THOMSON

BROADCAST

Total Transmission

INNOVATION

SYSTEM EXPERTISE

GREEN POWER TECHNOLOGY

RELIABILITY

ENERGY SAVING

TRUST

THOMSON SHORT WAVE

- MARKET OVERVIEW
- DRM – FM REBROADCAST
- ONGOING R&D FOR DRM

Moritz Steinmann
HFCC Conference Paris
August 28, 2012

VON
LUGBE ABUJA – NIGERIA
250KW SHORT WAVE STATION

250 KW NEW LUGBE STATION ABUJA NIGERIA

- Voice of Nigeria (VON) decided to build a brand new radio station close to Abuja, the capital city of Nigeria
- The turn-key project has been executed by Thomson Broadcast AG from Turgi with its partners from Germany for Antennas and Nigeria for civil works

- 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
- This ultramodern super transmitting station and its rotatable antenna is in line with the Federal Government's commitment to meet the 2015 global deadline for the digitisation of the broadcast industry and international best practices.

250 KW NEW LUGBE STATION ABUJA NIGERIA

THOMSON Scope of delivery

- 3 new 250 kW SW Transmitter TXW2300D
  DRM ready
  with PSM
  and VHF Filter
- 1 new Rotatable Antenna
- 3 new Curtain Antennas
- PI Rack with DRM Equipment
- ACS (Antenna Control System)
- BCS (Broadcast Control System)
- Installation
- Commissioning and Training
- **Turnkey Project including Civil Works and Generator/Power House**

250 KW NEW LUGBE STATION ABUJA NIGERIA

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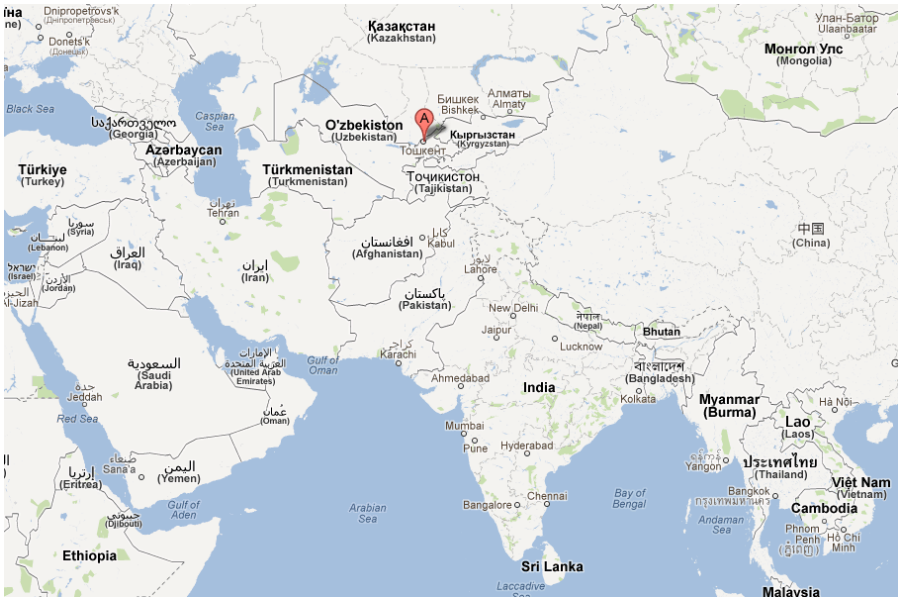
TASHKENT - UZBEKISTAN
NEW 100KW SHORT WAVE TRANSMITTER

100 KW TASHKENT UZBEKISTAN

- Thomson delivered one 100kW Shortwave transmitter to Tashkent, Uzbekistan, in December 2011
- Tashkent is located at the famous Silk Road that was the most important trading route from China to the Mediterranean Sea



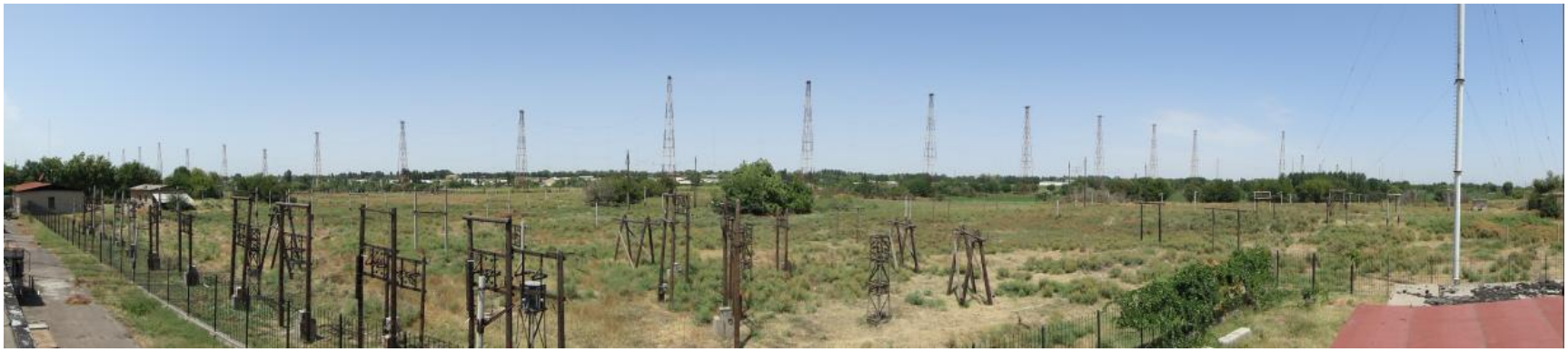
- The radio station was established in the late 1950. The ten 100kW transmitters manufactured in the former DDR and installed in 1957/1958 are still “On Air”, confirming the myth that the soviet design will last for centuries
- The radio station is mainly acting as a relay, servicing Asian countries like Nepal, India or Iran
- The new transmitter will offer the customer a wide range of new opportunities of modern transmission aspects, as outstanding AM and DRM qualities, easy and straight forward operation with the ECOS control system and energy savings due to high efficient transmitter technology

