



VOV / WorldDMB Workshop on Digital Radio Technologies

27-29 July 2013

*The Melia Hotel & VOV HQ Building,
Hanoi, Vietnam*



Supported by



DAB+ Demonstration Briefing

Friday 26 July 2013, Session 3

Dr. Les Sabel - WorldDMB Technical Committee

Wilson Ng – Commercial Radio Australia

DAB+ Demonstration

Overview

DAB+ Trial Goals

DAB+ System Design

Review of Equipment

Demonstration Overview

Drive Routes

Data Analysis

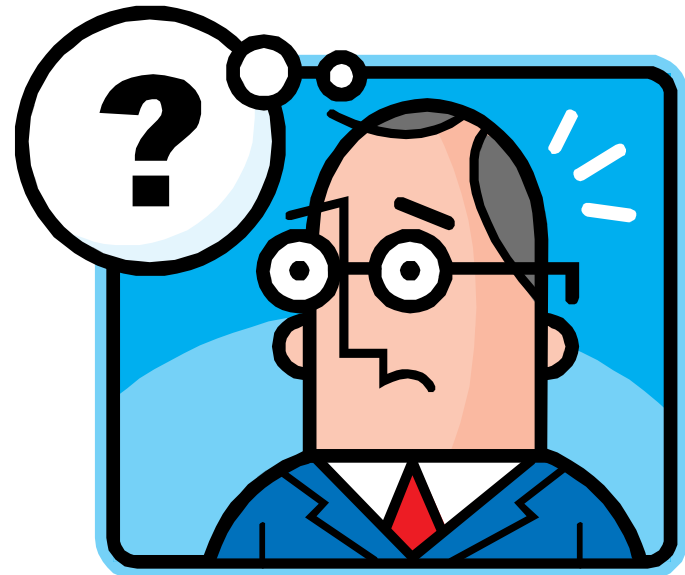
DAB+ Demonstration

Goals

Experience the technology
in an on-air situation

Demonstration of equipment
operation

Gain an understanding of
field trial activities



DAB+ Demonstration

The Importance of Field Testing

Quality testing

Proof of performance

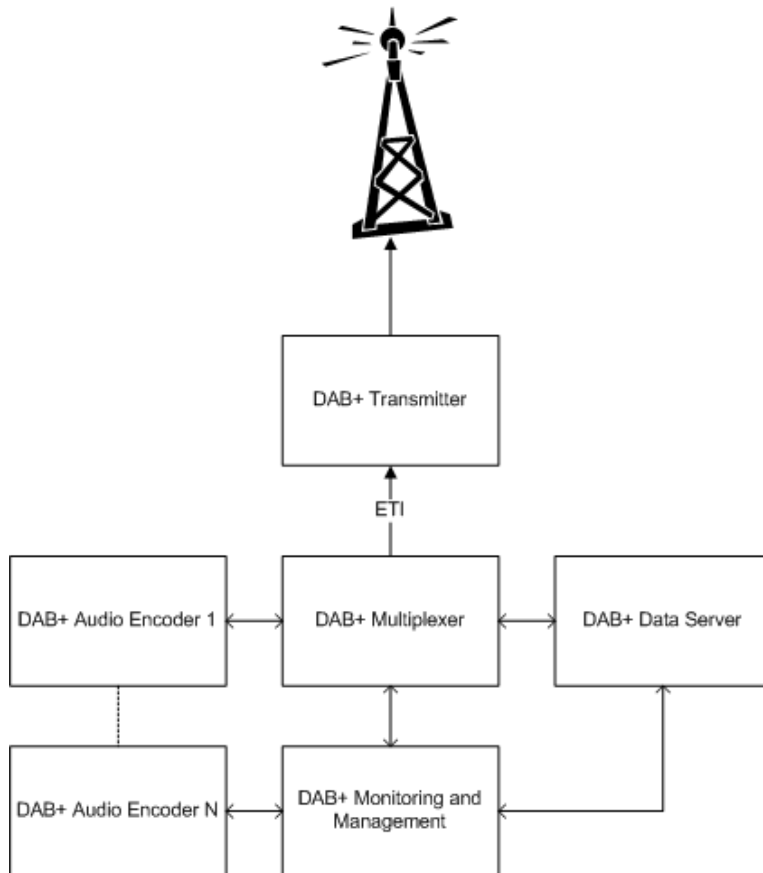
Coverage tuning

Research



DAB+ Demonstration

System Design



DAB+ Multiplexer

DAB+ Audio Encoders

DAB+ Data Server

DAB+ Management/Monitoring

DAB+ Transmitter

Antenna

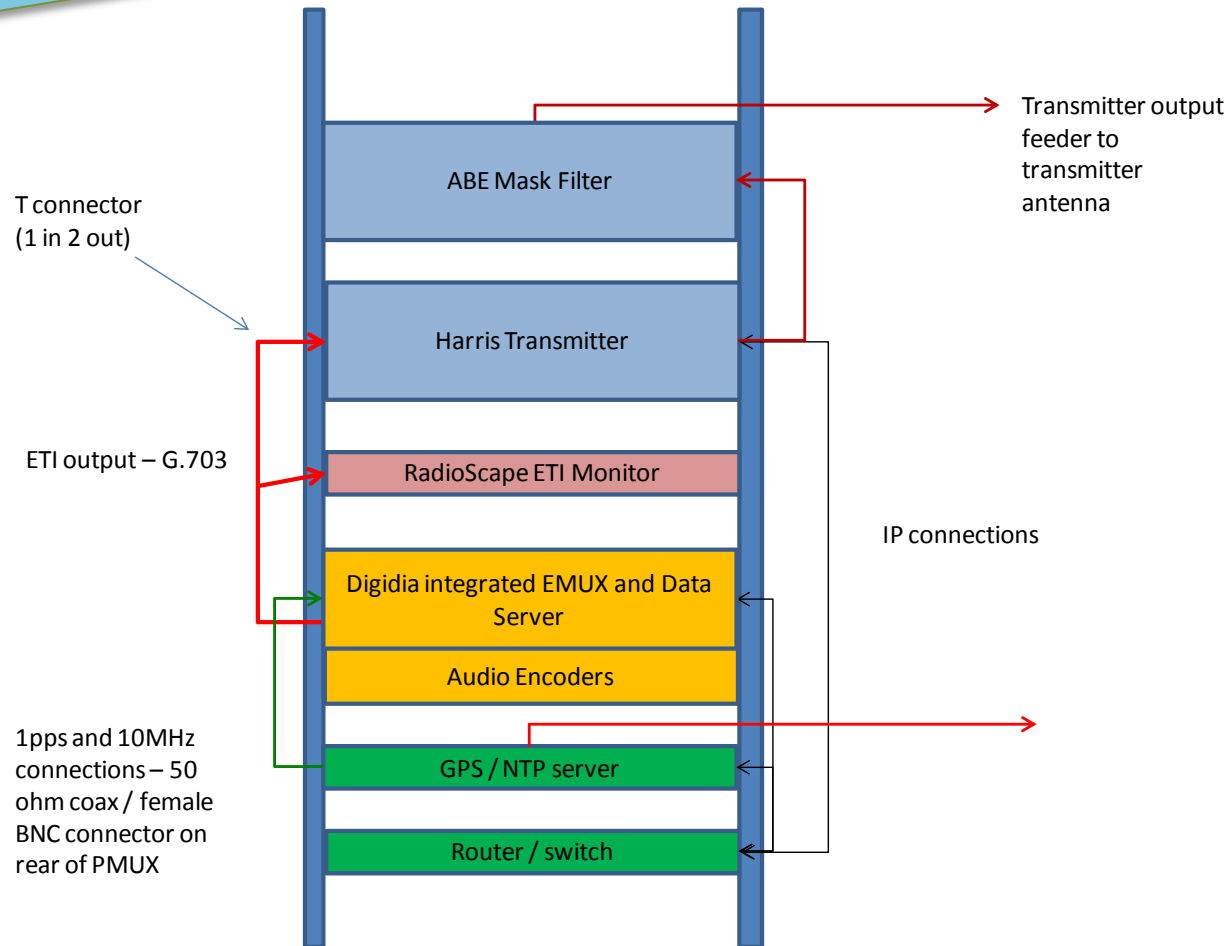
DAB+ Demonstration

Equipment Suppliers



DAB+ Demonstration

Broadcasting Equipment



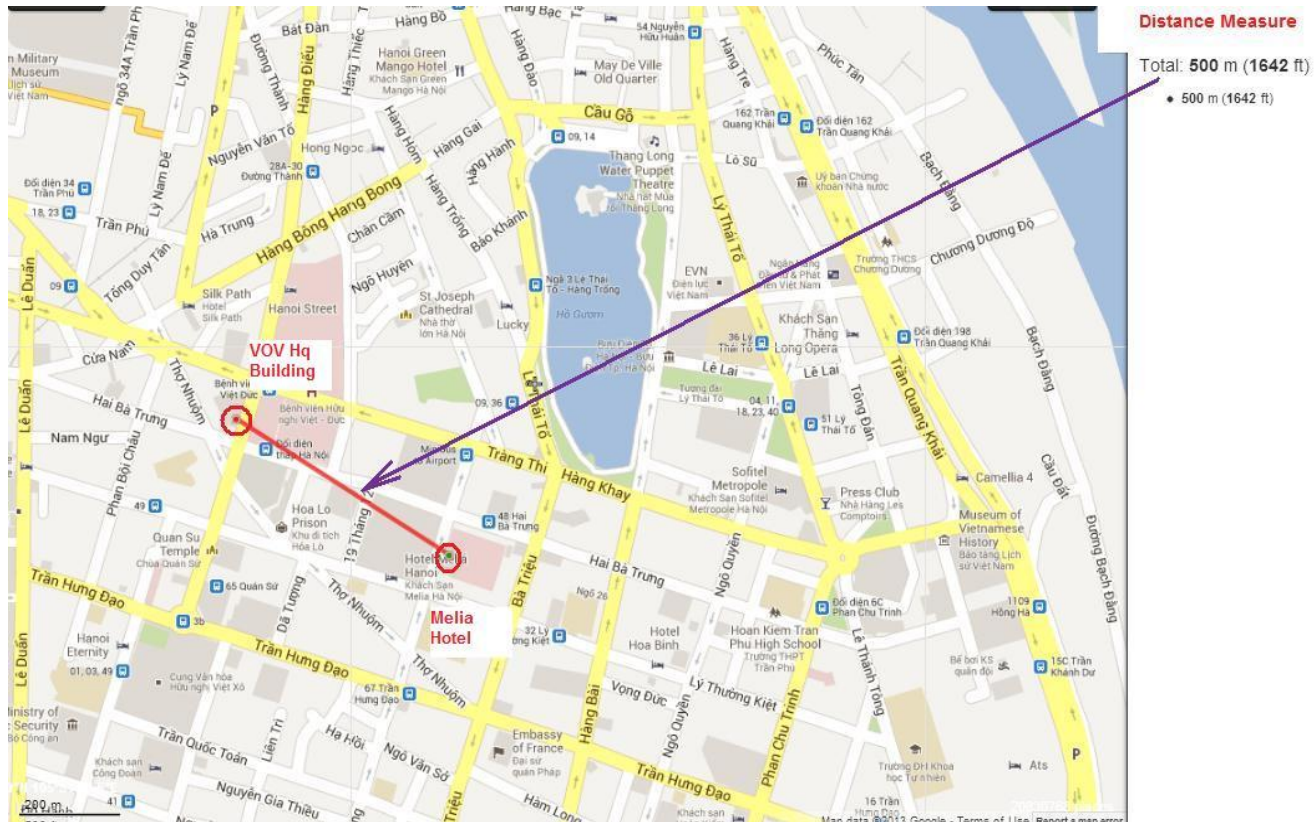
DAB+ Demonstration

