



Digital Radio Test Kit / Signal Generator RF-TK

General

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

The Test Kit complies to the complete family of Digital Radio standards including:

- ETSI ES 201 980: “DRM System Specification”, and
- ETSI EN 300 401: “DAB System Standard”

Key Features

- Highly reliable embedded platform
- RF signal generation from file:
 - DCP (EDI, MDI)
 - Baseband IQ files
- RF feedback path for reference demodulation incl. audio streaming and data services decoding
- DCP and IQ baseband file upload
- UDP/IP DCP input possible for live digital radio modulation

Basic Software Features

Advanced GUI

The advanced graphical user interface (GUI) is designed to provide the full experience of a modern and professional device:

- State-of-the-art HTML5 technology
- No software / plug-in installation
- HTTPS capable
- Adapts to different screen sizes

File playback

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

- Parametrization (e.g. MSC, protection levels, data and audio services) of files is shown
- Intuitive and easy file selection using text-based as well as pre-defined filtering

Configuration and Monitoring

- Advanced HTML5 GUI
- MQTT
- LCD Display
- SNMP

Hardware

Input Interfaces

- 1xETH (1G)
- 1xETH (100M)
- 10 MHz, SMA 50 Ω , 0.16 - 5 Vpp
- 1 PPS, SMA 50 Ω , TTL
- RF feedback, SMA 50 Ω , max. 10dBm

Output Interfaces

- RF output, SMA 50 Ω (max. 3 dBm)
- Attenuation max. -30 dB (0.1 dB steps)

Power Supply AC Input

- Auto-sensing supply, 100 VAC to 240 VAC, 50-60 Hz
- Power consumption: 15 W typ.

Mechanical

- Aluminum extrusion front bezel
- Industrial 19" 1RU, rack mountable
- 420 (483) x 250 x 44 mm
- Weight: 3.5 kg
- Operating temperature: 5 - 45°C
- Humidity: 20 - 80% non-condensing

IQ Sources

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

- User file upload
- Basic IQ files
- Simulated channel library (optional)
- Live modulator (optional)
- Live IQ input via UDP (optional)

DCP Sources

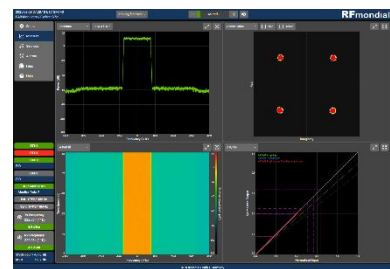
The signal generator can be fed with live DCP data, which are converted to baseband using the integrated DRM/DAB modulator. This can be used for content verification, demonstration and receiver user interface development. The following DCP sources can be provided:

- User file upload (optional)
- DCP library (optional)
- Integrated ContentServer (optional)
- Live DCP input via UDP (optional)

Reference decoder

To compare the own implementation to an industry-standard reference, the generated output can be either decoded internally, or via the provided RF feedback path. The following reference decoder possibilities exist:

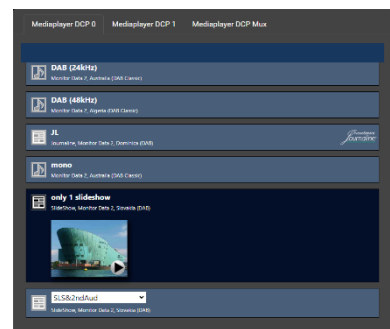
RF Monitoring Features



Integrated RF monitoring capability, based on proven monitoring and measurement receiver technology.

- RF level
- MER over Carrier
- Constellation
- Spectrum
- Display of measurements over time

Service Decoder



- Decoding of the DCP stream either internally or via the RF feedback
- Listening to audio in remote browser
- Decoding of data services

Options

Digital Radio Standards

The Test Kit can be configured for the following radio standards:

- DAB
- DRM-AM
- DRM-FM
- FM

DCP File Upload (DFU)

- User-specific files can be added to the system.

- Requires LMO

DCP File Library (DFL)

- A very extensive set of possible configurations of the respective standard
- Variations of different services and signalling using the minimum receiver requirements of the respective digital radio standard as starting setup, i.e.
 - Different audio codecs with variations of sampling rates, mono/parametric stereo/stereo, SBR
 - Variations of data services like DynamicLabel/TextMessages, Journaline, Slideshow, Logos, SPI
 - Variations of signalling like reconfiguration, EWF/EWS/ASA, service following
 - Variations of Unicode, e.g. Korean characters in text-based services
- Requires LMO

Internal ContentServer (ICS)

The DRM/DAB ContentServer Developer Edition is available to support the quick and efficient development and testing of digital radio receivers and broadcast equipment. It makes the complete functionality of the digital radio system with regards to signaling and transmittable content available for laboratory use (including

dynamic reconfigurations), enabling a close to 100% test coverage.

- Requires LDI

Live DCP Input (LDI)

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

- EDI/MDI from external source
- Unicast and multicast possibility
- Requires LMO

Simulated Channel Library (SCL)

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, ITU-R BS.1114 as well as other relevant configurations.

- Recommended channel profiles for DAB after ITU-R BS.1114
- Channel profiles after ES 201 980 Annex B for DRM-AM and DRM-FM
- Frequency-selective fading (multipath) and flat fading
- Various AWGN configurations

Live Modulator (LMO)

To feed the signal generator from DCP sources, a live digital radio modulator (LV-core: DRM or DAB) can be integrated into the device:

- Modulation from DCP
- Field proven modulator conform to the relevant ETIS standards

- High performance (MER >45dB)
- Proven long term stability
- Requires one or more of the options DFU, DFL, ICS, LDI

Enhanced attenuator (EAT)

- The standard output attenuation can be enhanced with max. -90 dB (0.25 dB steps)
- Control of the attenuator via GUI and MQTT possible

Ordering Information

RF-TK: Basic signal generator with RF out, basic IQ files, and IQ file upload

-DAB: DAB radio standard

-DRM: DRM radio standard

-FM: FM radio standard

RF-TK-DFU: DCP file upload

RF-TK-DFL: DCP file library

RF-TK-ICS: Integrated ContentServer

RF-TK-LDI: Live DCP input

RF-TK-SCL: IQ simulated channel file library

RF-TK-LMO: Live modulator

RF-TK-EAT: Enhanced attenuator

Block diagram

