

# DAB+ Digital Radio

## Field Testing

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# Why do field testing

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- To demonstrate the DAB+ transmission technology
- To demonstrate the features of the DAB+ system
- To understand, measure and verify field strength coverage and quality
- Check areas of suspected or known poor coverage
- Ensure that coverage models are accurate by tuning them using measured data
- Provide the maximum accuracy for future coverage plans,
  - e.g. repeaters in the same area
  - other areas with similar characteristics

# JRTV DAB+ trial participants

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- ASBU
- JRTV
- TRC
- Commercial broadcasters
- WorldDAB



# JRTV DAB+ trial equipment

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- Photo of the tower and antenna
- Location: JRTV transmission site, ? Street
- Lat: Long: Altitude:
- Antenna height: 80m AGL
- Antenna type: repurposed RFS 656 panel antenna

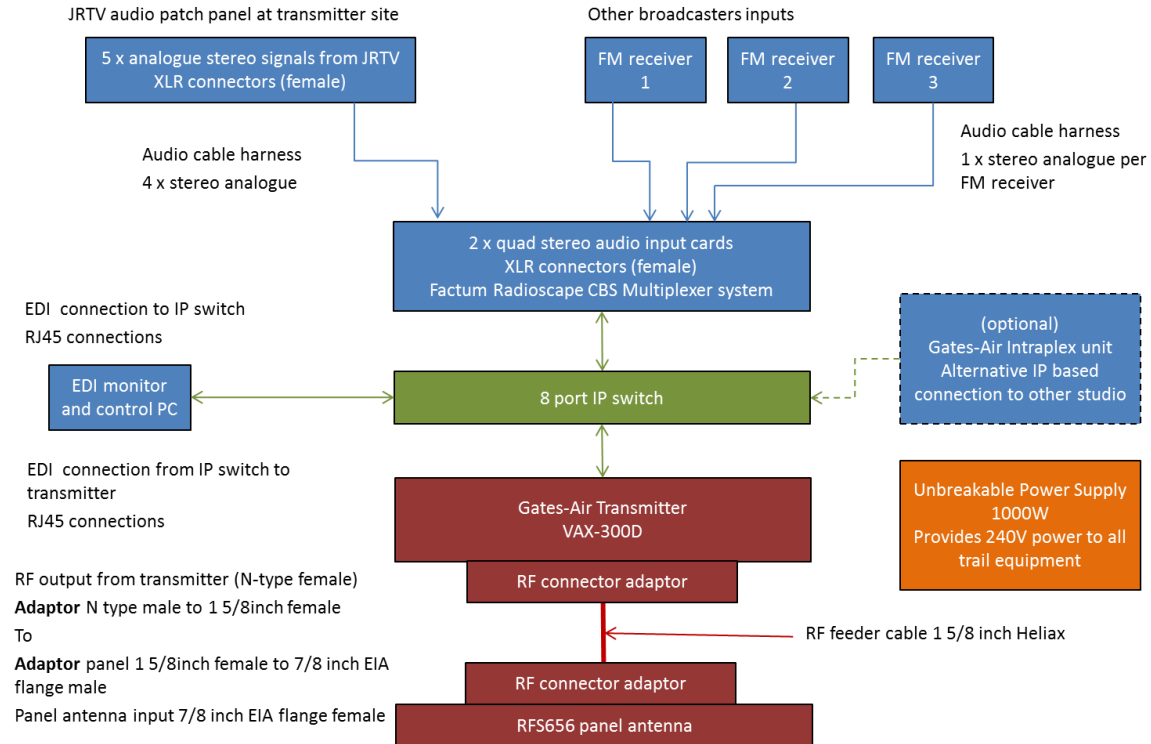
# JRTV DAB+ trial equipment

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- Photo of the equipment room showing the multiplexer and transmitter equipment

