



DRM Test Kit – Signal Generator

General

The RFmondial DRM Signal Generator and Test Kit is a professional, modular tool kit for various applications including DRM chip set configuration and testing, radio receiver development, laboratory usage and customer demonstration.

The DRM Test Kit complies to the following standards:

- ETSI ES 201 980: "DRM System Specification"
- ETSI TS 102 821: "Digital Radio Mondiale (DRM); Distribution and Communications Protocol (DCP)"
- ETSI TS 102 820: "Digital Radio Mondiale (DRM); Multiplex Distribution Interface (MDI)"

Basic Features

- Highly reliable embedded platform
- Asynchronous PRBS for DRM-AM and DRM-FM signal generation
- IQ baseband file upload
- Files can be selected, played, stopped, and looped.

Signal Generator

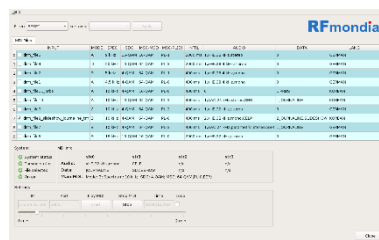
- IQ baseband input file specification:
DRM-AM: 48 kHz, 32 bit, IQ
DRM-FM: 192 kHz, 32 bit, IQ
- Power level and performance:

	MER [dB]	Mask dist. [dB]	Level [dBm]
LW	>35	>15	-40
MW	>35	>20	-30
SW	>30	>20	-20
DRM-FM	>30	>10	-20

Browser-Based User Interface

Files can be selected, played, stopped, and looped.

- All important options (Robustness mode, spectrum occupancy, SDC and MSC modes and protection levels, data and audio services, language) of selected file graphically depicted
- Intuitive and easy file selection using text-based as well as pre-defined filtering



IQ Sources

The signal generator can be fed with various IQ baseband sources, to generate an RF signal without the necessity of a live DRM modulator. This can be used for chipset and receiver demodulation development and verification.

Simulated Channel Library (option)

The simulated channel library consists of a comprehensive set of baseband IQ files, which were generated using the channel profile specifications of ETSI ES 201 980 as well as other proven and relevant configurations.

- All channel profiles after ETSI ES 201 980 Annex B for DRM-AM and DRM-FM
- Frequency-selective fading (multi-path) and flat fading
- Various AWGN configurations
- The library is also available stand-alone

International Field Trial Library (DRM-FM only) (option)

A comprehensive set of IQ files taken from various field trials all over the world enables the user to test its own implementation under real-world conditions. The following field trials are available:

- 1kW DRM Trial, Edinburgh
- DRM-FM band, Sri Lanka
- Low power DRM SFN Hannover
- DRM field trial, Band II, Rome
- Band II, Jakarta, Indonesia
- Band II, South Africa
- The library is also available stand-alone

Live DRM Modulator (option)

To feed the signal generator from MDI sources, a live DRM modulator (LV-core) can be integrated into the device:

- DRM modulation from MDI/DCP
- Field proven DRM modulator conform to ETSI ES 201 980
- High performance (MER >45dB @ >20dB difference to spectral mask)
- Proven long term stability
- Supports the full DRM standard (DRM-AM, DRM-FM)
- An MDI source is needed to properly use the DRM modulator

MDI Sources

The signal generator can be fed with live MDI data, which are converted to baseband using the DRM modulator. This can be used for content verification, demonstration and receiver user interface development.

MDI Library (option)

- A very extensive set of possible configurations of the respective standard results in more than 400 pre-stored files
- User-specific files can be added to the system. They can be generated e.g. with an RFmondial ContentServer or any other standard compliant multiplexer

Variations of the following channel parameter are available:

DRM-AM:

- Robustness modes A, B, C, D
- Spectrum occupancy 4.5, 5, 9, 10, 18, 20 kHz
- MSC modes 16 QAM, 64 QAM, and hierarchical (HMMix, HMsym)
- SDC modes 4 QAM and 16 QAM
- Interleaver length 0.4s and 2s
- EEP and UEP with various protection ratios / code rates

DRM-FM:

- Robustness mode E
- Spectrum occupancy 96 kHz
- MSC modes 4 and 16 QAM
- SDC modes 4 QAM, CR 0.5 & 0.25
- Interleaver length 0.6s
- EEP and UEP with various protection ratios / code rates

Variations of different services and signaling are available, including

- Encoded audio with xHE, AAC at different sampling rates, mono/parametric stereo/stereo/5.1/7.1, SBR
- Encoded services TextMessages, Journaline, MOT Slideshow
- Encoded signalling: Reconfiguration, Emergency Warning Feature
- Inclusion of Unicode, e.g. Korean characters for TextMessages and Journaline applications.
- The library is also available stand-alone

Live DRM ContentServer (option)

The DRM ContentServer Developer Edition is available to support the quick and efficient development and testing of DRM receivers and broadcast equipment. It makes the complete functionality of the DRM system with regards to signaling and transmittable content available for laboratory use (including dynamic reconfigurations), enabling a close to 100% test coverage. The following items are included:

- DRM AudioServer with multi stream real-time audio encoding (including the MPEG xHE-AAC audio codec)
- DRM Multimedia DataServer supporting all standardized as well as broadcaster specific data services; covering import, processing, encoding and broadcast
- DRM Multiplex Generator managing the extensive DRM signalling capabilities, generating the full digital DRM Multiplex, scheduling among multiplex configurations and providing standard MDI/DCP output streams

External MDI input (option)

To use an external DCP/MDI source an external MDI input can be integrated.

- DCP/MDI from external source
- Unicast and multicast possibility

Reference information

To compare the own implementation to a industry-standard reference, two options are available.

Integrated MultimediaPlayer (option)

The integrated MultimediaPlayer provides complete decoding of all available audio and data service in a browser-based environment.

- Live decoding of audio and data services
- Remote streaming of audio
- Statistics: basic text statistics based on signalling information



Measurement information (option)

This option provides a measurement reference to be compared with the users' own implementation.

- Along with the IQ files, reference information are provided like MER, audio error rate, audio files in Wave format
- Only available for IQ files

Interfaces

Input Interfaces

- 2 Ethernet (100 Mbit) for MDI/DCP, configuration, web-interface
- 10 MHz input

Output Interfaces

- RF out via BNC

Synchronization

- External 10 MHz

Configuration and monitoring

- Webinterface (via Ethernet)
- Via LCD Display

Device

Power Supply AC Input

- Auto-sensing supply, 100 VAC to 240 VAC, 50-60 Hz
- Power consumption: 35 W typ., 45W. max.

Mechanical

- Aluminum extrusion front bezel
- Industrial 19" 1RU, rack mountable
- 420 (483) x 250 x 44 mm
- Weight: 5.5 kg
- Operating temperature: 0 – 50°C
- Humidity: 20 – 80% non-condensing

Ordering Information

DRMTK: Basis signal generator with RF out, internal PRBS generation and IQ file upload

DRMTK-IQF: IQ simulated channels file library

DRMTK-IQI: International Field Trial IQ file library

DRMTK-MOD: Live DRM Modulator

DRMTK-MDF: MDI file library and MDI file upload

DRMTK-ICS: Internal ContentServer Developer

DRMTK-MDX: MDI input from external

DRMTK-MMP: Reference MultimediaPlayer

DRMTK-REF: Reference measurements information

Block diagram

