DIGITAL radio mondiale

The FUTURE of global radio

Latest news on a versatile system for Broadcasters:

DRM on Short Wave

HFCC Conference

TUNIS

28.01 – 01.02.2013

TRANSRADIO SenderSysteme Berlin

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Formerly Known as TELEFUNKEN SenderSysteme Berlin

Jean-Francois Kipp
Director of Sales Asia and Africa
AM and DRM transmitters

Jochen Huber
CEO TRANSRADIO and
Vice President of the DRM Consortium

TRANSRADIO SenderSysteme Berlin

The core competence

TRANSRADIO is specialised in Research, Development, Design, Installation and Commissioning of modern **AM, VHF/FM and DRM Broadcasting Systems**, Antennas and Customized Solutions for Radio and Data Broadcasting Systems

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DRM

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The Open Standard for Digital Radio

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The digital radio technology for all your needs

Worldwide open digital radio standard

DRM: The whole worldwide open system in all frequency bands composed of :

- **DRM30**: DRM below 30 MHz.
  i.e. LF, MF, HF (or LW, MW, SW) – *the AM bands*
- **DRM+:** DRM above 30 MHz.
  i.e. VHF (Band I, II, III) – *including the FM band*

STANDARD is COMPLETE!

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DRM AM and FM bands

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

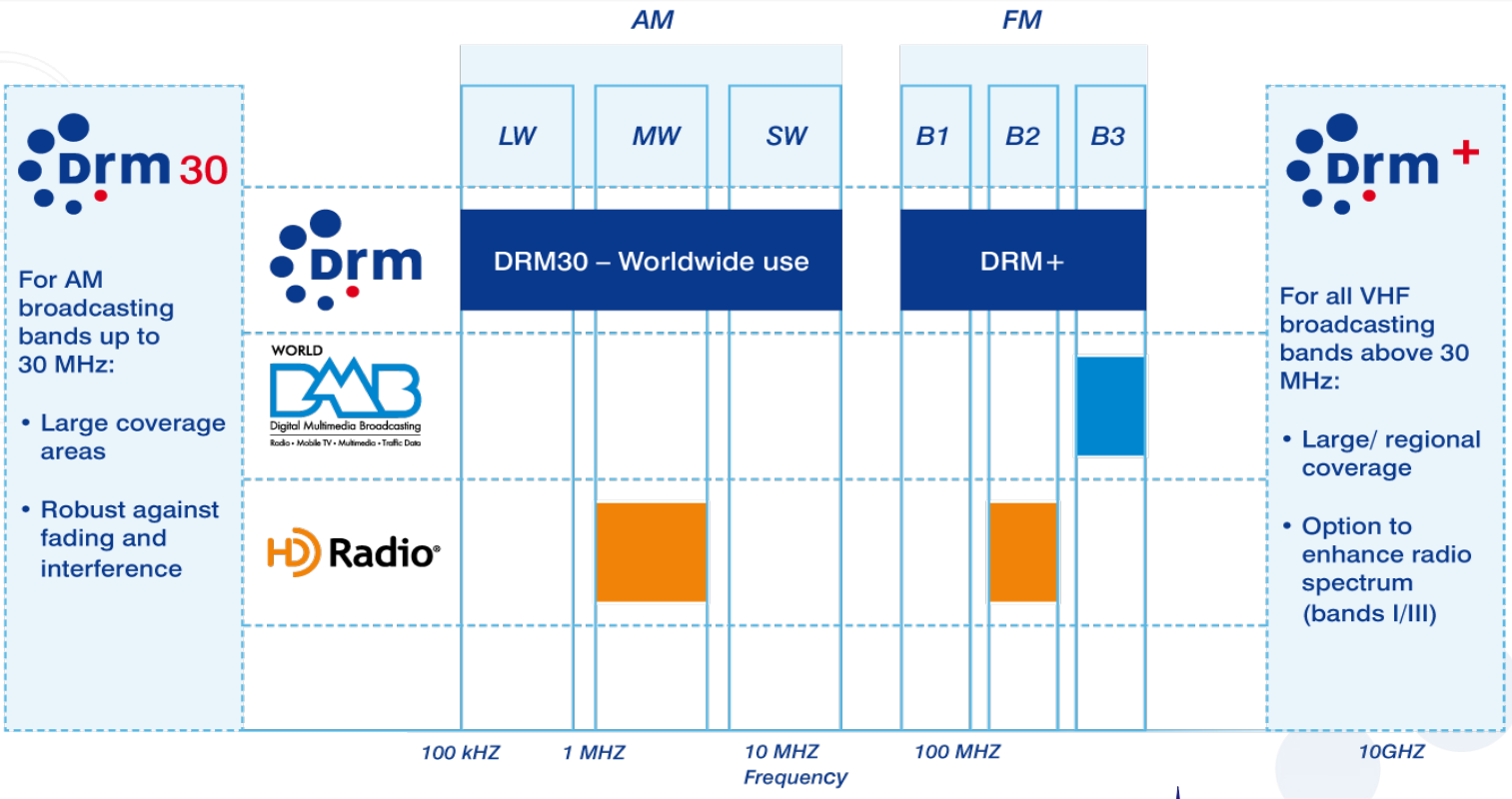
30MHZ

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

DIGITAL radio mondiale

The FUTURE of global radio

DRM is the Global Digital Radio Standard for all Bands Below and Above 30 MHz!



