

# Local area coverage: Use of the 26 MHz for DRM

Claudio Re, Radio Maria, Italy  
Vice-Chair of the DRM Steering Board

# PLANNING DIGITAL LOCAL RADIO SERVICES USING THE 26 MHz BAND (25670-26100Mhz)

## CONTENTS

- 1 FOREWORD
- 2 BENEFITS
- 3 FREQUENCY AND SERVICE PLANNING IN THE 26 MHz BAND
- 4 INTERFERENCE PROBABILITY
- 5 FREQUENCY PLANNING SCENARIO: INTERNATIONAL  
REGULATION APPROACH
- 6 FREQUENCY PLANNING SCENARIO: LOCAL REGULATION  
APPROACH
- 7 CONCLUSIONS

## FOREWORD

- This presentation is an abstract of the full document that contains a planning proposal approach that enables using the 26MHz band for local broadcasting.
- This document is an answer to some potential interference concerns that have been raised in different groups regarding the planning procedures for using this band on a local basis during the maximum of the solar activity cycle.

### [The 26 MHz broadcasting band \(traditionally named "the 11m band"\):](#)

- Comprises the frequencies between 25670 – 26100 MHz
- It has been scarcely used during the previous years as reported by HFCC
- Provides a total of 43 Channels on the basis of a 10 KHz spacing grid
- Taking advantage of the DRM standard robustness there is an opportunity for using this band for local broadcasting. The service would rely on "Line of Sight" propagation in a similar way to current VHF Band II FM stations.

# BENEFITS

Some of the most remarkable benefits of the use of this band are:

- Sound Quality according to the different DRM mode configurations.
- Significant availability of channels for having “Line of Sight” steady 24 h local services. This fact is a that is a key issue to develop the DRM market
- A new Broadcasting Market with a huge number of transmitters needed.

[A successful roll out of 26MHz local services would provide:](#)

- A new market for the chip manufacturers
- A new market for the consumer receiver manufacturers
- A new market for the transmitter manufacturers
- A new market for the antenna manufacturers
- A new market for the system integrators
- A new market for who build or lease sites
- A new market for the consultants

## FREQUENCY AND SERVICE PLANNING IN THE 26 MHz BAND

- This band is one of the broadcasting regulated bands that have been subject to international coordination procedures.
- The planning of this band is described by the article 12 of ITU-R Radio Regulations.
- So far, the planning process has relied on multilateral coordination at organizations such as the HFCC (High Frequency Coordination Conference), ASBU (Arab States Broadcasting Union), and ABU-HFC (Asia-Pacific Broadcasting Union - High Frequency Conference).
- The ionospheric sky wave propagation of radio signals in the 26 MHz band is subject to large variations. The propagation changes from day to night, from season to season and from year to year (the latter on an 11 year solar cycle basis). At the maximum of the solar cycle, when the propagation conditions are favourable, the propagation of low power transmissions could at long distances can be remarkable at certain moments of the day and the season. At the least favourable years the propagation is just restricted to the sporadic E phenomenon.
- As a result of these characteristics, so far, this band is practically unused for international long distance broadcasting services.

# INTERFERENCE PROBABILITY

- Several interference studies in the 26 MHz band have been carried out during the last years. Amongst them, some reports from Dr. Lauterbach (Georg-Simon-Ohm-Fachhochschule) provide a complete set of simulations and interference calculations that will be used as the base of this study.
- Figure 1 shows an example of frequency use in the 26 MHz band. This figure shows two zones: green and pink. The green zone corresponds to the vicinity of one 26 MHz band transmitter in Germany, where the frequency could be used with an ionospheric propagation interference that would be easily coped with.
- The pink zone represents the area where the ionospheric propagation could represent a problem. Even though it should not be dismissed, this problem would have a statistical nature. The interference would be restricted to certain periods of the solar cycle, season of the year, and hour of the day.

