VOV / WorldDMB Workshop on Digital Radio Technologies

26-29 July 2013

The Melia Hotel & VOV HQ Building, Hanoi, Vietnam

Supported by

DAB+ Coverage and Field Test Results

Monday 29 July 2013, Session 6

Dr. Les Sabel - WorldDMB Technical Committee

DAB+ Demonstration

Overview

- DAB+ Demonstration Goals
- DAB+ System
- Results
- Conclusions

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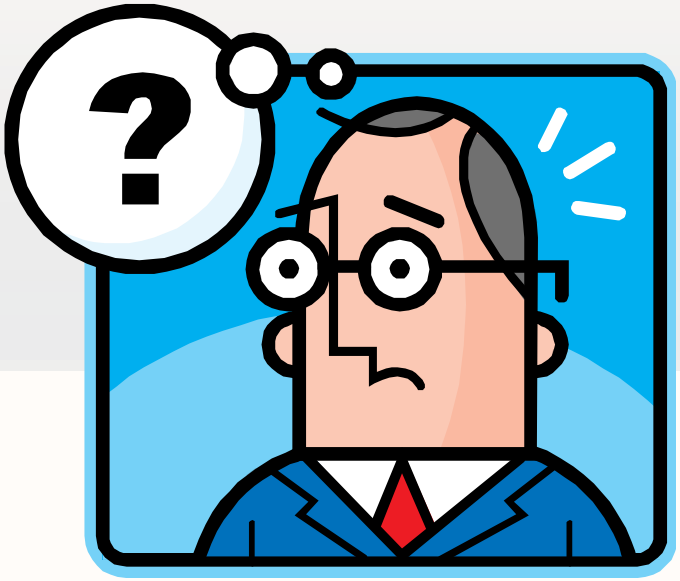
DAB+ Demonstration

Demonstration goals

- Experience the technology in an on-air situation
- Demonstration of equipment operation
- Gain an understanding of field trial activities and process
- Experience a variety of reception environments



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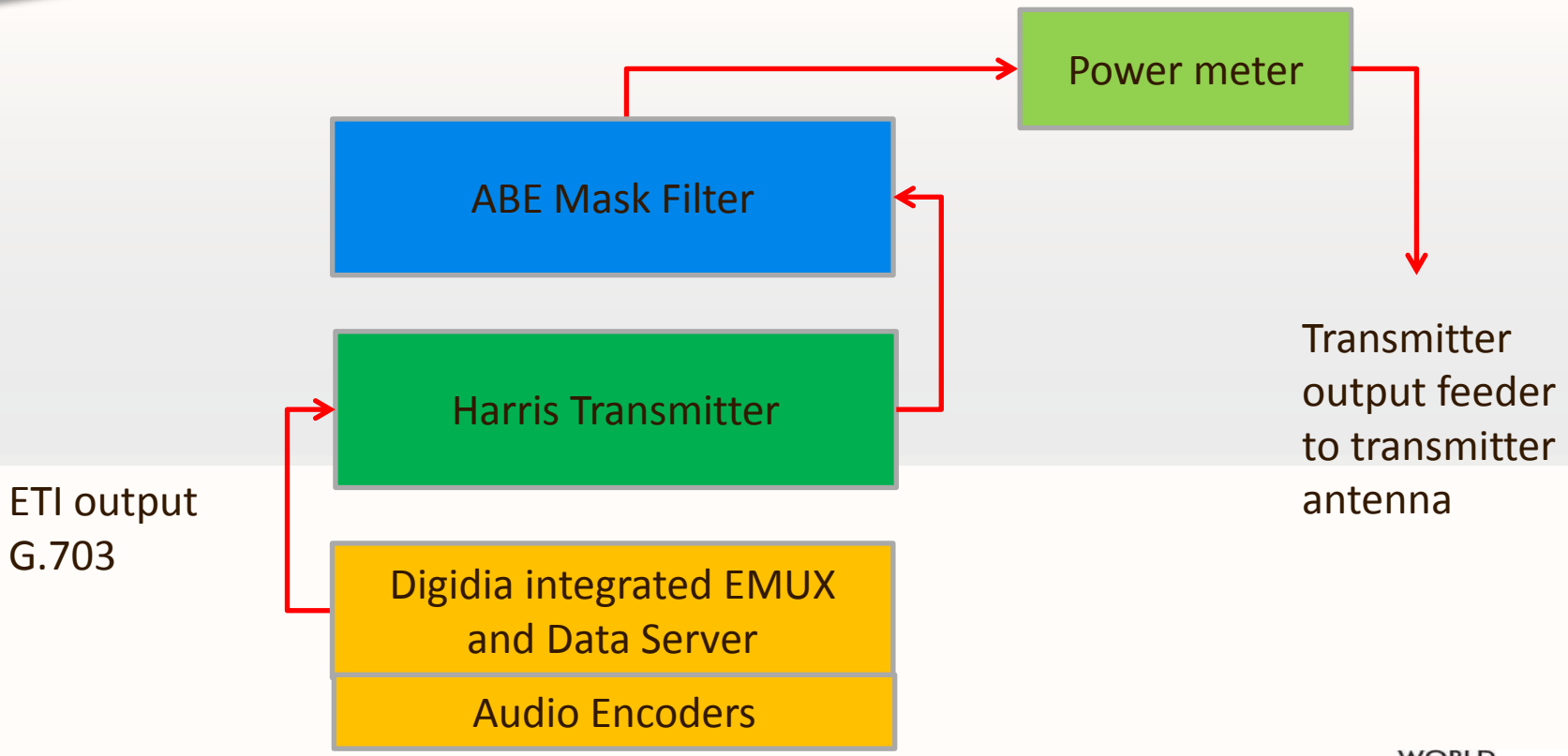
DAB+ Demonstration

