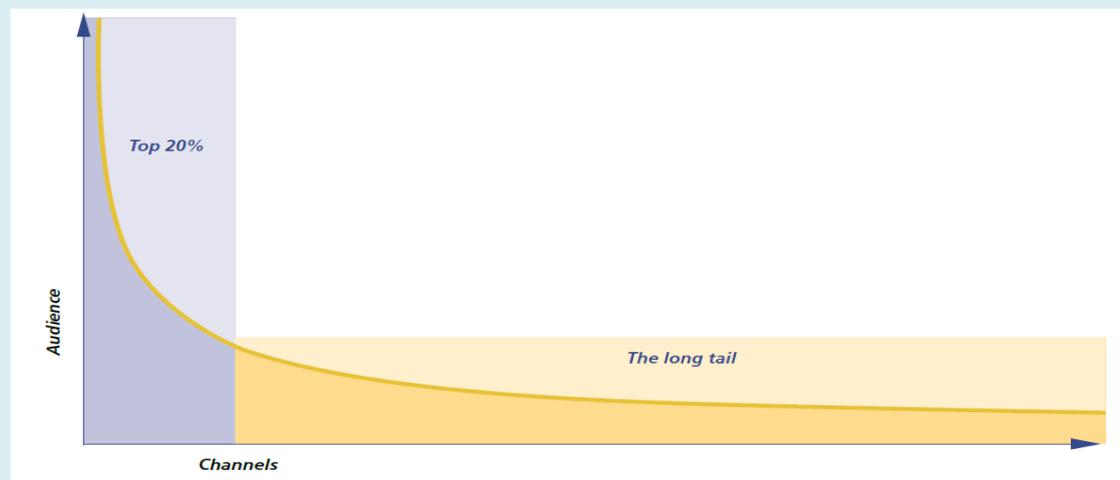


Source: InMobi

- Mobile penetration high (>120%) and mobile radio listening popular
- Broadband penetration < 7% (2013) and leveling
 - Broadband only available in the larger cities
 - Last 5 years FX line penetration declined (7.2 to 6.2%)

1. Thai radio market trends (6/6)

Typical Curve of Advertising Income per Service



Source: EBU

- Strong indicators for income disparity
 - BKK FM Top-10 stations take 3b of 5 b THB (60%)
 - >7000 FM/AM services/stations

Income disparity extremely large between top 10 (in BKK) and the rest

2. *Digital radio specifics*

Radio market structure different from TV and business case more challenging

- In general installed base of analogue receivers much larger than for TV
- Analogue receivers have to be replaced (no 'STB')
- Radio market is predominately FTA → horizontal market → no receiver subsidies
- ARPU is significantly lower than TV
- No Digital Dividend for Radio ASO

- Business case much harder to make viable
- Simulcast period long
- Digital receiver retail prices are critical

3. Digital radio in the UK (1/2)

Market leader in Europe

Item	Value
# of multiplexes	2 National
	10 Regional
	38 Local
Network coverage	94% pop
# of DAB services	417
# of DAB-only services	123
# of receivers sold	17,5m (accumulated)
receiver penetration	46% of households

Source: WorldDMB (Last update: 18.12.2013)

- DAB in Band III
- 15+ years DAB services available
- DAB most popular for digital listening (65% of all digital hours)
- Analogue installed base still 85-100m
- 2-years network expansions to include more roads and local services

3. Digital radio in Australia (2/2)

Market leader in Asia Pacific

Item	Value
# of multiplexes	0 National
	13 Regional
	2 Local (Trial)
Network coverage	64% pop
# of DAB services	210
# of DAB-only services	129
# of receivers sold	1,4m
receiver penetration	16% of households

Source: WorldDMB (Last update: 12.11.2013)

- DAB+ in Band III (L-band)
- 5 years DAB services available
- Emergency broadcasting on DAB (pop-up station “4TAB FLOOD”)
- Network expansions: 16 repeaters for 5 cities
- Planning for ‘regional’ deployment

4. Key technology choices (1/3)

VHF Band III
only option
at present for
DR
introduction

Band reference	Alternative service name	Frequency Range	Options for Thailand
LF Band	AM Long Wave	30 to 300 kHz	None at present
MF Band	AM Medium Wave	526.5-1606.5 kHz	Limited at present
HF Band	AM Short Wave	3 to 26 MHz	None for coverage in Thailand ²²
VHF Band I	Television Band I	47 to 68 MHz	Not tried. Good potential.
VHF Band II	FM Radio Band	87 to 108 MHz	Very Limited to None at present.
VHF Band III	Television Band III	174 to 230 MHz	Limited, but Good
UHF Band IV/V	Television Band IV/V	470 to 854 MHz	Very Limited
UHF L-Band	L-Band	1452 to 1492 MHz	Limited to Very Limited

Source: ITU project

4. Key technology choices (2/3)

Only DAB+ and DRM are realistic options for Thailand (for Trial)

