Digital Radio Mondiale

WEBINAR

June 24th 2013

The Flexible Way from FM to Digital

DRM Moderator & Speakers

Ruxandra Obreja
Chair of the DRM Consortium,
Head of Digital Radio Development ,
BBC World Service, UK
Moderator

Hal Kneller
Digital Radio Consultant

1 – What is DRM?

Hermann Zensen
Sales Manager,
Digidia, France

3 – Brittany and Agora DRM+ Trials

Eivind Engberg
Chief Engineer,
Radio Metro, Norway

4 – Norway DRM+ Trial

Alexander Zink
DRM-SB,
Vice ChairDRM Technical Committee
Senior BDM Digital Radio Digital Radio
at Fraunhofer IIS, Germany

2 – Key Features of DRM

5 – How To Introduce DRM+ – Considerations

6 – Compatibility with other standards – Seamless digital solution

1 – What is DRM?

Speaker

Hal Kneller
Digital Radio Consultant

What is DRM?

- **Digital Radio Mondiale (DRM)** is the only global open digital radio system which can be used in all frequency bands *(AM and VHF).*
- **DRM system** can be used to cover large geographic areas as well as rural and local markets and when on the move. A low power local service option is also available.
- **DRM receivers** are simple and easy to use with better audio quality and Multimedia applications.
- DRM fits with **existing broadcast channelization** and enables broadcaster-controlled infrastructure
- The DRM standard is **ITU recommended** for worldwide adoption on all frequencies
- DRM complements and **works seamlessly with other digital radio standards**

WHAT IS DRM?

- Global Digital Radio standard endorsed by ITU
- Only global open standard recognised worldwide
- Applies equally for AM and FM → in HF and VHF high quality audio
- Can cover large geographic areas as well as rural and local markets
- Up to 4 programmes on 1 frequency
- Option for stereo and even 5.1 Surround sound (Bollywood content!)
- Offers more than audio: Data and Multimedia (images, text, news, …)
- Emergency & Disaster Warning Alerts

DRM for all Bands

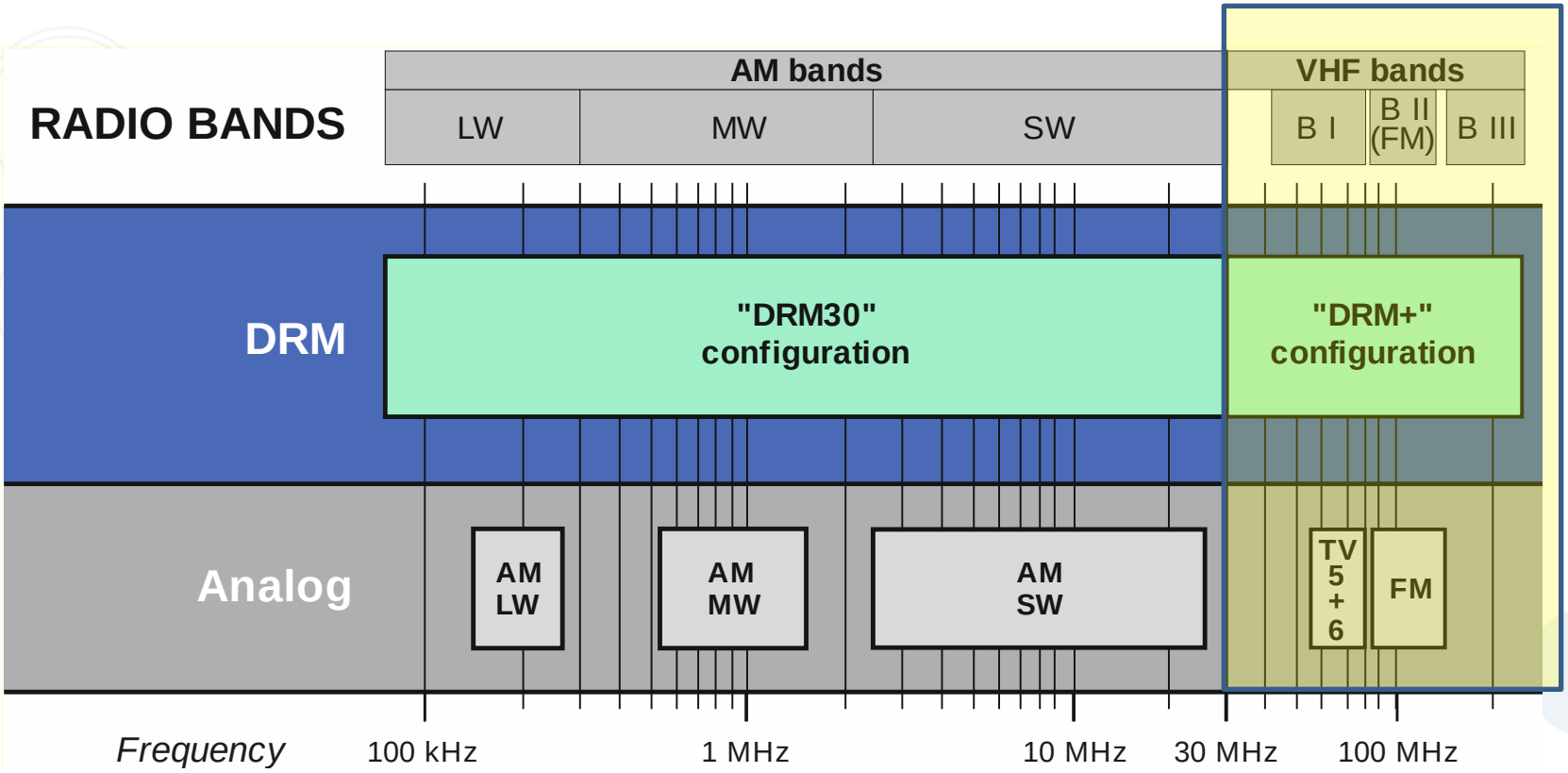
DRM above 30 MHz VHF
(Band I, II – FM band, III)

30MHz

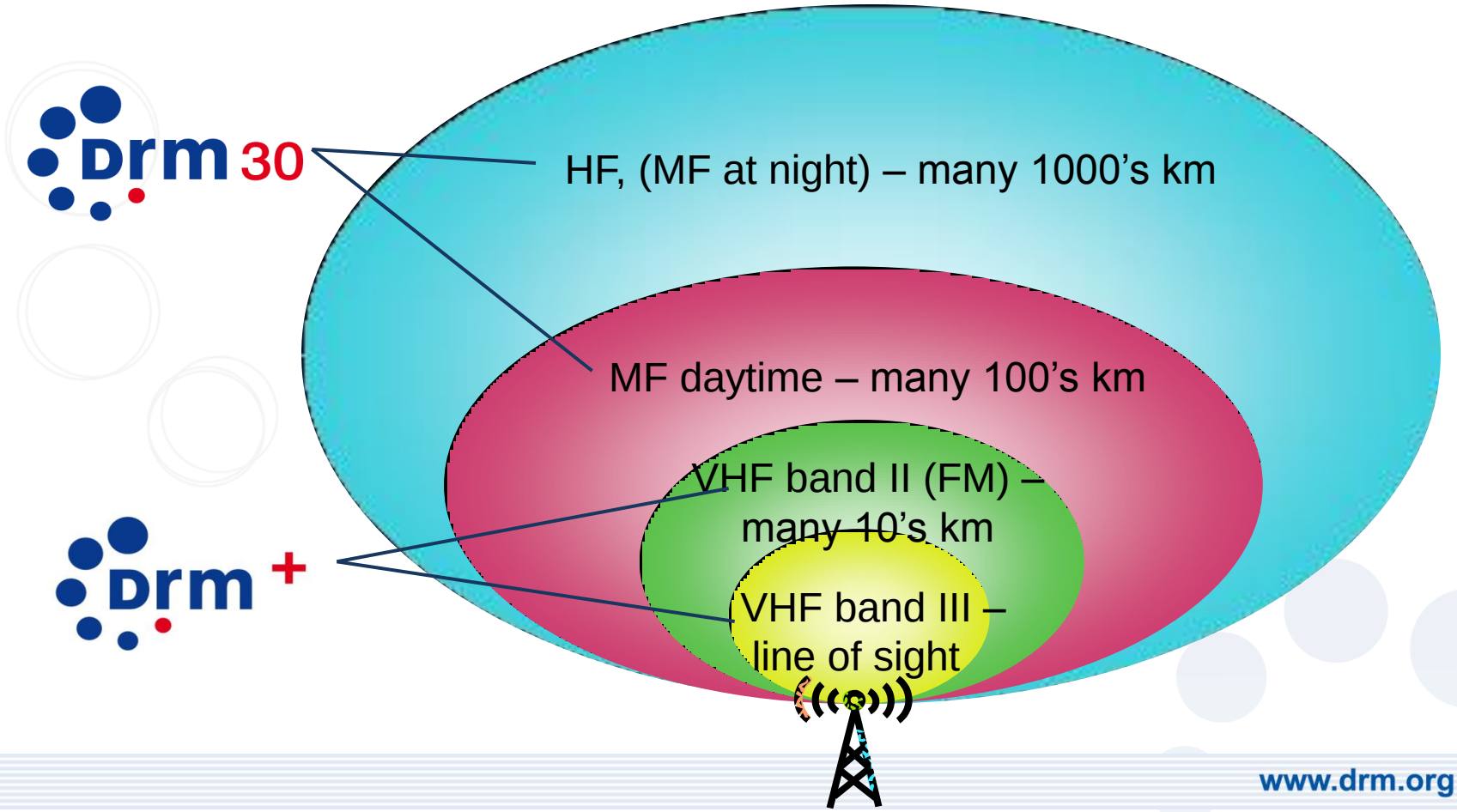
DRM below 30 MHz LF, MF, HF
(or LW, MW, SW) – the AM bands

BOTH MODES (DRM30 and DRM+) SHARE ALL DRM FEATURES!

