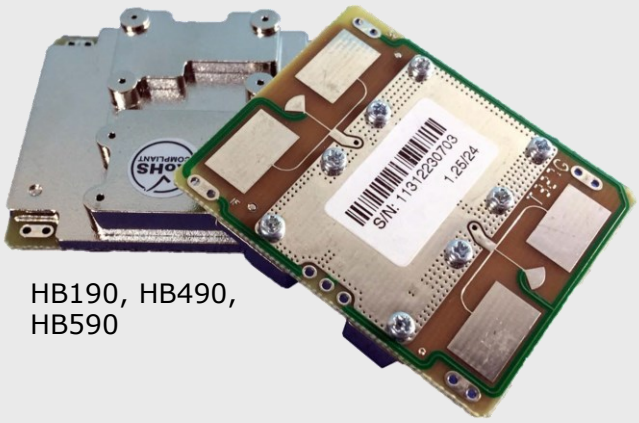


HB190, HB490, HB590

HB192, HB592

Product Data Sheet

AGIL Sense

HB9 Series

X-band Microwave Sensor

Product Overview

The HB9 microwave sensor is an X-band bi-static Doppler transceiver. It consists of a dielectric resonator oscillator (DRO), a single balanced mixer and a pair of antenna arrays.

It is suitable for applications in automatic access, security, lighting control and speed measurement.

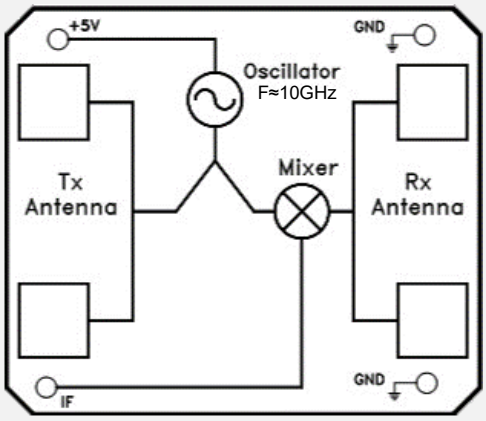
The HB9-series' compact footprint, low profile and light weight enables OEMs to create products where an optimum balance of space, range, power consumption and cost effectiveness is achieved.

Key Features

- Low current consumption
- Small and flat profile
- Lightweight
- CW or pulse mode
- Ceiling-mount option