VOV HQ Building



DAB+ Demonstration

VOV HQ and the Melia Hotel

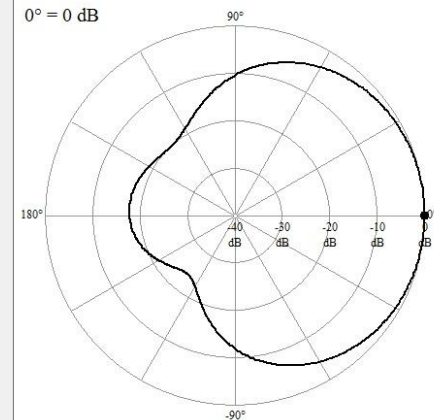


DAB+ Demonstration

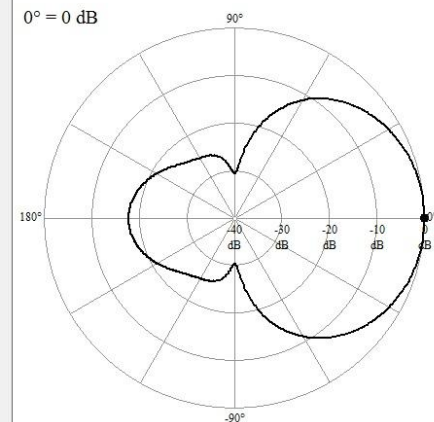
Transmission Antenna



File: 223L.adf
Manufacturer: Polar Electronic Industries
Model: 223L
Description:
Lightweight foldable 3 element yagi
Date: 2013-04-12
Frequency: 206 MHz–216 MHz
Mid-band gain: 7.8 dBi
Connector type: N female connector
V.S.W.R.: 1.50:1
Maximum power: 200.0 W
Pattern type: typical
Frequency: 211 MHz
Pattern cut: AZ
Polarization: V/V
Points: 361



File: 223L.adf
Manufacturer: Polar Electronic Industries
Model: 223L
Description:
Lightweight foldable 3 element yagi
Date: 2013-04-12
Frequency: 206 MHz–216 MHz
Mid-band gain: 7.8 dBi
Connector type: N female connector
V.S.W.R.: 1.50:1
Maximum power: 200.0 W
Pattern type: typical
Frequency: 211 MHz
Pattern cut: EL
Polarization: V/V
Points: 361



DAB+ Demonstration

Transmission information

Transmission: 38W ERP from a 3 element Yagi antenna mounted 60m AGL

Ensemble info	Content
Ensemble frequency	12D – 229.072MHz
Ensemble Label	Hanoi DAB+ Demo
Ensemble ID	0x01
Country Code	ECC = 0xF2, Country ID = 0x7

