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The Next Wave

DVB-H launch from a Service Provider perspective

Madrid, 7th November 2007

Agenda

1. RRD: Company Overview
2. One year later: the business results
3. Main technology challenges and achievements
4. The competitive scenario
5. Roadmap: next technology challenges
6. Lessons learned: opportunities for new Service Operators

RRD – Company Overview

- Founded in July 2004
- RRD is a private owned company with € 6,000,000 of equity
- 2006 revenues is € 45 m
- EBIT is € 8 m (EBIT margin 18%)
- No Debt - Self financed company
- First worldwide DVB-H commercial system launched in Italy together with Hutchison Whampoa mobile operator 3 Italy
- RRD is actively working with several prospects for DVB-H service rollout around the world
- The company is Member of DVB, BMCOforum, Mobile DTV Alliance and TeleManagement Forum.



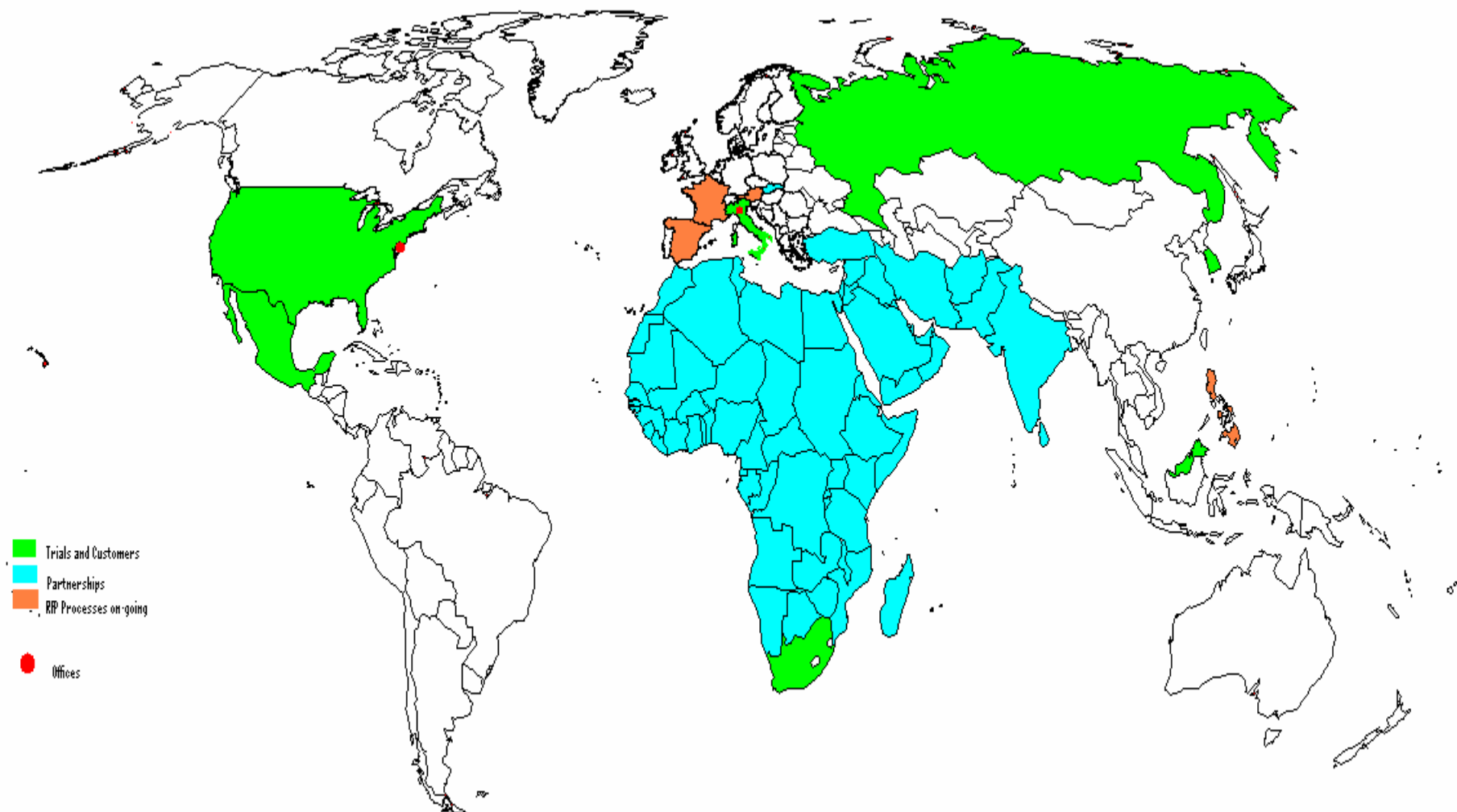
A Media Service company

First worldwide DVB-H commercial system launched in Italy

- With its Service Centre RRD has the complete outsourcing of the DVB-H service from 3 Italy
 - Content aggregation of different providers like Mediaset, Sky, Rai and H3G own channels
 - DVB-H head-end for encoding, protection and encapsulation for the final delivery to the customers
 - DVB-H playout for program schedule creation
 - Service Centre operation and management
- RRD built and manages the DVB-H radio network
 - Design, planning and deployment of the nationwide DVB-H network able to cover 40 million people in Italy, the 75% of the Italian population
 - About 1500 DVB-H sites “on air” in just 15 months (Sep. '07)



RRD – Small but Global



Business Results

- Time to market

The most important business deadlines have been met: set up the infrastructure to broadcast the World Football Championship, achieve the necessary channel capacity to broadcast the Italian *Serie A* football championship, set up the studios and palyout systems to broadcast the live channels for major sports events as *Moto GP*.

- Customer acquisition

In August 2007 3 Italia declared 720.000 DVB-H customers. This accounts for roughly 10% penetration of the service over its customer base in the first year from launch. No media service in the past has been as much successful at launch.

- Usability: improve customer experience

The first months of operation have consolidated a set of usability requirements that have greatly improved the customer experience. The importance of this experience has been proven by the great degree of acceptance by the market of the new user interface definition.

- Business models: adapt and enhance

The operations have also improved the knowledge of the customer preferences in terms of products purchased. Some products, like the very long subscription, have been cancelled from the product catalogue, some others have been adapted. This kind of market knowledge is likely to be specific, but nonetheless the process of service creation is a more general and reusable one.