Equipment Suppliers

DAB+ Demonstration

Demonstration equipment



DAB+ Demonstration

VOV HQ Building transmission site

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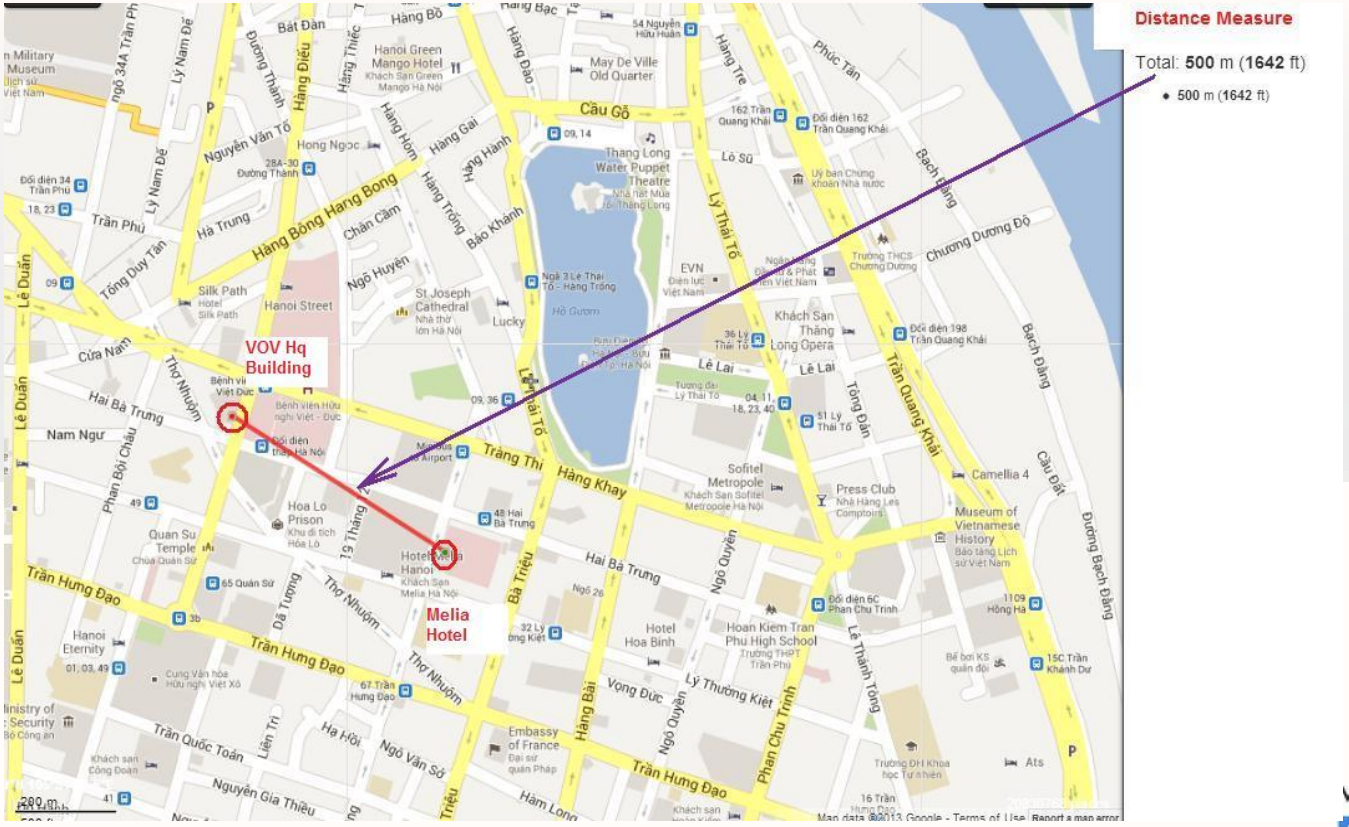
VOV HQ and the Melia Hotel