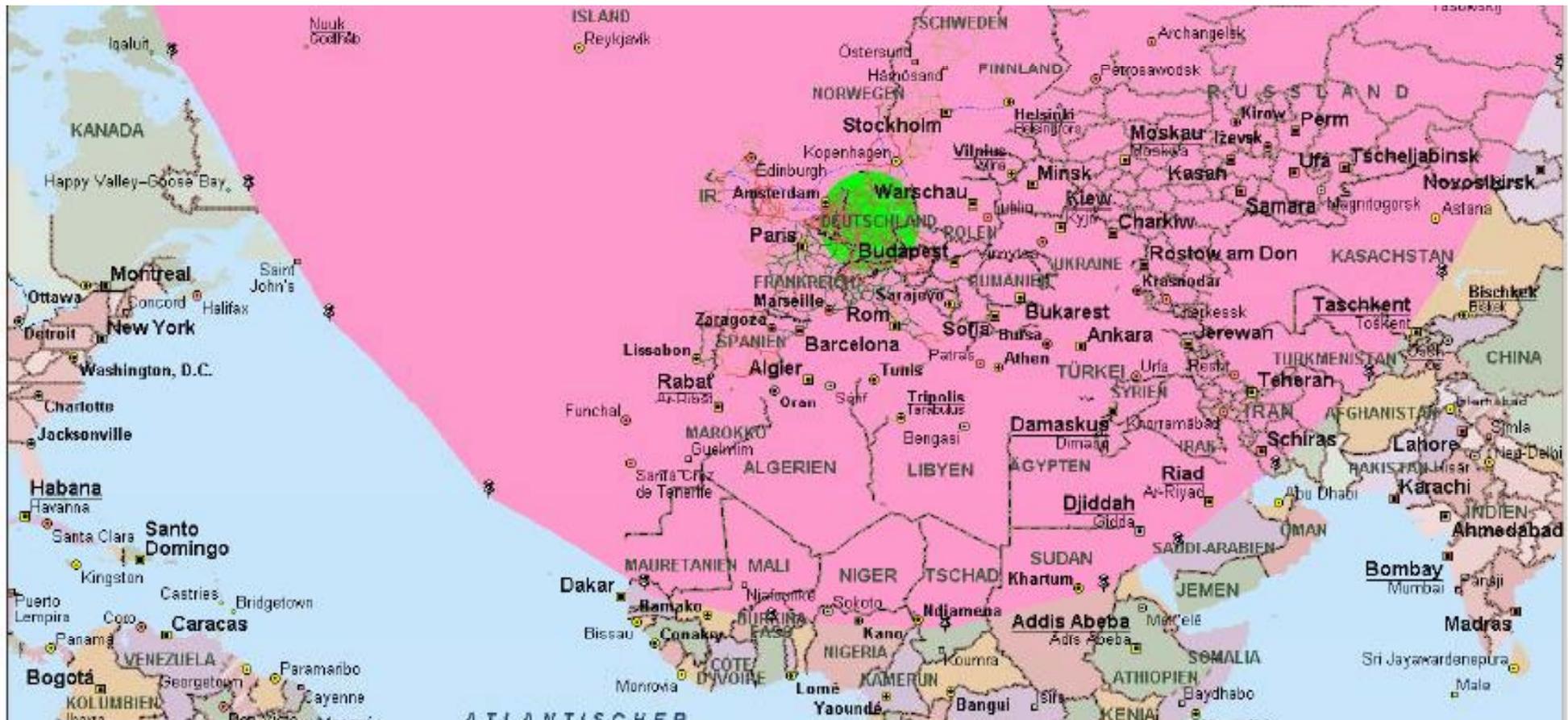
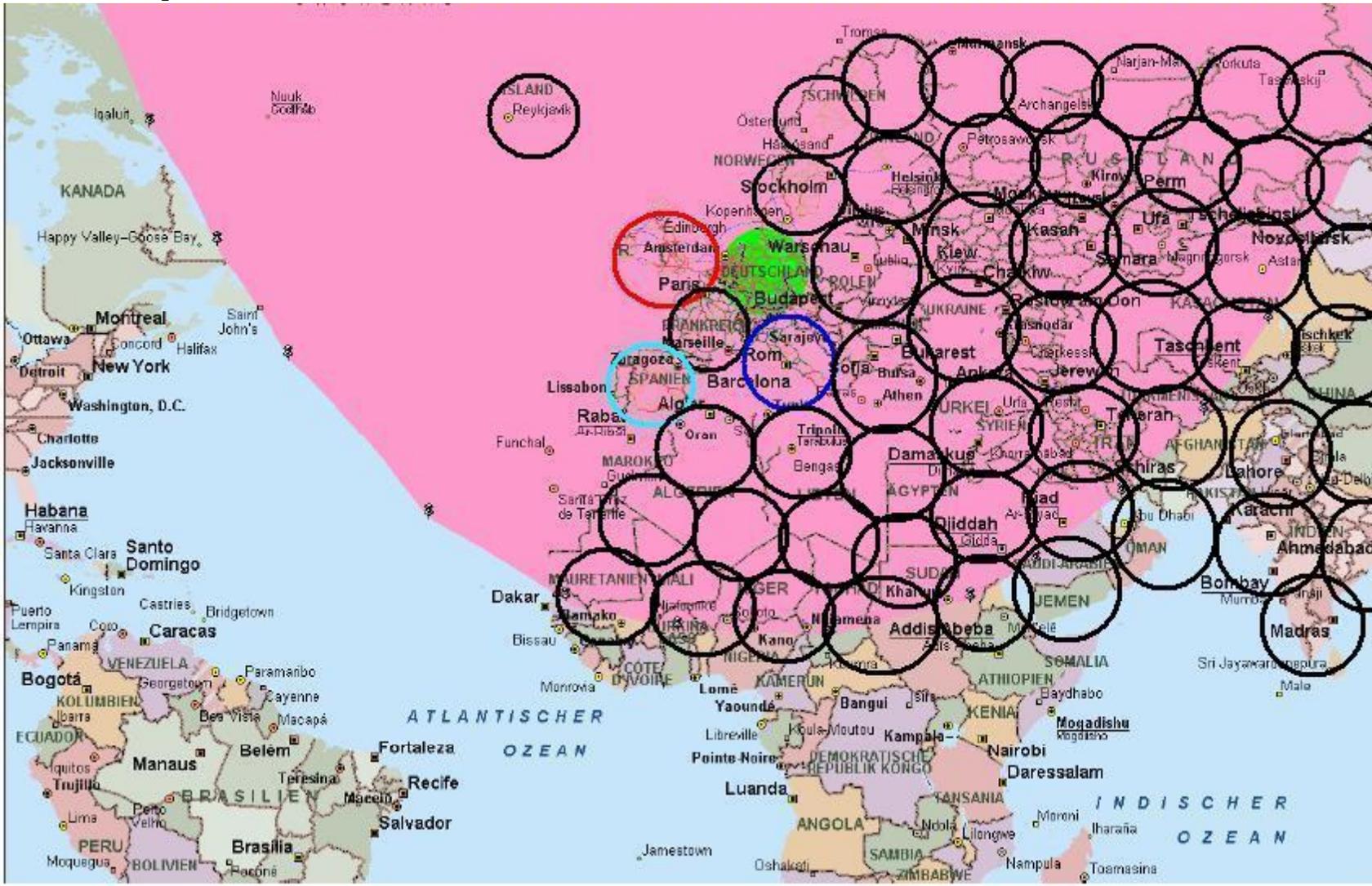