Main technology challenges and achievements

- The first year of operations has brought a number of achievements that are specific to the commercial service experience (i.e. to be considered differently from the ones in R&D labs and trials).
- In September 2006 the roll-out of the first commercial implementation of a DVB-H statistical multiplexing head end.
- In May/June 2007 the preparation of roll-out for the MFN handover has shown a number of necessary improvements on the devices at chipset level.
- More recently, the continuous search for improvement on the bandwidth usage has brought to the definition of new technology configurations for the transmission network.

Focus on infrastructure usage optimization


Focus on quality of the service (smoothness of image and audio)

Preparation for the second technology wave

It's a Natural Evolution!

- September 2007**
IBC2007 - RRD launch GTO (General Tool for Operations) a New Generation Operations Support System for Digital TV playlist and network.
- July 2007**
RRD DVB-H Platform to deliver 24 channels lineup in Hwire Las Vegas Trial
- April 2007**
NAB2007 - RRD launch Simulcrypt Headend integration featuring 10Crypt, CMA BCAST Smartcard Profile and CSP Conditional Access for Mobile Television
- March 2007**
RRD successfully broadcasted DVB-T and DVB-H programs on the same frequency using Hierarchical modulation
- February 2007**
3GSM2007 - RRD show Conditional Access interoperability decrypting DVB-H service, using Simulcrypt with NDS, Nagra and Insteo
- October 2006**
RRD launches DVB-H Statistical Multiplexor
- June 2006**
3 Italia launches Mobile TV service with RRD DVB-H Service Center

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 Comunicazioni e Servizi S.p.A. - 00187 Roma
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The competitive scenario

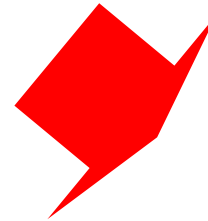
The competitive scenario to be evaluated includes both mobile operators and broadcasters.

Mobile Operators

- **TIM:** has announced in September 2006 the commercial launch using the infrastructure supplied by Mediaset. During the first half of 2007 no announcement were made on the commercial development of the service. At the last convention in Berlin some new products have been announced – the new Brionvega handset and datacard; however no public plan on the development of the network or the service has been announced.
- **VODAFONE:** has started the commercial operation in December 2006, with a significant move on the co-branding with SKY and the deployment of an exclusive handset, still using the network infrastructure of Mediaset. In 2007 no major announcement except that in October 2007 Vodafone announced the availability of the Mobile TV content on Vodafone Live! Over the UMTS bearer.
- **WIND:** No Mobile TV service announcement at the moment. However the announcement of the joint development of a TowerCo with 3 could open the door to an infrastructure sharing.

