



WorldDMB Workshop in Collaboration with NAB and SABC Johannesburg

DAB+ Network and Coverage Planning

Tuesday 16 July 2013

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DAB+ Transmission Network Planning

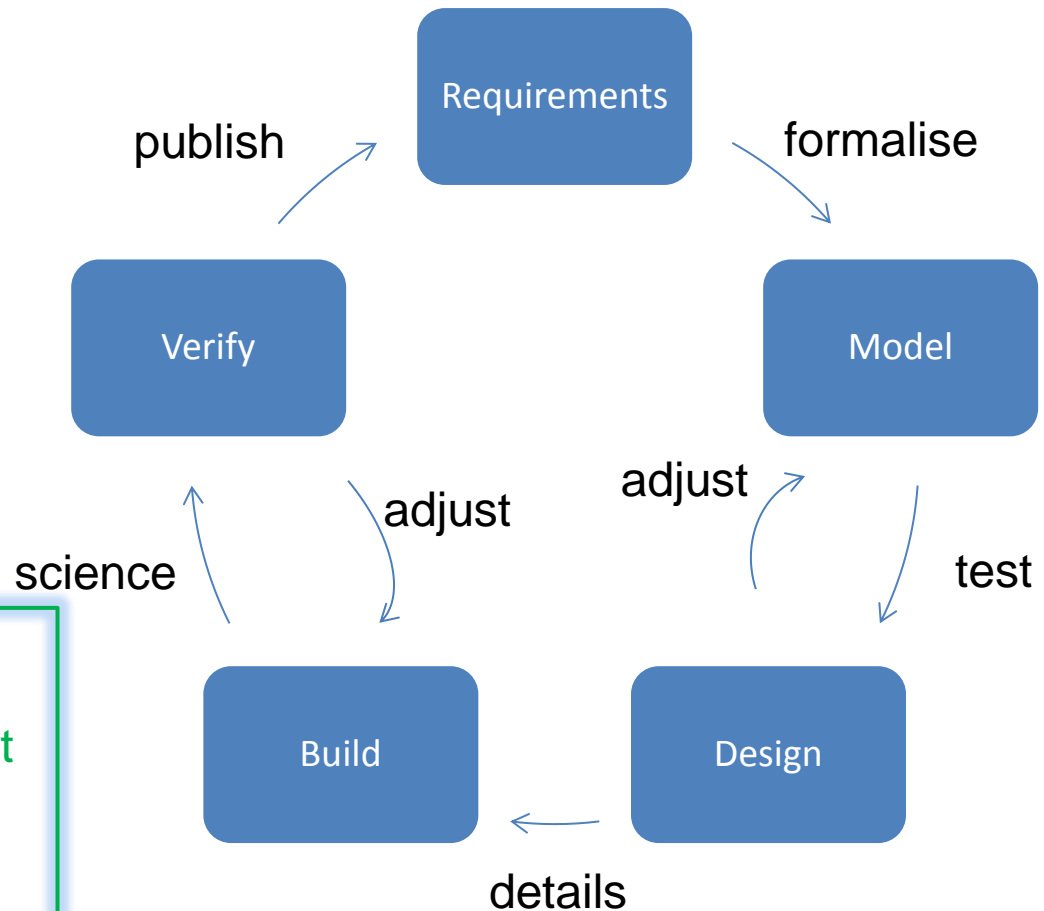
Overview

- **System Requirements**
- **Spectrum and Capacity Requirements**
- **Coverage Targets**
- **Regulatory Considerations**
- **Network Design**
- **Terrain, Licence Areas and Interference**
- **Equipment and Construction**
- **Performance Verification**

DAB+ Transmission Network Planning

The Design Cycle

- The first loop is the hardest
- A test transmission will provide the best learning experience
- Use the initial system results to help design future systems



Engineering collaboration helps minimise the system design and deployment effort and maximises benefits to listeners and in turn broadcaster returns

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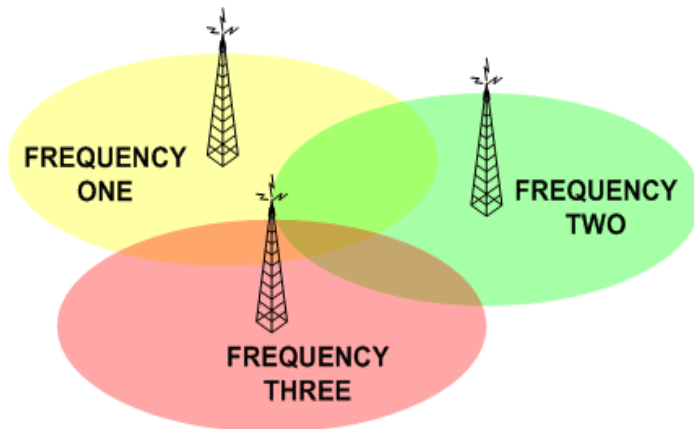
Multi-Frequency Networks and Single Frequency Networks

