



SAW filters for WiMAX applications



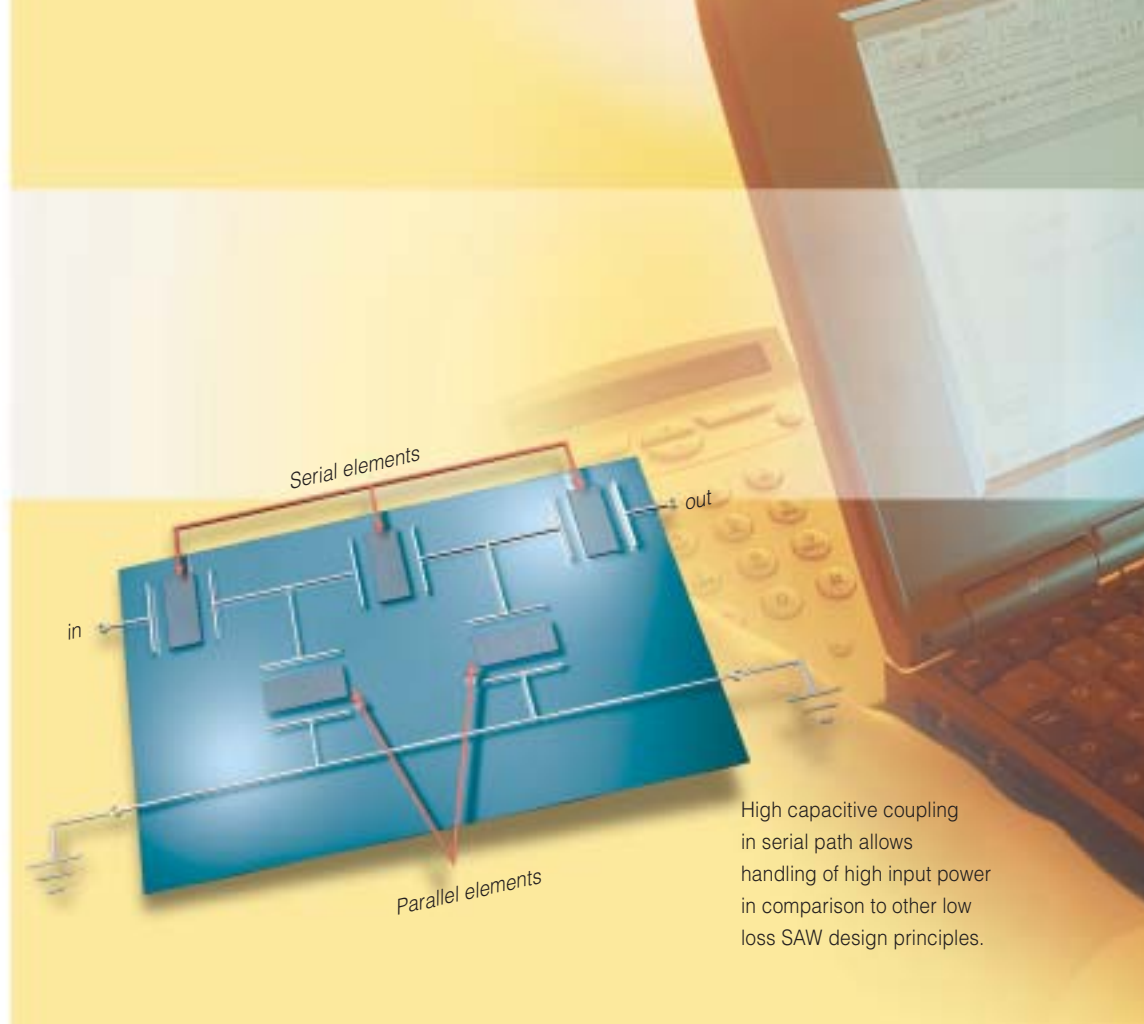
VECTRON
INTERNATIONAL

A **DOVER** COMPANY



Requirements for SAW filters for WiMAX applications:

- RF and IF filters requested
 - Low insertion loss and sharp transition from passband to stopband for IF filters (bandwidth from 3.15 to 13.2 MHz)
 - Low insertion loss and high input power handling capabilities for RF filters
 - Low cost



High capacitive coupling in serial path allows handling of high input power in comparison to other low loss SAW design principles.

SAW filters for WiMAX applications:

IEF (Impedance Element Filters) constitute the basic design principle for RF filters. SPUDT (Single Phase Unidirectional Transducer) and SFIT (Slanted Finger Interdigital Transducer) are normally used for IF filters. Quartz and LiTaO3 are substrate materials to handle a wide bandwidth range with a low insertion loss.

