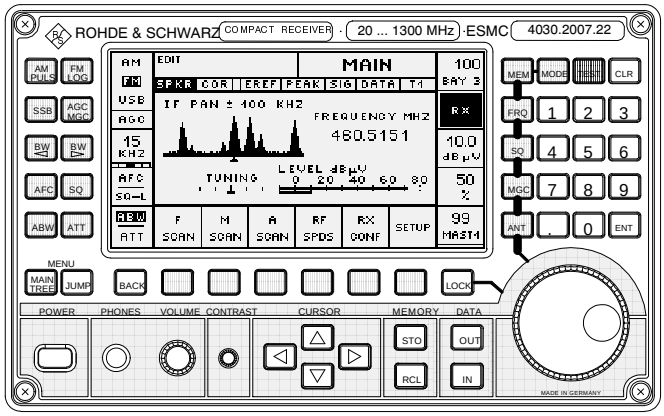
ROHDE&SCHWARZ

ESMC with extended frequency range ready for the future



Since its introduction to the market in 1994, the ESMC receiver has been the basis for quite a number of radiomonitoring systems. Extendability has been an important factor right from the inception of the receiver. So we are now in a position to introduce a frequency extension. This frequency extension permits to scan and intercept the frequency range from 500 kHz to 3 GHz with one ESMC. This corresponds to a span of twelve octaves. The ESMC thus meets our customers' increased requirements.

Frequency extension - for what purpose?

With increasing communication traffic it has become necessary to penetrate into new frequency ranges. It is no longer possible to handle today's communications interference-free in the "classical" VHF/UHF range from 20 to 1000 MHz. Globally, a change towards higher and lower frequencies can be observed.

Higher and higher ...

Latest ITU regulations recommend 2700 MHz as the upper frequency limit for communication and monitoring. This means that our customers are often faced with problems they cannot solve with existing equipment that cover the frequency range 20 to 1000 MHz. What is more, the range of the covert and illegal frequency users is shifting into the range above the frequency limit as a result of ITU monitoring. This is why the ESMC does not stop at 2700 MHz but also covers the range up to 3 Ghz.

Today, modern military directional radio links use the frequency range around 2.5 GHz. Mobile phone networks (PCN) operate in the range around 1.8 GHz. In the near future, a wireless data net (information network) will be installed above 2.0 GHz. Satellite communication (eg INMARSAT), operates from 1 to 3 GHz. This is why we expect growing requirements for VHF/UHF radiomonitoring systems that are able to provide this upwardly extended frequency range.

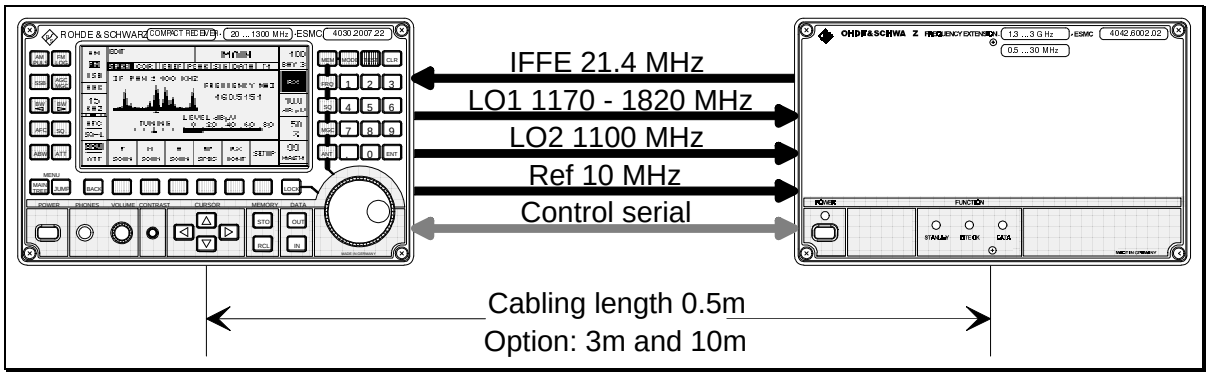
… and lower, too

Currently, the use of the HF band is undergoing a time of renaissance. More and more communication, in the form of speech as well as data, has been taking place in the HF band. As HF communication is inexpensive, independent and can be used globally, it has been misused again and again. This requires monitoring and monitoring is costly. So there are plans to monitor the HF range from an VHF/UHF working station. Besides the well-known Tuner 0 (0.5 to 30 MHz), the ESMC-FE additionally provides quality improvement by optional preselection thus minimizing the signal sum load. Monitoring is thus possible even if there are strong signal interferences.

