



# NXP RoadLINK® SAF5400 V2X 802.11p Safety Modem

NXP® V2X technology enables carmakers to increase vehicle safety on the road today.

- ▶ NXP RoadLINK® SAF5400/V110 second-generation V2X solution supports global DSRC standards as defined in Europe, North America, Korea (5.9 GHz) and Japan (760 MHz). It provides high-performance ECDSA verification engine, MRC antenna diversity and remote antenna control (compensator). Developed according to ISO26262 standards, the SAF5400V/110B extends the second-generation chip family with ASIL-B support for safety-critical applications such as truck platooning.
- ▶ The SAF5300/SAF5400 transceiver with integrated software-defined radio processor provides a system solution for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) applications. It covers V2X applications all over the world with high-quality communication performance and an AEC-Q100 grade 2 qualification.
- ▶ The SAF5300/SAF5400 is available in a ball grid array (LFBGA249, 12 x 12 mm) package that occupies a small printed circuit board (PCB) real estate and is suitable for multilayered PCBs.
- ▶ The transceiver is an integrated RFCMOS chip combined with the baseband processor performing the digital (de) modulation (PHY) and medium access control (MAC) handling.

## FEATURES

- ▶ Global standard support: Compliant with IEEE 802.11p, IEEE 1609.4, ETSI EN 302663, ETSI EN 302571, ARIB T-109M
- ▶ Scalable solution for single- and dual-channel applications, including channel switching and true concurrent channel with MRC antenna diversity
- ▶ High transceiver quality based on software-defined algorithms
- ▶ ECDSA verification: 2000 messages/sec (Brainpool/NIST curves 256 bits)
- ▶ Configurable secure booting from host or from external serial flash
- ▶ Embedded RF transceiver calibration enabling faster end-of-line testing
- ▶ Interfaces included for RF and active antenna(Compensator) handling
- ▶ Integrated support for remote active antenna, compensator reference design available
- ▶ Diagnostics interfaces available to detect and provide status information (antenna diagnostics for example)
- ▶ Qualified in accordance with AEC-Q100 grade 2
- ▶ Host interface can be selected from SDIO, SPI, R(G)MII Ethernet.



## TARGET APPLICATIONS

The RoadLINK® SAF5300/SAF5400 chip targets V2V and V2I applications which require reliable communication even at high speeds or without line-of-sight visibility. SAF5300/5400 is targeted at the global market, with dedicated support for EU/US/JP/KOR markets.

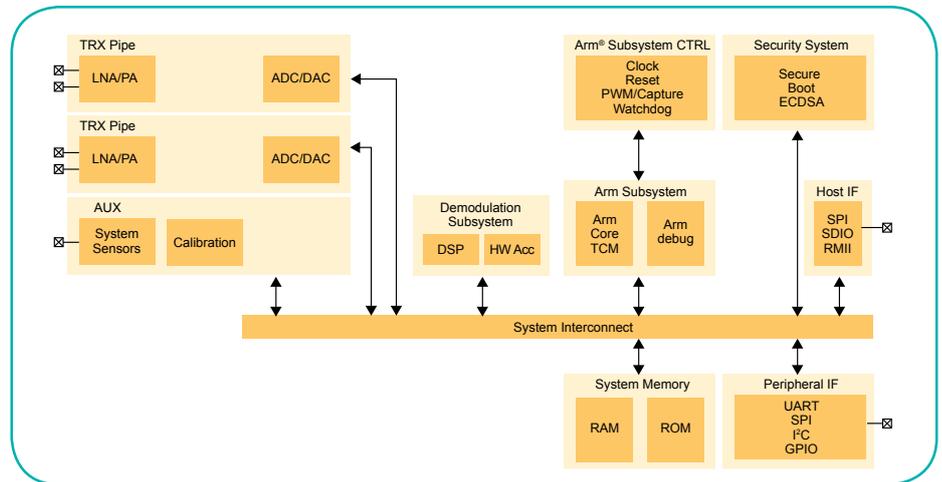
## DIFFERENT VARIANTS ARE AVAILABLE:

- ▶ SAF5400/V110: dual antenna, single channel
- ▶ SAF5400/V110B: dual antenna, single channel, ASIL-B
- ▶ Additional single antenna variants SAF5300V110/V110B available (pin/package/software compatible)

## PRODUCT SPECIFICATIONS

- ▶ Supported frequency band: 760 MHz and 5.850 to 5.925 MHz
- ▶ 10/20 MHz modulation BW
- ▶ 0 dBm linear OFDM transmit power
- ▶ 33 dB TX gain control
- ▶ 6 dB noise figure (5.9 GHz)
- ▶ 78 dB RX gain control
- ▶ RX gain settling time < 100 ns
- ▶ TX EVM at 5.9 GHz better than -32 dB
- ▶ Nominal reference frequency is 40 MHz
- ▶ 2000+ RX packets / second
- ▶ 100 Mbit/sec host interface
- ▶ Booting time 500 ms (in secure mode)
- ▶ 1.6 V analog supply
- ▶ 1.8 – 3.3 V I/O supply
- ▶ 1.2 V digital supply

## SAF5400 BLOCK DIAGRAM



The EVK is designed to fit small form factors to also allow for seamless integration into cars and roadside units.

## DEVELOPMENT TOOLS

- ▶ The latest RoadLINK® evaluation kit features second-generation V2X one-chip SAF5400 that can support two antennas for the 802.11p communication and a high-performance security engine to verify all messages received
- ▶ Two instances of the SAF5400 are included to support concurrent dual-channel communication with MRC diversity for safety.
- ▶ Includes the SXF1800 secure element for secure storage of keys and certificates as well for signing outgoing messages. NXP's i.MX 6UL application processor is integrated to run V2X stacks and applications.

## PARTNERS

NXP's V2X solutions provide a dedicated API on Logical Link Controller level. NXP provides a software stack agnostic V2X solution and is collaborating with all leading V2X software vendors.

[www.nxp.com/SAF5400](http://www.nxp.com/SAF5400)

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