DRM 30

For AM broadcasting bands up to 30 MHz:

- Large coverage areas
- Robust against fading and interference

DRM +

For all VHF broadcasting bands above 30 MHz:

- Large/ regional coverage
- Option to enhance radio spectrum (bands I/III)

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Some DRM Receivers

Some examples for DRM radio receivers

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DRM
-
Benefits for Broadcasters and Users

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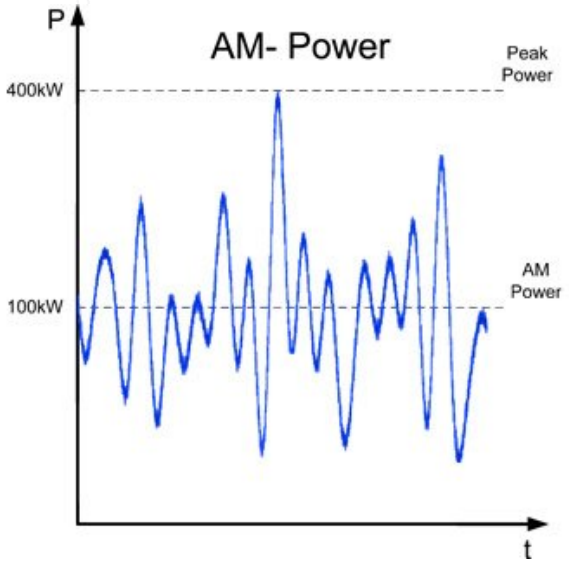
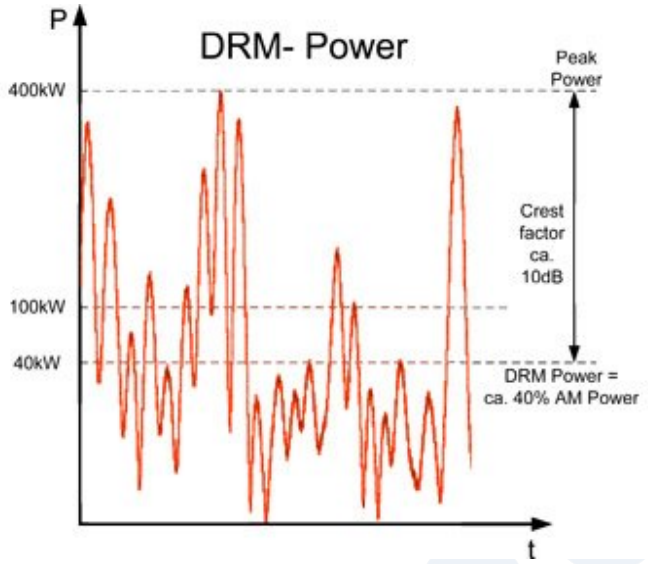
Benefits of Digital AM for Broadcasters

- Reduced power consumption of transmitters ~40%
- Increased covering areas
- Increased possible number of listeners
- Faster return of investment
- Easy operation of SFN/MFN





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Benefits of Digital AM for Listeners

- **“FM-like” sound quality with wide covering areas**
- **Improved reception quality**
- **Additional audio and data services**
  - associated text information
  - station name
  - record title
  - performer’s name
  - ...
- **Worldwide unique standard for radios**
- **Easy indoor and outdoor reception**
- **Easy to handle receivers**
  (selection of frequency, station name or program type)

DRM Everything is possible! MORE CONTENTS

1. Stage:	Main-Programme 24 kbps Simple text displayed		
2. Stage:	Music programme 20 kbps Stereo Plus information programme in parallel speech only 4 kbps: TOP NEWS		
3. Stage:	Main-Programme 24 kbps Stereo Text, Graphic, Picture, HTML 800 bps		
4. Stage:	Speech channel A 4 kbps Speech channel B 4 kbps Speech channel C 4 kbps	Music 24 kbps Stereo	Speech channel A 4 kbps Speech channel B 4 kbps Speech channel C 4 kbps

Benefits of Digital AM for Listeners

Sines Kotka
17740 kHz 08 Aug 15.00-15.30
Sample 4: High Quality SW 64 QAM
AAC + SBR 22220 bit/s
Sample 5: AM DSB