- Single frequency network.
- Several medium and low power transmitters

SFNs are a more efficient use of spectrum

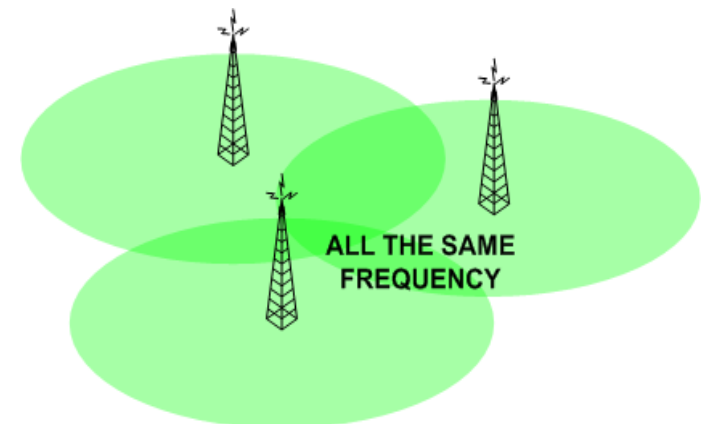
MFN

e.g. Main Tx and 2 Gap Fillers



SFN

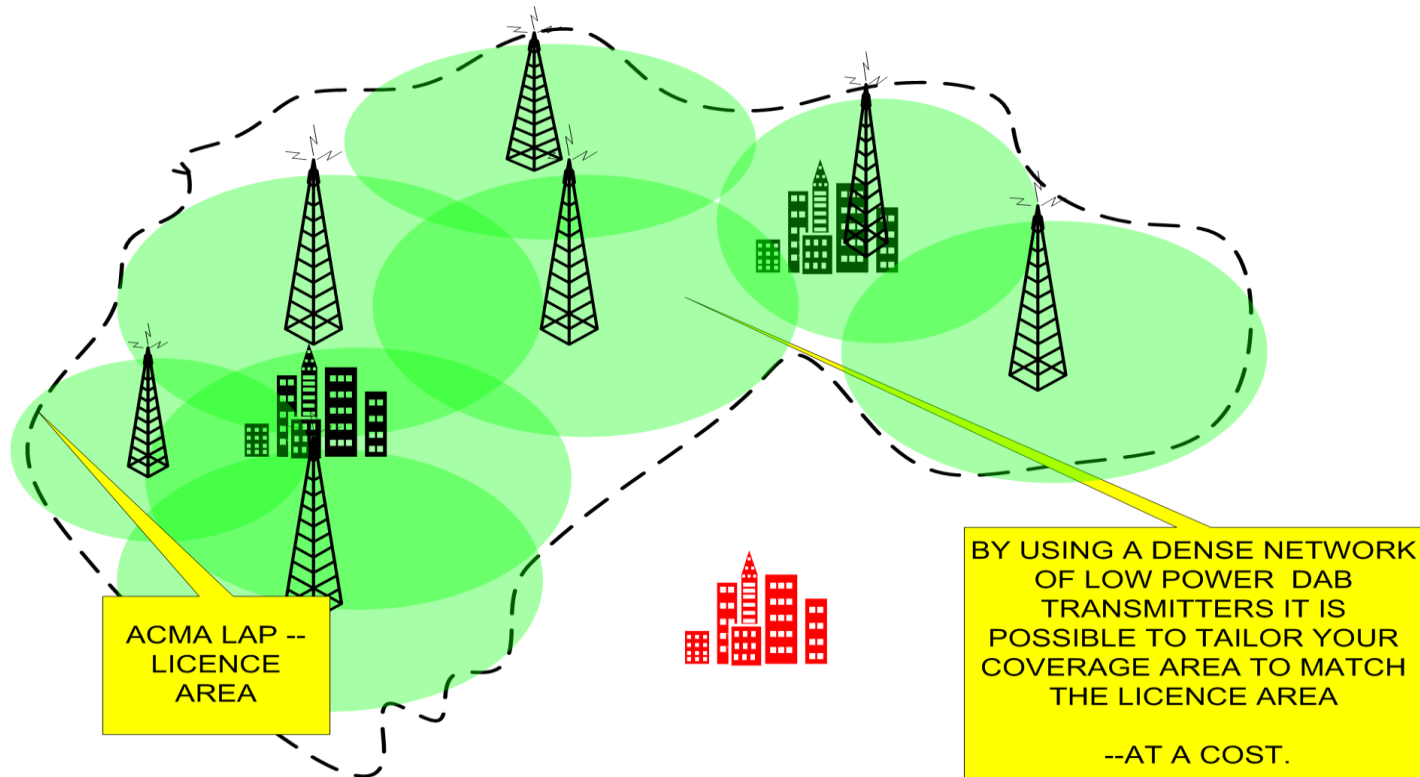
e.g. Main Tx and 2 Gap Fillers



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RF Network Options