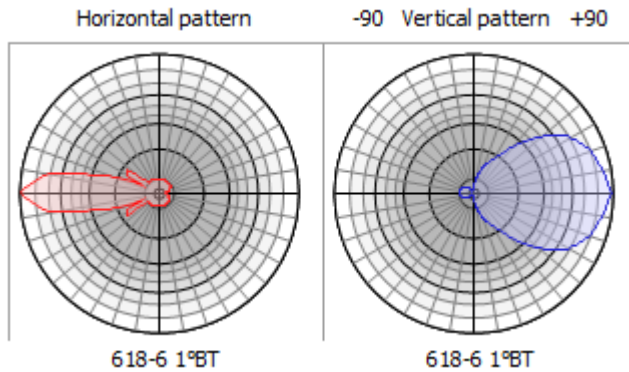
# JRTV DAB+ trial equipment

- Block diagram of the trial system



# JRTV DAB+ trial configuration

- RF configuration
  - RF channel 6C = 185. MHz
  - Transmitter output power =
  - Antenna ERP
  - Antenna pattern diagram



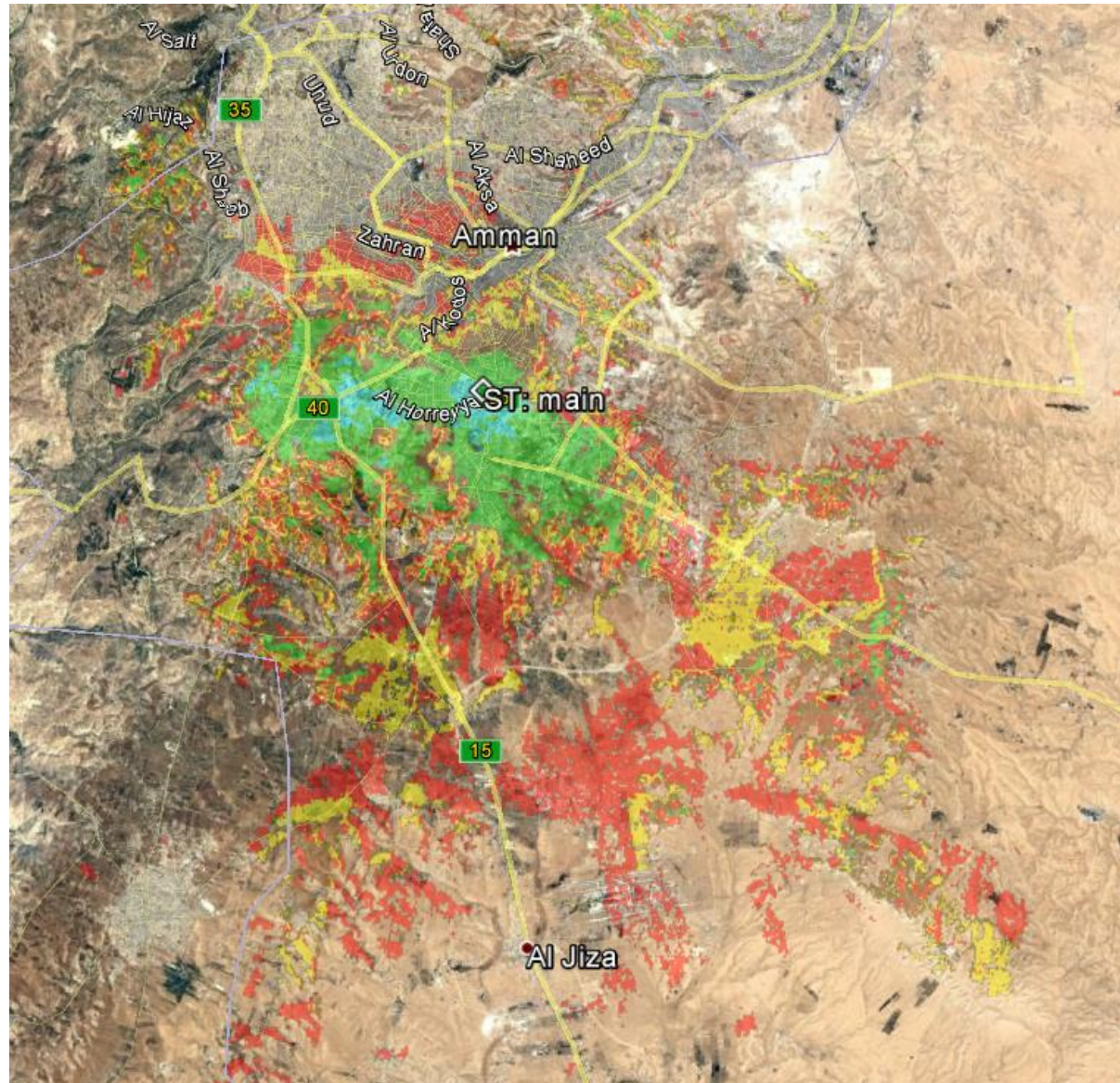
<b>Input power (W)</b>	<b>100</b>	<b>150</b>
feeder loss (dB)	0.93	0.93
antenna gain (dBd)	11	11
<b>output ERP (W)</b>	<b>1016</b>	<b>1524</b>