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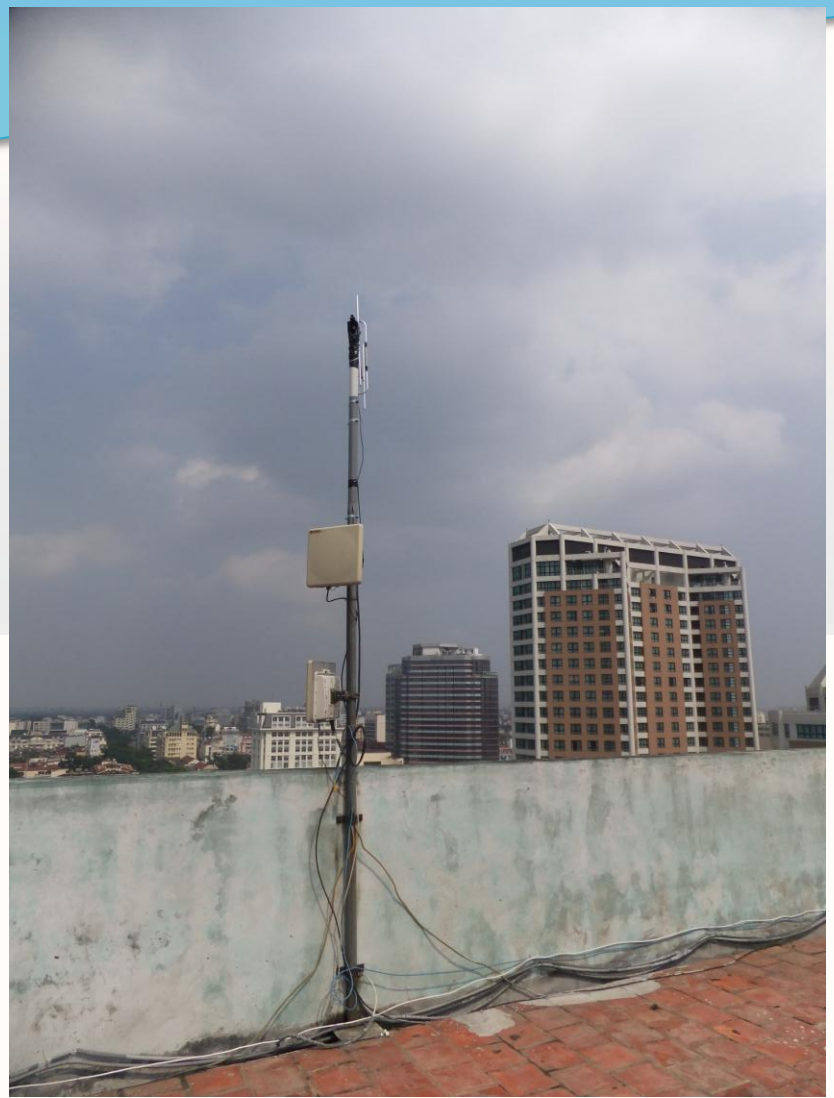
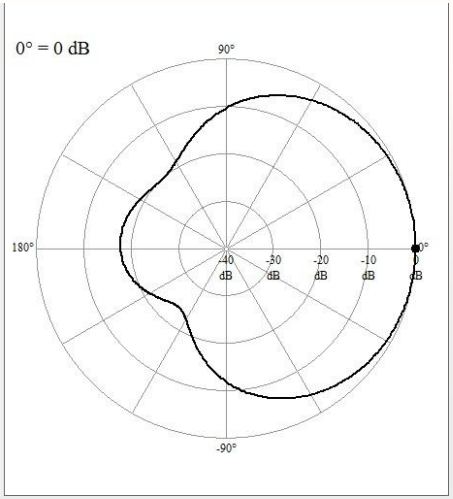
Transmission Antenna



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



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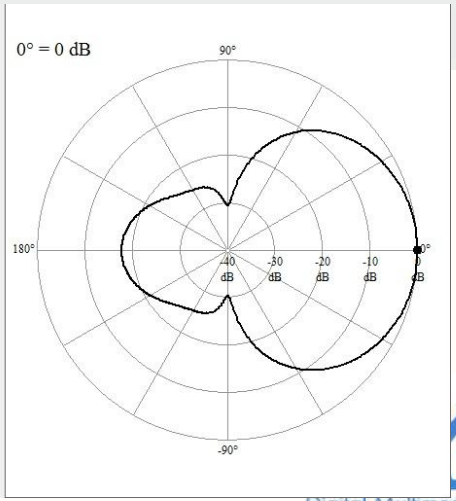