DRM Frequency Bands



Where DRM fits – Coverage Needs



DRM+

- **ETSI standard ratified** in 2009
- **Endorsed by the ITU** in 2011 “ITU-R Rec. BS.1114 (system) and ITU-R Rec. BS.1660 (planning parameters)
- **More content and choice:** up to four programmes on one frequency
  The new digital transmissions can also co-exist with the current analogue broadcasts.
- **Worldwide spectrum compatibility**: 100 kHz bandwidth
- **Useful content bit rate**: 37-186Kbps
- **Easier tuning and selection of programming:** e.g. station selection by brand not frequency and automatic switching between different transmitters and standards to give continuous service.
- **Worldwide tests:** Already tested in Asia Pacific, Europe and Brazil

2 – Key Features of DRM

Speaker

Alexander Zink
DRM-SB, Vice Chairman DRM Technical Committee
Senior BDM Digital Radio, Fraunhofer IIS, Germany

DRM Key Features

The DRM Key Features are common to the full DRM Standard – whether DRM30 and DRM+

DRM Key Features

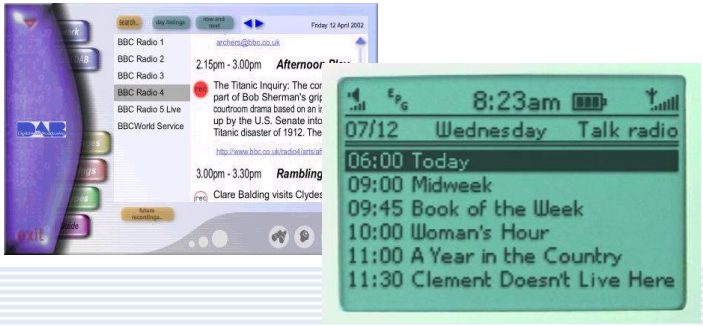
- **More choice** for listeners
  - Up to 4 programmes on 1 frequency
  - Simulcast analog / digital
- **Excellent audio** quality
  - No distortion
  - Stereo and 5.1 surround sound
- **Good coverage** area and robust signal
  - Supporting SFN (Single Frequency Networks)
  - Green and energy efficient
- **Multimedia Applications**
  - Great listener benefits
  - Extra revenue opportunities for broadcasters
- **Automatic tuning**
  - by station name, no longer by frequency
  - re-tunes when leaving coverage area
- **Emergency warning & alert**
  - All stations switch, present audio and text information

DRM 5.1 Surround Sound Audio

MPEG Surround

- Enables true 5.1 surround services (sports, jingles, ads, concerts, …)
- Very small embedded audio-data channel
- Compatible with all stereo/mono receivers

Mono → **Stereo** → **5.1 Surround**
past present future!



DRM – More than Audio

- **DRM Text Messages** –
  Programme accompanying labels (Unicode)
- **Journaline** –
  Text based information service (Unicode)
  Easy access & "Hot Button triggers" interactivity:
  - Web pages (sites)
  - Phone numbers
  - SMS / E-mail
  - Links to other Journaline or DRM services pages
- **MOT Slide Show** – Graphics with Animation
- **EPG** – Electronic Programme Guide
- **TPEG / TMC** – Traffic Information

→ **Great potential for new revenue sources!**

DRM is Excellent in Multimedia

DRM Radio menu

Journaline,
live information

Main menu

Pictures menu

Videos

Application: Emergency Information

- Natural disaster strikes → local communications infrastructure is OFF
- Digital radio broadcast → reaching trouble spots
  from a distance – no dependency on local infrastructure

Emergency Warning & Alert

DRM Emergency & Disaster Warning

- All receivers switch,
  present audio and text information
- Should be mandatory feature for all radios

Use case:

- Immediately spreads urgent information
- E.g. to be used in case of natural disasters or pending catastrophes (earthquakes, tsunamis, …)

Benefits:

- Deploys **wide-spread radio sets**
- Provides **spoken announcements** on alert channel
- Provides **detailed textual information (Journaline)** for immediate look-up by listeners, explaining alert reason and behaviour recommendat.
- Textual information to be **multi-lingual/-script**

Listener Experience – Detailed Text Info

Examples for receiver screen renderings with disaster warning content (Journaline):

AIR Emergency Broadcast

- Information in English
- हिन्दी में सूचना (Hindi)
- 中文信息 (Chinese)
- Info auf deutsch ↓

Information in English

- What is going on?
- What do I need to do?
- Where can I get help?

What is going on?

A major tsunami is expected for the Mumbai region at 16:00 today. The tsunami will hit the ↓

What do I need to do?

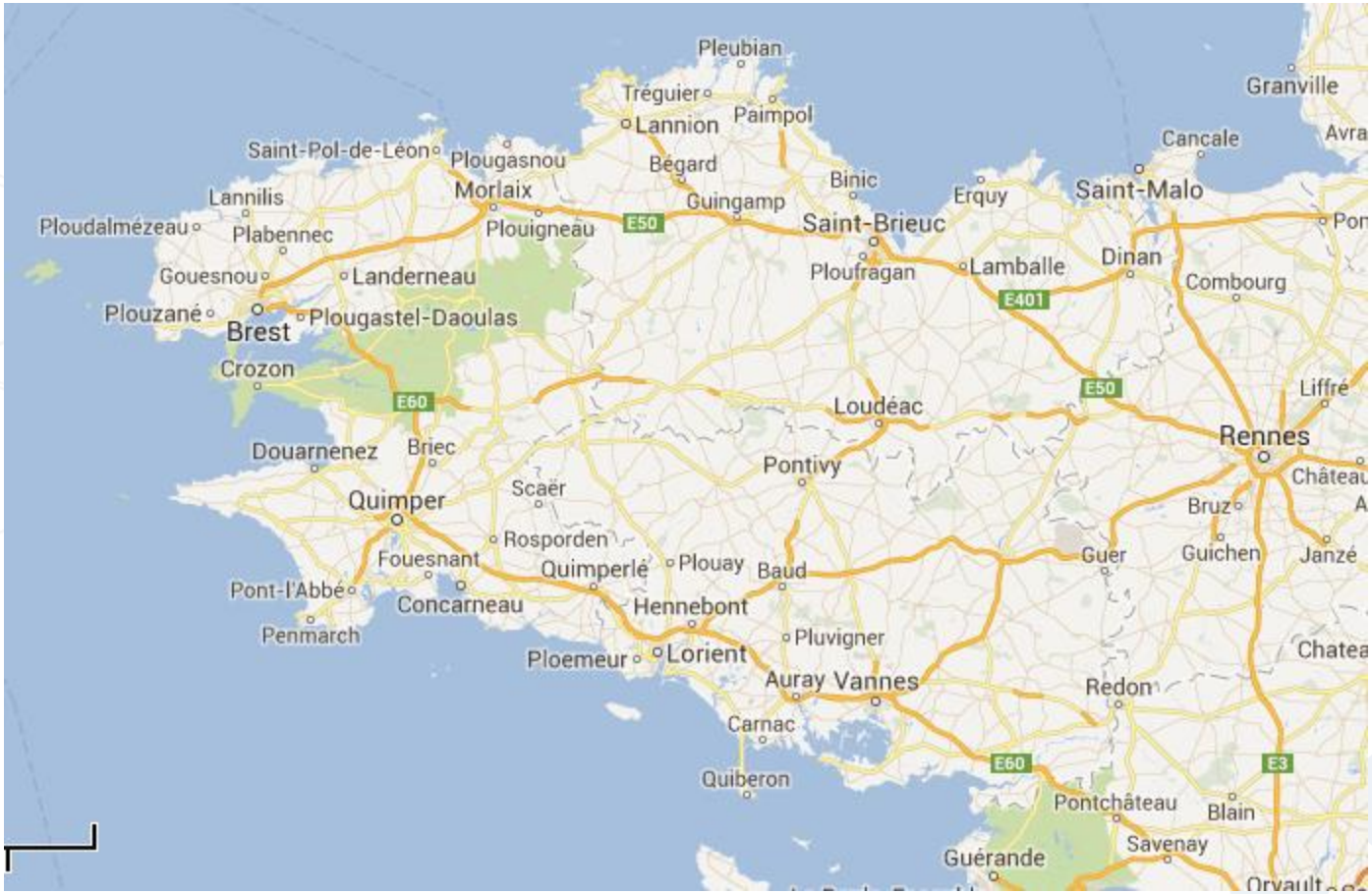
1. Move away from shore!
2. Evacuation has started. Find the nearest meeting point: Look for green ↓