Broadcasters

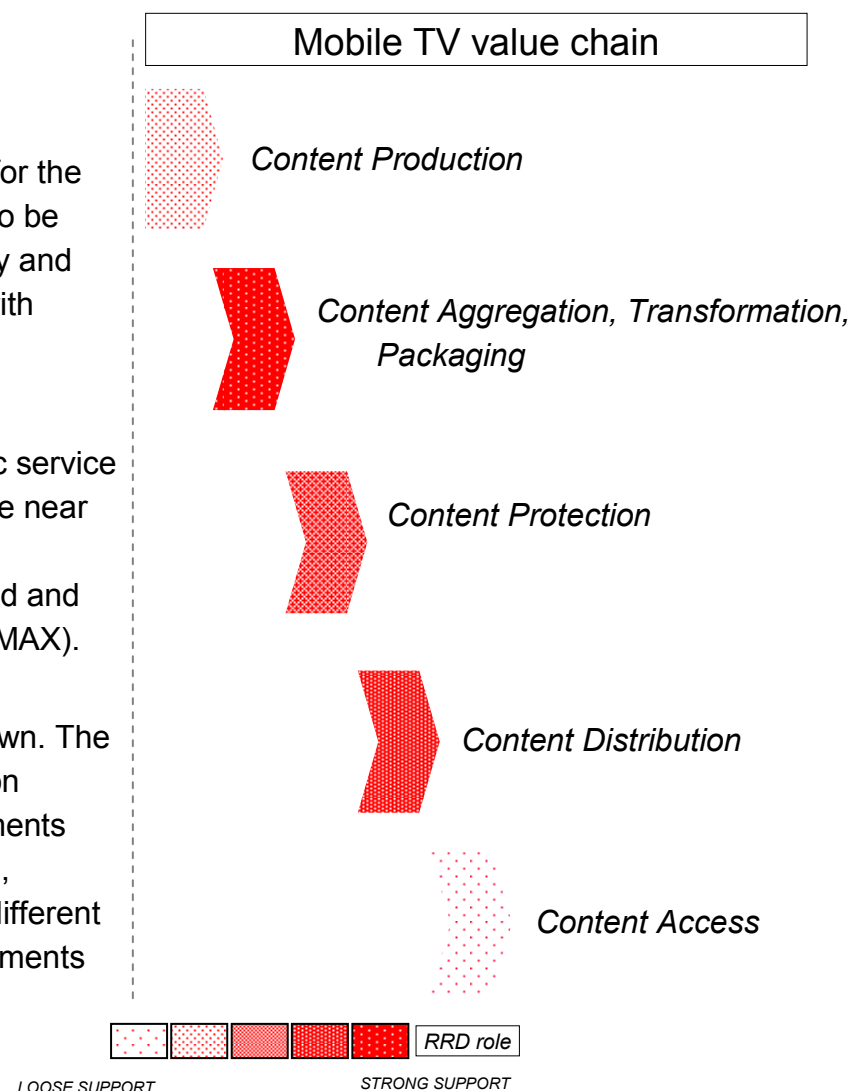
- **RAI:** Active at standardization and R&D level up until the announcement in summer of the choice of DMB as its mobile TV standard. No further announcement since then.
- **Mediaset:** Acts as infrastructure supplier to Mobile Operators but no service deployment announcement.
- **SKY:** Acts as marketing partner to one of the Mobile Operator, but no service announcement at the moment.



**No broadcaster involvement and very slow market takeover from mobile operators competition.
The market closely resembles the start of the UMTS mobile content business in Italy in 2003.**

Roadmap: next technology challenges

- The request for specific content will drive the major deployments for the near future. Standard digital broadcasting technologies will need to be adapted taking into account the specific needs of usage in mobility and small devices. Repurposing of existing content shall be coupled with specific technologies for mTV only production.
- The deployment of ubiquitous / device agnostic / network agnostic service announcement and protection technologies is the challenge for the near future. It is foreseeable in the next 2 years the need for a Service Platform capable to address mTV content distribution to connected and unconnected devices over a variety of networks (3GPP, DVB, WiMAX).
- The current transmission technology is quite mature and well known. The major development is expected in the definition of the transmission network architectures. It is already evident from different requirements arising from different parts of the world that the country regulation, demographic constraints, existing technology environments and different business models drive very different transmission network deployments and architectures.