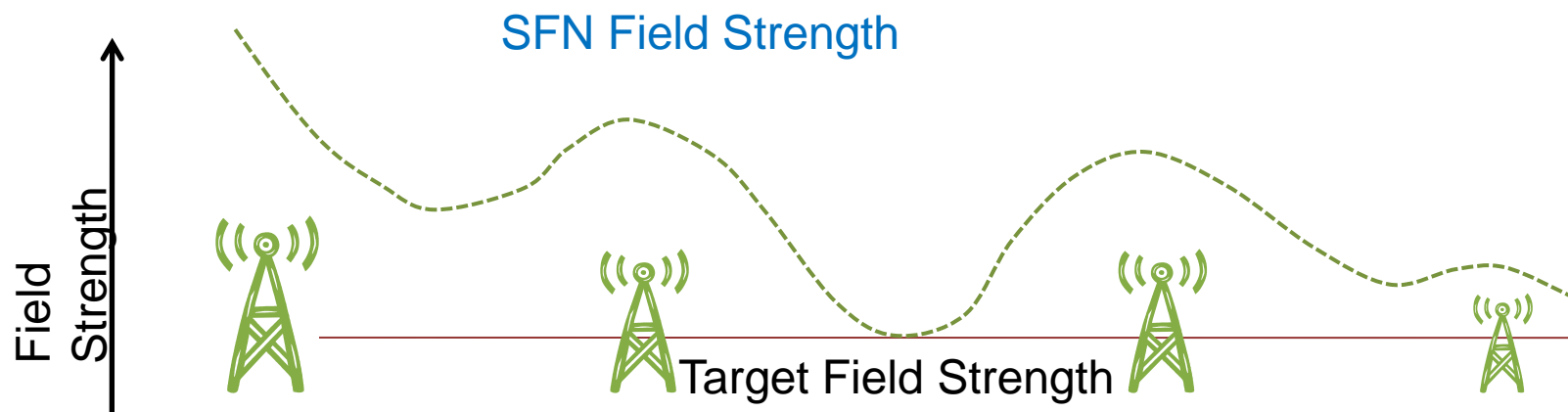
Covering a specific area
e.g. A Licence Area



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Typical DAB+ SFN

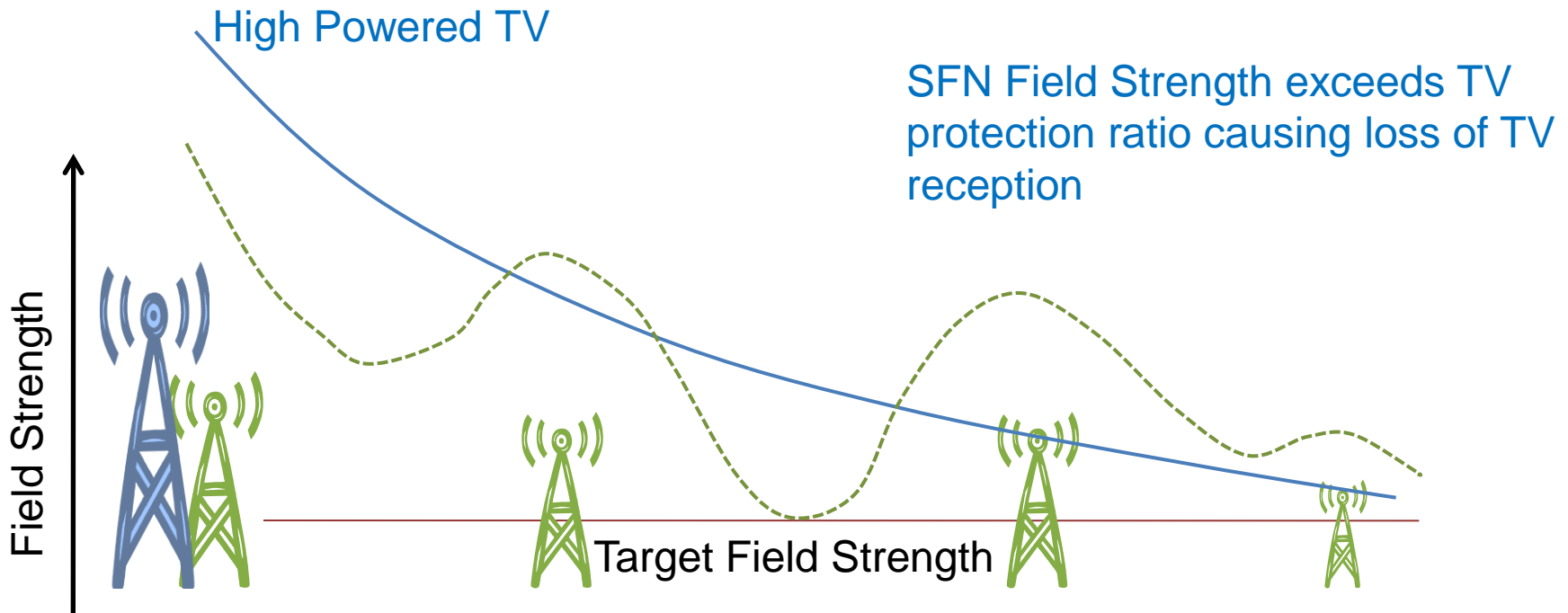
- Single frequency network.
- Several medium and low power transmitters



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Problems with TV in Same Band

