

## About us

RFmondial offers professional products and services for digital broadcasting. This covers stand-alone products for transmitting, receiving, and monitoring of digital broadcasts as well as IP core implementations and services in the field of digital radio technology. As a DRM consortium member RFmondial possesses a wide record of experience and know-how in the field of digital audio broadcasting. DRM30 and DRM+ measurement campaigns as well as technologies like transmitter diversity for digital broadcasts are part of its innovative portfolio.

## The DRM standards family: DRM30 and DRM+

DRM, Digital Radio Mondiale, the international consortium founded in 1998, developed a digital transmission system for the AM-bands, i.e. for long-, medium- and short waves up to 30 MHz (DRM30) and launched this system worldwide. The extension of the DRM system family to upper frequency bands above 30MHz (DRM+) is a possible system to enhance and/or replace analog FM radio transmission. A close placement of a DRM+ signal to an FM signal is possible and can be flexibly configured depending on the existing use of spectrum. In this way, DRM+ may be introduced into the FM frequency bands and the analog distribution can be kept.



**RFmondial**

Products and Services for Digital Broadcasting

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## Monitoring Solutions - RFmonitor

RFmonitor is a system for automated measuring, data transmission, and remote analysis of the reception quality of radio networks. It enables the broadcaster to continuously capture, monitor, and analyze different reception quality parameters at distributed locations.

The monitoring receiver RFbox is specially designed to work with RFmonitor, however, RFmonitor is compatible to all RSCI-receivers including Fraunhofer's DT700/DT4700. RFmonitor can also be used to fulfill legal requirements to store content (audio and/or data) for several weeks.

### RFbox



RFboxes are measurement receivers which are distributed over the reception area. They periodically measure quality parameters of the received signal, and transfer the data to the database server. Depending on the received broadcasting system various parameters can be evaluated.

**Demodulation:** DRM (DRM30, DRM+), AM, FM.

**High quality parameter:** DRM: most RSCI parameters can be measured, e.g. BER, MER, audio frame error rate. AM/FM: some parameters are measured (e.g. SNR, PSD).

**Audio measurements:** For DRM, AAC streams are available (extracted out of MSC streams, which are sent via RSCI). For AM/FM, the received audio is compressed and can give an indication of the received content, but does not represent the original audio quality.

**High performance frontend:** Well-proven frontend integrated incl. field strength measurement.

**Remote control:** Receivers are remotely scheduled, controlled and automatically retuned via RSCI.

**Data transmission:** RFbox connects to different networks, i.e. Ethernet, WLAN, GSM, analogue modem, or local storage. Encrypted data transfer possible. Failover mechanism if network is temporarily not available.

**Robust setup:** Quick local setup. No need for reconfiguration after power recycling.

**Mobile measurements:** Possible with local data storage and GPS connection.

**Interfaces:** Antenna (BNC 50Ohm), audio out, USB, DC in.

**Robust Chassis:** Industrial design 200x197x55mm, operating temperature: 0 - 50°C.

**LED indicators:** Power on, receiver running, connection to RFmonitor database server.



### RFmonitor analysis and configuration application



The browser-based application serves as the interface to the user for monitoring, analysis, configuration and maintenance of the system and the measurement data.

**Configuration:** Projects are used to combine several receivers, broadcasts and schedules to fulfill comprehensive measurement tasks, i.e. monitoring SFN networks, monitoring several broadcasts alternating at one location with one receiver. The receivers automatically follow the measurement plan, i.e. change frequency.

**Views:** Live monitoring, evaluation of parameters over a long period or daily variations can be displayed and statistics can be analyzed. Simultaneous comparison of several receivers at distributed locations is possible.

**Analysis:** DRM data inspector to easily assess the daily and long term audio availability at all locations. Detailed analysis down to 10 minute intervals incl. audio and PSD.

**Verification:** Listening to audio (live and historical), decoding of program information (DRM only), e.g. service labels, modulation parameters.

**Audio:** Listening to live audio. Listening to historical audio samples. Multimedia decoding possible.

**Easy access:** Storage of often needed views and analysis configurations.

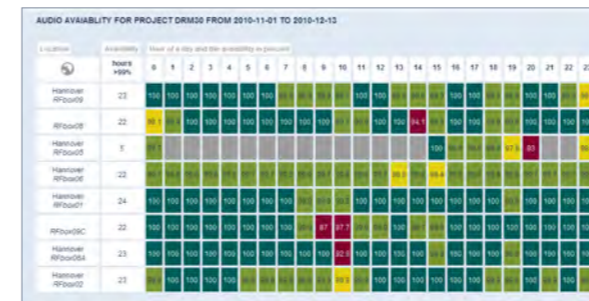
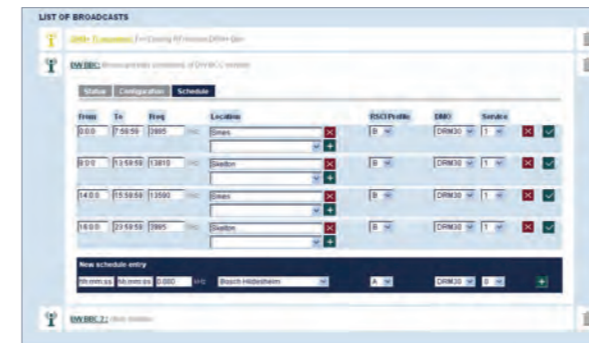
**Import/Export:** Import of mobile/offline RSCI measurement data, export of diagram data to CSV and JPEG, export of mobile measurements to Google Earth.

### RFmonitor database server



RFmonitor database server serves as the backend of the system captures the measurement parameters and processes them for analysis and long-term data storage.

**Compatibility:** Compatible to RFbox and RSCI based receivers (e.g. Fraunhofer DT700).



### BENEFITS

- Energy saving due to optimization of transmission power / frequency
- Cost reduction due to reduction or abolishment of monitoring tours
- Proof of coverage for public appointment or advertising
- Continuous and long term measurement data at distributed positions
- Analysis of daily and seasonal effects
- Live investigation of reception during transmitter installation changes
- Ad-hoc optimization of transmission parameters
- Easy integration of monitoring receivers, e.g. Fraunhofer DT700

### KEY FEATURES

- Automated measuring, data transmission, and remote analysis of the reception quality of radio networks
- Distributed receivers measure real-world signal parameters
- Web-based analysis software with dynamic diagram generation and remote configuration of measurement receivers
- Various import and export functionalities to analyse mobile measurement data



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