3 – Britanny and Agora DRM+ trials

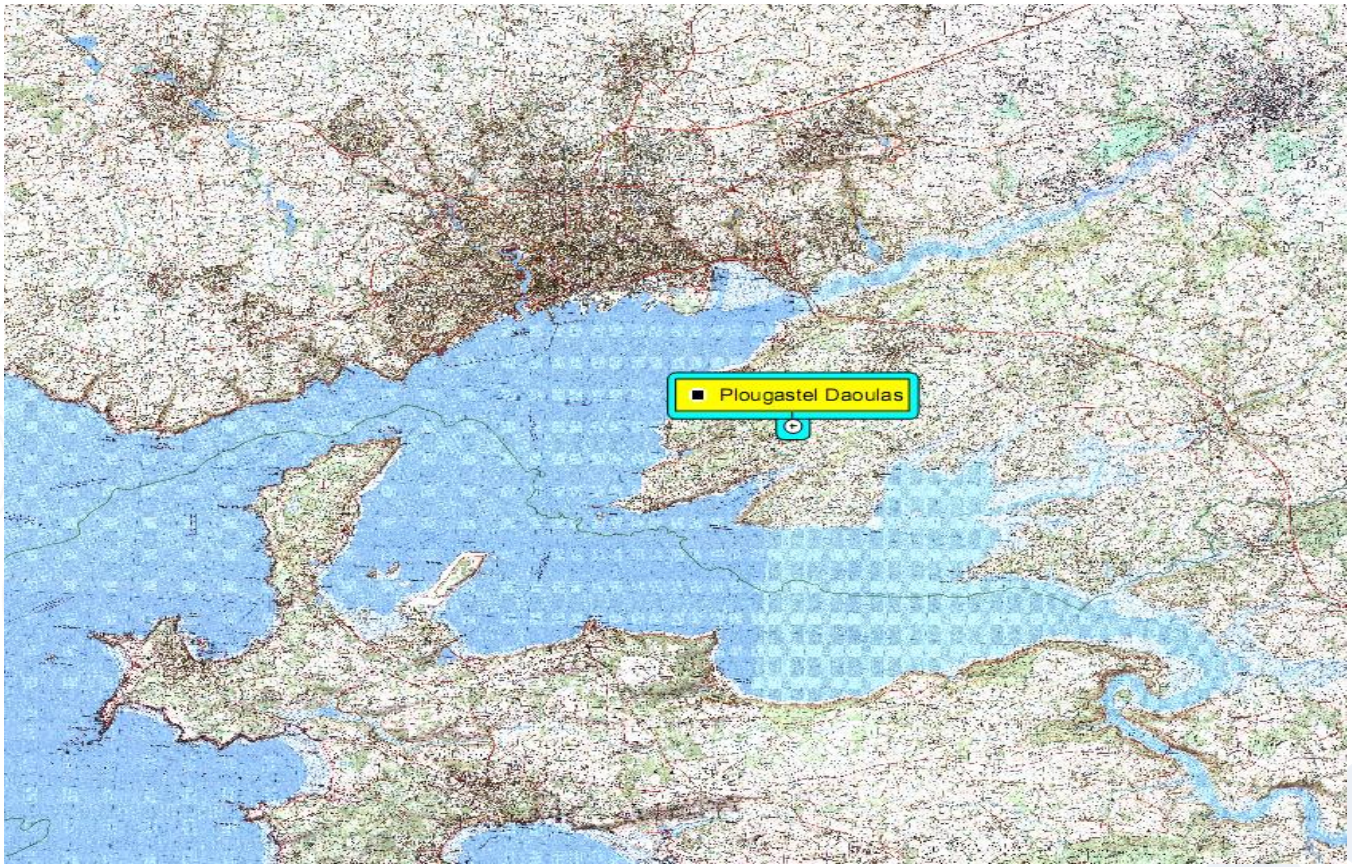
Speaker

Hermann Zensen
Sales Manager, *Digidia, France*

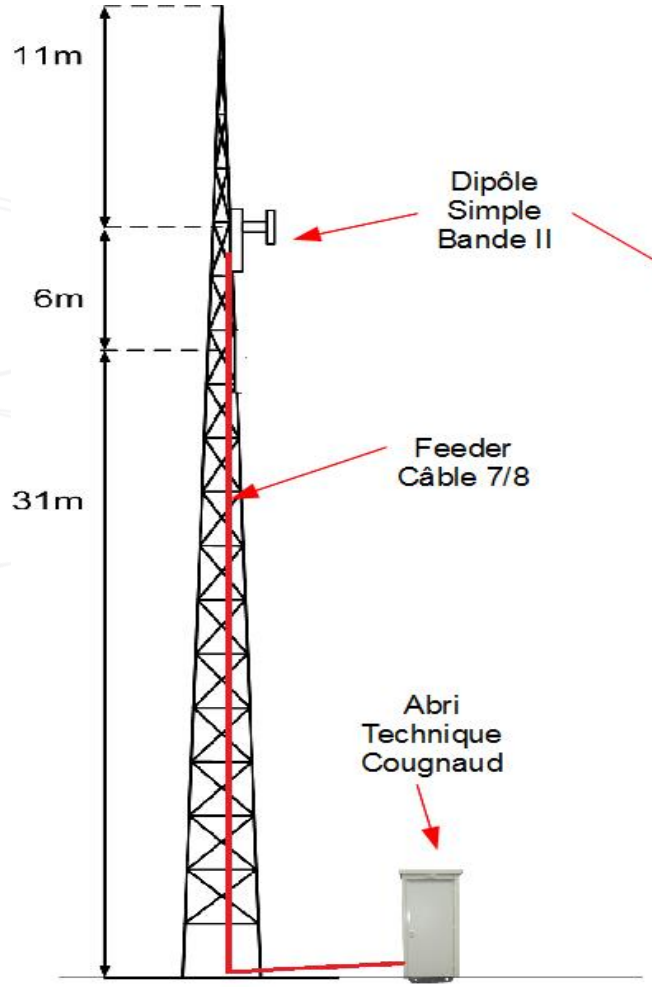
DRM+ Brittany Trials In Band II


Pleubian
Tréguier
Lannion
Paimpol
Granville
Cancale
Saint-Pol-de-Léon
Plougasnou
Bégard
Binic
Erquy
Saint-Malo
Lannilis
Morlaix
Guingamp
Ploudalmézeau
Plabennec
Plouigneau
E50
Saint-Brieuc
Dinan
Gouesnou
Landerneau
Ploufragan
Lamballe
Combourg
Plouzané
Plougastel-Daoulas
E401
Brest
Crozon
E60
Loudéac
Liffré
Douarnenez
Briec
Pontivy
Rennes
Quimper
Scaër
Bruz
Rosporden
Guer
Guichen
Janzé
Fouesnant
Quimperlé
Plouay
Baud
Pont-l'Abbé
Concarneau
Hennebont
Penmarch
Pluvigner
Ploemeur
Lorient
Auray
Vannes
Redon
Carnac
Quiberon
E60
E3
Pontchâteau
Blain
Savenay
Guérande

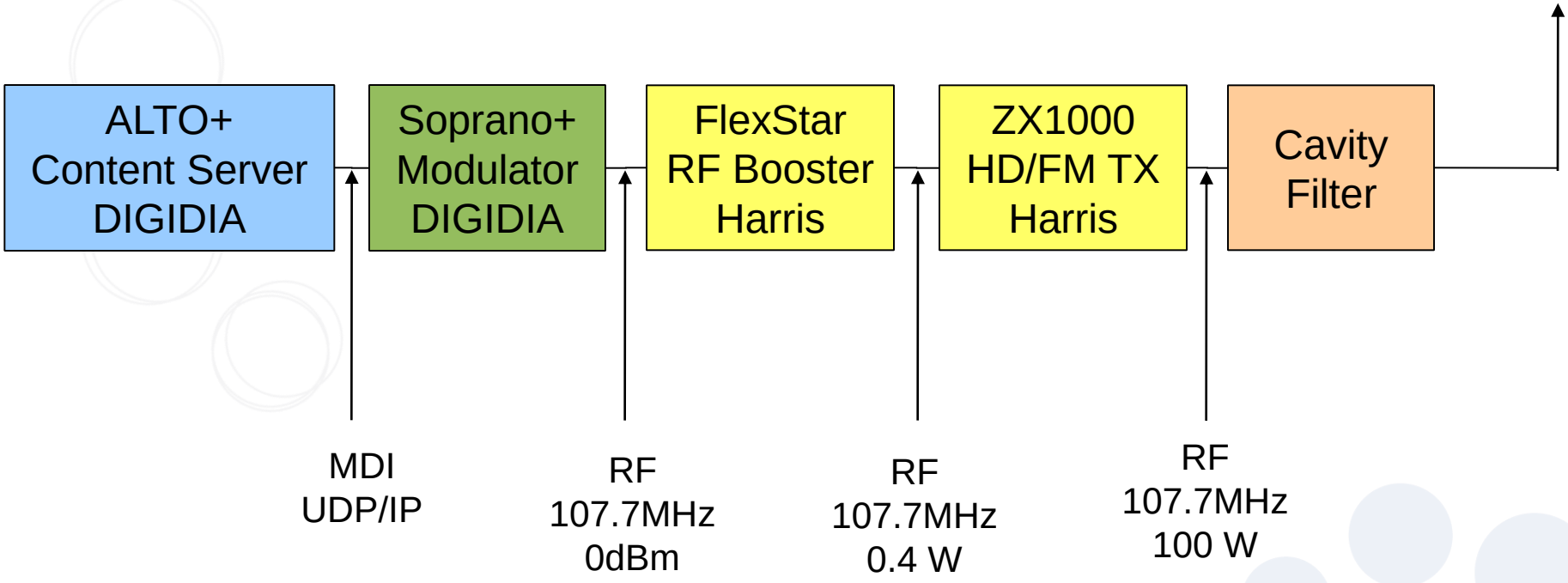
Commune	Plougastel Daoulas
Name of place	Kroas Ar Vossen
Code postal	29470
Latitude GPS	48° 21’10" W
Longitude GPS	04° 24’02" N
Height	95 meters above sea level
Type of support	Autosupporting power (see photo)
Height of support du support	48 mètres
Bande II Antenna	Used frequency: 107.7
Type	Dipôle simple
Model	I50A15B53
Height	37 mètres
Orientation	300°
Polarisation	Verticale



Operators: DIGIDIA and Telecom Bretagne (Engineer University in Brest)