DAB+ Demonstration

Demonstration Services

Channel plan

Feeds from encoders

VOV GT-HN

VOV 3

VOV 1

VOV 5

EMUX

Sub Channels

1

2

3

4

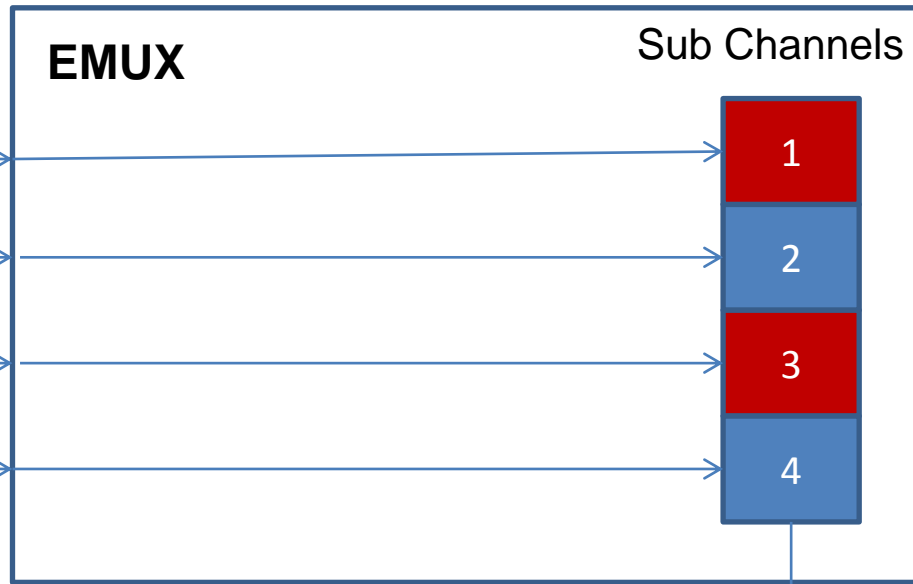
48kbps, PS., FEC=1A

80kbps, St., FEC=3A

48kbps, M., FEC=3A

32kbps, M., FEC=4A

ETI out



DAB+ Demonstration

Service Information

Parameter	Service			
	1	2	3	4
Content type	Music	Music	Speech	Cultural / speech
Feed type	Stereo	Stereo	Mono	Mono
Feed connector	2 x RCA	2 x RCA	1 x RCA	1 x RCA
Service Label	VOV GT-HN	VOV 3	VOV 1	VOV 5
Service Label (abr)	VOV GT-HN	VOV 3	VOV 1	VOV 5
Sub-channel	1	2	3	4
Service ID	1	2	3	4
AAC+ Audio coding	Parametric Stereo	Stereo	Mono	Mono
Inner layer FEC	1A	3A	3A	4A
Sub-channel bit rate (kbps)	48	80	48	32
Outer Layer FEC overheads (kbps)	4.8	8	4.8	3.2
PAD bit rate total (kbps)	8	8	8	8
DLS (kbps)	1	1	1	1
SLS (kbps)	7	7	7	7
Audio bit rate (kbps)	35.2	64	35.2	20.8

DAB+ Demonstration

Service Logos for Slideshow



HỆ THỜI SỰ -
CHÍNH TRỊ-TỔNG HỢP

VOV
GIAO THÔNG FM.91MHz

- + Thông tin kịp thời
- + Cập nhật liên tục
- + Lộ trình tối ưu

The image shows a promotional graphic for VOV GIAO THÔNG FM.91MHz. It features the station's logo at the top, followed by the frequency. Below this, three bullet points in green text list the station's features: timely information, continuous updates, and an optimal route. The background is a blue sky with a traffic light.

HỆ VĂN HÓA -
ĐỜI SỐNG-KHOA GIÁO



HỆ ÂM NHẠC -
THÔNG TIN - GIẢI TRÍ

DAB+ Demonstration

Coverage prediction

ATDI ICS Telecom

20m terrain

Coarse clutter

ITU 525
propagation model

Palette

>=usec/m ²	>= %	>= dB	>=dBuV/m/OAA	Label
auto	auto	auto	35	
auto	auto	auto	40	
auto	auto	auto	45	
auto	auto	auto	50	
auto	auto	auto	57	
auto	auto	auto	63	
auto	auto	auto	83	
auto	auto	auto		
auto	auto	auto		
auto	auto	auto		
auto	auto	auto		

From -360 to 10000 From 1 to 100 From -126 to 126 From -999 to 253

256 color palette (dBU)