Figure 1. Example of planning scheme to avoid mutual interference of 26MHz local service: Green area which the channel can be used several times; Pink: area in which the channel cannot be re-used. Source: Dr. Lauterbach “*Report on 26MHz Simulations*”.

## FREQUENCY PLANNING SCENARIO: INTERNATIONAL REGULATION APPROACH

- A quite simple approach is shown first. It is assumed that all the frequencies of the 12m band are used and easily planned in the green area. Within the green area, the regions (countries) would be able to make a frequency plan using the whole 26MHz spectrum, assigning sites, PRA values and coverage parameters according to service area targets.
- On the other side, all the regions (countries) in the pink area would not be able to make a similar planning as they would not be able to repeat the process of the green areas.
- As a conclusion, **none of the countries in the pink area would allow any transmission in the green area.**
- This situation is quite similar to the current planning procedures today, and effectively prevents the band from being used for local services.

# Reuse of frequencies on a cellular-like basis



- The previous figure shows the result of dividing the European continent, plus the north of Africa, Middle East and India into 56 areas. The conclusions associated to this planning:
- Having designated 56 different areas and bearing in mind that the maximum number of channels of the band is 46. Ten of these areas have to be cancelled.
- The pink area will be of course much wider. This means that following this simple example, that South Africa, the rest of Asia (including China) and parts of South America could not have spare frequencies to plan the service.
- It should be again emphasized that the areas in previous pictures are just an illustrative example. If the planning example is started locating transmitters in Asia, Europe would fall into the pink interfered area.
- **The most terrific conclusion is that in any case, even if countries outside the circled zone would allow this planning procedure, there would be only one frequency associated to each circle. No way to excite a market in this way.**
- **The system cannot be planned this way and a new approach is needed !**

## FREQUENCY PLANNING SCENARIO: LOCAL REGULATION APPROACH

- Frequency planning carried out on a national basis
- Procedures to be followed would be similar to the ones applied to other services in the VHF band:
- **A maximum ERP should be established for any station.** The number is still a matter of discussion, but from the experiments , the limit will be close to 100Wrms ERP
- Limit the number of stations within an area (country)
- Each country would take its own decisions on frequency assignments/allotments for areas well inside their territory.
- Bilateral/Multilateral agreements would be needed for bordering countries
- This approach will work nicely during the minimum sunspot period (As 2009).
- The potential interference would be restricted to sporadic E propagation.
- This interference would depend on the season and the region of the world
- It should be remarked that TV services in Band I and Band II broadcasting suffer from this phenomenon.
- **During the maximum of the solar cycle , when the solar activity will allow long distance propagation ,the broadcaster has to know and accept that they will have statistical interference limiting the maximum coverage area , like for instance in MW during the night**
- There will be still an area where a digital grade quality will still be ensured.

# CONCLUSIONS

- The 26MHz band is a valuable spectral resource for broadcasters.
- This resource has increased its value due to the robustness of the DRM standard, which provides a tool for using these frequencies for local broadcasting.
- Several trials in different parts of the world have demonstrated that the local services would be possible with a “Line of Sight” coverage deployment, with antennas placed at dominant sites with limited ERP.
- The local coverage expected for a typical station would be limited to tens of kilometres.
- The technical data available conclude that an Internationally regulated scenario will, in reality, prevent the band to be used on a global basis.
- The only realistic approach relies on a locally regulated scenario with the criteria described in the previous paragraph.
- Any additional info could be found in the original document attached in the DRM CD that has been recently submitted to ITU in the SG6 meeting as document 6A/260-E28 October 2009 ( copy also attached in the CD ) .

# Thank you

Claudio Re  
Radio Maria  
[reclaudio@alma.it](mailto:reclaudio@alma.it)