DAB+ Demonstration

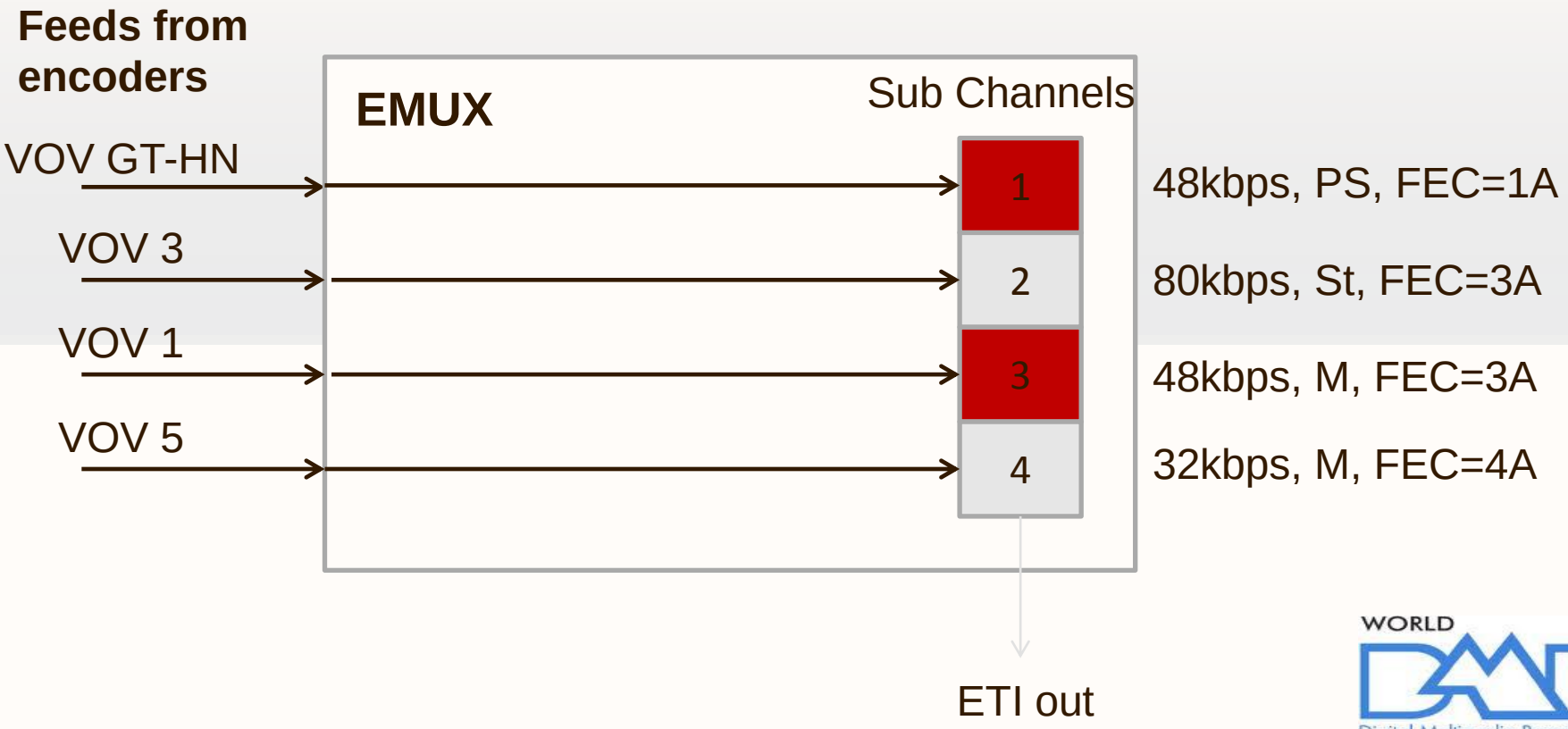
Transmission information

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



DAB+ Demonstration

Service Logos for Slideshow

VOV1

HỆ THỜI SỰ -
CHÍNH TRỊ-TỔNG HỢP

VOV5

VOV3

HỆ ÂM NHẠC -
THÔNG TIN - GIẢI TRÍ

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DAB+ Demonstration

Demonstration overview

What we demonstrated

- Operation of the field test system
- Quality of different audio bit rates and coding methods
- Impact of field strength on performance at different FEC code rates – 1A, 3A, 4A
- Complex multipath situations
- Dynamic environments

DAB+ Demonstration

Coverage prediction

ATDI ICS Telecom

20m terrain

Coarse clutter

- 25m buildings
- 100m high rise

ITU 525 propagation model

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Clutter Data

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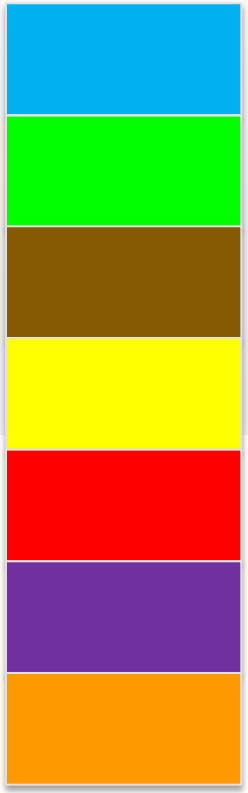
Coverage levels