# JRTV DAB+ trial configuration

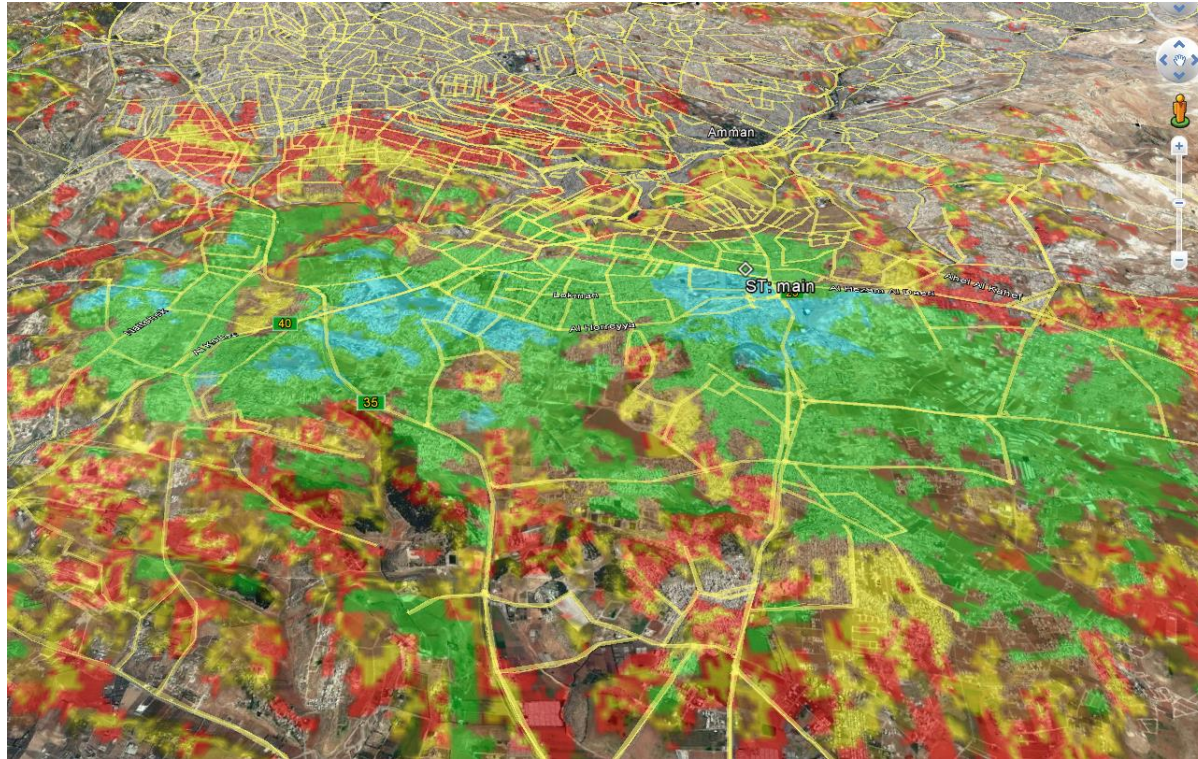
- RF coverage prediction

$\geq$ dBu/OAA	Label	
45	poor vehicle	Red
50	vehide	Yellow
54	suburban	Brown
60	urban	Green
80	dense urban	Cyan



# JRTV DAB+ trial configuration

- RF coverage prediction



# JRTV DAB+ trial configuration

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- Service configuration
  - 8 services

Service label	Sub-channel	Bit rate (kbps)	XPAD allocation (kbps)	Multicast IP address	Audio type	Audio coding
JRTV Radio 1	1	64	8	239.1.1.1	Talk, music	AAC stereo, SBR on
JRTV Radio 2	2	80	16	239.1.2.1	Classical music	AAC stereo
JRTV Radio 3	3	48	4	239.1.3.1	Pop music	AAC stereo, SBR on
JRTV Radio 4	4	32	4	239.1.4.1	Talk	AAC parametric stereo, SBR on
JRTV Radio 5	5	96	12	239.1.5.1	varied	AAC stereo
Commercial 1	6	64	8	239.1.6.1	Talk, music	AAC stereo, SBR on
Commercial 2	7	64	8	239.1.7.1	Talk, music	AAC stereo, SBR on
Commercial 3	8	64	16	239.1.8.1	Talk, music	AAC stereo, SBR on