Orfordness , Erlangen
1296 kHz 25 Jul 03.30-04.00
Sample 7: High Quality MW 64 QAM
AAC + SBR 25080 bit/s
Sample 8: AM DSB

Sines / Limassol
21630 kHz 11 Aug 10.30-11.00
Sample 9: Robust Quality SW 16 QAM
AAC 15960 bit/s
Sample 10: AM DSB

Kotka, Finland
Orfordness, UK
Sackville, Canada
Juelich, Germany
Erlangen, Germany
Sines, Portugal
Cyprus
Bonaire, Dutch Antilles
Quito, Ecuador
Guayaquil

Pifo
20.00 UTC 3,220kHz
Vertical incidence. 16km
1. Analogue DSB
2. 16QAM
3. 64 QAM

Juelich **to Bonaire 20th Dec 2000**
15.00 UTC 21,635kHz
Long path, 7,886km
1. Analogue DSB
2. 16QAM
3. 64QAM

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FM REBROADCAST WITH DRM

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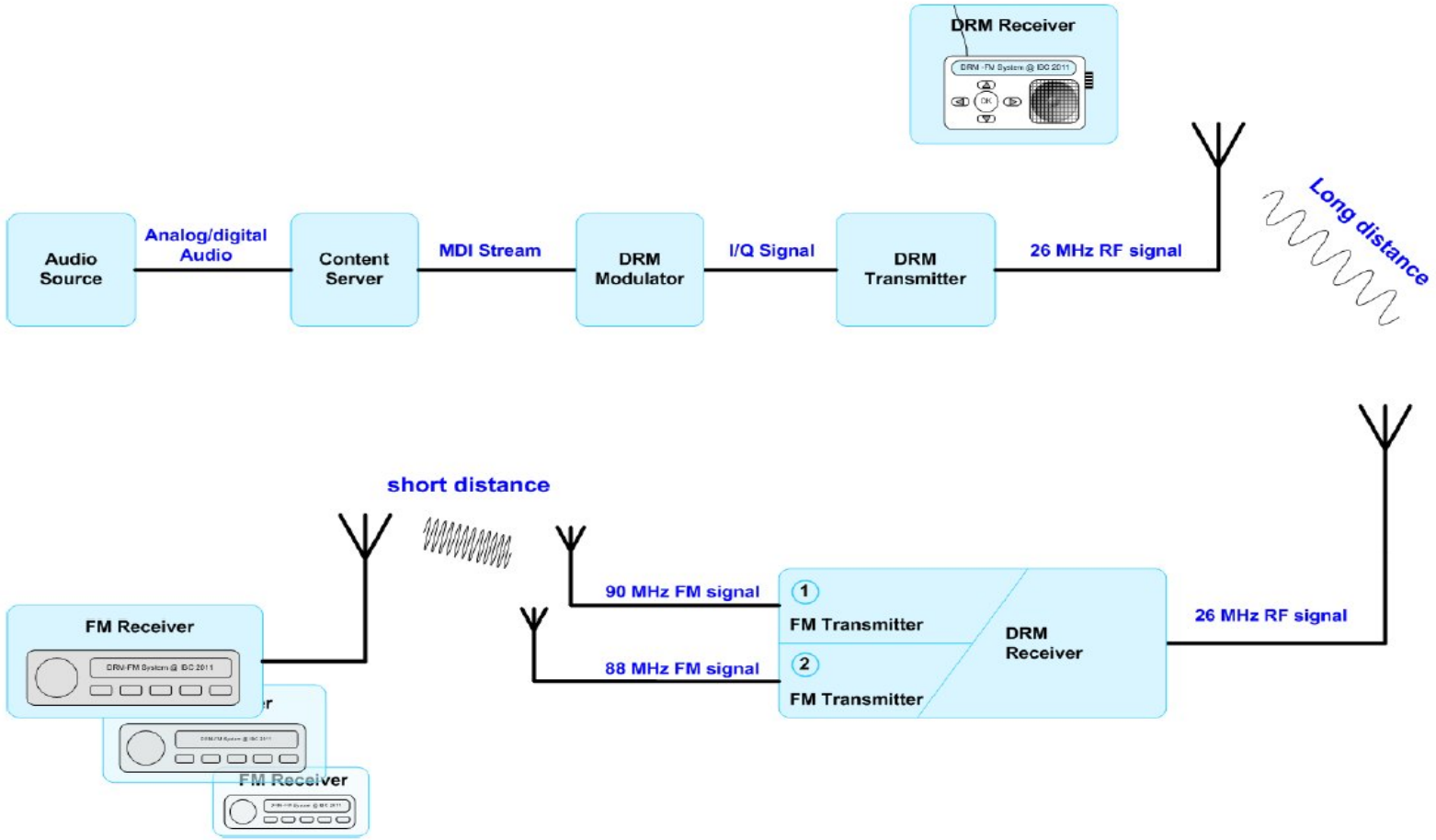
DRM Receiver
Audio Source
Analog/digital Audio
Content Server
MDI Stream
DRM Modulator
I/Q Signal
DRM Transmitter
26 MHz RF signal
Long distance
short distance
FM Receiver
FM Receiver
90 MHz FM signal
88 MHz FM signal
1
FM Transmitter
2
FM Transmitter
DRM Receiver
26 MHz RF signal