Key Applications

- Motion detection
- Lighting control
- Security alarm
- Automatic door control



Block Diagram

ST Engineering

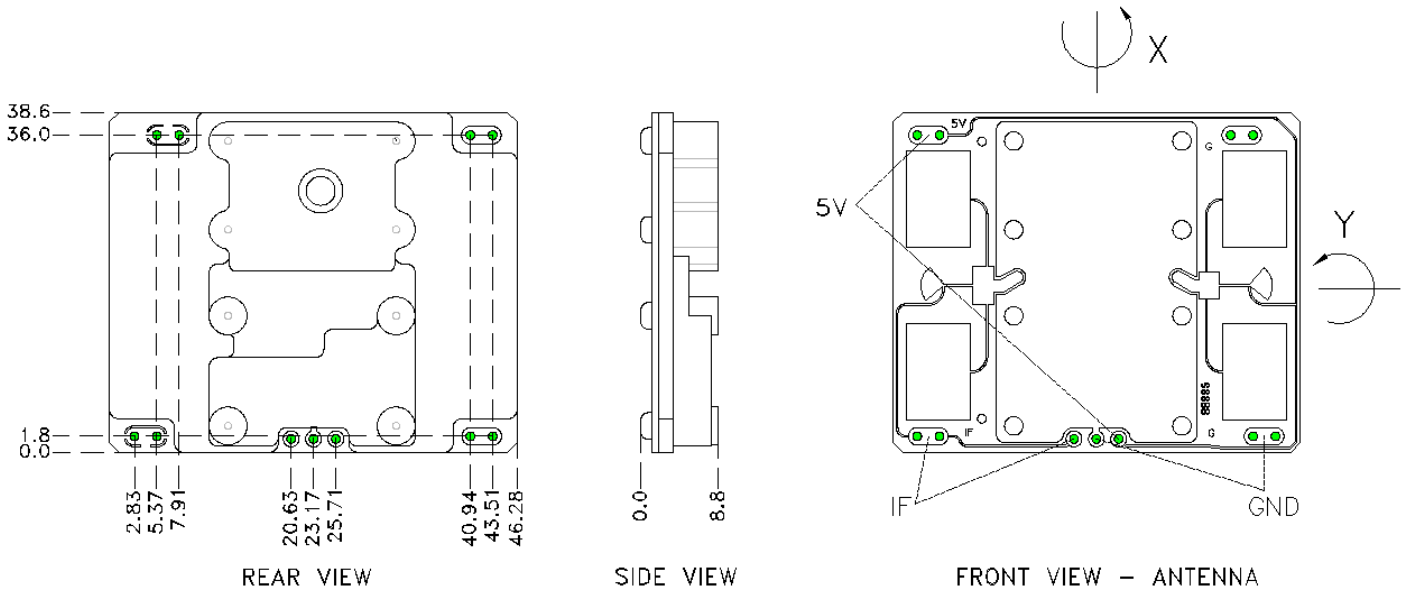
Technical Specifications

Parameter	Remarks	Min.	Typical	Max.	Unit
Operating Condition					
Supply Voltage, V_{IN}	HB190, HB192, HB490, HB590, HB592	4.75	5	5.25	V_{DC}
	HB190-3, HB590-3	2.85	3	3.15	V_{DC}
Current Consumption			30	40	mA
Operating Temperature		-15		55	°C
Recommended Pulse Scheme					
Pulse Frequency	Pulse mode		2		KHz
Duty Cycle	Pulse mode		2		%
Transmitter					
Operating Frequency	HB190, HB190-3, HB192	10.52	10.525	10.53	GHz
	HB490	9.345	9.35	9.355	GHz
	HB590, HB590-3, HB592	10.58	10.587	10.59	GHz
Radiated Power, EIRP	HB190, HB190-3, HB590, HB590-3		18		dBm
	HB192, HB592		15		dBm
	HB490		13		dBm
Spurious Emission				-30	dBm
Settling Time			3	6	µSec
Antenna					
3 dB Antenna Beam-width, – (X × Y)	HB190, HB490, HB590, HB190-3, HB590-3		80 × 40		°
	HB192, HB592		100 × 80		°
Sidelobe Rejection	HB190, HB490, HB590, HB190-3, HB590-3		15		dB
Physical Properties					
Dimensions			46.3 × 38.6 × 8.8		mm
Weight			10		g

Unless noted otherwise, the specifications are measured in CW mode, V_{IN} = +5 V_{DC} and 12 kΩ load at +25°C.

Note 1: HB190 and HB192 complies with FCC Part 15.245 and EN 300 440.
Note 2: HB590 and HB592 complies with EN 300 440.
Note 3: HB190-3, HB590-3 is designed to meet the requirements of EN 300 440 and FCC Part 15.245.
Note 4: CAUTION: ELECTROSTATIC SENSITIVE DEVICE. Observe precautions for handling and storage.