# JRTV DAB+ trial configuration

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- Service configuration
  - PAD information

# JRTV DAB+ trial configuration

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- Service configuration
  - 8 services
    - JRTV radio 1

# JRTV DAB+ trial configuration

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- Service configuration
  - 8 services
    - JRTV radio 1

# JRTV DAB+ trial configuration

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- Service configuration
  - 8 services
    - JRTV radio 1

# JRTV DAB+ trial configuration

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- Service configuration
  - 8 services
    - JRTV radio 1



# Field Monitor demonstration

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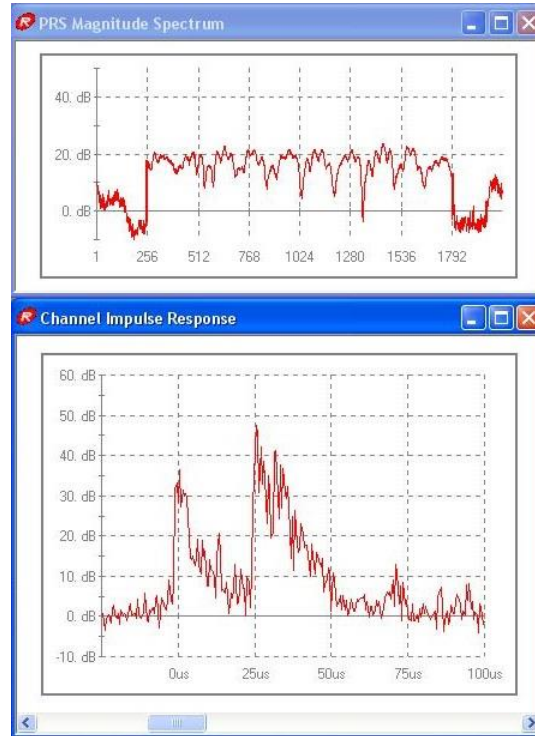
## Features

- Service information
- RF information
- Logging

# Example multipath situations

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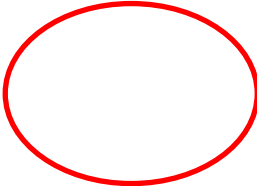
CIR and Spectrum of signal received on Channel 9A at CRA office in Surry Hills



# Site views

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Good and bad coverage area photos.

