

TRE-3

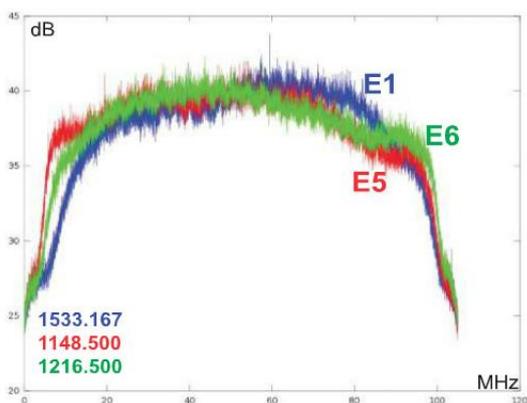
The State-of-the-art
in GNSS technology...

And this is why:

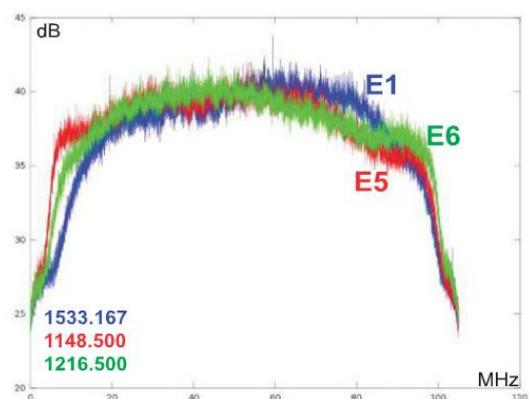
JAVAD



- Three ultra wide-band (100 MHz) fast sampling and processing, programmable digital filters and superior dynamic range. After 12-bit digital conversion, nine separate digital filters are perfectly shaped for each of the nine GPS L1/Galileo E1, GPS L2, GPS L5/Galileo E5A, GLONASS L1, GLONASS L2, Galileo E5B/BeiDou B2/GLONASS L3, Galileo altBoc, Galileo E6/BeiDou3/QZSS LEX, and BeiDou B1 bands.
- Each band consists of a combination of a digital Cascaded Integrator-Comb (CIC) filter and a digital Finite Impulse Response (FIR) filter (up to 60-th order) where signal selection is performed.
- Two types of digital in-band anti-jamming filters (automatic 80-th order and "user selectable" 256-th order).
- We assign multiple channels to acquire and track each satellite signal. For example we can assign 20 channels to acquire the GPS L1 signal, each spaced one millisecond apart. We also assign up to 5 channels to track each signal, each with different filter parameters and tracking strategies. This supports acquiring and tracking weaker signals in difficult conditions, especially under trees and canopy. People wonder why we need 864 channels! We put them to good use. Others use one channel per satellite signal. Several patents are pending (Patents and Pending).
- 80 dB out-of-band interference rejections: high dynamic range of wide RF bands and highly rectangular digital filters make the receiver much more resistant to out-of-band jamming.



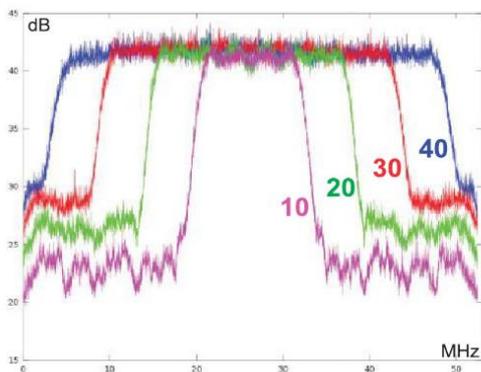
Noise spectrum of three wide RF bands (seen from DSP)
with 3 level signal quantization



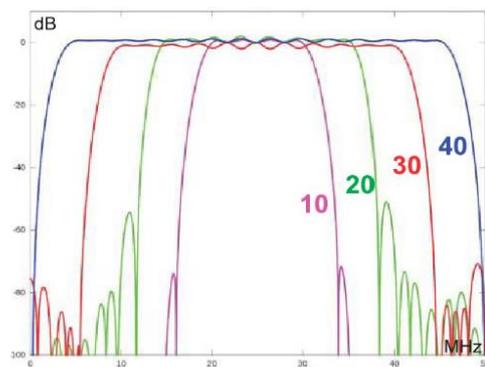
Noise spectrums of GNSS Bands which were cut from
E1 wide RF band by corresponding digital filter

- ✔ High-speed high-dynamic automatic gain control (AGC) to respond to interferences and signal variations.
- ✔ Programmable filter width (by Commands).
- ✔ Highly stable digital filters (band characteristics do not change With age, input voltages, or temperature).
- ✔ Improved GLONASS inter-channel bias performance (due to our flat digital filter shape).
- ✔ Excellent new multipath rejection technique, the best ever.
- ✔ 60-MHZ-wide Galileo altBoc band unleashes the full benefit of this signal. Its excellent multipath resistance is improved even further with our new multipath reduction technique.
- ✔ 864 GNSS channels allow tracking all current and future satellite signals.
- ✔ Three wide band RF sections allow monitoring spectrums and interferences in three 100-MHz—wide bands.
- ✔ TRE-3 is the only receiver in the market that can track AND DECODE the QZSS LEX signal messages.
- ✔ Excellent features for time transfer applications: In time sources where the zero crossing of the input frequency defines the exact moment of the time second, we monitor zero crossings and accurately define the moment of the time second. External time interval measurement unit is not required to measure zero crossing and 1-PPS Offset.
- ✔ Embedded calibrator measures phase and code delays of each of these nine bands in timing applications. External calibration is not required.

TRE-3 is form, pin-out, and command compatible with the TRE-G3T. It uses 7-Watts of power, compared to 4-Watts of the TRE-G3T.



Noise spectrums of GPS L1/Galileo E1 band with different digital filter band width (set by command)



Amplitude response of combination of digital CIC and FIR filters, computed on Matlab. Real out-band attenuation