

WaveBee Hive Extended AV1001A

V2X HiL Test System

WaveBee Hive Extended is a compact DSRC/IEEE 802.11p and C-V2X HiL V2X test system with a multi-stack environment for complex automotive simulations. While the WaveBee Hive Extended includes simulation of 50 virtual V2X stations (vehicles, roadside units etc.) and an active 5-port matrix for complex scenario-based testing, the WaveBee Hive includes simulation of five virtual V2X stations for testing.

Connected cars increase the complexity of automotive testing: Highly sophisticated components, such as advanced driver assistance systems and autonomous vehicle functions, require an equally sophisticated test environment for validation. The WaveBee Hive meets the automotive industry's requirements for complex, reproducible test environments.

With fully interactive, reproducible scenarios transmitted via multiple V2X modems supporting C-V2X and DSRC/IEEE 802.11p, depending on system configuration, this product is available for different regions V2X standards (SAE/ETSI/C-SAE). With the ability to simulate 50 ITS stations simultaneously and to generate and send the corresponding V2X messages, the WaveBee Hive massively reduces costs for test environments, accelerates development processes, and significantly reduces time-to-market.



Figure 1. WaveBee Hive Extended

Five features

- Test case creation as well as functional validation of V2X in a system validation
- Live simulation visualization, recording, and playback
- Accelerates the development process for V2X and ADAS applications
- Easy integration of third-party simulation frameworks
- V2X standards and multi-region support (ETSI, SAE, CSAE)
- V2X HiL testing focusing on the application layer

In this context, the WaveBee Hive can be used as a completely stand-alone solution that enables both the test scenario definition, the generation and broadcasting of the V2X test environment for the device under test, and the analysis of all V2X messages. Integration into existing test frameworks or vehicle test benches is also possible, enabling the WaveBee Hive to take over the V2X component as part of an ADAS, sensor fusion test system or a ViL complete vehicle test bench.

The WaveBee Hive Extended also features three V2X transceiver modules and a V2X monitor module connected to a 5-port air interface emulator, while the WaveBee Hive includes one V2X transceiver module and a V2X monitor module unit connected to a 3-port air interface emulator.

Typical areas of application

- Research and development
- Functional protection of series systems (e.g., V2X series ECU in vehicles)
- V2X simulation unit for ADAS test frameworks, ViL
- V2X mass simulation and test environment generation

Technical Details

Communication standard	ETSI, SAE, CSAE
Weight	78kg
Dimensions	60cm x 89cm x 83cm (23.62 in × 35.04 in × 32.68 in)(W/H/D)
Case	19" server rack system, 15 U, black
Power supply	100-240V, ~ 50/60Hz, 1200W
Operating temperature	20-30 °C (5-40 °C with possibly reduced HF performance)
System	Application and communication server (Windows), 64 GB RAM, 950 GB SSD
Network	10x Gigabit Ethernet RJ45 3- V2X Transceiver Module (hybrid: DSRC and C-V2X) 1 - V2X Monitor Module unit connected to 3 port air interface emulator (passive combiner matrix; hybrid: DSRC and C-V2X)
Interfaces	Gigabit Ethernet (RJ45 connector), GNSS in/out (N type connector), V2X DuT device (N type connector)
RF systems	1 x 3 Port RF Combiner 3 x V2X Transceiver Module, 1 x V2X Monitor Module 1 x GNSS Module
Software	WaveBee Creator, WaveBee Touch, WaveBee V2X Stack Simulation – 10/50 V2X instances (Software licenses required)

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

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