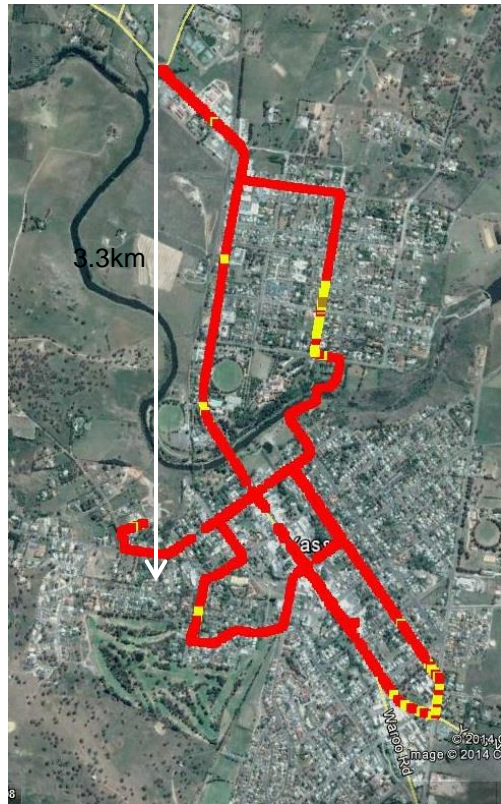


# Coverage vs prediction

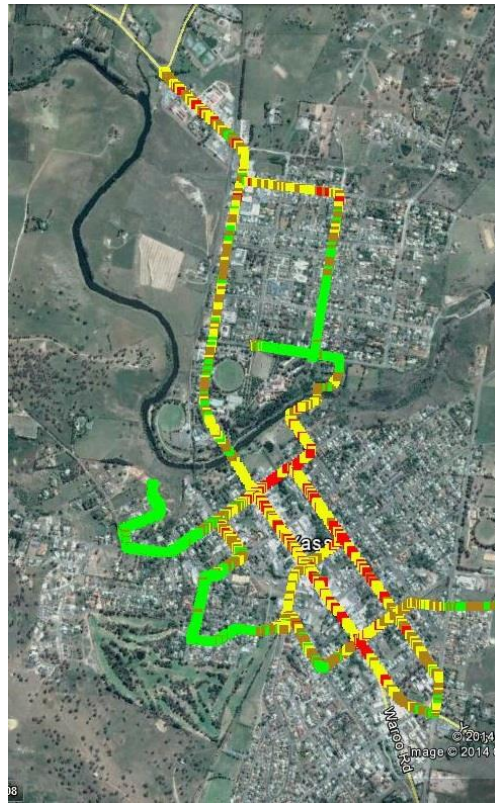
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Predicted vs measured field strength – Mt  
Manton Tx height = 10m, ERP = 108W.

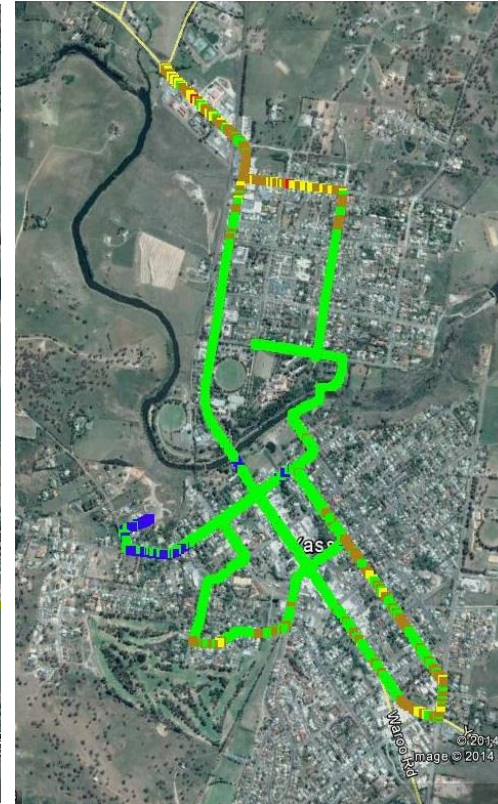
# Amman field strength plots



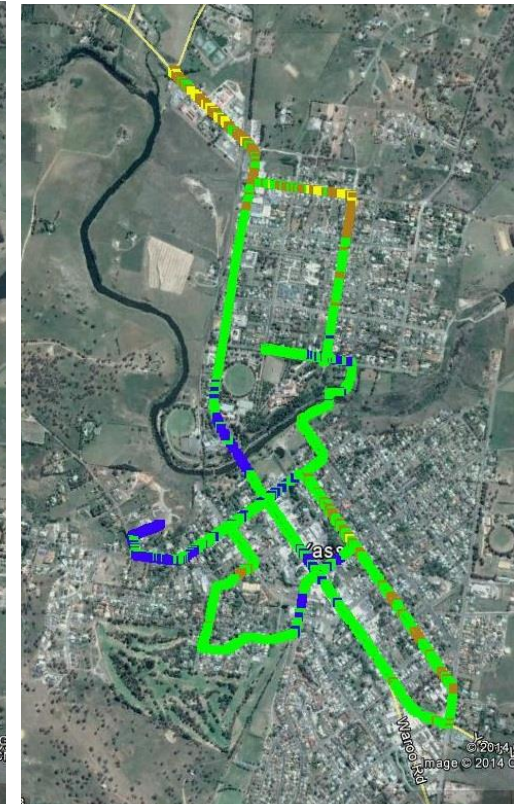
Black Mountain  
transmission only



Black Mountain and Mt  
Manton OCR (108W)