100 KW TASHKENT UZBEKISTAN

THOMSON Scope of delivery

- 1 new 100 kW SW Transmitter TSW2100D
  - DRM ready
  - with PSM
  - and VHF Filter
- Supply rack with DRM Equipment as the Stratus modulator / exciter and the Cirrus encoder / modulator
- Auxiliary equipment for water and room cooling
- Training in Thomson factory as well as on the radio station
- Installation Supervision
- Commissioning

100 KW TASHKENT UZBEKISTAN



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BETAR BANGLADESH
KABIRPUR STATION
250 KW SHORT WAVE TX AND ANTENNA

250 KW SW MODERNISATION IN BANGLADESH

- Radio Bangladesh (BETAR) decided to modernise the existing broadcasting station at Kabirpur, 40 km north of Dhaka
- Phase 1: one new 250 kW SW TX
- Phase 2: one RCA 2/2/0.5
- Phase 3: The second 250 kW SW TX will be replaced.
- Phase 4 One new RCA 4/4/1

Existing classical Antenna field with RCA on the right side

Key Factors

- Thomson can provide the entire broadcasting equipment from one hand
- Experience in Turn key Job with local company.
- Excellent reputation for SW worldwide

250 KW SW MODERNISATION IN BANGLADESH

- One new 250 kW SW transmitter DRM ready was commissioned Mid-July 2012 at site & handed over to BETAR.
- HV mains supply with Emergency Generator was provided by local company.

- Installation of the RCA 2/2 will be completed around Nov. 2012.
- Detailed view of a rigid dipole.
- Civil works and installation being done by a local company.
- Phase 3 & 4 will be tendered 2013.

BY THE WAY - MEDIUM WAVE

The following high power Medium Wave Thomson TX Projects were completed recently:

- 1000 kW MW DRM ready TX commissioned Early 2011 at Dhamrai, for BETAR Bangladesh.
- 1000 kW MW DRM equipped TX commissioned in May 2012 at Rajkot and 1000 kW MW TX will be handed over in October 2012 at Chinsurah, both for All India Radio.
- 1600 kW MW DRM equipped TX commissioned in July 2012 at DangJin for KBS Korea.

Key Factors

- Winning in a tough competitive field.
- Well established Product meeting the specifications.
- Experience in Digital Broadcasting.

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HITACHI KOKUSAI ELECTRIC INC.
YAMATA STATION –JAPAN
4 X 300 KW SHORT WAVE TRANSMITTERS

250 KW SW MODERNISATION JAPAN

- Hitachi Kokusai Electric (HiKE), the TOMSON partner in Japan has supplied Transmitters to Yamata station 1985 and 1989.
- It was decided to modernise Yamata Station in 4 Phases.
- First new TX shall be on-air in April 2013, three more in yearly intervals.

Key Factors

- Energy saving.
- Reliability of equipment and reputation of supplier
- Requirement for Digital Broadcasting. (DRM Equipped and Tested)
- Installation by a local company.
- Maintenance contract with a local company.

250 KW SW MODERNISATION JAPAN

- One new 250 kW SW was commissioned and accepted Mid-August 2012 by HIKE at Thomson Works in Turgi.
- TX 2, 3 & 4 will be supplied 2013 /14/15.
- Installation and commissioning will be done by HIKE.
- Station Control System (in Japanese Language) will be provided by HiKE.