>83dBμV/m - Strong Urban

63 – 83 dBμV/m – Urban

57 – 63 dBμV/m – Suburban

50 – 57 dBμV/m – Vehicle

45 – 50 dBμV/m – Variable Vehicle

40 – 45 dBμV/m – Poor Vehicle

35 – 40 dBμV/m – Very low

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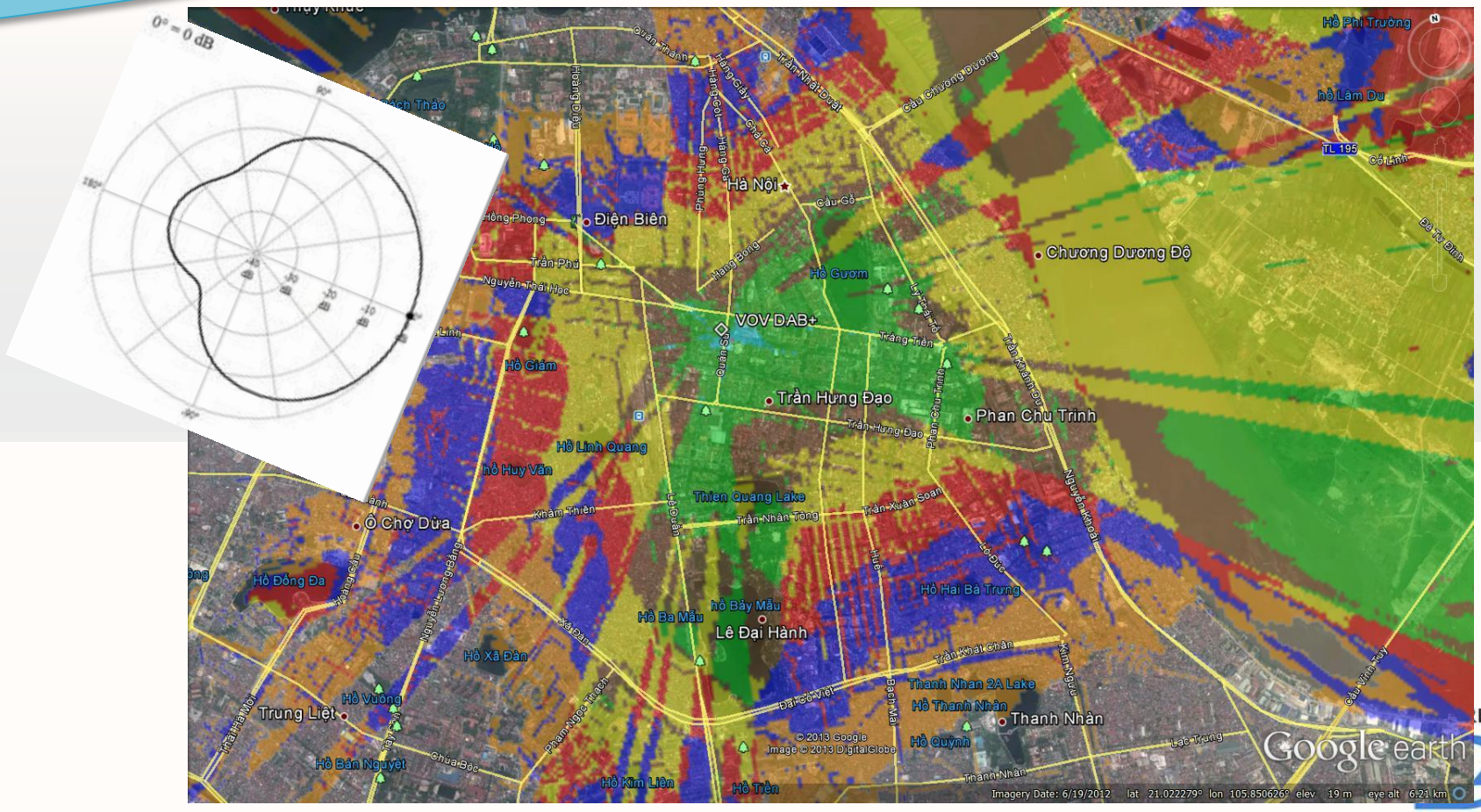
Coverage prediction



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Environment / terrain types

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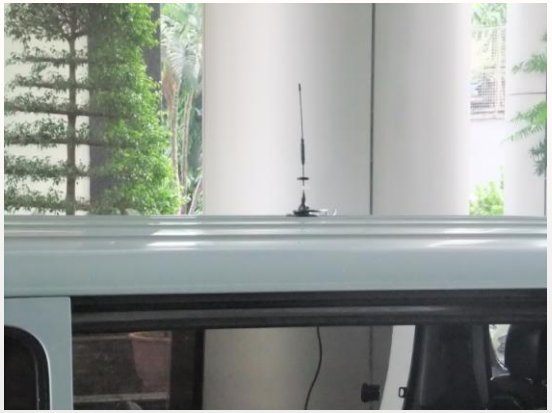
Test vehicle



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Demonstration Results

How the data is processed

- Data is captured from an antenna on the vehicle roof at approx 2m AGL
- Data is recorded in .csv files on the RadioScape FMON
- Transferred to PC via USB-Stick
- Program to adjust the field strength values according to calibration chart as the field strength measurement is slightly non-linear
- The resulting field strength and location coordinates are processed to form a .kmz file
- Display the kmz file in Google Earth
- Add the field strength prediction overlay (if available)