11m
6m
31m
Dipôle
Simple
Bande II
Feeder
Câble 7/8
Abri
Technique
Cougnaud

DRM+ Transmission Chain



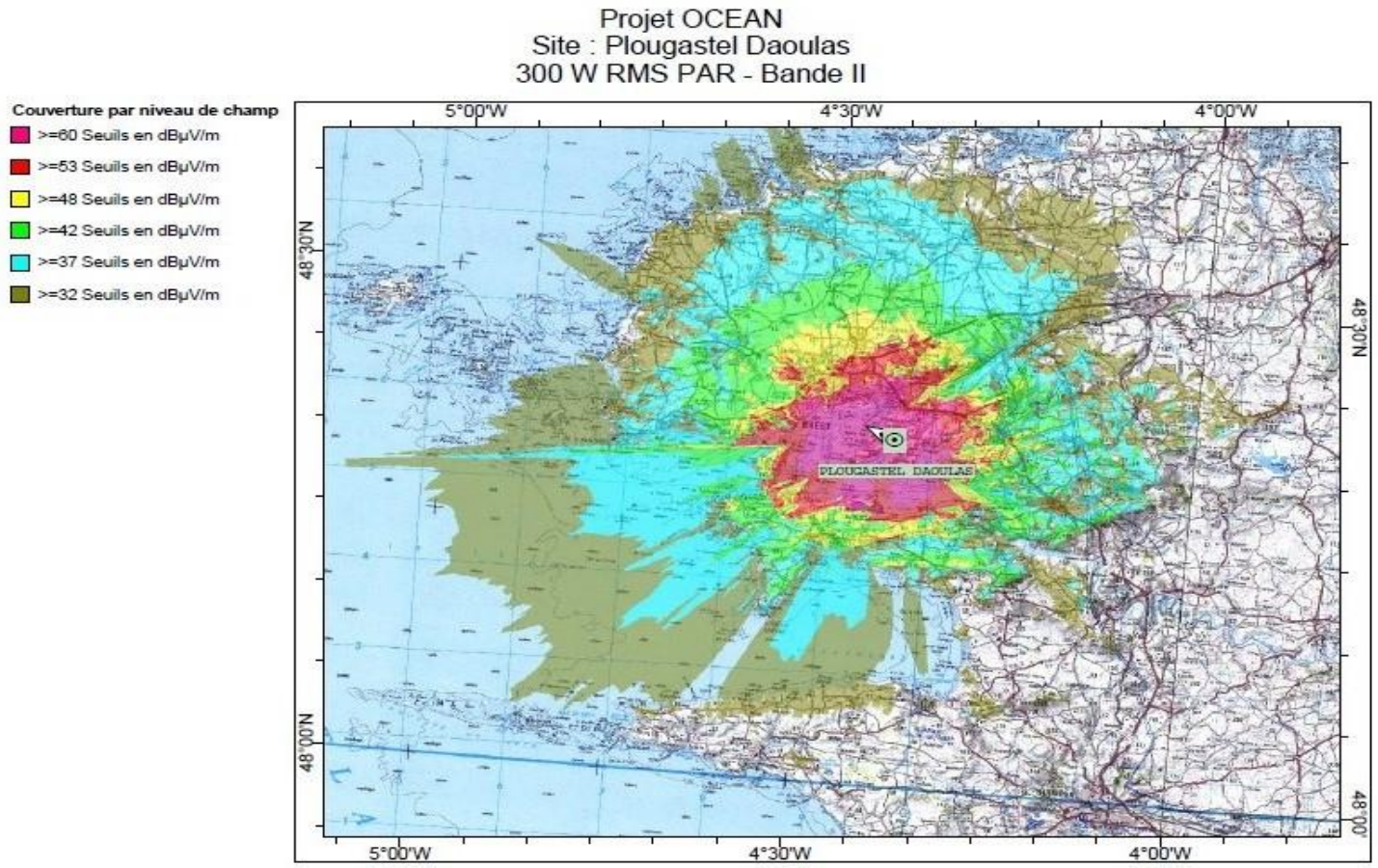
Serveur de contenu DRM+ ALTO+ de la société DIGIDIA

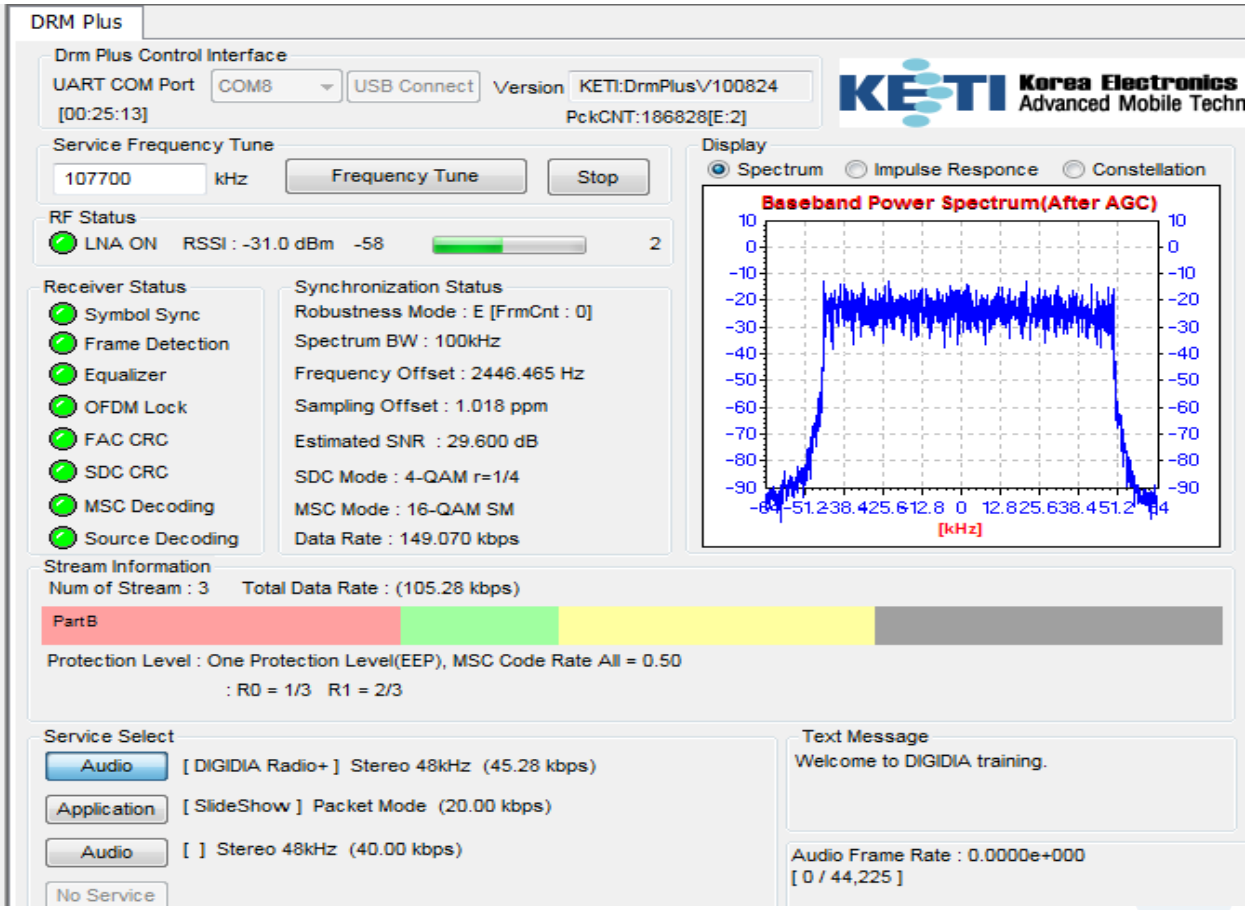
Modulateur DRM+ SOPRANO+ de la société DIGIDIA

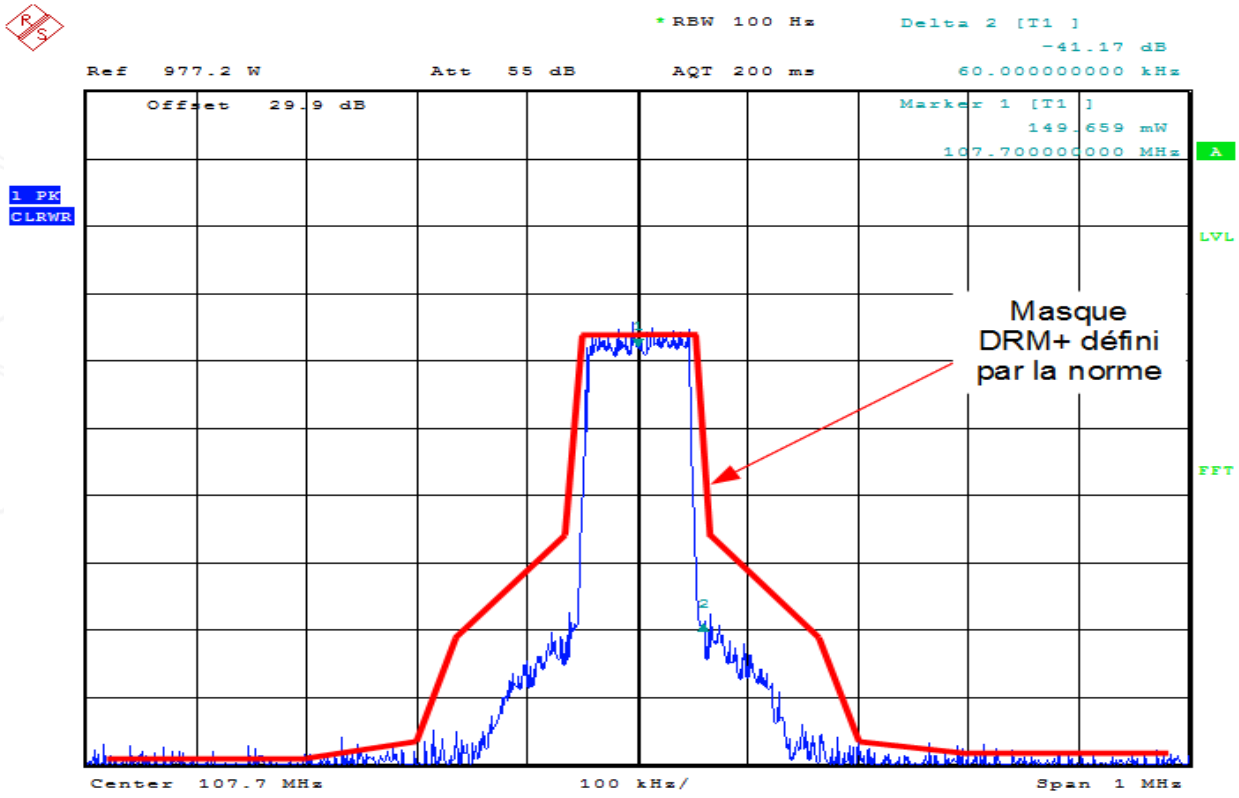
Pré-amplificateur FM/HDRadio FlexSTAR de la société HARRIS