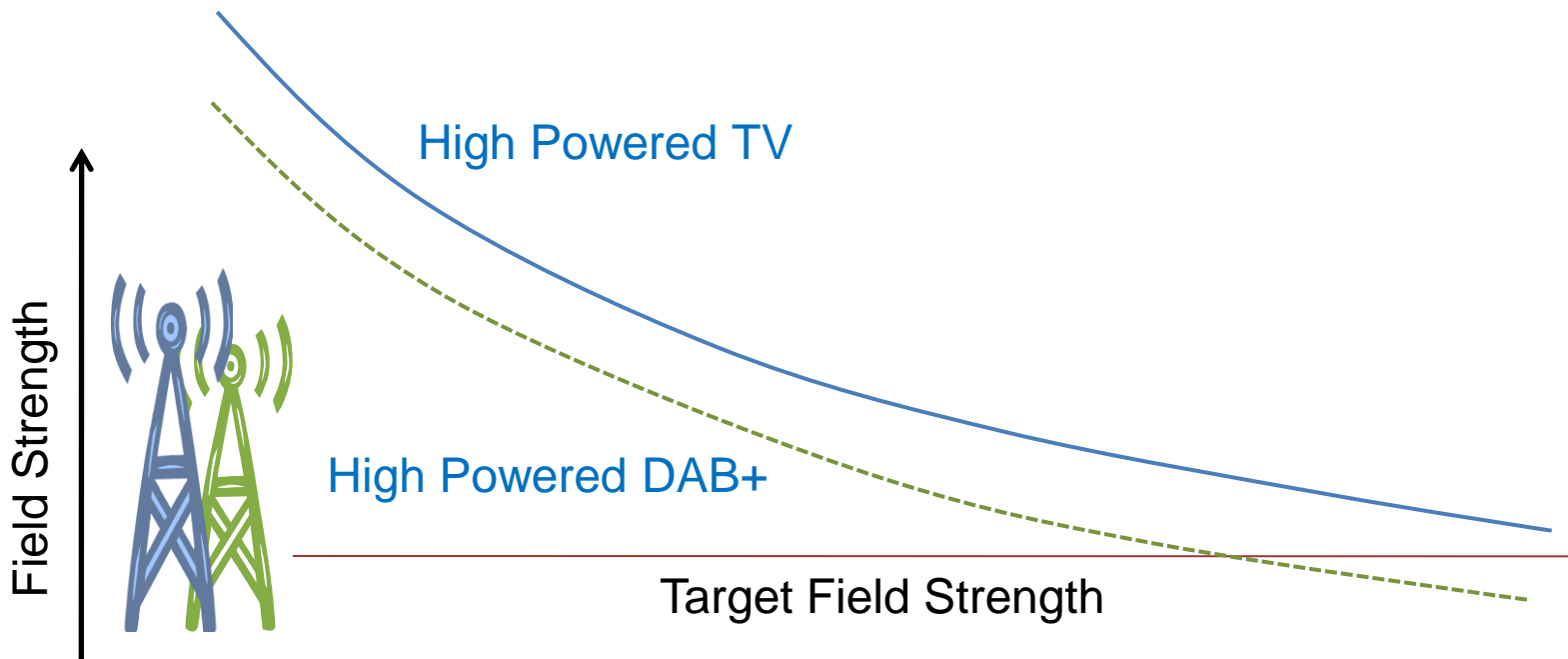
- Existing TV viewers will experience interference



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Co-Sited Transmitters

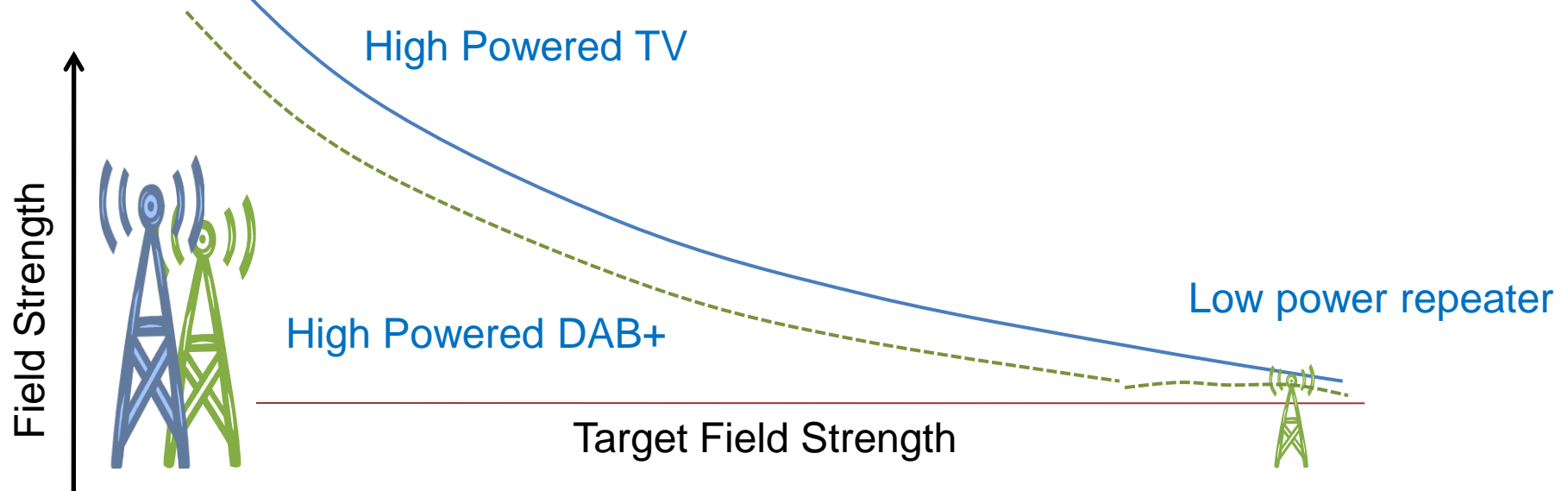
- If a high power DAB+ transmitter is placed at or near the same location as TV transmitters – interference to TV viewers is minimised.
- 50 kW ERP DAB+ transmitters are typical in Australia.