As there is no single antenna to cover the entire frequency range from 500 to 1000 MHz, the ESMC - together with the ESMC-FE - provides three inputs for the frequency ranges 0.5 to 30, 20 to 1300, and 1300 to 3000 MHz. The ESMC thus meets the requirements for monitoring from the MF band to the upper UHF band.

How to extend?

As the ESMC-FE corresponds to the ESMC with regard to size and design, the two units (ESMC and ESMC-FE) can be used standing side by side or one on top of the other, or else be integrated in a rack (option ZZA-98). To do so, there is a cable set measuring 0.5 m in length supplied together with the equipment. Optionally, there are cable sets available measuring 3 m and 10 m in length for covering larger distances.

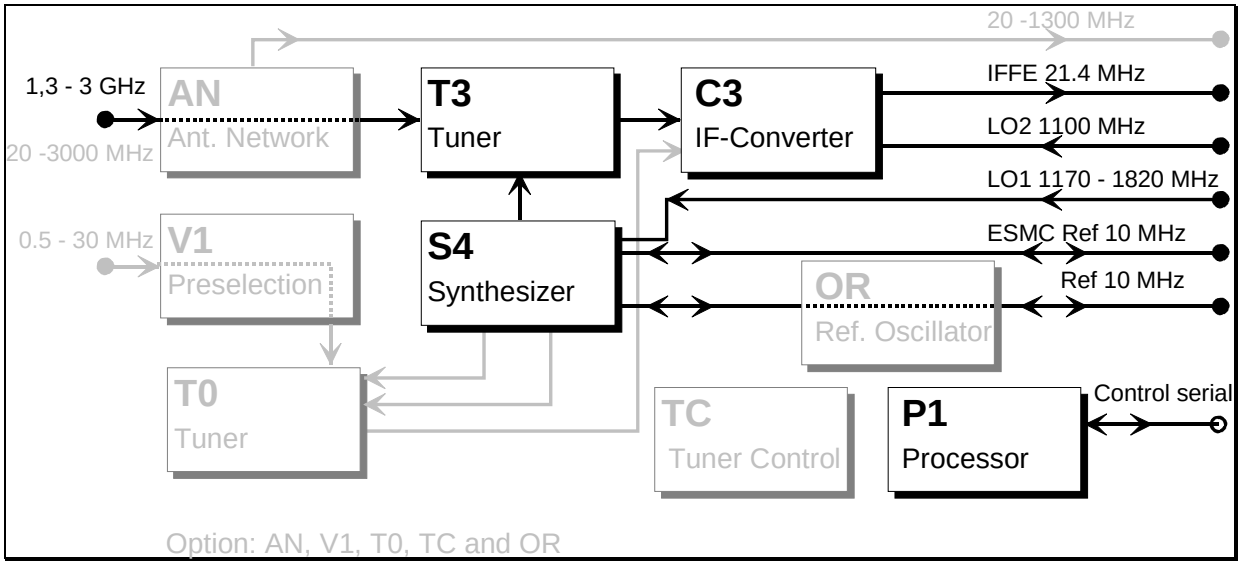


Assembly is very easy. There are no changes in the existing ESMC (apart from any firmware update, if required). Just unpack the frequency extension and cable set, connect them with the ESMC, plug in power cord and antenna cable, that's it.

What about the configuration of the ESMC-FE?

As the frequency extension ESMC-FE is based on a tuner concept, a number of disadvantages found in broadband converter concepts are avoided. It is in the frequency range above 1 GHz

that powerful radar systems operate in particular. In broadband converters, interference problems are caused by high pulses. A tuner with suboctave filters can prevent these interferences.



Basic equipment ...

The components Tuner 3, IF Converter C3, Synthesizer S4 and Processor P1 constitute the basic configuration of the ESMC-FE. In T3, the antenna signal is passed to the first mixer via a switchable input attenuation and a subrange bandpass. The synthesizer S4 generates the mixing frequency using the reference signal (LO1) of the basic ESMC unit. After filtering, the resulting IF of 1121.4 MHz is converted to the 21.4 MHz output frequency by using the frequency LO2 generated in the basic unit.