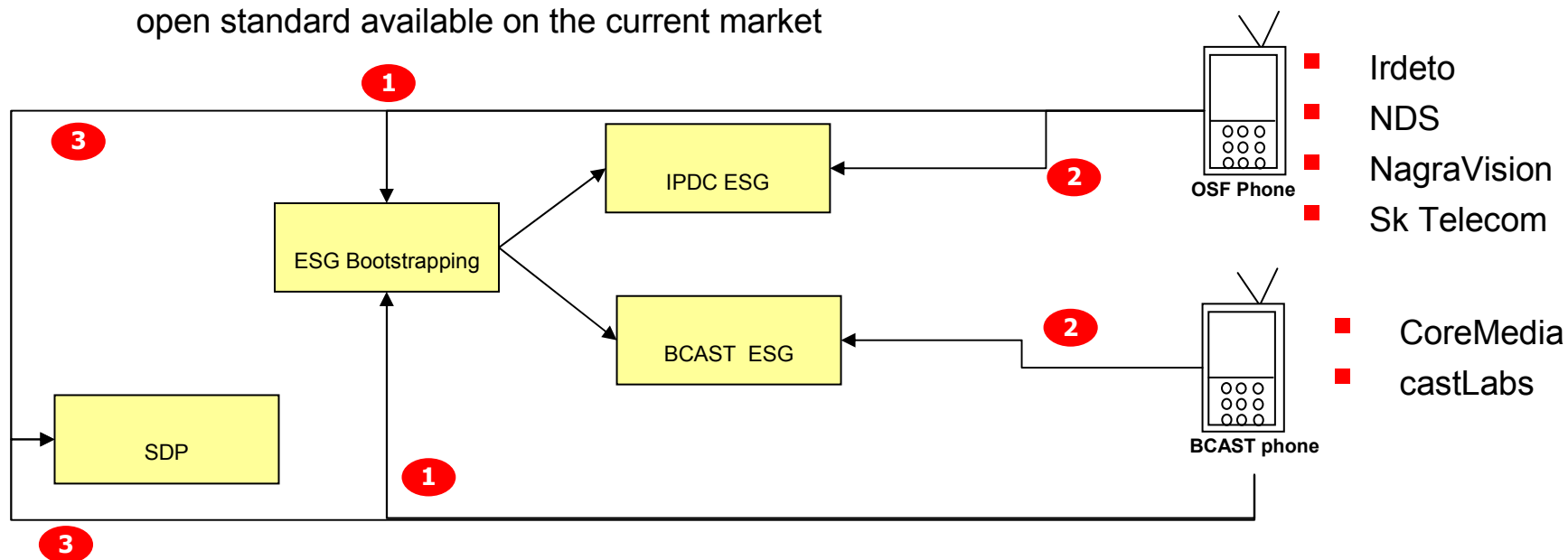
RRD Roadmap : near future cases

1. Unified Service Announcement
2. End to end service management
3. Network implementation architectures
4. Small gap fillers / Indoor coverage

RRD Roadmap : near future cases (1/4)

Unified Service Announcement

- RRD has broadcasted in Amsterdam the only transport stream with integrated IPDC and BCAST service guide.
- The service was tested against a variety of receiver platforms and devices among which LG , Samsung, Nokia, S3, AMD.
- The service description is available at:
<http://www.dvb-h.org/Services/services-IBC07.htm>
- The architecture of the broadcasting platform brought to Amsterdam RAI is the most open standard available on the current market



RRD Roadmap : near future cases (2/4)

End to End Service Management

- RRD has announced to the eco system the first General Availability of its GTO – integrated digital television management platform.
- The product has already been presented to selected equipment supplier for integration with their element manager.
- GTO is developed in accordance to the TMF OSS/J standards.
- Key features of the product

Technical Architecture

1. Rich Internet Application & OSGI (Eclipse) clients
2. JRules Engine
3. WSDL public interfaces
4. JSR 135 compliant & Mobile device deployable
5. Scriptable Open API interfaces
6. Oracle Embedded Database
7. RDBMS Independent

OSS Architecture

1. Manage SNMP compliant devices
2. MIB 2.0 browser
3. SOA compliant interfaces
4. JMS enabled
5. UHF management interfaces available as an option