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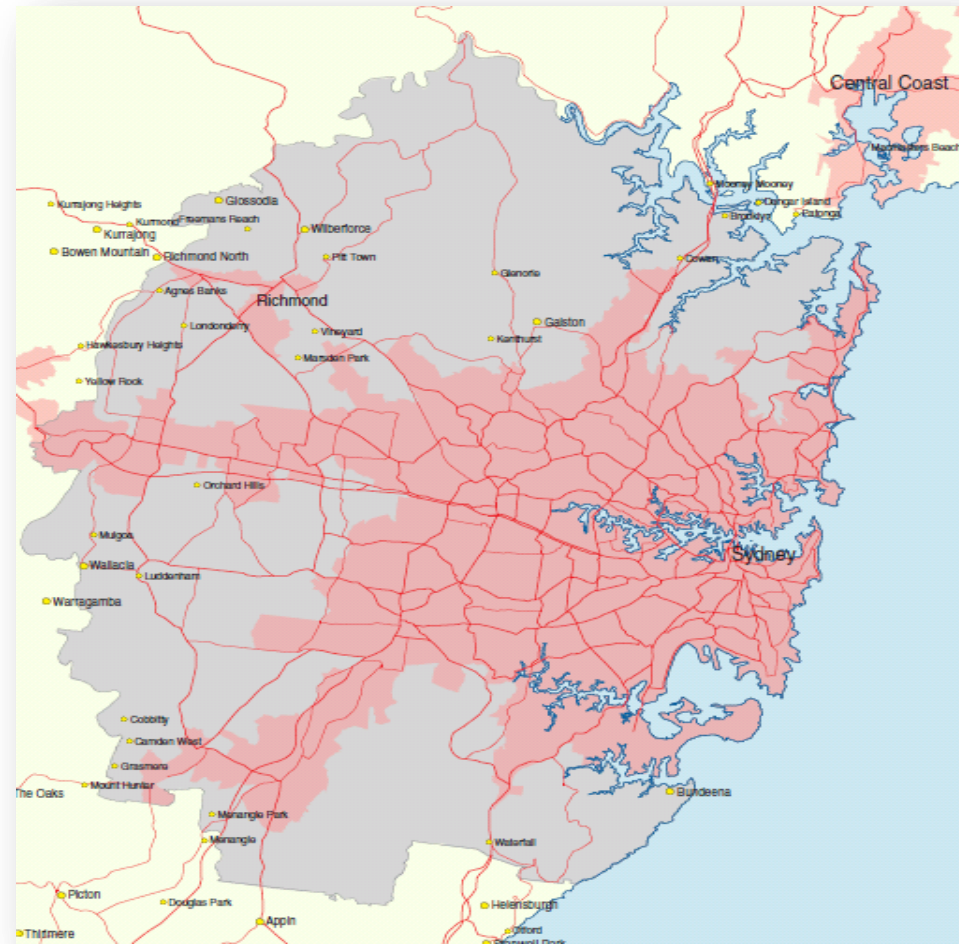
Co-Sited Transmitters

- Some black spots may still occur in CBD and edge of coverage areas.
- Low power repeaters can be employed to fill black spots
 - 300-500W ERP
 - >500W ERP in regional areas



