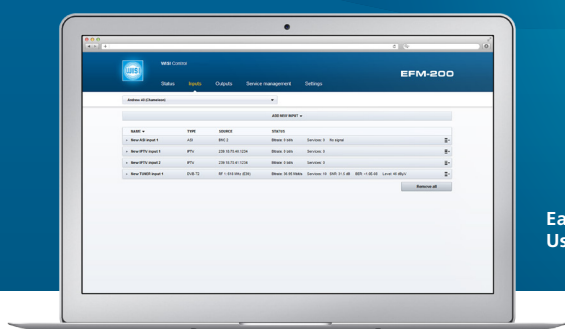# EFM-230

Easy-to-use Graphical User Interface

Cost-Optimised FM/DAB+ Radio Receiver with IP Output

The EFM-230 is a wallet friendly solution for receiving FM, DAB and DAB+ radio. It can receive 12 FM or DAB+ channels in 12 different inputs, and this gives 12 separate audio streams.

The received audio is MPEG encoded and packaged in an MPEG transport stream. This is in turn converted into IP for distribution over Ethernet via the dedicated streaming connector. The DSP based architecture reduces costs and enables power consumption to be as low as one watt per channel.

Analog outputs can be connected to legacy equipment or used for monitoring. The EFM-230 can also be used for remote monitoring of FM and DAB+ radio channels. By combining the EFM-230 with a Chameleon Processor it is possible to convert DAB+ to FM.

The EFM-230 is easy to set up via its web browser user interface, which is reached via the dedicated management connector. As it comes in a 19" chassis, the EFM-230 can be mounted in a cabinet, and works well in larger installations.

- **Web browser user interface**
- **For operation in SMATV and Cable TV networks**
- **FM 76-108 MHz radio input**

- **IP SPTS output in UDP/RTP**
- **MPEG-1, layer II audio output format**
- **DAB & DAB+ 168-240 MHz (band III) radio input**

- **Line and headphone compatible audio monitor output**
- **Legacy FM radio contribution for DOCSIS 3.1 networks**
- **Low power consumption**

Technical Specifications

INPUT

- 12 separate 75 Ω F-connectors

FM

- Frequency: 76-108 MHz
- Signal level: See figure 1
- Sensitivity: See figure 1
- THD+N: See figure 1
- Selectivity, adjacent channel: typical 50 dB
- Supported de-emphasis: 50 µs
- RDS support on request

DAB/DAB+

- Frequency: 168-240 MHz
- Signal level: See figure 1
- Sensitivity: See figure 1
- Selectivity, adjacent channel: typical 46 dB

OUTPUT

IP

- 10/100/1000 Mbit RJ45 connector
- UDP and RTP

ANALOG

- 3.5 mm phono jack (TRRS connector with left channel on tip, right channel on ring 1. Ring 2 and sleeve connected to ground).
- Accepted loads: 16 Ω-10 k Ω
- Voltage: Adjustable, nominal 0.95 V_{P-P} *

MISCELLANEOUS

- Mounting: 19" rack
- Mechanical dimensions: 483 x 44 x 166/184 mm **
- Weight: 2,05 kg
- Operating temperature: 0-40 °C
- Operating humidity: <95%, non-condensing
- Packaged dimensions: 510 x 95 x 340 mm
- Packaged weight: 2,55 kg

* See software manual for more information

** Excluding/including connectors

ENCODING

- Audio coder: MPEG-1, layer II stereo at 192 kbit/s
- Audio sample rates: 48 kHz
- Packaged into an MPEG transport stream

MANAGEMENT

- Web UI via the 10/100/1000 Mbit RJ45 connector
- Software upgradeable via the web UI

POWER SUPPLY

- Connector: IEC-60320 C14
- Voltage: 85-264 VAC 50/60 Hz
- Consumption: < 15 W

Typical SINAD and BER vs Level

(figure 1)

For FM, the SINAD has been measured between 30 and 15 kHz, using a 1 kHz stereo sine wave modulated to 75 kHz MPX deviation

- - - SINAD for FM (mono reception)
- ⋯⋯ SINAD for FM (mono-stereo blended reception)
- ── SINAD for FM (stereo reception)
- ── BER for DAB

Front
status LED
control
streaming
audio out
166/184 mm**
44 mm
483 mm
Back
radio in
power supply in
chassis ground