



**SAW filters
for high end
telecommuni-
cations**



VECTRON
INTERNATIONAL

A **DOVER** COMPANY



Requirements for SAW filters for telecommunications:

- Flat pass band
- Low insertion loss
- Low amplitude, phase and group delay ripple
- Sharp filter characteristics and excellent close-in rejection
- Specified absolute group delay
- Custom shaping of filter passband and transition band



Filter layout, meshing and charge distribution:

In IDTs, charge distribution is not a constant. For the design of precision filters with apodised transducers it is therefore essential to consider charge distribution one of the most important second order effects.

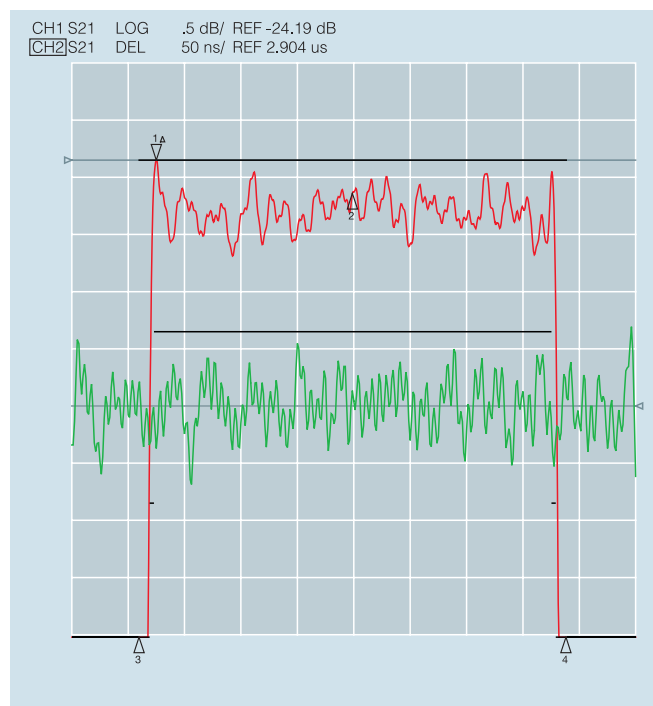
SAW filters for telecommunications:

There are various different design principles which are suitable for the design of SAW filters for telecommunications. However, none of them meets the requirements perfectly. Precision filter design meets most of the requirements such as low amplitude, group delay and phase ripple in combination with high close-in rejection and outstanding selectivity. The high insertion loss is a disadvantage.

Low insertion loss and/or miniaturized package size are usually covered by more resonant design principles.

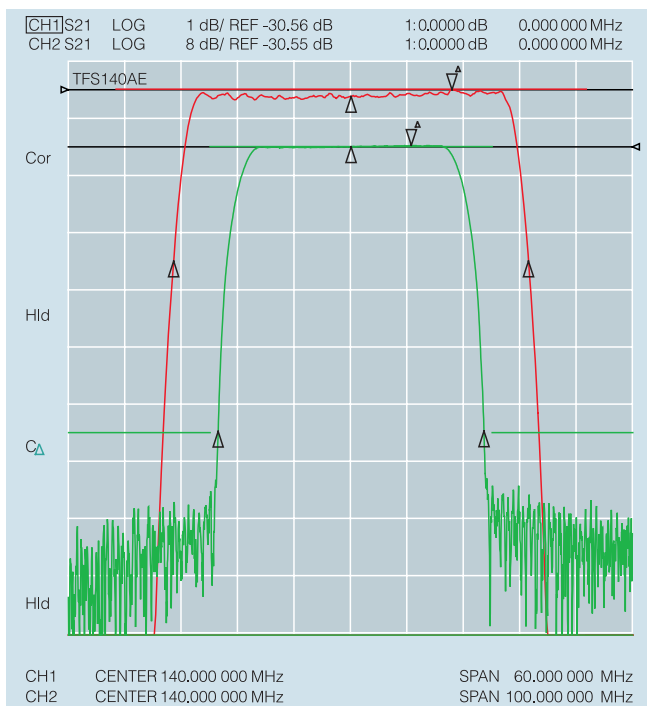
Design capabilities:

Precision filters are based on transversal filter design principles. For precision filters, a high level of accuracy in simulation has been achieved. Here, most second order effects are implemented in the simulation model (e. g. the charge distribution shown above). For precision filter designs the shaping in transition band can be specified together with the pass band and stop band. In addition, this is the only SAW filter design principle for which amplitude and phase/group delay can be chosen independently.





