WaveBee Togo AV1024A

Mobile V2X simulator

The WaveBee Togo, a mobile and self-sufficient solution for testing V2X functions in the field, is now part of Keysight's V2X product portfolio. In combination with the WaveBee Creator software for creating test cases, the system enables fast, easy, and reproducible execution of complex V2X test scenarios.

Automotive OEMs and manufacturers of traffic systems have to ensure the correct functioning of V2X-based applications: an ADAS/AD function in the vehicle, a signal request from an emergency vehicle at an intersection, or public transport prioritization.

Functional testing of V2X applications in a conventional way is costly, especially if several vehicles, infrastructure or even Vulnerable Road Users (VRUs) are to be involved in the test scenario. Vehicles and equipment such as traffic signals have to be on-site and equipped with V2X technology. Personnel are required to perform the test itself and reproducibility is not guaranteed. However, Keysight's WaveBee Togo can generate a real V2X network for the device under test, it can broadcast the V2X scenarios created by WaveBee Creator in a real map, which enables spatially and temporally valid regression tests.

Figure 1. WaveBee Togo

KEYSIGHT

Five features

- Rapid deployment field test system for V2X applications
- Environment generator (scenario-based) for simulation and generation of V2X messages from multiple C-ITS nodes (vehicles or RSUs)
- Multi-standard support (CSAE, ETSI, SAE)
- Hybrid communication DSRC and C-V2X
- Tests outstanding

The WaveBee Togo replaces all real participants of the test scenario — no matter where the test is performed — with simulated V2X nodes. WaveBee Togo generates all V2X messages relevant for the test case at runtime and transmits them standard-compliant via the air interface.

The WaveBee Togo is the sophisticated solution for a consistent and efficient V2X test strategy for OEMs as well as for infrastructure manufacturers and road operators.

Typical areas of application

- V2X research and development
- Functional validation of series systems (e.g., V2X ECUs in vehicles)
- Generation of test cases during installation (e.g., of Roadside Units/C-ITS stations)
- Maintenance and operational safety (e.g., of traffic systems)
- Proving ground and test track equipment
- Simulation of congestion situations, intersections, gantries, VRUs, various types of vehicles, barrier trailers, trams, buses, emergency vehicles, and more

Technical Details

Figure 2. WaveBee Togo generates I2V messages for public transport

Figure 3. WaveBee Togo simulating vehicles for RSU testing at intersection

Communication standard	ETSI, SAE, CSAE
Communication technology	DSRC (IEEE 802.11p) C-V2X (PC-5 sidelink)
Power supply	2x 14.4 V Litium Ion battery pack (summary 149.7 Wh) external charger: 18V⎓3.33 A
Connectivity	Wireless LAN 2.4 GHz Cellular 3G/4G/5G
System	i.MX8M Quad CPU 2 GB RAM 16 GB eMMC Mass memory Hardware Security Module (eHSM)
Weight	6.4 kg
Dimensions	320/110/325 mm (12.6/4.33/12.8 in.) (W/D/H)
Enclosure	Aluminum
Operating temperature	-20°C to 60°C (-4ºF to 140ºF), max. 95% humidity
Protection	IP44

Specifications are subject to change without notice due to product updates and future developments.

Ordering Configuration

Configure your WaveBee-Togo by choosing regional software and accessories.

Choose your software

Product models	Product description
AV2004CNA	WaveBee Togo Configuration CN (CSAE)
AV2004EUA	WaveBee Togo Configuration EU (ETSI)
AV2004USA	WaveBee Togo Configuration US (SAE)