A professional DRM Modulator :
TRANDSRADIO DMOD3

A professional DRM receiver :
Fraunhofer DT700

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- Polyvalent use of the DRM broadcasting :
  + Worldwide received with DRM with huge quality gain and relevant increased covered area
  + at the same time rebroadcasting possibilities, locally, in FM
- Use of the multicontent DRM advantages: up to 4 DRM services can be rebroadcasted in 4 different FM Channels
- Easy switch over between analog and DRM Short Wave stations
- Good sound quality reception suitable for FM
- Cost reductions - No constant up and down-link
- Broadcasters gain in independency – No dependence to other service providers

Best solution for signal distribution. Worldwide.

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DRM Modulator

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Design of a modern DRM Exciter

- SCS; AM and DRM on one or two 9kHz channels
- Fast and easy switchover between modes in less than 5 seconds!
- Integrated GPS receiver for single frequency networks (SFN)
- Feed back channel for optimization of the transmission system
- Integrated audio encoder
- Integrated synthesizer, Frequency range 9kHz to 27 MHz

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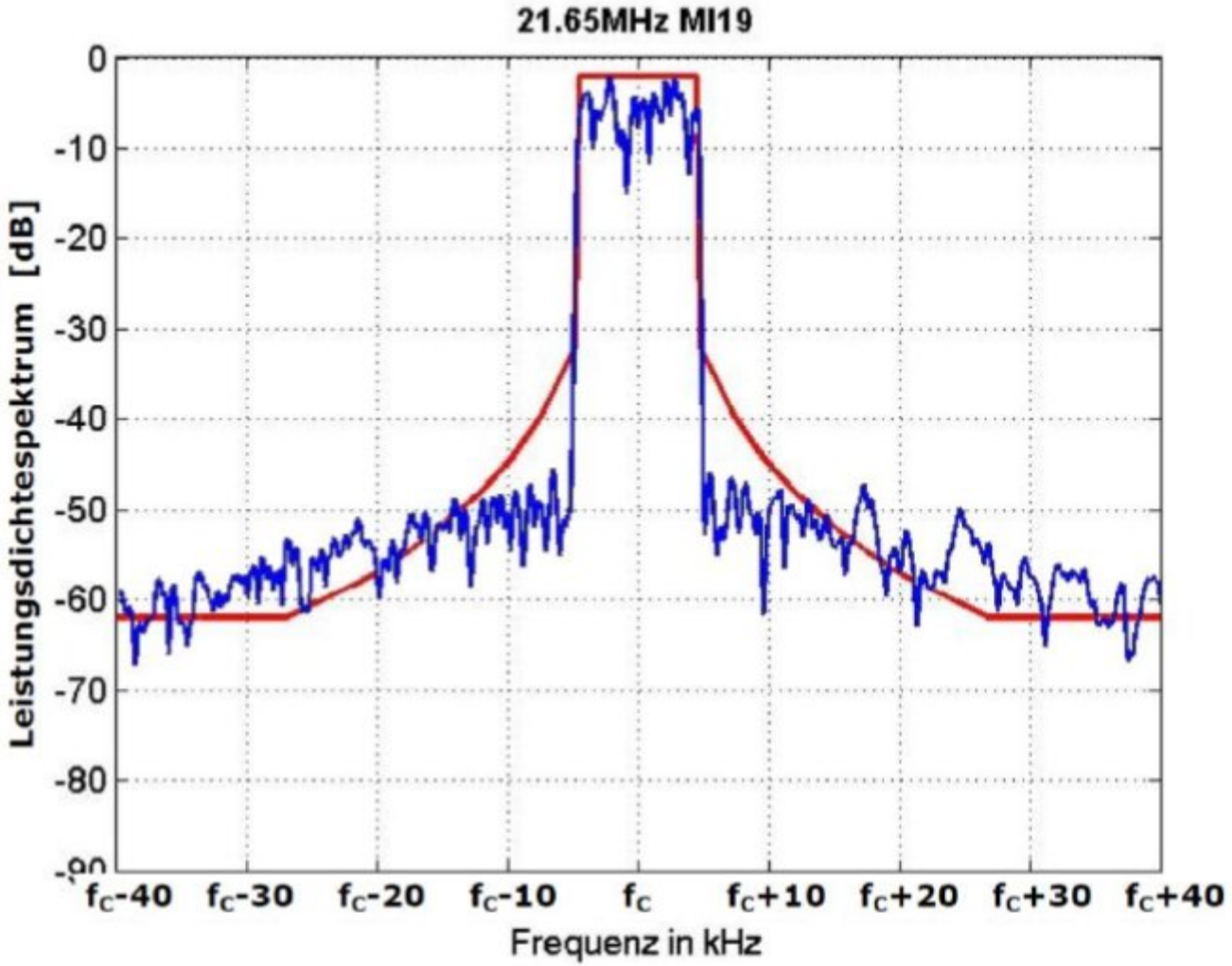
21.65MHz MI19
Leistungsdichtespektrum [dB]
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
fc-40
fc-30
fc-20
fc-10
fc
fc+10
fc+20
fc+30
fc+40
Frequenz in kHz