Advised configuration

1. Application Server: 2 x DL380, 4GB RAM, NAS, 2 GBE
2. Data Server: 2 x DL380, 4GB RAM, 2x80GB RAID 0/1 HD, 2 GBE

Equipment already configured

1. CISCO: Catalyst Series
2. 3COM: 45xx Series
3. RRD: Encoders, SCS, EMMC
4. UDCast: IPE, IPE Manager, GoldenEagle, Navigator
5. Thomson: Argos, Opal
6. DMT: all trasmitters and repeaters
7. ScreenService: DBH-3, Magnum
8. Harris: Leitch SDI/ASI Router

Equipment in roadmap

1. Irdeto: PISys CA
2. NDS: VideoGuard CA
3. Nagravision: iDTV CA
4. castLabs: OMA BCAST CA
5. Thomson: selected trasmitter lines
6. Harmonic: MV 60
7. Envivio: 4Caster M2
8. Expway: Fast ESG

RRD Roadmap : near future cases (3/4)

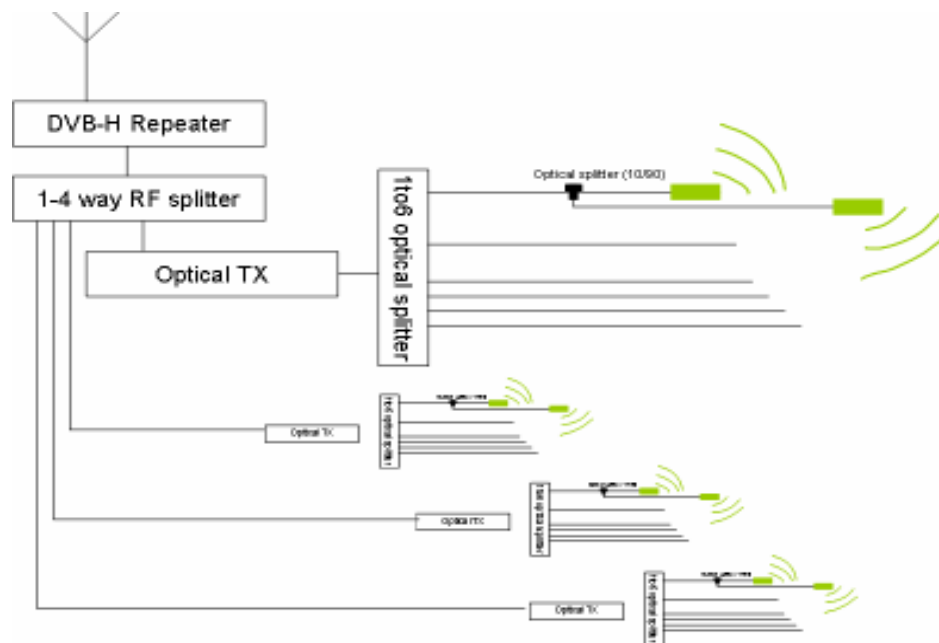
Network Implementation Architectures

- RRD has further developed its product range to cover different needs of mobile broadcast network operators
- Furthermore, the exploration work done at various levels for the tenders issued in the world has brought additional elements to the architecture skills developed by RRD
- Current network implementation of RRD includes:
 - Nationwide network with distribution over satellite and transmission with 3 layers of transmitters synchronized in SFN
 - Nationwide network with distribution over fibre and transmission with 2 layers of transmitters synchronized in SFN
 - Nationwide indoor coverage with RF repeaters fed via fibre optical network (under tender)
 - Regionwide coverage with distribution over satellite and transmission with 2 layers: high power transmitters and low power gap filling with UHF repeaters
- To all that we should add a number of network studies performed during tenders and tender qualifications in various regions of the world
- RRD is willing to share with the operators its view on the perceived needs of a decision support system application to aid in business planning for the deployment of mobile TV infrastructure.

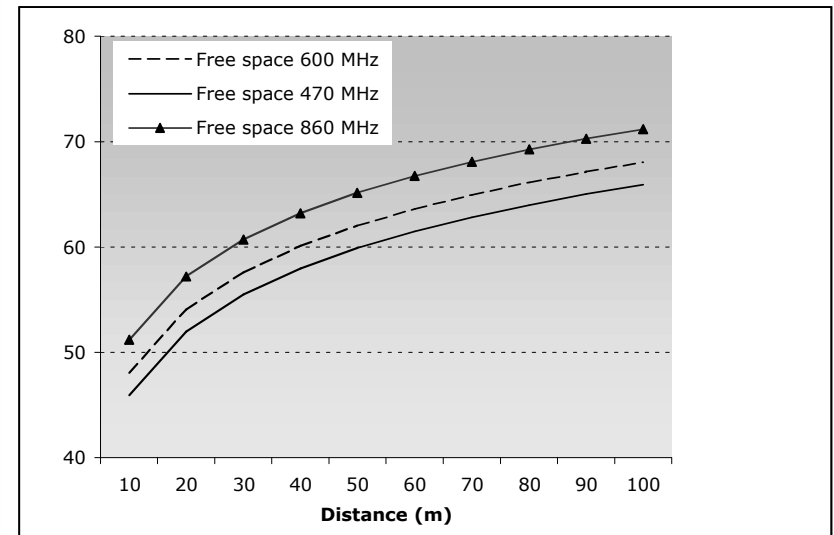
RRD Roadmap : near future cases (4/4)