DRM – FM RE-BROADCASTING

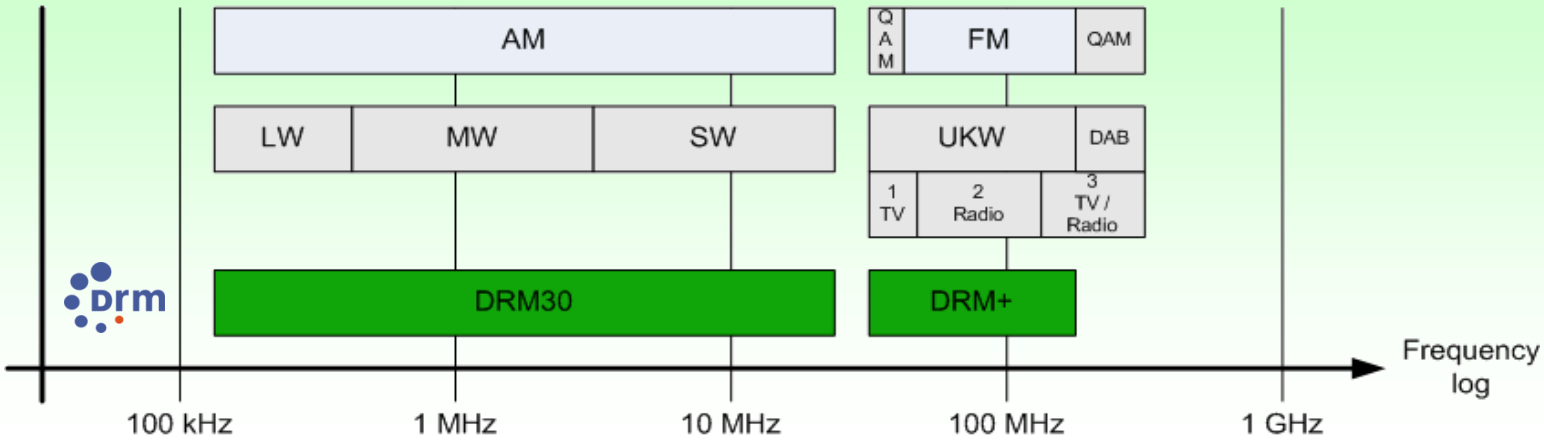
1. Overview
2. Example
3. Setup
4. Advantage
5. Future

The digital radio technology for all your needs

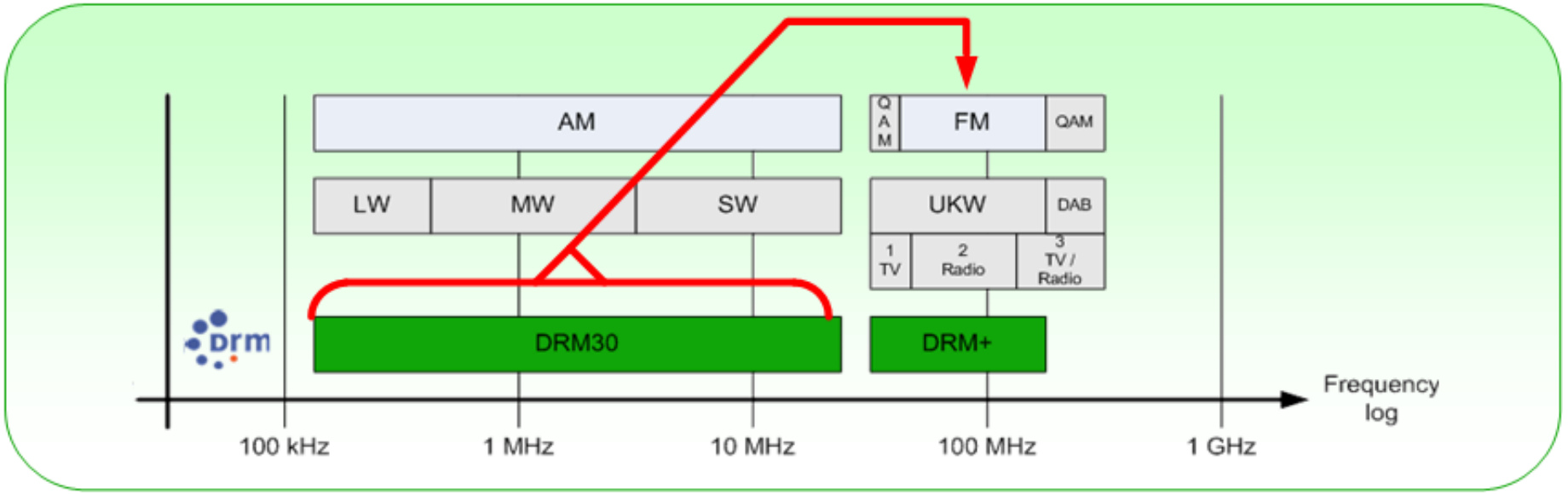
Worldwide open digital radio standard

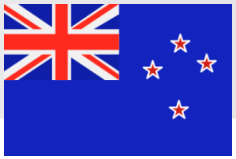
- DRM: The whole worldwide open system in all frequency bands
- DRM30: DRM below 30 MHz, ie LF, MF, HF (or LW, MW, SW) – *the AM bands*
- DRM+ : DRM above 30 MHz, ie VHF (Band I. II, III) – *including the FM band.*

Radio Transmissions: Frequency Band Overview



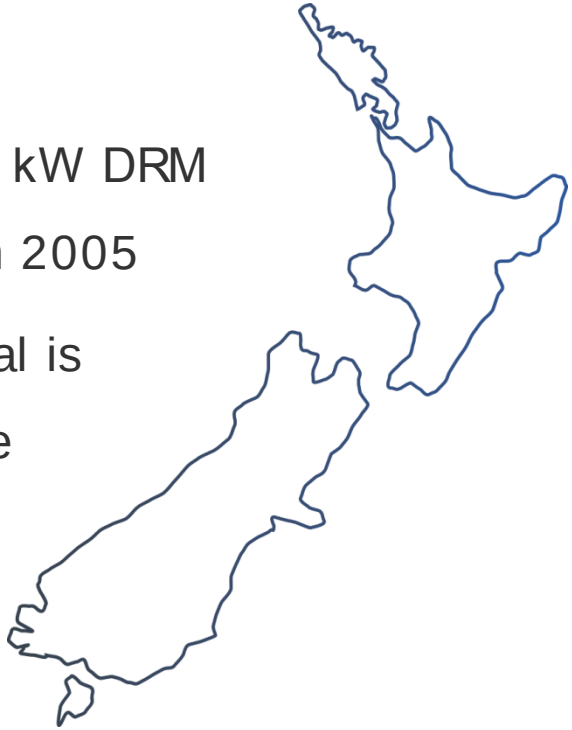
Radio Transmissions:
SW/DRM to FM technology bridge by Re-Broadcasting