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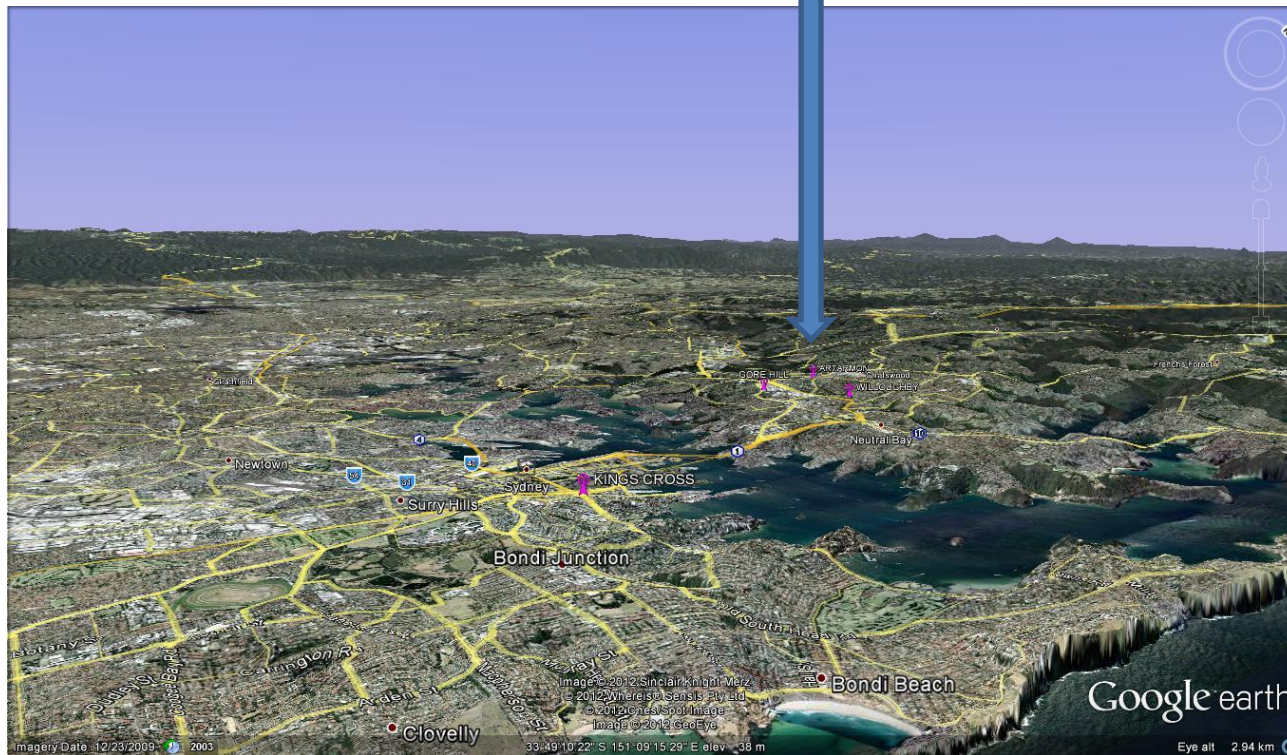
Sydney Licence Area



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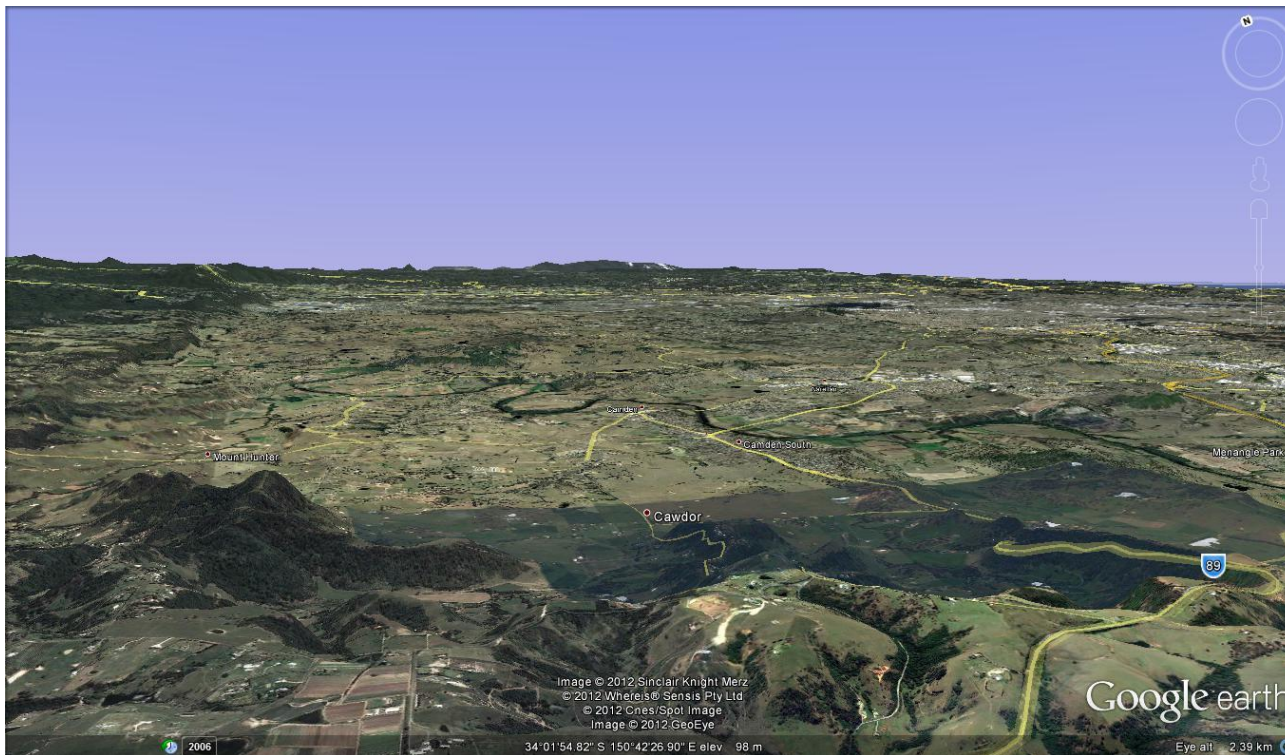
Sydney Terrain viewed from the East