Amplificateur FM/HDRadio ZX 1000 de la société HARRIS

Coverage Planning Tool with Atoll

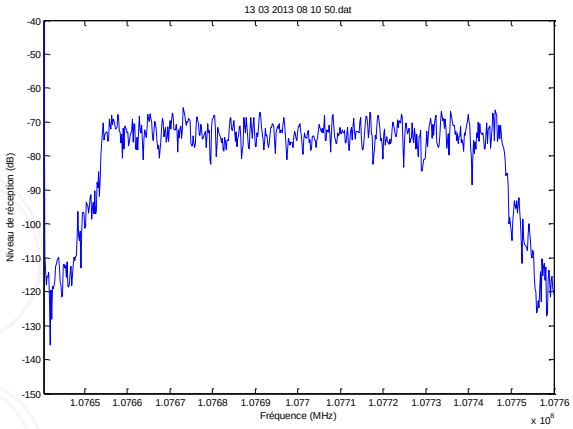



DRM Plus
Drm Plus Control Interface
UART COM Port
COM8
USB Connect
Version
KETI:DrmPlusV100824
[00:25:13]
PckCNT:186828[E:2]
KETI Korea Electronics
Advanced Mobile Techn
Service Frequency Tune
107700
kHz
Frequency Tune
Stop
Display
Spectrum
Impulse Responce
Constellation
RF Status
LNA ON
RSSI : -31.0 dBm
-58
2
Baseband Power Spectrum(After AGC)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-51.2
-38.4
-25.6
-12.8
0
12.8
25.6
38.4
51.2
[kHz]
Receiver Status
Symbol Sync
Frame Detection
Equalizer
OFDM Lock
FAC CRC
SDC CRC
MSC Decoding
Source Decoding
Synchronization Status
Robustness Mode : E [FrmCnt : 0]
Spectrum BW : 100kHz
Frequency Offset : 2446.465 Hz
Sampling Offset : 1.018 ppm
Estimated SNR : 29.600 dB
SDC Mode : 4-QAM r=1/4
MSC Mode : 16-QAM SM
Data Rate : 149.070 kbps
Stream Information
Num of Stream : 3
Total Data Rate : (105.28 kbps)
PartB
Protection Level : One Protection Level(EEP), MSC Code Rate All = 0.50
: R0 = 1/3 R1 = 2/3
Service Select
Audio
[DIGIDIA Radio+] Stereo 48kHz (45.28 kbps)
Application
[SlideShow] Packet Mode (20.00 kbps)
Audio
[ ] Stereo 48kHz (40.00 kbps)
No Service
Text Message
Welcome to DIGIDIA training.
Audio Frame Rate : 0.0000e+000
[0 / 44,225]

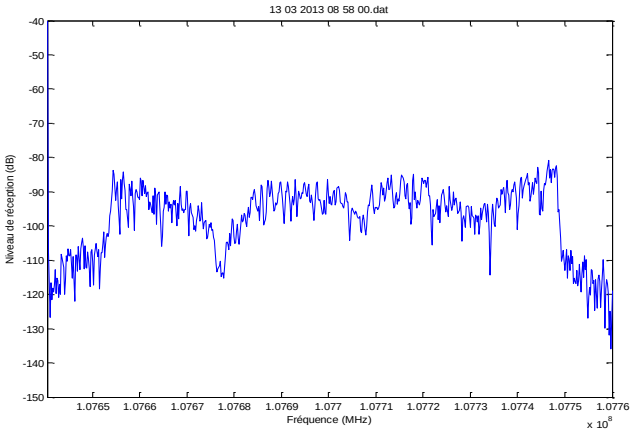


Date: 7.MAR.2013 06:12:05

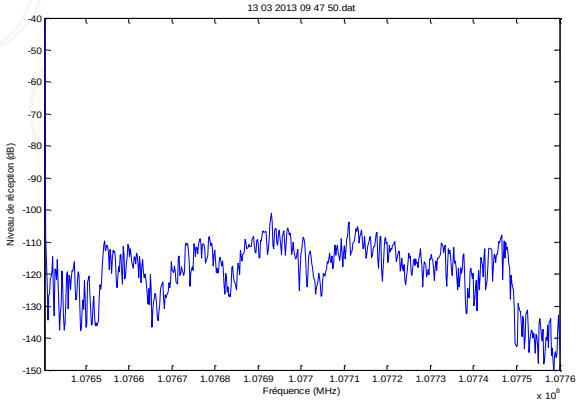
1
perfect



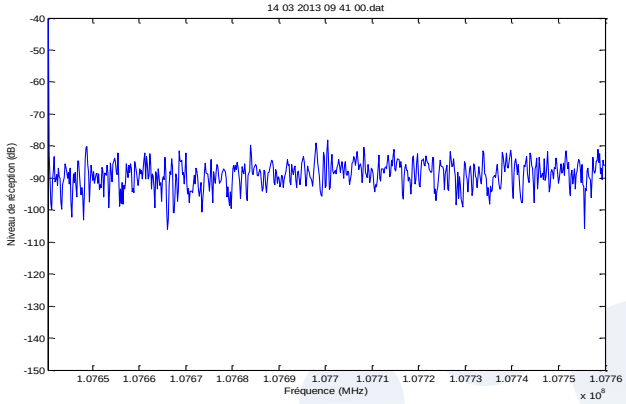
2
multi traject

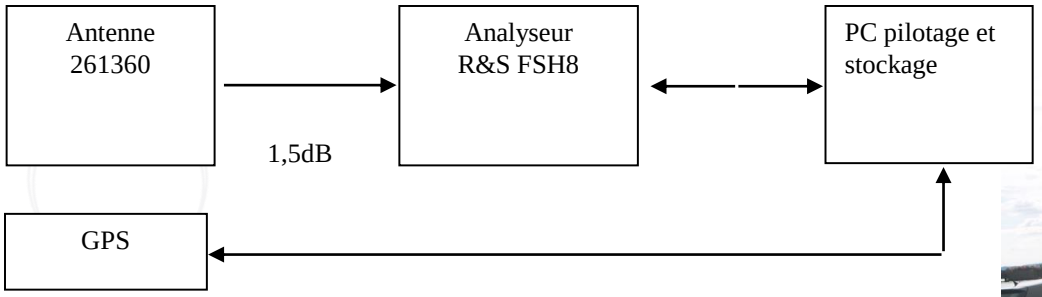


3
can
still be
heard



4
High
Power
Interferer

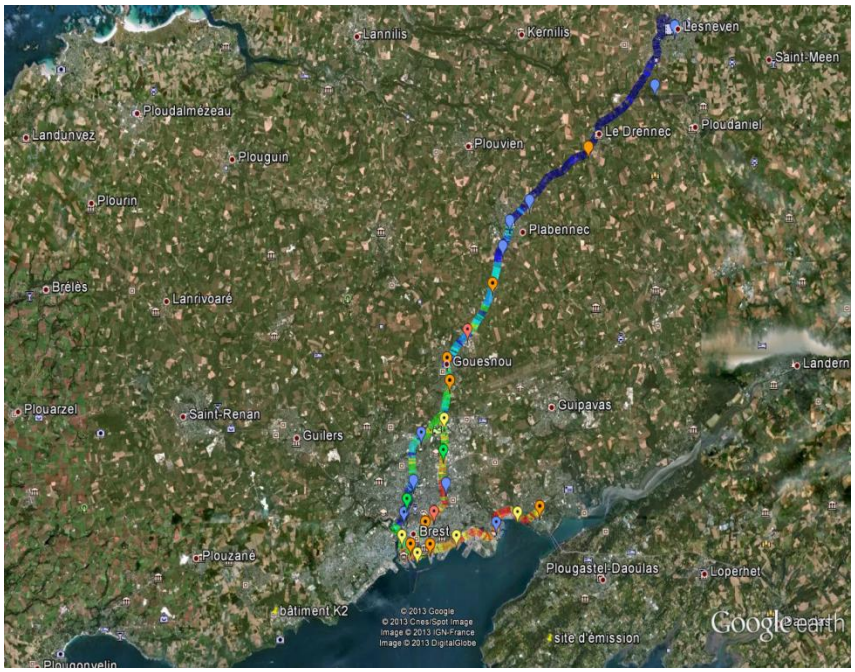



Antenne
261360
1,5dB
Analyseur
R&S FSH8
PC pilotage et
stockage
GPS

Coverage in4 QAM and 16 QAM

16QAM

10 km coverage



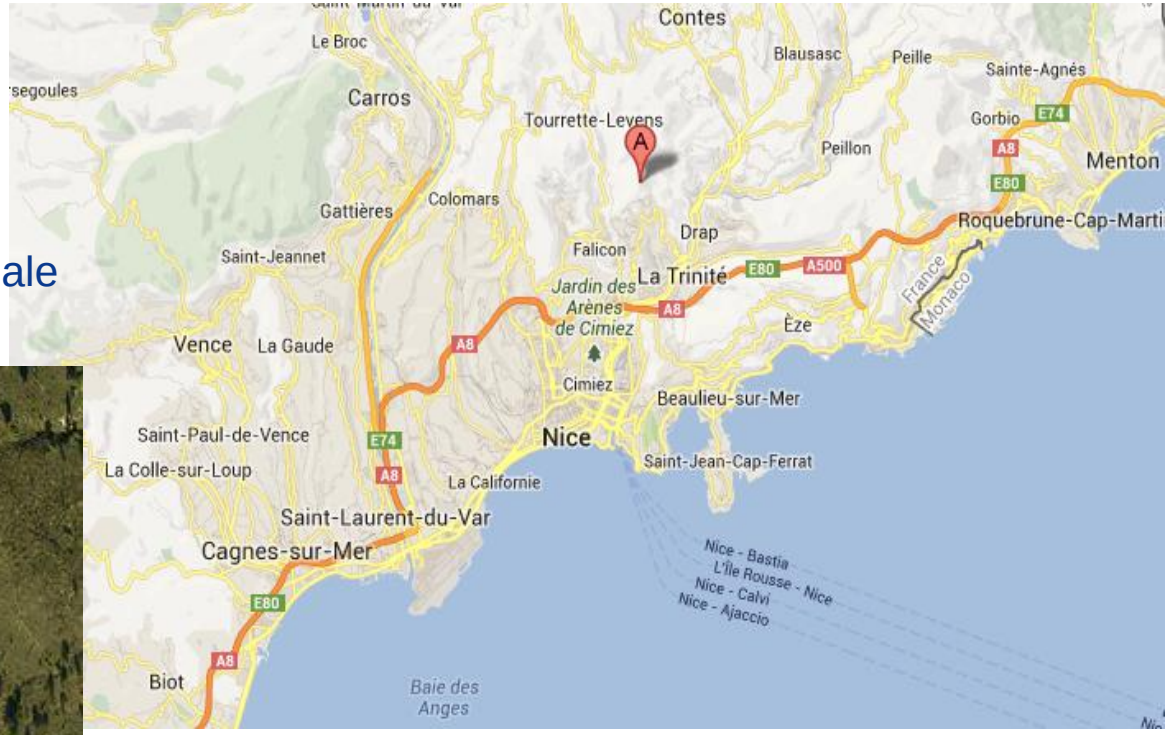
4QAM

15 km coverage

Nice DRM+ Trials in Band I (60 MHz)