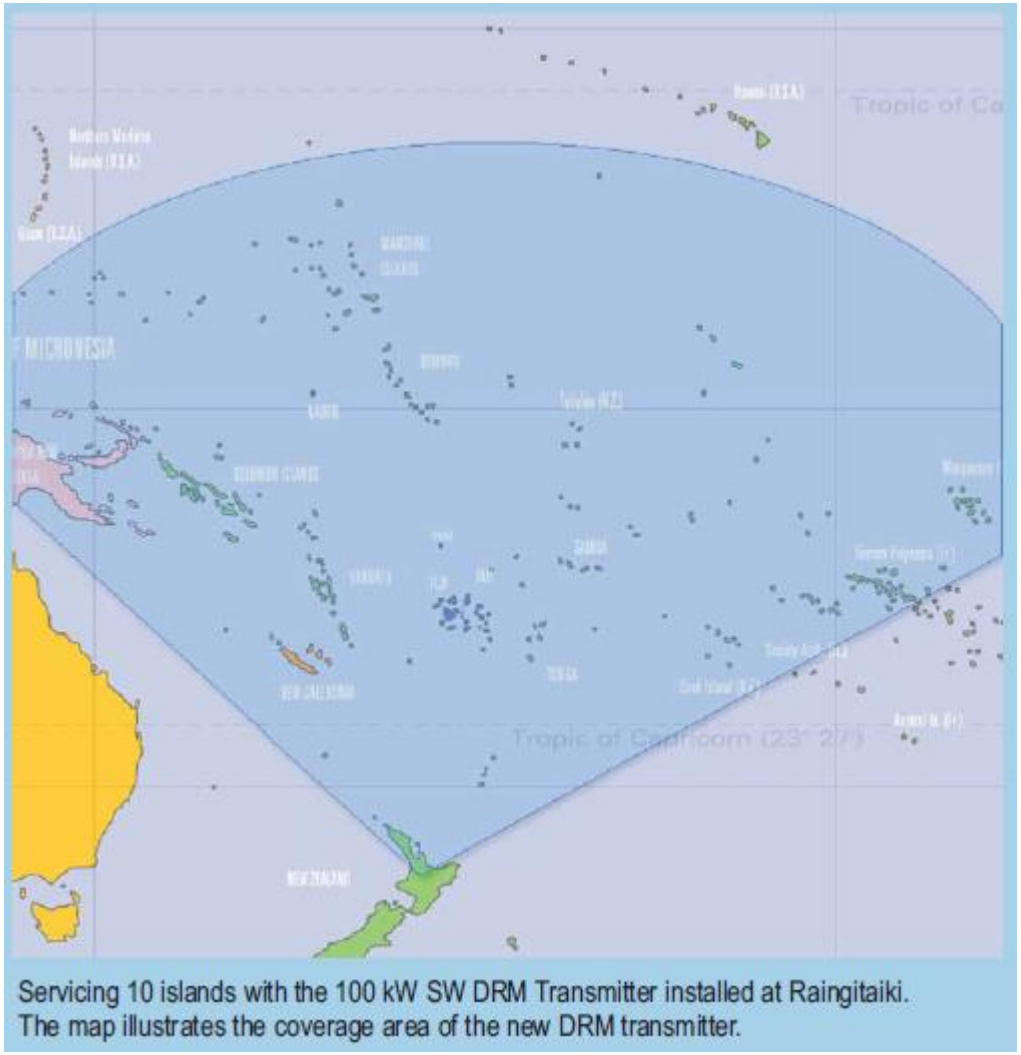
New Zealand

- Radio New Zealand International installed a 100 kW DRM shortwave broadcast transmitter in Rangitaiki in 2005
- At this moment, Radio New Zealand International is broadcasting 20 hours per day in DRM to all the Pacific islands



RADIO NEW ZEALAND INTERNATIONAL

EXAMPLE



Servicing 10 islands with the 100 kW SW DRM Transmitter installed at Raingitaiki.
The map illustrates the coverage area of the new DRM transmitter.