Small Gap Fillers: Indoor Coverage

- Currently RRD has two products – cfr. Product brochures – that cover the needs of indoor signal boosting
- Quite recently RRD has added an additional product aimed at those installations that – for size reason – cannot be handled through the already available products.
- The new product relies on distribution of the DTV signal over fibre in order to avoid back to front interference at the gap filling node.
- In the following a general overview of the architecture is given.



This architecture is expected to provide the following benefits in terms of signal path loss.



Lessons Learned: opportunities for new Service Operators

- At the end of this presentation we will try to summarize some lessons learned
- We will start from the review of the Business Challenge as it was in the pre-launch phase (mid 2005)
- We will try to identify the major changes in the scenario
- We will consolidate some specific items that could drive the decision process for new Service Operators

DVB-H Business Challenge (pre-launch phase)

Mobile Operators and Broadcasters had to face many different challenges during DVB-H service launch

DVB-H introduction - main challenges

Business Model

- ❑ The Business Model will depend on several variables like: specific market context, cooperation with content providers, mobile operators and broadcasters, etc.

Service evolution

- ❑ Understand which are the business drivers to make the DVB-H service a long term success story

DVB-H Solution

- ❑ Infrastructure implementation requires major integration efforts within the existing service and IT environment and towards the new DVB-H broadcasting chain

DVB-H Network

- ❑ DVB-H coverage is most likely difficult to achieve in the first phase

Devices

- ❑ DVB-H devices are still in an early phase and remain one of the main critical point to be handled for the DVB-H project launch for their technological complexity coming from the need of integration of different components and technologies in the same device

Industry Cooperation

- ❑ No widely accepted modular, reusable, and open standard reference implementation for mobile broadcast

DVB-H Business Challenge (evolution)

How has it changed ?

Now

In two years

Business Model



- ❑ **Worsened:** The number and complexity of possible combination has increased, and no real aid has come from the regulation environment or from the market.



Service evolution



- ❑ **Stable:** Some better knowledge has widespread from existing operations; at the same time however new technology possibilities have made the decision process more difficult.



DVB-H Solution



- ❑ **Improved:** The number of technology players have multiplied ten-fold and the maturity of existing technology has significantly improved.



DVB-H Network



- ❑ **Worsened:** The spectrum acquisition process has become even more complex and – especially in Europe – the frequency assignment has been delayed significantly. The claim that an overregulated resource assignment process will open up the market has – so far – only consolidated incumbent positions. This is significantly different from what is happening outside of EU



Devices



- ❑ **Stable:** Due to the uncertainty of the regulation scenario the device manufacturers are still very slow on the adoption of the DVB chipsets. Even the claim for a very low increase on the device cost from Nokia has not developed so much the .market.



Industry Cooperation



- ❑ **Improved:** The standard definition process has progressed a lot and now the technical normative scenario – and the IOT – is much better.



Just one Question Mark ?

Lessons Learned

- To summarize today presentation here are some arguments in the form of discussion items:
 - **Time to Market:** accelerate deployment where possible and leverage on existing and established technology
 - **Business Model:** all in one service provider performs better than uncertain service models
 - **Customer Acquisition:** the service in itself is extremely promising, in terms of customer acceptance. This should be considered a driver in itself.
 - **Technology Roadmap:** Despite the very slow take off, the mTV technology has known in 2007 a significant improvement. It can only improve with a fast developing market.
 - **Synergies:** not a threat to mTV but an opportunity.
 - **Role of Regulators:** outside of EU it is being reconsidered. A less Keynesian approach is being followed to let the market regulate itself.
 - **Role of Multinational Operators:** so far it has been important to sustain a slow developing market. However it has to be recognized that the widely accepted motto is “think globally, act locally”.

Questions & Answers

...Thank you



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