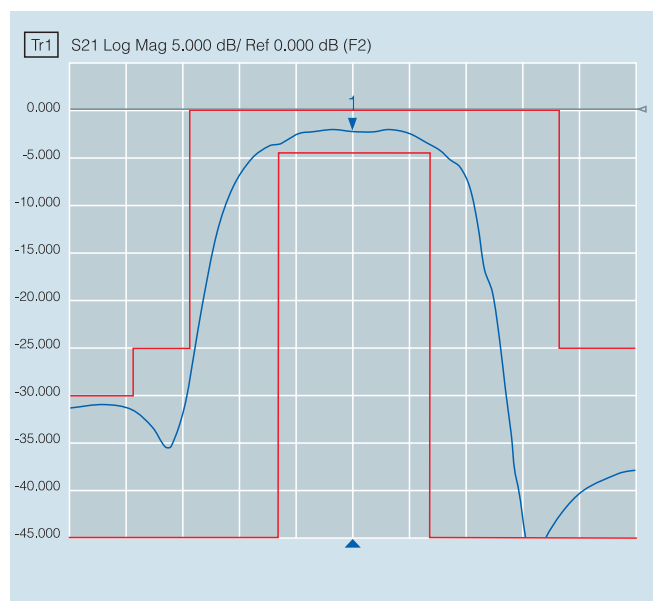
Design capabilities:

IEF are oneport resonators used as impedance elements.

Resonators are arranged in a ladder configuration. The difference between the acoustic impedance of resonance and anti-resonance is used. The resonators may be designed to have different resonant frequencies.

If resonators are designed in a way that the resonance of the serial arm and the anti-resonance of the parallel arm coincide, a band pass characteristic is obtained. A well-optimised filter offers a very low pass band loss and high close-in rejection.

A high capacitive coupling in the serial arm allows handling a high input power in comparison with other low-loss SAW design principles.





VI-Telefilter products for WiMAX

VI-Telefilter offers RF filters and IF filters for several regions of the world. Concerning RF filters, the latest decisions of the FCC to define TX and RX bands in the US have been supported (TFS2535 and TFS2657). Other filters following the WCA proposal are available as well.

Concerning IF filters, VI-Telefilter adheres to standards for Europe, the USA, and the rest of the world, which has resulted in the development of low-loss filters with a bandwidth of 3.15 to 13.2 MHz.

VI-Telefilter's competence

All VI-Telefilter plants are TS16949 and ISO14000 certified.

In our factory in Neuchatel (Switzerland), we support all processes down to a linewidth of 0.35 μm (3 GHz) necessary to produce RF SAW filters.

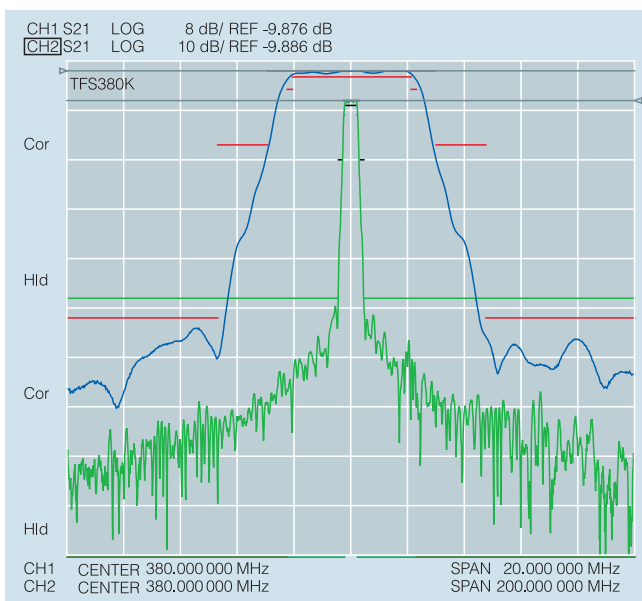
VI-Telefilter is using its experience in the development and production of low cost IF filters for WLAN applications and the field of GSM base station filters, where VI-Telefilter takes a leading position to support the upcoming market for WiMAX applications.



Solutions for WiMAX

- Front end and IF filters available
- Low insertion loss and high close in rejection
- Customized solutions

Type	Frequency MHz	Bandwidth MHz	Insertion Loss dB	Package mm
TFS380K	380.00	4.12	12.0	5.0x5.0
TFS456E	456.00	3.15	9.0	7.0x5.0
TFS456F	456.00	12.60	9.0	3.8x3.8
TFS456K	456.00	13.20	9.0	3.8x3.8
TFS2535	2535.00	66.00	2.0	3.0x3.0
TFS2657	2657.00	66.00	2.5	3.0x3.0





**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



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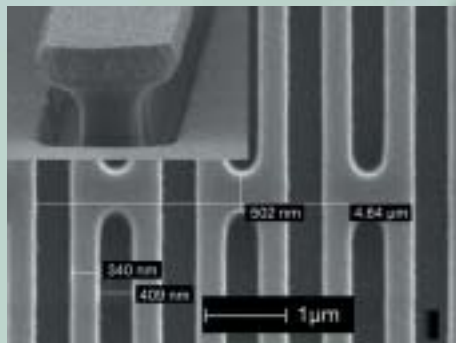
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**Vectron International-Telefilter
is always a good address**

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.



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