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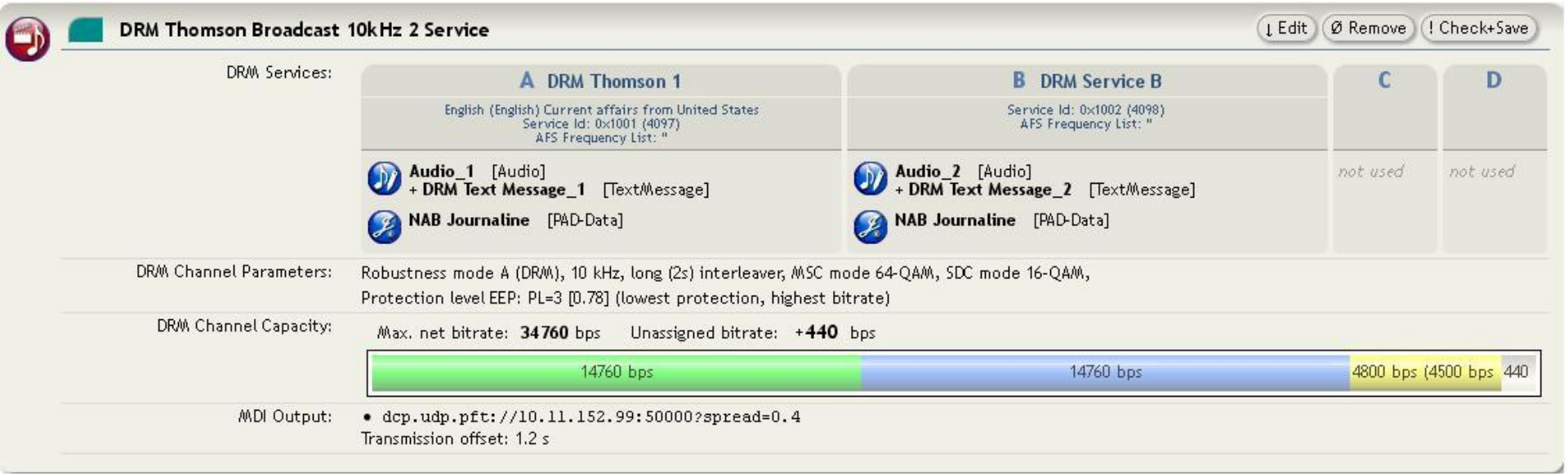
ADVANTAGES

1. **Program distribution by SW/DRMfor Re-broadcasting in FM**
2. **Independent Operation** (Independent from Satellites)
3. Extensive coverage with DRM30
4. Digital audio quality and full feature list in the DRM coverage
5. DRM and FM reception of the program possible in the coverage area
6. Low power consumption = > Stand Alone solution in a remote areas with solar energy and battery
7. One DRM transmission can feed two FM audio programs
8. DRM receiver and two full featured FM Exciter included.
9. RF amplifier and antenna can be individually selected, depending on the target area for the coverage has to be added.

