

# 4.9 GHz Wireless Broadband Interface Card

## Public Safety Band Transceiver Family

The FCC in the United States has allocated 50 MHz of licensed bandwidth in the 4.9-GHz frequency band for wireless broadband access for the public safety agencies to support mobile and fixed services. This licensed band enables the public safety organizations to create highly secure wireless IP networks between a remote workforce and headquarters. Improving communication through Broadband/IP applications empowers the remote workforce with information and tools that traditionally were accessible only from within the boundaries of an office building. Non-traditional public safety entities, such as utilities and commercial entities, and the Federal Government may enter into sharing arrangements with eligible traditional public safety entities to use the 4.9 GHz band in support of their missions regarding homeland security and protection of life and property. Many other countries (e.g. Japan and Australia) also have reserved this band for the exclusive use by the Public Safety Agencies.

## Target Applications

The 4.9 GHz band supports a wide variety of wireless broadband applications. The following types of uses have primary status:

- Wireless LANs for incident scene management (ad hoc mobile networks)
- Mesh networks
- Back-hauling for Wi-Fi hotspots
- Voice over IP (VoIP)
- Temporary fixed communications
- Permanent fixed point-to-point/multipoint links that deliver broadband service
- Permanent fixed point-to-point video surveillance
- Permanent fixed point-to-point/multipoint backhaul of broadband traffic originating from 700 MHz public safety broadband networks

Doodle Labs' family of 4.9 GHz Wireless Broadband Interface Cards allow System Integrators to rapidly develop the wireless routers that provide integrated, wireless WAN or LAN capabilities in the licensed band. These routers can provide public safety, homeland security, and transportation organizations with a mobile networking platform that extends the edge of the IP network out to mobile workforce in vehicles, trains, or airplanes. The wireless routers create a network in motion, enabling multiple devices in and around a vehicle to be connected to the main network as the vehicle roams between wireless WAN networks. Fully supports standards-based Mesh and Mobile IP applications for seamless roaming across different types of wireless networks and technologies

Designed in the compact miniPCI-Express form factor, the 4.9 GHz Broadband transceivers provide licensed, secure and fast communication. The 4.9 GHz transceivers are long range, up to 29 dBm RF power, FCC Part 90, IEEE 802.11y and 802.11n compliant radio Subsystems. They are developed specifically for applications needing very high throughput over long range in the rugged/outdoor environments.

## Key Features

- 4940~4990MHz operating band
- Compliant with FCC Docket #00-32 on 4.9 GHz ruling, Part 90
- Channel plans for USA and Japan
- AP, STA and Ad-hoc modes to implement Point to Point, Infrastructure Point to multi Point, and Mesh networks
- Highly linear PA provides low EVM signals for 64 QAM
- Up to 32 dBm of RF power helps to push downstream data at higher modulation rates
- Integrated LNA for best-in-class Rx sensitivity
- Single frequency transmit and Receive (TDD)
- Supports 5/10/20 MHz channels to maximize spectrum efficiency
- High selectivity band pass filters for increased noise immunity
- Modular architecture allows a variety of mounting and heat management possibilities.
- Loopback mode to assist FIPS AES certification
- Dynamic Link adaptation to optimize throughput depending on channel conditions
- Spatial Multiplexing for enhanced throughput
- Space Time Block Coding for enhanced robustness
- Beam forming for enhanced range and reception
- Supports spatial multiplexing, cyclic-delay diversity (CDD), low-density parity check (LDPC), maximal ratio combining (MRC)
- Small packet size (96 Bytes) in AES encryption at full packet rate
- Hardware NAT
- Frame aggregation, block ACK
- Support for IEEE 802.11 e, h, i, k, RO, v time stamp, and w standards

- WEP, TKIP, AES, and WAPI hardware encryption
- High resolution 8 bits spectral analysis
- Integrated Antenna Port protection > 20 KV
- Built with industrial-grade components. Reliable design for for both vehicular and outdoor environments. MMCX connectors, Electrical Stress protection, -40°C to +80°C operating environment

## Available Models

Doodle Labs offers various models to better fit the project requirements. Click on the below model numbers to get detailed datasheets.

Description	Model No.
Single stream, long range radio transceiver	NM-4965-1F

For other frequency bands, explore Doodle Labs' [complete family](#) of models optimized for different applications.

## Summary

OEM manufacturers can rely on Doodle Labs for expertise in designing their embedded wireless systems. We'll work with your development engineers to ensure rapid, seamless integration of our radio transceivers. It is our goal to have our customers go to market faster with better performing products at a lower overall cost.

Doodle Labs' Wireless Broadband Transceivers have been field proven in numerous demanding industrial and military applications. These best-in-class MIMO transceivers enable OEMs to incorporate world class wireless capabilities with minimum integration efforts and tremendous flexibility. By using Doodle Labs' field proven embedded radio transceivers, equipment developers can cut 6-12 months off of the design cycle by eliminating the laborious and difficult work of RF design, field characterization, regulatory compliance and certification approval. Please [contact us](#) with your project requirements and we will be happy to work with you.

### FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden. This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter.

This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module.

This exterior label can use wording such as the following:

"Contains Transmitter Module FCC ID:2AG87NM-4965-1F Or Contains FCC ID:2AG87NM-4965-1F"

when the module is installed inside another device, the user manual of this device must contain below warning statements;

1. 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.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.