Name of site:
Mont de l'Ubac

Operator: Agora FM
Head Engineer:Andre Scandale

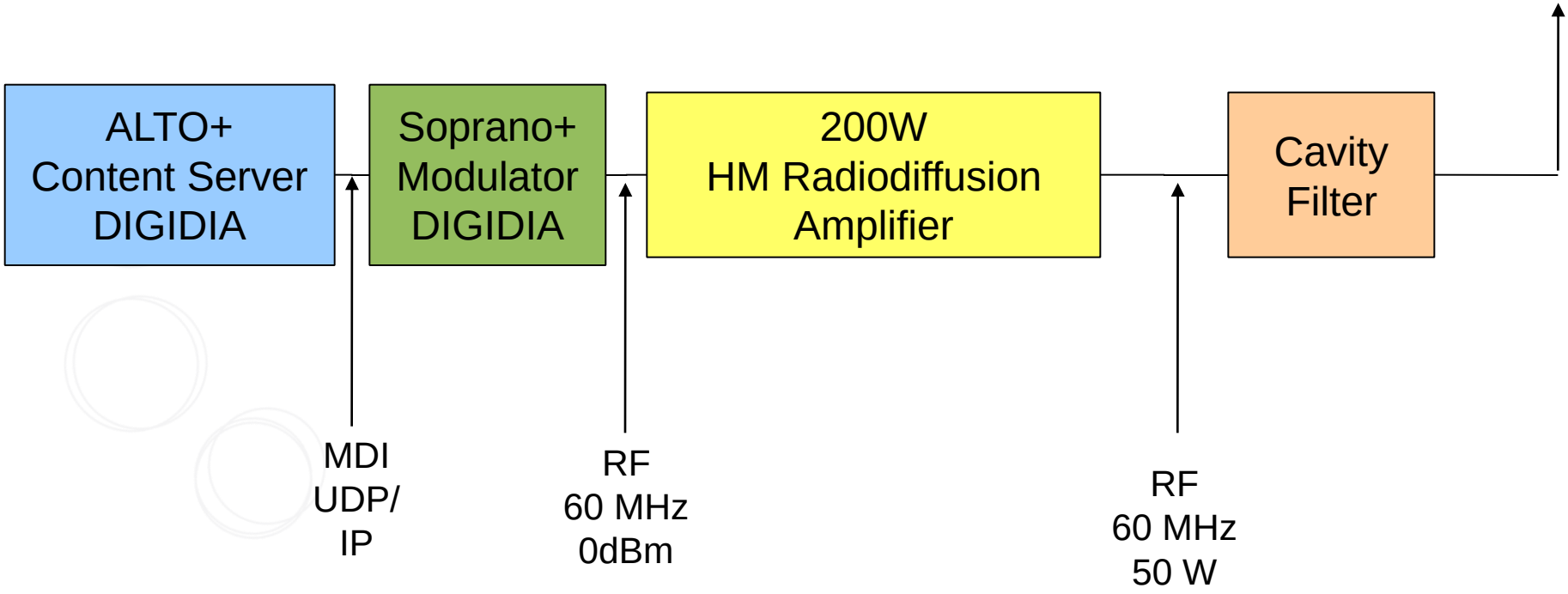


Multi Antenna Tower

- DAB

- FM

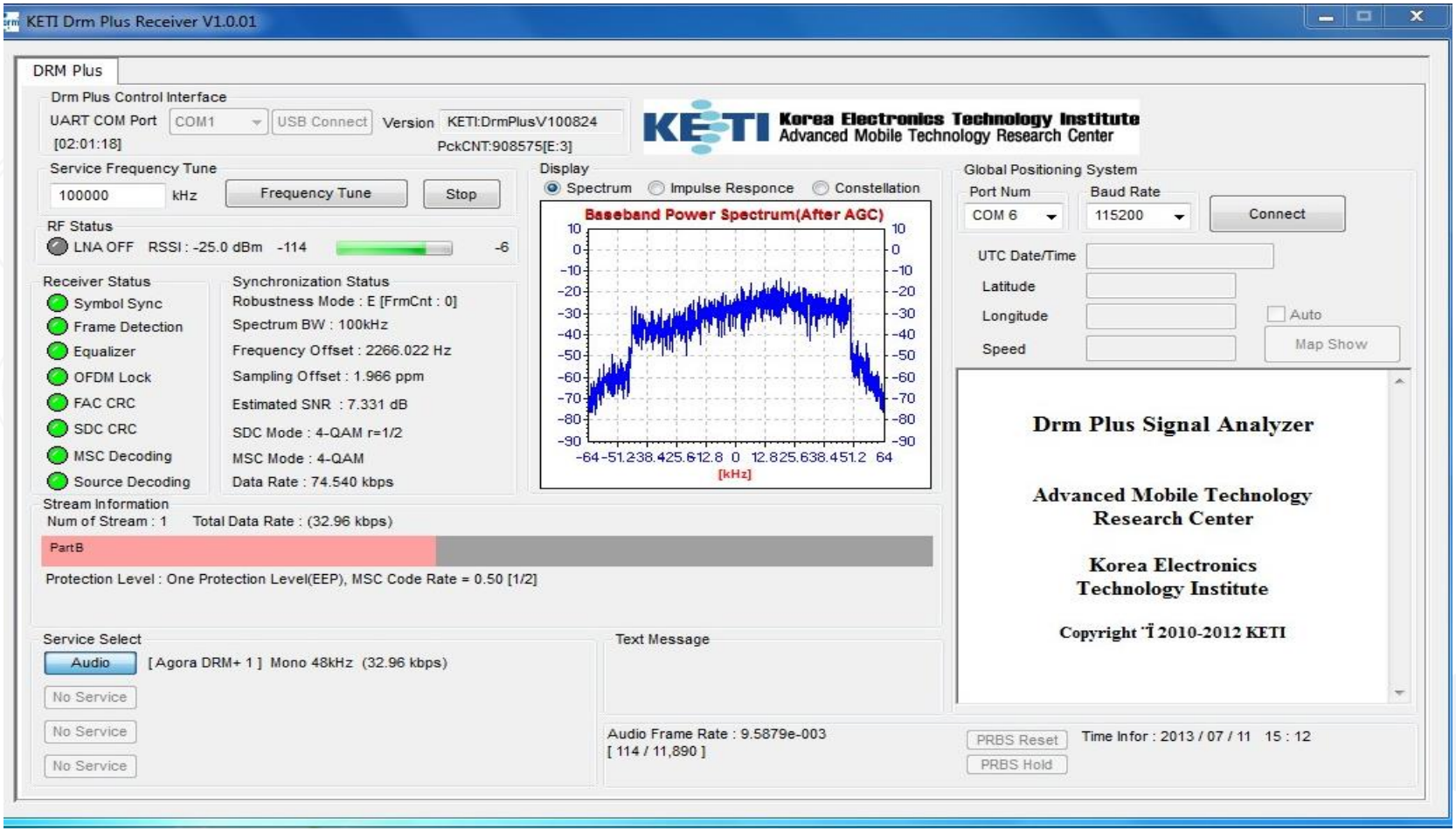
- Band 1 Antenna for DRM+


ALTO+
Content Server
DIGIDIA
Soprano+
Modulator
DIGIDIA
200W
HM Radiodiffusion
Amplifier
Cavity
Filter
MDI
UDP/
IP
RF
60 MHz
0dBm
RF
60 MHz
50 W

Transmission Set up

Own developments

- ¼ L Groundplane antenna
- Up converter in front of KETI Receiver from 60 MHz to Band 2, with 3 cavities of 60 Mhz, 2 Mos FETs and 1 Oscillator of 4 to MHz


KETI Drm Plus Receiver V1.0.01
DRM Plus
Drm Plus Control Interface
UART COM Port
COM1
USB Connect
Version
KETI:DrmPlusV100824
[02:01:18]
PckCNT:908575[E:3]
Korea Electronics Technology Institute
Advanced Mobile Technology Research Center
Service Frequency Tune
100000
kHz
Frequency Tune
Stop
RF Status
LNA OFF
RSSI : -25.0 dBm
-114
-6
Receiver Status
Symbol Sync
Frame Detection
Equalizer
OFDM Lock
FAC CRC
SDC CRC
MSC Decoding
Source Decoding
Synchronization Status
Robustness Mode : E [FrmCnt : 0]
Spectrum BW : 100kHz
Frequency Offset : 2266.022 Hz
Sampling Offset : 1.966 ppm
Estimated SNR : 7.331 dB
SDC Mode : 4-QAM r=1/2
MSC Mode : 4-QAM
Data Rate : 74.540 kbps
Display
Spectrum
Impulse Responce
Constellation
Baseband Power Spectrum(After AGC)
[kHz]
Global Positioning System
Port Num
COM 6
Baud Rate
115200
Connect
UTC Date/Time
Latitude
Longitude
Speed
Auto
Map Show
Drm Plus Signal Analyzer
Advanced Mobile Technology Research Center
Korea Electronics Technology Institute
Copyright ⓒ 2010-2012 KETI
Stream Information
Num of Stream : 1
Total Data Rate : (32.96 kbps)
PartB
Protection Level : One Protection Level(EEP), MSC Code Rate = 0.50 [1/2]
Service Select
Audio
[Agora DRM+ 1] Mono 48kHz (32.96 kbps)
No Service
No Service
No Service
Text Message
Audio Frame Rate : 9.5879e-003
[114 / 11,890]
PRBS Reset
PRBS Hold
Time Infor : 2013 / 07 / 11 15 : 12