Field proven DRM Systems

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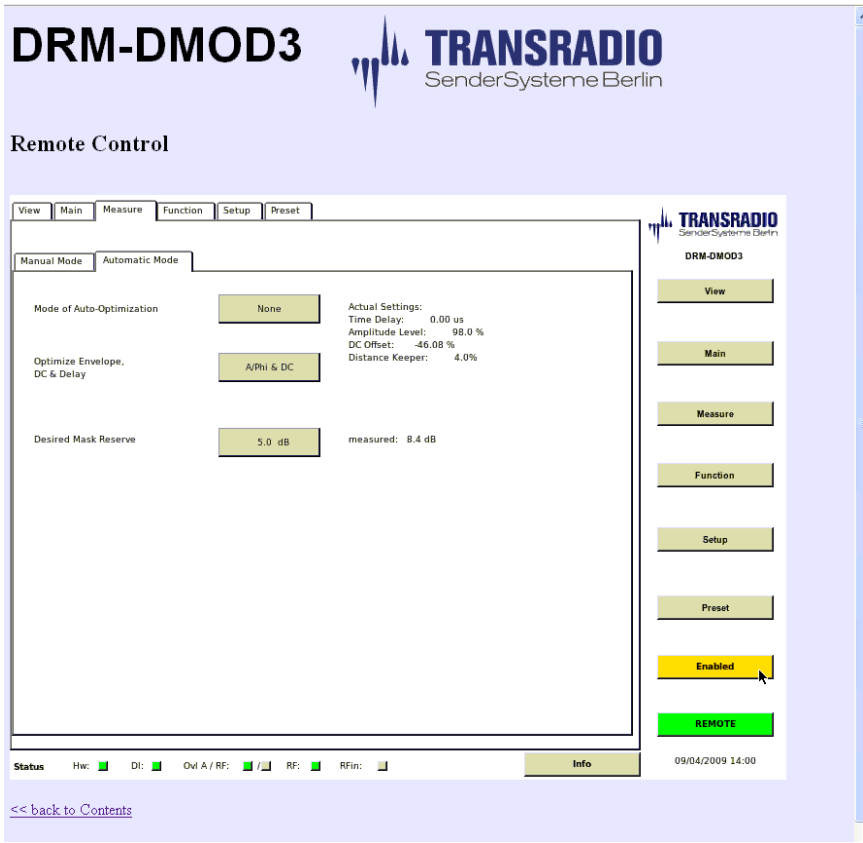
DRM DMOD3, Parameter settings Automatic Equalizer Adjustment