Radio Transmissions: DRM Setup

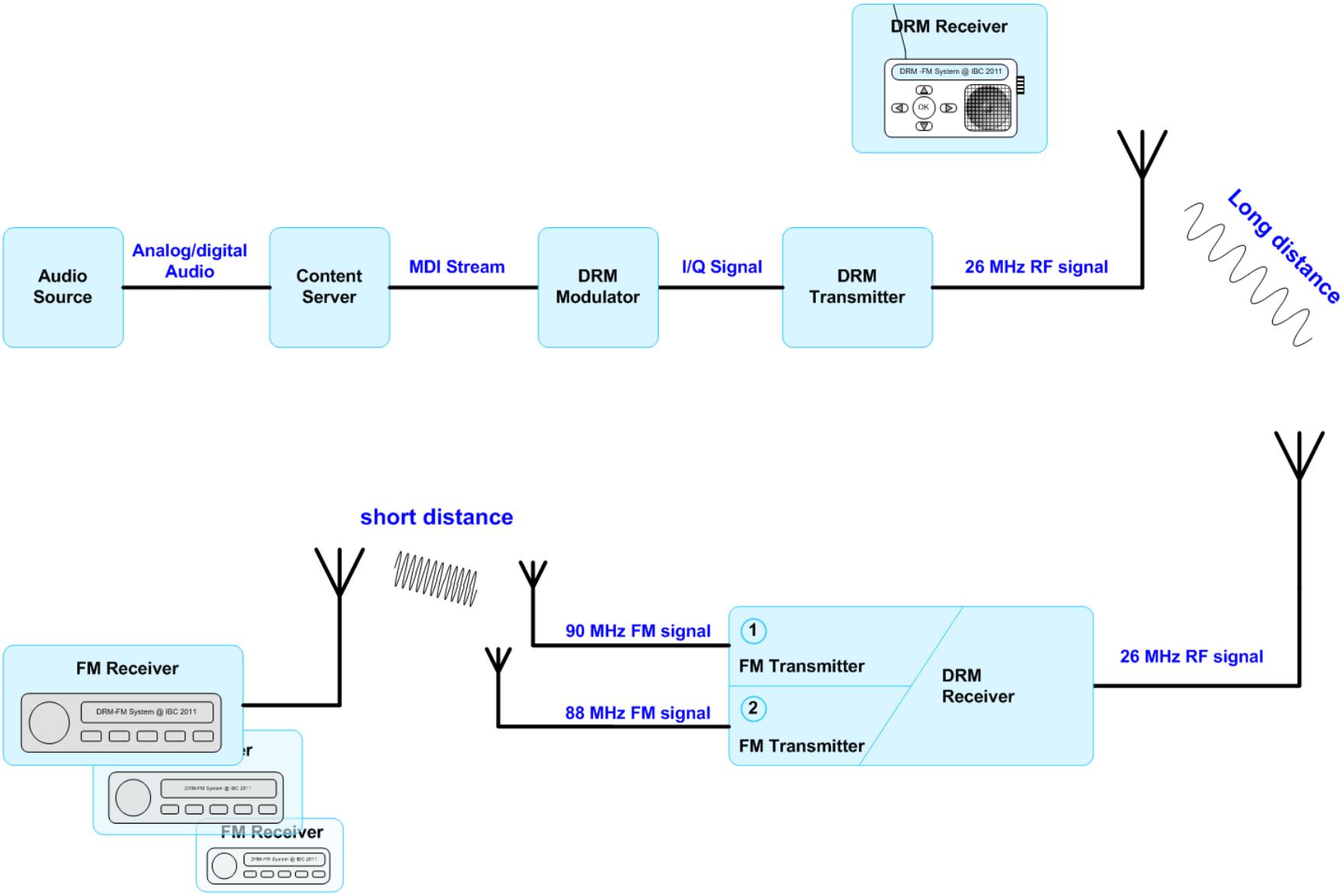


1. One DRM transmission with two audio service included (green / blue)
2. Text Message and Journaline possible (data service in yellow 4.8kBps)
3. 10kHz DRM bandwidth
4. Audio bit rate 2 x 14.7kBps -> parametric stereo.

Radio Transmissions: DRM to FM technology bridge

(3. FM Amplifier as required)

SETUP



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The future is DRM DIGITAL radio mondiale

More information on DRM is available on
www.drm.org

Download the entire system specification of DRM in the Broadcaster's User Guide
www.drm.org/uploads/files/broadcast_manual.pdf

To get regular DRM updates subscribe to
www.drm.org/newsletters

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

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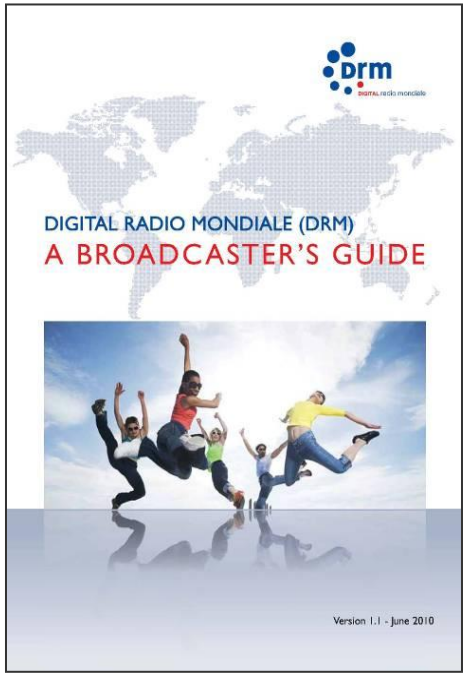
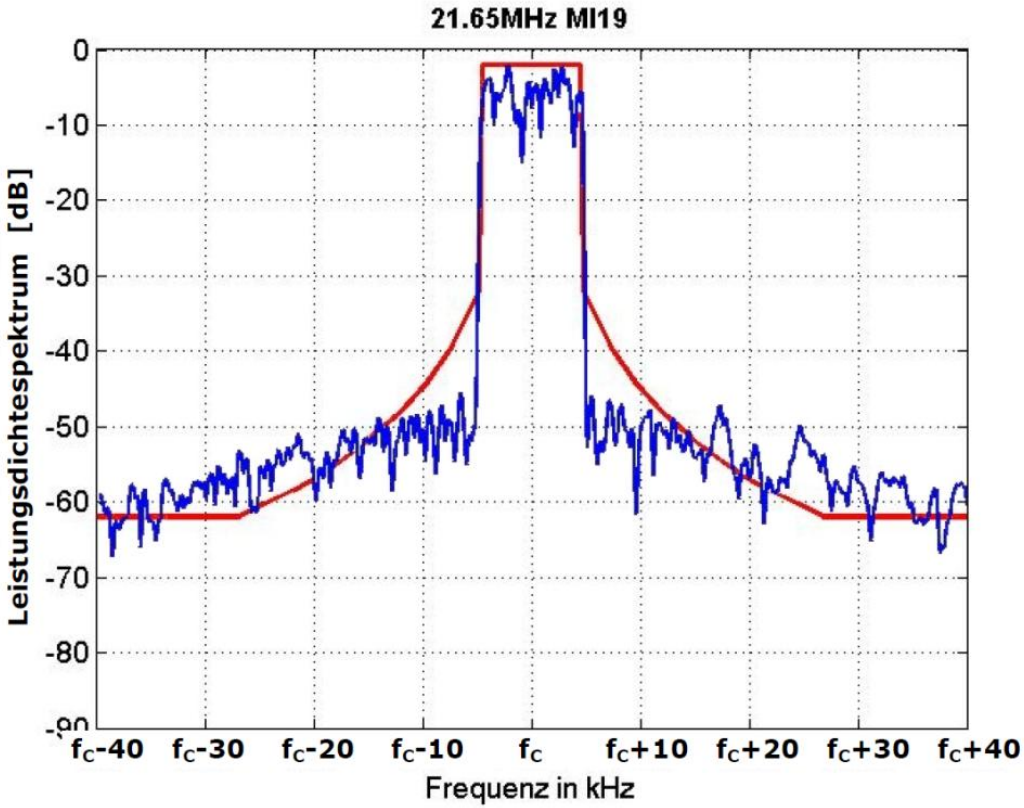
Matthias.Stoll@thomson-broadcast.ch