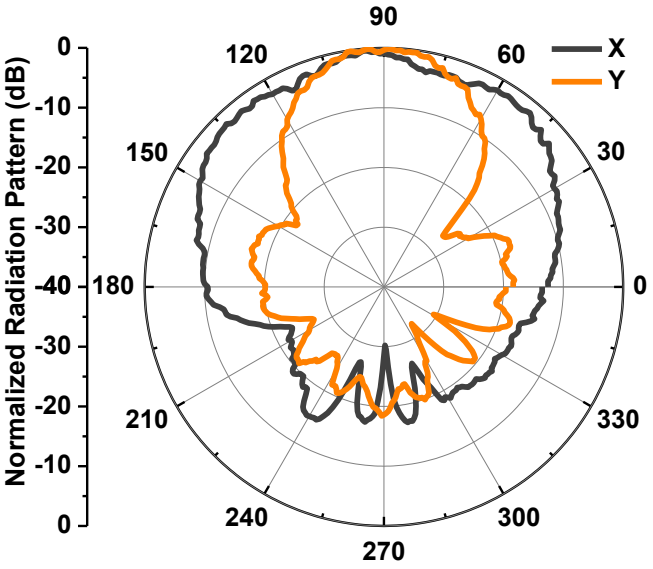
Module Outline



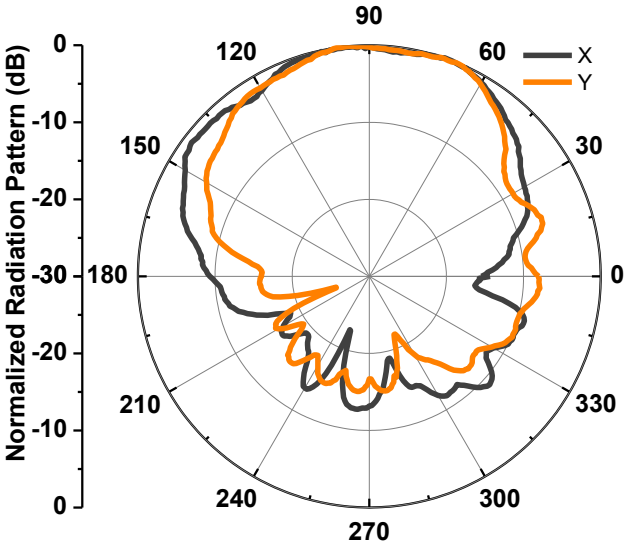
All dimensions are in mm.

Name	Description	Diameter	Plated Thru
5V	Supply voltage, V_{IN}	1 mm	Yes
IF	IF_{out}	1 mm	Yes
GND	Ground	1 mm	Yes

HBx90 Antenna Beam Pattern



HBx92 Antenna Beam Pattern



ST Engineering Electronics Ltd.
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Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

KDB 996369 D03 OEM Manual rule sections:
2.1 List of applicable FCC rules
This module has been tested for compliance to FCC Part 15.245.

2.2 Summarize the specific operational use conditions
Per §15.245, the final host product must be intended for use as a field disturbance sensor (integration in perimeter protection systems is prohibited).

Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation. Continuous operation of field disturbance sensors designed to be used in farm equipment, vehicles such as fork-lifts that are intended primarily for use indoors or for very specialized operations, or railroad locomotives, railroad cars and other equipment which travels on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g., putting a vehicle into reverse gear, activating a turn signal, etc.).

2.3 Limited module procedures
Not applicable.

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2.4 Trace antenna designs
Not applicable.

2.5 RF exposure considerations
This equipment complies with FCC mobile radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator & your body. If the module is installed in a portable host, a separate SAR evaluation is required to confirm compliance with relevant FCC portable RF exposure rules.

2.6 Antennas
The following antennas have been certified for use with this module; antennas of the same type with equal or lower gain may also be used with this module, except as described below. The antenna must be installed such that 20 cm can be maintained between the antenna and users.
[If multiple antenna sets are approved for use with module, please make sure to include all of them.]

Antenna Manufacturer	ST Electronics (Satcom & Sensor Systems) Pte. Ltd.
Antenna Model	HB192
Antenna Type	Patch
Antenna Gain (dBi)	5
Antenna Connector	Microstrip

2.7 Label and compliance information
The final end product must be labeled in a visible area with the following: “Contains FCC ID: VECHB192”. The grantee's FCC ID can be used only when all FCC compliance requirements are met.

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user’s manual of the end product which integrates this module.
The end product user manual shall include all required regulatory information/warning as shown in this manual.

2.8 Information on test modes and additional testing requirements
This transmitter is tested in a standalone mobile RF exposure condition and any co-located or simultaneous transmission with other transmitter(s) or portable use will require a separate class II permissive change re-evaluation or new certification.

2.9 Additional testing, Part 15 Subpart B disclaimer

This transmitter module is tested as a subsystem and its certification does not cover the FCC Part 15 Subpart B (unintentional radiator) rule requirement applicable to the final host. The final host will still need to be reassessed for compliance to this portion of rule requirements if applicable.

OEM/Host manufacturers are ultimately responsible for the compliance of the Host and Module. The final product must be reassessed against all the essential requirements of the FCC rule such as FCC Part 15 Subpart B before it can be placed on the US market. This includes reassessing the transmitter module for compliance with the Radio and EMF essential requirements of the FCC rules. This module must not be incorporated into any other device or system without retesting for compliance as multi-radio and combined equipment.

As long as all conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

2.10 Note EMI Considerations

Please follow the guidance provided for host manufacturers in KDB publications 996369 D02 and D04.

2.11 How to make changes

Only Grantees are permitted to make permissive changes. Please contact us should the host integrator expect the module to be used differently than as granted:

Contact Email: info@agilsense.com

IMPORTANT NOTE: In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.