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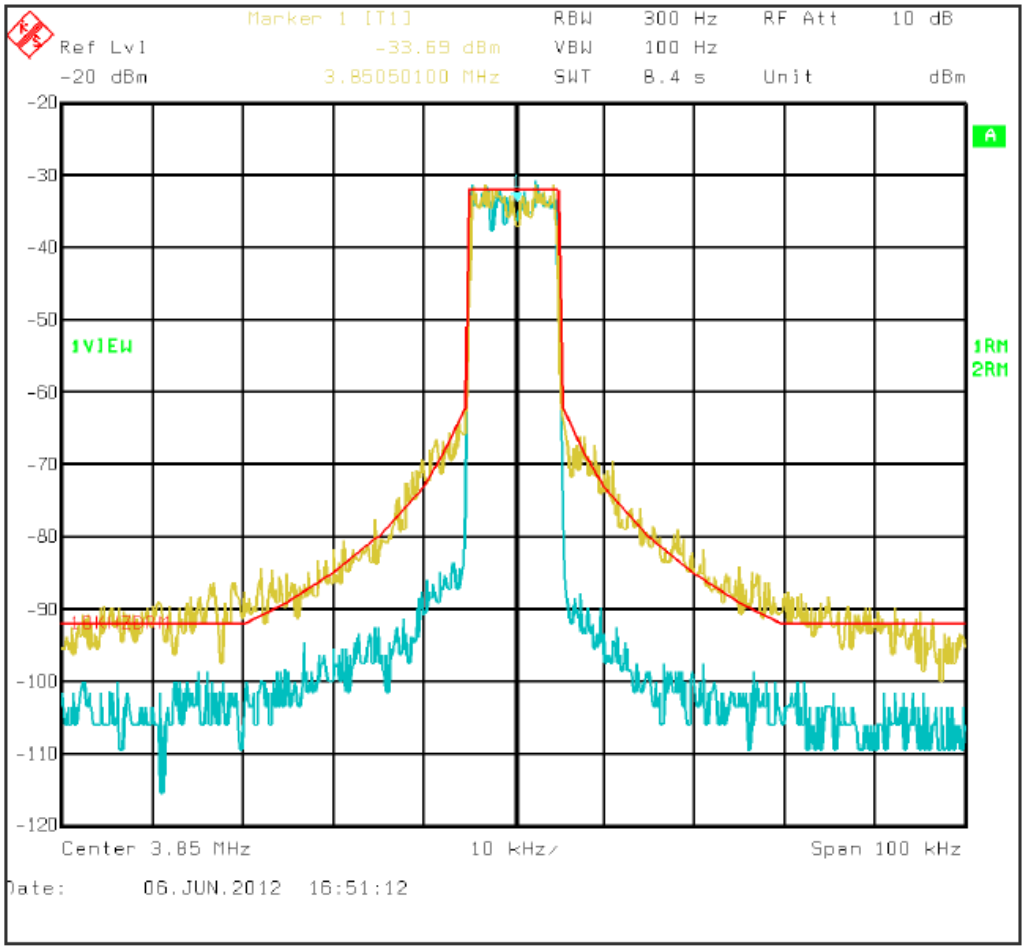

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How to turn my existing system analogue Short Wave system to DRM

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- **TRANSMITER SIDE**

Problematics to solve with the DRM Modulator :

1)Not only one operating frequency

-> is solved with an automatic Equalizer during operation from TRANSRADIO

2) IPM, Incidental Phase Modulation

-> is solved with an IPM Equalizer during operation and frequency dependent preset from TRANSRADIO

3) Bandwith of Transmitter AF Input

-> is solved with automatic Equalizer of the enveloppe from TRANSRADIO : correction of the filter during operation

- **TRANSMITER SIDE**

4) Bandwidth of Transmitter RF

-> is solved with a “distance keeper” during operation to reduce the RF Bandwidth from TRANSRADIO : correction

Eventually a carrier addition is needed, but this represent a higher power consumption

- **ANTENNA SIDE**

Minimum requirements for a DRM Antenna system:

•VSWR < 1,05 for +/- 5 kHz to Carrier
•VSWR < 1,10 for +/- 10 kHz to Carrier

In Short Wave this is **not a problem** BUT a SW Transmitter is operating mostly on different frequencies and different antenna systems. Each antenna or frequency switch will need a recalibration of the DRM parameters of the DRM modulator.

-> is solved with an automatic Equalizer during operation from TRANSRADIO

Analogue Short Wave to DRM Short Wave

Operation made several times successfully with TRANSRADIO DMOD3

- In Austria with a TELEFUNKEN Transmitter
- In the UK with 2 RIZ Transmitters
- In Bulgaria with 2 very old Russian Transmitters
- In Germany with TELEFUNKEN and RIZ Transmitters
- In Spain many Continental Transmitters
- In Malaysia with Continental Transmitters
- In Australia with Continental Transmitters
- In Chile for Chrisitian Vision (not in operation anymore)
- In Armenia with Russian Type Transmiiters

With a professional DRM Modulator, allmost all Short Wave Transmitters

are DRM Capable, even old type ones.

-> Contact TRANSRADIO : j.kipp@tsb-ag.de or sales@tsb-ag.de

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DRM

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Latest Worldwide Updates

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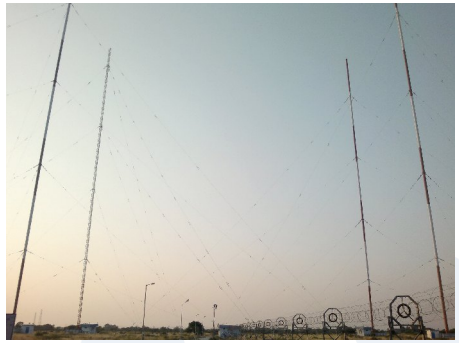
India

- **DRM** trials in SW conducted successfully in 2007
- **DRM+** trial completed in Delhi (May 2011)
- **Regular DRM** service started from SW Transmitter at Delhi on 16th January 2009
- **In Oct. 2011 All India Radio** increased DRM SW to 16 hours/day
- **India Radio** renewing and replacing all MF transmitters with DRM30 (72 transmitters)
  6 x 20 kW transmitters delivered already.
  One mobile in New Delhi. 6 mobile transmitters used for training
  27 (100kW, 200kW, 300kW) transmitters ordered. Rollout in full swing!
- **100kW medium wave transmitter at Rajkot**
  officially opened 10th September 2012
- **In Dec 2012 All India Radio ordered six 300kW MW DR30M transmitters**