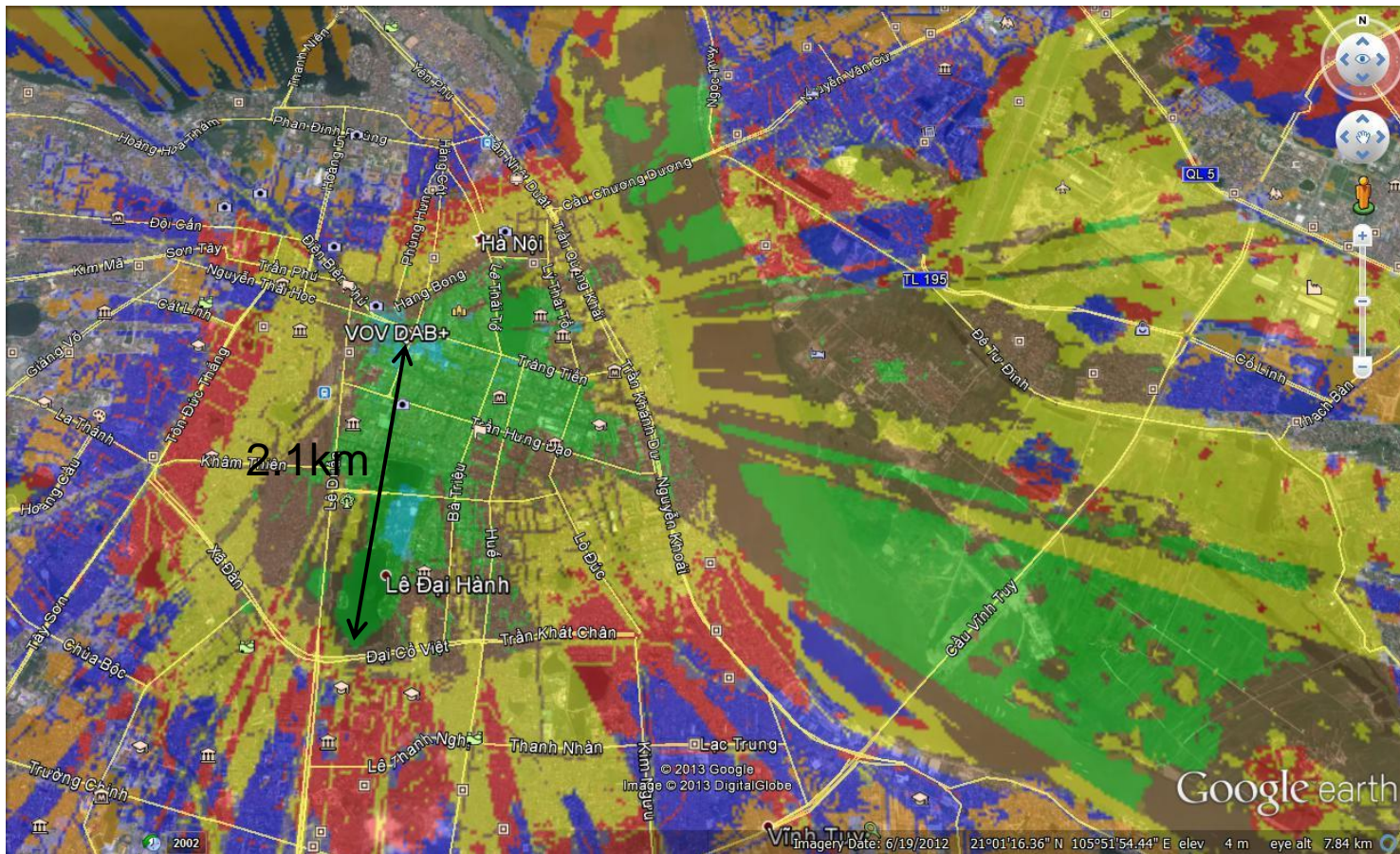
Click to change color
 Global palette

255 = infinite (dB/dBu/%)
32000 = infinite (usec/m²)

Close
Load...
Save...
Default colors
Default values dBU dBm
Default values C/I and Ec/I0
Default values %
Default values usec/m²