Technology/ System	Radio	VDO/ Image	Radio On Mobile Devices	On Mobile phones/ Devices	Frequency Band
DMB (DAB, DAB+)	Yes	Yes	Yes	Yes	VHF III
DRM (DRM30, DRM+)	Yes	Yes	Yes	Yes	LF, MF, Shortwave, FM, VHF
T-DMB	Yes	Yes	Yes	Yes	VHF III
ISDB-T_{SB}	Yes	-	Yes	Yes	TV bands
ISDB-T_{MM}	Yes	Yes	Yes	Yes	VHF III, etc.
HD-Radio (IBOC)	Yes	-	Yes	-	MF, FM

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 for DR

4. Key technology choices (3/3)

DAB+ receivers commercial available with a wide product range and lowest prices

- A wide diversity of commercially available DAB(+) radio receivers:
 - For all Profiles, including Multimedia Receivers
 - Prices range from 1,000 to 19,000 THB
- No/limited commercially available DRM receivers:
 - Indian DRM-30 project may change situation
 - DRM multiplex has relatively limited bandwidth (→ more transmitters for same # of services)

Profile 1

Standard Radio Receiver

Table-top/bedside/pocket
Simple text screen

- Receives all DAB, DAB+ and DMB services
- Displays scrolling text
- Mass market receivers
- Prices from €25

Profile 2

Rich Media Radio Receiver

Colour screen

- Slideshow, BIFS, advanced text
- EPG, TPEG

Creates new kinds of radio

- Wifi, in-car, interactive
- Media storage, podcast

Profile 3

Advanced Multimedia Receiver

Decodes all DAB, DAB+ and DMB services

- DMB Video
- BIFS, EPG, TPEG



5. *Digital radio roadmap (1/2)*

DR roadmap
comprises
Plan A and B
for
respectively
short and
long term

- Plan A is addressing the short term:
 - Launching Trial services in 2014
 - DAB+ in VHF Band III
 - 40-50 services in 10 most populated cities (with pop target of 40%)
 - Preparing and assigning regular licenses
- Plan B is addressing the long term:
 - Regular licensing at the moment when VHF Band III ASO is known (and DAB uptake is sufficient)
 - Matching demand and supply across all available platforms
 - Radio ASO (after BMP planning horizon 2012-16)

5. Digital radio roadmap (2/2)

Item	Plan A	Plan B
	Scenario 1	Scenario 2
Description	All VHF Band III on air (and protected)	All digital situation – ASO VHF Band III
Pop coverage target	10 +1 city	95%, including 11 cities
# national MUX	3	4
# national audio services	3x(18 or 9)=54 to 27 ⁽¹⁾	4x(18 or 9)=72 to 36
# local MUX	None	4
# local services	None	72 to 36 in 39 local areas
# regional MUX	None	None
# regional services	None	None

(1) Multiplex total bit rate = 1152 kbps, bit rate per *Service* license between 64 and 128 kbps (still to be decided)

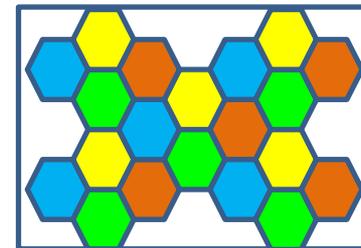
Appendix A: Frequency planning details (1/5)

Detailed planning exercise will show required spectrum

- First (theoretical) planning exercise already shows targets are demanding:
 - Scenario 1: avoiding adjacent channel interference
 - Scenario 2: number of blocks for national and local layer -> 2 in FP (Trial) and 7 (t.b.c) blocks (for nat. & loc.)
- Detailed planning exercise will show:
 - Actual coverage in scenario 1
 - Number of blocks for each local layer

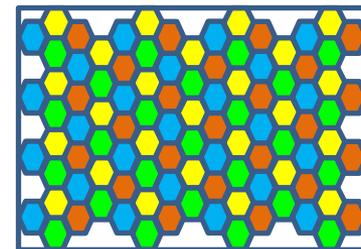
Target (scenario 3)	# blocks
4 national layers	8
4 local layers	28
total	36
Available	32-3=29