More information is available in the Broadcaster's Guide

ON-GOING R&D FOR DRM

PROBLEM STATEMENT



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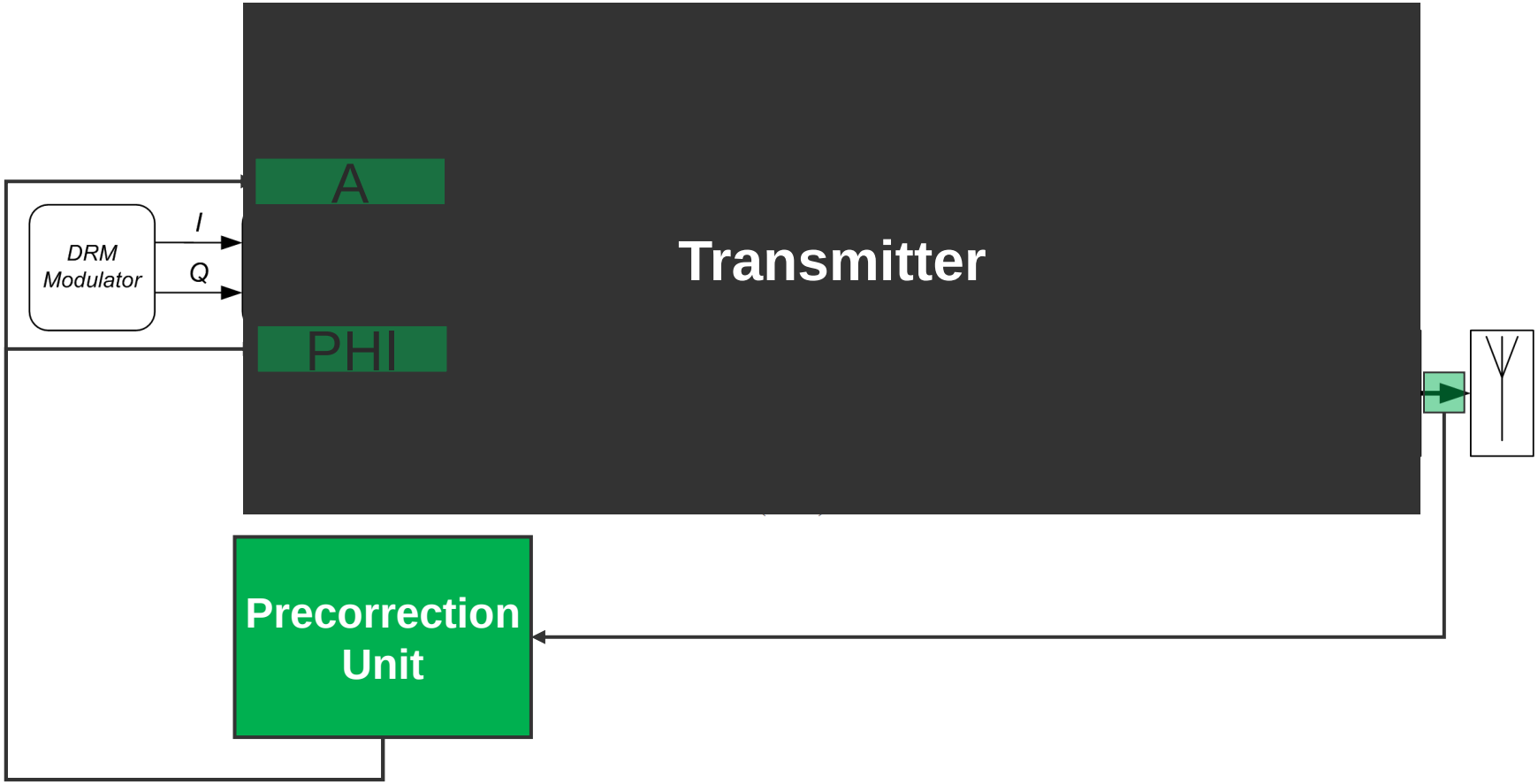
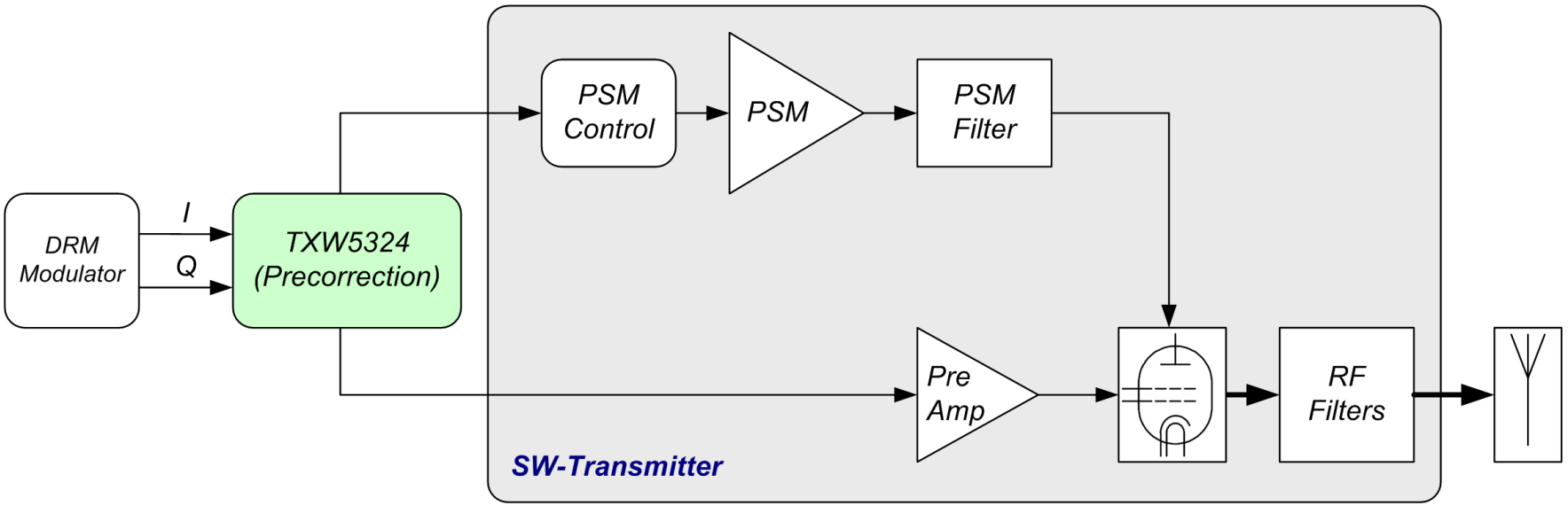
Pre-correction for tube type TX