Africa

- **Nigeria** tested DRM from its new transmitter site in Ab
- Interest in **Southern Africa.** First SW DRM transmission in October 2011 of EU live radio debate – feedback from Angola and S. Africa (also from Brazil!).
- DRM Consortium has contributed to **South Africa** government consultation
- **Mozambique** seems to have opted for DRM in its digitisation plans

Abuja - Nigeria
250 KW short wave transmitter with rotatable Antenna

On 13th of March 2012 with a big inauguration, the station has been completed in presence of the Vice-President Namadi Sambo who represented the President Goodluck Jonathan

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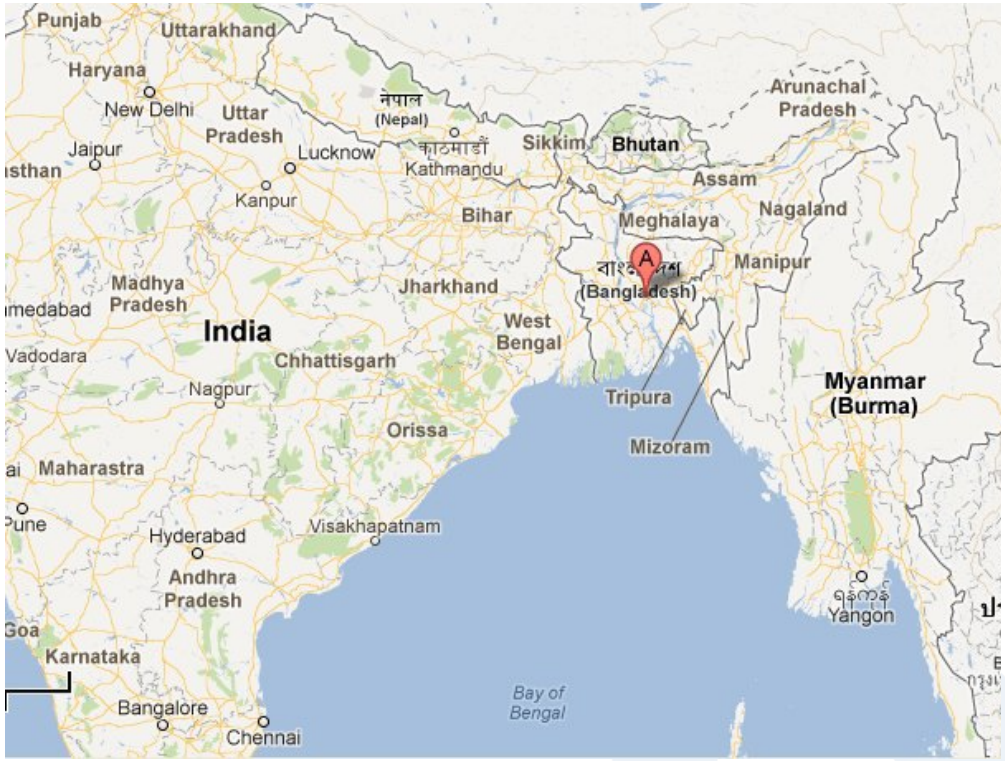
Bangladesh – DRM

- Kabirpur

•250 kW short wave TX and Antenna

•1000kW medium wave TX DRM ready, commissioned and in operation at Dhamrai for BETAR Bangladesh since early July 2011



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Japan - DRM Upgrade

- Yamata

- 4 x 300kW short wave TX
- April 2013 the first new TX on-air
- Three more planned in yearly intervals
- All DRM equipped and tested

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Australia

- Broadcast Australia is installing for **ABC Radio Australia**
- **2 DRM** ready shortwave **transmitters of 100 kW** (one in Shepparton due to air Summer 2012)
- DRM30 trial for data coverage (Gov. weather agency)
- **ABC Radio Australia** already **broadcasts 3 hours daily** in DRM from Brandom to Papua New Guinea and to Pacific island on 5995 kHz and 1280 kHz using a 5kW shortwave transmitter
- **DRM+ in band I to be tested in 2013**

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New Zealand

Radio New Zealand International

- Installed a 100 kW DRM shortwave transmitter that broadcasts 20 hours per day in DRM to all the Pacific islands

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Malaysia

•Radio TV Malaysia - 5 DRM ready shortwave transmitters of 100 kW in Kajang

• DRM30 transmissions have started on 7235 kHz and 11885 kHz (1 hr a.m.)