DAB+ Demonstration

Coverage prediction – wide area



DAB+ Demonstration

Field Measurement Exercise



DAB+ Demonstration

Field Measurement Exercise

Maximum of 7 people per Group

9:30 – 11:00

11:00 -12:30

13:00 - 14:30

14:30 - 16:00

DAB+ Demonstration

What is demonstrated

The features on the Radioscape Field Monitor

Different Coverage conditions – from marginal coverage to best coverage

Different Audio error correction levels

Comparing Audio services

DAB+ Demonstration

Equipment Listing



Radioscape Field Monitor

Radioscape Field Monitor Laptop

GPS Unit

Antenna

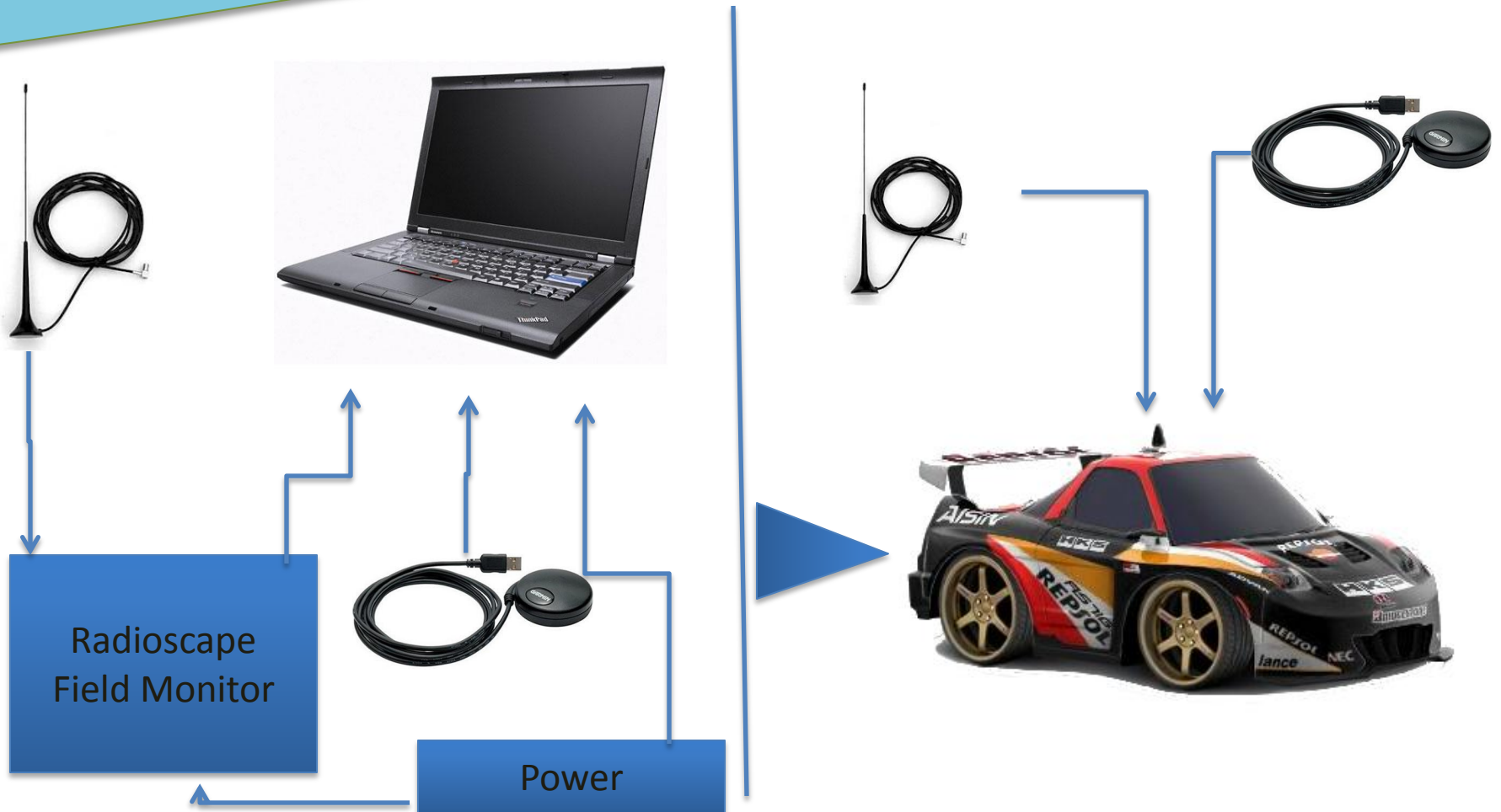
Vehicle

Other Accessories



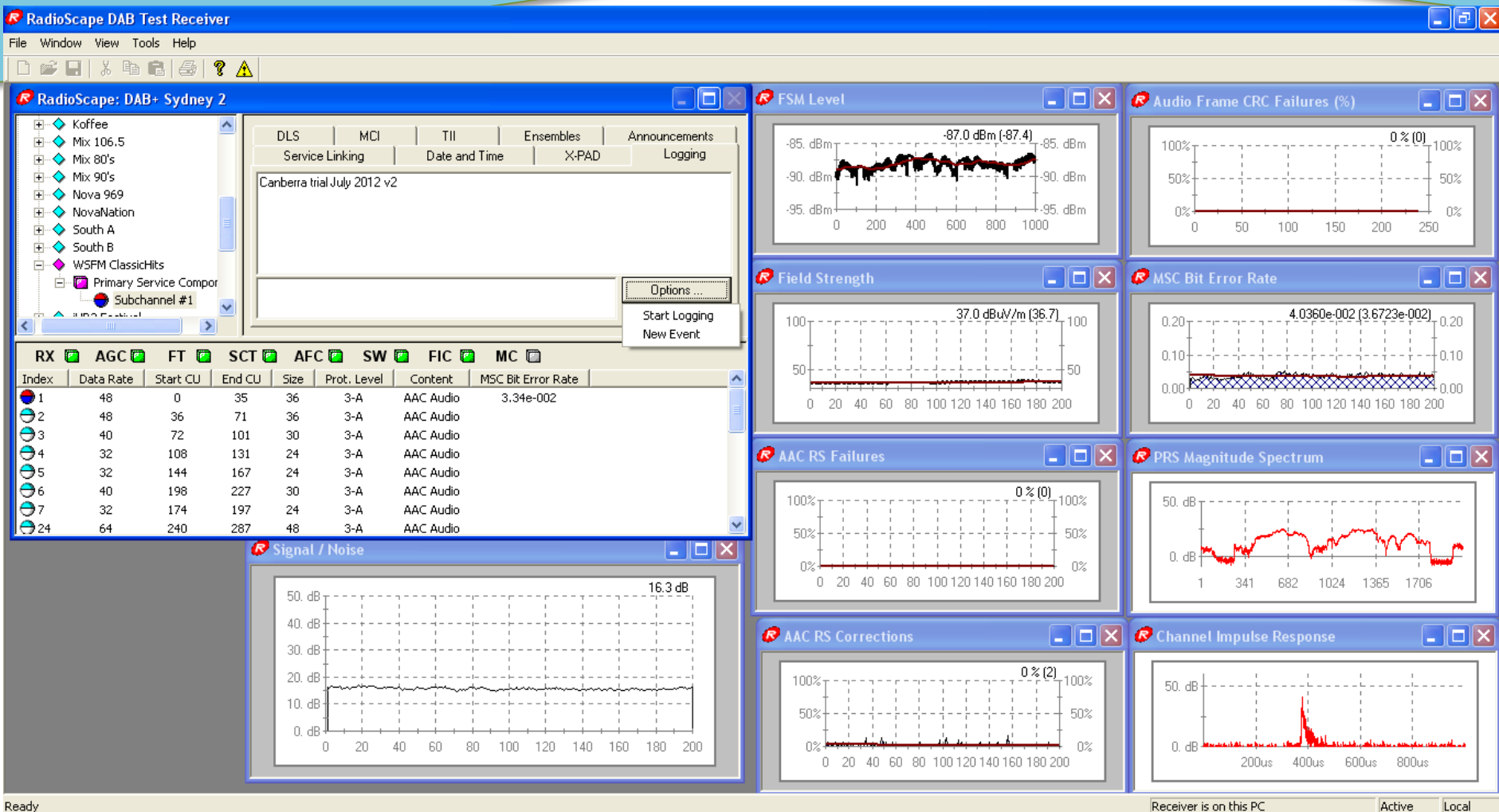
DAB+ Demonstration

Equipment Setup

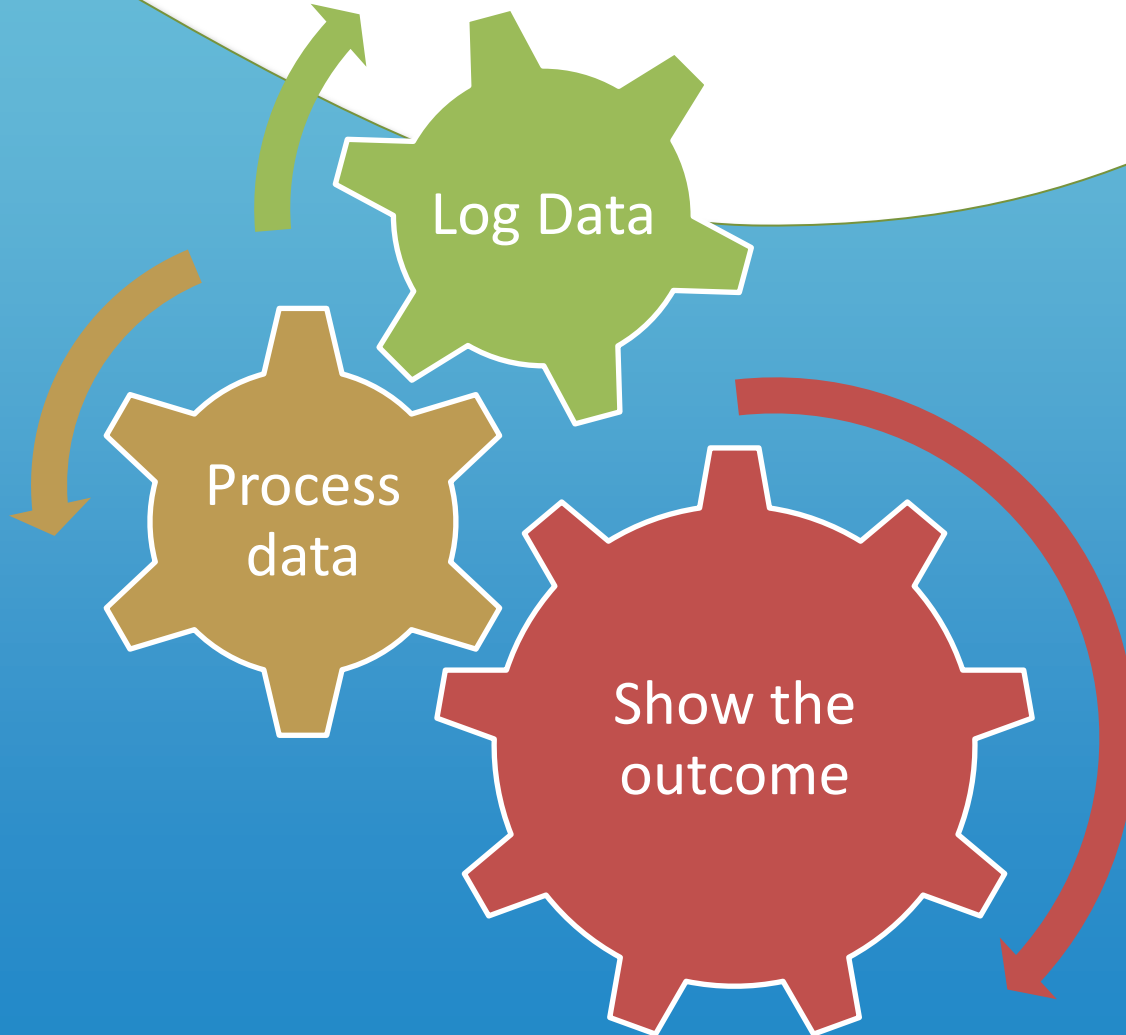


DAB+ Demonstration

Field Monitor Interface