Measurements Nice - St Laurent du Var- Cagnes - La Fontonne - Antibes

Find more information in French language under

http://agoradrmplus.canalblog.com/

Andre Scandale

4 – Norway DRM+ trial In Band II

Speaker

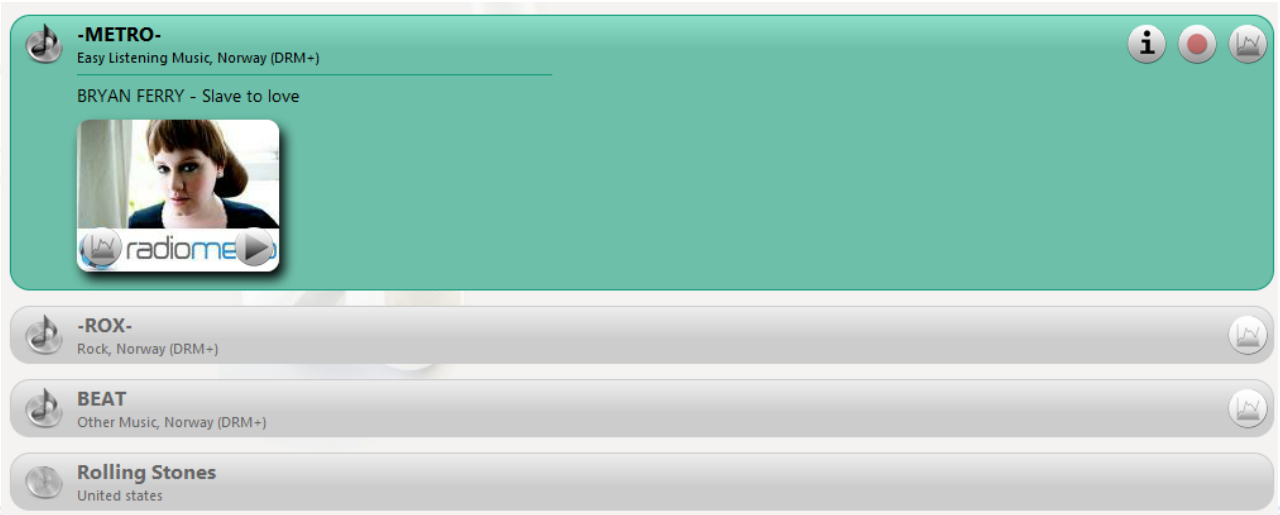
Eivind Engberg
Chief Engineer
Radio Metro, Norway

DRM+ Transmission in Norway

- Transmits from the Tyholt tower in Trondheim FM 94,0 MHz
- Transmitter in use: Nautel VS300+VSDRM
- Current output power: 25W
- Antenna in use: Sira FMC-01
- Combiner in use: Delta Meccanica star point combiner

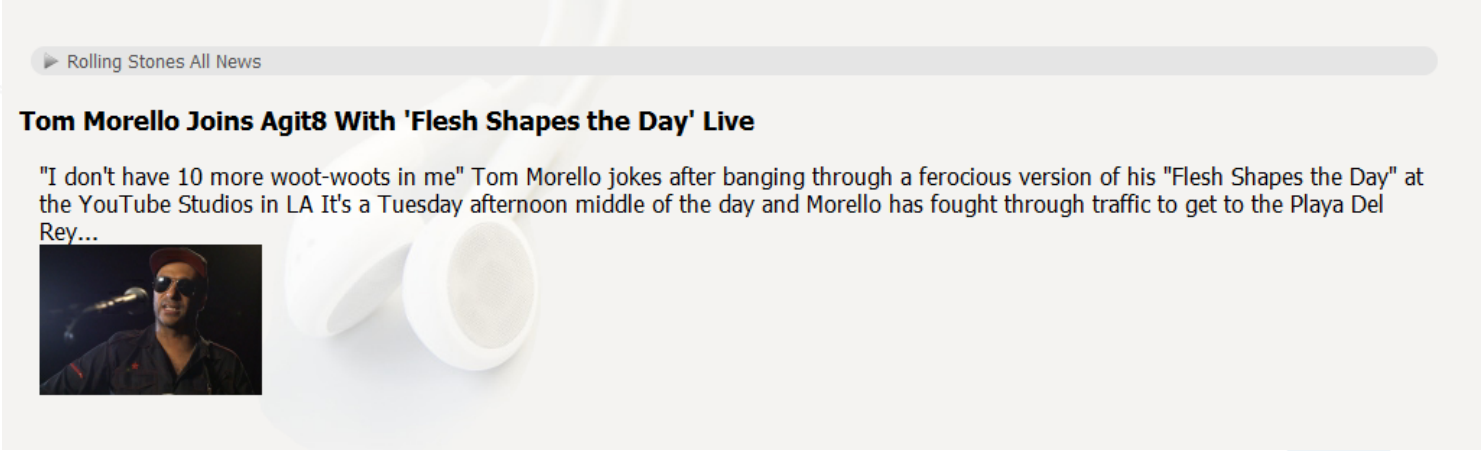
DRM+ Content Server

- Using Fraunhofer DRM ContentServer in two modes:
- 4QAM – One audio channel and three Journaline services
- 16QAM – Three audio channels and one Journaline service

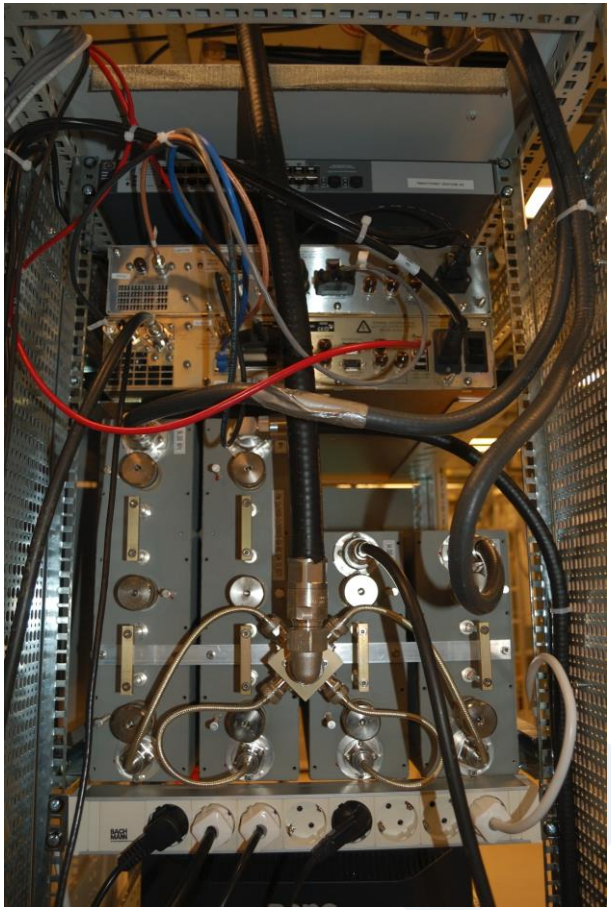


DRM+ Content Server

- Journaline Service provides news via the DRM system
- Simple RSS feed from internet feeds the receiver, can also be used to send newspapers on DRM




DRM
VS-DRM
TYHOLT FM 94.0
VS300
SBS RADIO NORGE AS / TWENTYFIRST VENTURE AS



DRM+ Transmission in Norway

- Planned coverage analysis during the fall of 2013
- Applied license to increase output power to 100W
- Adjustments need to be done in combiner/transmitter
- With help from BBC and Delta Meccanica

5 – Considerations for Introducing DRM+

Speaker

Alexander Zink
DRM-SB, Vice Chairman DRM Technical Committee
Senior BDM Digital Radio, Fraunhofer IIS, Germany

Why Digital Radio?

A – Public Broadcaster:

→ **Additional radio programs / audio content**
(e.g. special-interest content)

→ **Internet news**
get text content into radio sets

→ **Disaster Warning** feature
to quickly alert the public
through all radio sets

Why Digital Radio?

B – Private Broadcasters:

→Secure radio future in
Digital Era

→Benefit from
new revenue opportunities

→Link with **online resources**
(web sites, social media, etc.)

→Linking with **Disaster Warning**
(typically provided by public service)