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China

- **China has several DRM shortwave** transmitters at various locations
- **Test broadcasts from China Radio International** took place some years ago with very good results
- **China needs to decide yet** what digital standard it is going for (seems to favour a Chinese Digital Radio – **CDR** – solution which might borrow elements from existing standards)

Bangladesh

- 250 kW short wave TX and Antenna
- 1000kW medium wave TX DRM ready,
- commissioned and in operation at Dhamrai for BETAR since early July 2011

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Multi-standard Chipsets with DRM

one platform
for HD, DAB/DAB+/T-DMB and DRM

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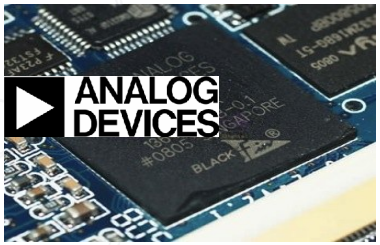
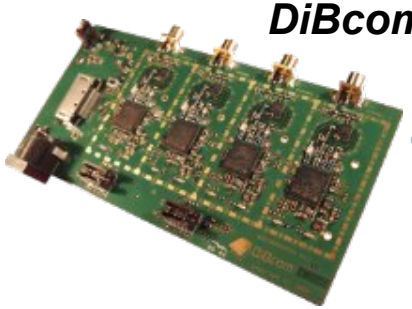
DRM Members Working on DRM Chipsets



KeyStone Semiconductor

MIRICS

csr

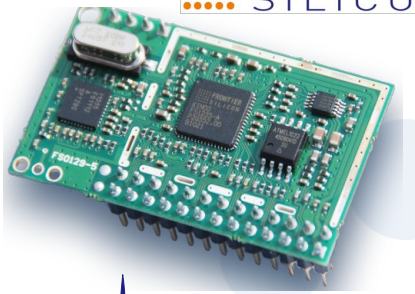


DiBcom

Parrot
move wireless

Octopus

FRONTIER SILICON



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DRM Receivers

RM has shown new receivers (IBC, Asia, Brazil)

- Big chipset manufacturers joined DRM: FS, Silabs, KeyStone, Dibcom/Parrot – one all standards solution (IP not the biggest issue)
- Kenwood Manufacturer Just joined Consortium!
- DRM30 and DRM+, FM!
- New Star PP order (DRM30)
- Handheld (NewStar), Mobile (Intel, Nokia), Car (Visteon, Delphi)

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DRM Introduction and Implementation Guide

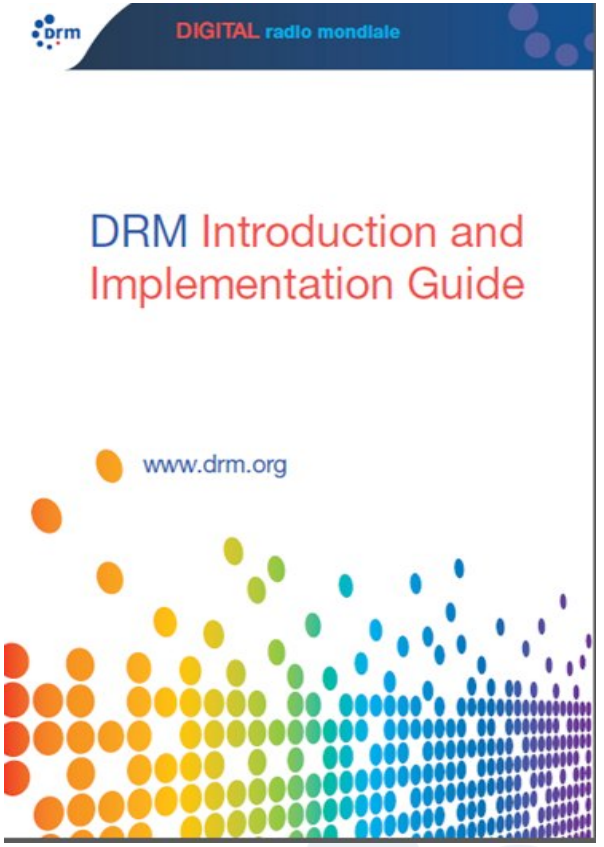
www.drm

re information on DRM is available on
w.drm.org

wnload the entire system specification of DRM
he DRM Introduction & Implementation Guide
p://www.drm.org/uploads/files/DRM%20intro&implementation%20guid

get regular DRM updates subscribe to
w.drm.org/newsletters

any inquiries or comments, please write to
jectoffice@drm.org



More information is available in the

DRM Introduction and Implementation Guide (DIG)

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Upcoming events DRM event:

Indian Cellular Association Workshop, 28 January
BES, New Delhi, 29-31 January
8th Annual Digital Switchover Conference, South Africa, 11-13 February
EBU Radio Week, Geneva, 13 February
UNESCO World Radio Day, Paris, 13 February
ABU Digital Broadcasting Symposium (Principal Sponsor), Kuala Lumpur, 5-8 March