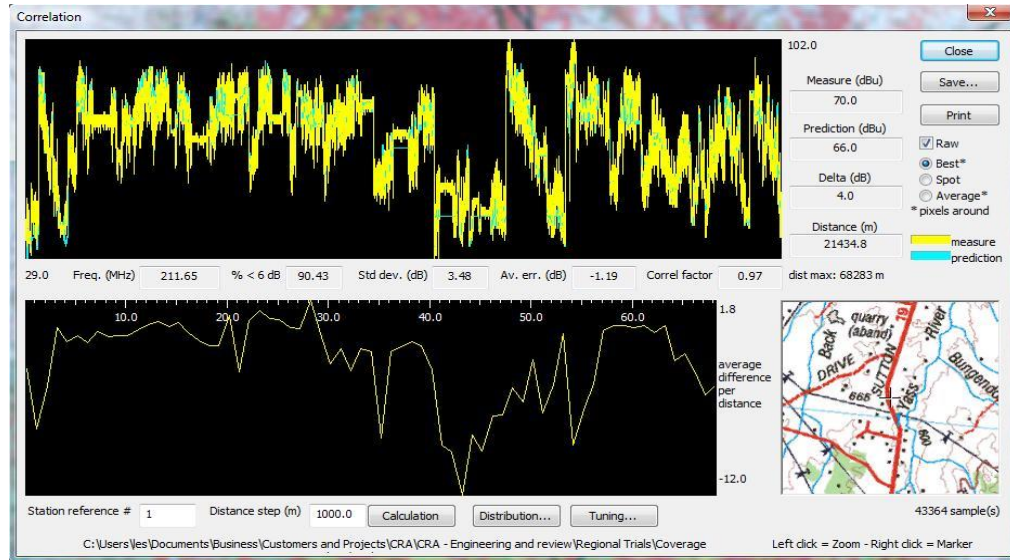
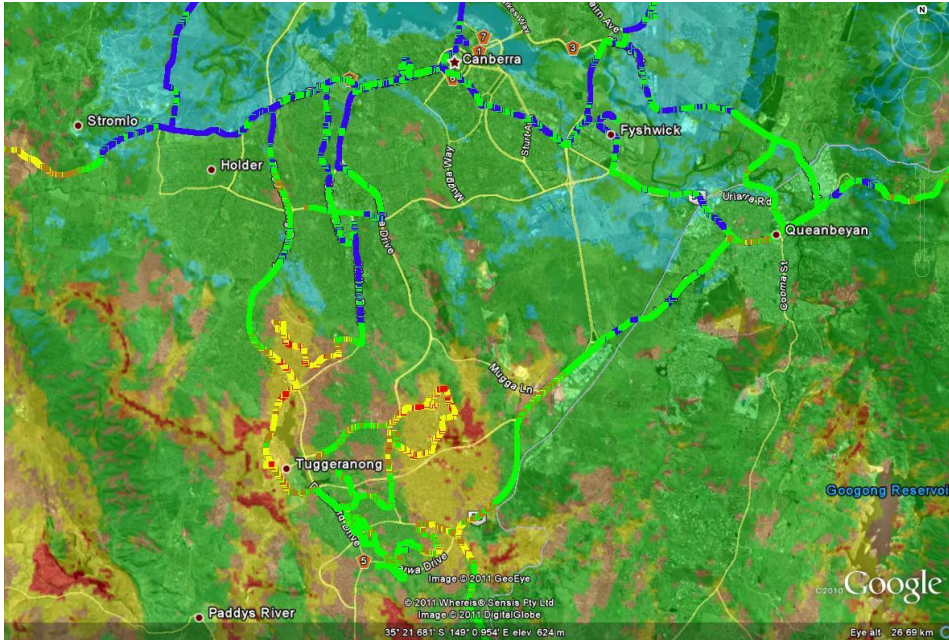
Black Mountain, Mt Manton  
OCR and Yass cascade  
OCR at 4.3W ERP



Black Mountain, Mt Manton  
OCR and Yass cascade  
OCR at 17.7W ERP

# Model tuning

## South Canberra shadowed areas overview



# What did we learn?

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- Example coverage from the transmission
  - Impact of terrain
  - Impact of FEC
- Experience of transmission
- Experience of content provision- audio and metadata

# Conclusions

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- Field testing is how we prove our broadcast system performance from planning to verification
- In field observation ensures a clear understanding of black-spot areas and their causes and hence potential solutions
- Field test data should always be used to tune coverage prediction models to ensure a clear understanding of their accuracy
- In field demonstrations of different propagation environments from line-of-sight to completely shadowed improves knowledge and understanding of the way DAB+ works.



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# Thank you

*For further information, please contact:*

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