Frequency MHz	Bandwidth MHz	Insertion Loss dB	Package mm
70	0.25-40	20-25	DIP 14 / 18
140	0.05-7	5-25	13.5x6.5
57-348	0.2-20	3.5-15	13.5x6.5
410-475	5	2.5	5x5 / 3.8x3.8
482-922	24	3	3x3
851-2657	38-66	2.5	3x3 / 2x2.5



VI-Telefilter products for telecommunications

VI-Telefilter's strategy is to provide continued support for the lifetime of the products, although 75% of the products for telecommunications are no older than 2 years.

The wide range of IF and RF SAW filters take advantage of a large selection of quartz, lithium niobate and lithium tantalate substrate material cuts. This allows for optimal performance of narrow band, medium band and wide band filters.

VI-Telefilter leads the market for GSM base station filters.

Telecommunications and VI-Telefilter

All VI-Telefilter plants are TS16949 and ISO14000 certified.

VI-Telefilter has several production lines that enable us to address low-volume, medium-volume and high-volume markets. Multilayer ceramic-based, surface-mount and metal-can pinned solutions are supported.

Many different SAW design principles are available for customized solutions.

VI-Telefilter provides filter sets and cascaded filter pairs.

Customized solutions may include an internal matching of the filter to 50 Ohms. Filters for ovened applications are available.



Solutions for telecommunications

- Comprehensive set of SAW design principles for customized products
- Low volumes requirements supported
- Highly automated and flexible production lines for low cost solutions
- Internal matching option
- Filter sets and cascaded filter pairs available

»Vectron International-Telefilter is our supplier of SAW filters for GSM/UMTS repeaters. For SAW filters we need technical solutions that fully meet our specifications. VI-Telefilter has proven both to have the design necessary expertise, and to be very flexible. Over the past few years, VI-Telefilter has become our reliable partner for reasonably priced high-quality components what has qualified them to be among our single-source suppliers.«

Udo Krause,
 Procurement Manager,
 Wireless Innovation Group,
 Mikom GmbH –
 An Andrew Company



Vectron International- Telefilter – Germany

Employees: 170

Turnover: \$28 Mio (2004)

Products:

SAW Filters, SAW Resonators and
Monolithic Crystal Filters (MCF)

Experienced SAW design team,
supported by a worldwide sales
organization

75% of product portfolio less
than 2 years old

Technological expertise on
materials, front-end and back-end

Fully automated assembly process

Vectron Frequency Devices – Switzerland

High-end Nikon stepper
for high resolution (0.35µm)
and high throughput

Products:

High-performance RF-filters,
High volume low cost RF-filters
up to 3 GHz



Vectron International-Telefilter

Potsdamer Straße 18
D-14513 Teltow
Germany

Phone: +49 (0) 3328 4784 17
Fax: +49 (0) 3328 4784 30

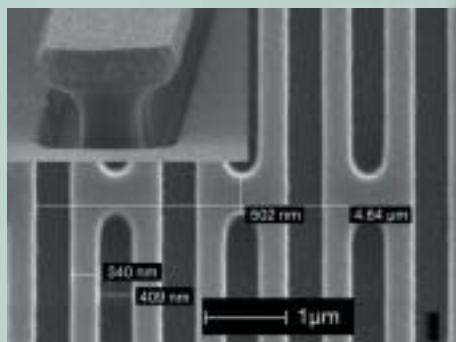
telefilter@vectron.com
www.vectron.com



Vectron International-Telefilter is always a good address

Vectron International-Telefilter (VI-Telefilter) is particularly successful in the development of passive electronic components like SAW filters, SAW resonators, and monolithic crystal filters (MCF). Our corporate policy is strictly customer-oriented, and our customers opt for us because we reliably deliver high-quality components always according to the individual customer requirements in terms of performance, costs, and technology modification.

Due to its flexible design capacities and thoroughly cost-optimized production facilities VI-Telefilter has gained a leading role among the suppliers of electronic components for the mass market as well as in the high-performance segment.



A true partner – with the reliability of an international group

VI-Telefilter is 100%-owned by Vectron International and is thus a member of the international Dover Corporation. Dover Corporation is NYSE-traded (DOV) and listed at Fortune 500. Dover Corporation has a broad customer base throughout the world, in over 100 countries and sales close to \$5 Billion.

According to the Dover corporate policy each individual group member company operates independently on the very sound financial background of a strong international group. VI is one of the largest suppliers of Frequency Control Products with worldwide annual sales of over \$200 Million and a growth rate that is clearly above average.

As a group member within the VI group VI-Telefilter is located in Teltow/Berlin and operates on a global level.