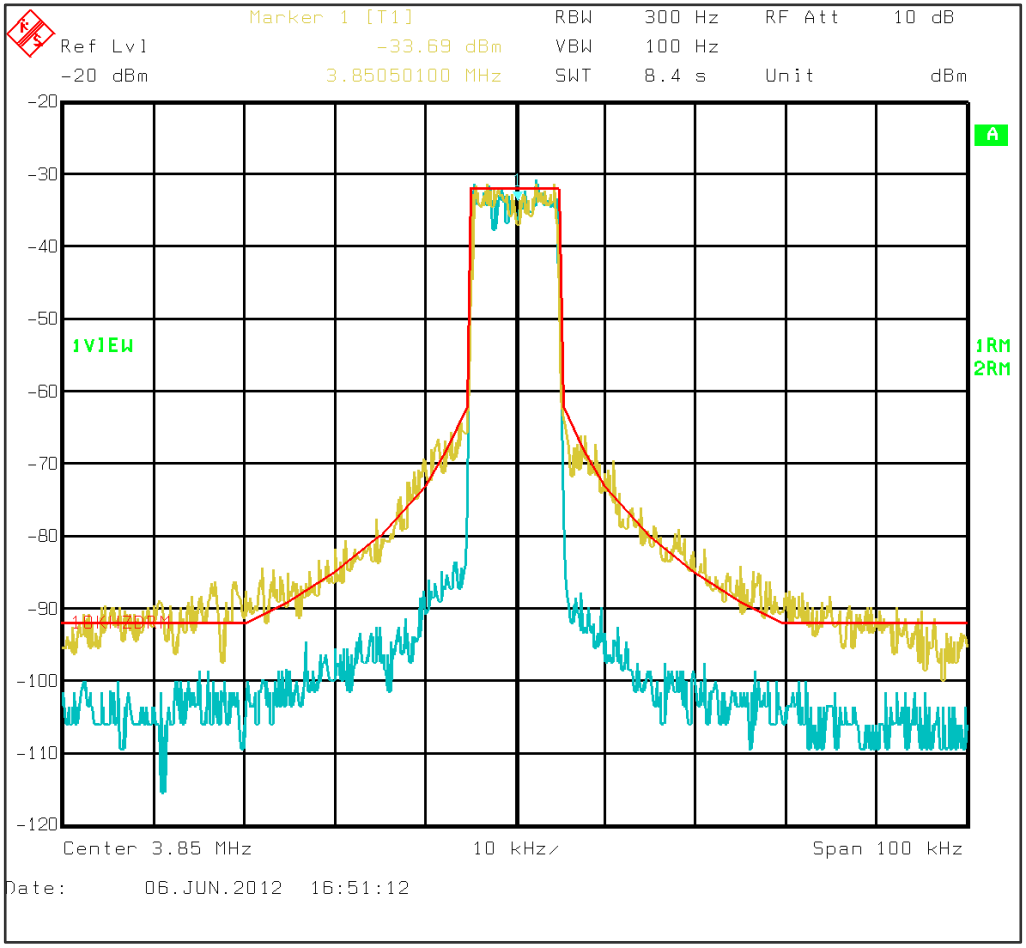


Hardware Based on Synthesizer TXW5323

Integration in Transmitter



FET model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Ref Lvl
-20 dBm
-33.69 dBm
3.85050100 MHz
RBW 300 Hz
VBW 100 Hz
SWT 8.4 s
RF Att 10 dB
Unit dBm
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
A
1VIEW
1RM
2RM
Center 3.85 MHz
10 kHz/
Span 100 kHz
Date: 06.JUN.2012 16:51:12

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BROADCAST

THANK YOU

(And see you again soon)