1 layer = 4 blocks



20 areas

1 layer = 4 blocks



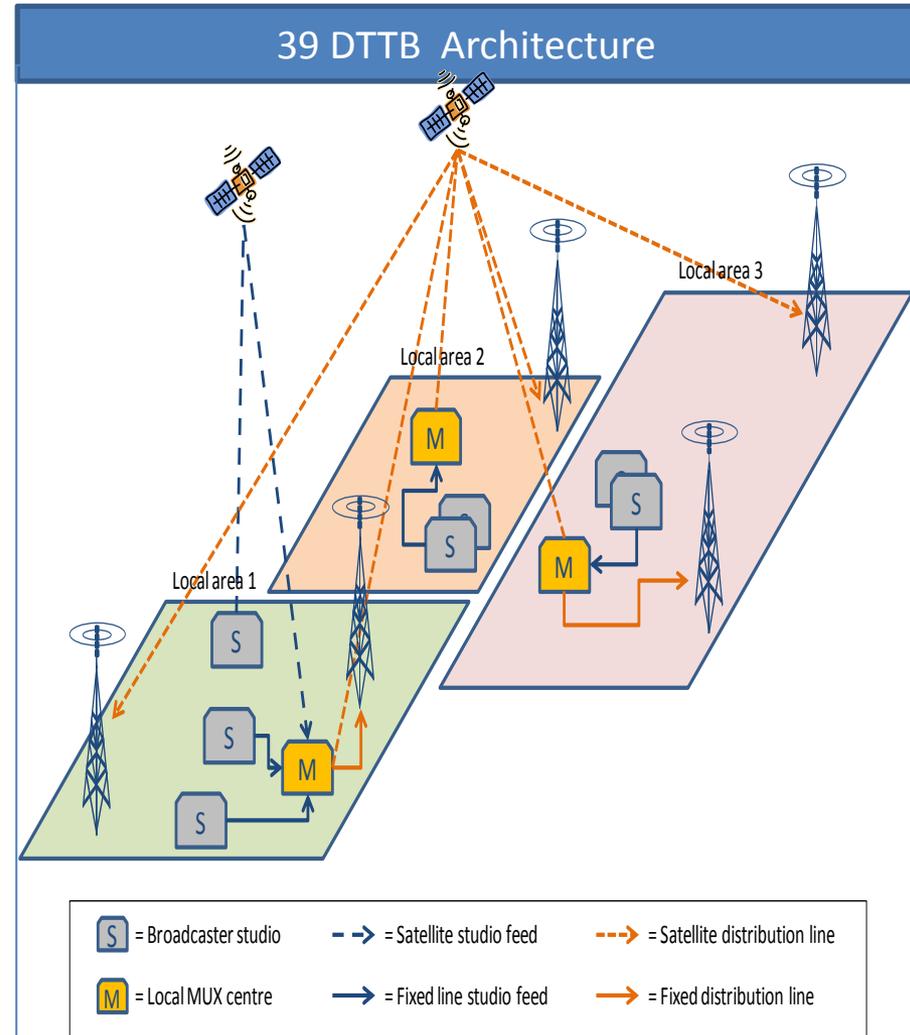
100 areas

⬡ = SFN or single site

Appendix A: Frequency planning details (3/5)

Facility sharing reduces DRB cost levels

- Facility sharing between DTTB / DRB:
 - Combined DTTB / DRB NOs
 - Sharing agreements
- Reducing DRB cost levels by sharing:
 - Distribution links
 - Site facilities
 - Fixed line studio feeds
 - Tower sharing

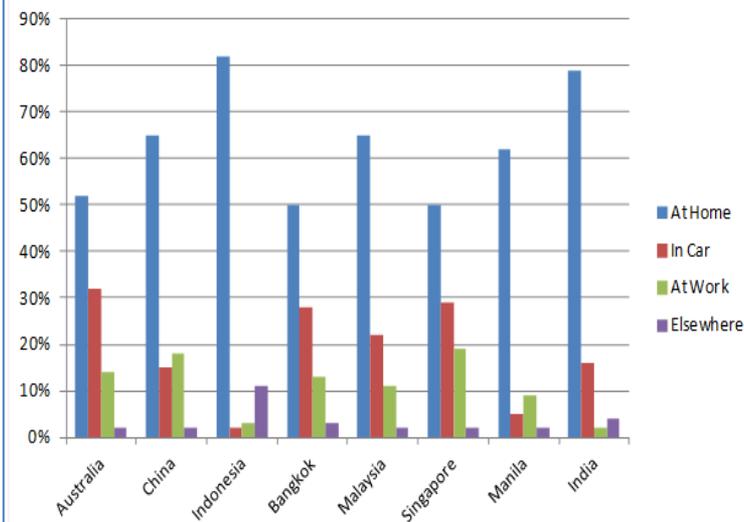


Appendix A: Frequency planning details (4/5)

DTTB and DRB Local areas should be the same

- Different DRB Local areas are not necessary because of different listening behavior
- Most listening is stationary (not in car!)
- Designing a DRB network for in-car/mobile reception increase network costs
- In-car/mobile requirement later (?)

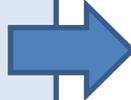
Place of radio listening (% of all listening)



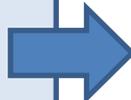
Appendix A: Frequency planning details (5/5)

Size of DRB Local areas not smaller

- Economic viability:
 - Smaller areas limit DRB earning capacity
 - Smaller broadcasters can still access market by Point of Service (PoS) pricing
- Frequency inefficiency:
 - Smaller areas lead to spectrum inefficiencies
 - Planning targets are spectrum demanding
- Deployment costs:
 - Smaller areas will require lower ERPs and more sites



Local area pop	#
< 1m	15



Local area size	#	PI diameter (10 kW ERP)
~ 25 – 80 km	10	~ 60 km