... and options:

We offer additional options for ESMC-FE which expand the range of applications, thus making this extension more attractive to the customer.

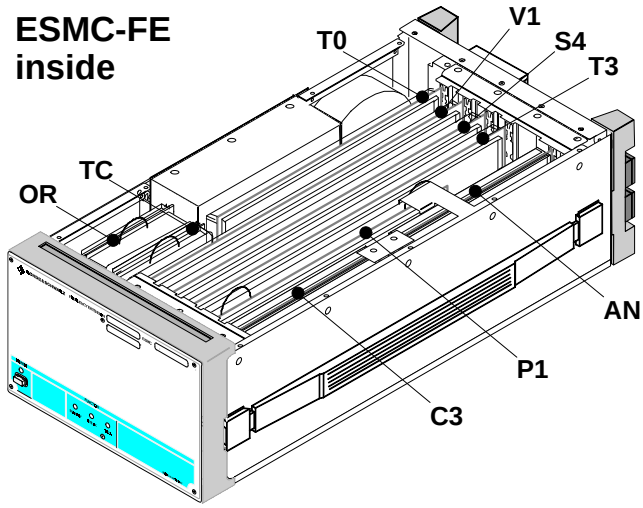
HF Extension ESMC-T0, ESMC-TC

Receiving signals in the range from 0.5 to 3000 MHz can be realized with the options T0 together with TC which controls the HF tuner T0. This permits the user to monitor and intercept the complete MF, HF, VHF and UHF band, and to analyze signals at the IF output with the aid of connected equipment.

HF Preselection ESMC-V1

Option RF preselection V1 comprises filtering with 10 subranges. This permits to reduce the signal sum load and thus provides better large-signal behavior. The user can then perform radio monitoring tasks in disturbed environments.

Antenna Splitter ESMC-AN



Option ESMC-AN is located between the two V/UHF inputs providing a common antenna input from 20 to 3000 MHz. The antenna splitter switches the signals to T3 of the frequency extension or to the V/UHF input of the basic unit depending on the current frequency.

In medium and large-size systems, an antenna matrix is integrated between receivers and antennas. This matrix connects the selected antenna with the receiver. With Option ESMC-AN, the matrix can be kept quite simple in structure due to the combined input.

In small systems operating with a broadband antenna (eg HL 040) no antenna switch is needed thanks to this option.

Existing systems including ESMC can be easily extended with ESMC-FE and ESMC-AN just by replugging the antenna cable.

Reference Oscillator ESMC-OR

In case of narrowband signals in the upper UHF band, in particular, a frequency drift can be disturbing which is an extremely undesirable effect during measurements. For this reason, we optionally offer a highly accurate reference oven-controlled oscillator (OCXO) the signal of which is used to synchronize the basic unit and other devices. To permit operation during warm-up during the first few minutes the reference in the basic unit is used automatically. Subsequently, ESMC and ESMC-FE are supplied by this highly accurate reference oscillator.

Cable Set ESMC-K1, ESMC-K2

In addition to the supplied cables there are optional 3-m or 10-m cable sets available. In complex systems, for example, the operator should see equipment with display only. All other equipment should be positioned beyond the operator's visual field. Using the 3-m cable set the ESMC can be separated from the frequency extension and be integrated at a remote position in the rack. This is an advantage for customers wanting to extend their existing systems.

The 10-m cable set permits even larger distances to be covered. The ESMC-FE can, for instance, be installed directly at the antenna mast low-end. The customer thus saves an expensive low-attenuation RF cable for the upper UHF range.

Overview

Designation	Type	Stock No.	Availability
Frequency Extension	ESMC-FE	4042.6002.02	from stock
Tuner Control	ESMC-TC	4037.5701.02	from stock
Tuner 0 (0.5 - 30 MHz)	ESMC-T0	4039.9004.03	from stock
Preselection	ESMC-V1	4039.0959.02	from stock
Antenna Splitter	ESMC-AN	4042.6702.02	12.96
Reference Oscillator	ESMC-OR	4042.6902.02	12.96
Cable Set 3 m	ESMC-K1	4048.2609.00	from stock
Cable Set 10 m	ESMC-K2	4048.2667.00	from stock

The ESMC is therefore a modular receiver with a large variety of possible configurations with extendability as a basic constituent of its concept. In line with this concept is the Frequency Extension ESMC-FE now being introduced which makes the ESMC fit for meeting present and future demands made on a radiomonitoring receiver.