SAW filters for GPS applications
**Requirements for SAW filters for navigation applications:**

- Low insertion loss
- Very low group delay and phase-ripple requirements
- Sometimes in combination with close in rejection requirements
- Single-ended to balanced operation
- Special final-testing requirements

**SAW filters for Navigation applications**

VI-Telefilter utilizes SFIT (Slanted Finger Interdigital Transducer)-filters and resonant structures to achieve a low insertion loss.

Several design methods like SFIT / IEF / LCRF, and a combination of IEF-LCRF for single ended / balanced operations may be used for SAW filters for navigation applications. To reduce the insertion loss (ohmic losses) we use parallel and serial connections of IEF-LCRF structures.

For wide-band, low-loss filters, we take advantage of different cuts of substrate materials (LiNbO3 (IF)/ LiTaO3 (RF)).

**Design capabilities**

SFIT (IF) filters are parallel connections of a high number of narrow-band, low-loss filters. This allows an effective generation of SAW for each frequency in the pass band. VI-Telefilter has generated sophisticated design tools to achieve a low group delay ripple, suppressing reflections including the triple transit signal.

As a service for customers, we offer non-standard final test routines, supporting special specifications. As an example, we can work with several measurement techniques on fixed golden samples, and may remove cubic trends from differential characteristics for ripple measurements.
VI-Telefilter products for GPS

VI-Telefilter has developed a family of RF filters for navigation applications. This means that even for one frequency and one chipset, several filters are available to offer the customer the best compromise between group delay and phase ripple, insertion loss, close-in rejection and package size. Solutions for single ended to single ended, and single ended to balanced operations are supported.

IF filters for GPS are available as well. Additional codes are under development.

GPS and VI-Telefilter

All VI-Telefilter plants are TS16949 and ISO14000 certified.

VI-Telefilter does have a long experience with RF and IF SAW filters. This allows to handle current requests for GPS RF and IF filters.

VI-Telefilter is well known for its capabilities in customized product developments. Here we may implement non-standard requests into specifications, as we do for GPS IF filters.

<table>
<thead>
<tr>
<th>Type</th>
<th>Frequency MHz</th>
<th>Bandwidth MHz</th>
<th>Insertion Loss dB</th>
<th>Package mm</th>
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Solutions for navigation applications

- Customized front end and IF filters
- Low group delay and phase ripple
- Low insertion loss

![Graph of TFS140Y filter performance](image-url)
Vectron International-Telefilter – Germany

Employees: 170

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

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.

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.