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Good reception – FEC = 3A

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Good reception – FEC = 4A

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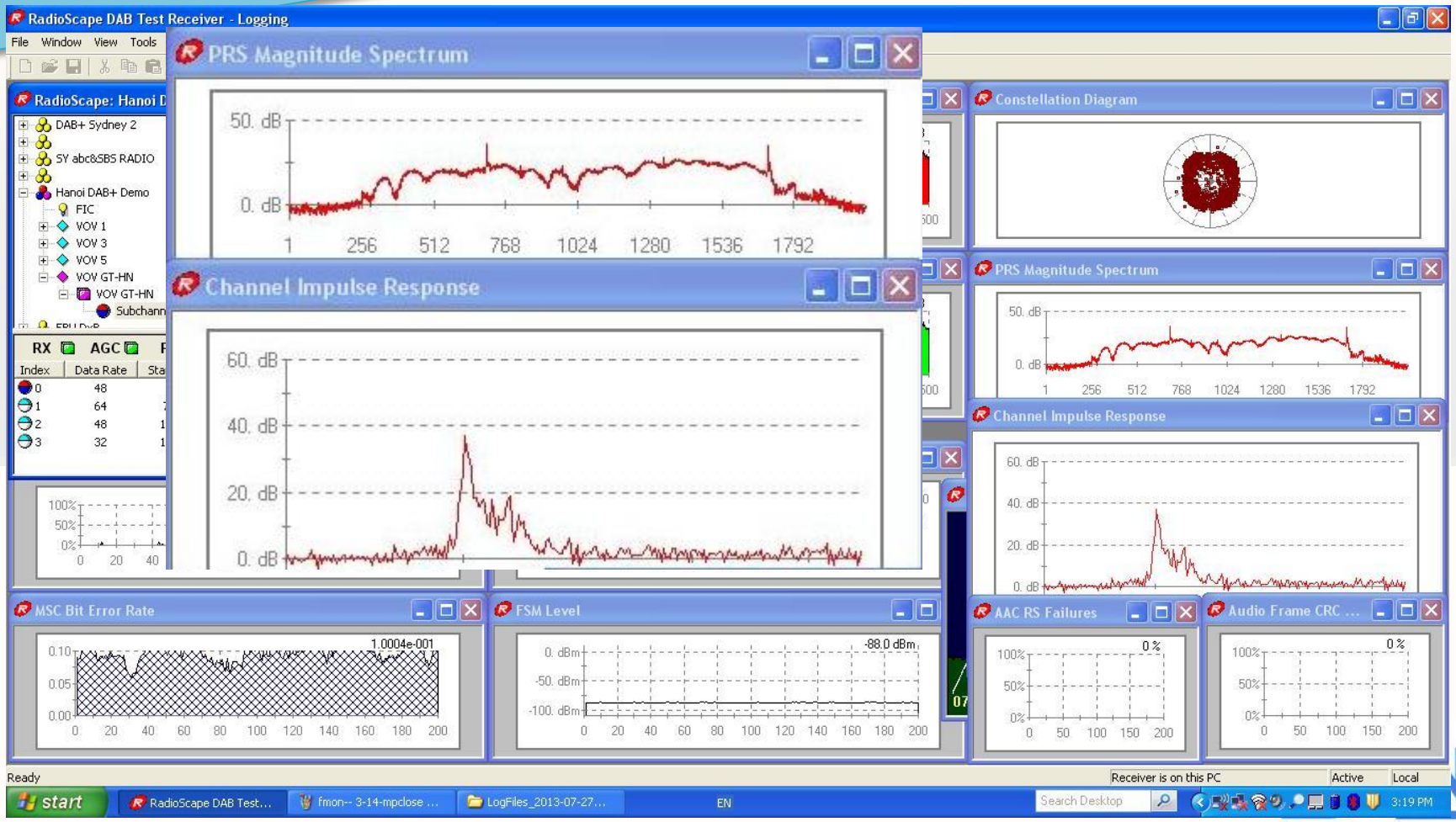
Good reception – FEC = 1A

DAB+ Demonstration

Field Monitor showing significant multipath



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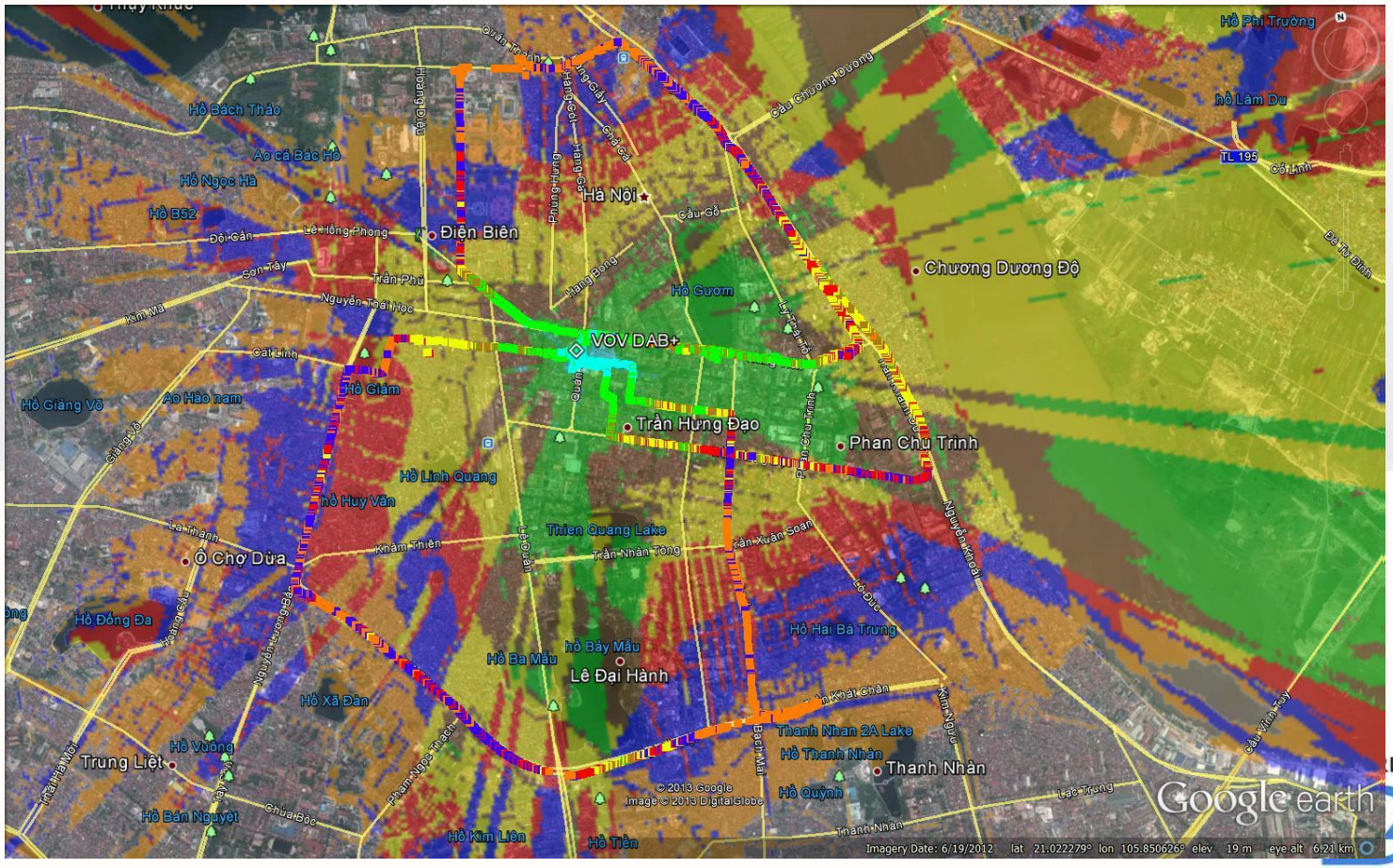
Coverage prediction with drive results



