

**Annex acc. to FCC Title 47 CFR Part 15  
relating to  
Hella KGaA Hueck & Co.  
RS4**

# **Annex no. 5 User Manual Functional Description**

**Title 47 - Telecommunication  
Part 15 - Radio Frequency Devices  
Subpart C – Intentional Radiators  
ANSI C63.4-2014  
ANSI C63.10-2013**



Deutsche  
Akkreditierungsstelle  
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## Technical Bulletin

Date: 2016-10-12

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Subject:

RS4 – Radar Sensor

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Ref.:

Enclosures:

# RS4 – Radar Sensor

## System Function and Purpose

The RS4 is an advanced driver assistant system, to warn the driver of the ego vehicle against potential collisions with other road users to the side and/or to the rear of the ego vehicle.

This system is not meant to encourage aggressive driving. The absence of a warning will not guarantee the absence of other road users. Responsibility for the safe operation of the vehicle remains with the driver.

## System Architecture

The system consists of two radar sensor units which are mounted behind the rear bumper in the left and right rear corners of a vehicle so that the rear and the sides of the vehicle can be observed. The two units interchange data between each other and the vehicle via the sensor CAN-bus. Both units incorporate an RF part and a microcontroller to perform the radar signal processing.

Each unit contains the following RF parts:

- one VCO,
- one transmitter (consisting of power amplifier and antenna)
- three receivers (each consisting of antenna, mixer, BPF and base-band amplifier).

The transmit signal is generated by the VCO.

The VCO is frequency modulated by a modulation control circuit and the DSP.

A frequency divider is read back the VCO frequency to the DSP and thus to keep it within the frequency band limits.

The transmit antenna is a microstrip patch antenna array with 1x8 elements.

It is designed to illuminate the rear and the side of the vehicle and is thus a medium gain antenna.

The receive antennas are also microstrip patch antennas with a medium gain (1x8 elements).

The receivers down-convert the receive signals directly to zero-IF by using the VCO signal.

The base-band receive signals are finally digitized by ADCs inside the DSP.

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| <br><b>Hella KGaA</b> Hueck & Co.<br>59552 Lippstadt | <b>Subject:</b><br><br>RS4 – Radar Sensor | Date: 2016-10-12 |
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## Technical Data

|                             |                         |
|-----------------------------|-------------------------|
| Supply voltage              | +9 V ... +16.5 V        |
| Supply current              | approx.. 0.22 A         |
| Frequency band 1            | 24050 MHz ... 24250 MHz |
| Modulation bandwidth        | < 200 MHz               |
| Modulation                  | FMCW                    |
| EIRP average                | < +12.7 dBmW            |
| EIRP peak                   | < +20 dBmW              |
| Antenna Type                | Microstrip patch array  |
| Transmit Antenna Gain       | approx.. 9 dBi          |
| Operating Temperature Range | -40°C ... 85°C          |

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