

TEST YOUR SYSTEM. COUNTER THE THREAT.

Emitter simulations for radar warning receiver testing.



High-performance simulation with off-the-shelf equipment?

Testing radar warning equipment in realistic scenarios is crucial to their reliable performance in the field. Radar warning receivers, for example, are an integral part of airborne electronic warfare (EW) self-protection suites on modern aircraft and need to be tested before becoming operational. Traditionally, dedicated instruments that use specialized and tailored hardware have been used. With the increase of available bandwidth and processing power of commercial vector signal generators such as the R&S SMW200A, these instruments are a good alternative. Engineers can share the signal source among different applications from simple vector signal generation to high-end radar simulation and profit from the outstanding RF performance. This reduces cost and gives users flexibility.

High-speed PDW streaming for real-life scenarios

With the R&S SMW200A capabilities, it is possible to build a wanted RF environment. Ultra-long scenario playtime is achieved by streaming Pulse Descriptor Words (PDW) via LAN to the R&S SMW200A that then takes on the role of an agile RF signal source. It supports classical unmodulated radar pulses, Barker coded pulses, frequency modulated continuous wave (FMCW) signals, or any kind of I/Q modulation on pulse to simulate the most modern, low probability of intercept radars. The R&S SMW200A supports PDW rates up to 12 MPDW/sec.



The R&S SMW200A and the R&S Pulse Sequencer set-up - ready for testing

Create complex scenarios and watch them in 3D

In all stages of the development cycle, from initial functional testing to final operational simulation testing, engineers need realistic test cases that reflect what the radar warning receiver will actually see when in operation. For that purpose, engineers can use the R&S Pulse Sequencer software package to define a wide range of radar scenarios that extend from simple pulses to dense multi-emitter RF environments. The software allows using smart pulse interleaving algorithms with an optimized, user-defined priority scheme and lowest drop rates as a standard feature. Alternatively, the user can also decide to simulate true pulse-on-pulse situations as they occur in reality, without any pulse dropping. The user can configure all typical radar types such as CW radars, FMCW radars or pulsed radars such as wide bandwidth, frequency agile radars with complex inter-pulse modulation (IPM) or modulation on pulse (MOP). For maximum realism, emitters and the receiver can move along predefined or imported trajectories with six degrees of freedom to make the simulation as realistic as possible. The usability is a core requirement for the software; because of that, it offers 3D previews and graphical live visualization of configured scenarios to familiarize users quickly with the software. In addition, calculation results even of complex multi-emitter scenarios are available fast so that the waiting time for the results is reduced to a minimum and the user can optimize test cases conveniently.



Webinar: Simulating radar signals for meaningful radar warning receiver tests

Learn how to create radar scenarios ranging from simple pulses to the most demanding emitter scenarios, generate complex radar signals and increase flexibility during radar simulation by streaming pulse descriptor words (PDW).

Watch the webinar here: www.rohde-schwarz.com/radarwarningreceivertests

Cutting-edge RF performance for AOA and pulse-on-pulse simulation

The RF hardware of the R&S SMW200A supports all typical radar bands up to 44 GHz. Engineers can use multiple coupled dual-path R&S SMW200A vector signal generators to simulate the angle of arrival (AoA) of radar signals. Coupled instruments support testing devices that use time difference of arrival (TDOA) interferometric or amplitude comparison techniques in a small form factor. The flexibility of the digital hardware with 2 GHz internal I/Q bandwidth in the R&S SMW200A enables simulation of pulse-on-pulse situations with up to six overlapping pulses in an instrument with one RF port and a maximum pulse density up to six times 3.3 MPulses per second.



White paper: Simulation of angle of arrival (AoA)

Learn how to test the direction finding capabilities of radar warning receivers in the lab with multiple coupled R&S SMW200A vector signal generators that are phase-coherent and time-synchronized.

Download the free whitepaper at: www.rohde-schwarz.com/aerospace-defense/AOA

With innovative test equipment from Rohde & Schwarz, radar engineers reduce testing uncertainty and gain confidence to be able to test like in real operational scenarios.

Rohde & Schwarz offers:

- ▶ Support of high speed PDW streaming with up to 12 MPDW/sec
- ▶ Powerful radar scenario simulation with the R&S Pulse Sequencer PC software
- ▶ Simulation of multiple emitters with up to six times 3.3 MPulses/sec in one instrument
- ▶ Pulse on pulse from 6 emitters with a single RF port in one instrument
- ▶ Commercial of the shelf simulator hardware with RF carrier frequency up to 44 GHz and 2 GHz bandwidth
- ▶ Realistic simulation of angle of arrival (AoA) with coupled instruments
- ▶ Support of TDOA, interferometric and amplitude comparison techniques

Follow our series of articles and webinars on latest test solutions for radar and EW testing. Next month, we will be focusing on radar system performance with advanced pulse stability measurements. For more information, visit: www.rohde-schwarz.com/radar-simulation