DAB+ Demonstration

Views from the Melia Hotel

To VOV HQ

North

South

East

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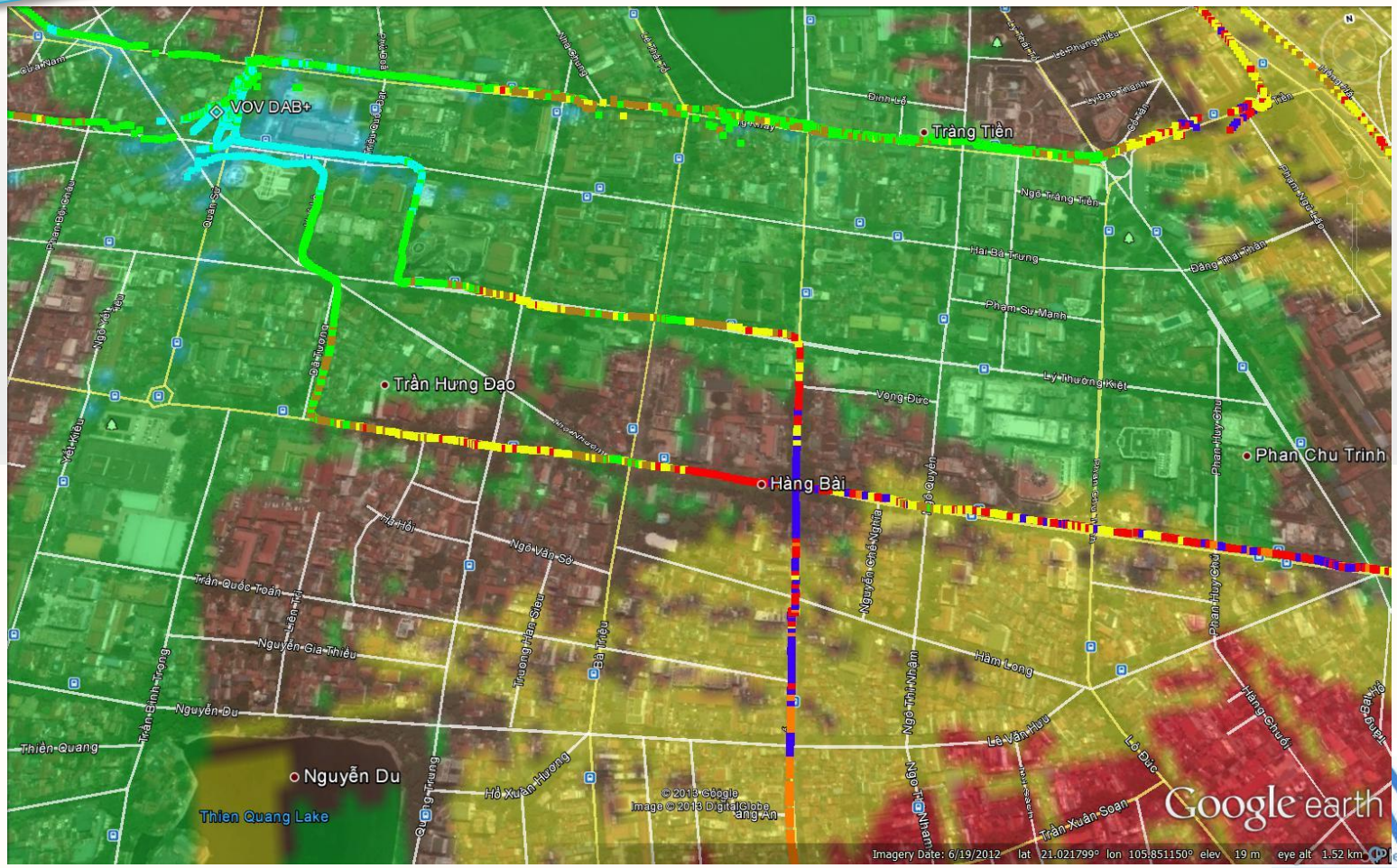
SE region showing high rise shadowing