Artarmon transmitter site



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Sydney Terrain – looking north over Camden valley



DAB+ Transmission Network Planning

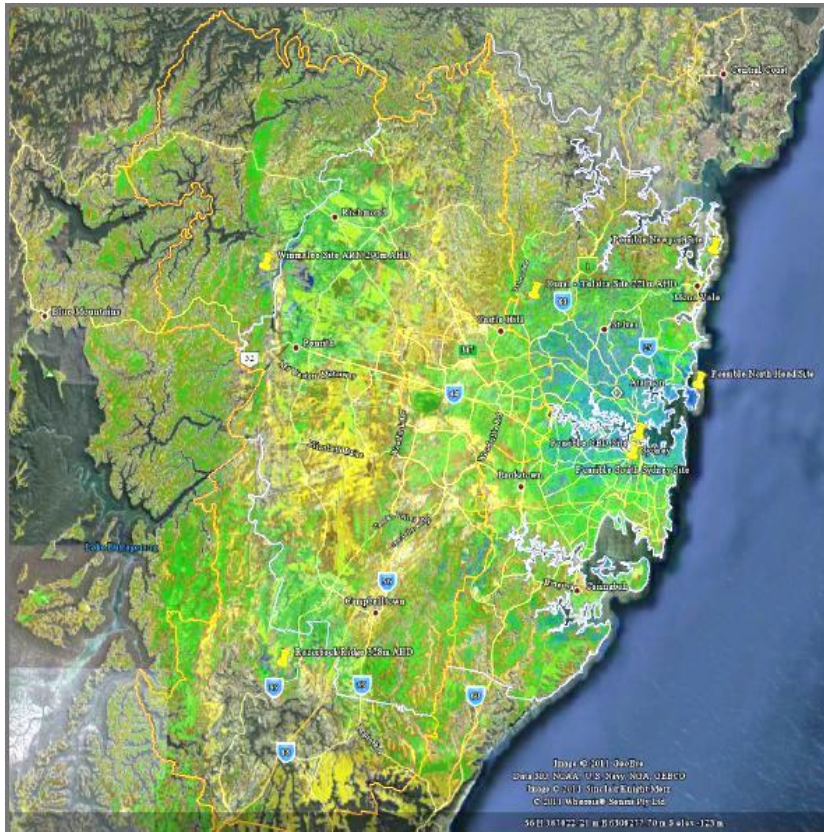
Sydney DAB+ Field Strength






	FIELD STRENGTH
Green	Urban Indoor & Vehicle
Brown	Suburban Indoor & Vehicle
Yellow	Vehicle Only

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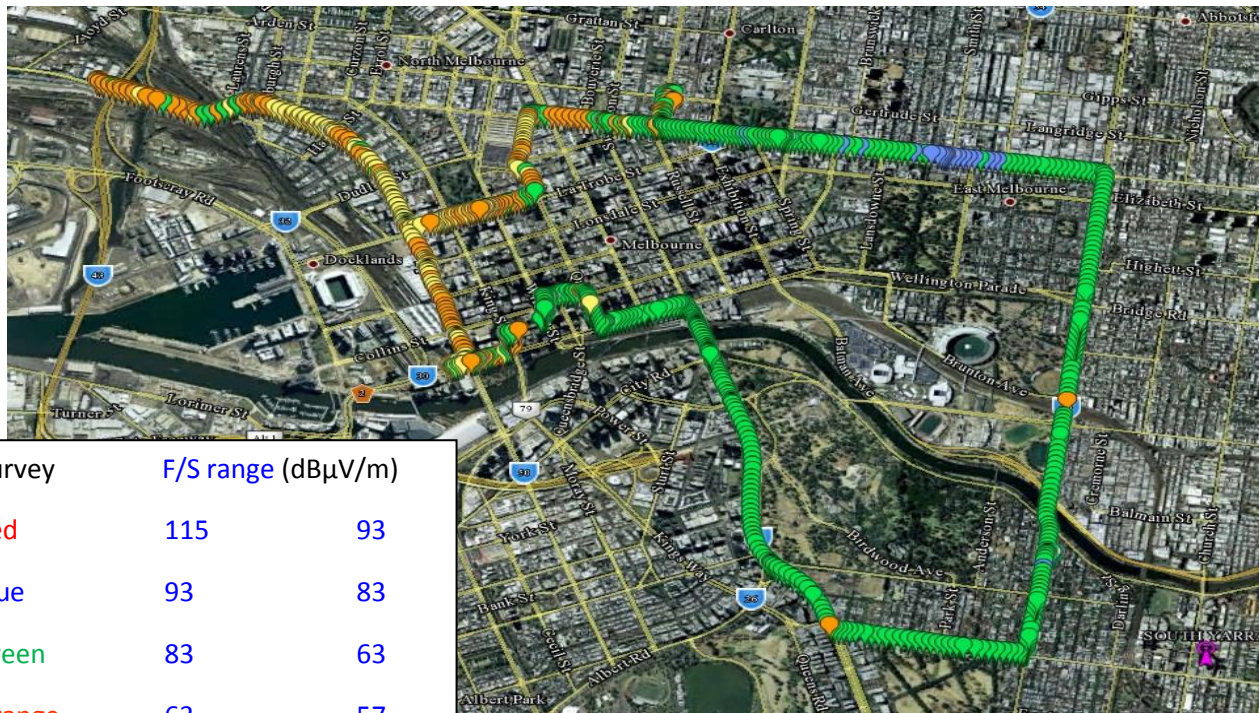
Sydney DAB+ Field Strength with OCR's