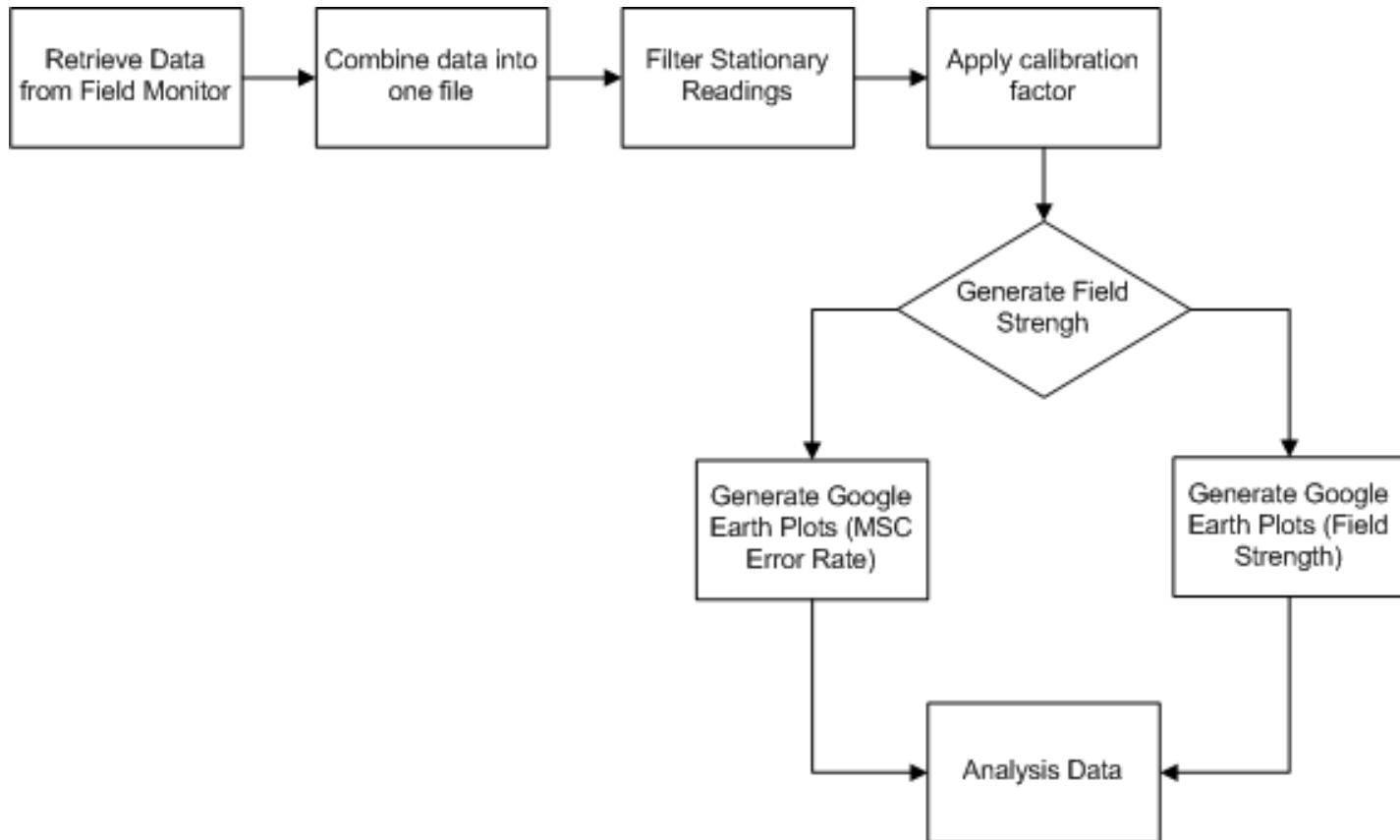


Data process outcome

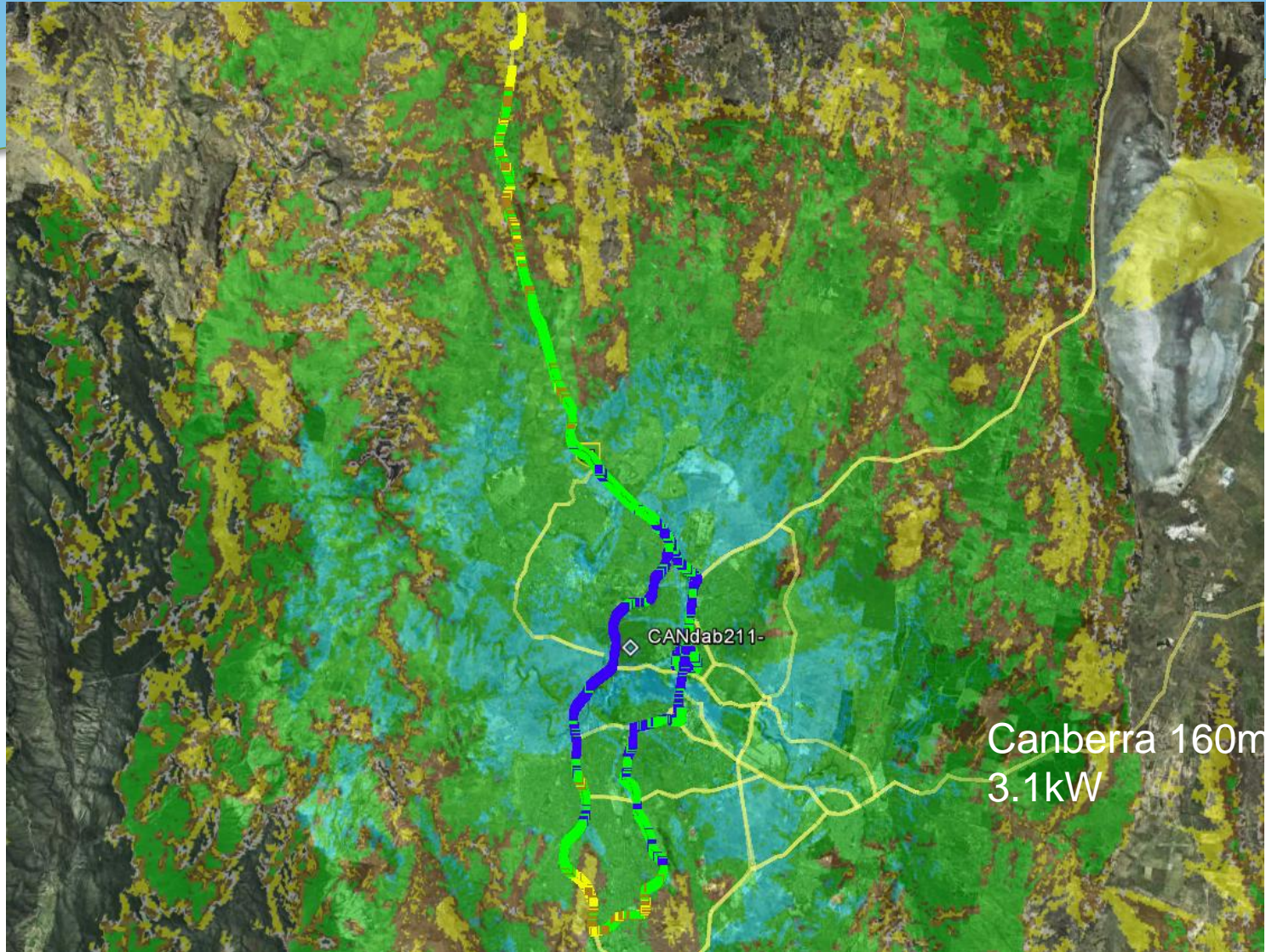


DAB+ Demonstration

Data Processing



Example Processed Data:- CANBERRA



DAB+ Demonstration

Thank You

les.sabel@commercialradio.com.au

wilson.ng@commercialradio.com.au