

#### 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



**Overview** 

## **DAB+** Demonstration Goals

## **DAB+** System

#### **Results**

## Conclusions



#### **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





#### **Equipment Suppliers**



#### **Demonstration equipment**



Radio - Mahila TV - Multimadia - Traffic Da

#### **VOV HQ Building transmission site**





#### **VOV HQ and the Melia Hotel**



#### **Transmission Antenna**





Padia - Mahila TV - Multimadia - Traffic Data

#### **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





Padia - Mahila TV - Mult

#### **Service Logos for Slideshow**



#### HỆ THỜI SỰ -CHÍNH TRỊ-TỔNG HỢP

GAOTHONGEMOME + Thông tin kập thời + Cập nhật liên tực + Lộ trình tới ưu





#### HỆ ÂM NHẠC -THÔNG TIN - GIẢI TRÍ

#### **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



Radio - Mobile TV - Multimedia - Traffic Date

#### **Coverage prediction**

#### **ATDI ICS Telecom**

#### 20m terrain

#### **Coarse clutter**

- 25m buildings
- 100m high rise

ITU 525 propagation model



#### **Clutter Data**



#### **Coverage levels**

>83dBµV/m - Strong Urban
63 – 83 dBµV/m – Urban
57 – 63 dBµV/m – Suburban
$50 - 57 \text{ dB}\mu\text{V/m} - \text{Vehicle}$
$45 - 50 \text{ dB}\mu\text{V/m} - \text{Variable Vehicle}$
$40 - 45 \text{ dB}\mu\text{V/m} - \text{Poor Vehicle}$
$35 - 40 \text{ dB}\mu\text{V/m} - \text{Very low}$



#### **Coverage prediction**



## **Environment / terrain types**



#### **Test vehicle**







## **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)



#### **Good reception – FEC = 3A**

🕫 RadioScape DAB Test Receiver - Logging		
File Window View Tools Help		
🕏 RadioScape: Hanoi DAB+ Demo	💶 🗖 🔀 🥝 Right Audio Level 💷 🗖 🗙	🖉 Constellation Diagram
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		Partia - Mahila TV - Multimadia - 7

#### **Good reception – FEC = 4A**

dioScape DAB Test Receiver	
Window View Tools Help	
adioScape: Hanoi DAB+ Demo 📃 🗖 🔀	🧟 Right Audio Level 💶 🗖 🔀 🧔 Constellation Diagram 📃 🗖 🔀
DAB+ Sydney 1  DLS  MCI  TII  Ensembles  Announcements    DAB+ Sydney 2  Service Linking  Date and Time  X-PAD  Logging    SY abc8SBS RADIO  Hanoi DAB+ Demo  Hanoi DAB+ Demo  FIC    Image: A comparison of the service Linking  MCI  TII  Ensembles  Announcements	0. dB -50. dB -100. dB 0 100 200 300 400 500
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#### **Good reception – FEC = 1A**



#### Field Monitor showing significant multipath



Radia - Mahila TV - Multimadia - Traffic Data

#### **Coverage prediction with drive results**



#### **Views from the Melia Hotel**

















#### **Clutter Data**



#### SE region showing high rise shadowing



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### East region showing building shadowing



Radio • Mobile TV • Multimedia • Traffic Dat

#### **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



## **Drive Testing**

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

# Thank You