	FIELD STRENGTH
	Urban Indoor & Vehicle
	Suburban Indoor & Vehicle
	Vehicle Only

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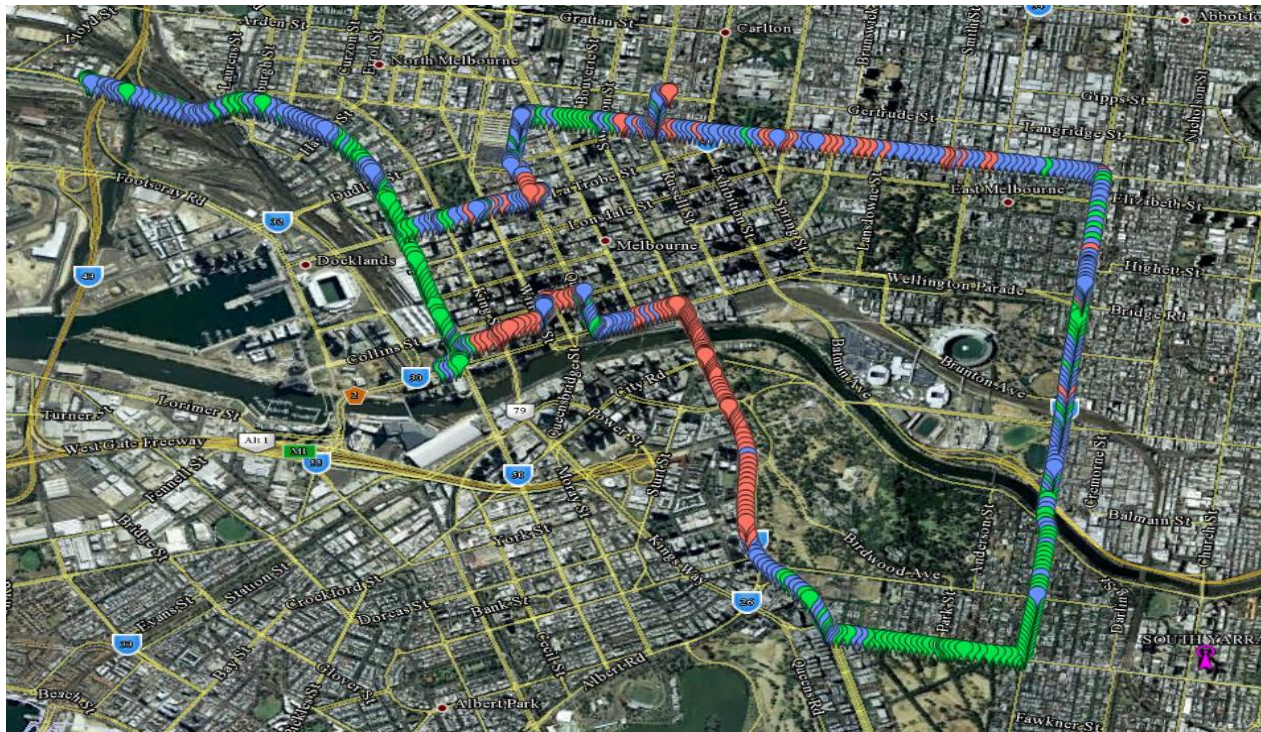
Measurement Locations – OCR Off



Prediction	Survey	F/S range (dB μ V/m)	
Blue	Red	115	93
	Blue	93	83
Green	Green	83	63
Brown	Orange	63	57
Yellow	Yellow	57	50
White	Yellow-dot	50	35
	Light blue	35	25

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Measurement Locations – OCR On



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Summary – Top Tips

1. Know what you want to achieve – the BIG PICTURE
2. Be **Collaborative in Engineering** the system – **Competitive on Content**
3. Work with your Regulator to ensure that all parties are considered
4. A successful rollout will require consultation with retailers, automotive etc
5. Use the design cycle to your advantage – process is important
6. RF Coverage modelling is essential
7. Beware of Co-Channel Interference and Adjacent Channel Interference
8. Always verify your design – tuning will probably be required!

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Thank You