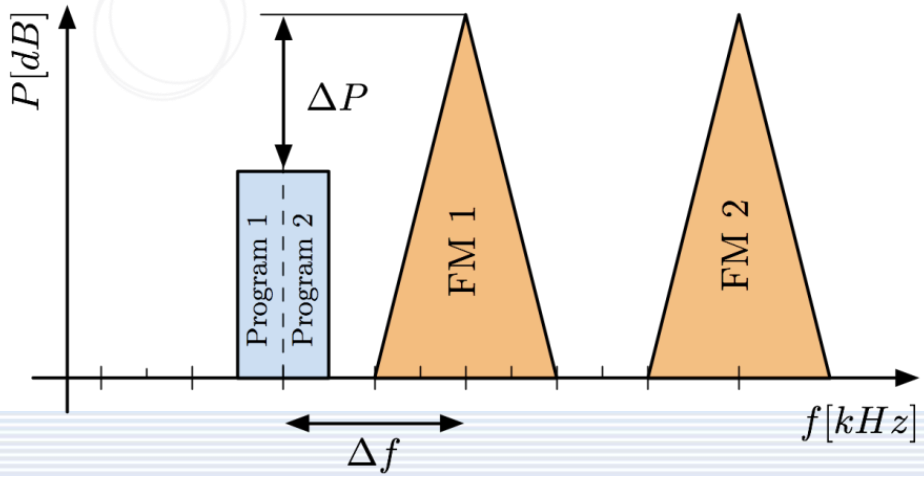
Considerations for DRM+ Introduction

→ **Simulcast** during transition period

→ Fits with **existing frequency assignment**

→ No change in **frequency licensing** required

→ Complete **planning parameters** @ ITU



Recommended values:
Δf = min. 150 kHz
ΔP >20 dB for Δf=150 kHz

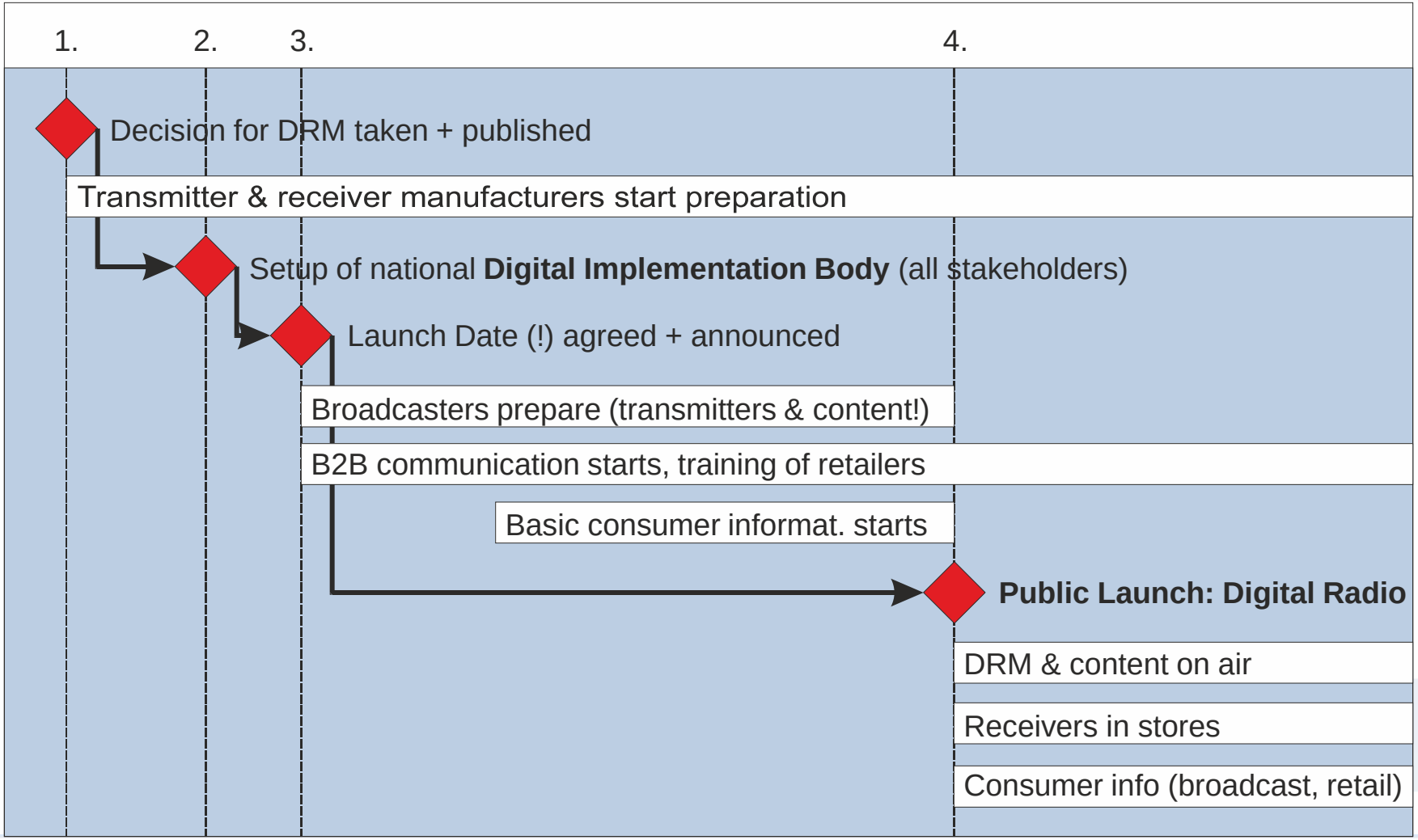
Receiver Availability for Launch Date

1. **Communication !**
   - → Decide upon a **fixed launch date**
   - → Communicate launch date in advance to receiver manufacturers
   - → Educate + excite public & listeners

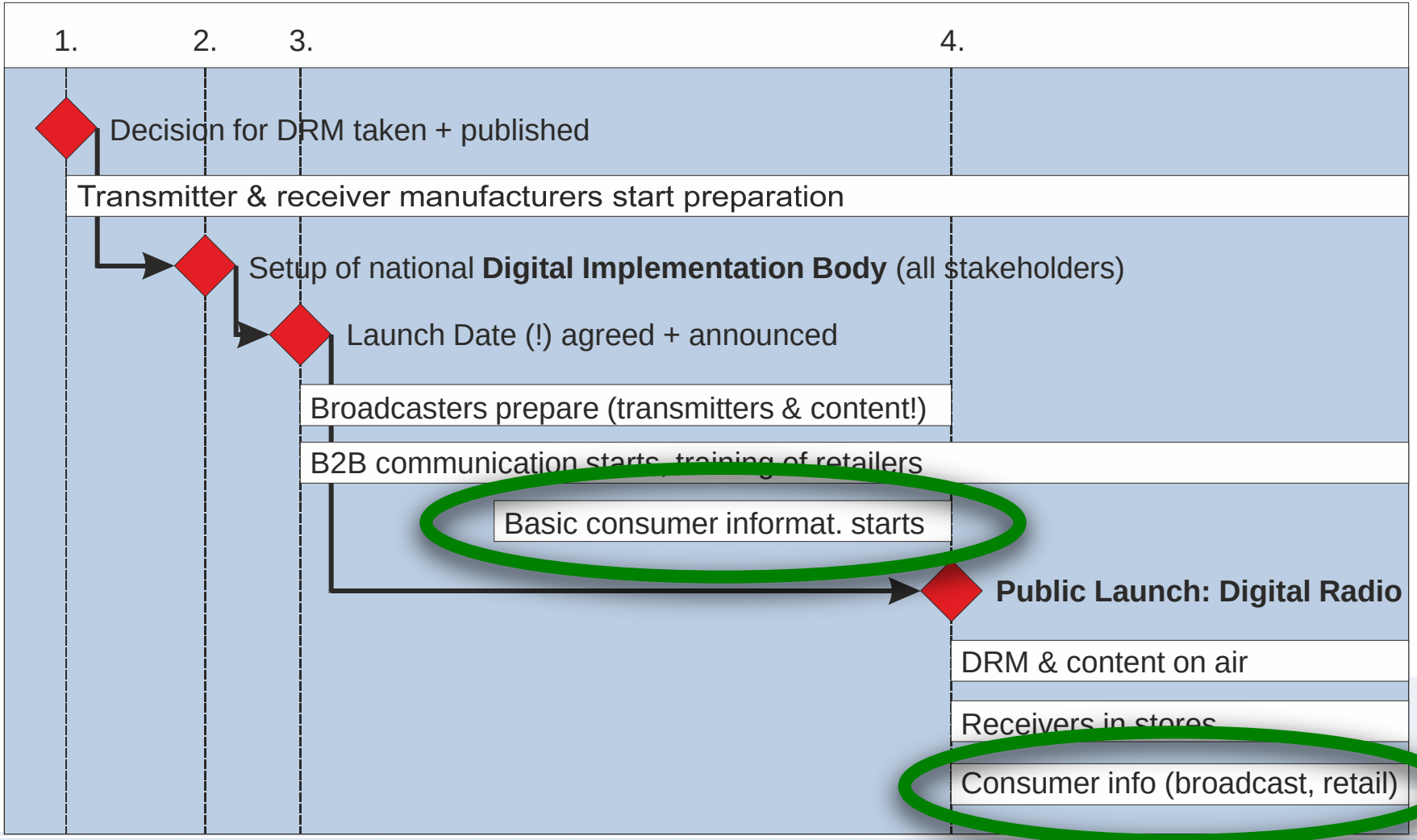
2. **Political support !**
   - → Make **DRM Disaster Alert** feature mandatory for all new radio sets
   - → In future potential decision for analog sunset date

3. **Content !**
   - → Create **exclusive audio + data** offers

Roll-Out Planning



Roll-Out Planning



6 – DRM & DAB+
The Open Standard Digital Radio Family

Speaker

Alexander Zink
DRM-SB, Vice Chairman DRM Technical Committee
Senior BDM Digital Radio, Fraunhofer IIS, Germany

DRM is the digital radio standard

that complements
and works seamlessly

with other digital radio standards.

DRM and DAB+ Digital Radio!

DIGITAL radio mondiale

WORLD DAB
Digital Multimedia Broadcasting
Radio • Mobile TV • Multimedia • Traffic Data

- **DAB+** is an efficient solution for local/regional terrestrial broadcast in case of many services with identical coverage area (multiplex transmissions)
- **DRM+** is the efficient local/regional terrestrial broadcast solution for individual services or coverage needs, with broadcaster-controlled transmissions (individual-service transmissions)
- **DRM30** is the terrestrial broadcast solution for large-area MW or SW coverage (individual-service transmissions)

➔ **DRM and DAB+ provide complementary solutions**

DRM and DAB+ Digital Radio!

DIGITAL radio mondiale

WORLD DAB Digital Multimedia Broadcasting
Radio • Mobile TV • Multimedia • Traffic Data

- Most core functionality is shared:
  - Mobile terrestrial broadcasting with SFN
  - Audio codec (MPEG-4 HE-AAC v2)
  - Data applications
  - Mutual service linking (AFS)
  - Open & ITU recommended standards

✓**Listener + broadcaster perspective: DAB+ and DRM offer equivalent functionality**

✓**Efficient implementation of combined receivers + chipsets** (Frontier Silicon, NXP, PNP, Parrot, …)

✓**DRM+ does not add any IP royalty on top of DAB+ & DRM30 receivers!**

DRM and DAB+ Digital Radio!

DIGITAL radio mondiale

WORLD DAB
Digital Multimedia Broadcasting
Radio • Mobile TV • Multimedia • Traffic Data

- DRM & DAB+ offer identical features
  - ✓ One Digital Radio Family
- DRM+ adds the individual-service perspective
  - ✓ Complementing DRM30 and DAB+
- DRM & DAB+ are open standards
  - → ITU recommended
- Combined receiver implementations are cost-efficient and straight-forward
  - → DRM+ does not add IP royalty cost to a DAB+ / DRM30 receiver

→DRM and DAB+ combined serve all digital radio broadcast scenarios

→Leaves individual choice to broadcaster

Your Questions NOW

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More information on DRM on:

For the DRM Implementation and Introduction Guide:
www.drm.org

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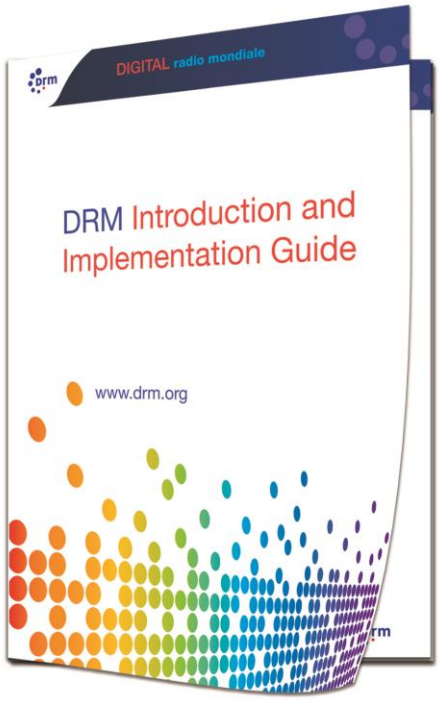
For any inquiries or comments, please write to:
projectoffice@drm.org

All you need to know on DRM – Free

DRM Introduction and Implementation Guide



www.drm.org

THANK YOU

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