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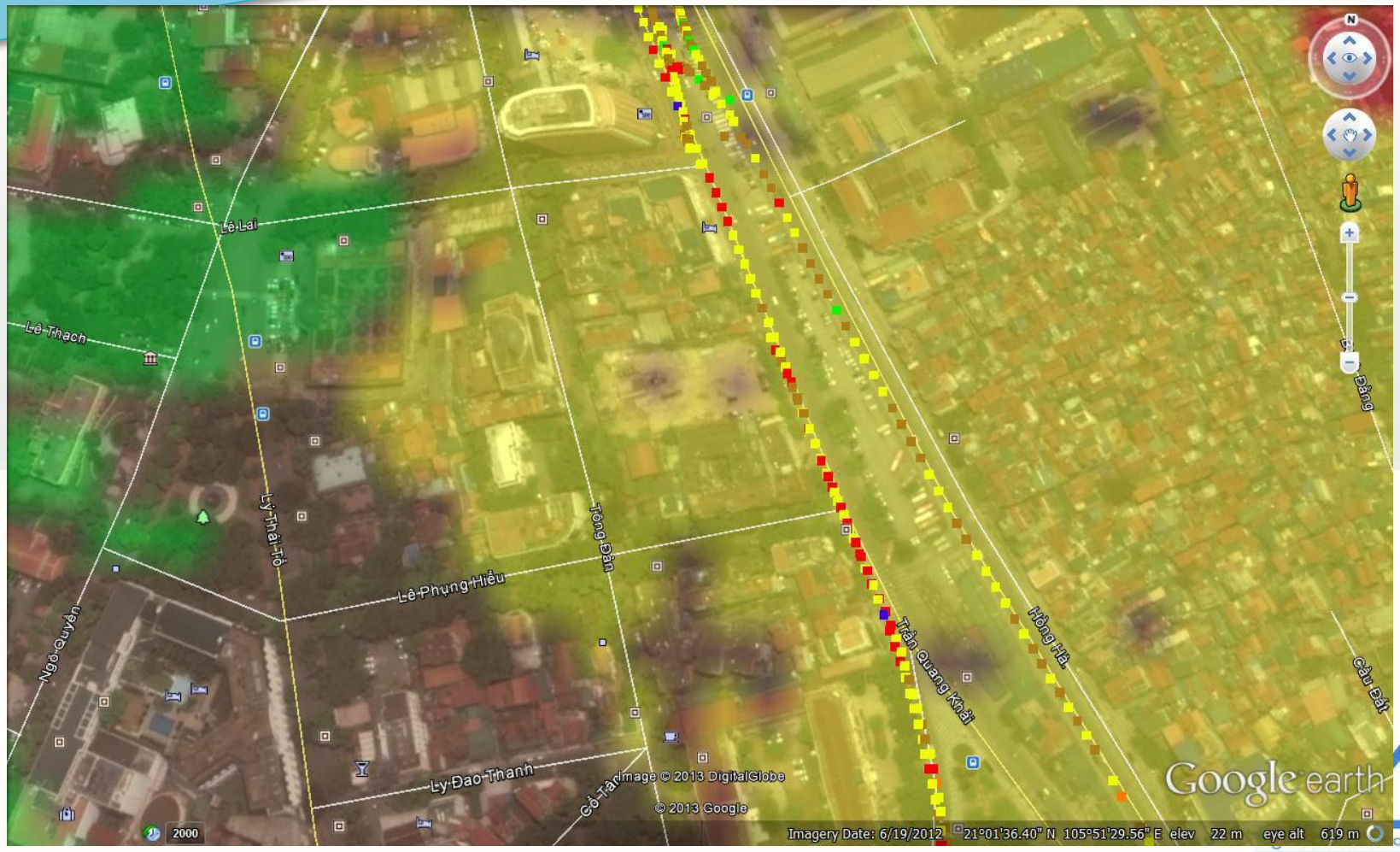
East region showing building shadowing



DAB+ Demonstration

Summary and recommendations

- Coverage prediction is essential for successful rollout
- Use map data that is appropriate to the area being planned
- Field strength planning levels vary depending on the type of buildings in the area
- Use field testing at the beginning to verify coverage planning data and parameters are appropriate
- Use field testing after broadcast system rollout to check coverage and tune your models
- **Use the engineering process to ensure success**

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Drive Testing

How we **prove** our broadcast system
from **planning** to **verification**

Thank You

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